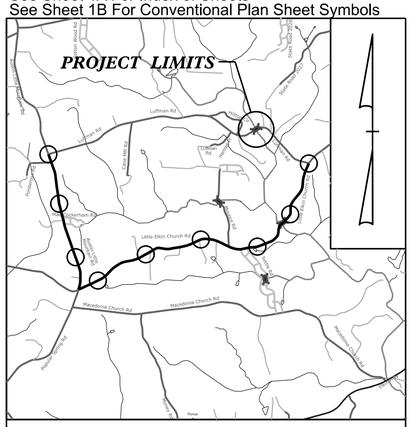
09/08/99

TIP PROJECT: BP11.R024

CONTRACT: DK00422

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



VICINITY MAP (NTS)

100% PLAN SET

OFF SITE DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WILKES COUNTY

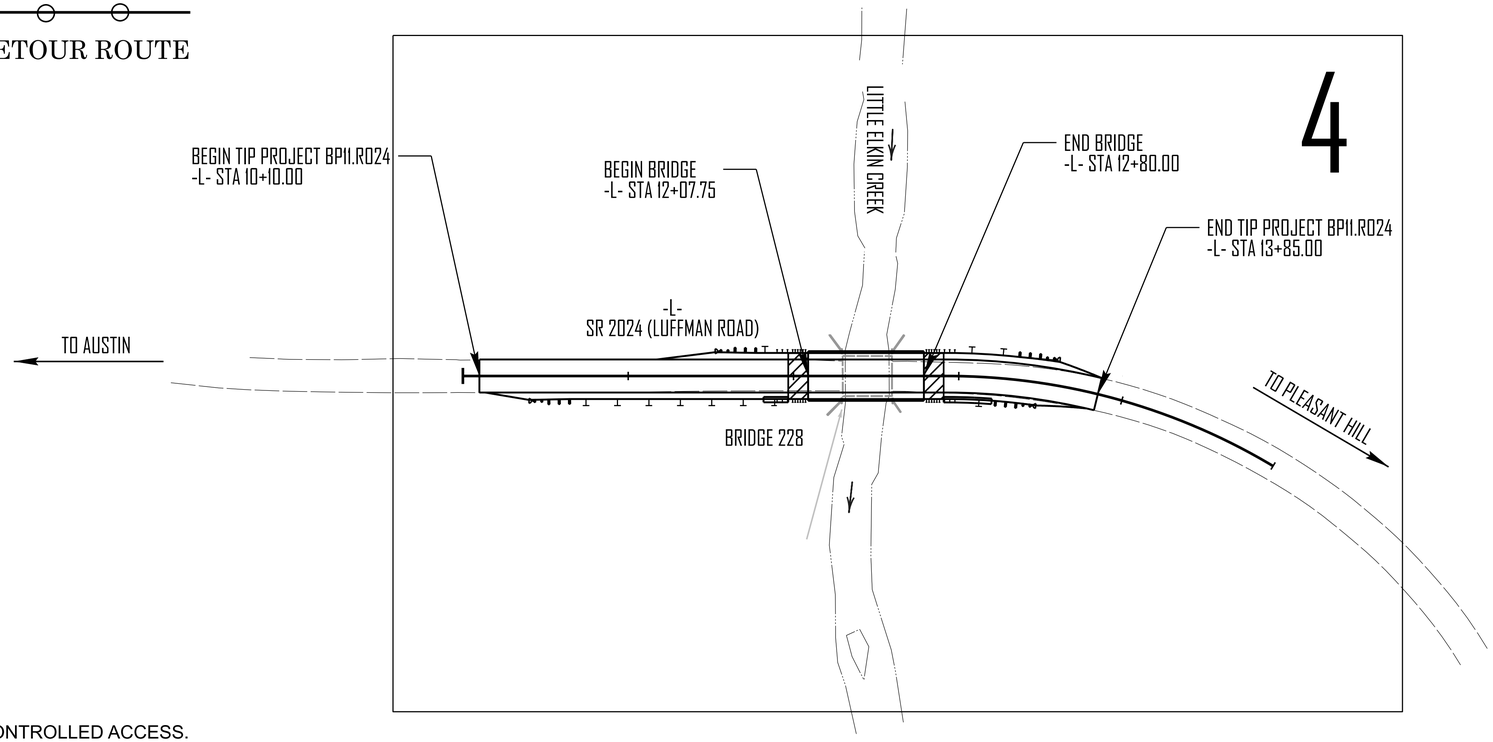
LOCATION: *BRIDGE 228 OVER LITTLE ELKIN CREEK ON SR 2024 (LUFFMAN ROAD)*

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP11-R024	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP11.R024.1		PE
BP11.R024.2		R/W + UTL
BP11.R024.3		CONST.

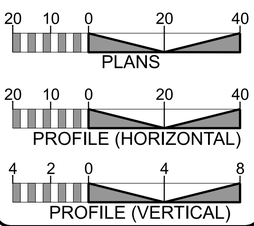
NAD 83 - NA 2011



THIS PROJECT HAS NO CONTROLLED ACCESS.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2025 = 250
ADT 2045 = 380
K = %
D = %
T = % *
V = 45 MPH
* TTST = 1% DUAL = 2%
FUNC CLASS =
LOCAL
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY STATE PROJECT BP11.R024 = 0.058 MILES

LENGTH STRUCTURES STATE PROJECT BP11.R024 = 0.013 MILES

TOTAL LENGTH STATE PROJECT BP11.R024 = 0.071 MILES

Prepared in the Office of:
KIMLEY-HORN
421 FAYETTEVILLE ST., SUITE 600, RALEIGH NC, 27601
NC LICENSE #F-0102

2014 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 26, 2024

LETTING DATE:
JUNE 5, 2025

JORDAN C. BENDL, P.E.
PROJECT ENGINEER

JACK R. CRINO, P.E.
PROJECT DESIGN ENGINEER

ROBBIE N. WEISZ, P.E.
NCDOT PROJECT MANAGER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 052128 ENGINEER JORDAN BENDL

4/30/2025 *P.E.*

SIGNATURE:

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 056618 ENGINEER JACK R. CRINO

4/30/2025 *P.E.*

SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

5/26/20

INDEX OF SHEETS

GENERAL NOTES: 2024 SPECIFICATIONS
EFFECTIVE: 01-16-2024
REVISED:

GRADING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED OR FUTURE SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

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

SUPERELEVATION:

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

SHOULDER CONSTRUCTION:

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

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.

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 O EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

COMMUNICATIONS - RIVER STREET NETWORKS: ANDREW CHURCH (336)-928-5251

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

2024 ROADWAY ENGLISH STANDARD DRAWINGS EFF. 01-16-2024
REV.

The following Roadway Standards as appear in "Roadway Standard Drawings" Contracts Standards and Development Unit - N. C. Department of Transportation - Raleigh, N. C., Dated January 16, 2024 are applicable to this project
and by reference hereby are considered a part of these plans:

STD.NO. TITLE

DIVISION 2 - EARTHWORK
200.02 Method of Clearing - Method II
225.02 Guide for Grading Subgrade - Secondary and Local
225.04 Method of Obtaining Superelevation - Two Lane Pavement

DIVISION 3 - PIPE CULVERTS
300.01 Method of Pipe Installation (Use Details in Lieu of Standards for Sheets 1 and 2 of 2)

DIVISION 4 - MAJOR STRUCTURES
423.01 Bridge Approach Fills - Type 1 Approach Fill for Bridge Abutment

DIVISION 5 - SUBGRADE, BASES AND SHOULDERS
560.01 Method of Shoulder Construction - High Side of Superelevated Curve - Method I

DIVISION 8 - INCIDENTALS
815.02 Subsurface Drain
840.00 Concrete Base Pad for Drainage Structures
840.02 Concrete Catch Basin - 12" thru 54" Pipe
840.29 Frames and Narrow Slot Flat Grates
840.35 Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45 Precast Drainage Structure
840.46 Traffic Bearing Precast Drainage Structure
846.04 Drop Inlet Installation in Shoulder Berm Gutter
862.01 Guardrail Placement (Use Details in Lieu of Standards for Sheets 4, 6, 12, and 14 of 15)
862.02 Guardrail Installation
862.03 Structure Anchor Units (Use Detail in Lieu of Standard for Sheet 8 of 9)
862.04 Anchoring End of Guardrail - for B-77 and B-83 Anchor Units
876.01 Rip Rap in Channels and Ditches
876.02 Guide for Rip Rap at Pipe Outlets
876.04 Drainage Ditches with Class 'B' Rip Rap

REVISIONS

BP11.R024
1A

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

PREPARED BY

Kimley»Horn

NC LICENSE #F-0102

9/21/21

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BP11.R024 | 1B

Note: Not to Scale

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin (EIP)
- Computed Property Corner
- Existing Concrete Monument (ECM)
- Parcel / Sequence Number
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary
- Proposed Wetland Boundary
- Existing Endangered Animal Boundary
- Existing Endangered Plant Boundary
- Existing Historic Property Boundary
- Known Contamination Area: Soil
- Potential Contamination Area: Soil
- Known Contamination Area: Water
- Potential Contamination Area: Water
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY & PROJECT CONTROL:

- Primary Horiz Control Point
- Primary Horiz and Vert Control Point
- Secondary Horiz and Vert Control Point
- Vertical Benchmark
- Existing Right of Way Monument
- Proposed Right of Way Monument (Rebar and Cap)
- Proposed Right of Way Monument (Concrete)
- Existing Permanent Easement Monument
- Proposed Permanent Easement Monument (Rebar and Cap)
- Existing C/A Monument
- Proposed C/A Monument (Rebar and Cap)
- Proposed C/A Monument (Concrete)
- Existing Right of Way Line
- Proposed Right of Way Line
- Existing Control of Access Line
- Proposed Control of Access Line
- Proposed ROW and CA Line
- Existing Easement Line
- Proposed Temporary Construction Easement
- Proposed Temporary Drainage Easement
- Proposed Permanent Drainage Easement
- Proposed Permanent Drainage/Utility Easement
- Proposed Permanent Utility Easement
- Proposed Temporary Utility Easement
- Proposed Aerial Utility Easement

ROADS AND RELATED FEATURES:

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

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert
- Bridge Wing Wall, Head Wall and End Wall

MINOR:

- Head and End Wall
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB
- Paved Ditch Gutter
- Storm Sewer Manhole
- Storm Sewer

UTILITIES:

** SUE - Subsurface Utility Engineering*
LOS - Level of Service - A,B,C or D (Accuracy)

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole
- H-Frame Pole
- U/G Power Line Test Hole (SUE - LOS A)*
- U/G Power Line (SUE - LOS B)*
- U/G Power Line (SUE - LOS C)*
- U/G Power Line (SUE - LOS D)*

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole
- Telephone Pedestal
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole
- U/G Telephone Test Hole (SUE - LOS A)*
- U/G Telephone Cable (SUE - LOS B)*
- U/G Telephone Cable (SUE - LOS C)*
- U/G Telephone Cable (SUE - LOS D)*
- U/G Telephone Conduit (SUE - LOS B)*
- U/G Telephone Conduit (SUE - LOS C)*
- U/G Telephone Conduit (SUE - LOS D)*
- U/G Fiber Optics Cable (SUE - LOS B)*
- U/G Fiber Optics Cable (SUE - LOS C)*
- U/G Fiber Optics Cable (SUE - LOS D)*

WATER:

- Water Manhole
- Water Meter
- Water Valve
- Water Hydrant
- U/G Water Line Test Hole (SUE - LOS A)*
- U/G Water Line (SUE - LOS B)*
- U/G Water Line (SUE - LOS C)*
- U/G Water Line (SUE - LOS D)*
- Above Ground Water Line

TV:

- TV Pedestal
- TV Tower
- U/G TV Cable Hand Hole
- U/G TV Test Hole (SUE - LOS A)*
- U/G TV Cable (SUE - LOS B)*
- U/G TV Cable (SUE - LOS C)*
- U/G TV Cable (SUE - LOS D)*
- U/G Fiber Optic Cable (SUE - LOS B)*
- U/G Fiber Optic Cable (SUE - LOS C)*
- U/G Fiber Optic Cable (SUE - LOS D)*

GAS:

- Gas Valve
- Gas Meter
- U/G Gas Line Test Hole (SUE - LOS A)*
- U/G Gas Line (SUE - LOS B)*
- U/G Gas Line (SUE - LOS C)*
- U/G Gas Line (SUE - LOS D)*
- Above Ground Gas Line

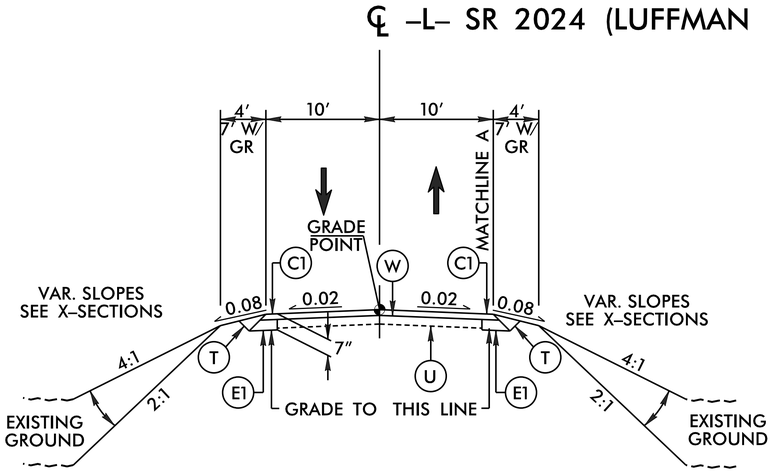
SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line
- Above Ground Sanitary Sewer
- SS Force Main Line Test Hole (SUE - LOS A)*
- SS Force Main Line (SUE - LOS B)*
- SS Force Main Line (SUE - LOS C)*
- SS Force Main Line (SUE - LOS D)*

MISCELLANEOUS:

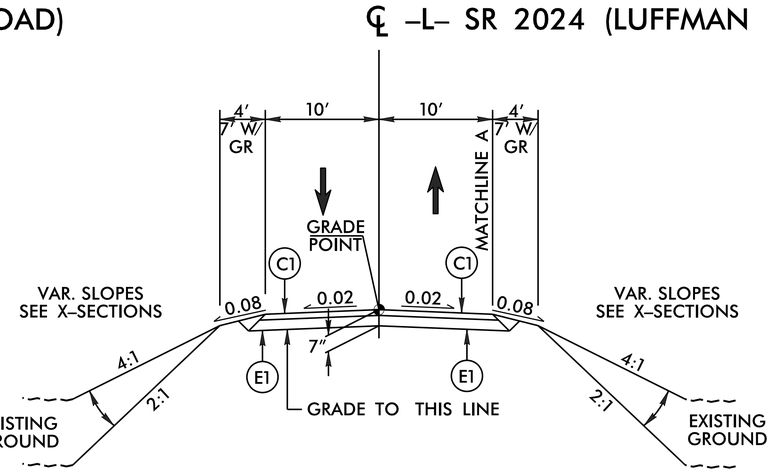
- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box
- Utility Unknown U/G Line (SUE - LOS B)*
- U/G Tank; Water, Gas, Oil
- Underground Storage Tank, Approx. Loc.
- A/G Tank; Water, Gas, Oil
- Geoenvironmental Boring
- Abandoned According to Utility Records —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

5/26/20



TYPICAL SECTION NO. 1

–L– STA. 10+10.00 TO 10+70.00
–L– STA. 13+00.00 TO 13+85.00



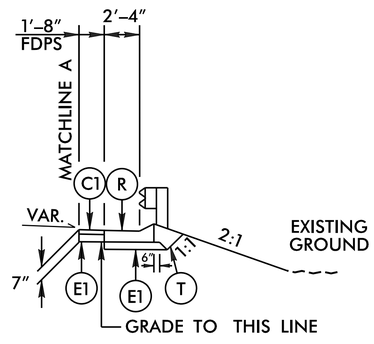
TYPICAL SECTION NO. 2

–L– STA. 10+70.00 TO 12+07.75
–L– STA. 12+80.00 TO 13+00.00

PAVEMENT SCHEDULE

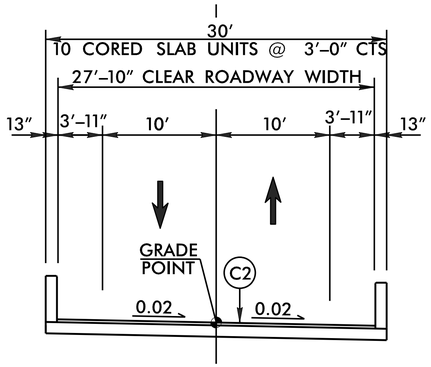
C1	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1½″ IN DEPTH.
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 5½″ IN DEPTH.
R	PROP. SHOULDER BERM GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V	INCIDENTAL MILLING.
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL).

NOTE:
1. PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.
2. TRANSITION FULL DEPTH SHOULDER IN AREAS OF 8:1 TAPERS, UNLESS OTHERWISE SHOWN IN THE PLANS.



TYPICAL SECTION NO. 1A/2A

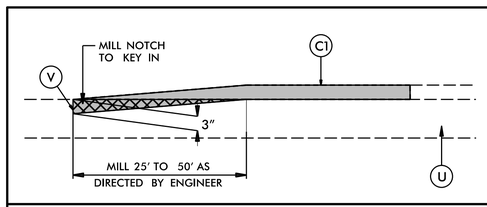
–L– STA. 11+81.88 TO 12+07.75
–L– STA. 12+80.00 TO 13+20.88



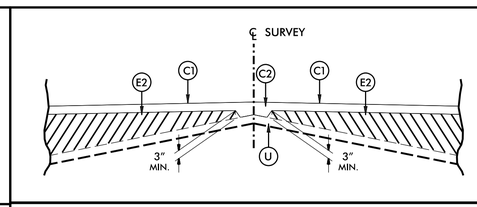
SEE STRUCTURES PLANS FOR STRUCTURE CONSTRUCTION DETAILS

TYPICAL SECTION NO. 3

–L– STA. 12+07.75 TO 12+80.00



INCIDENTAL MILLING DETAIL



WEDGING DETAIL FOR RESURFACING

REVISIONS

BP11.R024
2A-1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 056618 JACK R. CRINO
5/7/2025

PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 049851 RAMIE A. SHAW
Signed by: Ramie Shaw
5/7/2025

PREPARED BY
Kimley»Horn
NC LICENSE #F-0102

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5/26/20

SUMMARY OF EARTHWORK
IN CUBIC YARDS

LINE	STATION	STATION	EXCAVATION		EMBANKMENT	BORROW	WASTE
			TOTAL UNCLASSIFIED	UNDERCUT	EMBANKMENT +%		TOTAL
–L–	10+10.00	12+07.75	75	0	557	482	0
–L–	12+80.00	13+85.00	45	0	136	91	0
		PROJECT TOTAL	120	0	693	573	0
		LOSS DUE TO CLEARING AND GRUBBING					
		WASTE IN LIEU OF BORROW					
		EST 5% FOR REPLACING TOPSOIL ON BORROW PITS	0	0	0	29	0
		GRAND TOTAL	120			602	0
		SAY	200			700	

SUMMARY OF SHOULDER BERM GUTTER			
LINE	STATION TO STATION	LOCATION	LENGTH (LF)
–L–	11+81.88 TO 11+96.88	RT	15
–L–	12+90.88 TO 13+20.88	RT	30
TOTAL			45
SAY			45

SUMMARY OF PAVEMENT REMOVAL			
LINE	STATION TO STATION		AREA (SY)
–L–	10+70.00 TO 12+29.79		335
–L–	12+57.96 TO 13+00.00		87
TOTAL			422
SAY			430

LUMP SUM GRADING QUANTITIES

THE PAY ITEMS WILL BE PAID FOR AT THE THE CONTRACT LUMP SUM PRICE FOR "GRADING". QUANTITIES ARE APPROXIMATE AND SHALL BE CONFIRMED BY CONTRACTOR PRIOR TO BIDDING.

SPEC NO.	ITEM	QUANTITY	UNIT
200	CLEARING AND GRUBBING	0.2	ACR
225	UNCLASSIFIED EXCAVATION	200	CY
225	BORROW EXCAVATION	700	CY
250	REMOVAL OF EXISTING ASPHALT PAVEMENT	430	SY
500	FINE GRADING	610	SY

REVISIONS

BP11.R024

3B-1

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 056618 ENGINEER JACK R. CRINO

PREPARED BY

Kimley»Horn

NC LICENSE #F-0102

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5/26/20

"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 TL-3
NG = NON-GATING IMPACT ATTENUATOR TYPE TL-3

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			
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GREU TL-2	TYPE III		
-L-	11+51.50	12+07.75	LT	56.25					4	7		25'		0.5	1	1		
-L-	10+39.00	12+07.75	RT	168.75					4	7	25'		0.5		1	1		
-L-	12+80.00	13+61.25	LT	81.25					4	7	25'		0.5		1	1		
-L-	12+80.00	13+48.75	RT	68.75					4	7		25'		0.5	1	1		
			SUBTOTAL	375														
	LESS ANCHOR DEDUCTIONS																	
	GREU TL-2	4 @ 25'	=	100														
	TYPE III	4 @ 18.75'	=	75														
			TOTAL	200											4	4		
			SAY	200														

ADDITIONAL GUARDRAIL POSTS = 8 EA

LINE & STATION	OFFSET		STRUCTURE NUMBER		TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	MINIMUM REQUIRED SLOPE	Drainage Pipe (RCP, CSP, CAAP, HDPE, or PVC)						C. S. PIPE			R. C. PIPE CLASS IV			DRAINAGE STRUCTURE	QUANTITIES FOR DRAINAGE STRUCTURES NOTE: TOTAL LIN. FT. FOR PAY QUANTITY SHALL BE A + (1.3 X B)			C.B. STD. 840.01 OR STD. 840.02	CONCRETE BRIDGE APPROACH D.I. STD. 840.13	D.I. STD. 840.14 OR STD. 840.15	G.D.I. (N.S. FLAT) FRAME W/ 2 GRATES STD. 840.29	T.B.D.I. STD. 840.35	M.H. STD. 840.51, STD. 840.52, OR STD. 840.53	15" ELBOW
SIZE									12	15	18				12	15	18	12	15	18			A	B							
THICKNESS OR GAUGE			FROM	TO								DO NOT USE RCP	DO NOT USE CSP	DO NOT USE CAAP	DO NOT USE HDPE	DO NOT USE PVC	.064	.064	.064				MASONRY	0' THRU 5'	5' THRU 10'	10' AND ABOVE						
			FT.		FT.	FT.	FT.	%															CY	EACH	LIN. FT.	LIN. FT.						
L 11+86	13	RT	0403		1018.4																		1						1	1		
			0403	0402		1013.8	1010.8			20		X	X	X		X																2
L 13+14	13	RT	0401		1016.0																		1						1	1		
			0401	0400		1012.5	1009.6			16		X	X	X		X																2

ABBREVIATIONS

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

REMARKS

REVISIONS

BP11.R024

3B-2

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 056618 JACK R. CRINO

PREPARED BY

Kimley»Horn

NC LICENSE #F-0102

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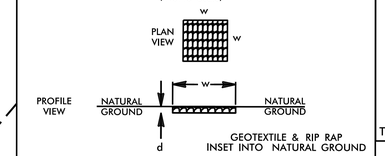
5/26/20

Plat Book 10 Page 282

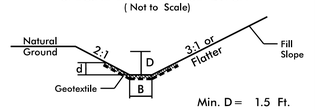
DETAIL 5
DECK DRAIN DISSIPATER PAD
(Not to Scale)



Type of Liner = CLASS B Rip–Rap
w = 3.0 FT
d = 1.0 FT

NOTE: PAD TO BE CENTERED UNDER DECK DRAIN

DETAIL 1
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D = 1.5 Ft.
Max. d = 1.0 Ft.
B = 2.0 Ft.

Type of Liner = CL. B Rip–Rap
FROM –L– STA. 11+14 TO STA. 12+04 LT

N08°56'01"E
171.56'

10

-L- STA. 12+14; 12+17; 12+20; 12+23
12+26; 12+65; 12+68; 12+71; 12+74
5 TONS CLASS B; 10 SY GEOTEXTILE
3 CY EXCAVATION

-L- POB 10+00.00

WOODS

9" GR.

GATE POST

EXISTING R/W

15" RCP

RIP/RAP

BEGIN TIP PROJECT
BP11.R024
-L- Sta. 10+10.00

PROP TCE
+57.00
EX R/W
43' LT

+78

28' INC (TYP)

+06

PROP PDE
+00.00
EX R/W
43' LT

SHRUBS

-L- Sta. 11+17.29

SPECIAL LATERAL BASE DITCH
w/CL. B RIP–RAP
EST. 47 TONS
100 SY GEOTEXTILE
SEE DETAIL 1

BEGIN APPROACH SLAB
-L- Sta. 11+95.75

BEGIN BRIDGE
-L- Sta. 12+07.75

PROP TCE
+00.00
43' LT
51' LT

PLANTER

RIPRAP AT EMBANKMENT
EST 3 TONS CL. I RIP–RAP
EST. 1 TON CL–II RIPRAP
SEE DETAIL 6

STANDARD BASE DITCH
w/CL. B RIP–RAP
EST. 3 CY DDE
SEE DETAIL 2

-BL- 3

SEAT ELEV = 1014.06'

STONE WALL

SNOW FENCE

LITTLE ELKIN CREEK

CONC WALL

BRUSH

DILAPIDATED

SEAT ELEV = 1013.84'

WOODS

PROP TCE
+85.00
43' LT
51' LT

END BRIDGE
-L- Sta. 12+80.00

END APPROACH SLAB
-L- Sta. 12+92.00

PROP PDE
+35.00
45' LT

+13

22' INC (TYP)

+35

LATERAL 'V' DITCH
SEE DETAIL 3

-L- Sta. 13+85.00

PROP PDE
+10.00
EX R/W
43' LT

BP11R024 GPS-2

GREU TL-2

8:1

50:1

TYPE III

Bridge #960228

BST Deck

0403

0401

0402

0400

-L-
N58°26'20.6"E

-L- POE 15+00.06

48"RW

SR 2024 LUFFMAN RD
19'BST

6:1

50:1

GREU TL-2

15"

TB-2GI

15" GREU TL-2

-L- Sta. 10+13.50

PROP PDE
+15.00
EX R/W
47' RT

11'SOIL

PROP DUE
+00.00
47' RT

PROP DUE
+00.00
47' RT

PROP DUE
+01.00
EX R/W

-L- PC 12+92.78

PROP PDE
+89.00
40' RT

PROP PDE
+25.00
EX R/W
40' RT

PROP TCE
+65.00
EX R/W
40' RT

PROP DUE
+80.00
47' RT

MTL GATE

EXISTING R/W

60.00'

END TIP PROJECT
BP11.R024
-L- Sta. 13+85.00
-L- Sta. 13+80.14

LATERAL 'V' DITCH
w/CL. B RIP–RAP
EST. 20 TONS
40 SY GEOTEXTILE
SEE DETAIL 7

LATERAL 'V' DITCH
EST. 36 CY DDE
SEE DETAIL 3

RIPRAP PAD AT OUTLET
CL. B EST. 2 TONS
7 SY GEOTEXTILE

EXISTING BRIDGE
TO BE REMOVED
(STRUCTURE PAY ITEM)

STANDARD 'V' DITCH
EST. 4 CY DDE
SEE DETAIL 4

LAY BACK BANKS AT 1.5:1
PROTECT W/CLASS II RIPRAP (TYP)
EST. 100 TONS CLASS II RIPRAP
130 CY EXCAVATION (TOTAL BOTH SIDES)

CLASS II RIPRAP TO
ELEV. = 1014.8'
(STRUCTURES PAY
ITEM TYP.)

