

HORIZONTAL CURVE DATA -RPC-

P.I. STA. = 16+77.09
 $\Delta = 38^\circ-26'-29.7''$ (RT.)
 $D = 3^\circ-00'-56.0''$
 $L = 1,274.77'$
 $T = 662.42'$
 $R = 1,900.00'$
 $S.E. = 0.07$

HORIZONTAL CURVE DATA -FLY-

P.I. STA. = 21+55.94
 $\Delta = 53^\circ-19'-18.6''$ (LT.)
 $D = 3^\circ-29'-37.1''$
 $L = 1,526.25'$
 $T = 823.43'$
 $R = 1,640.00'$
 $S.E. = 0.08$

- ① $125^\circ-00'-00''$ TO LONG CHORD
- ② $126^\circ-41'-19''$ TAN TO CURVE, \mathcal{C} SURVEY -RPC-
- ③ $123^\circ-18'-41''$ TAN TO CURVE, \mathcal{C} SURVEY -RPC-
- ④ $135^\circ-35'-00''$ TAN TO CURVE, \mathcal{C} SURVEY -RPC-
- ⑤ $135^\circ-24'-29''$ TAN TO LONG CHORD
- ⑥ $36^\circ-41'-19''$ RADIAL ANGLE
- ⑦ $33^\circ-18'-41''$ RADIAL ANGLE

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
24+61.99 -FLY-

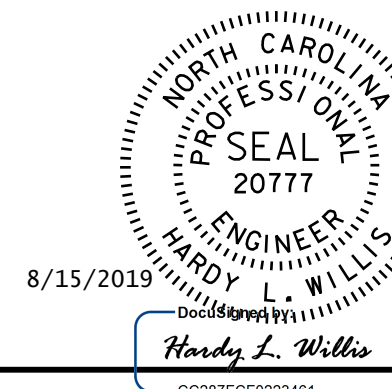
SHEET 2 OF 4

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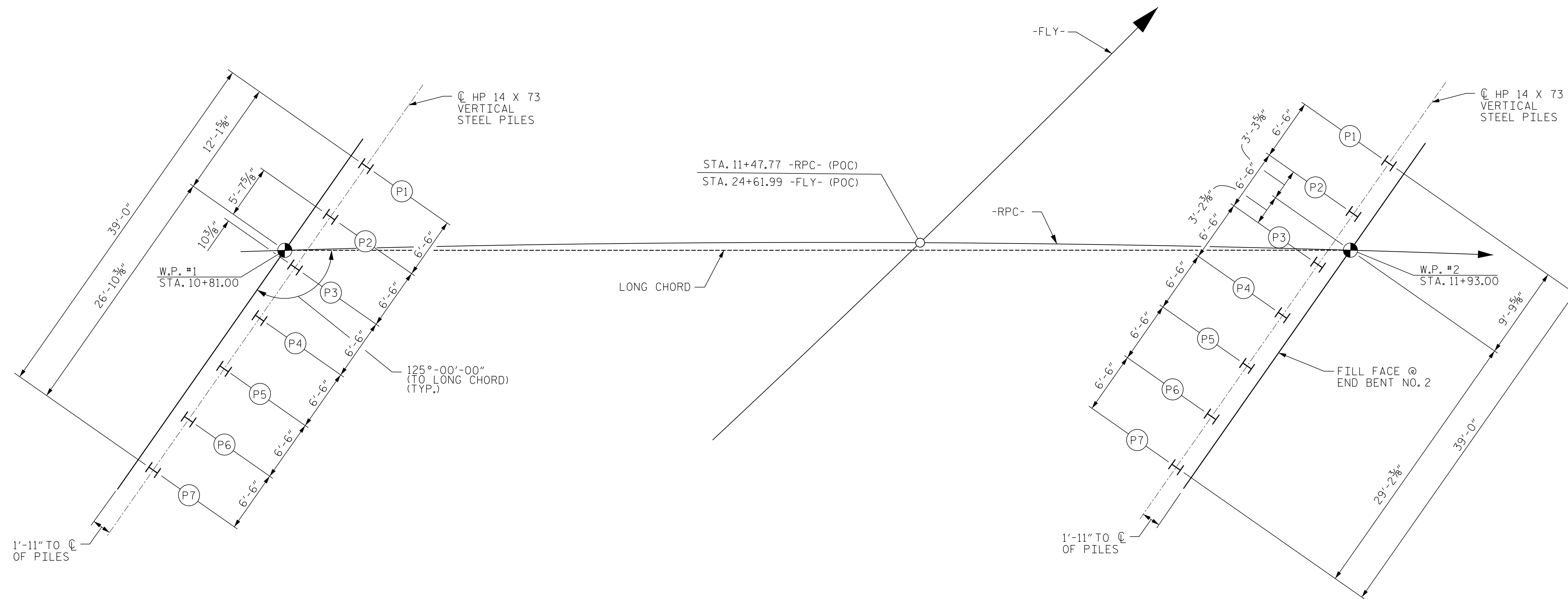
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

BRIDGE OVER US 74 BUS.
 WEST COLLECTOR ON RAMP C
 BETWEEN I-73/US 220 BYPASS
 AND US 74 BUS. EAST

SHEET 2 OF 26		REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-	
1		9/15	3			TOTAL SHEETS		
2		9/15	4					

STR. #5



FOUNDATION LAYOUT

DIMENSIONS LOCATING PILES ARE SHOWN TO THE CENTERLINES.

FOUNDATION NOTES:

FOR PILES, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO.1 AND END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 140 TONS PER PILE.

DRIVE PILES AT END BENT NO.1 AND END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 235 TONS PER PILE.

STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO.1 AND END BENT NO.2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

TESTING THE FIRST PRODUCTION PILE WITH THE PILE DRIVING ANALYZER (PDA) DURING DRIVING, RESTRIKING, OR REDRIVING IS REQUIRED. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

DRILLED-IN PILES ARE REQUIRED FOR END BENT NO.1 AND END BENT NO.2. EXCAVATE HOLES AT PILE LOCATIONS TO ELEVATION 214 FEET AT END BENT NO.1 AND 216 FEET AT END BENT NO.2. FOR PILE EXCAVATION, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

CONCRETE IS REQUIRED TO FILL HOLES FOR PILE EXCAVATION AT END BENT NO.1 AND NO.2.

SPECIAL FOUNDATION NOTES:

INSTALL PILES AT END BENT NO.1 AND END BENT NO.2 PRIOR TO MSE WALL CONSTRUCTION.

PROJECT NO. R-3421A
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SHEET 3 OF 4

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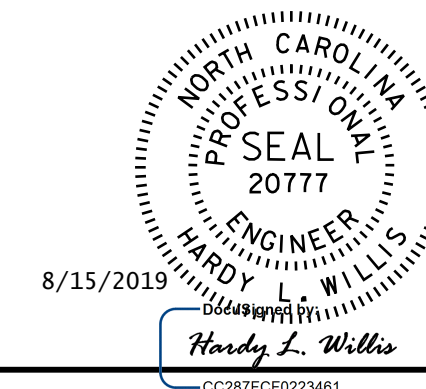
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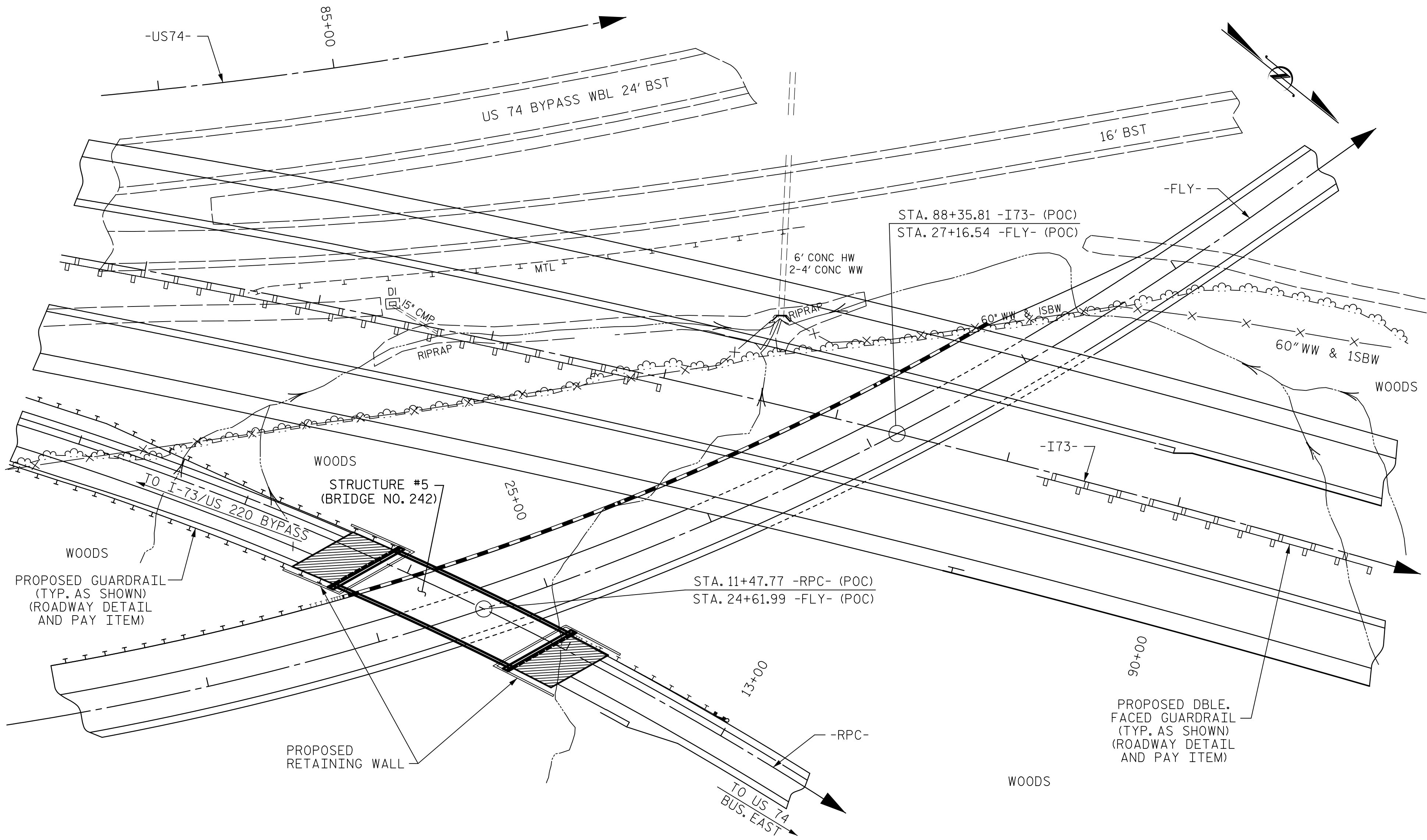
FOUNDATION LAYOUT



SHEET 3 OF 26		REVISIONS				SHEET NO.
DWN. BY: MAF	DATE: 9/15	NO.	BY:	DATE:		S-
CHKD. BY: HLW	DATE: 9/15	1				TOTAL SHEETS
DES. EGR. OF RECORD: RTS	DATE: 9/15	2				

STR. #5

BENCH MARK #4: RR SPIKE IN BASE OF 12" POPLAR TREE, 176' LEFT OF STA. 73+86.00 US74, EL. 300.00' (N 435151 E 1746745)



LOCATION SKETCH

NOTE:
FOR UTILITY INFORMATION, SEE UTILITY PLANS
AND SPECIAL PROVISIONS.

GENERAL NOTES:

- ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.
- THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.
- THIS BRIDGE IS LOCATED IN SEISMIC ZONE 2.
- FOR OTHER DESIGN DATA AND GENERAL NOTES, SEE SHEET SN.
- FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.
- FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.
- 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 ENGINEER.
- FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.
- FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.
- FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.
- THE ELEVATION AND CLEARANCE SHOWN ON THE PLANS AT THE POINT OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION 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.
- WORK SHALL NOT BE STARTED ON THIS BRIDGE UNTIL ROADWAY SECTION HAS BEEN EXCAVATED.

TOTAL BILL OF MATERIAL

	PILE EXCAVATION IN SOIL	PILE EXCAVATION NOT IN SOIL	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	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		
	LIN. FT.	LIN. FT.	EA.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	LIN. FT.	NO.	LIN. FT.	EACH	LIN. FT.	SQ. YDS.	LUMP SUM	LUMP SUM	
SUPERSTRUCTURE				3,641	4,298		LUMP SUM		4	428.79			259.0			LUMP SUM	LUMP SUM	
END BENT 1	10	60				37.5		6,189		7	7	210	7		52			
END BENT 2	20	50				36.3		6,007		7	7	210	7		31			
TOTAL	30	110	1	3,641	4,298	73.8	LUMP SUM	12,196	4	428.79	14	14	420	14	259.0	83	LUMP SUM	LUMP SUM

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
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SHEET 4 OF 4

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SHEET 4 OF 26

DWN. BY: MAF DATE: 9/15
 CHKD. BY: HLW DATE: 9/15
 DES. EGR. OF RECORD: RTS DATE: 9/15

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING

BRIDGE OVER US 74 BUS.
 WEST COLLECTOR ON RAMP C
 BETWEEN I-73/US 220 BYPASS
 AND US 74 BUS. EAST

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S05-4
1			3			TOTAL SHEETS 26
2			4			

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

LEVEL	VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (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 (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	1.17	--	1.75	0.712	1.28	A	I	52.9	0.964	1.96	A	I	5.1	0.80	0.712	1.17	A	I	52.9		
	HL-93 (OPERATING)	N/A		1.66	--	1.35	0.712	1.66	A	I	52.9	0.964	2.54	A	I	5.1	0.80	0.712	--	A	I	52.9		
	HS-20 (INVENTORY)	36.000	②	1.65	59.557	1.75	0.712	1.81	A	I	52.9	0.964	2.68	A	I	5.1	0.80	0.712	1.65	A	I	52.9		
	HS-20 (OPERATING)	36.000		2.34	84.379	1.35	0.712	2.34	A	I	52.9	0.964	3.47	A	I	5.1	0.80	0.712	--	A	I	52.9		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH	12,500		4.29	53.565	1.40	0.712	5.86	A	I	52.9	0.964	9.02	A	I	5.1	0.80	0.712	4.29	A	I	52.9	
		S3C	21,500		2.51	53.894	1.40	0.712	3.42	A	I	52.9	0.964	5.28	A	I	5.1	0.80	0.712	2.51	A	I	52.9	
		S3A	22,750		2.38	54.031	1.40	0.712	3.24	A	I	52.9	0.964	5.00	A	I	5.1	0.80	0.712	2.38	A	I	52.9	
		S4A	26,750		2.08	55.531	1.40	0.712	2.84	A	I	52.9	0.964	4.34	A	I	5.1	0.80	0.712	2.08	A	I	52.9	
		S5A	30,500		1.83	55.867	1.40	0.712	2.50	A	I	52.9	0.964	3.93	A	I	5.1	0.80	0.712	1.83	A	I	52.9	
		S6A	34,500		1.65	57.008	1.40	0.712	2.26	A	I	52.9	0.964	3.52	A	I	5.1	0.80	0.712	1.65	A	I	52.9	
		S7B	38,500		1.50	57.699	1.40	0.712	2.05	A	I	52.9	0.964	3.25	A	I	5.1	0.80	0.712	1.50	A	I	52.9	
	S7A	40,000	③	1.47	58.938	1.40	0.712	2.01	A	I	52.9	0.964	3.27	A	I	5.1	0.80	0.712	1.47	A	I	52.9		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	T4A	28,250		2.03	57.370	1.40	0.712	2.77	A	I	52.9	0.964	4.18	A	I	5.1	0.80	0.712	2.03	A	I	52.9	
		T5B	32,000		1.79	57.121	1.40	0.712	2.44	A	I	52.9	0.964	3.89	A	I	5.1	0.80	0.712	1.79	A	I	52.9	
		T6A	36,000		1.63	58.521	1.40	0.712	2.22	A	I	52.9	0.964	3.54	A	I	5.1	0.80	0.712	1.63	A	I	52.9	
		T7A	40,000		1.51	60.595	1.40	0.712	2.05	A	I	52.9	0.964	3.26	A	I	5.1	0.80	0.712	1.51	A	I	52.9	
		T7B	40,000		1.58	63.048	1.40	0.712	2.15	A	I	52.9	0.964	3.13	A	I	5.1	0.80	0.712	1.58	A	I	52.9	

LOAD FACTORS:

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

NOTES:

MINIMUM RATING FACTORS ARE BASED ON THE STRENGTH I AND SERVICE III LIMIT STATES.

ALLOWABLE STRESSES FOR SERVICE III LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

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

⊕ CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

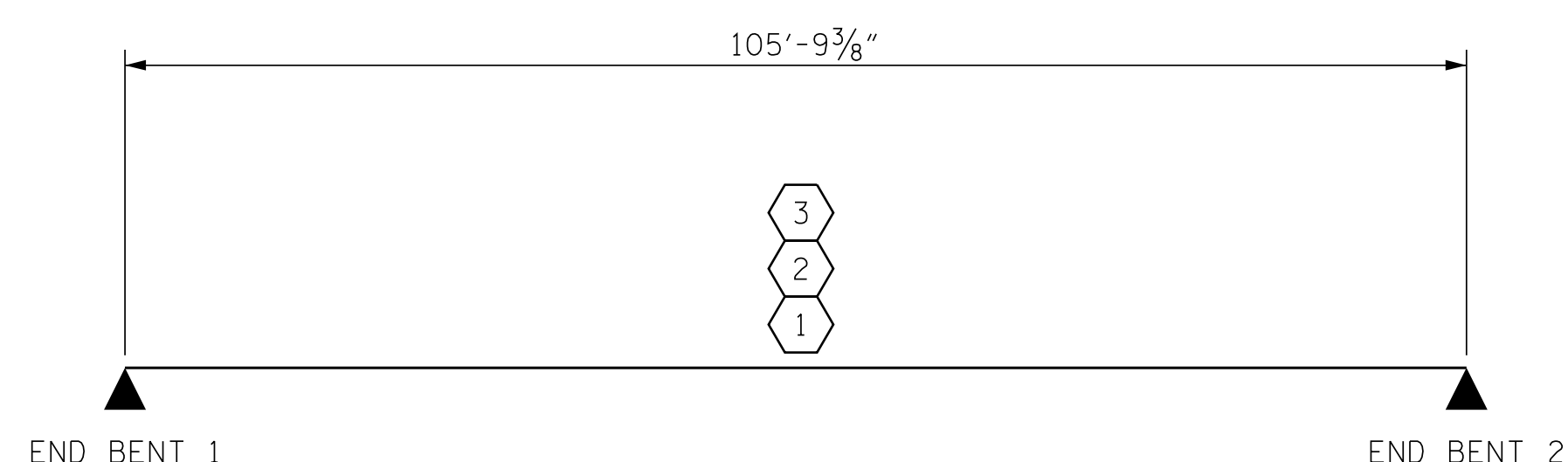
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

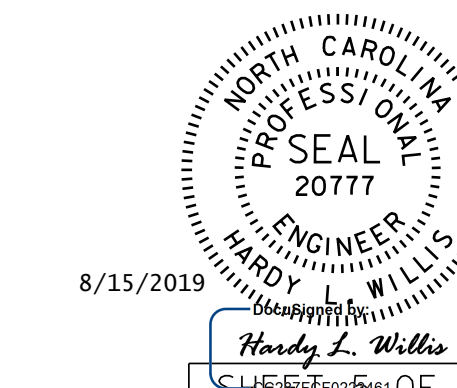
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
24+61.99 -FLY-

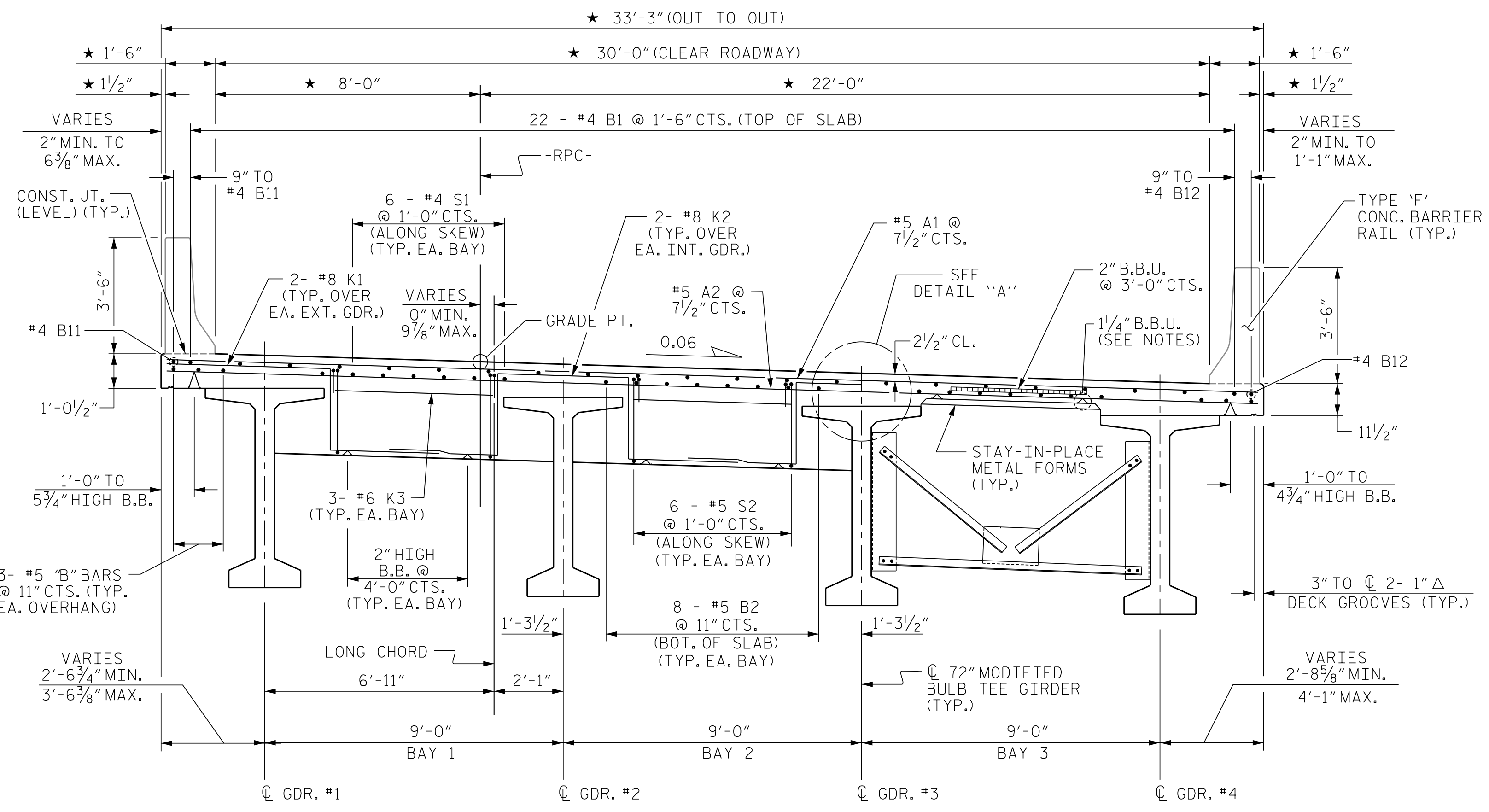
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 LRFR SUMMARY FOR
 PRESTRESSED
 CONCRETE GIRDERS
 (INTERSTATE TRAFFIC)



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

ASSEMBLED BY : MAF DATE : 9/2015
 CHECKED BY : HLW DATE : 9/2015
 DRAWN BY : MAA 1/08 REV. 11/12/08RR MAA/GM
 CHECKED BY : GM/DI 2/08 REV. 10/1/11 MAA/GM

★ RADIAL DIMENSIONS

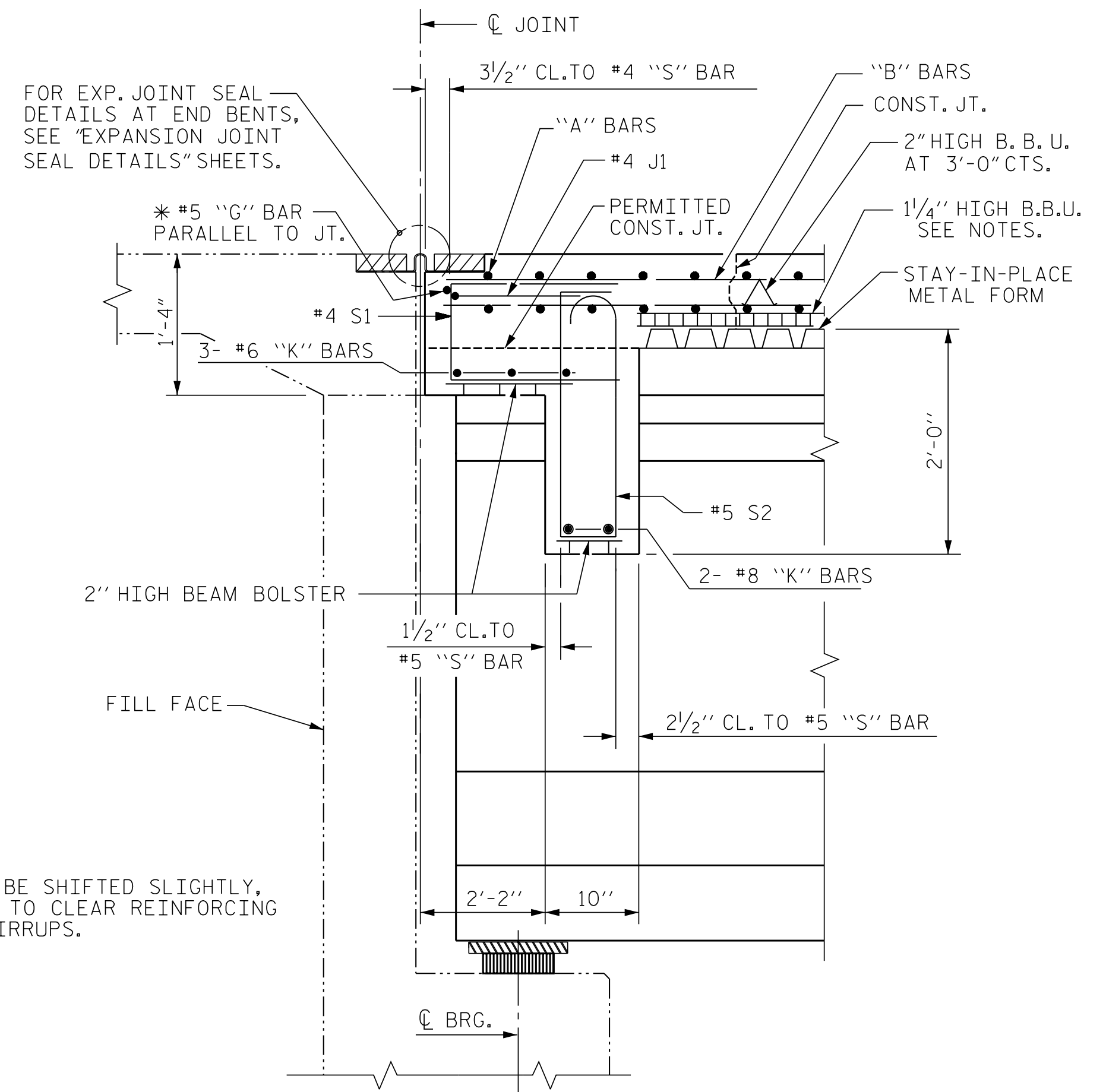


PART TYPICAL SECTION
SHOWING END BENT DIAPHRAGMS

PART TYPICAL SECTION
SHOWING INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

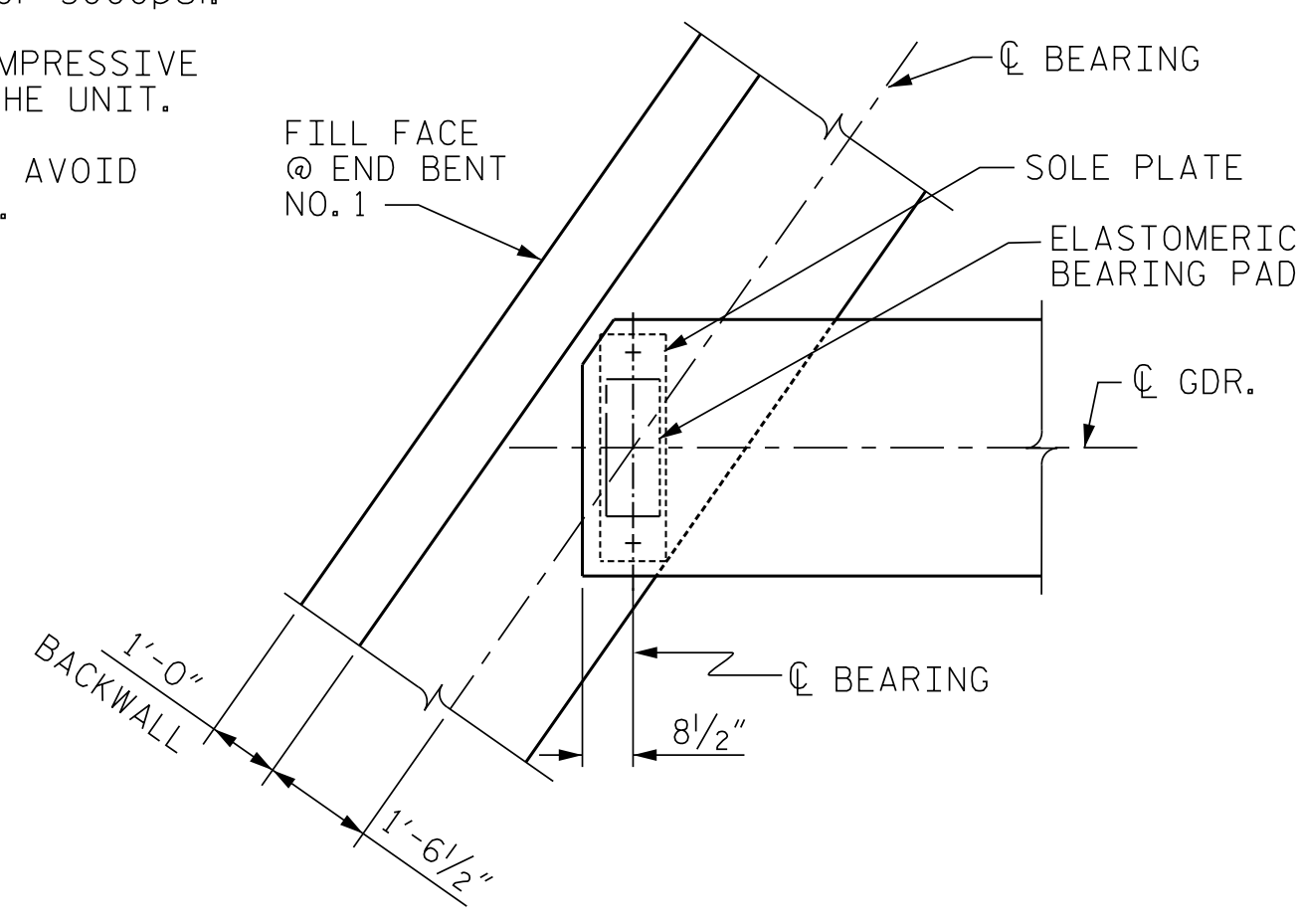
SIMPLE SPAN COMPOSITE DECK ON 72" MBT PRESTRESSED CONCRETE GIRDERS.
GIRDERS ARE PARALLEL TO LONG CHORD.



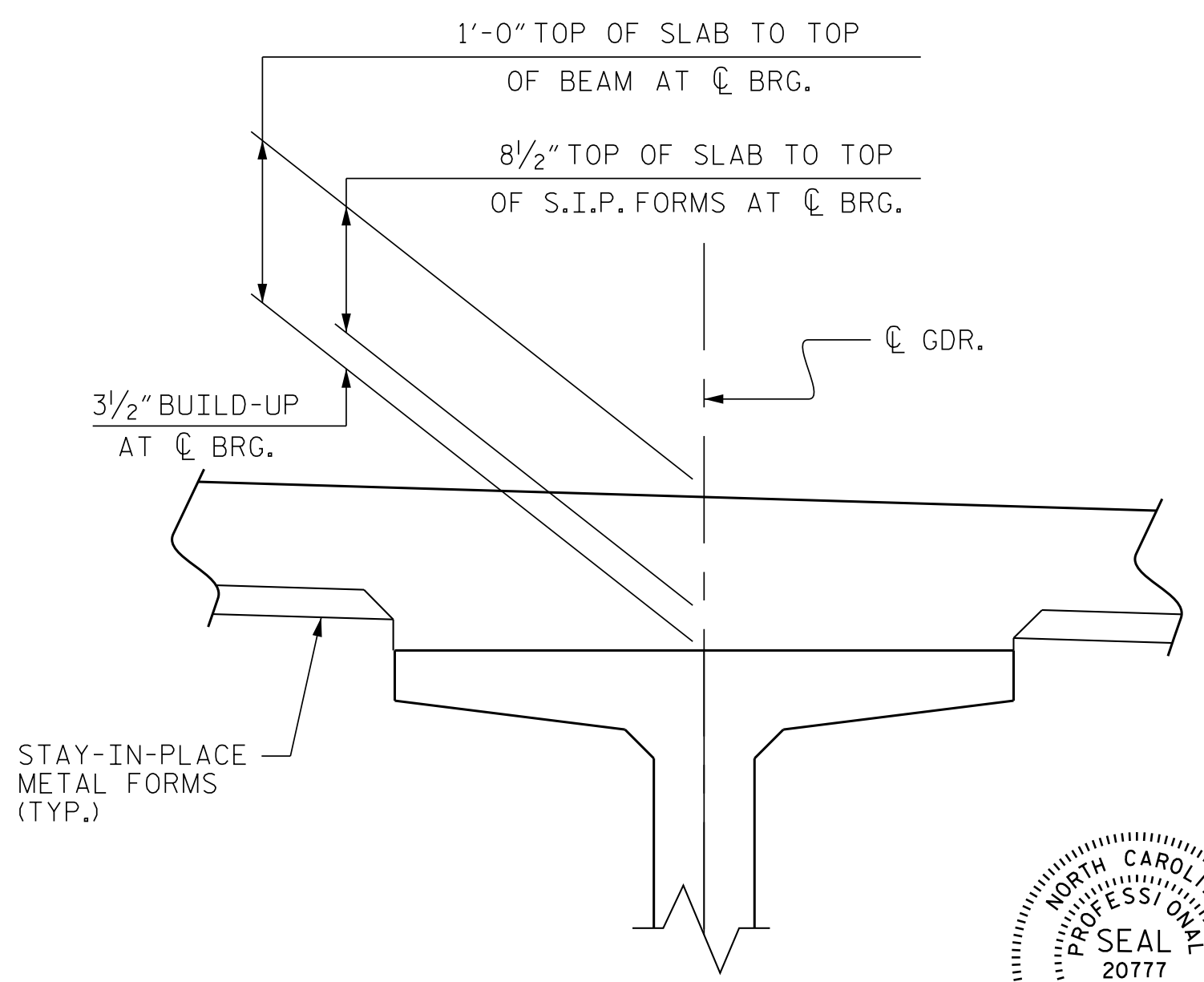
END OF GIRDER DETAIL AT END BENT

NOTES:

- PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER @ 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.
- BARRIER RAIL SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THE SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3000psi.
- PREVIOUSLY CAST CONCRETE SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3000psi BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.
- LONGITUDINAL STEEL MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO AVOID INTERFERENCE WITH STIRRUPS IN PRESTRESSED CONCRETE GIRDERS.



PLAN OF GIRDER
END BENT NO. 1 SHOWN,
END BENT NO. 2 SIMILAR.



DETAIL "A"
(TYP. EA. GIRDER)



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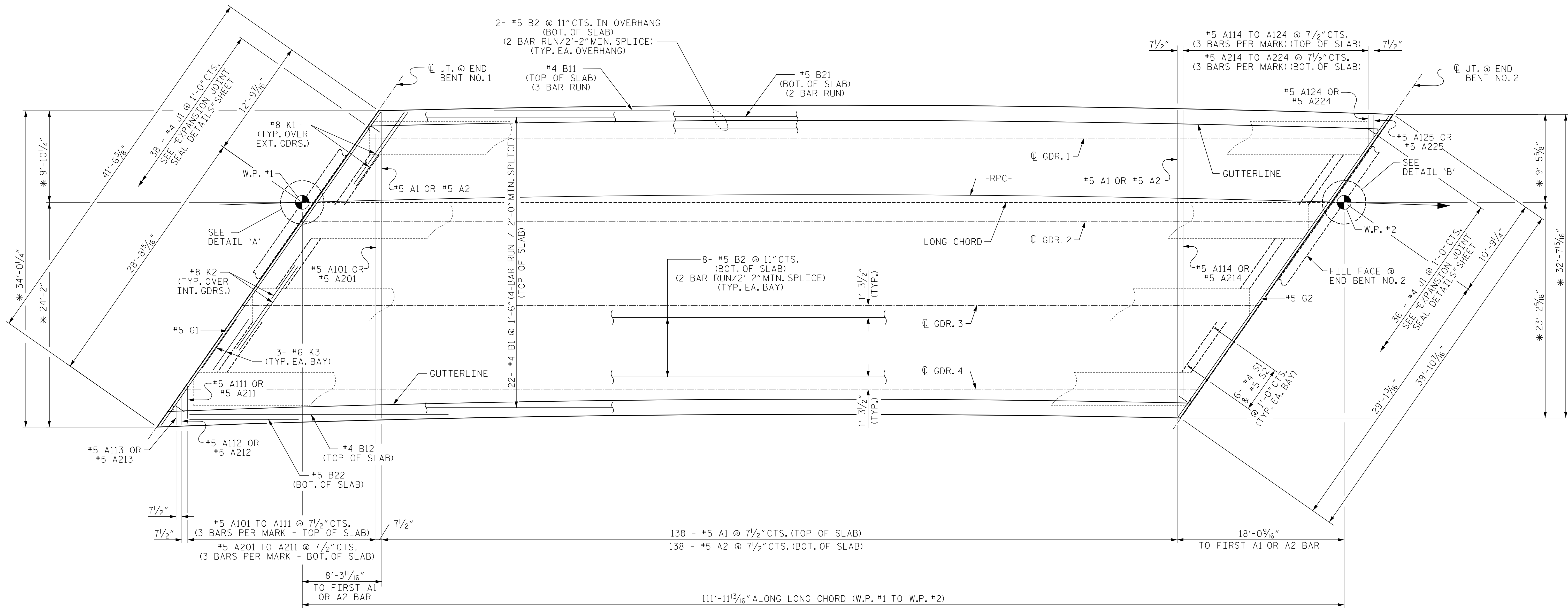
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RICHMOND COUNTY
STATION: 11+47.77 -RPC-
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DEPARTMENT OF TRANSPORTATION
RALEIGH

TYPICAL SECTION

SHEET 6 OF 26				REVISIONS				SHEET NO.	
NO.	BY:	DATE:	NO.	BY:	DATE:	S-			
1	MAF	9/15	3			TOTAL SHEETS			
2	HLW	9/15	4						
	RTS	9/15							

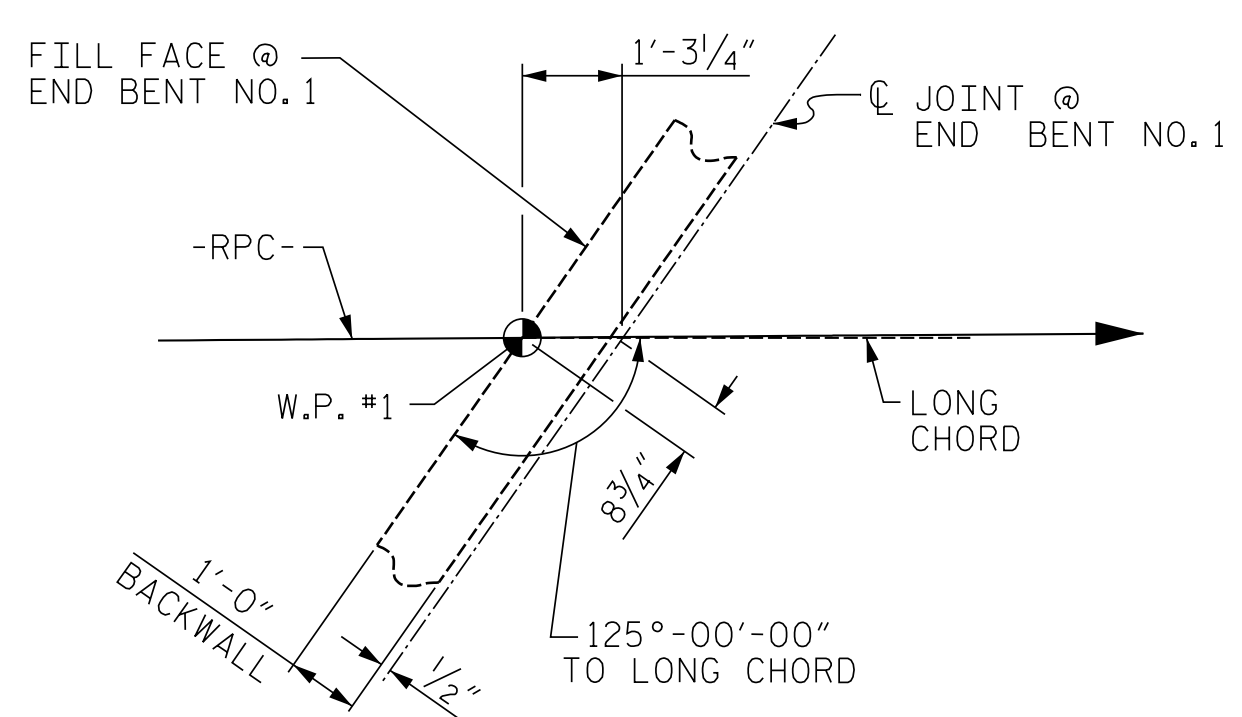
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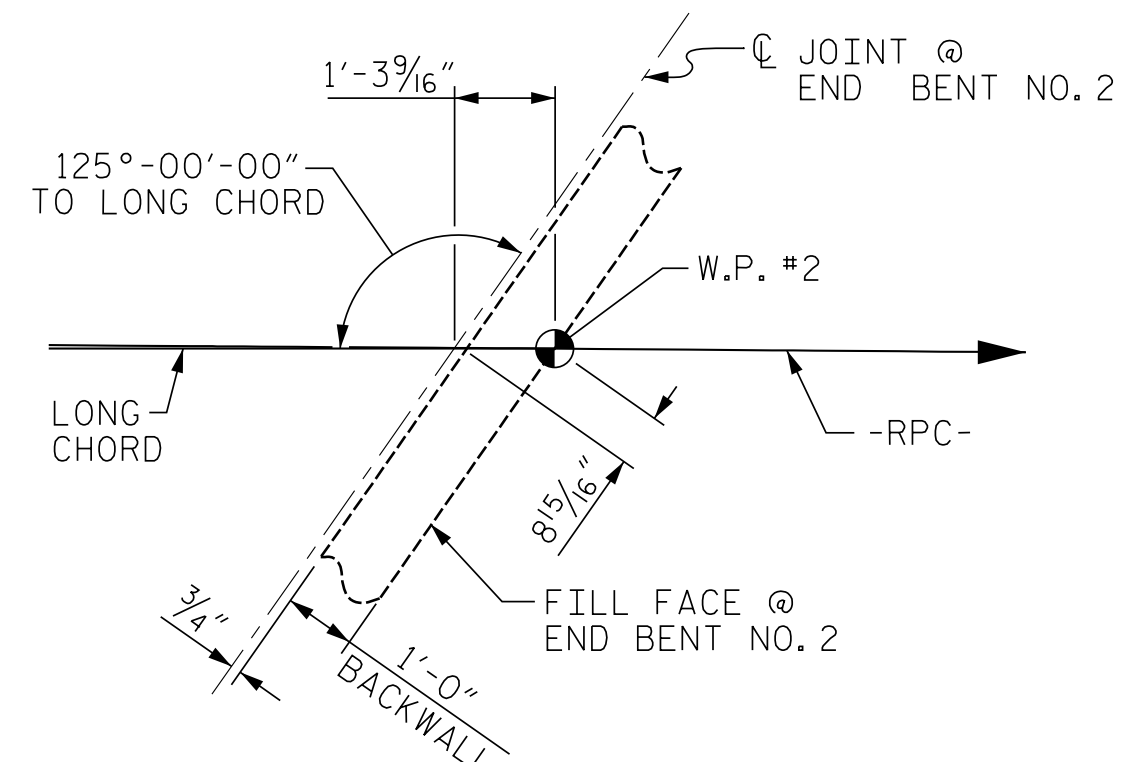
PLAN OF SPAN

FOR LOCATION OF INTERMEDIATE DIAPHRAGMS, SEE "FRAMING PLAN".
 FOR BARRIER RAIL REINFORCING STEEL AND DETAILS, SEE "CONCRETE BARRIER RAIL" SHEET.

