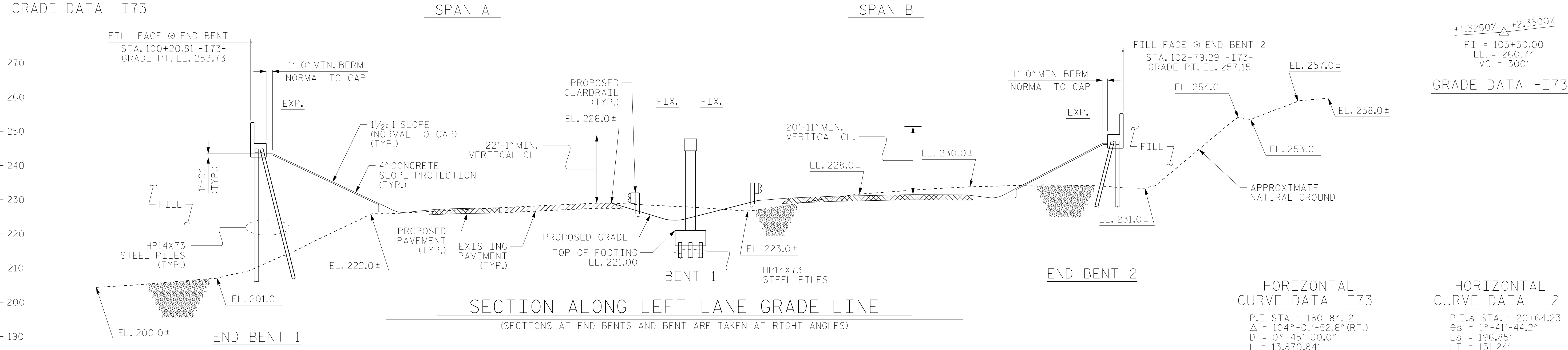


100+00 100+50 101+00 101+50 102+00 102+50 103+00 103+50

GRADE DATA -I73-
 -0.9000% Δ +1.3250%
 P.I. = 95+50.00
 EL. = 247.49
 VC = 600'

GRADE DATA -I73-
 +1.3250% Δ +2.3500%
 P.I. = 105+50.00
 EL. = 260.74
 VC = 300'



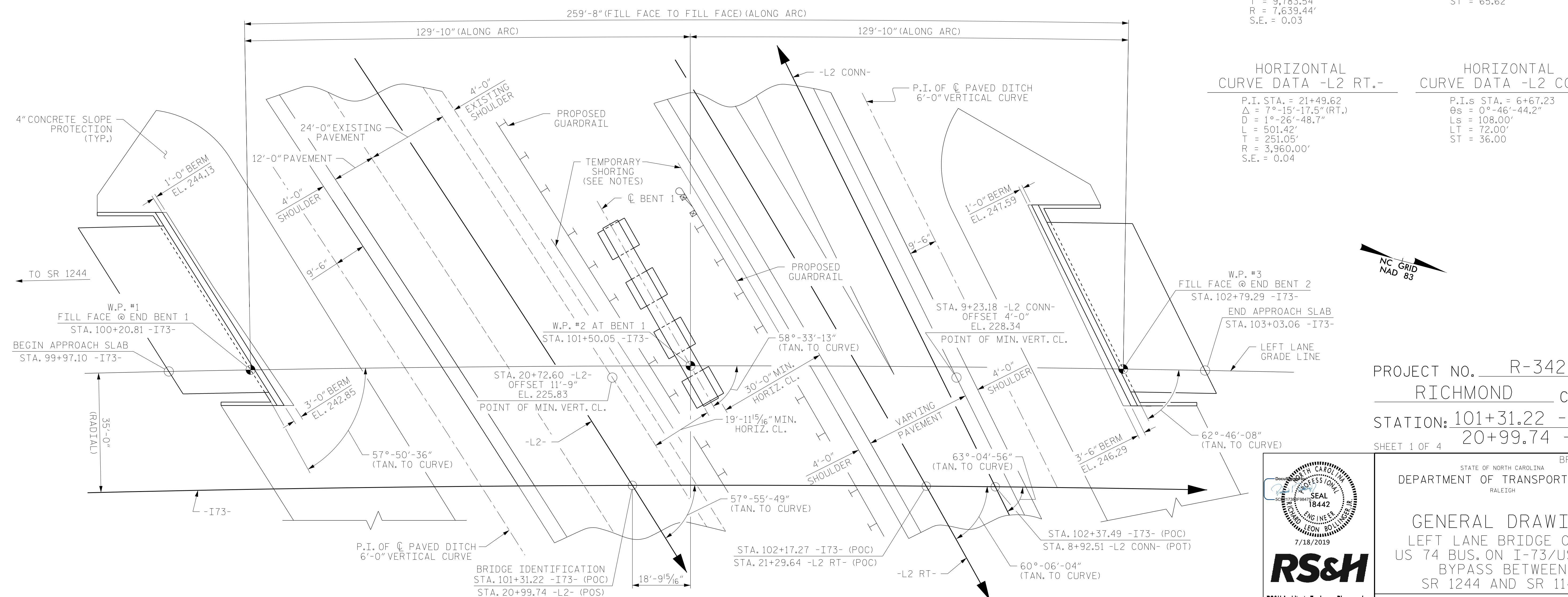
SECTION ALONG LEFT LANE GRADE LINE
 (SECTIONS AT END BENTS AND BENT ARE TAKEN AT RIGHT ANGLES)

HORIZONTAL CURVE DATA -I73-
 P.I. STA. = 180+84.12
 Δ = 104°-01'-52.6" (RT.)
 D = 0°-45'-00.0"
 L = 13,870.84'
 T = 9,783.54'
 R = 7,639.44'
 S.E. = 0.03

HORIZONTAL CURVE DATA -L2-
 P.I.S STA. = 20+64.23
 θs = 1°-41'-44.2"
 Ls = 196.85'
 LT = 131.24'
 ST = 65.62

HORIZONTAL CURVE DATA -L2 RT.-
 P.I. STA. = 21+49.62
 Δ = 7°-15'-17.5" (RT.)
 D = 1°-26'-48.7"
 L = 501.42'
 T = 251.05'
 R = 3,960.00'
 S.E. = 0.04

HORIZONTAL CURVE DATA -L2 CONN.-
 P.I.S STA. = 6+67.23
 θs = 0°-46'-44.2"
 Ls = 108.00'
 LT = 72.00'
 ST = 36.00



PLAN ALONG -I73-
 (FOR CLARITY, PILES ARE NOT SHOWN IN PLAN VIEW)

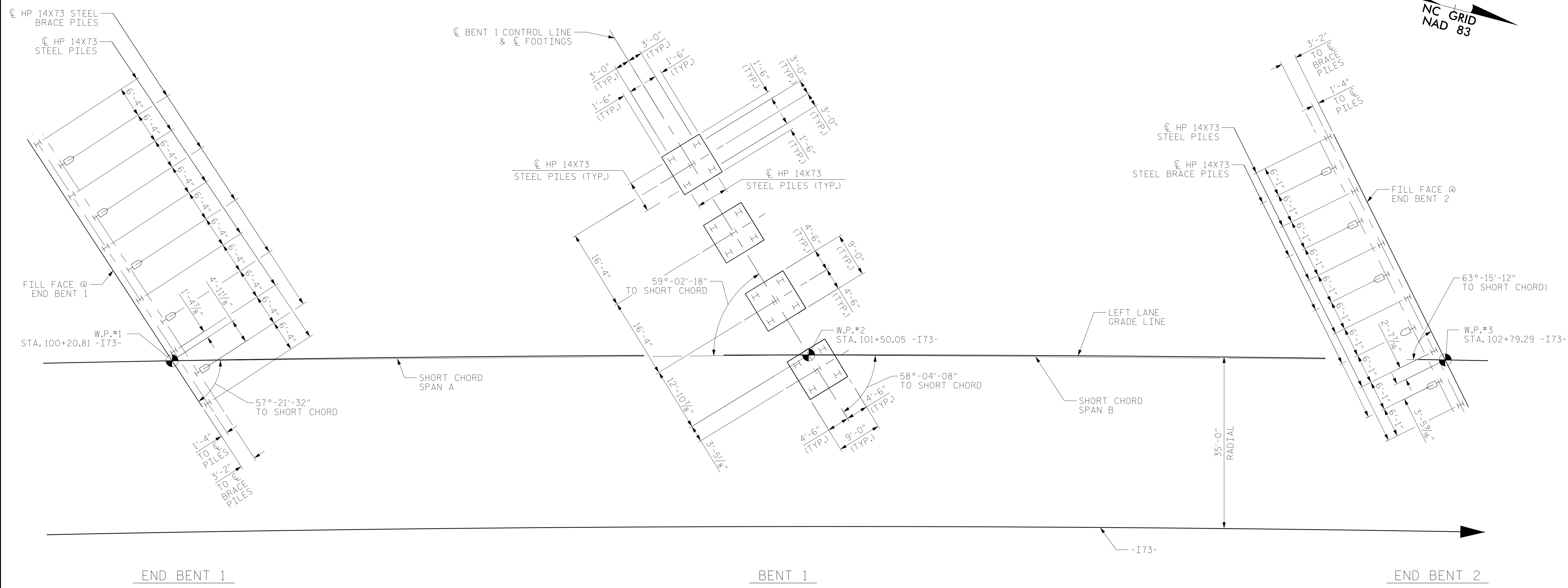
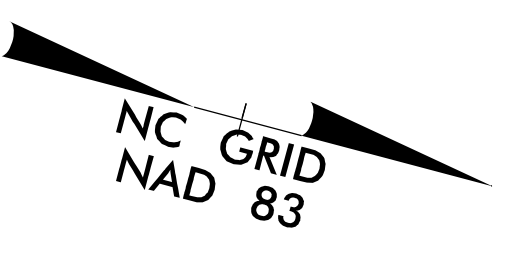
DRAWN BY : MAL DATE : 01/2015
 CHECKED BY : JMR DATE : 06/2015
 DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

7/17/2019
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 SIGNATURES COMPLETED

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 20+99.74 -L2-
 SHEET 1 OF 4

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
BRIDGE #240					
GENERAL DRAWING LEFT LANE BRIDGE OVER US 74 BUS. ON I-73/US 220 BYPASS BETWEEN SR 1244 AND SR 1140					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S03-1					TOTAL SHEETS 39



FOUNDATION LAYOUT PLAN

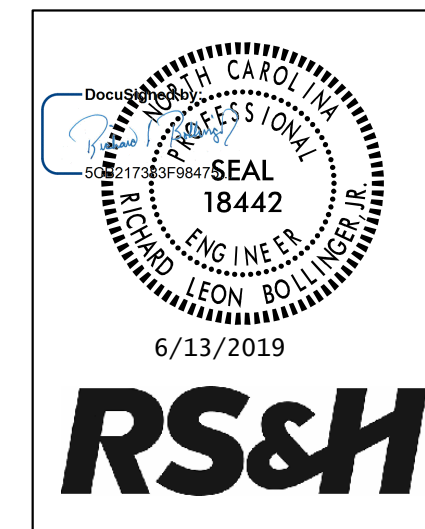
DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE.
BRACE PILES AT END BENTS SHALL BE BATTERED AT 3:12.

NOTES

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT No.1 AND END BENT No.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 165 TONS PER PILE. PILES AT BENT No.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 150 TONS PER PILE.
- DRIVE PILES AT END BENT No.1 TO A REQUIRED DRIVING RESISTANCE OF 275 TONS PER PILE.
- DRIVE PILES AT END BENT No.2 TO A REQUIRED DRIVING RESISTANCE OF 275 TONS PER PILE.
- DRIVE PILES AT BENT No.1 TO A REQUIRED DRIVING RESISTANCE OF 250 TONS PER PILE.
- STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT No.1, BENT No.1, AND END BENT No.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- OBSERVE A 3 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT Nos.1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.
- TESTING PILES WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING, OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73

SHEET 2 OF 4



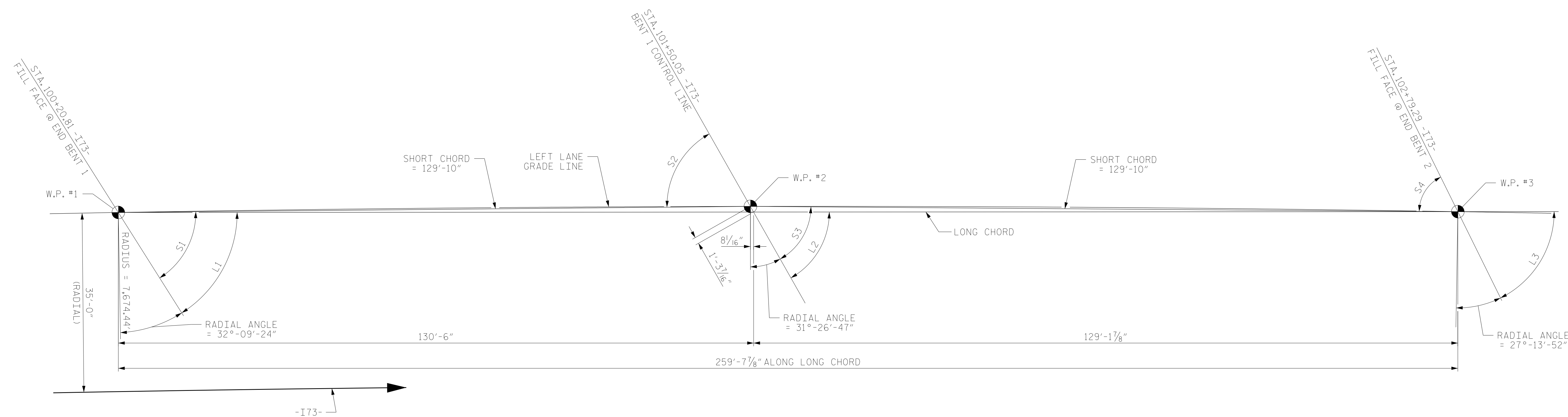
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 LEFT LANE BRIDGE OVER
 US 74 BUS. ON I-73/US 220
 BYPASS BETWEEN
 SR 1244 AND SR 1140

DRAWN BY :	MAL, MKO	DATE :	03/2015
CHECKED BY :	JMR	DATE :	07/2015
DESIGN ENGINEER OF RECORD :	JMR	DATE :	04/2019

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S03-2
2			4			TOTAL SHEETS 39



LONG CHORD LAYOUT

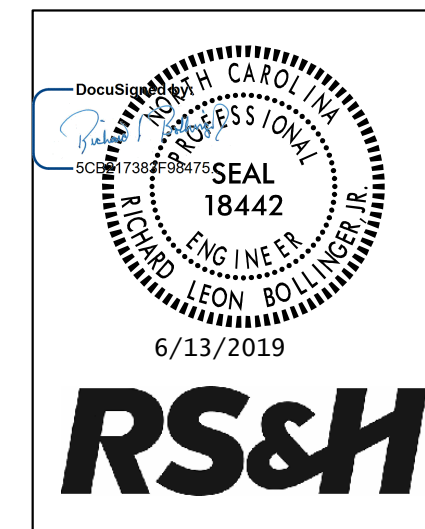
ANGLES	
LONG CHORD	SHORT CHORD
L1 = 56°-52'-27"	S1 = 57°-21'-32"
L2 = 58°-33'-13"	S2 = 59°-02'-18"
L3 = 63°-44'-17"	S3 = 58°-04'-08"
	S4 = 63°-15'-12"

HORIZONTAL CURVE DATA -I73-

P.I. STA. = 180+84.12
 Δ = 104°-01'-52.6" (RT.)
 D = 0°-45'-00.0"
 L = 13,870.84'
 T = 9,783.54'
 R = 7,639.44'
 S.E. = 0.03

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 3 OF 4



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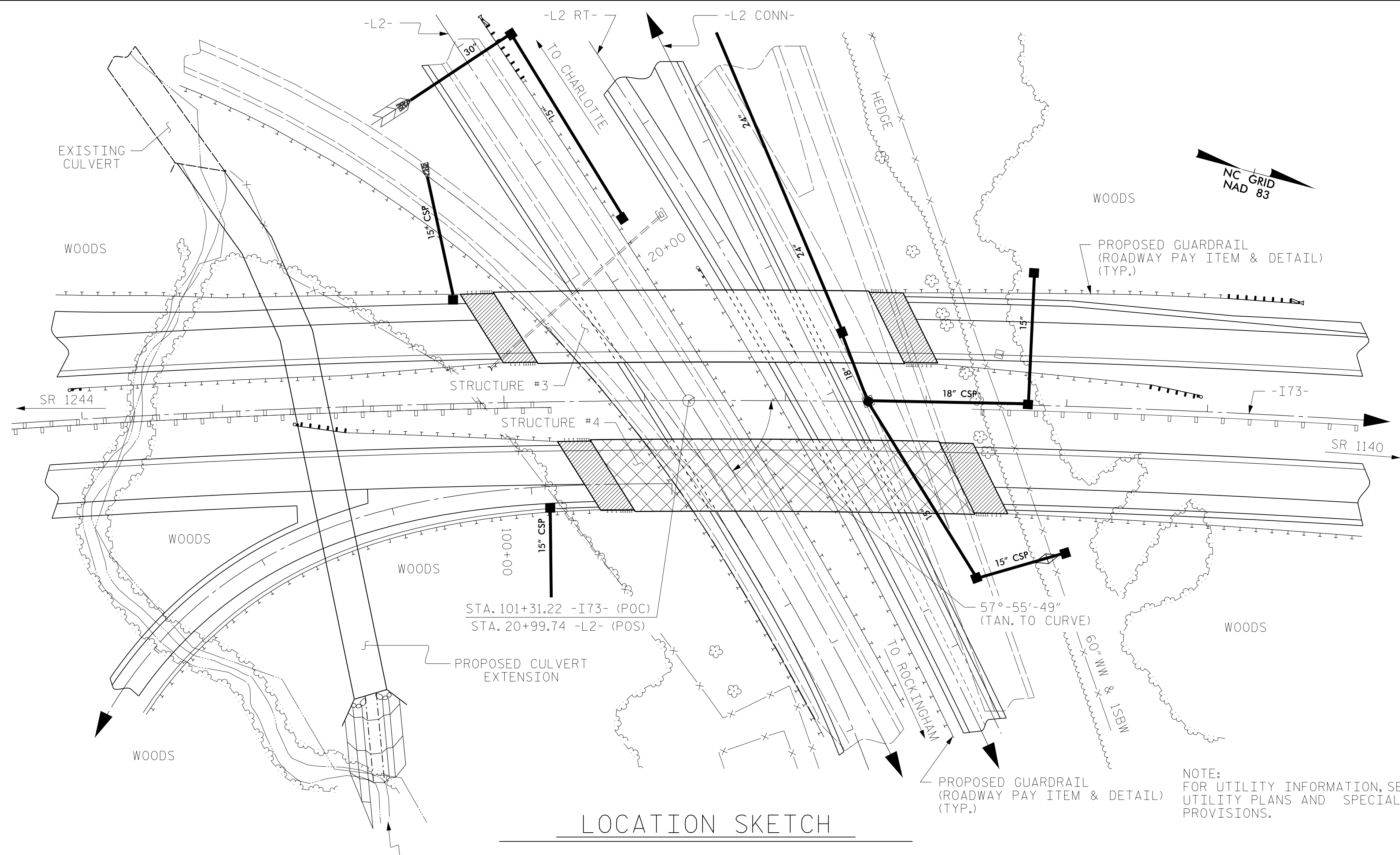
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 LEFT LANE BRIDGE OVER
 US 74 BUS. ON I-73/US 220
 BYPASS BETWEEN
 SR 1244 AND SR 1140

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-3
1			3			TOTAL SHEETS
2			4			39

DRAWN BY : MAL DATE : 01/2015
 CHECKED BY : JMR DATE : 06/2015
 DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

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 SIGNATURES COMPLETED

BENCH MARK #6: RR SPIKE IN BASE OF 15" SWEETGUM TREE 208' RIGHT OF STA. 105+88 -I73-, EL. 266.10'



NOTES

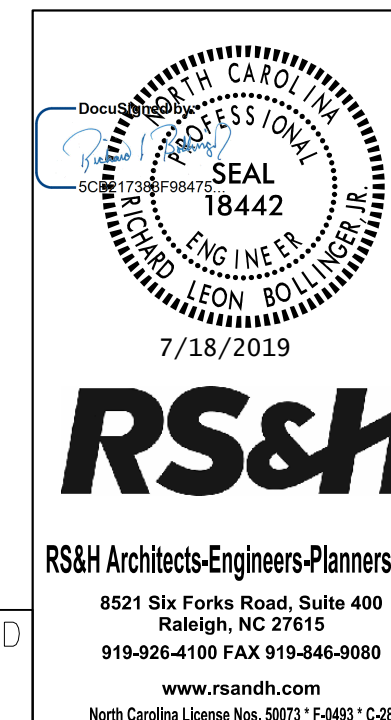
- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 2.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THE ELEVATIONS AND CLEARANCES SHOWN ON THE PLANS AT THE POINTS OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION(S) ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.
- FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
- REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
- NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEERS.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION FOR BENT 1	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 14X73 STEEL PILES	HP 14X73 STEEL PILES	STEEL PILE POINTS	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS
	LUMP SUM	EA.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO. LIN. FT.	EACH	NO. LIN. FT.	EACH	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			13,312	13,903		LUMP SUM			12 1,542.28				561.65		LUMP SUM	LUMP SUM
END BENT 1					75.3		11,194			11	11	715	11	552		
BENT 1	LUMP SUM				131.3		24,467	3,156		20	20	600	20			
END BENT 2					72.4		10,775			11	11	495	11	477		
TOTAL	LUMP SUM	1	13,312	13,903	279.0	LUMP SUM	46,436	3,156	12 1,542.28	42	42	1,810	42	1,029	LUMP SUM	LUMP SUM

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 4 OF 4



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 LEFT LANE BRIDGE OVER
 US 74 BUS. ON I-73/US 220
 BYPASS BETWEEN
 SR 1244 AND SR 1140

DRAWN BY : MAL DATE : 01/2015
 CHECKED BY : JMR DATE : 01/2015
 DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

7/17/2019
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S03-4
2			4			TOTAL SHEETS 39

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LEVEL	VEHICLE	WEIGHT (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE								COMMENT NUMBER
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)		
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.02	--	1.75	0.77	1.15	B	EL	65.23	0.98	1.14	B	I	90.85	0.80	0.77	1.02	B	EL	65.23		
	HL-93 (OPERATING)	N/A		1.49	--	1.35	0.77	1.49	B	EL	65.23	0.97	1.66	A	I	24.99	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.50	54.00	1.75	0.77	1.69	B	EL	65.23	0.98	1.75	B	I	103.92	0.80	0.77	1.50	B	EL	65.23		
	HS-20 (OPERATING)	36.000		2.20	79.20	1.35	0.77	2.20	B	EL	65.23	0.98	2.33	B	I	103.92	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH	12.500		3.96	49.50	1.40	0.77	5.58	B	EL	65.23	0.98	6.27	B	I	103.92	0.80	0.77	3.96	B	EL	65.23	
		S3C	21.500		2.31	49.67	1.40	0.77	3.25	B	EL	65.23	0.98	3.60	B	I	103.92	0.80	0.77	2.31	B	EL	65.23	
		S3A	22.750		2.18	49.60	1.40	0.77	3.08	B	EL	65.23	0.98	3.40	B	I	103.92	0.80	0.77	2.18	B	EL	65.23	
		S4A	26.750		1.90	50.83	1.40	0.77	2.68	B	EL	65.23	0.98	2.93	B	I	103.92	0.80	0.77	1.90	B	EL	65.23	
		S5A	30.500		1.68	51.24	1.40	0.77	2.36	B	EL	65.23	0.98	2.64	B	I	103.92	0.80	0.77	1.68	B	EL	65.23	
		S6A	34.500		1.51	52.10	1.40	0.77	2.12	B	EL	65.23	0.98	2.34	B	I	103.92	0.80	0.77	1.51	B	EL	65.23	
		S7B	38.500		1.36	52.36	1.40	0.77	1.92	B	EL	65.23	0.98	2.16	B	I	103.92	0.80	0.77	1.36	B	EL	65.23	
	S7A	40.000	③	1.34	53.60	1.40	0.77	1.88	B	EL	65.23	0.98	2.16	B	I	103.92	0.80	0.77	1.34	B	EL	65.23		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	T4A	28.250		1.85	52.26	1.40	0.77	2.61	B	EL	65.23	0.98	2.82	B	I	103.92	0.80	0.77	1.85	B	EL	65.23	
		T5B	32.000		1.63	52.16	1.40	0.77	2.29	B	EL	65.23	0.98	2.62	B	I	103.92	0.80	0.77	1.63	B	EL	65.23	
T6A		36.000		1.48	53.28	1.40	0.77	2.08	B	EL	65.23	0.98	2.37	B	I	103.92	0.80	0.77	1.48	B	EL	65.23		
	T7A	40.000		1.36	54.40	1.40	0.77	1.91	B	EL	65.23	0.98	2.16	B	I	103.92	0.80	0.77	1.36	B	EL	65.23		
	T7B	40.000		1.41	56.40	1.40	0.77	1.99	B	EL	65.23	0.98	2.06	B	I	103.92	0.80	0.77	1.41	B	EL	65.23		

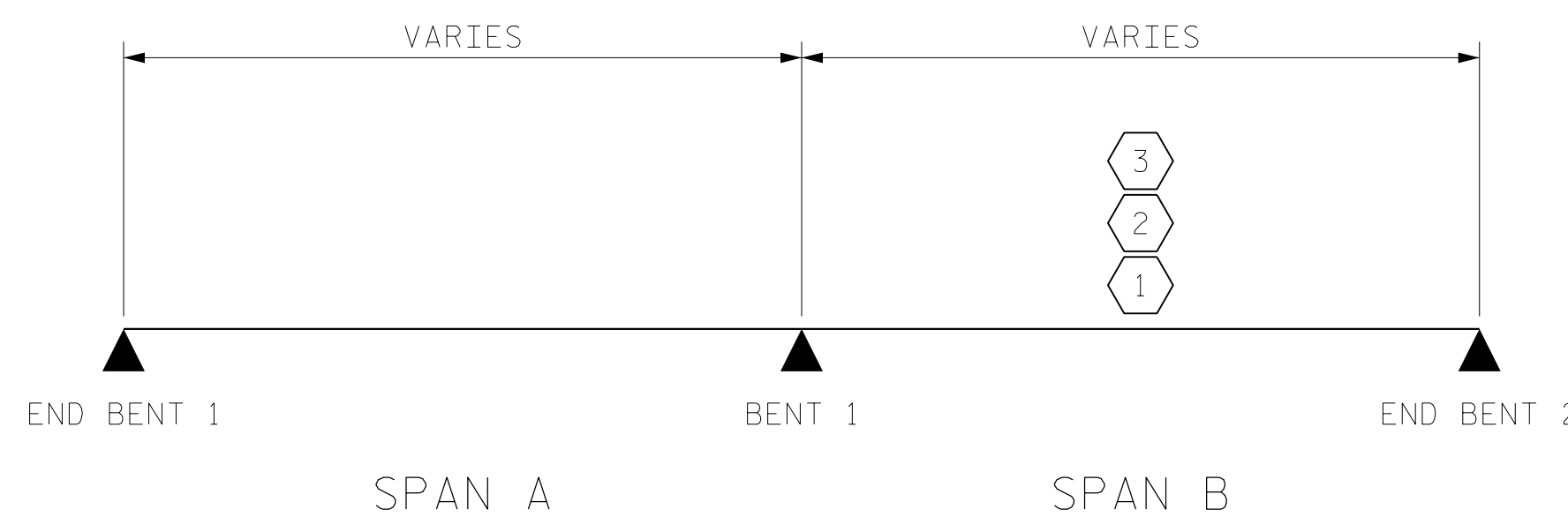
NOTES:

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

COMMENTS:

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

①	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	

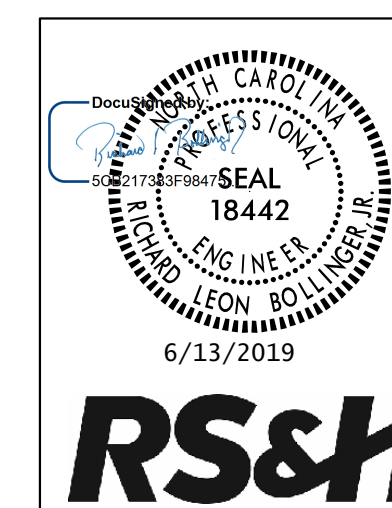


LRFR SUMMARY

SECTION PROPERTIES			
SPAN B - EXTERIOR LEFT			
	UNITS	NON-COMPOSITE	COMPOSITE
HEIGHT	IN	72	80.25
AREA	IN ²	833.1	1370.54
Ixx	IN ⁴	570260	1078779
Ycg	IN	36.79	52.21
SELF WT.	PLF	867.8	1683.9
EFF. WIDTH	IN	-	95.0
SPAN B - INTERIOR			
	UNITS	NON-COMPOSITE	COMPOSITE
HEIGHT	IN	72	80.25
AREA	IN ²	833.1	1443.82
Ixx	IN ⁴	570260	1118958
Ycg	IN	36.79	53.43
SELF WT.	PLF	867.8	1795.2
EFF. WIDTH	IN	-	108.0

SECTION PROPERTIES PROVIDED AT MIDSPAN

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-



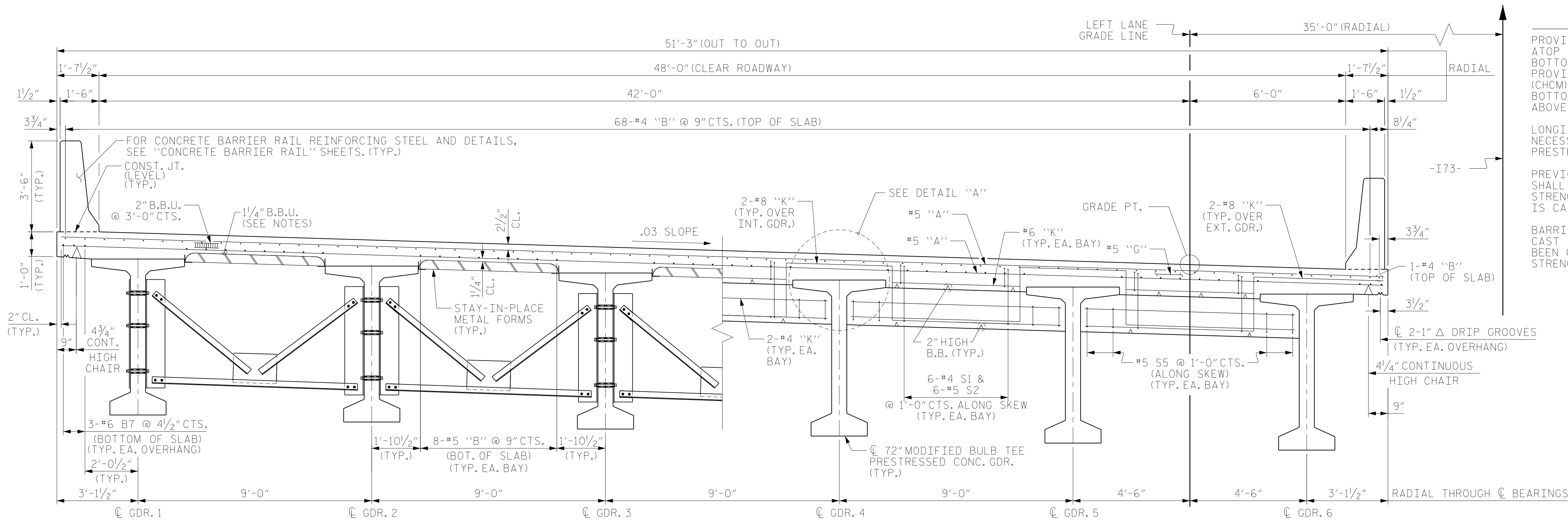
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
PRESTRESSED
CONCRETE GIRDERS
(INTERSTATE TRAFFIC)
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S03-5
2			4			TOTAL SHEETS 39

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DRAWN BY: MKO DATE: 03/2015
CHECKED BY: JMR DATE: 06/2015
DESIGN ENGINEER: JMR DATE: 04/2019



AT INTERMEDIATE DIAPHRAGM

TYPICAL SECTION

AT END BENT

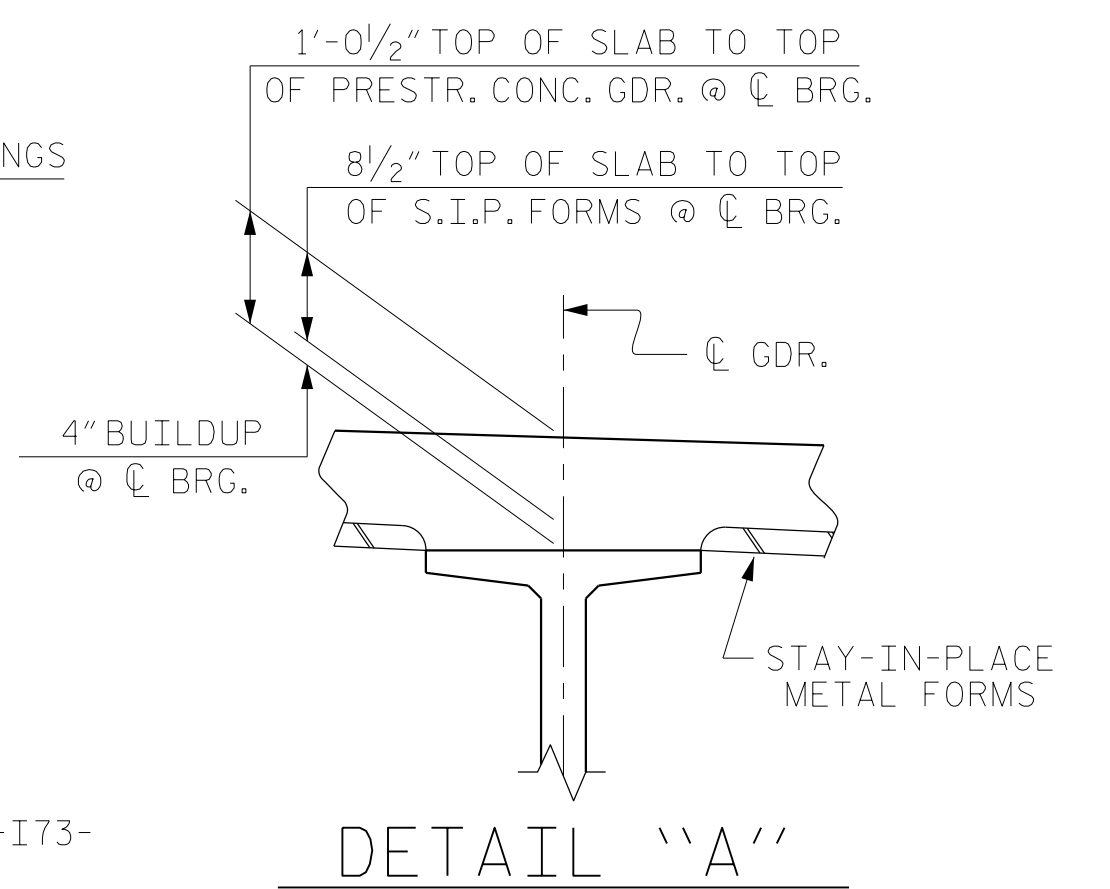
NOTES

PROVIDE 1/4" 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 (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

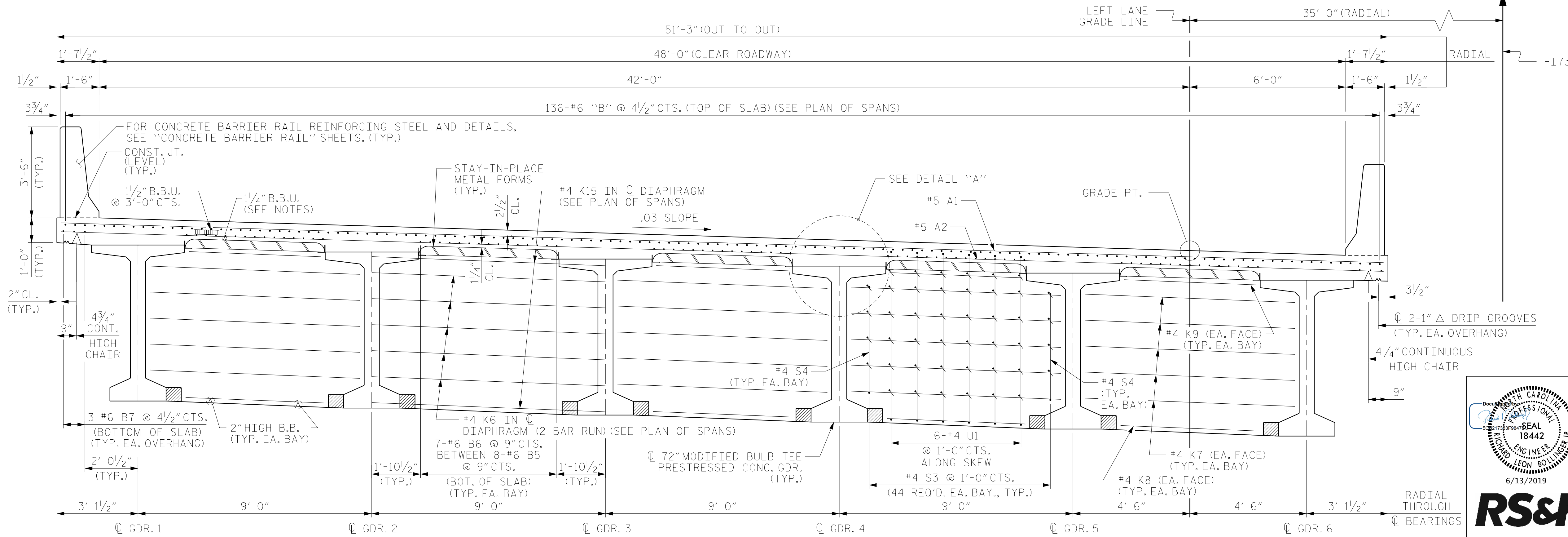
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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.

BARRIER RAIL 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 3000 PSI.

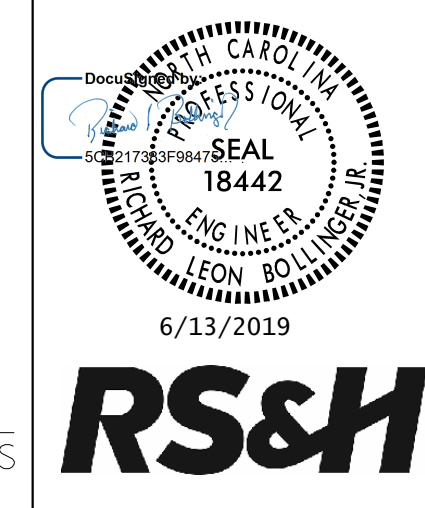


DETAIL "A"



TYPICAL SECTION AT BENT DIAPHRAGM

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 1 OF 2

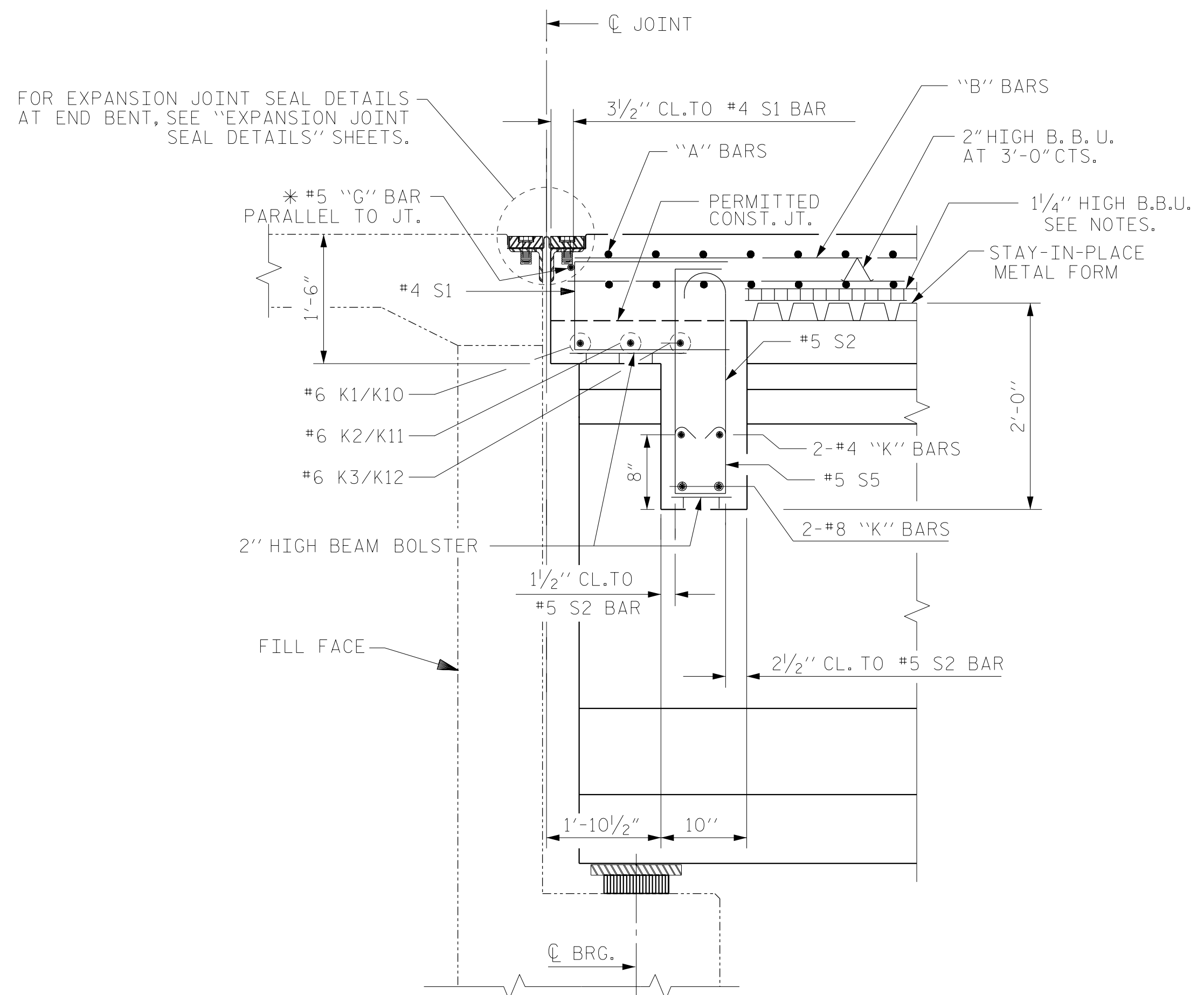


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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION					
LEFT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S03-6					TOTAL SHEETS 39

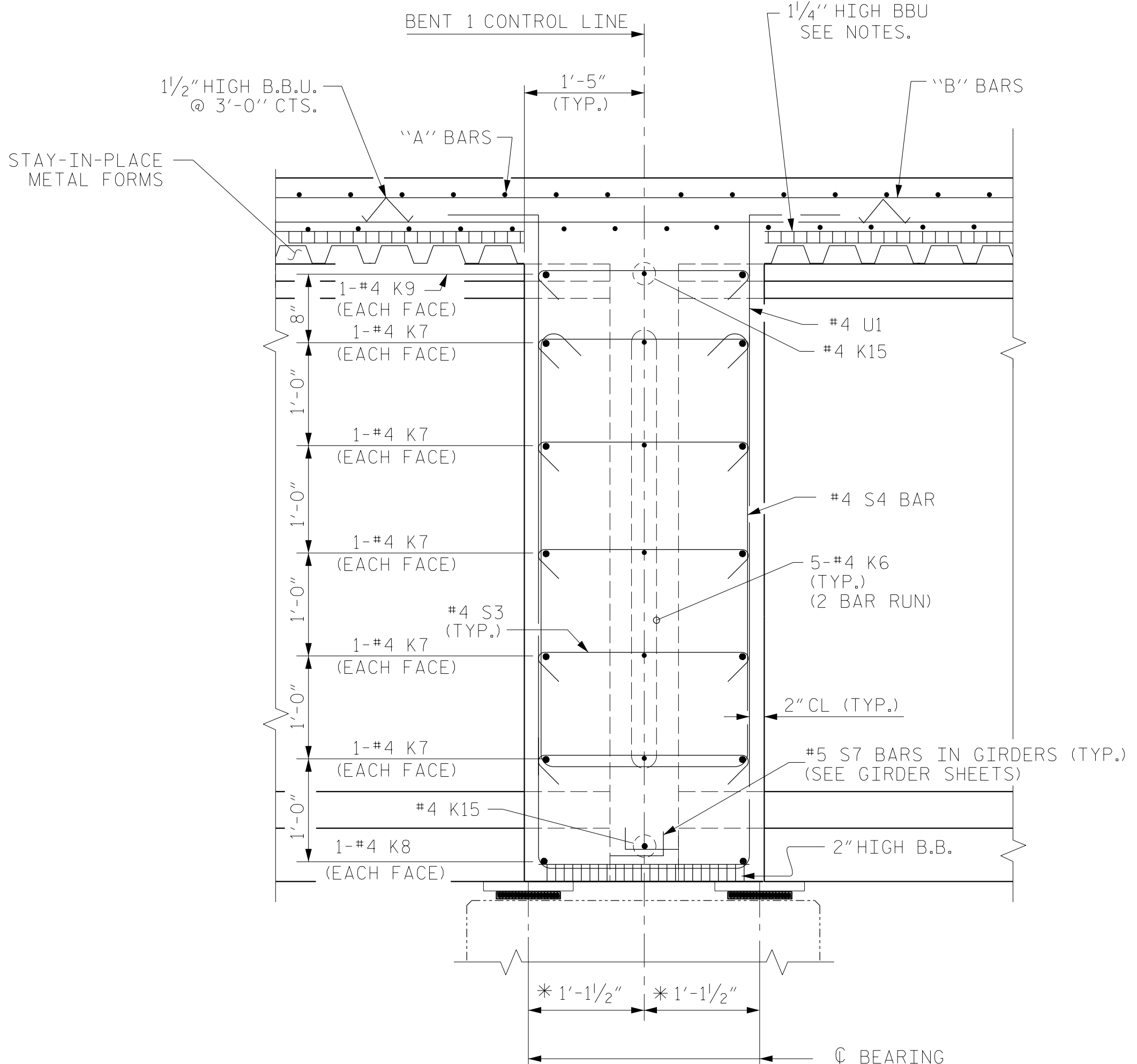
DRAWN BY : MAL DATE : 05/2015
 CHECKED BY : JMR DATE : 05/2015
 DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

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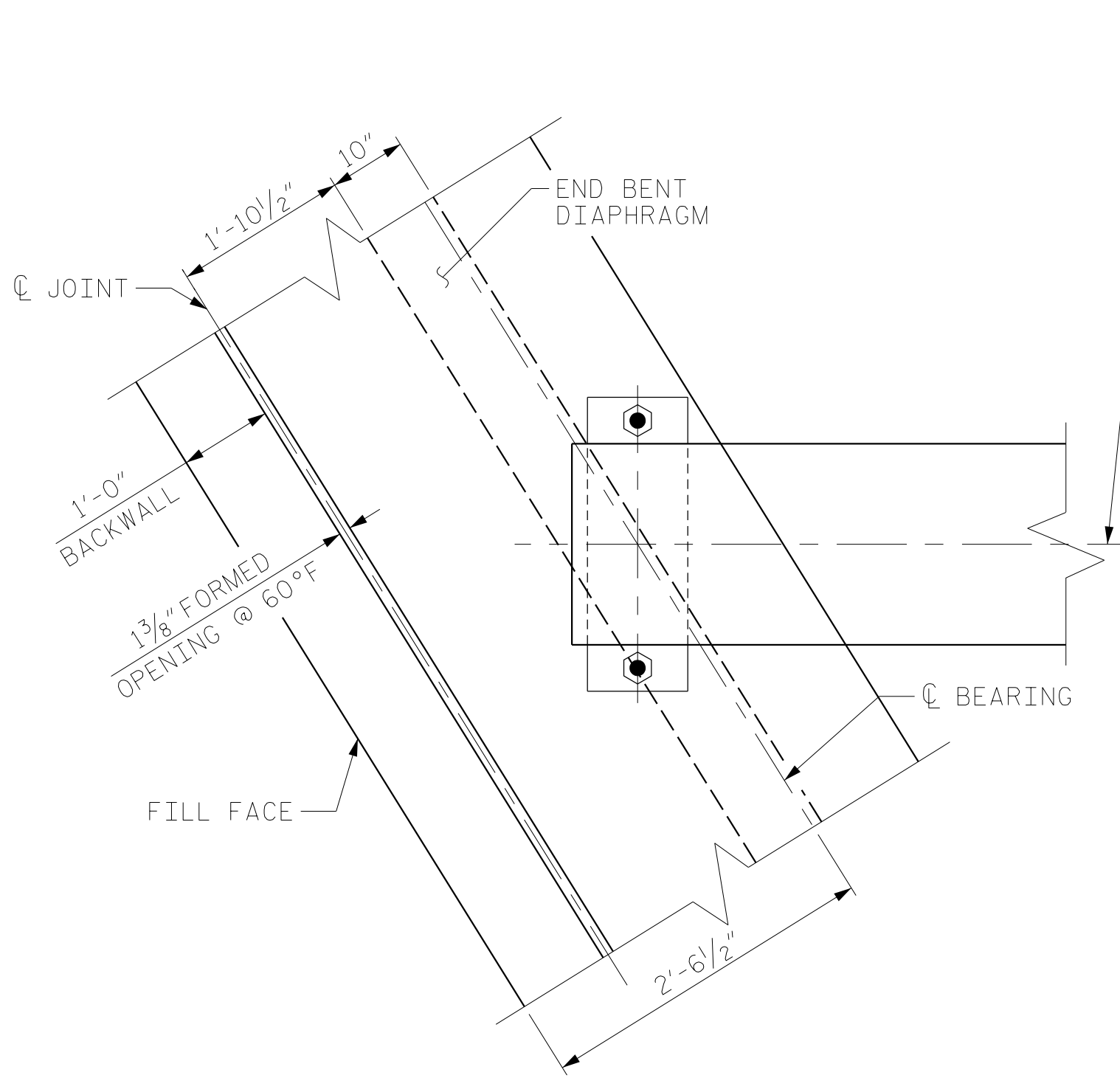
SECTION AT END BENT DIAPHRAGM

* "C" BAR MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR REINFORCING STEEL & STIRRUPS

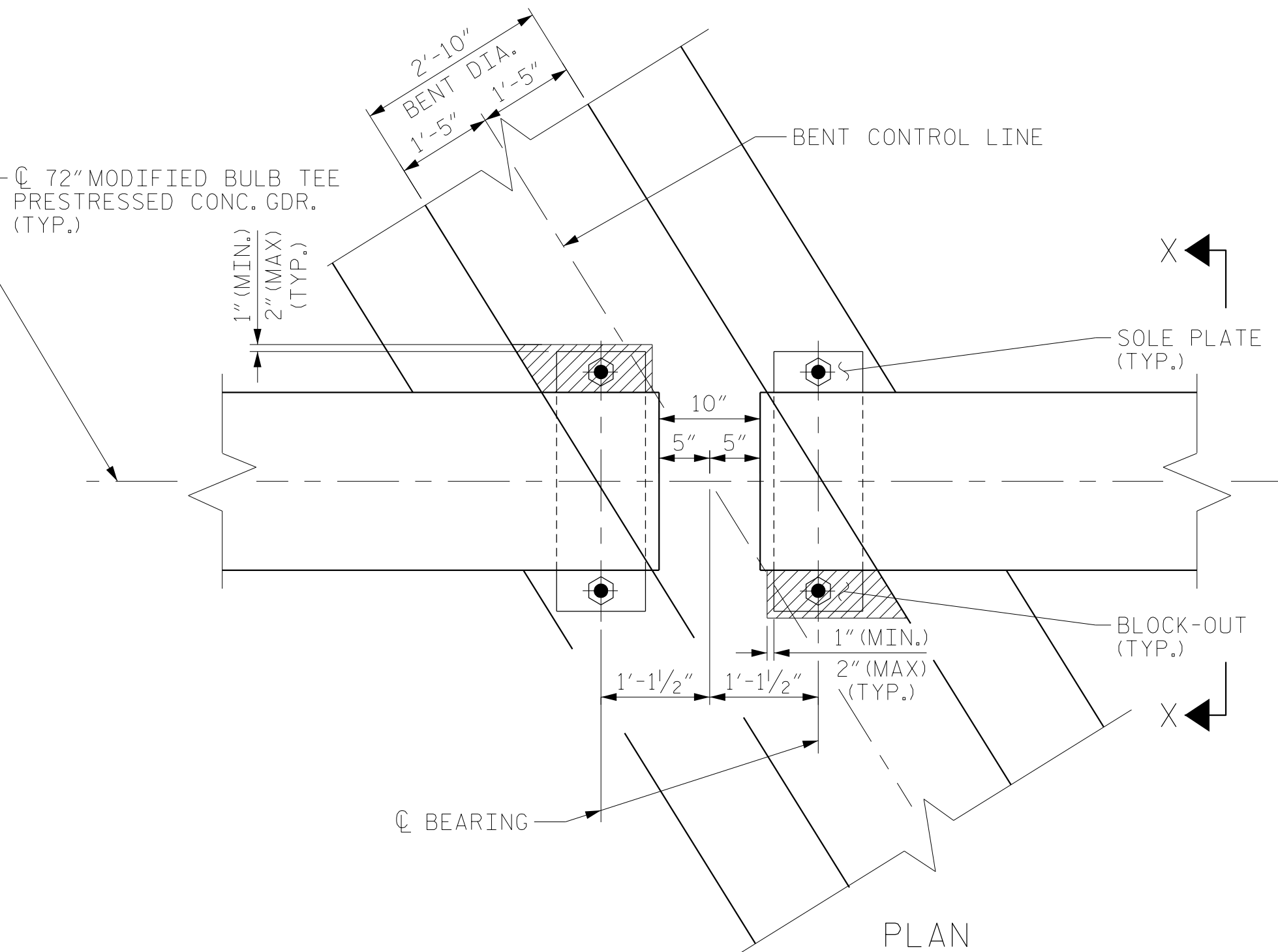


SECTION AT BENT DIAPHRAGM

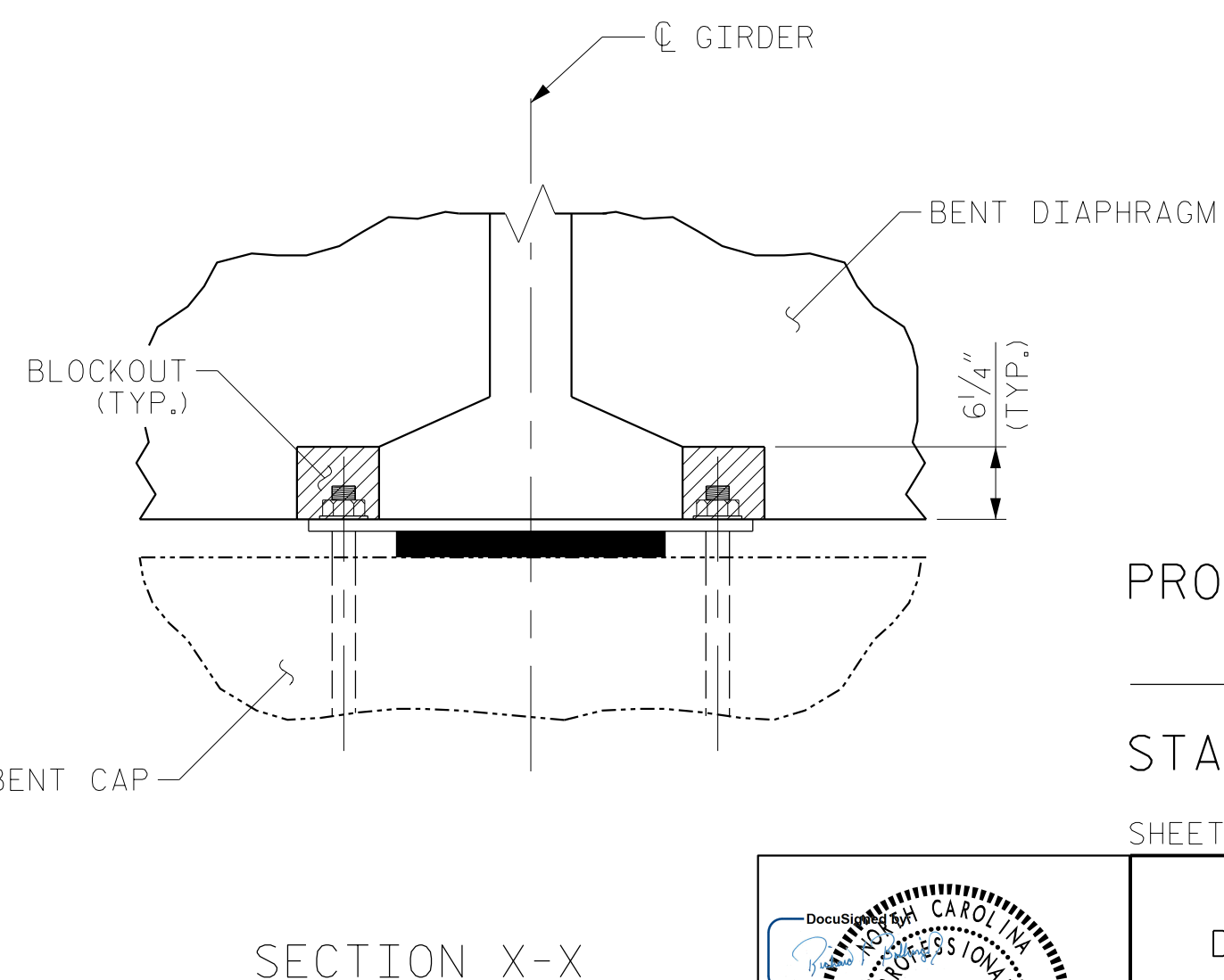
* MEASURED ALONG C GIRDER



END BENT DIAPHRAGM



BENT DIAPHRAGM BLOCK-OUT DETAIL



SECTION X-X

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 2 OF 2



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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 TYPICAL SECTION
 DETAILS
 LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-7
1			3			TOTAL SHEETS
2			4			39

DRAWN BY : MAL DATE : 05/2015
 CHECKED BY : JMR DATE : 05/2015
 DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

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NOTES

FOR SPLICE LENGTHS NOT SHOWN, REFER TO MINIMUM SPLICE LENGTH TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 1 OF 2.

FOR END BENT DIAPHRAGM BARS AND BENT DIAPHRAGM BARS, SEE "TYPICAL SECTION" SHEET 2 OF 2.

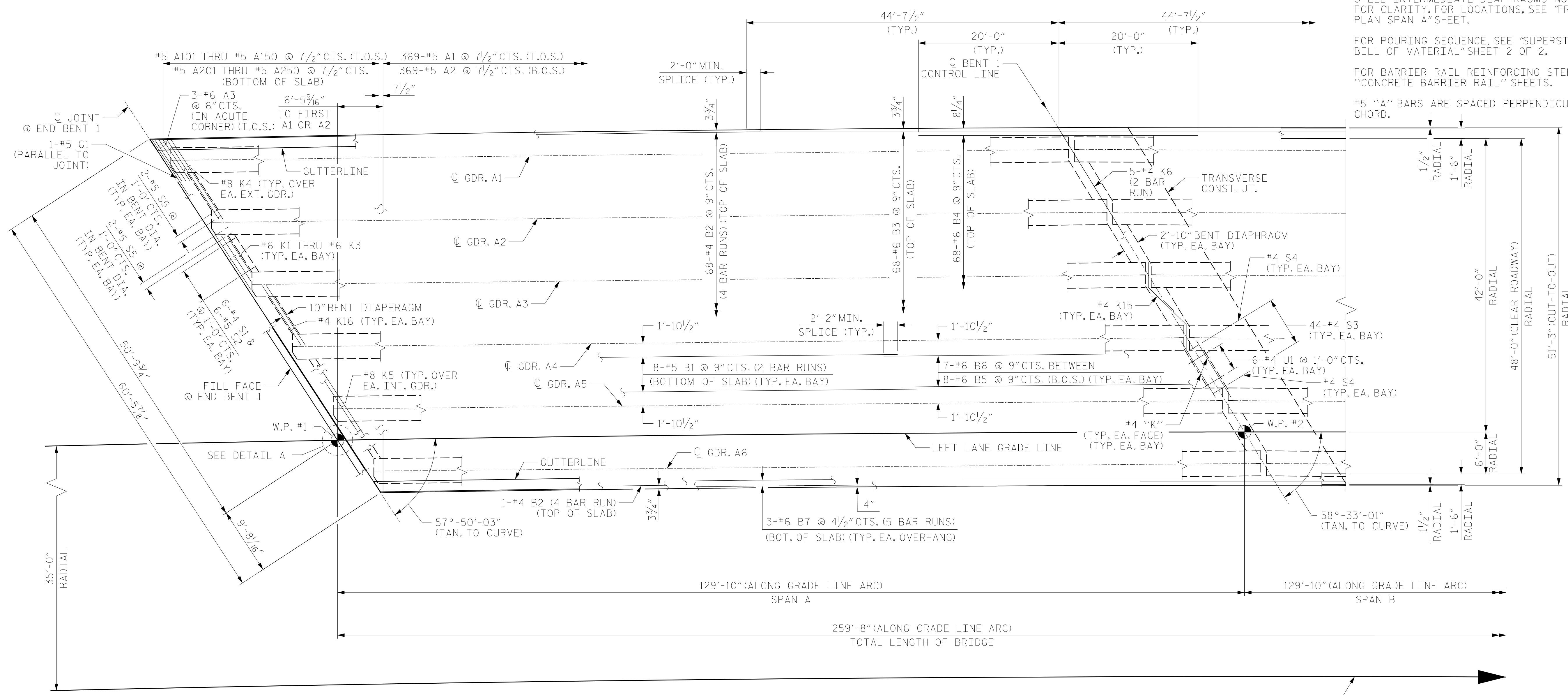
STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY, FOR LOCATIONS, SEE "FRAMING PLAN SPAN A" SHEET.

FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 2 OF 2.

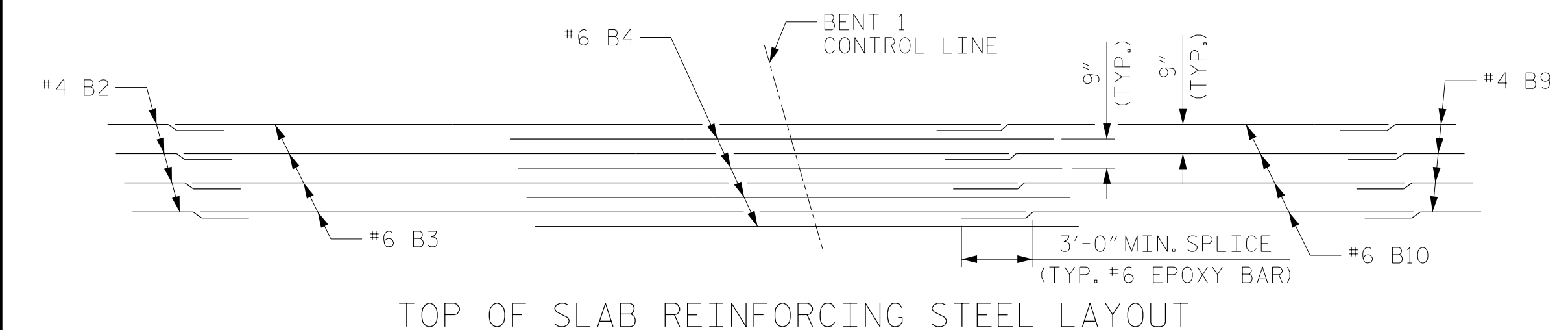
FOR BARRIER RAIL REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEETS.

#5 "A" BARS ARE SPACED PERPENDICULAR TO LONG CHORD.

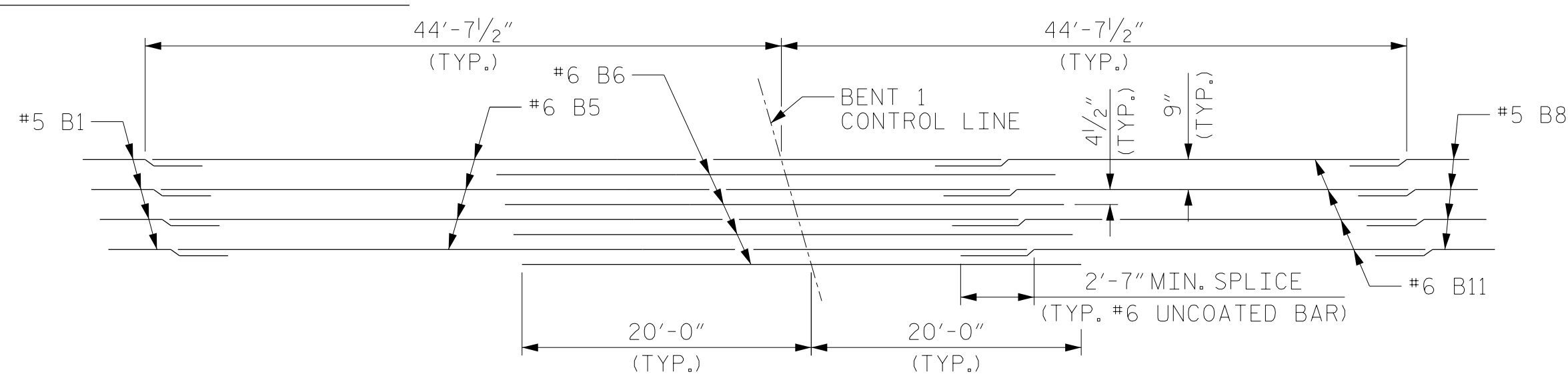
T.O.S. = TOP OF SLAB
B.O.S. = BOT. OF SLAB



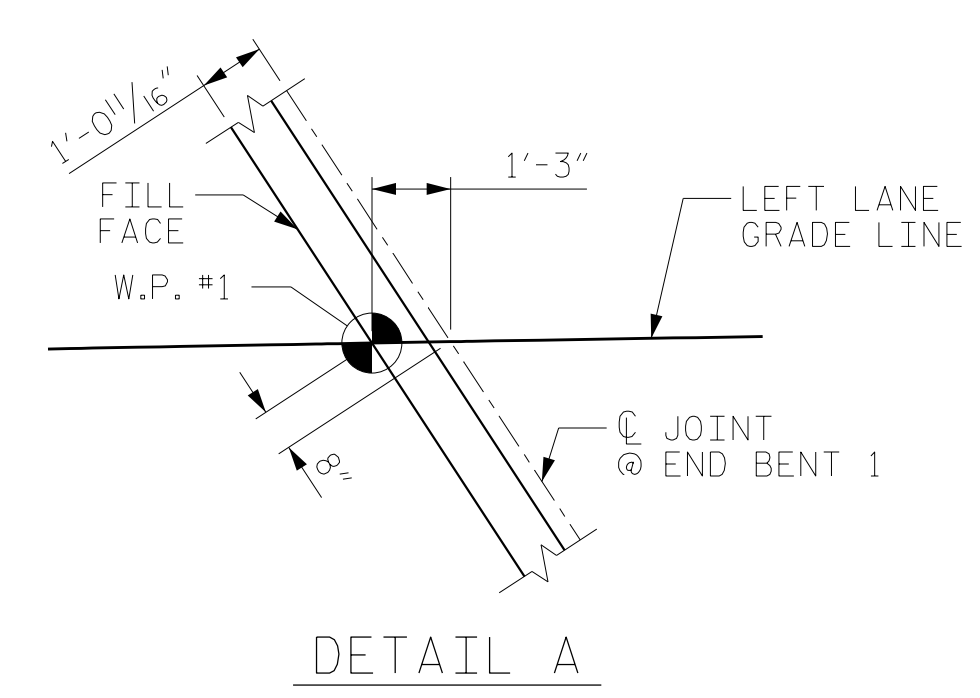
PLAN OF SPAN A



TOP OF SLAB REINFORCING STEEL LAYOUT



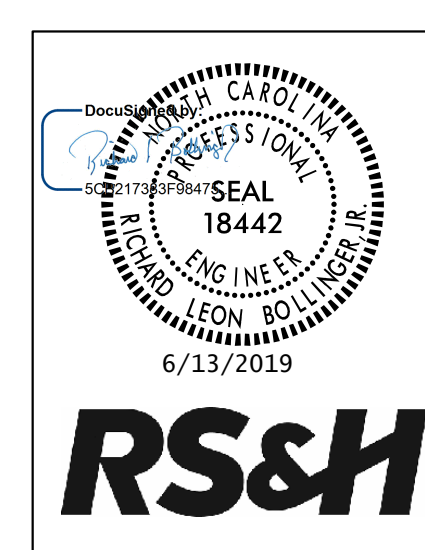
BOTTOM OF SLAB REINFORCING STEEL LAYOUT



DETAIL A

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-

SHEET 1 OF 2



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPAN A
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-8
1			3			TOTAL SHEETS
2			4			39

DRAWN BY : MAL DATE : 05/2015
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NOTES

FOR SPLICE LENGTHS NOT SHOWN, REFER TO MINIMUM SPLICE LENGTH TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 1 OF 2.

FOR END BENT DIAPHRAGM BARS AND BENT DIAPHRAGM BARS, SEE "TYPICAL SECTION" SHEET 2 OF 2.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN SPAN B" SHEET.

FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 2 OF 2.

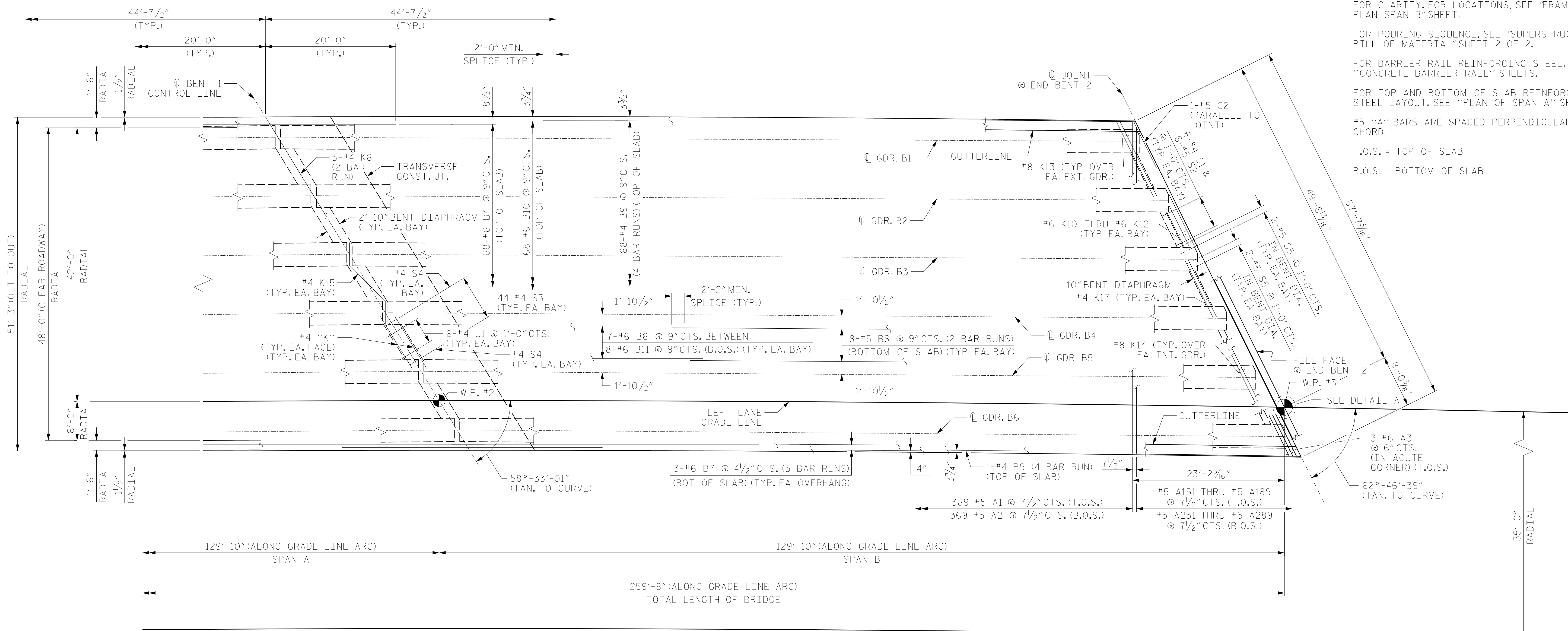
FOR BARRIER RAIL REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEETS.

FOR TOP AND BOTTOM OF SLAB REINFORCING STEEL LAYOUT, SEE "PLAN OF SPAN A" SHEET.

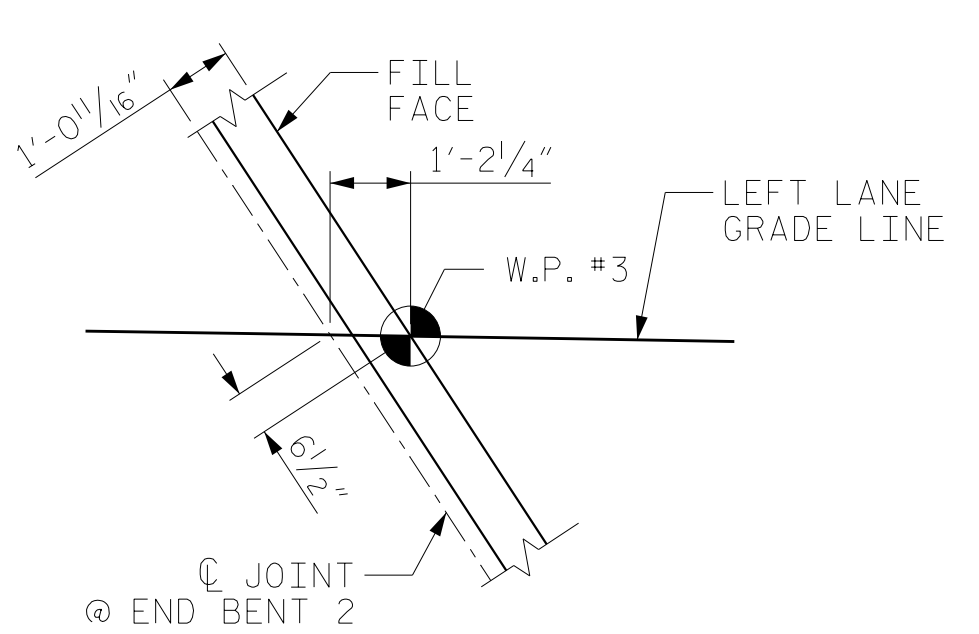
#5 "A" BARS ARE SPACED PERPENDICULAR TO LONG CHORD.

T.O.S. = TOP OF SLAB

B.O.S. = BOTTOM OF SLAB



PLAN OF SPAN B



DETAIL A

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

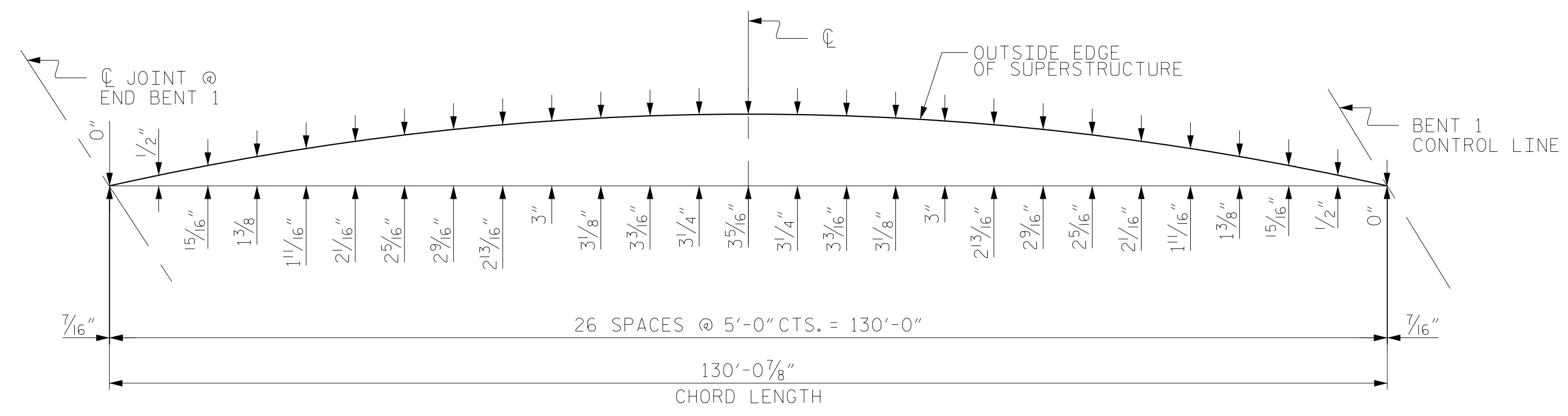
SHEET 2 OF 2



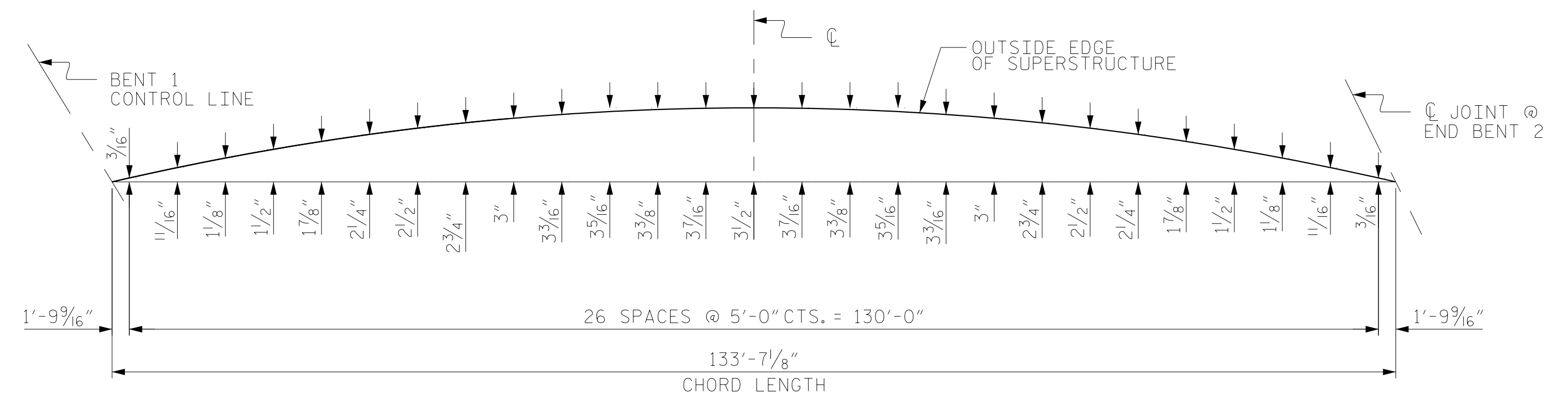
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S03-9
SUPERSTRUCTURE PLAN OF SPAN B LEFT LANE						
REVISIONS						TOTAL SHEETS 39
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DRAWN BY : MAL	DATE : 05/2015
CHECKED BY : JMR	DATE : 05/2015
DESIGN ENGINEER OF RECORD : JMR	DATE : 04/2019

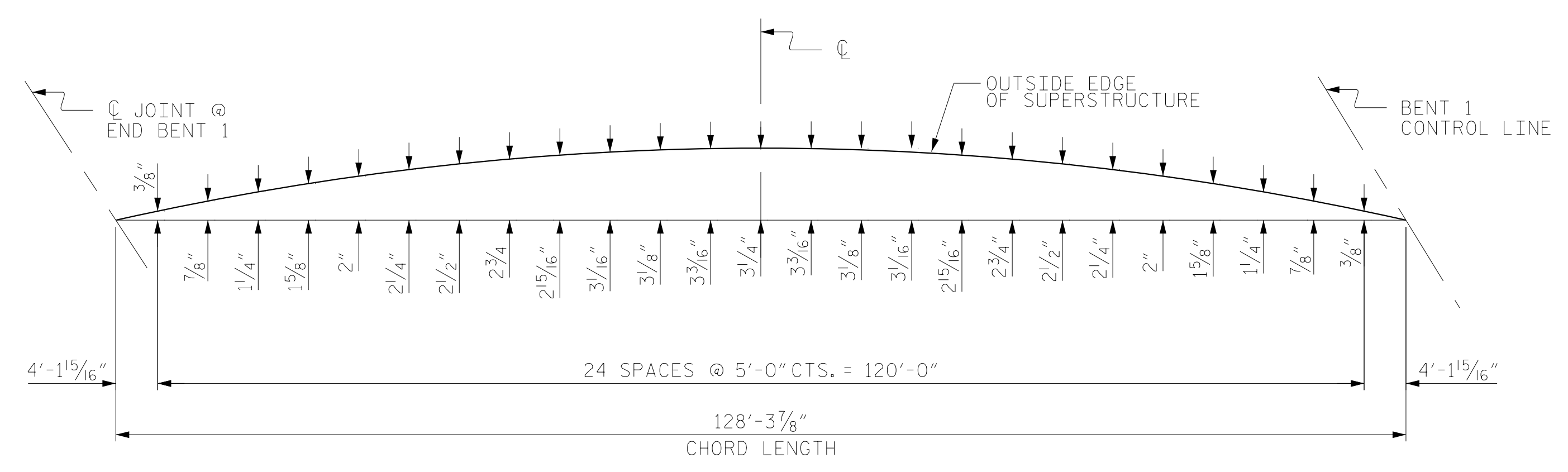
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



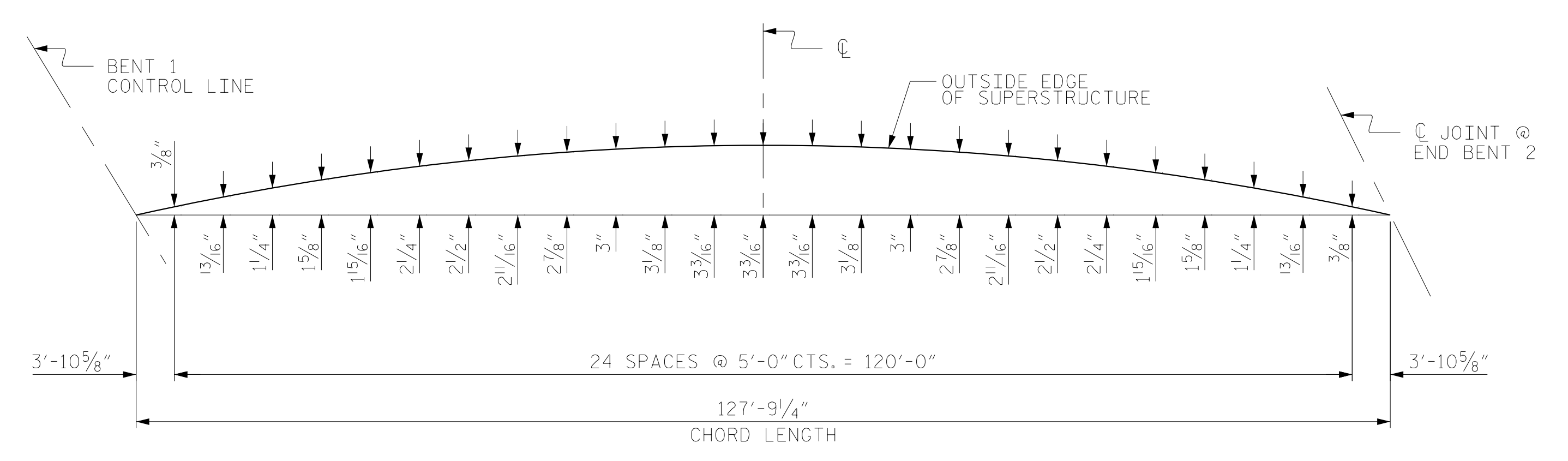
LEFT SIDE SPAN "A" ARC OFFSETS



LEFT SIDE SPAN "B" ARC OFFSETS



RIGHT SIDE SPAN "A" ARC OFFSETS



RIGHT SIDE SPAN "B" ARC OFFSETS

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

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 DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

6/13/2019
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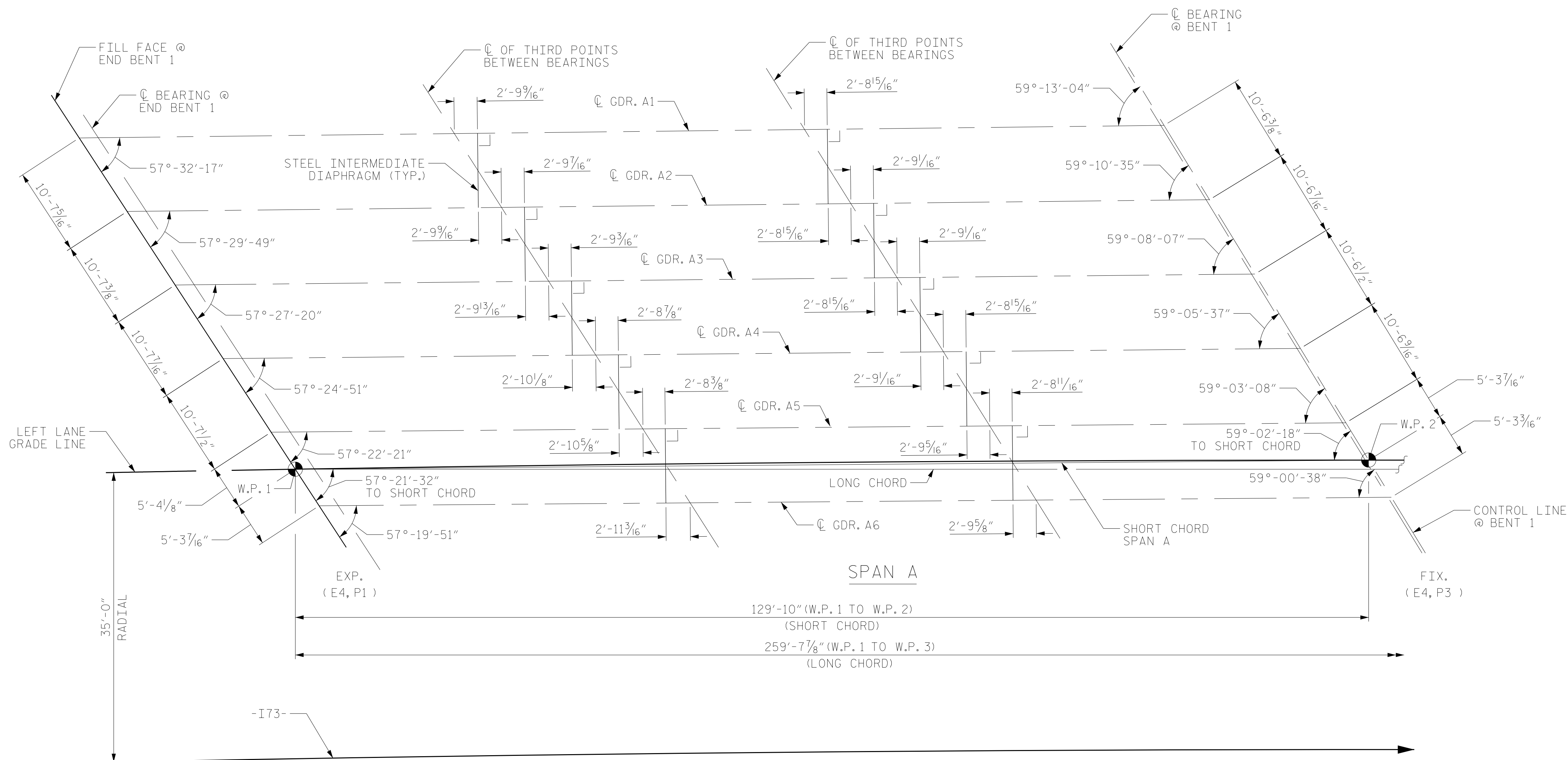
DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE ARC OFFSETS LEFT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S03-10
					TOTAL SHEETS 39

NOTES:

FOR DIMENSIONS TO STEEL INTERMEDIATE DIAPHRAGMS, SEE "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS," SHEET 3 OF 4.

FOR STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS."



FRAMING PLAN

END BENT DIAPHRAGMS AND BENT DIAPHRAGMS ARE NOT SHOWN

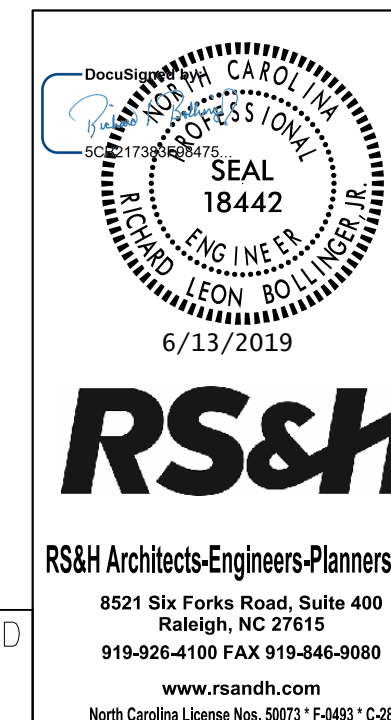
PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 1 OF 2

DRAWN BY : MKO DATE : 04/2015
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

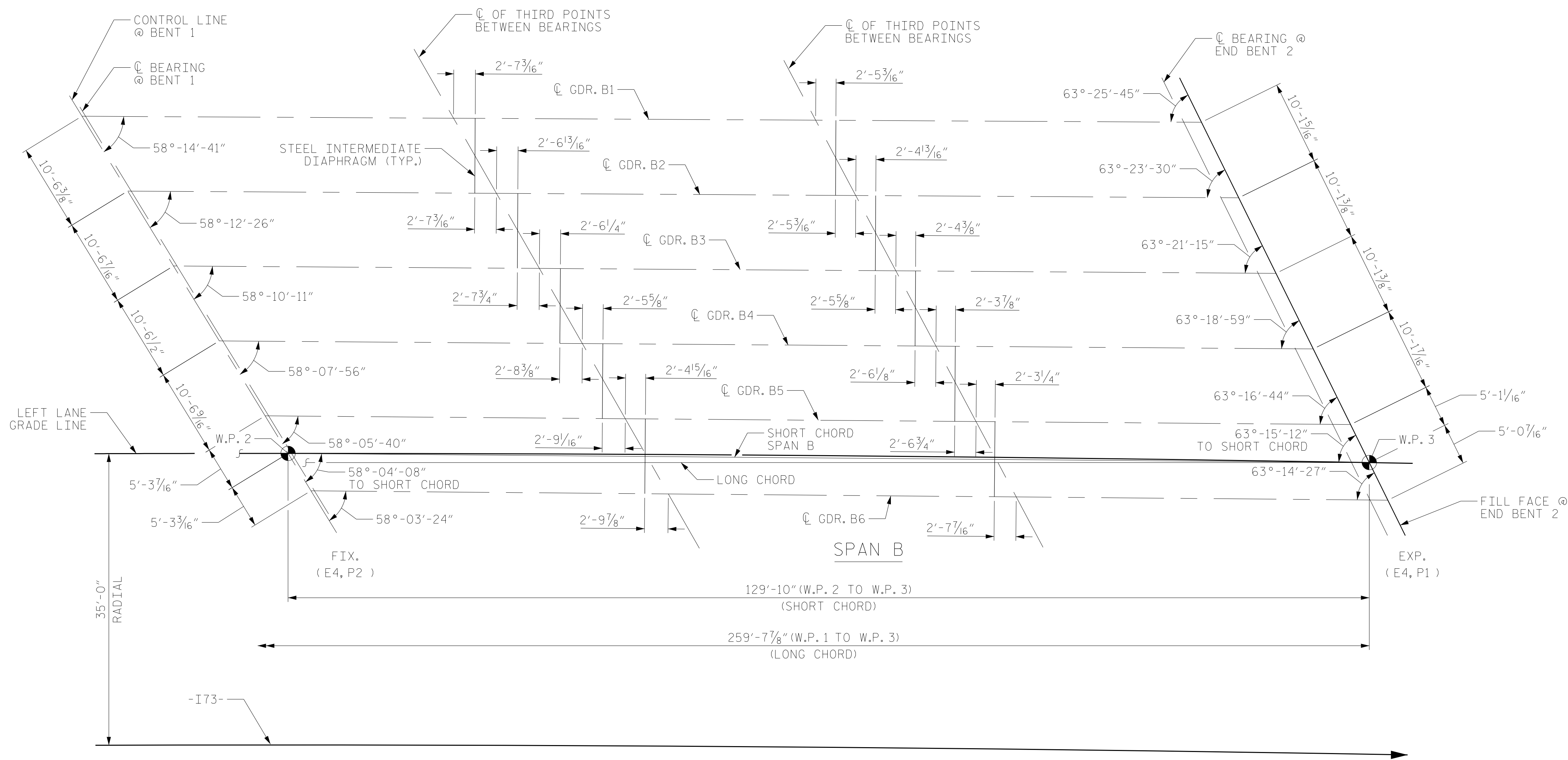
SUPERSTRUCTURE
 FRAMING PLAN
 SPAN A
 LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S03-11
2			4			TOTAL SHEETS 39

NOTES:

FOR DIMENSIONS TO STEEL INTERMEDIATE DIAPHRAGMS, SEE "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS," SHEET 3 OF 4.

FOR STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS."



FRAMING PLAN

END BENT DIAPHRAGMS AND BENT DIAPHRAGMS ARE NOT SHOWN

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 2 OF 2

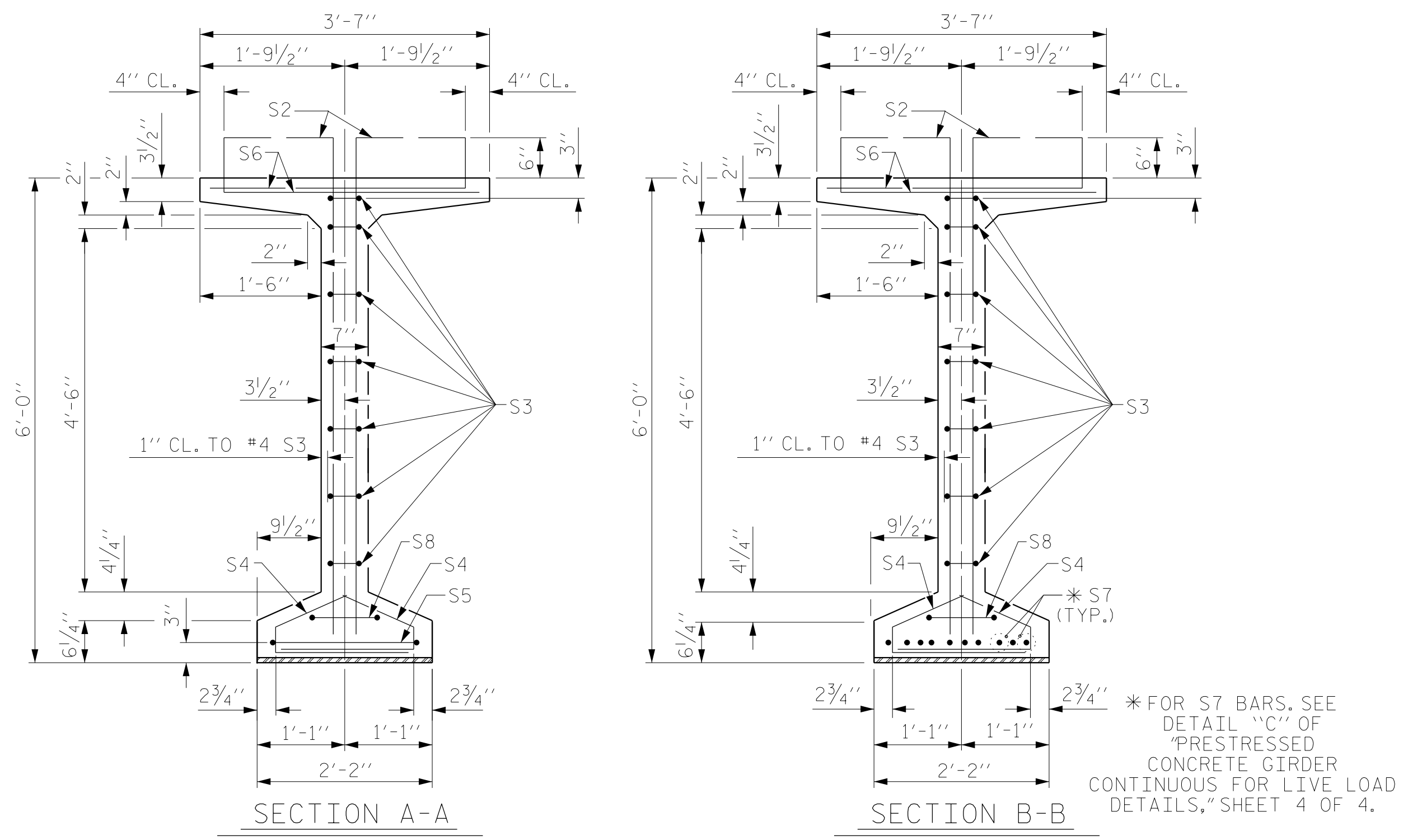
DRAWN BY : MKO DATE : 04/2015
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6/13/2019
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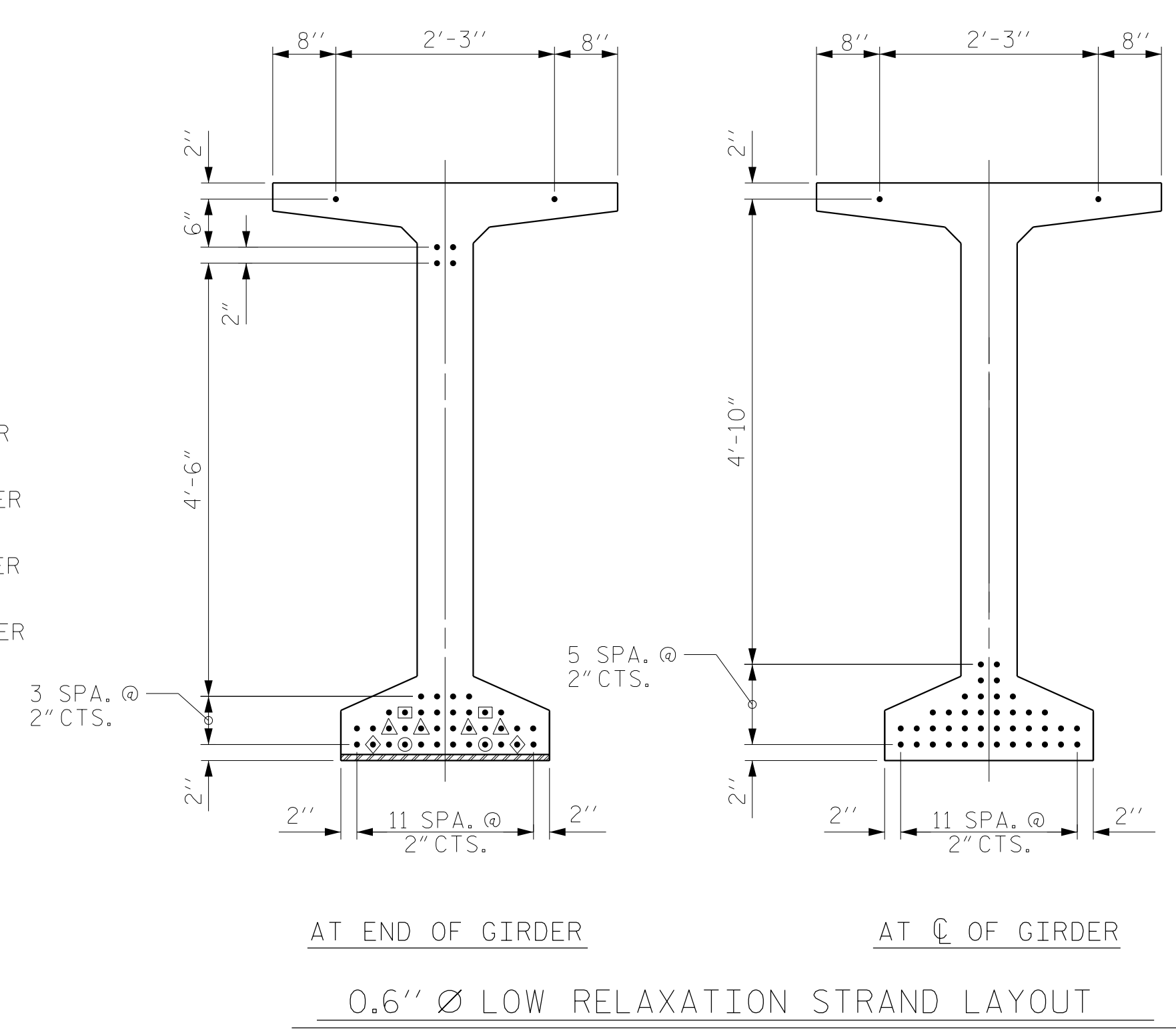
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S03-12
SUPERSTRUCTURE FRAMING PLAN SPAN B LEFT LANE						TOTAL SHEETS 39
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



- DEBONDING LEGEND**
- FULLY BONDED STRANDS
 - ◻ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
 - ◻ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
 - ◻ STRANDS DEBONDED FOR 14'-0" FROM END OF GIRDER
 - ◻ STRANDS DEBONDED FOR 26'-0" FROM END OF GIRDER

* FOR S7 BARS, SEE DETAIL "C" OF "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS," SHEET 4 OF 4.