RIPRAP PAD AT OUTLET
CL. B EST. 1 TONS
5 SY GEOTEXTILE

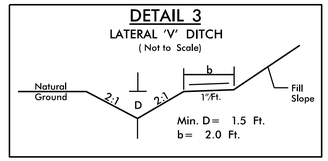
DECK DRAIN DISSIPATER
(BOTH SIDES)
SEE DETAIL 5

EXISTING BRIDGE
EXCAVATION (SEE
STRUCTURES PLANS)

SEAT ELEV = 1013.80'

CUR DATA -L-
Plc 13+99.00
Δc = 30°50'52.6" (RT)
D = 14°52'55.3"
Lc = 207.28
Tc = 106.22
R = 385
SE = 0.06
Ro = 132
DS = 35 MPH

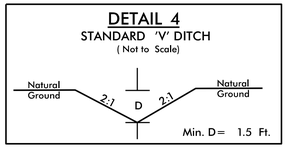
DETAIL 3
LATERAL 'V' DITCH
(Not to Scale)



Min. D = 1.5 Ft.
b = 2.0 Ft.

FROM –L– STA. 10+98 TO STA. 12+05 RT
FROM –L– STA. 12+82 TO STA. 13+75 RT

DETAIL 4
STANDARD 'V' DITCH
(Not to Scale)



Min. D = 1.5 Ft.

FROM –L– STA. 12+05 TO STA. 12+22 RT
FROM –L– STA. 12+61 TO STA. 12+82 LT

NAD 83
NA 2011

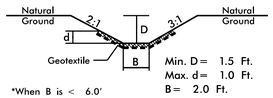
(1) James D. Lineberger, Glenda G. Linberger, Deed Book 952 Page 210, Plat Book 10 Page 282

(2) Anita J. Mastin, Deed Book 810 Page 235, Deed Book 804 Page 425

(3) Larry P. Holbrook, Linda S. Holbrook, Deed Trust 767 Page 735, Deed Book 501 Page 3

(3) Larry P. Holbrook, Llnda S. Holbrook, Deed Trust 767 Page 735, Deed Book 501 Page 3

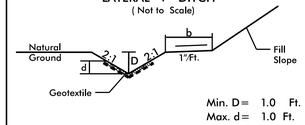
DETAIL 2
STANDARD BASE DITCH
(Not to Scale)



Min. D = 1.5 Ft.
Max. d = 1.0 Ft.
B = 2.0 Ft.
*When B is < 6.0'

Type of Liner = CL B Rip–Rap
FROM –L– STA. 12+04 TO STA. 12+16 LT

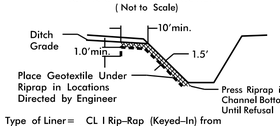
DETAIL 7
LATERAL 'V' DITCH
(Not to Scale)



Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
b = 2.0 Ft.

Type of Liner = CL. B Rip–Rap
FROM –L– STA. 10+23 TO STA. 10+98

DETAIL 6
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner = CL I Rip–Rap (Keyed–In) from ditch to Normal High Water (NHW) elev. then CL–II riprap (Keyed–In) below NHW

FROM –L– STA. 12+15 TO STA. 12+35 LT
FROM –L– STA. 13+87 TO STA. 13+92 LT

SEE SHEET 005 FOR -L- PROFILE

BP11.R024
004

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 056618 ENGINEER JACK R. CRINKO
4/21/2025

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 052128 ENGINEER JORDAN BENDL
4/21/2025

PREPARED BY
Kimley»Horn
NC LICENSE #F-0102
KIMLEY-HORN ASSOCIATES
421 FAYETTEVILLE ST. SUITE 600
RALEIGH NC, 27601
(919)677-2000

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

5/26/20

-L-

SR 2024 (LUFFMAN ROAD)

BRIDGE HYDRAULIC DATA	
DESIGN DISCHARGE	= 1800 CFS
DESIGN FREQUENCY	= 25 YRS
DESIGN HW ELEVATION	= 1012.1 FT
BASE DISCHARGE	= 2534 CFS
BASE HW ELEVATION	= 1013.7 FT
OVERTOPPING DISCHARGE	= 4600 CFS
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING ELEVATION	= 1016.9 FT
DATE OF SURVEY	= 05/23/23
W.S. ELEVATION AT DATE OF SURVEY	= 1004 FT

CL –L– Sta. 12+43.88
1 @ 70'
24" CORED SLAB
CL ELEV = 1017.18'
SKEW = 90°

L = 320
K = 36
Sf = 201
DS = 25 MPH

VPC 10+15.00 1028.77

PROPOSED GRADE

BEGIN BRDIGE –L– Sta. 12+07.75

BEGIN APPROACH SLAB –L– Sta. 11+95.75

EXISTING BRIDGE TO BE REMOVED

LOW CHORD

LOWEST LOW CHORD

END BRIDGE –L– Sta. 12+80.00

END APPROACH SLAB 12+92.00

END GRADE –L– Sta. 13+85.00 EL. 1,016.85'

LP 13+14.20 1016.50

VPT 13+35.00 1016.56

(-)8.2000%

(+)0.5700%

(+)0.5700%

BEGIN DITCH RT. Sta. 10+23 El. 1022.31'

(-)18.87%

BEGIN GRADE –L– Sta. 10+10.00 EL. 1029.18'

(-)10.56%

Sta. 10+53 El. 1016.65'

(-)1.31%

Sta. 10+98 El. 1011.90'

BEGIN DITCH LT. Sta. 11+14 El. 1018.06'

(-)6.57%

(-)4.80%

(-)4.27%

(-)2.94%

VPI 11+75.00 1015.65

Sta. 11+84 El. 1013.46'

Sta. 12+04 El. 1012.50'

Sta. 12+05 El. 1010.50'

3.5'

1.5:1

END DITCH LT. Sta. 12+16 El. 1012.00'

END DITCH RT. Sta. 12+22 El. 1010.00'

REMOVE TIMBER PILES AND CONCRETE FOOTERS AND PROTECT W/CL–II RIPRAP AS SHOWN (BOTH SIDES)

(+)14.76%

(+)11.54%

(+)19.40%

Sta. 12+82 El. 1009.00'

EXISTING GROUND

END DITCH LT. Sta. 13+75 El. 1011.61'

Sta. 13+60 El. 1010.20'

CLASS II ABUTMENT RIPRAP (TYP.) (STRUCTURES PAYITEM)

BEGIN DITCH LT. Sta. 12+61 El. 1008.00'

LAY BACK BANKS AT 1.5:1 PROTECT W/CLASS–II RIPRAP (TYP)
EST. 100 TON$ CLASS II RIPRAP
130 CY EXCAVATION (TOTAL BOTH SIDES)

= 4-5' EARTH/GRASS STRIP (0.5' IN DEPTH) ABOVE RIPRAP

LEGEND
RIGHT DITCH
LEFT DITCH

SEE SHEET 004 FOR -L- PLAN

1,030.07 1,029.18 | 1,022.79 1,021.66 | 1,018.29 1,016.61 | 1,016.53 1,016.01 | 1,016.85 | 1,017.02 | 1,019.22

10 +50 11 +50 12 +50 13 +50 14 +50 15

1050 1040 1030 1020 1010 1000 990 980

BP11.R024
005

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 056618 ENGINEER JACK R. CRINO
4/21/2025

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 052128 ENGINEER JORDAN BENDL
4/21/2025

PREPARED BY
Kimley»Horn
NC LICENSE #F-0102
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RALEIGH NC, 27601
(919)677-2000

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REVISIONS

6/2/99

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
BP11-R024	RW02C-1

Location and Surveys

ALLIED ASSOCIATES, P.A.
4720 KESTER MILL ROAD
WINSTON SALEM, NC 27103
WWW.ALLIEDAPA.COM C-2198
(336)765-2377

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-3834 LAND SURVEYOR CLINTON B OSBORNE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

I, Clinton B. Osborne, PLS, certify that the Project Control was performed under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey:

Class of survey: ***AA***
Type of GPS field procedure: RTN
Dates of survey: 11/17/2022
Datum/Epoch: NAD83-2011
Published/Fixed-control use: RTN
Localized around: BP11R024 GPS-2
Northing: 921,027.1526
Easting: 1,435,794.1869
Combined grid factor: 0.99998555
Geoid model: GEOID 18
Units: U.S. SURVEY FOOT

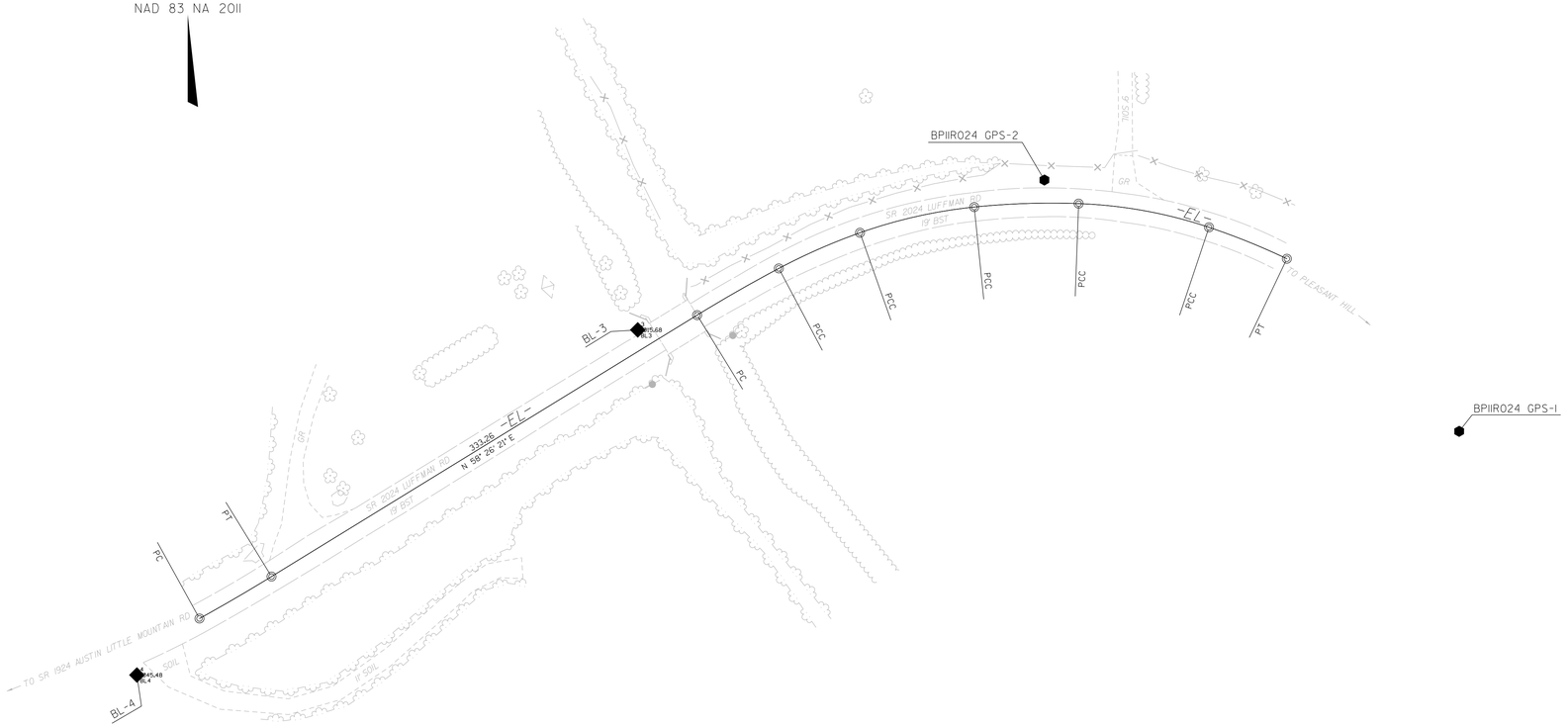
I also certify that the Baseline Control for this project was completed under my direct and responsible charge from an actual survey made under my supervision; that all horizontal closures had a minimum ratio of precision of 1:20,000 (Class AA) and Vertical accuracy to Class A. Field work was performed from November 2022 to January 2023 , 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 29th day of January, 2023.

DocuSigned by:
Clinton B. Osborne
D46F6B085F6449B...

Professional Land Surveyor L-3834

NC GRID
NAD 83 NA 2011



SEE SHEET RW02C-3
FOR FURTHER
ALIGNMENT DETAILS

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.

29-JAN-2023 16:46
$(1.Projects|PA21004\CONTROL SHEETS\bp11-r024_ls-rw02c-1.dgn
Owner AT OWNER-PC

6/2/99

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
BP11-R024	RW02C-2

Location and Surveys

ALLIED ASSOCIATES, P.A.
4720 KESTER MILL ROAD
WINSTON SALEM, NC 27103
WWW.ALLIEDAPA.COM C-2198
(336)765-2377

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-3834 LAND SURVEYOR CLINTON B OSBORNE

DocuSigned by:
Clinton B. Osborne
0A6F8B085F6449B...
1/29/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BASELINE

BL

POINT	DESC.	NORTH	EAST	ELEVATION
1	BP11R024 GPS-1	920859.4633	1436070.9344	1021.34
2	BP11R024 GPS-1	921027.1526	1435794.1869	1020.08
3	BL3	920927.1285	1435522.8484	1015.68
4	BL4	920696.8489	1435188.6872	1045.48

BM1 ELEVATION = 1007.36
N 920560 E 1435927
BL STATION 8+61.00 484 LEFT
RAILROAD SPIKE IN 42" SYCAMORE TREE

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.

25-JAN-2023 08:35
V:\Projects\P22\0004\CONTROL SHEETS\bp11-r024_ls_rw02c-2.dgn
apal AT APA1-PC

6/2/99

SURVEY CONTROL SHEET

W/ EXISTING CENTERLINE ALIGNMENTS PRIOR TO CONSTRUCTION

PROJECT REFERENCE NO.	SHEET NO.
BP11-R024	RW02C-3

Location and Surveys

ALLIED ASSOCIATES, P.A.
4720 KESTER MILL ROAD
WINSTON SALEM, NC 27103
WWW.ALLIEDAPA.COM C-2198
(336)765-2377

PROJECT SURVEYOR

NORTH CAROLINA PROFESSIONAL SEAL L-3834 LAND SURVEYOR CLINTON B OSBORNE

DocuSigned by:
Clinton B. Osborne
0A6F6B086F6449B...
1/29/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ALIGNMENT

POINT	N	E	BEARING	DIST	DELTA	D	L	T	R
PC	920734.556	1435230.461							
CURVE			N 59°46'01.7" E	55.62	02°39'22.1"(LT)	04°46'28.7"	55.63	27.82	1200.00
PT	920762.564	1435278.520							
LINE			N 58°26'20.6" E	333.26					
PC	920936.992	1435562.482							
CURVE			N 60°14'18.9" E	62.80	03°35'56.5"(RT)	05°43'46.5"	62.82	31.42	1000.00
PCC	920968.167	1435617.002							
CURVE			N 66°16'41.0" E	59.15	08°28'47.7"(RT)	14°19'26.2"	59.20	29.65	400.00
PCC	920991.962	1435671.152							
CURVE			N 77°19'01.5" E	78.14	13°35'53.3"(RT)	17°21'44.5"	78.32	39.34	330.00
PCC	921009.117	1435747.381							
CURVE			N 88°06'43.8" E	69.69	07°59'31.4"(RT)	11°27'33.0"	69.74	34.93	500.00
PCC	921011.413	1435817.031							
CURVE			S 79°41'31.7" E	88.43	16°23'57.6"(RT)	18°28'57.0"	88.73	44.67	310.00
PCC	920995.590	1435904.030							
CURVE			S 68°00'05.8" E	56.02	06°58'54.3"(RT)	12°27'20.2"	56.05	28.06	460.00
PT	920974.607	1435955.970							

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.

25-JAN-2023 08:40
V:\Projects\P22\0004\CONTROL SHEETS\bp11-r024_ls_rw02c-3.dgn
apal AT APA1-PC

5/26/20

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 JANAUARY 2024 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.03	TEMPORARY ROAD CLOSURES
1110.01	STATIONARY WORK ZONE SIGNS
1145.01	BARRICADES

MANAGEMENT STRATEGIES

CONSTRUCTION SUMMARY:
PROPOSED BRIDGE REPLACEMENT WILL BE CONSTRUCTED AWAY FROM TRAFFIC USING A ROAD CLOSURE AND DETOUR ROUTE.

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.

TRAFFIC PATTERN ALTERATIONS

A) NOTIFY THE ENGINEER AND STATE FORCES THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION, SUCH THAT NECESSARY PROVISIONS CAN BE MADE TO INFORM LOCAL EMERGENCY, LAW ENFORCEMENT, SCHOOLS, OR ANY OTHER PARTIES AFFECTED BY THE ROAD CLOSURE.

SIGNING

B) 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.

C) PROVIDE PERMANENT SIGNING AND DEVICES REQUIRED TO CLOSE THE ROAD ACCORDING TO THE ROADWAY STANDARD DRAWINGS AND TRAFFIC CONTROL PLANS.

D) PROVIDE SIGNING REQUIRED FOR THE OFF-SITE DETOUR ROUTES USING ROADWAY STANDARD DRAWING NUMBER 1101.03.

E) COVER OR REMOVE ALL SIGNS REQUIRED FOR THE OFF-SITE DETOUR WHEN THE DETOUR IS NOT IN OPERATION.

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

G) INSTALL SIGNS BEFORE BARRICADES WHEN CLOSING THE ROADWAY TO TRAFFIC. REMOVE BARRICADES BEFORE SIGNS WHEN OPENING THE ROADWAY TO TRAFFIC. INSTALL AND REMOVE SIGNS/BARRICADES IN THE SAME CALENDER DAY.

TRAFFIC CONTROL DEVICES

H) PLACE TYPE III BARRICADES, WITH "ROAD CLOSED" SIGN R11-2 ATTACHED, OF SUFFICIENT LENGTH TO CLOSE ENTIRE ROADWAY.

PAVEMENT MARKINGS AND MARKERS

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

PHASING

STEP 1: USING ROADWAY STANDARD DRAWING NUMBER 1101.03, SHEET 1 OF 9, PERFORM THE FOLLOWING:

- INSTALL ALL ROAD CLOSURE AND DETOUR SIGNING, INCLUDING BARRICADES
- IMPLEMENT A TEMPORARY CLOSURE OF SR 2024 (LUFFMAN RD) USING A DETOUR ALONG SR 2021 (LITTLE ELKIN CHURCH RD) AND SR 1924 (AUSTIN LITTLE MOUNTAIN RD).

STEP 2: REMOVE EXISTING BRIDGE #228 OVER LITTLE ELKIN CREEK AND CONSTRUCT THE PROPOSED BRIDGE AND APPROACHES AS SHOWN IN THE CONSTRUCTION PLANS.

STEP 3: INSTALL ALL FINAL PAVEMENT MARKINGS.

STEP 4: REMOVE ALL TRAFFIC CONTROL SIGNING AND DEVICES AND OPEN SR 2024 (LUFFMAN RD) TO THE FINAL TRAFFIC PATTERN.

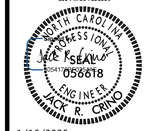
BP11.R024

TMP | 1A

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER



1/16/2025

PREPARED BY

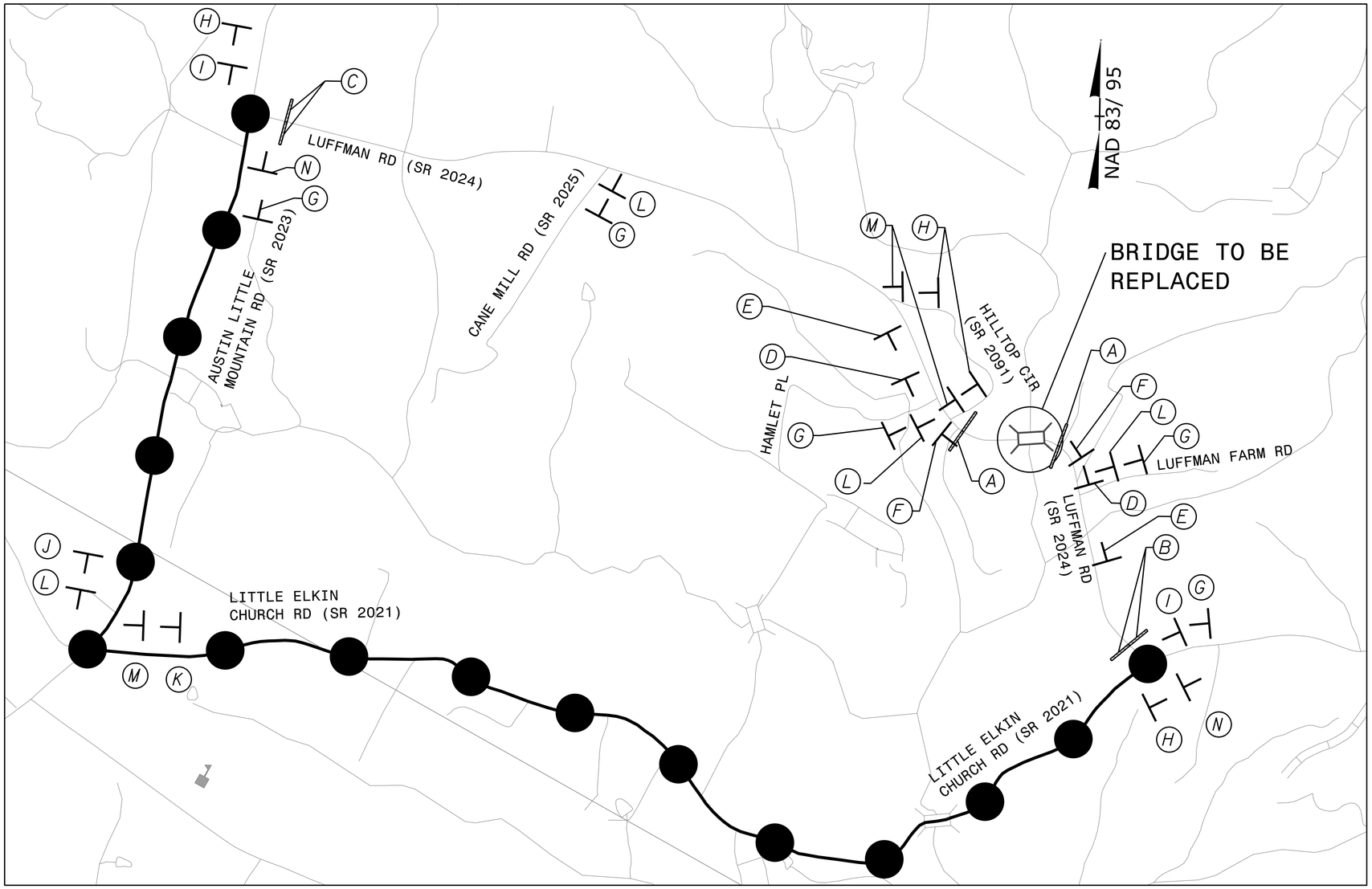
Kimley»Horn

NC LICENSE #F-0102

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

5/26/20



(A)
R11–2
48″ X 30″
ROAD CLOSED
TYPE III BARRICADE(S)