* THESE DIMENSIONS MEASURED PERPENDICULAR TO LONG CHORD.



DETAIL 'A'



DETAIL 'B'

PROJECT NO. R-3421A
 RICHMOND COUNTY
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 24+61.99 -FLY-

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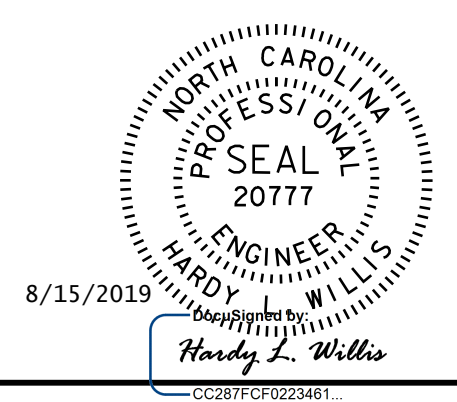
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PLAN OF SPAN

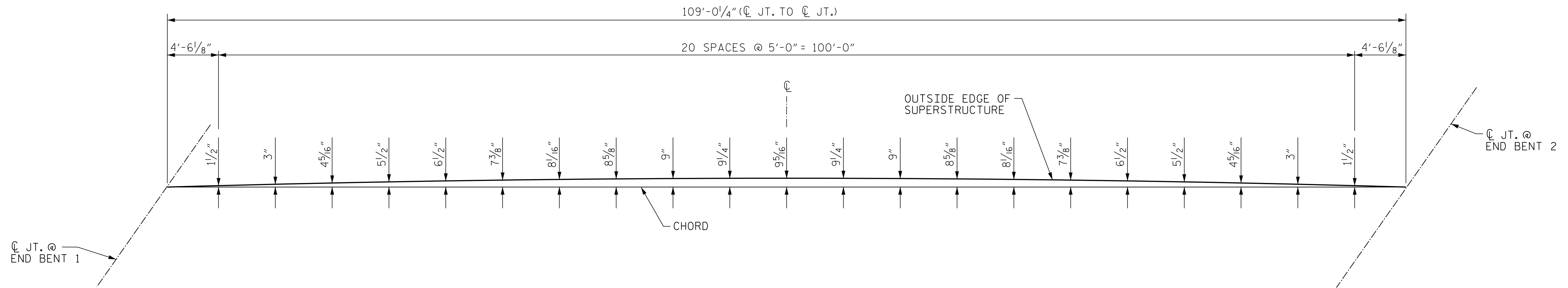


SHEET 7 OF 26

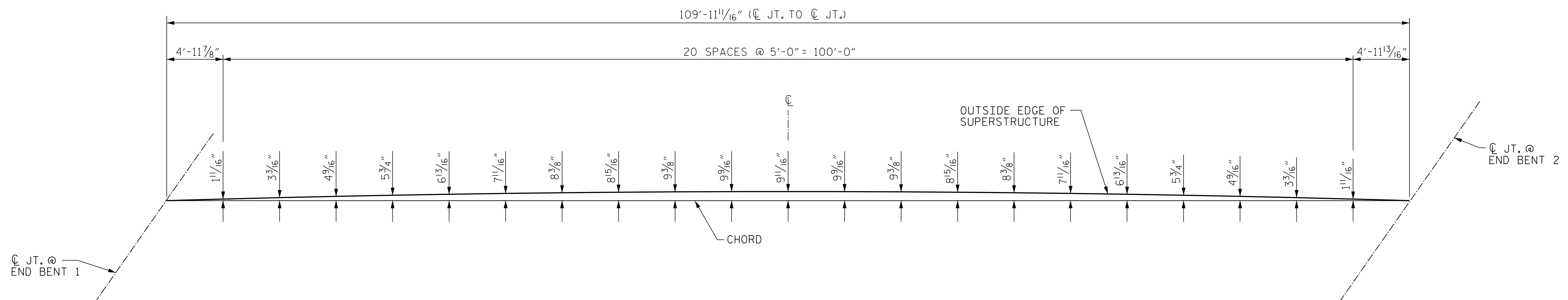
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 CHKD. BY: HLW DATE: 9/15
 DES. EGR. OF RECORD: RTS DATE: 9/15

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

SHEET NO. S-
 TOTAL SHEETS



OUTSIDE LEFT OVERHANG ARC OFFSETS



OUTSIDE RIGHT OVERHANG ARC OFFSETS

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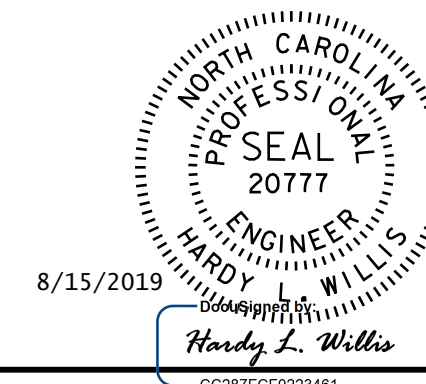
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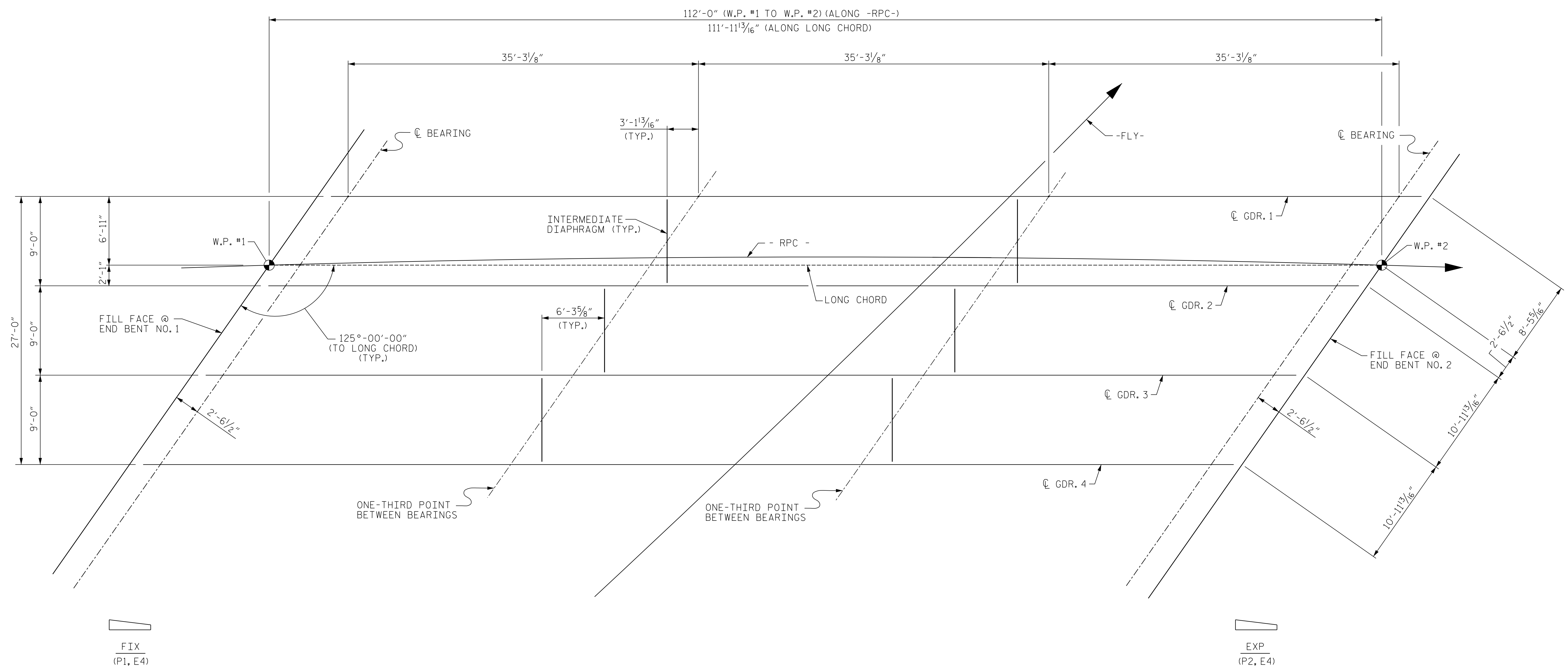
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ARC OFFSETS



SHEET 8 OF 26						REVISIONS						SHEET NO.	
DWN. BY: MAF						DATE: 9/15						S-	
CHKD. BY: HLW						DATE: 9/15						TOTAL SHEETS	
DES. EGR. OF RECORD: RTS						DATE: 9/15							
						NO. 1 BY: DATE: NO. 3 BY: DATE: NO. 2 BY: DATE: NO. 4 BY: DATE:							



FRAMING PLAN

NOTE: GIRDERS ARE PARALLEL TO LONG CHORD.

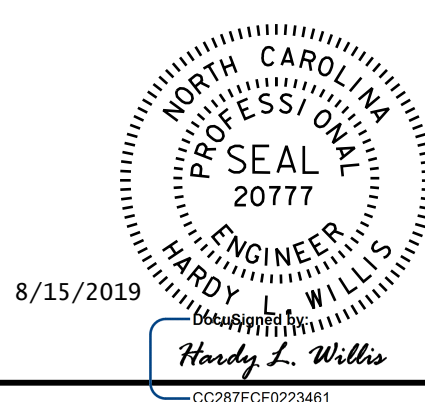
PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
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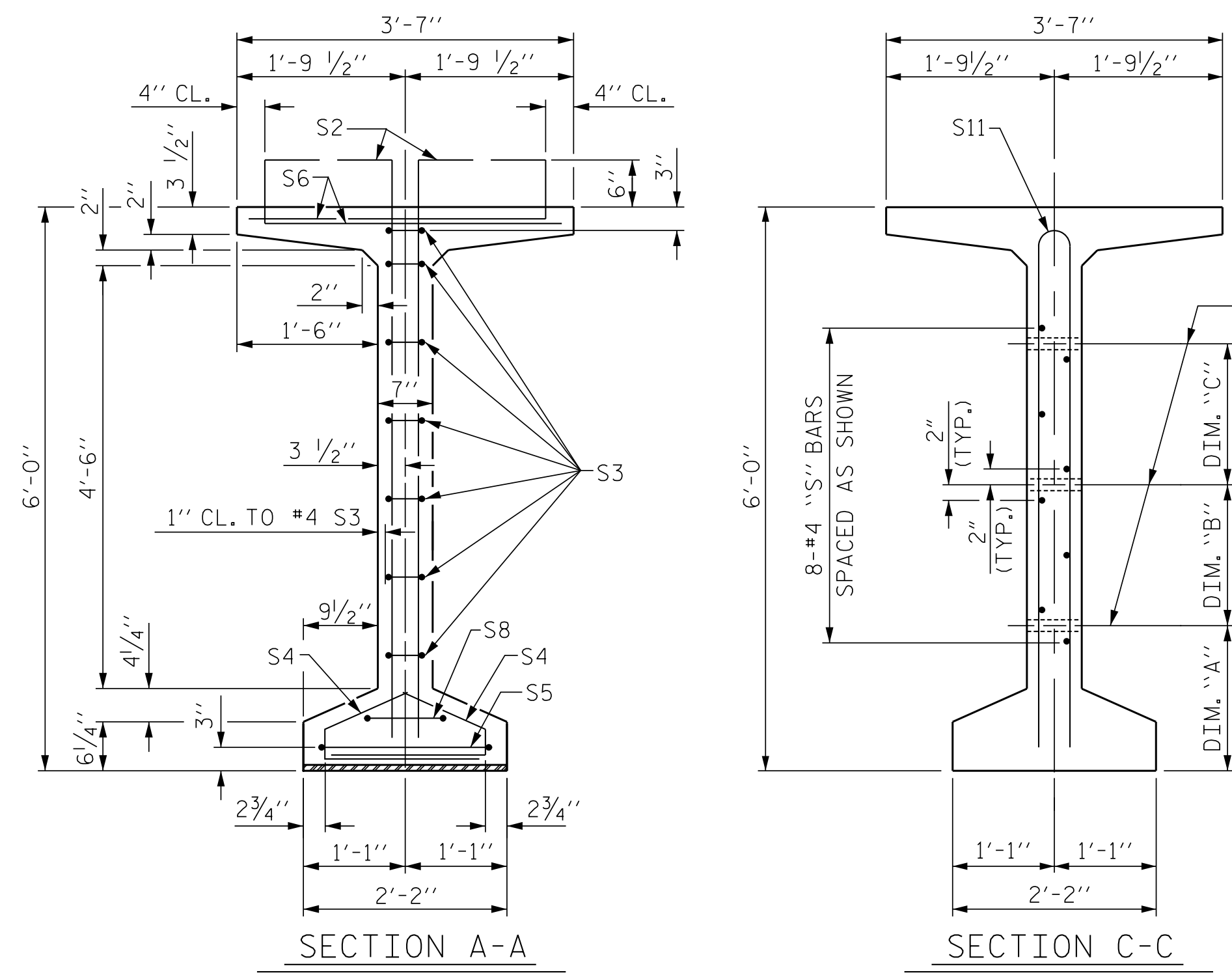


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

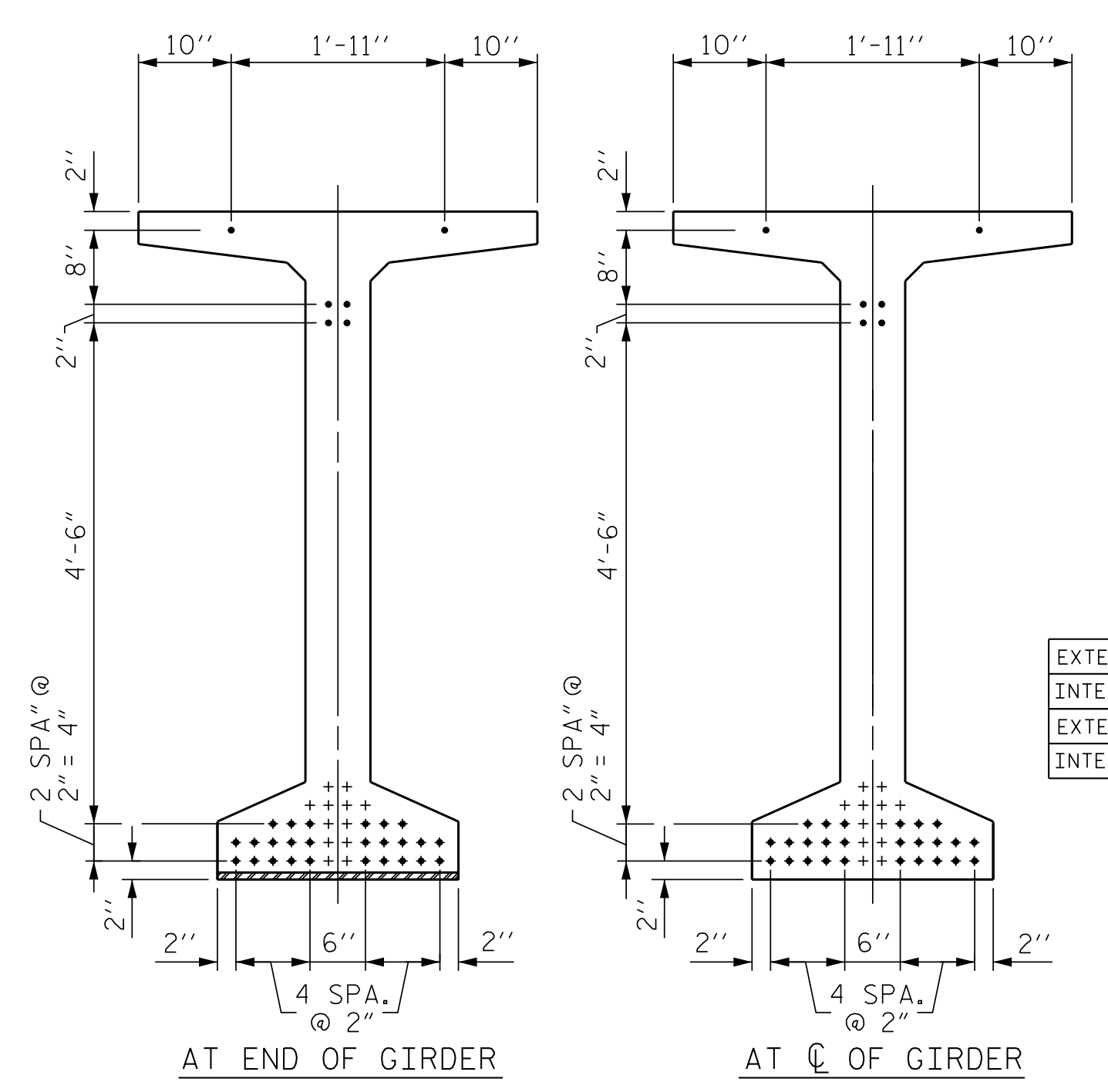
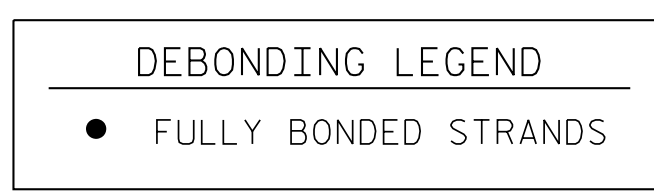
FRAMING PLAN

SHEET 9 OF 26		REVISIONS				SHEET NO.
DWN. BY: FJ/MAF	DATE: 9/15	NO.	BY:	DATE:	S-	TOTAL SHEETS
CHKD. BY: HLW	DATE: 9/15	1				
DES. EGR. OF RECORD: RTS	DATE: 9/15	2				
		3				
		4				

STR. #5



1/2" Ø FORMED HOLE. SEE ELEVATION FOR LOCATION. FOR DIM. "A", "B" & "C" SEE "INTERMEDIATE STEEL DIAPHRAGMS" SHEET.)

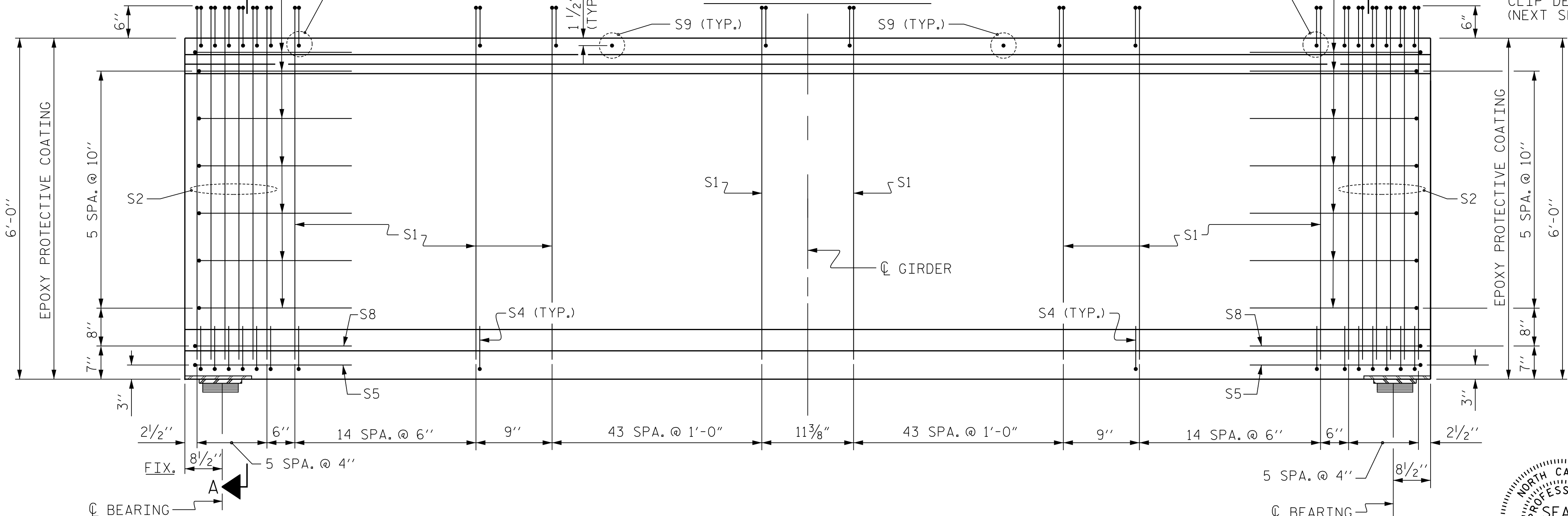
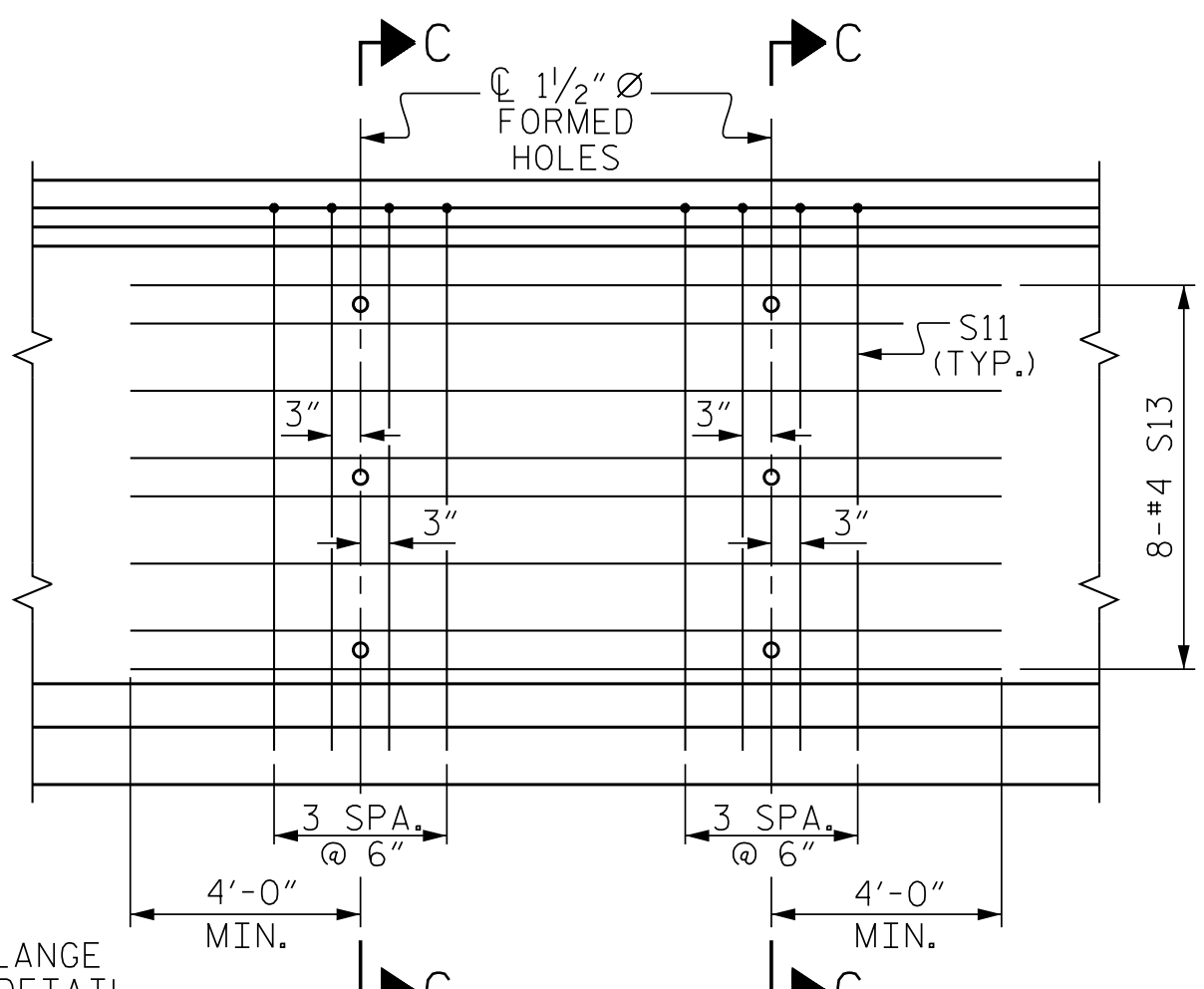
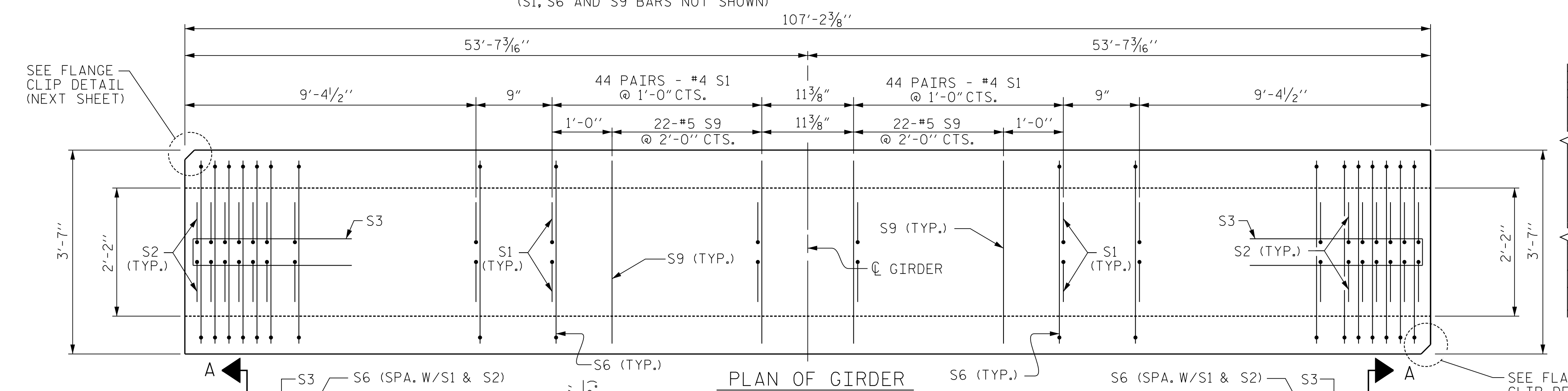
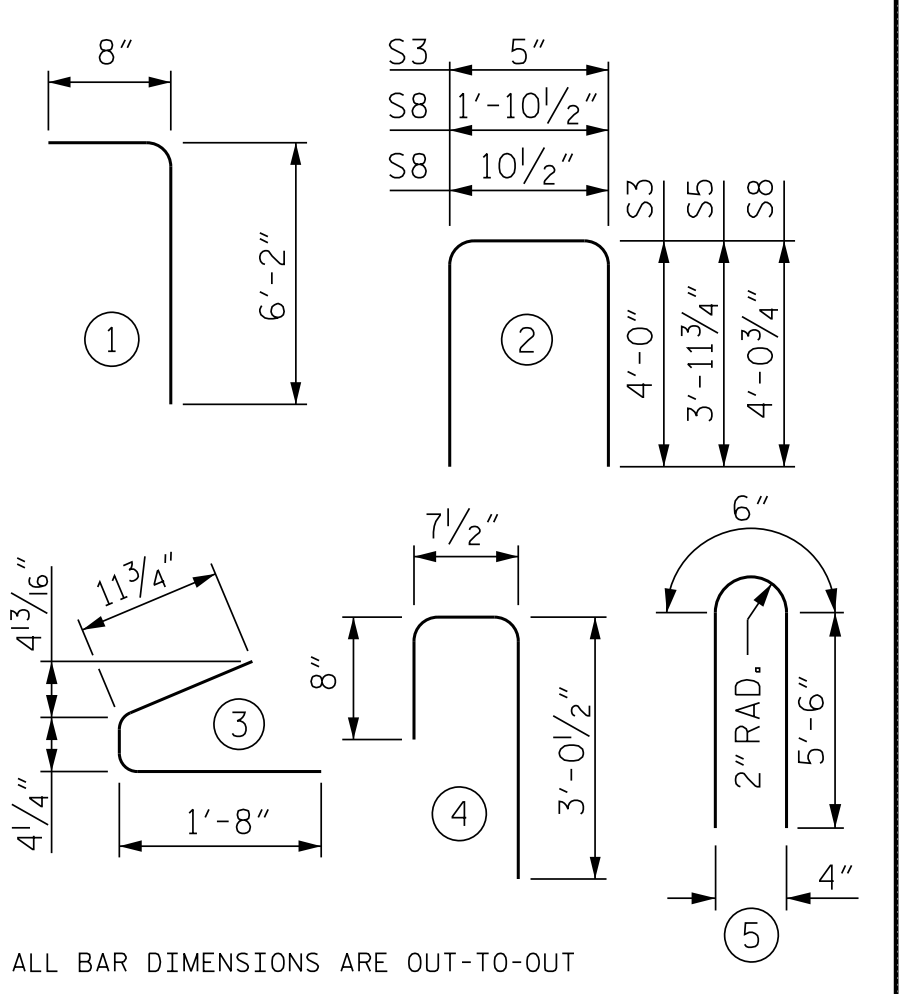


EXTERIOR GDR.	INTERIOR GDR.	EXTERIOR GDR.	INTERIOR GDR.
S11	8	#5	5
S11	16	#5	5
S12	16	#4	STR
S13	16	#4	STR

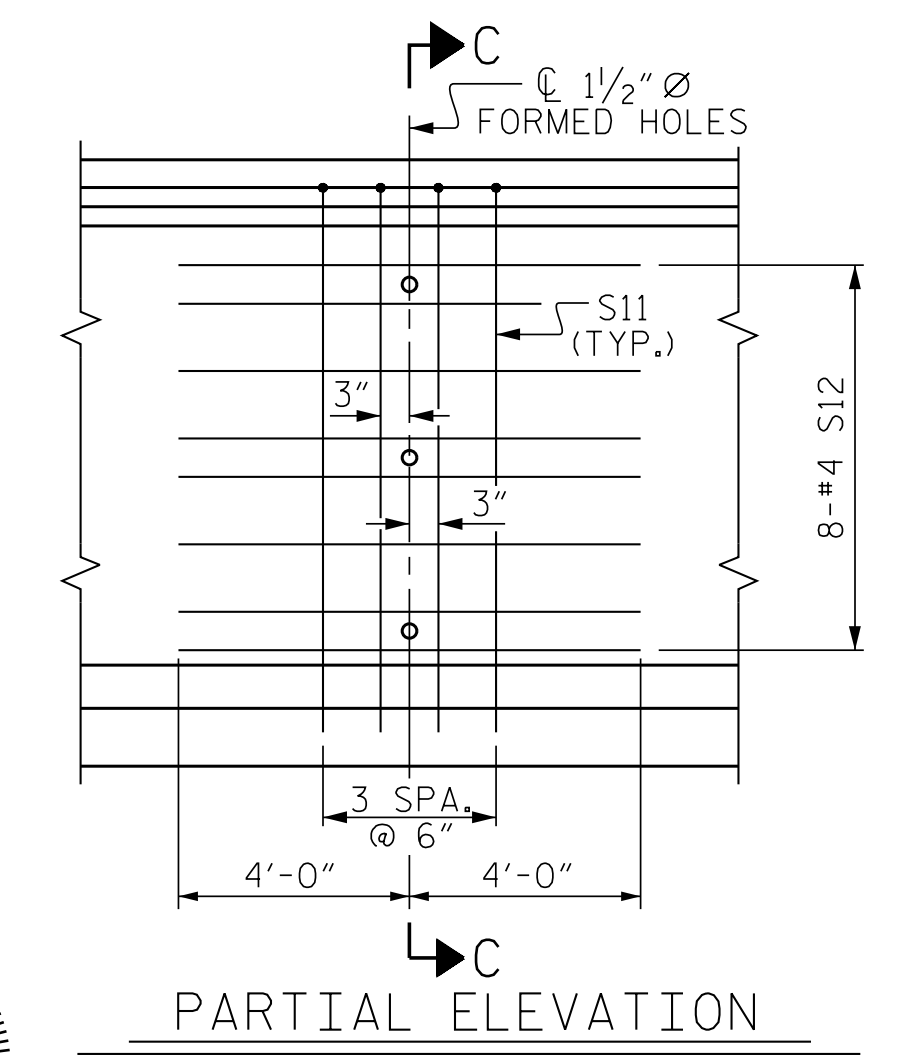
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	236	#4	1	6'-10"	1078
S2	24	#5	1	6'-10"	171
S3	14	#4	2	8'-5"	79
S4	84	#4	3	3'-0"	168
S5	2	#5	2	9'-10"	21
S6	260	#5	4	4'-4"	1175
S8	2	#5	2	9'-0"	19
S9	44	#5	STR	3'-3"	149
S11	8	#5	5	11'-6"	96
S11	16	#5	5	11'-6"	192
S12	16	#4	STR	8'-0"	86
S13	16	#4	STR	14'-6"	155

BAR TYPES



PARTIAL ELEVATION SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 2 & 3



PARTIAL ELEVATION SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. 1 & 4

QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL (LB.)	9000 PSI CONCRETE (CY)	0.6" Ø L.R. STRANDS (NO.)
EXTERIOR GIRDER	3042	23.0	32
INTERIOR GIRDER	3207	23.0	32

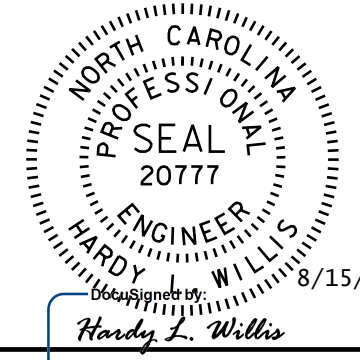
GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4	107'-2 3/8"	428'-9 1/2"

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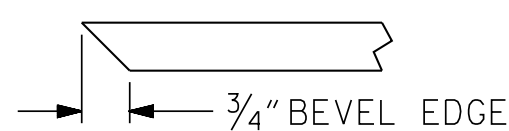
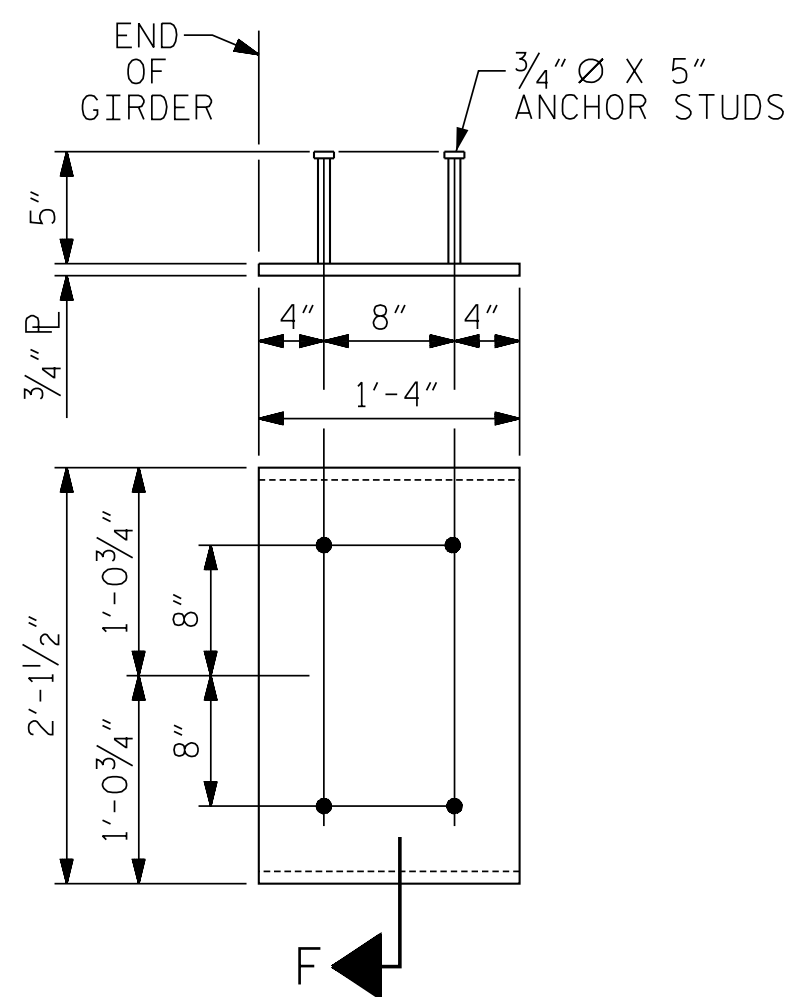
SHEET 1 OF 2
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 72" PRESTRESSED CONCRETE
 MODIFIED BULB TEE
 CONTINUOUS FOR LIVE LOAD

ASSEMBLED BY : MAF DATE : 9/2015
 CHECKED BY : HLW DATE : 9/2015
 DRAWN BY : EEM 2/6/97 TLA/GM
 CHECKED BY : VAP 2/6/97 REV. 10/1/11 MAA/GM
 REV. 5/1/06R REV. 6/13 MAA/GM

ELEVATION OF GIRDER



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



SECTION "F"

(SEE NOTES)

EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER AND 63" & 72" MODIFIED BULB TEES

(2 REQ'D PER GIRDER)

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS AND SHALL CONFORM TO AASHTO M203 EXCEPT FOR SAMPLING REQUIREMENTS WHICH SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

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

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,000 PSI.

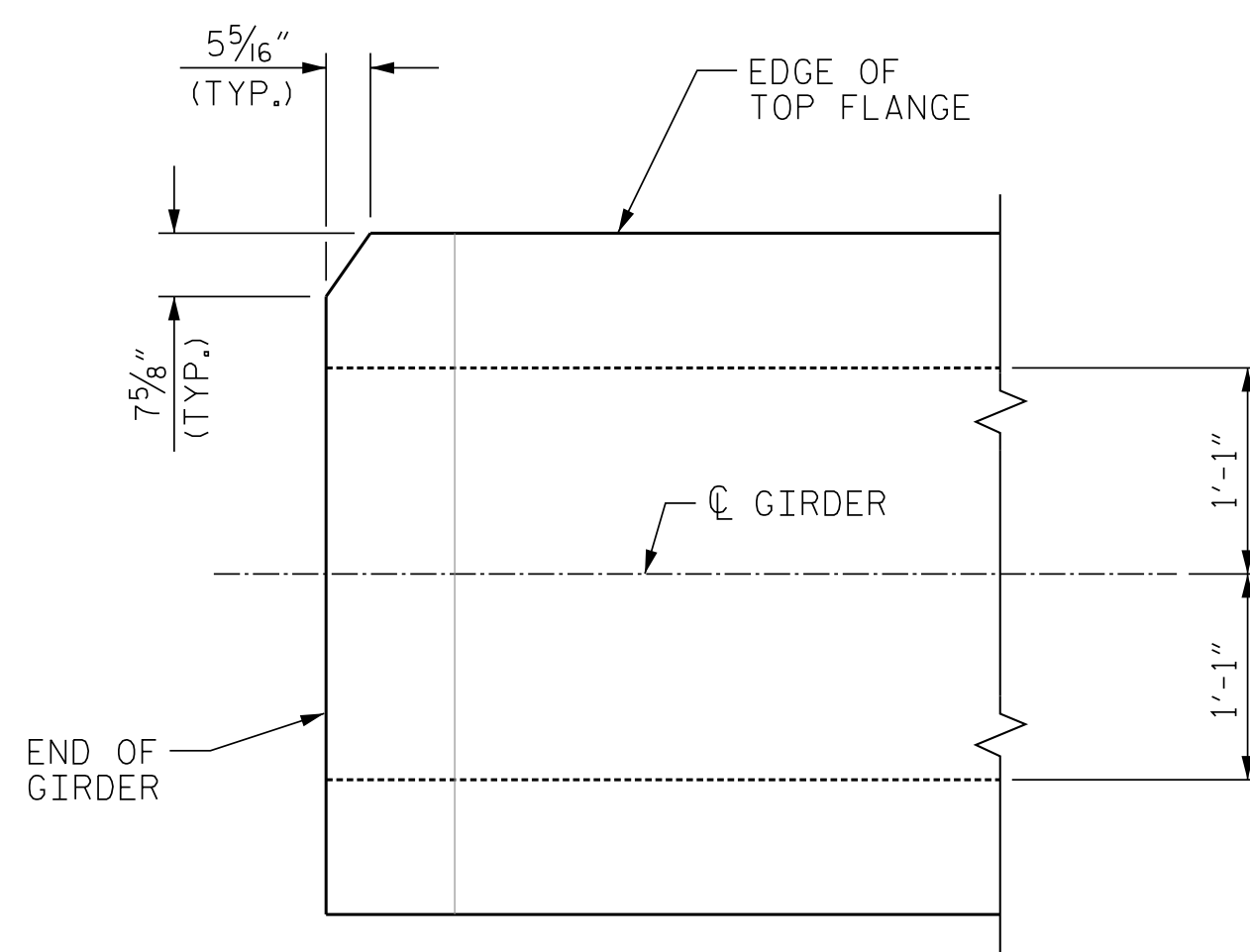
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

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.



