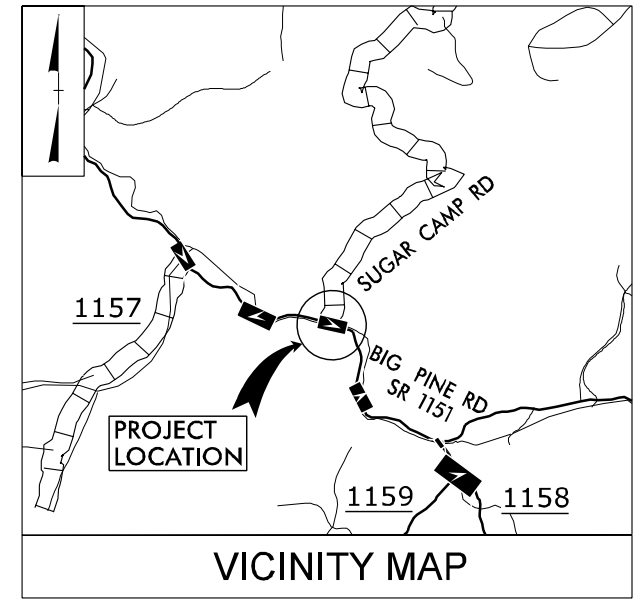


09/08/99

WBS: 17BP.13.R.183

CONTRACT: DM00340

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



100% PLAN SUBMITTAL

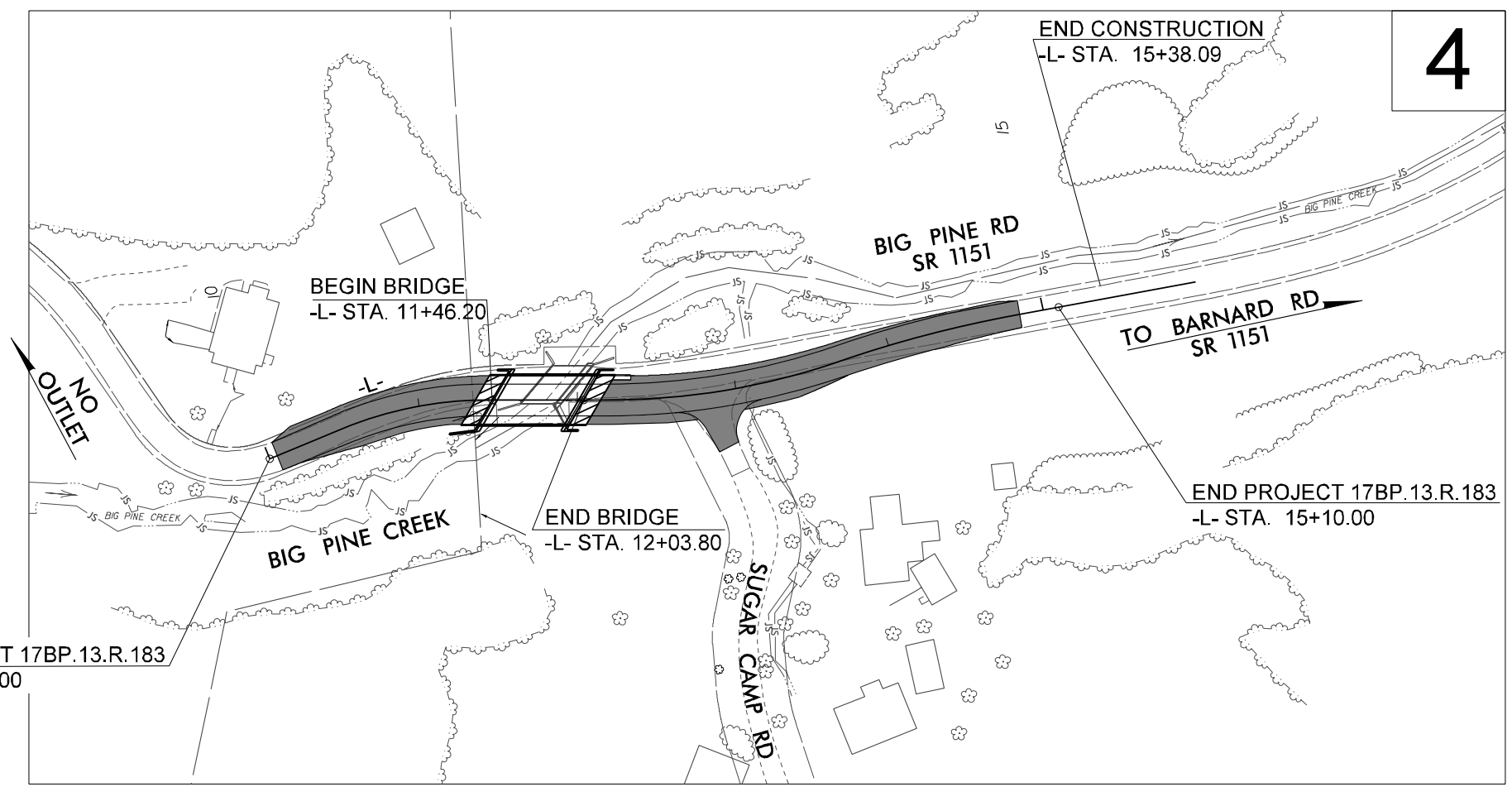
# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

## MADISON COUNTY

**LOCATION: REPLACE EXISTING BRIDGE NO.144  
OVER BIG PINE CREEK ON BIG PINE RD (SR 1151)**

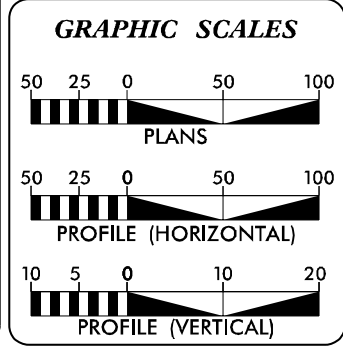
**TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURE**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.13.R.183	1	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
17BP.13.PE.183	N/A	PE	
17BP.13.ROW.183	N/A	ROW & UTILITY	
17BP.13.CONST.183	N/A	CONSTRUCTION	



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

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



**DESIGN DATA**

ADT 2011 = 470

V = 40 MPH  
SUB REGIONAL TIER

FUNC CLASS = MAJOR COLLECTOR

**PROJECT LENGTH**

LENGTH ROADWAY PROJECT 17BP.13.R.183	=	0.086 MI
LENGTH STRUCTURE PROJECT 17BP.13.R.183	=	0.011 MI
<b>TOTAL LENGTH PROJECT 17BP.13.R.183</b>	<b>=</b>	<b>0.097 MI</b>

Prepared in the Office of

WSP USA  
451 FAYETTEVILLE STREET  
SUITE 1800  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
FAX: 1.919.836.4099  
LICENSE NO. L-0165

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
SEPTEMBER 06, 2021

**LETTING DATE:**  
JUNE 21, 2023

**NCDOT CONTACT:** EDDIE DOUGLAS  
DIVISION BRIDGE PROGRAM MANAGER

**RONYELL THIGPEN, PE**  
PROJECT ENGINEER

**ERIC MISAK**  
PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

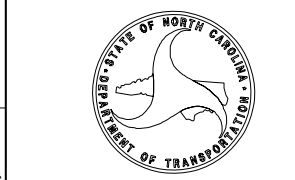
Seal: VIDYA MOHANDAS, ENGINEER, 043232, NORTH CAROLINA PROFESSIONAL ENGINEER

Signature: Vidya Mohandas, 4/5/2023

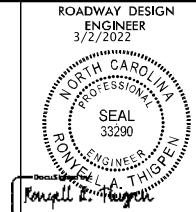
**ROADWAY DESIGN ENGINEER**

Seal: RONYELL A. THIGPEN, ENGINEER, 33290, NORTH CAROLINA PROFESSIONAL ENGINEER

Signature: Ronyell Thigpen, 4/5/2023



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4/5/2023



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

INDEX OF SHEETS:

SHEET NUMBER	SHEET DESCRIPTION
1	TITLE SHEET
1A	INDEX OF SHEETS
1B	CONVENTIONAL SYMBOLS
2A-1	PAVEMENT SCHEDULE, TYPICAL SECTIONS AND MILLING DETAIL
2C-1	GUARDRAIL ANCHOR UNIT, TYPE AT-1 DETAIL
2C-2	GUARDRAIL ANCHOR UNIT, TYPE III DETAIL
2C-3	STANDARD W-BEAM GUARDRAIL DETAIL
3B-1	GUARDRAIL SUMMARY, SUMMARY OF EARTHWORK AND PAVEMENT REMOVAL SUMMARY
3D-1	SUMMARY OF DRAINAGE
3G-1	SUMMARY OF GEOTECHNICAL
4	PLAN AND PROFILE SHEET
RW01 THRU RW04	SURVEY CONTROL AND RIGHT OF WAY SHEETS
TMP-1 THRU TMP-5	TRANSPORTATION MANAGEMENT PLANS
PMP-1	PAVEMENT MARKING PLANS
EC-1 THRU EC-6	EROSION CONTROL PLANS
RF-1	REFORESTATION PLANS
UO-1 THRU UO-2	UTILITIES BY OTHER PLANS
X-1A	CROSS-SECTIONS SUMMARY
X-1 THRU X-9	CROSS-SECTIONS
S-1 THRU S-26	STRUCTURE PLANS
SN	STANDARD NOTES

2018 ROADWAY ENGLISH STANDARD DRAWINGS

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

STD. NO.	TITLE
<b>DIVISION 2 - EARTHWORK</b>	
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
275.01	Rock Plating
<b>DIVISION 3 - PIPE CULVERTS</b>	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
<b>DIVISION 4 - MAJOR STRUCTURES</b>	
422.02	BRIDGE APPROACH FILLS - TYPE II MODIFIED APPROACH FILL
<b>DIVISION 5 - SUBGRADE, BASES AND SHOULDERS</b>	
560.01	METHOD OF SHOULDER CONSTRUCTION - HIGH SIDE OF SUPERELEVATED CURVE - METHOD I
<b>DIVISION 6 - ASPHALT BASES AND PAVEMENTS</b>	
654.01	Pavement Repairs
<b>DIVISION 8 - INCIDENTALS</b>	
815.02	Subsurface Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
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
840.66	Drainage Structure Steps
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
876.01	Rip Rap in Channels

GENERAL NOTES:

2018 SPECIFICATIONS  
EFFECTIVE: 01-16-18  
REVISED:

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.

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.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01.

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 FOR "TEMPORARY SHORING".

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:

POWER: FRENCH BROAD ELECTRIC COOP  
TELEPHONE: FRONTIER COMMUNICATIONS

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 WILL BE PLACED BY OTHERS.

# 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	○ EIP
Computed Property Corner	-----
Property Monument	EDM
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	☠ -W- ☠
Potential Contamination Area: Water	?? -W- ??
Contaminated Site: Known or Potential	☠ ??

## BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or UG Tank Cap	○
Sign	○
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	----- RW
New Right of Way Line with Pin and Cap	----- RW ▲
New Right of Way Line with Concrete or Granite RW Marker	----- RW ●
New Control of Access Line with Concrete CA Marker	----- CA
Existing Control of Access	----- CA
New Control of Access	----- CA
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	----- CR
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	----- Vineyard

## EXISTING STRUCTURES:

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

## UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	⊕
Power Line Tower	⊠
Power Transformer	⊠
UG Power Cable Hand Hole	-----
H-Frame Pole	●
UG Power Line LOS B (S.U.E.*)	----- P
UG Power Line LOS C (S.U.E.*)	----- P
UG Power Line LOS D (S.U.E.*)	----- P

## TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	⊕
Telephone Pedestal	⊠
Telephone Cell Tower	⊠
UG Telephone Cable Hand Hole	-----
UG Telephone Cable LOS B (S.U.E.*)	----- T
UG Telephone Cable LOS C (S.U.E.*)	----- T
UG Telephone Cable LOS D (S.U.E.*)	----- T
UG Telephone Conduit LOS B (S.U.E.*)	----- TC
UG Telephone Conduit LOS C (S.U.E.*)	----- TC
UG Telephone Conduit LOS D (S.U.E.*)	----- TC
UG Fiber Optics Cable LOS B (S.U.E.*)	----- T FO
UG Fiber Optics Cable LOS C (S.U.E.*)	----- T FO
UG Fiber Optics Cable LOS D (S.U.E.*)	----- T FO

## WATER:

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

## TV:

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

## GAS:

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

## SANITARY SEWER:

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

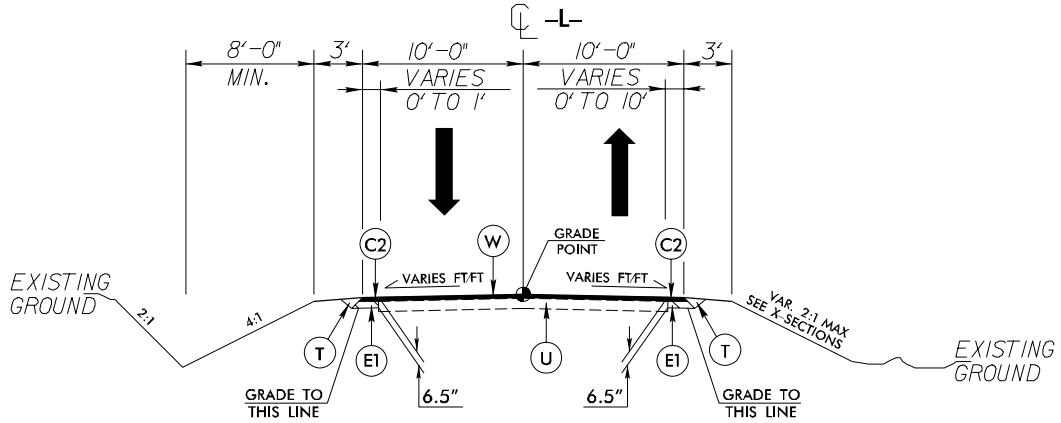
## MISCELLANEOUS:

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

8/17/99

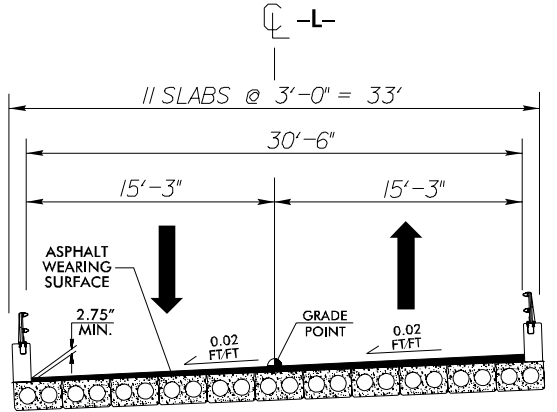
REVISIONS

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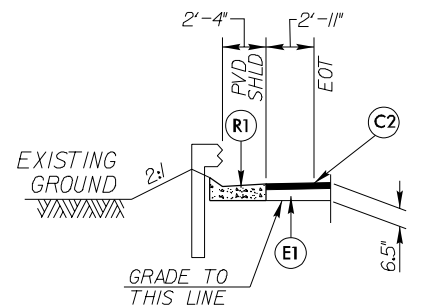
**TYPICAL SECTION NO. 1**

(USE IN CONJUNCTION WITH DETAIL A, B, C, D, E)  
 TRANSITION FROM EXISTING TO NO.1 -L- STA. 10+05.00 TO STA. 10+55.00  
 -L- STA. 10+55.00 TO STA. 11+46.20 (BEGIN BRIDGE)  
 -L- STA. 12+03.80 (END BRIDGE) TO STA. 14+35.00  
 TRANSITION FROM NO.1 TO EXISTING -L- STA. 14+35.00 TO STA. 14+85.00



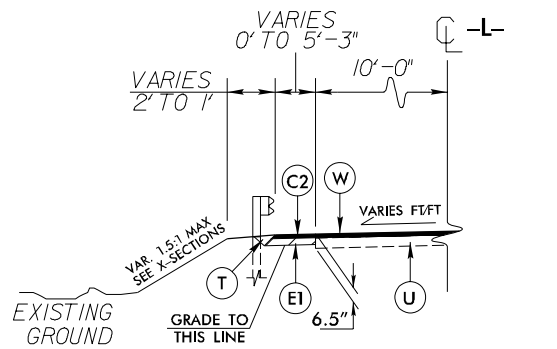
**TYPICAL SECTION NO. 2**

-L- STA. 11+46.20 TO STA. 12+03.80



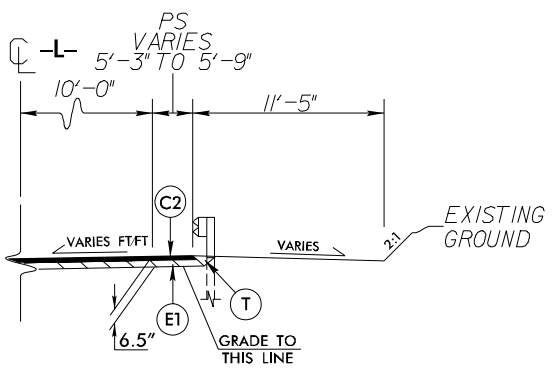
**DETAIL B**

**SHOULDER BERM GUTTER**  
 -L- STA. 12+22.37 TO 12+34.05 (LT)



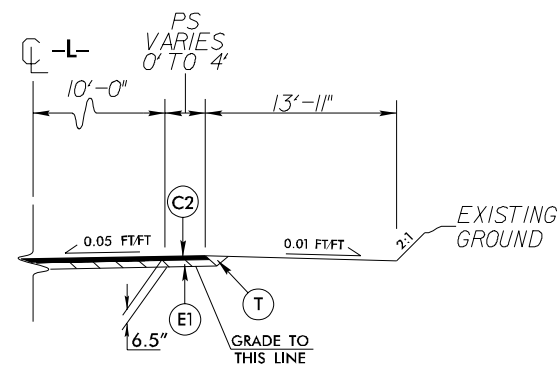
**DETAIL C**

**GUARDRAIL**  
 -L- STA. 12+10.87 TO 14+73.37 (LT)



**DETAIL D**

**SHOULDER**  
 -L- STA. 12+25.00 TO 12+60.81 (RT)

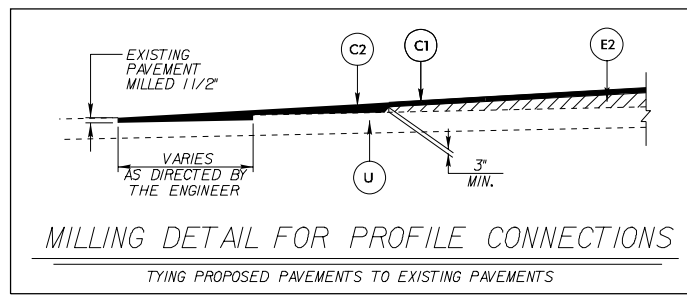


**DETAIL E**

**SHOULDER**  
 -L- STA. 13+14.51 TO 14+00.00 (RT)

**DETAIL A**

**GUARDRAIL**  
 -L- STA. 10+19.34 TO 11+56.84 (LT)  
 -L- STA. 10+57.73 TO 11+38.98 (RT)  
 -L- STA. 11+93.16 TO 12+55.66 (RT)

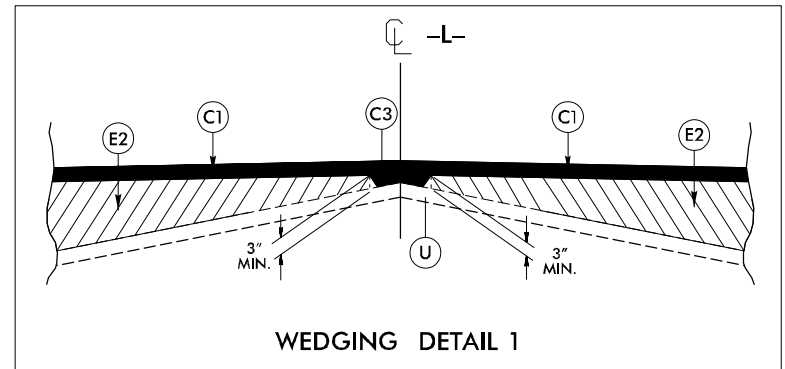


**MILLING DETAIL FOR PROFILE CONNECTIONS**  
 TYING PROPOSED PAVEMENTS TO EXISTING PAVEMENTS

**FINAL PAVEMENT SCHEDULE**

C1	PROP. APPROX. 1.25" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 137.50 LBS. PER SQ. YD.
C2	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 137.50 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1 1/2" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
R1	SHOULDER BERM GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	WEDGING (SEE DETAIL THIS SHEET).

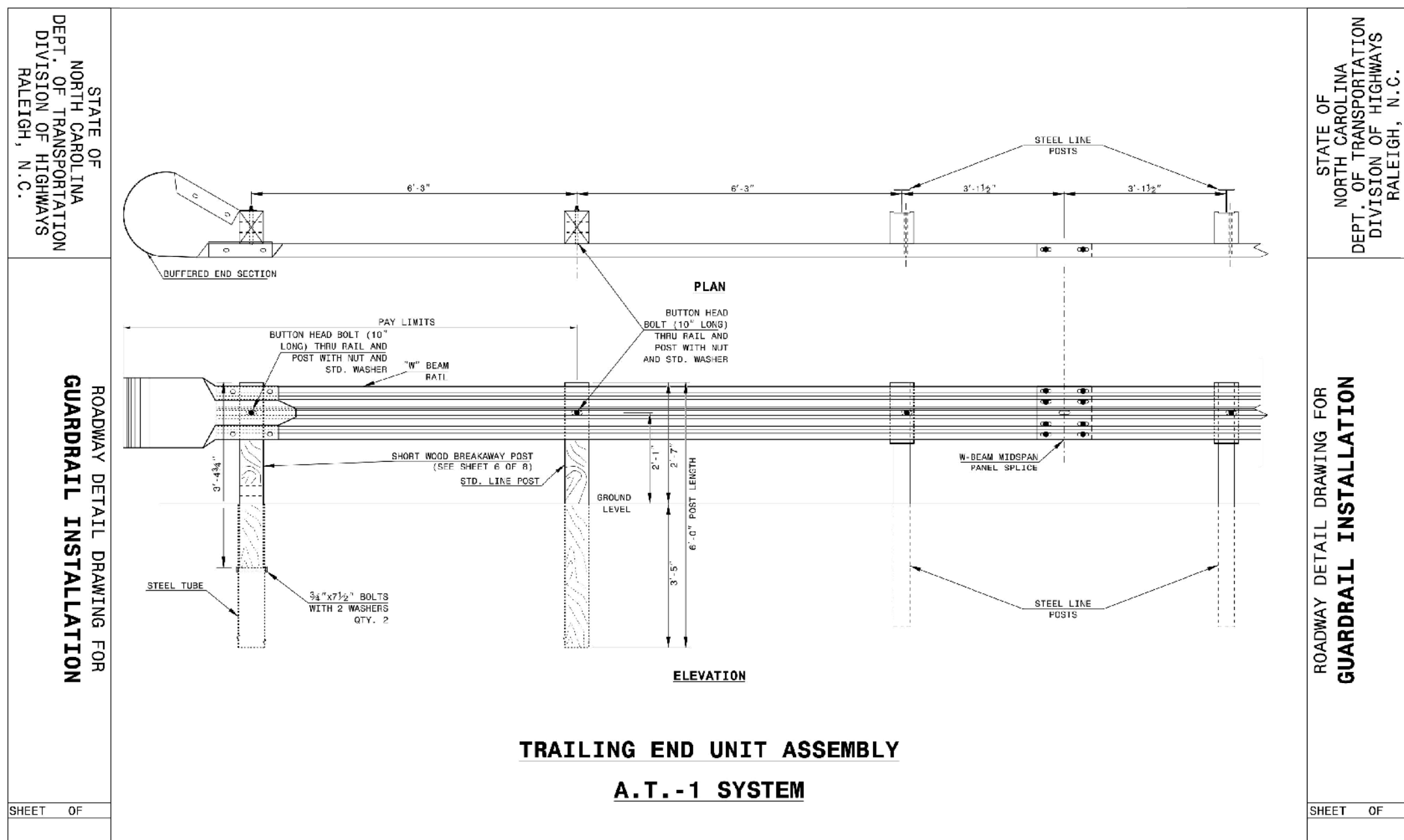
NOTES:  
 1. ALL SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.



**WEDGING DETAIL 1**

PROJECT REFERENCE NO. 17BP13.R.183	SHEET NO. 2A-1
RW SHEET NO.	PAVEMENT DESIGN ENGINEER 4/14/2023
ROADWAY DESIGN ENGINEER 4/14/2023	PAVEMENT DESIGN ENGINEER 4/14/2023
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	
PLANS PREPARED BY: 	
WSP USA 434 FAYETTEVILLE STREET SUITE 1500 RALEIGH, NC 27601 TEL: 1.919.836.1040 FAX: 1.919.836.4099 LICENSE NO. F-0165	





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

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET OF

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

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET OF



3/2/2022  
 Ron Davenport  
 DOCUMENT NOT VALID FOR FINAL  
 UNLESS ALL SIGNATURES COMPLETED

CONTRACTS STANDARDS AND DEVELOPMENT UNIT	
Office 919-707-6950	FAX 919-250-4119
<b>A.T.-1 SYSTEM</b>	
ORIGINAL BY: _____	DATE: _____
MODIFIED BY: _____	DATE: _____
CHECKED BY: _____	DATE: _____
FILE SPEC.: _____	

6/2/99

10:02:01 AM  
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12/20/2021

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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

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 1 1/2' IF CONCRETE BACKWALL IS NOT PRESENT.  
 -SHOULDER BEAM 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 3 FOR POST SECTIONS 1 THRU 9.

ELEVATION

PLAN VIEW

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

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 - SUB REGIONAL TIER

SHEET 2 OF 7 862D03

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 1 1/2' IF CONCRETE BACKWALL IS NOT PRESENT.  
 -SHOULDER BEAM 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 3 FOR POST SECTIONS 1 THRU 9.

ELEVATION

PLAN VIEW

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 - SUB REGIONAL TIER

SHEET 2 OF 7 862D03



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

**SEE TITLE BLOCK**

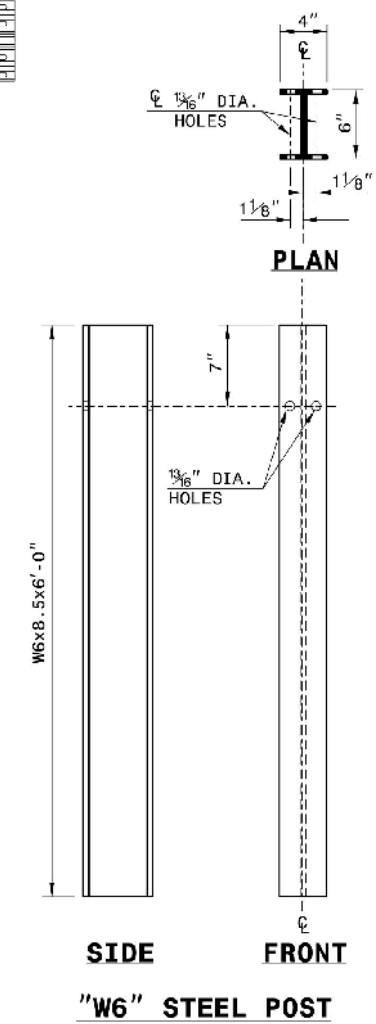
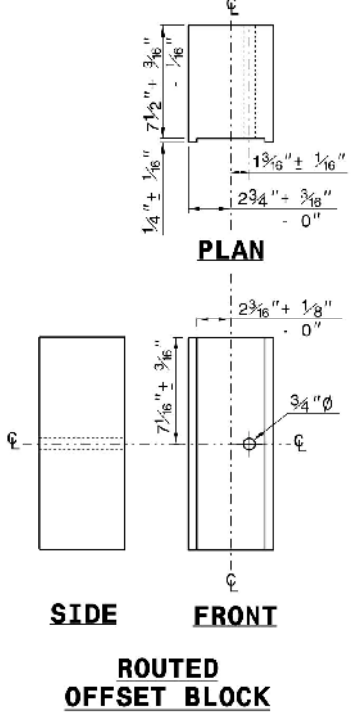
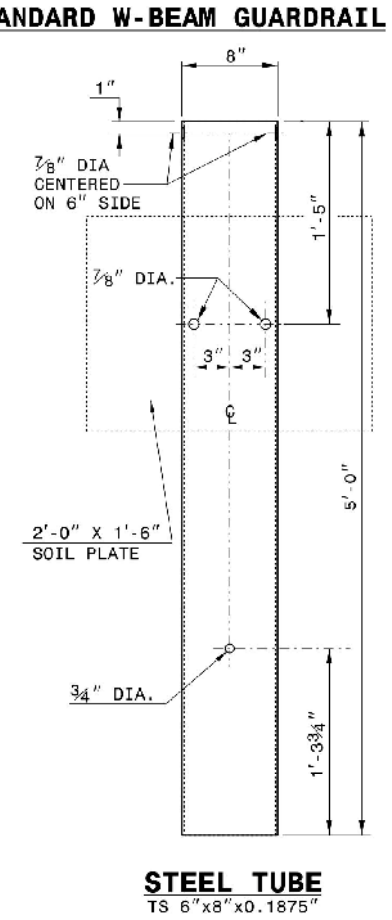
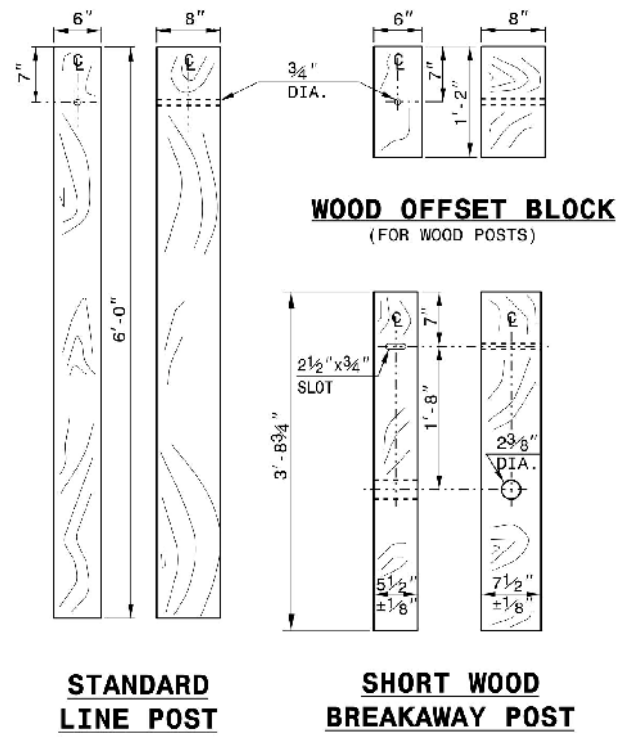
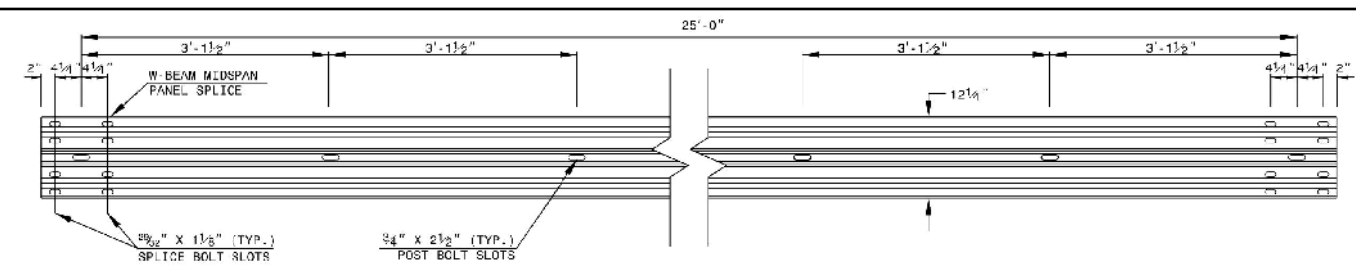
ORIGINAL BY: J. HOWERTON DATE: 06-22-12  
 MODIFIED BY: DATE: \_\_\_\_\_  
 CHECKED BY: DATE: \_\_\_\_\_  
 FILE SPEC: \_\_\_\_\_

PROJECT REFERENCE NO. SHEET NO.  
**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

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

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 6 OF 8  
**862D02**



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

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 6 OF 8  
**862D02**

**SYSTEM PARTS**



Designed by  
**Ron Davenport**  
 3/2/2022

**CONTRACTS STANDARDS AND DEVELOPMENT UNIT**  
 Office 919-707-8950 FAX 919-250-4119

**SEE TITLE BLOCK**

ORIGINAL BY: J. HOWERTON DATE: 3-7-2018  
 MODIFIED BY: DATE: \_\_\_\_\_  
 CHECKED BY: DATE: \_\_\_\_\_  
 FILE SPEC: \_\_\_\_\_

6/2/99

10:03:31 AM  
 17BP13.R183\_rdy-2C-3.dgn  
 2/20/2021

12/06/07

COMPUTED BY: DJO DATE: 3-9-2022  
 CHECKED BY: EM DATE: 3-9-2022

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

PROJECT REFERENCE NO. 17BP.13.R.183 SHEET NO. 3B-1

**WSP**  
 434 Fayetteville Street Suite 1500  
 Raleigh, NC 27601 - 919.836.4040  
 www.wspgroup.com  
 LICENSE NO. F-0891

**PAVEMENT REMOVAL SUMMARY**

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD'
L	10+65.70	11+83.22	LT	112.34
L	11+97.50	14+40.80	LT	245.62
L	12+70.67	12+84.20	RT	2.60
TOTAL:				360.56
SAY:				370

**SHOULDER BERM GUTTER SUMMARY**

SURVEY LINE	STATION	STATION	LENGTH
L	12+22.37	12+34.05	11.7
TOTAL:			11.7
SAY:			12

**SUMMARY OF EARTHWORK**

STATION	STATION	UNCL. EXCAV.	EMBANK. +%	BORROW	WASTE
10+00.00	11+46.20 (BRIDGE)	495	45		450
SUBTOTALS :		495	45		450
12+03.80 (BRIDGE)	15+10.00	693	29		664
SUBTOTALS :		693	29		664
PROJECT TOTALS:		1,188	74		1,113
MATERIAL FOR SHOULDER CONSTRUCTION			9	9	
WASTE IN LIEU OF BORROW				-9	-9
GRAND TOTALS:		1,188	83		1,104
SAY:		1,200			

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY WSP. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

EST. DDE = 40 CY  
 SHOULDER BORROW = 9 CY  
 EST. SHALLOW UNDERCUT (CONTINGENCY) = 100 CY  
 TOTAL SHALLOW UNDERCUT = 100 CY  
 CLASS IV SUBGRADE STABILIZATION (CONTINGENCY) = 200 TONS PER GEOTECH RECOMMENDATION, ESTIMATED 450 CY CUBIC YARDS OF UNDERCUT TO BE USED IN THE DISCRETION OF THE RESIDENT ENGINEER.

Approximate quantities only. Shoulder borrow, fine grading, clearing and grubbing, and removal of existing pavement will be paid for at the contract lump sum price for "Grading."

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL  
 TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.  
 FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.  
 W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.  
 G = GATING IMPACT ATTENUATOR TYPE 350  
 NG = NON-GATING IMPACT ATTENUATOR TYPE 350

**GUARDRAIL SUMMARY**

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL. WIDTH	FLARE LENGTH		W		ANCHORS							IMPACT ATTENUATOR TYPE 350			SINGLE FACED GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMOVE AND STOCKPILE EXISTING GUARDRAIL	REMARKS					
				STRAIGHT	STRONG POST CORRUGATED	SHOP CURVED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	XI	GREU TL-2	M-350	TYPE III	CAT-1	GR ATTEN.	B-77	AT-1	EA					G	NG			
L	10+18.84	11+56.84	LT	137.50'				10+18.84	5'-3"	8'-3"	25'	25'	0'-6"	0'-6"				1		1													
L	12+10.87	14+73.87	LT		262.50'		14+73.87		5'-3"	8'-3"	25'		0'-6"	0'-6"				1		1													
L	10+55.09	11+38.98	RT	81.25'			10+55.09		5'-3"	8'-3"	25'		0'-6"	0'-6"				1		1													
L	11+93.16	12+55.32	RT	62.50'			12+55.32		5'-3"	8'-3"	25'		0'-6"	0'-6"				1		1													
			SUBTOTAL	281.25'																													
			LESS DEDUCTIONS																														
			GREU TL-2 (4 x 25) =	75.00'	25.00'																												
			TYPE III (4 x 18.75) =	56.25'	18.75'																												
			SUBTOTAL	150'	218.75'																												
			TOTALS	150'	218.75'													4		4													
			SAY	150'	225'																												
TEMPORARY GUARDRAIL																																	
L	12+23 +/=-	12+66 +/=-	RT			37.50'	12+23 +/=-	0'	3'-0"																							TEMPORARY GUARDRAIL	
			LESS DEDUCTIONS																														
			GREU TL-2 (4 x 25) =																														
			TYPE III (4 x 18.75) =																														
			TOTALS	150'	218.75'																												
			SAY	150'	225'																												ADDITIONAL GUARDRAIL POSTS = 5 EA

17-BP-2023-14-41  
 17-BP-13.R.183-1-3B.dgn  
 WSP

COMPUTED BY: Jonathan T. May DATE: 01/21/2022  
CHECKED BY: Jon W. Becker DATE: 01/21/2022

PROJECT NO. SHEET NO.  
17BP.13.R.183 3D-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS

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

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

Table with columns for LINE & STATION, OFFSET, STRUCTURE NUMBER, TOP ELEVATION, INVERT ELEVATION, R.C. PIPE CLASS III, R.C. PIPE CLASS IV, ENDWALLS, REINFORCED ENDWALLS, DRAINAGE STRUCTURE, QUANTITIES FOR DRAINAGE STRUCTURES, FRAME, GRATES, AND HOOD, CONCRETE TRANSITIONAL SECTION, GRATE TYPE, PIPE REMOVAL, and REMARKS. Includes sub-totals for SHEET TOTALS and PROJECT TOTALS.

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



COMPUTED BY: DMM \_\_\_\_\_ DATE: 8/19/2019  
 CHECKED BY: JCK \_\_\_\_\_ DATE: 8/19/2019  
 UPDATED BY: SCC \_\_\_\_\_ DATE: 2/9/2022

(12-17-19)

PROJECT NO.	SHEET NO.
SF-560144 17BP.13.R.183 (B-5883)	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	200
				<b>TOTAL LF:</b>	200

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

**SUMMARY OF GEOTEXTILE FOR PAVEMENT STABILIZATION**

LINE	Station	Station	Geotextile for Pavement Stabilization SY	Class IV Subgrade Stabilization TONS
CONTINGENCY				
			<b>TOTAL SY/TONS:</b>	0 0*

\*Total tons of "Class IV Subgrade Stabilization" is only the estimated quantity for pavement stabilization and may only represent a portion of the subgrade stabilization quantity shown in the Item Sheets of the Proposal.

**SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION**

LINE	Station	Station	Aggregate Type* ASU(1/2)/AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY					100	200	700		
					<b>TOTAL CY/TONS/SY:</b>	100	200**	700**	0 0

\*ASU(1/2) = Aggregate Subgrade (Type 1 or 2)  
 \*AST = Aggregate Stabilization  
 \*\*Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Soil Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.

**SUMMARY OF ROCK PLATING**

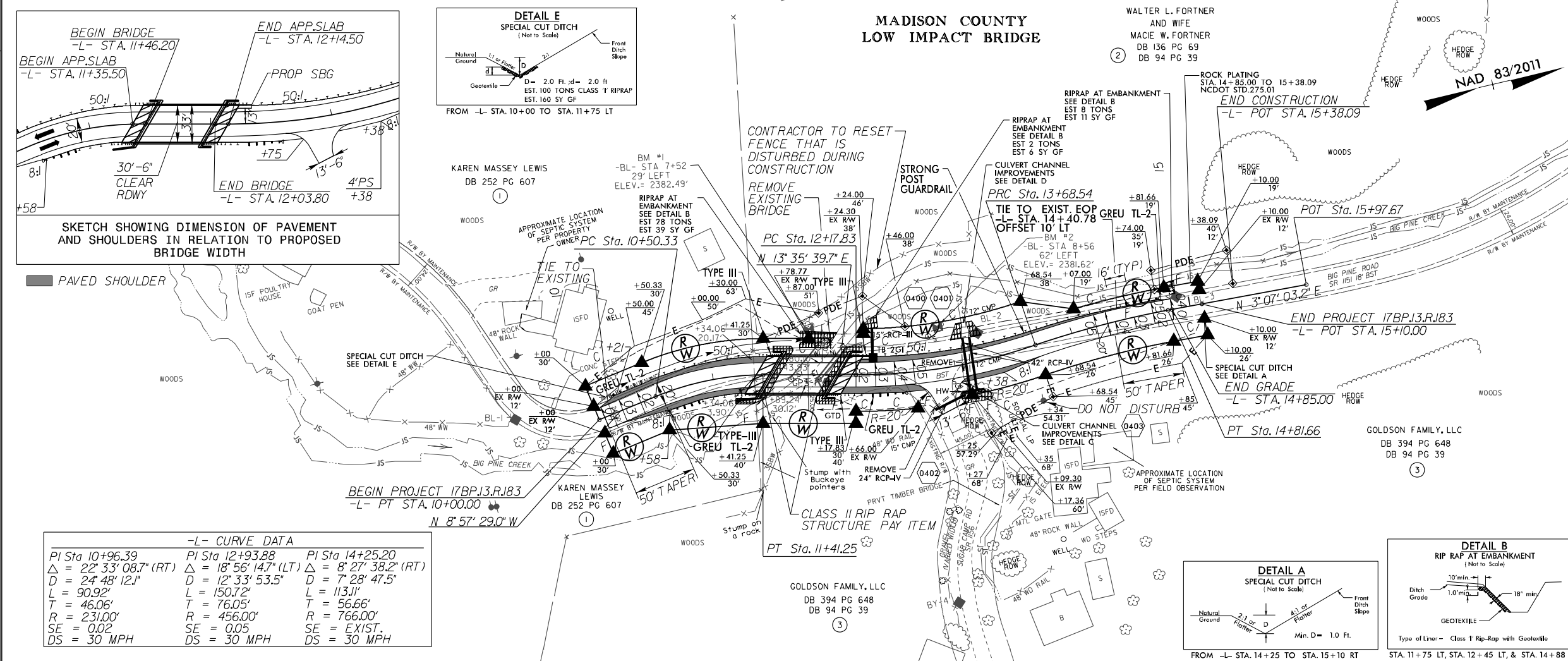
LINE	Beginning Slope (H:V)	Approx. Station	Ending Slope (H:V)	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* 1/2/B	Rock Plating SY
-L-	2:1	14+85	2:1	15+38.09	LT	1	2	200
							<b>TOTAL SY:</b>	200

\*Use Class 1, 2 or B riprap if riprap class is not shown for rock plating location.

# MADISON COUNTY LOW IMPACT BRIDGE

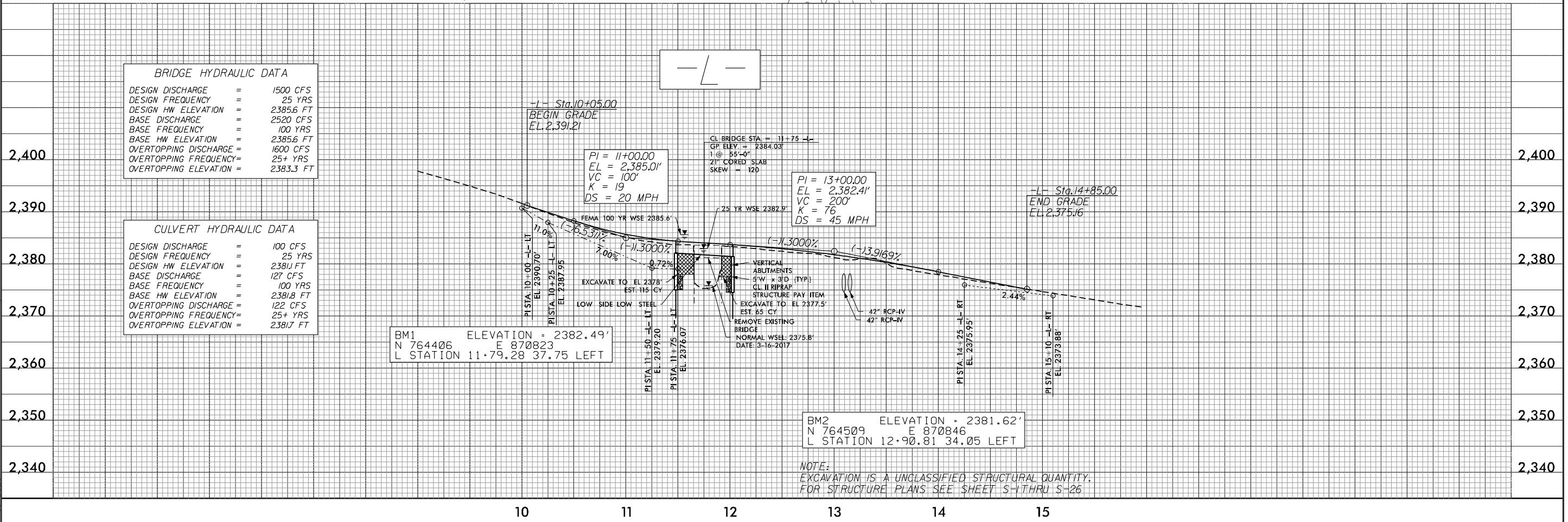
WALTER L. FORTNER  
AND WIFE  
MACIE W. FORTNER  
DB 136 PG 69  
DB 94 PG 39

PROJECT REFERENCE NO.	17BP13.R183	SHEET NO.	4
ROADWAY DESIGN	ENGINEER 4/14/2023	HYDRAULICS	ENGINEER 4/14/2023
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 33290		NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043232	
Kempell E. Thigpen		Vidya Mohandas	
DO NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
PLANS PREPARED BY:			
WSP USA		WSP USA	
434 FAYETTEVILLE STREET		434 FAYETTEVILLE STREET	
SUITE 1500		SUITE 1500	
RALEIGH, NC 27601		RALEIGH, NC 27601	
TEL: 1.919.836.4040		TEL: 1.919.836.4040	
FAX: 1.919.836.4099		FAX: 1.919.836.4099	
LICENSE NO. T-0165		LICENSE NO. T-0165	



**-L- CURVE DATA**

PI Sta 10+96.39	PI Sta 12+93.88	PI Sta 14+25.20
$\Delta = 22^\circ 33' 08.7" (RT)$	$\Delta = 18^\circ 56' 14.7" (LT)$	$\Delta = 8^\circ 27' 38.2" (RT)$
$D = 24^\circ 48' 12.1"$	$D = 12^\circ 33' 53.5"$	$D = 7^\circ 28' 47.5"$
$L = 90.92'$	$L = 150.72'$	$L = 113.11'$
$T = 46.06'$	$T = 76.05'$	$T = 56.66'$
$R = 231.00'$	$R = 456.00'$	$R = 766.00'$
$SE = 0.02$	$SE = 0.05$	$SE = EXIST.$
$DS = 30 MPH$	$DS = 30 MPH$	$DS = 30 MPH$



11/02/2022 PARCEL 1 - REVISED TEMPORARY CONSTRUCTION EASEMENT ON PARCEL 1.  
11/02/2022 PARCEL 3 - ADDED TEMPORARY CONSTRUCTION EASEMENT AROUND EXISTING UNDERGROUND PROPONE TANK.