(B)
60″ x 30″
ROAD CLOSED TO THRU TRAFFIC
DETOUR
M4-10L
48″ x 18″
TYPE III BARRICADE

(C)
R11-4
60″ x 30″
ROAD CLOSED TO THRU TRAFFIC
DETOUR
M4-10R
48″ x 18″
TYPE III BARRICADE

(D) ROAD CLOSED 500 FT — W20–3B 48″ X 48″

(E) ROAD CLOSED 1000 FT — W20–3C 48″ X 48″

(F) ROAD CLOSED AHEAD — W20–3A 48″ X 48″

(G) ROAD CLOSED AHEAD / NEXT RIGHT — W20–3A 48″ X 48″; SP–4R 42″ X 12″

(H) ROAD CLOSED AHEAD / NEXT LEFT — W20–3A 48″ X 48″; SP–4L 42″ X 12″

(I) DETOUR AHEAD — W20–2 48″ X 48″

(J) DETOUR — M4–8 24″ X 12″; M5–1 M 21″ X 15″

(K) DETOUR — M4–8 24″ X 12″; M5–1 R 21″ X 15″

(L) DETOUR — M4–8 24″ X 12″; M6–1 L 21″ X 15″

(M) DETOUR — M4–8 24″ X 12″; M6–1 21″ X 15″

(N) END DETOUR — M4–8 A 24″ X 18″

NOTE:
REFER TO RSD 1101.03 SHEET 1 OF 9 FOR ADVANCE WARNING SIGNAGE AND BARRICADE PLACEMENT

LEGEND
DETOUR ROUTE
STATIONARY SIGN

BP11.R024
TMP | 2

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

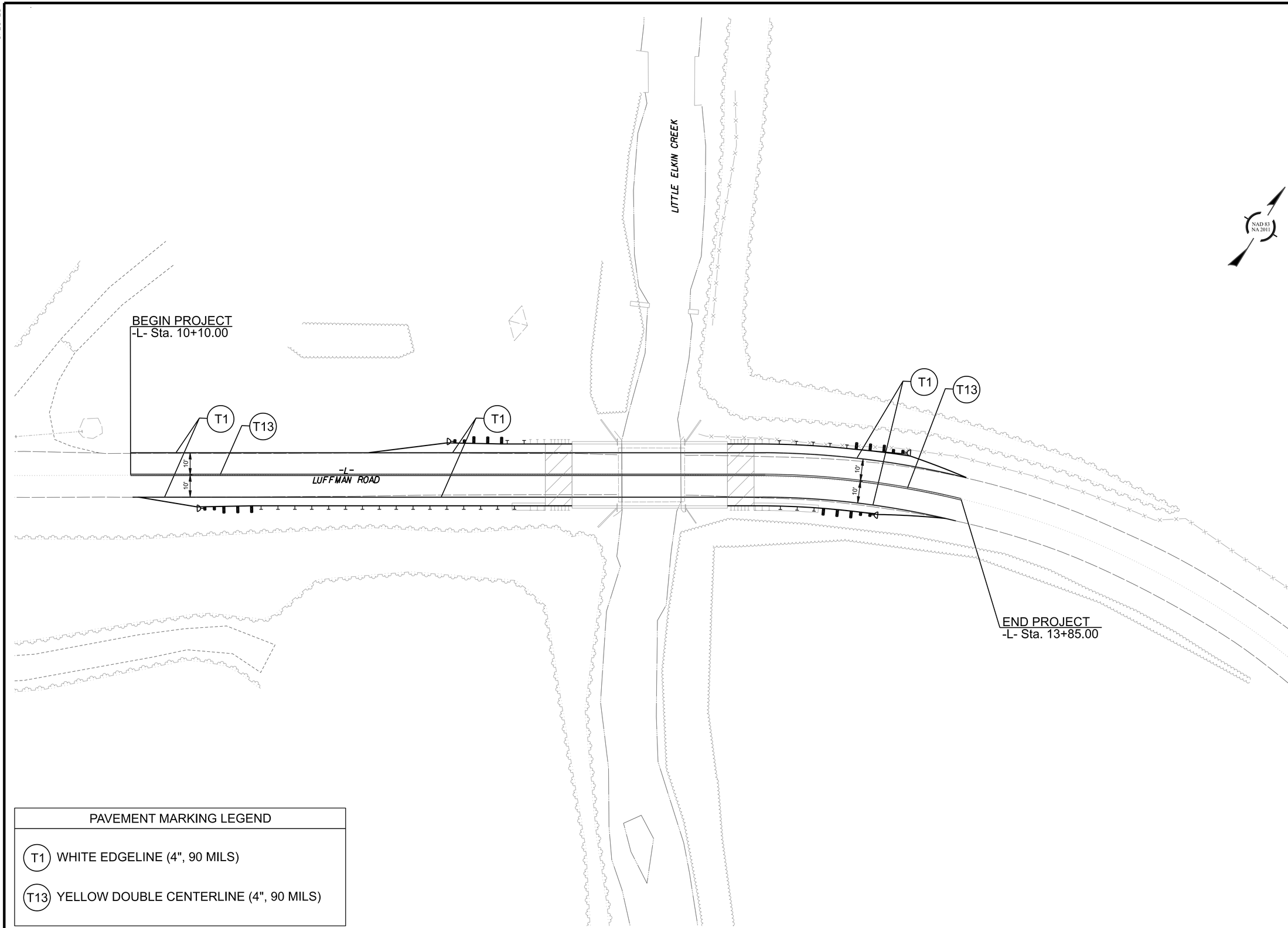
ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 058618 ENGINEER JACK R. CRINO
1/16/2025

PREPARED BY
Kimley»Horn
NC LICENSE #F-0102

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

5/26/20



PAVEMENT MARKING LEGEND	
T1	WHITE EDGELINE (4", 90 MILS)
T13	YELLOW DOUBLE CENTERLINE (4", 90 MILS)

BP11.R024

PMP | 01

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 058618 ENGINEER JACK R. CRINO

1/16/2025

PREPARED BY

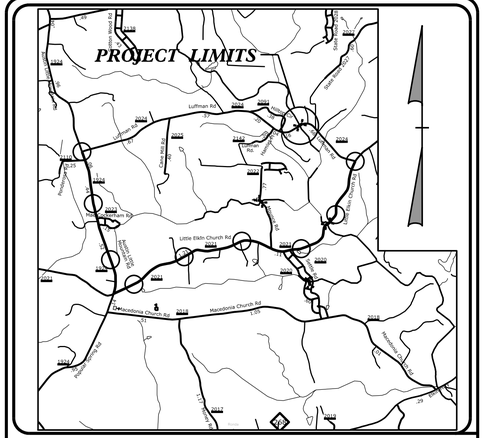
Kimley»Horn

NC LICENSE #F-0102

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

TIP PROJECT: BP11.R024



PROJECT REFERENCE NO.	SHEET NO.
BP11.R024	EC-02

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

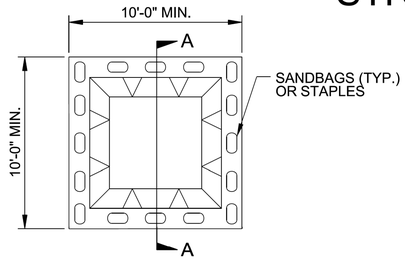
EROSION & SEDIMENT CONTROL LEGEND

Std. #	Description	Symbol
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1630.03	Temporary Silt Ditch	TSD
1630.04	Stilling Basin	
1630.05	Temporary Diversion	TD
1630.06	Special Stilling Basin	
1630.07	Skimmer Basin	
1630.08	Tiered Skimmer Basin	
1630.09	Earthen Dam with Skimmer	
	Infiltration Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C

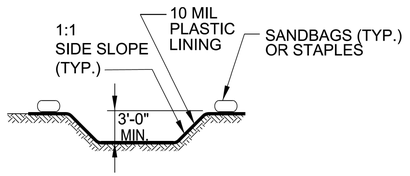
Std. #	Description	Symbol
1633.01	Temporary Rock Silt Check Type A	
1633.02	Temporary Rock Silt Check Type B	
1633.03	Temporary Rock Silt Check Type A with Excelsior Matting and Flocculant	
1634.01	Temporary Rock Sediment Dam Type A	
1634.02	Temporary Rock Sediment Dam Type B	
1635.01	Rock Pipe Inlet Sediment Trap Type A	A
1635.02	Rock Pipe Inlet Sediment Trap Type B	B
1636.01	Excelsior Wattle Check	
1636.01	Excelsior Wattle Check with Flocculant	
1636.01	Coir Fiber Wattle Check	
1636.01	Coir Fiber Wattle Check with Flocculant	
1636.02	Silt Fence Excelsior Wattle Break	EW
	Silt Fence Coir Fiber Wattle Break	CFW
1636.03	Excelsior Wattle Barrier	EW EW EW
1636.03	Coir Fiber Wattle Barrier	CFW CFW CFW

PROJECT REFERENCE NO.	SHEET NO.
BP11.R024	EC-2A

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



PLAN



SECTION A-A

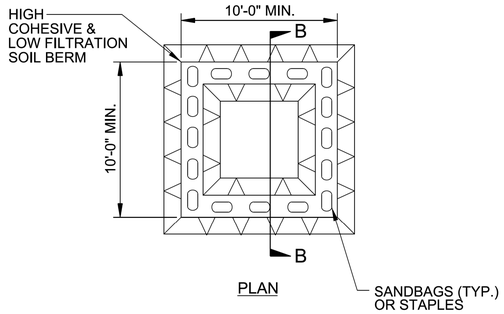
NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

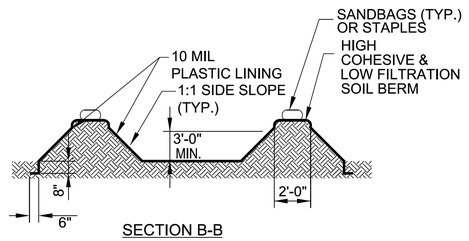
3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

BELOW GRADE WASHOUT STRUCTURE

NOT TO SCALE



PLAN



SECTION B-B

NOTES:
1. ACTUAL LOCATION DETERMINED IN FIELD

2. THE CONCRETE WASHOUT STRUCTURES SHALL BE MAINTAINED WHEN THE LIQUID AND/OR SOLID REACHES 75% OF THE STRUCTURES CAPACITY TO PROVIDE ADEQUATE HOLDING CAPACITY WITH A MINIMUM 12 INCHES OF FREEBOARD.

3.CONCRETE WASHOUT STRUCTURE NEEDS TO BE CLEARY MARKED WITH SIGNAGE NOTING DEVICE.

ABOVE GRADE WASHOUT STRUCTURE

NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
BP11.R024	EC-3

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
DITCHES					
4	-L-	10+45	12+22	RT	135
4	-L-	12+61	13+60	LT	85
SLOPES					
4	-L-	10+50	12+00	RT	160
4	-L-	10+10	11+90	LT	260
			SUBTOTAL		640
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					500
				TOTAL	1140
NOTE: EXCELSIOR MATTING TO BE USED FOR DITCHES. STRAW MATTING MAY BE USED FOR SLOPES					

PRSM FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	13+60	13+75	LT	10

PROJECT REFERENCE NO.	SHEET NO.
BP11.R024	EC-3A

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

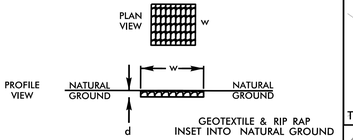
SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	*STABILIZATION TIME*	*TIMEFRAME EXCEPTIONS*
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 TO 4:1	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH WITH SLOPES STEEPER THAN 4:1. 7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HQW ZONES
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	7 DAYS FOR PERIMETER DIKES, SWALES, DITCHES PERIMETER SLOPES, AND HQW ZONES

5/26/20

Plat Book 10 Page 282

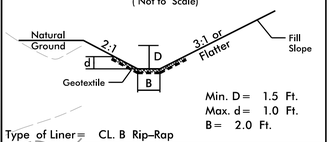
DETAIL 5
DECK DRAIN DISSIPATER PAD
(Not to Scale)



Type of Liner= CLASS B Rip-Rap
w=3.0 FT
d=1.0 FT

NOTE: PAD TO BE CENTERED UNDER DECK DRAIN

DETAIL 1
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D= 1.5 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.

Type of Liner= CL. B Rip-Rap
FROM -L- STA. 11+14 TO STA. 12+04 LT

-L- STA. 12+14; 12+17; 12+20; 12+23
12+26; 12+65; 12+68; 12+71; 12+74
5 TONS CLASS B; 10 SY GEOTEXTILE
3 CY EXCAVATION

-L- POB 10+00.00

RIPRAP AT EMBANKMENT
EST 3 TONS CL. I RIP-RAP
EST. 1 TON CL-II RIPRAP
SEE DETAIL 6

STANDARD BASE DITCH
w/CL. B RIP-RAP
EST. 3 CY DDE
SEE DETAIL 2

SPECIAL LATERAL BASE DITCH
w/CL. B RIP-RAP
EST. 47 TONS
100 SY GEOTEXTILE
SEE DETAIL 1

BEGIN TIP PROJECT
BP11.R024
-L- Sta. 10+10.00

-L- Sta. 11+17.29

BEGIN BRIDGE
-L- Sta. 12+07.75

BEGIN APPROACH SLAB
-L- Sta. 11+96.88

-L- Sta. 10+13.50

-L- Sta. 12+92.78

END BRIDGE
-L- Sta. 12+80.00

END APPROACH SLAB
-L- Sta. 12+90.88

-L- Sta. 13+85.00

-L- POE 15+00.06

END TIP PROJECT
BP11.R024
-L- Sta. 13+85.00
-L- Sta. 13+80.14

-L- N58°26'20.6"E

SR 2024 LUFFMAN RD
19'BST

LITTLE ELKIN CREEK

IMPERVIOUS DIKE

28' INC (TYP)

22' INC (TYP)

GREU TL-2

TYPE III

TB-2GI

15" GREU TL-2

15"

0403 0402 0401 0400

LATERAL 'V' DITCH
EST. 36 CY DDE
SEE DETAIL 3

RIPRAP PAD AT OUTLET
CL. B EST. 2 TONS
7 SY GEOTEXTILE

LATERAL 'V' DITCH
w/CL. B RIP-RAP
EST. 20 TONS
40 SY GEOTEXTILE
SEE DETAIL 7

EXISTING BRIDGE
TO BE REMOVED
(STRUCTURE PAY ITEM)

STANDARD 'V' DITCH
EST. 4 CY DDE
SEE DETAIL 4

LAY BACK BANKS AT 1.5:!
PROTECT W/CLASS II RIPRAP (TYP)
EST. 100 TONS CLASS II RIPRAP
130 CY EXCAVATION (TOTAL BOTH SIDES)

CLASS II RIPRAP TO
ELEV. = 1014.8'
(STRUCTURES PAY
ITEM TYP.)

DECK DRAIN DISSIPATER
(BOTH SIDES)
SEE DETAIL 5

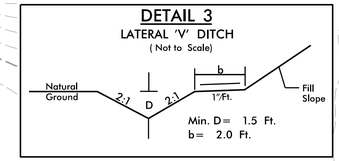
EXISTING BRIDGE
EXCAVATION (SEE
STRUCTURES PLANS)

RIPRAP PAD AT OUTLET
CL. B EST. 1 TONS
5 SY GEOTEXTILE

SEAT ELEV = 1013.84'
SEAT ELEV = 1014.06'
SEAT ELEV = 1013.80'

CUR DATA -L-
PIc 13+99.00
Δc = 30°50'52.6" (RT)
D = 14°52'55.3"
Lc = 207.28
Tc = 106.22
R = 385
SE = 0.06
Ro = 132
DS = 35 MPH

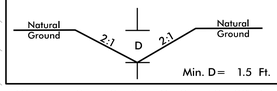
DETAIL 3
LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.5 Ft.
b= 2.0 Ft.

FROM -L- STA. 10+98 TO STA. 12+05 RT
FROM -L- STA. 12+82 TO STA. 13+75 RT

DETAIL 4
STANDARD 'V' DITCH
(Not to Scale)



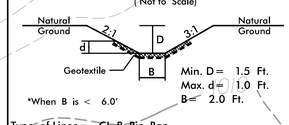
Min. D= 1.5 Ft.

FROM -L- STA. 12+05 TO STA. 12+22 RT
FROM -L- STA. 12+61 TO STA. 12+82 LT

CLEARING AND GRUBBING
EROSION CONTROL FOR
CONSTRUCTION SHEET 04

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

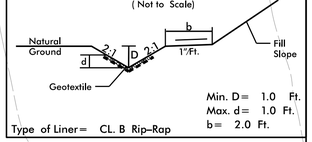
DETAIL 2
STANDARD BASE DITCH
(Not to Scale)



Min. D= 1.5 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
*When B is < 6.0'

Type of Liner= CL B Rip-Rap
FROM -L- STA. 12+04 TO STA. 12+16 LT

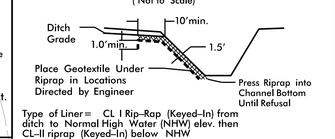
DETAIL 7
LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
b= 2.0 Ft.

Type of Liner= CL. B Rip-Rap
FROM -L- STA. 10+23 TO STA. 10+98

DETAIL 6
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= CL I Rip-Rap (Keyed-In) from ditch to Normal High Water (NHW) elev. then CL-II riprap (Keyed-In) below NHW
FROM -L- STA. 12+15 TO STA. 12+35 LT
FROM -L- STA. 13+87 TO STA. 13+92 LT

James O. Lineberger
Glenda G. Lineberger
Deed Book 952 Page 210
Plat Book 10 Page 282

Larry P. Holbrook
Linda S. Holbrook
Deed Trust 767 Page 735
Deed Book 501 Page 3

Anita J. Mastin
Deed Book 810 Page 235
Deed Book 804 Page 425

BP11.R024
EC-04/CONST. 04

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

PREPARED BY

Kimley»Horn

NC LICENSE #F-0102

REVISIONS

5/26/20

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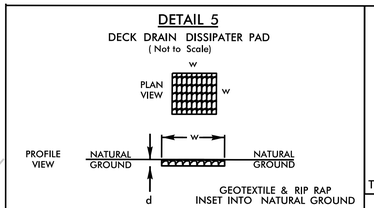
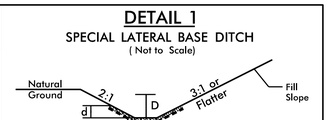
DETAIL 5
DECK DRAIN DISSIPATER PAD
(Not to Scale)



Type of Liner= CLASS B Rip–Rap
w=3.0 FT
d=1.0 FT

NOTE: PAD TO BE CENTERED UNDER DECK DRAIN

DETAIL 1
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D= 1.5 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.

Type of Liner= CL. B Rip–Rap
FROM –L– STA. 11+14 TO STA. 12+04 LT

–L– STA. 12+14; 12+17; 12+20; 12+23
12+26; 12+65; 12+68; 12+71; 12+74
5 TONS CLASS B; 10 SY GEOTEXTILE
3 CY EXCAVATION

-L- POB 10+00.00

BEGIN TIP PROJECT
BP11.R024
-L- Sta. 10+10.00

SPECIAL LATERAL BASE DITCH
w/CL. B RIP–RAP
EST. 47 TONS
100 SY GEOTEXTILE
SEE DETAIL 1

-L- Sta. 11+17.29

BEGIN APPROACH SLAB
-L- Sta. 11+96.88

BEGIN BRIDGE
-L- Sta. 12+07.75

RIPRAP AT EMBANKMENT
EST 3 TONS CL. I RIP–RAP
EST. 1 TON CL–II RIPRAP
SEE DETAIL 6

RIPRAP AT EMBANKMENT
EST 3 TONS CL. I RIP–RAP
EST. 1 TON CL–II RIPRAP
SEE DETAIL 6

STANDARD BASE DITCH
w/CL. B RIP–RAP
EST. 3 CY DDE
SEE DETAIL 2

STANDARD 'V' DITCH
EST. 6 CY DDE
SEE DETAIL 4

END BRIDGE
-L- Sta. 12+80.00

END APPROACH SLAB
-L- Sta. 12+90.88

LATERAL 'V' DITCH
SEE DETAIL 3

-L- Sta. 13+85.00

-L- POE 15+00.06

-L- Sta. 10+13.50

LATERAL 'V' DITCH
EST. 36 CY DDE
SEE DETAIL 3

RIPRAP PAD AT OUTLET
CL. B EST. 2 TONS
7 SY GEOTEXTILE

LATERAL 'V' DITCH
w/CL. B RIP–RAP
EST. 20 TONS
40 SY GEOTEXTILE
SEE DETAIL 7

EXISTING BRIDGE
TO BE REMOVED
(STRUCTURE PAY ITEM)

STANDARD 'V' DITCH
EST. 4 CY DDE
SEE DETAIL 4

LAY BACK BANKS AT 1.5:1
PROTECT W/CLASS II RIPRAP (TYP)
EST. 100 TONS CLASS II RIPRAP
130 CY EXCAVATION (TOTAL BOTH SIDES)

CLASS II RIPRAP TO
ELEV. = 1014.8'
(STRUCTURES PAY
ITEM TYP.)

DECK DRAIN DISSIPATER
(BOTH SIDES)
SEE DETAIL 5

EXISTING BRIDGE
EXCAVATION (SEE
STRUCTURES PLANS)

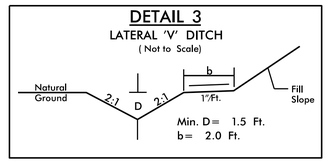
RIPRAP PAD AT OUTLET
CL. B EST. 1 TONS
5 SY GEOTEXTILE

-L- PC 12+92.78

END TIP PROJECT
BP11.R024
-L- Sta. 13+85.00
-L- Sta. 13+80.14

CUR DATA -L-
PIc 13+99.00
Δc = 30°50'52.6" (RT)
D = 14°52'55.3"
Lc = 207.28
Tc = 106.22
R = 385
SE = 0.06
Ro = 132
DS = 35 MPH

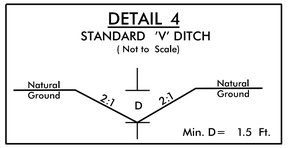
DETAIL 3
LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.5 Ft.
b= 2.0 Ft.

FROM –L– STA. 10+98 TO STA. 12+05 RT
FROM –L– STA. 12+82 TO STA. 13+75 RT

DETAIL 4
STANDARD 'V' DITCH
(Not to Scale)



Min. D= 1.5 Ft.

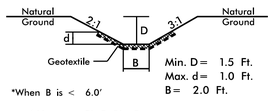
FROM –L– STA. 12+05 TO STA. 12+22 RT
FROM –L– STA. 12+61 TO STA. 12+82 LT

FINAL EROSION CONTROL FOR CONSTRUCTION SHEET 04

NOTE:
INSTALL TEMPORARY SLOPE DRAINS TO CONVEY RUNOFF FROM ROAD GRADE INTO PROPOSED DITCHES WITH A SPACING OF 100 FT. OR AS DIRECTED.

Place Matting for Erosion Control on Slope as Work Allows.
Sta. 10+50 to Sta. 12+00 RT
Sta. 10+10 to Sta. 11+90 LT

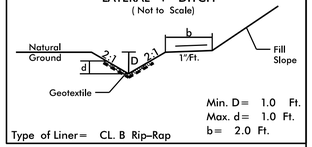
DETAIL 2
STANDARD BASE DITCH
(Not to Scale)



Min. D= 1.5 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
*When B is < 6.0'

Type of Liner= CL B Rip–Rap
FROM –L– STA. 12+04 TO STA. 12+16 LT

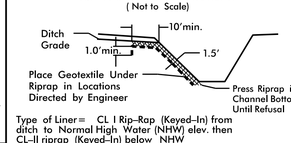
DETAIL 7
LATERAL 'V' DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
b= 2.0 Ft.

Type of Liner= CL. B Rip–Rap
FROM –L– STA. 10+23 TO STA. 10+98

DETAIL 6
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= CL I Rip–Rap (Keyed–In) from ditch to Normal High Water (NHW) elev. then CL–II riprap (Keyed–In) below NHW

FROM –L– STA. 12+15 TO STA. 12+35 LT
FROM –L– STA. 13+87 TO STA. 13+92 LT

James D. Lineberger
Glenda G. Lineberger
Deed Book 952 Page 210
Plat Book 10 Page 282

Anita J. Mastin
Deed Book 810 Page 235
Deed Book 804 Page 425

Larry P. Holbrook
Linda S. Holbrook
Deed Trust 767 Page 735
Deed Book 501 Page 3

BP11.R024
EC-05/CONST. 04

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

PREPARED BY

Kimley»Horn

NC LICENSE #F-0102

REVISIONS

5/26/20

Plat Book 10 Page 282

N08°56'01"E
171.56'

10

-L- POB 10+00.00

WOODS

9' GR

GATE POST

EXISTING RW

15" RCP

RIP/RAP

60.00'

20'

10'

10'

6:1

50:1

F

C

E

PDE

TB

TE

JS

SR

BST

Deck

TYPE III

GREU TL-2

8:1

27'-10"

Bridge #960228

-L-
N58°26'20.6"E

SR 2024 LUFFMAN RD
19'BST

UG COMM

T FO

BEGIN TIP PROJECT
BP11.R024
-L- Sta. 10+10.00

PROP TCE
+57.00
EX R/W
43' LT

-L- Sta. 11+17.29

PROP PDE
+00.00
EX R/W
43' LT

SHRUBS

BEGIN BRIDGE
-L- Sta. 12+07.75

BEGIN APPROACH SLAB
-L- Sta. 11+96.88

-L- Sta. 10+13.50

PROP PDE
+15.00
EX R/W
47' RT

PROP DUE
+00.00
47' RT

PROP TCE
+00.00
43' LT
51' LT

PLANTER

-BL- 3

STONE WALL

CONC WALL

SEAT ELEV = 1014.07'

SEAT ELEV = 1014.06'

LITTLE ELKIN CREEK

DILAPIDATED

BRUSH

SEAT ELEV = 1013.84'

PROP TCE
+85.00
43' LT
51' LT

END BRIDGE
-L- Sta. 12+80.00

END APPROACH SLAB
-L- Sta. 12+90.88

PROP PDE
+35.00
45' LT

-L- Sta. 13+85.00

PROP PDE
+10.00
EX R/W
43' LT

-L- PC 12+92.78

PROP DUE
+01.00
EX R/W

PROP PDE
+25.00
EX R/W
40' RT

PROP TCE
+65.00
EX R/W
40' RT

PROP PDE
+89.00
40' RT

PROP DUE
+80.00
47' RT

EXISTING BRIDGE
TO BE REMOVED
(STRUCTURE PAY ITEM)

RIVER STREET TO DIG BACK ON EXISTING LINE AND REPLACE IN FILL SLOPE AT 3' BELOW EXISTING GROUND TO NEW POLE LOCATION

RIVER STREET TO TIE TO EXIST PEDESTAL OUTSIDE OF PROJECT LIMITS AND REPLACE IN FILL SLOPE AT 3' BELOW EXISTING GROUND TO NEW POLE LOCATION

RIVER STREET EXIST POLE TO BE REMOVED

RIVER STREET PROP POLE LOCATION AND PEDESTAL

RIVER STREET PROP POLE LOCATION AND PEDESTAL

RIVER STREET EXIST POLE TO BE REMOVED

-L- POE 15+00.06

BP11R024 GPS-2

48"WW

END TIP PROJECT
BP11.R024
-L- Sta. 13+85.00

-L- Sta. 13+80.14

MTL GATE

9' SC

GR

60.00'

EXISTING RW

1 FO

CUR DATA -L-
PIc 13+99.00
Δc = 30°50'52.6" (RT)
D = 14°52'55.3"
Lc = 207.28
Tc = 106.22
R = 385
SE = 0.06
Ro = 132
DS = 35 MPH

NAD 83
(NSRS 2007)

1
James D. Lineberger
Glenda G. Linberger
Deed Book 952 Page 210
Plat Book 10 Page 282

2
Anita J. Mastin
Deed Book 810 Page 235
Deed Book 804 Page 425

3
Larry P. Holbrook
Linda S. Holbrook
Deed Trust 767 Page 735
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3
Larry P. Holbrook
Linda S. Holbrook
Deed Trust 767 Page 735
Deed Book 501 Page 3

BP11.R024
UBO | 001

NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
WAKE COUNTY

ROADWAY DESIGN UNIT

PREPARED BY

Kimley»Horn

NC LICENSE #F-0102

REVISIONS

PROJ. REFERENCE NO.	SHEET NO.
BP11.R024	X-1A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CROSS-SECTION SUMMARY

Quantities are approximate only. The Resident Engineer will recross-section the work accurately when the project is staked out. These cross-section notes will be used in computing the final quantities for which the contractor will be paid.