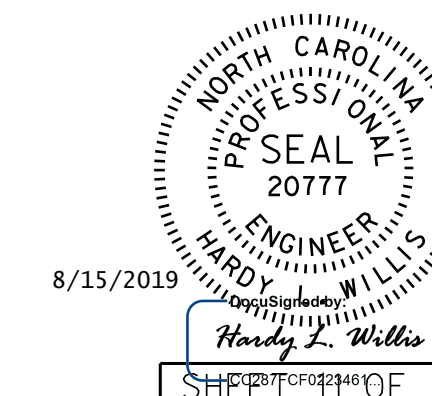
FLANGE CLIP DETAIL

CHAMFER AT END BENT NO. 1 SHOWN. CHAMFER AT END BENT NO. 2 SIMILAR. CLIP OR SHIFT REINFORCEMENT AS NECESSARY TO ENSURE 2" CLEAR.

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RICHMOND COUNTY
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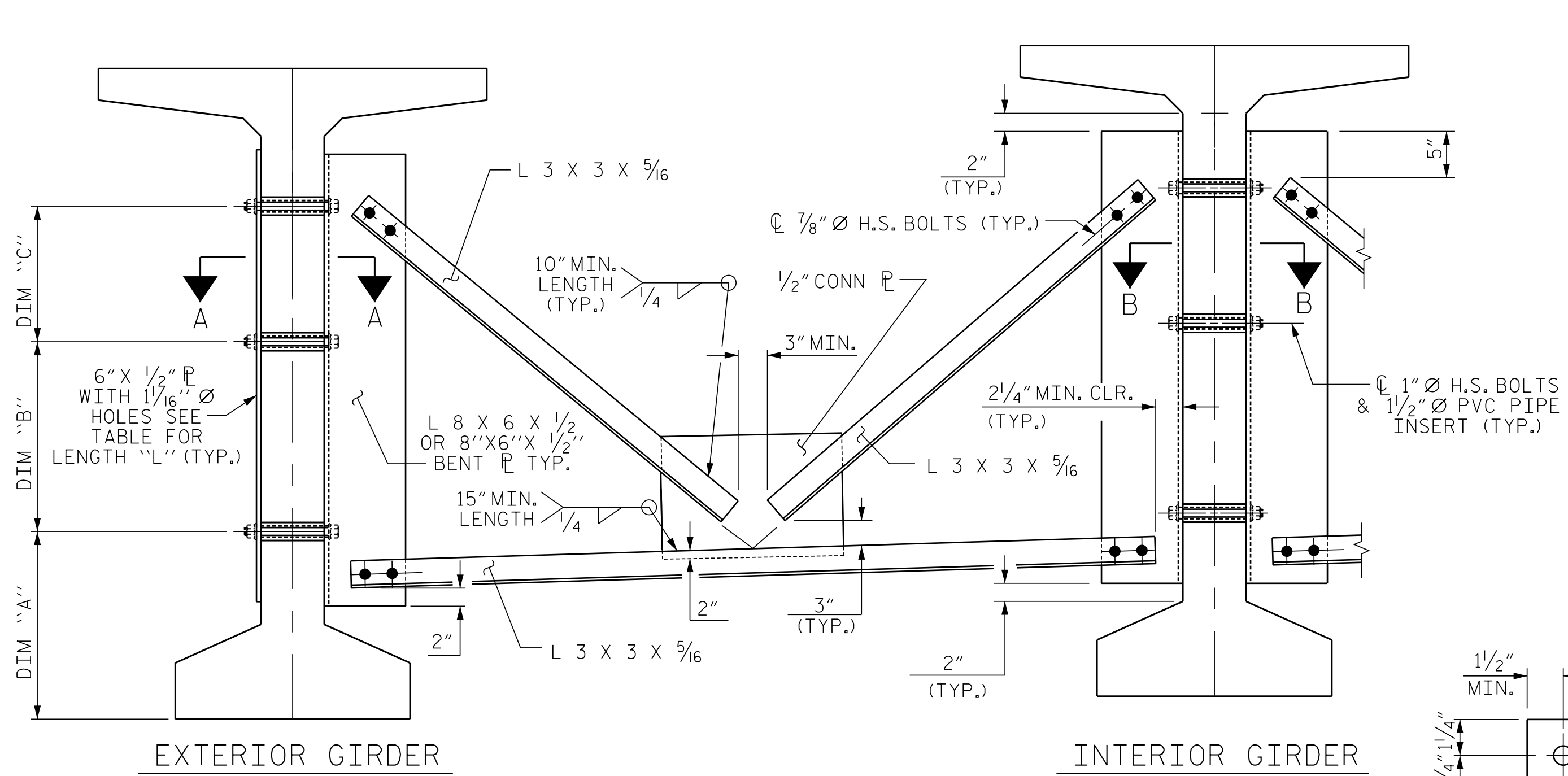
SHEET 2 OF 2

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

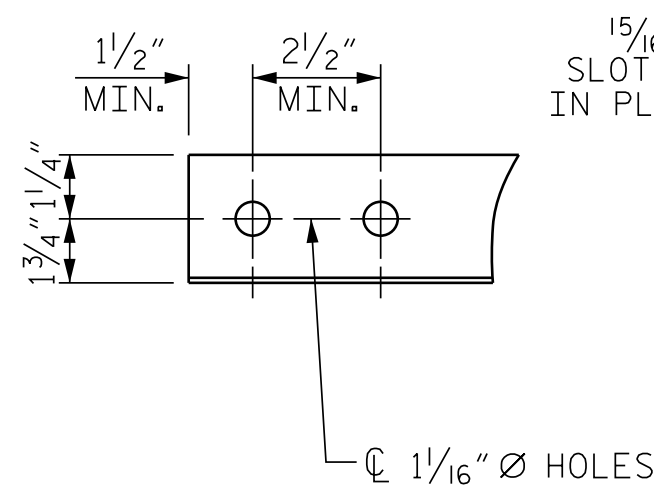


REVISIONS						SHEET NO. S-
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			

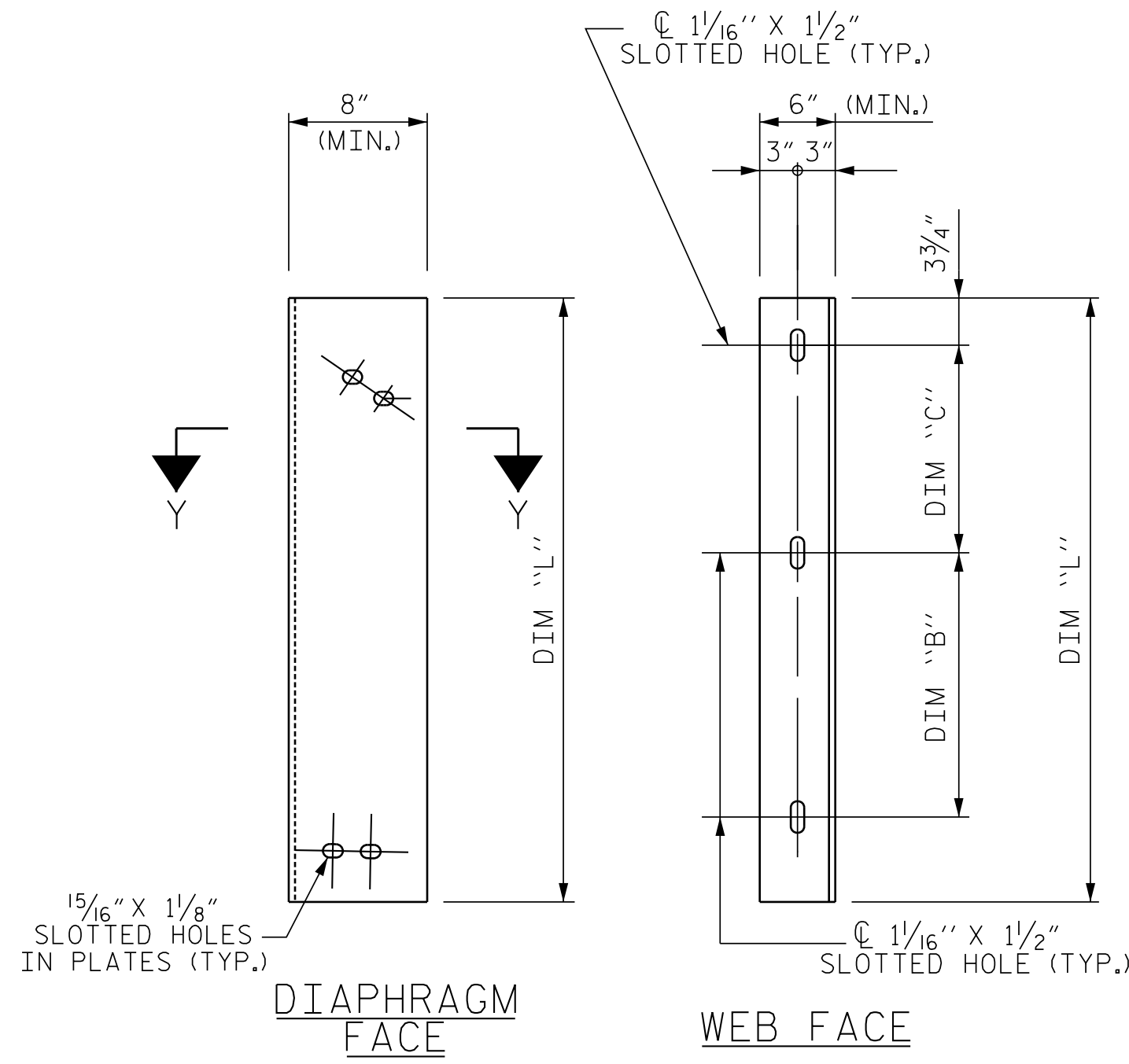
ASSEMBLED BY : MAF	DATE : 9/2015
CHECKED BY : HLW	DATE : 9/2015
DRAWN BY : ELR 11/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 11/91	REV. 1/15 MAA/TMG
	REV. 2/15 MAA/TMG



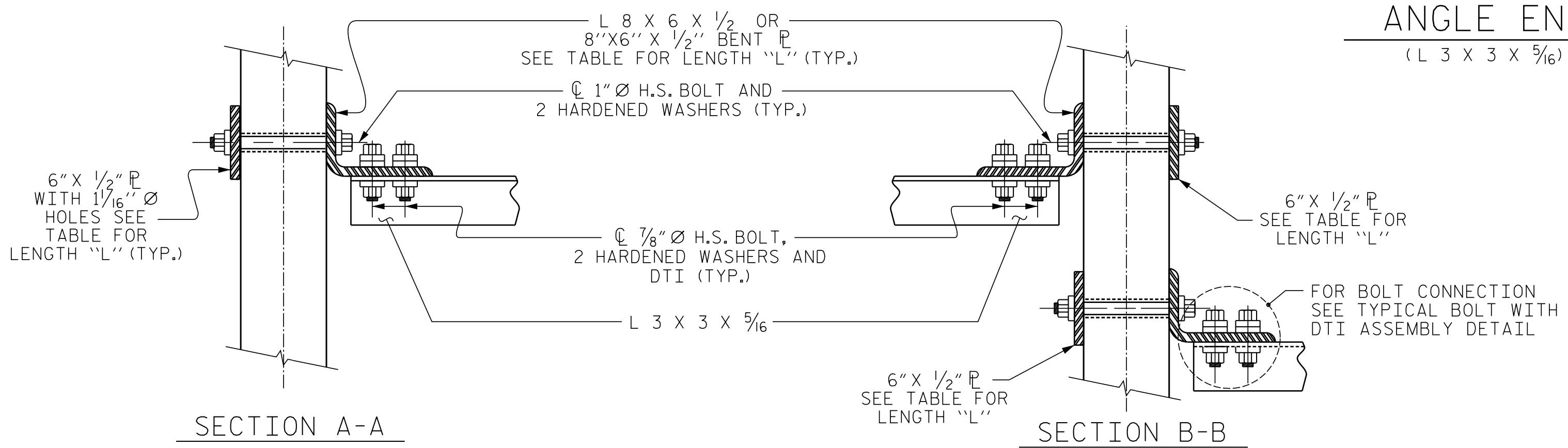
PART SECTION AT INTERMEDIATE DIAPHRAGM
(63" BULB TEE OR 72" BULB TEE GIRDER SHOWN)



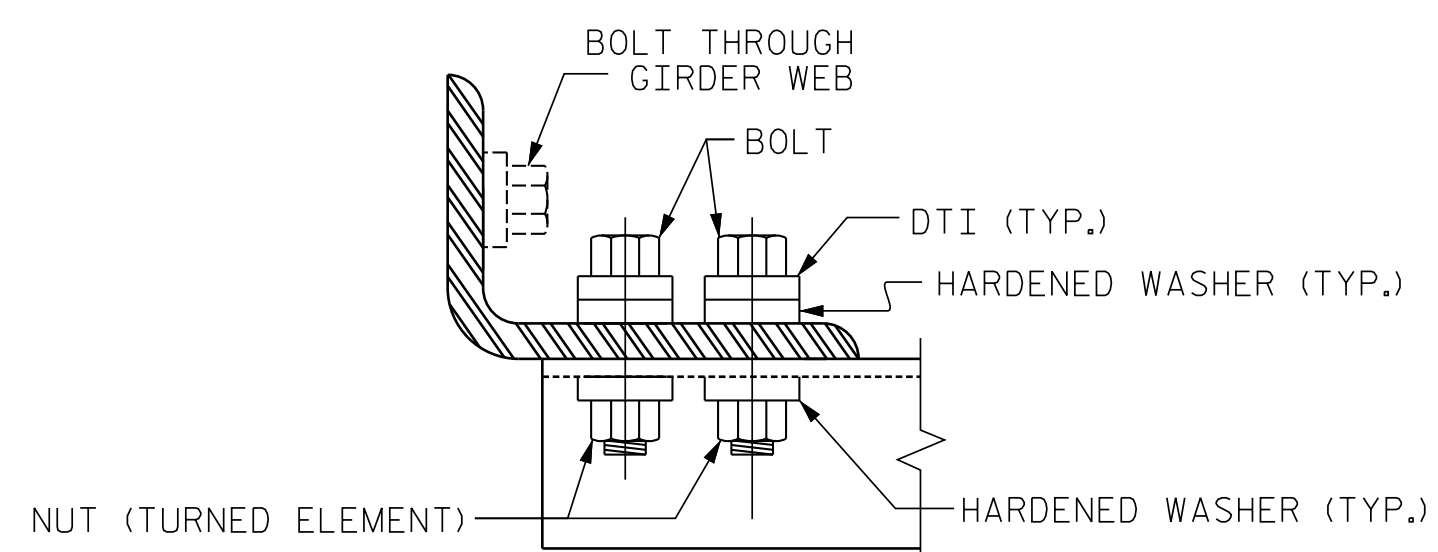
ANGLE END
(L 3 x 3 x 5/16)



CONNECTOR PLATE DETAIL



CONNECTION DETAILS
(FOR SKEW > 110°)



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

TENSION ON THE ASTM A325 BOLTS THROUGH THE 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 AN 8 MIL THICK 99.99 PERCENT ZINC (W-Zn-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE 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.

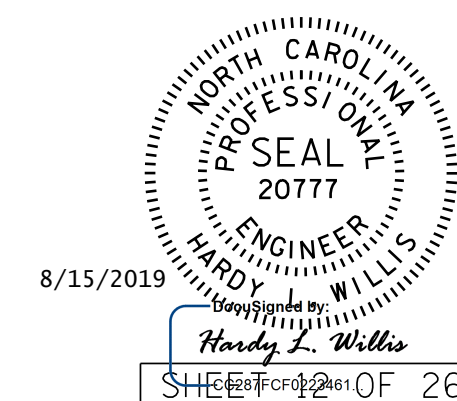
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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'-10 1/2"	1'-3"	1'-3"	4'-2"

ASSEMBLED BY : MAF DATE : 9/2015
 CHECKED BY : HLW DATE : 9/2015
 DRAWN BY : RWW 11/09 ADDED 11/23/09R
 CHECKED BY : GM 11/09 REV. 10/1/11 MAA/GM



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD INTERMEDIATE STEEL DIAPHRAGMS FOR 63" & 72" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS

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

8/15/2019 SHEET 2 OF 26

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.

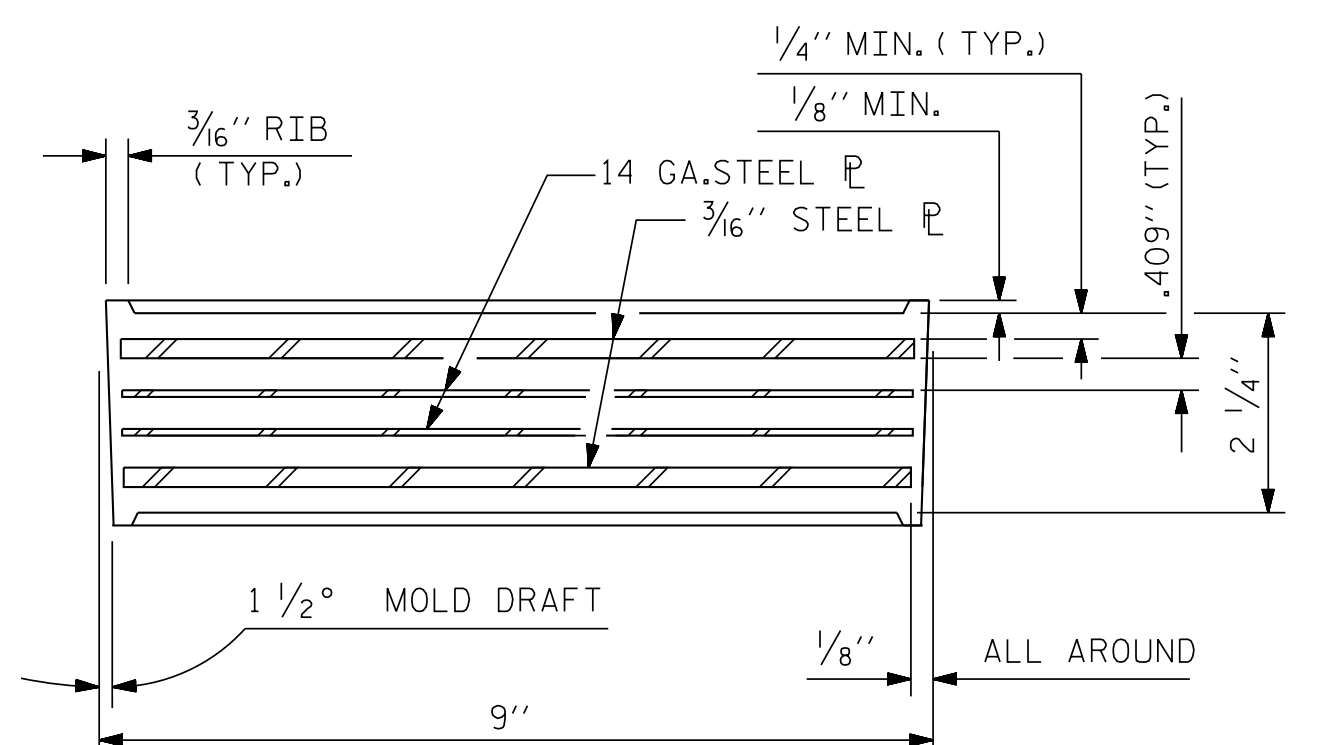
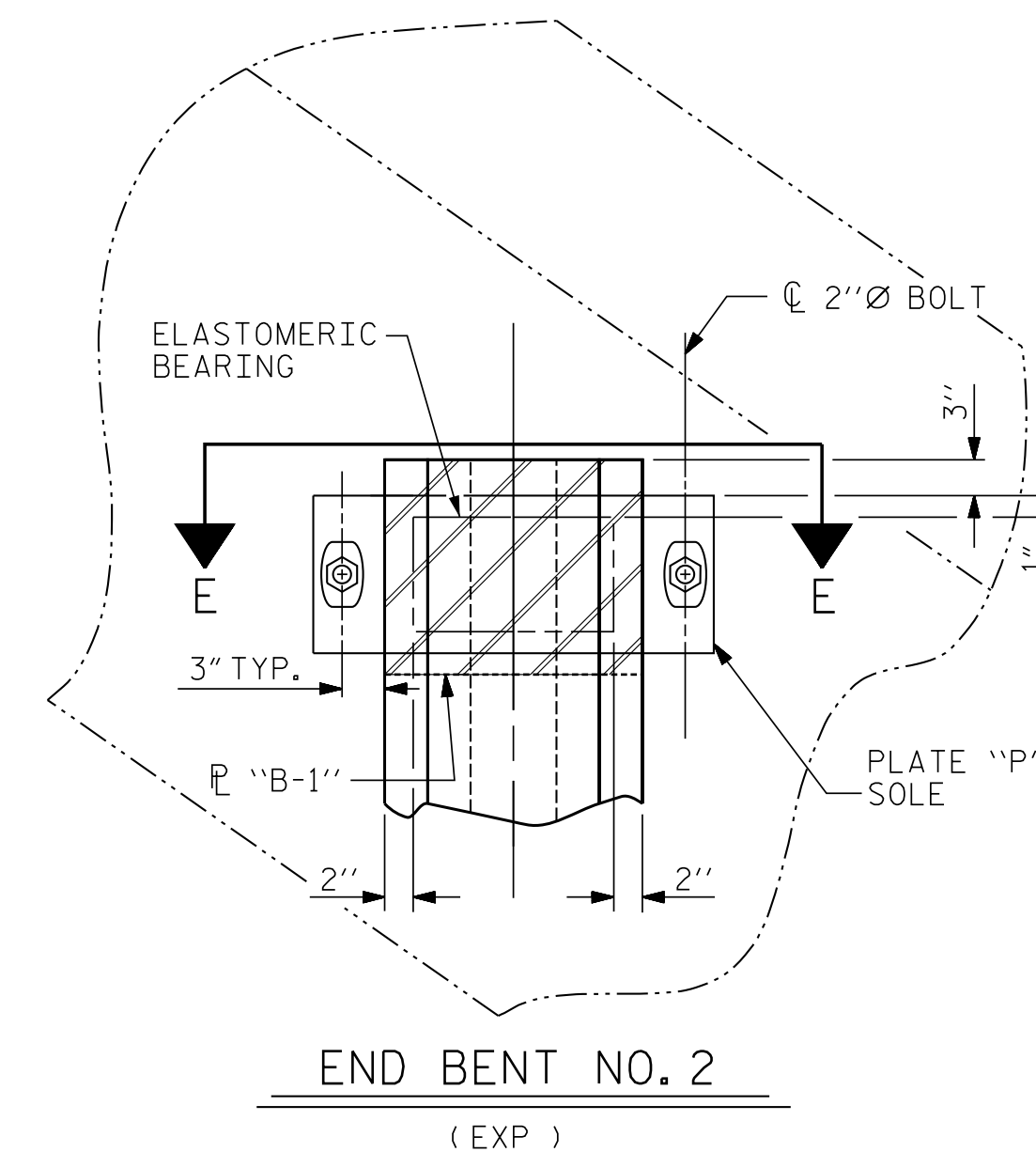
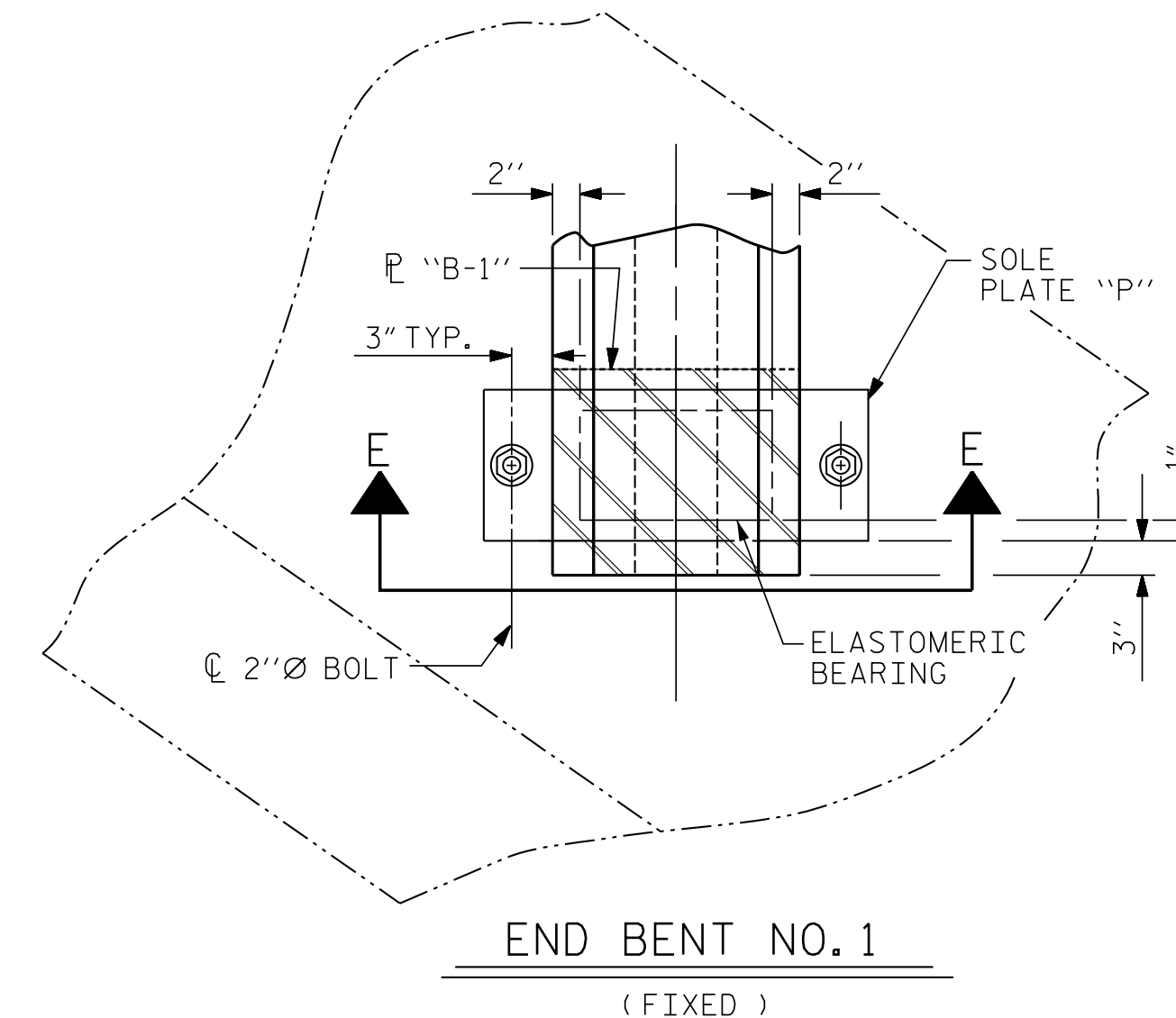
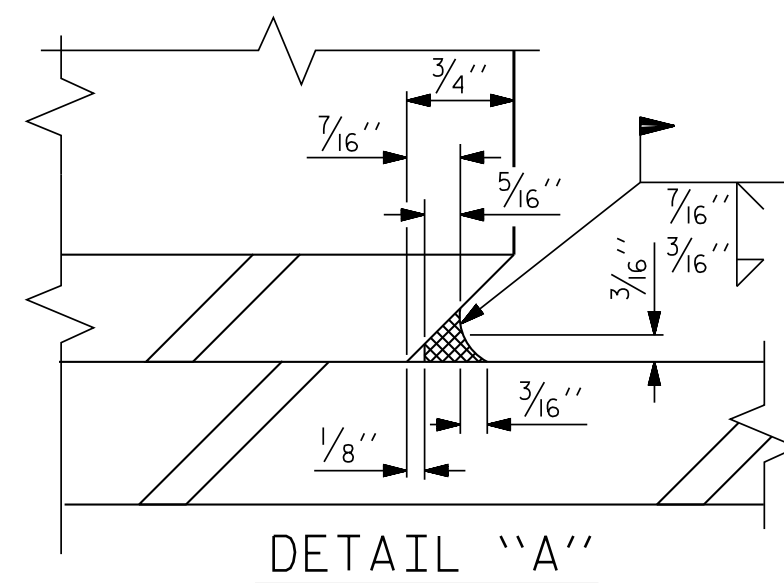
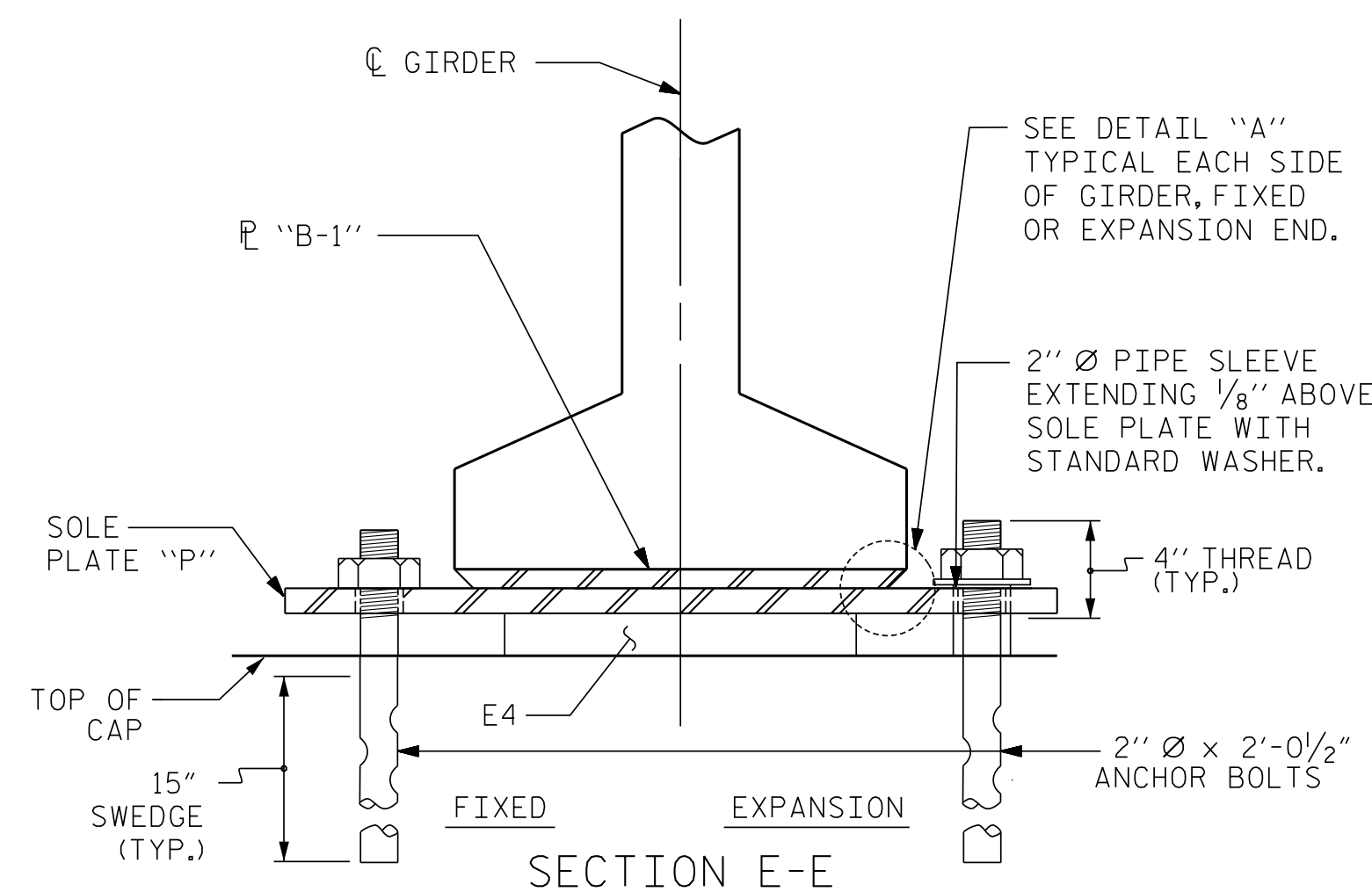
SOLE PLATE "P", BOLTS, NUTS, WASHERS, AND PIPE SLEEVE SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

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.

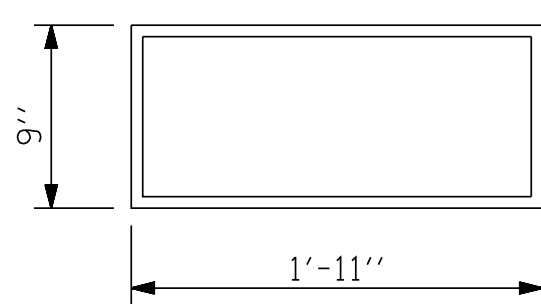
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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.

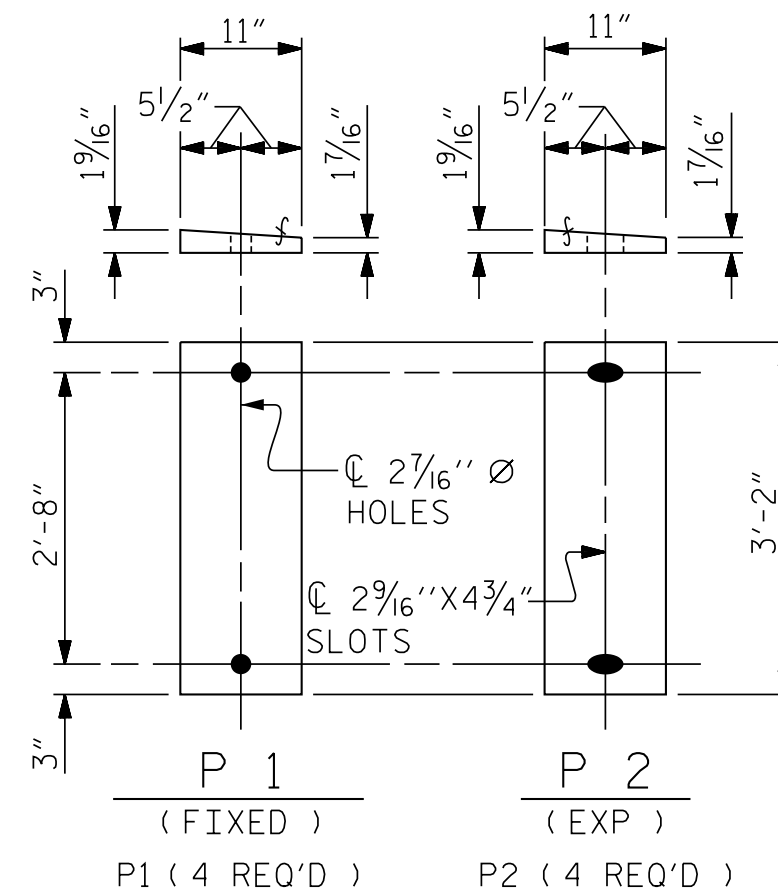


TYPICAL SECTION OF ELASTOMERIC BEARINGS



PLAN VIEW OF ELASTOMERIC BEARING
TYPE V

E4 (8 REQ'D)



SOLE PLATE PLACEMENT DETAIL

UP-STATION →

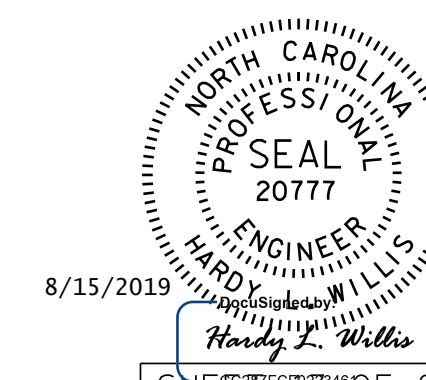
SOLE P ("P")

SOLE PLATE DETAILS ("P")

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

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RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 ELASTOMERIC BEARING
 DETAILS
 PRESTRESSED CONCRETE GIRDER
 SUPERSTRUCTURE



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

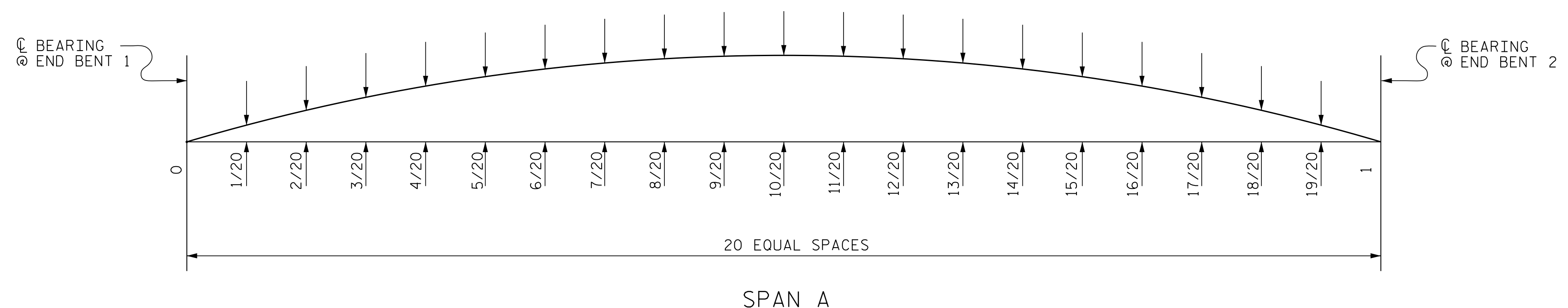
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CHECKED BY : HLW	DATE : 9/2015
DRAWN BY : EEM 2/97	REV. 5/1/06 TLA/GM
CHECKED BY : VAP 2/97	REV. 10/1/11 MAA/GM
	REV. 6/13 AAC/MAA

8/15/2019
 SHEET 19 OF 26

STR. #5 STD. NO. EB4

SPAN A - DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
0.60" Ø LOW RELAXATION		GIRDERS 1 & 4																				
TWENTIETH POINTS		0.0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.5	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.0
	CAMBER (GIRDER ALONE IN PLACE) (FT.) (UP) ↑	0.000	0.023	0.045	0.066	0.085	0.102	0.116	0.127	0.136	0.141	0.142	0.141	0.136	0.127	0.116	0.102	0.085	0.066	0.045	0.023	0.000
*	DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.) (DOWN) ↓	0.000	.018	.034	.049	.062	.073	.082	.090	.096	.100	.102	.100	.096	.090	.082	.073	.062	.049	.034	.018	0.000
	FINAL CAMBER (INCHES) (UP) ↑	0	1/16	1/8	3/16	1/4	3/8	7/16	7/16	1/2	1/2	1/2	1/2	1/2	7/16	7/16	3/8	1/4	3/16	1/8	1/16	0
* INCLUDES WEIGHT OF SLAB, BUILDUP, STAY-IN-PLACE FORMS, AND FUTURE WEARING SURFACE.																						

SPAN A - DEAD LOAD DEFLECTION TABLE FOR GIRDERS																						
0.60" Ø LOW RELAXATION		GIRDERS 2-3																				
TWENTIETH POINTS		0.0	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.5	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.0
	CAMBER (GIRDER ALONE IN PLACE) (FT.) (UP) ↑	0.000	0.023	0.045	0.066	0.085	0.102	0.116	0.127	0.136	0.141	0.142	0.141	0.136	0.127	0.116	0.102	0.085	0.066	0.045	0.023	0.000
*	DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.) (DOWN) ↓	0.000	.019	.037	.052	.065	.077	.087	.094	.100	.104	.106	.104	.100	.094	.087	.077	.065	.052	.037	.019	0.000
	FINAL CAMBER (INCHES) (UP) ↑	0	1/16	1/8	3/16	1/4	5/16	3/8	3/8	7/16	7/16	7/16	7/16	7/16	3/8	3/8	5/16	1/4	3/16	1/8	1/16	0
* INCLUDES WEIGHT OF SLAB, BUILDUP, STAY-IN-PLACE FORMS, AND FUTURE WEARING SURFACE.																						



SCHEMATIC OF CAMBER ORDINATES
 FOR CAMBER VALUES AT EACH GIRDER TWENTIETH POINTS, SEE TABLE ABOVE.
 SLOPE FOR ZERO CAMBER BASE LINE VARIES.