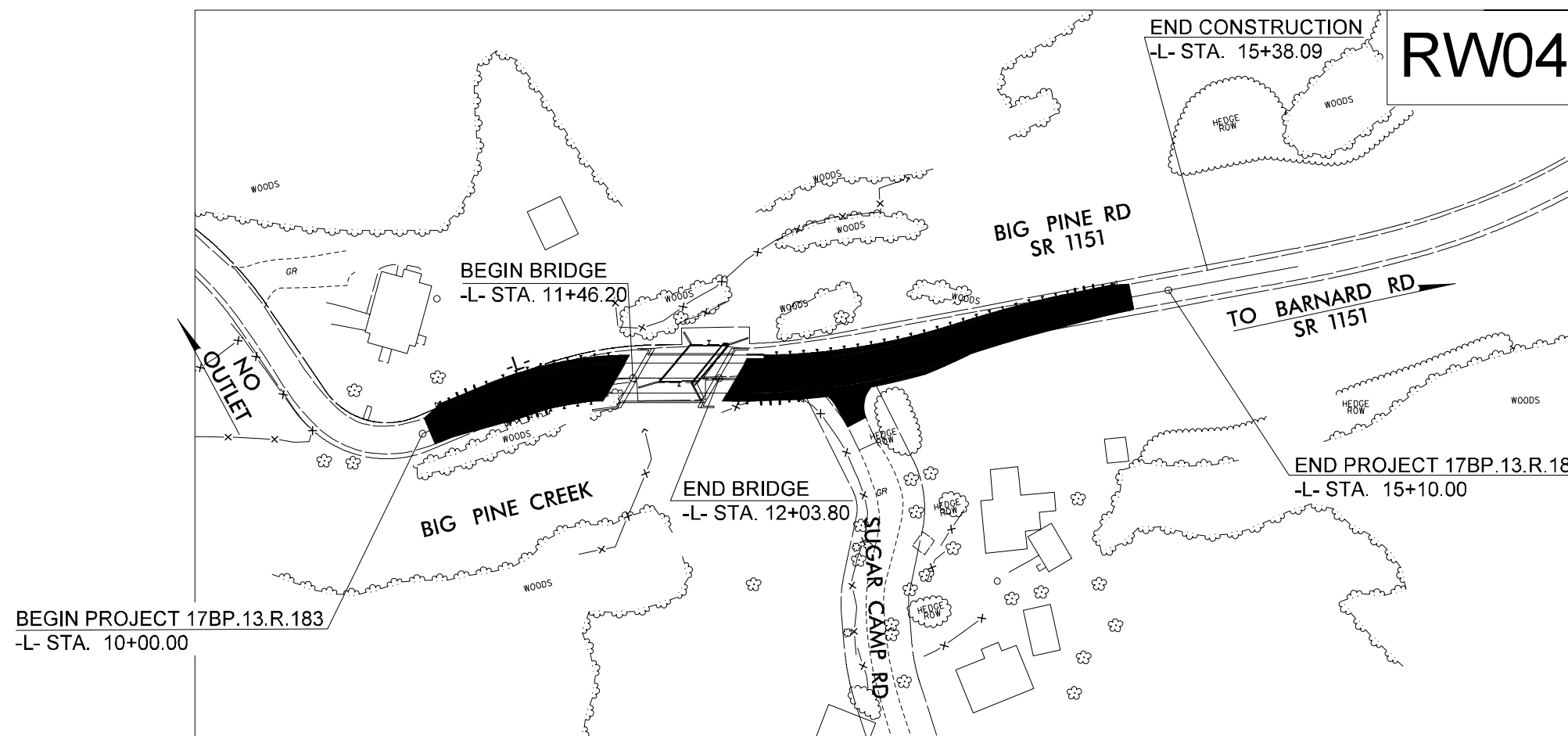
3/18/23 PM  
17BP13.R183\_PSH4.dgn  
4/14/2023

09/08/19

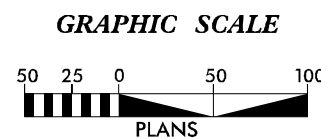
TIP PROJECT: 17BP.13.R.183

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.13.R.183	RW01	04

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS  
 SURVEY CONTROL, EXISTING CENTERLINES,  
 RIGHT OF WAY, EASEMENTS AND PROPERTY TIES  
**MADISON COUNTY**



\$\$\$\$\$ SYSTEM TIME \$\$\$\$\$\$  
 \$\$\$ DDN \$\$\$  
 \$\$\$ SERNAME \$\$\$



**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "GPS-1" WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF NORTHING: 764,410.686(ft) EASTING: 870868.904(ft) ELEVATION: 2382.59(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99980774 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS-1" TO -L- STATION 10+00.00 IS S 04-01'50" W 190.53'(ft) ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

Prepared In the Office of:

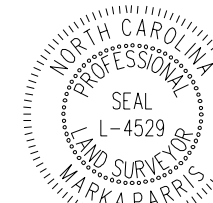
**V&M**  
**Vaughn & Melton**  
 1318-F Patton Avenue  
 Asheville, NC 28806  
 Firm License # F-1088

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
 09/06/2021

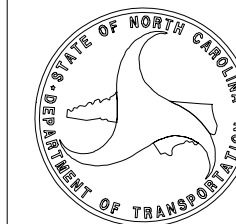
LETTING DATE:  
 06/01/2022

PROFESSIONAL LAND SURVEYOR




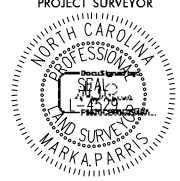
Signature: *Mark A. Parris*

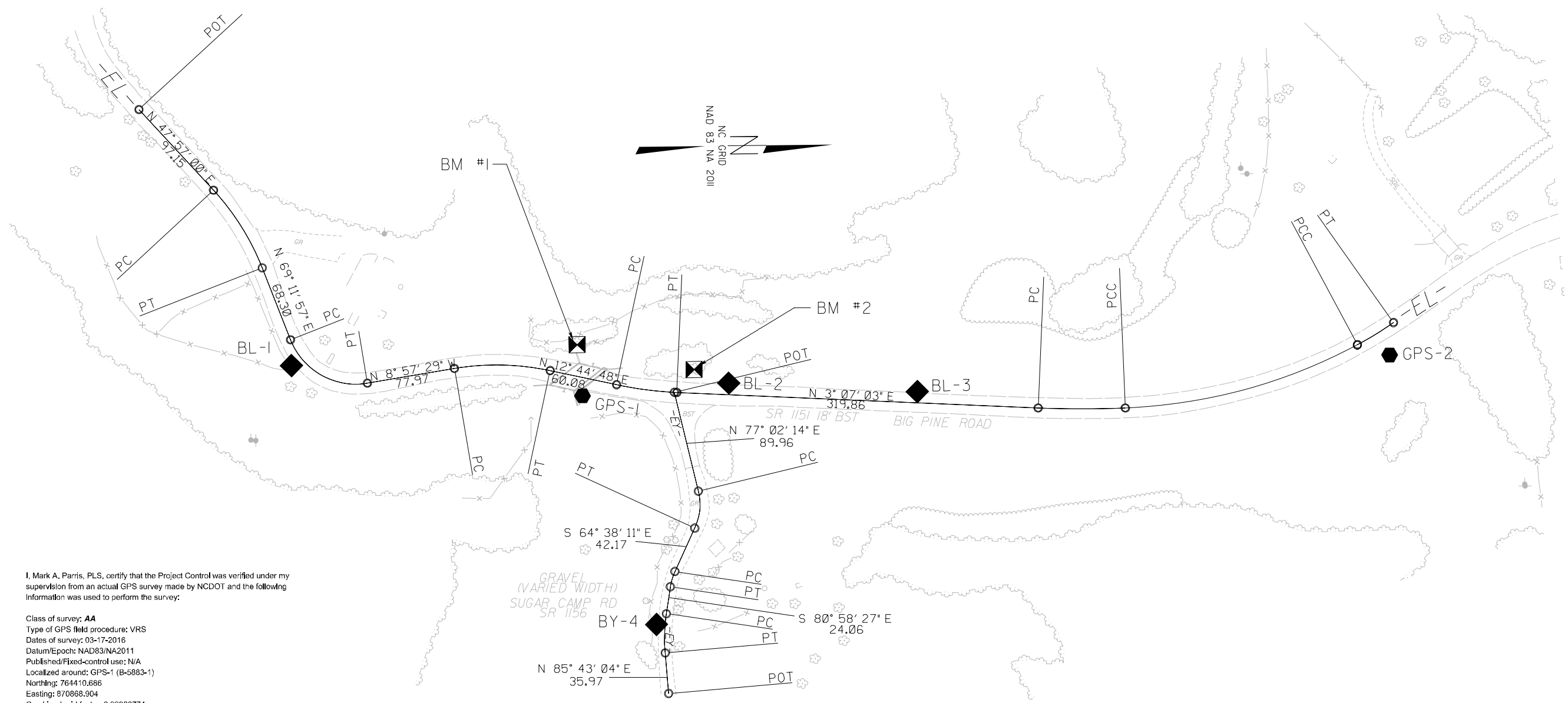
Date: 6/8/2022



# SURVEY CONTROL SHEET

W/EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO. 17BP.13.R.183	SHEET NO. RW02C-1
Location and Surveys	
	
PROJECT SURVEYOR	
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



I, Mark A. Parris, PLS, certify that the Project Control was verified under my supervision from an actual GPS survey made by NCDOT and the following information was used to perform the survey:

Class of survey: **AA**  
 Type of GPS field procedure: VRS  
 Dates of survey: 03-17-2016  
 Datum/Epoch: NAD83/NA2011  
 Published/Fixed-control use: N/A  
 Localized around: GPS-1 (B-5883-1)  
 Northing: 764410.686  
 Easting: 870868.904  
 Combined grid factor: 0.99980774  
 Geoid model: 12NC  
 Units: US SURVEY FEET

I also certify that the Baseline Control for this project was verified under my direct and responsible charge from an actual survey made by another firm; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed on 03/17/2016, and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 16 day of May, 2022.

  
 Professional Land Surveyor L-4529


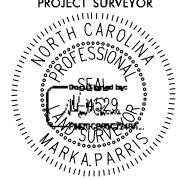
### NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

REVISIONS

# SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO. 17BP.13.R.183	SHEET NO. RW02C-2
Location and Surveys	
	
PROJECT SURVEYOR 	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

BL POINT	DESC.	NORTH	EAST	ELEVATION
1	BL-1	764153.5330	870839.1440	2396.26
2	BL-2	764540.1870	870859.0850	2380.14
3	BL-3	764706.8310	870868.5300	2374.32

BY POINT	DESC.	NORTH	EAST	ELEVATION
2	BL-2	764540.1870	870859.0850	2380.14
4	BY-4	764473.7910	871071.7850	2400.41

.....  
 BM1 ELEVATION = 2382.49  
 N 764406 E 870824  
 SPIKE SET IN BASE OF 32' DOUBLE POPLAR  
 .....


.....  
 BM2 ELEVATION = 2381.64  
 N 764510 E 870847  
 SPIKE SET IN BASE OF 22' TULIP POPLAR  
 .....

I, Mark A. Parris, PLS, certify that the Project Control was verified under my supervision from an actual GPS survey made by NCDOT and the following information was used to perform the survey:

Class of survey: **AA**  
 Type of GPS field procedure: VRS  
 Dates of survey: 03-17-2016  
 Datum/Epoch: NAD83/NA2011  
 Published/Fixed-control use: N/A  
 Localized around: GPS-1 (B-5883-1)  
 Northing: 764410.688  
 Easting: 870868.904  
 Combined grid factor: 0.99980774  
 Geoid model: 12NC  
 Units: US SURVEY FEET

I also certify that the Baseline Control for this project was verified under my direct and responsible charge from an actual survey made by another firm; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed on 03/17/2016, and all coordinates are based on NAD 83/2011 and all elevations are based on NAVD 88; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

This 16 day of May, 2022.

  
 Professional Land Surveyor L-4529

EL POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	764021.396	870611.076							
LINE			N 47°57'00.3" E	97.15					
PC	764086.463	870683.214							
CURVE			N 58°34'28.6" E	81.12	21°14'56.8"(RT)	26°02'36.7"	81.59	41.27	220.00
PT	764128.760	870752.439							
LINE			N 69°11'57.0" E	68.30					
PC	764153.014	870816.285							
CURVE			N 30°07'14.0" E	78.17	78°09'26.0"(LT)	92°24'45.2"	84.57	50.35	62.00
PT	764220.627	870855.512							
LINE			N 08°57'29.0" W	77.97					
PC	764297.646	870843.371							
CURVE			N 01°53'39.6" E	84.73	21°42'17.2"(RT)	25°27'53.2"	85.23	43.13	225.00
PT	764382.326	870846.172							
LINE			N 12°44'48.2" E	60.08					
PC	764440.929	870859.429							
CURVE			N 07°55'55.7" E	53.72	09°37'45.1"(LT)	17°54'17.8"	53.78	26.95	320.00
PT	764494.131	870866.842							
LINE			N 03°07'03.2" E	319.86					
PC	764813.514	870884.237							
CURVE			N 00°41'37.8" E	77.06	04°50'50.6"(LT)	06°17'18.7"	77.08	38.56	911.12
PCC	764890.569	870885.170							
CURVE			N 14°33'48.6" W	212.70	25°40'02.3"(LT)	11°57'59.6"	214.49	109.08	478.00
PCC	765096.437	870831.685							
CURVE			N 30°58'39.3" W	37.47	07°09'39.1"(LT)	19°05'54.9"	37.49	18.77	300.00
PT	765128.563	870812.399							



EY POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
POT	764492.004	870866.719							
LINE			N 77°02'14.0" E	89.96					
PC	764512.183	870954.384							
CURVE			S 83°47'58.7" E	32.83	38°19'34.7"(RT)	114°35'29.6"	33.45	17.38	50.00
PT	764508.638	870987.018							
LINE			S 64°38'11.4" E	42.17					
PC	764490.572	871025.126							
CURVE			S 72°48'19.1" E	14.21	16°20'15.4"(LT)	114°35'29.6"	14.26	7.18	50.00
PT	764486.372	871038.700							
LINE			S 80°58'26.8" E	24.06					
PC	764482.597	871062.461							
CURVE			S 87°37'41.4" E	34.76	13°18'29.1"(LT)	38°11'49.9"	34.84	17.50	150.00
PT	764481.159	871097.194							
LINE			N 85°43'04.1" E	35.97					
POT	764483.845	871133.063							

### NOTES:

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
2. THE SURVEY CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.



# PROPOSED ALIGNMENT CONTROL SHEET

PROJECT REFERENCE NO. 17BP.13.R.183	SHEET NO. RW02D-1
<b>Location and Surveys</b>	
 Vaughn & Melton 1318-F Patton Avenue Asheville, NC 28906 Firm License # F-1088	
PROJECT SURVEYOR 	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



REVISIONS

		L	
TYPE	STATION	NORTH	EAST
POT	10+00.00	764220.6274	870855.5116
PC	10+50.33	764270.3408	870847.6751
PT	11+41.25	764360.6058	870851.3292
PC	12+17.83	764435.0355	870869.3279
PRC	13+68.54	764584.6789	870880.1218
PT	14+81.66	764697.6666	870877.9271
POT	15+97.67	764813.5138	870884.2368

**NOTES:**

1. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
2. THE PROPOSED ALIGNMENT CONTROL DATA FOR THIS PROJECT HAS BEEN COMPILED FROM VARIOUS SOURCES. IF FURTHER INFORMATINO REGARDING PROJECT CONTROL IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

# RIGHT OF WAY CONTROL SHEET

PROJECT REFERENCE NO. 17BP.13.R.183	SHEET NO. RW03E-1
Location and Surveys	
 <p style="font-size: 8px;">1316-F Patton Avenue Asheville, NC 28906 Firm License # F-1988</p>	
PROJECT SURVEYOR	
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	


### ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	10+00.00	-30.00	764215.9561	870825.8775
L	10+00.00	30.00	764225.2988	870885.1457
L	10+00.00	-12.00	764218.7589	870843.6580
L	10+00.00	12.00	764222.4960	870867.3652
L	10+50.33	-30.00	764265.6695	870818.0410
L	10+50.33	30.00	764275.0122	870877.3092
L	11+41.25	-30.00	764367.6572	870822.1697
L	11+41.25	40.00	764351.2040	870890.2085
L	11+78.77	-30.00	764404.1222	870830.9876
L	12+17.83	30.00	764427.9841	870898.4874
L	12+17.83	40.00	764425.6336	870908.2072
L	12+24.30	-34.00	764448.8594	870837.6470
L	12+24.31	-38.00	764449.7557	870833.7487
L	12+65.97	30.02	764478.3990	870907.9181
L	13+09.30	26.00	764524.5438	870907.7790
L	13+68.54	26.00	764587.1000	870906.0088
L	13+68.54	-38.00	764581.1404	870842.2869
L	14+07.00	-19.00	764622.2236	870858.5208
L	14+81.66	-19.00	764698.6999	870858.9552
L	14+81.66	26.00	764696.2526	870903.8886
L	15+10.00	-19.00	764727.0019	870860.4967
L	15+10.00	-12.00	764726.6212	870867.4864
L	15+10.00	26.00	764724.5546	870905.4301
L	15+10.05	12.00	764725.3625	870891.4534

### ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
L	11+87.00	-51.00	764417.0595	870812.5109
L	12+24.00	-65.00	764455.4666	870807.3581
L	12+62.00	-38.00	764483.7239	870839.9903
L	13+17.36	60.00	764532.4173	870942.0100
L	13+68.54	45.00	764588.8693	870924.9264
L	14+74.00	-35.00	764691.5740	870842.5835
L	14+74.00	-19.00	764690.8636	870858.5677
L	15+38.09	-40.00	764756.1924	870841.0555
L	15+38.09	-12.00	764754.6697	870869.0140

I, Mark A. Parris, certify that the right of way and permanent easement monumentation for this project shown herein was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:10,000 (Class A). Field work was performed from 05/10/2022 to 05/11/2022, and all coordinates are based on NAD83/2011; that this survey was performed to meet the requirements of 21NCAC 56.1600 as applicable.

The date of May, 2022.  
  
 Mark A. Parris, Professional Surveyor L-4529

**NOTES:**

1. IF FURTHER INFORMATION REGARDING PROJECT CONTROL IS NEEDED PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
2. PROJECT CONTROL WAS ESTABLISHED USING GNSS, THE GLOBAL NAVIGATION SATELLITE SYSTEM.
3. RIGHT OF WAY MONUMENTATION ESTABLISHED 05/10/2022 TO 05/11/2022 .

REVISIONS

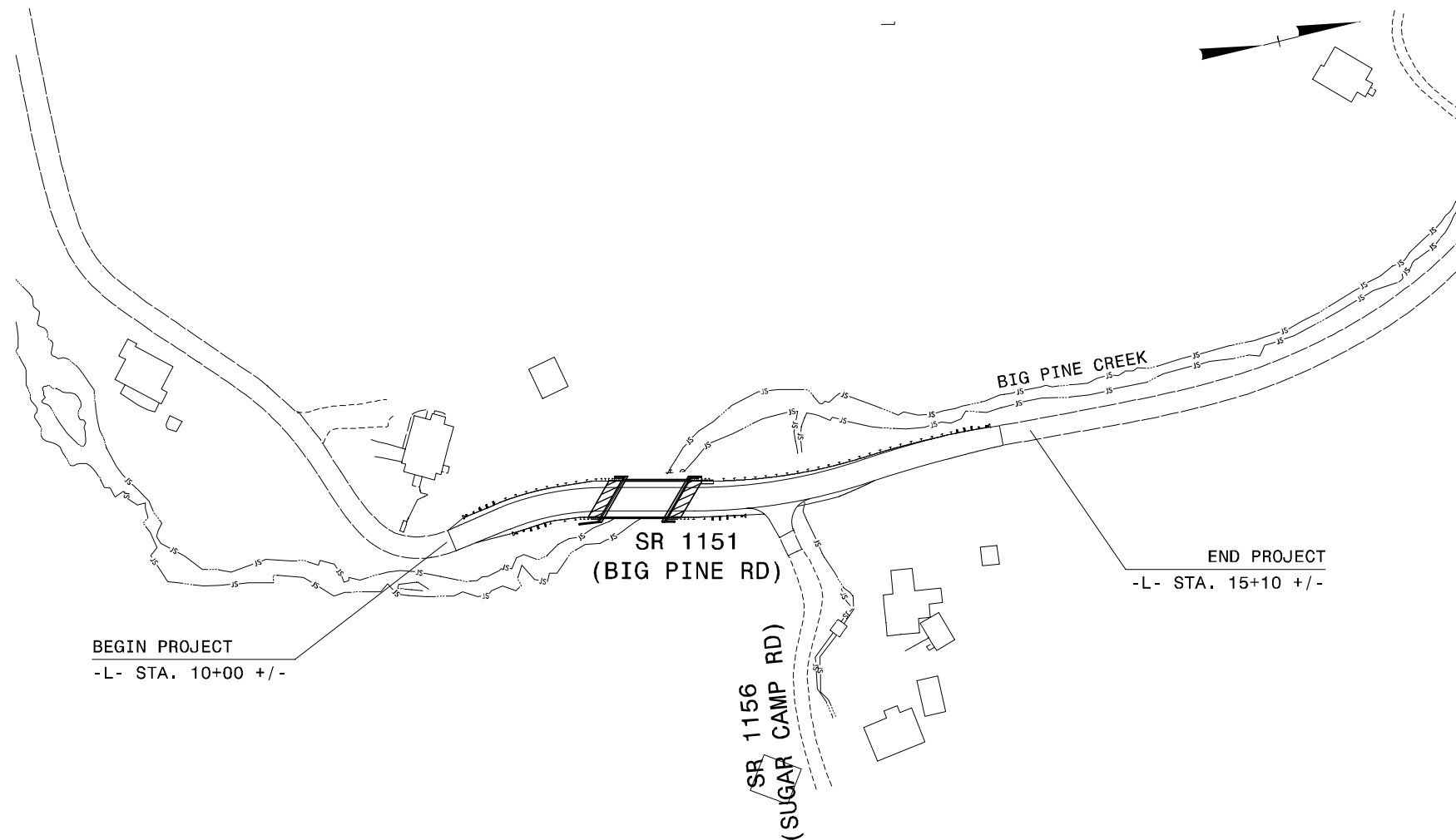
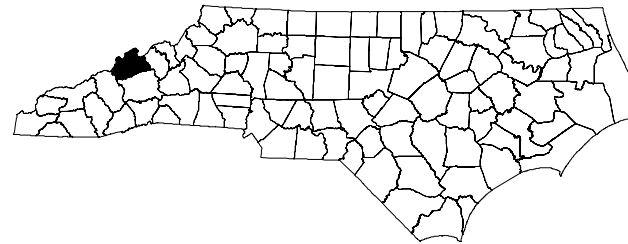
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STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**TRANSPORTATION MANAGEMENT PLAN**

**MADISON COUNTY**

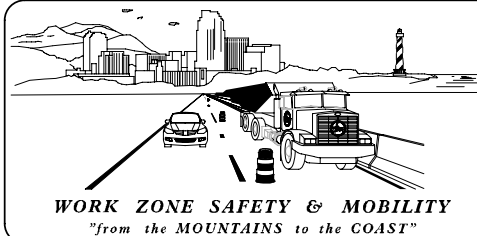


**INDEX OF SHEETS**

SHEET NO.	TITLE
TMP-01	TITLE SHEET, VICINITY MAP AND INDEX OF SHEETS
TMP-02	ROADWAY STANDARD DRAWINGS AND LEGEND
TMP-03	GENERAL NOTES AND WRITTEN PHASING
TMP-04	TEMPORARY TRAFFIC CONTROL PHASE I
TMP-05	TEMPORARY TRAFFIC CONTROL PHASE II

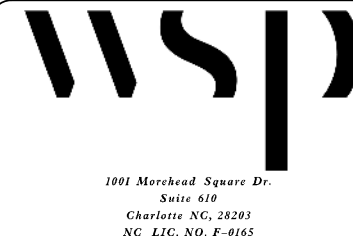
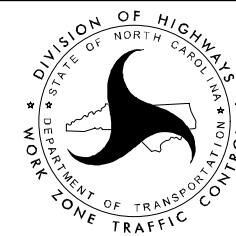
SHEET NO.  
TMP-01

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



**N.C.D.O.T. WORK ZONE TRAFFIC CONTROL**  
1561 MAIL SERVICE CENTER (MSC) RALEIGH, NC 27699-1561  
750 N. GREENFIELD PARKWAY, GARNER, NC 27529 (DELIVERY)  
PHONE: (919) 814-5000 FAX: (919) 771-2745

- \_\_\_\_\_ STATE TRAFFIC MANAGEMENT ENGINEER
- \_\_\_\_\_ TRAFFIC CONTROL PROJECT ENGINEER
- \_\_\_\_\_ TRAFFIC CONTROL PROJECT DESIGN ENGINEER
- \_\_\_\_\_ TRAFFIC CONTROL DESIGN ENGINEER



APPROVED: \_\_\_\_\_  
DATE: 2/22/2022

Richard E. Adamski  
REGISTERED PROFESSIONAL ENGINEER



**PROJECT: 17BP.13.R.183**






# ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS SHOWN IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

<u>STD. NO.</u>	<u>TITLE</u>
1101.01	WORK ZONE ADVANCE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.01	STATIONARY WORK ZONE SIGNS
1110.02	PORTABLE WORK ZONE SIGNS
1130.01	DRUM
1135.01	CONES
1145.01	BARRICADES - TYPE III
1150.01	FLAGGING DEVICES
1170.01	POSITIVE PROTECTION
1180.01	SKINNY-DRUM
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - TWO-LANE AND MULTI-LANE ROADWAYS
1261.01	GUARDRAIL AND BARRIER DELINEATOR SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATOR TYPES
1262.01	GUARDRAIL END DELINEATION

# LEGEND

## GENERAL











-  DIRECTION OF TRAFFIC FLOW
-  DIRECTION OF PEDESTRIAN TRAFFIC FLOW
-  EXIST. PVMT.
-  NORTH ARROW
-  PROPOSED PVMT.

 WORK AREA




## TEMPORARY PAVEMENT MARKING

- PAINT (4")
- PA WHITE SOLID EDGE LINE
- PAINT (24")
- P2 WHITE SOLID STOP BAR

## TRAFFIC CONTROL DEVICES


-  BARRICADE (TYPE III)
-  CONE
-  DRUM  SKINNY DRUM
-  TEMPORARY CRASH CUSHION
-  FLASHING ARROW BOARD
-  FLAGGER
-  LAW ENFORCEMENT
-  TRUCK MOUNTED ATTENUATOR (TMA)
-  CHANGEABLE MESSAGE SIGN

## TEMPORARY SIGNING

-  PORTABLE SIGN
-  STATIONARY SIGN
-  STATIONARY OR PORTABLE SIGN

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION



APPROVED:	DATE:
	2/22/2022

TRANSPORTATION  
MANAGEMENT PLAN  
ROADWAY STANDARD  
DRAWINGS & LEGEND



### GENERAL NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRED OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.  
 THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

#### LANE AND SHOULDER CLOSURE REQUIREMENTS

- A) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.
- B) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.
- C) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.  
  
 WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO A DIVIDED FACILITY AND WITHIN 10 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.
- D) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN A LANE OF TRAVEL OF AN UNDIVIDED OR DIVIDED FACILITY, CLOSE THE LANE ACCORDING TO THE TRAFFIC CONTROL PLANS, ROADWAY STANDARD DRAWINGS, OR AS DIRECTED BY THE ENGINEER. CONDUCT THE WORK SO THAT ALL PERSONNEL AND/OR EQUIPMENT REMAIN WITHIN THE CLOSED TRAVEL LANE.
- E) DO NOT WORK SIMULTANEOUSLY WITHIN 15 FT ON BOTH SIDES OF AN OPEN TRAVELWAY, RAMP, OR LOOP WITHIN THE SAME LOCATION UNLESS PROTECTED WITH GUARDRAIL OR BARRIER.
- F) CONTRACTOR SHALL PROVIDE ACCESS TO ALL RESIDENCES AT ALL TIMES. COORDINATE WITH PROPERTY OWNERS DURING CONSTRUCTION ACTIVITIES IMPACTING DRIVEWAYS.

#### PAVEMENT EDGE DROP OFF REQUIREMENTS

- G) BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF EXISTING PAVEMENT IN AREAS ADJACENT TO AN OPENED TRAVEL LANE THAT HAS AN EDGE OF PAVEMENT DROP-OFF AS FOLLOWS:  
  
 BACKFILL DROP-OFFS THAT EXCEED 2 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS OF 45 MPH OR GREATER.  
  
 BACKFILL DROP-OFFS THAT EXCEED 3 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS LESS THAN 45 MPH.  
  
 BACKFILL WITH SUITABLE COMPACTED MATERIAL, AS APPROVED BY THE ENGINEER, AT NO EXPENSE TO THE DEPARTMENT.
- H) DO NOT EXCEED A DIFFERENCE OF 2 INCHES IN ELEVATION BETWEEN OPEN LANES OF TRAFFIC FOR NOMINAL LIFTS OF 1.5 INCHES. INSTALL ADVANCE WARNING "UNEVEN LANES" SIGNS (W8-11) 500 FT IN ADVANCE AND A MINIMUM OF EVERY HALF MILE THROUGHOUT THE UNEVEN AREA.

#### TRAFFIC PATTERN ALTERATIONS

- I) NOTIFY THE ENGINEER TWENTY ONE (21) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

#### SIGNING

- J) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.

- K) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.

#### TRAFFIC BARRIER

- L) INSTALL TEMPORARY BARRIER ACCORDING TO THE TRANSPORTATION MANAGEMENT PLANS A MAXIMUM OF TWO (2) WEEKS PRIOR TO BEGINNING WORK IN ANY LOCATION. ONCE TEMPORARY BARRIER IS INSTALLED AT ANY LOCATION PROCEED IN A CONTINUOUS MANNER TO COMPLETE THE PROPOSED WORK IN THAT LOCATION UNLESS OTHERWISE STATED IN THE TRANSPORTATION MANAGEMENT PLANS OR AS DIRECTED BY THE ENGINEER.

DO NOT PLACE BARRIER DIRECTLY ON ANY SURFACE OTHER THAN ASPHALT OR CONCRETE.

ONCE TEMPORARY BARRIER IS INSTALLED AT ANY LOCATION AND NO WORK IS PERFORMED BEHIND THE TEMPORARY BARRIER FOR A PERIOD LONGER THAN TWO (2) MONTHS, REMOVE / RESET TEMPORARY BARRIER AT NO COST TO THE DEPARTMENT UNLESS OTHERWISE STATED IN THE TRANSPORTATION MANAGEMENT PLANS, TEMPORARY BARRIER IS PROTECTING A HAZARD, OR AS DIRECTED BY THE ENGINEER.

INSTALL TEMPORARY BARRIER WITH THE TRAFFIC FLOW BEGINNING WITH THE UPSTREAM SIDE OF TRAFFIC. REMOVE TEMPORARY BARRIER AGAINST THE TRAFFIC FLOW BEGINNING WITH THE DOWNSTREAM SIDE OF TRAFFIC.

INSTALL AND SPACE DRUMS NO GREATER THAN TWICE THE POSTED SPEED LIMIT (MPH) TO CLOSE OR KEEP THE SECTION OF THE ROADWAY CLOSED UNTIL THE TEMPORARY BARRIER CAN BE PLACED OR AFTER THE TEMPORARY BARRIER IS REMOVED.

- M) PROTECT THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER AT ALL TIMES DURING THE INSTALLATION AND REMOVAL OF THE BARRIER BY EITHER A TRUCK MOUNTED ATTENUATOR (MAXIMUM 72 HOURS) OR A TEMPORARY CRASH CUSHION.

PROTECT THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER FROM ONCOMING TRAFFIC AT ALL TIMES BY A TEMPORARY CRASH CUSHION UNLESS THE APPROACH END OF MOVABLE/PORTABLE CONCRETE BARRIER IS OFFSET FROM ONCOMING TRAFFIC AS FOLLOWS OR AS SHOWN IN THE PLANS: (SEE ALSO 1101.05)

POSTED SPEED LIMIT	MINIMUM OFFSET
40 OR LESS	15 FT
45 - 50	20 FT
55	25 FT
60 MPH or HIGHER	30 FT

#### PAVEMENT MARKINGS AND MARKERS

- N) INSTALL TEMPORARY PAVEMENT MARKINGS AND TEMPORARY PAVEMENT MARKERS ON INTERIM LAYERS OF PAVEMENT AS FOLLOWS:

ROAD NAME	MARKING	MARKER
ALL ROADS	PAINT	NONE

- O) PLACE ONE APPLICATION OF PAINT FOR TEMPORARY TRAFFIC PATTERNS. PLACE A SECOND APPLICATION OF PAINT SIX (6) MONTHS AFTER THE INITIAL APPLICATION AND EVERY SIX MONTHS AS DIRECTED BY THE ENGINEER.

- P) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

- Q) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS BY THE END OF EACH DAY'S OPERATION.

### PHASING NOTES

#### PHASE I (TMP-04)

NOTE: PORTABLE SIGNAL SYSTEMS AND DEVICES WILL NEED TO BE ACTIVE FOR 24 HOURS FOR THE DURATION OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR DESIGN, MAINTENANCE, AND OPERATION OF ALL EQUIPMENT.

STEP 1: INSTALL WORK ZONE ADVANCED WARNING SIGNS ON ALL ROADS ACCORDING TO ROADWAY STANDARD DRAWING NO. 110.01 WHERE WORK WILL BE OCCURRING NO MORE THAN THREE DAYS PRIOR TO BEGINNING CONSTRUCTION.

STEP 2: USING ROADWAY STANDARD DRAWING NO. 1101.02, SHEET 1 OF 14, AS NEEDED, INSTALL TEMPORARY MARKINGS, BARRIER, GUARDRAIL, AND SHORING. SHIFT TRAFFIC AND ACTIVATE PORTABLE TRAFFIC SIGNAL SYSTEM.

STEP 3: USING ROADWAY STANDARD DRAWING NO. 1101.02, SHEET 14 OF 14, CONSTRUCT BRIDGE AND ROADWAY IMPROVEMENTS ALONG -L-.

#### PHASE II (TMP-05)

NOTE: PORTABLE SIGNAL SYSTEMS AND DEVICES WILL NEED TO BE ACTIVE FOR 24 HOURS FOR THE DURATION OF CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR DESIGN, MAINTENANCE, AND OPERATION OF ALL EQUIPMENT.

STEP 1: USING ROADWAY STANDARD DRAWING NO. 1101.02, SHEET 1 OF 14, AND FLAGGERS AS NEEDED, INSTALL TEMPORARY MARKINGS AND BARRIER.

STEP 2: USING ROADWAY STANDARD DRAWING NO. 1101.02, SHEET 14 OF 14, CONSTRUCT BRIDGE IMPROVEMENTS AND RETAINING WALL ALONG -L-.

STEP 3: USING ROADWAY STANDARD DRAWING NO. 1101.02, SHEET 1 OF 14, INSTALL FINAL OVERLAY AND PAVEMENT MARKINGS.

STEP 4: REMOVE LANE CLOSURE DEVICES AND SIGNS AFTER CONSTRUCTION IS COMPLETE.

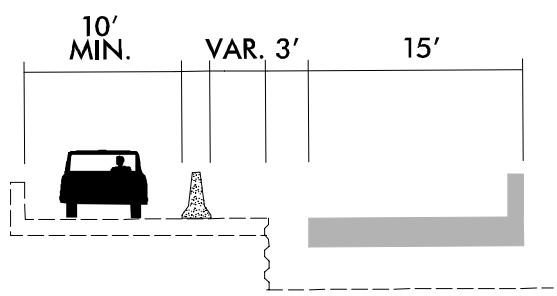
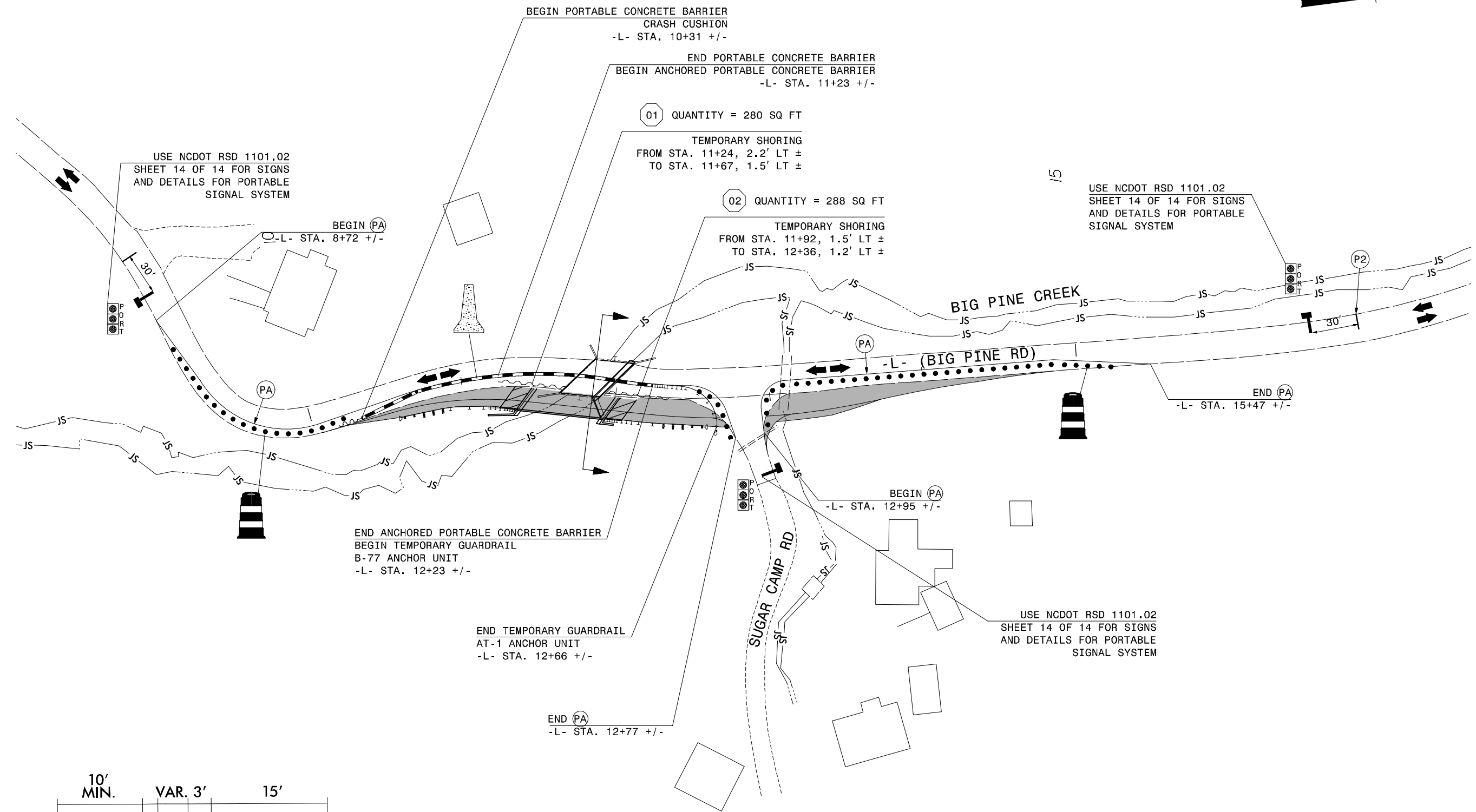
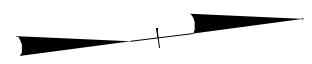
**PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION**



APPROVED: \_\_\_\_\_ DATE: 2/22/2022

Richard A. Odense

**TRANSPORTATION  
MANAGEMENT PLAN  
GENERAL NOTES AND  
WRITTEN PHASING**



NOTE:  
 1. ALL TEMPORARY LANE WIDTHS ARE 10', UNLESS OTHERWISE NOTED.

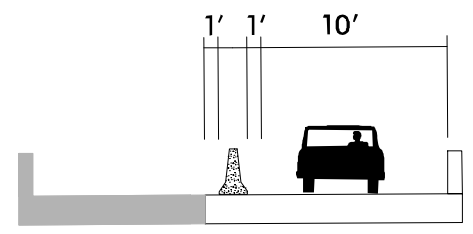
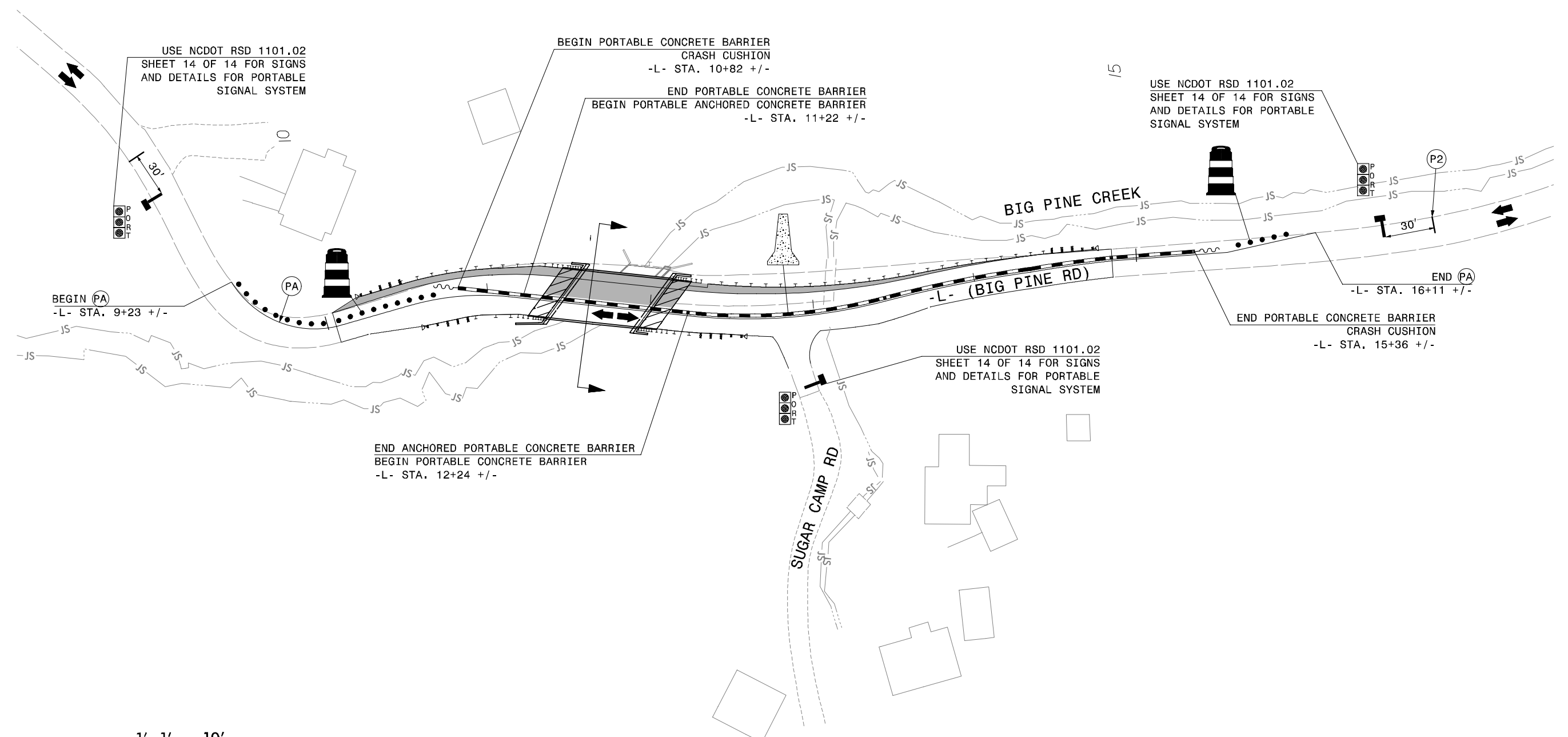
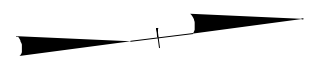


APPROVED: \_\_\_\_\_ DATE: 2/22/2022

Richard A. Odense  
 ENGINEER  
 NORTH CAROLINA  
 SEAL 037467

PRELIMINARY PLANS  
 DO NOT USE FOR CONSTRUCTION

TRANSPORTATION  
 MANAGEMENT PLAN  
 TEMPORARY TRAFFIC CONTROL  
 PHASE I



NOTE: ALL TEMPORARY LANE WIDTHS ARE 10', UNLESS OTHERWISE NOTED.



APPROVED: 2/22/2022 DATE:

Richard A. Odinski

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

TRANSPORTATION  
MANAGEMENT PLAN  
TEMPORARY TRAFFIC CONTROL  
PHASE II

PAVEMENT MARKING SCHEDULE	
P2	WHITE STOPBAR (24", 2 COATS)
P8	2 FT.-6 FT./SP WHITE MINISKIP (4", 2 COATS)
PA	PAINT WHITE EDGELINE (4", 2 COATS)
PI	PAINT YELLOW DOUBLE CENTER LINE (4", 2 COATS)

ROADWAY STANDARD DRAWINGS	
1205.01	PAVEMENT MARKINGS - LINE TYPES AND OFFSETS
1205.02	PAVEMENT MARKINGS - DIVIDED AND UNDIVIDED ROADWAYS
1205.04	PAVEMENT MARKINGS - INTERSECTIONS
1205.12	PAVEMENT MARKINGS - BRIDGES
1261.01	GUARDRAIL AND BARRIER DELINEATOR SPACING
1261.02	GUARDRAIL AND BARRIER DELINEATOR TYPES
1262.01	GUARDRAIL END DELINEATION
1264.01	OBJECT MARKERS
1264.02	PLACEMENT OF OBJECT MARKERS

**GENERAL NOTES**

THE FOLLOWING NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE PROJECT, EXCEPT WHEN OTHERWISE NOTED IN THE PLAN, OR DIRECTED BY THE ENGINEER.

A) INSTALL PAVEMENT MARKINGS AND PAVEMENT MARKERS ON THE FINAL SURFACE AS FOLLOWS:

ROAD	MARKING	MARKER
ALL ROADS	PAINT	NONE

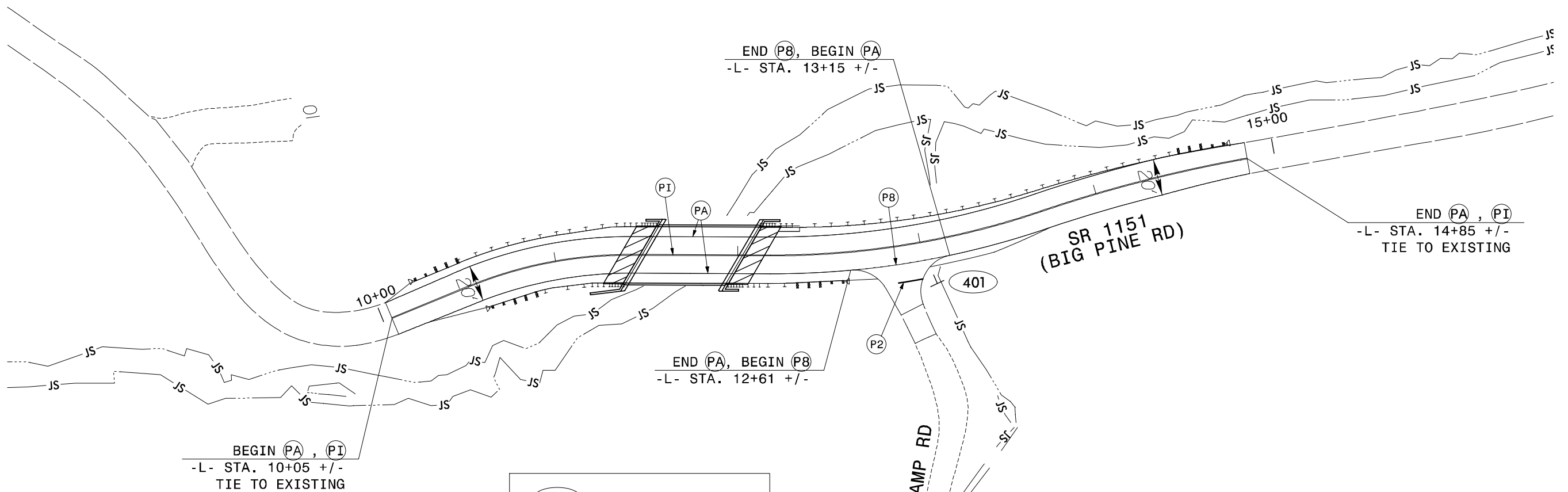
B) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

C) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS.

D) STOP BAR LOCATIONS AT NON-SIGNALIZED INTERSECTIONS MAY BE ADJUSTED AS DIRECTED BY THE ENGINEER. USE 10 FEET AS THE TYPICAL SETBACK DISTANCE.

E) ALL PAVEMENT MARKINGS ARE EXISTING UNLESS OTHERWISE NOTED.

F) RELOCATE ALL EXISTING SIGNS AS REQUIRED BY THE ENGINEER.



PAVEMENT MARKING QUANTITIES			
P2	PAY ITEM LENGTH = 13 LF	TOTAL QUANTITY = 26 LF	
P8	PAY ITEM LENGTH = 54 LF	TOTAL QUANTITY = 27 LF	
PA	PAY ITEM LENGTH = 930 LF	TOTAL QUANTITY = 1860 LF	
PI	PAY ITEM LENGTH = 480 LF	TOTAL QUANTITY = 1920 LF	

401 QUANTITY REQ'D: 1

ONE "U" POST PER SIGN

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

APPROVED: \_\_\_\_\_ DATE: 2/22/2022

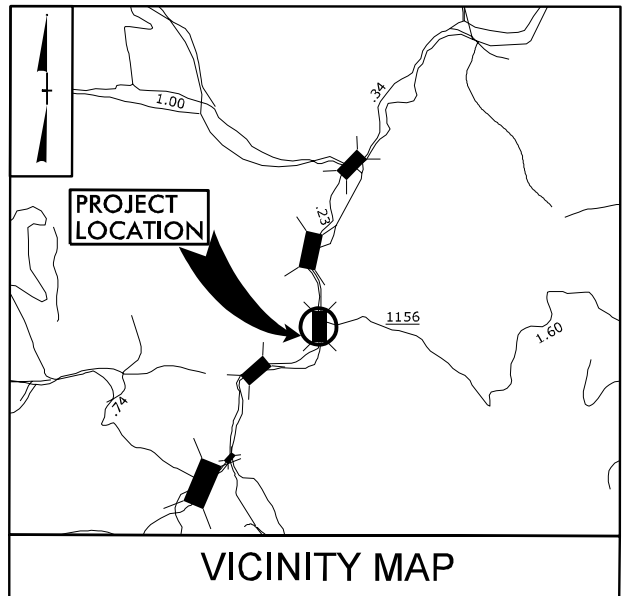
Richard A. Odum  
Professional Engineer



PAVEMENT MARKING PLAN

**TIP PROJECT: 17.BP.13.R.183**

See Sheet 1A For Index of Sheets (Not Included)  
See Sheet 1B For Symbology Sheet



STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

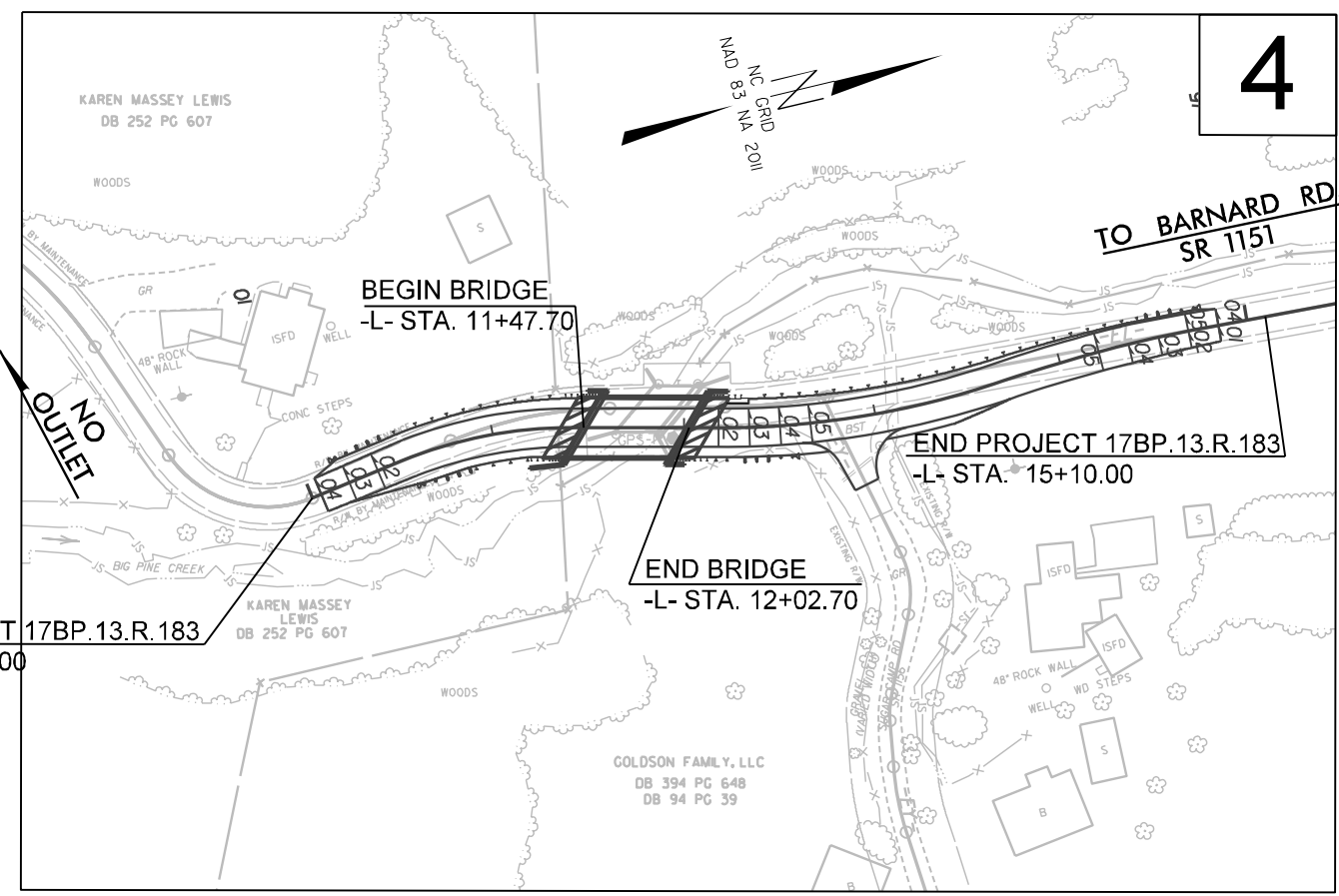
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PLAN FOR PROPOSED  
HIGHWAY EROSION CONTROL

---

**MADISON COUNTY**

**LOCATION: REPLACE EXISTING BRIDGE NO. 144  
OVER BIG PINE CREEK ON BIG PINE RD (SR 1151)  
TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE**



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17.BP.13.R.183	EC-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	

**EROSION AND SEDIMENT CONTROL MEASURES**

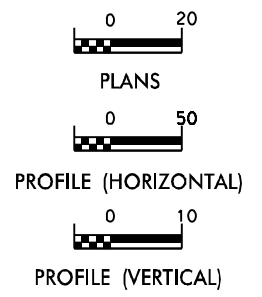
Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	---
1630.05	Temporary Diversion	--->---
1605.01	Temporary Silt Fence	--- --- ---
1606.01	Special Sediment Control Fence	---X---X---
1622.01	Temporary Berms and Slope Drains	--- --- ---
1630.02	Silt Basin Type B	--- ---
1633.01	Temporary Rock Silt Check Type-A	---X---X---
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	---X---X---
1633.02	Temporary Rock Silt Check Type-B	---X---X---
	Wattle/Coir Fiber Wattle	--- ---
	Wattle/Coir Fiber Wattle with Polyacrylamide (PAM)	--- ---
1634.01	Temporary Rock Sediment Dam Type-A	---X---X---
1634.02	Temporary Rock Sediment Dam Type-B	---X---X---
1635.01	Rock Pipe Inlet Sediment Trap Type-A	--- ---
1635.02	Rock Pipe Inlet Sediment Trap Type-B	--- ---
1630.04	Stilling Basin	--- ---
1630.06	Special Stilling Basin	--- ---
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	--- ---
	Tiered Skimmer Basin	--- ---
	Infiltration Basin	--- ---

THIS PROJECT CONTAINS  
EROSION CONTROL PLANS  
FOR CLEARING AND  
GRUBBING PHASE OF  
CONSTRUCTION.