NOTE: EMBANKMENT COLUMN INCLUDES BACKFILL FOR UNDERCUT

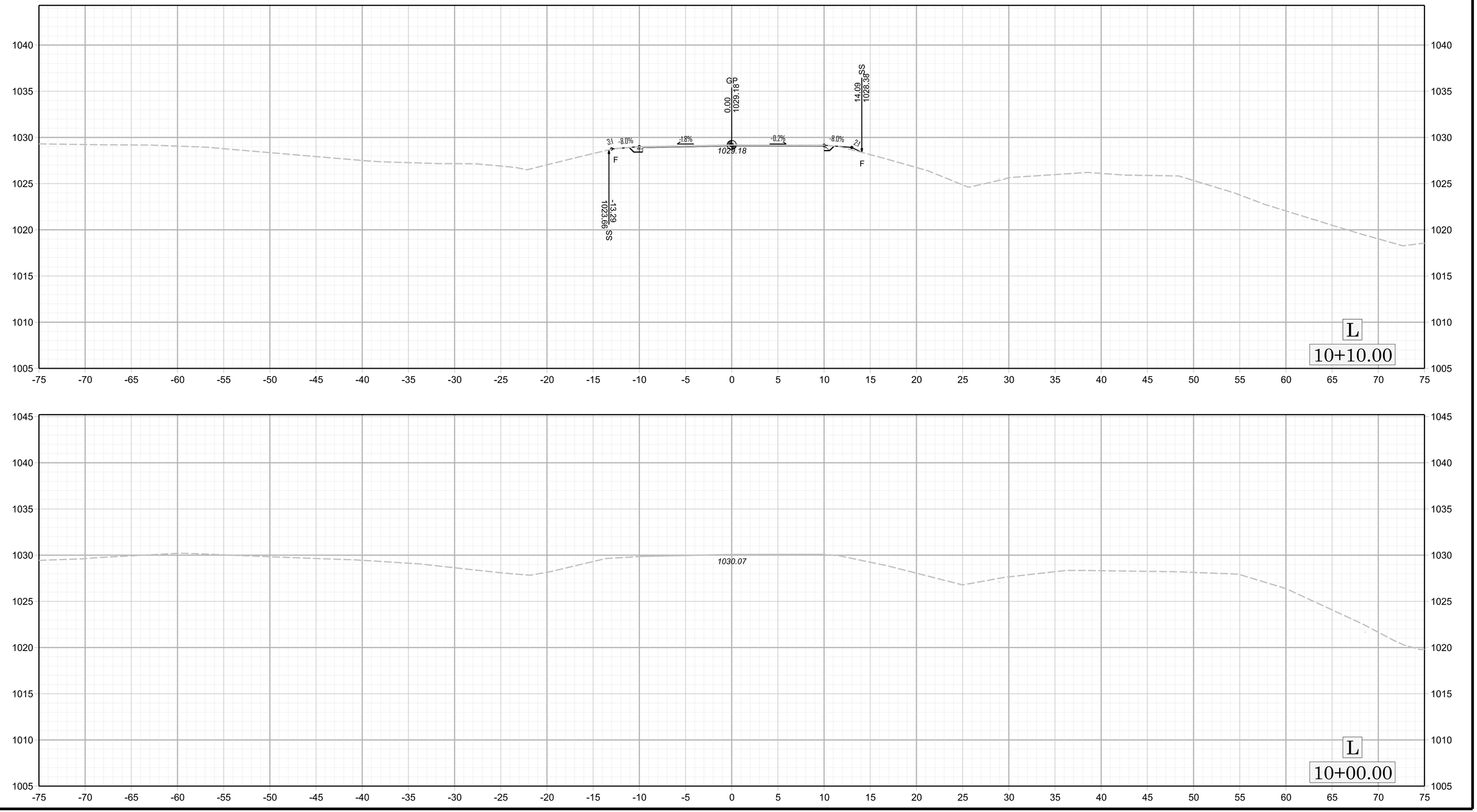
Station L	Uncl. Exc. (cu. yd.)	Embt (cu. yd.)															
10+00.00	0	0															
10+10.00	1	0															
10+50.00	3	30															
11+00.00	1	99															
11+50.00	9	145															
12+00.00	13	164															
12+05.00	0	16															
12+09.00	14	7															
12+18.00	31	0															
12+50.00	0	0															
12+72.00	0	0															
12+79.00	23	0															
12+83.00	15	4															
13+00.00	0	31															
13+50.00	2	61															
13+85.00	2	17															
14+00.00	0	0															

