TIP PROJECT: B-5318

CONTRACT: C204554

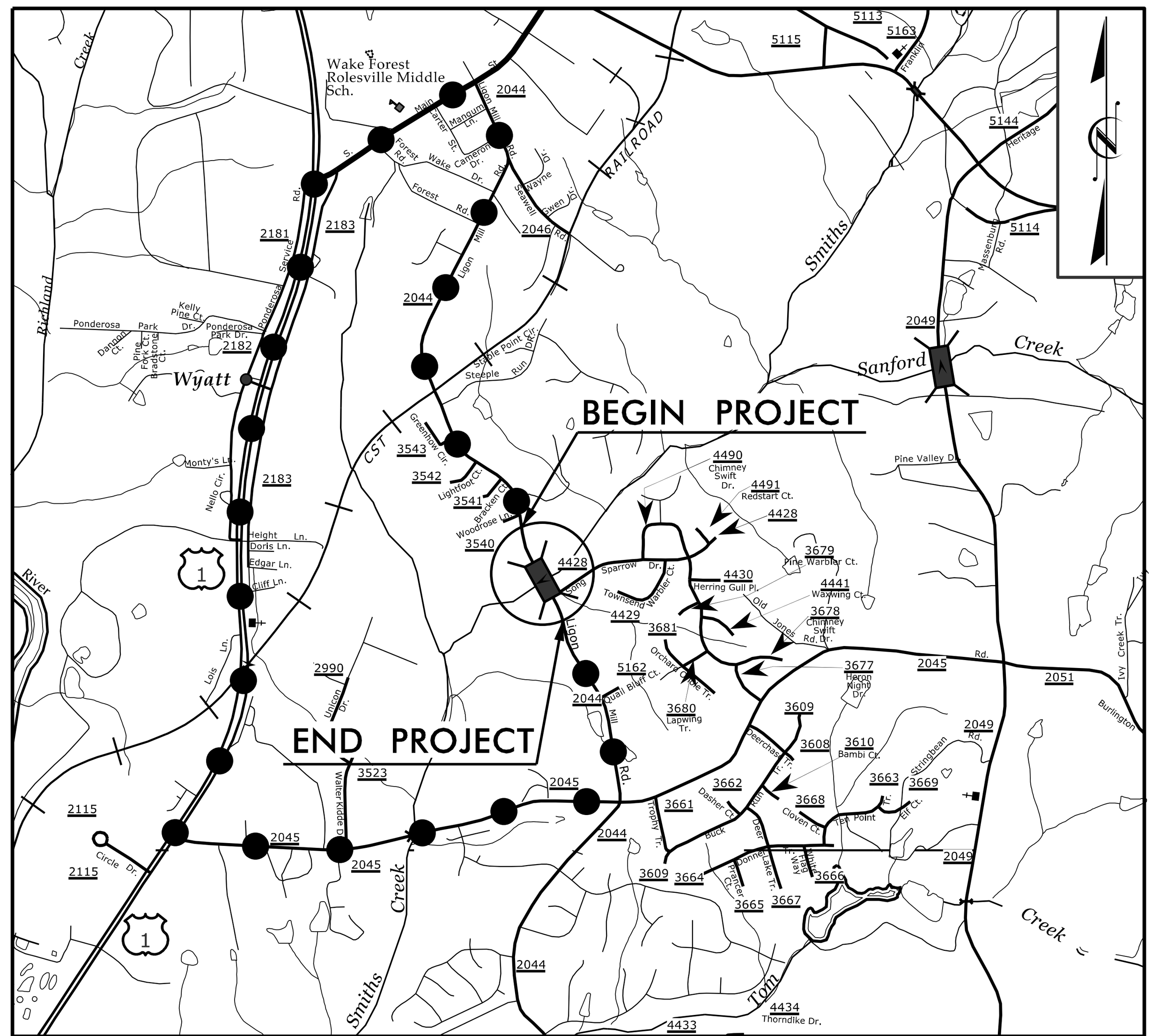
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5318	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
46032.1.1	BRZ-2044(4)	P.E.	
46032.2.1		R/W	
46032.2.2		UTILITIES	
46032.3.2	BRZ-2044(4)	CONST.	

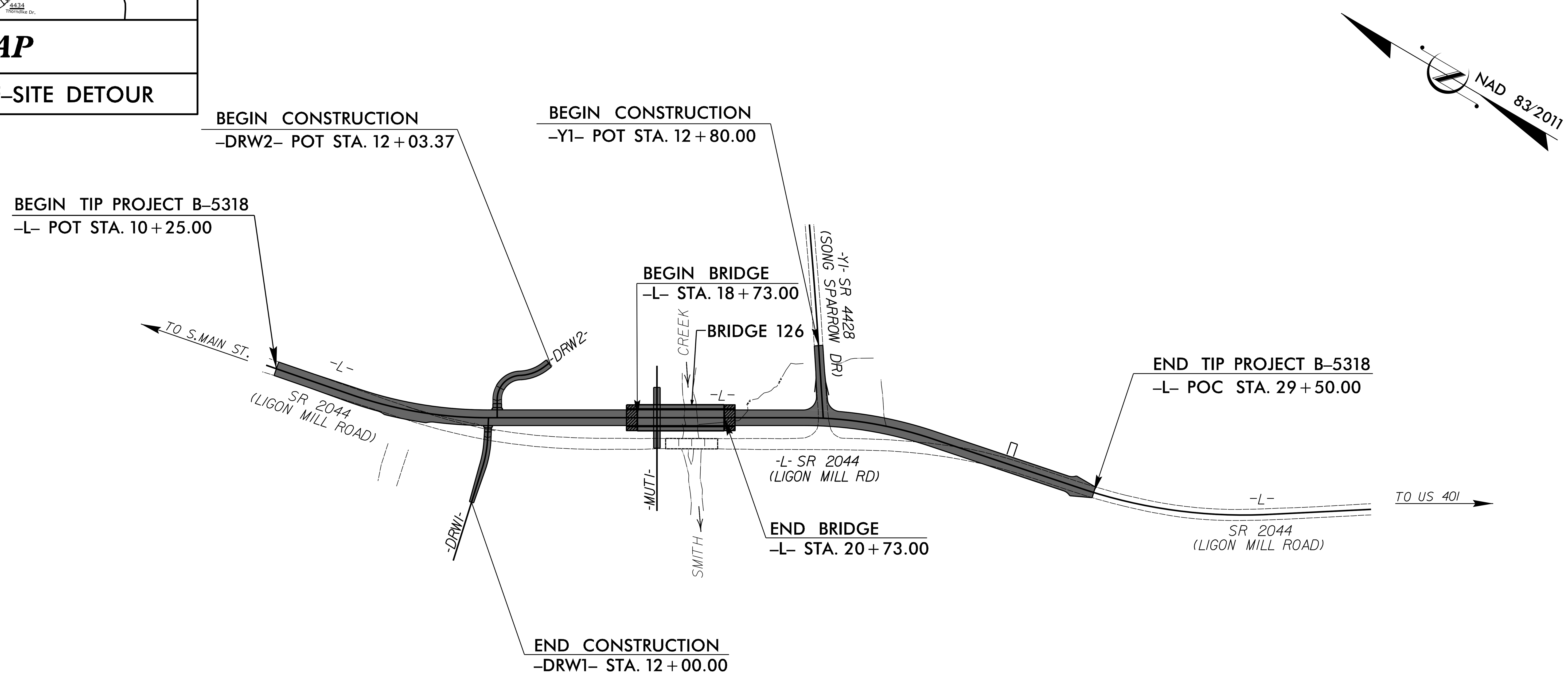
LOCATION: REPLACE BRIDGE #126 OVER SMITH CREEK ON SR 2044 (LIGON MILL ROAD) IN WAKE FOREST

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURE



VICINITY MAP

●—●—●—● DENOTES OFF-SITE DETOUR



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2022 = 9,070
ADT 2042 = 12,770
K = 10 %
D = 55 %
T = 2 % *
V = 50 MPH
* TTST = 1 DUAL 3
FUNC CLASS = MAJOR COLLECTOR

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-5318	=	0.327 MILES
LENGTH STRUCTURE TIP PROJECT B-5318	=	0.038 MILES
TOTAL LENGTH TIP PROJECT B-5318	=	0.365 MILES

PLANS PREPARED FOR NCDOT BY:

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 21, 2019

LETTING DATE: NOVEMBER 15, 2022

ZACHARY BROWN, P.E.
STRUCTURE DESIGN ENGINEER

NCDOT CONTACT: LISA BULLARD-GILCHRIST, EI

STRUCTURE DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ZACHARY BROWN
DocuSigned by: Zachary Brown
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GRADE DATA -L-

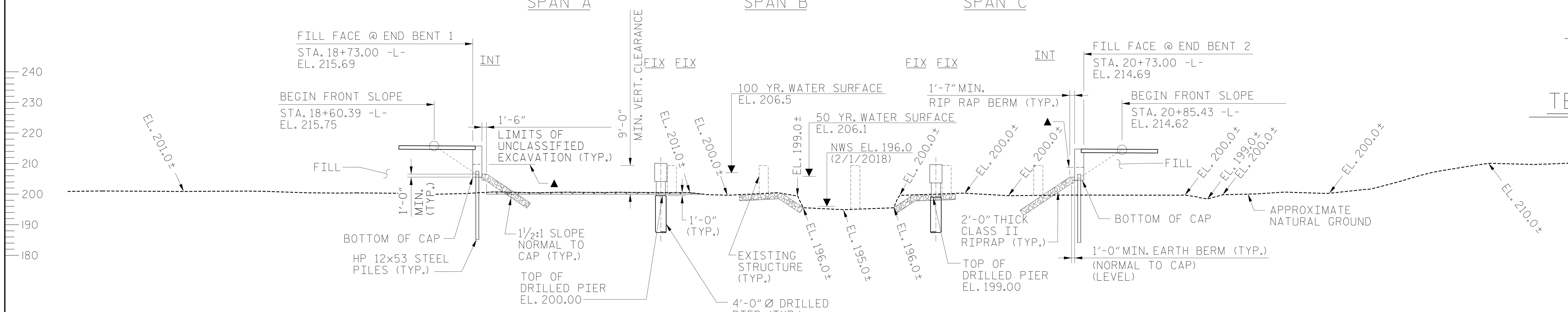
(-)6.500% (-)0.500%

P.I. STA. = 13+20.00
ELEV. = 218.45'
VC = 385'

GRADE DATA -L-

(-)0.500% (+)5.955%

P.I. STA. = 24+60.00
ELEV. = 212.75'
VC = 415'



INTEGRAL END BENT 1

▲ LOW CHORD EL. @ END BENT 1 209.66

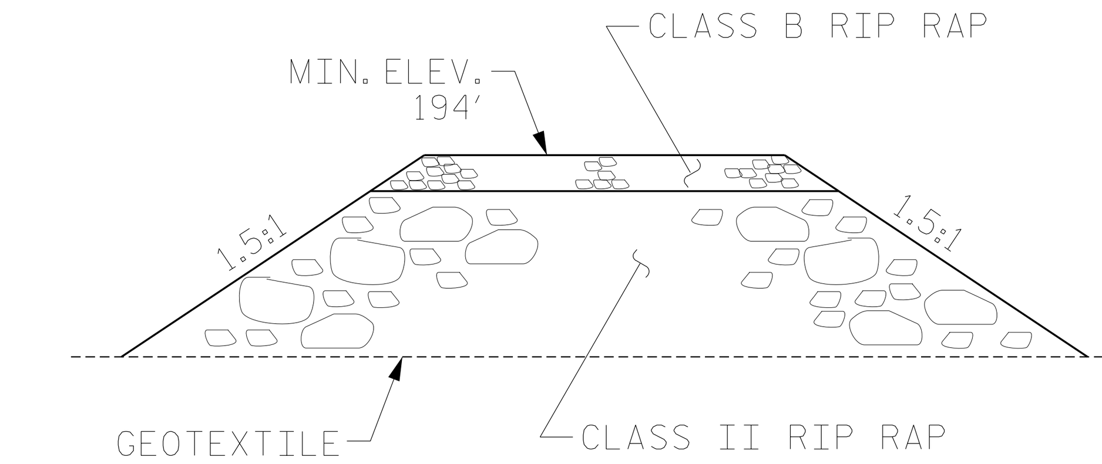
BENT 1

BENT 2

INTEGRAL END BENT 2

▲ LOW CHORD EL. @ END BENT 2 208.69

SECTION ALONG -L-



TEMPORARY CAUSEWAY DETAIL

HYDRAULIC DATA

DESIGN DISCHARGE	= 5,370 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YR.
DESIGN HIGH WATER ELEVATION	= 206.1
DRAINAGE AREA	= 21.4 SQ.MI.
BASE DISCHARGE (Q100)	= 5,970 CFS
BASE HIGH WATER ELEVATION	= 206.5

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 30,400 CFS
FREQUENCY OF OVERTOPPING FLOOD	= +500 YR.
OVERTOPPING FLOOD ELEVATION	= 217.0

KEY

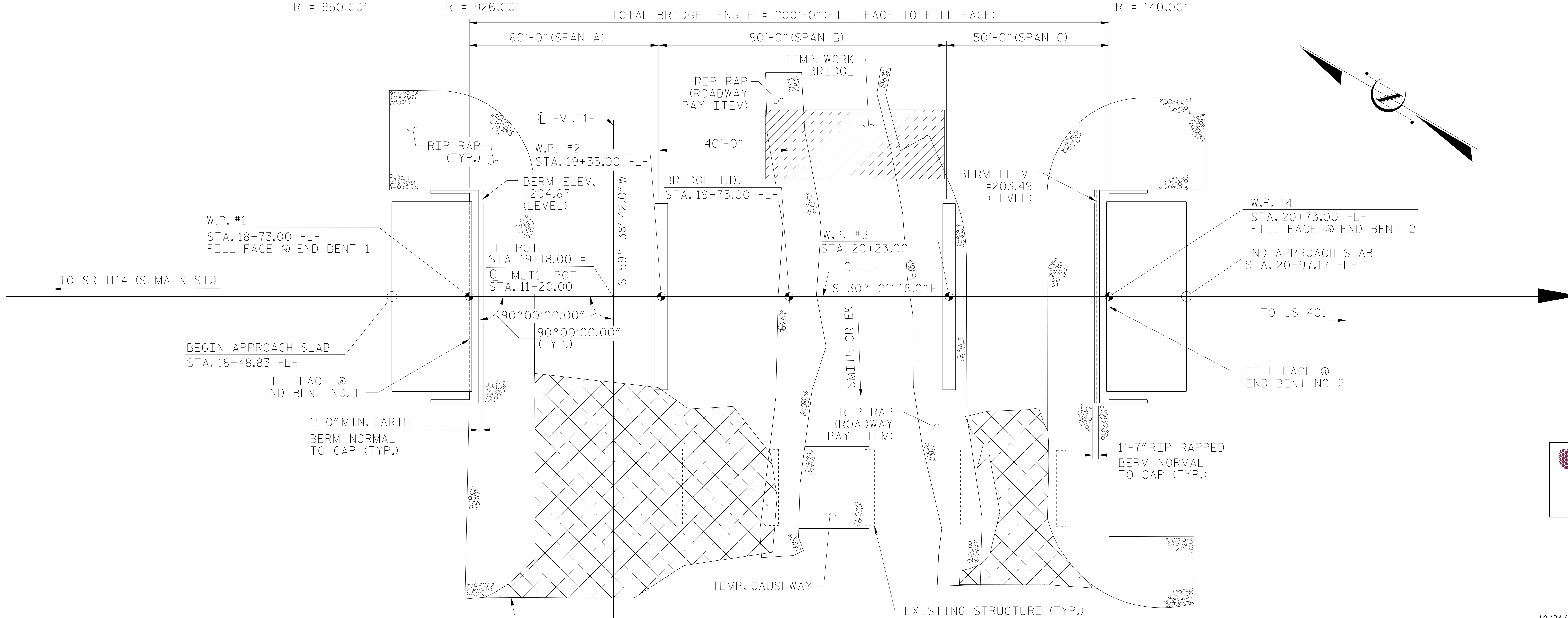
UNCLASSIFIED STRUCTURE EXCAVATION

CURVE DATA -L-

P.I. STA. = 13+71.03	P.I. STA. = 24+07.43
Δ = 19°03'10.3" (LT.)	Δ = 18°28'01.3" (RT.)
D = 6°01'52.1"	D = 6°11'14.8"
L = 315.91'	L = 298.46'
T = 159.43'	T = 150.54'
R = 950.00'	R = 926.00'

CURVE DATA -MUT1-

P.I. STA. = 9+71.28
Δ = 22°25'55.1" (RT.)
D = 40°55'32.0"
L = 54.81'
T = 27.76'
R = 140.00'



PLAN

(PILES NOT SHOWN FOR CLARITY)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 910126

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 2044 OVER SMITH CREEK BETWEEN SR 1114 AND US 401

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ZACHARY BROWN
DocuSigned by: Zachary Brown
10/24/2022

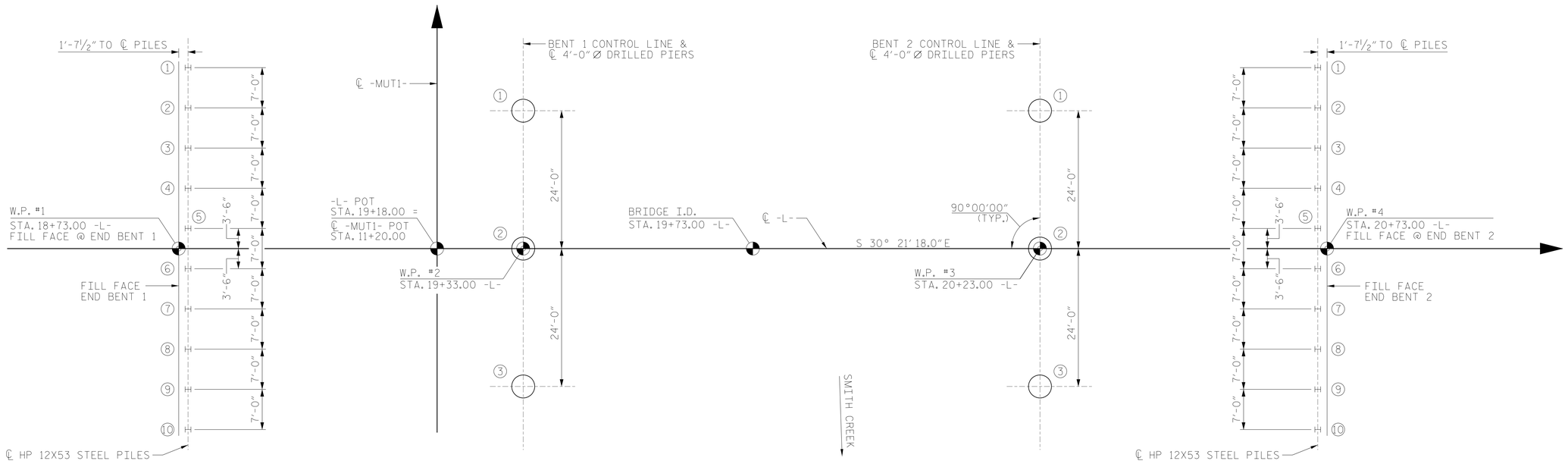
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY :	E. JONES	DATE :	JUNE 21			
CHECKED BY :	P. O'NEILL	DATE :	JUNE 21			
DESIGN ENGINEER OF RECORD:	Z. BROWN	DATE :	JUNE 21			

REVISIONS

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

SHEET NO. S-1
TOTAL SHEETS 41



INTEGRAL END BENT 1 | BENT 1 | BENT 2 | INTEGRAL END BENT 2

FOUNDATION LAYOUT

(DIMENSION LOCATING PILES ARE SHOWN TO THE CENTERLINE OF PILES AT BOTTOM OF CAP)

FOUNDATION NOTES:

FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

DO NOT DEWATER DRILLED PIER EXCAVATIONS AT BENT NO. 1 OR BENT NO. 2. CLEAN THE BOTTOM OF THE EXCAVATIONS WITH A SUBMERSIBLE PUMP OR AN AIRLIFT. WET PLACEMENT OF CONCRETE IS REQUIRED.

SLURRY CONSTRUCTION IS REQUIRED FOR DRILLED PIERS AT BENT NO. 1 AND BENT NO. 2.

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

THE USE OF A LOW OVERHEAD PILE DRIVING SYSTEM USING A HYDRAULIC HAMMER, SUCH AS APE 6-2 OR EQUIVALENT, AND SPLICED PILE SECTIONS IS REQUIRED AT END BENT NO. 2 TO AVOID CONFLICTS WITH OVERHEAD HIGH VOLTAGE LINES DURING PILE DRIVING. THIS RECOMMENDED PILE HAMMER DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTCILE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 2 OF 3

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. P-0929

NORTH CAROLINA PROFESSIONAL SEAL 046785 ENGINEER ZACHARY BROWN
Docusigned by: Zachary Brown 631BBD869053484...
9/16/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 2044
OVER SMITH CREEK
BETWEEN SR 1114 AND US 401

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
P:\50084265\50084274 B5318 PH2\CAD\Civil\B5318\Structures\PLANS\FinalPlans\401_003_B5318_SMU_GD02_002_910126.dgn
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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")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Lenth per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1, Piles 1-10	110	207.51	40			150							
End Bent 2, Piles 1-10	110	206.51	30			150							

*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.

$$^{**}RDR = \frac{Factored\ Resistance + Factored\ Downdrag\ Load + Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Downdrag\ Resistance + \frac{Nominal\ Scour\ Resistance}{Scour\ Resistance\ Factor}$$

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 TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1, Piles 1-10	110			0.75			1.00
End Bent 2, Piles 1-10	110			0.75			1.00

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

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #-# (e.g., "Bent 1, Piers 1-3")	Factored Resistance per Pier TONS	Minimum Pier Tip (Tip No Higher Than) Elevation FT	Required Tip Resistance per Pier TSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier Lin FT	Drilled Pier Length per Pier Lin FT	Drilled Pier Length Not In Soil per Pier Lin FT	Drilled Pier Length In Soil per Pier Lin FT	Permanent Steel Casing Required? YES or MAYBE	Permanent Steel Casing Tip Elevation (Elev Not To Extend Casing Below) FT	Permanent Steel Casing Length* per Pier Lin FT
Bent 1, Piers 1-3	675	145.0	25	180	0.0	55.0	7.0	48.0			
Bent 2, Piers 1-3	675	155.0	20	181	0.0	44.0	11.0	33.0			

*Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation.

SUMMARY OF PDA/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Pile Driving Analyzer (PDA)				Pile Order Lengths	
End Bent/ Bent No	PDA Testing Required? YES or MAYBE	PDA Test Pile Length FT	Total PDA Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or PDA
End Bent 1, Piles 1-10	MAYBE	45	2		
End Bent 2, Piles 1-10	YES	35			

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

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 Required? YES or MAYBE	Steel Pile Points			Steel Pile Tips Required? YES
		Pipe Pile Cutting Shoes Required? YES	Pipe Pile Conical Points Required? YES	H-Pile Points Required? YES	
End Bent 1, Piles 1-10				YES	
End Bent 2, Piles 1-10				YES	
TOTAL QTY:				20	

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #-# (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) Required? YES or MAYBE	Crosshole Sonic Logging (CSL) Required?* YES or MAYBE	Total CSL Tube Length (For All Tubes) per Pier Lin FT	Shaft Inspection Device (SID) Required? YES or MAYBE	Pile Integrity Test (PIT) Required? MAYBE
Bent 1, Piers 1-3	YES	MAYBE	226	YES	
Bent 2, Piers 1-3	YES	MAYBE	182	YES	
TOTAL QTY:		3	1224	6	

*CSL Tubes are required if CSL Testing is or may be required. The number of CSL Tubes per drilled pier is equal to one tube per foot of design pier diameter with at least 4 tubes per pier. The length of each CSL Tube is equal to the drilled pier length plus 1.5 ft.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73

NOTES:

1. The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Jacob Wessell, P.E., NC PE 030395) on 08-10-2021.
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 will determine the need for CSL Testing when these items may be required.

NORTH CAROLINA PROFESSIONAL SEAL 046785 ENGINEER ZACHARY BROWN

DocuSigned by: Zachary Brown 10/26/2022

SIGNATURE DATE

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE AND DRILLED PIER FOUNDATION TABLES

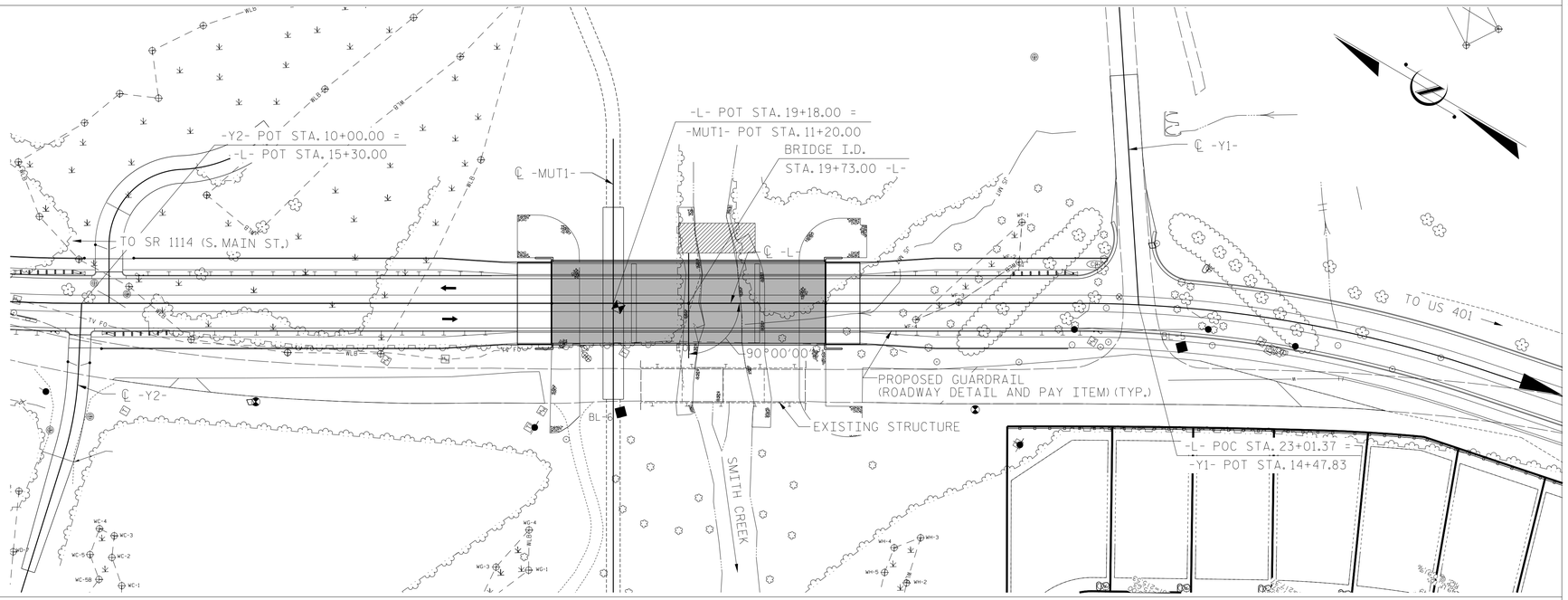
REVISIONS

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

SHEET NO. S-3

TOTAL SHEETS 41

BENCH MARK: BM#2 - R/R SPIKE SET IN 11"GUM TREE, STATION 14+65.00, 76' LEFT
N 793495 E 2139827, ELEV. = 201.04', NAVD 1988



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF 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 CONTRACTOR SHALL PROVIDE INDEPENDANT ASSURANCE SAMPLES OF REINFORCING STEEL AS FOLLOWS: FOR PROJECTS REQUIRING UP TO 400 TONS OF REINFORCING STEEL, ONE 30 INCH SAMPLE OF EACH SIZE BAR USED, AND FOR PROJECTS REQUIRING OVER 400 TONS OF REINFORCING STEEL, TWO 30 INCH SAMPLES OF EACH SIZE BAR USED. THE SAMPLE BARS SHOULD COME FROM STEEL ACTUALLY USED IN THE PROJECT AND THE SAMPLE BARS SHOULD BE REPLACED BY SPLICED BARS AS SPECIFIED IN THE SAMPLE BAR REPLACEMENT CHART. PAYMENT FOR THE SAMPLE BARS AND REPLACEMENT REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO VARIOUS PAY ITEMS.

REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 19+73.00 -L-.

NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEER.

THE CLASS AA CONCRETE IN THE BRIDGE DECK SHALL CONTAIN FLY ASH OR GROUND GRANULATED BLAST FURNACE SLAG AT THE SUBSTITUTION RATE SPECIFIED IN ARTICLE 1024-1 AND IN ACCORDANCE WITH ARTICLES 1024-5 AND 1024-6 OF THE STANDARD SPECIFICATIONS. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE COST OF THE REINFORCED CONCRETE DECK SLAB.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 94 FT RIGHT OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

THE EXISTING STRUCTURE CONSISTING OF STEEL GIRDERS, 4 SPANS, 121 FT LONG; 24 FT WIDE REINFORCED CONCRETE DECK; ON CAST-IN-PLACE CONCRETE END BENTS AND INTERIOR BENTS SHALL BE COMPLETELY REMOVED. ALL ABANDONED REMNANT TIMBER PILES IN THE STREAM NEAR THE SOUTH BANK SHALL BE REMOVED OR CUT OFF 1 FT BELOW THE MUDLINE. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPILICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR REMOVAL OF EXISTING STRUCTURE AT STATION 19+73.00 -L-.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE, & REMOVAL OF TEMP ACCESS AT STA 19+73.00 -L-	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	4'-0" DIA. DRILLED PIERS IN SOIL	4'-0" DIA. DRILLED PIERS NOT IN SOIL	PDA TESTING	SID INSPECTIONS	SPT TESTING	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS
	LUMP SUM	LUMP SUM	LUMP SUM	CY	CY	EA	EA	EA	EA	LUMP SUM	SF	SF	CY	LUMP SUM
SUPERSTRUCTURE											12,016	9,116		LUMP SUM
END BENT 1													45.9	
BENT 1				144.0	21.0								47.9	
BENT 2				99.0	33.0								48.3	
END BENT 2													45.9	
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	243.0	54.0	1	1	1	1	LUMP SUM	12,016	9,116	188.0	LUMP SUM

	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12X53	HP 12X53 STEEL PILES		STEEL PILE POINTS	TWO BAR METAL RAIL	VERTICAL CONCRETE BARRIER RAIL	1'-0" X 2'-6" CONCRETE PARAPET	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	LBS	LBS	NO.	LIN FT	EA	NO.	LIN FT	EA	LIN FT	LIN FT	LIN FT	TON	SY	LUMP SUM
SUPERSTRUCTURE			18	1,185					381.67	496.67	396.67			LUMP SUM
END BENT 1	7,273				10	10	400	10				418	465	
BENT 1	21,390	3,722												
BENT 2	18,600	3,098												
END BENT 2	7,273				10	10	300	10				446	495	
TOTAL	54,536	6,820	18	1,185	20	20	700	20	381.67	496.67	396.67	864	960	LUMP SUM

SAMPLE BAR REPLACEMENT

SIZE	LENGTH
#3	6'-2"
#4	7'-4"
#5	8'-6"
#6	9'-8"
#7	10'-10"
#8	12'-0"
#9	13'-2"
#10	14'-6"
#11	15'-10"

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 3 OF 3

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ENGINEER ZACHARY BROWN

DocuSigned by: Zachary Brown A31B80D8D033484...

11/9/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON SR 2044
OVER SMITH CREEK
BETWEEN SR 1114 AND US 401

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

11/8/2022
P:\50084265\50084274 B5318 PH2\CAD\Civil\B5318\Structures\PLANS\FinalPlans\401_007_B5318_SMU_GD04_004_910126.dgn
$USER$

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	(#) CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE						COMMENT NUMBER
							LIVE-LOAD FACTORS (γ_{LL})	MOMENT					SHEAR					LIVE-LOAD FACTORS (γ_{LL})	MOMENT					
								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)		DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING		HL-93 (INVENTORY)	N/A	(1)	1.17	--	1.75	0.879	1.68	B	EL	44.10	0.879	2.32	B	I	83.50	0.80	0.879	1.17	B	EL	44.10	1-3
		HL-93 (OPERATING)	N/A		2.17	--	1.35	0.879	2.17	B	EL	44.10	0.879	3.03	B	I	83.50	N/A	--	--	--	--	--	1-3
		HS-20 (INVENTORY)	36.000	(2)	1.59	57.24	1.75	0.879	2.29	B	EL	44.10	0.879	3.14	B	I	83.50	0.80	0.879	1.59	B	EL	44.10	1-3
		HS-20 (OPERATING)	36.000		2.96	106.56	1.35	0.879	2.96	B	EL	44.10	0.879	4.08	B	I	83.50	N/A	--	--	--	--	--	1-3
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.73	50.36	1.40	0.879	6.69	B	EL	44.10	0.879	8.32	A	I	46.40	0.80	0.879	3.73	B	EL	44.10	1-3
		SNGARBS2	20.000		2.72	54.40	1.40	0.879	4.88	B	EL	44.10	0.879	6.00	A	I	46.40	0.80	0.879	2.72	B	EL	44.10	1-3
		SNAGRIS2	22.000		2.55	56.10	1.40	0.879	4.58	B	EL	44.10	0.879	5.61	A	I	46.40	0.80	0.879	2.55	B	EL	44.10	1-3
		SNCOTTS3	27.250		1.86	50.69	1.40	0.879	3.35	B	EL	44.10	0.879	4.10	A	I	46.40	0.80	0.879	1.86	B	EL	44.10	1-3
		SNAGGRS4	34.925		1.53	53.44	1.40	0.879	2.74	B	EL	44.10	0.879	3.47	A	I	46.40	0.80	0.879	1.53	B	EL	44.10	1-3
		SNS5A	35.550		1.49	52.97	1.40	0.879	2.68	B	EL	44.10	0.879	3.56	A	I	46.40	0.80	0.879	1.49	B	EL	44.10	1-3
		SNS6A	39.950		1.36	54.33	1.40	0.879	2.44	B	EL	44.10	0.879	3.28	A	I	46.40	0.80	0.879	1.36	B	EL	44.10	1-3
		SNS7B	42.000		1.30	54.60	1.40	0.879	2.33	B	EL	44.10	0.879	3.27	A	I	46.40	0.80	0.879	1.30	B	EL	44.10	1-3
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.66	54.78	1.40	0.879	2.98	B	EL	44.10	0.879	3.86	A	I	46.40	0.80	0.879	1.66	B	EL	44.10	1-3
		TNT4A	33.075		1.66	54.90	1.40	0.879	2.99	B	EL	44.10	0.879	3.72	A	I	46.40	0.80	0.879	1.66	B	EL	44.10	1-3
		TNT6A	41.600		1.35	56.16	1.40	0.879	2.43	B	EL	44.10	0.879	3.55	A	I	46.40	0.80	0.879	1.35	B	EL	44.10	1-3
		TNT7A	42.000		1.35	56.70	1.40	0.879	2.43	B	EL	44.10	0.879	3.31	A	I	46.40	0.80	0.879	1.35	B	EL	44.10	1-3
		TNT7B	42.000		1.39	58.38	1.40	0.879	2.49	B	EL	44.10	0.879	3.12	A	I	46.40	0.80	0.879	1.39	B	EL	44.10	1-3
		TNAGRIT4	43.000		1.33	57.19	1.40	0.879	2.39	B	EL	44.10	0.879	3.01	A	I	46.40	0.80	0.879	1.33	B	EL	44.10	1-3
		TNAGT5A	45.000		1.26	56.70	1.40	0.879	2.26	B	EL	44.10	0.879	3.05	A	I	46.40	0.80	0.879	1.26	B	EL	44.10	1-3
		TNAGT5B	45.000	(3)	1.24	55.80	1.40	0.879	2.24	B	EL	44.10	0.879	2.85	A	I	46.40	0.80	0.879	1.24	B	EL	44.10	1-3

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. GIRDERS DESIGNED AS SIMPLE SPANS FOR FLEXURE AND SHEAR.
2. FUTURE WEARING SURFACE WAS CONSIDERED BETWEEN INTERIOR BARRIERS.
3. ADTT OF 5000 WAS ASSUMED.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

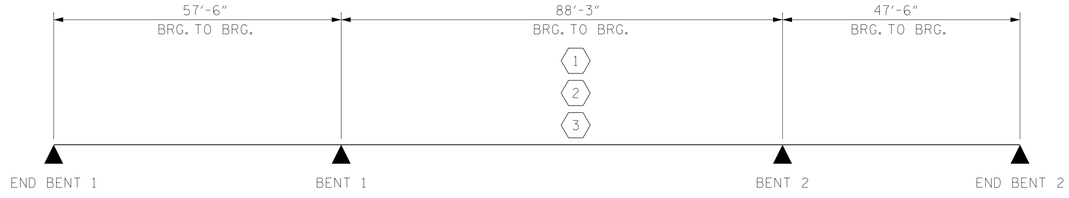
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER ZACHARY BROWN 046785

Docusigned by: Zachary Brown 43B8086900384F4...