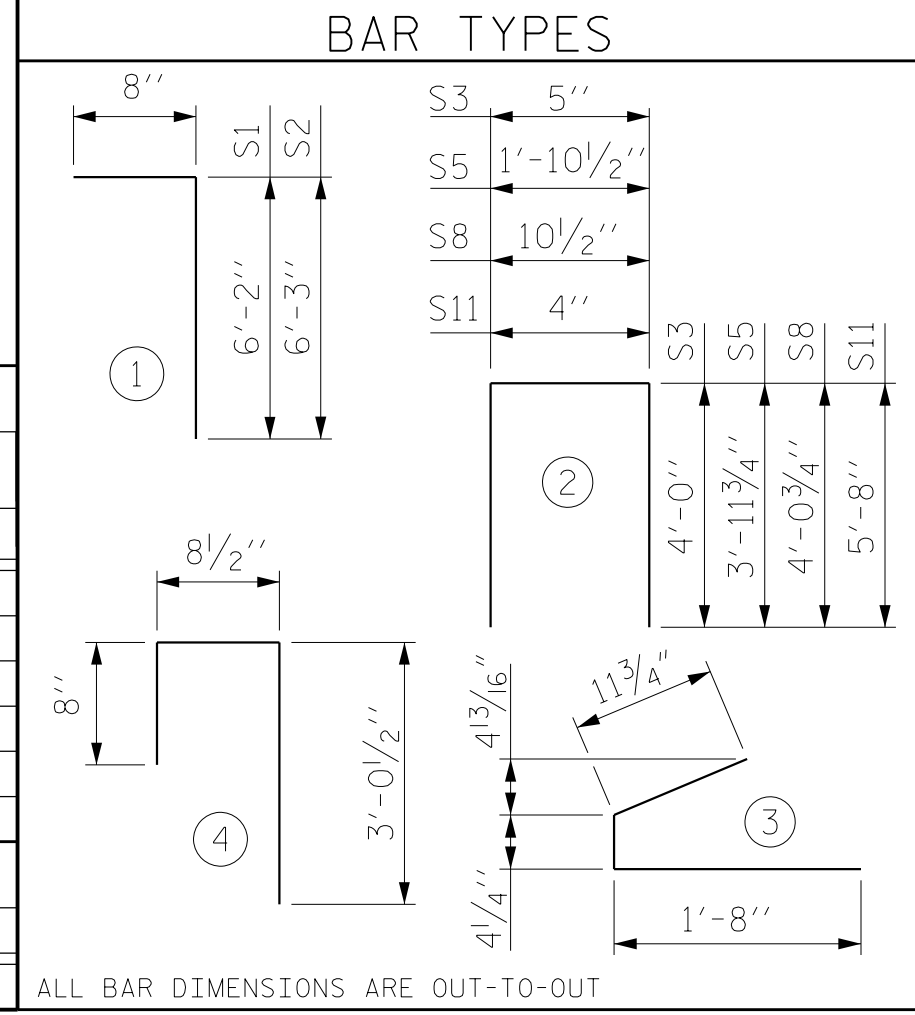
0.6" Ø L. R. GRADE 270 STRANDS

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

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	226	#4	1	6'-10"	1032	
S2	28	#5	1	6'-11"	202	
S3	14	#4	2	8'-5"	79	
S4	88	#4	3	3'-0"	176	
S5	1	#5	2	9'-10"	10	
S6	88	#5	4	4'-5"	405	
*S7	10	#5	STR	3'-8"	38	
S8	2	#5	2	9'-0"	19	
S9	83	#5	STR	3'-3"	281	
S10	1	#3	STR	1'-10"	1	
GDR. 1 & 6	S11	8	#5	2	11'-8"	97
GDR. 2 - 5	S11	16	#5	2	11'-8"	195
GDR. 1 & 6	S12	16	#4	STR	8'-0"	86
GDR. 2 - 5	S13	16	#4	STR	13'-7"	145

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

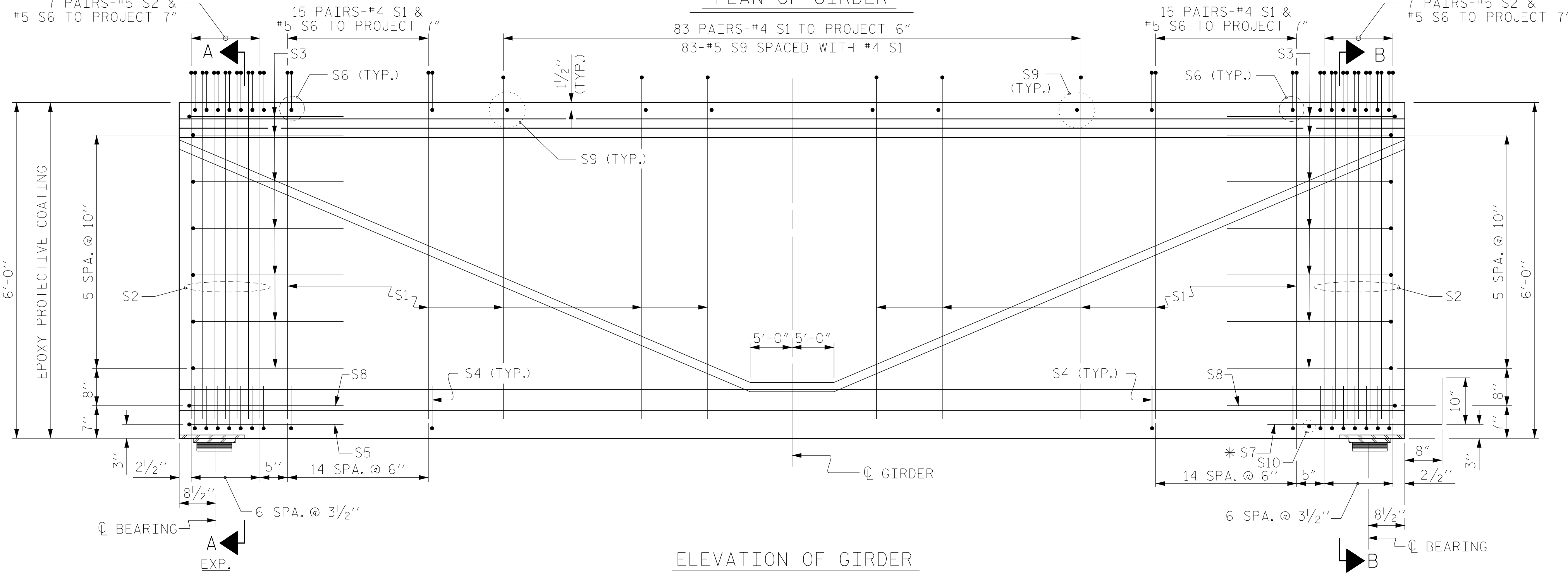
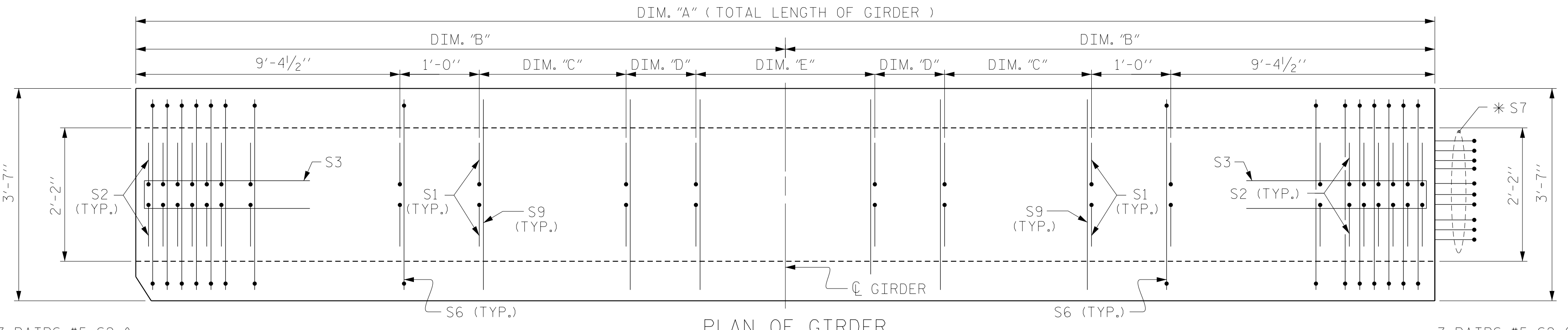


QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDER 1	2426	27.5	42
GIRDER 2	2583	27.5	42
GIRDER 3	2583	27.4	42
GIRDER 4	2583	27.3	42
GIRDER 5	2583	27.3	42
GIRDER 6	2426	27.2	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	SEE TABLE	766.41



GIRDER DIMENSIONS TABLE

GDR. NO.	SPAN A				
	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"
A1	128'-6 1/16"	64'-3 1/16"	15 SPA. @ 1'-0"	1'-4 9/16"	50 SPA. @ 1'-6"
A2	128'-2 3/8"	64'-1 3/16"	15 SPA. @ 1'-0"	1'-2 1/16"	50 SPA. @ 1'-6"
A3	127'-10 1/16"	63'-11 3/8"	15 SPA. @ 1'-0"	1'-0 7/8"	50 SPA. @ 1'-6"
A4	127'-7"	63'-9 1/2"	15 SPA. @ 1'-0"	11"	50 SPA. @ 1'-6"
A5	127'-3 1/4"	63'-7 5/8"	15 SPA. @ 1'-0"	9 1/8"	50 SPA. @ 1'-6"
A6	126'-11 7/16"	63'-5 3/16"	15 SPA. @ 1'-0"	7 3/16"	50 SPA. @ 1'-6"

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 1 OF 4



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 72" PRESTRESSED CONCRETE
 MODIFIED BULB TEE
 CONTINUOUS FOR LIVE LOAD
 SPAN A
 LEFT LANE

DRAWN BY : MKO DATE : 03/2015
 CHECKED BY : MAL DATE : 05/2015
 DESIGN ENGINEER : JMR DATE : 04/2019
 OF RECORD :

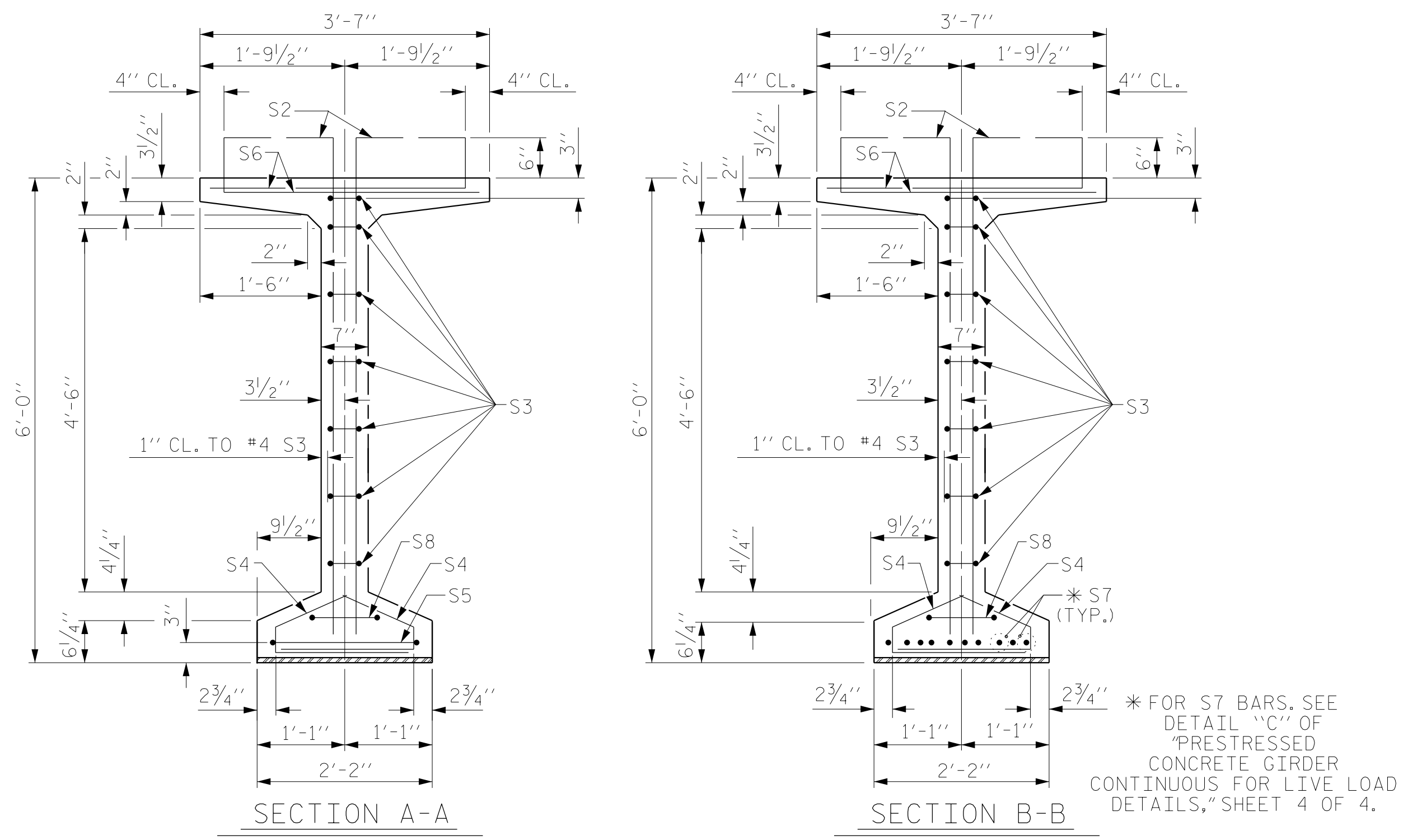
FOR LOCATIONS OF 1 1/2" Ø FORMED HOLES FOR STEEL INTERMEDIATE DIAPHRAGMS, SEE SHEET 3 OF 4.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

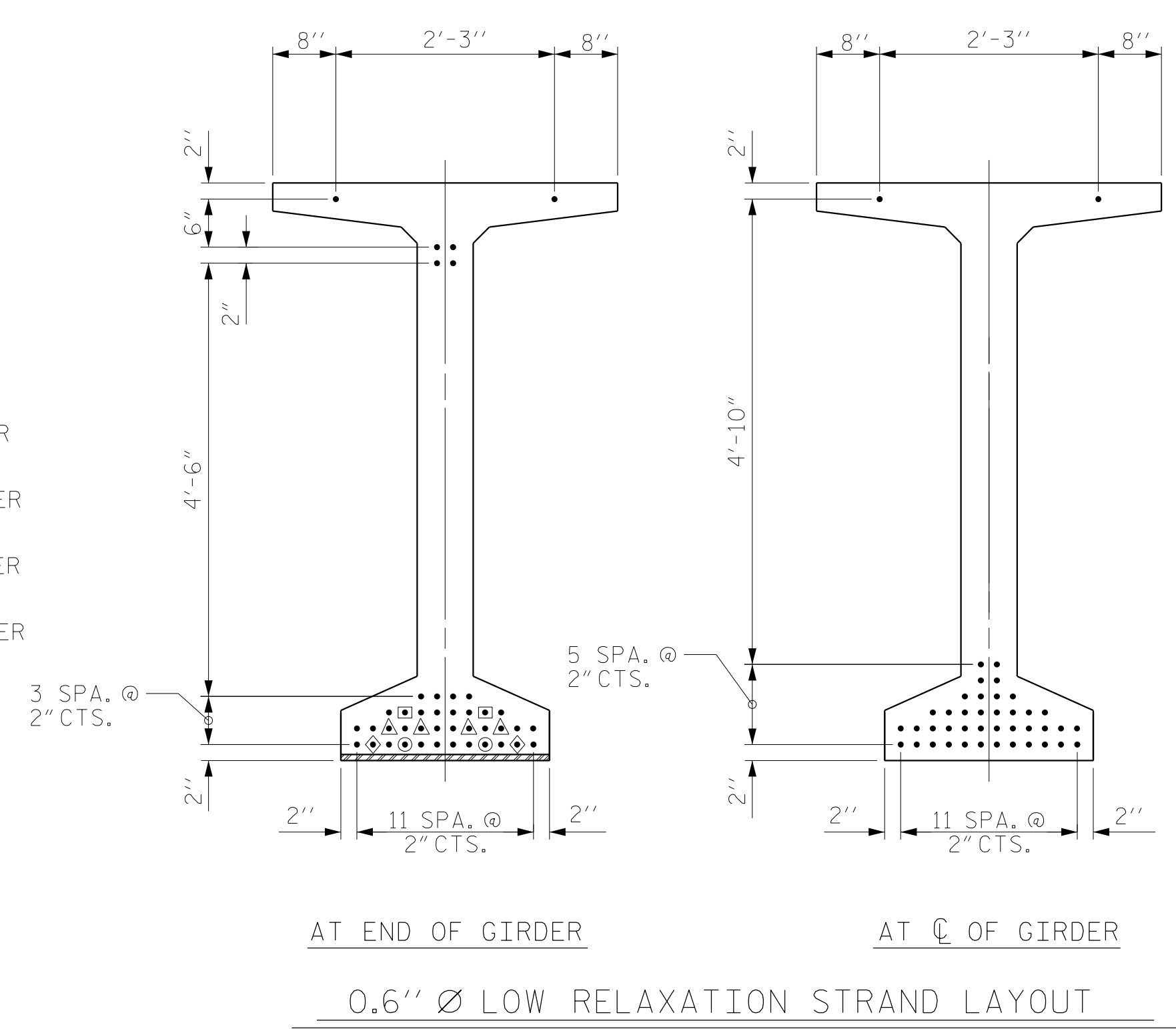
REVISIONS

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

SHEET NO. S03-13
 TOTAL SHEETS 39



- DEBONDING LEGEND**
- FULLY BONDED STRANDS
 - ◻ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
 - ◻ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
 - ◻ STRANDS DEBONDED FOR 14'-0" FROM END OF GIRDER
 - ◻ STRANDS DEBONDED FOR 26'-0" FROM END OF GIRDER



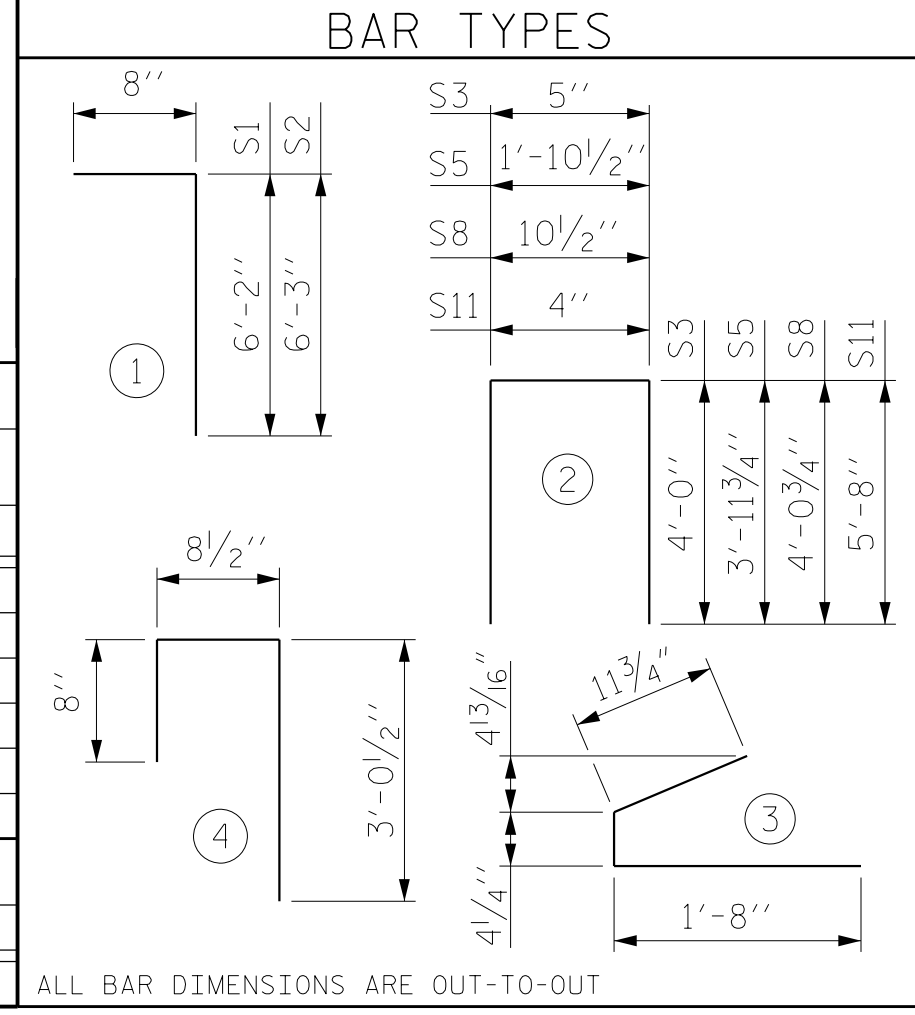
0.6" Ø L. R. GRADE 270 STRANDS

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

REINFORCING STEEL FOR ONE GDR

GDR.	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
GDR. 1	S1	232	#4	1	6'-10"	1059
GDR. 2	S1	230	#4	1	6'-10"	1050
GDR. 3 & 4	S1	228	#4	1	6'-10"	1041
GDR. 5	S1	226	#4	1	6'-10"	1032
GDR. 6	S1	224	#4	1	6'-10"	1022
	S2	28	#5	1	6'-11"	202
	S3	14	#4	2	8'-5"	79
	S4	88	#4	3	3'-0"	176
	S5	1	#5	2	9'-10"	10
	S6	88	#5	4	4'-5"	405
	* S7	10	#5	STR	3'-8"	38
	S8	2	#5	2	9'-0"	19
GDR. 1	S9	86	#5	STR	3'-3"	292
GDR. 2	S9	85	#5	STR	3'-3"	288
GDR. 3 & 4	S9	84	#5	STR	3'-3"	285
GDR. 5	S9	83	#5	STR	3'-3"	281
GDR. 6	S9	82	#5	STR	3'-3"	278
	S10	1	#3	STR	1'-10"	1
GDR. 1 & 6	S11	8	#5	2	11'-8"	97
GDR. 2 - 5	S11	16	#5	2	11'-8"	195
GDR. 1 & 6	S12	16	#4	STR	8'-0"	86
GDR. 2 - 5	S13	16	#4	STR	13'-7"	145

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

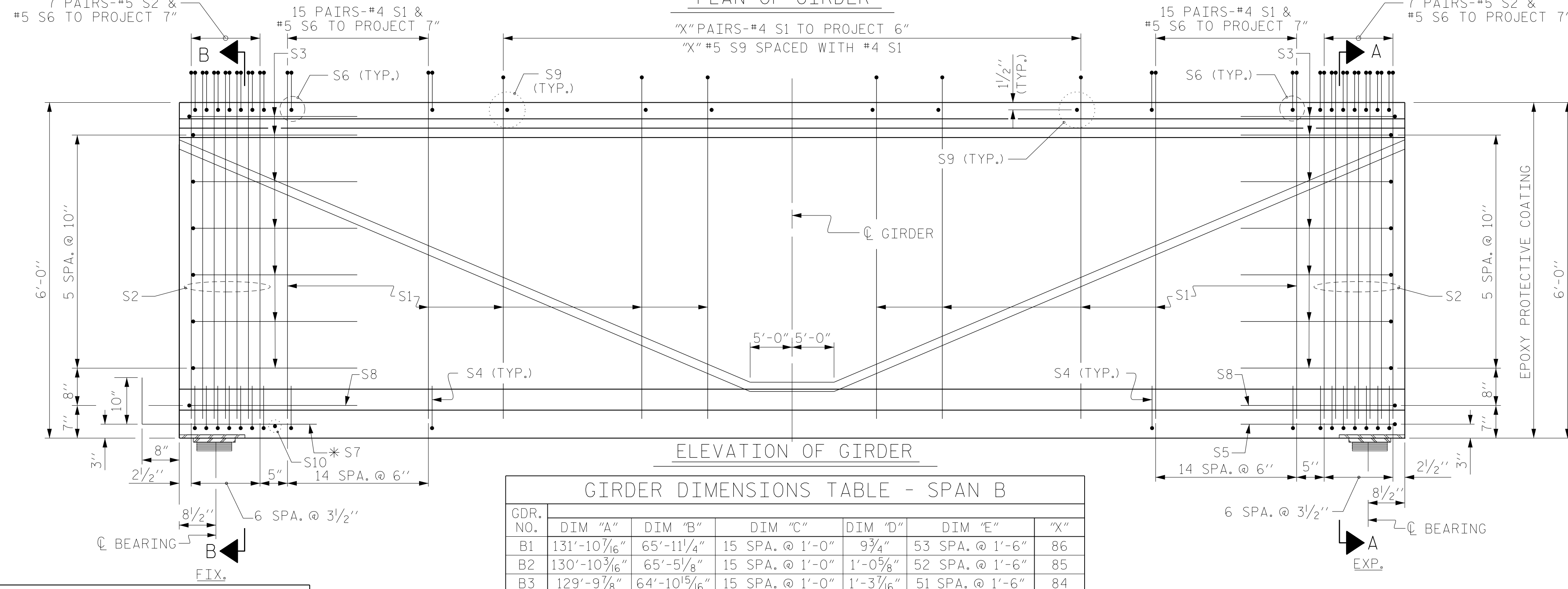
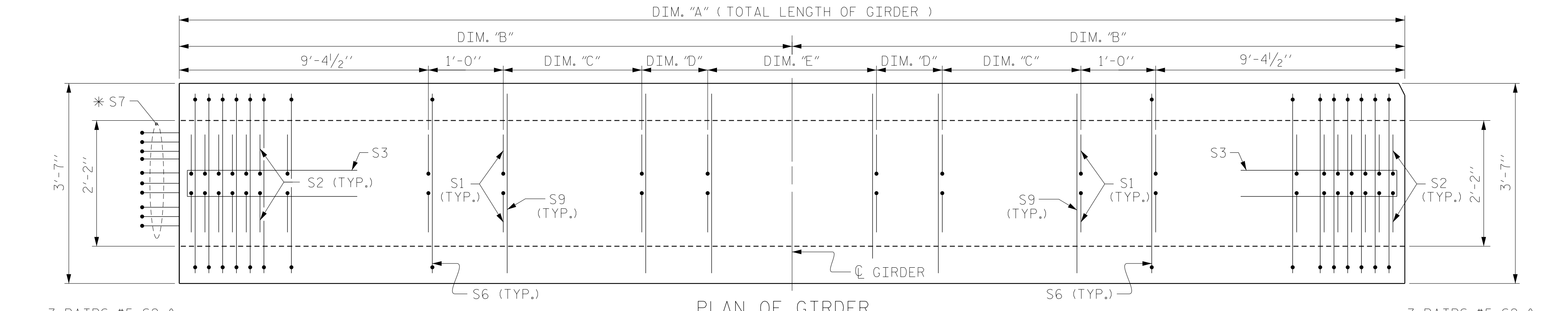


QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDER 1	2464	28.3	42
GIRDER 2	2608	28.0	42
GIRDER 3	2596	27.8	42
GIRDER 4	2596	27.6	42
GIRDER 5	2583	27.4	42
GIRDER 6	2413	27.2	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	SEE TABLE	775.87



GIRDER DIMENSIONS TABLE - SPAN B

GDR. NO.	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"	"X"
B1	131'-10 7/16"	65'-11 1/4"	15 SPA. @ 1'-0"	9 3/4"	53 SPA. @ 1'-6"	86
B2	130'-10 3/16"	65'-5 1/8"	15 SPA. @ 1'-0"	1'-0 5/8"	52 SPA. @ 1'-6"	85
B3	129'-9 7/8"	64'-10 15/16"	15 SPA. @ 1'-0"	1'-3 1/16"	51 SPA. @ 1'-6"	84
B4	128'-9 5/8"	64'-4 3/16"	15 SPA. @ 1'-0"	9 3/16"	51 SPA. @ 1'-6"	84
B5	127'-9 9/16"	63'-10 5/8"	15 SPA. @ 1'-0"	1'-0 1/8"	50 SPA. @ 1'-6"	83
B6	126'-9"	63'-4 1/2"	15 SPA. @ 1'-0"	1'-3"	49 SPA. @ 1'-6"	82

FOR LOCATIONS OF 1/2" Ø FORMED HOLES FOR STEEL INTERMEDIATE DIAPHRAGMS, SEE SHEET 3 OF 4.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : MKO DATE : 03/2015
 CHECKED BY : MAL DATE : 05/2015
 DESIGN ENGINEER : JMR DATE : 04/2019



PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

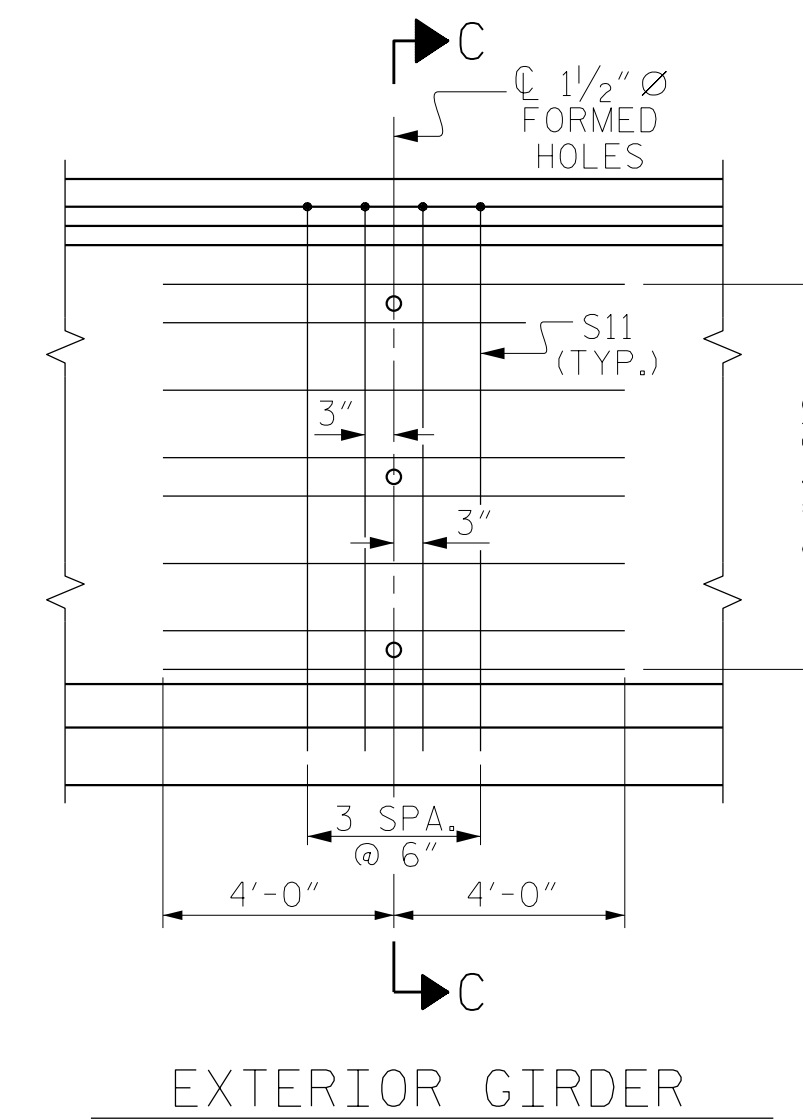
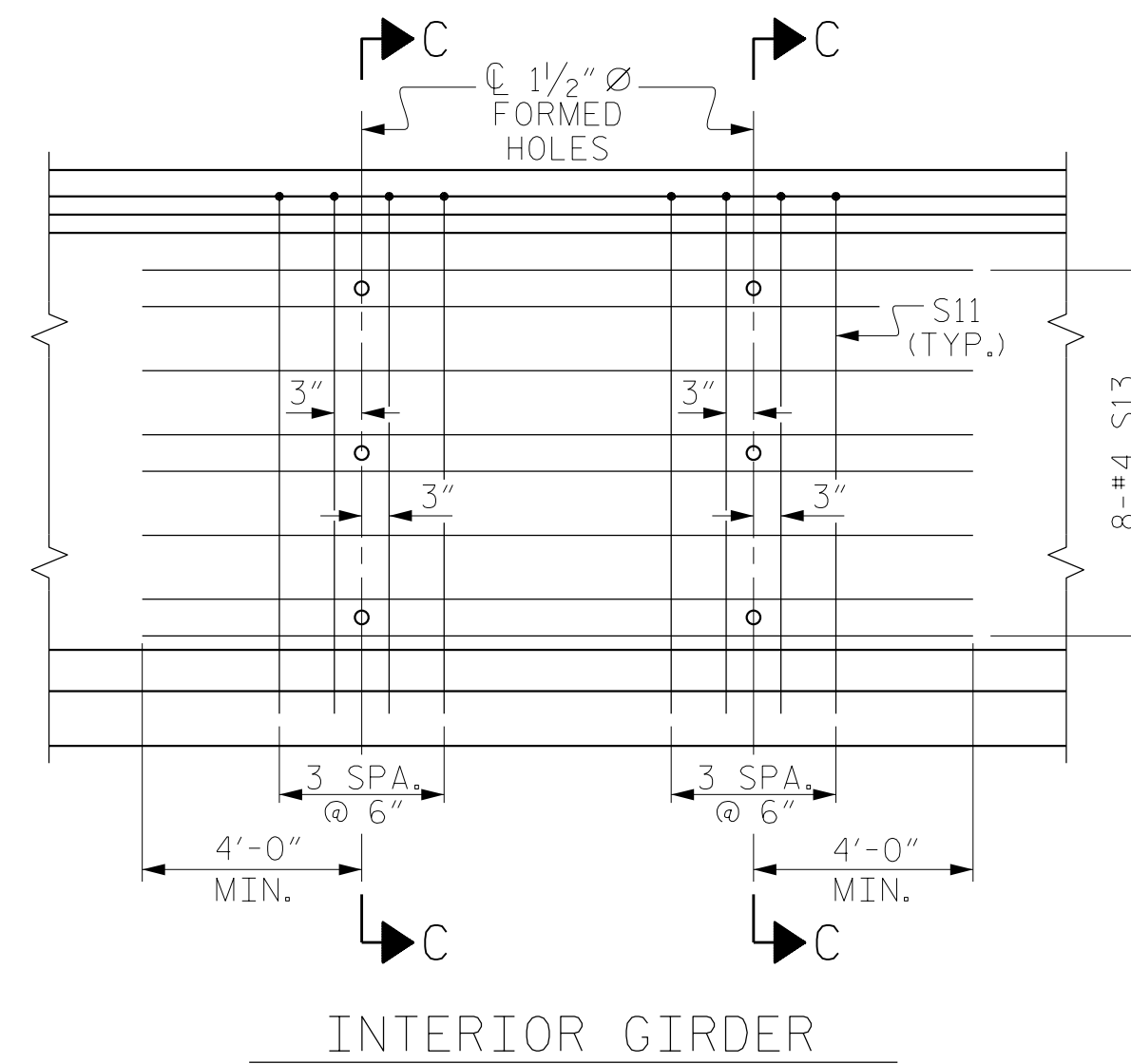
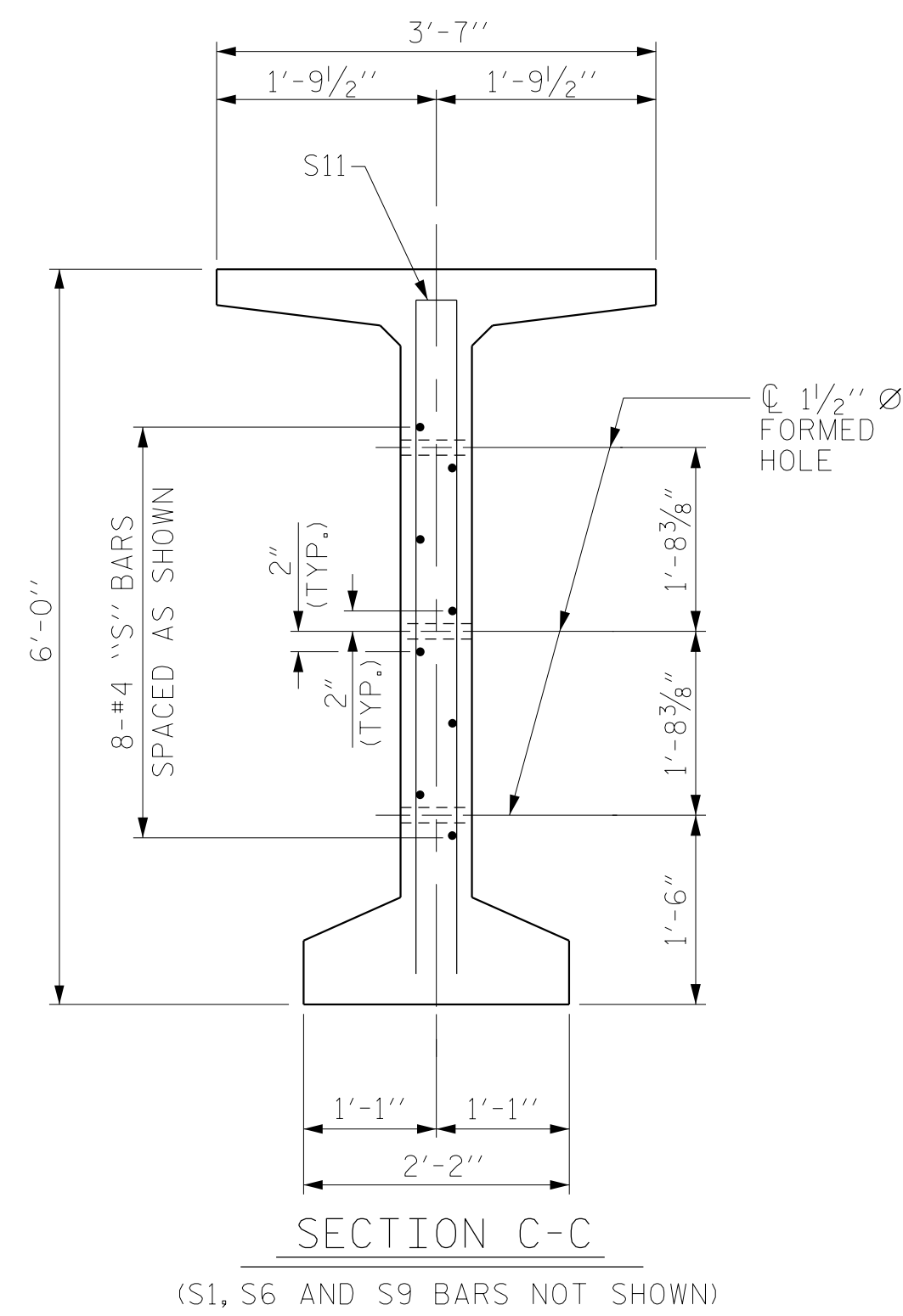
72" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN B LEFT LANE

REVISIONS

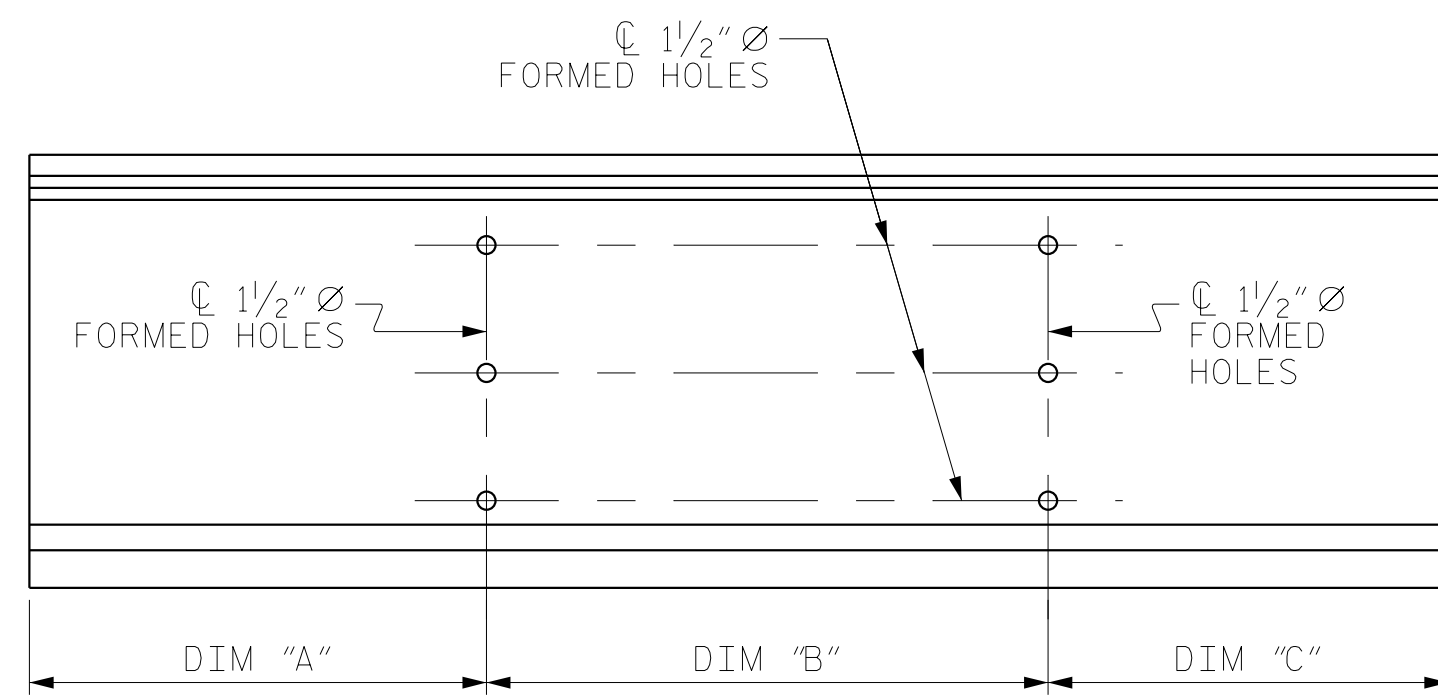
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. SO3-14
 TOTAL SHEETS 39

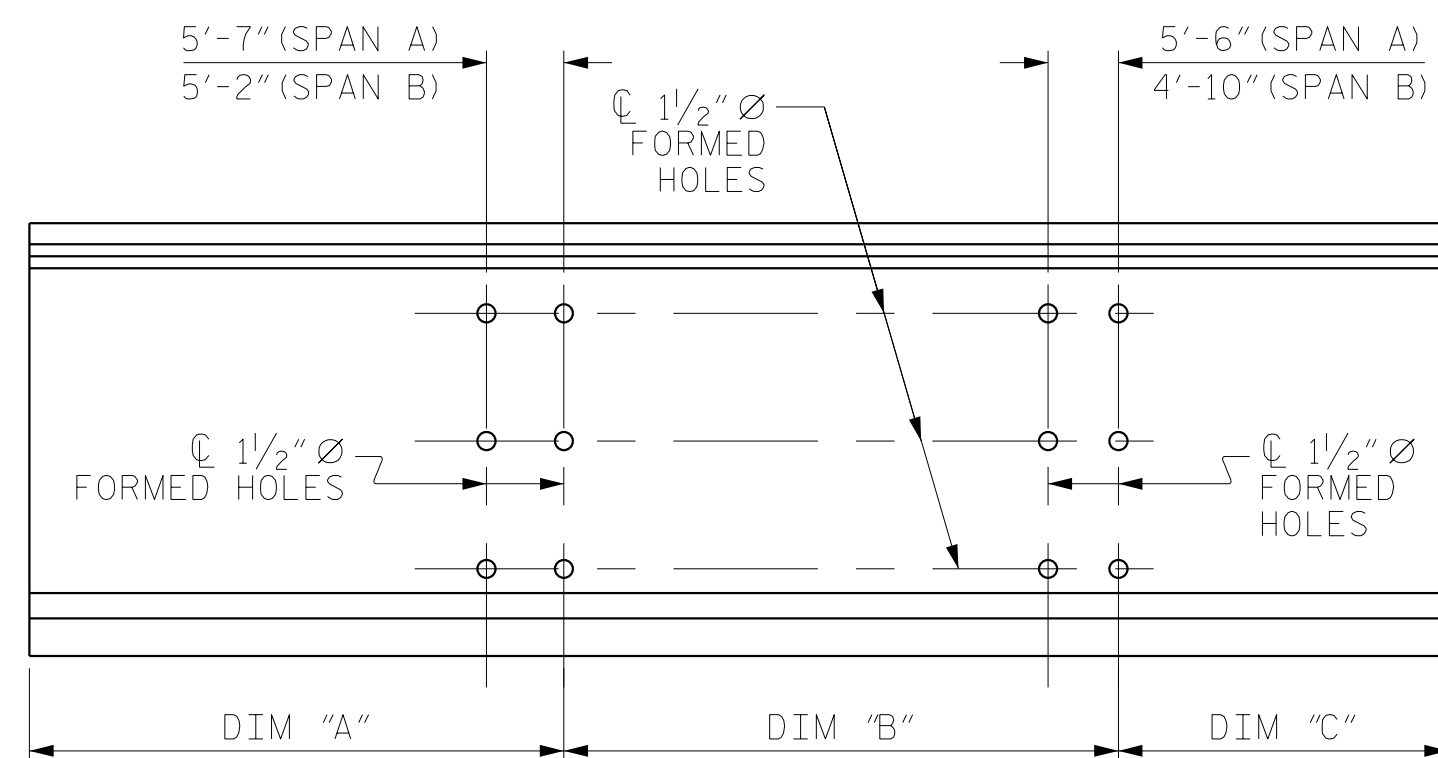
RS&H Architects-Engineers-Planners, Inc.
 8521 Six Forks Road, Suite 400
 Raleigh, NC 27615
 919-926-4100 FAX 919-846-9080
 www.rsandh.com
 North Carolina License No. 50737-0403-C&E



PARTIAL ELEVATION
SHOWING INTERMEDIATE STEEL DIAPHRAGM
REINFORCING STEEL FOR GIRDERS



EXTERIOR GIRDER - SPANS A & B



INTERIOR GIRDER - SPANS A & B

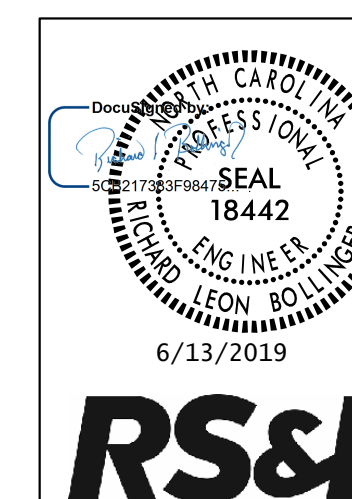
BOLT HOLE PLACEMENT

GDR. NO.	SPAN A			SPAN B		
	DIM "A"	DIM "B"	DIM "C"	DIM "A"	DIM "B"	DIM "C"
1	45'-10 1/16"	42'-3 3/4"	40'-3 3/8"	46'-9 1/2"	43'-3 3/4"	41'-9 3/16"
2	45'-9 9/16"	42'-2 3/4"	40'-2 9/16"	46'-5"	42'-11 3/4"	41'-5 7/16"
3	45'-7 9/16"	42'-1 3/4"	40'-1 3/8"	46'-0 3/8"	42'-7 3/4"	41'-1 3/4"
4	45'-6"	42'-0 3/4"	40'-0 1/4"	45'-7 11/16"	42'-3 3/4"	40'-10 3/16"
5	45'-4 9/16"	41'-11 3/4"	39'-11 3/16"	45'-2 7/8"	41'-11 3/4"	40'-6 11/16"
6	39'-7 1/2"	41'-11 3/4"	45'-4 5/16"	39'-7 15/16"	41'-11 3/4"	45'-1 5/16"

BOLT HOLE PLACEMENT DIMENSIONS

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 3 OF 4



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 North Carolina License No. 50737-F-0403-C-02

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 DETAILS
 LEFT LANE**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-15
1			3			TOTAL SHEETS
2			4			39

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

DRAWN BY : MKO DATE : 03/2015
 CHECKED BY : MAL DATE : 05/2015
 DESIGN ENGINEER : JMR DATE : 04/2019
 OF RECORD :

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 6500 PSI.

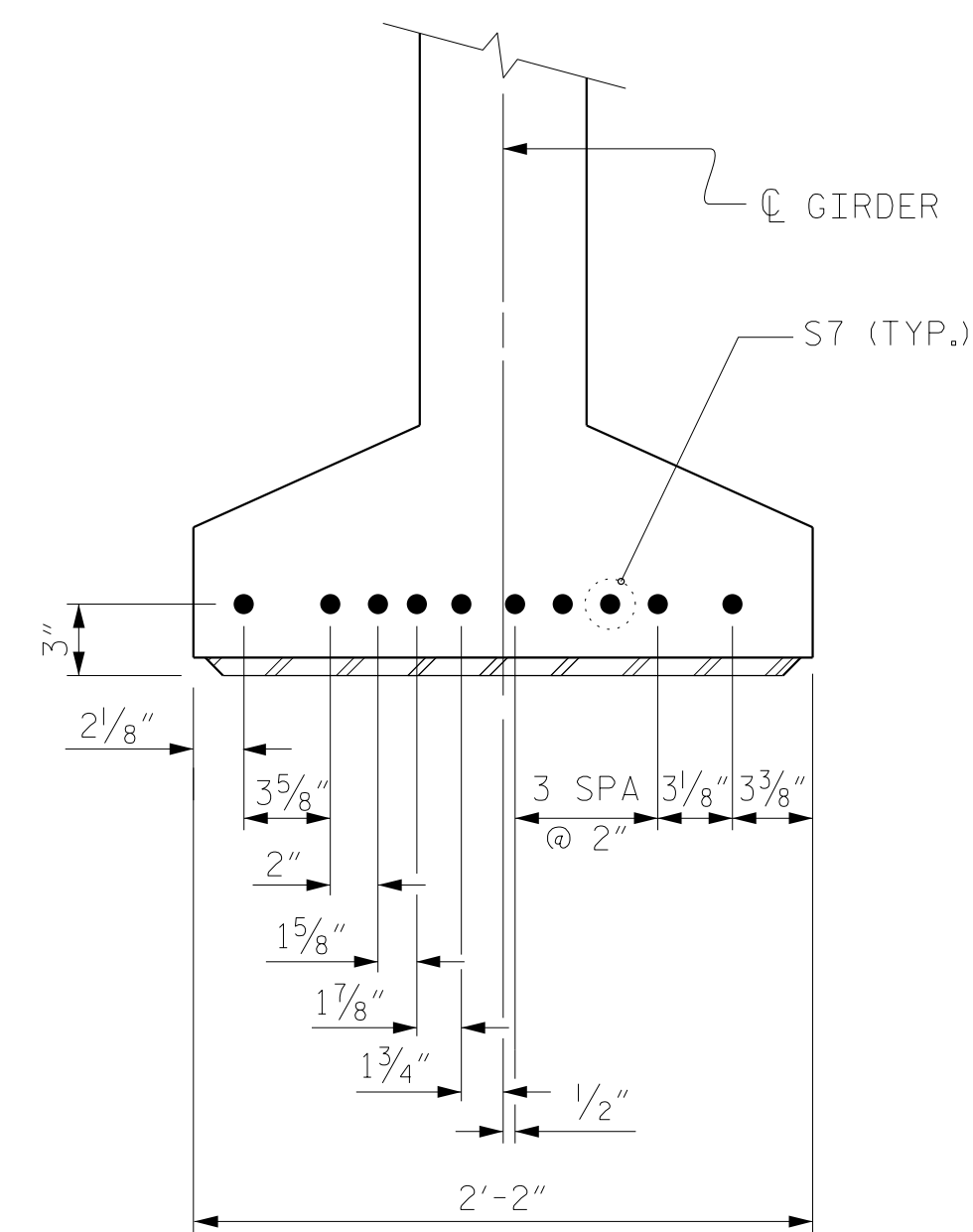
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

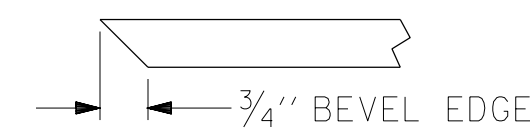
WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 63" AND 72" MODIFIED BULB TEES ONLY.

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.

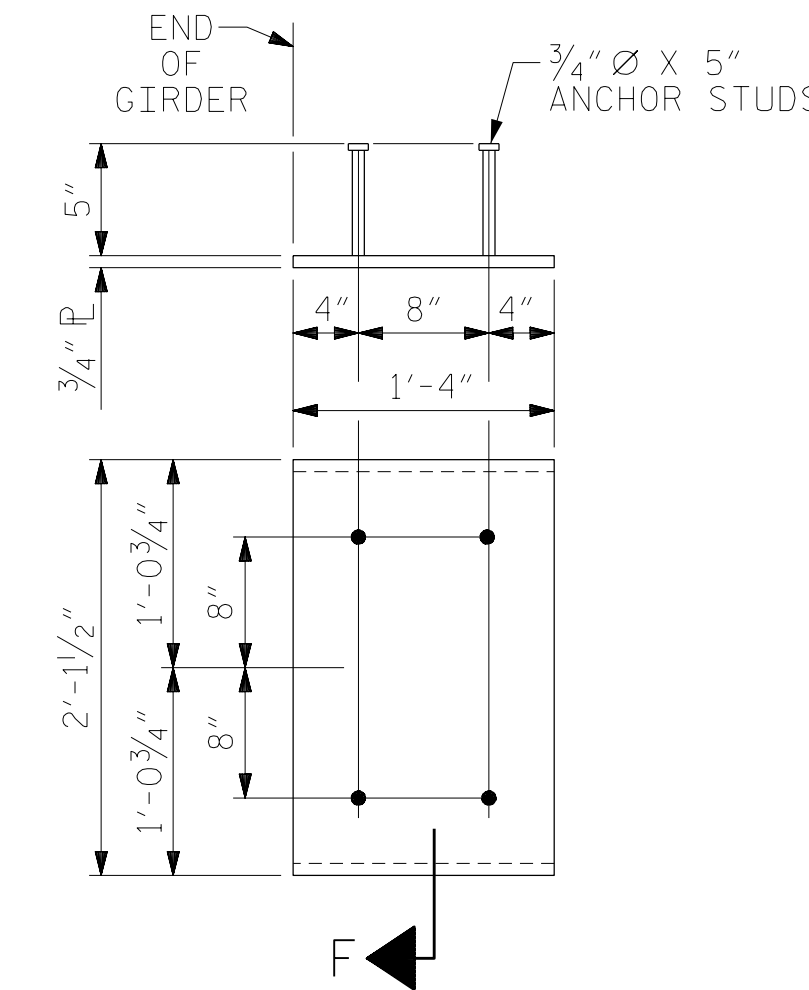


DETAIL "C"



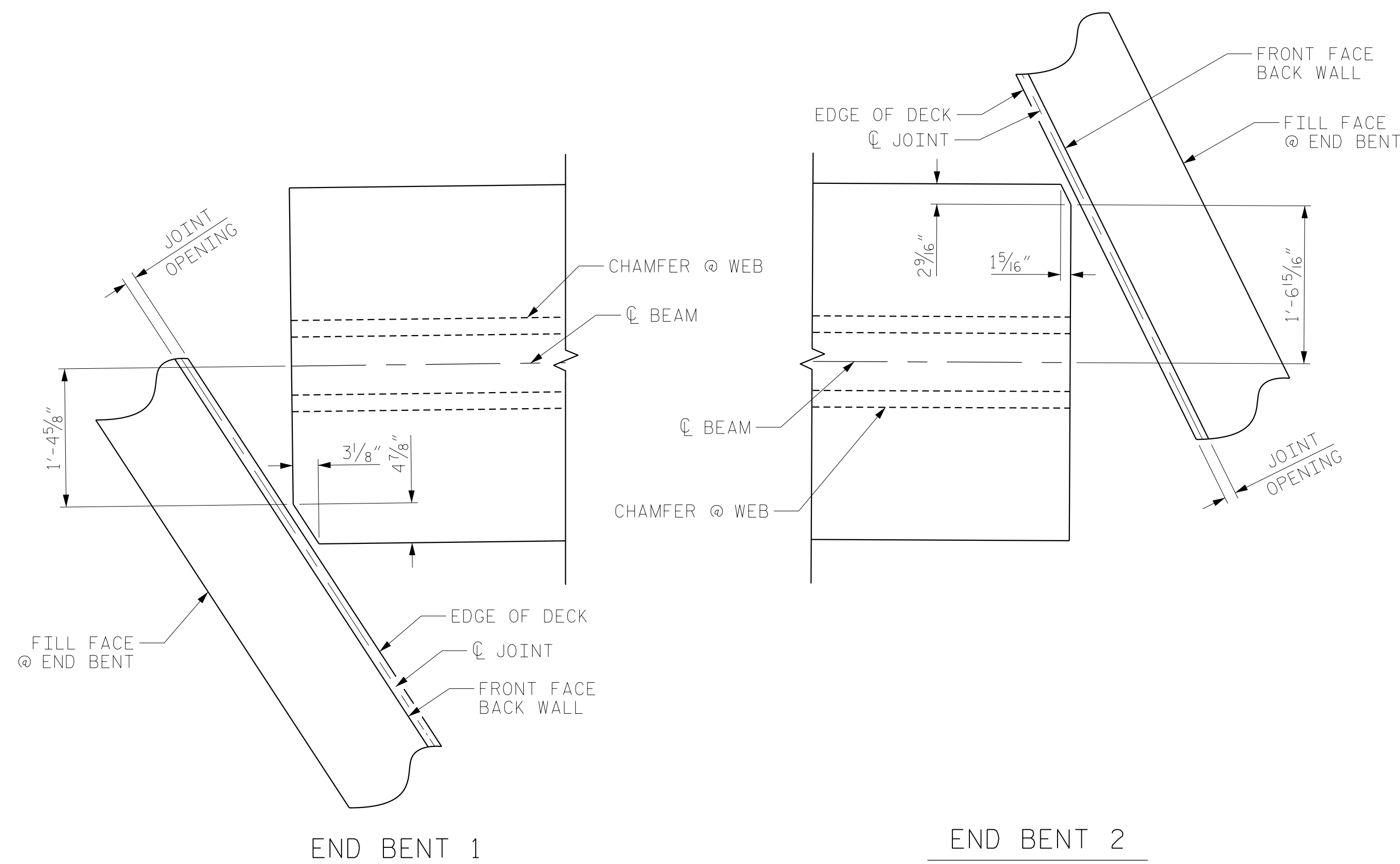
SECTION "F"

(SEE NOTES)



EMBEDDED PLATE "B-1" DETAILS FOR 72" MODIFIED BULB TEE

(2 REQ'D PER GIRDER)



FLANGE CLIP DETAIL

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 4 OF 4



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 DETAILS
 LEFT LANE

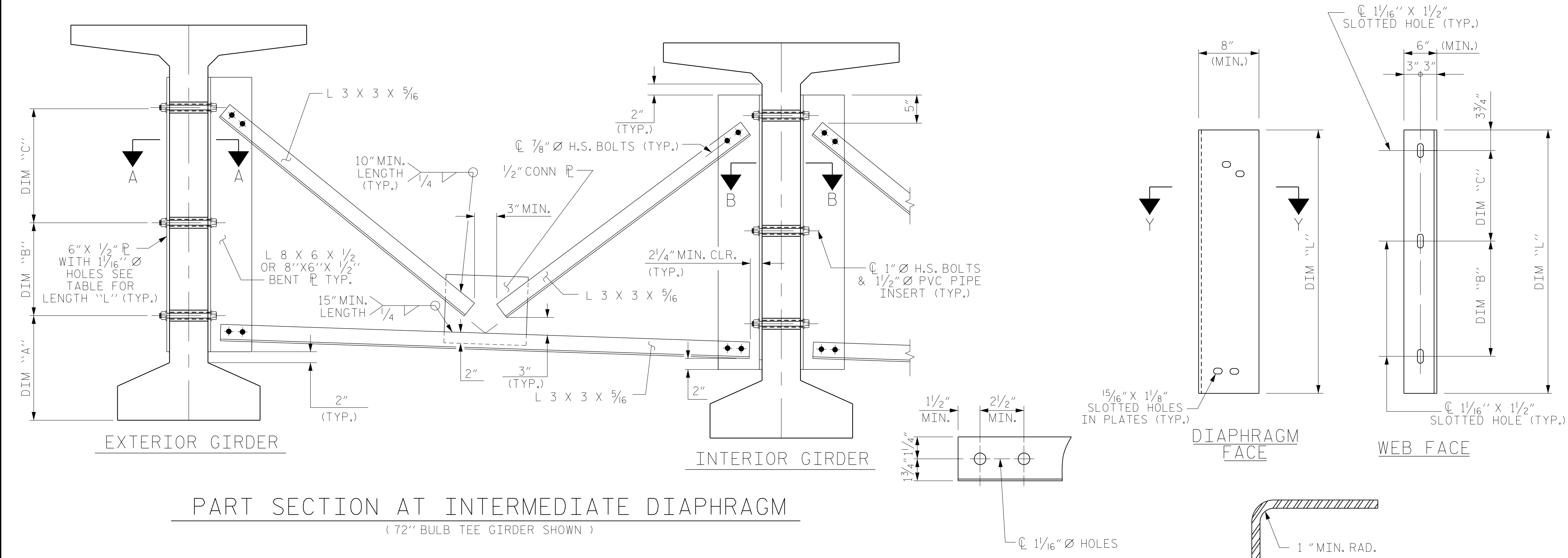
ASSEMBLED BY :	MKO	DATE :	03/2015
CHECKED BY :	MAL	DATE :	05/2015
DRAWN BY :	ELR 11/91	REV. 1/15	MAA/TMG
CHECKED BY :	GRP 11/91	REV. 2/15	MAA/TMG
		REV. 12/17	MAA/THC

6/13/2019
 X:\P\1030180000 R-3421A Richmond\Structures\Working DGN\R-3421A.SD.LT.C*.dgn
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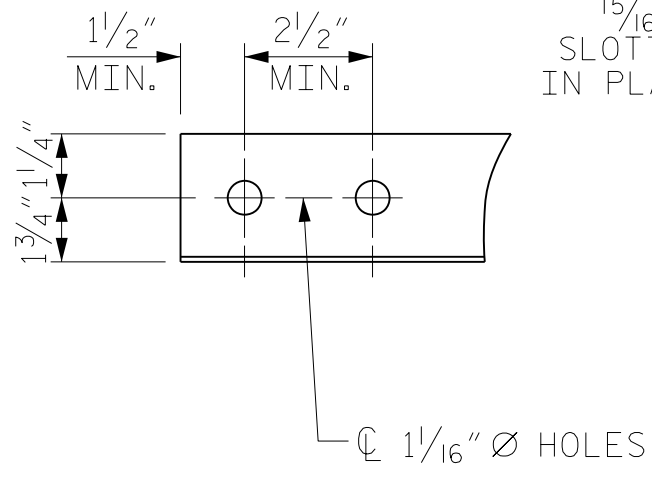
DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-16
1			3			TOTAL SHEETS
2			4			39

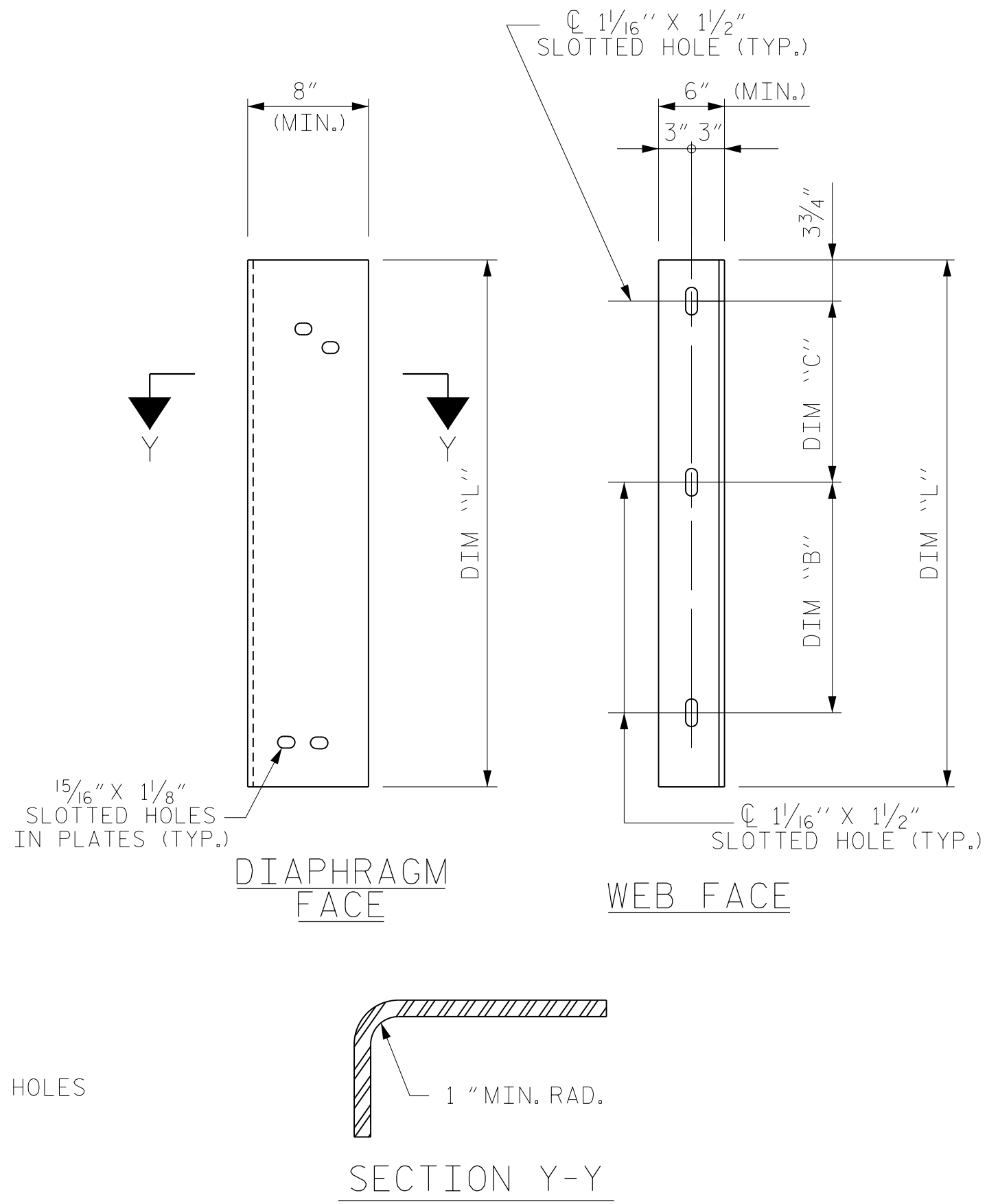
STD. NO. PCG9 (Sh. 5)



PART SECTION AT INTERMEDIATE DIAPHRAGM
(72" BULB TEE GIRDER SHOWN)



ANGLE END
(L 3 X 3 X 5/16)



CONNECTOR PLATE 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 ANGLE 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 1/4 TURN.

THE PLATES, BENT PLATES, 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 1/4" PROJECTION BEYOND THE NUT.

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

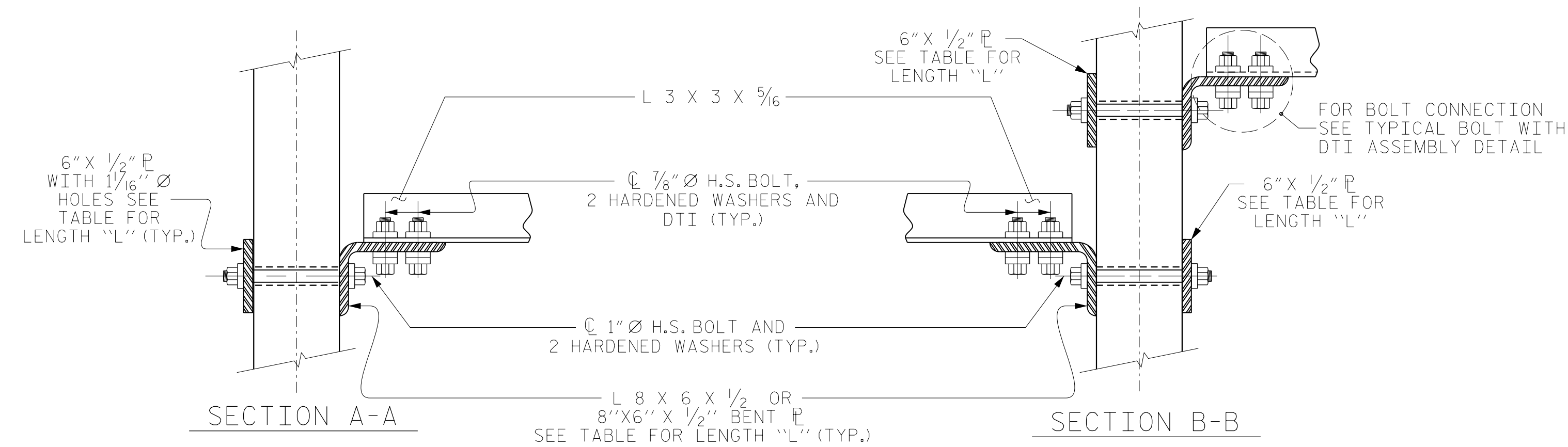
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

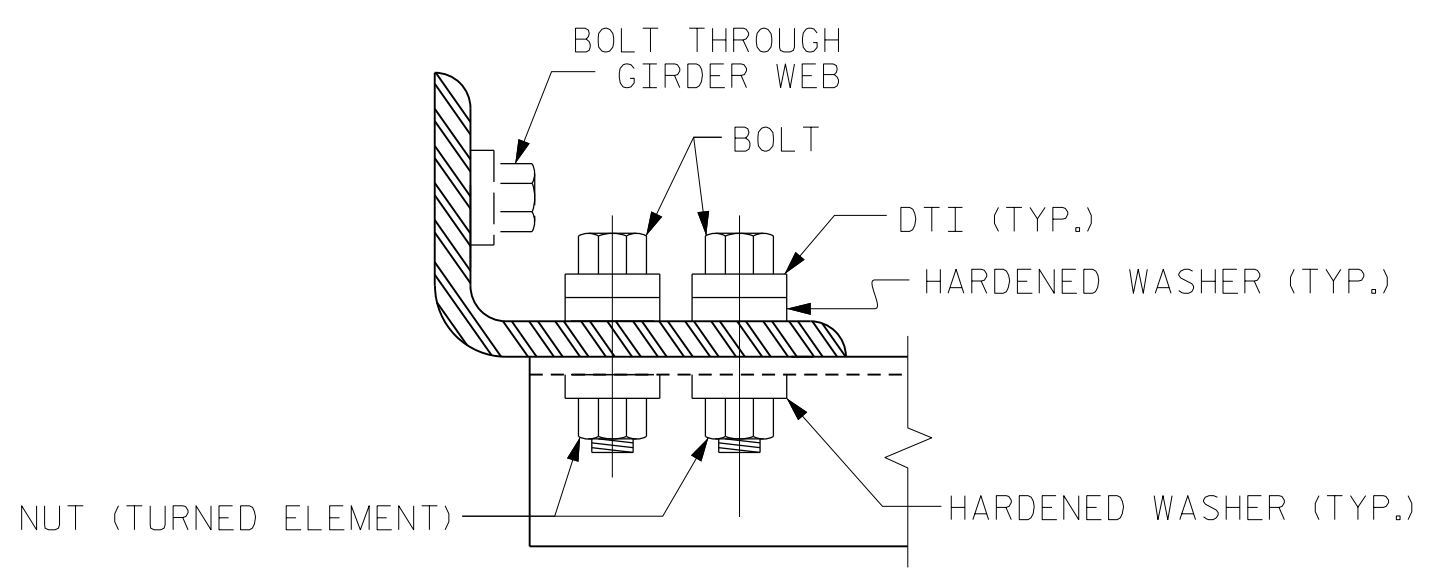
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	1'-6"	1'-8 3/8"	1'-8 3/8"	4'-2"



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS LEFT LANE						S03-17
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	39
1			3			
2			4			

ASSEMBLED BY : MKO	DATE : 04/2015
CHECKED BY : MAL	DATE : 05/2015
DRAWN BY : RWW 11/09	REV. 10/11
CHECKED BY : GM 11/09	REV. 12/17
	MAA/GM
	MAA/THC

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

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.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

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, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

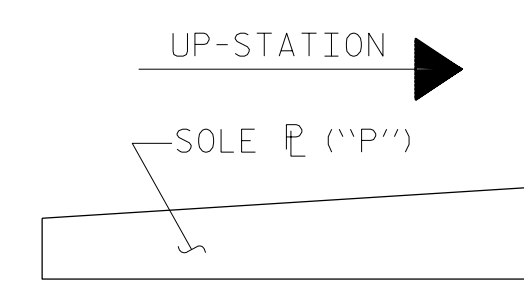
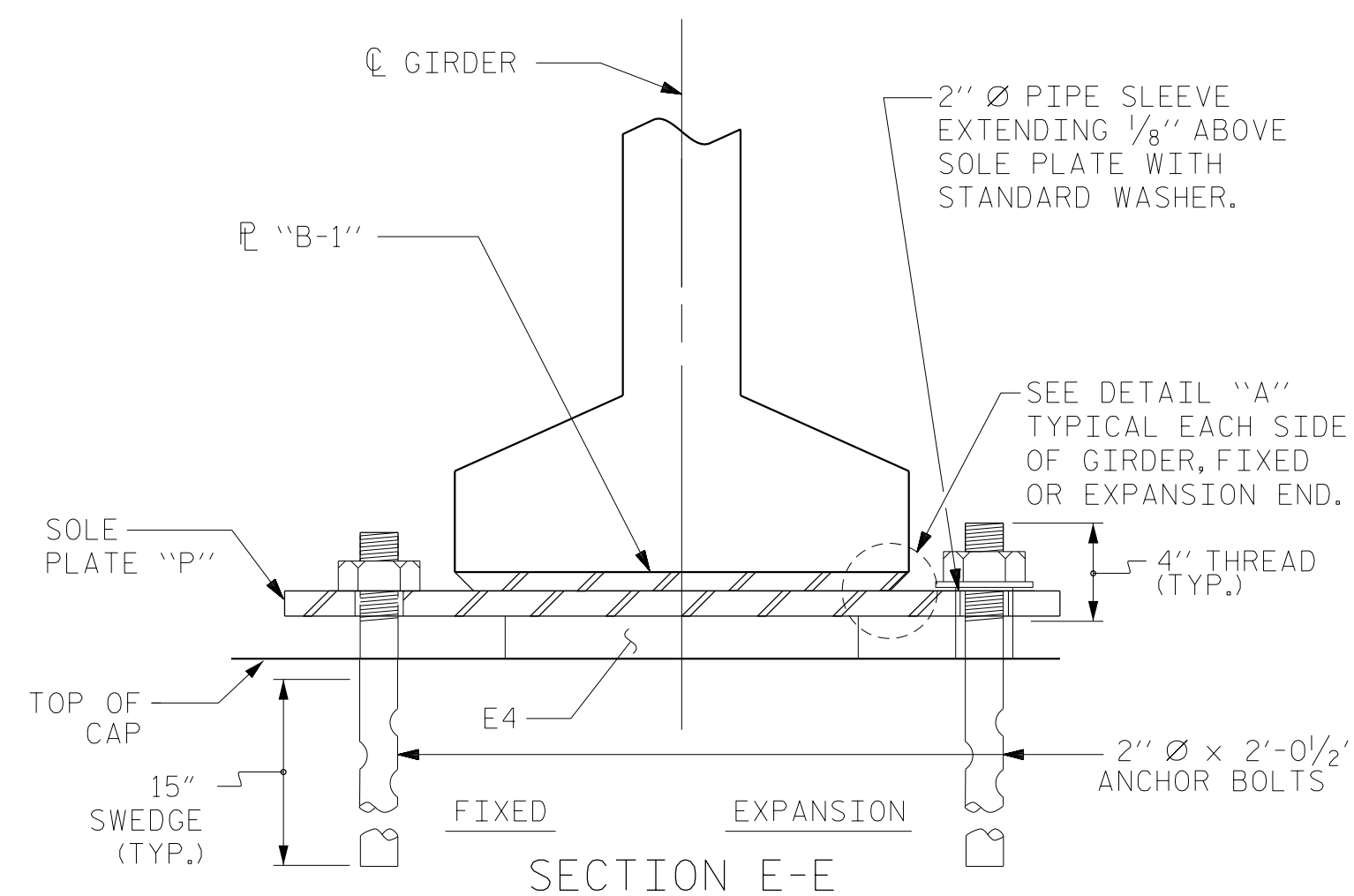
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

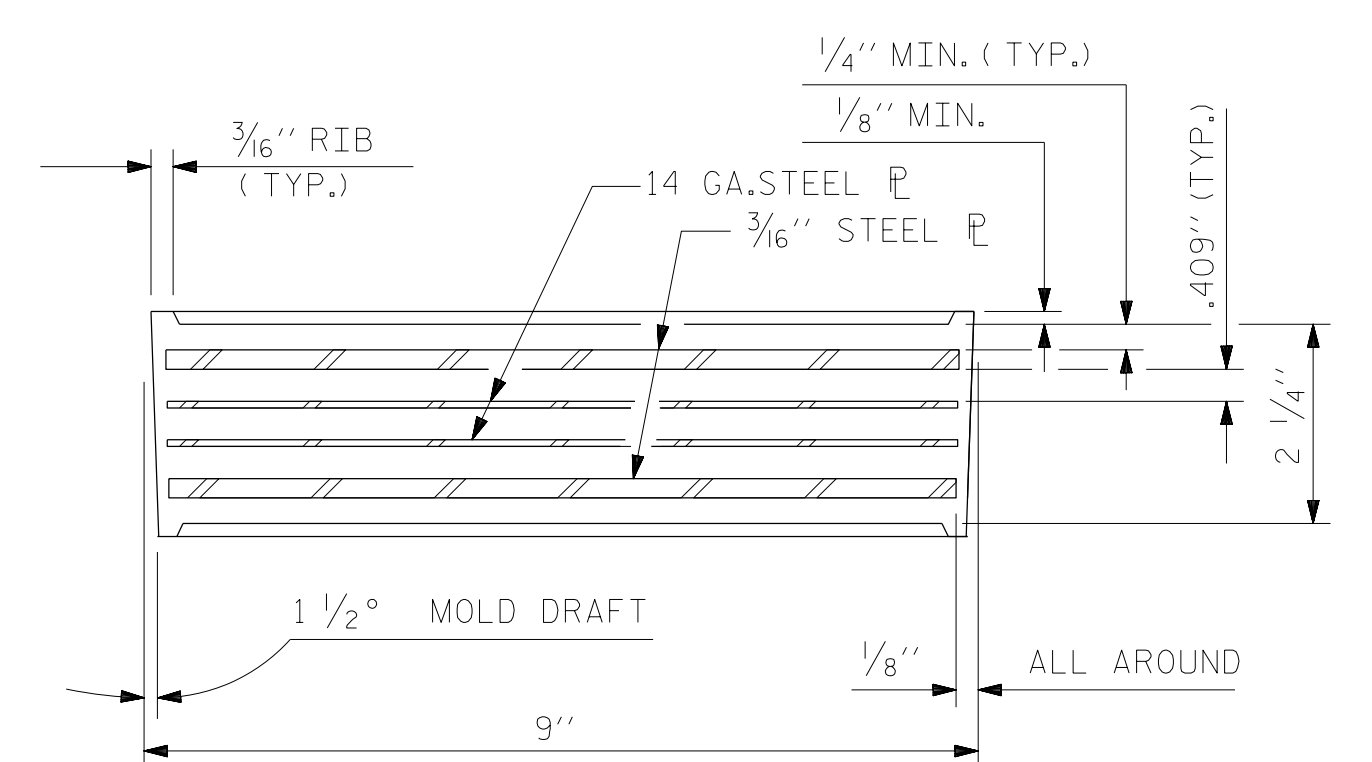
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

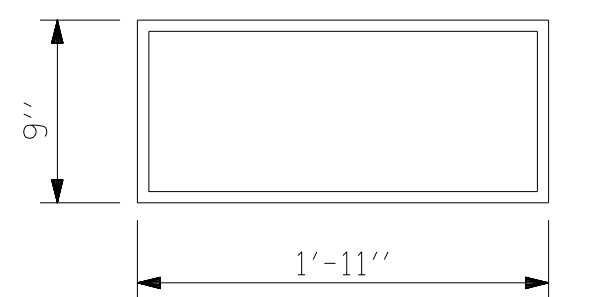
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



SOLE P PLACEMENT DETAIL



TYPICAL SECTION OF ELASTOMERIC BEARINGS

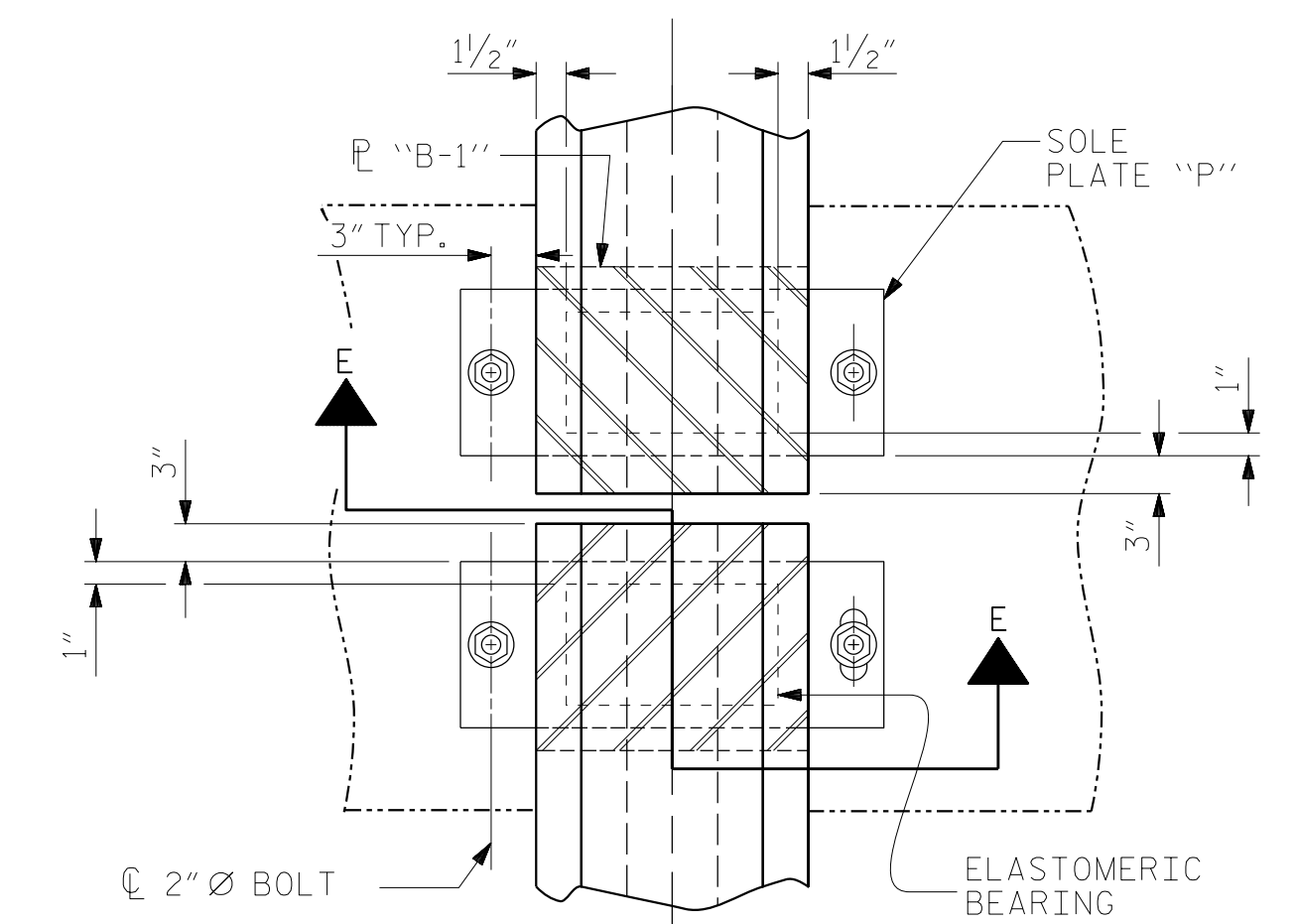


E4 (24 REQ'D)

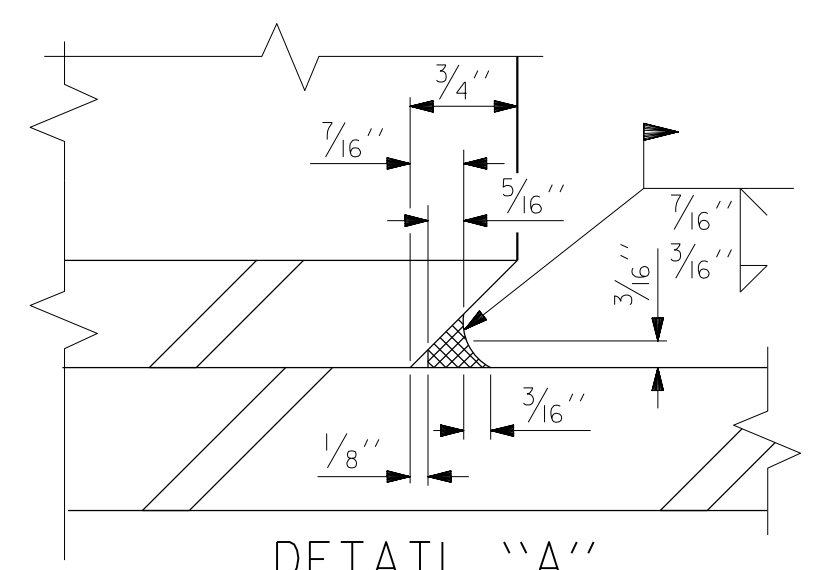
PLAN VIEW OF ELASTOMERIC BEARING

TYPE V

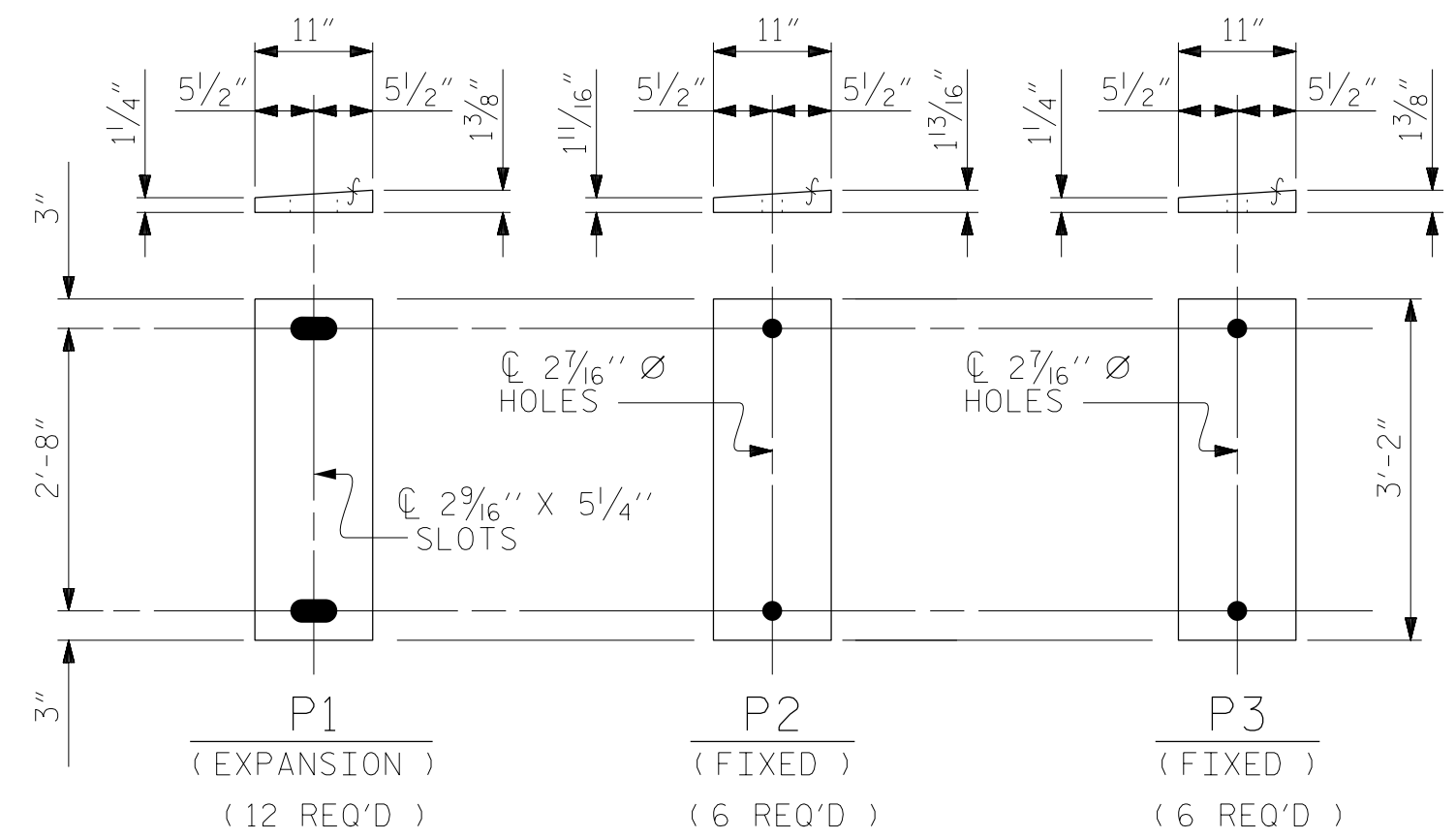
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L. + L.L. (NO IMPACT)	
TYPE V	365 K



TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT) TYPICAL HALF-PLAN (SHOWING SIMPLE SPAN BENT)



DETAIL "A"



SOLE PLATE DETAILS ("P")

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S03-18
STANDARD ELASTOMERIC BEARING DETAILS PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE LEFT LANE						TOTAL SHEETS 39
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

ASSEMBLED BY :	MKO	DATE :	05/2015
CHECKED BY :	JMR	DATE :	06/2015
DRAWN BY :	EEM 2/97	REV. 6/13	AAC/MAA
CHECKED BY :	VAP 2/97	REV. 1/15	MAA/TMG
		REV. 12/17	MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPAN A																					
	GIRDER 1 (EXTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.151	0.195	0.234	0.267	0.294	0.313	0.325	0.329	0.325	0.313	0.294	0.267	0.234	0.195	0.151	0.103	0.052	0.000	
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.025	0.049	0.071	0.092	0.111	0.126	0.139	0.148	0.153	0.155	0.153	0.148	0.139	0.126	0.111	0.092	0.071	0.049	0.025	0.000	
FINAL CAMBER ↑	0	5/16"	5/8"	15/16"	1/4"	1/2"	11/16"	17/8"	2"	21/16"	21/16"	21/16"	2"	17/8"	11/16"	1/2"	1/4"	15/16"	5/8"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 2 (INTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.151	0.195	0.234	0.267	0.293	0.312	0.324	0.328	0.324	0.312	0.293	0.267	0.234	0.195	0.151	0.103	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.054	0.079	0.102	0.123	0.140	0.154	0.164	0.170	0.172	0.170	0.164	0.154	0.140	0.123	0.102	0.079	0.054	0.027	0.000	
FINAL CAMBER ↑	0	5/16"	9/16"	7/8"	11/8"	13/8"	11/2"	11/16"	13/4"	17/8"	17/8"	17/8"	13/4"	11/16"	1/2"	13/8"	11/8"	7/8"	9/16"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 3 (INTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.151	0.195	0.234	0.266	0.293	0.312	0.324	0.328	0.324	0.312	0.293	0.266	0.234	0.195	0.151	0.103	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.053	0.078	0.101	0.121	0.138	0.152	0.162	0.168	0.170	0.168	0.162	0.152	0.138	0.121	0.101	0.078	0.053	0.027	0.000	
FINAL CAMBER ↑	0	5/16"	5/8"	7/8"	11/8"	13/8"	19/16"	11/16"	13/16"	17/8"	17/8"	17/8"	13/16"	11/16"	19/16"	13/8"	11/8"	7/8"	5/8"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 4 (INTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.150	0.194	0.233	0.266	0.292	0.311	0.323	0.327	0.323	0.311	0.292	0.266	0.233	0.194	0.150	0.103	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.053	0.078	0.100	0.120	0.137	0.151	0.160	0.167	0.169	0.167	0.160	0.151	0.137	0.120	0.100	0.078	0.053	0.027	0.000	
FINAL CAMBER ↑	0	5/16"	5/8"	7/8"	11/8"	13/8"	19/16"	11/16"	13/16"	17/8"	17/8"	17/8"	13/16"	11/16"	19/16"	13/8"	11/8"	7/8"	5/8"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 5 (INTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.150	0.194	0.233	0.265	0.292	0.311	0.323	0.327	0.323	0.311	0.292	0.265	0.233	0.194	0.150	0.103	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.052	0.077	0.099	0.119	0.136	0.149	0.159	0.165	0.167	0.165	0.159	0.149	0.136	0.119	0.099	0.077	0.052	0.027	0.000	
FINAL CAMBER ↑	0	5/16"	5/8"	7/8"	11/8"	13/8"	19/16"	11/16"	13/16"	17/8"	15/16"	17/8"	13/16"	11/16"	19/16"	13/8"	11/8"	7/8"	5/8"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 6 (EXTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.102	0.150	0.194	0.232	0.265	0.291	0.310	0.322	0.326	0.322	0.310	0.291	0.265	0.232	0.194	0.150	0.102	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.022	0.044	0.065	0.084	0.101	0.115	0.126	0.135	0.140	0.141	0.140	0.135	0.126	0.115	0.101	0.084	0.065	0.044	0.022	0.000	
FINAL CAMBER ↑	0	3/8"	11/16"	1"	15/16"	19/16"	113/16"	2"	21/8"	23/16"	23/16"	23/16"	21/8"	2"	113/16"	19/16"	15/16"	1"	11/16"	3/8"	0	

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-3421A
 RICHMOND COUNTY
STATION: 101+31.22 -I73-

SHEET 1 OF 2

DRAWN BY : MKO DATE : 03/2015
CHECKED BY : MAL DATE : 10/2015
DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

6/13/2019
X:\N\1030180000 R-3421A Richmond\Structures\Working DGN\R-3421A_SD.LT_DL.dgn
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SIGNATURES COMPLETED



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUPERSTRUCTURE DEAD LOAD DEFLECTION SPAN A LEFT LANE						SHEET NO. S03-19
REVISIONS						TOTAL SHEETS 39
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DEAD LOAD DEFLECTION TABLE FOR GIRDERS																					
0.6" Ø LOW RELAXATION	SPAN B																				
	GIRDER 1 (EXTERIOR)																				
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.053	0.105	0.153	0.198	0.238	0.271	0.298	0.318	0.330	0.334	0.330	0.318	0.298	0.271	0.238	0.198	0.153	0.105	0.053	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.054	0.079	0.102	0.123	0.140	0.154	0.164	0.170	0.172	0.170	0.164	0.154	0.140	0.123	0.102	0.079	0.054	0.027	0.000
FINAL CAMBER ↑	0	5/16"	5/8"	7/8"	1 1/8"	1 3/8"	1 1/2"	1 5/8"	1 3/4"	1 5/8"	1 5/16"	1 5/16"	1 7/8"	1 3/4"	1 9/16"	1 3/8"	1 1/8"	7/8"	5/8"	5/16"	0
GIRDER 2 (INTERIOR)																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.053	0.104	0.153	0.197	0.237	0.270	0.297	0.316	0.328	0.332	0.328	0.316	0.297	0.270	0.237	0.197	0.153	0.104	0.053	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.030	0.059	0.086	0.111	0.133	0.152	0.167	0.178	0.184	0.187	0.184	0.178	0.167	0.152	0.133	0.111	0.086	0.059	0.030	0.000
FINAL CAMBER ↑	0	1/4"	9/16"	1 3/16"	1 1/16"	1 1/4"	1 1/16"	1 3/16"	1 5/8"	1 3/4"	1 3/4"	1 3/4"	1 5/8"	1 9/16"	1 7/16"	1 1/4"	1 1/16"	1 3/16"	9/16"	1/4"	0
GIRDER 3 (INTERIOR)																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.053	0.104	0.152	0.196	0.236	0.269	0.296	0.315	0.327	0.331	0.327	0.315	0.296	0.269	0.236	0.196	0.152	0.104	0.053	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.029	0.057	0.083	0.107	0.129	0.147	0.162	0.172	0.179	0.181	0.179	0.172	0.162	0.147	0.129	0.107	0.083	0.057	0.029	0.000
FINAL CAMBER ↑	0	5/16"	9/16"	1 3/16"	1 1/16"	1 5/16"	1 7/16"	1 5/8"	1 11/16"	1 3/4"	1 13/16"	1 3/4"	1 11/16"	1 5/8"	1 7/16"	1 5/16"	1 1/16"	1 3/16"	9/16"	5/16"	0
GIRDER 4 (INTERIOR)																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.151	0.195	0.235	0.268	0.294	0.313	0.325	0.329	0.325	0.313	0.294	0.268	0.235	0.195	0.151	0.103	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.028	0.055	0.081	0.104	0.125	0.142	0.157	0.167	0.173	0.175	0.173	0.167	0.157	0.142	0.125	0.104	0.081	0.055	0.028	0.000
FINAL CAMBER ↑	0	5/16"	9/16"	1 3/16"	1 1/16"	1 5/16"	1 1/2"	1 5/8"	1 3/4"	1 13/16"	1 7/8"	1 13/16"	1 3/4"	1 5/8"	1 1/2"	1 5/16"	1 1/16"	1 3/16"	9/16"	5/16"	0
GIRDER 5 (INTERIOR)																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.151	0.194	0.233	0.266	0.293	0.312	0.323	0.327	0.323	0.312	0.293	0.266	0.233	0.194	0.151	0.103	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.053	0.078	0.101	0.121	0.138	0.152	0.162	0.168	0.170	0.168	0.162	0.152	0.138	0.121	0.101	0.078	0.053	0.027	0.000
FINAL CAMBER ↑	0	5/16"	5/8"	7/8"	1 1/8"	1 3/8"	1 1/2"	1 11/16"	1 13/16"	1 7/8"	1 7/8"	1 7/8"	1 13/16"	1 11/16"	1 9/16"	1 3/8"	1 1/8"	7/8"	5/8"	5/16"	0
GIRDER 6 (EXTERIOR)																					
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.102	0.150	0.193	0.232	0.265	0.291	0.310	0.322	0.326	0.322	0.310	0.291	0.265	0.232	0.193	0.150	0.102	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.022	0.044	0.065	0.083	0.100	0.114	0.126	0.134	0.139	0.140	0.139	0.134	0.126	0.114	0.100	0.083	0.065	0.044	0.022	0.000
FINAL CAMBER ↑	0	3/8"	1 1/16"	1"	1 5/16"	1 9/16"	1 13/16"	2"	2 1/8"	2 3/16"	2 1/4"	2 3/16"	2 1/8"	2"	1 13/16"	1 9/16"	1 5/16"	1"	1 1/16"	3/8"	0

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-3421A
 RICHMOND COUNTY
STATION: 101+31.22 -I73-

SHEET 2 OF 2

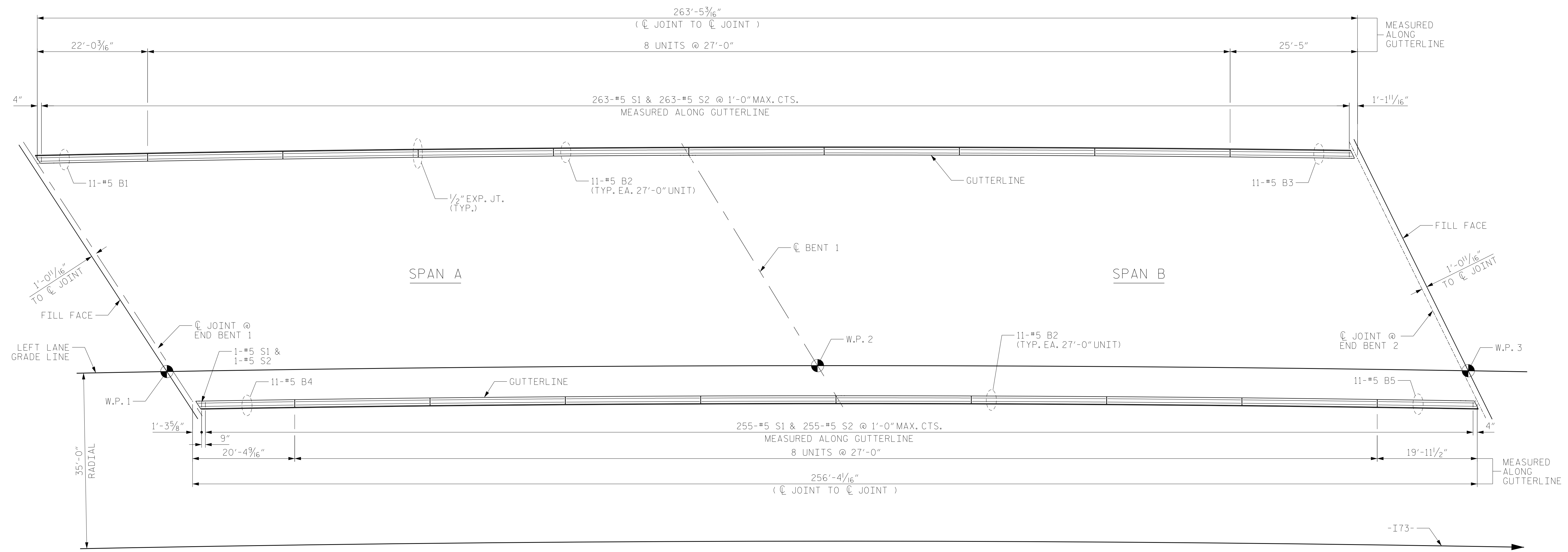
DRAWN BY : MKO DATE : 03/2015
CHECKED BY : MAL DATE : 10/2015
DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

6/13/2019
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DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUPERSTRUCTURE DEAD LOAD DEFLECTION SPAN B LEFT LANE						SHEET NO. S03-20
REVISIONS						TOTAL SHEETS 39
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



PLAN OF BARRIER RAIL

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 1 OF 2

DRAWN BY : MKO DATE : 02/2015
 CHECKED BY : JMR DATE : 06/2015
 DESIGN ENGINEER OF RECORD : RLB DATE : 04/2019

6/13/2019
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 919-926-4100 FAX 919-846-9080
 www.rsandh.com
 North Carolina License No. 50737-F-5403-C-28

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S03-21
SUPERSTRUCTURE CONCRETE BARRIER RAIL SPANS A & B LEFT LANE						TOTAL SHEETS 39
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

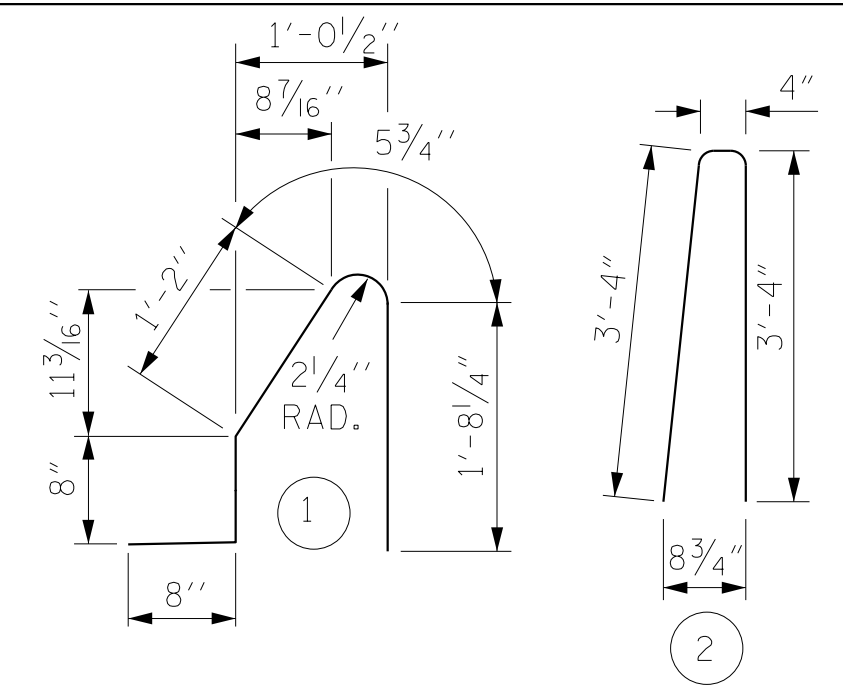
NOTES

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.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. 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.

BAR TYPES

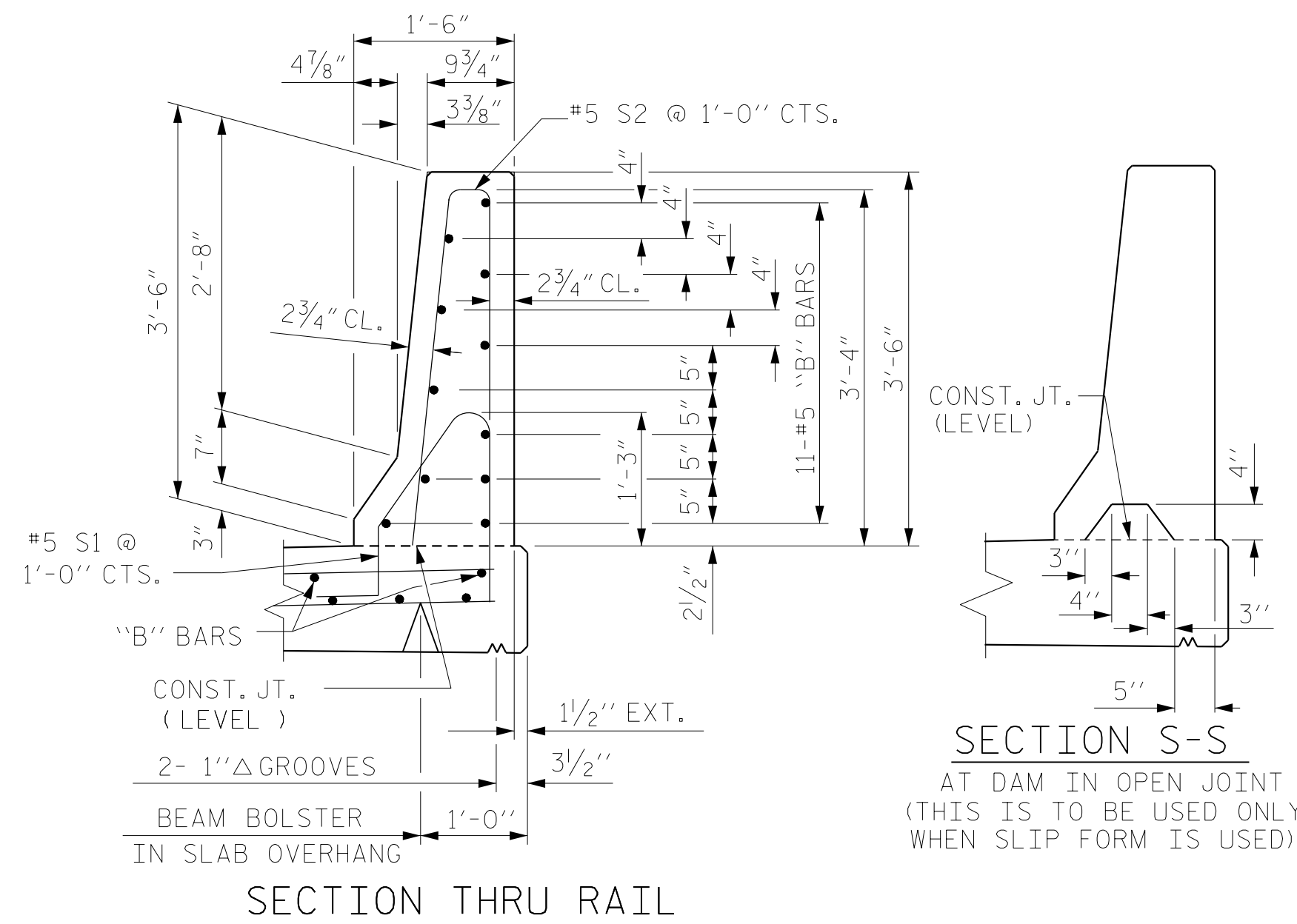


ALL BAR DIMENSIONS ARE OUT TO OUT

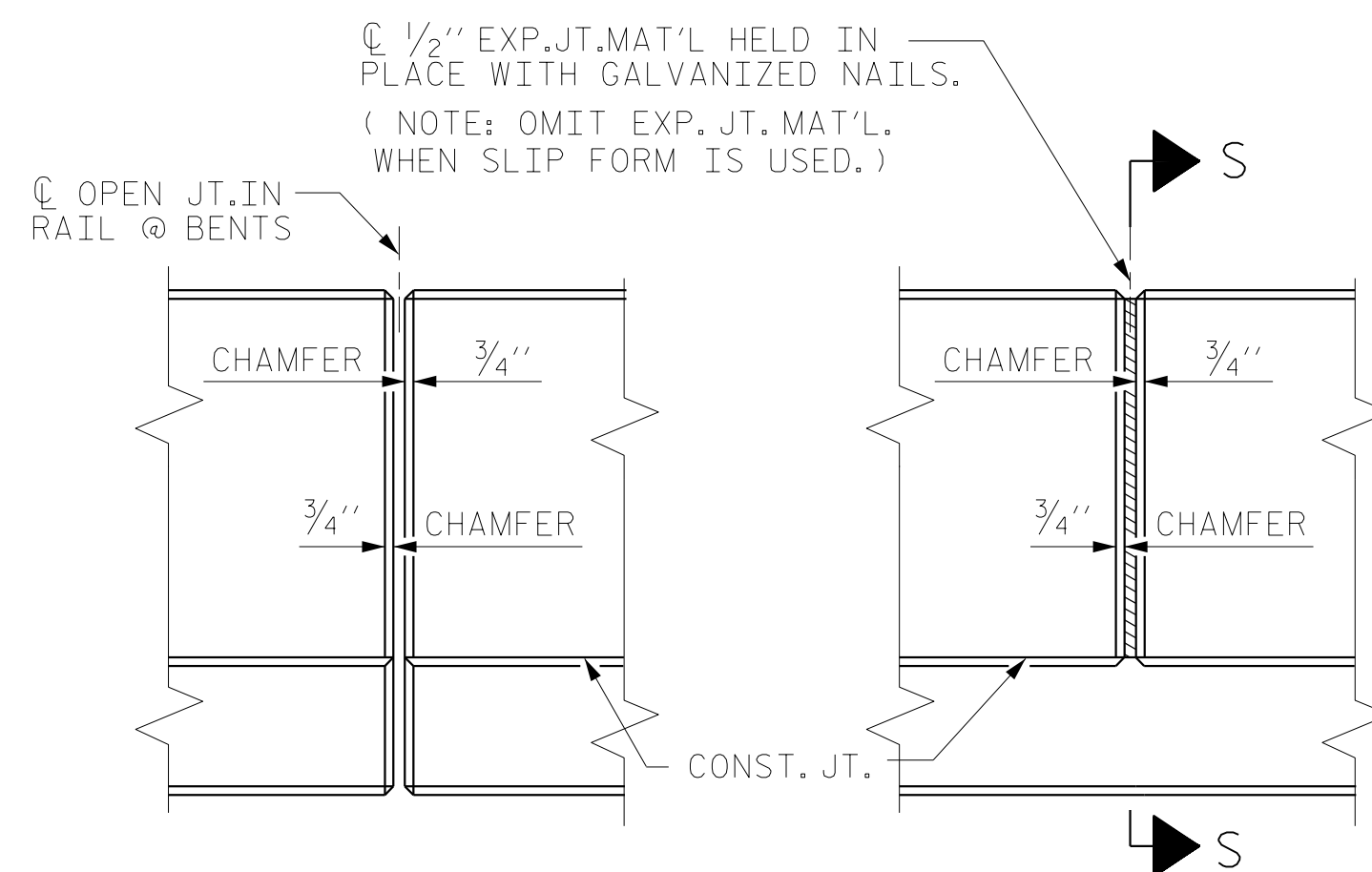
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	11	#5	STR	21'-10"	250
* B2	176	#5	STR	26'-7"	4880
* B3	11	#5	STR	24'-6"	281
* B4	11	#5	STR	19'-3"	221
* B5	11	#5	STR	19'-9"	227
* S1	519	#5	1	4'-8"	2526
* S2	519	#5	2	7'-0"	3789
* EPOXY COATED REINFORCING STEEL					12174 LBS.
CLASS AA CONCRETE					70.7 CU. YDS.
CONCRETE BARRIER RAIL					519.65 LIN. FT.



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

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-

SHEET 2 OF 2



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
CONCRETE
BARRIER RAIL
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	503-22
1			3			TOTAL SHEETS
2			4			39

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

ASSEMBLED BY : MKO	DATE : 02/2015
CHECKED BY : JMR	DATE : 06/2015
DRAWN BY : ARB 5/87	REV. 7/12 MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

NOTES

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

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 1/8" 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.)

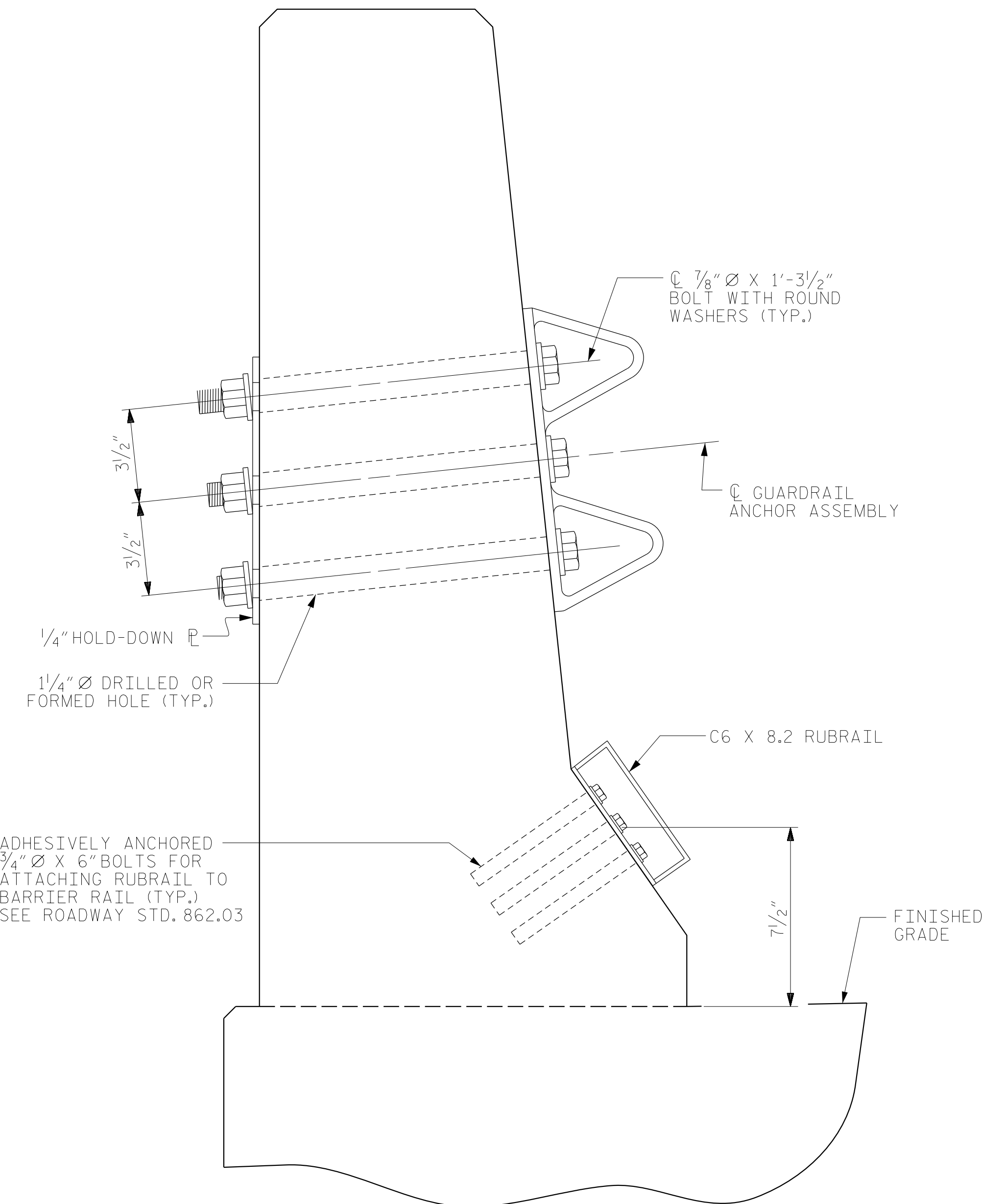
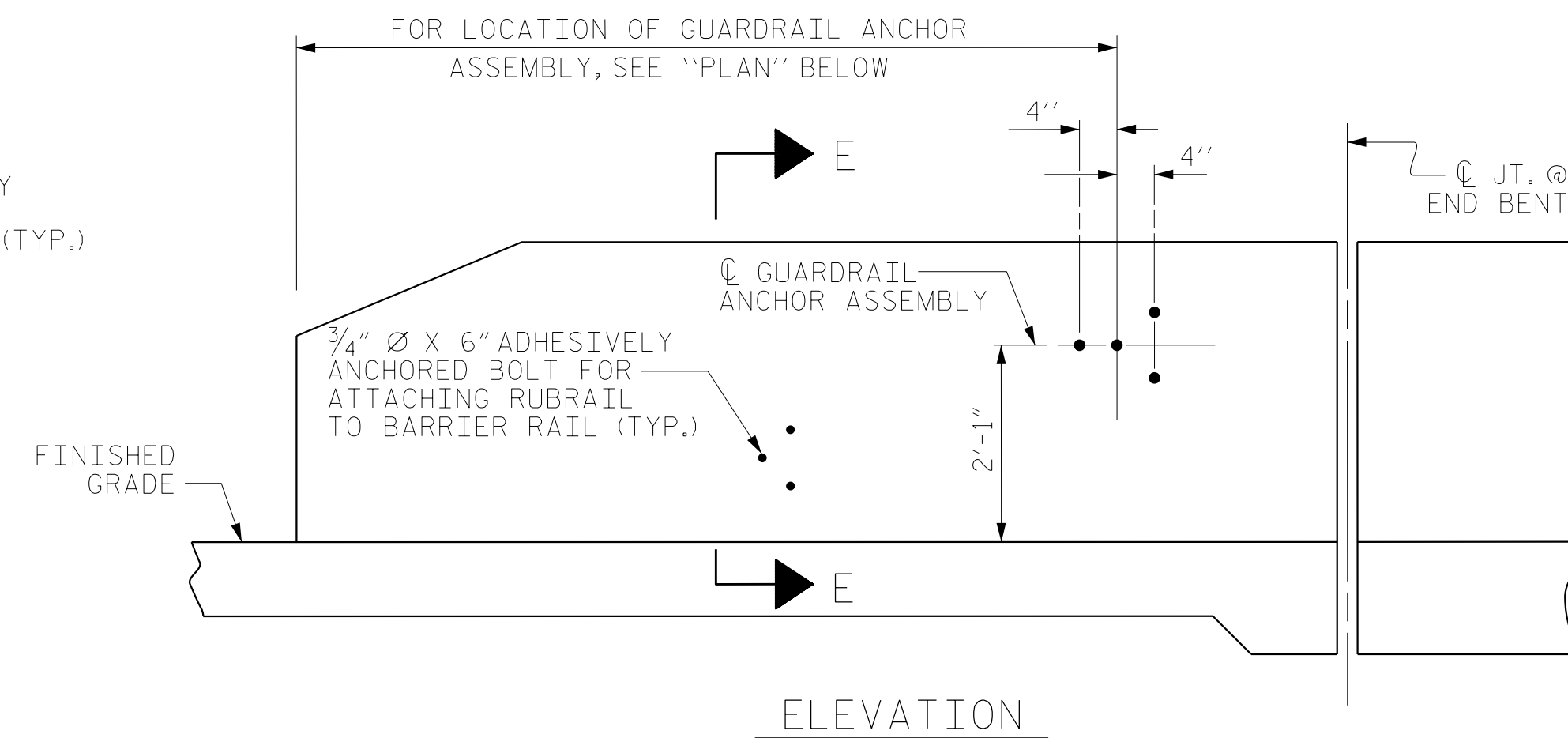
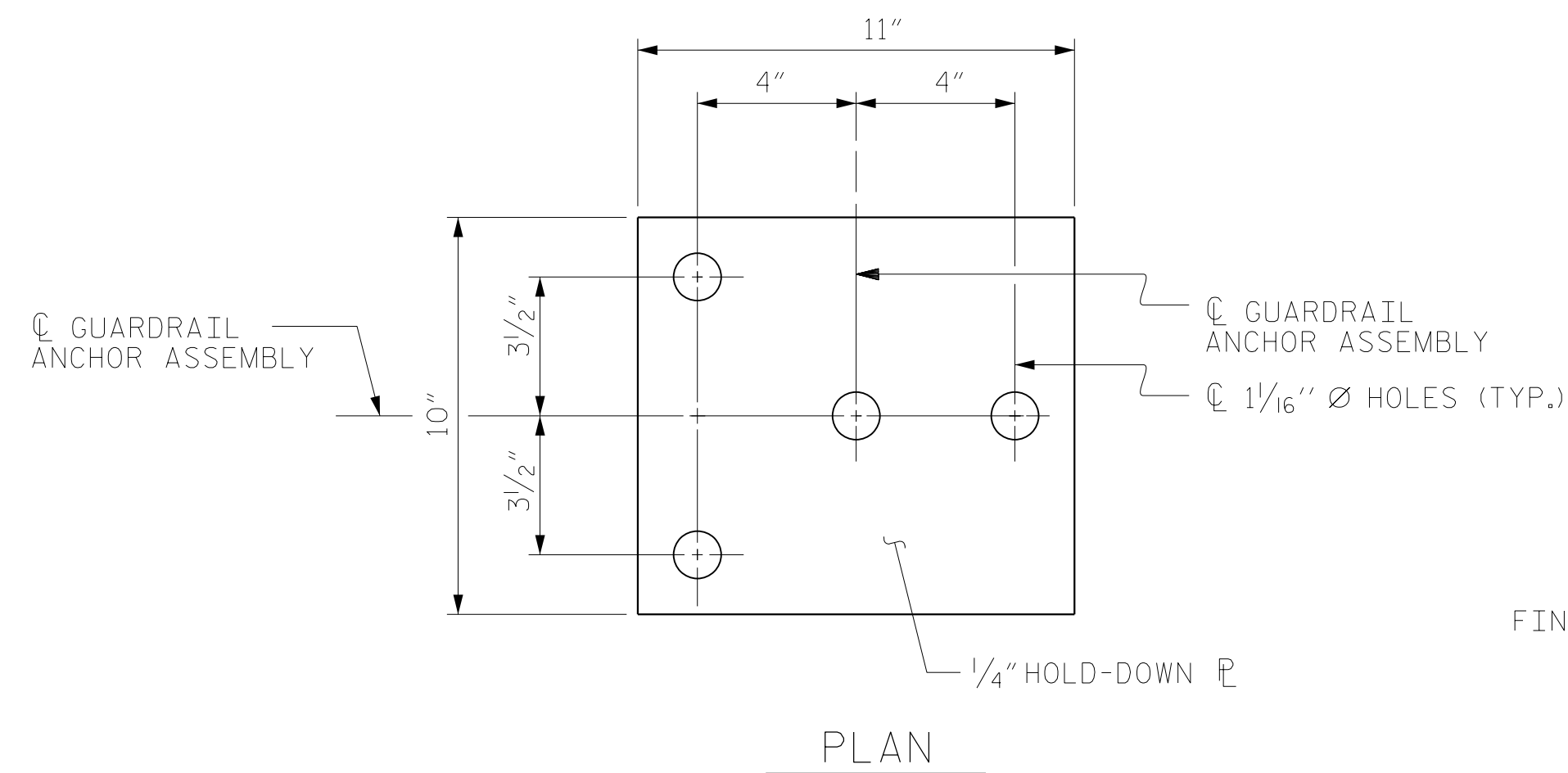
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

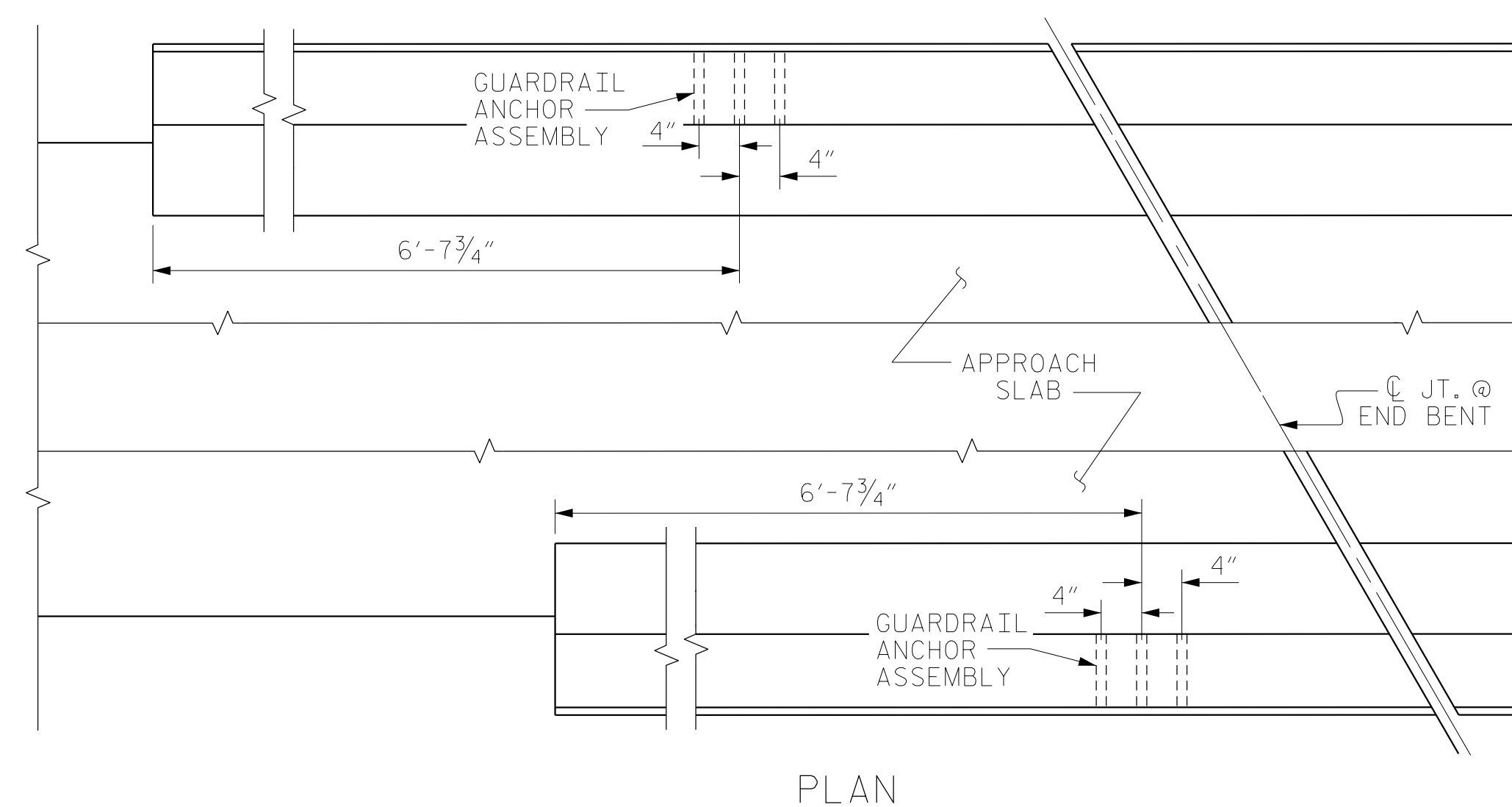
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.

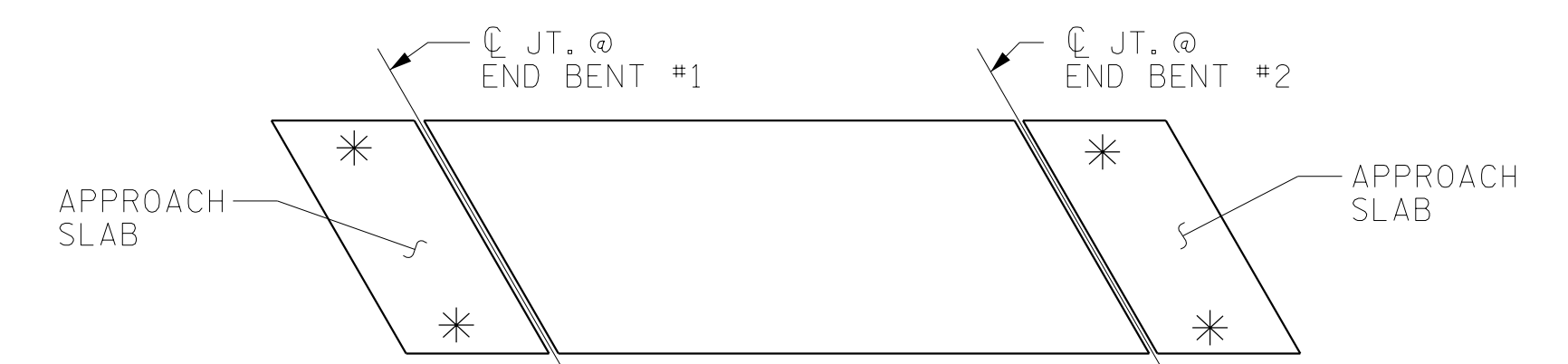


SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

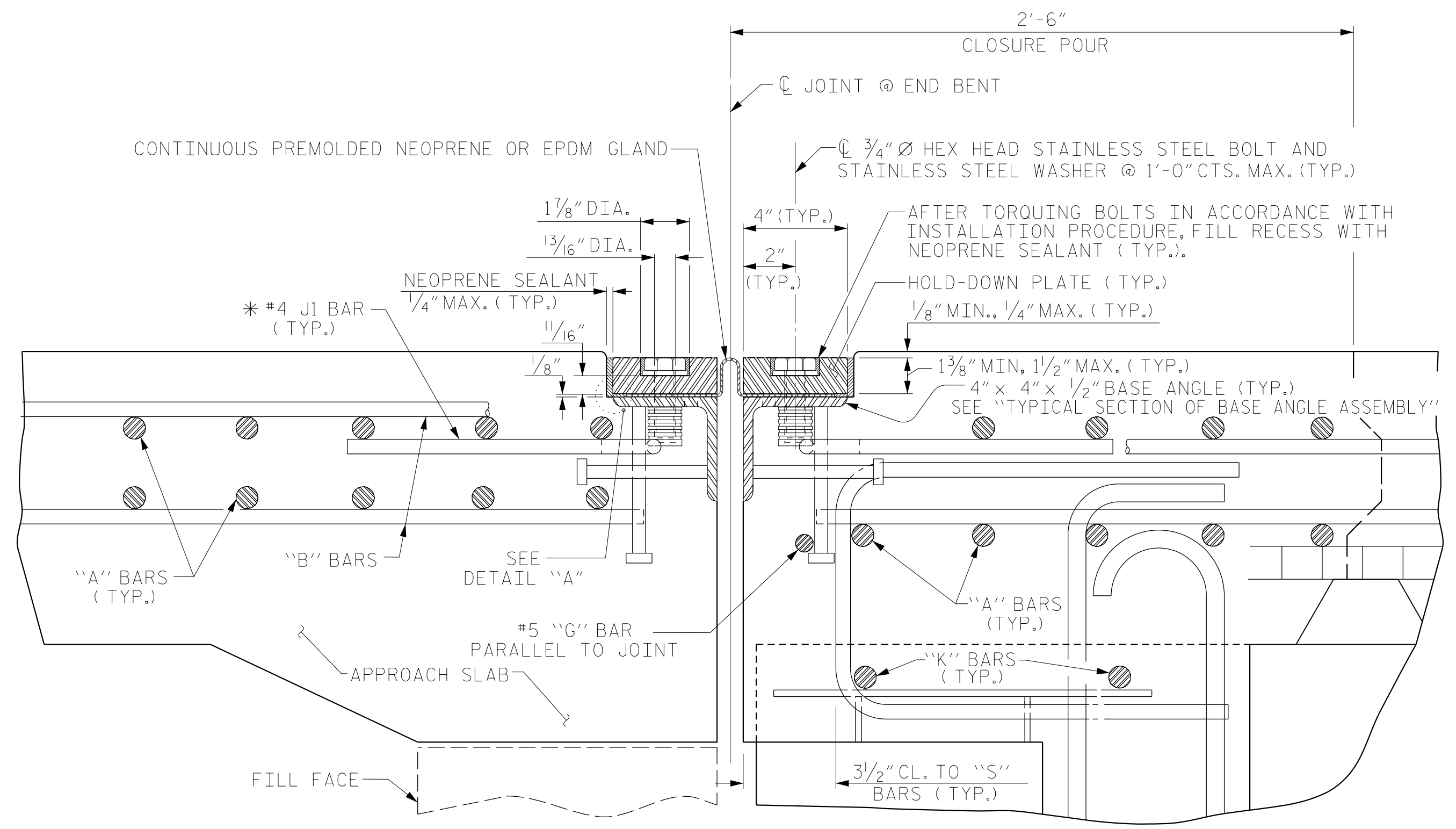
PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-

ASSEMBLED BY : MKO	DATE : 03/2015
CHECKED BY : JMR	DATE : 06/2015
DRAWN BY : TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

6/13/2019
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SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD GUARDRAIL ANCHORAGE FOR BARRIER RAIL LEFT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S03-23					TOTAL SHEETS 39



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

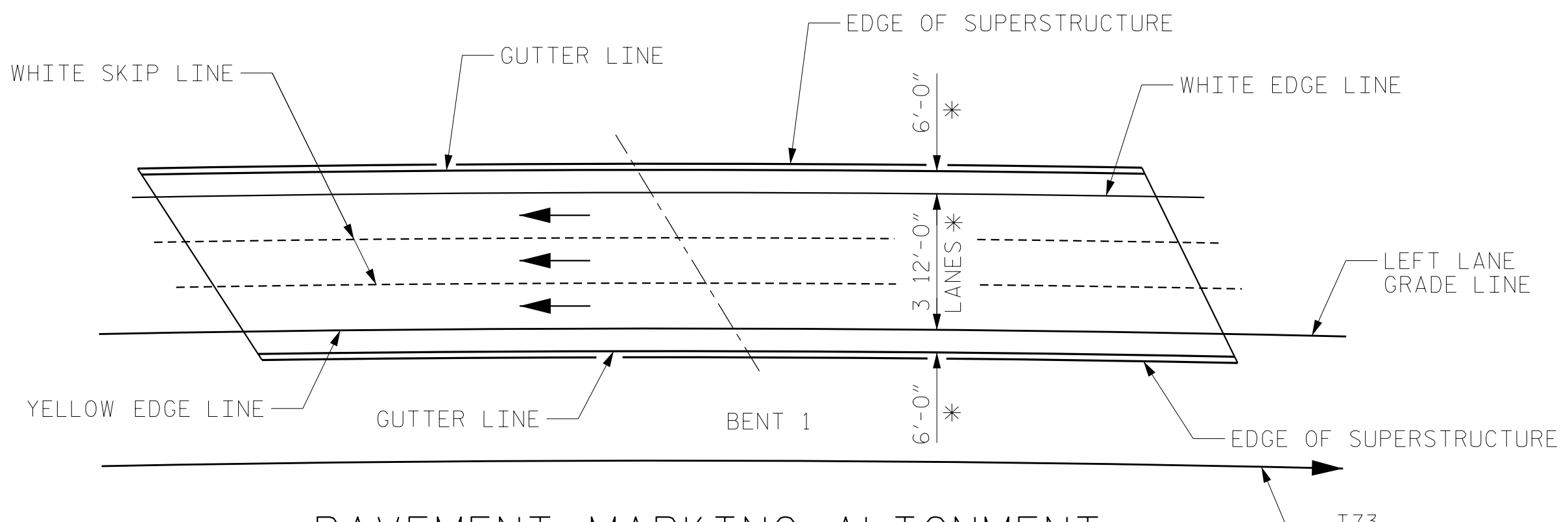
* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

INSTALLATION PROCEDURE

1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4 1/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE, THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 7/8" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

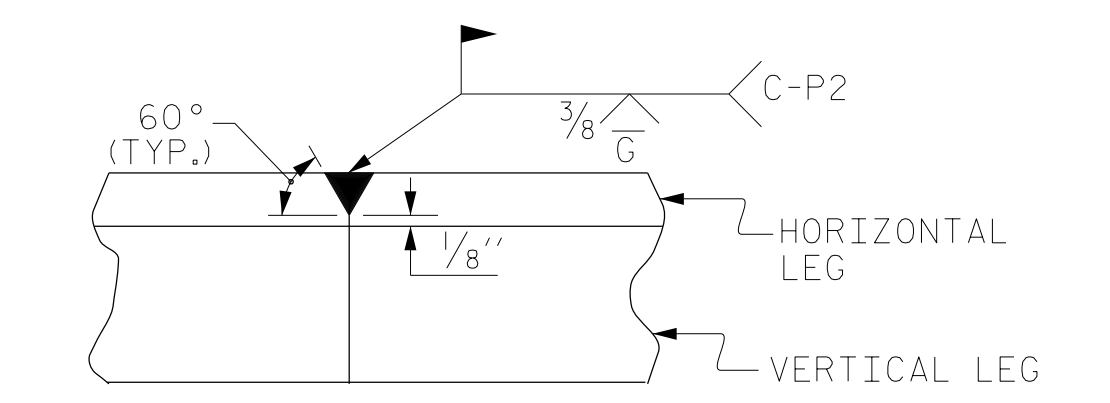
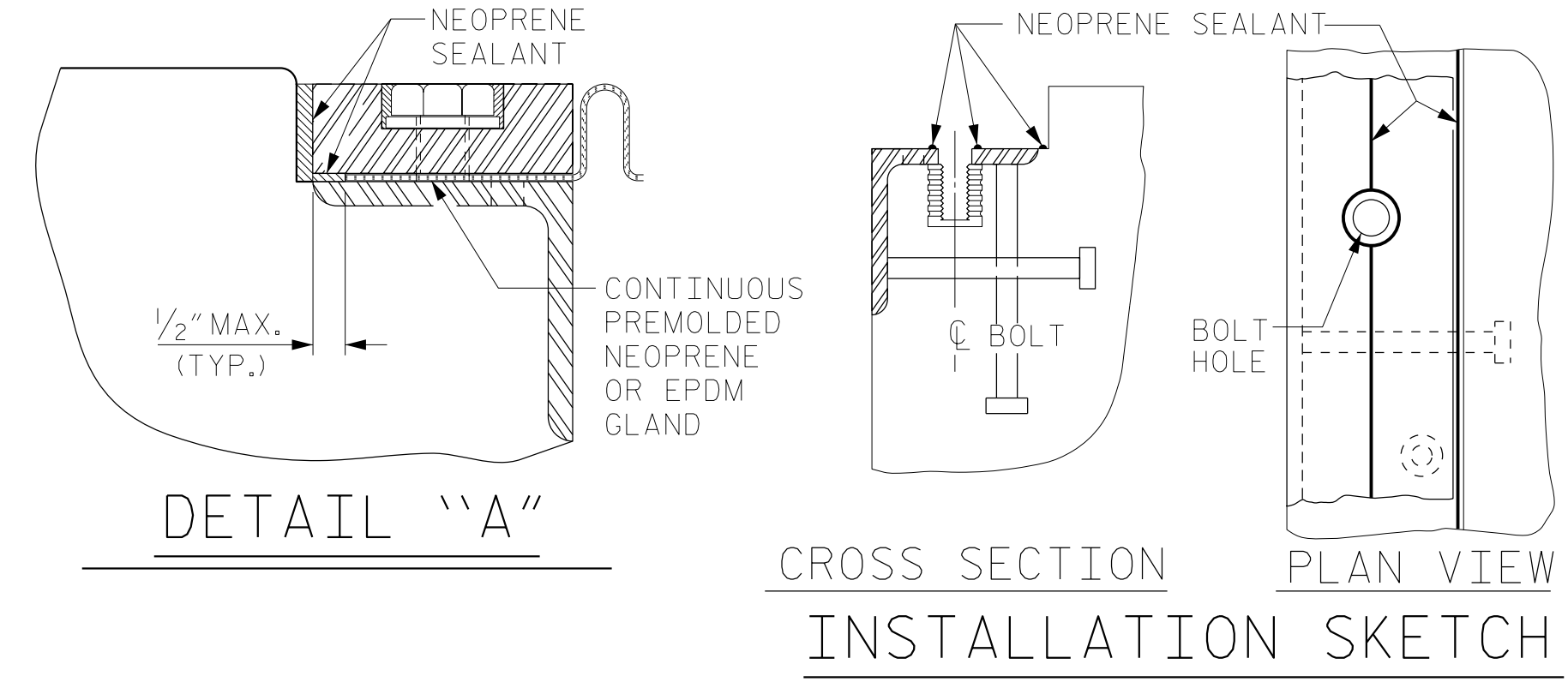
GENERAL NOTES

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE 1/2" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE 3/4" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.