THIS PROJECT HAS  
BEEN DESIGNED TO  
SENSITIVE WATERSHED  
STANDARDS.

ENVIRONMENTALLY  
SENSITIVE AREA(S) EXIST  
ON THIS PROJECT  
  
*Refer To E. C. Special Provisions  
for Special Considerations.*

**GRAPHIC SCALE**



THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE DECEMBER 1, 2018 AND ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER RESOURCES.

Prepared In the Office of:

**wsp** WSP USA  
414 FAYETTEVILLE STREET  
SUITE 1800  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
FAX: 1.919.836.4099  
LICENSE NO. 1-0165

Designed by:

**John F. Watson** 3419  
NAME LEVEL III CERTIFICATION NO.

Reviewed In the Office of:

**ROADSIDE ENVIRONMENTAL UNIT**  
1 South Wilmington St.  
Raleigh, NC 27611

2018 STANDARD SPECIFICATIONS

Reviewed by:

**Reid Whitehead, PE**

Roadway Standard Drawings

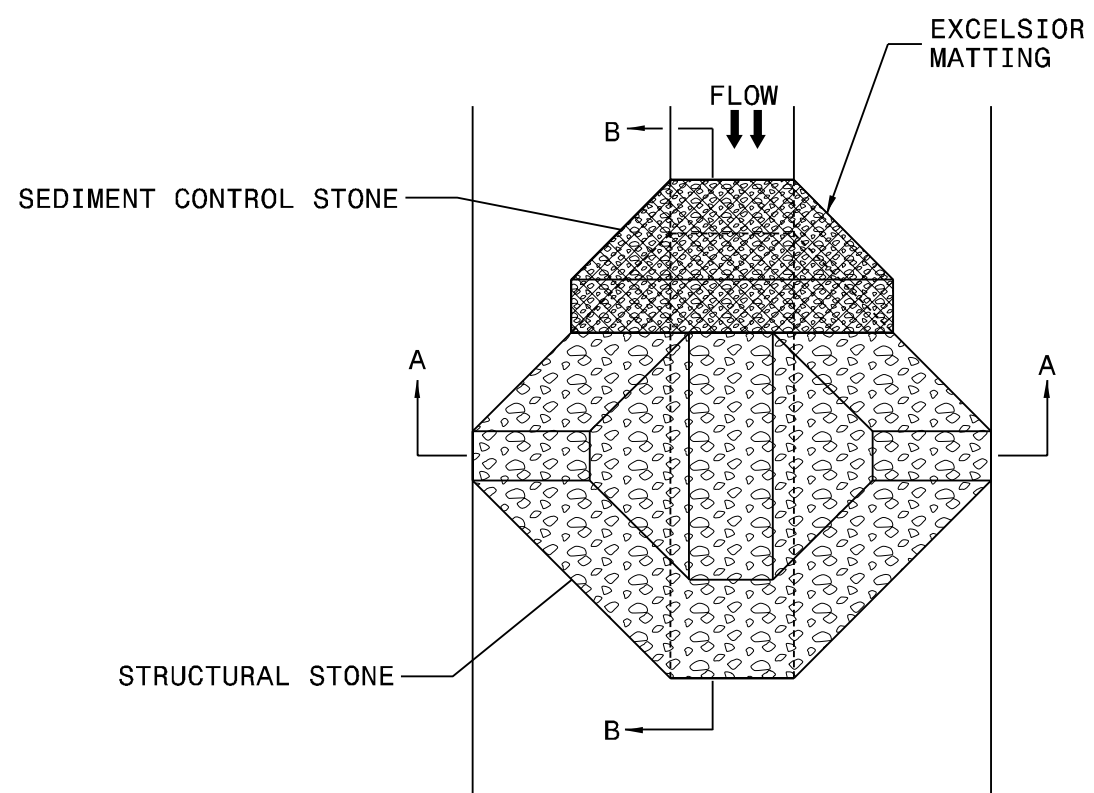
The following roadway english standards as appear in "Roadway Standard Drawings"- Roadway Design Unit - N. C. Department of Transportation - Raleigh, N. C., dated January 2012 and the latest revision thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01 Railroad Erosion Control Detail	1632.01 Rock Inlet Sediment Trap Type A
1605.01 Temporary Silt Fence	1632.02 Rock Inlet Sediment Trap Type B
1606.01 Special Sediment Control Fence	1632.03 Rock Inlet Sediment Trap Type C
1607.01 Gravel Construction Entrance	1633.01 Temporary Rock Silt Check Type A
1622.01 Temporary Berms and Slope Drains	1633.02 Temporary Rock Silt Check Type B
1630.01 Riser Basin	1634.01 Temporary Rock Sediment Dam Type A
1630.02 Silt Basin Type B	1634.02 Temporary Rock Sediment Dam Type B
1630.03 Temporary Silt Ditch	1635.01 Rock Pipe Inlet Sediment Trap Type A
1630.04 Stilling Basin	1635.02 Rock Pipe Inlet Sediment Trap Type B
1630.05 Temporary Diversion	1640.01 Coir Fiber Baffle
1630.06 Special Stilling Basin	1645.01 Temporary Stream Crossing
1631.01 Matting Installation	



PROJECT REFERENCE NO. 17BP13RJ83	SHEET NO. EC-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# TEMPORARY ROCK SILT CHECK TYPE 'A' WITH EXCELSIOR MATTING AND POLYACRYLAMIDE (PAM)



PLAN

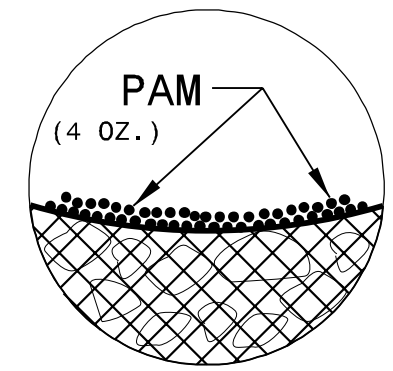
NOTES:

INSTALL TEMPORARY ROCK SILT CHECK TYPE A IN ACCORDANCE WITH ROADWAY STANDARD DRAWING NO. 1633.01.

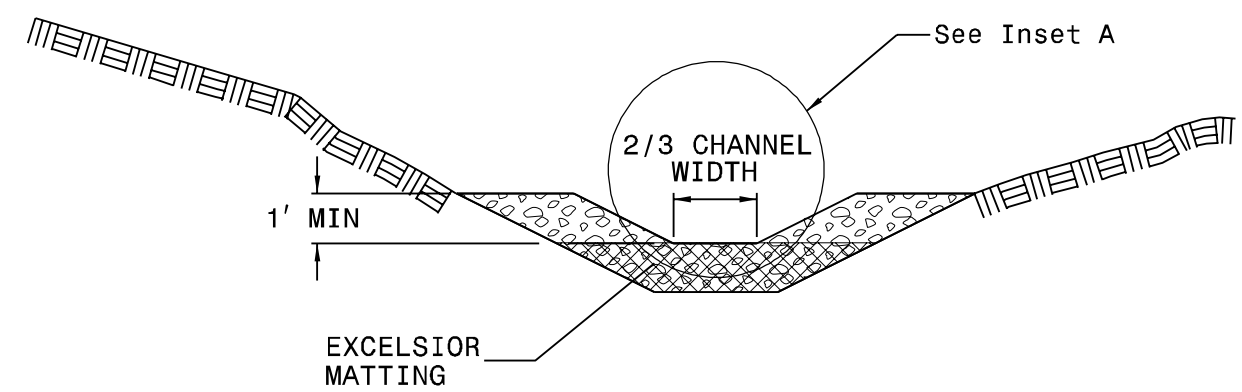
USE EXCELSIOR FOR MATTING MATERIAL AND ANCHOR MATTING SECTION AT TOP AND BOTTOM WITH CLASS B STONE.

PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH ROCK SILT CHECK.

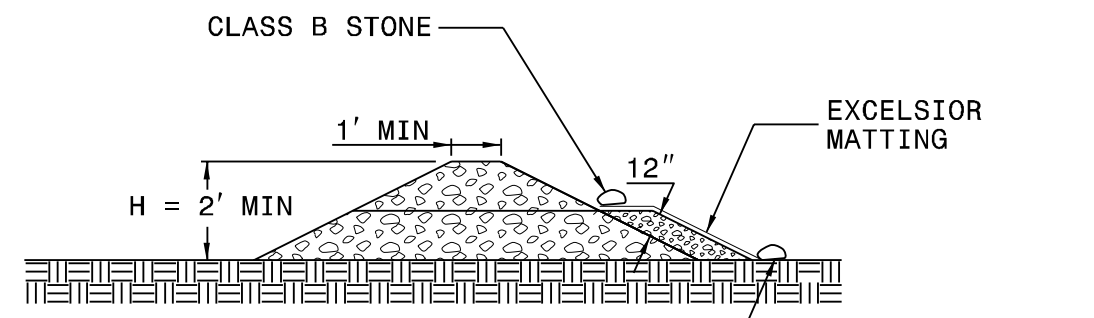
INITIALLY APPLY 4 OUNCES OF POLYACRYLAMIDE (PAM) TO TOP OF MATTING SECTION AND AFTER EVERY RAINFALL EVENT THAT EQUALS OR EXCEEDS 0.50 INCHES.



INSET A



SECTION A-A

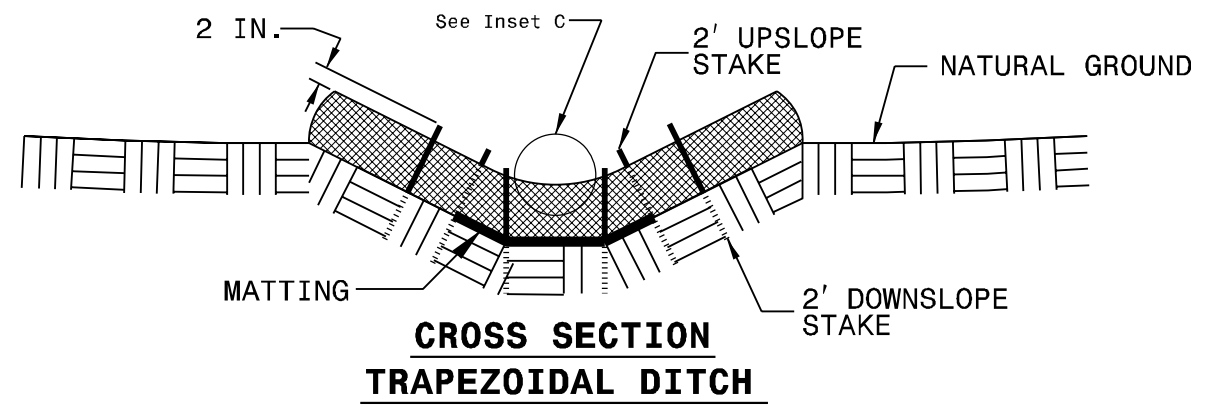
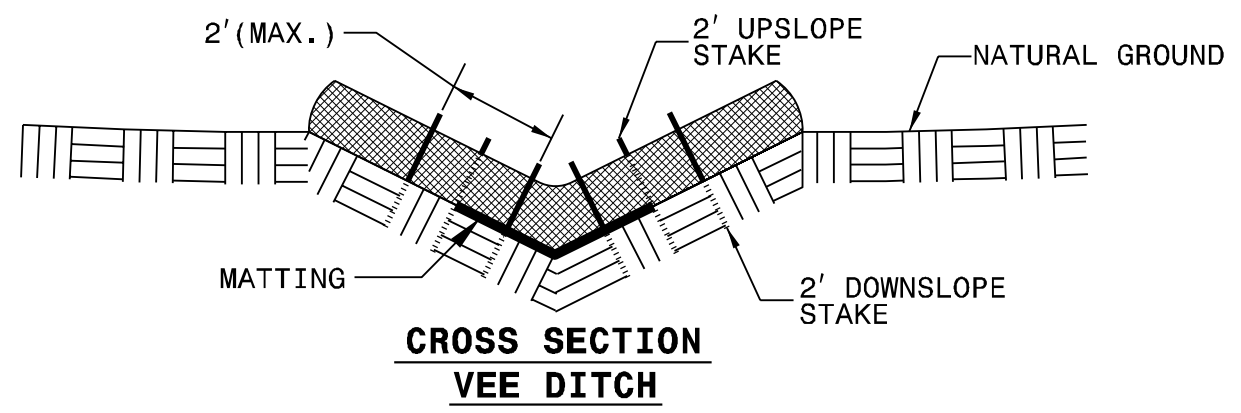
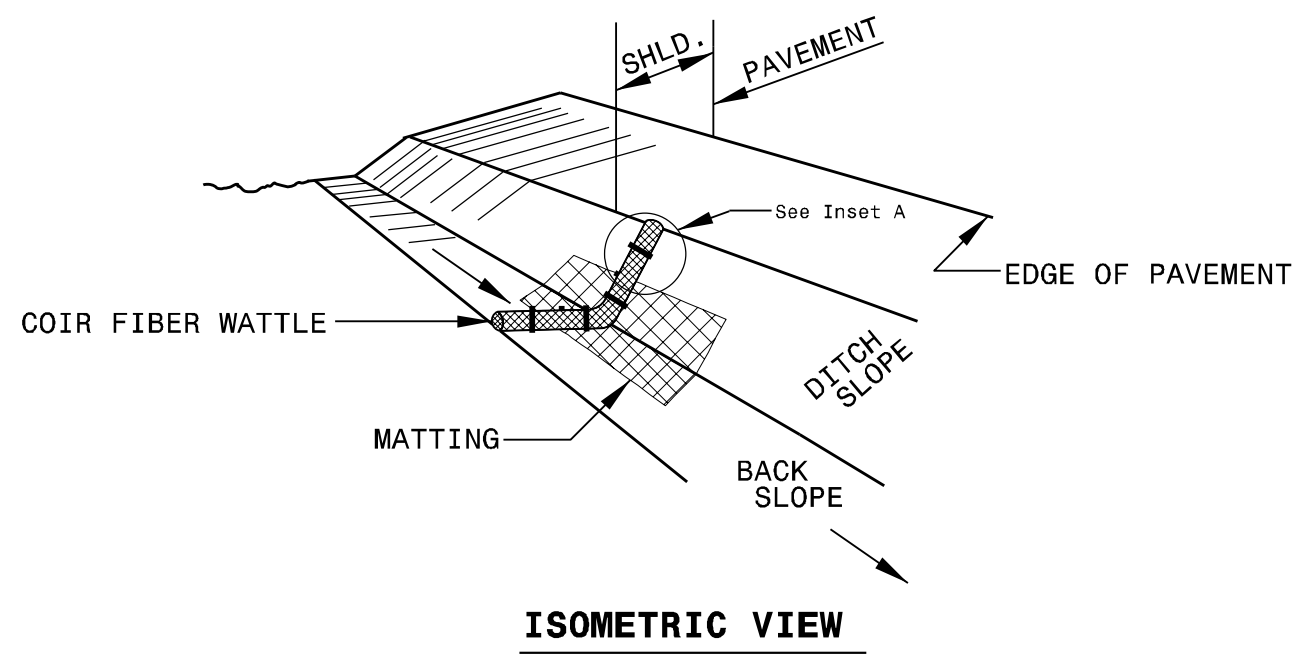


SECTION B-B

NOT TO SCALE

PROJECT REFERENCE NO. 17BP13RJ83	SHEET NO. EC-2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# COIR FIBER WATTLE WITH POLYACRYLAMIDE (PAM) DETAIL



**NOTES:**

USE MINIMUM 12 IN. DIAMETER COIR FIBER (COCONUT FIBER) WATTLE.

USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.

ONLY INSTALL WATTLE(S) TO A HEIGHT IN DITCH SO FLOW WILL NOT WASH AROUND WATTLE AND SCOUR DITCH SLOPES AND AS DIRECTED.

INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO BOTTOM OF DITCH.

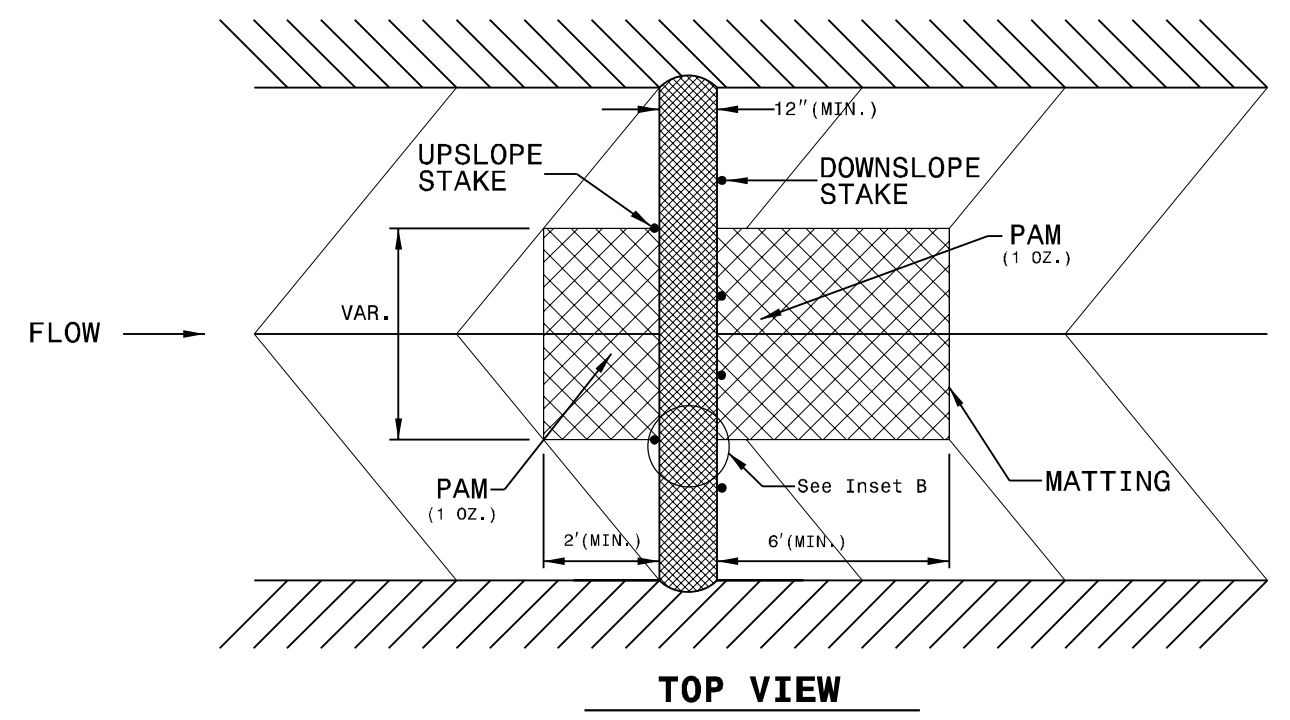
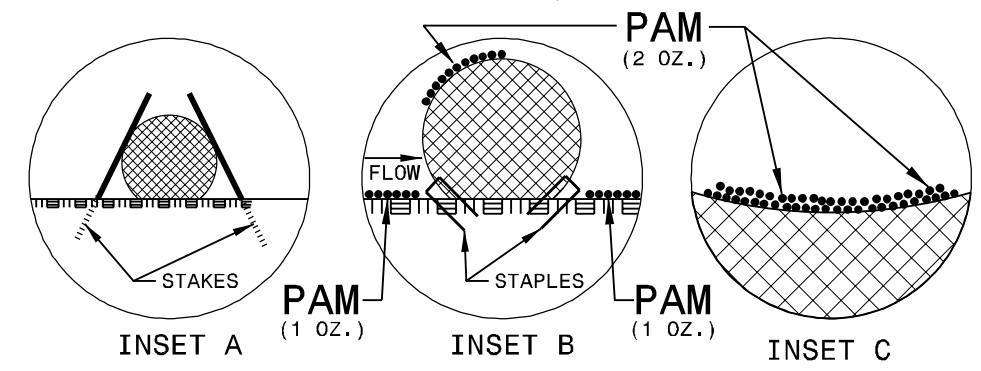
PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.

INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.

INSTALL MATTING IN ACCORDANCE WITH SECTION 1631 OF THE STANDARD SPECIFICATIONS.

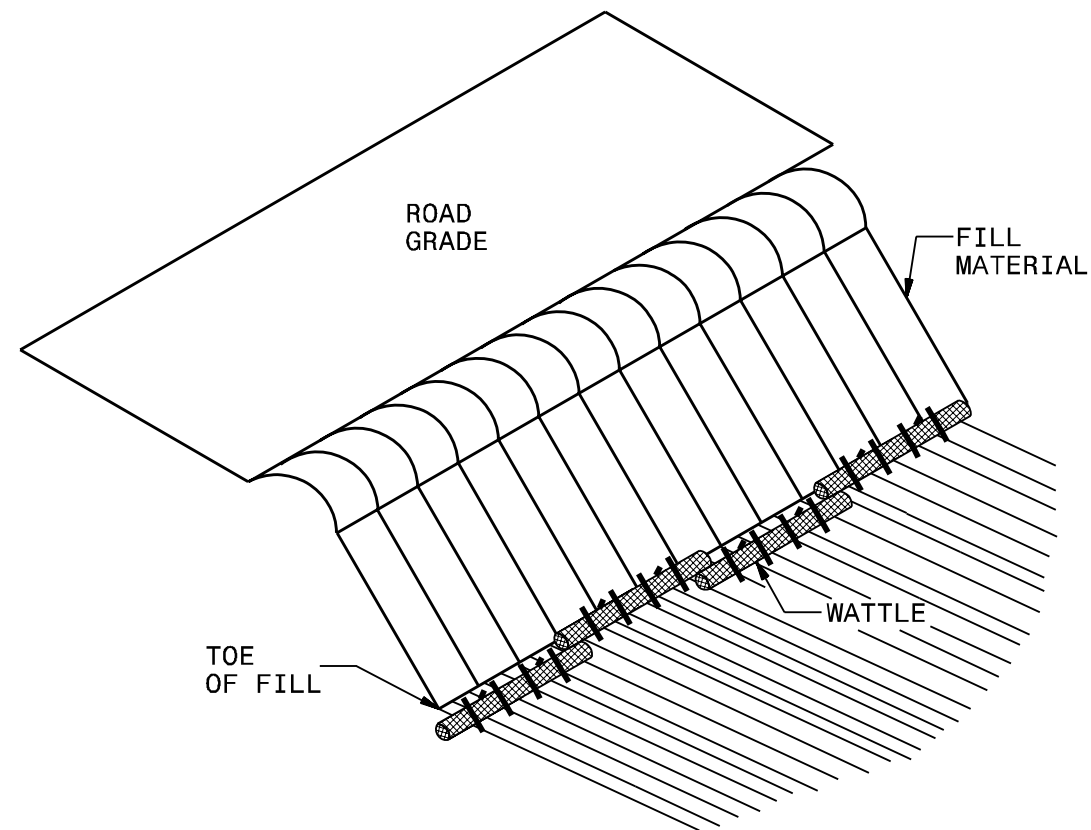
PRIOR TO POLYACRYLAMIDE (PAM) APPLICATION, OBTAIN A SOIL SAMPLE FROM PROJECT LOCATION, AND FROM OFFSITE MATERIAL, AND ANALYZE FOR APPROPRIATE PAM FLOCCULANT TO BE APPLIED TO EACH WATTLE.

INITIALLY APPLY 2 OUNCES OF ANIONIC OR NEUTRALLY CHARGED PAM OVER WATTLE WHERE WATER WILL FLOW AND 1 OUNCE OF PAM ON MATTING ON EACH SIDE OF WATTLE. REAPPLY PAM AFTER EVERY RAINFALL EVENT THAT IS EQUAL TO OR EXCEEDS 0.50 IN.

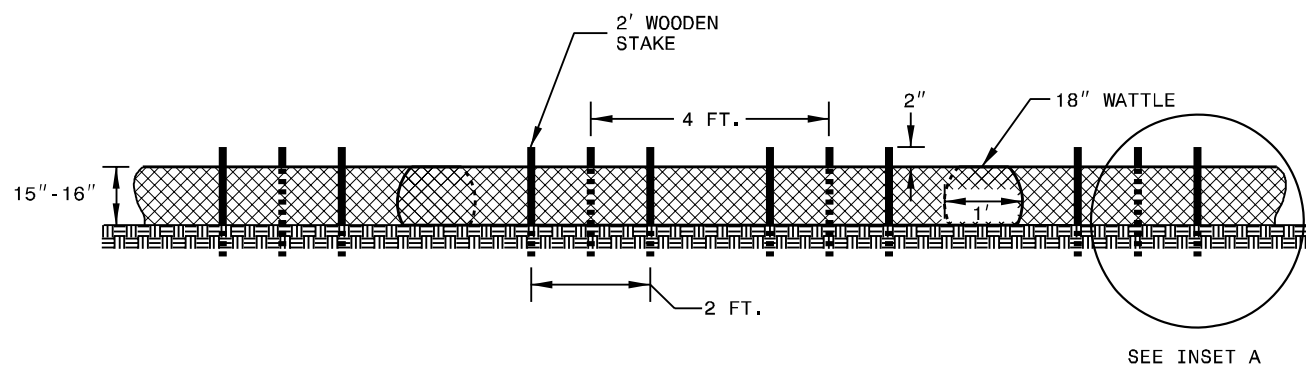


PROJECT REFERENCE NO. 17BPJ3RJ83	SHEET NO. EC-2B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

# COIR FIBER WATTLE BARRIER DETAIL



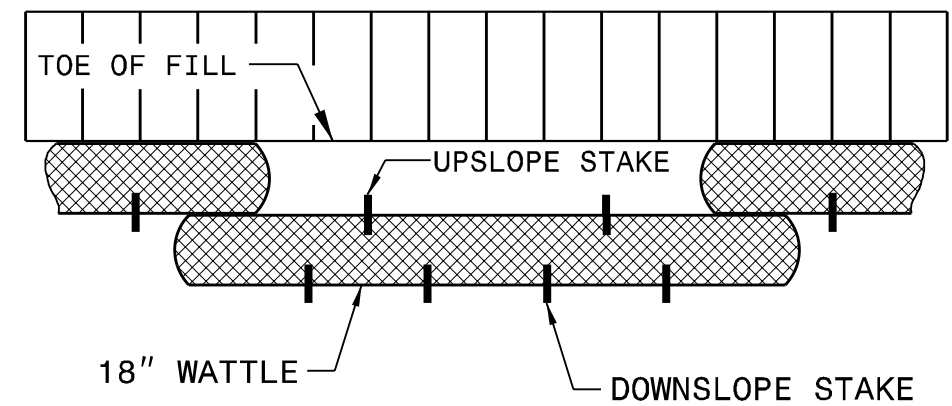
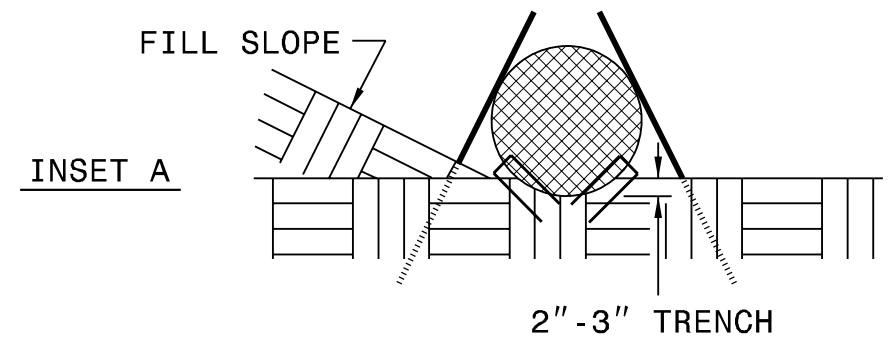
**ISOMETRIC VIEW**



**FRONT VIEW**

**NOTES:**

- USE MINIMUM 18 IN. NOMINAL DIAMETER COIR FIBER (COCONUT) WATTLE AND LENGTH OF 10 FT.
- EXCAVATE A 2 TO 3 INCH TRENCH FOR WATTLE TO BE PLACED.
- DO NOT PLACE WATTLES ON TOE OF SLOPE.
- USE 2 FT. WOODEN STAKES WITH A 2 IN. BY 2 IN. NOMINAL CROSS SECTION.
- INSTALL A MINIMUM OF 2 UPSLOPE STAKES AND 4 DOWNSLOPE STAKES AT AN ANGLE TO WEDGE WATTLE TO GROUND.
- PROVIDE STAPLES MADE OF 0.125 IN. DIAMETER STEEL WIRE FORMED INTO A U SHAPE NOT LESS THAN 12" IN LENGTH.
- INSTALL STAPLES APPROXIMATELY EVERY 1 LINEAR FOOT ON BOTH SIDES OF WATTLE AND AT EACH END TO SECURE IT TO THE SOIL.
- FOR BREAKS ALONG LARGE SLOPES, USE MAXIMUM SPACING OF 25 FT.



**TOP VIEW**

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA

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PROJECT REFERENCE NO.	SHEET NO.
<i>17BPJ3RJ83</i>	<i>EC-3</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

## ***SOIL STABILIZATION TIMEFRAMES***

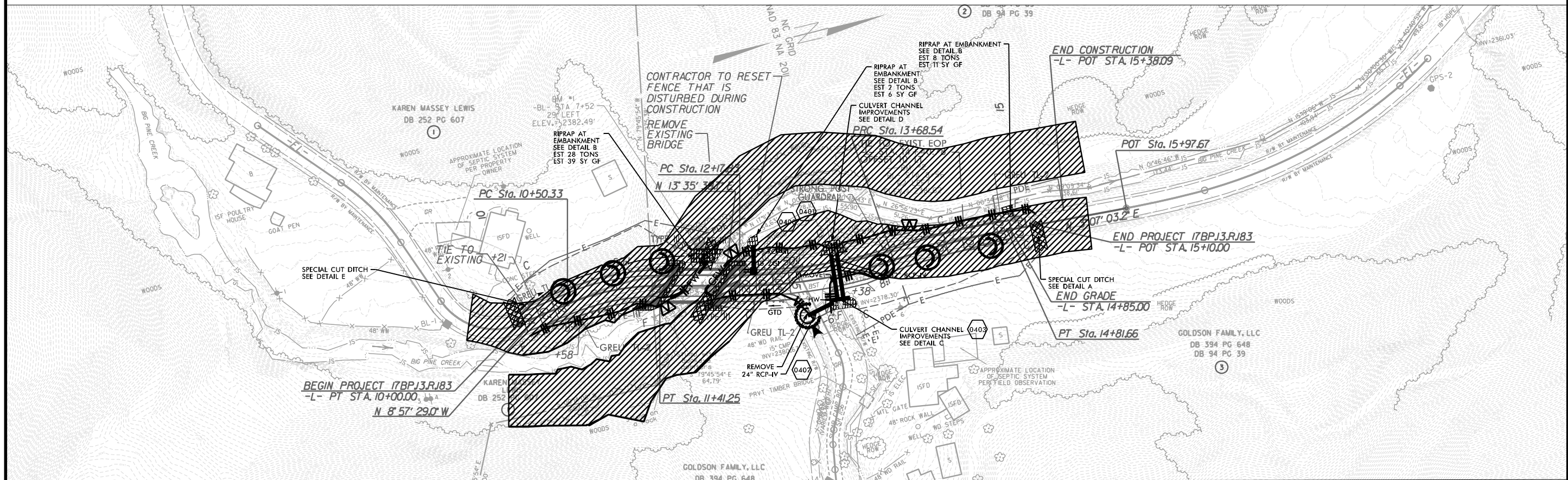
<i>SITE DESCRIPTION</i>	<i>STABILIZATION TIME</i>	<i>TIMEFRAME EXCEPTIONS</i>
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.





# EROSION CONTROL PLAN

PROJECT REFERENCE NO. <b>17BPJ3RJ83</b>	SHEET NO. <b>EC-4/CONST.4</b>
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



**TROUT STREAM  
BUFFER ZONE**

CLEARING AND GRUBBING  
EROSION CONTROL FOR  
CONSTRUCTION SHEET 4

NOTE:  
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE - B  
AND TEMPORARY ROCK SILT CHECKS TYPE - A AT  
DRAINAGE OUTLETS.

BRIDGE REMOVAL AND BRIDGE CONSTRUCTION SHALL BE PER  
REQUIREMENTS IN THE NCDOT BEST MANAGEMENT PRACTICES  
FOR CONSTRUCTION AND MAINTENANCE ACTIVITIES MANUAL

CONTRACTOR SHALL INSTALL AN ONSITE CONCRETE WASHOUT  
STRUCTURE PER THE NCDOT DETAIL AND SPECIAL PROVISIONS.  
ACTUAL LOCATION OF THE STRUCTURE SHALL BE DETERMINED  
IN THE FIELD. CONCRETE WASHOUT STRUCTURE SHALL BE  
MAINTAINED BY THE CONTRACTOR. ALL CONCRETE TRUCKS SHALL  
USE THE CONCRETE WASHOUT STRUCTURE. NO WASHOUT OF  
CONCRETE TRUCKS SHALL BE ALLOWED EXCEPT IN THE CONCRETE  
WASHOUT STRUCTURE.



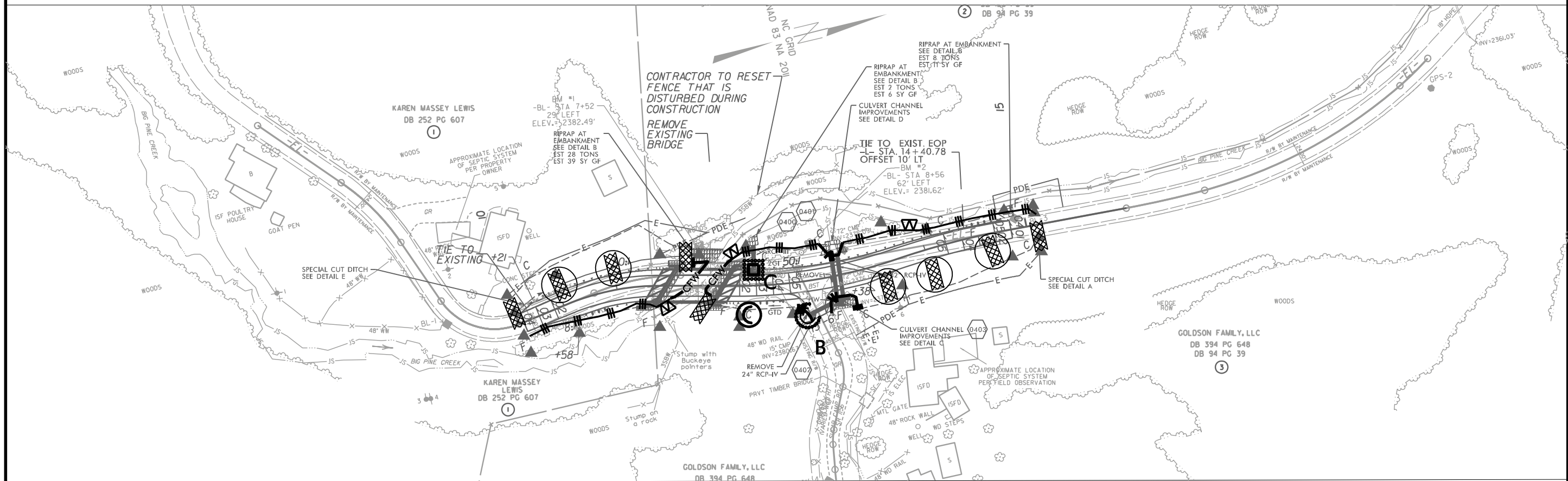
# EROSION CONTROL PLAN

PROJECT REFERENCE NO. <b>17BPJ3RJ83</b>	SHEET NO. <b>EC-5/CONST.4</b>
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INSTALL RIPRAP IN THE PROPOSED DITCH LINE.  
-L- STA 10+00 TO STA 11+75 LT

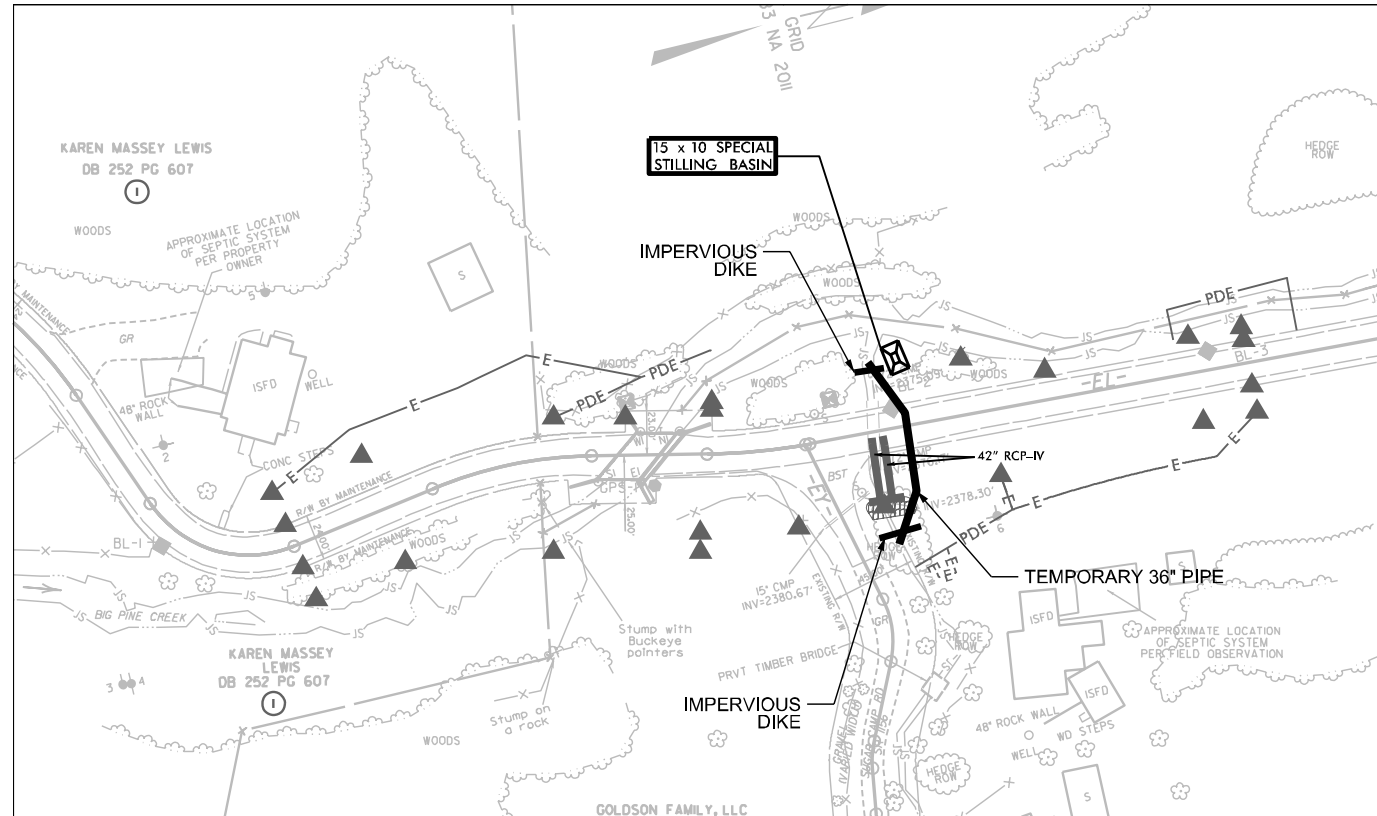
PLACE MATTING FOR EROSION CONTROL ON SLOPE AS WORK ALLOWS.  
-L- STA 10+00 TO STA 12+00 LT

INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.  
-L- STA 13+25 TO STA 15+10 RT



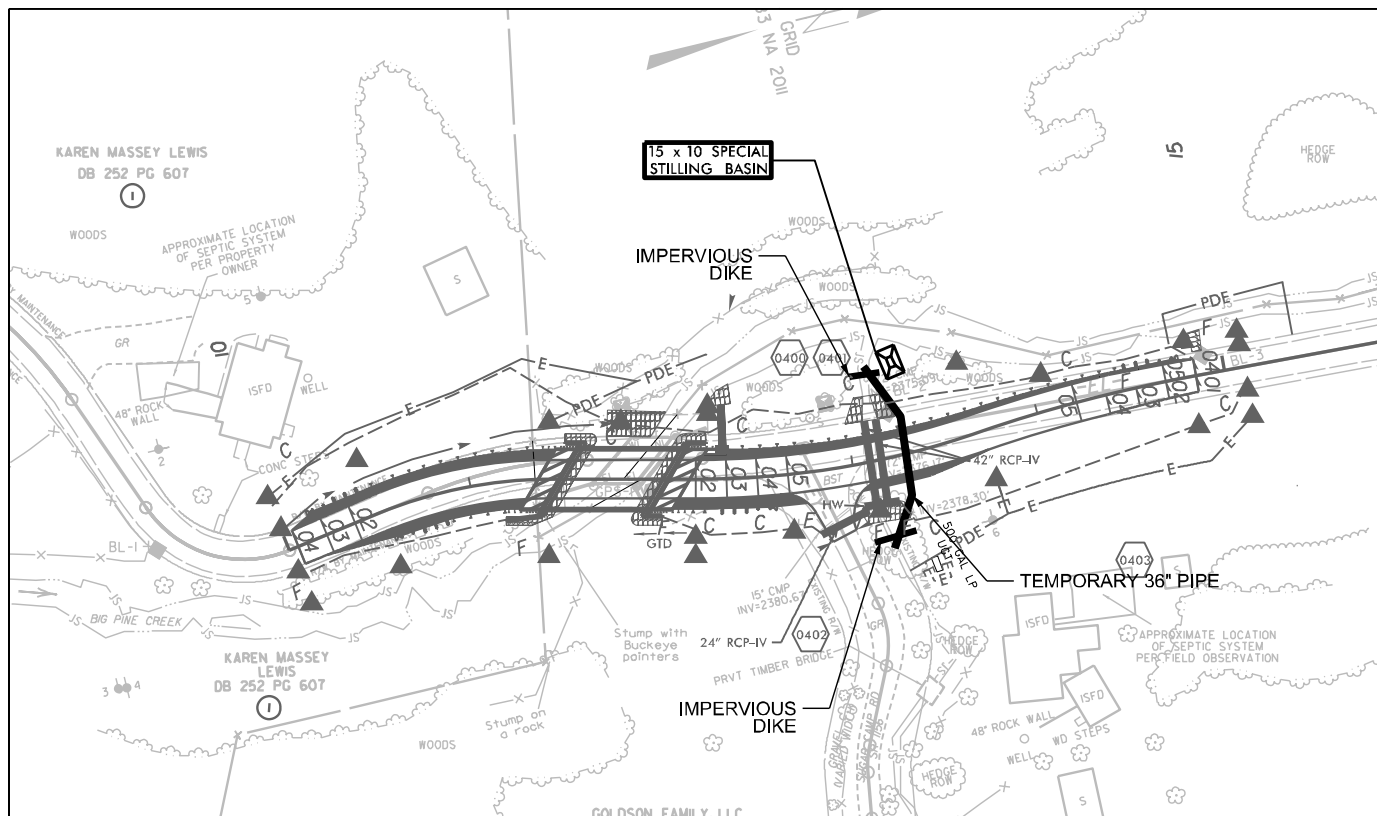
17BP.13.R.183 PIPE PHASING  
 TRIB TO BIG PINE CREEK  
 MADISON COUNTY

PROJECT REFERENCE NO.	SHEET NO.
17BP.13.R.183	EC-6
RW SHEET NO.	
JOHN F. WATSON, PE EROSION CONTROL LEVEL III CERTIFICATION #3419	



**PHASE I**

1. INSTALL IMPERVIOUS DIKES AS SHOWN UPSTREAM AND DOWNSTREAM OF PROPOSED CHANNEL IMPROVEMENTS.
2. INSTALL TEMPORARY 36" PIPE.
3. BEGIN REMOVAL OF UPSTREAM HALF OF EXISTING 72" CMP AND REPLACE UPSTREAM HALF WITH PROPOSED DUAL 42" RCP PIPES.
4. DEWATER CONSTRUCTION AREA INTO SPECIAL STILLING BASIN(S) AS NEEDED WHILE NEW ALIGNMENT IS UNDER CONSTRUCTION.



**PHASE II**

1. MOVE TRAFFIC TO NEWLY CONSTRUCTED ROADWAY AND BRIDGE.
2. REMOVE DOWNSTREAM HALF OF EXISTING 72" CMP.
3. INSTALL REMAINDER OF DUAL 42" RCP AND DEWATER CONSTRUCTION AREA INTO SPECIAL STILLING BASIN(S) AS NEEDED.
4. REMOVE IMPERVIOUS DIKES AND TEMP. PIPE.

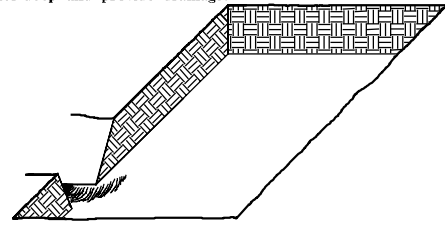
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.13.R.183	RF-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	

# PLANTING DETAILS

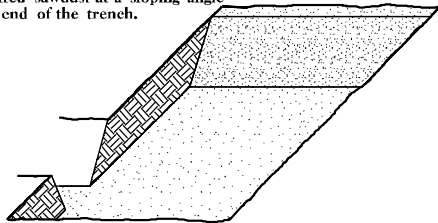
## SEEDLING / LINER BAREROOT PLANTING DETAIL

### HEALING IN

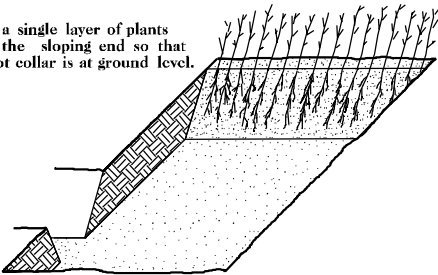
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



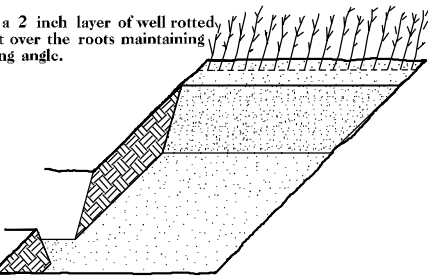
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

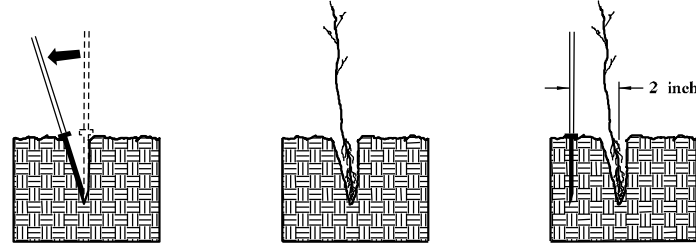


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.



6. Repeat layers of plants and sawdust as necessary and water thoroughly.

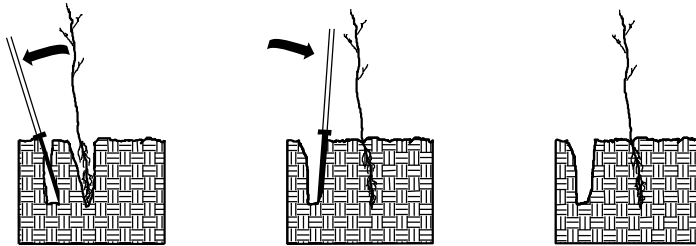
### DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



1. Insert planting bar as shown and pull handle toward planter.

2. Remove planting bar and place seedling at correct depth.

3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.