9/16/2022

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS (NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			41

STD. NO. LRFR1

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

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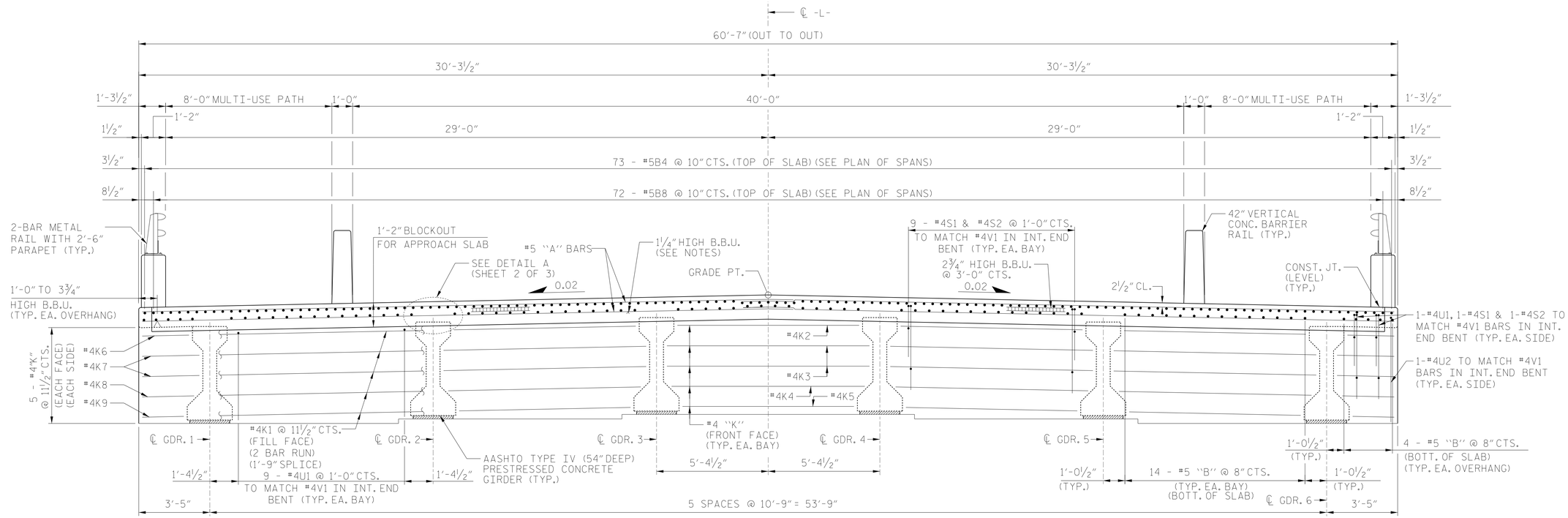
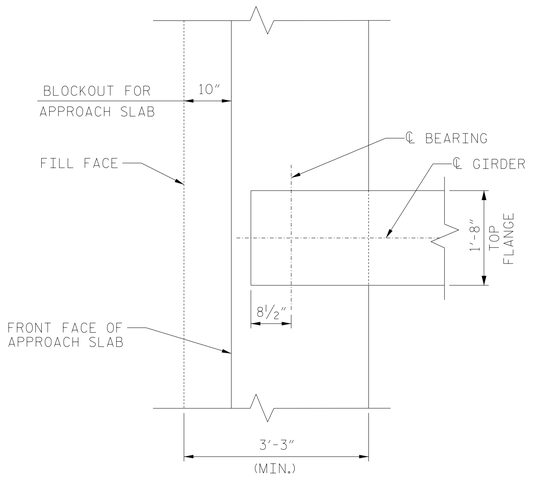
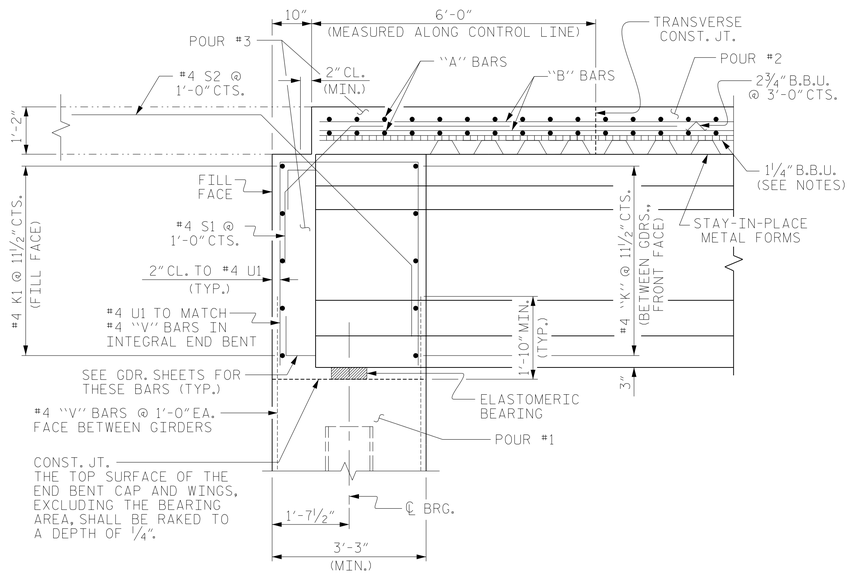


TYPICAL SECTION AT INTEGRAL END BENT



PLAN OF GIRDER AT END BENT



SECTION THRU INTEGRAL END BENT DIAPHRAGM

NOTES:

PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 1 OF 3

Dewberry
2610 WYCLIFF ROAD
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NC COA No. P-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ZACHARY BROWN
Docusigned by: Zachary Brown
9/16/2022

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-6
1			3				TOTAL SHEETS
2			4				41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

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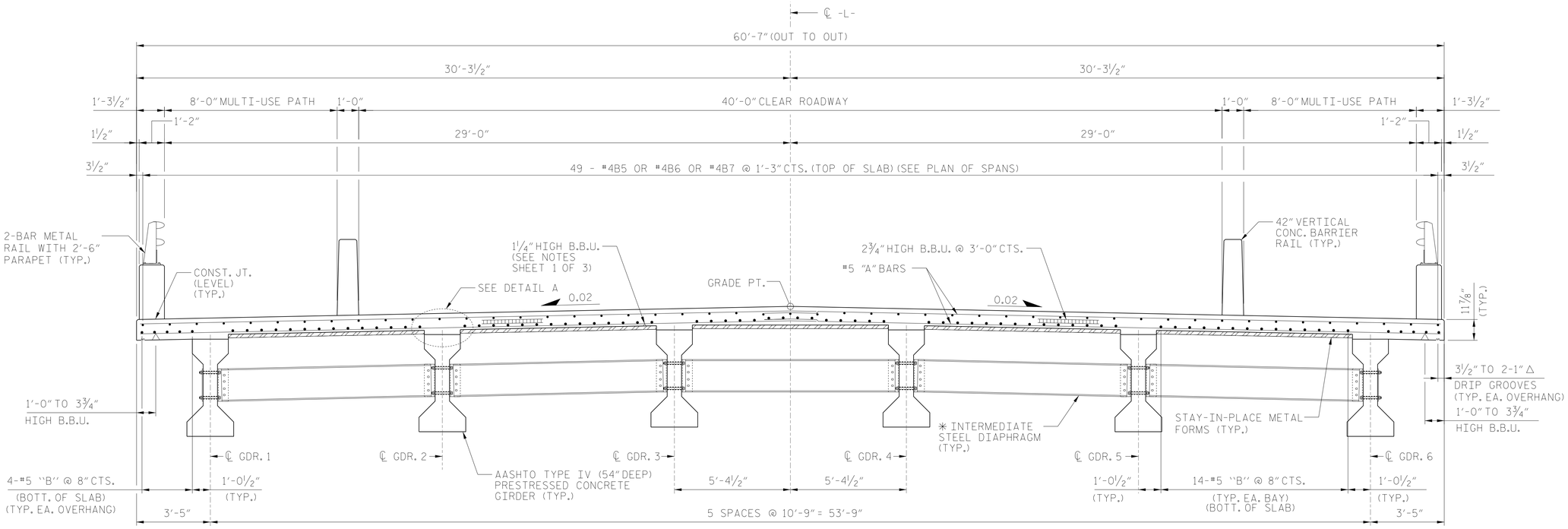
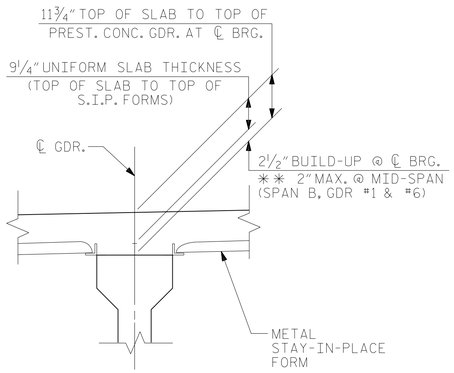


TYPICAL SECTION AT INTERMEDIATE DIAPHRAGM

∗ FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.



DETAIL A

∗∗ BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 2 OF 3

Dewberry
2610 WYCLIFF ROAD
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PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL SEAL 046785 ENGINEER ZACHARY BROWN

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9/16/2022

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RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

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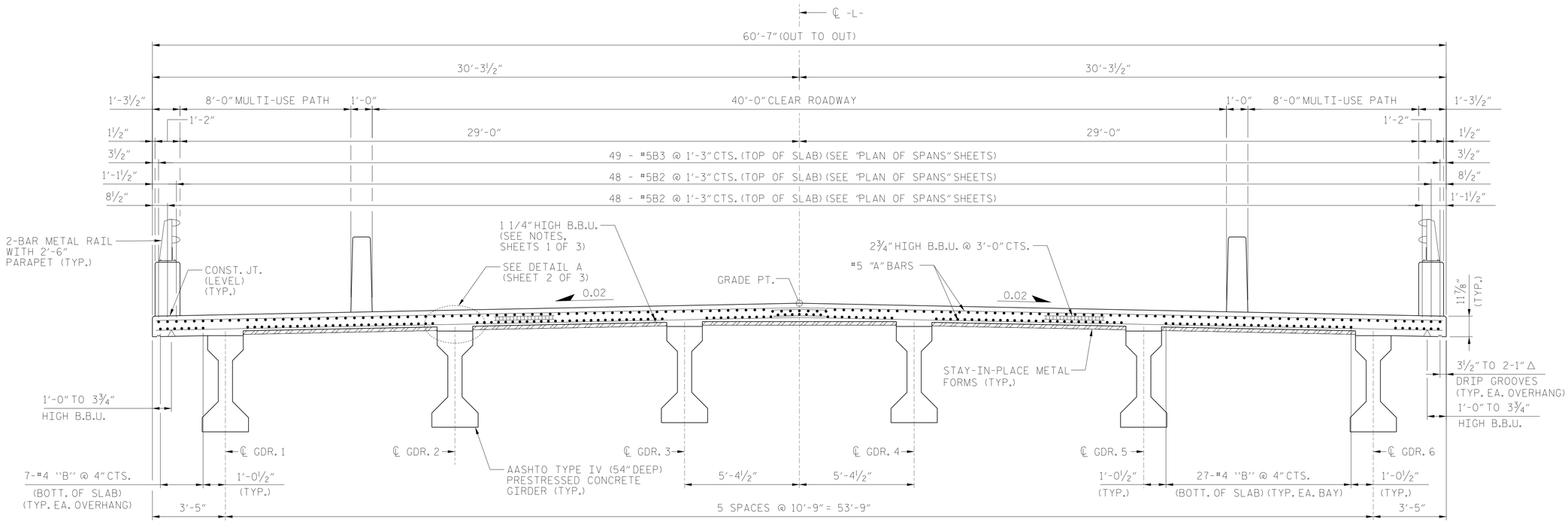
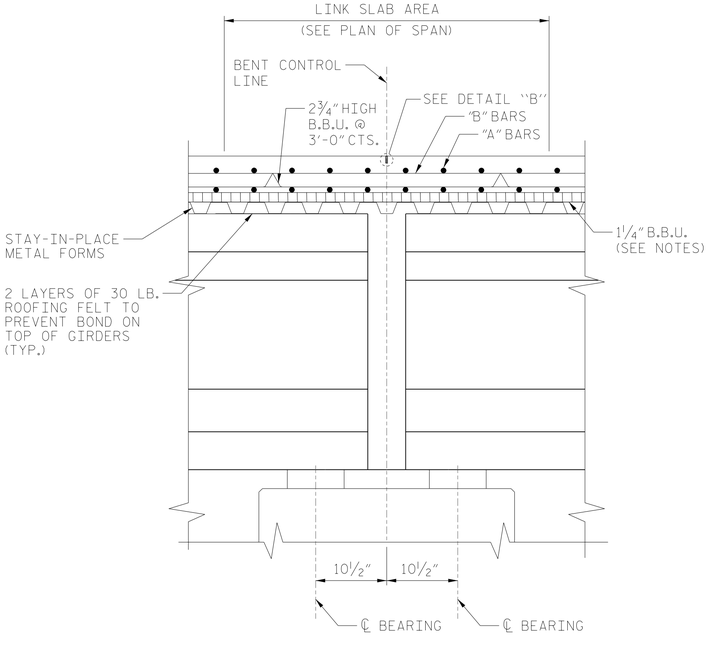
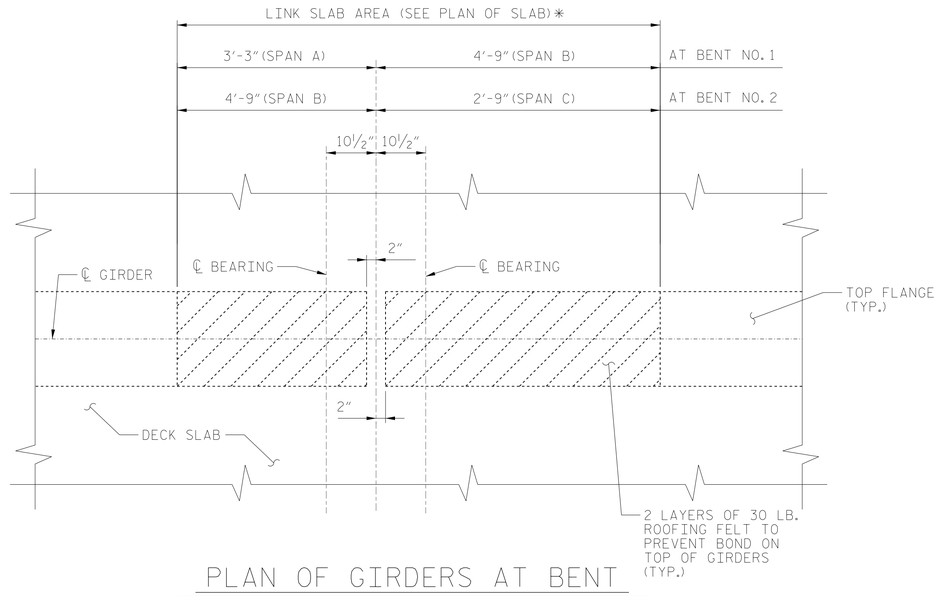


TYPICAL SECTION AT LINK SLAB

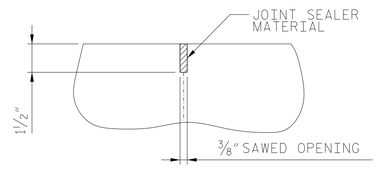


PLAN OF GIRDERS AT BENT



PLAN OF GIRDERS AT BENT

* THE TOP OF GIRDER IN THE REGION OF THE LINK SLAB SHALL BE SMOOTH (NOT RAKED) AND FREE OF STIRRUPS/STUDS, ANCHOR STUDS, DECK FORMWORK ATTACHMENTS, AND OVERHANG FALSEWORK/FORMWORK ATTACHMENTS.



DETAIL B

A 1½" DEEP, ⅜" WIDE CONTRACTION JOINT AT BENT CONTROL LINE SHALL BE SAWN WITHIN 24 HOURS OF POURING THE DECK. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 3 OF 3

DRAWN BY : E. JONES DATE : JUNE 21

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DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

Dewberry
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PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ZACHARY BROWN
Digitally signed by Zachary Brown
9/16/2022

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			41

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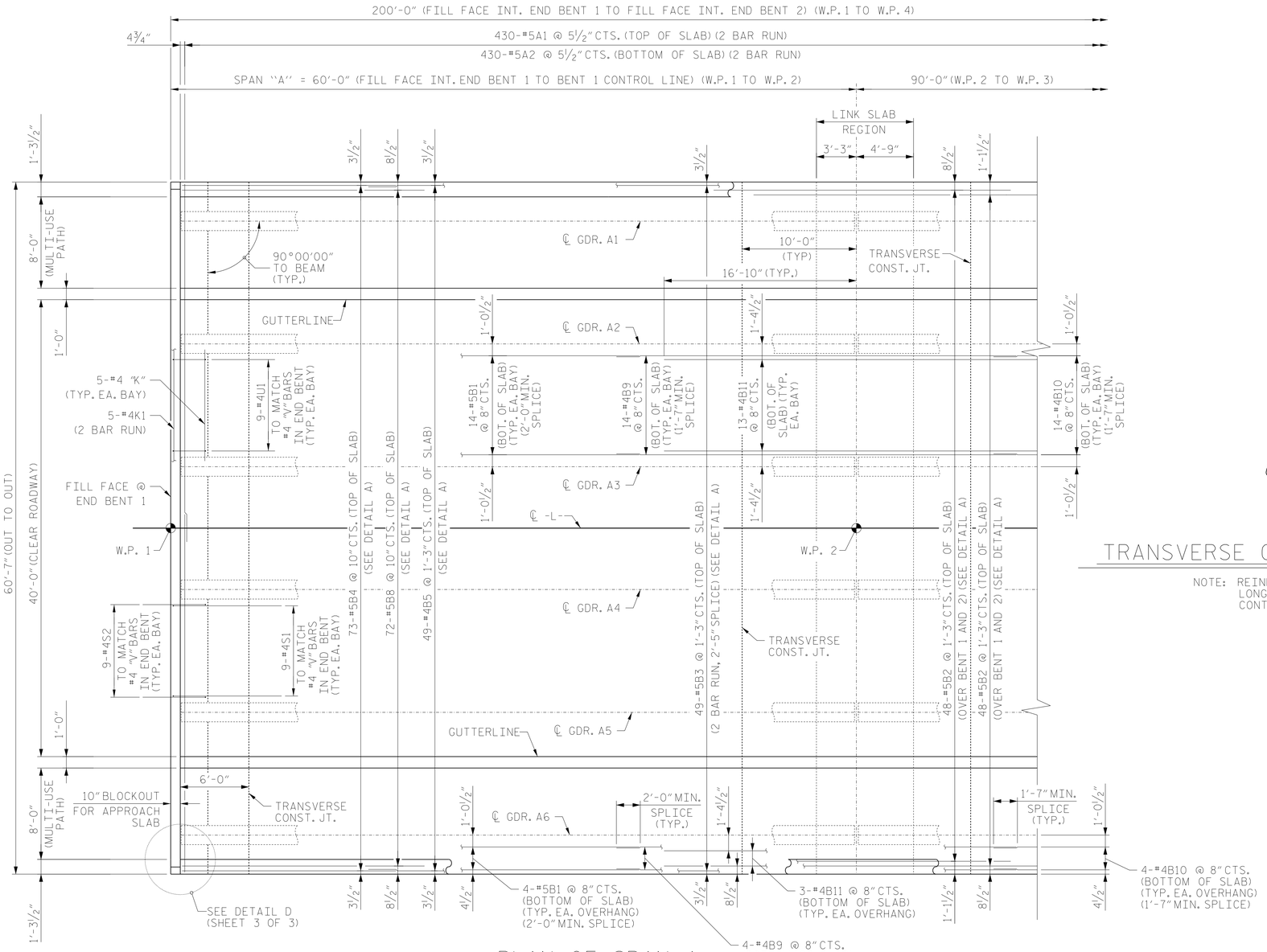
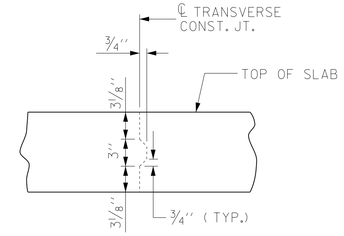
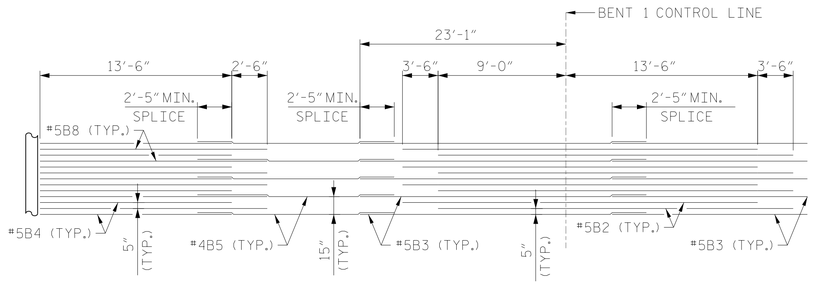


PLAN OF SPAN A



TRANSVERSE CONSTRUCTION JOINT DETAIL

NOTE: REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THRU JOINT



DETAIL A

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 1 OF 3

Dewberry
2610 WYCLIFF ROAD
SUITE 410
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RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

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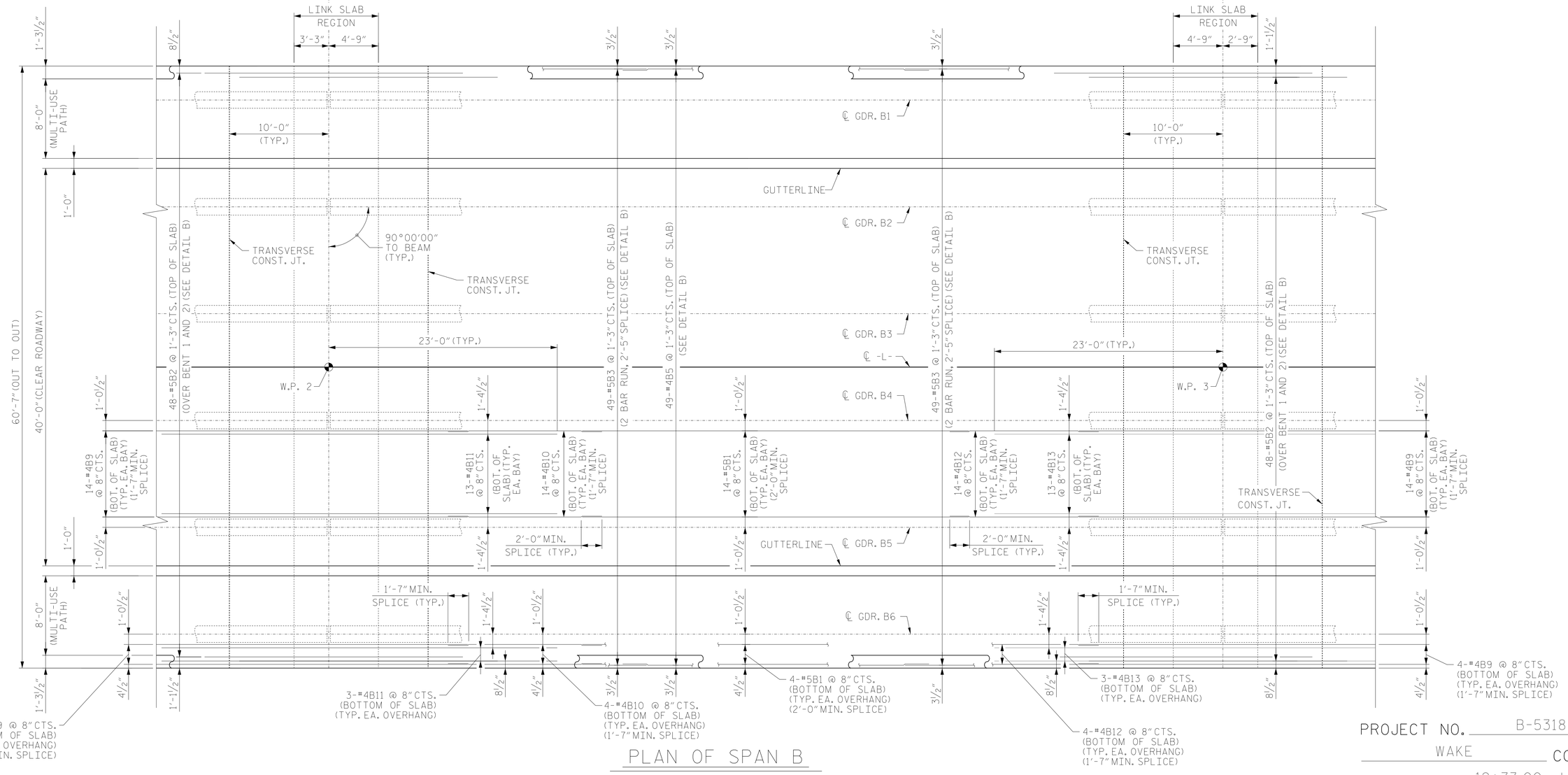
200'-0" (FILL FACE INT. END BENT 1 TO FILL FACE INT. END BENT 2) (W.P. 1 TO W.P. 4)

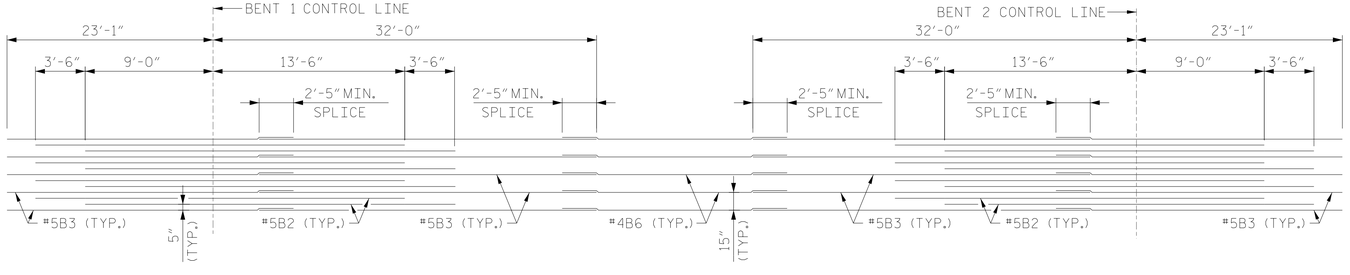
430 - #5A1 @ 5½" CTS. (TOP OF SLAB) (2 BAR RUN)

430 - #5A2 @ 5½" CTS. (BOTTOM OF SLAB) (2 BAR RUN)

SPAN "B" = 90'-0" (BENT 1 CONTROL LINE TO BENT 2 CONTROL LINE) (W.P. 2 TO W.P. 3)



PLAN OF SPAN B



DETAIL B

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DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

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Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ENGINEER ZACHARY BROWN
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9/16/2022

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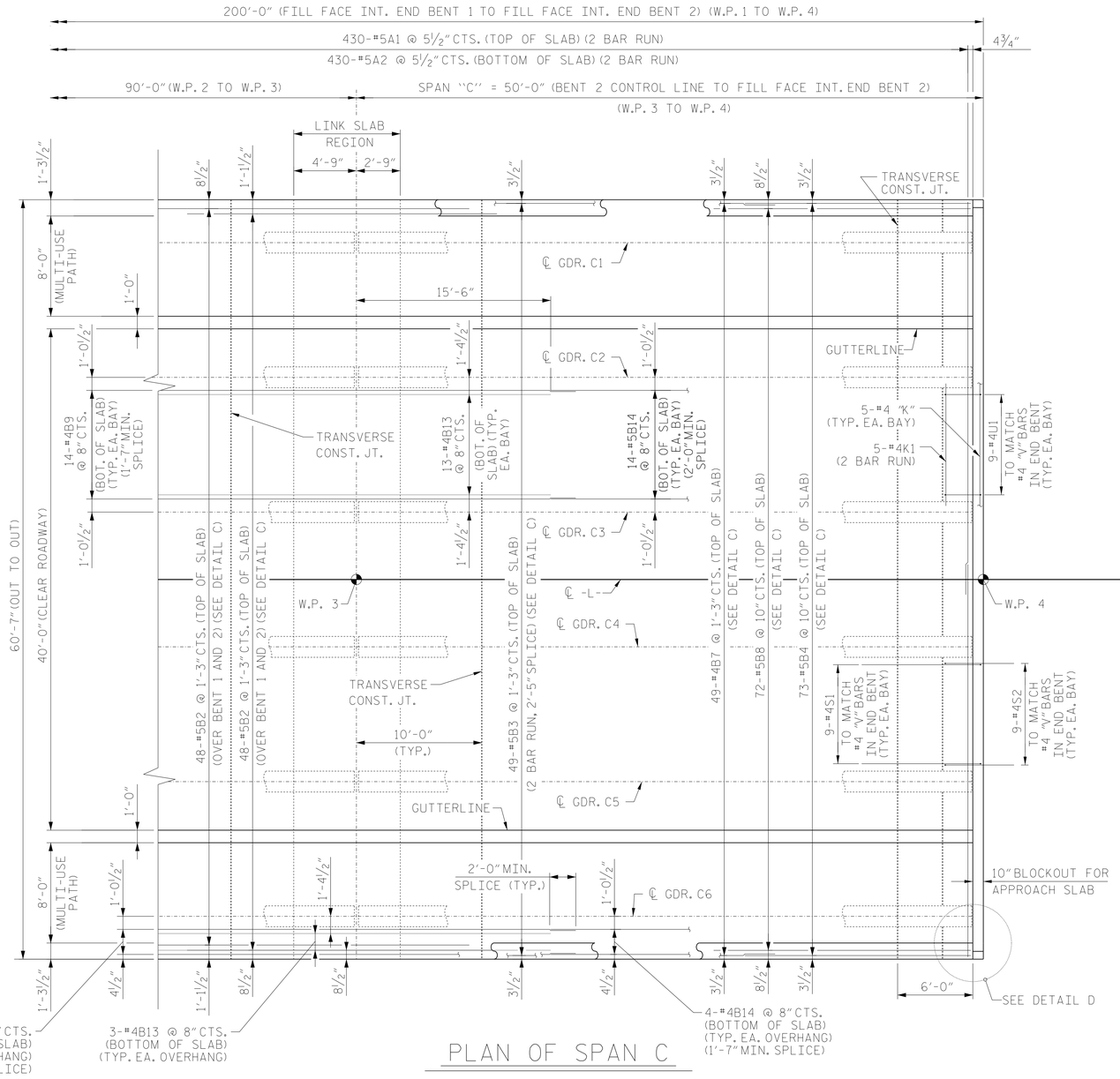
PROJECT NO. B-5318
WAKE COUNTY
STATION: 19+73.00 -L-
SHEET 2 OF 3

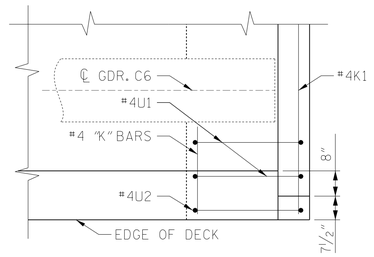
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			41

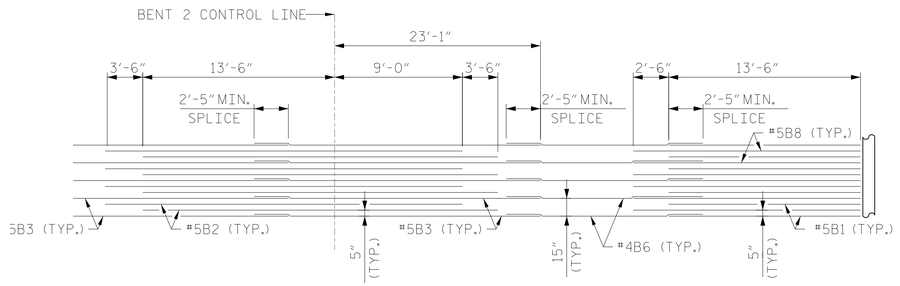


PLAN OF SPAN C



DETAIL D

(ALL CORNERS SIMILAR)



DETAIL C

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 3 OF 3

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043808 ZACHARY BROWN
Documented by Zachary Brown
9/16/2022

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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN C

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

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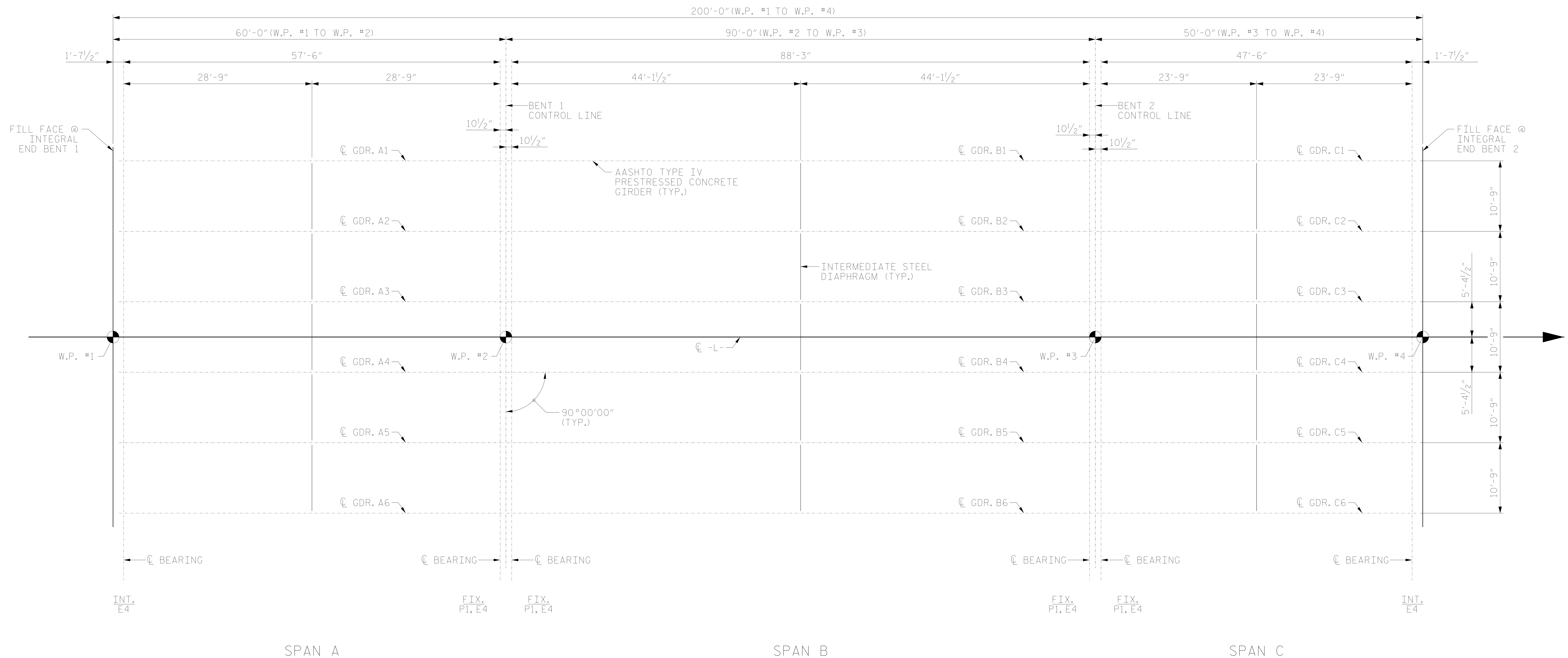

FRAMING PLAN

PROJECT NO. B-5318
WAKE COUNTY
STATION: 19+73.00 -L-

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 — ZACHARY BROWN
DocuSigned by: Zachary Brown
9/16/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

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

SHEET NO. S-12
TOTAL SHEETS 41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

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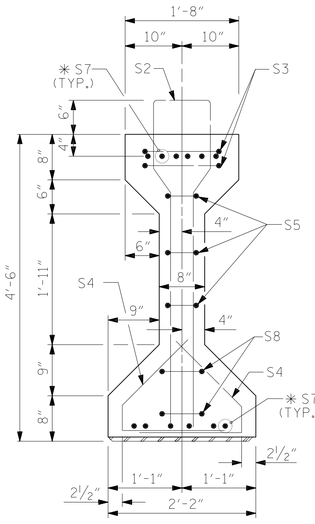
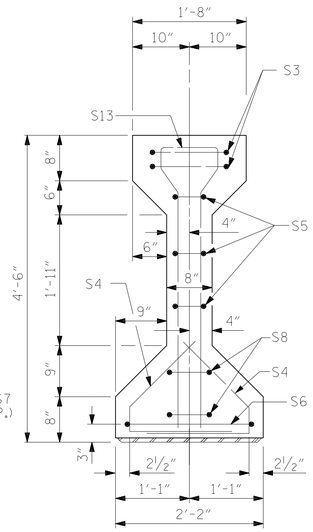
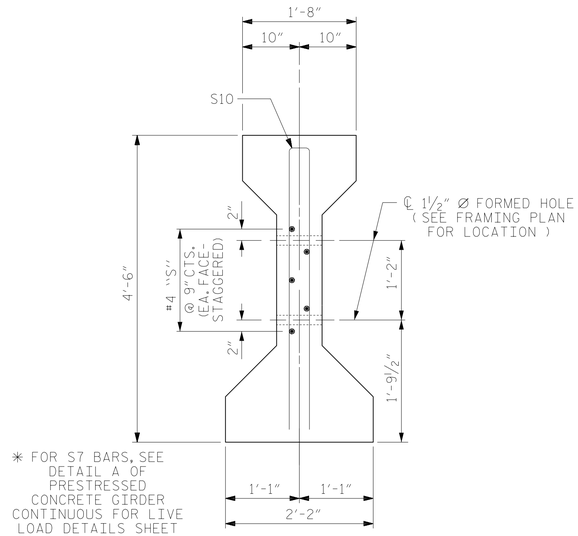


SECTION A-A



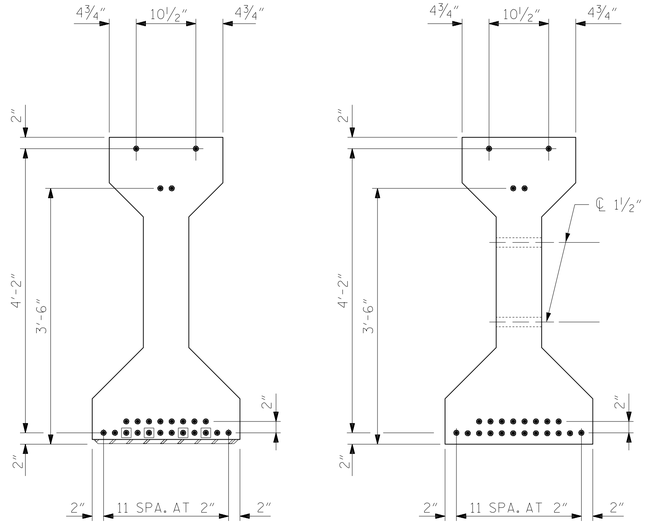
SECTION B-B



✳ FOR S7 BARS, SEE DETAIL A OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION C-C

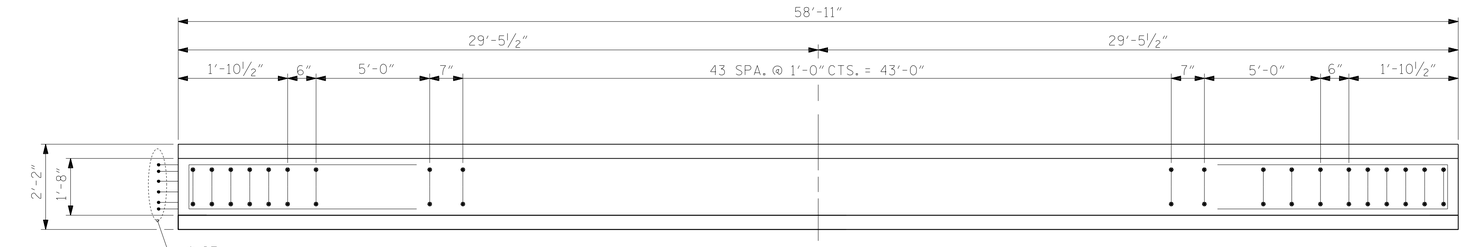
(S1 BARS NOT SHOWN)



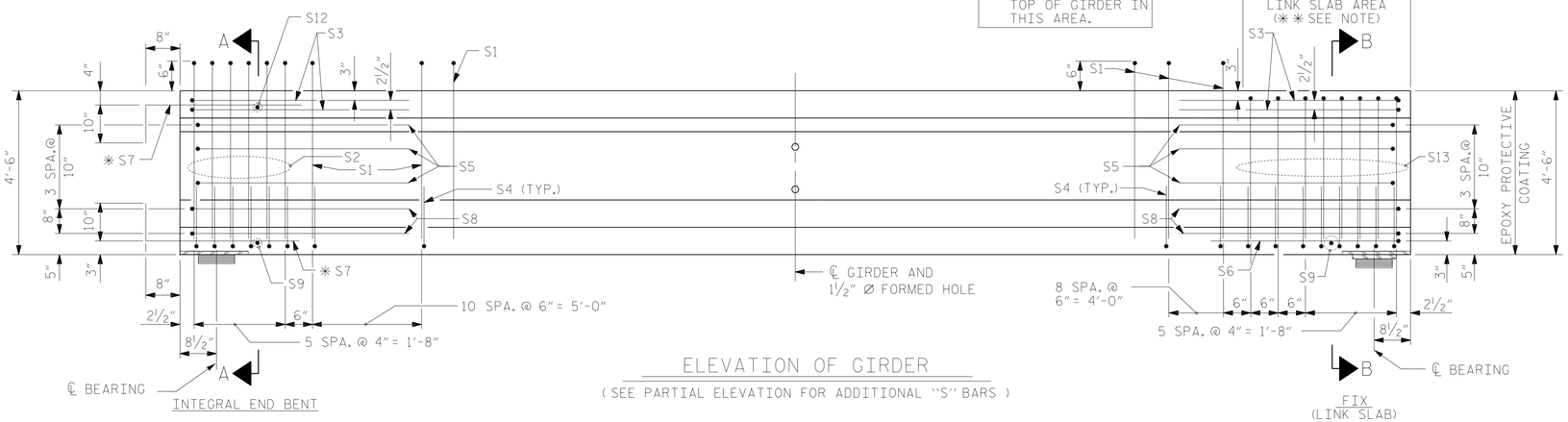
AT END OF GIRDER

AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER

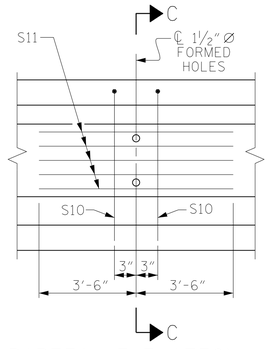


ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

DEBONDING LEGEND

- • FULLY BONDED STRANDS.
- ◙ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER.