PAVEMENT MARKING ALIGNMENT

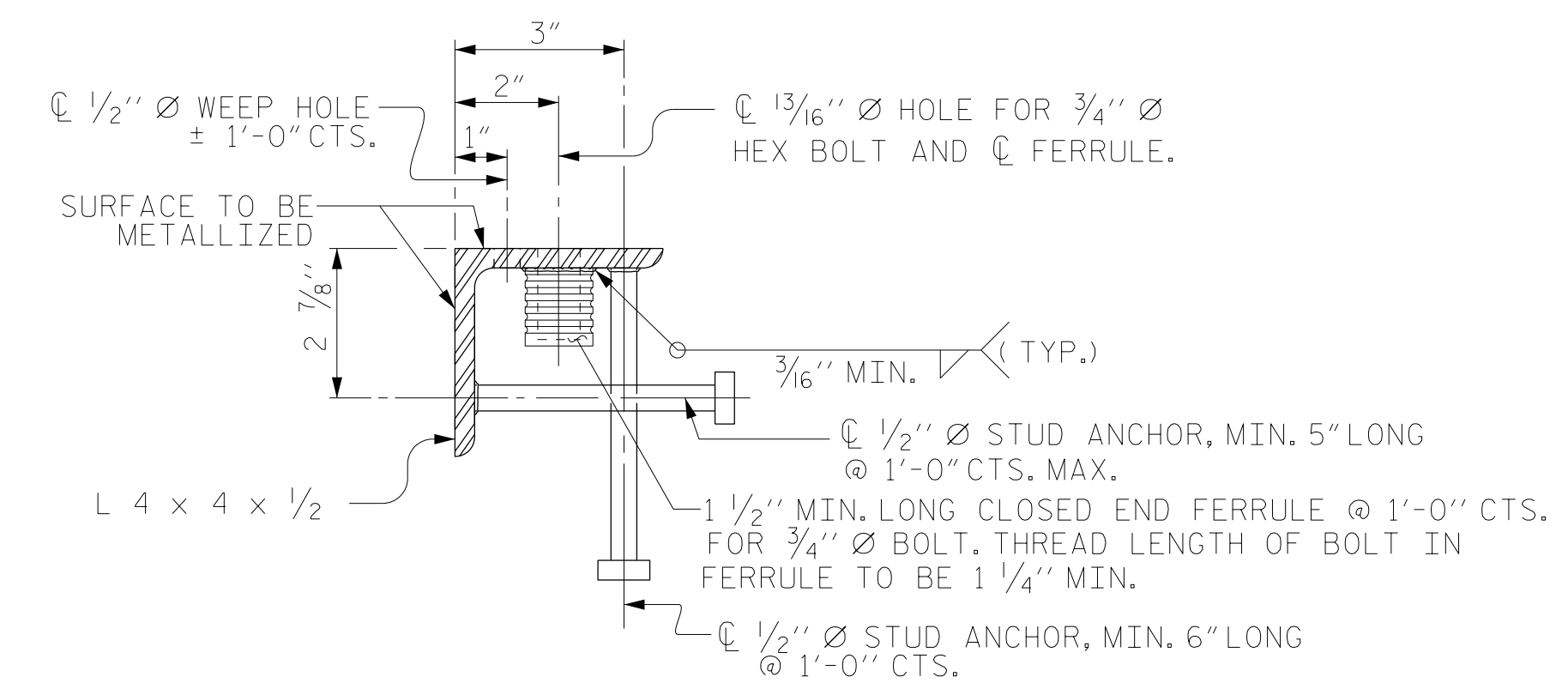
* DENOTES RADIAL DIMENSION



DETAIL- FIELD WELD SPLICE OF BASE ANGLE

MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG CL RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	57°-50'-36"	1 3/16"	1 1/2"	1 3/8"	1 1/8"
2	62°-46'-08"	1 3/16"	1 1/2"	1 3/8"	1 1/8"

SKEW ANGLE PROVIDED TANGENT TO CURVE.



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

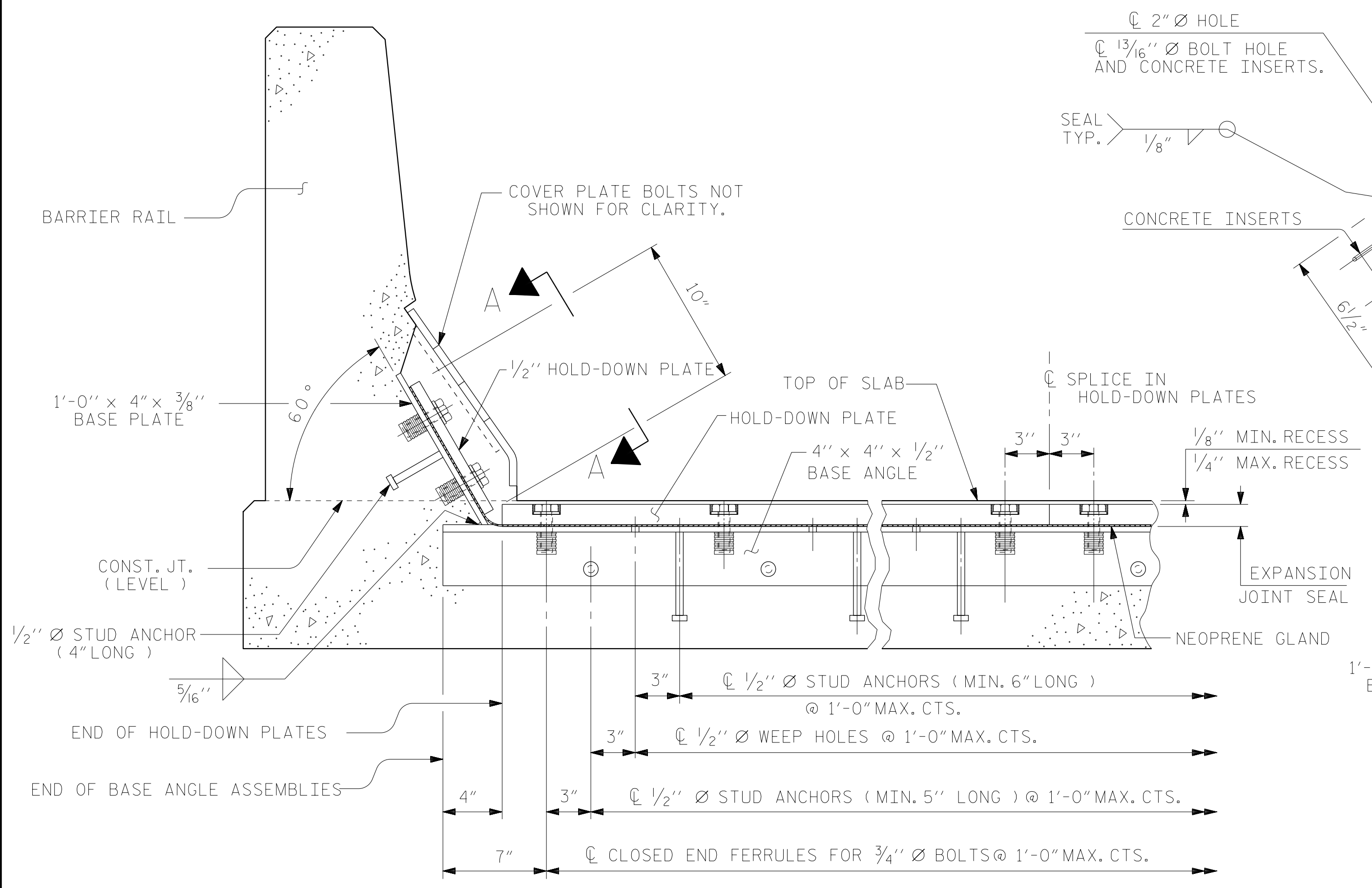
SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
EXPANSION JOINT SEAL DETAILS
 LEFT LANE

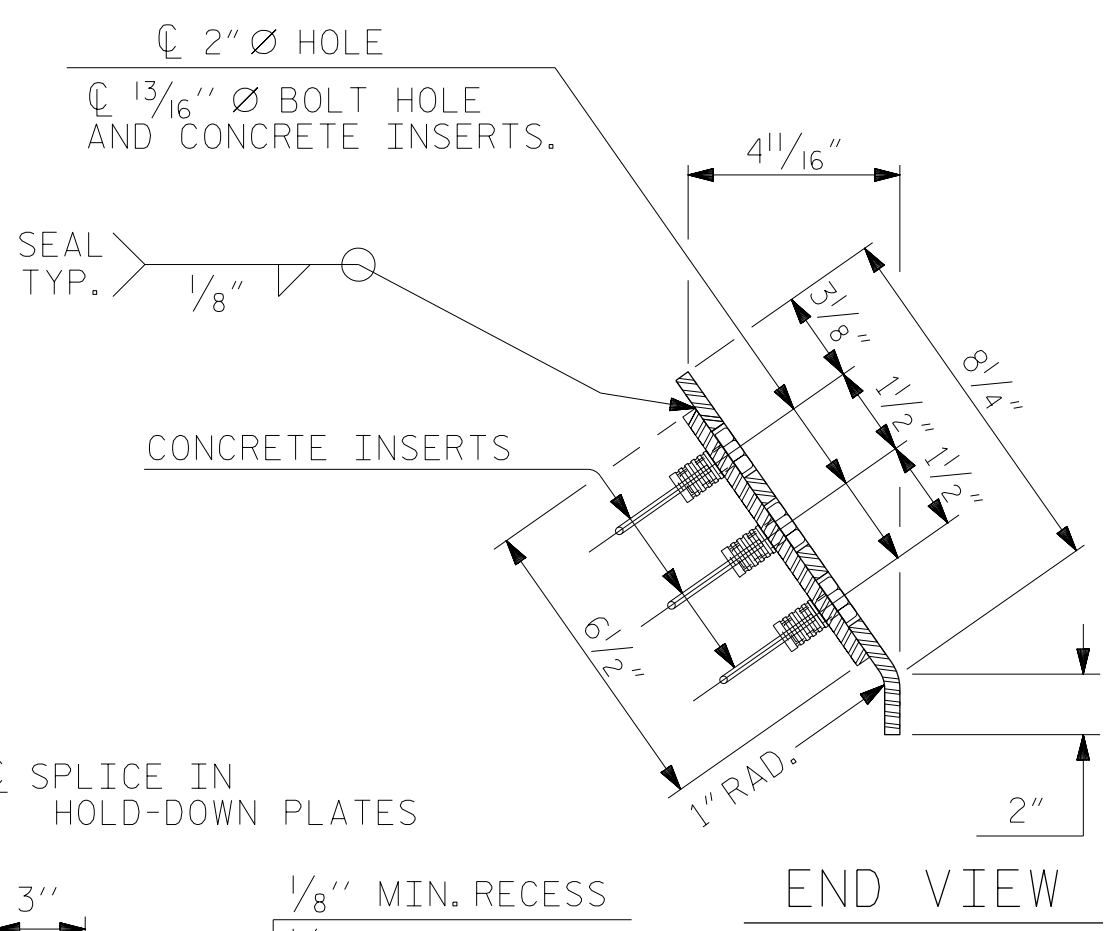
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	TOTAL SHEETS
1			3			39
2			4			

ASSEMBLED BY : MKO	DATE : 05/2015
CHECKED BY : JMR	DATE : 06/2015
DRAWN BY : REK 9/87	REV. 10/11/11 MAA/THC
CHECKED BY : CRK 10/87	REV. 10/11 MAA/THC
	REV. 6/18 MAA/THC

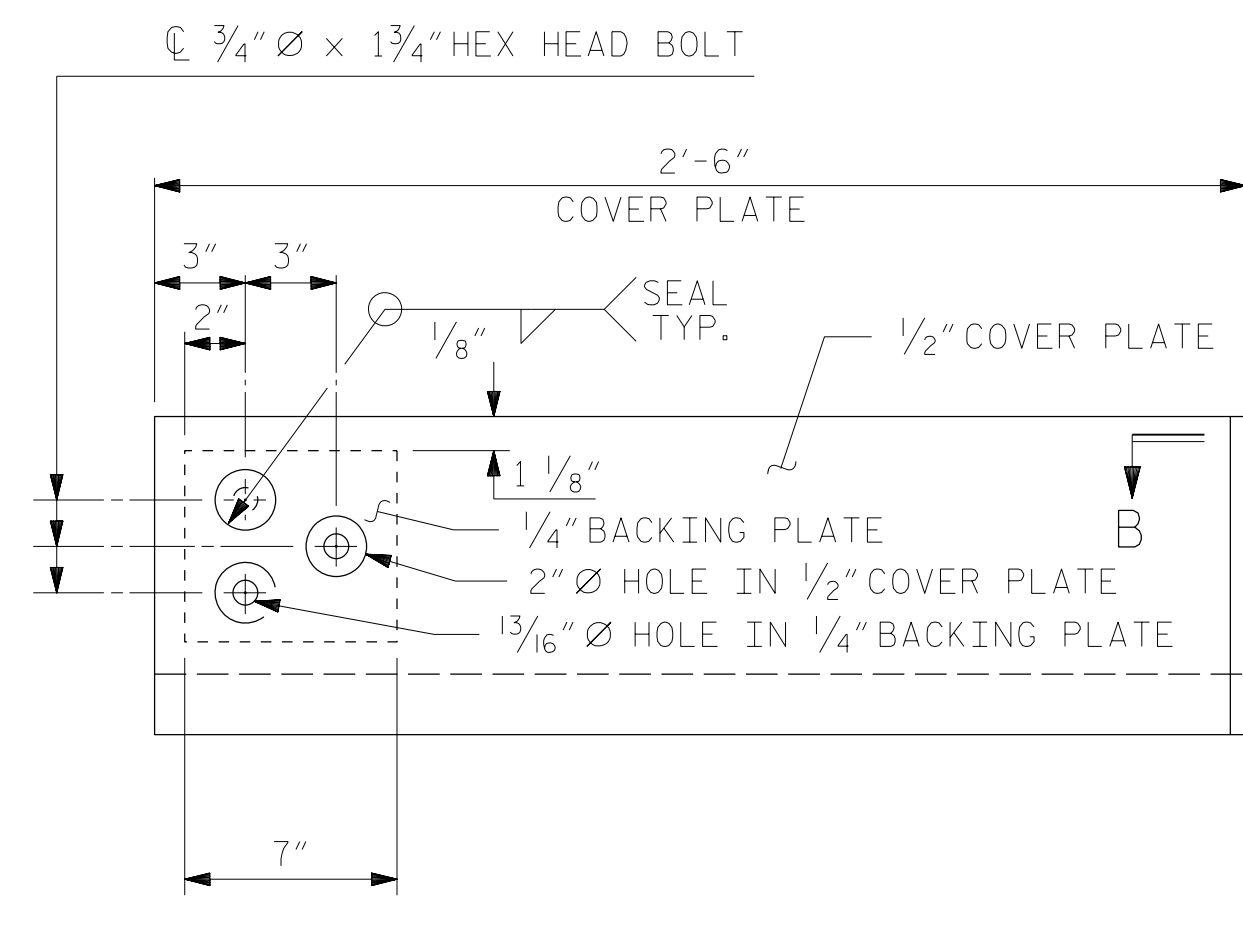
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



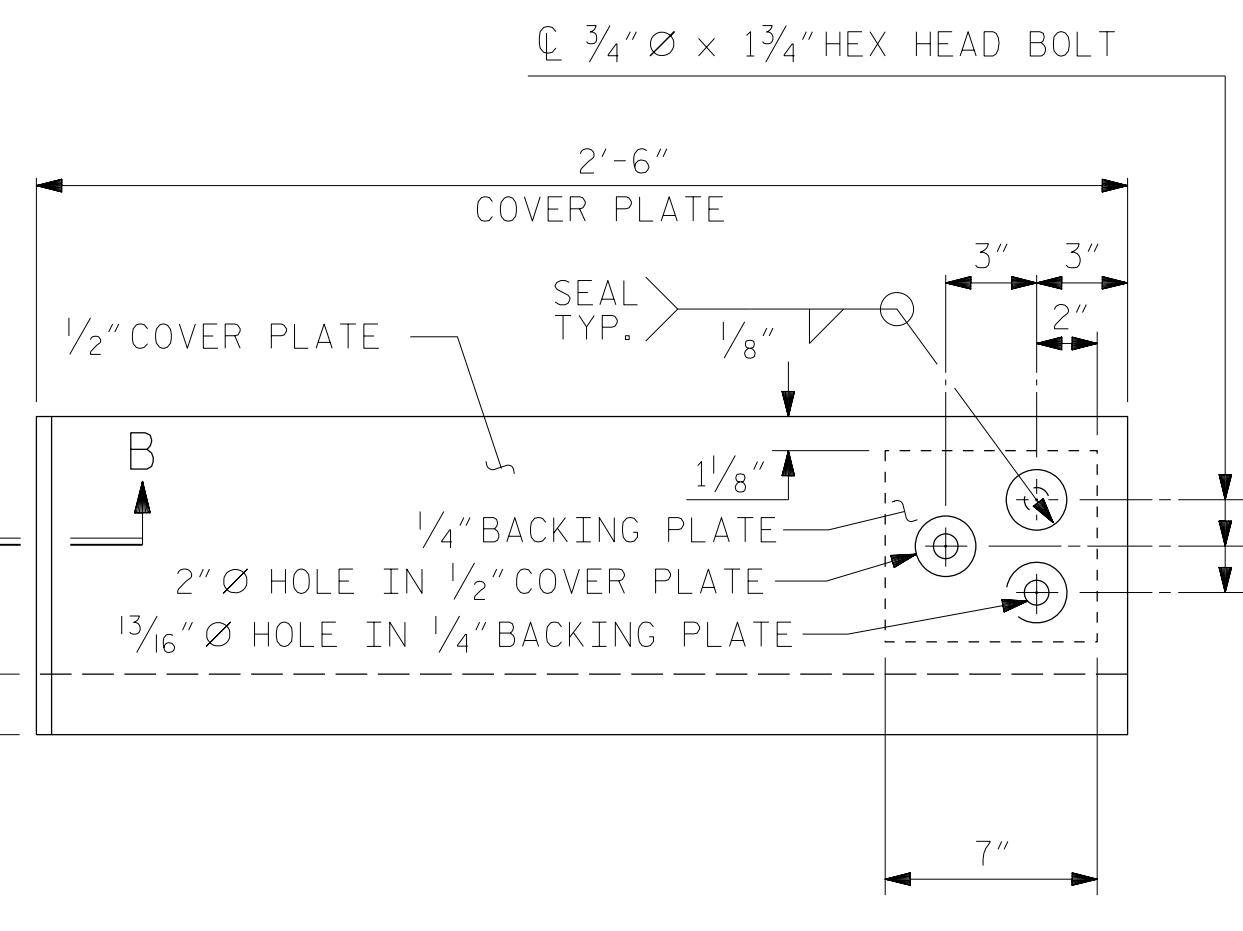
SECTION THRU RAIL NORMAL TO JOINT



END VIEW

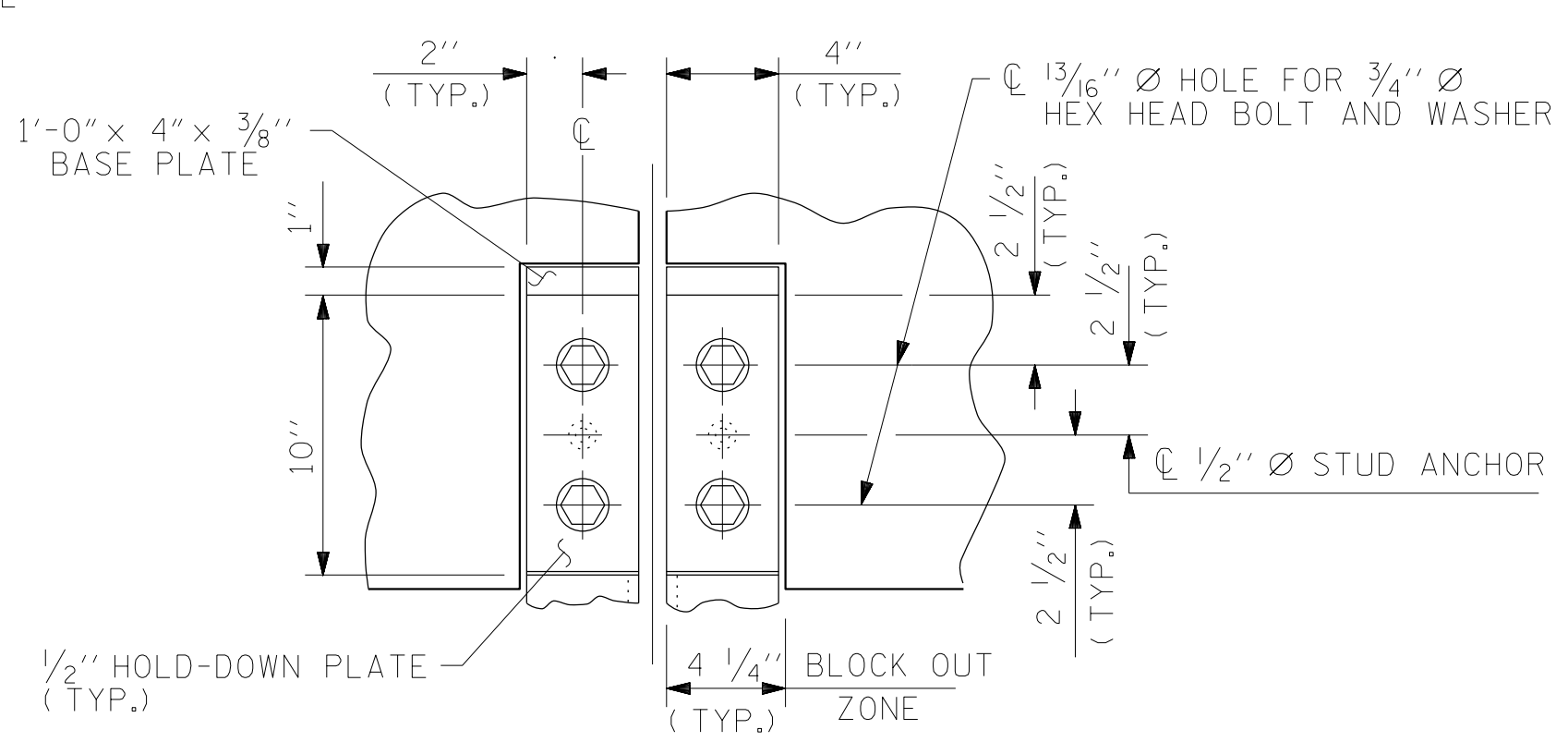


TYPE I - ELEVATION VIEW

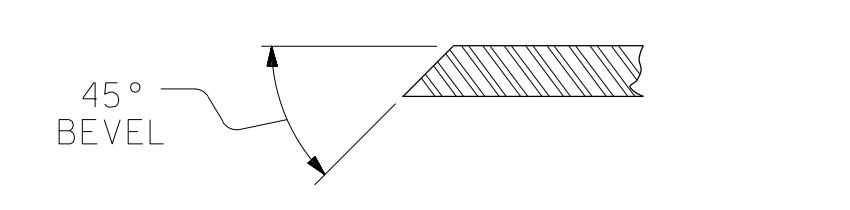


TYPE II - ELEVATION VIEW

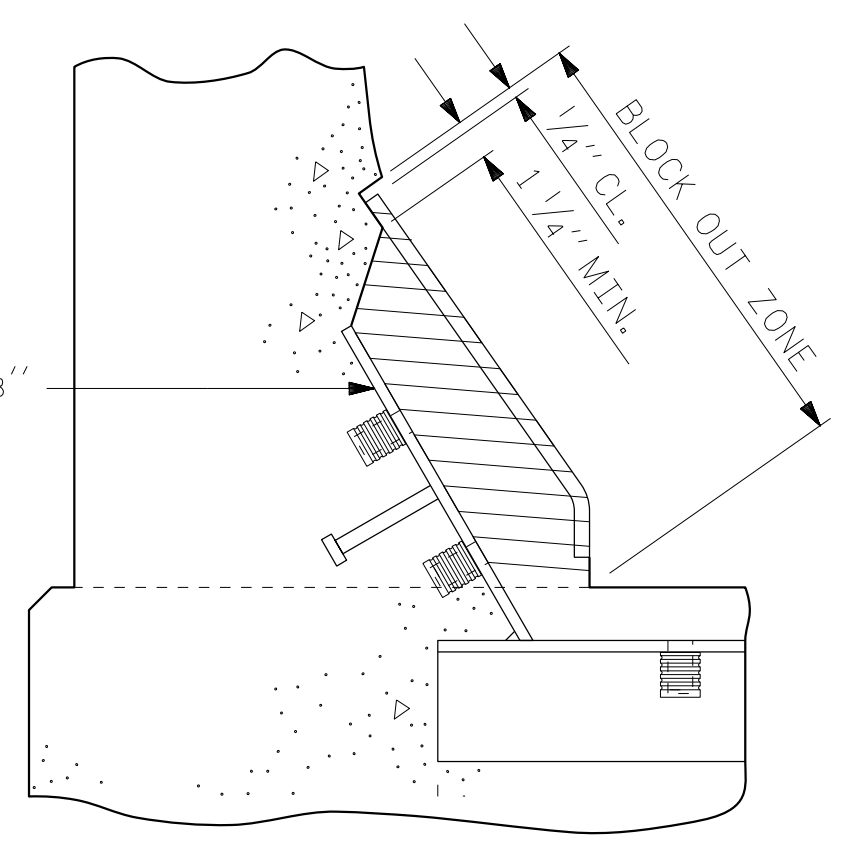
COVER PLATE DETAILS



SECTION A - A

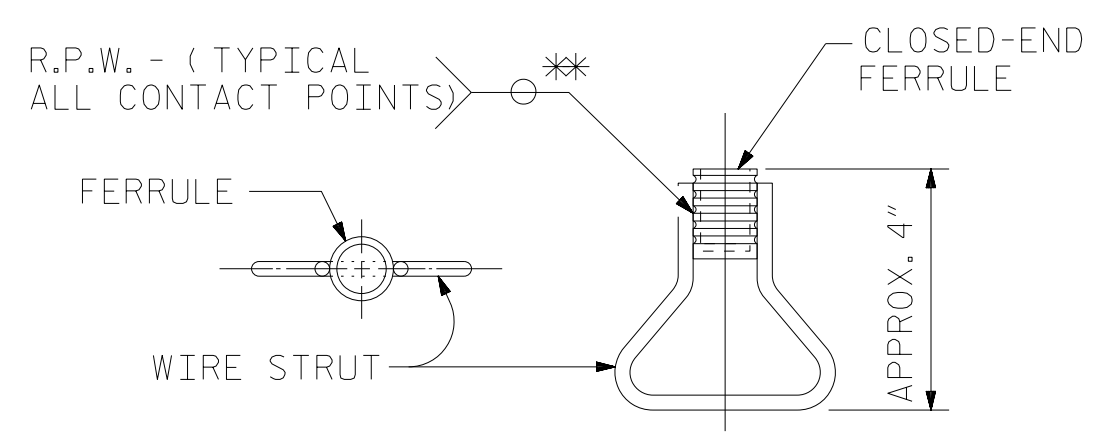


SECTION B - B



BLOCK OUT DETAIL

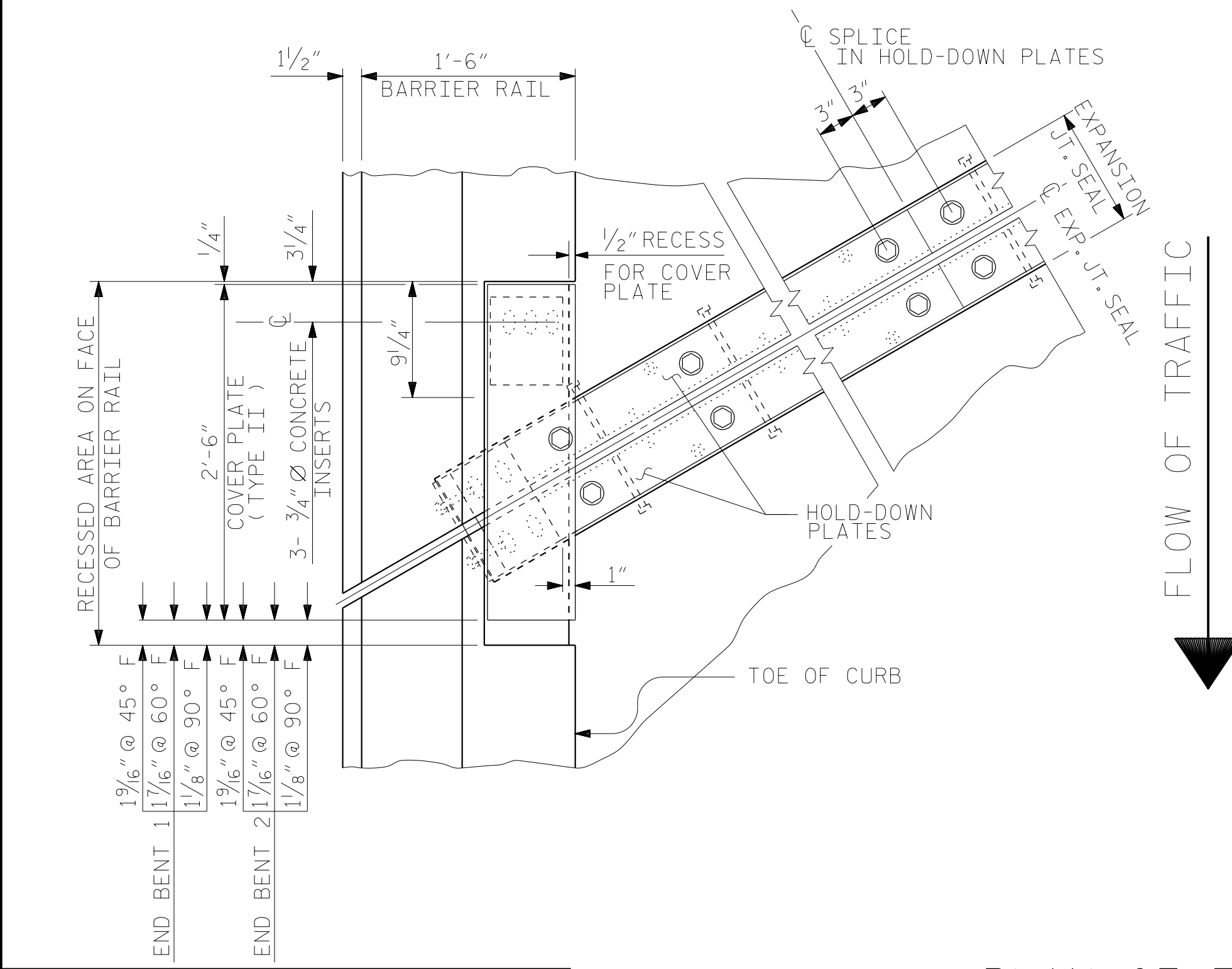
SEE "SECTION A - A" FOR OTHER DETAILS.



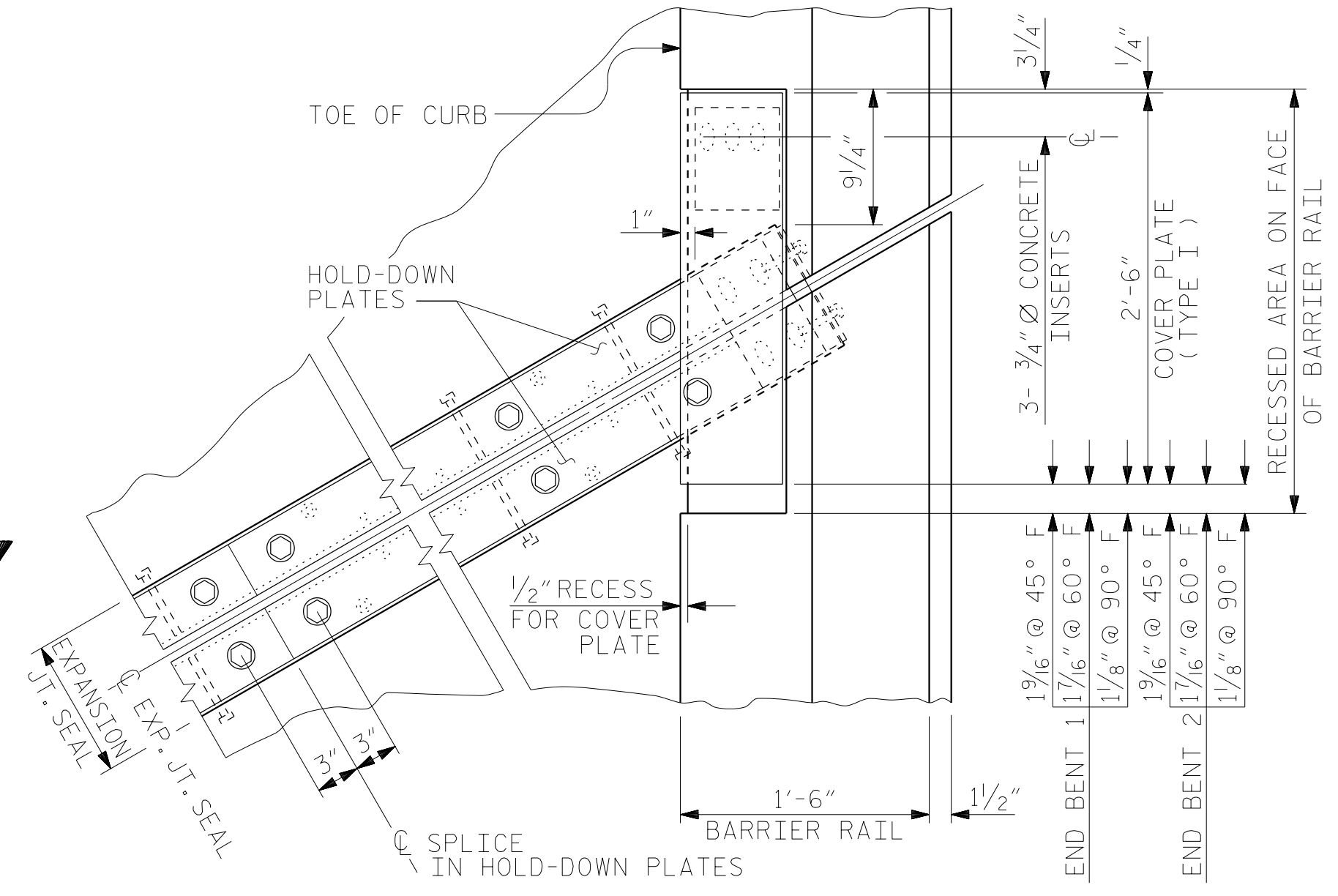
PLAN ELEVATION

CONCRETE INSERT

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



PLAN OF EXPANSION JOINT SEAL



ASSEMBLED BY :	MKO	DATE :	06/2015
CHECKED BY :	JMR	DATE :	06/2015
DRAWN BY :	REK 9/87	REV. 7/12	MAA/GM
CHECKED BY :	CRK 10/87	REV. 6/13	MAA/GM
		REV. 12/17	MAA/THC

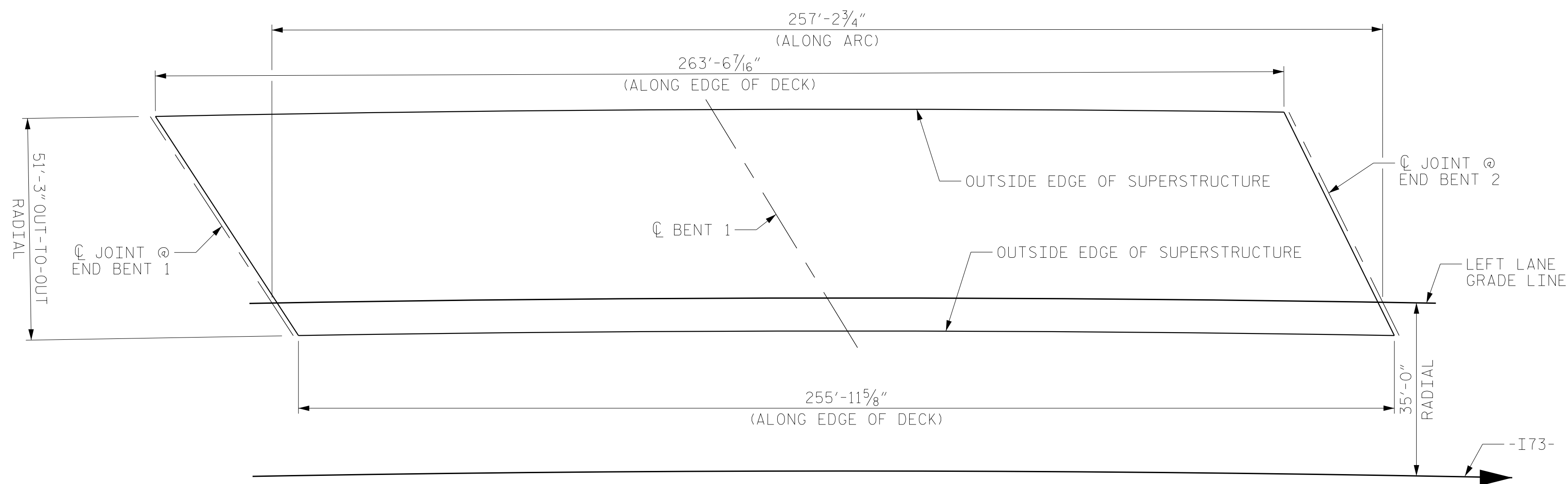
6/13/2019 X:\P\1030180000 R-3421A Richmond\Structures\Working DGN\R-3421A.SD.LT.JS.dgn CuonyN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

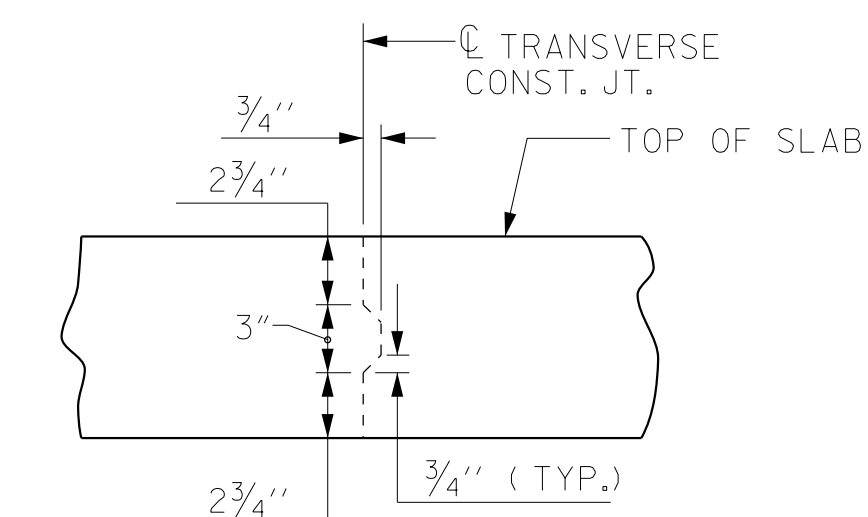
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STATION: 101+31.22 -I73-
SHEET 2 OF 2

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			39

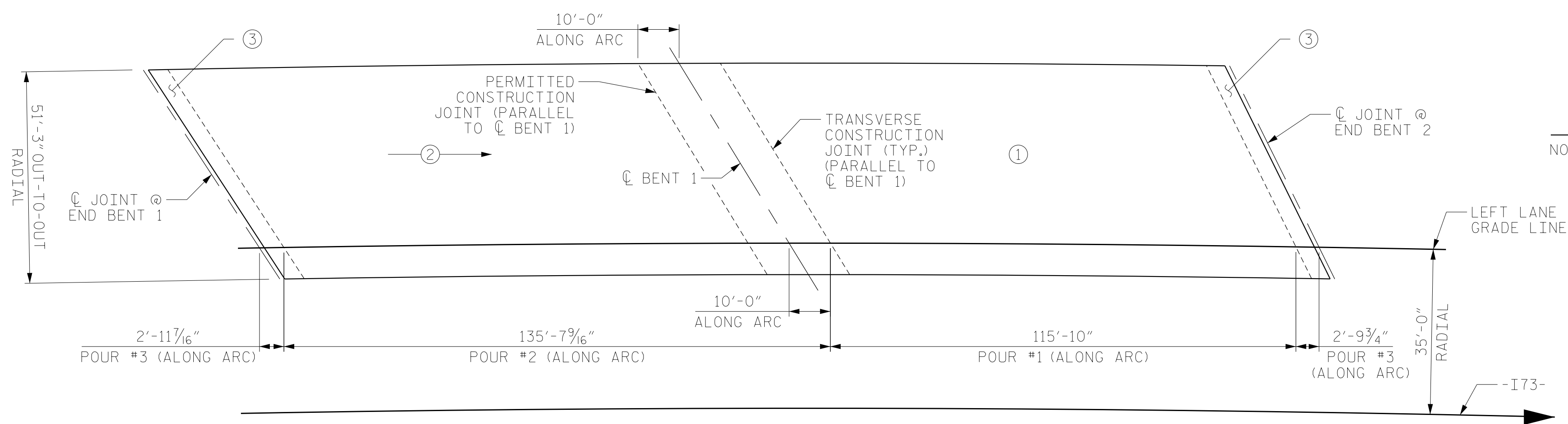


LAYOUT FOR COMPUTING
AREA OF REINFORCED CONCRETE DECK SLAB
(SQ. FT = 13,312)

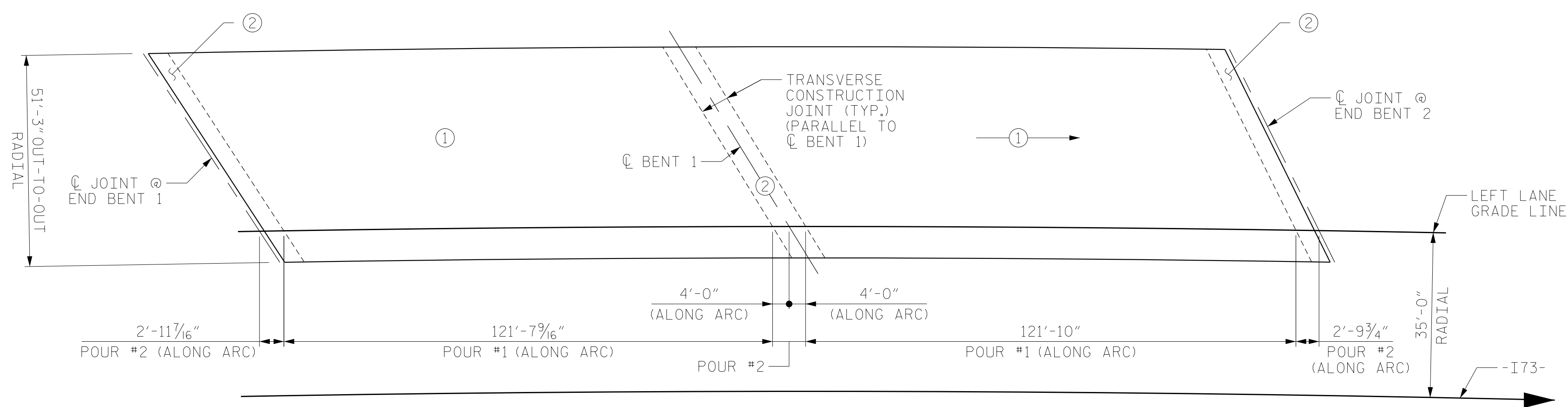


TRANSVERSE CONSTRUCTION JOINT DETAIL

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



POURING SEQUENCE

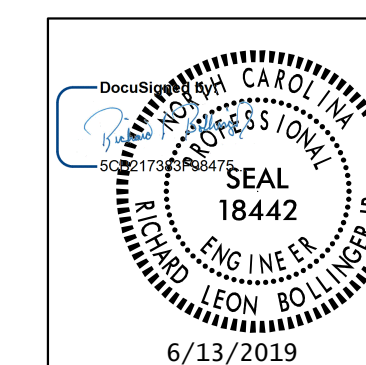


OPTIONAL POURING SEQUENCE

POUR ② CAN NOT BE STARTED UNTIL BOTH ADJACENT ① POURS REACH A MINIMUM OF 3000 PSI

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RICHMOND COUNTY
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SHEET 2 OF 2



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
BILL OF MATERIAL
LEFT LANE

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-27	
1			3			TOTAL SHEETS	
2			4			39	

DRAWN BY : MKO, MAL DATE : 07/2015
CHECKED BY : JMR DATE : 07/2015
DESIGN ENGINEER : JMR DATE : 04/2019
OF RECORD :

DOCUMENT NOT CONSIDERED
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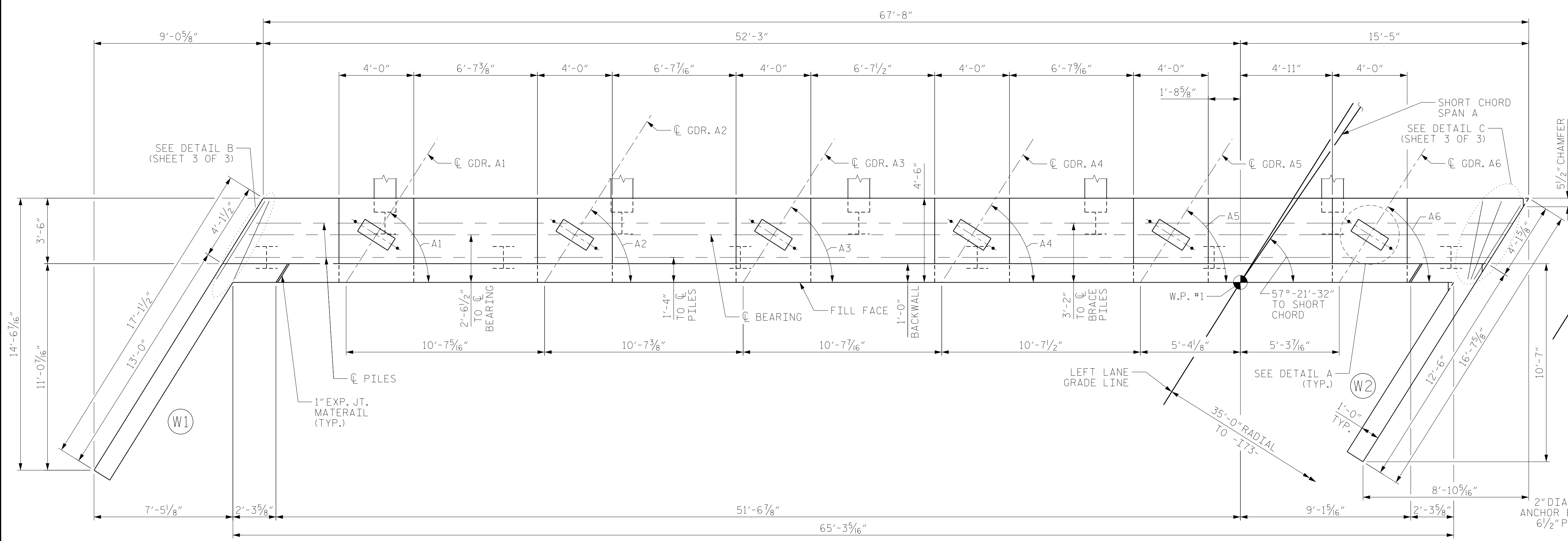
NOTES

STIRRUPS, U2 BARS AND B6 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

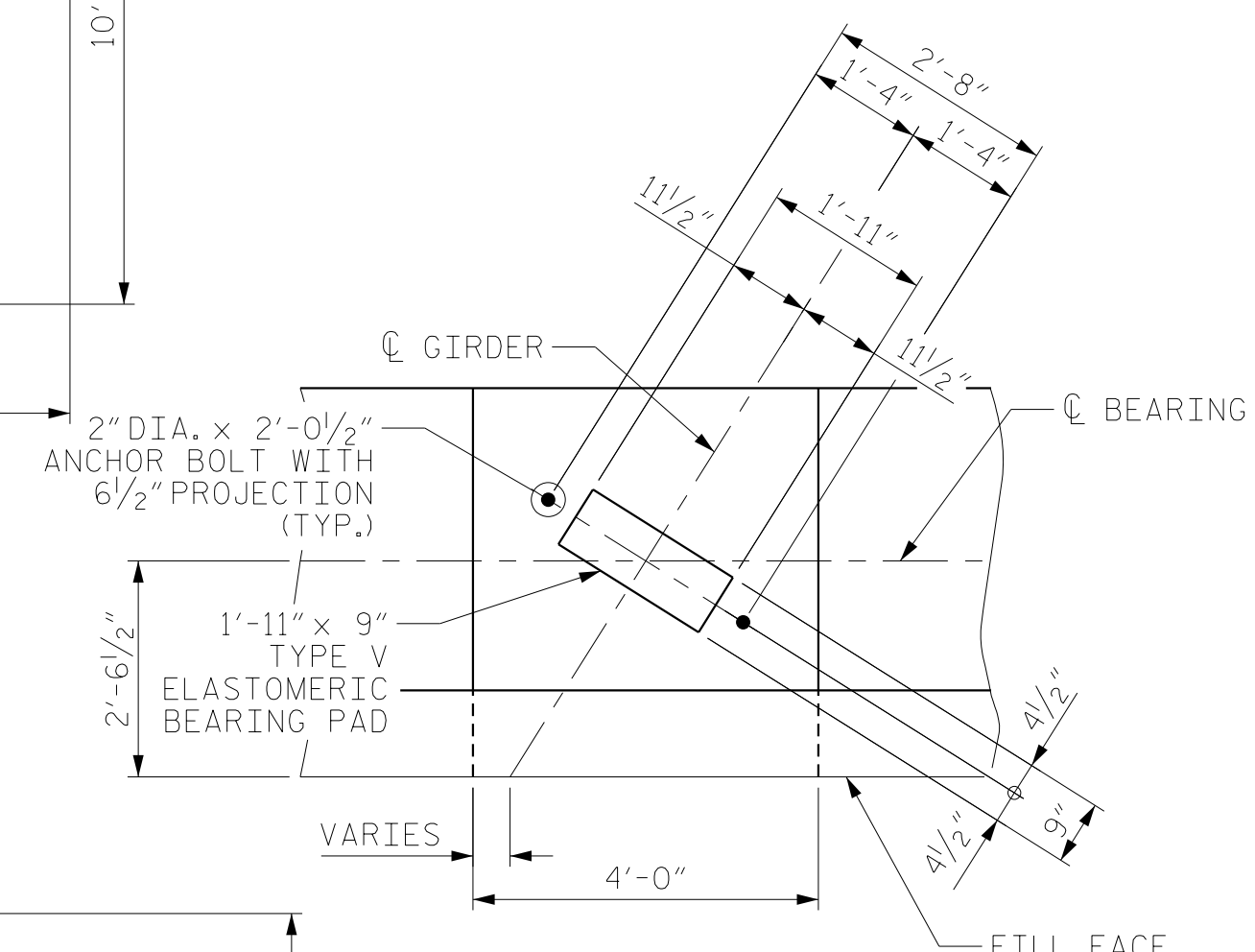
THE TOP SURFACE OF THE END BENT CAP EXCEPT BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT A RATE OF 2%.



PLAN

BEAM ANGLES

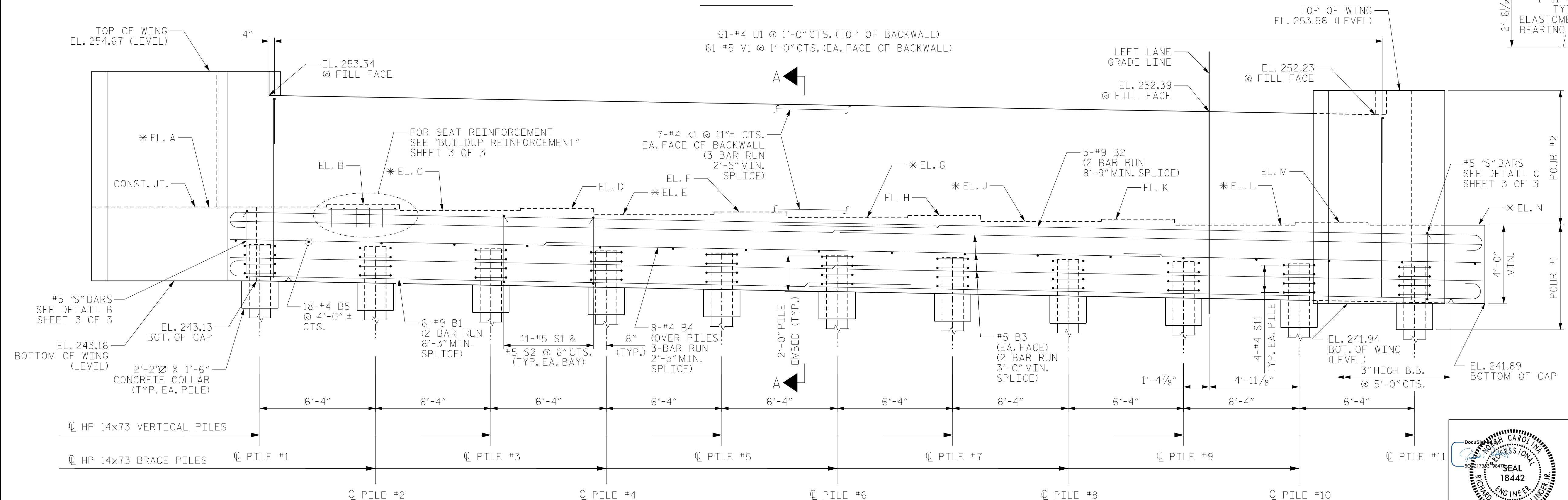
A1	57°-32'-17"
A2	57°-29'-49"
A3	57°-27'-20"
A4	57°-24'-51"
A5	57°-22'-21"
A6	57°-19'-51"



DETAIL A

MINIMUM SPLICE LENGTHS

#9 B1	6'-3"
#9 B2	8'-9"
#5 B3	3'-0"
#4 B4	2'-5"
#4 K1	2'-5"



ELEVATION

ELEVATIONS

A	B	C	D	E	F	G	H	J	K	L	M	N
247.18	247.31	246.99	247.11	246.79	246.92	246.60	246.72	246.40	246.53	246.21	246.33	246.21

PILE TIP ELEVATIONS

PILE #1	PILE #2	PILE #3	PILE #4	PILE #5	PILE #6	PILE #7	PILE #8	PILE #9	PILE #10	PILE #11
245.12	245.01	244.89	244.77	244.66	244.54	244.42	244.30	244.18	244.07	243.95

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 1 OF 3



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

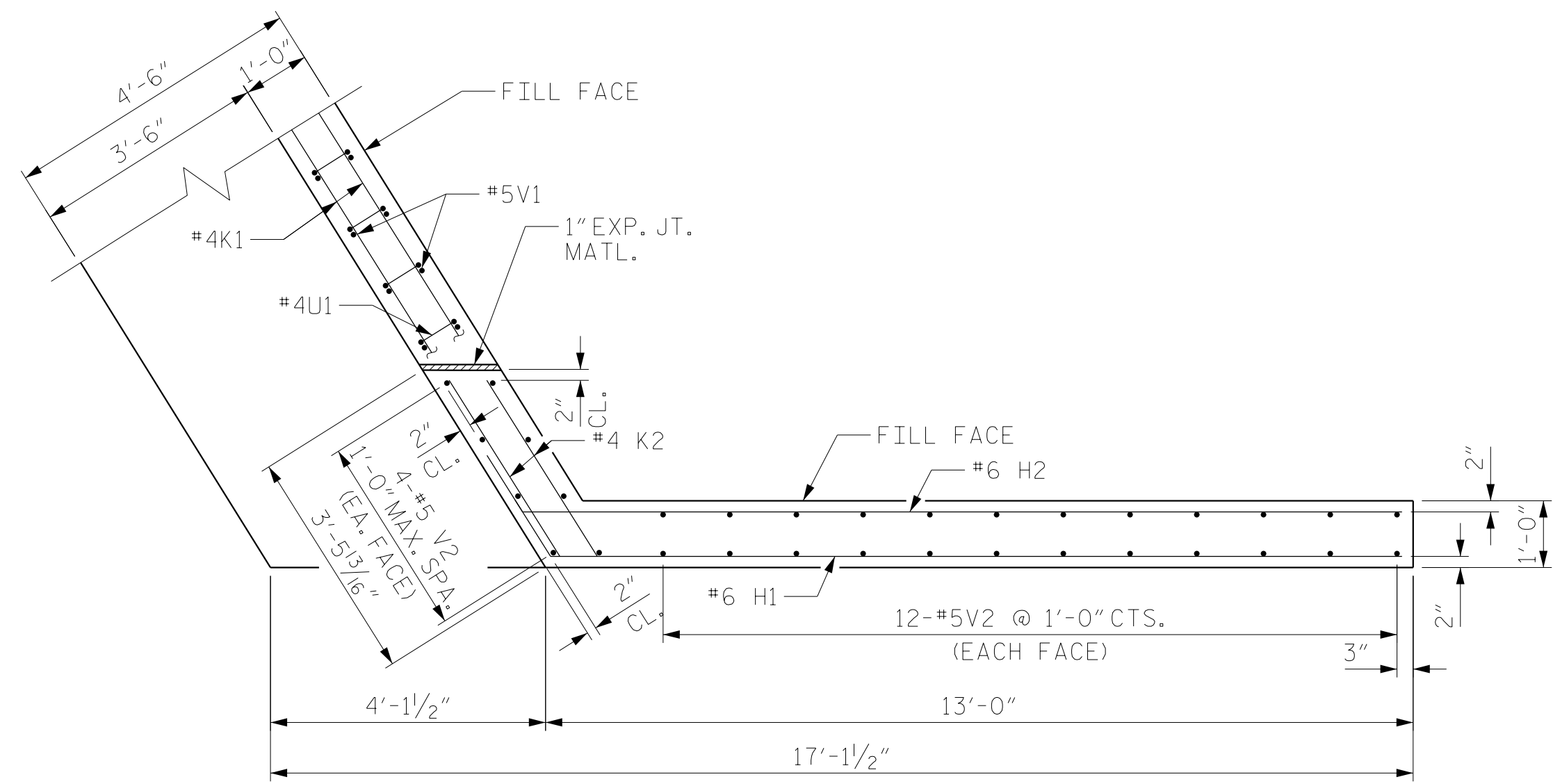
SUBSTRUCTURE
 END BENT #1
 LEFT LANE

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

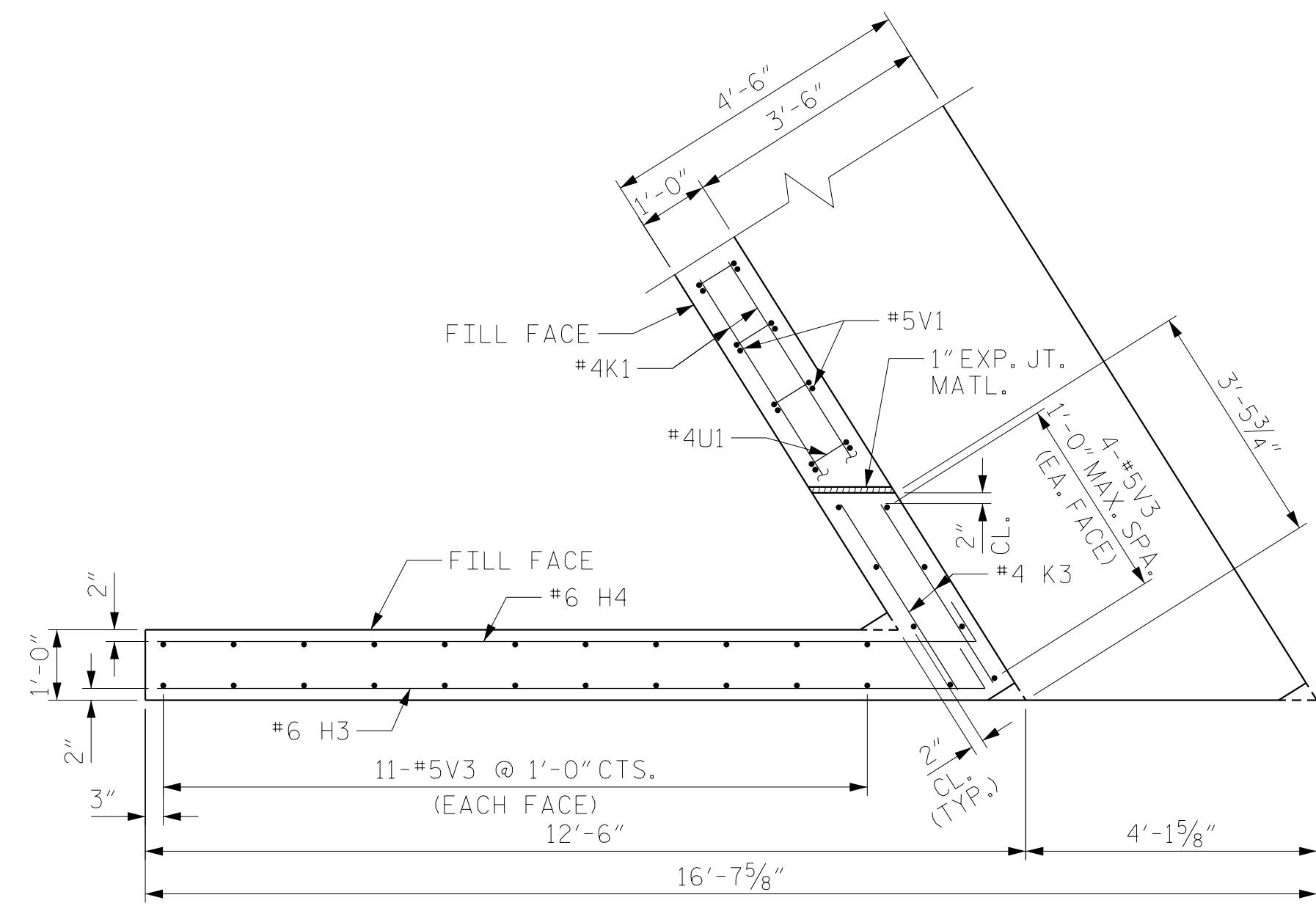
SHEET NO. S03-28
 TOTAL SHEETS 39

DRAWN BY : MKO DATE : 06/2015
 CHECKED BY : JMR DATE : 07/2015
 DESIGN ENGINEER OF RECORD : RLB DATE : 04/2019

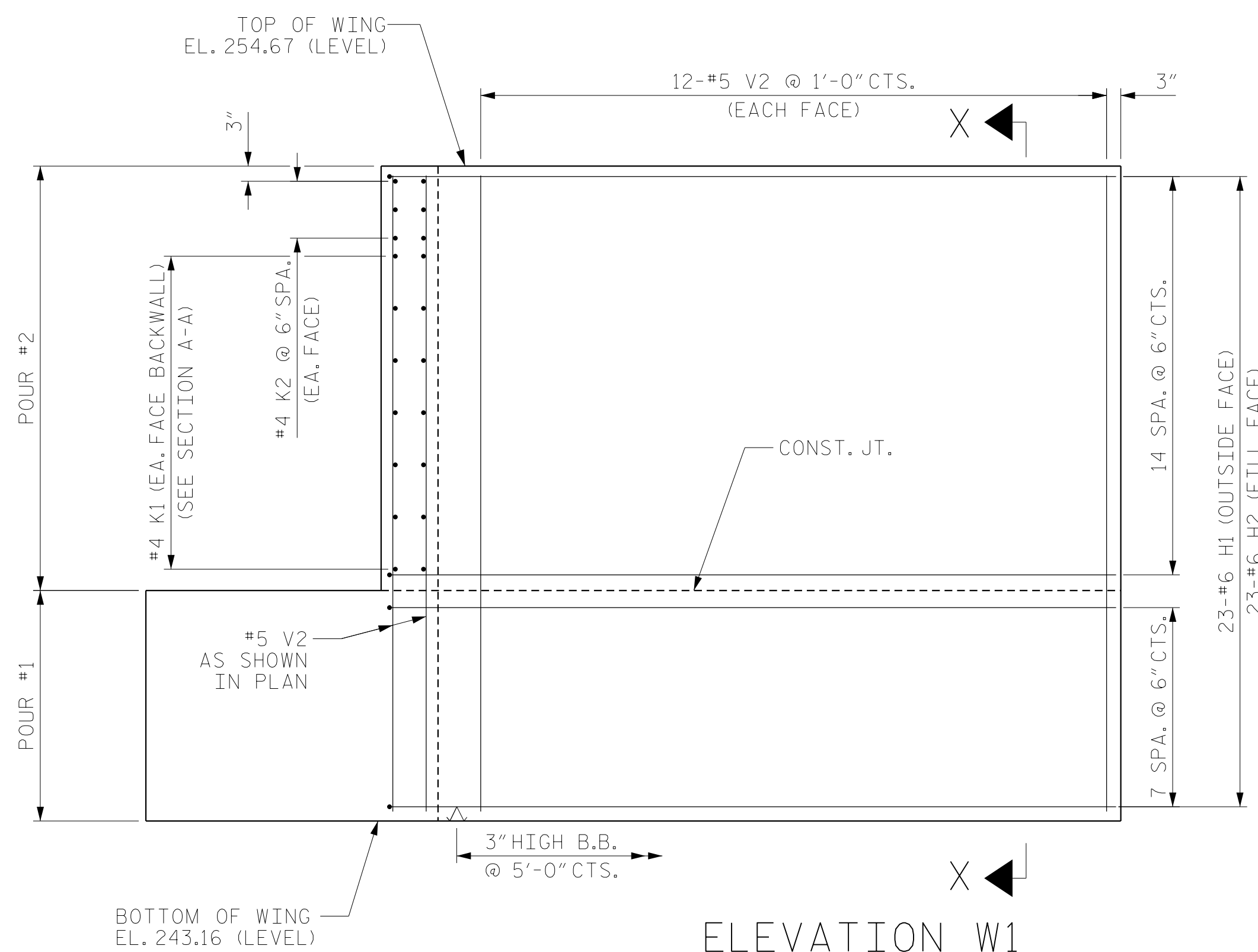
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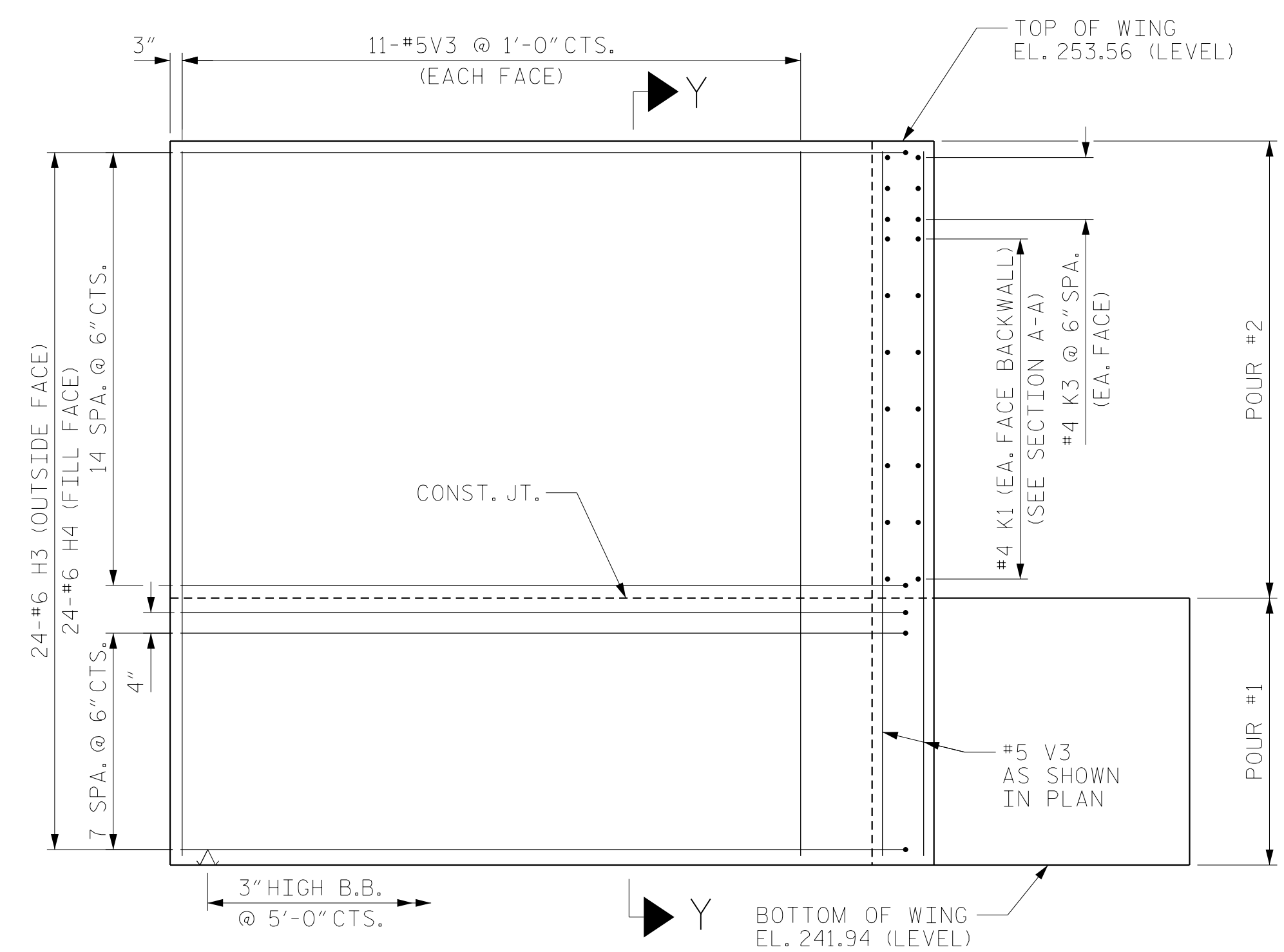
PLAN W1



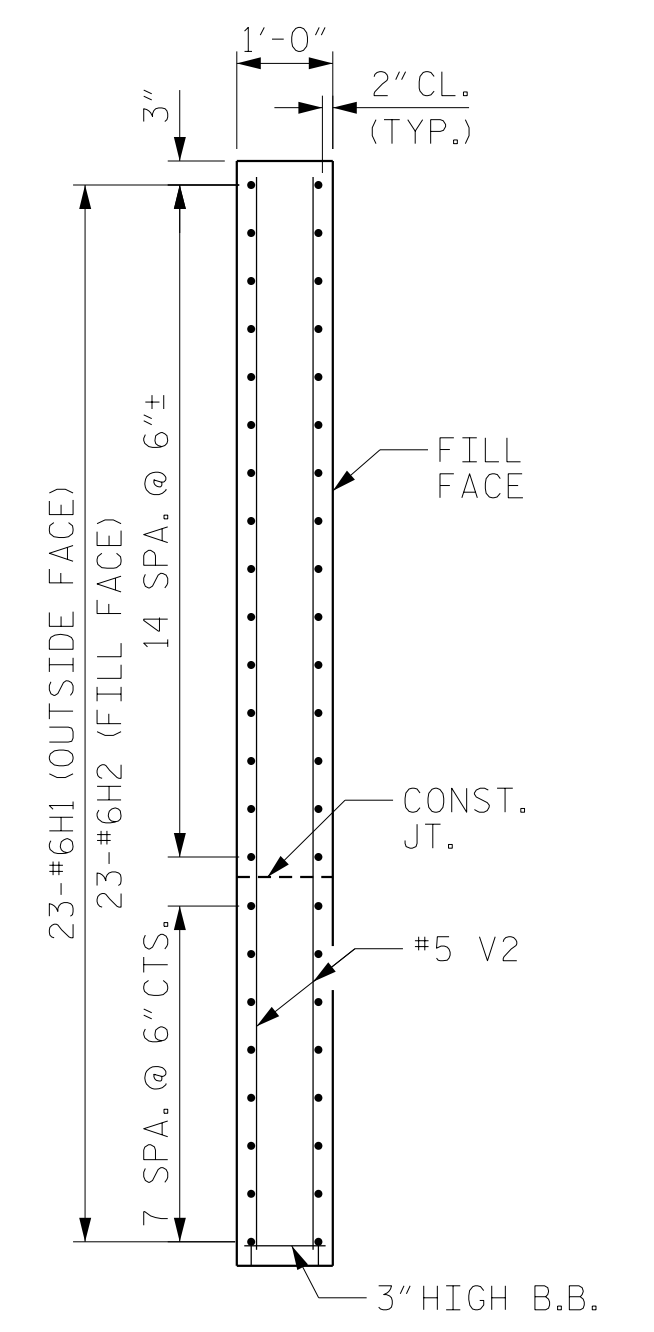
PLAN W2



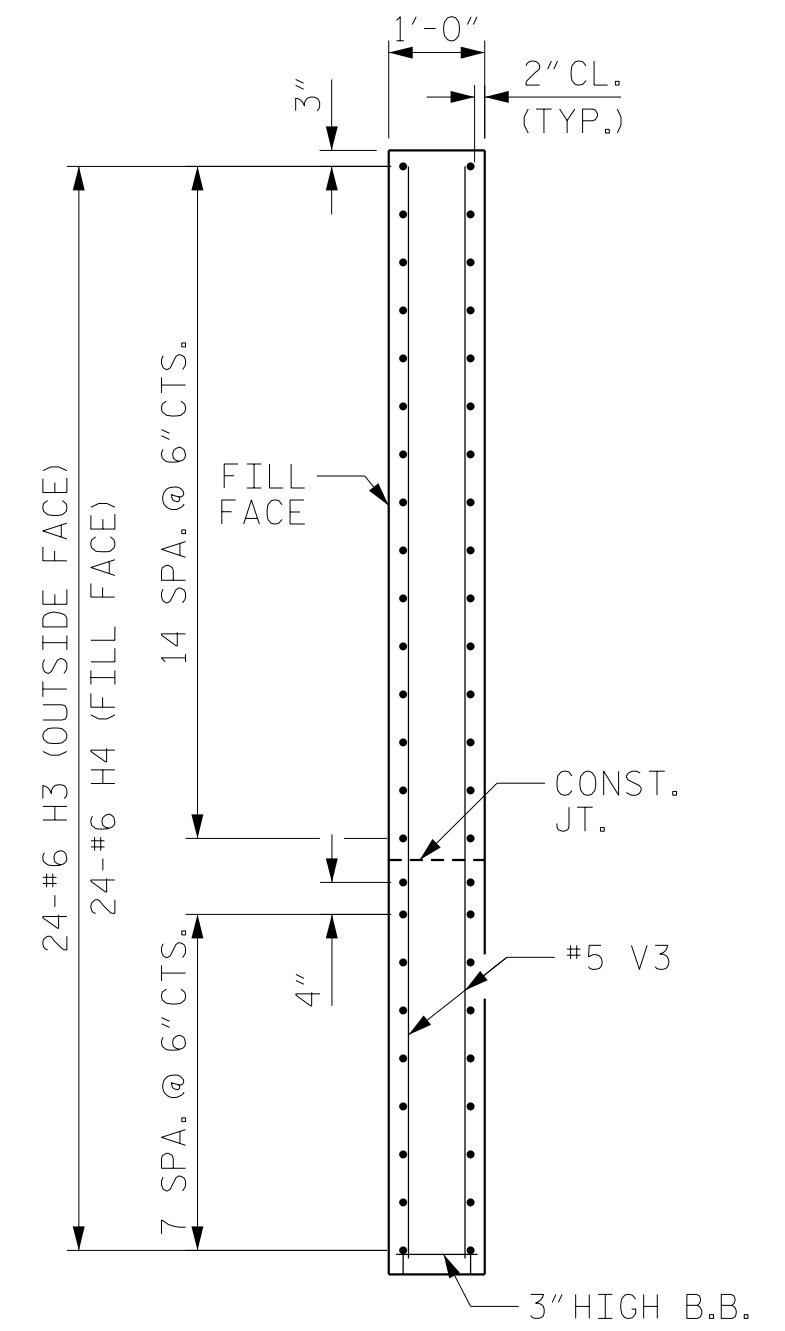
ELEVATION W1



ELEVATION W2



SECTION X-X



SECTION Y-Y

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 2 OF 3



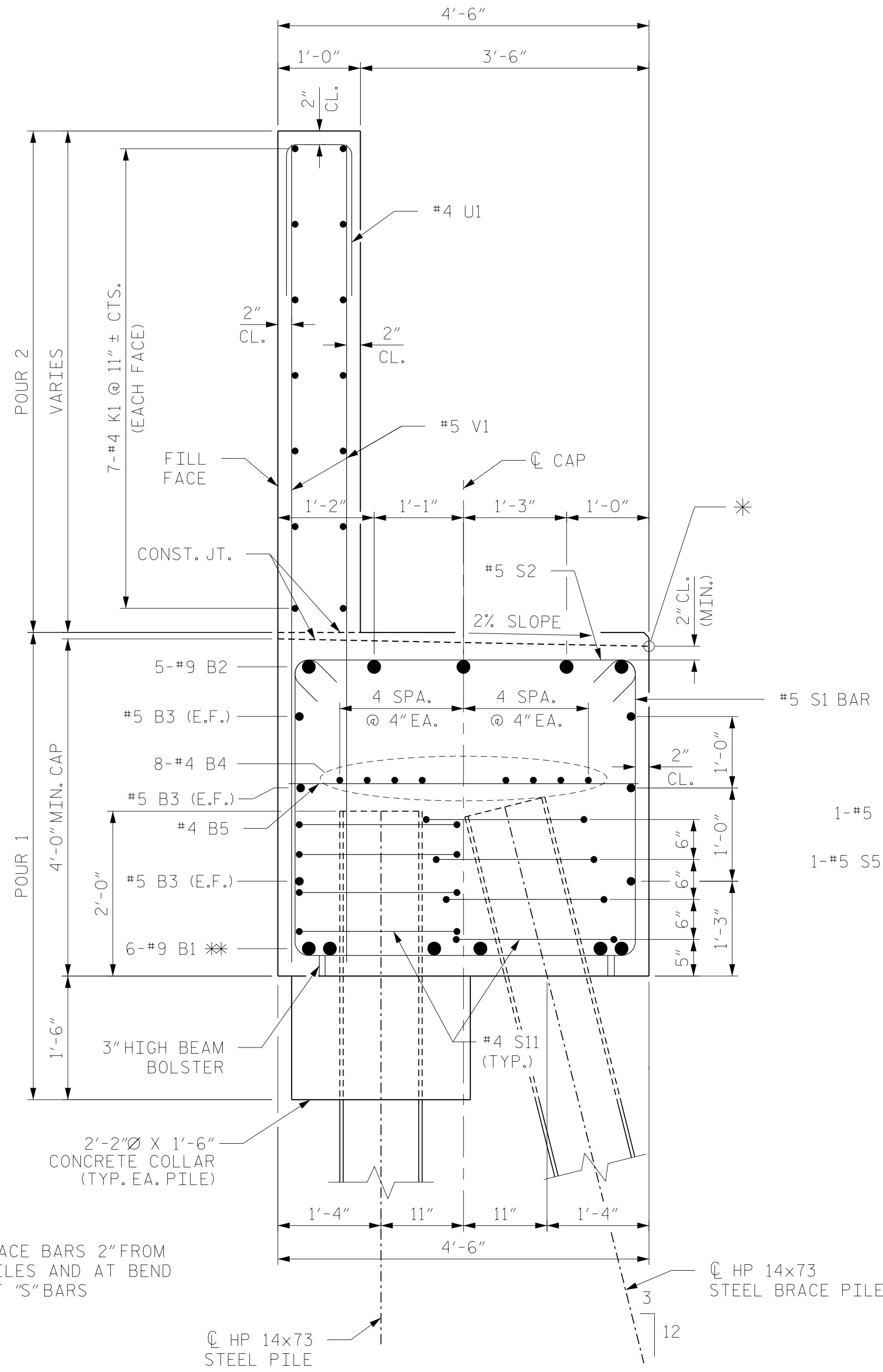
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 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT #1
 LEFT LANE

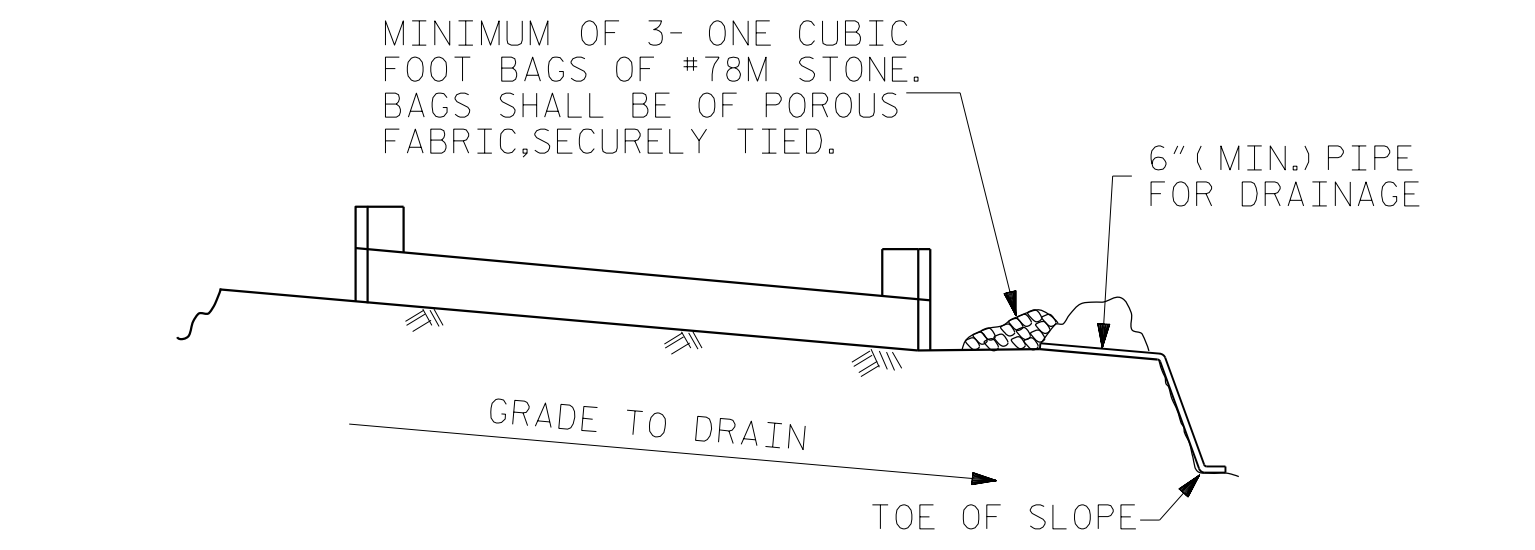
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-29
1			3			TOTAL SHEETS
2			4			39

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SECTION A-A
 *ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS ARE SHOWN AT THIS POINT
 NOTE: CONCRETE COLLAR NOT SHOWN ON BRACE PILE FOR CLARITY.



MINIMUM OF 3- ONE CUBIC FOOT BAGS OF #78M STONE. BAGS SHALL BE OF POROUS FABRIC, SECURELY TIED.

6\"/>

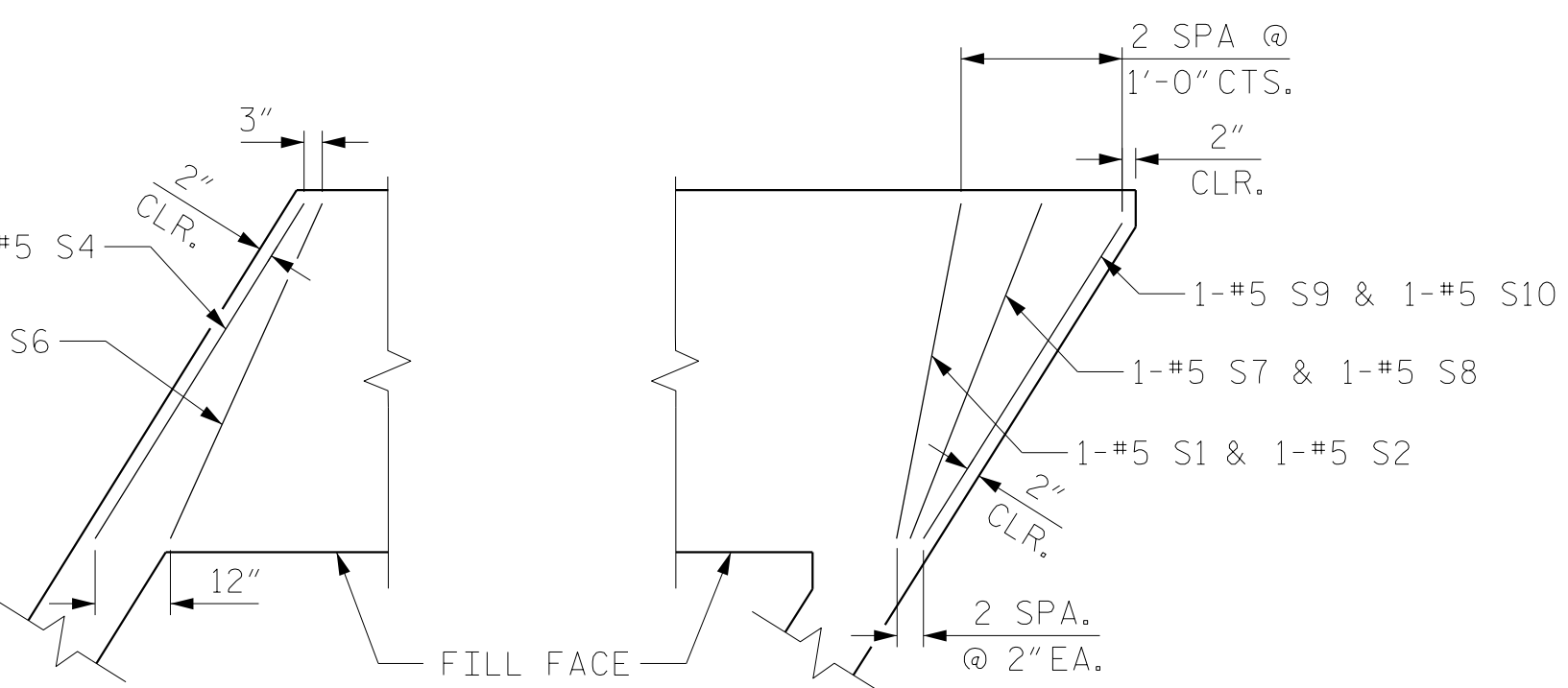
GRADE TO DRAIN
 TOE OF SLOPE

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

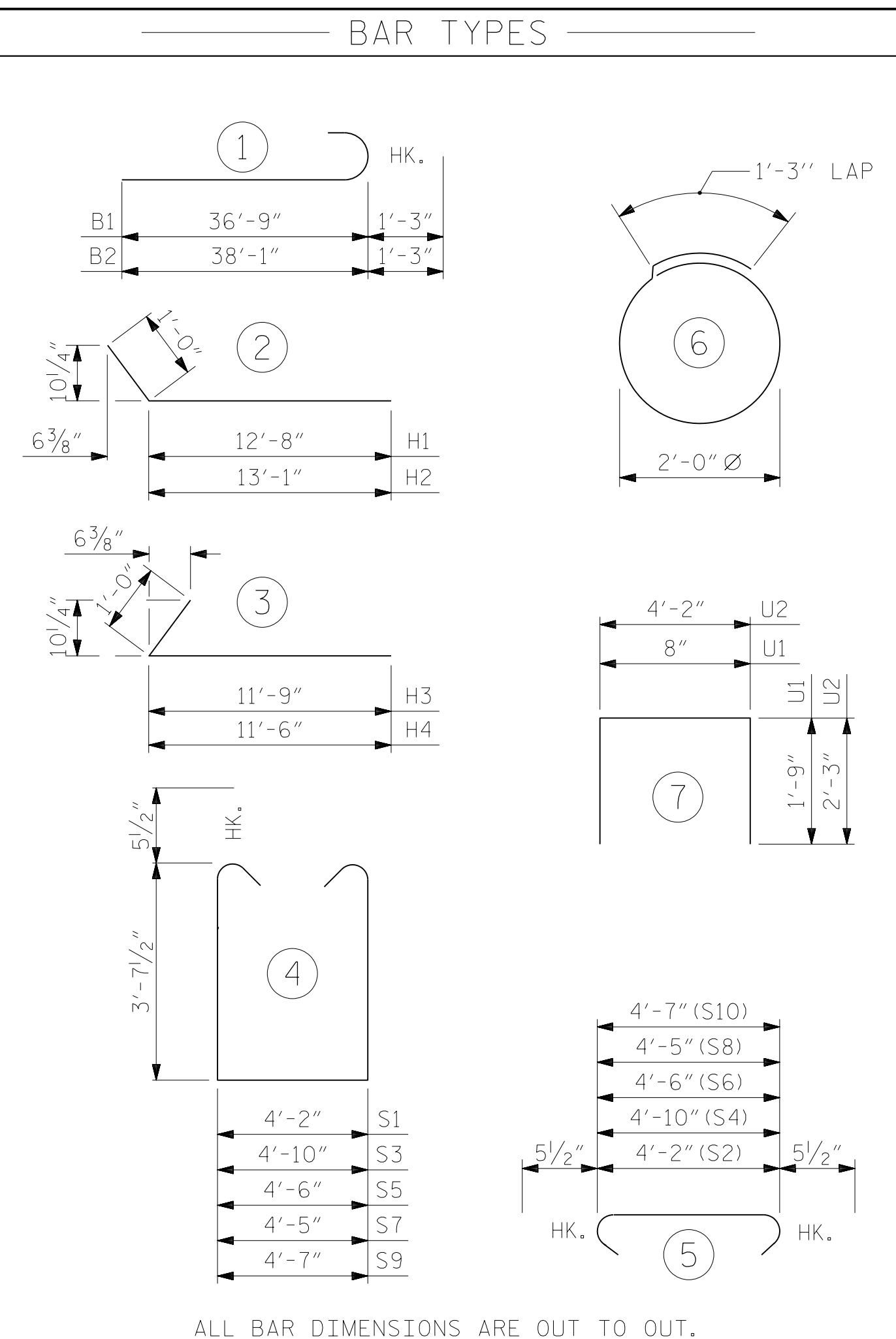
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

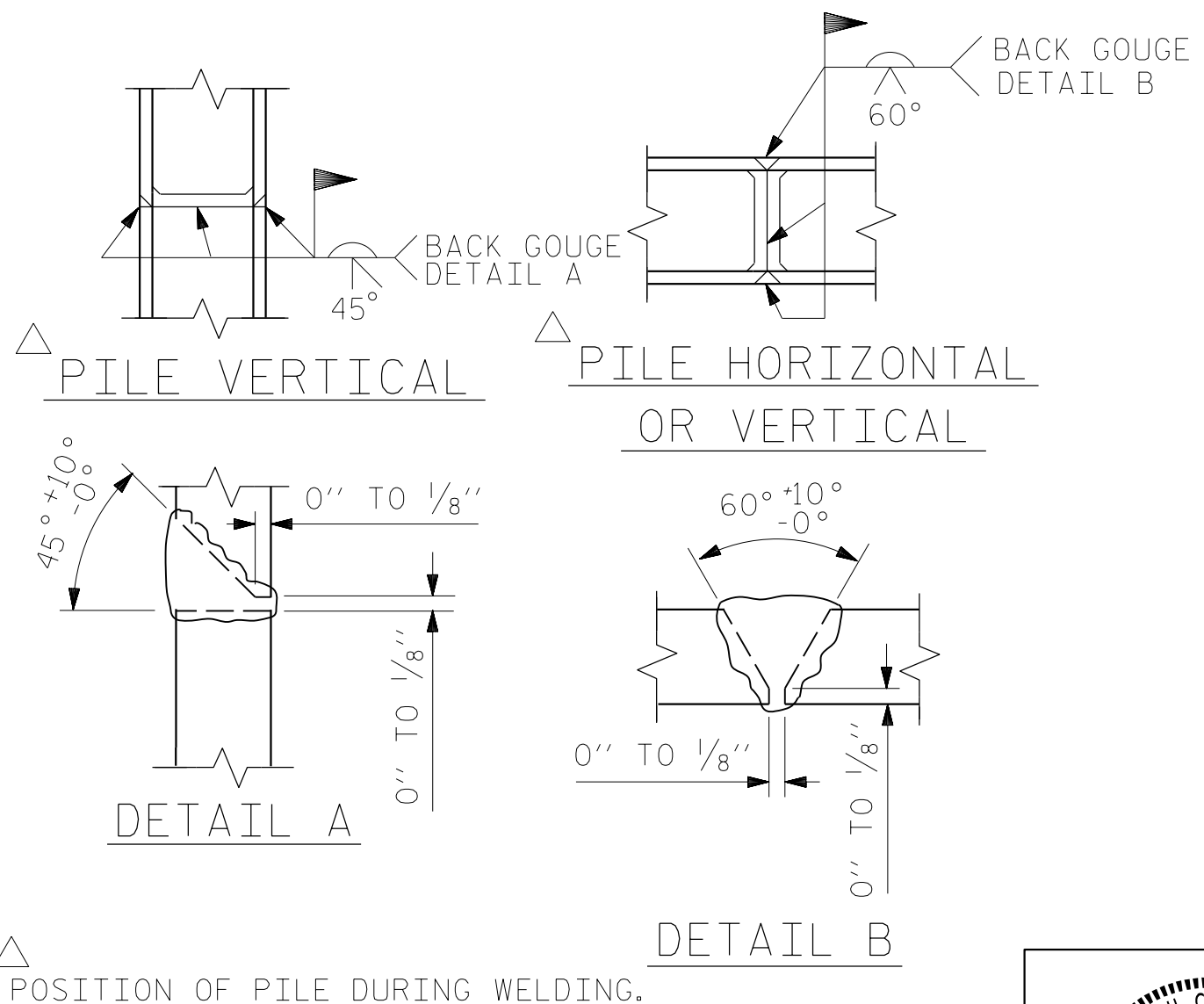
TEMPORARY DRAINAGE AT END BENT



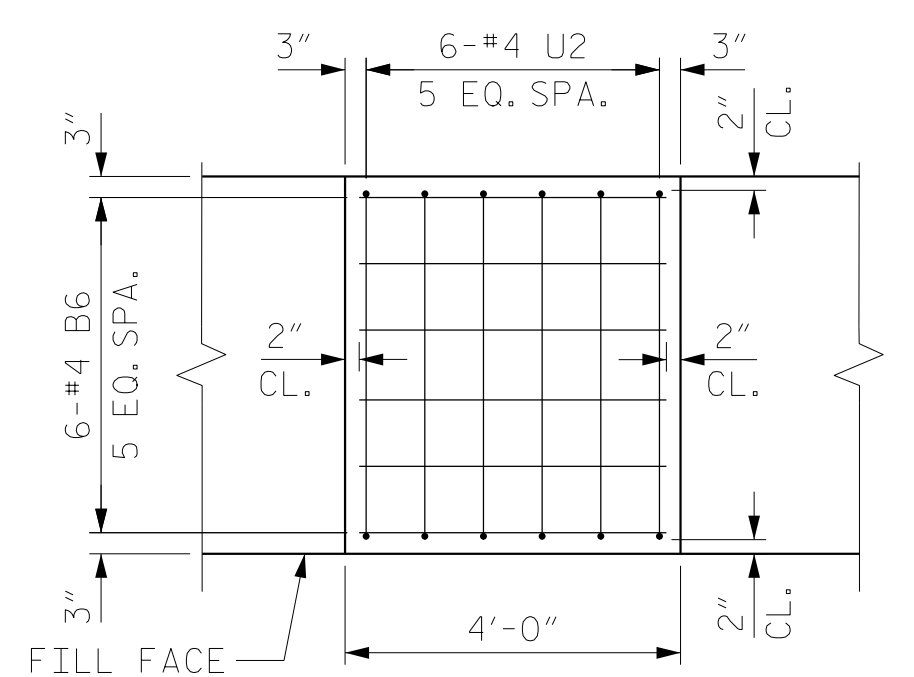
DETAIL B **DETAIL C**



ALL BAR DIMENSIONS ARE OUT TO OUT.



PILE SPLICE DETAILS



BRIDGE SEAT BUILDUP REINFORCEMENT
 BACKWALL NOT SHOWN FOR CLARITY

BILL OF MATERIAL					
END BENT #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	38'-0"	1550
B2	10	#9	1	39'-4"	1337
B3	12	#5	STR	35'-2"	440
B4	24	#4	STR	24'-0"	385
B5	18	#4	STR	4'-2"	50
B6	36	#4	STR	3'-8"	88
H1	23	#6	2	13'-8"	472
H2	23	#6	2	14'-1"	487
H3	24	#6	3	12'-9"	460
H4	24	#6	3	12'-6"	451
K1	42	#4	STR	24'-0"	673
K2	6	#4	STR	3'-1"	12
K3	6	#4	STR	3'-0"	12
S1	110	#5	4	12'-4"	1415
S2	110	#5	5	5'-1"	583
S3	1	#5	4	13'-0"	14
S4	1	#5	5	5'-9"	6
S5	1	#5	4	12'-8"	13
S6	1	#5	5	5'-5"	6
S7	1	#5	4	12'-7"	13
S8	1	#5	5	5'-4"	6
S9	1	#5	4	12'-9"	13
S10	1	#5	5	5'-6"	6
S11	44	#5	6	7'-7"	348
U1	61	#4	7	4'-2"	170
U2	36	#4	7	8'-8"	208
V1	122	#5	STR	9'-10"	1251
V2	32	#5	STR	11'-2"	373
V3	30	#5	STR	11'-3"	352

REINFORCING STEEL	11,194 LBS.
CLASS A CONCRETE BREAKDOWN	
POUR #1 CAP, LOWER PART OF WINGS & COLLARS	52.9 C.Y.
POUR #2 UPPER PART OF WINGS & BACKWALL	22.4 C.Y.
TOTAL CLASS A CONCRETE	75.3 C.Y.
HP 14 X 73 STEEL PILES	
NO: 11	LIN. FT. = 715
PILE DRIVING EQUIPMENT SETUP	EA. 11
STEEL PILE POINTS	NO. 11

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 3 OF 3

6/13/2019

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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
END BENT #1					
LEFT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S03-30					TOTAL SHEETS 39

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NOTES

STIRRUPS AND U1 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

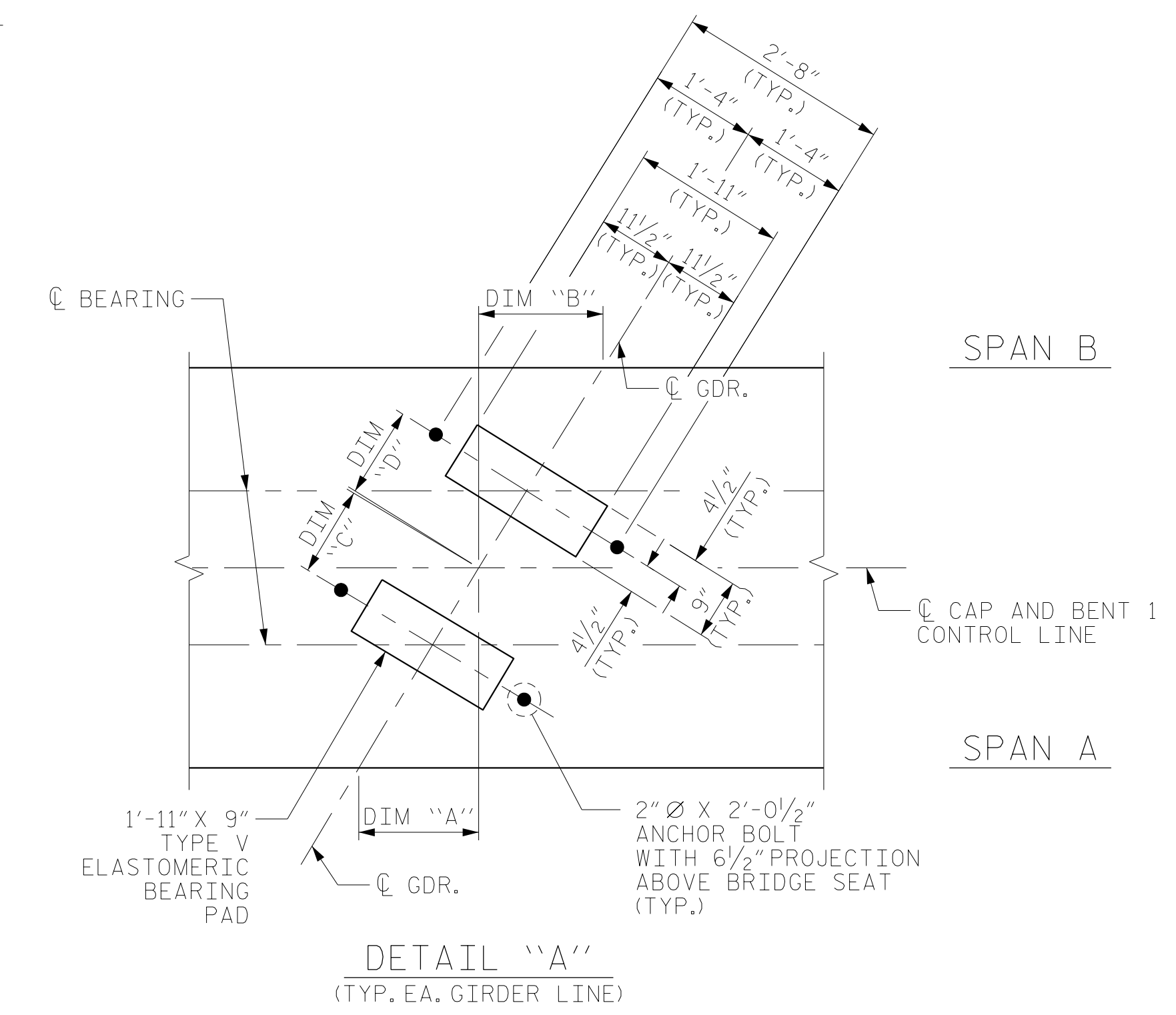
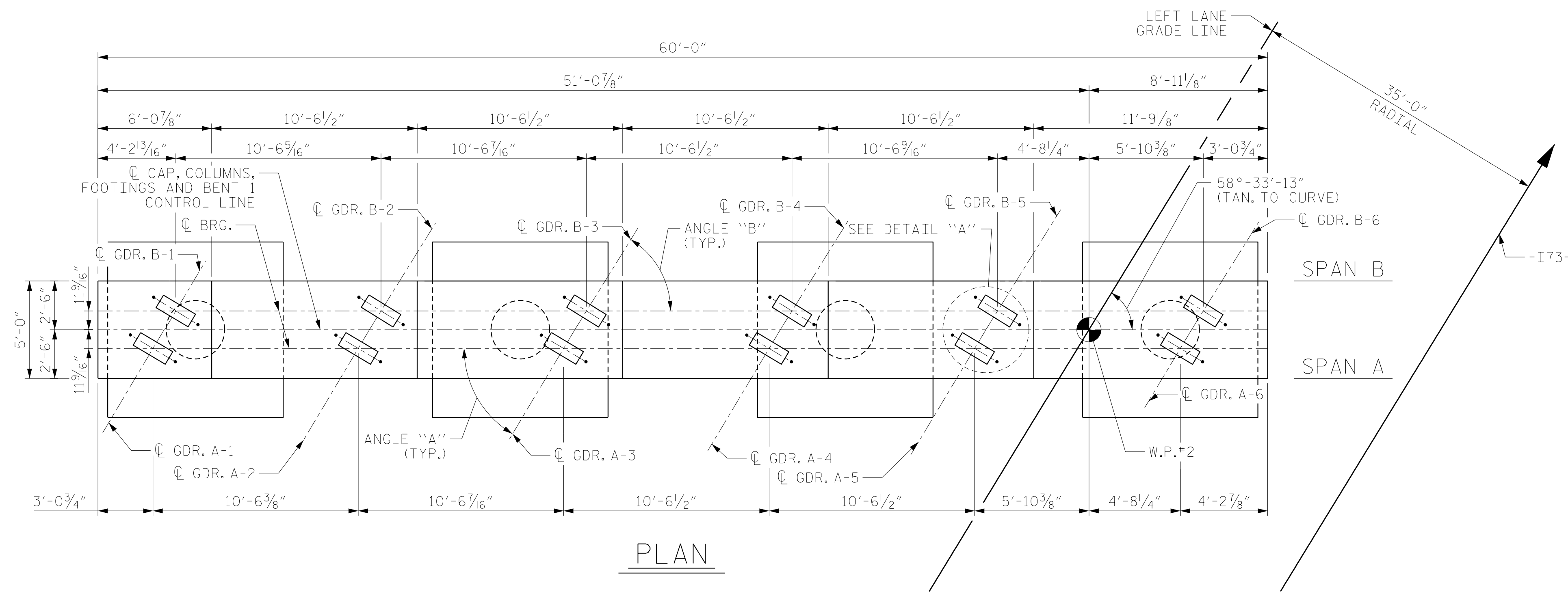
FOR PILE SPLICE DETAILS, SEE END BENT 1 SHEET 3 OF 3.

T.O.F. = TOP OF FOOTING

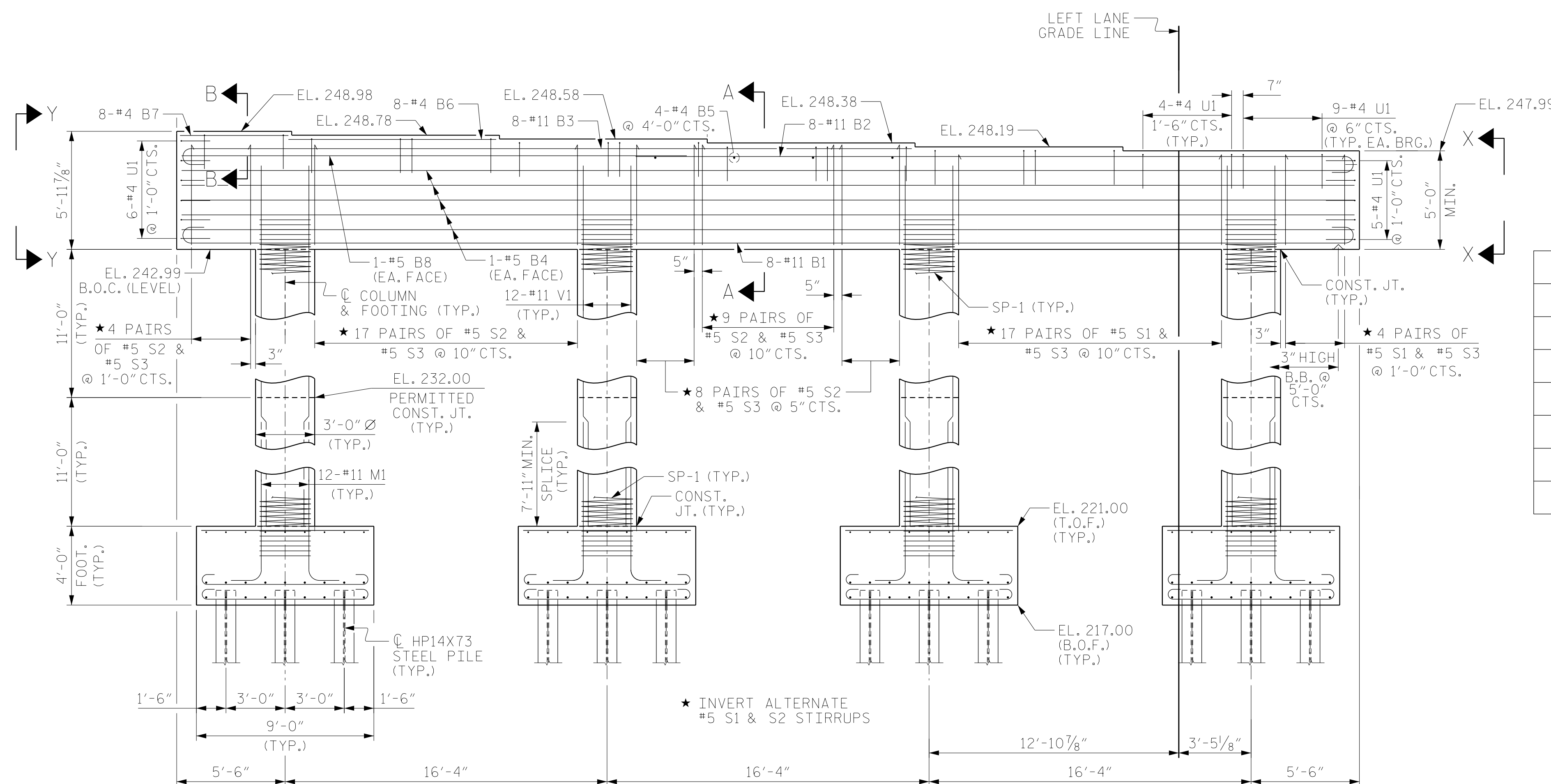
B.O.F. = BOTTOM OF FOOTING

B.O.C. = BOTTOM OF CAP

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



SPAN A				SPAN B			
GIRDER	ANGLE "A"	DIM "A"	DIM "C"	GIRDER	ANGLE "B"	DIM "B"	DIM "D"
A-1	59°-13'-04"	1'-5 7/8"	1'-1 1/16"	B-1	58°-14'-41"	1'-6 9/16"	1'-1 9/16"
A-2	59°-10'-35"	1'-5 7/8"	1'-1 1/16"	B-2	58°-12'-26"	1'-6 5/8"	1'-1 9/16"
A-3	59°-08'-07"	1'-5 5/16"	1'-1 1/16"	B-3	58°-10'-11"	1'-6 5/8"	1'-1 9/16"
A-4	59°-05'-37"	1'-5 5/16"	1'-1 1/16"	B-4	58°-07'-56"	1'-6 5/8"	1'-1 9/16"
A-5	59°-03'-08"	1'-6"	1'-1 1/16"	B-5	58°-05'-40"	1'-6 11/16"	1'-1 9/16"
A-6	59°-00'-38"	1'-6"	1'-1 1/16"	B-6	58°-03'-24"	1'-6 11/16"	1'-1 5/8"



ELEVATION
FOR FOOTING REINFORCEMENT AND COLUMN CONNECTION REINFORCEMENT SEE "END VIEW," SHEET 2 OF 2.
FOR ALL SECTION VIEWS, SEE SHEET 2 OF 2.