5. Push handle forward firming soil at top.

6. Leave compaction hole open. Water thoroughly.

### PLANTING NOTES:

**PLANTING BAG**  
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.



**KBC PLANTING BAR**  
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.



**ROOT PRUNING**  
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

## REFORESTATION

- TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

### REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

25%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in - 18 in BR
25%	PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in - 18 in BR
25%	FRAXINUS PENNSYLVANICA	GREEN ASH	12 in - 18 in BR
25%	BETULA NIGRA	RIVER BIRCH	12 in - 18 in BR

**REFORESTATION DETAIL SHEET**  
N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

**TIP PROJECT: 17BP.13.R.183**

**CONTRACT: 7000016202**

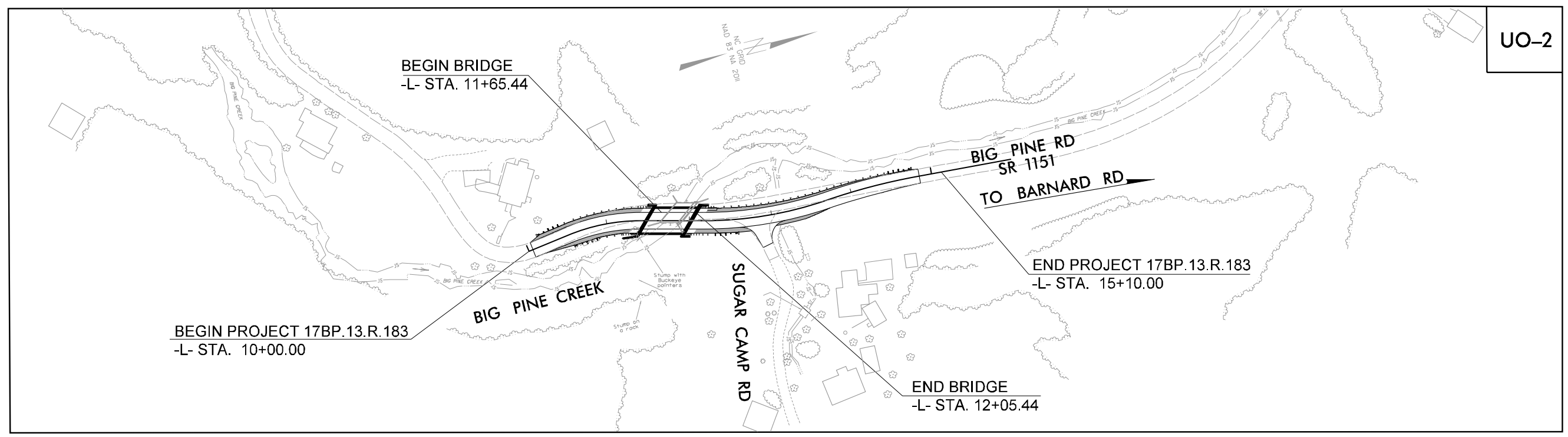
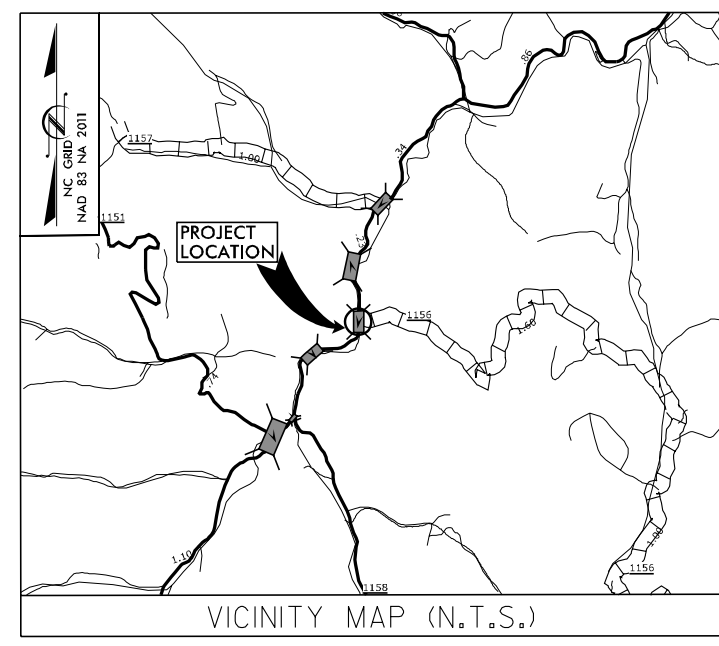
PROJECT REFERENCE NO.	SHEET NO.
17BP.13.R.183	UO-1

NOTE:  
 ALL UTILITY WORK SHOWN ON THIS SHEET IS DONE BY OTHERS.  
 NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

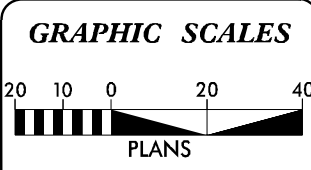
STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

**UTILITIES BY OTHERS  
 MADISON COUNTY**

LOCATION: BRIDGE NO. 560144 OVER BIG PINE CREEK  
 ON SR 1151 (BIG PINE ROAD)  
 TYPE OF WORK: NONE. NO UTILITY CONFLICTS ON PROJECT



UO-2



**INDEX OF SHEETS**

SHEET NO.	DESCRIPTION
UO-1	TITLE SHEET
UO-2	UBO PLAN SHEET

**UTILITY OWNERS WITH CONFLICTS**

NONE

PREPARED IN THE OFFICE OF:

**V&M**  
 Vaughn & Melton  
 Consulting Engineers  
 1318-F Patton Ave.  
 Asheville, NC 28806  
 828-253-2796

Nick Asaro UTILITY PROJECT MANAGER  
Will Matthews PROJECT UTILITY COORDINATOR

**DIVISION OF HIGHWAYS  
 DIVISION 13**

1591 MAIL SERVICES CENTER  
 RALEIGH NC 27699-1591  
 PHONE (919) 250-4128  
 FAX (919) 250-4119

R. Keith Radcliff SR. UTILITY COORDINATOR  
John D. Metcalf DIVISION UTILITY COORDINATOR

**PROJECT: 17BP.13.R.183**

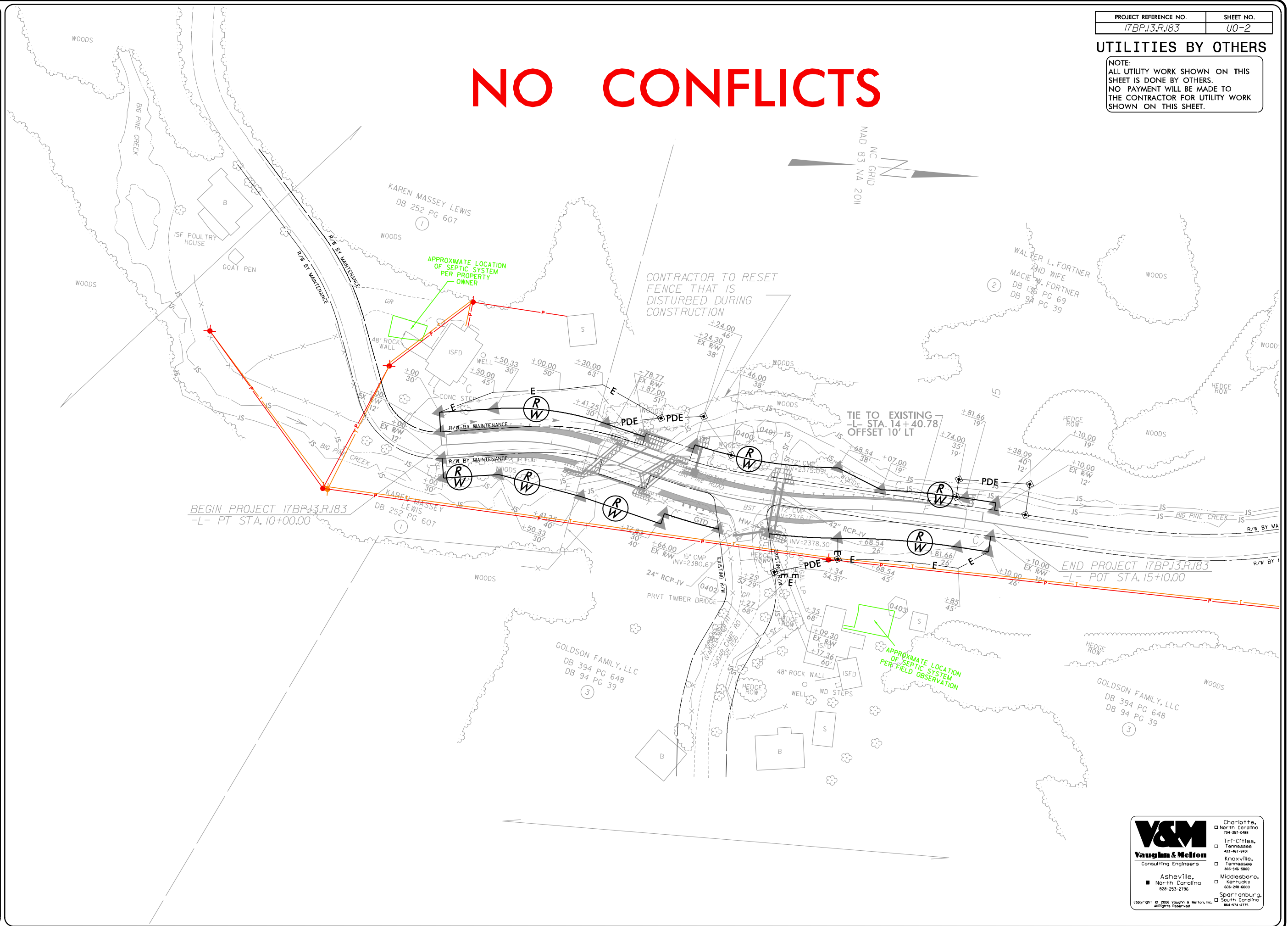
**CONTRACT: 7000016202**

PROJECT REFERENCE NO. 17BP.13.R.183	SHEET NO. U0-2
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**UTILITIES BY OTHERS**

NOTE:  
ALL UTILITY WORK SHOWN ON THIS SHEET IS DONE BY OTHERS.  
NO PAYMENT WILL BE MADE TO THE CONTRACTOR FOR UTILITY WORK SHOWN ON THIS SHEET.

# NO CONFLICTS



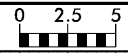
**V&M**  
Vaughn & Melton  
Consulting Engineers

Charlotte, NC 704-397-0488  
Tri-Cities, Tennessee 423-467-8100  
Knoxville, Tennessee 865-546-5800  
Asheville, North Carolina 828-253-2196  
Middlesboro, Kentucky 606-248-8600  
Spartanburg, South Carolina 864-574-4775

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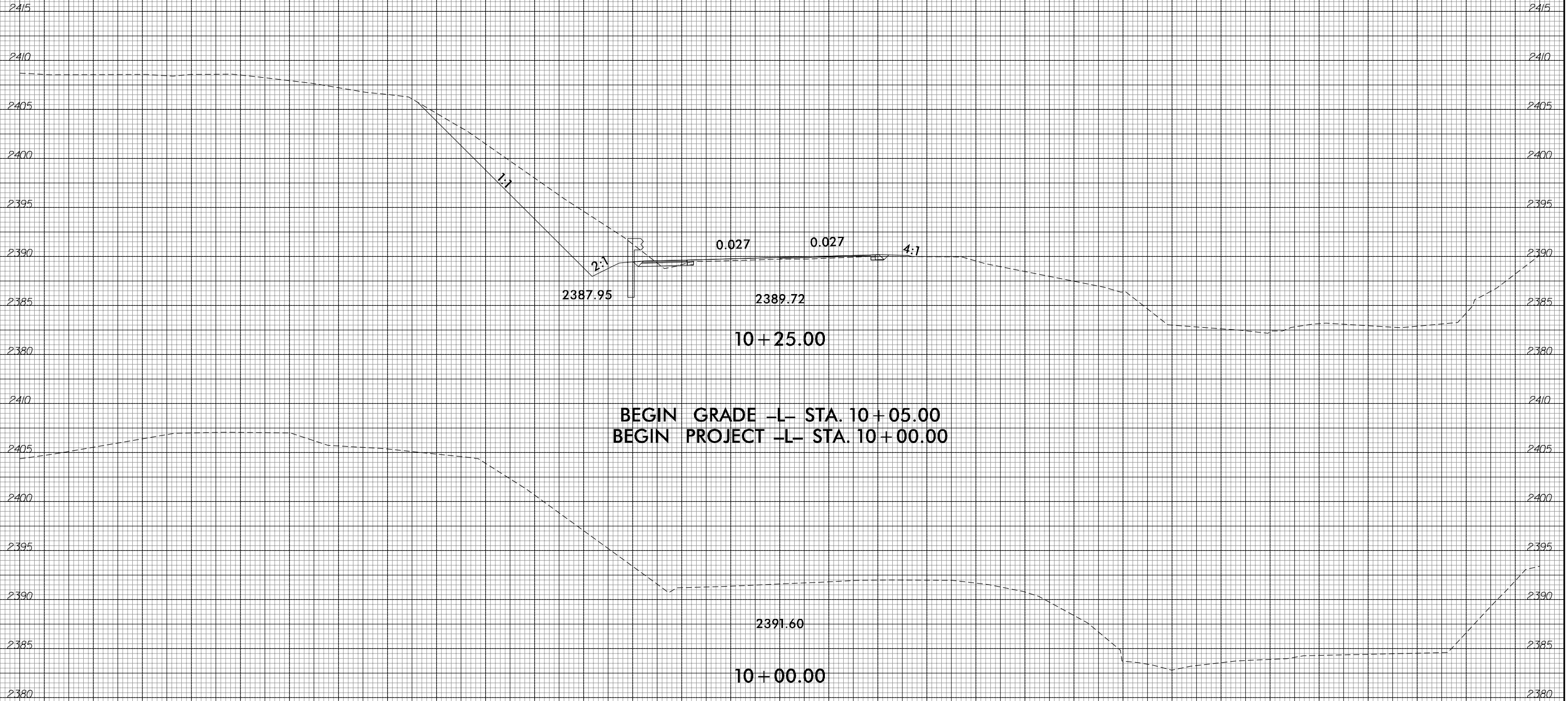






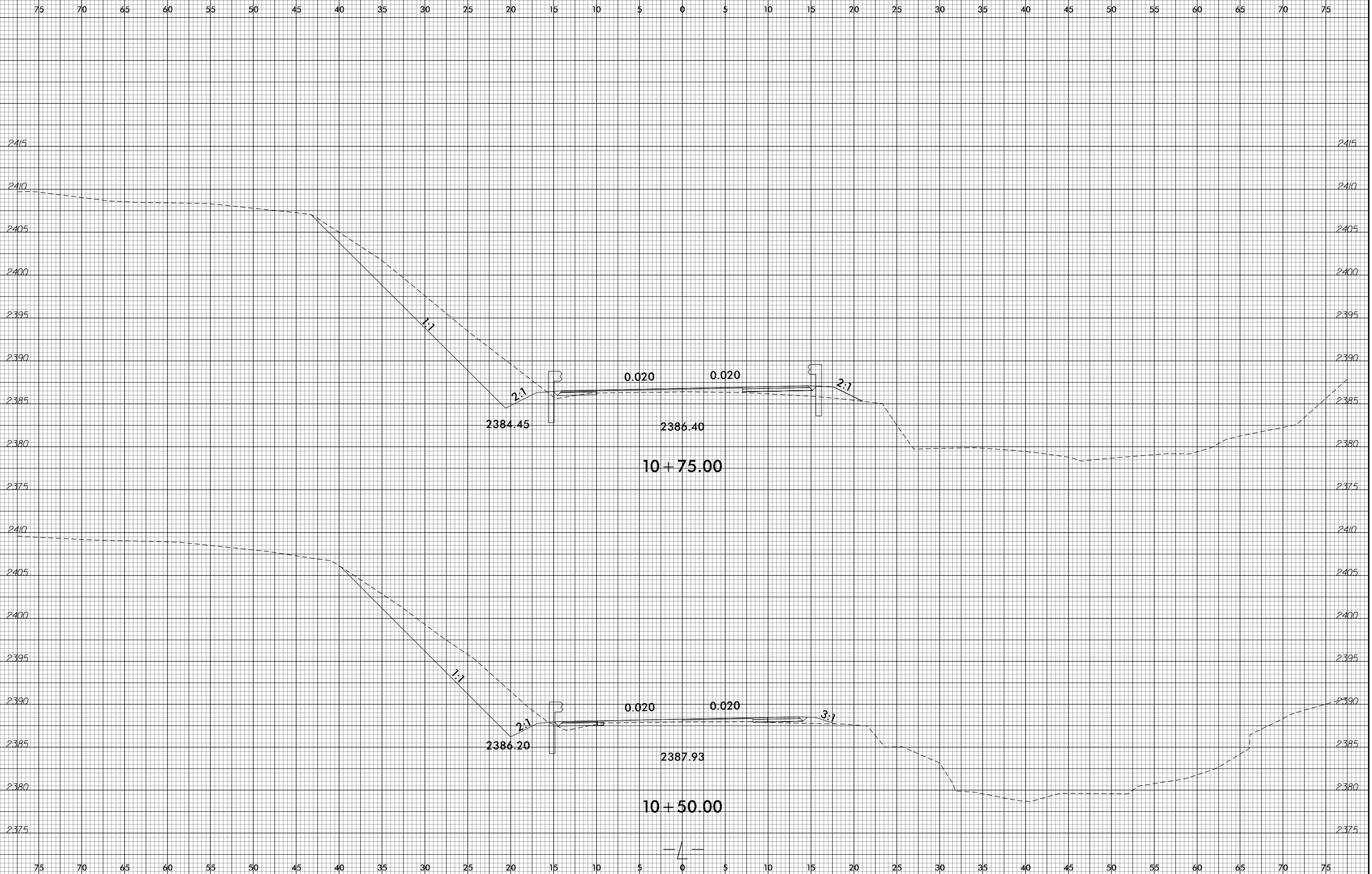
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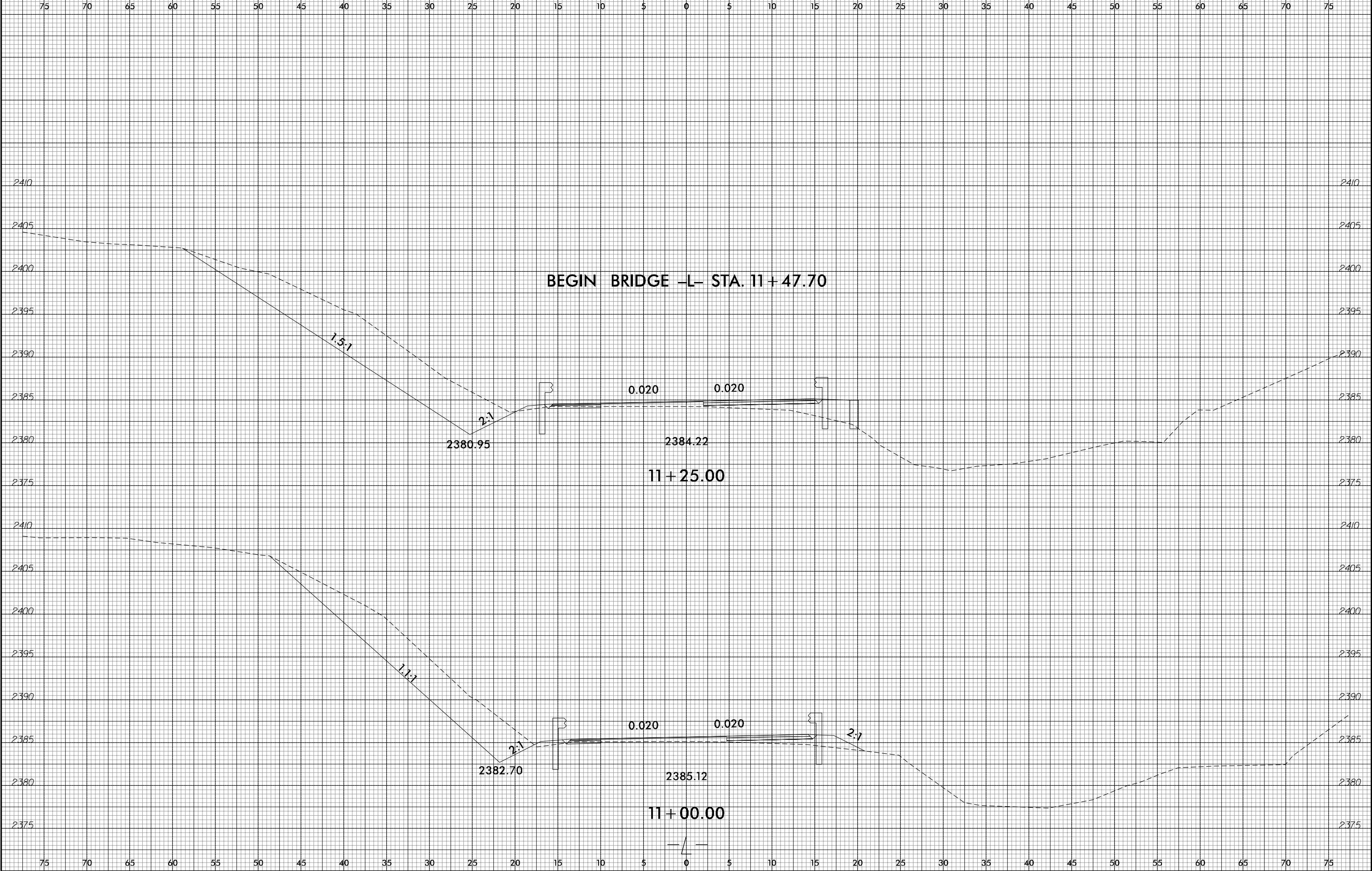
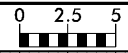
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UNLESS ALL SIGNATURES COMPLETED



BEGIN GRADE -L- STA. 10+05.00  
BEGIN PROJECT -L- STA. 10+00.00

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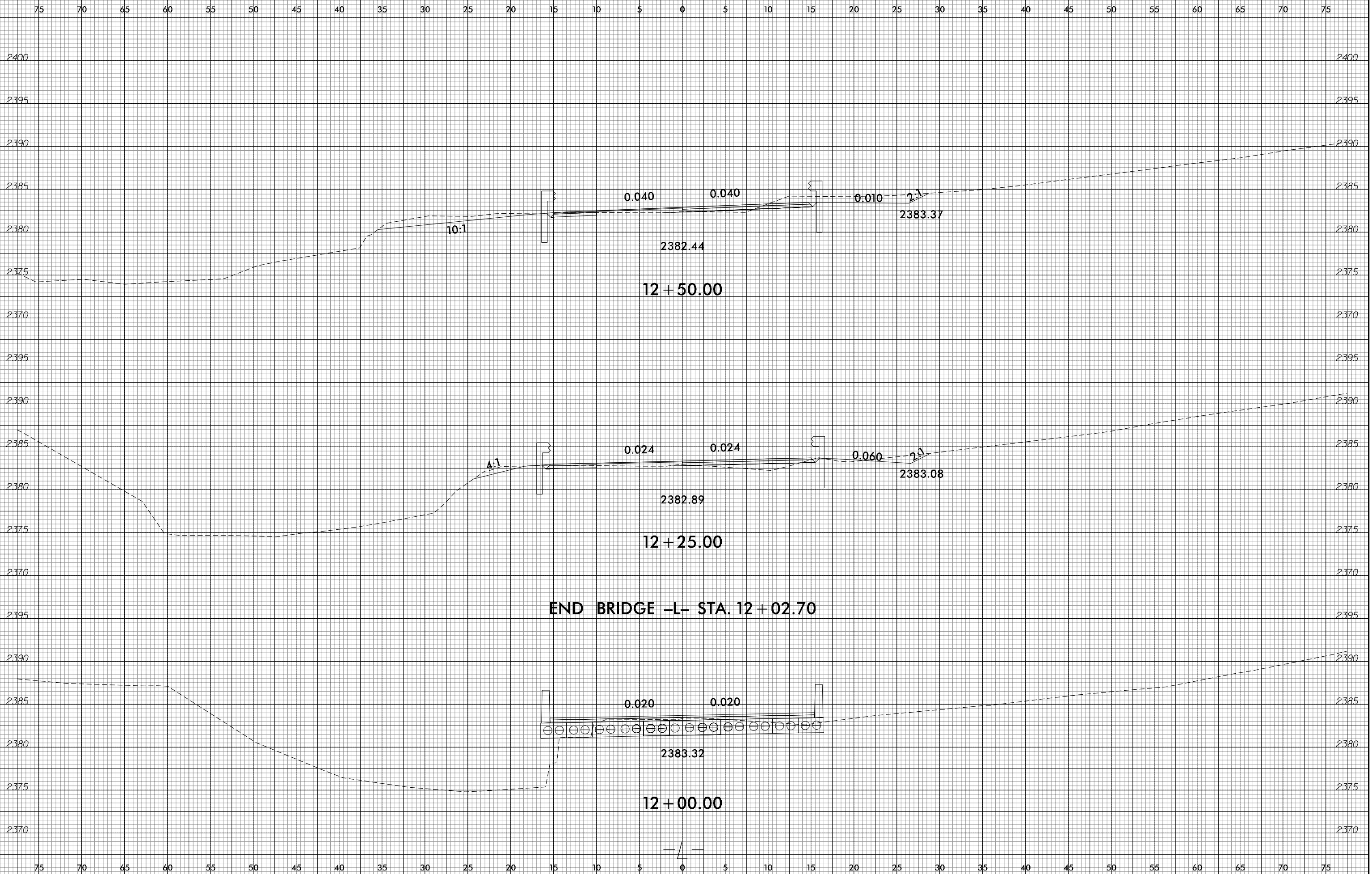


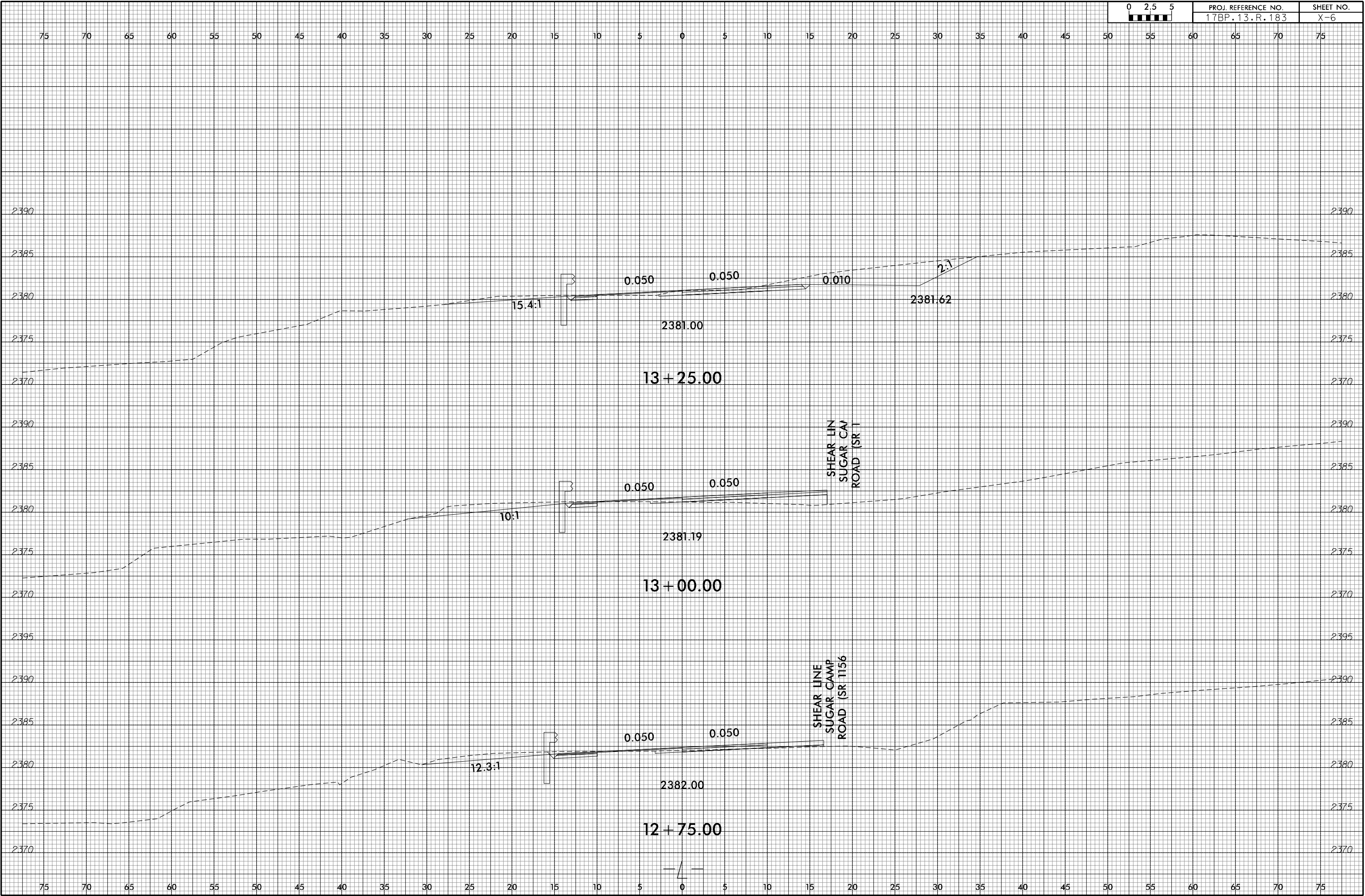
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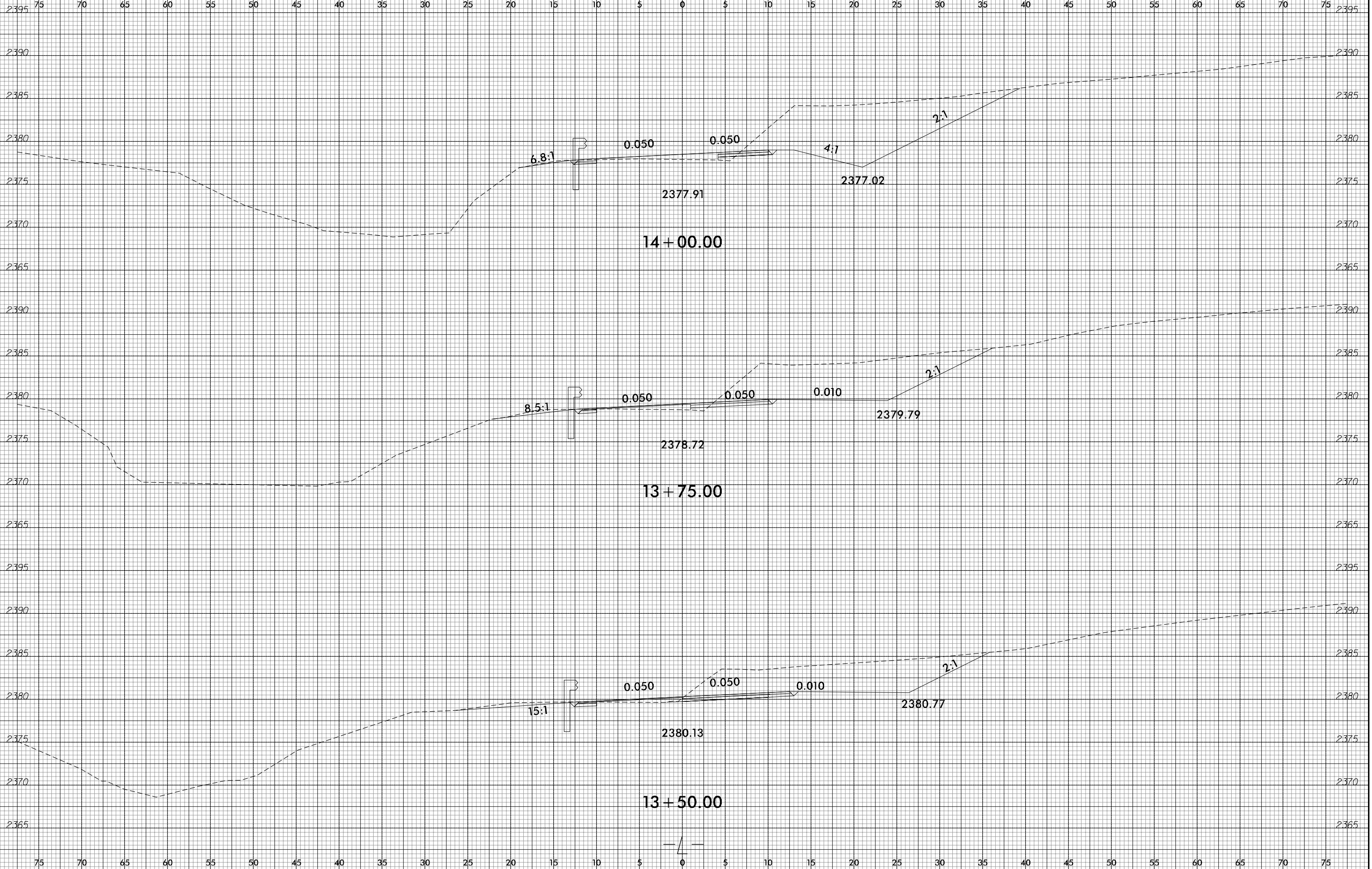


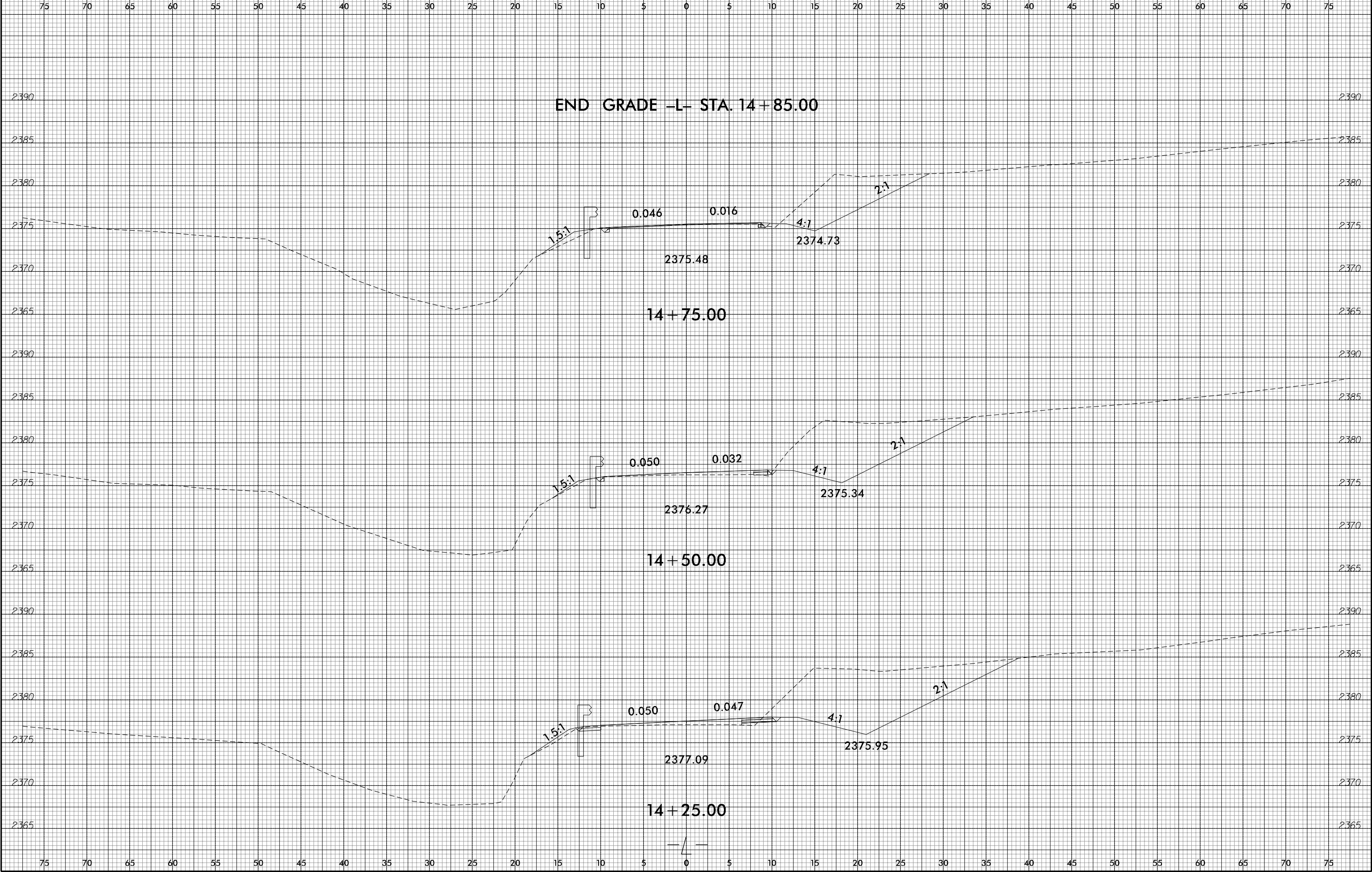
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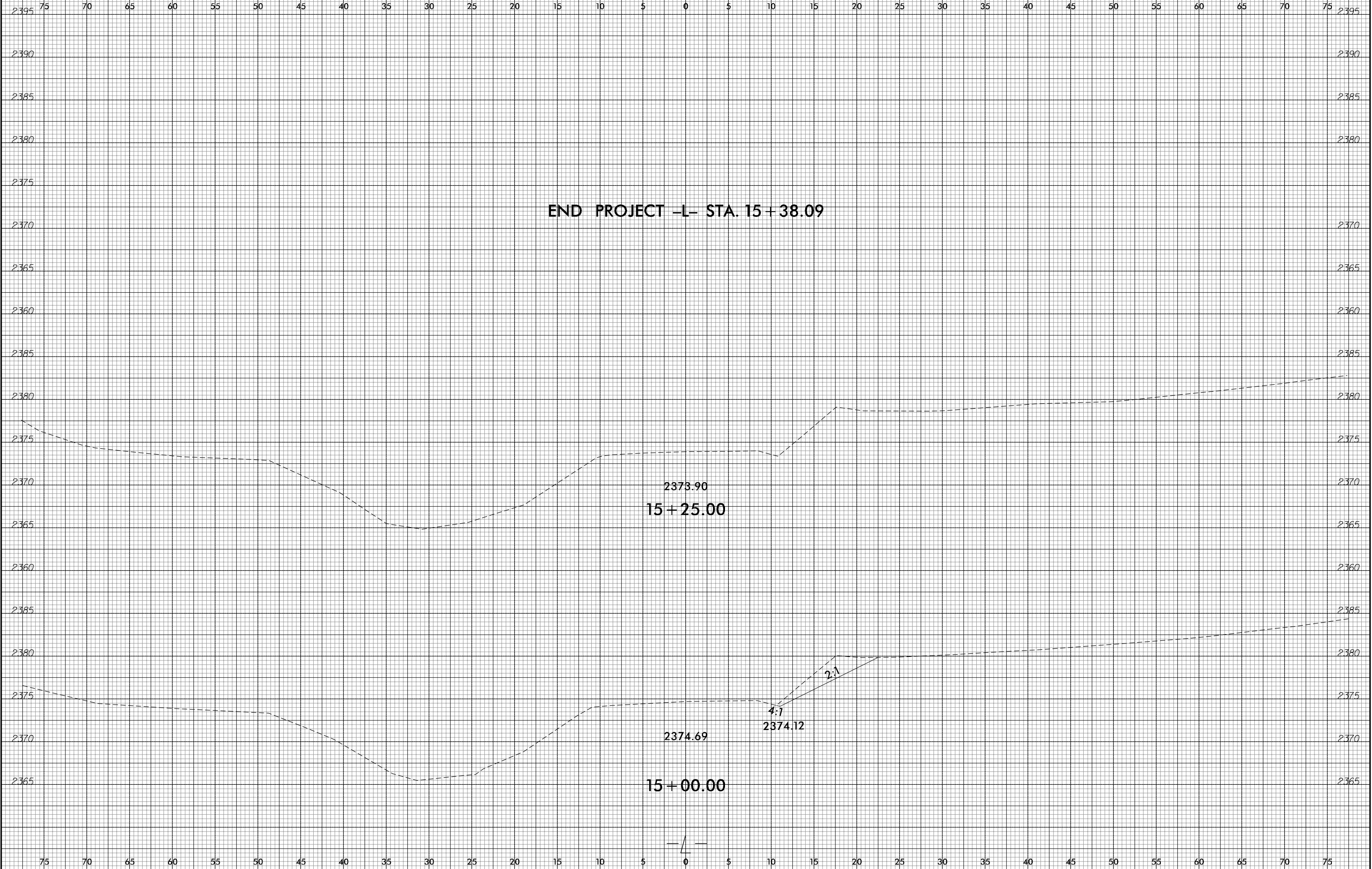






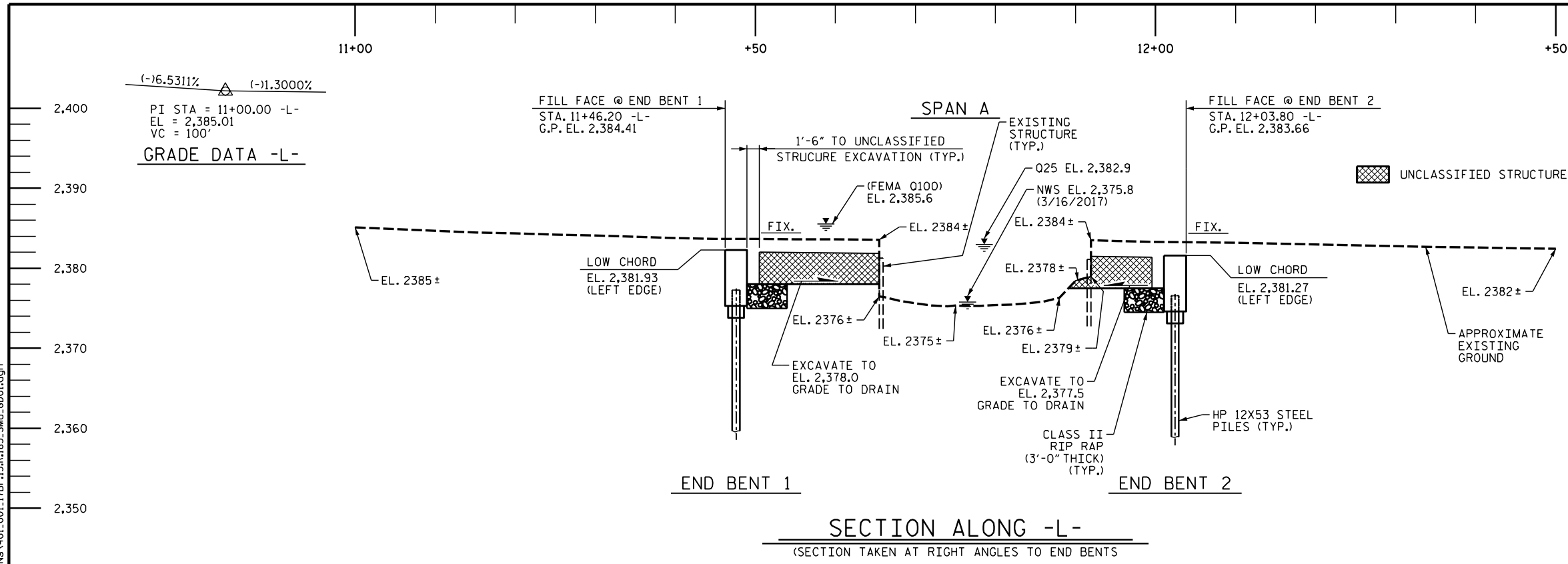








2/22/2022 J:\188360C - 2015 W Divisions Planning & Design On-Call\188360 Division 13 Bridges\17BP.13.R.183 Madison\44\Structures\2.0 Drafting\1.0 DGNs\401.001.17BP.13.R.183.SMU.GD01.dgn



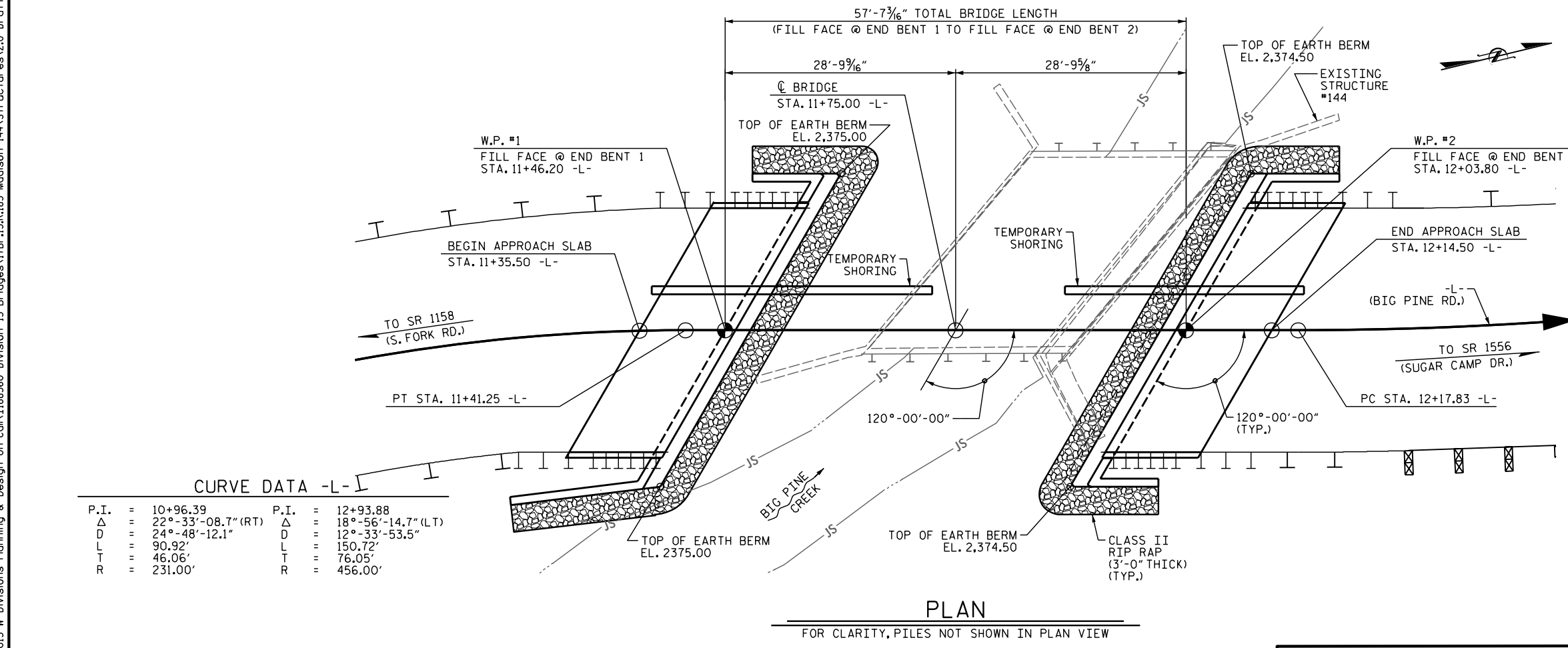
**HYDRAULIC DATA**

DESIGN DISCHARGE	1500 CFS
FREQUENCY OF DESIGN FLOOD	25 YRS. *
DESIGN HIGH WATER ELEVATION	2,382.9
DRAINAGE AREA	6.1 SQ.MI.
BASE DISCHARGE (Q100)	2520 CFS
BASE HIGH WATER ELEVATION	2,385.6
* MAINTAINS EXISTING LEVEL OF SERVICE	

**OVERTOPPING FLOOD DATA**

OVERTOPPING FLOOD DISCHARGE	1600 CFS
FREQUENCY OF OVERTOPPING FLOOD	>25 YRS.
OVERTOPPING FLOOD ELEVATION	2,383.3
@ STA. 12+65.00 -L-	

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS



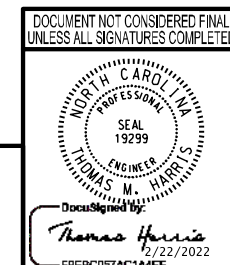
**CURVE DATA -L-**

P.I.	= 10+96.39	P.I.	= 12+93.88
Δ	= 22°-33'-08.7" (RT)	Δ	= 18°-56'-14.7" (LT)
D	= 24°-48'-12.1"	D	= 12°-33'-53.5"
L	= 90.92'	L	= 150.72'
T	= 46.06'	T	= 76.05'
R	= 231.00'	R	= 456.00'

PROJECT NO. 17BP.13.R.183  
 MADISON COUNTY  
 STATION: 11+75.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 144

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUPERSTRUCTURE  
 GENERAL DRAWING  
 FOR BRIDGE ON SR 1151  
 (BIG PINE RD.) OVER BIG PINE CREEK  
 BETWEEN SR 1158 & SR 1156



**wsp**  
 WSP USA Inc.  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 TEL: 1.919.836.4040  
 LICENSE NO. F-0165

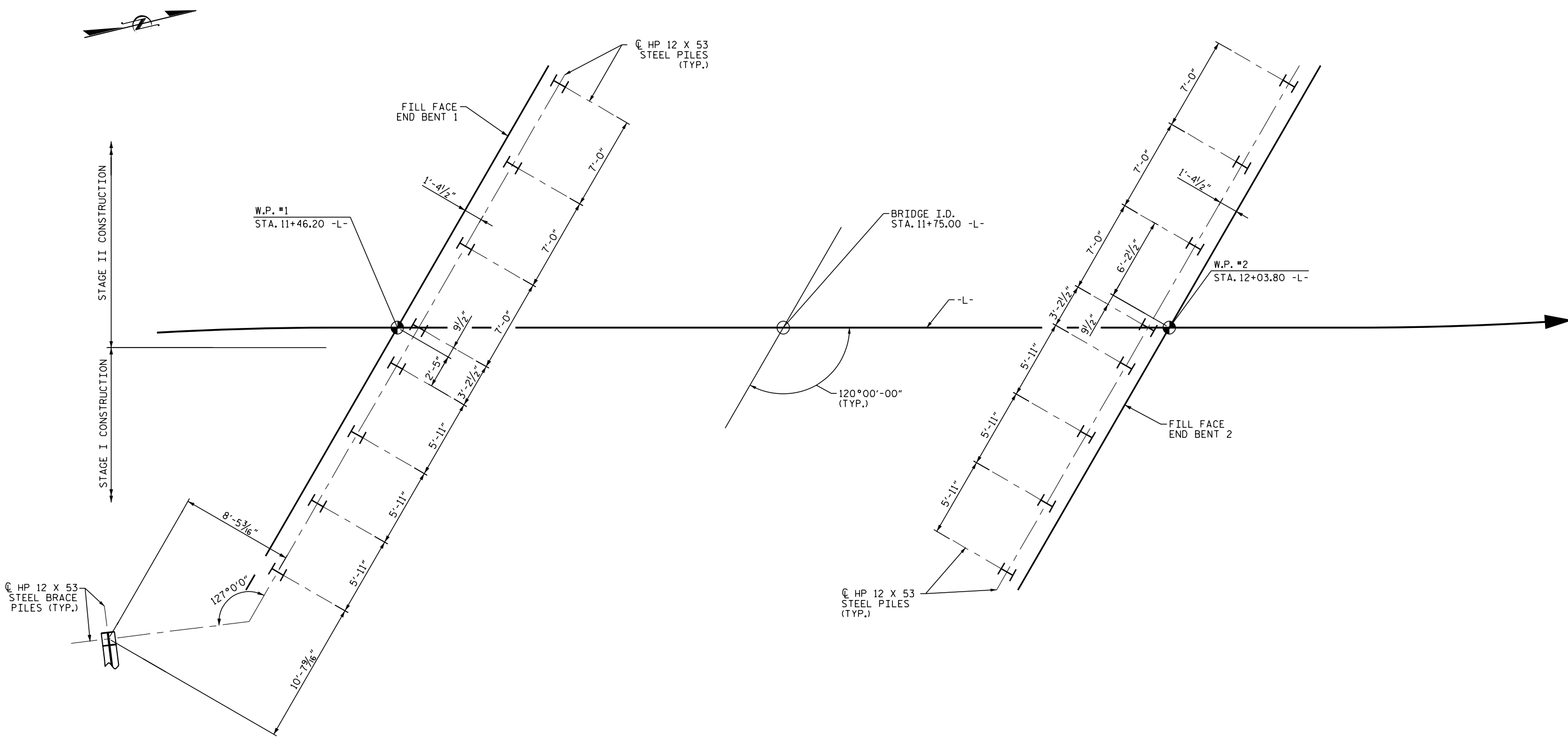
DESIGNED BY: J. WHEATLEY DATE: FEB 2022  
 DRAWN BY: J. WHEATLEY DATE: FEB 2022  
 CHECKED BY: T. KIRSCHBAUM DATE: FEB 2022  
 DESIGN ENGINEER OF RECORD: T.M. HARRIS DATE: FEB 2022

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-1  
 TOTAL SHEETS 26

2/14/2022 J:\188360C - 2015 W Divisions Planning & Design On-Call\188360 Division 13 Bridges\17BP.13.R.183 Madison\144\Structures\2.0 Drafting\1.0 DGNs\401\_003\_17BP.13.R.183\_SMU\_GD02.dgn



END BENT 1

### FOUNDATION LAYOUT

(END BENTS ARE PARALLEL)

END BENT 2

#### NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 75 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 125 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT 1. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 75 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 125 TONS PER PILE.