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

0.6" Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

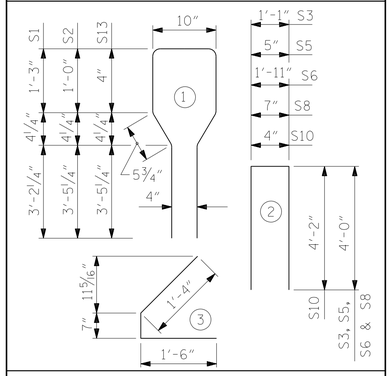
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	64	#4	1	10'-8"	456
S2	6	#6	1	10'-8"	96
S3	4	#4	2	9'-1"	24
S4	68	#4	3	3'-5"	155
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✳ S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S12	1	#3	STR	1'-4"	1
S13	8	#6	1	10'-0"	120

✳ NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
GIRDERS 1-6	884	12.0	24

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	58'-11"	353'-6"

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9239
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL SEAL 047785 ENGINEER ZACHARY BROWN

Docusigned by: Zachary Brown 43198086903486...

9/16/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN A

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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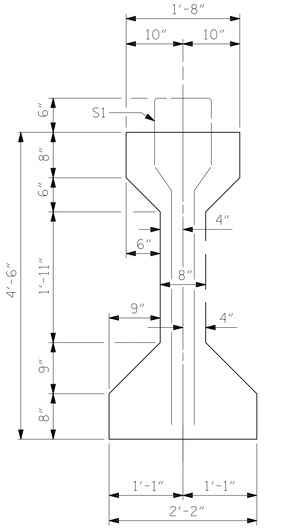
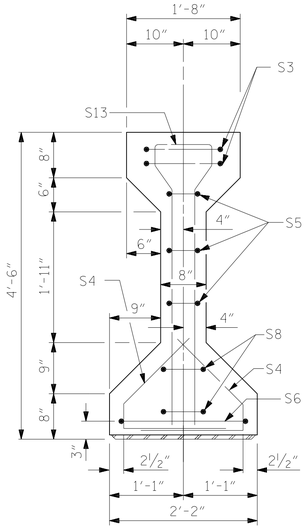
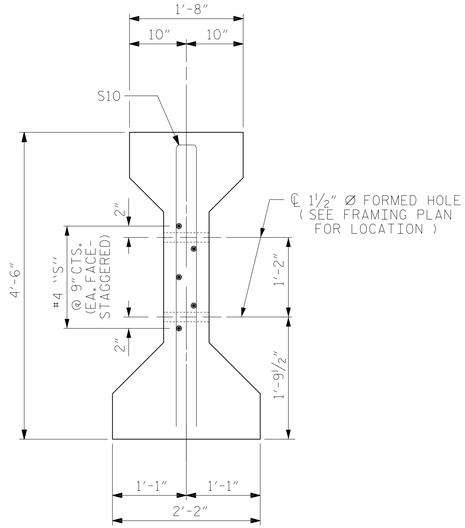


SECTION A-A

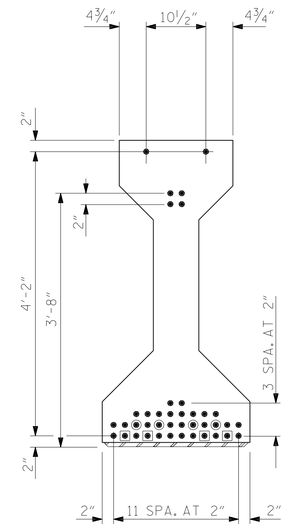


SECTION B-B

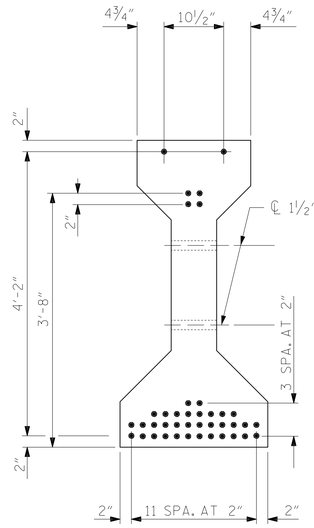


SECTION C-C

(S1 BARS NOT SHOWN)

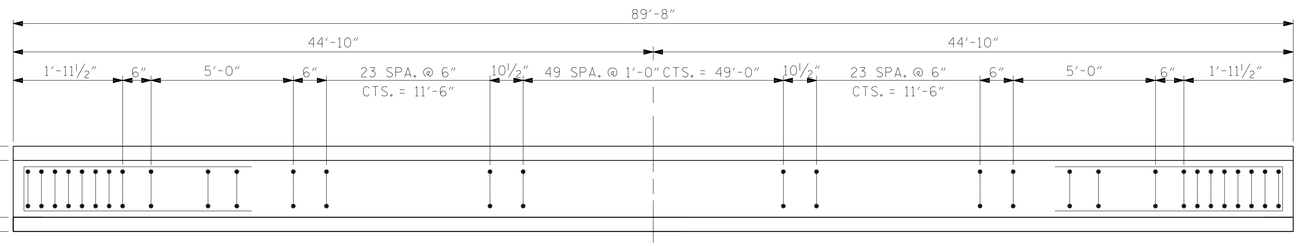


AT END OF GIRDER

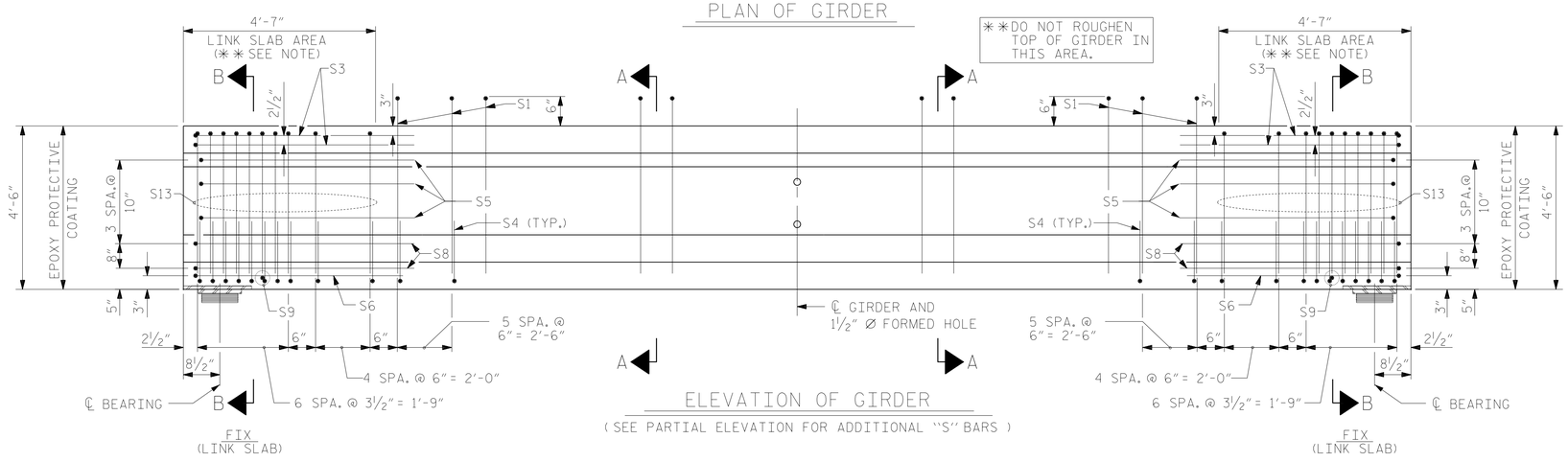


AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER

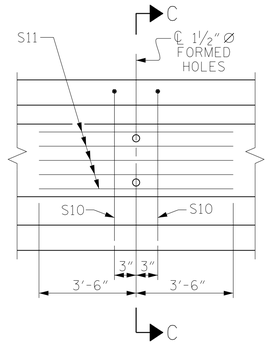


ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

DEBONDING LEGEND

- ● FULLY BONDED STRANDS.
- ▣ STRANDS DEBONDED FOR 20'-0" FROM END OF GIRDER.
- ◉ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER.



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

0.6" Ø L. R. GRADE 270 STRANDS

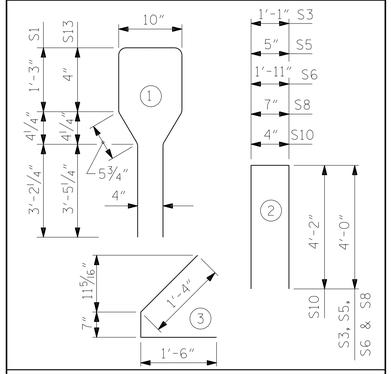
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	110	#4	1	10'-8"	784
S3	4	#4	2	9'-1"	24
S4	72	#4	3	3'-5"	164
S5	6	#4	2	8'-5"	34
S6	2	#4	2	9'-11"	14
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S13	24	#6	1	9'-4"	336

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDERS 1-6	1,421	18.2	40

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	89'-8"	538'-0"

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL SEAL 046785 ENGINEER ZACHARY BROWN
Docusigned by: Zachary Brown
9/16/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN B

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-14
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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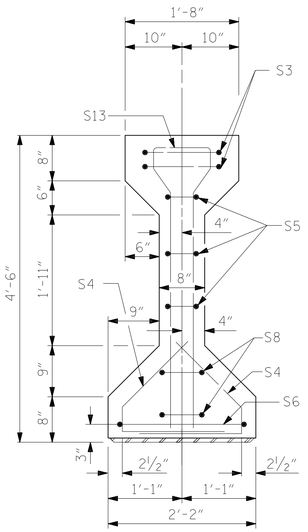
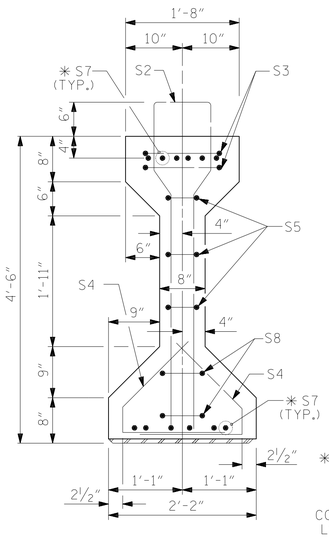
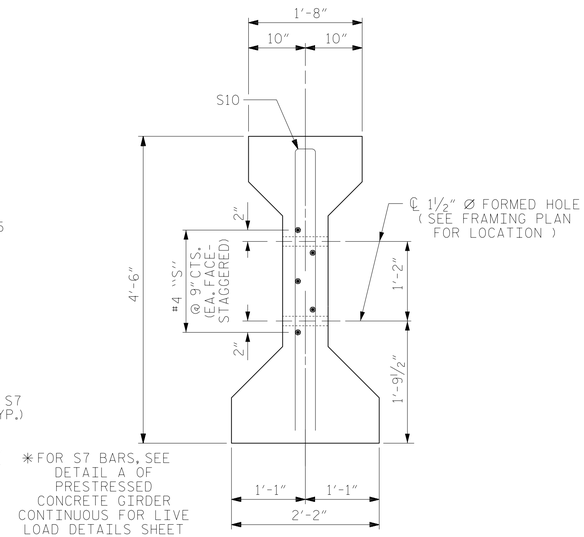
STD. NO. PCG6



SECTION A-A



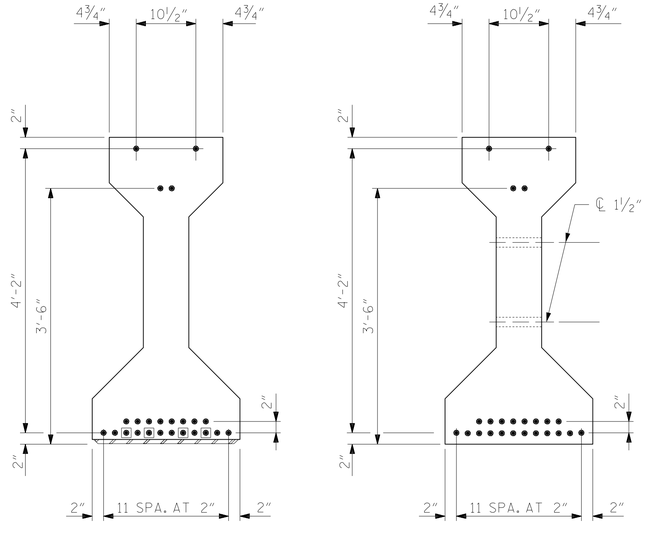
SECTION B-B



✳FOR S7 BARS, SEE DETAIL A OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

SECTION C-C

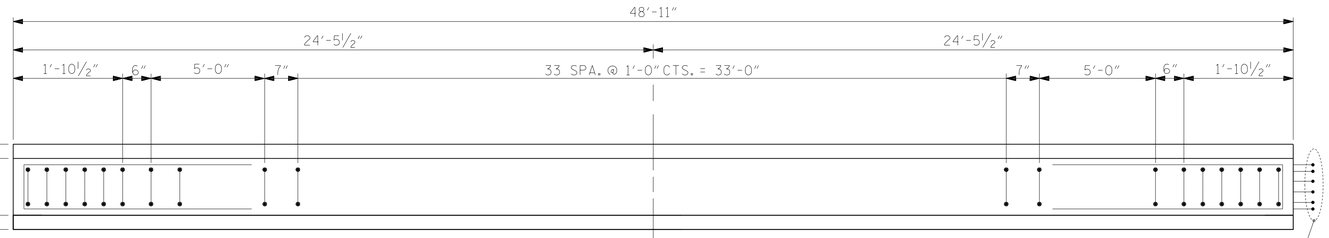
(S1 BARS NOT SHOWN)



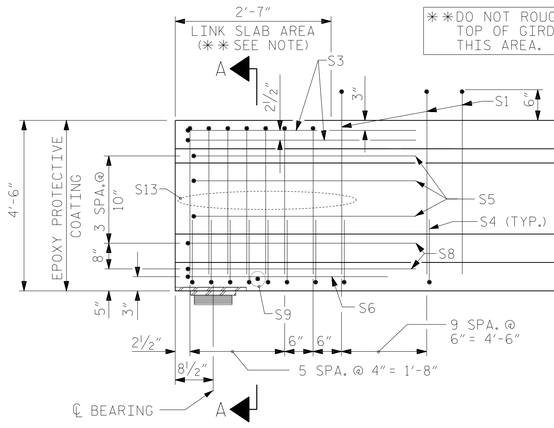
AT END OF GIRDER

AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

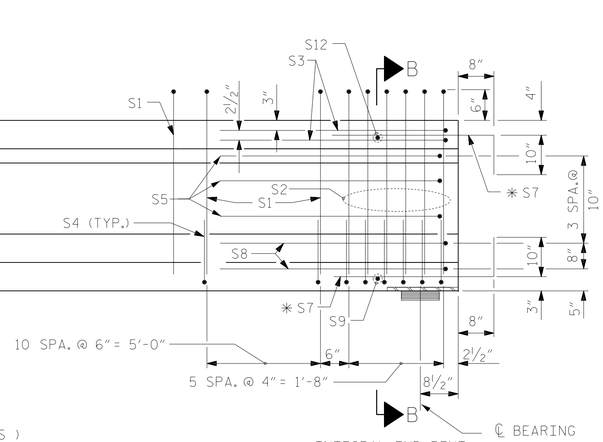


PLAN OF GIRDER



FIX
(LINK SLAB)

✳✳DO NOT ROUGHEN TOP OF GIRDER IN THIS AREA.



INTEGRAL END BENT

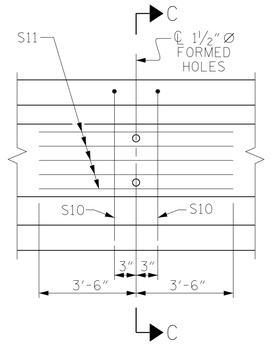
℄ GIRDER AND 1½" Ø FORMED HOLE

ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

DEBONDING LEGEND

- ● FULLY BONDED STRANDS.
- ▣ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER.



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

0.6" Ø L. R. GRADE 270 STRANDS

AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

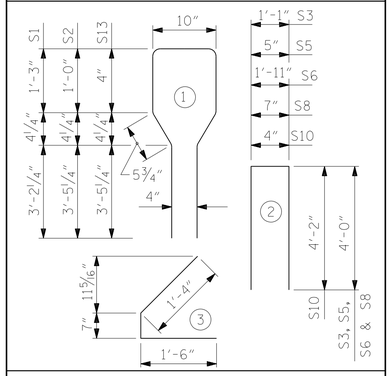
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	55	#4	1	10'-8"	392
S2	6	#6	1	10'-8"	96
S3	4	#4	2	9'-1"	24
S4	68	#4	3	3'-5"	155
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✳S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S12	1	#3	STR	1'-4"	1
S13	7	#6	1	9'-4"	98

✳NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
GIRDERS 1-6	918	10.0	24

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	48'-11"	293'-6"

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL SEAL 047785 ENGINEER ZACHARY BROWN
Docusigned by: Zachary Brown
9/16/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN C

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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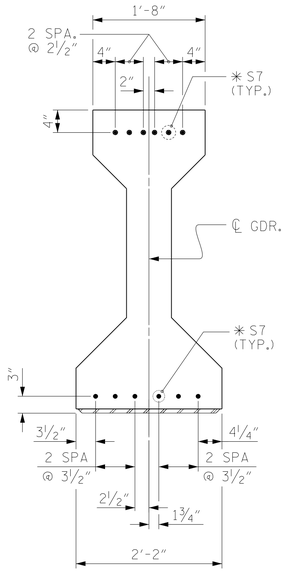
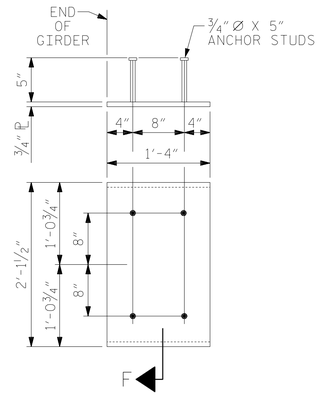
SECTION ''F''

(SEE NOTES)



DETAIL A

(FOR AASHTO TYPE IV GIRDERS)



EMBEDDED PLATE ''B-1'' DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)

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 SHALL BE GRADE 60.

APPLY EPOXY PROTECTIVE COATING TO END OF GIRDER SURFACES INDICATED IN ELEVATION VIEW.

EMBEDDED PLATE ''B-1'' SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ANCHOR STUDS SHALL CONFORM TO AASHTO M169 GRADES 1010 THROUGH 1020 OR APPROVED EQUAL, AND SHALL MEET THE TYPE ''B'' REQUIREMENTS OF SUBSECTION 7.3 OF THE ANSI/AASHTO/AWS D1.5 BRIDGE WELDING CODE.

AT ENDS OF GIRDERS TO BE EMBEDDED IN CONCRETE DIAPHRAGMS OR END WALLS, PRESTRESSING STRANDS MAY EXTEND A MAXIMUM OF 2" BEYOND THE GIRDER ENDS. OTHERWISE, PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH THE GIRDER ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6400 PSI.

DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF ¼".

WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN ½" OF THE THEORETICAL LOCATION SHOWN.

THE CONTRACTOR HAS THE OPTION TO PROVIDE, AT NO ADDITIONAL COST TO THE DEPARTMENT, 2 ADDITIONAL STRANDS AT THE TOP OF THE GIRDER TO FACILITATE TYING OF THE REINFORCING STEEL. THESE STRANDS SHALL BE PULLED TO A LOAD OF 4500 lbs.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

DocuSigned by: Zachary Brown 431B0869053418...

NORTH CAROLINA PROFESSIONAL SEAL 046785 ENGINEER ZACHARY BROWN

9/16/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-16
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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STD. NO. PCG9

DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPAN A

0.6" Ø LOW RELAXATION	GIRDERS 1 & 6																					
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.70	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.017	0.024	0.031	0.038	0.043	0.047	0.050	0.052	0.053	0.052	0.050	0.047	0.043	0.038	0.031	0.024	0.017	0.008	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.003	0.007	0.010	0.013	0.016	0.018	0.018	0.021	0.022	0.022	0.022	0.021	0.020	0.018	0.016	0.013	0.010	0.006	0.003	0.000
FINAL CAMBER ↑	0	1/16"	1/8"	3/16"	3/16"	1/4"	5/16"	3/8"	3/8"	3/8"	3/8"	3/8"	3/8"	5/16"	5/16"	1/4"	3/16"	3/16"	1/8"	1/16"	0

0.6" Ø LOW RELAXATION	GIRDERS 2 - 5																					
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.70	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.017	0.024	0.031	0.038	0.043	0.047	0.050	0.052	0.053	0.052	0.050	0.047	0.043	0.038	0.031	0.024	0.017	0.008	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.004	0.007	0.011	0.014	0.017	0.020	0.022	0.023	0.024	0.025	0.024	0.023	0.022	0.020	0.017	0.014	0.011	0.007	0.004	0.000
FINAL CAMBER ↑	0	1/16"	1/8"	3/16"	3/16"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	3/16"	3/16"	1/8"	1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPAN B

0.6" Ø LOW RELAXATION	GIRDERS 1 & 6																					
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.70	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.027	0.053	0.078	0.100	0.120	0.137	0.151	0.161	0.167	0.169	0.167	0.161	0.151	0.137	0.120	0.100	0.078	0.053	0.027	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.018	0.036	0.054	0.071	0.085	0.099	0.107	0.116	0.119	0.122	0.119	0.116	0.107	0.099	0.085	0.071	0.054	0.036	0.018	0.000
FINAL CAMBER ↑	0	1/8"	3/16"	1/4"	3/8"	3/8"	7/16"	1/2"	9/16"	9/16"	9/16"	9/16"	9/16"	1/2"	7/16"	3/8"	3/8"	1/4"	3/16"	1/8"	0

0.6" Ø LOW RELAXATION	GIRDERS 2 - 5																					
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.70	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.027	0.053	0.078	0.100	0.120	0.137	0.151	0.161	0.167	0.169	0.167	0.161	0.151	0.137	0.120	0.100	0.078	0.053	0.027	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.021	0.041	0.061	0.081	0.096	0.112	0.121	0.131	0.135	0.138	0.135	0.131	0.121	0.112	0.096	0.081	0.061	0.041	0.021	0.000
FINAL CAMBER ↑	0	1/16"	1/8"	3/16"	1/4"	1/4"	5/16"	1/2"	3/8"	3/8"	3/8"	3/8"	3/8"	5/16"	5/16"	1/4"	1/4"	3/16"	1/8"	1/16"	0

DEAD LOAD DEFLECTION TABLE FOR GIRDERS - SPAN C

0.6" Ø LOW RELAXATION	GIRDERS 1 & 6																					
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.70	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.017	0.024	0.031	0.038	0.043	0.047	0.050	0.052	0.053	0.052	0.050	0.047	0.043	0.038	0.031	0.024	0.017	0.008	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.002	0.003	0.005	0.006	0.007	0.008	0.009	0.010	0.010	0.011	0.010	0.010	0.009	0.009	0.007	0.006	0.005	0.003	0.002	0.000
FINAL CAMBER ↑	0	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	7/16"	1/2"	1/2"	1/2"	1/2"	1/2"	7/16"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0

0.6" Ø LOW RELAXATION	GIRDERS 2 - 5																					
TWENTIETH POINTS	0	.05	.1	.15	.2	.25	.3	.35	.4	.45	.5	.55	.6	.65	.70	.75	.8	.85	.9	.95	1.0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.008	0.017	0.024	0.031	0.038	0.043	0.047	0.050	0.052	0.053	0.052	0.050	0.047	0.043	0.038	0.031	0.024	0.017	0.008	0.000
✳ DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.002	0.003	0.005	0.007	0.008	0.009	0.010	0.011	0.011	0.012	0.011	0.011	0.010	0.009	0.008	0.007	0.005	0.003	0.002	0.000
FINAL CAMBER ↑	0	1/16"	3/16"	1/4"	5/16"	3/8"	3/8"	1/2"	7/16"	1/2"	1/2"	1/2"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/16"	0

✳ INCLUDES FUTURE WEARING SURFACE.

ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT "FINAL CAMBER", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

Dewberry
2610 WYCLIFF ROAD
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PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ENGINEER ZACHARY BROWN

DocuSigned by: Zachary Brown 431B0B0B90534F4...

9/16/2022

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRESTRESSED CONCRETE GIRDER CAMBER AND DEAD LOAD DEFLECTIONS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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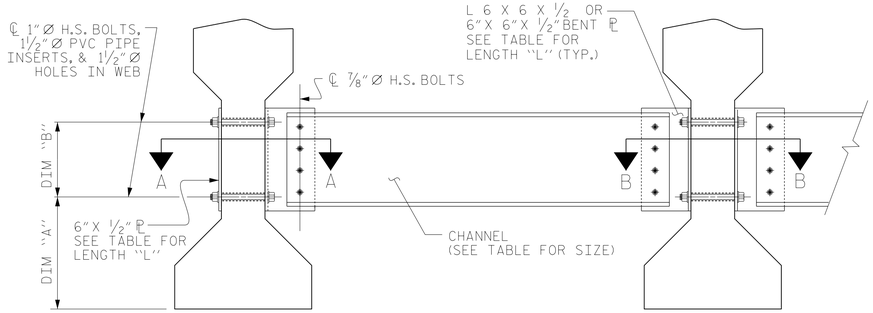
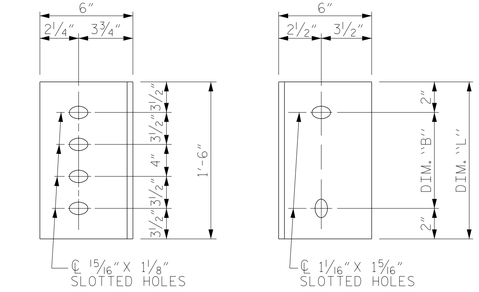


EXTERIOR GIRDER INTERIOR GIRDER

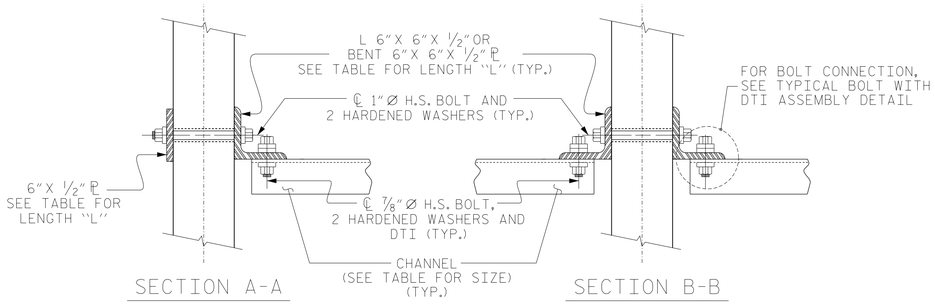
PART SECTION AT INTERMEDIATE DIAPHRAGM

(EXTERIOR BAY SHOWN)



DIAPHRAGM FACE WEB FACE

CONNECTOR PLATE DETAILS



SECTION A-A SECTION B-B

CONNECTION DETAILS

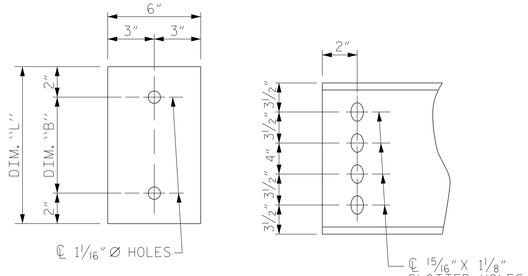
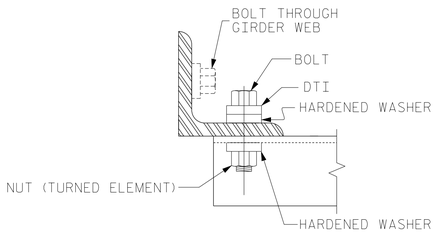


PLATE DETAILS CHANNEL END



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

ALL INTERMEDIATE DIAPHRAGM STEEL AND CONNECTOR PLATES SHALL BE AASHTO M270 GRADE 50 OR APPROVED EQUAL.

TENSION ON THE ASTM A325 BOLTS THROUGH THE CHANNEL MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL ¼ TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY A THERMAL SPRAYED COATING WITH A SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM, THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

GALVANIZE THE HIGH STRENGTH BOLTS, NUTS, WASHERS AND DIRECT TENSION INDICATORS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

USE AN ASTM F436 HARDENED WASHER WITH STANDARD AND SLOTTED HOLES UNDER EACH BOLT HEAD AND NUT.

FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST ¼" PROJECTION BEYOND THE NUT.

INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9½"	1'-2"	1'-6"

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

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PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047785 ENGINEER ZACHARY BROWN
Docusigned by: Zachary Brown 431B8086903348E...
9/16/2022

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE II, III, & IV PRESTRESSED CONCRETE GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			41

STD. NO. PCG10

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

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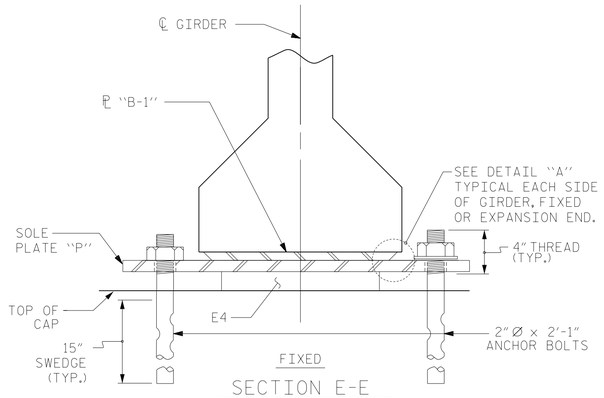
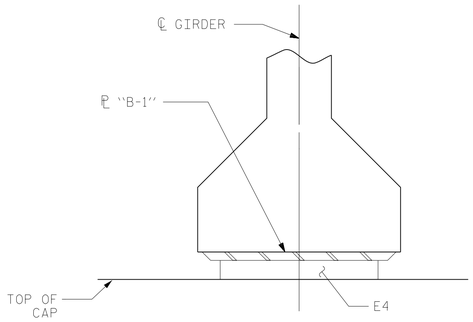
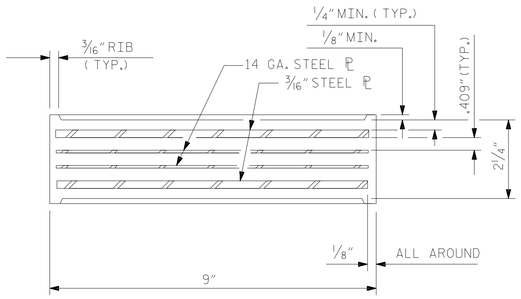


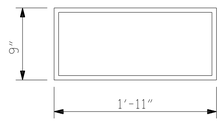
SECTION E-E



SECTION F-F



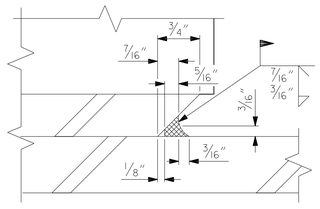
TYPICAL SECTION OF ELASTOMERIC BEARINGS



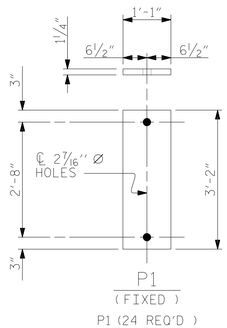
E4 (36 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



DETAIL "A"



P1 (FIXED)

P1 (24 REQ'D)

SOLE PLATE DETAILS ("P")

TYPICAL PLAN

(SHOWING END BENT)

TYPICAL PLAN

(SHOWING CONTINUOUS BENT)

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE V	365 K

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF 1/2 TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

STEEL SOLE PLATES, ANCHOR BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRIOR TO WELDING, GRIND THE GALVANIZED SURFACE OF THE PORTION OF THE EMBEDDED PLATE AND SOLE PLATE THAT ARE TO BE WELDED. AFTER WELDING, DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

WHEN WELDING THE SOLE PLATE TO THE EMBEDDED PLATE IN THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE SOLE PLATE DOES NOT EXCEED 300°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE ELASTOMER.