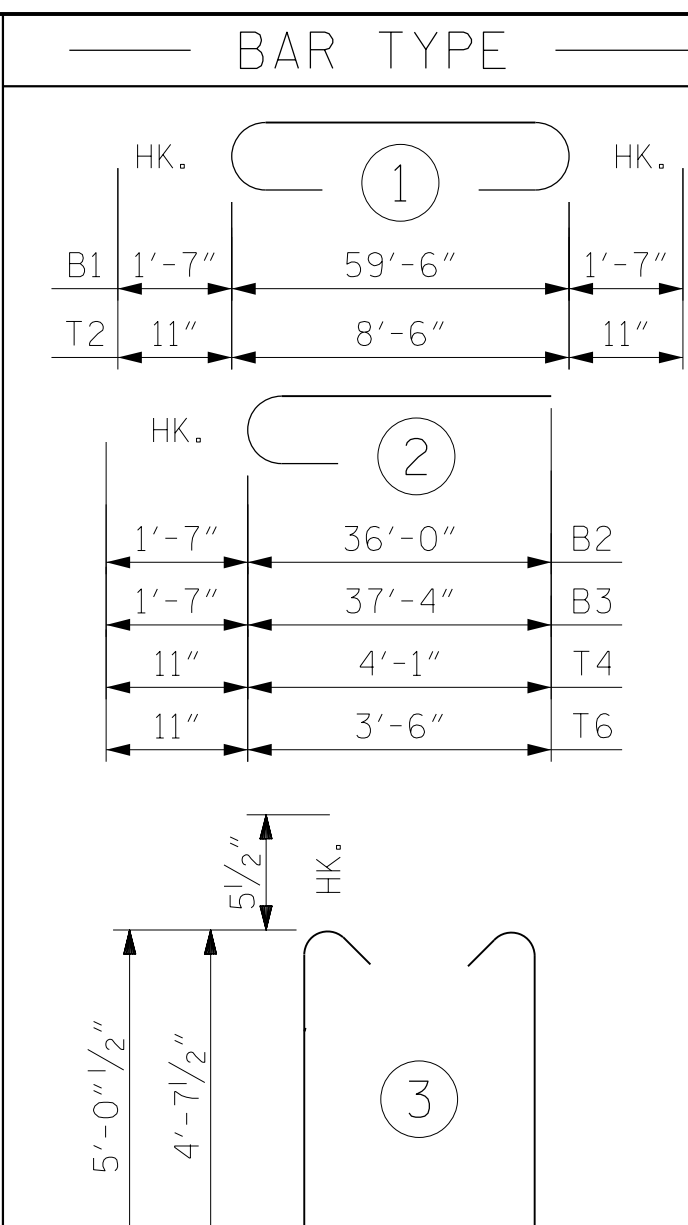
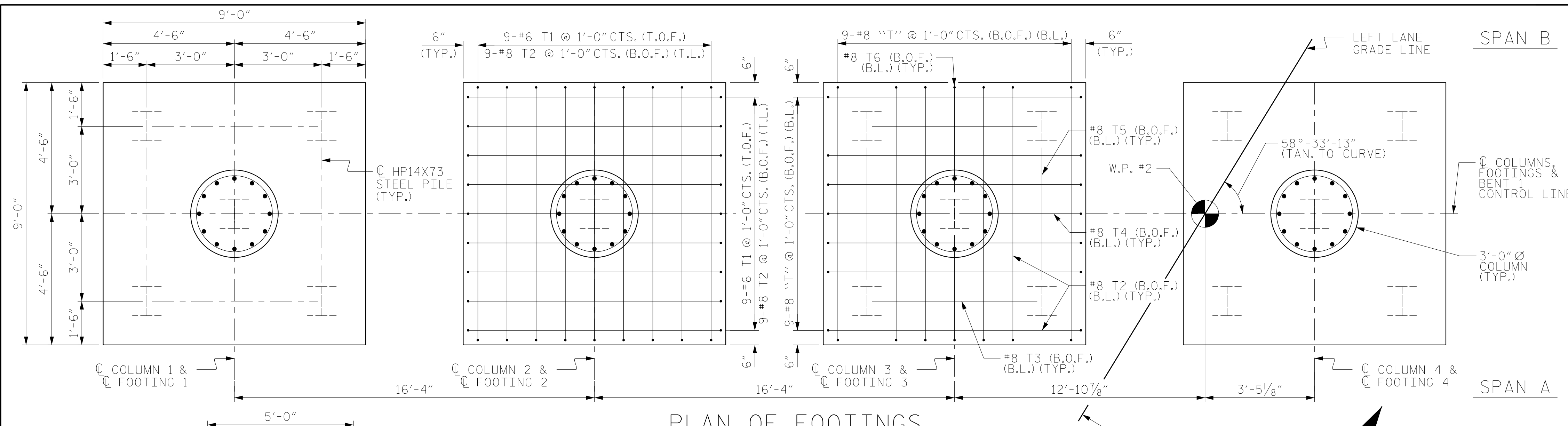
PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-
SHEET 1 OF 2



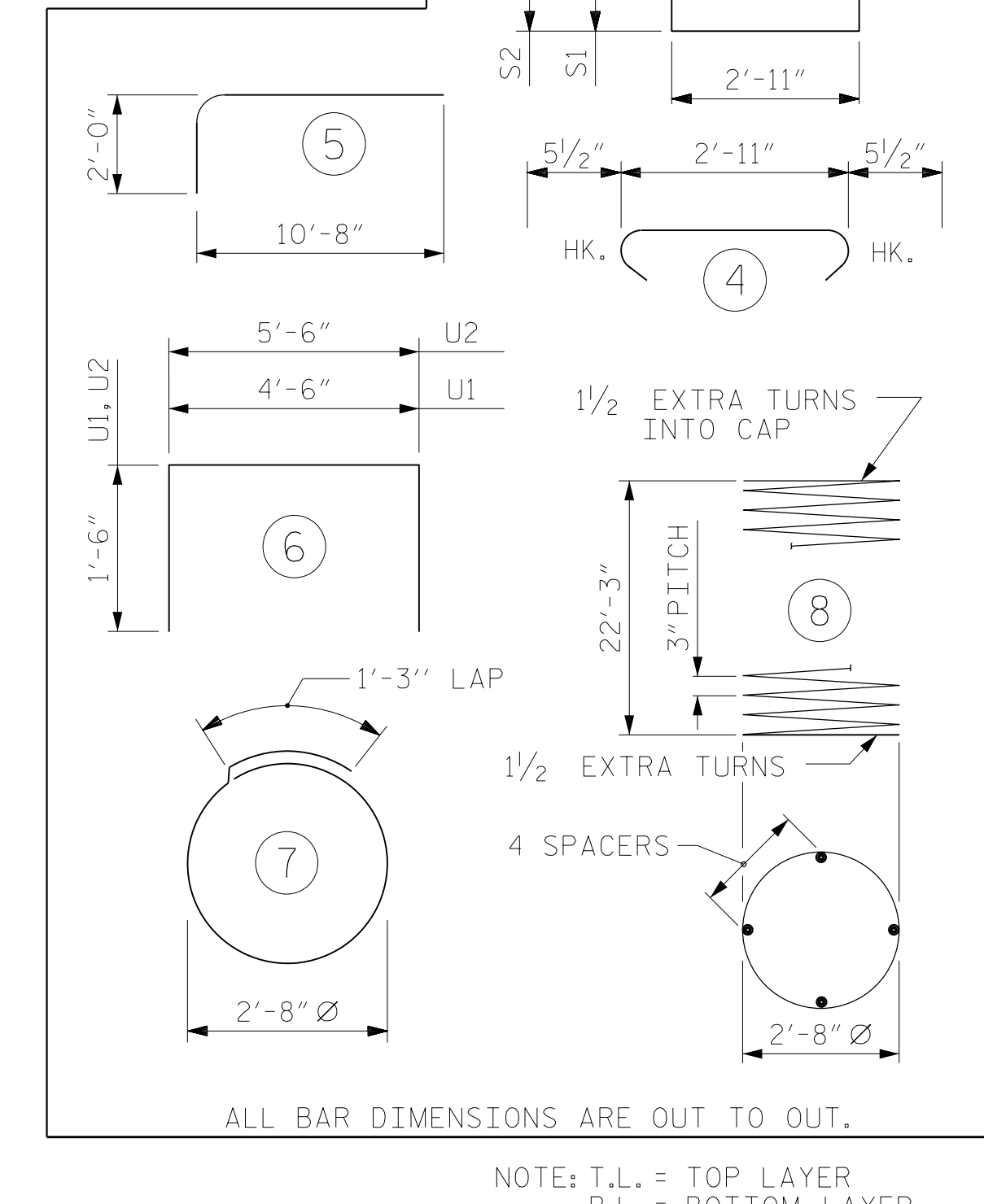
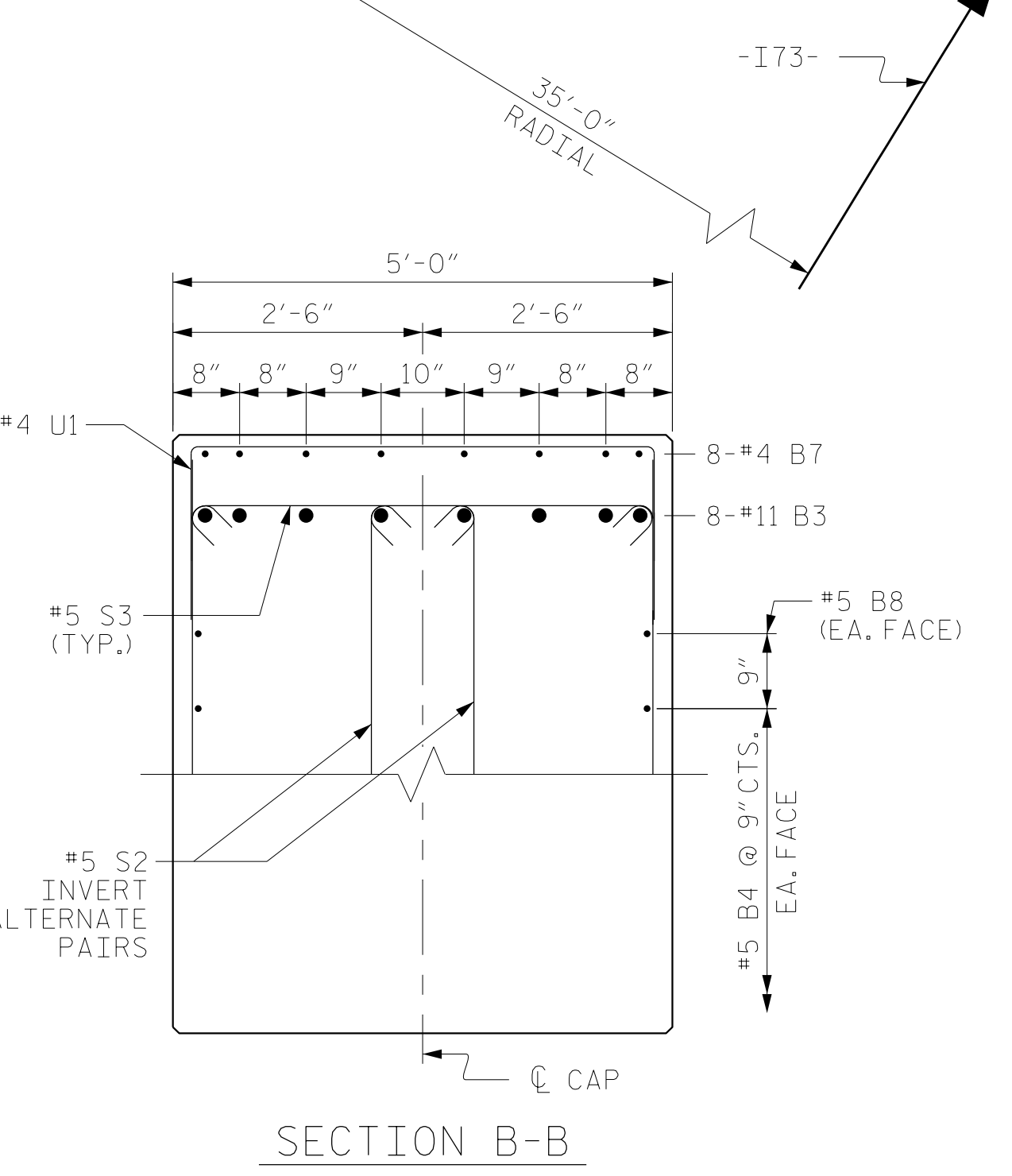
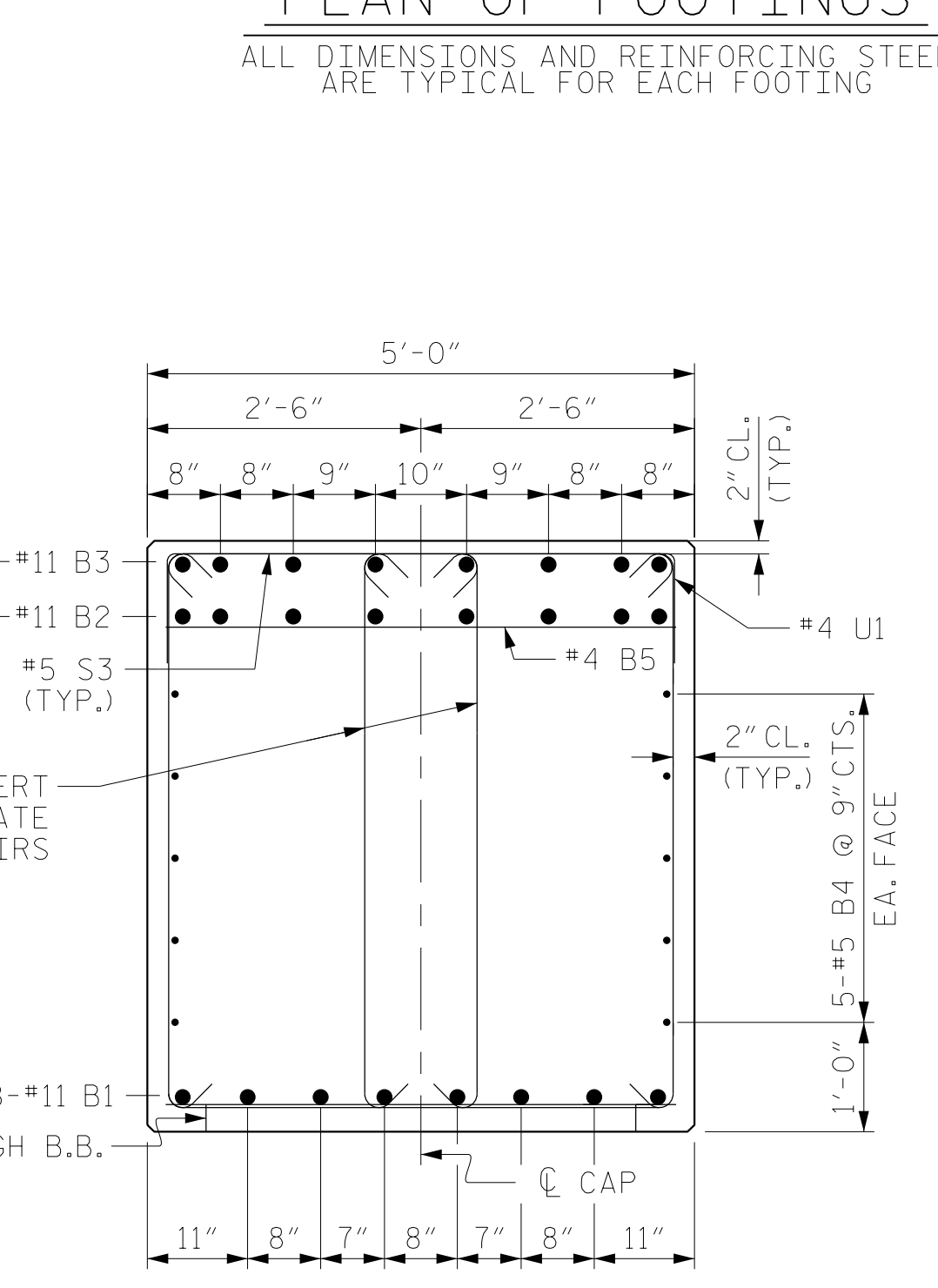
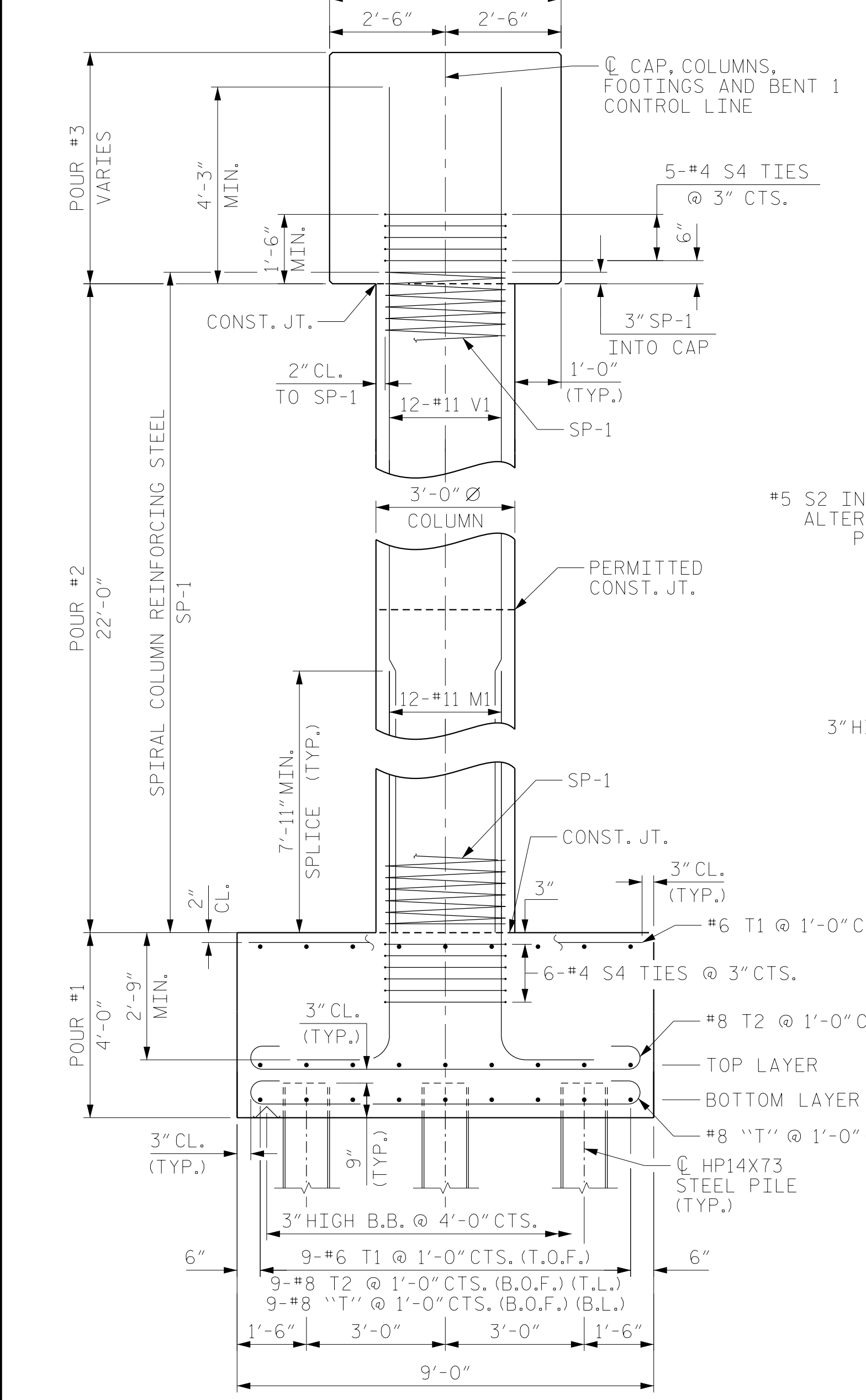
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-31
1			3			TOTAL SHEETS
2			4			39

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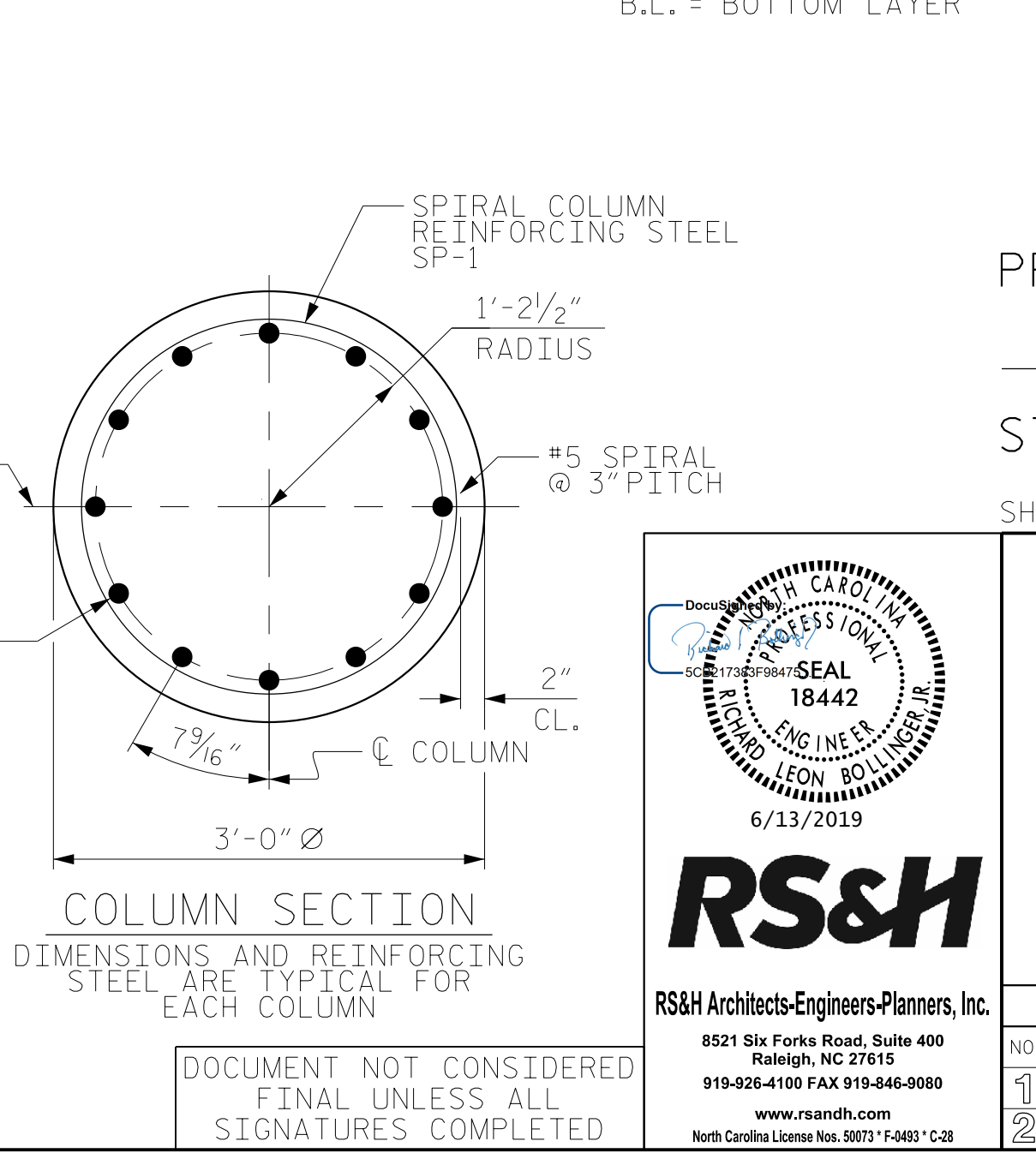
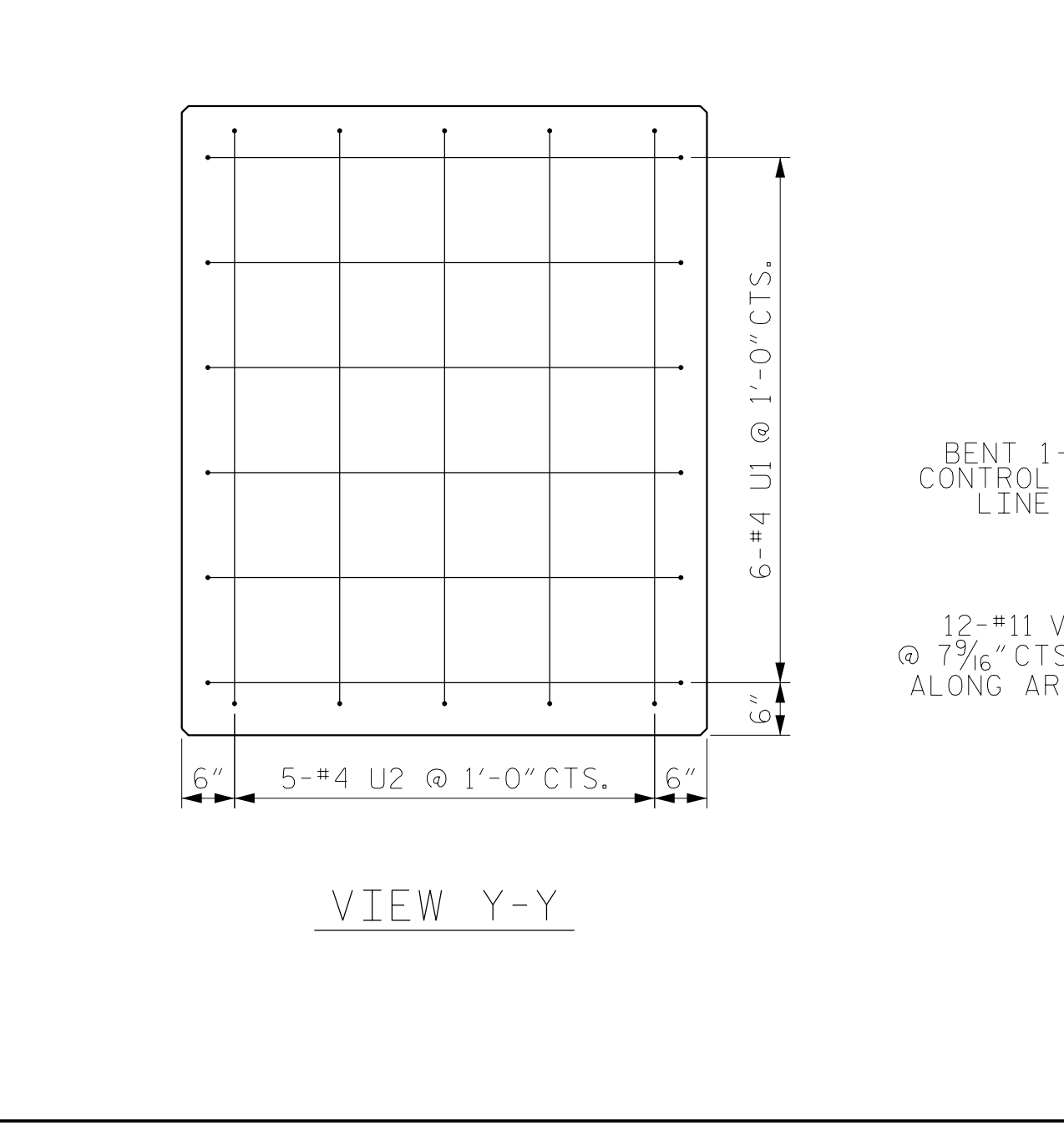
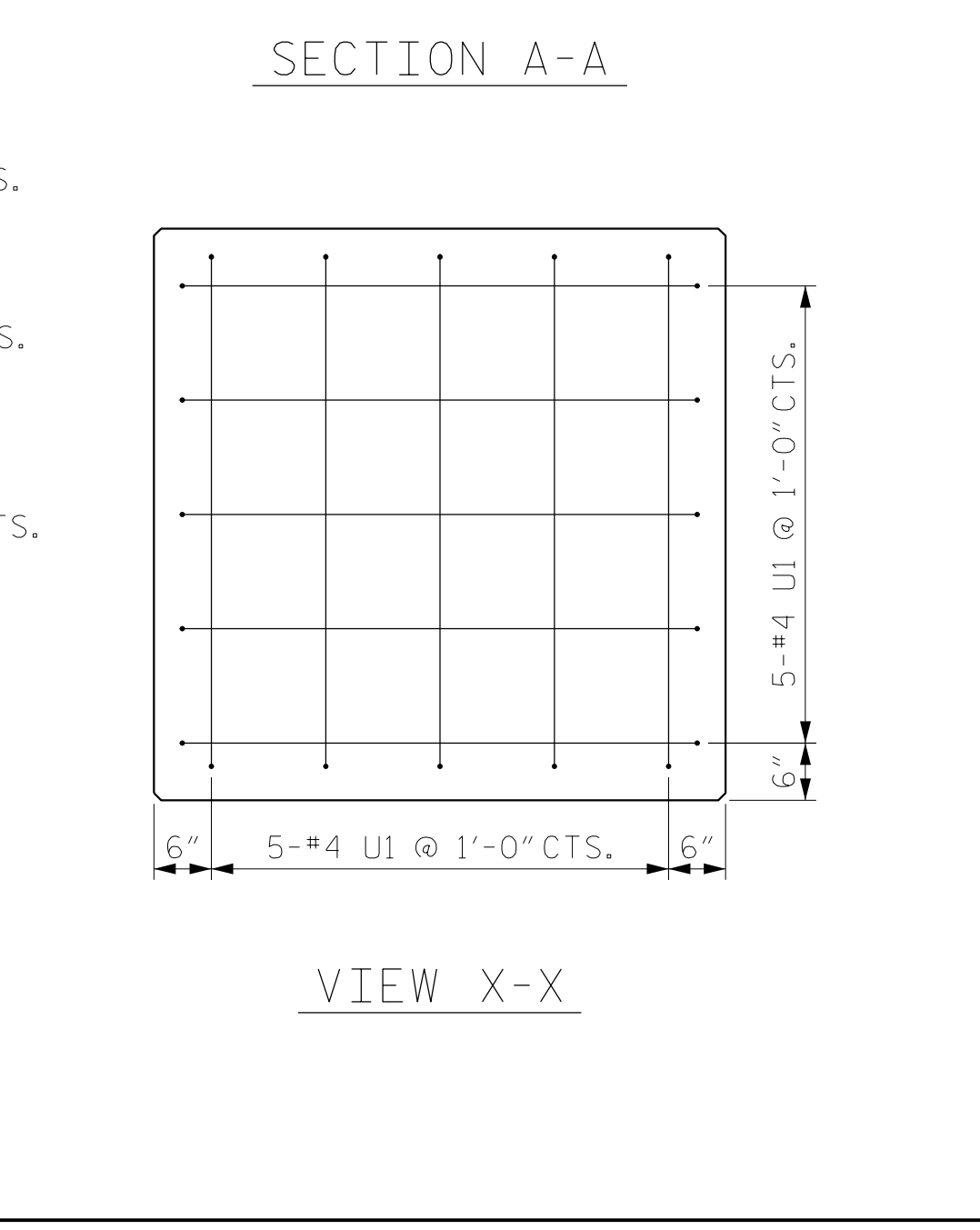
BILL OF MATERIAL FOR BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11	1	62'-8"	2664
B2	8	#11	2	37'-7"	1597
B3	8	#11	2	38'-11"	1654
B4	10	#5	STR	59'-6"	621
B5	4	#4	STR	4'-8"	12
B6	8	#4	STR	10'-7"	57
B7	8	#4	STR	5'-6"	29
B8	2	#5	STR	25'-8"	54
M1	48	#11	5	12'-8"	3230
S1	42	#5	3	13'-1"	573
S2	92	#5	3	13'-11"	1335
S3	134	#5	4	3'-10"	536
S4	44	#4	7	9'-8"	284
T1	72	#6	STR	8'-6"	919
T2	120	#8	1	10'-4"	3311
T3	8	#8	STR	5'-8"	121
T4	8	#8	2	5'-0"	107
T5	8	#8	STR	4'-6"	96
T6	8	#8	2	4'-5"	94
U1	90	#4	6	7'-6"	451
U2	5	#4	6	8'-6"	28
V1	48	#11	STR	26'-3"	6694
REINFORCING STEEL					24467 LBS.



CLASS A CONCRETE BREAKDOWN (FOR BENT 1)					
POUR #1 (FOOTINGS)	48.0	C.Y.			
POUR #2 (COLUMNS)	23.1	C.Y.			
POUR #3 (CAP)	60.2	C.Y.			
TOTAL CLASS A CONCRETE	131.3	C.Y.			
HP 14X73 STEEL PILES	600	LIN. FT.			
PILE DRIVING EQUIPMENT SETUP	EA. 20				
STEEL PILE POINTS	NO. 20				
FOUNDATION EXCAVATION	LUMP SUM				
FOR BENT					

END VIEW

POUR #3 VARIES
 4'-3" MIN.
 1'-6" MIN.
 3" SP-1 INTO CAP
 CONST. JT.
 2" CL. TO SP-1
 12-#11 V1
 SP-1
 3'-0" Ø COLUMN
 PERMITTED CONST. JT.
 12-#11 M1
 7'-11" MIN. SPLICE (TYP.)
 3" CONST. JT.
 3" CL. (TYP.)
 6-#4 S4 TIES @ 3" CTS.
 3" HIGH B.B. @ 4'-0" CTS.
 9-#6 T1 @ 1'-0" CTS. (T.O.F.)
 9-#8 T2 @ 1'-0" CTS. (B.O.F.) (T.L.)
 9-#8 "T" @ 1'-0" CTS. (B.O.F.) (B.L.)



PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 2 OF 2



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2			4		

SHEET NO. S03-32
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NOTES

STIRRUPS, U2 BARS AND B6 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

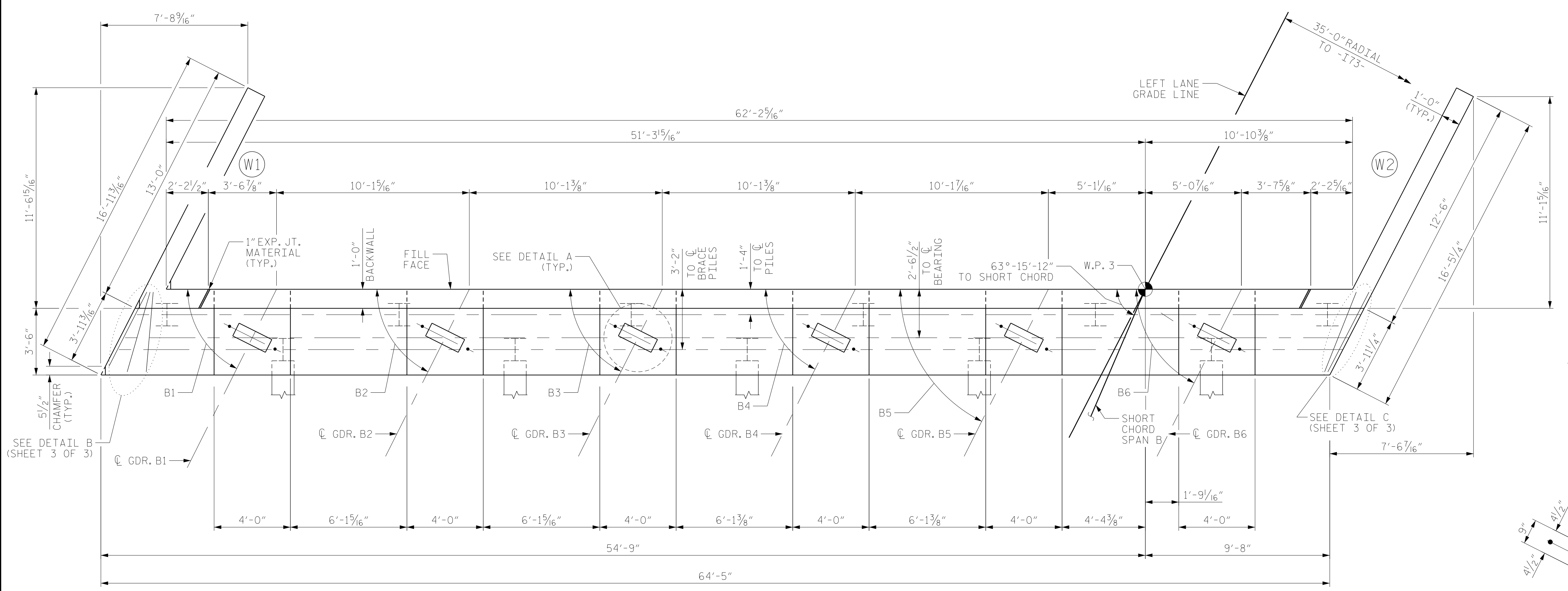
THE TOP SURFACE OF THE END BENT CAP EXCEPT BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT A RATE OF 2%.

MINIMUM SPLICE LENGTHS

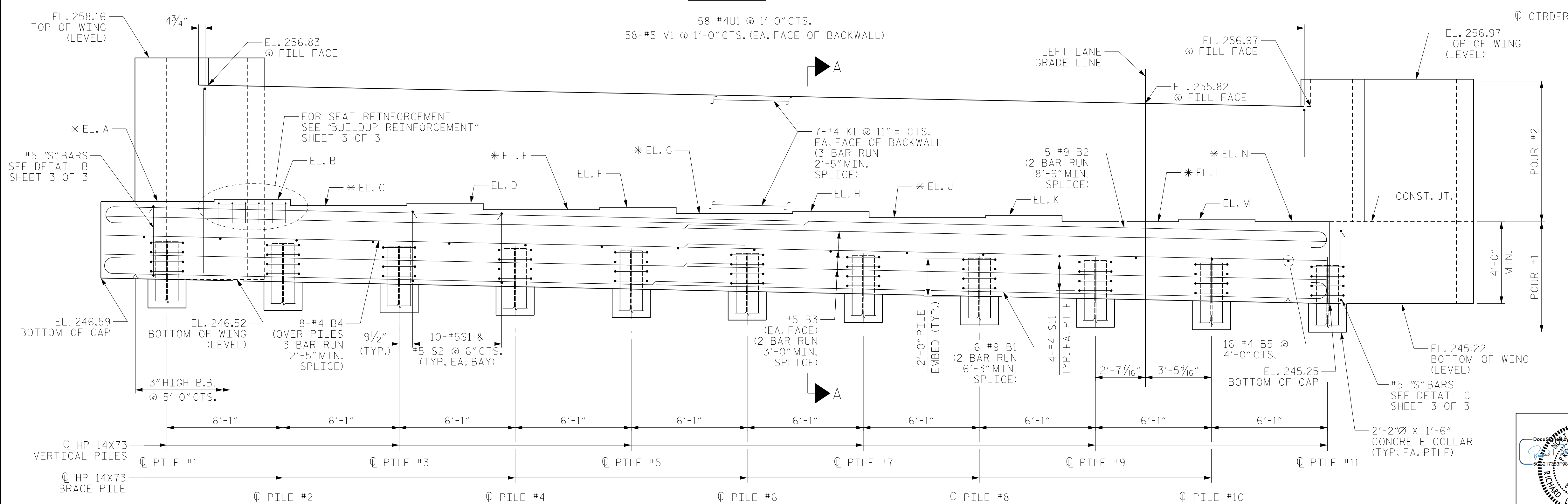
#9 B1	6'-3"
#9 B2	8'-9"
#5 B3	3'-0"
#4 B4	2'-5"
#4 K1	2'-5"

BEAM ANGLES

B1	63°-25'-45"
B2	63°-23'-30"
B3	63°-21'-15"
B4	63°-18'-59"
B5	63°-16'-44"
B6	63°-14'-27"



PLAN



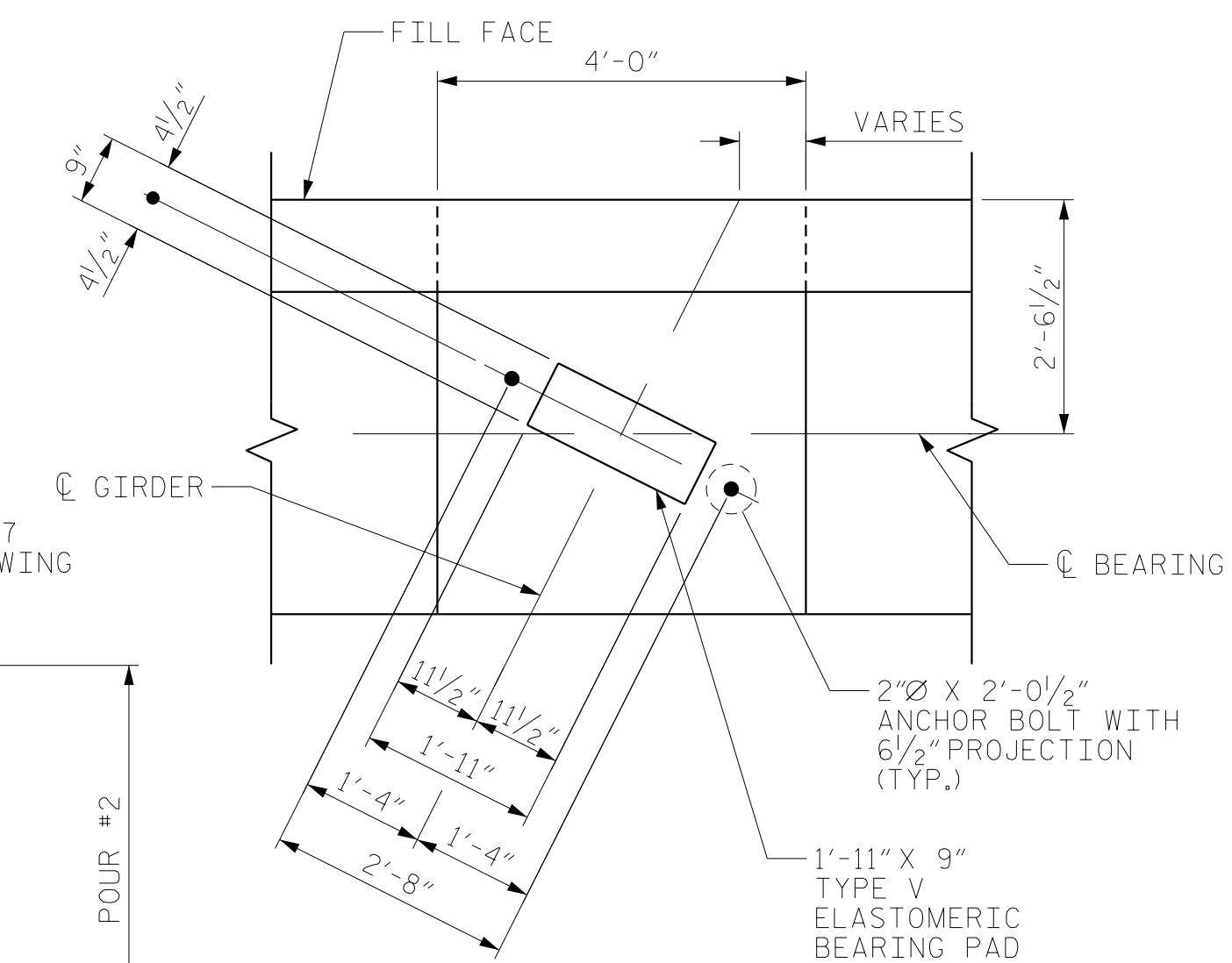
ELEVATION

ELEVATIONS

A	B	C	D	E	F	G	H	J	K	L	M	N
250.59	250.72	250.38	250.51	250.18	250.30	249.97	250.09	249.76	249.88	249.55	249.67	249.55

PILE TIP ELEVATIONS

PILE #1	PILE #2	PILE #3	PILE #4	PILE #5	PILE #6	PILE #7	PILE #8	PILE #9	PILE #10	PILE #11
248.52	248.39	248.27	248.14	248.01	247.89	247.76	247.63	247.51	247.38	247.25



DETAIL A

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 1 OF 3

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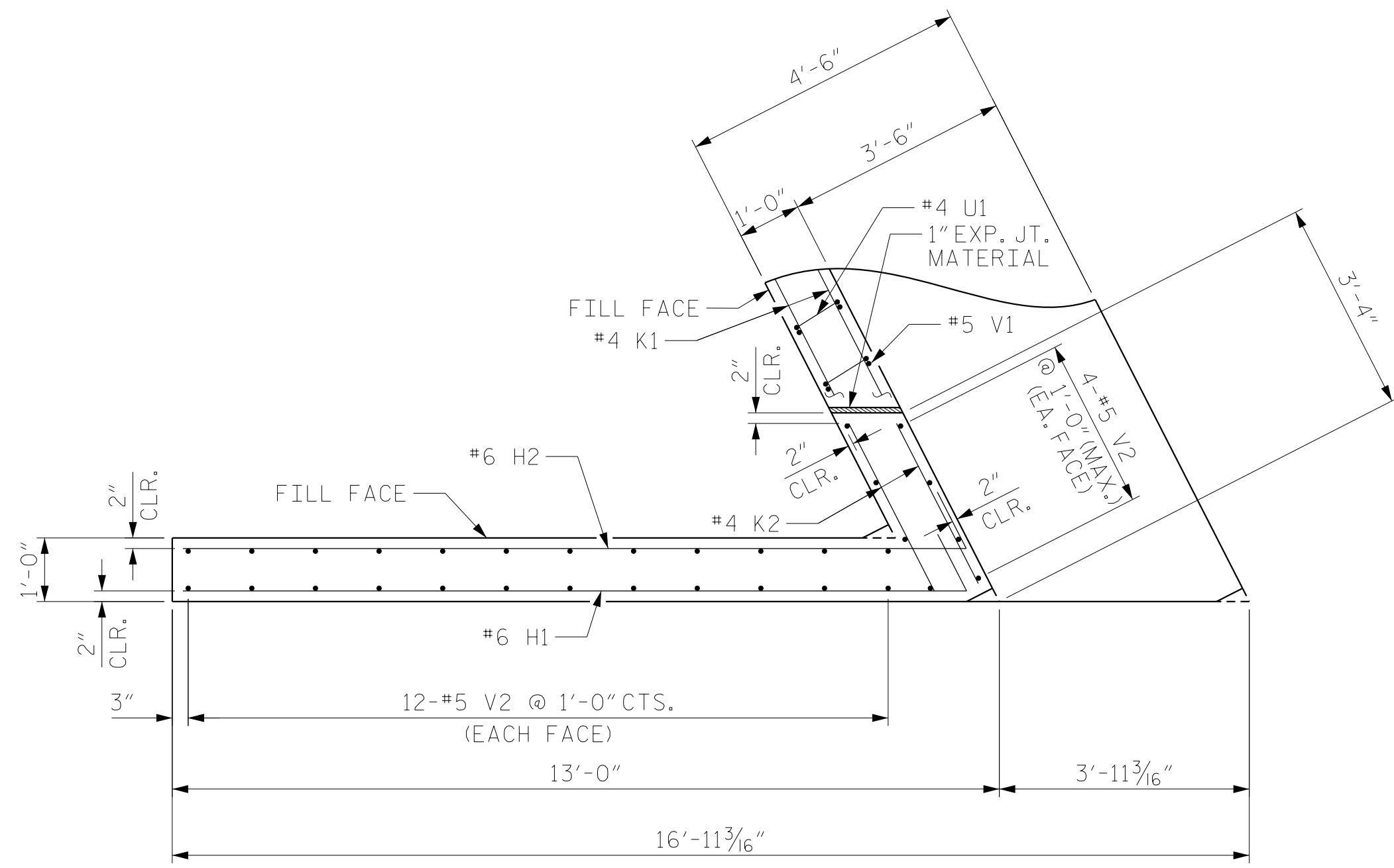
SUBSTRUCTURE
 END BENT #2
 LEFT LANE

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

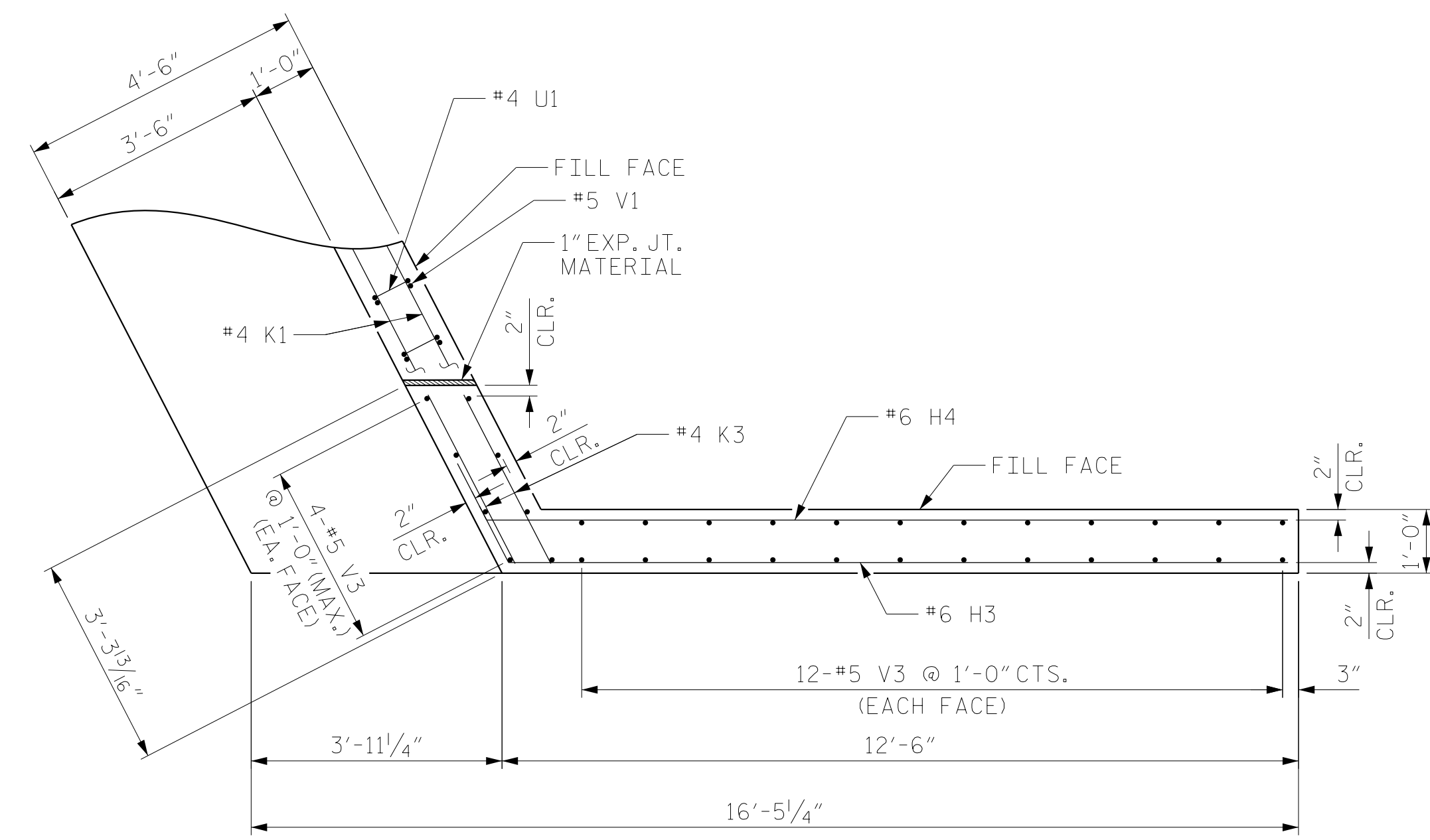
SHEET NO. S03-33
 TOTAL SHEETS 39

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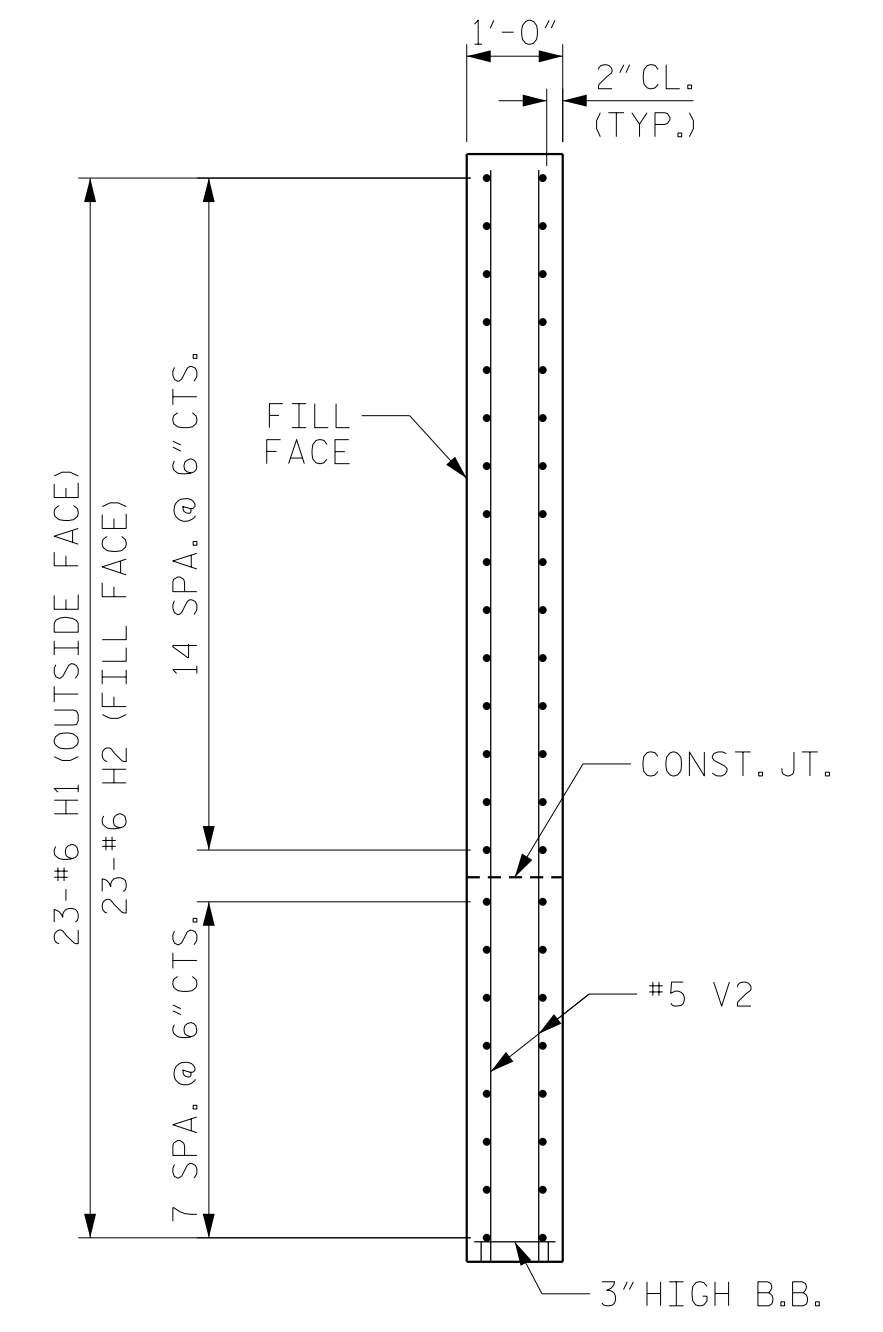
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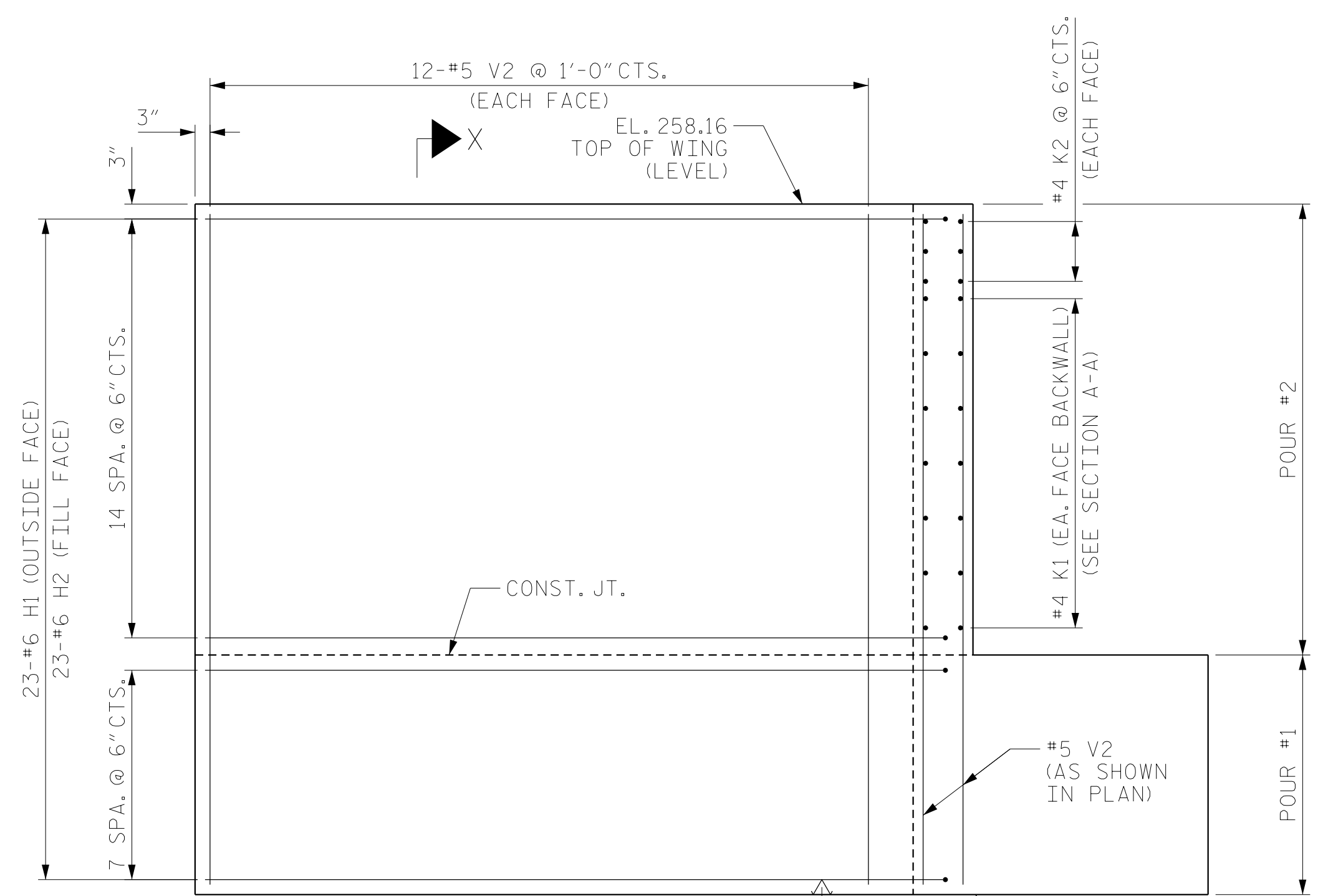
PLAN W1



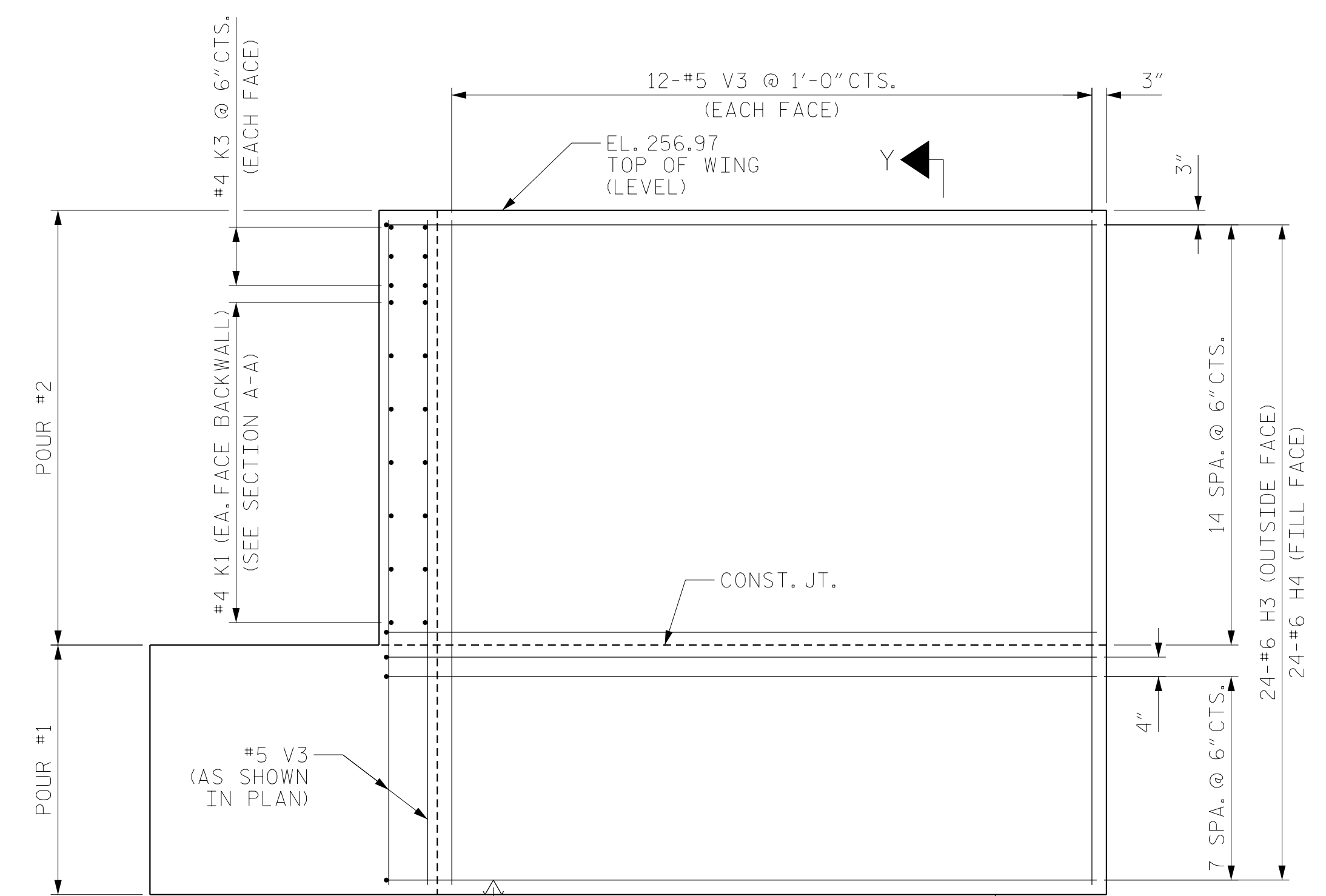
PLAN W2



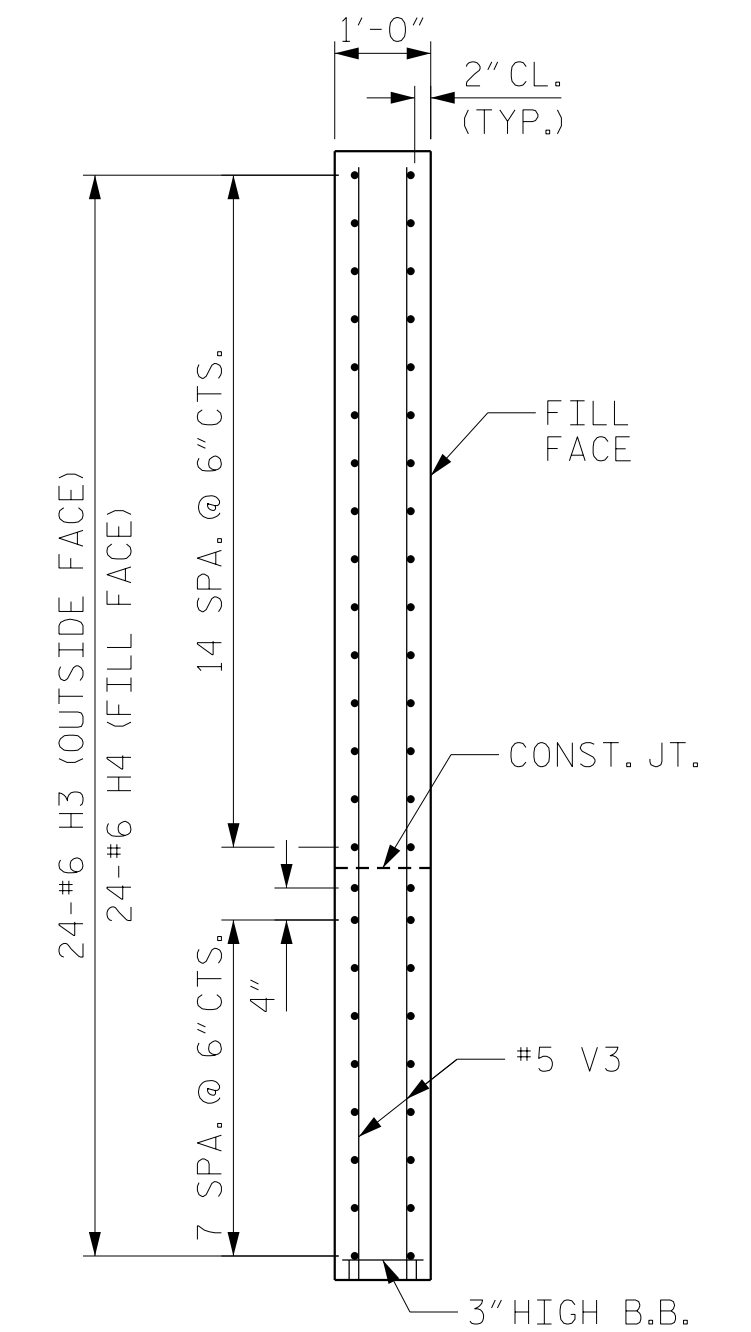
SECTION X-X



ELEVATION W1



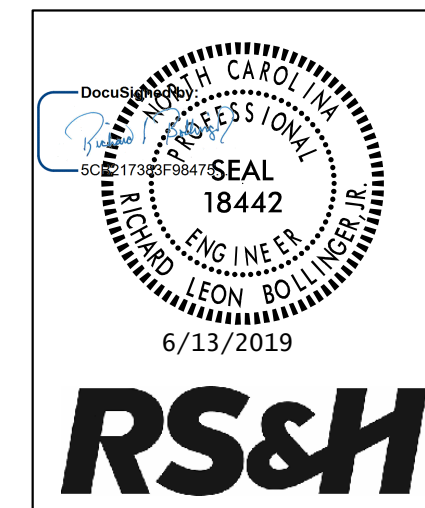
ELEVATION W2



SECTION Y-Y

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 2 OF 3



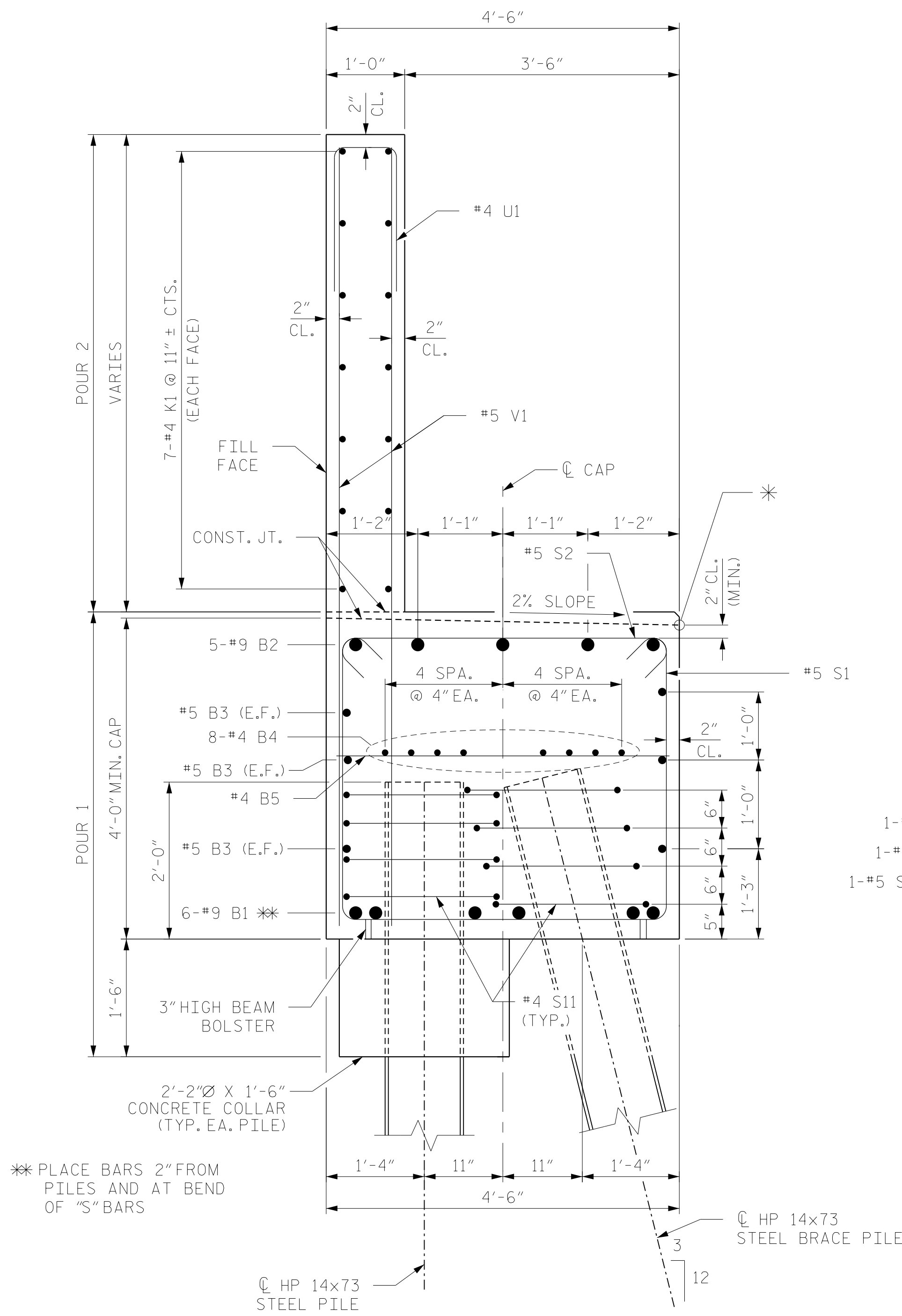
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 SUBSTRUCTURE
 END BENT #2
 LEFT LANE

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2			4			39	

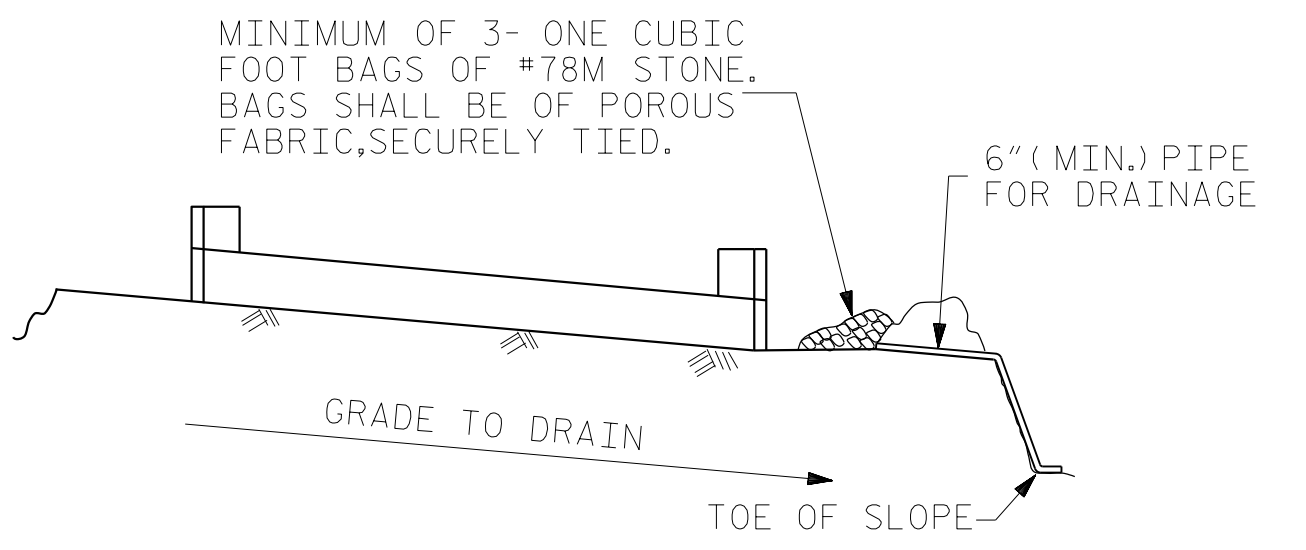
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SECTION A-A

*ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS ARE SHOWN AT THIS POINT
NOTE: CONCRETE COLLAR NOT SHOWN ON BRACE PILE FOR CLARITY.

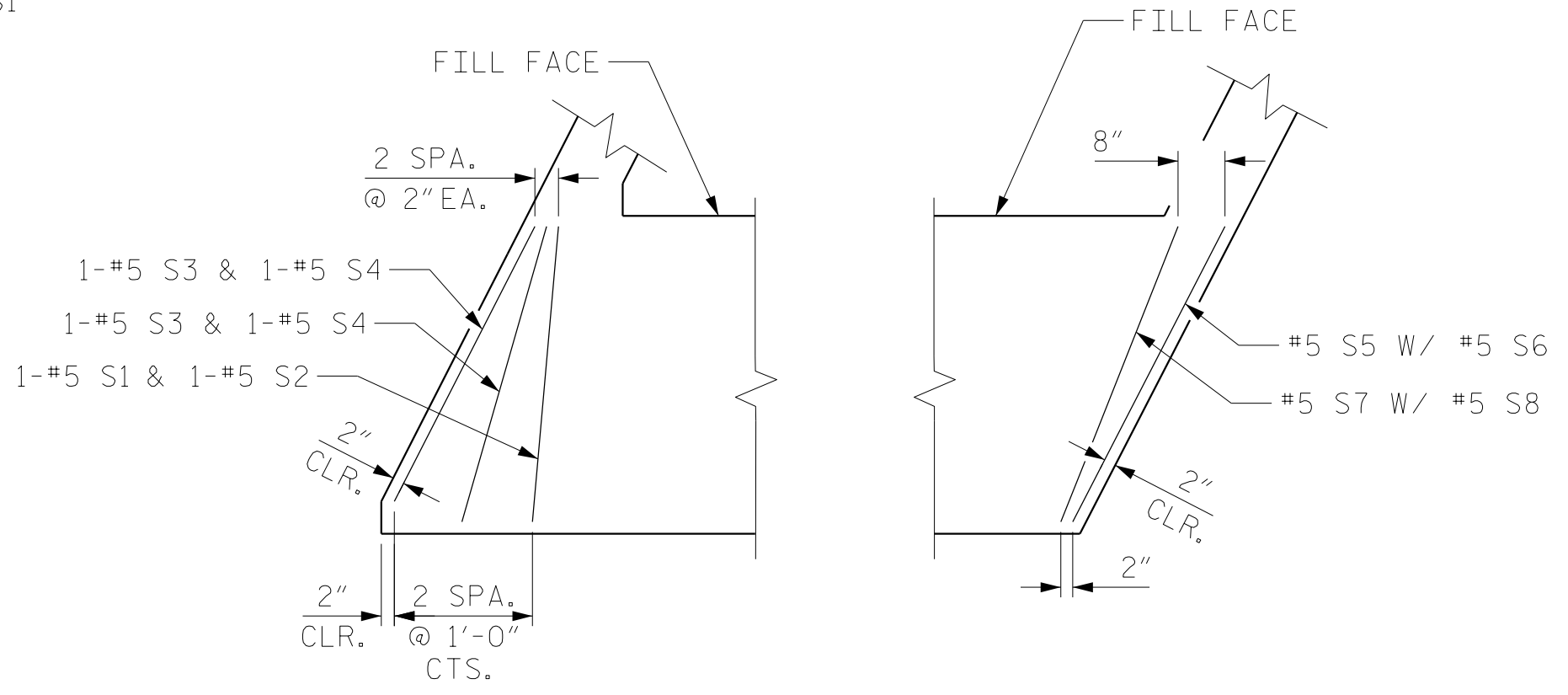


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

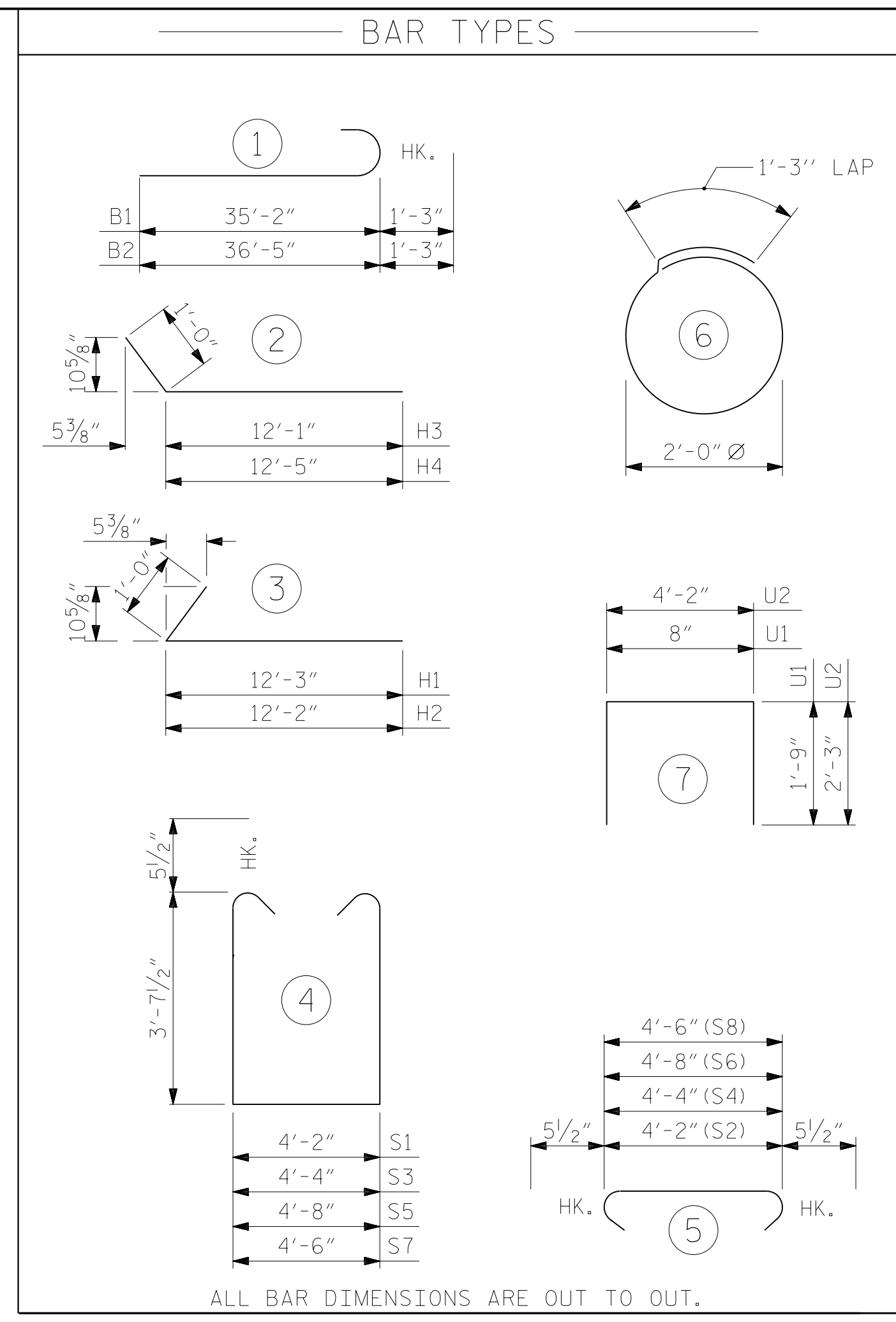
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



DETAIL B

DETAIL C

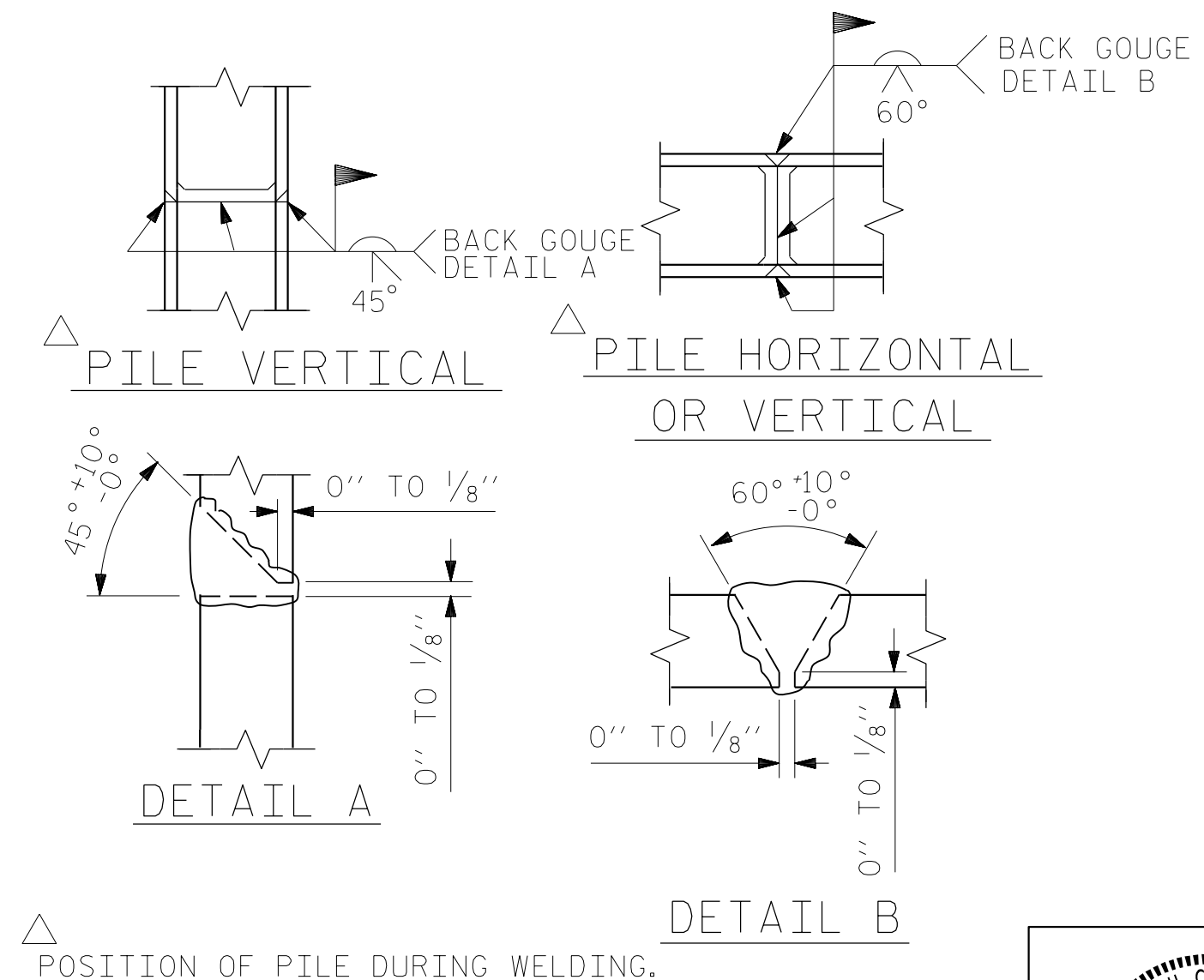


ALL BAR DIMENSIONS ARE OUT TO OUT.

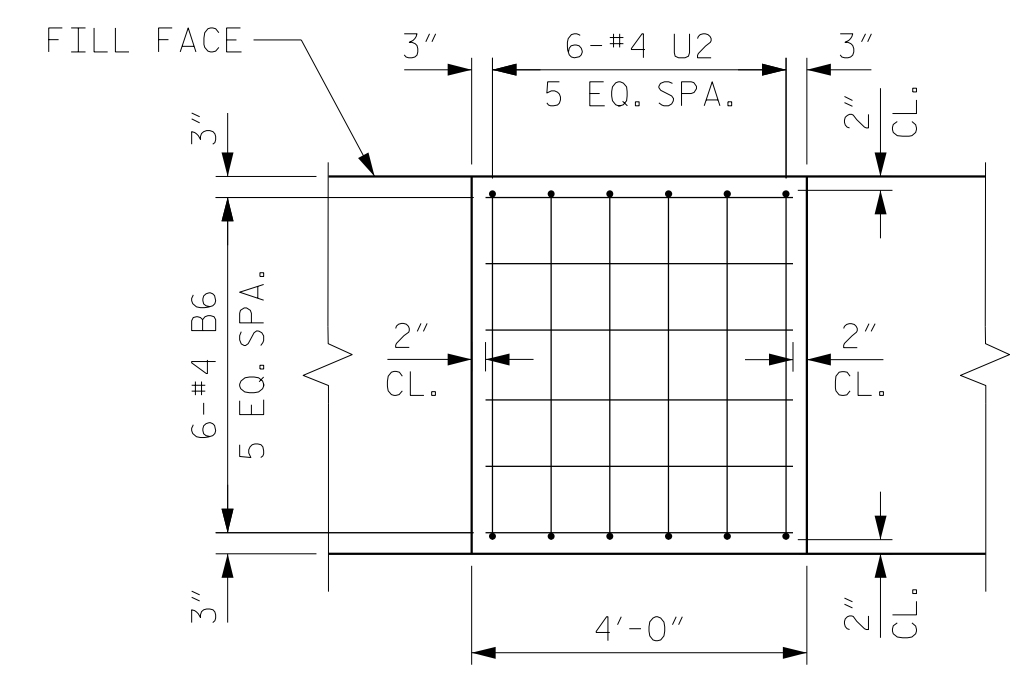
BILL OF MATERIAL

END BENT #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	36'-5"	1486
B2	10	#9	1	37'-8"	1281
B3	12	#5	STR	33'-7"	420
B4	24	#4	STR	23'-0"	369
B5	16	#4	STR	4'-2"	45
B6	36	#4	STR	3'-8"	88
H1	23	#6	3	13'-3"	458
H2	23	#6	3	13'-2"	455
H3	24	#6	2	13'-1"	472
H4	24	#6	2	13'-5"	484
K1	42	#4	STR	23'-0"	645
K2	6	#4	STR	2'-10"	11
K3	6	#4	STR	2'-11"	12
S1	100	#5	4	12'-4"	1286
S2	100	#5	5	5'-1"	530
S3	2	#5	4	12'-6"	26
S4	2	#5	5	5'-3"	11
S5	1	#5	4	12'-10"	13
S6	1	#5	5	5'-7"	6
S7	1	#5	4	12'-8"	13
S8	1	#5	5	5'-5"	6
S11	44	#5	6	7'-7"	348
U1	58	#4	7	4'-2"	161
U2	36	#4	7	8'-8"	208
V1	116	#5	STR	9'-10"	1190
V2	32	#5	STR	11'-2"	373
V3	32	#5	STR	11'-4"	378
REINFORCING STEEL					10,775 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					50.6 C.Y.
POUR #2 UPPER PART OF WINGS					21.8 C.Y.
TOTAL CLASS A CONCRETE					72.4 C.Y.
HP 14 X 73 STEEL PILES					
NO: 11					LIN. FT. = 495
PILE DRIVING EQUIPMENT SETUP					EA. 11
STEEL PILE POINTS					NO. 11



PILE SPLICE DETAILS



BRIDGE SEAT BUILDUP REINFORCEMENT

BACKWALL NOT SHOWN FOR CLARITY

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RICHMOND COUNTY
STATION: 101+31.22 -I73-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT #2
LEFT LANE

REVISIONS						SHEET NO.
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2			4			39

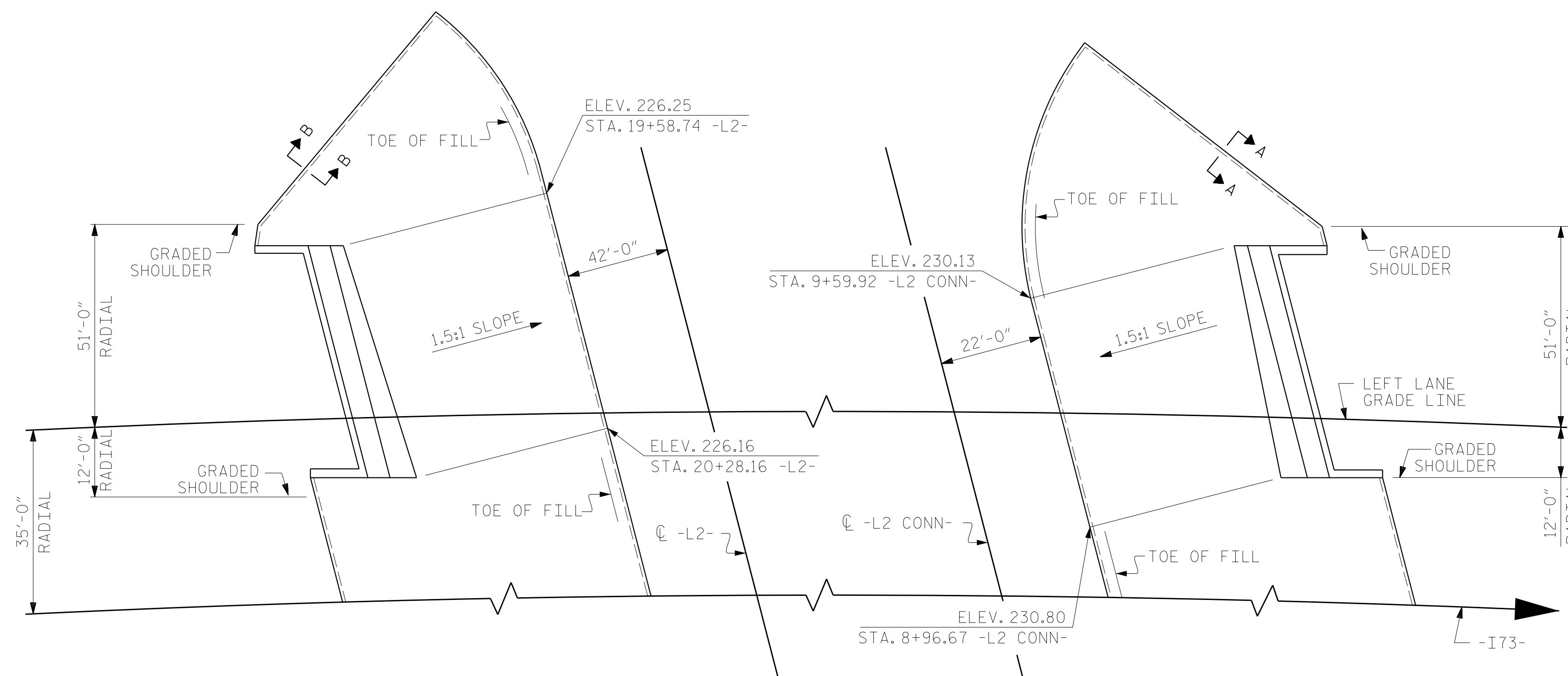
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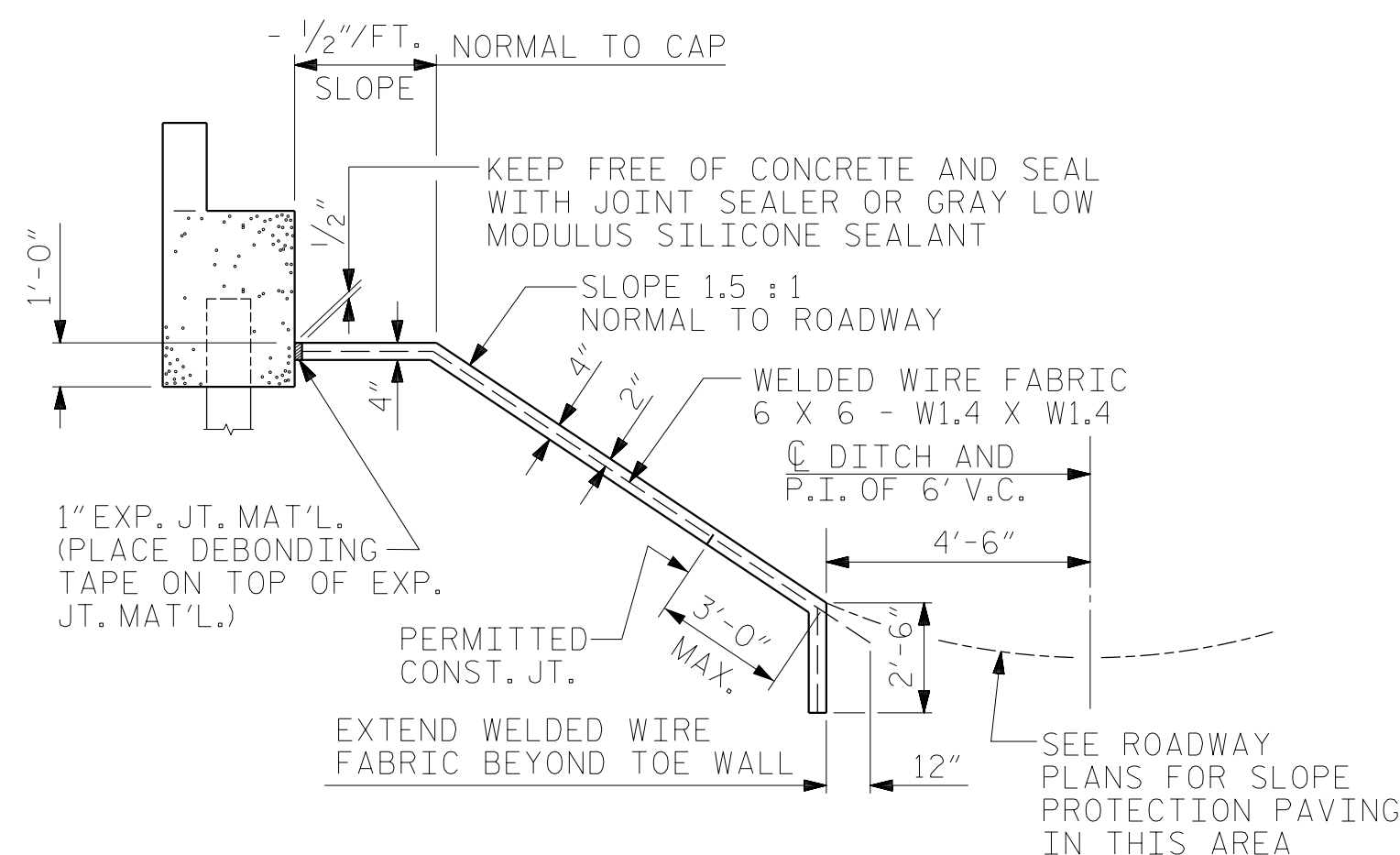
NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS, FOR BERM WIDTH, SEE GENERAL DRAWING.

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.



PLAN



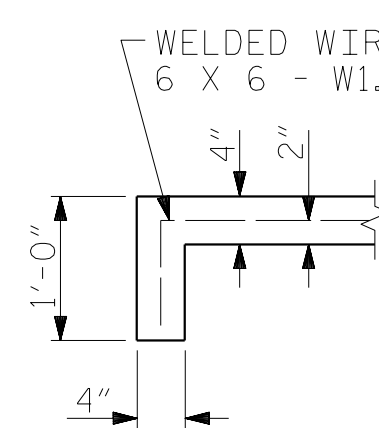
SECTION ALONG @ ROADWAY WHEN FILL CATCHES IN DITCH

BRIDGE @ STA. 101+31.22 -I73-	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	552	993
END BENT 2	477	859

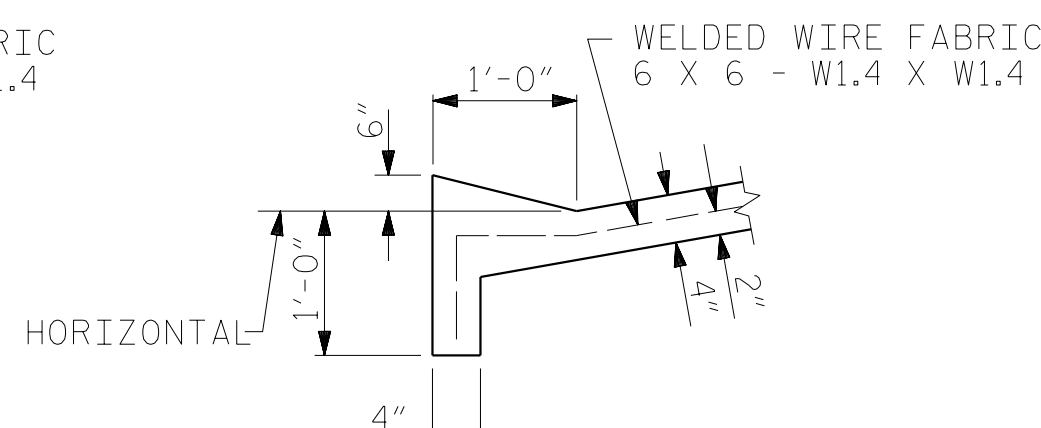
* QUANTITY SHOWN IS BASED ON 5' POURS.

PROJECT NO. R-3421A
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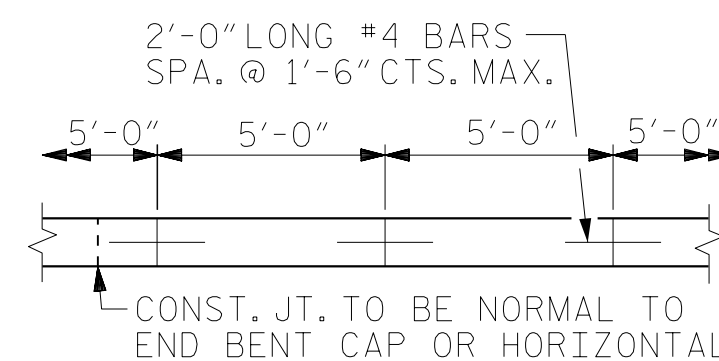
SHEET 1 OF 2



SECTION A-A

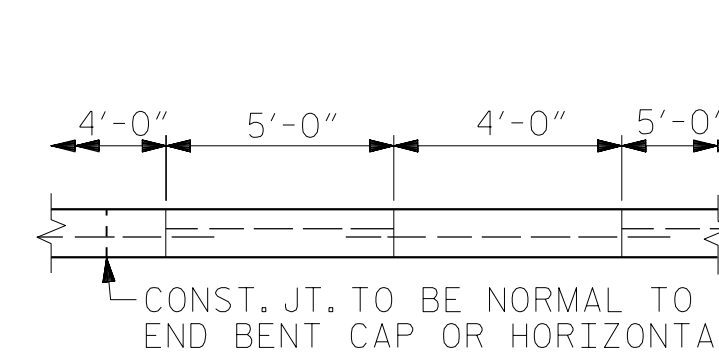


SECTION B-B



CONST. JT. TO BE NORMAL TO END BENT CAP OR HORIZONTAL

POURING DETAIL



CONST. JT. TO BE NORMAL TO END BENT CAP OR HORIZONTAL

OPTIONAL POURING DETAIL

STRIP WIDTHS MAY VARY IN CURVED PORTION.

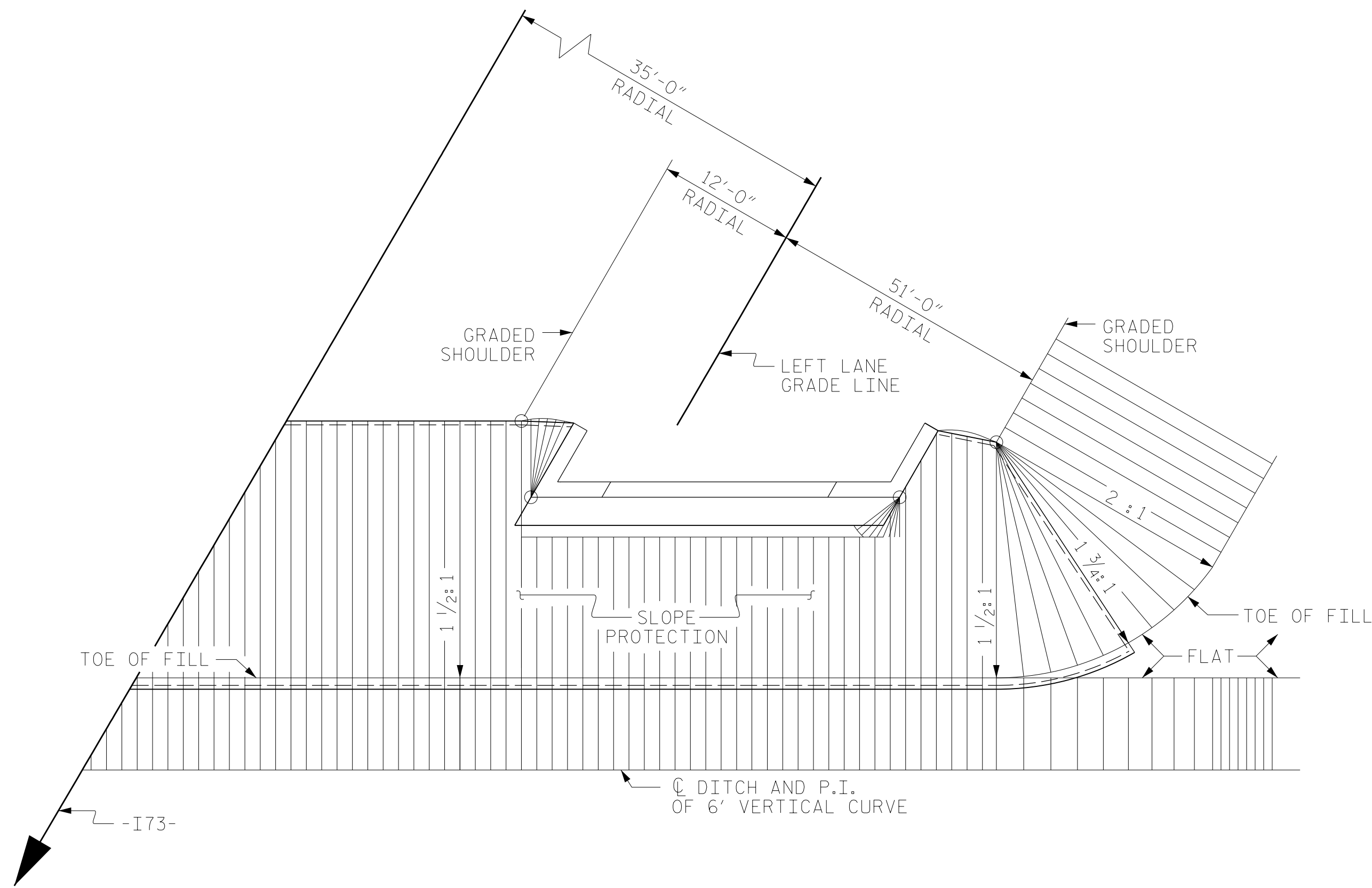
POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

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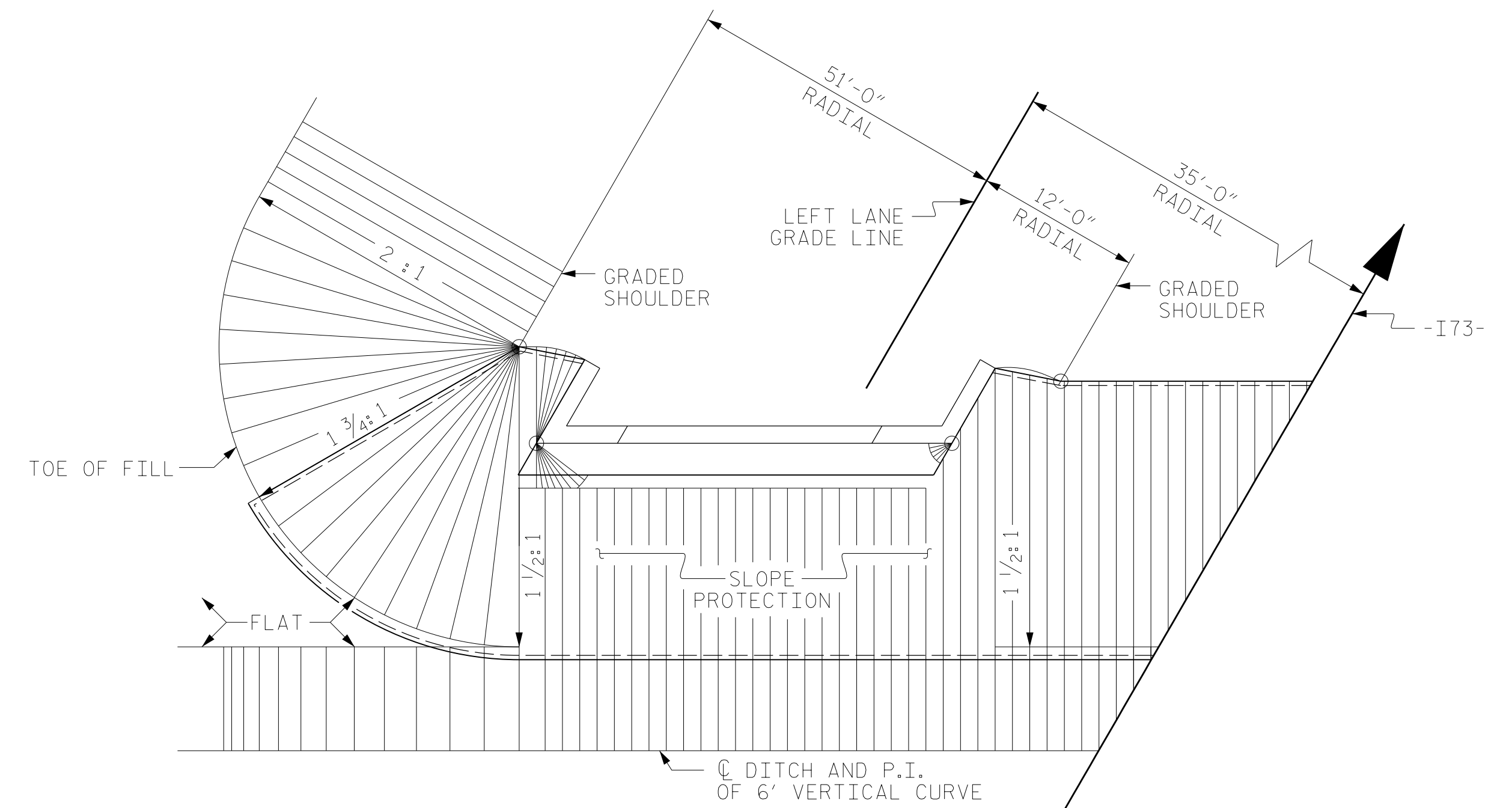
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SLOPE PROTECTION
 DETAILS
 LEFT LANE

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END BENT #1

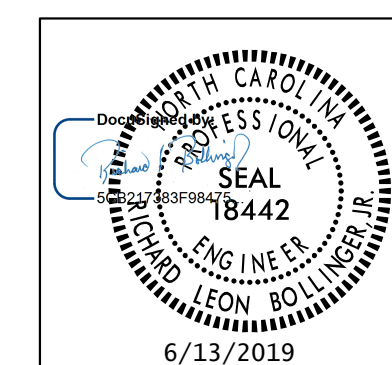


END BENT #2

PLAN - END BENT WITH SWEEPED BACK WINGS - SKEWED
(1 1/2:1 SLOPE)

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-

SHEET 2 OF 2



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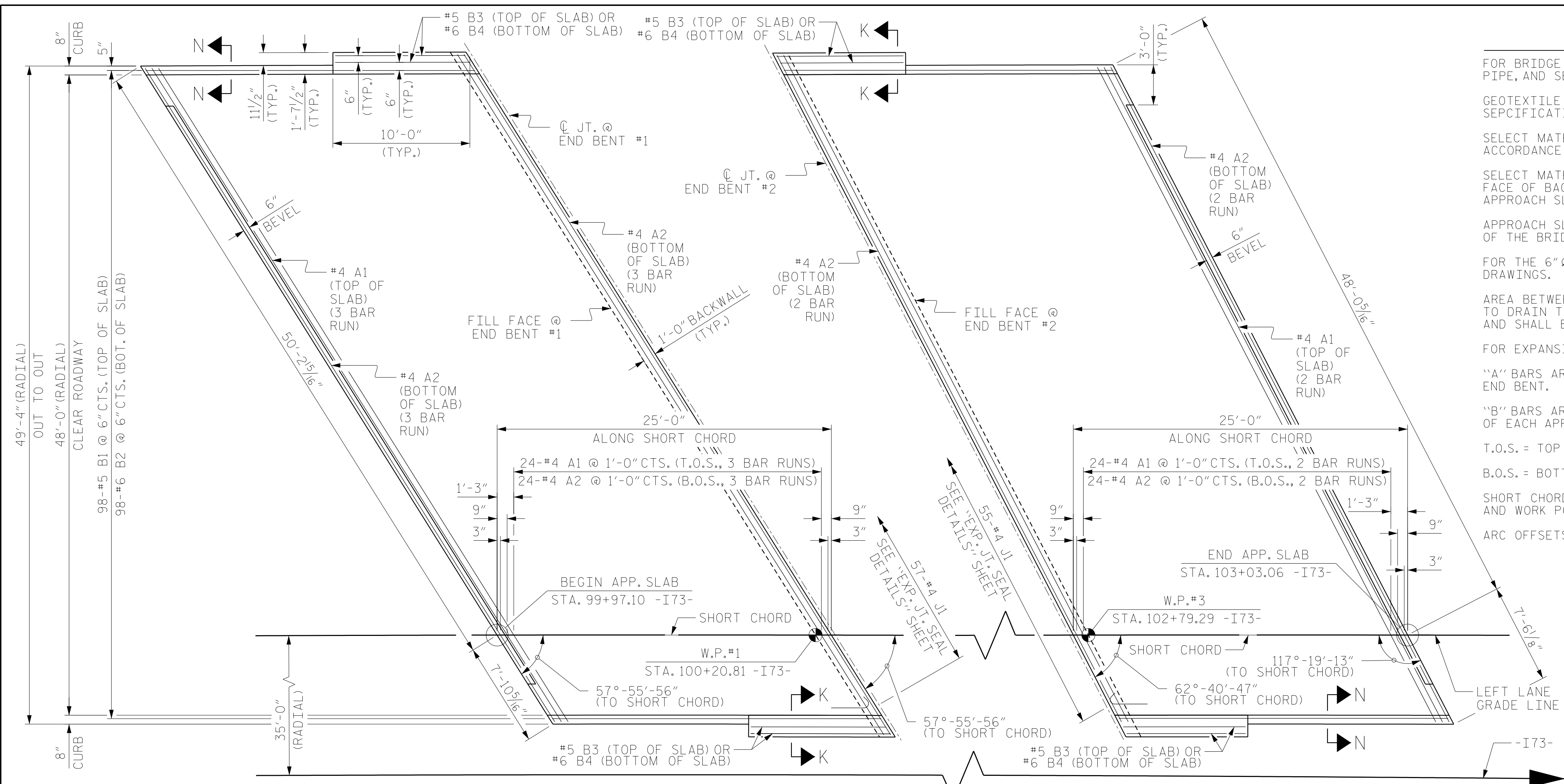
SLOPE PROTECTION
DETAILS

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-37
1			3			TOTAL SHEETS
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PLAN @ END BENT #1
 PLAN @ END BENT #2
 DIMENSIONS AND "B" BARS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS, UNLESS NOTED OTHERWISE

NOTES

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

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

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH THE 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.

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

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.

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

"A" BARS ARE PLACED PARALLEL TO THE RESPECTIVE SKEW OF EACH END BENT.

"B" BARS ARE PLACED PARALLEL TO THE RESPECTIVE SHORT CHORD OF EACH APPROACH SLAB.

T.O.S. = TOP OF SLAB
 B.O.S. = BOTTOM OF SLAB

SHORT CHORD IS A CHORD BETWEEN BEGIN (END) APPROACH SLAB AND WORK POINT.

ARC OFFSETS ARE NEGLIGIBLE AND THEREFORE NOT SHOWN.

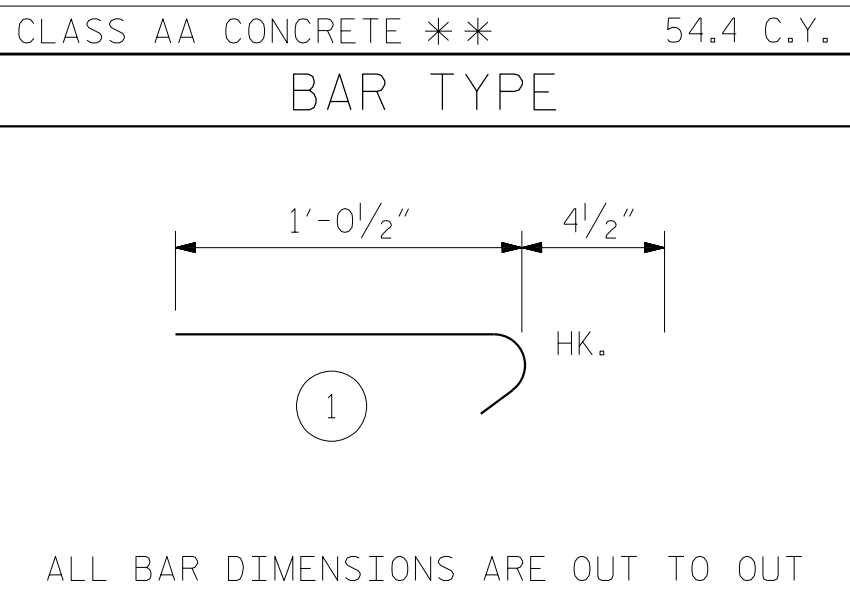
BILL OF MATERIAL

APPROACH SLAB AT EB #1

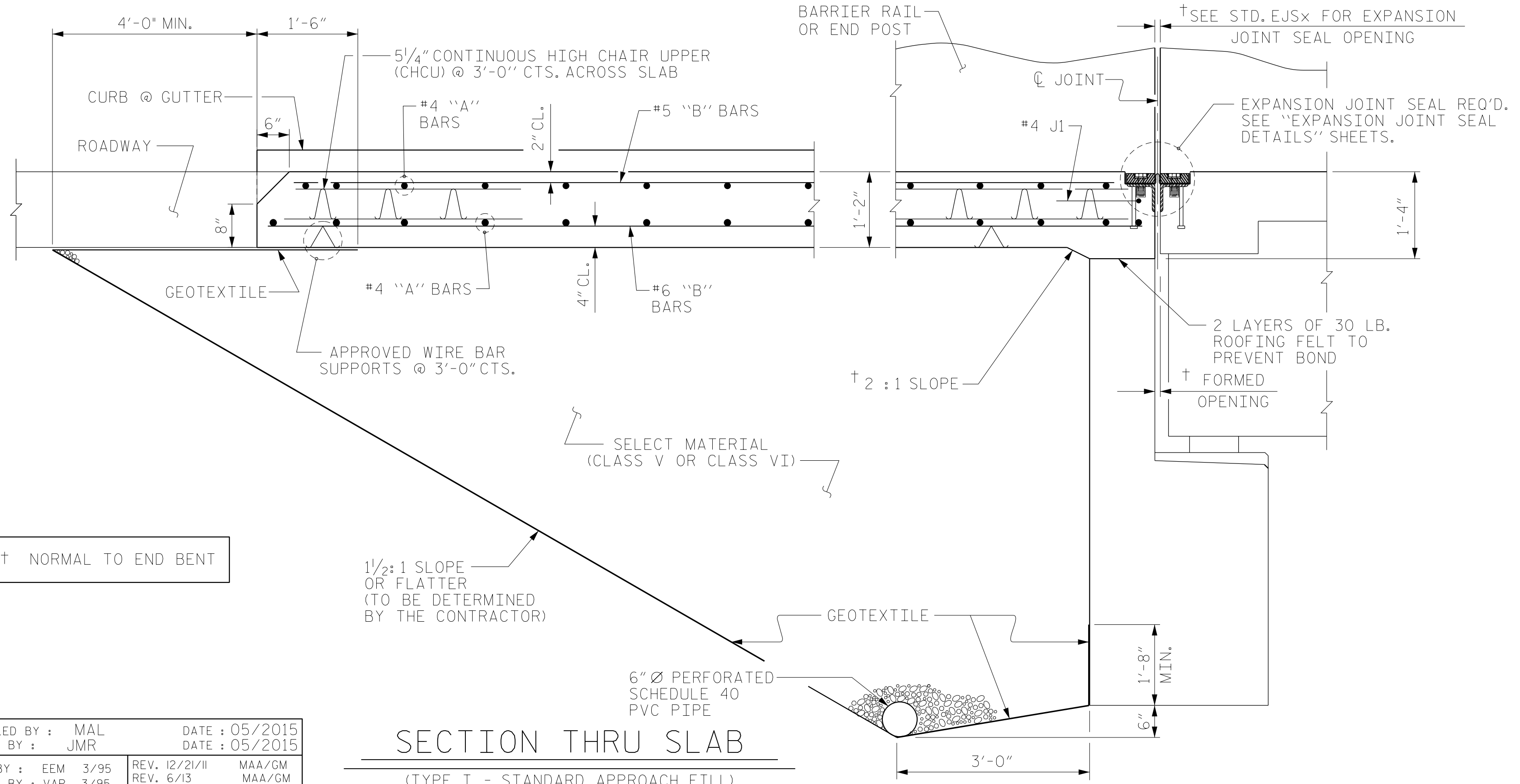
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	75	#4	STR	21'-5"	1073
A2	78	#4	STR	21'-3"	1107
*B1	98	#5	STR	24'-0"	2453
B2	98	#6	STR	24'-7"	3619
*B3	4	#5	STR	9'-9"	41
B4	4	#6	STR	9'-9"	59
*J1	57	#4	1	1'-5"	54
REINFORCING STEEL **					4785 LBS.
* EPOXY COATED REINFORCING STEEL **					3621 LBS.
CLASS AA CONCRETE **					54.5 C.Y.

APPROACH SLAB AT EB #2

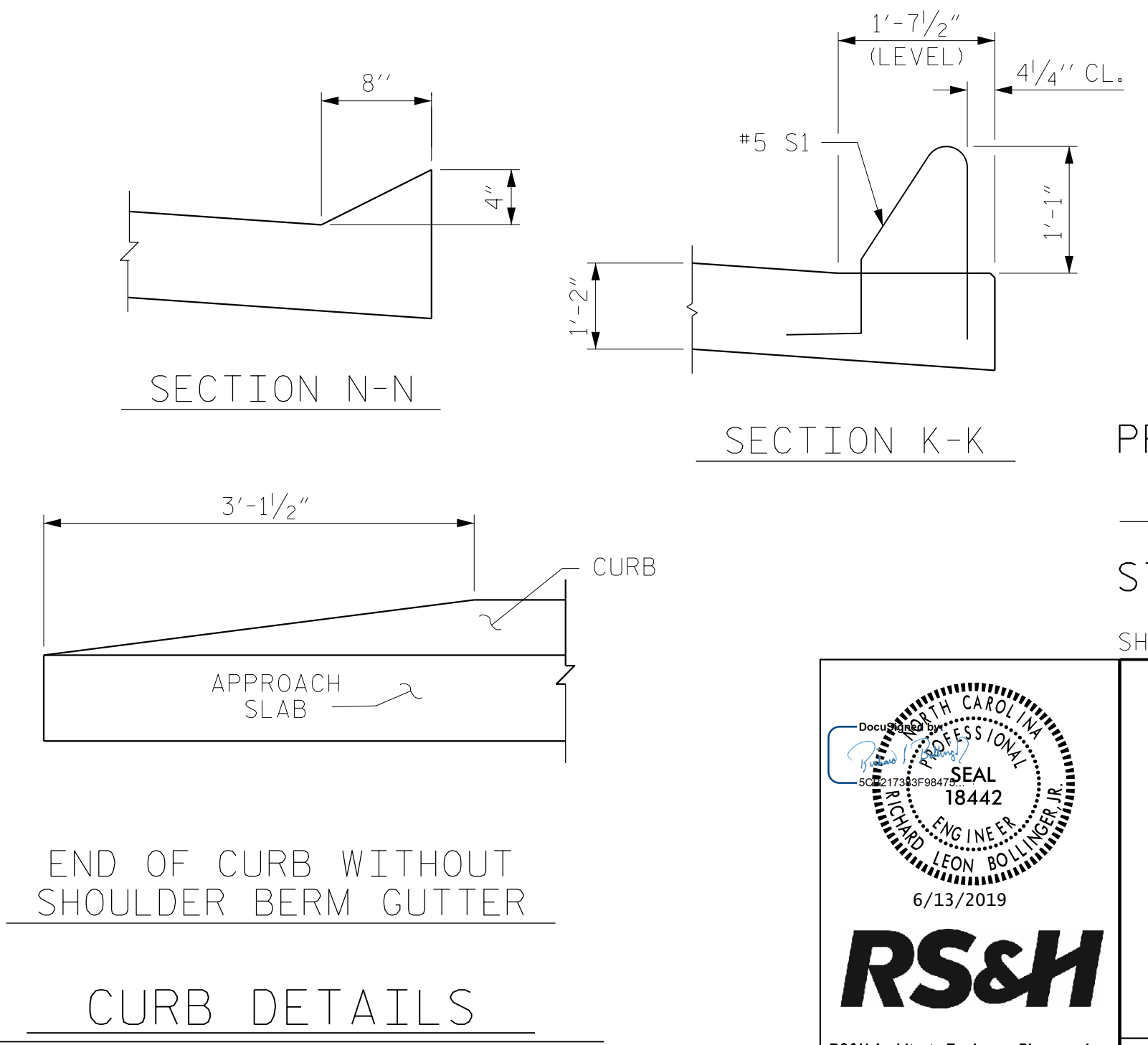
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	29'-8"	991
A2	52	#4	STR	29'-6"	1025
*B1	98	#5	STR	24'-0"	2453
B2	98	#6	STR	24'-7"	3619
*B3	4	#5	STR	8'-10"	37
B4	4	#6	STR	8'-10"	53
*J1	55	#4	1	1'-5"	52
REINFORCING STEEL **					4697 LBS.
* EPOXY COATED REINFORCING STEEL **					3533 LBS.
CLASS AA CONCRETE **					54.4 C.Y.



ALL BAR DIMENSIONS ARE OUT TO OUT
 ** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 2.