5/26/20

0 5 10

BP11.R024

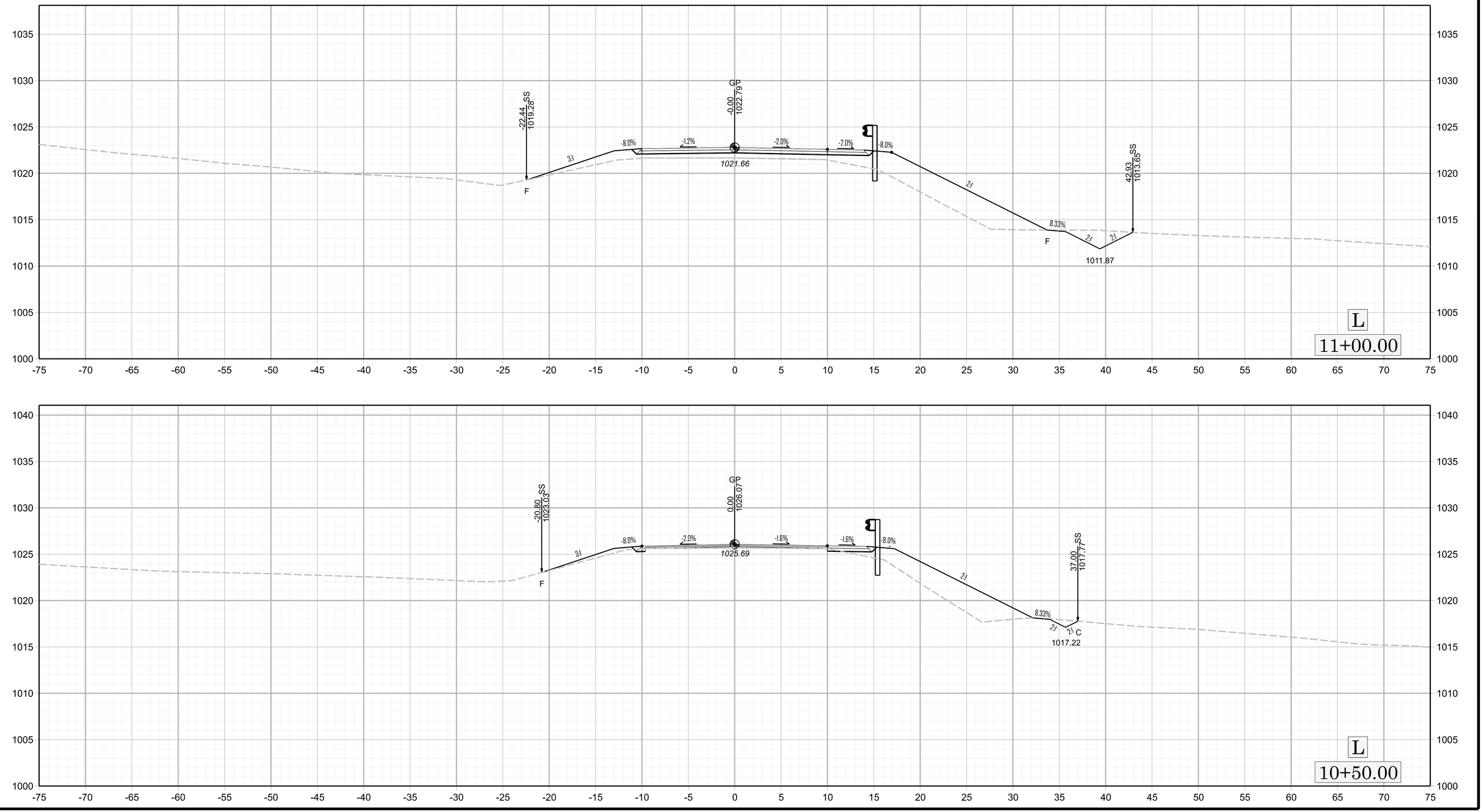
X-1



5/26/20

0 5 10

BP11.R024
X-2

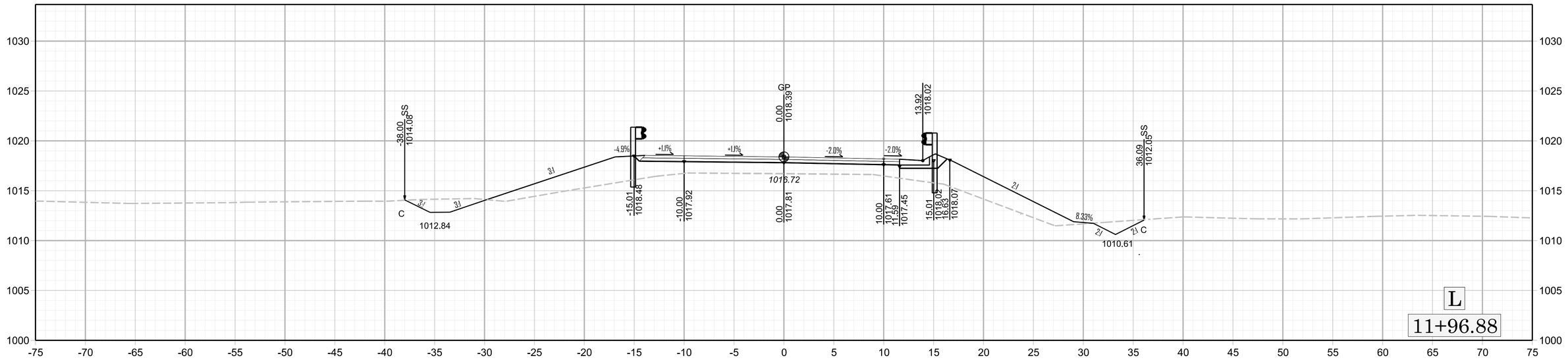


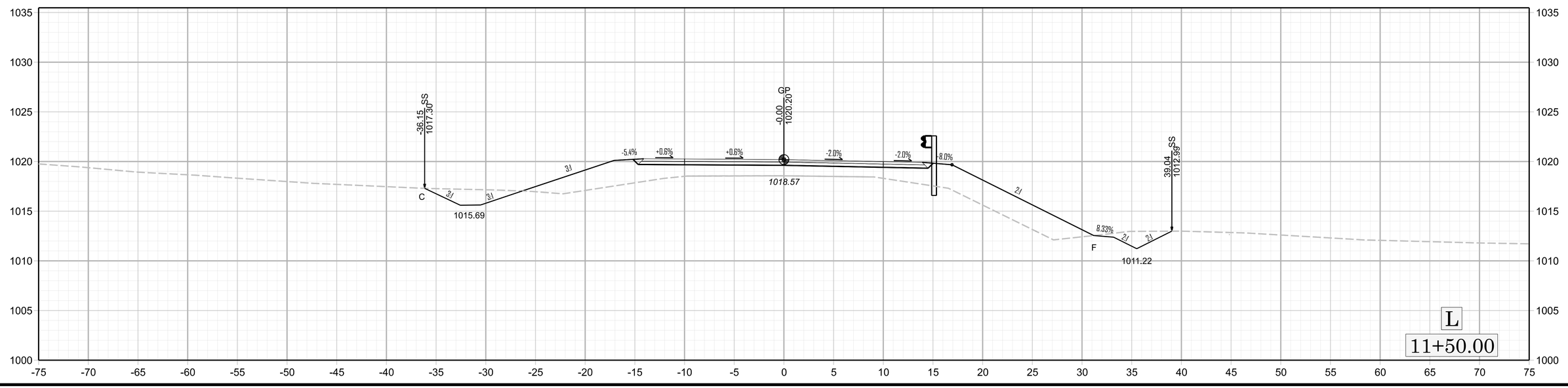
5/26/20

0 5 10

BP11.RD24

X-3



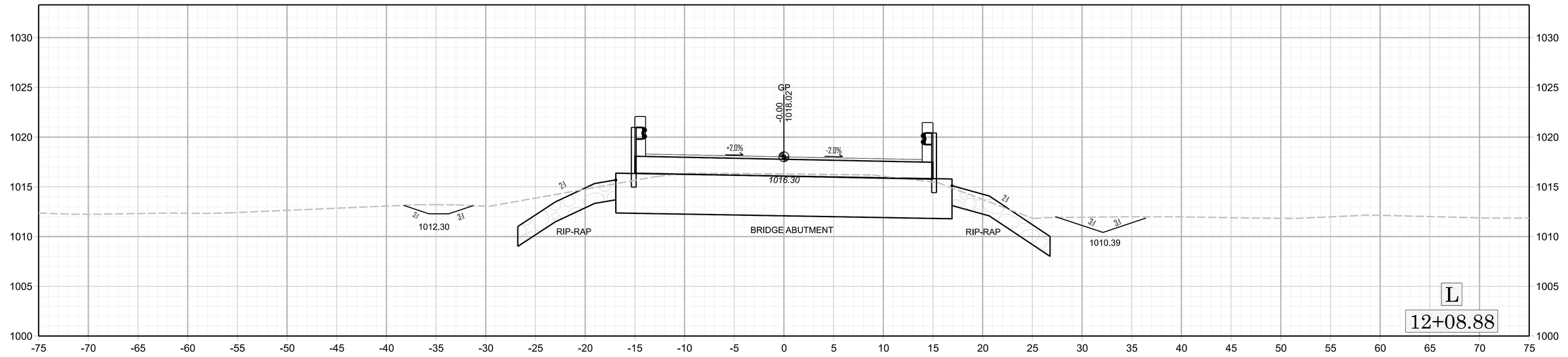


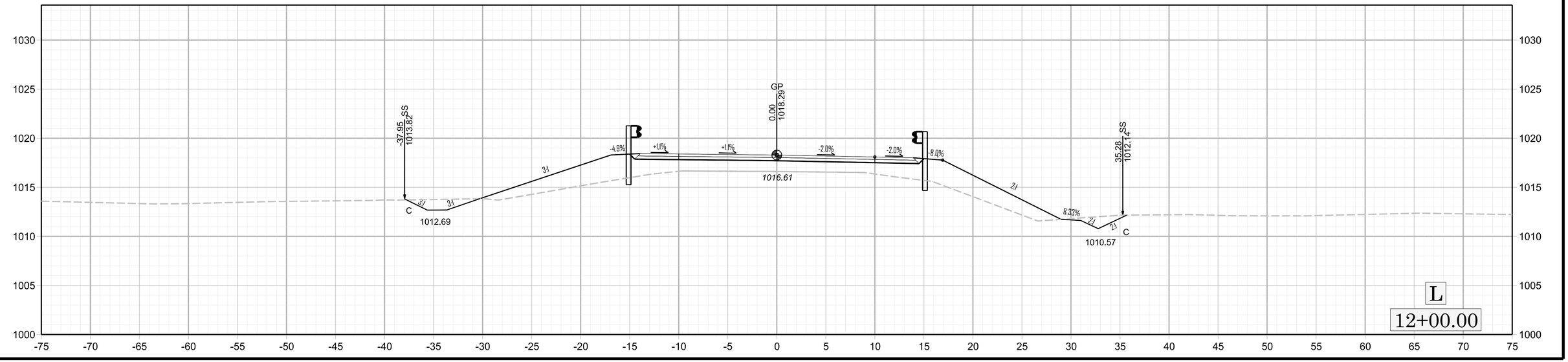
5/26/20

0 5 10

BP11.R024

X-4



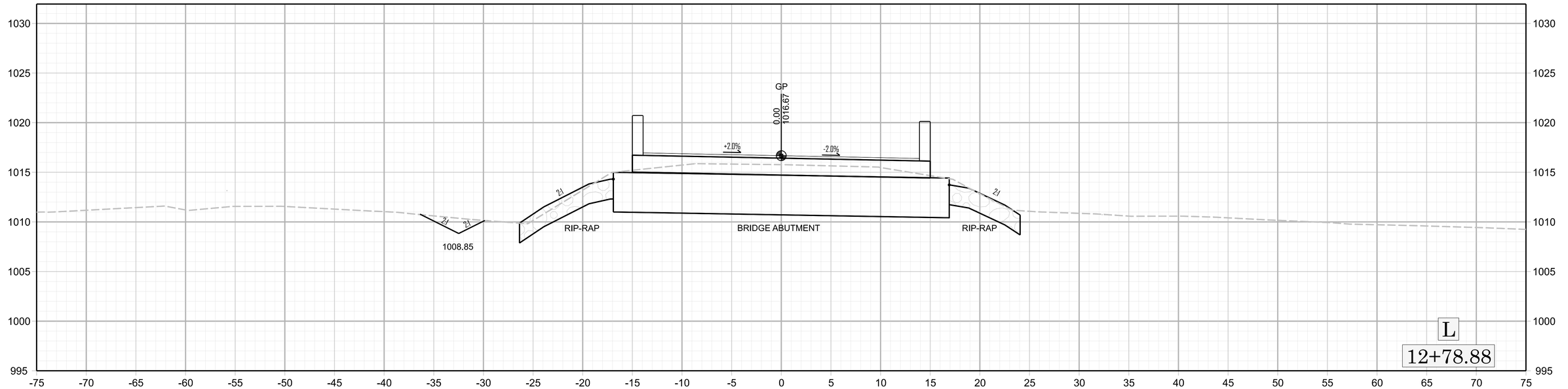


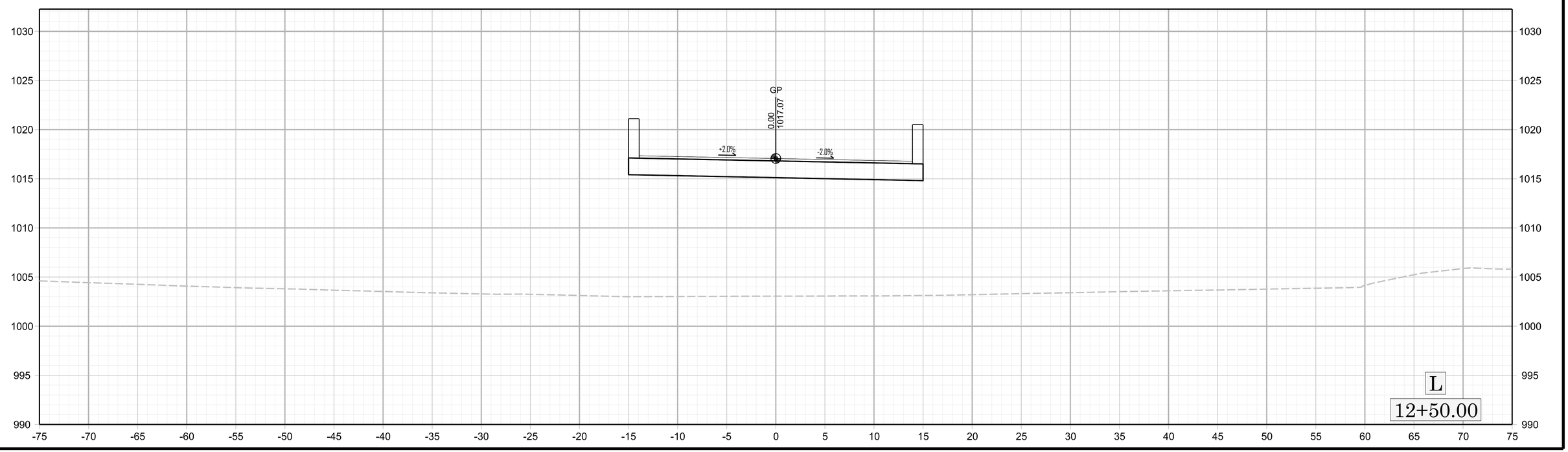
5/26/20

0 5 10

BP11.RD24

X-5

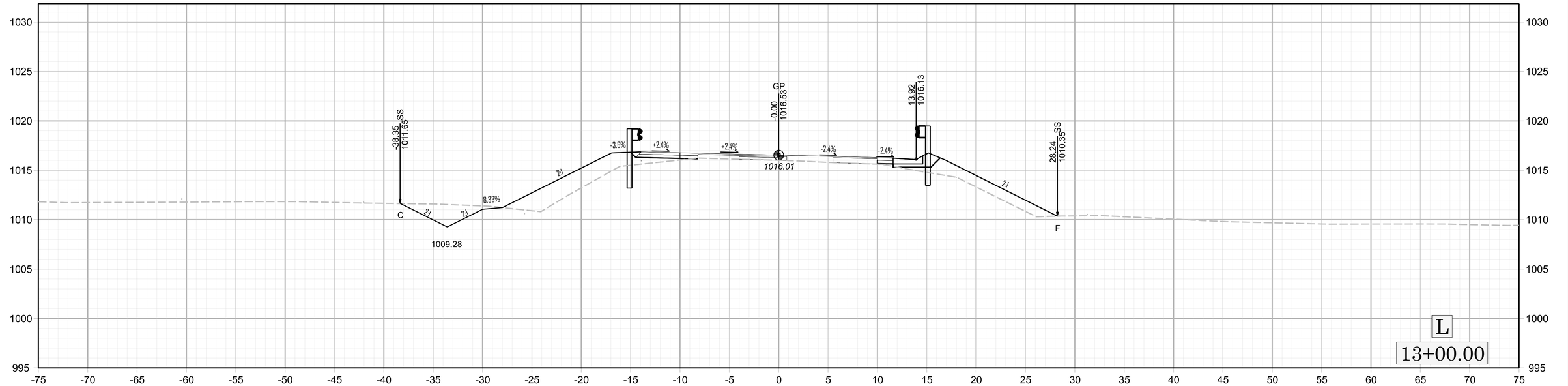


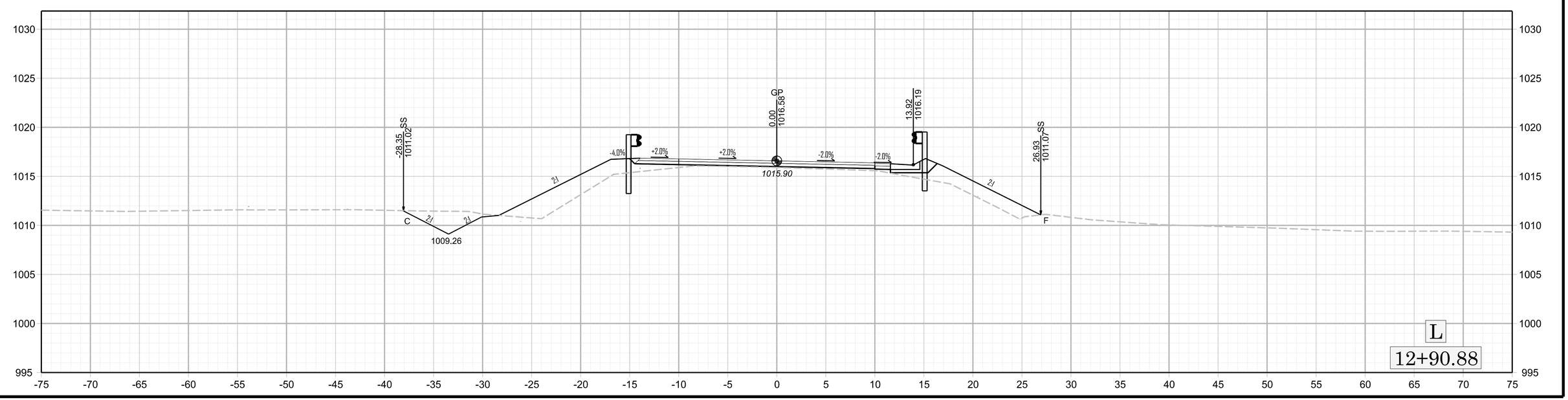


5/26/20

0 5 10

BP11.R024
X-6

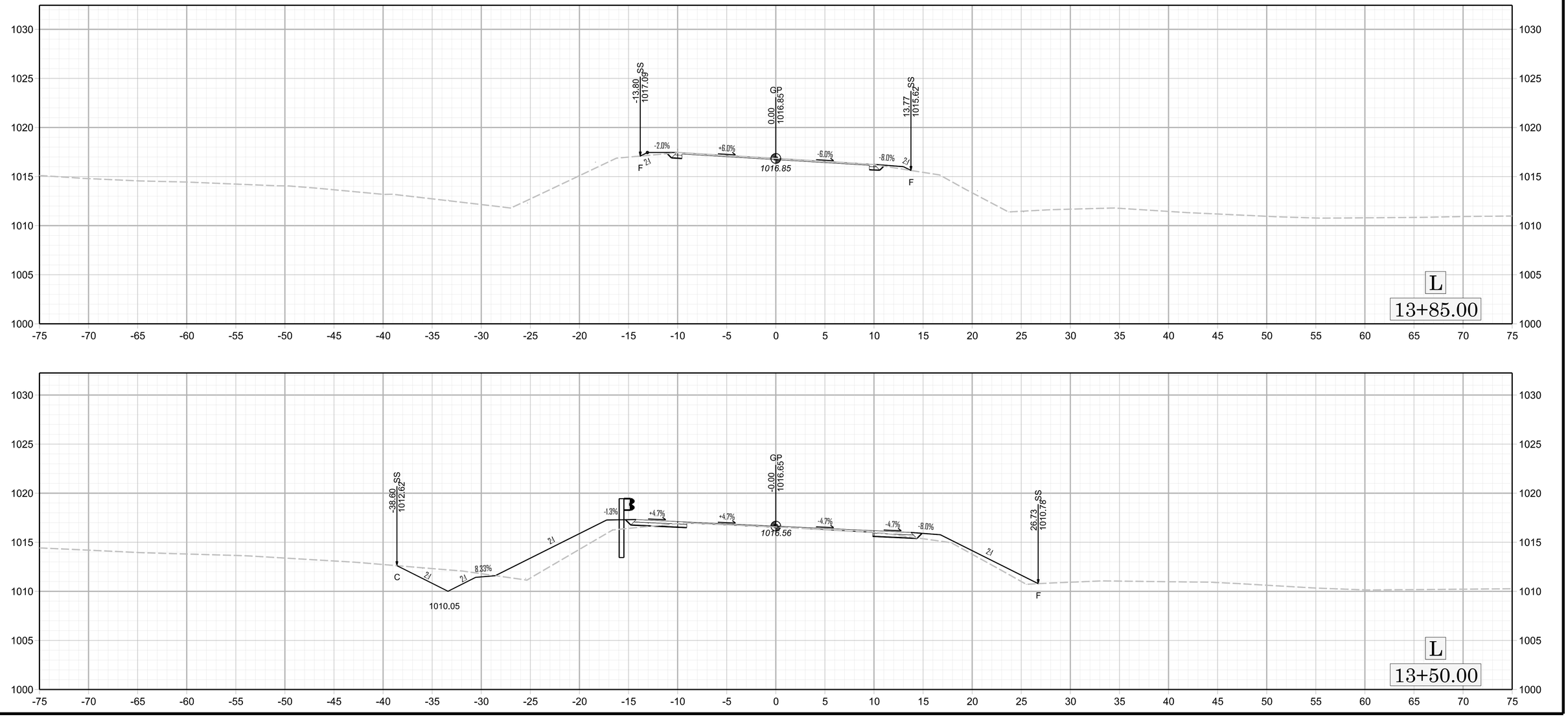




5/26/20

0 5 10

BP11.R024
X-7

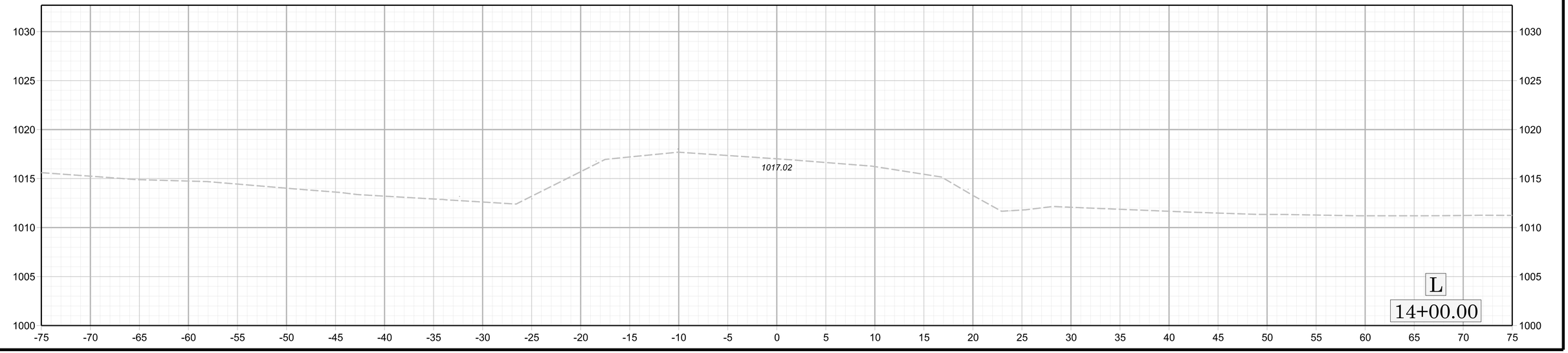


5/26/20

0 5 10

BP11.R024

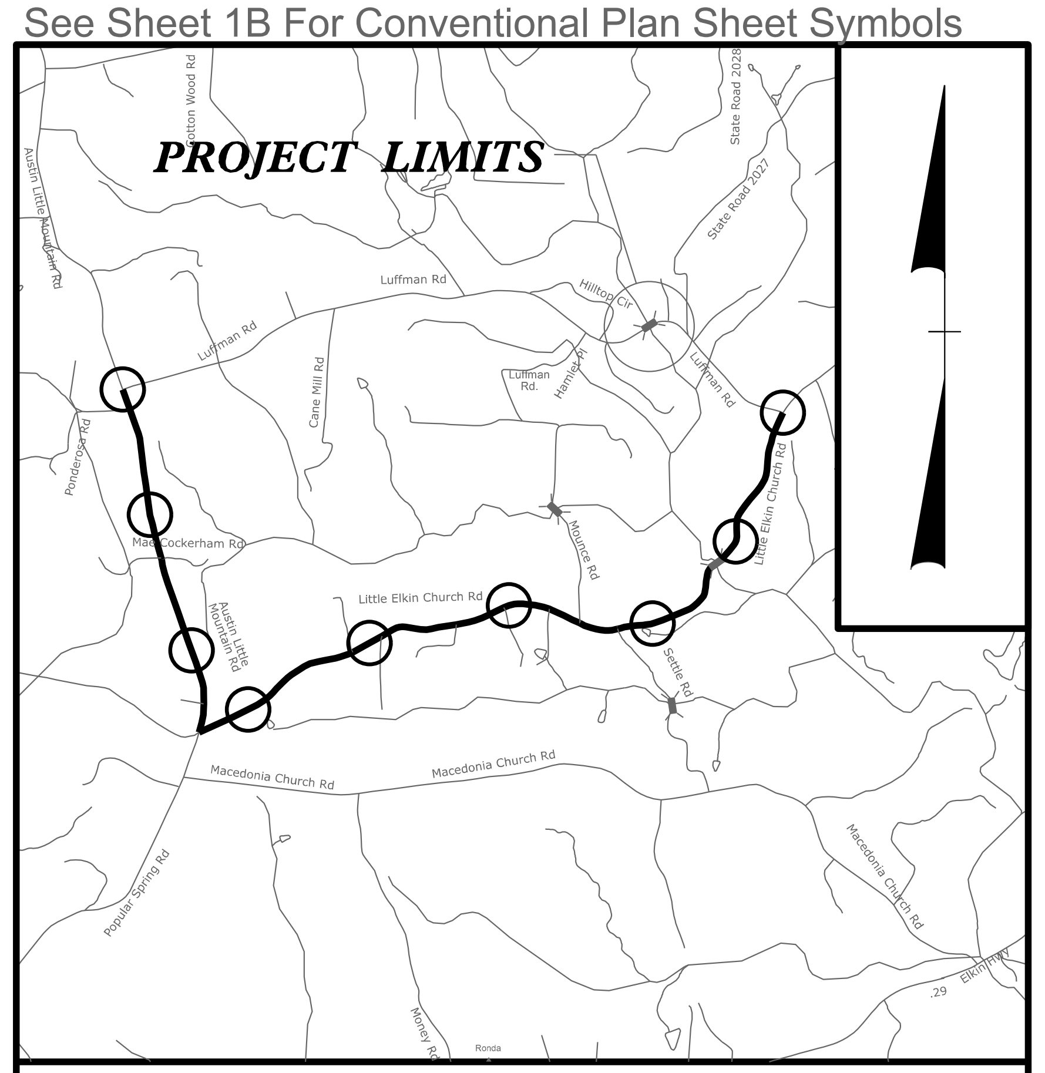
X-8



09/08/99

TIP PROJECT: BP11.R024

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



VICINITY MAP (NTS)

90% PLAN SET

OFF SITE DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WILKES COUNTY

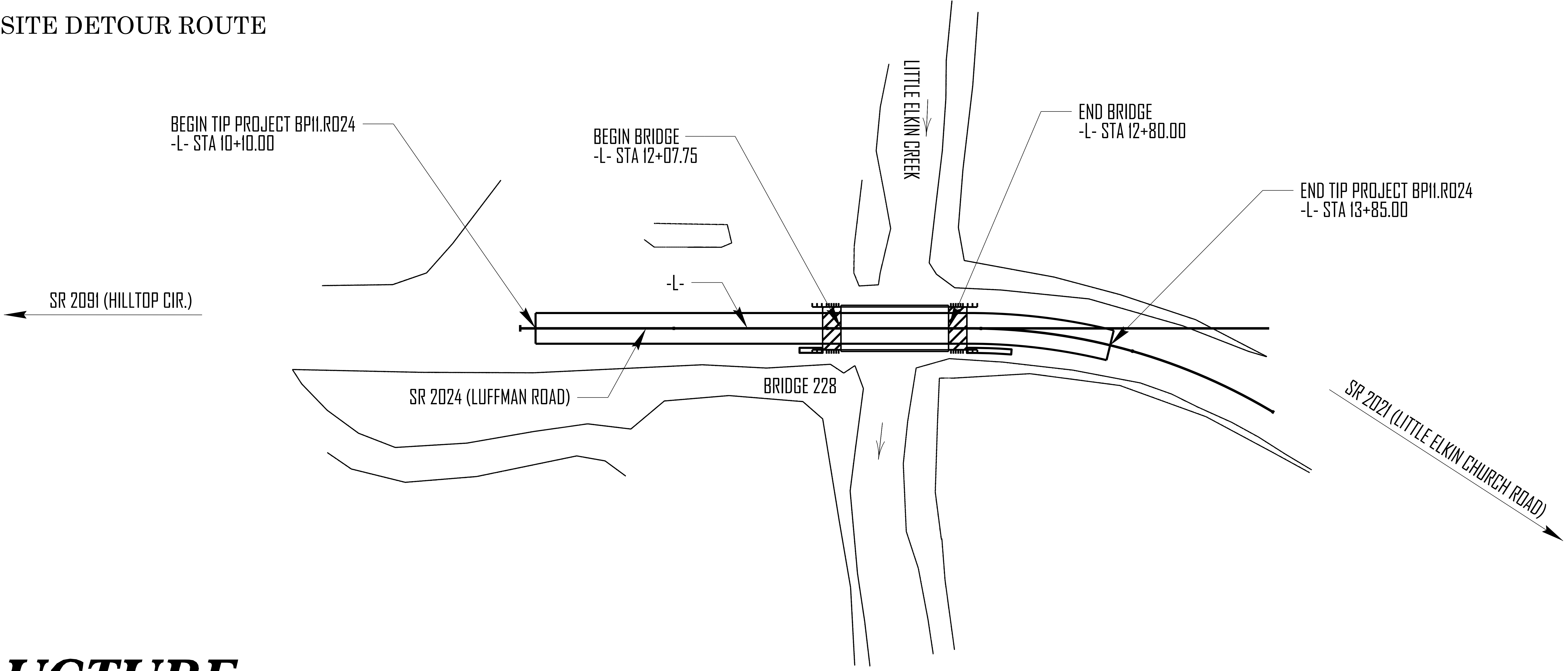
LOCATION: *BRIDGE 228 OVER LITTLE ELKIN CREEK ON SR 2024 (LUFFMAN ROAD)*

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BP11.R024		

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
BP11.R024.1		PE
BP11.R024.2		R/W + UTL
BP11.R024.3		CONST.

NAD 83
NA 2011



STRUCTURE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

CONTRACT: ________

DESIGN DATA

ADT 2024 = 250
ADT 2044 = 380
K = __ %
D = __ %
T = __ % *
V = 45 MPH
* TTST = 1% DUAL = 2%
FUNC CLASS =
LOCAL
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY STATE PROJECT BP11.R024 = 0.058 MILES
LENGTH STRUCTURES STATE PROJECT BP11.R024 = 0.013 MILES
TOTAL LENGTH STATE PROJECT BP11.R024 = 0.071 MILES

Prepared in the Office of:
KIMLEY-HORN
421 FAYETTEVILLE ST., SUITE 600, RALEIGH NC, 27601
NC LICENSE #F-0102

2014 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
FEBRUARY 26, 2024

LETTING DATE:
MARCH 18, 2025

ANDREW L. PHILLIPS, P.E.
PROJECT ENGINEER

JACK R. LOGAN, E.I.
PROJECT DESIGN ENGINEER

ROBBIE N. WEISZ, P.E.
NCDOT PROJECT MANAGER

8/26/21

12+00 13+00

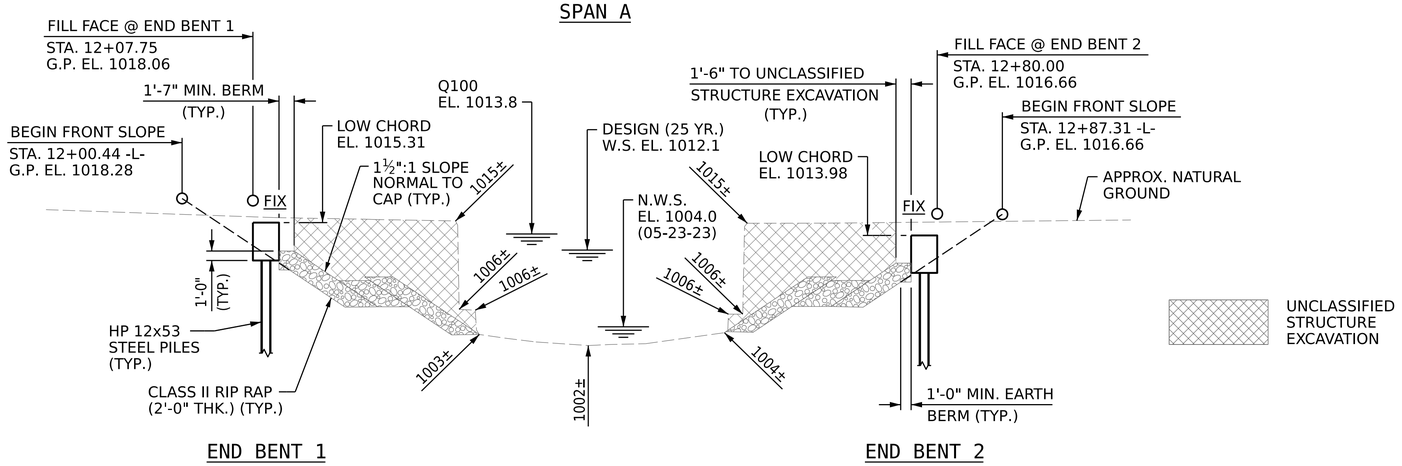
(-)8.2000% (+)0.5700%

P.I. STA. = 11+75.00 -L-
EL. = 1015.65
V.C. = 320'

-L- GRADE DATA

1020 1015 1010 1005 1000

SPAN A



END BENT 1 END BENT 2

SECTION ALONG -L-

SECTION AT END BENTS ARE AT RIGHT ANGLES

HYDRAULIC DATA

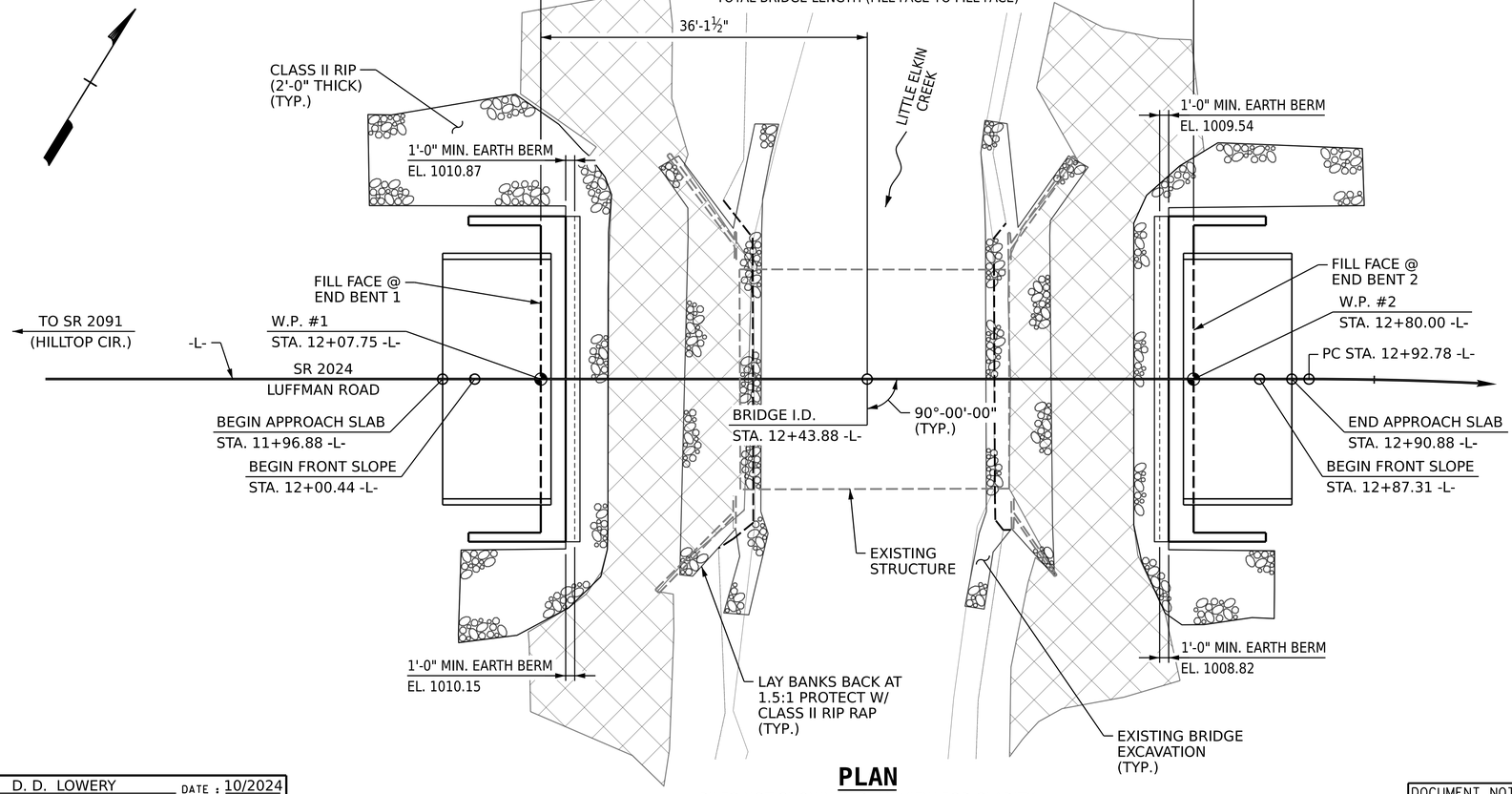
DESIGN DISCHARGE ---------- 1,800 C.F.S.
FREQUENCY OF DESIGN FLOOD --------- 25 YRS.
DESIGN HIGH WATER ELEVATION ------ 1012.1 FT
DRAINAGE AREA ---------- 7.02 SQ. MI.
BASIC DISCHARGE (Q100) ---------- 2534 C.F.S.
BASIC HIGH WATER ELEVATION ------- 1013.7 FT

OVERTOPPING FLOOR DATA

OVERTOPPING DISCHARGE ---------- 4,600 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD --- >500 YRS.
OVERTOPPING FLOOD ELEVATION ------ 1016.9 FT
WS EL. TAKEN @ RIVER STATION 17102
ROADWAY OVERTOPS AT -L- STA. 13+14 (SAG)

HORIZONTAL CURVE DATA -L-

P.I. STA. 13+99.00
Δ = 30° 50' 52.6" (RT)
D = 14° 52' 55.3"
L = 207.28'
T = 106.22'
R = 385.00'



PLAN

PILES NOT SHOWN IN PLAN VIEW FOR CLARITY

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. BP11.R024.1
WILKES COUNTY
STATION: 12+43.88 -L-

SHEET 1 OF 4 REPLACES BRIDGE NO. 960228

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 2/20/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
LITTLE ELKIN CREEK
ON SR 2024 BETWEEN
SR 2091 AND SR 2021

DRAWN BY : D. D. LOWERY DATE : 10/2024
CHECKED BY : R. M. KROL DATE : 10/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE : 01/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

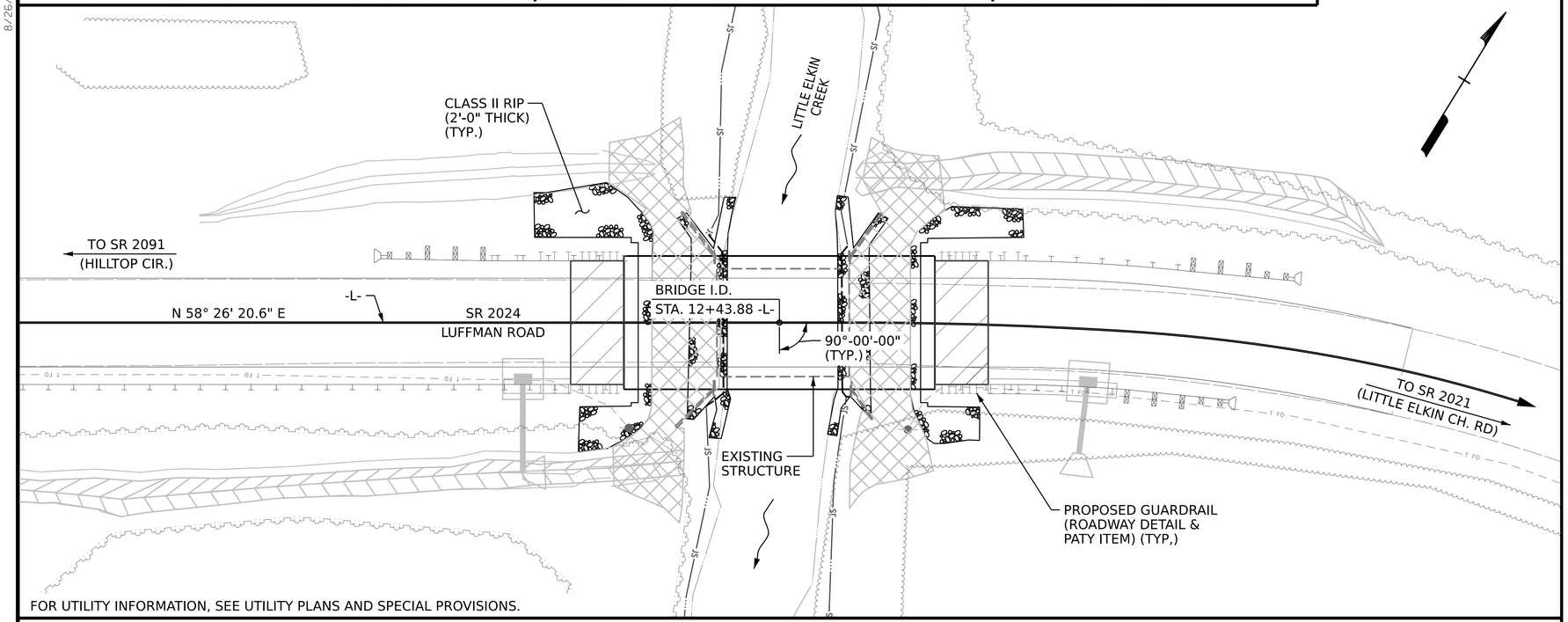
Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			14

.SYSTIME.
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\lowery, david\d0312489\BP11.R024_SMU_GD1_960228.dgn
david.lowery

8/26/21

BM #1: RR SPIKE IN 42" SYCAMORE TREE, 47.89' RT. OF STA. 15+00.06 -L-, EL. 1007.36



FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.

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.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA ON SHEET S-1 SHALL BE EXCAVATED FOR A DISTANCE OF 20 FT. EACH SIDE OF ℄ 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 EXISTING STRUCTURE CONSISTING OF 1 @ 30'-10" SPAN, 24'-6" CLEAR ROADWAY WIDTH ON PRESTRESSED CONCRETE CHANNEL BEAM BRIDGE WITH WOODEN ABUTMENTS AND LOCATED AT THE SITE OF THE PROPOSED STRUCTURE, SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT.

THE SUBSTRUCTURE OF THE EXISTING BRIDGE INDICATED ON THE PLANS IS FROM THE BEST INFORMATION AVAILABLE. SINCE THIS INFORMATION IS SHOWN FOR CONVENIENCE OF THE CONTRACTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COSTS INCURRED BASED ON DIFFERENCES BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED IN A MANNER THAT PREVENTS DEBRIS FROM FALLING INTO THE WATER. THE CONTRACTOR SHALL SUBMIT DEMOLITION PLANS FOR REVIEW AND REMOVE THE BRIDGE IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

THIS STRUCTURE HAS BEEN DESIGNED IN ACCORDANCE WITH ''HEC 18-EVALUATING SCOUR AT BRIDGES''.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

ASPHALT WEARING SURFACE IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

FOR ASBESTOS ASSESSMENT FOR BRIDGE DEMOLITION AND RENOVATION ACTIVITIES, SEE SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	UNCLASSIFIED STRUCTURE EXCAVATION	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	HP 12 x 53 STEEL PILES		VERTICAL CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	3'-0" x 2'-0" PRESTRESSED CONC CORED SLABS	
	LUMP SUM	LUMP SUM	LUMP SUM	CU. YDS.	LUMP SUM	LBS.	EA.	NO.	LIN. FT.	LIN. FT.	TONS	SQ. YDS.	LUMP SUM	NO.	LIN. FT.
SUPERSTRUCTURE					LUMP SUM					140.25			LUMP SUM	10	700
END BENT 1			LUMP SUM	20.2		2458	5	5	475		120	134			
END BENT 2			LUMP SUM	20.2		2458	5	5	325		90	100			
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	40.4	LUMP SUM	4916	10	10	800	140.25	210	234	LUMP SUM	10	700

FOUNDATION NOTES

FOR PILES, SEE PILES PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. BP11.R024.1

WILKES COUNTY

STATION: 12+43.88 -L-

NORTH CAROLINA
Professional Engineer
E6B09ABAD4004D3...
SEAL
040769
ENGINEER
ANDREW L. PHILLIPS
2/20/2025

DRAWN BY : D. D. LOWERY DATE : 10/2024
CHECKED BY : R. M. KROL DATE : 10/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE : 01/2025

SYSTIME
c:\workdir\ncdot-pw.bentley.com_ncdot-pw-01\lowery, david\d0312489\BP11.R024_SMU_GD2_960228.dgn
david.lowery

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE OVER
LITTLE ELKIN CREEK
ON SR 2024 BETWEEN
SR 2091 AND SR 2021

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			14

8/26/21

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Number of Piles per Line	Factored Resistance per Pile KIPS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles **			Drilled-In Piles		
						Minimum Pile Tip (Tip No Higher Than) Elevation FT	Required Driving Resistance (RDR)* per pile KIPS	Pile Redrives Quantity EACH	Predrilling Length per Pile LIN FT	Predrilling Elevation (Elevation Not To Predrill Below) FT	Maximum Predrilling Diameter INCHES	Pile Excavation (Bottom of Hole) Elevation FT	Pile Excavation Not In Soil per Pile LIN FT	Pile Excavation In Soil per Pile LIN FT
End Bent 1,Piles 1-5	5	194	See Substructure Plans	95			325	0						
End Bent 2, Piles 1-5	5	194	See Substructure Plans	65			325	0						
TOTAL QUANTITY:														

$$* RDR = \frac{Factored\ Resistance + Factored\ Drag\ Load + Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Drag\ Load\ Resistance + Nominal\ Resistance\ from\ Scourable\ Material$$

** Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile KIPS	Factored Drag Load per Pile KIPS	Factored Dead Load * per Pile KIPS	Dynamic Resistance Factor	Nominal Drag Resistance per Pile KIPS	Nominal Scour Resistance per Pile KIPS
End Bent 1, Piles 1-5	194			0.60		
End Bent 2, Piles 1-5	194			0.60		

* Factored Dead Load is factored weight of pile above the ground line.