SOLE PLATE "P", BOLTS, NUTS, AND WASHERS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

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NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ENGINEER ZACHARY BROWN

9/16/2022

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			41

STD. NO. EB4

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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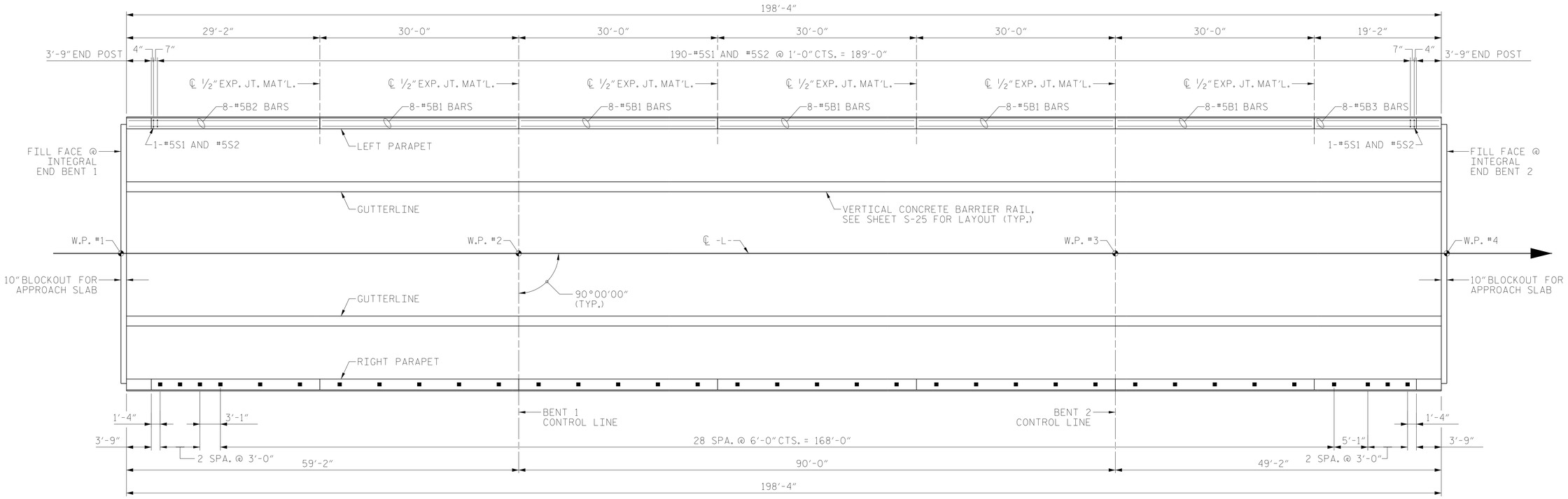

PARAPET LAYOUT AND PLAN OF RAIL POST SPACINGS

LEFT PARAPET LAYOUT SHOWN, RIGHT SIDE SIMILAR.
RIGHT RAIL POST SPACING SHOWN, LEFT SIDE SIMILAR.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 1 OF 2

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL SEAL 046785 ENGINEER ZACHARY BROWN
Docusigned by: Zachary Brown 431B0B0869034B8...
9/16/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
CONCRETE PARAPET DETAILS AND RAIL POST SPACING FOR 2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			41

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DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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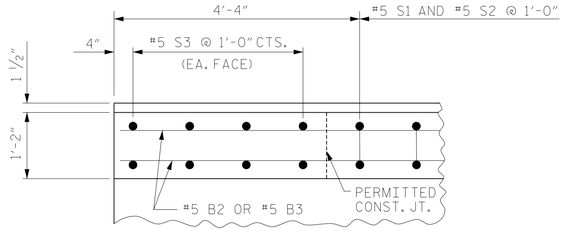
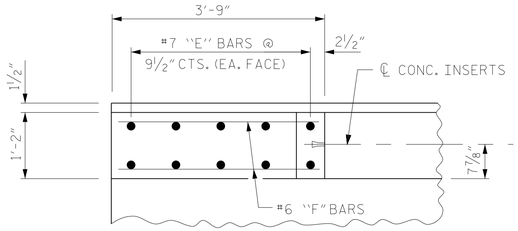
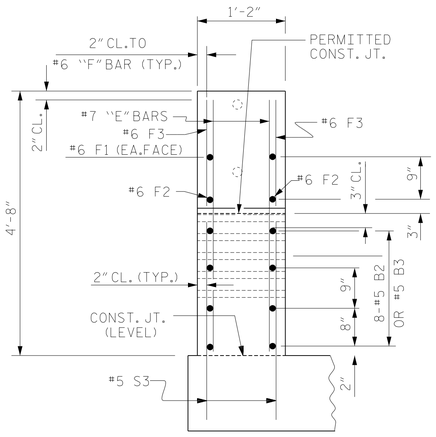


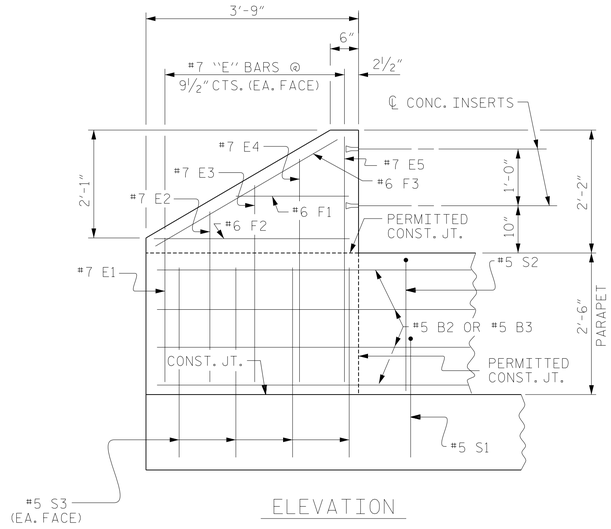
PLAN OF PARAPET



PLAN OF END POST

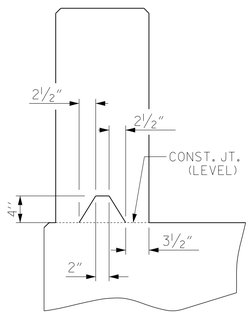


END VIEW

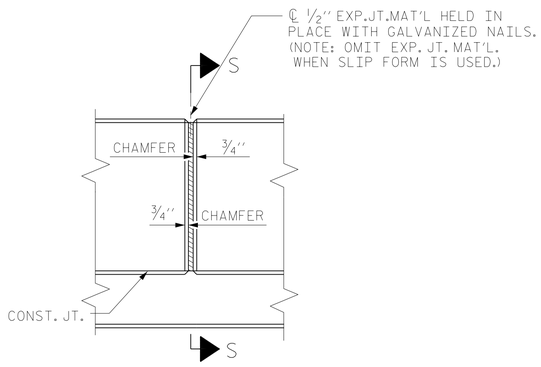


ELEVATION

END POST DETAILS



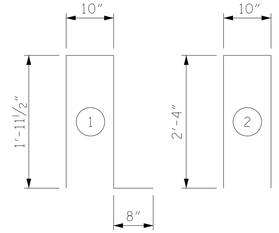
SECTION S-S
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY
WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR TWO PARAPETS AND FOUR END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	80	#5	STR	29'-7"	2,468
* B2	16	#5	STR	28'-9"	480
* B3	16	#5	STR	18'-9"	313
* E1	8	#7	STR	2'-6"	40
* E2	8	#7	STR	3'-0"	50
* E3	8	#7	STR	3'-6"	58
* E4	8	#7	STR	4'-0"	66
* E5	8	#7	STR	4'-4"	70
* F1	8	#6	STR	1'-11"	23
* F2	8	#6	STR	3'-2"	38
* F3	8	#6	STR	3'-8"	44
* S1	384	#5	1	5'-5"	2,169
* S2	384	#5	2	5'-6"	2,203
* S3	32	#5	STR	3'-0"	100

* EPOXY COATED REINFORCING STEEL	8,122 LBS.
CLASS AA CONCRETE	43.4 CU. YDS.
1'-2" x 2'-6" CONCRETE PARAPET	396.67 LIN. FT.

NOTES:

ALL REINFORCING STEEL IN PARAPETS AND END POSTS SHALL BE EPOXY COATED.

PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE UNIT HAS BEEN CAST AND REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

THE #5 S3 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 2 OF 2

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL SEAL 046785 ENGINEER ZACHARY BROWN
Docusigned by: Zachary Brown
9/16/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE PARAPET DETAILS FOR 2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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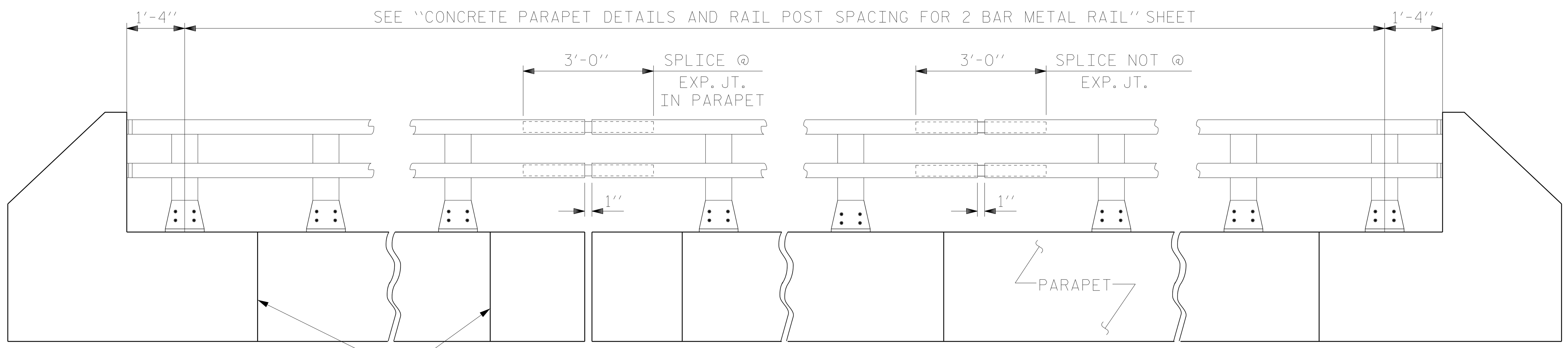
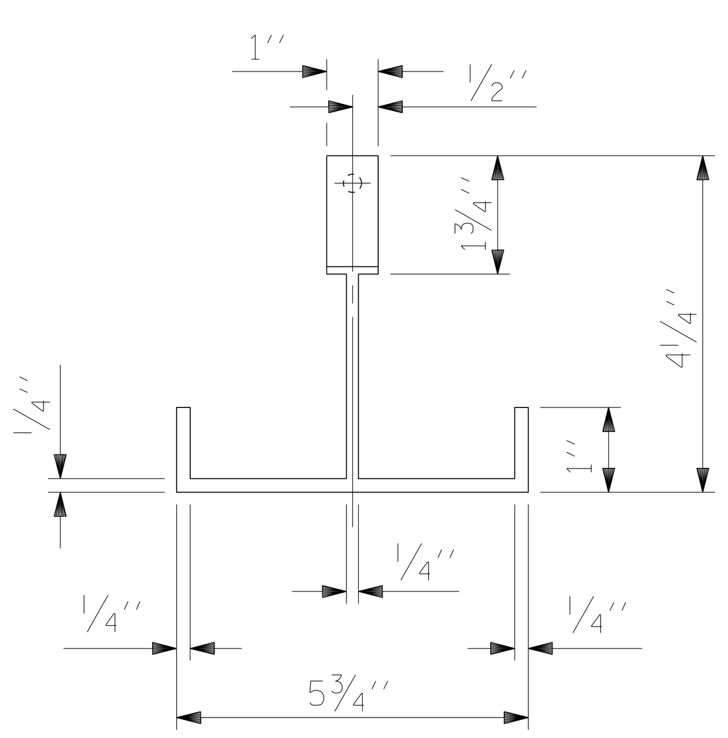
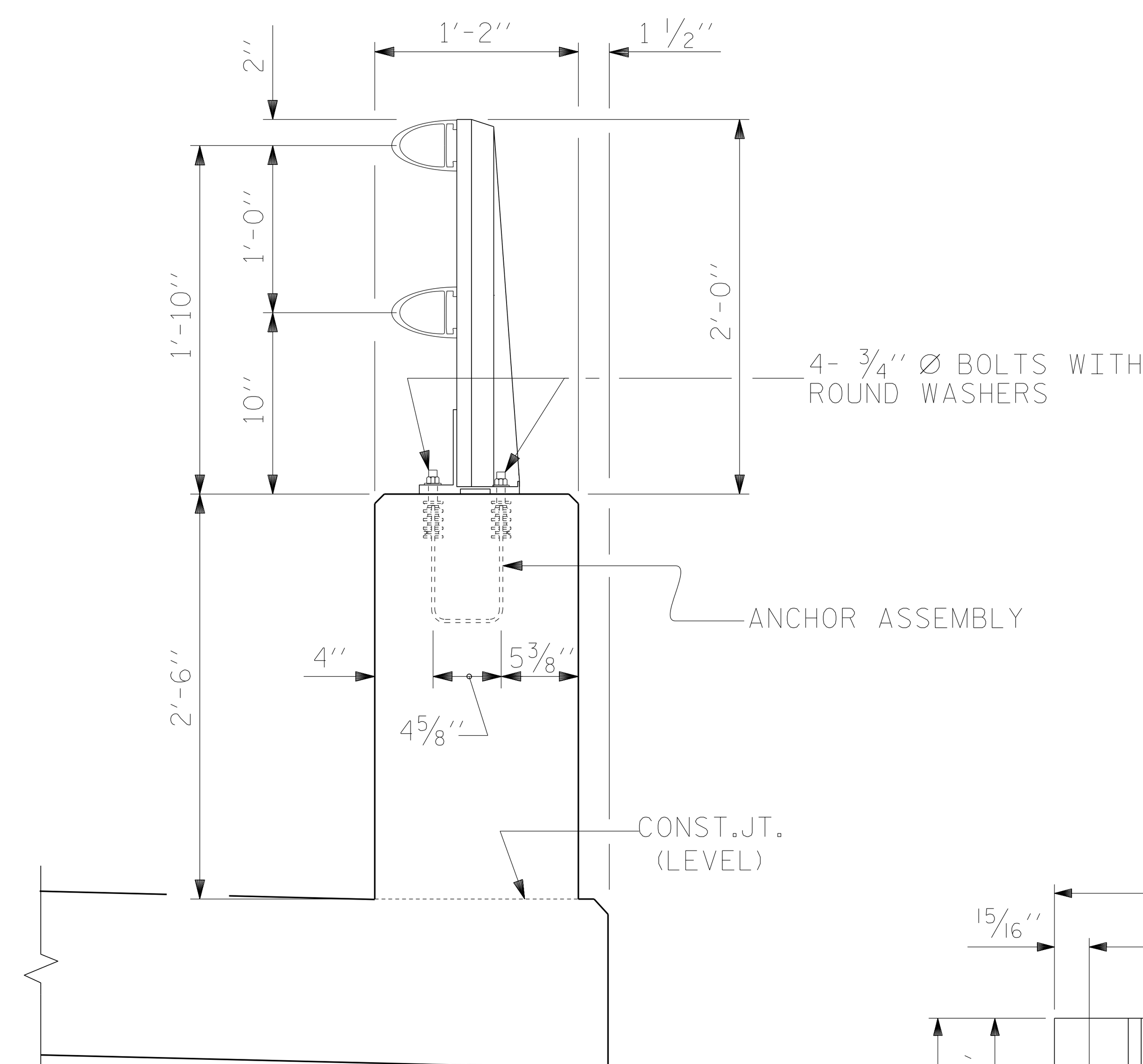


ELEVATION

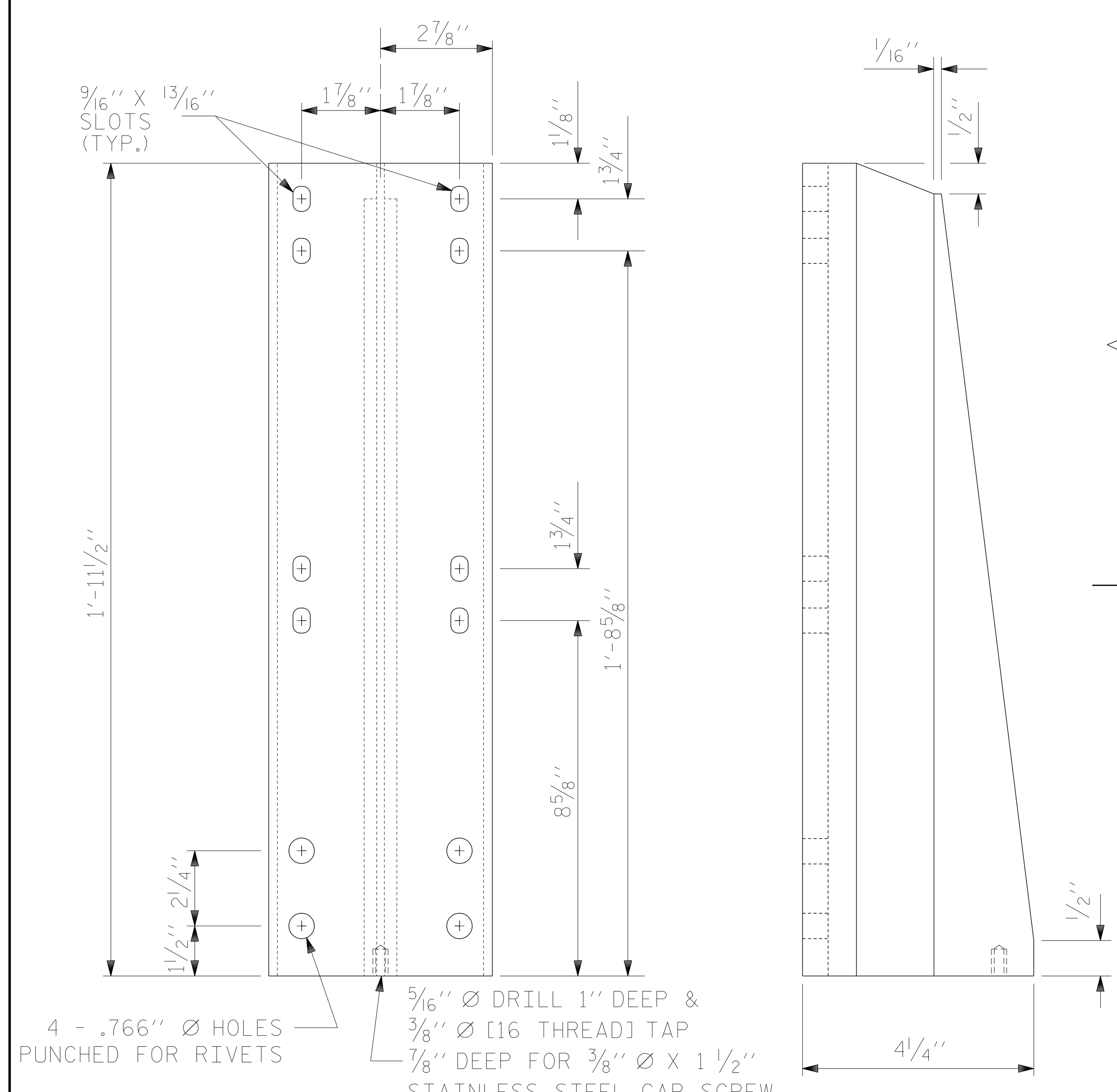
NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE STANDARD NO. BMR2.



PLAN



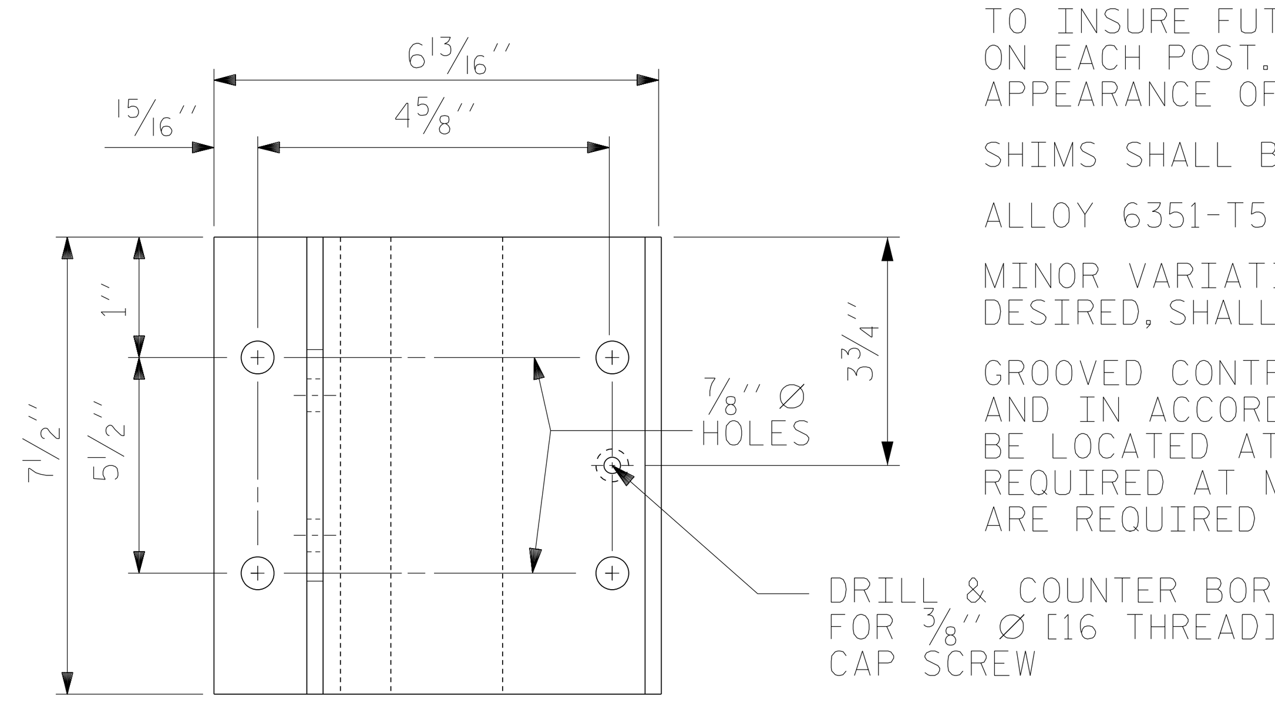
SECTION THRU PARAPET AND RAIL



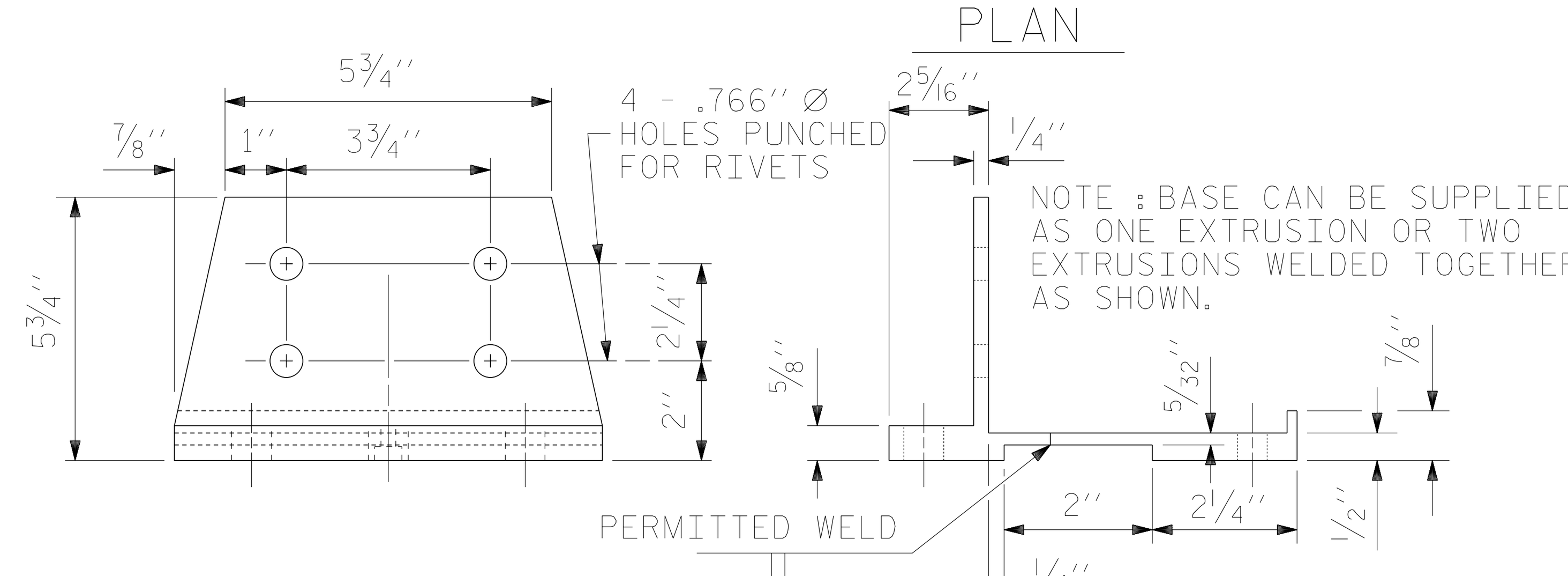
FRONT ELEVATION

SIDE ELEVATION

DETAILS OF POST



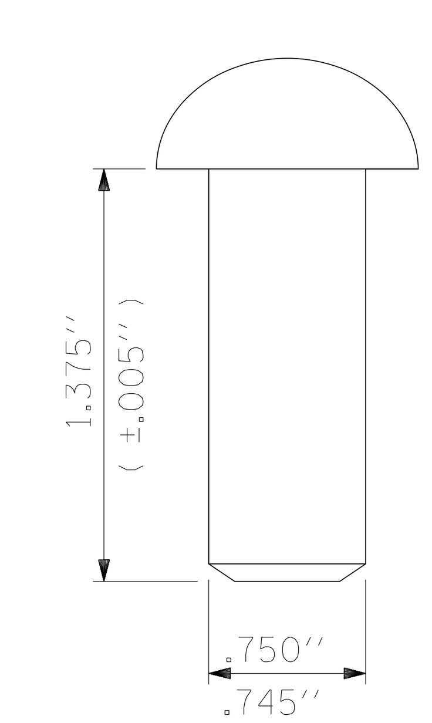
PLAN



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

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

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

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

MATERIAL FOR RIVETS SHALL BE ASTM B316 ALLOY 6061-T6. RIVETS SHALL BE STANDARD BUTTON HEAD AND CONE POINT COLD DRIVEN AS PER DRAWING.

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

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

PAY LENGTH = 381'-8'' LIN. FT.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 1 OF 3

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

DocuSigned by: Zachary Brown
NORTH CAROLINA PROFESSIONAL ENGINEER 046785 ZACHARY BROWN
9/16/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS							
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.	S-22
1			3			TOTAL SHEETS	41
2			4				

DRAWN BY :	E. JONES	DATE :	JUNE 21
CHECKED BY :	P. O'NEILL	DATE :	JUNE 21
DESIGN ENGINEER OF RECORD:	Z. BROWN	DATE :	JUNE 21

9/16/2022
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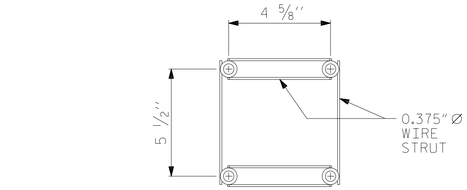


4-BOLT METAL RAIL ANCHOR ASSEMBLY

(70 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2'' FOR 3/4'' FERRULES.

B. 4 - 3/4'' Ø X 2 1/2'' BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4'' Ø X 2 1/2'' GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

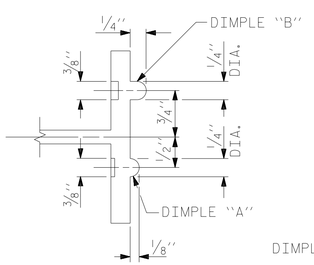
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

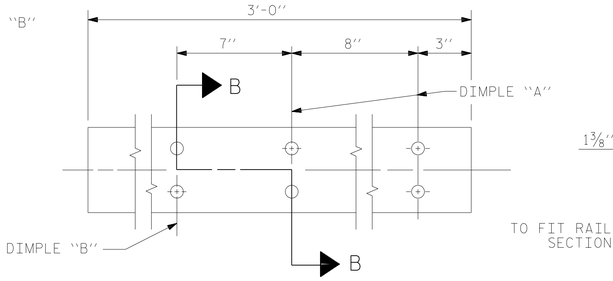
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

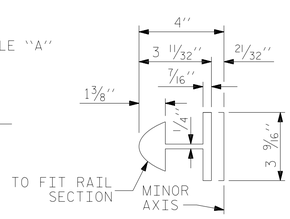
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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



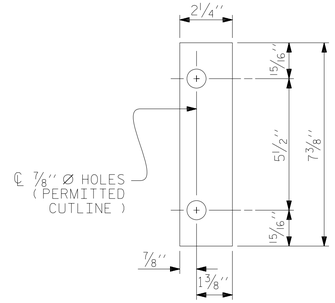
SECTION B - B



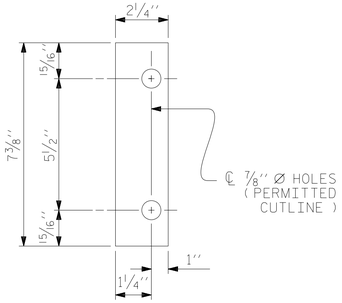


BAR SECTION

EXPANSION BAR DETAILS



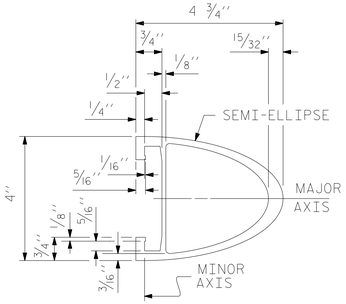
FRONT PLATE



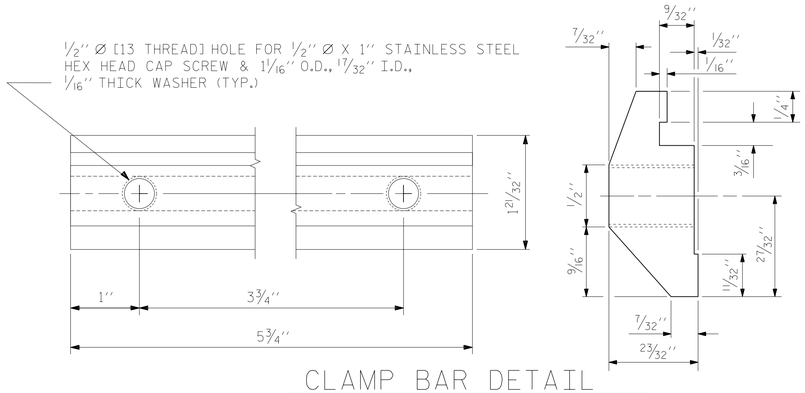
REAR PLATE

SHIM DETAILS

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

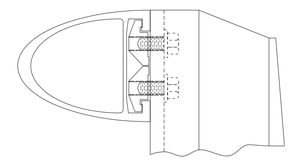


RAIL SECTION

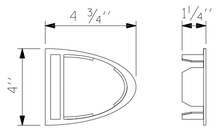


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 2 OF 3

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ZACHARY BROWN
Docusigned by: Zachary Brown
9/16/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

2 BAR METAL RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

9/16/2022
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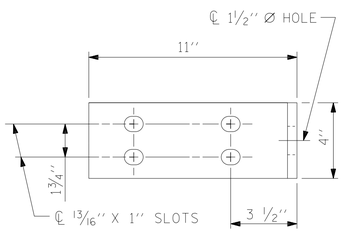
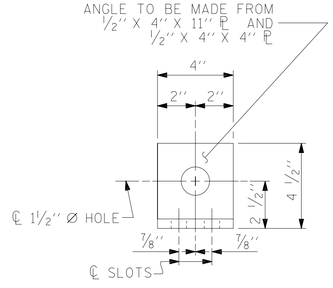
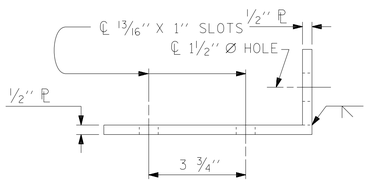
STD. NO. BMR4



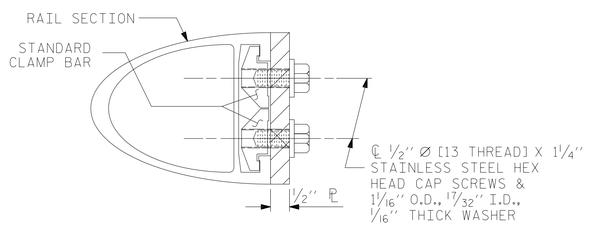
ELEVATION



END VIEW



TOP VIEW



SECTION H-H (FIX)

FIXED

NOTES

STRUCTURAL CONCRETE INSERT

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1½''.

B. 1 - ¾'' Ø X 1⅝'' BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾'' Ø X 1⅝'' GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)

C. WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16'' Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:

A. ½'' PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾'' STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾''Ø X 1⅝'' BOLT WITH 2'' O.D. WASHER IN PLACE. THE ¾''Ø X 1⅝'' BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F.

D. STANDARD CLAMP BARS (SEE METAL RAIL SHEET 2 OF 3).

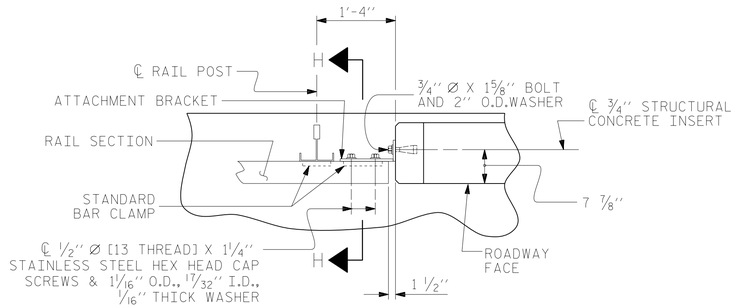
E. ½'' Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

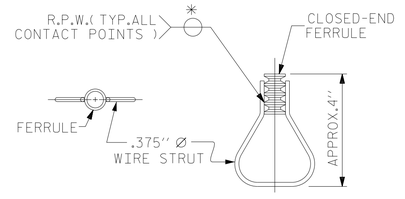
THE ¾'' STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾'' STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½'' PLATES COMPLETE IN PLACE SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

THE CONTRACTOR, AT HIS OPTION, MAY USE AN ADHESIVE BONDING SYSTEM IN LIEU OF THE STRUCTURAL CONCRETE INSERT EMBEDDED IN THE END POST. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾'' Ø X 1⅝'' BOLT WITH WASHER SHALL BE REPLACED WITH A ¾''Ø X 6½'' BOLT AND 2'' O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾'' Ø X 1⅝'' BOLT SHALL APPLY TO THE ¾''Ø X 6 ½'' BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.