SECTION THRU SLAB
 (TYPE I - STANDARD APPROACH FILL)



CURB DETAILS

SPLICE LENGTHS

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

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 1 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH
 SLAB FOR FLEXIBLE
 PAVEMENT
 LEFT LANE

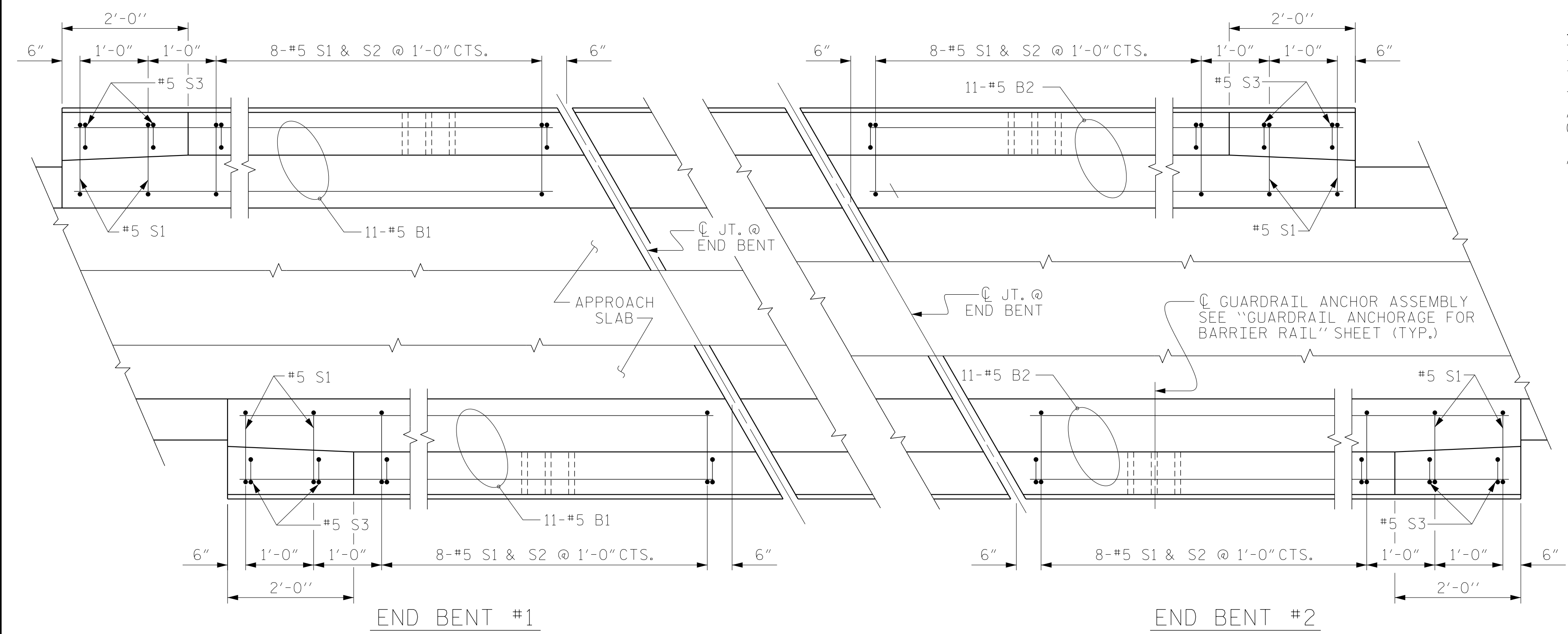
REVISIONS

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

SHEET NO. S03-38
 TOTAL SHEETS 39

ASSEMBLED BY : MAL DATE : 05/2015
 CHECKED BY : JMR DATE : 05/2015
 DRAWN BY : EEM 3/95 REV. 12/21/11 MAA/GM
 CHECKED BY : VAP 3/95 REV. 6/13 MAA/GM
 REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED



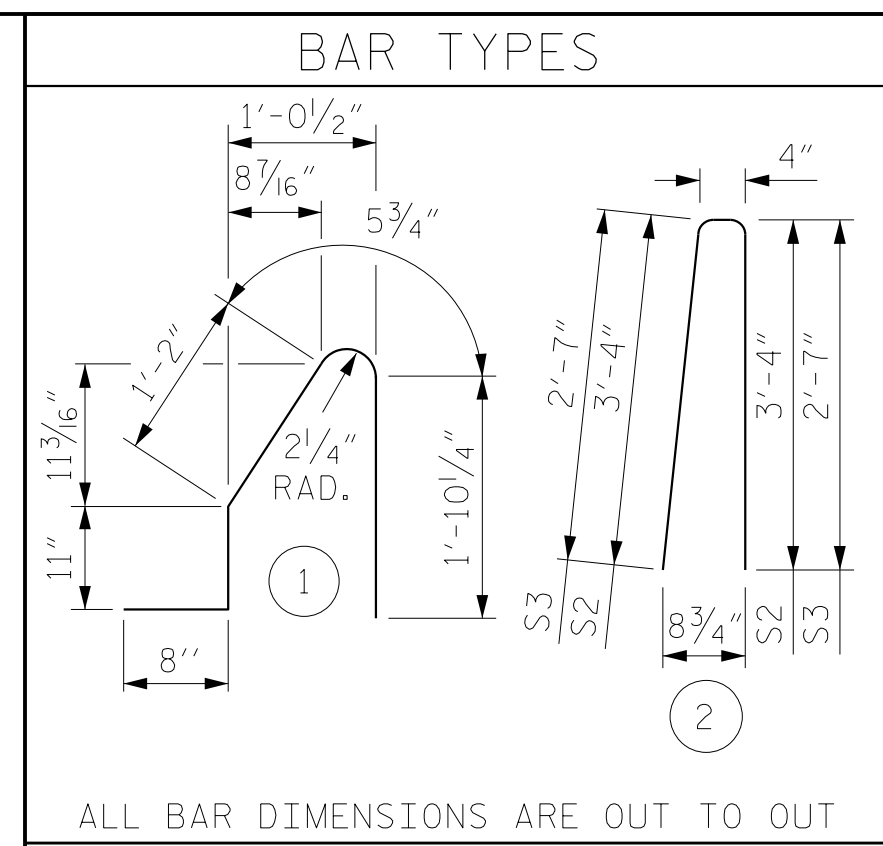
PLAN OF BARRIER RAIL

NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

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

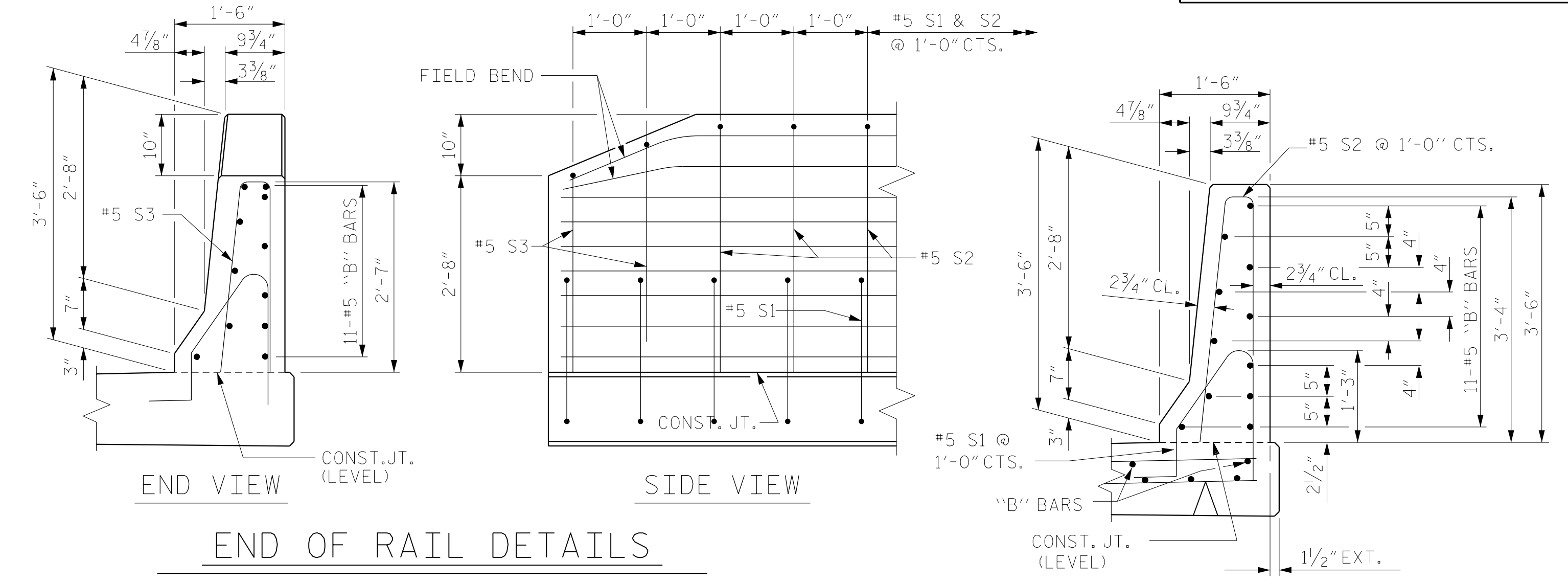
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.



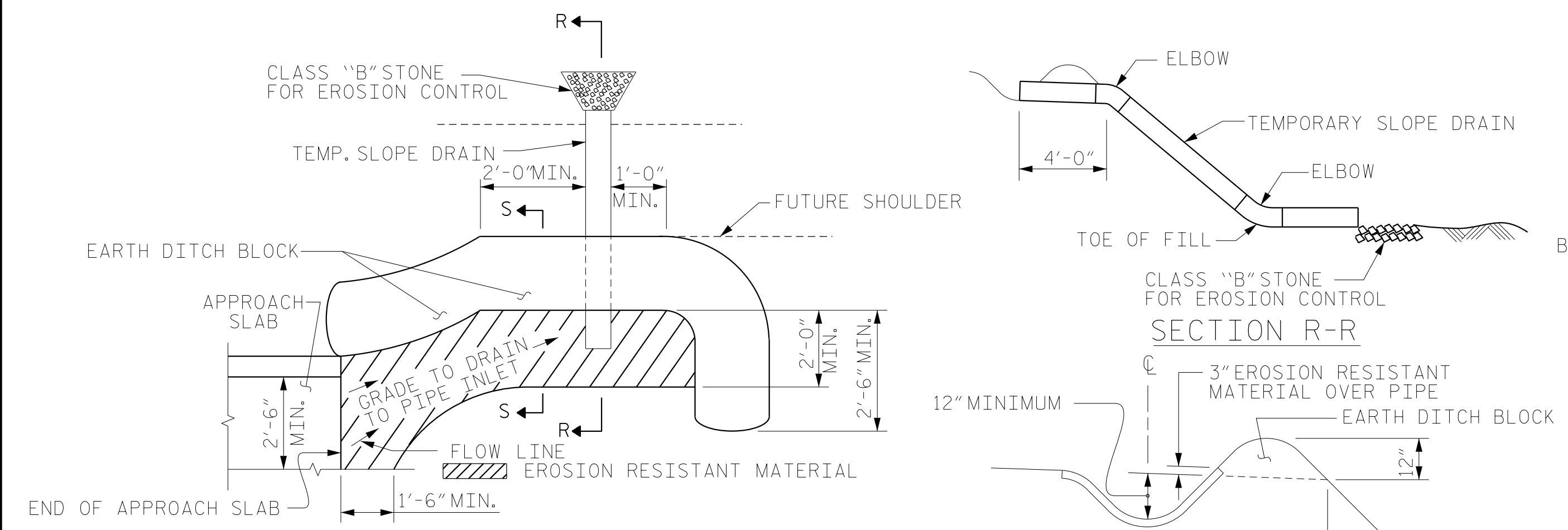
BILL OF MATERIAL

BARRIER RAIL ONLY

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	22	#5	STR	9'-9"	224
* B2	22	#5	STR	8'-10"	203
* S1	40	#5	1	5'-1"	212
* S2	32	#5	2	7'-0"	234
* S3	8	#5	2	5'-6"	46
* EPOXY COATED REINFORCING STEEL				LBS.	919
CLASS AA CONCRETE				C. Y.	5.6
CONCRETE BARRIER RAIL				LTN. FT.	42.0



END OF RAIL DETAILS



TEMPORARY BERM AND SLOPE DRAIN DETAILS

TEMPORARY DRAINAGE DETAIL

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.

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 2 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH
 SLAB DETAILS
 LEFT LANE

REVISIONS

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

SHEET NO. S03-39
 TOTAL SHEETS 39

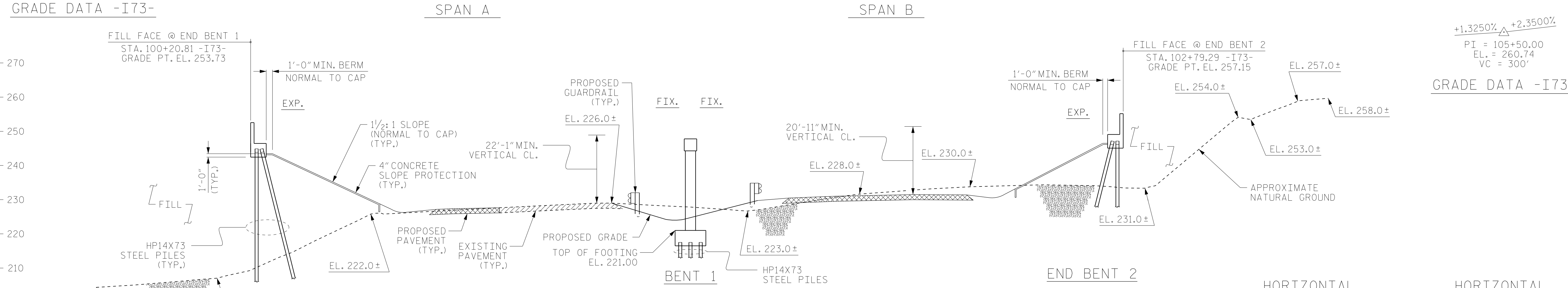
ASSEMBLED BY : MAL DATE : 05/2015
 CHECKED BY : JMR DATE : 05/2015
 DRAWN BY : FCJ 11/88
 CHECKED BY : ARB 11/88

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

100+00 100+50 101+00 101+50 102+00 102+50 103+00 103+50

GRADE DATA -I73-
PI = 95+50.00
EL. = 247.49
VC = 600'

GRADE DATA -I73-
PI = 105+50.00
EL. = 260.74
VC = 300'



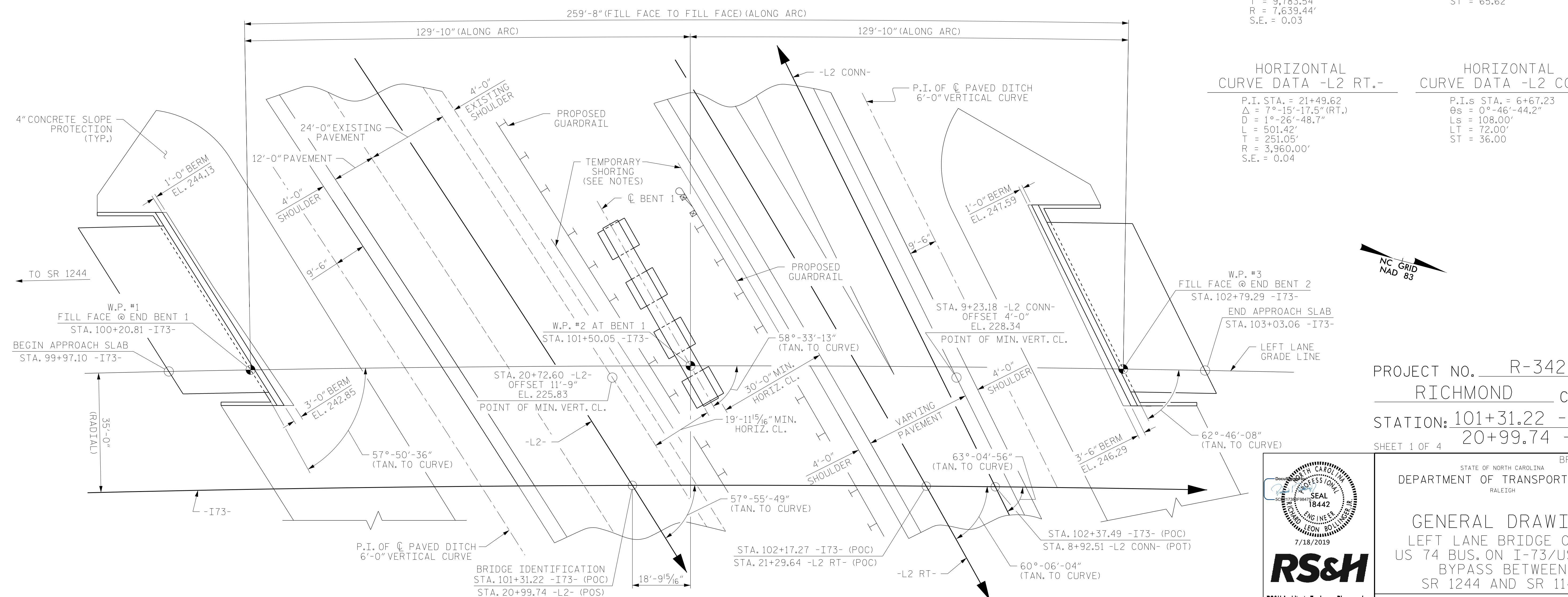
SECTION ALONG LEFT LANE GRADE LINE
(SECTIONS AT END BENTS AND BENT ARE TAKEN AT RIGHT ANGLES)

HORIZONTAL CURVE DATA -I73-
P.I. STA. = 180+84.12
Δ = 104°-01'-52.6" (RT.)
D = 0°-45'-00.0"
L = 13,870.84'
T = 9,783.54'
R = 7,639.44'
S.E. = 0.03

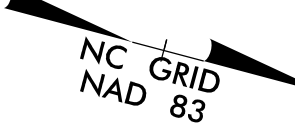
HORIZONTAL CURVE DATA -L2-
P.I.S STA. = 20+64.23
θs = 1°-41'-44.2"
Ls = 196.85'
LT = 131.24'
ST = 65.62

HORIZONTAL CURVE DATA -L2 RT.-
P.I. STA. = 21+49.62
Δ = 7°-15'-17.5" (RT.)
D = 1°-26'-48.7"
L = 501.42'
T = 251.05'
R = 3,960.00'
S.E. = 0.04

HORIZONTAL CURVE DATA -L2 CONN-
P.I.S STA. = 6+67.23
θs = 0°-46'-44.2"
Ls = 108.00'
LT = 72.00'
ST = 36.00



PLAN ALONG -I73-
(FOR CLARITY, PILES ARE NOT SHOWN IN PLAN VIEW)



DRAWN BY : MAL DATE : 01/2015
CHECKED BY : JMR DATE : 06/2015
DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

7/17/2019
X:\P1030180000 R-3421A Richmond\Structures\Working DGN\R-3421A.SD.GD.dgn
CuonyN

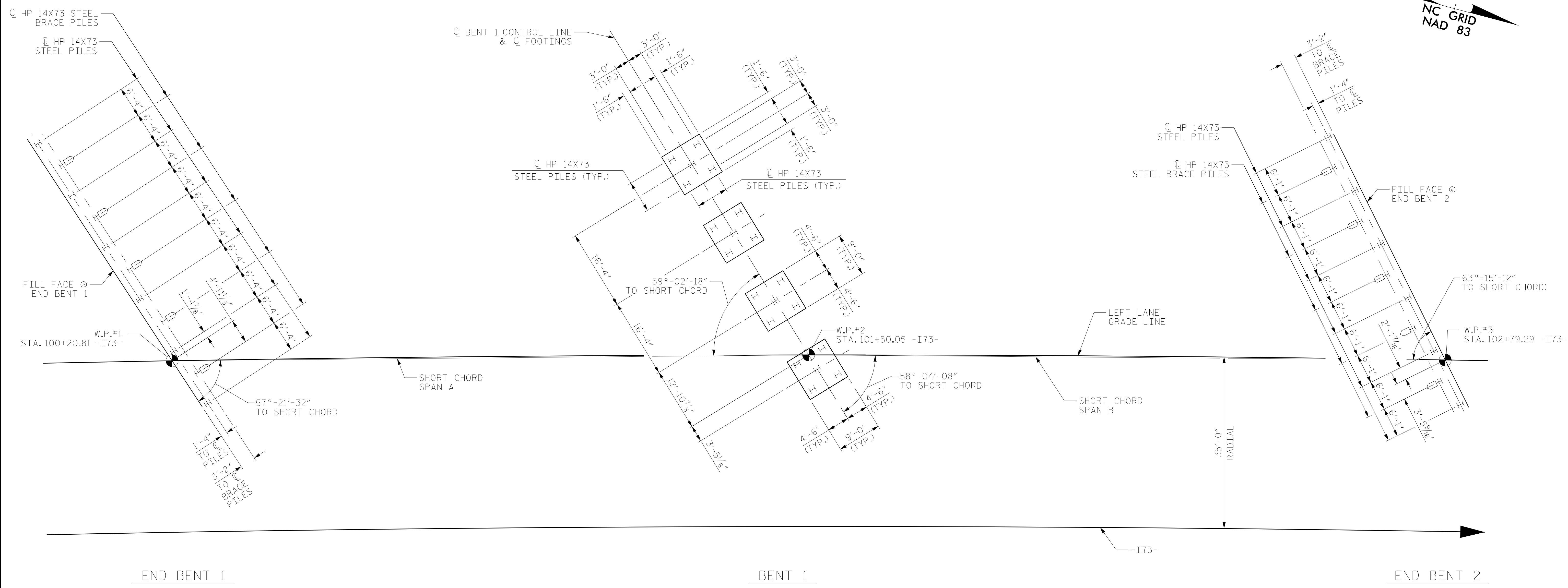
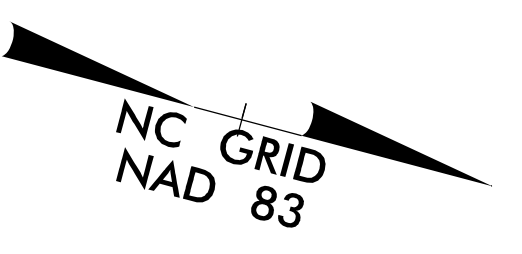
Professional Engineer Seal for Leon Boullenger, No. 18442, State of North Carolina. Includes RS&H logo and contact information: 8521 Six Forks Road, Suite 400, Raleigh, NC 27615, 919-826-4100 FAX 919-846-9080, www.rsandh.com, North Carolina License No. 50737-5403-C-28.

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-
20+99.74 -L2-
SHEET 1 OF 4

BRIDGE #240
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
GENERAL DRAWING
LEFT LANE BRIDGE OVER
US 74 BUS. ON I-73/US 220
BYPASS BETWEEN
SR 1244 AND SR 1140

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-1
1			3			TOTAL SHEETS
2			4			39

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



FOUNDATION LAYOUT PLAN

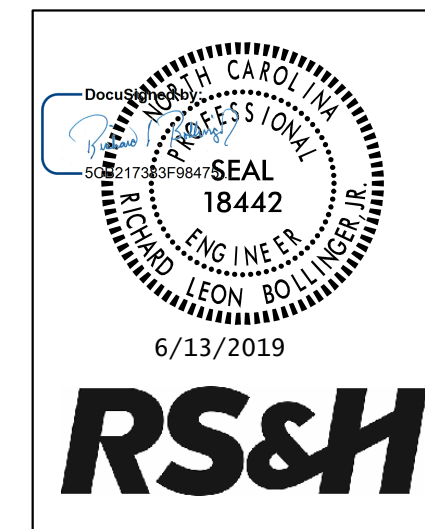
DIMENSIONS LOCATING PILES ARE SHOWN TO PILE CENTERLINE.
BRACE PILES AT END BENTS SHALL BE BATTERED AT 3:12.

NOTES

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT No.1 AND END BENT No.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 165 TONS PER PILE. PILES AT BENT No.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 150 TONS PER PILE.
- DRIVE PILES AT END BENT No.1 TO A REQUIRED DRIVING RESISTANCE OF 275 TONS PER PILE.
- DRIVE PILES AT END BENT No.2 TO A REQUIRED DRIVING RESISTANCE OF 275 TONS PER PILE.
- DRIVE PILES AT BENT No.1 TO A REQUIRED DRIVING RESISTANCE OF 250 TONS PER PILE.
- STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT No.1, BENT No.1, AND END BENT No.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- OBSERVE A 3 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT Nos.1 AND 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.
- TESTING PILES WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING, OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73

SHEET 2 OF 4



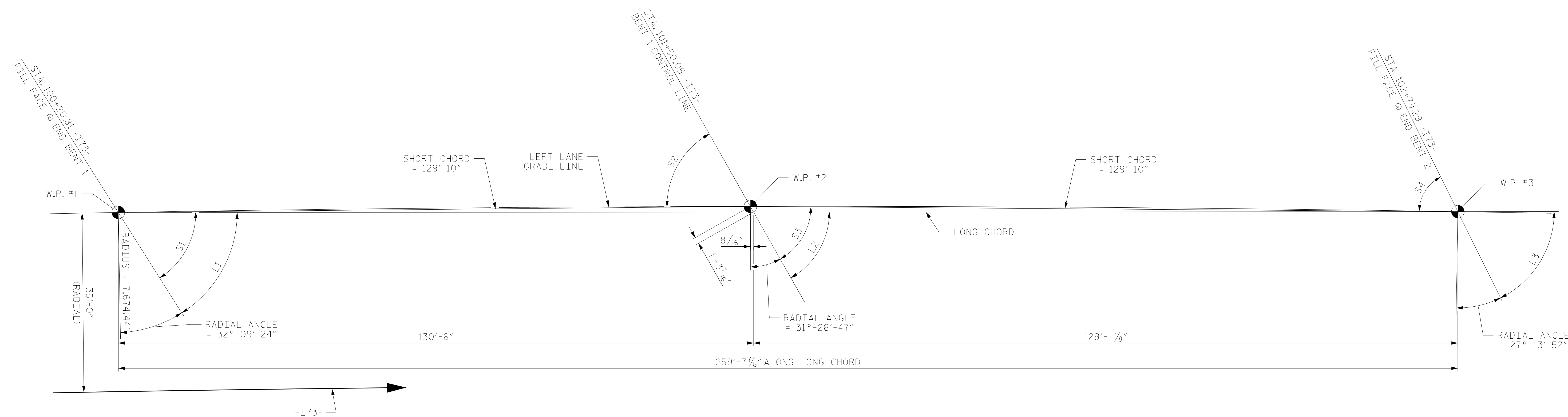
8521 Six Forks Road, Suite 400
 Raleigh, NC 27615
 919-926-4100 FAX 919-846-9080
 www.rsandh.com
 North Carolina License No. 50737-F-0403-C-28

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
GENERAL DRAWING
 LEFT LANE BRIDGE OVER
 US 74 BUS. ON I-73/US 220
 BYPASS BETWEEN
 SR 1244 AND SR 1140

DRAWN BY : MAL, MKO DATE : 03/2015
 CHECKED BY : JMR DATE : 07/2015
 DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S03-2
2			4			TOTAL SHEETS 39



LONG CHORD LAYOUT

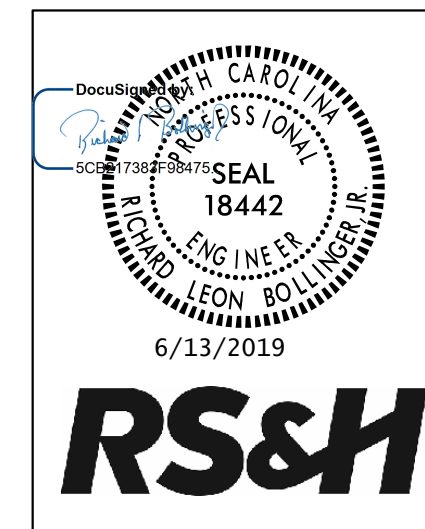
ANGLES	
LONG CHORD	SHORT CHORD
L1 = 56°-52'-27"	S1 = 57°-21'-32"
L2 = 58°-33'-13"	S2 = 59°-02'-18"
L3 = 63°-44'-17"	S3 = 58°-04'-08"
	S4 = 63°-15'-12"

HORIZONTAL CURVE DATA -I73-

P.I. STA. = 180+84.12
 Δ = 104°-01'-52.6" (RT.)
 D = 0°-45'-00.0"
 L = 13,870.84'
 T = 9,783.54'
 R = 7,639.44'
 S.E. = 0.03

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 3 OF 4



RS&H Architects-Engineers-Planners, Inc.
 8521 Six Forks Road, Suite 400
 Raleigh, NC 27615
 919-926-4100 FAX 919-846-9080
 www.rsandh.com
 North Carolina License No. 50973-F-5403-C-28

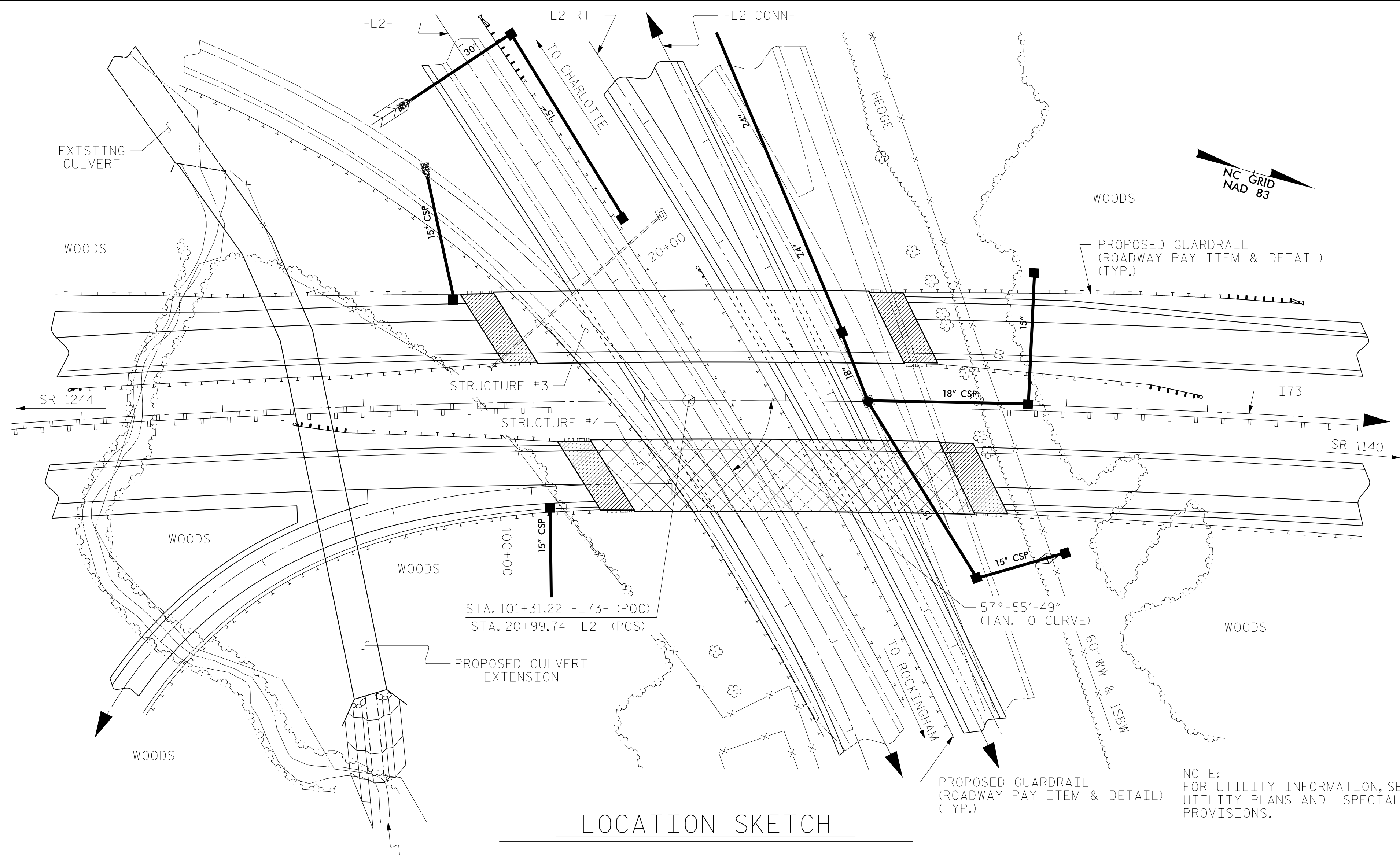
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 GENERAL DRAWING
 LEFT LANE BRIDGE OVER
 US 74 BUS. ON I-73/US 220
 BYPASS BETWEEN
 SR 1244 AND SR 1140

DRAWN BY : MAL DATE : 01/2015
 CHECKED BY : JMR DATE : 06/2015
 DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S03-3
2			4			TOTAL SHEETS 39

BENCH MARK #6: RR SPIKE IN BASE OF 15" SWEETGUM TREE 208' RIGHT OF STA. 105+88 -I73-, EL. 266.10'



- 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 2.
 - 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 ELEVATIONS AND CLEARANCES SHOWN ON THE PLANS AT THE POINTS OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION(S) ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.
 - FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.
 - REMOVABLE FORMS MAY BE USED IN LIEU OF METAL STAY-IN-PLACE FORMS IN ACCORDANCE WITH ARTICLE 420-3 OF THE STANDARD SPECIFICATIONS.
 - NEEDLE BEAMS WILL NOT BE ALLOWED UNLESS OTHERWISE CALLED FOR ON THE PLANS OR APPROVED BY THE ENGINEERS.
 - FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
 - FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION FOR BENT 1	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONCRETE GIRDERS	PILE DRIVING EQUIPMENT SETUP FOR HP 14X73 STEEL PILES	HP 14X73 STEEL PILES	STEEL PILE POINTS	CONCRETE BARRIER RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS
	LUMP SUM	EA.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	NO. LIN. FT.	EACH	NO. LIN. FT.	EACH	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE			13,312	13,903		LUMP SUM			12 1,542.28				561.65		LUMP SUM	LUMP SUM
END BENT 1					75.3		11,194			11	11 715	11		552		
BENT 1	LUMP SUM				131.3		24,467	3,156		20	20 600	20				
END BENT 2					72.4		10,775			11	11 495	11		477		
TOTAL	LUMP SUM	1	13,312	13,903	279.0	LUMP SUM	46,436	3,156	12 1,542.28	42	42 1,810	42	561.65	1,029	LUMP SUM	LUMP SUM

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 4 OF 4



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 LEFT LANE BRIDGE OVER
 US 74 BUS. ON I-73/US 220
 BYPASS BETWEEN
 SR 1244 AND SR 1140

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S03-4
2			4			TOTAL SHEETS 39

DRAWN BY : MAL DATE : 01/2015
 CHECKED BY : JMR DATE : 01/2015
 DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPAN A																					
	GIRDER 1 (EXTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.151	0.195	0.234	0.267	0.294	0.313	0.325	0.329	0.325	0.313	0.294	0.267	0.234	0.195	0.151	0.103	0.052	0.000	
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.025	0.049	0.071	0.092	0.111	0.126	0.139	0.148	0.153	0.155	0.153	0.148	0.139	0.126	0.111	0.092	0.071	0.049	0.025	0.000	
FINAL CAMBER ↑	0	5/16"	5/8"	15/16"	1/4"	1/2"	11/16"	17/8"	2"	21/16"	21/16"	21/16"	2"	17/8"	11/16"	1/2"	1/4"	15/16"	5/8"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 2 (INTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.151	0.195	0.234	0.267	0.293	0.312	0.324	0.328	0.324	0.312	0.293	0.267	0.234	0.195	0.151	0.103	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.054	0.079	0.102	0.123	0.140	0.154	0.164	0.170	0.172	0.170	0.164	0.154	0.140	0.123	0.102	0.079	0.054	0.027	0.000	
FINAL CAMBER ↑	0	5/16"	9/16"	7/8"	11/8"	13/8"	11/2"	11/16"	13/4"	17/8"	17/8"	17/8"	13/4"	11/16"	1/2"	13/8"	11/8"	7/8"	9/16"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 3 (INTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.151	0.195	0.234	0.266	0.293	0.312	0.324	0.328	0.324	0.312	0.293	0.266	0.234	0.195	0.151	0.103	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.053	0.078	0.101	0.121	0.138	0.152	0.162	0.168	0.170	0.168	0.162	0.152	0.138	0.121	0.101	0.078	0.053	0.027	0.000	
FINAL CAMBER ↑	0	5/16"	5/8"	7/8"	11/8"	13/8"	19/16"	11/16"	13/16"	17/8"	17/8"	17/8"	13/16"	11/16"	19/16"	13/8"	11/8"	7/8"	5/8"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 4 (INTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.150	0.194	0.233	0.266	0.292	0.311	0.323	0.327	0.323	0.311	0.292	0.266	0.233	0.194	0.150	0.103	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.053	0.078	0.100	0.120	0.137	0.151	0.160	0.167	0.169	0.167	0.160	0.151	0.137	0.120	0.100	0.078	0.053	0.027	0.000	
FINAL CAMBER ↑	0	5/16"	5/8"	7/8"	11/8"	13/8"	19/16"	11/16"	13/16"	17/8"	17/8"	17/8"	13/16"	11/16"	19/16"	13/8"	11/8"	7/8"	5/8"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 5 (INTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.150	0.194	0.233	0.265	0.292	0.311	0.323	0.327	0.323	0.311	0.292	0.265	0.233	0.194	0.150	0.103	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.052	0.077	0.099	0.119	0.136	0.149	0.159	0.165	0.167	0.165	0.159	0.149	0.136	0.119	0.099	0.077	0.052	0.027	0.000	
FINAL CAMBER ↑	0	5/16"	5/8"	7/8"	11/8"	13/8"	19/16"	11/16"	13/16"	17/8"	15/16"	17/8"	13/16"	11/16"	19/16"	13/8"	11/8"	7/8"	5/8"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 6 (EXTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.102	0.150	0.194	0.232	0.265	0.291	0.310	0.322	0.326	0.322	0.310	0.291	0.265	0.232	0.194	0.150	0.102	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.022	0.044	0.065	0.084	0.101	0.115	0.126	0.135	0.140	0.141	0.140	0.135	0.126	0.115	0.101	0.084	0.065	0.044	0.022	0.000	
FINAL CAMBER ↑	0	3/8"	11/16"	1"	15/16"	19/16"	113/16"	2"	21/8"	23/16"	23/16"	23/16"	21/8"	2"	113/16"	19/16"	15/16"	1"	11/16"	3/8"	0	

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

PROJECT NO. R-3421A
 RICHMOND COUNTY
STATION: 101+31.22 -I73-

SHEET 1 OF 2

DRAWN BY : MKO DATE : 03/2015
CHECKED BY : MAL DATE : 10/2015
DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

6/13/2019
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH SUPERSTRUCTURE DEAD LOAD DEFLECTION SPAN A LEFT LANE						SHEET NO. S03-19
REVISIONS						TOTAL SHEETS 39
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

0.6" Ø LOW RELAXATION	SPAN B																					
	GIRDER 1 (EXTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.053	0.105	0.153	0.198	0.238	0.271	0.298	0.318	0.330	0.334	0.330	0.318	0.298	0.271	0.238	0.198	0.153	0.105	0.053	0.000	
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.054	0.079	0.102	0.123	0.140	0.154	0.164	0.170	0.172	0.170	0.164	0.154	0.140	0.123	0.102	0.079	0.054	0.027	0.000	
FINAL CAMBER ↑	0	5/16"	5/8"	7/8"	1 1/8"	1 3/8"	1 1/2"	1 5/8"	1 3/4"	1 5/8"	1 5/16"	1 5/16"	1 7/8"	1 3/4"	1 9/16"	1 3/8"	1 1/8"	7/8"	5/8"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 2 (INTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.053	0.104	0.153	0.197	0.237	0.270	0.297	0.316	0.328	0.332	0.328	0.316	0.297	0.270	0.237	0.197	0.153	0.104	0.053	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.030	0.059	0.086	0.111	0.133	0.152	0.167	0.178	0.184	0.187	0.184	0.178	0.167	0.152	0.133	0.111	0.086	0.059	0.030	0.000	
FINAL CAMBER ↑	0	1/4"	9/16"	1 3/16"	1 1/16"	1 1/4"	1 1/16"	1 3/16"	1 5/8"	1 3/4"	1 3/4"	1 3/4"	1 5/8"	1 9/16"	1 1/2"	1 1/16"	1 1/4"	1 1/16"	1 3/16"	9/16"	1/4"	0
0.6" Ø LOW RELAXATION	GIRDER 3 (INTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.053	0.104	0.152	0.196	0.236	0.269	0.296	0.315	0.327	0.331	0.327	0.315	0.296	0.269	0.236	0.196	0.152	0.104	0.053	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.029	0.057	0.083	0.107	0.129	0.147	0.162	0.172	0.179	0.181	0.179	0.172	0.162	0.147	0.129	0.107	0.083	0.057	0.029	0.000	
FINAL CAMBER ↑	0	5/16"	9/16"	1 3/16"	1 1/16"	1 1/16"	1 1/16"	1 5/8"	1 11/16"	1 3/4"	1 13/16"	1 3/4"	1 11/16"	1 5/8"	1 7/16"	1 5/16"	1 1/16"	1 3/16"	9/16"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 4 (INTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.151	0.195	0.235	0.268	0.294	0.313	0.325	0.329	0.325	0.313	0.294	0.268	0.235	0.195	0.151	0.103	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.028	0.055	0.081	0.104	0.125	0.142	0.157	0.167	0.173	0.175	0.173	0.167	0.157	0.142	0.125	0.104	0.081	0.055	0.028	0.000	
FINAL CAMBER ↑	0	5/16"	9/16"	1 3/16"	1 1/16"	1 1/16"	1 1/2"	1 5/8"	1 3/4"	1 13/16"	1 7/8"	1 13/16"	1 3/4"	1 5/8"	1 1/2"	1 5/16"	1 1/16"	1 3/16"	9/16"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 5 (INTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.103	0.151	0.194	0.233	0.266	0.293	0.312	0.323	0.327	0.323	0.312	0.293	0.266	0.233	0.194	0.151	0.103	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.027	0.053	0.078	0.101	0.121	0.138	0.152	0.162	0.168	0.170	0.168	0.162	0.152	0.138	0.121	0.101	0.078	0.053	0.027	0.000	
FINAL CAMBER ↑	0	5/16"	5/8"	7/8"	1 1/8"	1 3/8"	1 1/2"	1 11/16"	1 13/16"	1 7/8"	1 7/8"	1 7/8"	1 13/16"	1 11/16"	1 9/16"	1 3/8"	1 1/8"	7/8"	5/8"	5/16"	0	
0.6" Ø LOW RELAXATION	GIRDER 6 (EXTERIOR)																					
	TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	0
	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.052	0.102	0.150	0.193	0.232	0.265	0.291	0.310	0.322	0.326	0.322	0.310	0.291	0.265	0.232	0.193	0.150	0.102	0.052	0.000
* DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.022	0.044	0.065	0.083	0.100	0.114	0.126	0.134	0.139	0.140	0.139	0.134	0.126	0.114	0.100	0.083	0.065	0.044	0.022	0.000	
FINAL CAMBER ↑	0	3/8"	1 1/16"	1"	1 5/16"	1 9/16"	1 13/16"	2"	2 1/8"	2 3/16"	2 1/4"	2 3/16"	2 1/8"	2"	1 13/16"	1 9/16"	1 5/16"	1"	1 1/16"	3/8"	0	

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM), EXCEPT " FINAL CAMBER ", WHICH IS GIVEN IN INCHES (FRACTION FORM).

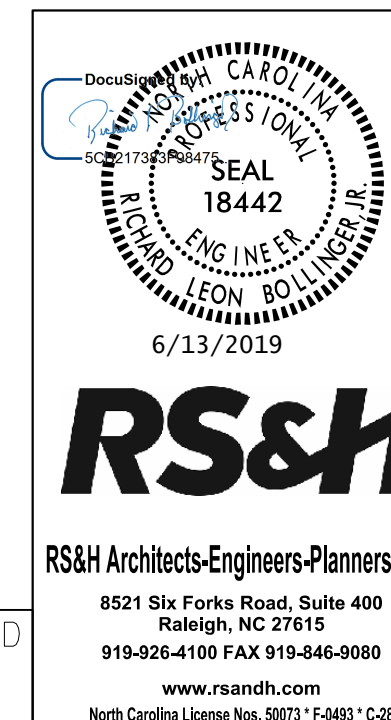
PROJECT NO. R-3421A
 RICHMOND COUNTY
STATION: 101+31.22 -I73-

SHEET 2 OF 2

DRAWN BY : MKO DATE : 03/2015
CHECKED BY : MAL DATE : 10/2015
DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

6/13/2019
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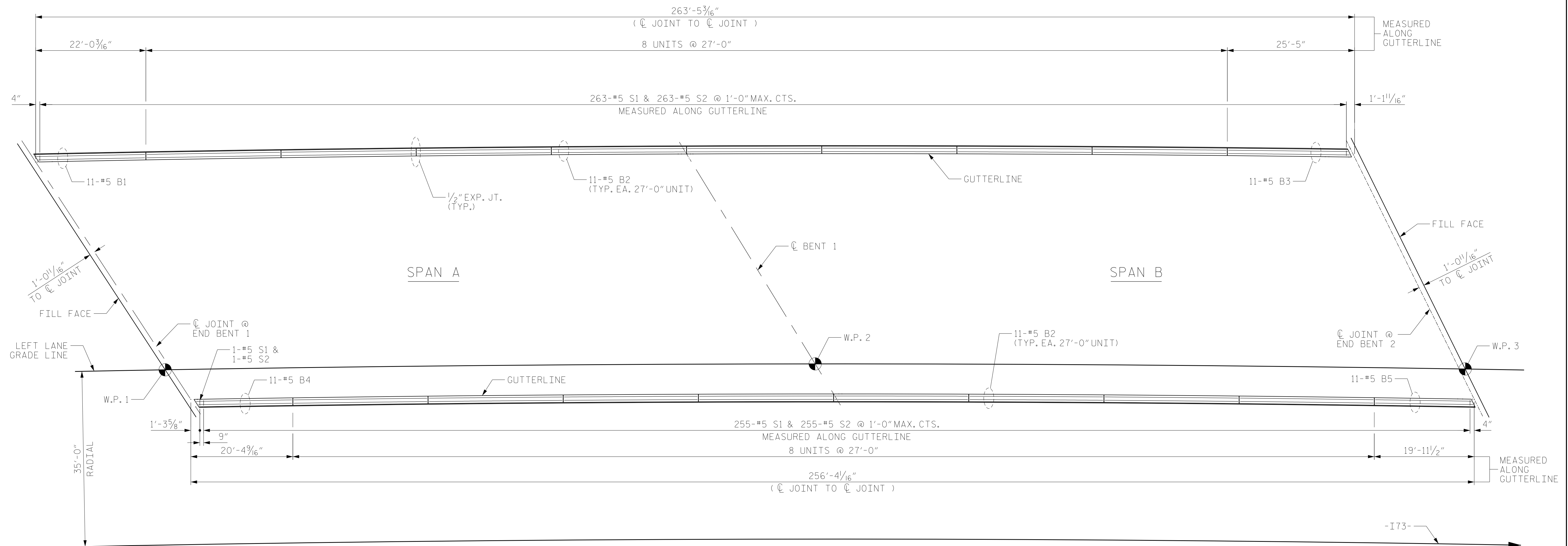
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
DEAD LOAD DEFLECTION
SPAN B
LEFT LANE

REVISIONS						SHEET NO.
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1			3			503-20
2			4			TOTAL SHEETS 39

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919-826-4100 FAX 919-846-9080
www.rsandh.com
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PLAN OF BARRIER RAIL

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 1 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 CONCRETE
 BARRIER RAIL
 SPANS A & B
 LEFT LANE

DRAWN BY : MKO DATE : 02/2015
 CHECKED BY : JMR DATE : 06/2015
 DESIGN ENGINEER OF RECORD : RLB DATE : 04/2019

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NO.	BY:	DATE:	NO.	BY:	DATE:	S03-21
1			3			TOTAL SHEETS
2			4			39

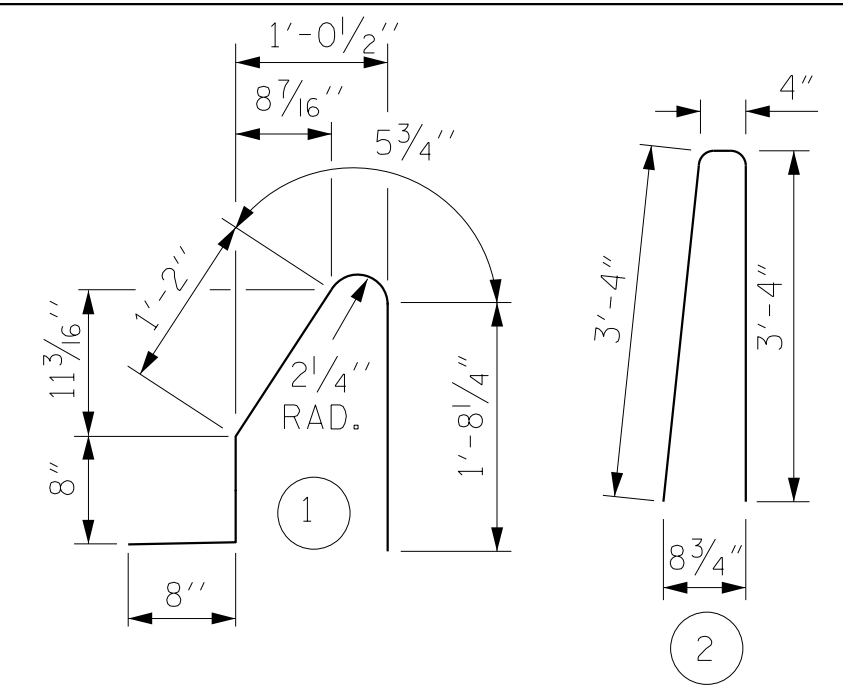
NOTES

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.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. 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.

BAR TYPES

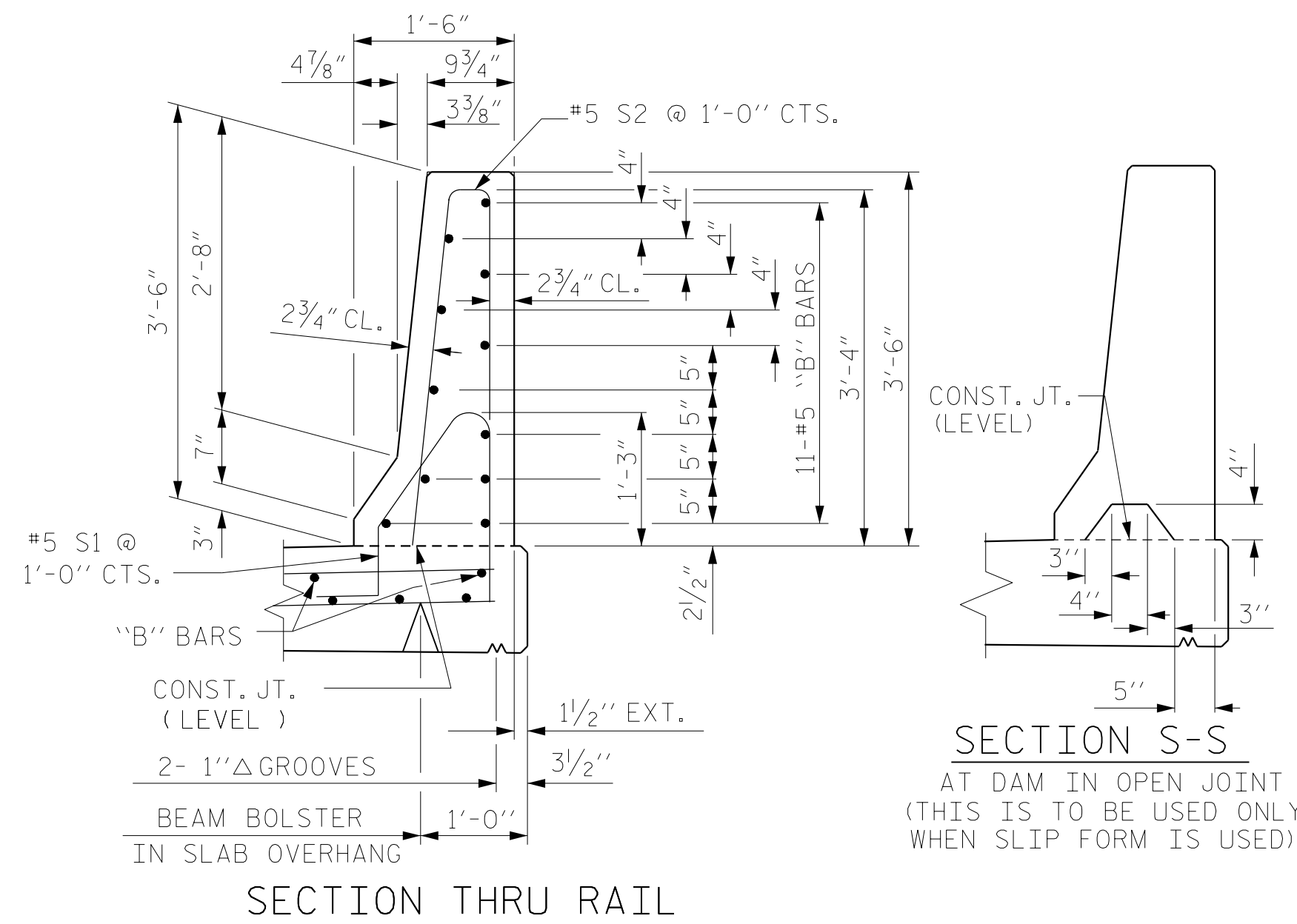


ALL BAR DIMENSIONS ARE OUT TO OUT

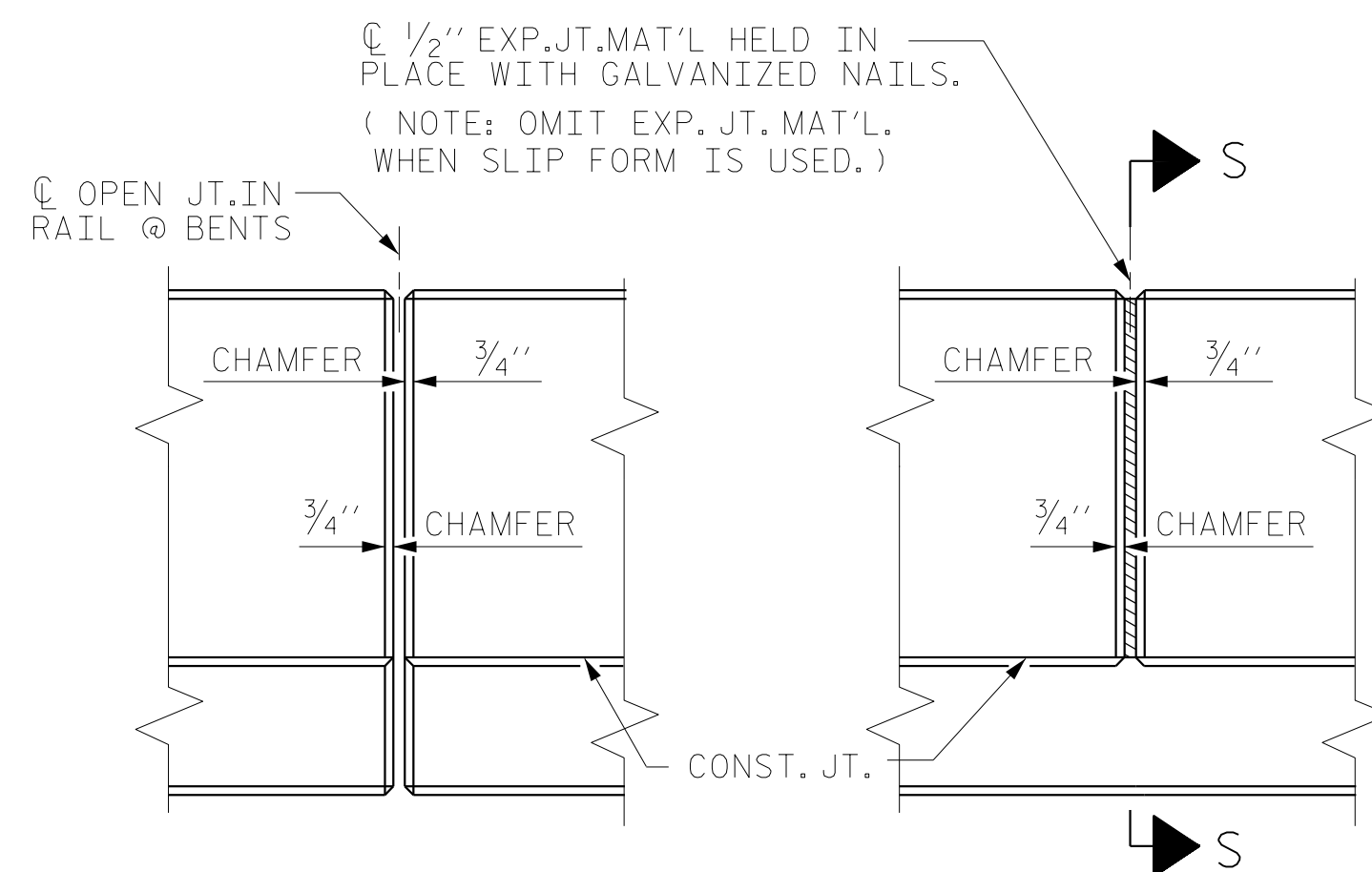
BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	11	#5	STR	21'-10"	250
* B2	176	#5	STR	26'-7"	4880
* B3	11	#5	STR	24'-6"	281
* B4	11	#5	STR	19'-3"	221
* B5	11	#5	STR	19'-9"	227
* S1	519	#5	1	4'-8"	2526
* S2	519	#5	2	7'-0"	3789
* EPOXY COATED REINFORCING STEEL					12174 LBS.
CLASS AA CONCRETE					70.7 CU. YDS.
CONCRETE BARRIER RAIL					519.65 LIN. FT.



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

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-

SHEET 2 OF 2



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
CONCRETE
BARRIER RAIL
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	503-22
1			3			TOTAL SHEETS
2			4			39

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ASSEMBLED BY : MKO	DATE : 02/2015
CHECKED BY : JMR	DATE : 06/2015
DRAWN BY : ARB 5/87	REV. 7/12 MAA/GM
CHECKED BY : SJD 9/87	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

NOTES

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

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.)

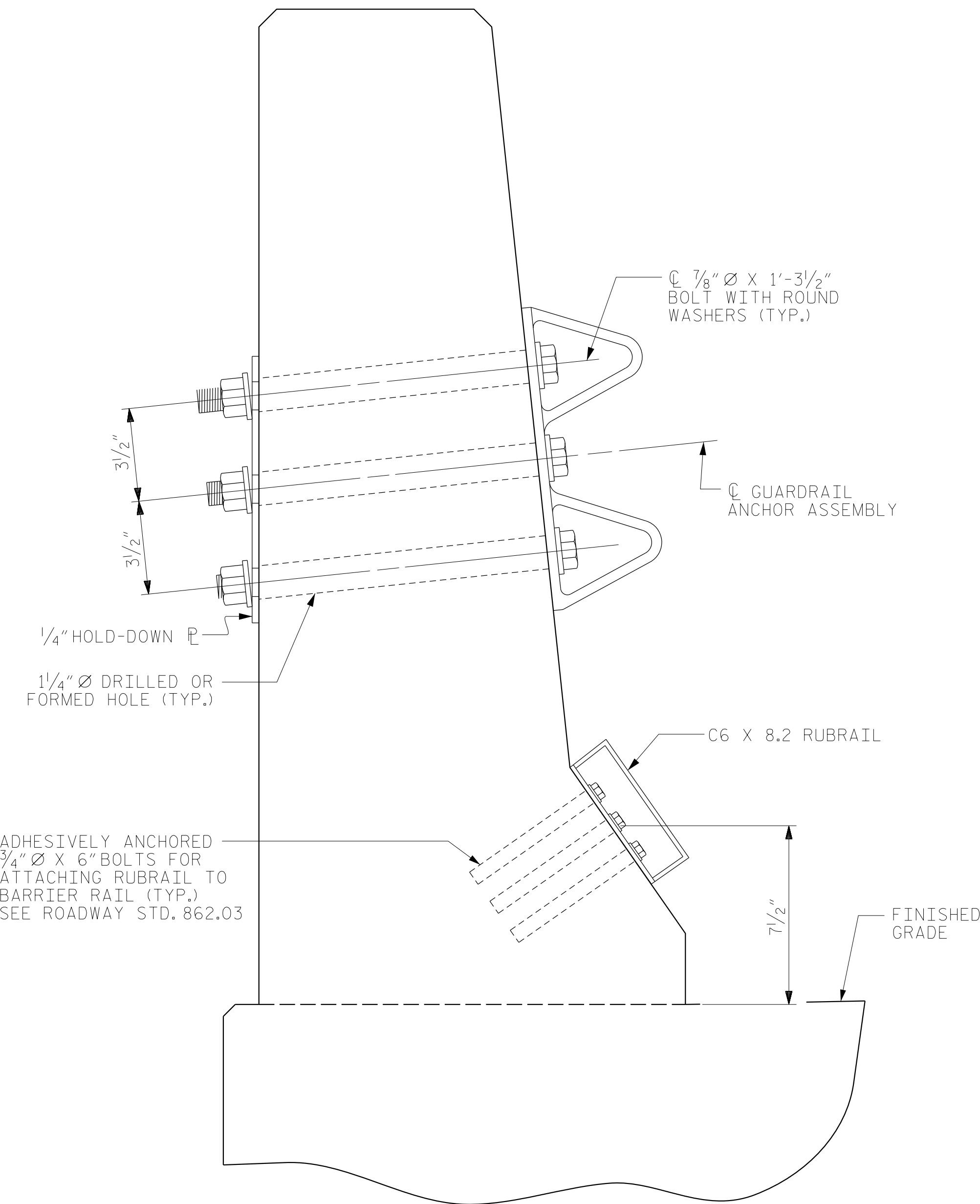
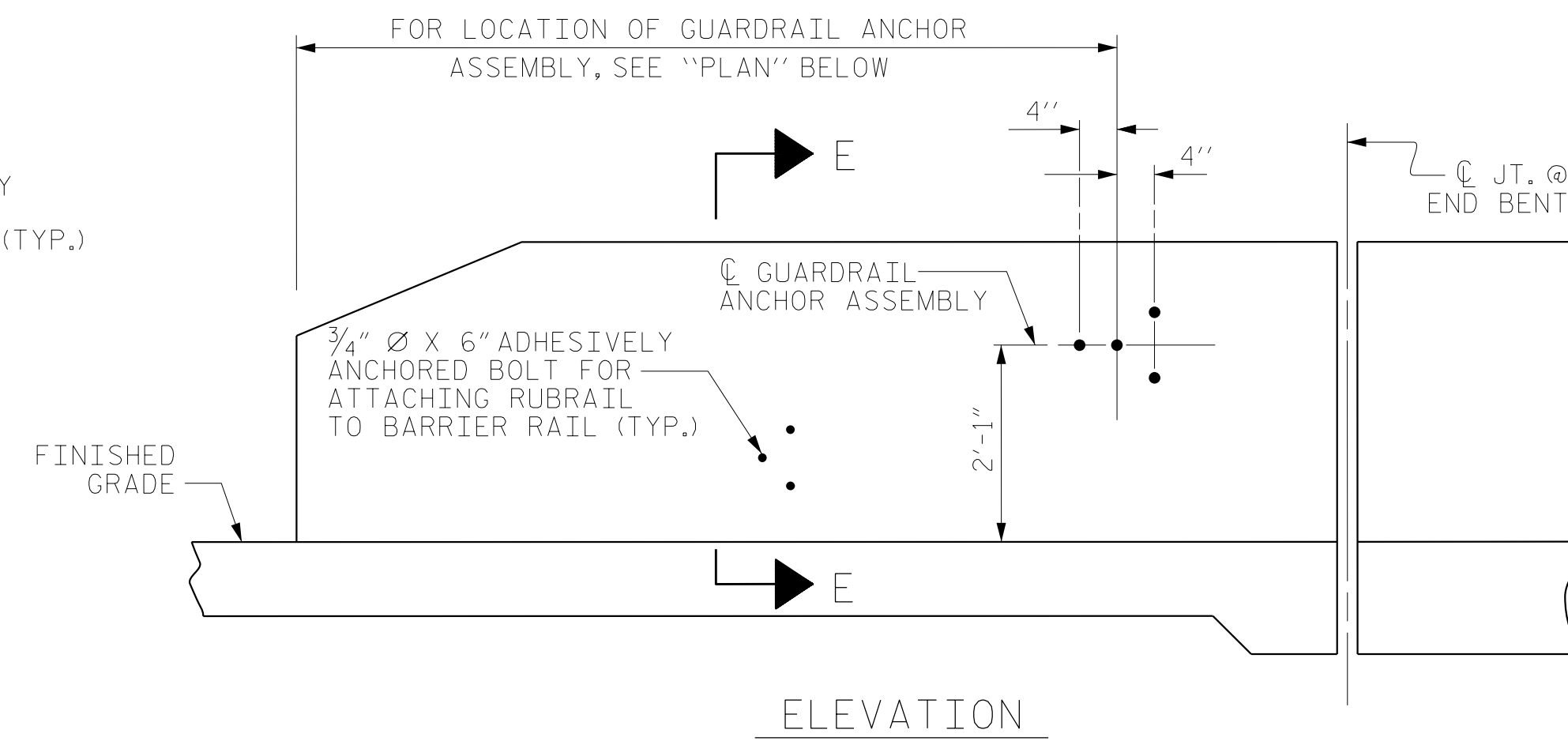
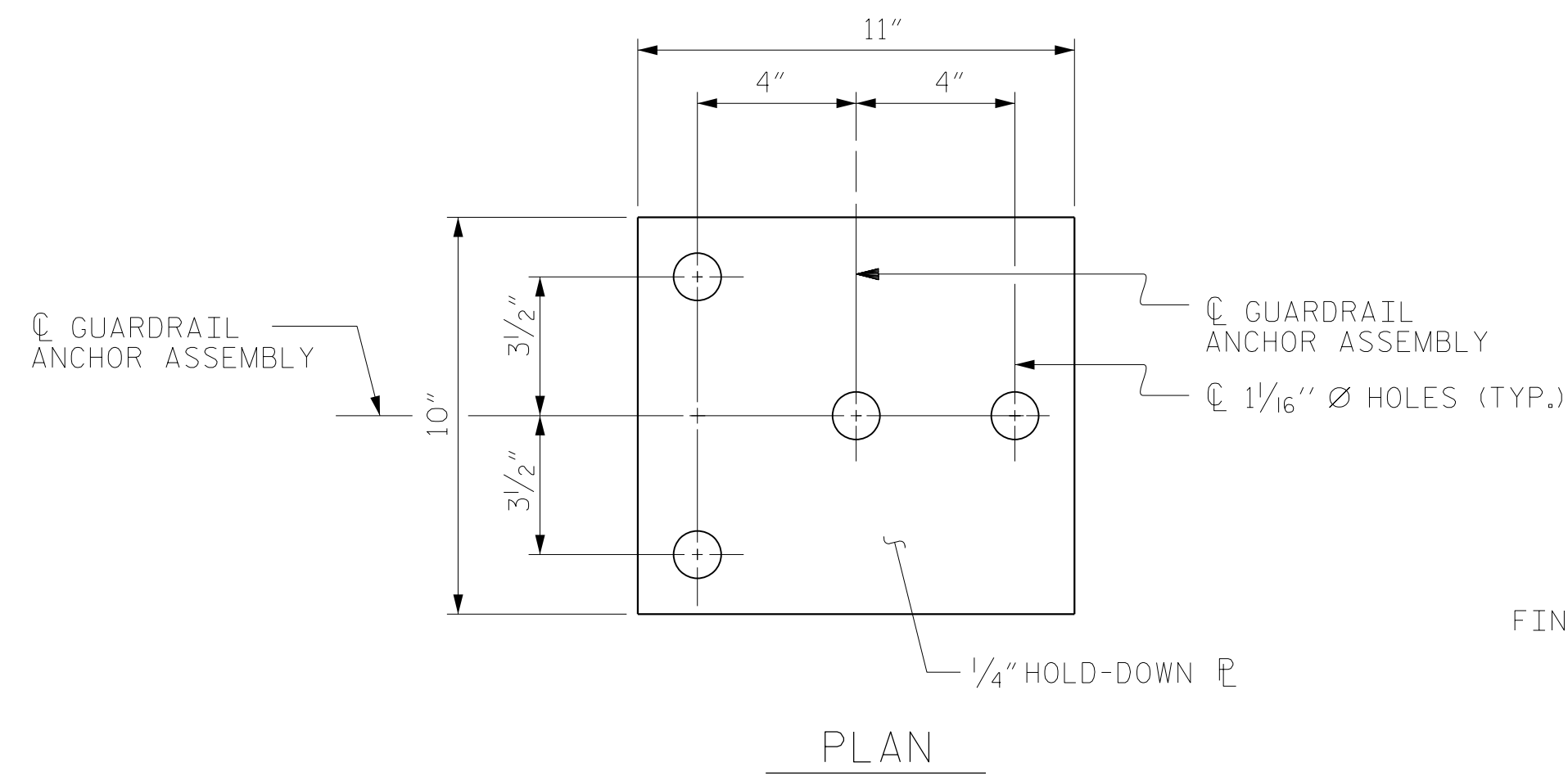
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

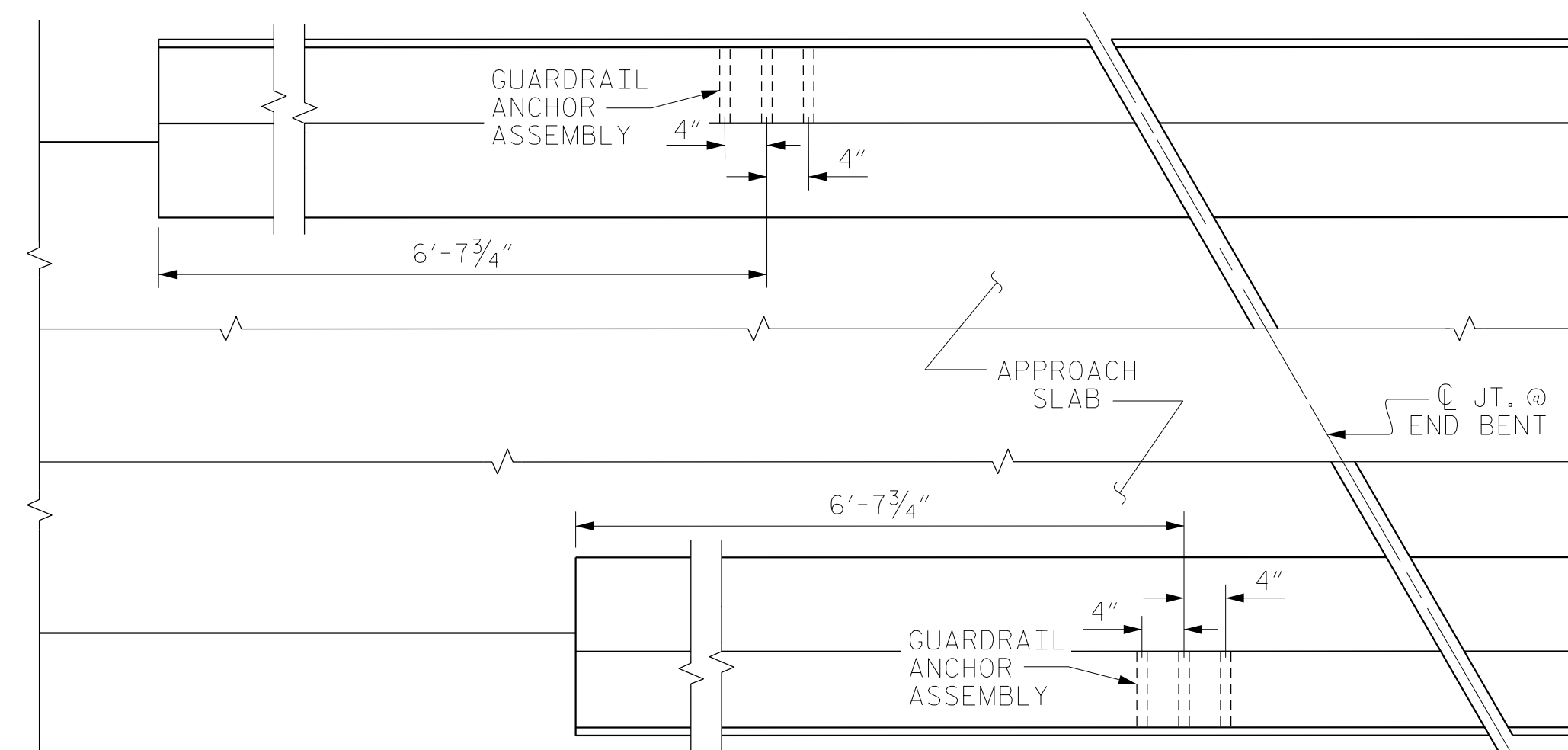
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLY SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR CONCRETE BARRIER RAIL.

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.

THE C6 X 8.2 RUBRAIL IS TO BE ADHESIVELY ANCHORED TO THE RAIL USING THREE 3/4" Ø X 6" BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 12 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE STANDARD SPECIFICATIONS. SEE ROADWAY STANDARD 862.03 FOR DETAILS AND LOCATION OF THE RUBRAIL.

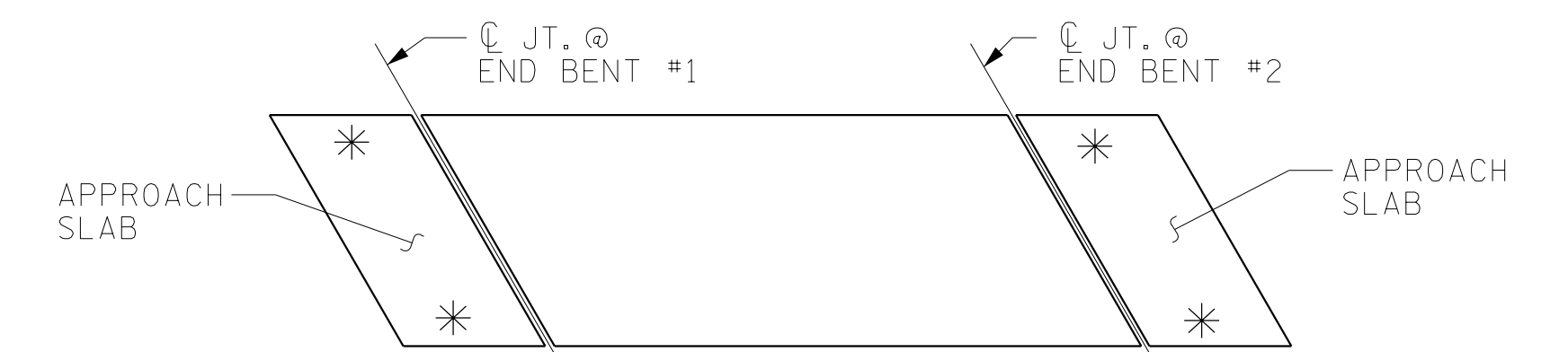


SECTION E-E
GUARDRAIL ANCHOR ASSEMBLY DETAILS



LOCATION OF ANCHORS FOR GUARDRAIL

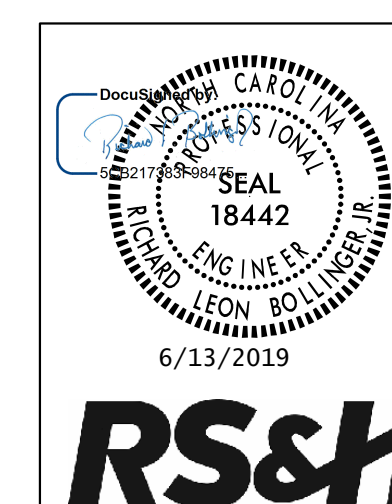
END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-



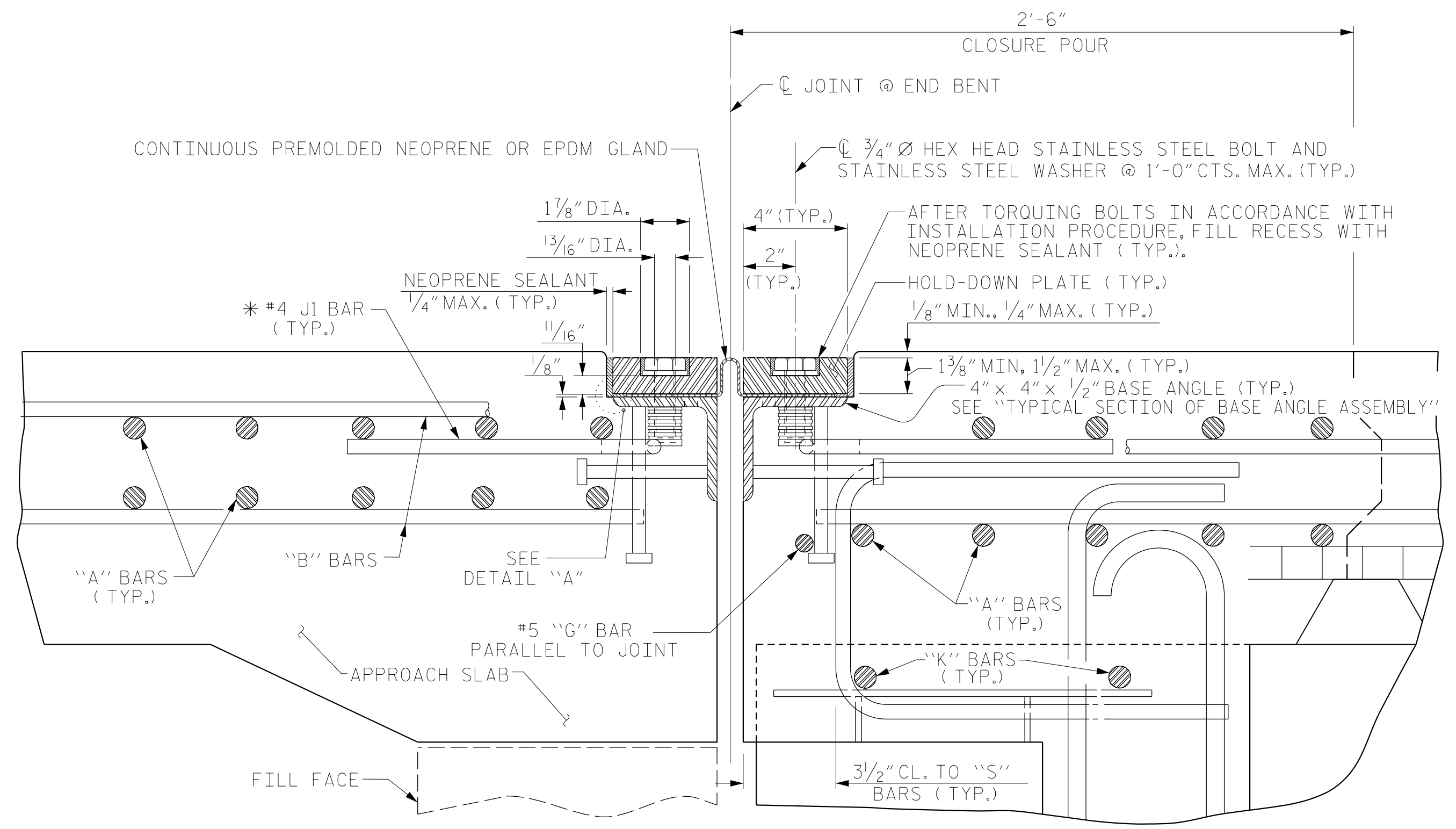
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
GUARDRAIL ANCHORAGE
FOR BARRIER RAIL
LEFT LANE

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

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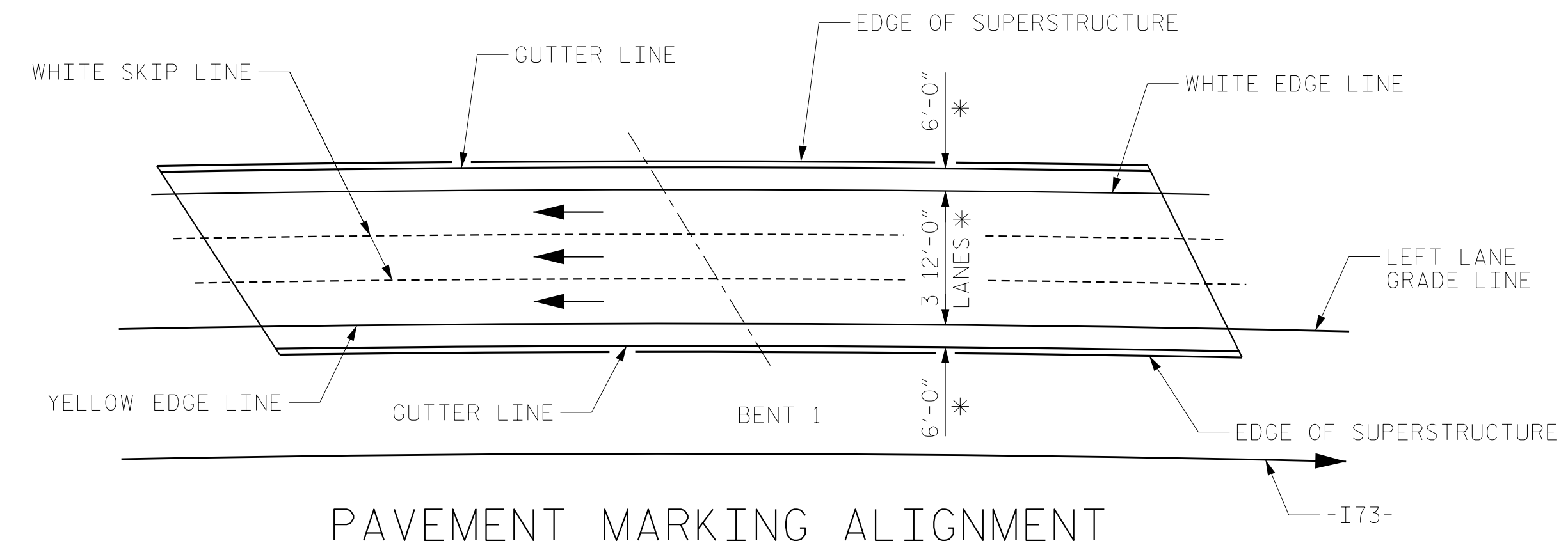
ASSEMBLED BY : MKO	DATE : 03/2015
CHECKED BY : JMR	DATE : 06/2015
DRAWN BY : TLA 5/06	REV. 7/12 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.



PAVEMENT MARKING ALIGNMENT

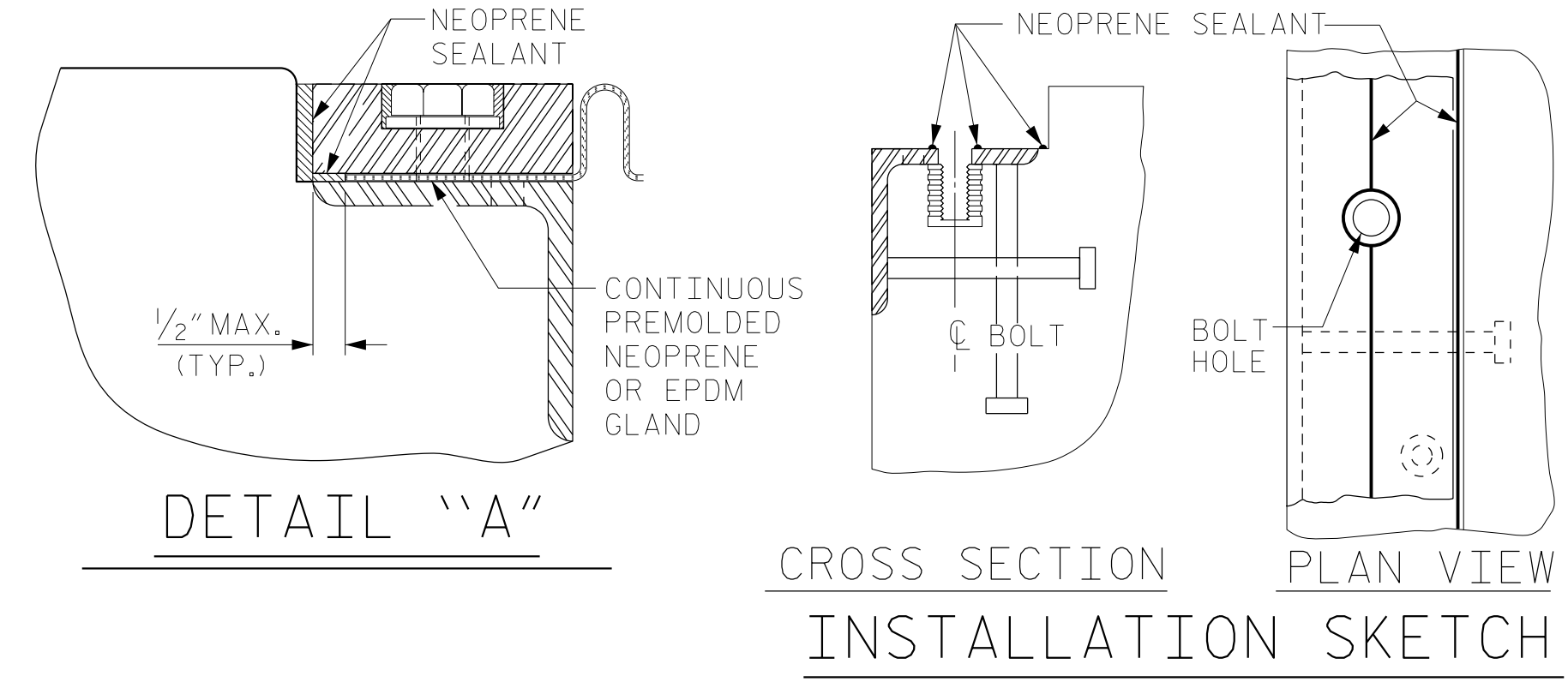
* DENOTES RADIAL DIMENSION

MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKWE ANGLE	TOTAL MOVEMENT (ALONG CL RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	57°-50'-36"	1 3/16"	1 1/2"	1 3/8"	1 1/8"
2	62°-46'-08"	1 3/16"	1 1/2"	1 3/8"	1 1/8"

SKWE ANGLE PROVIDED TANGET TO CURVE.

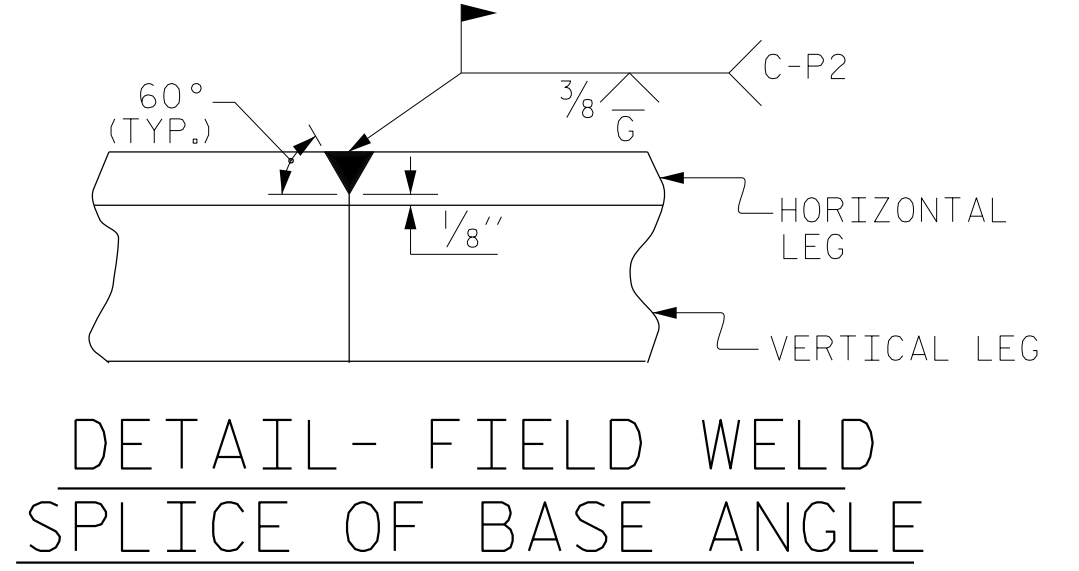
- INSTALLATION PROCEDURE**
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4 1/8" TO 4 1/4" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE 3/4" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X 1/2" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
 2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE, THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
 3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 7/8" IN DIAMETER WITH A HAND PUNCH.
 4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
 5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
 6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

- GENERAL NOTES**
1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
 2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
 3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
 4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
 5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
 6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
 7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
 8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
 9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
 10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
 11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
 12. THE FABRICATOR SHALL PROVIDE 1/2" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE 3/4" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.

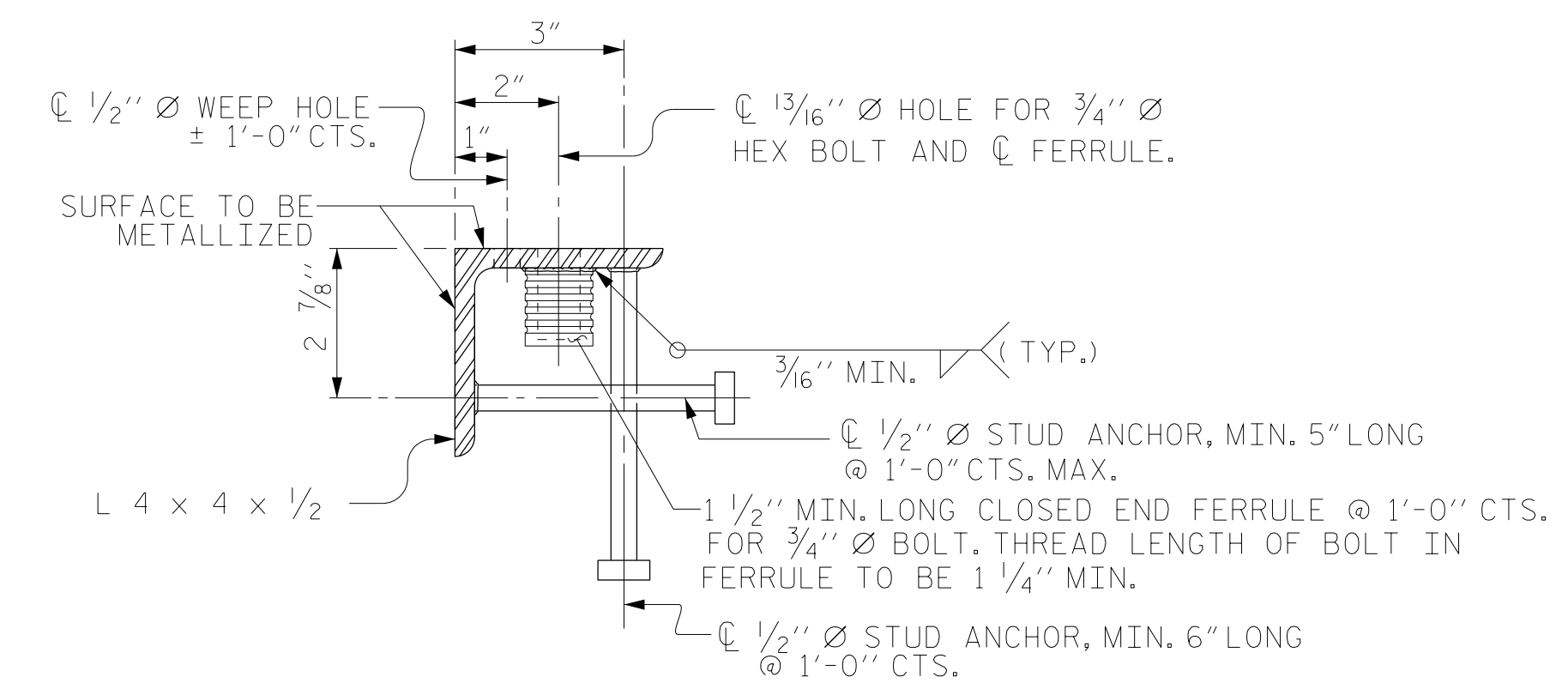


DETAIL "A"

**CROSS SECTION
PLAN VIEW
INSTALLATION SKETCH**



**DETAIL- FIELD WELD
SPLICE OF BASE ANGLE**



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

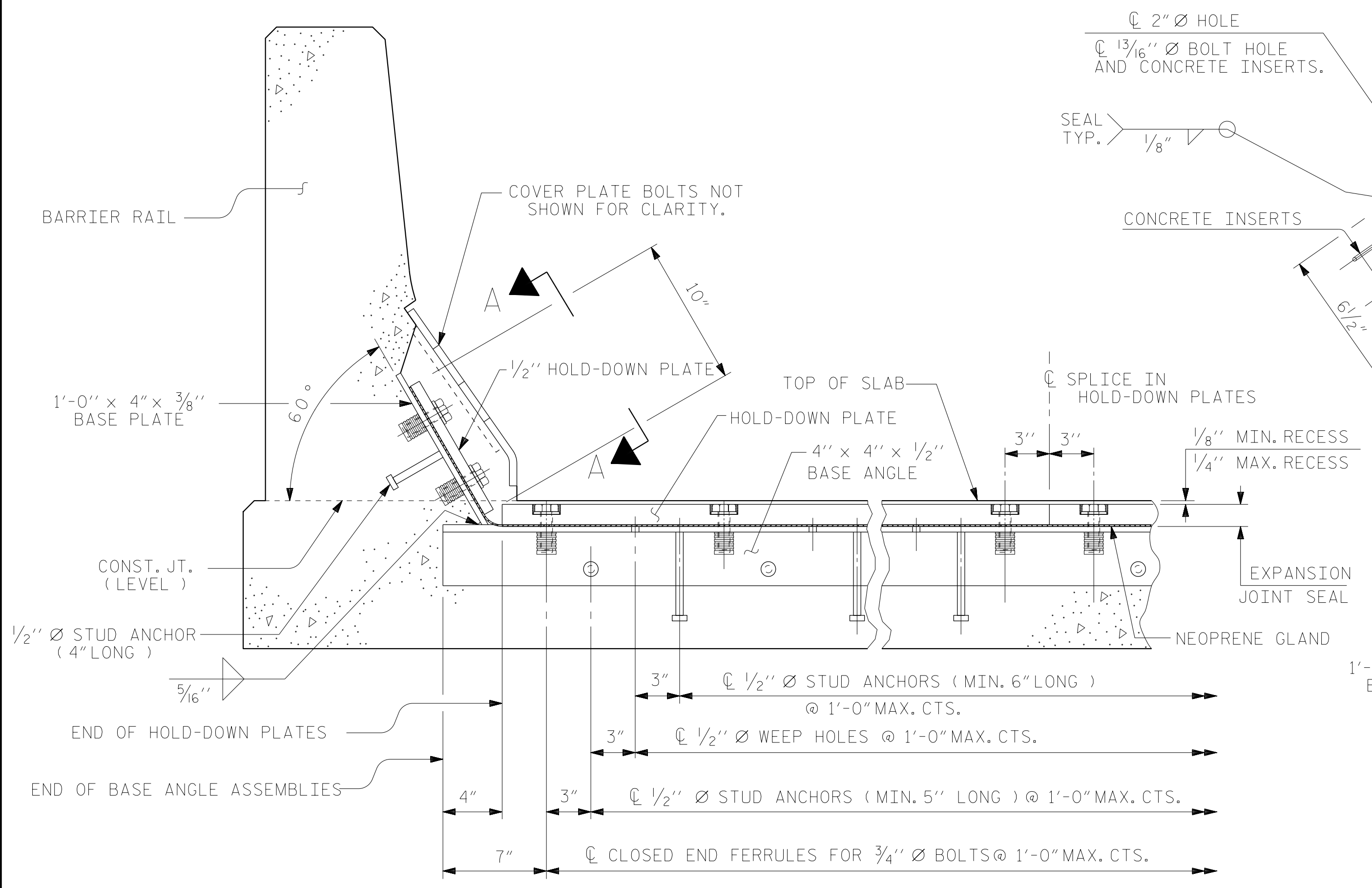
PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 1 OF 2

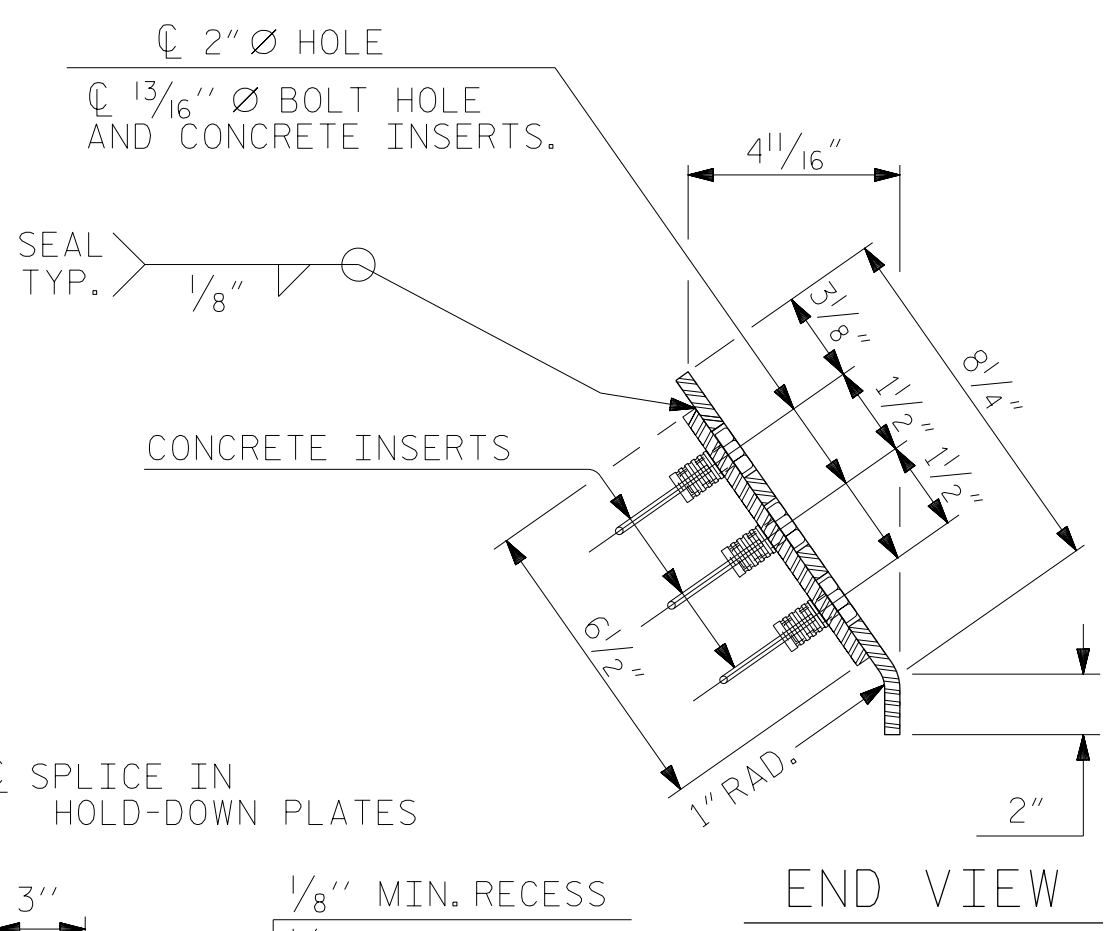
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CHECKED BY : JMR	DATE : 06/2015
DRAWN BY : REK 9/87	REV. 10/11/11 MAA/THC
CHECKED BY : CRK 10/87	REV. 10/11 MAA/THC
	REV. 6/18 MAA/THC

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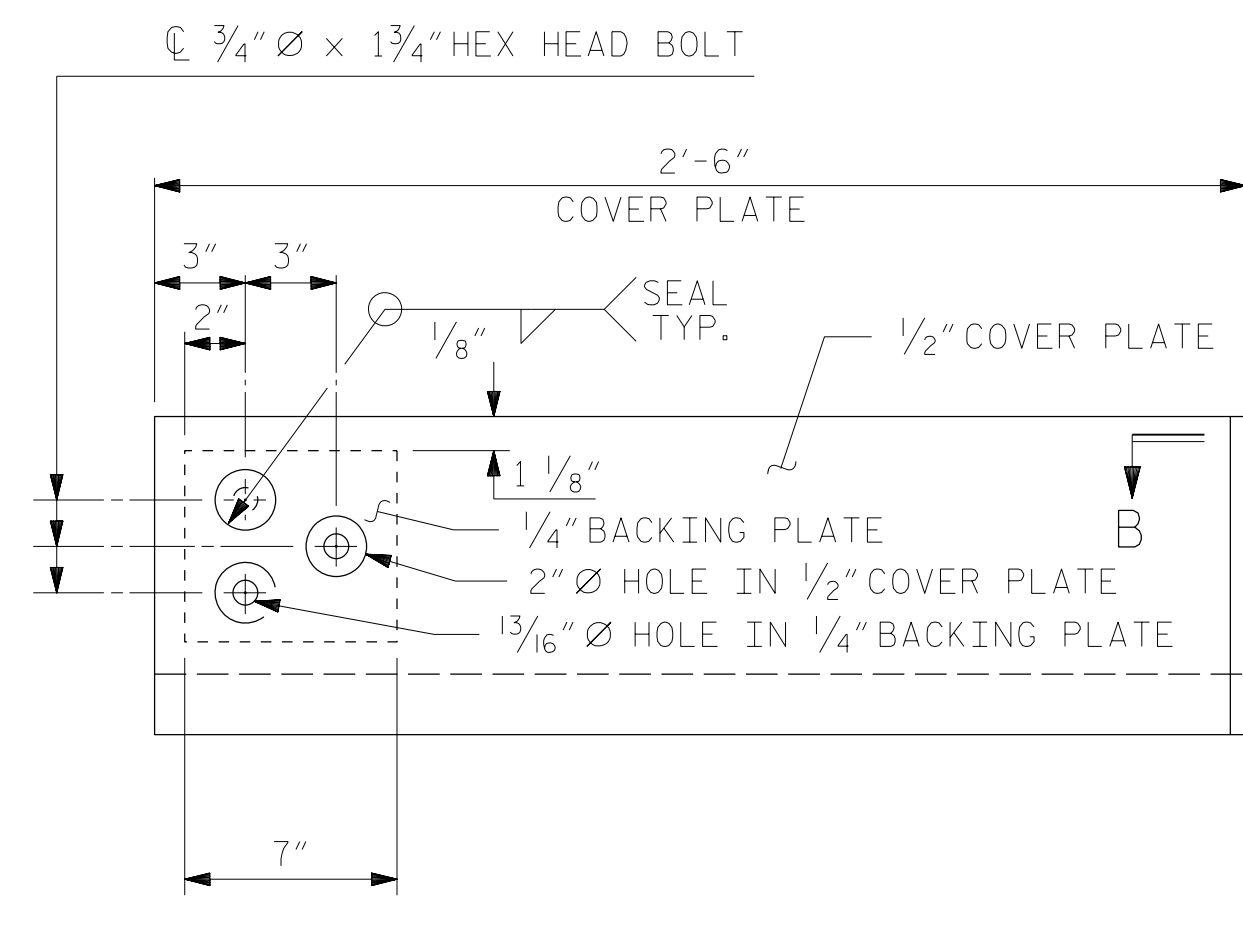
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD EXPANSION JOINT SEAL DETAILS LEFT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S03-24
					TOTAL SHEETS 39



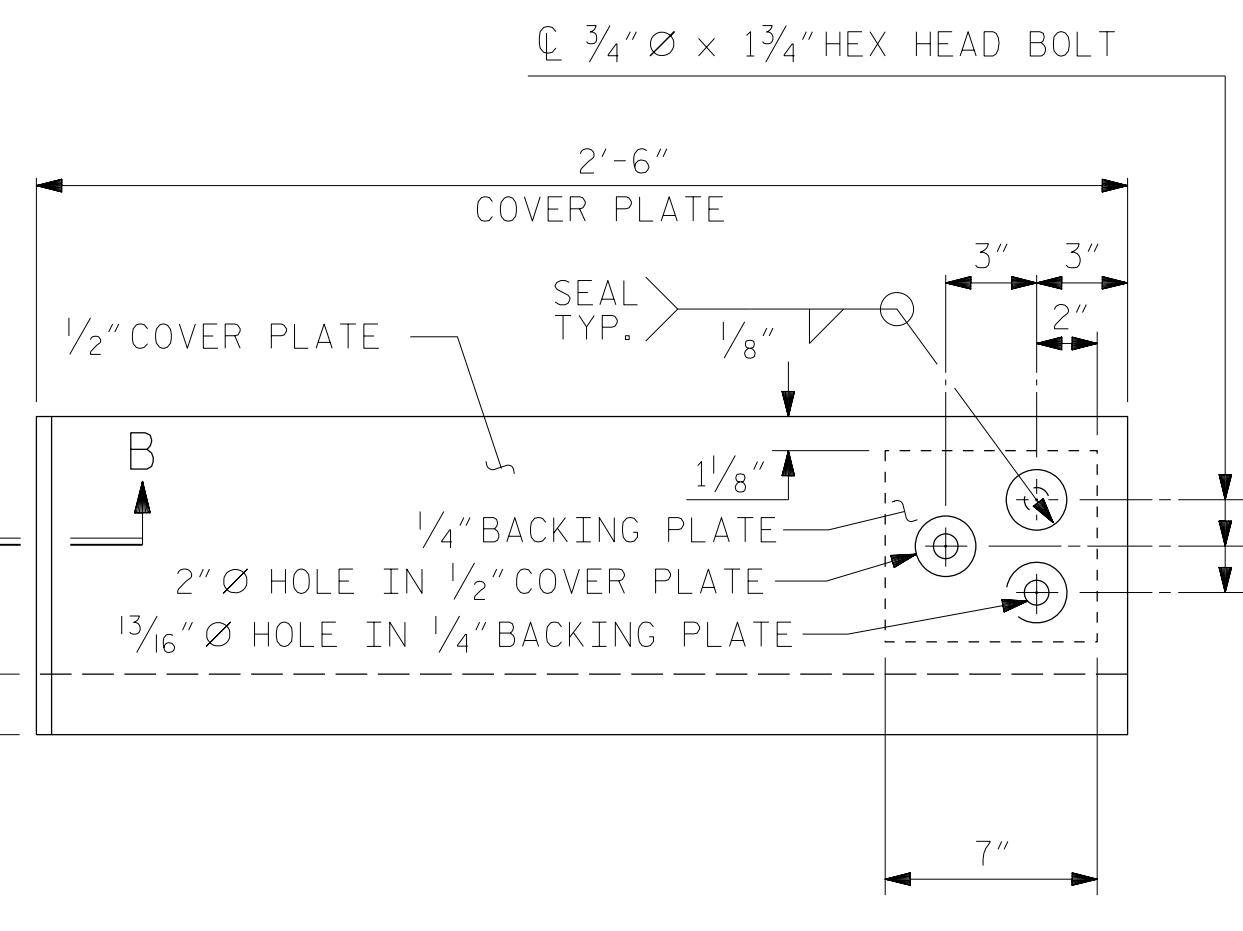
SECTION THRU RAIL NORMAL TO JOINT



END VIEW

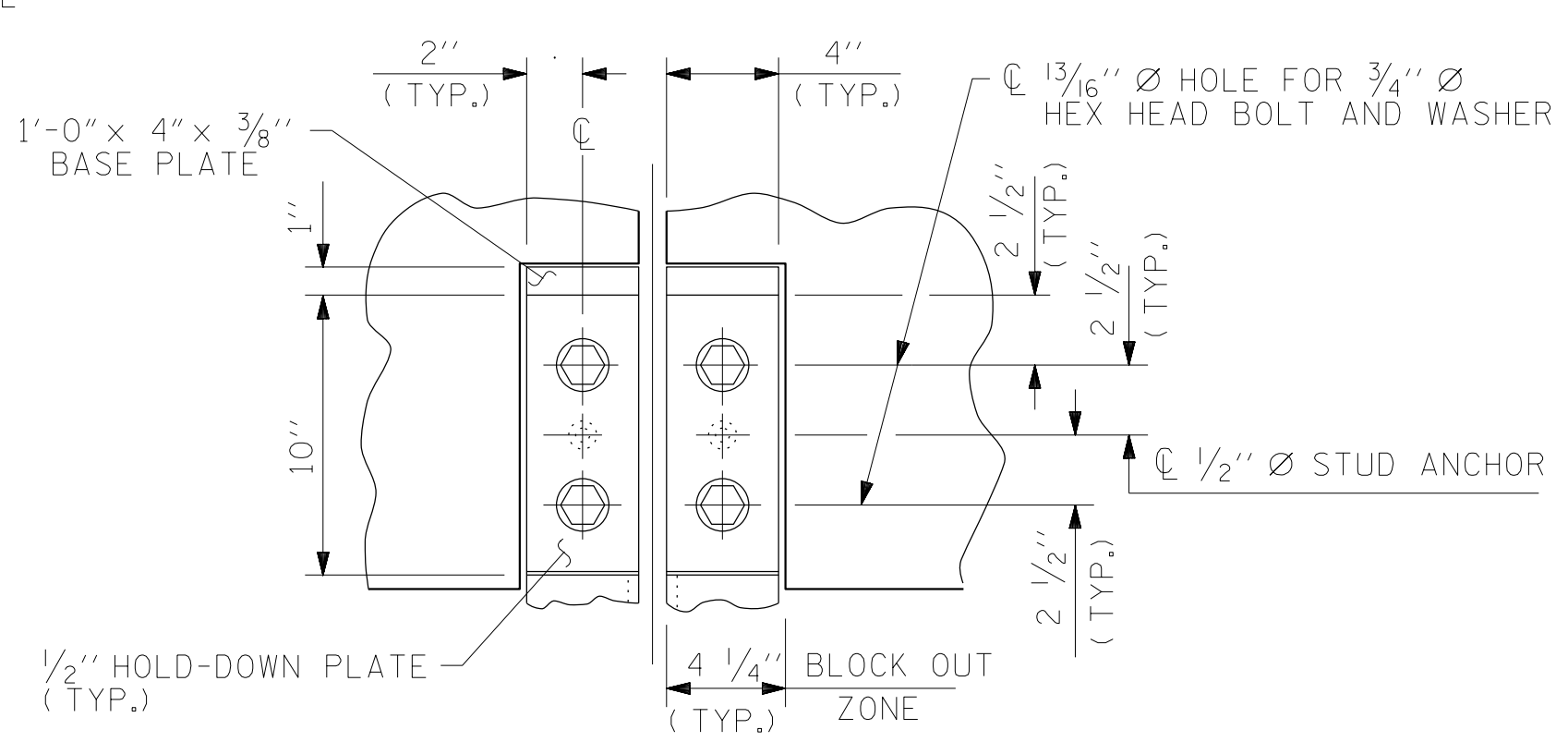


TYPE I - ELEVATION VIEW

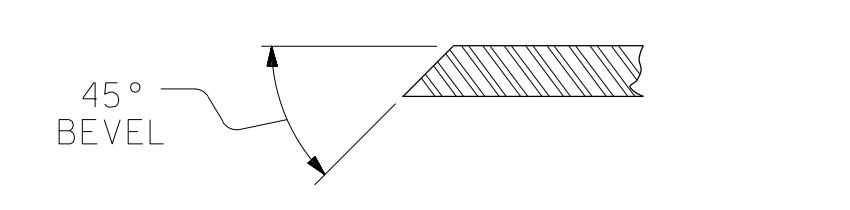


TYPE II - ELEVATION VIEW

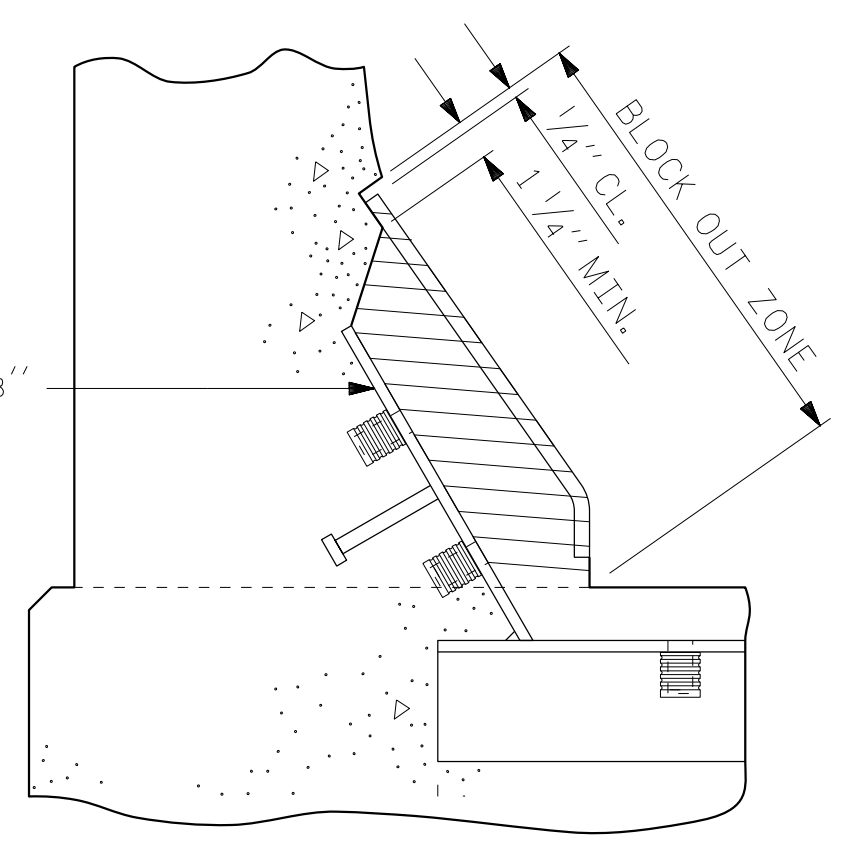
COVER PLATE DETAILS



SECTION A - A

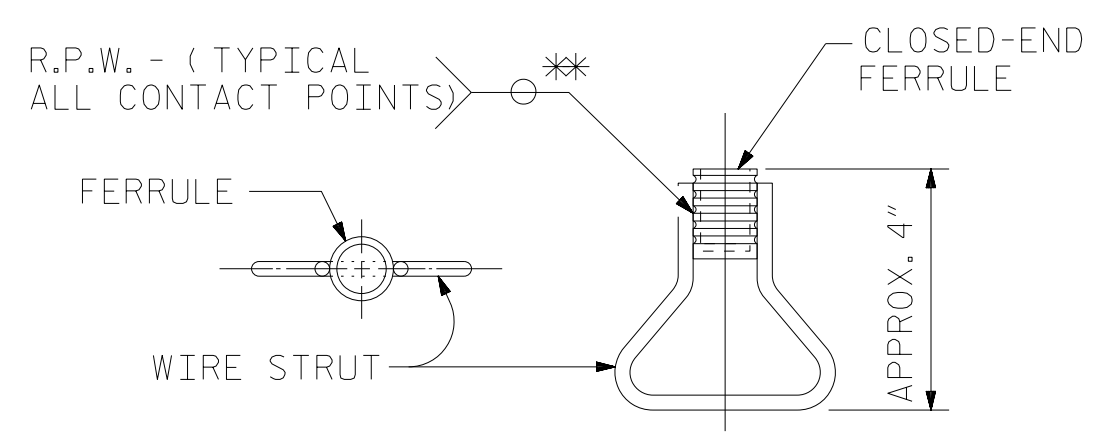


SECTION B - B



BLOCK OUT DETAIL

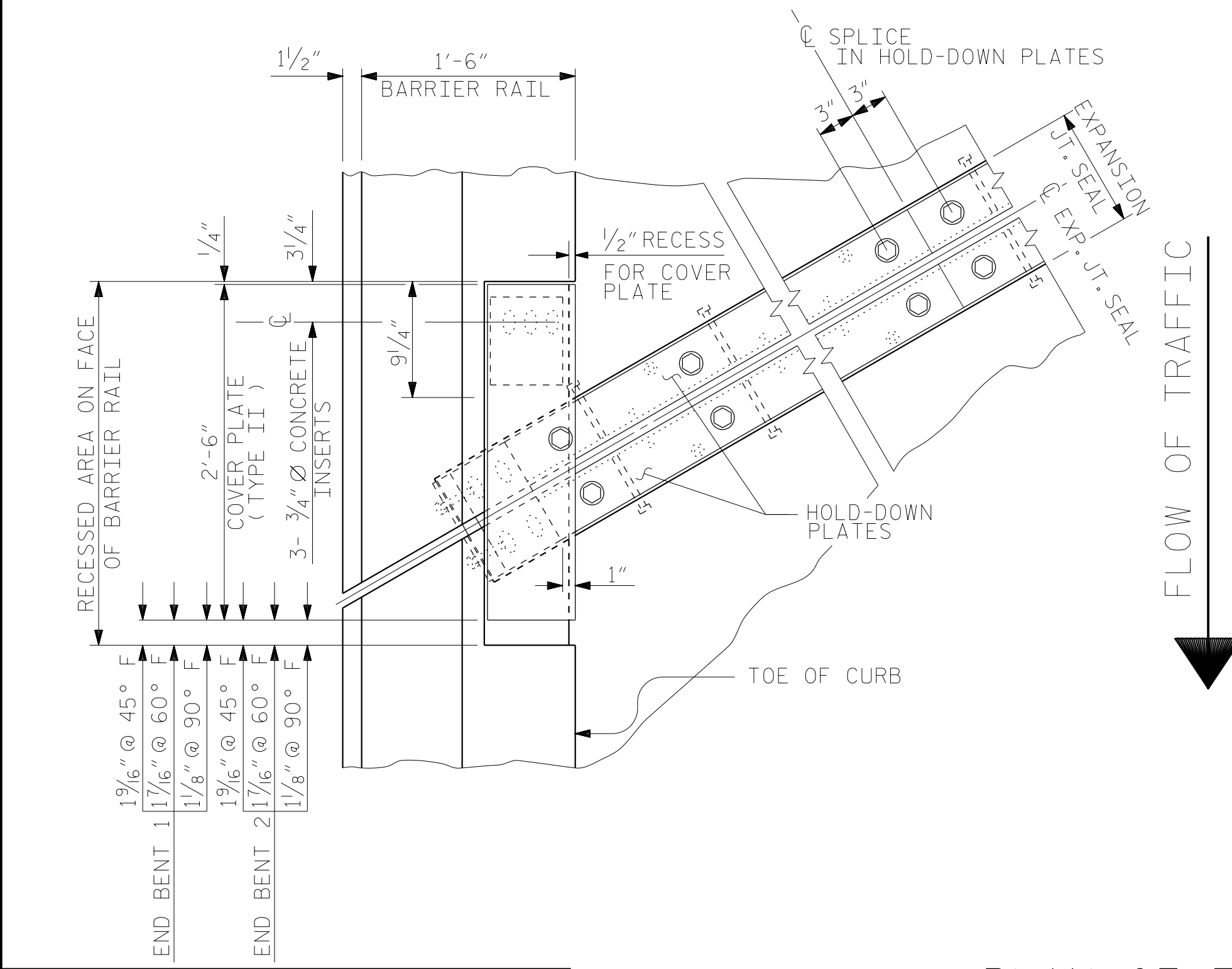
SEE "SECTION A - A" FOR OTHER DETAILS.