DRILLED-IN PILES ARE REQUIRED FOR END BENT 2. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 2364.6 FT. (LEFT) AND 2365.7 FT. (RIGHT). FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

CONCRETE IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT 2.

DIMENSIONS ARE TO CENTERLINE OF PILE AT BOTTOM OF CAP/WING.

PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
 STATION: 11+75.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUPERSTRUCTURE  
 GENERAL DRAWING  
 FOR BRIDGE ON SR 1151  
 (BIG PINE RD.) OVER BIG PINE CREEK  
 BETWEEN SR 1158 & SR 1156

DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

THOMAS M. HARRIS  
 ENGINEER  
 SEAL 19299  
 2/22/2022

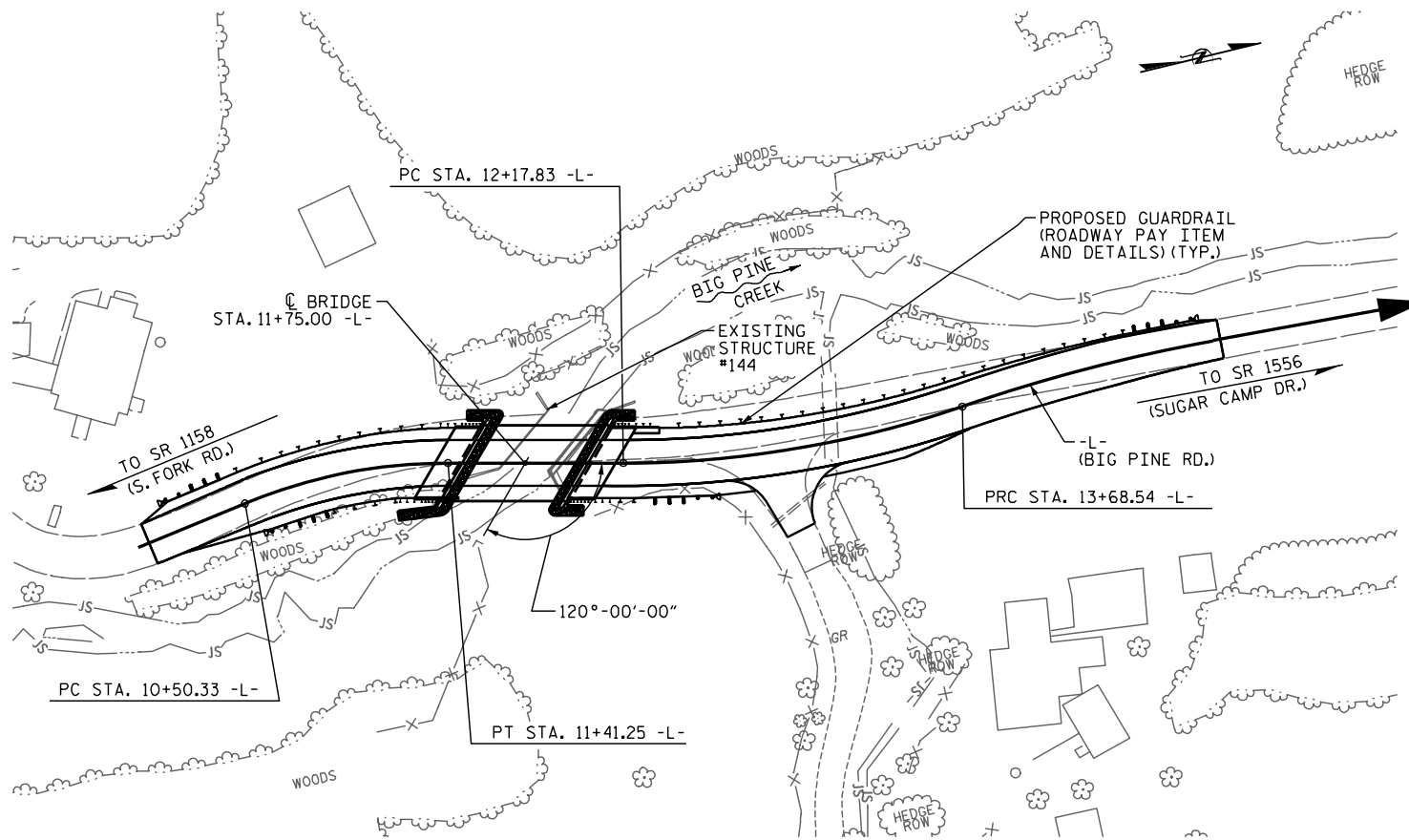
**wsp**

WSP USA Inc.  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 TEL: 1.919.836.4040  
 LICENSE NO. F-0165

DESIGNED BY:	J. WHEATLEY	DATE:	FEB 2022
DRAWN BY:	J. WHEATLEY	DATE:	FEB 2022
CHECKED BY:	T. KIRSCHBAUM	DATE:	FEB 2022
DESIGN ENGINEER OF RECORD:	T.M. HARRIS	DATE:	FEB 2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			26
2			4			

BM #1 : STA. 11+79.28 -L- 37.75' LEFT, ELEVATION = 2382.49'



**LOCATION SKETCH**

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

**NOTES**

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF A SINGLE SPAN 24'-0", WITH A CLEAR ROADWAY WIDTH OF 24'-0" TIMBER DECK WITH ASPHALT WEARING SURFACE ON STEEL I-BEAMS WITH CONCRETE END BENTS AND LOCATED AT PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED BELOW LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE FURTHER DETERIORATE, THIS LOAD LIMITATION MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.
- REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.
- INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURE".
- THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 25 FT. (LEFT) AND 25 FT. (RIGHT) OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.
- THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.
- THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH "HEC 18 - EVALUATING SCOUR AT BRIDGES".
- ASPHALT WEARING SURFACE IS INCLUDED IN THE ROADWAY QUANTITY ON ROADWAY PLANS.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.
- FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.
- TEMPORARY SHORING WILL BE REQUIRED IN THE AREA INDICATED IN THE PLAN VIEW.
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

**TOTAL BILL OF MATERIAL**

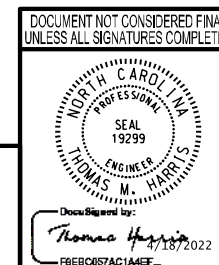
	REMOVAL OF EXISTING STRUCTURE @ STA. 11+75.00 -L-	ASBESTOS ASSESSMENT	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES	HP 12 X 53 STEEL PILES	STEEL PILE POINTS	2-BAR METAL RAIL	1'-3" X 2'-9" CONCRETE PARAPET	RIP RAP CLASS II (3'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" X 1'-9" PRESTRESSED CONCRETE CORED SLABS	
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	EA.	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	No.	No.	LIN. FT.	EACH	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	No.	LIN. FT.
SUPERSTRUCTURE	LUMP SUM	LUMP SUM						LUMP SUM					93.7	95			LUMP SUM	11	605
END BENT 1						LUMP SUM	41.6		3947	8	8	120	8		72	53			
END BENT 2			46	24		LUMP SUM	39.5		3503	8	8	96			66	49			
<b>TOTAL</b>	LUMP SUM	LUMP SUM	46	24	2	LUMP SUM	81.1	LUMP SUM	7450	16	16	216	8	93.7	95	138	LUMP SUM	11	605

PROJECT NO. 17BP.13.R.183  
 MADISON COUNTY  
 STATION: 11+75.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

GENERAL DRAWING  
 FOR BRIDGE ON SR 1151  
 (BIG PINE RD.) OVER BIG PINE CREEK  
 BETWEEN SR 1158 & SR 1156



**wsp**  
 WSP USA Inc.  
 434 FAYETTEVILLE STREET  
 SUITE 1500  
 RALEIGH, NC 27601  
 TEL: 1.919.836.4040  
 LICENSE NO. F-0165

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			26

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DESIGNED BY: J. WHEATLEY DATE: APR 2022  
 DRAWN BY: J. WHEATLEY DATE: APR 2022  
 CHECKED BY: T. KIRSCHBAUM DATE: APR 2022  
 DESIGN ENGINEER OF RECORD: T.M. HARRIS DATE: APR 2022

## LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W X RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVELOAD FACTORS	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93(Inv)	N/A	1	1.163	--	1.75	0.249	1.36	55'	EL	26.923	0.659	1.21	55'	EL	10.769	0.80	0.249	<b>1.16</b>	55'	EL	<b>26.923</b>		
	HL-93(0pr)	N/A	--	1.564	--	1.35	0.249	1.76	55'	EL	26.923	0.659	1.56	55'	EL	10.769	N/A	--	--	--	--	--		
	HS-20(Inv)	36,000	2	1.424	51.265	1.75	0.249	1.7	55'	EL	26.923	0.659	<b>1.42</b>	55'	EL	<b>10.769</b>	0.80	0.249	1.46	55'	EL	26.923		
	HS-20(0pr)	36,000	--	1.846	66.455	1.35	0.249	2.2	55'	EL	26.923	0.659	1.85	55'	EL	10.769	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SV	SNSH	13,500	--	3.057	41.264	1.4	0.249	4.46	55'	EL	26.923	0.659	3.96	55'	EL	10.769	0.80	0.249	3.06	55'	EL	26.923	
		SNGARBS2	20,000	--	2.374	47.473	1.4	0.249	3.46	55'	EL	26.923	0.659	2.9	55'	EL	10.769	0.80	0.249	2.37	55'	EL	26.923	
		SNAGRIS2	22,000	--	2.291	50.392	1.4	0.249	3.34	55'	EL	26.923	0.659	2.72	55'	EL	10.769	0.80	0.249	2.29	55'	EL	26.923	
		SNCOTTS3	27,250	--	1.524	41.521	1.4	0.249	2.22	55'	EL	26.923	0.659	1.98	55'	EL	10.769	0.80	0.249	1.52	55'	EL	26.923	
		SNAGGRS4	34,925	--	1.31	45.74	1.4	0.249	1.91	55'	EL	26.923	0.659	1.71	55'	EL	10.769	0.80	0.249	1.31	55'	EL	26.923	
		SNS5A	35,550	--	1.278	45.439	1.4	0.249	1.86	55'	EL	26.923	0.659	1.76	55'	EL	10.769	0.80	0.249	1.28	55'	EL	26.923	
		SNS6A	39,950	--	1.189	47.481	1.4	0.249	1.73	55'	EL	26.923	0.659	1.63	55'	EL	10.769	0.80	0.249	1.19	55'	EL	26.923	
	SNS7B	42,000	--	1.132	47.562	1.4	0.249	1.65	55'	EL	26.923	0.659	1.64	55'	EL	10.769	0.80	0.249	1.13	55'	EL	26.923		
	TTST	TNAGRIT3	33,000	--	1.454	47.984	1.4	0.249	2.12	55'	EL	26.923	0.659	1.92	55'	EL	10.769	0.80	0.249	1.45	55'	EL	26.923	
		TNT4A	33,075	--	1.465	48.451	1.4	0.249	2.14	55'	EL	26.923	0.659	1.85	55'	EL	10.769	0.80	0.249	1.46	55'	EL	26.923	
		TNT6A	41,600	--	1.213	50.478	1.4	0.249	1.77	55'	EL	26.923	0.659	1.81	55'	EL	10.769	0.80	0.249	1.21	55'	EL	26.923	
		TNT7A	42,000	--	1.228	51.576	1.4	0.249	1.79	55'	EL	26.923	0.659	1.67	55'	EL	10.769	0.80	0.249	1.23	55'	EL	26.923	
		TNT7B	42,000	--	1.282	53.827	1.4	0.249	1.87	55'	EL	26.923	0.659	1.58	55'	EL	10.769	0.80	0.249	1.28	55'	EL	26.923	
		TNAGRIT4	43,000	--	1.213	52.158	1.4	0.249	1.77	55'	EL	26.923	0.659	1.52	55'	EL	10.769	0.80	0.249	1.21	55'	EL	26.923	
TNAGT5A		45,000	--	1.136	51.134	1.4	0.249	1.66	55'	EL	26.923	0.659	1.55	55'	EL	10.769	0.80	0.249	1.14	55'	EL	26.923		
TNAGT5B	45,000	<b>3</b>	1.116	50.224	1.4	0.249	1.63	55'	EL	26.923	0.659	1.44	55'	EL	10.769	0.80	0.249	<b>1.12</b>	55'	EL	<b>26.923</b>			

### LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	$\gamma_{DC}$	$\gamma_{DW}$
	STRENGTH I	1.25	1.50
	SERVICE III	1.00	1.00

### NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.  
ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

### COMMENTS:

- 1.
- 2.
- 3.
- 4.

**# CONTROLLING LOAD RATING**

① DESIGN LOAD RATING (HL-93)

② DESIGN LOAD RATING (HS-20)

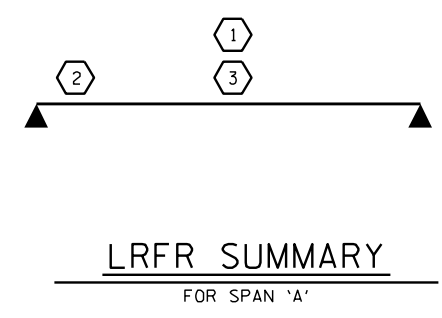
③ LEGAL LOAD RATING \*\*

\*\* SEE CHART FOR VEHICLE TYPE

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**GIRDER LOCATION**

I - INTERIOR GIRDER  
EL - EXTERIOR LEFT GIRDER  
ER - EXTERIOR RIGHT GIRDER

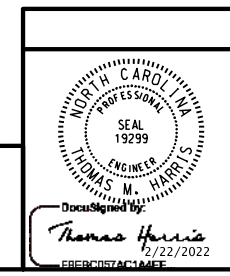


PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
STATION: 11+75.00 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
LRFR SUMMARY FOR  
55' CORED SLAB UNIT  
120° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			
2			4			26



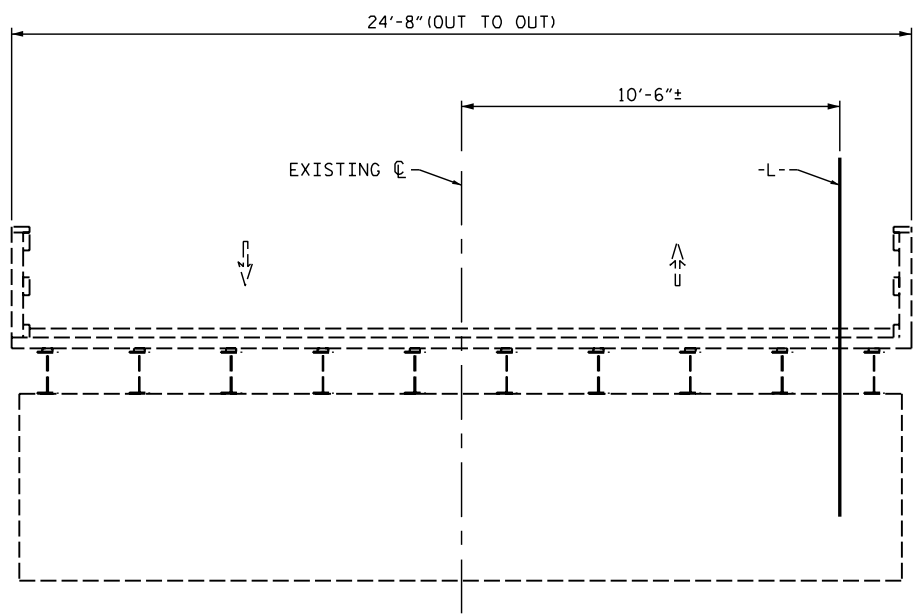
**wsp**

WSP USA Inc.  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
LICENSE NO. F-0165

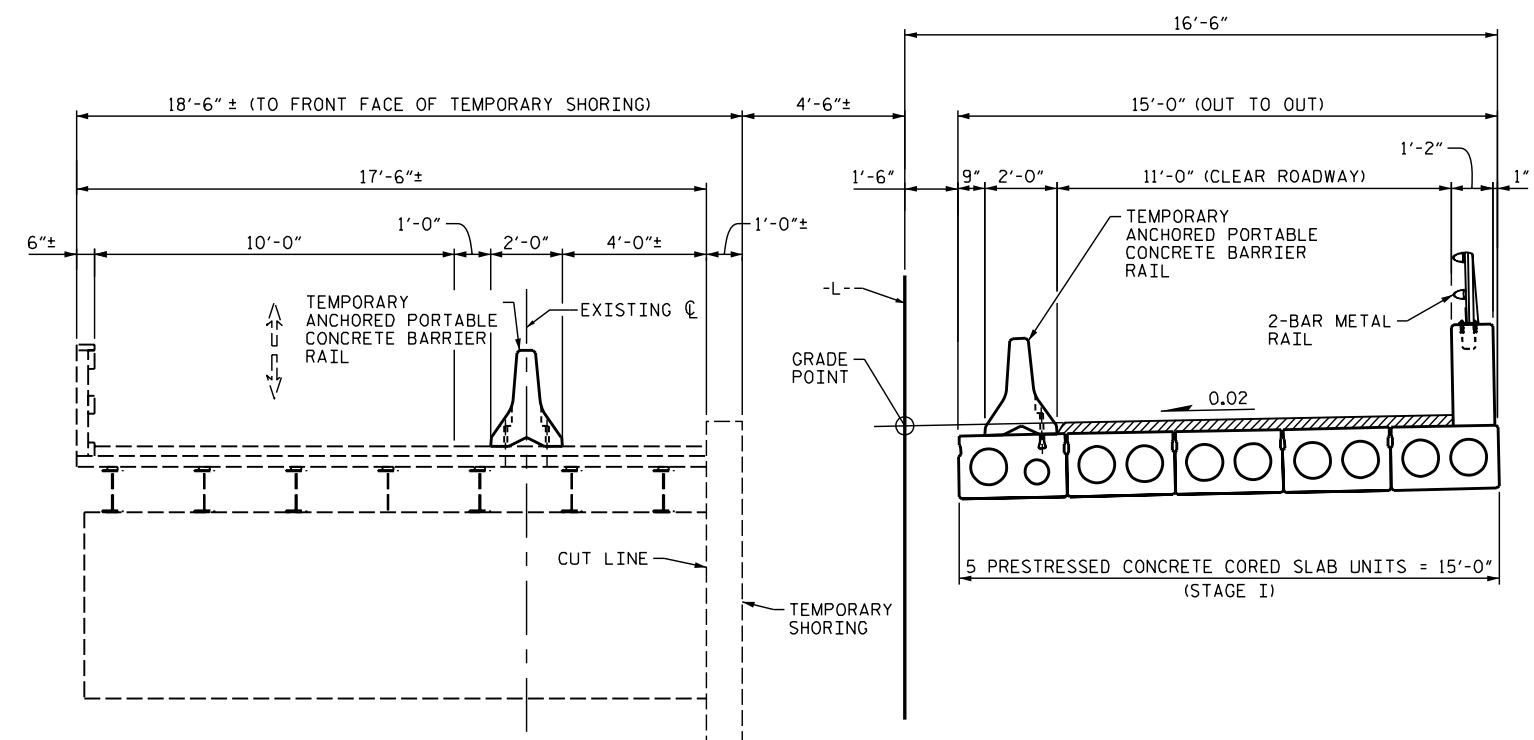
2/14/2022  
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CHECKED BY: DNS 6/10

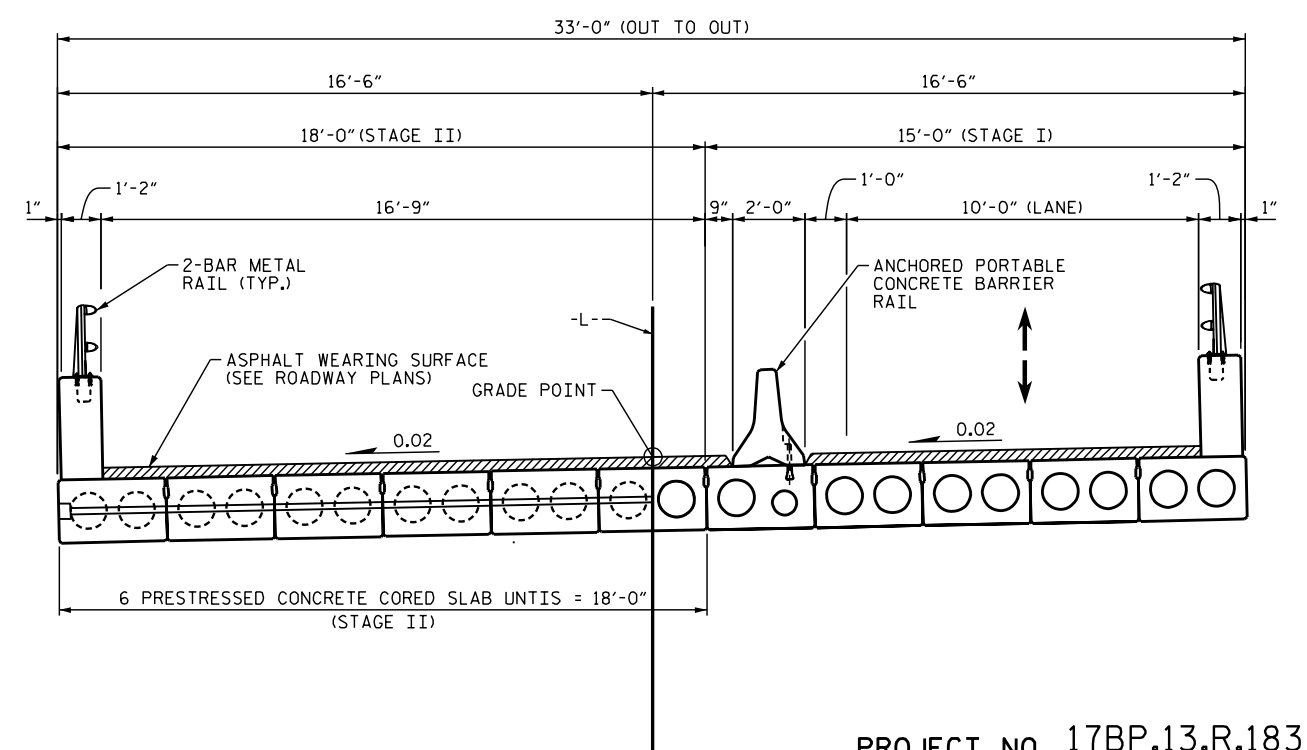
ASSEMBLED BY: J. WHEATLEY DATE: FEB 2022  
CHECKED BY: T. KIRSCHBAUM DATE: FEB 2022  
DESIGN ENGINEER OF RECORD: T. HARRIS DATE: FEB 2022



EXISTING STRUCTURE



STAGE I



STAGE II

PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
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DRAWN BY:	J. WHEATLEY	DATE:	FEB 2022
CHECKED BY:	T. KIRSCHBAUM	DATE:	FEB 2022
DESIGN ENGINEER OF RECORD:	T.M. HARRIS	DATE:	FEB 2022

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434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
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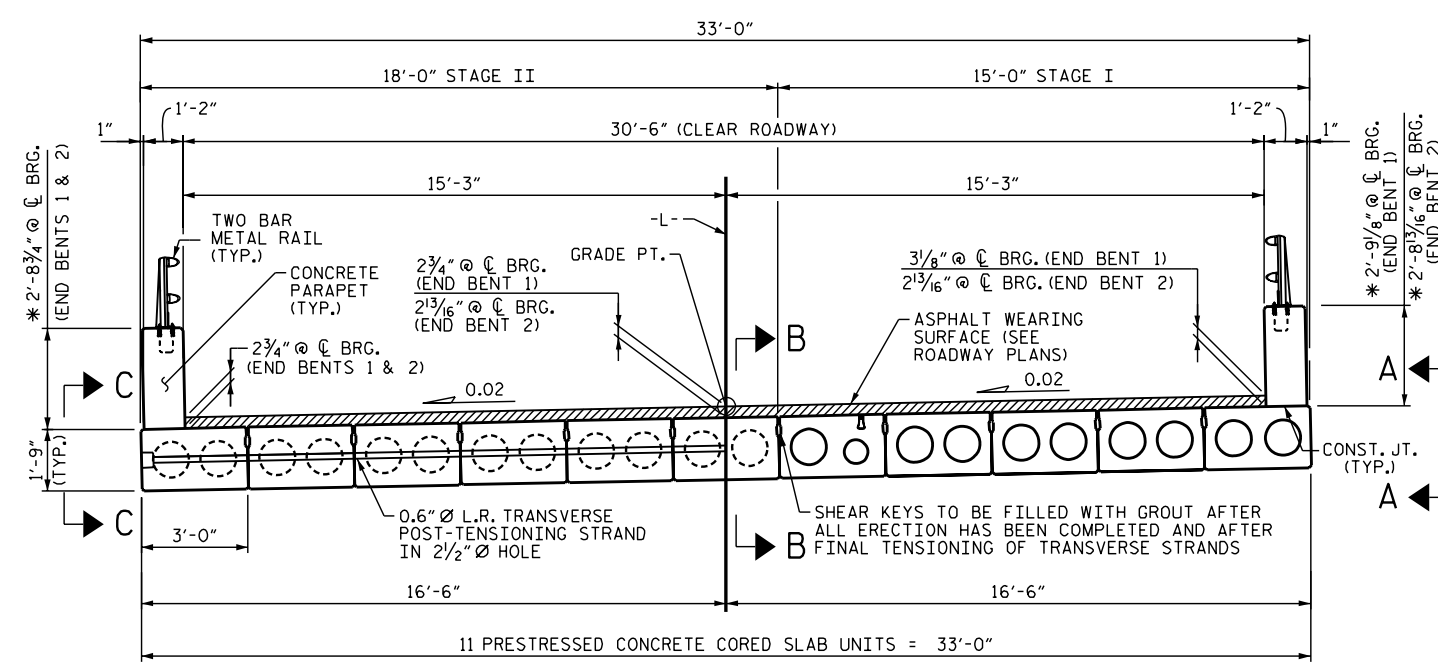
Thomas M. Harris  
2/22/2022

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**PHASE CONSTRUCTION**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			26

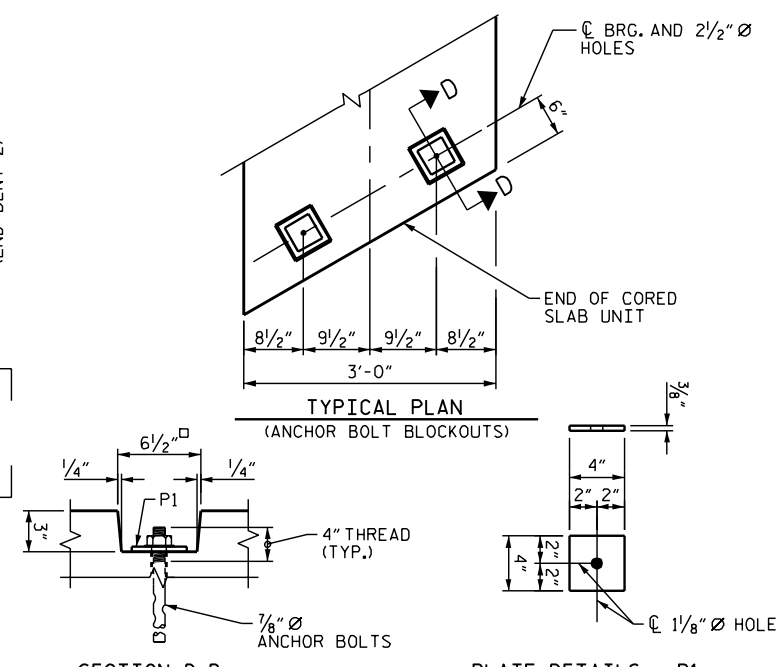




HALF SECTION AT INTERMEDIATE DIAPHRAGMS  
HALF SECTION THROUGH VOIDS

TYPICAL SECTION

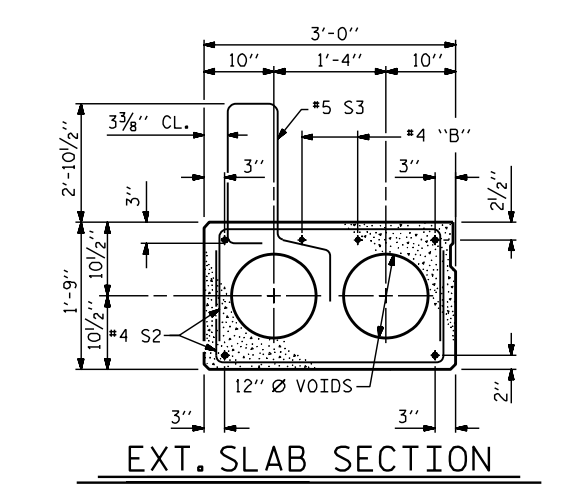
\* - THE MAXIMUM PARAPET HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE PARAPET AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE PARAPET FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS SEE THE "CONCRETE PARAPET DETAILS" SHEET. FOR VIEWS A-A, B-B AND C-C, SEE SHEET 2 OF 5.



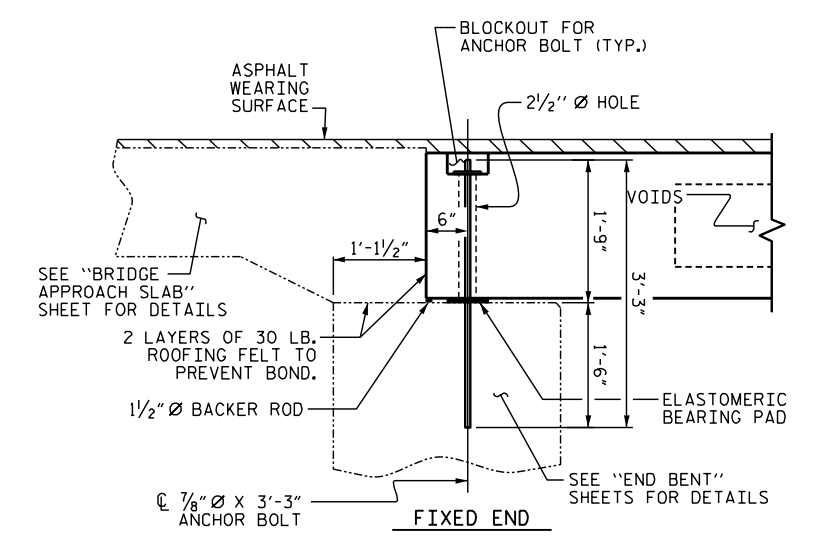
SECTION D-D (FIXED)  
PLATE DETAILS - P1 (FIXED) P1 (44 REQ'D)

BLOCKOUT DETAIL FOR ANCHOR BOLTS

BLOCKOUTS SHALL BE FILLED WITH NONSHRINK GROUT.

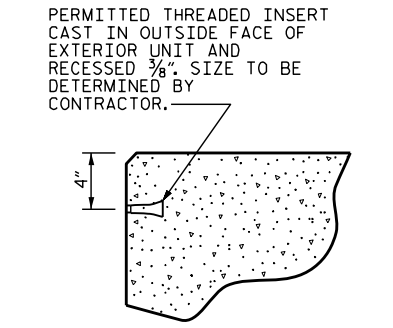


EXT. SLAB SECTION  
TYPE I (FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION - TYPE II)

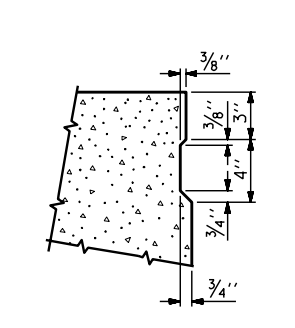


SECTION AT END BENT

THE COST OF ANCHOR BOLTS, P1 PLATES AND NUTS SHALL BE INCLUDED IN THE PRICE BID FOR PRECAST UNITS.

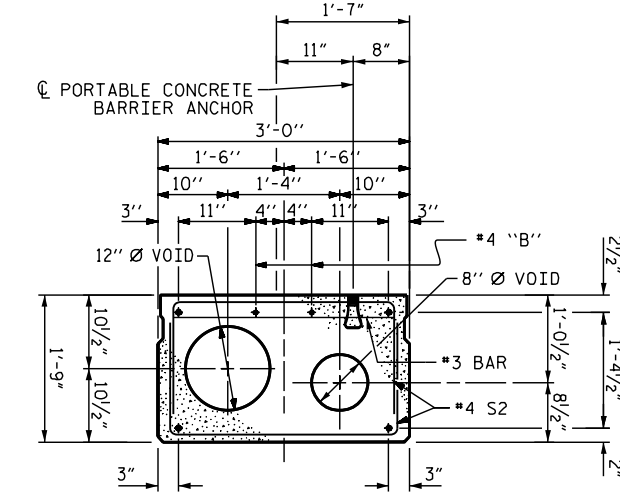


THREADED INSERT DETAIL

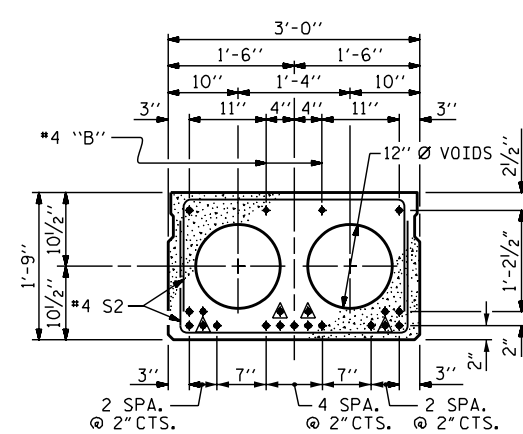


SHEAR KEY DETAIL

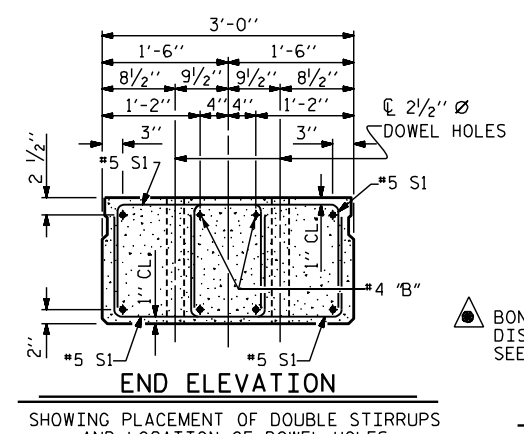
NOTE: OMIT SHEAR KEY ON OUTSIDE FACE OF EXTERIOR CORED SLABS.



INTERIOR SLAB SECTION  
TYPE II (FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTIONS - TYPE II)



INTERIOR SLAB SECTION  
TYPE II (19 STRANDS REQUIRED)



END ELEVATION  
SHOWING PLACEMENT OF DOUBLE STIRRUPS AND LOCATION OF DOWEL HOLES (STRAND LAYOUT NOT SHOWN)  
INTERIOR SLAB SECTION SHOWN-EXTERIOR SLAB SECTION SIMILAR EXCEPT SHEAR KEY LOCATION.

DEBONDING LEGEND

BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 6'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

0.6" Ø LOW RELAXATION STRAND LAYOUT

PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
STATION: 11+75.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA  
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RALEIGH

3'-0" X 1'-9"  
PRESTRESSED CONCRETE  
CORED SLAB UNIT  
120° SKEW

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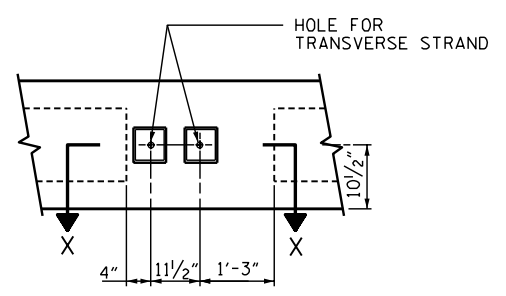
THOMAS M. HARRIS  
ENGINEER  
2/22/2022

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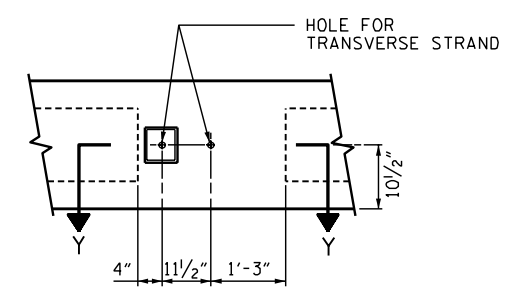
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CHECKED BY:	T. KIRSCHBAUM	DATE:	FEB 2022
DESIGN ENGINEER OF RECORD:	T.M. HARRIS	DATE:	FEB 2022

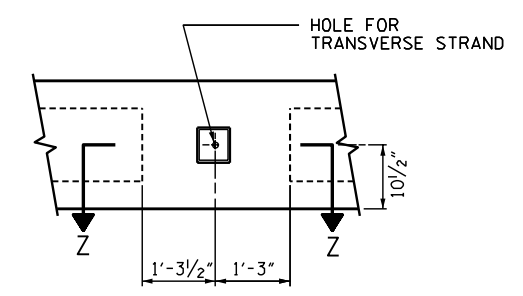




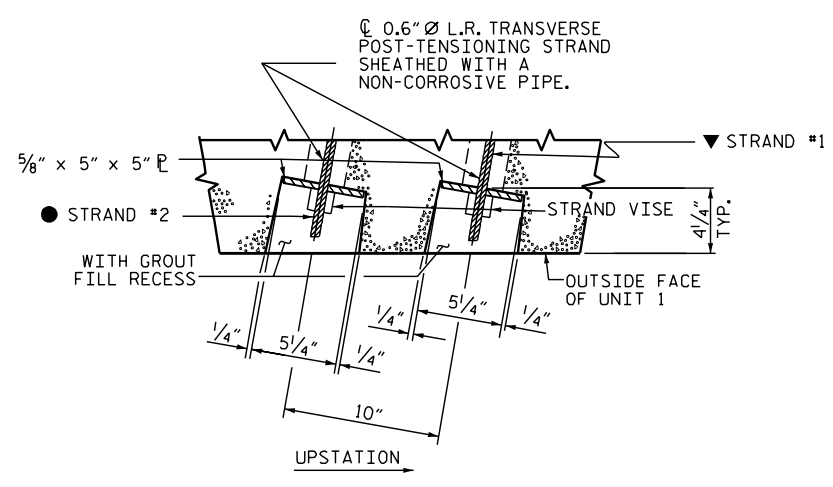
VIEW A-A  
SEE SHEET 3 OF 5



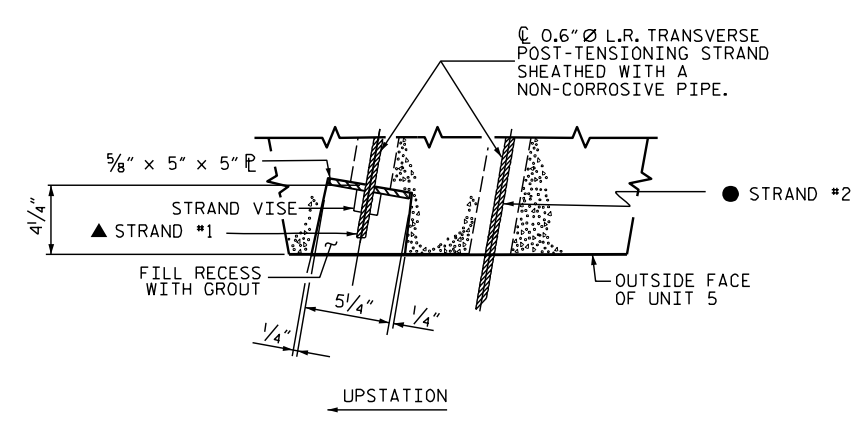
VIEW B-B  
SEE SHEET 3 OF 5



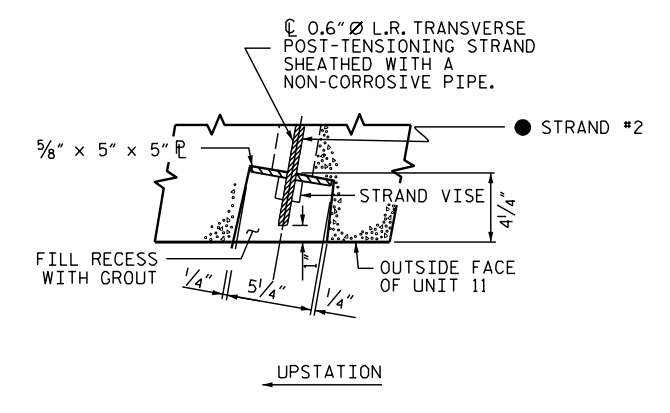
VIEW C-C  
SEE SHEET 3 OF 5



SECTION X-X



SECTION Y-Y



SECTION Z-Z

**GROUPED RECESS AT END OF POST-TENSIONED STRAND CORED SLABS**

- ▲ STRAND #1 GOES THROUGH 5 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE I CONSTRUCTION)
- STRAND #2 GOES THROUGH ALL 11 CORED SLAB UNITS (TO BE TENSIONED DURING STAGE II CONSTRUCTION)

PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
 STATION: 11+75.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

3'-0" X 1'-9"  
 PRESTRESSED CONCRETE  
 CORED SLAB UNIT  
 120° SKEW

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1			3			TOTAL SHEETS
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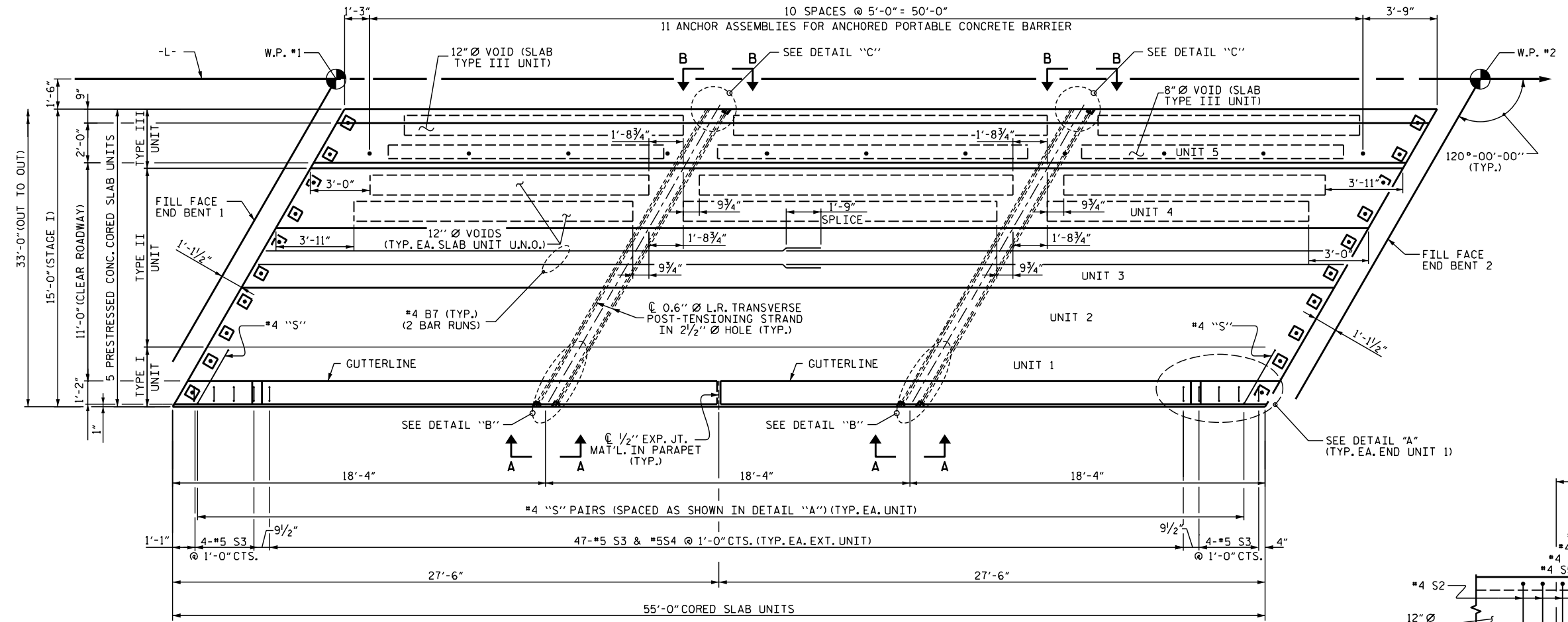
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SEAL  
 19299  
 ENGINEER  
 THOMAS M. HARRIS  
 2/22/2022

2/14/2022  
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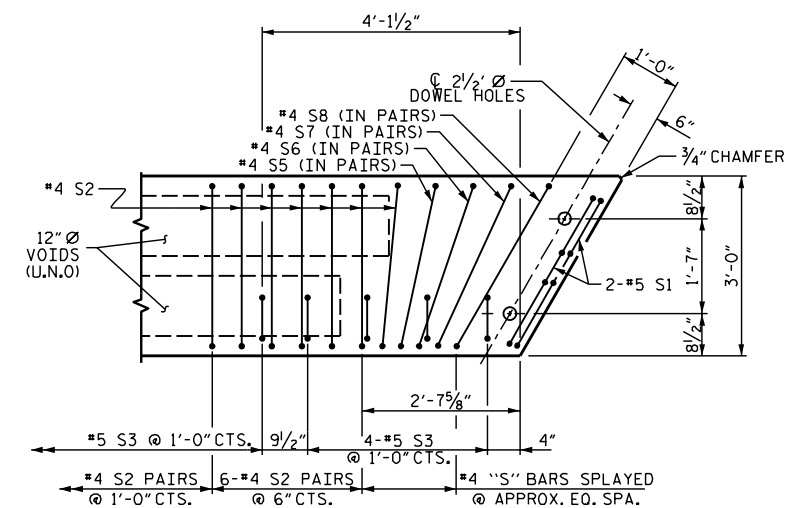
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CHECKED BY:	T. KIRSCHBAUM	DATE:	FEB 2022
DESIGN ENGINEER OF RECORD:	T.M. HARRIS	DATE:	FEB 2022

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**PLAN OF UNIT - STAGE I**

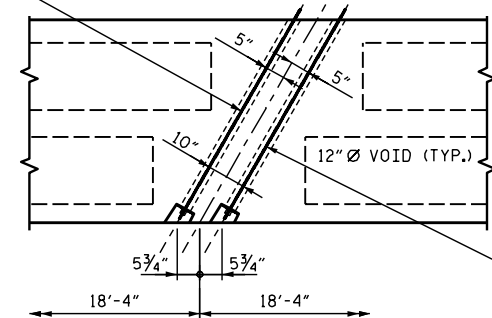
U.N.O. DENOTES UNLESS NOTED OTHERWISE FOR VIEW A-A AND B-B, SEE SHEET 2 OF 5



**DETAIL "A"**

(SIMILAR EACH END OF UNIT)  
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S3 BARS.