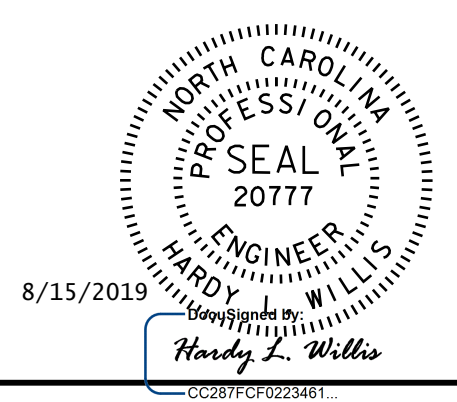
PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
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 Charlotte, NC 704-357-0488
 Atlanta, GA 770-627-3509

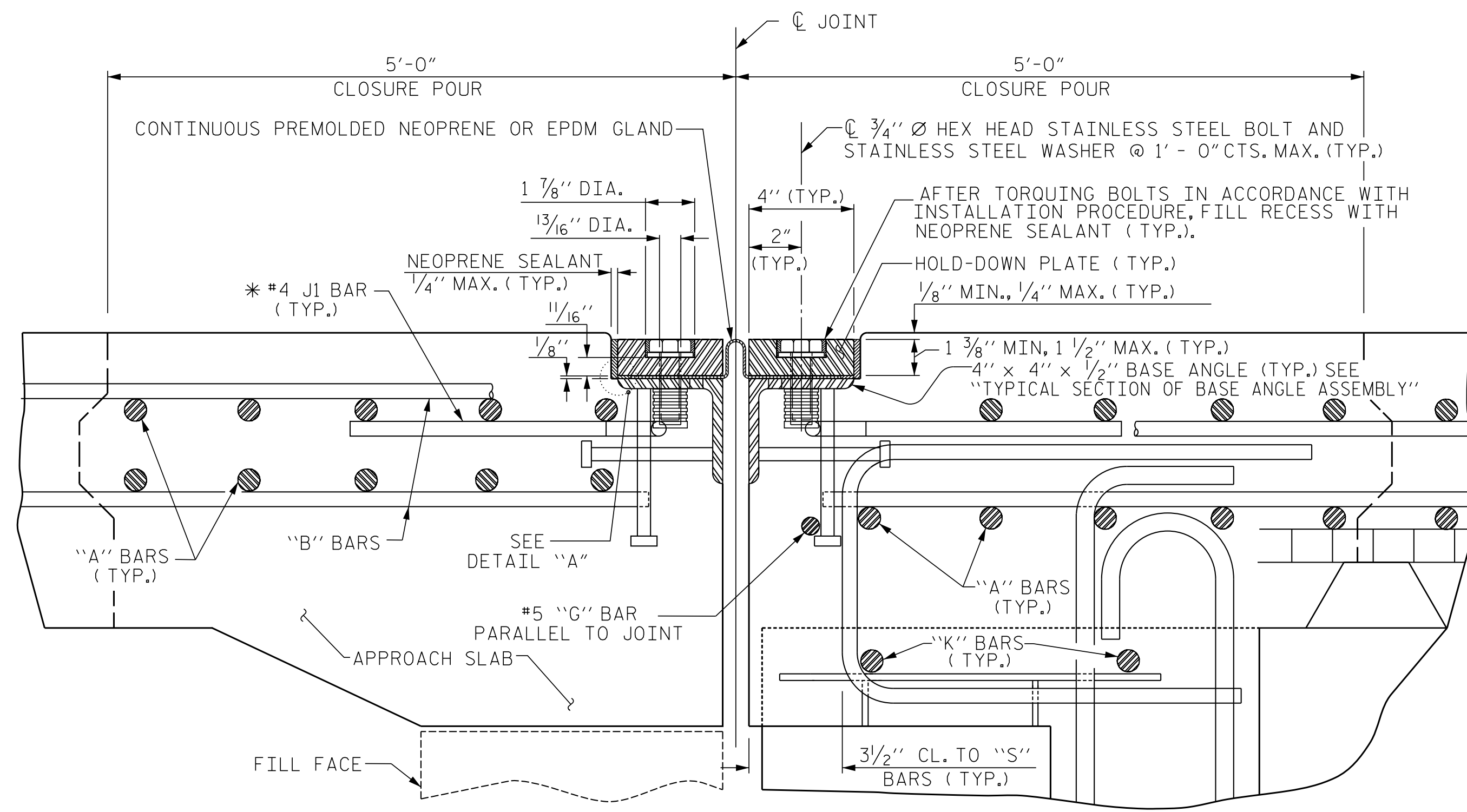
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

DEAD LOAD DEFLECTIONS

SHEET 14 OF 26				REVISIONS				SHEET NO.	
DWN. BY: MAF	DATE: 9/15	NO.	BY:	DATE:	NO.	BY:	DATE:	S-	
CHKD. BY: HLW	DATE: 9/15	1			3			TOTAL SHEETS	
DES. EGR. OF RECORD: RTS	DATE: 9/15	2			4				



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.

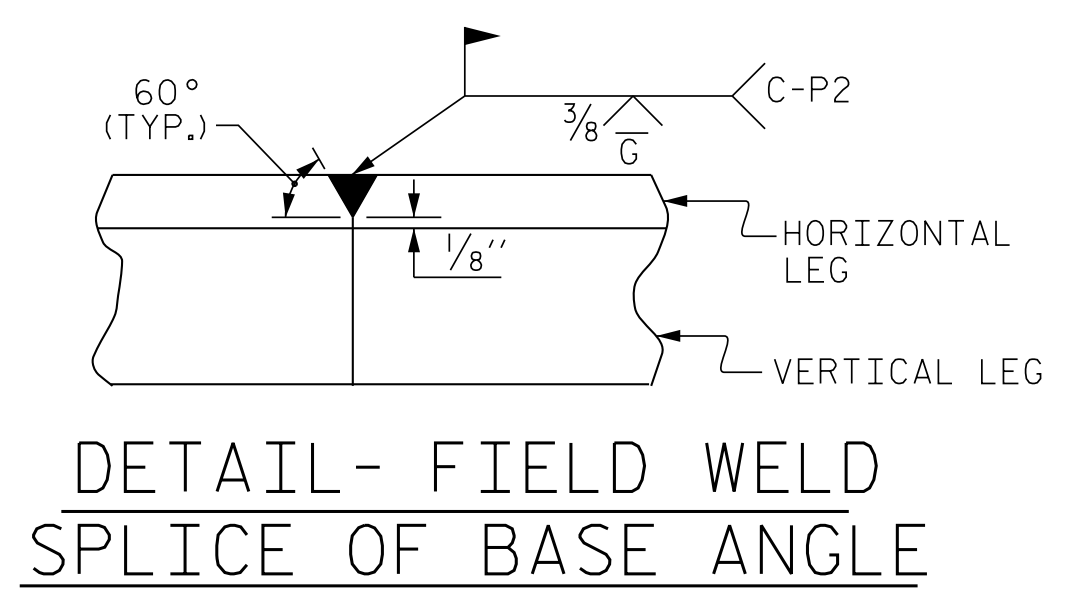
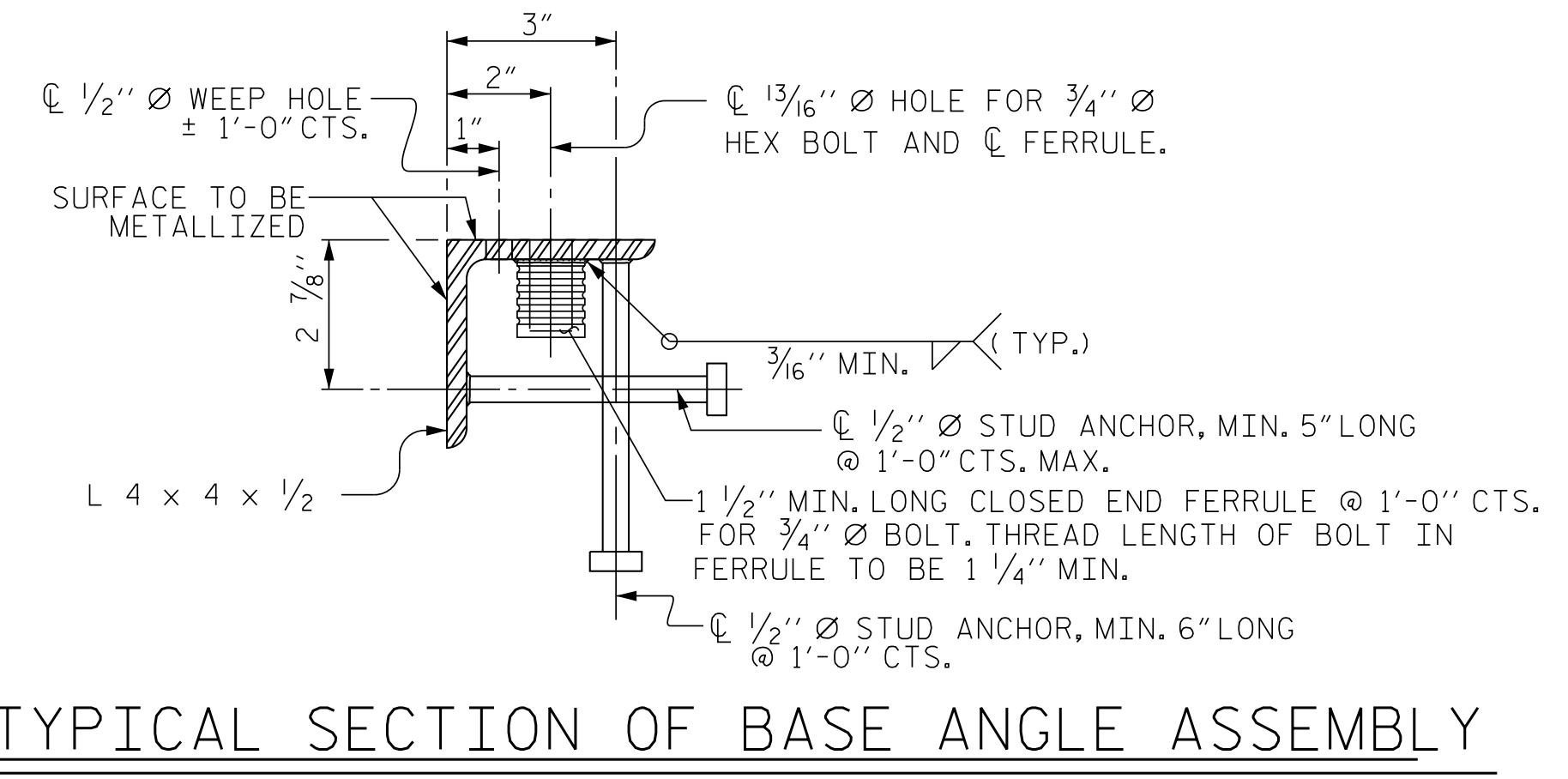
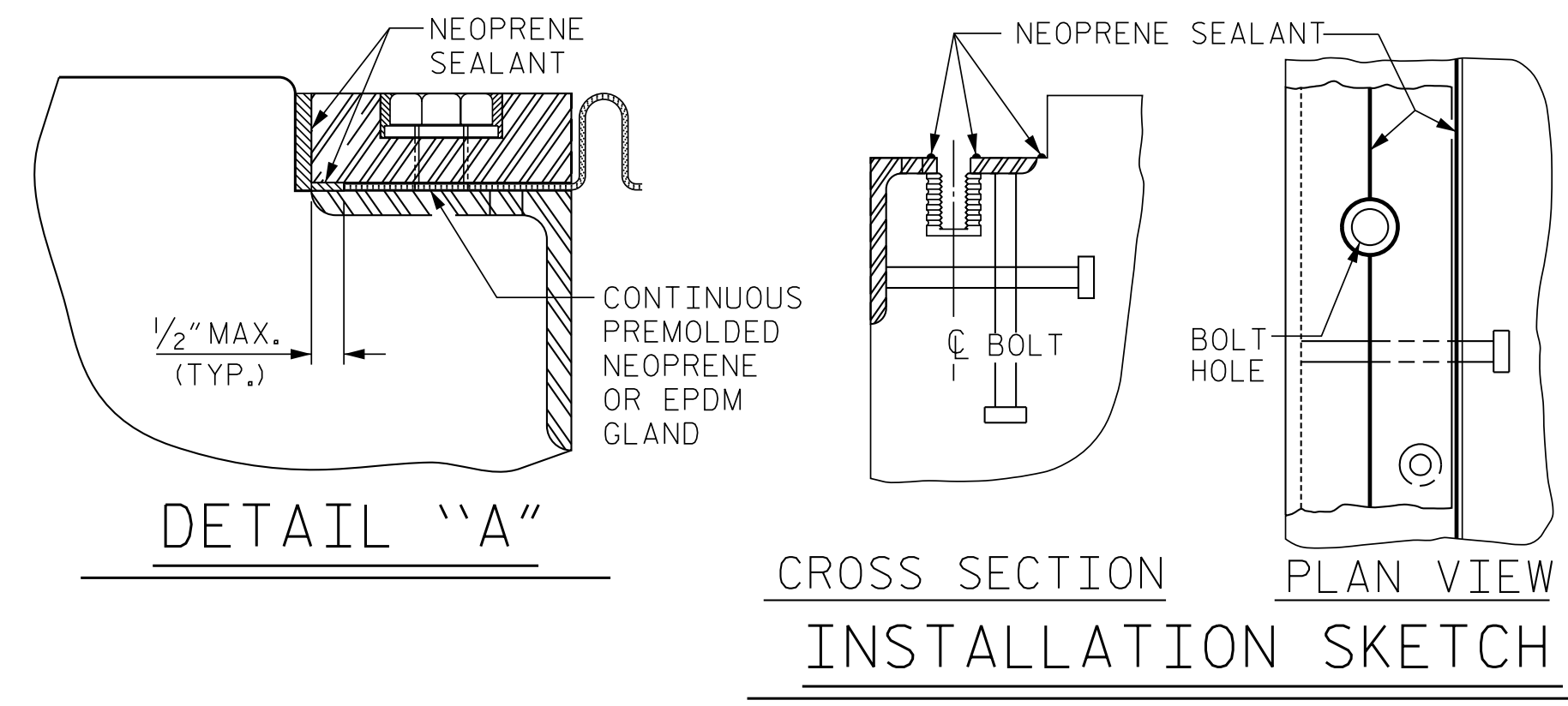
INSTALLATION PROCEDURE

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 COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED 1/8" 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 AND THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, COMPLETELY FILL THESE RECESSES WITH NEOPRENE SEALANT.

GENERAL NOTES

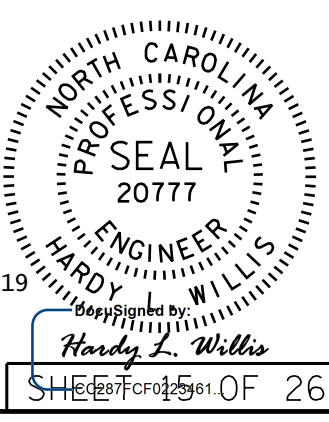
1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS 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. MIN.
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. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
7. 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 GROUND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
8. 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.
9. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
10. 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.

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	125°-00'-00"	0"	1"	1"	1"
2	125°-00'-00"	1 1/16"	1 7/16"	1 1/2"	1 5/16"



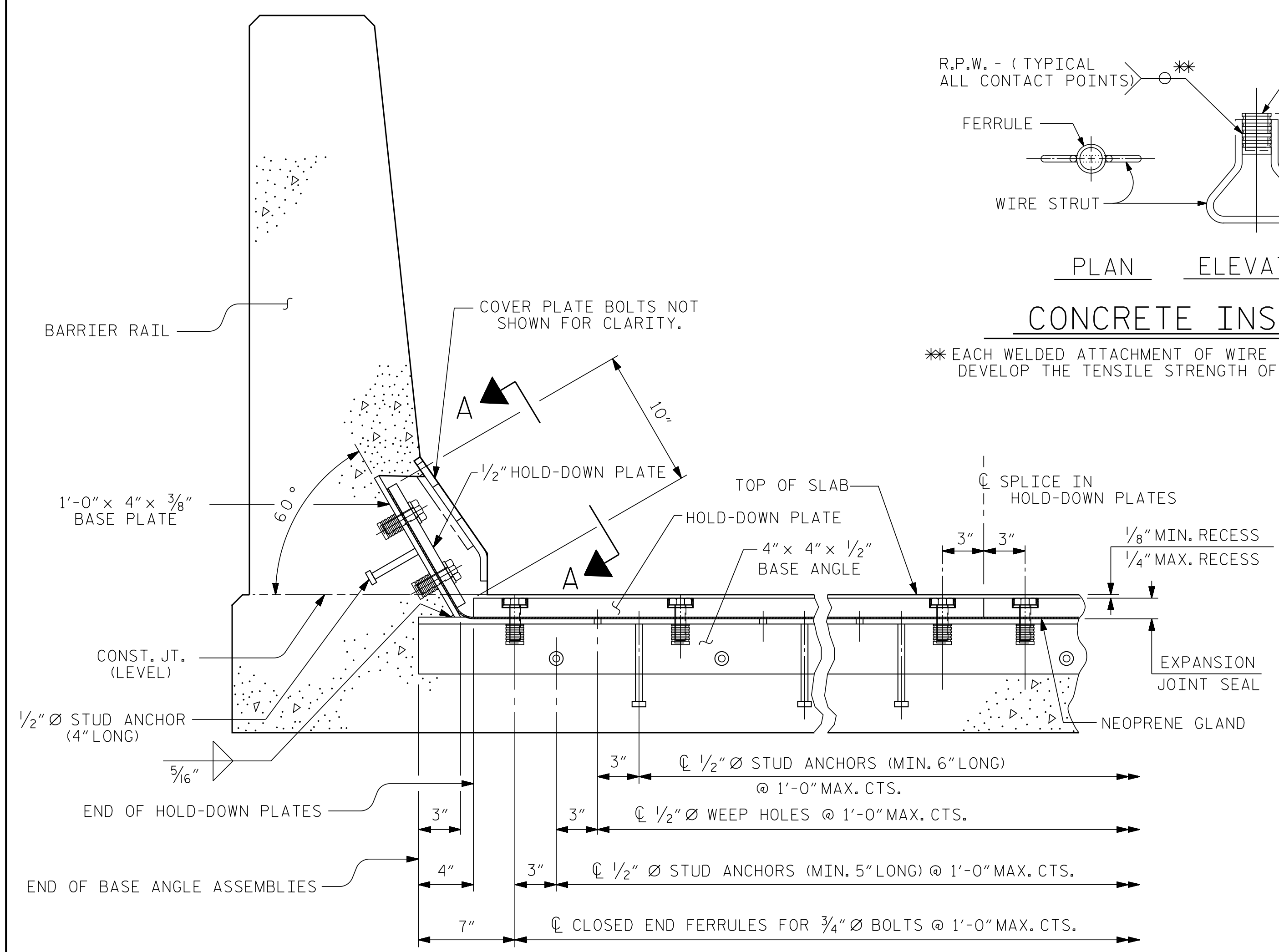
PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
24+61.99 -FLY-
 SHEET 1 OF 2

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

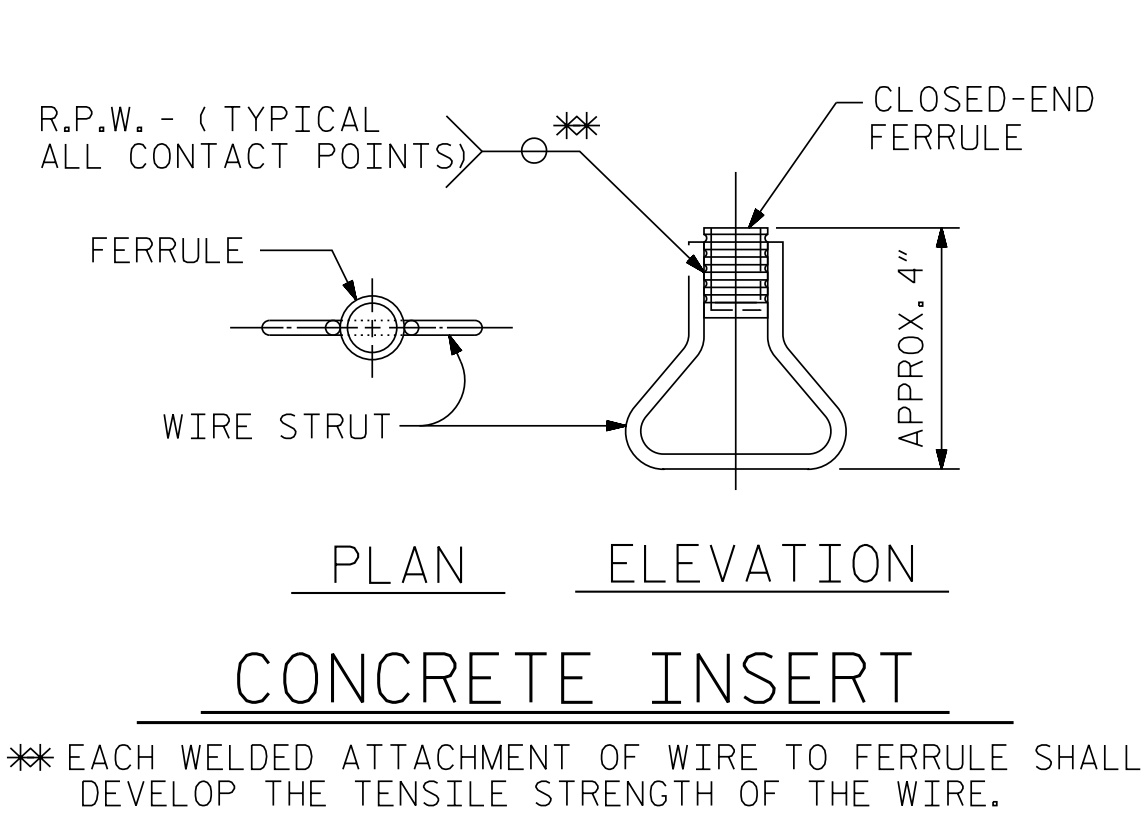


ASSEMBLED BY : MAF	DATE : 9/20/15
CHECKED BY : HLW	DATE : 9/20/15
DRAWN BY : REK 9/87	REV. 5/7/03R FWW/JTE
CHECKED BY : CRK 10/87	REV. 5/1/06R TLA/GM
	REV. 10/1/11 MAA/GM

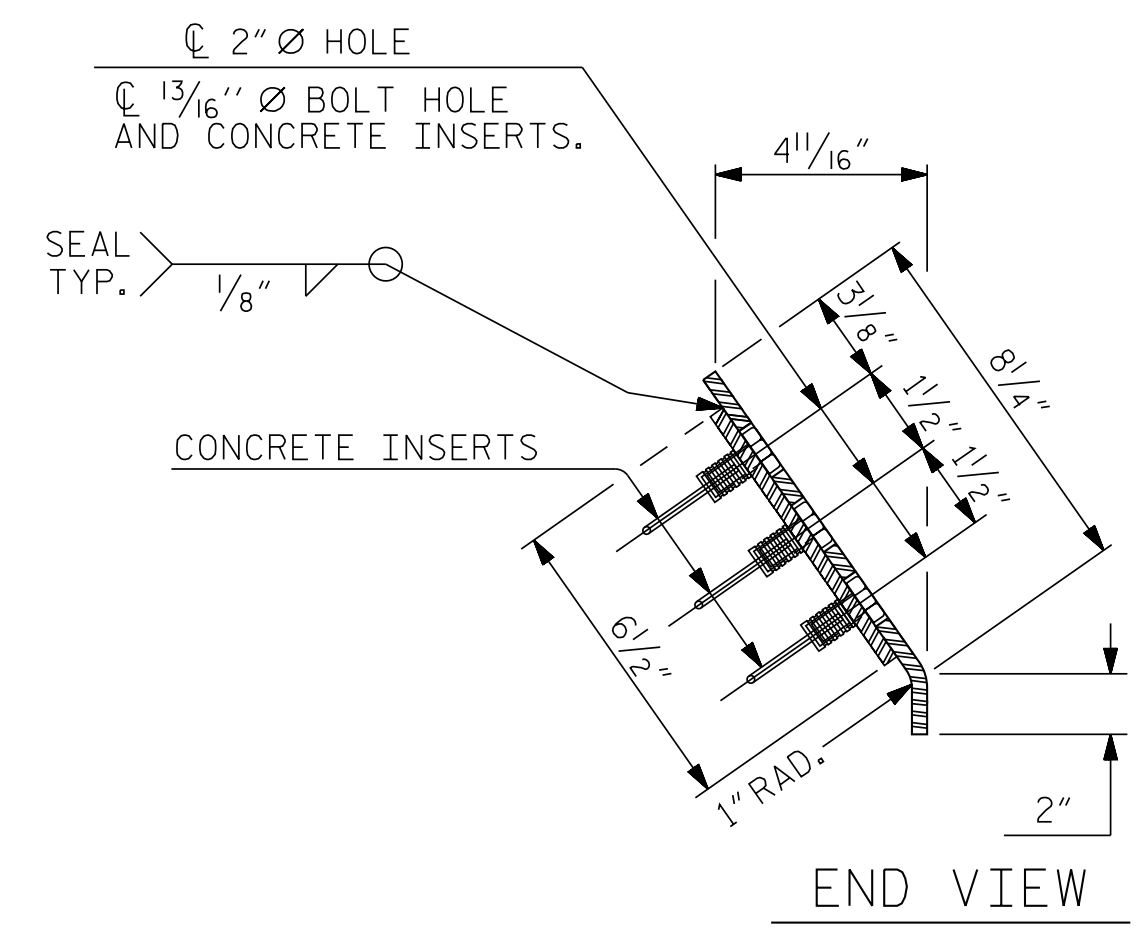
REVISIONS						SHEET NO. S- TOTAL SHEETS
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			26
2			4			



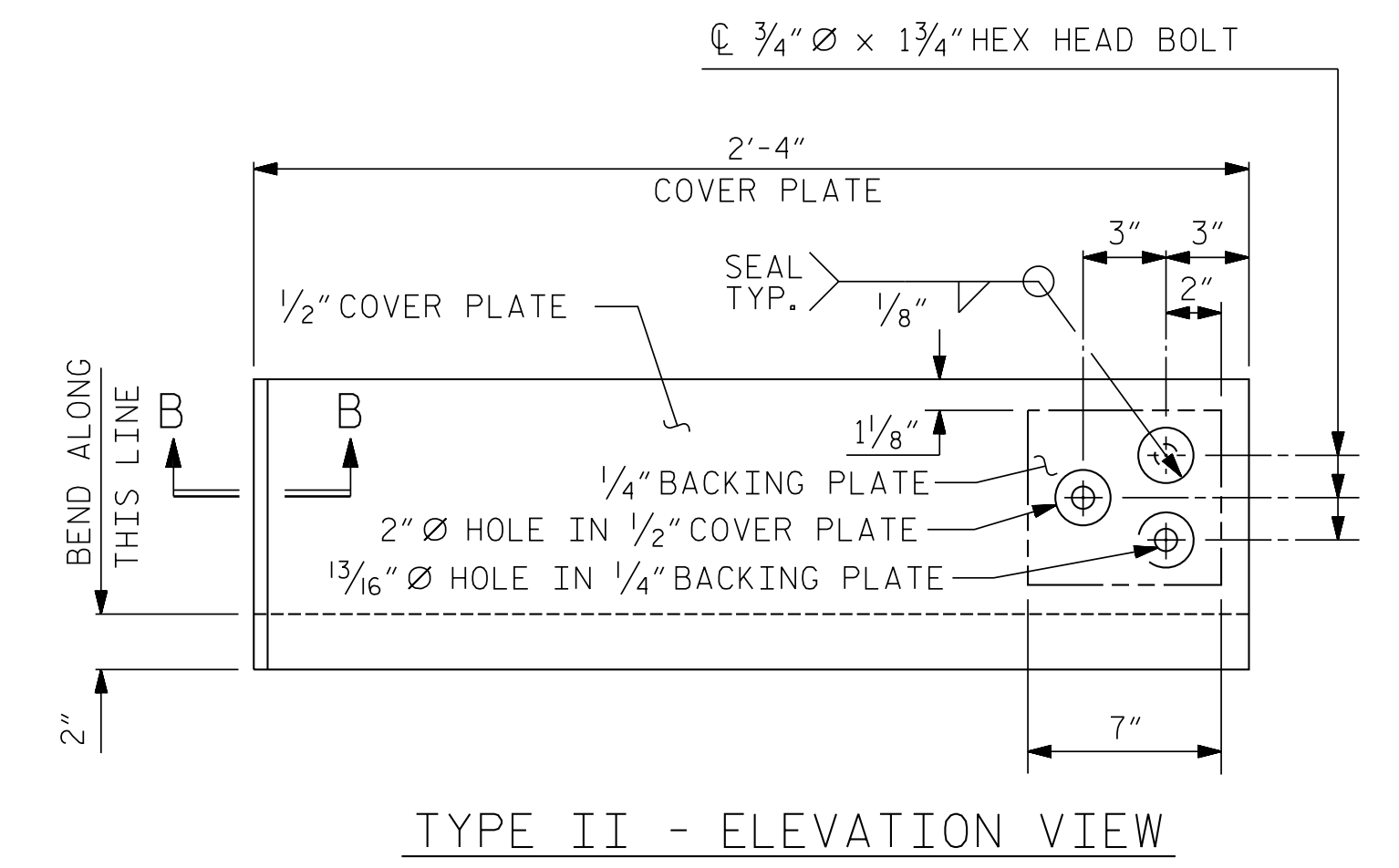
SECTION THRU RAIL NORMAL TO JOINT



CONCRETE INSERT

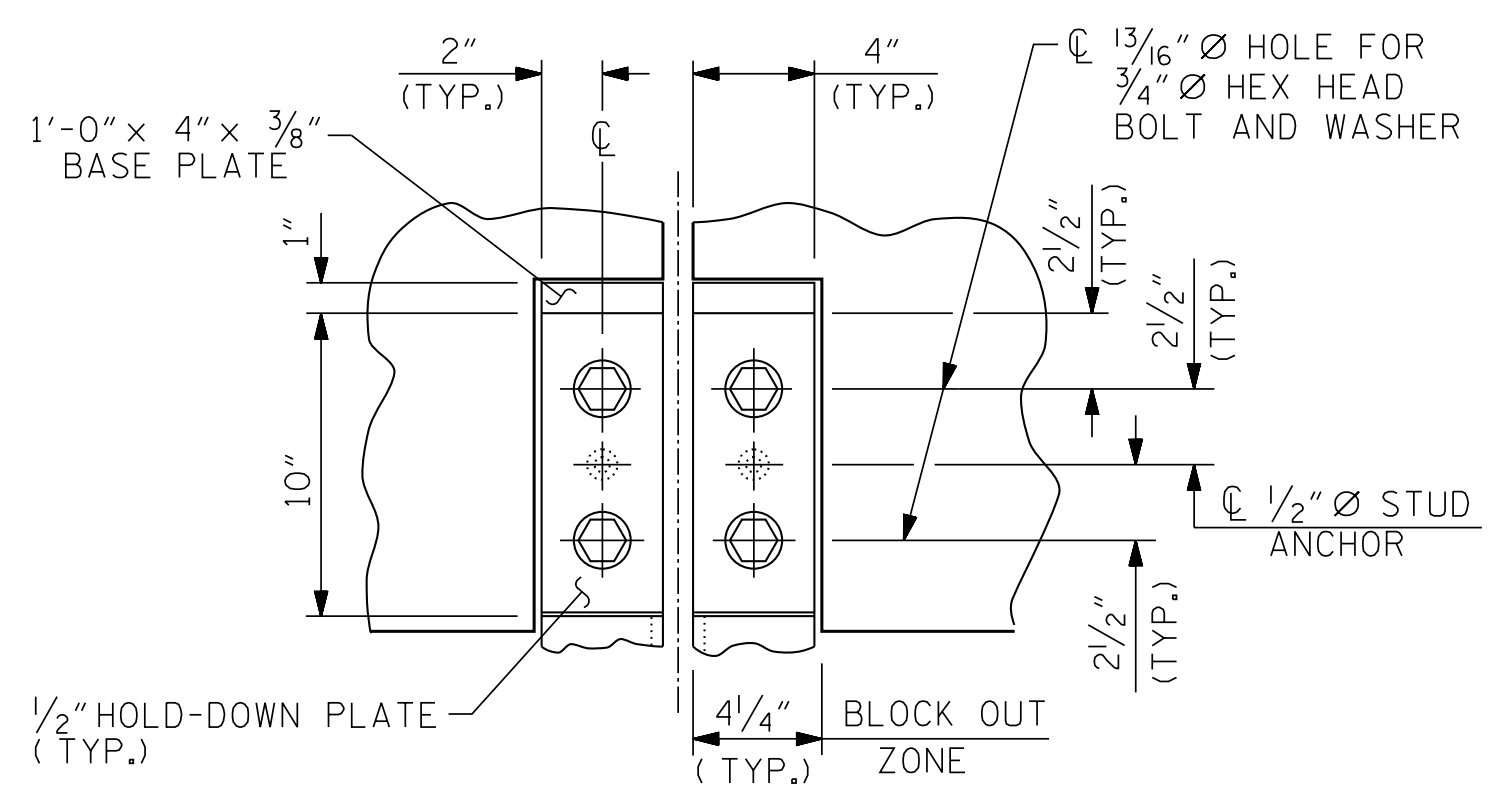


END VIEW

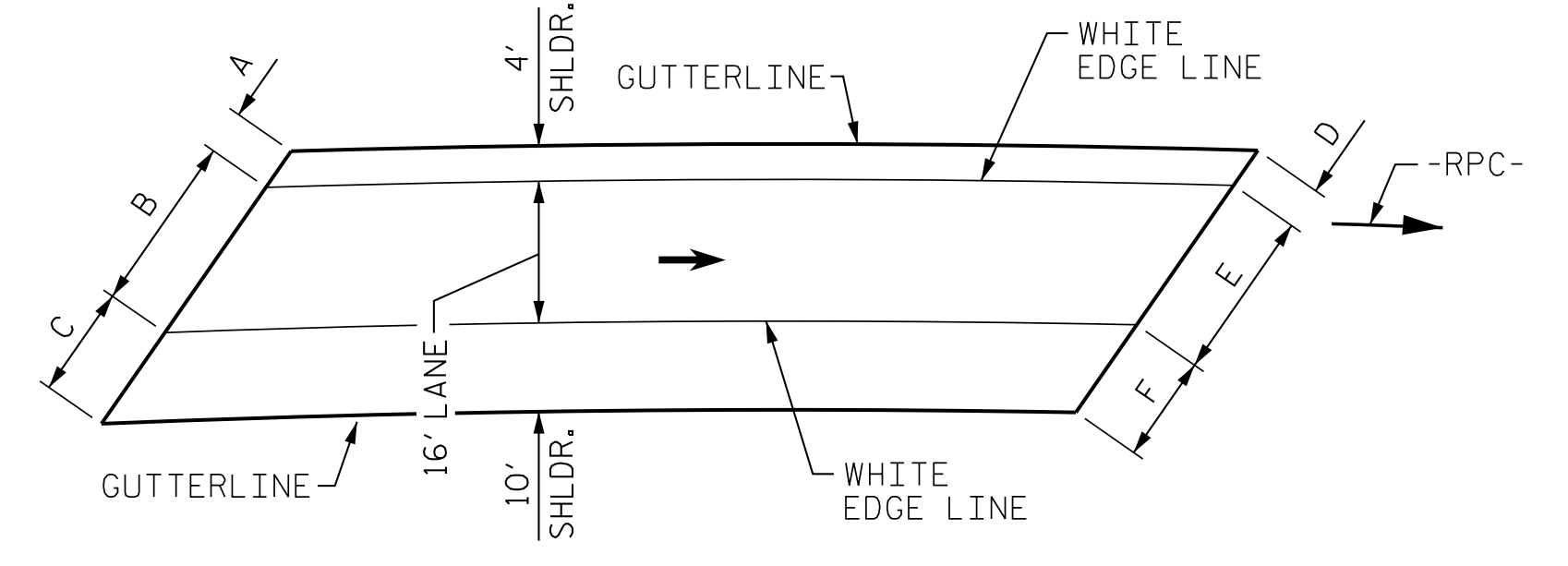


TYPE II - ELEVATION VIEW

COVER PLATE DETAILS

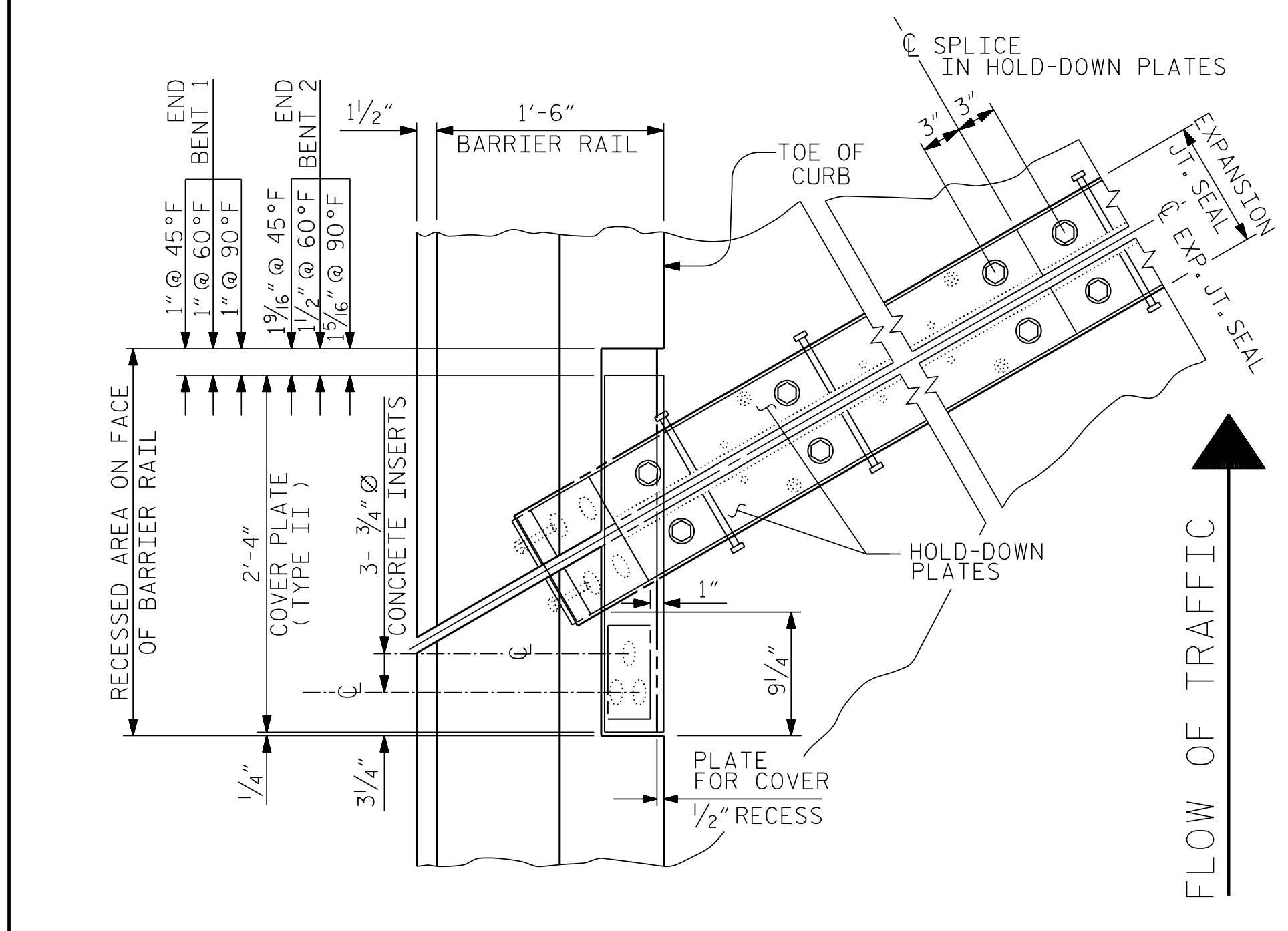


SECTION A - A

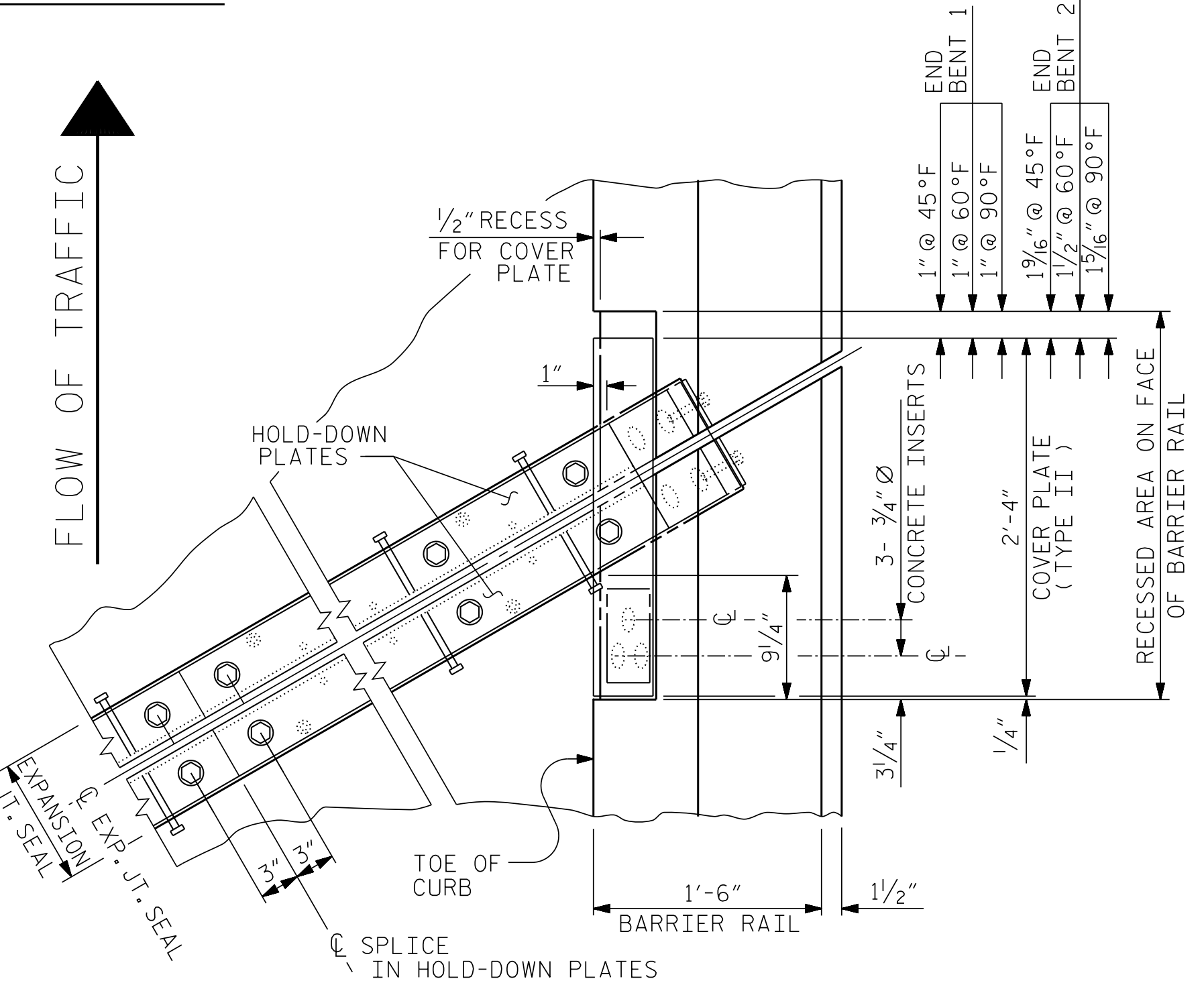


PAVEMENT MARKING ALIGNMENT

TABLE OF LETTERED DIMENSIONS					
A	B	C	D	E	F
4'-11 3/4"	19'-11 1/16"	12'-6 5/16"	4'-9 3/8"	19'-2 1/16"	12'-0 1/4"

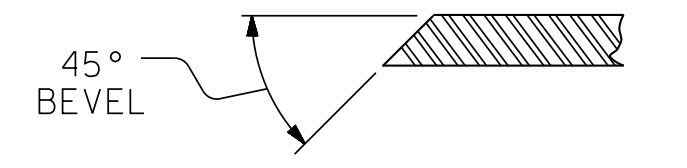


PLAN OF EXPANSION JOINT SEAL



BLOCK OUT DETAIL

SEE "SECTION A - A" FOR OTHER DETAILS.