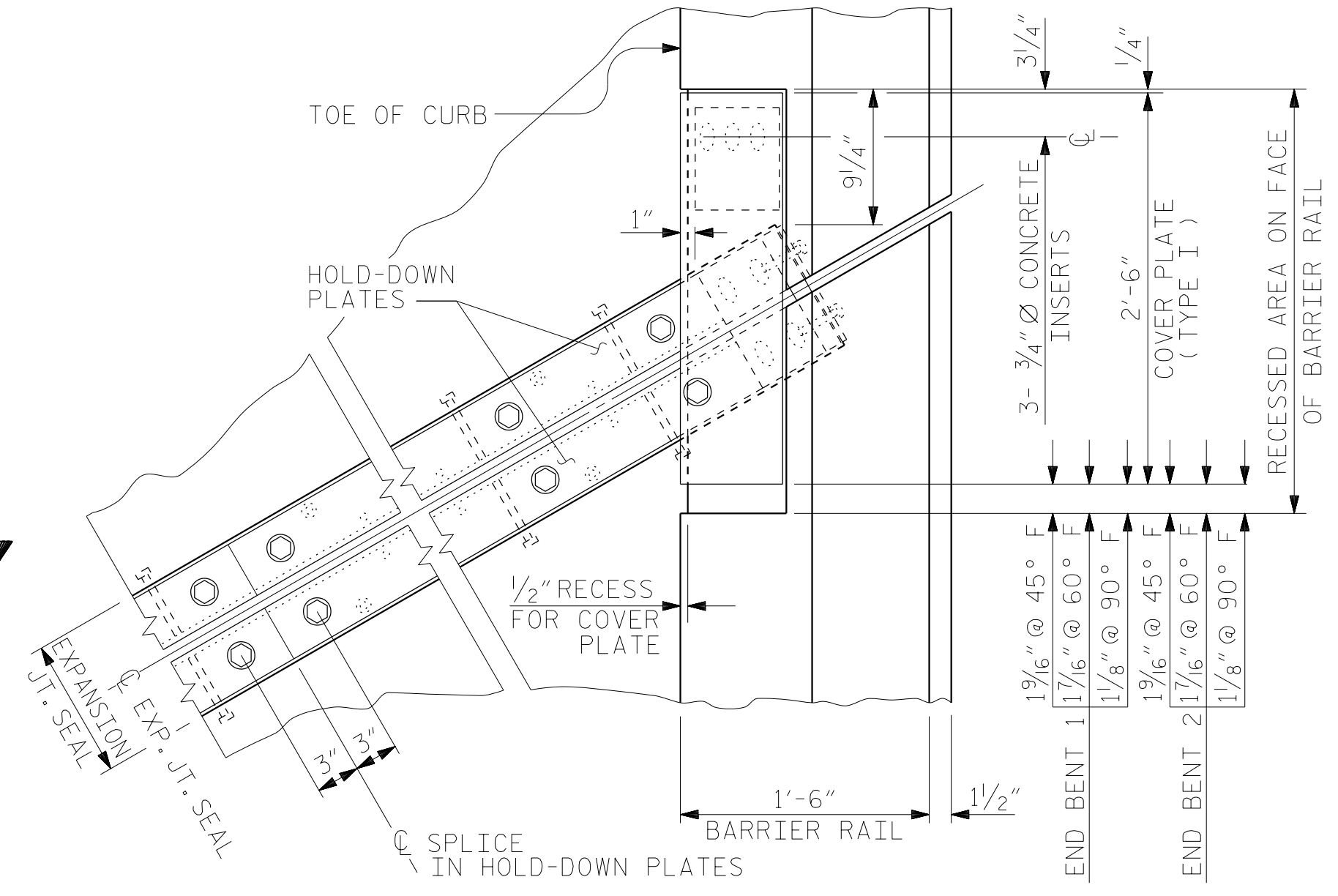
PLAN ELEVATION

CONCRETE INSERT

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



PLAN OF EXPANSION JOINT SEAL



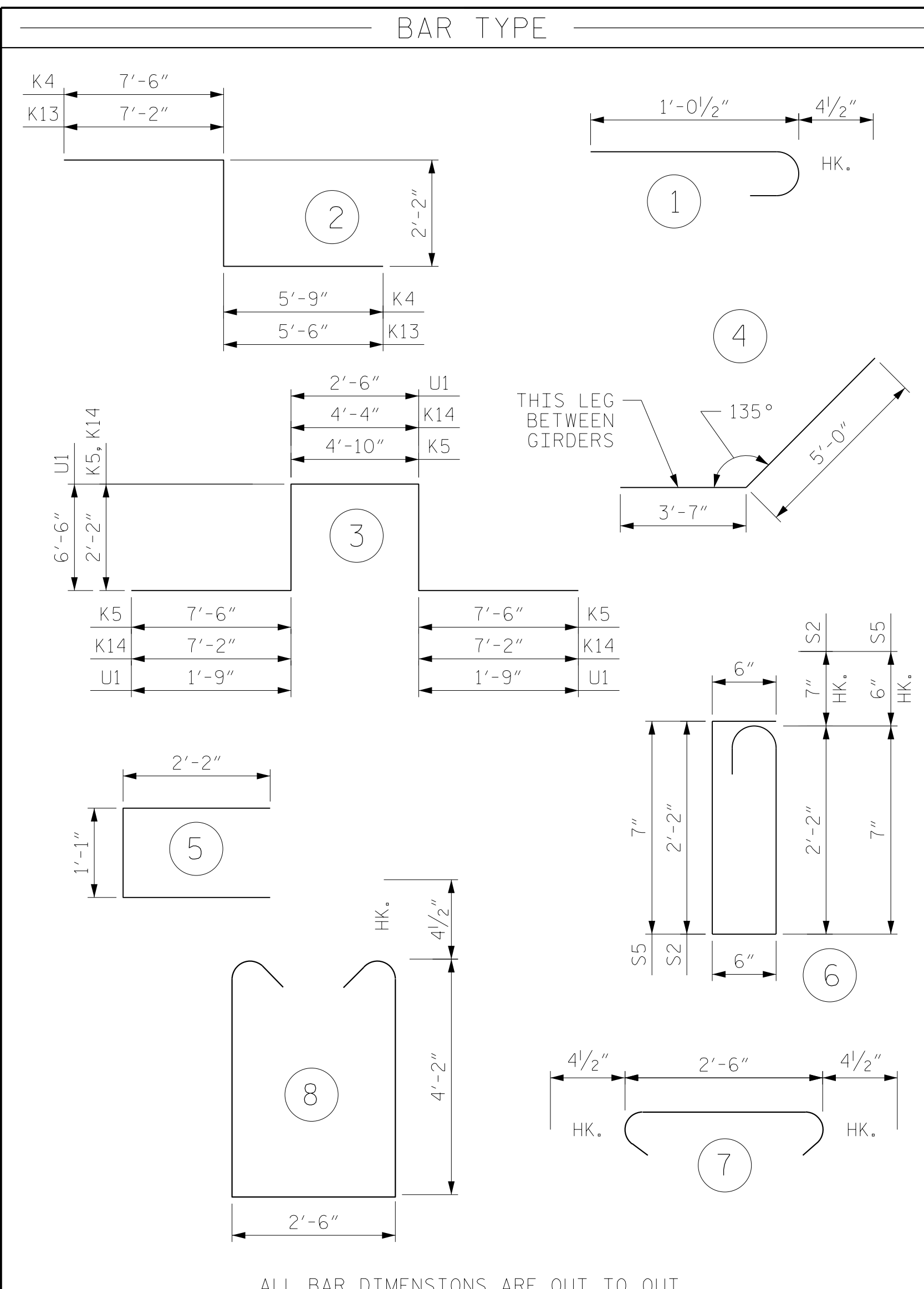
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CHECKED BY :	CRK 10/87	REV. 6/13	MAA/GM
		REV. 12/17	MAA/THC

6/13/2019 X:\P\1030180000 R-3421A Richmond\Structures\Working DGN\R-3421A.SD.LT.JS.dgn CuonyN

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PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 2 OF 2

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
STANDARD EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL LEFT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
					SHEET NO. S03-25
					TOTAL SHEETS 39



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	#5	STR	50'-11"	19596	* A143	#5	STR	43'-4"	45	* A189	#5	STR	2'-1"	2	A245	#5	STR	45'-3"	47	B1	#5	STR	44'-9"	3734	
A2	#5	STR	50'-11"	19596	* A144	#5	STR	44'-3"	46	A246	#5	STR	46'-3"	48	* B2	276	#4	STR	23'-4"	4302					
* A3	#6	STR	10'-0"	90	* A145	#5	STR	45'-3"	47	A247	#5	STR	47'-2"	49	* B3	68	#6	STR	60'-0"	6128					
* A101	#5	STR	2'-8"	3	* A146	#5	STR	46'-3"	48	A201	#5	STR	2'-8"	3	A248	#5	STR	48'-2"	50	* B4	68	#6	STR	40'-0"	4085
* A102	#5	STR	3'-8"	4	* A147	#5	STR	47'-2"	49	A202	#5	STR	3'-8"	4	A249	#5	STR	49'-1"	51	B5	40	#6	STR	60'-0"	3605
* A103	#5	STR	4'-7"	5	* A148	#5	STR	48'-2"	50	A203	#5	STR	4'-7"	5	A250	#5	STR	50'-1"	52	B6	35	#6	STR	40'-0"	2103
* A104	#5	STR	5'-7"	6	* A149	#5	STR	49'-1"	51	A204	#5	STR	5'-7"	6	A251	#5	STR	49'-10"	52	B7	30	#6	STR	54'-10"	2471
* A105	#5	STR	6'-6"	7	* A150	#5	STR	50'-1"	52	A205	#5	STR	6'-6"	7	A252	#5	STR	48'-7"	51	B8	80	#5	STR	46'-1"	3845
* A106	#5	STR	7'-6"	8	* A151	#5	STR	49'-10"	52	A206	#5	STR	7'-6"	8	A253	#5	STR	47'-4"	49	* B9	276	#4	STR	24'-3"	4471
* A107	#5	STR	8'-6"	9	* A152	#5	STR	48'-7"	51	A207	#5	STR	8'-6"	9	A254	#5	STR	46'-1"	48	* B10	68	#6	STR	32'-3"	3294
* A108	#5	STR	9'-5"	10	* A153	#5	STR	47'-4"	49	A208	#5	STR	9'-5"	10	A255	#5	STR	44'-10"	47	B11	40	#6	STR	31'-10"	1913
* A109	#5	STR	10'-5"	11	* A154	#5	STR	46'-1"	48	A209	#5	STR	10'-5"	11	A256	#5	STR	43'-7"	45						
* A110	#5	STR	11'-5"	12	* A155	#5	STR	44'-10"	47	A210	#5	STR	11'-5"	12	A257	#5	STR	42'-4"	44	* G1	1	#5	STR	60'-0"	63
* A111	#5	STR	12'-4"	13	* A156	#5	STR	43'-7"	45	A211	#5	STR	12'-4"	13	A258	#5	STR	41'-0"	43	* G2	1	#5	STR	57'-0"	59
* A112	#5	STR	13'-4"	14	* A157	#5	STR	42'-4"	44	A212	#5	STR	13'-4"	14	A259	#5	STR	39'-9"	41						
* A113	#5	STR	14'-3"	15	* A158	#5	STR	41'-0"	43	A213	#5	STR	14'-3"	15	A260	#5	STR	38'-6"	40	* J1	112	#4	1	1'-5"	106
* A114	#5	STR	15'-3"	16	* A159	#5	STR	39'-9"	41	A214	#5	STR	15'-3"	16	A261	#5	STR	37'-3"	39						
* A115	#5	STR	16'-3"	17	* A160	#5	STR	38'-6"	40	A215	#5	STR	16'-3"	17	A262	#5	STR	36'-0"	38	* K1	5	#6	STR	8'-9"	66
* A116	#5	STR	17'-2"	18	* A161	#5	STR	37'-3"	39	A216	#5	STR	17'-2"	18	A263	#5	STR	34'-9"	36	* K2	5	#6	STR	6'-11"	52
* A117	#5	STR	18'-2"	19	* A162	#5	STR	36'-0"	38	A217	#5	STR	18'-2"	19	A264	#5	STR	33'-6"	35	* K3	5	#6	STR	5'-7"	42
* A118	#5	STR	19'-1"	20	* A163	#5	STR	34'-9"	36	A218	#5	STR	19'-1"	20	A265	#5	STR	32'-3"	34	* K4	4	#8	2	15'-5"	165
* A119	#5	STR	20'-1"	21	* A164	#5	STR	33'-6"	35	A219	#5	STR	20'-1"	21	A266	#5	STR	31'-0"	32	* K5	8	#8	3	24'-2"	516
* A120	#5	STR	21'-1"	22	* A165	#5	STR	32'-3"	34	A220	#5	STR	21'-1"	22	A267	#5	STR	29'-9"	31	K6	10	#4	STR	27'-8"	185
* A121	#5	STR	22'-0"	23	* A166	#5	STR	31'-0"	32	A221	#5	STR	22'-0"	23	A268	#5	STR	28'-6"	30	K7	50	#4	STR	9'-6"	317
* A122	#5	STR	23'-0"	24	* A167	#5	STR	29'-9"	31	A222	#5	STR	23'-0"	24	A269	#5	STR	27'-3"	28	K8	10	#4	STR	6'-5"	43
* A123	#5	STR	23'-11"	25	* A168	#5	STR	28'-6"	30	A223	#5	STR	23'-11"	25	A270	#5	STR	25'-11"	27	K9	10	#4	STR	6'-0"	40
* A124	#5	STR	24'-11"	26	* A169	#5	STR	27'-3"	28	A224	#5	STR	24'-11"	26	A271	#5	STR	24'-8"	26	* K10	5	#6	STR	8'-7"	64
* A125	#5	STR	25'-11"	27	* A170	#5	STR	25'-11"	27	A225	#5	STR	25'-11"	27	A272	#5	STR	23'-5"	24	* K11	5	#6	STR	6'-6"	49
* A126	#5	STR	26'-10"	28	* A171	#5	STR	24'-8"	26	A226	#5	STR	25'-11"	27	A273	#5	STR	22'-2"	23	* K12	5	#6	STR	5'-6"	41
* A127	#5	STR	27'-10"	29	* A172	#5	STR	23'-5"	24	A227	#5	STR	24'-8"	26	A274	#5	STR	20'-11"	22	* K13	4	#8	2	14'-10"	158
* A128	#5	STR	28'-10"	30	* A173	#5	STR	22'-2"	23	A228	#5	STR	23'-5"	24	A275	#5	STR	19'-8"	21	* K14	8	#8	3	23'-0"	491
* A129	#5	STR	29'-9"	31	* A174	#5	STR	20'-11"	22	A229	#5	STR	22'-2"	23	A276	#5	STR	18'-5"	19	K15	20	#4	4	8'-7"	115
* A130	#5	STR	30'-9"	32	* A175	#5	STR	19'-8"	21	A230	#5	STR	20'-11"	22	A277	#5	STR	17'-2"	18	K16	10	#4	STR	9'-6"	63
* A131	#5	STR	31'-8"	33	* A176	#5	STR	18'-5"	19	A231	#5	STR	19'-8"	21	A278	#5	STR	15'-11"	17	K17	10	#4	STR	9'-0"	60
* A132	#5	STR	32'-8"	34	* A177	#5	STR	17'-2"	18	A232	#5	STR	18'-5"	19	A279	#5	STR	14'-8"	15						
* A133	#5	STR	33'-8"	35	* A178	#5	STR	15'-11"	17	A233	#5	STR	17'-2"	18	A280	#5	STR	13'-5"	14	* S1	60	#4	5	5'-5"	217
* A134	#5	STR	34'-7"	36	* A179	#5	STR	14'-8"	15	A234	#5	STR	15'-11"	17	A281	#5	STR	12'-2"	13	* S2	60	#5	6	5'-11"	370
* A135	#5	STR	35'-7"	37	* A180	#5	STR	13'-5"	14	A235	#5	STR	14'-8"	15	A282	#5	STR	10'-11"	11	* S3	220	#4	7	3'-3"	478
* A136	#5	STR	36'-6"	38	* A181	#5	STR	12'-2"	13	A236	#5	STR	13'-5"	14	A283	#5	STR	9'-7"	10	* S4	10	#4	8	11'-7"	77
* A137	#5	STR	37'-6"	39	* A182	#5	STR	10'-11"	11	A237	#5	STR	12'-2"	13	A284	#5	STR	8'-4"	9	* S5	40	#4	6	2'-8"	71
* A138	#5	STR	38'-6"	40	* A183	#5	STR	9'-7"	10	A238	#5	STR	10'-11"	11	A285	#5	STR	7'-1"	7						
* A139	#5	STR	39'-5"	41	* A184	#5	STR	8'-4"	9	A239	#5	STR	9'-7"	10	A286	#5	STR	5'-10"	6	* U1	30	#4	3	19'-0"	381
* A140	#5	STR	40'-5"	42	* A185	#5	STR	7'-1"	7	A240	#5	STR	8'-4"	9	A287	#5	STR	4'-7"	5						
* A141	#5	STR	41'-4"	43	* A186	#5	STR	5'-10"	6	A241	#5	STR	7'-1"	7	A288	#5	STR	3'-4"	3						
* A142	#5	STR	42'-4"	44	* A187	#5	STR	4'-7"	5	A242	#5	STR	5'-10"	6	A289	#5	STR	2'-1"	2						
					* A188	#5	STR	3'-4"	3	A243	#5	STR	4'-7"	5											
					* A189	#5	STR	3'-4"	3	A244	#5	STR	44'-3"	46											

REINFORCING STEEL 41,146 LBS.
 *EPOXY COATED REINFORCING STEEL 47,236 LBS.

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

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

GROOVING BRIDGE FLOORS

APPROACH SLABS	2,231 SQ.FT.
BRIDGE DECK	11,672 SQ.FT.
TOTAL	13,903 SQ.FT.

—SUPERSTRUCTURE BILL OF MATERIAL—

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	213.1		
POUR 2	280.0		
POUR 3	19.5		
TOTALS**	512.6	41,146 LBS.	47,236 LBS.

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

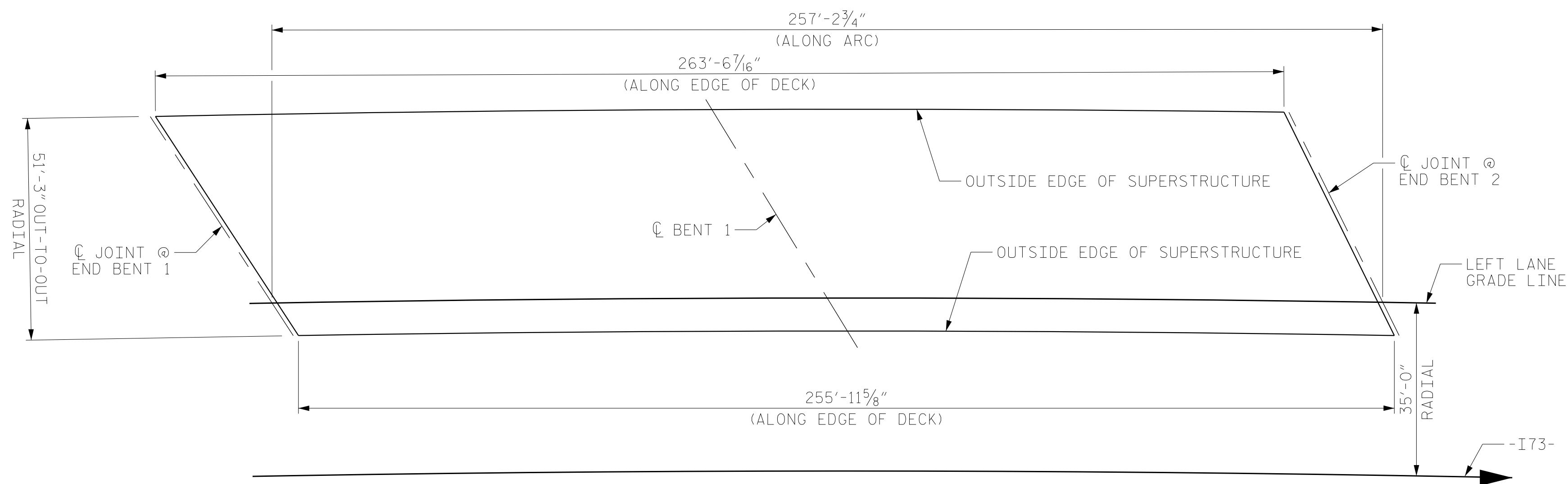
SHEET 1 OF 2



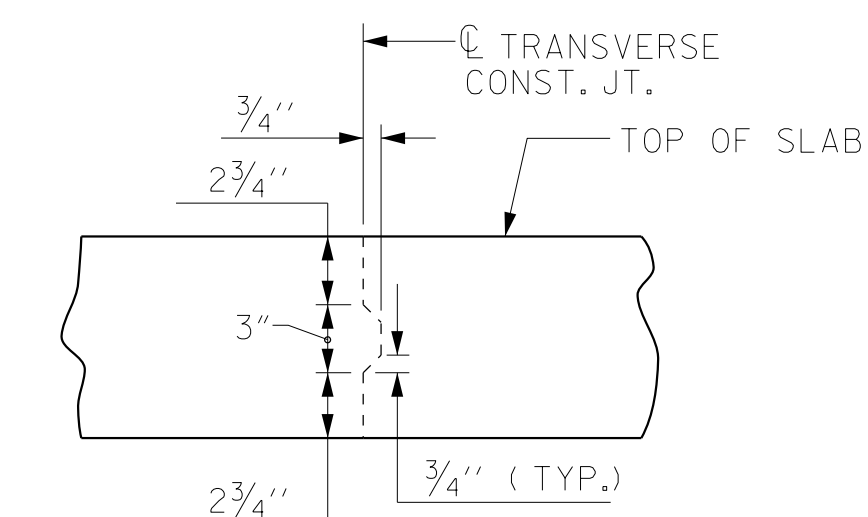
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL
 LEFT LANE

REVISIONS						SHEET NO
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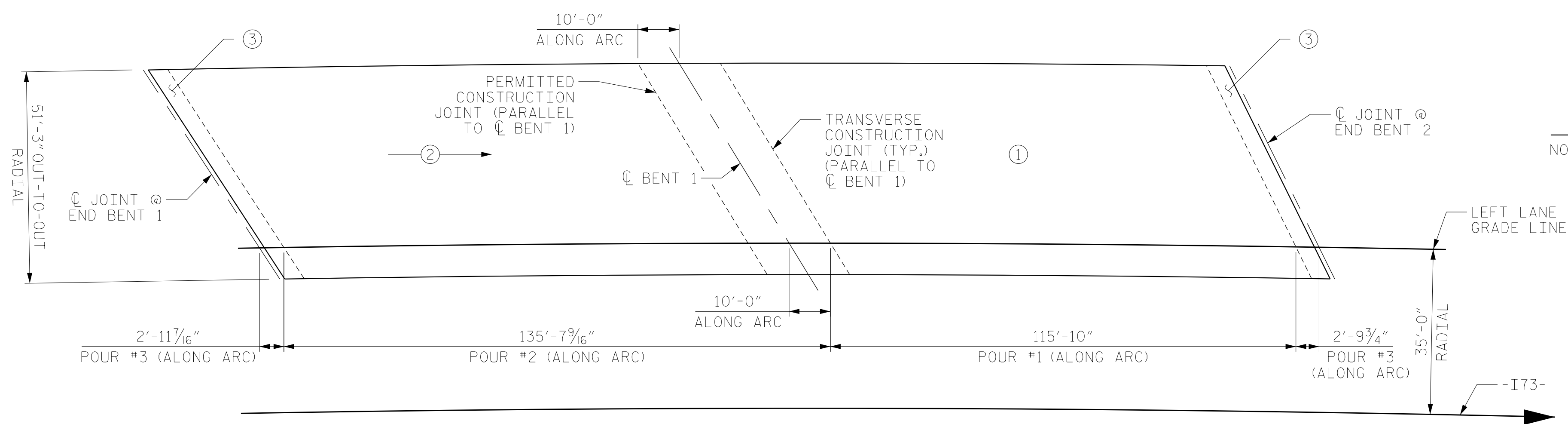


LAYOUT FOR COMPUTING
AREA OF REINFORCED CONCRETE DECK SLAB
(SQ. FT = 13,312)

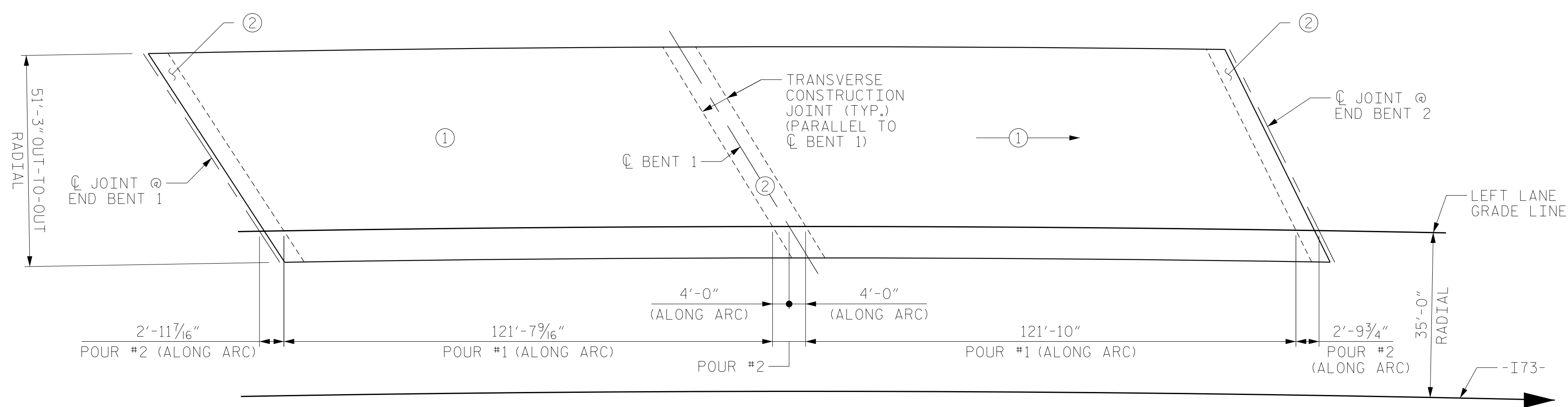


TRANSVERSE CONSTRUCTION JOINT DETAIL

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



POURING SEQUENCE

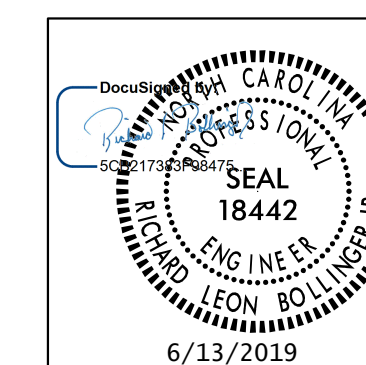


OPTIONAL POURING SEQUENCE

POUR ② CAN NOT BE STARTED UNTIL BOTH ADJACENT ① POURS REACH A MINIMUM OF 3000 PSI

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-

SHEET 2 OF 2



RS&H

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
BILL OF MATERIAL
LEFT LANE

REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-27	
1			3			TOTAL SHEETS	
2			4			39	

DRAWN BY : MKO, MAL DATE : 07/2015
CHECKED BY : JMR DATE : 07/2015
DESIGN ENGINEER : JMR DATE : 04/2019
OF RECORD :

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED

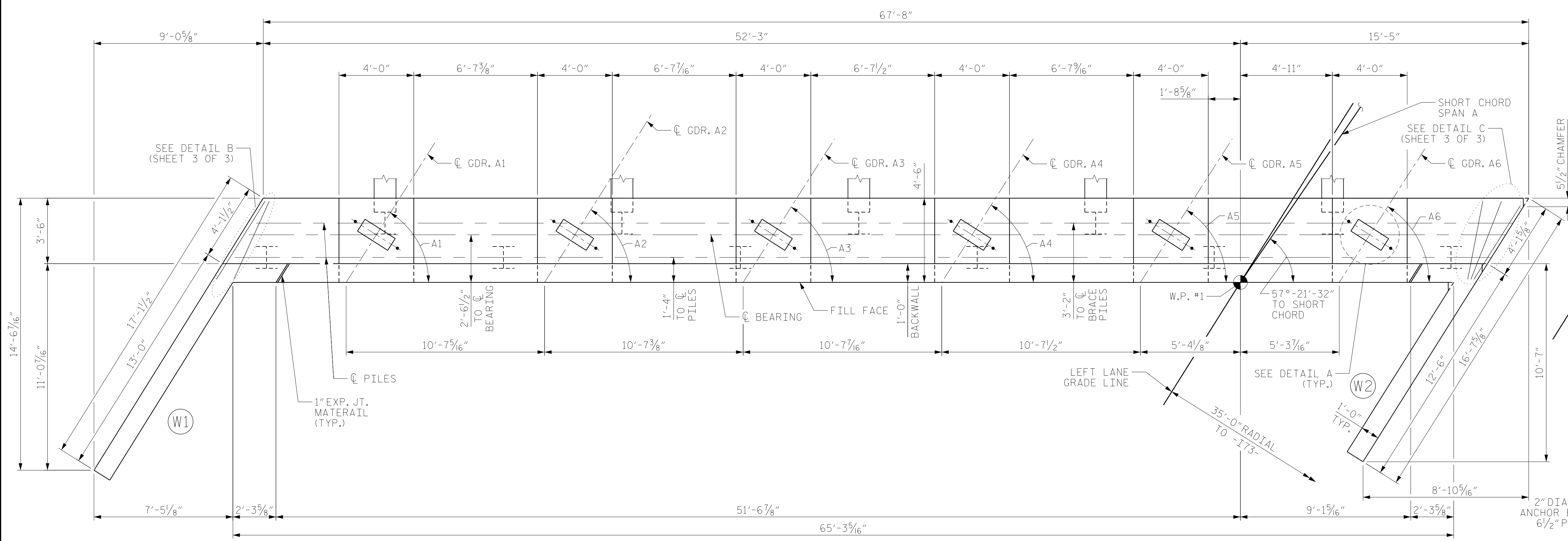
NOTES

STIRRUPS, U2 BARS AND B6 BARS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

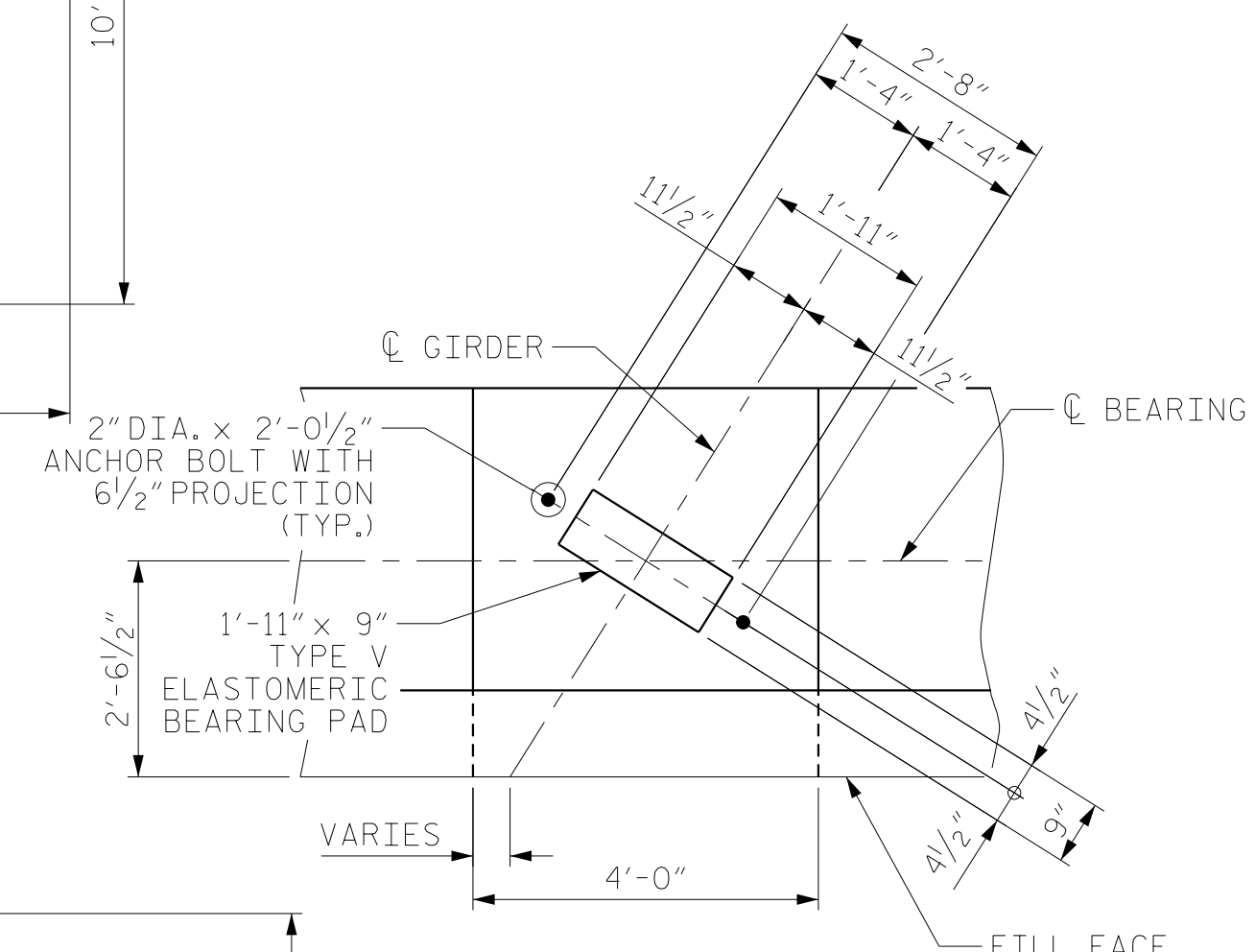
THE TOP SURFACE OF THE END BENT CAP EXCEPT BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT A RATE OF 2%.



PLAN

BEAM ANGLES

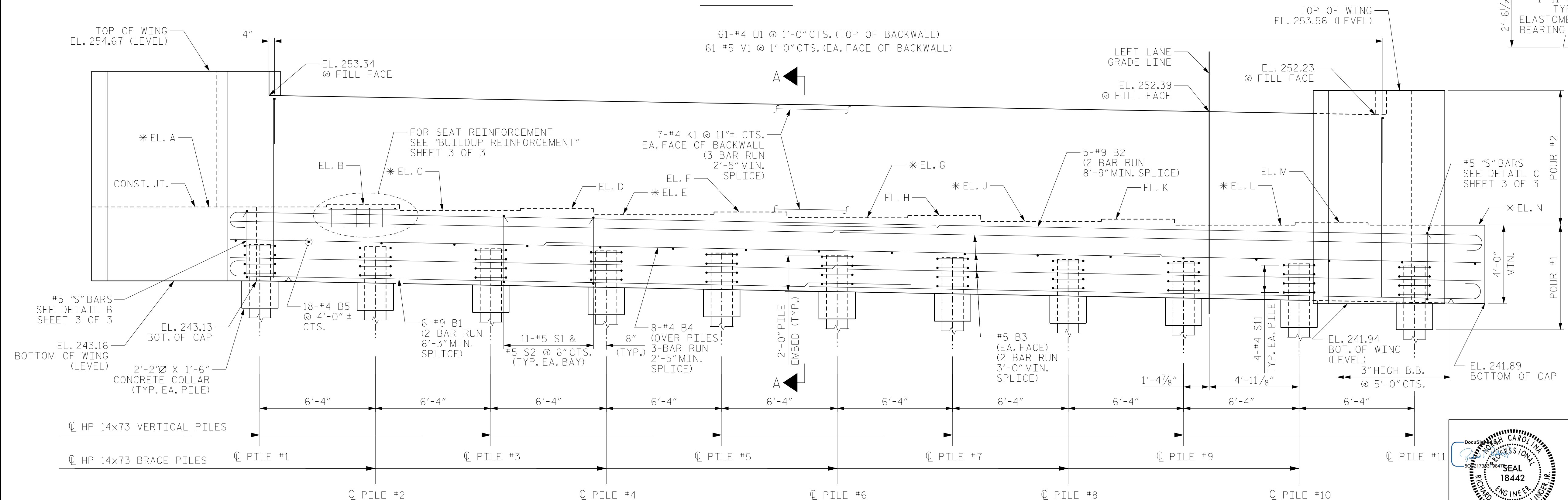
A1	57°-32'-17"
A2	57°-29'-49"
A3	57°-27'-20"
A4	57°-24'-51"
A5	57°-22'-21"
A6	57°-19'-51"



DETAIL A

MINIMUM SPLICE LENGTHS

#9 B1	6'-3"
#9 B2	8'-9"
#5 B3	3'-0"
#4 B4	2'-5"
#4 K1	2'-5"



ELEVATION

ELEVATIONS

A	B	C	D	E	F	G	H	J	K	L	M	N
247.18	247.31	246.99	247.11	246.79	246.92	246.60	246.72	246.40	246.53	246.21	246.33	246.21

PILE TIP ELEVATIONS

PILE #1	PILE #2	PILE #3	PILE #4	PILE #5	PILE #6	PILE #7	PILE #8	PILE #9	PILE #10	PILE #11
245.12	245.01	244.89	244.77	244.66	244.54	244.42	244.30	244.18	244.07	243.95

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 1 OF 3

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 RALEIGH

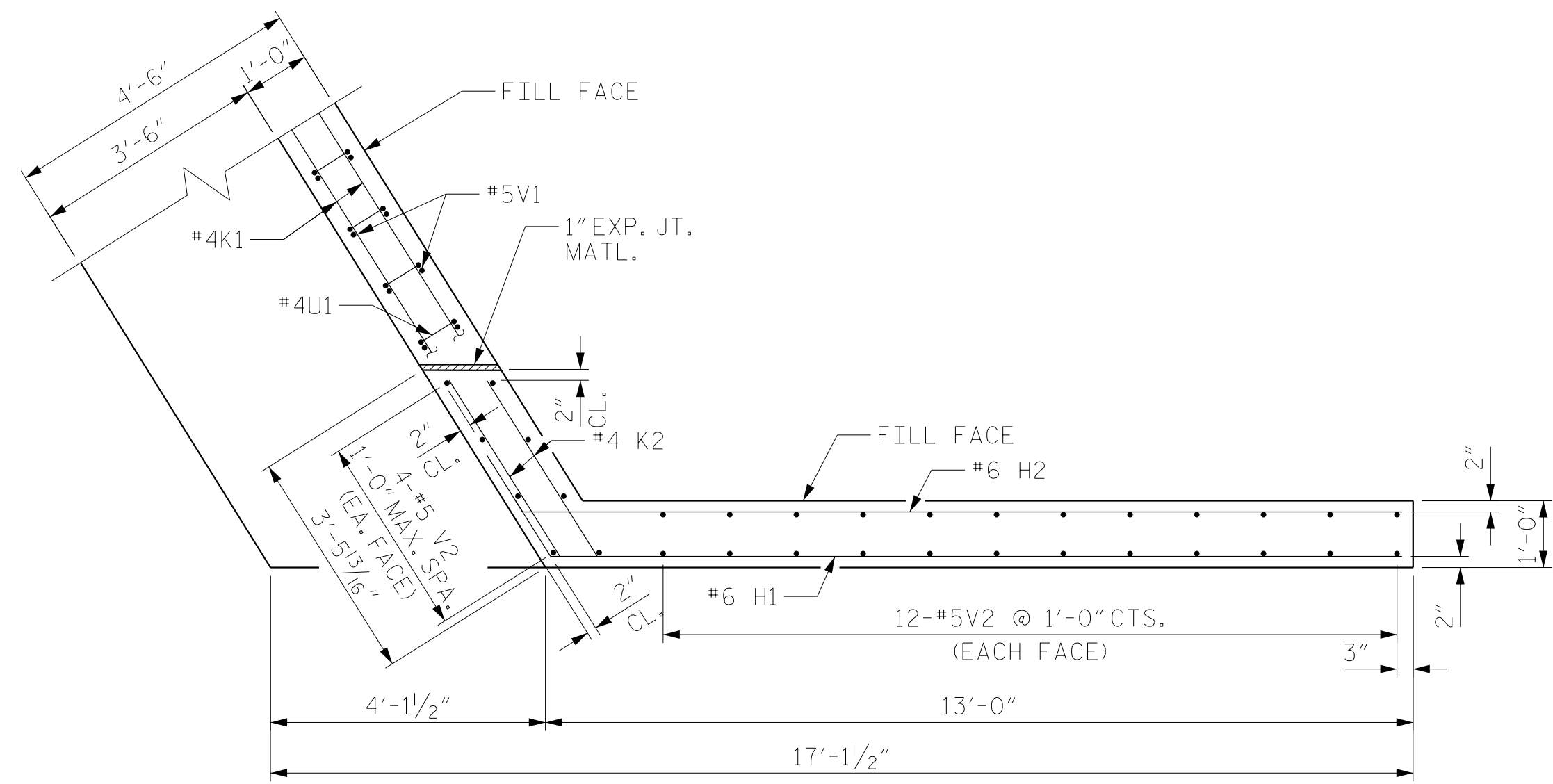
SUBSTRUCTURE
 END BENT #1
 LEFT LANE

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

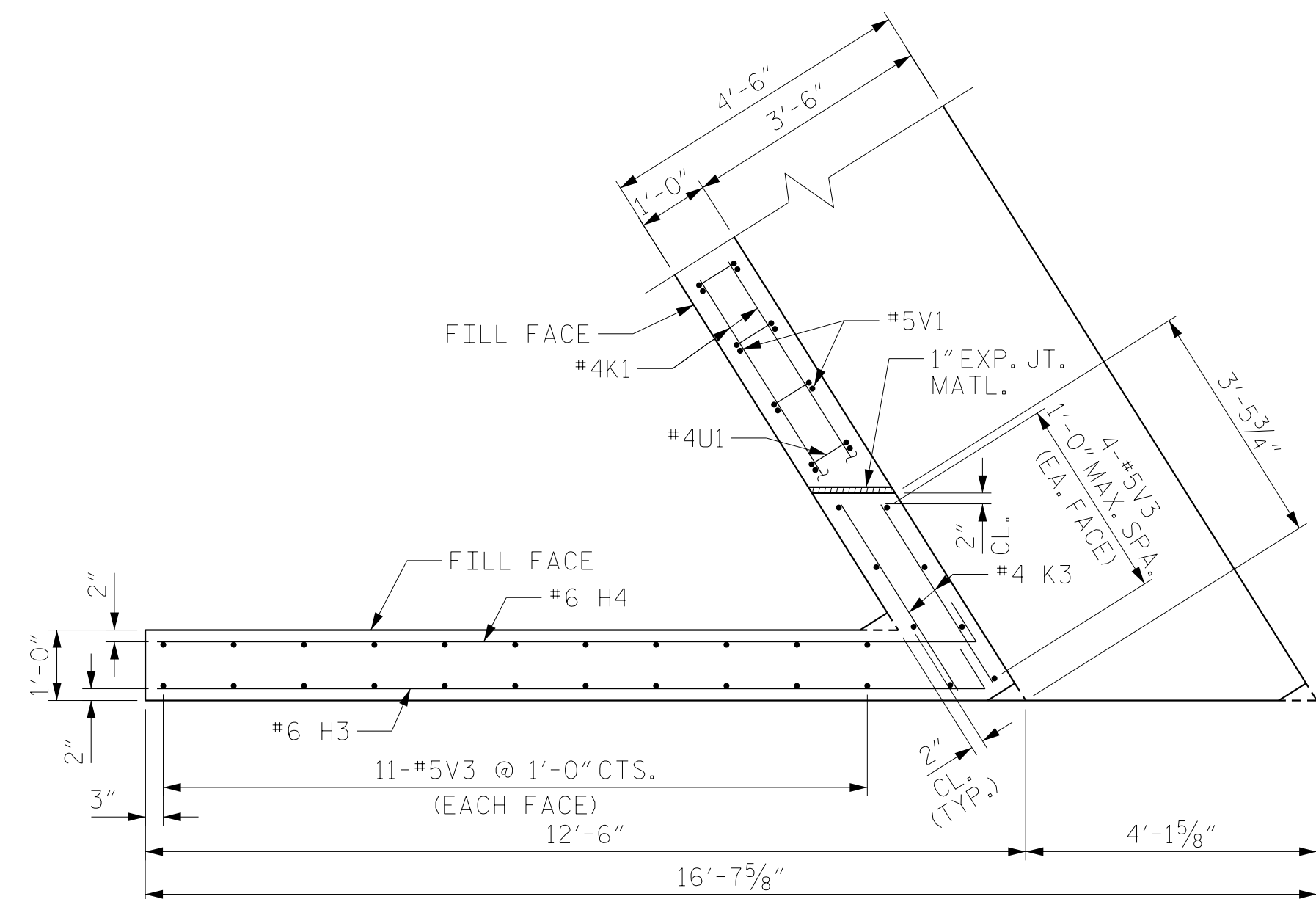
SHEET NO. S03-28
 TOTAL SHEETS 39

DRAWN BY : MKO DATE : 06/2015
 CHECKED BY : JMR DATE : 07/2015
 DESIGN ENGINEER OF RECORD : RLB DATE : 04/2019

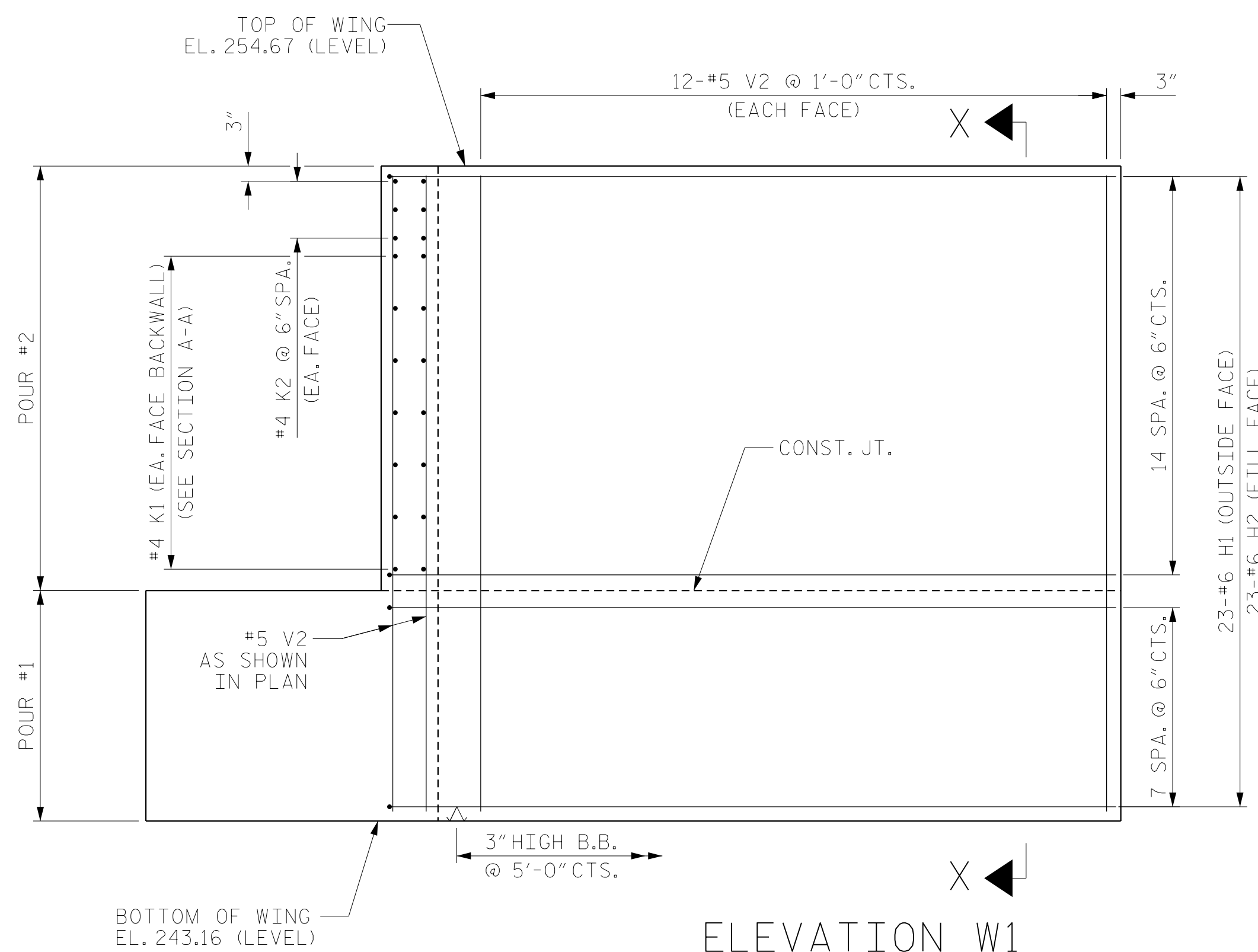
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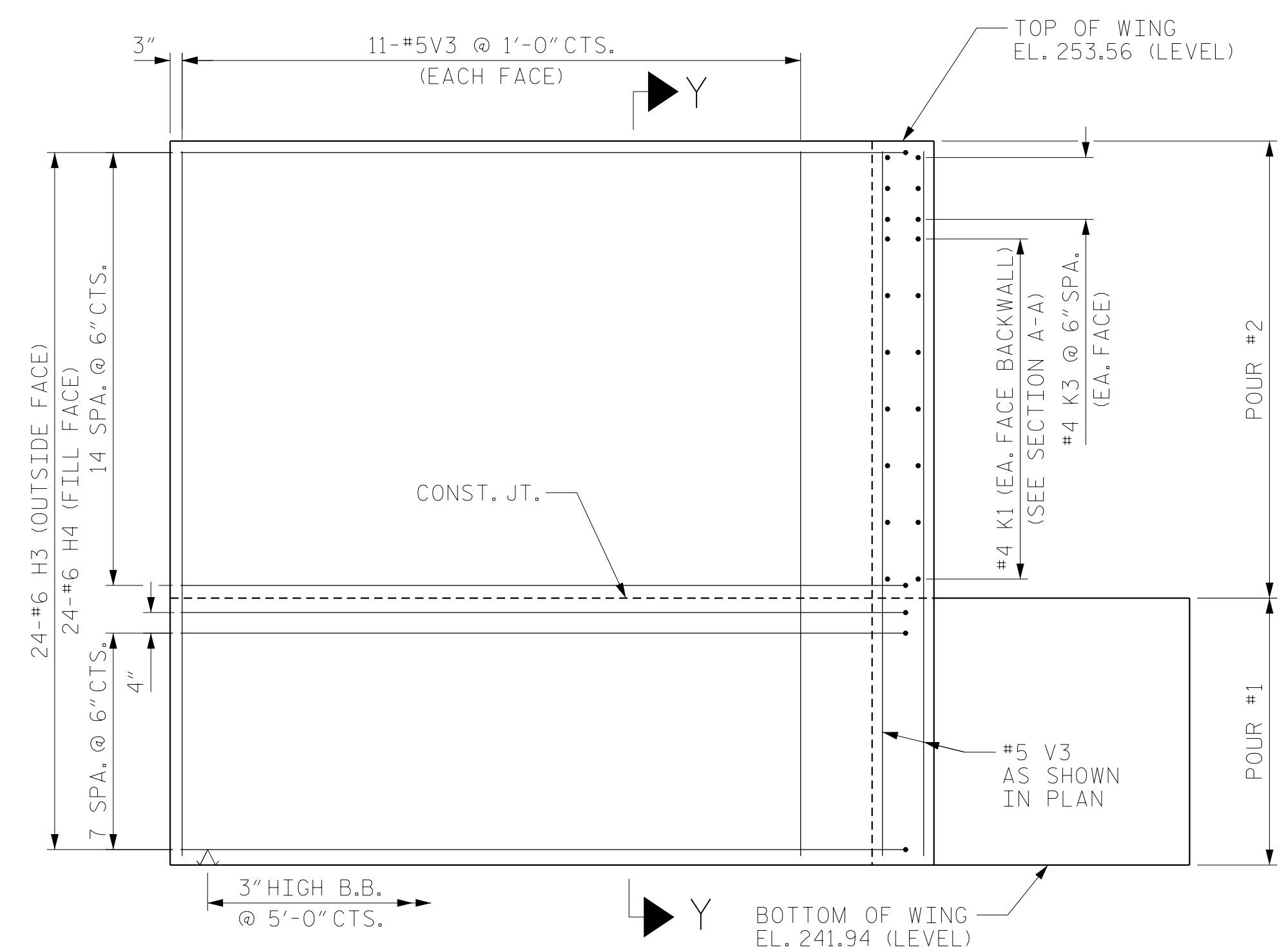
PLAN W1



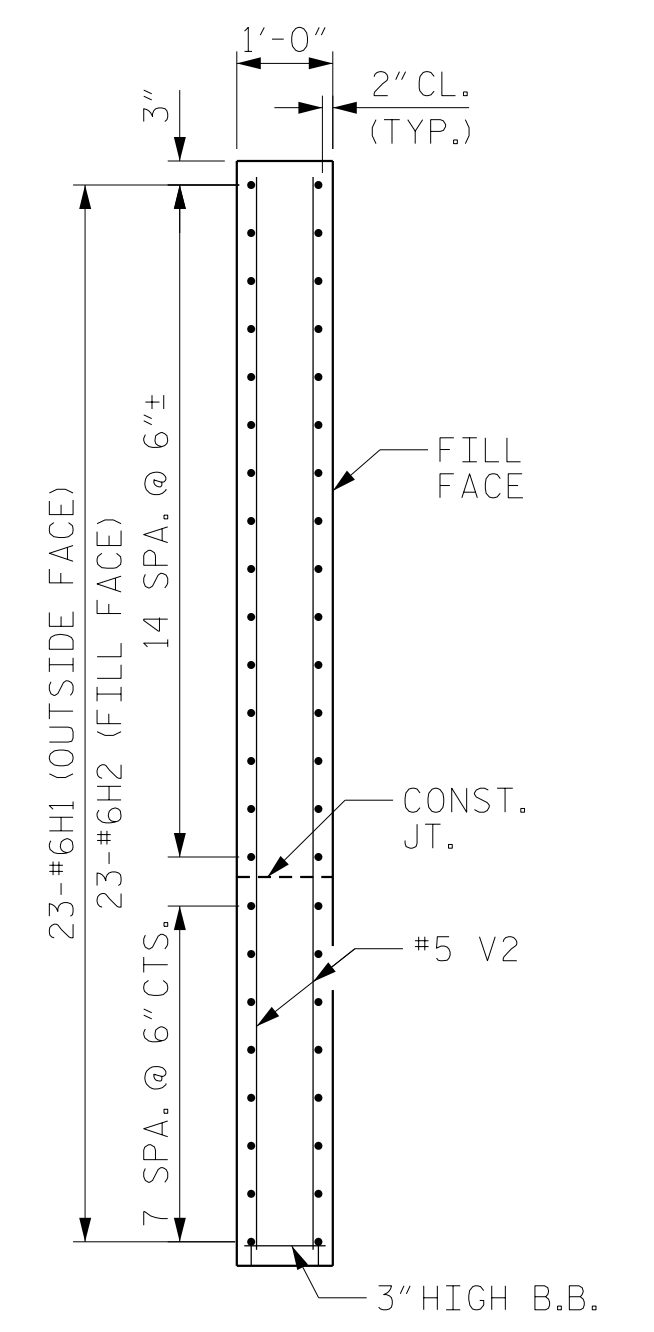
PLAN W2



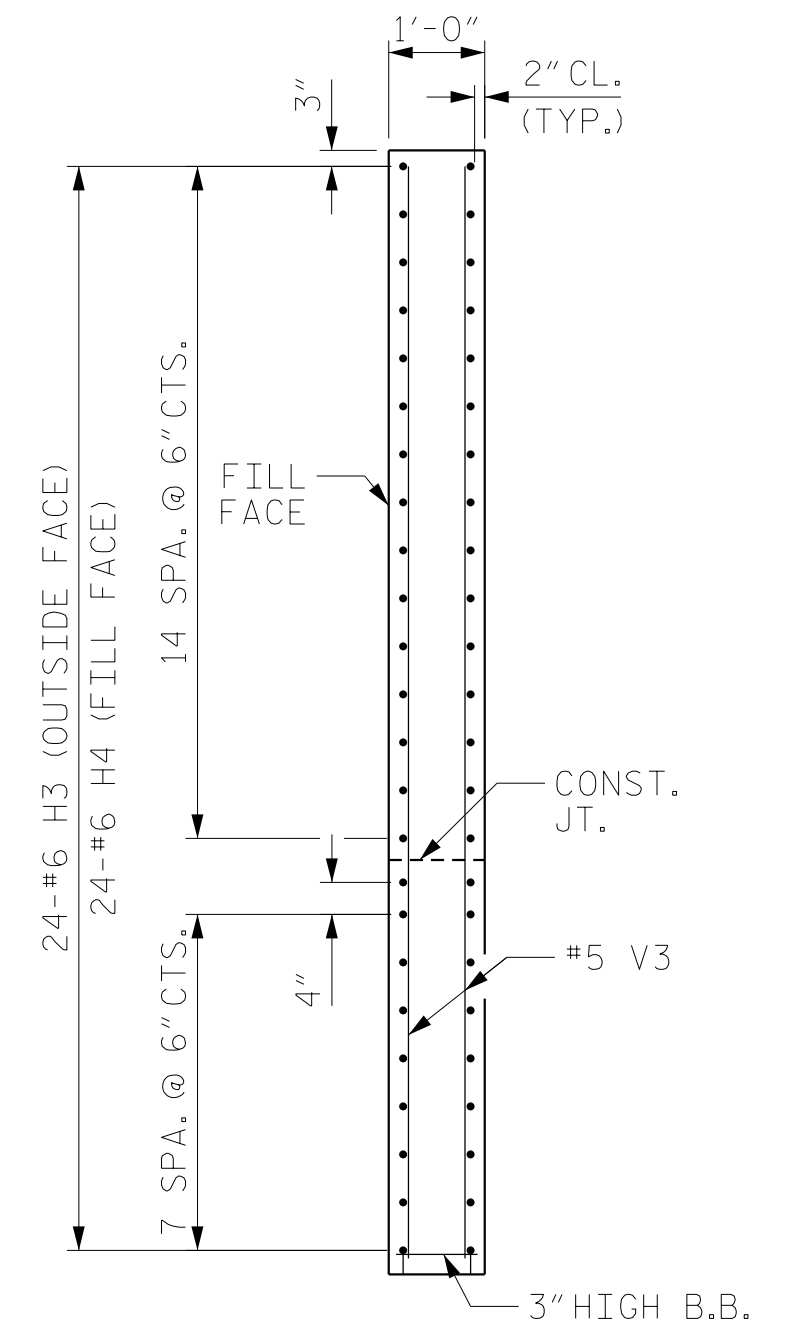
ELEVATION W1



ELEVATION W2



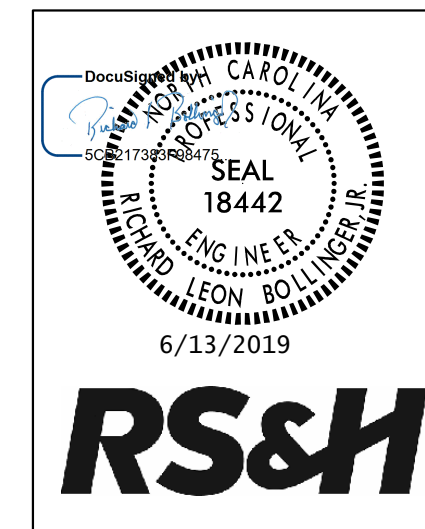
SECTION X-X



SECTION Y-Y

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 2 OF 3



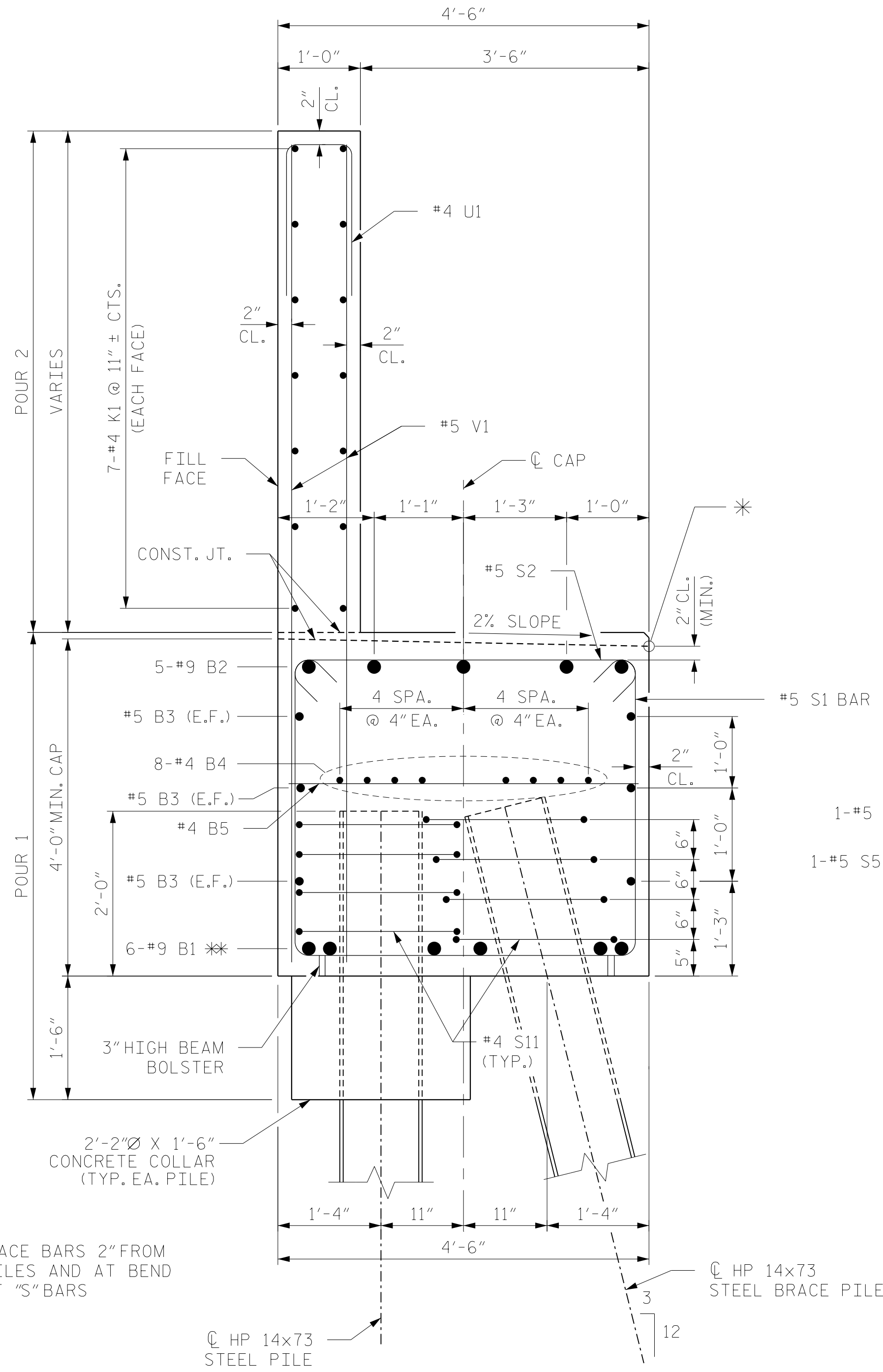
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT #1
 LEFT LANE

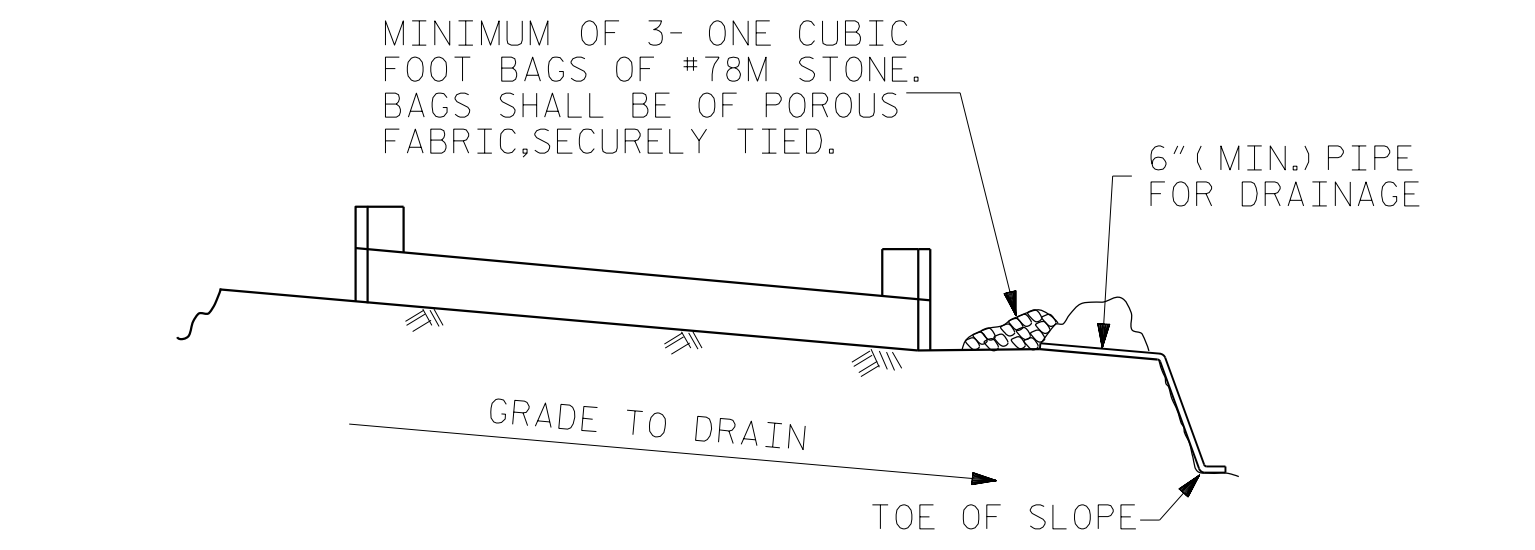
REVISIONS						SHEET NO.
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1			3			S03-29
2			4			TOTAL SHEETS 39

DRAWN BY : MKO DATE : 06/2015
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 DESIGN ENGINEER OF RECORD : RLB DATE : 04/2019

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SECTION A-A
 * ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS ARE SHOWN AT THIS POINT
 NOTE: CONCRETE COLLAR NOT SHOWN ON BRACE PILE FOR CLARITY.

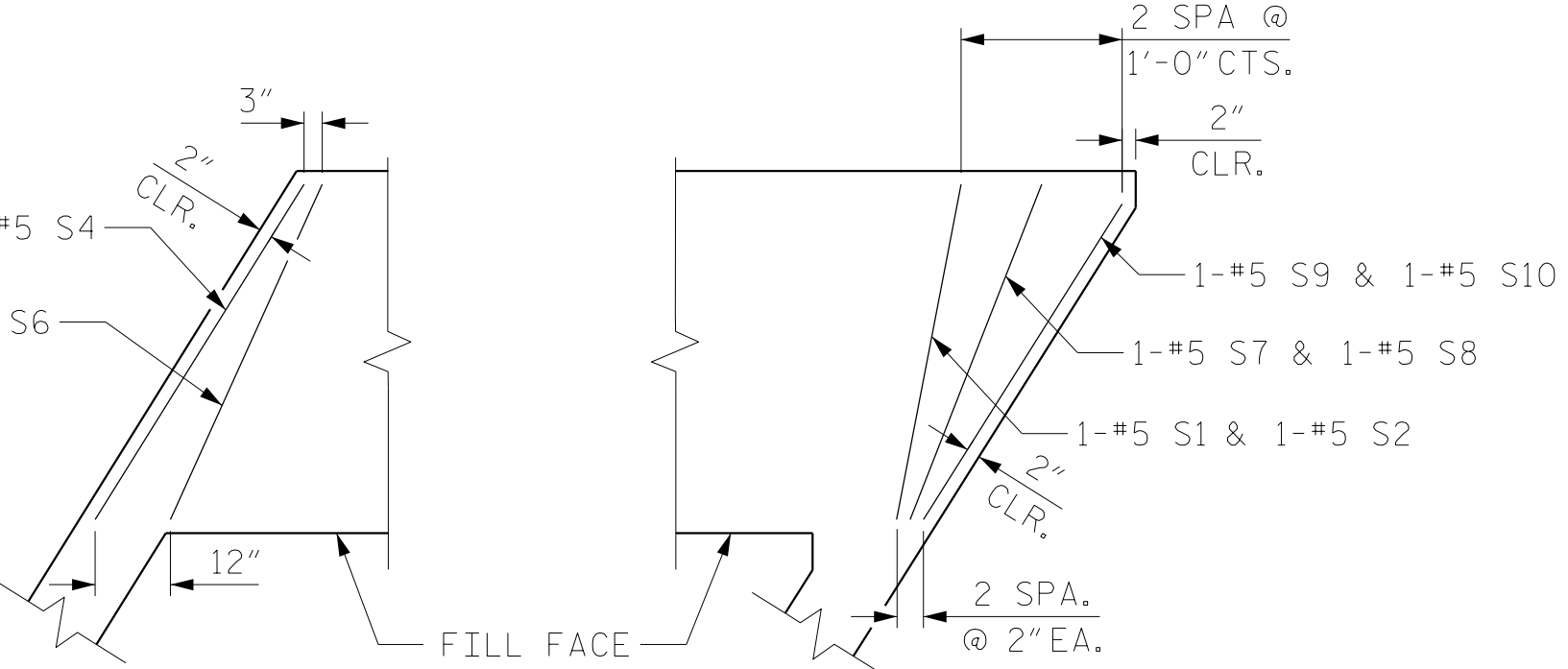


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

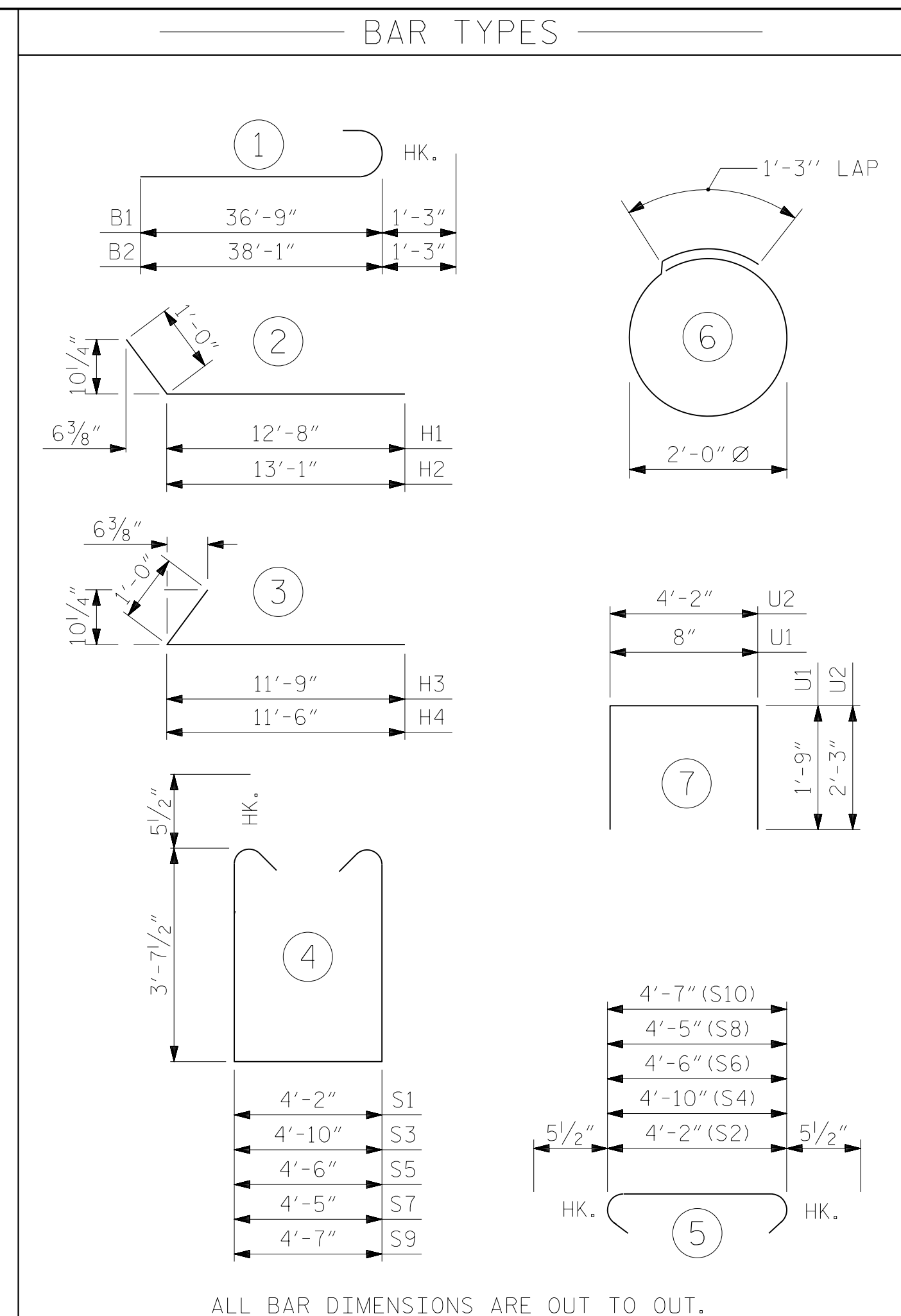
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

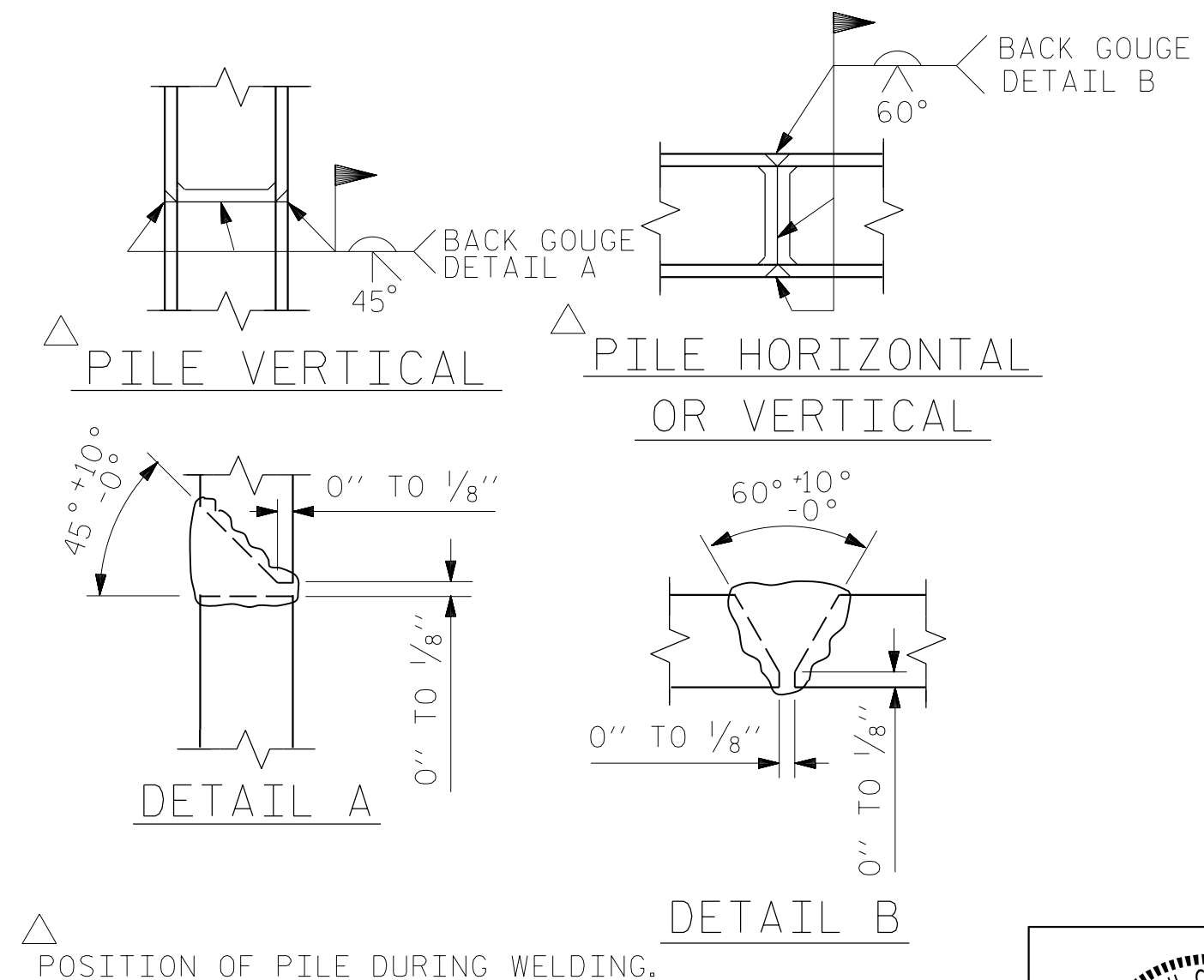
TEMPORARY DRAINAGE AT END BENT



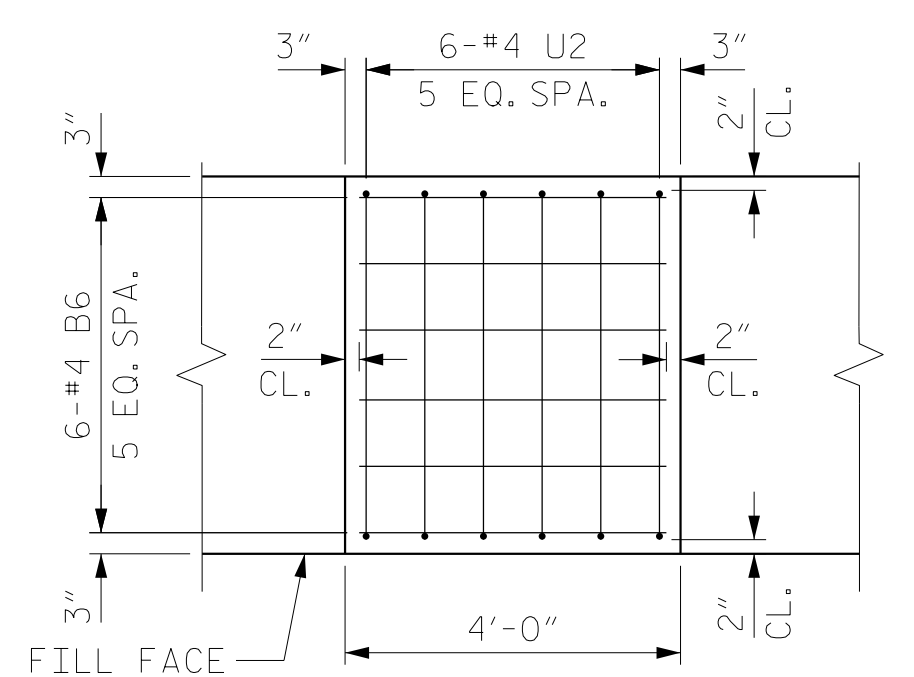
DETAIL B **DETAIL C**



ALL BAR DIMENSIONS ARE OUT TO OUT.



PILE SPLICE DETAILS



BRIDGE SEAT BUILDUP REINFORCEMENT
 BACKWALL NOT SHOWN FOR CLARITY

BILL OF MATERIAL					
END BENT #1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	38'-0"	1550
B2	10	#9	1	39'-4"	1337
B3	12	#5	STR	35'-2"	440
B4	24	#4	STR	24'-0"	385
B5	18	#4	STR	4'-2"	50
B6	36	#4	STR	3'-8"	88
H1	23	#6	2	13'-8"	472
H2	23	#6	2	14'-1"	487
H3	24	#6	3	12'-9"	460
H4	24	#6	3	12'-6"	451
K1	42	#4	STR	24'-0"	673
K2	6	#4	STR	3'-1"	12
K3	6	#4	STR	3'-0"	12
S1	110	#5	4	12'-4"	1415
S2	110	#5	5	5'-1"	583
S3	1	#5	4	13'-0"	14
S4	1	#5	5	5'-9"	6
S5	1	#5	4	12'-8"	13
S6	1	#5	5	5'-5"	6
S7	1	#5	4	12'-7"	13
S8	1	#5	5	5'-4"	6
S9	1	#5	4	12'-9"	13
S10	1	#5	5	5'-6"	6
S11	44	#5	6	7'-7"	348
U1	61	#4	7	4'-2"	170
U2	36	#4	7	8'-8"	208
V1	122	#5	STR	9'-10"	1251
V2	32	#5	STR	11'-2"	373
V3	30	#5	STR	11'-3"	352

REINFORCING STEEL		11,194 LBS.
CLASS A CONCRETE BREAKDOWN		
POUR #1 CAP, LOWER PART OF WINGS & COLLARS		52.9 C.Y.
POUR #2 UPPER PART OF WINGS & BACKWALL		22.4 C.Y.
TOTAL CLASS A CONCRETE		75.3 C.Y.
HP 14 X 73 STEEL PILES		
NO: 11		LIN. FT. = 715
PILE DRIVING EQUIPMENT SETUP	EA. 11	
STEEL PILE POINTS	NO. 11	

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 3 OF 3

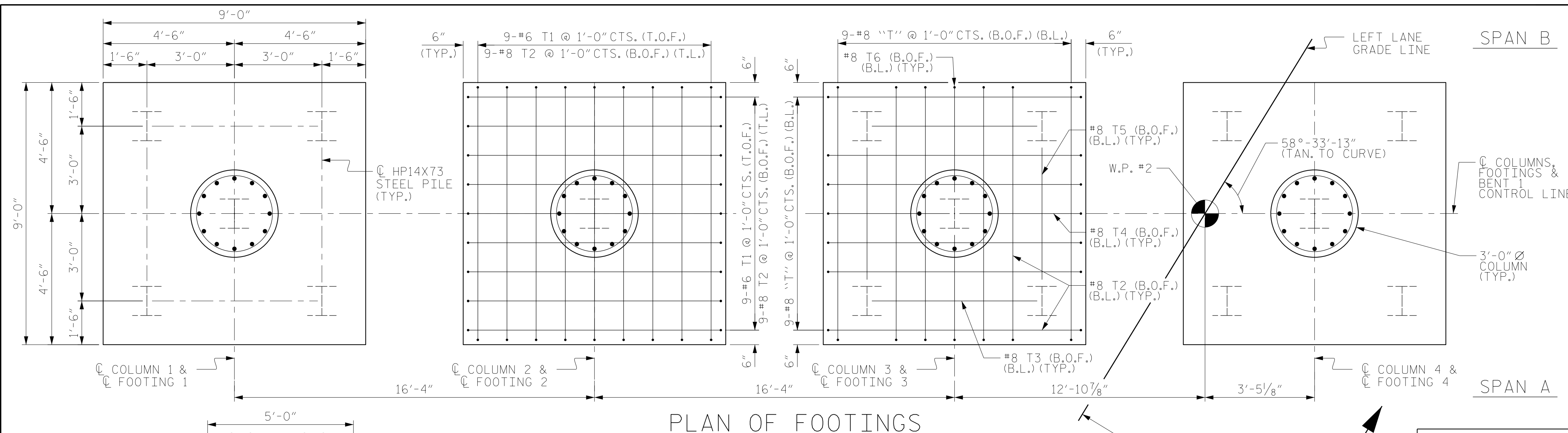


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT #1
 LEFT LANE

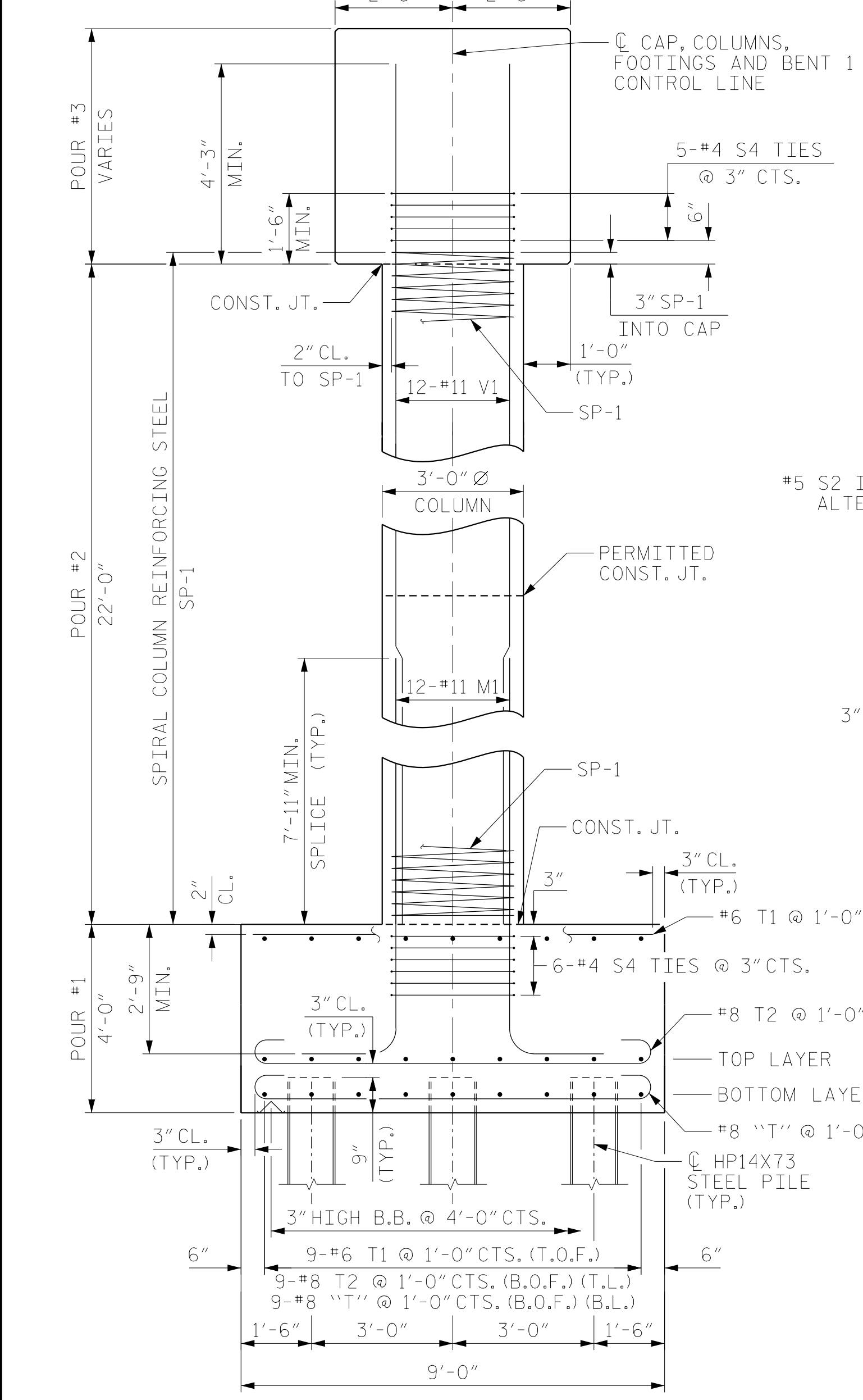
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-30
1			3			TOTAL SHEETS
2			4			39

DRAWN BY: MKO DATE: 07/2015
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 DESIGN ENGINEER OF RECORD: RLB DATE: 04/2019

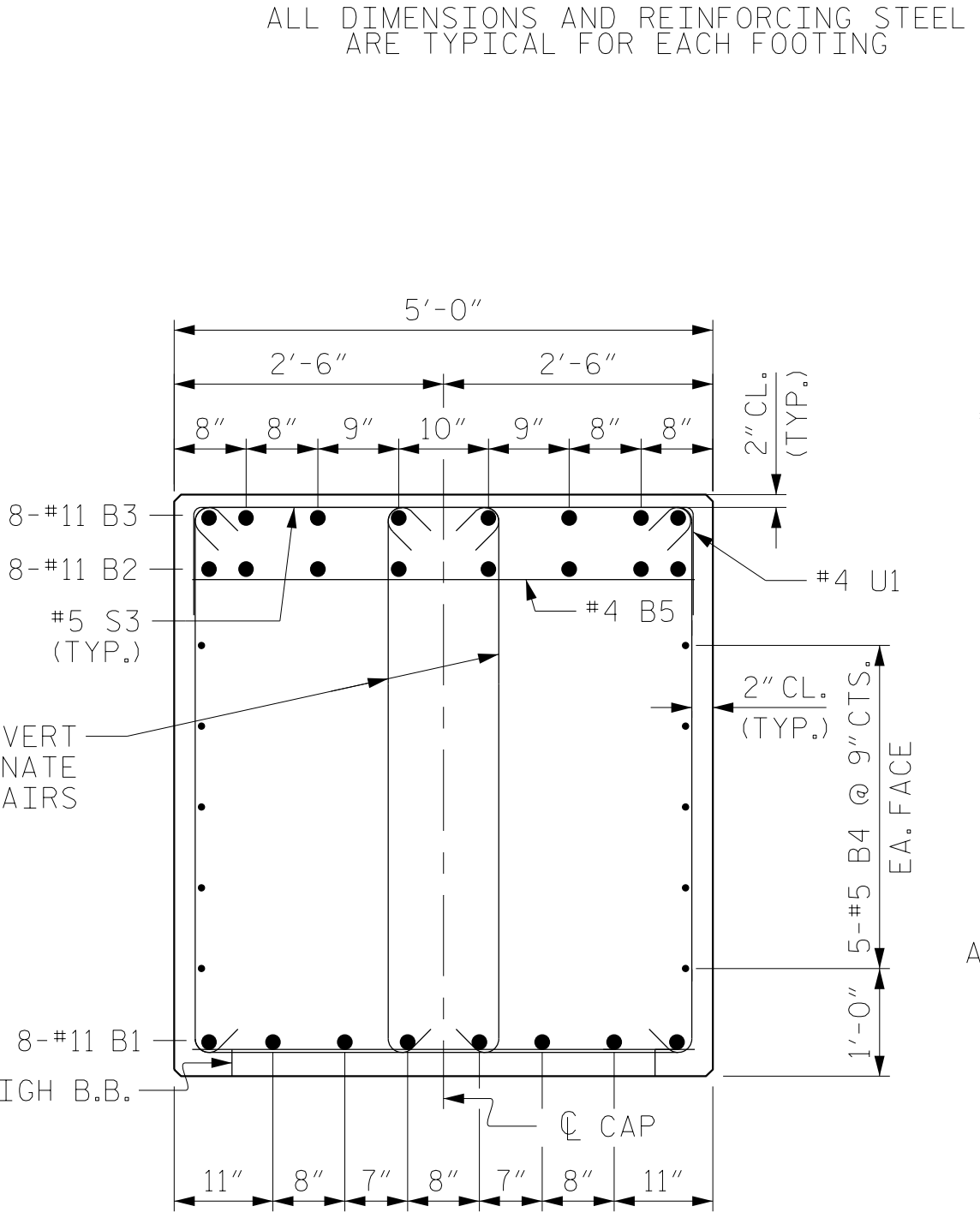
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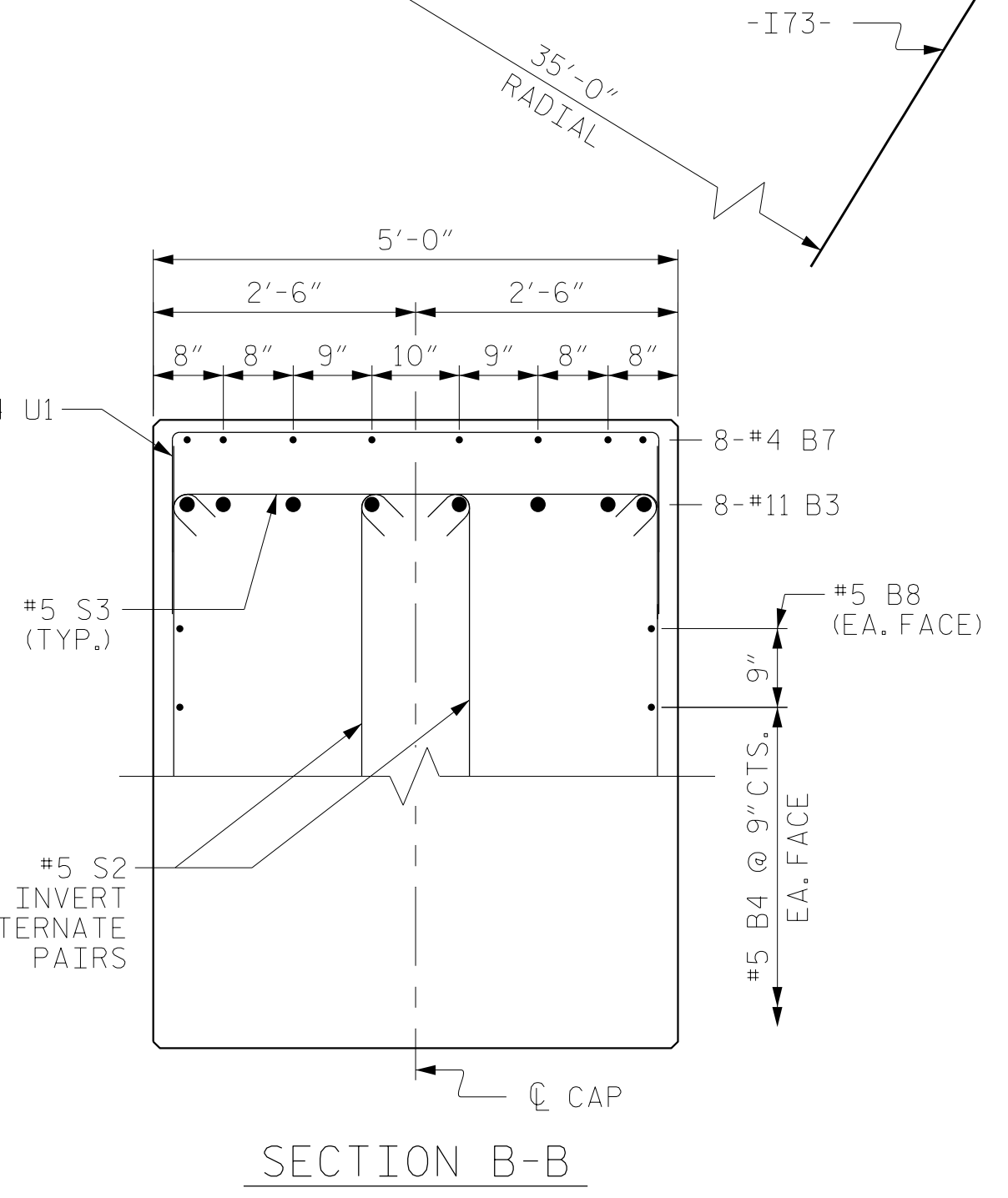
PLAN OF FOOTINGS
ALL DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH FOOTING



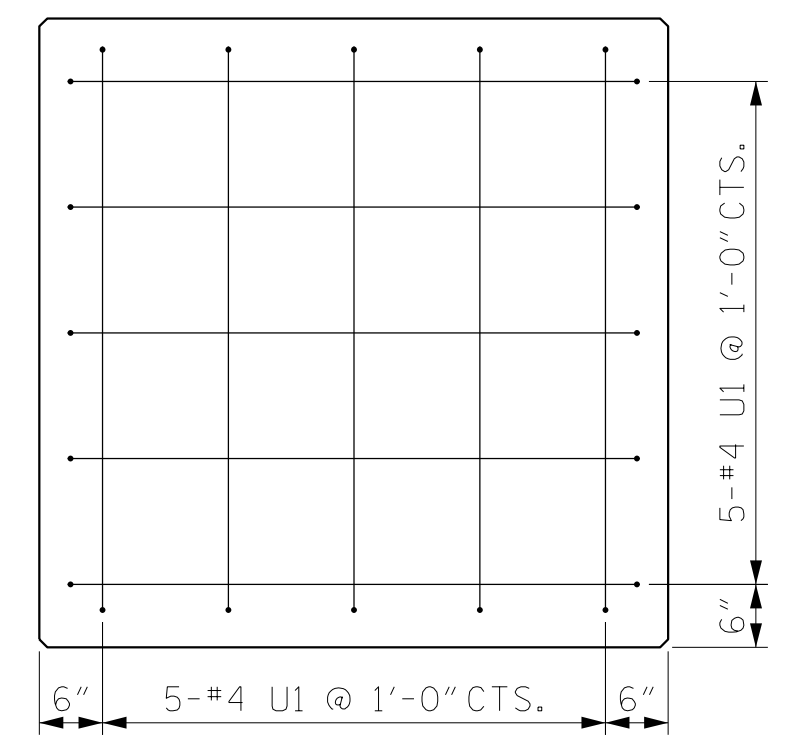
END VIEW



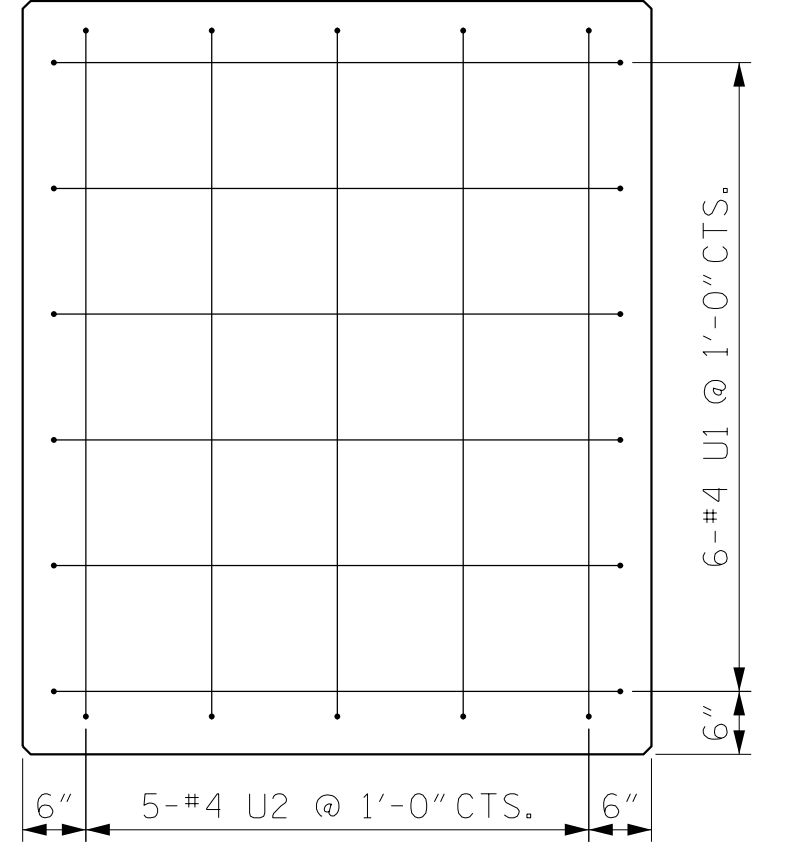
SECTION A-A



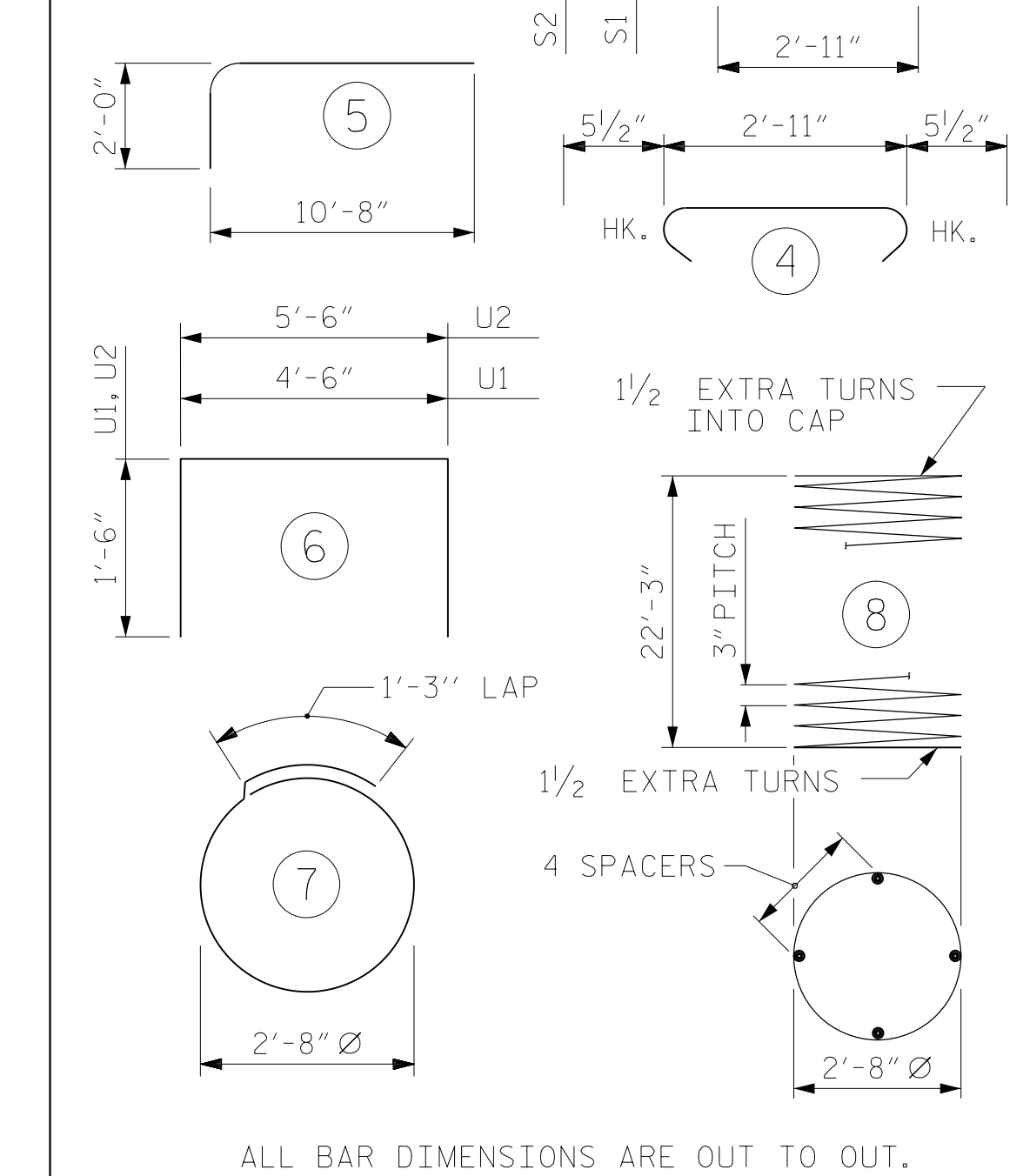
SECTION B-B



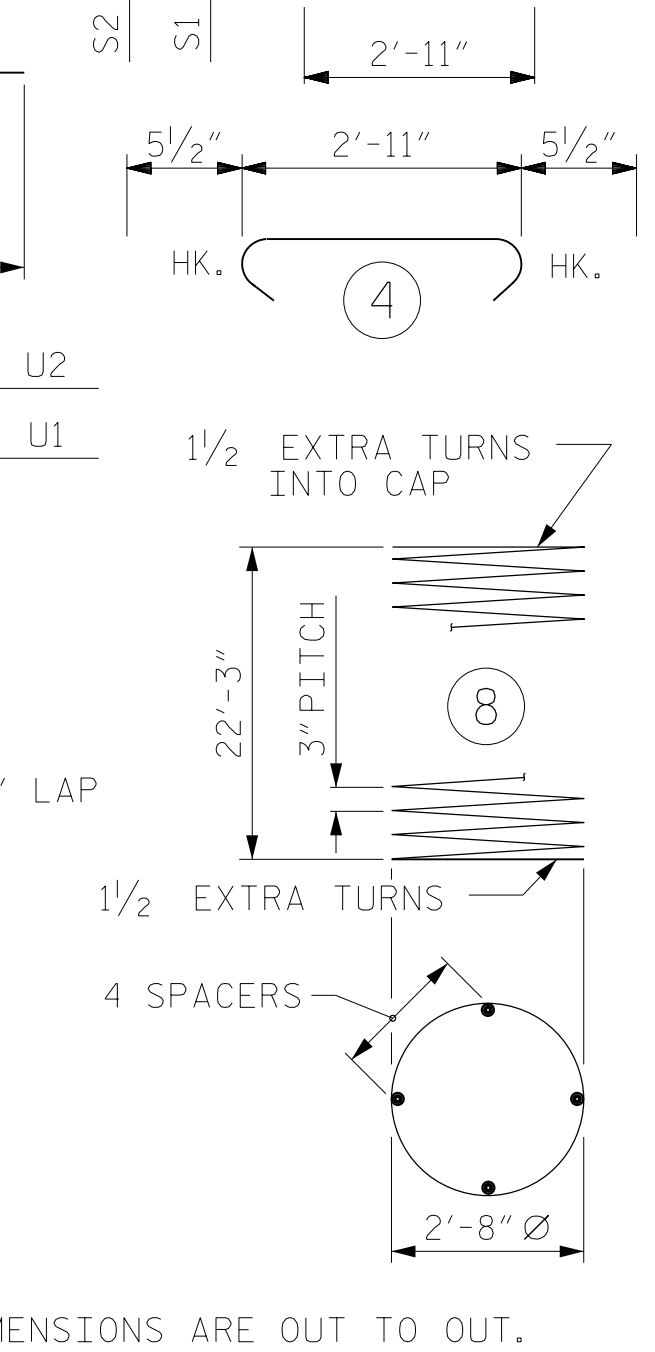
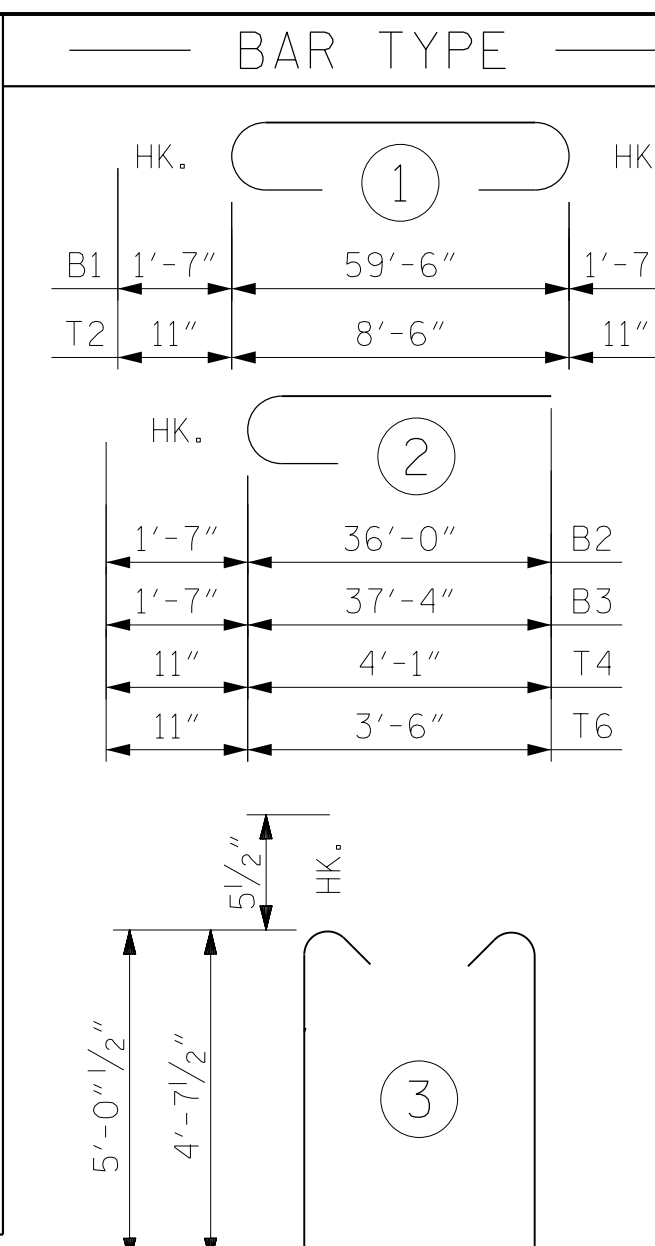
VIEW X-X



VIEW Y-Y



COLUMN SECTION
DIMENSIONS AND REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN



BILL OF MATERIAL FOR BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11	1	62'-8"	2664
B2	8	#11	2	37'-7"	1597
B3	8	#11	2	38'-11"	1654
B4	10	#5	STR	59'-6"	621
B5	4	#4	STR	4'-8"	12
B6	8	#4	STR	10'-7"	57
B7	8	#4	STR	5'-6"	29
B8	2	#5	STR	25'-8"	54
M1	48	#11	5	12'-8"	3230
S1	42	#5	3	13'-1"	573
S2	92	#5	3	13'-11"	1335
S3	134	#5	4	3'-10"	536
S4	44	#4	7	9'-8"	284
T1	72	#6	STR	8'-6"	919
T2	120	#8	1	10'-4"	3311
T3	8	#8	STR	5'-8"	121
T4	8	#8	2	5'-0"	107
T5	8	#8	STR	4'-6"	96
T6	8	#8	2	4'-5"	94
U1	90	#4	6	7'-6"	451
U2	5	#4	6	8'-6"	28
V1	48	#11	STR	26'-3"	6694
REINFORCING STEEL					24467 LBS.
SP-1	4	*	8	756'-1"	3156
SPIRAL COLUMN REINFORCING STEEL (FOR BENT 1)					3156 LBS.
* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR					
CLASS A CONCRETE BREAKDOWN (FOR BENT 1)					
POUR #1 (FOOTINGS)					48.0 C.Y.
POUR #2 (COLUMNS)					23.1 C.Y.
POUR #3 (CAP)					60.2 C.Y.
TOTAL CLASS A CONCRETE					131.3 C.Y.
HP 14X73 STEEL PILES					600 LIN. FT.
NO. 20					600 LIN. FT.
PILE DRIVING EQUIPMENT SETUP					EA. 20
STEEL PILE POINTS					NO. 20
FOUNDATION EXCAVATION					LUMP SUM
FOR BENT					

NOTE: T.L. = TOP LAYER
B.L. = BOTTOM LAYER

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-
SHEET 2 OF 2



REVISIONS						SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-32	
1			3			TOTAL SHEETS	
2			4			39	

DRAWN BY : MAL DATE : 06/2015
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DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

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NOTES

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THE TOP SURFACE AREAS OF THE END BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS, EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

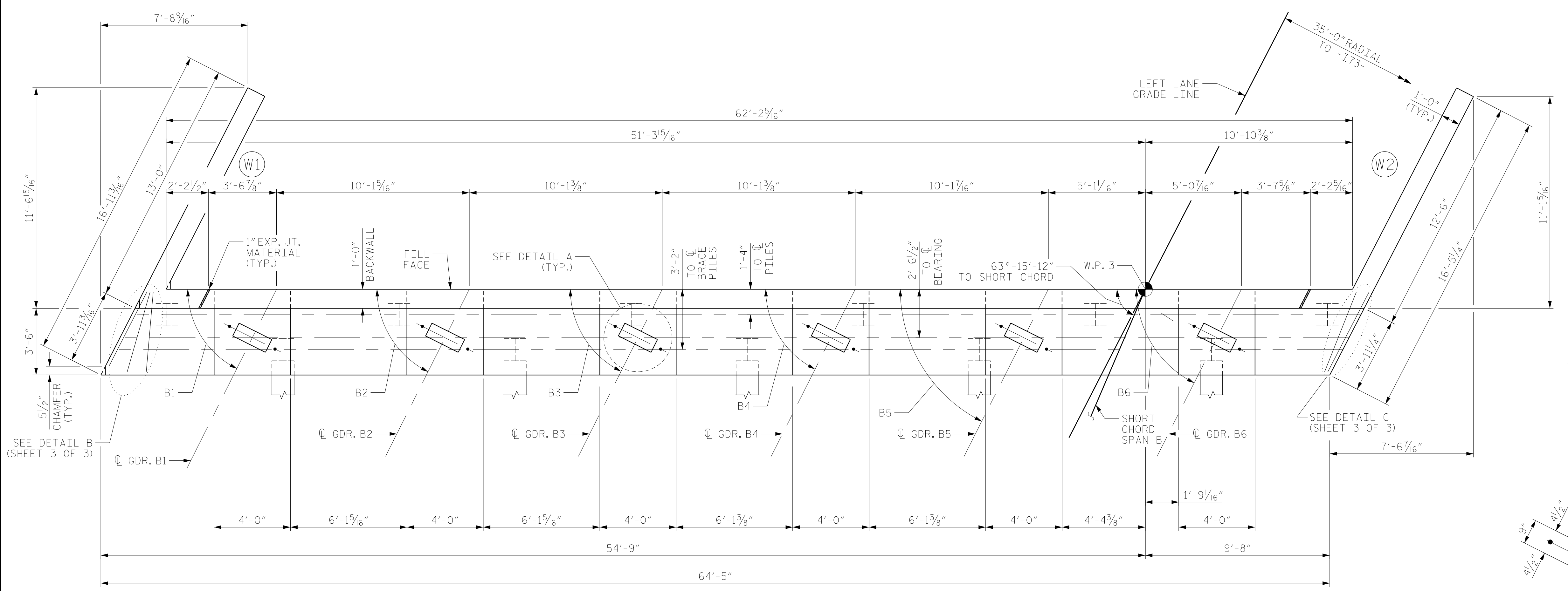
THE TOP SURFACE OF THE END BENT CAP EXCEPT BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE FRONT FACE AT A RATE OF 2%.

