

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.

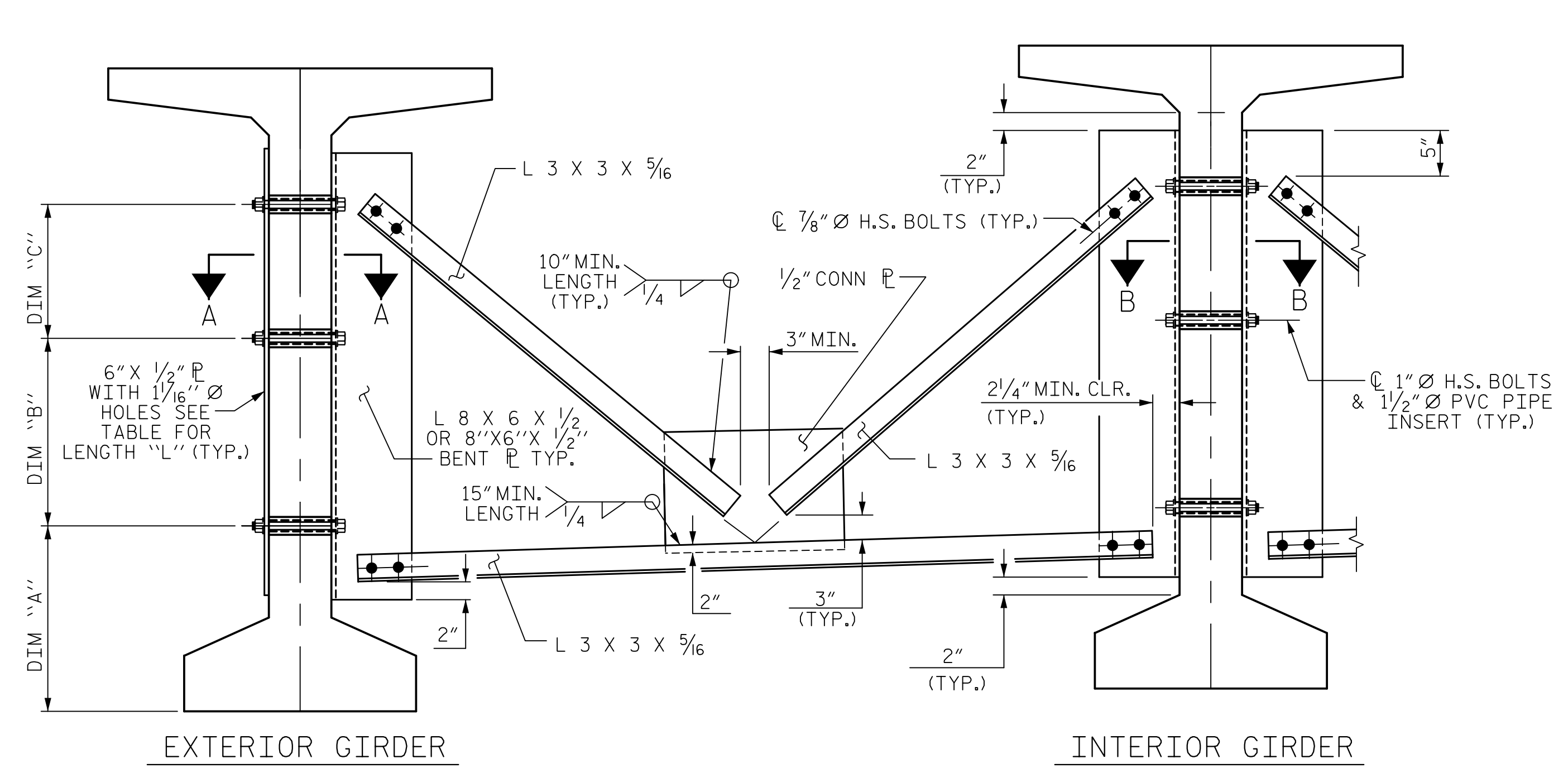
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

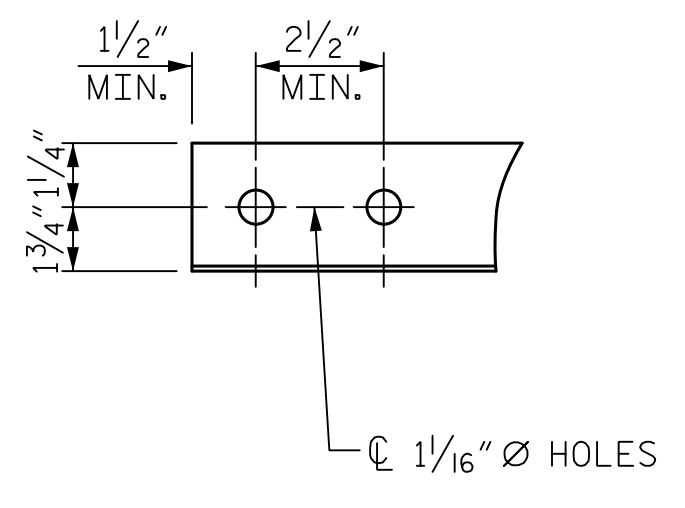
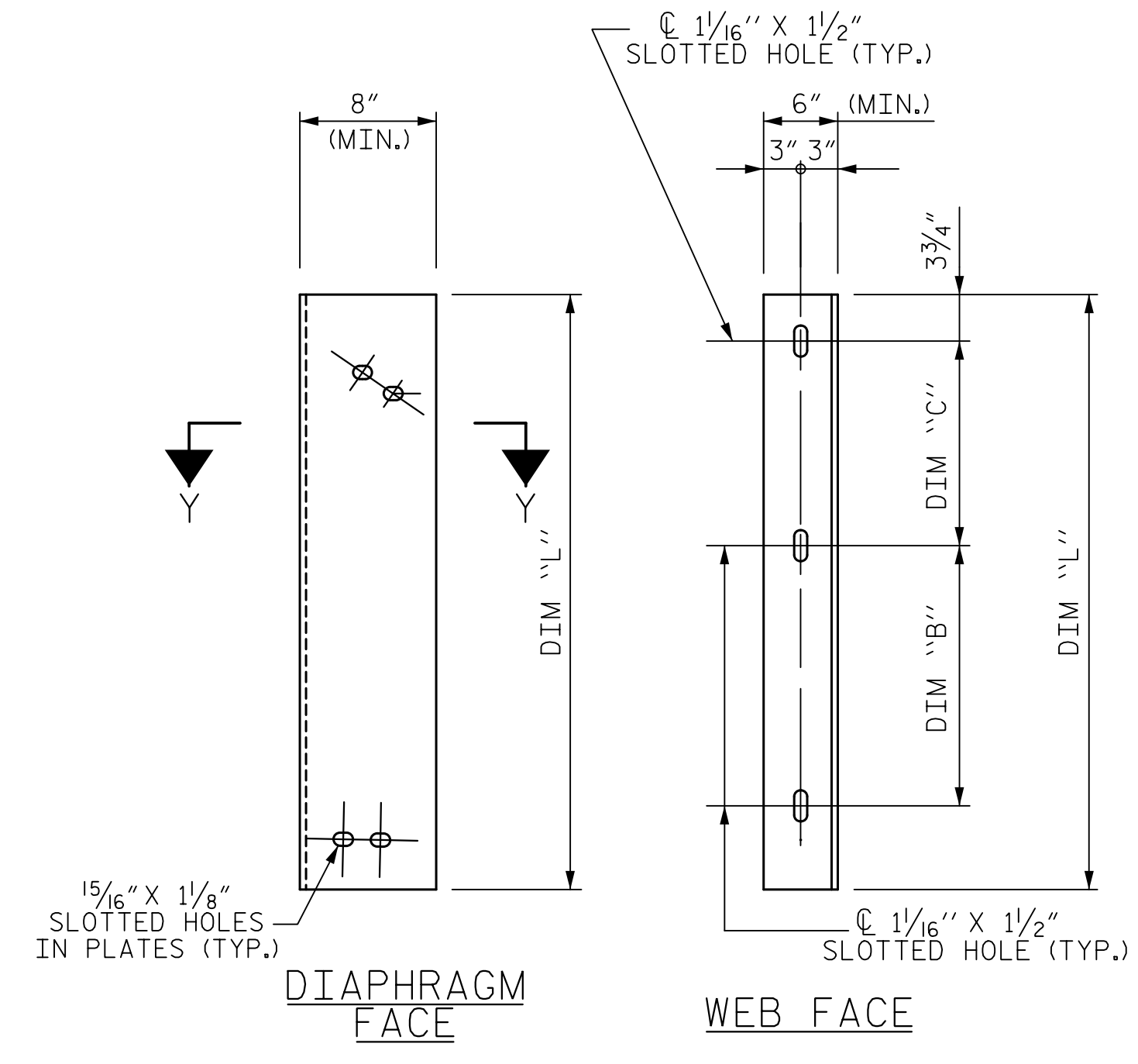
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.

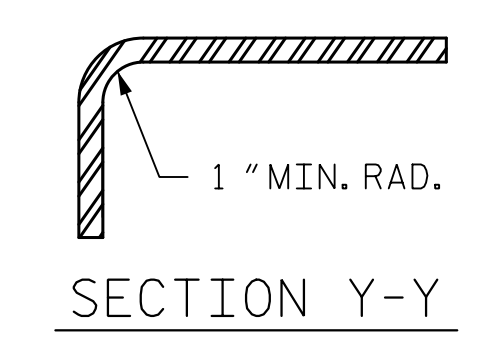
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.



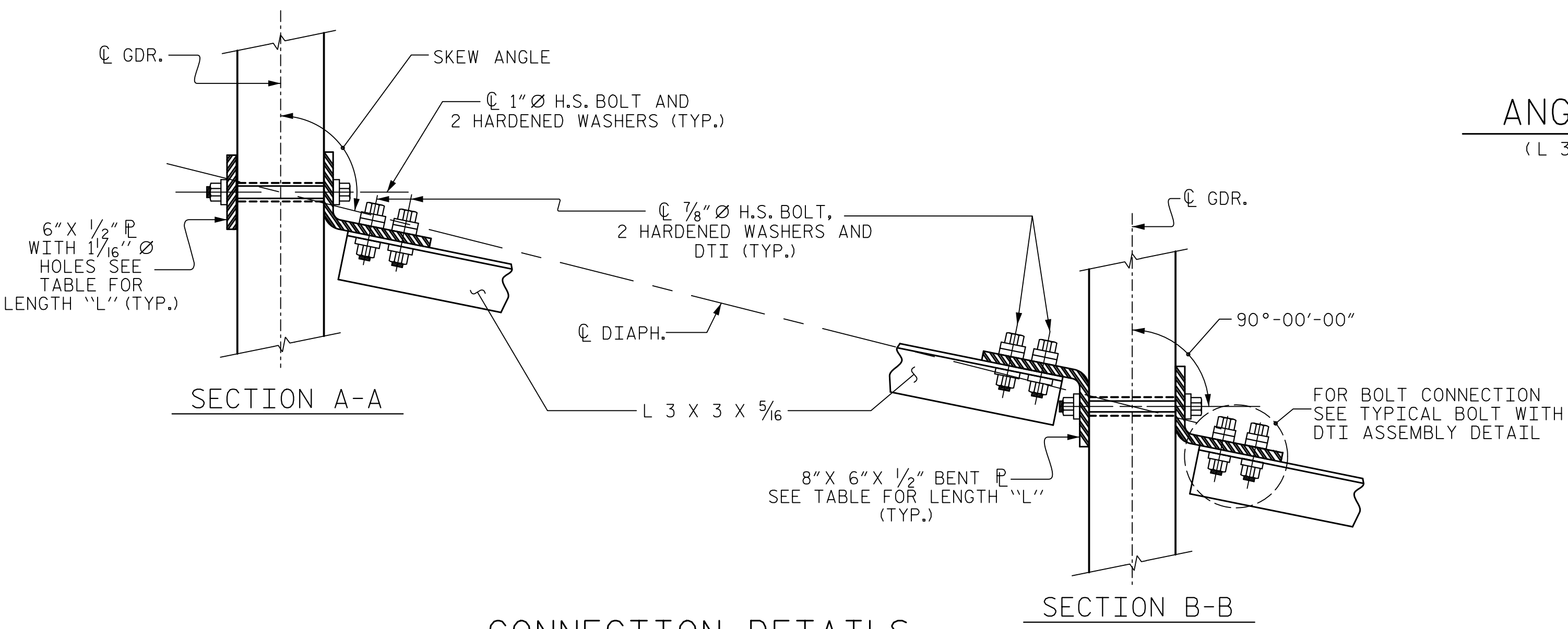
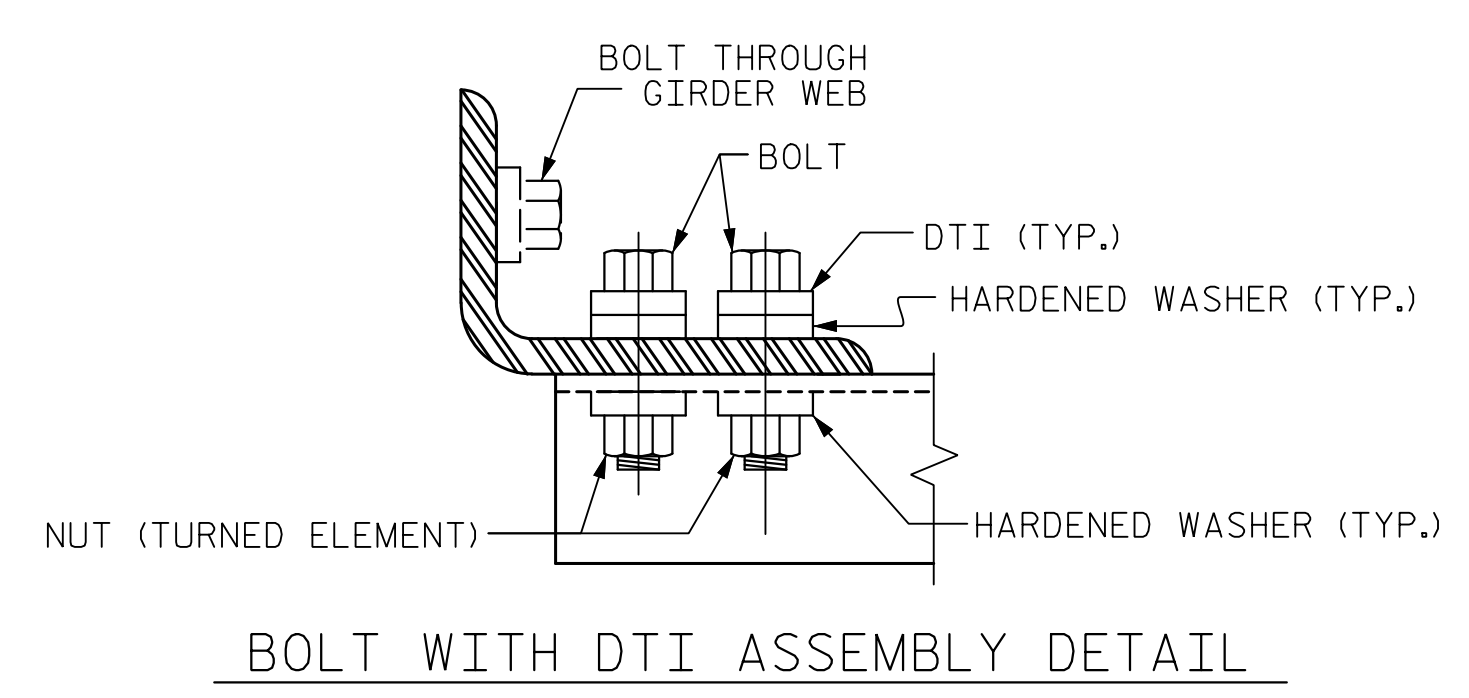
PART SECTION AT INTERMEDIATE DIAPHRAGM
(72" BULB TEE GIRDER SHOWN)



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



CONNECTOR PLATE DETAIL



CONNECTION DETAILS

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72" BULB TEE	1'-4 1/4"	1'-9 1/4"	1'-9 1/4"	4'-2"

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: 39+52.37 -Y14A-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

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

DocuSigned by:
 R. BOSLEY
 SEAL 046234
 ENGINEER
 12/7/2018

DocuSigned by:
 PAUL J. BARBER
 SEAL 12916
 ENGINEER
 12/7/2018

DOCUMENT NOT CONSIDERED
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 SIGNATURES COMPLETED

HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: L. WATERS DATE: 7/18
 CHECKED BY: B. BOSLEY DATE: 7/18
 DESIGN ENGINEER OF RECORD: B. BOSLEY DATE: 12/18

DWG. NO. II

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

TOTAL SHEETS: 24

ASSEMBLED BY: LLW DATE: 3/18
 CHECKED BY: RBB DATE: 3/18

DRAWN BY: RWW 11/09
 CHECKED BY: GM 11/09

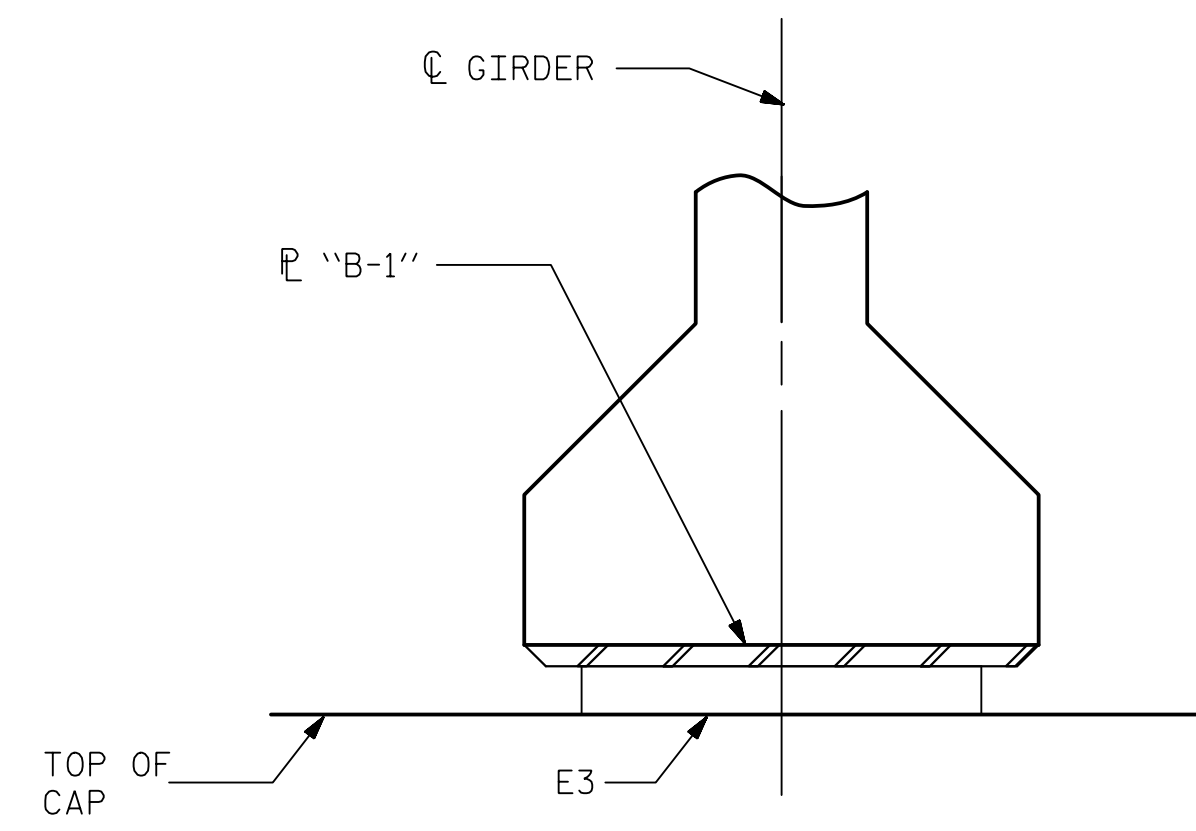
ADDED 11/23/09R
 REV. 10/11/11 MAA/GM

NOTES

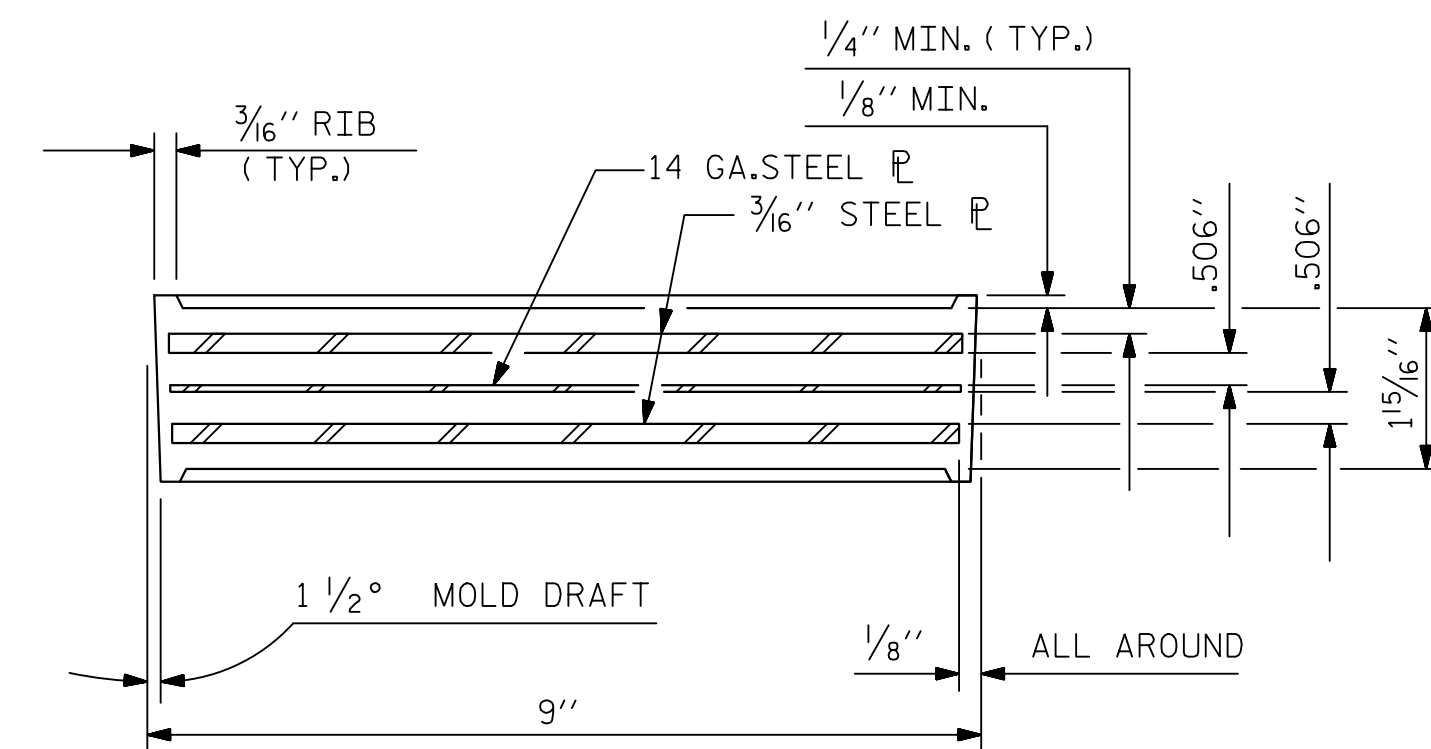
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

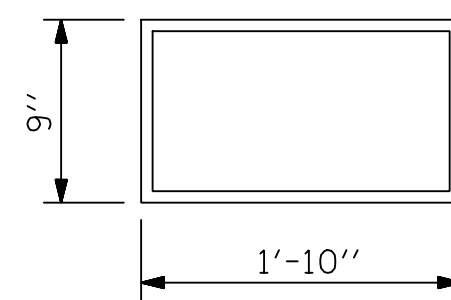
FOR BEARING LOCATIONS, SEE 'FRAMING PLAN' SHEET.



FIXED SECTION E-E



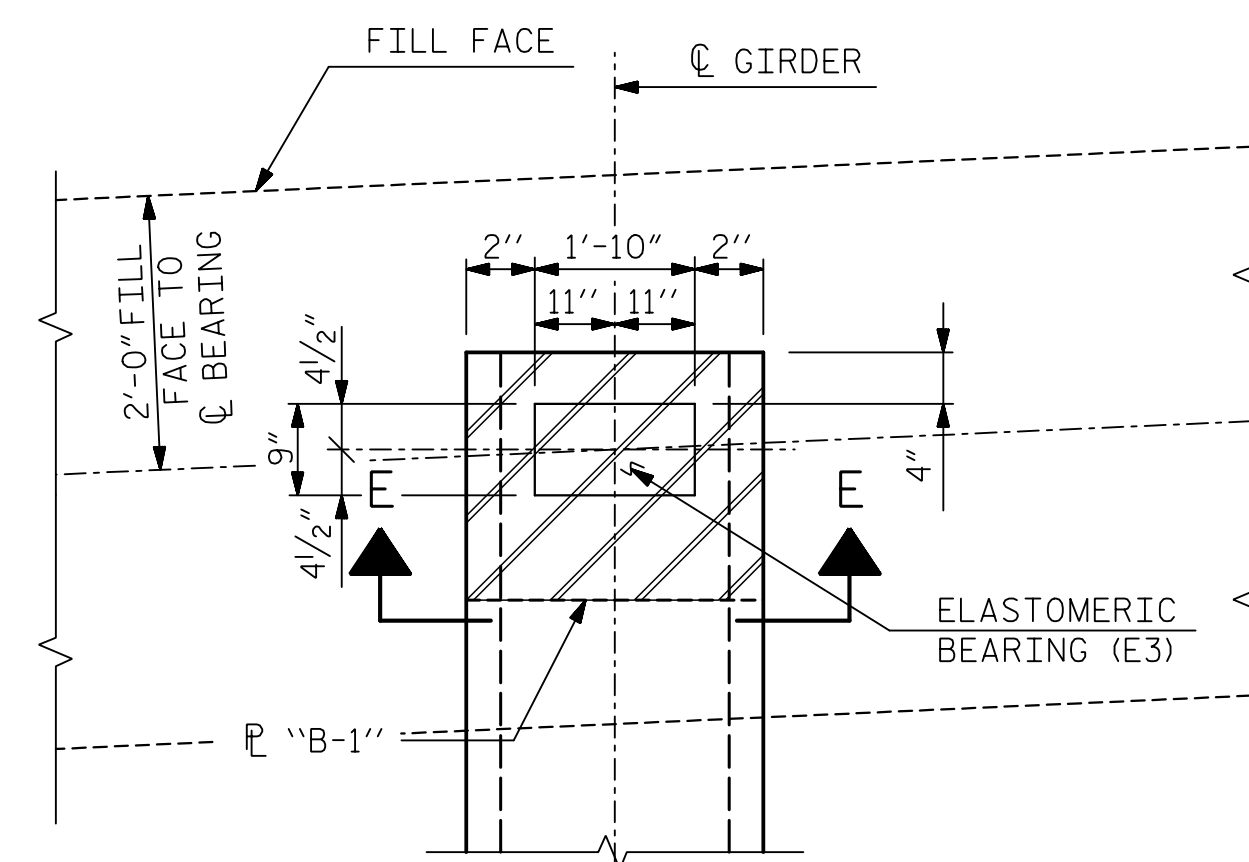
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E3 (14 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

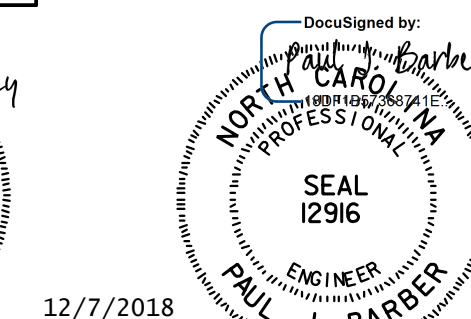
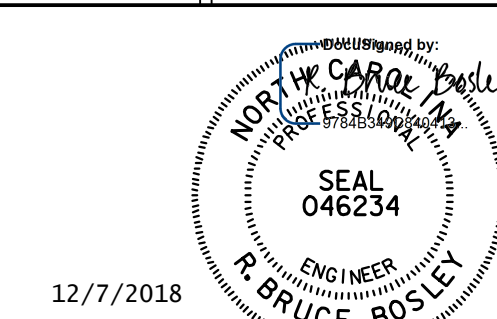
TYPE IV



PLAN VIEW AT INTEGRAL END BENTS

(END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION)

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225.0 k



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PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: 39+52.37 -Y14A-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 ELASTOMERIC BEARING
 DETAILS
 PRESTRESSED CONCRETE GIRDER
 SUPERSTRUCTURE

ASSEMBLED BY : ADG	DATE : 4/18
CHECKED BY : JVE	DATE : 4/18
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

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DRAWN BY : A. GOFF	DATE : 7/18	DWG. NO. 12	
CHECKED BY : J. ELKINS	DATE : 7/18		
DESIGN ENGINEER OF RECORD : B. BOSLEY	DATE : 12/18		

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			24
2			4			

DEAD LOAD DEFLECTION TABLE FOR SPAN A																					
0.6" Ø LOW RELAXATION STRANDS	GIRDER 1 AND 7																				
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.046	0.09	0.132	0.171	0.205	0.233	0.257	0.273	0.284	0.287	0.284	0.273	0.257	0.233	0.205	0.171	0.132	0.090	0.046	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.027	0.054	0.080	0.105	0.126	0.145	0.159	0.170	0.177	0.179	0.177	0.170	0.159	0.145	0.126	0.105	0.080	0.054	0.027	0.000
FINAL CAMBER ↑	0	1/4	7/16	5/8	13/16	15/16	1 1/16	1 3/16	1 1/4	1 1/4	1 5/16	1 1/4	1 1/4	1 3/16	1 1/16	1 5/16	1 3/16	5/8	7/16	1/4	0

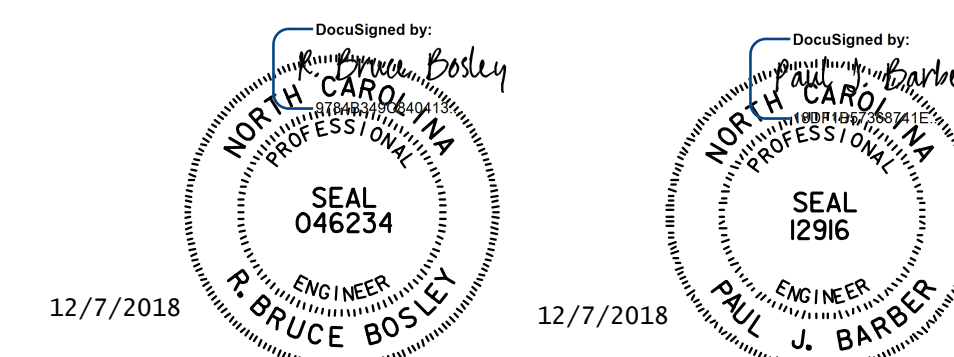
DEAD LOAD DEFLECTION TABLE FOR SPAN A																					
0.6" Ø LOW RELAXATION STRANDS	GIRDER 2 AND 6																				
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.046	0.090	0.132	0.171	0.205	0.233	0.257	0.273	0.284	0.287	0.284	0.273	0.257	0.233	0.205	0.171	0.132	0.090	0.046	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.027	0.054	0.080	0.105	0.126	0.145	0.160	0.171	0.178	0.180	0.178	0.171	0.160	0.145	0.126	0.105	0.080	0.054	0.027	0.000
FINAL CAMBER ↑	0	1/4	7/16	5/8	13/16	15/16	1 1/16	1 3/16	1 1/4	1 1/4	1 5/16	1 1/4	1 1/4	1 3/16	1 1/16	1 5/16	1 3/16	5/8	7/16	1/4	0

DEAD LOAD DEFLECTION TABLE FOR SPAN A																					
0.6" Ø LOW RELAXATION STRANDS	GIRDER 3 AND 5																				
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.047	0.090	0.132	0.171	0.205	0.233	0.257	0.273	0.284	0.287	0.284	0.273	0.257	0.233	0.205	0.171	0.132	0.090	0.046	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.027	0.053	0.079	0.104	0.125	0.143	0.158	0.168	0.175	0.177	0.175	0.168	0.158	0.143	0.125	0.104	0.079	0.053	0.027	0.000
FINAL CAMBER ↑	0	1/4	7/16	5/8	13/16	15/16	1 1/16	1 3/16	1 1/4	1 5/16	1 5/16	1 5/16	1 1/4	1 3/16	1 1/16	1 5/16	1 3/16	5/8	7/16	1/4	0

DEAD LOAD DEFLECTION TABLE FOR SPAN A																					
0.6" Ø LOW RELAXATION STRANDS	GIRDER 4																				
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.046	0.090	0.132	0.171	0.205	0.233	0.257	0.273	0.284	0.287	0.284	0.273	0.257	0.233	0.205	0.171	0.132	0.090	0.046	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.028	0.055	0.082	0.107	0.129	0.148	0.163	0.174	0.181	0.183	0.181	0.174	0.163	0.148	0.129	0.107	0.082	0.055	0.028	0.000
FINAL CAMBER ↑	0	3/16	7/16	5/8	3/4	15/16	1	1 1/8	1 3/16	1 1/4	1 1/4	1 1/4	1 3/16	1 1/8	1	1 5/16	3/4	5/8	7/16	3/16	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).

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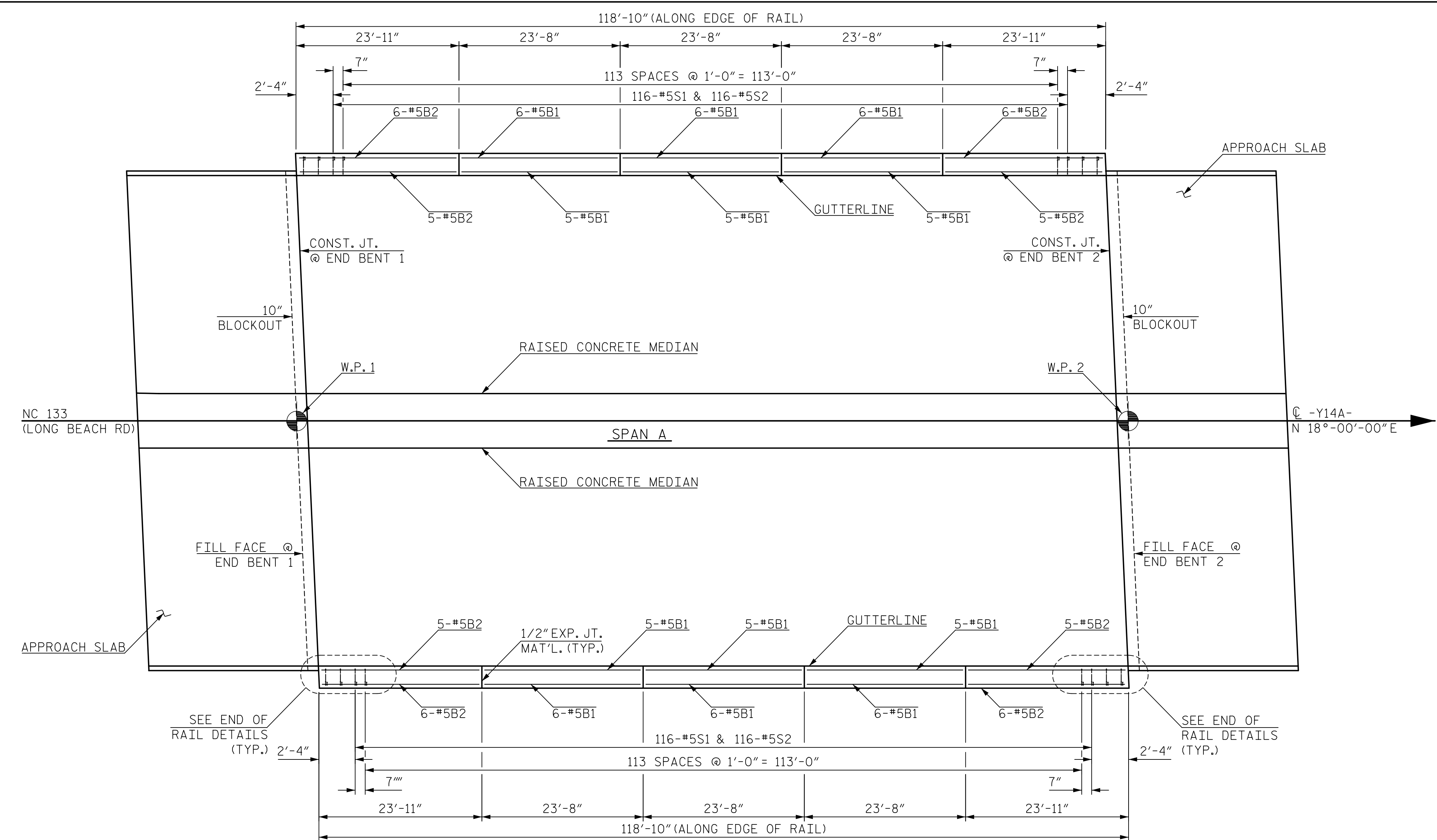


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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 GIRDER
 DEAD LOAD DEFLECTIONS
 AND CAMBER

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DRAWN BY	L. WATERS	DATE	7/18
CHECKED BY	A. GOFF	DATE	7/18
DESIGN ENGINEER OF RECORD	B. BOSLEY	DATE	12/18
			DWG. NO. 13

REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					TOTAL SHEETS 24



NOTES

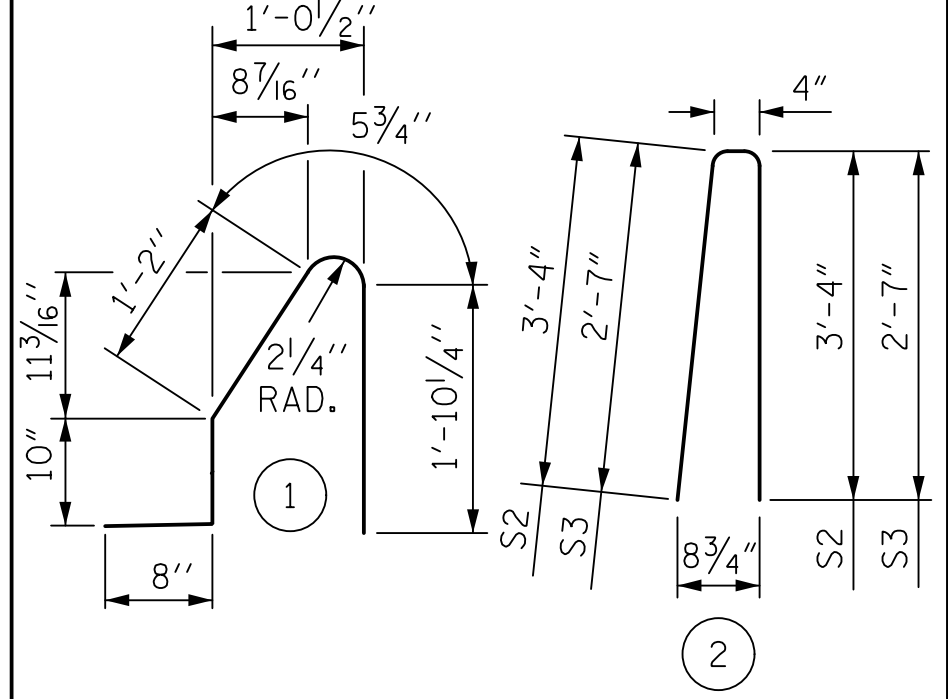
THE BARRIER RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5 S1 AND #5 S2 MAY BE SHIFTED SLIGHTLY AS REQUIRED TO PROVIDE 2" MINIMUM CONCRETE COVER AT THE 1/2" EXPANSION JOINTS IN THE BARRIER RAIL.

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

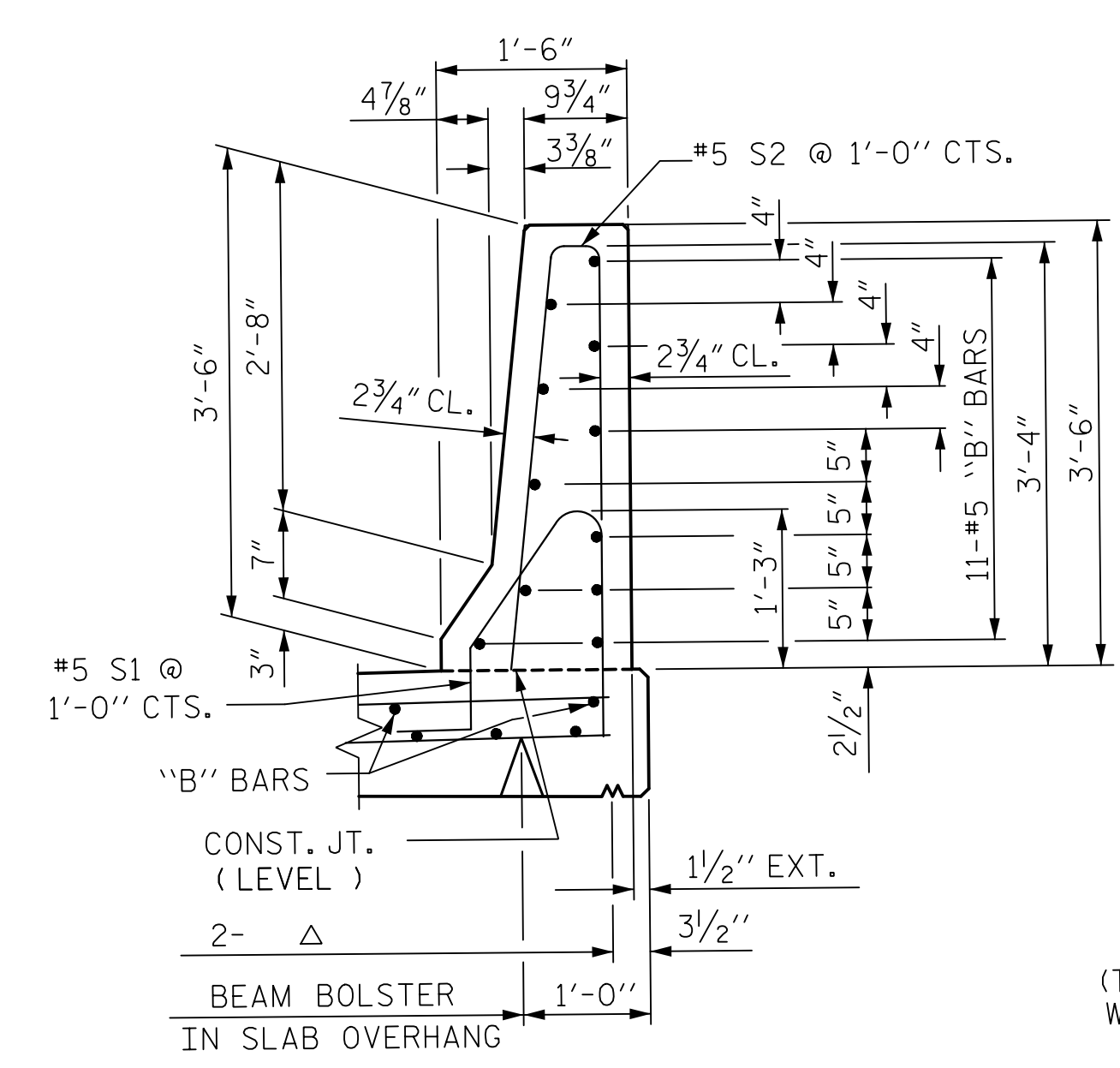


ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

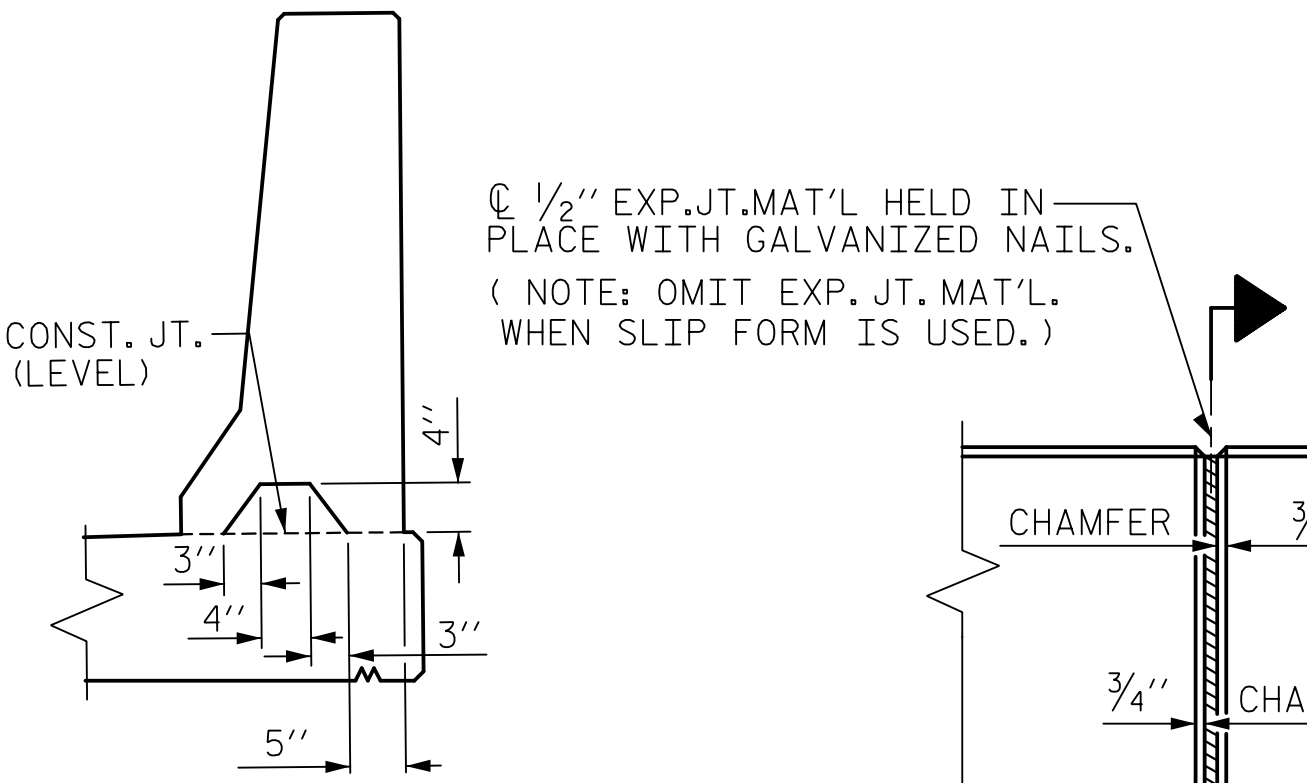
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* B1	66	#5	STR.	23'-2"	1,595
* B2	44	#5	STR.	23'-5"	1,075
* S1	240	#5	1	4'-7"	1,147
* S2	232	#5	2	7'-0"	1,694
* S3	8	#5	2	5'-6"	46
* EPOXY COATED REINFORCING STEEL					5,557 LBS.
CLASS AA CONCRETE					32.3 CU. YDS.
CONCRETE BARRIER RAIL					237.7 LIN. FT.

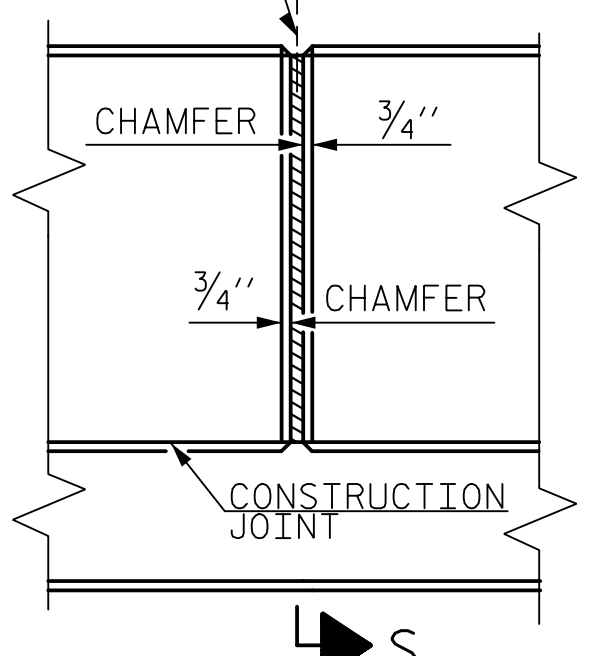


PLAN OF BARRIER RAIL

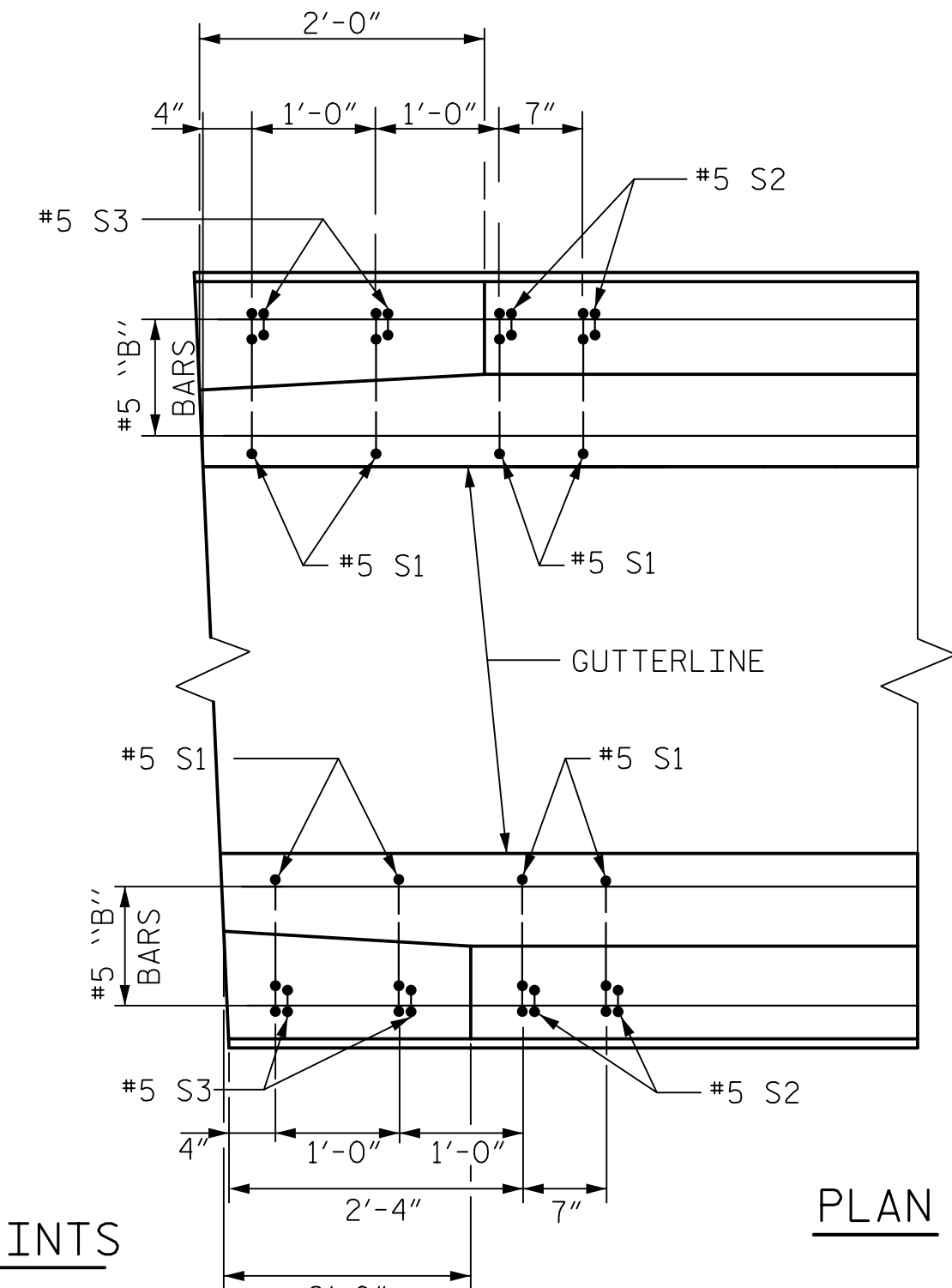
NOTE: EDGE OF SLAB NOT SHOWN FOR CLARITY.



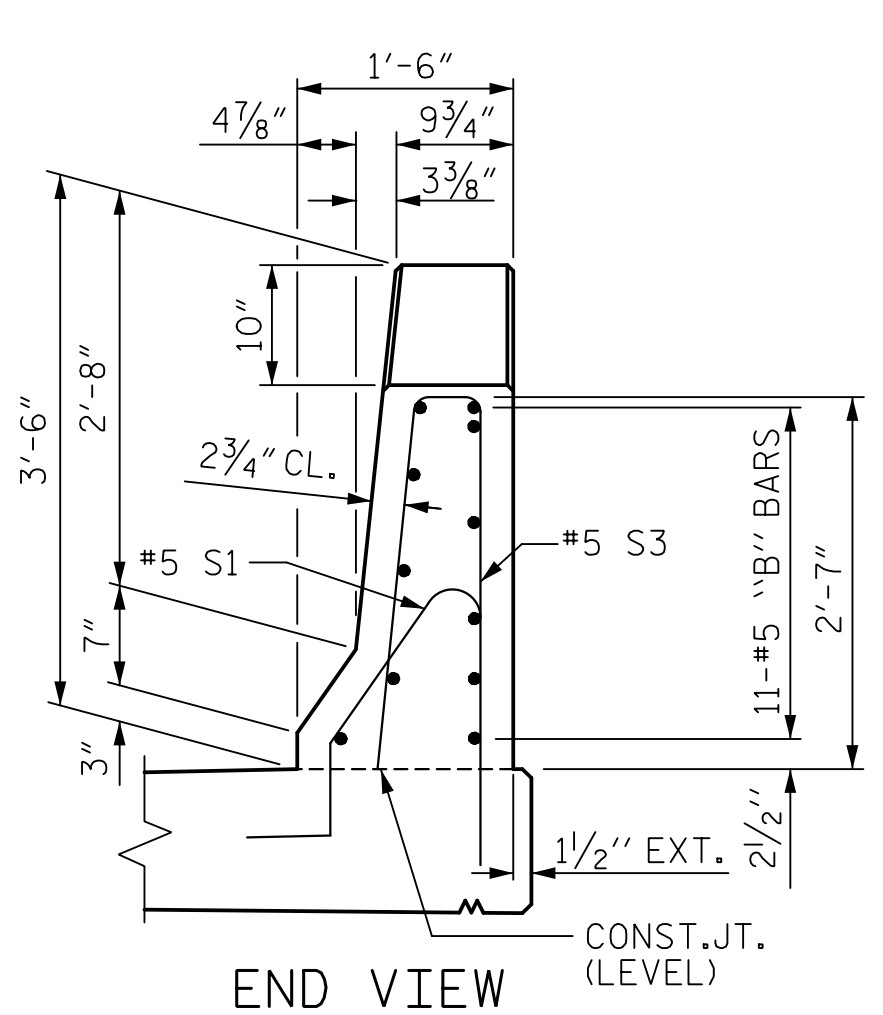
SECTION S-S AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



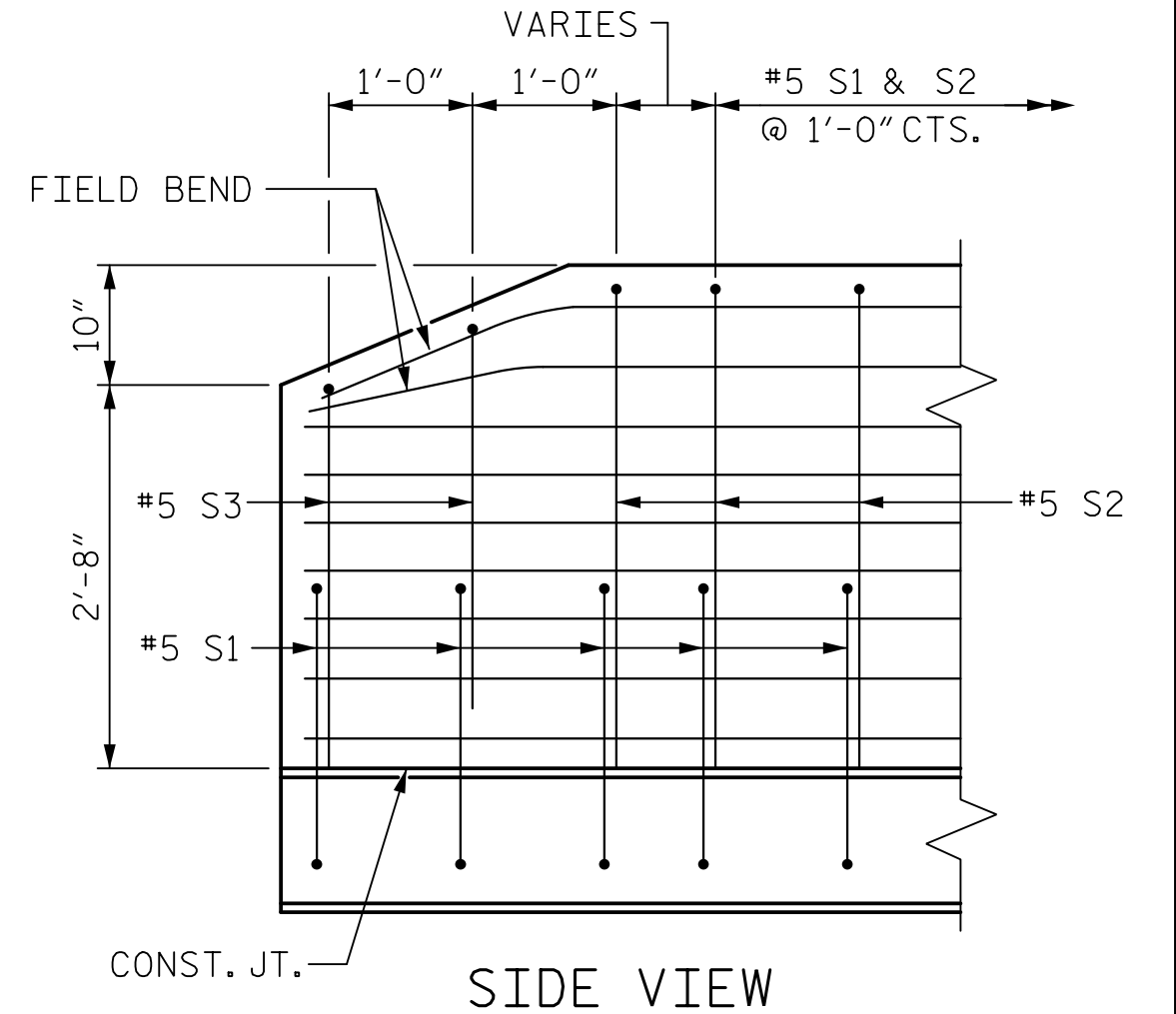
ELEVATION AT EXPANSION JOINTS



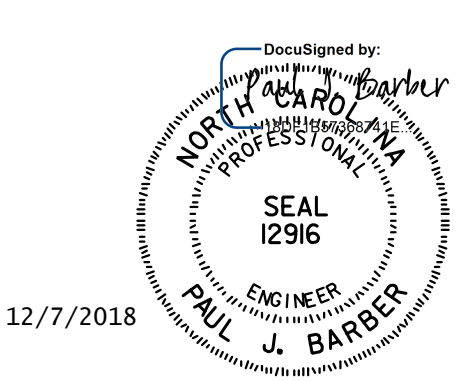
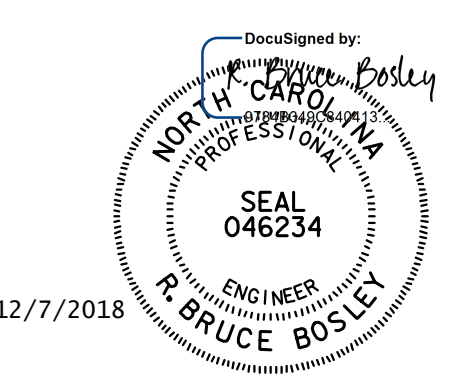
PLAN



END OF RAIL DETAILS



SIDE VIEW



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PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: 39+52.37 -Y14A-

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

ASSEMBLED BY : LLW	DATE : 3/18
CHECKED BY : JVE	DATE : 3/18
DRAWN BY : ARB 5/87	REV. 10/11/11
CHECKED BY : SJD 9/87	REV. 7/12
	REV. 6/13
MAA/GM	
MAA/GM	
MAA/GM	

HNTB	HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
DRAWN BY : L. WATERS	DATE : 7/18
CHECKED BY : J. ELKINS	DATE : 7/18
DESIGN ENGINEER OF RECORD : B. BOSLEY	DATE : 12/18
DWG. NO. 14	

REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					TOTAL SHEETS
					24

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.)

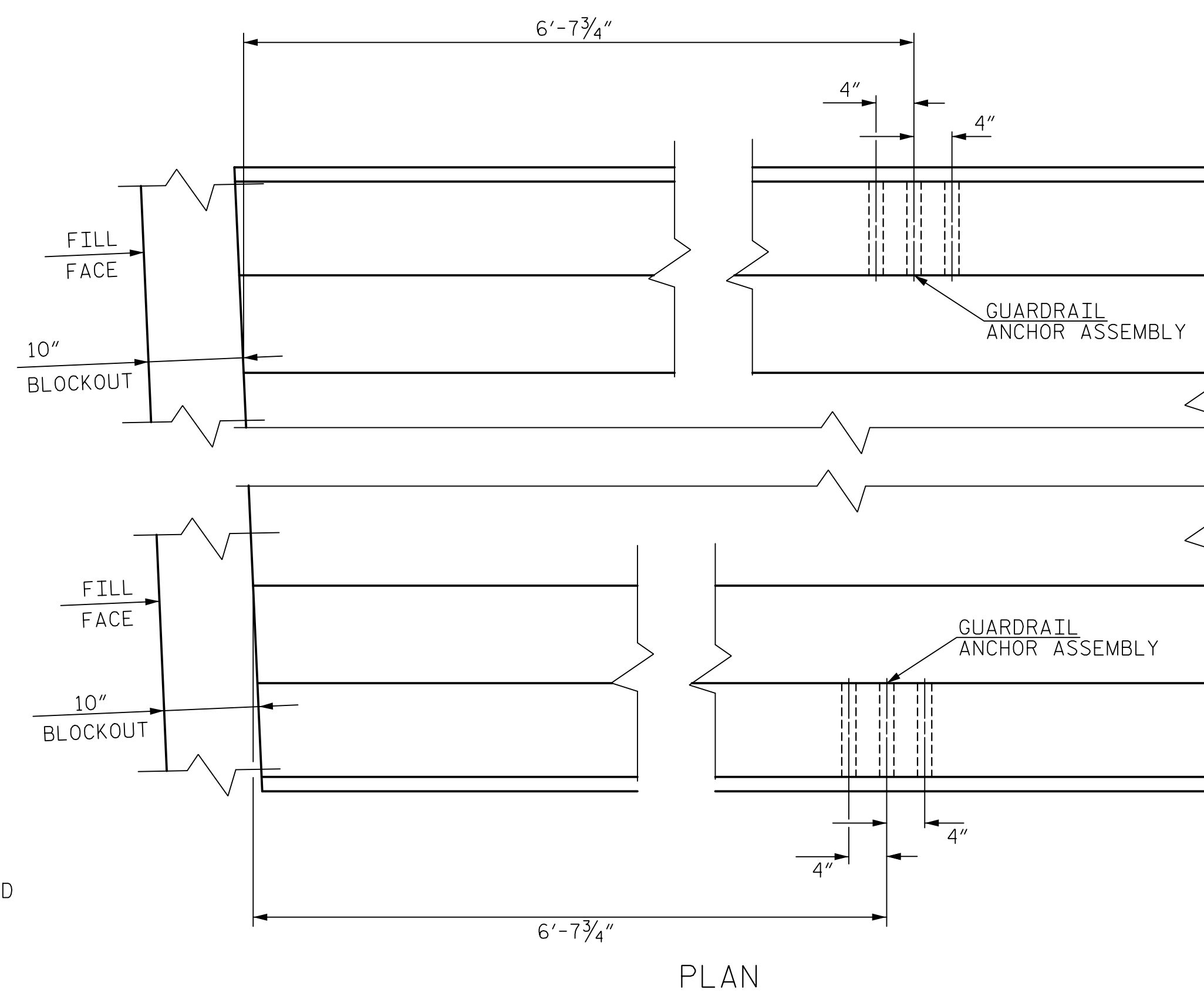
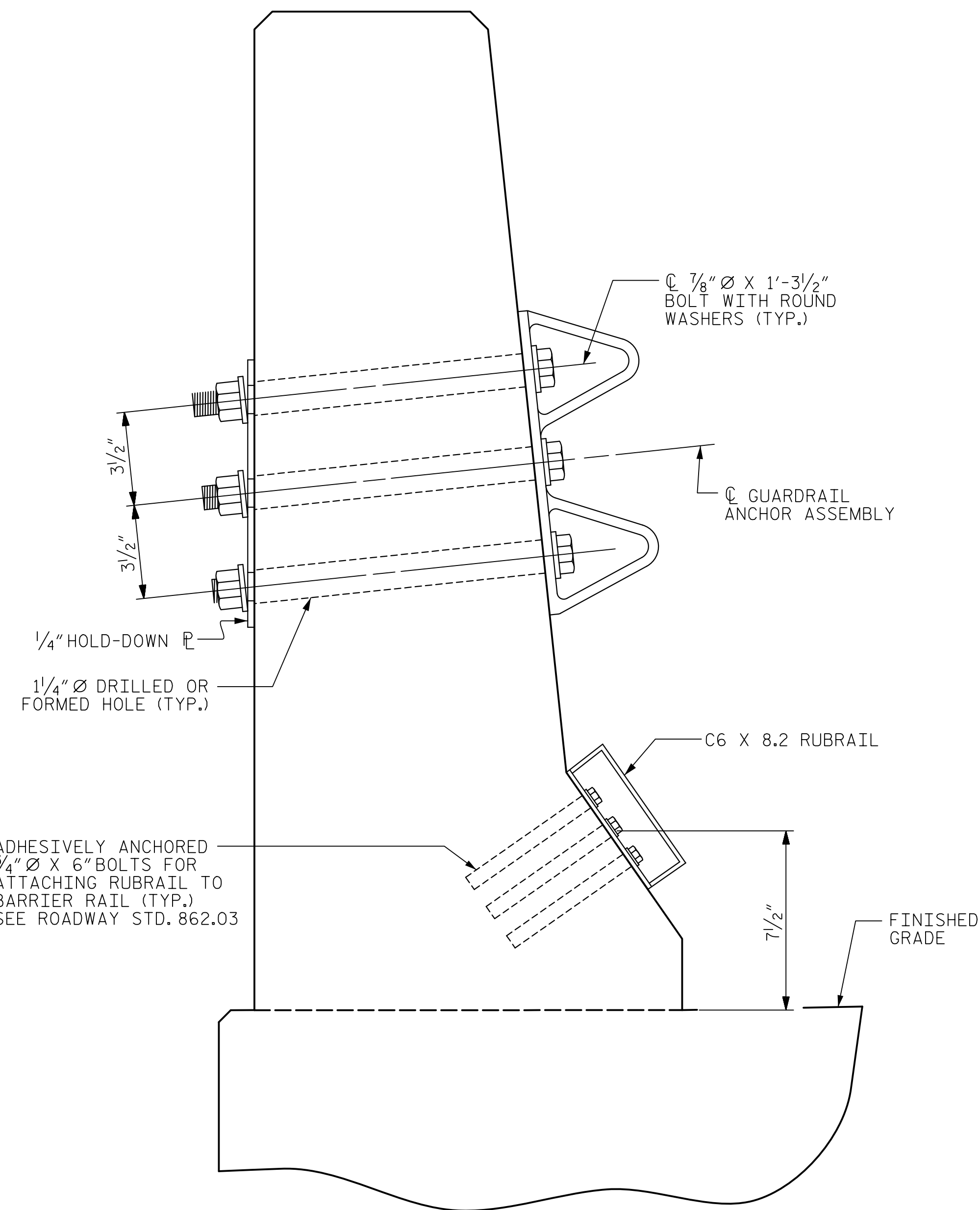
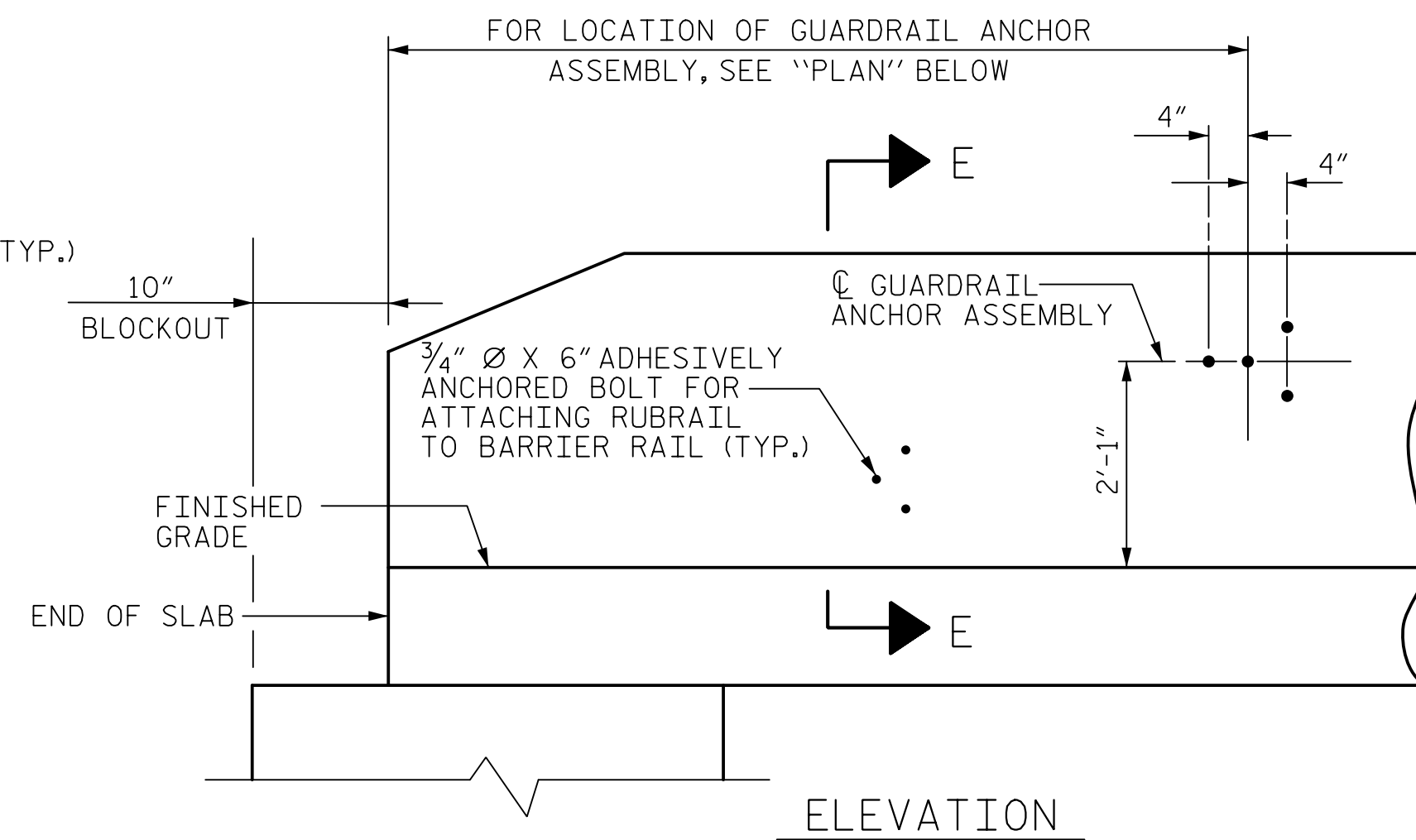
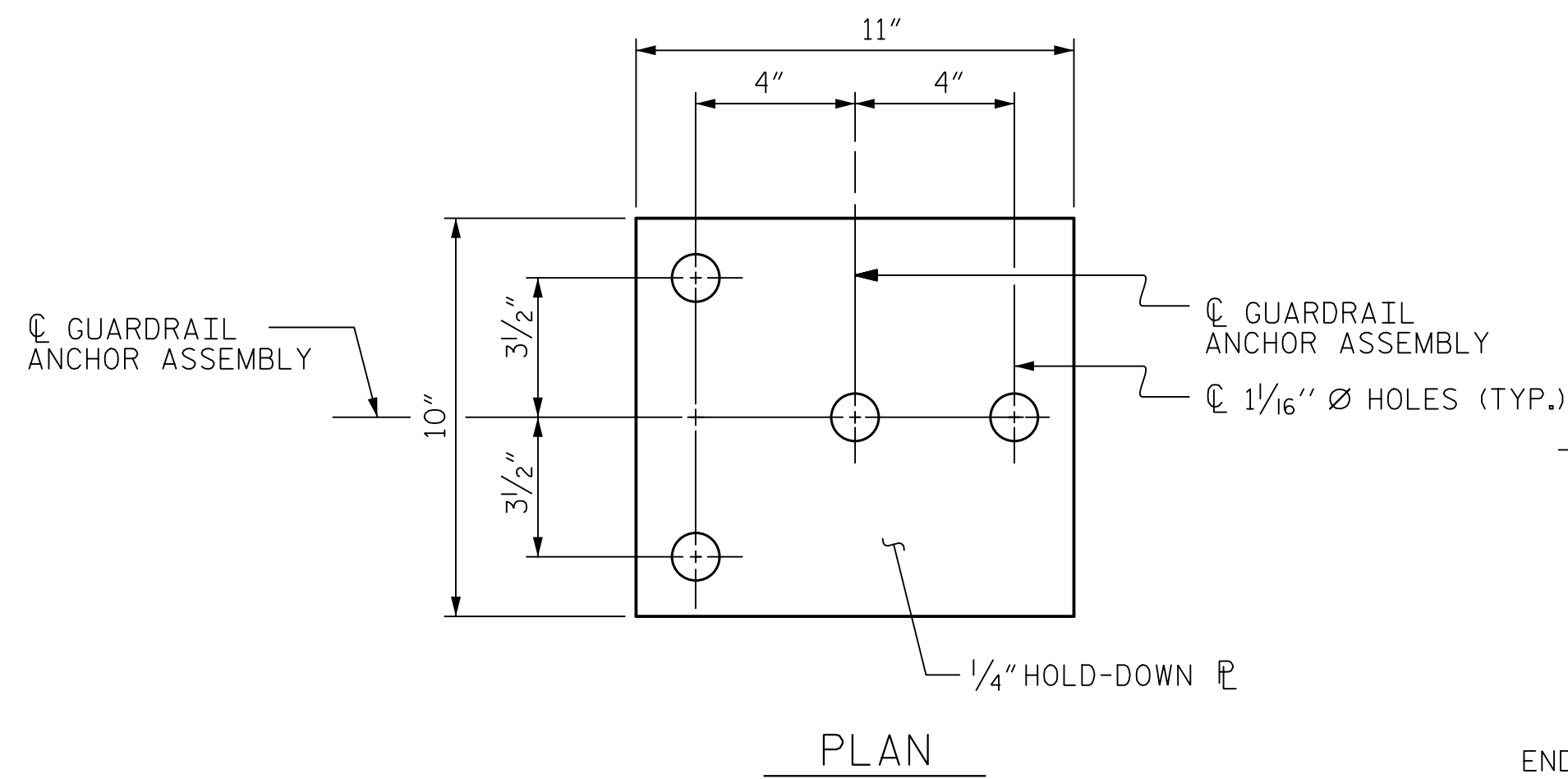
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

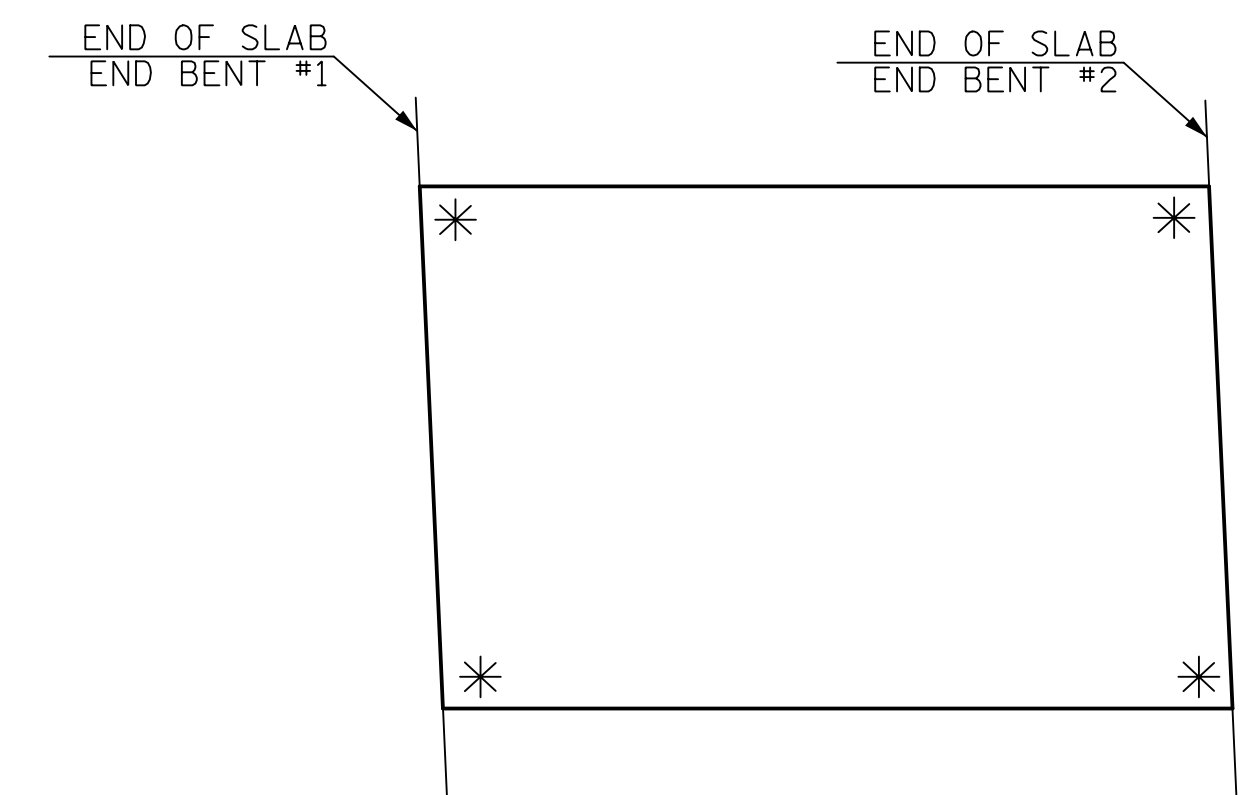
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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

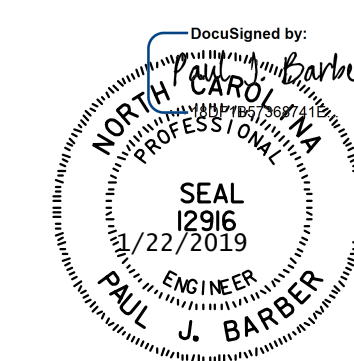
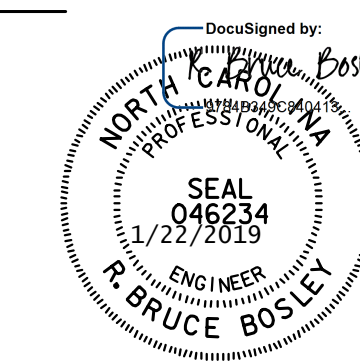
END BENT #1 SHOWN, END BENT #2 SIMILAR.



SKETCH SHOWING POINTS OF ATTACHMENTS

* DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: 39+52.37 -Y14A-



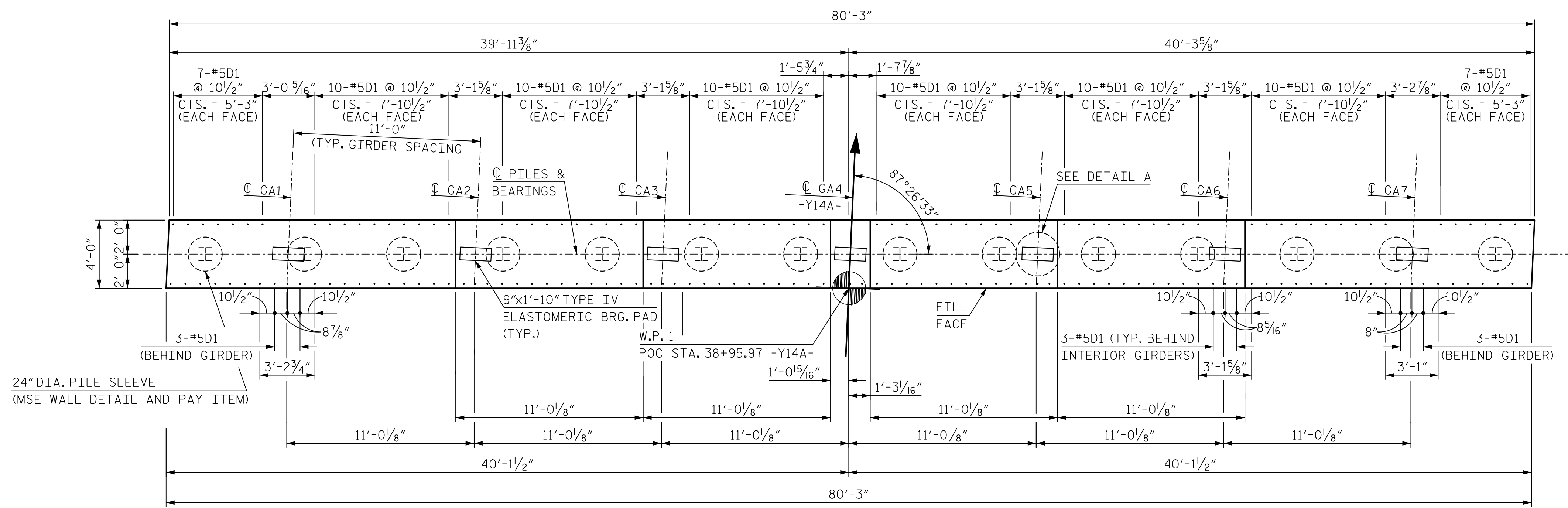
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

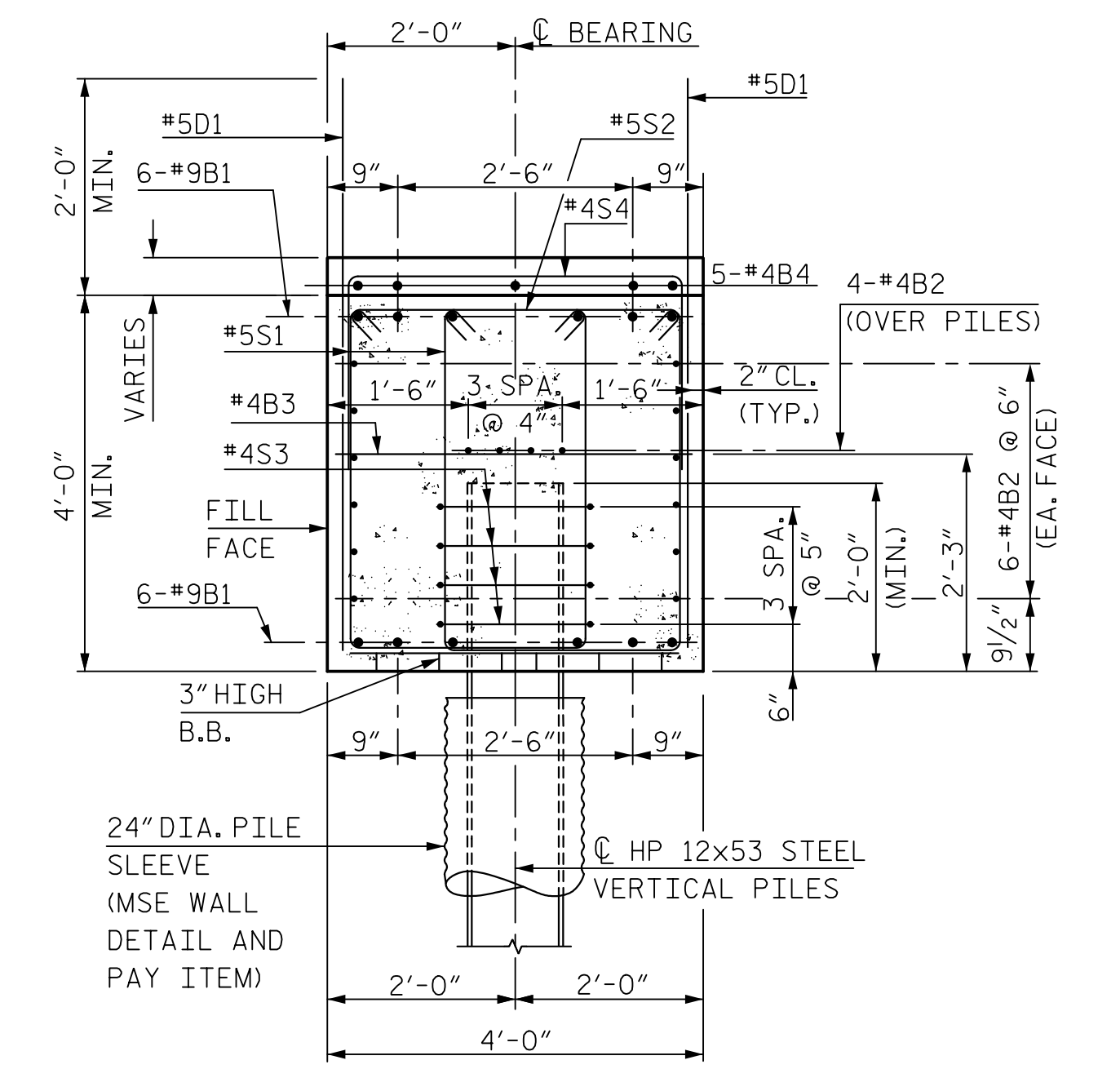
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CHECKED BY : RBB	DATE : 3/18
DRAWN BY : TLA 5/06	REV. 10/1/11 MAA/GM
CHECKED BY : GM 5/06	REV. 7/12 MAA/GM
	REV. 6/13 MAA/GM

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DRAWN BY : L. WATERS	DATE : 7/18	DWG. NO. 15	
CHECKED BY : B. BOSLEY	DATE : 7/18		
DESIGN ENGINEER OF RECORD : B. BOSLEY	DATE : 12/18		

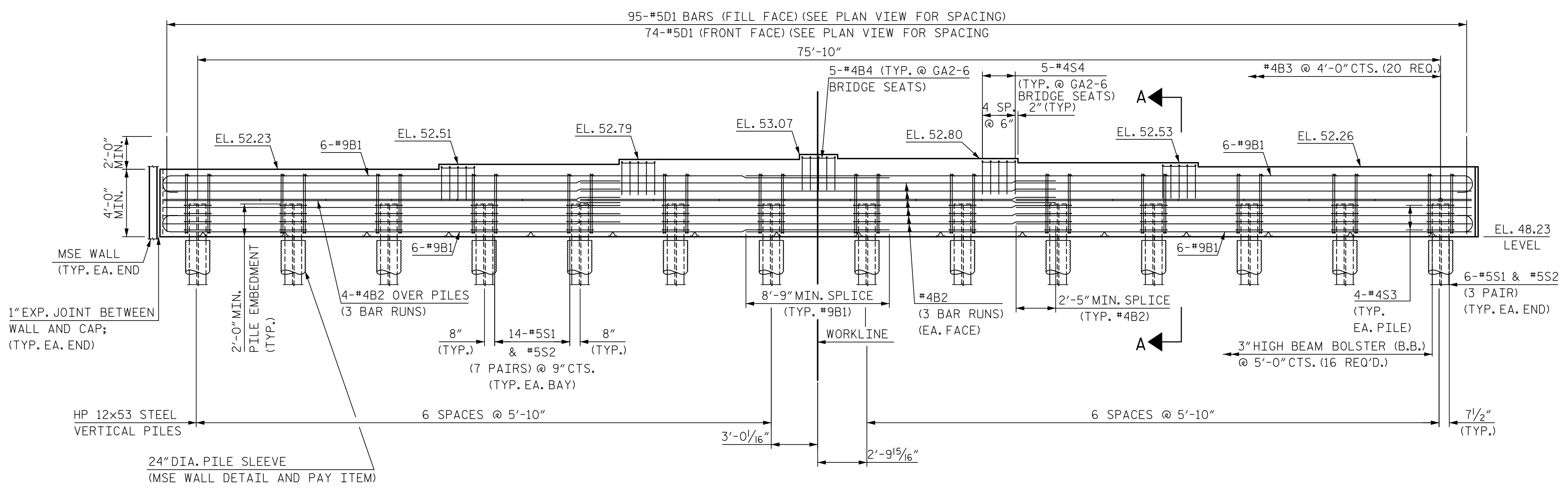
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			24
2			4			



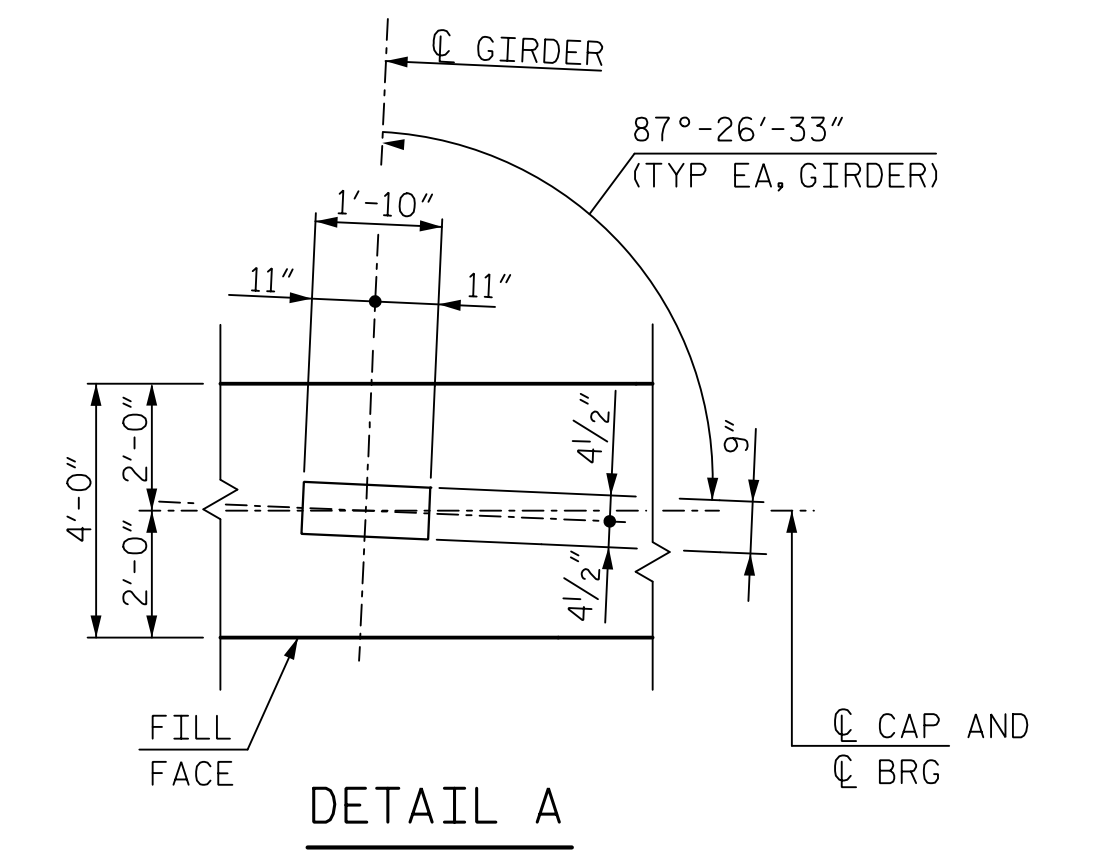
PLAN



SECTION A-A



ELEVATION



DETAIL A

NOTES:
 THE END BENT DIAPHRAGM SHALL BE POURED WITH THE SUPERSTRUCTURE.
 CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIALS. FOR DETAILS, SEE SUPERSTRUCTURE PLANS.