PLAN - RAIL AND END POST



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 3 OF 3

DETAILS FOR ATTACHING METAL RAIL TO END POST

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL SEAL 046785 ENGINEER ZACHARY BROWN
Docusigned by: Zachary Brown
9/16/2022

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

2 BAR METAL RAIL

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

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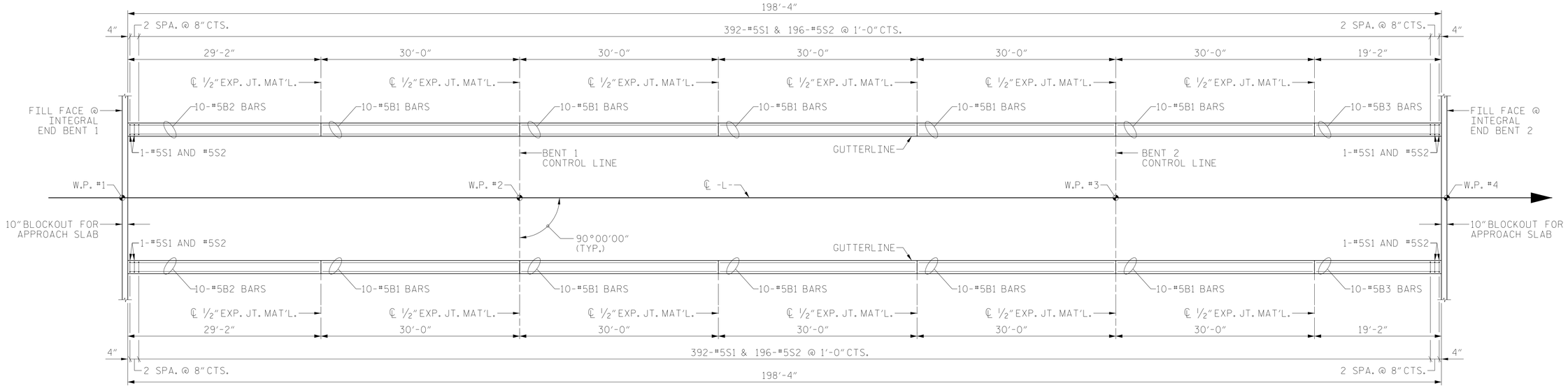
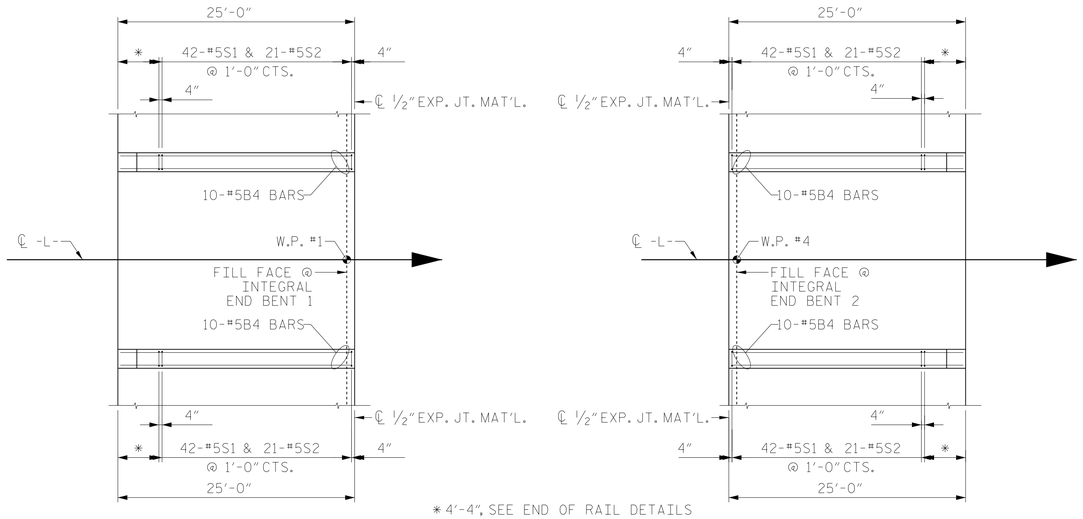
STD. NO. BMR2



VERTICAL BARRIER RAIL PLAN



VERTICAL BARRIER RAIL PLAN - APPROACH SLABS

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 1 OF 2

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

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NORTH CAROLINA PROFESSIONAL SEAL 046785 ENGINEER ZACHARY BROWN
9/16/2022

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SUPERSTRUCTURE

VERTICAL CONCRETE BARRIER RAIL LAYOUT

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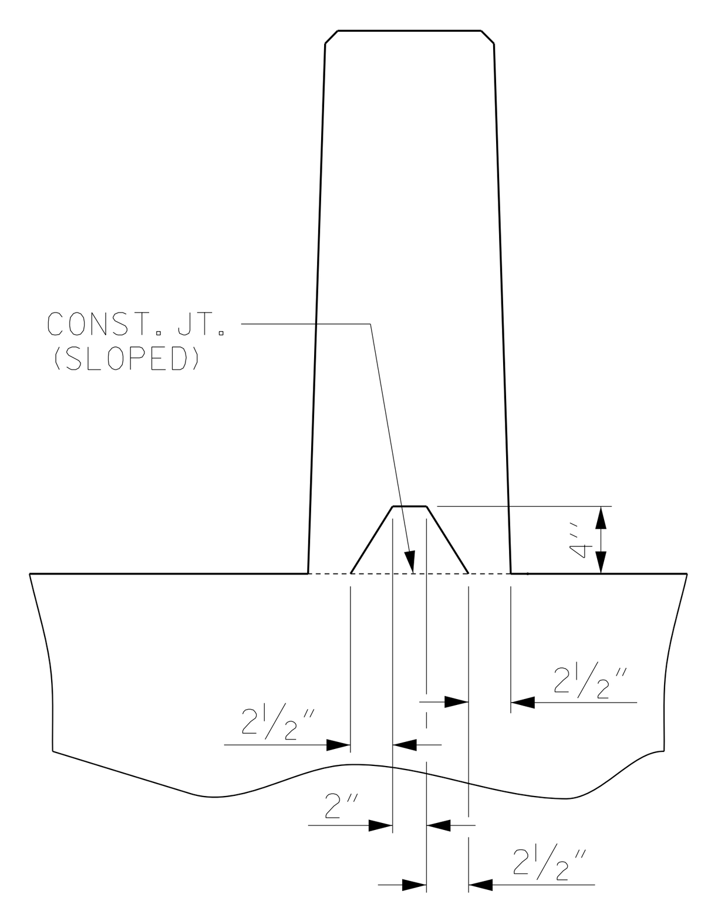
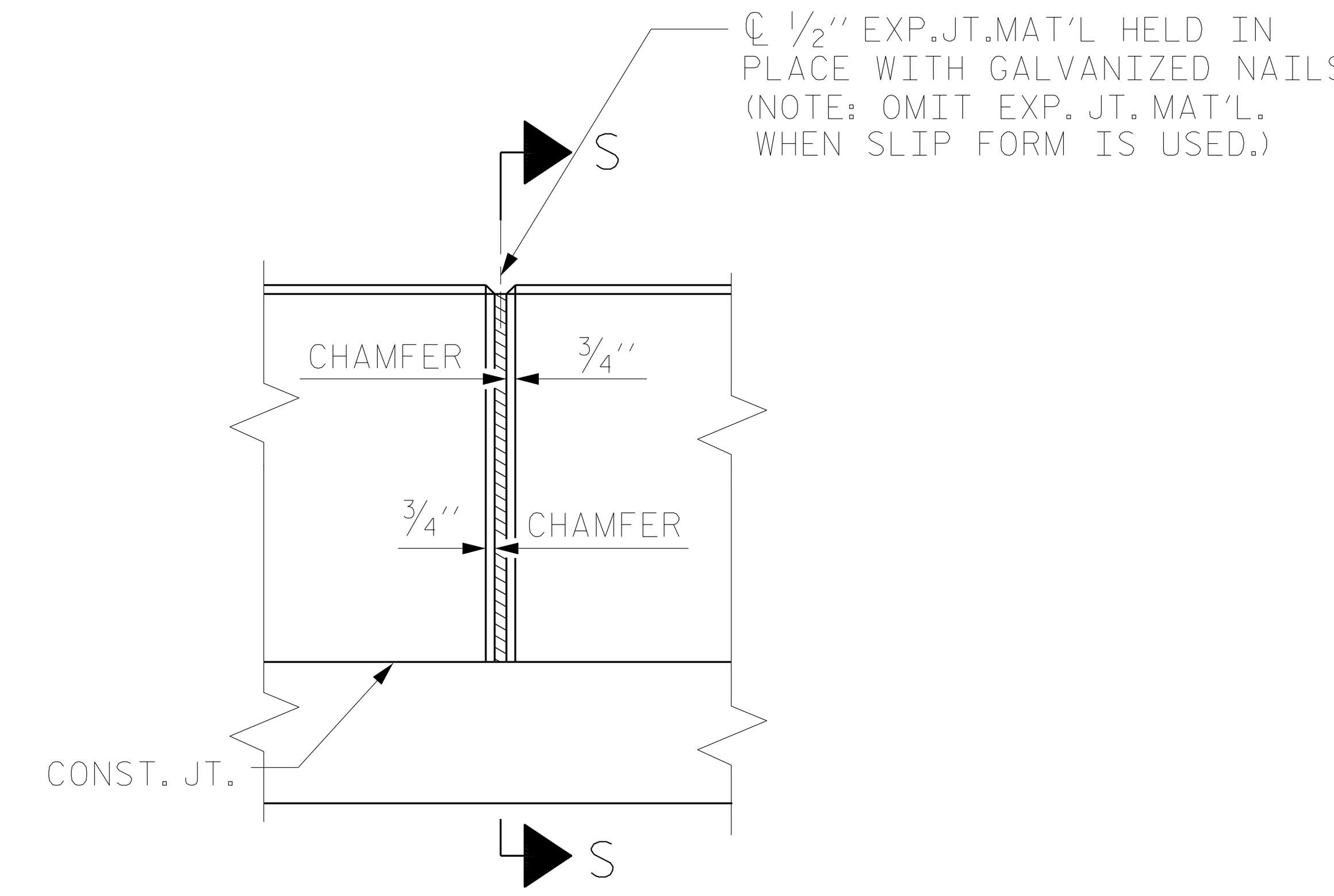


SECTION S-S

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



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

NOTES

THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

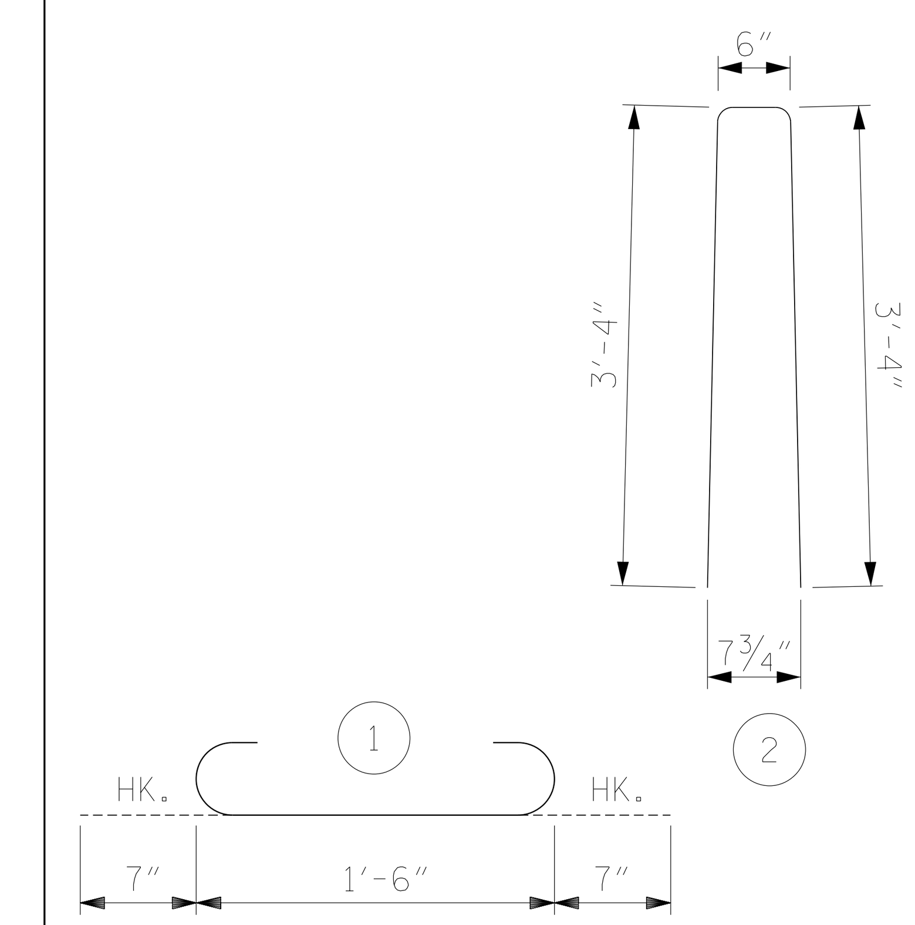
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S3 & S4 BARS SHALL BE INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, AFTER SAWING THE JOINT. THE YIELD LOAD FOR THE #5 S3 & S4 BARS IS 18.6 KIPS. FIELD TESTING FOR THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

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. THE 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.

THE CONTRACTOR SHALL PLACE S1 BARS IN GREEN CONCRETE. THE CONTRACTOR DOES HAVE THE OPTION TO EPOXY S1 BARS.

BAR TYPES



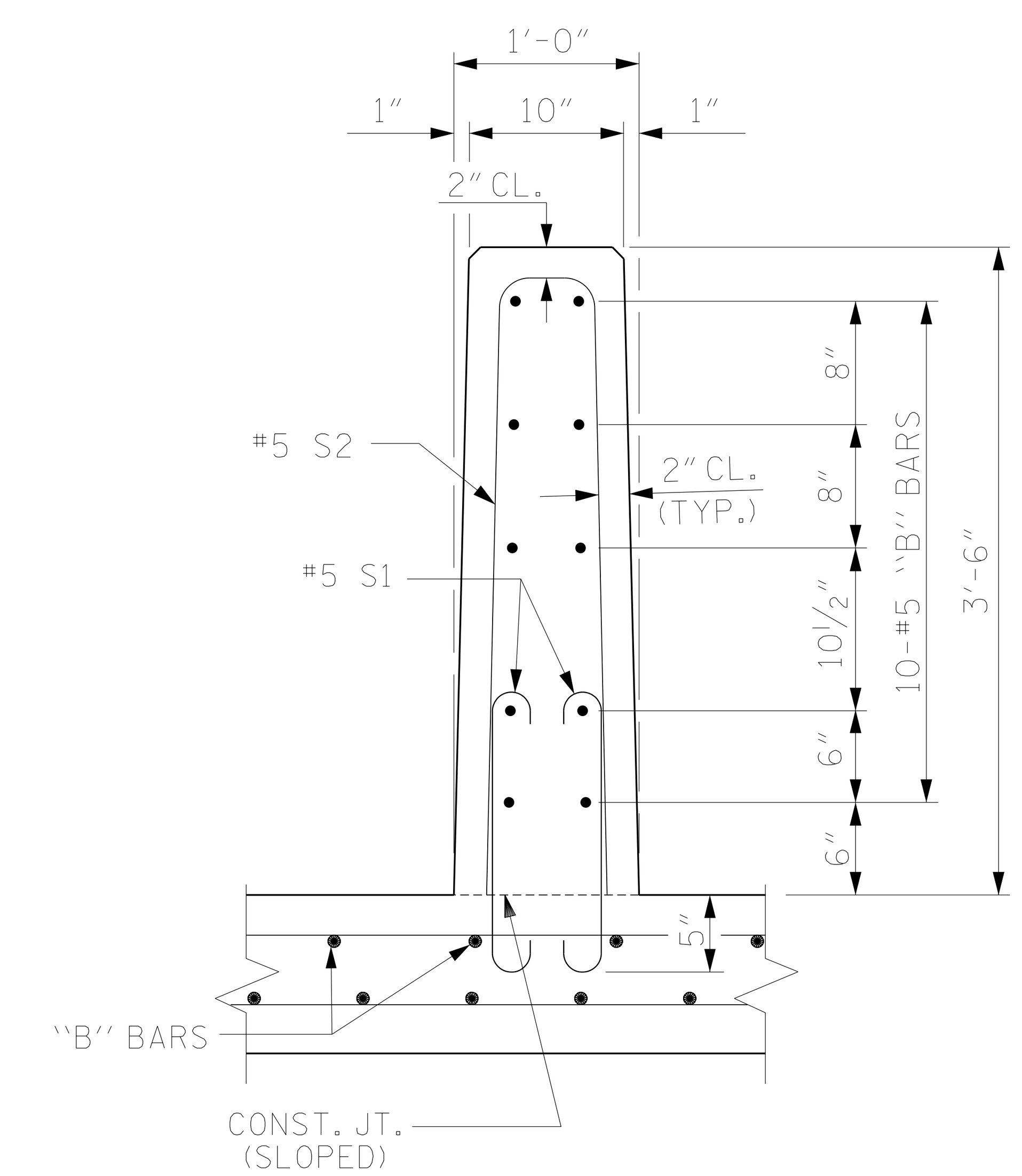
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR VERTICAL CONCRETE BARRIER RAIL ONLY
(INCLUDES TOTAL BARRIER RAIL
ON DECK AND APROACH SLABS)

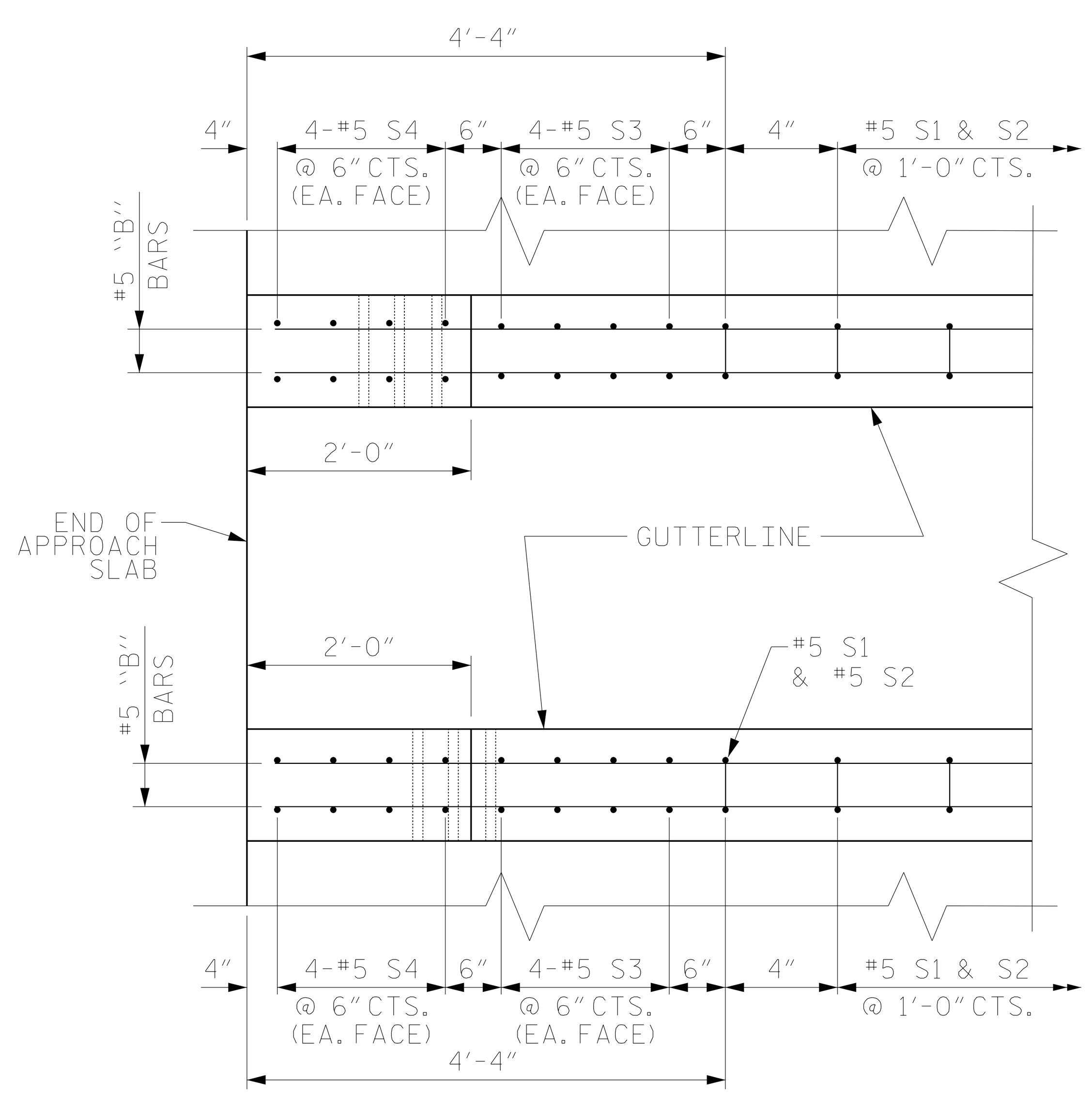
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	100	#5	STR	29'-7"	3,086
* B2	20	#5	STR	28'-9"	600
* B3	20	#5	STR	18'-9"	391
* B4	40	#5	STR	24'-7"	1,026
* S1	976	#5	1	5'-1"	2,715
* S2	488	#5	2	2'-8"	3,684
* S3	32	#5	STR	4'-0"	134
* S4	32	#5	STR	3'-6"	117

* EPOXY COATED REINFORCING STEEL	11,753 LBS.
CLASS AA CONCRETE	58.9 CU. YDS.
VERTICAL CONCRETE BARRIER RAIL	496.67 LIN. FT.

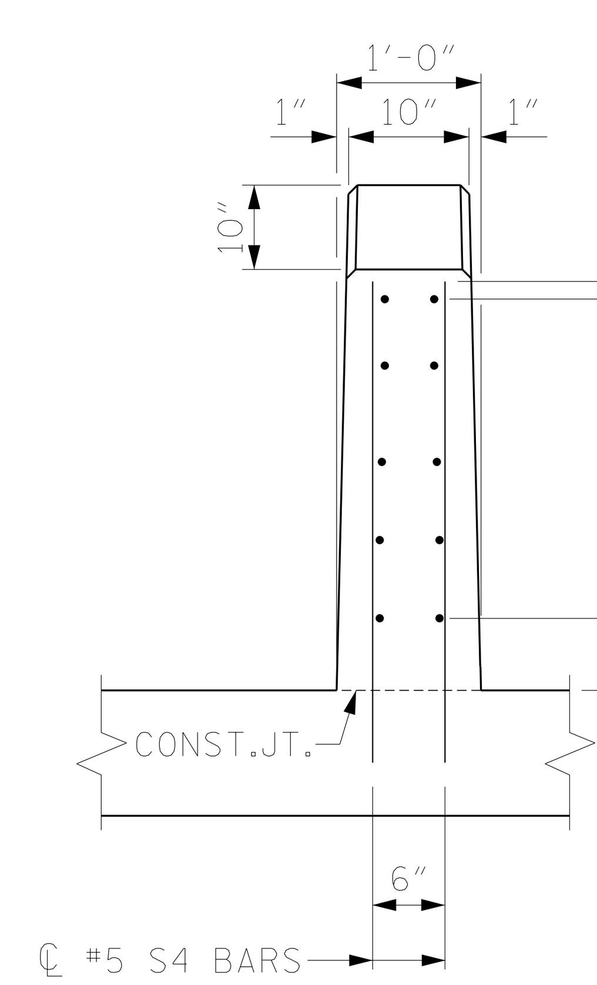


SECTION THRU RAIL

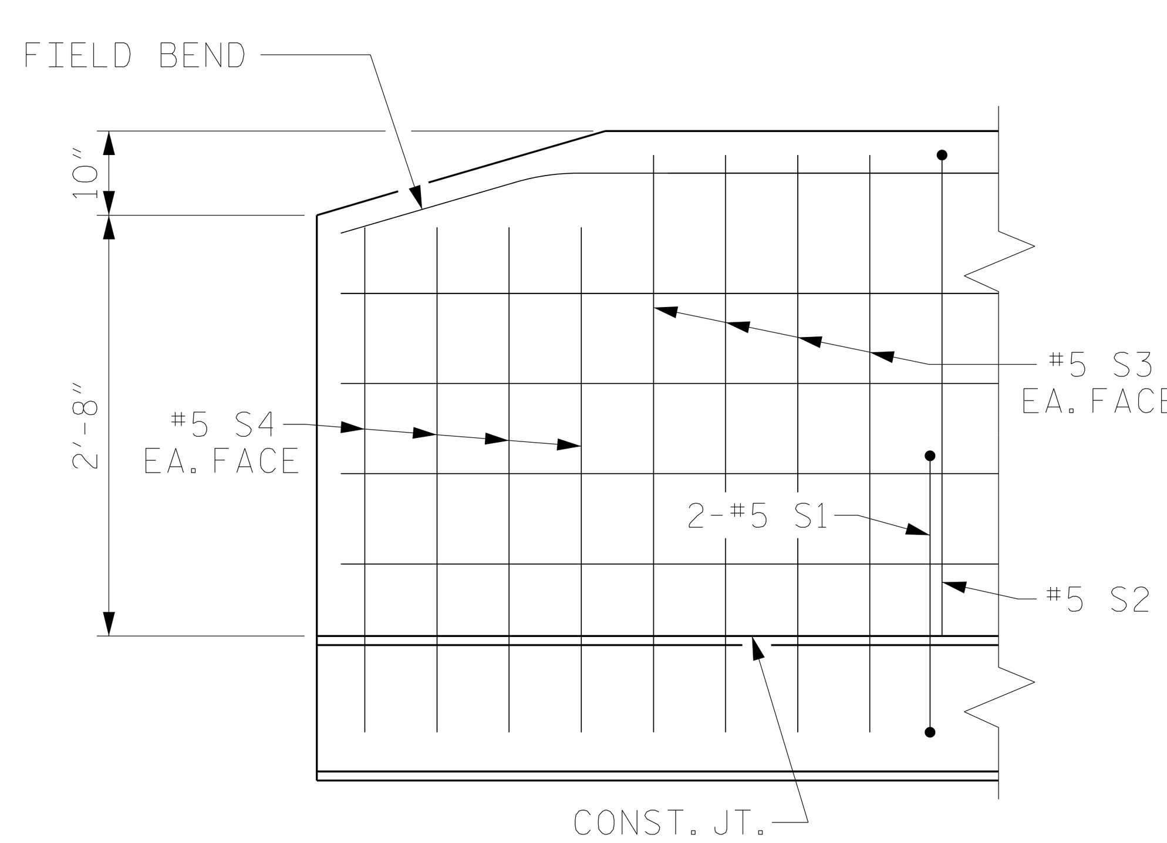
NOTE: CONTRACTOR HAS THE OPTION TO USE ADHESIVELY ANCHORED BARS. LEVEL 2 FIELD TESTING IS REQUIRED FOR ADHESIVELY ANCHORED BARS, PRODUCING A MINIMUM YIELD STRENGTH OF 18.6 KIPS. SEE STANDARD SPECIFICATIONS FOR ADHESIVELY ANCHORED BOLTS OR DOWELS.



PLAN



END VIEW



SIDE VIEW

END OF RAIL DETAILS

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 2 OF 2

Dewberry
2610 WYCLIFF ROAD
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ZACHARY BROWN
DocuSigned by: Zachary Brown
9/16/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

VERTICAL CONCRETE BARRIER RAIL

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1			3				TOTAL SHEETS
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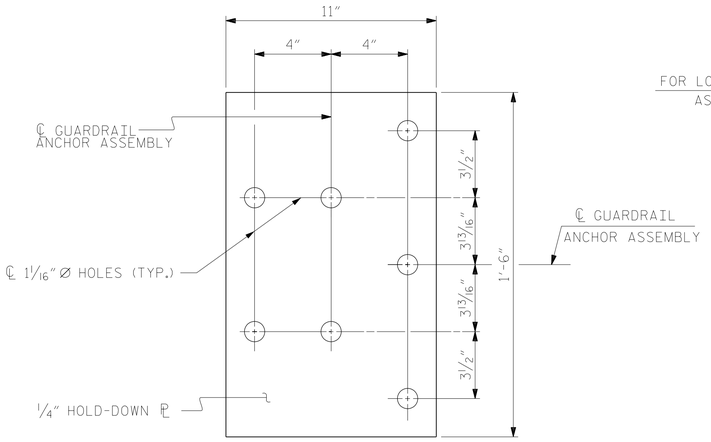
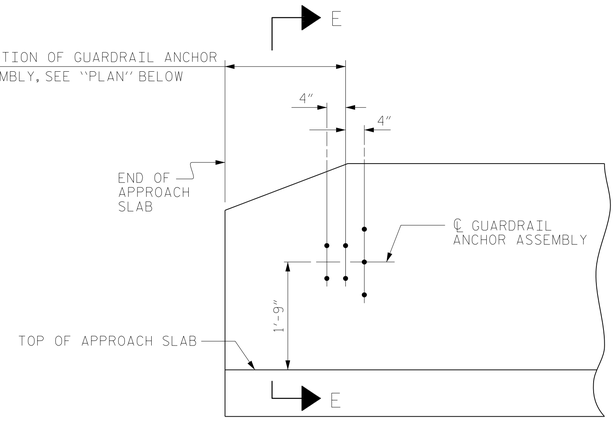
STD. NO. CBR2



PLAN



ELEVATION

NOTES

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

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

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

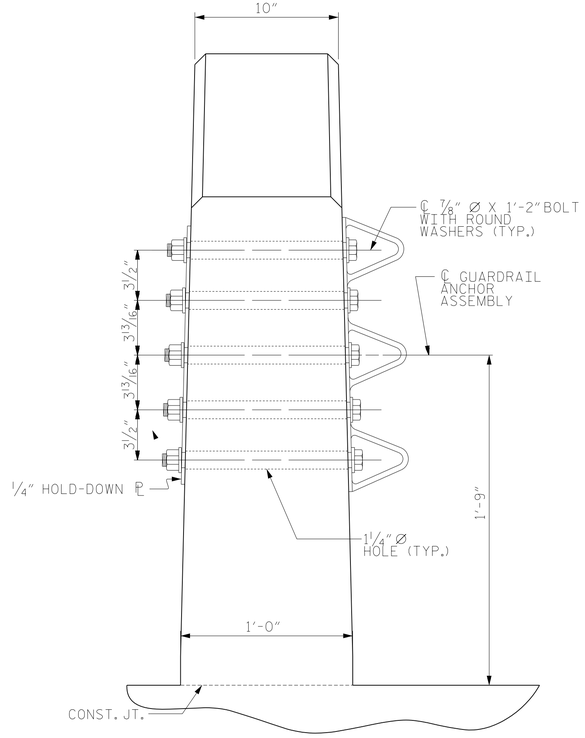
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

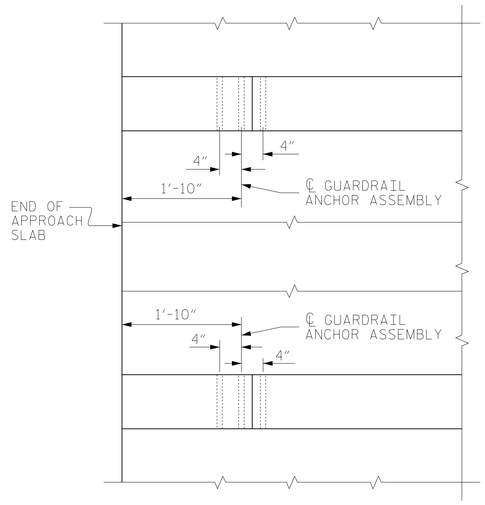
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE VERTICAL CONCRETE BARRIER RAIL TO CLEAR ASSEMBLY BOLTS.

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



SECTION E-E

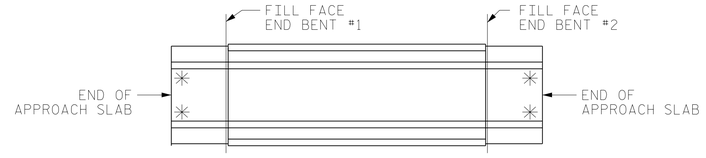
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

APPROACH SLAB AT END BENT #1 SHOWN, APPROACH SLAB AT END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENT

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY TO VERTICAL CONCRETE BARRIER RAIL

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

Dewberry
2610 WYCLIFF ROAD
SUITE 410
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PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 048185 ENGINEER ZACHARY BROWN
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9/16/2022

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GUARDRAIL ANCHORAGE DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

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1			3			TOTAL SHEETS
2			4			41

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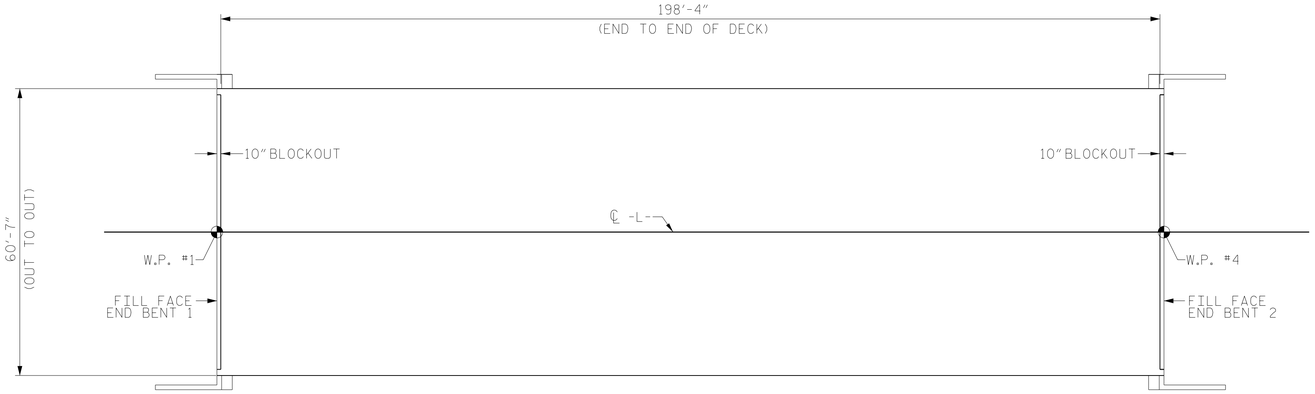


LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 12016)

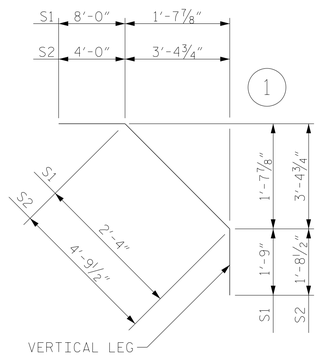
REINFORCING BAR SCHEDULE

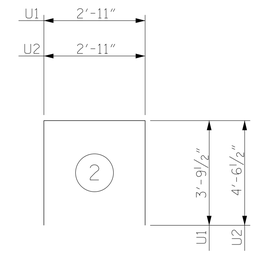
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	860	#5	STR	31'-4"	28105
✳ A2	860	#5	STR	31'-4"	28105
B1	156	#5	STR	40'-0"	6508
✳ B2	192	#5	STR	29'-6"	5908
✳ B3	196	#5	STR	28'-9"	5877
✳ B4	146	#4	STR	13'-6"	1317
✳ B5	49	#4	STR	27'-3"	892
✳ B6	49	#4	STR	30'-10"	1009
✳ B7	49	#4	STR	17'-3"	565
✳ B8	144	#5	STR	16'-0"	2403
B9	156	#4	STR	35'-0"	3647
B10	78	#4	STR	15'-1"	786
B11	71	#4	STR	39'-10"	1889
B12	78	#4	STR	11'-7"	604
B13	71	#4	STR	38'-6"	1826
B14	78	#5	STR	33'-6"	2725
K1	20	#4	STR	31'-0"	414
K2	10	#4	STR	8'-8"	58
K3	20	#4	STR	9'-8"	129
K4	10	#4	STR	8'-11"	60
K5	10	#4	STR	8'-2"	55
K6	4	#4	STR	2'-2"	6
K7	8	#4	STR	2'-8"	14
K8	4	#4	STR	2'-4"	6
K9	4	#4	STR	1'-11"	5
✳ S1	98	#4	1	12'-1"	791
✳ S2	98	#4	1	10'-6"	687
U1	98	#4	2	10'-6"	687
U2	4	#4	2	12'-0"	32

REINFORCING STEEL = 19,451 LBS.

✳ EPOXY COATED REINFORCING STEEL = 75,659 LBS.

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT

GROOVING BRIDGE FLOORS

APPROACH SLABS	1790 SQ.FT.
BRIDGE DECK	7326 SQ.FT.
TOTAL	9116 SQ.FT.

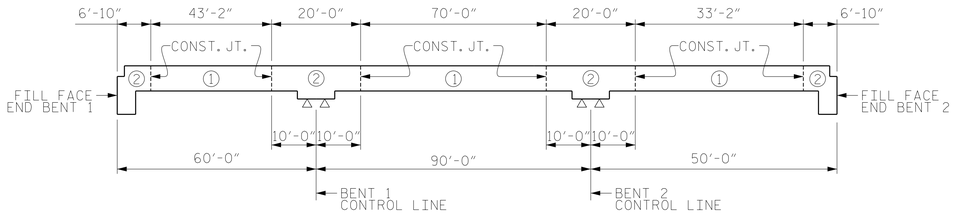
POUR SEQUENCE BREAKDOWN

	CLASS AA CONCRETE (CU. YDS.)
POUR 1	289.9
POUR 2	169.1
TOTALS**	459.0

** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS

BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPETS, AND BARRIER RAILS		APPROACH SLABS		PARAPETS AND BARRIER RAILS
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			



POUR SEQUENCE

POUR ② CANNOT BE STARTED UNTIL BOTH ADJACENT ① POURS REACH A MINIMUM OF 3000 PSI.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

REPLACES BRIDGE NO. 126

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL SEAL 046785 ENGINEER ZACHARY BROWN
Docusigned by: Zachary Brown 431B0869053486E...
9/16/2022

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STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			41

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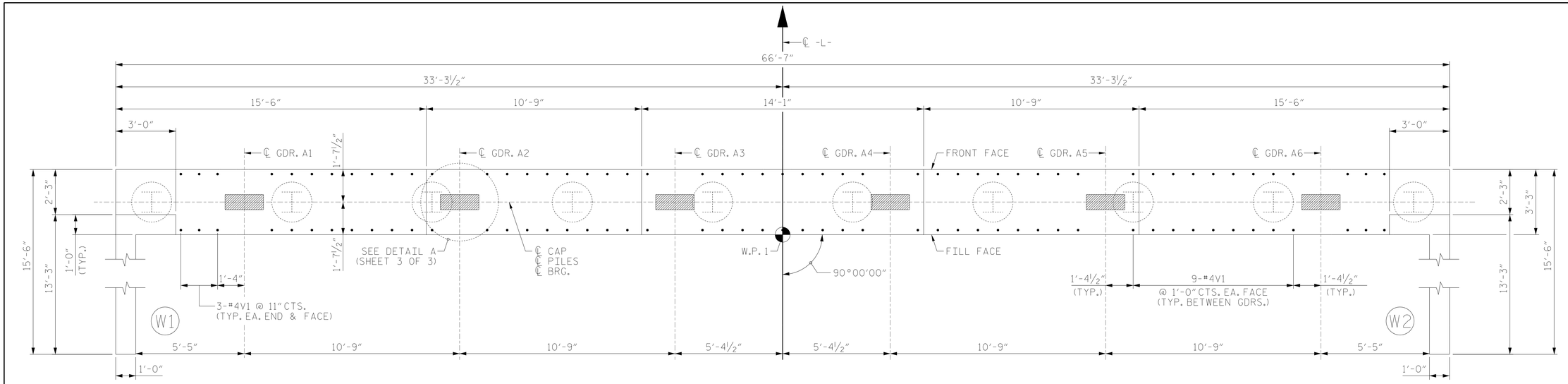
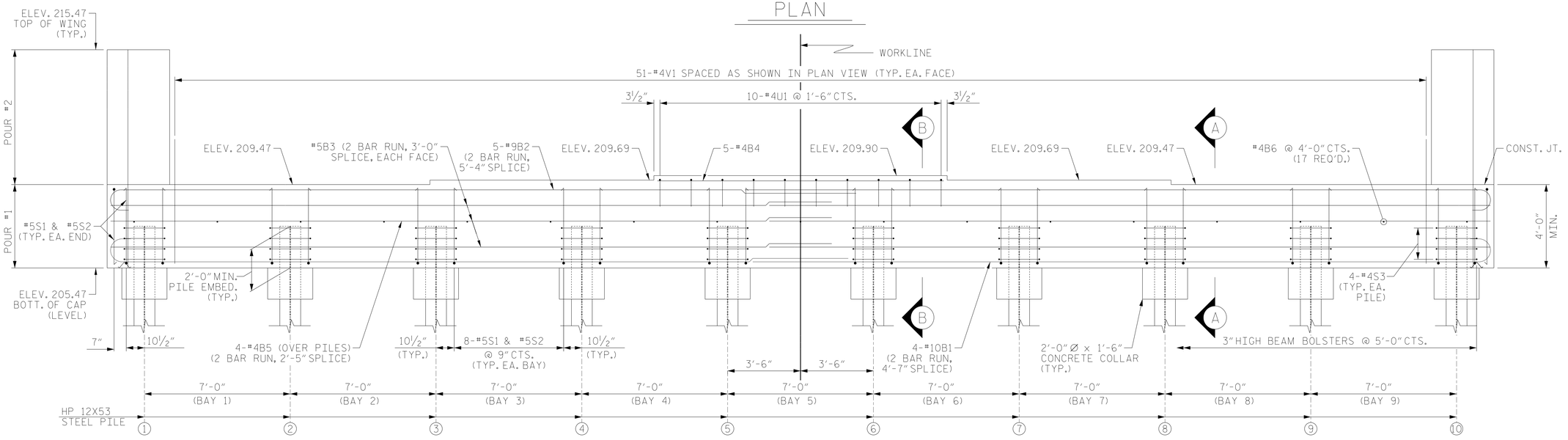


PLAN



ELEVATION

NOTES:

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF ¼".