MINIMUM SPLICE LENGTHS

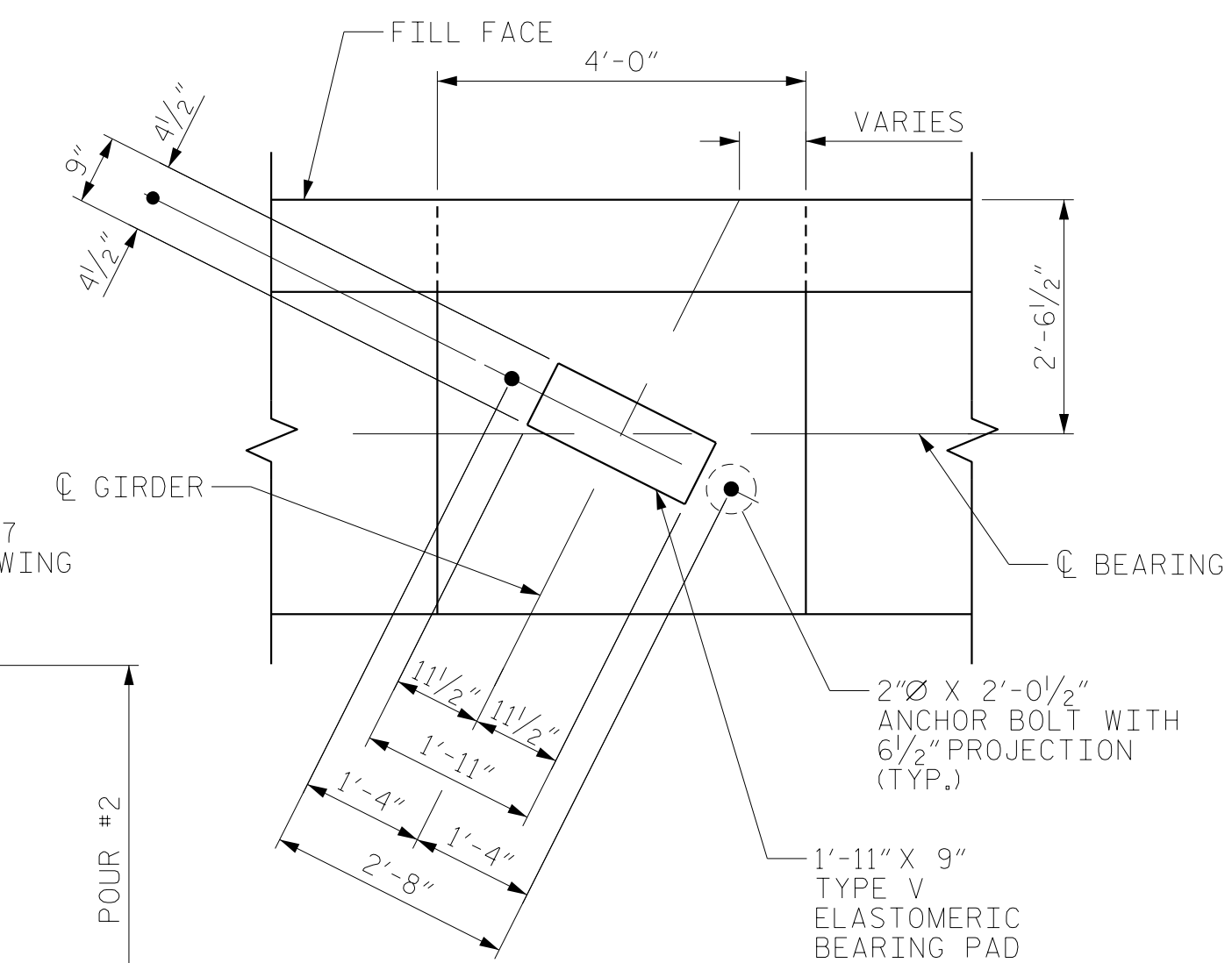
#9 B1	6'-3"
#9 B2	8'-9"
#5 B3	3'-0"
#4 B4	2'-5"
#4 K1	2'-5"

BEAM ANGLES

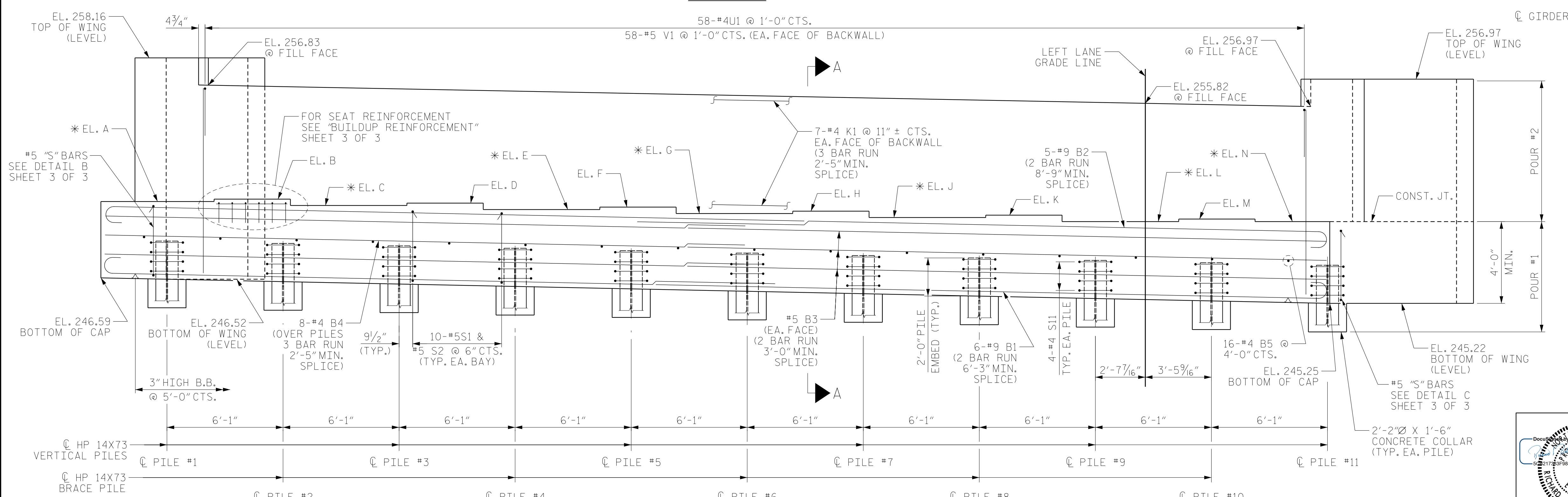
B1	63°-25'-45"
B2	63°-23'-30"
B3	63°-21'-15"
B4	63°-18'-59"
B5	63°-16'-44"
B6	63°-14'-27"



PLAN



DETAIL A



ELEVATION

ELEVATIONS

A	B	C	D	E	F	G	H	J	K	L	M	N
250.59	250.72	250.38	250.51	250.18	250.30	249.97	250.09	249.76	249.88	249.55	249.67	249.55

PILE TIP ELEVATIONS

PILE #1	PILE #2	PILE #3	PILE #4	PILE #5	PILE #6	PILE #7	PILE #8	PILE #9	PILE #10	PILE #11
248.52	248.39	248.27	248.14	248.01	247.89	247.76	247.63	247.51	247.38	247.25

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PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

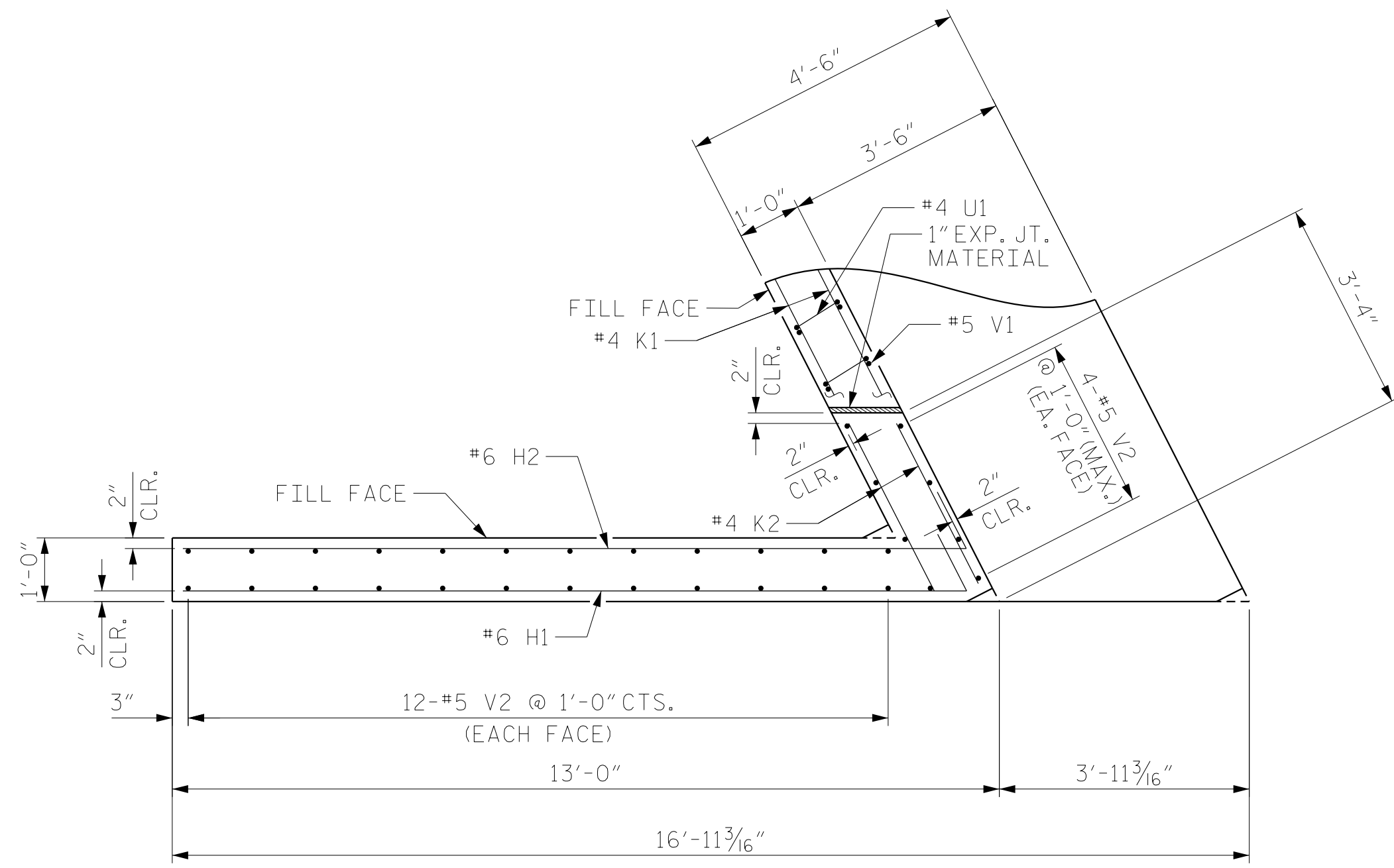
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 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT #2
 LEFT LANE

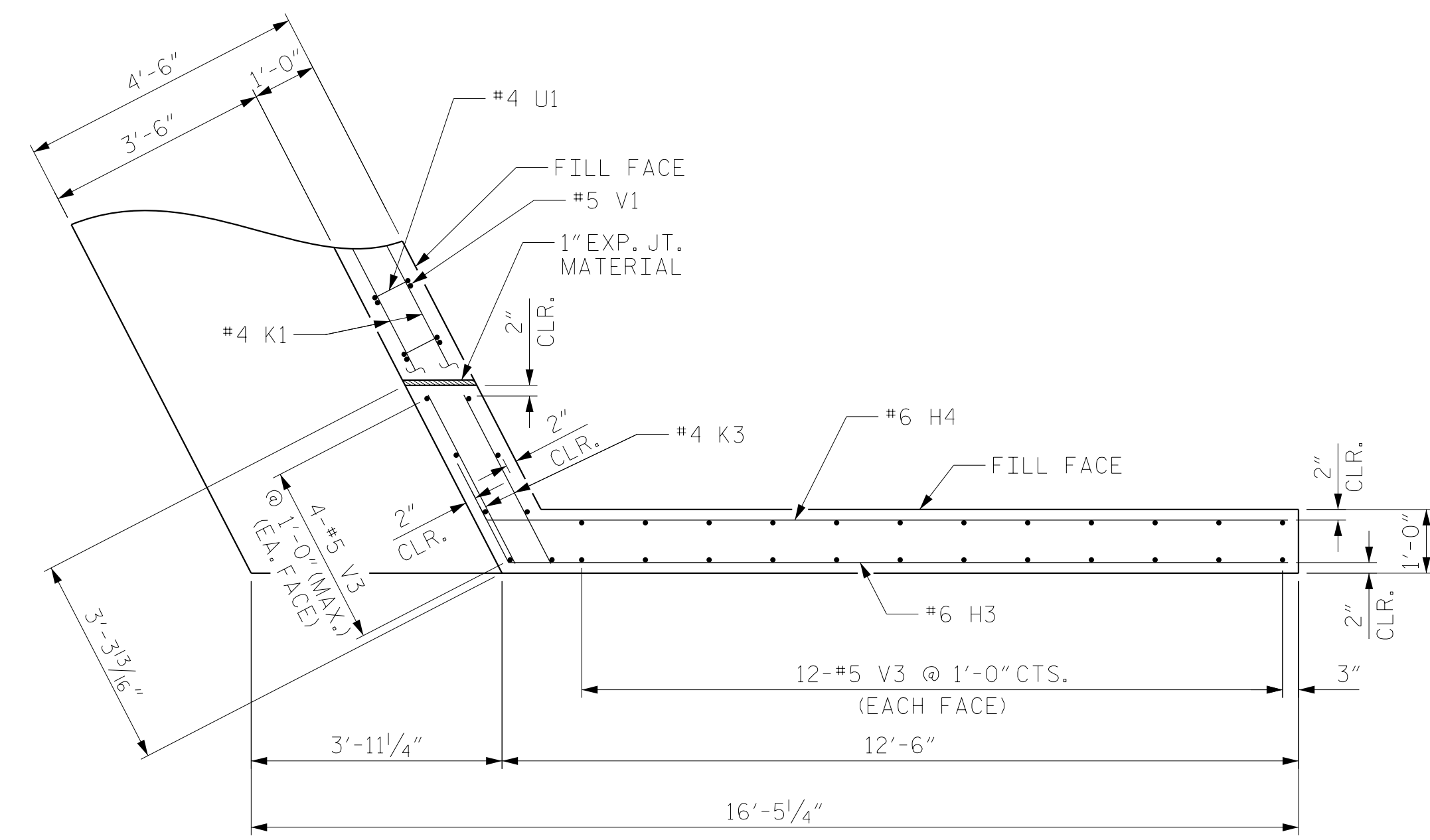
REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
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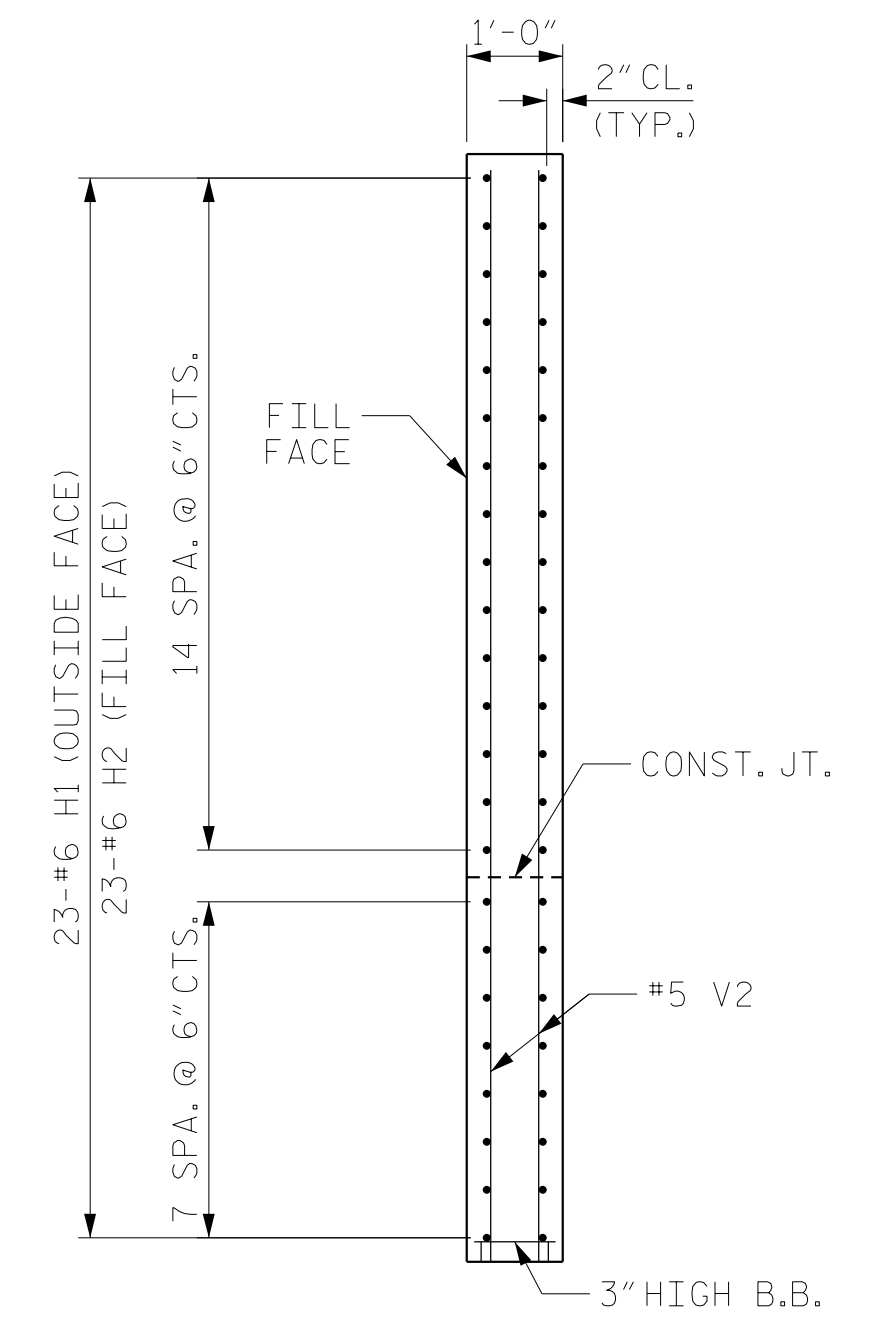
SHEET NO. S03-33
 TOTAL SHEETS 39



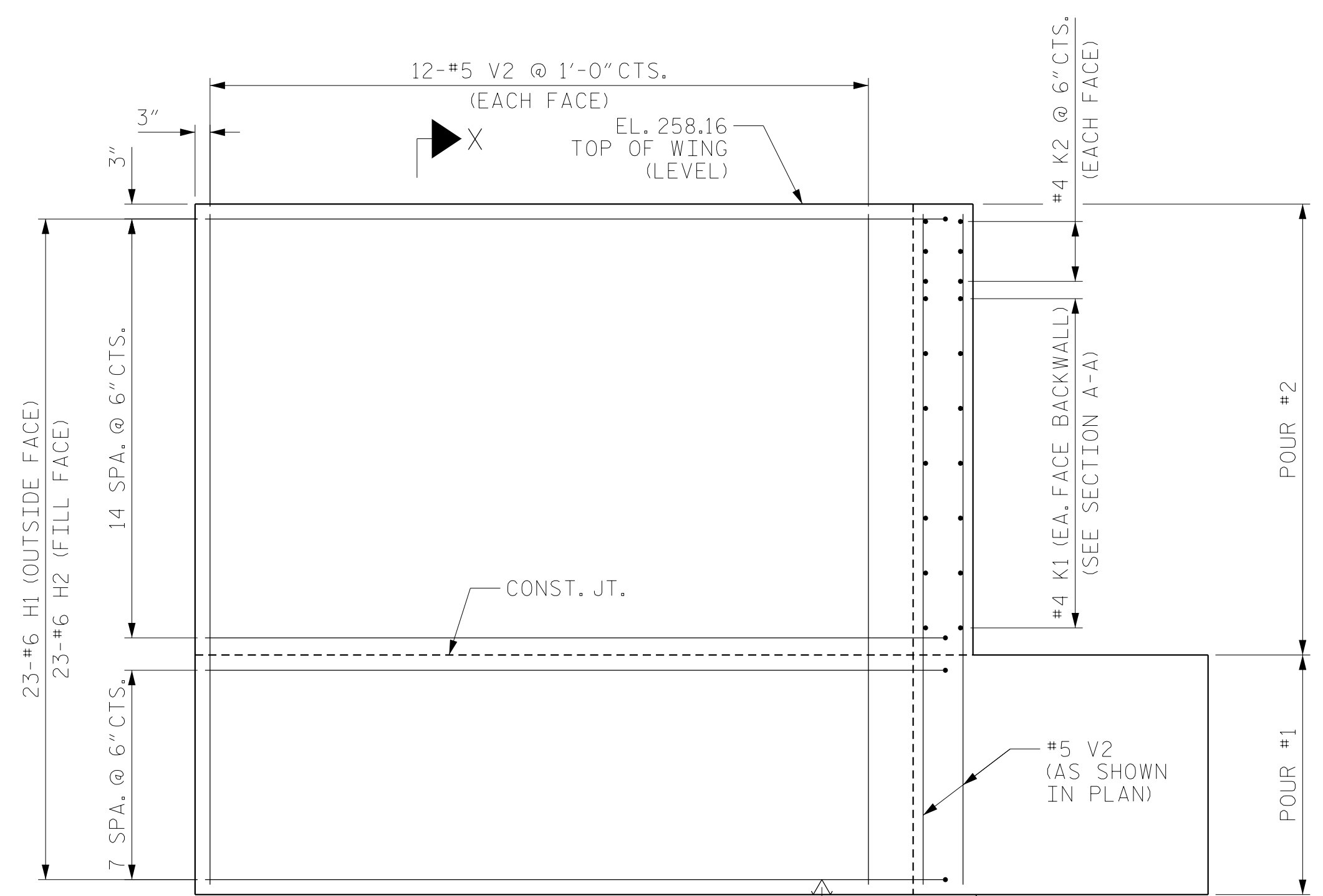
PLAN W1



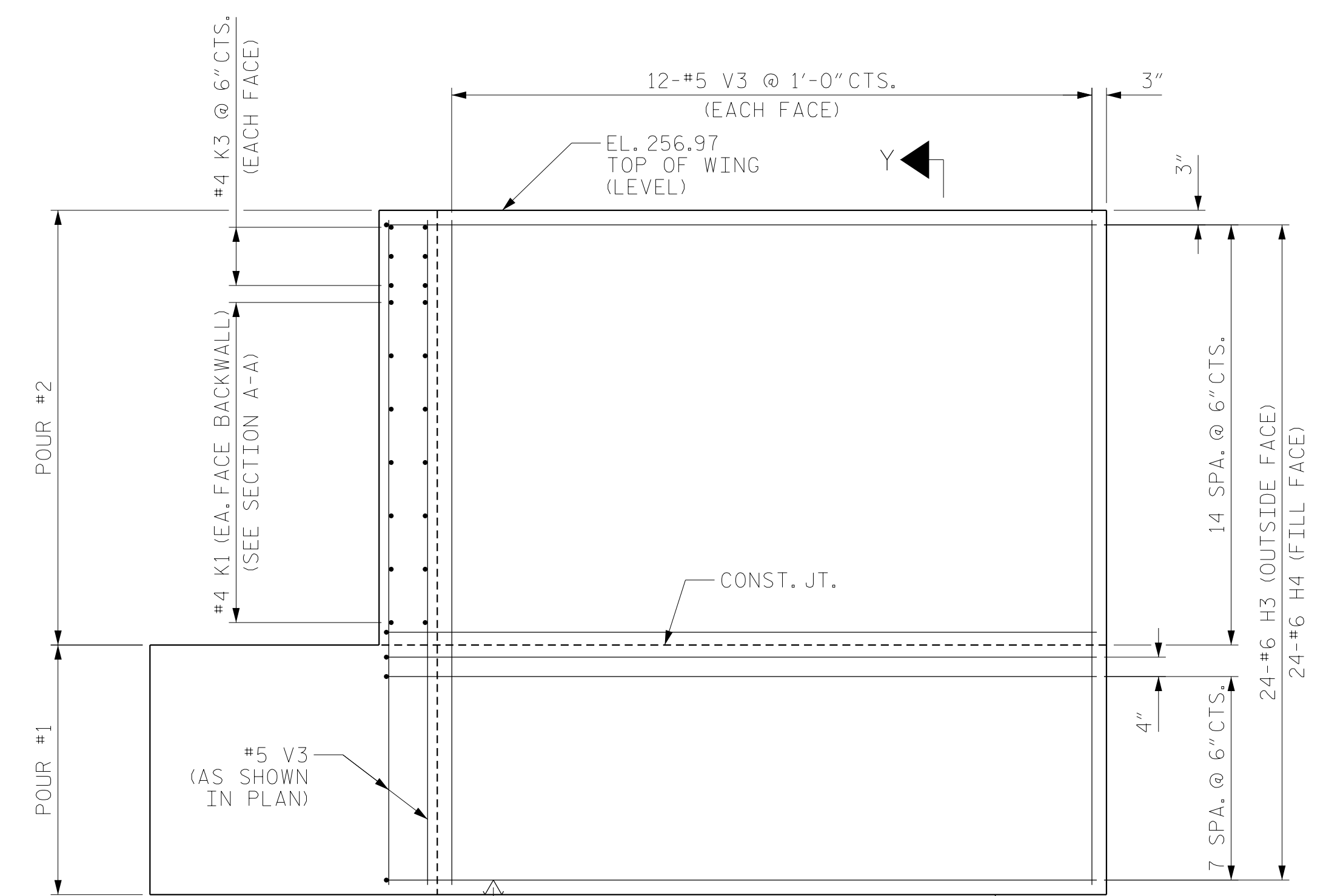
PLAN W2



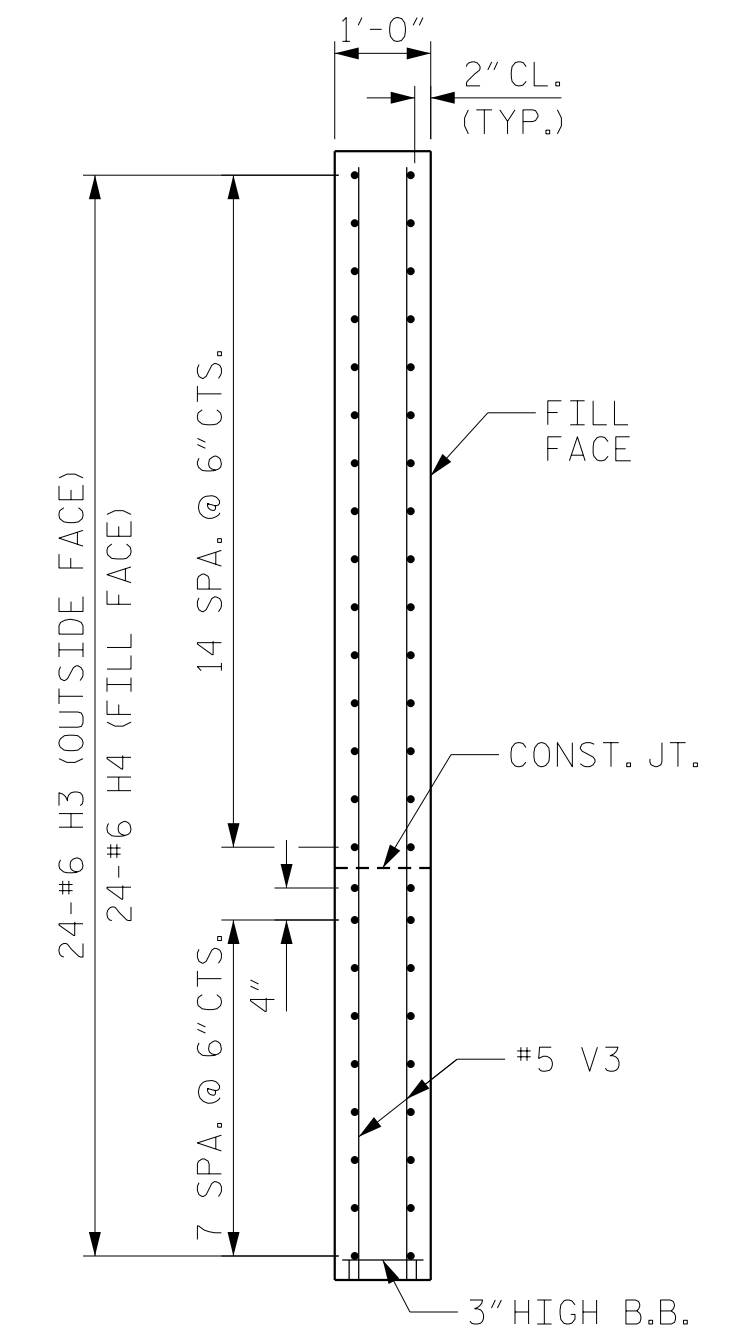
SECTION X-X



ELEVATION W1



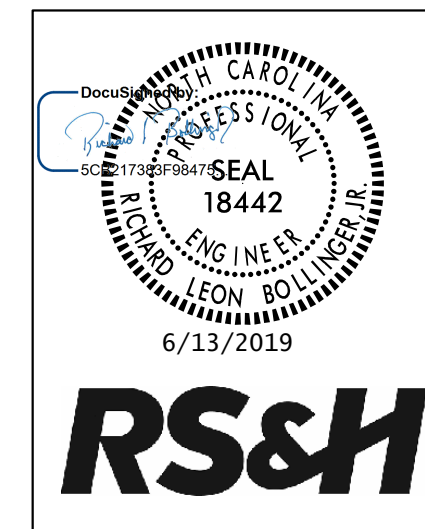
ELEVATION W2



SECTION Y-Y

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 2 OF 3



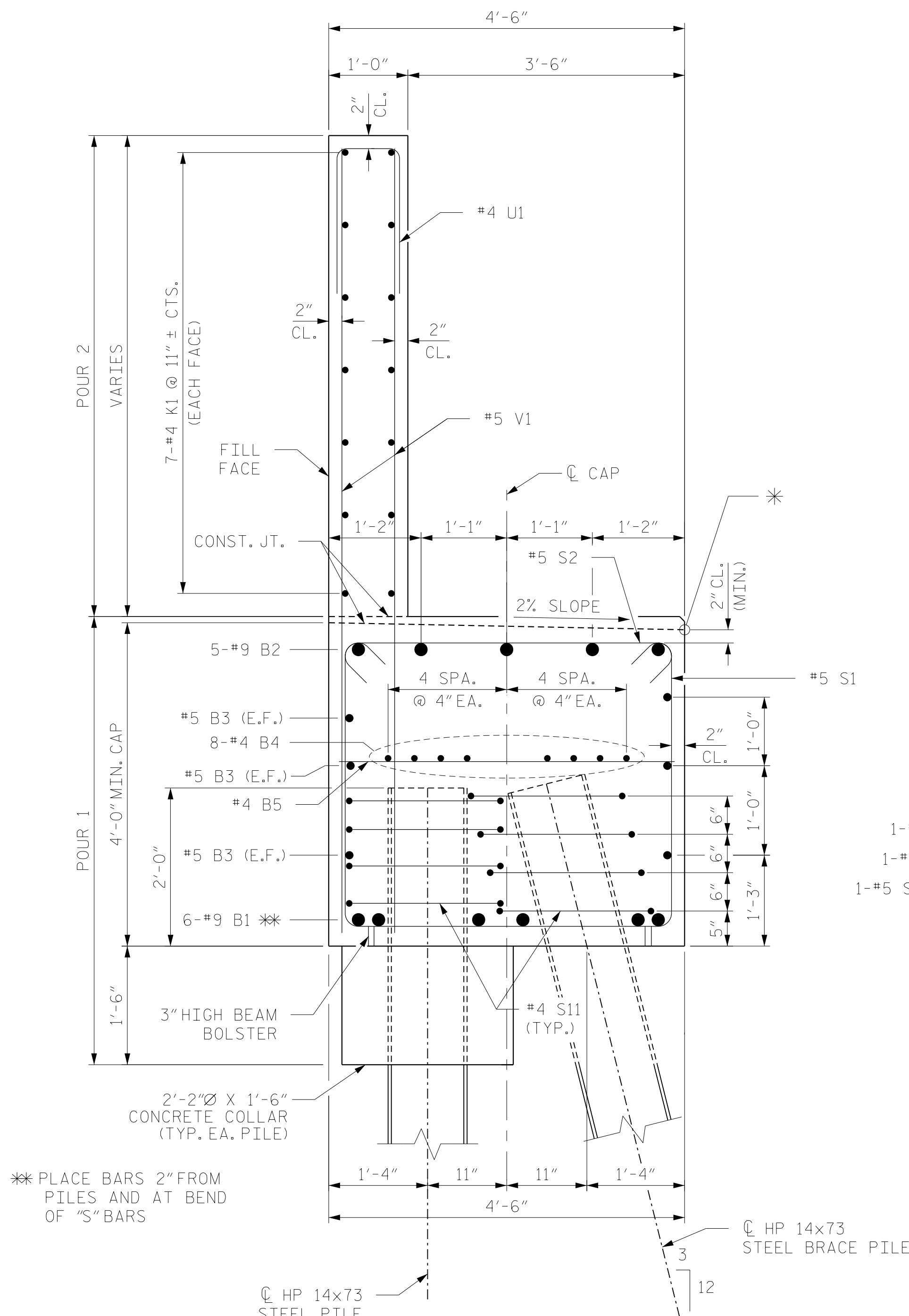
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT #2
 LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-34
1			3			TOTAL SHEETS
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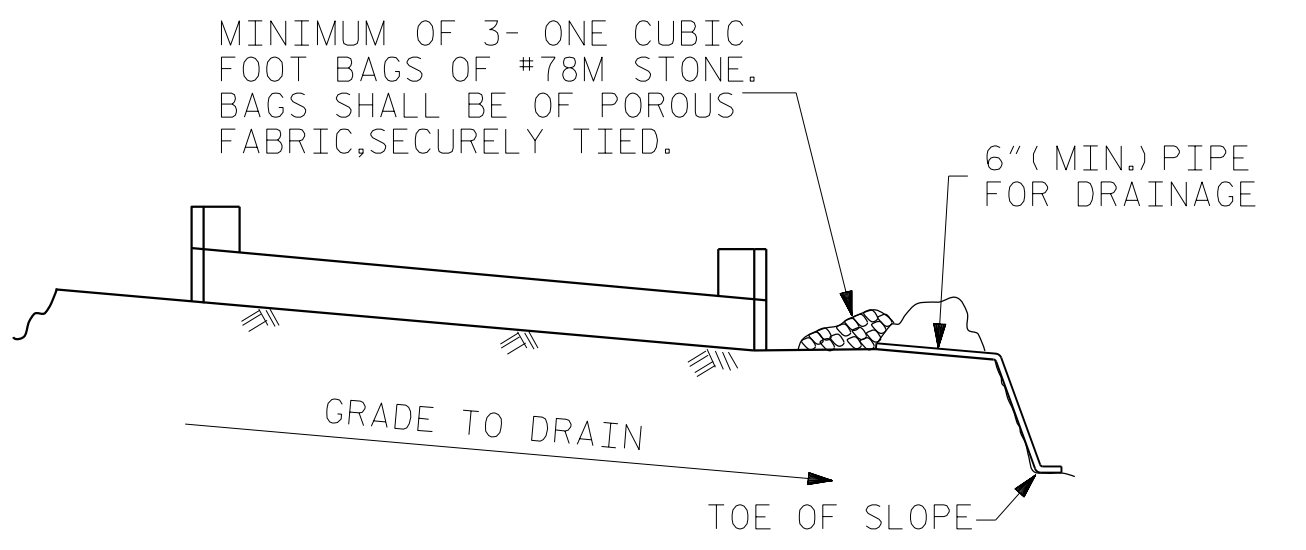
DRAWN BY : MKO DATE : 06/2015
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SECTION A-A

*ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS ARE SHOWN AT THIS POINT
NOTE: CONCRETE COLLAR NOT SHOWN ON BRACE PILE FOR CLARITY.

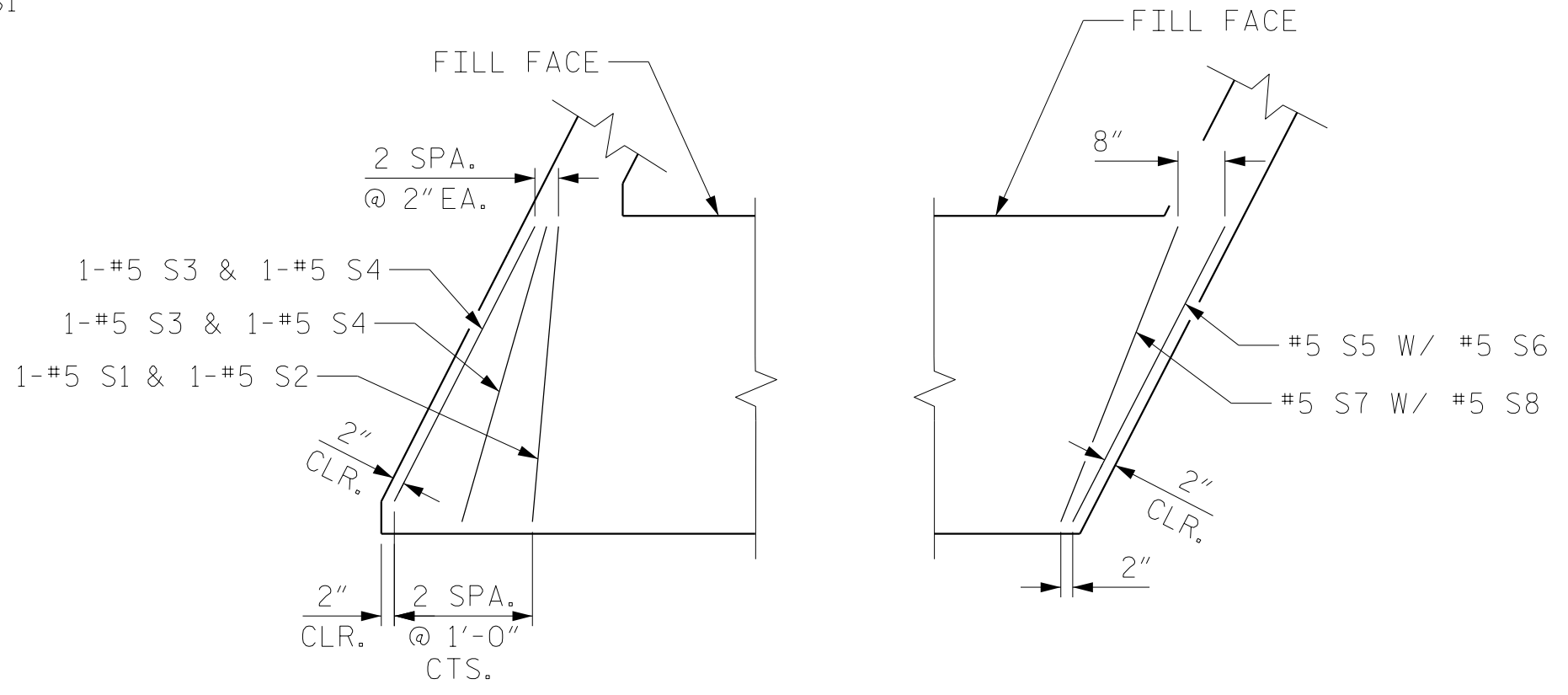


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BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER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

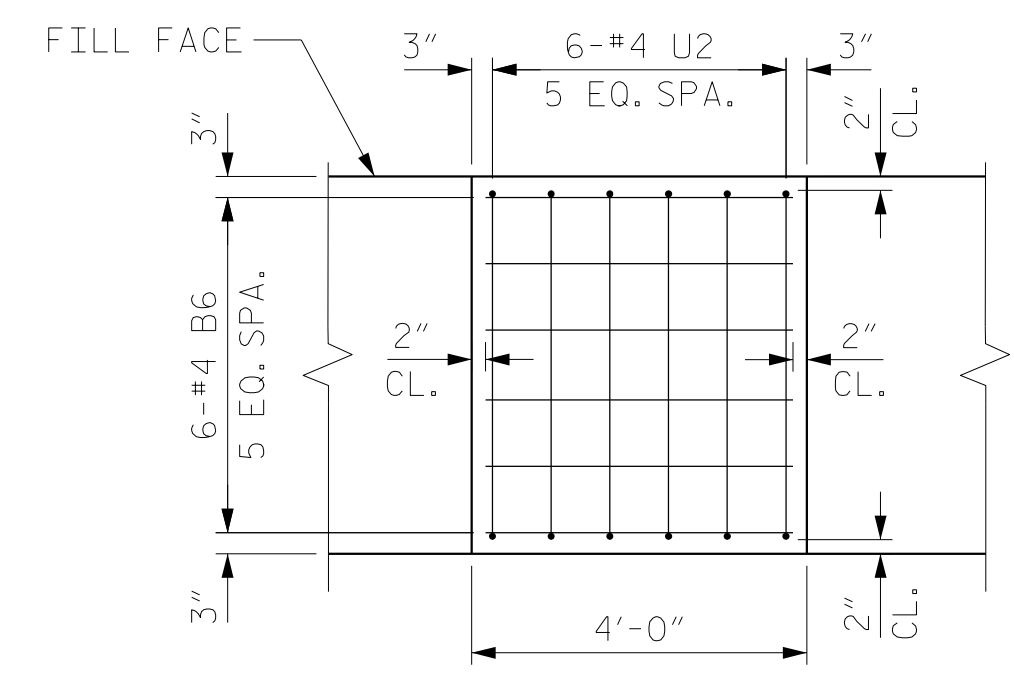
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT



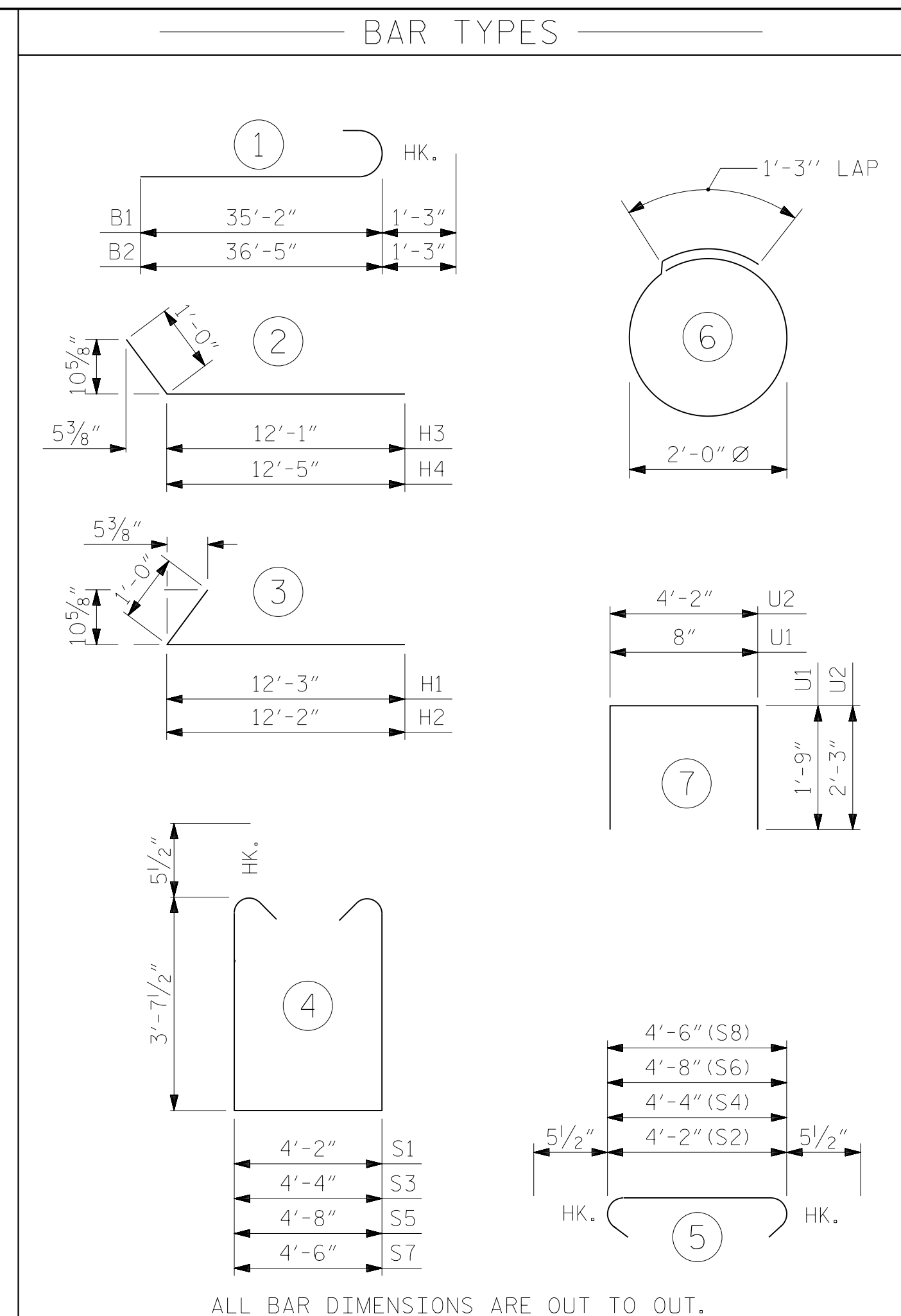
DETAIL B

DETAIL C

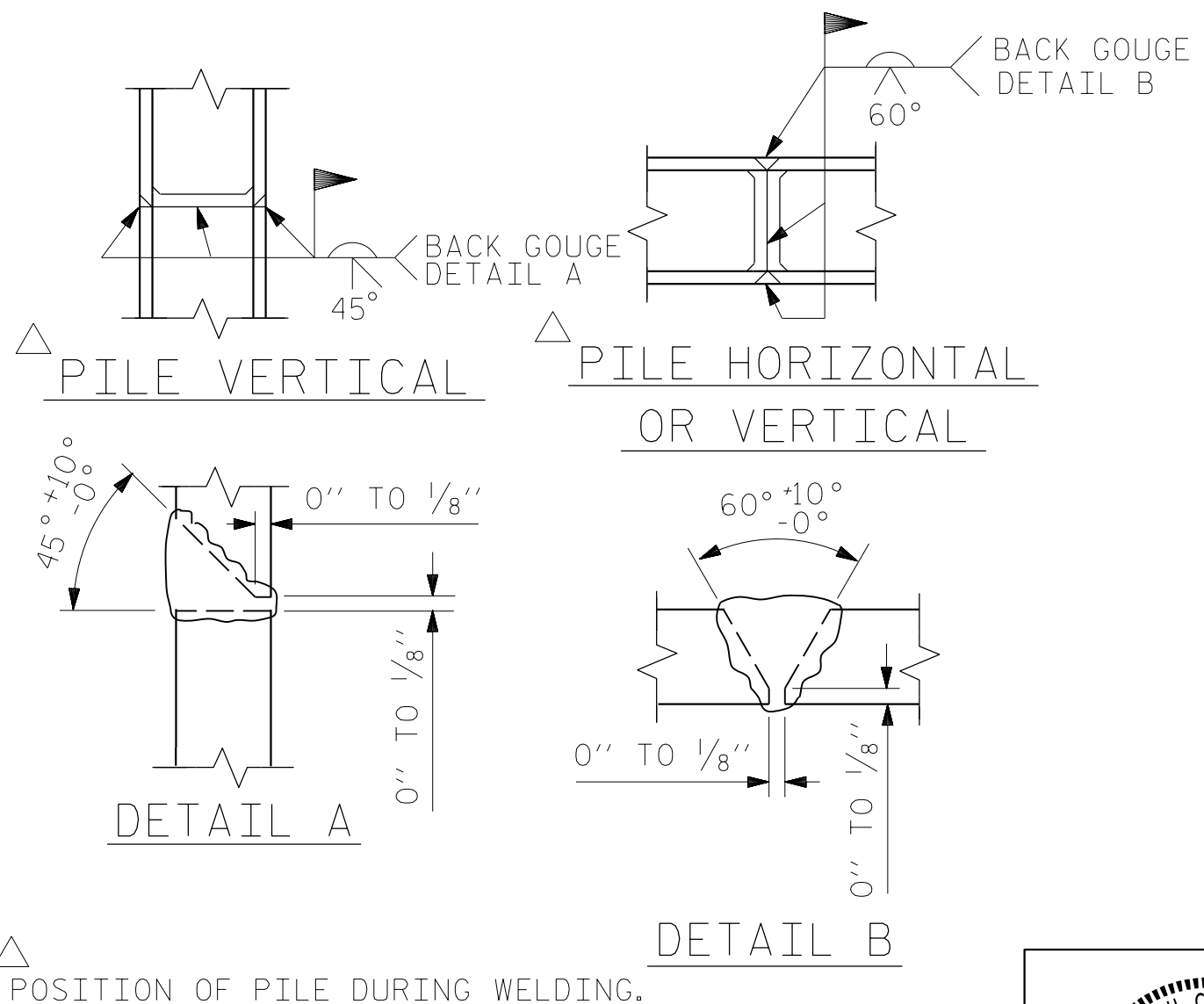


BRIDGE SEAT BUILDUP REINFORCEMENT

BACKWALL NOT SHOWN FOR CLARITY



ALL BAR DIMENSIONS ARE OUT TO OUT.



PILE SPLICE DETAILS

BILL OF MATERIAL					
END BENT #2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	36'-5"	1486
B2	10	#9	1	37'-8"	1281
B3	12	#5	STR	33'-7"	420
B4	24	#4	STR	23'-0"	369
B5	16	#4	STR	4'-2"	45
B6	36	#4	STR	3'-8"	88
H1	23	#6	3	13'-3"	458
H2	23	#6	3	13'-2"	455
H3	24	#6	2	13'-1"	472
H4	24	#6	2	13'-5"	484
K1	42	#4	STR	23'-0"	645
K2	6	#4	STR	2'-10"	11
K3	6	#4	STR	2'-11"	12
S1	100	#5	4	12'-4"	1286
S2	100	#5	5	5'-1"	530
S3	2	#5	4	12'-6"	26
S4	2	#5	5	5'-3"	11
S5	1	#5	4	12'-10"	13
S6	1	#5	5	5'-7"	6
S7	1	#5	4	12'-8"	13
S8	1	#5	5	5'-5"	6
S11	44	#5	6	7'-7"	348
U1	58	#4	7	4'-2"	161
U2	36	#4	7	8'-8"	208
V1	116	#5	STR	9'-10"	1190
V2	32	#5	STR	11'-2"	373
V3	32	#5	STR	11'-4"	378
REINFORCING STEEL					10,775 LBS.
CLASS A CONCRETE BREAKDOWN					
POUR #1 CAP, LOWER PART OF WINGS & COLLARS					50.6 C.Y.
POUR #2 UPPER PART OF WINGS					21.8 C.Y.
TOTAL CLASS A CONCRETE					72.4 C.Y.
HP 14 X 73 STEEL PILES					
NO: 11					LIN. FT. = 495
PILE DRIVING EQUIPMENT SETUP					EA. 11
STEEL PILE POINTS					NO. 11

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 3 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
END BENT #2					
LEFT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

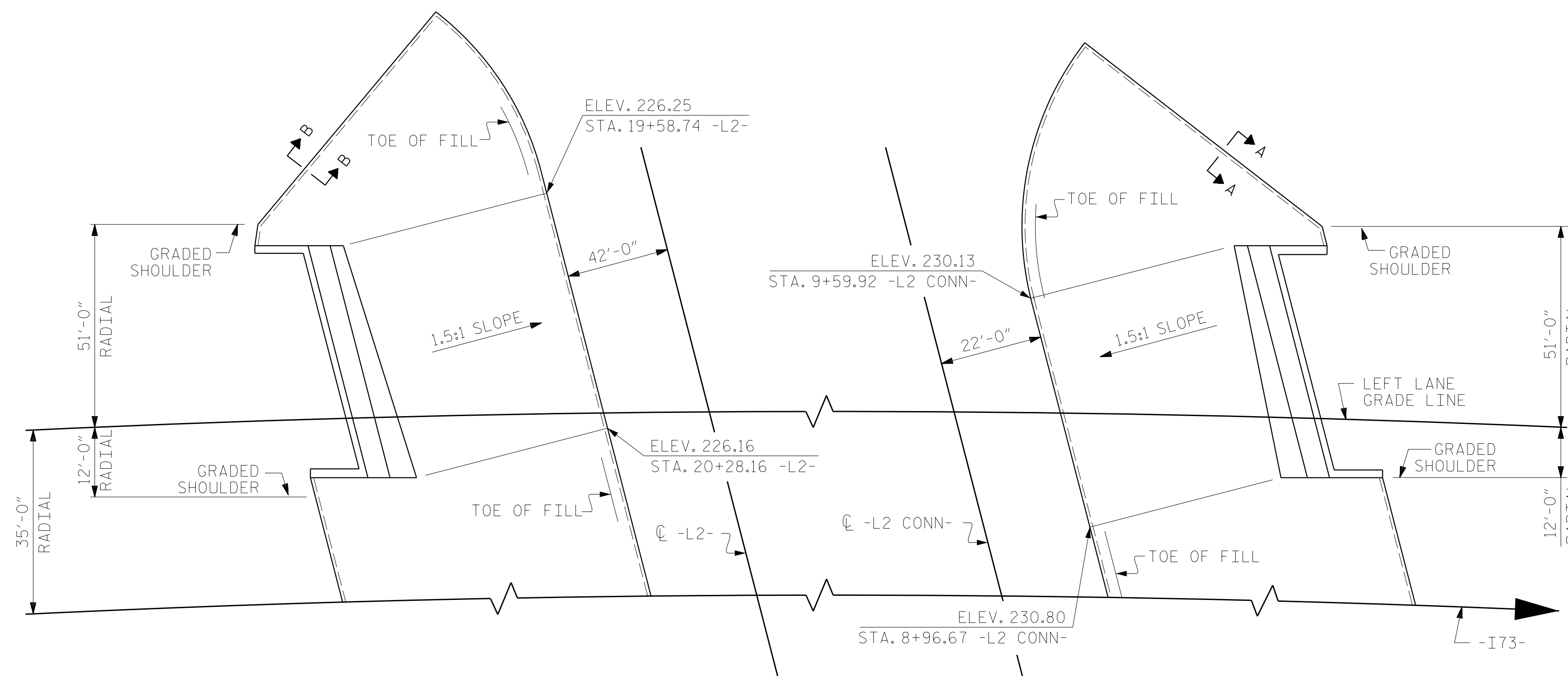
DRAWN BY : MKO DATE : 07/2015
 CHECKED BY : JMR DATE : 07/2015
 DESIGN ENGINEER : RLB DATE : 04/2019
 OF RECORD :

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

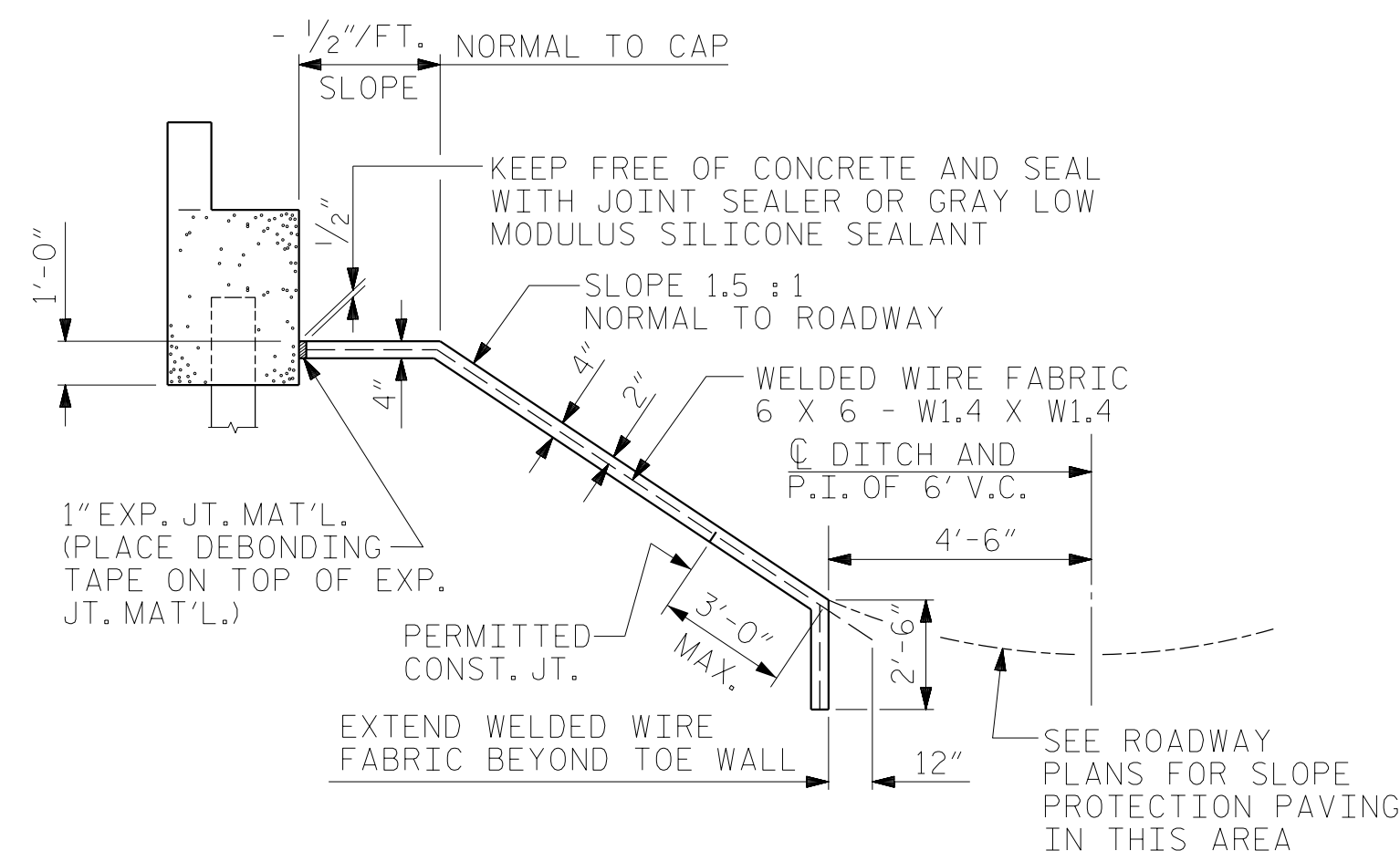
NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS, FOR BERM WIDTH, SEE GENERAL DRAWING.

SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE POURED IN 5' STRIPS AS SHOWN IN THE "POURING DETAIL" WITH 2'-0" LONG #4 BARS PLACED ALONG THE SLOPE BETWEEN STRIPS AT 1'-6" MAXIMUM SPACING. SLOPE PROTECTION MAY BE POURED IN ALTERNATE 4' AND 5' STRIPS AS SHOWN IN THE "OPTIONAL POURING DETAIL" WITH ADJACENT RUNS OF WELDED WIRE FABRIC LAPPING AT LEAST 6". THE COST OF THE WELDED WIRE FABRIC AND #4 BARS, IF USED, SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID PER SQUARE YARD FOR SLOPE PROTECTION.



PLAN



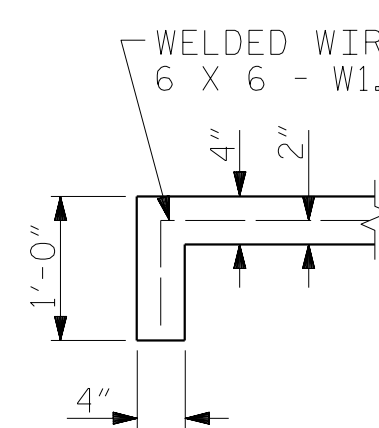
SECTION ALONG @ ROADWAY WHEN FILL CATCHES IN DITCH

BRIDGE @ STA. 101+31.22 -I73-	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	552	993
END BENT 2	477	859

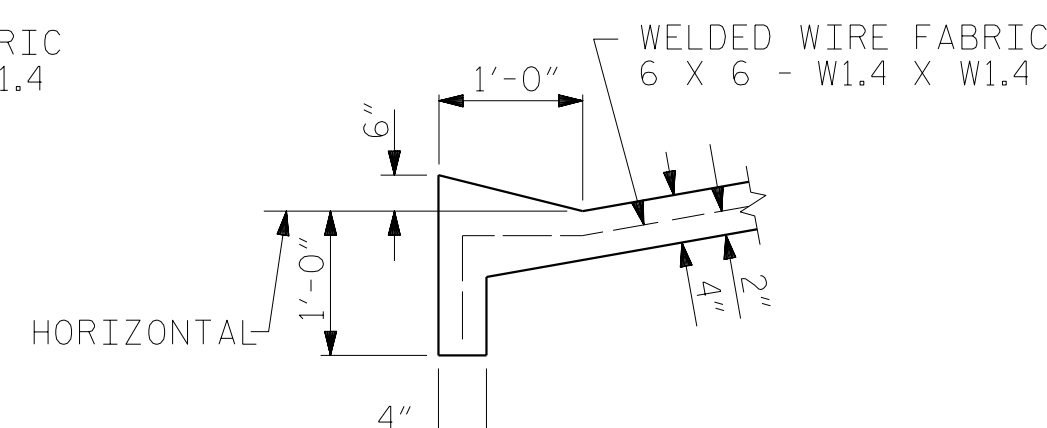
* QUANTITY SHOWN IS BASED ON 5' POURS.

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

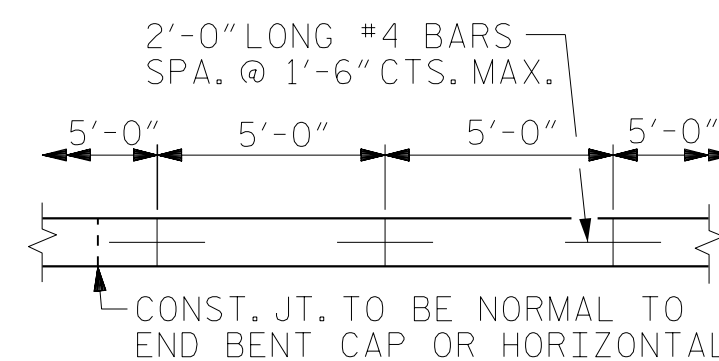
SHEET 1 OF 2



SECTION A-A

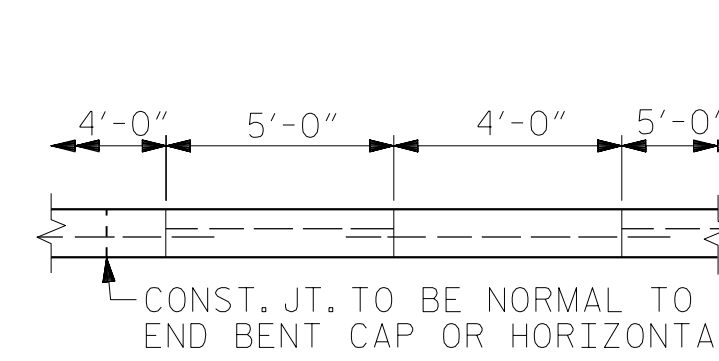


SECTION B-B



CONST. JT. TO BE NORMAL TO END BENT CAP OR HORIZONTAL

POURING DETAIL



CONST. JT. TO BE NORMAL TO END BENT CAP OR HORIZONTAL

OPTIONAL POURING DETAIL

STRIP WIDTHS MAY VARY IN CURVED PORTION.

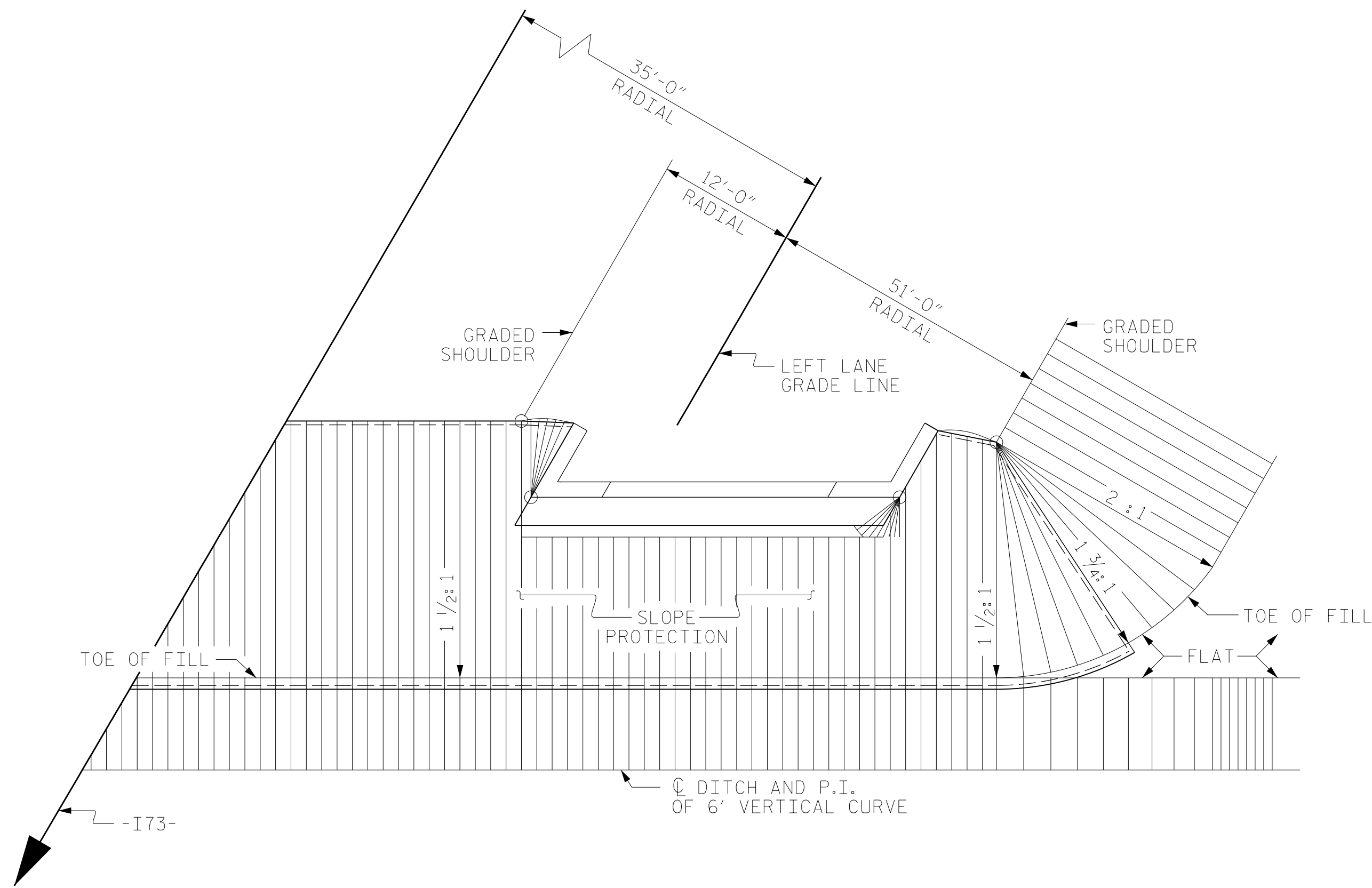
POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

DRAWN BY : MAL DATE : 07/2015
 CHECKED BY : RLB DATE : 07/2015
 DESIGN ENGINEER : RLB DATE : 04/2019
 OF RECORD :

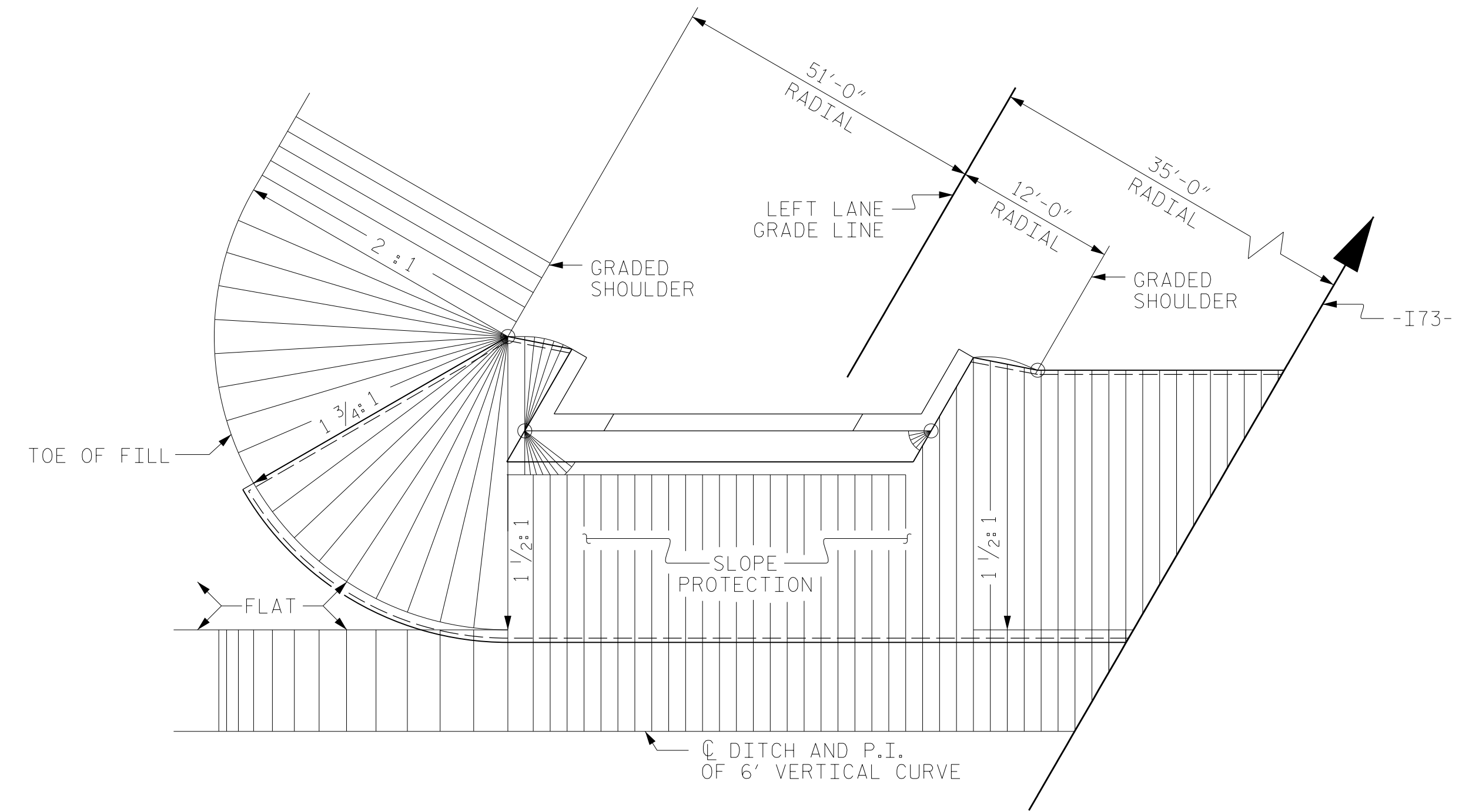
DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SLOPE PROTECTION DETAILS					
LEFT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S03-36
TOTAL SHEETS 39



END BENT #1

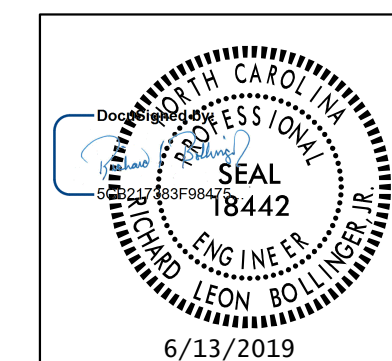


END BENT #2

PLAN - END BENT WITH SWEEPED BACK WINGS - SKEWED
(1 1/2:1 SLOPE)

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-

SHEET 2 OF 2



RS&H Architects-Engineers-Planners, Inc.
8521 Six Forks Road, Suite 400
Raleigh, NC 27615
919-926-4100 FAX 919-846-9080
www.rsandh.com
North Carolina License No. 50737-F-0403-C-03

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

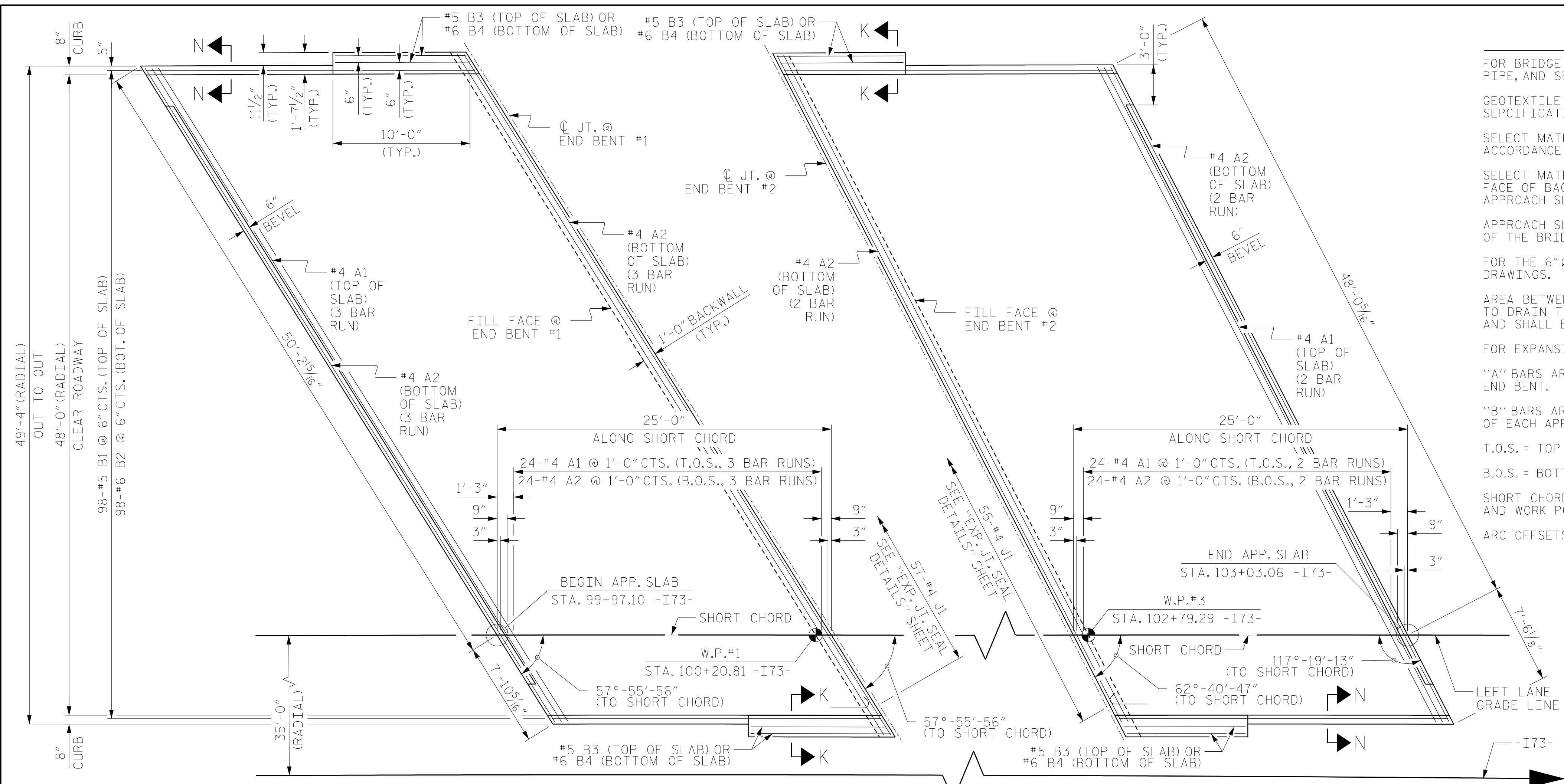
SLOPE PROTECTION
DETAILS

LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-37
1			3			TOTAL SHEETS
2			4			39

DRAWN BY : MAL DATE : 07/2015
CHECKED BY : RLB DATE : 07/2015
DESIGN ENGINEER OF RECORD : RLB DATE : 04/2019

DOCUMENT NOT CONSIDERED
FINAL UNLESS ALL
SIGNATURES COMPLETED



PLAN @ END BENT #1
 PLAN @ END BENT #2
 DIMENSIONS AND "B" BARS SHOWN ARE TYPICAL FOR BOTH APPROACH SLABS, UNLESS NOTED OTHERWISE

NOTES

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

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

SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH THE 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.

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

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.

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

"A" BARS ARE PLACED PARALLEL TO THE RESPECTIVE SKEW OF EACH END BENT.

"B" BARS ARE PLACED PARALLEL TO THE RESPECTIVE SHORT CHORD OF EACH APPROACH SLAB.

T.O.S. = TOP OF SLAB
 B.O.S. = BOTTOM OF SLAB

SHORT CHORD IS A CHORD BETWEEN BEGIN (END) APPROACH SLAB AND WORK POINT.

ARC OFFSETS ARE NEGLIGIBLE AND THEREFORE NOT SHOWN.

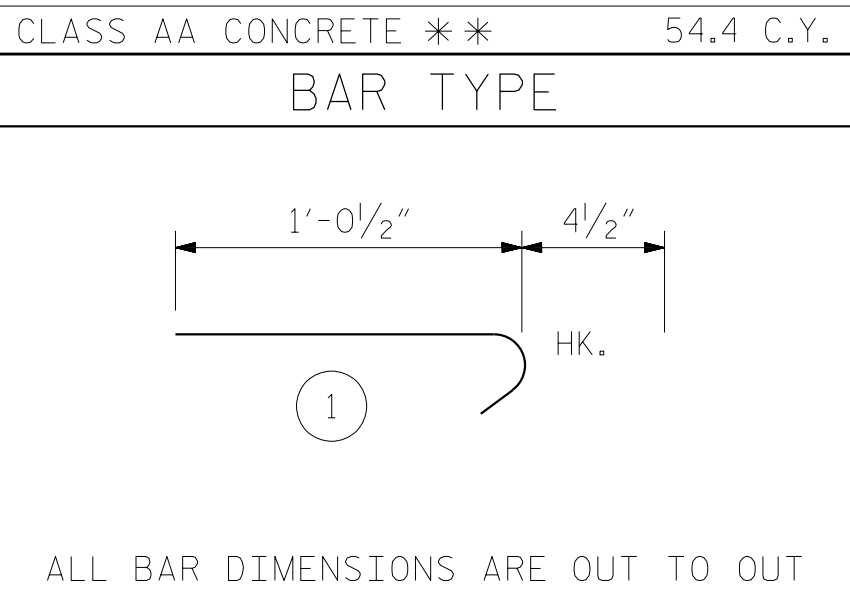
BILL OF MATERIAL

APPROACH SLAB AT EB #1

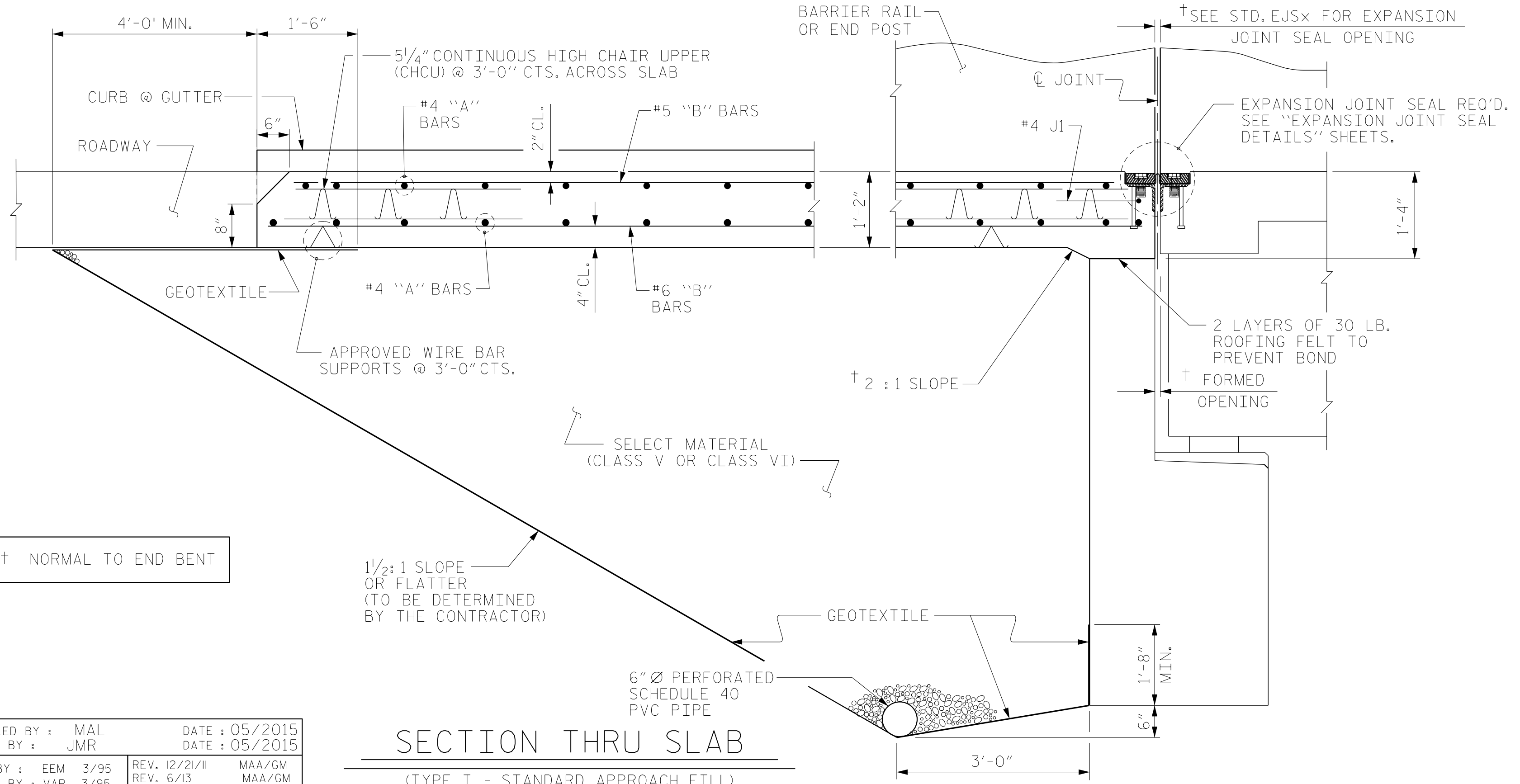
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	75	#4	STR	21'-5"	1073
A2	78	#4	STR	21'-3"	1107
*B1	98	#5	STR	24'-0"	2453
B2	98	#6	STR	24'-7"	3619
*B3	4	#5	STR	9'-9"	41
B4	4	#6	STR	9'-9"	59
*J1	57	#4	1	1'-5"	54
REINFORCING STEEL **					4785 LBS.
* EPOXY COATED REINFORCING STEEL **					3621 LBS.
CLASS AA CONCRETE **					54.5 C.Y.

APPROACH SLAB AT EB #2

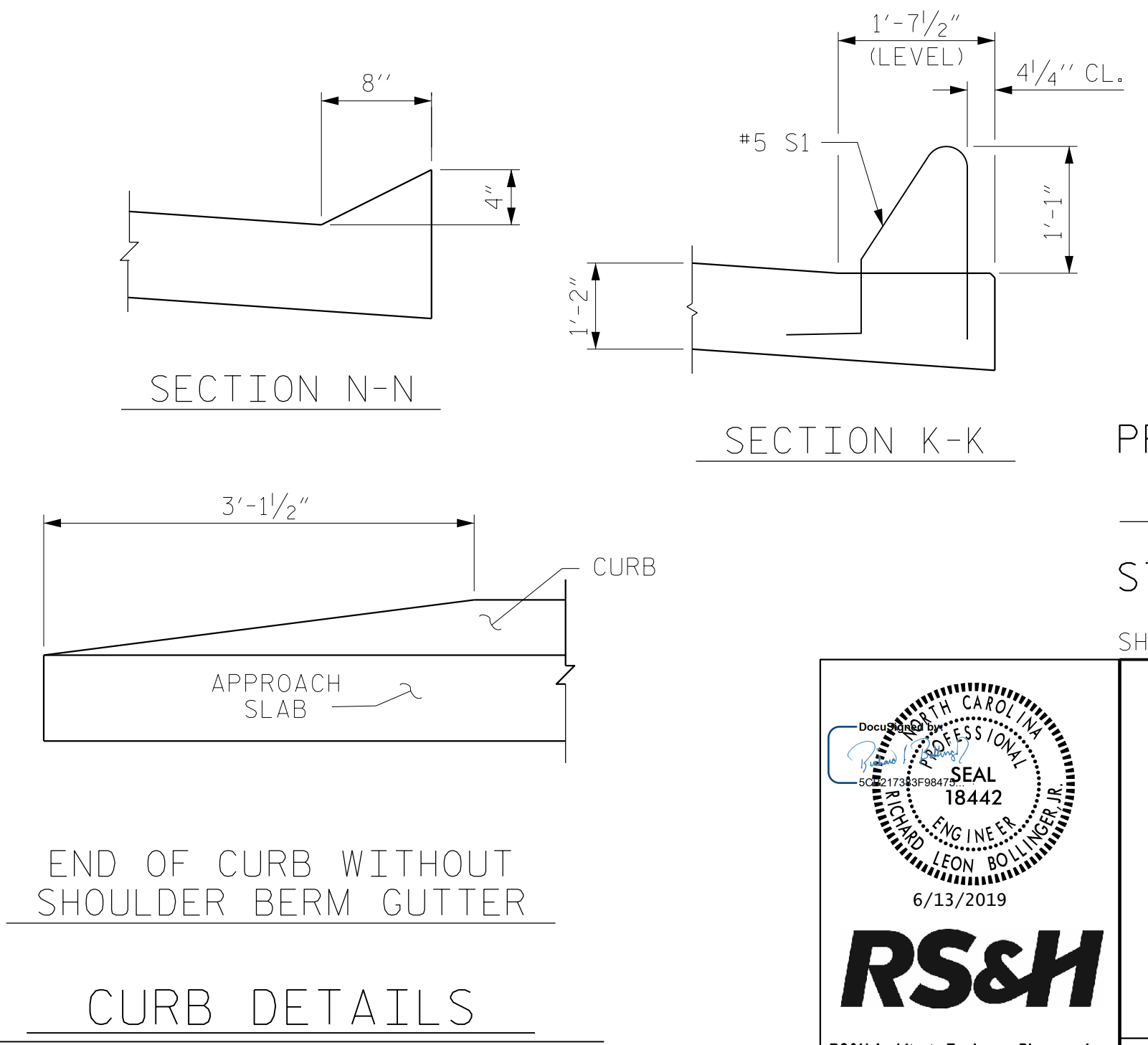
BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	50	#4	STR	29'-8"	991
A2	52	#4	STR	29'-6"	1025
*B1	98	#5	STR	24'-0"	2453
B2	98	#6	STR	24'-7"	3619
*B3	4	#5	STR	8'-10"	37
B4	4	#6	STR	8'-10"	53
*J1	55	#4	1	1'-5"	52
REINFORCING STEEL **					4697 LBS.
* EPOXY COATED REINFORCING STEEL **					3533 LBS.
CLASS AA CONCRETE **					54.4 C.Y.



ALL BAR DIMENSIONS ARE OUT TO OUT
 ** QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 2.



SECTION THRU SLAB
 (TYPE I - STANDARD APPROACH FILL)



CURB DETAILS

SPLICE LENGTHS

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

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 1 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH
 SLAB FOR FLEXIBLE
 PAVEMENT
 LEFT LANE

REVISIONS

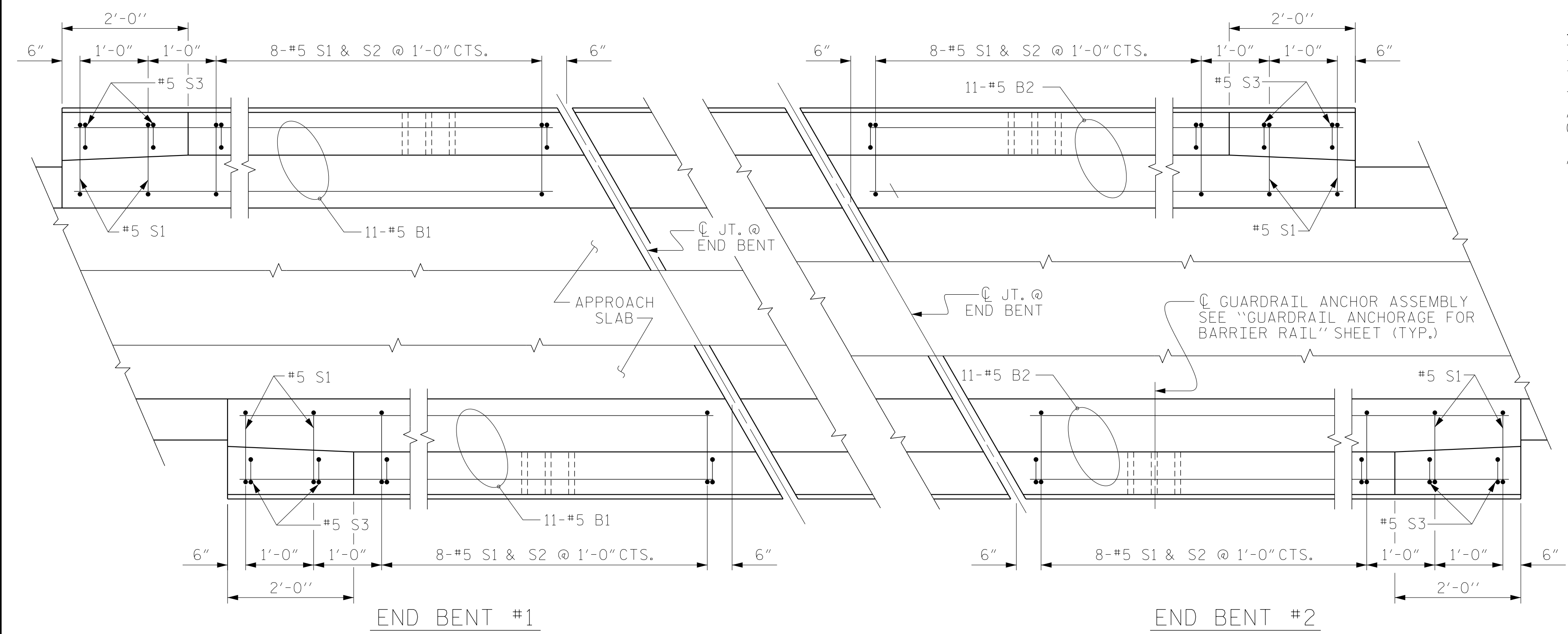
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S03-38
 TOTAL SHEETS 39

ASSEMBLED BY : MAL DATE : 05/2015
 CHECKED BY : JMR DATE : 05/2015

DRAWN BY : EEM 3/95 REV. 12/21/11 MAA/GM
 CHECKED BY : VAP 3/95 REV. 6/13 MAA/GM
 REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED



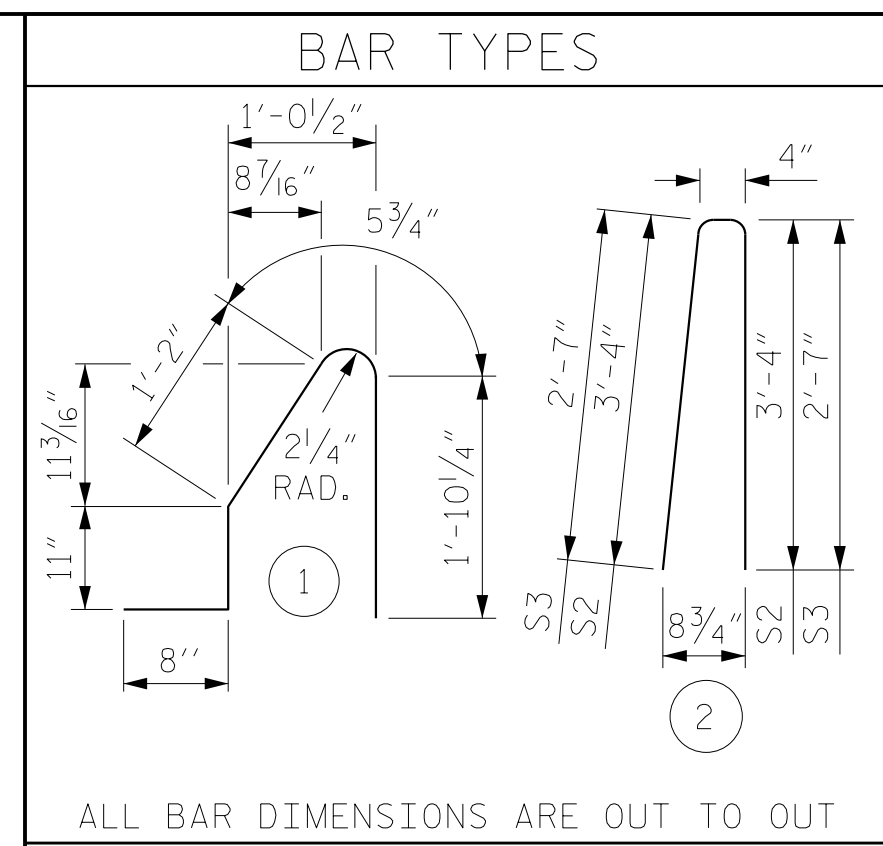
PLAN OF BARRIER RAIL

NOTES

THE COST OF THE BARRIER RAIL ON THE APPROACH SLAB SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "CONCRETE BARRIER RAIL".

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

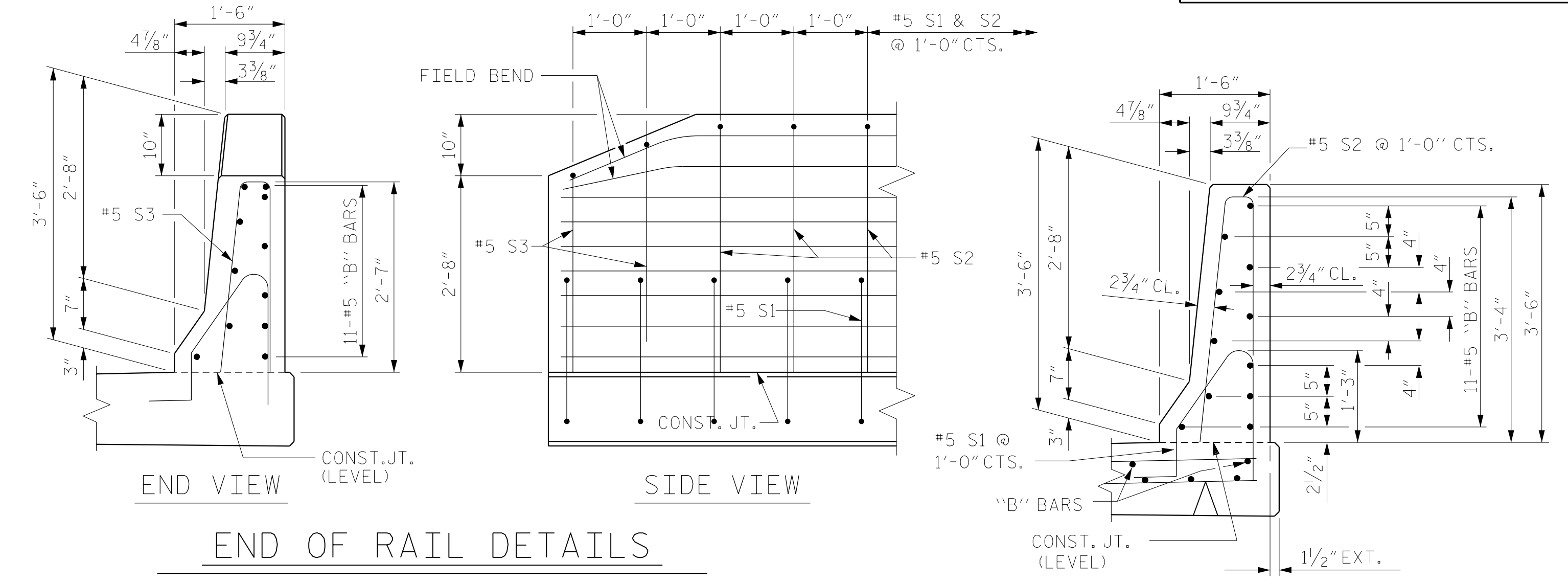
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.



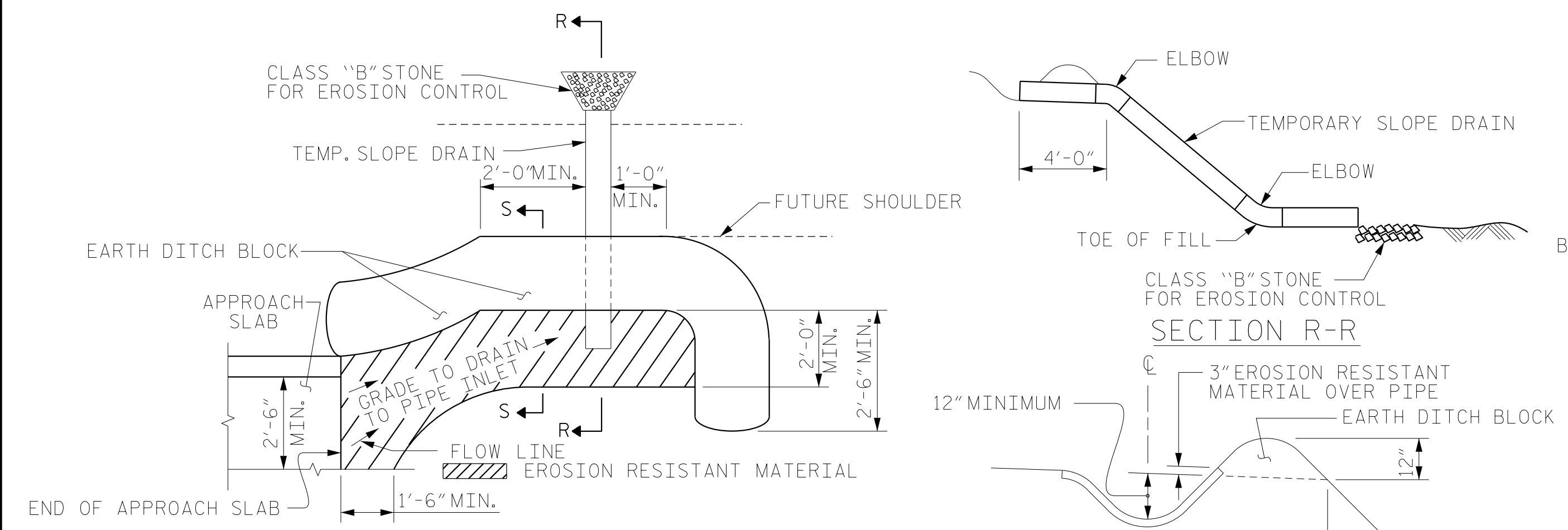
BILL OF MATERIAL

BARRIER RAIL ONLY

BAR NO.	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	22	#5	STR	9'-9"	224
*B2	22	#5	STR	8'-10"	203
*S1	40	#5	1	5'-1"	212
*S2	32	#5	2	7'-0"	234
*S3	8	#5	2	5'-6"	46
* EPOXY COATED REINFORCING STEEL				LBS.	919
CLASS AA CONCRETE				C. Y.	5.6
CONCRETE BARRIER RAIL				LTN. FT.	42.0



END OF RAIL DETAILS



TEMPORARY BERM AND SLOPE DRAIN DETAILS

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.

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 2 OF 2



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH
 SLAB DETAILS
 LEFT LANE

REVISIONS

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

SHEET NO. S03-39
 TOTAL SHEETS 39

ASSEMBLED BY : MAL DATE : 05/2015
 CHECKED BY : JMR DATE : 05/2015
 DRAWN BY : FCJ 11/88
 CHECKED BY : ARB 11/88

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

LOAD FACTORS:

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

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR PRESTRESSED CONCRETE GIRDERS																								
LEVEL	VEHICLE	WEIGHT (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE								COMMENT NUMBER
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (FT)		
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.02	--	1.75	0.77	1.15	B	EL	65.23	0.98	1.14	B	I	90.85	0.80	0.77	1.02	B	EL	65.23		
	HL-93 (OPERATING)	N/A		1.49	--	1.35	0.77	1.49	B	EL	65.23	0.97	1.66	A	I	24.99	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	1.50	54.00	1.75	0.77	1.69	B	EL	65.23	0.98	1.75	B	I	103.92	0.80	0.77	1.50	B	EL	65.23		
	HS-20 (OPERATING)	36.000		2.20	79.20	1.35	0.77	2.20	B	EL	65.23	0.98	2.33	B	I	103.92	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH	12.500		3.96	49.50	1.40	0.77	5.58	B	EL	65.23	0.98	6.27	B	I	103.92	0.80	0.77	3.96	B	EL	65.23	
		S3C	21.500		2.31	49.67	1.40	0.77	3.25	B	EL	65.23	0.98	3.60	B	I	103.92	0.80	0.77	2.31	B	EL	65.23	
		S3A	22.750		2.18	49.60	1.40	0.77	3.08	B	EL	65.23	0.98	3.40	B	I	103.92	0.80	0.77	2.18	B	EL	65.23	
		S4A	26.750		1.90	50.83	1.40	0.77	2.68	B	EL	65.23	0.98	2.93	B	I	103.92	0.80	0.77	1.90	B	EL	65.23	
		S5A	30.500		1.68	51.24	1.40	0.77	2.36	B	EL	65.23	0.98	2.64	B	I	103.92	0.80	0.77	1.68	B	EL	65.23	
		S6A	34.500		1.51	52.10	1.40	0.77	2.12	B	EL	65.23	0.98	2.34	B	I	103.92	0.80	0.77	1.51	B	EL	65.23	
		S7B	38.500		1.36	52.36	1.40	0.77	1.92	B	EL	65.23	0.98	2.16	B	I	103.92	0.80	0.77	1.36	B	EL	65.23	
	S7A	40.000	③	1.34	53.60	1.40	0.77	1.88	B	EL	65.23	0.98	2.16	B	I	103.92	0.80	0.77	1.34	B	EL	65.23		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	T4A	28.250		1.85	52.26	1.40	0.77	2.61	B	EL	65.23	0.98	2.82	B	I	103.92	0.80	0.77	1.85	B	EL	65.23	
		T5B	32.000		1.63	52.16	1.40	0.77	2.29	B	EL	65.23	0.98	2.62	B	I	103.92	0.80	0.77	1.63	B	EL	65.23	
T6A		36.000		1.48	53.28	1.40	0.77	2.08	B	EL	65.23	0.98	2.37	B	I	103.92	0.80	0.77	1.48	B	EL	65.23		
	T7A	40.000		1.36	54.40	1.40	0.77	1.91	B	EL	65.23	0.98	2.16	B	I	103.92	0.80	0.77	1.36	B	EL	65.23		
	T7B	40.000		1.41	56.40	1.40	0.77	1.99	B	EL	65.23	0.98	2.06	B	I	103.92	0.80	0.77	1.41	B	EL	65.23		

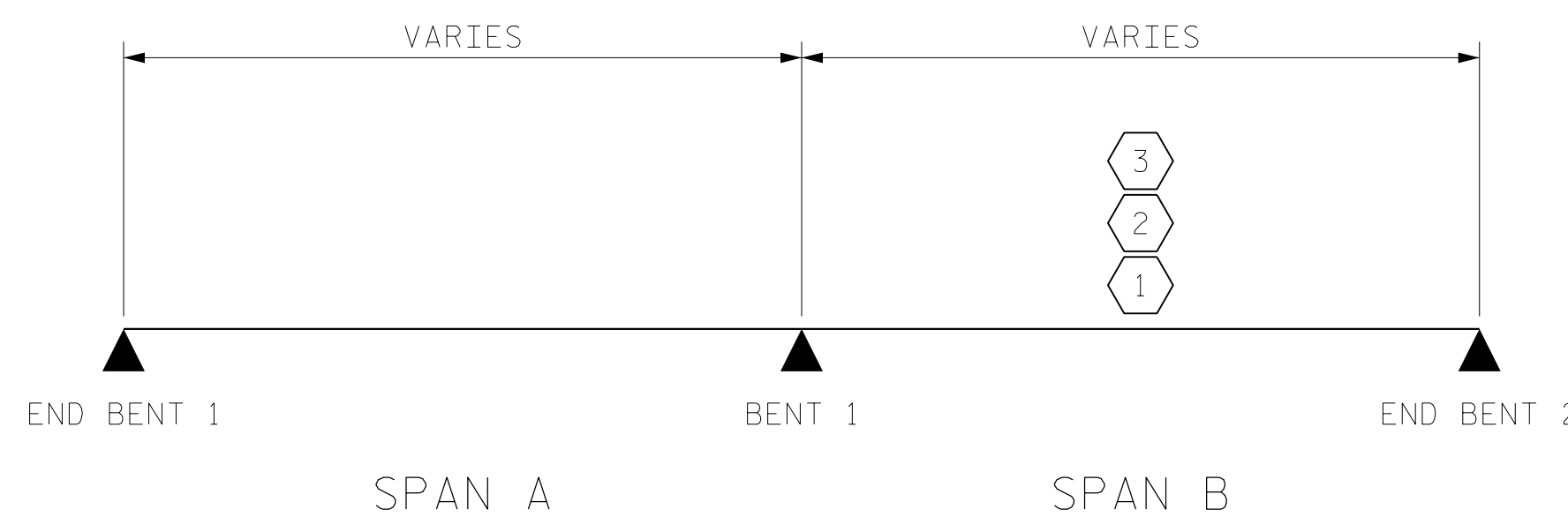
NOTES:

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

COMMENTS:

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

①	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	

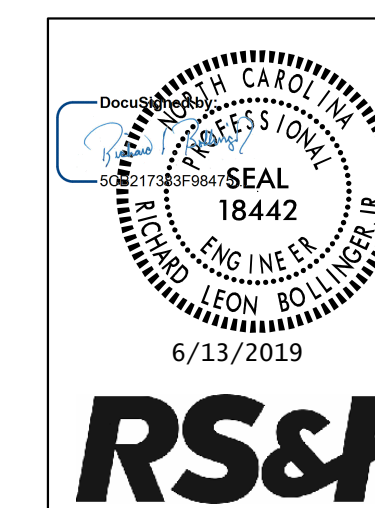


LRFR SUMMARY

SECTION PROPERTIES			
SPAN B - EXTERIOR LEFT			
	UNITS	NON-COMPOSITE	COMPOSITE
HEIGHT	IN	72	80.25
AREA	IN ²	833.1	1370.54
Ixx	IN ⁴	570260	1078779
Ycg	IN	36.79	52.21
SELF WT.	PLF	867.8	1683.9
EFF. WIDTH	IN	-	95.0
SPAN B - INTERIOR			
	UNITS	NON-COMPOSITE	COMPOSITE
HEIGHT	IN	72	80.25
AREA	IN ²	833.1	1443.82
Ixx	IN ⁴	570260	1118958
Ycg	IN	36.79	53.43
SELF WT.	PLF	867.8	1795.2
EFF. WIDTH	IN	-	108.0

SECTION PROPERTIES PROVIDED AT MIDSPAN

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-



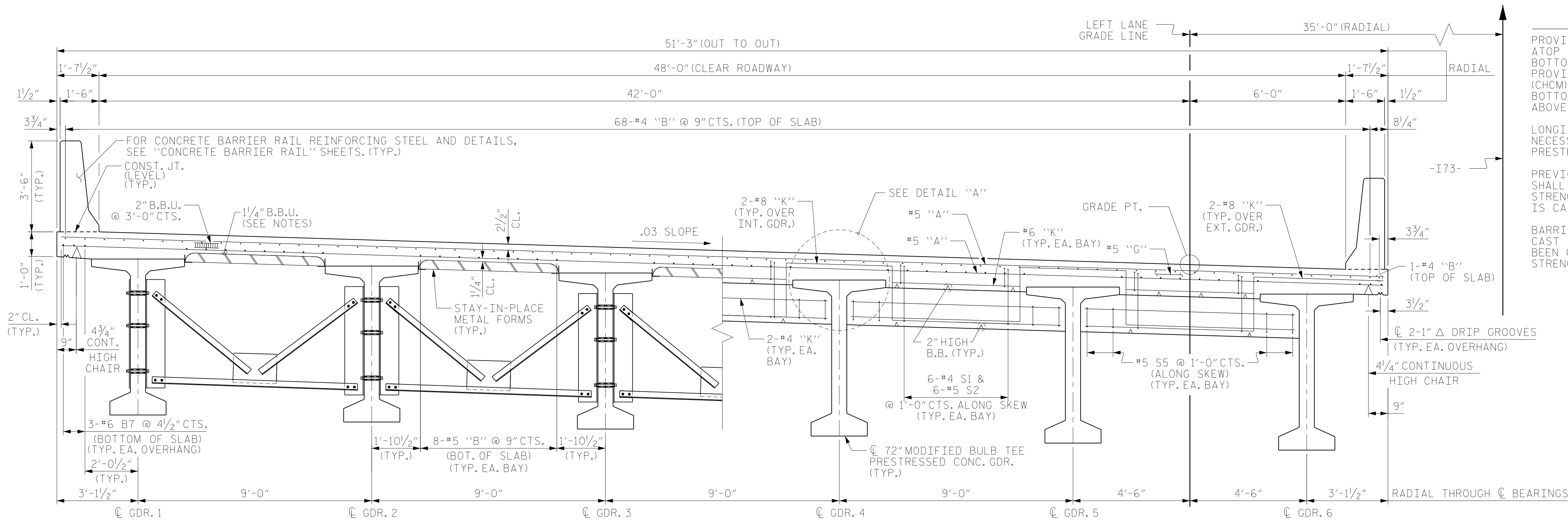
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
PRESTRESSED
CONCRETE GIRDERS
(INTERSTATE TRAFFIC)
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S03-5
2			4			TOTAL SHEETS 39

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DRAWN BY: MKO DATE: 03/2015
CHECKED BY: JMR DATE: 06/2015
DESIGN ENGINEER: JMR DATE: 04/2019



AT INTERMEDIATE DIAPHRAGM

TYPICAL SECTION

AT END BENT

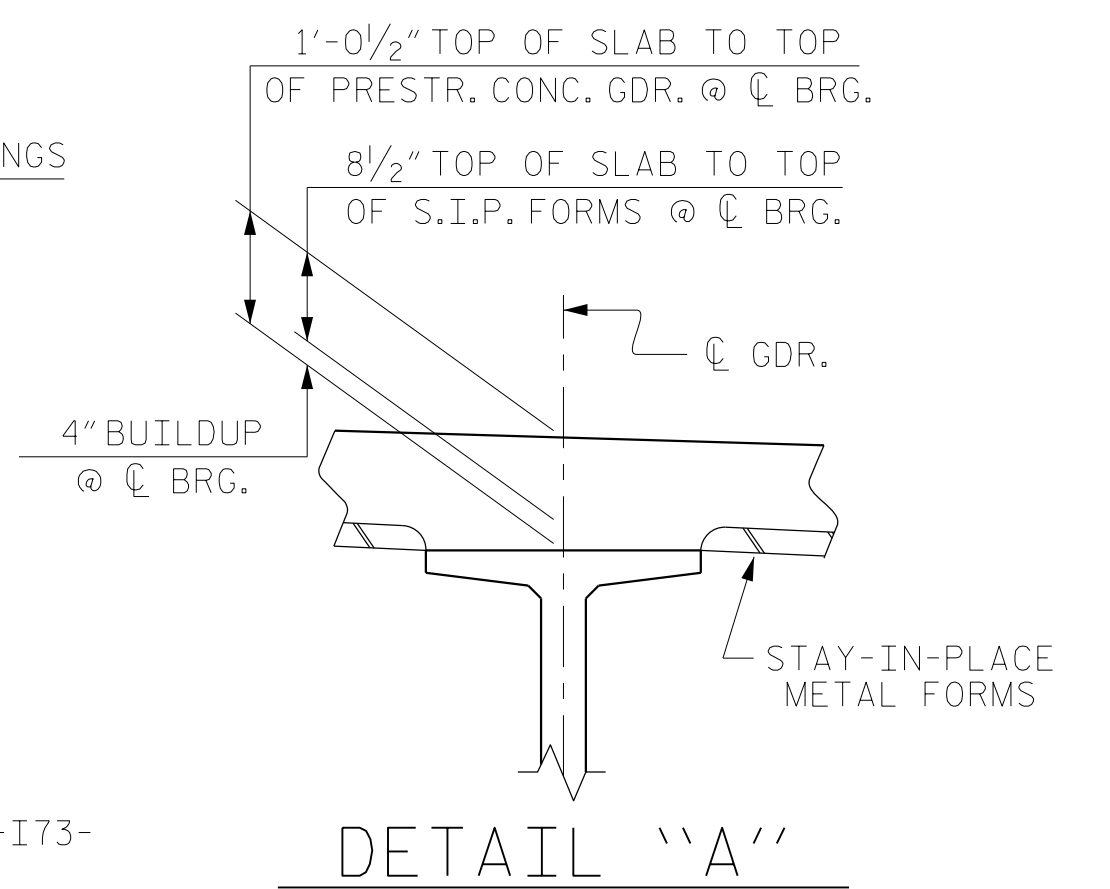
NOTES

PROVIDE 1/4" 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 (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

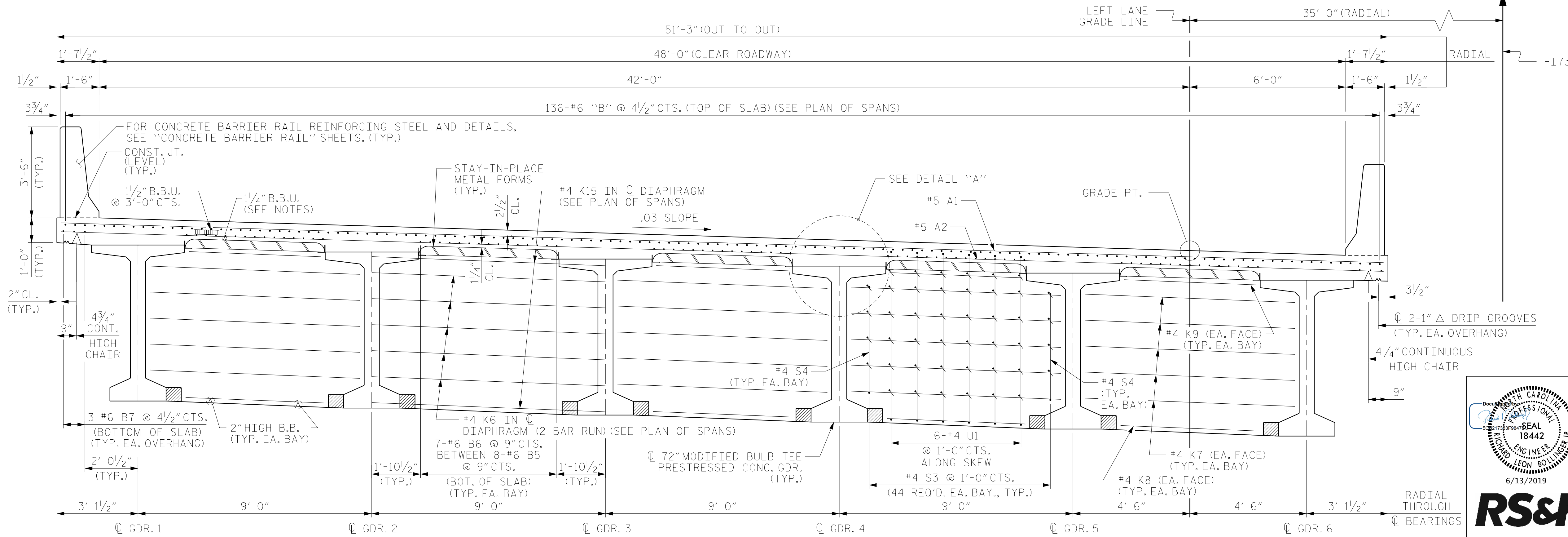
LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.

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.

BARRIER RAIL 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 3000 PSI.



DETAIL "A"



TYPICAL SECTION AT BENT DIAPHRAGM

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 1 OF 2

DRAWN BY : MAL DATE : 05/2015
 CHECKED BY : JMR DATE : 05/2015
 DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

6/13/2019
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE TYPICAL SECTION					
LEFT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S03-6					TOTAL SHEETS 39

NOTES

FOR SPLICE LENGTHS NOT SHOWN, REFER TO MINIMUM SPLICE LENGTH TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 1 OF 2.

FOR END BENT DIAPHRAGM BARS AND BENT DIAPHRAGM BARS, SEE "TYPICAL SECTION" SHEET 2 OF 2.

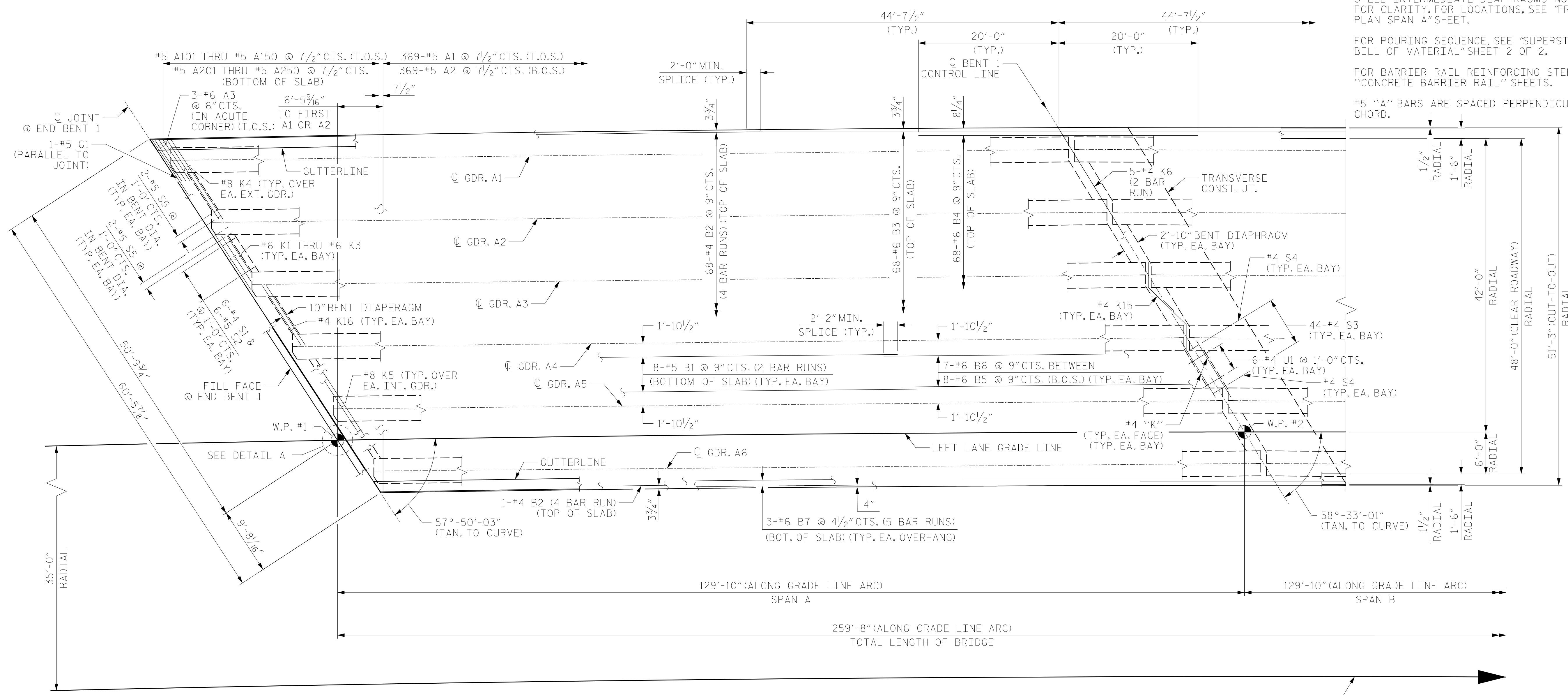
STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY, FOR LOCATIONS, SEE "FRAMING PLAN SPAN A" SHEET.

FOR POURING SEQUENCE, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET 2 OF 2.

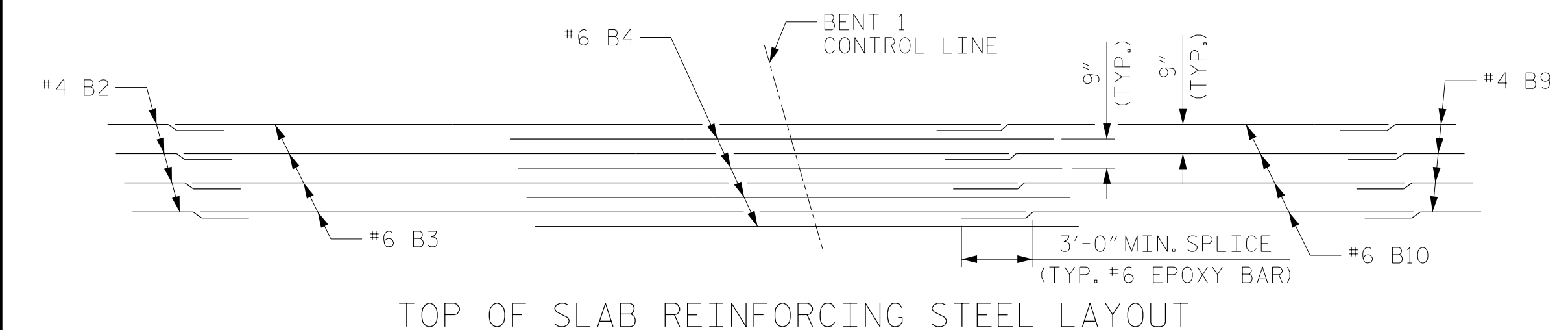
FOR BARRIER RAIL REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEETS.

#5 "A" BARS ARE SPACED PERPENDICULAR TO LONG CHORD.