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: 39+52.37 -Y14A-

DocuSigned by:
R. BRUCE BOSLEY
 SEAL 046234
 ENGINEER
 12/7/2018

DocuSigned by:
PAUL J. BARBER
 SEAL 12916
 ENGINEER
 12/7/2018

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 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: L. WATERS DATE: 7/18
 CHECKED BY: J. ELKINS DATE: 7/18
 DESIGN ENGINEER OF RECORD: B. BOSLEY DATE: 12/18

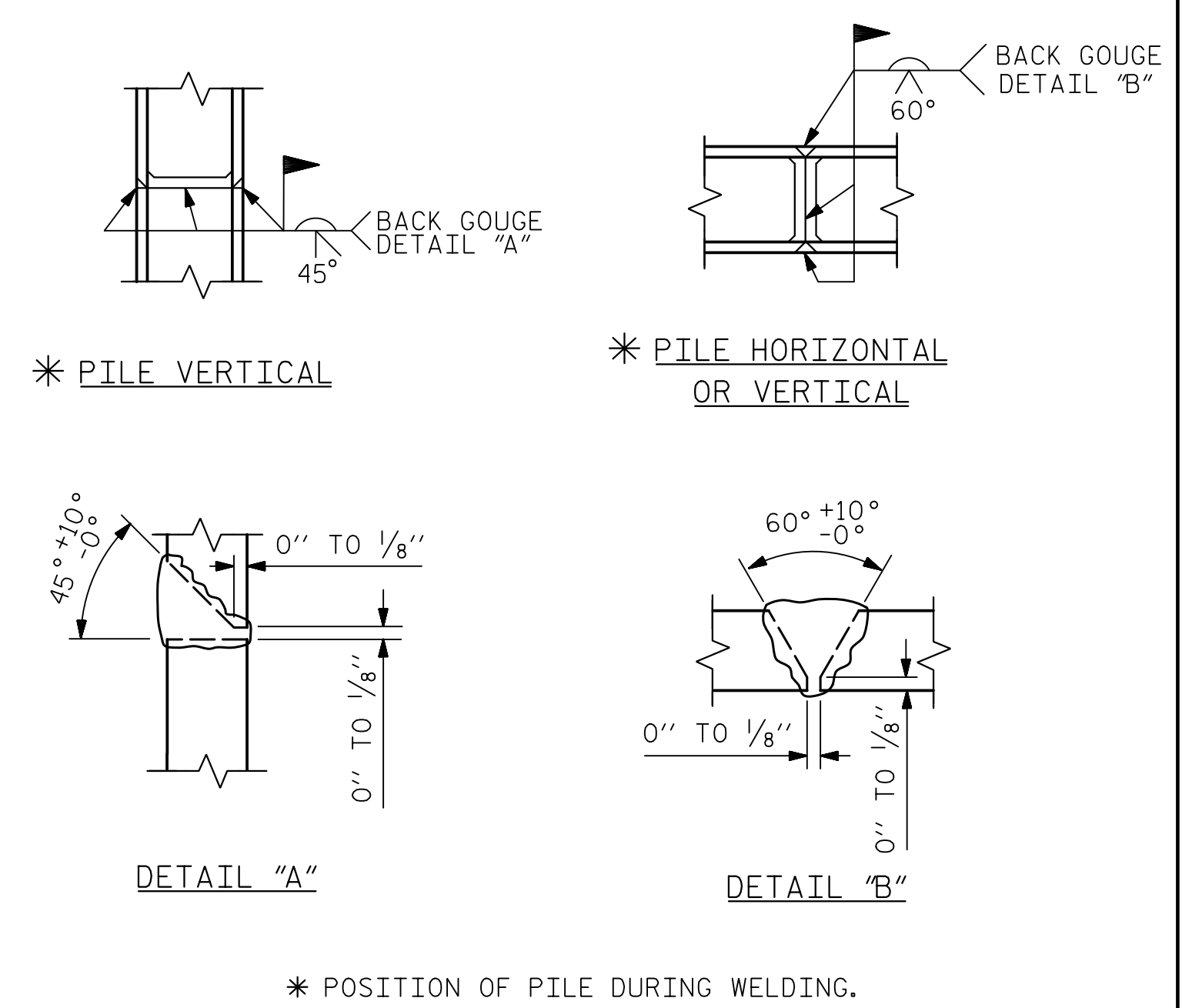
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SHEET 1 OF 2

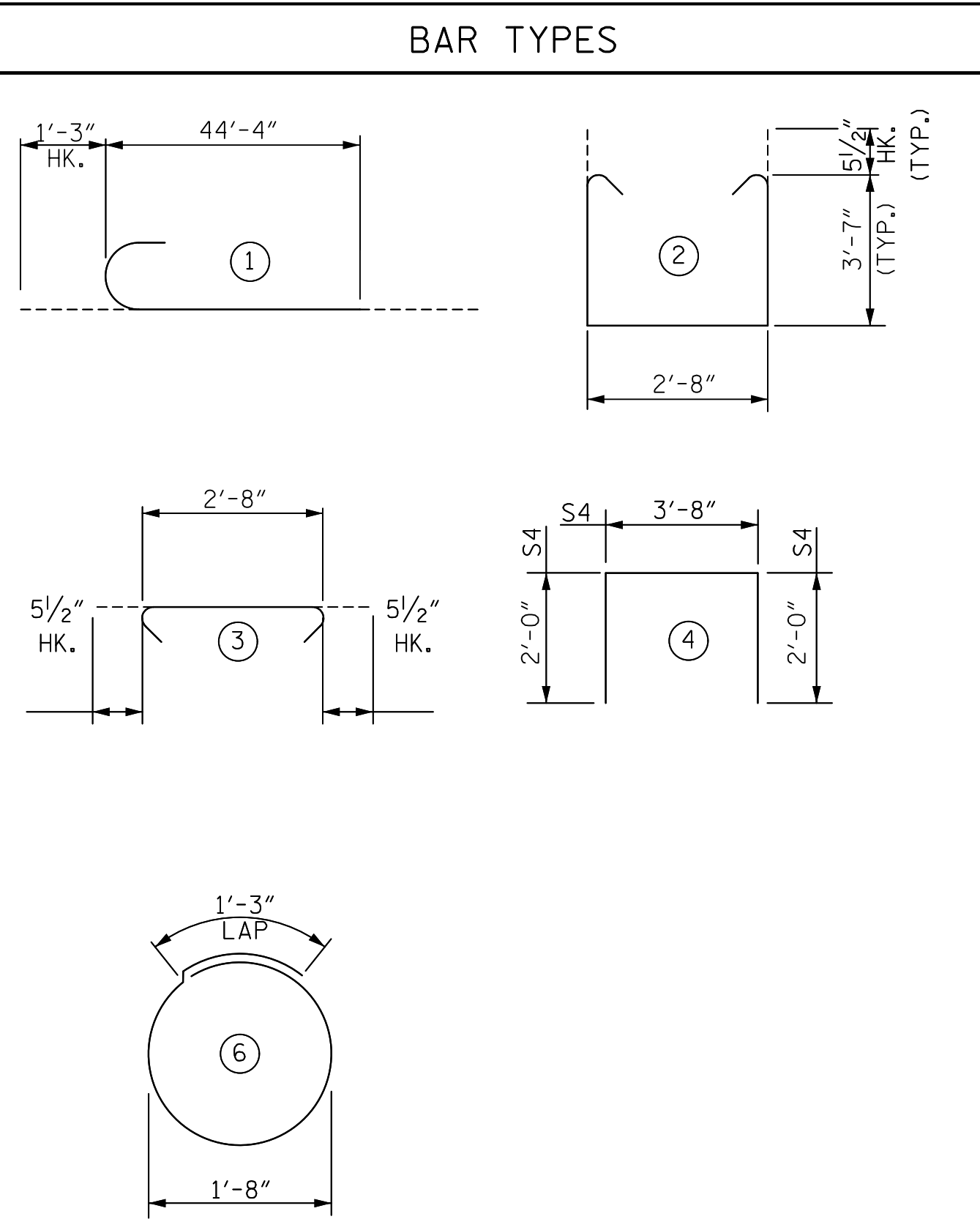
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-17
1			3			TOTAL SHEETS
2			4			24



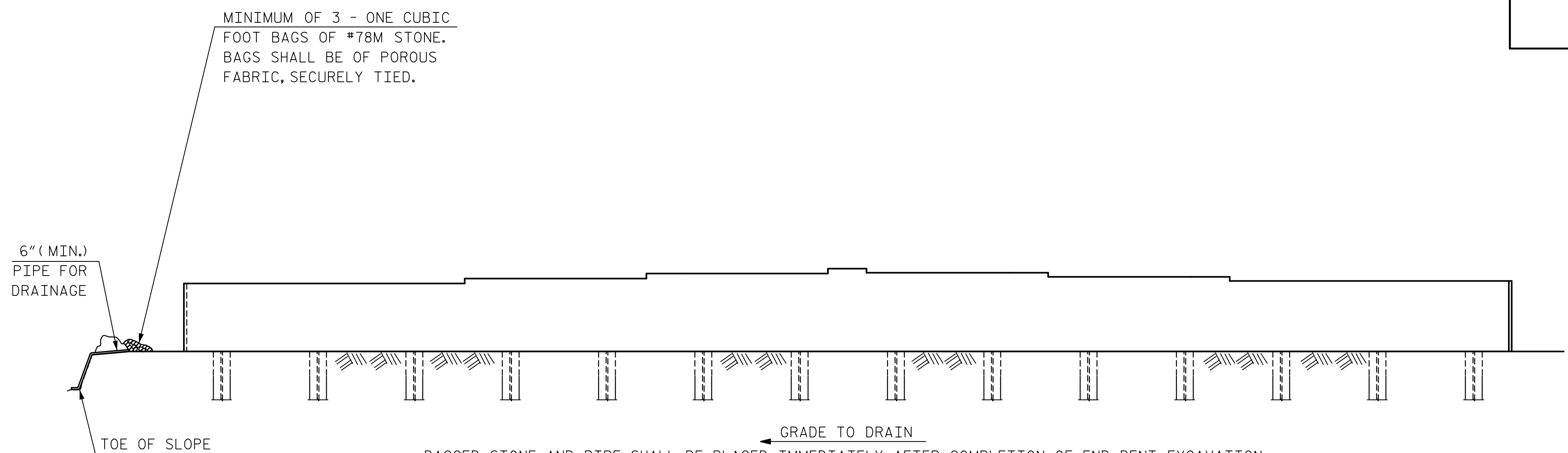
PILE SPLICE DETAILS



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING					
END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	24	9	1	45'-7"	3,720
B2	48	4	STR.	29'-1"	933
B3	20	4	STR.	3'-8"	49
B4	30	4	STR.	2'-0"	40
D1	169	5	STR.	5'-10"	1,028
S1	194	5	2	10'-9"	2,175
S2	194	5	3	3'-7"	725
S3	56	4	6	6'-6"	243
S4	25	4	4	7'-8"	128

QUANTITIES		
REINFORCING STEEL	LBS.	9,041
CLASS "A" CONCRETE	CU. YDS.	50.6
PILE REDRIVES	EA.	7
PILE DRIVING EQUIPMENT SETUP	EA.	14
STEEL PILE POINTS	EA.	14
HP 12x53 STEEL PILES	NO.	14
	FEET	1,078



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 FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 1

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: 39+52.37 -Y14A-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1

DocuSigned by:
 R. BOSLEY
 SEAL 046234
 ENGINEER
 12/7/2018

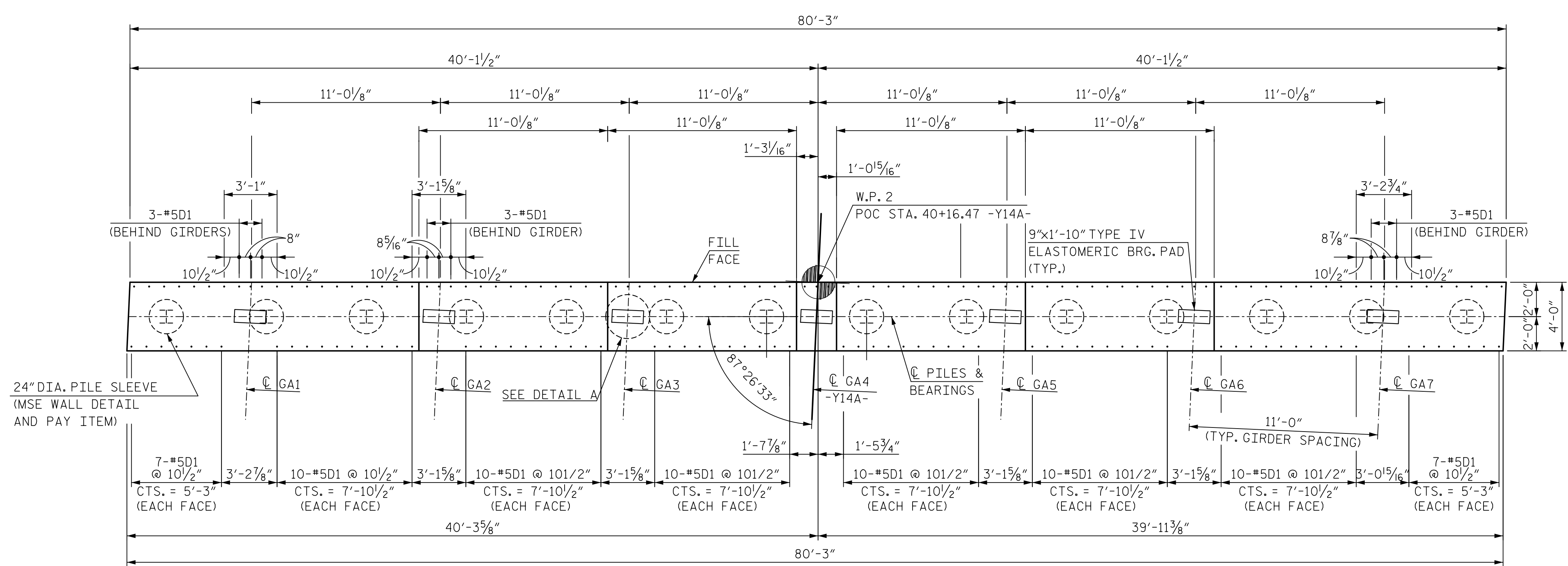
DocuSigned by:
 PAUL J. BARBER
 SEAL 12916
 ENGINEER
 12/7/2018

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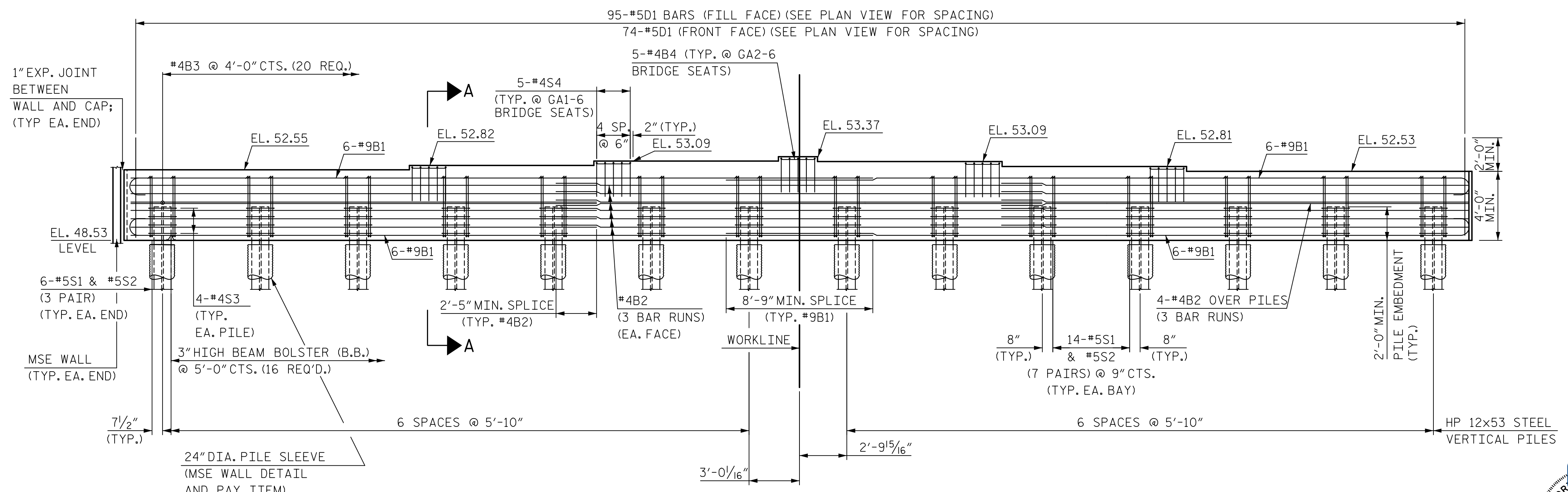
HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY	L. WATERS	DATE	7/18
CHECKED BY	J. ELKINS	DATE	7/18
DESIGN ENGINEER OF RECORD	B. BOSLEY	DATE	12/18

DWG. NO. 18

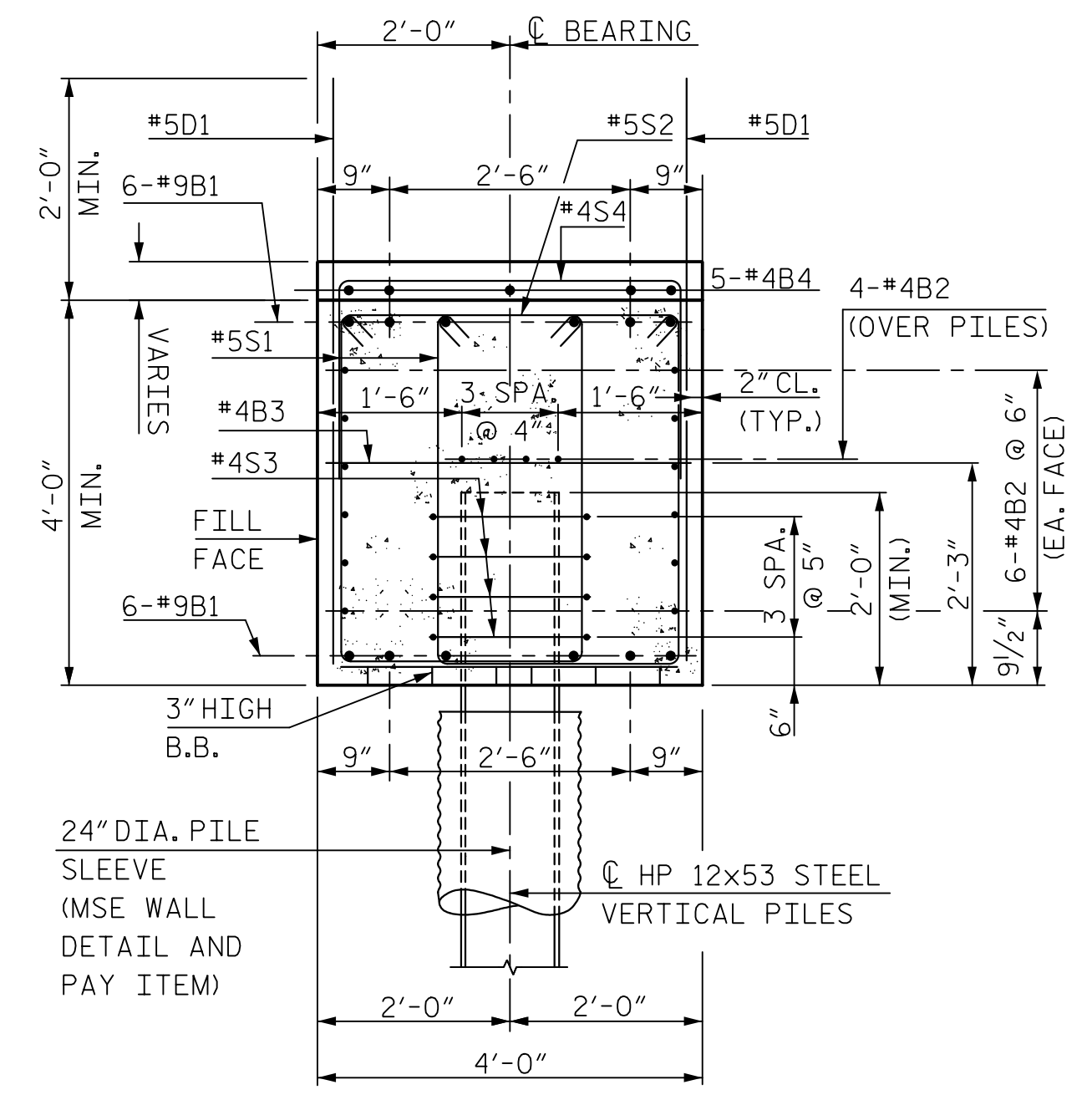
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NO.	BY	DATE	NO.	BY	DATE	S4-18
1			3			TOTAL SHEETS
2			4			24



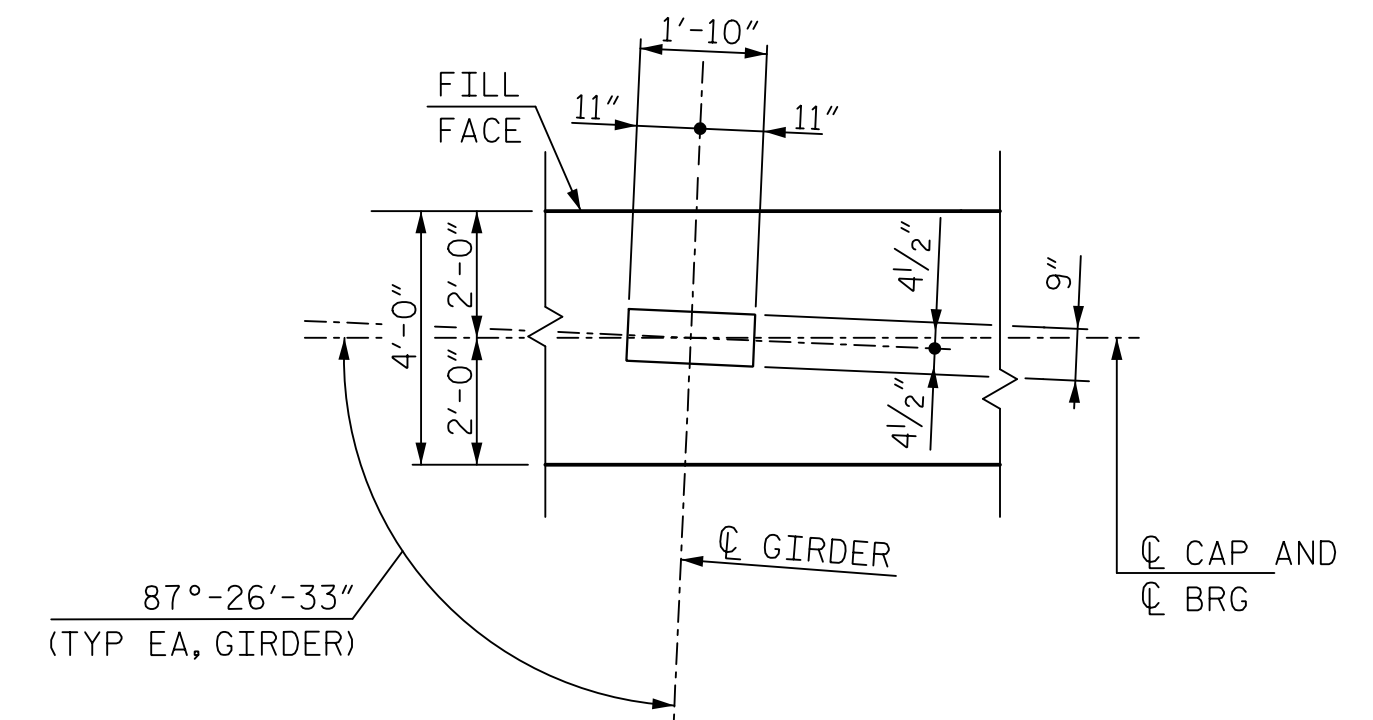
PLAN



ELEVATION



SECTION A-A



DETAIL A

NOTES:
 THE END BENT DIAPHRAGM SHALL BE POURED WITH THE SUPERSTRUCTURE. CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIALS. FOR DETAILS, SEE SUPERSTRUCTURE PLANS.

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: 39+52.37 -Y14A-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 2

DocuSigned by:
BRUCE BOSLEY
 SEAL 046234
 ENGINEER
 12/7/2018

DocuSigned by:
PAUL J. BARBER
 SEAL 12916
 ENGINEER
 12/7/2018

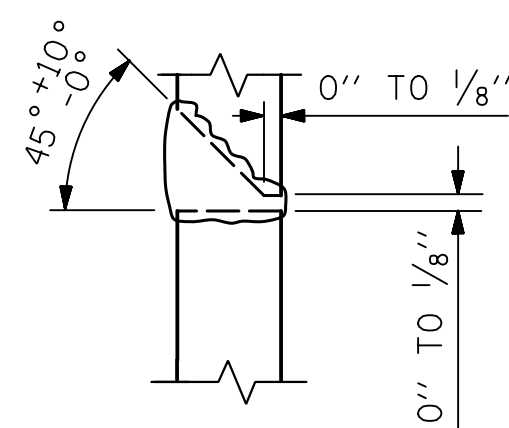
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DRAWN BY: L. WATERS	DATE: 7/18	DWG. NO. 19			
CHECKED BY: J. ELKINS	DATE: 7/18				
DESIGN ENGINEER OF RECORD: B. BOSLEY	DATE: 12/18				
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
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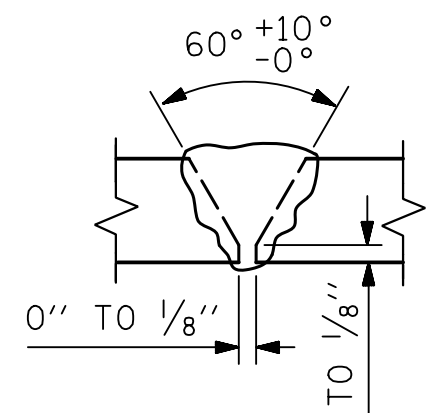
SHEET NO.
 S4-19
 TOTAL SHEETS
 24

* PILE VERTICAL

* PILE HORIZONTAL OR VERTICAL



DETAIL "A"

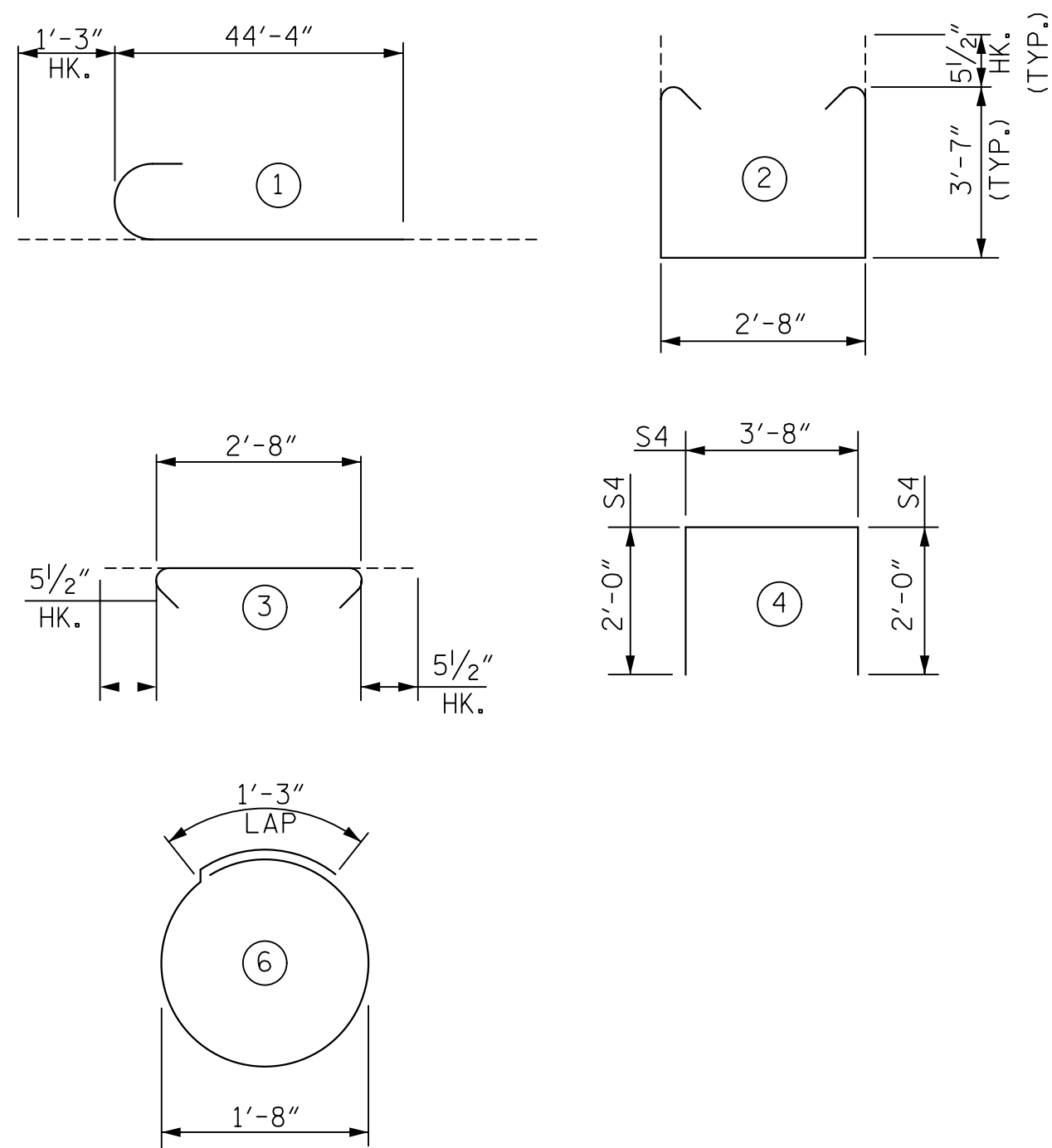


DETAIL "B"

* POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

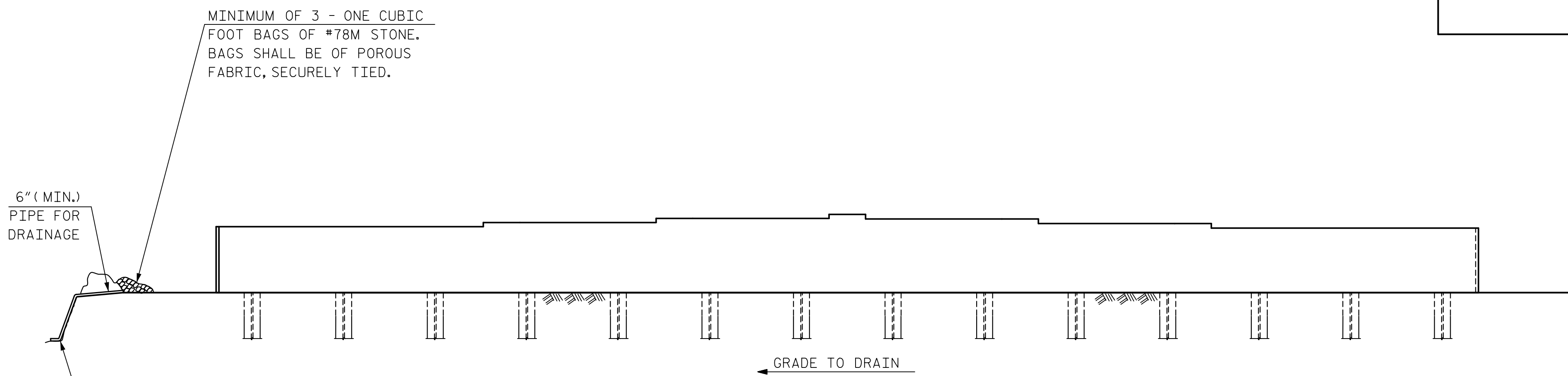
BILL OF REINFORCING

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	24	9	1	45'-7"	3,720
B2	48	4	STR.	29'-1"	933
B3	20	4	STR.	3'-8"	49
B4	30	4	STR.	2'-0"	40
D1	169	5	STR.	5'-10"	1,028
S1	194	5	2	10'-9"	2,175
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QUANTITIES

REINFORCING STEEL	LBS.	9,041
CLASS "A" CONCRETE	CU. YDS.	50.6
PILE REDRIVES	EA.	7
PILE DRIVING EQUIPMENT SETUP	EA.	14
STEEL PILE POINTS	EA.	14
HP 12x53 STEEL PILES	NO.	14
	FEET	1,078



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

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 FOR THE SEVERAL PAY ITEMS.

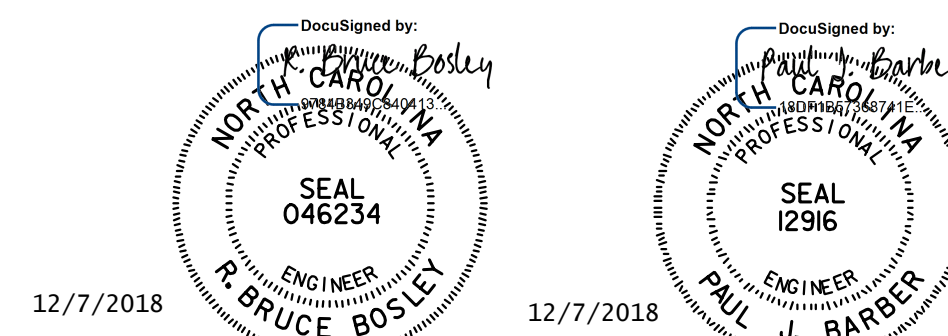
TEMPORARY DRAINAGE AT END BENT 2

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: 39+52.37 -Y14A-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 2



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DRAWN BY	L. WATERS	DATE	7/18
CHECKED BY	J. ELKINS	DATE	7/18
DESIGN ENGINEER OF RECORD	B. BOSLEY	DATE	12/18

DWG. NO. 20

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-20
1			3			TOTAL SHEETS
2			4			24

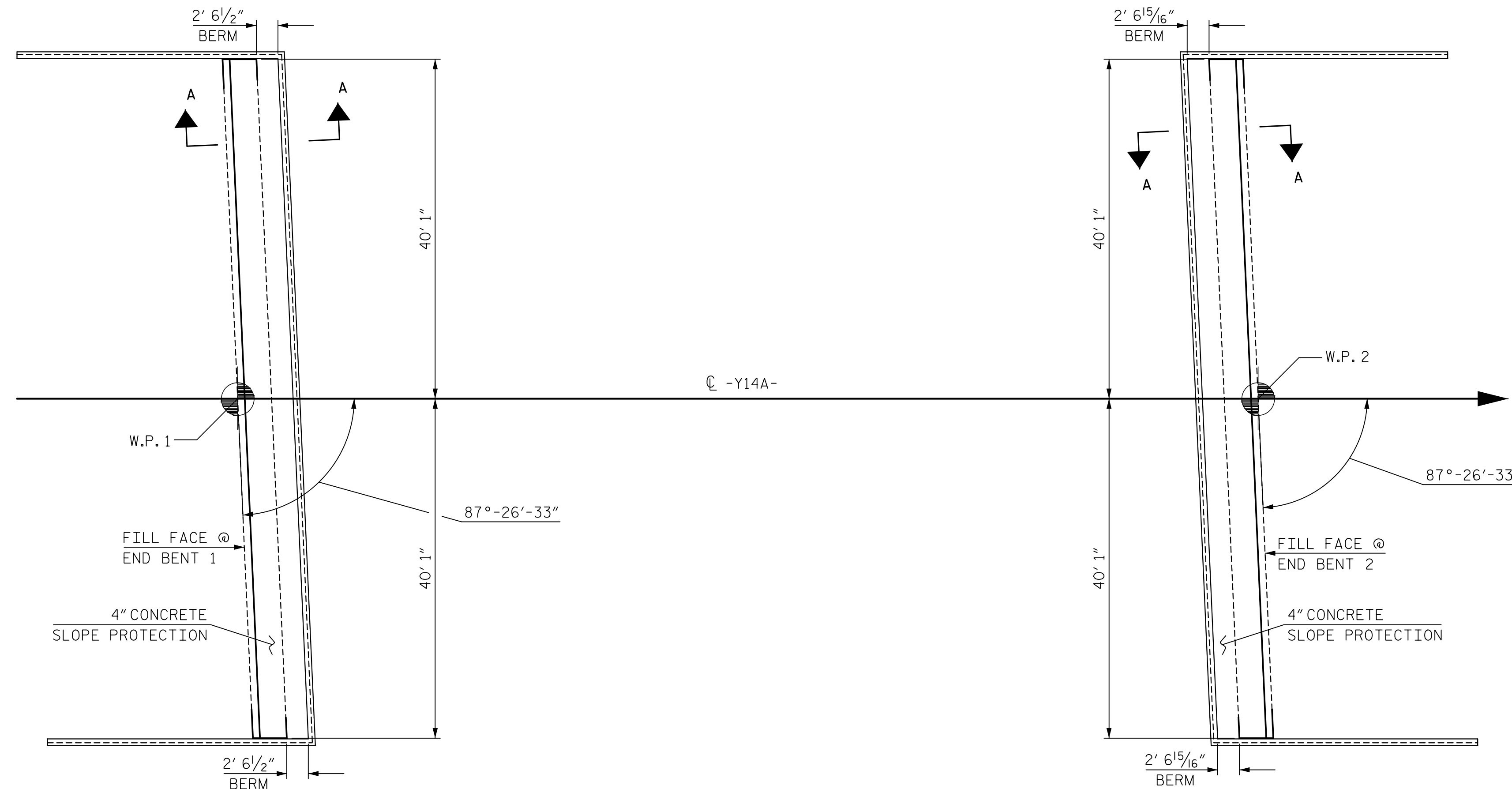
NOTES:

FOR BERM WIDTHS AND ELEVATIONS, SEE GENERAL DRAWING.

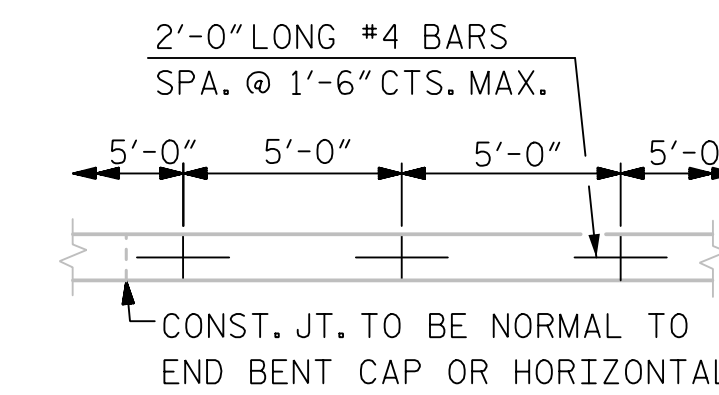
SLOPE PROTECTION SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL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

BRIDGE @ STA. 39+52.37 -Y14A-	4" INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	26	52
END BENT 2	26	52

* QUANTITY SHOWN IS BASED ON 5' POURS.

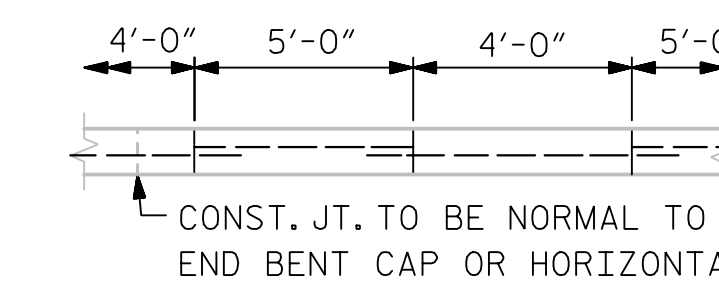


PLAN



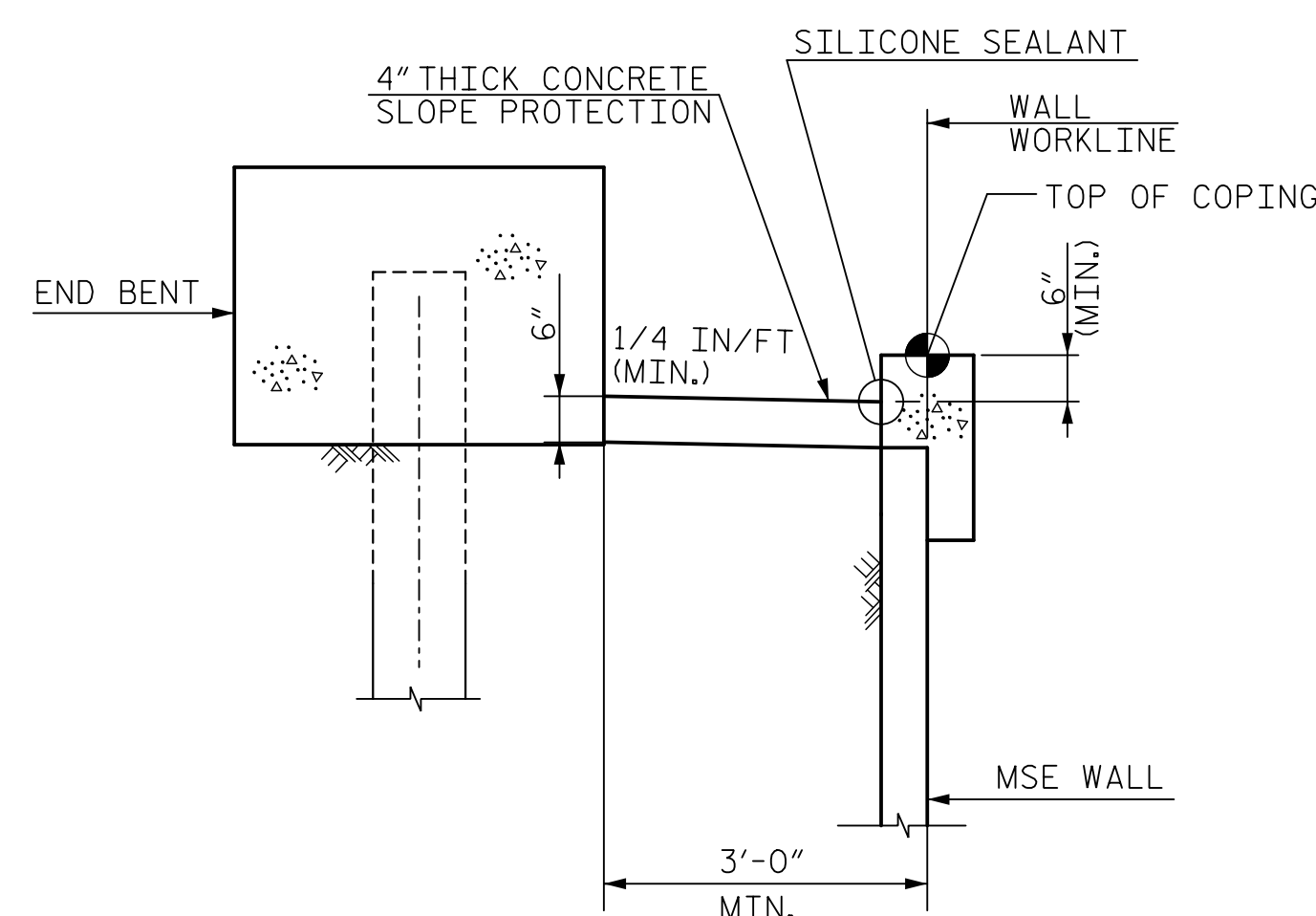
STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



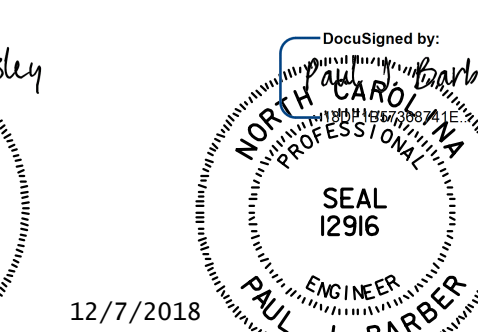
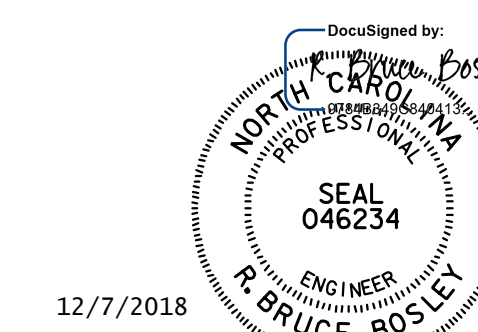
POUR A 4'-0" STRIP FIRST. STRIP WIDTHS MAY VARY IN CURVED PORTION.

OPTIONAL POURING DETAIL



SECTION A-A

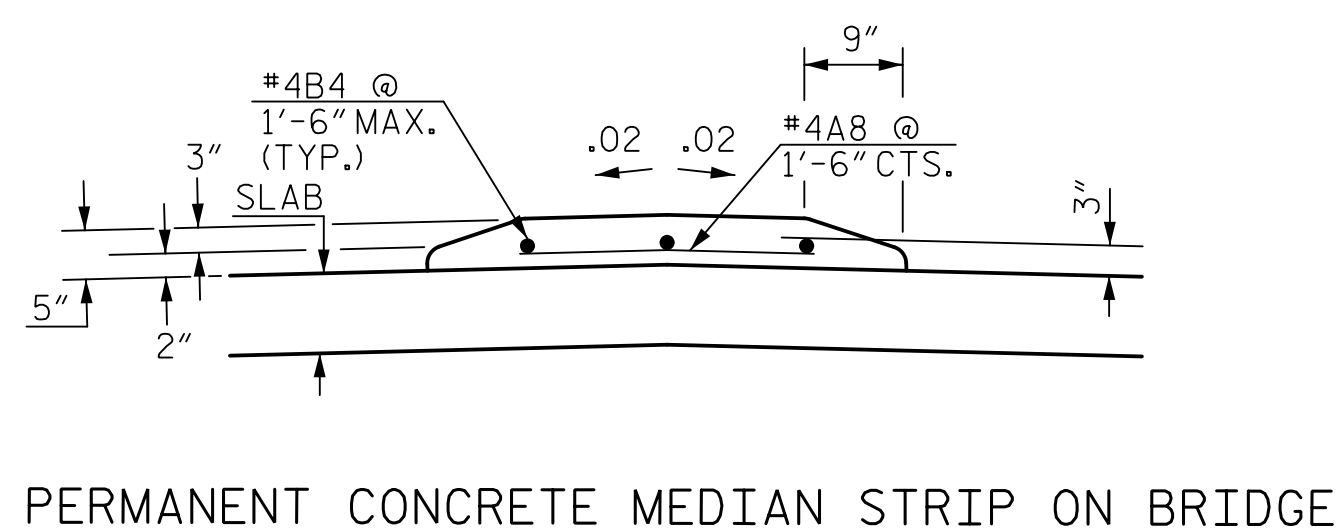
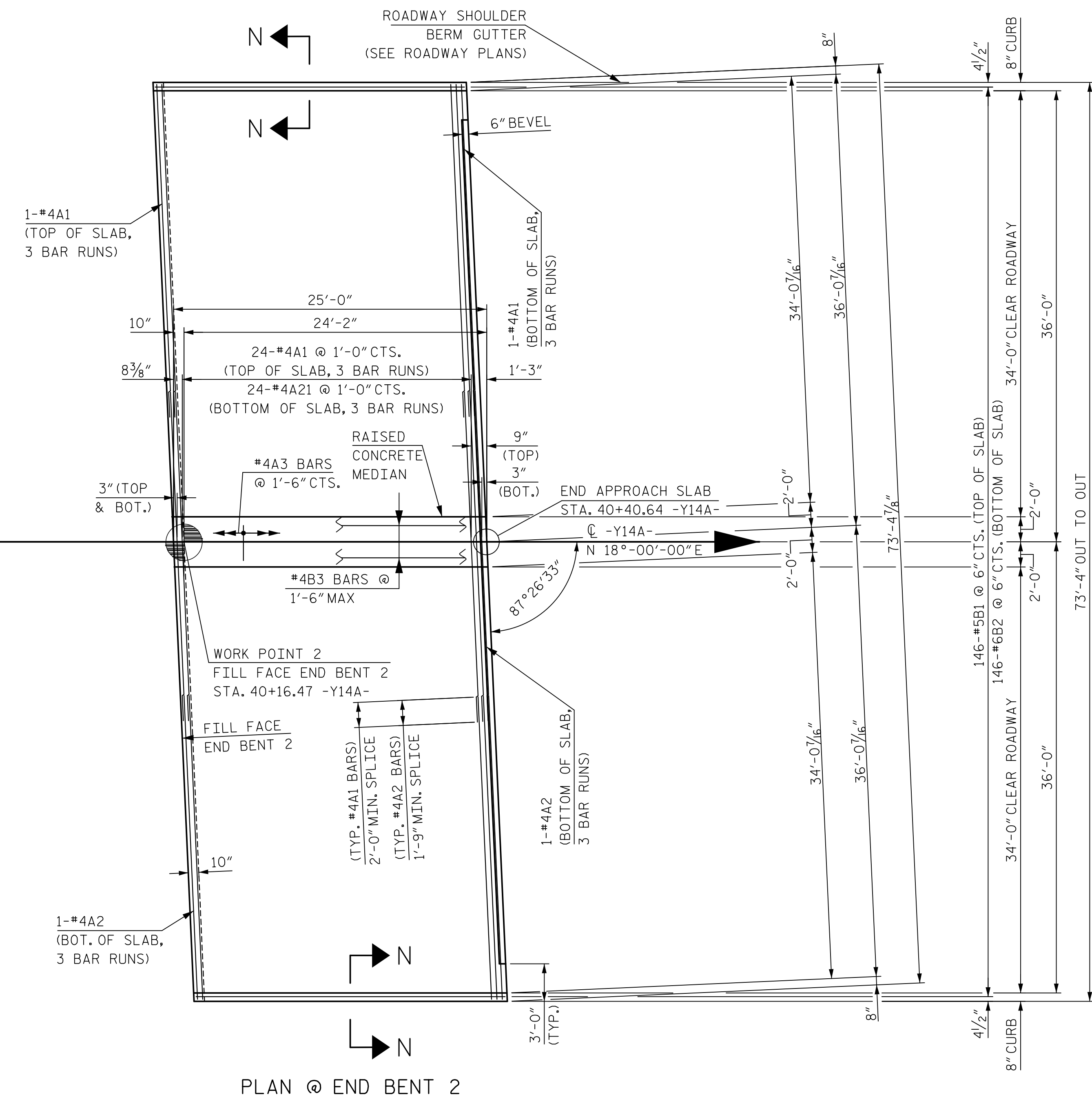
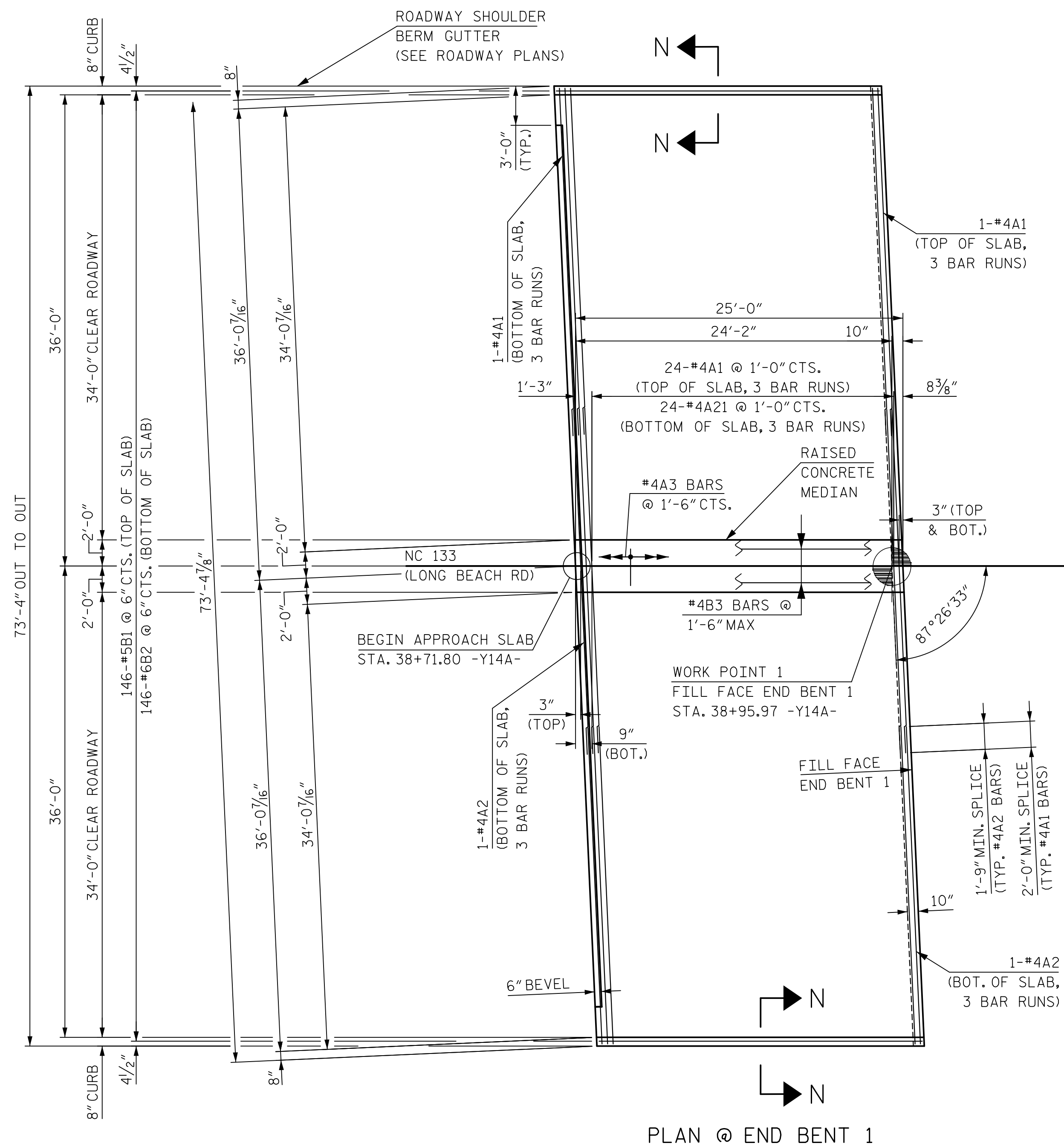
PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: 39+52.37 -Y14A-



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DRAWN BY: L. WATERS	DATE: 7/18	DWG. NO. 21	SHEET NO. S4-21
CHECKED BY: B. BOSLEY	DATE: 7/18		
DESIGN ENGINEER OF RECORD: B. BOSLEY	DATE: 12/18		

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SLOPE PROTECTION DETAILS	
REVISIONS			
NO.	BY	DATE	NO.
1			3
2			4
			TOTAL SHEETS 24



NOTES:

FOR SECTION N-N, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEET 2 OF 3.

FOR APPROACH SLAB BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEET 2 OF 3

DocuSigned by:
BRUCE BOSLEY
SEAL 046234
ENGINEER
12/7/2018

DocuSigned by:
PAUL J. BARBER
SEAL 12916
ENGINEER
12/7/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY	L. WATERS	DATE	7/18
CHECKED BY	B. BOSLEY	DATE	7/18
DESIGN ENGINEER OF RECORD	B. BOSLEY	DATE	12/18
DWG. NO. 22			

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: 39+52.37 -Y14A-

1 OF 3

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
BRIDGE APPROACH SLAB PLAN					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
				SHEET NO.	S4-22
				TOTAL SHEETS	24

NOTES

FOR BRIDGE APPROACH FILL INCLUDING GEOTEXTILE, MSE WALL REINFORCEMENT AND BACKFILL MATERIAL SEE ROADWAY PLANS.

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

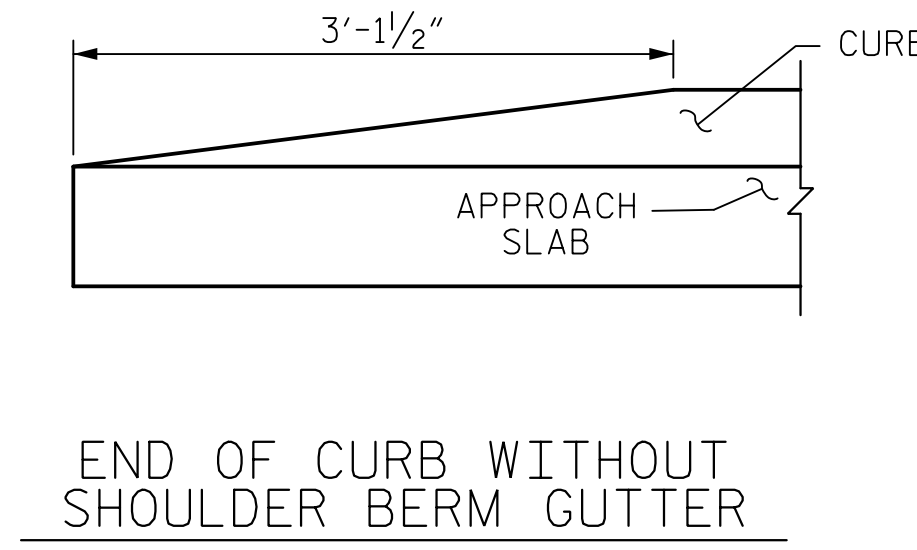
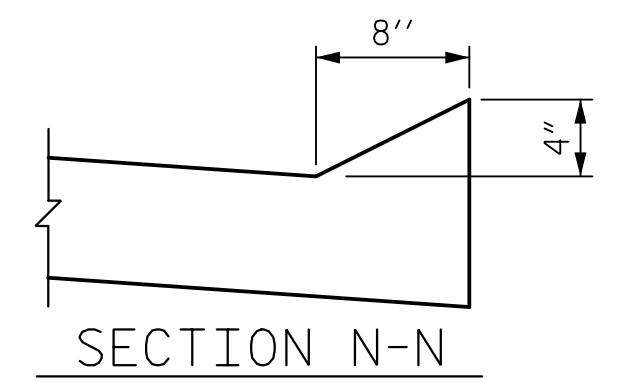
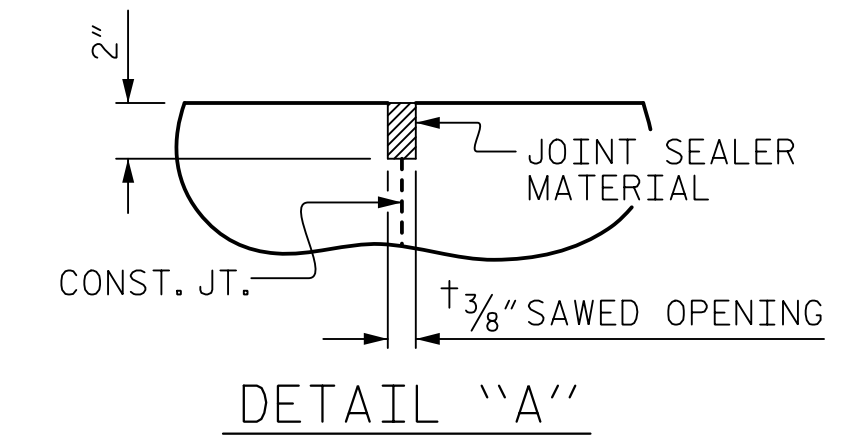
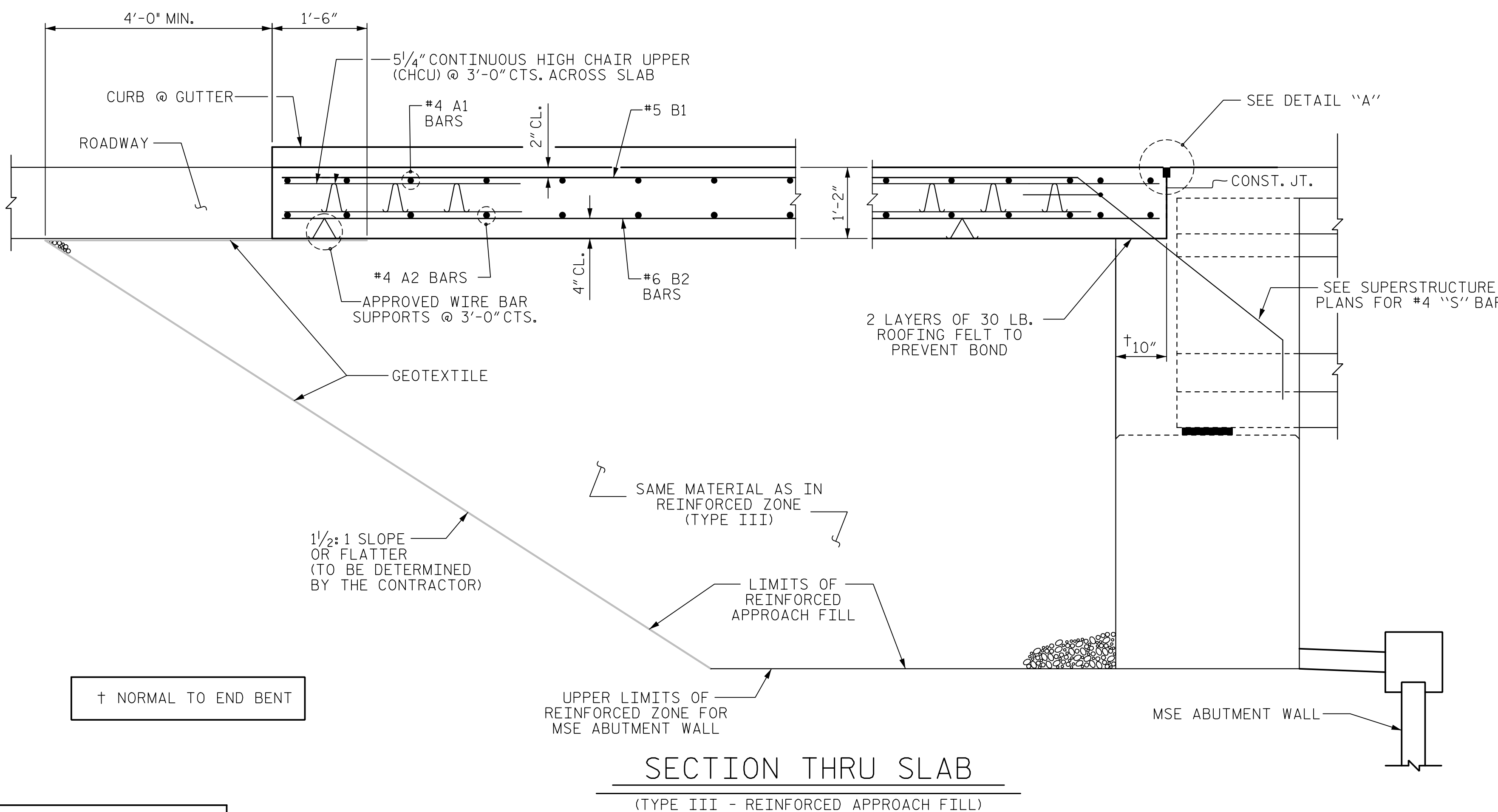
BACKFILL MATERIAL SHALL BE THE SAME MATERIAL USED IN THE MSE REINFORCED ZONE.

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.

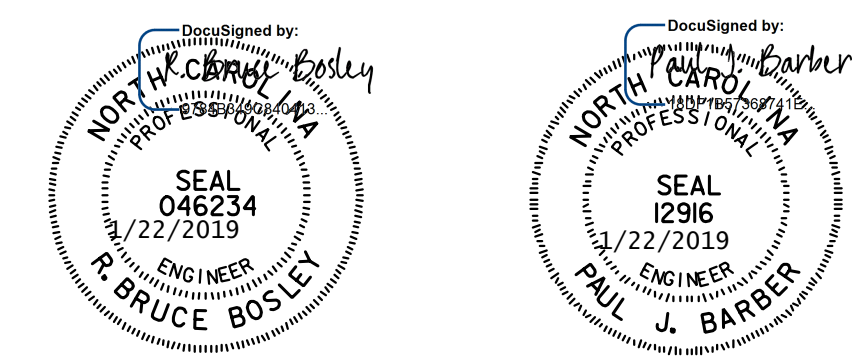
THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

FOR PLAN VIEW OF APPROACH SLABS AT END BENT 1 AND END BENT 2, SEE SHEET 1 OF 3.



PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: 39+52.37 -Y14A-

SHEET 2 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH SLAB
 FOR INTEGRAL ABUTMENT

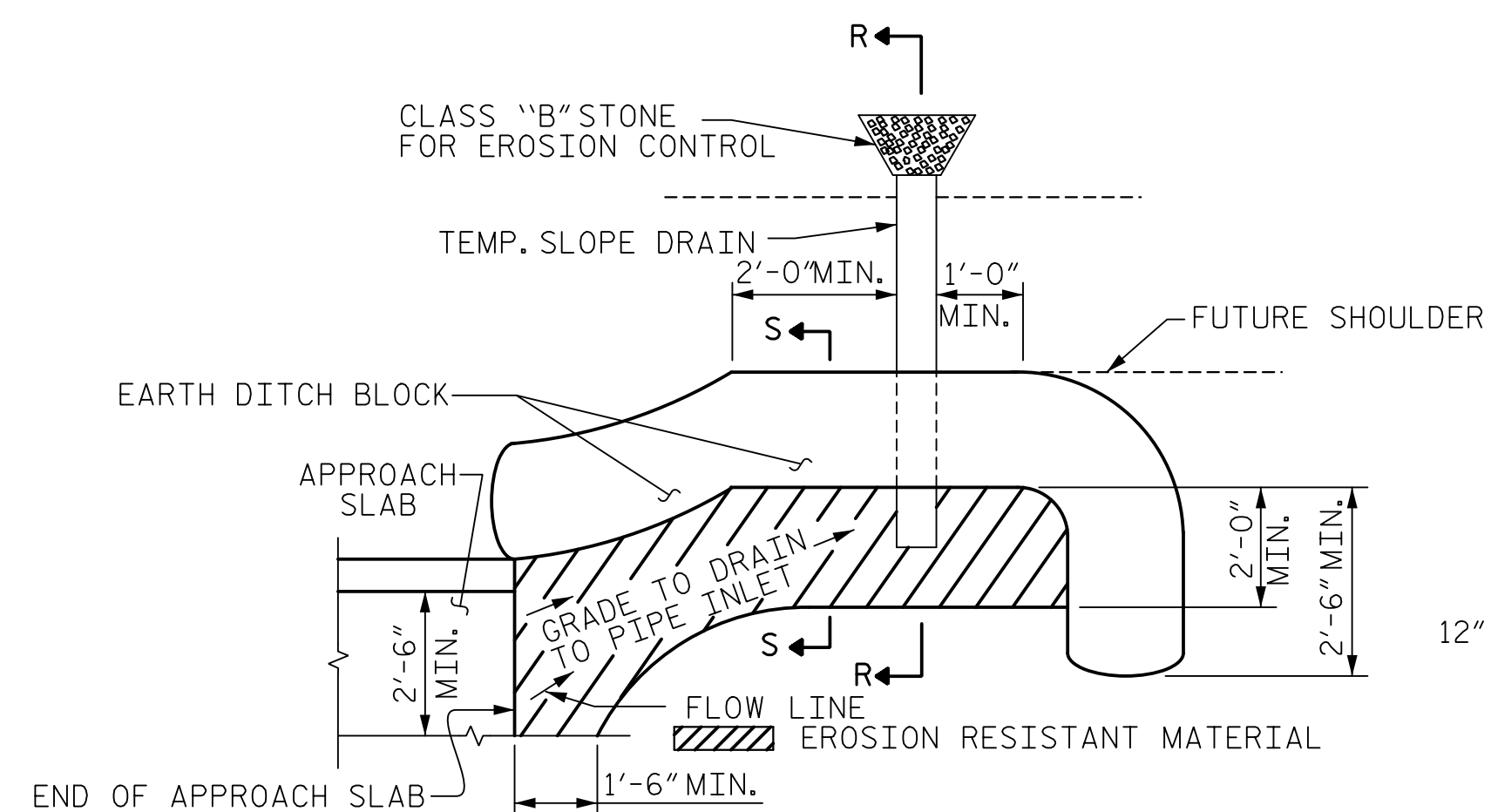


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ASSEMBLED BY : LLW	DATE : 4/18
CHECKED BY : RBB	DATE : 4/18
DRAWN BY : TLA 10/05	REV. 10/1/11 MAA/GM
CHECKED BY : GM 5/06	REV. 12/21/11 MAA/GM
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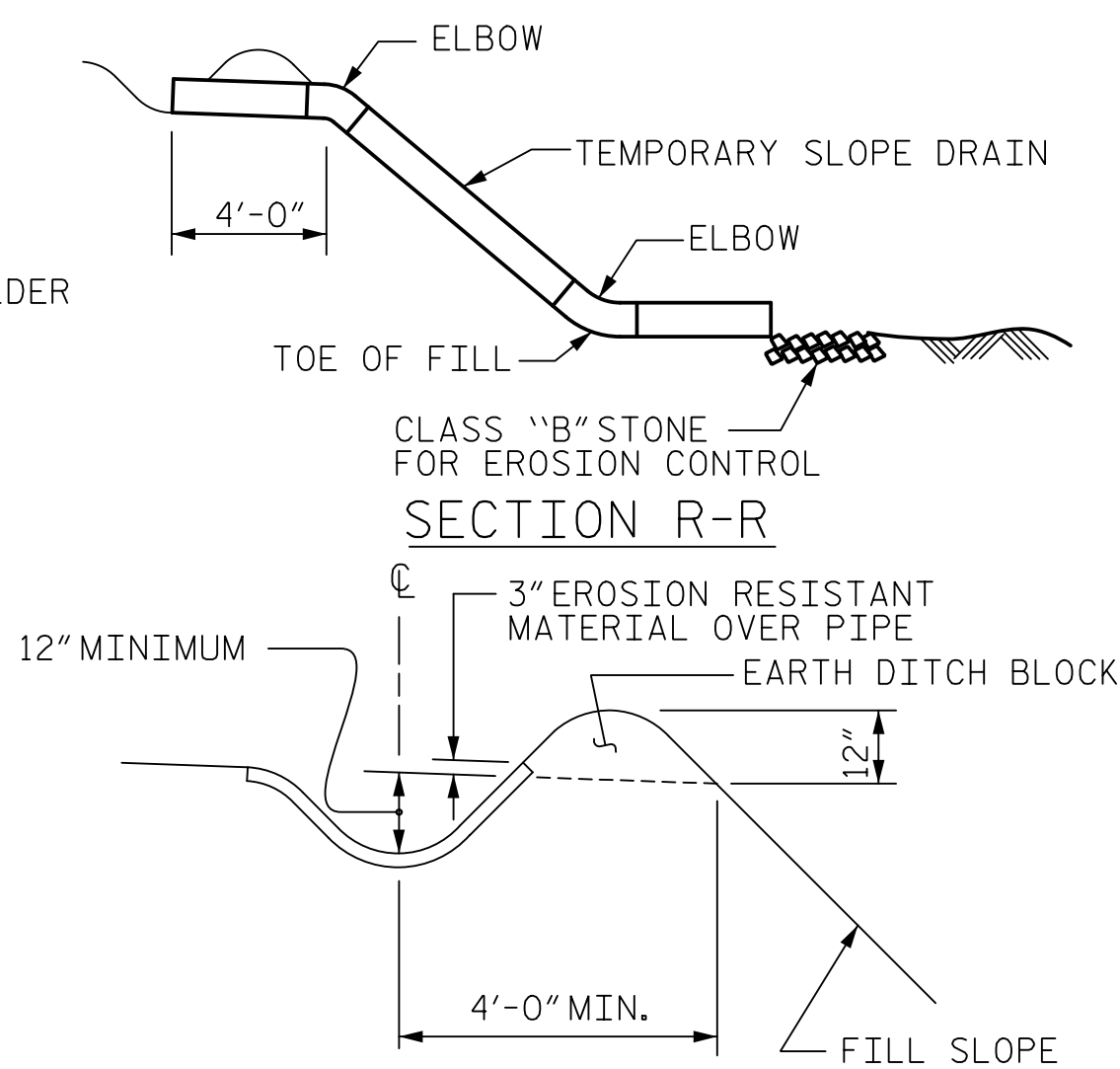
HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY : L. WATERS	DATE : 7/18	DWG. NO. 23	
CHECKED BY : B. BOSLEY	DATE : 7/18		
DESIGN ENGINEER OF RECORD : B. BOSLEY	DATE : 12/18		

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
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2			4			

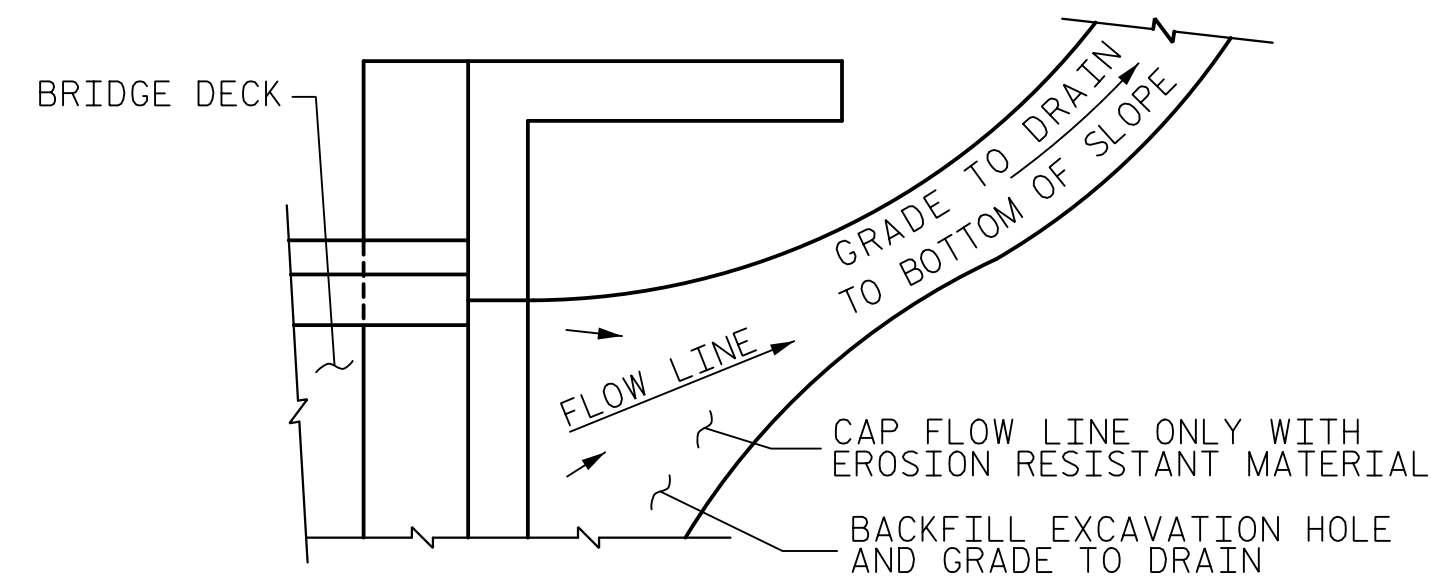


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



SECTION 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

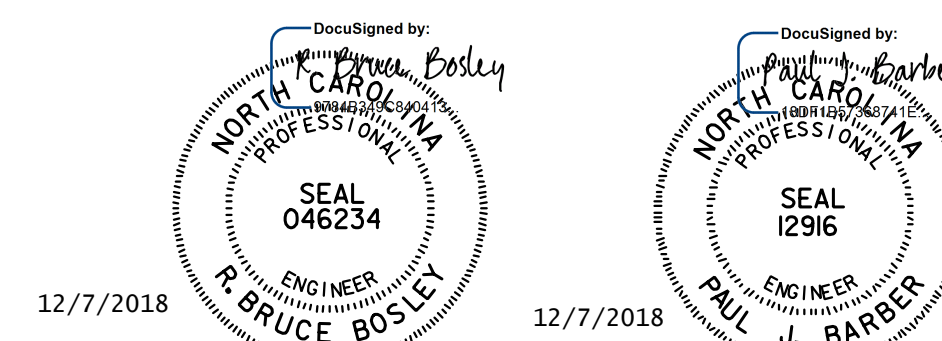
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: 39+52.37 -Y14A-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 BRIDGE APPROACH
 SLAB DETAILS

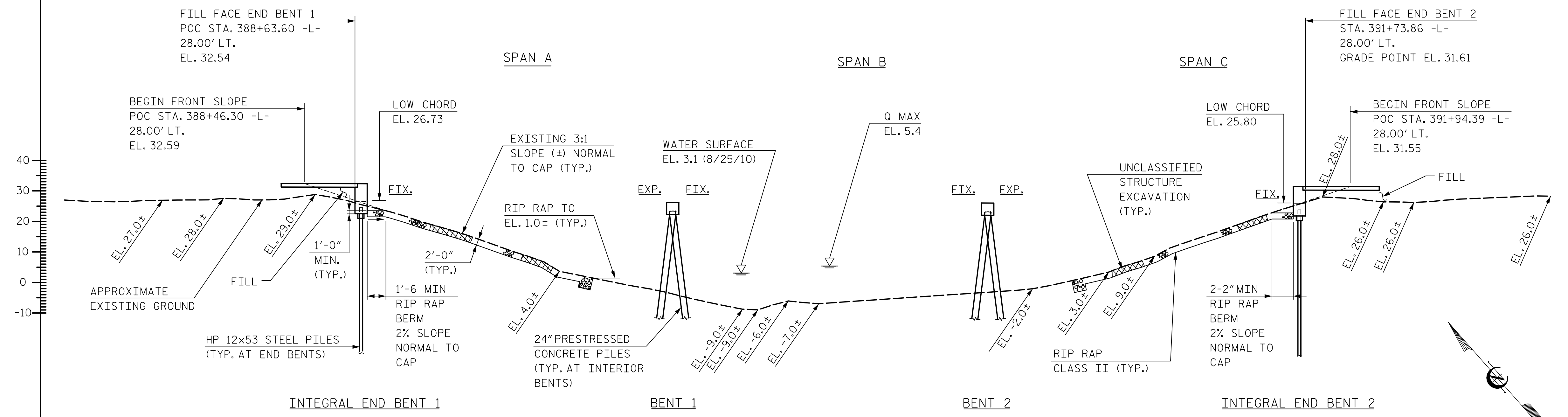


DOCUMENT NOT CONSIDERED
 FINAL UNLESS ALL
 SIGNATURES COMPLETED

ASSEMBLED BY : LLW	DATE : 3/18
CHECKED BY : RBB	DATE : 3/18
DRAWN BY : FCJ 11/88	REV. 10/11/11 MAA/GM
CHECKED BY : ARB 11/88	REV. 7/12 MAA/GM
	REV. 6/13 MAA/GM

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY : L. WATERS	DATE : 7/18	DWG. NO. 24	
CHECKED BY : B. BOSLEY	DATE : 7/18		
DESIGN ENGINEER OF RECORD : B. BOSLEY	DATE : 12/18		

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-24
1			3			TOTAL SHEETS
2			4			24

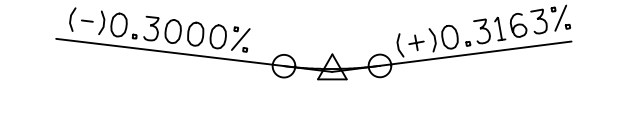


NOTES:
FOR GENERAL NOTES, SEE SHEET 4 OF 4.

BRIDGE HYDRAULIC DATA

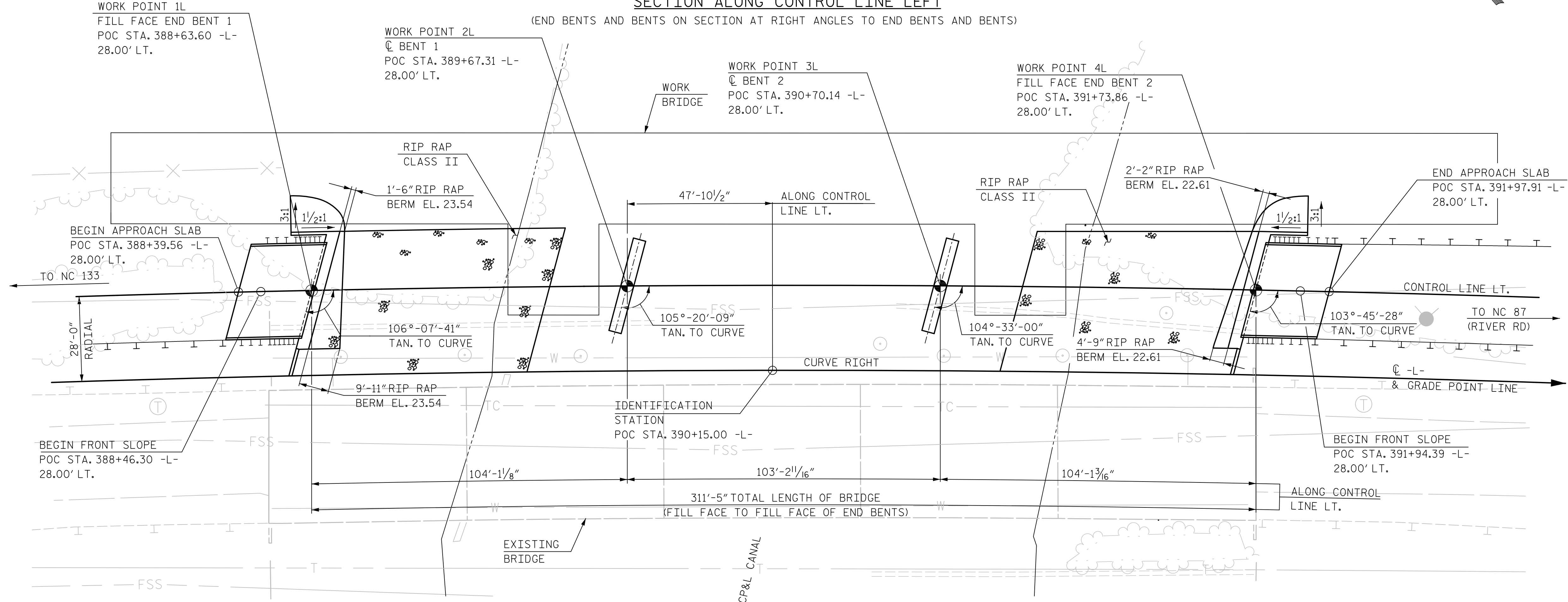
DESIGN DISCHARGE	=	2,393 CFS
FREQUENCY OF DESIGN DISCHARGE	=	MAX YR
DESIGN HIGH WATER ELEVATION	=	5.4 FT.
DRAINAGE AREA	=	N/A.

PI STA. = 393+40.25
ELEV = 30.41
V.C. = 200'



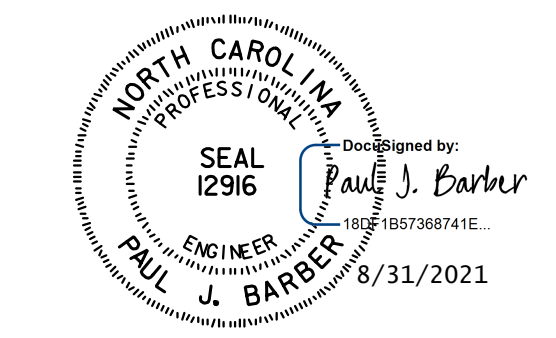
HORIZONTAL CURVE DATA -L-

PI STA. =	397+21.04
Δ =	14°51'00.3" (RT)
D =	0°45'50.2"
L =	1,943.87'
T =	977.41'
R =	7,500.00'
SE =	0.025



PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 1 OF 4 BRIDGE NO. 260



HNTB HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	7/21
CHECKED BY	P. BARBER	DATE	7/21
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	7/21

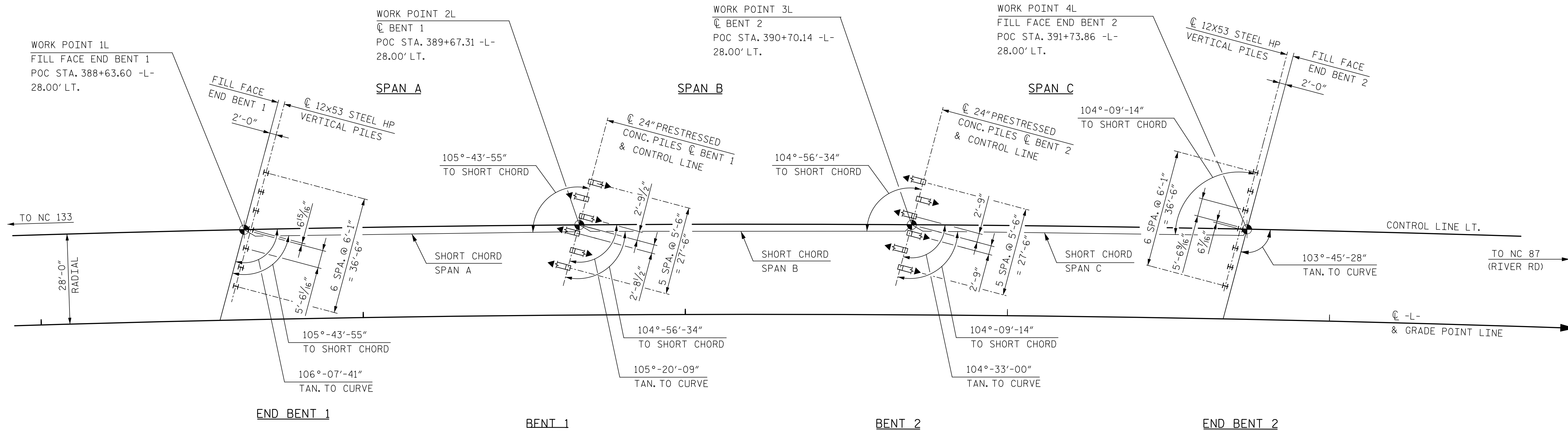
DWG. NO. 1

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
BRIDGE OVER CP&L CANAL
ON NC 211
BETWEEN NC 133 AND NC 87
LEFT LANE

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

SHEET NO.				
S5-1				
TOTAL SHEETS				
39				



FOUNDATION LAYOUT

FOUNDATION NOTES

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

PILES AT BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 265 TONS PER PILE.

DRIVE PILES AT BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 360 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.

INSTALL PILES AT BENT NO.1 TO A TIP ELEVATION NO HIGHER THAN -45.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT NO.1 IS -17.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

PILES AT BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 265 TONS PER PILE.

DRIVE PILES AT BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 360 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.

INSTALL PILES AT BENT NO.2 TO A TIP ELEVATION NO HIGHER THAN -45.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT NO.2 IS -17.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

STEEL PILE TIPS ARE REQUIRED FOR PRESTRESSED CONCRETE PILES AT BENTS NO.1 AND 2. FOR STEEL PILE TIPS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

TESTING THE FIRST PRODUCTION PILES WITH THE PDA DURING DRIVING IS REQUIRED AT BENTS NO.1 AND 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 75,000 TO 125,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENTS NO.1 AND 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

NOTES:

ALL DIMENSIONS ARE PARALLEL OR NORMAL TO BENT CONTROL LINES AND FILL FACES.

← INDICATES PILE BATTER IN DIRECTION SHOWN. BRACE PILES AT BENTS ARE TO BE BATTERED AT 1/2:12.

ALL PILES AT END BENT 1 AND END BENT 2 ARE HP 12x53 STEEL PILES.

FOR FOUNDATION ELEVATIONS AND DETAILS, SEE BENT AND END BENT SHEETS.

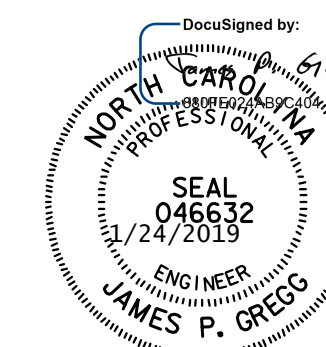
ALL PILE DIMENSIONS ARE TO CENTERS OF PILES AT BOTTOM OF END BENTS.

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 2 OF 4

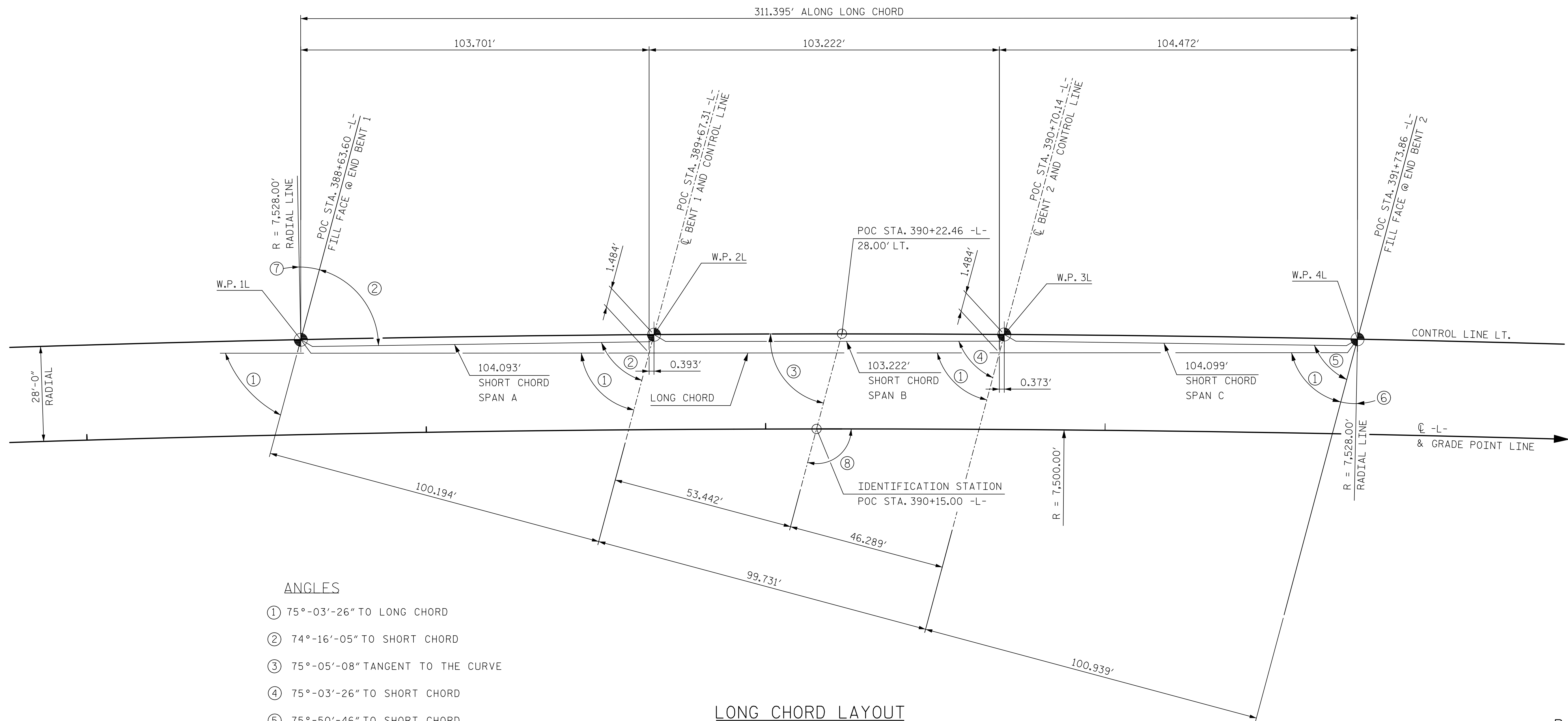
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOUNDATION LAYOUT
 LEFT LANE



HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY	A. SMITH	DATE	5/17
CHECKED BY	B. EMAMI	DATE	8/17
DESIGN ENGINEER OF RECORD	J. GREGG	DATE	8/18

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



- ANGLES**
- ① 75°-03'-26" TO LONG CHORD
 - ② 74°-16'-05" TO SHORT CHORD
 - ③ 75°-05'-08" TANGENT TO THE CURVE
 - ④ 75°-03'-26" TO SHORT CHORD
 - ⑤ 75°-50'-46" TO SHORT CHORD
 - ⑥ 13°-45'-28"
 - ⑦ 16°-07'-41"
 - ⑧ 104°-58'-17" TANGENT TO THE CURVE

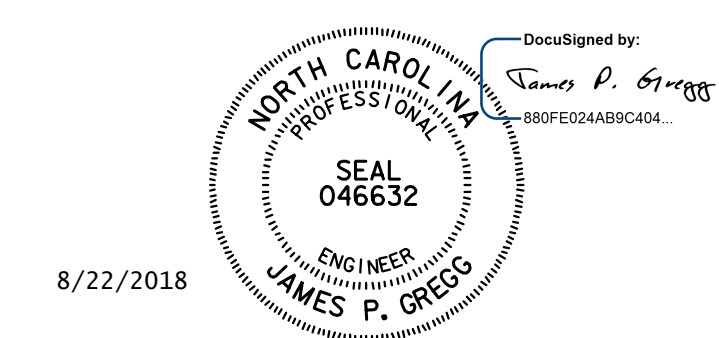
LONG CHORD LAYOUT
NOTE: ALL BENTS ARE PARALLEL

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 3 OF 4

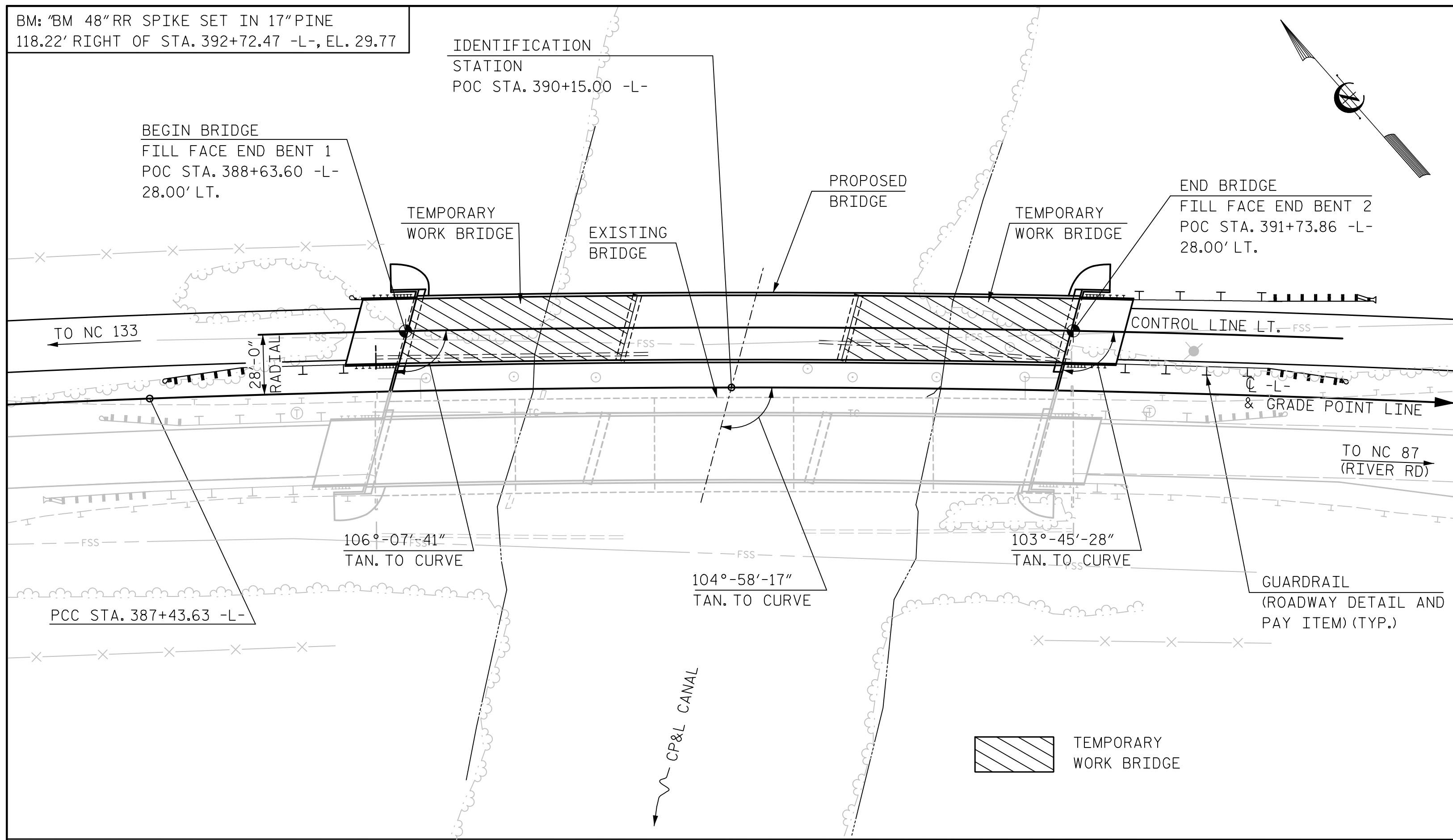
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
LONG CHORD LAYOUT
LEFT LANE



HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: A. SMITH	DATE: 5/17	DWG. NO. 3	SHEET NO. S5-3
CHECKED BY: B. EMAMI	DATE: 8/17		
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18		

REVISIONS						SHEET NO. S5-3
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 39
2			4			



GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

PRESTRESSED CONCRETE DECK PANELS SHALL BE USED FOR THE DECK. METAL STAY-IN-PLACE FORMS SHALL NOT BE PERMITTED IN THIS PROJECT.

ALL METALLIZED SURFACES SHALL RECEIVE A SEAL COATING AS SPECIFIED IN TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE BENT CAPS AND PILE CAPS AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

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

PRESTRESSED CONCRETE GIRDERS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PRECAST PANELS SHALL BE DESIGNED FOR AN ALLOWABLE TENSILE STRESS OF 0 PSI IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

ALL BAR SUPPORTS USED IN THE PARAPET, DECK, BENT CAPS, PILE CAPS, FOOTINGS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRESTRESSED CONCRETE GIRDERS, PRECAST DECK PANELS, AND PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

THE CONCRETE IN THE PILES OF BENT NO. 1 AND 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

METALIZE PILES IN ACCORDANCE WITH TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

AFTER DRIVING THE PILES APPLY 1 COAT EACH OF 1080-09 BROWN AND 1080-09 GRAY PAINT TO THE EMBEDDED SECTION OF THE METALLIZED PILE PRIOR TO CONCRETE EMBEDMENT IN ACCORDANCE WITH SECTION 442 OF THE STANDARD SPECIFICATIONS.

PRIOR TO BEGINNING METALLIZATION THE CONTRACTOR WILL PROVIDE METALLIZED SAMPLES TO THE ENGINEER FOR APPROVAL.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

THIS STRUCTURE CONTAINS THE NECESSARY CORROSION PROTECTION REQUIRED FOR A CORROSIVE SITE.

FOR CONSTRUCTION MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS, SEE SPECIAL PROVISIONS.

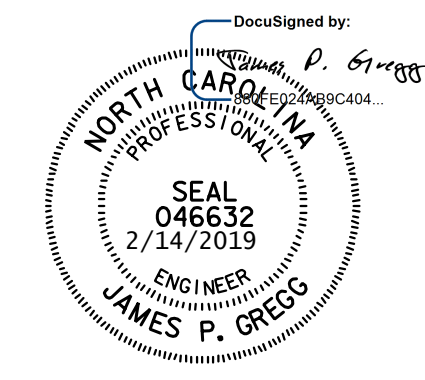
THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 28'-0" RIGHT AND 19'-6" LEFT OF CONTROL LINE LT. AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

TOTAL BILL OF MATERIAL											
	CONSTRUCTION, MAINTENANCE, AND REMOVAL OF TEMPORARY ACCESS AT STATION 390+15.00 -L-	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION 390+15.00 -L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS AA CONCRETE	BRIDGE APPROACH SLABS, STATION 390+15.00 -L-	EPOXY COATED REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING SETUP FOR 24" PRESTRESSED CONCRETE PILES
	LUMP SUM	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	L.F.	EACH
SUPERSTRUCTURE	---	---	---	10,091	9,711	---	LUMP SUM	---	12	1,227.50	---
END BENT 1	---	---	---	---	---	40.6	---	6,423	---	---	---
BENT 1	---	---	---	---	---	18.4	---	3,254	---	---	6
BENT 2	---	---	---	---	---	18.4	---	3,254	---	---	6
END BENT 2	---	---	---	---	---	40.3	---	6,394	---	---	---
TOTAL	LUMP SUM	2	LUMP SUM	10,091	9,711	117.7	LUMP SUM	19,325	12	1,227.50	12

TOTAL BILL OF MATERIAL												
	PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	24" PRESTRESSED CONCRETE PILES		HP 12x53 STEEL PILES		PILE REDRIVES	TWO BAR METAL RAIL	1'-2" x 2'-6" CONCRETE PARAPET	RIPRAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	ELECTRICAL CONDUIT SYSTEM FOR SIGNALS AT STATION 390+15.00 -L-
	EACH	NO.	L.F.	NO.	L.F.	EACH	L.F.	L.F.	TONS	SQ. YD.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	---	---	---	---	---	---	604.38	619.38	---	---	LUMP SUM	---
END BENT 1	7	---	---	7	525	7	---	---	415	460	---	---
BENT 1	---	6	630	---	---	6	---	---	---	---	---	---
BENT 2	---	6	630	---	---	6	---	---	---	---	---	---
END BENT 2	7	---	---	7	560	7	---	---	405	450	---	---
TOTAL	14	12	1,260	14	1,085	26	604.38	619.38	820	910	LUMP SUM	LUMP SUM

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

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND fy = 60ksi.



PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 LOCATION SKETCH,
 GENERAL NOTES &
 TOTAL BILL OF MATERIAL
 LEFT LANE

HNTB	HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
DRAWN BY: B. NEUPANE	DATE: 6/17
CHECKED BY: B. EMAMI	DATE: 9/17
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18

DWG. NO. 4

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

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	1.50	--	1.75	0.81	1.78	C	ER	50.4	0.90	1.56	C	I	9.5	0.8	0.81	1.50	C	ER	50.4		
	HL-93 (OPERATING)	N/A	--	2.06	--	1.35	0.81	2.31	C	ER	50.4	0.90	2.06	C	I	9.5	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	2	2.12	76.3	1.75	0.81	2.51	C	ER	50.4	0.90	2.14	C	I	9.5	0.8	0.81	2.12	C	ER	50.4		
	HS-20 (OPERATING)	36.000	--	2.82	101.5	1.35	0.81	3.26	C	ER	50.4	0.90	2.82	C	I	9.5	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	5.11	68.9	1.40	0.81	7.56	C	ER	50.4	0.90	6.91	C	I	9.5	0.8	0.81	5.11	C	ER	50.4	
		SNGARBS2	20.000	--	3.66	73.2	1.40	0.81	5.42	C	ER	50.4	0.90	4.79	C	I	9.5	0.8	0.81	3.66	C	ER	50.4	
		SNAGRIS2	22.000	--	3.39	74.6	1.40	0.81	5.02	C	ER	50.4	0.90	4.41	C	I	9.5	0.8	0.81	3.39	C	ER	50.4	
		SNCOTTS3	27.250	--	2.51	68.4	1.40	0.81	3.72	C	ER	50.4	0.90	3.37	C	I	9.5	0.8	0.81	2.51	C	ER	50.4	
		SNAGGRS4	34.925	--	2.05	71.6	1.40	0.81	3.04	C	ER	50.4	0.90	2.71	C	I	9.5	0.8	0.81	2.05	C	ER	50.4	
		SNS5A	35.550	--	2.01	71.4	1.40	0.81	2.98	C	ER	50.4	0.90	2.72	C	I	9.5	0.8	0.81	2.01	C	ER	50.4	
		SNS6A	39.950	--	1.83	73.1	1.40	0.81	2.71	C	ER	50.4	0.90	2.45	C	I	9.5	0.8	0.81	1.83	C	ER	50.4	
		SNS7B	42.000	--	1.74	73.1	1.40	0.81	2.57	C	ER	50.4	0.90	2.38	C	I	9.5	0.8	0.81	1.74	C	ER	50.4	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	2.23	73.6	1.40	0.81	3.30	C	ER	50.4	0.90	2.96	C	I	9.5	0.8	0.81	2.23	C	ER	50.4	
		TNT4A	33.075	--	2.23	73.8	1.40	0.81	3.31	C	ER	50.4	0.90	2.91	C	I	9.5	0.8	0.81	2.23	C	ER	50.4	
		TNT6A	41.600	--	1.80	74.9	1.40	0.81	2.66	C	ER	50.4	0.90	2.49	C	I	9.5	0.8	0.81	1.80	C	ER	50.4	
		TNT7A	42.000	--	1.81	76.0	1.40	0.81	2.68	C	ER	50.4	0.90	2.45	C	I	9.5	0.8	0.81	1.81	C	ER	50.4	
		TNT7B	42.000	--	1.84	77.3	1.40	0.81	2.72	C	ER	50.4	0.90	2.34	C	I	9.5	0.8	0.81	1.84	C	ER	50.4	
		TNAGRIT4	43.000	--	1.76	75.7	1.40	0.81	2.61	C	ER	50.4	0.90	2.27	C	I	9.5	0.8	0.81	1.76	C	ER	50.4	
		TNAGT5A	45.000	--	1.67	75.1	1.40	0.81	2.48	C	ER	50.4	0.90	2.22	C	I	9.5	0.8	0.81	1.67	C	ER	50.4	
TNAGT5B	45.000	3	1.66	74.7	1.40	0.81	2.46	C	ER	50.4	0.90	2.15	C	I	9.5	0.8	0.81	1.66	C	ER	50.4			

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:

-
-
-
-

CONTROLLING LOAD RATING

1 DESIGN LOAD RATING (HL-93)

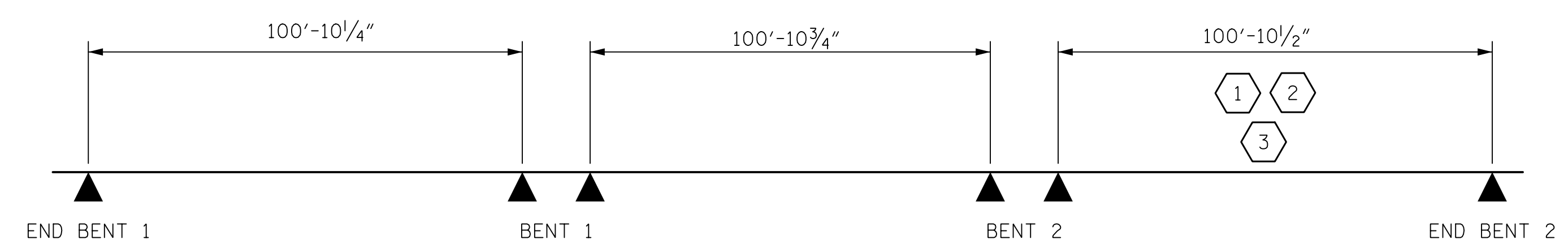
2 DESIGN LOAD RATING (HS-20)

3 LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

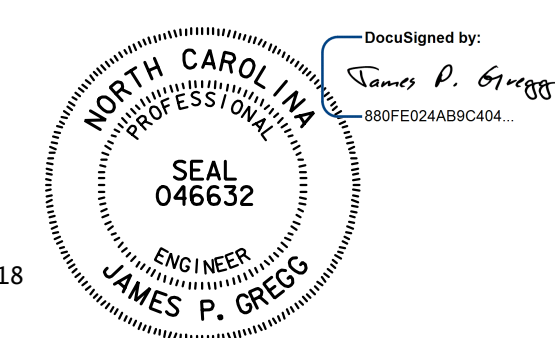
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

NOTE: SPAN LENGTHS PROVIDED ARE BEARING TO BEARING LENGTHS

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

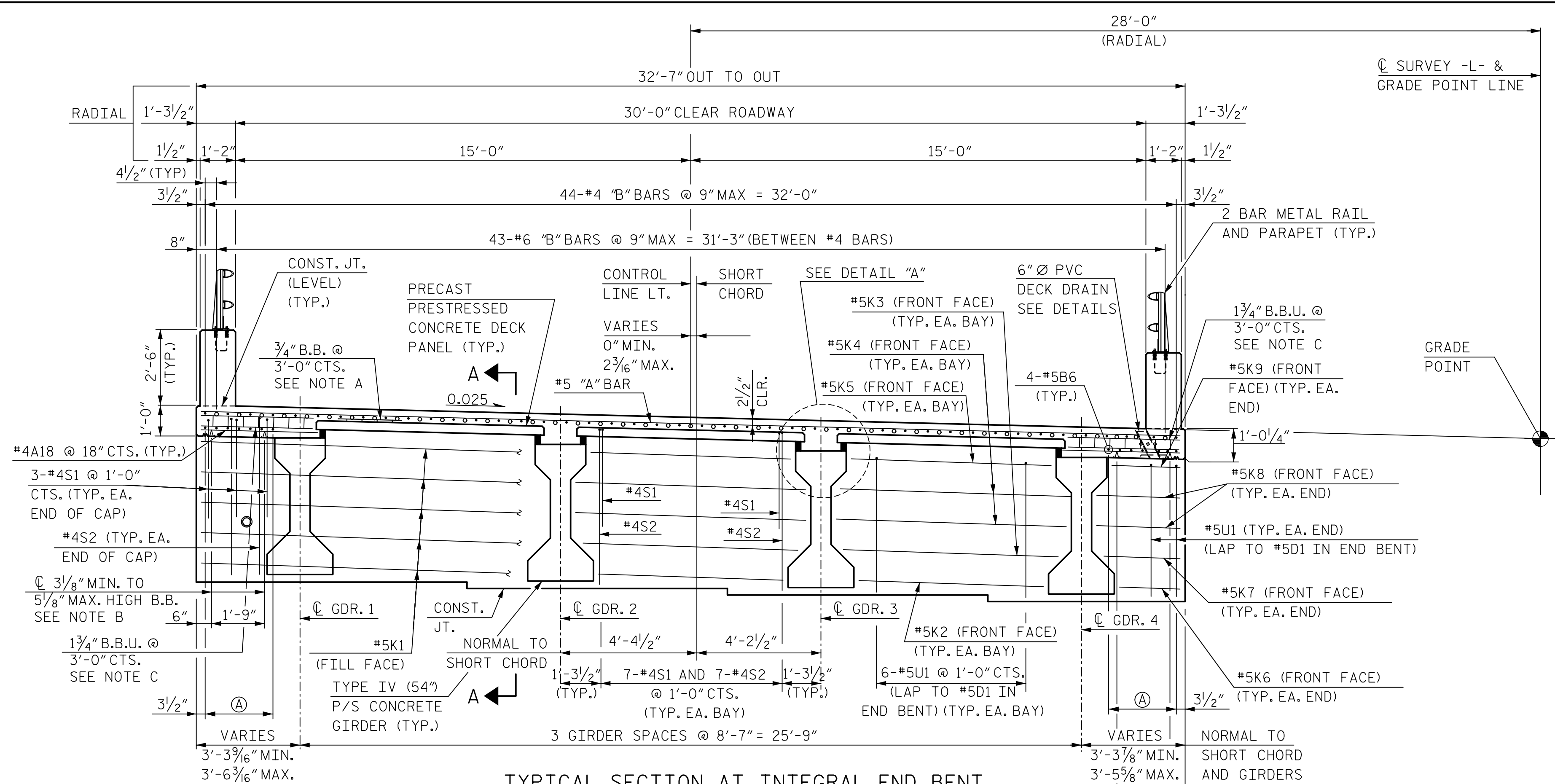


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
PRESTRESSED
CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)
LEFT LANE

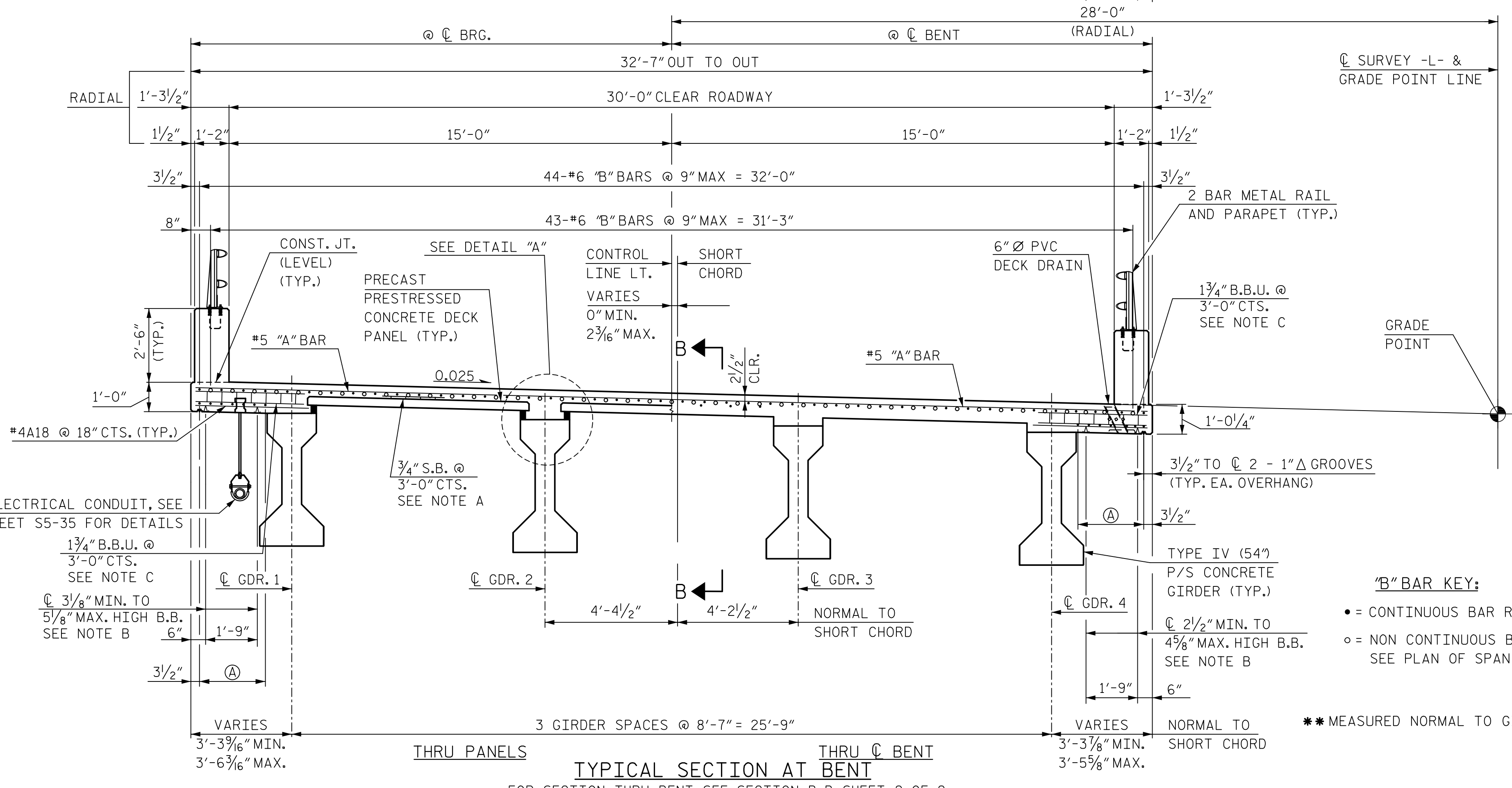
ASSEMBLED BY : AES	DATE : 5/17
CHECKED BY : BN	DATE : 9/17
DRAWN BY : MAA 1/08	REV. 11/2/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM

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DRAWN BY : A. SMITH	DATE : 5/17	DWG. NO. 5	SHEET NO. S5-5
CHECKED BY : B. NEUPANE	DATE : 9/17		
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18		

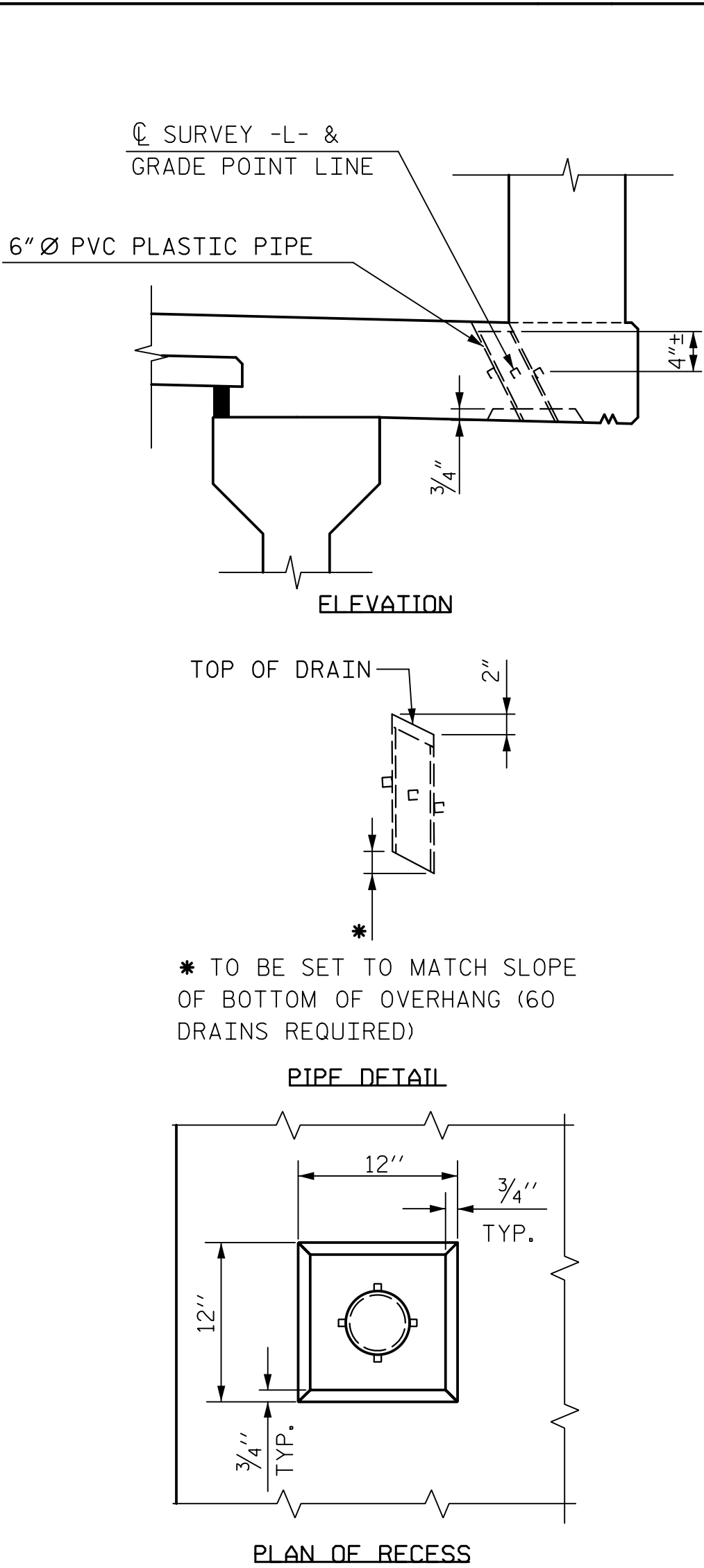
REVISIONS						TOTAL SHEETS
NO.	BY	DATE	NO.	BY	DATE	
1			3			39
2			4			



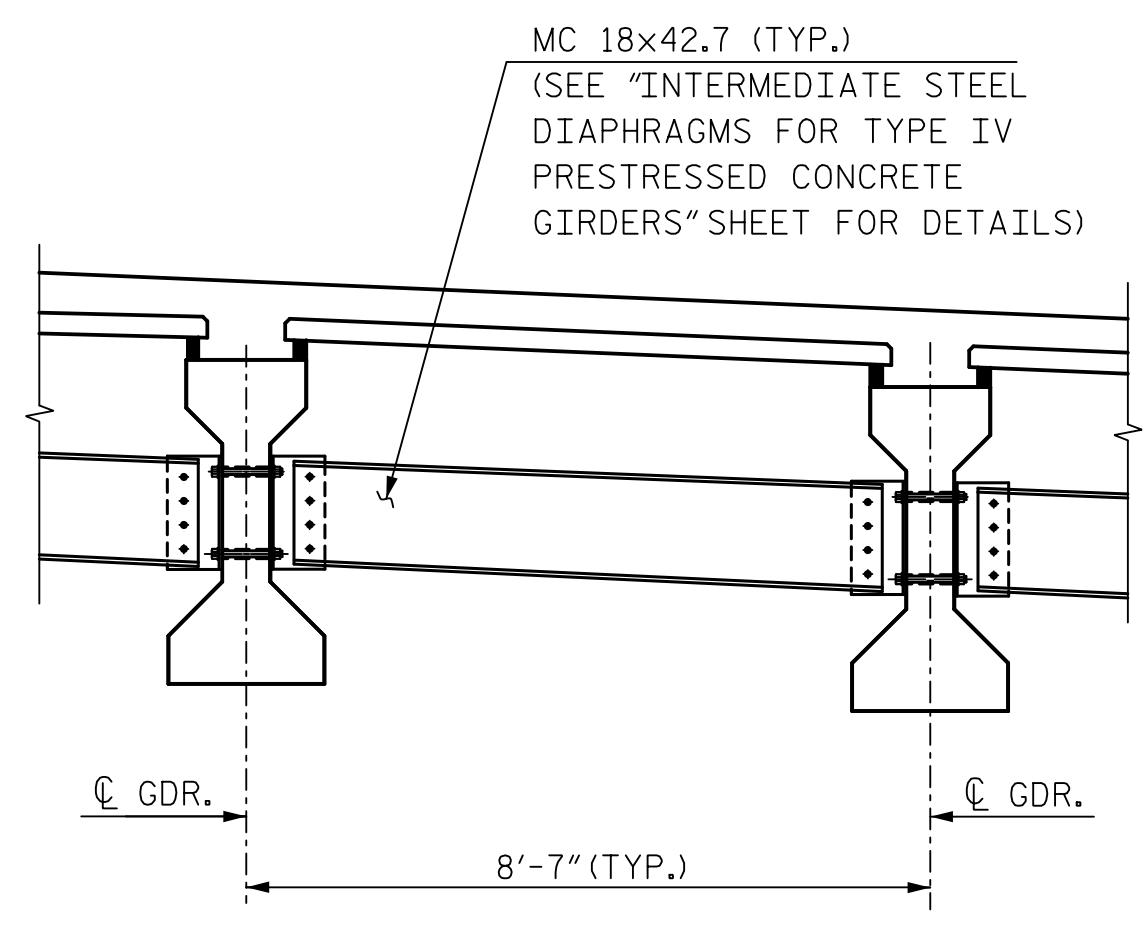
TYPICAL SECTION AT INTEGRAL END BENT
FOR SECTION THRU END BENT, SEE SECTION A-A, SHEET 2 OF 2



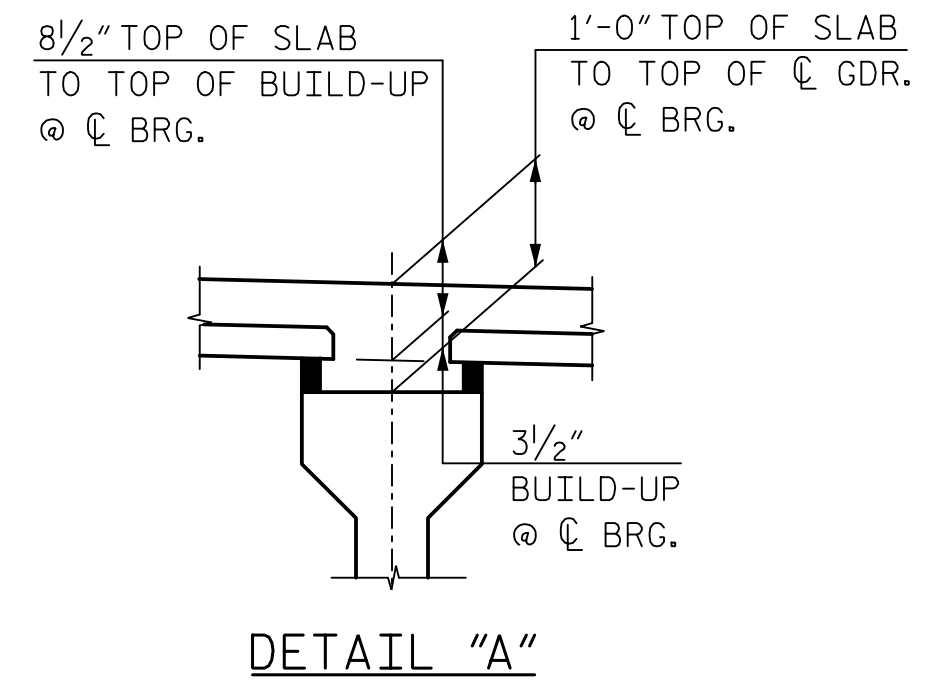
TYPICAL SECTION AT BENT
FOR SECTION THRU BENT, SEE SECTION B-B, SHEET 2 OF 2



DECK DRAIN DETAILS



PARTIAL TYPICAL SECTION
(SHOWING INTERMEDIATE DIAPHRAGM)



DETAIL "A"

NOTES

- 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.
- PARAPET RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.
- NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILD-UPS.
- THE SKEWED END CONDITIONS OF END BENTS AND BENTS ARE SUCH THAT THE USE OF 4' WIDE PRESTRESSED CONCRETE DECK PANELS IS NOT POSSIBLE; USE OF 8' WIDE PRESTRESSED CONCRETE DECK PANELS IS NECESSARY.
- NOTE A: TO MAINTAIN PROPER LOCATION OF "A" BARS IN THE TOP OF SLAB, SB DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE "B" BARS IN THE TOP OF THE SLAB VARIES. A 1 1/4" SB SHALL BE USED WHERE ONLY #4 "B" BARS ARE PRESENT. WHERE #6 "B" BARS ARE PRESENT, A 3/4" SB SHALL BE USED.
- NOTE B: THE HEIGHT OF THE BEAM BOLSTER VARIES ALONG THE LENGTH OF THE SPAN DUE TO CAMBER AND THE VARYING HEIGHT REQUIRED FOR THE BUILDUP. THE CONTRACTOR SHALL HAVE SUFFICIENT SIZES TO PROPERLY SUPPORT THE REINFORCING STEEL.
- NOTE C: TO MAINTAIN PROPER LOCATION OF "A" BARS IN THE TOP OF SLAB, BBU DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE "B" BARS IN THE TOP OF THE SLAB VARIES. A 2 1/4" BBU SHALL BE USED WHERE ONLY #4 "B" BARS ARE PRESENT. WHERE #6 "B" BARS ARE PRESENT, A 1 3/4" BBU SHALL BE USED.

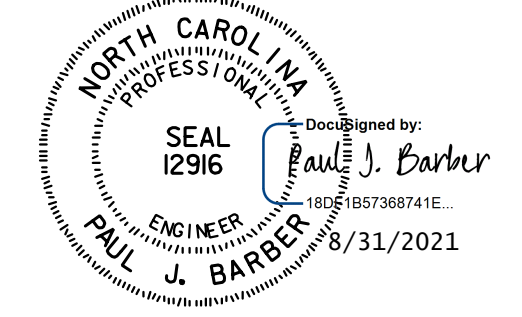
DECK DRAIN NOTES

- TOP OF FLOOR DRAIN TO BE SET 3/8" BELOW SURFACE OF SLAB.
- 4 - 1/2" SQUARE LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.
- THE 6" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

"B" BAR KEY:

- = CONTINUOUS BAR RUN
- = NON CONTINUOUS BAR RUN SEE PLAN OF SPAN SHEETS.

** MEASURED NORMAL TO GIRDER



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DRAWN BY: M. WRIGHT DATE: 7/21
CHECKED BY: P. BARBER DATE: 7/21
DESIGN ENGINEER OF RECORD: P. BARBER DATE: 7/21

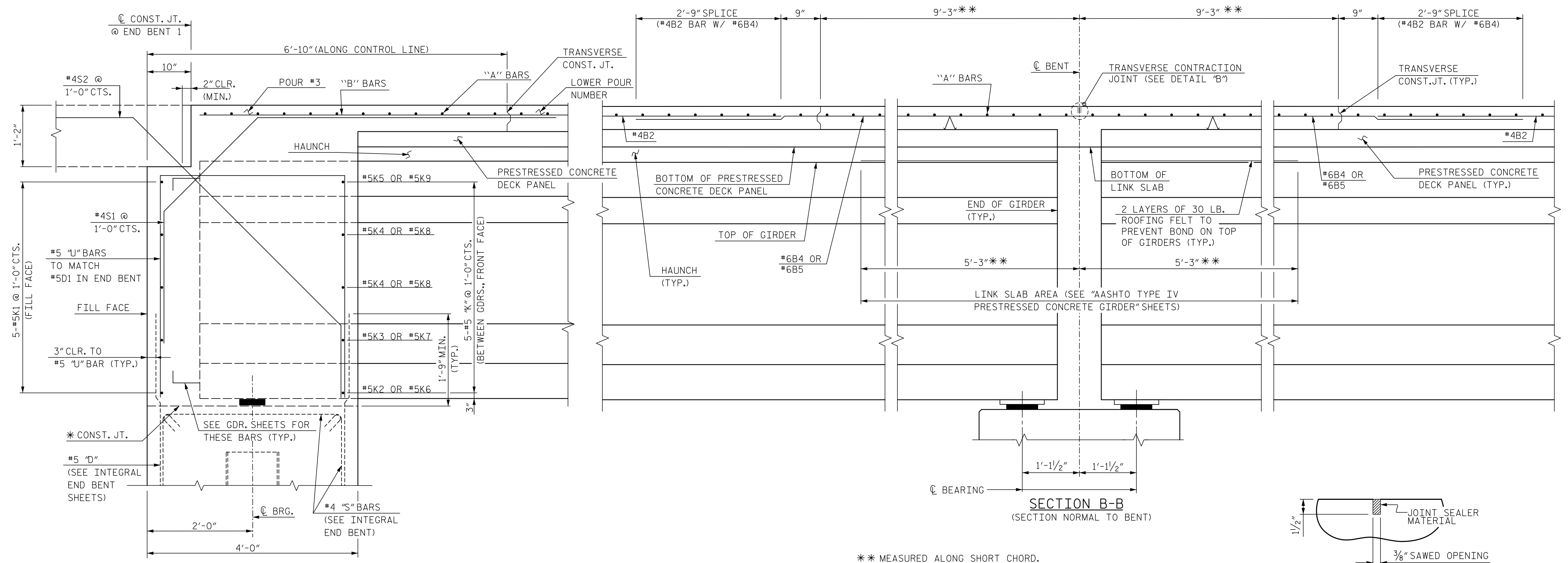
DWG. NO. 6

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 1 OF 2

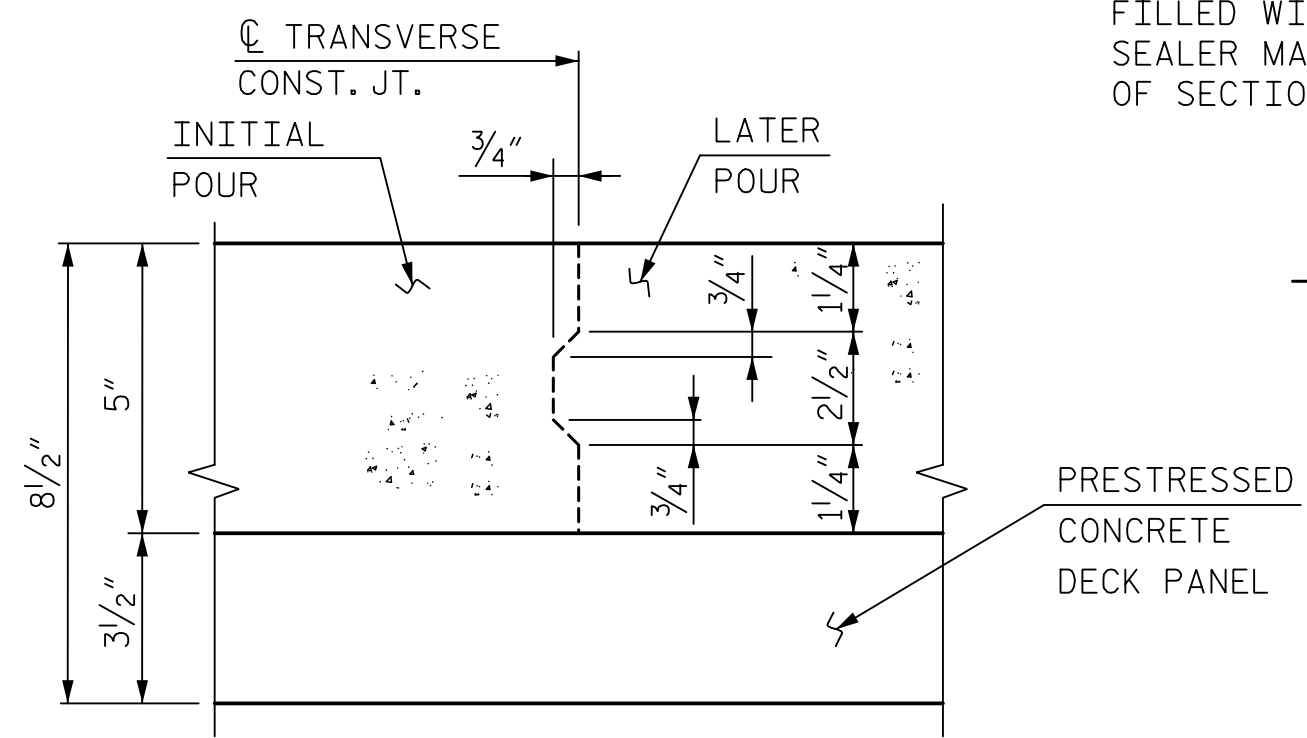
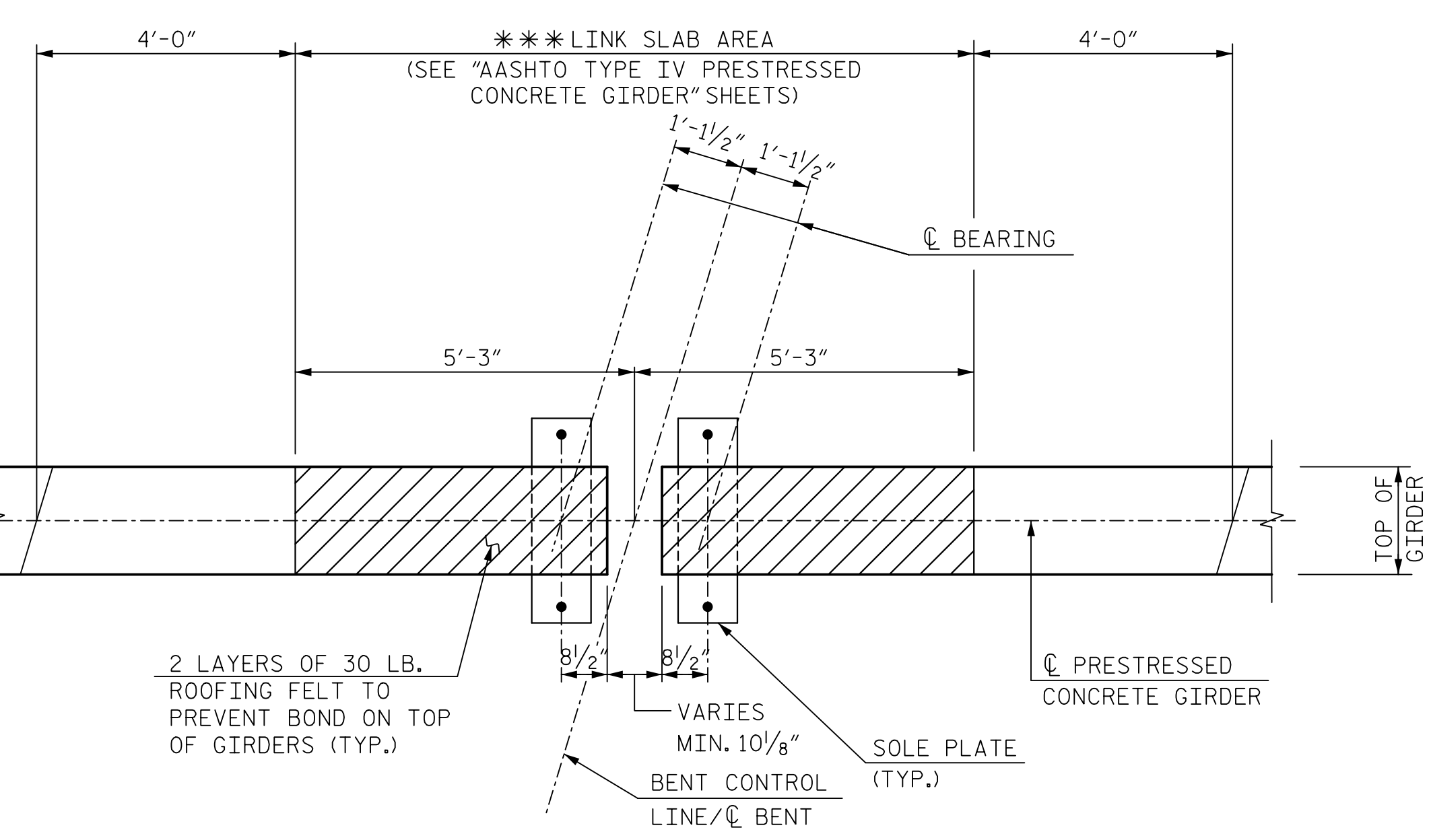
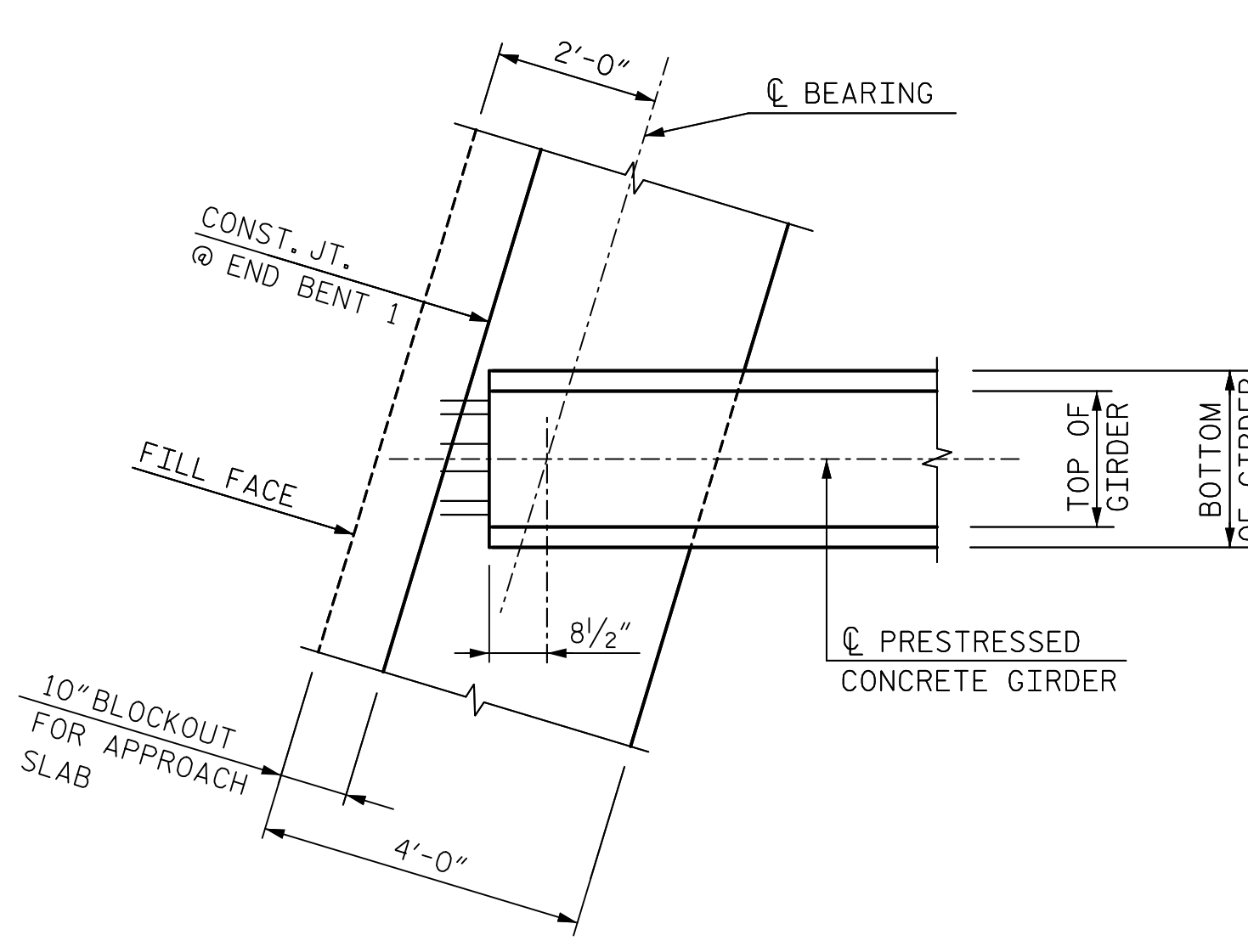
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
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SHEET NO. S5-6
TOTAL SHEETS 39



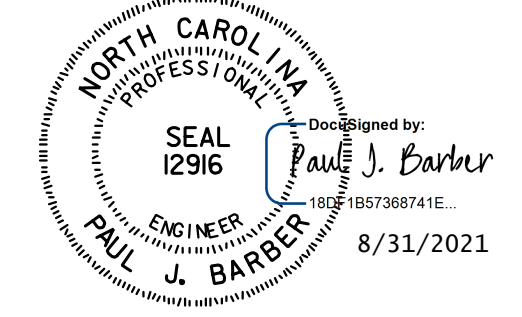
* THE TOP SURFACE OF THE END BENT CAP EXCLUDING THE BEARING AREA SHALL BE RAKED TO A DEPTH OF 1/4".

A 1/2" DEEP 3/8" WIDE CONTRACTION JOINT AT THE BENT CONTROL LINE SHALL BE SAWN WITHIN 24 HOURS OF POURING THE LINK SLAB. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.



TRANSVERSE CONSTRUCTION JOINT DETAIL

REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT.



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CHECKED BY: P. BARBER	DATE: 7/21		
DESIGN ENGINEER OF RECORD: P. BARBER	DATE: 7/21		

DETAIL "B"

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 2 OF 2

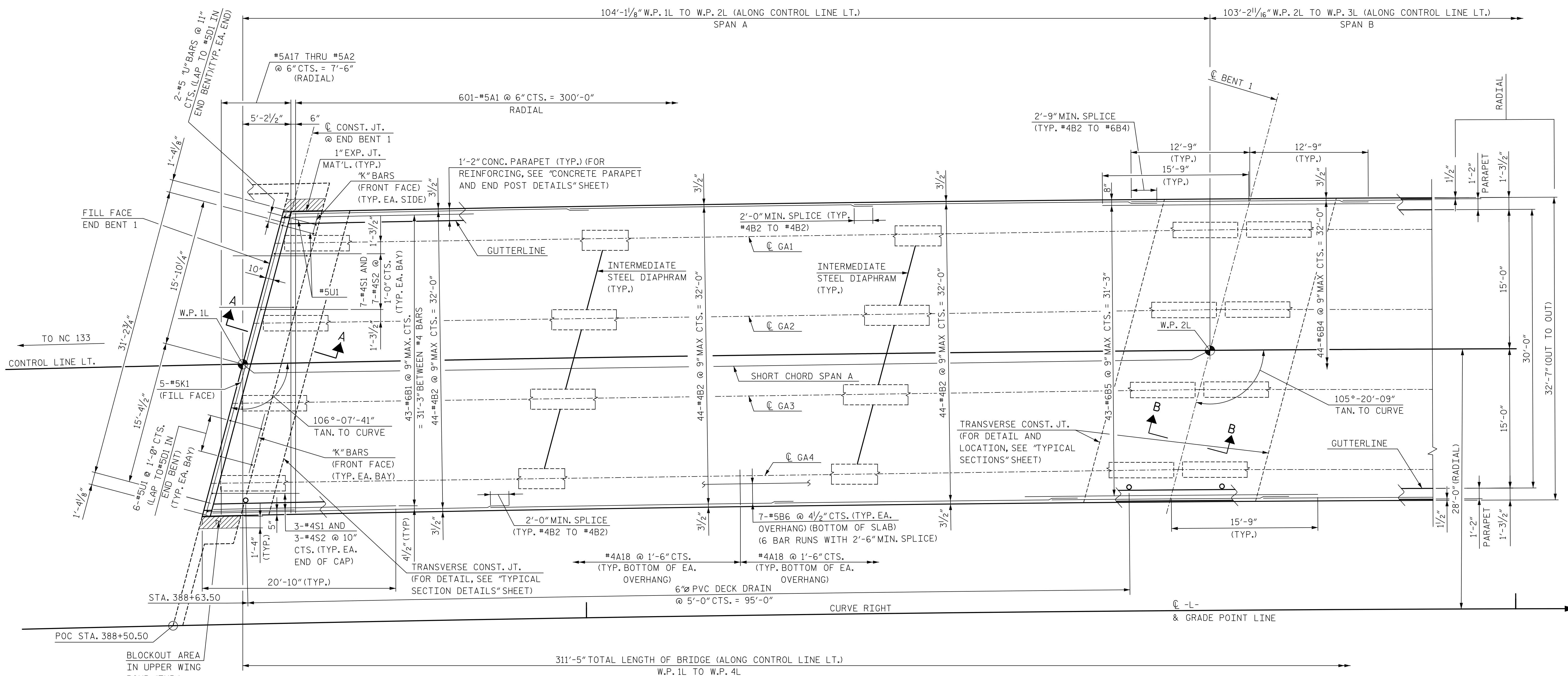
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

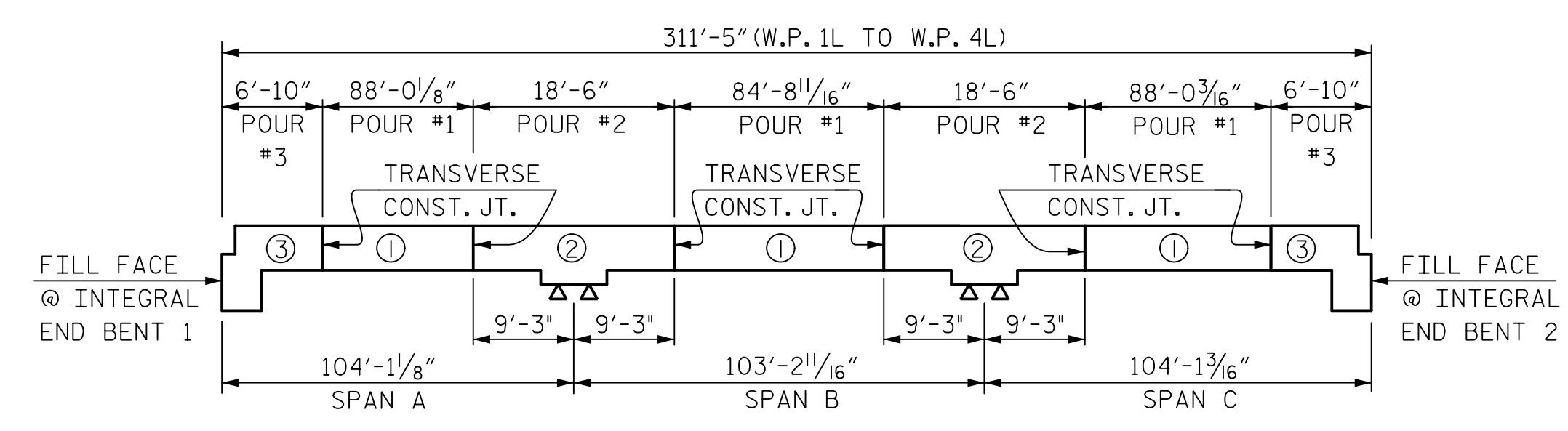
TYPICAL SECTIONS

LEFT LANE

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



PLAN OF SPAN A



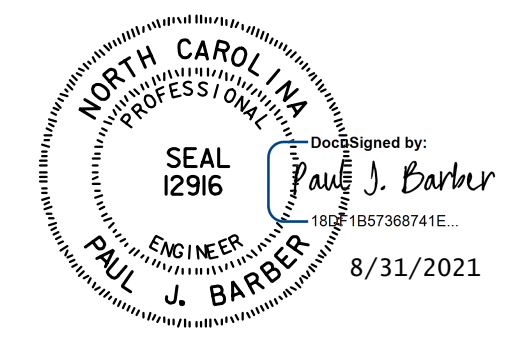
POURING SEQUENCE
DIMENSIONS GIVEN ALONG CONTROL LINE LEFT

NOTES:
SEE SPAN B FOR NOTES.
SEE SPAN C FOR ARC OFFSETS.

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

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

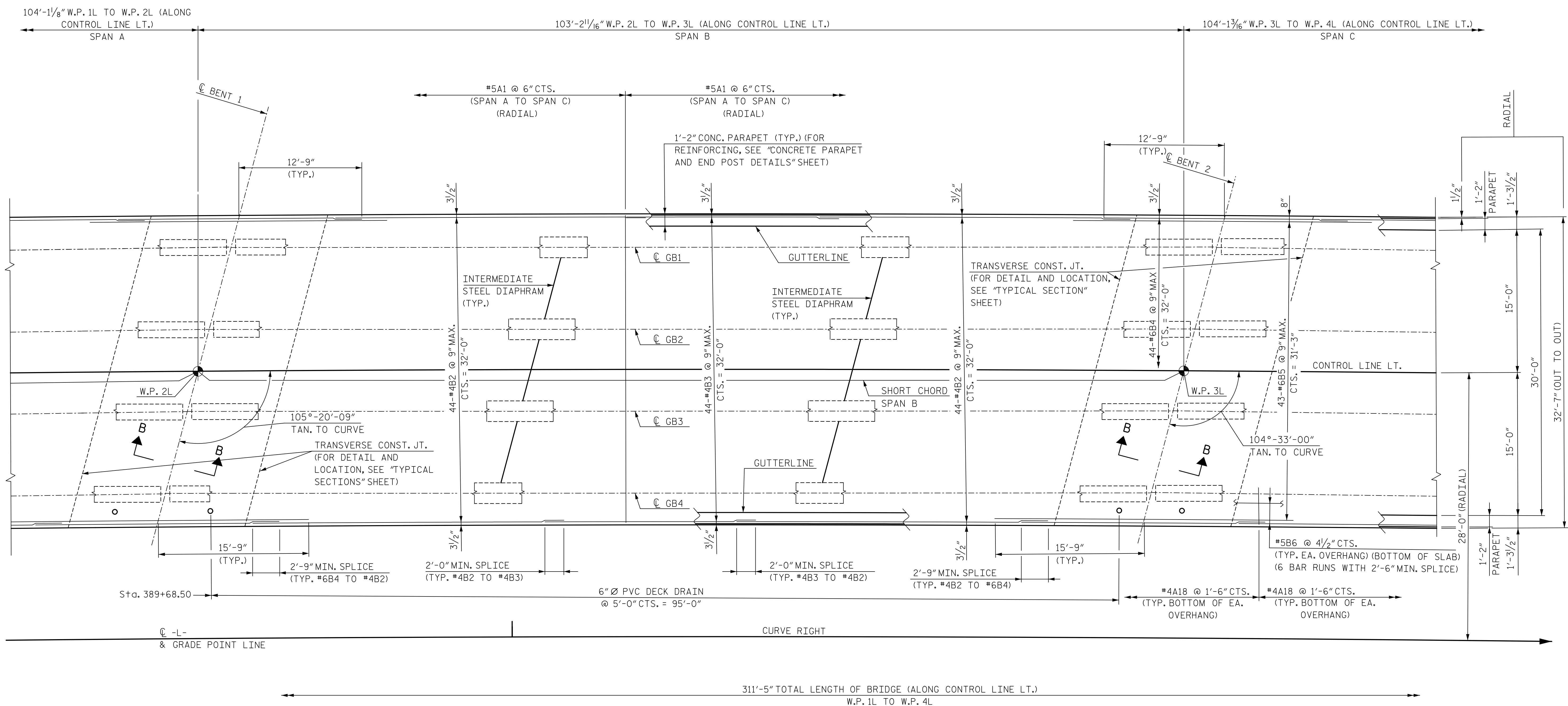
SHEET 1 OF 3
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPAN A
LEFT LANE



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DRAWN BY: M. WRIGHT	DATE: 7/21	DWG. NO. 8	REVISIONS
CHECKED BY: P. BARBER	DATE: 7/21		
DESIGN ENGINEER OF RECORD: P. BARBER	DATE: 7/21		

NO.	BY	DATE	NO.	BY	DATE
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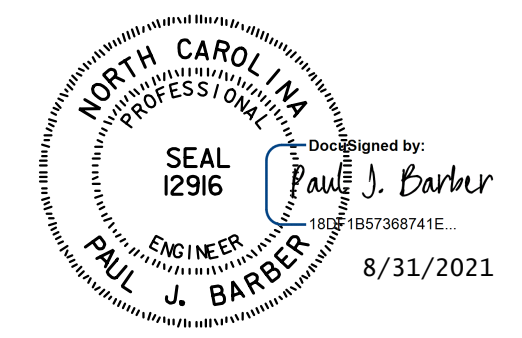
SHEET NO. S5-8
TOTAL SHEETS 39



PLAN OF SPAN B

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

NOTES:
 FOR SECTION VIEWS, SEE "TYPICAL SECTIONS" SHEETS.
 FOR INTERMEDIATE STEEL DIAPHRAGM, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET FOR DETAILS. FOR LOCATION, SEE "SUPERSTRUCTURE FRAMING PLAN" SHEET.
 FOR CONCRETE PARAPET DIMENSIONS, REINFORCING AND JOINT SPACING, SEE "CONCRETE PARAPET AND END POST DETAILS" SHEETS.
 6" Ø PVC DRAINS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO AVOID INTERFERENCE WITH DECK REBARS.
 SEE SPAN C FOR ARC OFFSETS.



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DRAWN BY: M. WRIGHT DATE: 7/21
 CHECKED BY: P. BARBER DATE: 7/21
 DESIGN ENGINEER OF RECORD: P. BARBER DATE: 7/21

DWG. NO. 9

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPAN B
 LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-9
1			3			TOTAL SHEETS
2			4			39

DECK PANEL SUPPORTS

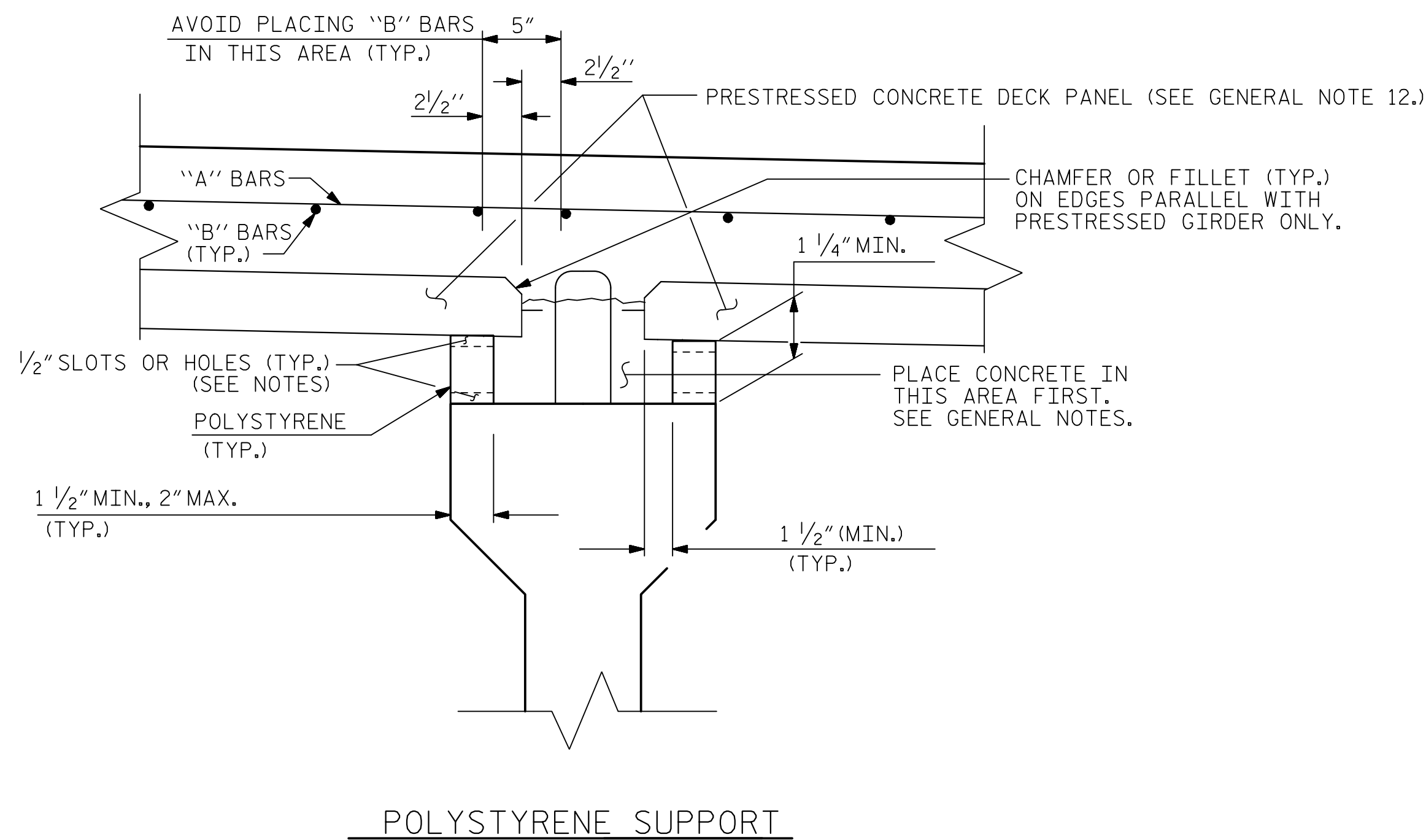
THE CONTRACTOR SHALL PROVIDE THE DECK PANEL SUPPORT SYSTEM SHOWN OR HE MAY SUBMIT A DECK PANEL SUPPORT SYSTEM OF HIS OWN DESIGN TO THE ENGINEER FOR APPROVAL.

POLYSTYRENE SUPPORT SYSTEM

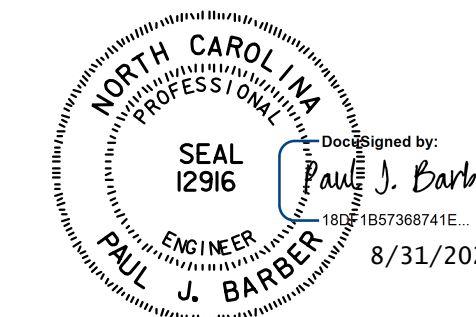
1. ALL POLYSTYRENE SHALL BE DOW STYROFOAM 60 HIGH-LOAD, UC INDUSTRIES FOAMULAR 600 OR APPROVED EQUAL.
2. THE POLYSTYRENE SUPPORT SYSTEM SHALL CONSIST OF ONE LAYER WITH A MINIMUM WIDTH OF 1 1/2" AND A MAXIMUM WIDTH OF 2". THE POLYSTYRENE SHALL HAVE 1/2" X 1/2" WIDE SLOTS OR 1/2" DIAMETER HOLES AT 4'-0" CENTERS STAGGERED ALONG THE TOP AND BOTTOM.
3. THE POLYSTYRENE MAY BE CUT AND PLACED ON EDGE AS NECESSARY TO MATCH THE REQUIRED BUILDUP PROFILE ALONG THE GIRDER.
4. ADHESIVE, AS APPROVED BY THE ENGINEER, SHALL BE APPLIED TO THE TOP OF THE GIRDER IN A CONTINUOUS BEAD AND IN SUFFICIENT AMOUNT TO PREVENT THE POLYSTYRENE FROM BLOWING OUT AND TO PREVENT GAPS FROM FORMING BETWEEN THE POLYSTYRENE AND THE GIRDER. PRIOR TO PLACEMENT OF THE DECK PANELS, THE ADHESIVE SHALL ALSO BE APPLIED TO THE TOP OF THE POLYSTYRENE.
5. CONCRETE-FILLED BUCKETS, STACKS OF DECK PANELS, BUNDLED REINFORCING BARS OR OTHER HEAVY CONCENTRATED LOADS WILL NOT BE PERMITTED ON THE DECK PANEL ONCE THE PANEL HAS BEEN PLACED ON THE POLYSTYRENE SUPPORT SYSTEM.

GENERAL NOTES

1. THE DESIGN COMPRESSIVE STRENGTH (F'G) FOR THE CONCRETE IN PRESTRESSED PANELS SHALL BE 5000 PSI MINIMUM AT 28 DAYS. COMPRESSIVE STRENGTH OF CONCRETE AT TIME OF RELEASE OF STRANDS SHALL BE 4000 PSI MINIMUM.
2. THE PRECAST PRESTRESSED PANEL SHALL HAVE A THICKNESS OF 3 1/2" WITH THE PRESTRESSED STRANDS LOCATED AT HALF THE DEPTH OF THE PANEL.
3. FOR SKEWED SPANS, TRAPEZOIDAL CLOSURE PANELS SHALL HAVE A MINIMUM WIDTH OF 2 FEET ON THE SHORT SIDE.
4. ALL PRESTRESSING STRANDS SHALL EXTEND 2" BEYOND THE PANEL EDGES.
5. SHEAR REINFORCING OF 0.60 SQ. INCHES OF REINFORCING STEEL PER 10 SQ. FEET OF PANEL SURFACE SHALL BE PROVIDED IN THE PANEL TO ENSURE COMPOSITE ACTION BETWEEN PANEL AND THE CAST-IN-PLACE CONCRETE. SHEAR REINFORCEMENT SHALL BE MADE OF WELDED WIRE HAVING A MINIMUM YIELD STRENGTH OF 60 KSI.
6. SHEAR REINFORCEMENT AND LIFTING DEVICES SHALL BE CONSTRUCTED AND PLACED SO AS TO AVOID ANY INTERFERENCE WITH REINFORCING STEEL IN THE CAST-IN-PLACE DECK SLAB AND TO ALLOW FOR PROPER CONCRETE CONSOLIDATION IN THE DECK PANEL.
7. SHIFT LONGITUDINAL "B" BARS AS NECESSARY TO OBTAIN A MINIMUM CLEAR DISTANCE OF 2 1/2" TO THE RIGHT OR LEFT OF THE EDGE OF THE DECK PANEL.
8. WHEN CASTING THE DECK, PLACE CONCRETE FIRST OVER THE GIRDERS IN CONTINUOUS STRIPS A MINIMUM OF THREE PANEL LENGTHS AHEAD OF THE REST OF THE CONCRETE. CAREFULLY VIBRATE THE CONCRETE OVER THE GIRDERS SO THAT CONCRETE COMPLETELY FILLS THE AREA UNDER THE DECK PANEL OVERHANGS. THEN PLACE AND VIBRATE THE REMAINING DECK CONCRETE.
9. PRECAST DECK PANELS SHALL BE DESIGNED FOR AN ALLOWABLE TENSILE STRESS OF 0 PSI IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.
10. PRECAST DECK PANELS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.
11. ALL BAR SUPPORTS AND INCIDENTAL REINFORCING STEEL USED IN THE PRECAST PANELS SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
12. ENDS OF PANELS AT INTERIOR BENTS SHALL NOT OVERHANG ANY PORTION OF THE GIRDER END BY MORE THAN 1", MEASURED PERPENDICULAR TO THE END OF THE GIRDER. PANELS EDGE SHALL BE PARALLEL TO INTERIOR BENT CONTROL LINES AND PROVIDE A MINIMUM 10" WIDE GAP TO ALLOW CAST-IN-PLACE TO BE INSTALLED. SEE SECTION B-B ON "TYPICAL SECTIONS" SHEET.



PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

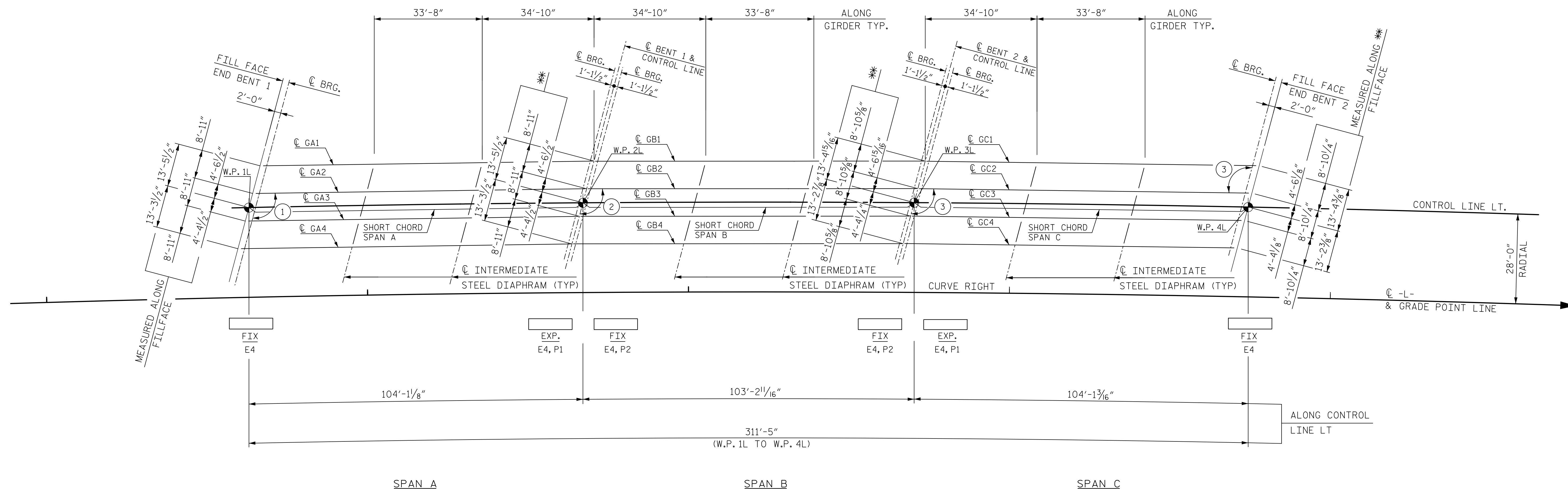


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 PRECAST PRESTRESSED
 CONCRETE DECK PANELS
 LEFT LANE

ASSEMBLED BY : AES	DATE : 5/17
CHECKED BY : BE	DATE : 8/17
DRAWN BY : ELR 1/92	REV. 5/7/03R RWW/JTE
CHECKED BY : GRP 4/92	REV. 5/1/06R TLA/GM
	REV. 10/1/11 MAA/GM

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609																								
DRAWN BY : M. WRIGHT	DATE : 7/21	DWG. NO. II	<table border="1"> <tr> <th colspan="5">REVISIONS</th> </tr> <tr> <th>NO.</th> <th>BY</th> <th>DATE</th> <th>NO.</th> <th>BY</th> <th>DATE</th> </tr> <tr> <td>1</td> <td></td> <td></td> <td>3</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> <td>4</td> <td></td> <td></td> </tr> </table>	REVISIONS					NO.	BY	DATE	NO.	BY	DATE	1			3			2			4		
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CHECKED BY : P. BARBER	DATE : 7/21																									
DESIGN ENGINEER OF RECORD : P. BARBER	DATE : 7/21																									

SHEET NO. S5-11				
TOTAL SHEETS 39				



FRAMING PLAN

ANGLES

- ① 105°-43'-55" (TYP. FOR SPAN A)
- ② 104°-56'-34" (TYP. FOR SPAN B)
- ③ 104°-09'-14" (TYP. FOR SPAN C)

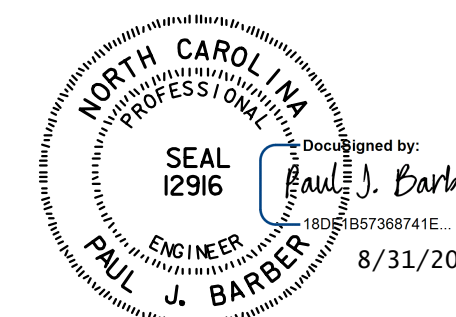
SPAN *	LENGTH
A	100'-10 1/4"
B	100'-10 3/4"
C	100'-10 1/2"

NOTES:
 "FIX." DENOTES FIXED BEARING ASSEMBLY.
 "EXP." DENOTES EXPANSION BEARING ASSEMBLY.
 "E" DENOTES ELASTOMERIC BEARING PAD MARK.
 "P" DENOTES STEEL SOLE PLATE MARK.

* GIRDERS ARE SET PARALLEL TO THE SHORT CHORD. SPAN LENGTHS SHOWN ARE C OF BEARINGS TO C OF BEARINGS.

** DIMENSIONS ARE ALONG C BENT AND ARE THE SAME FOR:
 EB1 AND PIER 1 (SPAN A)
 PIER 1 AND PIER 2 (SPAN B)
 PIER 2 AND EB2 (SPAN C)

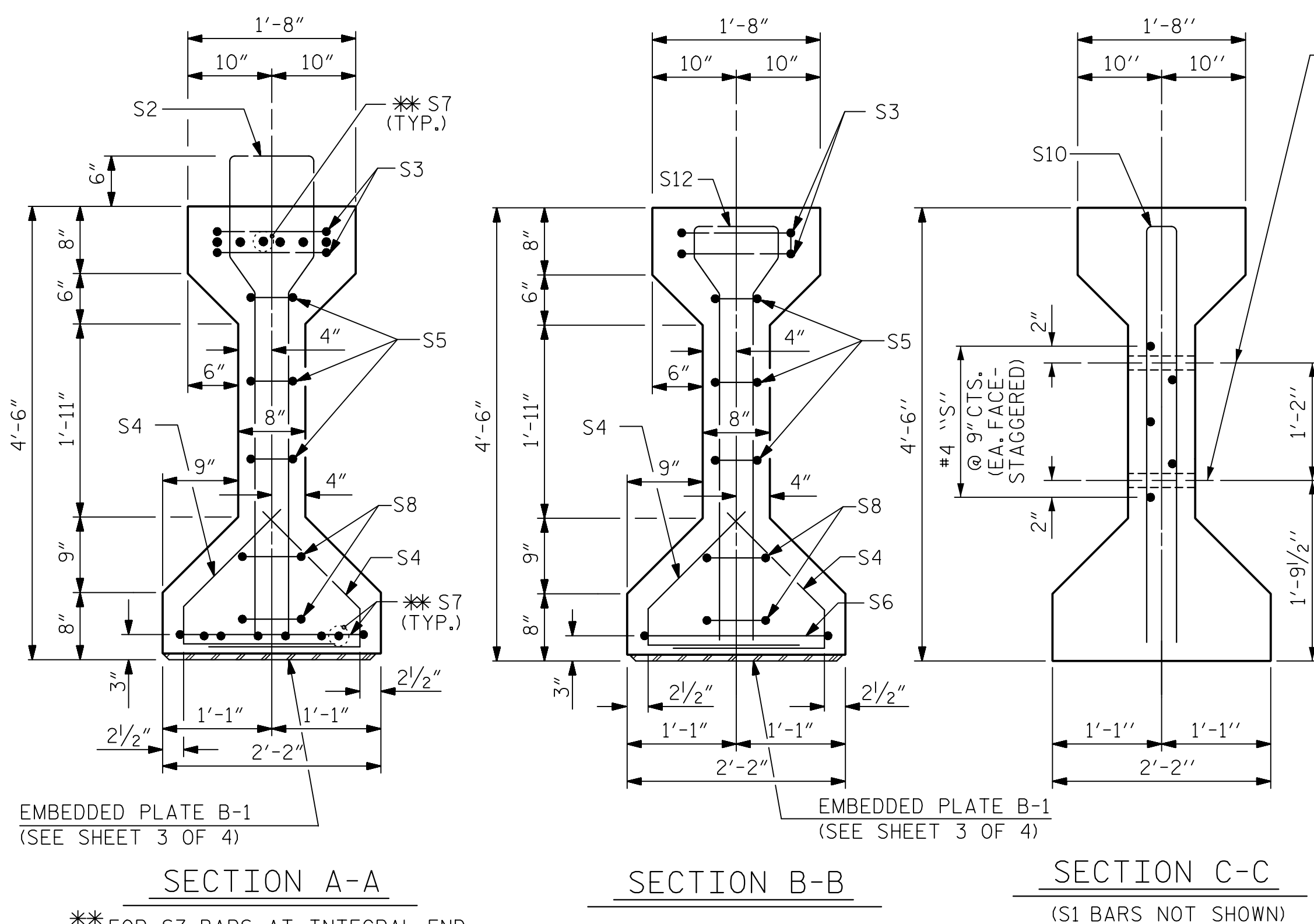
PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-



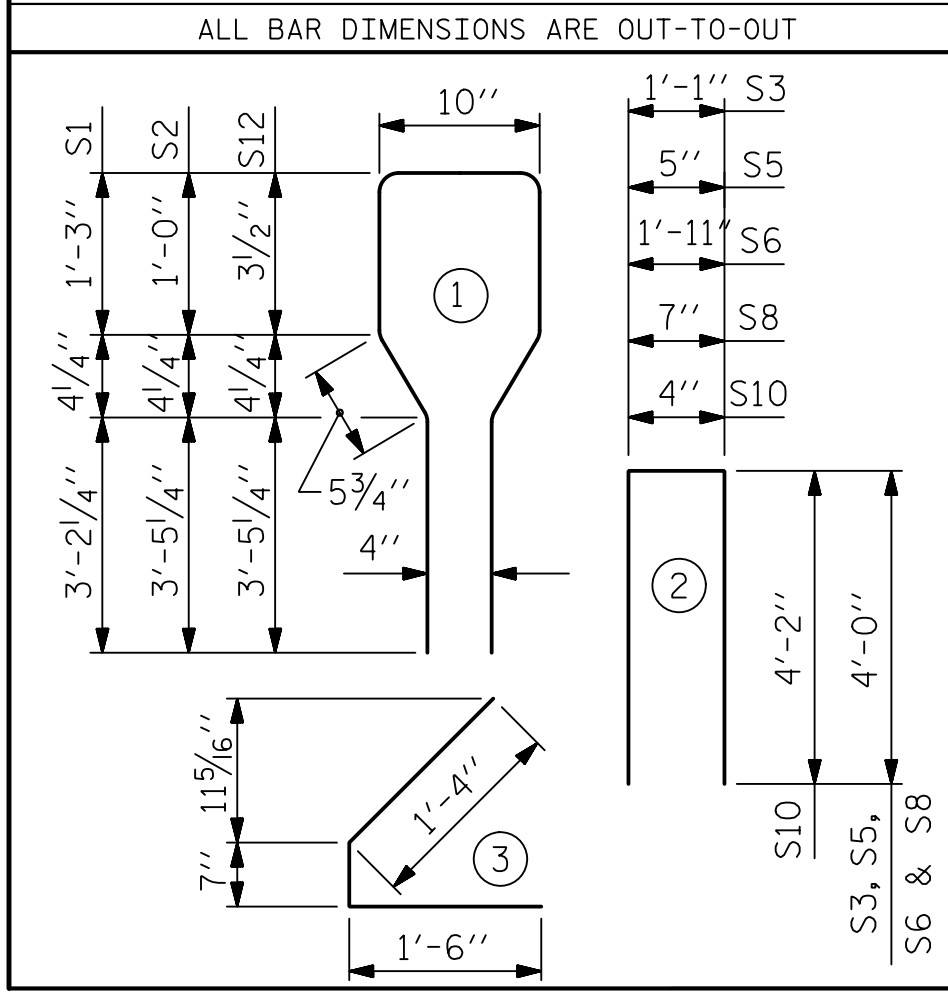
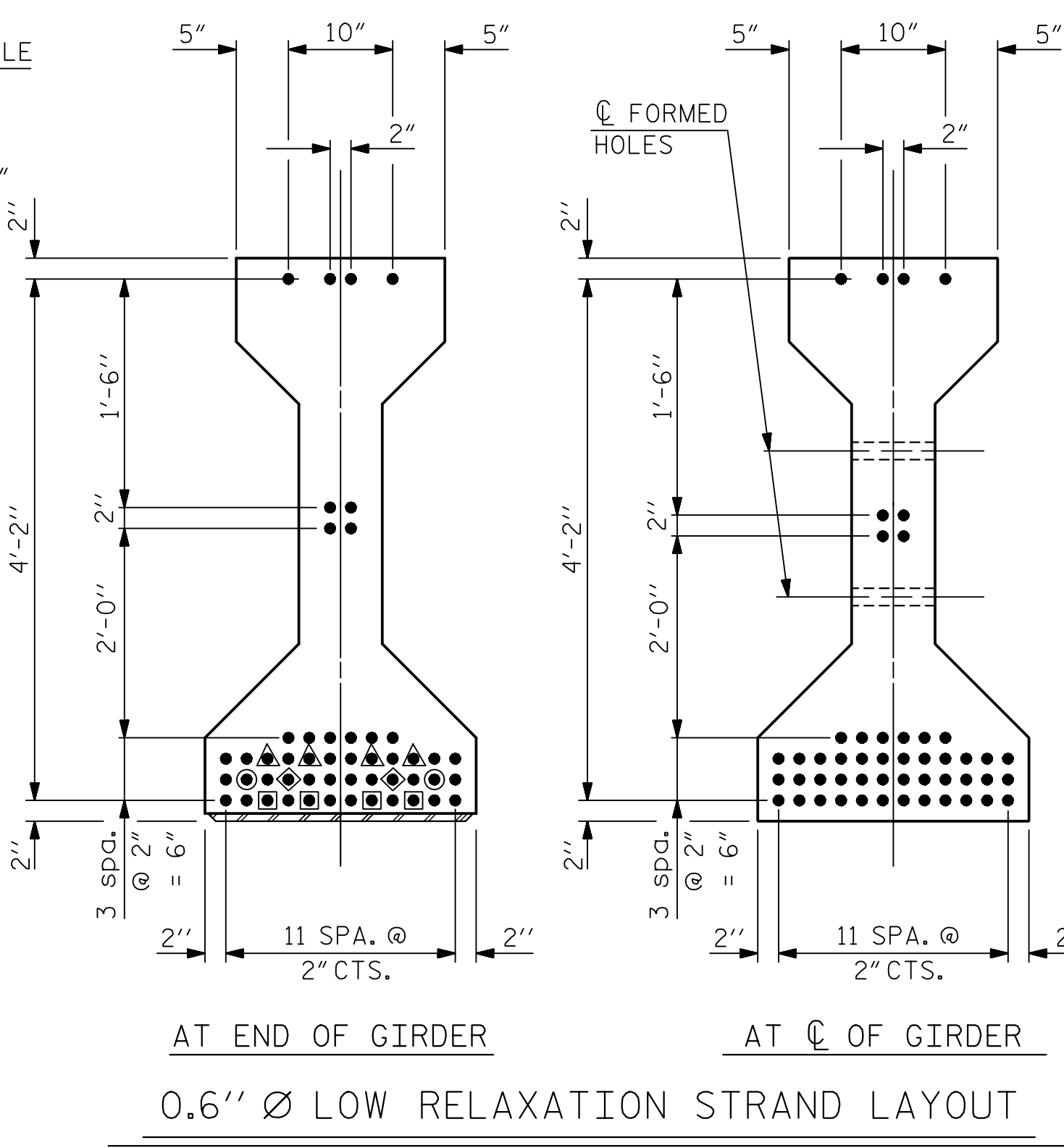
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
SUPERSTRUCTURE
 FRAMING PLAN
 LEFT LANE

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: M. WRIGHT	DATE: 7/21	DWG. NO. 12	SHEET NO. S5-12
CHECKED BY: P. BARBER	DATE: 7/21		
DESIGN ENGINEER OF RECORD: P. BARBER	DATE: 7/21		

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



1 1/2" Ø FORMED HOLE
(SEE "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET FOR LOCATION)



- DEBONDING LEGEND
- FULLY BONDED STRANDS
 - ▲ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
 - STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
 - ⊙ STRANDS DEBONDED FOR 22'-0" FROM END OF GIRDER
 - ◆ STRANDS DEBONDED FOR 30'-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 GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	71	#4	1	10'-8"	506
S2	21	#6	1	10'-8"	336
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
*S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	4	#5	2	8'-8"	36
S11	10	#4	STR	7'-0"	47
S12	11	#6	1	9'-3"	153

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

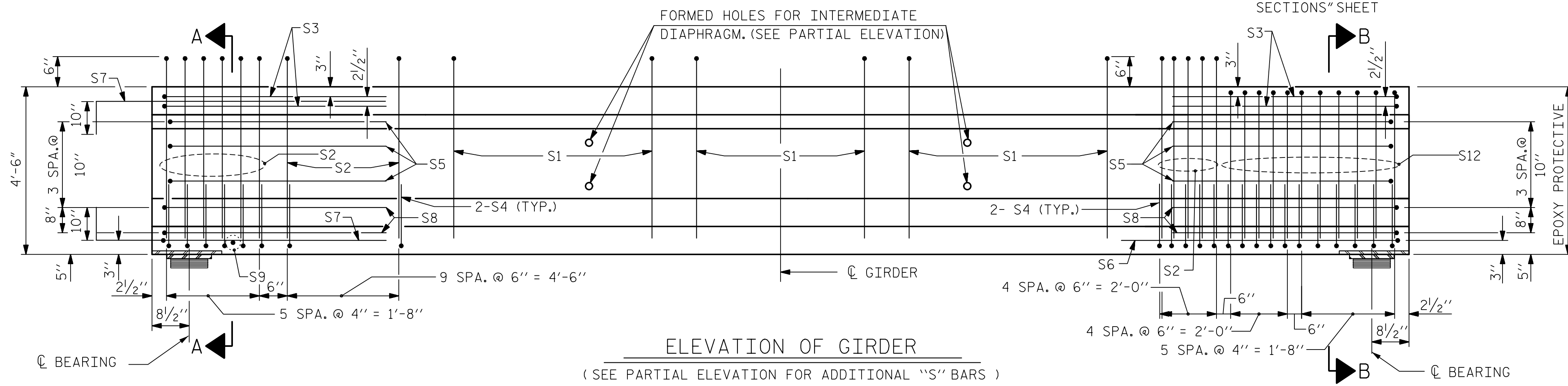
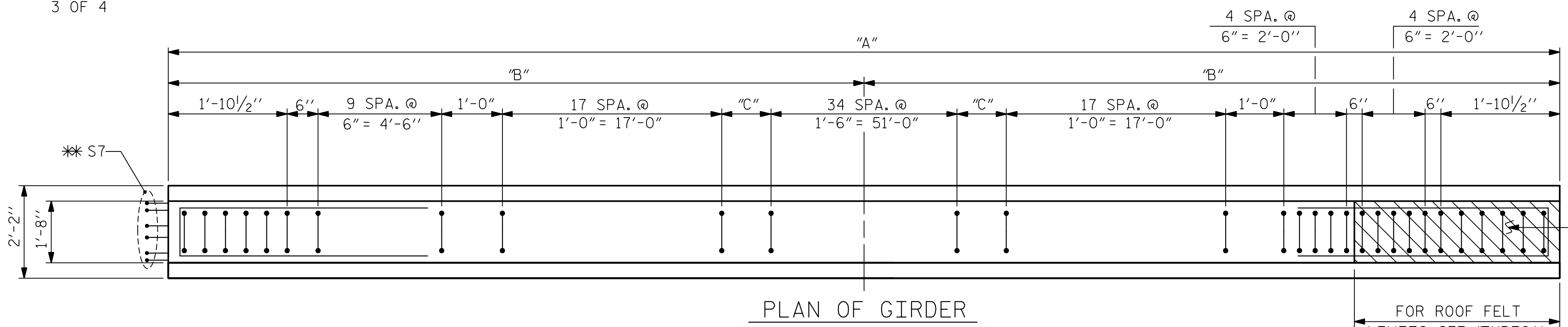
QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL LB.	9,000 PSI CONCRETE C.Y.	0.6" Ø L. R. STRANDS No.
GA1-GA4	1,359	20.8	50
GC1-GC4	1,359	20.8	50
GIRDERS REQUIRED			
NUMBER	LENGTH	TOTAL LENGTH	
4 (GA1-GA4)	102'-3 1/4"	409.08'	
4 (GC1-GC4)	102'-3 1/2"	409.17'	

NOTES:
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,750 PSI FOR SPAN A AND SPAN C GIRDERS.

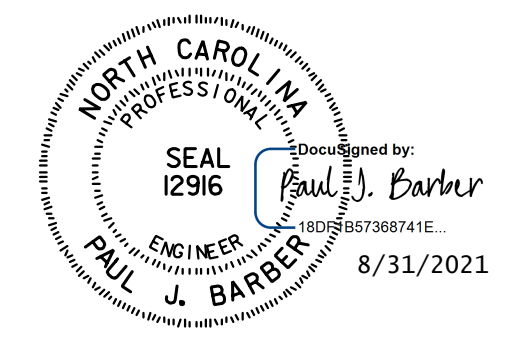
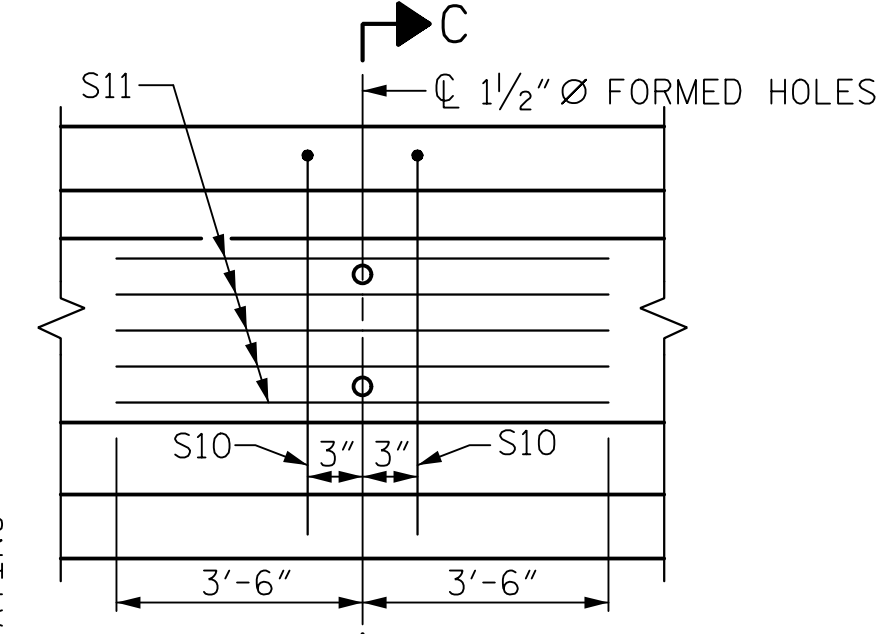
GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 9,000 PSI AT THE AGE OF 28 DAYS.

PRESTRESSED CONCRETE GIRDERS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PRESTRESSED CONCRETE GIRDERS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.



GIRDER	"A"	"B"	"C"
GA1	102'-3 1/4"	51'-1 5/8"	9 1/8"
GA2	102'-3 1/4"	51'-1 5/8"	9 1/8"
GA3	102'-3 1/4"	51'-1 5/8"	9 1/8"
GA4	102'-3 1/4"	51'-1 5/8"	9 1/8"
GC1	102'-3 1/2"	51'-1 3/4"	9 1/4"
GC2	102'-3 1/2"	51'-1 3/4"	9 1/4"
GC3	102'-3 1/2"	51'-1 3/4"	9 1/4"
GC4	102'-3 1/2"	51'-1 3/4"	9 1/4"



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NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: M. WRIGHT DATE: 7/21
CHECKED BY: P. BARBER DATE: 7/21
DESIGN ENGINEER OF RECORD: P. BARBER DATE: 7/21

DWG. NO. 13

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

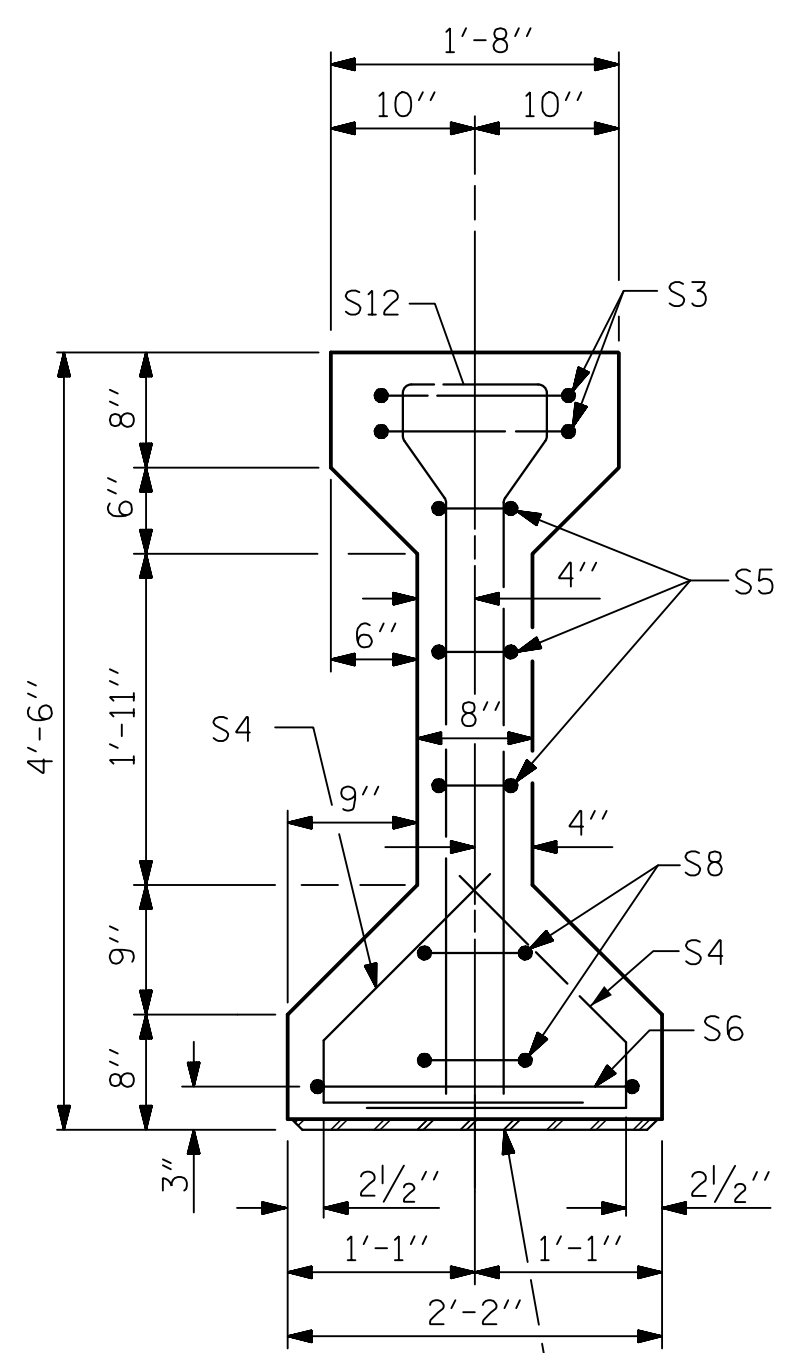
SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

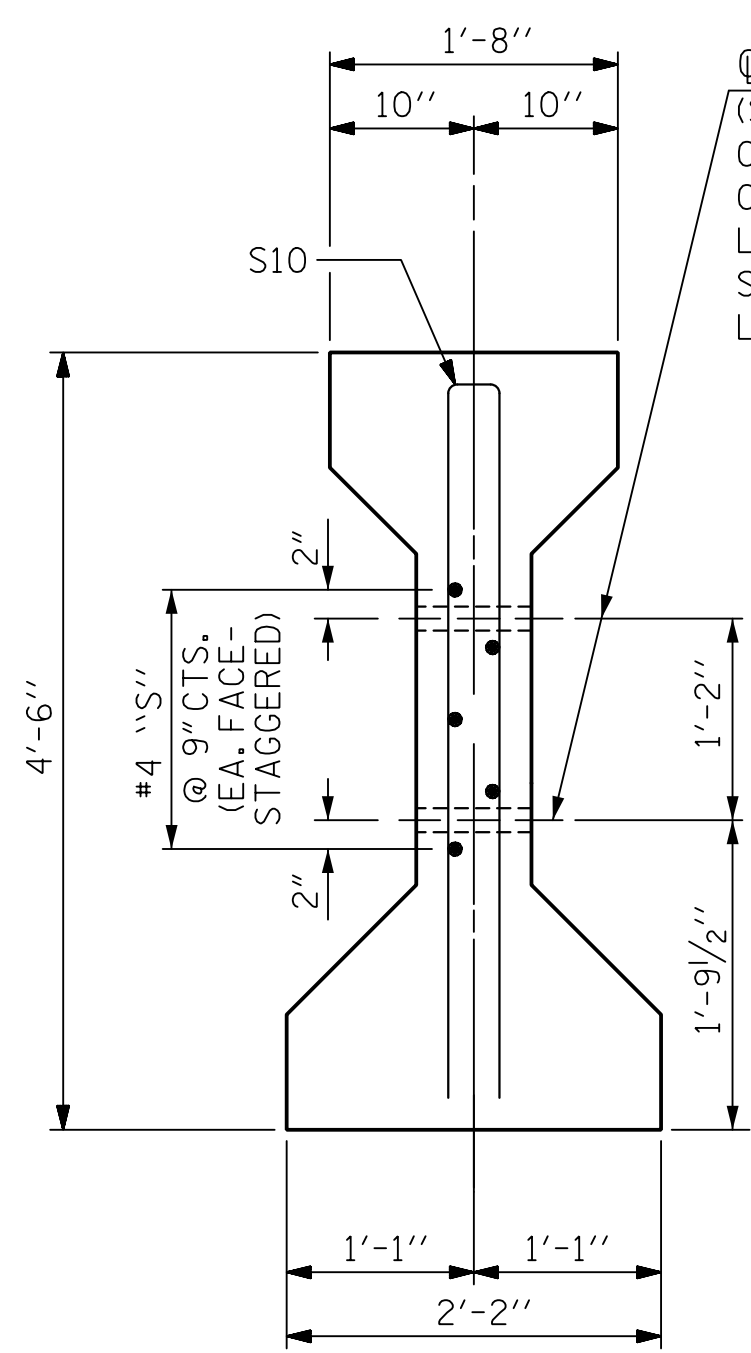
STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
CONTINUOUS FOR LIVE LOAD
SPANS A & C
LEFT LANE

REVISIONS						SHEET NO. S5-13
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 39
2			4			

ASSEMBLED BY : BN	DATE : 5/17
CHECKED BY : BE	DATE : 8/17
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM
CHECKED BY : CRP 8/91	REV. 10/1/11 MAA/GM
	REV. 1/15 MAA/TMG



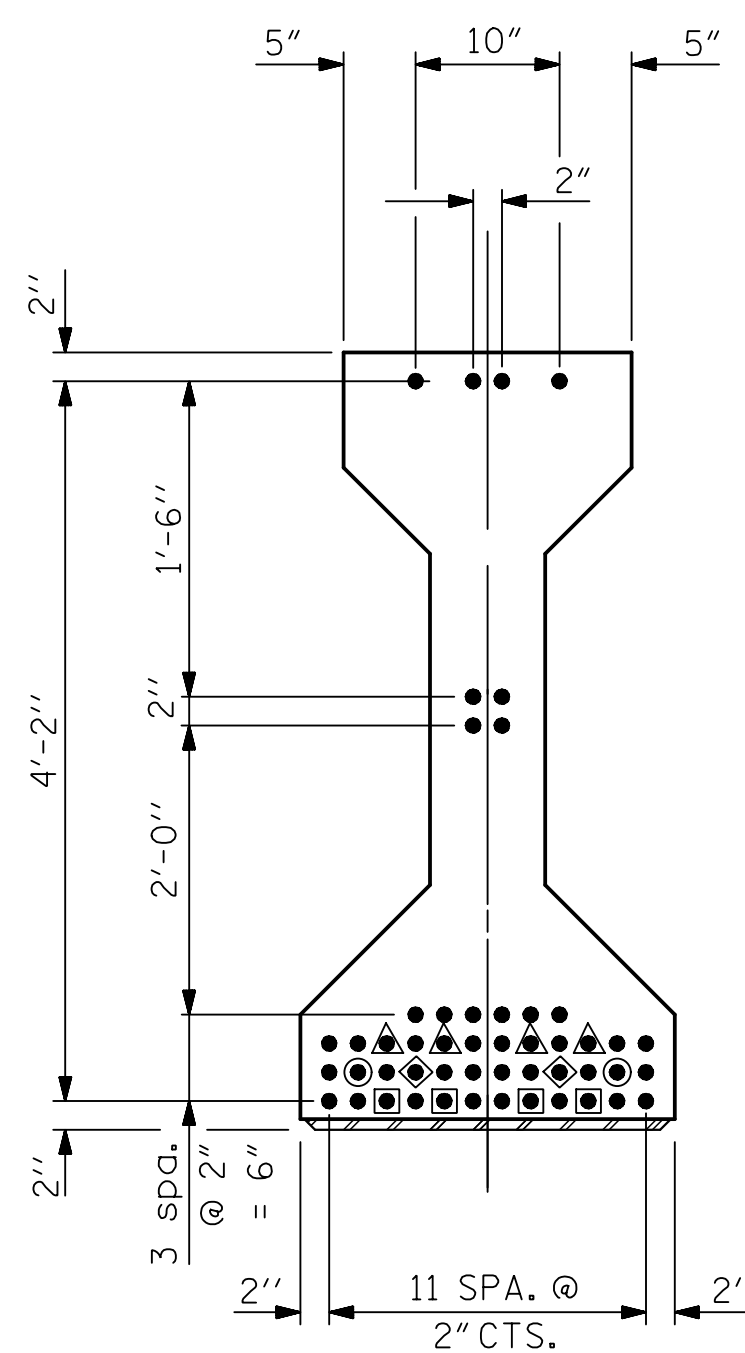
SECTION B-B



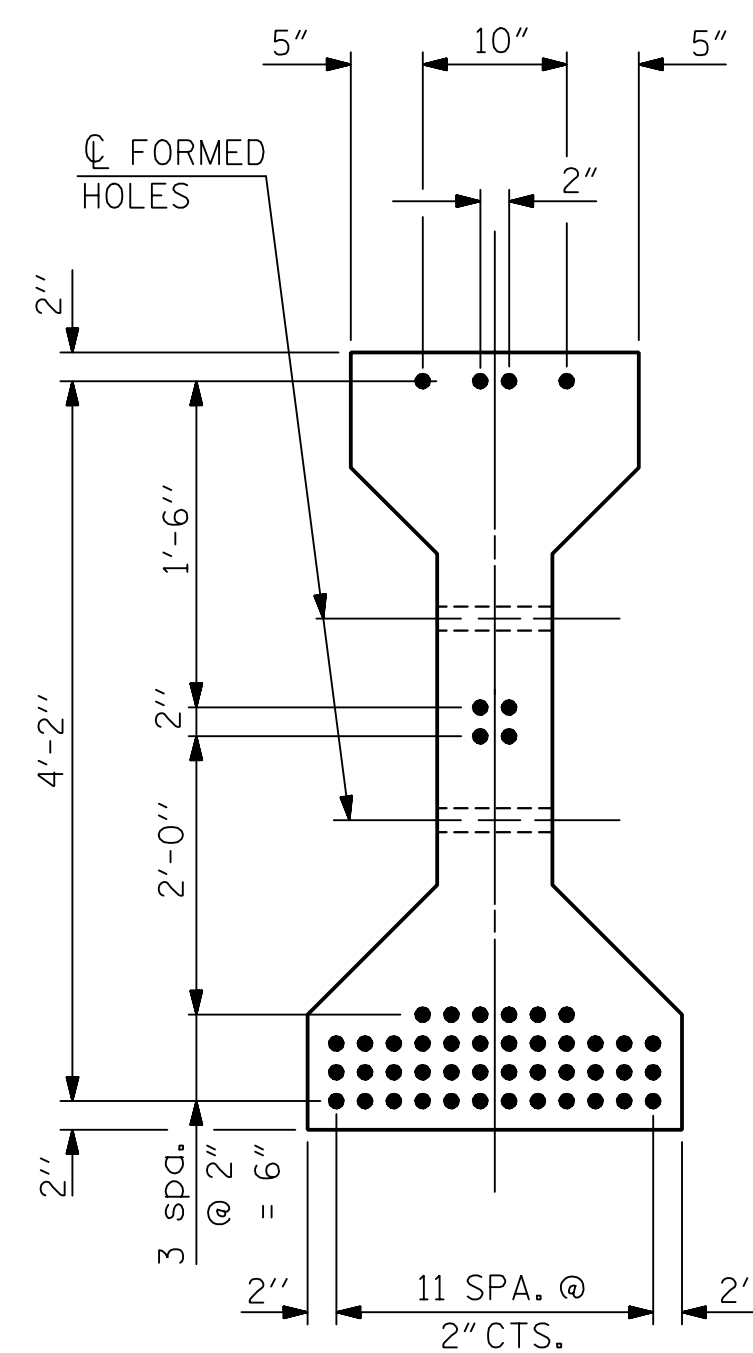
SECTION C-C

(S1 BARS NOT SHOWN)

1/2" Ø FORMED HOLE (SEE "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET FOR LOCATION)

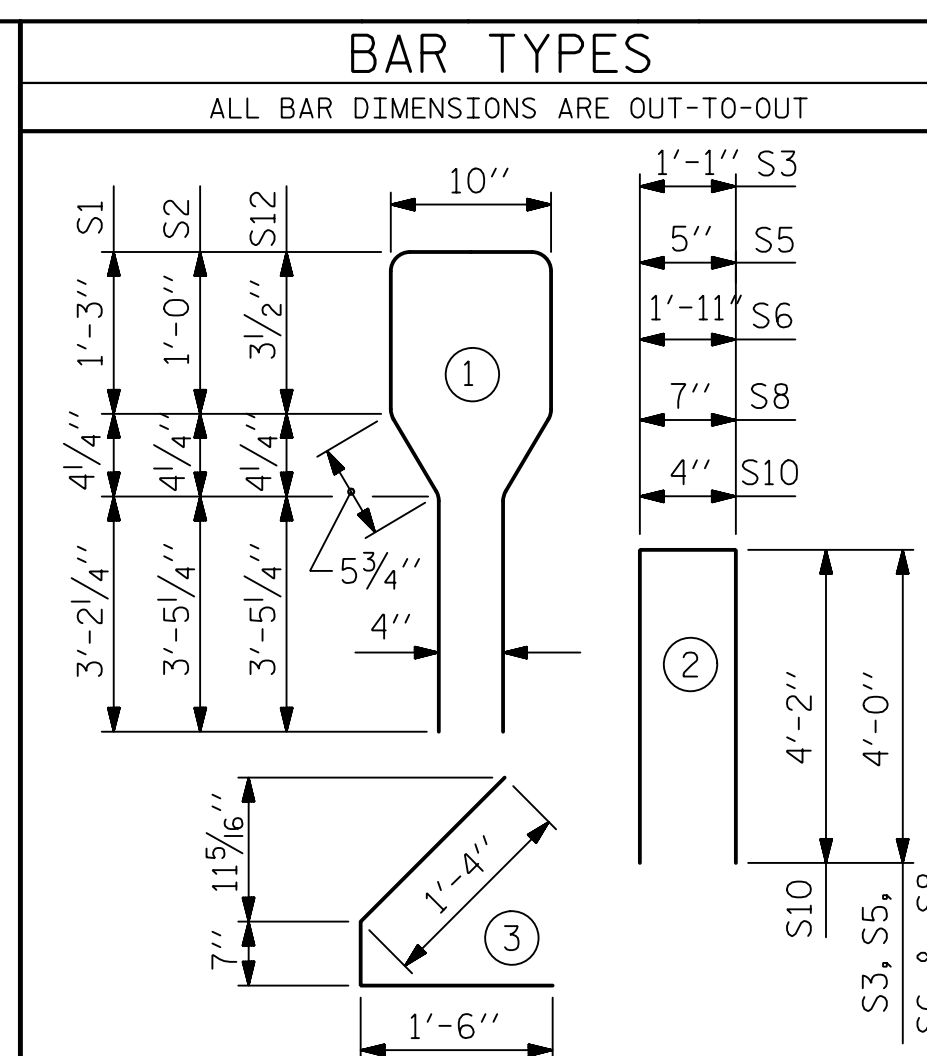


AT END OF GIRDER



AT C OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT



DEBONDING LEGEND

- FULLY BONDED STRANDS
- ▲ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 22'-0" FROM END OF GIRDER
- ◆ STRANDS DEBONDED FOR 30'-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 GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	71	#4	1	10'-8"	506
S2	10	#6	1	10'-8"	160
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	2	#4	2	9'-11"	13
S8	4	#4	2	8'-7"	23
S10	4	#5	2	8'-8"	36
S11	10	#4	STR	7'-0"	47
S12	22	#6	1	9'-3"	306

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9,000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
GB1-GB4	1295	20.8	50

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4 (GB1-GB4)	102'-3 3/4"	409.25'

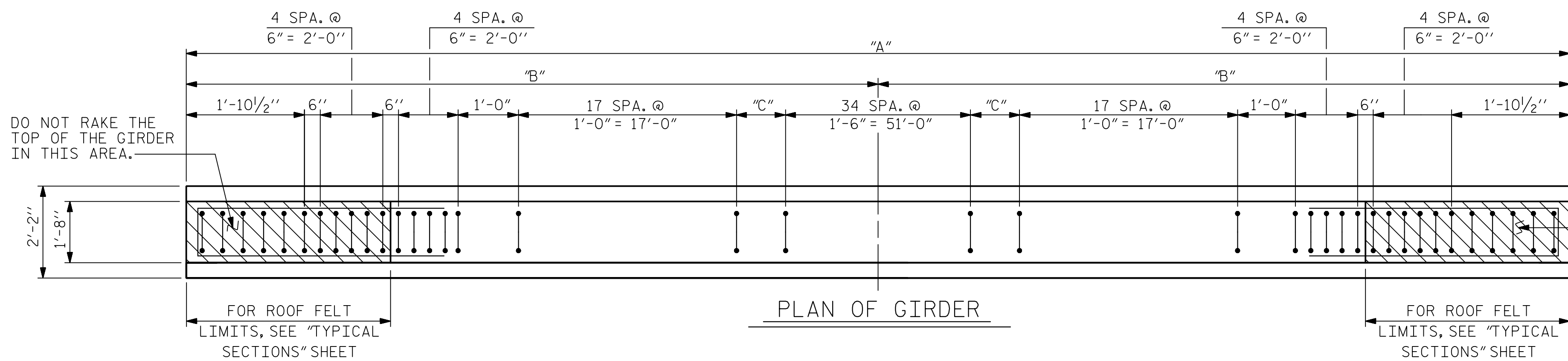
NOTES:

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,750 PSI FOR SPAN B GIRDERS.