#4V1 BARS MAY BE SHIFTED SLIGHTLY TO AVOID STIRRUPS IN THE CAP.

FOR SECTIONS A-A & B-B, AND DETAIL A, SEE SHEET 3 OF 3.

SEE "GENERAL DRAWING FOUNDATION LAYOUT" FOR ADDITIONAL NOTES FOR DRIVING PILES.

FOR TEMPORARY DRAINAGE AT END BENT DETAIL SEE "SUBSTRUCTURE END BENT 1" SHEET 3 OF 3.

FOR PILE SPLICE DETAILS, SEE "SUBSTRUCTURE END BENT 1" SHEET 3 OF 3.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 126

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SUBSTRUCTURE

END BENT 1

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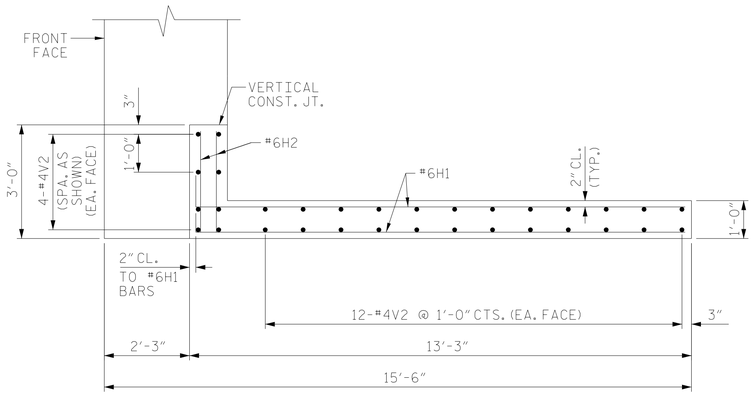
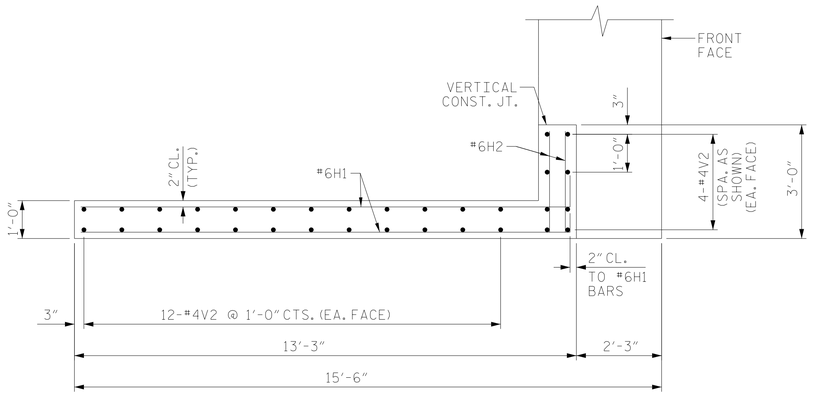
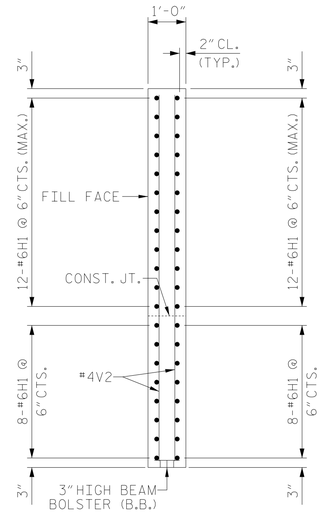


PLAN OF WING (W1)



PLAN OF WING (W2)



SECTION X-X

ELEVATION OF WING (W1)

ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 2 OF 3 REPLACES BRIDGE NO. 126

Dewberry
2610 WYCLIFF ROAD
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RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : Z. BROWN DATE : OCT. 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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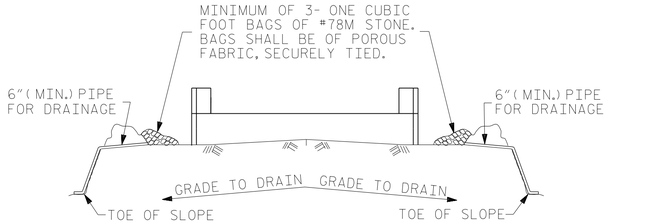
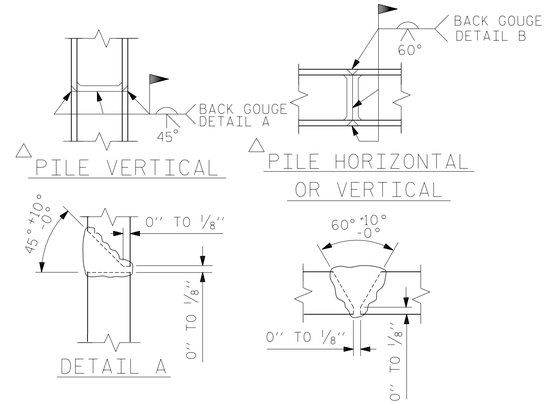


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

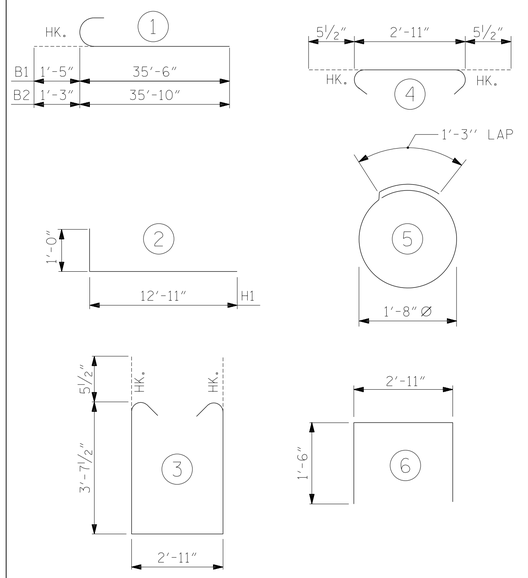
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	36'-11"	1271
B2	10	#9	1	37'-1"	1261
B3	12	#5	STR	31'-8"	396
B4	5	#4	STR	13'-8"	46
B5	8	#4	STR	34'-4"	183
B6	17	#4	STR	2'-11"	33
H1	80	#6	2	13'-11"	1672
H2	48	#6	2	2'-8"	192
S1	76	#5	3	11'-1"	879
S2	76	#5	4	3'-10"	304
S3	40	#4	5	6'-6"	174
U1	10	#4	6	5'-11"	40
V1	102	#4	STR	6'-0"	409
V2	64	#4	STR	9'-8"	413

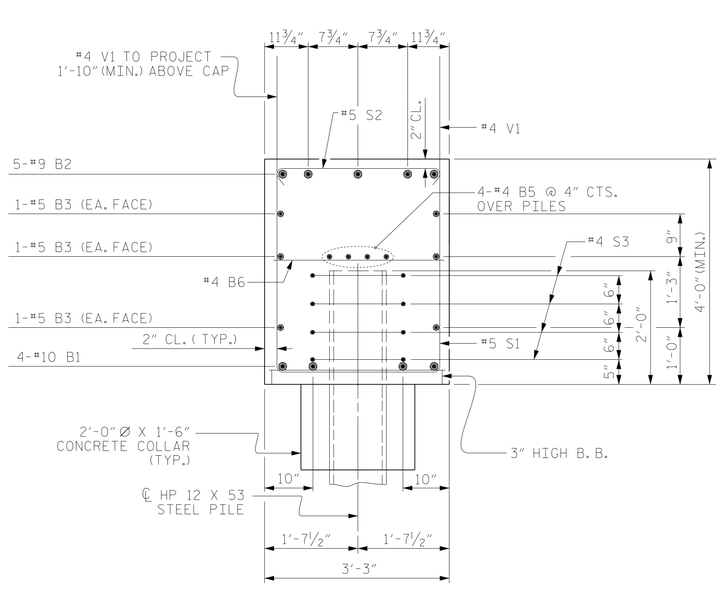
REINFORCING STEEL (FOR ONE END BENT) 7,273 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

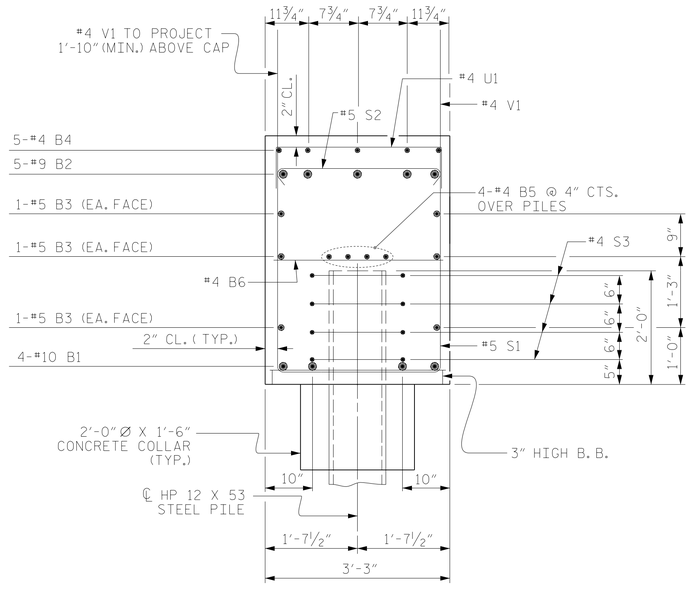
POUR #1 CAP, LOWER PART OF WINGS & COLLARS 38.7 C.Y.

POUR #2 UPPER PART OF WINGS 7.2 C.Y.

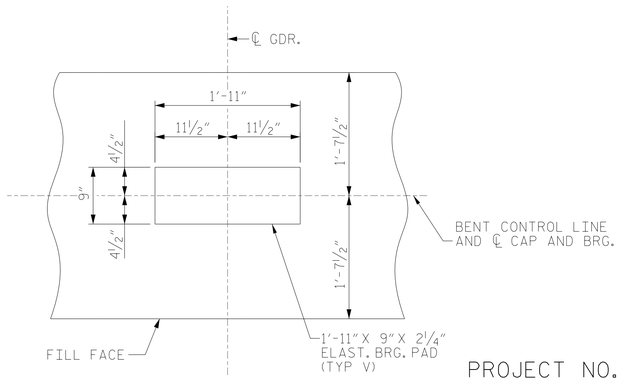
TOTAL CLASS A CONCRETE 45.9 C.Y.



SECTION A-A



SECTION B-B



DETAIL A

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 3 OF 3 REPLACES BRIDGE NO. 126

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046185 — Digitally signed by Zachary Brown — ENGINEER ZACHARY BROWN

9/16/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : Z. BROWN DATE : OCT. 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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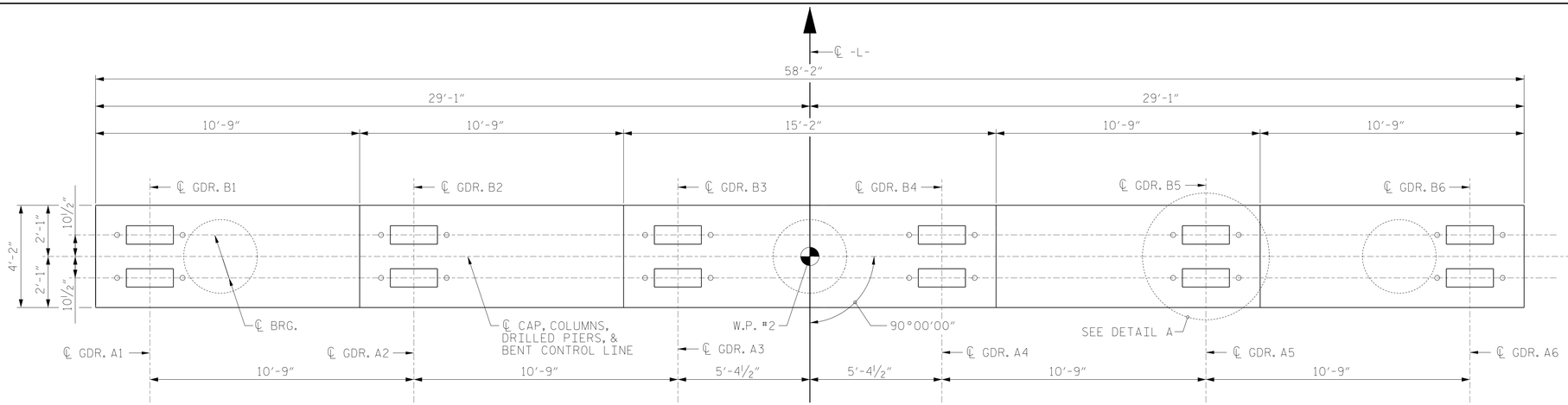


PLAN

NOTES

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

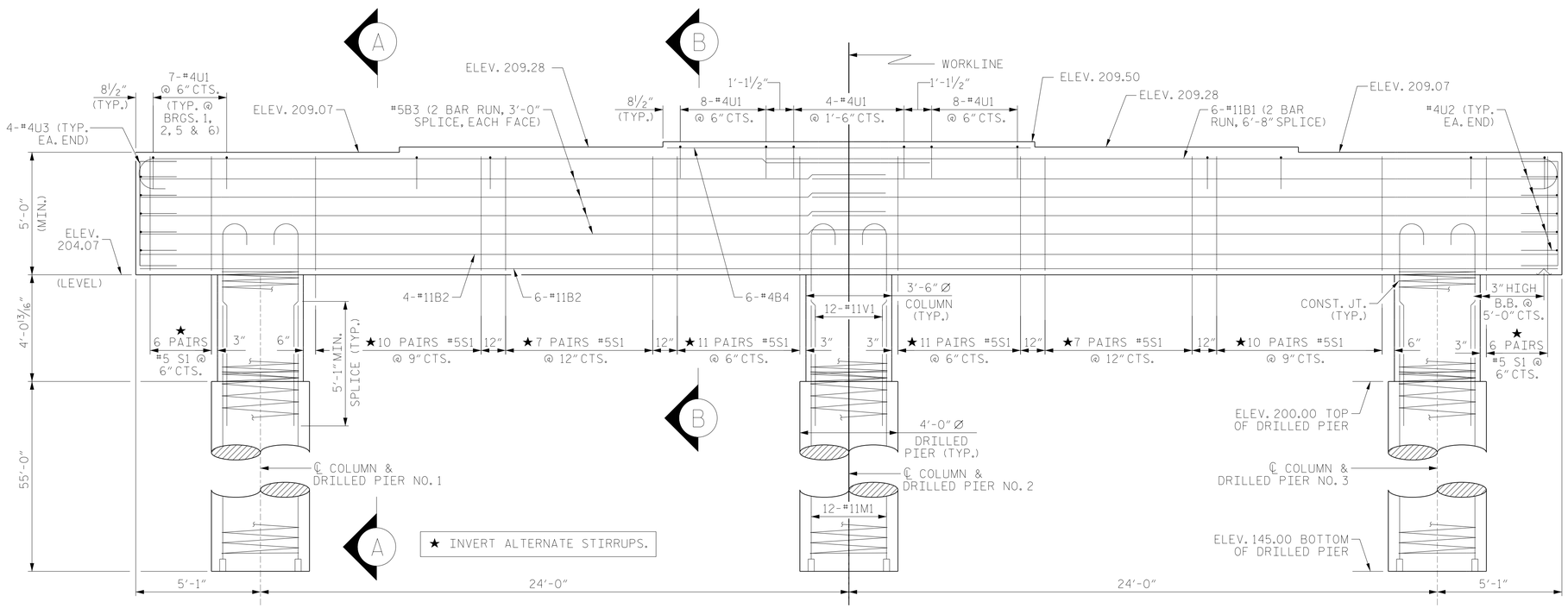
FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

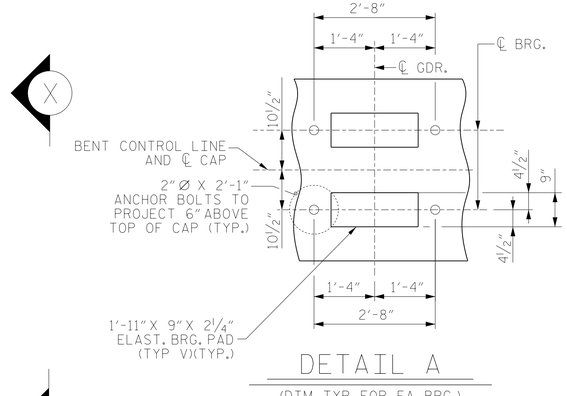
INVERT ALTERNATE STIRRUPS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



ELEVATION



DETAIL A

(DIM. TYP. FOR EA. BRG.)

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 1 OF 2 REPLACES BRIDGE NO. 126

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL SEAL 047785 ENGINEER ZACHARY BROWN

Docusigned by: Zachary Brown 431B0B0B0C5A4B4...

9/16/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : Z. BROWN DATE : OCT. 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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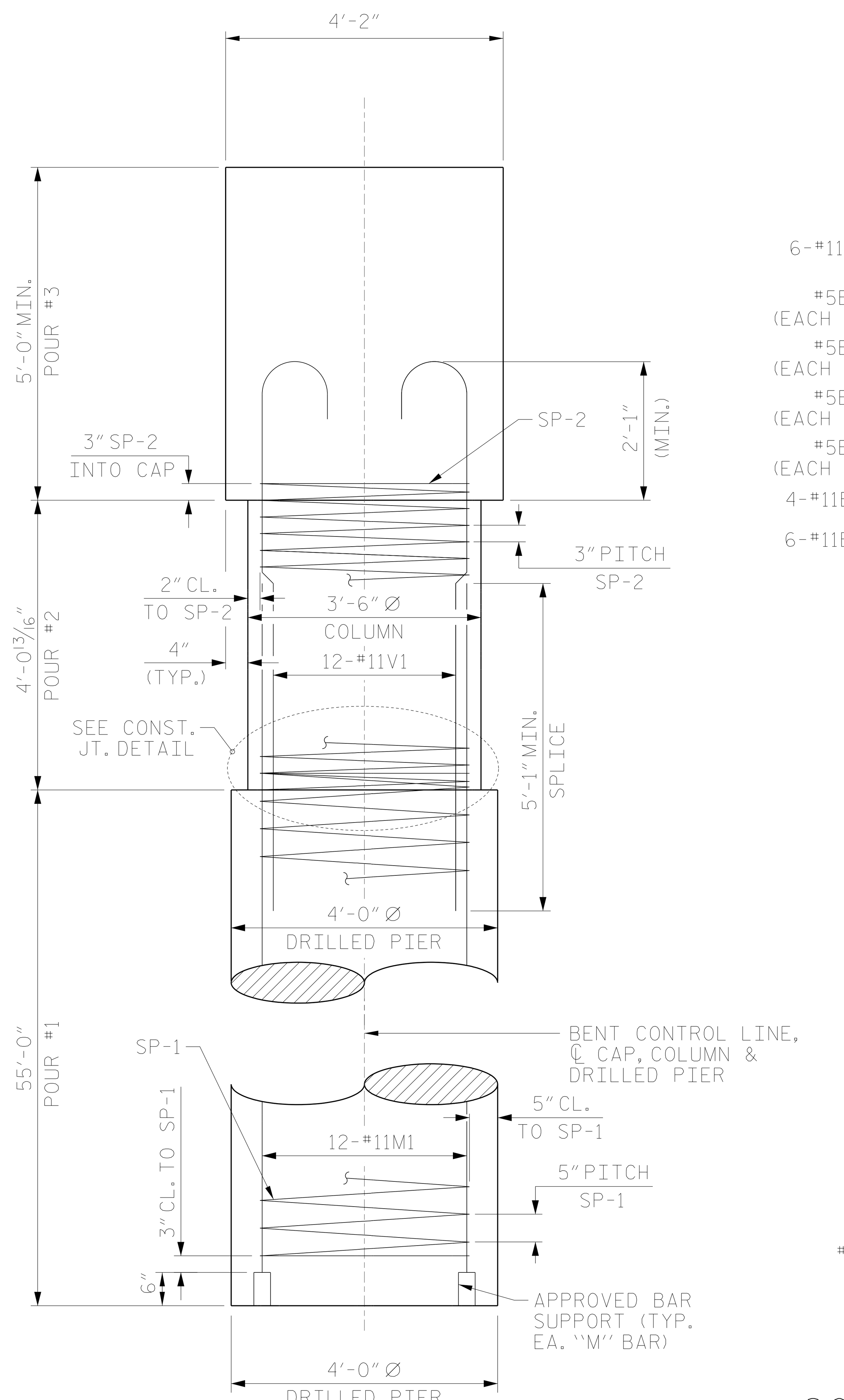
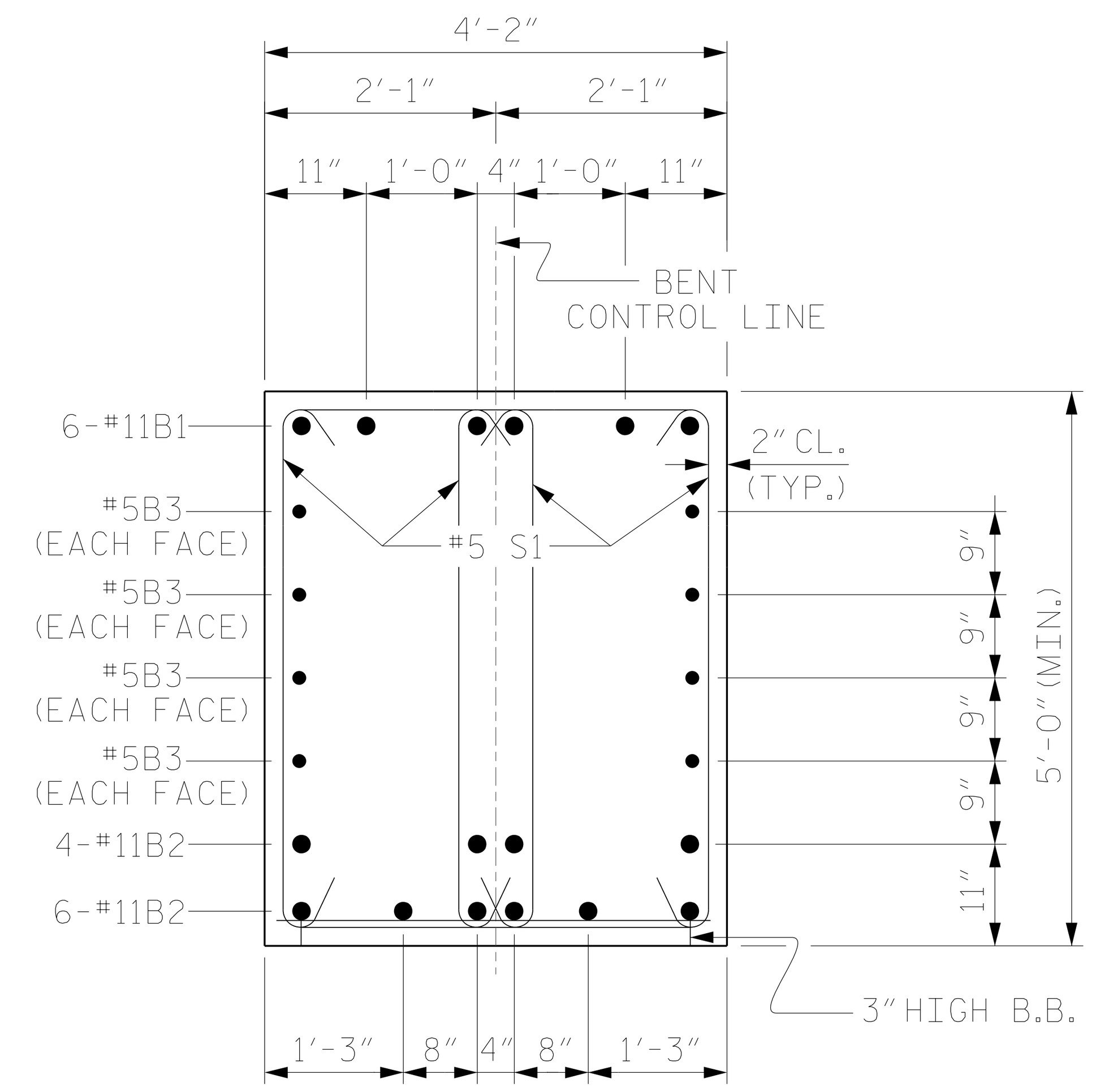
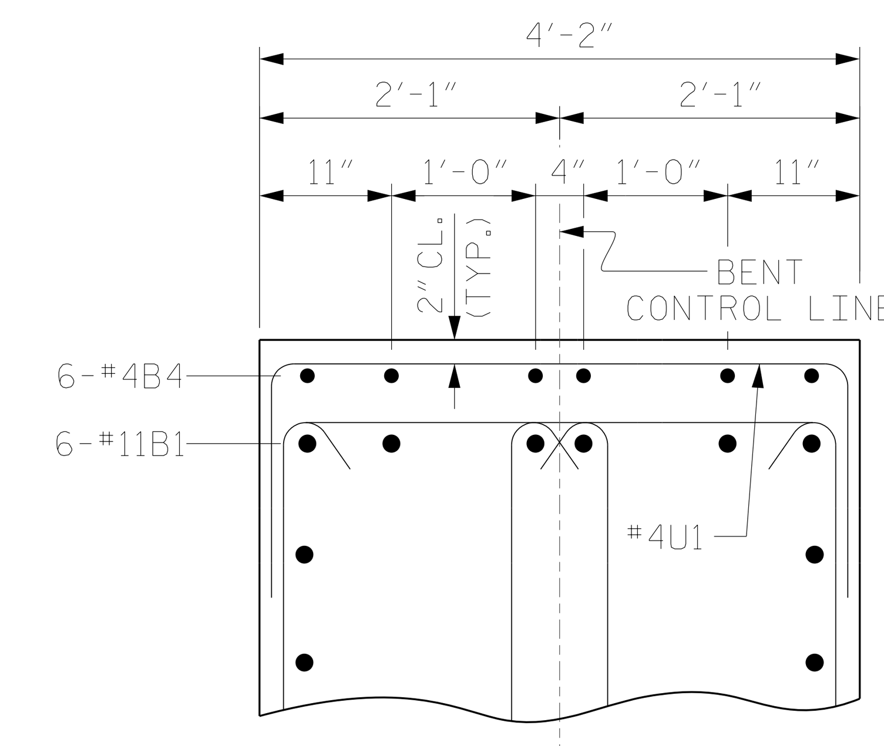


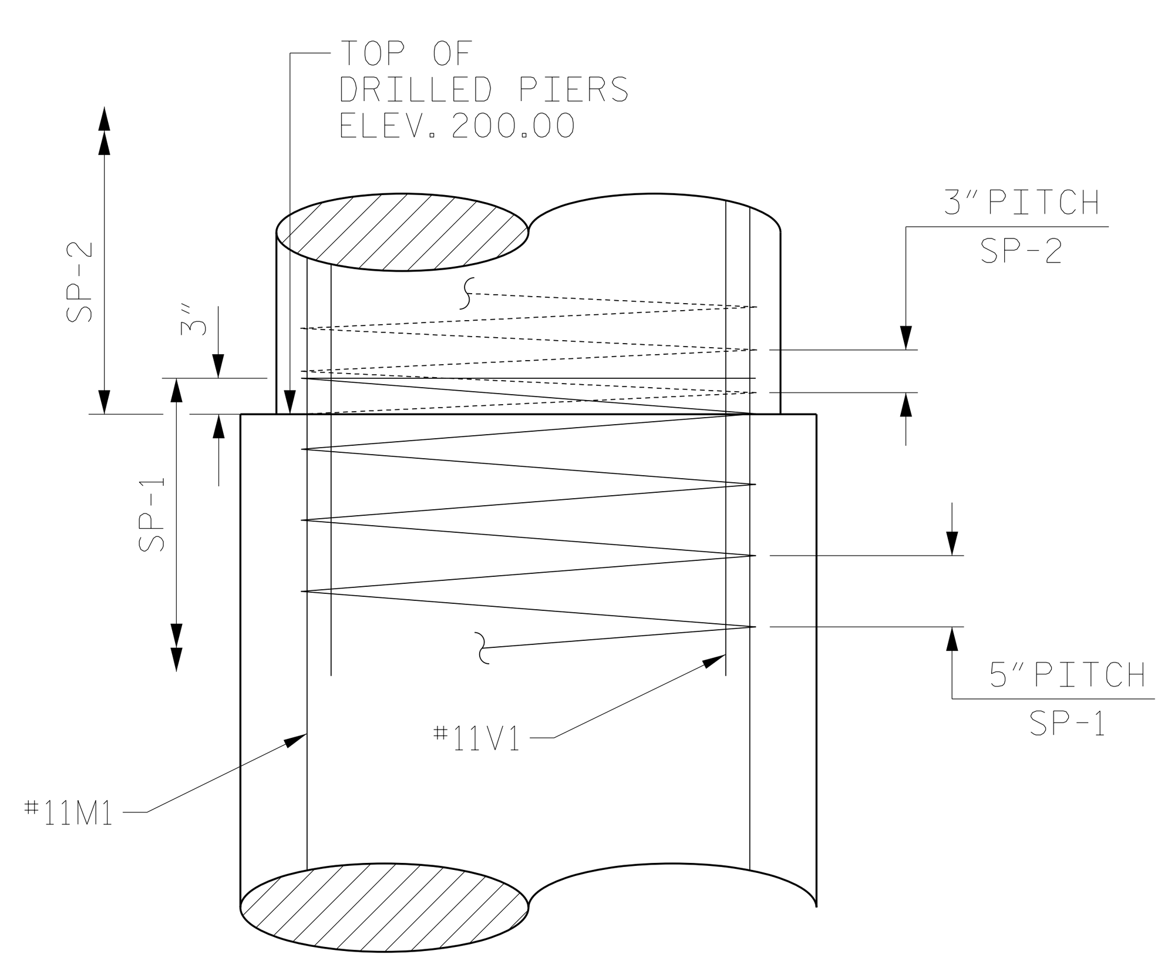
END VIEW



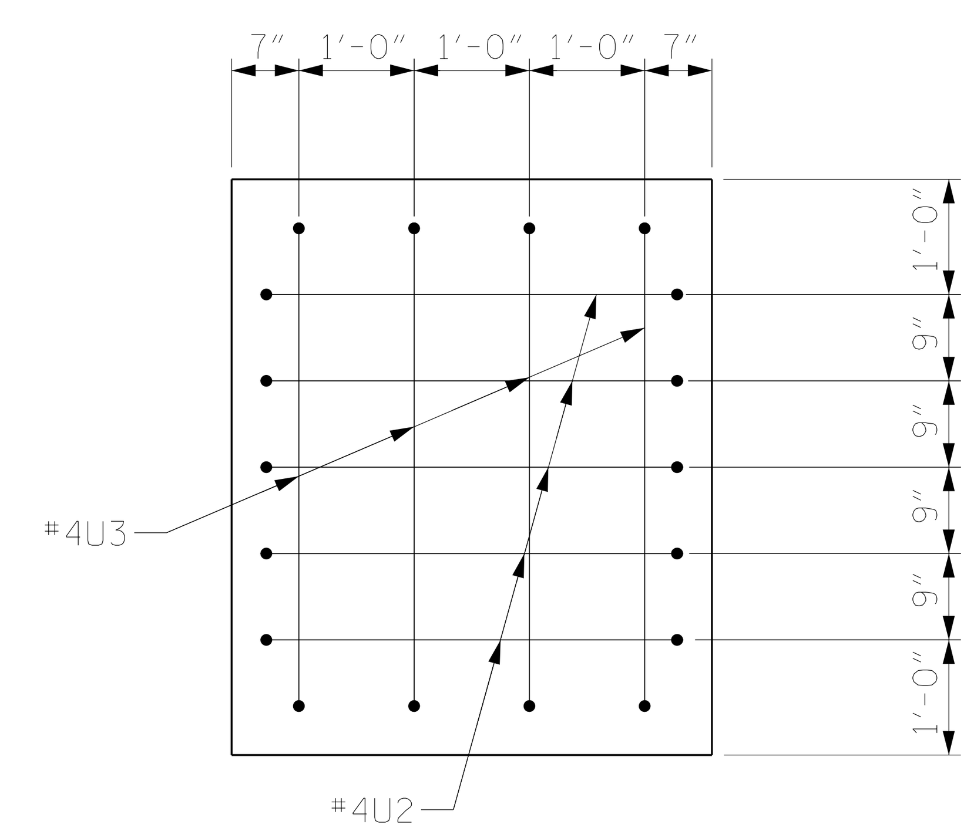
SECTION A-A



SECTION B-B



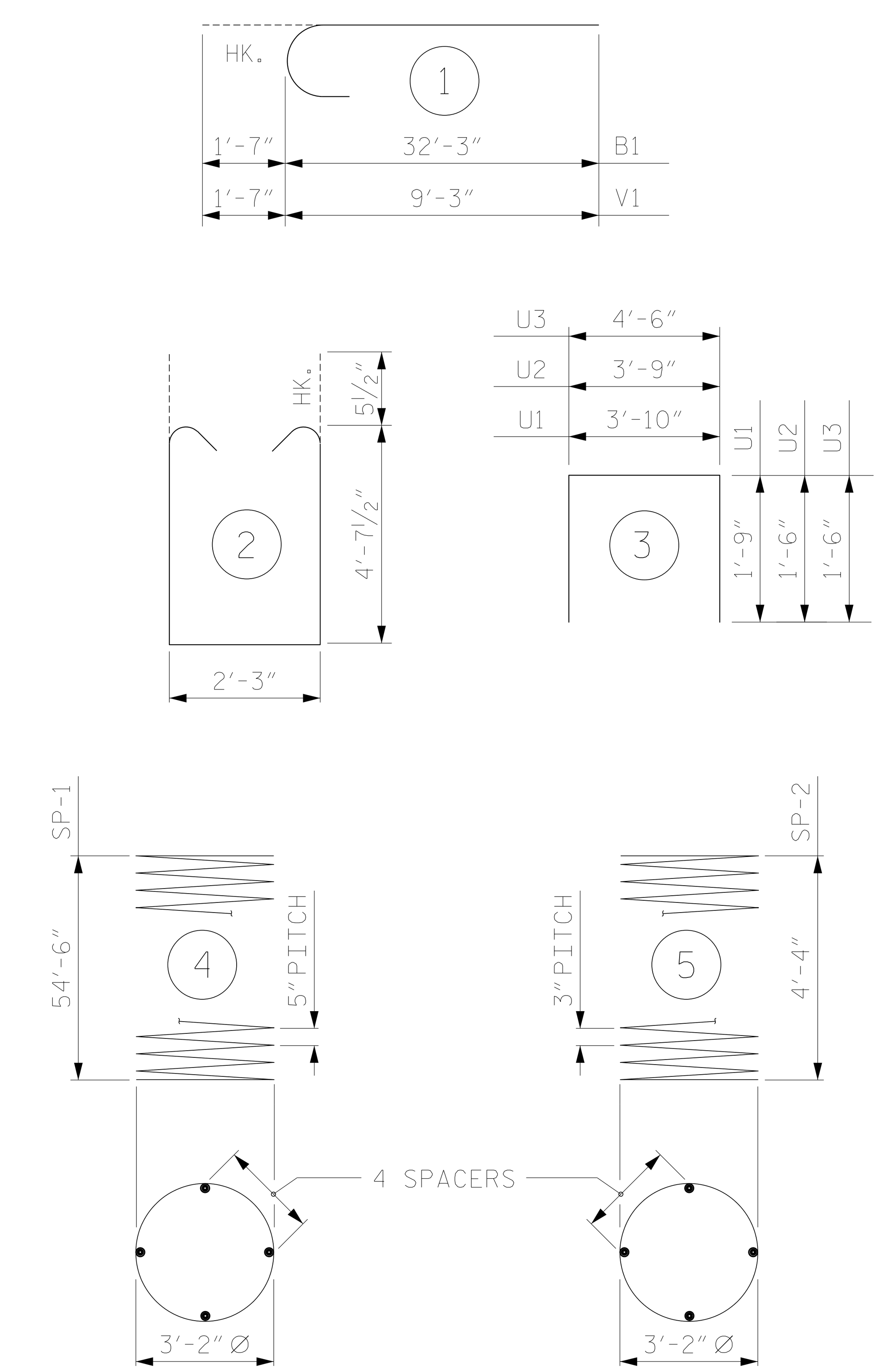
CONSTRUCTION JOINT DETAIL



VIEW X-X

(TYP. BOTH ENDS)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#11	1	33'-10"	2,157
B2	10	#11	STR	57'-10"	2,860
B3	16	#5	STR	30'-5"	508
B4	6	#4	STR	14'-10"	59
M1	36	#11	STR	60'-0"	11,476
S1	136	#5	2	12'-5"	1,761
U1	48	#4	3	7'-4"	235
U2	10	#4	3	6'-9"	45
U3	8	#4	3	7'-6"	40
V1	36	#11	1	10'-10"	2,072
REINFORCING STEEL					21,213 LBS.
SP-1	3	**	4	1290'-6"	4,038
SP-2	3	***	5	203'-6"	408
SPIRAL COLUMN REINFORCING STEEL					4,446 LBS.

** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

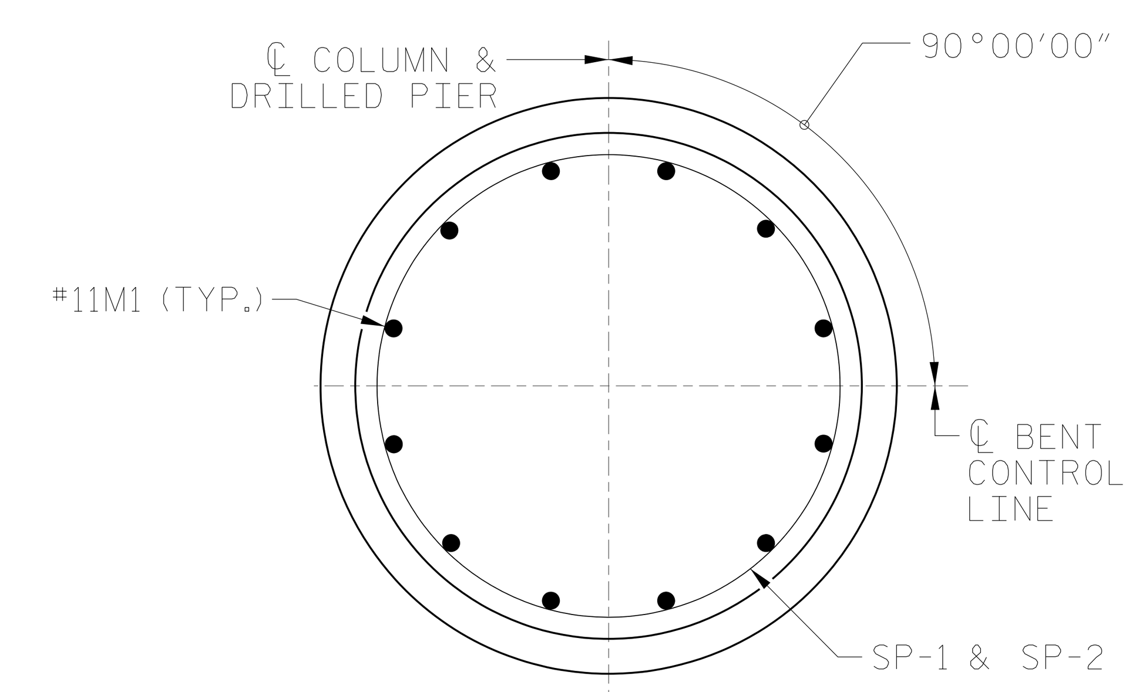
*** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

CLASS A CONCRETE BREAKDOWN

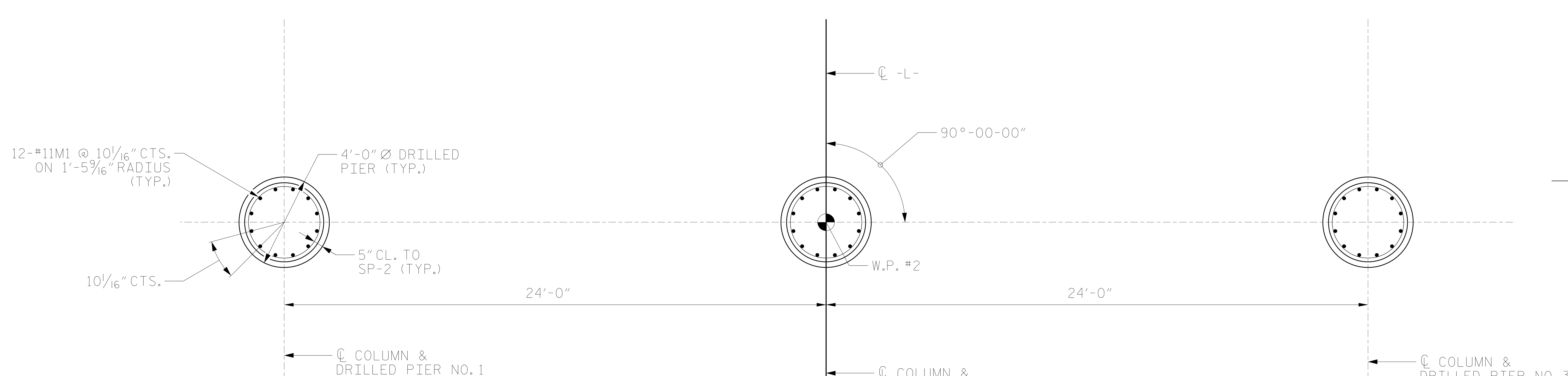
POUR #2 (COLUMNS)	4.4 C.Y.
POUR #3 (CAP)	46.6 C.Y.
TOTAL CLASS A CONCRETE	51.0 C.Y.

DRILLED PIER QUANTITES

POUR #1 (DRILLED PIER)	76.8 C.Y.
4'-0" Ø DRILLED PIERS IN SOIL	144.0 L.F.
4'-0" Ø DRILLED PIERS NOT IN SOIL	21.0 L.F.
CSL TUBES	678.0 L.F.



COLUMN & DRILLED PIER DETAIL



PLAN OF COLUMNS AND DRILLED SHAFTS

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 2 OF 2 REPLACES BRIDGE NO. 126

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ZACHARY BROWN
DocuSigned by: Zachary Brown
9/16/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S-33
TOTAL SHEETS 41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : Z. BROWN DATE : OCT. 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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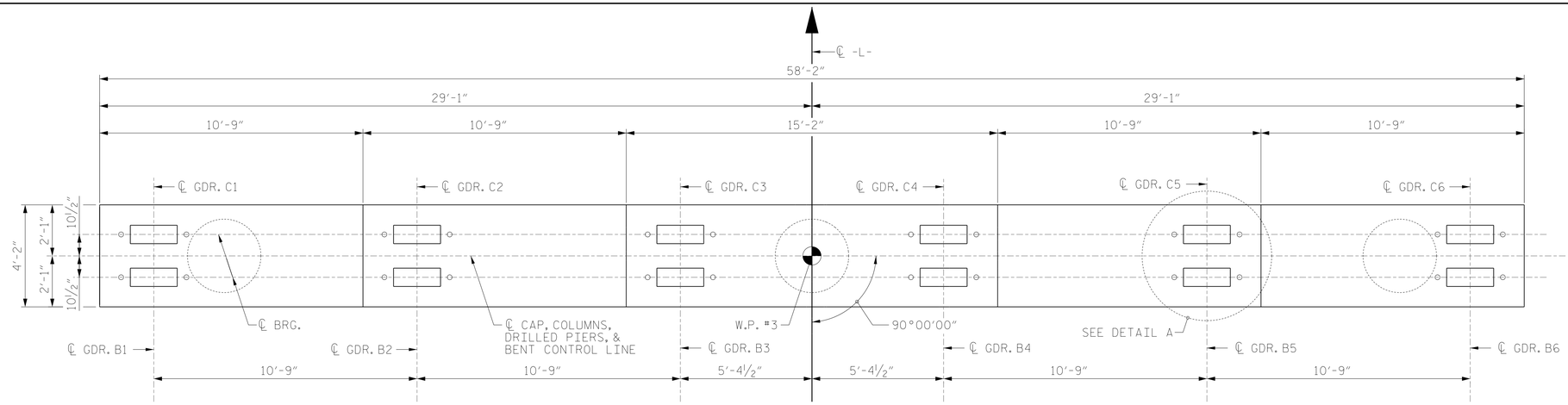


PLAN

NOTES

STIRRUPS IN CAP AND "U" BARS MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS ON "V" BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

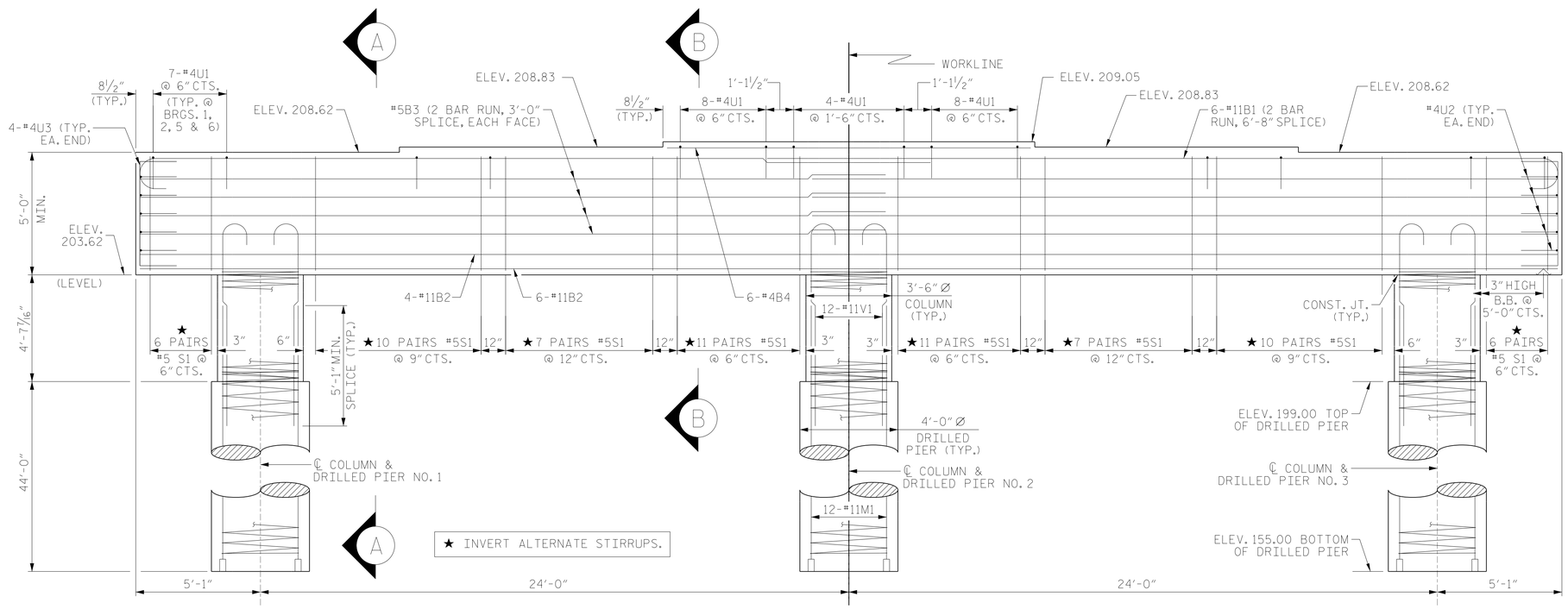
FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL."

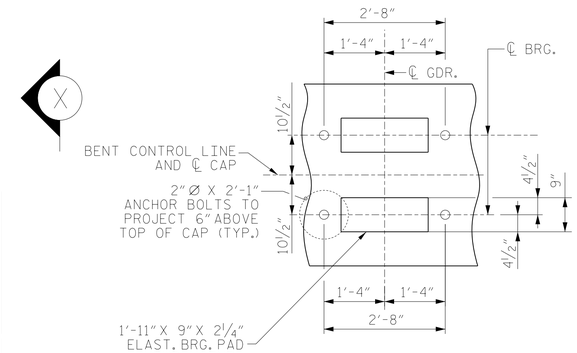
INVERT ALTERNATE STIRRUPS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT ONE FOOT BELOW THE GROUND LINE.

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.



ELEVATION



DETAIL A

(DIM. TYP. FOR EA. BRG.)

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 1 OF 2 REPLACES BRIDGE NO. 126

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 — Docusigned by: Zachary Brown — ENGINEER ZACHARY BROWN

9/16/2022

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : Z. BROWN DATE : OCT. 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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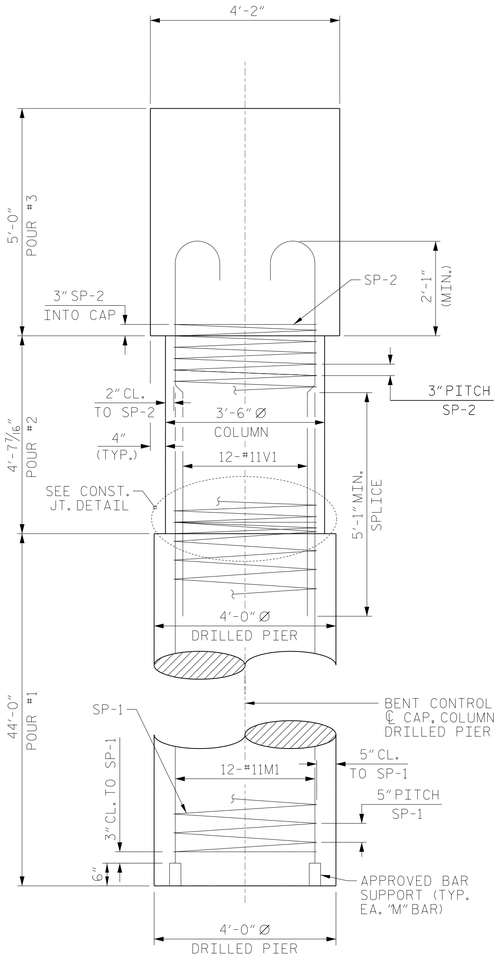
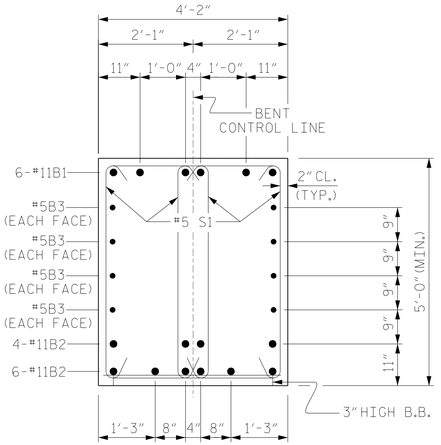
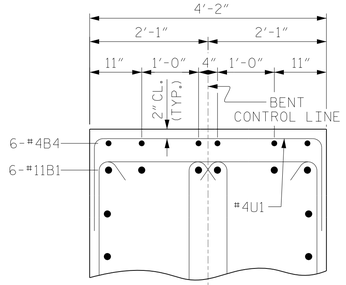


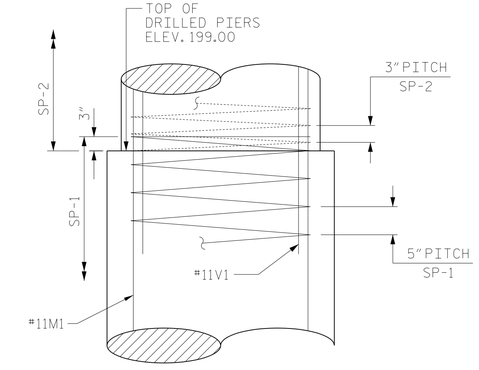
END VIEW



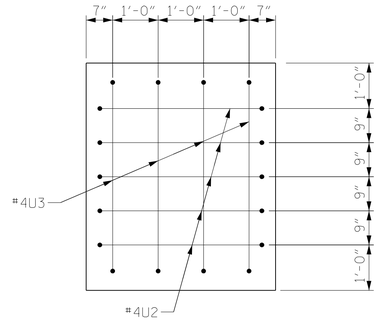
SECTION A-A



SECTION B-B



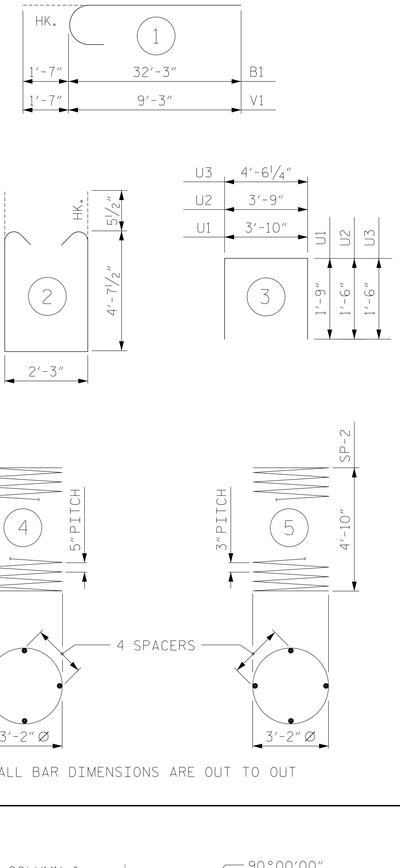
CONSTRUCTION JOINT DETAIL



VIEW X-X

(TYP. BOTH ENDS)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#11	1	33'-10"	2,157
B2	20	#11	STR	57'-10"	2,860
B3	16	#5	STR	30'-5"	508
B4	6	#4	STR	14'-10"	59
M1	36	#11	STR	50'-1"	9,579
S1	136	#5	2	12'-5"	1,761
U1	48	#4	3	7'-4"	235
U2	10	#4	3	6'-9"	45
U3	8	#4	3	7'-6"	40
V1	36	#11	1	10'-10"	2,072

REINFORCING STEEL 19,316 LBS.

SP-1	3	**	4	1,040'-1"	3,254
SP-2	3	***	5	222'-11"	447

SPIRAL COLUMN REINFORCING STEEL 3,701 LBS.

** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

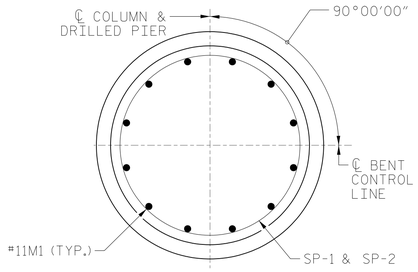
*** THE SP-2 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

CLASS A CONCRETE BREAKDOWN

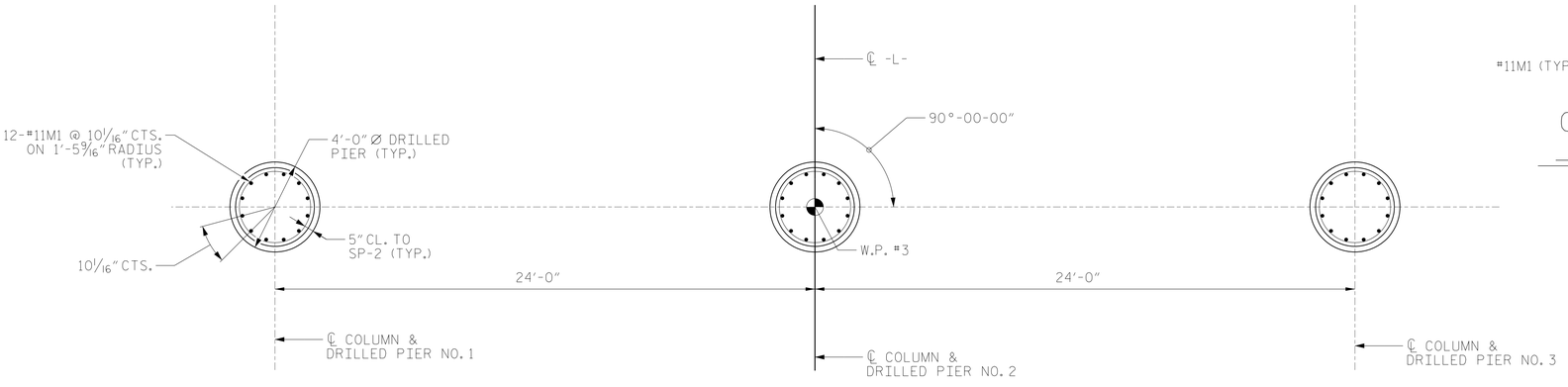
POUR #2 (COLUMNS)	4.9 C.Y.
POUR #3 (CAP)	46.6 C.Y.
TOTAL CLASS A CONCRETE	51.5 C.Y.

DRILLED PIER QUANTITES

POUR #1 (DRILLED PIER)	61.4 C.Y.
4'-0" Ø DRILLED PIERS IN SOIL	99.0 L.F.
4'-0" Ø DRILLED PIERS NOT IN SOIL	33.0 L.F.
CSL TUBES	546.0 L.F.



COLUMN & DRILLED PIER DETAIL



PLAN OF COLUMNS AND DRILLED SHAFTS

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 2 OF 2 REPLACES BRIDGE NO. 126

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ENGINEER ZACHARY BROWN
Documents by: Zachary Brown
9/16/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : Z. BROWN DATE : OCT. 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

9/16/2022
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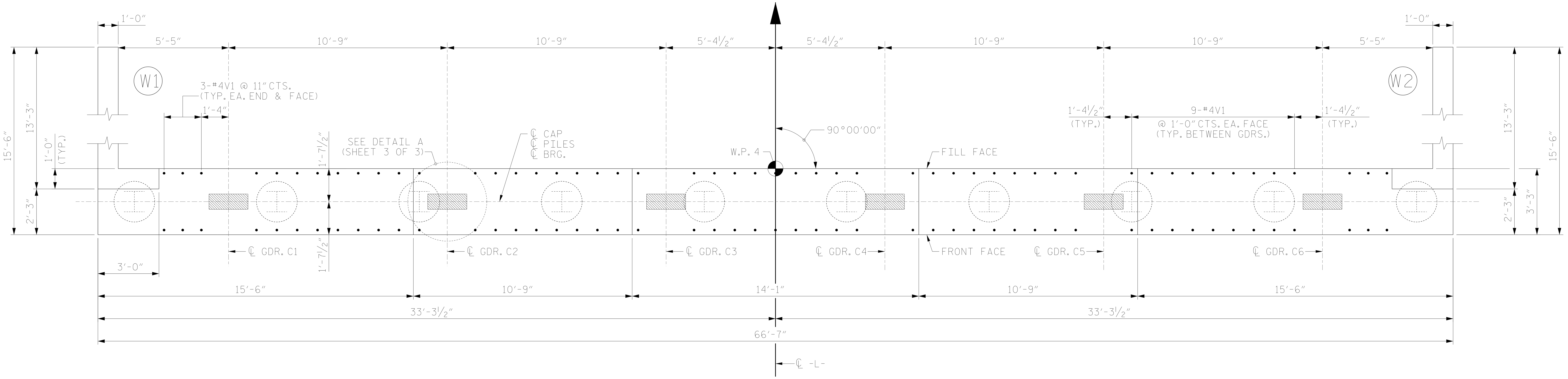
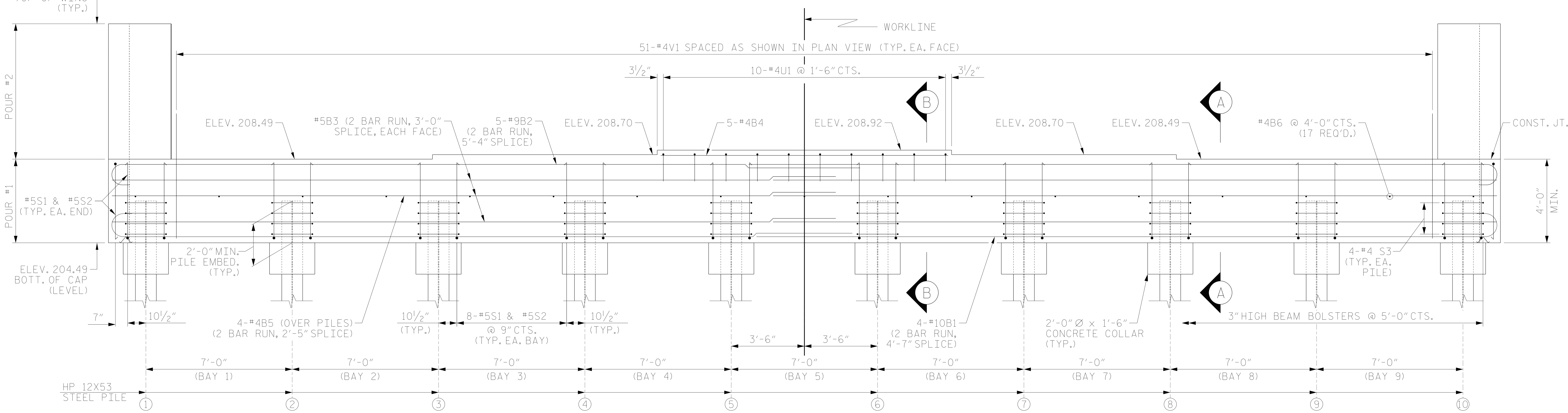


PLAN



ELEVATION

NOTES:

THE TOP SURFACE OF THE END BENT CAP AND WINGS, EXCEPT THE BEARING AREA, SHALL BE RAKED TO A DEPTH OF 1/4".

FOR SECTIONS A-A & B-B, AND DETAIL A, SEE SHEET 3 OF 3.

SEE "GENERAL DRAWING FOUNDATION LAYOUT" FOR ADDITIONAL NOTES FOR DRIVING PILES.

FOR TEMPORARY DRAINAGE AT END BENT DETAIL SEE "SUBSTRUCTURE END BENT 1" SHEET 3 OF 3.

FOR PILE SPLICE DETAILS, SEE "SUBSTRUCTURE END BENT 1" SHEET 3 OF 3.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 126

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ZACHARY BROWN
Zachary Brown
9/16/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

DRAWN BY : E. JONES	DATE : JUNE 21
CHECKED BY : Z. BROWN	DATE : OCT. 21
DESIGN ENGINEER OF RECORD: Z. BROWN	DATE : JUNE 21

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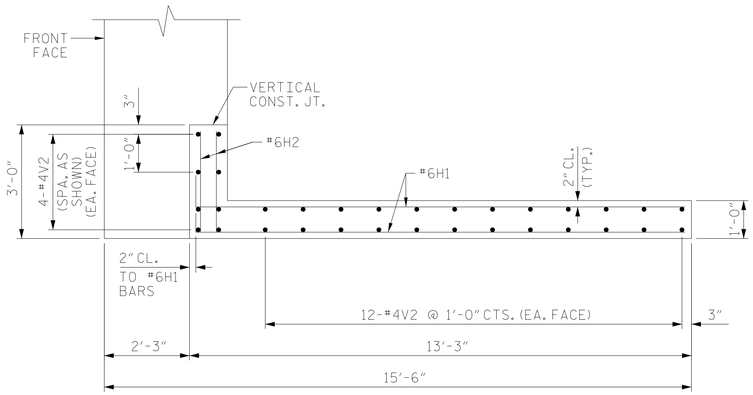
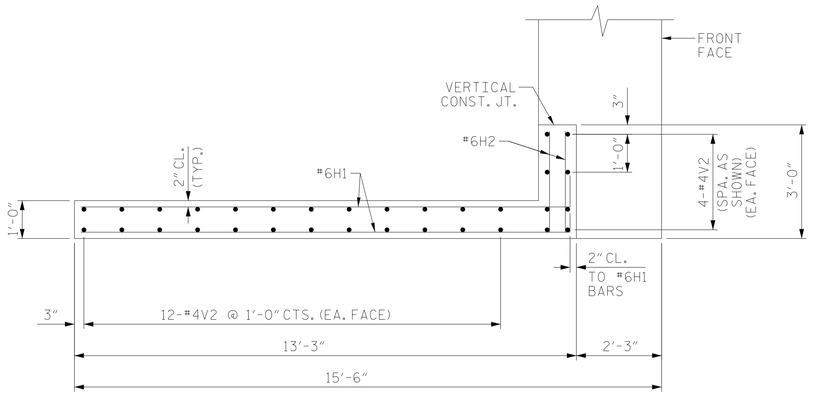
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

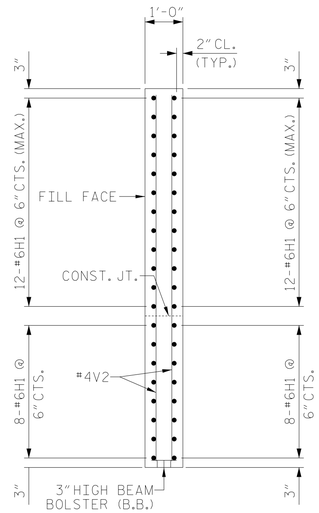
SHEET NO. S-36
TOTAL SHEETS 41



PLAN OF WING (W1)



PLAN OF WING (W2)



SECTION X-X

ELEVATION OF WING (W1)

ELEVATION OF WING (W2)

WING DETAILS

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 2 OF 3 REPLACES BRIDGE NO. 126

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 046785 ENGINEER ZACHARY BROWN
Zachary Brown
9/16/2022

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : Z. BROWN DATE : OCT. 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

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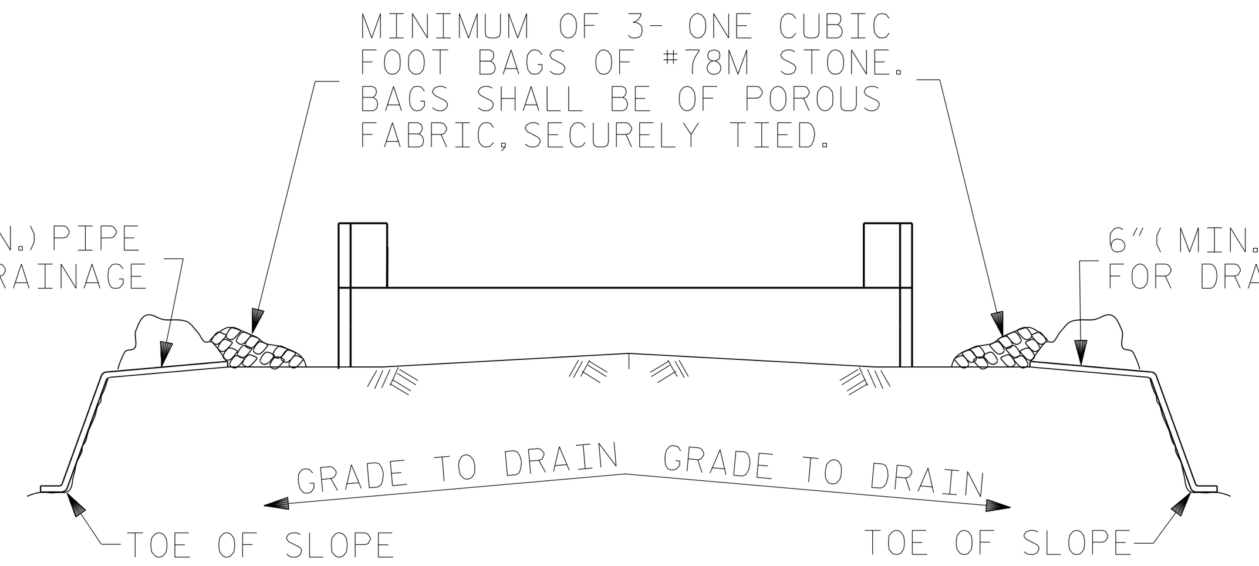
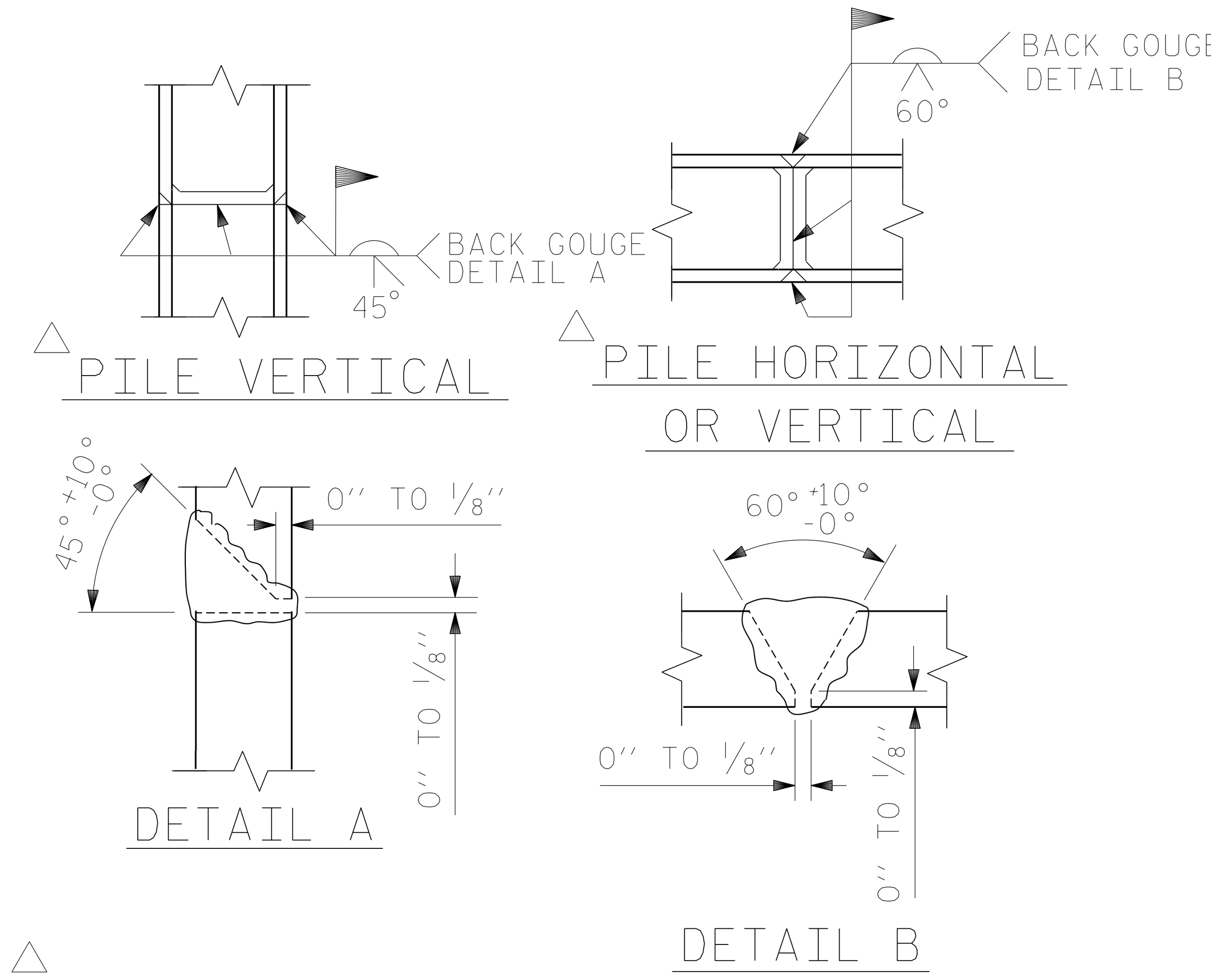


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

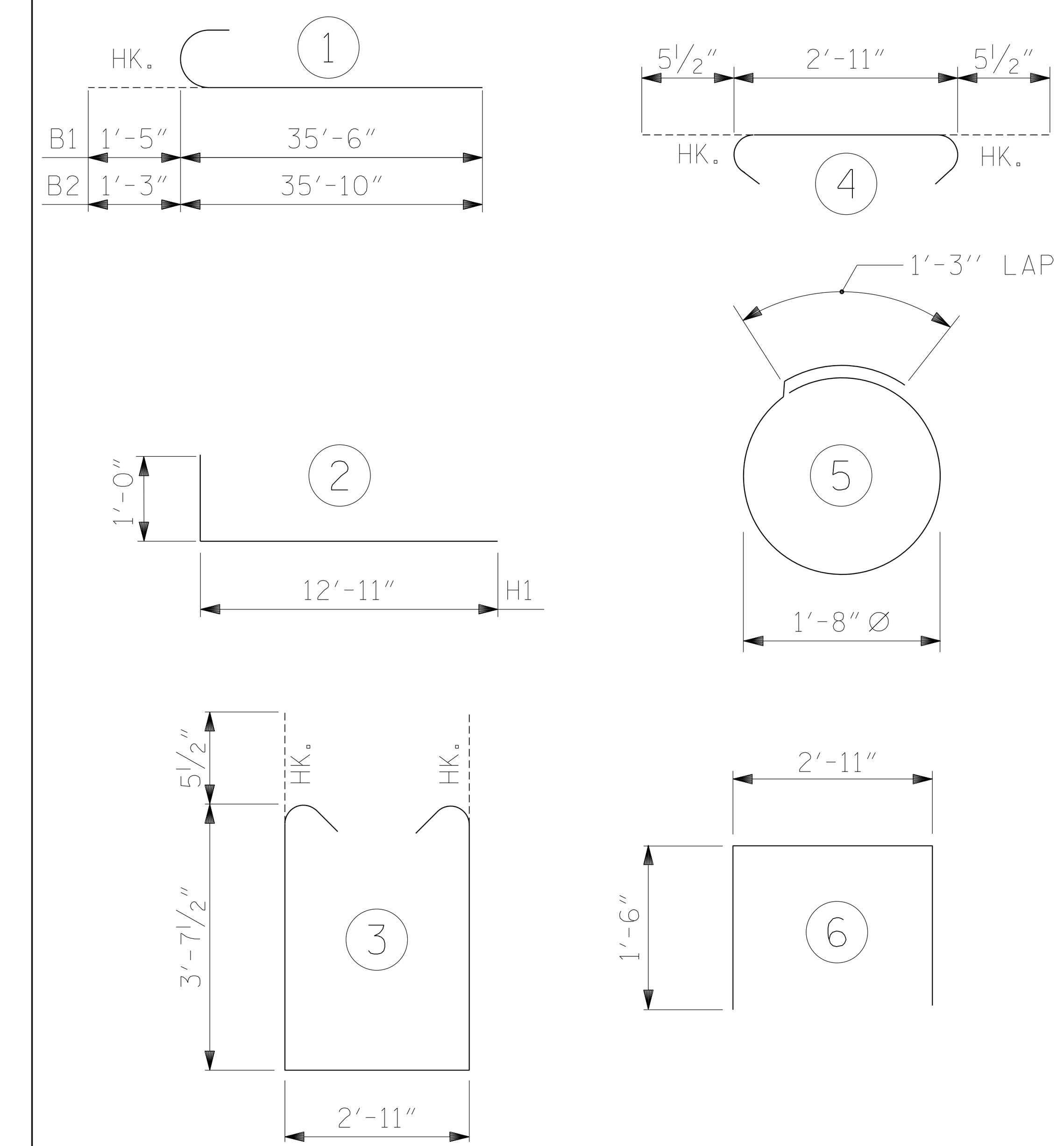
TEMPORARY DRAINAGE AT END BENT



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	1	36'-11"	1271
B2	10	#9	1	37'-1"	1261
B3	12	#5	STR	31'-8"	396
B4	5	#4	STR	13'-8"	46
B5	8	#4	STR	34'-4"	183
B6	17	#4	STR	2'-11"	33
H1	80	#6	2	13'-11"	1672
H2	48	#6	2	2'-8"	192
S1	76	#5	3	11'-1"	879
S2	76	#5	4	3'-10"	304
S3	40	#4	5	6'-6"	174
U1	10	#4	6	5'-11"	40
V1	102	#4	STR	6'-0"	409
V2	64	#4	STR	9'-8"	413

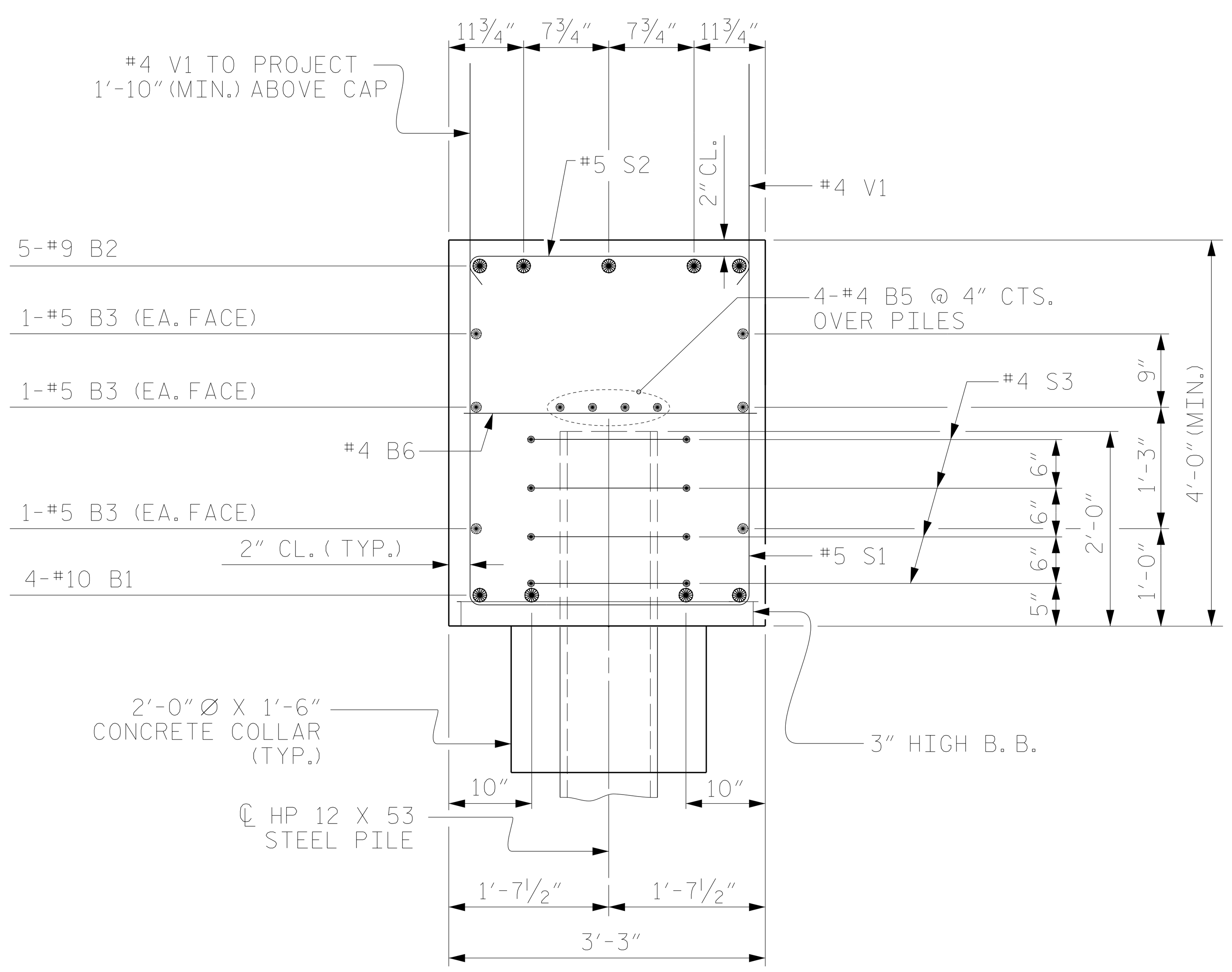
REINFORCING STEEL (FOR ONE END BENT) 7,273 LBS.