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent / Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates EACH	Steel Pile Points		
		Pipe Pile Cutting Shoes EACH	Pipe Pile Conical Points EACH	H-Pile Points EACH
TOTAL QUANTITY:				

SUMMARY OF DPT/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Dynamic Pile Testing (DPT)		
End Bent / Bent No (e.g., "Bent 1 - Bent 3")	DPT Test Pile Length FT	DPT Testing Quantity EACH
TOTAL QUANTITY:		

Pile Order Lengths for Concrete Piles	
End Bent / Bent No (e.g., "Bent 1 - Bent 3")	Pile Order Length Basis* EST or DPT

* EST = Pile order lengths from estimated pile lengths; DPT = Pile order lengths based on Dynamic Pile Testing. For groups of end bents/bents with pile order lengths based on DPT testing, the first end bent/bent no. listed for each group is the representative end bent/bent with the DPT.

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Abner F. Riggs, Jr., #014155) on 01-17-2025.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer may adjust the quantity for DPT Testing and Pipe Pile Plates when necessary.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS 2/20/2025

DRAWN BY : D. D. LOWERY DATE : 10/2024
CHECKED BY : R. M. KROL DATE : 10/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE : 01/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Kimley»Horn
421 Fayetteville Street, Suite 600
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Phone (919) 677-2000
NC LICENSE # F-0102

PROJECT NO. BP11.R024.1
WILKES COUNTY
STATION: 12+43.88 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE FOUNDATION TABLES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			14

-SYSTIME-
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david.lowery

8/26/21

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

LOAD TYPE		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						
							LIVE-LOAD FACTORS (γ LL)	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)	LIVE-LOAD FACTORS (γ LL)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD		HL-93 (INVENTORY)	N/A	1	1.006	--	1.75	0.273	1.03	70'	EL	34.5	0.507	1.32	70'	EL	6.9	0.80	0.273	1.01	70'	EL	34.5	
		HL-93 (OPERATING)	N/A		1.341	--	1.35	0.273	1.34	70'	EL	34.5	0.507	1.72	70'	EL	6.9	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.306	47.02	1.75	0.273	1.34	70'	EL	34.5	0.507	1.65	70'	EL	6.9	0.80	0.273	1.31	70'	EL	34.5	
		HS-20 (OPERATING)	36.000		1.740	62.64	1.35	0.273	1.74	70'	EL	34.5	0.507	2.14	70'	EL	6.9	N/A	--	--	--	--	--	
LEGAL LOAD	SINGLE VEHICLE (SV)	SNSH	13.500		2.917	39.379	1.4	0.273	3.75	70'	EL	34.5	0.507	4.87	70'	EL	6.9	0.80	0.273	2.92	70'	EL	34.5	
		SNGARBS2	20.000		2.187	43.741	1.4	0.273	2.81	70'	EL	34.5	0.507	3.47	70'	EL	6.9	0.80	0.273	2.19	70'	EL	34.5	
		SNAGRIS2	22.000		2.077	45.690	1.4	0.273	2.67	70'	EL	34.5	0.507	3.23	70'	EL	6.9	0.80	0.273	2.08	70'	EL	34.5	
		SNCOTTS3	27.250		1.452	39.565	1.4	0.273	1.87	70'	EL	34.5	0.507	2.43	70'	EL	6.9	0.80	0.273	1.45	70'	EL	34.5	
		SNAGGRS4	34.925		1.218	42.554	1.4	0.273	1.57	70'	EL	34.5	0.507	2.03	70'	EL	6.9	0.80	0.273	1.22	70'	EL	34.5	
		SNS5A	35.550		1.191	42.346	1.4	0.273	1.53	70'	EL	34.5	0.507	2.06	70'	EL	6.9	0.80	0.273	1.19	70'	EL	34.5	
		SNS6A	39.950		1.095	43.747	1.4	0.273	1.41	70'	EL	34.5	0.507	1.88	70'	EL	6.9	0.80	0.273	1.10	70'	EL	34.5	
		SNS7B	42.000		1.043	43.801	1.4	0.273	1.34	70'	EL	34.5	0.507	1.85	70'	EL	6.9	0.80	0.273	1.04	70'	EL	34.5	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.336	44.087	1.4	0.273	1.72	70'	EL	34.5	0.507	2.23	70'	EL	6.9	0.80	0.273	1.34	70'	EL	34.5	
		TNT4A	33.075		1.342	44.401	1.4	0.273	1.72	70'	EL	34.5	0.507	2.17	70'	EL	6.9	0.80	0.273	1.34	70'	EL	34.5	
		TNT6A	41.600		1.100	45.746	1.4	0.273	1.41	70'	EL	34.5	0.507	1.98	70'	EL	6.9	0.80	0.273	1.10	70'	EL	34.5	
		TNT7A	42.000		1.106	46.462	1.4	0.273	1.42	70'	EL	34.5	0.507	1.94	70'	EL	6.9	0.80	0.273	1.11	70'	EL	34.5	
		TNT7B	42.000		1.147	48.180	1.4	0.273	1.47	70'	EL	34.5	0.507	1.80	70'	EL	6.9	0.80	0.273	1.15	70'	EL	34.5	
		TNAGRIT4	43.000		1.089	46.838	1.4	0.273	1.40	70'	EL	34.5	0.507	1.74	70'	EL	6.9	0.80	0.273	1.09	70'	EL	34.5	
		TNAGT5A	45.000		1.026	46.175	1.4	0.273	1.32	70'	EL	34.5	0.507	1.74	70'	EL	6.9	0.80	0.273	1.03	70'	EL	34.5	
		TNAGT5B	45.000	3	1.013	45.579	1.4	0.273	1.30	70'	EL	34.5	0.507	1.66	70'	EL	6.9	0.80	0.273	1.01	70'	EL	34.5	
EMERGENCY VEHICLE (EV)		EV2	28.750		1.816	52.212	1.3	0.273	2.11	70'	EL	34.5	0.507	2.59	70'	EL	6.9	0.80	0.273	1.82	70'	EL	34.5	
		EV3	43.000	4	1.188	51.068	1.3	0.273	1.38	70'	EL	34.5	0.507	1.75	70'	EL	6.9	0.80	0.273	1.19	70'	EL	34.5	

LOAD FACTORS:

DESIGN LOAD RATING FACTORS	LIMIT STATE	γ DC	γ 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 * *

(4) EMERGENCY VEHICLE LOAD RATING **

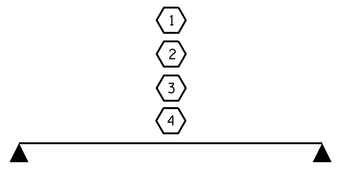
* * SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

I - INTERIOR GIRDER

EL - EXTERIOR LEFT GIRDER

ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

FOR SPAN "A"

PROJECT NO. BP11.R024.1

WILKES COUNTY

STATION: 12+43.88 -L-

SHEET 4 OF 4

2/20/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR 70' CORED SLAB UNIT 90° SKEW
(NON-INTERSTATE TRAFFIC)

ASSEMBLED BY : D.D. LOWERY	DATE : 10/2024
CHECKED BY : R.M. KROL	DATE : 10/2024
DRAWN BY : CVC 6/10	REV. BY : BNB/AKP 06/23
CHECKED BY : DNS 6/10	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			14

SYSTIME
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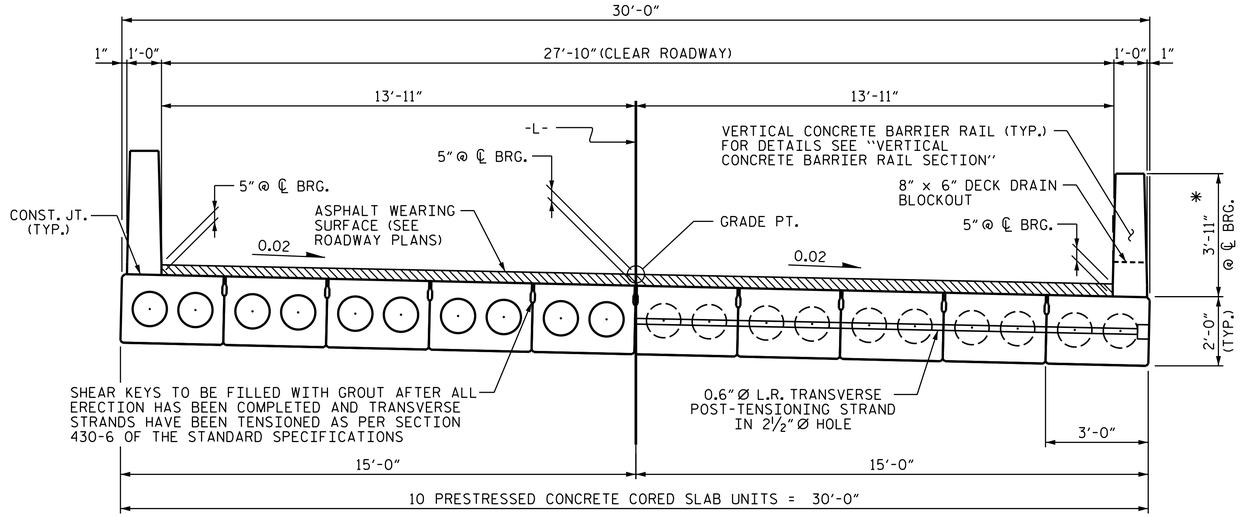
david.lowery

STD. NO. 24LRFR1_90S_70L

8/26/21



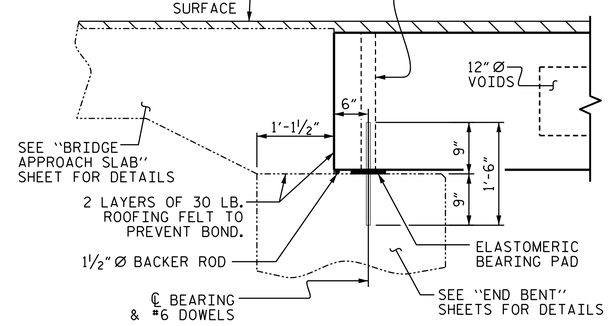
HALF SECTION
AT INTERMEDIATE DIAPHRAGMS

HALF SECTION
THROUGH VOIDS

TYPICAL SECTION

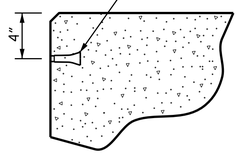
* - THE MAXIMUM BARRIER RAIL HEIGHT AND ASPHALT THICKNESS IS SHOWN. THE HEIGHT OF THE BARRIER RAIL AND ASPHALT THICKNESS VARIES WHILE THE TOP OF THE BARRIER RAIL FOLLOWS THE PROFILE OF THE GUTTERLINE. FOR RAIL HEIGHT DETAILS AND ASPHALT THICKNESS, SEE THE "VERTICAL CONCRETE BARRIER RAIL SECTION" DETAIL.

FIXED END

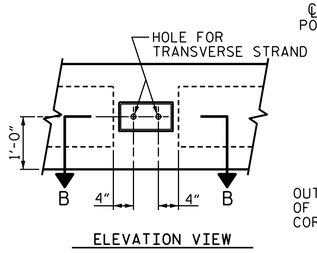


SECTION AT END BENT

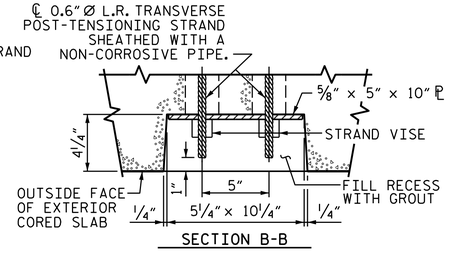
PERMITTED THREADED INSERT
CAST IN OUTSIDE FACE OF
EXTERIOR UNIT AND
RECESSED ⅜". SIZE TO BE
DETERMINED
BY CONTRACTOR.



THREADED INSERT DETAIL

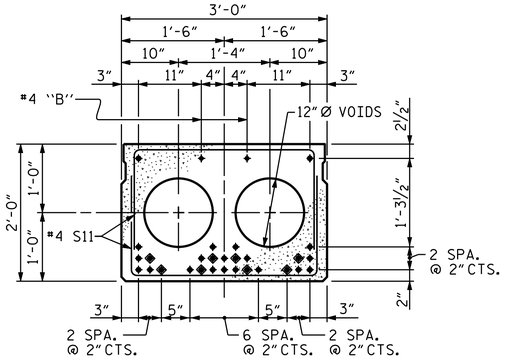


ELEVATION VIEW

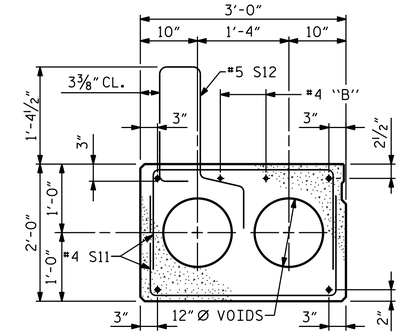


SECTION B-B

GROUTED RECESS AT END OF POST-TENSIONED STRAND-CORED SLABS



INTERIOR SLAB SECTION
(28 STRANDS REQUIRED)

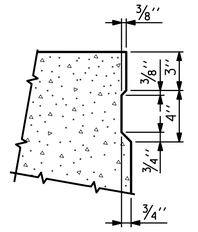


EXTERIOR SLAB SECTION
(FOR PRESTRESSED STRAND LAYOUT, SEE INTERIOR SLAB SECTION.)

0.6" Ø LOW RELAXATION STRAND LAYOUT

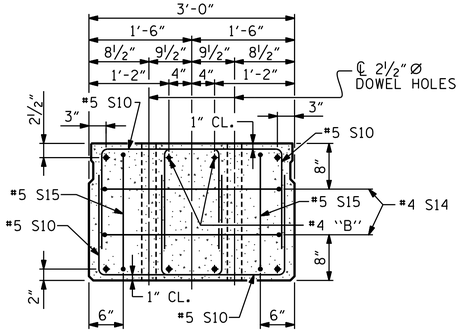
◈ BOND SHALL BE BROKEN ON THESE STRANDS FOR A DISTANCE OF 12'-0" FROM END OF CORED SLAB UNIT. SEE STANDARD SPECIFICATIONS, ARTICLE 1078-7.

DEBONDING LEGEND



SHEAR KEY DETAIL

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



END ELEVATION

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

NORTH CAROLINA
Professional Engineer
SEAL
040769
ENGINEER
ANDREW L. PHILLIPS
2/20/2025

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

PROJECT NO. BP11.R024.1
WILKES COUNTY
STATION: 12+43.88 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
3'-0" X 2'-0"
PRESTRESSED CONCRETE
CORED SLAB UNIT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			14

ASSEMBLED BY : D. D. LOWERY	DATE : 10/2024	
CHECKED BY : R. M. KROL	DATE : 10/2024	
DRAWN BY : MAA 6/10	REV. 8/14	MAA/TMG
CHECKED BY : MKT 7/10		

SYSTIME
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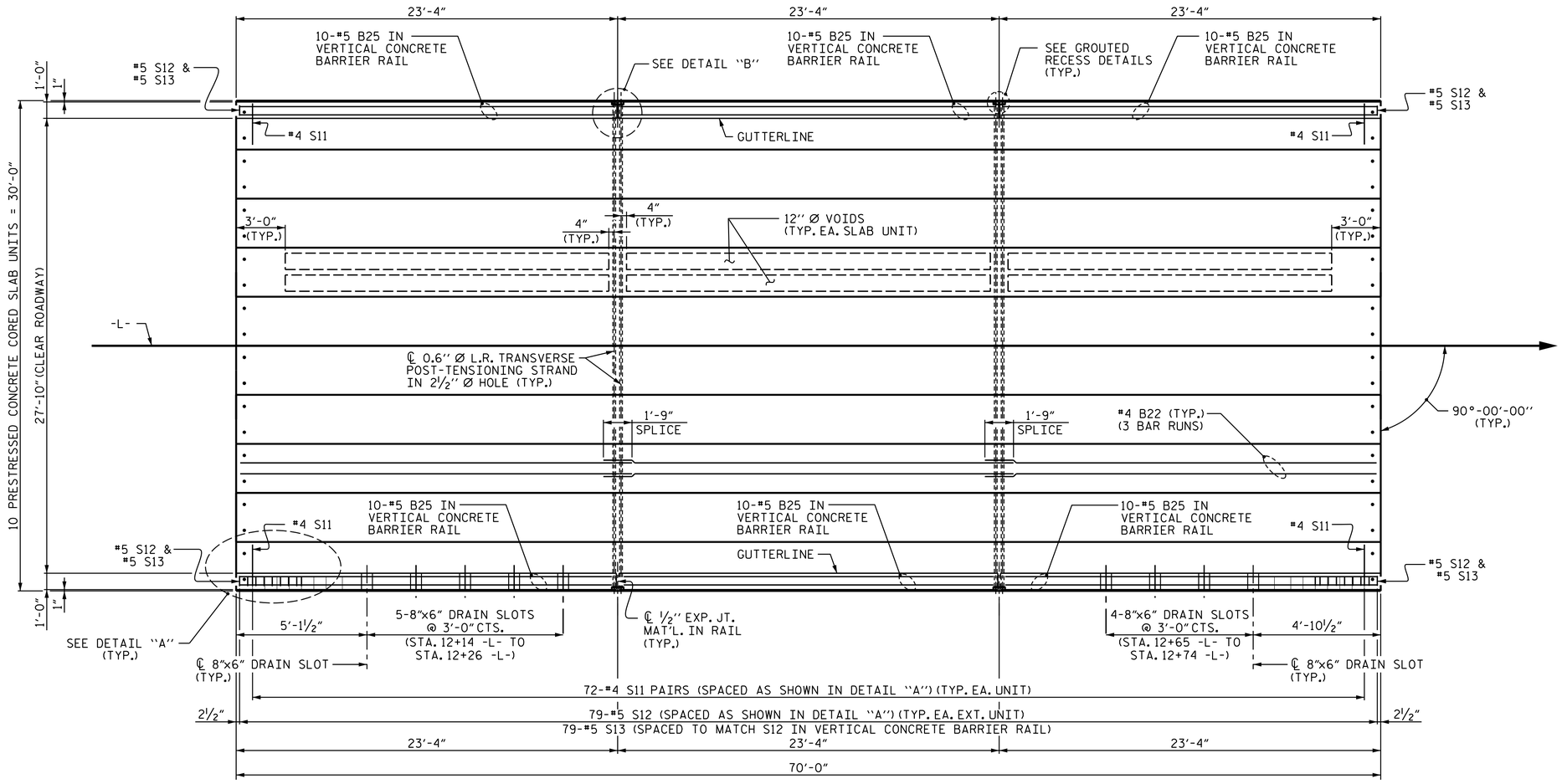
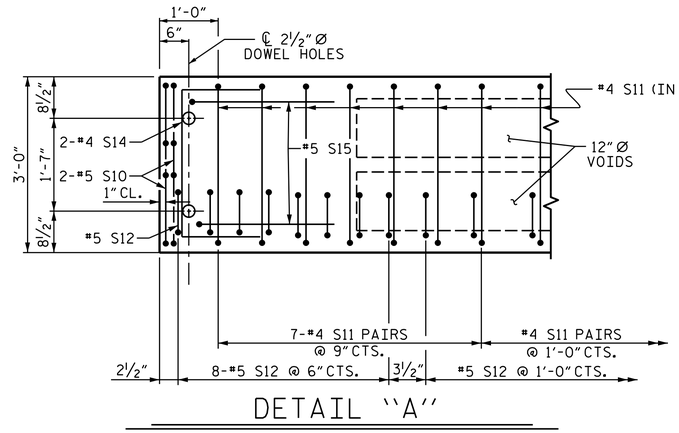
david.lowery

STD. NO. 24PCS4_30_90S

8/26/21

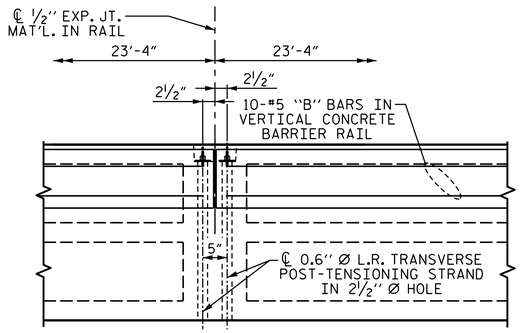


PLAN OF UNIT



DETAIL "A"

(TYPICAL EACH END OF UNIT)
NOTE: EXTERIOR UNIT SHOWN - INTERIOR UNIT SIMILAR EXCEPT OMIT #5 S12 BARS.



DETAIL "B"

#4 S11 BARS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO GROUTED RECESS AND 2½" Ø TRANSVERSE POST-TENSIONING STRAND HOLES

ASSEMBLED BY : D. D. LOWERY	DATE : 10/2024		
CHECKED BY : R. M. KROL	DATE : 10/2024		
DRAWN BY : MAA 6/10	REV. 12/5/11		MAA/AAC
CHECKED BY : MKT 7/10	REV. 8/14		MAA/TMG

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david.lowery

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NORTH CAROLINA
Docusigned by: Andrew L. Phillips
2B89ABAD4094D3...
SEAL
040769
ENGINEER
ANDREW L. PHILLIPS
2/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
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Phone (919) 677-2000
NC LICENSE # F-0102

PROJECT NO. BP11.R024.1
WILKES COUNTY
STATION: 12+43.88 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

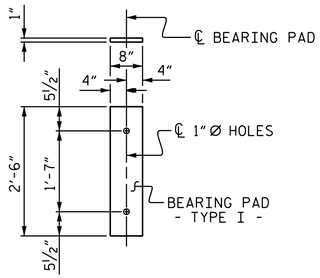
STANDARD

PLAN OF 70' UNIT 27'-10" CLEAR ROADWAY 90° SKEW

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			14

STD. NO. 24PCS_30_90S_70L

8/26/21



FIXED END
(TYPE I - 20 REQ'D)

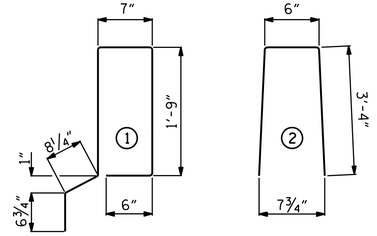
BILL OF MATERIAL FOR VERTICAL CONCRETE BARRIER RAIL

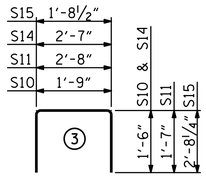
BAR	BARS PER PAIR OF EXTERIOR UNITS	TOTAL NO.	SIZE	TYPE	LENGTH	WEIGHT
	70' UNIT					
✳B25	60	60	#5	STR	22'-11"	1434
✳S13	158	158	#5	2	7'-2"	1181
✳EPOXY COATED REINFORCING STEEL				LBS.		2615
CLASS AA CONCRETE				CU.YDS.		18.1
TOTAL VERTICAL CONCRETE BARRIER RAIL				LN.FT.		140.25

GUTTERLINE ASPHALT THICKNESS & RAIL HEIGHT

	ASPHALT OVERLAY THICKNESS @ MID-SPAN	RAIL HEIGHT @ MID-SPAN
70' UNITS	1½"	3'-7½"

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT

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 2½" Ø DOWEL 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 SIDEWAYS. 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.

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.

ALL REINFORCING STEEL IN VERTICAL CONCRETE BARRIER RAILS 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, ½" 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.

MAINTAIN A SYMMETRIC TENSION FORCE BETWEEN EACH PAIR OF TRANSVERSE POST TENSIONING STRANDS IN THE DIAPHRAGM.

THE #4 S11 STIRRUPS MAY BE SHIFTED AS NECESSARY TO MAINTAIN 1" CLEAR TO THE GROUTED RECESS.

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.

ELASTOMERIC BEARING DETAILS

ELASTOMER IN ALL BEARINGS SHALL BE 60 DUROMETER HARDNESS.

DEAD LOAD DEFLECTION AND CAMBER

	3'-0" x 2'-0"
70' CORED SLAB UNIT	0.6" Ø L.R. STRAND
CAMBER (SLAB ALONE IN PLACE)	2¼" ↑
DEFLECTION DUE TO SUPERIMPOSED DEAD LOAD✳✳	¾" ↓
FINAL CAMBER	1½" ↑

✳✳ INCLUDES FUTURE WEARING SURFACE

BILL OF MATERIAL FOR ONE 70' CORED SLAB UNIT

				EXTERIOR UNIT		INTERIOR UNIT	
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	LENGTH	WEIGHT
B22	6	#4	STR	24'-6"	98	24'-6"	98
S10	8	#5	3	4'-9"	40	4'-9"	40
S11	144	#4	3	5'-10"	561	5'-10"	561
✳S12	79	#5	1	5'-10"	481		
S14	4	#4	3	5'-7"	15	5'-7"	15
S15	4	#5	3	7'-1"	30	7'-1"	30
REINFORCING STEEL		LBS.			744		744
✳EPOXY COATED REINFORCING STEEL		LBS.			481		
7000 P.S.I. CONCRETE		CU. YDS.			11.8		11.8
0.6" Ø L.R. STRANDS		No.			28		28

CONCRETE RELEASE STRENGTH

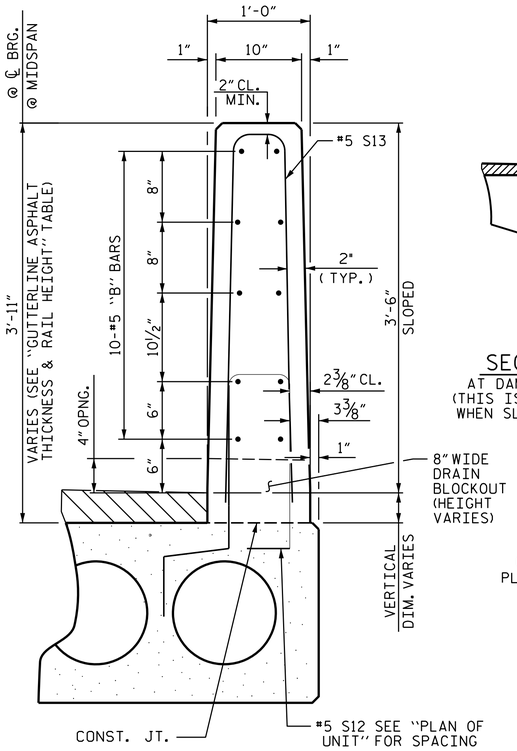
UNIT	PSI
70' UNITS	5500

CORED SLABS REQUIRED

	NUMBER	LENGTH	TOTAL LENGTH
70' UNIT			
EXTERIOR C.S.	2	70'-0"	140'-0"
INTERIOR C.S.	8	70'-0"	560'-0"
TOTAL	10		700'-0"

GRADE 270 STRANDS

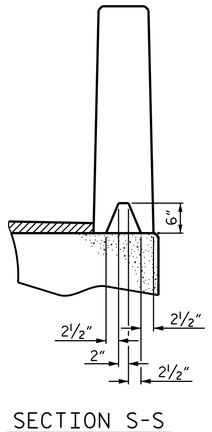
	0.6" Ø L.R.
AREA (SQUARE INCHES)	0.217
ULTIMATE STRENGTH (LBS. PER STRAND)	58,600
APPLIED PRESTRESS (LBS. PER STRAND)	43,950



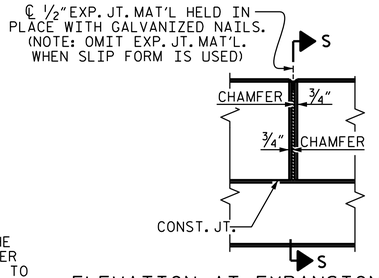
SECTION THRU RAIL W/ DRAIN

THE DRAIN OPENING AT THE GUTTERLINE SHALL BE 4" X 8". THE HEIGHT OF THE BLOCKOUT IN THE VERTICAL CONCRETE BARRIER RAIL SHALL EXTEND FROM THE TOP OF THE CORED SLAB UNIT TO THE TOP OF THE DRAIN OPENING.