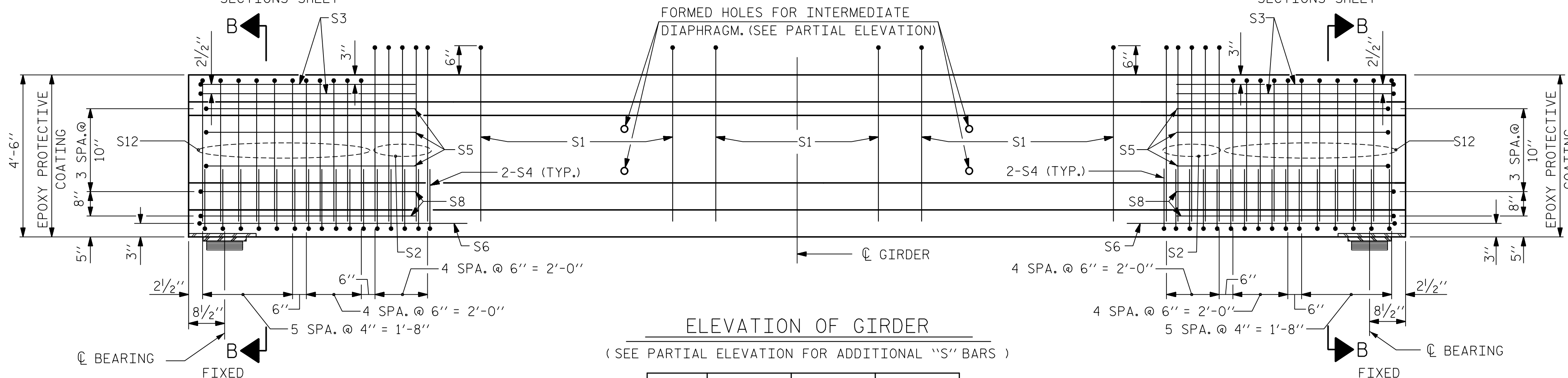
GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 9,000 PSI AT THE AGE OF 28 DAYS.

PRESTRESSED CONCRETE GIRDERS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PRESTRESSED CONCRETE GIRDERS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.



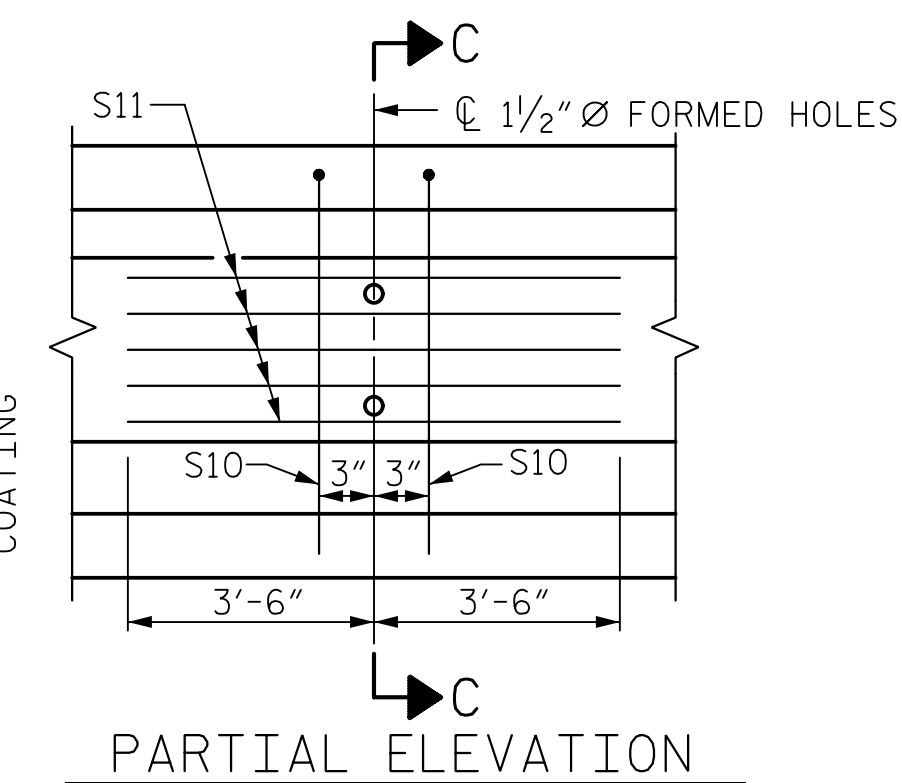
PLAN OF GIRDER



ELEVATION OF GIRDER

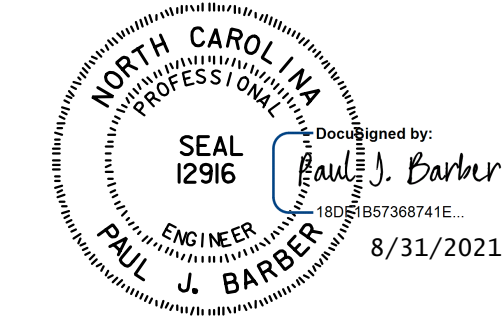
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

GIRDER	"A"	"B"	"C"
GB1	102'-3 3/4"	51'-1 7/8"	9 3/8"
GB2	102'-3 3/4"	51'-1 7/8"	9 3/8"
GB3	102'-3 3/4"	51'-1 7/8"	9 3/8"
GB4	102'-3 3/4"	51'-1 7/8"	9 3/8"



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER GB1 - GB4



PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 AASHTO TYPE IV
 PRESTRESSED CONCRETE GIRDER
 CONTINUOUS FOR LIVE LOAD
 SPAN B
 LEFT LANE

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

STD. NO. PCG6

ASSEMBLED BY : AES	DATE : 9/17
CHECKED BY : BE	DATE : 9/17
DRAWN BY : ELR 8/91	REV. 5/1/06R TLA/GM
CHECKED BY : GRP 8/91	REV. 10/1/11 MAA/GM
	REV. 1/15 MAA/TMG

HNTB	HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
DRAWN BY: M. WRIGHT	DATE: 7/21
CHECKED BY: P. BARBER	DATE: 7/21
DESIGN ENGINEER OF RECORD: P. BARBER	DATE: 7/21

DWG. NO. 14

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.

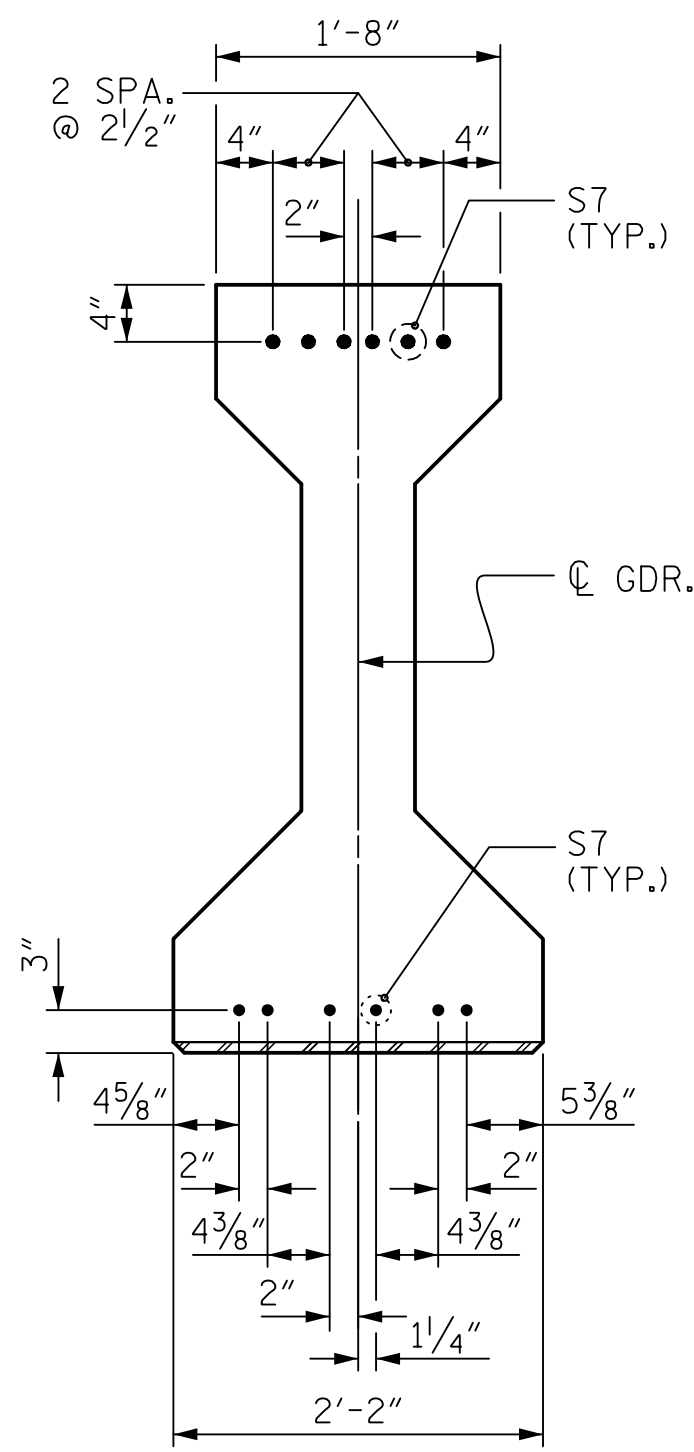
EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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.

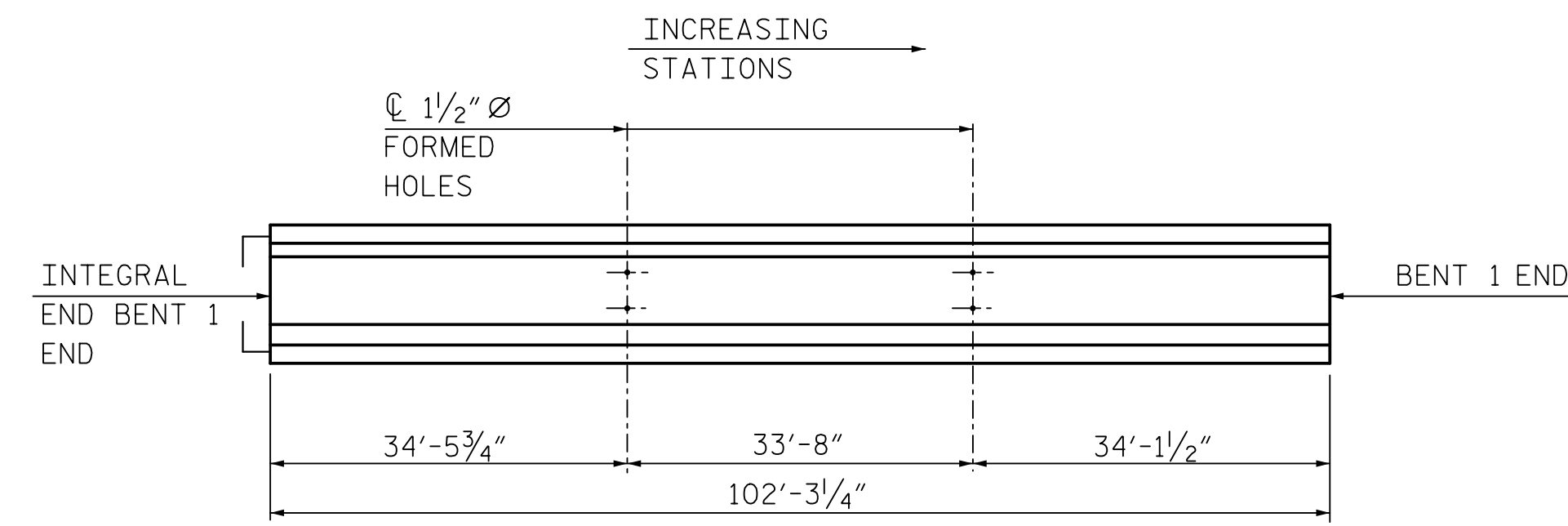
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4", UNLESS NOTED OTHERWISE. SEE PRESTRESSED CONCRETE GIRDER SHEETS FOR AREA NOT TO BE RAKED.

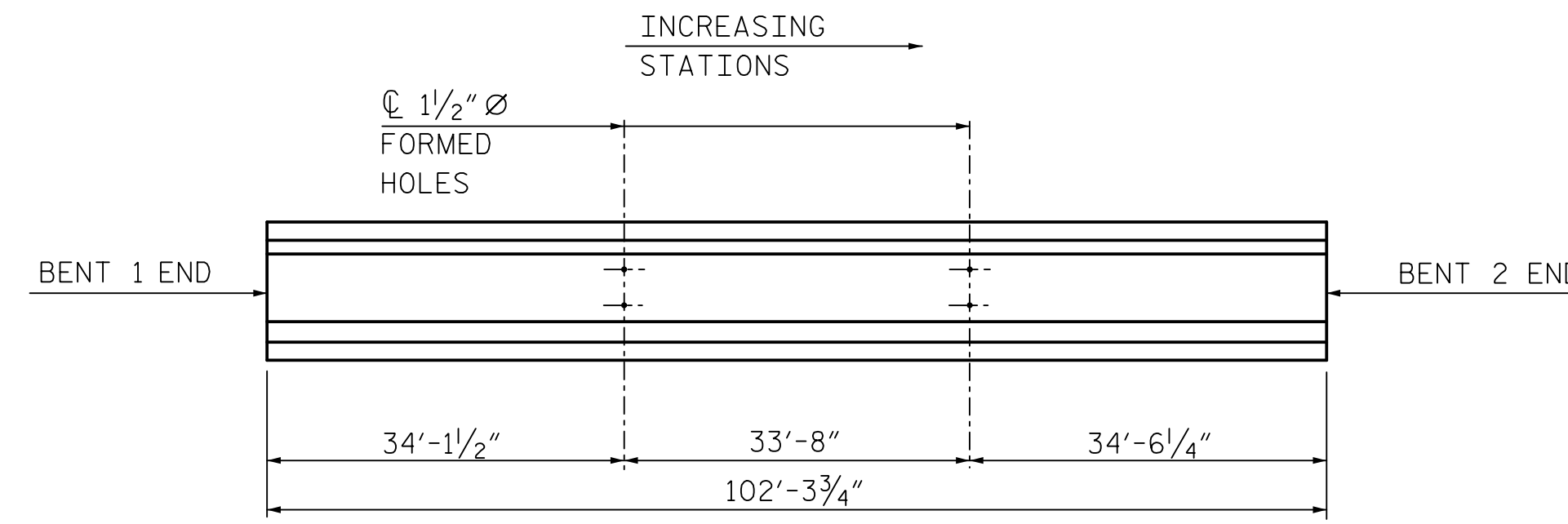


DETAIL "A"

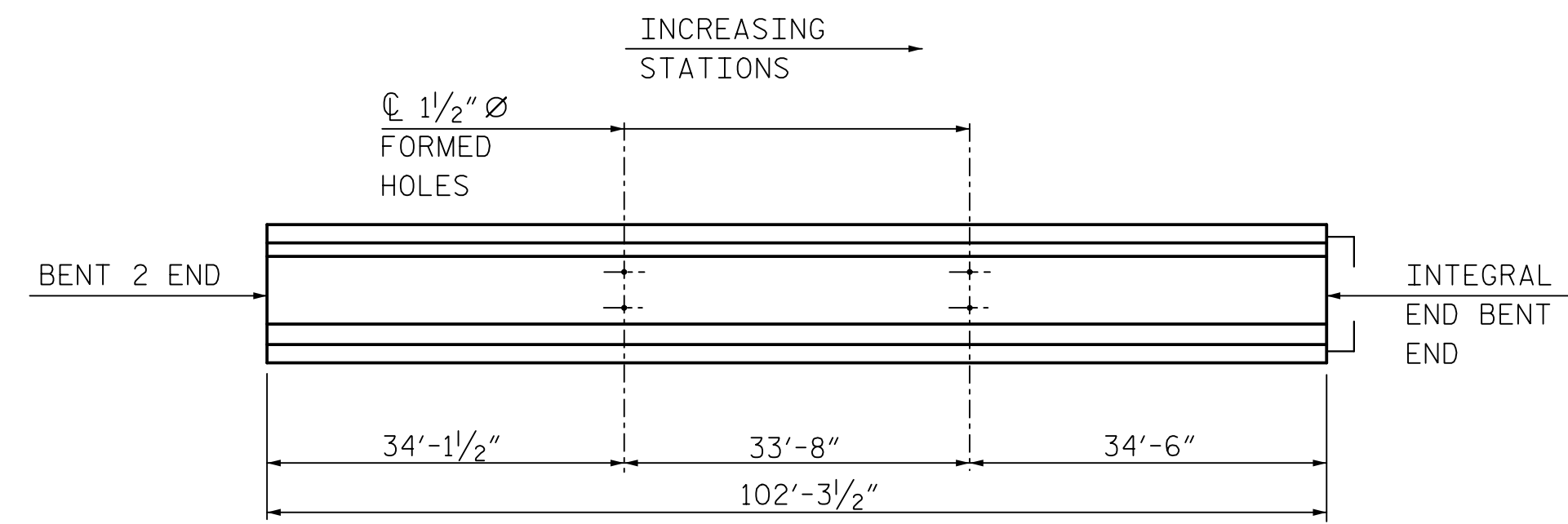
(FOR AASHTO TYPE IV GIRDERS AT INTEGRAL END BENT)



GIRDER ELEVATION (SPAN A GIRDERS)

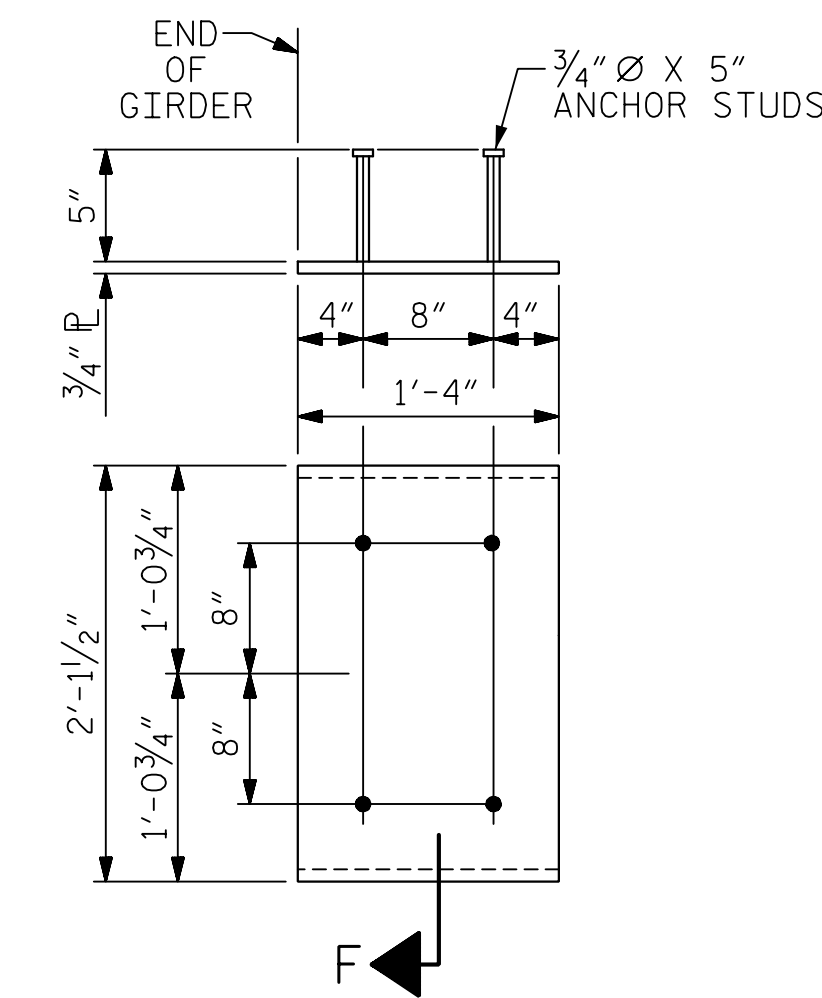


GIRDER ELEVATION (SPAN B GIRDERS)



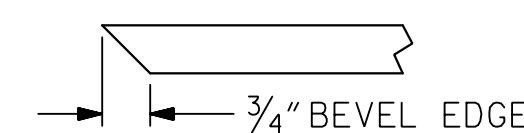
GIRDER ELEVATION (SPAN C GIRDERS)

1 1/2" Ø FORMED HOLE LOCATIONS



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

(2 REQ'D PER GIRDER)

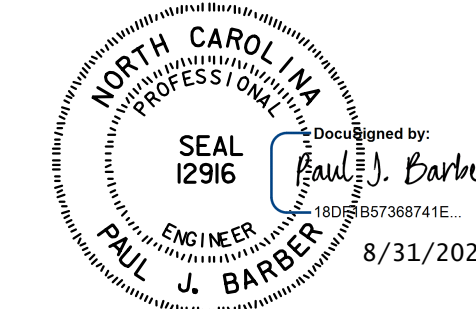


SECTION "F" (SEE NOTES)

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 PRESTRESSED CONCRETE GIRDER
 DETAILS
 LEFT LANE



HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: M. WRIGHT DATE: 7/21
 CHECKED BY: P. BARBER DATE: 7/21
 DESIGN ENGINEER OF RECORD: P. BARBER DATE: 7/21

DWG. NO. 15

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-15
1			3			TOTAL SHEETS
2			4			39

ASSEMBLED BY : AES	DATE : 5/17
CHECKED BY : BE	DATE : 8/17
DRAWN BY : ELR 11/91	REV. 10/1/11 MAA/TMG
CHECKED BY : GRP 11/91	REV. 1/15 MAA/TMG
	REV. 2/15 MAA/TMG

STRUCTURAL STEEL NOTES

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

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

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE 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 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.

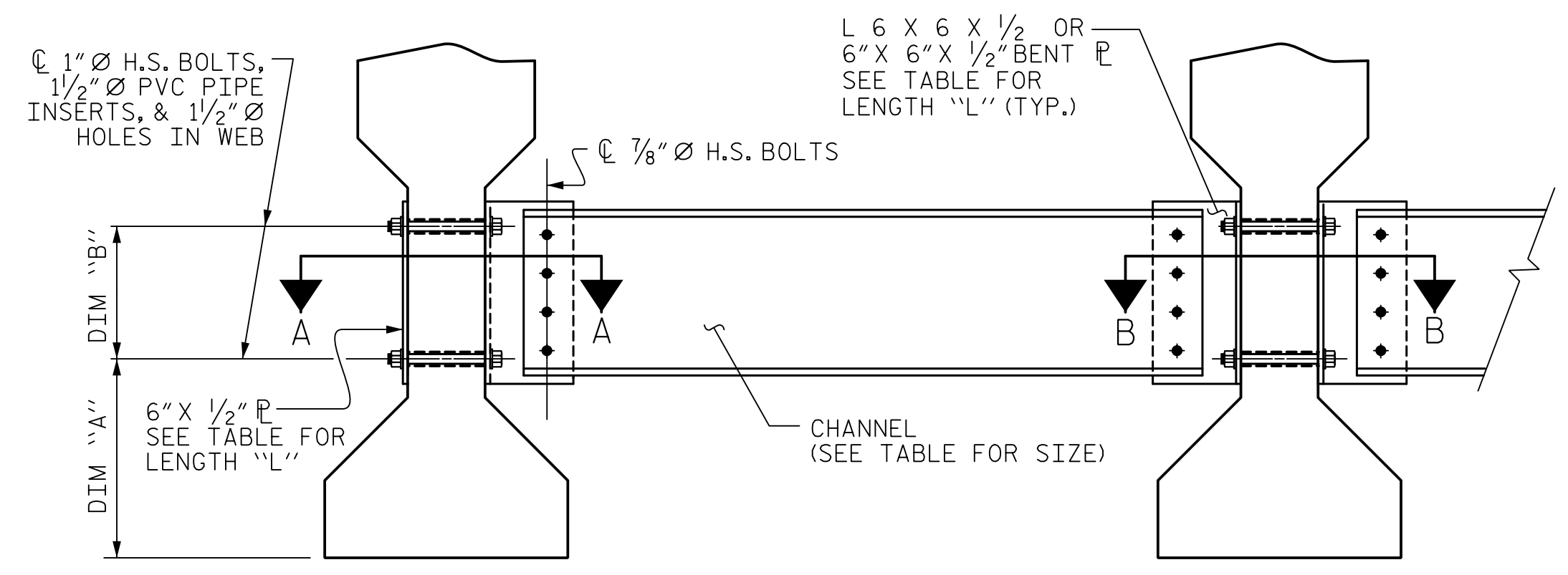
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

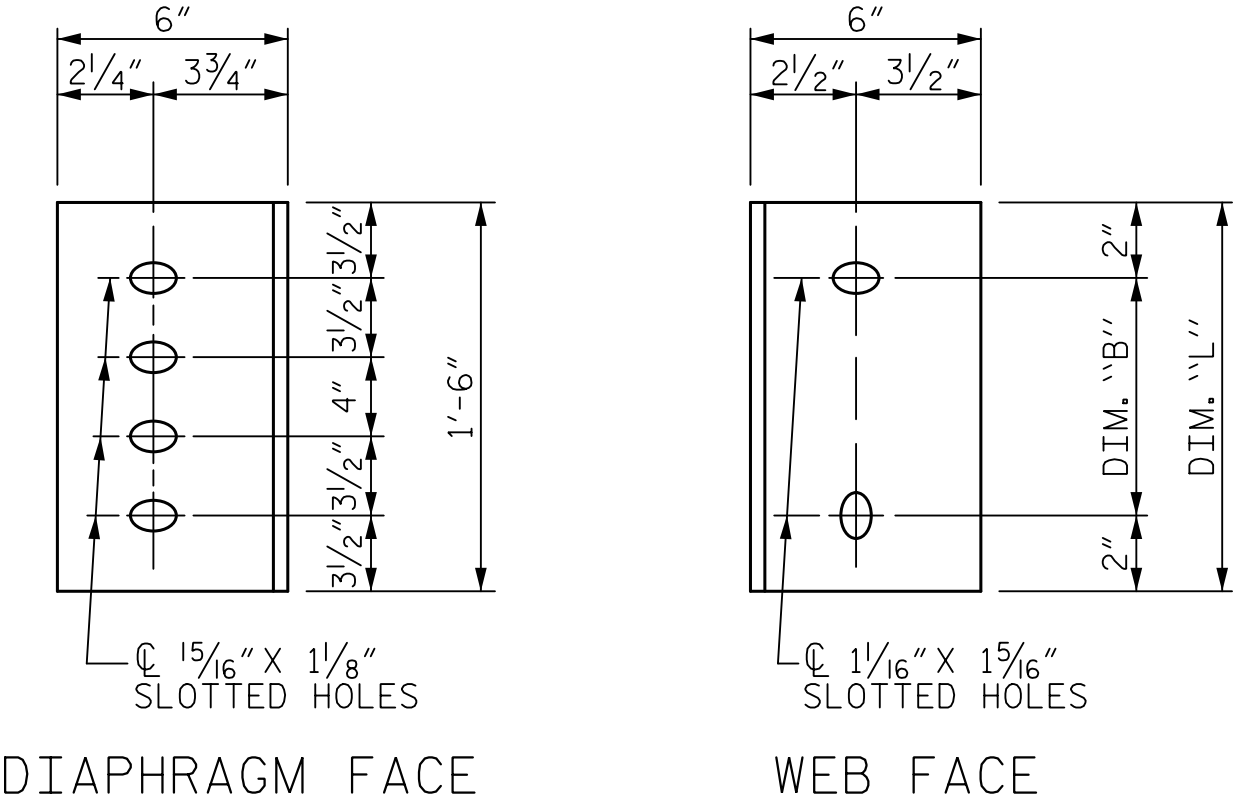
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.



EXTERIOR GIRDER **INTERIOR GIRDER**
PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE **WEB FACE**
CONNECTOR PLATE DETAILS

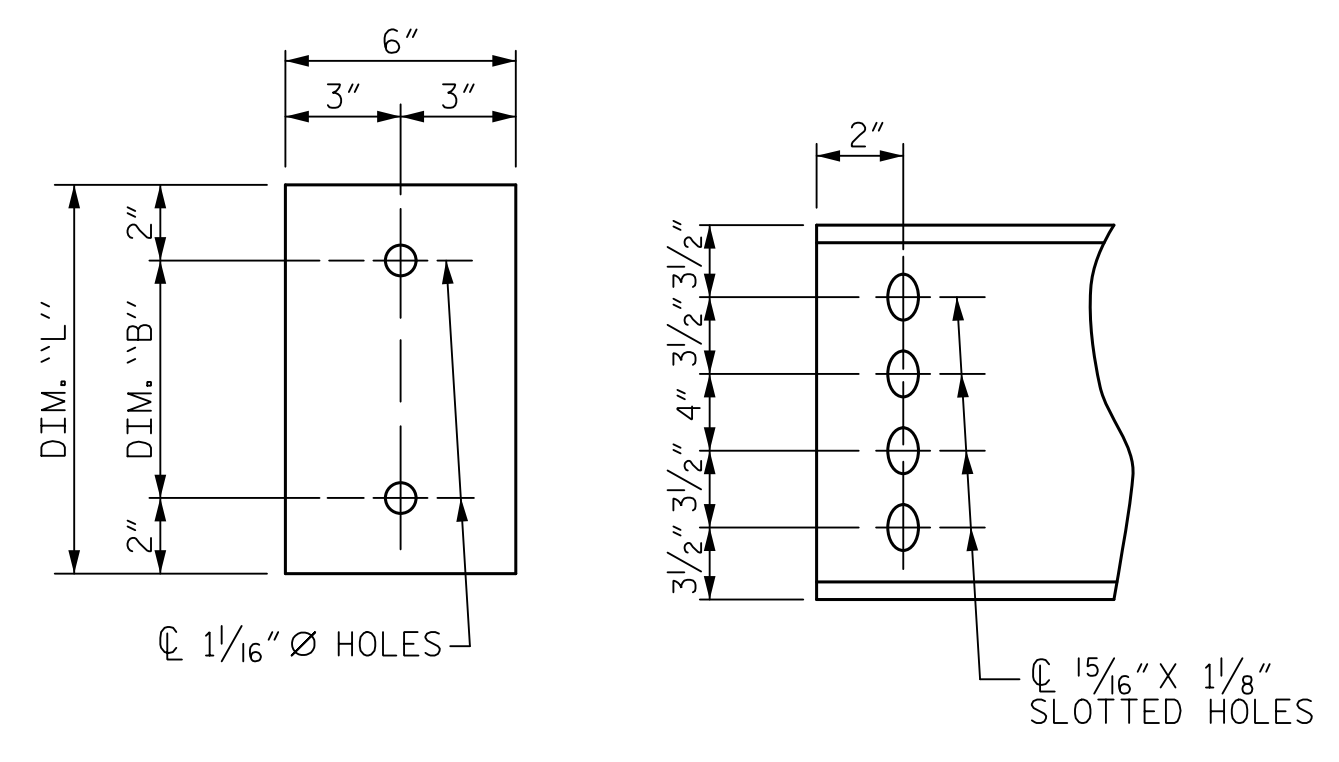
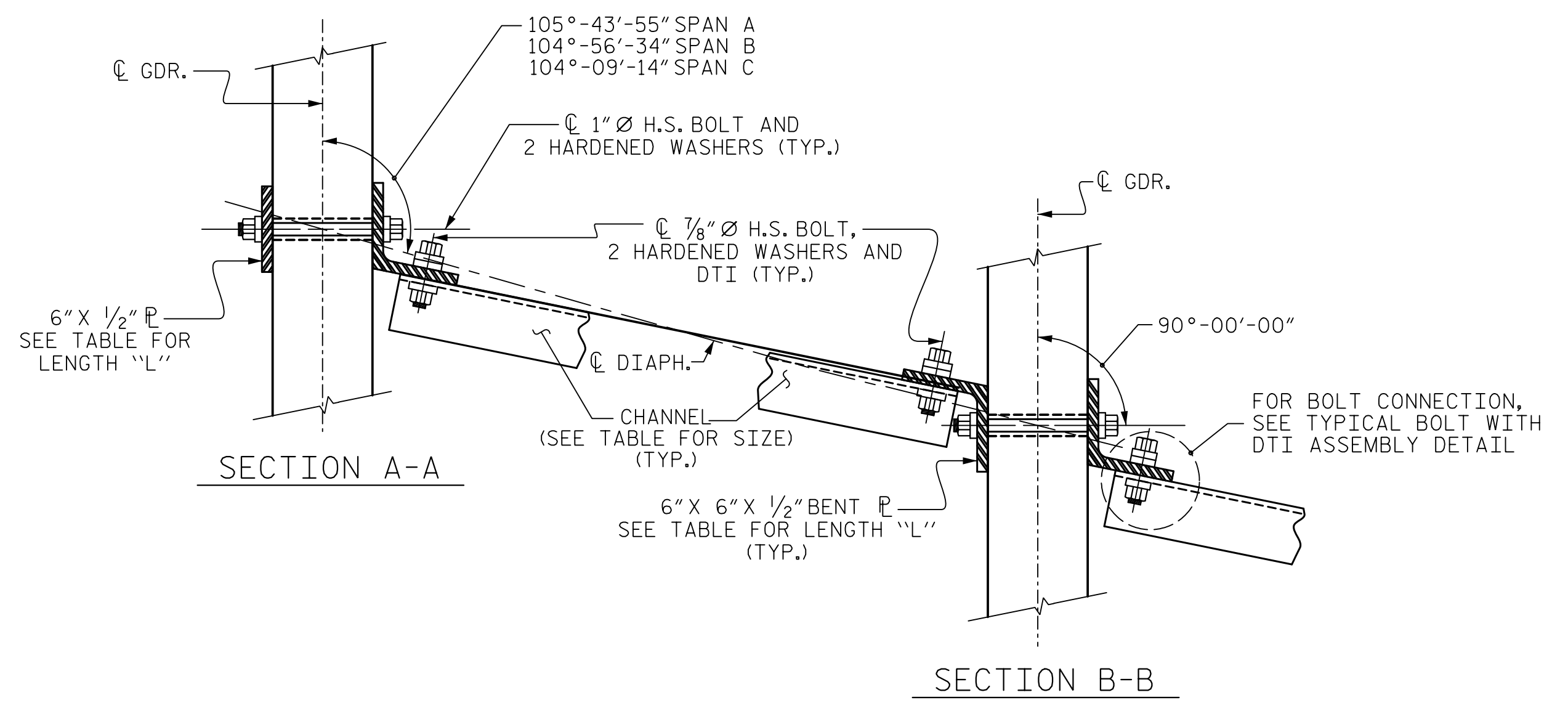
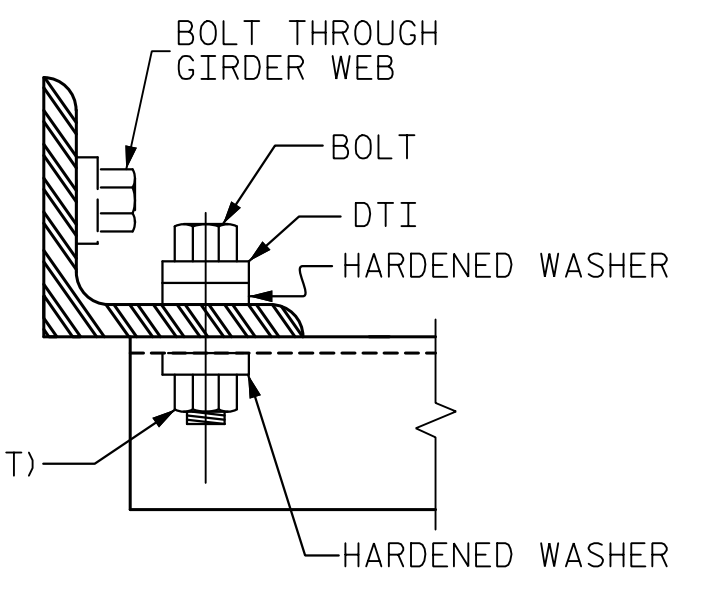


PLATE DETAILS **CHANNEL END**



SECTION A-A **SECTION B-B**
CONNECTION DETAILS



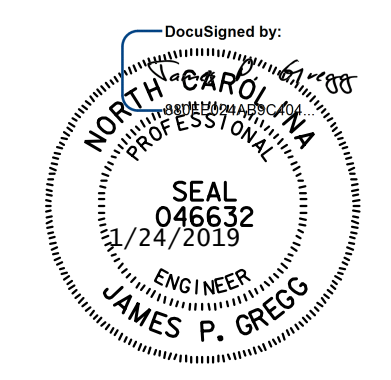
BOLT WITH DTI ASSEMBLY DETAIL

TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9 1/2"	1'-2"	1'-6"

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 4 OF 4



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
INTERMEDIATE STEEL
DIAPHRAGMS FOR TYPE IV
PRESTRESSED CONCRETE GIRDERS
LEFT LANE

ASSEMBLED BY : AES	DATE : 5/17
CHECKED BY : BE	DATE : 8/17
DRAWN BY : TLA 6/05	ADDED 10/21/05
CHECKED BY : VC 6/05	REV. 5/1/06RRR KMM/GM
	REV. 10/1/11 MAA/GM

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NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY : A. SMITH	DATE : 5/17	DWG. NO. 16
CHECKED BY : B. EMAMI	DATE : 8/17	
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18	

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

TOTAL SHEETS: 39

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.

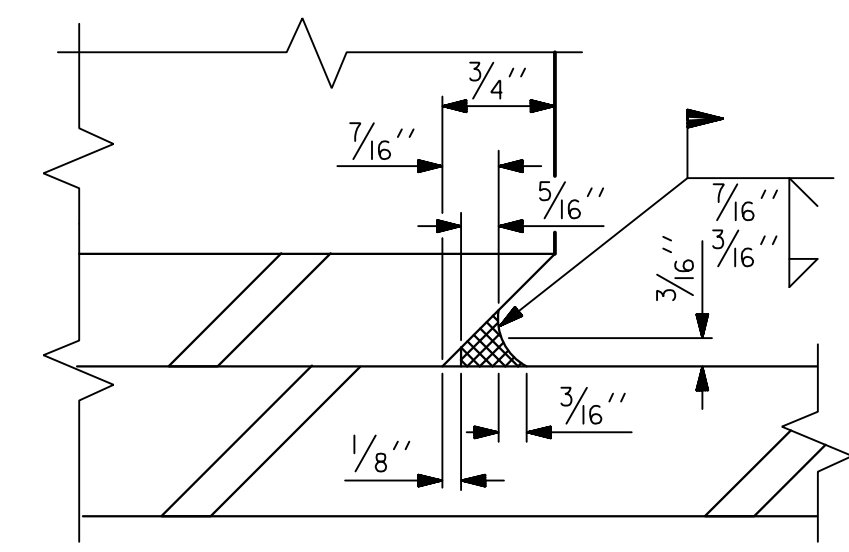
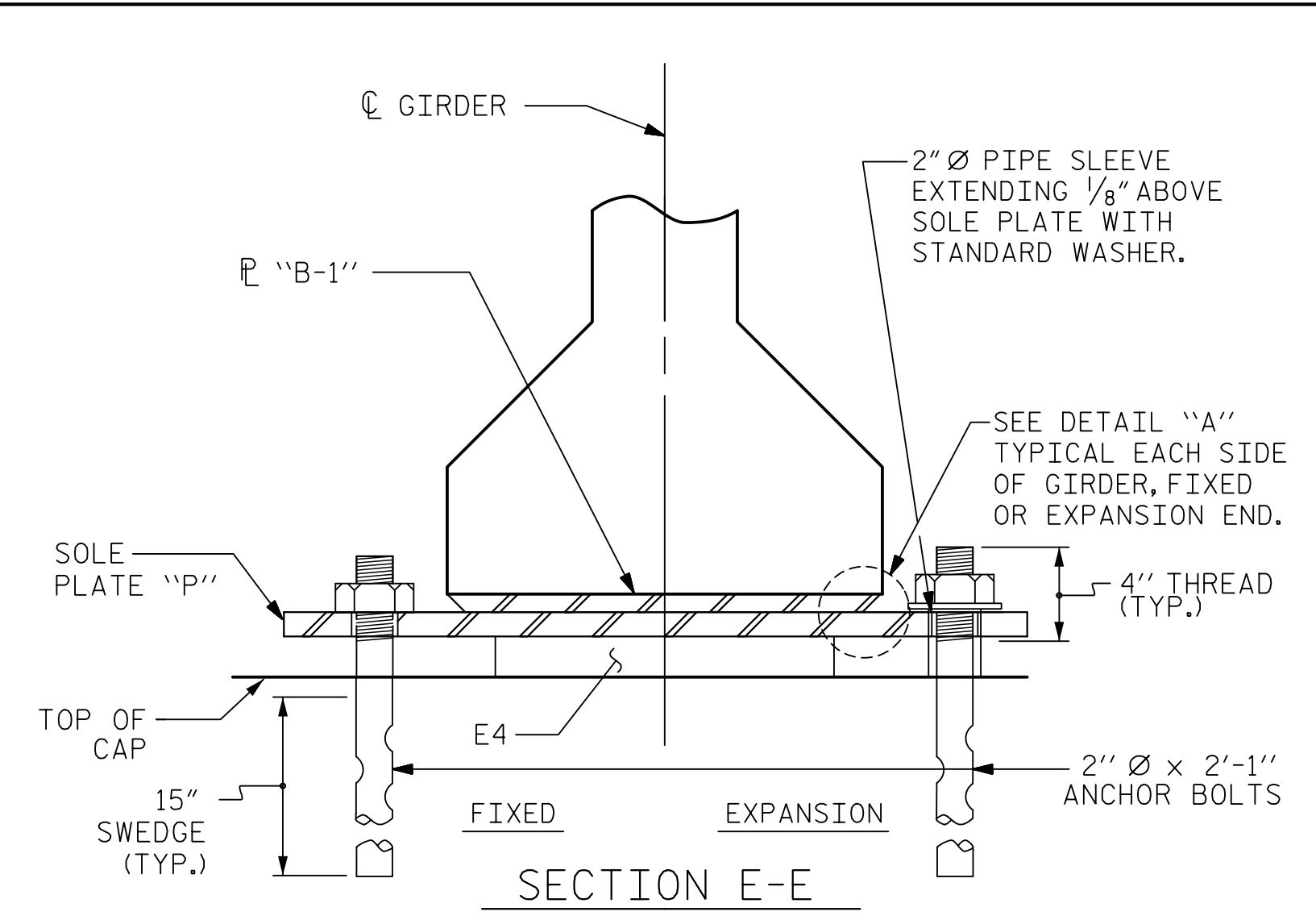
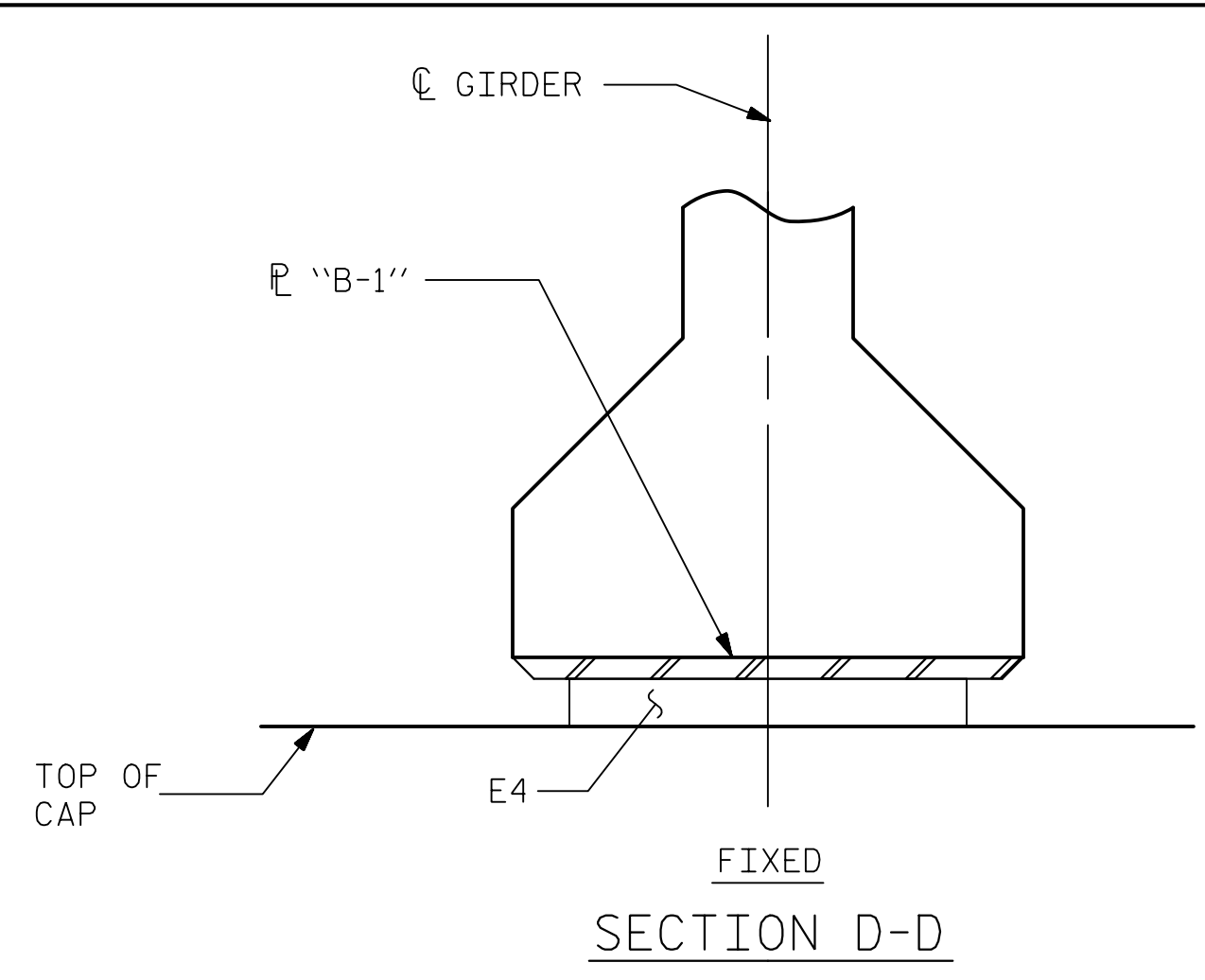
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251, AND SHALL BE 60 DUROMETER HARDNESS.

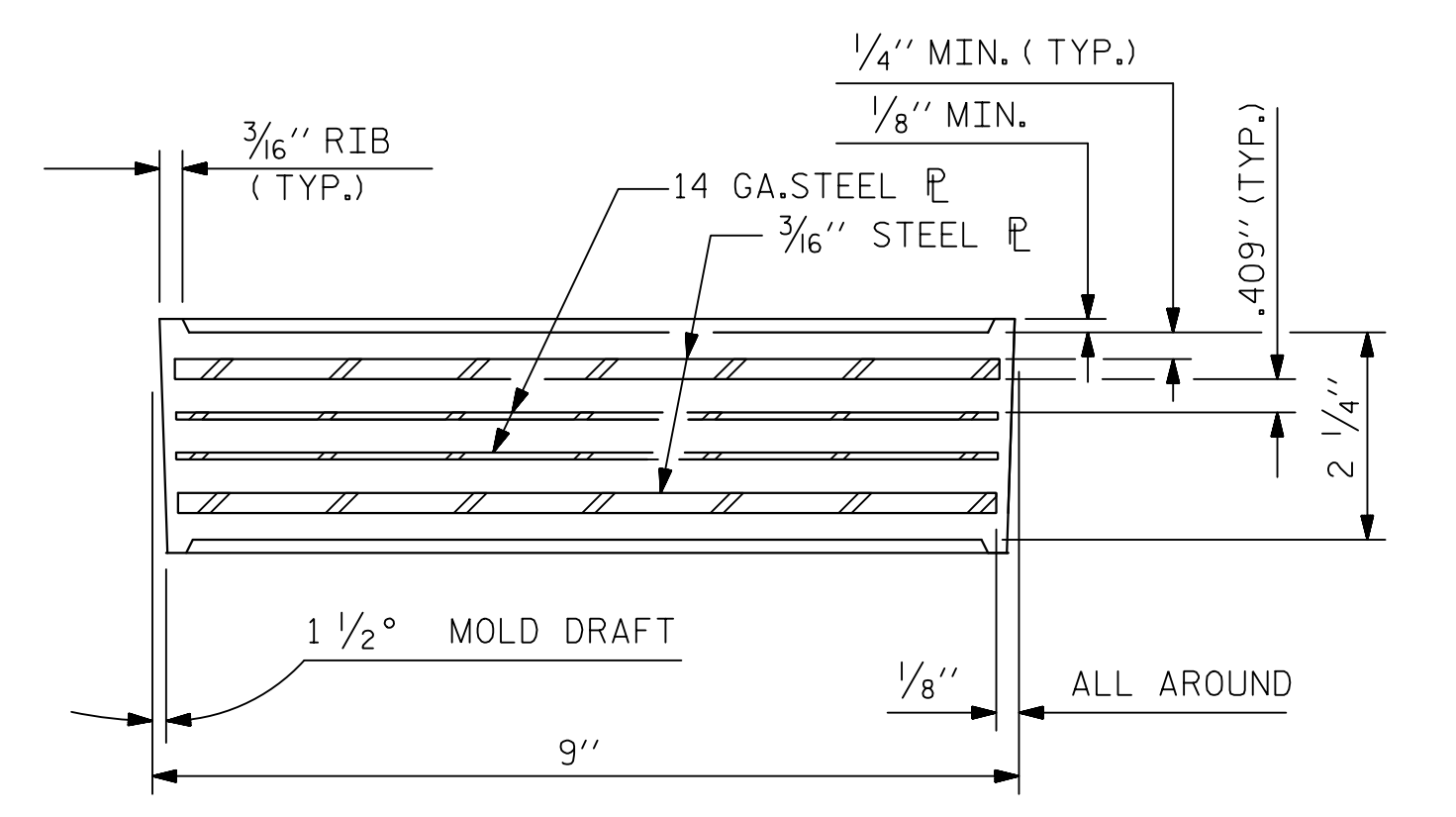
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

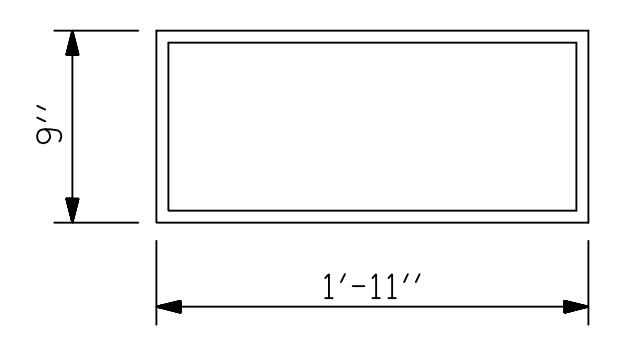
FOR BEARING AND SOLE PLATE LOCATIONS, SEE "FRAMING PLAN" SHEET.



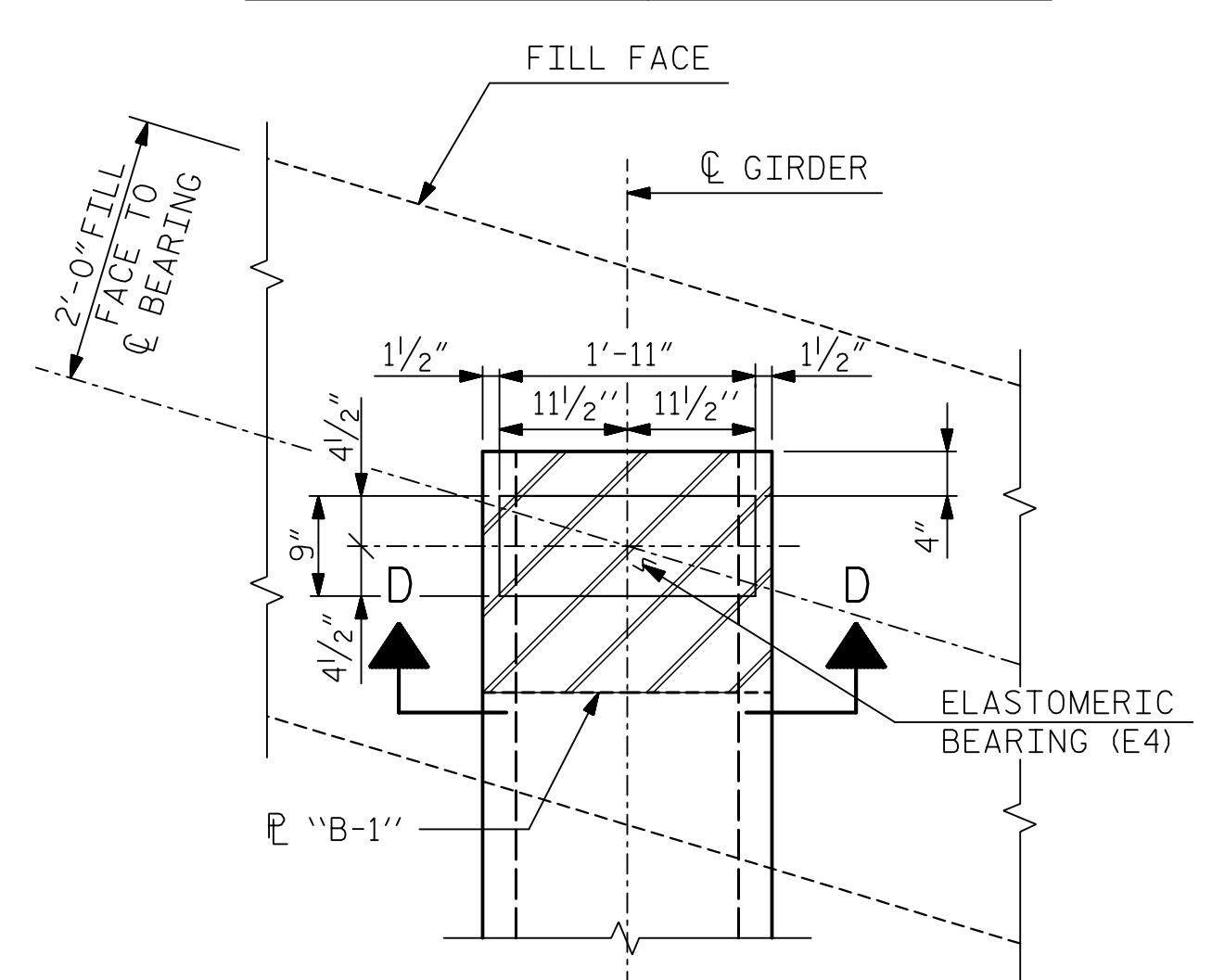
DETAIL "A"



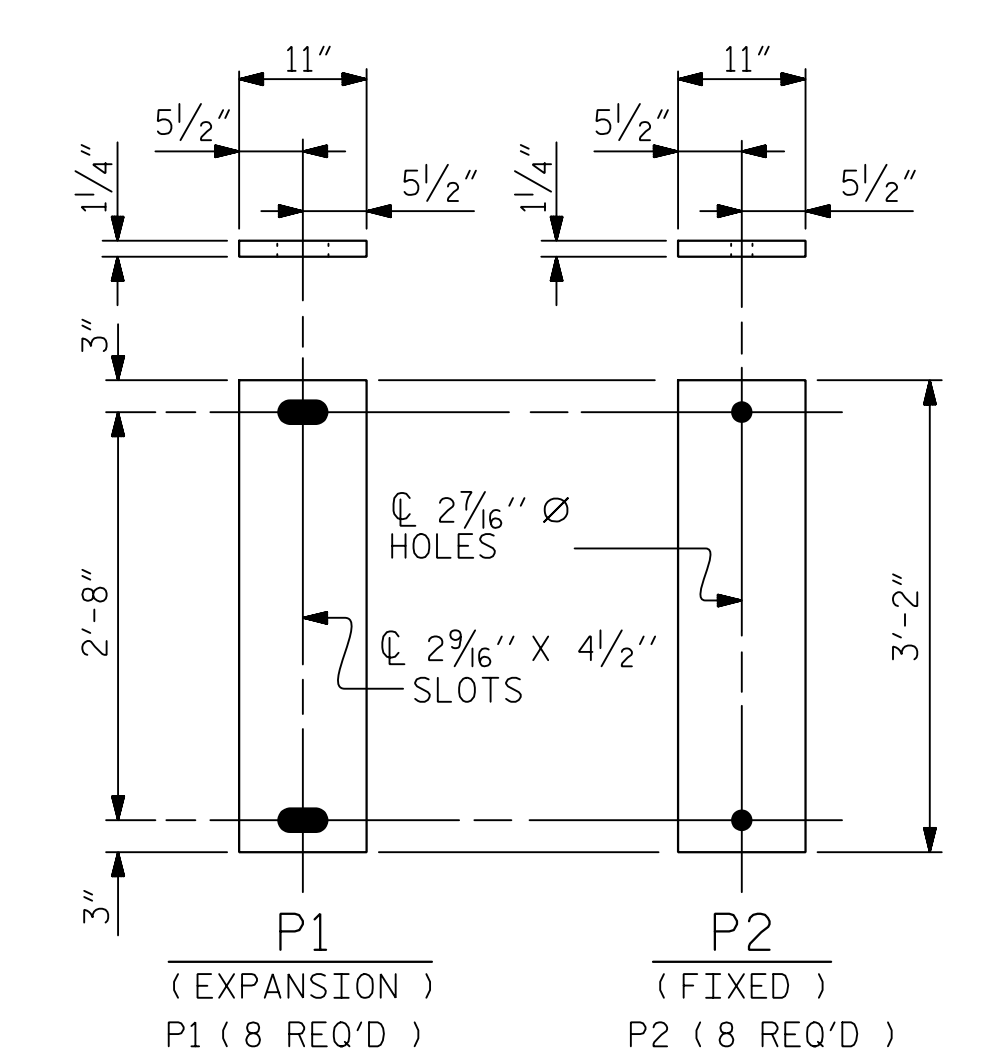
TYPICAL SECTION OF ELASTOMERIC BEARINGS



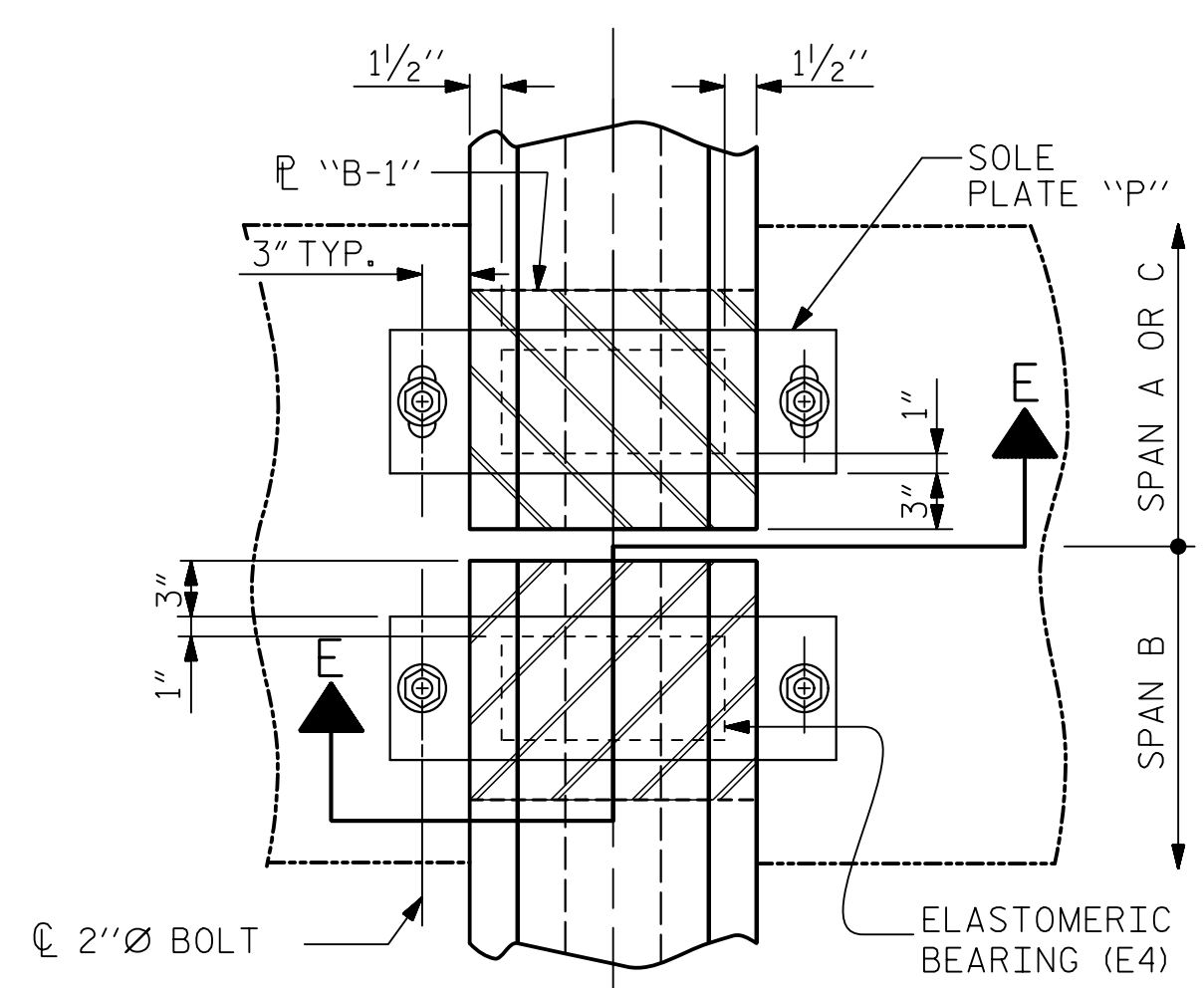
E4 (24 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING
TYPE V



PLAN VIEW AT INTEGRAL END BENTS

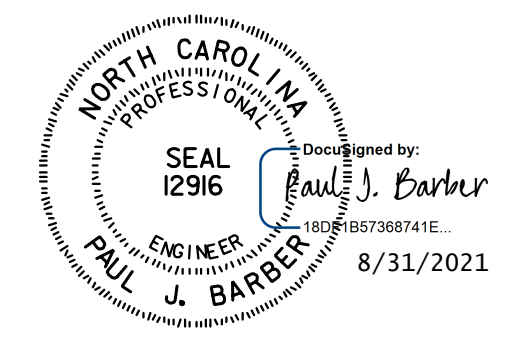


SOLE PLATE DETAILS ("P")



PLAN VIEW @ BENT

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



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NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: M. WRIGHT DATE: 7/21
CHECKED BY: P. BARBER DATE: 7/21
DESIGN ENGINEER OF RECORD: P. BARBER DATE: 7/21

DWG. NO. 17

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
ELASTOMERIC BEARING
DETAILS
PRESTRESSED CONCRETE GIRDER
SUPERSTRUCTURE
LEFT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-17
1			3			TOTAL SHEETS
2			4			39

ASSEMBLED BY : AES	DATE : 6/17
CHECKED BY : BE	DATE : 8/17
DRAWN BY : EEM 2/97	REV. 10/11/11 MAA/GM
CHECKED BY : VAP 2/97	REV. 10/13 AAC/MAA
	REV. 1/15 MAA/TMG

DEAD LOAD DEFLECTION TABLE FOR SPANS A & C																						
0.6" Ø LOW RELAXATION STRANDS		GIRDER 1																				
TWENTIETH POINTS		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.066	0.123	0.174	0.218	0.255	0.286	0.307	0.323	0.334	0.336	0.334	0.323	0.307	0.286	0.255	0.218	0.174	0.123	0.066	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L.	* ↓	0.000	0.025	0.049	0.073	0.095	0.114	0.131	0.144	0.154	0.160	0.162	0.160	0.154	0.145	0.132	0.115	0.096	0.074	0.050	0.025	0.000
FINAL CAMBER	↑	0	1/2	7/8	1 1/4	1 1/2	1 11/16	1 7/8	1 5/16	2 1/16	2 1/16	2 1/16	2 1/16	2	1 5/16	1 7/8	1 11/16	1 7/16	1 3/16	7/8	1/2	0

DEAD LOAD DEFLECTION TABLE FOR SPANS A & C																						
0.6" Ø LOW RELAXATION STRANDS		GIRDER 2 & 3																				
TWENTIETH POINTS		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.066	0.123	0.174	0.218	0.255	0.286	0.307	0.323	0.334	0.336	0.334	0.323	0.307	0.286	0.255	0.218	0.174	0.123	0.066	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L.	* ↓	0.000	0.024	0.048	0.072	0.094	0.113	0.130	0.143	0.153	0.159	0.161	0.159	0.153	0.144	0.131	0.114	0.095	0.073	0.050	0.025	0.000
FINAL CAMBER	↑	0	1/2	7/8	1 1/4	1 1/2	1 11/16	1 7/8	2	2 1/16	2 1/8	2 1/8	2 1/16	2 1/16	1 5/16	1 7/8	1 11/16	1 1/2	1 3/16	7/8	1/2	0

DEAD LOAD DEFLECTION TABLE FOR SPANS A & C																						
0.6" Ø LOW RELAXATION STRANDS		GIRDER 4																				
TWENTIETH POINTS		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.066	0.123	0.174	0.218	0.255	0.286	0.307	0.323	0.334	0.336	0.334	0.323	0.307	0.286	0.255	0.218	0.174	0.123	0.066	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L.	* ↓	0.000	0.025	0.049	0.074	0.096	0.116	0.133	0.147	0.157	0.163	0.165	0.163	0.157	0.148	0.134	0.117	0.098	0.075	0.051	0.026	0.000
FINAL CAMBER	↑	0	1/2	7/8	1 3/16	1 1/16	1 11/16	1 13/16	1 5/16	2	2 1/16	2 1/16	2 1/16	2	1 5/16	1 3/16	1 5/8	1 7/16	1 3/16	7/8	1/2	0

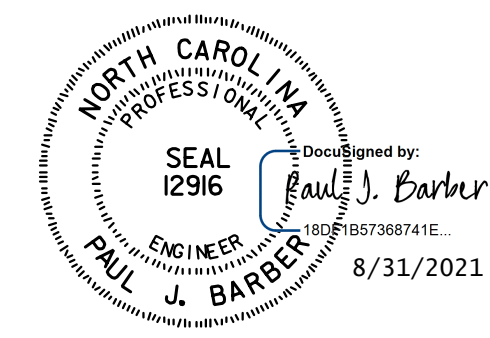
DEAD LOAD DEFLECTION TABLE FOR SPAN B																						
0.6" Ø LOW RELAXATION STRANDS		GIRDER 1																				
TWENTIETH POINTS		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.066	0.123	0.175	0.218	0.255	0.286	0.308	0.324	0.334	0.336	0.334	0.324	0.308	0.286	0.255	0.218	0.175	0.123	0.066	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L.	* ↓	0.000	0.024	0.048	0.072	0.094	0.113	0.130	0.143	0.153	0.159	0.161	0.159	0.154	0.144	0.131	0.114	0.095	0.073	0.049	0.025	0.000
FINAL CAMBER	↑	0	1/2	7/8	1 1/4	1 1/2	1 11/16	1 7/8	2	2 1/16	2 1/16	2 1/8	2 1/16	2 1/16	1 5/16	1 7/8	1 11/16	1 1/2	1 1/4	7/8	1/2	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B																						
0.6" Ø LOW RELAXATION STRANDS		GIRDER 2 & 3																				
TWENTIETH POINTS		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.066	0.123	0.175	0.218	0.255	0.286	0.308	0.324	0.334	0.336	0.334	0.324	0.308	0.286	0.255	0.218	0.175	0.123	0.066	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L.	* ↓	0.000	0.024	0.048	0.072	0.094	0.113	0.129	0.142	0.152	0.158	0.160	0.158	0.152	0.143	0.130	0.113	0.094	0.072	0.049	0.024	0.000
FINAL CAMBER	↑	0	1/2	7/8	1 1/4	1 1/2	1 11/16	1 7/8	2	2 1/16	2 1/8	2 1/8	2 1/8	2 1/16	2	1 7/8	1 11/16	1 1/2	1 1/4	7/8	1/2	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B																						
0.6" Ø LOW RELAXATION STRANDS		GIRDER 4																				
TWENTIETH POINTS		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.066	0.123	0.175	0.218	0.255	0.286	0.308	0.324	0.334	0.336	0.334	0.324	0.308	0.286	0.255	0.218	0.175	0.123	0.066	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L.	* ↓	0.000	0.025	0.049	0.073	0.096	0.115	0.133	0.146	0.156	0.162	0.164	0.162	0.156	0.147	0.133	0.116	0.097	0.074	0.050	0.025	0.000
FINAL CAMBER	↑	0	1/2	7/8	1 3/16	1 1/16	1 11/16	1 13/16	1 5/16	2	2 1/16	2 1/16	2 1/16	2	1 5/16	1 3/16	1 11/16	1 7/16	1 3/16	7/8	1/2	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).

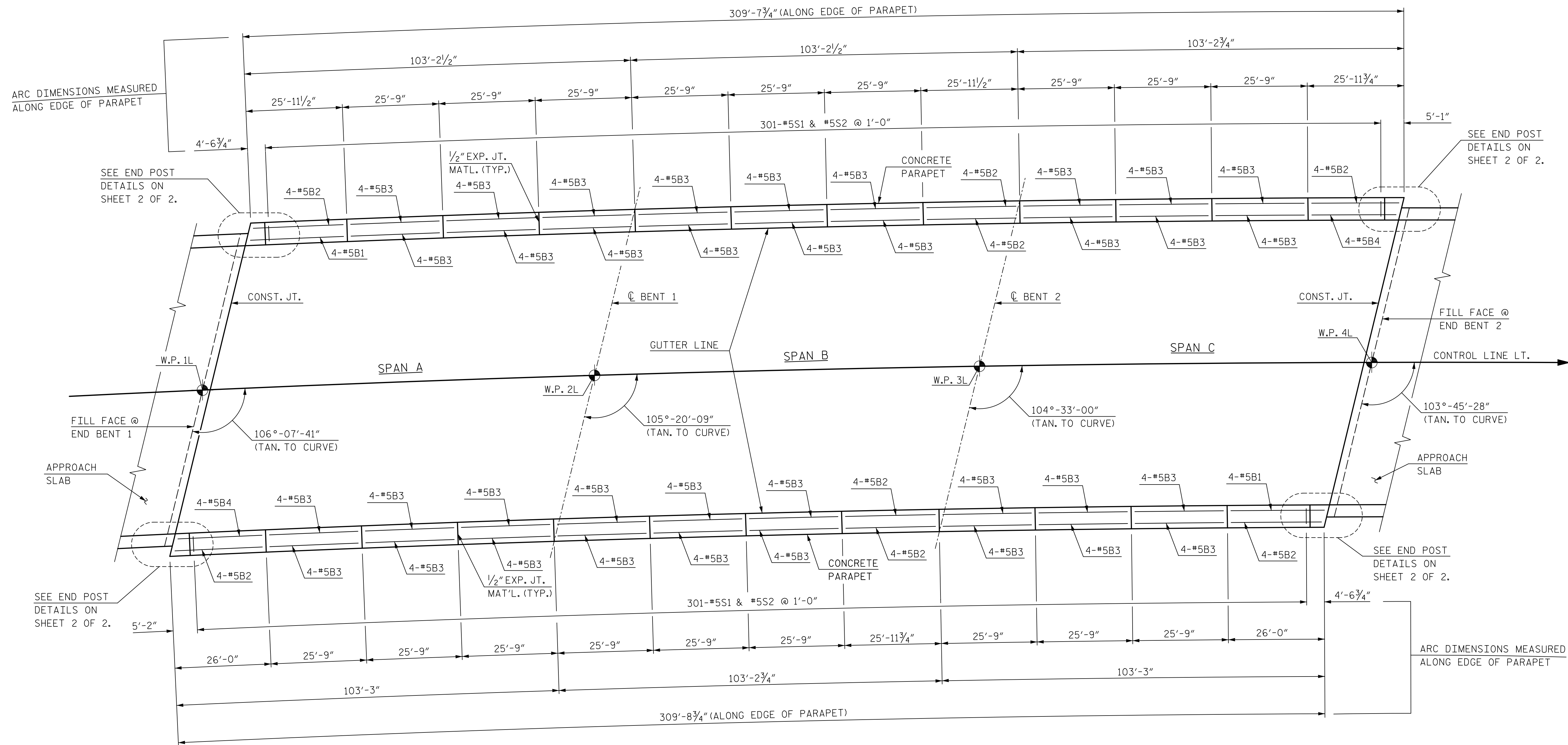
PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUPERSTRUCTURE
 DEAD LOAD DEFLECTIONS
 LEFT LANE

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DRAWN BY: A. SMITH	DATE: 5/17
CHECKED BY: B. NEUPANE	DATE: 9/17
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18
DWG. NO. 18	

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



CONCRETE PARAPET PLAN

NOTE: EDGE OF SLAB NOT SHOWN FOR CLARITY

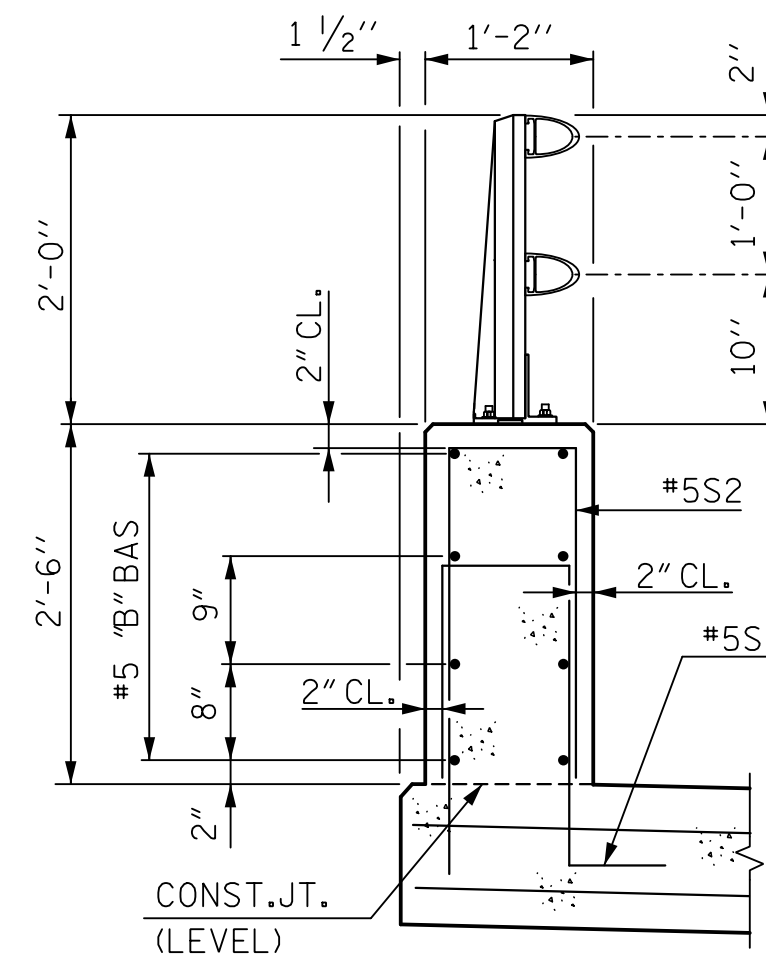
NOTES:

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

ALL REINFORCING STEEL IN PARAPET SHALL BE EPOXY COATED.

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

FOR CONCRETE PARAPET & END POST BILL OF MATERIAL, SEE SHEET 2 OF 2.



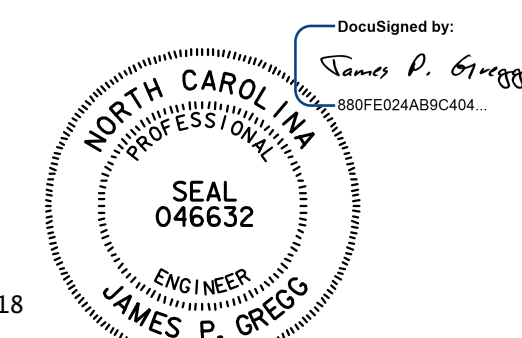
SECTION THRU PARAPET AND RAIL

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
CONCRETE PARAPET AND
END POST DETAILS
LEFT LANE

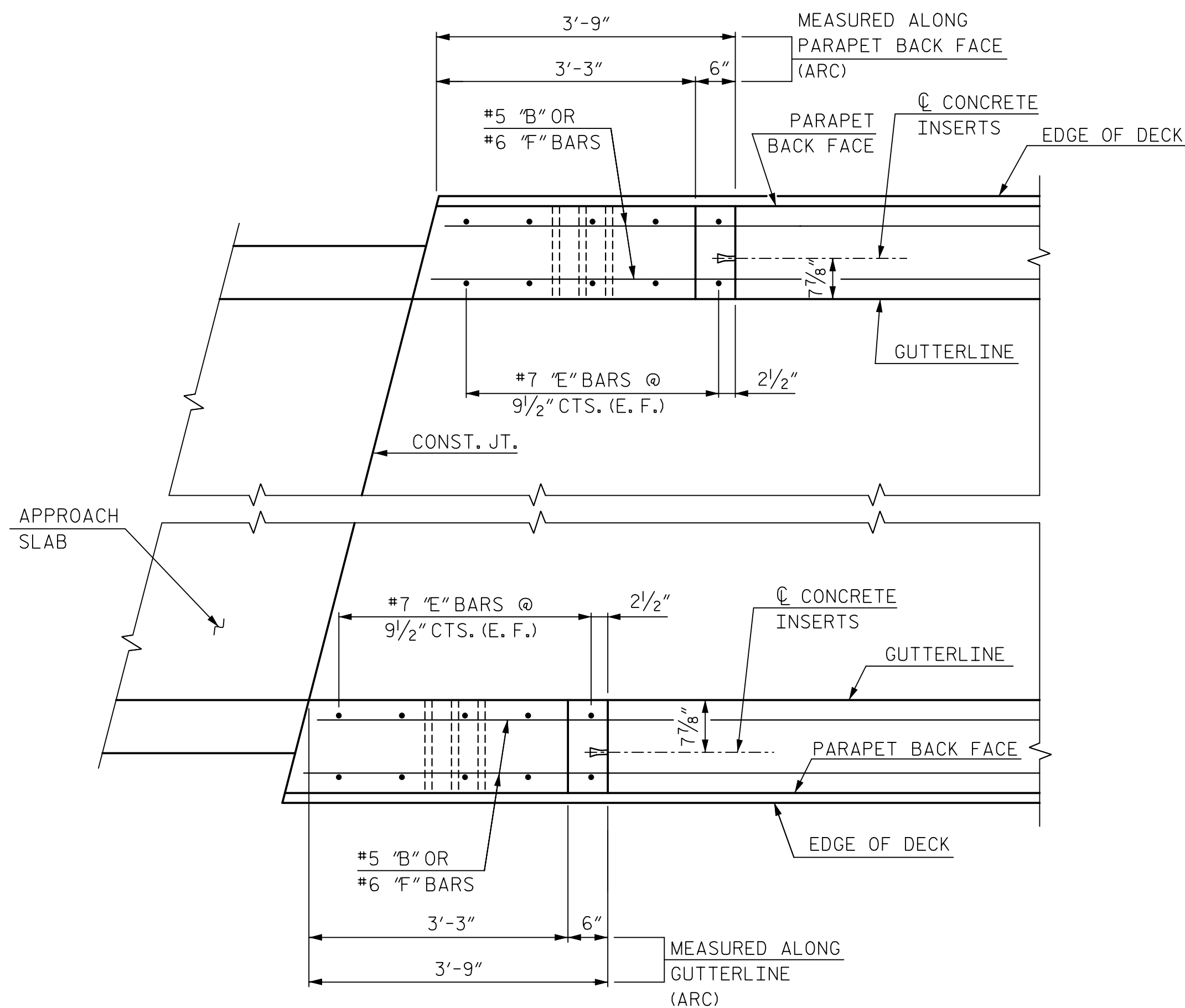


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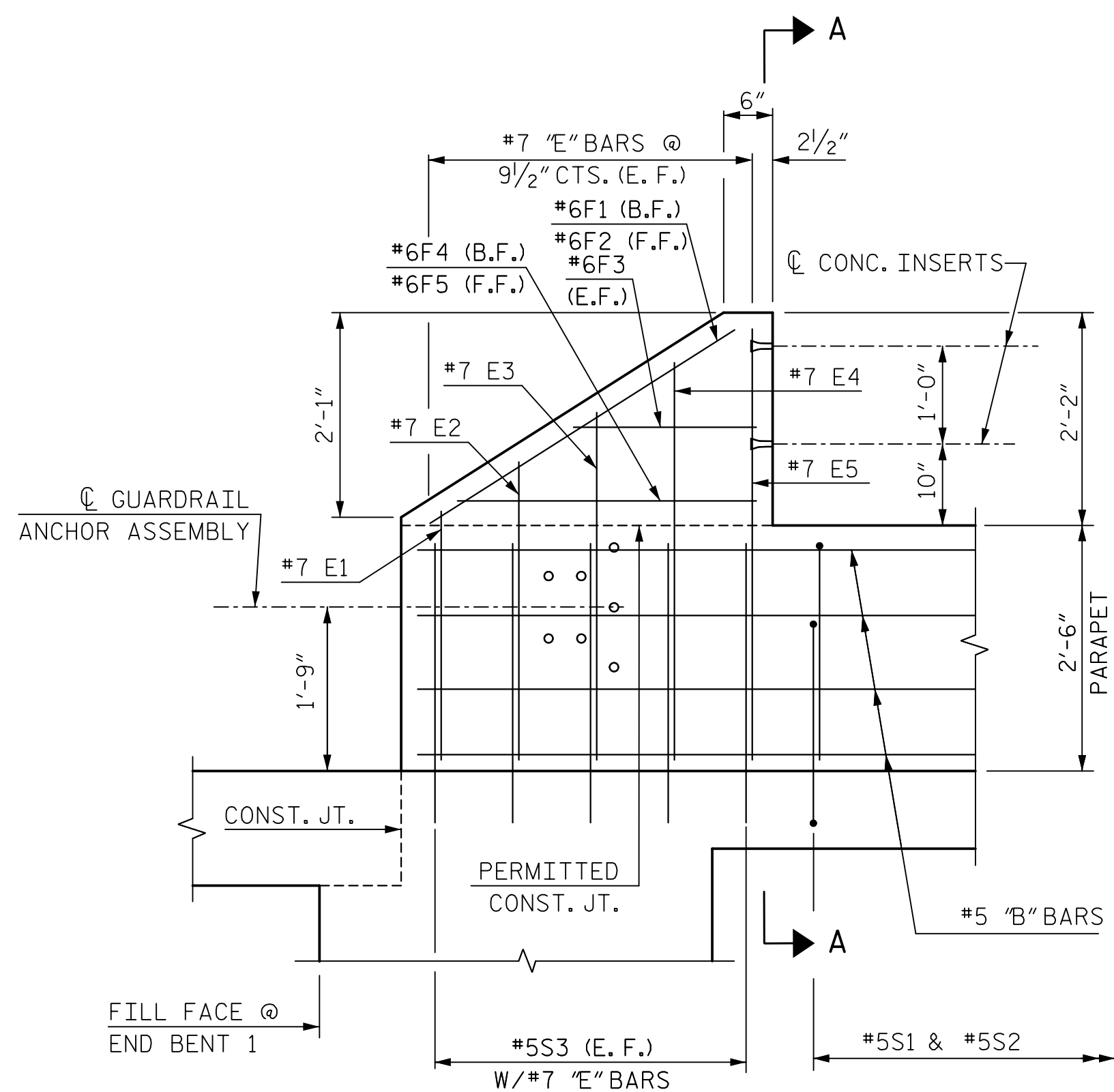
DRAWN BY: B. NEUPANE DATE: 5/17
 CHECKED BY: B. EMAM DATE: 8/17
 DESIGN ENGINEER OF RECORD: J. GREGG DATE: 8/18

DWG. NO. 19

REVISIONS						SHEET NO.	
NO.	BY	DATE	NO.	BY	DATE	S5-19	
1			3			TOTAL SHEETS	
2			4			39	



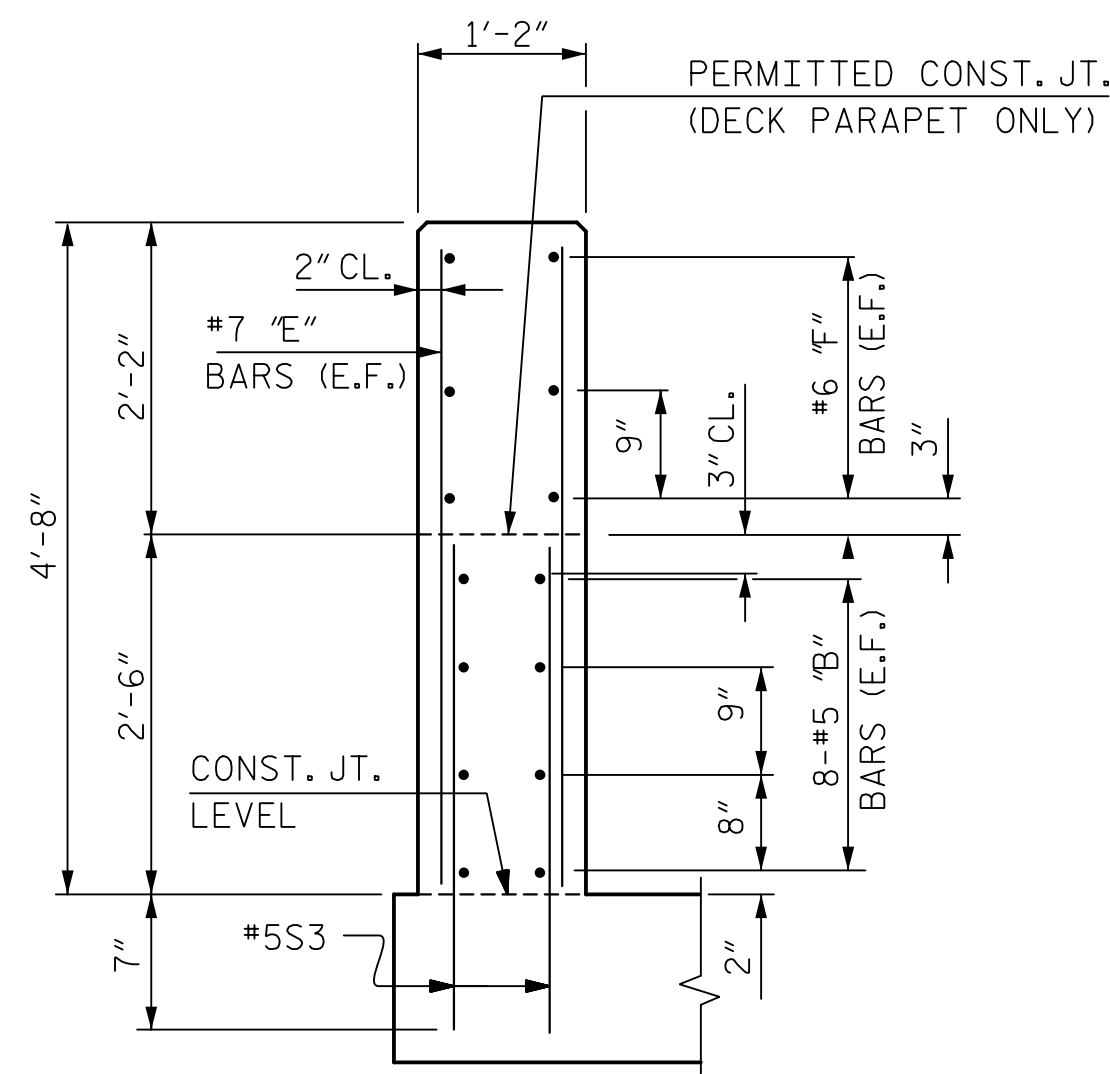
END OF RAIL PLAN
END BENT 1 SHOWN END BENT 2 SIMILAR



ELEVATION

END BENT 1 SHOWN END BENT 2 SIMILAR

NOTE: E.F. DENOTES EACH FACE.
B.F. DENOTES BACK FACE.
F.F. DENOTES FRONT FACE.

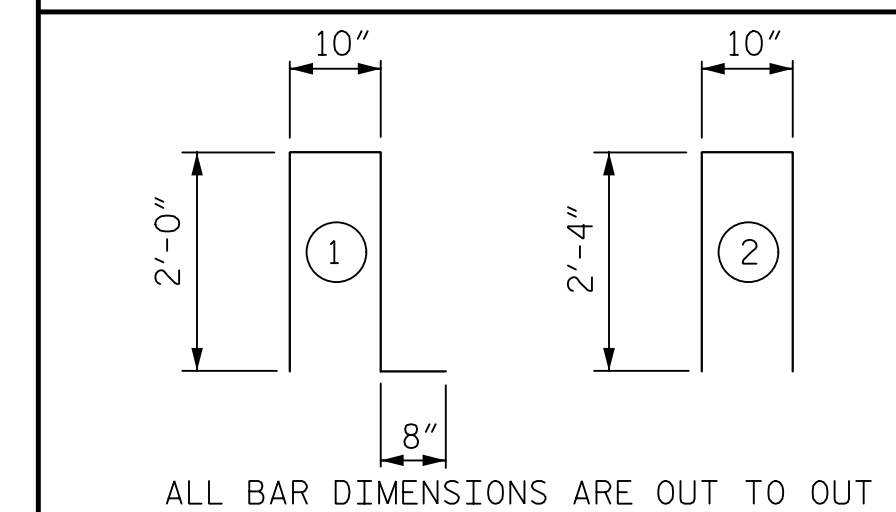


SECTION A-A

BILL OF MATERIAL FOR TWO PARAPETS AND FOUR END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	5	STR	25'-10"	216	F1	4	6	STR	3'-8"	22
B2	32	5	STR	25'-7"	854	F2	4	6	STR	3'-6"	21
B3	144	5	STR	25'-5"	3,817	F3	8	6	STR	1'-10"	22
B4	8	5	STR	25'-4"	211	F4	4	6	STR	3'-1"	19
						F5	4	6	STR	3'-3"	20
E1	8	7	STR	2'-7"	42						
E2	8	7	STR	3'-1"	50	S1	602	5	1	5'-6"	3,453
E3	8	7	STR	3'-7"	59	S2	602	5	2	5'-6"	3,453
E4	8	7	STR	4'-1"	67	S3	40	5	STR	2'-11"	122
E5	8	7	STR	4'-6"	74						

BAR TYPES



QUANTITIES

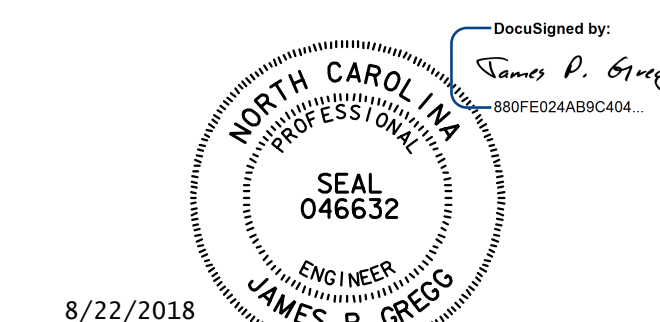
EPOXY COATED REINFORCING STEEL	LBS.	12,522
CLASS "AA" CONCRETE	CU. YDS.	67.7
CONCRETE PARAPET	L.F.	619.38

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

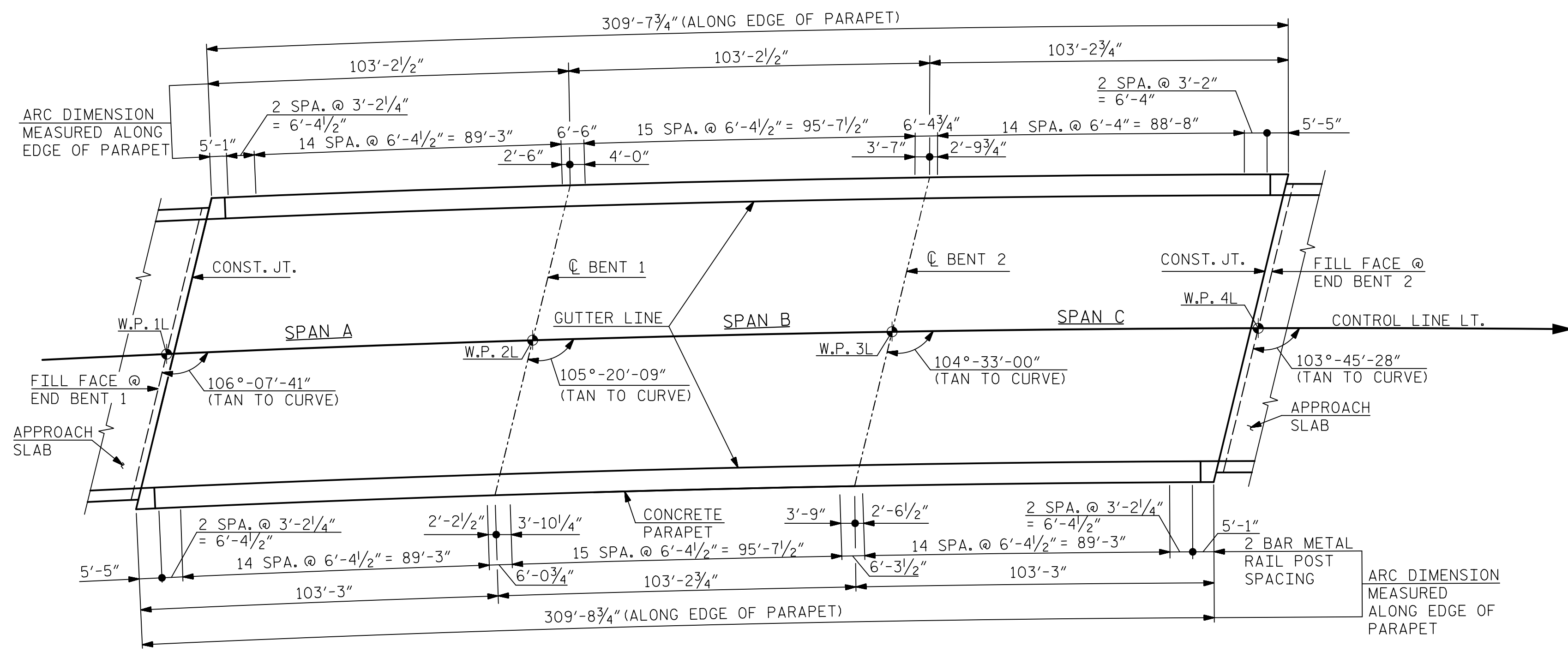
SUPERSTRUCTURE
 CONCRETE PARAPET AND
 END POST DETAILS
 LEFT LANE



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DRAWN BY: B. NEUPANE	DATE: 8/17
CHECKED BY: B. EMAMI	DATE: 8/17
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18

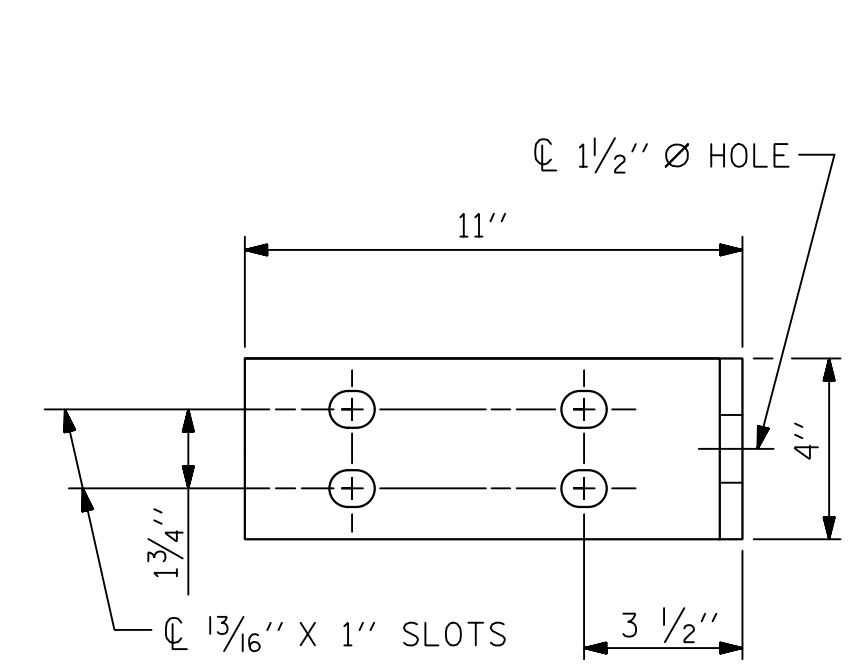
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-20
1			3			TOTAL SHEETS
2			4			39

DWG. NO. 20

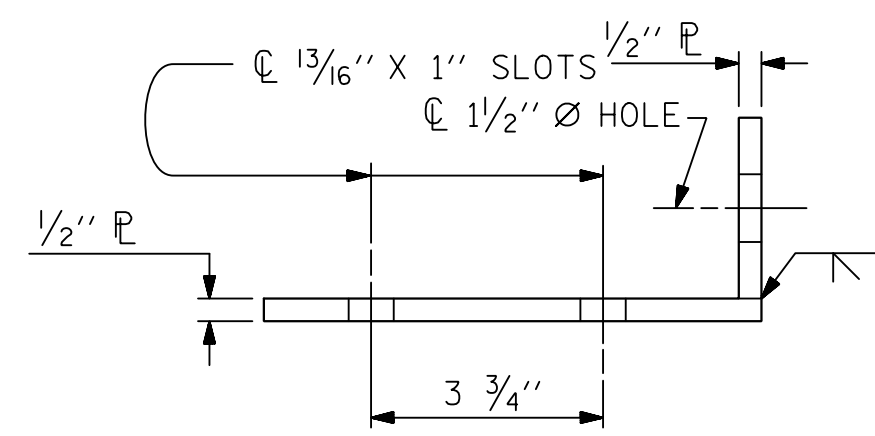


PLAN OF RAIL POST SPACINGS

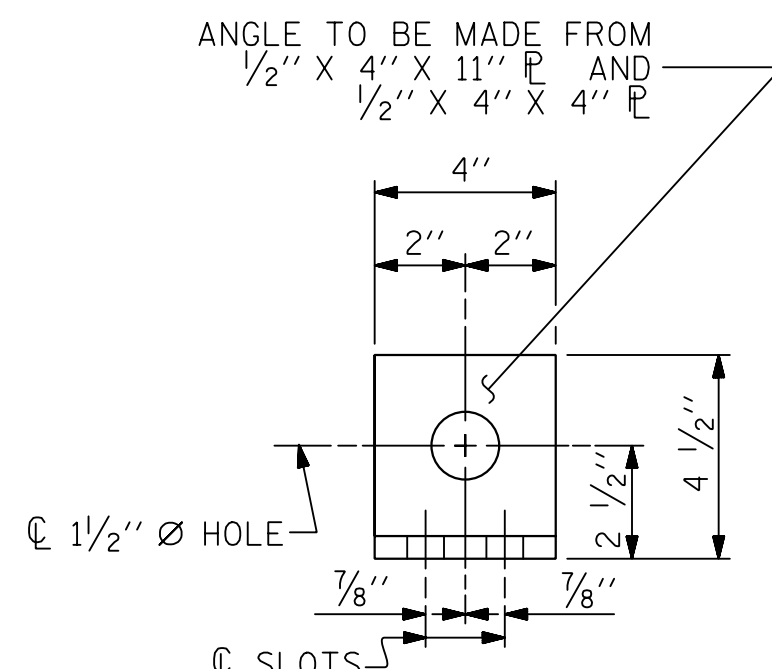
EDGE OF SLAB NOT SHOWN FOR CLARITY



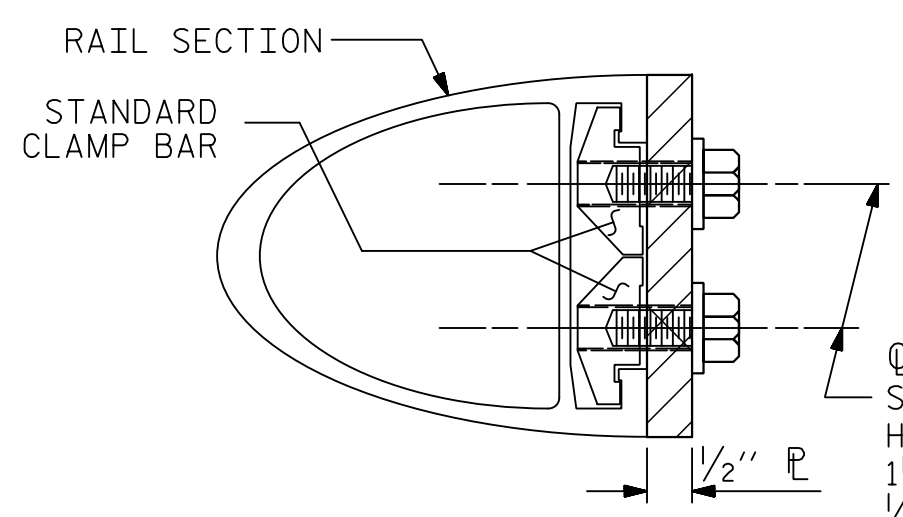
ELEVATION



TOP VIEW

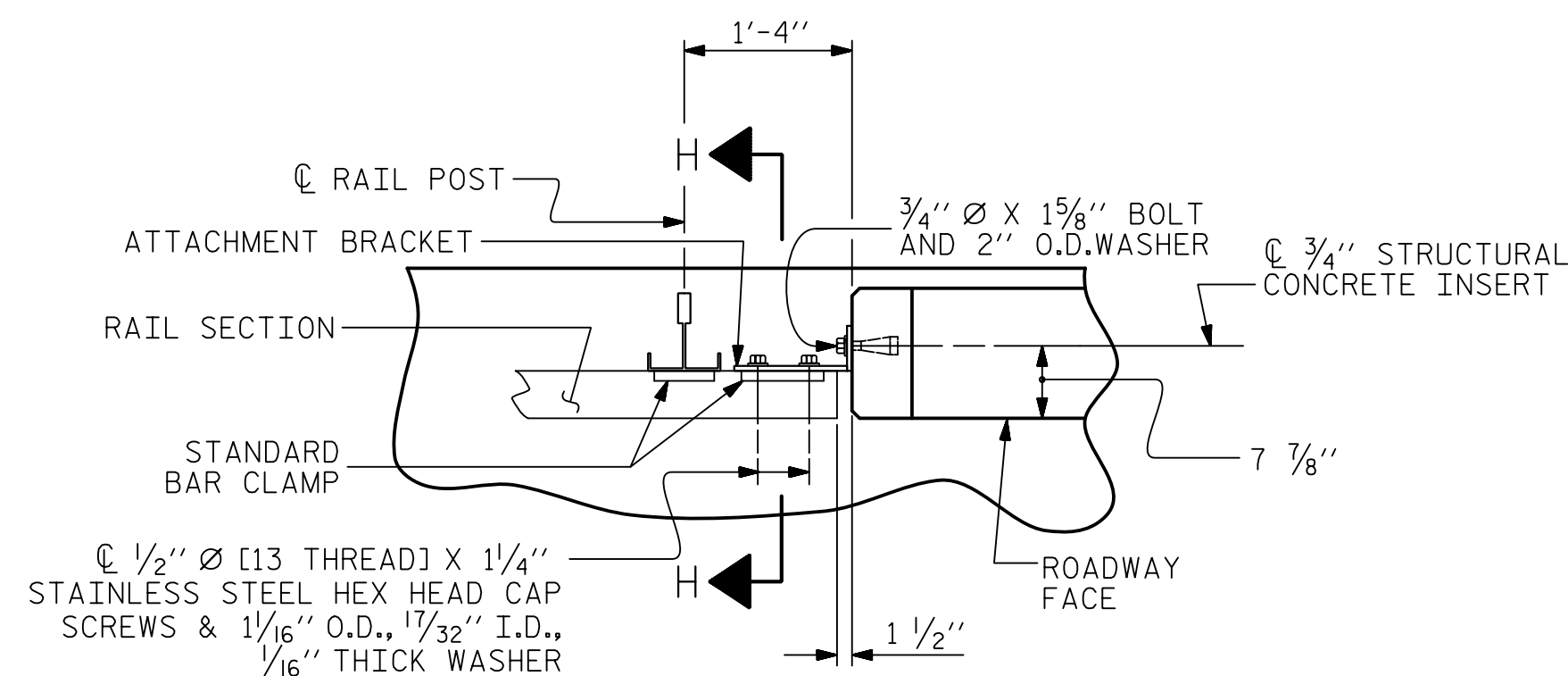


END VIEW (FIX AND EXP.)