CLASS A CONCRETE BREAKDOWN (FOR ONE END BENT)

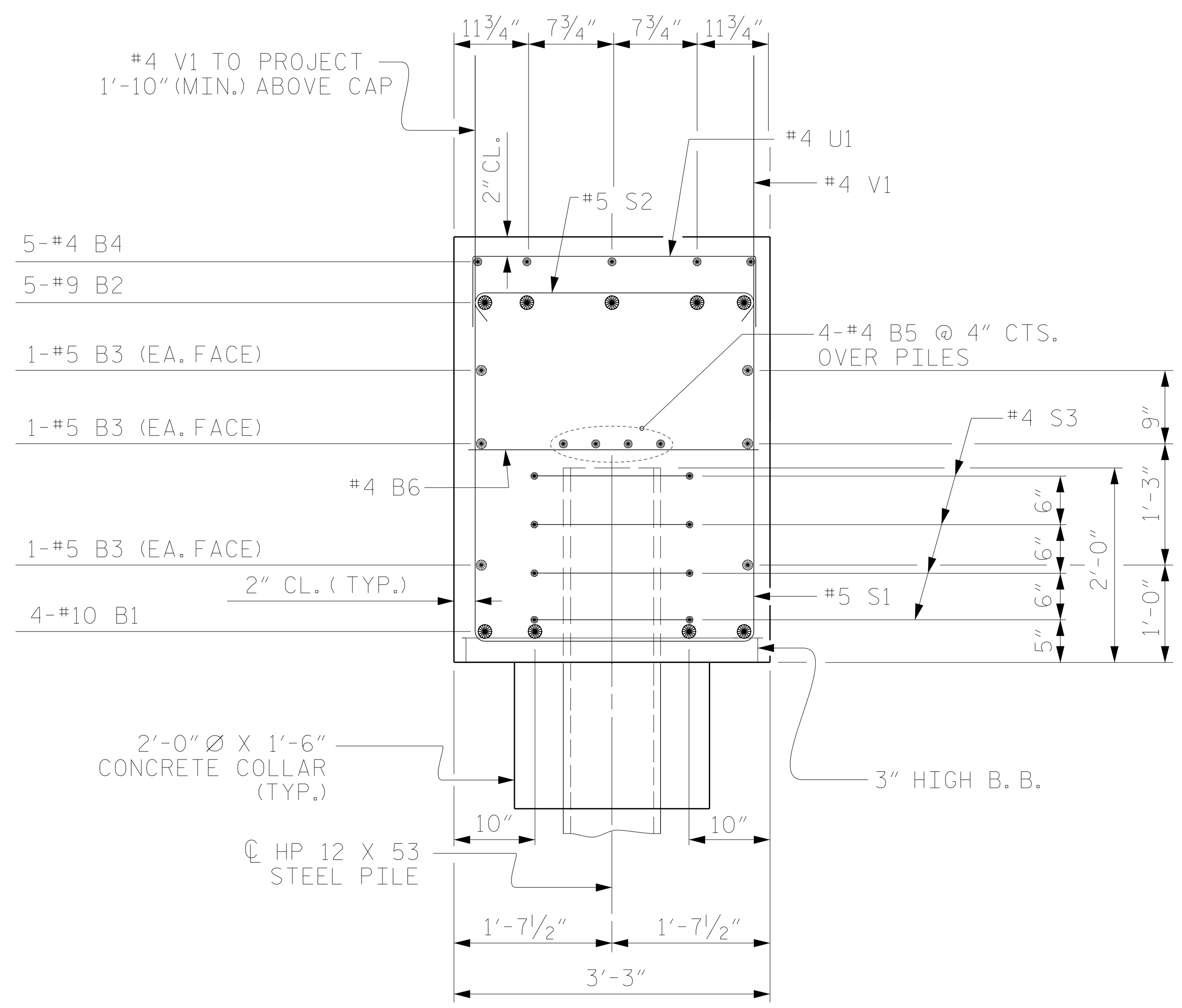
POUR #1 CAP, LOWER PART OF WINGS & COLLARS 38.7 C.Y.

POUR #2 UPPER PART OF WINGS 7.2 C.Y.

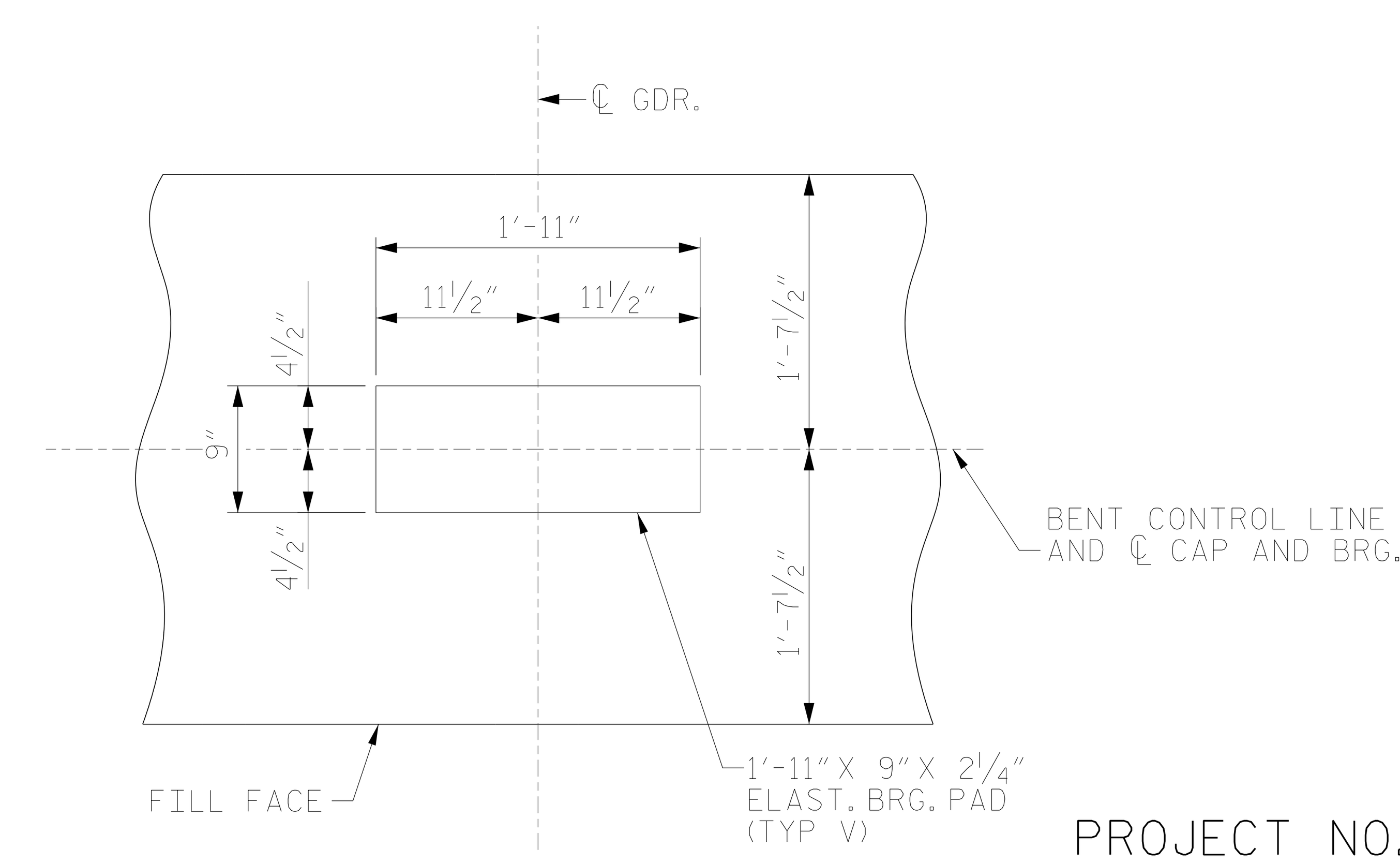
TOTAL CLASS A CONCRETE 45.9 C.Y.



SECTION A-A



SECTION B-B



DETAIL A

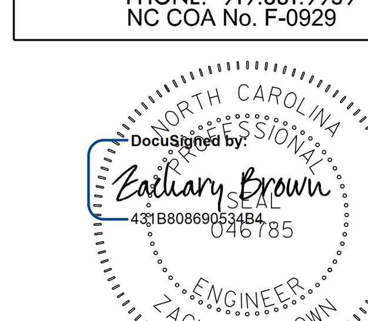
PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 3 OF 3 REPLACES BRIDGE NO. 126

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929



9/16/2022

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS								SHEET NO.
NO.	BY:	DATE:		NO.	BY:	DATE:		S-38
1				3				TOTAL SHEETS
2				4				41

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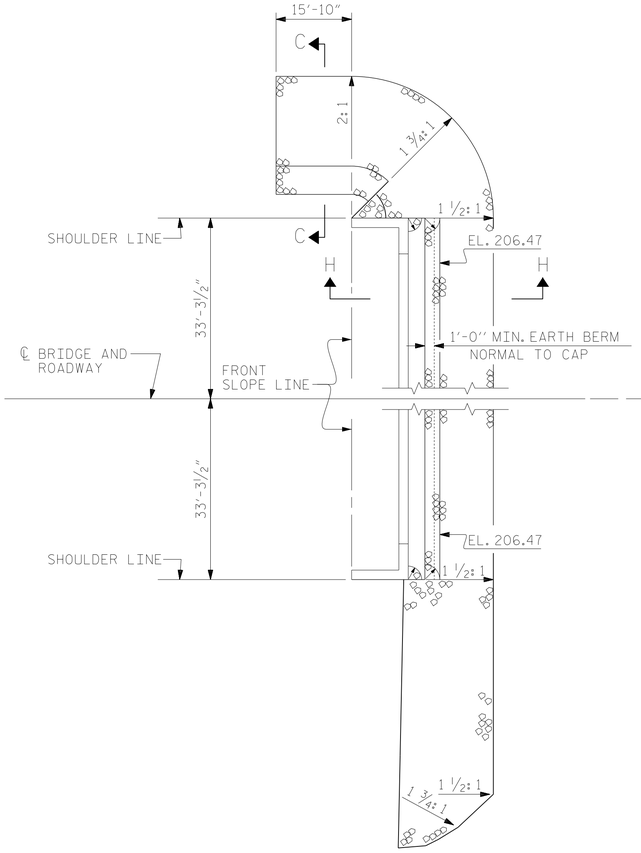
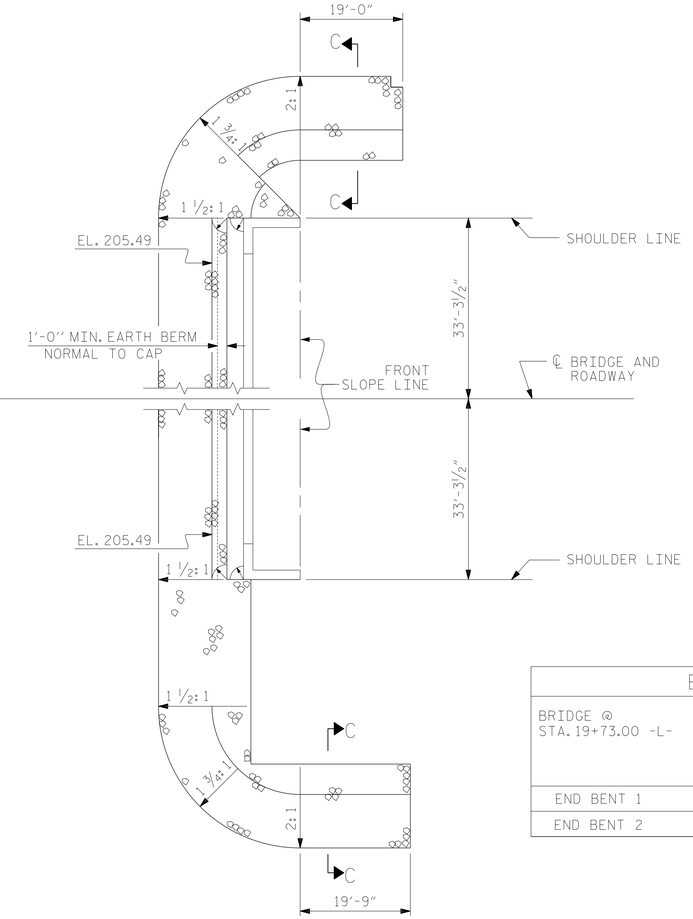
DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : Z. BROWN DATE : OCT. 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21



END BENT 1



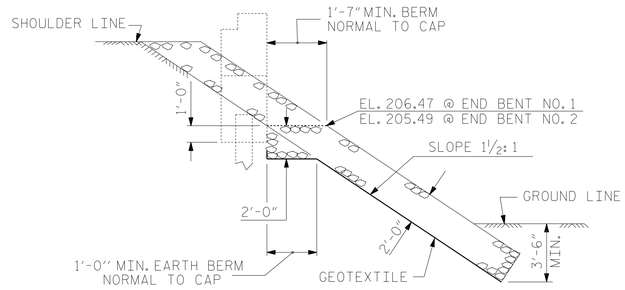
END BENT 2

NOTES :

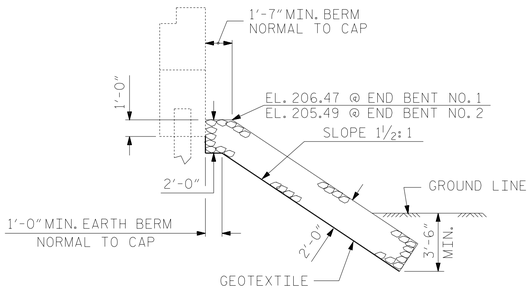
FOR BERM WIDTH DIMENSIONS, SEE GENERAL DRAWING.

ESTIMATED QUANTITIES

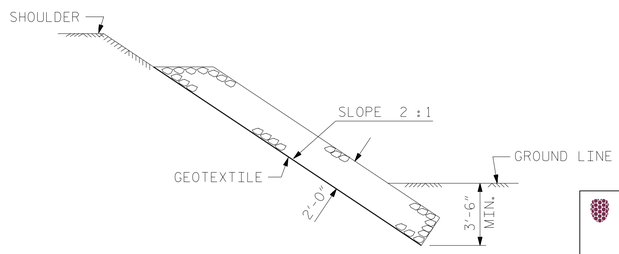
BRIDGE @ STA. 19+73.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	418	465
END BENT 2	446	495



SECTION H-H



℄ SECTION
BERM RIP RAPPED



SECTION C-C

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047785 ZACHARY BROWN
Docusigned by: Zachary Brown
9/16/2022

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-39
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

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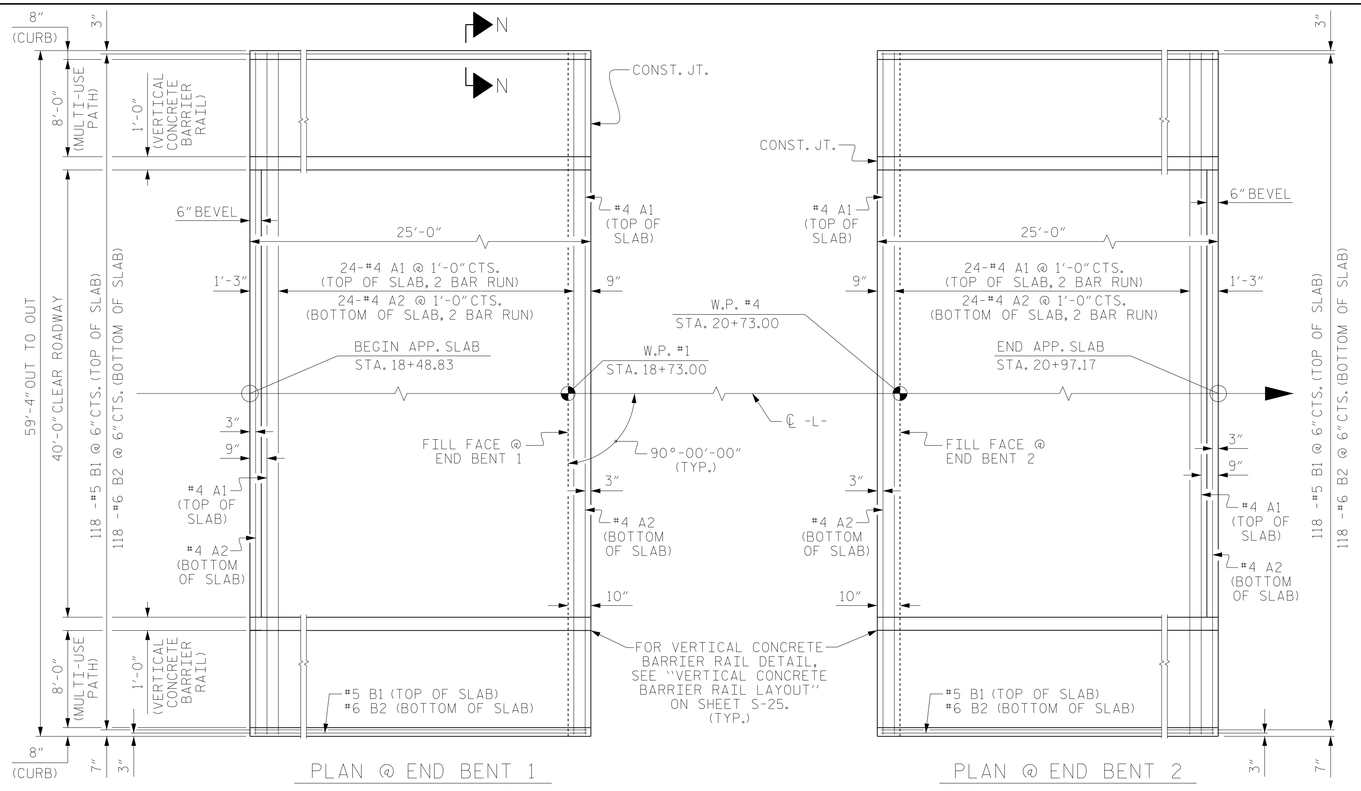
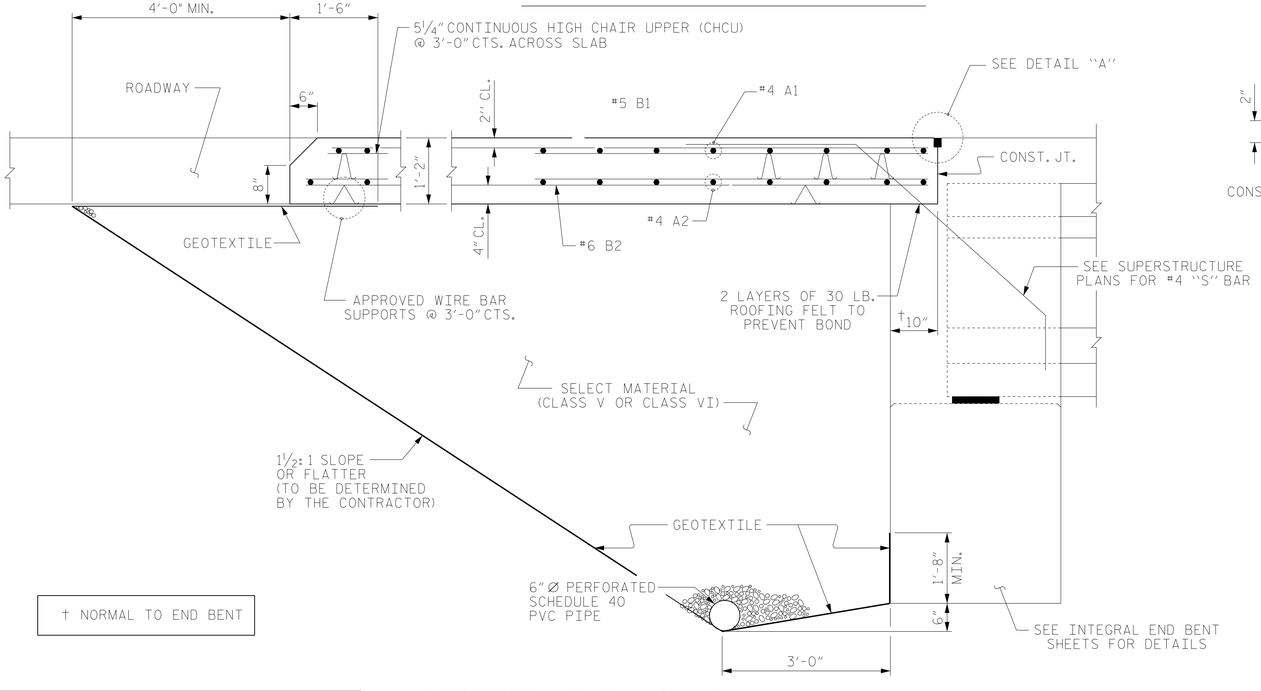
STD. NO. RR1



PLAN @ END BENT 1 PLAN @ END BENT 2

DIMENSIONS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS

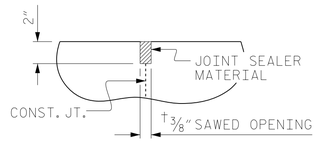
PLAN OF SLABS



† NORMAL TO END BENT

SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)



DETAIL "A"

NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, AND SELECT MATERIAL, SEE ROADWAY PLANS.

GEOTEXTILE SHALL BE TYPE 1 IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

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

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

FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

AT THE CONTRACTORS OPTION, "TYPE A - ALTERNATE APPROACH FILL" IN LIEU OF "TYPE I - STANDARD APPROACH FILL" MAY BE CONSTRUCTED AT NO ADDITIONAL COST TO THE DEPARTMENT. SEE SHEET 2 OF 2 FOR DETAILS AND NOTES.

BILL OF MATERIAL

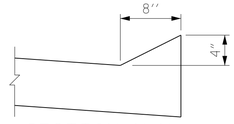
FOR ONE APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	52	#4	STR	30'-6"	1,059
A2	52	#4	STR	30'-6"	1,059
* B1	119	#5	STR	24'-4"	3,020
B2	119	#6	STR	24'-8"	4,409
REINFORCING STEEL				LBS.	5,468
* EPOXY COATED REINFORCING STEEL				LBS.	4,079
CLASS AA CONCRETE				C.Y.	64.3

SPLICE LENGTHS

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

END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION N-N

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 1 OF 2

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL SEAL 046785 ENGINEER ZACHARY BROWN
Docusigned by: Zachary Brown 431B0000634BE...
9/16/2022

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT WITH FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

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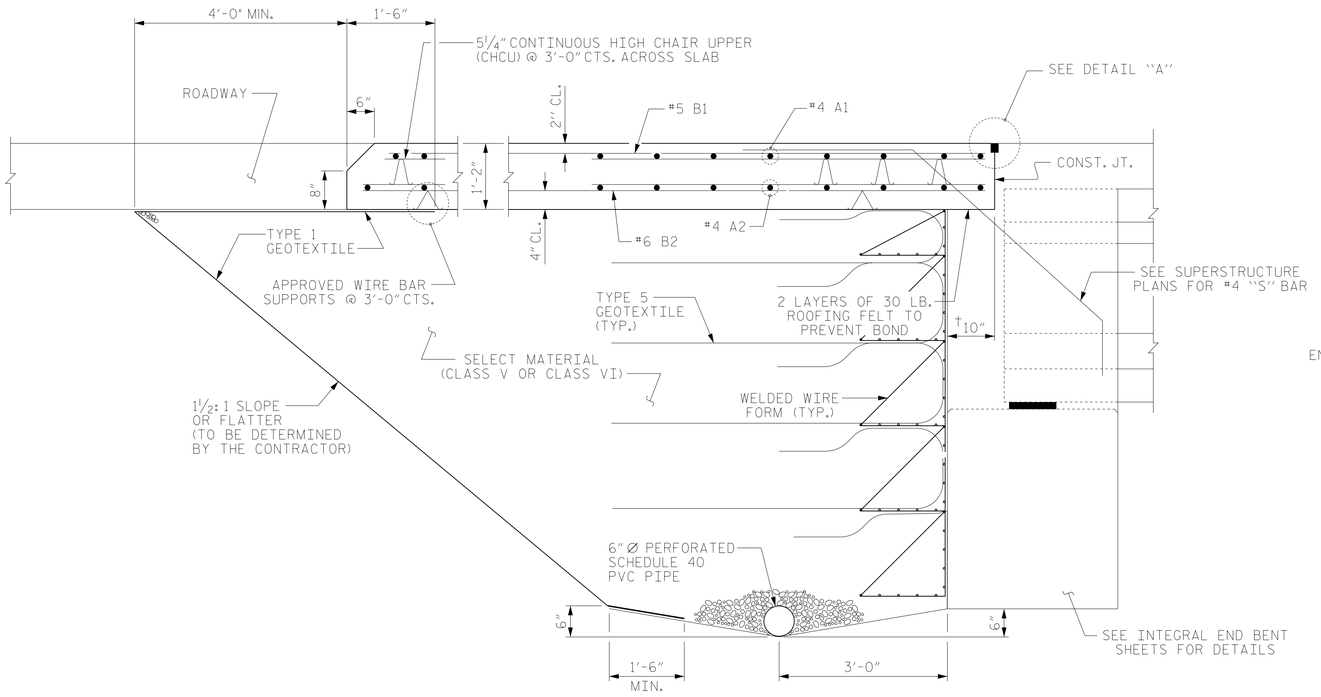
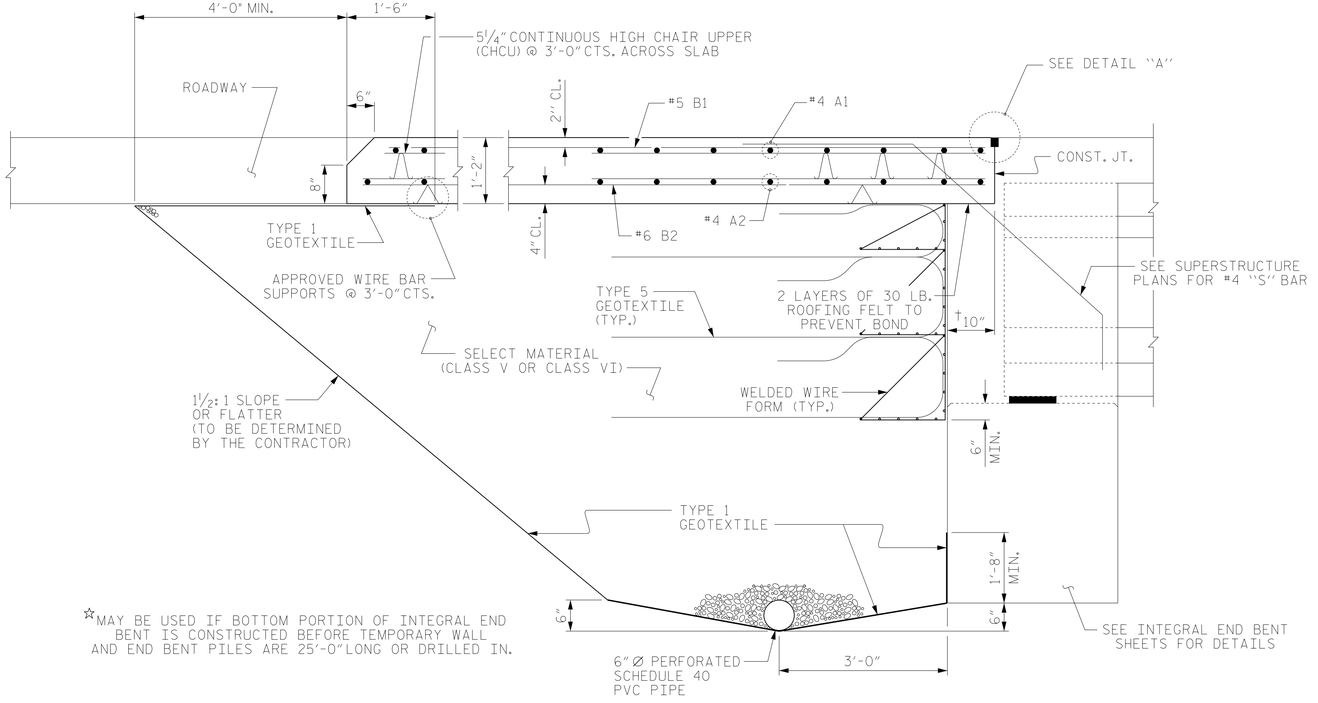
STD. NO. BAS5



SECTION THRU SLAB

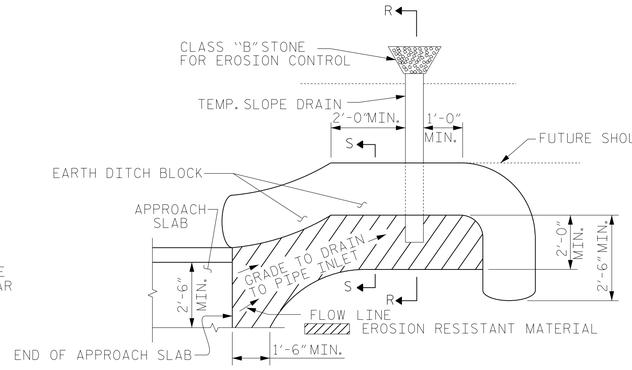
(TYPE A - ALTERNATE APPROACH FILL)



☆MAY BE USED IF BOTTOM PORTION OF INTEGRAL END BENT IS CONSTRUCTED BEFORE TEMPORARY WALL AND END BENT PILES ARE 25'-0" LONG OR DRILLED IN.

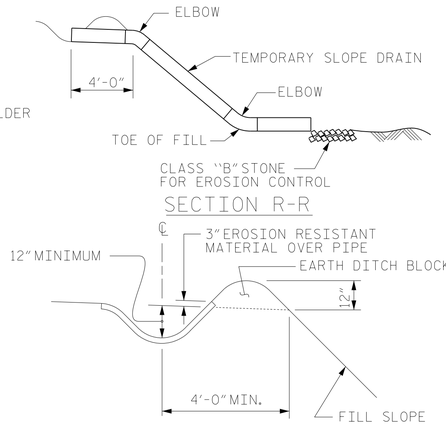
SECTION THRU SLAB

☆(TYPE A - ALTERNATE APPROACH FILL)



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.

PLAN VIEW

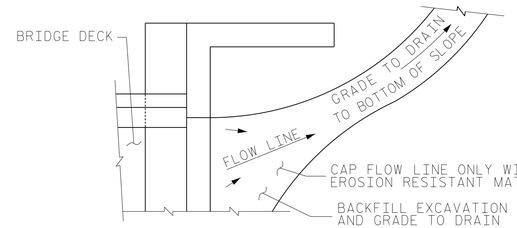


SECTION R-R

SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS 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

NOTES

APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.

FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.

GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.

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

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

FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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

THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. B-5318

WAKE COUNTY

STATION: 19+73.00 -L-

SHEET 2 OF 2

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047785 ENGINEER ZACHARY BROWN
Zachary Brown
9/16/2022

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
1			3			TOTAL SHEETS
2			4			41

DRAWN BY : E. JONES DATE : JUNE 21
CHECKED BY : P. O'NEILL DATE : JUNE 21
DESIGN ENGINEER OF RECORD: Z. BROWN DATE : JUNE 21

SECTION THRU SLAB

☆(TYPE A - ALTERNATE APPROACH FILL)

9/16/2022
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STD. NO. BAS5

STANDARD NOTES

DESIGN DATA:

SPECIFICATIONS - - - - - - - - - - - - - - - - -	A.A.S.H.T.O. (CURRENT)
LIVE LOAD -	SEE PLANS
IMPACT ALLOWANCE - - - - - - - - - - - - - - - -	SEE A.A.S.H.T.O.
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 A.A.S.H.T.O.
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 2018 "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 ¾" WITH THE FOLLOWING EXCEPTIONS: TOP CORNERS OF CURBS MAY BE ROUNDED TO 1½" RADIUS WHICH IS BUILT INTO CURB FORMS; CORNERS OF TRANSVERSE FLOOR EXPANSION JOINTS SHALL BE ROUNDED WITH A ¼" 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 ¼" 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 ⅞" Ø SHEAR STUDS FOR THE ¾" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF ⅞" Ø STUDS ALONG THE BEAM AS SHOWN FOR ¾" Ø STUDS BASED ON THE RATIO OF 3 - ⅞" Ø STUDS FOR 4 - ¾" Ø 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 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 1/16 INCH 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.

ENGLISH

JANUARY, 1990

STD. NO. SN

REV. 6-16-95 EEM (/) RGW REV. 5-7-03 RWW (/) JTE REV. 10-1-11 MAA (/) GM
REV. 8-16-99 RWW (/) LES REV. 5-1-06 TLA (/) GM REV. 12-17 MAA (/) THC

Invalid expression
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USER: atysinger