SECTION B - B

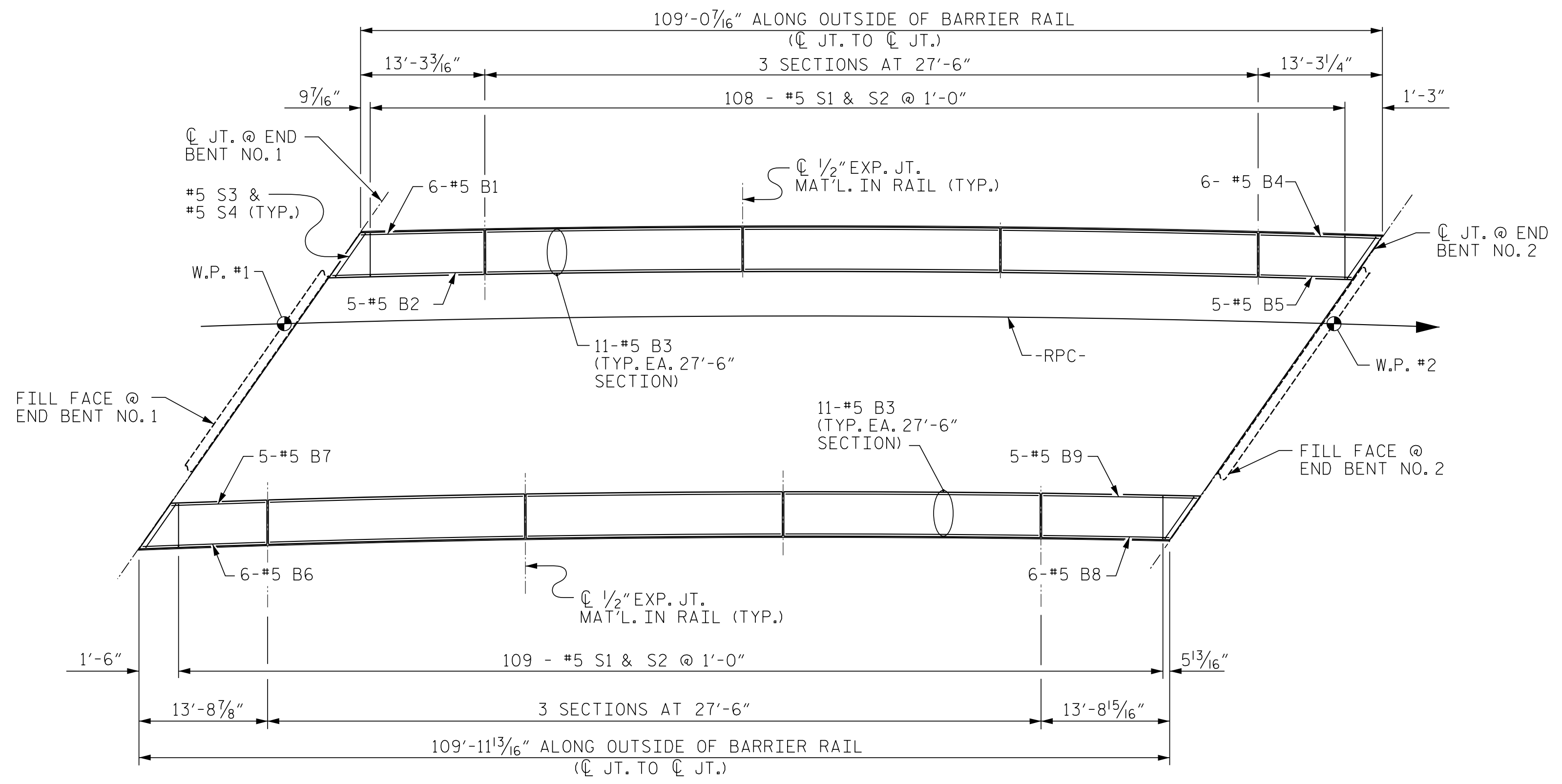
PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
 24+61.99 -FLY-
 SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 EXPANSION JOINT
 SEAL DETAILS
 FOR BARRIER RAIL

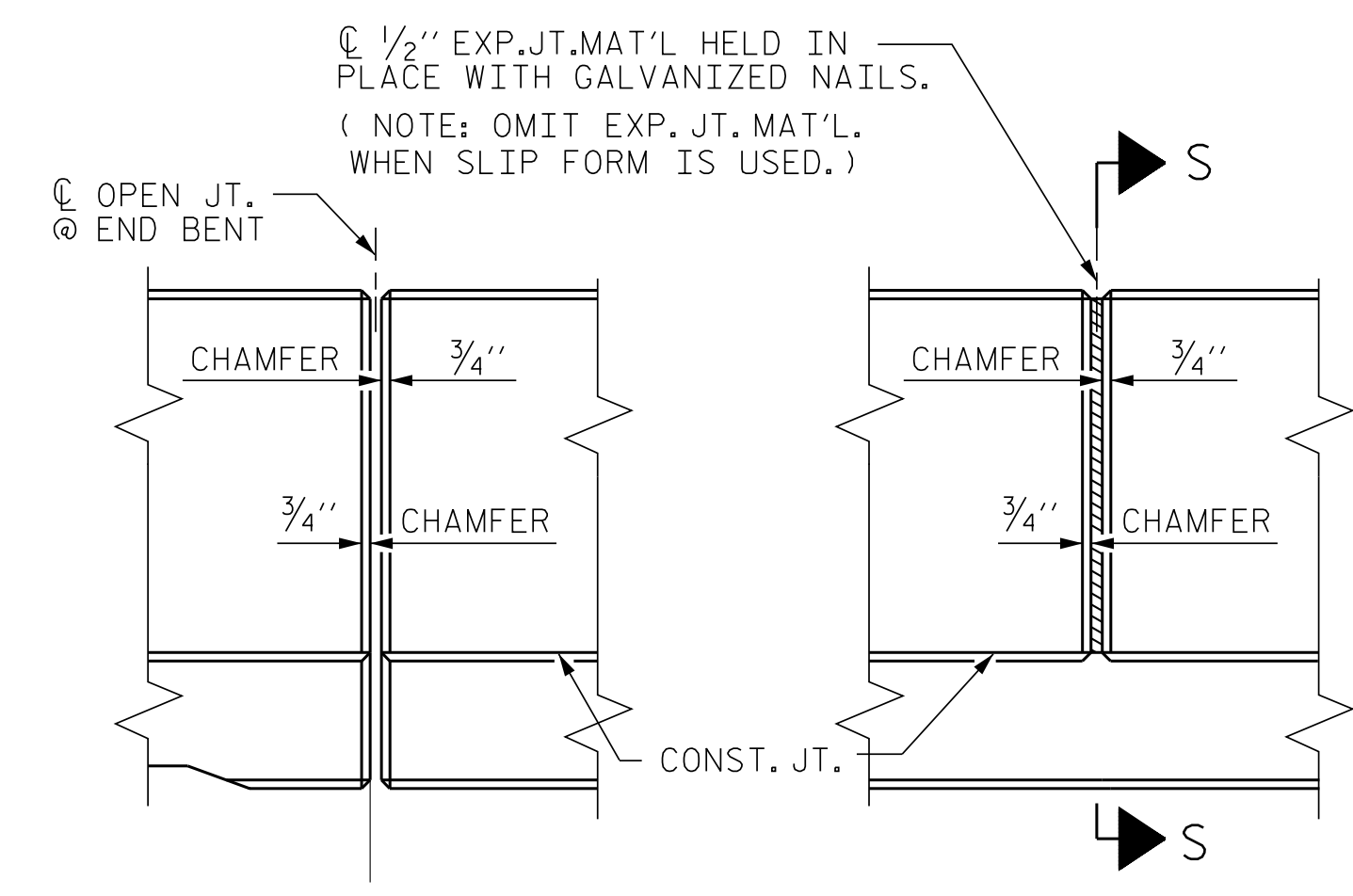
ASSEMBLED BY : MAF
 CHECKED BY : HLW
 DATE : 9/2015
 DATE : 9/2015
 DRAWN BY : REK 9/87
 CHECKED BY : CRK 10/87
 REV. 10/1/11
 REV. 7/12
 REV. 6/13
 MAA/GM
 MAA/GM
 MAA/GM

8/15/2019
 NORTH CAROLINA
 PROFESSIONAL
 SEAL
 20777
 HARDY L. WILSON
 ENGINEER

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



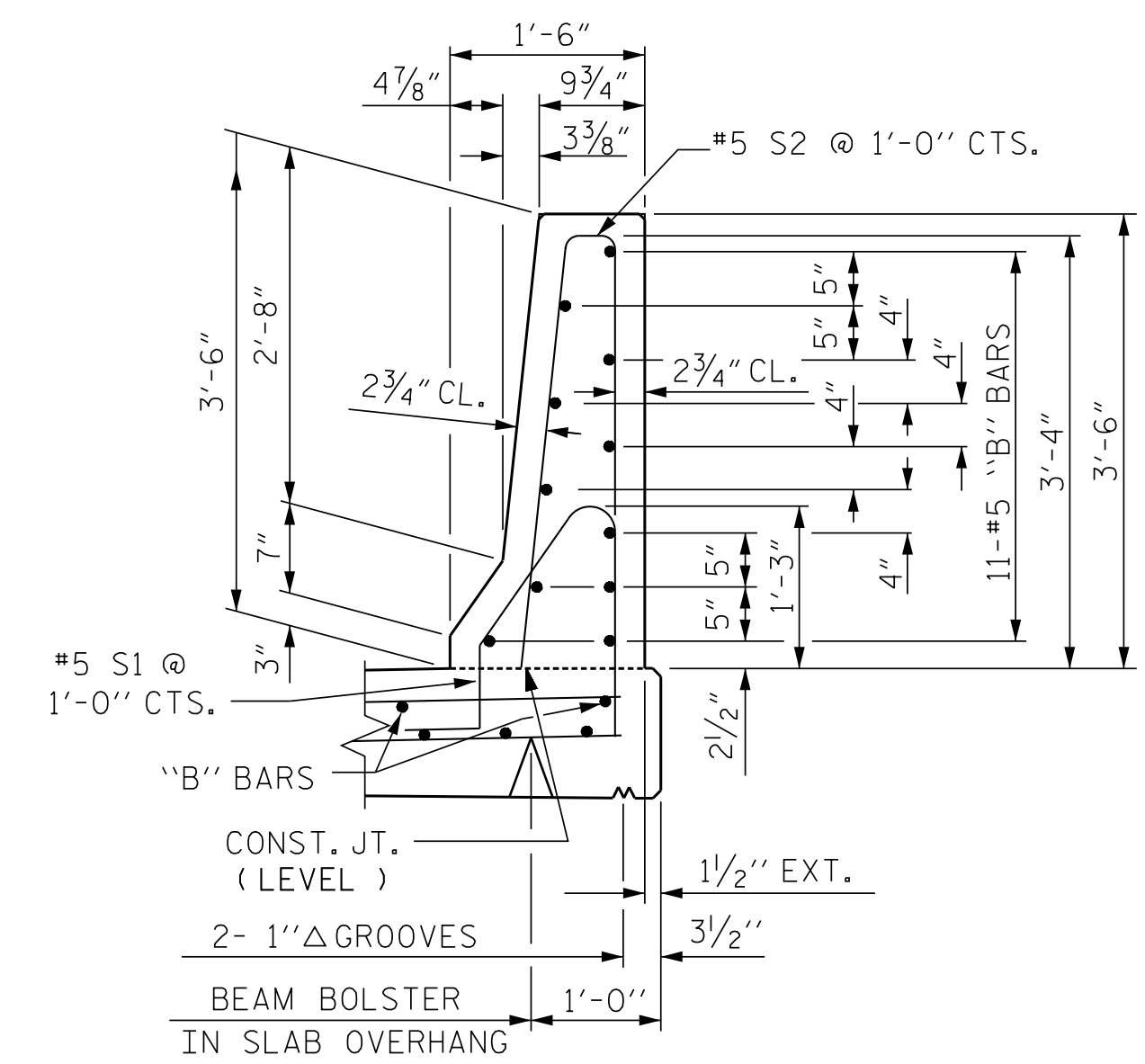
PLAN



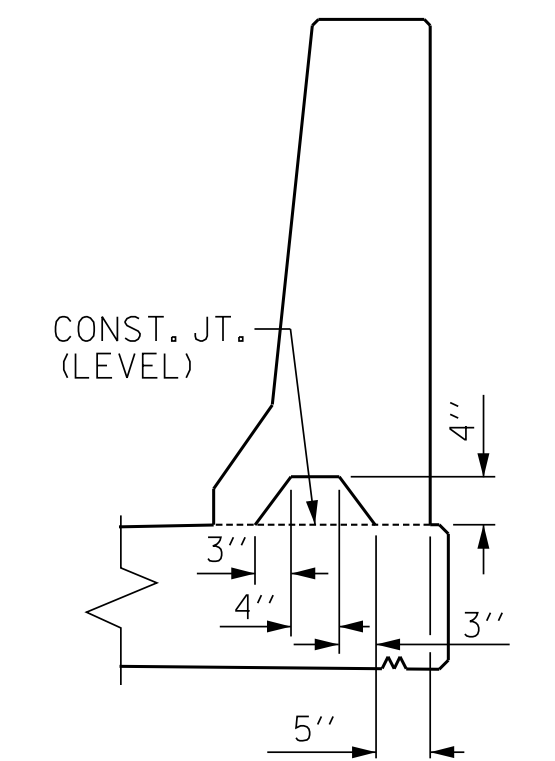
ELEVATION AT EXPANSION JOINTS
BARRIER RAIL DETAILS

NOTES

THE BARRIER RAIL IN THE 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.

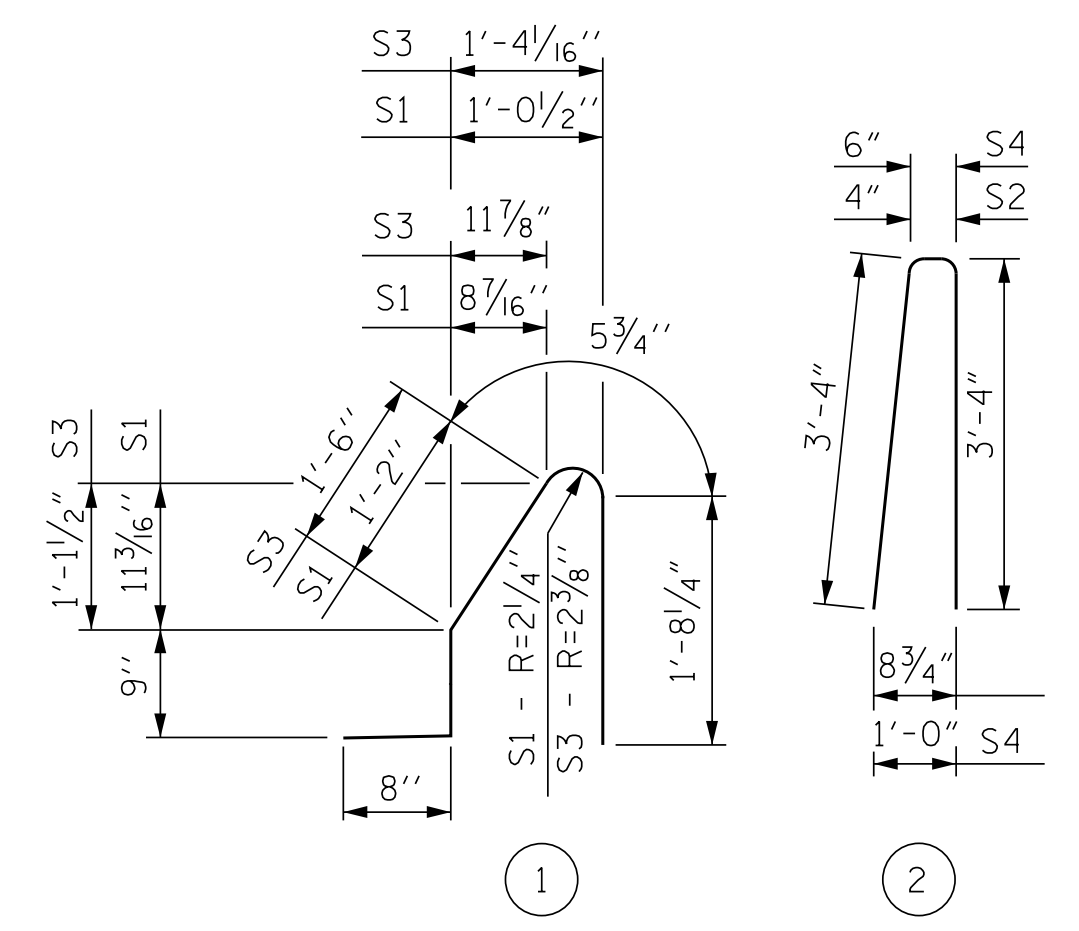


SECTION THRU RAIL



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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

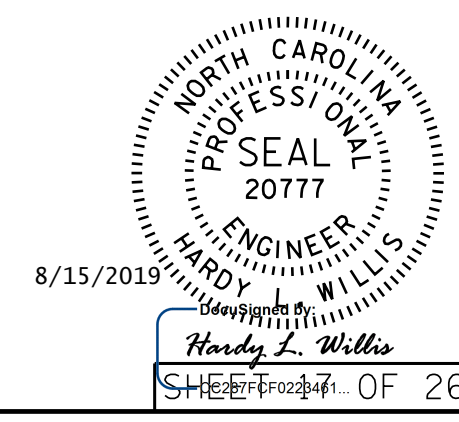
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	6	#5	STR	12'-11"	81
* B2	5	#5	STR	13'-10"	72
* B3	66	#5	STR	27'-1"	1864
* B4	6	#5	STR	12'-9"	80
* B5	5	#5	STR	12'-0"	63
* B6	6	#5	STR	13'-2"	82
* B7	5	#5	STR	12'-4"	64
* B8	6	#5	STR	13'-5"	85
* B9	5	#5	STR	14'-3"	74
* S1	217	#5	1	4'-9"	1075
* S2	217	#5	2	7'-0"	1584
* S3	4	#5	1	5'-1"	21
* S4	4	#5	2	7'-2"	30

* EPOXY COATED REINFORCING STEEL 5175 LBS.
CLASS AA CONCRETE 29.8 CU. YDS.
CONCRETE BARRIER RAIL BRIDGE 219.0 LIN. FT.
● APPROACH SLABS 40.0 LIN. FT.
TOTAL 259.0 LIN. FT.

● FOR EPOXY COATED REINFORCING STEEL AND CLASS AA CONCRETE IN BARRIER RAIL ON APPROACH SLABS, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET.

PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 11+47.77 -RPC-
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
CONCRETE
BARRIER RAIL



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

ASSEMBLED BY : MAF	DATE : 9/2015	MAA/GM
CHECKED BY : RTS	DATE : 9/2015	MAA/GM
DRAWN BY : ARB 5/87	REV. 10/1/11	MAA/GM
CHECKED BY : SJD 9/87	REV. 7/12	MAA/GM
	REV. 6/13	MAA/GM

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.)

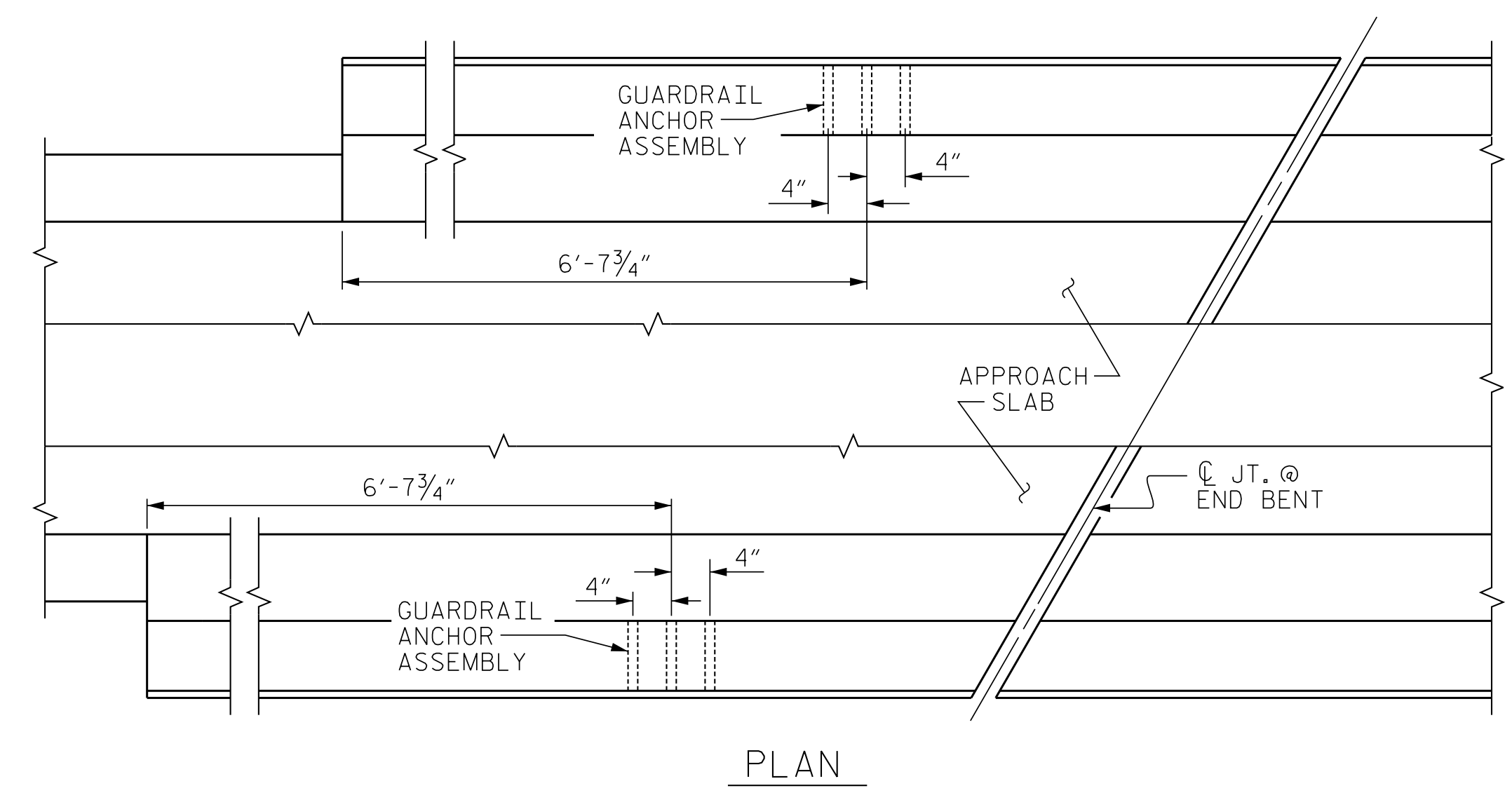
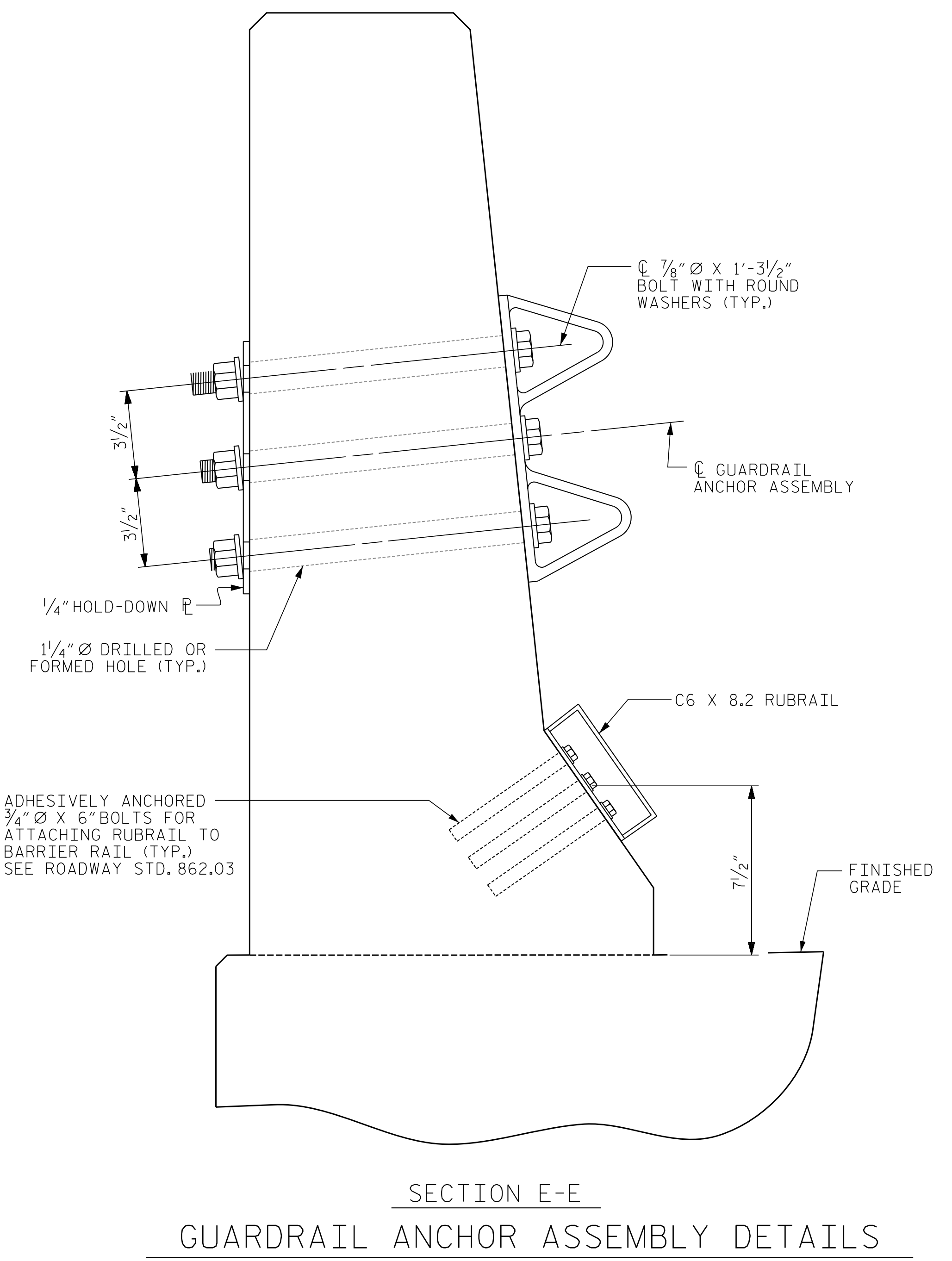
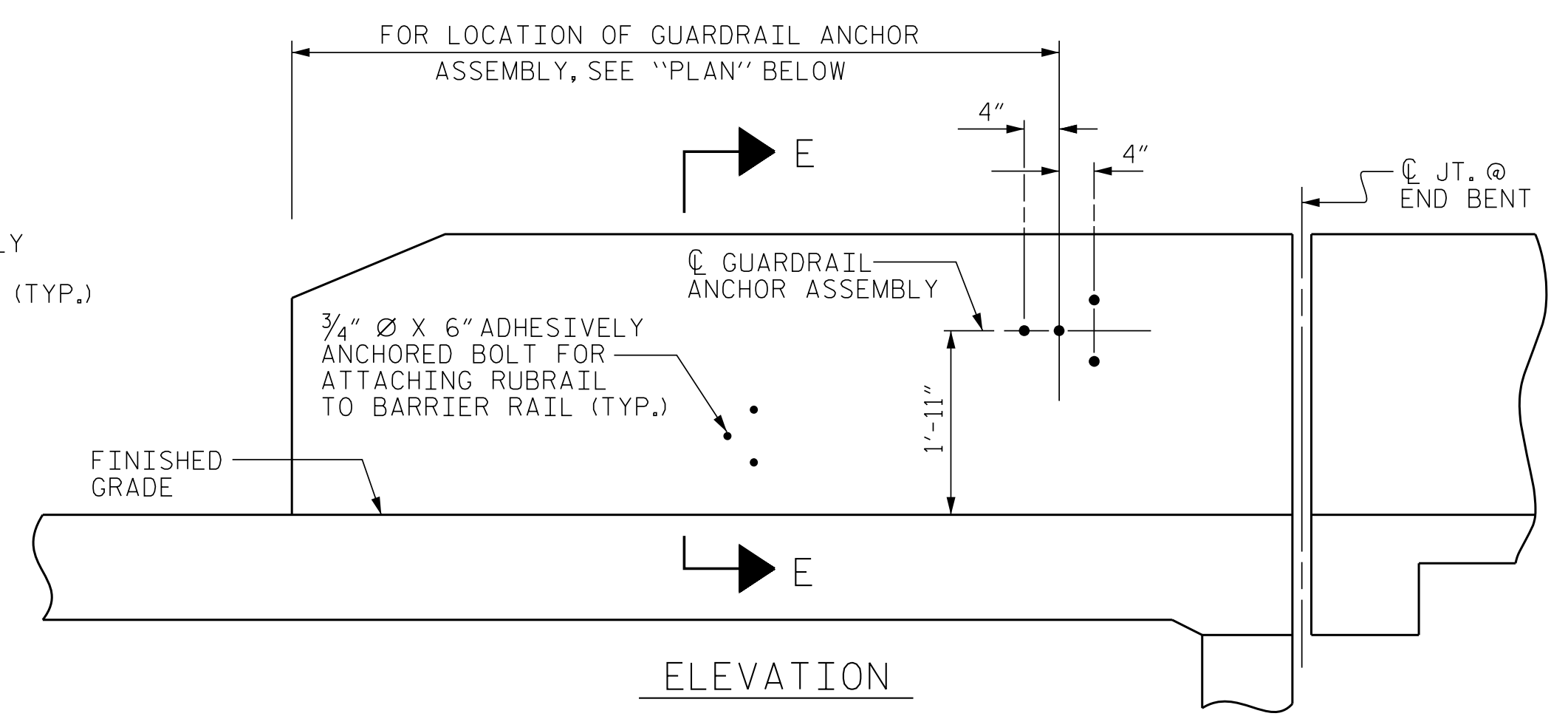
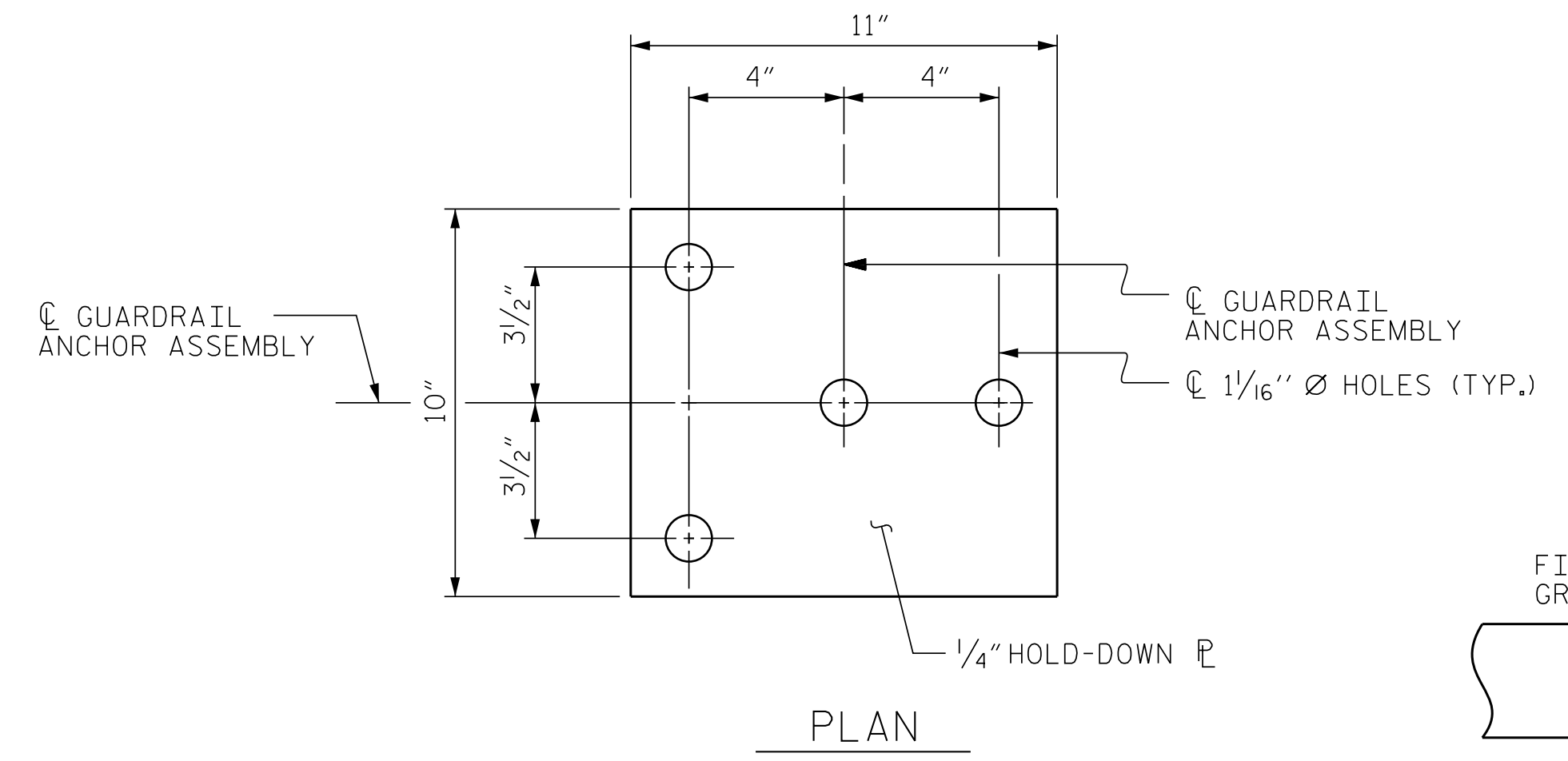
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

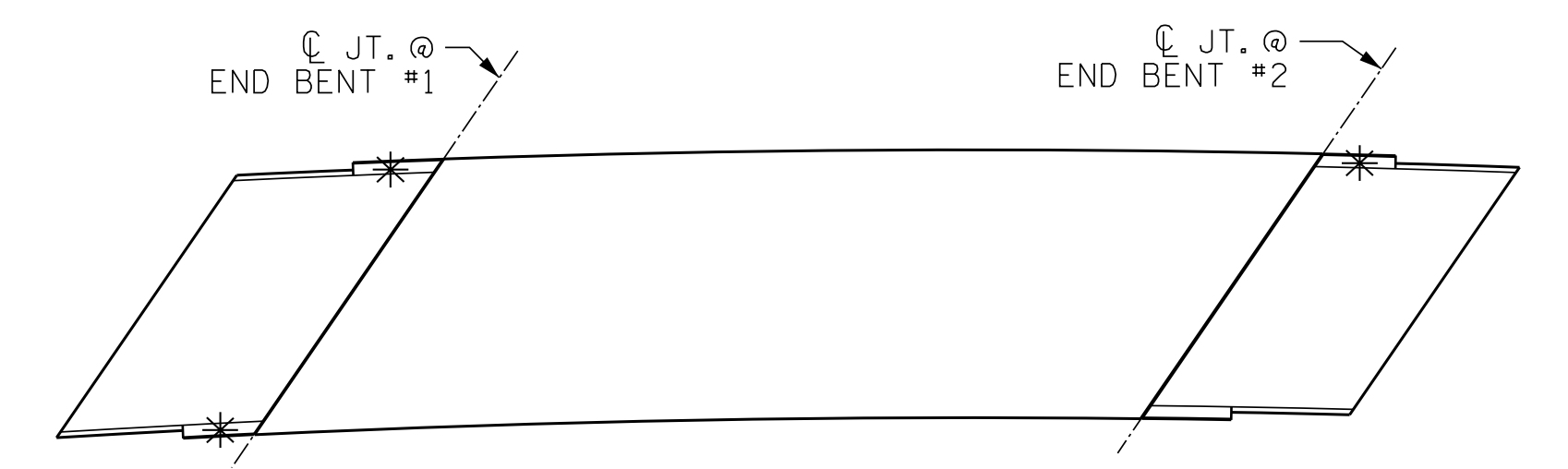
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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.