SECTION H-H (FIX)

FIXED



PLAN - RAIL AND END POST

NOTES
STRUCTURAL CONCRETE INSERT

- THE STRUCTURAL CONCRETE INSERT ASSEMBLY SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".
 - 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.)
 - WIRE STRUT SHOWN IN THE CONCRETE INSERT ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.

NOTES

METAL RAIL TO END POST CONNECTION

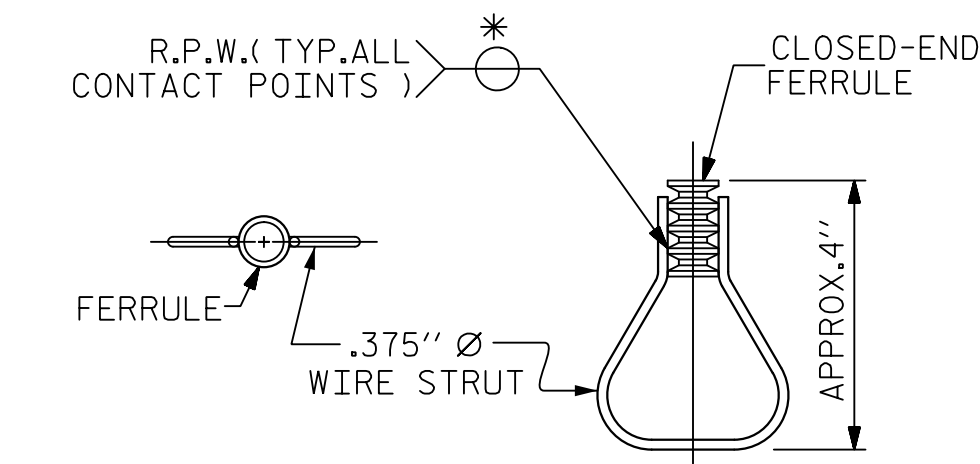
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
 - 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø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

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

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

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

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



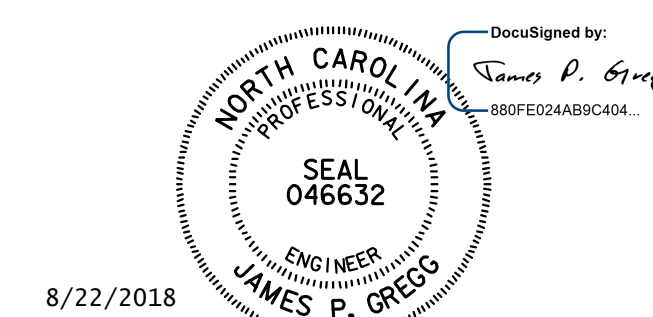
PLAN **ELEVATION**
STRUCTURAL CONCRETE INSERT

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

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
RAIL POST SPACINGS
AND
END OF RAIL DETAILS
FOR ONE OR TWO BAR METAL RAILS
LEFT LANE

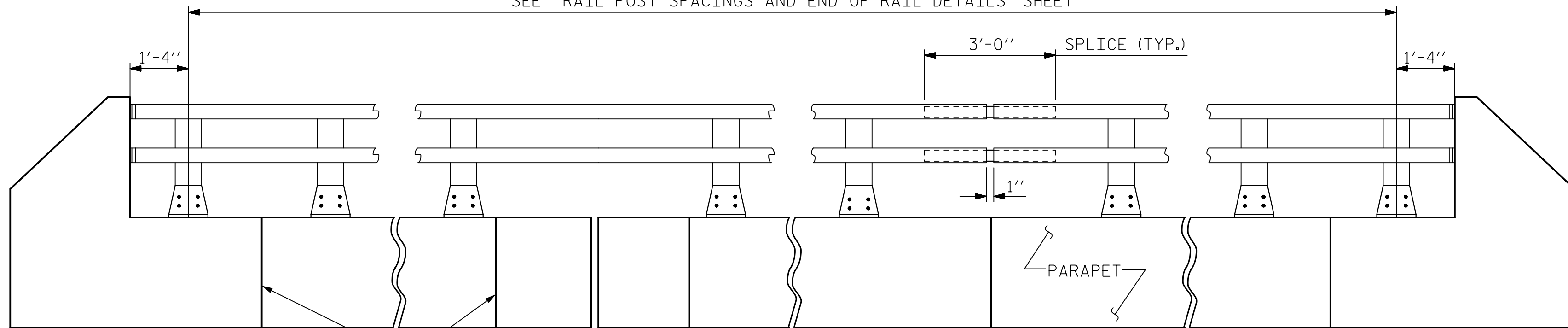


ASSEMBLED BY : AES	DATE : 5/17
CHECKED BY : BE	DATE : 8/17
DRAWN BY : FCJ 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : CRK 3/89	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

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DRAWN BY : A. SMITH	DATE : 5/17
CHECKED BY : B. EMAMI	DATE : 8/17
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18

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

SEE "RAIL POST SPACINGS AND END OF RAIL DETAILS" SHEET



TOOLED CONTRACTION JT.
(SEE NOTES)

ELEVATION

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

NOTES

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

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

ALUMINUM RAILS

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

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

PAY LENGTH = 604.38 LIN. FT.

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

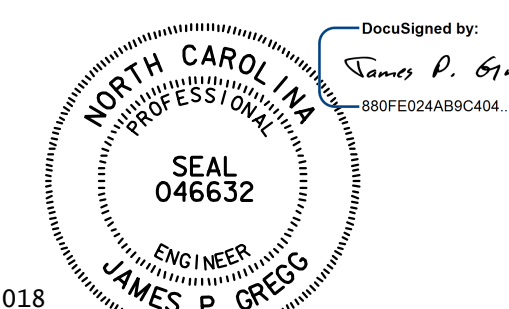
SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

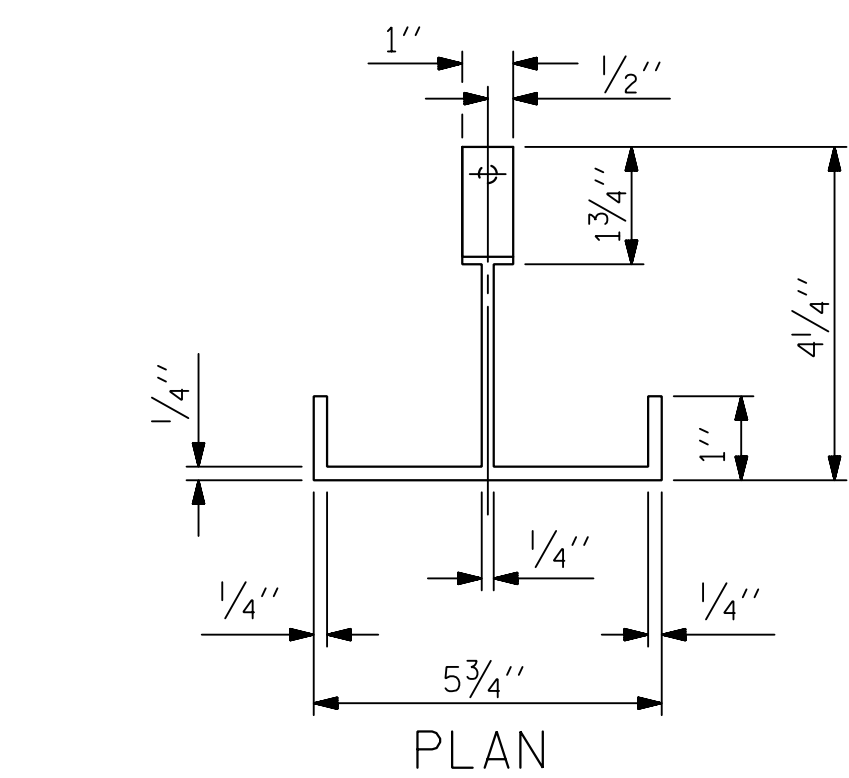
STANDARD
 2 BAR METAL RAIL

LEFT LANE

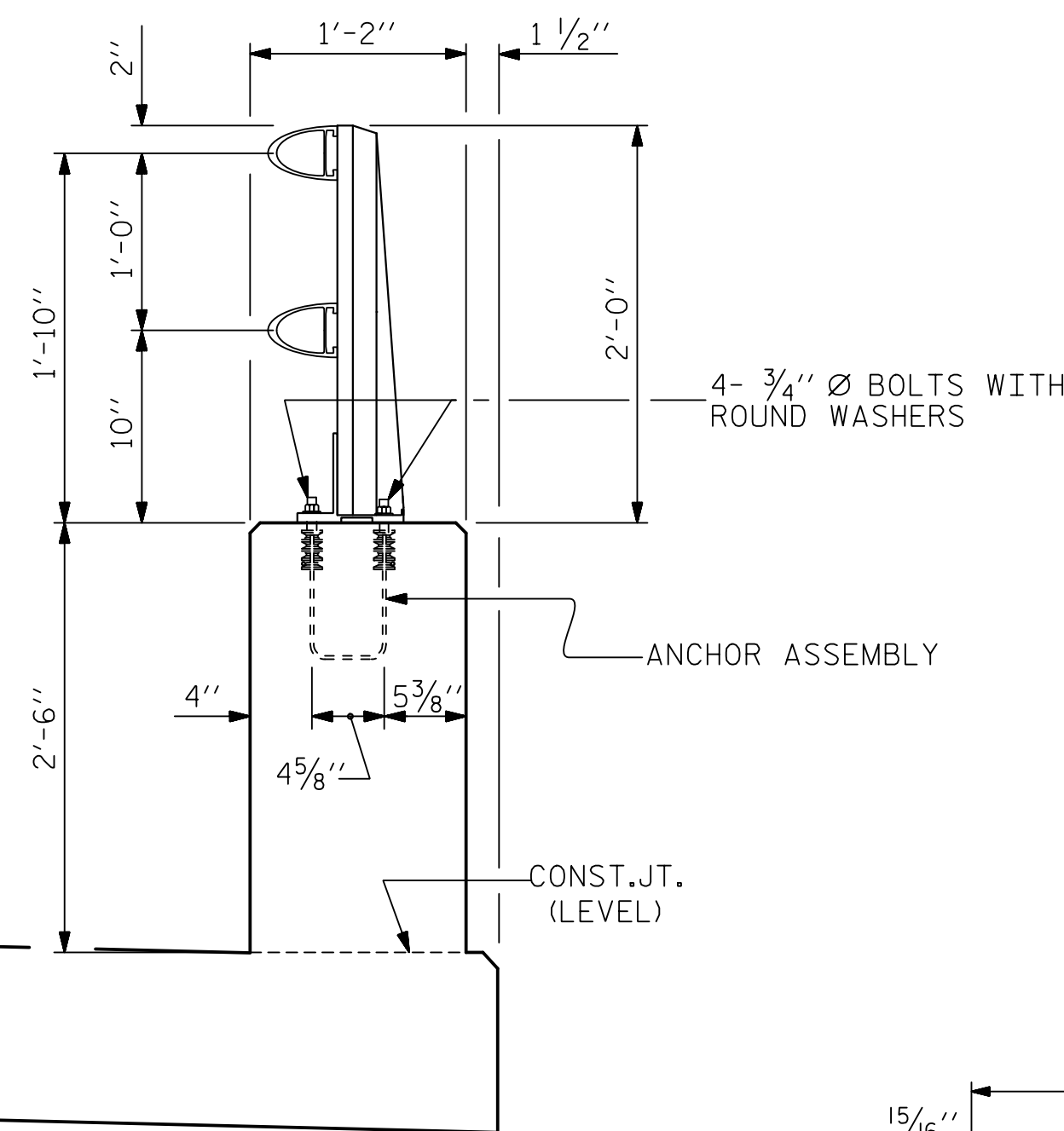
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-22
1			3			TOTAL SHEETS
2			4			39



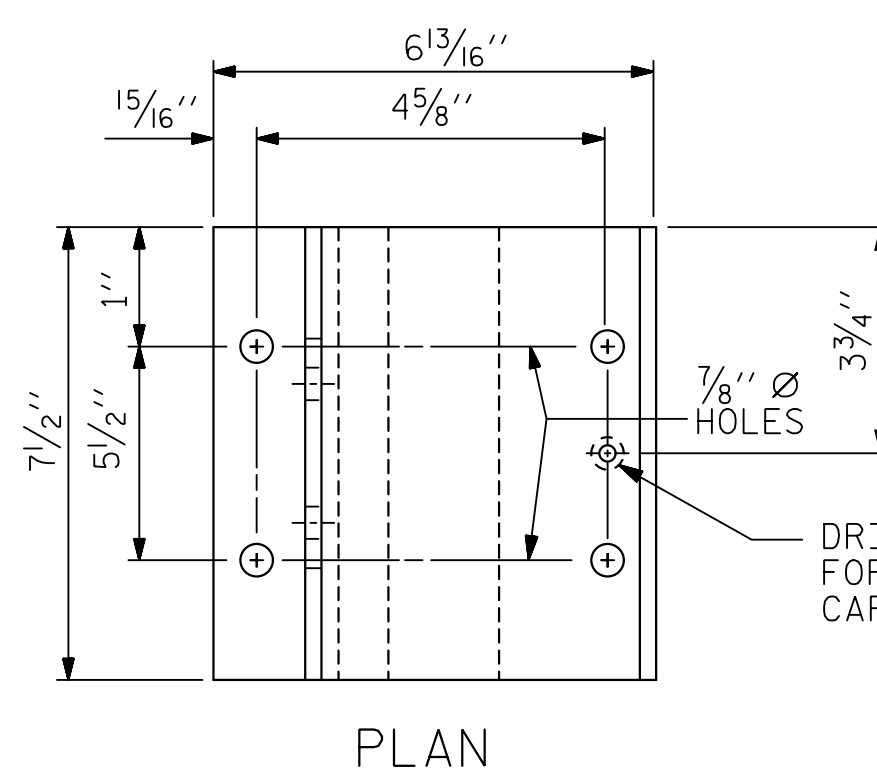
8/22/2018



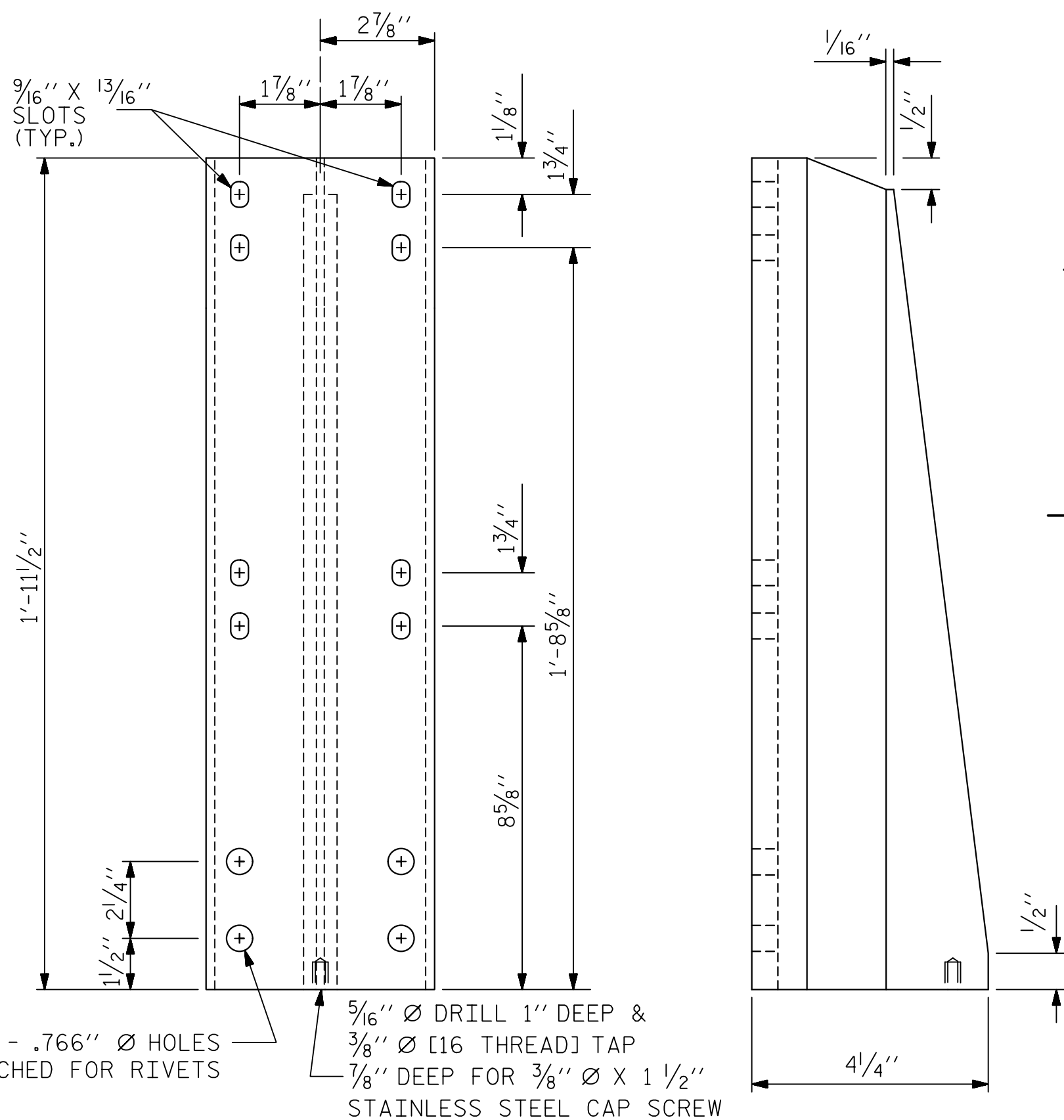
PLAN



SECTION THRU PARAPET AND RAIL



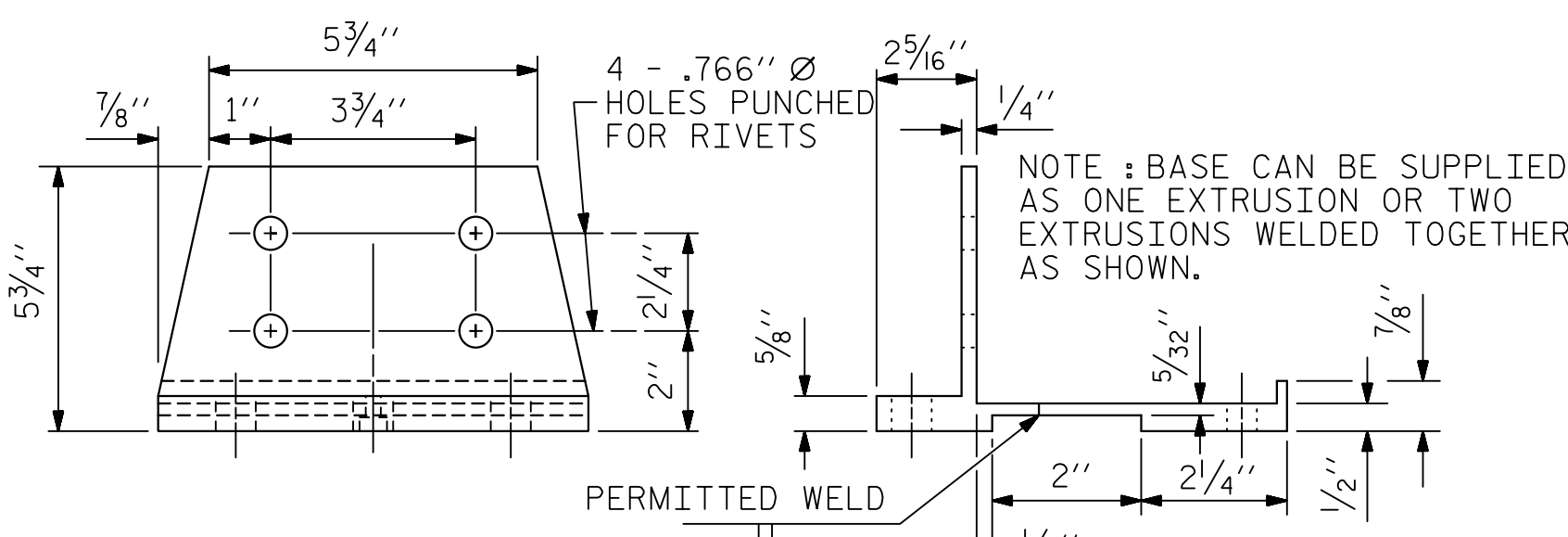
PLAN



FRONT ELEVATION

SIDE ELEVATION

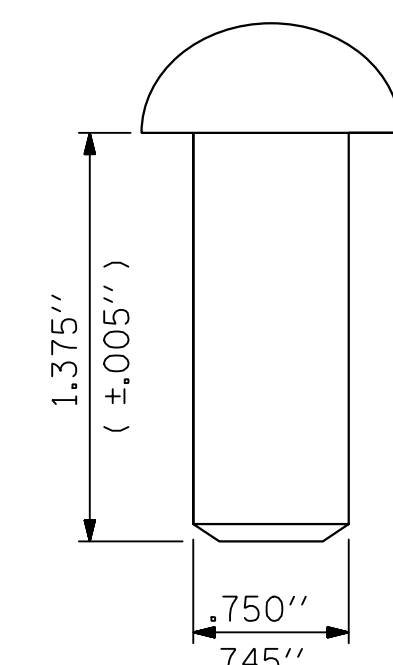
DETAILS OF POST



FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

ASSEMBLED BY : AES	DATE : 5/17		
CHECKED BY : BE	DATE : 8/17		
DRAWN BY : EEM 6/94	REV. 5/1/06	TLA/GM	
CHECKED BY : RGW 6/94	REV. 10/1/11	MAA/GM	
	REV. 6/13	MAA/GM	

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DRAWN BY : A. SMITH	DATE : 5/17
CHECKED BY : B. EMAMI	DATE : 8/17
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18

DWG. NO. 22

STD. NO. BMR3

NOTES

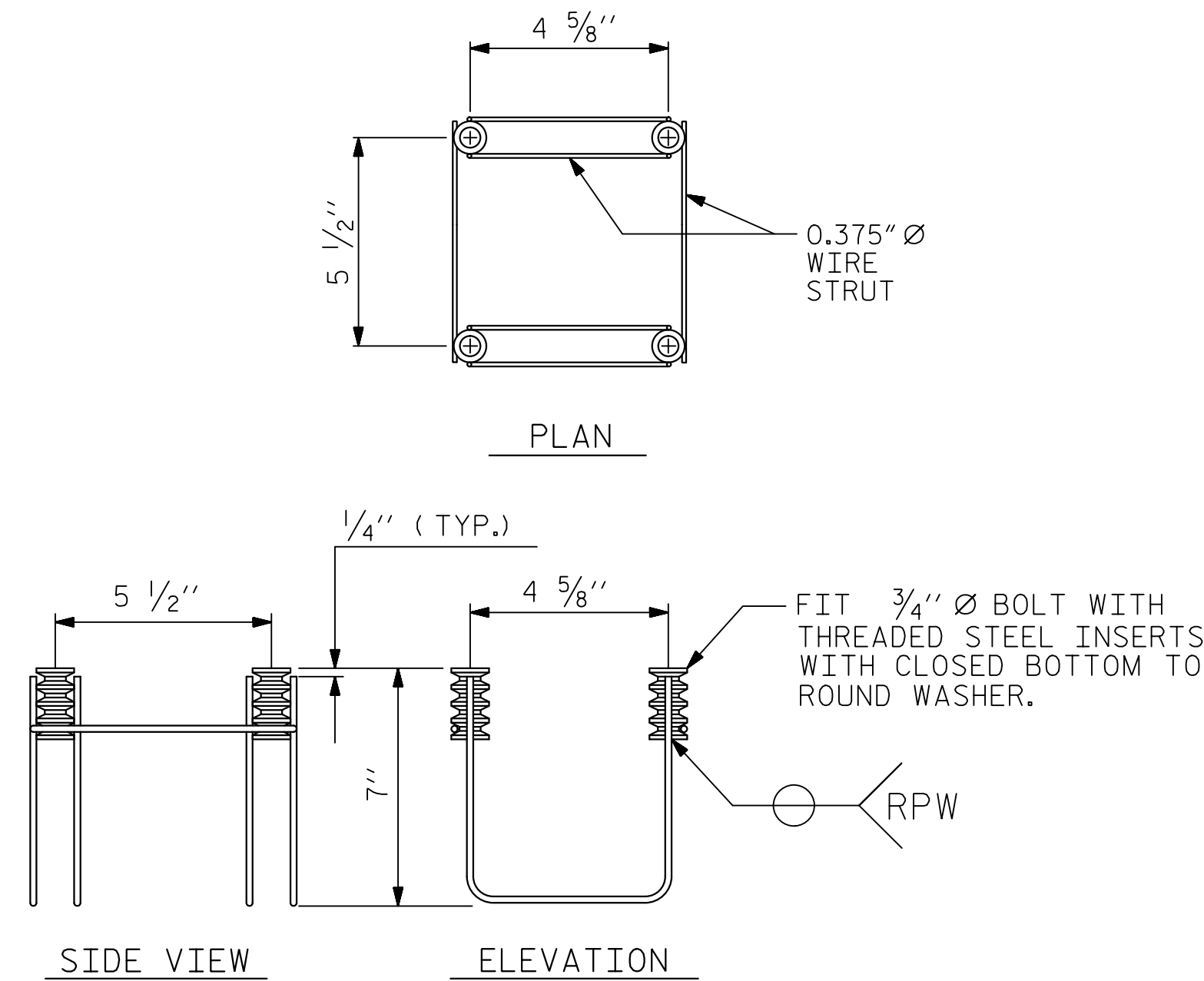
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLY TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

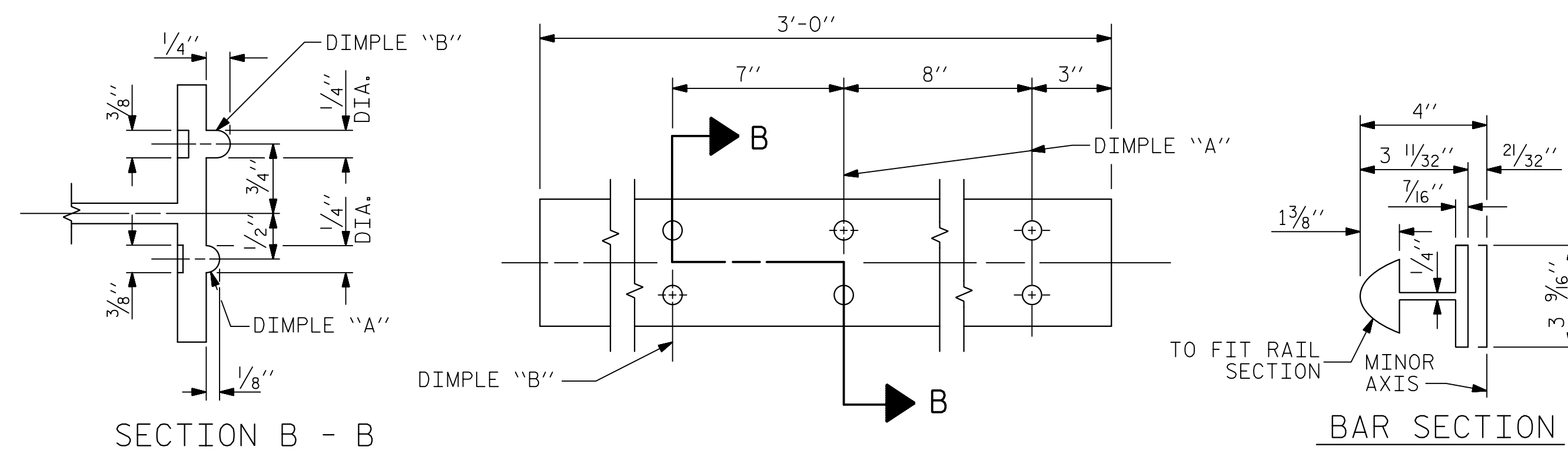
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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

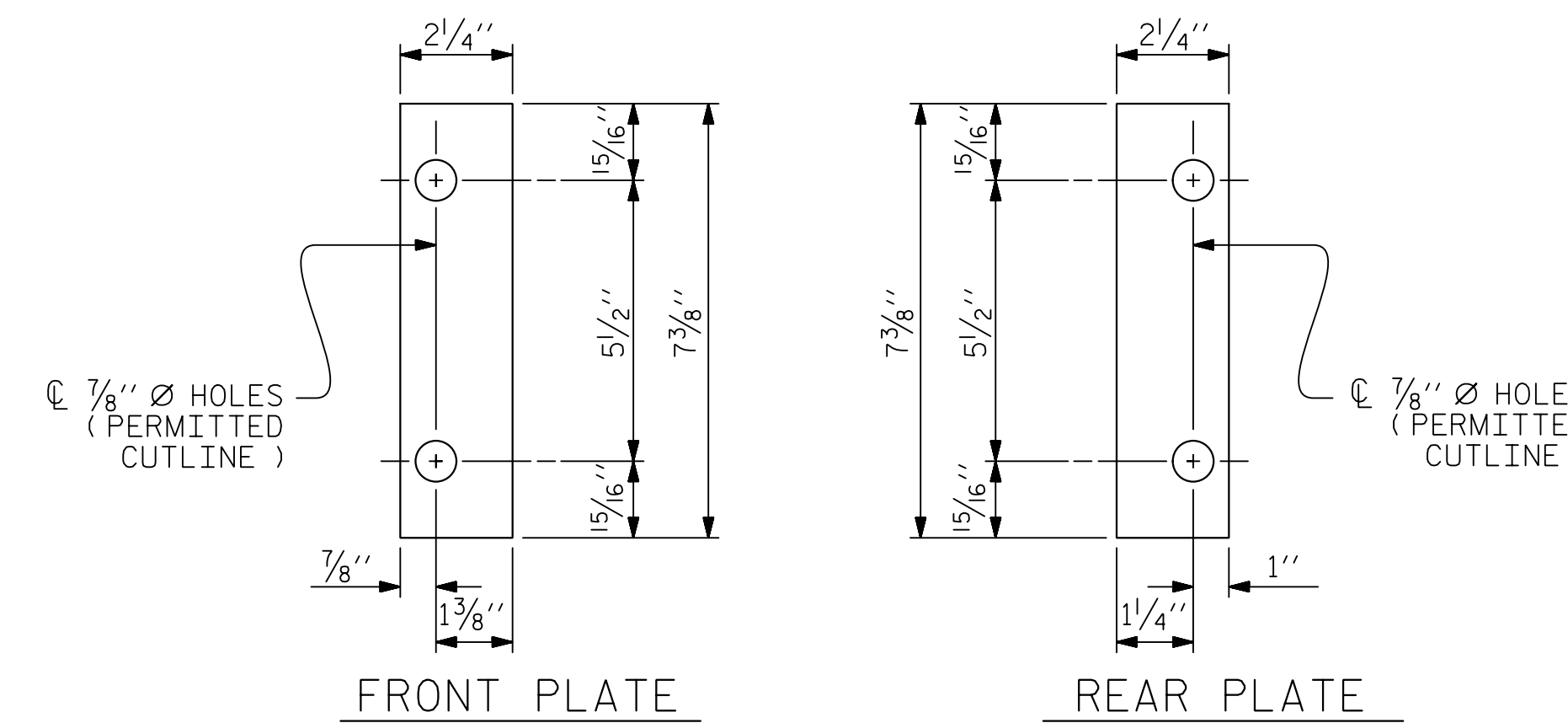


4-BOLT METAL RAIL ANCHOR ASSEMBLY

(100 ASSEMBLIES REQUIRED)

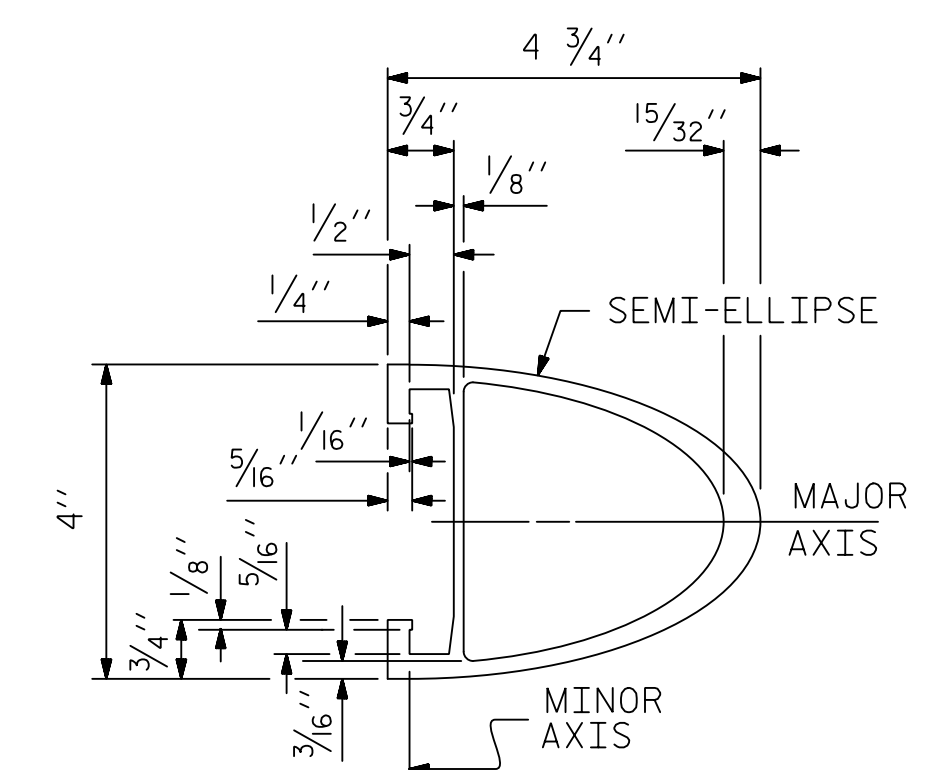


EXPANSION BAR DETAILS

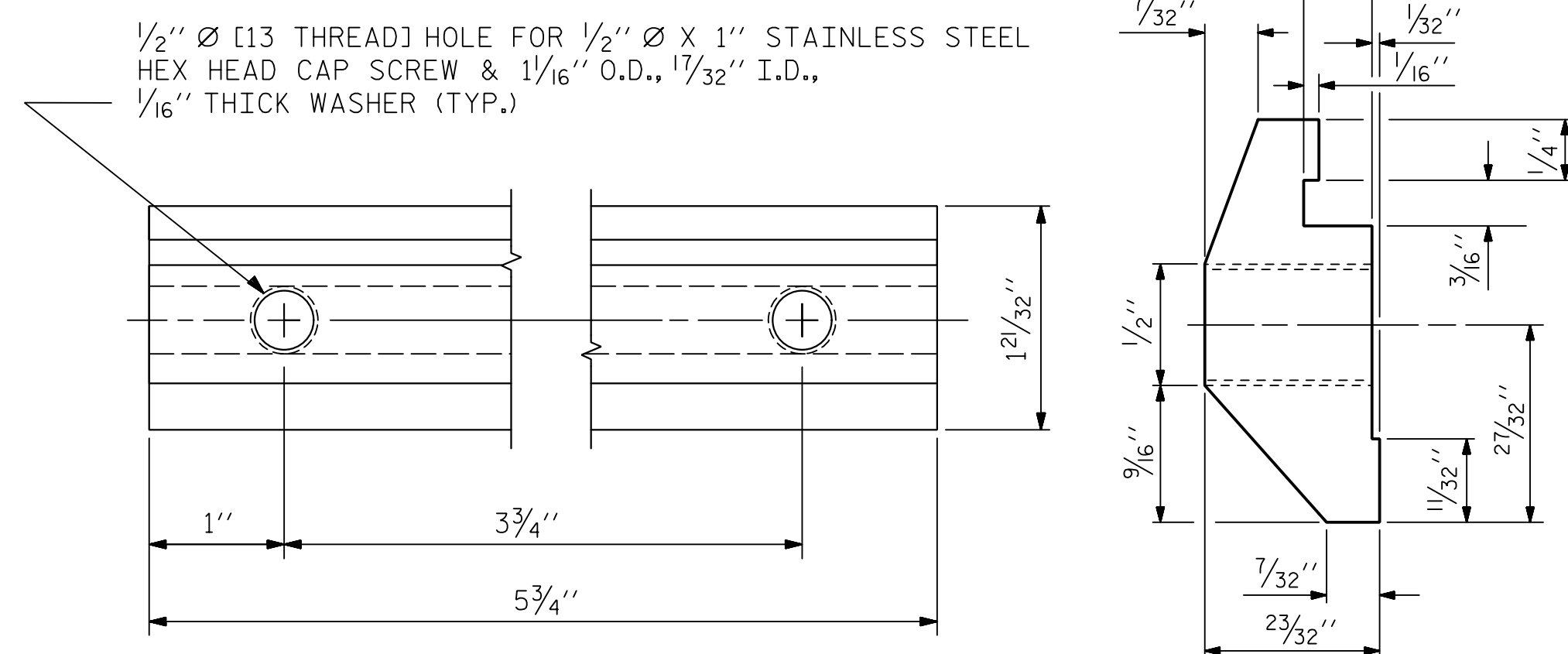


SHIM DETAILS

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

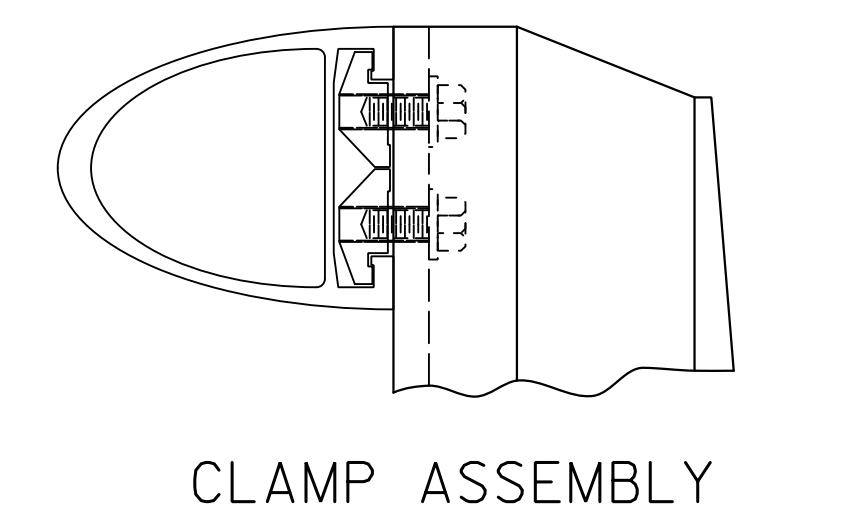


RAIL SECTION

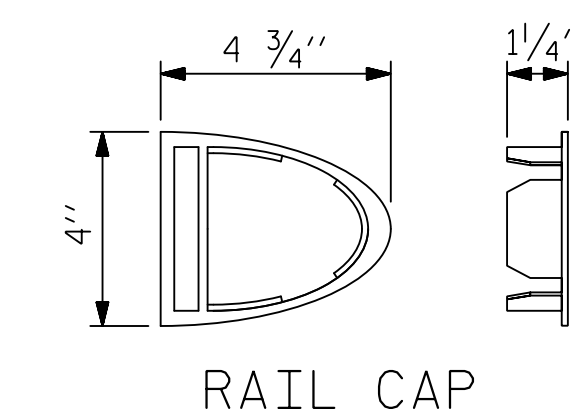


CLAMP BAR DETAIL

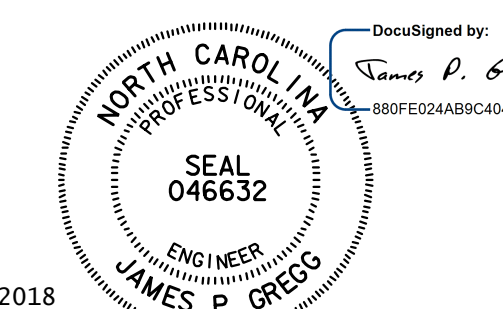
(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP



8/22/2018

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 2 BAR METAL RAIL

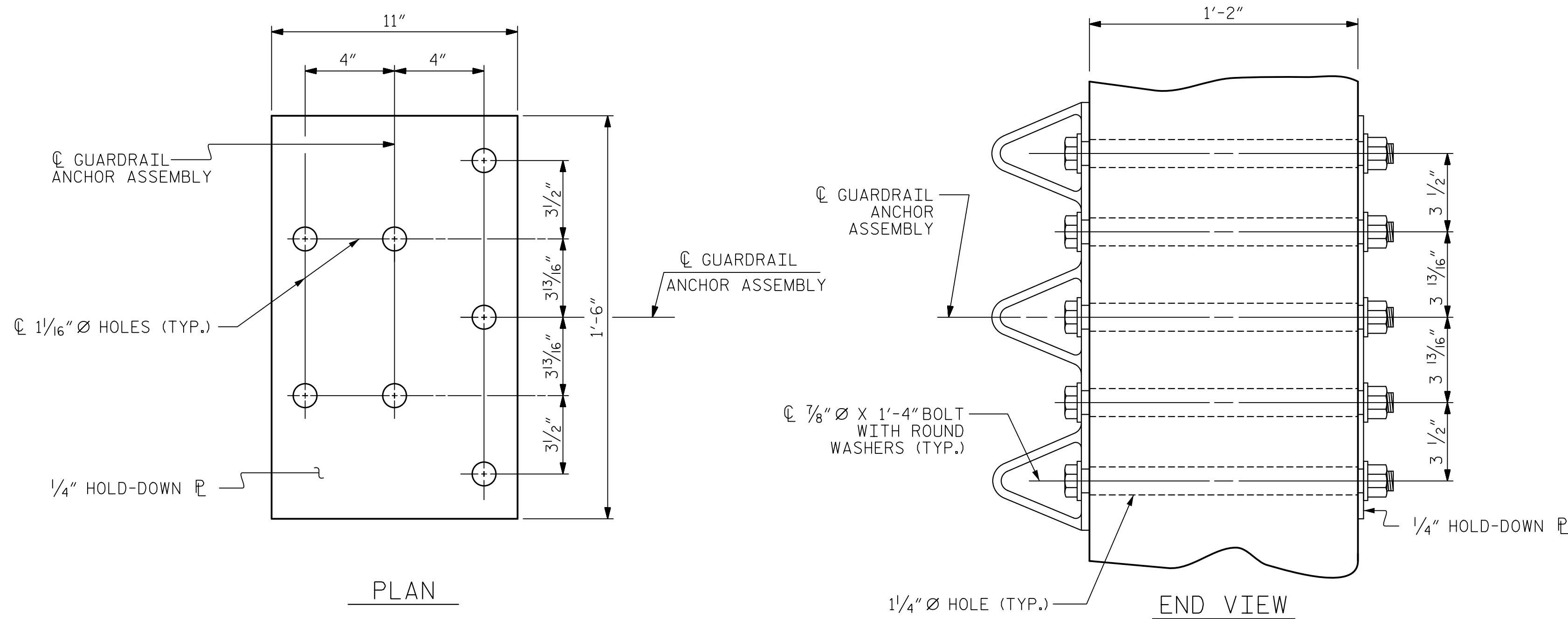
LEFT LANE

ASSEMBLED BY : AES	DATE : 5/17
CHECKED BY : BE	DATE : 8/17
DRAWN BY : EEM 6/94	REV. 8/16/99 MAB/LES
CHECKED BY : RGW 6/94	REV. 5/1/06R KMM/GM
	REV. 10/1/11 MAA/GM

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DRAWN BY : A. SMITH	DATE : 5/17
CHECKED BY : B. EMAMI	DATE : 8/17
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18

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

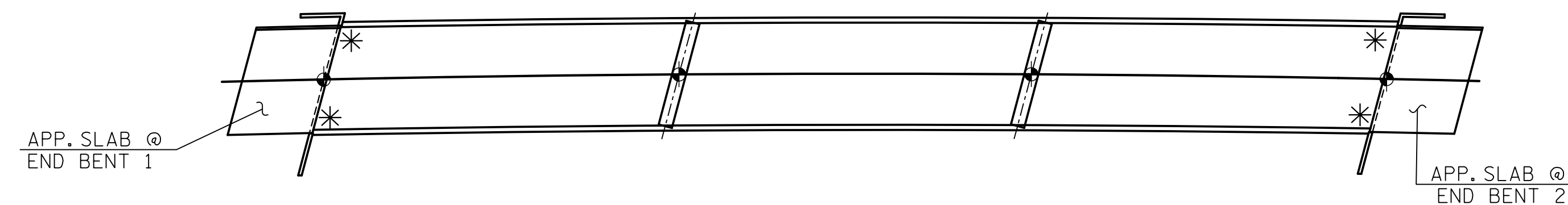
STD. NO. BMR4



GUARDRAIL ANCHOR ASSEMBLY DETAILS

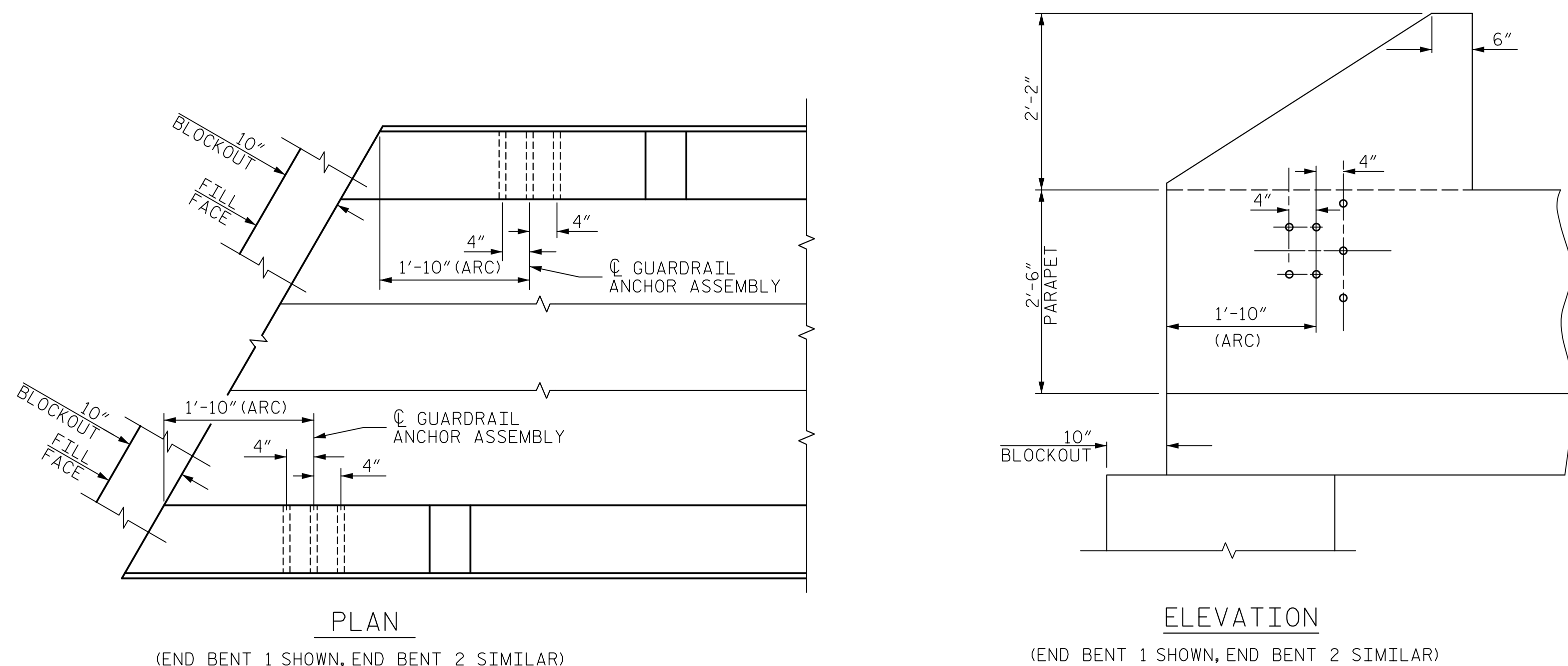
NOTES

- THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A 1/4" HOLD DOWN PLATE AND 7 - 7/8" Ø BOLTS WITH NUTS AND WASHERS.
- THE HOLD-DOWN PLATE SHALL CONFORM TO AASHTO M270 GRADE 36. AFTER FABRICATION, THE HOLD-DOWN PLATE SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M111.
- BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307 AND NUTS SHALL CONFORM TO THE REQUIREMENTS OF AASHTO M291. BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS, NUTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 7/8" Ø GALVANIZED BOLTS, NUTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.
- AFTER INSTALLATION, THE EXPOSED THREAD OF THE BOLT SHALL BE BURRED WITH A SHARP POINTED TOOL.
- THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.
- THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.
- THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

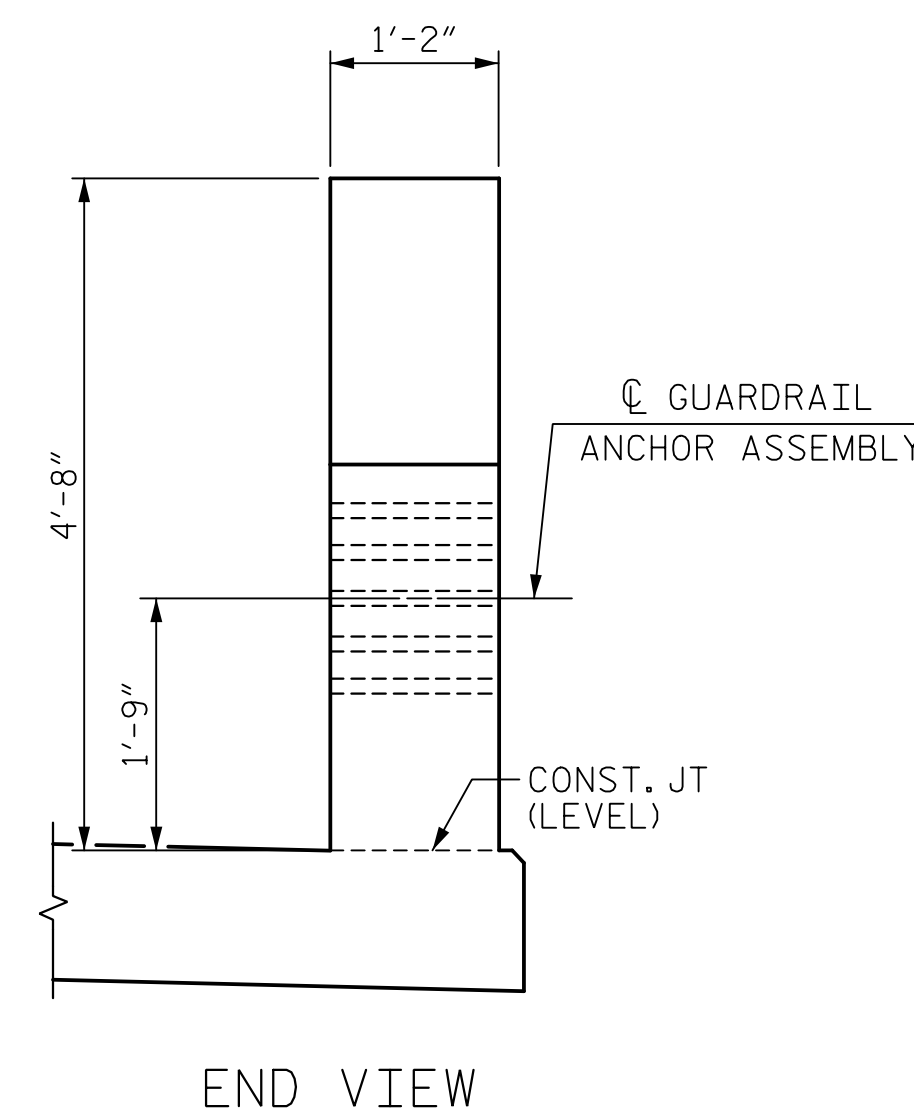


SKETCH SHOWING POINTS OF ATTACHMENT

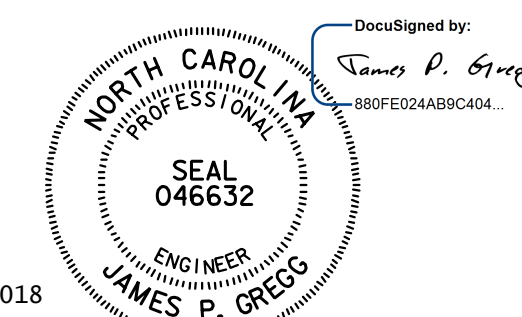
* LOCATION OF GUARDRAIL ATTACHMENT
(4 REQUIRED)



LOCATION OF GUARDRAIL ANCHOR AT END POST



PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-



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

ASSEMBLED BY : AES	DATE : 5/17
CHECKED BY : BE	DATE : 8/17
DRAWN BY : MAA 5/10	REV. 12/5/11 MAA/GM
CHECKED BY : GM 5/10	REV. 6/13 MAA/GM
	REV. 1/15 MAA/TMG

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DRAWN BY : A. SMITH	DATE : 5/17
CHECKED BY : B. EMAMI	DATE : 8/17
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18

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

BILL OF MATERIAL					
EPOXY COATED REINFORCING STEEL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	601	5	STR.	32'-3"	20,216
A2	2	5	STR.	32'-3"	67
A3	2	5	STR.	31'-10"	66
A4	2	5	STR.	30'-1"	63
A5	2	5	STR.	28'-4"	59
A6	2	5	STR.	26'-7"	55
A7	2	5	STR.	24'-10"	52
A8	2	5	STR.	23'-2"	48
A9	2	5	STR.	21'-5"	45
A10	2	5	STR.	19'-8"	41
A11	2	5	STR.	17'-11"	37
A12	2	5	STR.	16'-2"	34
A13	2	5	STR.	14'-6"	30
A14	2	5	STR.	12'-9"	27
A15	2	5	STR.	11'-0"	23
A16	2	5	STR.	9'-3"	19
A17	2	5	STR.	7'-6"	16
A18	412	4	STR.	3'-9"	1,032

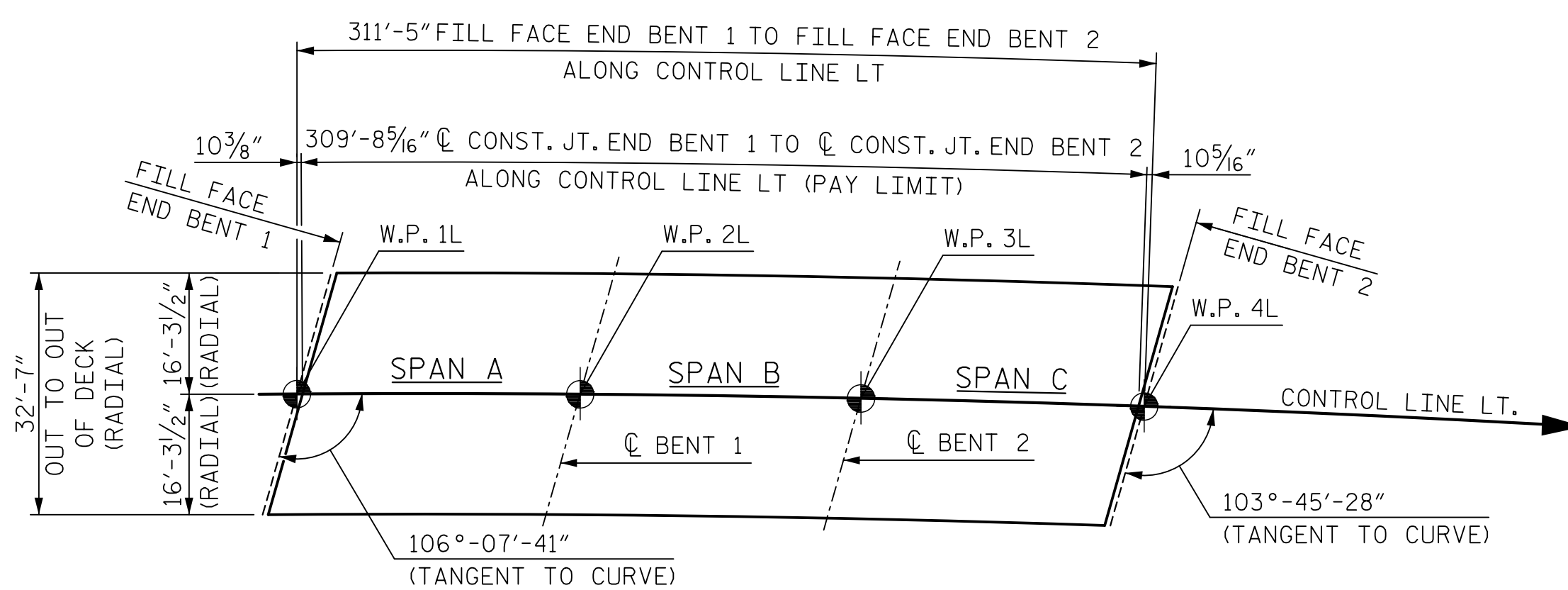
BILL OF MATERIAL					
EPOXY COATED REINFORCING STEEL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	86	6	STR.	19'-9"	2,551
B2	352	4	STR.	32'-7"	7,662
B3	44	4	STR.	22'-6"	661
B4	88	6	STR.	25'-6"	3,370
B5	86	6	STR.	31'-6"	4,069
B6	84	5	STR.	54'-0"	4,731
S1	54	4	3	11'-11"	430
S2	54	4	3	11'-4"	409
U1	44	5	5	11'-10"	543

BILL OF MATERIAL					
EPOXY COATED REINFORCING STEEL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
K1	10	5	STR.	39'-8"	414
K2	6	5	STR.	6'-4"	40
K3	6	5	STR.	7'-3"	45
K4	12	5	STR.	7'-10"	98
K5	6	5	STR.	6'-10"	43
K6	4	5	STR.	2'-0"	8
K7	4	5	STR.	2'-6"	10
K8	8	5	STR.	2'-9"	23
K9	4	5	STR.	2'-3"	9
TOTAL					47,046

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

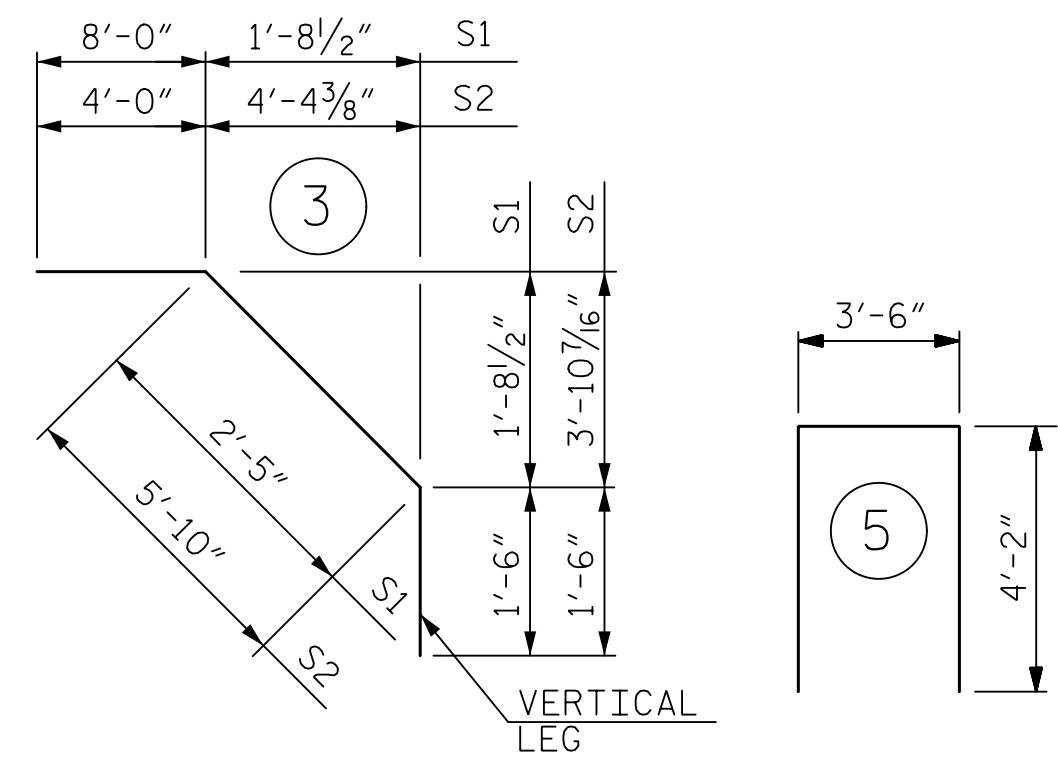
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			

GROOVING BRIDGE FLOORS		
APPROACH SLABS	1,350	SQ.FT.
BRIDGE DECK	8,361	SQ.FT.
TOTAL	9,711	SQ.FT.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 10,091)

BAR TYPES



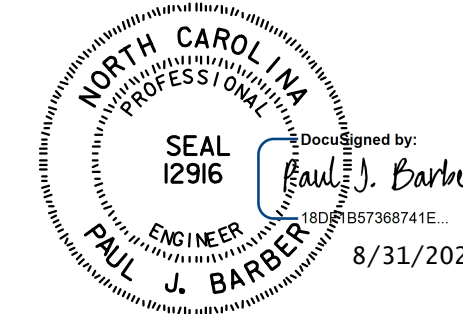
ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE (CU. YDS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	190.2	
POUR 2	27.4	
POUR 3	56.2	
TOTALS**	273.8	47,046

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED
NOTE: QUANTITIES INCLUDE THE CONCRETE AND REINFORCING STEEL FOR THE UPPER PORTION OF THE INTEGRAL END BENTS.

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

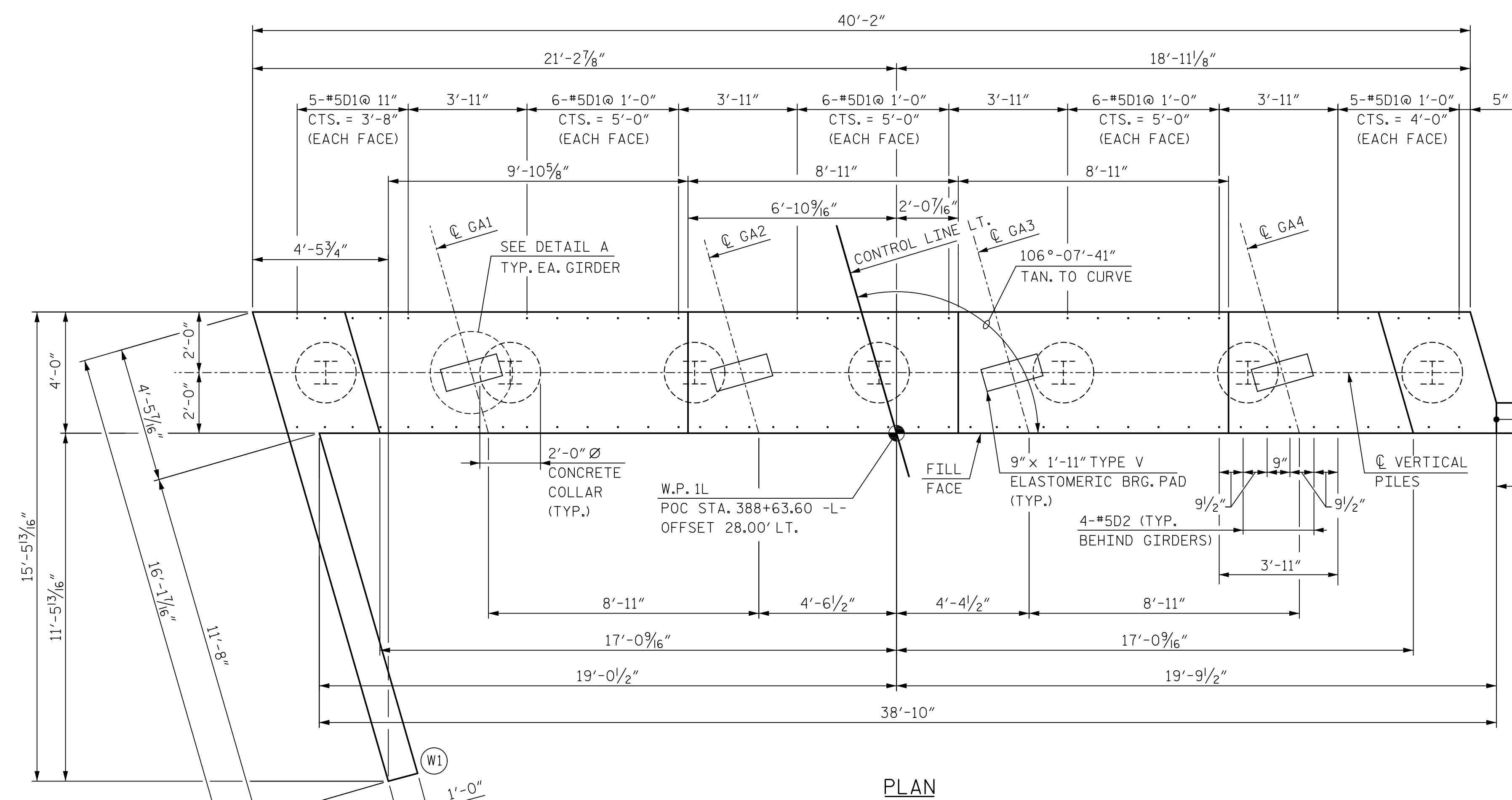


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
SUPERSTRUCTURE
BILL OF MATERIAL
LEFT LANE

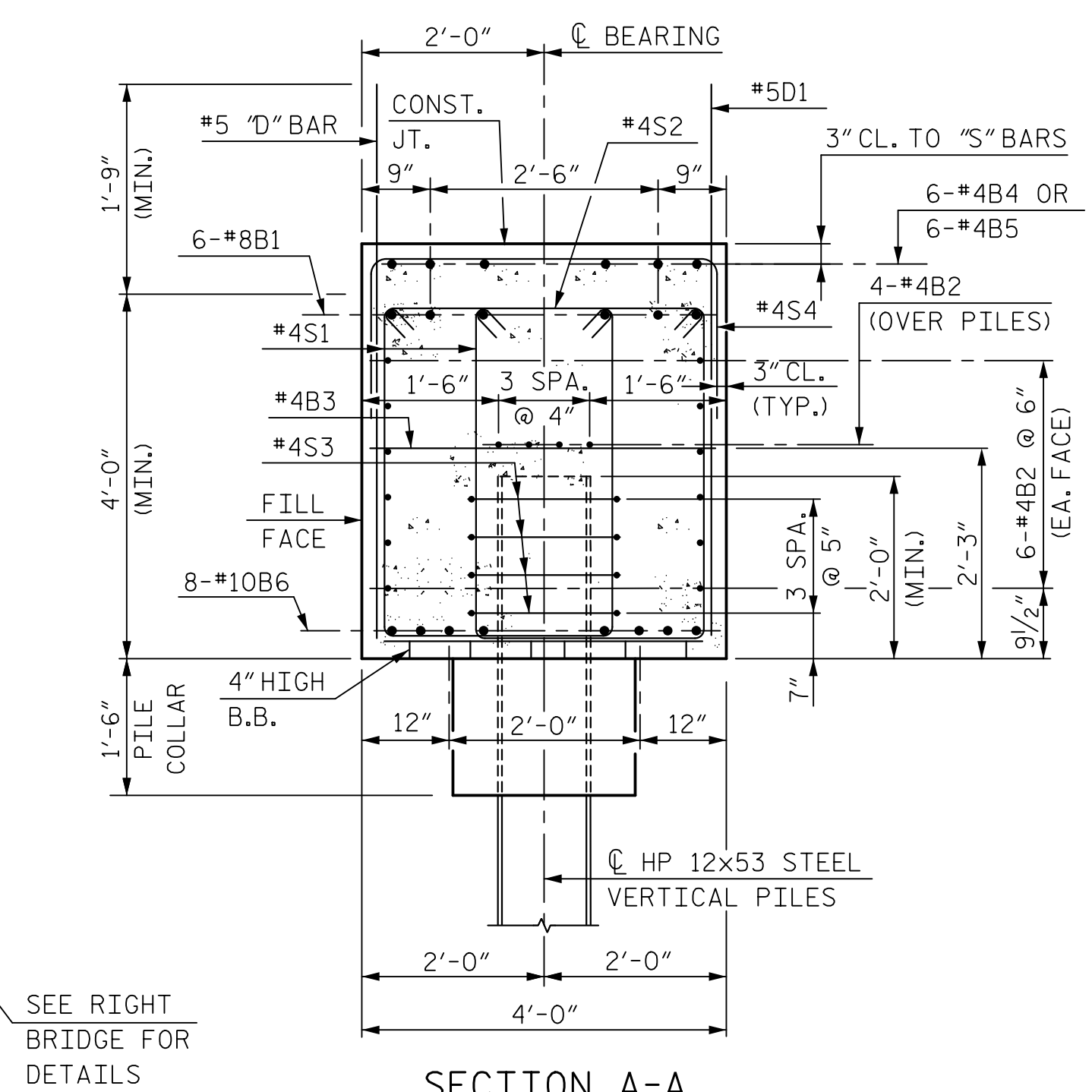
ASSEMBLED BY : BN	DATE : 5/17
CHECKED BY : BE	DATE : 9/17
DRAWN BY : JMB 5/87	REV. 8/16/99 RWW/LES
CHECKED BY : SJD 9/87	REV. 5/1/06 TLA/GM
	REV. 10/1/11 MAA/GM

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DRAWN BY : M. WRIGHT	DATE : 7/21
CHECKED BY : P. BARBER	DATE : 7/21
DESIGN ENGINEER OF RECORD : P. BARBER	DATE : 7/21

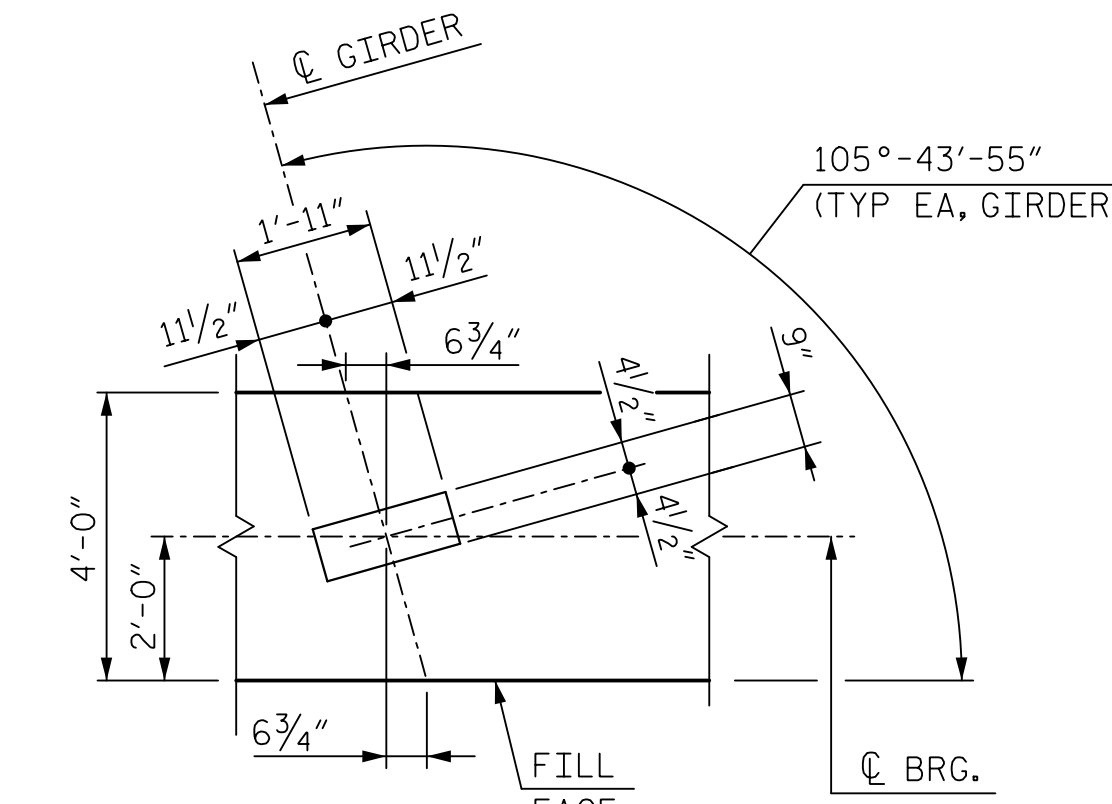
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-25
1			3			TOTAL SHEETS
2			4			39



PLAN

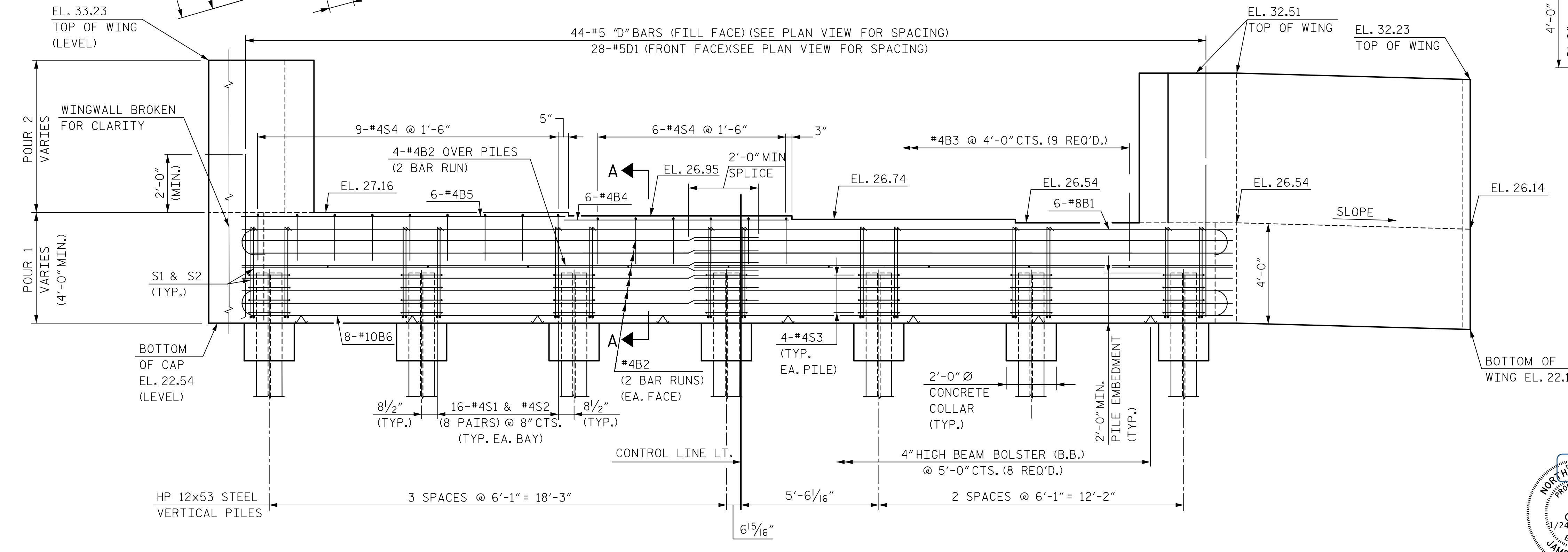


SECTION A-A



DETAIL A

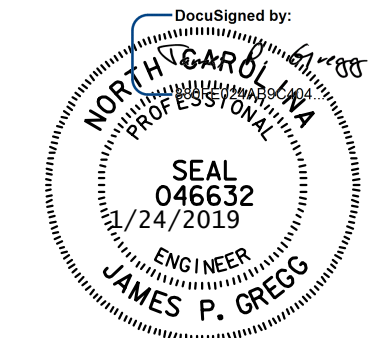
NOTES:
 FOR NOTES, SEE SHEET 3 OF 3.
 FOR WINGWALL DETAILS, SEE SHEET 2 OF 3.



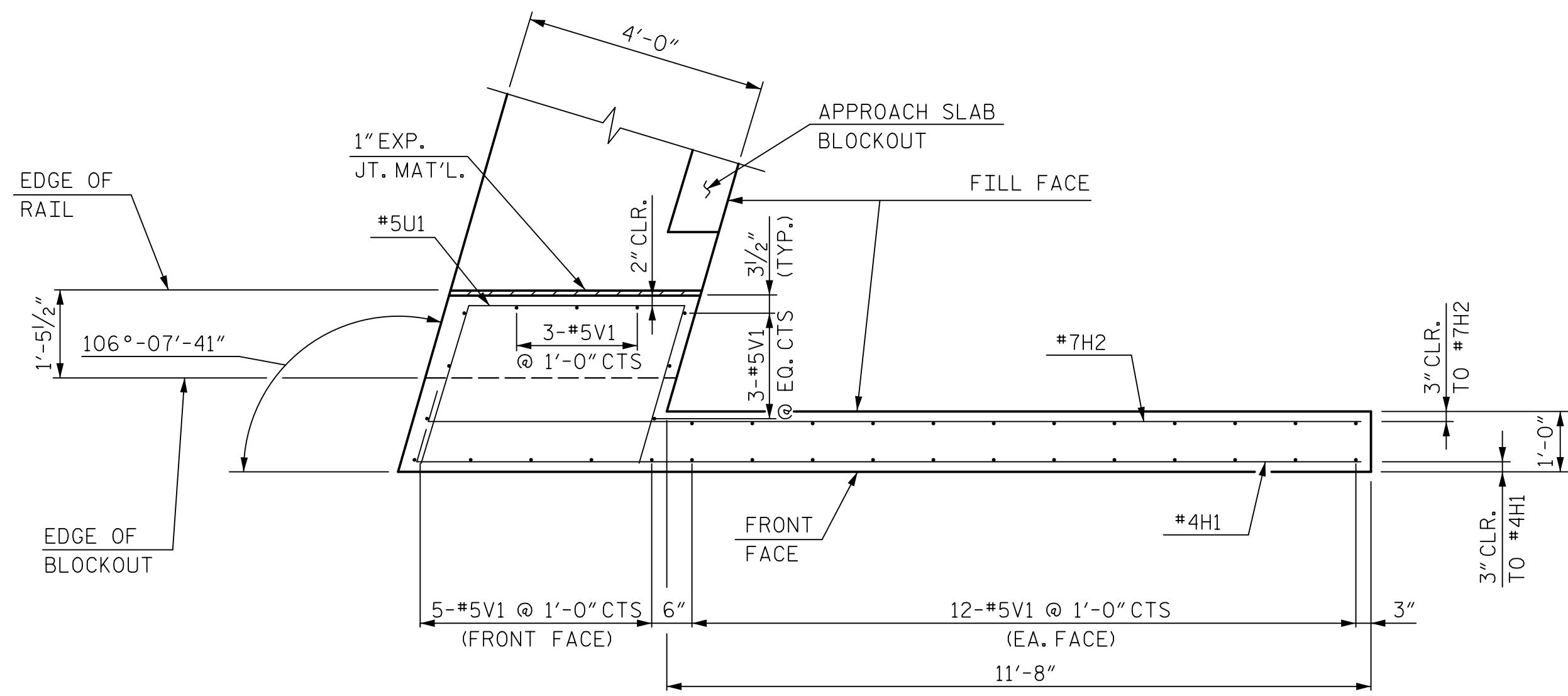
ELEVATION

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

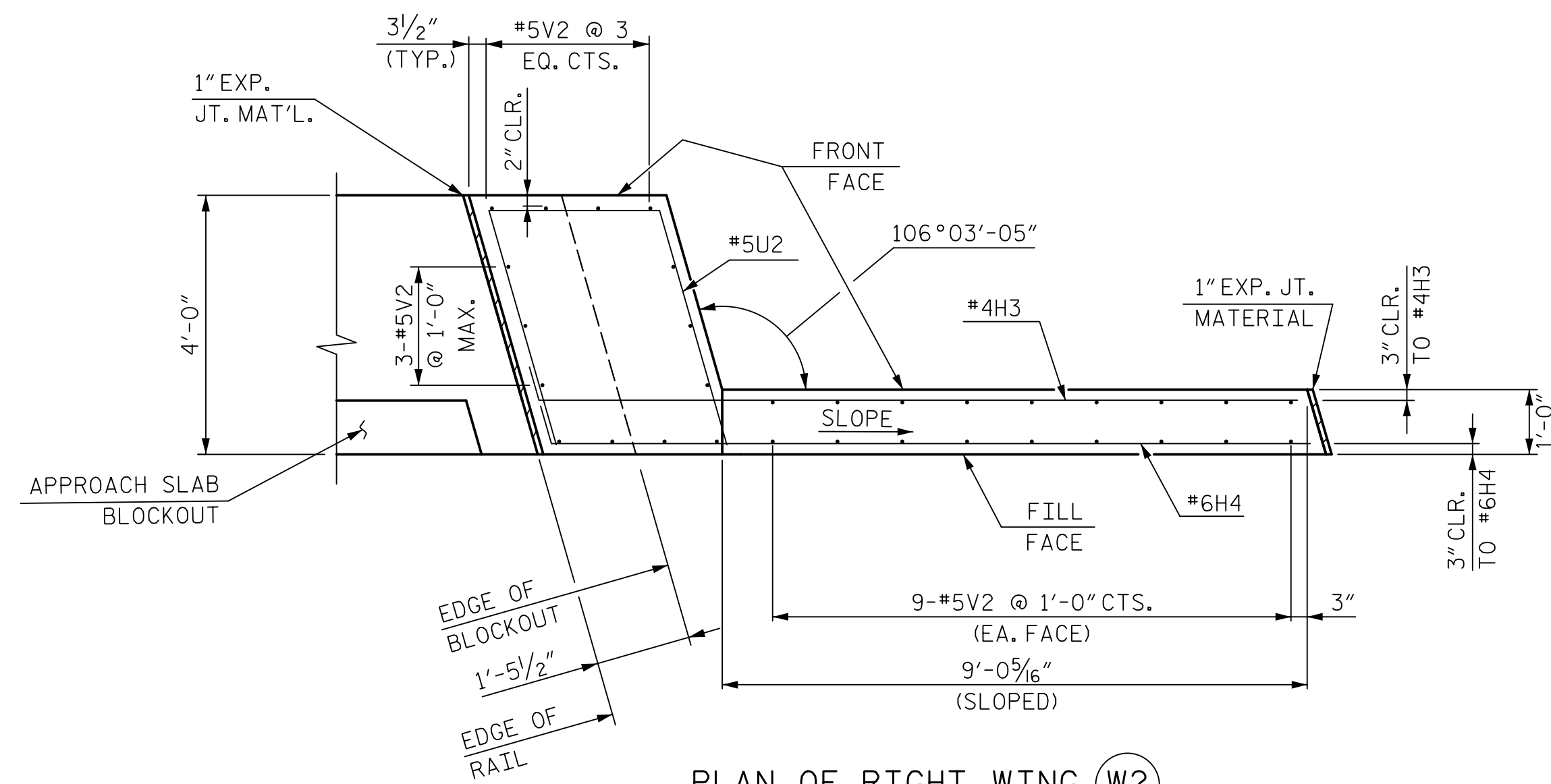
SHEET 1 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 END BENT 1
 LEFT LANE



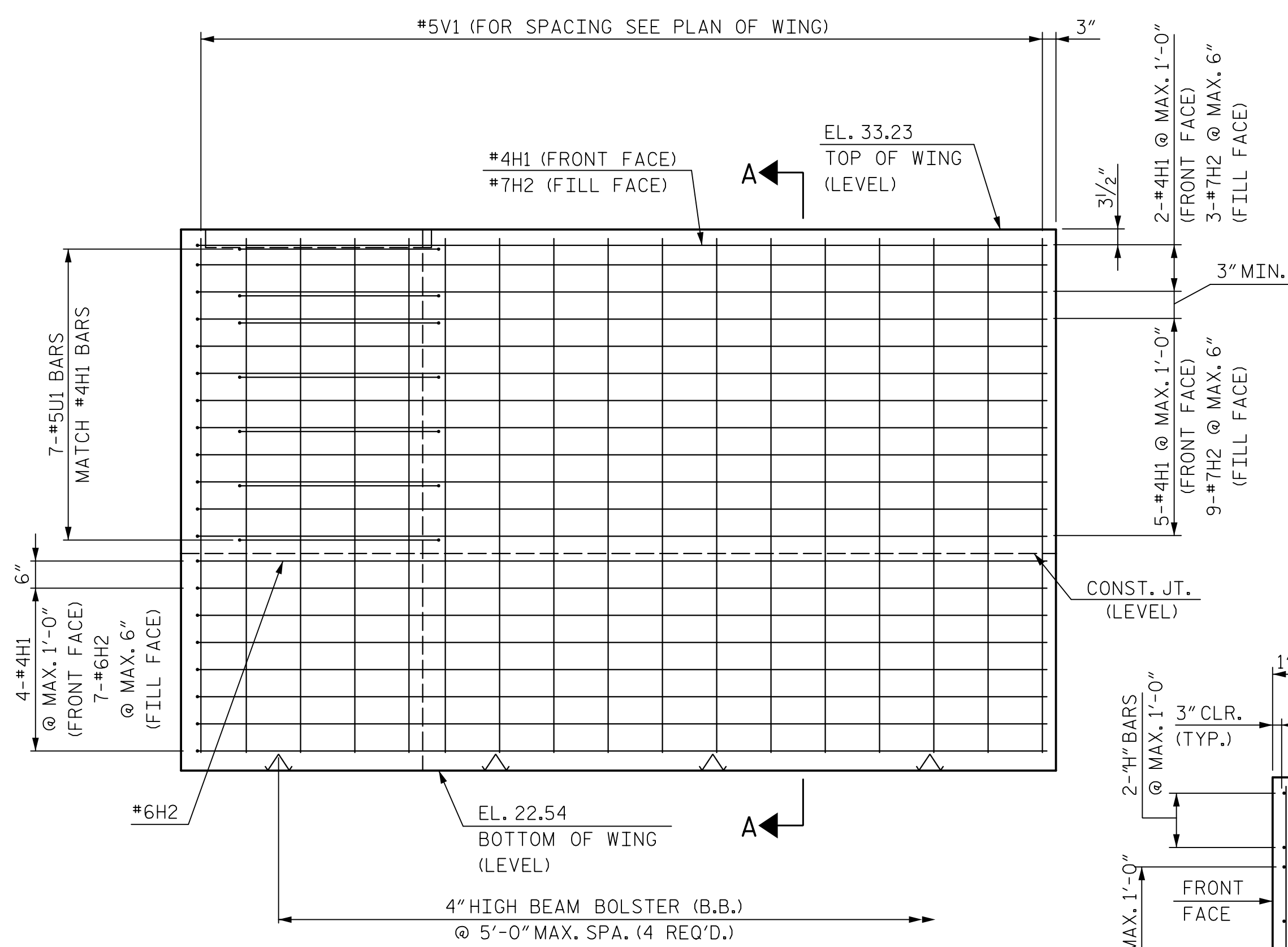
HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: B. NELIPANE	DATE: 5/17	NO.	BY
CHECKED BY: B. EMAMI	DATE: 8/17	1	3
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18	2	4
DWG. NO. 26		SHEET NO. S5-26	
		TOTAL SHEETS 39	



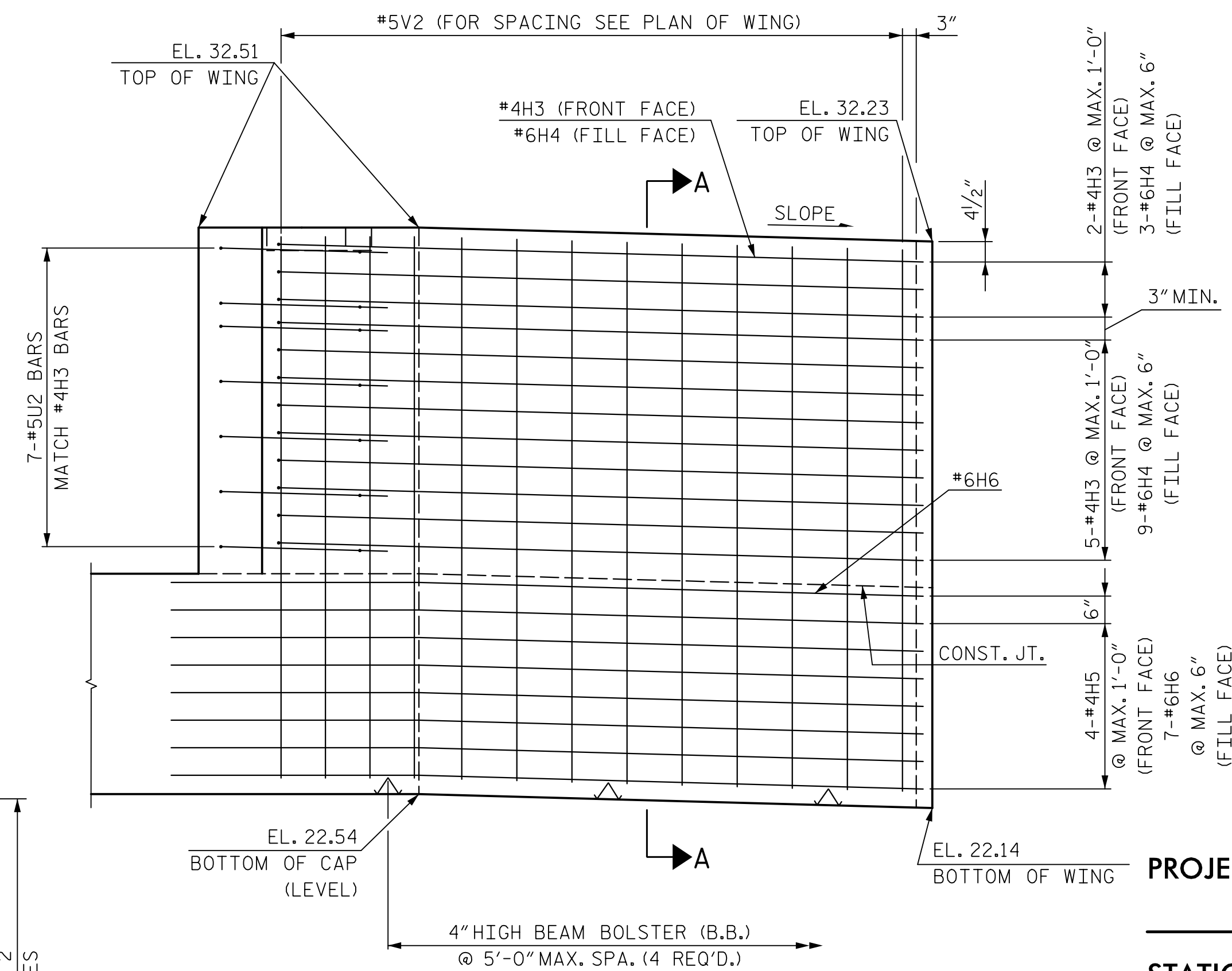
PLAN OF LEFT WING (W1)



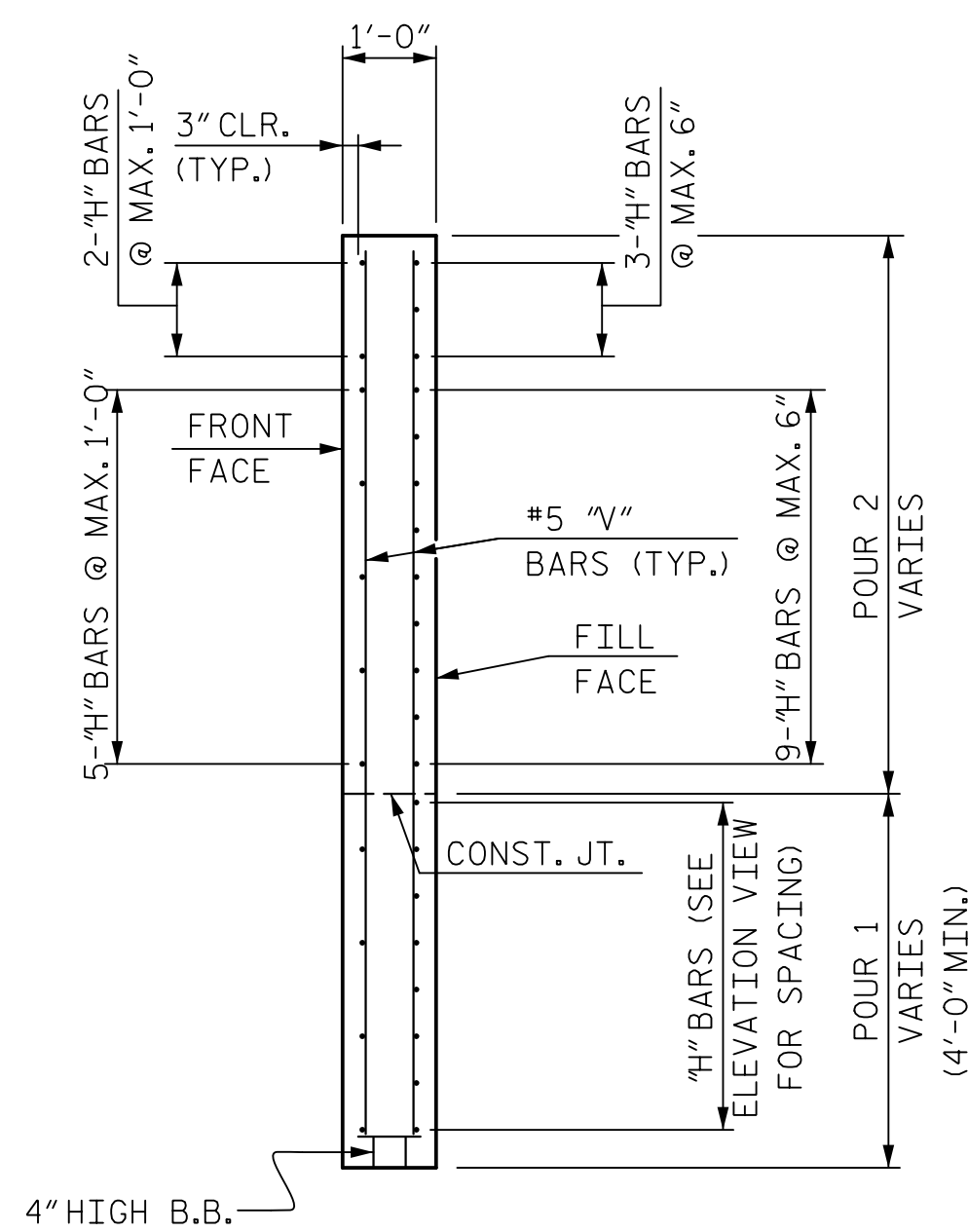
PLAN OF RIGHT WING (W2)



ELEVATION OF LEFT WING (W1)



ELEVATION OF RIGHT WING (W2)



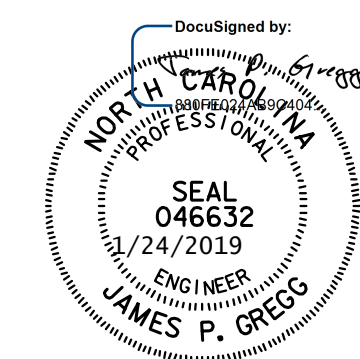
SECTION A-A

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 2 OF 3

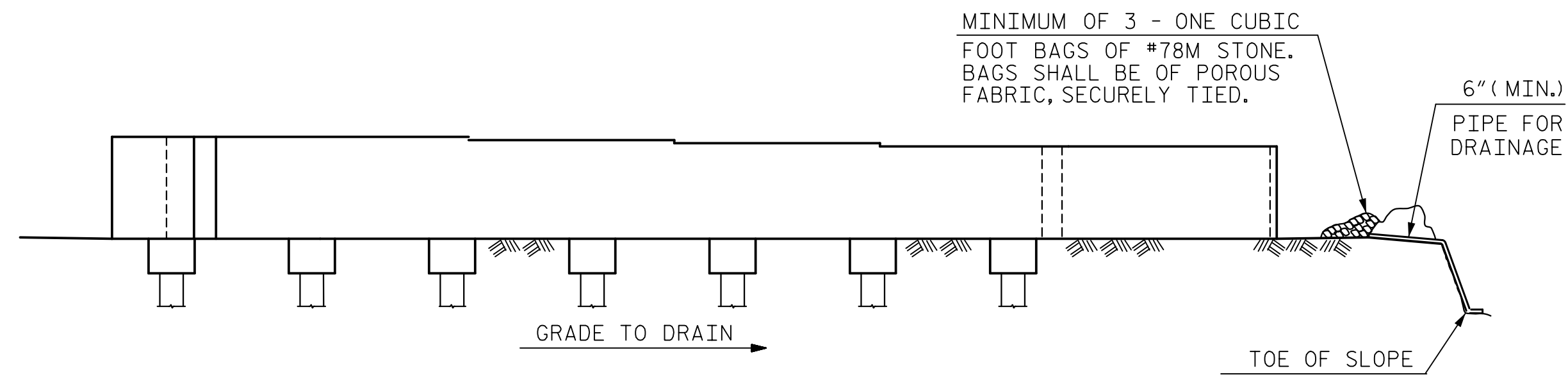
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1
 LEFT LANE



HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: B. NEUPANE	DATE: 6/17	DWG. NO. 27	
CHECKED BY: B. EMAMI	DATE: 8/17		
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18		

REVISIONS						SHEET NO. S5-27
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 39
2			4			

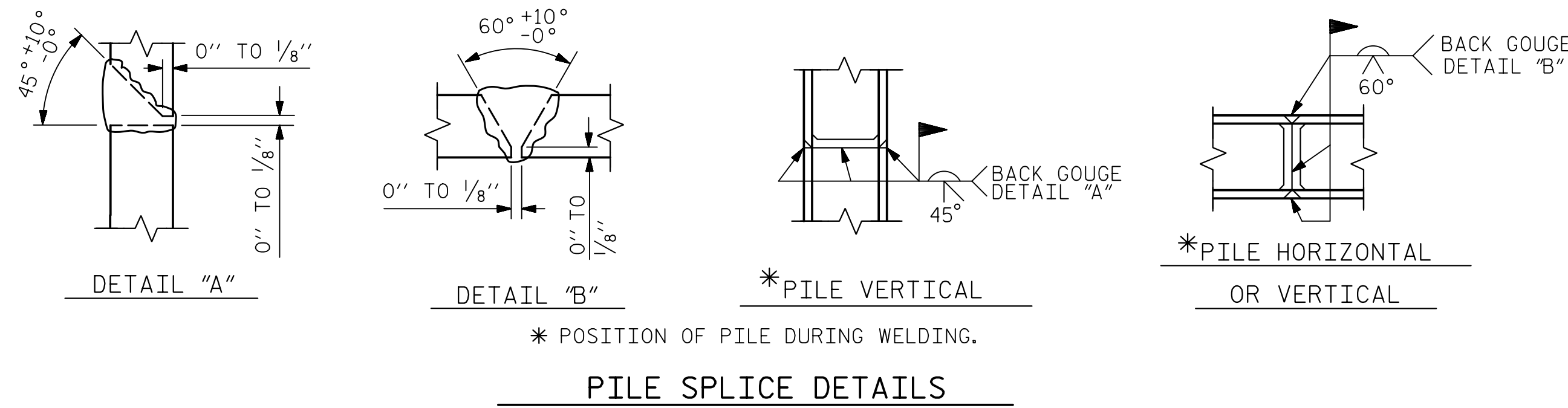


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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

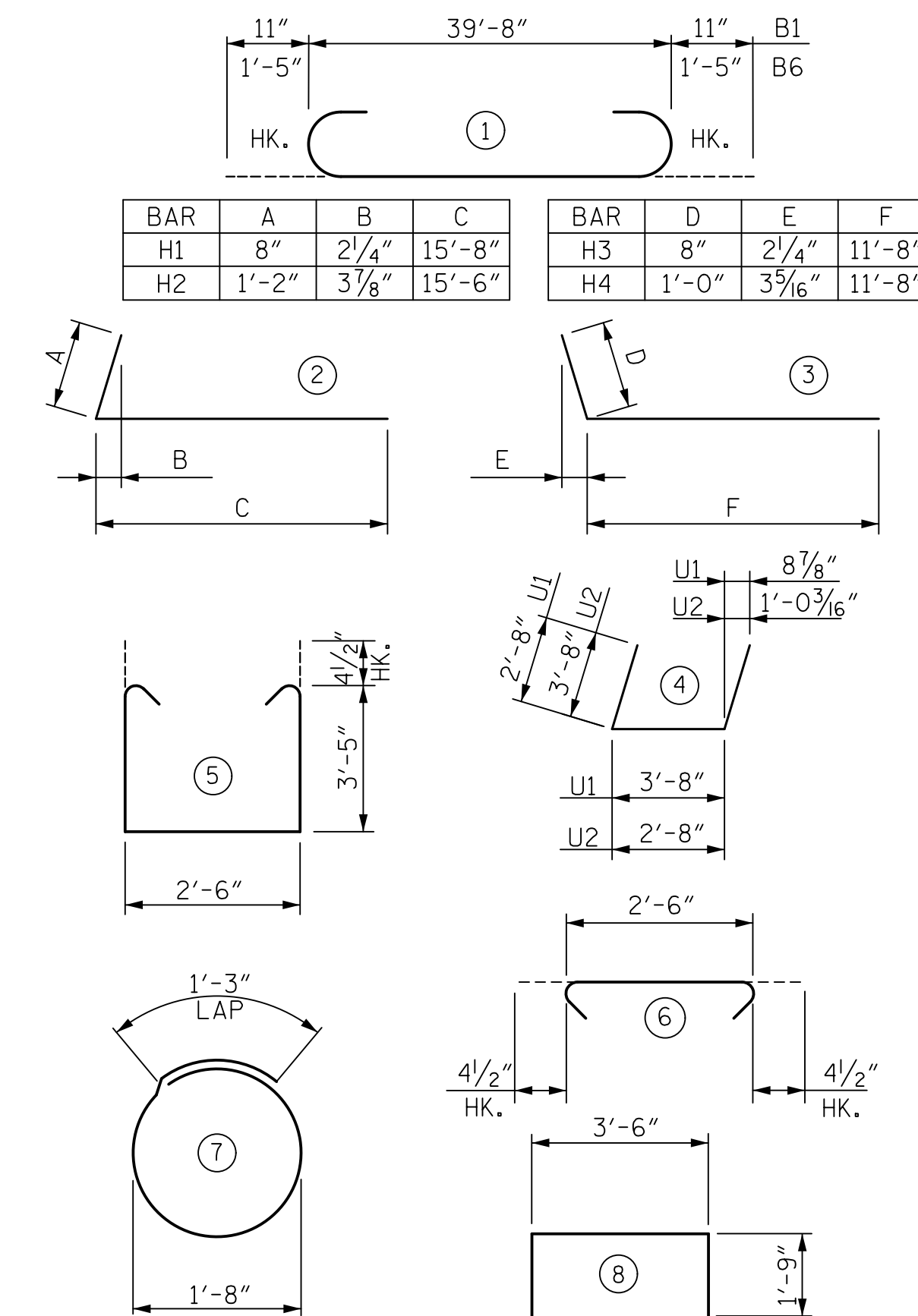
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 1



PILE SPLICE DETAILS

BAR TYPES



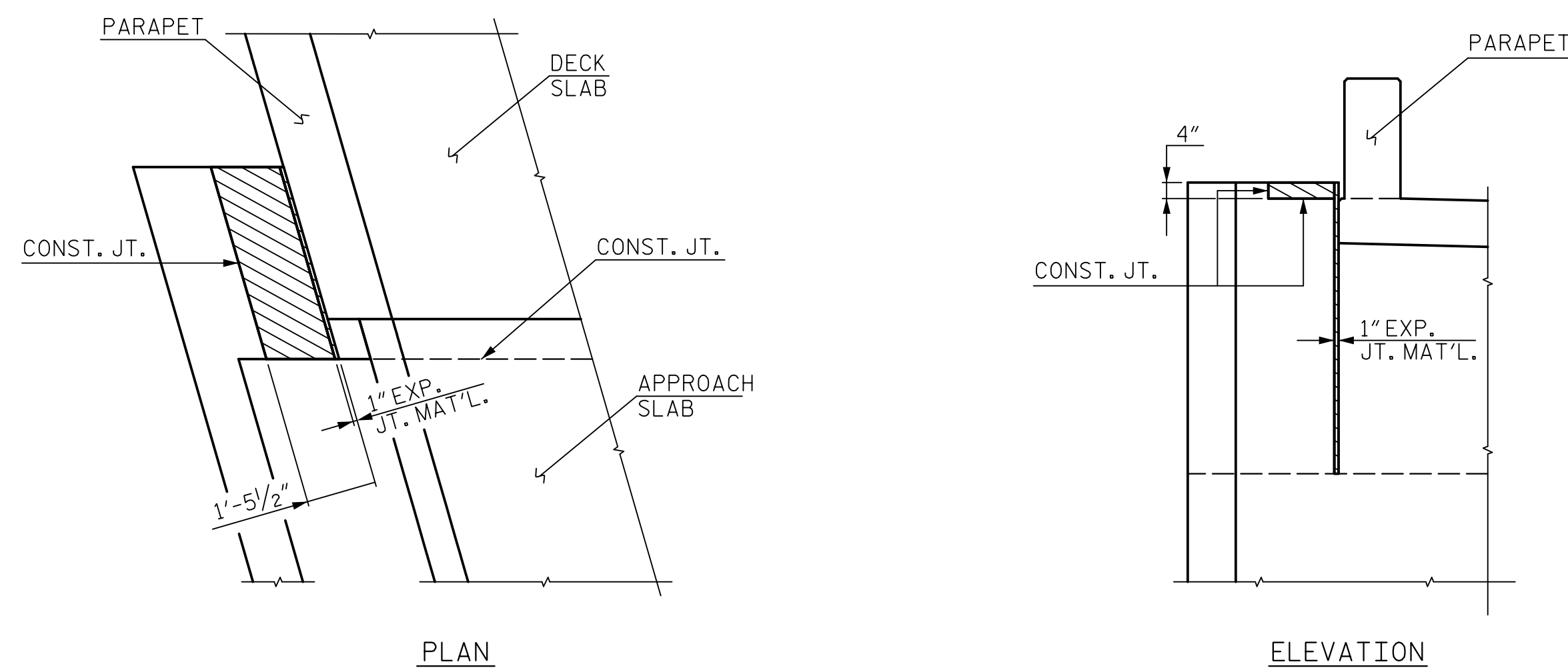
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING

END BENT 1					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#8	1	41'-6"	665
B2	32	#4	STR.	21'-1"	451
B3	9	#4	STR.	3'-6"	21
B4	6	#4	STR.	9'-0"	36
B5	6	#4	STR.	12'-8"	51
B6	8	#10	1	42'-6"	1,463
D1	56	#5	STR.	6'-5"	375
D2	16	#5	STR.	8'-3"	138
H1	11	#4	2	16'-4"	120
H2	20	#7	2	16'-8"	681
H3	7	#4	3	12'-4"	58
H4	12	#6	3	12'-8"	228
H5	4	#4	STR.	13'-3"	35
H6	8	#6	STR.	13'-6"	162
S1	100	#4	5	10'-1"	674
S2	100	#4	6	3'-3"	217
S3	28	#4	7	6'-6"	122
S4	15	#4	8	7'-0"	70
V1	38	#5	STR.	10'-1"	400
V2	32	#5	STR.	9'-6"	317
U1	7	#5	4	9'-0"	66
U2	7	#5	4	10'-0"	73
QUANTITIES					
EPOXY COATED REINFORCING STEEL	LBS.	6,423			
CLASS AA CONCRETE BREAKDOWN					
POUR 1 - CAP	CU. YDS.	30.5			
POUR 1 - WINGS	CU. YDS.	10.1			
TOTAL:	CU. YDS.	40.6			
HP 12x53 STEEL PILES	NO.	7			
	LIN. FT.	525			

NOTES:

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



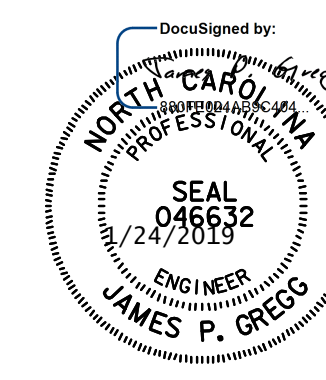
BLOCKOUT IN WINGWALL

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1
 LEFT LANE

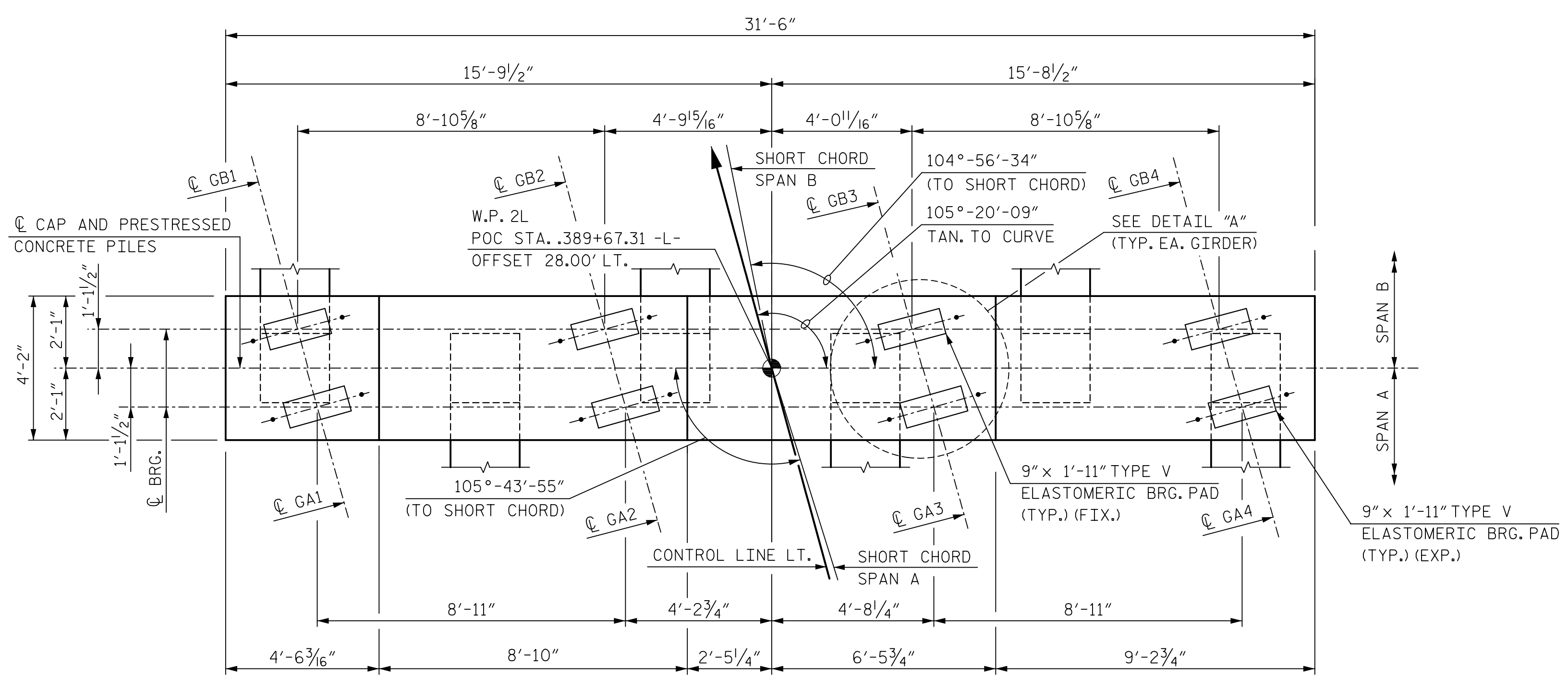


HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

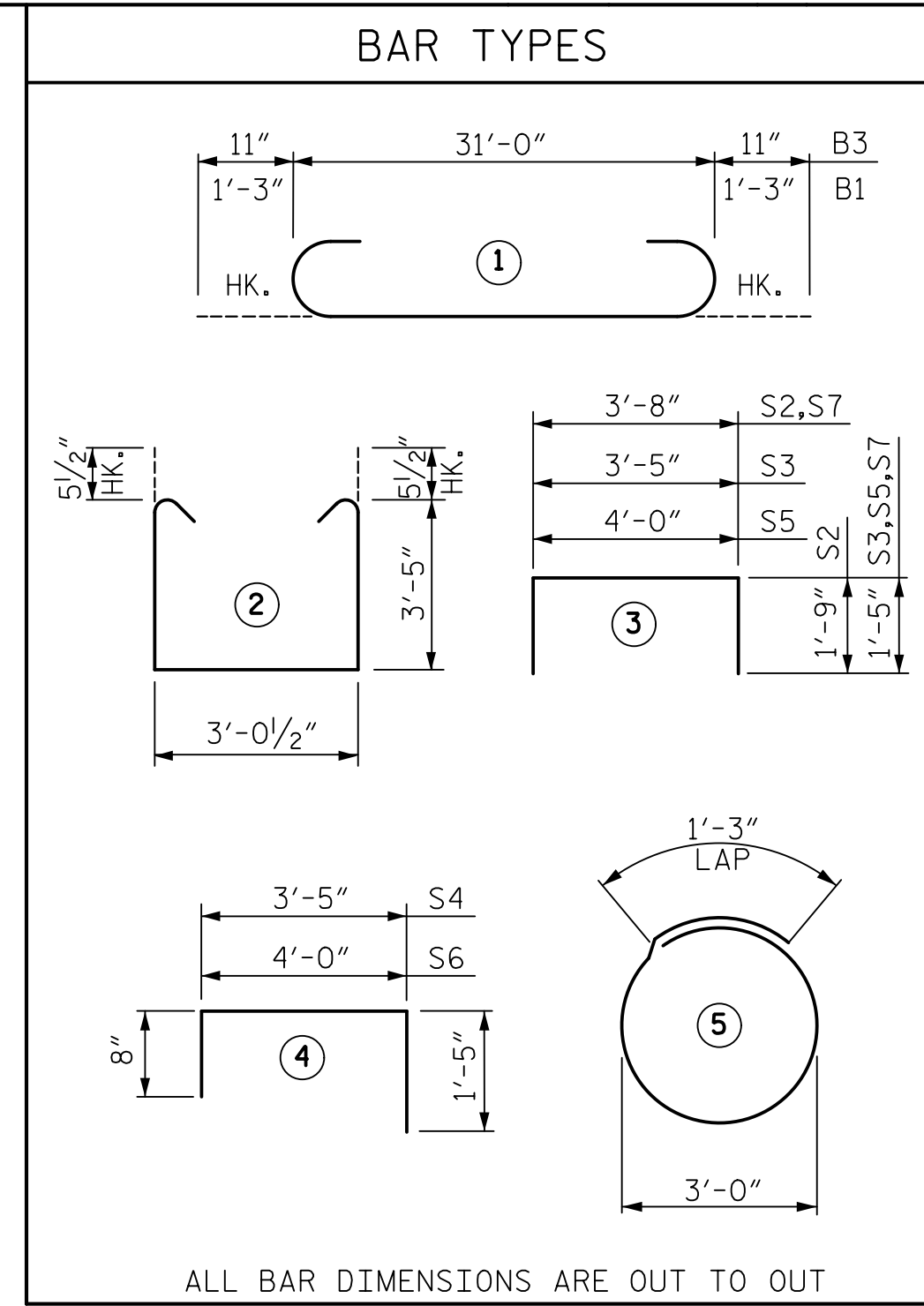
DRAWN BY: B. NELPANE DATE: 6/17
 CHECKED BY: B. EMAMI DATE: 8/17
 DESIGN ENGINEER OF RECORD: J. GREGG DATE: 8/18

DWG. NO. 28

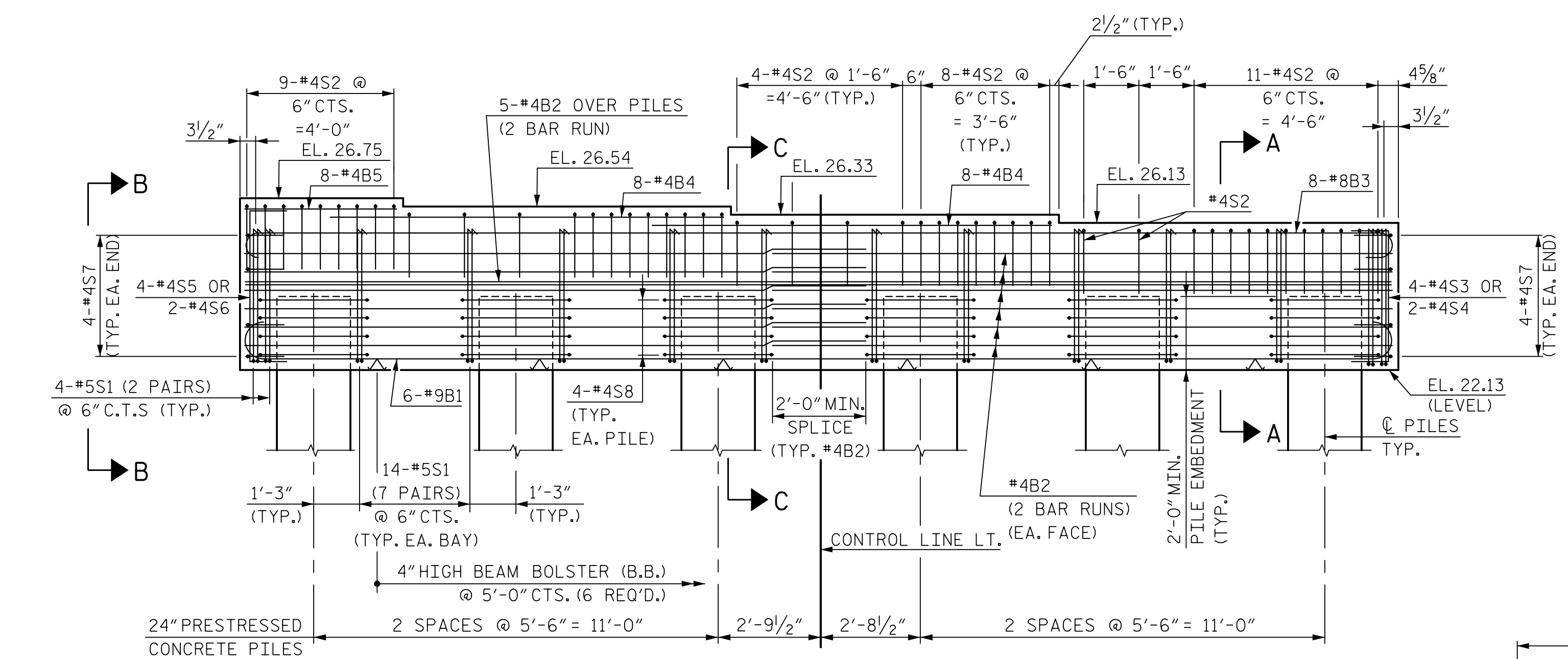
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-28
1			3			TOTAL SHEETS
2			4			39



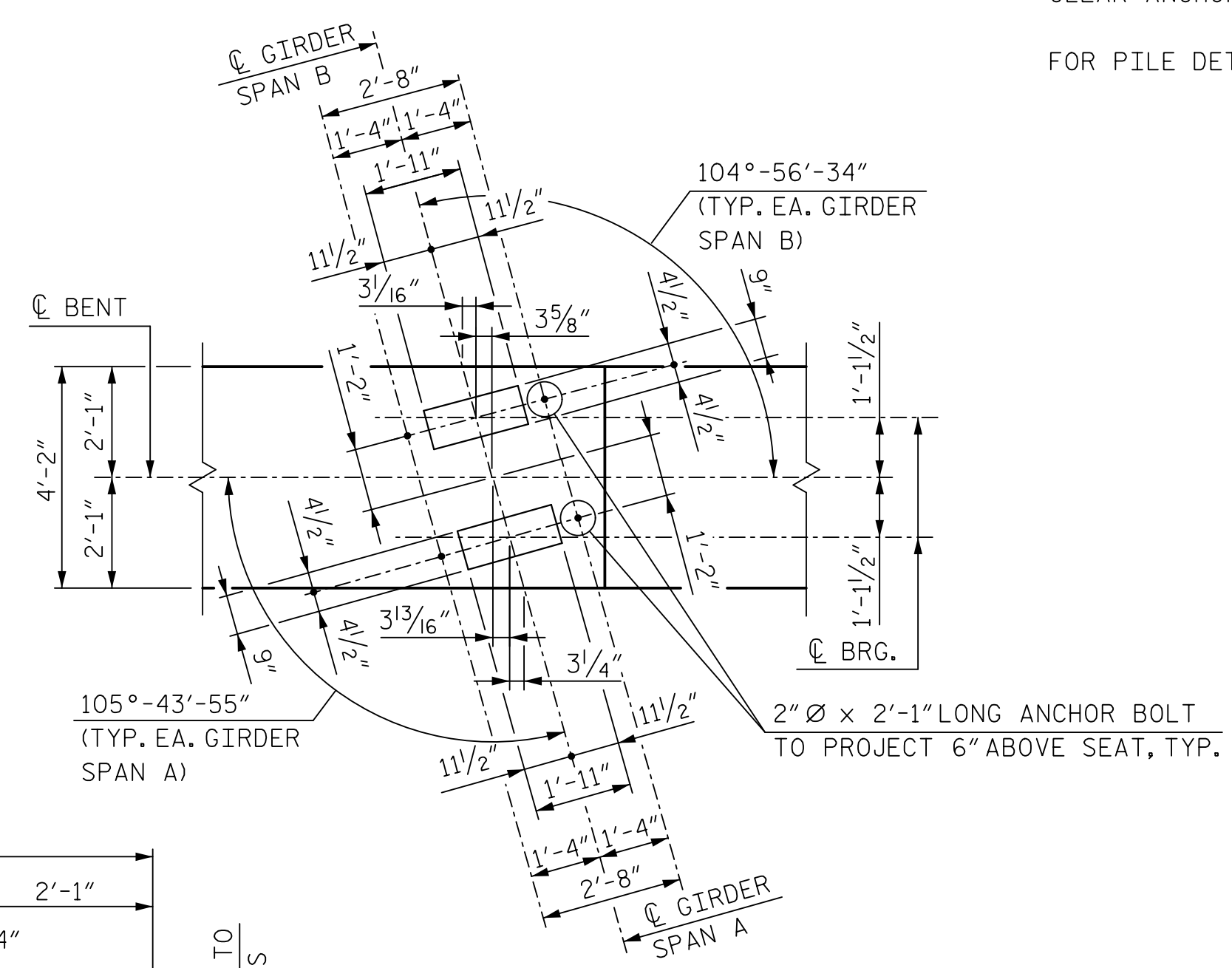
PLAN



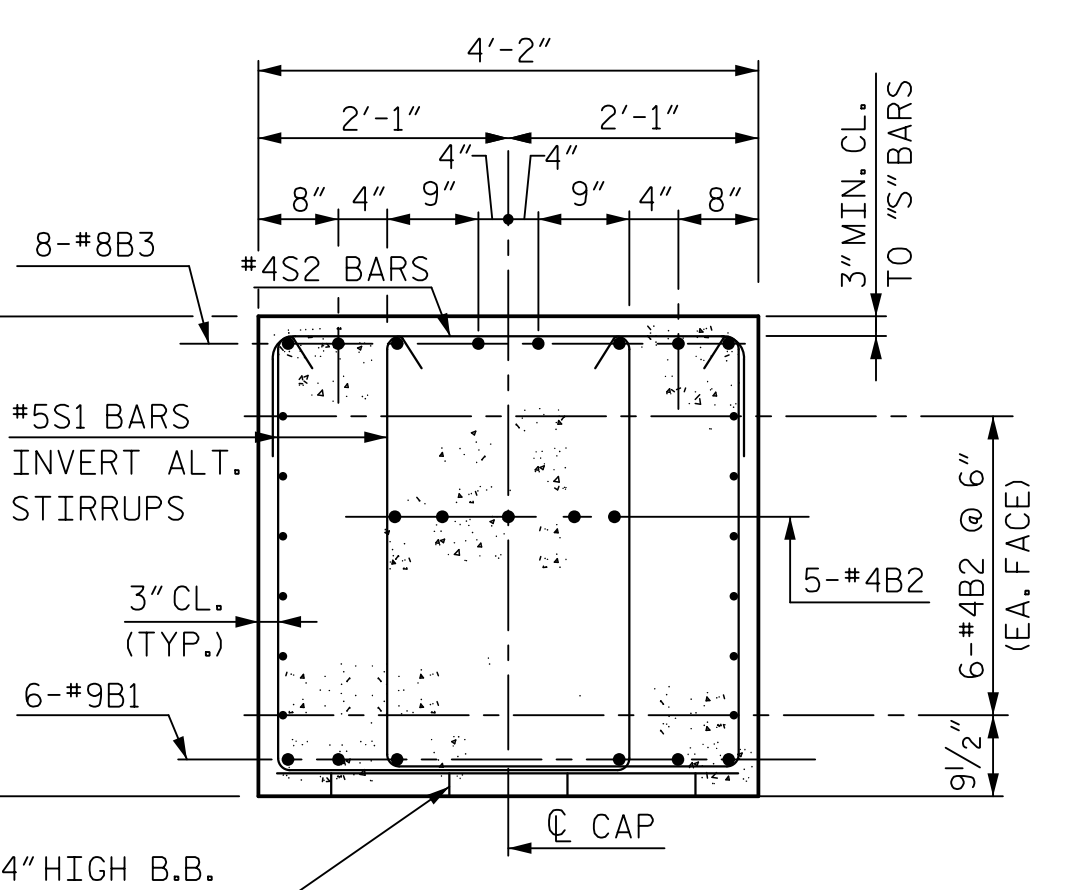
BILL OF REINFORCING						
BENT 1						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	6	9	1	33'-6"	683	
B2	34	4	STR.	16'-6"	375	
B3	8	8	1	32'-10"	701	
B4	16	4	STR.	10'-10"	116	
B5	8	4	STR.	4'-1"	22	
S1	78	5	2	10'-10"	881	
S2	46	4	3	7'-2"	220	
S3	4	4	3	6'-3"	17	
S4	2	4	4	5'-6"	7	
S5	4	4	3	6'-10"	18	
S6	2	4	4	6'-1"	8	
S7	8	4	3	6'-6"	35	
S8	24	4	5	10'-8"	171	
QUANTITIES						
EPOXY COATED REINFORCING STEEL					LBS.	3,254
CLASS AA CONCRETE						
CAP POUR 1					CU. YDS.	18.4
PRESTRESSED CONCRETE PILE					NO.	6
					FEET	630.0



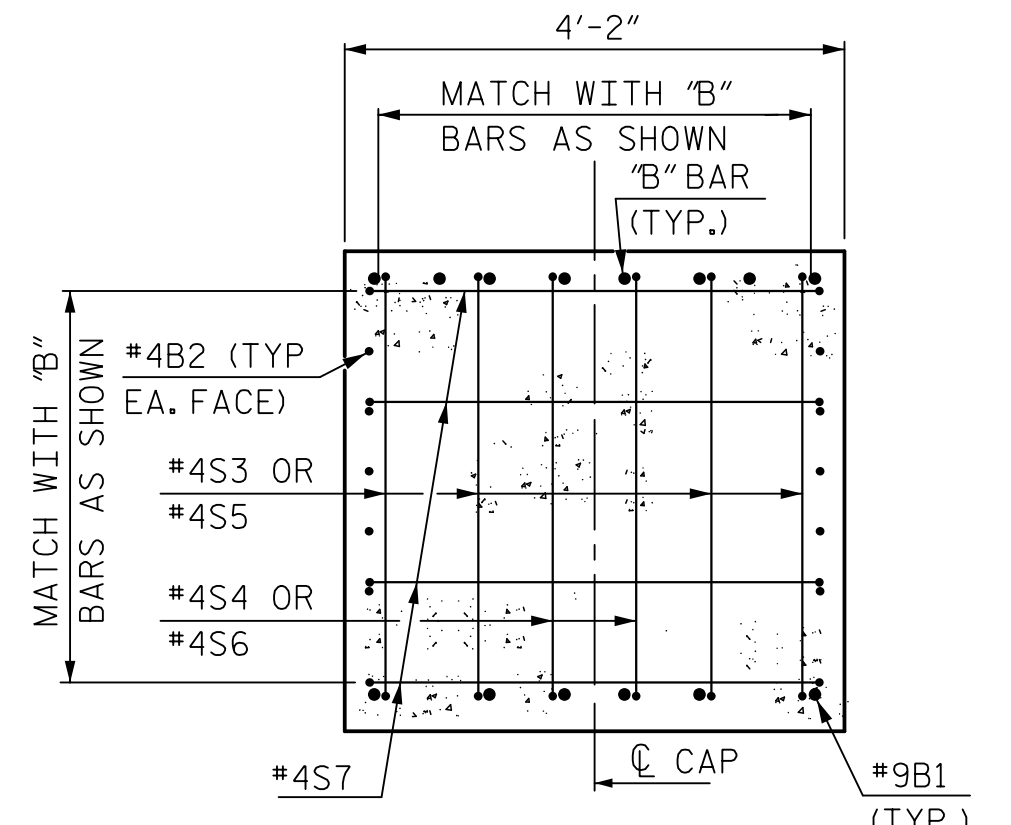
ELEVATION



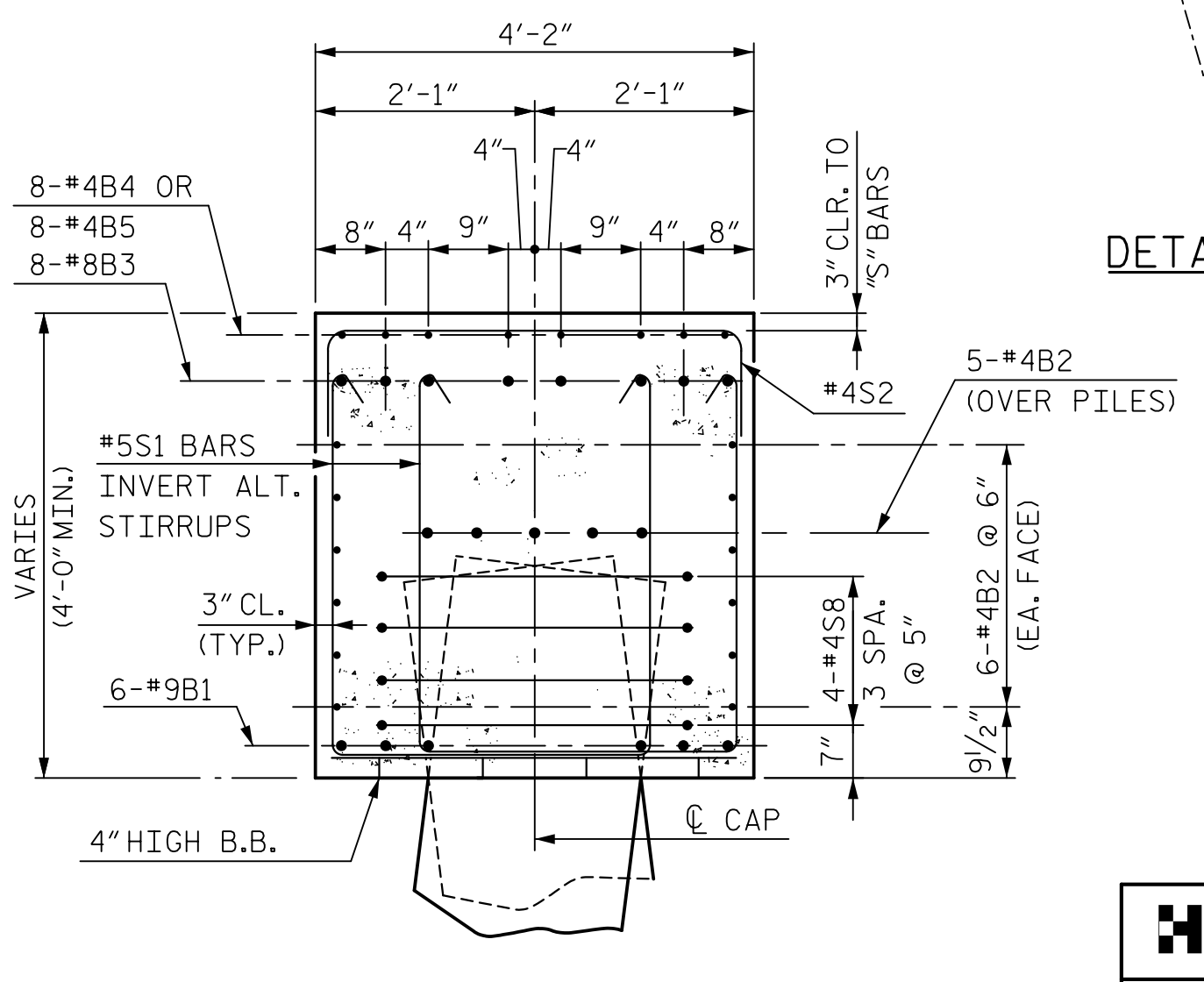
DETAIL A



SECTION A-A



VIEW B-B

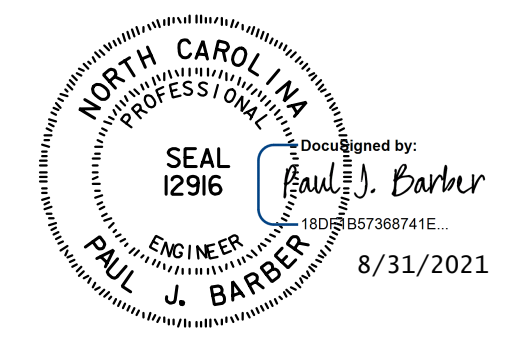


SECTION C-C

NOTES:
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 FOR PILE DETAILS, SEE SHEET S5-34.

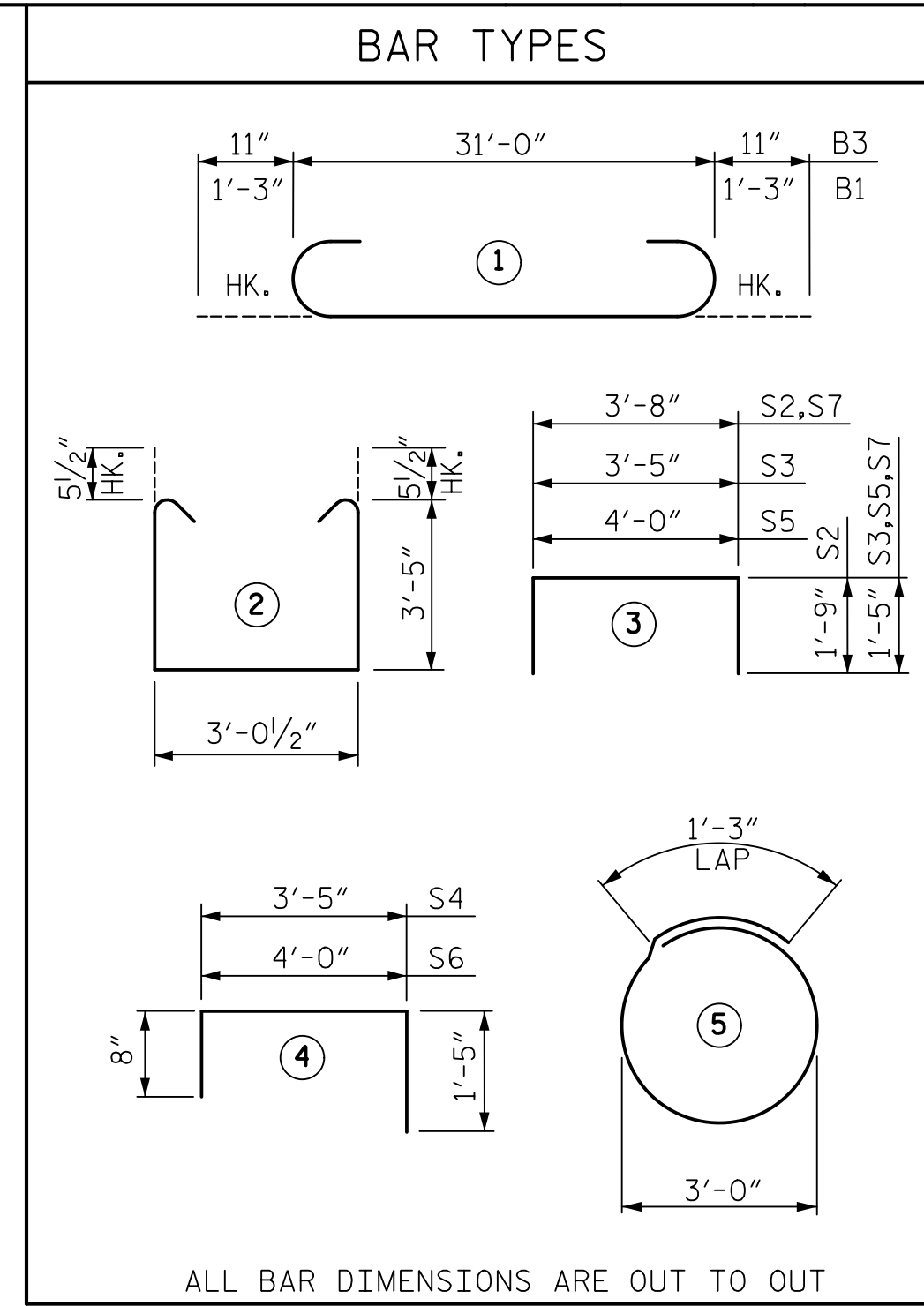
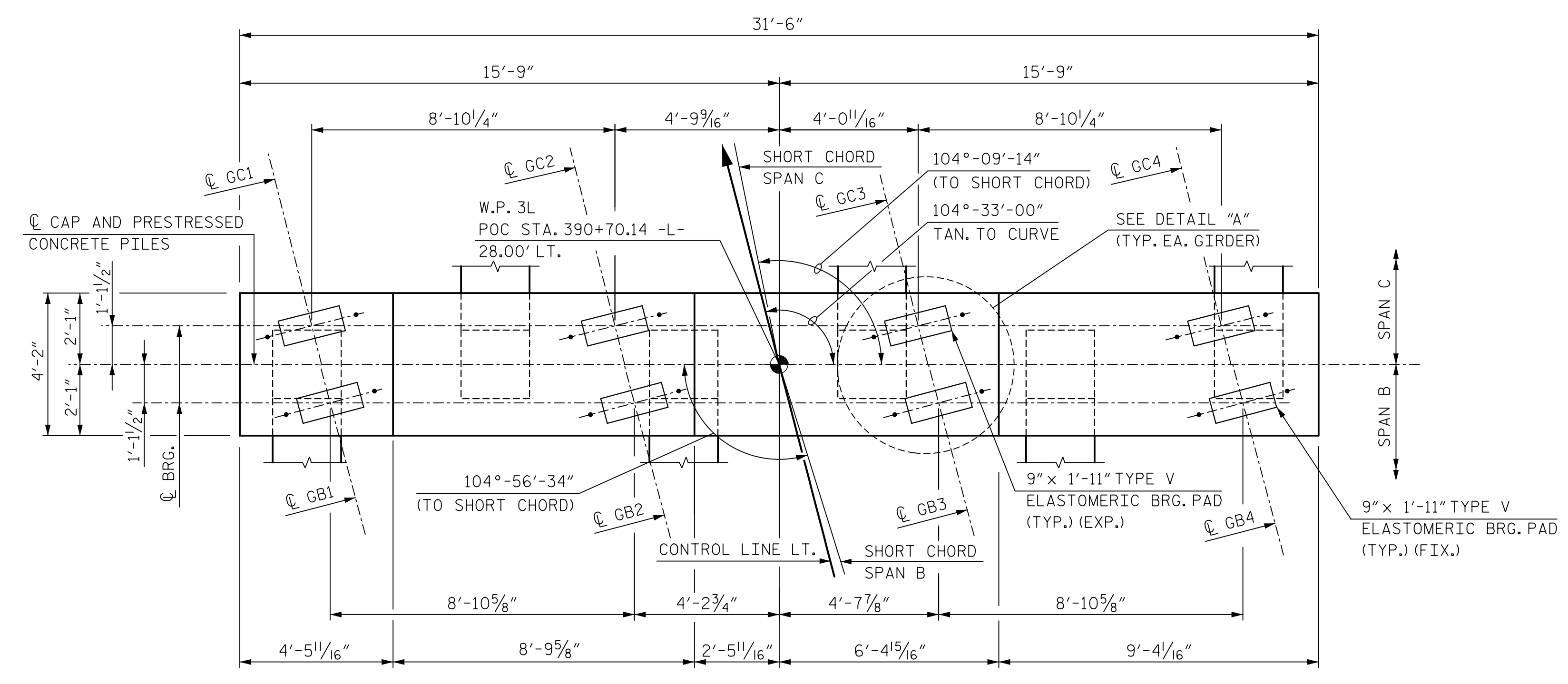
INDICATES 1/2:12 PILE BATTERED IN DIRECTION SHOWN

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-



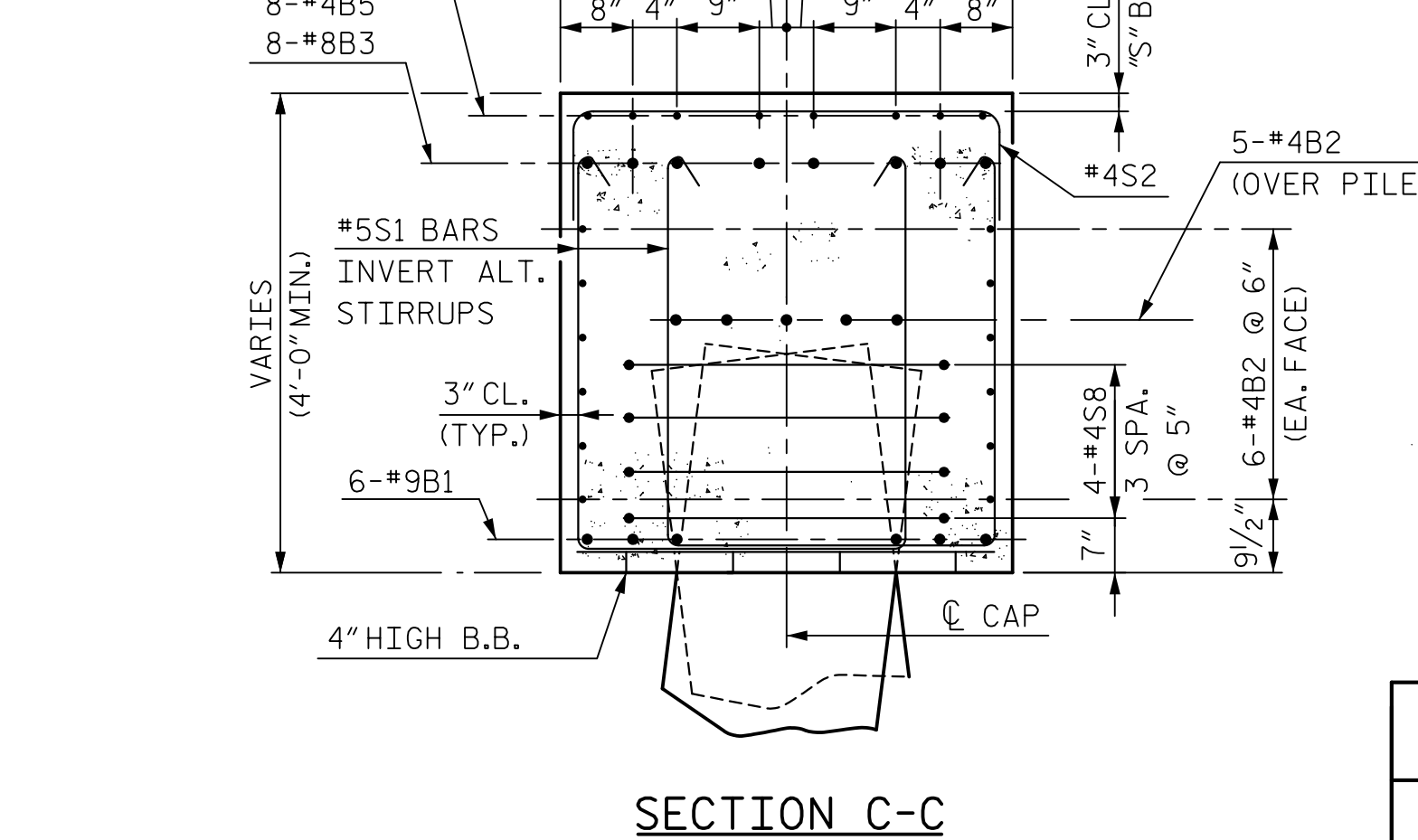
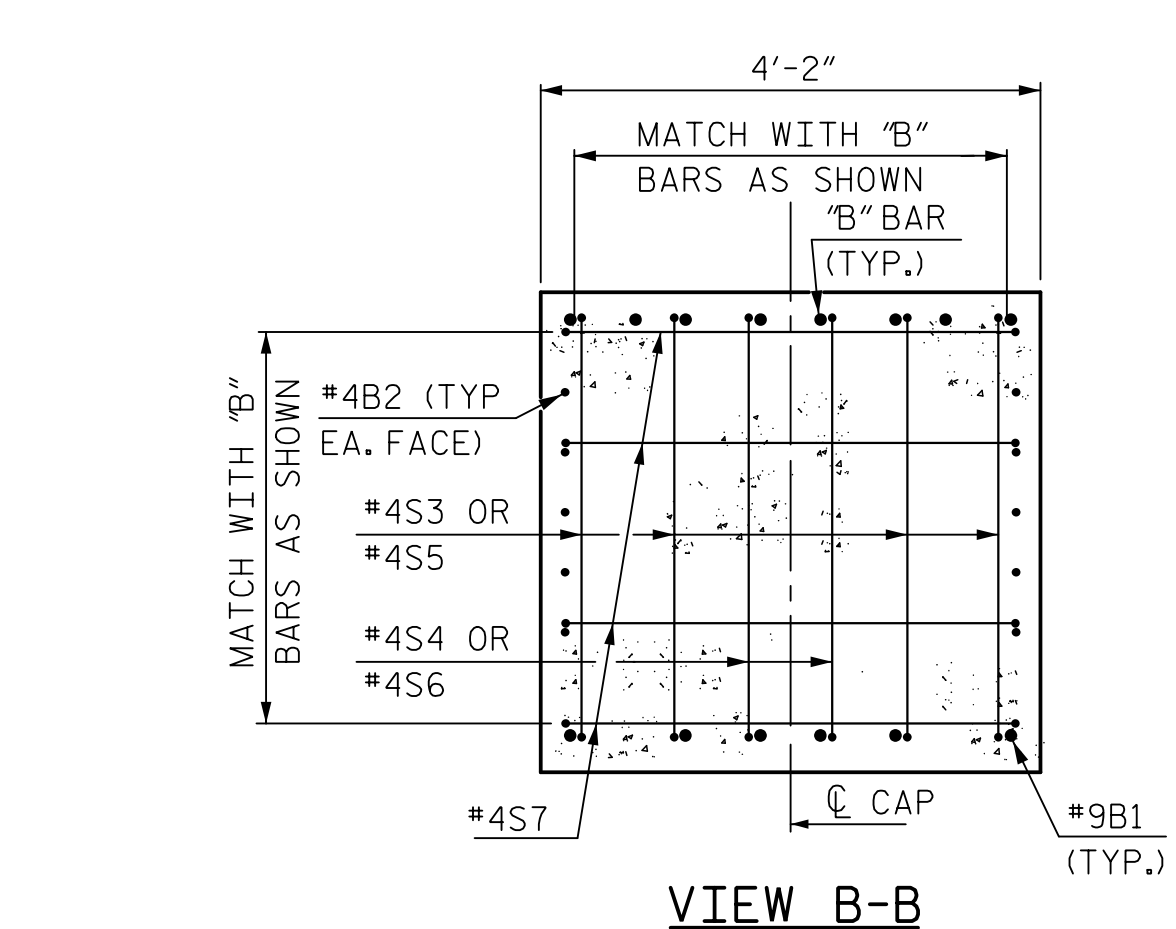
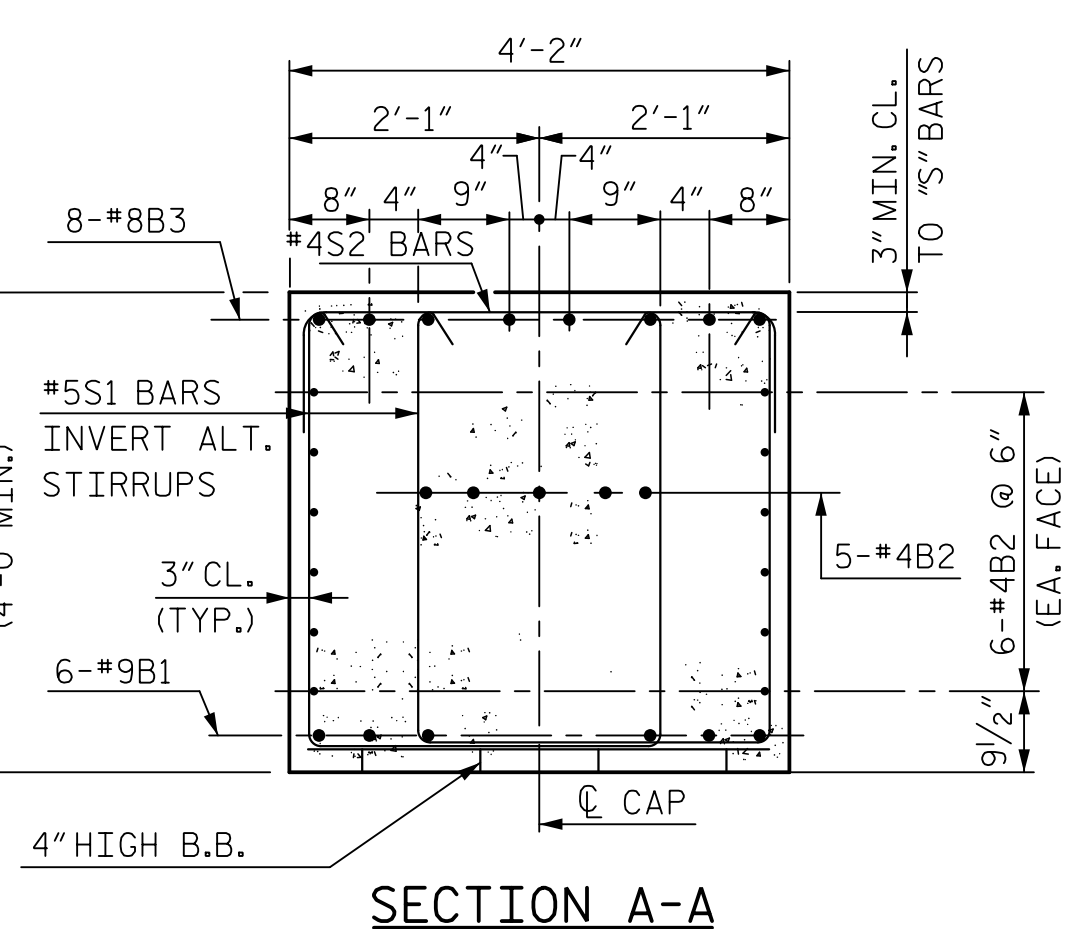
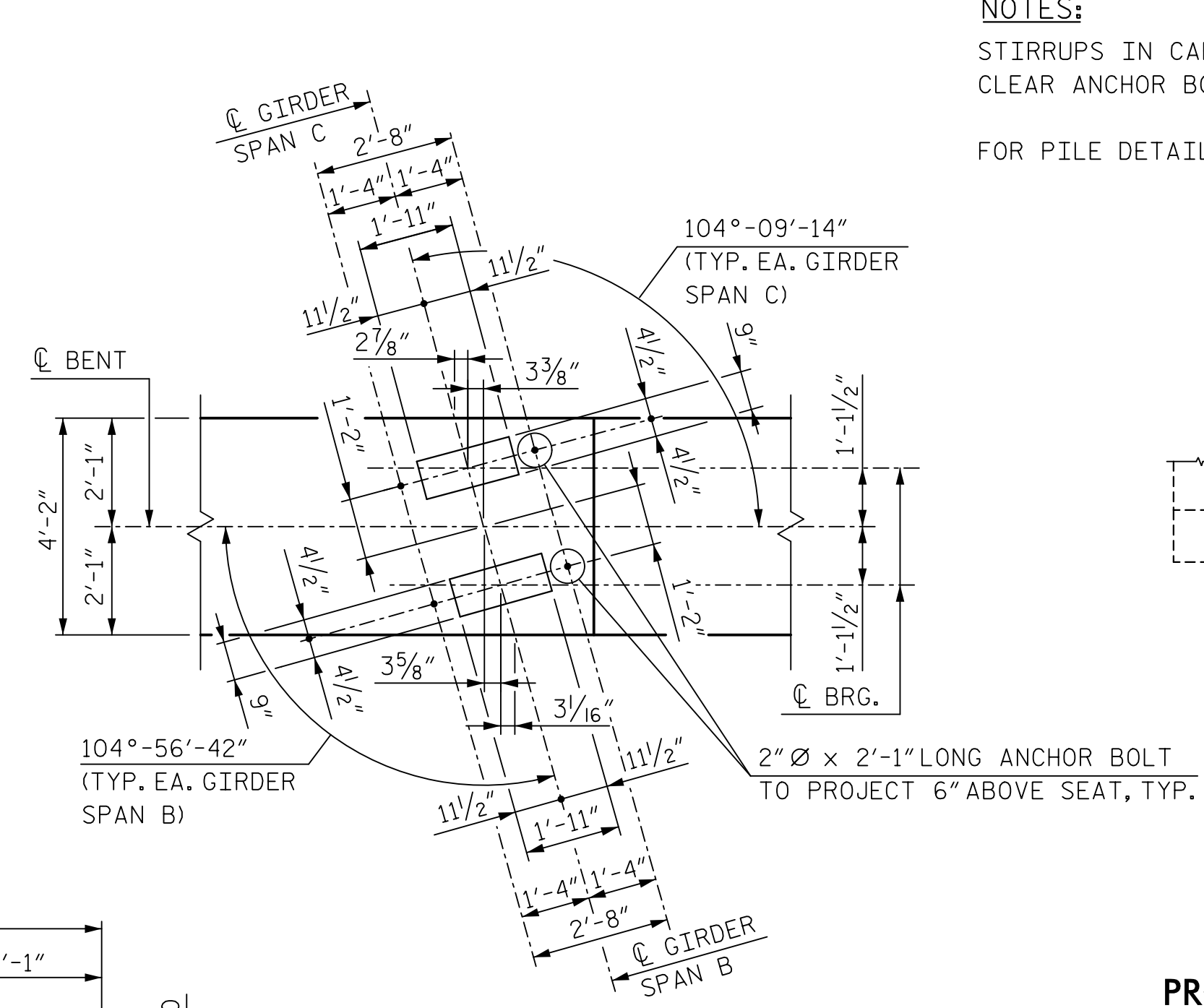
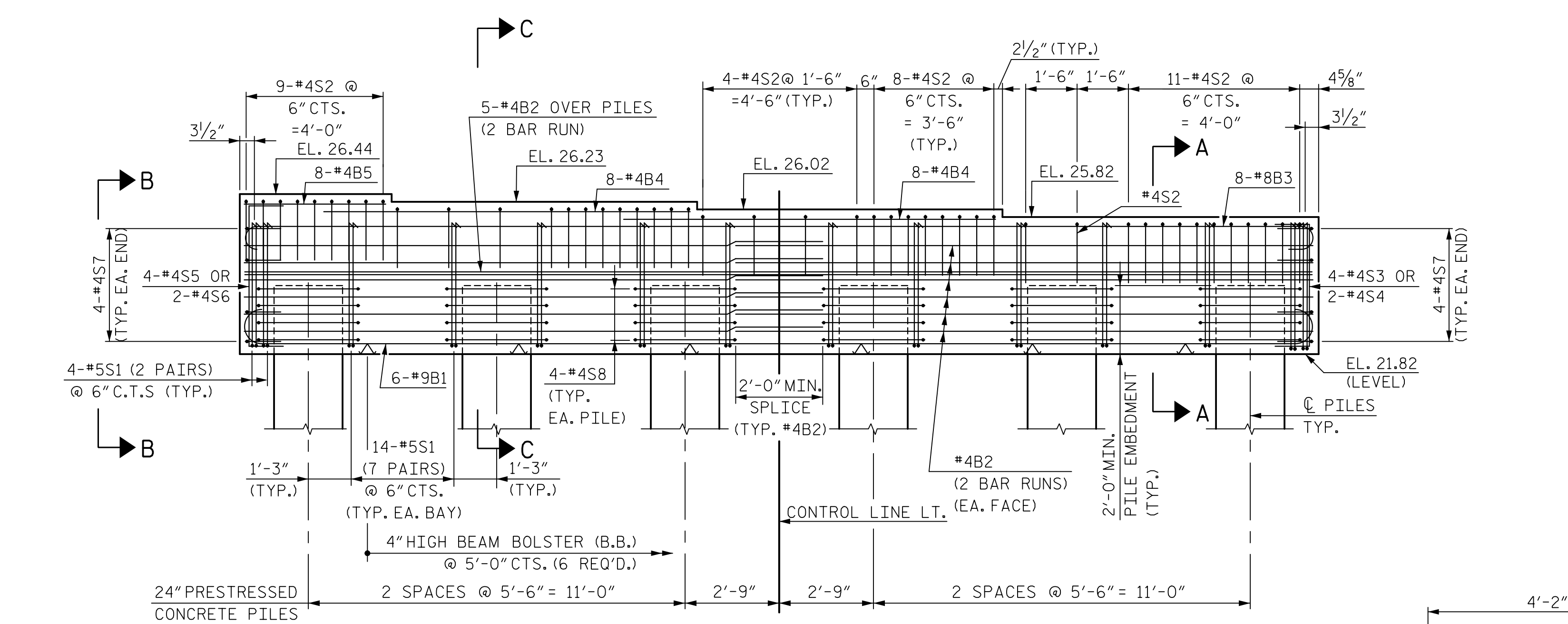
HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
 DRAWN BY: M. WRIGHT DATE: 7/21
 CHECKED BY: P. BARBER DATE: 7/21
 DESIGN ENGINEER OF RECORD: P. BARBER DATE: 7/21
 DWG. NO. 29

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
BENT 1					
LEFT LANE					
REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					S5-29
					TOTAL SHEETS 39



BILL OF REINFORCING					
BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	9	1	33'-6"	683
B2	34	4	STR.	16'-6"	375
B3	8	8	1	32'-10"	701
B4	16	4	STR.	10'-10"	116
B5	8	4	STR.	4'-1"	22
S1	78	5	2	10'-10"	881
S2	46	4	3	7'-2"	220
S3	4	4	3	6'-3"	17
S4	2	4	4	5'-6"	7
S5	4	4	3	6'-10"	18
S6	2	4	4	6'-1"	8
S7	8	4	3	6'-6"	35
S8	24	4	5	10'-8"	171

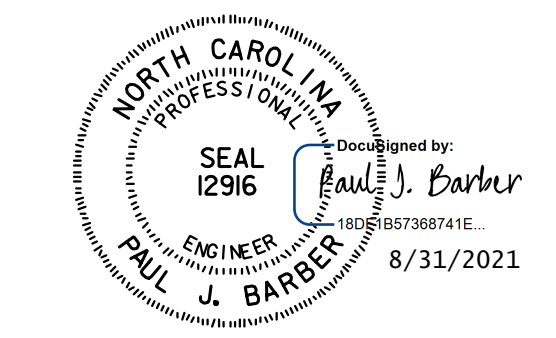
QUANTITIES		
EPOXY COATED REINFORCING STEEL	LBS.	3,254
CLASS AA CONCRETE		
CAP POUR 1	CU. YDS.	18.4
PRESTRESSED CONCRETE PILE	NO.	6
	FEET	630.0



NOTES:
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 FOR PILE DETAILS, SEE SHEET S5-34.

INDICATES 1/2:12 PILE BATTERED IN DIRECTION SHOWN

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

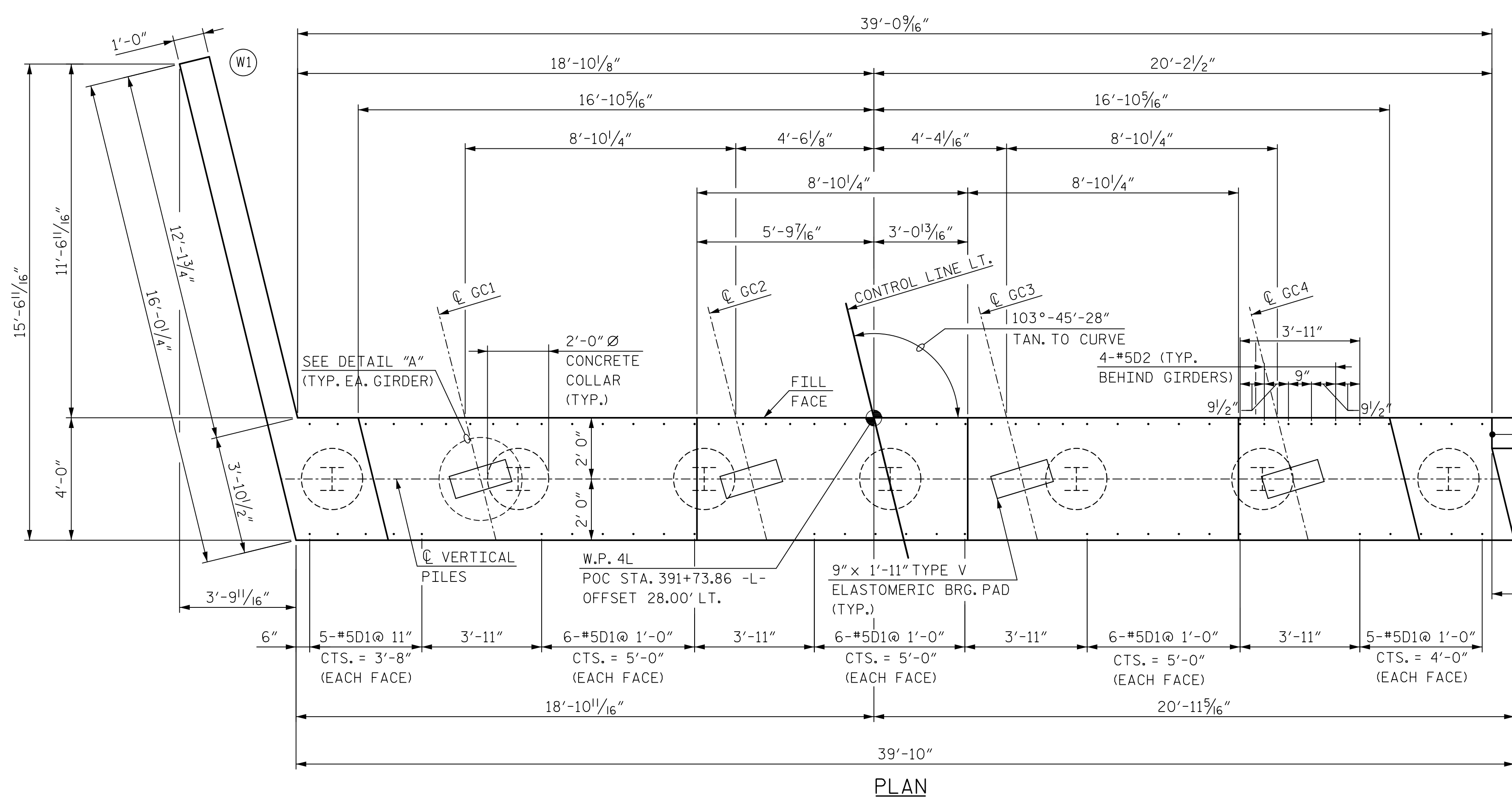


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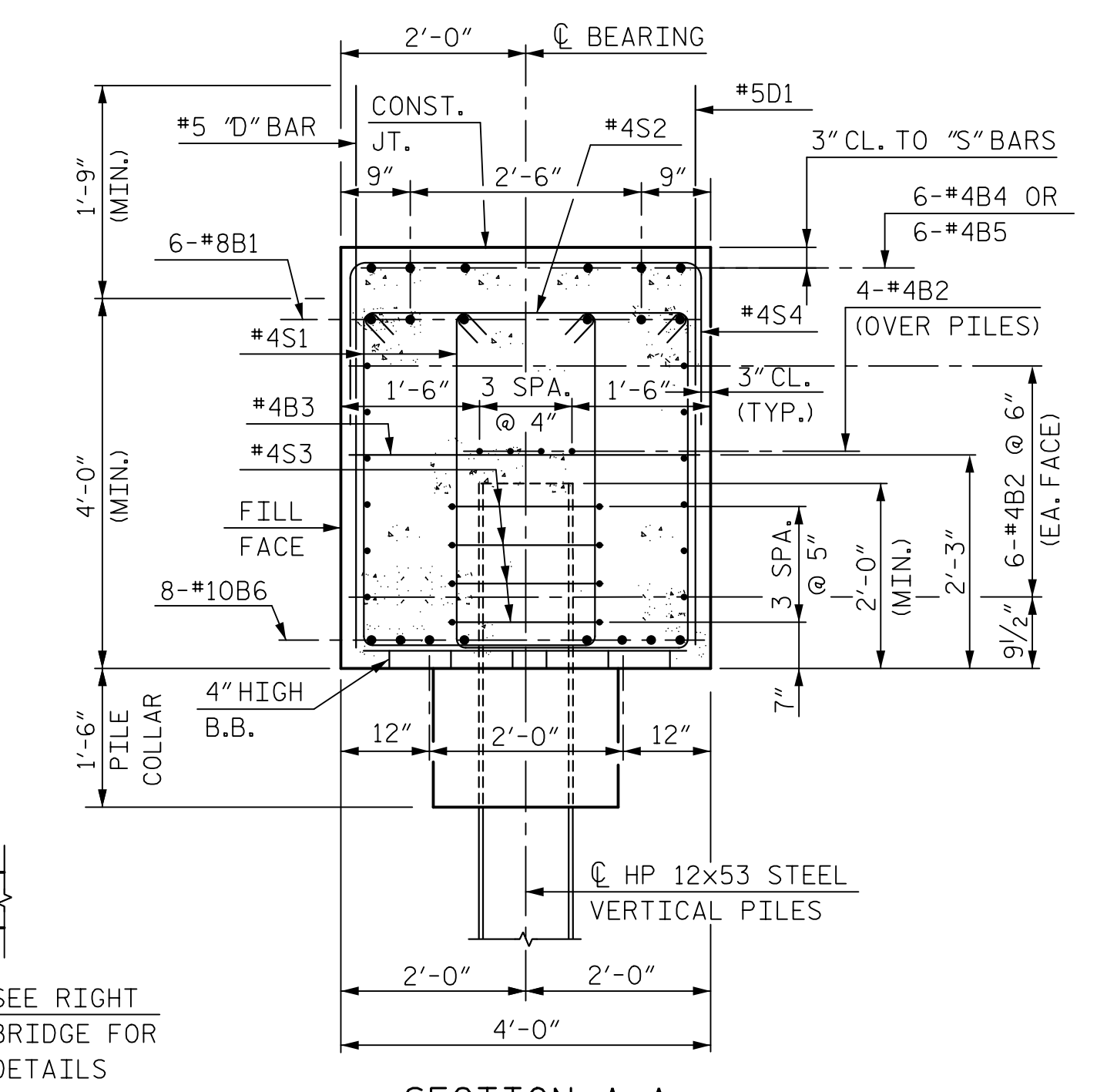
DRAWN BY: M. WRIGHT DATE: 7/21
 CHECKED BY: P. BARBER DATE: 7/21
 DESIGN ENGINEER OF RECORD: P. BARBER DATE: 7/21

DWG. NO. 30

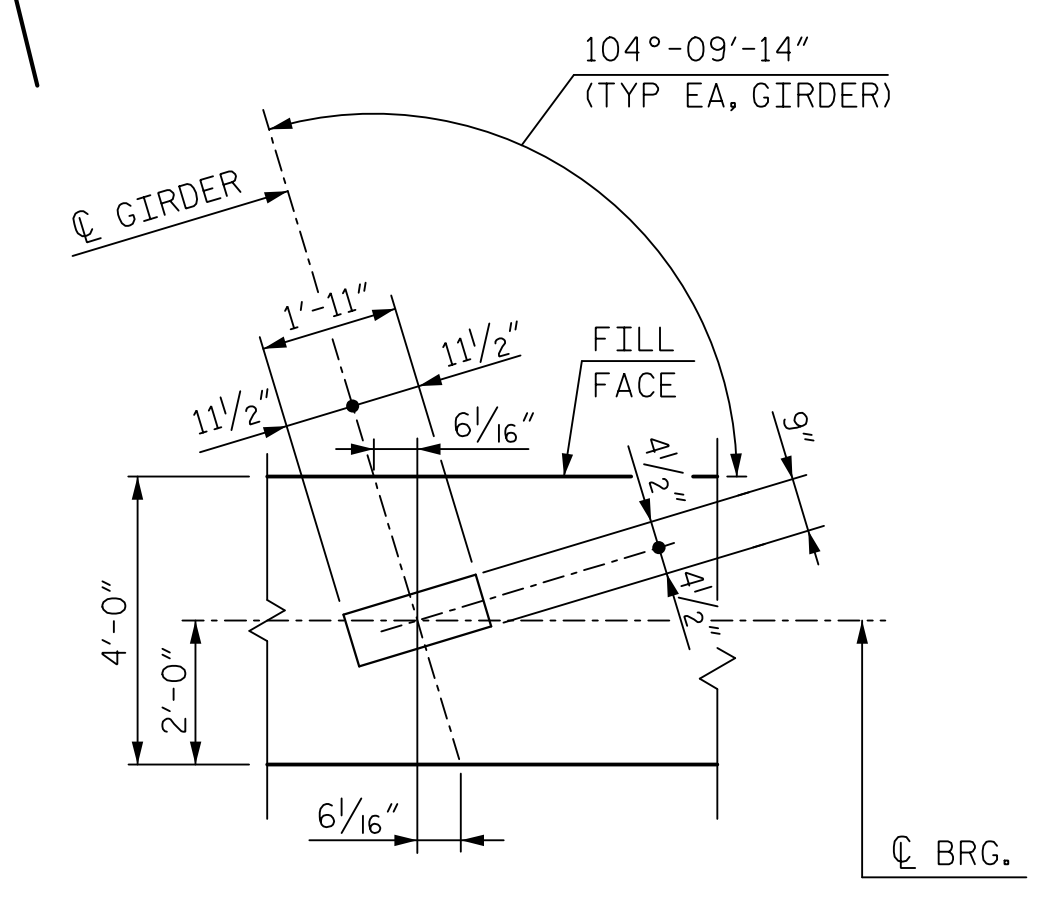
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE					
BENT 2					
LEFT LANE					
REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					S5-30
					TOTAL SHEETS 39



PLAN



SECTION A-A

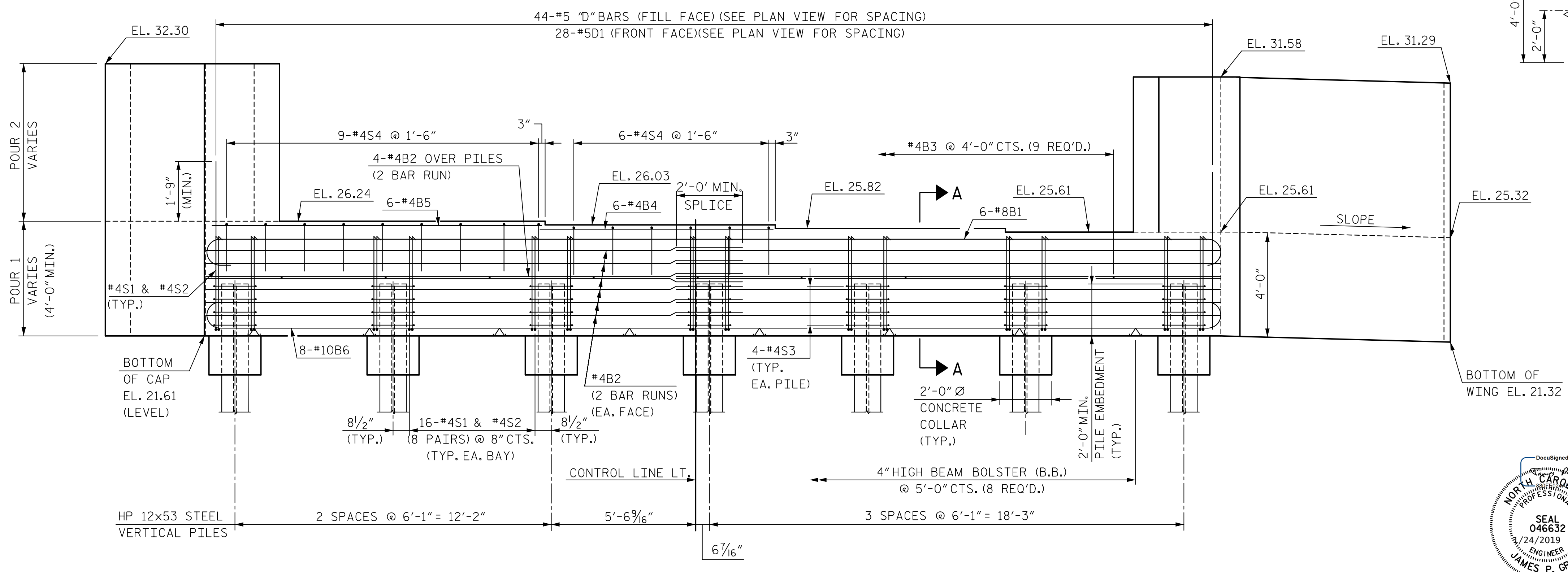


DETAIL A

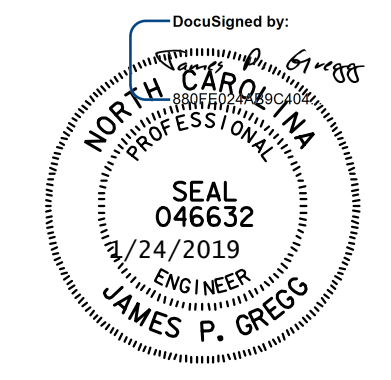
NOTES:
 FOR NOTES, SEE SHEET 3 OF 3.
 FOR WINGWALLS DETAILS, SEE SHEET 2 OF 3.

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 3 OF 3



ELEVATION

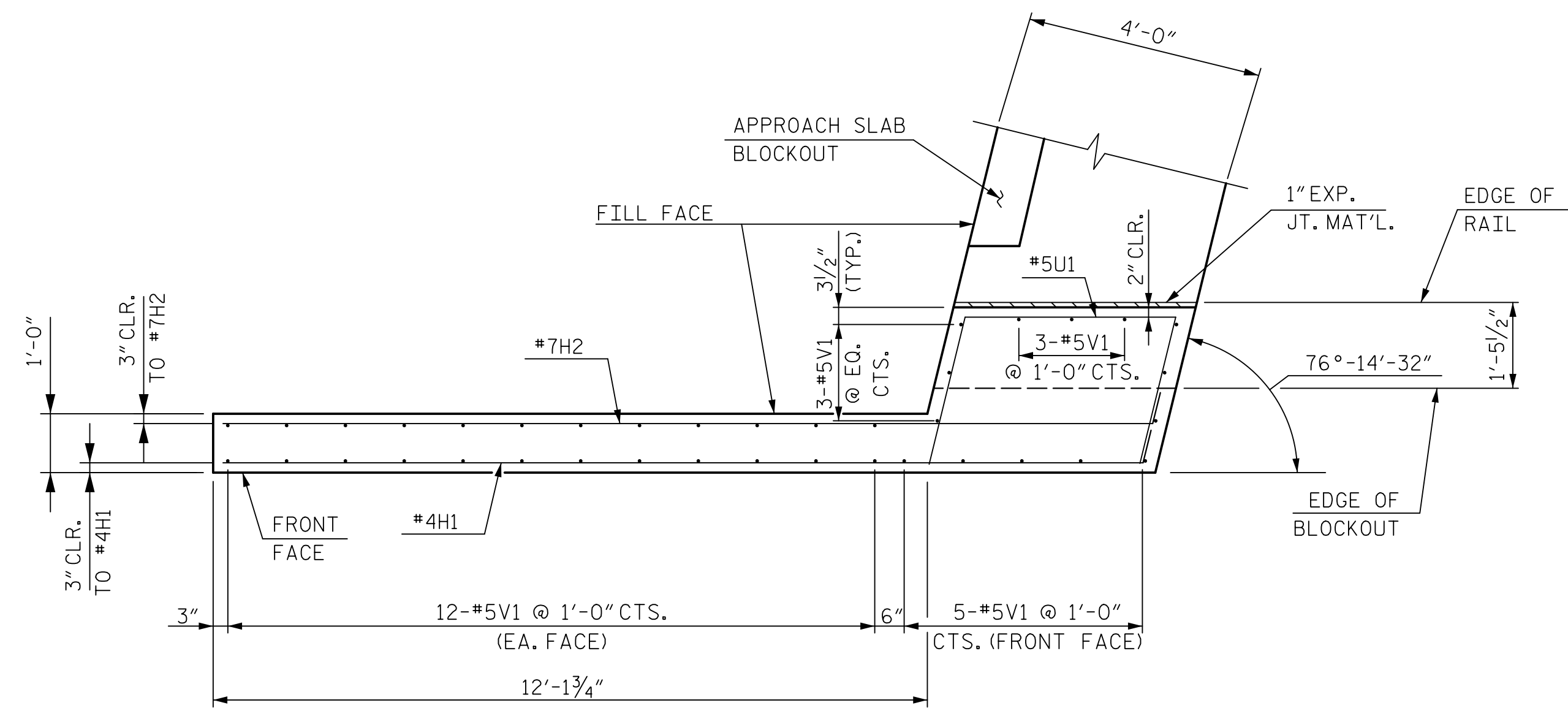


HNTB HNTB NORTH CAROLINA, P.C.
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 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

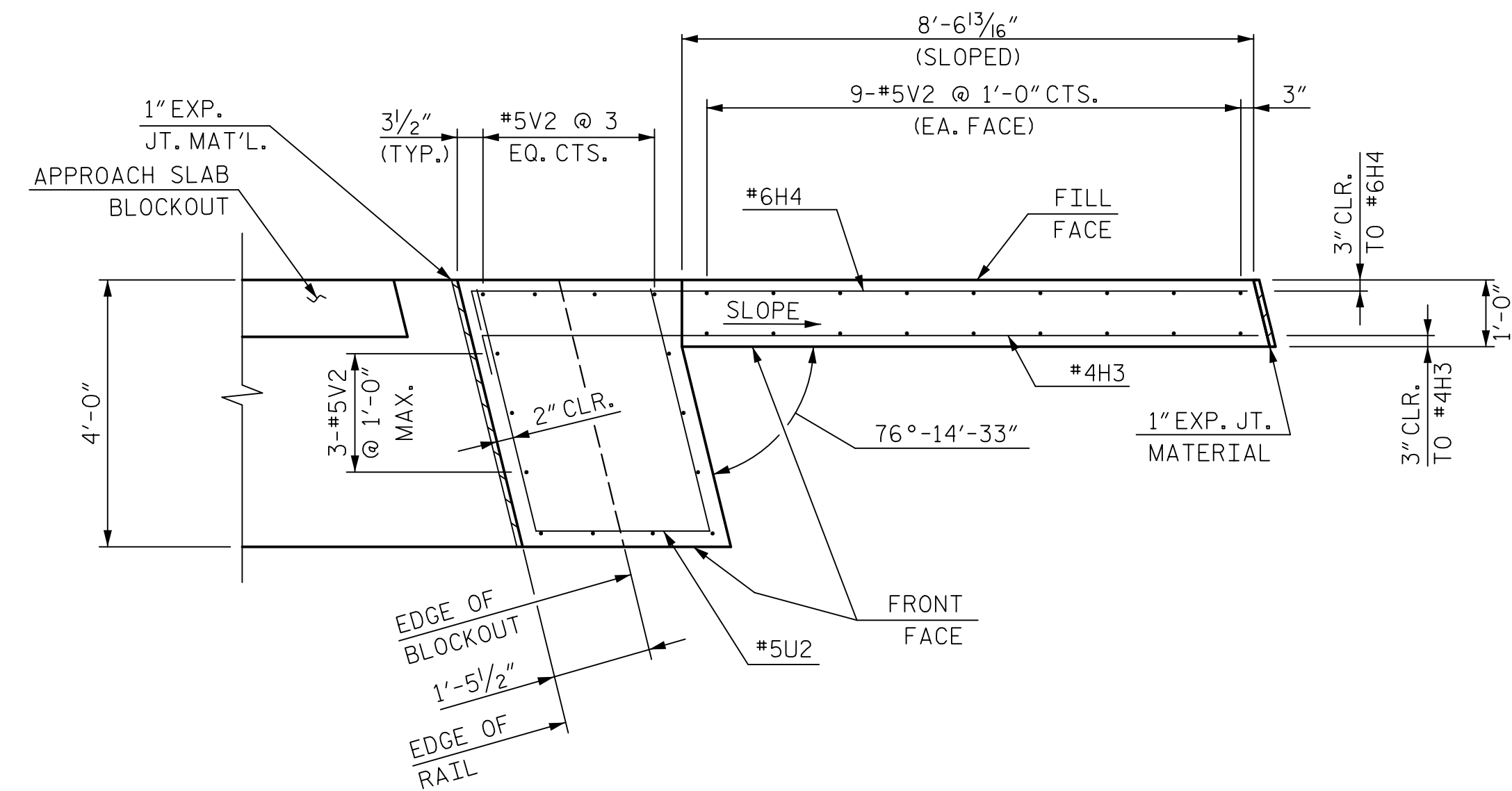
DRAWN BY: A. SMITH DATE: 6/17
 CHECKED BY: B. EMAMI DATE: 8/17
 DESIGN ENGINEER OF RECORD: J. GREGG DATE: 8/18

DWG. NO. 31

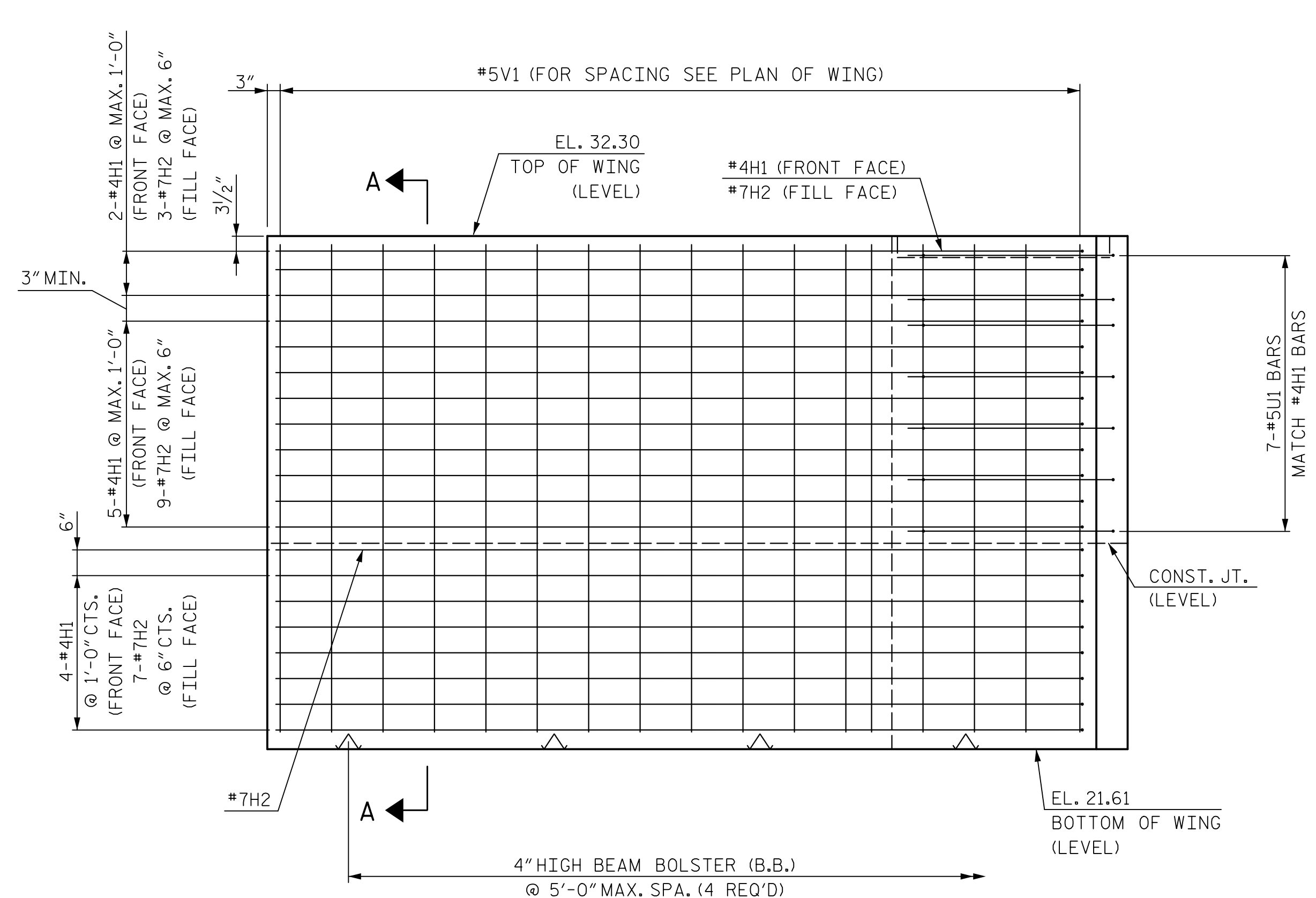
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE END BENT 2 LEFT LANE					
SHEET NO. S5-31					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
					TOTAL SHEETS 39



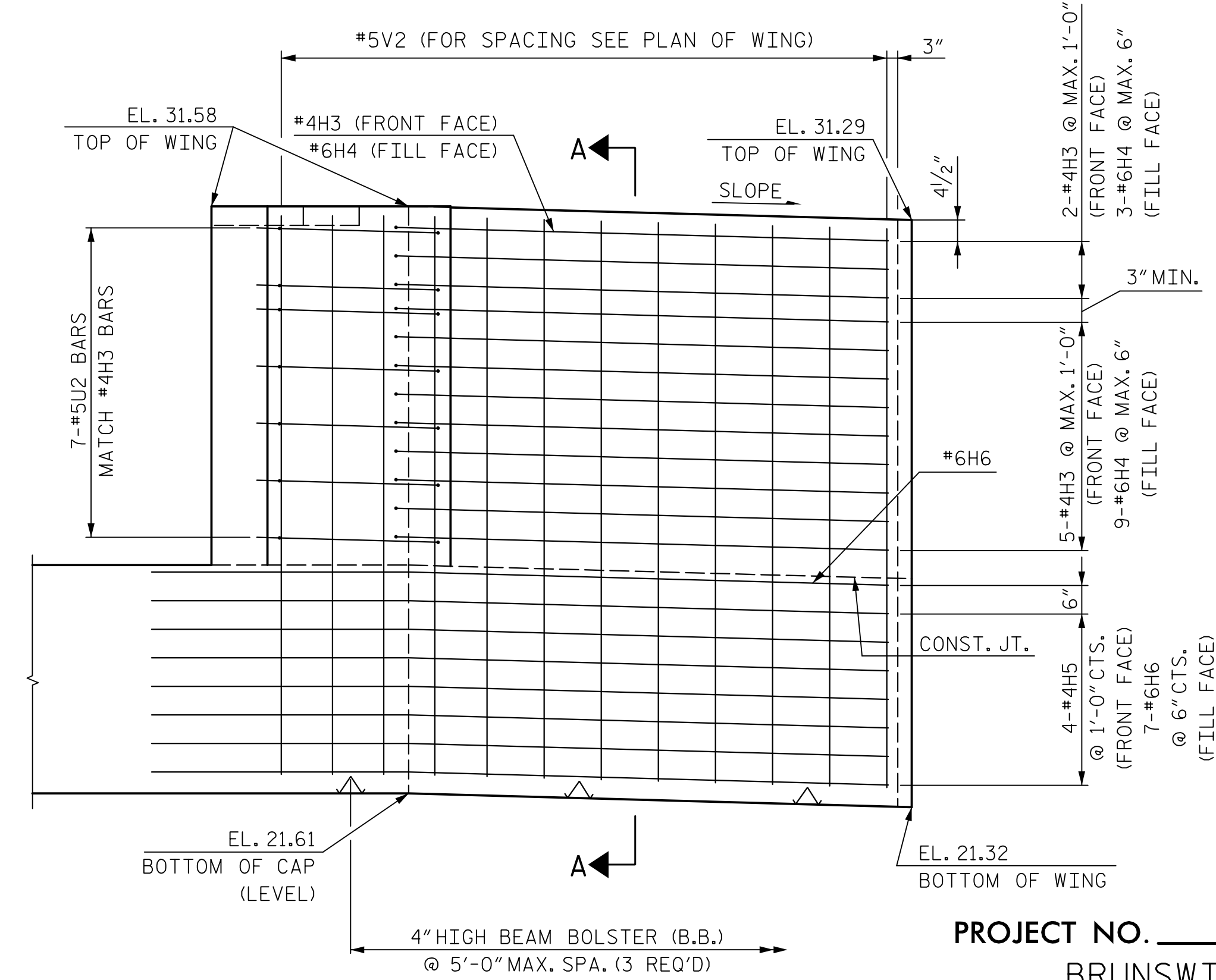
PLAN OF LEFT WING (W1)



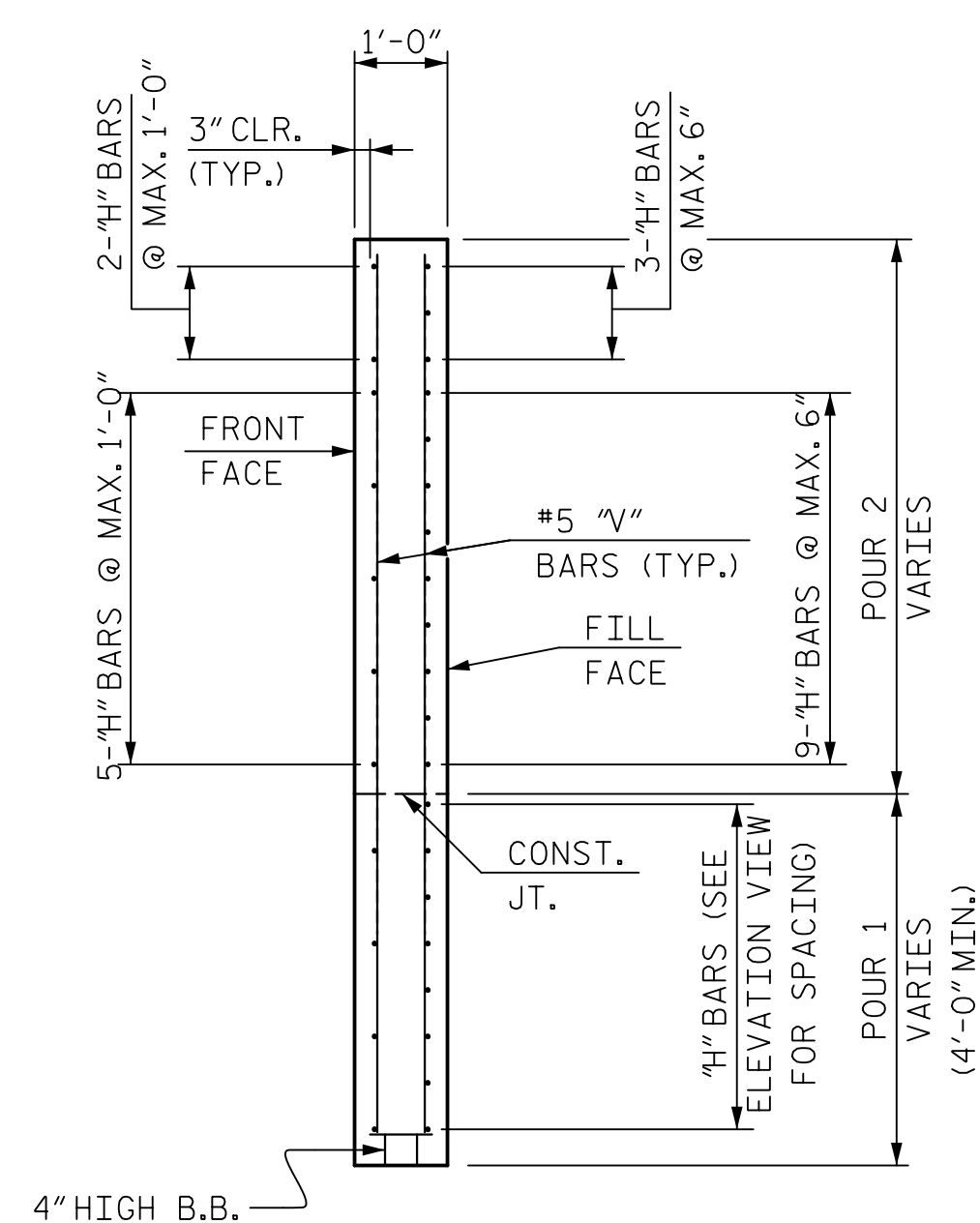
PLAN OF RIGHT WING (W2)



ELEVATION OF LEFT WING (W1)



ELEVATION OF RIGHT WING (W2)



SECTION A-A

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 2 OF 3

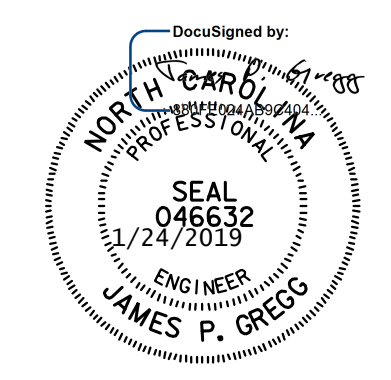
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 2
 LEFT LANE

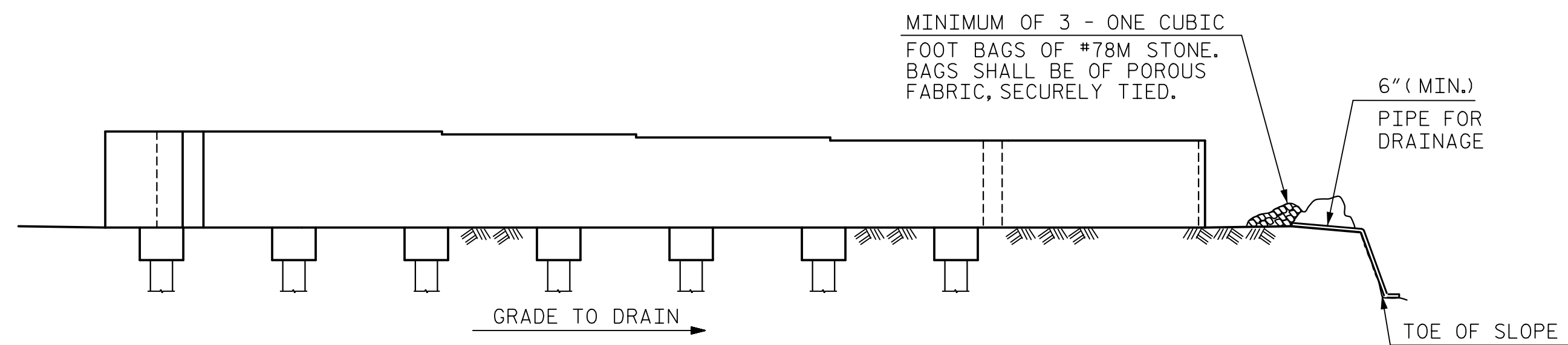
HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

Drawn by: A. SMITH DATE: 6/17
 Checked by: B. EMAMI DATE: 8/17
 Design Engineer of Record: J. GREGG DATE: 8/18