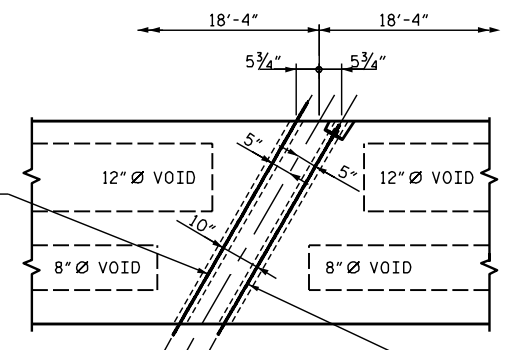
0.6" Ø L.R. TRANSVERSE POST-TENSIONING STRAND IN 2 1/2" Ø HOLE (STRAND #2 TO BE TENSIONED IN STAGE II)



**DETAIL "B"**

#4 S2 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUDED RECESS AND 2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES (TYPE I UNIT SHOWN)

0.6" Ø L.R. TRANSVERSE POST-TENSIONING STRAND IN 2 1/2" Ø HOLE (STRAND #2 TO BE TENSIONED IN STAGE II)



**DETAIL "C"**

#4 S2 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUDED RECESS AND 2 1/2" Ø TRANSVERSE POST-TENSIONING STRAND HOLES (TYPE III UNIT SHOWN)

0.6" Ø L.R. TRANSVERSE POST-TENSIONING STRAND IN 2 1/2" Ø HOLE (STRAND #1 - STAGE I)

PROJECT NO. 17BP.13.R.183

MADISON COUNTY

STATION: 11+75.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA  
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PLAN OF 55' UNIT  
30'-6" CLEAR ROADWAY  
120° SKEW

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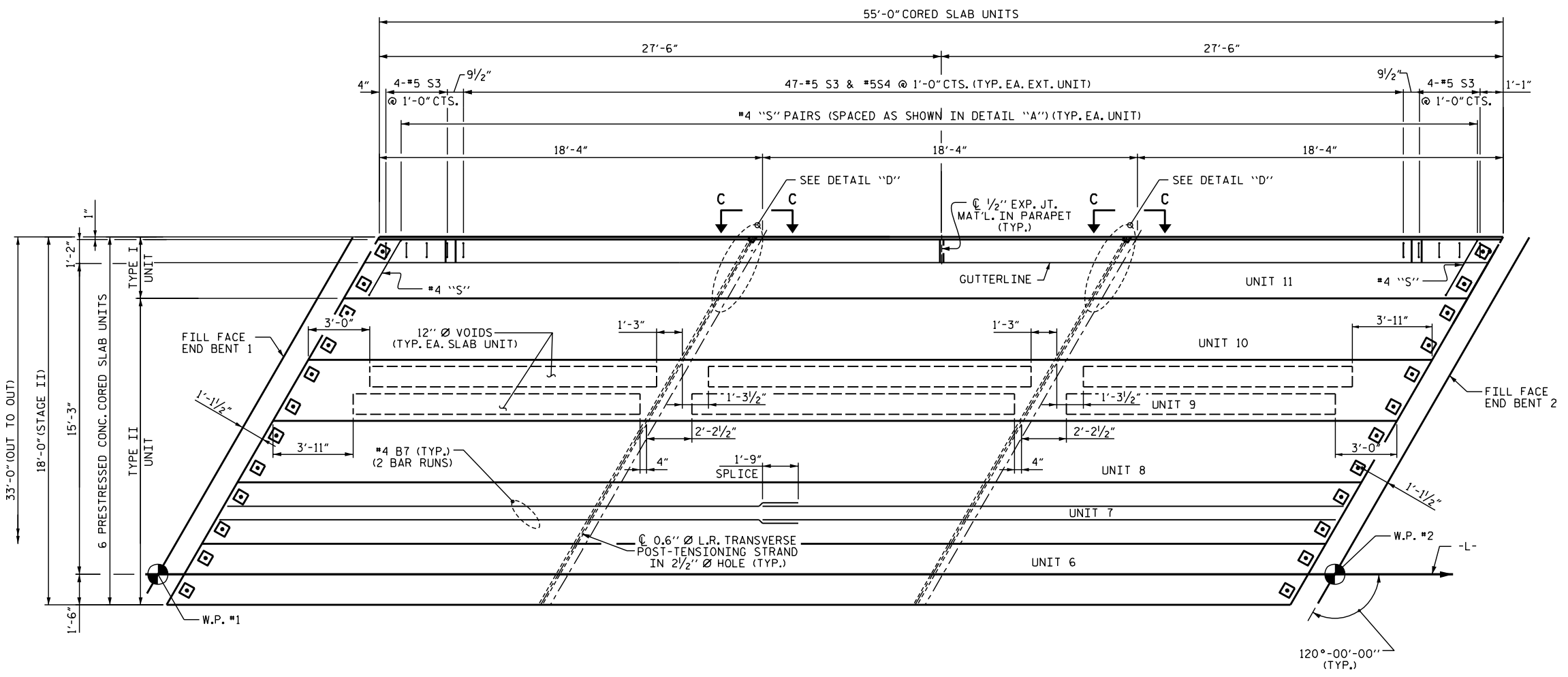
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THOMAS M. HARRIS  
REGISTERED PROFESSIONAL ENGINEER  
SEAL 19299  
2/22/2022

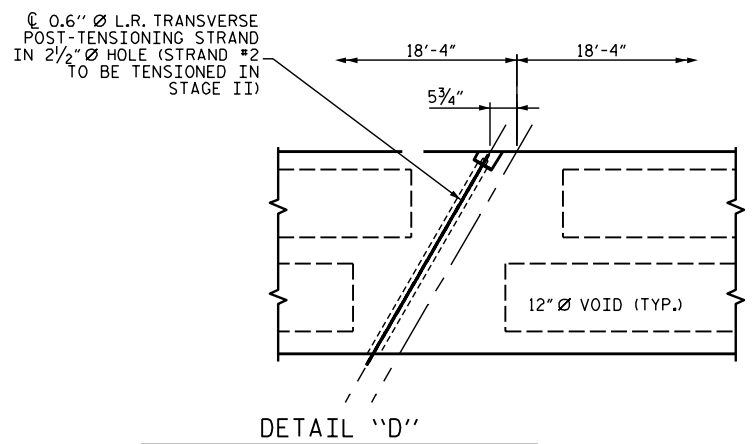
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**PLAN OF UNIT - STAGE II**  
FOR VIEW C-C, SEE SHEET 2 OF 5



\*4 S2 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2 1/2" TRANSVERSE POST-TENSIONING STRAND HOLES (TYPE I UNIT SHOWN)

PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
STATION: 11+75.00 -L-  
SHEET 4 OF 5

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**PLAN OF 55' UNIT  
30'-6" CLEAR ROADWAY  
120° SKEW**

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DESIGN ENGINEER OF RECORD:	T.M. HARRIS	DATE :	FEB 2022

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**BILL OF MATERIAL FOR ONE 55' CORED SLAB UNIT**

BAR	NUMBER	SIZE	TYPE	EXT. UNIT (TYPE I) LENGTH	WEIGHT	INT. UNIT (TYPE II) LENGTH	WEIGHT	INT. UNIT (TYPE III) LENGTH	WEIGHT
B7	4	#4	STR	28'-3"	75	28'-3"	75	28'-3"	75
S1	8	#5	3	4'-6"	38	4'-6"	38	4'-6"	38
S2	112	#4	3	5'-4"	399	5'-4"	399	5'-4"	399
*S3	55	#5	1	5'-9"	330	-	-	-	-
S5	4	#4	3	5'-5"	14	5'-5"	14	5'-5"	14
S6	4	#4	3	5'-6"	15	5'-6"	15	5'-6"	15
S7	4	#4	3	5'-7"	15	5'-7"	15	5'-7"	15
S8	4	#4	3	5'-9"	15	5'-9"	15	5'-9"	15
REINFORCING STEEL		LBS.			571		571		571
* EPOXY COATED REINFORCING STEEL		LBS.			330				
6500 P.S.I. CONCRETE		CU. YDS.			8.0		8.0		8.7
0.6" Ø L.R. STRANDS		No.			19		19		19

**CORED SLABS REQUIRED**

STAGE	TYPE	NUMBER	LENGTH	TOTAL LENGTH
STAGE I	TYPE I	1	55'-0"	55'-0"
	TYPE II	3	55'-0"	165'-0"
	TYPE III	1	55'-0"	55'-0"
STAGE II	TYPE I	1	55'-0"	55'-0"
	TYPE II	5	55'-0"	275'-0"
	TOTAL	11		605'-0"

**GRADE 270 STRANDS**

	0.6" Ø L.R.
AREA ( SQUARE INCHES )	0.217
ULTIMATE STRENGTH ( LBS. PER STRAND )	58,600
APPLIED PRESTRESS ( LBS. PER STRAND )	43,950

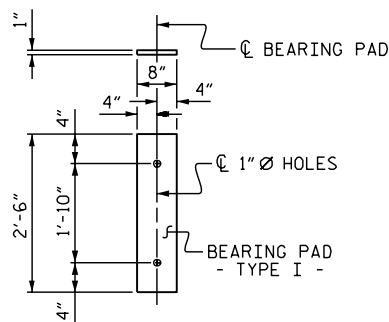
**DEAD LOAD DEFLECTION AND CAMBER**

	3'-0" x 1'-9"
55' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER ( SLAB ALONE IN PLACE )	1 1/2" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD**	3/8" ↓
FINAL CAMBER	1 1/8" ↑

\*\* INCLUDES FUTURE WEARING SURFACE

**CONCRETE RELEASE STRENGTH**

UNIT	PSI
55' UNIT	4900

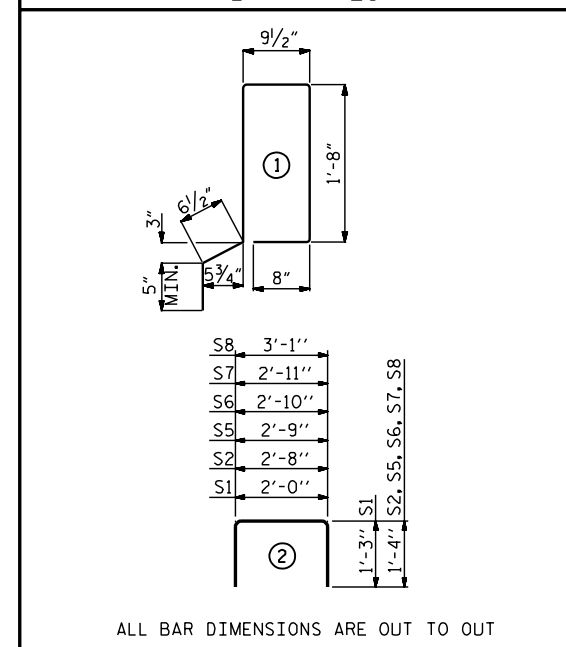


FIXED END  
(TYPE I - 22 REQ'D)

**ELASTOMERIC BEARING DETAILS**

ELASTOMER IN BEARINGS FOR 21" CSU SHALL BE 50 DUROMETER HARDNESS.

**BAR TYPES**



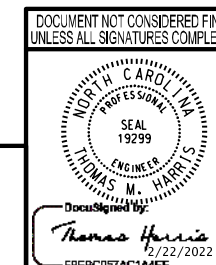
**NOTES**

- ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- ALL REINFORCING STEEL CAST WITH THE CORED SLAB SECTIONS SHALL BE GRADE 60 AND SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE CORED SLABS.
- RECESSES FOR TRANSVERSE STRANDS SHALL BE GROUTED AFTER THE TENSIONING OF THE STRANDS.
- THE 2 1/2" Ø HOLES AT FIXED ENDS OF SLAB SECTIONS SHALL BE FILLED WITH NON-SHRINK GROUT.
- THE BACKER RODS SHALL CONFORM TO THE REQUIREMENTS OF TYPE M BOND BREAKER. SEE SECTION 1028 OF THE STANDARD SPECIFICATIONS.
- WHEN CORED SLABS ARE CAST, AN INTERNAL HOLD-DOWN SYSTEM SHALL BE EMPLOYED TO PREVENT VOIDS FROM RISING OR MOVING SIDWAYS. AT LEAST SIX WEEKS PRIOR TO CASTING CORED SLABS, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND COMMENT, DETAILED DRAWINGS OF THE PROPOSED HOLD-DOWN SYSTEM. IN ADDITION TO STRUCTURAL DETAILS, LOCATION AND SPACING OF THE HOLD-DOWNS SHALL BE INDICATED.
- ALL REINFORCING STEEL IN THE VERTICAL CONCRETE BARRIER RAIL SHALL BE EPOXY COATED.
- PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE CORED SLAB UNIT ENDS.
- APPLY EPOXY PROTECTIVE COATING TO CORED SLAB UNIT ENDS.
- GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.
- FLAME CUTTING OF THE TRANSVERSE POST-TENSIONING STRAND IS NOT ALLOWED.
- THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE CORED SLAB UNIT SHALL BE DONE WHEN THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN THE REQUIRED STRENGTH SHOWN IN THE "CONCRETE RELEASE STRENGTH" TABLE.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THE PERMITTED THREADED INSERTS ARE DETAILED AS AN OPTION FOR THE CONTRACTOR TO ATTACH FALSEWORK AND FORMWORK DURING CONSTRUCTION.
- THE PERMITTED THREADED INSERTS IN THE EXTERIOR UNITS SHALL BE SIZED BY THE CONTRACTOR, SPACED AT 4'-0" CENTERS AND GALVANIZED IN ACCORDANCE WITH SECTION 1076 OF THE STANDARD SPECIFICATIONS. STAINLESS STEEL THREADED INSERTS MAY BE USED AS AN ALTERNATE.
- THE PERMITTED THREADED INSERTS SHALL BE GROUTED BY THE CONTRACTOR IMMEDIATELY FOLLOWING REMOVAL OF THE FALSEWORK.
- THE COST OF THE PERMITTED THREADED INSERTS SHALL BE INCLUDED IN THE PRICE BID FOR THE PRECAST UNITS.
- ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449 AND SHALL BE GALVANIZED. NO SEPARATE PAYMENT WILL BE MADE FOR THE ANCHOR BOLTS AND THE COST OF MATERIALS AND INSTALLATION SHALL BE INCLUDED IN OTHER PAY ITEMS.

PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
 STATION: 11+75.00 -L-

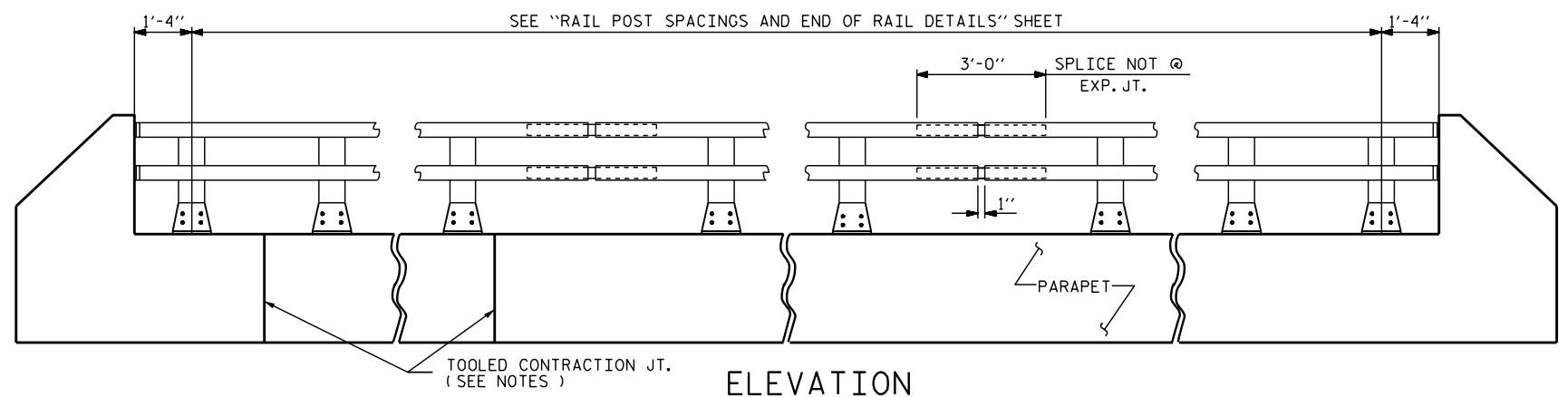
SHEET 5 OF 5

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
 3'-0" X 1'-9"  
 PRESTRESSED CONCRETE  
 CORED SLAB UNIT  
 120° SKEW

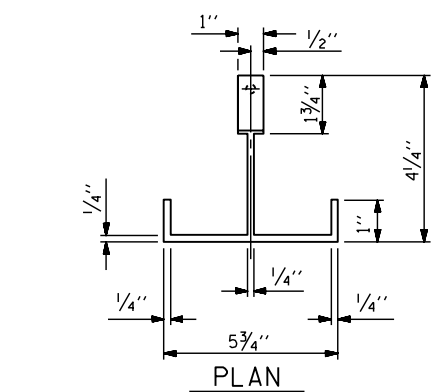


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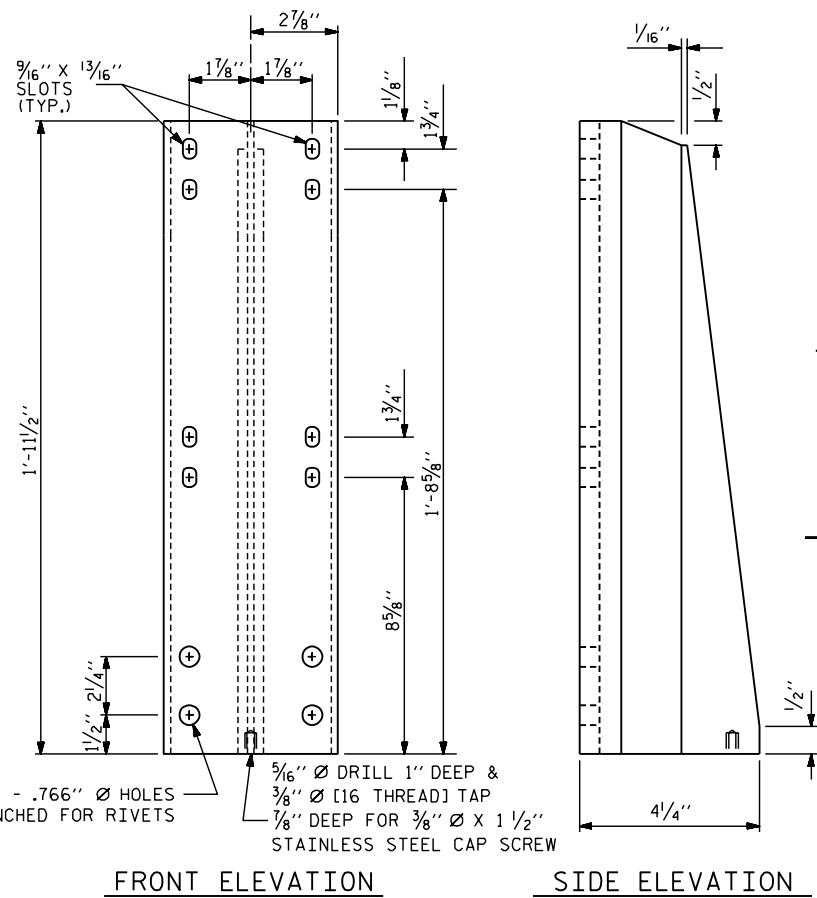
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-10
2			4			TOTAL SHEETS 26



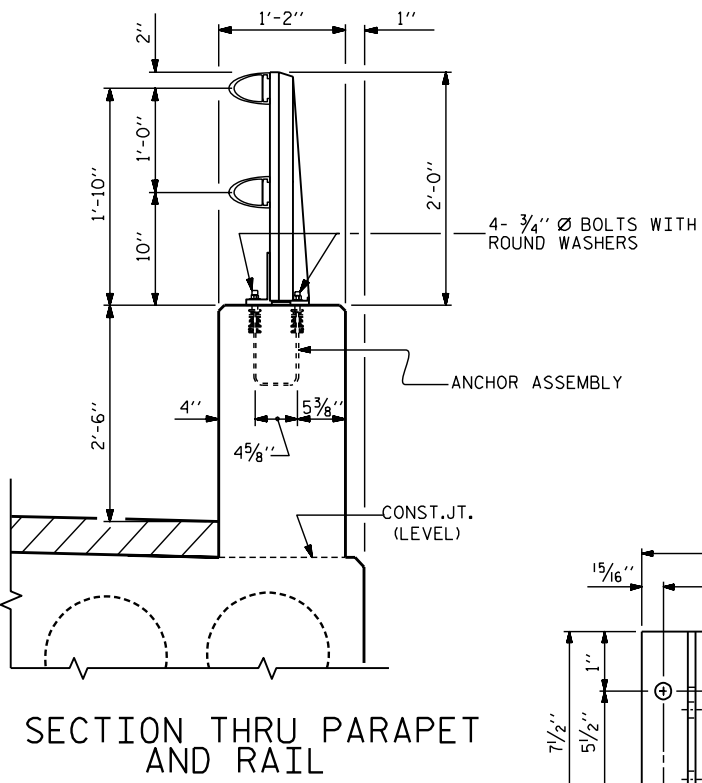
**ELEVATION**  
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE SHEET 3 OF 3.



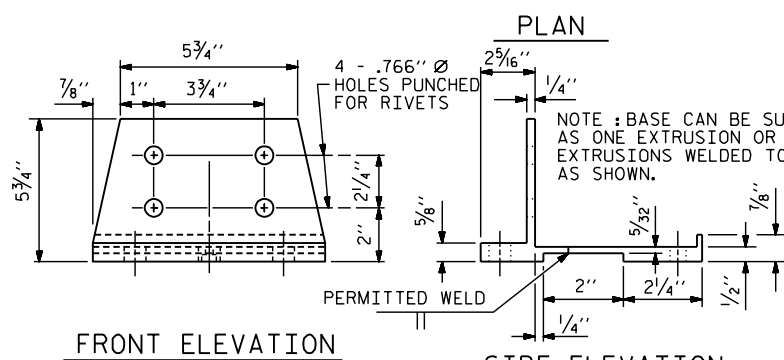
**PLAN**



**FRONT ELEVATION**      **SIDE ELEVATION**  
**DETAILS OF POST**



**SECTION THRU PARAPET AND RAIL**



**FRONT ELEVATION**      **SIDE ELEVATION**  
**POST BASE DETAILS**

**NOTES**

AT THE CONTRACTOR'S OPTION, METAL RAIL MAY BE EITHER ALUMINUM OR GALVANIZED STEEL IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

UNLESS OTHERWISE REQUIRED IN THE CONTRACT DOCUMENTS, THE CONTRACTOR HAS THE OPTION TO USE AN ALTERNATE TO THE 2 BAR METAL RAIL. THE ALTERNATE RAIL SHALL MEET THE REQUIREMENTS OF THE AASHTO LRFB BRIDGE DESIGN SPECIFICATIONS AND MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST (APL) UNDER "2 BAR METAL RAIL ALTERNATE". ADJUSTMENTS TO THE CONCRETE PARAPET WILL NOT BE ALLOWED.

**ALUMINUM RAILS**

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6. MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

THE BASE OF RAIL POSTS, OR ANY OTHER ALUMINUM SURFACE IN CONTACT WITH CONCRETE SHALL BE THOROUGHLY COATED WITH AN ALUMINUM IMPREGNATED CAULKING COMPOUND OF APPROVED QUALITY.

MATERIAL FOR SHIMS TO BE ASTM B209 ALLOY 6061-T6.

**GALVANIZED STEEL RAILS**

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

POST, POST BASES, RAILS, EXPANSION BARS AND CLAMP BARS: AASHTO M270 GRADE 36 STRUCTURAL STEEL - GALVANIZED TO AASHTO M111.

RIVETS: RIVETS SHALL MEET THE REQUIREMENTS OF ASTM A502 FOR GRADE 1 RIVETS.

THE CUT ENDS OF GALVANIZED STEEL RAILING, AFTER GRINDING SMOOTH SHALL BE GIVEN TWO COATS OF ZINC RICH PAINT MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION MIL-P-26915 USAF TYPE 1, OR OF FEDERAL SPECIFICATIONS TT-P-641.

SHIMS: SHIMS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

RAIL CAPS: RAIL CAPS SHALL MEET THE REQUIREMENTS OF ASTM A570 FOR GRADE 33 OR A611 FOR GRADE C AND SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

**GENERAL NOTES**

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR2.

CAP SCREWS SHALL BE ASTM F593 ALLOY 305 STAINLESS STEEL. WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

CERTIFIED MILL REPORTS ARE REQUIRED FOR RAILS AND POSTS. SHOP INSPECTION IS NOT REQUIRED.

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

METHOD OF MEASUREMENT FOR METAL RAILS: FOR LENGTH OF METAL RAILS TO BE PAID FOR, SEE THE STANDARD SPECIFICATIONS.

CURVED RAIL USAGE: WHERE RAILS ARE TO BE USED ON BRIDGES ON HORIZONTAL AND/OR VERTICAL CURVATURE THE CONTRACTOR MAY, AT HIS OPTION, HAVE THE REQUIRED CURVATURE IN THE RAIL FORMED IN THE SHOP OR IN THE FIELD. IN EITHER EVENT, THE RAIL SHALL CONFORM WITHOUT BUCKLING OR KINKING TO THE REQUIRED CURVATURE IN A UNIFORM MANNER ACCEPTABLE TO THE ENGINEER.

TO INSURE FUTURE IDENTIFICATION OF THE FABRICATOR, A PERMANENT IDENTIFYING MARK SHALL BE PLACED ON EACH POST. THE METHOD OF MARKING AND LOCATION SHALL BE SUCH THAT IT DOES NOT DETRACT FROM THE APPEARANCE OF THE POST, BUT REMAINS VISIBLE AFTER RAIL PLACEMENT.

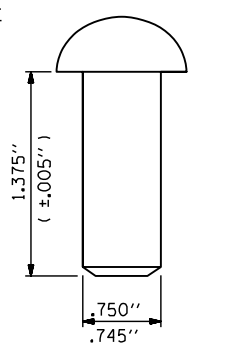
SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

ALLOY 6351-T5 MAY BE SUBSTITUTED FOR ALLOY 6061-T6 WHERE APPLICABLE.

MINOR VARIATIONS IN DETAILS OF METAL RAIL WILL BE CONSIDERED. DETAILS OF SUCH VARIATIONS, IF DESIRED, SHALL BE SUBMITTED FOR APPROVAL.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE PARAPET AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. A CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN PARAPET EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF PARAPET SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

PAY LENGTH = 93.7 LIN. FT.



**RIVET DETAIL**

PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
STATION: 11+75.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

STANDARD  
**2 BAR METAL RAIL**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			26

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

THOMAS M. HARRIS  
ENGINEER  
2/22/2022

**WSP**

WSP USA Inc.  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
LICENSE NO. F-0165

2/14/2022  
J:\188360C - 2015 W Divisions Planning & Design On-Call\188360 Division 13 Bridges\17BP.13.R.183 Madison\144\Structures\2.0 Drafting\1.0 DGNs\401\_021\_17BP.13.R.183\_SMU\_BRI.dgn

ASSEMBLED BY: J. WHEATLEY      DATE: FEB 2022  
CHECKED BY: T. KIRSCHBAUM      DATE: FEB 2022  
DESIGN ENGINEER OF RECORD: T. HARRIS      DATE: FEB 2022

DRAWN BY: EEM 6/94      REV. 10/11      MAA/GM  
CHECKED BY: RGW 6/94      REV. 6/13      MAA/GM  
REV. 12/17      MAA/THC



2/14/2022 J:\188360C - 2015 W Divisions Planning & Design On-Call\1188360 Division 13 Bridges\17BP.13.R.183 Madison\144\Structures\2.0 Drafting\1.0 DCNS\401\_023\_17BP.13.R.183\_SMU\_BR2.dgn

**NOTES**

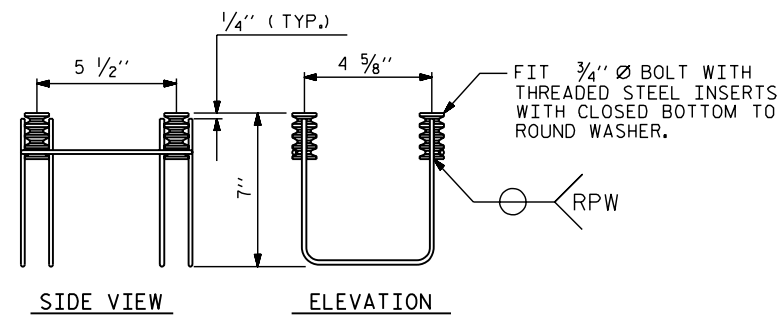
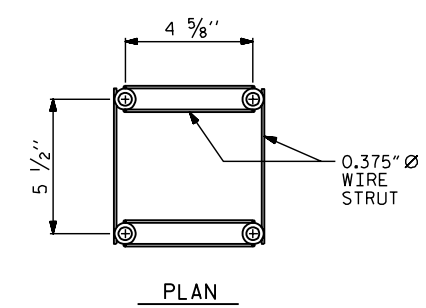
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

THE STRUCTURAL CONCRETE ANCHOR ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS :

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

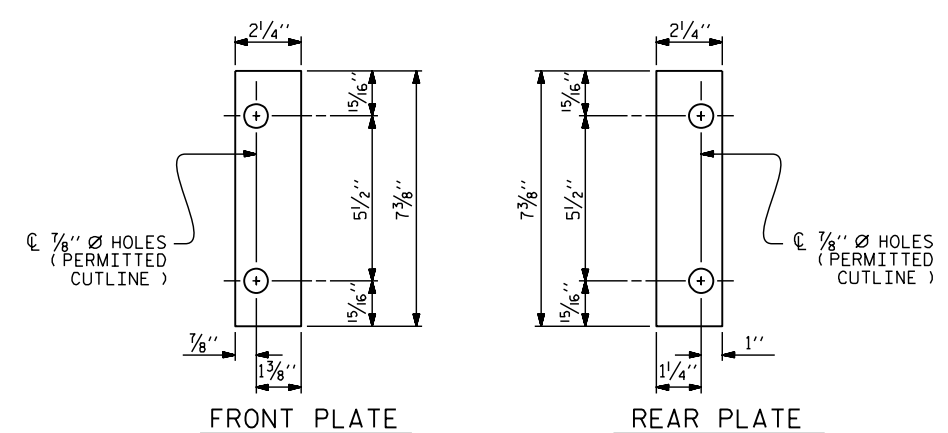
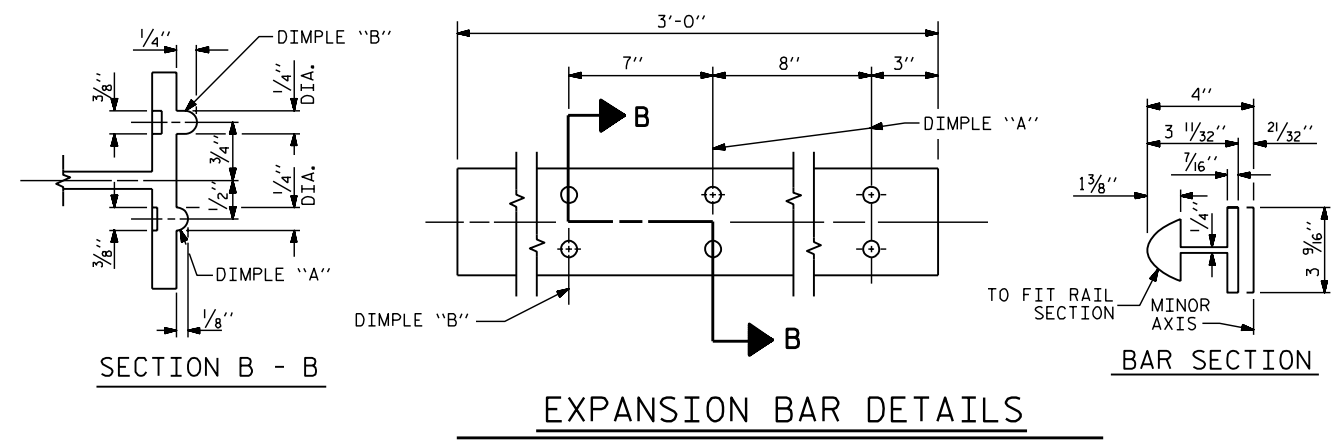
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

WHEN ADHESIVELY ANCHORED ANCHOR BOLTS ARE USED, BOLTS SHALL MEET THE REQUIREMENTS OF ASTM F593 ALLOY 304 STAINLESS STEEL WITH MINIMUM 75,000 PSI ULTIMATE STRENGTH. NUTS SHALL MEET THE REQUIREMENTS OF ASTM F594 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.



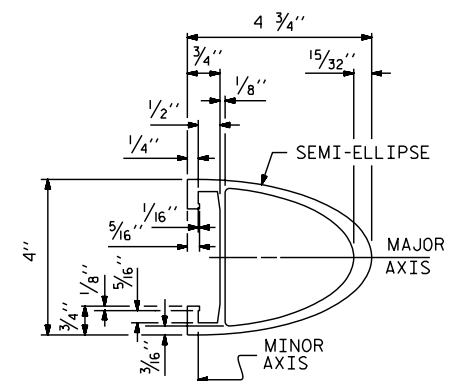
**4-BOLT METAL RAIL ANCHOR ASSEMBLY**

( 20 ASSEMBLIES REQUIRED )

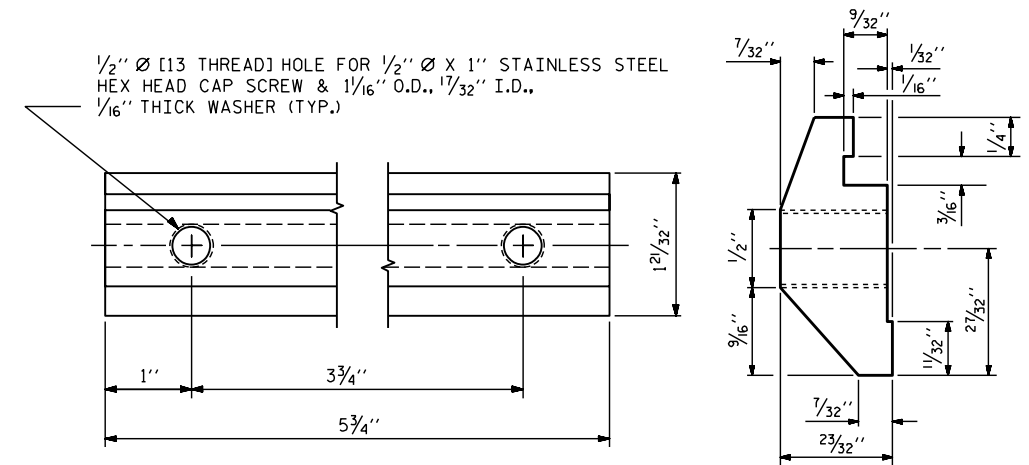


**SHIM DETAILS**

NOTE : SHIMS MAY BE CUT ALONG PERMITTED CUTLINE OR SLOTTED TO EDGE OF PLATE TO FACILITATE PLACEMENT.

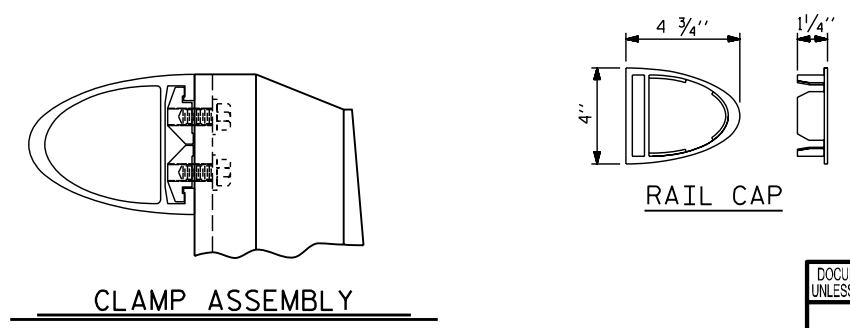


**RAIL SECTION**



**CLAMP BAR DETAIL**

( 4 REQUIRED PER POST )



PROJECT NO. 17BP.13.R.183

MADISON COUNTY

STATION: 11+75.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH  
STANDARD  
2 BAR METAL RAIL

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

THOMAS M. HARRIS  
ENGINEER  
SEAL 19299  
2/22/2022

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			5-12
2			4			TOTAL SHEETS 26

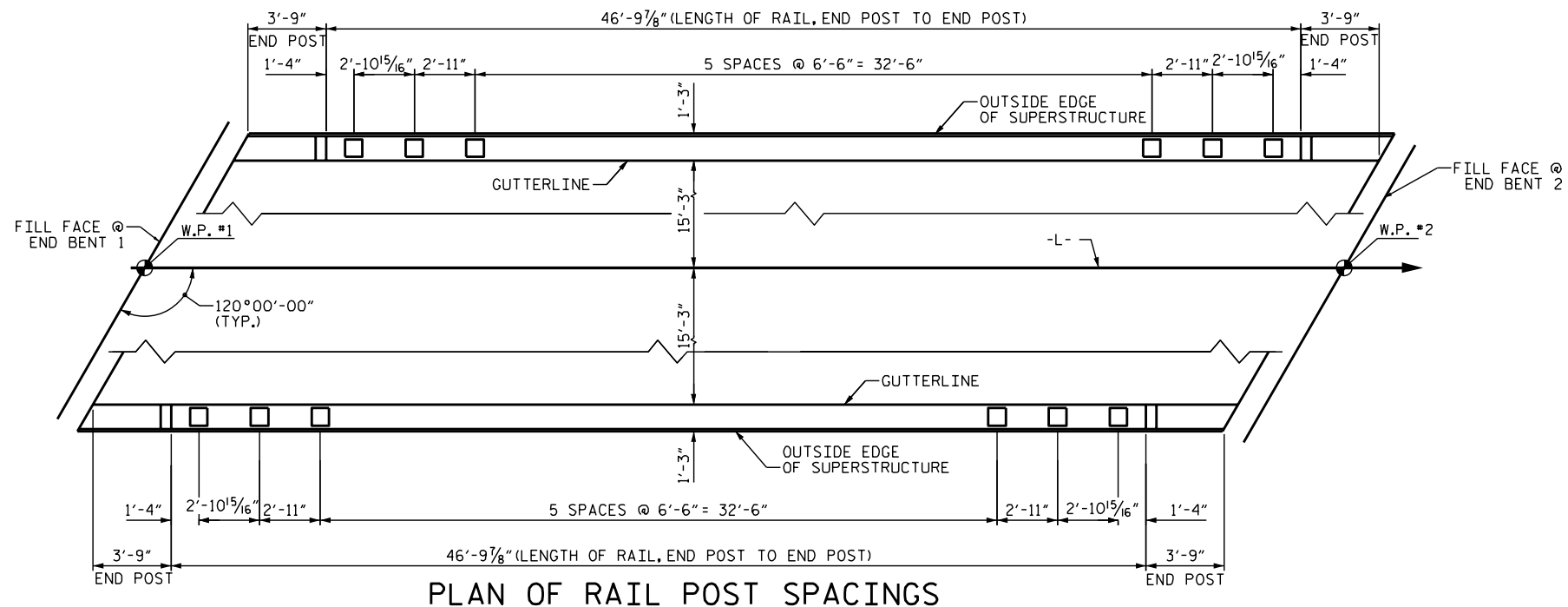
ASSEMBLED BY:	J. WHEATLEY	DATE :	FEB 2022
CHECKED BY:	T. KIRSCHBAUM	DATE :	FEB 2022
DESIGN ENGINEER	T. HARRIS	DATE :	FEB 2022

DRAWN BY :	EEM	6/94	REV. 5/1/06R	KMM/GM
CHECKED BY :	RGW	6/94	REV. 10/1/11	MAA/GM
			REV. 12/17	MAA/THC

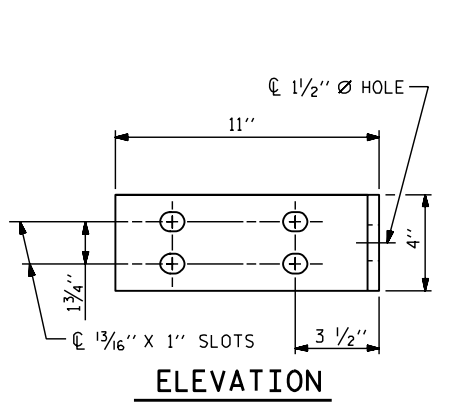
**wsp**  
WSP USA Inc.  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
LICENSE NO. F-0165



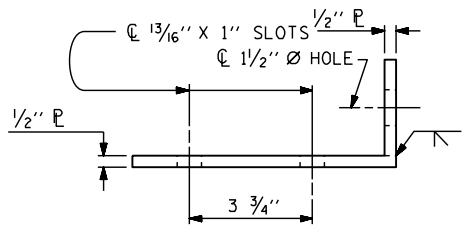
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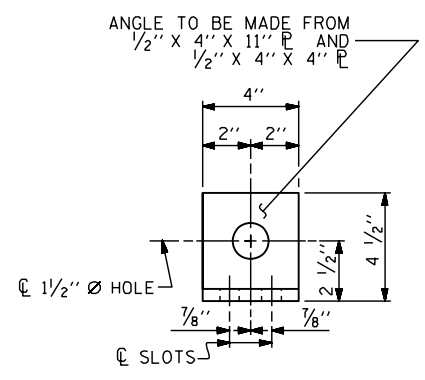
**PLAN OF RAIL POST SPACINGS**



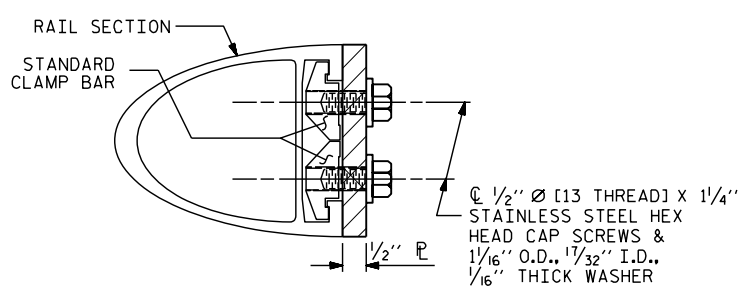
**ELEVATION**



**TOP VIEW**

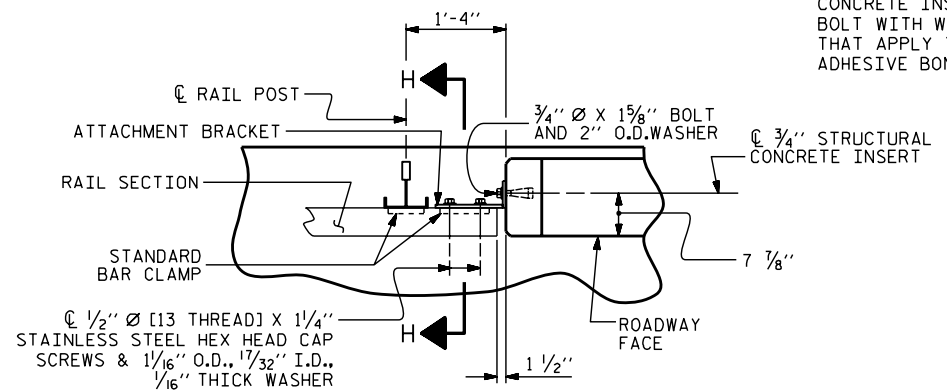


**END VIEW (FIX.)**

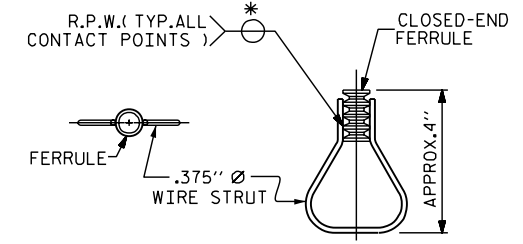


**SECTION H-H (FIX)**

**FIXED**



**PLAN - RAIL AND END POST**



**STRUCTURAL CONCRETE INSERT**

\* EACH WELDED ATTACHMENT OF WIRE TO FERRULE SHALL DEVELOP THE TENSILE STRENGTH OF THE WIRE.

**NOTES**

**STRUCTURAL CONCRETE INSERT**

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1/2".
  - B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
  - C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 1/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

**NOTES**

**METAL RAIL TO END POST CONNECTION**

- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
  - B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N.C. THREADS.
  - C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°.
  - D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET).
  - E. 1/2" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 1 OR 2 BAR METAL RAILS.

THE 3/4" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE 3/4" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE 1/2" PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE 3/4" Ø X 1 5/8" BOLT WITH WASHER SHALL BE REPLACED WITH A 3/4" Ø X 6 1/2" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE 3/4" Ø X 1 5/8" BOLT SHALL APPLY TO THE 3/4" Ø X 6 1/2" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

DRAWN BY : FCJ	1/88	REV. 5/1/06	TLA/GM
CHECKED BY : CRK	3/89	REV. 10/1/11	MAA/GM
		REV. 12/17	MAA/THC
ASSEMBLED BY : J. WHEATLEY	DATE : FEB 2022		
CHECKED BY : T. KIRSCHBAUM	DATE : FEB 2022		
DESIGN ENGINEER OF RECORD : T. HARRIS	DATE : FEB 2022		

**DETAILS FOR ATTACHING METAL RAIL TO END POST**

WSP USA Inc.  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
LICENSE NO. F-0165

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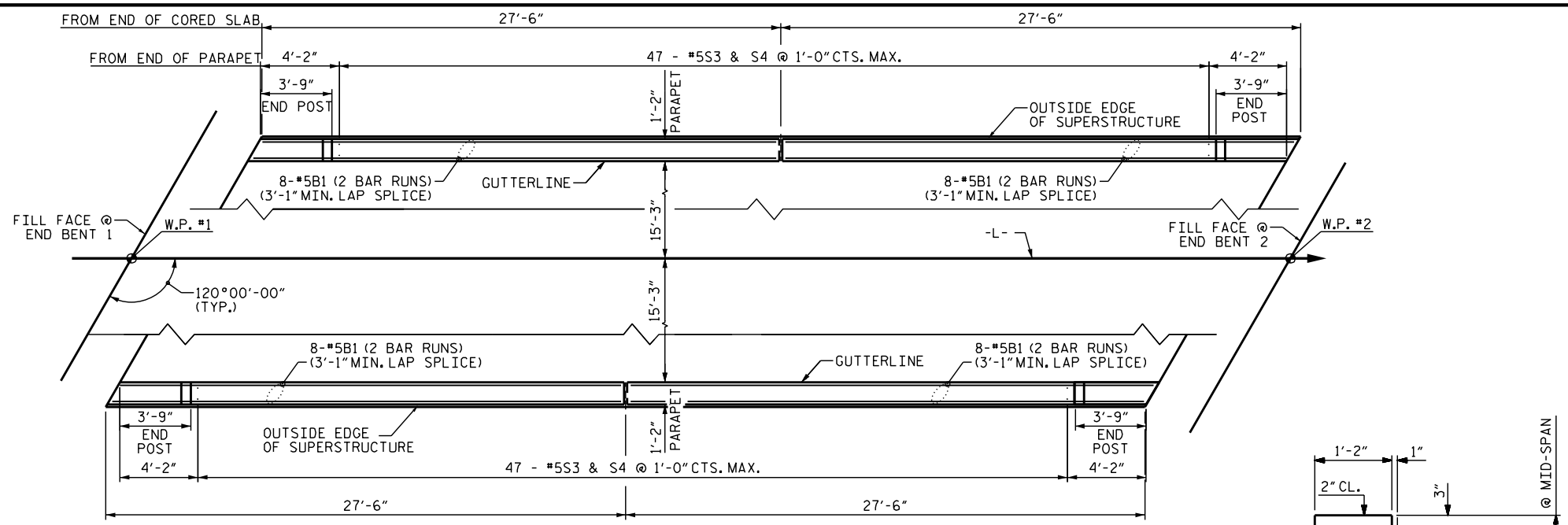
Thomas M. Harris  
2/22/2022

PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
STATION: 11+75.00 -L-

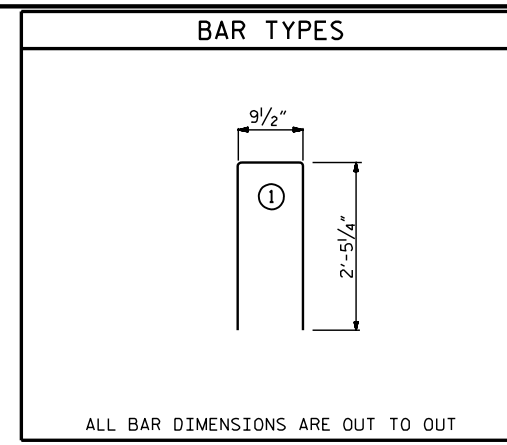
SHEET 3 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH STANDARD					
RAIL POST SPACINGS AND END OF RAIL DETAILS FOR TWO BAR METAL RAILS					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO.					S-13
TOTAL SHEETS					26

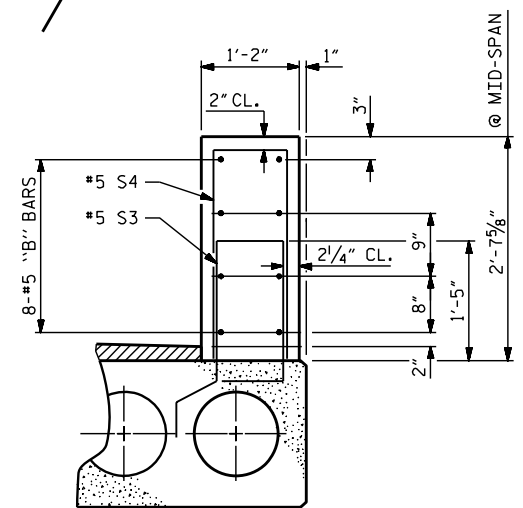
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PLAN OF PARAPET

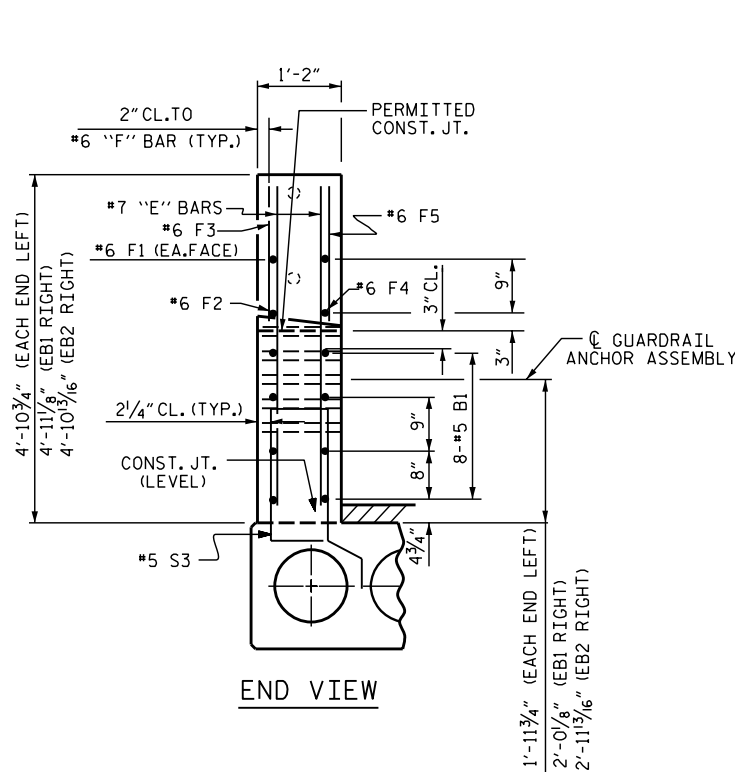


BILL OF MATERIAL FOR ONE CONCRETE PARAPET					
BAR	NUMBER	SIZE	TYPE	EXTERIOR UNIT	
				LENGTH	WEIGHT
*B1	32	#5	STR	15'-6"	517
*E1	4	#7	STR	2'-6"	20
*E2	4	#7	STR	3'-0"	25
*E3	4	#7	STR	3'-6"	29
*E4	4	#7	STR	4'-0"	33
*E5	4	#7	STR	4'-4"	35
*F1	4	#6	STR	2'-0"	12
*F2	2	#6	STR	3'-3"	10
*F3	2	#6	STR	3'-8"	11
*F4	2	#6	STR	3'-9"	11
*F5	2	#6	STR	4'-2"	13
*S4	47	#5	1	5'-8"	278
* EPOXY COATED REINFORCING STEEL LBS.					993
CLASS "AA" CONCRETE 1 PARAPET CU. YDS.					5.5
2 END POSTS CU. YDS.					1.3
TOTAL CU. YDS.					6.8
1'-3" x 2'-9" 1 CONCRETE PARAPET LIN. FT.					47.5

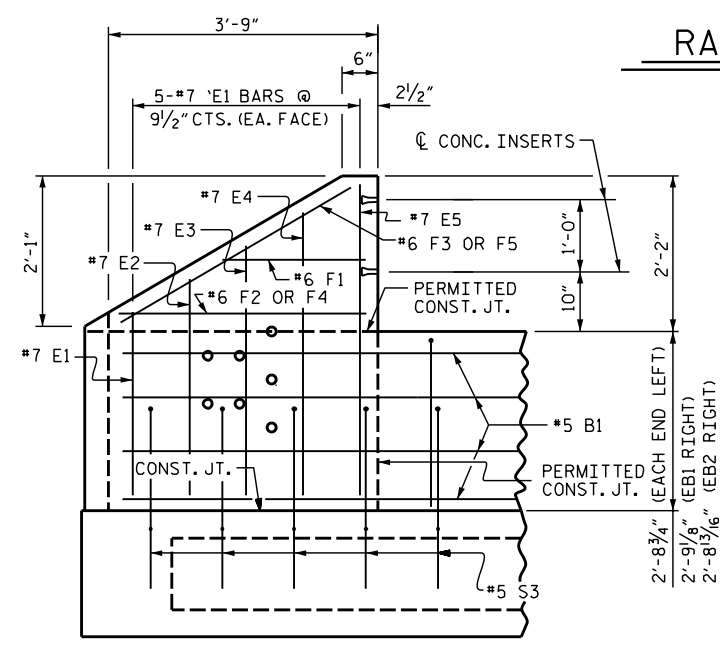


TWO BAR METAL RAIL PARAPET SECTION

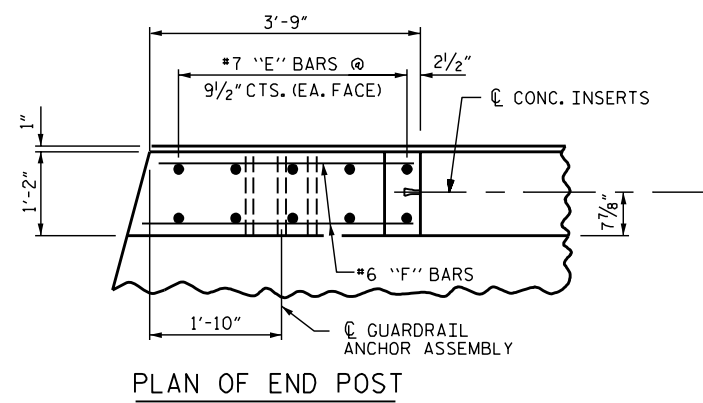
GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT		
	ASPHALT OVERLAY THICKNESS	PARAPET HEIGHT
55' UNIT	@ MID-SPAN	@ MID-SPAN
LEFT & RIGHT GUTTERLINES	1 7/8"	2'-7 7/8"



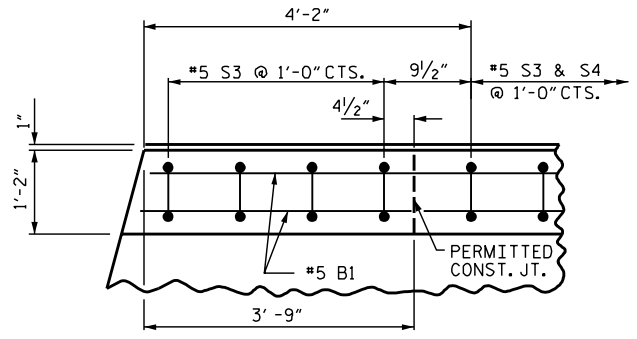
END VIEW



ELEVATION



PLAN OF END POST



PLAN OF PARAPET

PARAPET AND END POST FOR TWO BAR RAIL

PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
STATION: 11+75.00 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

CONCRETE PARAPET DETAILS

REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-14  
TOTAL SHEETS 26

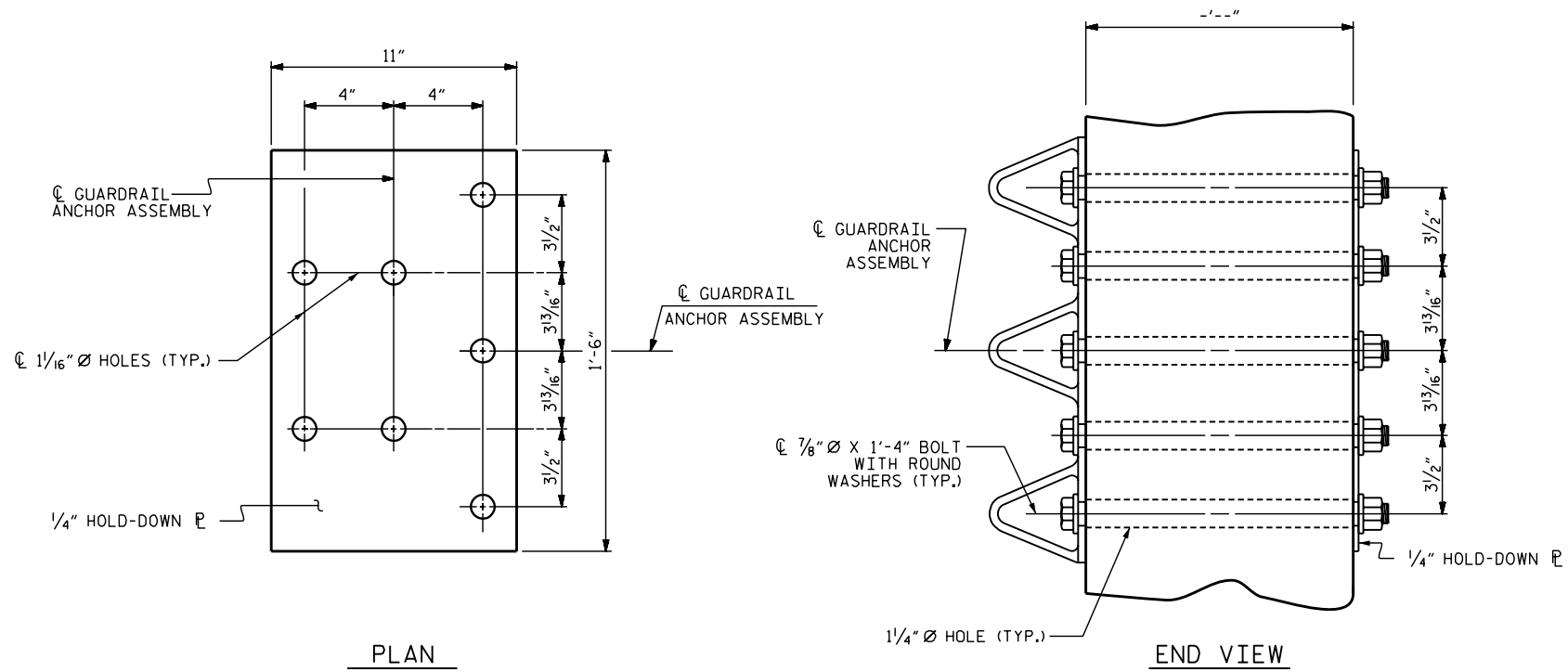
DESIGNED BY: J. WHEATLEY DATE: FEB 2022  
DRAWN BY: J. WHEATLEY DATE: FEB 2022  
CHECKED BY: T. KIRSCHBAUM DATE: FEB 2022  
DESIGN ENGINEER OF RECORD: T.M. HARRIS DATE: FEB 2022

**wsp**

WSP USA Inc.  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
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THOMAS M. HARRIS  
REGISTERED PROFESSIONAL ENGINEER  
SEAL 19299  
2/22/2022



**GUARDRAIL ANCHOR ASSEMBLY DETAILS**

**NOTES**

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.

THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.

BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.

THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

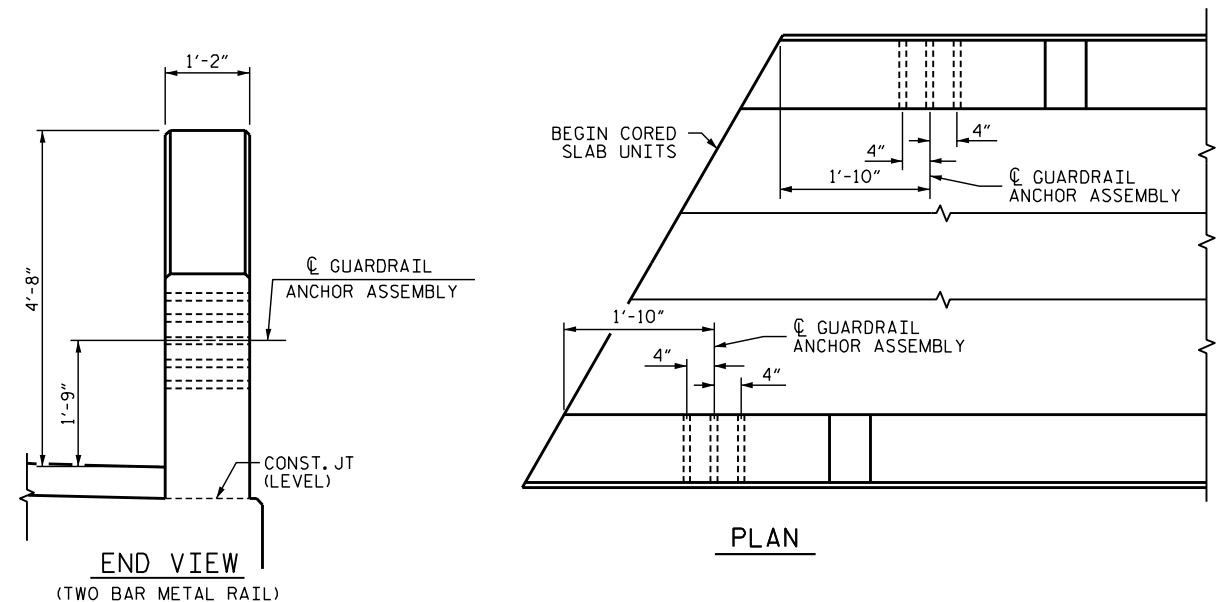
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.



**SKETCH SHOWING POINTS OF ATTACHMENT**

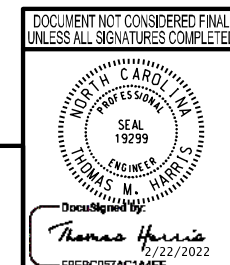
\* LOCATION OF GUARDRAIL ATTACHMENT



**LOCATION OF GUARDRAIL ANCHOR AT END POST**

PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
 STATION: 11+75.00 -L-

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 STANDARD  
**GUARDRAIL ANCHORAGE  
 DETAILS  
 FOR METAL RAILS**



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 WSP USA Inc.  
 434 FAYETTEVILLE STREET  
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 TEL: 1.919.836.4040  
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-15
2			4			TOTAL SHEETS 26

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### NOTES

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.

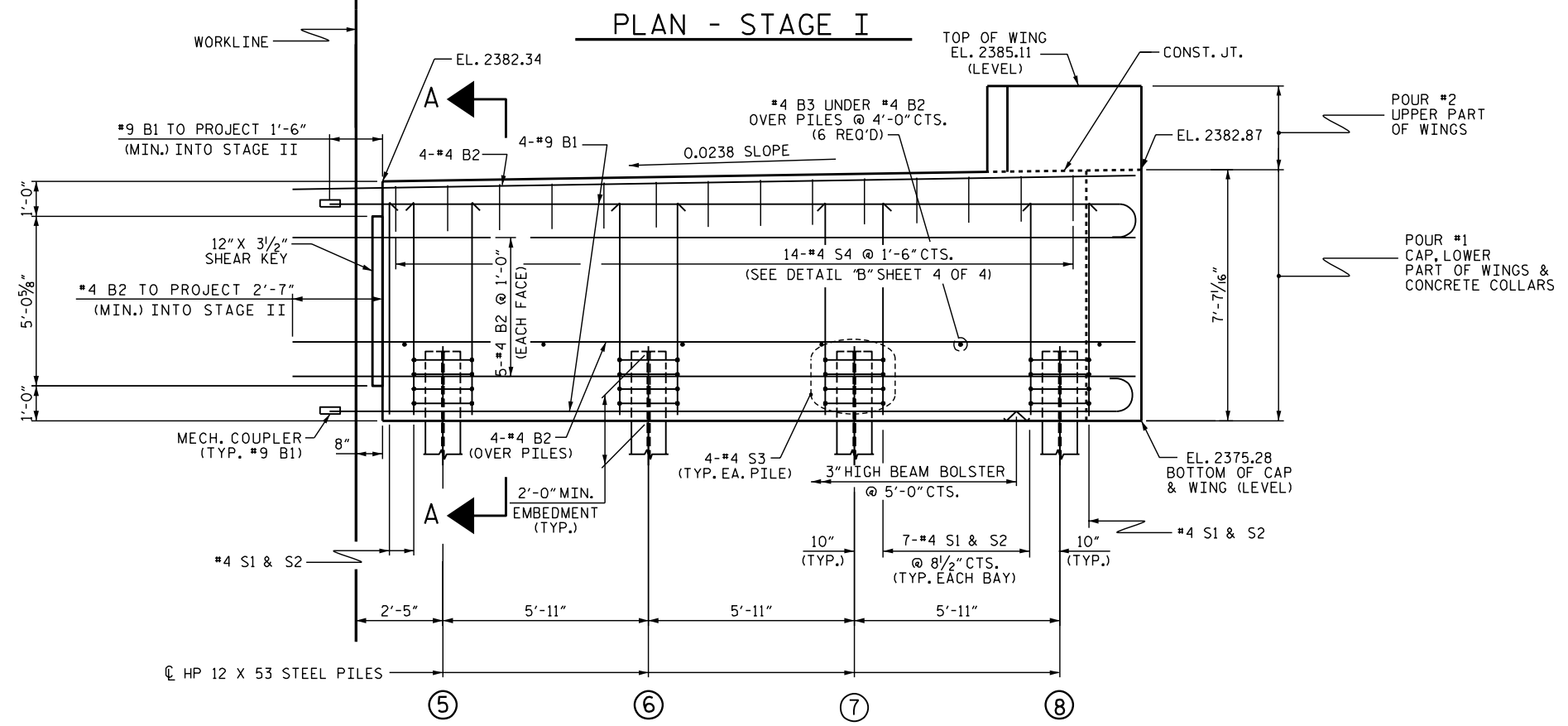
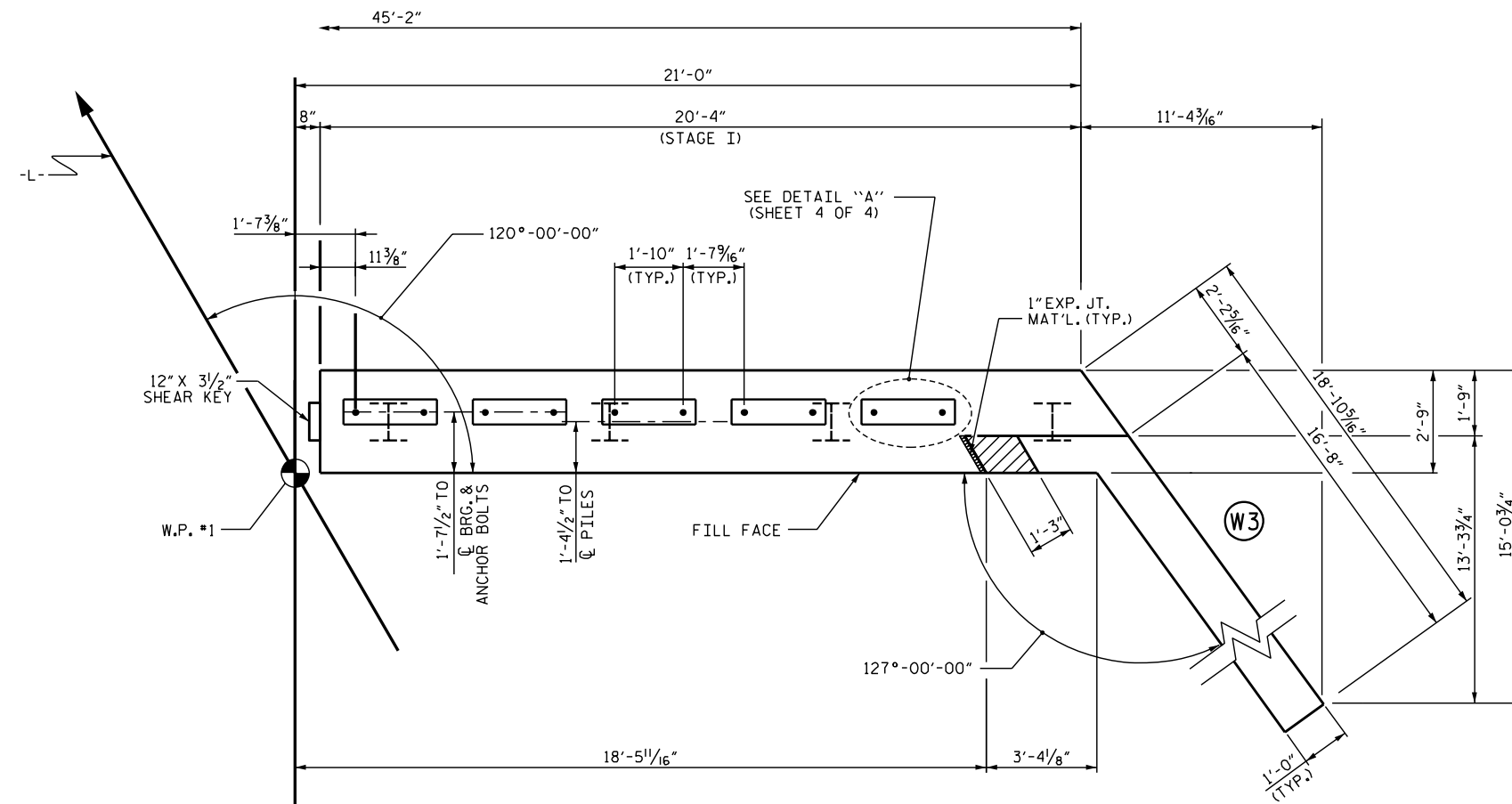
FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449 AND SHALL BE GALVANIZED. NO SEPARATE PAYMENT WILL BE MADE FOR THE ANCHOR BOLTS AND THE COST OF MATERIALS AND INSTALLATION SHALL BE INCLUDED IN OTHER PAY ITEMS.

FOR MECHANICAL COUPLERS, SEE MECHANICAL BUTT SPLICES FOR REINFORCING STEEL IN STANDARD PROVISIONS.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.



### ELEVATION - STAGE I

WINGS NOT SHOWN FOR CLARITY.  
FOR SECTION A-A, SEE SHEET 4 OF 4.  
CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

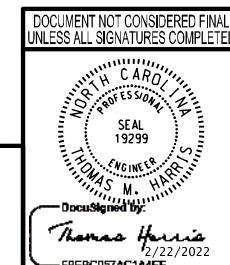
PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
 STATION: 11+75.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1  
 STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			26



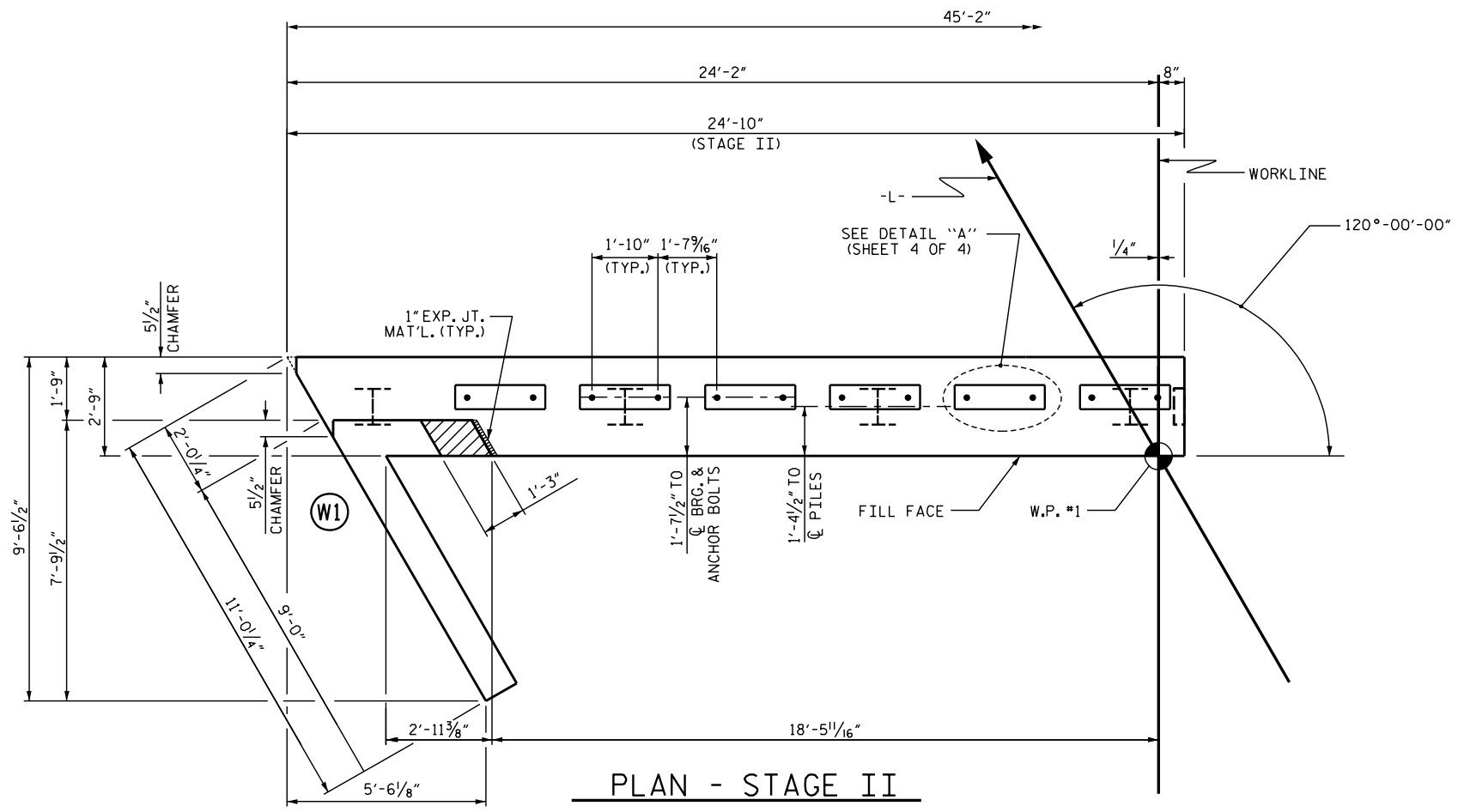
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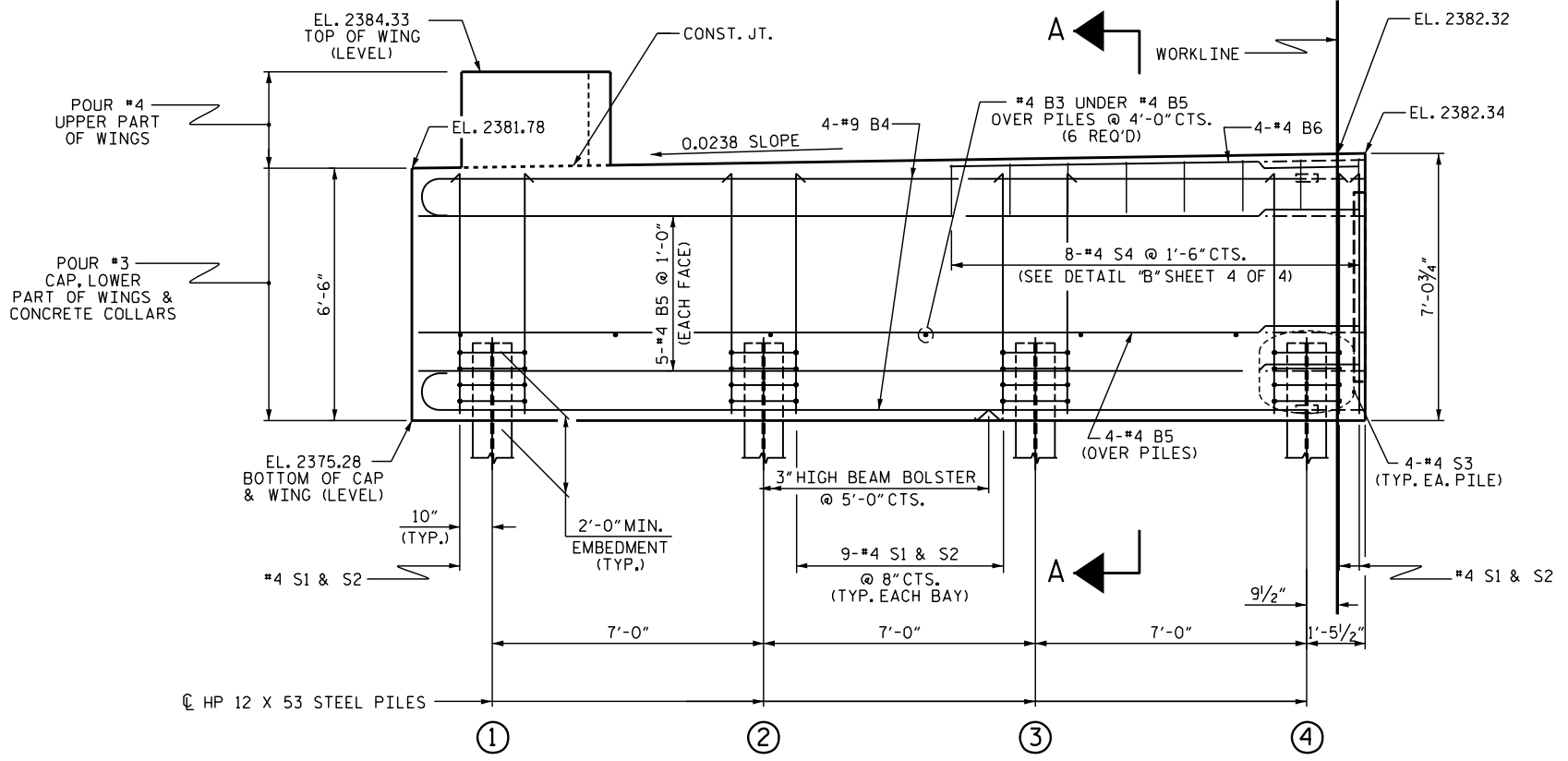
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 DESIGNED BY: J. WHEATLEY DATE: FEB 2022  
 DRAWN BY: J. WHEATLEY DATE: FEB 2022  
 CHECKED BY: T. KIRSCHBAUM DATE: FEB 2022  
 DESIGN ENGINEER OF RECORD: T.M. HARRIS DATE: FEB 2022

NOTES

SEE SHEET 1 OF 4.



PLAN - STAGE II



ELEVATION - STAGE II

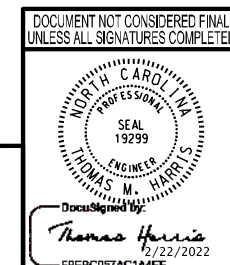
WINGS NOT SHOWN FOR CLARITY.  
 FOR SECTION A-A, SEE SHEET 4 OF 4.  
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. 17BP.13.R.183  
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 STATION: 11+75.00 -L-  
 SHEET 2 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH

SUBSTRUCTURE  
 END BENT No. 1  
 STAGE II

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			26



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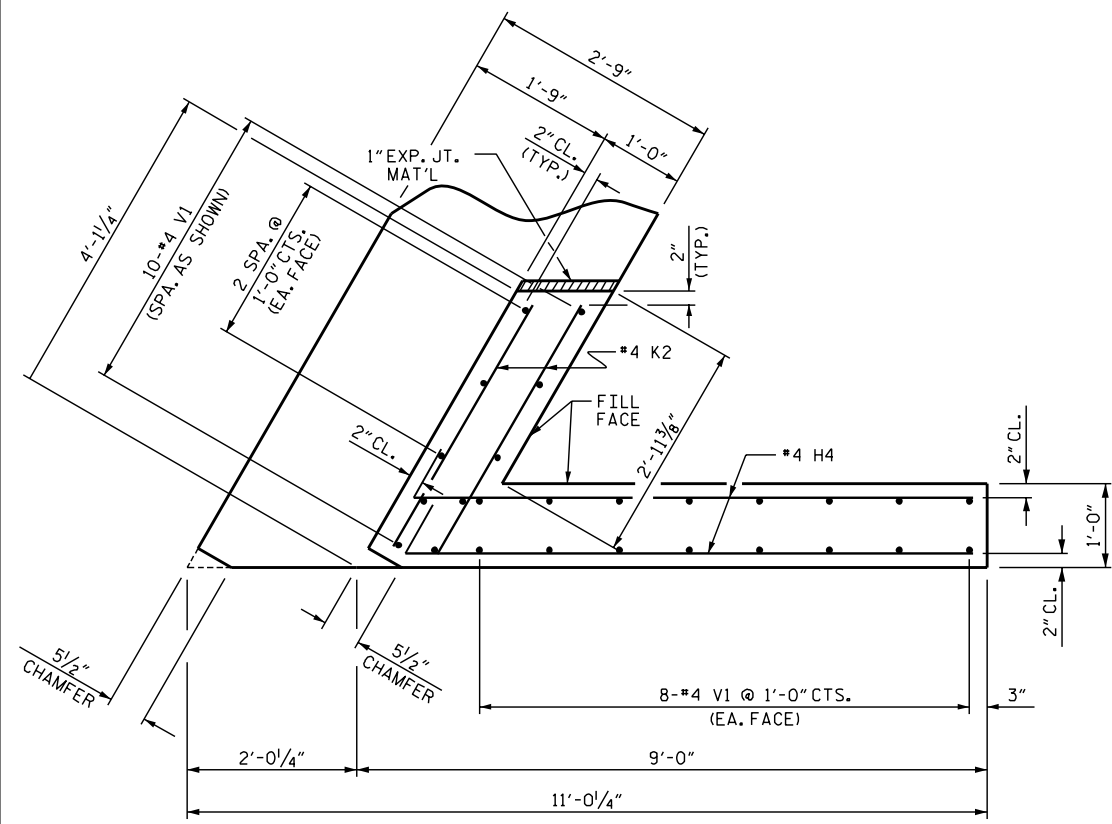
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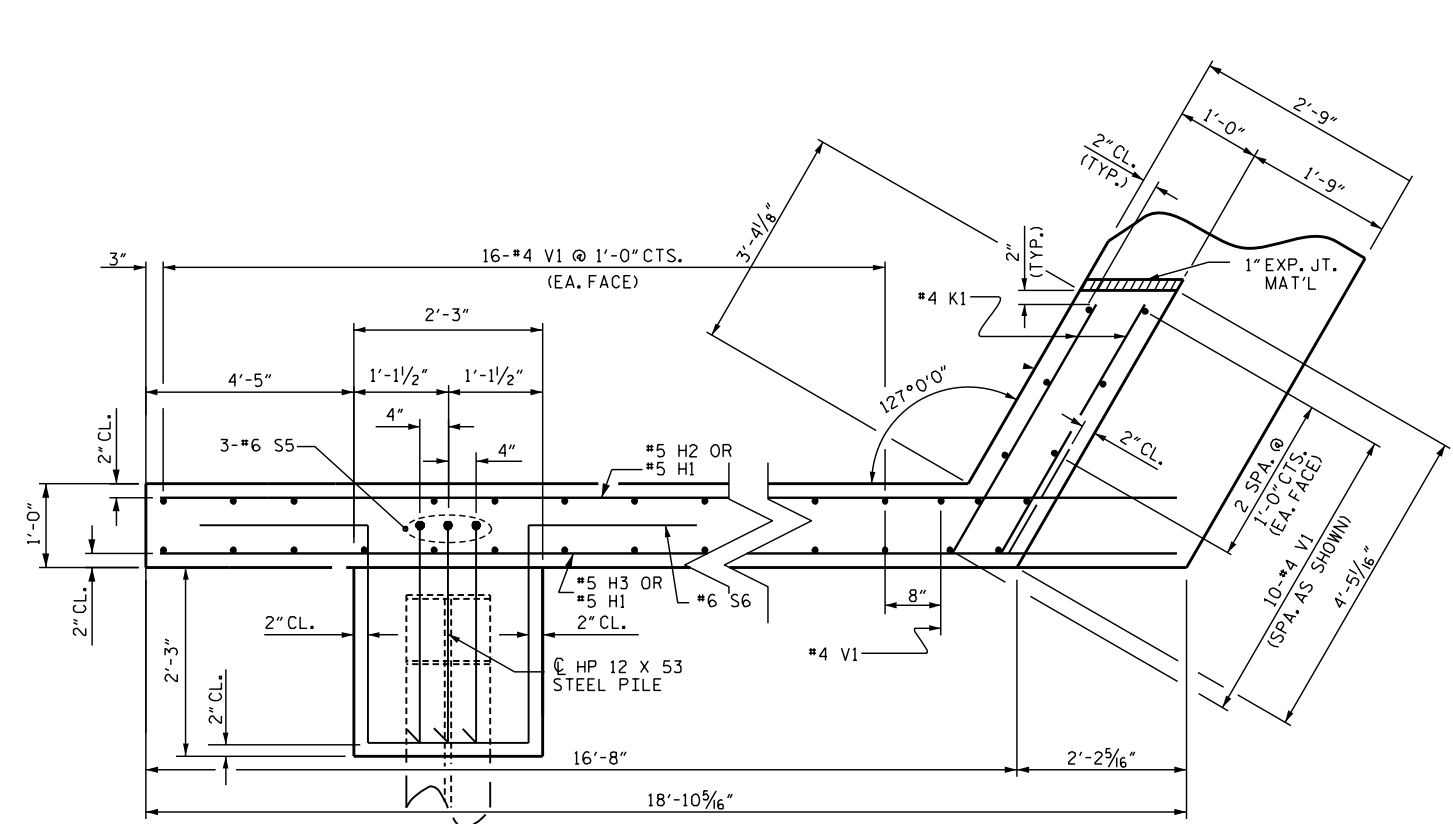
DESIGNED BY:	J. WHEATLEY	DATE:	FEB 2022
DRAWN BY:	J. WHEATLEY	DATE:	FEB 2022
CHECKED BY:	T. KIRSCHBAUM	DATE:	FEB 2022
DESIGN ENGINEER OF RECORD:	T.M. HARRIS	DATE:	FEB 2022



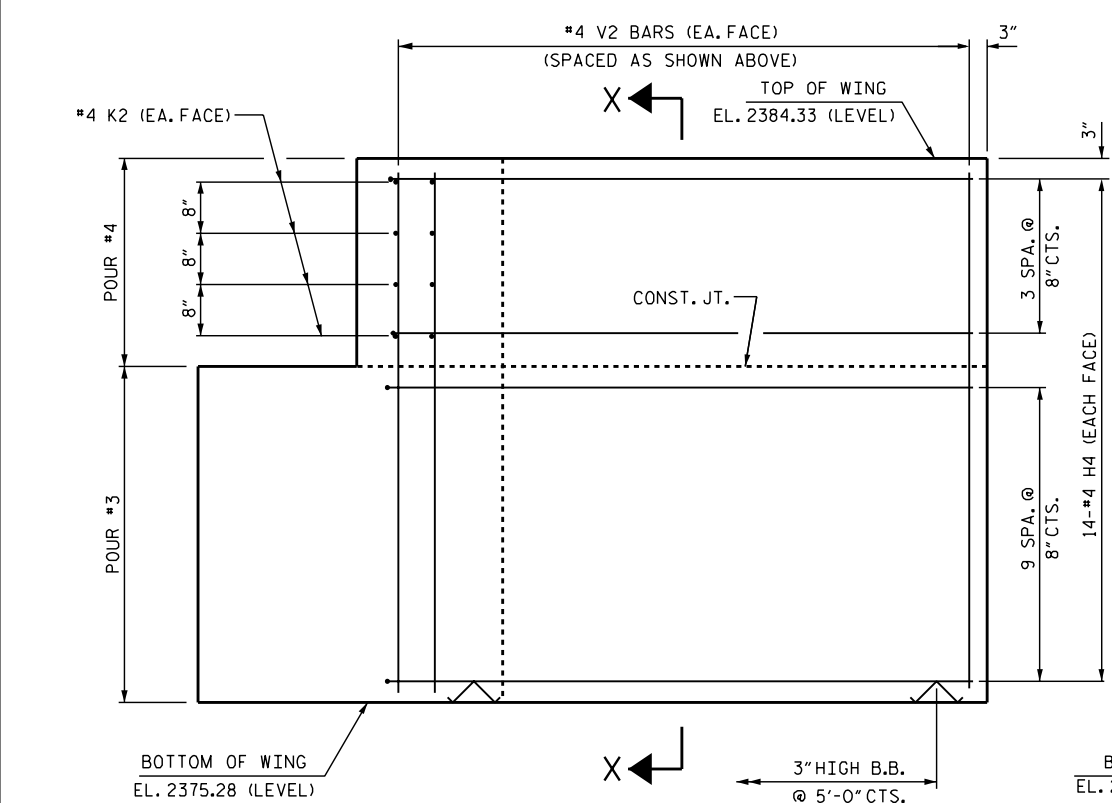
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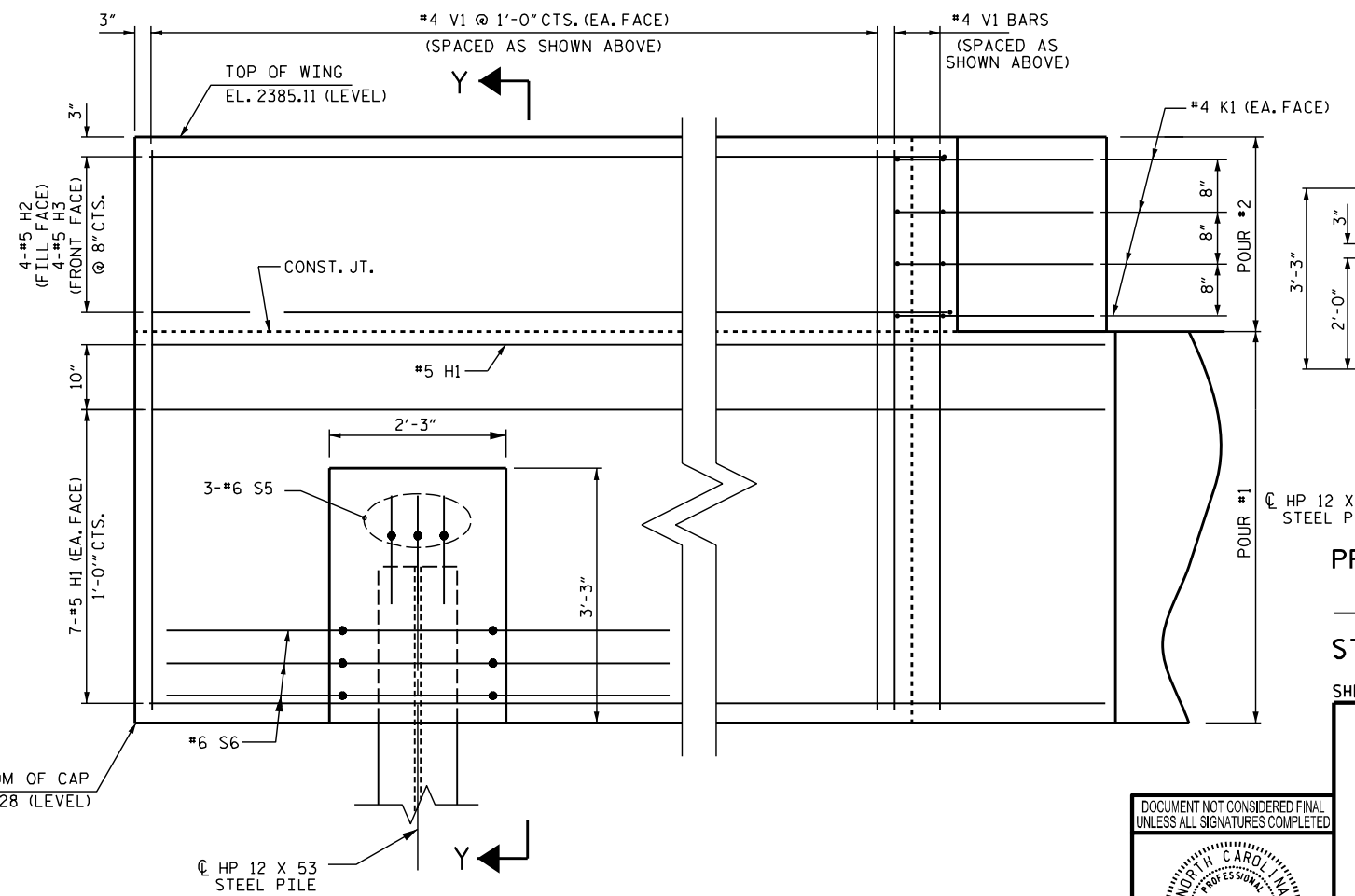
**PLAN OF WING (W1)**



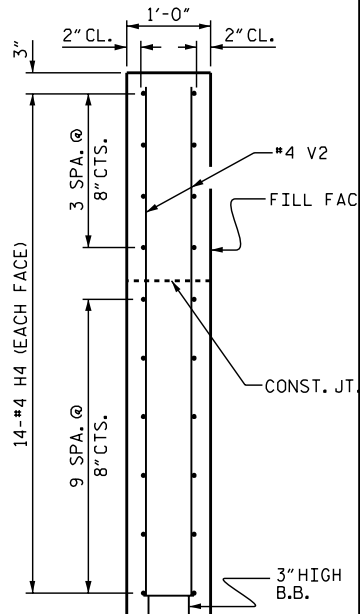
**PLAN OF WING (W3)**



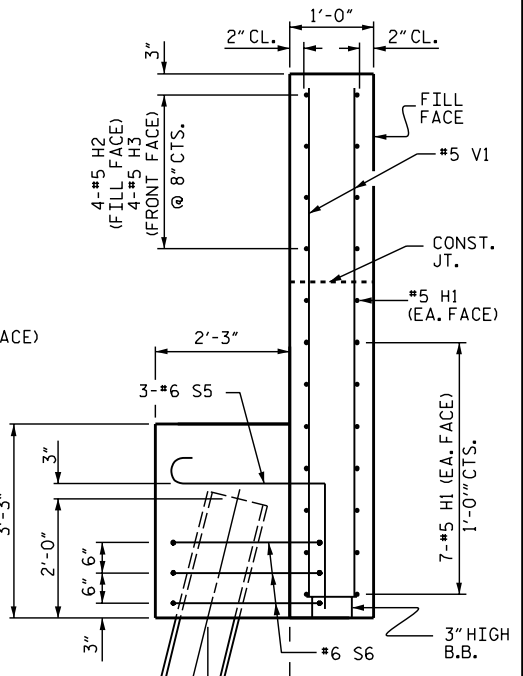
**ELEVATION OF WING (W1)**



**ELEVATION OF WING (W3)**



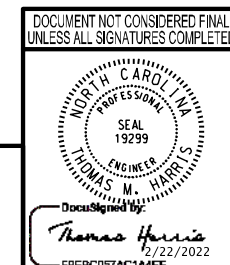
**SECTION X-X**



**SECTION Y-Y**

PROJECT NO. 17BP.13.R.183  
 MADISON COUNTY  
 STATION: 11+75.00 -L-  
 SHEET 3 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 1 WING DETAILS					
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1			3		
2			4		
					SHEET NO. S-18 TOTAL SHEETS 26



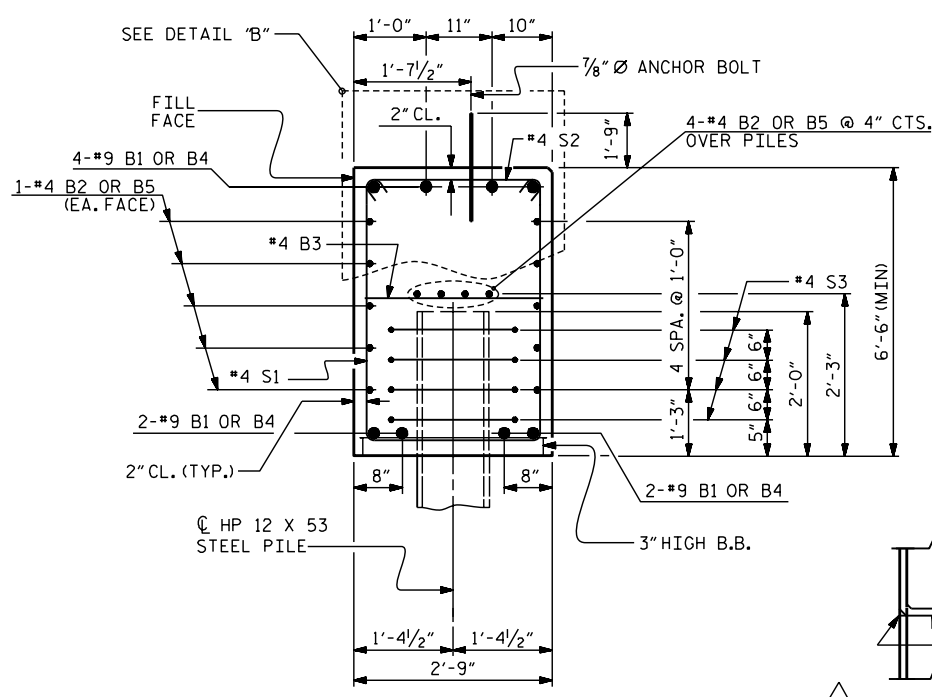
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DESIGNED BY:	J. WHEATLEY	DATE:	FEB 2022
DRAWN BY:	J. WHEATLEY	DATE:	FEB 2022
CHECKED BY:	T. KIRSCHBAUM	DATE:	FEB 2022
DESIGN ENGINEER OF RECORD:	T.M. HARRIS	DATE:	FEB 2022

**WING DETAILS**

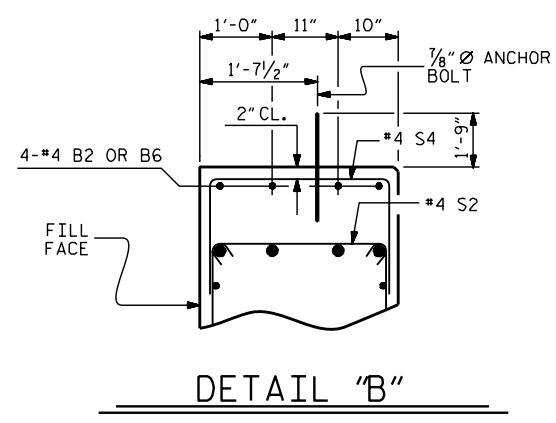


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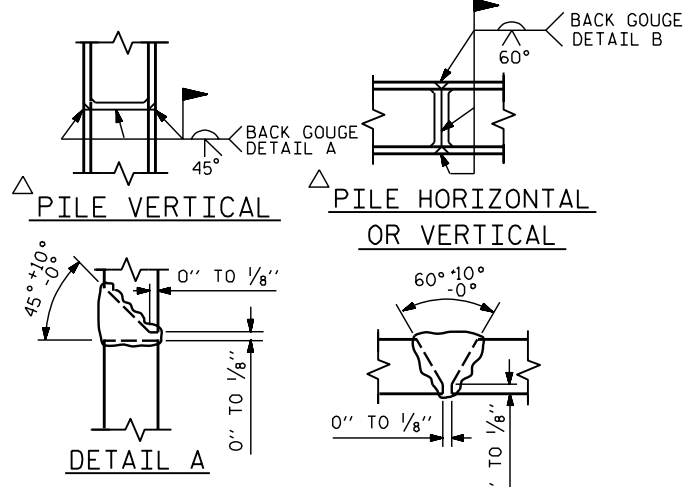


**SECTION A-A**

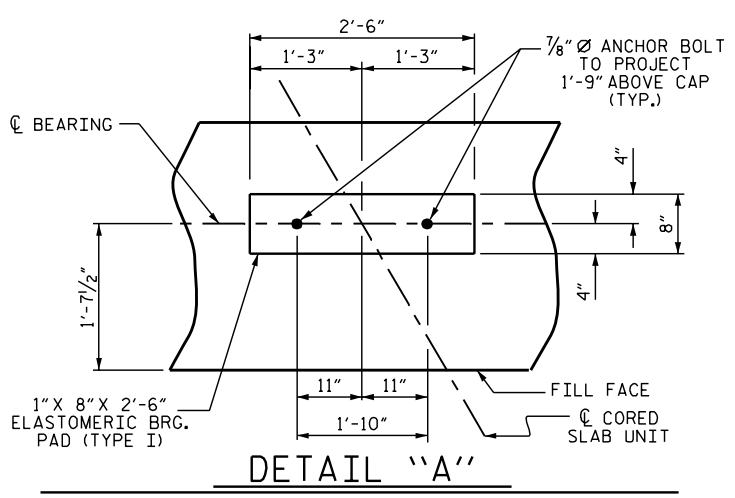
(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")



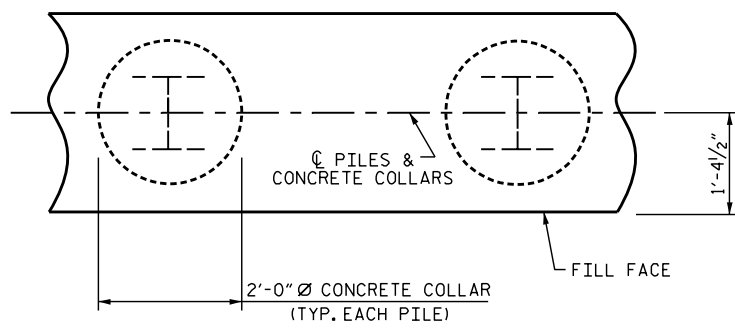
**DETAIL "B"**



**PILE SPLICE DETAILS**

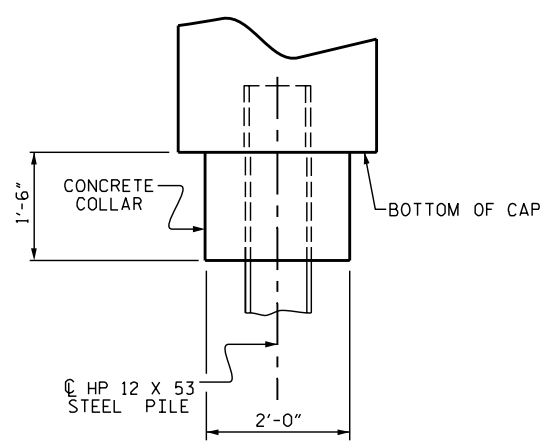


**DETAIL "A"**

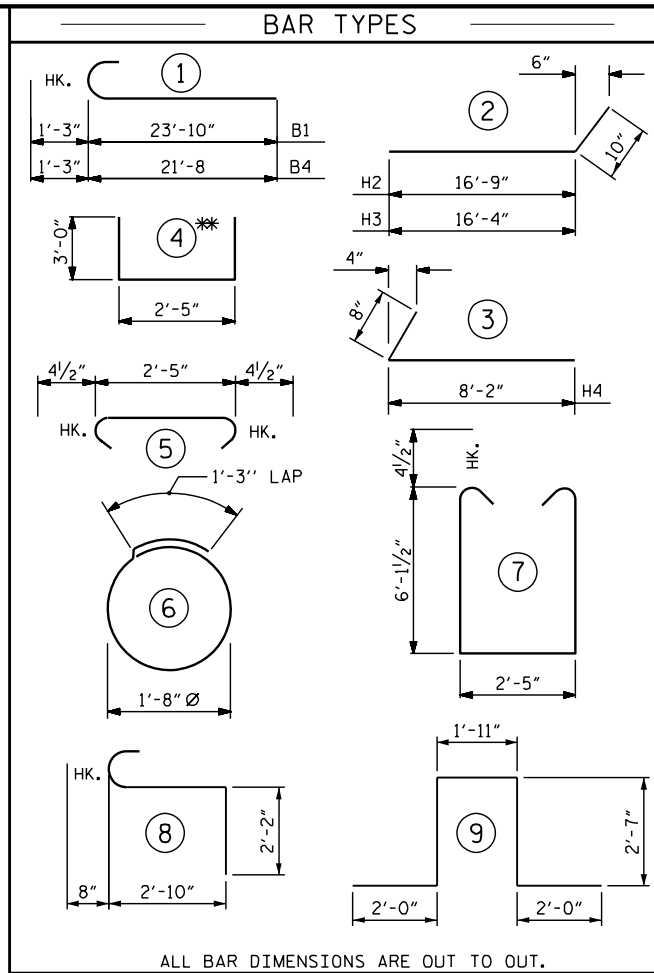


**PLAN CORROSION PROTECTION FOR STEEL PILES DETAIL**

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)

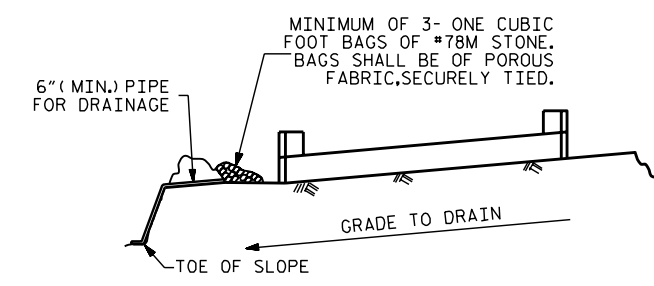


**ELEVATION**



ALL BAR DIMENSIONS ARE OUT TO OUT.  
 \* TO BE USED WHERE SLOPE OF TOP CAP INCREASES BAR SPACING GREATER THAN 6 INCHES. SEE PLAN SHEETS FOR LOCATION.