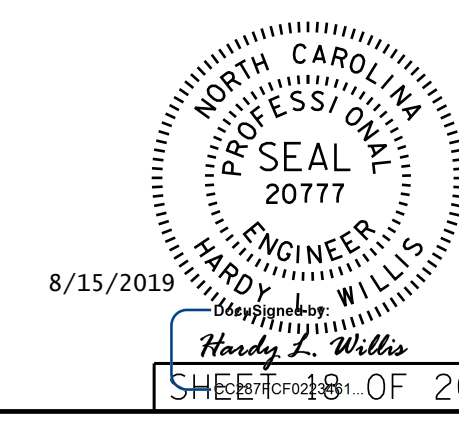
LOCATION OF ANCHORS FOR GUARDRAIL

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



PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 GUARDRAIL ANCHORAGE
 FOR BARRIER RAIL



ASSEMBLED BY : MAF	DATE : 9/2015	MAA/GM
CHECKED BY : HLW	DATE : 9/2015	MAA/GM
DRAWN BY : TLA 5/06	REV. 10/11/11	MAA/GM
CHECKED BY : GM 5/06	REV. 7/12	MAA/GM
	REV. 6/13	MAA/GM

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

BILL OF MATERIAL

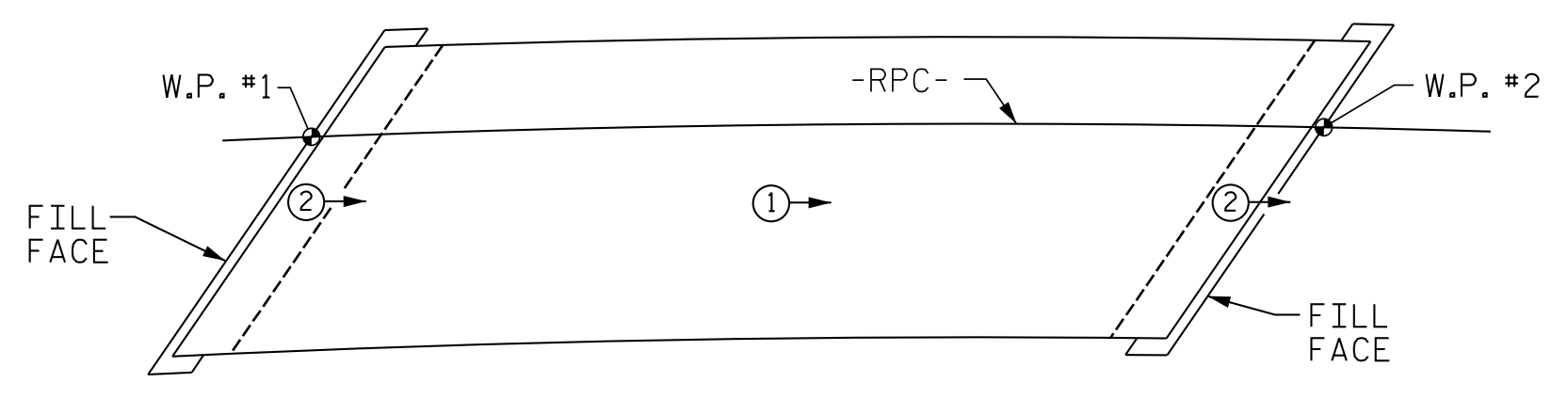
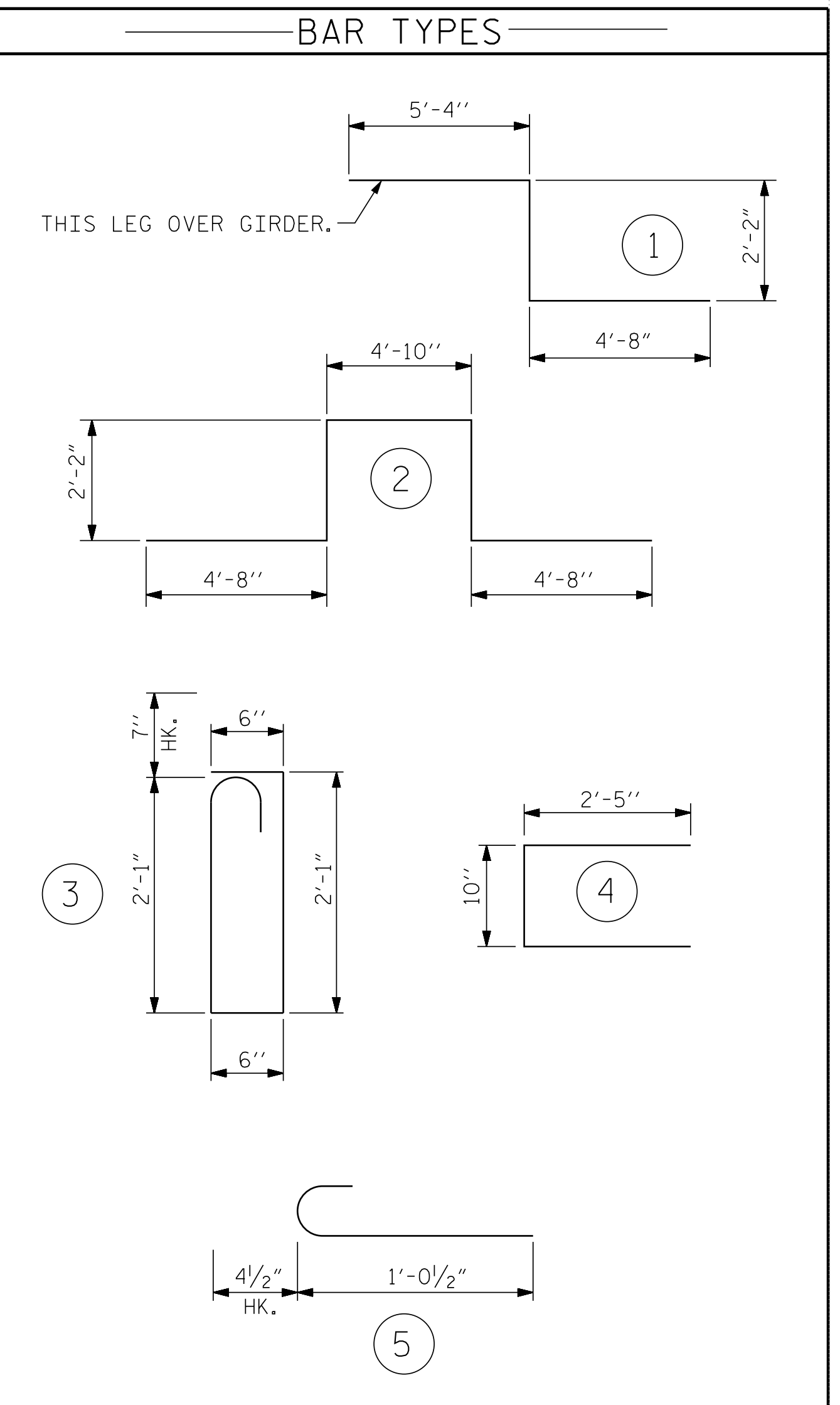
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
* A1	138	#5	STR	32'-11"	4738	* B1	88	#4	STR	28'-11"	1700	
A2	138	#5	STR	32'-11"	4738	B2	56	#5	STR	55'-11"	3266	
						* B11	3	#4	STR	26'-4"	53	
* A101	3	#5	STR	30'-3"	95	* B12	1	#4	STR	29'-6"	20	
* A102	3	#5	STR	27'-7"	86	B21	2	#5	STR	31'-6"	66	
* A103	3	#5	STR	25'-0"	78	B22	1	#5	STR	24'-3"	25	
* A104	3	#5	STR	22'-4"	70							
* A105	3	#5	STR	19'-9"	62	* G1	1	#5	STR	41'-1"	43	
* A106	3	#5	STR	17'-1"	53	* G2	1	#5	STR	39'-5"	41	
* A107	3	#5	STR	14'-6"	45							
* A108	3	#5	STR	11'-10"	37	* J1	74	#5	⑤	1'-5"	109	
* A109	3	#5	STR	9'-3"	29							
* A110	3	#5	STR	6'-8"	21	* K1	8	#8	①	12'-2"	260	
* A111	3	#5	STR	4'-0"	13	* K2	8	#8	②	18'-6"	395	
* A112	1	#5	STR	3'-2"	3	* K3	18	#6	STR	6'-2"	167	
* A113	1	#5	STR	2'-4"	2							
* A114	3	#5	STR	30'-8"	96	* S1	36	#4	④	5'-8"	136	
* A115	3	#5	STR	28'-0"	88	* S2	36	#5	③	5'-9"	216	
* A116	3	#5	STR	25'-3"	79	REINFORCING STEEL					9,281	LBS.
* A117	3	#5	STR	22'-7"	71	* EPOXY COATED REINF. STEEL					9,064	LBS.
* A118	3	#5	STR	19'-10"	62	TOTAL REINFORCING STEEL					18,345	LBS.
* A119	3	#5	STR	17'-1"	53							
* A120	3	#5	STR	14'-4"	45							
* A121	3	#5	STR	11'-8"	37							
* A122	3	#5	STR	8'-11"	28							
* A123	3	#5	STR	6'-2"	19							
* A124	3	#5	STR	3'-5"	11							
* A125	1	#5	STR	2'-6"	3							
A201	3	#5	STR	30'-3"	95							
A202	3	#5	STR	27'-7"	86							
A203	3	#5	STR	25'-0"	78							
A204	3	#5	STR	22'-4"	70							
A205	3	#5	STR	19'-9"	62							
A206	3	#5	STR	17'-1"	53							
A207	3	#5	STR	14'-6"	45							
A208	3	#5	STR	11'-10"	37							
A209	3	#5	STR	9'-3"	29							
A210	3	#5	STR	6'-8"	21							
A211	3	#5	STR	4'-0"	13							
A212	1	#5	STR	3'-2"	3							
A213	1	#5	STR	2'-4"	2							
A214	3	#5	STR	30'-8"	96							
A215	3	#5	STR	28'-0"	88							
A216	3	#5	STR	25'-3"	79							
A217	3	#5	STR	22'-7"	71							
A218	3	#5	STR	19'-10"	62							
A219	3	#5	STR	17'-1"	53							
A220	3	#5	STR	14'-4"	45							
A221	3	#5	STR	11'-8"	37							
A222	3	#5	STR	8'-11"	28							
A223	3	#5	STR	6'-2"	19							
A224	3	#5	STR	3'-5"	11							
A225	1	#5	STR	2'-6"	3							

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

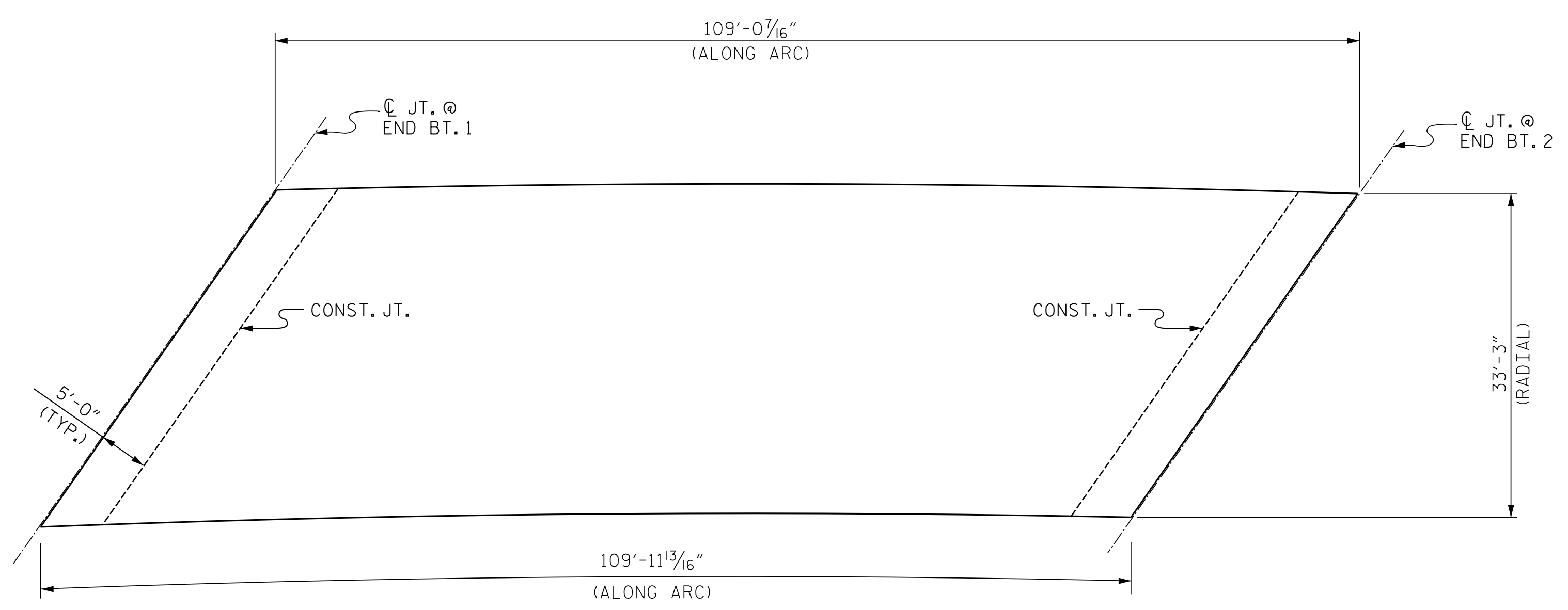
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

GROOVING BRIDGE FLOORS

APPROACH SLABS	1347	SQ.FT.
BRIDGE DECK	2951	SQ.FT.
TOTAL	4298	SQ.FT.



POURING SEQUENCE



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 3,641)

ALL BAR DIMENSIONS ARE OUT TO OUT

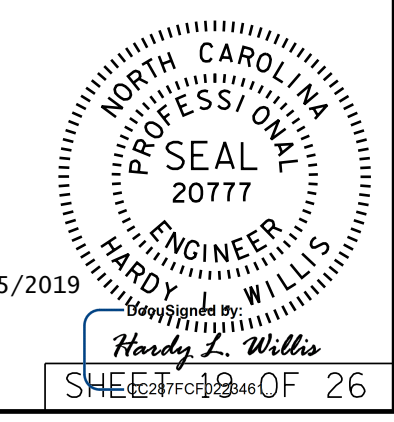
SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
SPAN "A"	120.2	9,281	9,064
TOTALS**	120.2	9,281	9,064

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED.

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
 24+61.99 -FLY-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD SUPERSTRUCTURE BILL OF MATERIAL

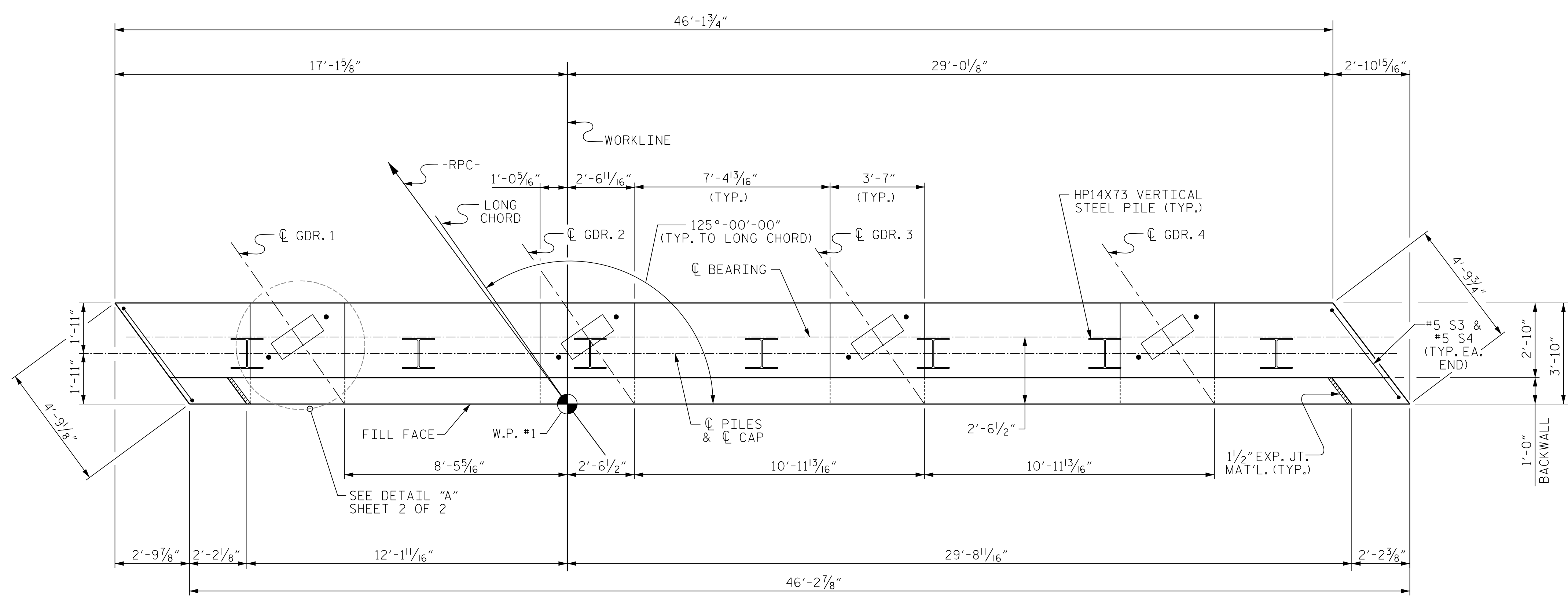


REVISIONS						SHEET NO. S-
NO.	BY:	DATE:	NO.	BY:	DATE:	
1			3			TOTAL SHEETS
2			4			

ASSEMBLED BY : MAF	DATE : 9/2015
CHECKED BY : HLW	DATE : 9/2015
DRAWN BY : JMB 5/87	REV. 8/16/99 RWW/LES
CHECKED BY : SJD 9/87	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

8/15/2019
 SHEET 19 OF 26

STR. #5 STD. NO. BOM2



NOTES:

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

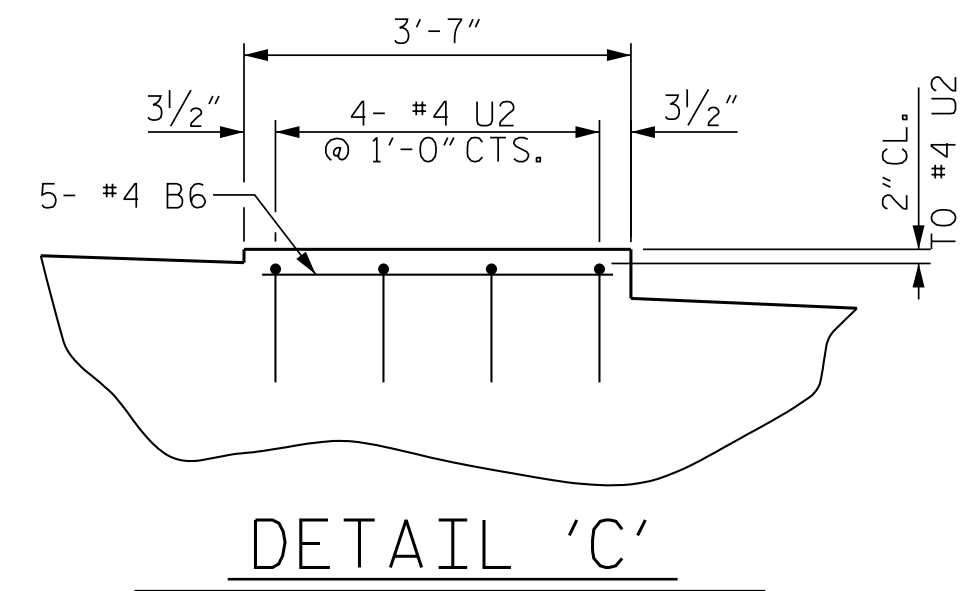
BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

THE TOP SURFACE OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANCE CURING COMPOUND METHOD SHALL NOT BE USED.

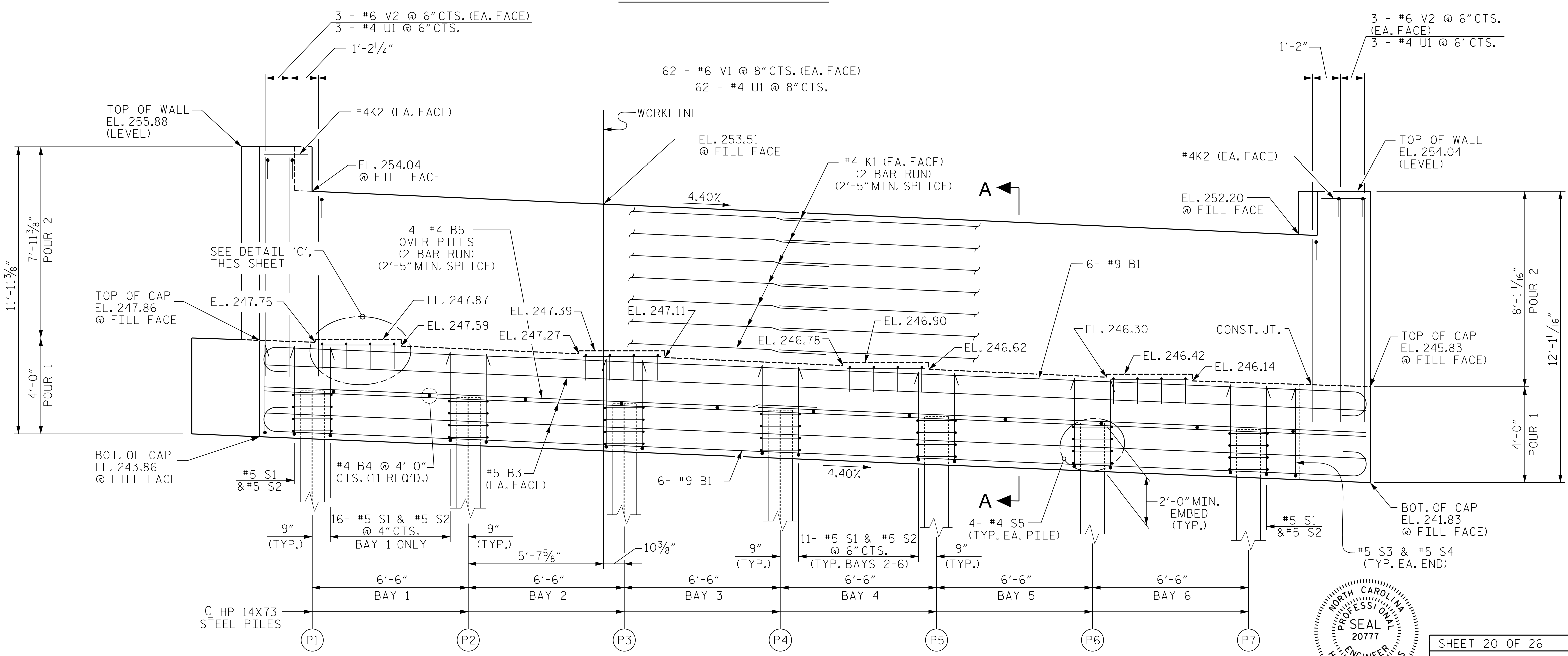
THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.

CONCRETE PILE COLLARS ARE NOT NECESSARY AT THIS END BENT, SINCE THE PILES ARE BEHIND AN MSE RETAINING WALL.

FOR MSE RETAINING WALLS, SEE SPECIAL PROVISIONS.



TOP OF PILE ELEVATIONS			
①	245.76	⑤	244.61
②	245.47	⑥	244.33
③	245.18	⑦	244.04
④	244.90		



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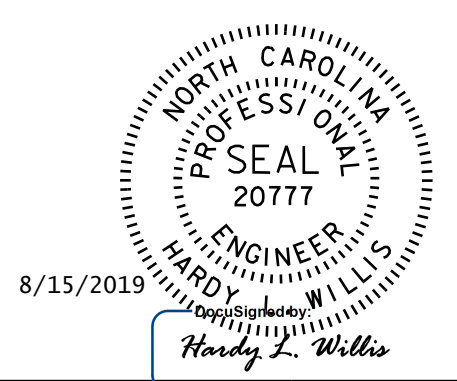
- Boone, NC 828-355-9933
- Tri-Cities, TN 423-467-8400
- Knoxville, TN 865-546-5800
- Spartanburg, SC 864-574-4775
- Charleston, SC 843-974-5650
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PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
24+61.99 -FLY-
 SHEET 1 OF 2

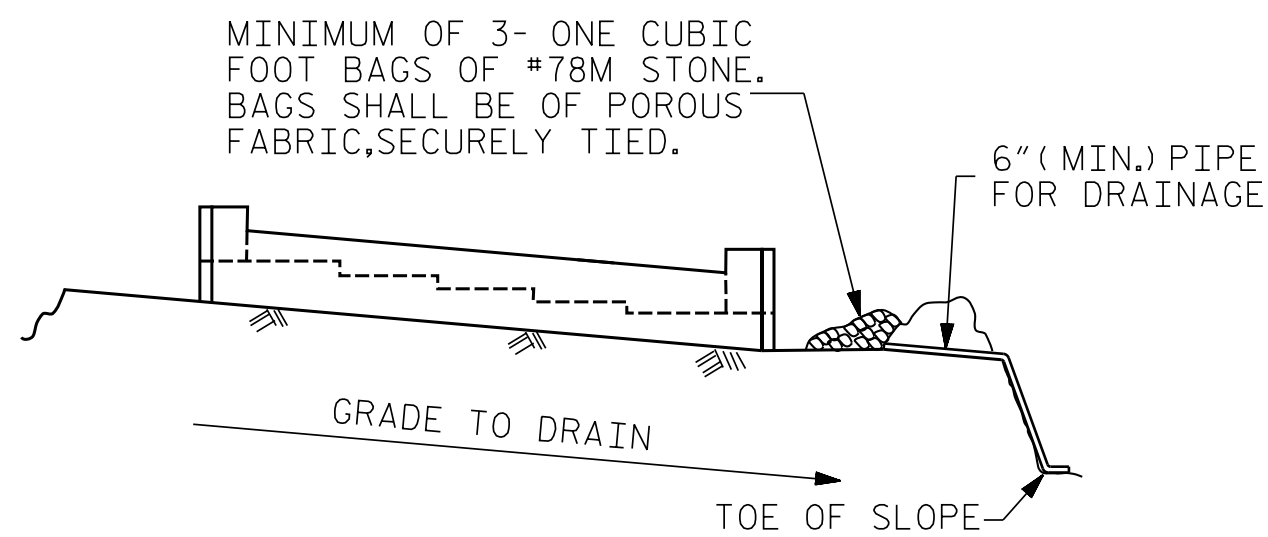
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

END BENT NO. 1



SHEET 20 OF 26		NO.		BY:		DATE:	
DWN. BY: MAF	DATE: 9/15	1		3			
CHKD. BY: HLW	DATE: 9/15	2		4			
DES. EGR. OF RECORD: RTS	DATE: 9/15						

STR. #5

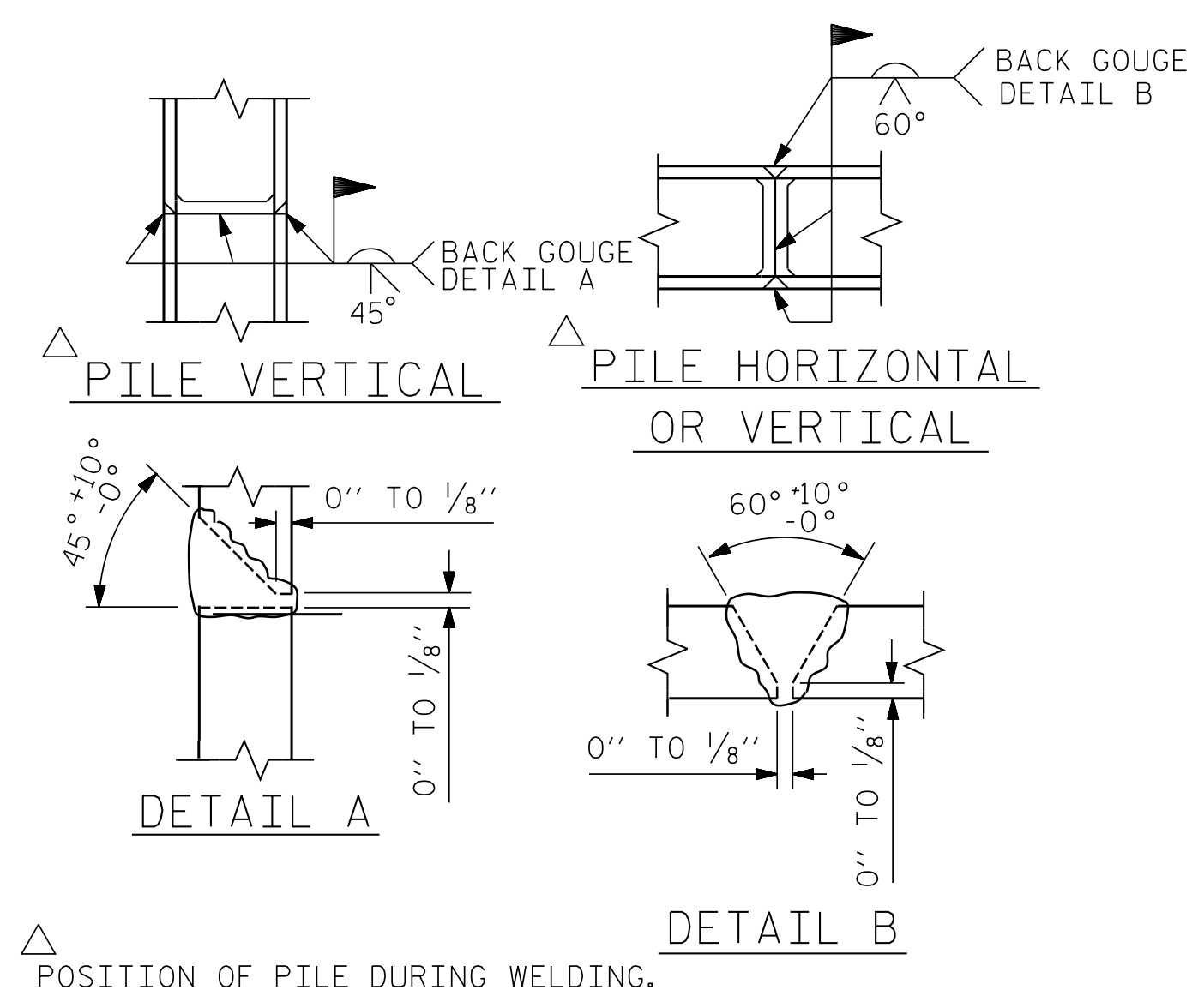


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

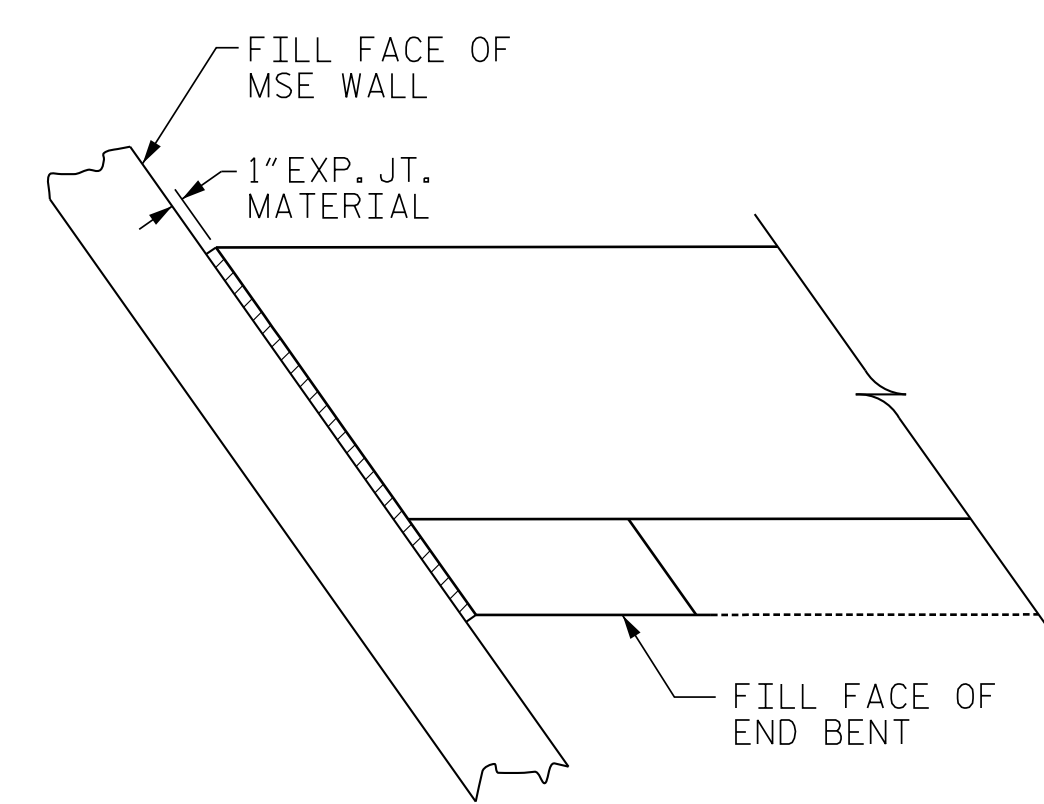
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT

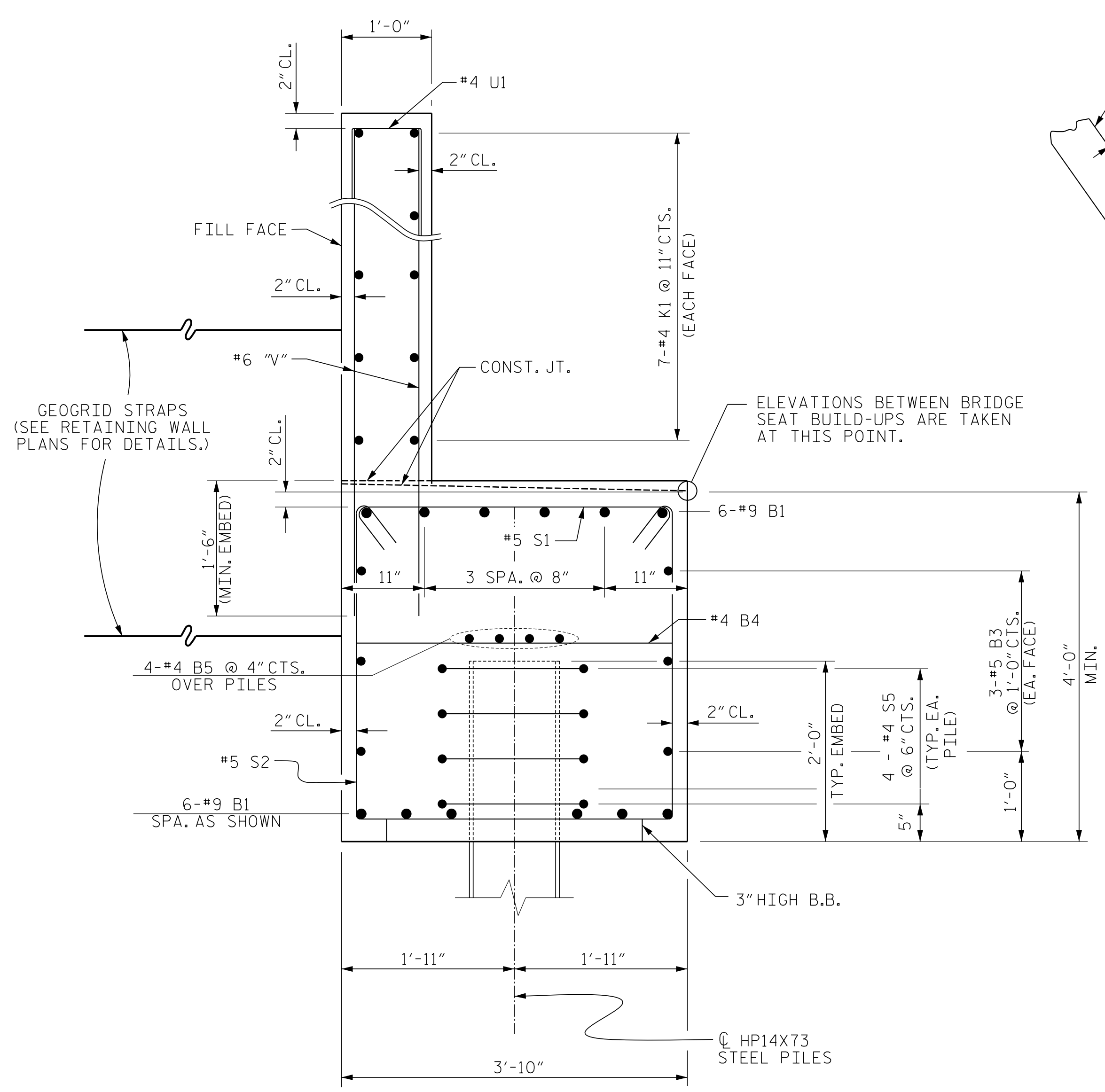


PILE SPLICE DETAILS

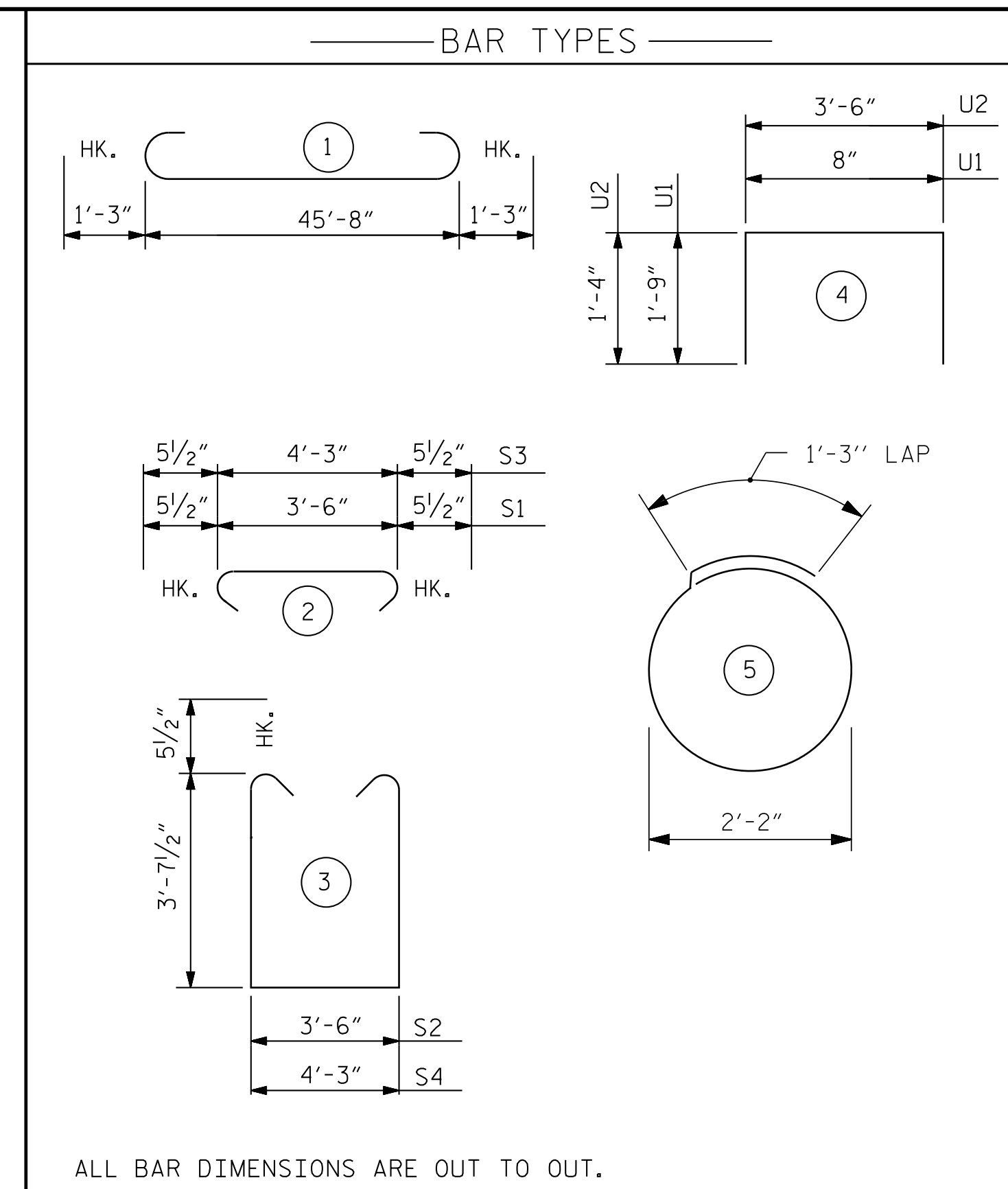


END OF CAP DETAIL

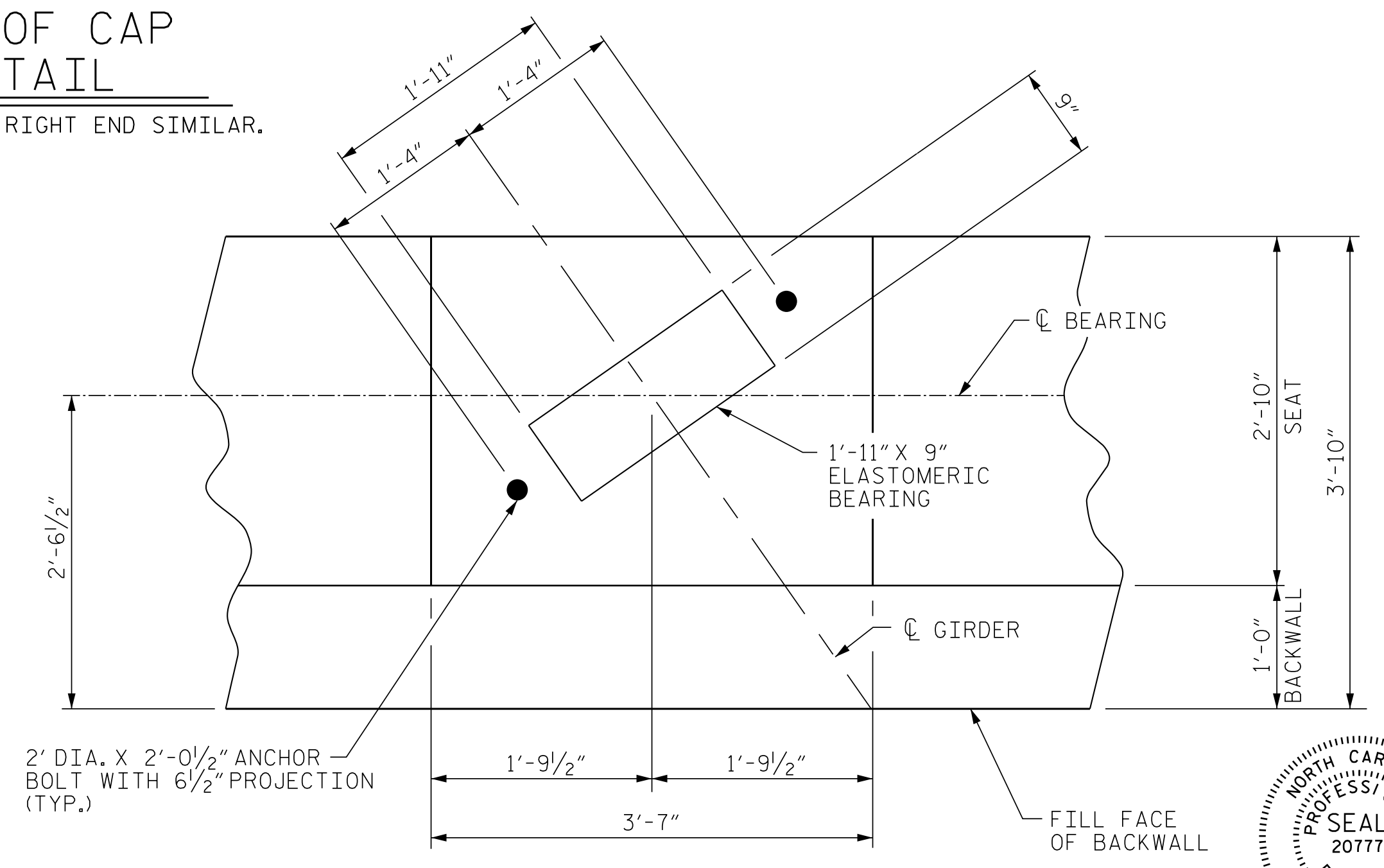
LEFT END SHOWN, RIGHT END SIMILAR.



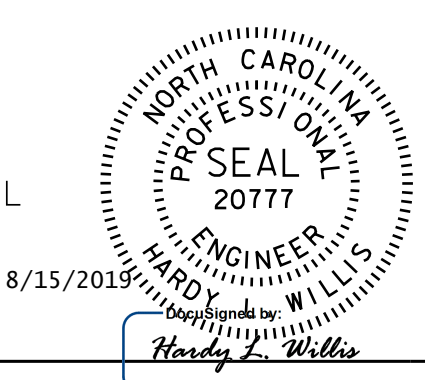
SECTION A-A



ALL BAR DIMENSIONS ARE OUT TO OUT.