DWG. NO. 32



REVISIONS						SHEET NO.	
NO.	BY	DATE	NO.	BY	DATE	S5-32	
1			3			TOTAL SHEETS	
2			4			39	

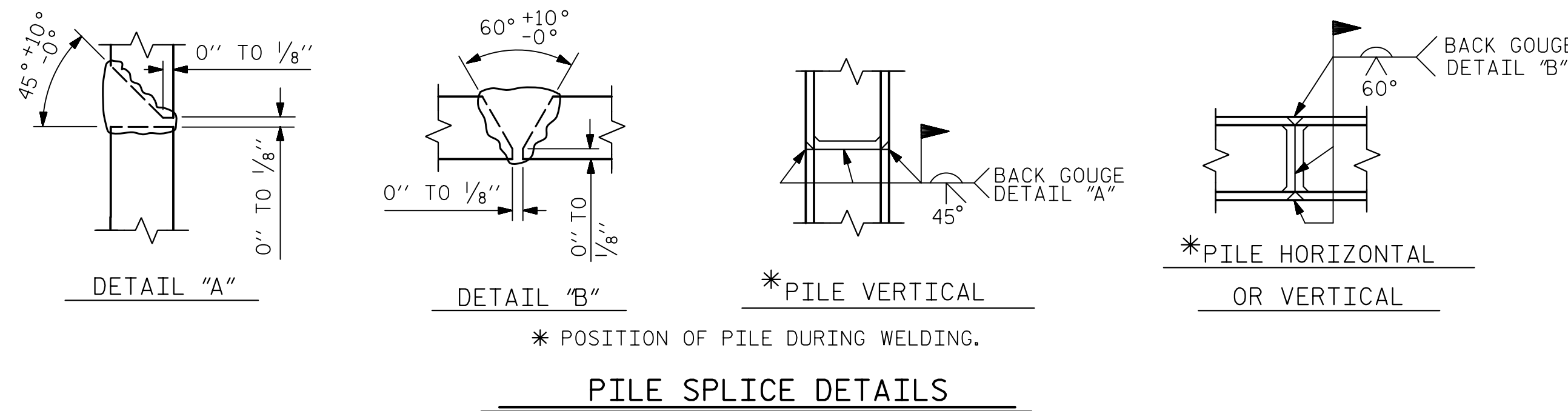


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

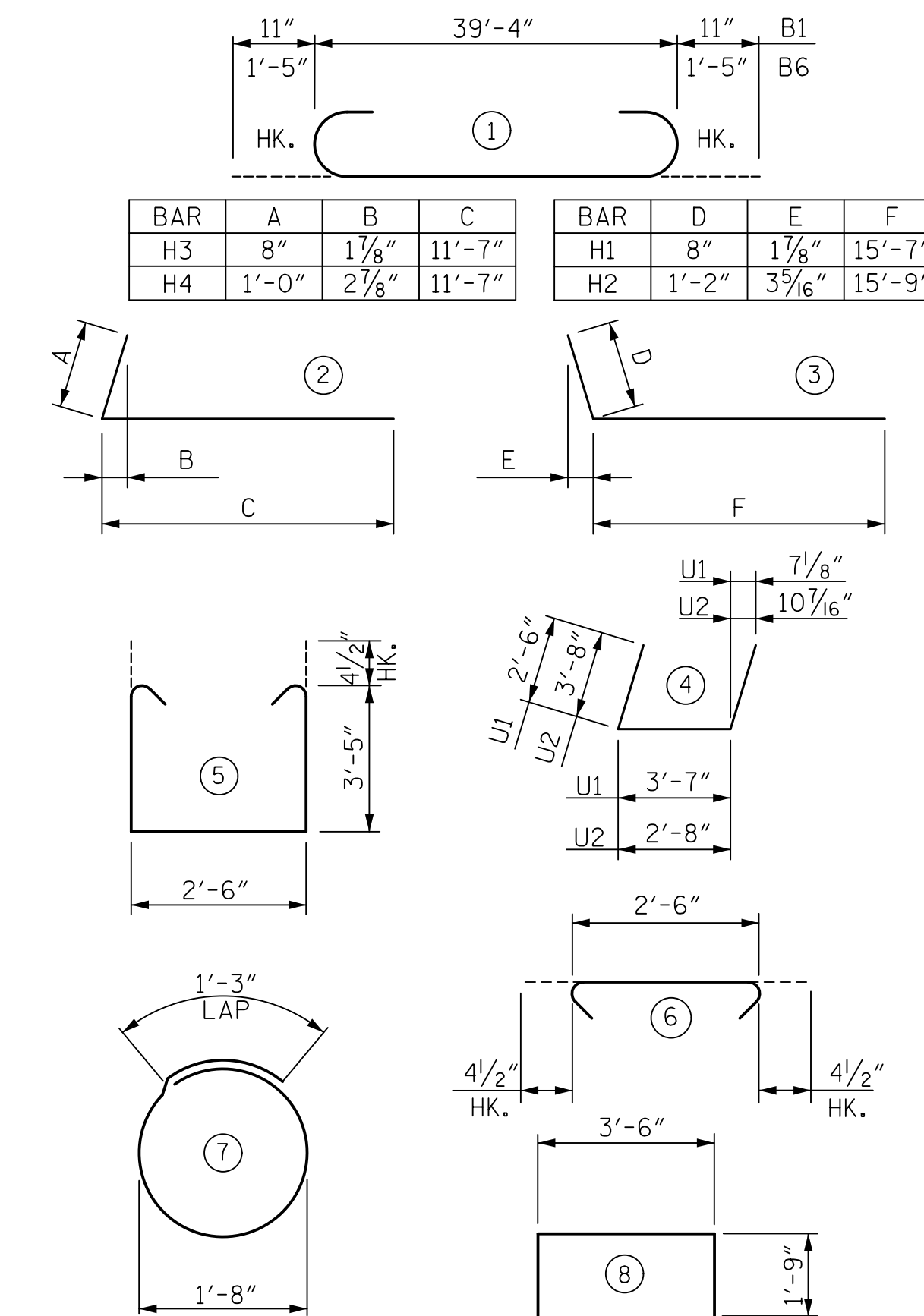
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 2



PILE SPLICE DETAILS

BAR TYPES



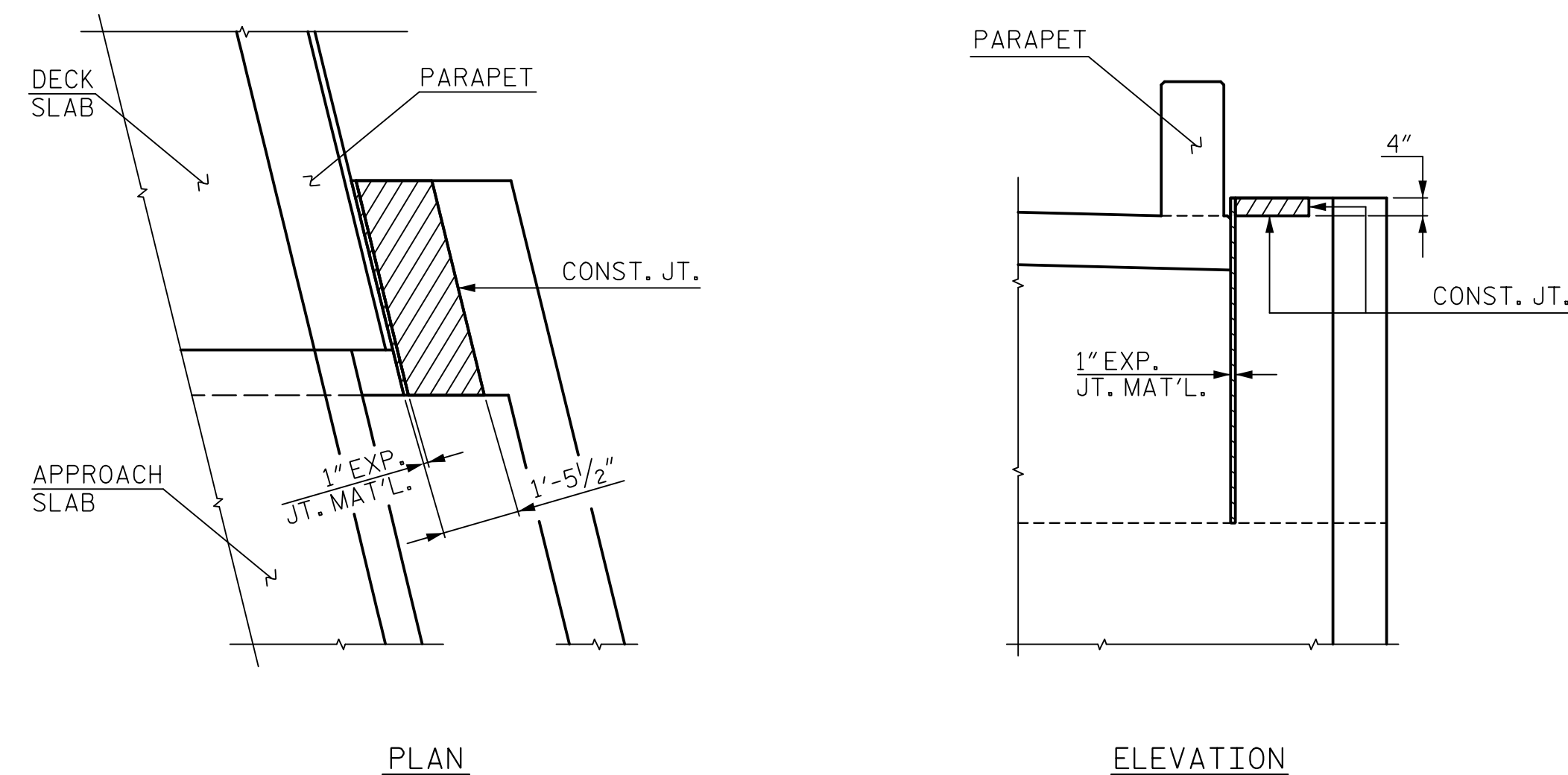
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING

END BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#8	1	41'-2"	659
B2	32	#4	STR.	20'-11"	447
B3	9	#4	STR.	3'-6"	21
B4	6	#4	STR.	9'-0"	36
B5	6	#4	STR.	12'-7"	50
B6	8	#10	1	42'-2"	1,452
D1	56	#5	STR.	6'-5"	375
D2	16	#5	STR.	8'-3"	138
H1	11	#4	3	16'-3"	119
H2	20	#7	3	16'-11"	692
H3	7	#4	2	12'-3"	57
H4	12	#6	2	12'-7"	227
H5	4	#4	STR.	13'-0"	35
H6	8	#6	STR.	12'-9"	153
S1	100	#4	5	10'-1"	674
S2	100	#4	6	3'-3"	217
S3	28	#4	7	6'-6"	122
S4	15	#4	8	7'-0"	70
V1	38	#5	STR.	10'-1"	400
V2	32	#5	STR.	9'-5"	314
U1	7	#5	4	8'-7"	63
U2	7	#5	4	10'-0"	73
QUANTITIES					
EPOXY COATED REINFORCING STEEL	LBS.	6,394			
CLASS AA CONCRETE BREAKDOWN					
POUR 1 - CAP	CU. YDS.	30.3			
POUR 2 - WINGS	CU. YDS.	10.0			
TOTAL:	CU. YDS.	40.3			
HP 12x53 STEEL PILES	NO.	7			
	LIN. FT.	560			

NOTES:

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



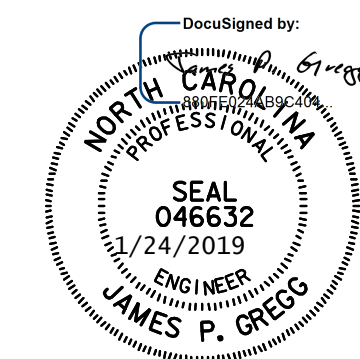
BLOCKOUT IN WINGWALL

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 3 OF 3

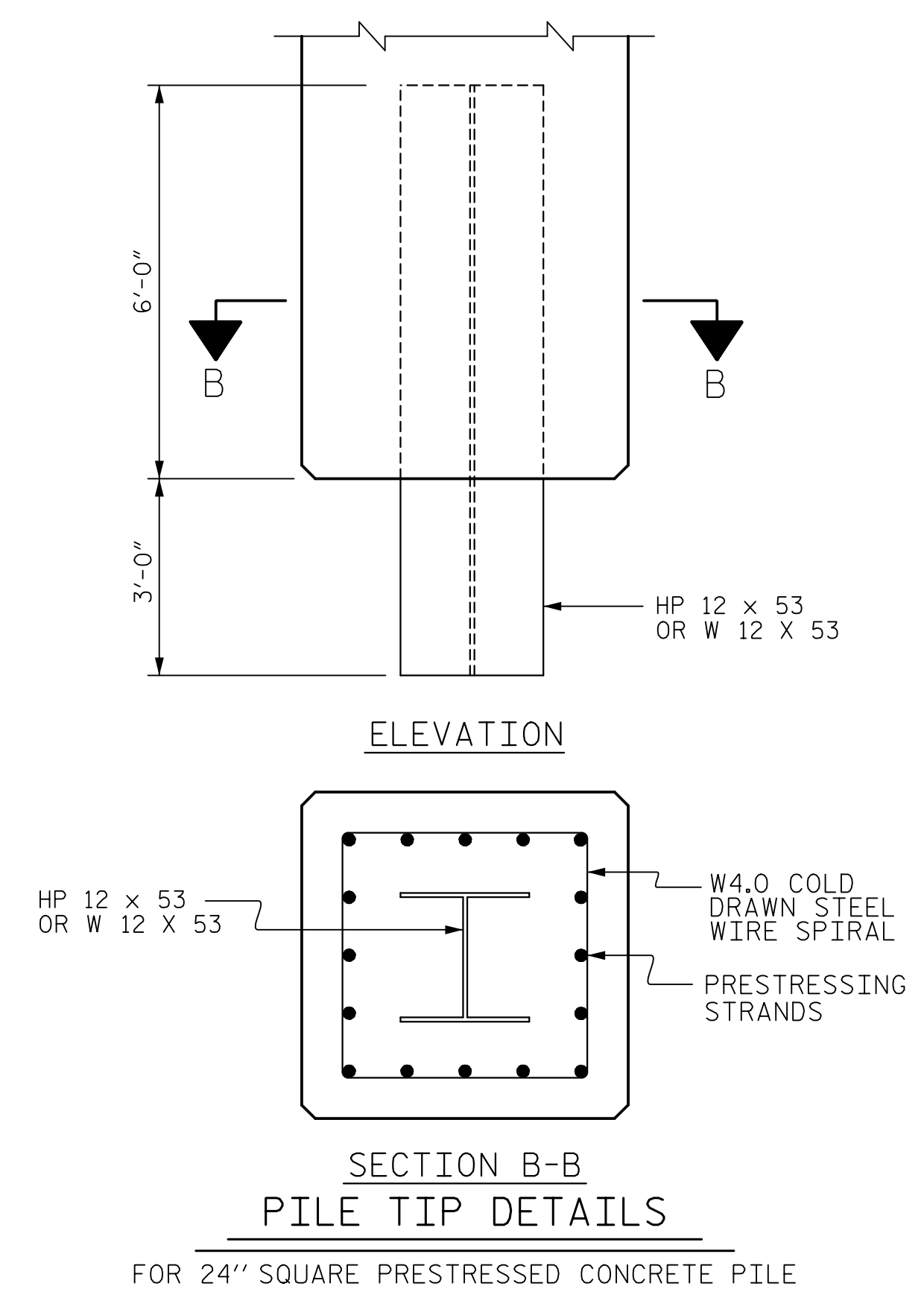
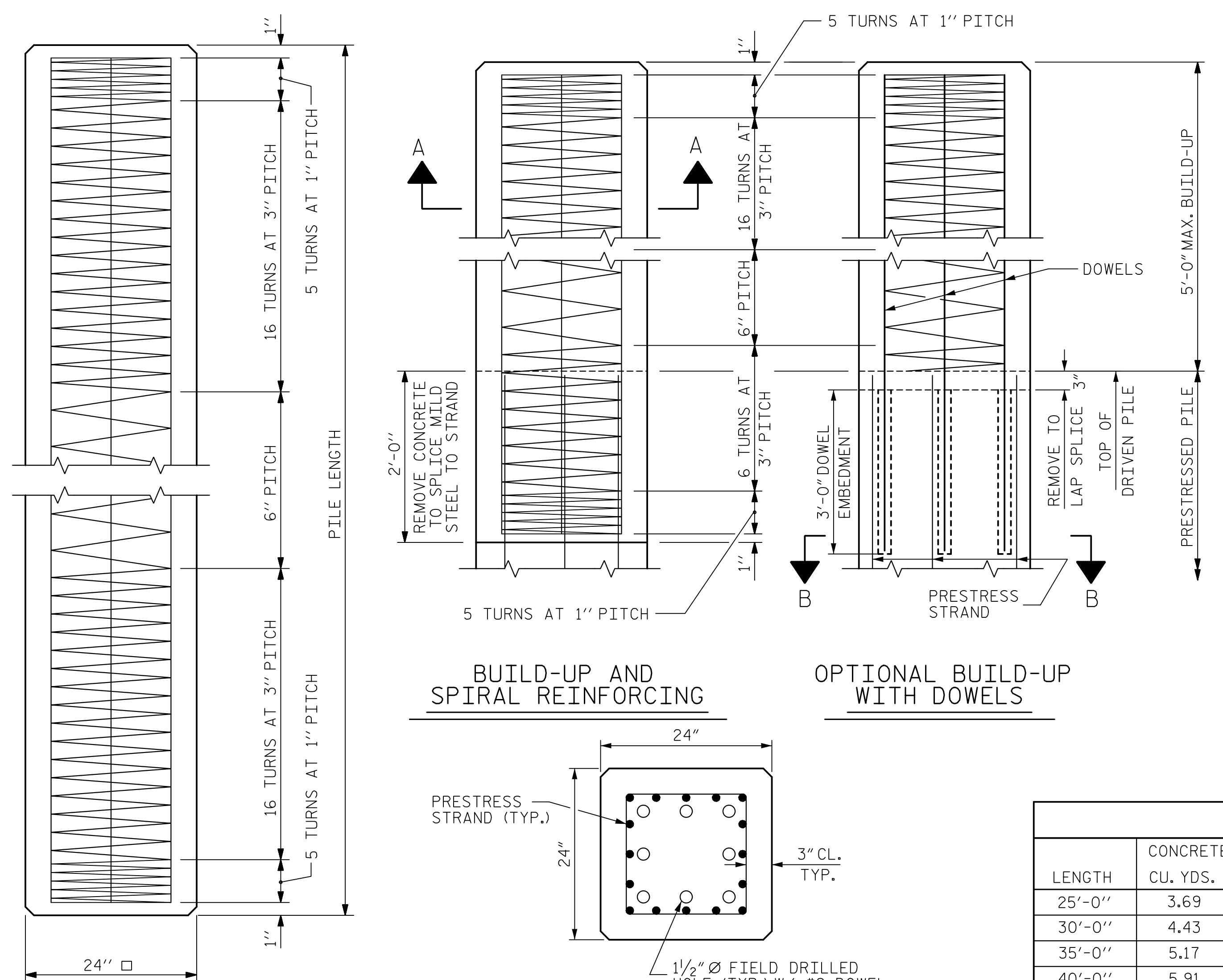
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 2
 LEFT LANE



HNTB	HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
DRAWN BY: A. SMITH	DATE: 6/17
CHECKED BY: B. EMAMI	DATE: 8/17
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18
DWG. NO. 33	

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-33
1			3			TOTAL SHEETS
2			4			39



NOTES

PRESTRESSED CONCRETE STRENGTH : $f'_c = 7,500$ PSI
 BUILD-UP CONCRETE STRENGTH : $f'_c = 7,500$ PSI

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS CONFORMING TO AASHTO M203. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. AT THE CONTRACTOR'S OPTION, "OR 0.6" STRANDS MAY BE USED IN THE STRAND CONFIGURATION SHOWN IN THE TYPICAL SECTION DETAIL. MIXING OF STRAND SIZE IS NOT ALLOWED. THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED. TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN OPPOSITE PAIRS AS INDICATED IN THE TYPICAL PATTERN SHOWN. FOR ANY NUMBER OF STRANDS, BURN IN OPPOSITE PAIRS AND SYMMETRICALLY ABOUT BOTH THE VERTICAL AND HORIZONTAL AXES. STRANDS 1-1 SHALL BE BURNED BEFORE 2-2, ETC. NOT MORE THAN 4 STRANDS, SAY 5-5 AND 6-6, MAY BE BURNED AT ANY ONE SECTION BEFORE THESE SAME PAIRS OF STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS ARE TO BE INDICATED WITH A 2" WIDE BLACK MARK.

DRIVE PILES USING A METHOD APPROVED BY THE ENGINEER, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

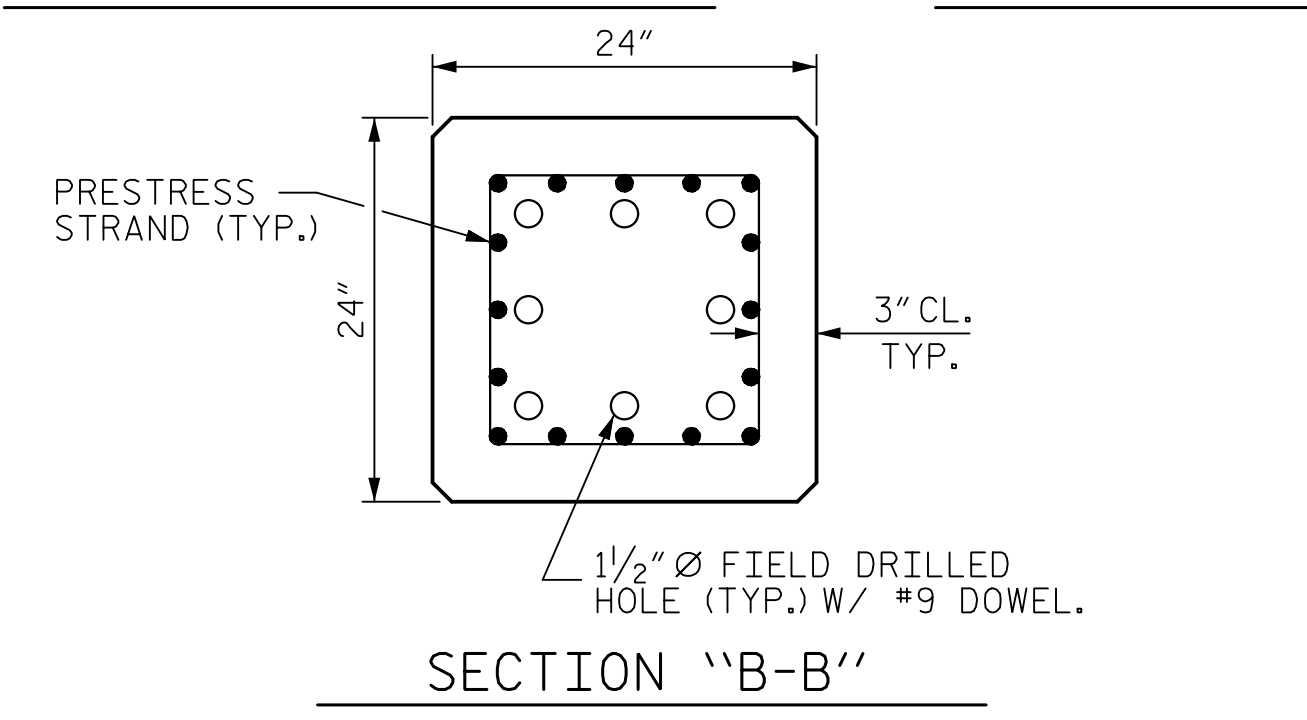
DRIVING OF THE BUILT-UP PILE WILL NOT BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 5,000 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

THE CONCRETE IN THE PILES OF BENT NO. 1 AND 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

PRESTRESSED PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

BUILD-UP AND SPIRAL REINFORCING
OPTIONAL BUILD-UP WITH DOWELS



QUANTITIES FOR ONE 24" SQUARE PILE

LENGTH	CONCRETE CU. YDS.	PILE WT. TONS	ONE POINT PICK-UP		TWO POINT PICK-UP		THREE POINT PICK-UP	
			0.3L	0.7L	0.207L	0.586L	0.145L	0.355L
25'-0"	3.69	7.47	7'-6"	17'-6"				
30'-0"	4.43	8.97	9'-0"	21'-0"				
35'-0"	5.17	10.46	10'-6"	24'-6"				
40'-0"	5.91	11.96	12'-0"	28'-0"				
45'-0"	6.64	13.45	13'-6"	31'-6"				
50'-0"	7.38	14.95	15'-0"	35'-0"				
55'-0"	8.12	16.44	16'-6"	38'-6"				
60'-0"	8.86	17.94	18'-0"	42'-0"				
65'-0"	9.60	19.43	19'-6"	45'-6"				
70'-0"	10.33	20.93	21'-0"	49'-0"				
75'-0"	11.07	22.42			15'-6 1/2"	43'-11"		
80'-0"	11.81	23.92			16'-6 1/2"	46'-11"		
85'-0"	12.55	25.41			17'-7"	49'-10"		
90'-0"	13.29	26.91			18'-7 1/2"	52'-9"		
95'-0"	14.03	28.40			19'-8"	55'-8"		
100'-0"	14.76	29.90			20'-8 1/2"	58'-7"		
105'-0"	15.50	31.39					15'-3"	37'-3"
110'-0"	16.24	32.89					15'-11 1/2"	39'-0 1/2"
115'-0"	16.98	34.38					16'-8"	40'-10"
120'-0"	17.72	35.87					17'-5"	42'-7"

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

GROUT COMPRESSIVE STRENGTH: $f'_c = 5,000$ PSI

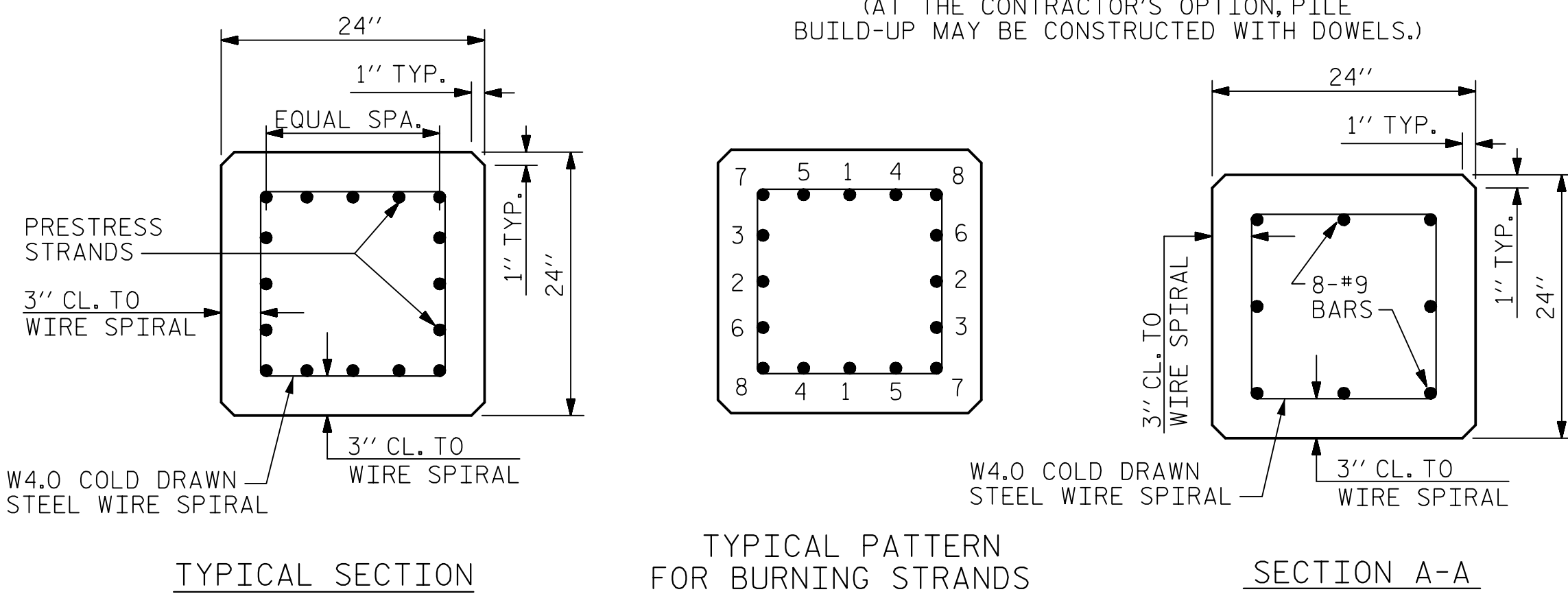
BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3" OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING STEEL. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN 1/2" CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

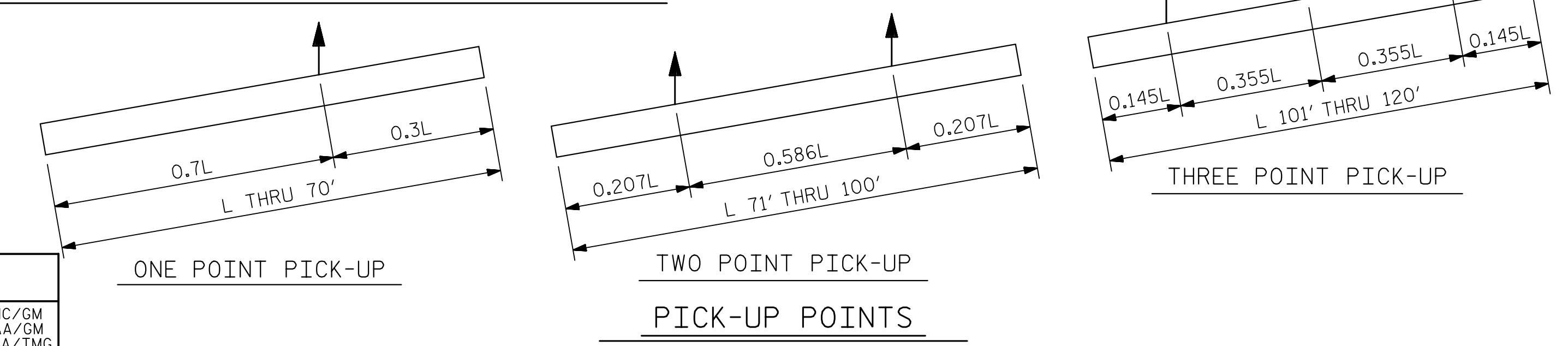
FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

THE SPIRAL REINFORCING IN ALL BUILD-UPS SHALL BE W4.0 COLD DRAWN WIRE WHICH SHALL BE SECURED TO THE LONGITUDINAL REINFORCEMENT TO MAINTAIN PITCH.

THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.

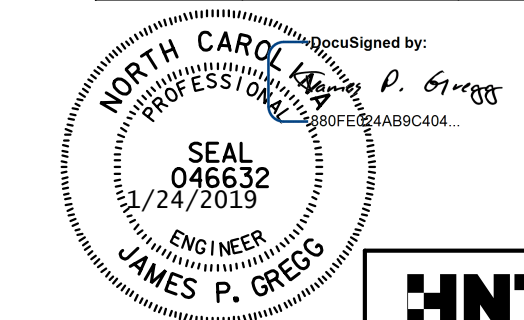


1/2" OR 0.6" Ø GRADE 270 L.R. PRESTRESS STRANDS



STRAND DATA:

SIZE	GRADE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
1/2"	270 L.R.	0.153	41,300# PER STRAND	30,980# PER STRAND
0.6"	270 L.R.	0.217	58,600# PER STRAND	43,940# PER STRAND



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DRAWN BY: A. SMITH DATE: 5/17
 CHECKED BY: B. EMAMI DATE: 8/17
 DESIGN ENGINEER OF RECORD: J. GREGG DATE: 8/18

DWG. NO. 34

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
 RALEIGH

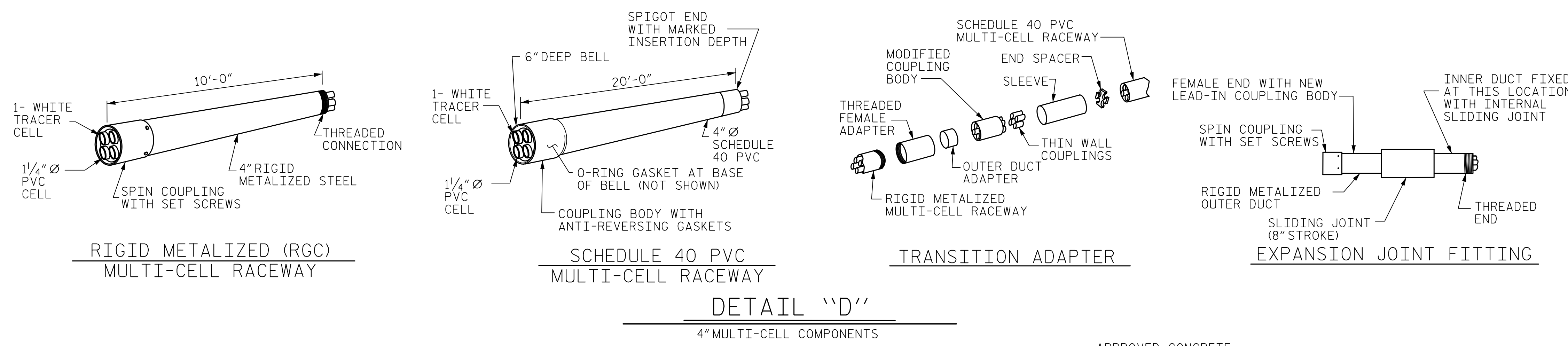
STANDARD
24" PRESTRESSED CONCRETE PILE
 LEFT LANE

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

S5-34
TOTAL SHEETS 39

ASSEMBLED BY: AES DATE: 5/17
 CHECKED BY: BE DATE: 8/17

DRAWN BY: WJH 1/89 REV. 11/30/10 WMC/GM
 CHECKED BY: CRK 3/89 REV. 10/1/11 MAA/GM
 REV. 12/14 MAA/TMG



NOTES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE TOTAL QUANTITY OF CONDUIT NEEDED TO COMPLETE THE WORK AND THAT THE CONDUIT(S) ARE PLACED AT THE NOTED DIMENSION AND ABOVE THE BOTTOM OF THE GIRDER.

THE INSTALLATION OF THE CONDUIT SYSTEM SHALL BE PAID FOR AS LUMP SUM. THE PRICE SHALL INCLUDE ALL CONDUIT, HANGERS, STABILIZERS, EXPANSION JOINTS, CONCRETE INSERTS, PVC SLEEVES AND ALL NECESSARY HARDWARE TO COMPLETE THE WORK.

THE CONTRACTOR SHALL FIELD VERIFY THAT THE CONDUIT SYSTEM IS NOT IN CONFLICT WITH THE GUARDRAIL POSTS.

SEE DETAIL "C" FOR HANGER ASSEMBLY INSTALLATION.

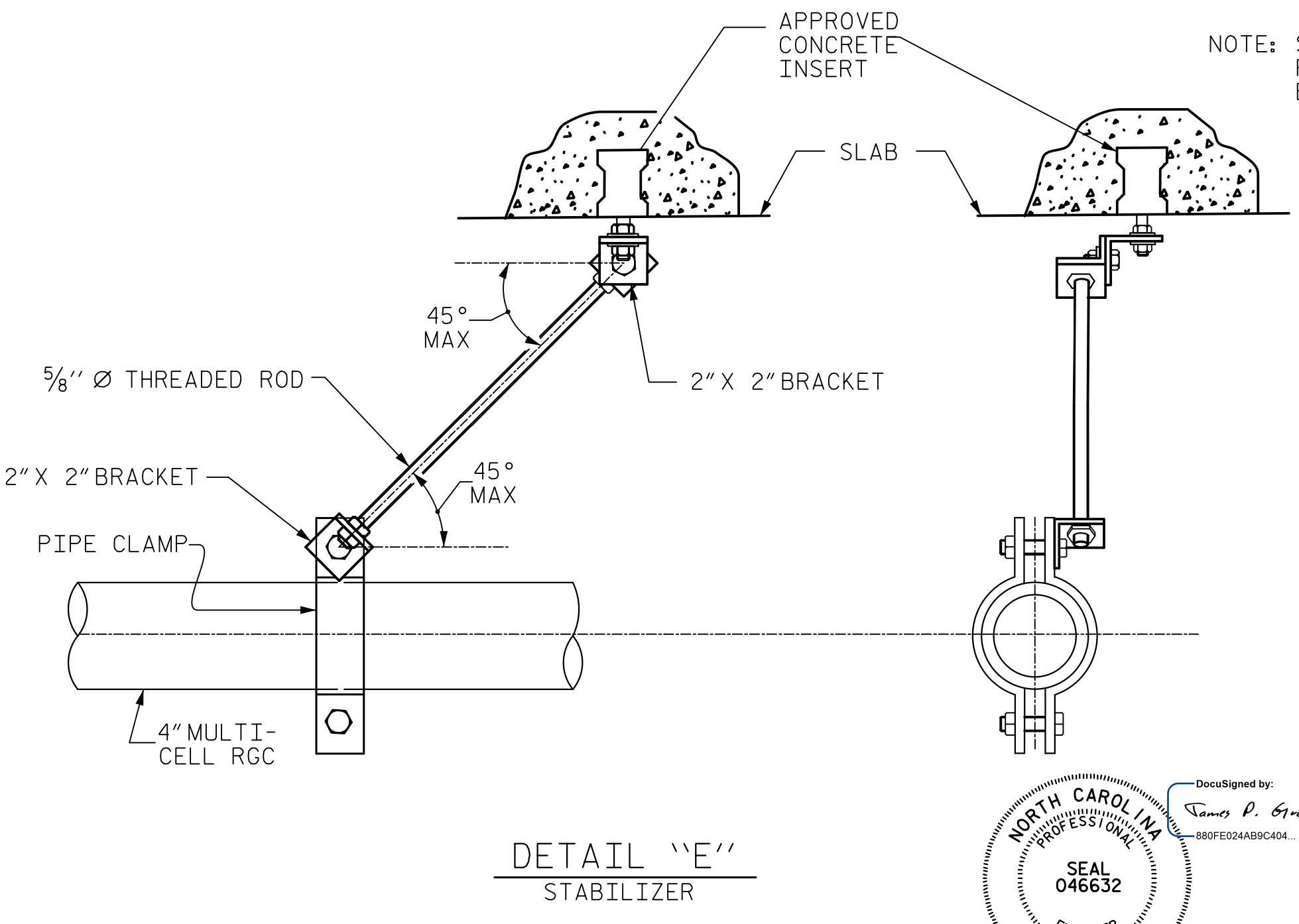
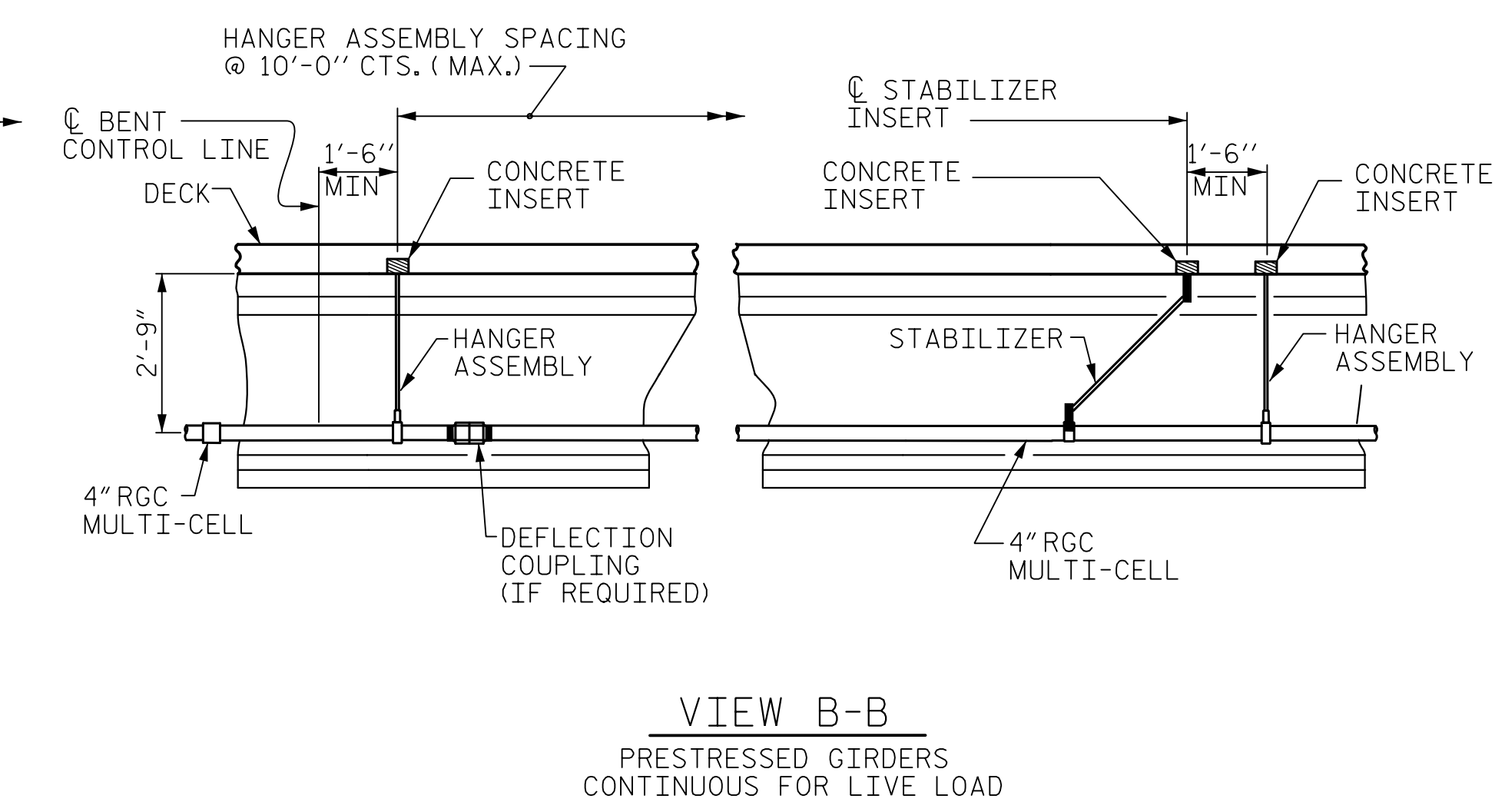
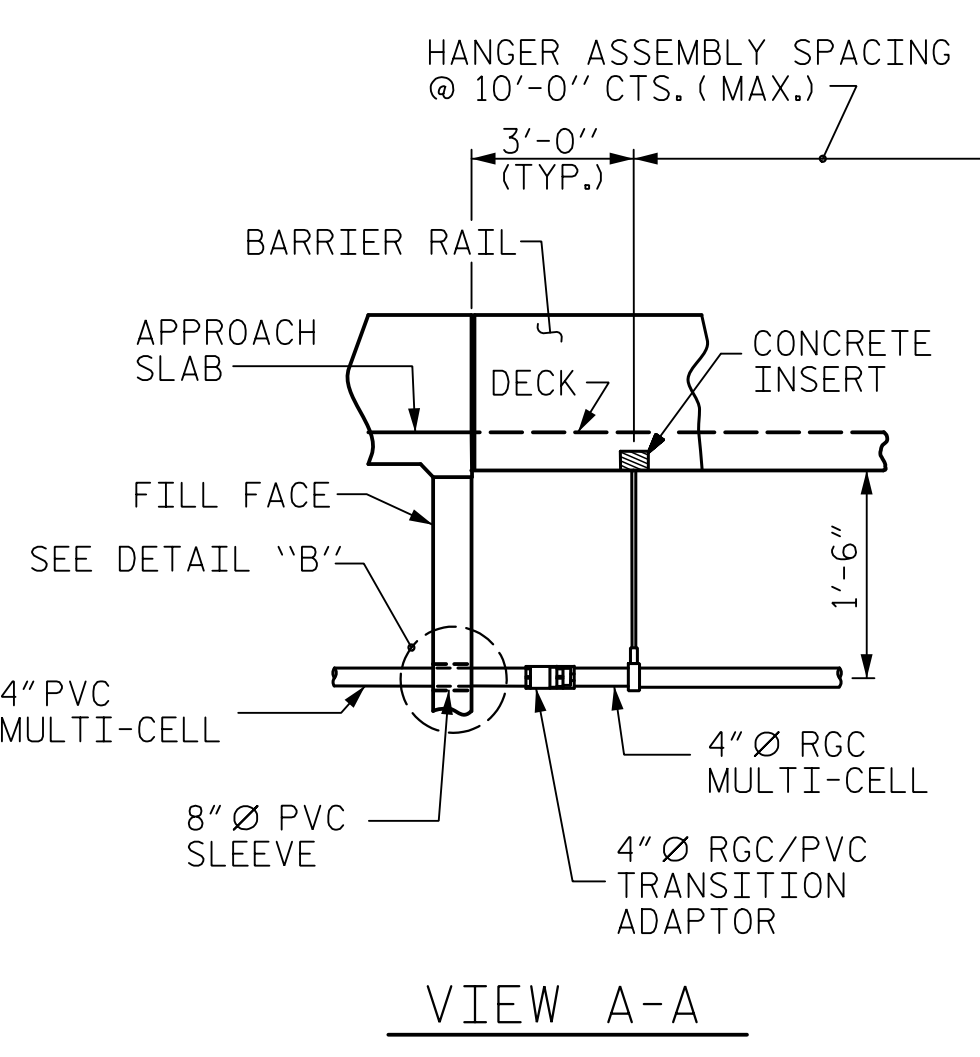
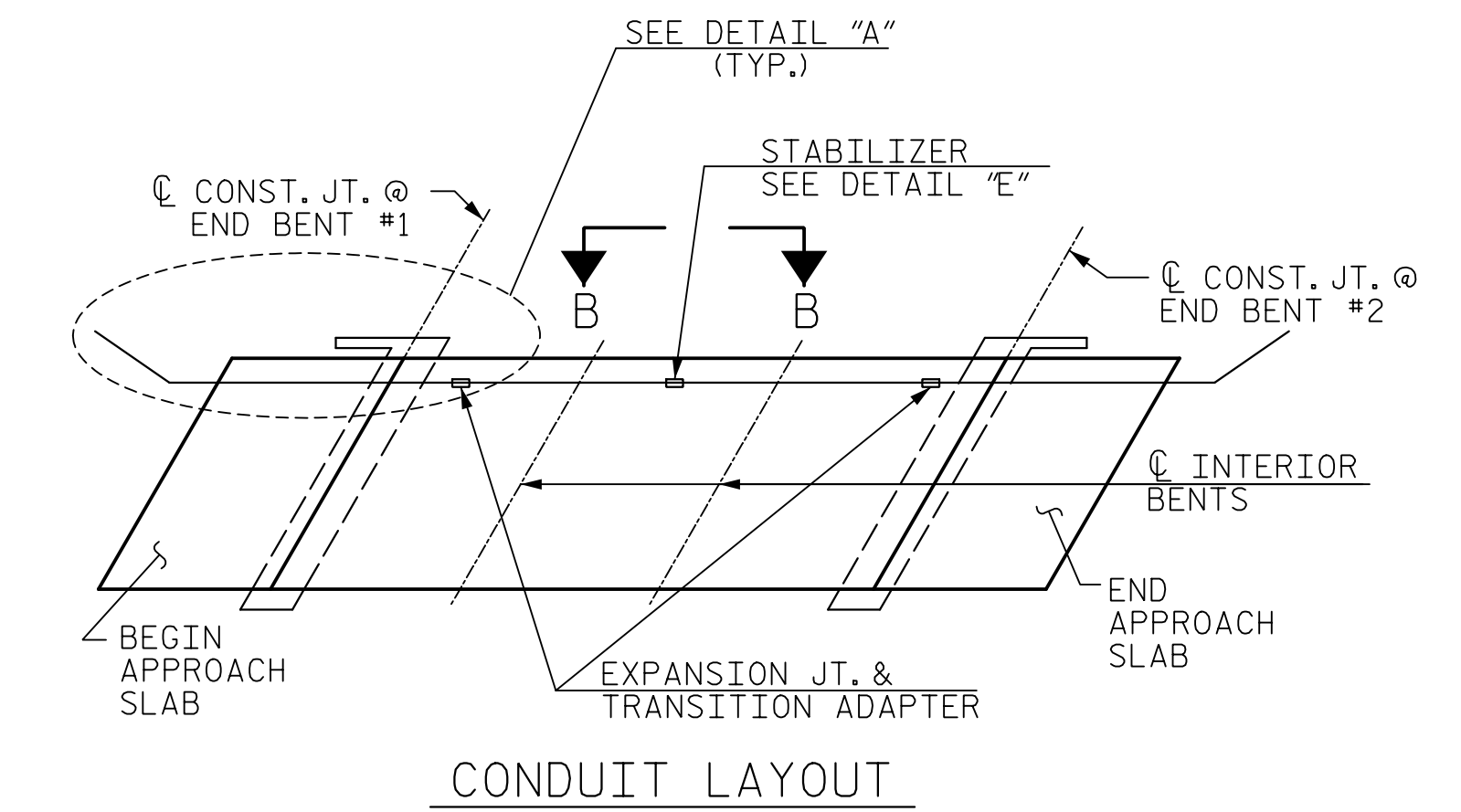
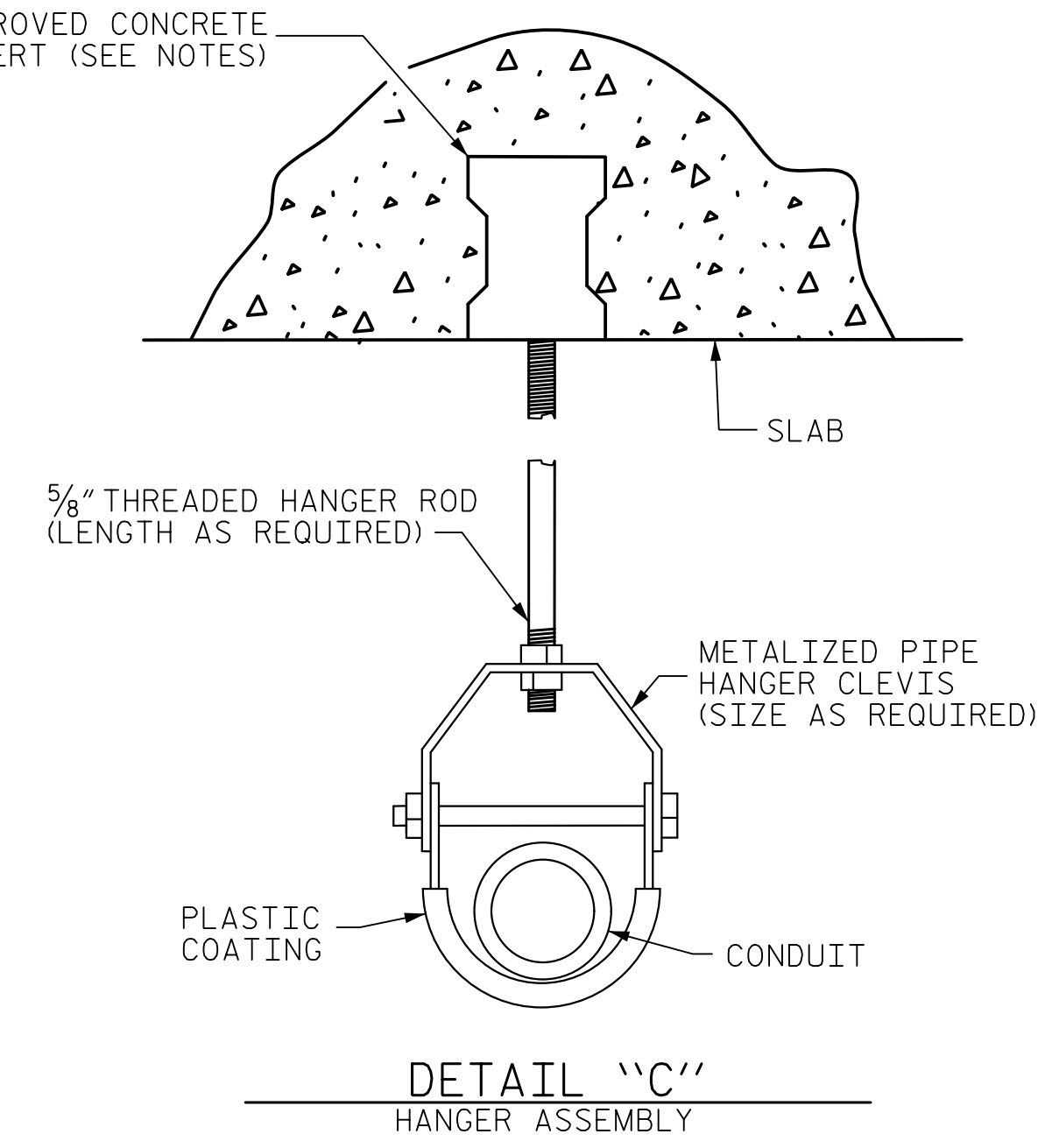
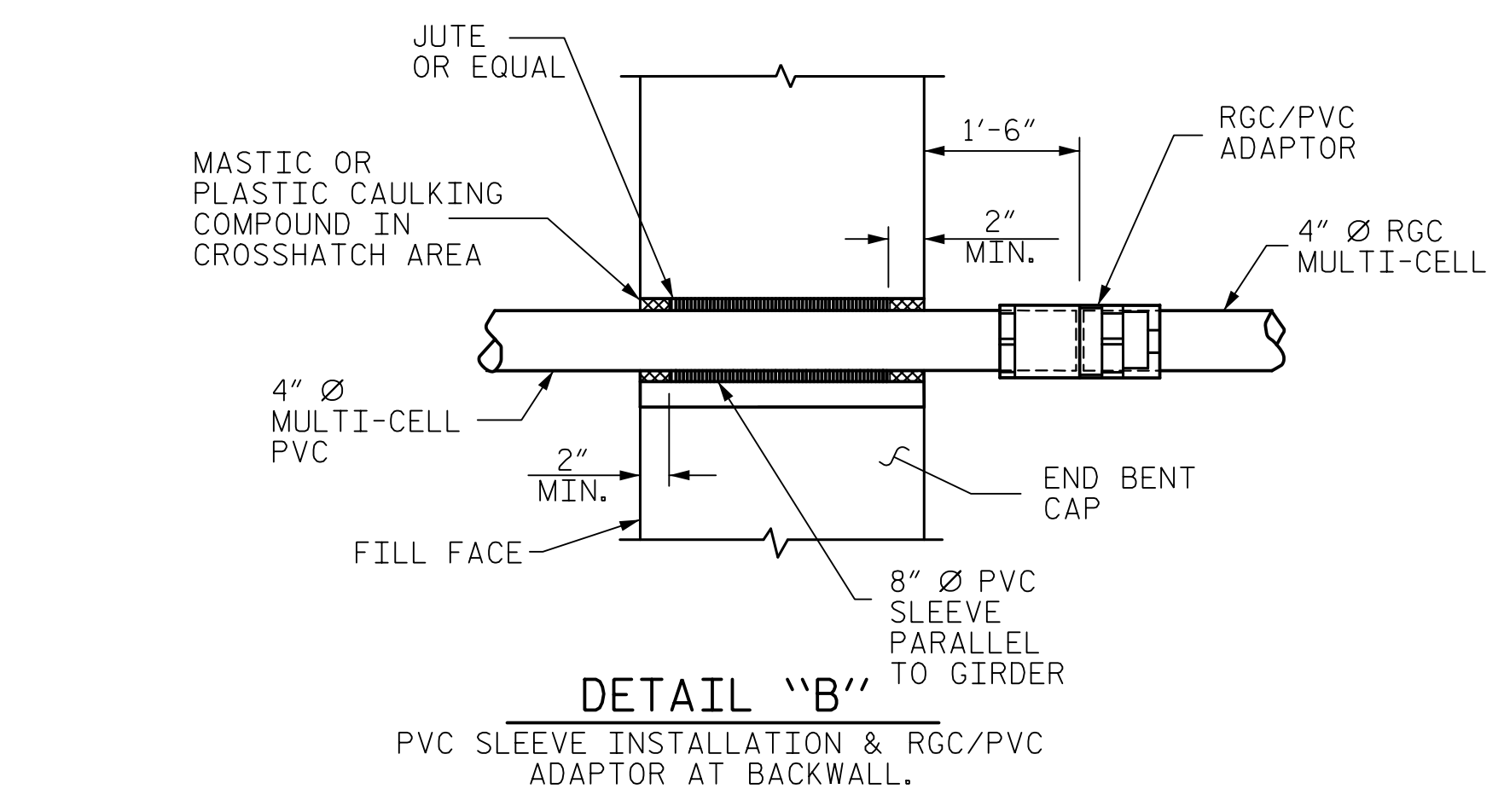
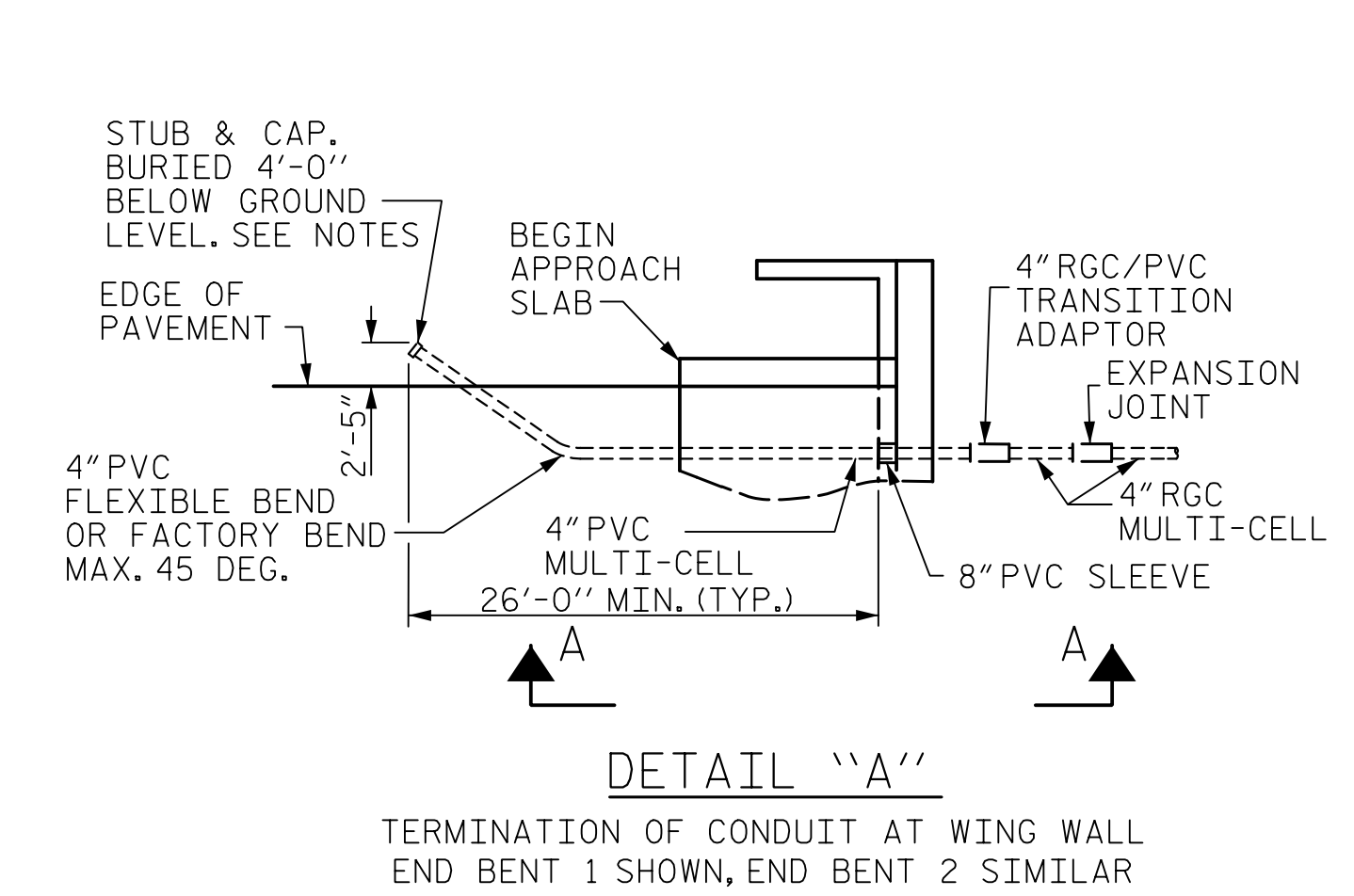
INSTALL SLEEVES PARALLEL TO GIRDERS. SEE DETAIL "B" FOR SLEEVE INSTALLATION.

PROVIDE TRANSITION ADAPTOR AND EXPANSION JOINT FOR CONDUIT AT END BENT 1 AND END BENT 2.

INSTALL STABILIZER'S MIDWAY BETWEEN DECK EXPANSION JOINTS. STABILIZER CAN NOT BE USED INSTEAD OF A HANGER ASSEMBLY.

THE CONCRETE SCREW INSERT SHALL HAVE A ROD SIZE OF 5/8" AND A PULL FORCE OF 1260 lbs.

FOR ELECTRICAL CONDUIT SYSTEM FOR SIGNALS, SEE SPECIAL PROVISIONS.



PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 COUNTY

DocuSigned by:
 James P. Gregg
 880FE024AB9C404
 SEAL 046632
 ENGINEER
 JAMES P. GREGG
 8/22/2018

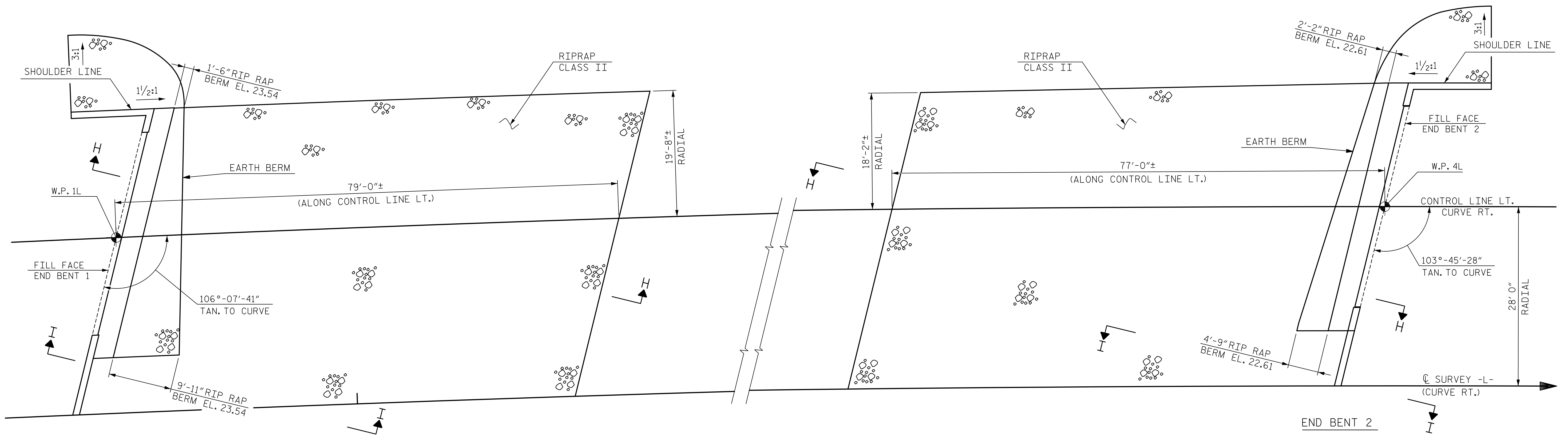
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 ELECTRICAL CONDUIT SYSTEM FOR SIGNALS
 LEFT LANE

ASSEMBLED BY : BN	DATE : 7/17
CHECKED BY : BE	DATE : 8/17
DRAWN BY : RWW	2-4-03
CHECKED BY : DBM	2-4-03
REV. 5/1/06	TLA/GM
REV. 10/1/11	MAA/GM

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DRAWN BY : B. NEUPANE	DATE : 7/17
CHECKED BY : B. EMAMI	DATE : 8/17
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18
DWG. NO. 35	

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

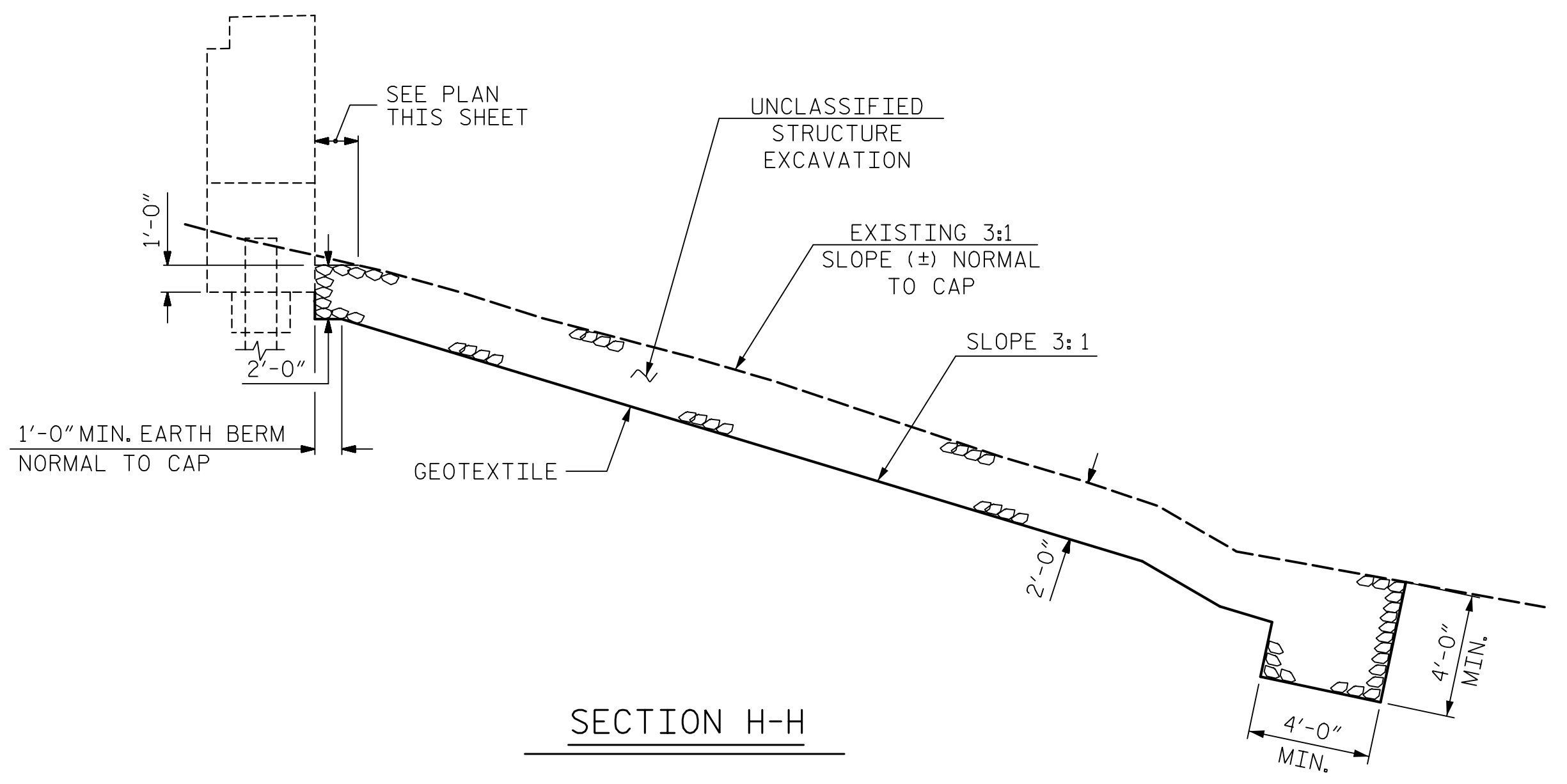
ELECTRIC CONDUIT DETAILS



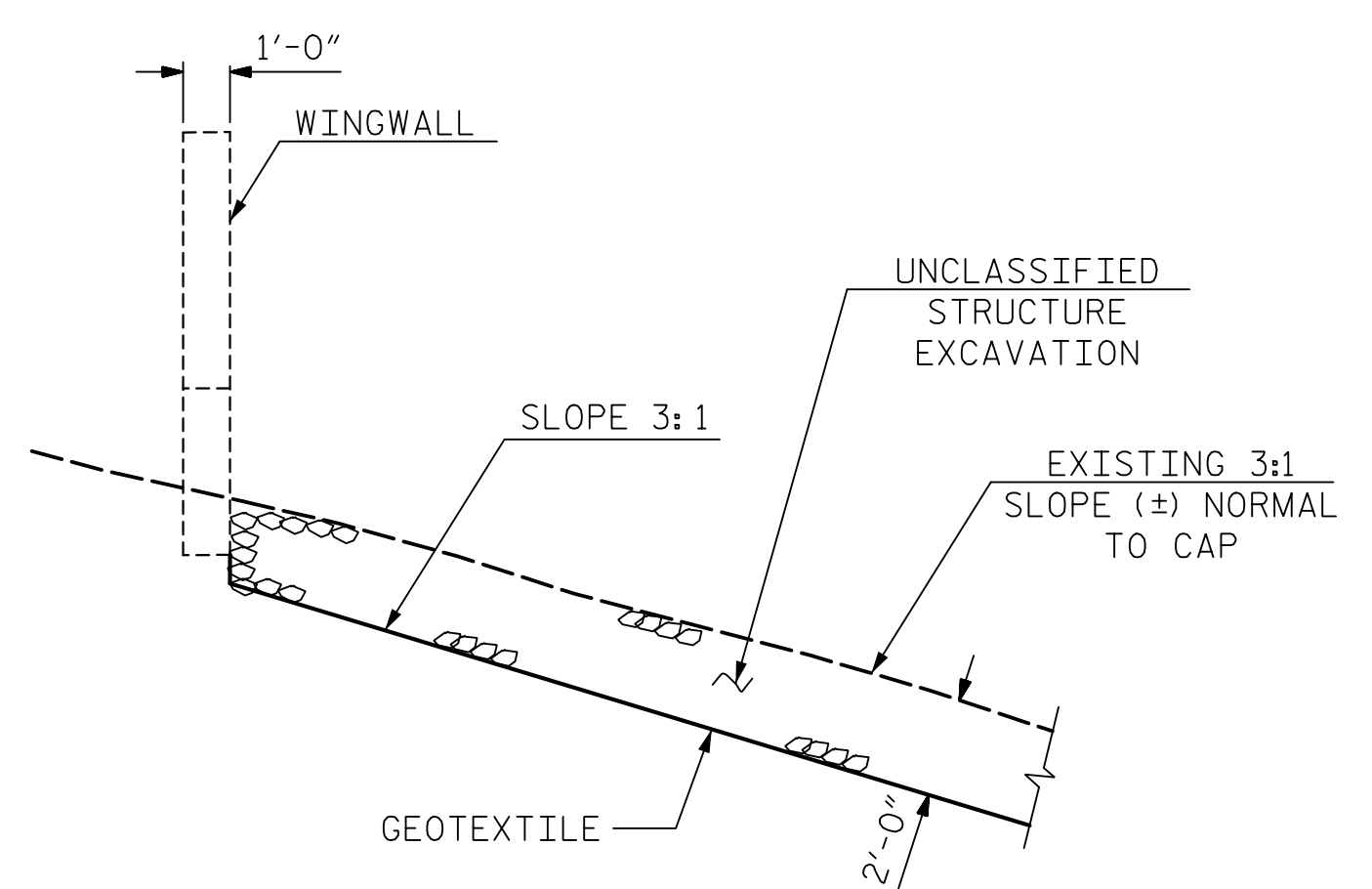
PLAN OF RIP RAP

SEE RIGHT BRIDGE FOR SLOPE PROTECTION RIGHT OF CL SURVEY -L-

ESTIMATED QUANTITIES		
BRIDGE @ POC STA. 390+15.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	415	460
END BENT 2	405	450



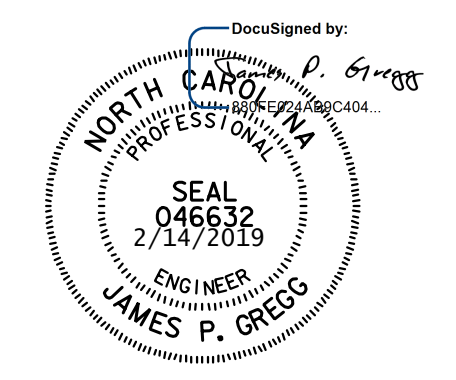
SECTION H-H



SECTION I-I

NOTES :
 RIP RAP SHALL MEET THE REQUIREMENTS OF SECTION 1042 OF THE STANDARD SPECIFICATIONS. THE USE OF MARL SHALL NOT BE ALLOWED. THE RIP RAP SHALL BE PLACED WITHIN UNCLASSIFIED STRUCTURE EXCAVATION LIMITS TO KEY RIP RAP INTO EXISTING GROUND.

*FOR DETAILS NOT SHOWN, SEE SECTION H-H.



PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
—RIP RAP DETAILS—
 LEFT LANE

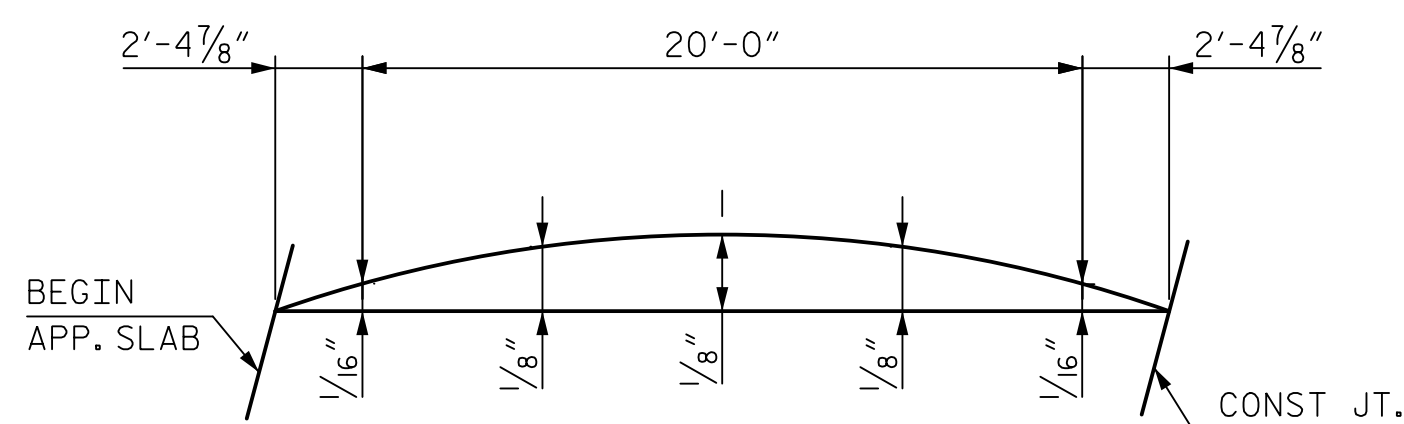
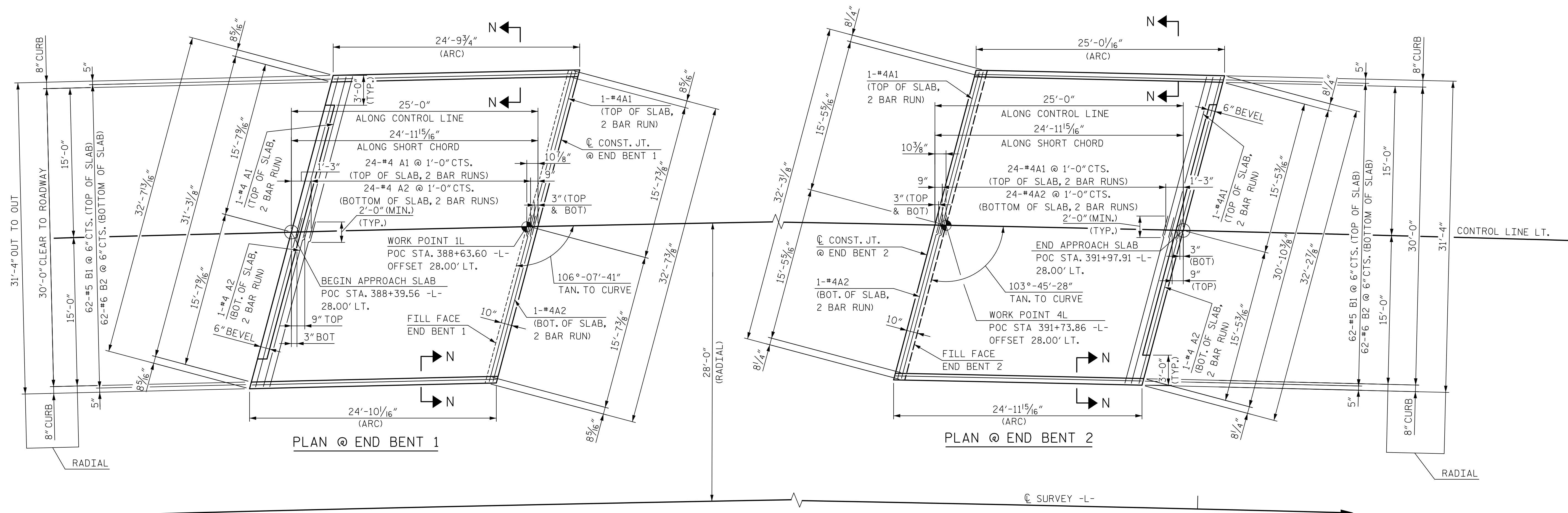
ASSEMBLED BY : BN	DATE : 5/17
CHECKED BY : BE	DATE : 8/17
DRAWN BY : REK 1/84	REV. 5/1/06R TLA/GM
CHECKED BY : RDU 1/84	REV. 10/1/11 MAA/GM
	REV. 12/2/11 MAA/GM

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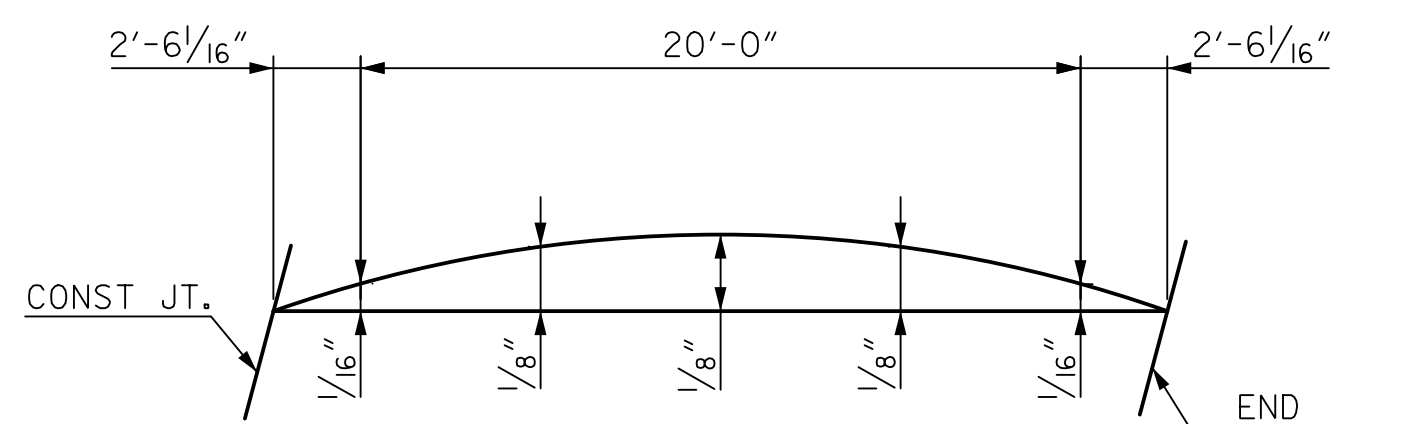
DRAWN BY : B. NEUPANE DATE : 5/17
 CHECKED BY : B. EMAMI DATE : 8/17
 DESIGN ENGINEER OF RECORD : J. GREGG DATE : 8/18

DWG. NO. 36

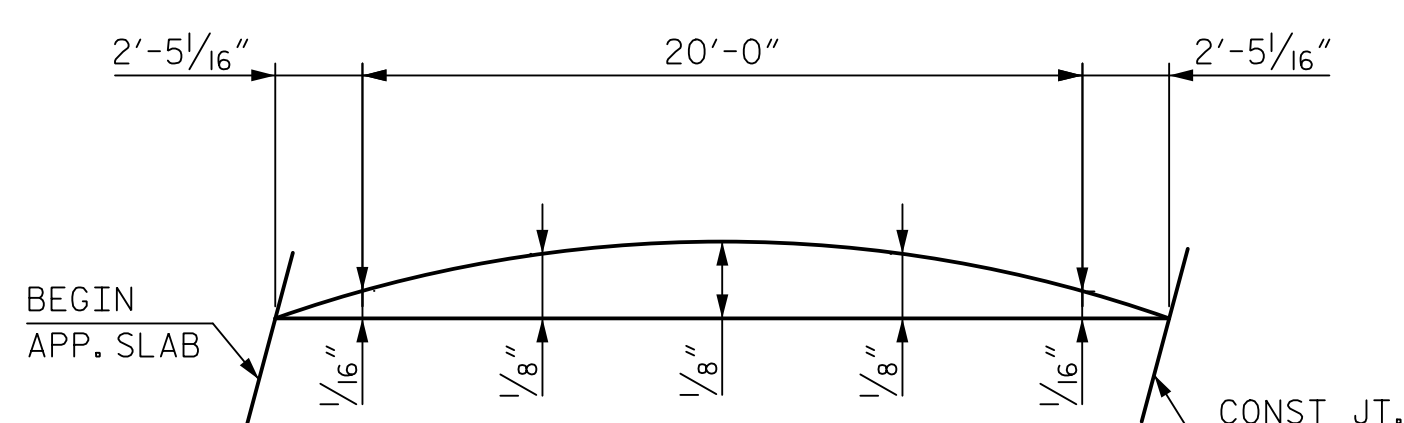
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-36
1			3			TOTAL SHEETS
2			4			39



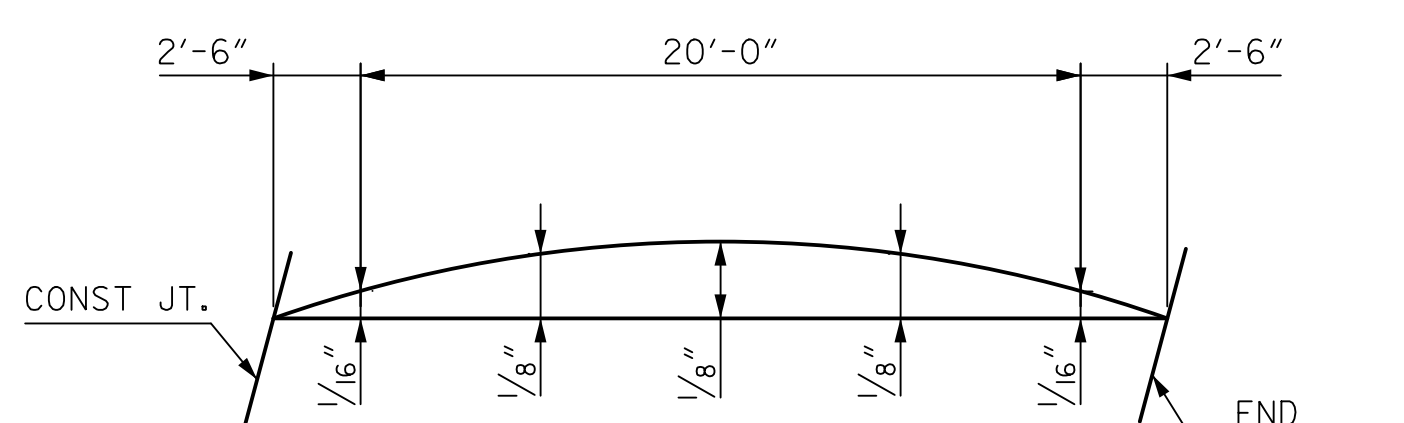
LEFT CURVE OFFSET



LEFT CURVE OFFSET



RIGHT CURVE OFFSET



RIGHT CURVE OFFSET

CURVE OFFSETS - APPROACH SLAB AT
END BENT 1

CURVE OFFSETS - APPROACH SLAB AT
END BENT 2

NOTES:
 FOR SECTION N-N, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEET 2 OF 3.
 FOR APPROACH SLAB BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEET 2 OF 3.
 FOR SECTION THROUGH SLAB, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEET 2 OF 3.

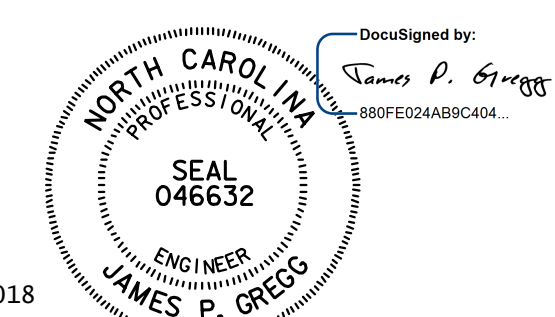
PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

BRIDGE APPROACH
 SLAB PLAN

LEFT LANE



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DRAWN BY: A. SMITH DATE: 6/17
 CHECKED BY: B. EMAMI DATE: 8/17
 DESIGN ENGINEER OF RECORD: J. GREGG DATE: 8/18

DWG. NO. 37

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-37
1			3			TOTAL SHEETS
2			4			39

NOTES

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

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

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

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

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

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

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

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

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

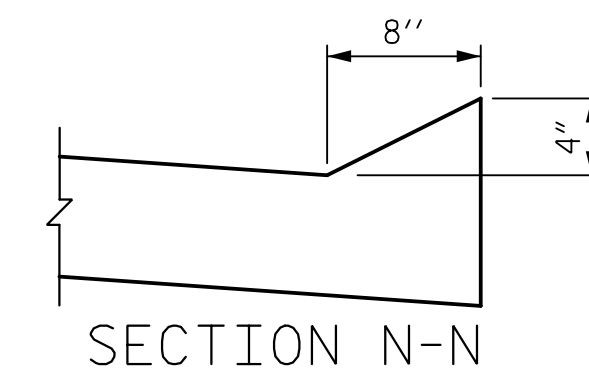
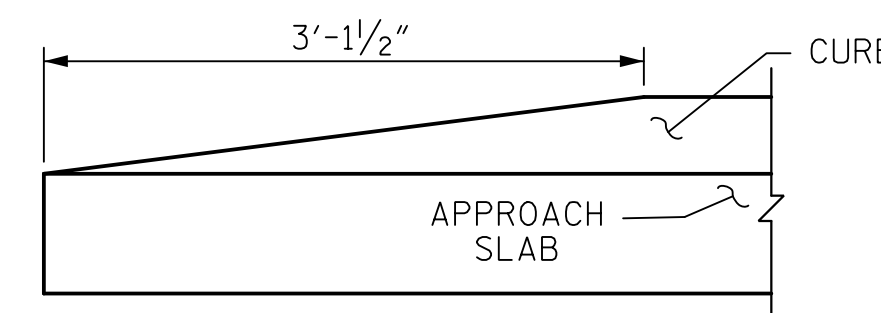
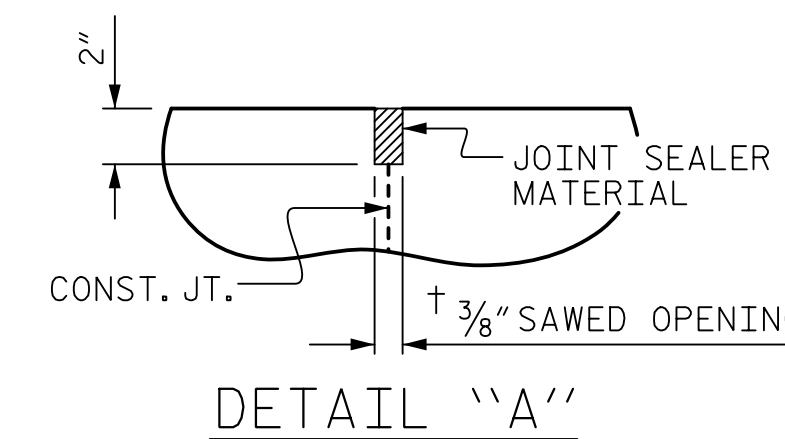
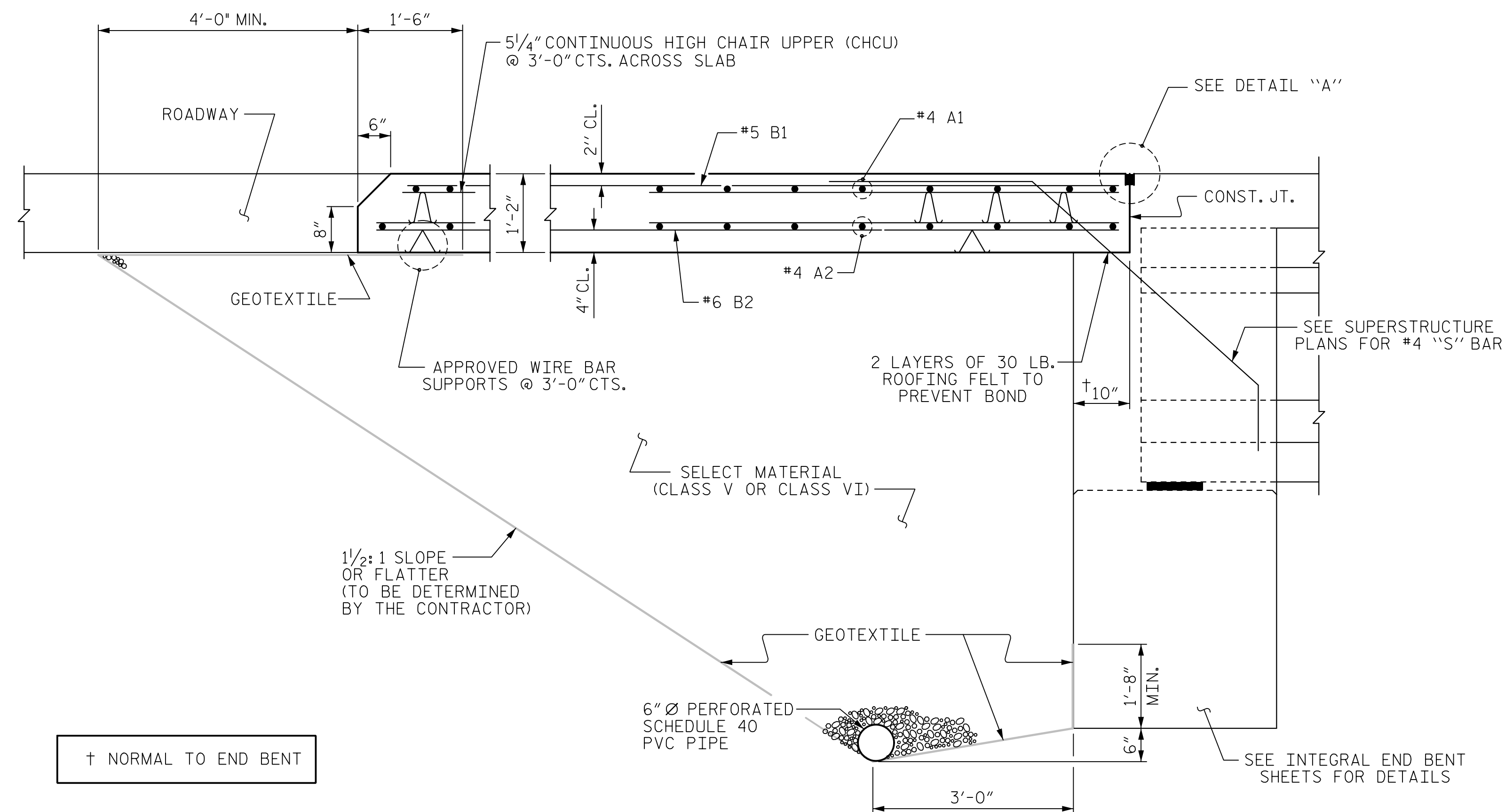
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

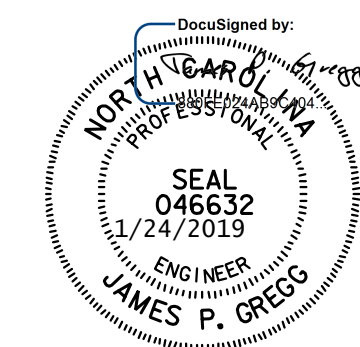
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	52	#4	STR	17'-2"	596
A2	52	#4	STR	17'-2"	596
B1	62	#5	STR	24'-1"	1557
B2	62	#6	STR	24'-7"	2289

EPOXY COATED REINFORCING STEEL 5,038 LBS.

CLASS AA CONCRETE 33.9 C. Y.