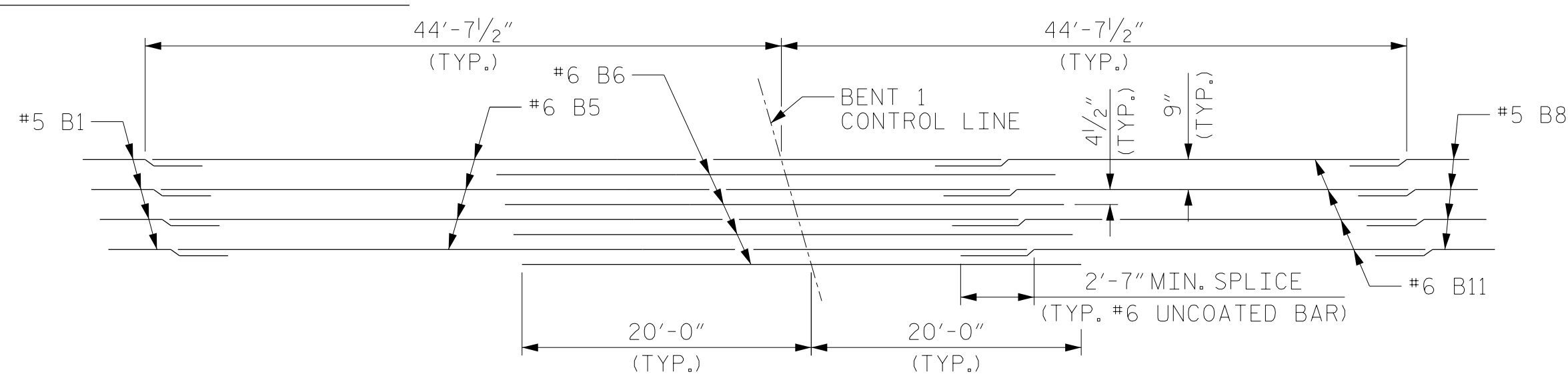
T.O.S. = TOP OF SLAB
B.O.S. = BOT. OF SLAB



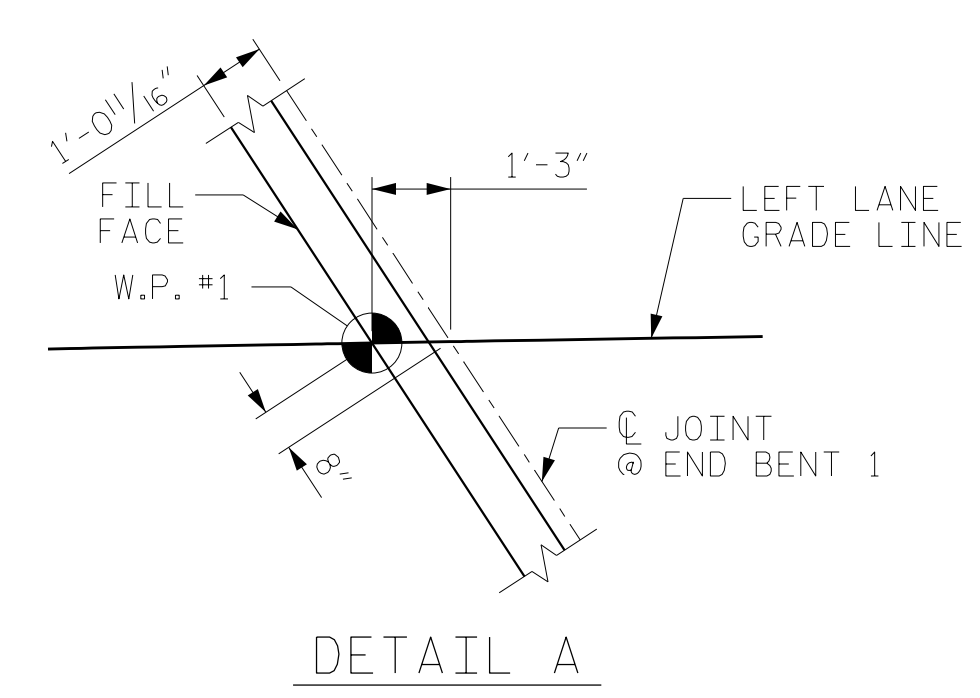
PLAN OF SPAN A



TOP OF SLAB REINFORCING STEEL LAYOUT



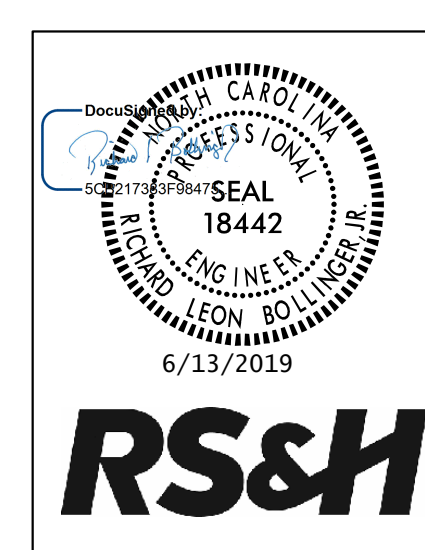
BOTTOM OF SLAB REINFORCING STEEL LAYOUT



DETAIL A

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 101+31.22 -I73-

SHEET 1 OF 2



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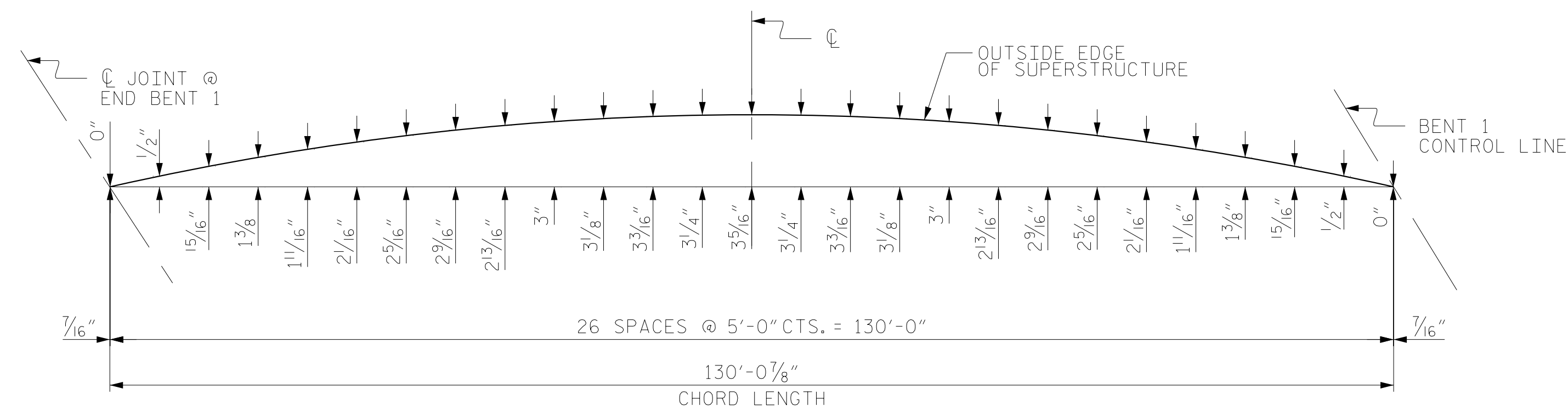
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPAN A
LEFT LANE

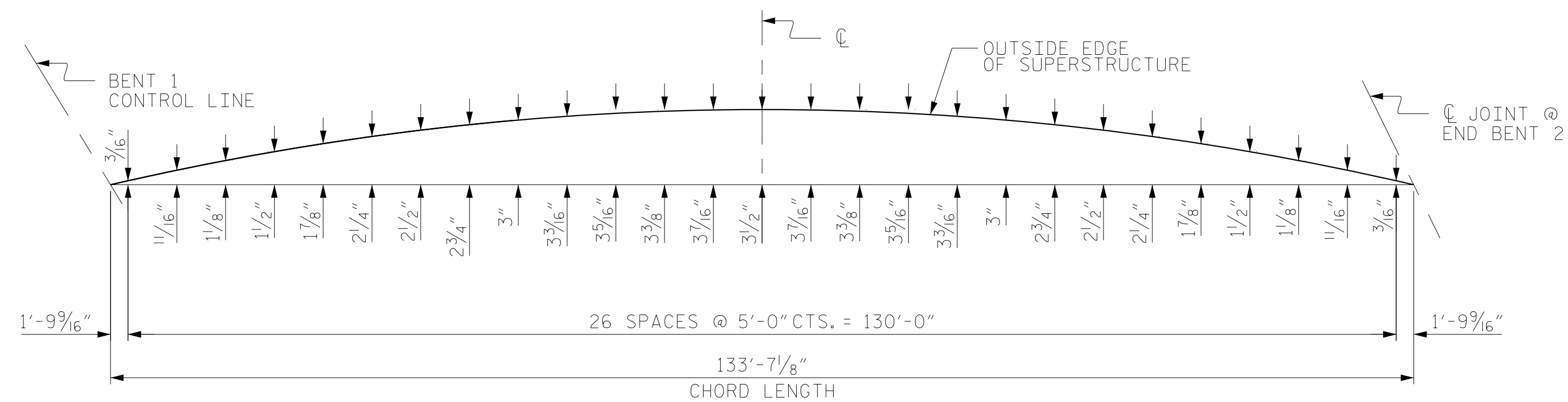
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-8
1			3			TOTAL SHEETS
2			4			39

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CHECKED BY : JMR DATE : 05/2015
DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

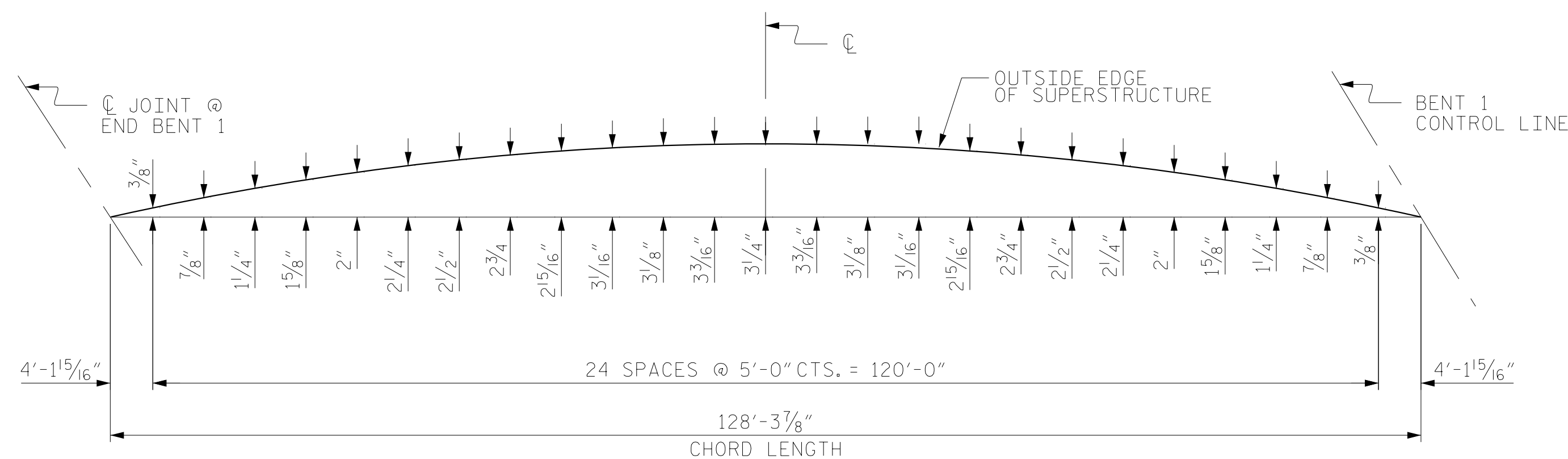
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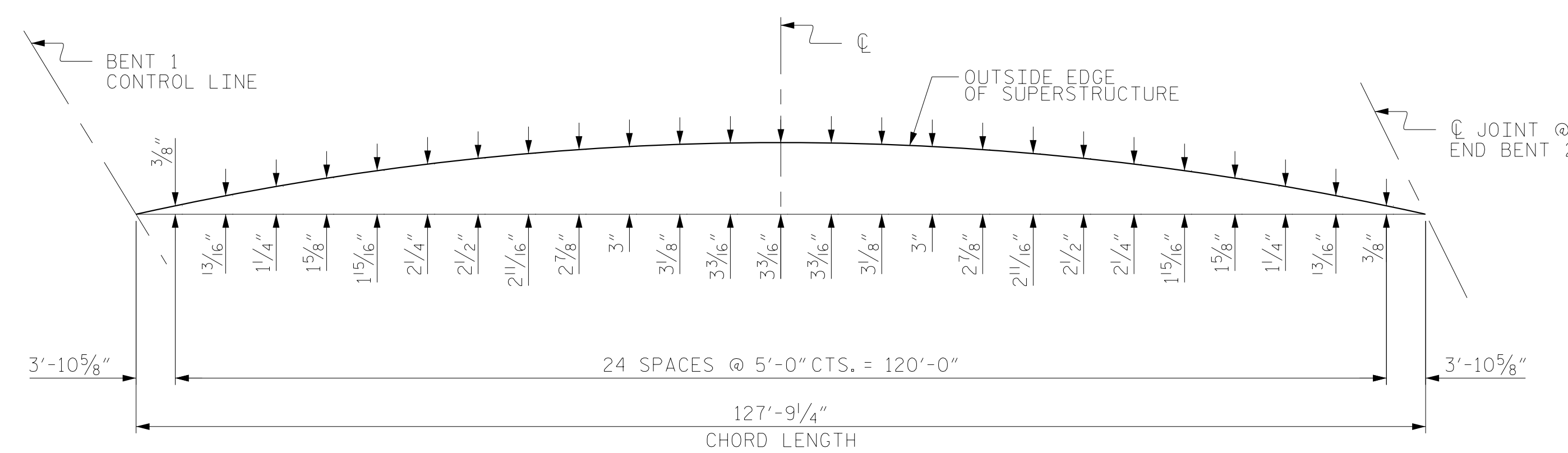
LEFT SIDE SPAN "A" ARC OFFSETS



LEFT SIDE SPAN "B" ARC OFFSETS



RIGHT SIDE SPAN "A" ARC OFFSETS



RIGHT SIDE SPAN "B" ARC OFFSETS

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

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 CHECKED BY : JMR DATE : 05/2015
 DESIGN ENGINEER OF RECORD : JMR DATE : 04/2019

6/13/2019
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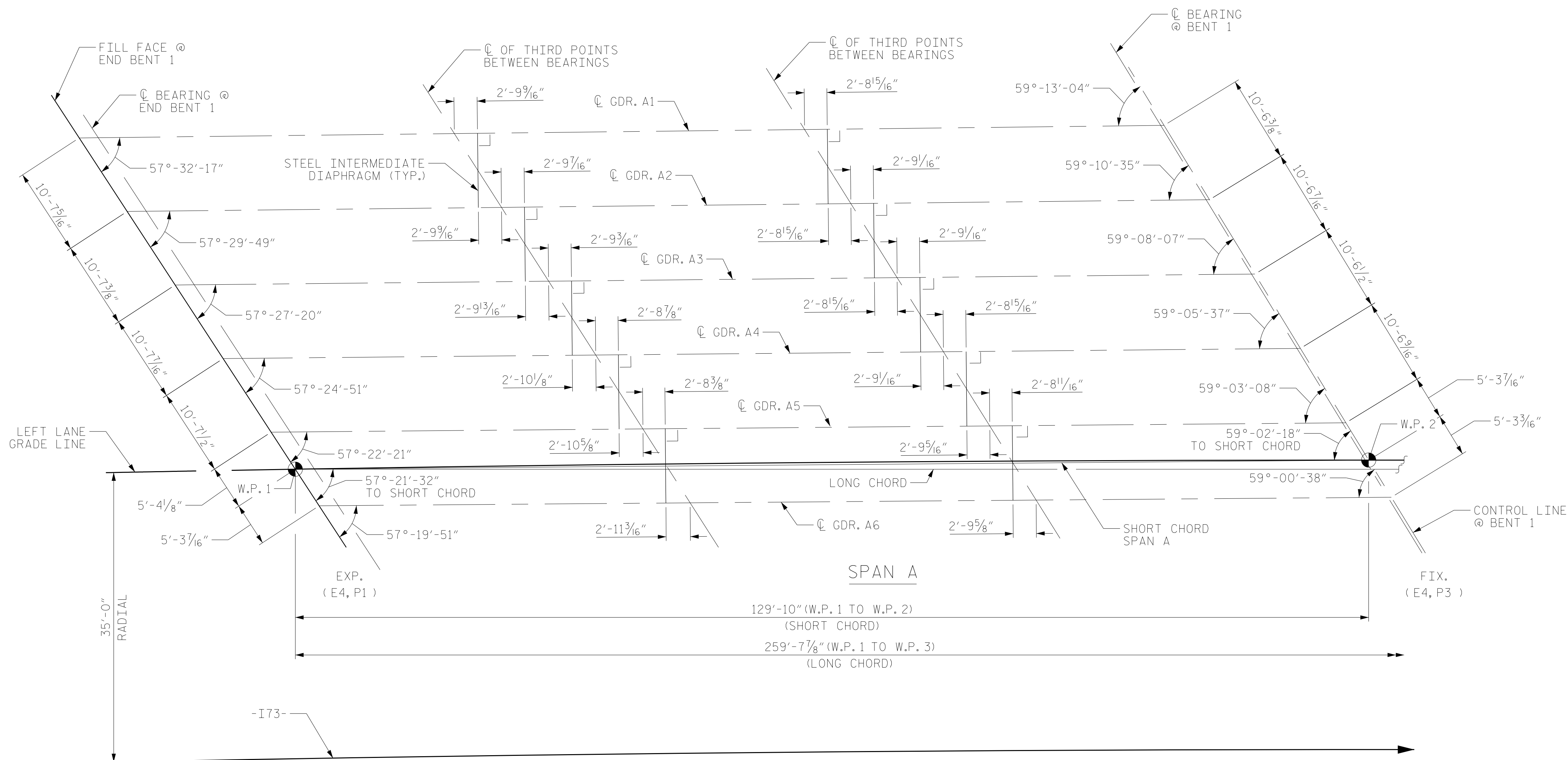


STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUPERSTRUCTURE ARC OFFSETS LEFT LANE					
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		
SHEET NO. S03-10					TOTAL SHEETS 39

NOTES:

FOR DIMENSIONS TO STEEL INTERMEDIATE DIAPHRAGMS, SEE "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS," SHEET 3 OF 4.

FOR STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS."



FRAMING PLAN

END BENT DIAPHRAGMS AND BENT DIAPHRAGMS ARE NOT SHOWN

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 1 OF 2

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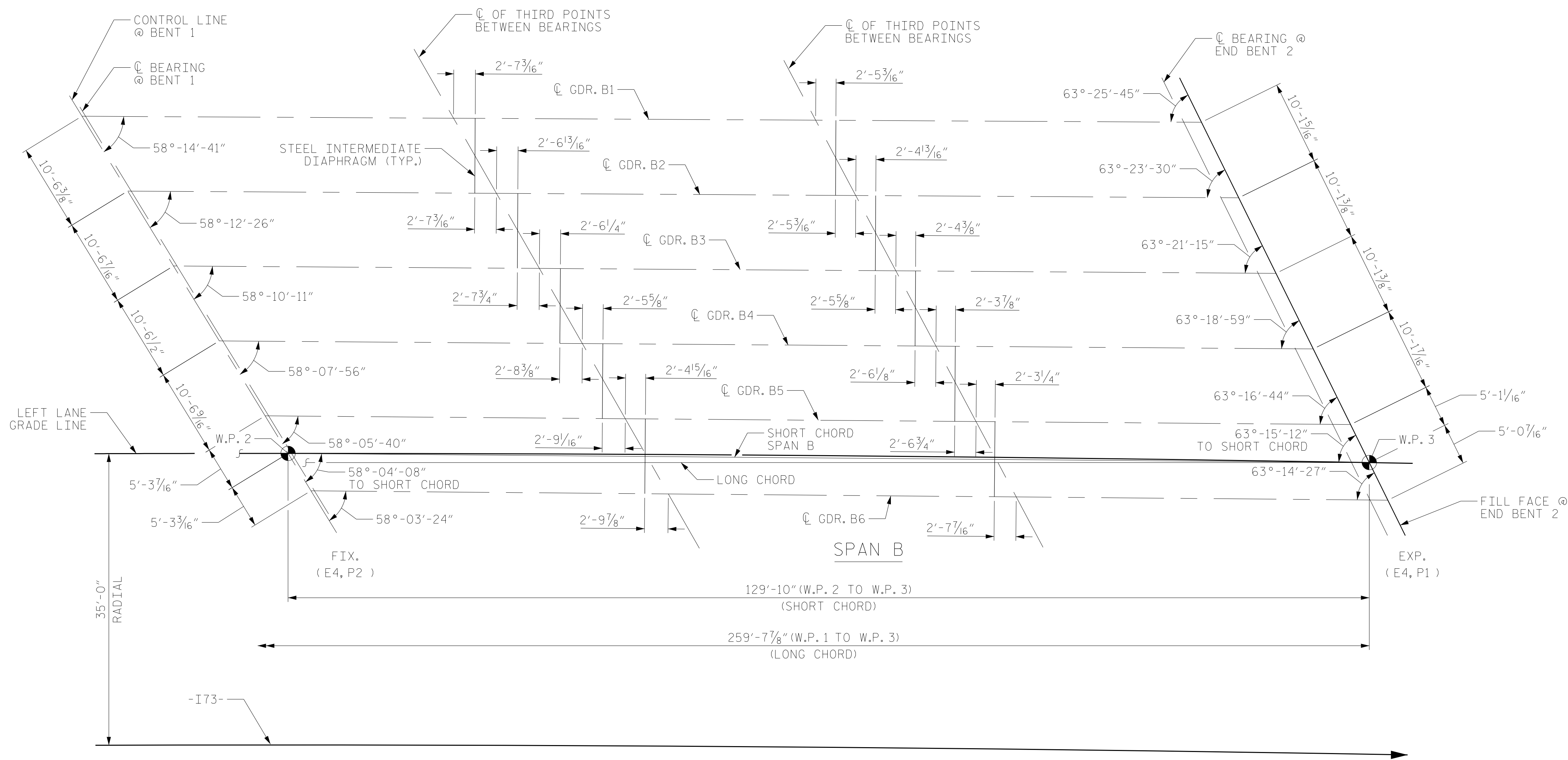
SUPERSTRUCTURE
 FRAMING PLAN
 SPAN A
 LEFT LANE

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

NOTES:

FOR DIMENSIONS TO STEEL INTERMEDIATE DIAPHRAGMS, SEE "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS," SHEET 3 OF 4.

FOR STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS."



FRAMING PLAN

END BENT DIAPHRAGMS AND BENT DIAPHRAGMS ARE NOT SHOWN

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 2 OF 2

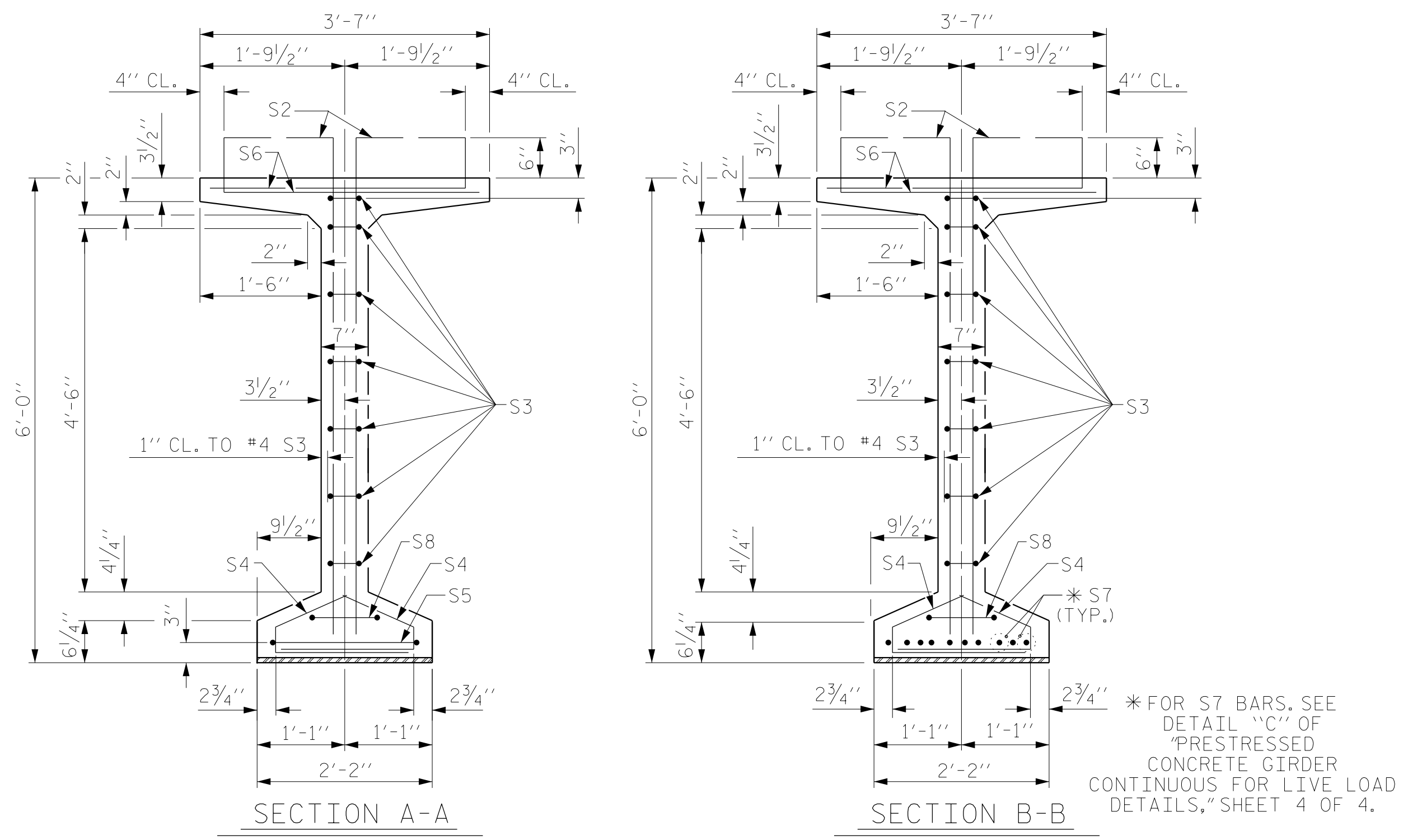
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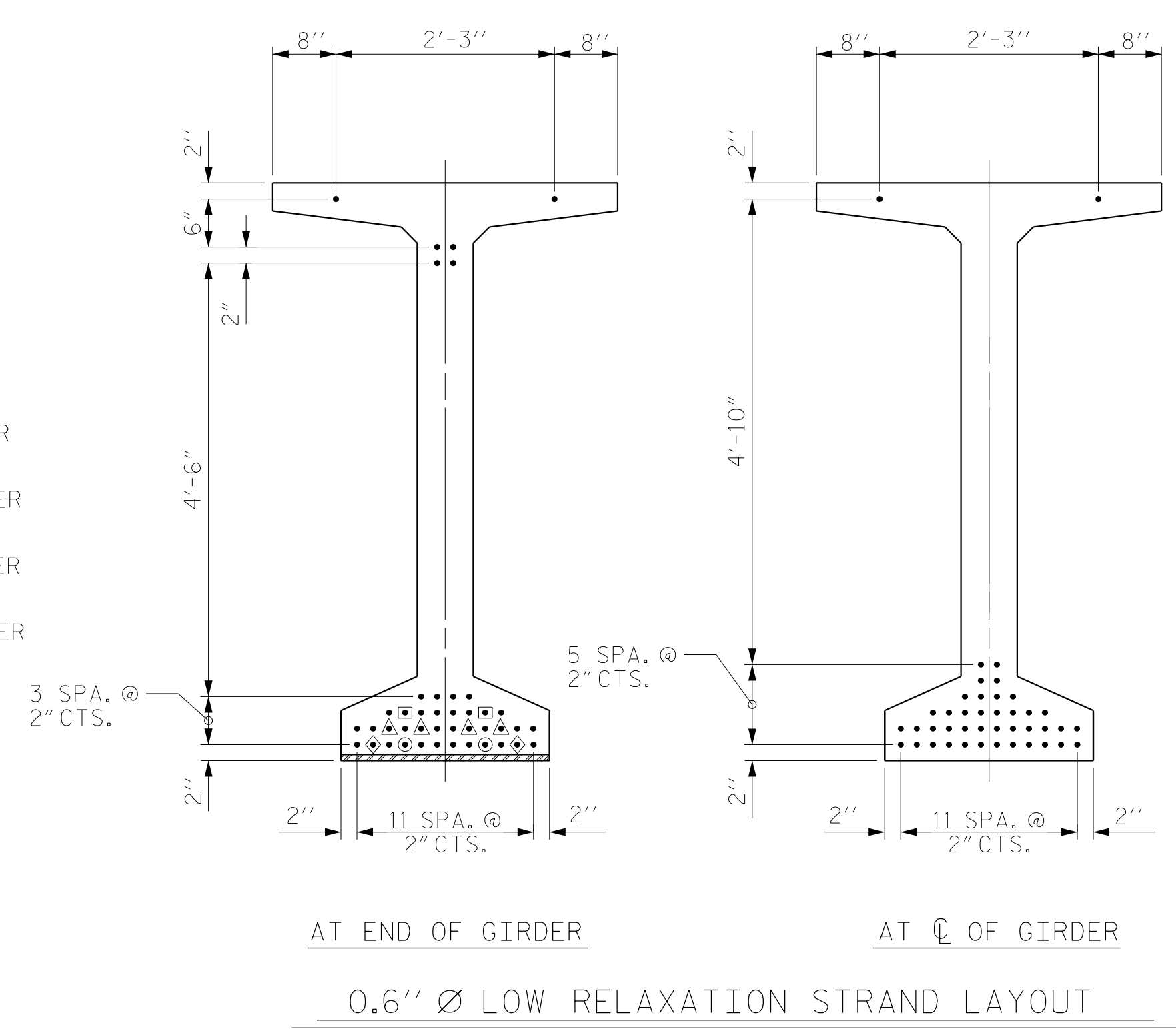
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S03-12
SUPERSTRUCTURE FRAMING PLAN SPAN B LEFT LANE						TOTAL SHEETS 39
REVISIONS						NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			



- DEBONDING LEGEND**
- FULLY BONDED STRANDS
 - STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
 - ▲ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
 - STRANDS DEBONDED FOR 14'-0" FROM END OF GIRDER
 - ◆ STRANDS DEBONDED FOR 26'-0" FROM END OF GIRDER



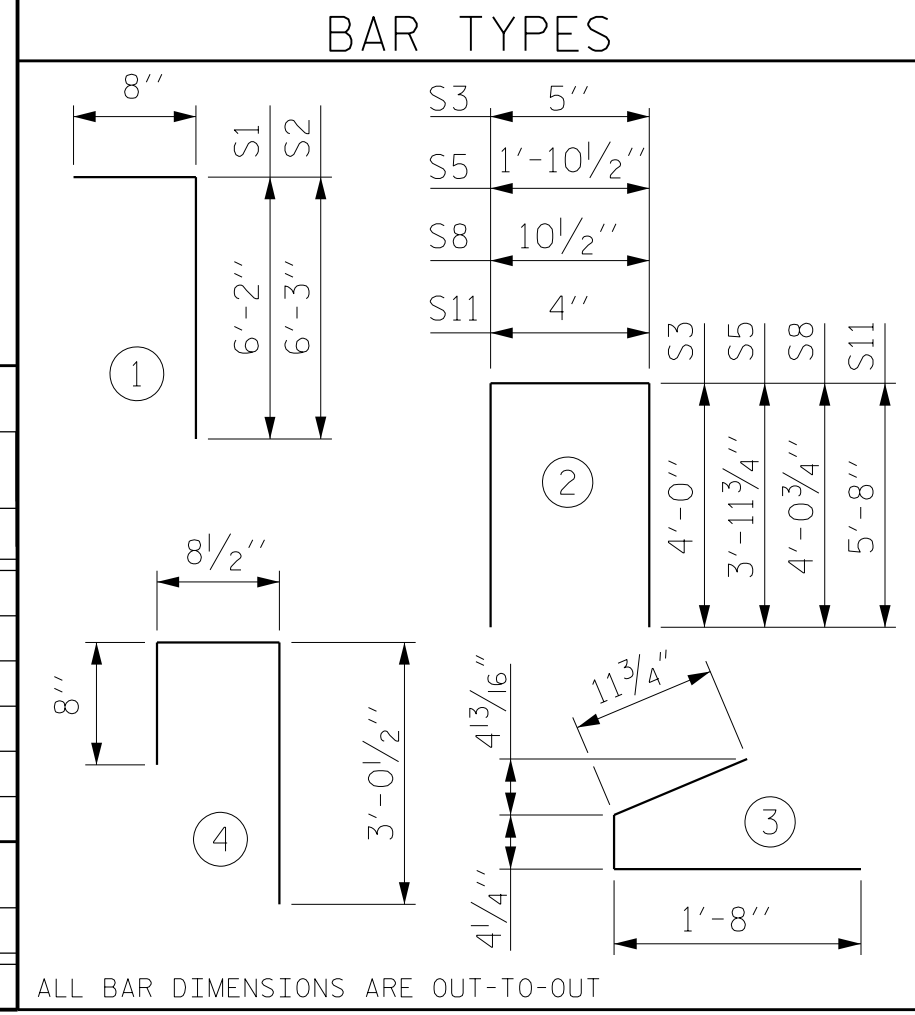
0.6" Ø L. R. GRADE 270 STRANDS

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

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	
S1	226	#4	1	6'-10"	1032	
S2	28	#5	1	6'-11"	202	
S3	14	#4	2	8'-5"	79	
S4	88	#4	3	3'-0"	176	
S5	1	#5	2	9'-10"	10	
S6	88	#5	4	4'-5"	405	
*S7	10	#5	STR	3'-8"	38	
S8	2	#5	2	9'-0"	19	
S9	83	#5	STR	3'-3"	281	
S10	1	#3	STR	1'-10"	1	
GDR. 1 & 6	S11	8	#5	2	11'-8"	97
GDR. 2 - 5	S11	16	#5	2	11'-8"	195
GDR. 1 & 6	S12	16	#4	STR	8'-0"	86
GDR. 2 - 5	S13	16	#4	STR	13'-7"	145

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

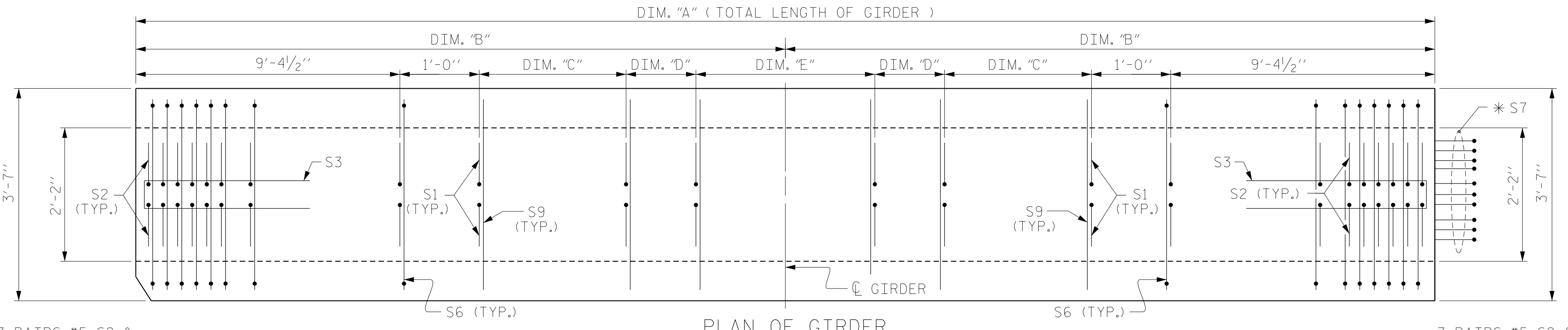


QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDER 1	2426	27.5	42
GIRDER 2	2583	27.5	42
GIRDER 3	2583	27.4	42
GIRDER 4	2583	27.3	42
GIRDER 5	2583	27.3	42
GIRDER 6	2426	27.2	42

GIRDERS REQUIRED

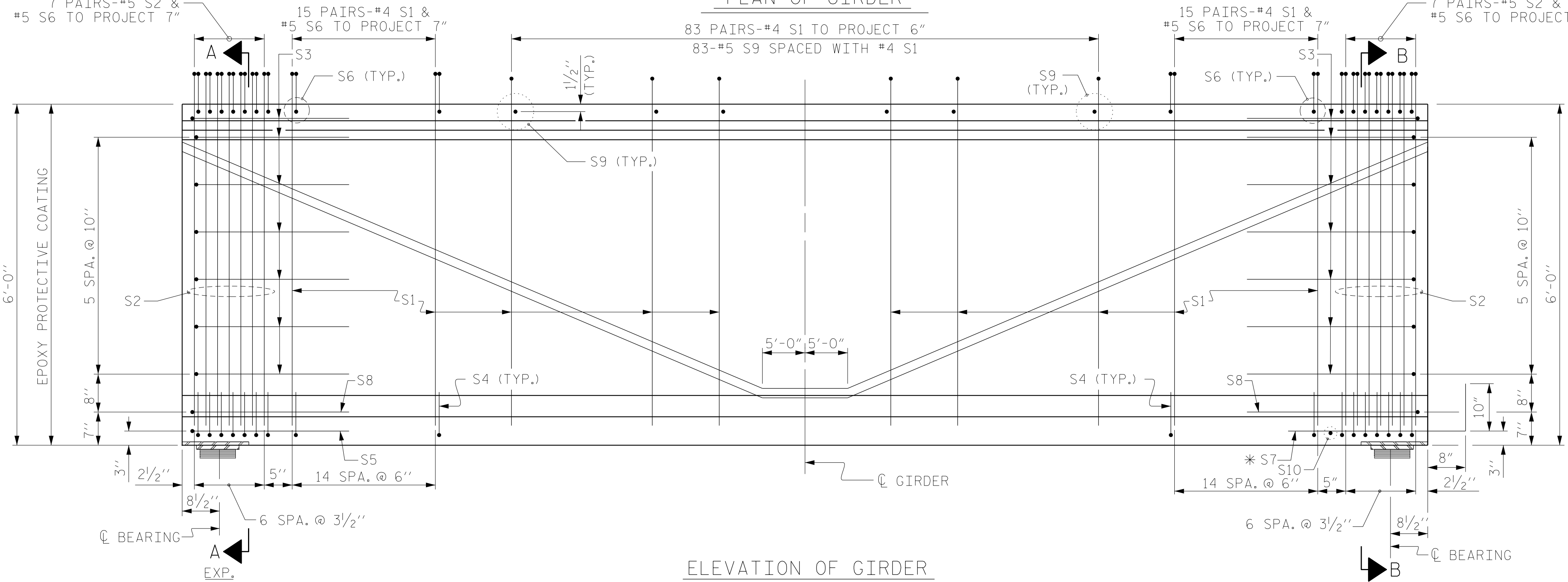
NUMBER	LENGTH	TOTAL LENGTH
6	SEE TABLE	766.41



GIRDER DIMENSIONS TABLE

GDR. NO.	SPAN A				
	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"
A1	128'-6 1/16"	64'-3 1/16"	15 SPA. @ 1'-0"	1'-4 9/16"	50 SPA. @ 1'-6"
A2	128'-2 3/8"	64'-1 3/16"	15 SPA. @ 1'-0"	1'-2 1/16"	50 SPA. @ 1'-6"
A3	127'-10 1/16"	63'-11 3/8"	15 SPA. @ 1'-0"	1'-0 7/8"	50 SPA. @ 1'-6"
A4	127'-7"	63'-9 1/2"	15 SPA. @ 1'-0"	11"	50 SPA. @ 1'-6"
A5	127'-3 1/4"	63'-7 5/8"	15 SPA. @ 1'-0"	9 1/8"	50 SPA. @ 1'-6"
A6	126'-11 7/16"	63'-5 3/16"	15 SPA. @ 1'-0"	7 3/16"	50 SPA. @ 1'-6"

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 1 OF 4



FOR LOCATIONS OF 1 1/2" Ø FORMED HOLES FOR STEEL INTERMEDIATE DIAPHRAGMS, SEE SHEET 3 OF 4.

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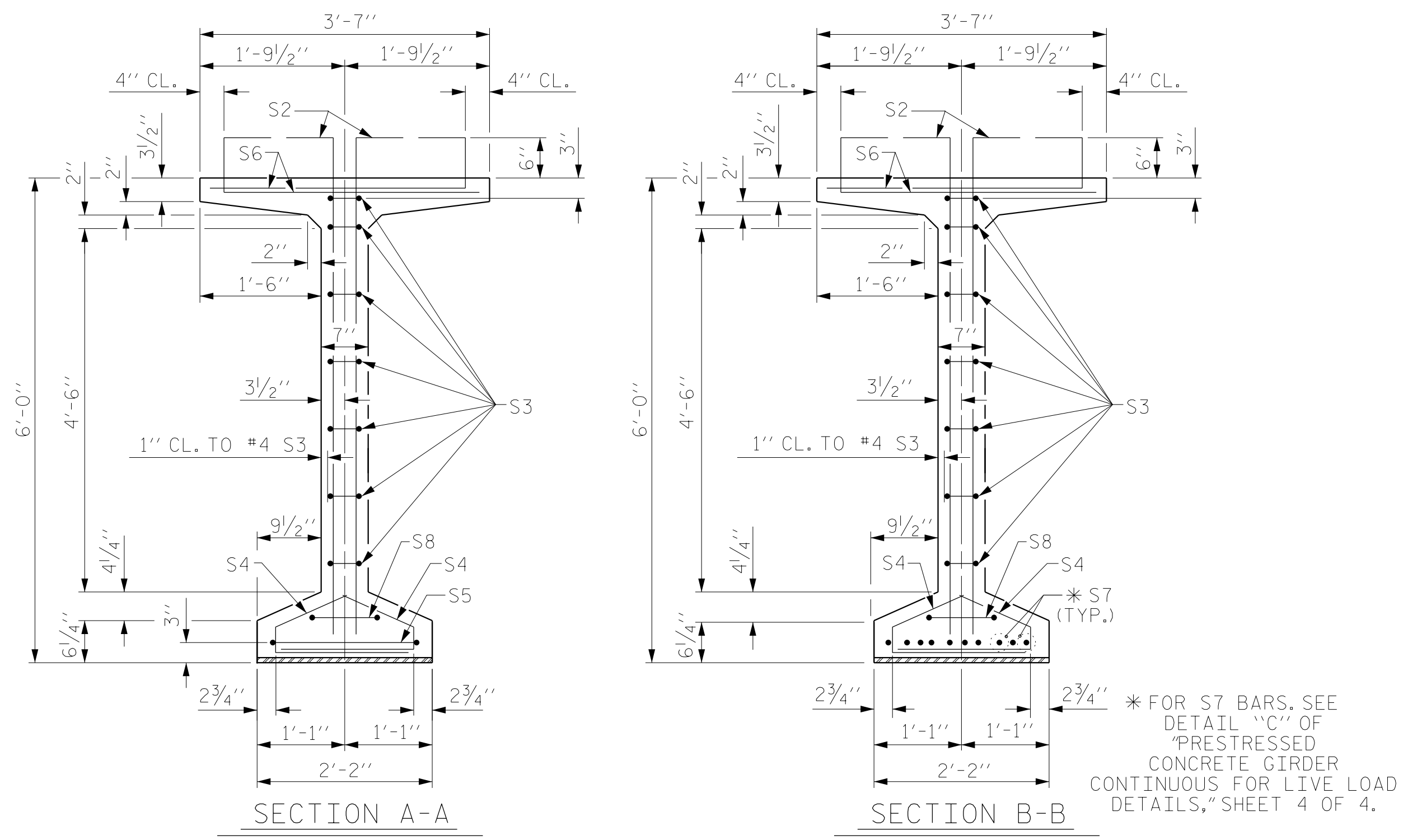


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

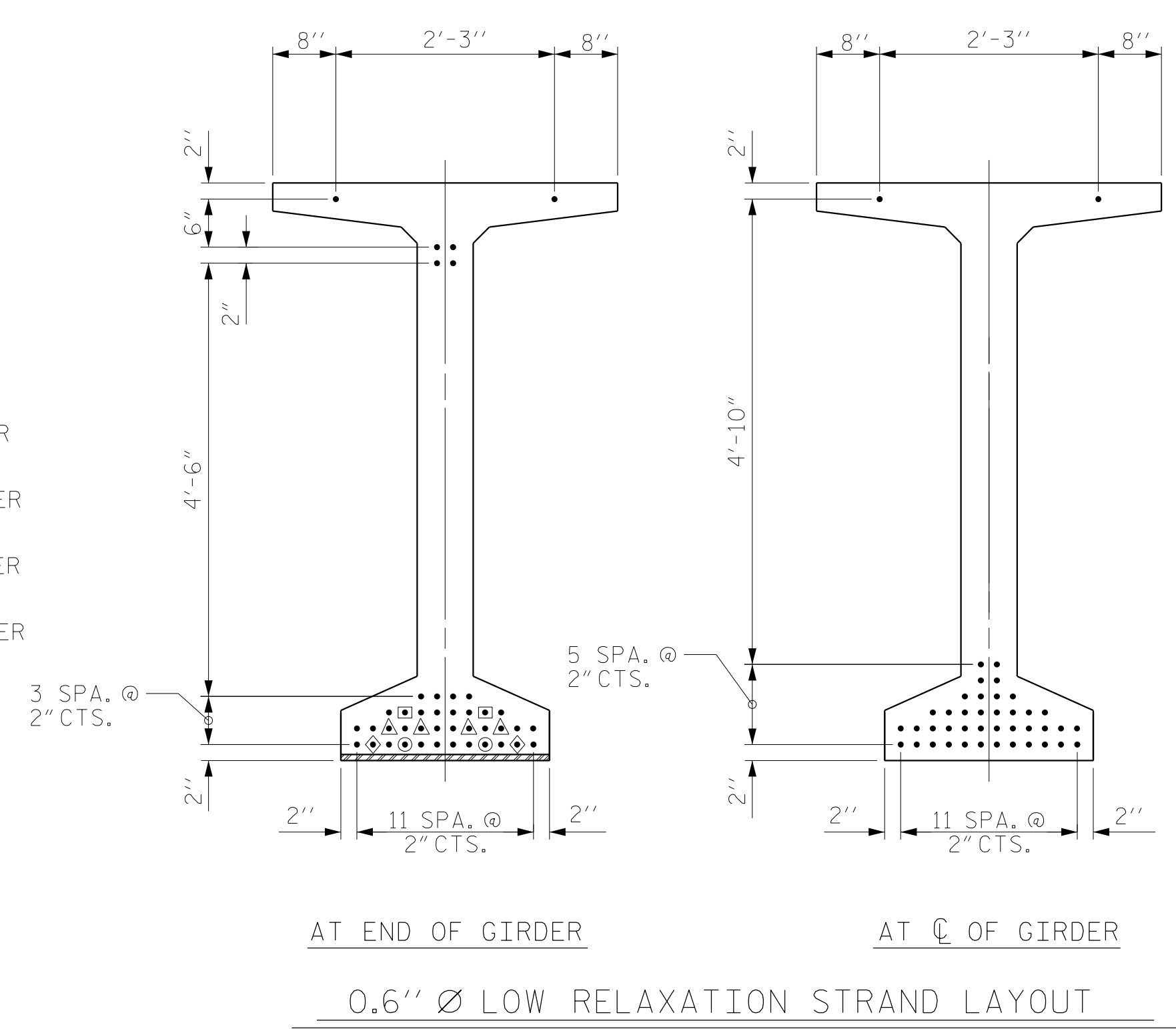
72" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN A LEFT LANE

REVISIONS						SHEET NO. S03-13
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS 39
2			4			

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- DEBONDING LEGEND**
- FULLY BONDED STRANDS
 - ◻ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
 - ◻ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
 - ◻ STRANDS DEBONDED FOR 14'-0" FROM END OF GIRDER
 - ◻ STRANDS DEBONDED FOR 26'-0" FROM END OF GIRDER



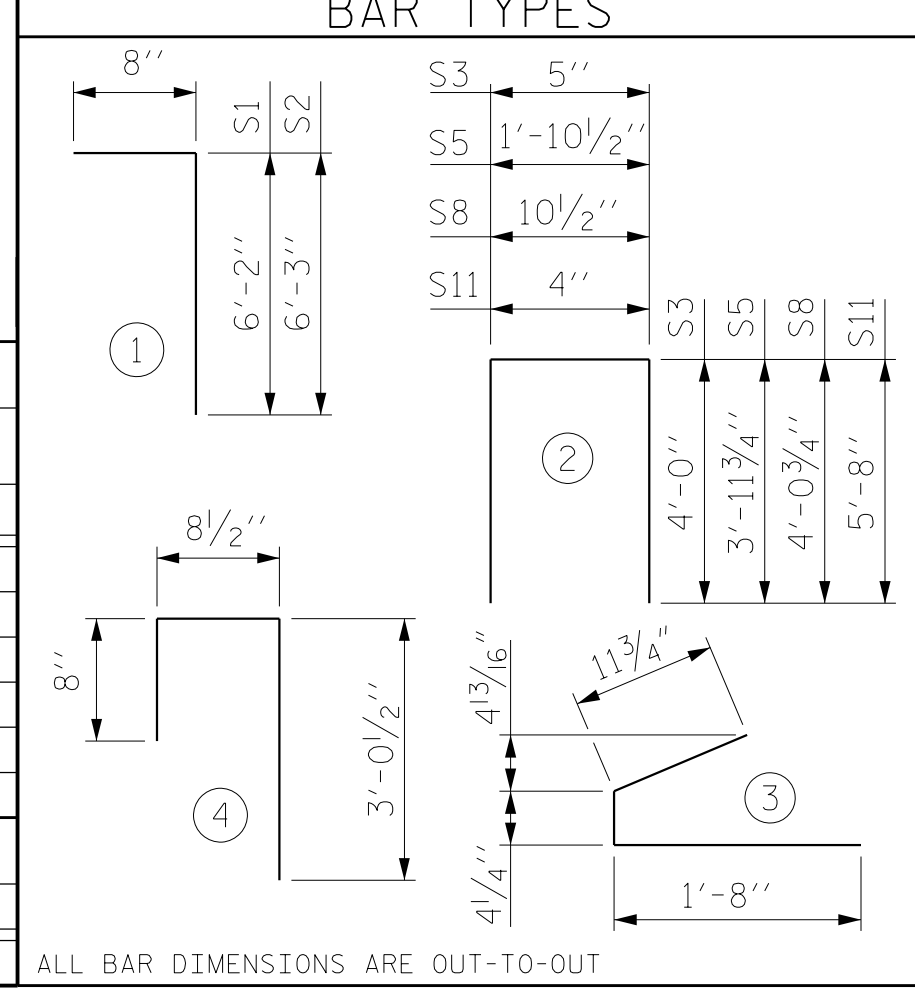
0.6" Ø L. R. GRADE 270 STRANDS

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

REINFORCING STEEL FOR ONE GDR

GDR.	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
GDR. 1	S1	232	#4	1	6'-10"	1059
GDR. 2	S1	230	#4	1	6'-10"	1050
GDR. 3 & 4	S1	228	#4	1	6'-10"	1041
GDR. 5	S1	226	#4	1	6'-10"	1032
GDR. 6	S1	224	#4	1	6'-10"	1022
	S2	28	#5	1	6'-11"	202
	S3	14	#4	2	8'-5"	79
	S4	88	#4	3	3'-0"	176
	S5	1	#5	2	9'-10"	10
	S6	88	#5	4	4'-5"	405
	* S7	10	#5	STR	3'-8"	38
	S8	2	#5	2	9'-0"	19
GDR. 1	S9	86	#5	STR	3'-3"	292
GDR. 2	S9	85	#5	STR	3'-3"	288
GDR. 3 & 4	S9	84	#5	STR	3'-3"	285
GDR. 5	S9	83	#5	STR	3'-3"	281
GDR. 6	S9	82	#5	STR	3'-3"	278
	S10	1	#3	STR	1'-10"	1
GDR. 1 & 6	S11	8	#5	2	11'-8"	97
GDR. 2 - 5	S11	16	#5	2	11'-8"	195
GDR. 1 & 6	S12	16	#4	STR	8'-0"	86
GDR. 2 - 5	S13	16	#4	STR	13'-7"	145

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

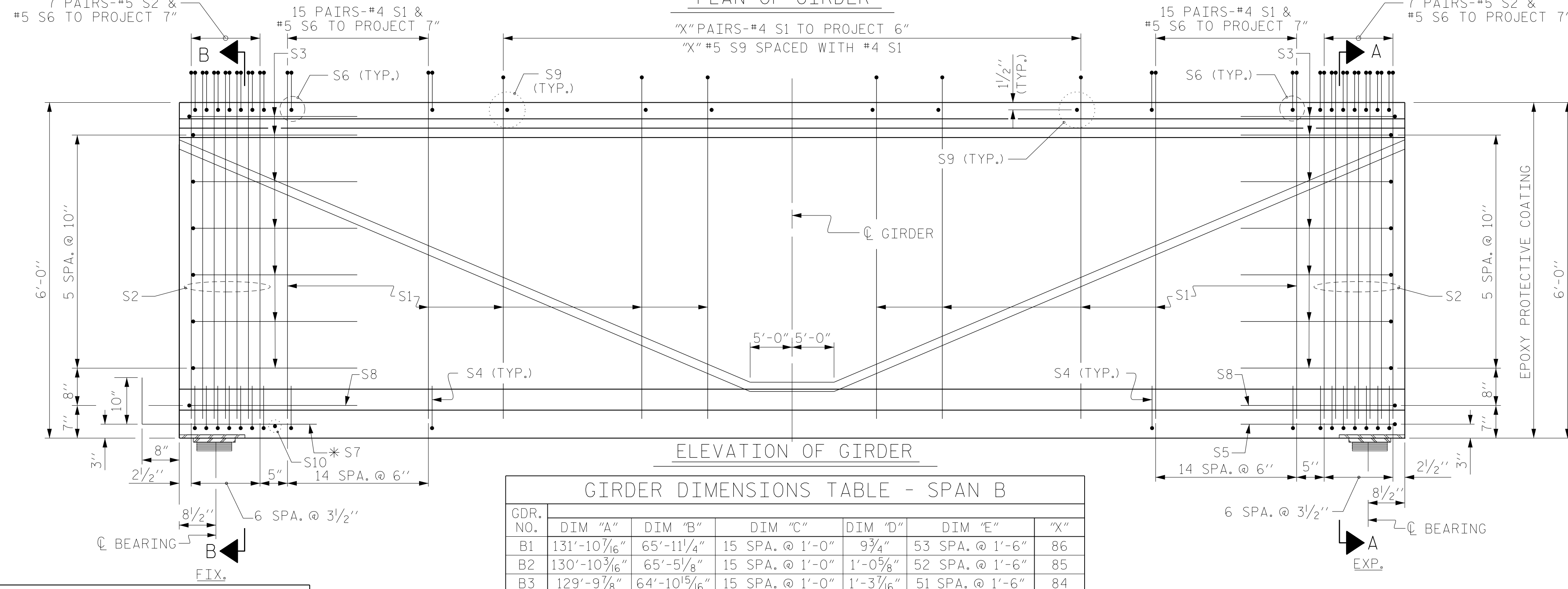
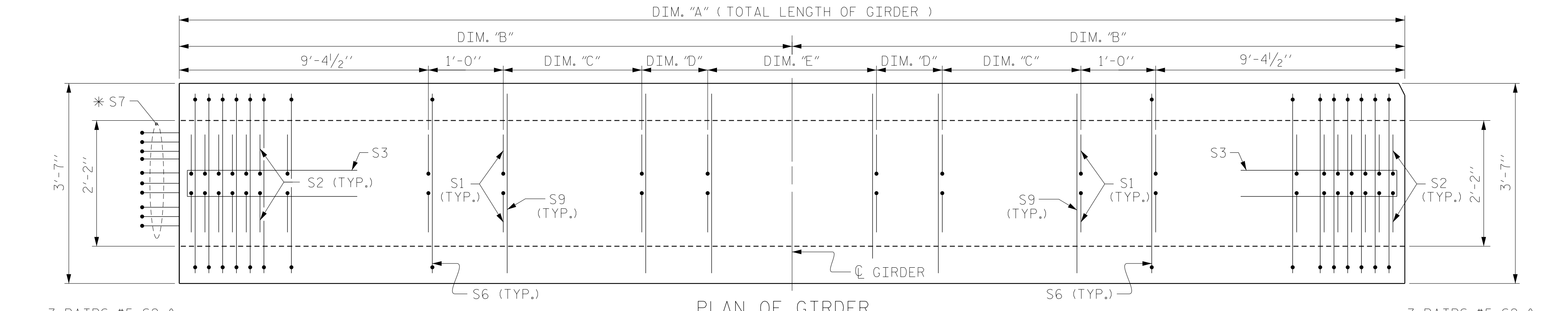


QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
GIRDER 1	2464	28.3	42
GIRDER 2	2608	28.0	42
GIRDER 3	2596	27.8	42
GIRDER 4	2596	27.6	42
GIRDER 5	2583	27.4	42
GIRDER 6	2413	27.2	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	SEE TABLE	775.87



GIRDER DIMENSIONS TABLE - SPAN B

GDR. NO.	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"	"X"
B1	131'-10 7/16"	65'-11 1/4"	15 SPA. @ 1'-0"	9 3/4"	53 SPA. @ 1'-6"	86
B2	130'-10 3/16"	65'-5 1/8"	15 SPA. @ 1'-0"	1'-0 5/8"	52 SPA. @ 1'-6"	85
B3	129'-9 7/8"	64'-10 15/16"	15 SPA. @ 1'-0"	1'-3 1/16"	51 SPA. @ 1'-6"	84
B4	128'-9 5/8"	64'-4 3/16"	15 SPA. @ 1'-0"	9 3/16"	51 SPA. @ 1'-6"	84
B5	127'-9 9/16"	63'-10 5/8"	15 SPA. @ 1'-0"	1'-0 1/8"	50 SPA. @ 1'-6"	83
B6	126'-9"	63'-4 1/2"	15 SPA. @ 1'-0"	1'-3"	49 SPA. @ 1'-6"	82

FOR LOCATIONS OF 1/2" Ø FORMED HOLES FOR STEEL INTERMEDIATE DIAPHRAGMS, SEE SHEET 3 OF 4.

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 DESIGN ENGINEER : JMR DATE : 04/2019



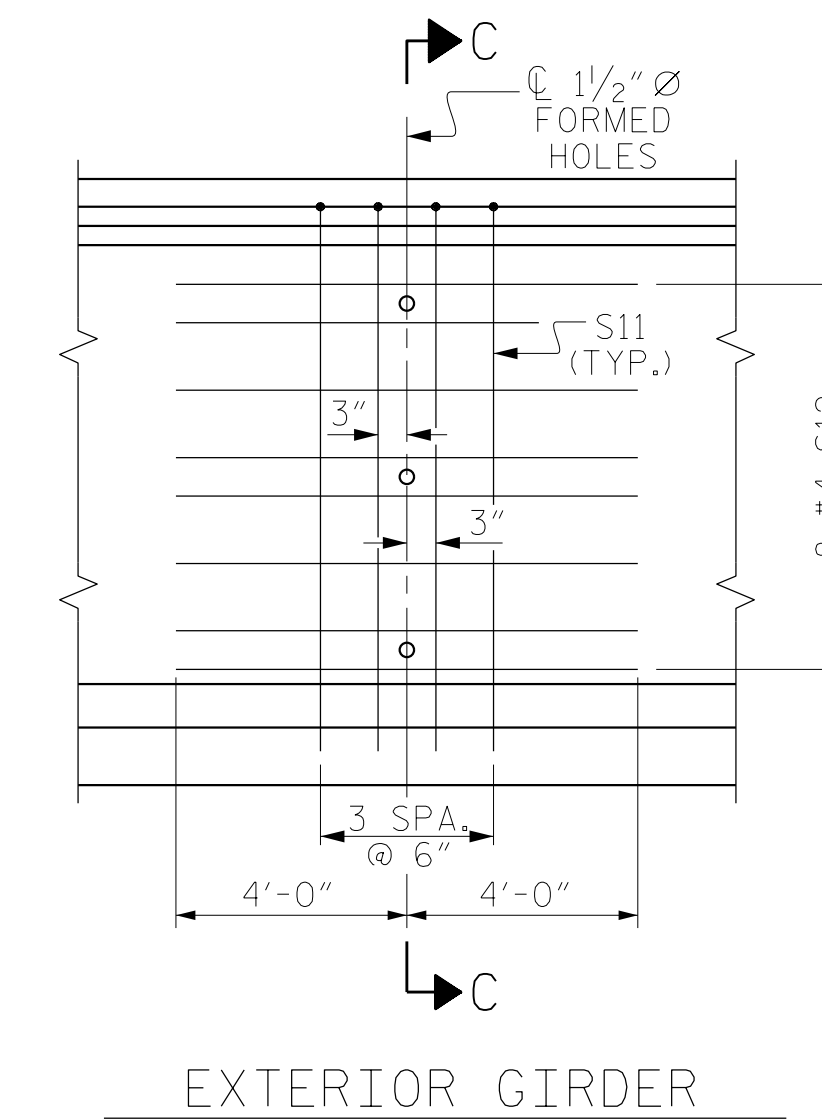
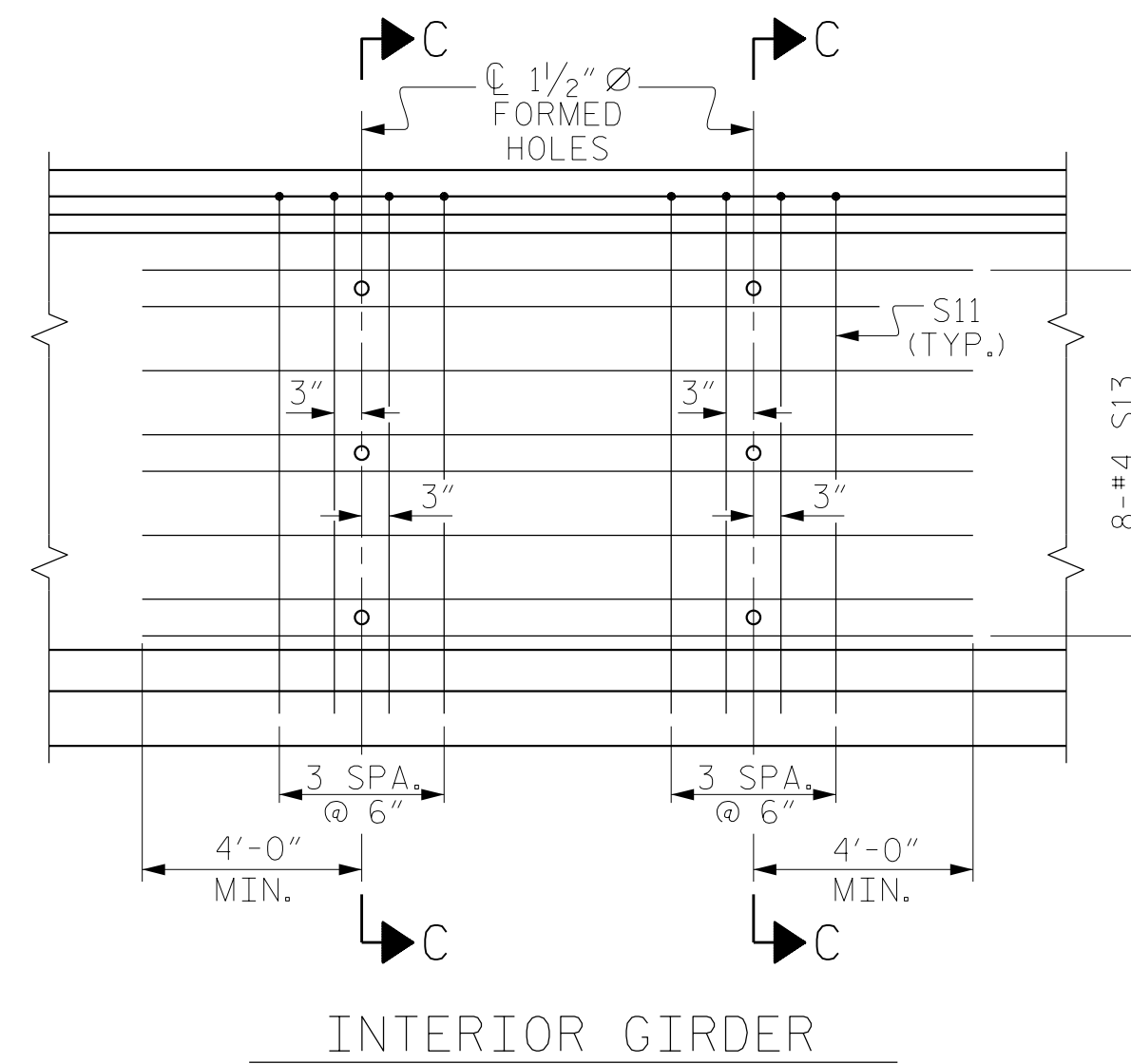
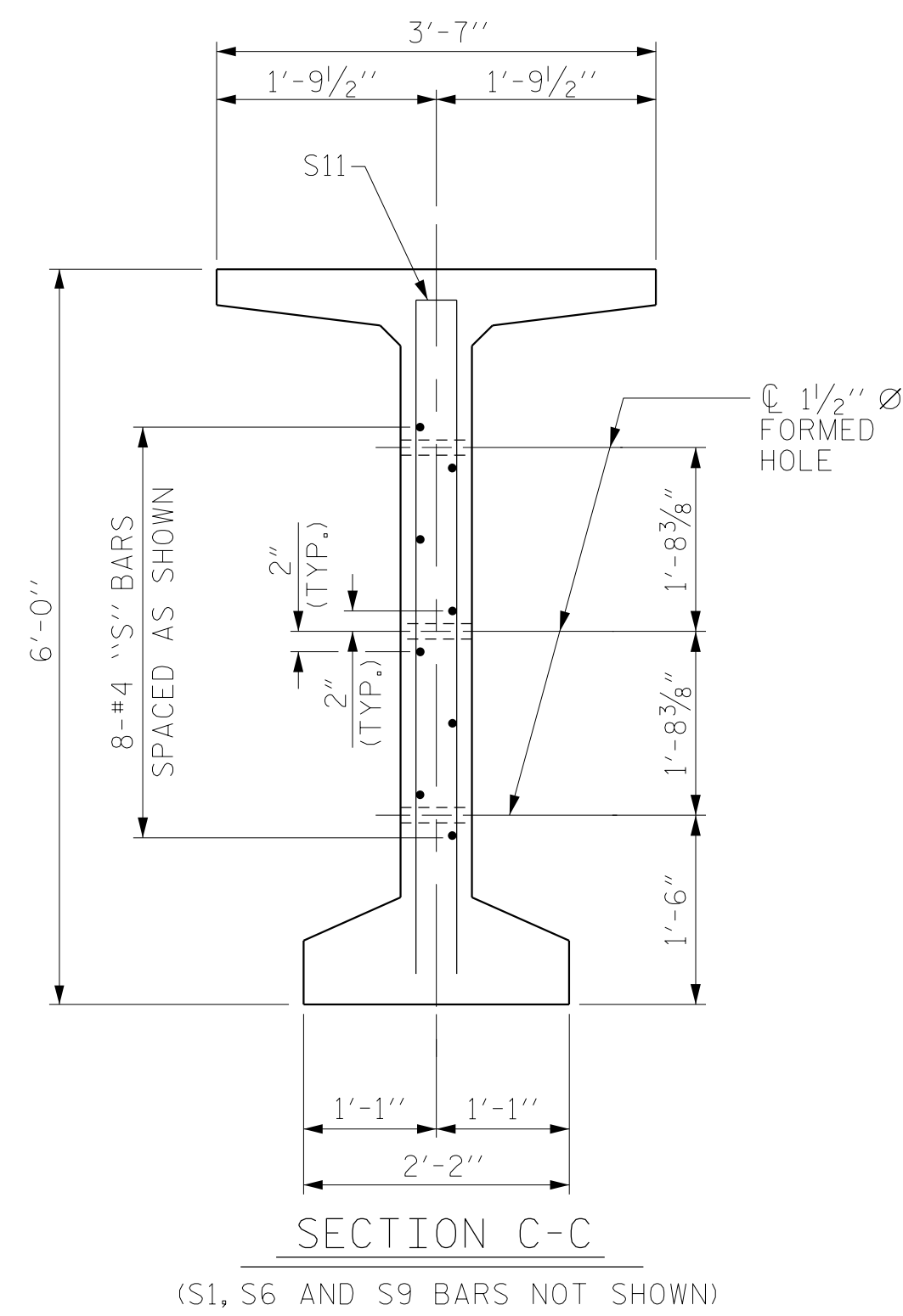
PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-
 SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

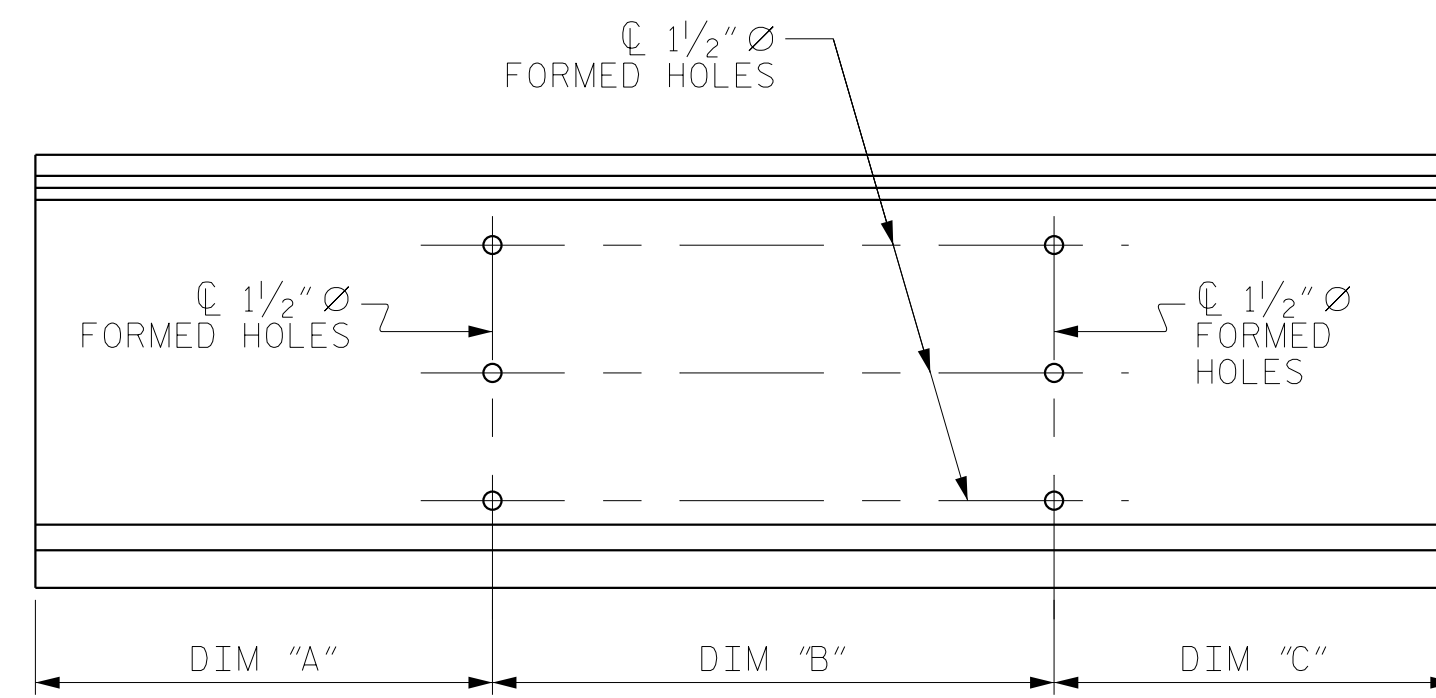
72" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN B LEFT LANE

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

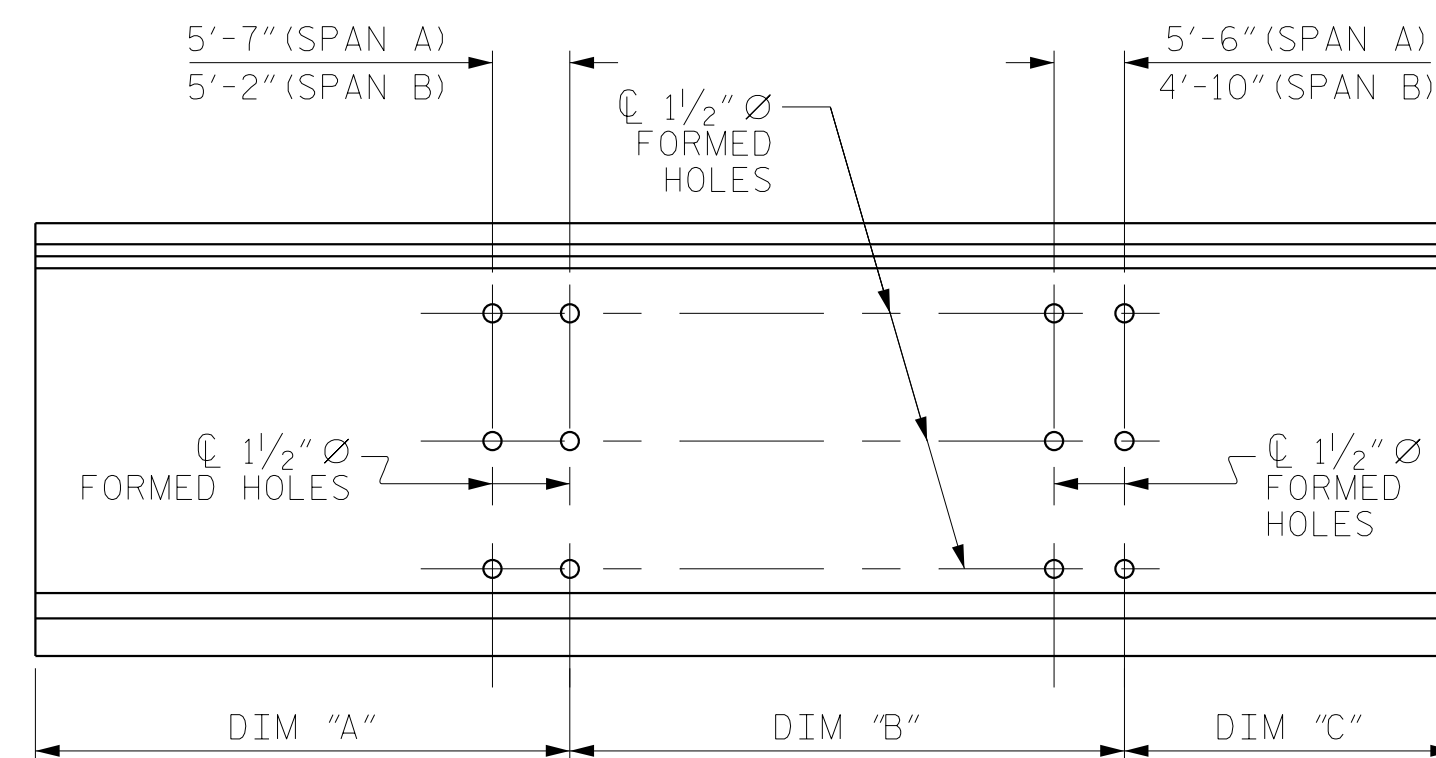
RS&H Architects-Engineers-Planners, Inc.
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 Raleigh, NC 27615
 919-926-4100 FAX 919-846-9080
 www.rsandh.com
 North Carolina License No. 50737-0403-C&E



PARTIAL ELEVATION
SHOWING INTERMEDIATE STEEL DIAPHRAGM
REINFORCING STEEL FOR GIRDERS



EXTERIOR GIRDER - SPANS A & B



INTERIOR GIRDER - SPANS A & B

BOLT HOLE PLACEMENT

GDR. NO.	SPAN A			SPAN B		
	DIM "A"	DIM "B"	DIM "C"	DIM "A"	DIM "B"	DIM "C"
1	45'-10 1/16"	42'-3 3/4"	40'-3 3/8"	46'-9 1/2"	43'-3 3/4"	41'-9 3/16"
2	45'-9 9/16"	42'-2 3/4"	40'-2 9/16"	46'-5"	42'-11 3/4"	41'-5 7/16"
3	45'-7 9/16"	42'-1 3/4"	40'-1 3/8"	46'-0 3/8"	42'-7 3/4"	41'-1 3/4"
4	45'-6"	42'-0 3/4"	40'-0 1/4"	45'-7 11/16"	42'-3 3/4"	40'-10 3/16"
5	45'-4 9/16"	41'-11 3/4"	39'-11 3/16"	45'-2 7/8"	41'-11 3/4"	40'-6 11/16"
6	39'-7 1/2"	41'-11 3/4"	45'-4 5/16"	39'-7 15/16"	41'-11 3/4"	45'-1 5/16"

BOLT HOLE PLACEMENT DIMENSIONS

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 3 OF 4



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
**PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 DETAILS
 LEFT LANE**

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-15
1			3			TOTAL SHEETS
2			4			39

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

DRAWN BY : MKO DATE : 03/2015
 CHECKED BY : MAL DATE : 05/2015
 DESIGN ENGINEER : JMR DATE : 04/2019
 OF RECORD :

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 6500 PSI.

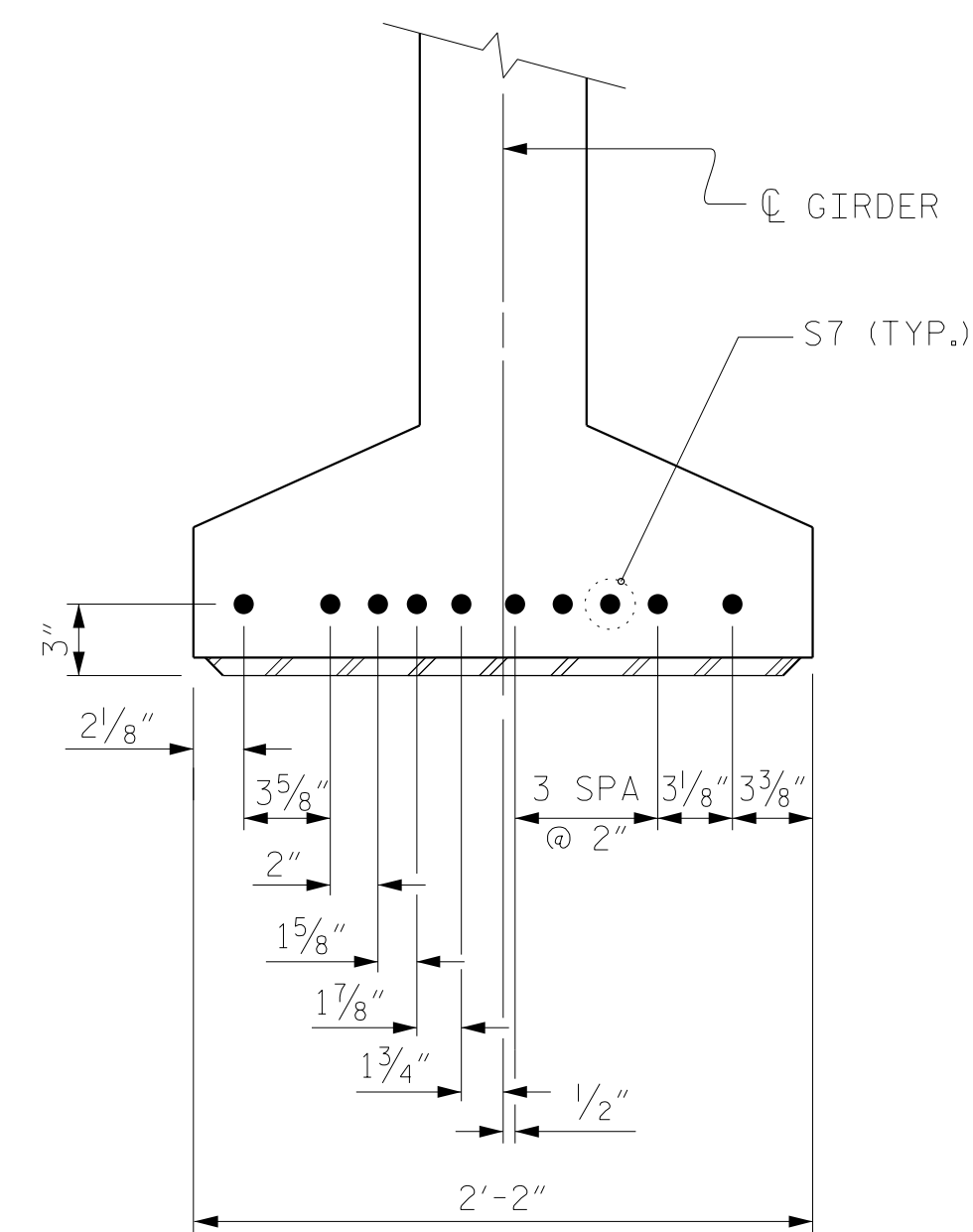
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4".

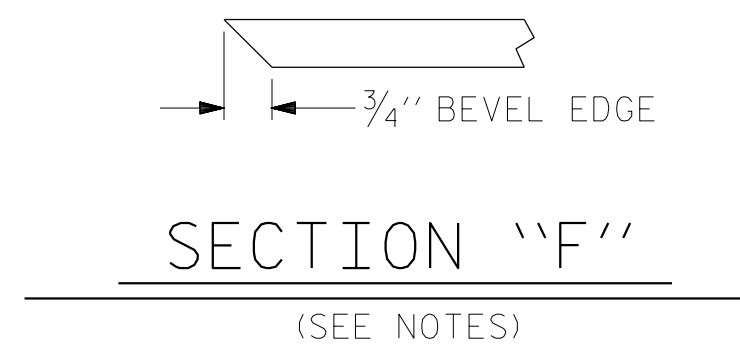
WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE OF THE 63" AND 72" MODIFIED BULB TEES ONLY.

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.

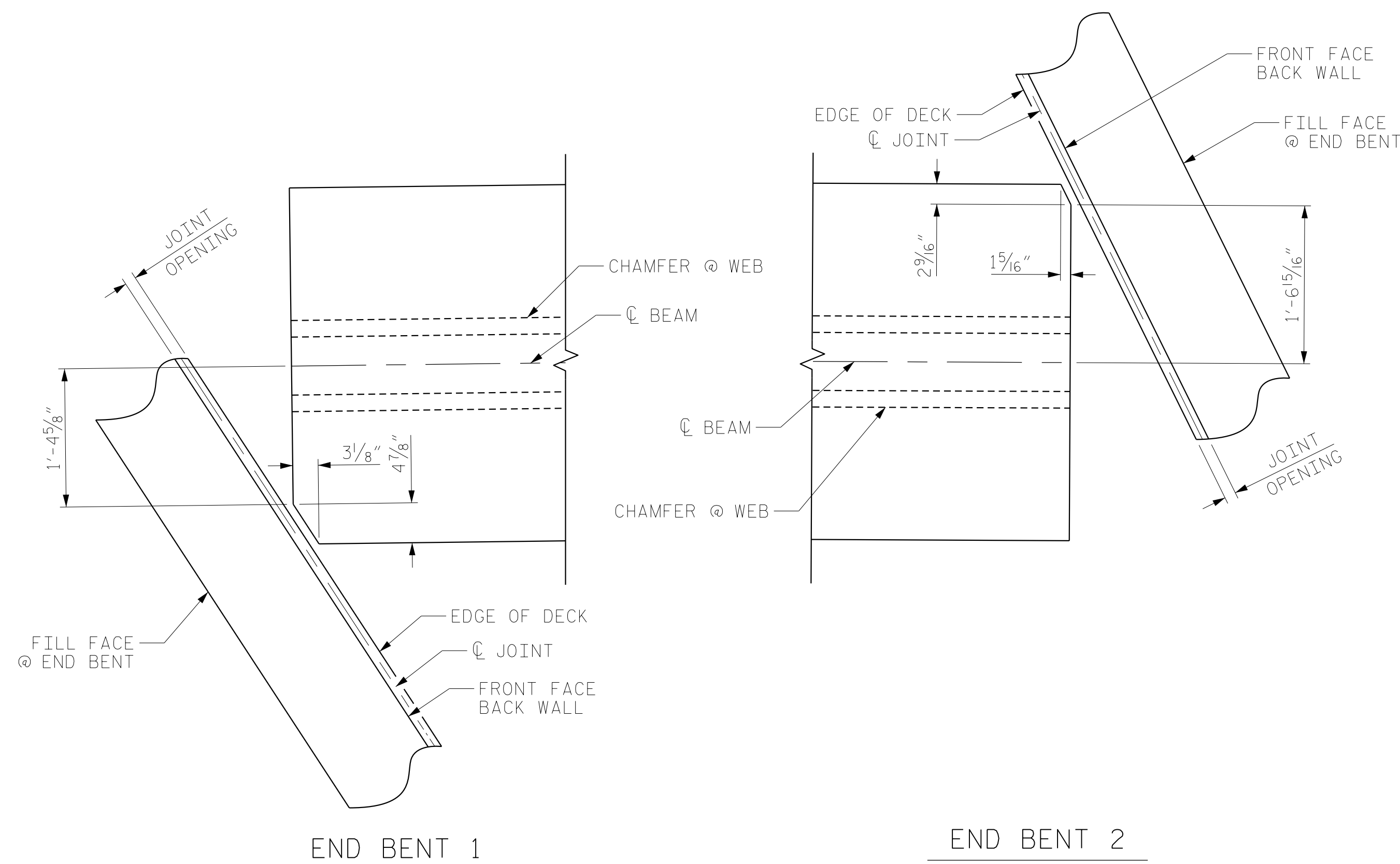
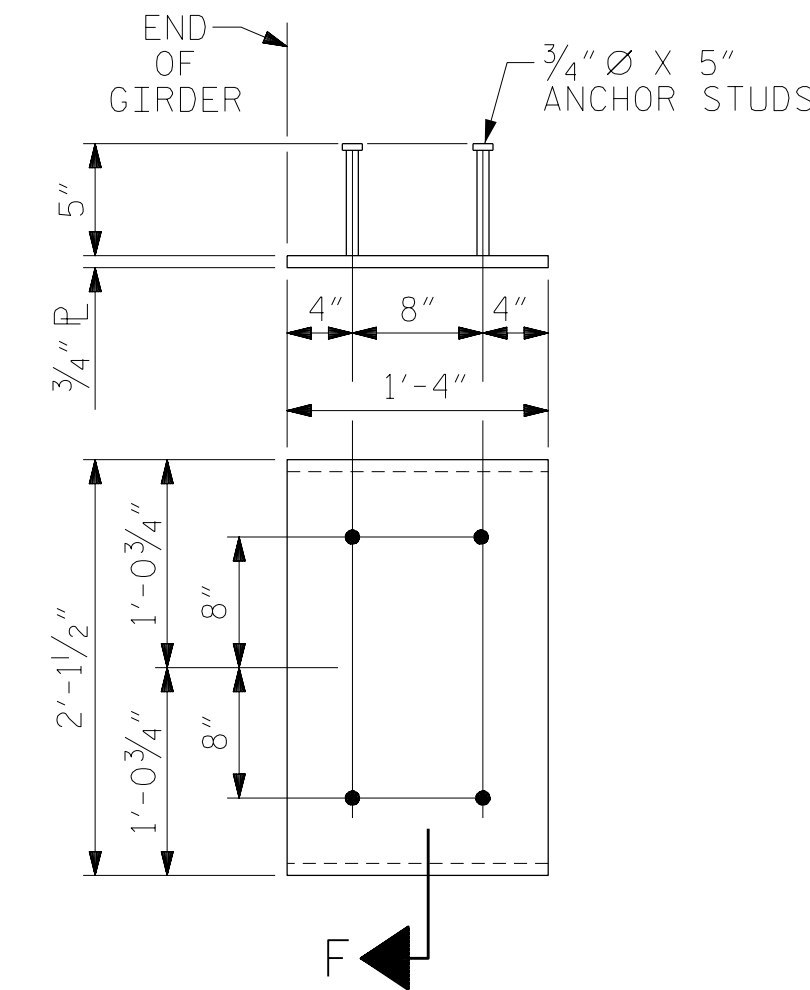


DETAIL "C"



EMBEDDED PLATE "B-1" DETAILS FOR 72" MODIFIED BULB TEE

(2 REQ'D PER GIRDER)



FLANGE CLIP DETAIL

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 101+31.22 -I73-

SHEET 4 OF 4

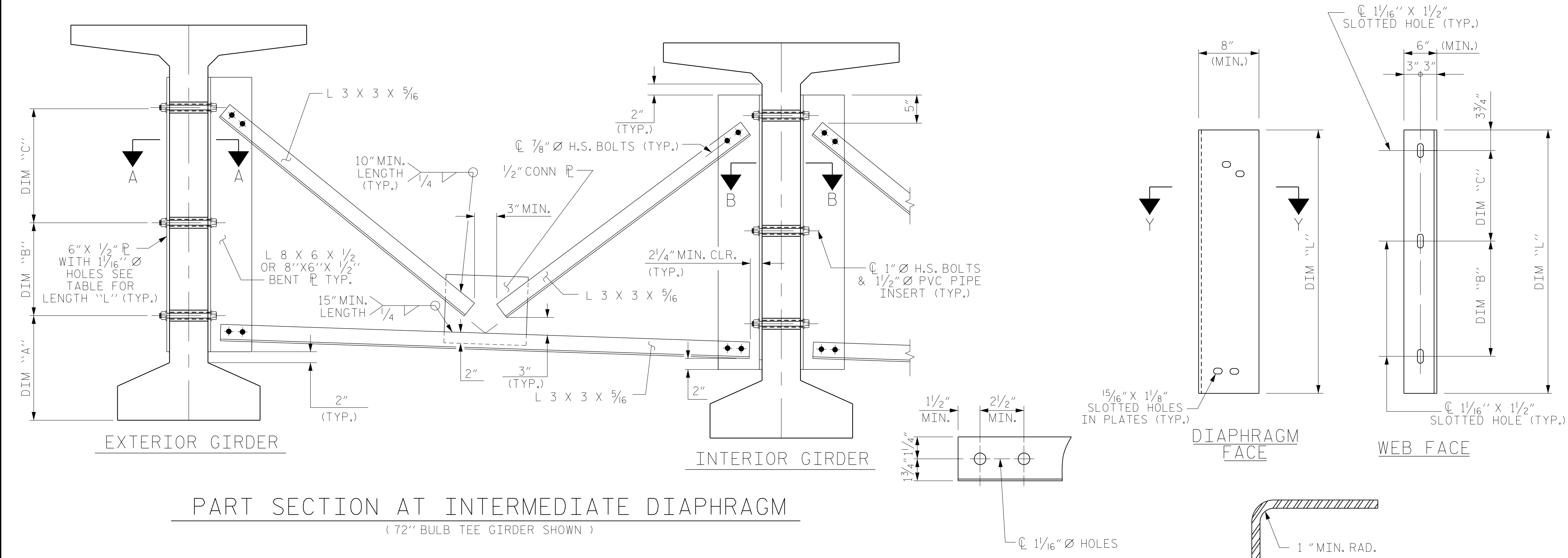


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 DETAILS
 LEFT LANE

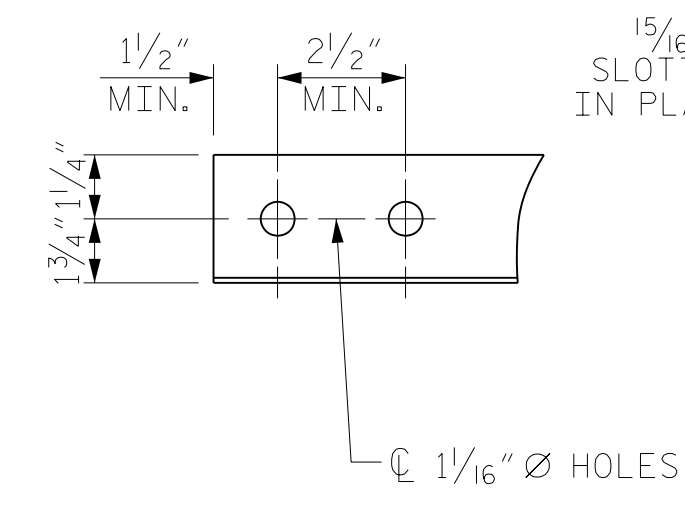
ASSEMBLED BY :	MKO	DATE :	03/2015
CHECKED BY :	MAL	DATE :	05/2015
DRAWN BY :	ELR 11/91	REV. 1/15	MAA/TMG
CHECKED BY :	GRP 11/91	REV. 2/15	MAA/TMG
		REV. 12/17	MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

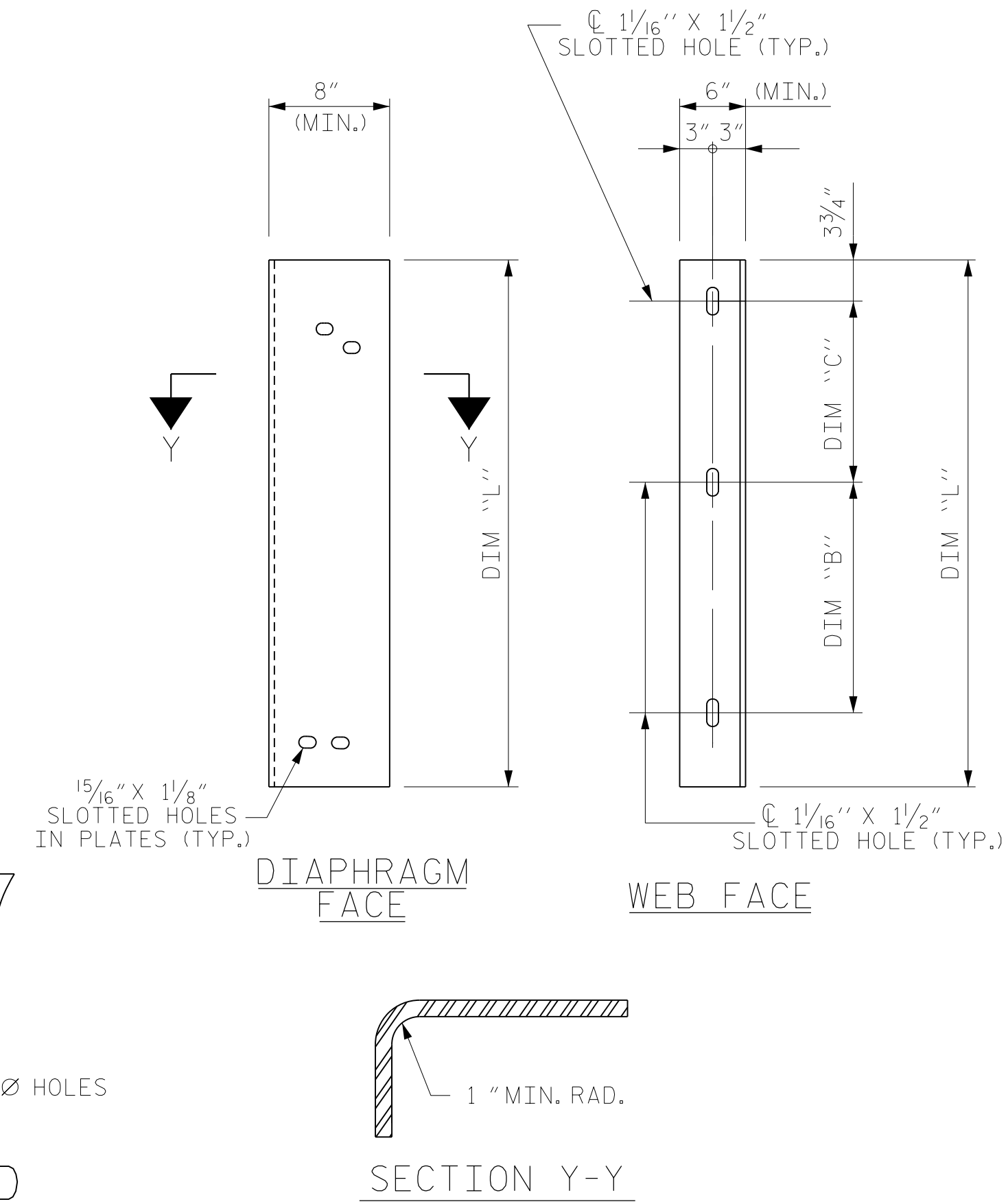
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S03-16
1			3			TOTAL SHEETS
2			4			39



PART SECTION AT INTERMEDIATE DIAPHRAGM
(72" BULB TEE GIRDER SHOWN)



ANGLE END
(L 3 X 3 X 5/16)



CONNECTOR PLATE 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 ANGLE 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 1/4 TURN.

THE PLATES, BENT PLATES, 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 1/4" PROJECTION BEYOND THE NUT.

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

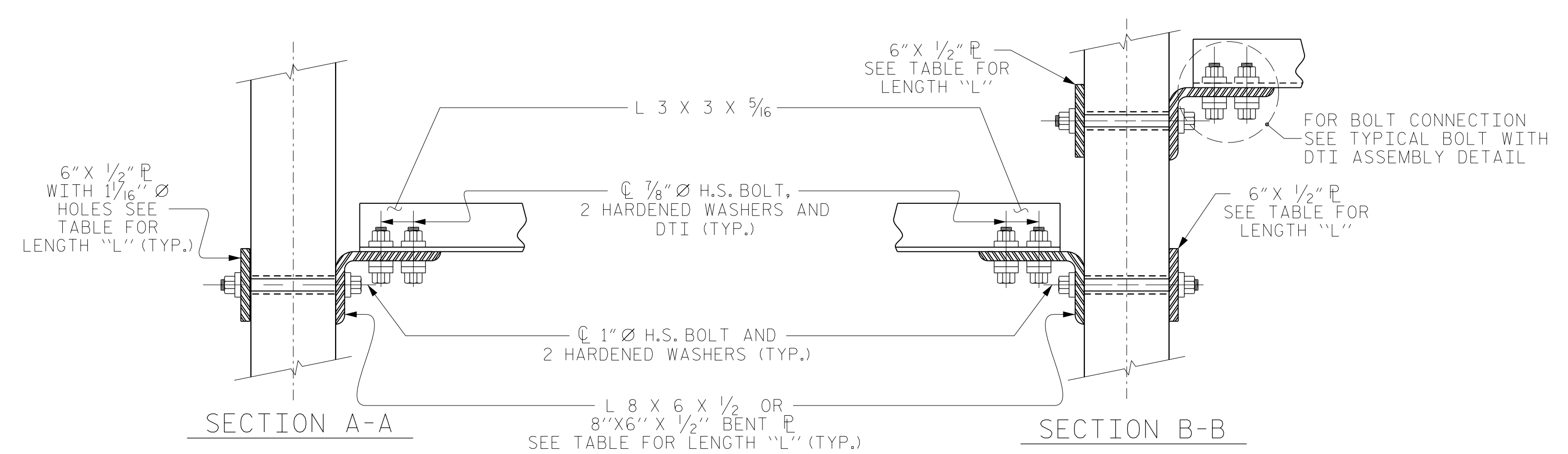
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

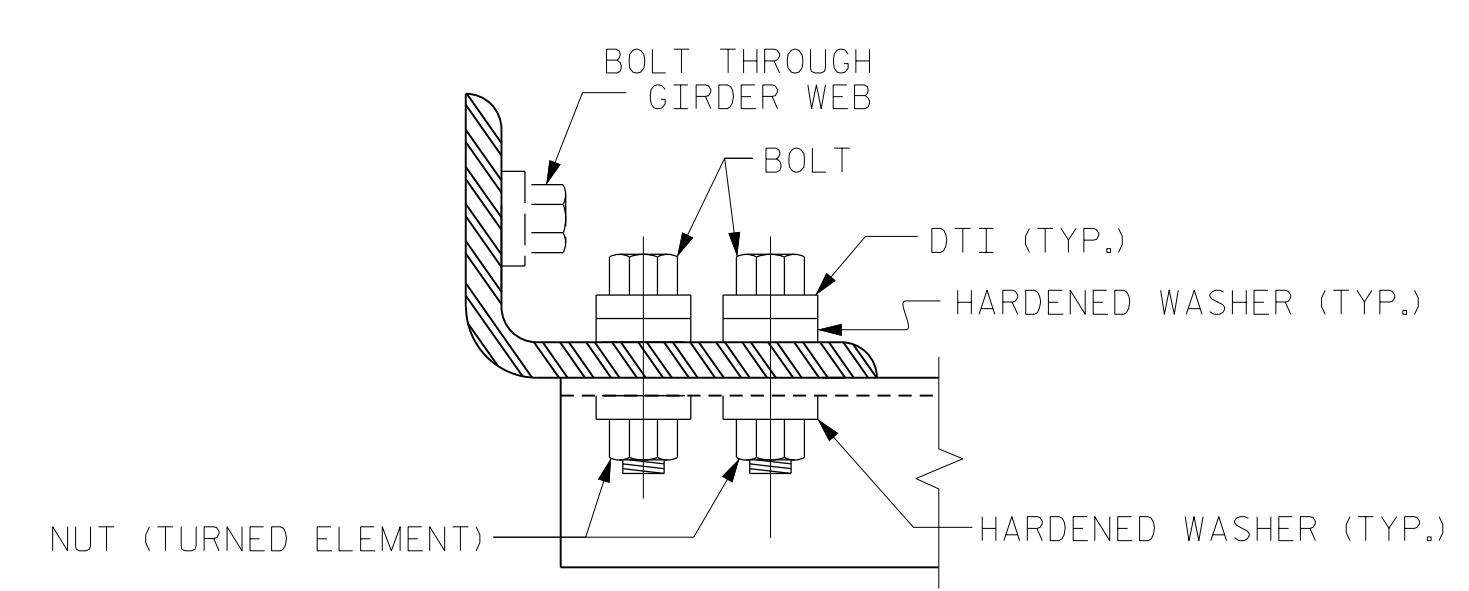
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	1'-6"	1'-8 3/8"	1'-8 3/8"	4'-2"



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 101+31.22 -I73-

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 North Carolina License No. 50737-F-0403-C-28

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO.
STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS LEFT LANE						S03-17
REVISIONS						TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	39
1			3			
2			4			

ASSEMBLED BY : MKO	DATE : 04/2015
CHECKED BY : MAL	DATE : 05/2015
DRAWN BY : RWW 11/09	REV. 10/11/11 MAA/GM
CHECKED BY : GM 11/09	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

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.

THE 2" Ø PIPE SLEEVE SHALL BE CUT FROM SCHEDULE 40 PVC PLASTIC PIPE. THE PVC PLASTIC PIPE SHALL MEET THE REQUIREMENTS OF ASTM D1785.

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, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

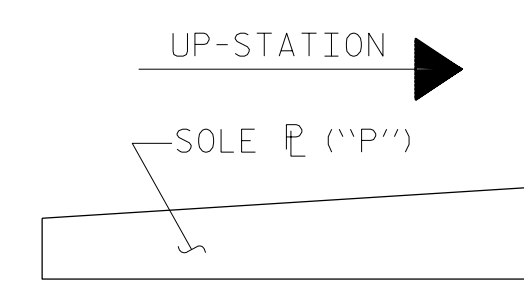
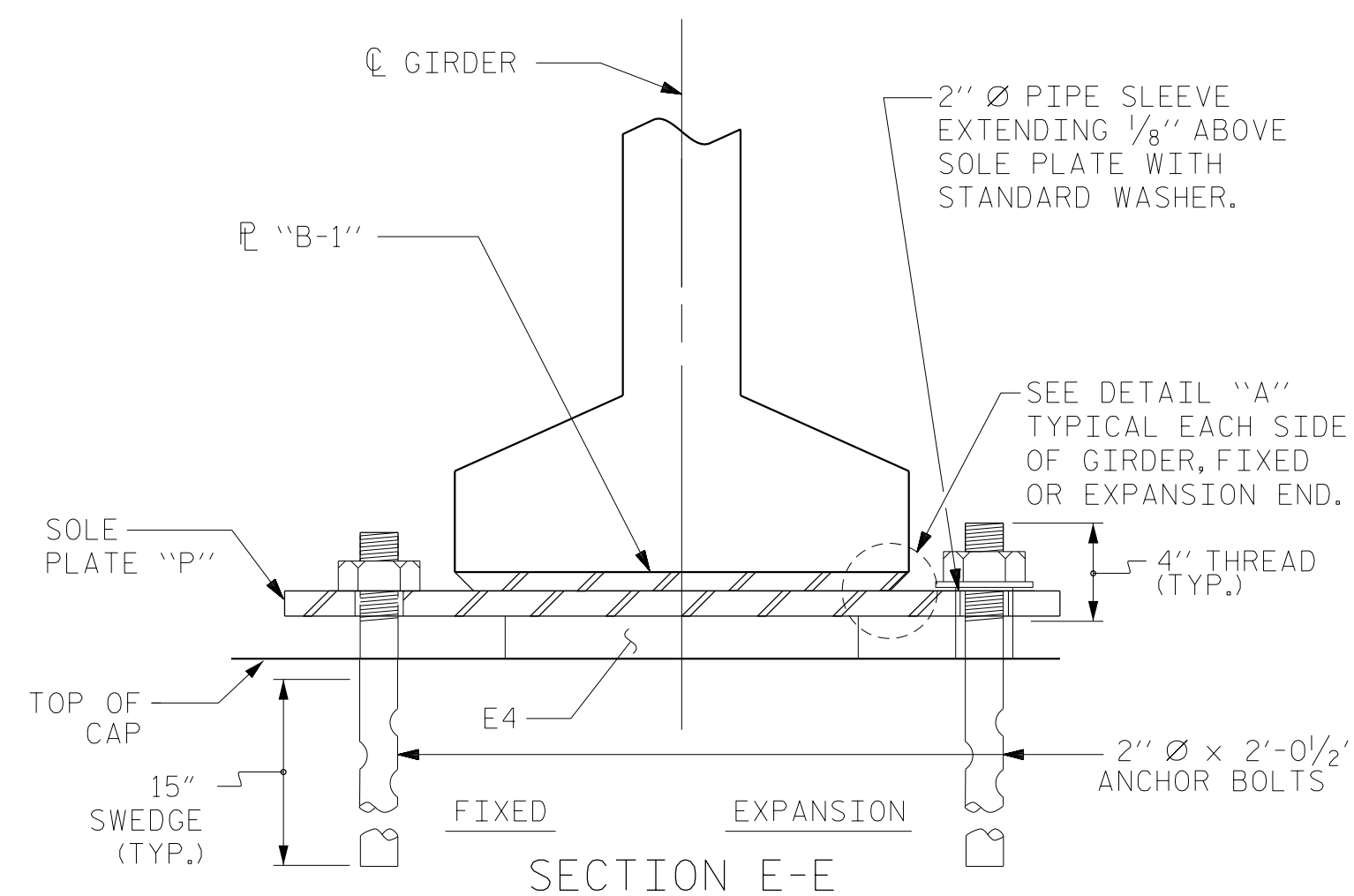
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

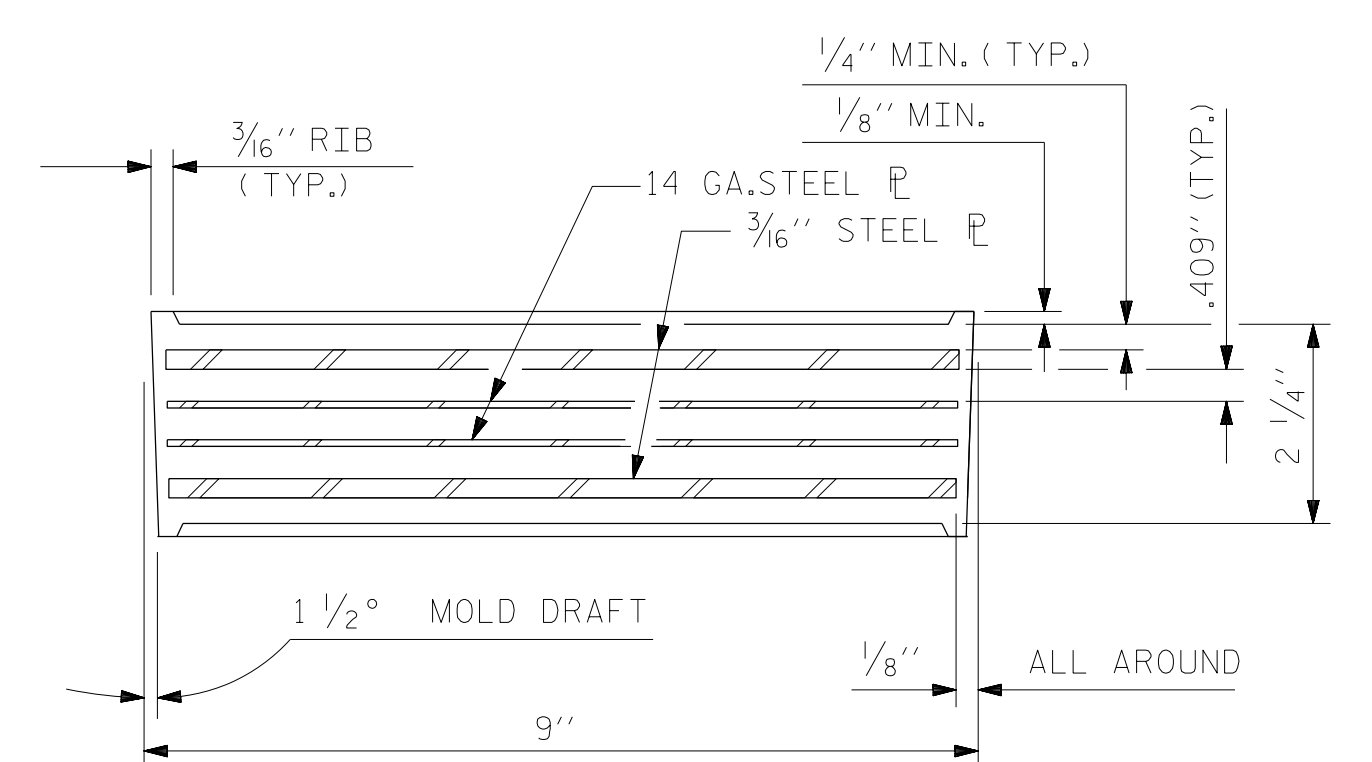
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

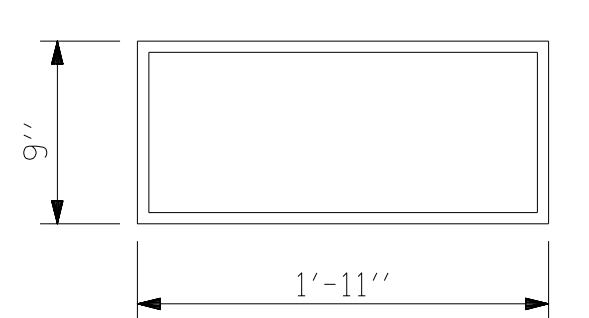
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



SOLE P PLACEMENT DETAIL



TYPICAL SECTION OF ELASTOMERIC BEARINGS

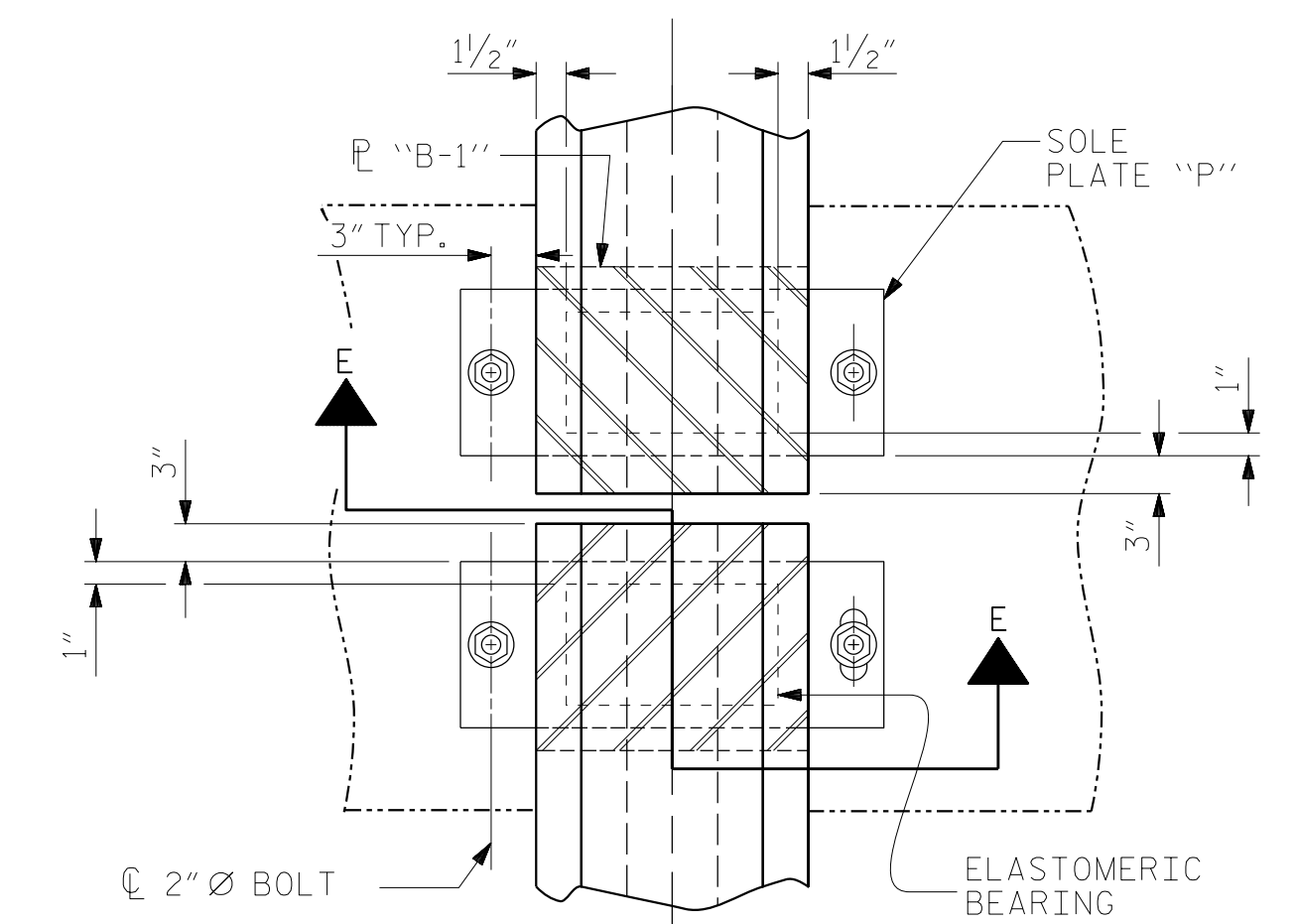


E4 (24 REQ'D)

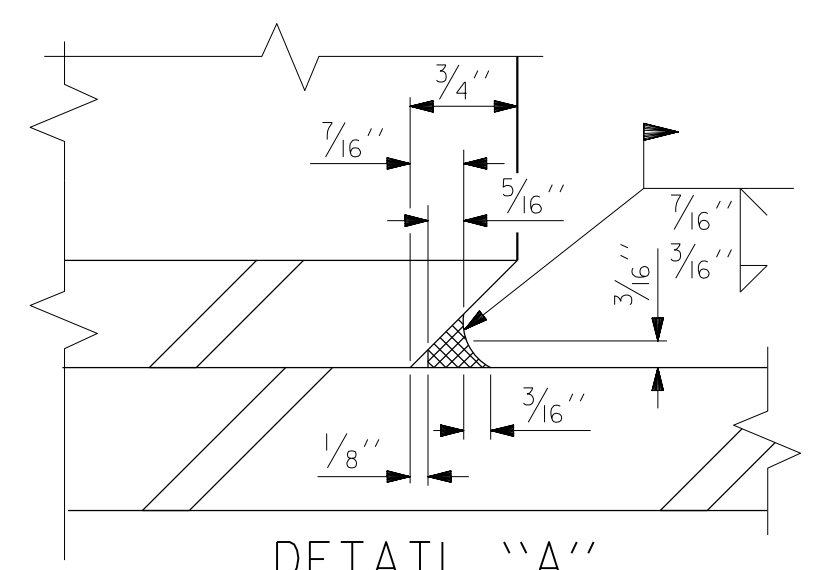
PLAN VIEW OF ELASTOMERIC BEARING

TYPE V

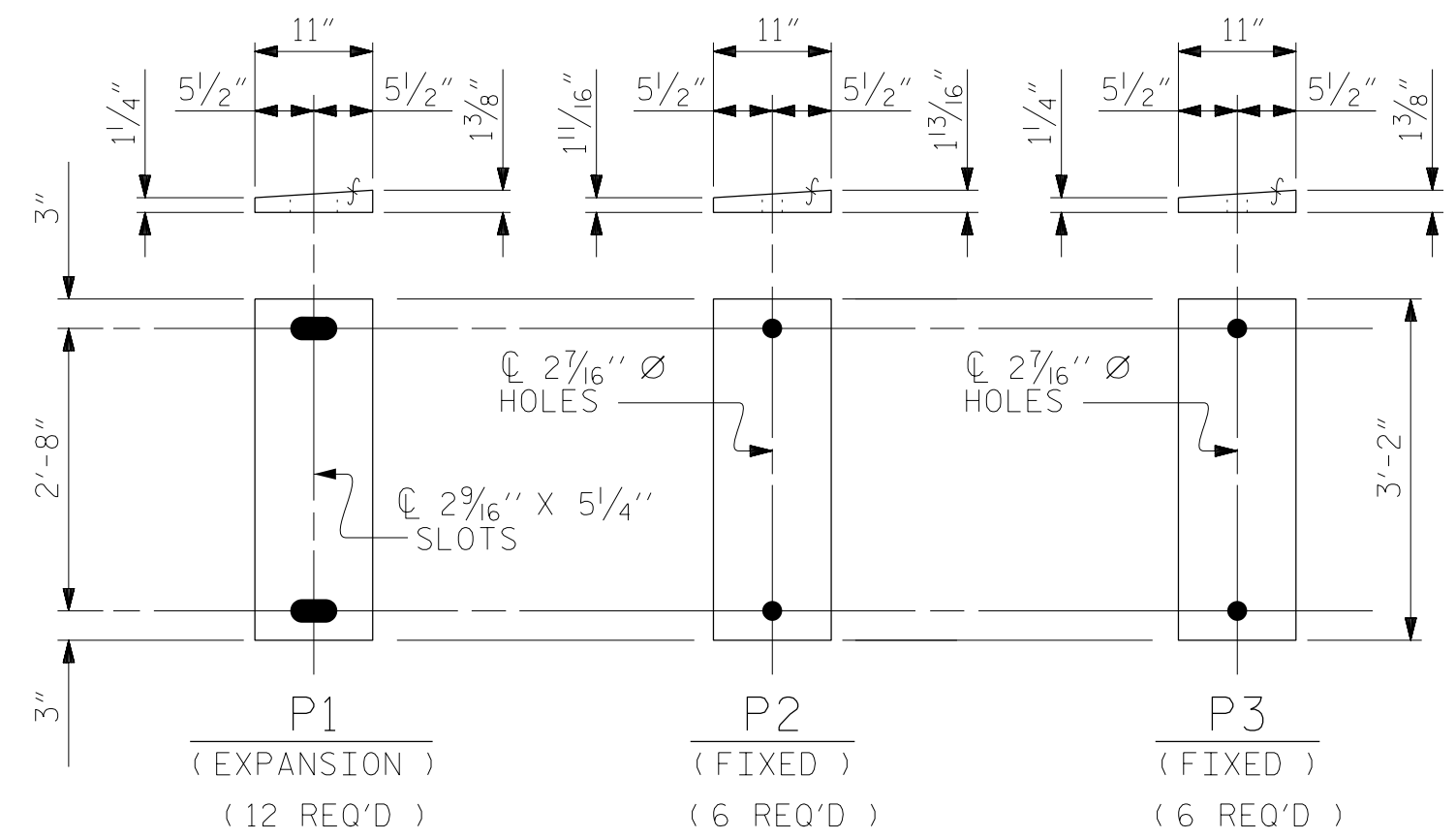
MAXIMUM ALLOWABLE SERVICE LOADS	
D.L. + L.L. (NO IMPACT)	
TYPE V	365 K



TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT) TYPICAL HALF-PLAN (SHOWING SIMPLE SPAN BENT)



DETAIL "A"



SOLE PLATE DETAILS ("P")

PROJECT NO. R-3421A
 RICHMOND COUNTY
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STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH						SHEET NO. S03-18
STANDARD ELASTOMERIC BEARING DETAILS PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE LEFT LANE						TOTAL SHEETS 39
REVISIONS						
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			
2			4			

ASSEMBLED BY :	MKO	DATE :	05/2015
CHECKED BY :	JMR	DATE :	06/2015
DRAWN BY :	EEM 2/97	REV. 6/13	AAC/MAA
CHECKED BY :	VAP 2/97	REV. 1/15	MAA/TMG
		REV. 12/17	MAA/THC

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