BILL OF MATERIAL						BILL OF MATERIAL					
END BENT 1 - STAGE I						END BENT 1 - STAGE II					
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	8	#9	1	25'-1"	682	B3	6	#4	STR	2'-5"	10
B2	18	#4	STR	24'-11"	300	B4	8	#9	1	22'-11"	623
B3	6	#4	STR	2'-5"	10	B5	14	#4	STR	23'-0"	215
B6	4	#4	STR	10'-6"	28	B6	4	#4	STR	10'-6"	28
H1	16	#5	STR	18'-5"	307	H2	4	#5	2	17'-7"	73
H2	4	#5	2	17'-7"	73	H3	4	#5	2	17'-2"	72
H3	4	#5	2	17'-2"	72	H4	28	#4	2	8'-10"	165
K1	8	#4	STR	4'-1"	22	K2	8	#4	STR	3'-10"	20
S1	24	#4	7	15'-5"	247	S1	30	#4	7	15'-5"	309
S2	24	#4	5	3'-2"	51	S2	30	#4	5	3'-2"	63
S3	16	#4	6	6'-6"	69	S3	16	#4	6	6'-6"	69
S4	14	#4	4	8'-5"	79	S4	8	#4	4	8'-5"	45
S5	3	#6	8	5'-8"	26	V2	26	#4	STR	8'-8"	151
S6	3	#6	9	9'-1"	41						
V1	43	#4	STR	9'-5"	270						
REINFORCING STEEL (STAGE I)						REINFORCING STEEL (STAGE II)					
CLASS A CONCRETE BREAKDOWN (STAGE I)						CLASS A CONCRETE BREAKDOWN (STAGE II)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS 20.9 C.Y.						POUR #3 CAP, LOWER PART OF WINGS & COLLARS 19.3 C.Y.					
POUR #2 UPPER PART OF WINGS 0.8 C.Y.						POUR #4 UPPER PART OF WINGS 0.6 C.Y.					
TOTAL CLASS A CONCRETE 21.7 C.Y.						TOTAL CLASS A CONCRETE 19.9 C.Y.					
END BENT 1 - STAGE I						END BENT 1 - STAGE II					
HP 12 X 53 STEEL PILES NO: 4 LIN. FT. = 60						HP 12 X 53 STEEL PILES NO: 4 LIN. FT. = 60					
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 4						PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES NO: 4					



BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**

PROJECT NO. 17BP.13.R.183  
 MADISON COUNTY  
 STATION: 11+75.00 -L-  
 SHEET 4 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH											
SUBSTRUCTURE END BENT No. 1 DETAILS											
REVISIONS											
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.					
1			3			S-19					
2			4			TOTAL SHEETS 26					

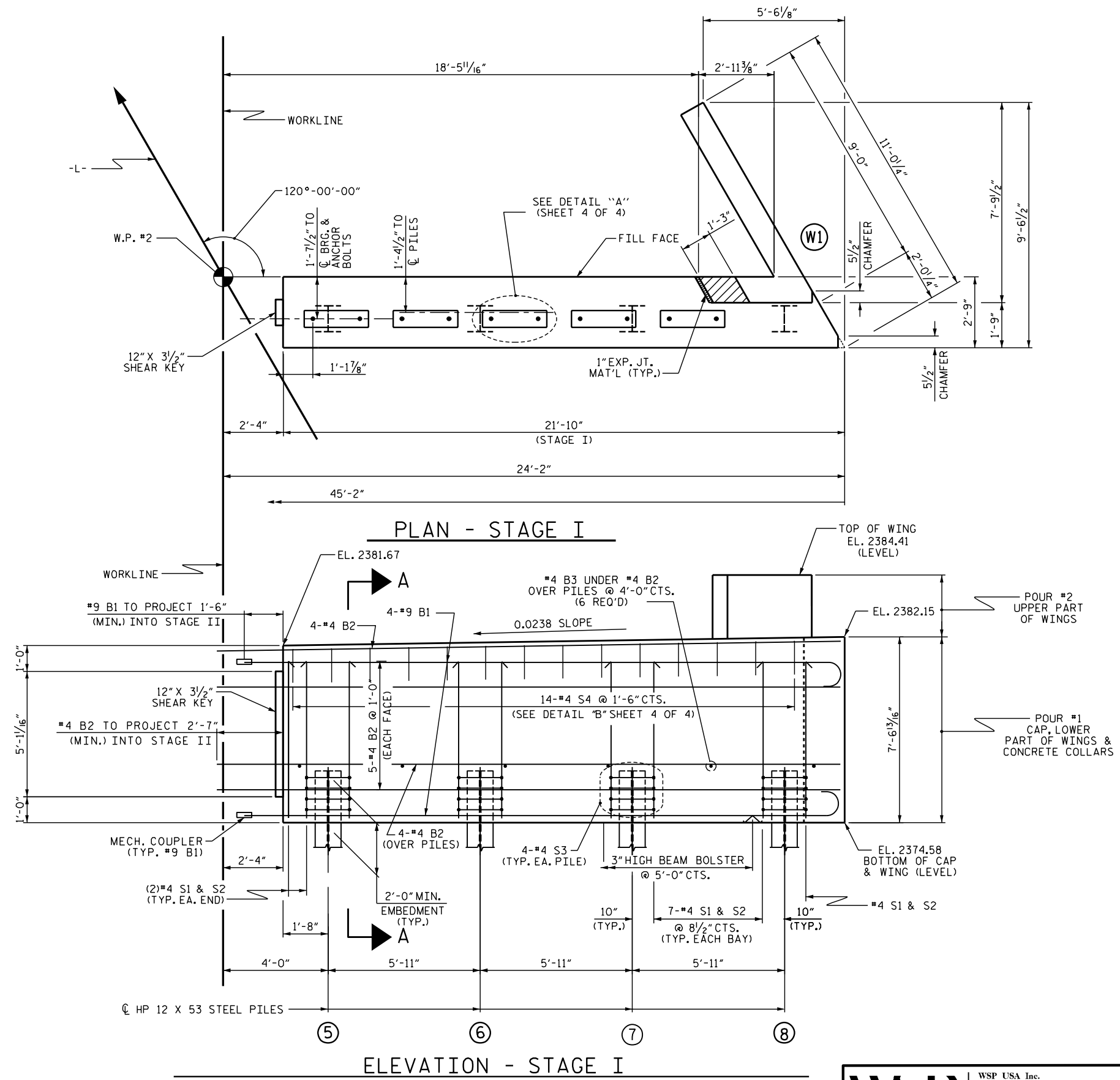
DESIGNED BY:	J. WHEATLEY	DATE:	FEB 2022
DRAWN BY:	J. WHEATLEY	DATE:	FEB 2022
CHECKED BY:	T. KIRSCHBAUM	DATE:	FEB 2022
DESIGN ENGINEER OF RECORD:	T.M. HARRIS	DATE:	FEB 2022

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DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

**NOTES**

STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR DOWELS.  
 FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.  
 FOR WING DETAILS, SEE SHEET 3 OF 4.  
 ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449 AND SHALL BE GALVANIZED. NO SEPARATE PAYMENT WILL BE MADE FOR THE ANCHOR BOLTS AND THE COST OF MATERIALS AND INSTALLATION SHALL BE INCLUDED IN OTHER PAY ITEMS.  
 FOR MECHANICAL COUPLERS, SEE MECHANICAL BUTT SPLICES FOR REINFORCING STEEL IN STANDARD PROVISIONS.  
 THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE CONCRETE PARAPET IS CAST IF SLIP FORMING IS USED.

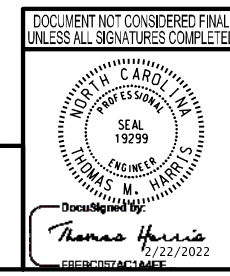


WINGS NOT SHOWN FOR CLARITY.  
 FOR SECTION A-A, SEE SHEET 4 OF 4.  
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
 STATION: 11+75.00 -L-  
 SHEET 1 OF 4

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 SUBSTRUCTURE  
 END BENT No. 2  
 STAGE I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			26



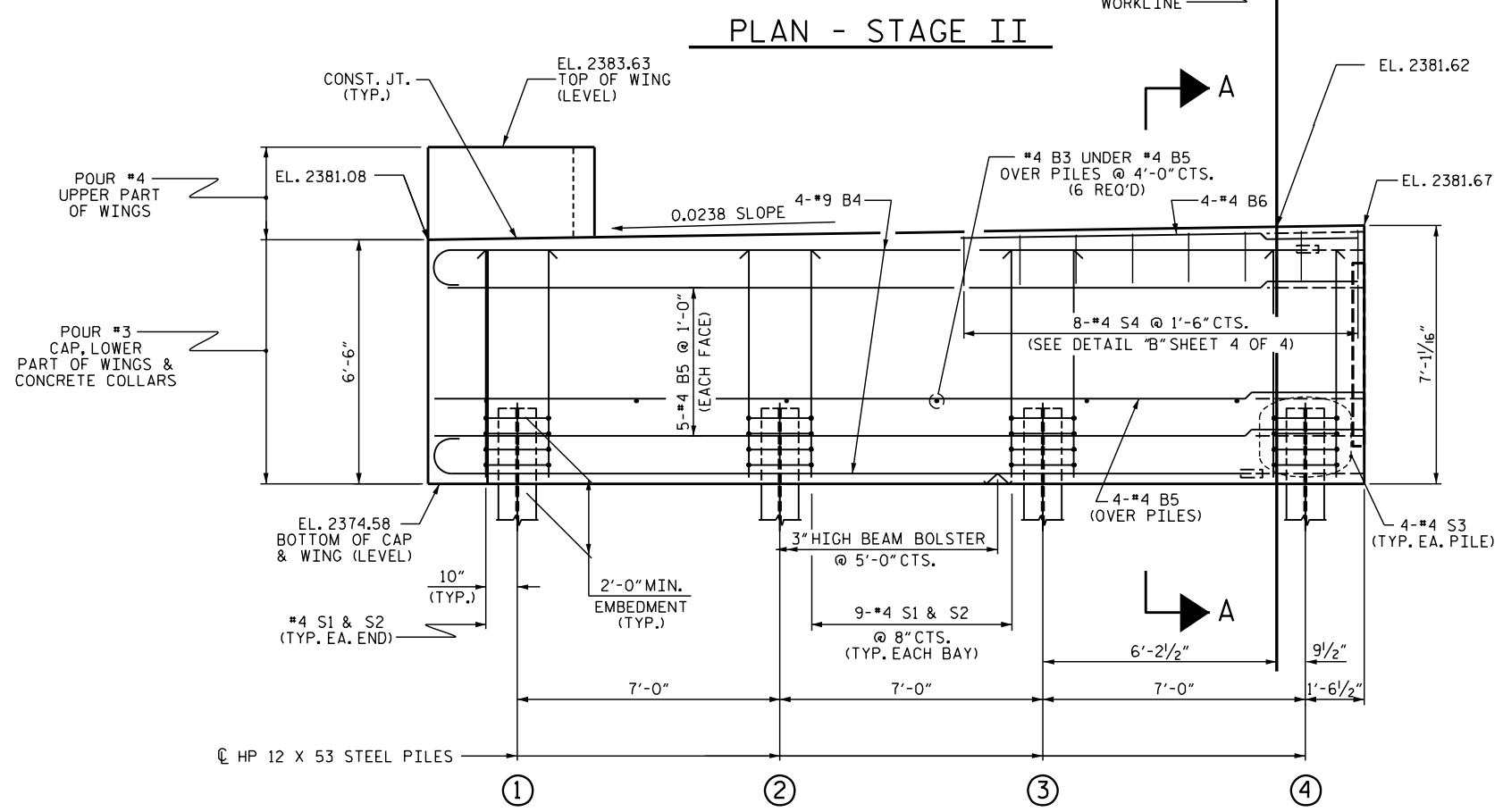
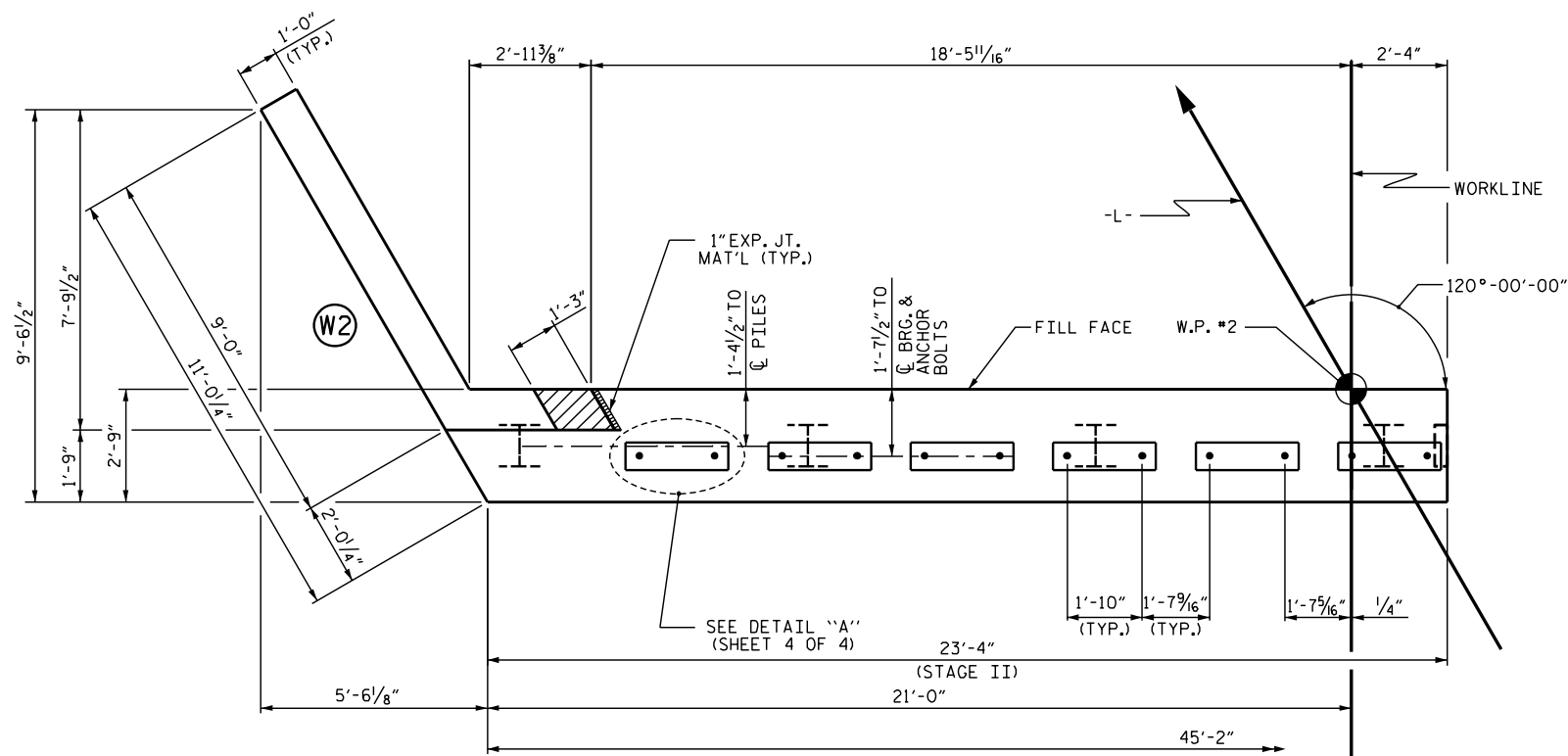
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DESIGNED BY:	J. WHEATLEY	DATE:	FEB 2022
DRAWN BY:	J. WHEATLEY	DATE:	FEB 2022
CHECKED BY:	T. KIRSCHBAUM	DATE:	FEB 2022
DESIGN ENGINEER OF RECORD:	T.M. HARRIS	DATE:	FEB 2022

NOTES

FOR NOTES, SEE SHEET 1 OF 4.

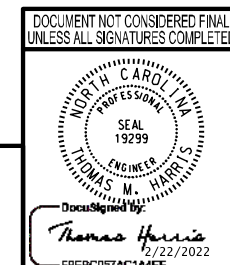


ELEVATION - STAGE II

WINGS NOT SHOWN FOR CLARITY.  
 FOR SECTION A-A, SEE SHEET 4 OF 4.  
 CONCRETE COLLARS FOR STEEL PILES NOT SHOWN IN PLAN AND ELEVATION VIEWS FOR CLARITY.  
 SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL", SHEET 4 OF 4.

PROJECT NO. 17BP.13.R.183  
 MADISON COUNTY  
 STATION: 11+75.00 -L-  
 SHEET 2 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT No. 2 STAGE II					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S-21 TOTAL SHEETS 26



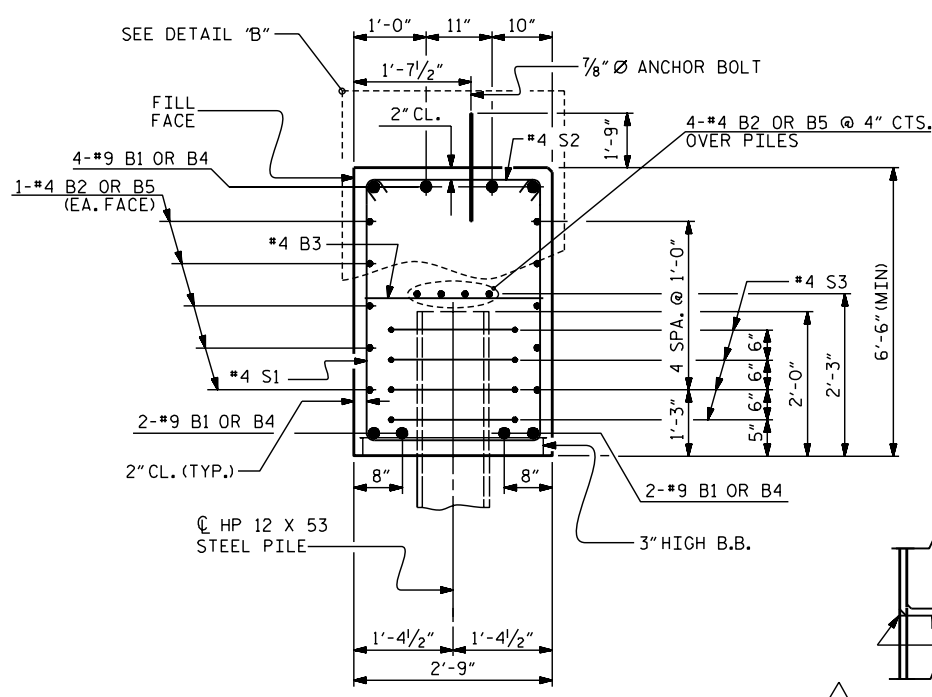
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DRAWN BY:	J. WHEATLEY	DATE:	FEB 2022
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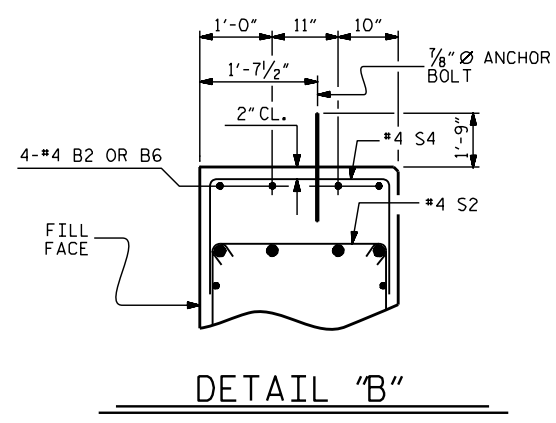


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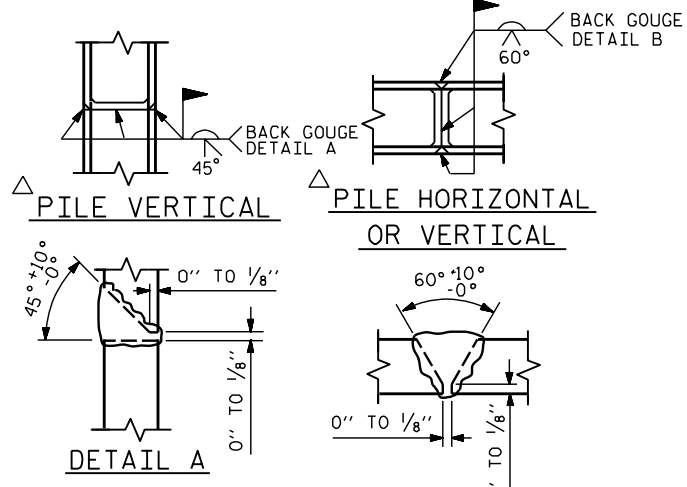


**SECTION A-A**

(CONCRETE COLLAR NOT SHOWN FOR CLARITY. SEE "CORROSION PROTECTION FOR STEEL PILES DETAIL.")

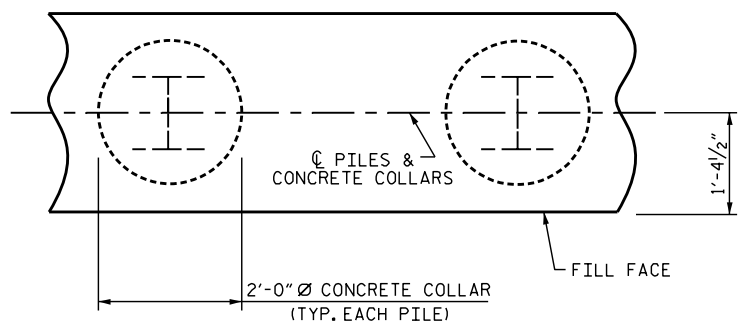


**DETAIL "B"**



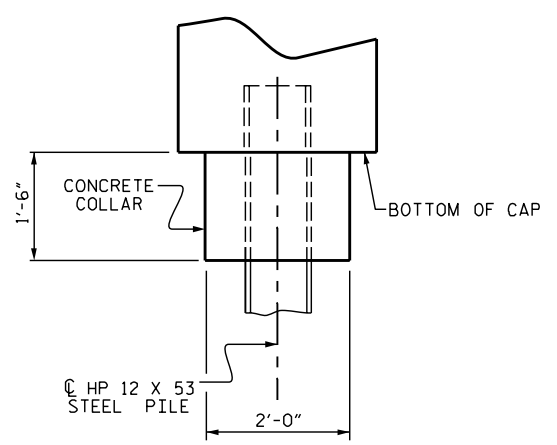
**PILE SPLICE DETAILS**

POSITION OF PILE DURING WELDING.

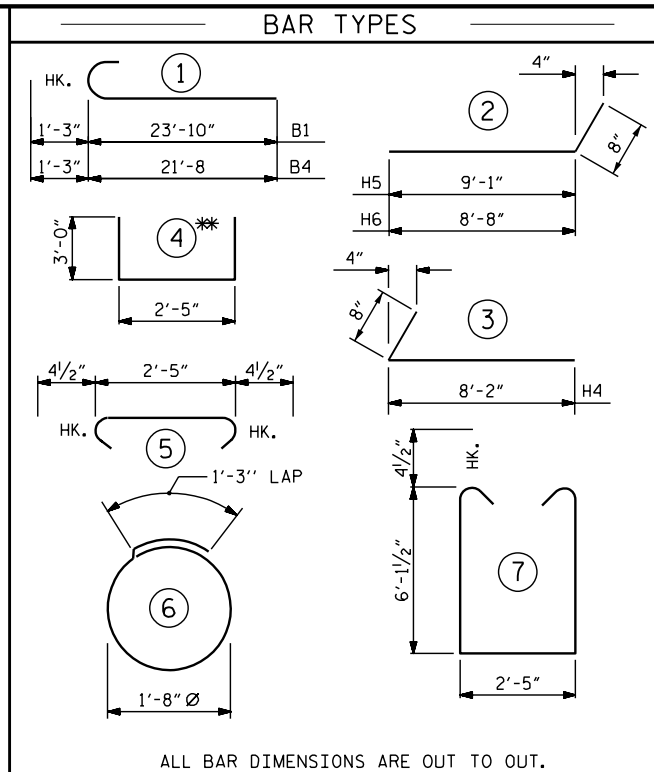


**PLAN**  
**CORROSION PROTECTION FOR STEEL PILES DETAIL**

(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)

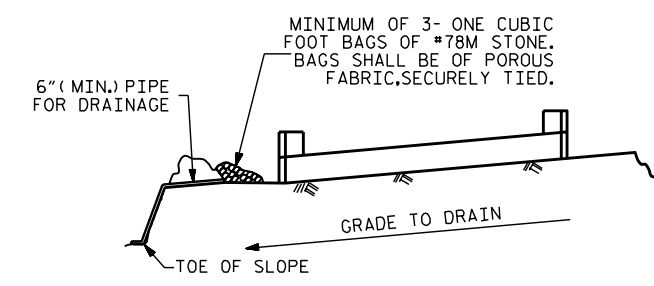


**ELEVATION**



ALL BAR DIMENSIONS ARE OUT TO OUT.  
\*\* TO BE USED WHERE SLOPE OF TOP CAP INCREASES BAR SPACING GREATER THAN 6 INCHES. SEE PLAN SHEETS FOR LOCATION.

BILL OF MATERIAL					BILL OF MATERIAL						
END BENT 2 - STAGE I					END BENT 2 - STAGE II						
BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT		
B1	8	#9	1	25'-1"	682	B3	6	#4	STR	2'-5"	10
B2	18	#4	STR	24'-11"	300	B4	8	#9	1	22'-11"	623
B3	6	#4	STR	2'-5"	10	B5	14	#4	STR	23'-0"	215
B4	4	#4	STR	10'-6"	28	B6	4	#4	STR	10'-6"	28
H4	30	#4	2	9'-9"	177	H5	14	#4	2	9'-9"	91
K2	8	#4	STR	3'-10"	20	H6	14	#4	2	9'-4"	87
S1	24	#4	7	15'-5"	247	K2	8	#4	STR	3'-10"	20
S2	24	#4	5	3'-2"	51	S1	29	#4	7	15'-5"	299
S3	16	#4	6	6'-6"	69	S2	29	#4	5	3'-2"	61
S4	14	#4	4	8'-5"	79	S3	16	#4	6	6'-6"	69
V1	26	#4	STR	9'-5"	164	S4	8	#4	4	8'-5"	45
						V2	27	#4	STR	8'-8"	156
REINFORCING STEEL (STAGE I)					1,799 LBS.	REINFORCING STEEL (STAGE II)					1,704 LBS.
CLASS A CONCRETE BREAKDOWN (STAGE I)						CLASS A CONCRETE BREAKDOWN (STAGE II)					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					18.9 C.Y.	POUR #3 CAP, LOWER PART OF WINGS & COLLARS					19.5 C.Y.
POUR #2 UPPER PART OF WINGS					0.5 C.Y.	POUR #4 UPPER PART OF WINGS					0.6 C.Y.
TOTAL CLASS A CONCRETE					19.4 C.Y.	TOTAL CLASS A CONCRETE					20.1 C.Y.
END BENT 2 - STAGE I						END BENT 2 - STAGE II					
HP 12 X 53 STEEL PILES						HP 12 X 53 STEEL PILES					
NO: 4					LIN. FT. = 48	NO: 4					LIN. FT. = 48
PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES					NO: 4	PILE DRIVING EQUIPMENT SETUP FOR HP 12 X 53 STEEL PILES					NO: 4

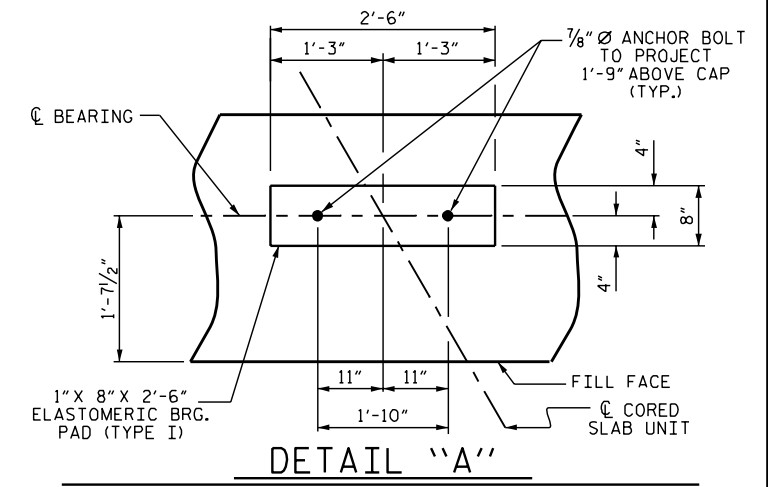


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR EFFECTIVENESS.

NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

**TEMPORARY DRAINAGE AT END BENT**



**DETAIL "A"**

PROJECT NO. 17BP.13.R.183

MADISON COUNTY

STATION: 11+75.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

SUBSTRUCTURE  
END BENT No. 2  
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-23
2			4			TOTAL SHEETS 26

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THOMAS M. HARRIS  
REGISTERED PROFESSIONAL ENGINEER  
SEAL 19299  
2/22/2022

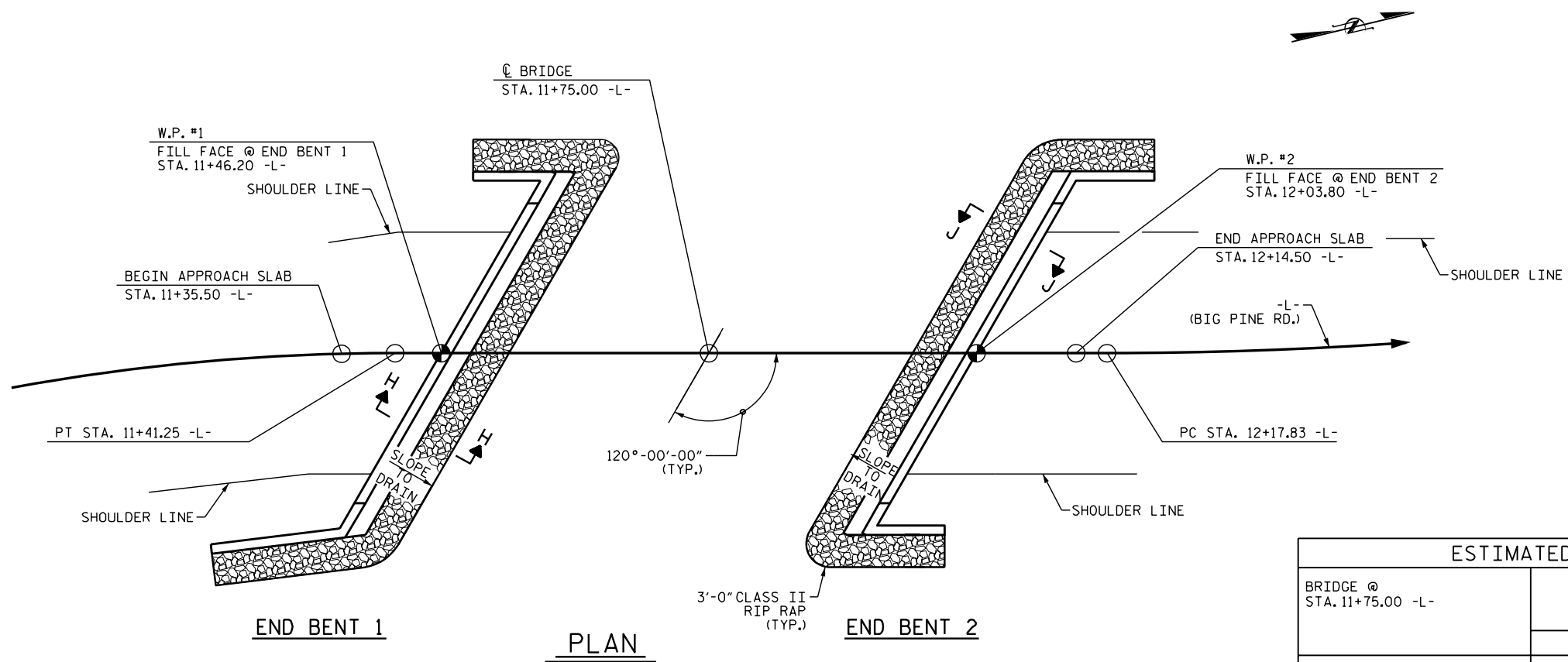
**wsp**

WSP USA Inc.  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
LICENSE NO. E-0165

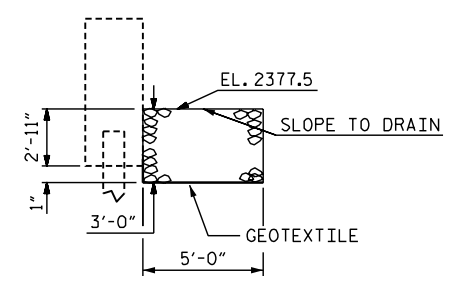
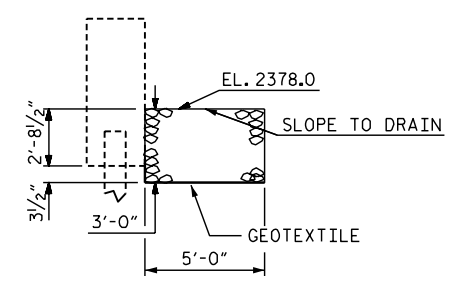
DESIGNED BY:	J. WHEATLEY	DATE:	FEB 2022
DRAWN BY:	J. WHEATLEY	DATE:	FEB 2022
CHECKED BY:	T. KIRSCHBAUM	DATE:	FEB 2022
DESIGN ENGINEER OF RECORD:	T.M. HARRIS	DATE:	FEB 2022



NOTES :  
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



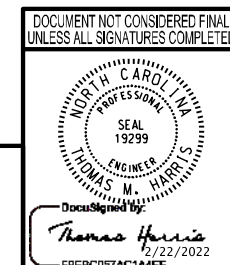
ESTIMATED QUANTITIES		
BRIDGE @ STA. 11+75.00 -L-	RIP RAP CLASS II (3'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	72	53
END BENT 2	66	49



PROJECT NO. 17BP.13.R.183  
MADISON COUNTY  
STATION: 11+75.00 -L-

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

## RIP RAP DETAILS



**wsp**  
WSP USA Inc.  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
LICENSE NO. F-0165

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			S-24
2			4			TOTAL SHEETS 26

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DESIGNED BY: J. WHEATLEY DATE: FEB 2022  
DRAWN BY: J. WHEATLEY DATE: FEB 2022  
CHECKED BY: T. KIRSCHBAUM DATE: FEB 2022  
DESIGN ENGINEER OF RECORD: T.M. HARRIS DATE: FEB 2022



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**NOTES**

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 4"Ø DRAINAGE PIPE, AND SELECT MATERIAL BACKFILL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE I IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.

SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.

FOR THE 4"Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.

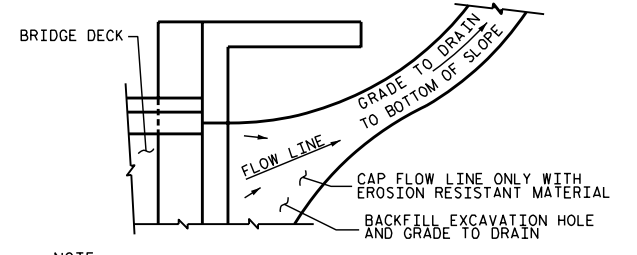
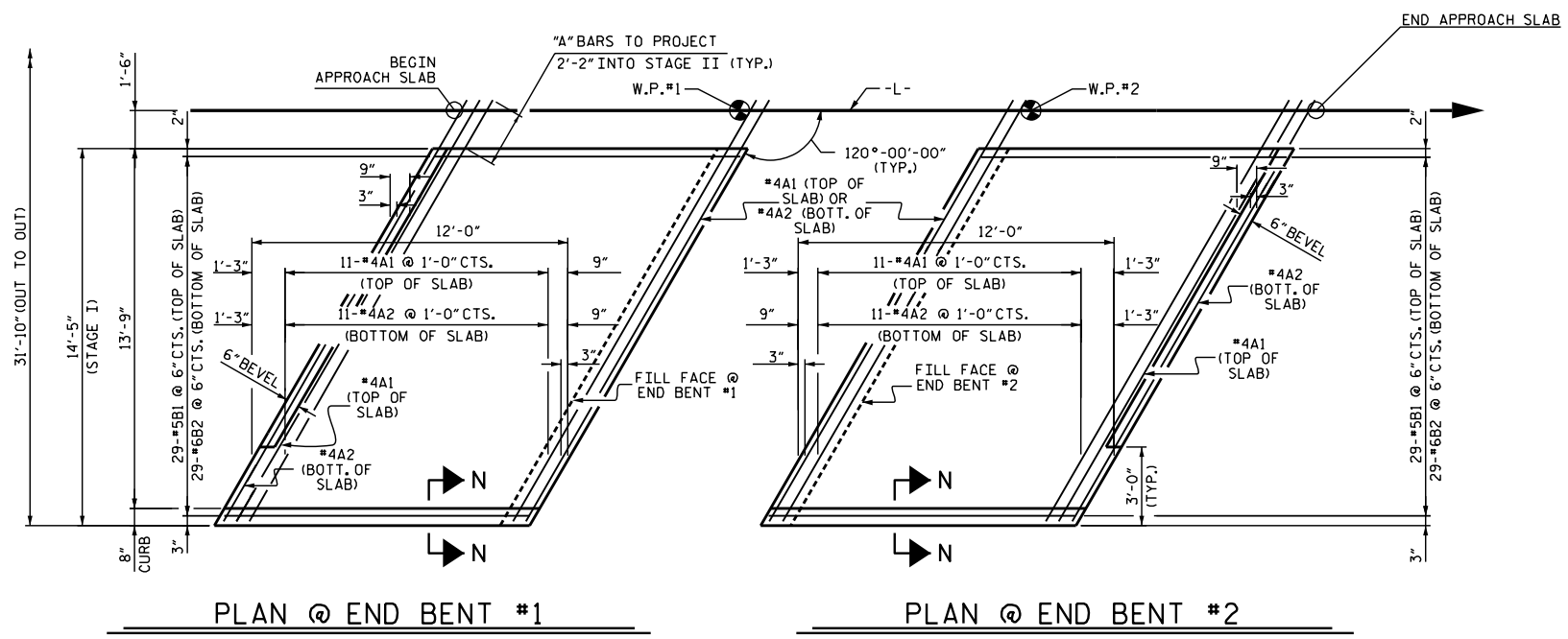
APPLY TYPE 4 OR 5 GEOTEXTILE ONE FOOT BELOW THE APPROACH SLAB FOR THE FULL WIDTH OF THE APPROACH FILL PER NCDOT MEMO DATED 2/25/2021.

**BILL OF MATERIAL - STAGE I**

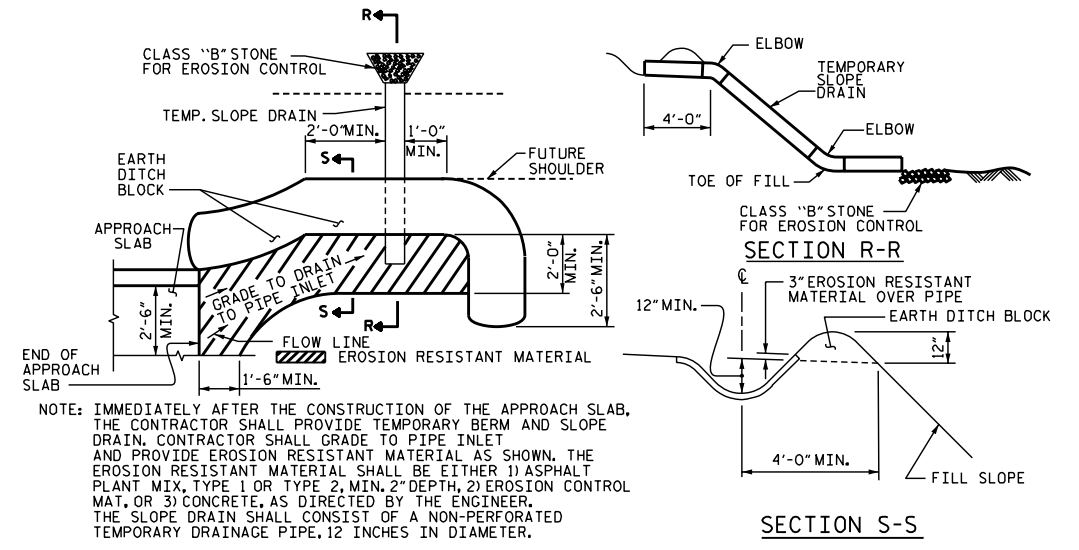
APPROACH SLAB FOR ONE EB					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	13	#4	STR	18'-8"	162
A2	13	#4	STR	18'-8"	162
*B1	29	#5	STR	11'-1"	335
B2	29	#6	STR	11'-7"	505
REINFORCING STEEL				LBS.	667
*EPOXY COATED REINFORCING STEEL				LBS.	497
CLASS AA CONCRETE				C. Y.	7.4

**SPLICE LENGTHS**

BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-9"
#5	2'-6"	2'-2"
#6	3'-10"	2'-7"



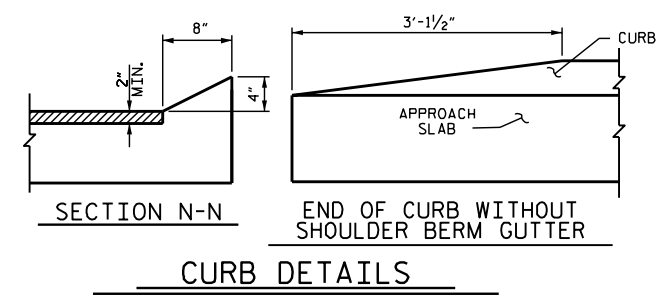
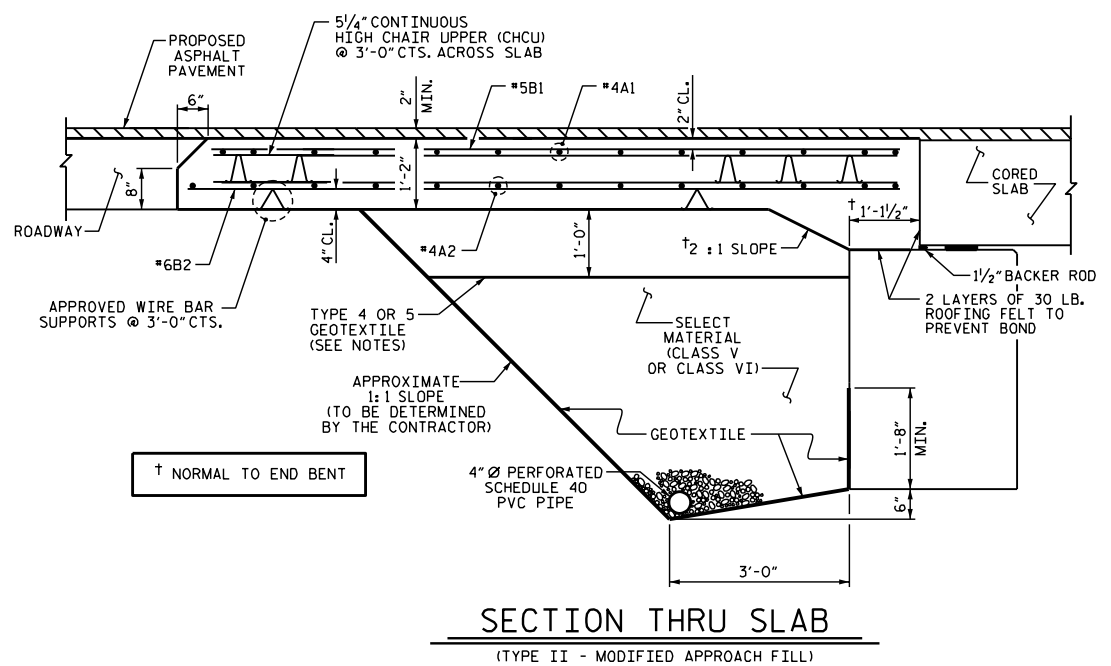
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT TO THE STRUCTURE. THE CONTRACTOR WILL BE REQUIRED TO REMOVE THESE MATERIALS PRIOR TO CONSTRUCTION OF THE APPROACH SLAB.



NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 2" DEPTH, 2) EROSION CONTROL MAT, OR 3) CONCRETE, AS DIRECTED BY THE ENGINEER. THE SLOPE DRAIN SHALL CONSIST OF A NON-PERFORATED TEMPORARY DRAINAGE PIPE, 12 INCHES IN DIAMETER.

**TEMPORARY BERM AND SLOPE DRAIN DETAILS**

(TO BE USED WHEN SHOULDER BERM CUTTER IS REQUIRED)



PROJECT NO. 17BP.13.R.183

MADISON COUNTY

STATION: 11+75.00 -L-

SHEET 1 OF 2

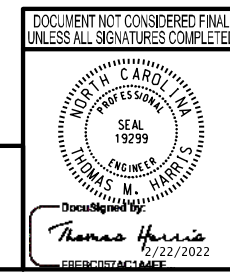
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
RALEIGH

**BRIDGE APPROACH SLAB FOR PRESTRESSED CONCRETE CORED SLAB UNIT (SUB-REGIONAL TIER) (STAGE I)**

REVISIONS				SHEET NO.
NO.	BY:	DATE:	NO.	DATE:
1			3	
2			4	

S-25

TOTAL SHEETS 26

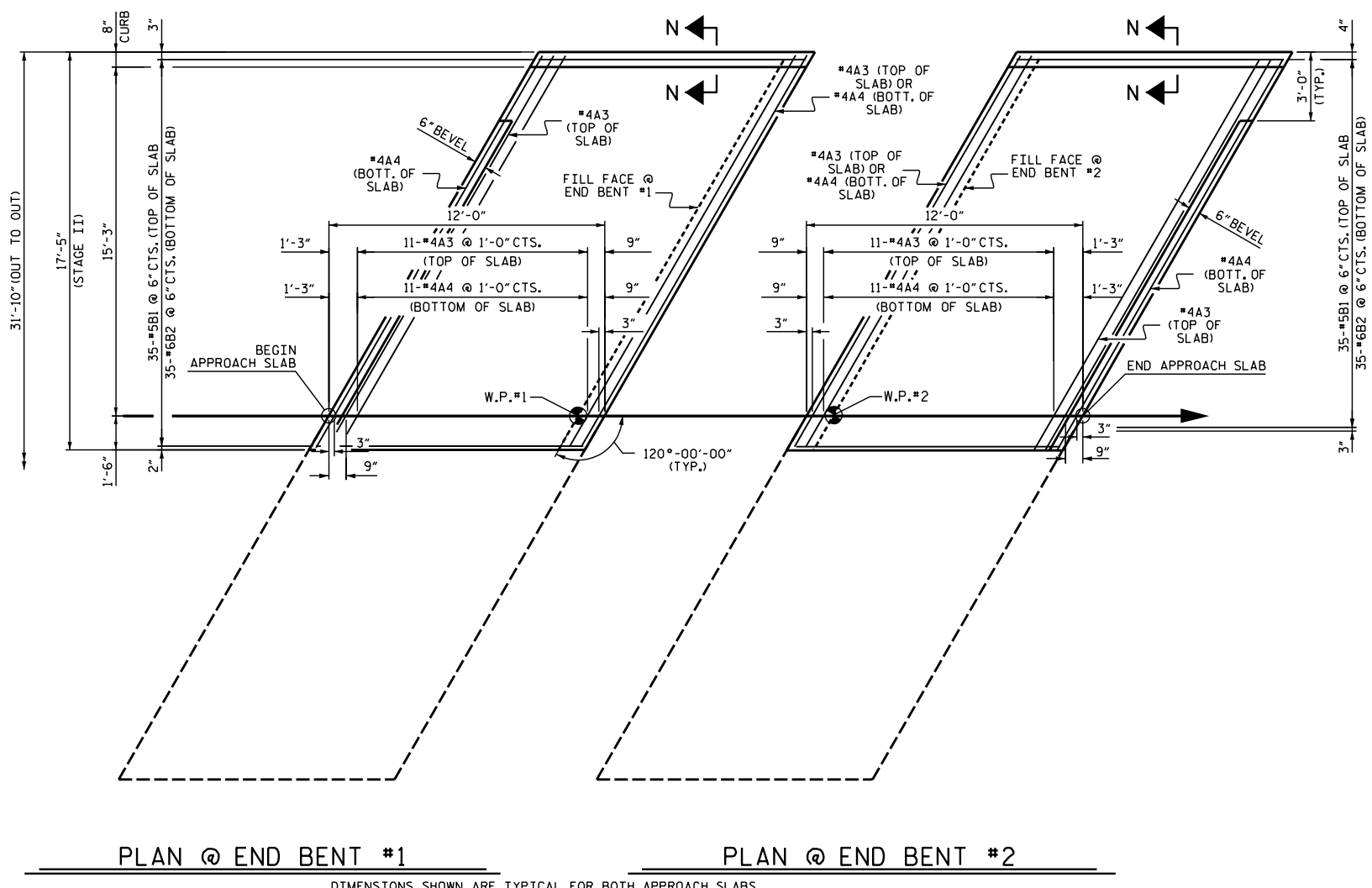


**wsp**

WSP USA Inc.  
434 FAYETTEVILLE STREET  
SUITE 1500  
RALEIGH, NC 27601  
TEL: 1.919.836.4040  
LICENSE NO. F-0165

ASSEMBLED BY: J. WHEATLEY	DATE: FEB 2022	DRAWN BY: MAA	5/10	REV. 6/13	MAA/GM
CHECKED BY: T. KIRSCHBAUM	DATE: FEB 2022	CHECKED BY: CM	5/10	REV. 1/15	MAA/TMG
DESIGN ENGINEER OF RECORD: T. HARRIS	DATE: FEB 2022			REV. 12/17	MAA/THC

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PLAN @ END BENT #1

PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

NOTES

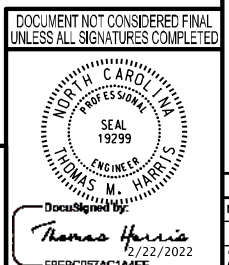
FOR NOTES, TEMPORARY DRAINAGE DETAIL, CURB DETAILS, SPLICE LENGTHS AND SECTION THROUGH SLAB, SEE SHEET 1 OF 2.

BILL OF MATERIAL - STAGE II					
APPROACH SLAB FOR ONE EB					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	13	#4	STR	19'-10"	172
A2	13	#4	STR	19'-10"	172
*B1	35	#5	STR	11'-1"	405
B2	35	#6	STR	11'-7"	609
REINFORCING STEEL				LBS.	781
* EPOXY COATED REINFORCING STEEL				LBS.	577
CLASS AA CONCRETE				C. Y.	8.8

PROJECT NO. 17BP.13.R.183  
 MADISON COUNTY  
 STATION: 11+75.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 RALEIGH  
 BRIDGE APPROACH SLAB  
 FOR PRESTRESSED CONCRETE  
 CORED SLAB UNIT  
 (SUB-REGIONAL TIER)  
 (STAGE II)



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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-26
2			4			TOTAL SHEETS 26

ASSEMBLED BY: J. WHEATLEY	DATE: FEB 2022	DRAWN BY: MAA	5/10	REV. 6/13	MAA/GM
CHECKED BY: T. KIRSCHBAUM	DATE: FEB 2022	CHECKED BY: CM	5/10	REV. 1/15	MAA/TMG
DESIGN ENGINEER OF RECORD: T. HARRIS	DATE: FEB 2022			REV. 12/17	MAA/THC