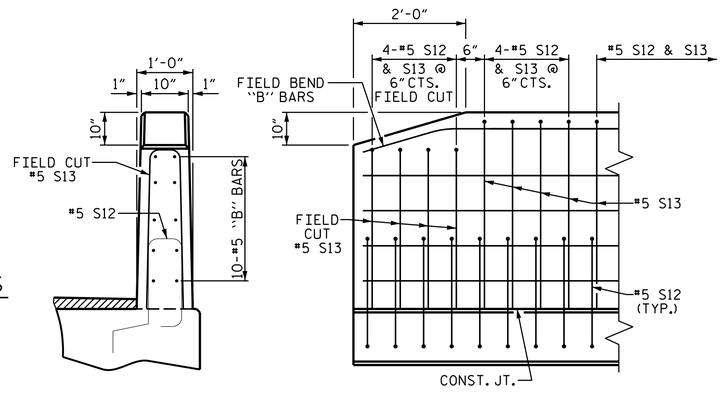
APPLY EPOXY PROTECTIVE COATING TO EXTERIOR FACE OF THE EXTERIOR CORED SLAB UNITS THAT REQUIRE DRAINS IN THE BARRIER RAIL.



SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS



END VIEW

SIDE VIEW

END OF RAIL DETAILS

VERTICAL CONCRETE BARRIER RAIL DETAILS

PROJECT NO. BP11.R024.1
WILKES COUNTY
STATION: 12+43.88 -L-
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
3'-0" X 2'-0"
PRESTRESSED CONCRETE
CORED SLAB UNIT

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L PHILLIPS
2/20/2025

ASSEMBLED BY :	D.D. LOWERY
DATE :	10/2024
CHECKED BY :	R.M. KROL
DATE :	10/2024
DRAWN BY :	MAA 6/10
CHECKED BY :	MKT 7/10
REV. 5/18	MAA/THC

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davidlowery

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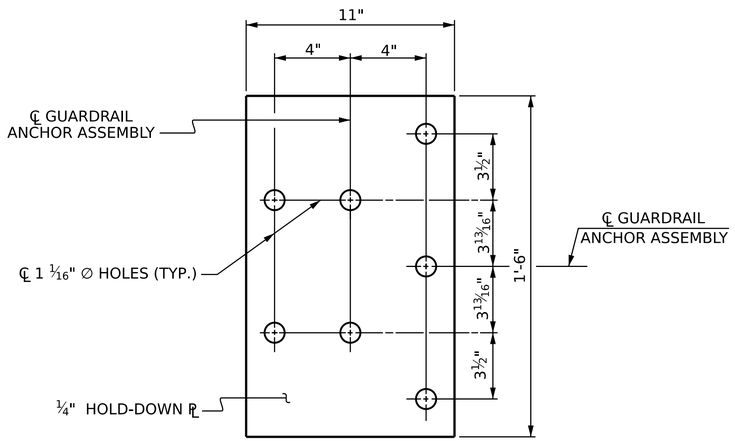
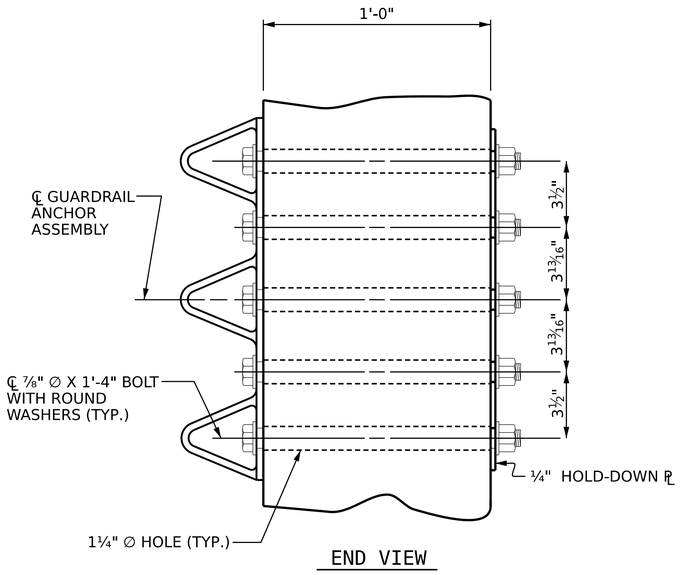
8/26/21



PLAN



END VIEW

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼'' HOLD DOWN PLATE AND 7 - ⅞'' ∅ 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 ⅞'' ∅ 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.)

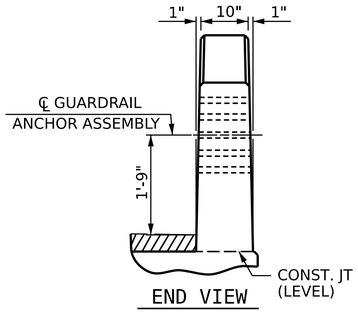
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

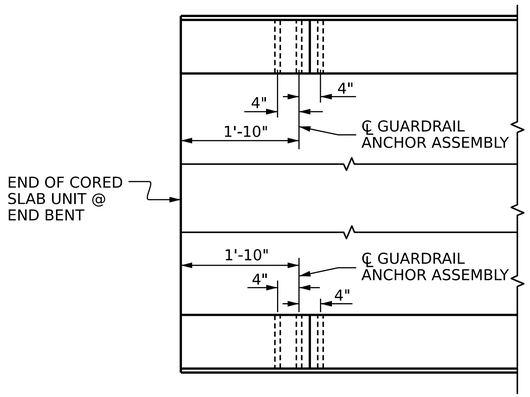
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR VERTICAL CONCRETE BARRIER RAIL.

THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

THE 1 ¼'' ∅ 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.



END VIEW



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR

SKETCH SHOWING POINTS OF ATTACHMENT

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. BP11.R024.1

WILKES COUNTY

STATION: 12+43.88 -L-

NORTH CAROLINA
Engineering Practice
SEAL
040769
ENGINEER
ANDREW L PHILLIPS
2/20/2025

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			14

ASSEMBLED BY : D. D. LOWERY	DATE : 10/2024	
CHECKED BY : R. M. KROL	DATE : 10/2024	
DRAWN BY : MAA 5/10	REV. 2/15	MAA/TMC
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC
	REV. 5/18	MAA/THC

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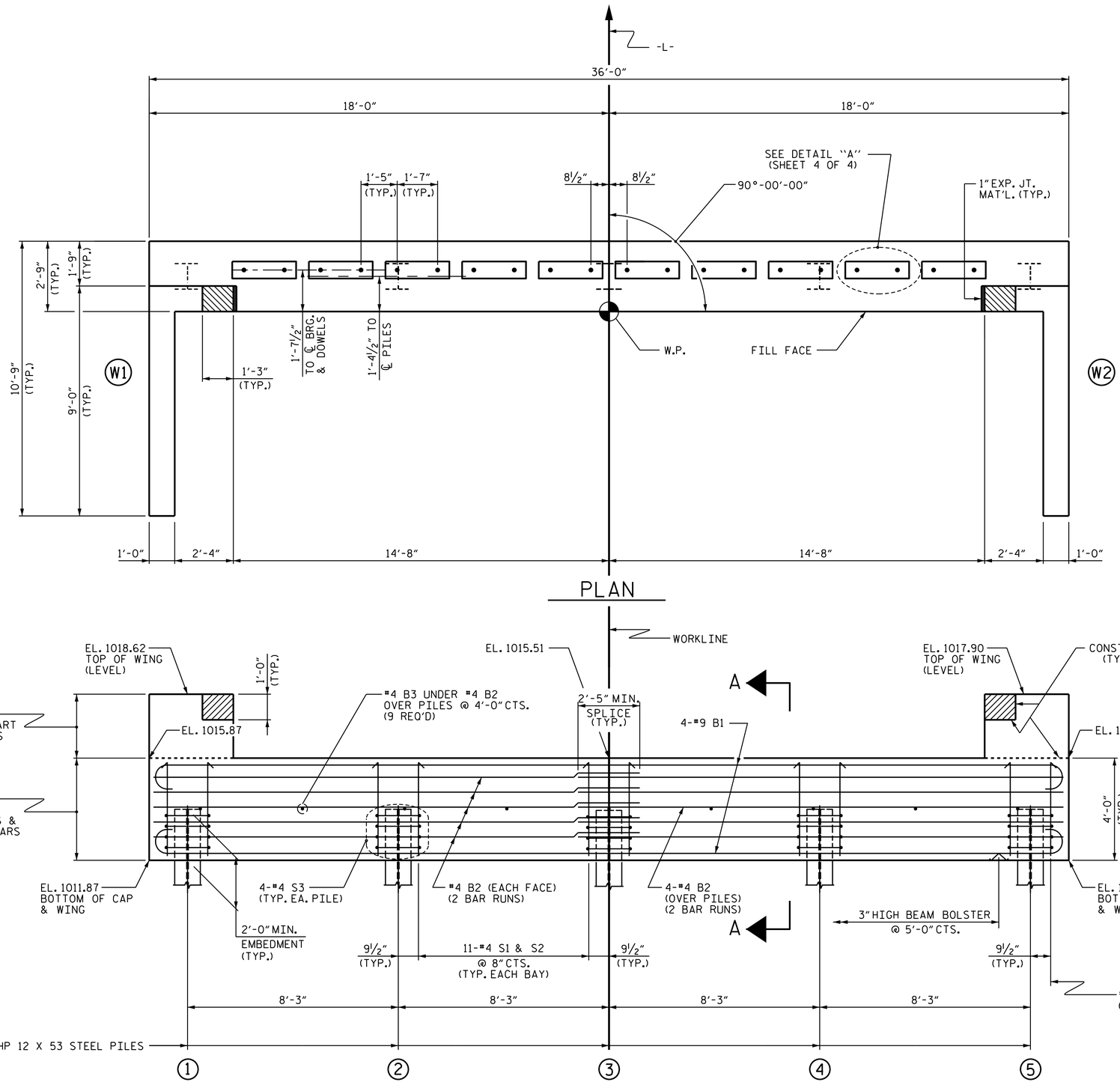
david.lowery

STD. GRA3

8/26/21



ELEVATION

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.

NOTES

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

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

TOP OF PILE ELEVATIONS	
①	1013.84
②	1013.67
③	1013.51
④	1013.34
⑤	1013.18

PROJECT NO. BP11.R024.1
WILKES COUNTY
STATION: 12+43.88 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

END BENT No. 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
2/20/2025

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			14

ASSEMBLED BY : D. D. LOWERY	DATE : 10/2024	
CHECKED BY : R. M. KROL	DATE : 10/2024	
DRAWN BY : WJH 12/11	REV. 4/15	MAA/TMG
CHECKED BY : AAC 12/11		

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david.lowery

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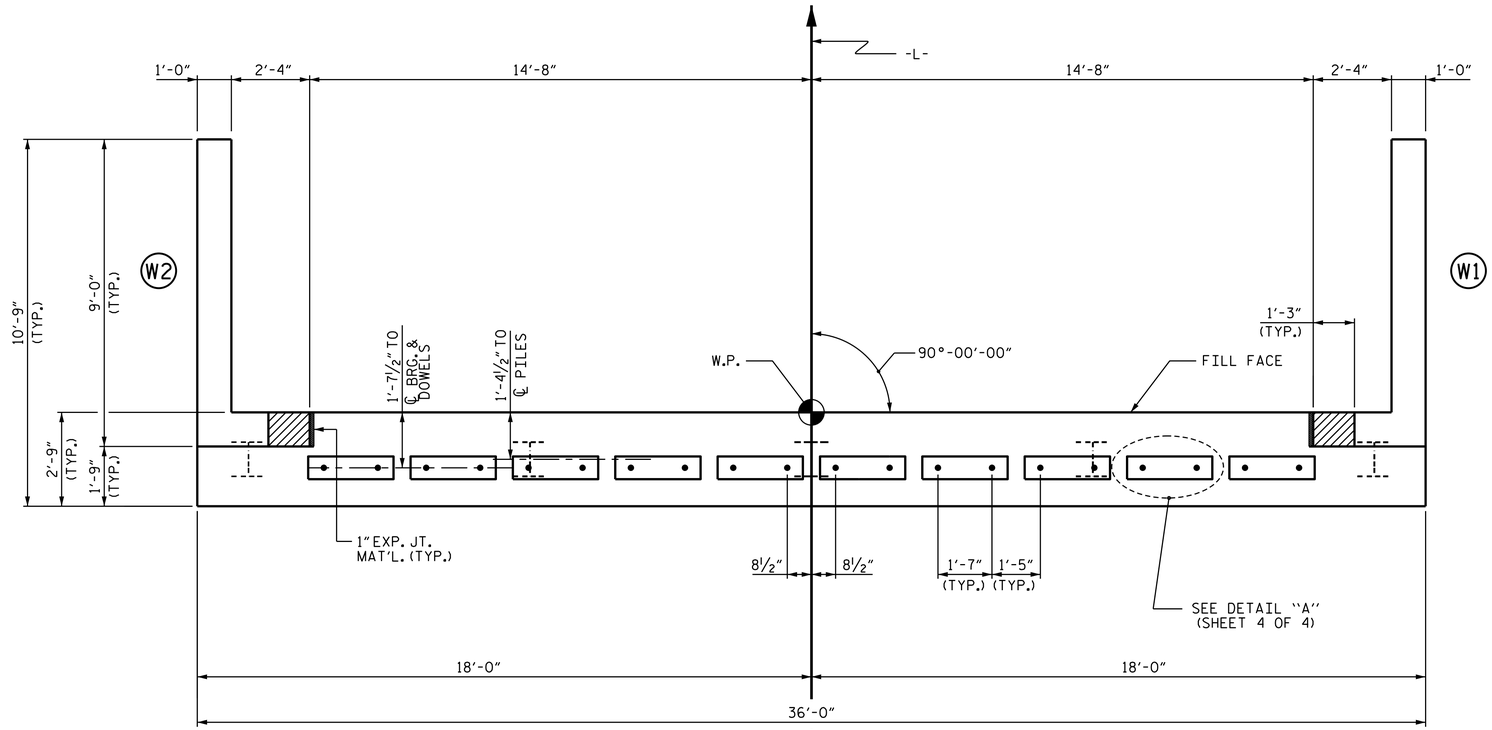
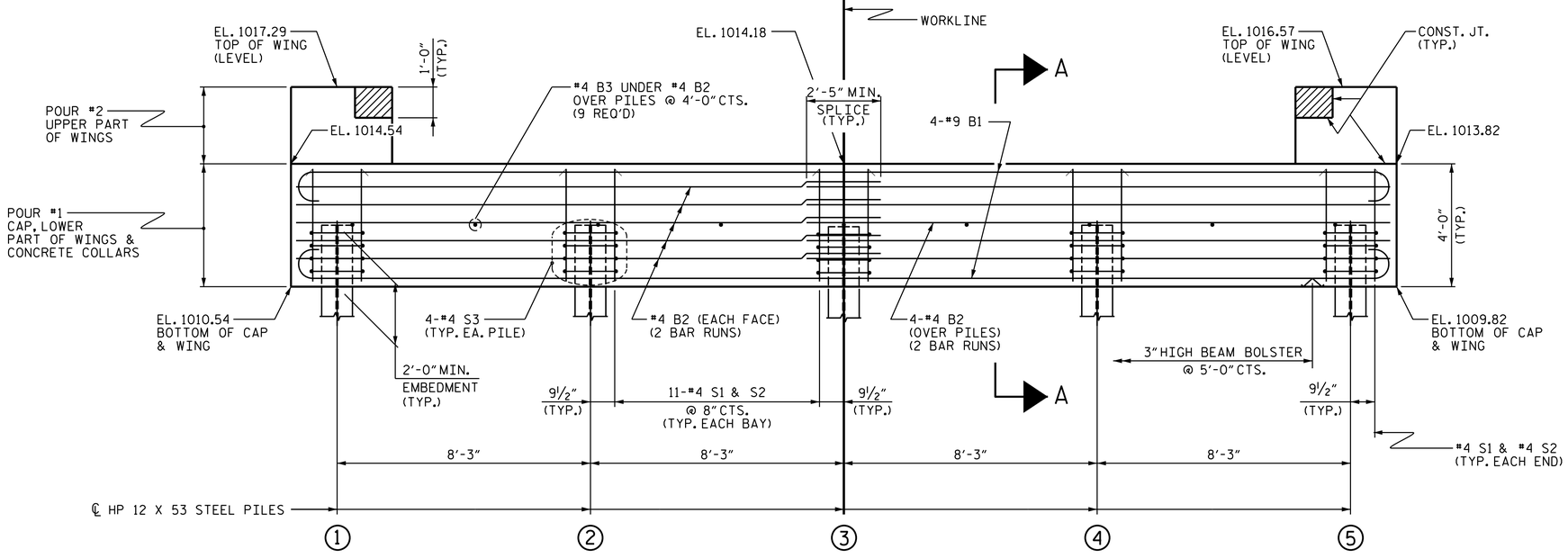
8/26/21



PLAN



ELEVATION

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.

NOTES

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

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

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR WING DETAILS, SEE SHEET 3 OF 4.

TOP OF PILE ELEVATIONS	
1	1012.51
2	1012.34
3	1012.18
4	1012.01
5	1011.85

PROJECT NO. BP11.R024.1
WILKES COUNTY
STATION: 12+43.88 -L-
SHEET 2 OF 4

ASSEMBLED BY : D.D. LOWERY	DATE : 10/2024
CHECKED BY : R.M. KROL	DATE : 10/2024
DRAWN BY : WJH 12/11	REV. 4/15 MAA/TMG
CHECKED BY : AAC 12/11	

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NORTH CAROLINA Licensed Professional Engineer
SEAL 040769
ENGINEER
ANDREW L. PHILLIPS
2/20/2025

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END BENT No. 2

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			14

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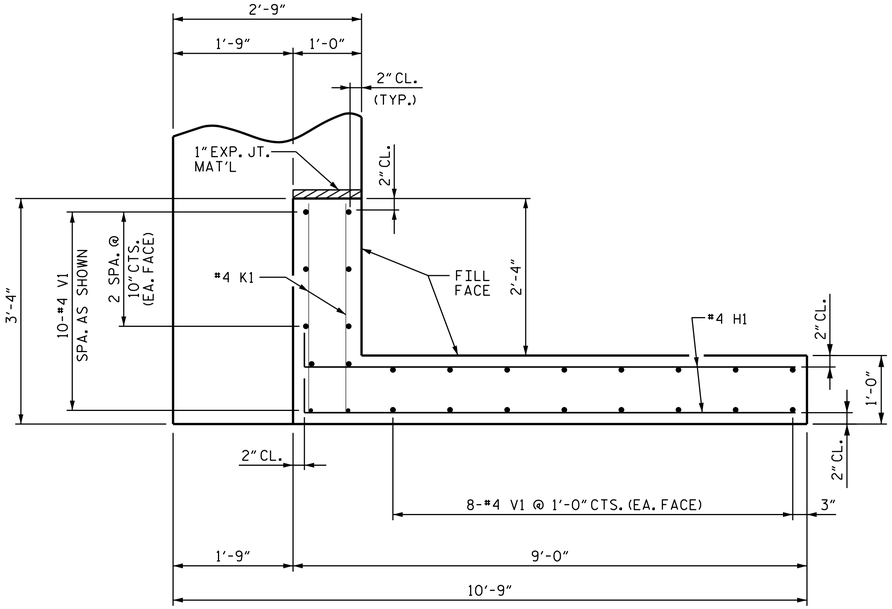
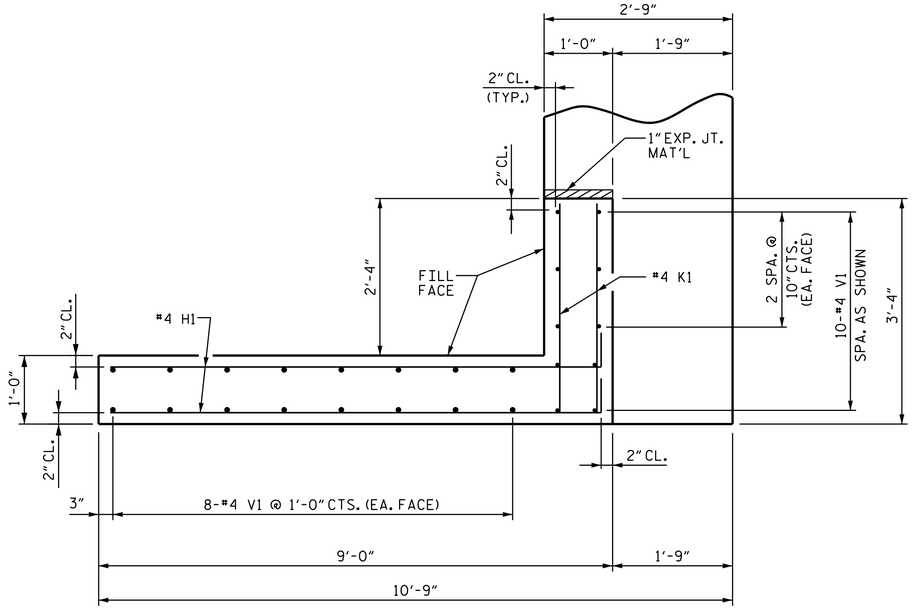
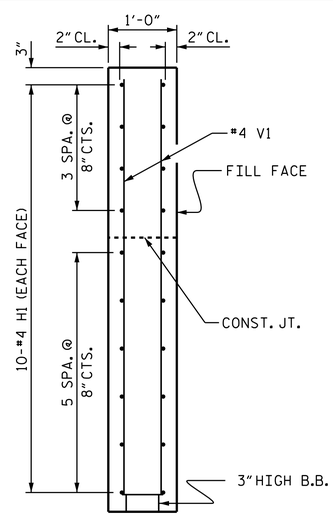


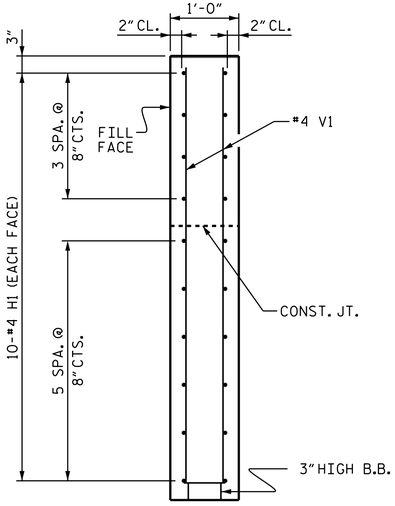
PLAN OF WING (W1)



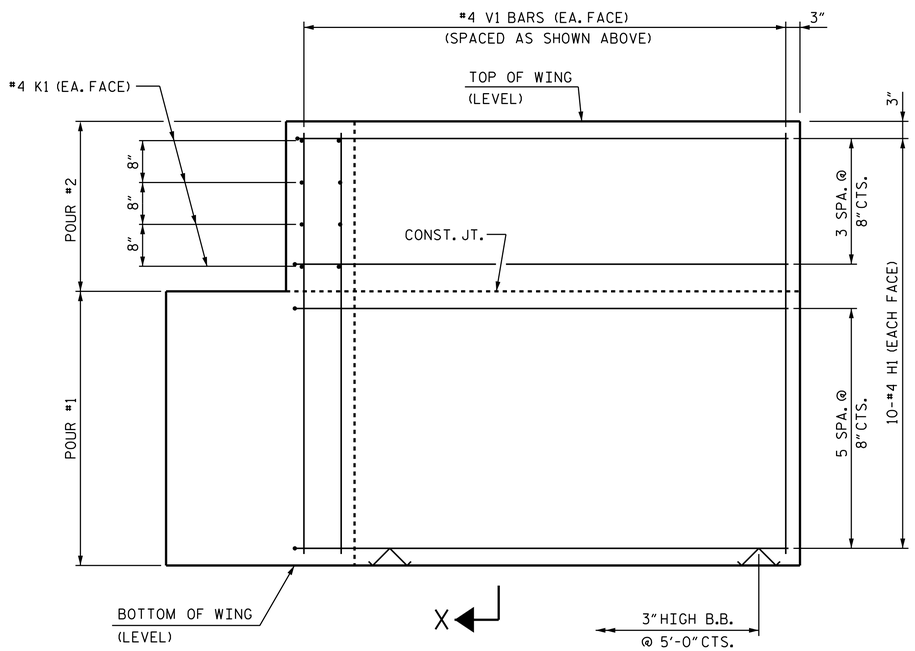
PLAN OF WING (W2)