DETAIL 'A'



SHEET 21 OF 26

DWN. BY: MAF
CHKD. BY: HLW
DES. EGR. OF RECORD: RTS

DATE: 9/15
DATE: 9/15
DATE: 9/15

BILL OF MATERIAL - END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	①	48'-2"	1965
B3	6	#5	STR	45'-8"	286
B4	11	#4	STR	3'-6"	26
B5	8	#4	STR	24'-2"	129
B6	20	#4	STR	3'-3"	43
K1	28	#4	STR	24'-2"	452
K2	4	#4	STR	1'-9"	5
S1	73	#5	②	4'-5"	336
S2	73	#5	③	11'-8"	888
S3	2	#5	②	5'-2"	11
S4	2	#5	③	12'-5"	26
S5	28	#4	⑤	8'-1"	151
U1	68	#4	④	4'-2"	189
U2	16	#4	④	6'-2"	66
V1	124	#6	STR	7'-9"	1443
V2	12	#6	STR	9'-7"	173

REINFORCING STEEL	= 6,189 LBS.
CLASS A CONCRETE BREAKDOWN	
POUR #1: CAP	= 26.5 C.Y.
POUR #2: BACKWALL	= 11.0 C.Y.
TOTAL CLASS A CONCRETE	= 37.5 C.Y.
HP 14 X 73 STEEL PILES NO: 7	LIN. FT. = 210
STEEL PILE POINTS	7
PILE EXCAVATION	
IN SOIL	LIN. FT. = 10
NOT IN SOIL	LIN. FT. = 60

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- Charleston, SC 843-974-5650
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- Atlanta, GA 770-627-3509
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PROJECT NO. R-3421A
RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
24+61.99 -FLY-
 SHEET 2 OF 2

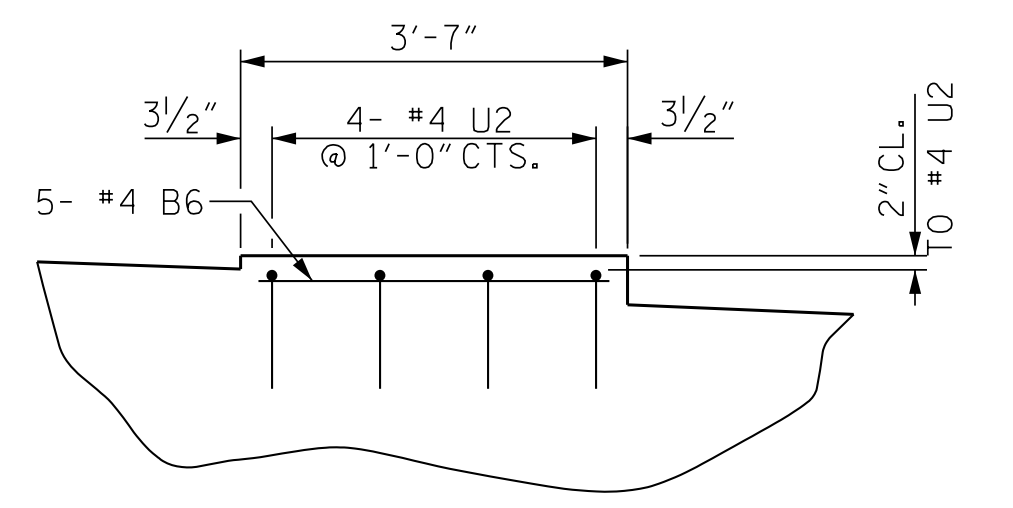
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

END BENT NO. 1

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

SHEET NO. S-
TOTAL SHEETS
STR. #5

NOTES:
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.
 THE TOP SURFACE OF THE END BENT CAPS SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE CURING COMPOUND METHOD SHALL NOT BE USED.
 THE TOP SURFACE OF THE CAP EXCEPT THE BRIDGE SEAT BUILDUPS SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE TO THE BACK FACE AT THE RATE OF 2%.
 CONCRETE PILE COLLARS ARE NOT NECESSARY AT THIS END BENT, SINCE THE PILES ARE BEHIND AN MSE RETAINING WALL.
 FOR MSE RETAINING WALLS, SEE SPECIAL PROVISIONS.



DETAIL 'C'

①	245.10	⑤	243.90
②	244.80	⑥	243.60
③	244.50	⑦	243.30
④	244.20		

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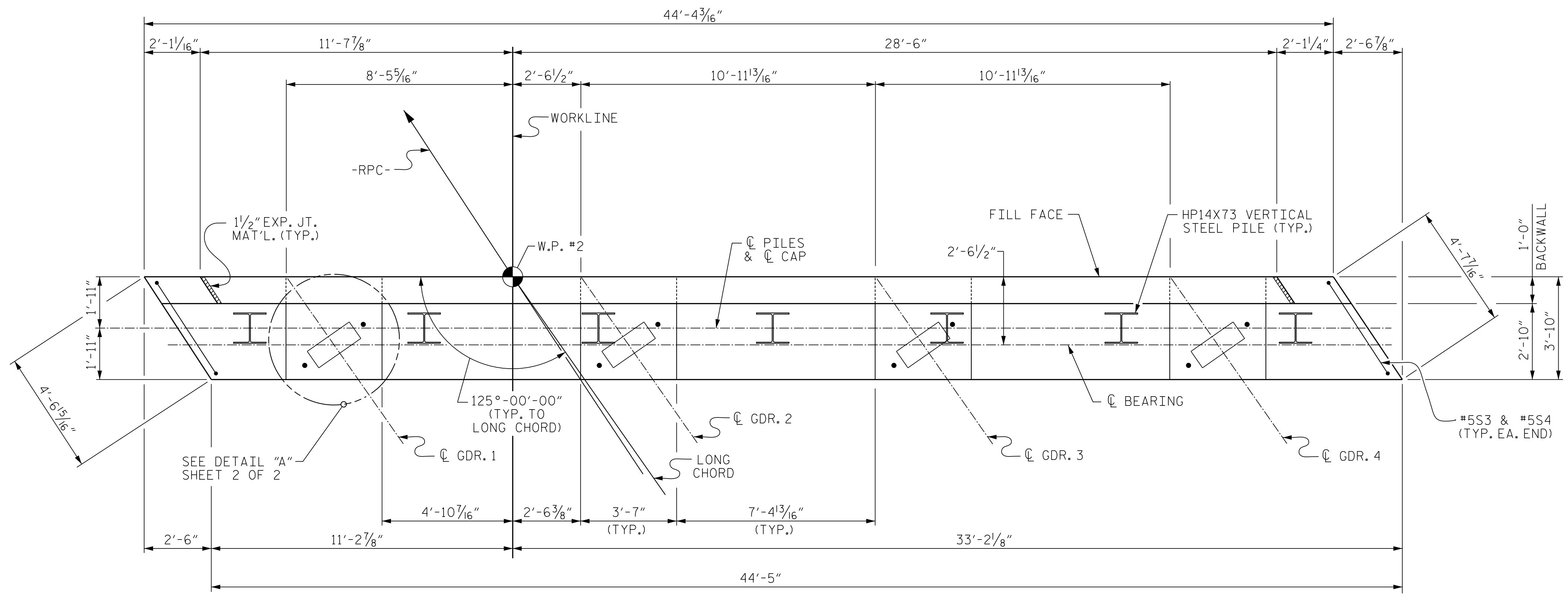
Boone, NC 828-355-9933
 Tri-Cities, TN 423-467-8409
 Knoxville, TN 865-546-5800
 Spartanburg, SC 864-574-4775
 Charleston, SC 843-974-5650
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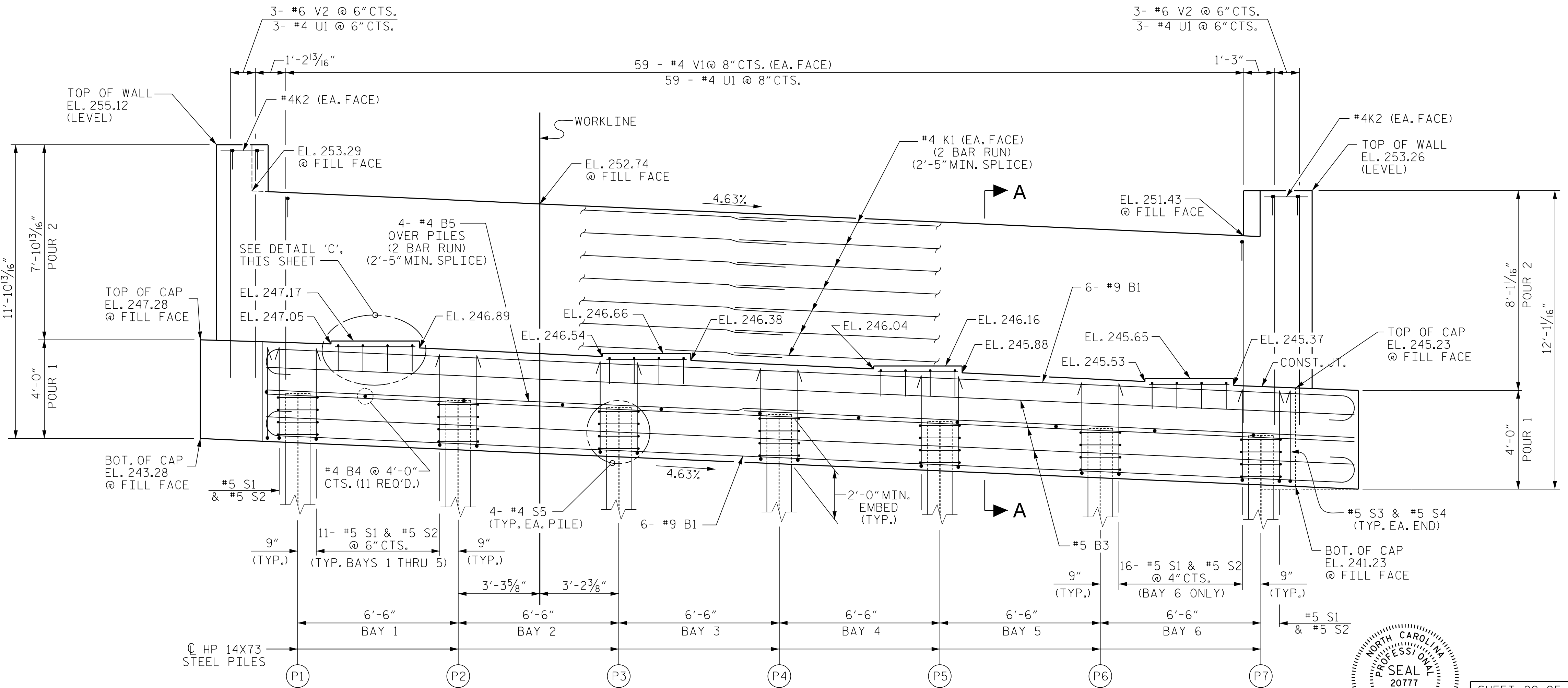
PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
24+61.99 -FLY-
 SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

END BENT NO. 2



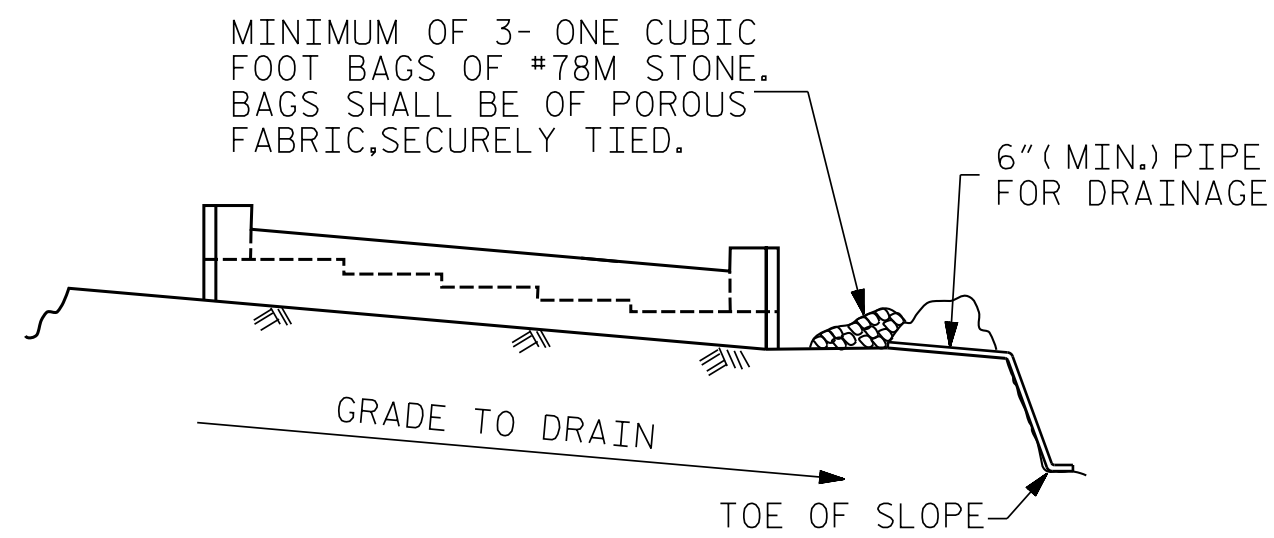
PLAN



ELEVATION

NORTH CAROLINA PROFESSIONAL SEAL
 20777
 ENGINEER
 HARDY WILLIS
 8/15/2019
 Hardy L. Willis
 CC287FC0223461

SHEET 22 OF 26		DATE: 9/15		NO.		REVISIONS		SHEET NO.	
DWN. BY: MAF	DATE: 9/15	NO.	BY:	DATE:	NO.	BY:	DATE:	S-	
CHKD. BY: HLW	DATE: 9/15	①			③			TOTAL SHEETS	
DES. EGR. OF RECORD: RTS	DATE: 9/15	②			④			STR. #5	

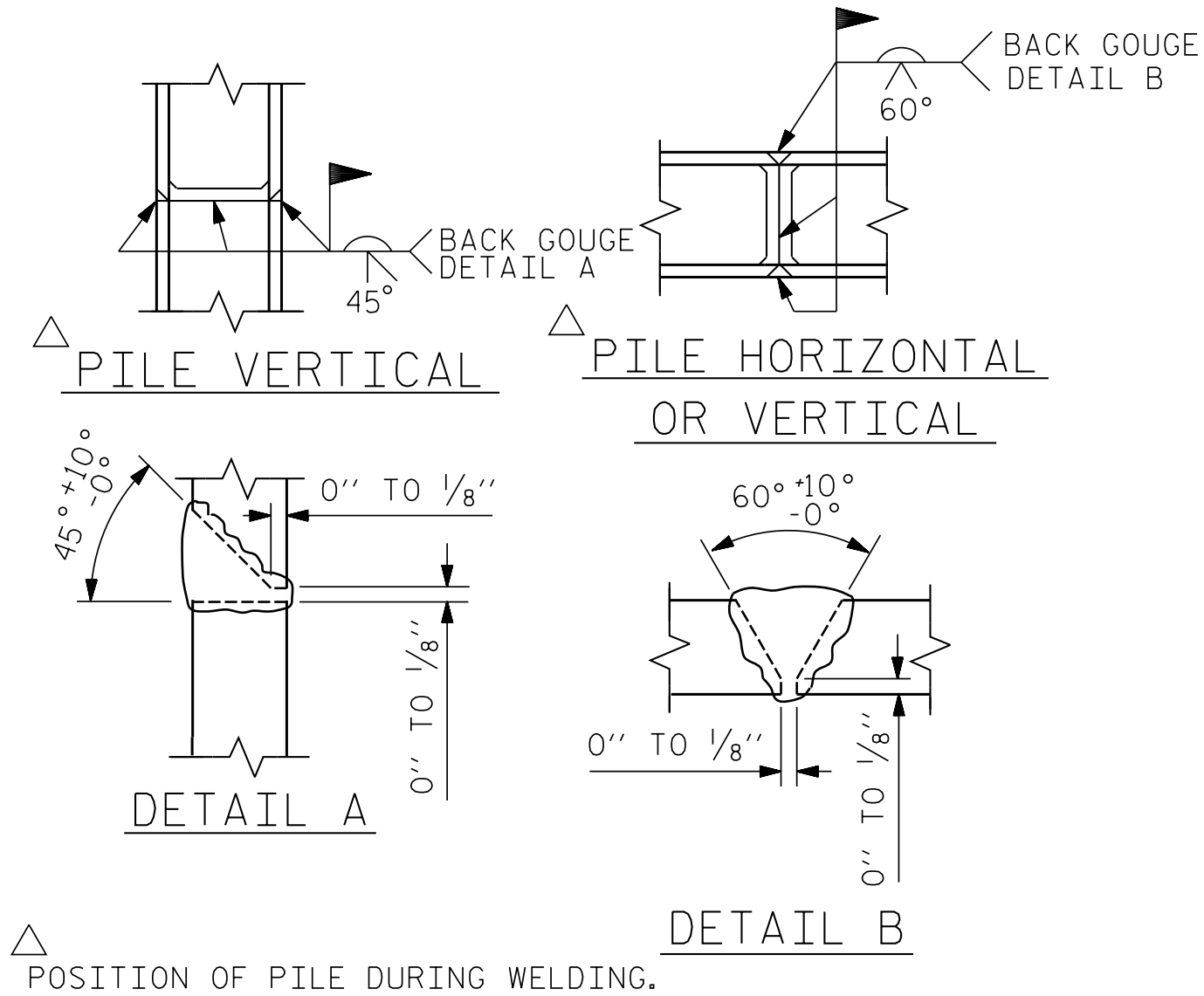


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

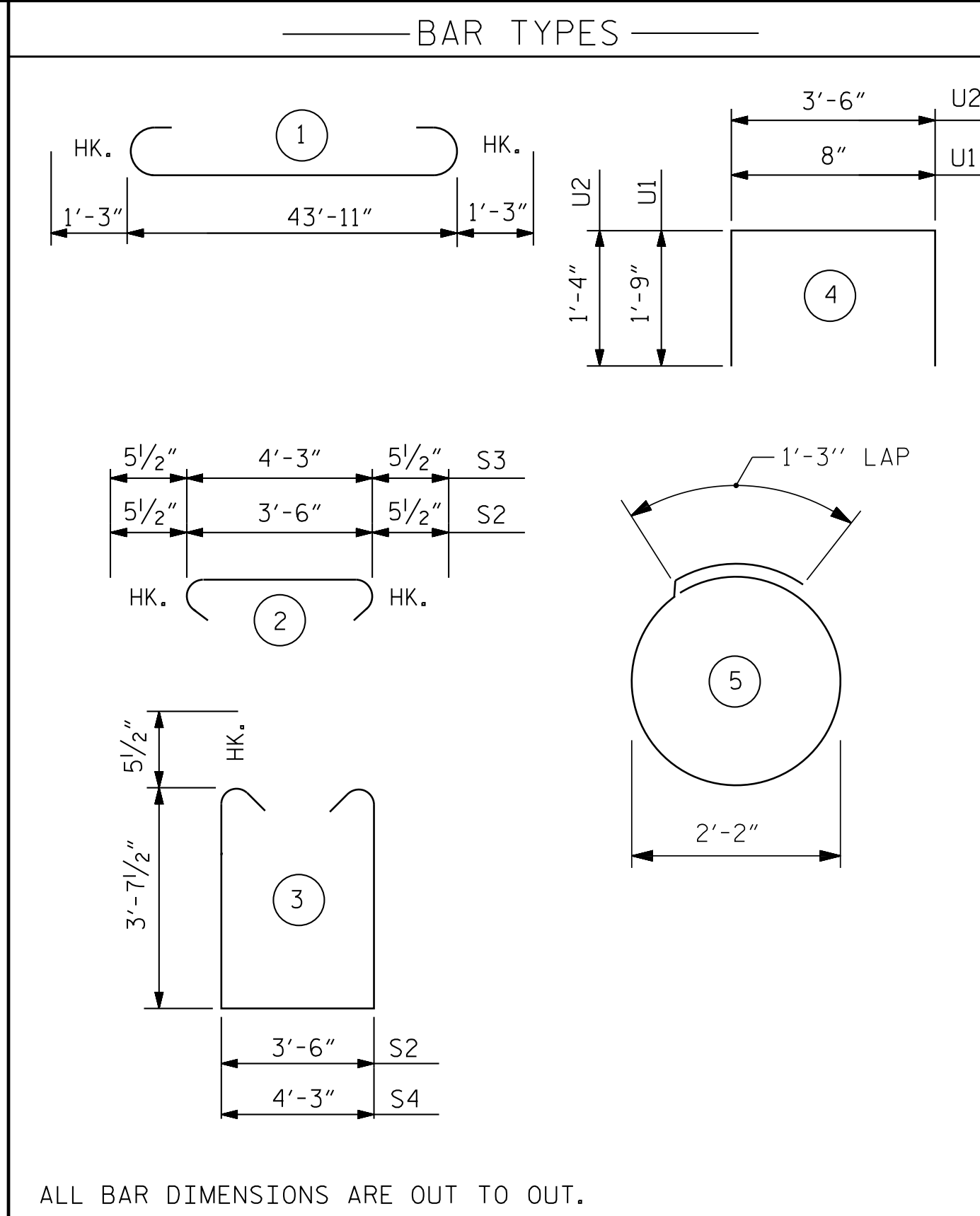
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

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

TEMPORARY DRAINAGE AT END BENT



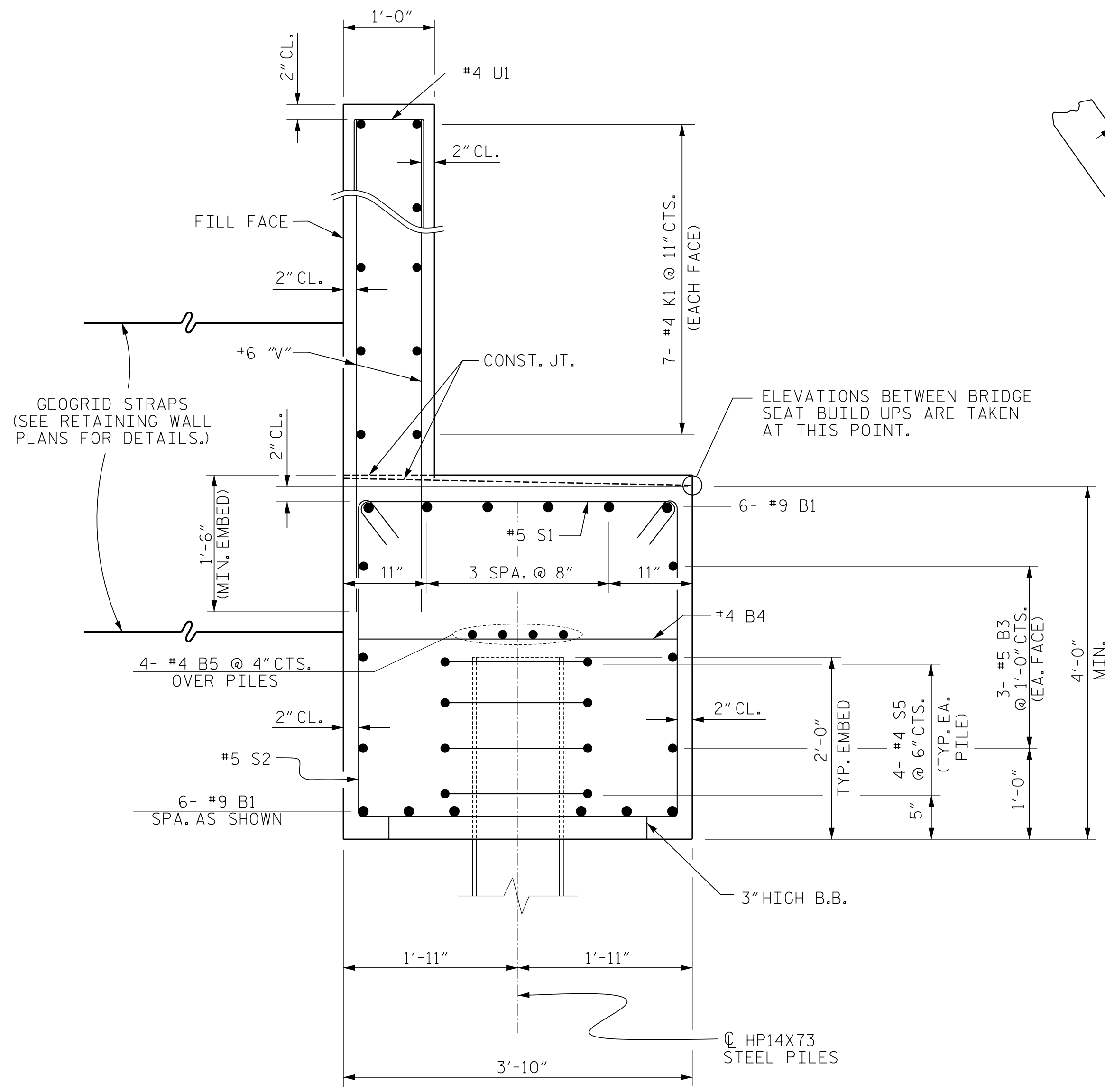
PILE SPLICE DETAILS



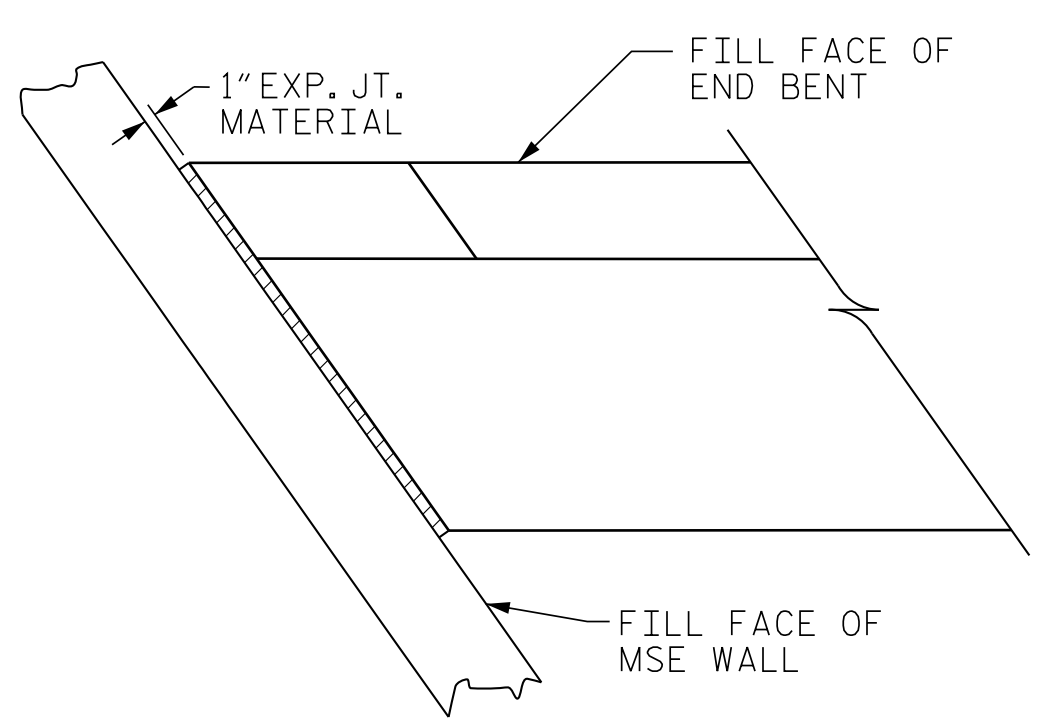
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL - END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	(1)	46'-5"	1894
B3	6	#5	STR	43'-11"	275
B4	11	#4	STR	3'-6"	26
B5	8	#4	STR	23'-3"	124
B6	20	#4	STR	3'-3"	43
K1	28	#4	STR	23'-3"	435
K2	4	#4	STR	1'-8"	4
S1	73	#5	(2)	4'-5"	336
S2	73	#5	(3)	11'-8"	888
S3	2	#5	(2)	5'-2"	11
S4	2	#5	(3)	12'-5"	26
S5	28	#4	(5)	8'-1"	151
U1	65	#4	(4)	4'-2"	181
U2	16	#4	(4)	6'-2"	66
V1	118	#6	STR	7'-9"	1374
V2	12	#6	STR	9'-7"	173

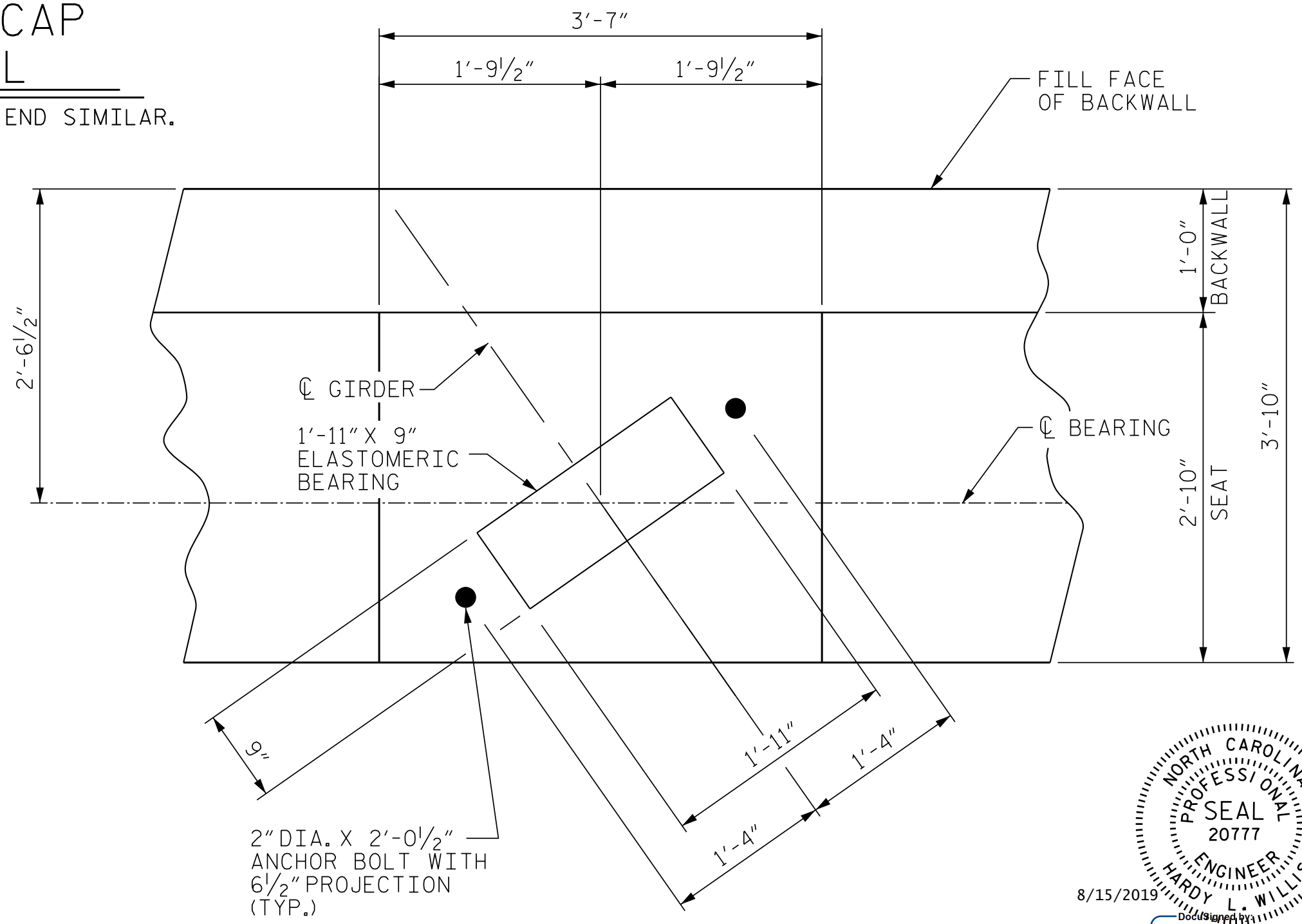
REINFORCING STEEL	= 6,007 LBS.
CLASS A CONCRETE BREAKDOWN	
POUR #1: CAP	= 25.3 C.Y.
POUR #2: BACKWALL	= 11.0 C.Y.
TOTAL CLASS A CONCRETE	= 36.3 C.Y.
HP 14 X 73 STEEL PILES NO: 7	LIN. FT. = 210
STEEL PILE POINTS	7
PILE EXCAVATION	
IN SOIL	LIN. FT. = 20
NOT IN SOIL	LIN. FT. = 50



SECTION A-A



END OF CAP DETAIL
LEFT END SHOWN, RIGHT END SIMILAR.



DETAIL 'A'

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- Charleston, SC 843-974-5650
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- Atlanta, GA 770-627-3509
- Raleigh, NC 919-977-9455
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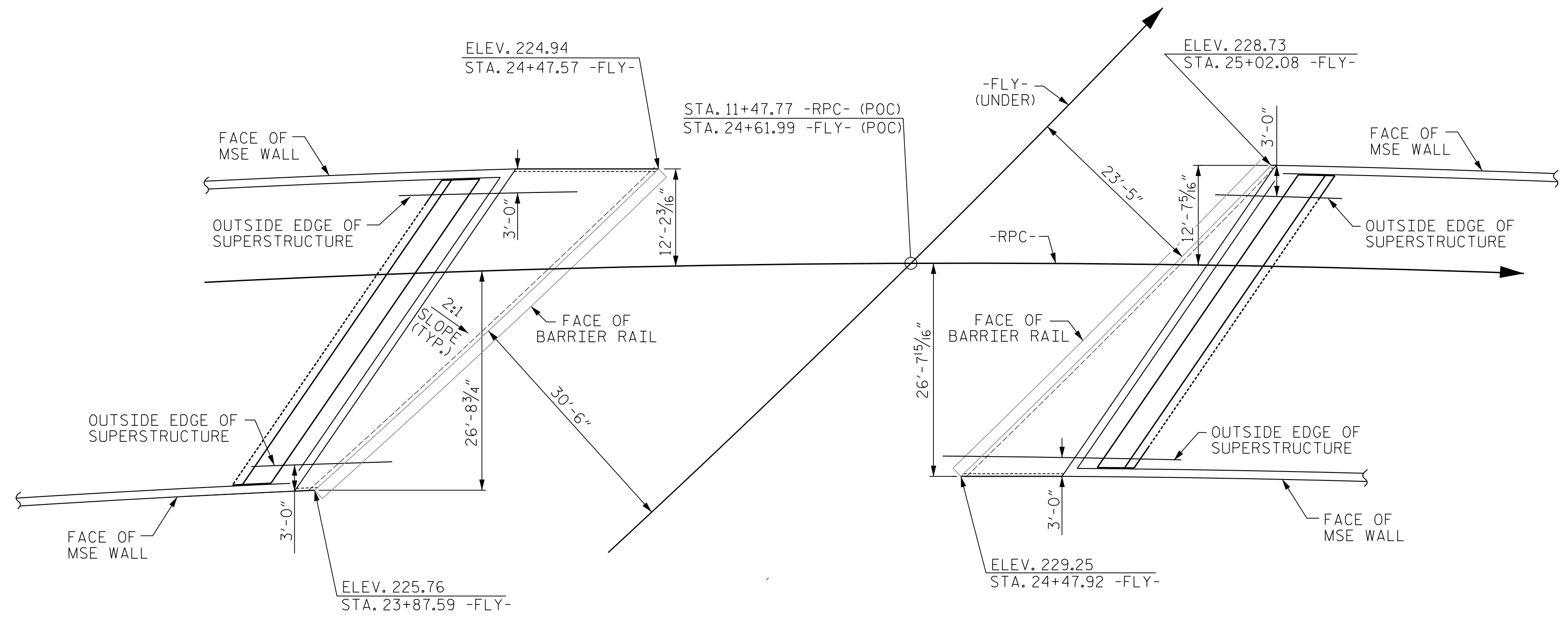
PROJECT NO. R-3421A
RICHMOND COUNTY
STATION: 11+47.77 -RPC-
24+61.99 -FLY-
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

END BENT NO. 2



SHEET 23 OF 26		DATE: 9/15		NO.		BY:		DATE:		SHEET NO.	
DWN. BY: MAF		DATE: 9/15		1		3				S-	
CHKD. BY: HLW		DATE: 9/15		2		4				TOTAL SHEETS	
DES. EGR. OF RECORD: RTS		DATE: 9/15								STR. #5	



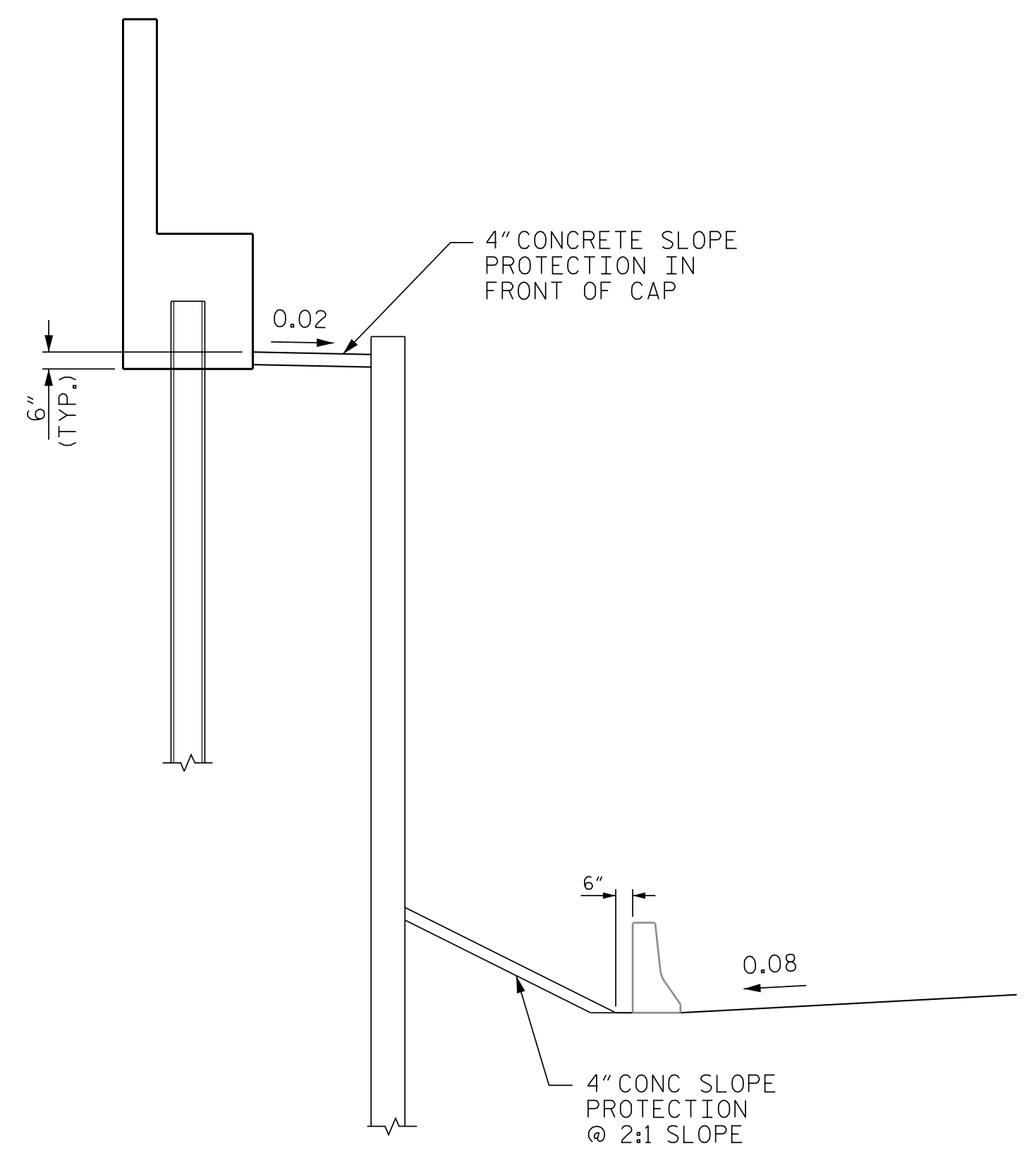
PLAN

GENERAL NOTES

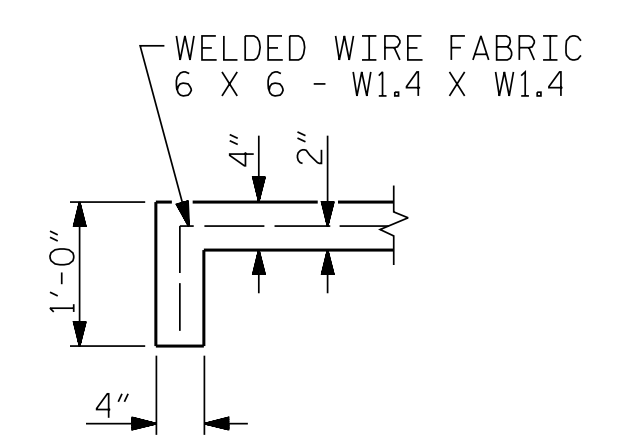
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL 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.

BRIDGE @ 11+47.77 -RPC- 24+61.99 -FLY-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	52	110
END BENT 2	31	58

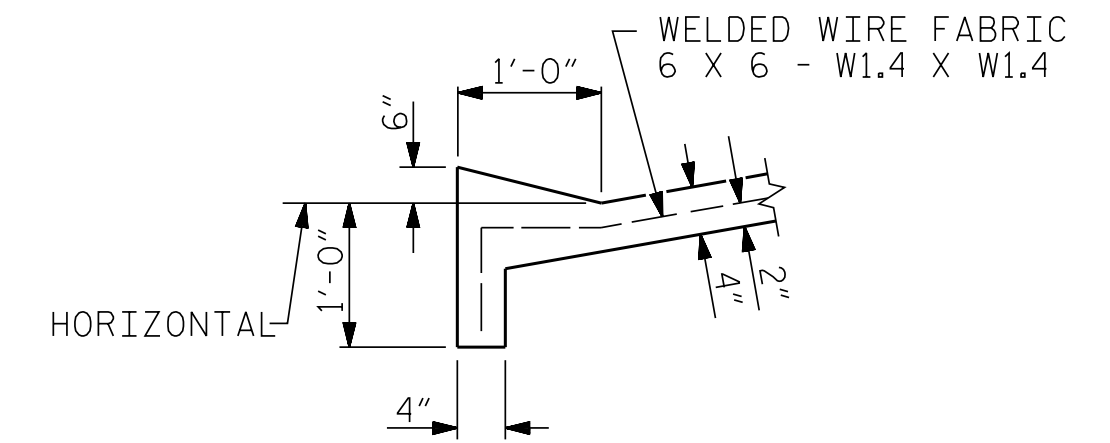
* QUANTITY SHOWN IS BASED ON 5' POURS.