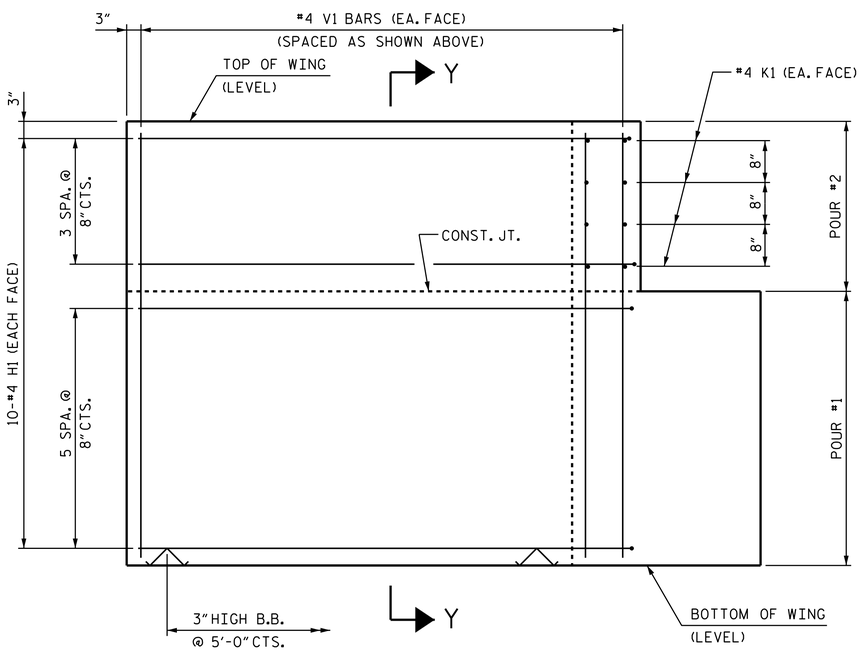
SECTION X-X



SECTION Y-Y



ELEVATION OF WING (W1)



ELEVATION OF WING (W2)

WING DETAILS

ASSEMBLED BY : D.D. LOWERY		DATE : 10/2024	
CHECKED BY : R.M. KROL		DATE : 10/2024	
DRAWN BY : WJH 12/11	REV. 4/15		MAA/TMG
CHECKED BY : AAC 12/11			

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NORTH CAROLINA — Registered Professional Engineer — SEAL 040789 — ENGINEER — ANDREW L. PHILLIPS — 2/20/2025

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PROJECT NO. BP11.R024.1
WILKES COUNTY
STATION: 12+43.88 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

END BENT
WING DETAILS

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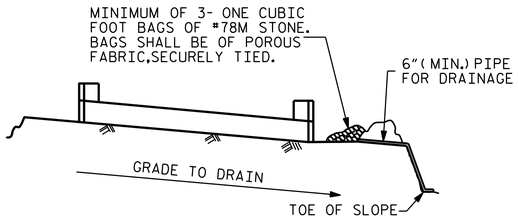
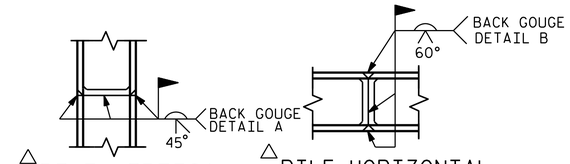


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

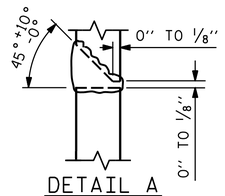
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

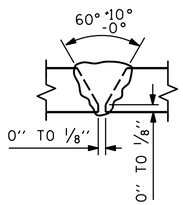


△ PILE VERTICAL

△ PILE HORIZONTAL OR VERTICAL



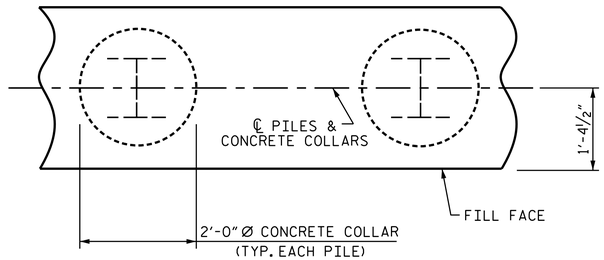
DETAIL A



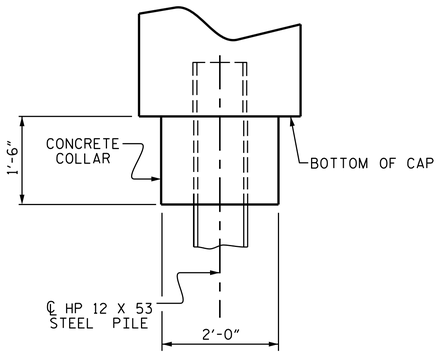
DETAIL B

△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



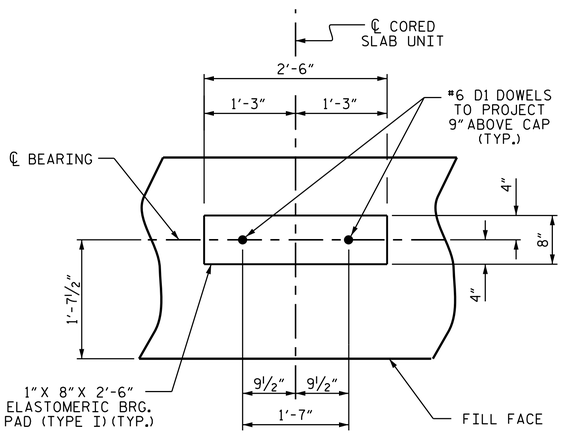
PLAN



ELEVATION

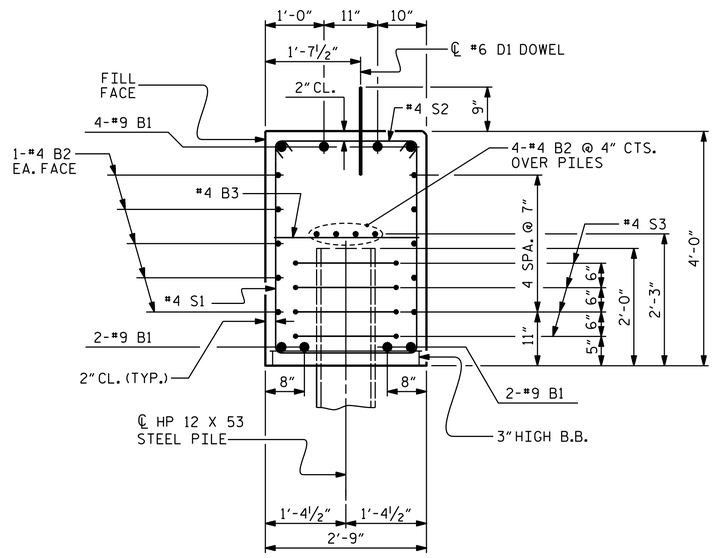
CORROSION PROTECTION FOR STEEL PILES DETAIL

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



DETAIL "A"

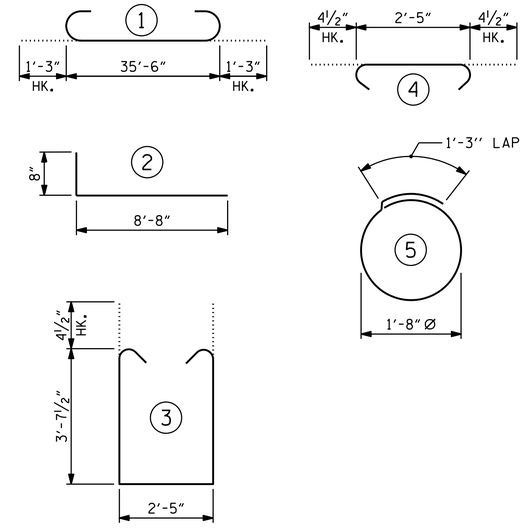
(END BENT No. 1 SHOWN, END BENT No. 2 SIMILAR BY ROTATION)



SECTION A-A

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL FOR ONE END BENT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#9	1	38'-0"	1034
B2	28	#4	STR	19'-1"	357
B3	9	#4	STR	2'-5"	15
D1	20	#6	STR	1'-6"	45
H1	40	#4	2	9'-4"	249
K1	16	#4	STR	2'-11"	31
S1	46	#4	3	10'-5"	320
S2	46	#4	4	3'-2"	97
S3	20	#4	5	6'-6"	87
V1	52	#4	STR	6'-5"	223

REINFORCING STEEL (FOR ONE END BENT) 2458 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 17.9 C.Y.

POUR #2 UPPER PART OF WINGS 2.3 C.Y.

TOTAL CLASS A CONCRETE 20.2 C.Y.

PROJECT NO. BP11.R024.1

WILKES COUNTY

STATION: 12+43.88 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT No. 1 & 2 DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L PHILLIPS
2/20/2025

Kimley»Horn
421 Fayetteville Street, Suite 600
Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			14

ASSEMBLED BY : D. D. LOWERY	DATE : 10/2024		
CHECKED BY : R. M. KROL	DATE : 10/2024		
DRAWN BY : WJH 12/11	REV. 4/17	MAA/TMG	
CHECKED BY : AAC 12/11			

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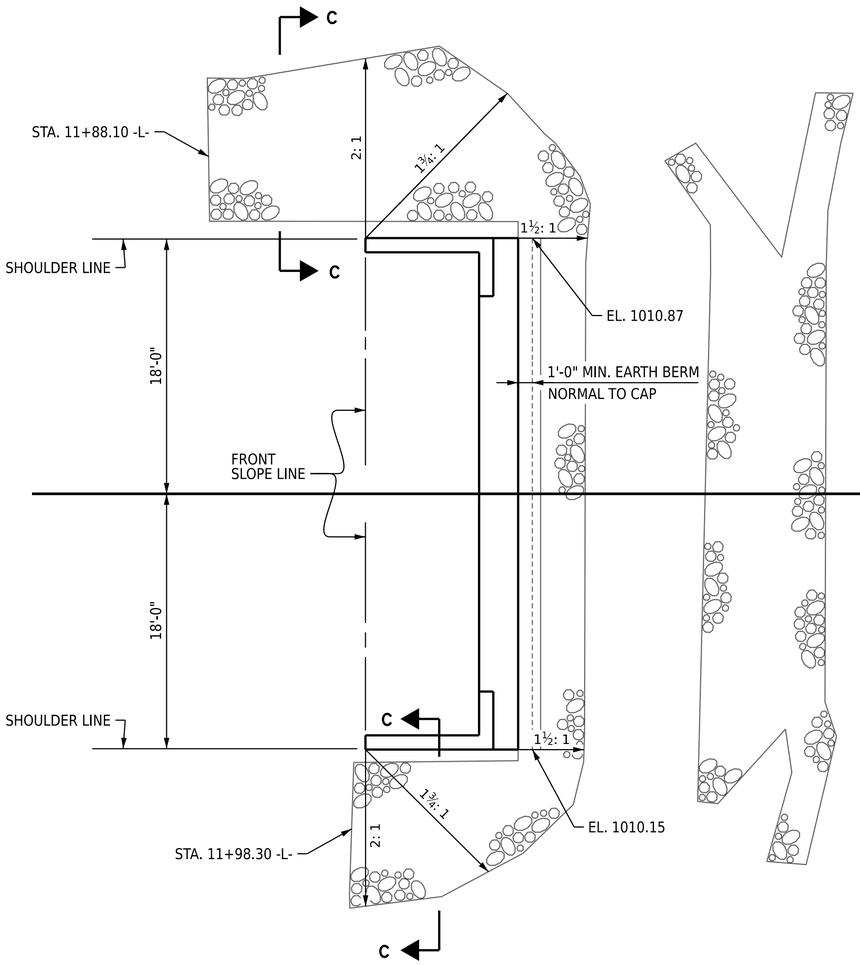
STD. NO. EB_30_90S4

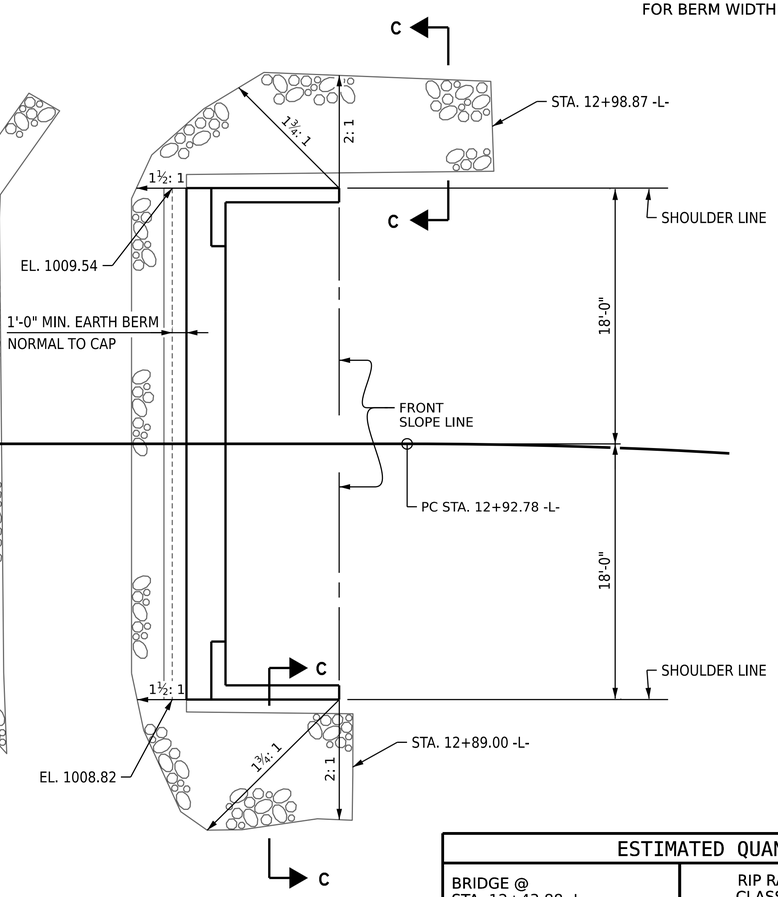
8/26/21

NOTES :

FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.



END BENT 1

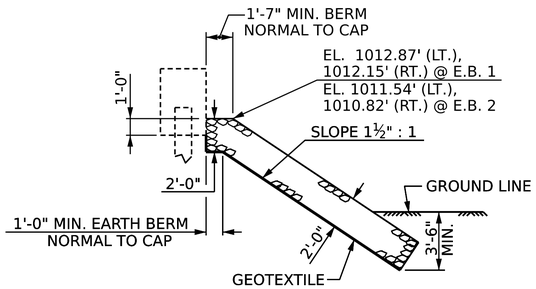


END BENT 2

-L-

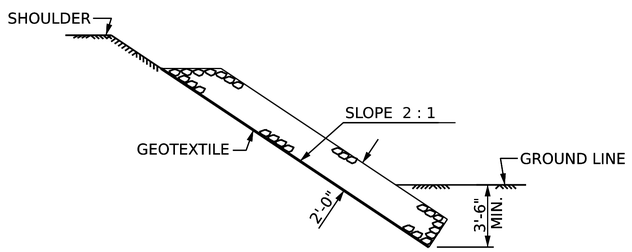
PLAN OF RIP RAP

ESTIMATED QUANTITIES		
BRIDGE @ STA. 12+43.88 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	120.0	134.0
END BENT 2	90.0	100.0



℄ SECTION

BERM RIP RAPPED



SECTION C-C

PROJECT NO. BP11.R024.1

WILKES COUNTY

STATION: 12+43.88 -L-

NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL
040789
ANDREW L. PHILLIPS
ENGINEER
2/20/2025

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

RIP RAP DETAILS

DRAWN BY : D. D. LOWERY DATE : 10/2024
CHECKED BY : R. M. KROL DATE : 10/2024
DESIGN ENGINEER OF RECORD: A. L. PHILLIPS DATE : 01/2025

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Phone (919) 677-2000
NC LICENSE # F-0102

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2			4			14

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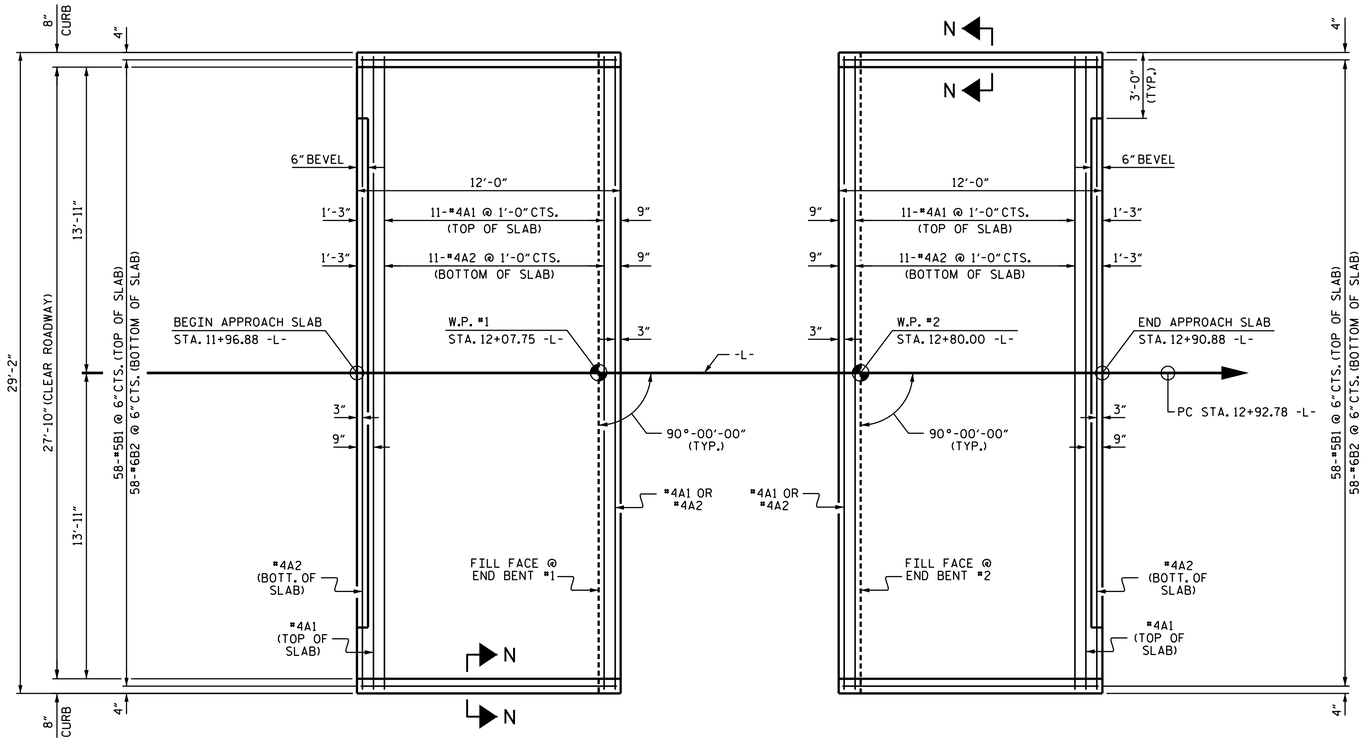
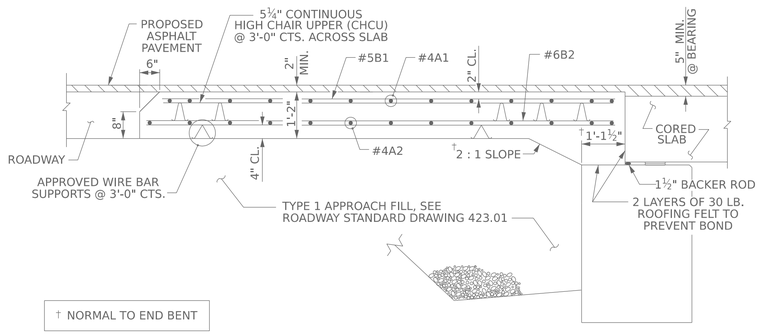


PLAN @ END BENT #1

PLAN @ END BENT #2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS



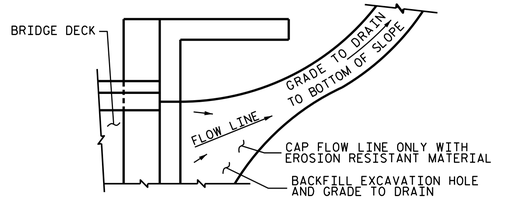
SECTION THRU SLAB

NOTES

FOR BRIDGE APPROACH FILL, SEE ROADWAY PLANS.

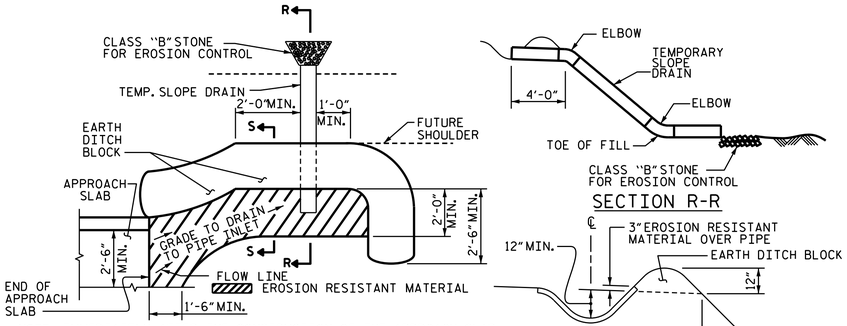
AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.

APPROACH SLAB GROOVING IS NOT REQUIRED.



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.

TEMPORARY DRAINAGE DETAIL



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 GUTTER IS REQUIRED)

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	13	#4	STR	28'-10"	250
A2	13	#4	STR	28'-10"	250
✱ B1	58	#5	STR	11'-2"	676
B2	58	#6	STR	11'-8"	1016
REINFORCING STEEL				LBS.	1266
✱ EPOXY COATED REINFORCING STEEL				LBS.	926
CLASS AA CONCRETE				C.Y.	17.7

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	13	#4	STR	28'-10"	250
A2	13	#4	STR	28'-10"	250
✱ B1	58	#5	STR	11'-2"	676
B2	58	#6	STR	11'-8"	1016
REINFORCING STEEL				LBS.	1266
✱ EPOXY COATED REINFORCING STEEL				LBS.	926
CLASS AA CONCRETE				C.Y.	17.7

SECTION N-N

CURB DETAILS

SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	1'-11"	1'-7"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"

PROJECT NO. BP11.R024.1

WILKES COUNTY

STATION: 12+43.88 -L-

CORED SLAB UNIT

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 040769 ANDREW L. PHILLIPS
2/20/2025

ASSEMBLED BY : D.D. LOWERY	DATE : 10/2024		
CHECKED BY : R.M. KROL	DATE : 10/2024		
DRAWN BY : SHS/MAA 5-09	REV. 12-17	MAA/THC	
CHECKED BY : BCH 5-09	REV. 08-19	BNB/THC	

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Raleigh, NC 27601-1772
Phone (919) 677-2000
NC LICENSE # F-0102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

REVISIONS						SHEET NO.
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2			4			14

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STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS	AASHTO (CURRENT)
LIVE LOAD	SEE PLANS
IMPACT ALLOWANCE	SEE AASHTO
STRESS IN EXTREME FIBER OF STRUCTURAL STEEL - AASHTO M270 GRADE 36	20,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50W	27,000 LBS. PER SQ. IN.
- AASHTO M270 GRADE 50	27,000 LBS. PER SQ. IN.
REINFORCING STEEL IN TENSION - GRADE 60	24,000 LBS. PER SQ. IN.
CONCRETE IN COMPRESSION	1,200 LBS. PER SQ. IN.
CONCRETE IN SHEAR	SEE AASHTO
STRUCTURAL TIMBER - TREATED OR UNTREATED EXTREME FIBER STRESS	1,800 LBS. PER SQ. IN.
COMPRESSION PERPENDICULAR TO GRAIN OF TIMBER	375 LBS. PER SQ. IN.
EQUIVALENT FLUID PRESSURE OF EARTH	30 LBS. PER CU. FT. (MINIMUM)

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2024 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

STEEL SHEET PILING FOR PERMANENT OR TEMPORARY APPLICATIONS SHALL BE HOT ROLLED.

CONCRETE:

UNLESS OTHERWISE REQUIRED ON PLANS, CLASS A CONCRETE SHALL BE USED FOR ALL PORTIONS OF ALL STRUCTURES WITH THE EXCEPTION THAT: CLASS AA CONCRETE SHALL BE USED IN BRIDGE SUPERSTRUCTURES, ABUTMENT BACKWALLS, AND APPROACH SLABS; AND CLASS B CONCRETE SHALL BE USED FOR SLOPE PROTECTION AND RIP RAP.

CONCRETE CHAMFERS:

UNLESS OTHERWISE NOTED ON THE PLANS, ALL EXPOSED CORNERS ON STRUCTURES SHALL BE CHAMFERED $\frac{3}{4}$" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1$\frac{1}{2}$" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A $\frac{1}{4}$" FINISHING TOOL UNLESS OTHERWISE REQUIRED ON PLANS; AND CORNERS OF EXPANSION JOINTS IN THE ROADWAY FACES AND TOPS OF CURBS AND SIDEWALKS SHALL BE ROUNDED TO A $\frac{1}{4}$" RADIUS WITH A FINISHING STONE OR TOOL UNLESS OTHERWISE REQUIRED ON PLANS.

DOWELS:

DOWELS WHEN INDICATED ON PLANS AS FOR CULVERT EXTENSIONS, SHALL BE EMBEDDED AT LEAST 12" INTO THE OLD CONCRETE AND GROUTED INTO PLACE WITH 1:2 CEMENT MORTAR.

ALLOWANCE FOR DEAD LOAD DEFLECTION, SETTLEMENT, ETC. IN CASTING SUPERSTRUCTURES:

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.

ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.

IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.

DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.

WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE $\frac{7}{8}$" ∅ SHEAR STUDS FOR THE $\frac{3}{4}$" ∅ STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - $\frac{7}{8}$" ∅ STUDS FOR 4 - $\frac{3}{4}$" ∅ STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF $\frac{7}{8}$" ∅ STUDS ALONG THE BEAM AS SHOWN FOR $\frac{3}{4}$" ∅ STUDS BASED ON THE RATIO OF 3 - $\frac{7}{8}$"∅ STUDS FOR 4 - $\frac{3}{4}$" ∅ STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".

EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST $\frac{5}{16}$" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.

WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY $\frac{1}{16}$" OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.

METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

GENERALLY, IN CASE OF DISCREPANCY, THIS STANDARD SHEET OF NOTES SHALL GOVERN OVER THE SPECIFICATIONS, BUT THE REMAINDER OF THE PLANS SHALL GOVERN OVER NOTES HEREON, AND SPECIAL PROVISIONS SHALL GOVERN OVER ALL. SEE SPECIFICATIONS ARTICLE 105-4.