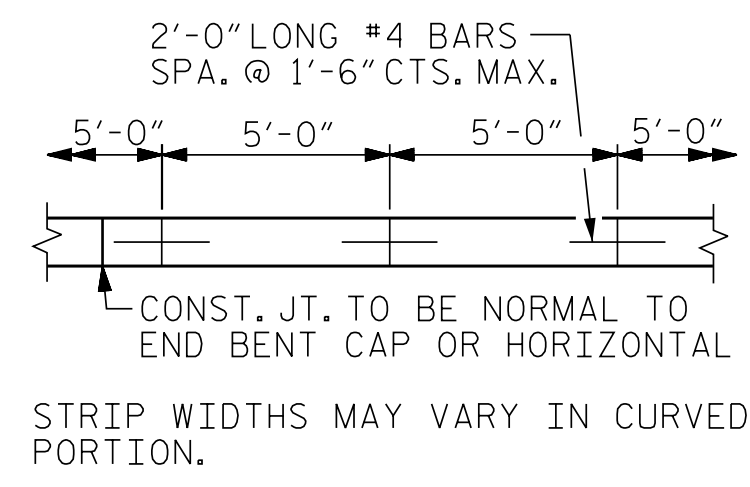
PARTIAL SECTION ALONG
-RPC-



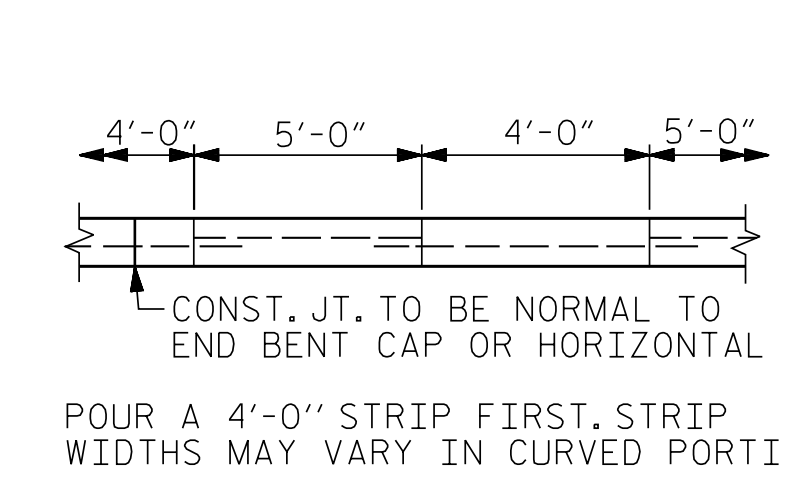
SECTION A-A



SECTION B-B



POURING DETAIL

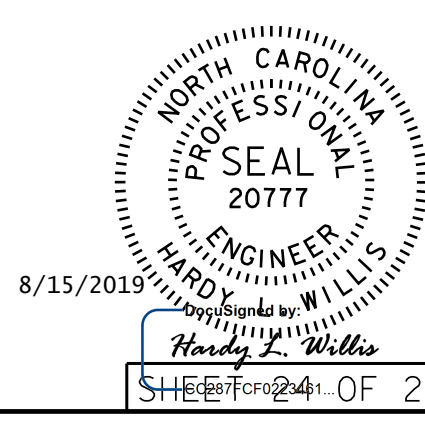


OPTIONAL POURING DETAIL

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
 24+61.99 -FLY-

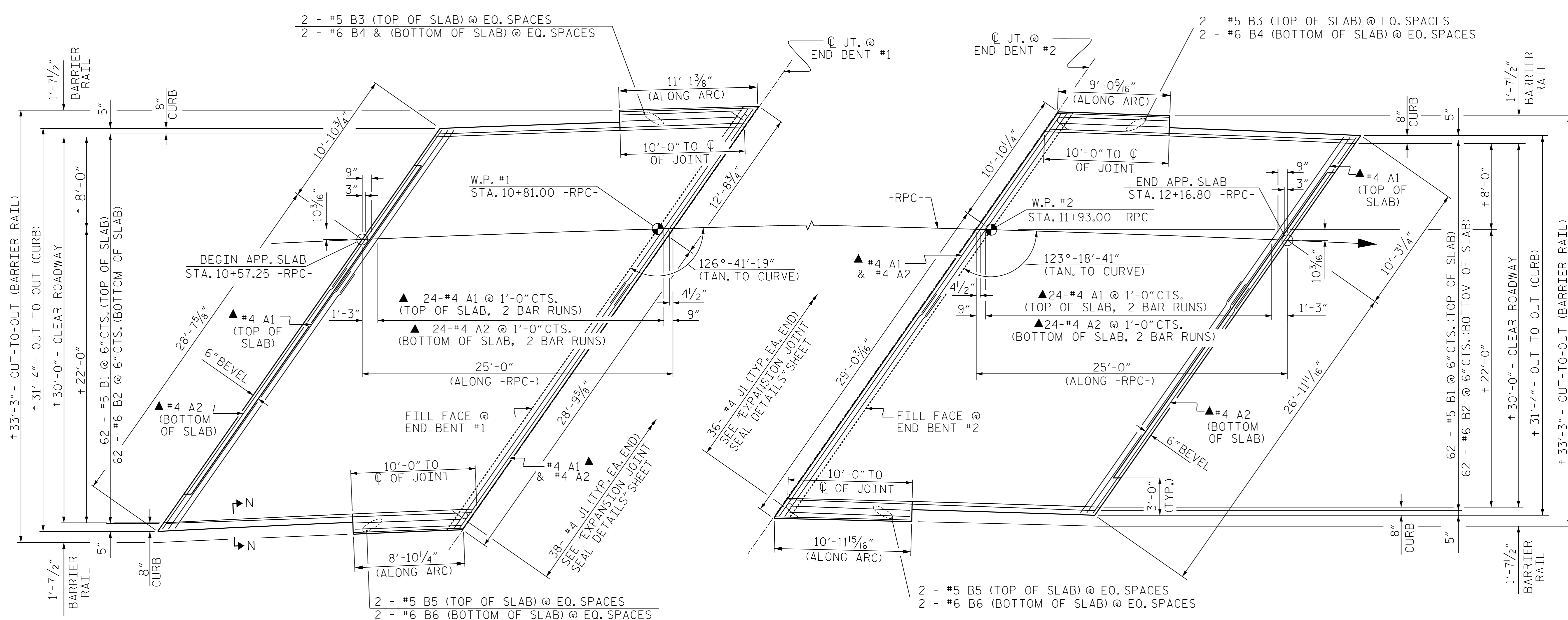
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 SLOPE PROTECTION
 DETAILS



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

ASSEMBLED BY : MAF	DATE : 9/2015
CHECKED BY : HLW	DATE : 9/2015
DRAWN BY : ELR 5/92	REV. 5/1/06 TLA/GM
CHECKED BY : GRP 6/92	REV. 10/1/11 MAA/GM
	REV. 12/21/11 MAA/GM



PLAN @ END BENT #1

PLAN @ END BENT #2

† RADIAL DIMENSIONS

▲ "A" BARS TO BE PLACED PARALLEL TO FILL FACE

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

BILL OF MATERIAL

APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	52	#4	STR	21'-7"	750
A2	52	#4	STR	21'-6"	747
*B1	62	#5	STR	24'-7"	1590
B2	62	#6	STR	24'-7"	2289
*B3	2	#5	STR	9'-8"	20
B4	2	#6	STR	9'-8"	29
*B5	2	#5	STR	8'-6"	18
B6	2	#6	STR	8'-6"	26
*J1	38	#4	①	1'-5"	36

REINFORCING STEEL	LBS.	3,091
*EPOXY COATED REINFORCING STEEL	LBS.	2,414

CLASS AA CONCRETE C. Y. 35.1

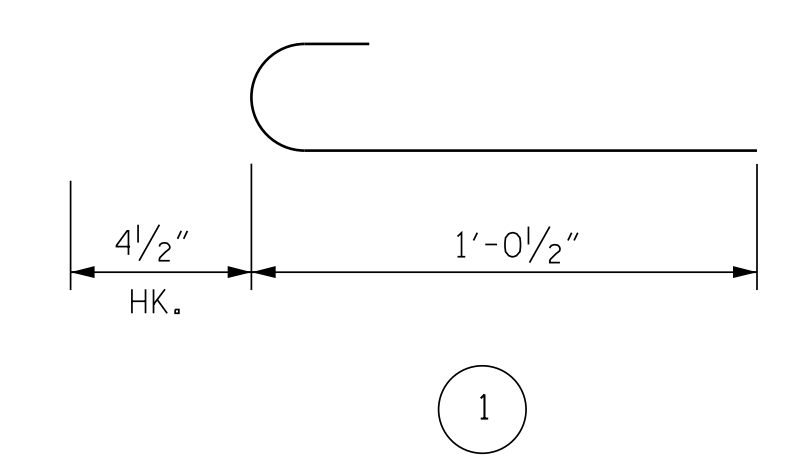
APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*A1	52	#4	STR	20'-9"	721
A2	52	#4	STR	20'-8"	718
*B1	62	#5	STR	24'-7"	1590
B2	62	#6	STR	24'-7"	2289
*B3	2	#5	STR	8'-8"	18
B4	2	#6	STR	8'-8"	26
*B5	2	#5	STR	9'-8"	20
B6	2	#6	STR	9'-8"	29
*J1	36	#4	①	1'-5"	34

REINFORCING STEEL	LBS.	3,062
*EPOXY COATED REINFORCING STEEL	LBS.	2,383

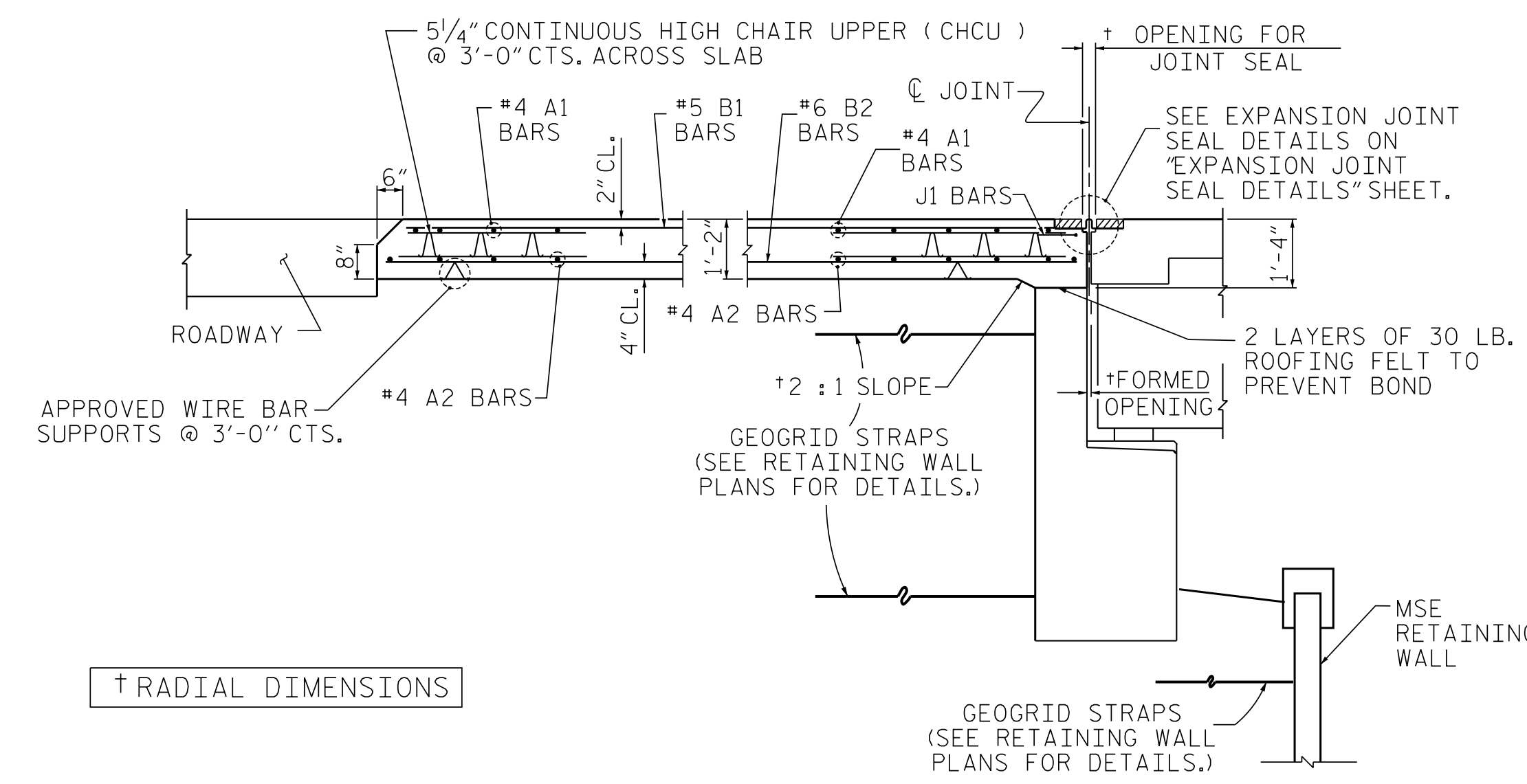
CLASS AA CONCRETE C. Y. 35.1

BAR TYPE

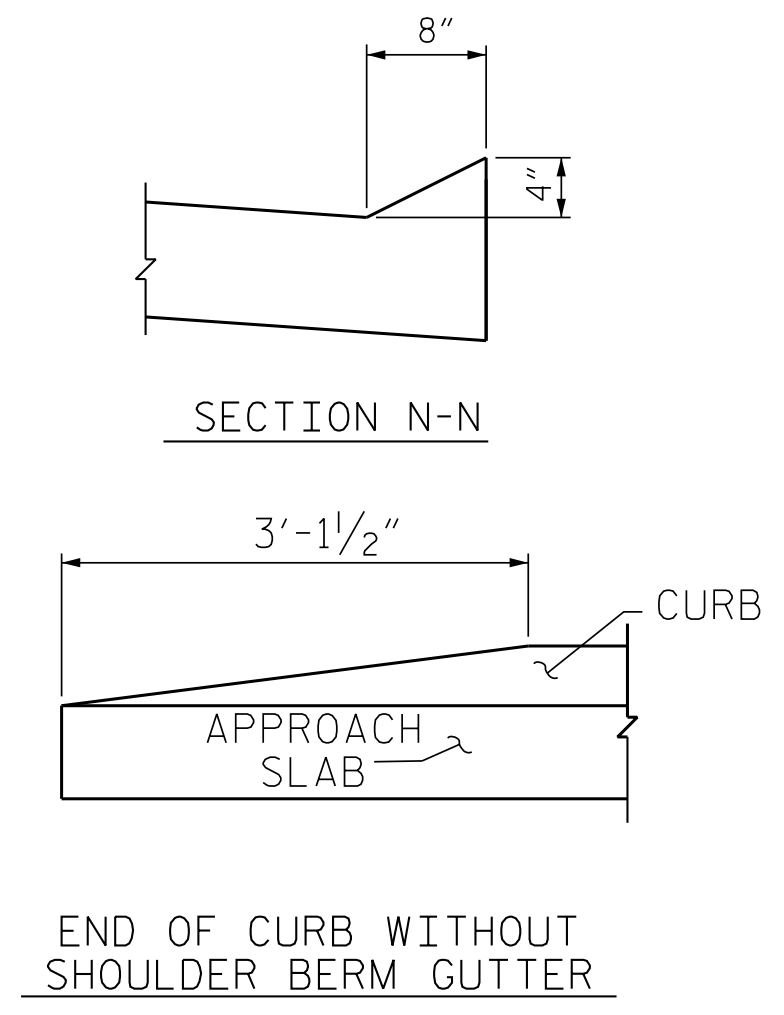


NOTES

- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
- THE JOINT SHALL BE INSTALLED PRIOR TO THE CASTING OF THE BARRIER RAIL OR PARAPET AND END POST.
- FOR MSE RETAINING WALL BACK FILL, SEE WALL PLANS
- FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
- THE QUANTITY OF #4 JI BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. JI BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOUT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUDS EXCEED THE NUMBER OF JI BARS SPECIFIED ADDITIONAL JI BARS WILL NOT BE REQUIRED.

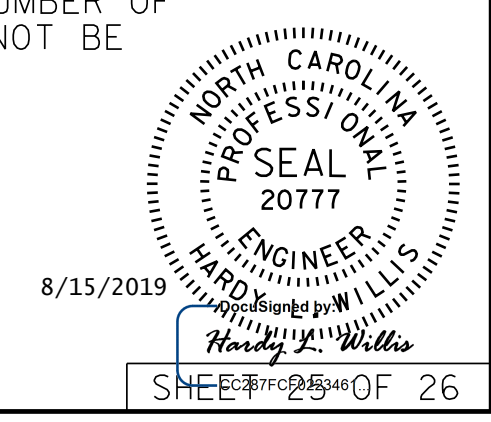


SECTION THRU SLAB



CURB DETAILS

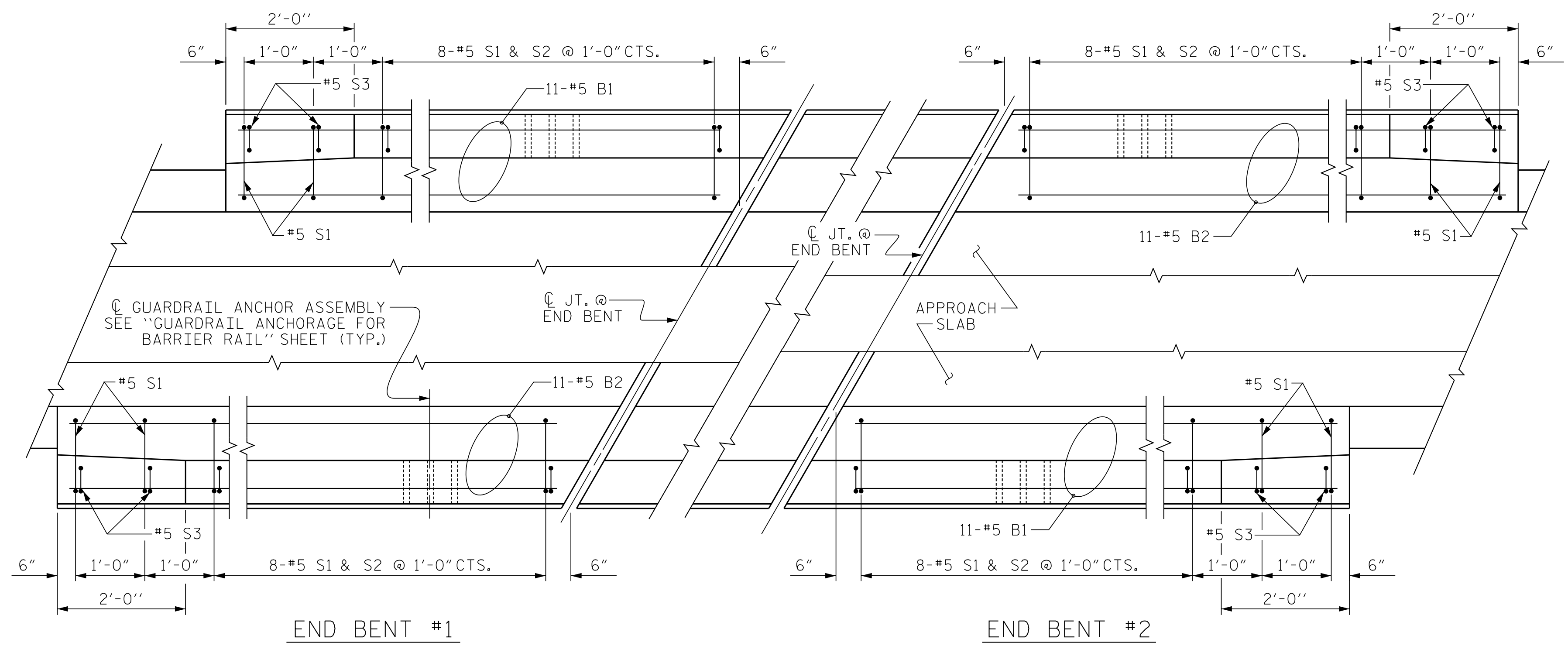
ASSEMBLED BY : MAF	DATE : 9/2015
CHECKED BY : HLW	DATE : 9/2015
DRAWN BY : EEM 3/95	REV. 10/1/11 MAA/GM
CHECKED BY : VAP 3/95	REV. 12/21/11 MAA/GM
	REV. 6/13 MAA/GM



PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
 24+61.99 -FLY-
 SHEET 1 OF 2

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

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



PLAN OF BARRIER RAIL

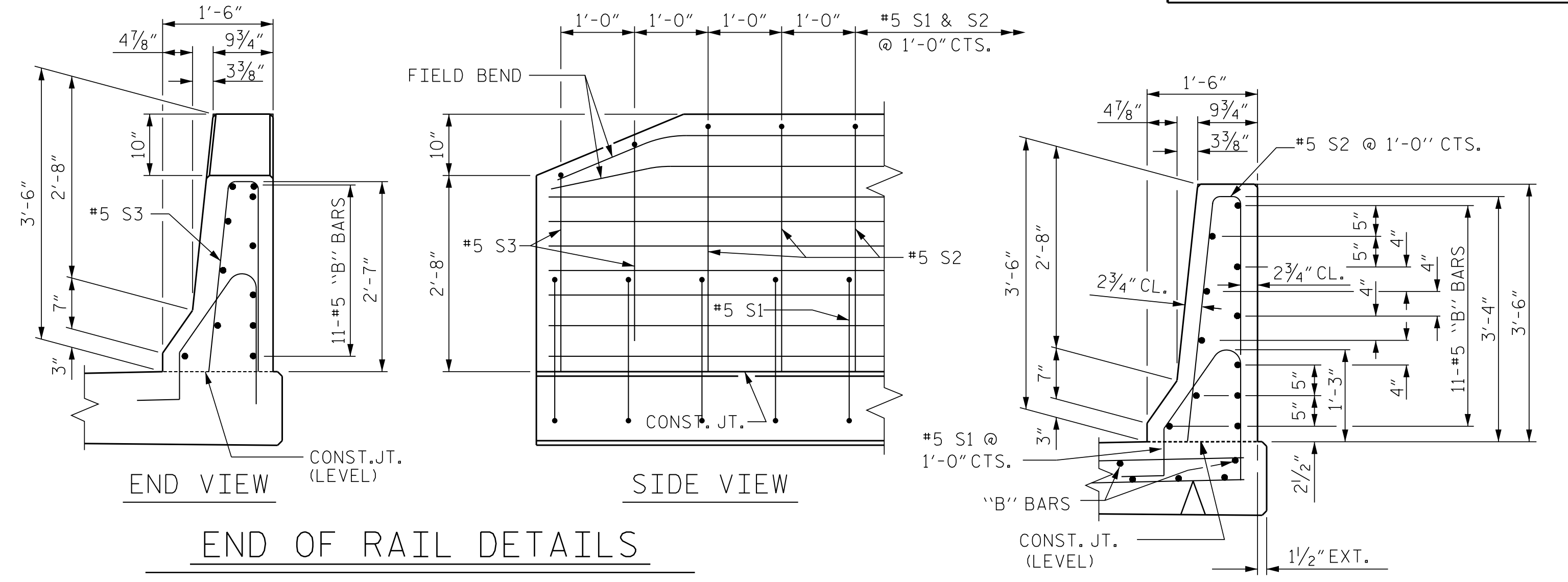
NOTES

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.

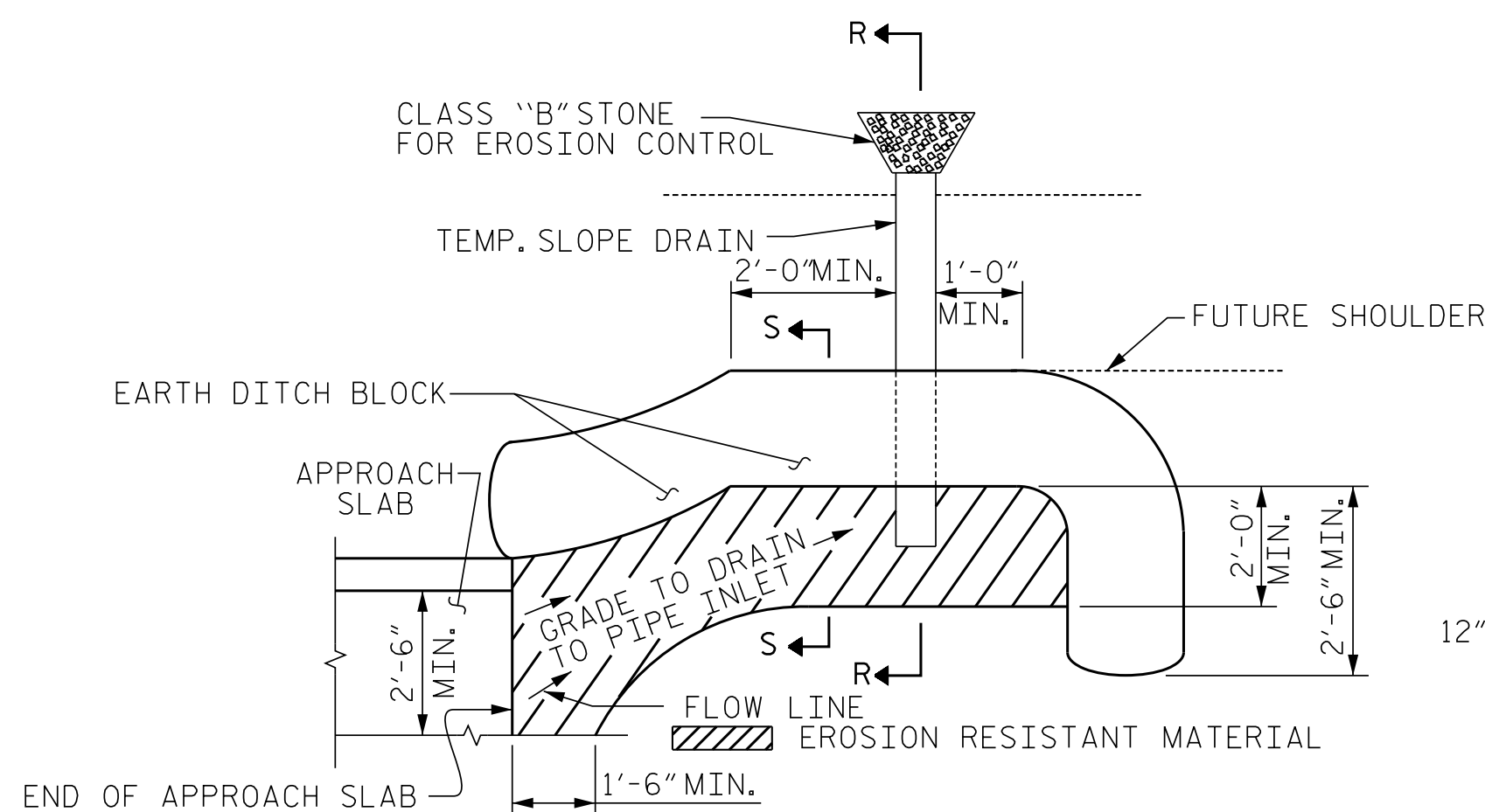
BAR TYPES

ALL BAR DIMENSIONS ARE OUT TO OUT

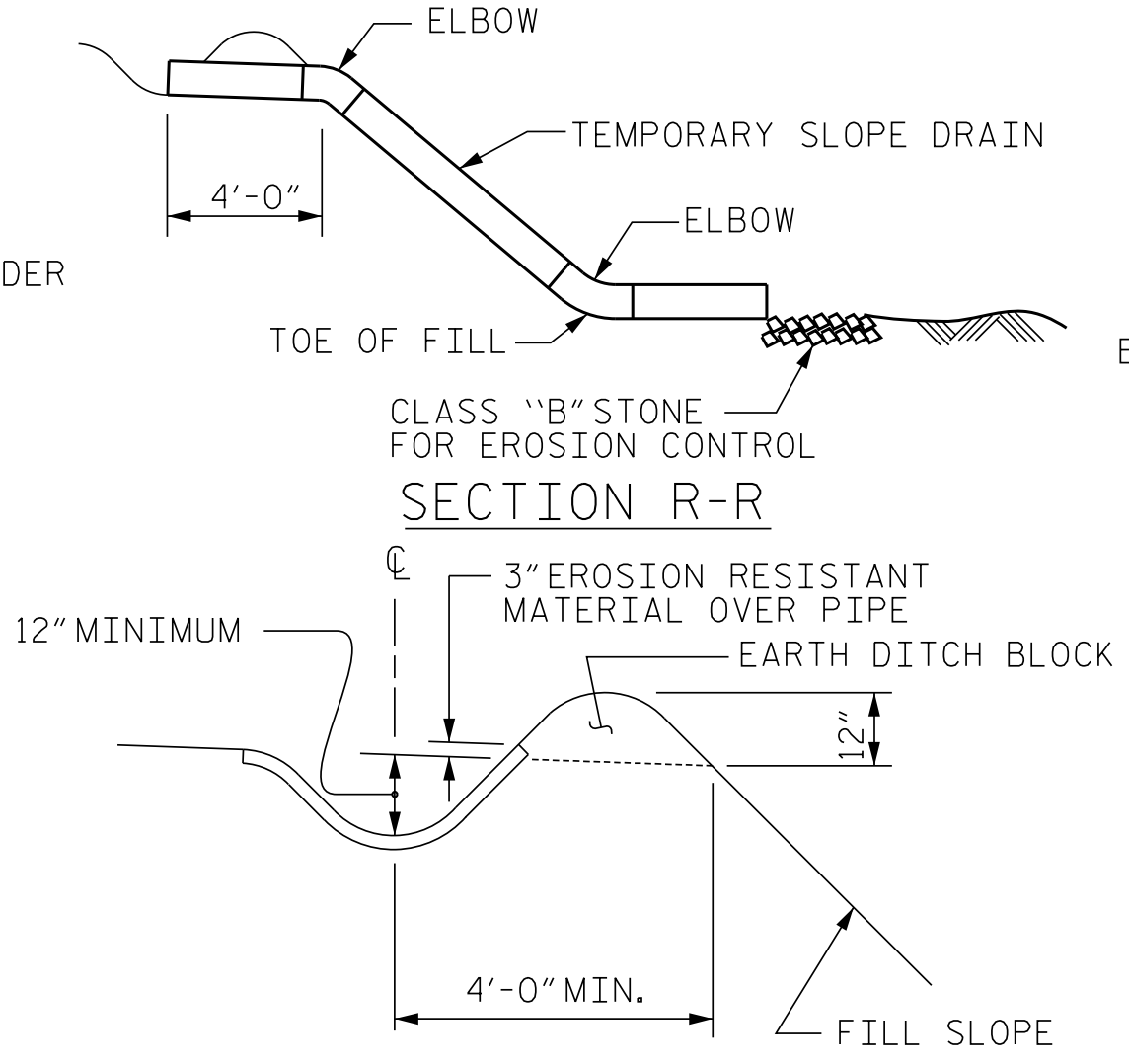
BILL OF MATERIAL				
BARRIER RAIL ONLY				
BAR	NO.	SIZE	TYPE	WEIGHT
* B1	22	#5	STR	222
* B2	22	#5	STR	197
* S1	40	#5	①	212
* S2	32	#5	②	234
* S3	8	#5	②	46
* EPOXY COATED REINFORCING STEEL				LBS. 911
CLASS AA CONCRETE				C. Y. 5.2
CONCRETE BARRIER RAIL				40.0 LIN. FT.



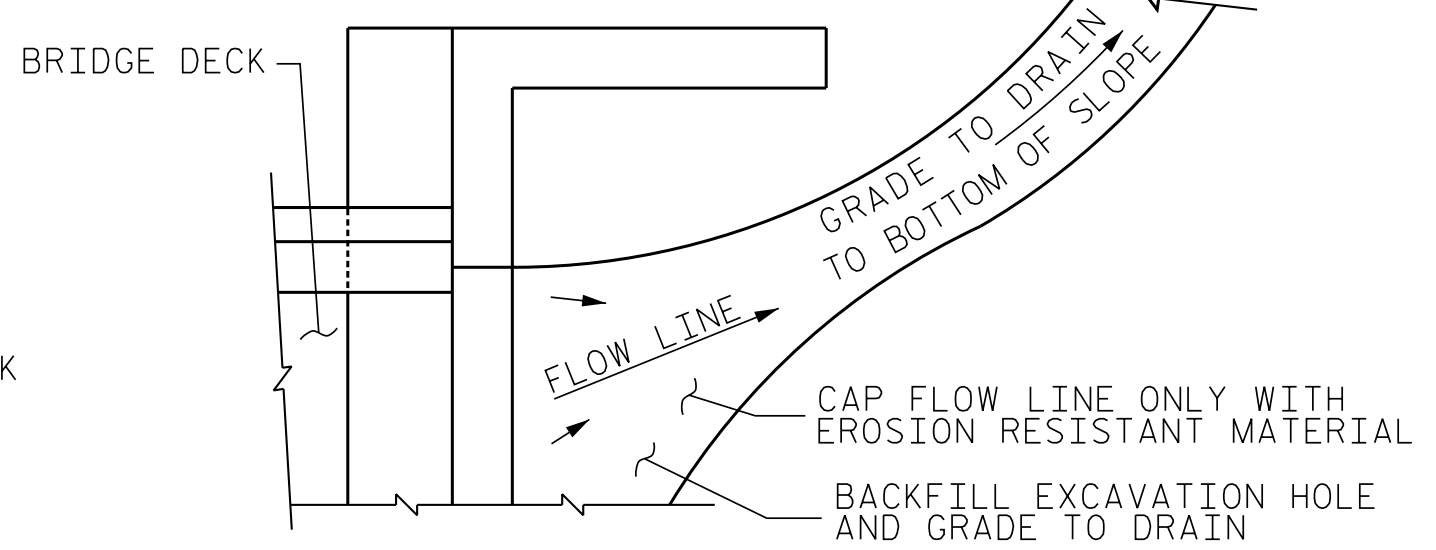
END OF RAIL DETAILS



PLAN VIEW



SECTION S-S



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

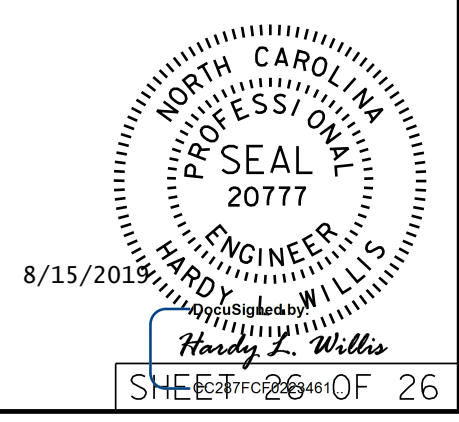
TEMPORARY DRAINAGE DETAIL

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. R-3421A
 RICHMOND COUNTY
 STATION: 11+47.77 -RPC-
 24+61.99 -FLY-
 SHEET 2 OF 2

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



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

ASSEMBLED BY : MAF	DATE : 9/2015
CHECKED BY : HLW	DATE : 9/2015
DRAWN BY : FCJ 11/88	REV. 10/1/11
CHECKED BY : ARB 11/88	REV. 7/12
	REV. 6/13
	MAA/GM
	MAA/GM
	MAA/GM

STANDARD NOTES

DESIGN DATA:

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

MATERIAL AND WORKMANSHIP:

EXCEPT AS MAY OTHERWISE BE SPECIFIED ON PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE 2012 "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" OF THE N. C. DEPARTMENT OF TRANSPORTATION.

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

CONCRETE:

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

CONCRETE CHAMFERS:

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

DOWELS:

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

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

BRIDGES SHALL BE BUILT ON THE GRADE OR VERTICAL CURVE SHOWN ON PLANS. SLABS, CURBS AND PARAPETS SHALL CONFORM TO THE GRADE OR CURVE.
 ALL DIMENSIONS WHICH ARE GIVEN IN SECTION AND ARE AFFECTED BY DEAD LOAD DEFLECTIONS ARE DIMENSIONS AT CENTER LINE OF BEARING UNLESS OTHERWISE NOTED ON PLANS. IN SETTING FORMS FOR STEEL BEAM BRIDGES AND PRESTRESSED CONCRETE GIRDER BRIDGES, ADJUSTMENTS SHALL BE MADE DUE TO THE DEAD LOAD DEFLECTIONS FOR THE ELEVATIONS SHOWN. WHERE BLOCKS ARE SHOWN OVER BEAMS FOR BUILDING UP TO THE SLAB, THE VERTICAL DIMENSIONS OF THE BLOCKS SHALL BE ADJUSTED BETWEEN BEARINGS TO COMPENSATE FOR DEAD LOAD DEFLECTIONS, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER. WHERE BOTTOM OF SLAB IS IN LINE WITH BOTTOM OF TOP FLANGES, DEPTH OF SLAB BETWEEN BEARINGS SHALL BE ADJUSTED TO COMPENSATE FOR DEAD LOAD DEFLECTION, VERTICAL CURVE ORDINATE, AND ACTUAL BEAM CAMBER.
 IN SETTING FALSEWORK AND FORMS FOR REINFORCED CONCRETE SPANS, AN ALLOWANCE SHALL BE MADE FOR DEAD LOAD DEFLECTIONS, SETTLEMENT OF FALSEWORK, AND PERMANENT CAMBER WHICH SHALL BE PROVIDED FOR IN ADDITION TO THE ELEVATIONS SHOWN. AFTER REMOVAL OF THE FALSEWORK, THE FINISHED STRUCTURES SHALL CONFORM TO THE PROFILE AND ELEVATIONS SHOWN ON THE PLANS AND CONSTRUCTION ELEVATIONS FURNISHED BY THE ENGINEER.
 DETAILED DRAWINGS FOR FALSEWORK OR FORMS FOR BRIDGE SUPERSTRUCTURE AND ANY STRUCTURE OR PARTS OF A STRUCTURE AS NOTED ON THE PLANS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE CONSTRUCTION OF THE FALSEWORK OR FORMS IS STARTED.

REINFORCING STEEL:

ALL REINFORCING STEEL SHALL BE DEFORMED. DIMENSIONS RELATIVE TO PLACEMENT OF REINFORCING ARE TO CENTERS OF BARS UNLESS OTHERWISE INDICATED IN THE PLANS. DIMENSIONS ON BAR DETAILS ARE TO CENTERS OF BARS OR ARE OUT TO OUT AS INDICATED ON PLANS.
 WIRE BAR SUPPORTS SHALL BE PROVIDED FOR REINFORCING STEEL WHERE INDICATED ON THE PLANS. WHEN BAR SUPPORT PIECES ARE PLACED IN CONTINUOUS LINES, THEY SHALL BE SO PLACED THAT THE ENDS OF THE SUPPORTING WIRES SHALL BE LAPPED TO LOCK LEGS ON ADJOINING PIECES.

STRUCTURAL STEEL:

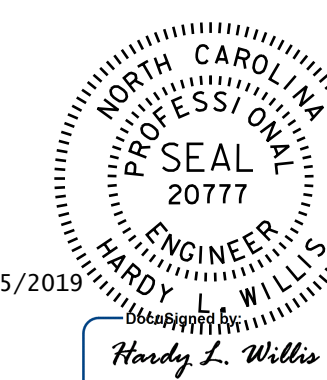
AT THE CONTRACTOR'S OPTION, HE MAY SUBSTITUTE 7/8" Ø SHEAR STUDS FOR THE 3/4" Ø STUDS SPECIFIED ON THE PLANS. THIS SUBSTITUTION SHALL BE MADE AT THE RATE OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS, AND STUD SPACING CHANGES SHALL BE MADE AS NECESSARY TO PROVIDE THE SAME EQUIVALENT NUMBER OF 7/8" Ø STUDS ALONG THE BEAM AS SHOWN FOR 3/4" Ø STUDS BASED ON THE RATIO OF 3 - 7/8" Ø STUDS FOR 4 - 3/4" Ø STUDS. STUDS OF THE LENGTH SPECIFIED ON THE PLANS MUST BE PROVIDED. THE MAXIMUM SPACING SHALL BE 2'-0".
 EXCEPT AT THE INTERIOR SUPPORTS OF CONTINUOUS BEAMS WHERE THE COVER PLATE IS IN CONTACT WITH BEARING PLATE, THE CONTRACTOR MAY, AT HIS OPTION, SUBSTITUTE FOR THE COVER PLATES DESIGNATED ON THE PLANS COVER PLATES OF THE EQUIVALENT AREA PROVIDED THESE PLATES ARE AT LEAST 5/16" IN THICKNESS AND DO NOT EXCEED A WIDTH EQUAL TO THE FLANGE WIDTH LESS 2" OR A THICKNESS EQUAL TO 2 TIMES THE FLANGE THICKNESS. THE SIZE OF FILLET WELDS SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT ANSI/AASHTO/AWS "BRIDGE WELDING CODE". ELECTROSLAG WELDING WILL NOT BE PERMITTED.
 WITH THE SOLE EXCEPTION OF EDGES AT SURFACES WHICH BEAR ON OTHER SURFACES, ALL SHARP EDGES AND ENDS OF SHAPES AND PLATES SHALL BE SLIGHTLY ROUNDED BY SUITABLE MEANS TO A RADIUS OF APPROXIMATELY 1/16 INCH OR EQUIVALENT FLAT SURFACE AT A SUITABLE ANGLE PRIOR TO PAINTING, GALVANIZING, OR METALLIZING.

HANDRAILS AND POSTS:

METAL STANDARDS AND FACES OF THE CONCRETE END POSTS FOR THE METAL RAIL SHALL BE SET NORMAL TO THE GRADE OF THE CURB, UNLESS OTHERWISE SHOWN ON PLANS. THE METAL RAIL AND TOPS OF CONCRETE POSTS USED WITH THE ALUMINUM RAIL SHALL BE BUILT PARALLEL TO THE GRADE OF THE CURB.
 METAL HANDRAILS SHALL BE IN ACCORDANCE WITH THE PLANS. RAILS SHALL BE AS MANUFACTURED FOR BRIDGE RAILING. CASTINGS SHALL BE OF A UNIFORM APPEARANCE. FINIS AND OTHER DEFORMATIONS RESULTING FROM CASTING OR OTHERWISE SHALL BE REMOVED IN A MANNER SO THAT A UNIFORM COLORING OF THE COMPLETED CASTING SHALL BE OBTAINED. CASTINGS WITH DISCOLORATIONS OR OF NON-UNIFORM COLORING WILL NOT BE ACCEPTED. CERTIFIED MILL REPORTS ARE REQUIRED FOR METAL RAILS AND POSTS.

SPECIAL NOTES:

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



ENGLISH

JANUARY, 1990