END OF CURB WITHOUT SHOULDER BERM GUTTER



PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 2 OF 3
 STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH SLAB
 FOR INTEGRAL ABUTMENT
 WITH FLEXIBLE PAVEMENT
 LEFT LANE

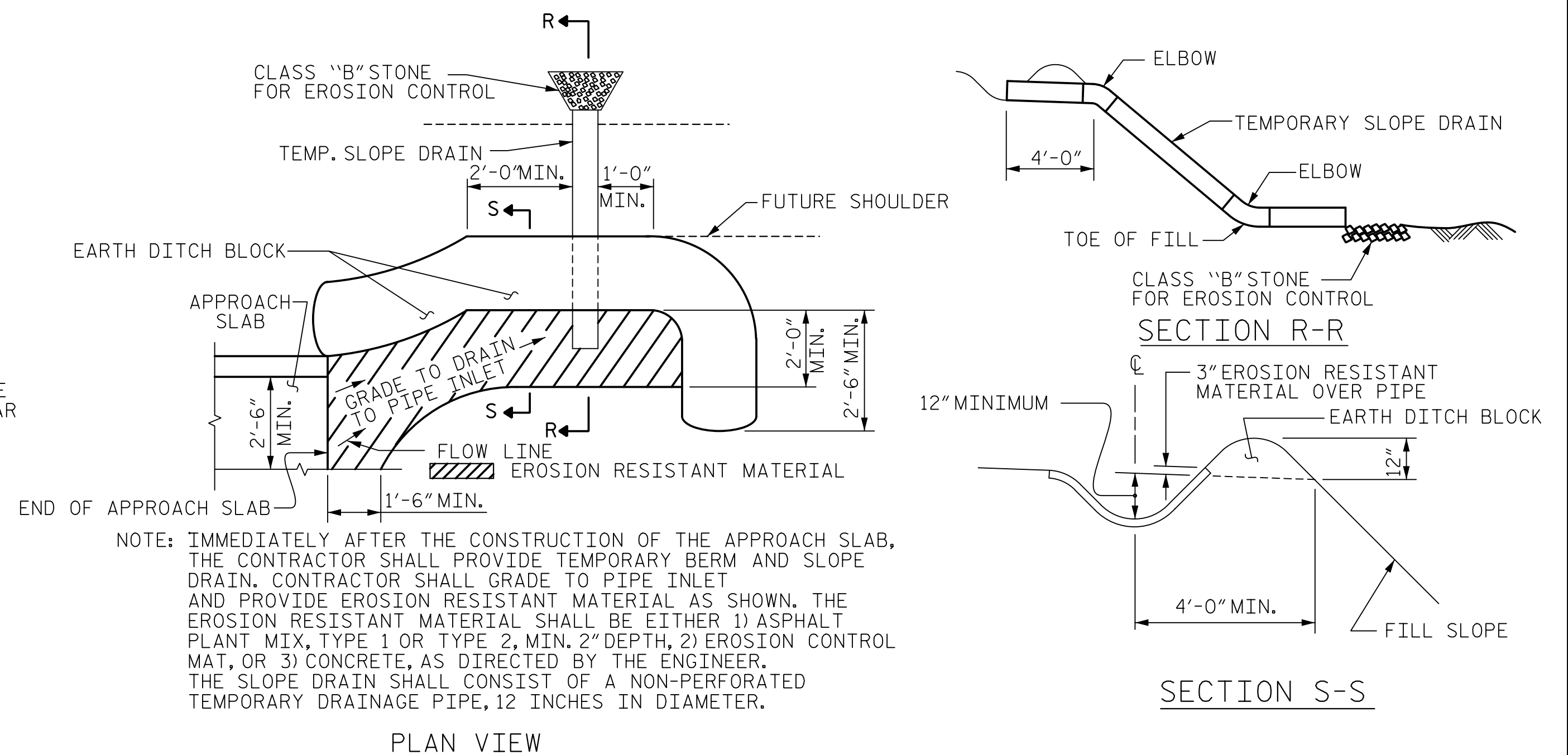
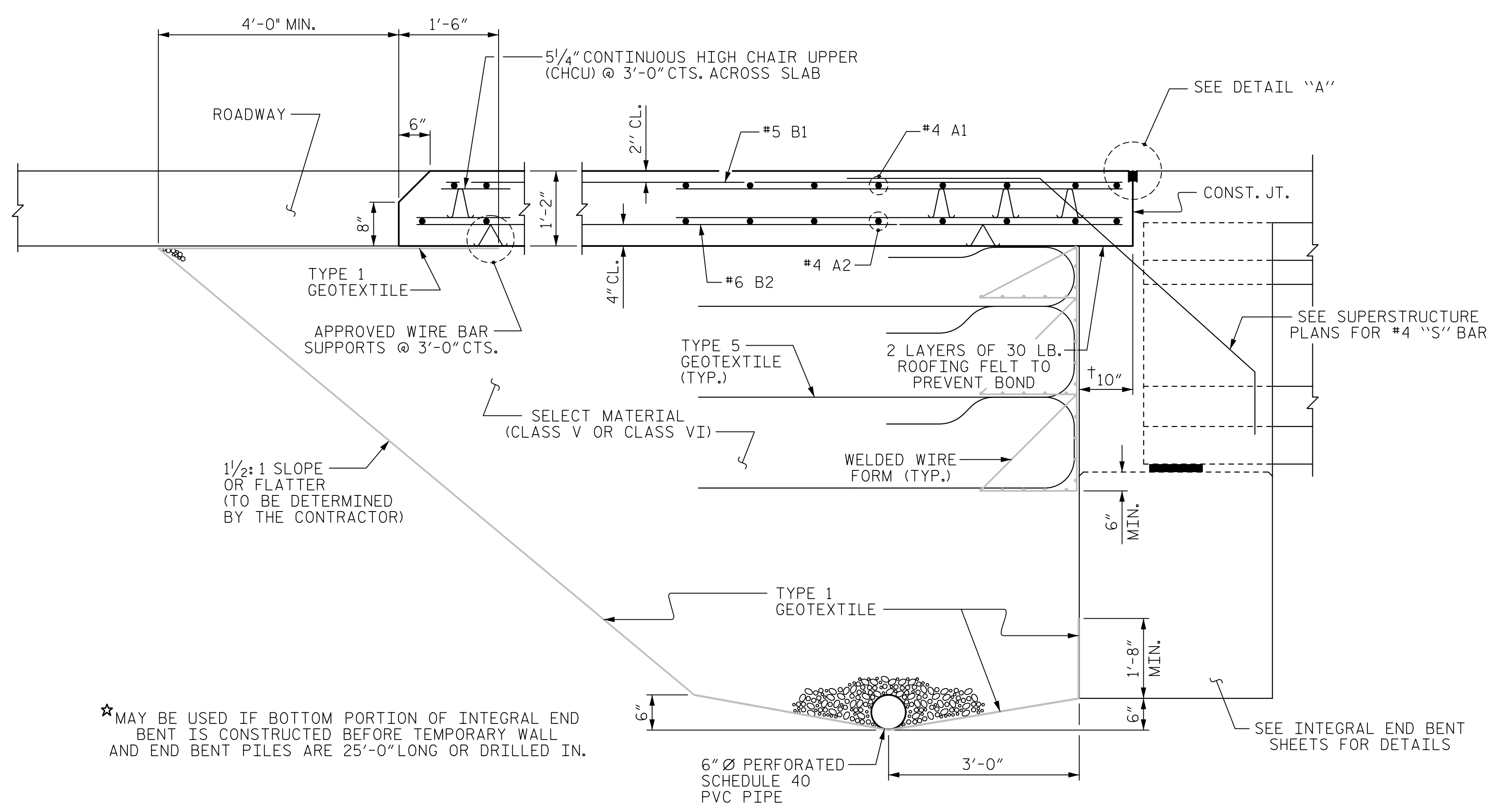
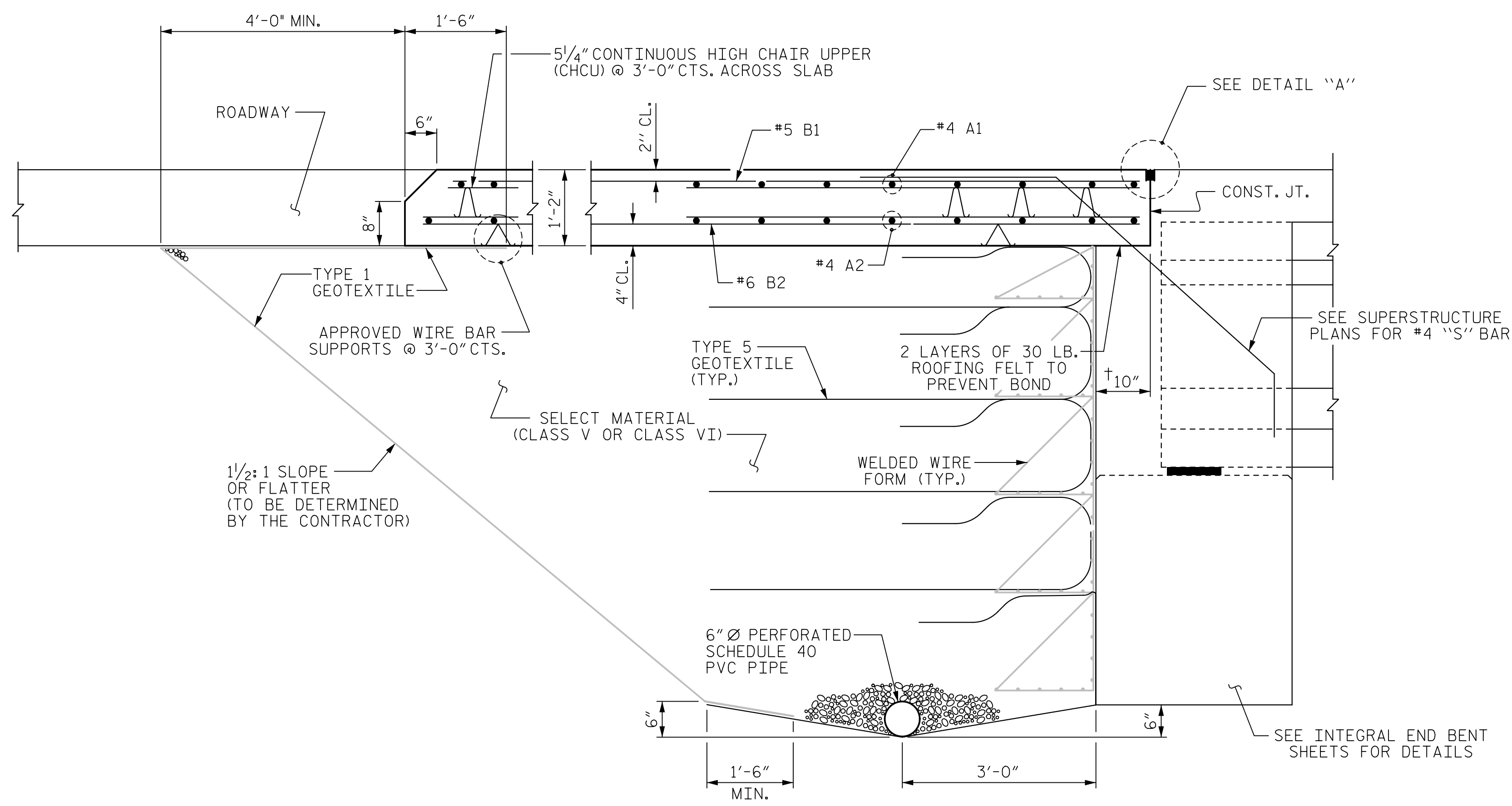
ASSEMBLED BY : AES	DATE : 5/17
CHECKED BY : BE	DATE : 8/17
DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

SECTION THRU SLAB
 (TYPE I - STANDARD APPROACH FILL)

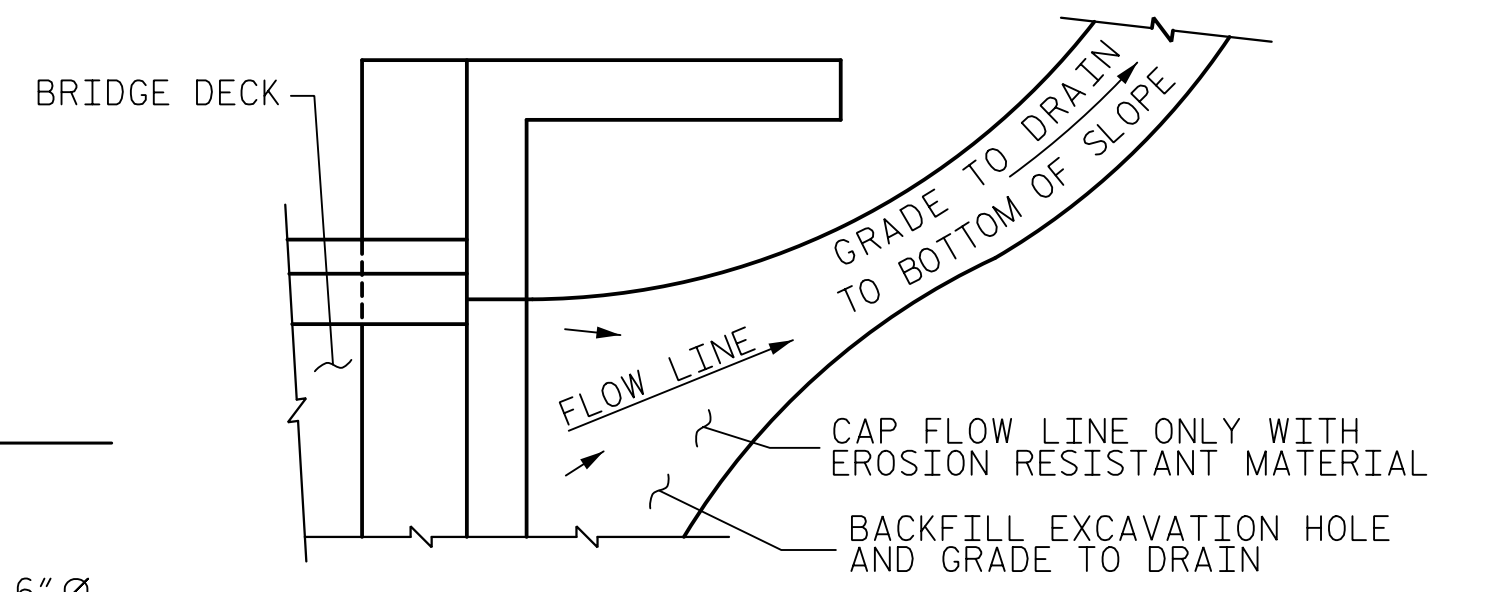
HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY : A. SMITH	DATE : 8/17	DWG. NO. 38	
CHECKED BY : B. EMAMI	DATE : 9/17		
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18		

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

TOTAL SHEETS 39



TEMPORARY BERM AND SLOPE DRAIN DETAILS
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

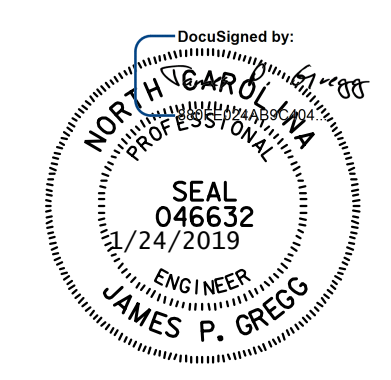
NOTES

- APPROACH SLAB SHALL NOT BE CONSTRUCTED PRIOR TO COMPLETION OF THE BRIDGE DECK.
- FOR TEMPORARY GEOTEXTILE WALL INCLUDING GEOTEXTILE, 6" Ø DRAINAGE PIPE, WELDED WIRE FORM, AND SELECT MATERIAL, SEE ROADWAY PLANS.
- GEOTEXTILE (TYPE 1 OR TYPE 5) SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS SECTION 1056.
- SELECT MATERIAL BACKFILL (CLASS V OR CLASS VI) SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS SECTION 1016.
- SELECT MATERIAL BACKFILL IS TO BE CONTINUOUS ALONG FILL FACE OF BACKWALL FROM OUTSIDE EDGE TO OUTSIDE EDGE OF APPROACH SLAB.
- FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.
- AREA BETWEEN THE WINGWALL AND APPROACH SLAB SHALL BE GRADED TO DRAIN THE WATER AWAY FROM THE FILL FACE OF THE BRIDGE AND SHALL BE PAVED. SEE ROADWAY PLANS.
- THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 3 OF 3

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



ASSEMBLED BY : AES	DATE : 5/17
CHECKED BY : BE	DATE : 8/17
DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

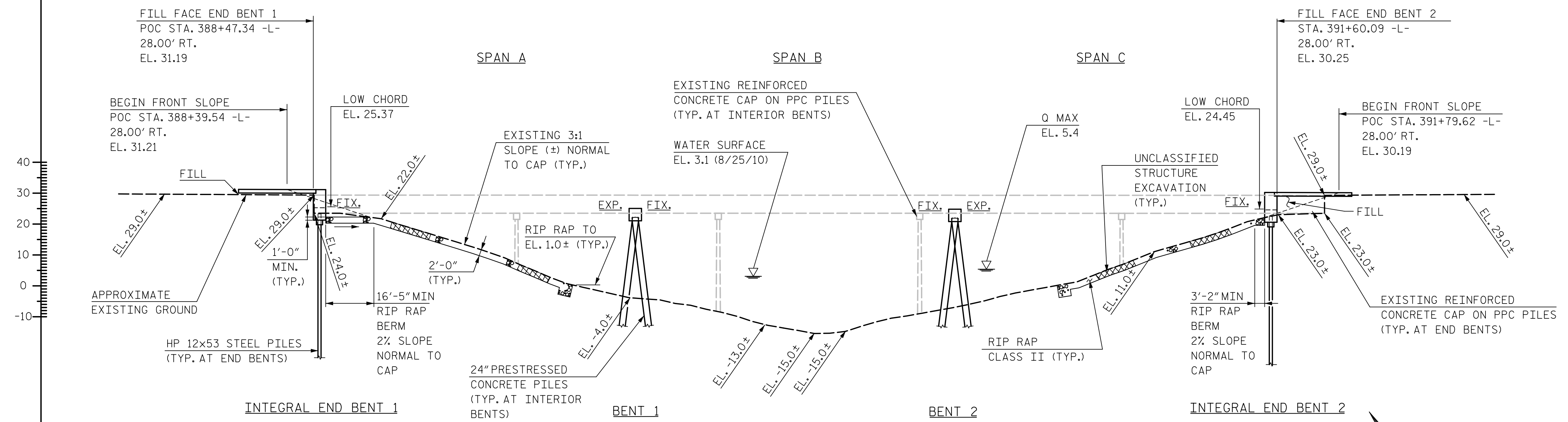
SECTION THRU SLAB
(TYPE A - ALTERNATE APPROACH FILL)

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NC License No. C-1554
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DRAWN BY : A. SMITH	DATE : 8/17
CHECKED BY : B. EMAM	DATE : 8/17
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18

DWG. NO. 39

REVISIONS						SHEET NO. S5-39
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 39
2			4			



NOTES:
 FOR GENERAL NOTES, SEE SHEET 4 OF 4.

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	2,393 CFS
FREQUENCY OF DESIGN DISCHARGE	=	MAX YR
DESIGN HIGH WATER ELEVATION	=	5.4 FT.
DRAINAGE AREA	=	N/A.

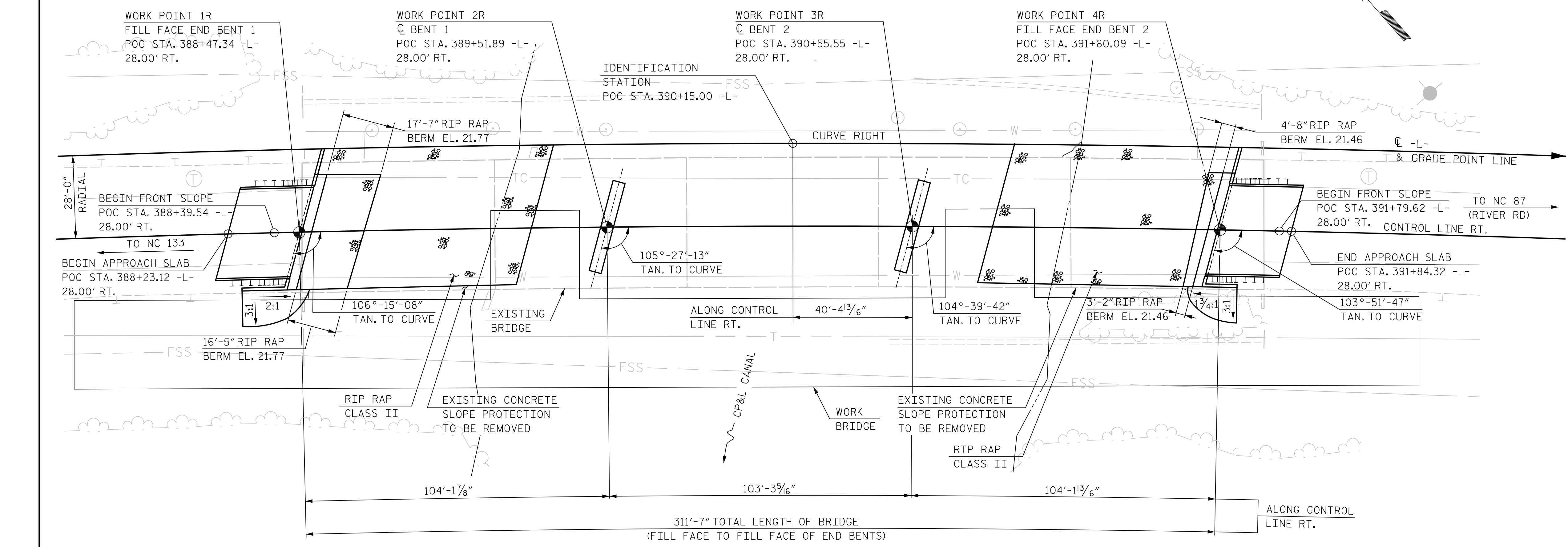
PI STA. = 393+40.25
 ELEV = 30.41
 V.C. = 200'

(-)-0.3000% (+)-0.3163%

GRADE DATA -L-

HORIZONTAL CURVE DATA -L-

PI STA. = 397+21.04
 Δ = 14°51'00.3" (RT)
 D = 0°45'50.2"
 L = 1,943.87'
 T = 977.41'
 R = 7,500.00'
 SE = 0.025



PLAN

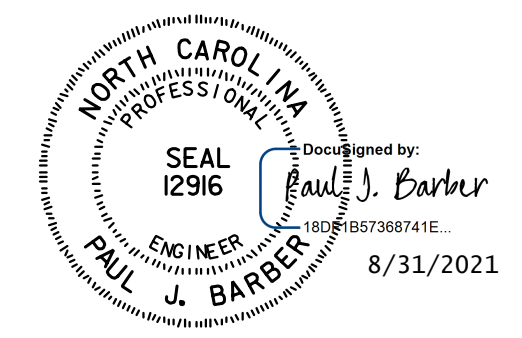
PILES NOT SHOWN IN PLAN VIEW FOR CLARITY
 ALL END BENTS AND BENTS ARE PARALLEL

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 1 OF 4 REPLACES BRIDGE NO. 093

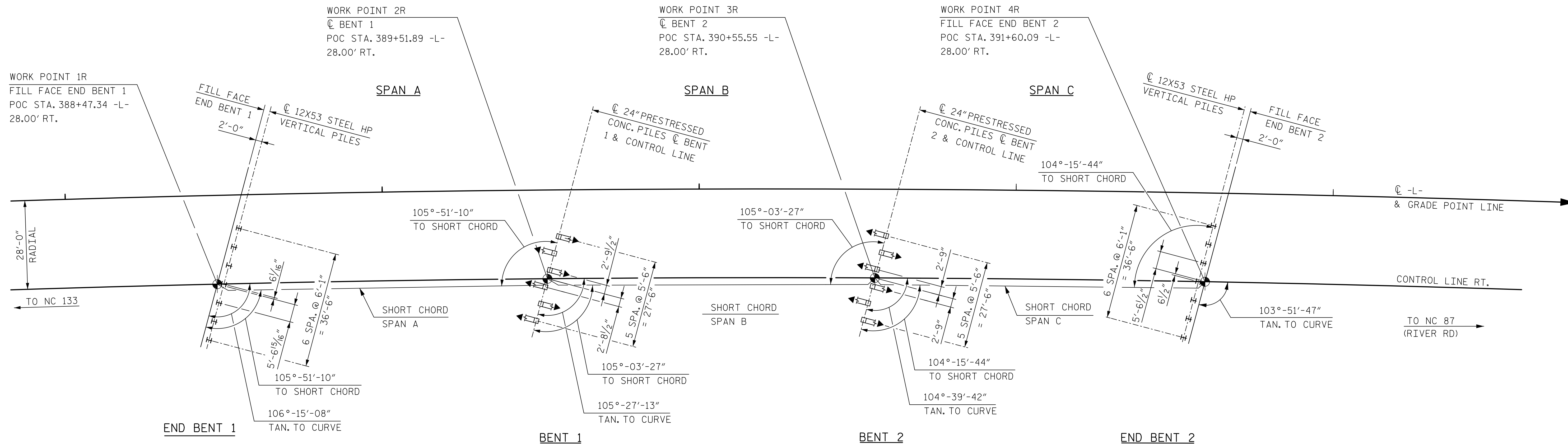
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 BRIDGE OVER CP&L CANAL
 ON NC 211
 BETWEEN NC 133 AND NC 87
 RIGHT LANE



HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: M. WRIGHT	DATE: 7/21	DWG. NO. 1	SHEET NO. S6-1
CHECKED BY: P. BARBER	DATE: 7/21		
DESIGN ENGINEER OF RECORD: P. BARBER	DATE: 7/21		

REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	DATE	
1			3		39
2			4		



FOUNDATION LAYOUT

FOUNDATION NOTES

- FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.
- DRIVE PILES AT END BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.
- PILES AT BENT NO.1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 265 TONS PER PILE.
- DRIVE PILES AT BENT NO.1 TO A REQUIRED DRIVING RESISTANCE OF 360 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.
- INSTALL PILES AT BENT NO.1 TO A TIP ELEVATION NO HIGHER THAN -45.0 FEET.
- THE SCOUR CRITICAL ELEVATION FOR BENT NO.1 IS -17.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.
- PILES AT BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 265 TONS PER PILE.
- DRIVE PILES AT BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 360 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR SCOUR.
- INSTALL PILES AT BENT NO.2 TO A TIP ELEVATION NO HIGHER THAN -45.0 FEET.

- THE SCOUR CRITICAL ELEVATION FOR BENT NO.2 IS -17.0 FT. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.
- STEEL PILE TIPS ARE REQUIRED FOR PRESTRESSED CONCRETE PILES AT BENTS NO.1 AND 2. FOR STEEL PILE TIPS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- TESTING THE FIRST PRODUCTION PILES WITH THE PDA DURING DRIVING IS REQUIRED AT BENTS NO.1 AND 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 75,000 TO 125,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENTS NO.1 AND 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.
- PILES AT END BENT NO.2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.
- DRIVE PILES AT END BENT NO.2 TO A REQUIRED DRIVING RESISTANCE OF 200 TONS PER PILE.

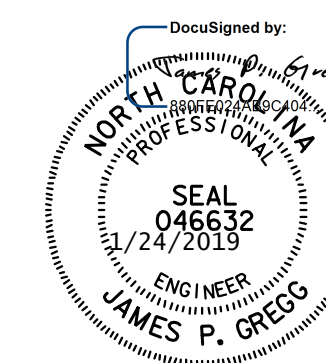
- NOTES:**
- ALL DIMENSIONS ARE PARALLEL OR NORMAL TO BENT CONTROL LINES AND FILL FACES.
 - ← INDICATES PILE BATTER IN DIRECTION SHOWN. BRACE PILES AT BENTS ARE TO BE BATTERED AT 1/2:12.
 - ALL PILES AT END BENT 1 AND END BENT 2 ARE HP 12x53 STEEL PILES.
 - FOR FOUNDATION ELEVATIONS AND DETAILS, SEE BENT AND END BENT SHEETS.
 - ALL PILE DIMENSIONS ARE TO CENTERS OF PILES AT BOTTOM OF END BENTS.

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 FOUNDATION LAYOUT
 RIGHT LANE

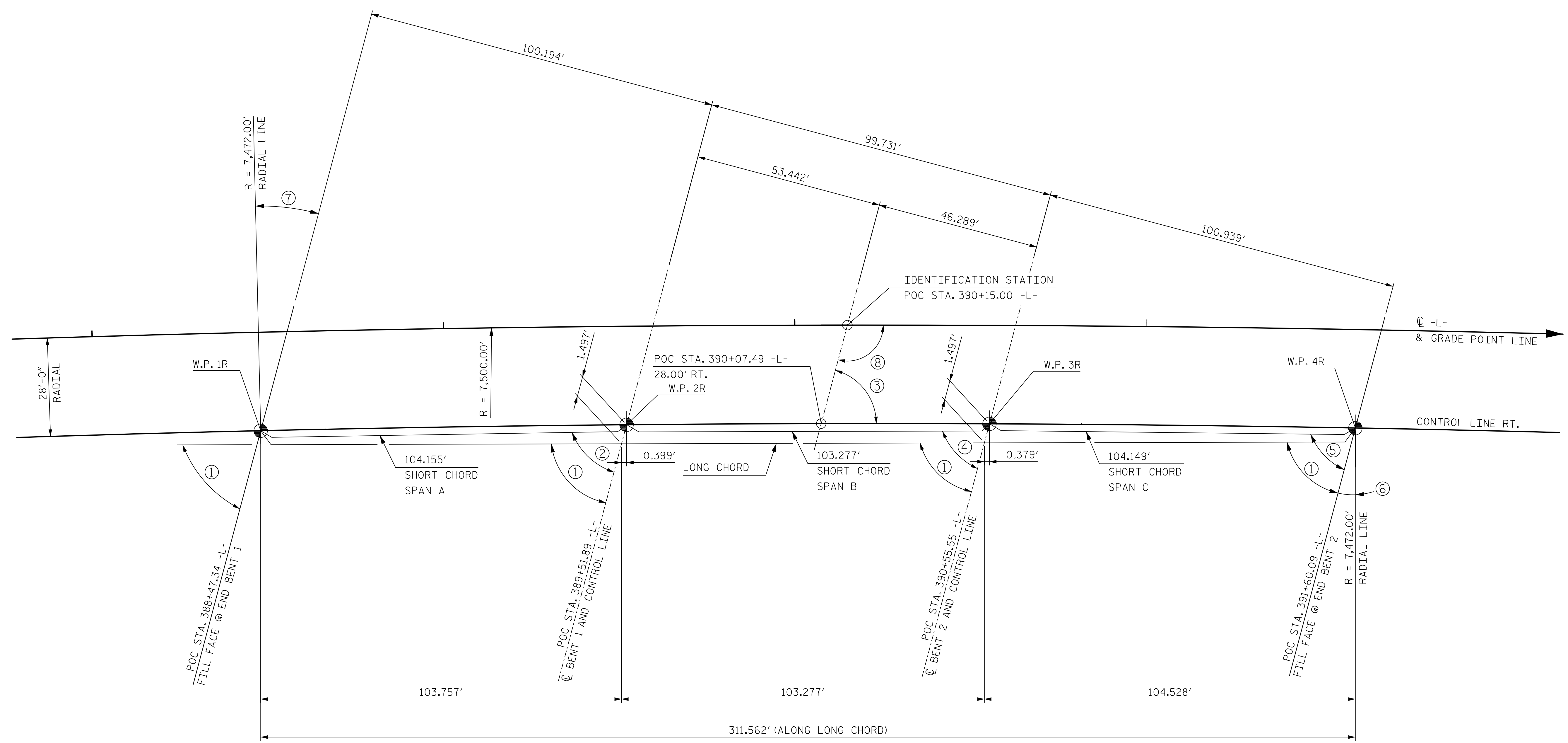


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 NC License No. C-1554
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DRAWN BY: B. NEUPANE DATE: 8/17
 CHECKED BY: B. EMAMI DATE: 9/17
 DESIGN ENGINEER OF RECORD: J. GREGG DATE: 8/18

DWG. NO. 2

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S6-2
1			3			TOTAL SHEETS
2			4			39



LONG CHORD LAYOUT

NOTE: ALL BENTS ARE PARALLEL

ANGLES

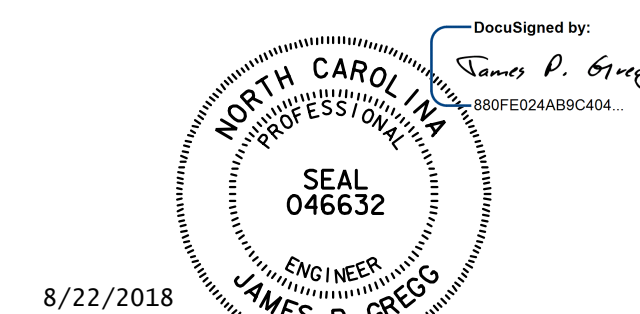
- ① 74°-56'-33" TO LONG CHORD
- ② 74°-08'-50" TO SHORT CHORD
- ③ 74°-58'-16" TANGENT TO THE CURVE
- ④ 74°-56'-33" TO SHORT CHORD
- ⑤ 75°-44'-16" TO SHORT CHORD
- ⑥ 13°-51'-47"
- ⑦ 16°-15'-08"
- ⑧ 104°-58'-17" TANGENT TO THE CURVE

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 3 OF 4

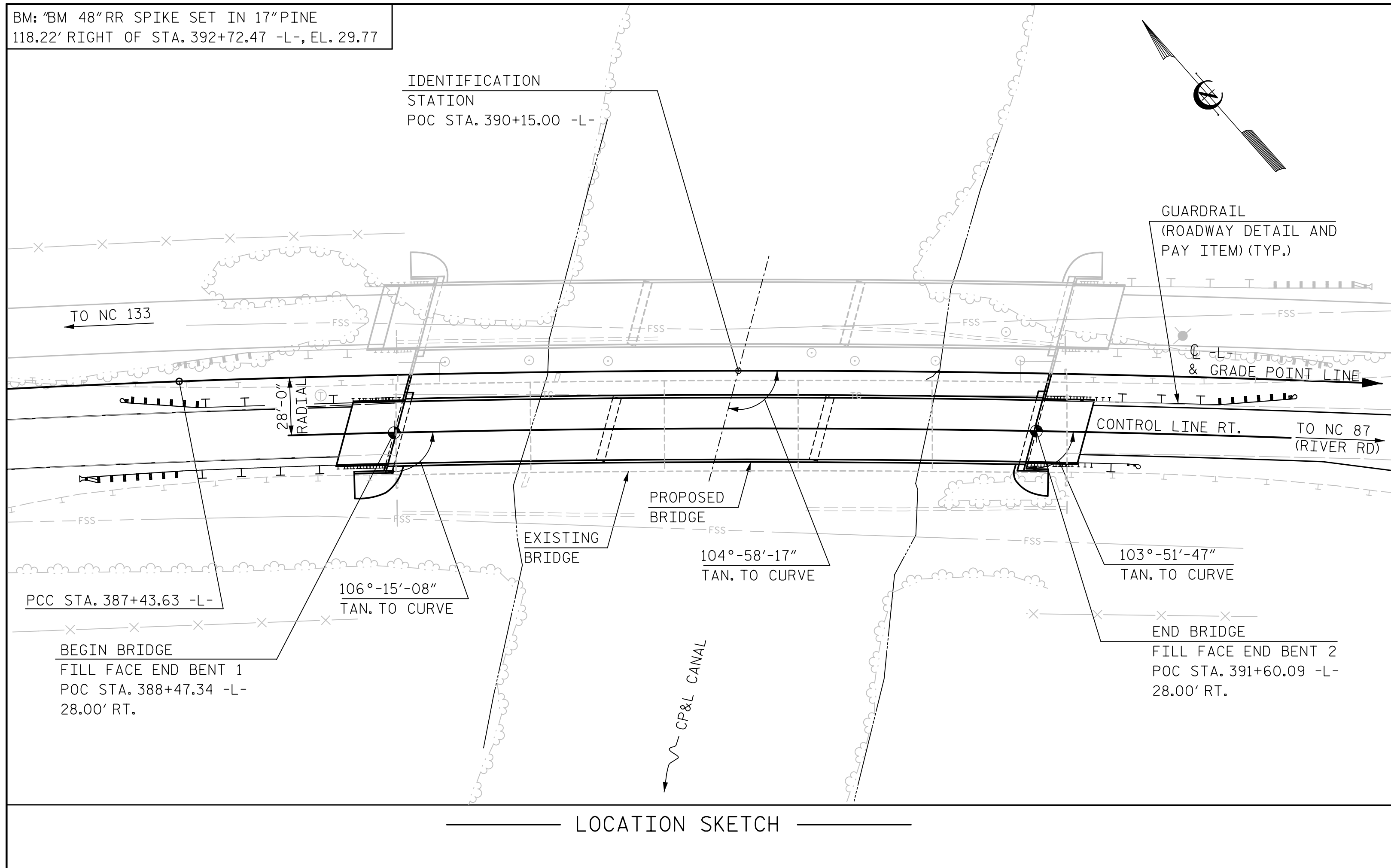
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

GENERAL DRAWING
 LONG CHORD LAYOUT
 RIGHT LANE



HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: B. NEUPANE	DATE: 8/17	DWG. NO. 3	
CHECKED BY: B. EMAMI	DATE: 9/17		
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18		

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S6-3
1			3			TOTAL SHEETS
2			4			39



GENERAL NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

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

PRESTRESSED CONCRETE DECK PANELS SHALL BE USED FOR THE DECK. METAL STAY-IN-PLACE FORMS SHALL NOT BE PERMITTED IN THIS PROJECT.

ALL METALLIZED SURFACES SHALL RECEIVE A SEAL COATING AS SPECIFIED IN TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE BENT CAPS AND PILE CAPS AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

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

PRESTRESSED CONCRETE GIRDERS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PRECAST PANELS SHALL BE DESIGNED FOR AN ALLOWABLE TENSILE STRESS OF 0 PSI IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

ALL BAR SUPPORTS USED IN THE PARAPET, DECK, BENT CAPS, PILE CAPS, FOOTINGS AND ALL INCIDENTAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

PRESTRESSED CONCRETE GIRDERS, PRECAST DECK PANELS, AND PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

THE CONCRETE IN THE PILES OF BENT NO. 1 AND 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

FOR CONSTRUCTION MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS, SEE SPECIAL PROVISIONS.

METALIZE PILES IN ACCORDANCE WITH TABLE 2 OF THE DEPARTMENTS THERMAL SPRAYED COATINGS (METALLIZATION) PROGRAM. FOR THERMAL SPRAYED COATINGS, SEE SPECIAL PROVISIONS.

AFTER DRIVING THE PILES APPLY 1 COAT EACH OF 1080-09 BROWN AND 1080-09 GRAY PAINT TO THE EMBEDDED SECTION OF THE METALLIZED PILE PRIOR TO CONCRETE EMBEDMENT IN ACCORDANCE WITH SECTION 442 OF THE STANDARD SPECIFICATIONS.

PRIOR TO BEGINNING METALLIZATION THE CONTRACTOR WILL PROVIDE METALLIZED SAMPLES TO THE ENGINEER FOR APPROVAL.

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

REMOVAL OF THE EXISTING BRIDGE SHALL BE PERFORMED SO AS NOT TO ALLOW DEBRIS TO FALL INTO THE WATER. THE CONTRACTOR SHALL REMOVE THE BRIDGE AND SUBMIT PLANS FOR DEMOLITION IN ACCORDANCE WITH ARTICLE 402-2 OF THE STANDARD SPECIFICATIONS.

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

THIS STRUCTURE CONTAINS THE NECESSARY CORROSION PROTECTION REQUIRED FOR A CORROSIVE SITE.

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING 5 SPAN STRUCTURE CONSISTING OF TWO END SPAN LENGTHS OF 65'-4" AND THREE INTERIOR SPAN LENGTHS OF 65'-1" WITH REINFORCED CONCRETE DECK SUPPORTED BY 6 LINES OF 54" PPC GIRDERS AT 8'-0" CTS. AND A 44'-0" CLEAR ROADWAY ON REINFORCED CONCRETE CAPS AND PPC PILES SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 28'-0" LEFT AND 19'-6" RIGHT OF CONTROL LINE RT. AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
LOCATION SKETCH,
GENERAL NOTES &
TOTAL BILL OF MATERIAL
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S6-4
1			3			TOTAL SHEETS
2			4			39

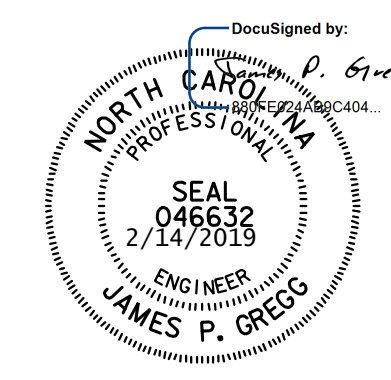
TOTAL BILL OF MATERIAL												
	REMOVAL OF EXISTING STRUCTURE AT STATION 390+15.00 -L-	ASBESTOS ASSESSMENT	PDA TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION 390+15.00 -L-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS AA CONCRETE	BRIDGE APPROACH SLABS, STATION 390+15.00 -L-	EPOXY COATED REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING SETUP FOR 24" PRESTRESSED CONCRETE PILES
	LUMP SUM	LUMP SUM	EACH	LUMP SUM	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	NO.	L.F.	EACH
SUPERSTRUCTURE	---	---	---	---	10,096	9,716	---	LUMP SUM	---	12	1,228.13	---
END BENT 1	---	---	---	---	---	---	41.4	---	6,618	---	---	---
BENT 1	---	---	---	---	---	---	18.4	---	3,254	---	---	6
BENT 2	---	---	---	---	---	---	18.4	---	3,254	---	---	6
END BENT 2	---	---	---	---	---	---	39.7	---	6,336	---	---	---
TOTAL	LUMP SUM	LUMP SUM	2	LUMP SUM	10,096	9,716	117.9	LUMP SUM	19,462	12	1,228.13	12

TOTAL BILL OF MATERIAL												
	PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	24" PRESTRESSED CONCRETE PILES		HP 12x53 STEEL PILES		PILE REDRIVES	TWO BAR METAL RAIL	1'-2" x 2'-6" CONCRETE PARAPET	RIPRAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	ELECTRICAL CONDUIT SYSTEM FOR SIGNALS AT STATION 390+15.00 -L-
	EACH	NO.	L.F.	NO.	L.F.	EACH	L.F.	L.F.	TONS	SQ. YD.	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	---	---	---	---	---	---	604.71	619.71	---	---	LUMP SUM	---
END BENT 1	7	---	---	7	525	7	---	---	420	465	---	---
BENT 1	---	6	630	---	---	6	---	---	---	---	---	---
BENT 2	---	6	630	---	---	6	---	---	---	---	---	---
END BENT 2	7	---	---	7	560	7	---	---	405	450	---	---
TOTAL	14	12	1,260	14	1,085	26	604.71	619.71	825	915	LUMP SUM	LUMP SUM

SAMPLE BAR REPLACEMENT

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

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND fy = 60ksi.



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NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: B. NEUPANE DATE: 8/17
CHECKED BY: B. EMAMI DATE: 9/17
DESIGN ENGINEER OF RECORD: J. GREGG DATE: 8/18

DWG. NO. 4

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 (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W x RF	STRENGTH I LIMIT STATE										SERVICE III LIMIT STATE					COMMENT NUMBER			
						MOMENT					SHEAR					MOMENT								
						LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN	GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	LIVE-LOAD FACTORS (γ_{LL})	DISTRIBUTION FACTORS (DF)	RATING FACTOR	SPAN		GIRDER LOCATION	DISTANCE FROM LEFT END OF SPAN (ft)	
DESIGN LOAD RATING	HL-93 (INVENTORY)	N/A	①	1.50	--	1.75	0.81	1.78	C	ER	50.5	0.90	1.55	C	I	9.5	0.8	0.81	1.50	C	ER	50.5		
	HL-93 (OPERATING)	N/A	--	2.05	--	1.35	0.81	2.31	C	ER	50.5	0.90	2.05	C	I	9.5	N/A	--	--	--	--	--		
	HS-20 (INVENTORY)	36.000	②	2.12	76.3	1.75	0.81	2.51	C	ER	50.5	0.90	2.14	C	I	9.5	0.8	0.81	2.12	C	ER	50.5		
	HS-20 (OPERATING)	36.000	--	2.82	101.5	1.35	0.81	3.25	C	ER	50.5	0.90	2.82	C	I	9.5	N/A	--	--	--	--	--		
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	5.09	67.7	1.40	0.81	7.55	C	ER	50.5	0.90	6.91	C	I	9.5	0.8	0.81	5.09	C	ER	50.5	
		SNGARBS2	20.000	--	3.65	73.0	1.40	0.81	5.41	C	ER	50.5	0.90	4.79	C	I	9.5	0.8	0.81	3.65	C	ER	50.5	
		SNAGRIS2	22.000	--	3.38	74.4	1.40	0.81	5.02	C	ER	50.5	0.90	4.40	C	I	9.5	0.8	0.81	3.38	C	ER	50.5	
		SNCOTTS3	27.250	--	2.50	68.1	1.40	0.81	3.71	C	ER	50.5	0.90	3.37	C	I	9.5	0.8	0.81	2.50	C	ER	50.5	
		SNAGGRS4	34.925	--	2.05	71.6	1.40	0.81	3.04	C	ER	50.5	0.90	2.71	C	I	9.5	0.8	0.81	2.05	C	ER	50.5	
		SNS5A	35.550	--	2.01	71.4	1.40	0.81	2.98	C	ER	50.5	0.90	2.72	C	I	9.5	0.8	0.81	2.01	C	ER	50.5	
		SNS6A	39.950	--	1.83	73.1	1.40	0.81	2.71	C	ER	50.5	0.90	2.45	C	I	9.5	0.8	0.81	1.83	C	ER	50.5	
	SNS7B	42.000	--	1.73	72.7	1.40	0.81	2.57	C	ER	50.5	0.90	2.37	C	I	9.5	0.8	0.81	1.73	C	ER	50.5		
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	2.22	73.3	1.40	0.81	3.29	C	ER	50.5	0.90	2.96	C	I	9.5	0.8	0.81	2.22	C	ER	50.5	
		TNT4A	33.075	--	2.23	73.8	1.40	0.81	3.30	C	ER	50.5	0.90	2.90	C	I	9.5	0.8	0.81	2.23	C	ER	50.5	
		TNT6A	41.600	--	1.79	74.5	1.40	0.81	2.66	C	ER	50.5	0.90	2.48	C	I	9.5	0.8	0.81	1.79	C	ER	50.5	
		TNT7A	42.000	--	1.80	75.6	1.40	0.81	2.67	C	ER	50.5	0.90	2.44	C	I	9.5	0.8	0.81	1.80	C	ER	50.5	
		TNT7B	42.000	--	1.83	76.9	1.40	0.81	2.72	C	ER	50.5	0.90	2.33	C	I	9.5	0.8	0.81	1.83	C	ER	50.5	
		TNAGRIT4	43.000	--	1.76	75.7	1.40	0.81	2.61	C	ER	50.5	0.90	2.26	C	I	9.5	0.8	0.81	1.76	C	ER	50.5	
TNAGT5A		45.000	--	1.67	75.1	1.40	0.81	2.47	C	ER	50.5	0.90	2.22	C	I	9.5	0.8	0.81	1.67	C	ER	50.5		
TNAGT5B	45.000	③	1.66	74.7	1.40	0.81	2.46	C	ER	50.5	0.90	2.15	C	I	9.5	0.8	0.81	1.66	C	ER	50.5			

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:

-
-
-
-

CONTROLLING LOAD RATING

① DESIGN LOAD RATING (HL-93)

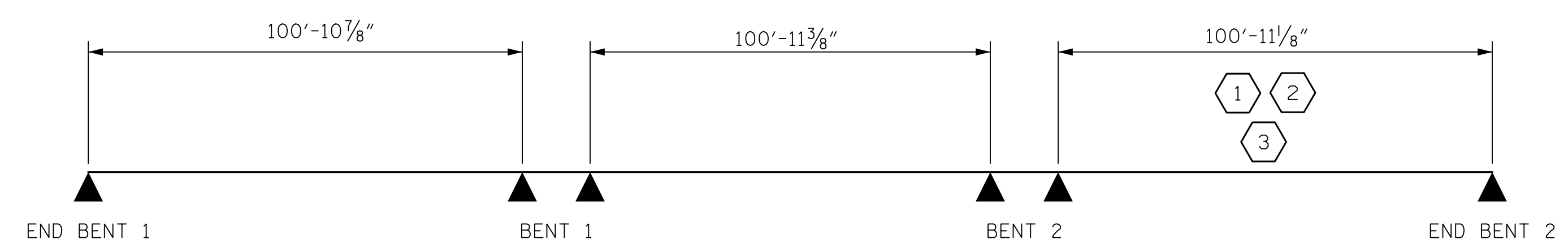
② DESIGN LOAD RATING (HS-20)

③ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

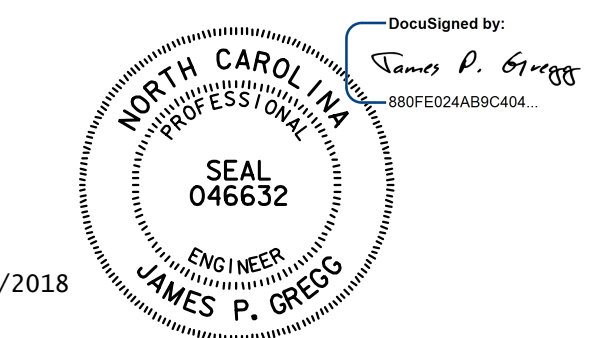
I - INTERIOR GIRDER
EL - EXTERIOR LEFT GIRDER
ER - EXTERIOR RIGHT GIRDER



LRFR SUMMARY

NOTE: SPAN LENGTHS PROVIDED ARE BEARING TO BEARING LENGTHS

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

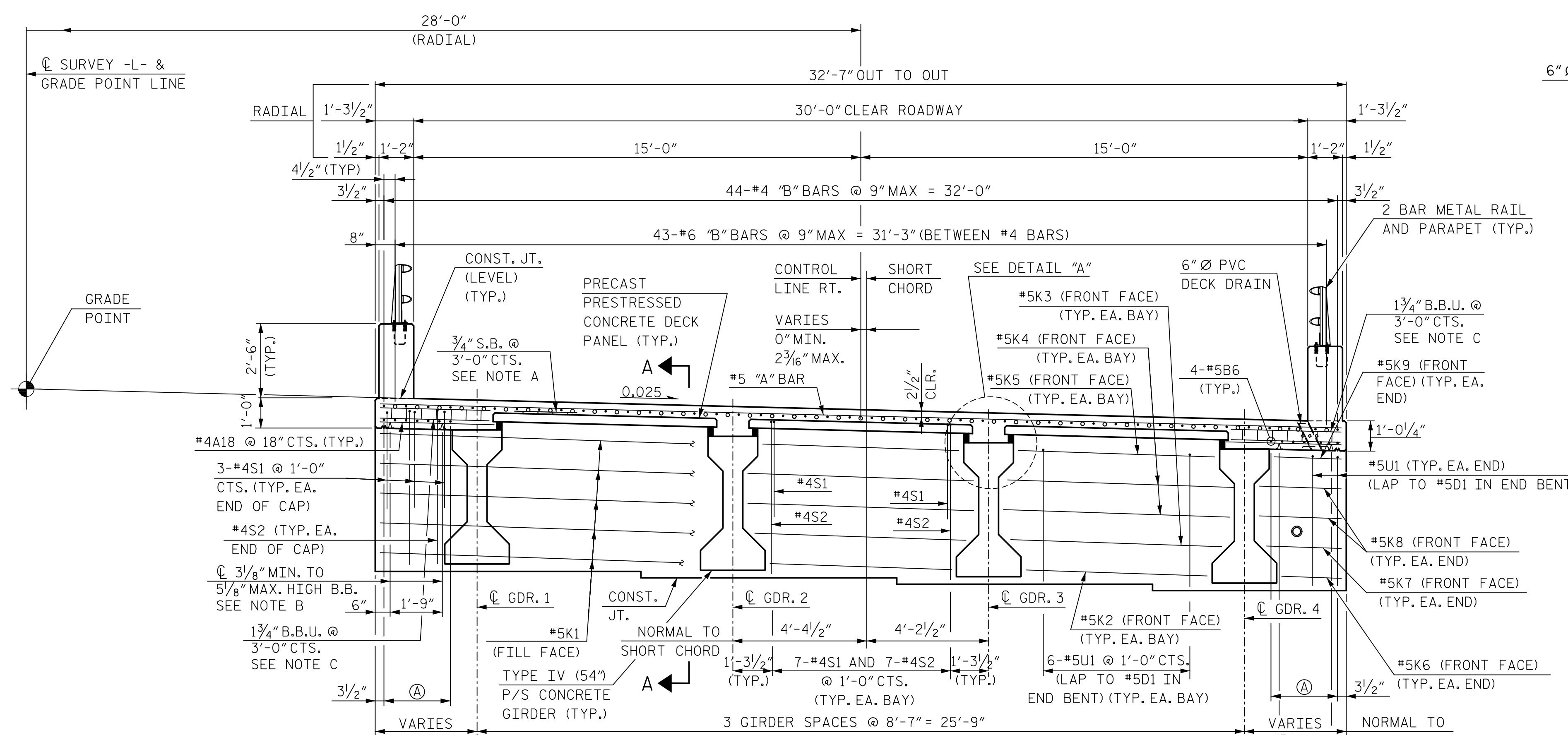


STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR
PRESTRESSED
CONCRETE GIRDERS
(NON-INTERSTATE TRAFFIC)
RIGHT LANE

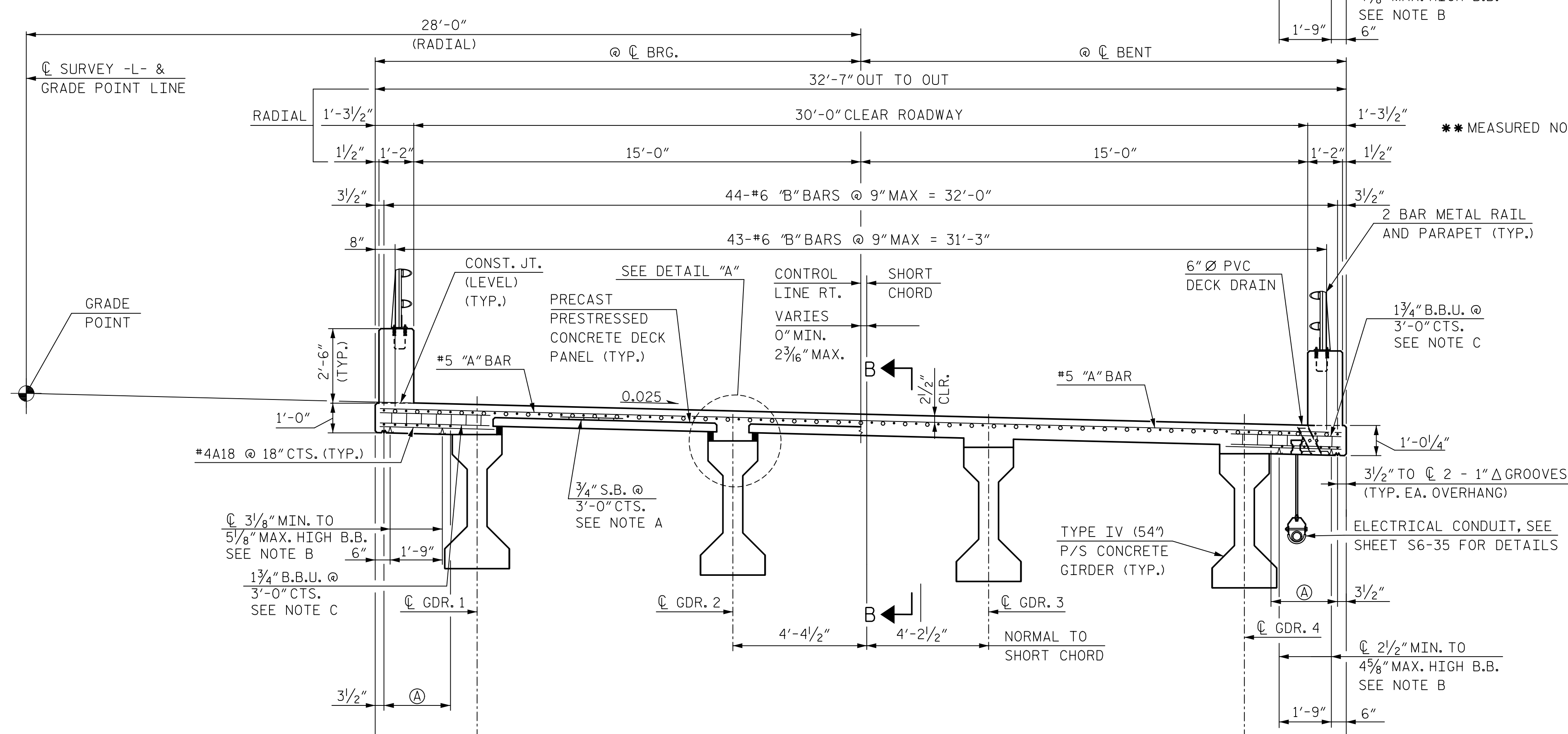
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CHECKED BY : BE	DATE : 9/17
DRAWN BY : MAA 1/08	REV. 11/2/08RR MAA/GM
CHECKED BY : GM/DI 2/08	REV. 10/1/11 MAA/GM

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DRAWN BY : B. NEUPANE	DATE : 8/17	DWG. NO. 5	TOTAL SHEETS 39
CHECKED BY : B. EMAM	DATE : 9/17		
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18		

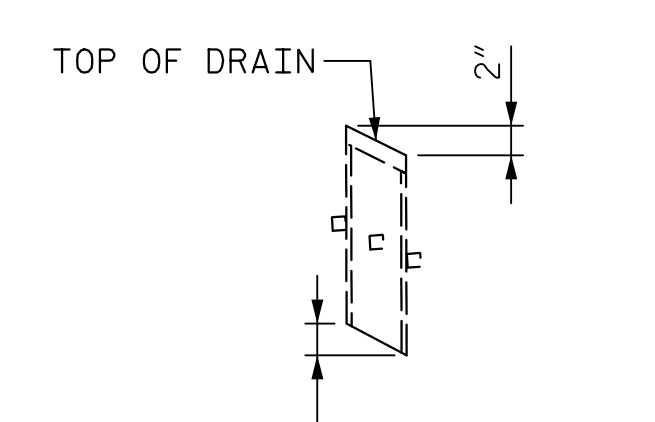
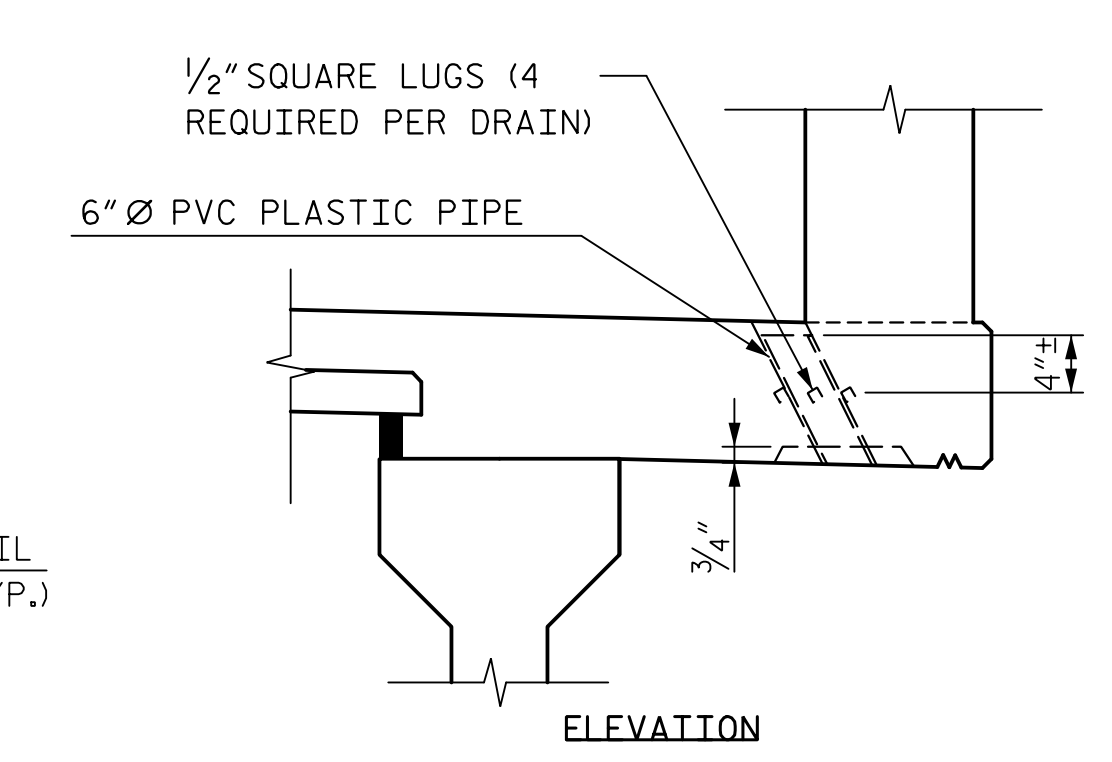
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S6-5
1			3			
2			4			



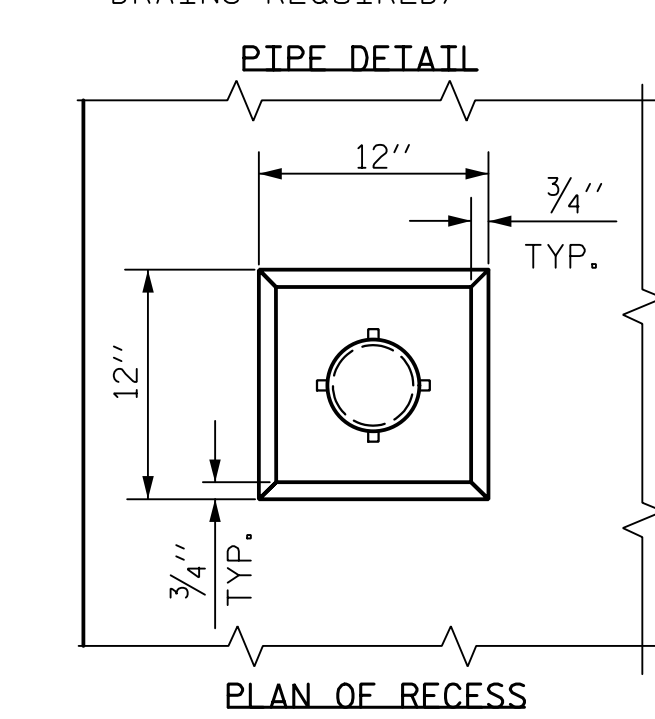
TYPICAL SECTION AT INTEGRAL END BENT
FOR SECTION THRU END BENT, SEE SECTION A-A, SHEET 2 OF 2



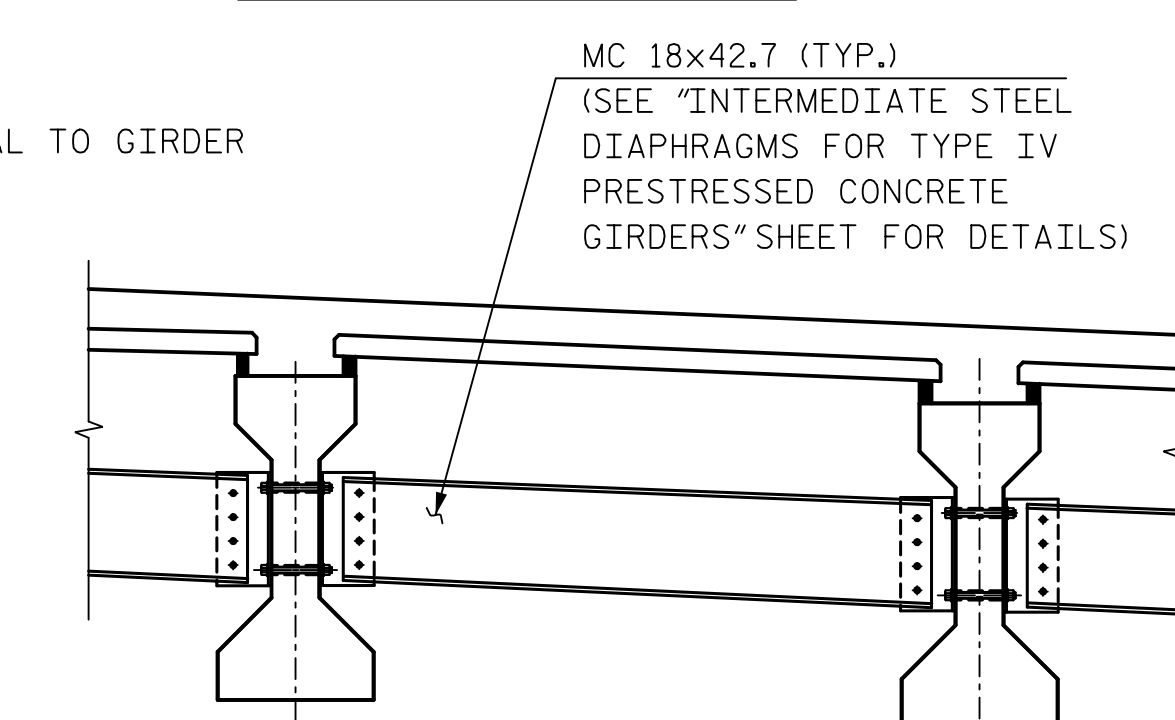
TYPICAL SECTION AT BENT
FOR SECTION THRU BENT, SEE SECTION B-B, SHEET 2 OF 2



* TO BE SET TO MATCH SLOPE OF BOTTOM OF OVERHANG (60 DRAINS REQUIRED)

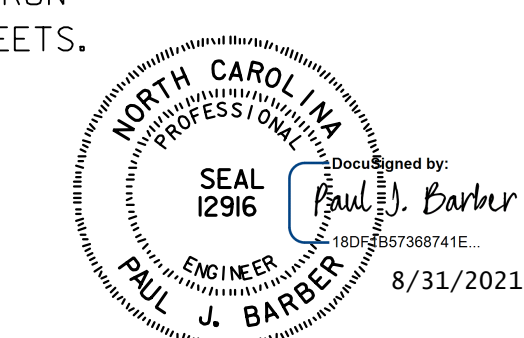


DECK DRAIN DETAILS



PARTIAL TYPICAL SECTION
(SHOWING INTERMEDIATE DIAPHRAGM)

'B' BAR KEY:
• = CONTINUOUS BAR RUN
◦ = NON CONTINUOUS BAR RUN
SEE PLAN OF SPAN SHEETS.



NOTES

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.

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

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILD-UPS.

THE SKEWED END CONDITIONS OF END BENTS AND BENTS ARE SUCH THAT THE USE OF 4' WIDE PRESTRESSED CONCRETE DECK PANELS IS NOT POSSIBLE; USE OF 8' WIDE PRESTRESSED CONCRETE DECK PANELS IS NECESSARY.

NOTE A: TO MAINTAIN PROPER LOCATION OF 'A' BARS IN THE TOP OF SLAB, SB DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE 'B' BARS IN THE TOP OF THE SLAB VARIES. A 1/4" SB SHALL BE USED WHERE ONLY #4 'B' BARS ARE PRESENT. WHERE #6 'B' BARS ARE PRESENT, A 3/4" SB SHALL BE USED.

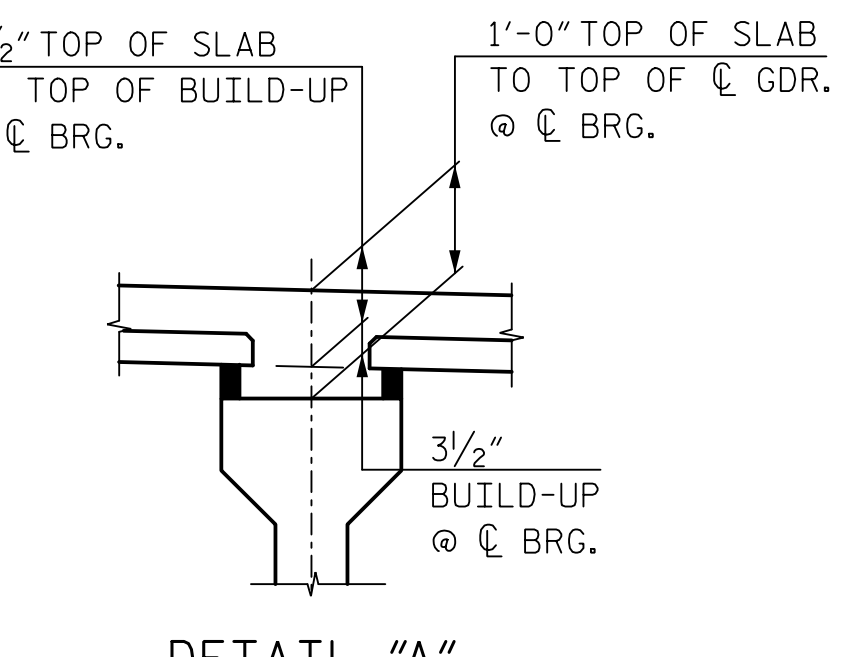
NOTE B: THE HEIGHT OF THE BEAM BOLSTER VARIES ALONG THE LENGTH OF THE SPAN DUE TO CAMBER AND THE VARYING HEIGHT REQUIRED FOR THE BUILDUP. THE CONTRACTOR SHALL HAVE SUFFICIENT SIZES TO PROPERLY SUPPORT THE REINFORCING STEEL.

NOTE C: TO MAINTAIN PROPER LOCATION OF 'A' BARS IN THE TOP OF SLAB, BBU DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE 'B' BARS IN THE TOP OF THE SLAB VARIES. A 2/4" BBU SHALL BE USED WHERE ONLY #4 'B' BARS ARE PRESENT. WHERE #6 'B' BARS ARE PRESENT, A 1 3/4" BBU SHALL BE USED.

DECK DRAIN NOTES

TOP OF FLOOR DRAIN TO BE SET 3/8" BELOW SURFACE OF SLAB.
4 - 1/2" SQUARE LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF THE PIPE.

THE 6" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

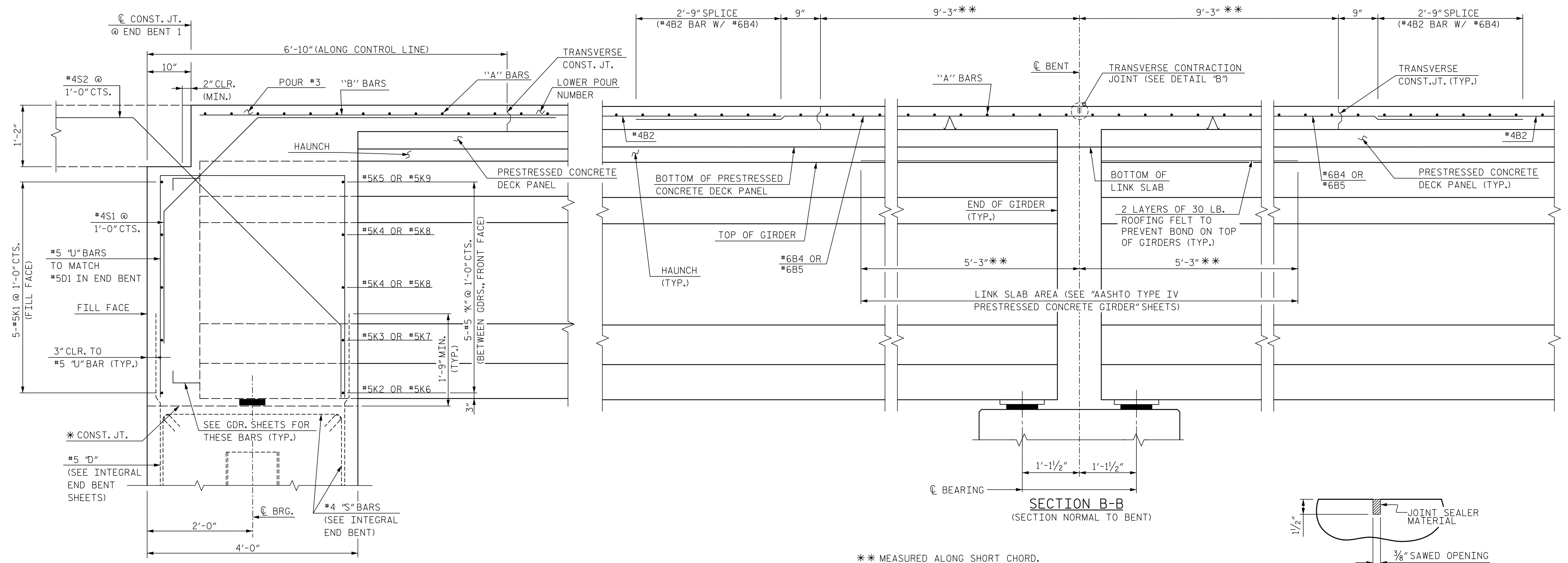


PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 1 OF 2
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION
RIGHT LANE

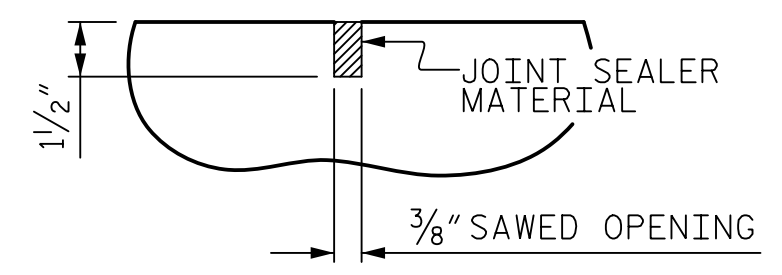
HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: M. WRIGHT	DATE: 7/21	CHECKED BY: P. BARBER	DATE: 7/21
DESIGN ENGINEER OF RECORD: P. BARBER	DATE: 7/21	DWG. NO. 6	

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



SECTION A-A
(END BENT 1 SHOWN, END BENT 2 SIMILAR)

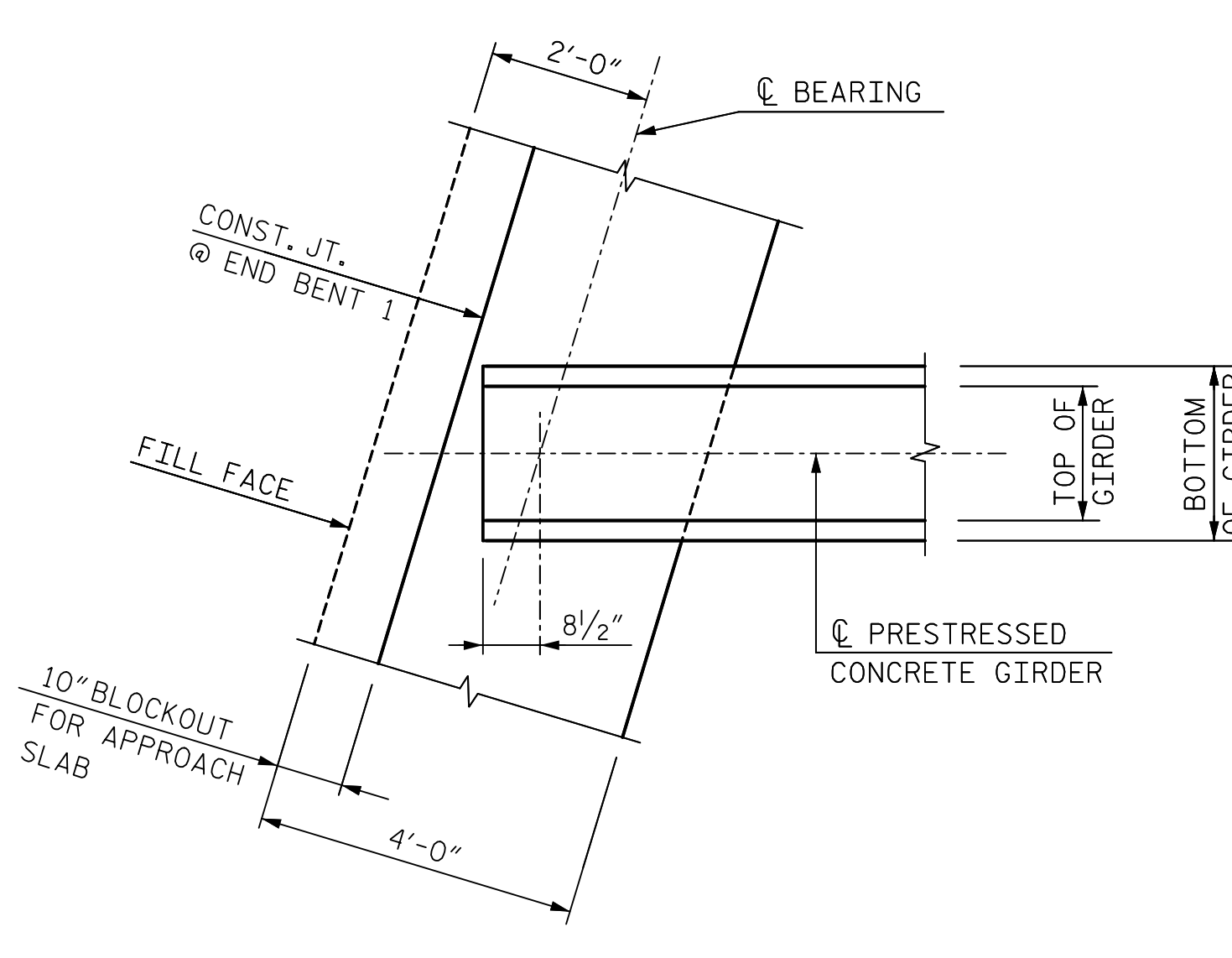
SECTION B-B
(SECTION NORMAL TO BENT)



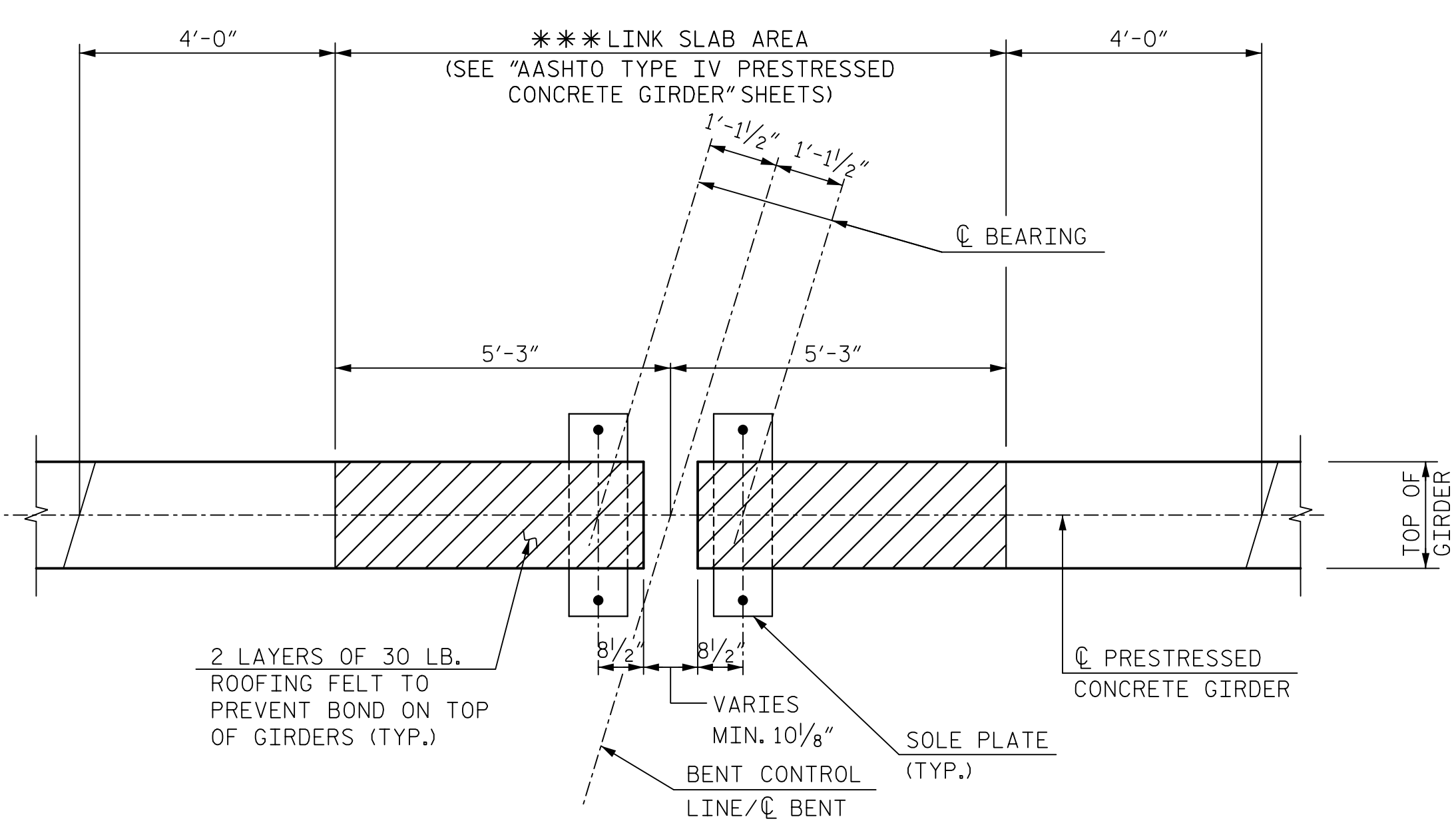
** MEASURED ALONG SHORT CHORD.

* THE TOP SURFACE OF THE END BENT CAP EXCLUDING THE BEARING AREA SHALL BE RAKED TO A DEPTH OF 1/4".

A 1/2" DEEP 3/8" WIDE CONTRACTION JOINT AT THE BENT CONTROL LINE SHALL BE SAWN WITHIN 24 HOURS OF POURING THE LINK SLAB. THE JOINT SHALL BE FILLED WITH JOINT SEALER MATERIAL. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

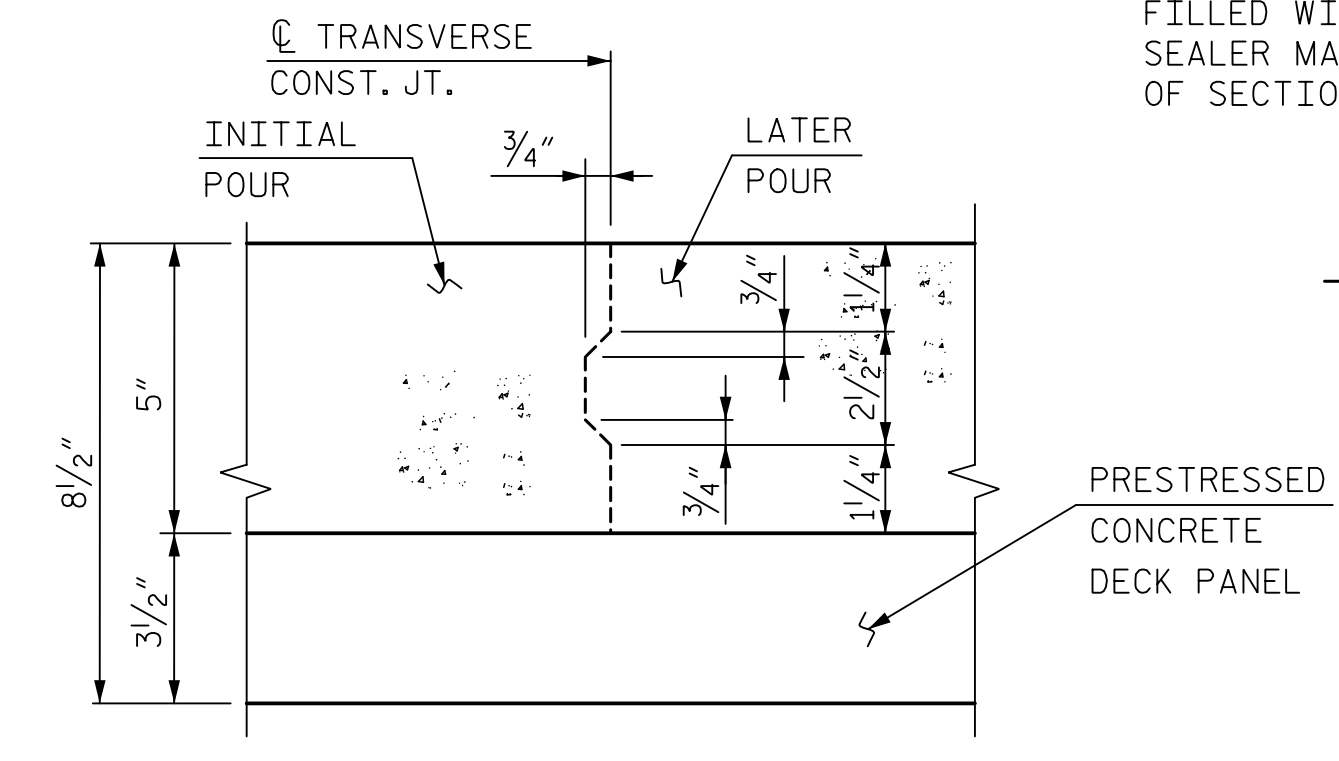


PLAN OF GIRDER AT INTEGRAL END BENT 1
(END BENT 2 SIMILAR)



PLAN @ BENT

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



TRANSVERSE CONSTRUCTION JOINT DETAIL

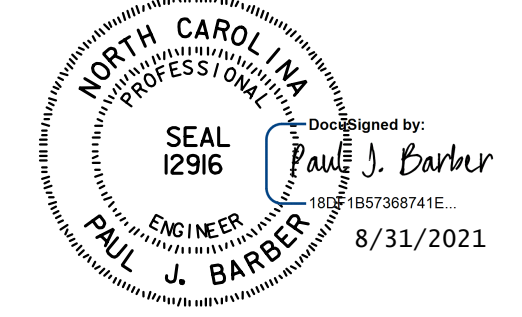
REINFORCING STEEL IN SLAB NOT SHOWN. LONGITUDINAL REINFORCING STEEL SHALL BE CONTINUOUS THROUGH JOINT.

DETAIL "B"

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

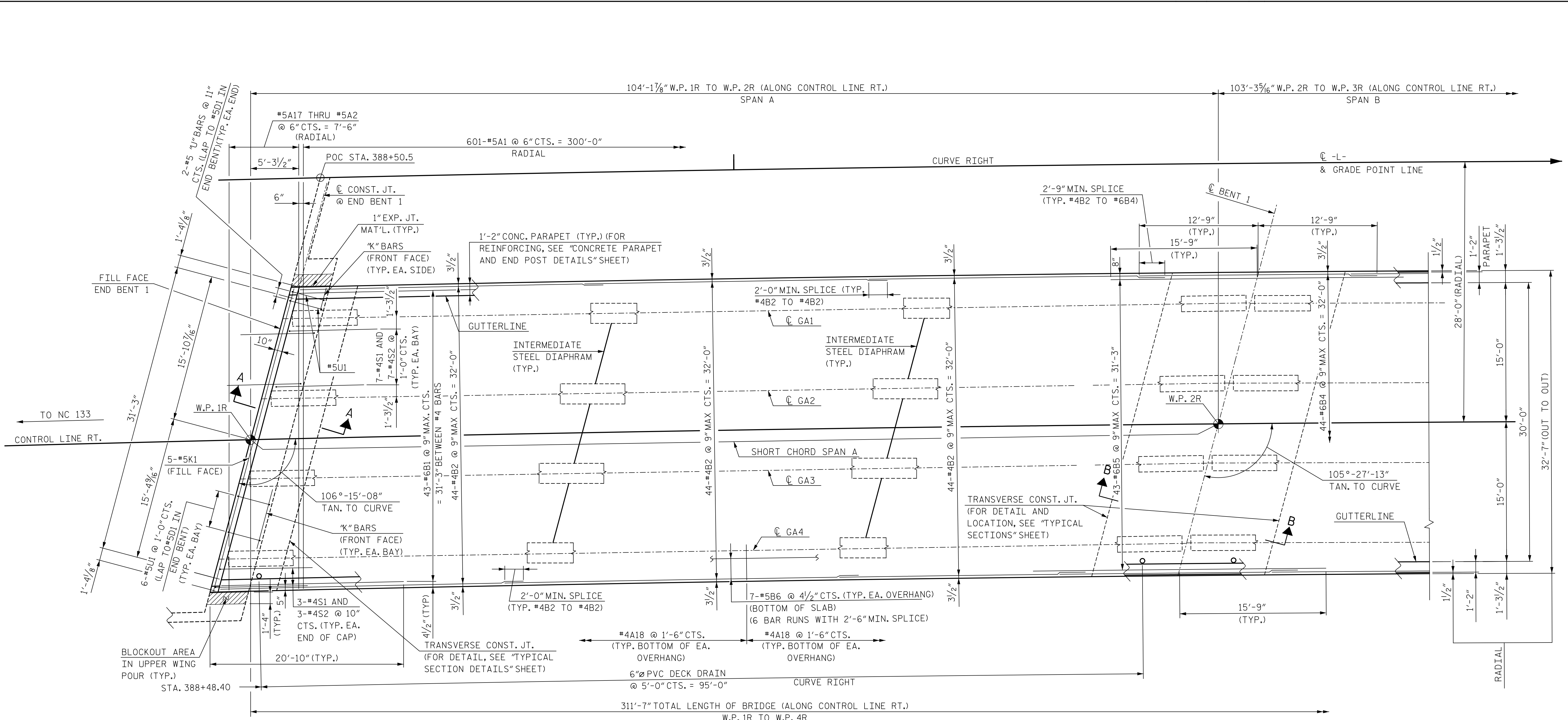
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTIONS
RIGHT LANE

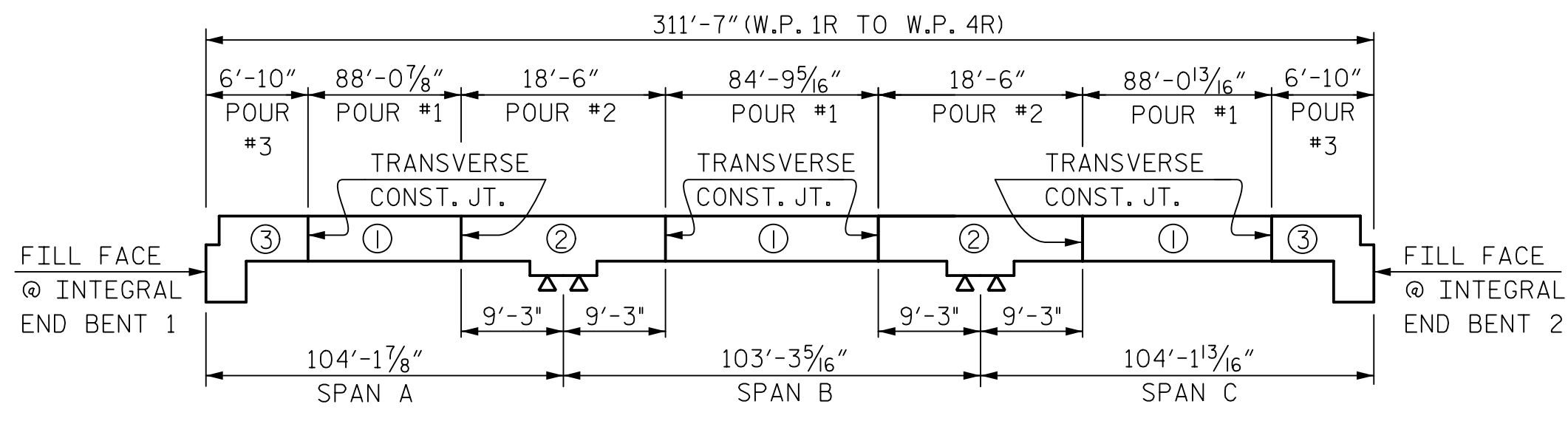


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DRAWN BY: M. WRIGHT	DATE: 7/21	DWG. NO. 7	<table border="1"> <tr> <th colspan="4">REVISIONS</th> </tr> <tr> <th>NO.</th> <th>BY</th> <th>DATE</th> <th>NO.</th> </tr> <tr> <td>1</td> <td>P. BARBER</td> <td>7/21</td> <td>3</td> </tr> <tr> <td>2</td> <td></td> <td></td> <td>4</td> </tr> </table>	REVISIONS				NO.	BY	DATE	NO.	1	P. BARBER	7/21	3	2			4
REVISIONS																			
NO.	BY			DATE	NO.														
1	P. BARBER	7/21	3																
2			4																
CHECKED BY: P. BARBER	DATE: 7/21																		
DESIGN ENGINEER OF RECORD: P. BARBER	DATE: 7/21																		

SHEET NO.	S6-7
TOTAL SHEETS	39



PLAN OF SPAN A

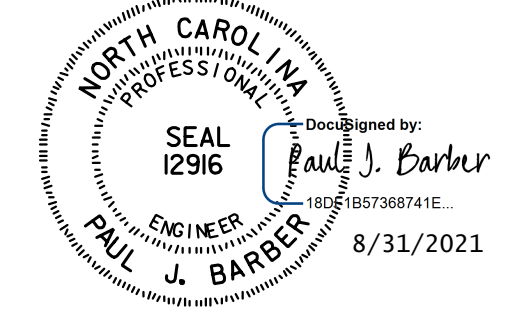


POURING SEQUENCE
DIMENSIONS GIVEN ALONG CONTROL LINE RIGHT

NOTES:
SEE SPAN B FOR NOTES.
SEE SPAN C FOR ARC OFFSETS.
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

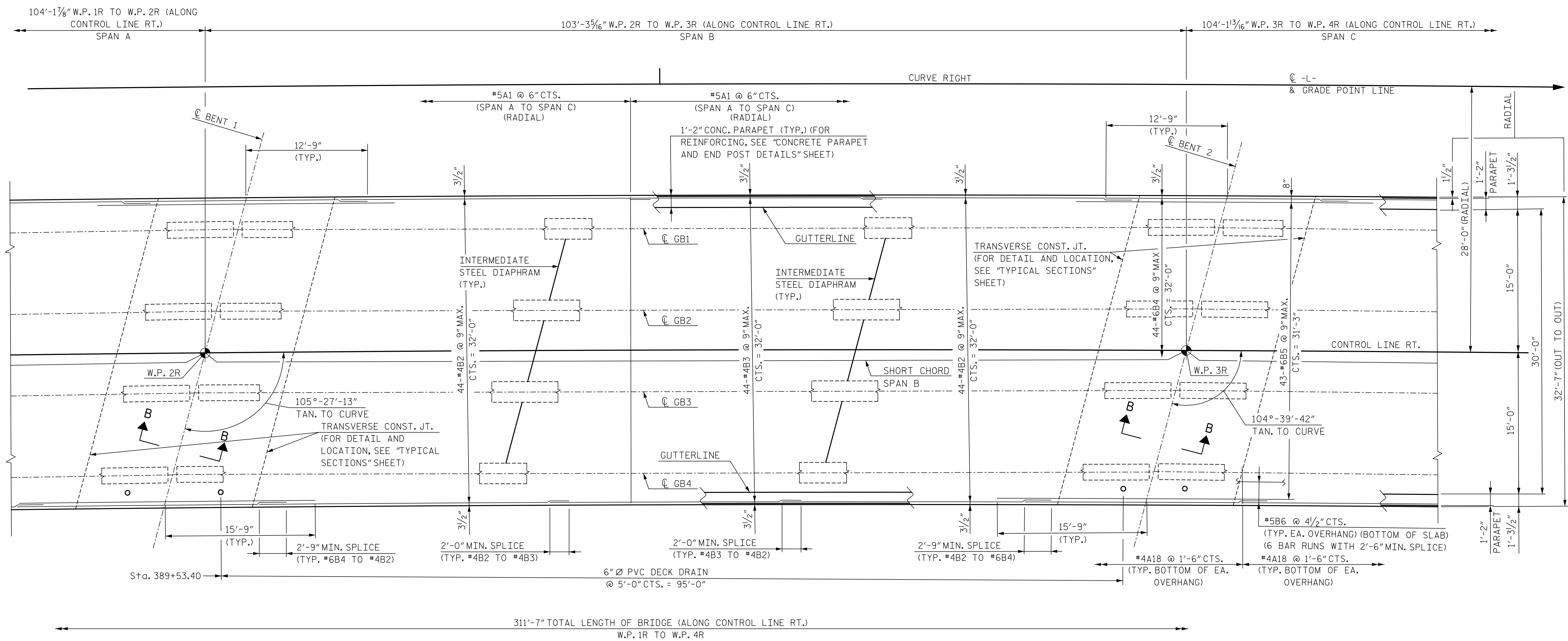
PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 1 OF 3
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPAN A
RIGHT LANE



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CHECKED BY: P. BARBER	DATE: 7/21		
DESIGN ENGINEER OF RECORD: P. BARBER	DATE: 7/21		

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S6-8
1			3			TOTAL SHEETS
2			4			39



PLAN OF SPAN B

NOTES:

FOR SECTION VIEWS, SEE "TYPICAL SECTIONS" SHEETS.

FOR INTERMEDIATE STEEL DIAPHRAGM, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET FOR DETAILS. FOR LOCATION, SEE "SUPERSTRUCTURE FRAMING PLAN" SHEET.

FOR CONCRETE PARAPET DIMENSIONS, REINFORCING AND JOINT SPACING, SEE "CONCRETE PARAPET AND END POST DETAILS" SHEETS.

6" Ø PVC DRAINS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO AVOID INTERFERENCE WITH DECK REBARS.

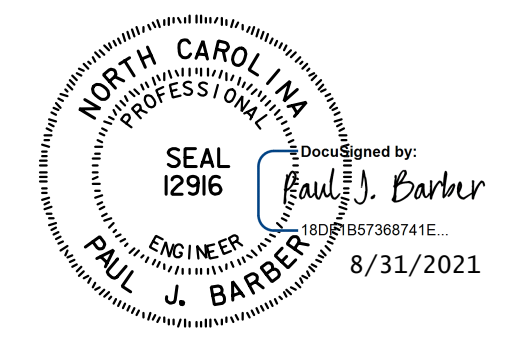
SEE SPAN C FOR ARC OFFSETS.

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUPERSTRUCTURE
 PLAN OF SPAN B
 RIGHT LANE



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DRAWN BY: M. WRIGHT DATE: 7/21
 CHECKED BY: P. BARBER DATE: 7/21
 DESIGN ENGINEER OF RECORD: P. BARBER DATE: 7/21

DWG. NO. 9

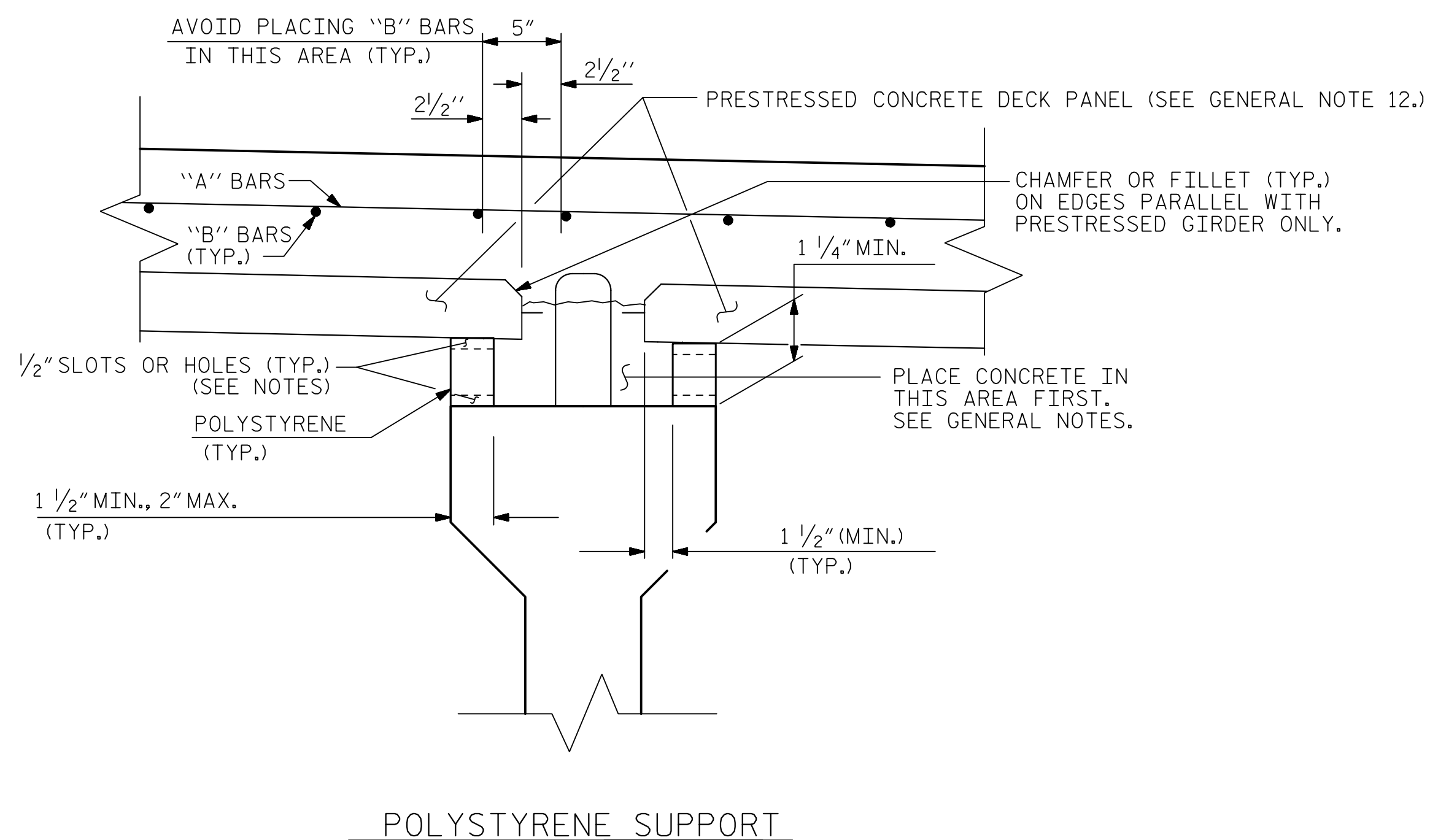
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S6-9
1			3			TOTAL SHEETS
2			4			39

DECK PANEL SUPPORTS

THE CONTRACTOR SHALL PROVIDE THE DECK PANEL SUPPORT SYSTEM SHOWN OR HE MAY SUBMIT A DECK PANEL SUPPORT SYSTEM OF HIS OWN DESIGN TO THE ENGINEER FOR APPROVAL.

POLYSTYRENE SUPPORT SYSTEM

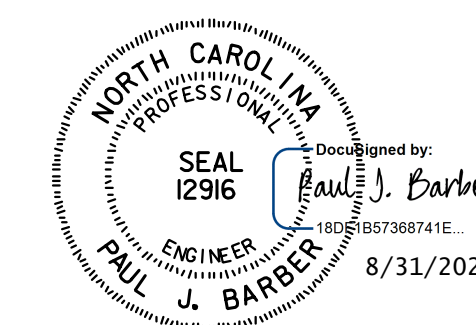
1. ALL POLYSTYRENE SHALL BE DOW STYROFOAM 60 HIGH-LOAD, UC INDUSTRIES FOAMULAR 600 OR APPROVED EQUAL.
2. THE POLYSTYRENE SUPPORT SYSTEM SHALL CONSIST OF ONE LAYER WITH A MINIMUM WIDTH OF 1 1/2" AND A MAXIMUM WIDTH OF 2". THE POLYSTYRENE SHALL HAVE 1/2" X 1/2" WIDE SLOTS OR 1/2" DIAMETER HOLES AT 4'-0" CENTERS STAGGERED ALONG THE TOP AND BOTTOM.
3. THE POLYSTYRENE MAY BE CUT AND PLACED ON EDGE AS NECESSARY TO MATCH THE REQUIRED BUILDUP PROFILE ALONG THE GIRDER.
4. ADHESIVE, AS APPROVED BY THE ENGINEER, SHALL BE APPLIED TO THE TOP OF THE GIRDER IN A CONTINUOUS BEAD AND IN SUFFICIENT AMOUNT TO PREVENT THE POLYSTYRENE FROM BLOWING OUT AND TO PREVENT GAPS FROM FORMING BETWEEN THE POLYSTYRENE AND THE GIRDER. PRIOR TO PLACEMENT OF THE DECK PANELS, THE ADHESIVE SHALL ALSO BE APPLIED TO THE TOP OF THE POLYSTYRENE.
5. CONCRETE-FILLED BUCKETS, STACKS OF DECK PANELS, BUNDLED REINFORCING BARS OR OTHER HEAVY CONCENTRATED LOADS WILL NOT BE PERMITTED ON THE DECK PANEL ONCE THE PANEL HAS BEEN PLACED ON THE POLYSTYRENE SUPPORT SYSTEM.



GENERAL NOTES

1. THE DESIGN COMPRESSIVE STRENGTH (F'G) FOR THE CONCRETE IN PRESTRESSED PANELS SHALL BE 5000 PSI MINIMUM AT 28 DAYS. COMPRESSIVE STRENGTH OF CONCRETE AT TIME OF RELEASE OF STRANDS SHALL BE 4000 PSI MINIMUM.
2. THE PRECAST PRESTRESSED PANEL SHALL HAVE A THICKNESS OF 3 1/2" WITH THE PRESTRESSED STRANDS LOCATED AT HALF THE DEPTH OF THE PANEL.
3. FOR SKEWED SPANS, TRAPEZOIDAL CLOSURE PANELS SHALL HAVE A MINIMUM WIDTH OF 2 FEET ON THE SHORT SIDE.
4. ALL PRESTRESSING STRANDS SHALL EXTEND 2" BEYOND THE PANEL EDGES.
5. SHEAR REINFORCING OF 0.60 SQ. INCHES OF REINFORCING STEEL PER 10 SQ. FEET OF PANEL SURFACE SHALL BE PROVIDED IN THE PANEL TO ENSURE COMPOSITE ACTION BETWEEN PANEL AND THE CAST-IN-PLACE CONCRETE. SHEAR REINFORCEMENT SHALL BE MADE OF WELDED WIRE HAVING A MINIMUM YIELD STRENGTH OF 60 KSI.
6. SHEAR REINFORCEMENT AND LIFTING DEVICES SHALL BE CONSTRUCTED AND PLACED SO AS TO AVOID ANY INTERFERENCE WITH REINFORCING STEEL IN THE CAST-IN-PLACE DECK SLAB AND TO ALLOW FOR PROPER CONCRETE CONSOLIDATION IN THE DECK PANEL.
7. SHIFT LONGITUDINAL "B" BARS AS NECESSARY TO OBTAIN A MINIMUM CLEAR DISTANCE OF 2 1/2" TO THE RIGHT OR LEFT OF THE EDGE OF THE DECK PANEL.
8. WHEN CASTING THE DECK, PLACE CONCRETE FIRST OVER THE GIRDERS IN CONTINUOUS STRIPS A MINIMUM OF THREE PANEL LENGTHS AHEAD OF THE REST OF THE CONCRETE. CAREFULLY VIBRATE THE CONCRETE OVER THE GIRDERS SO THAT CONCRETE COMPLETELY FILLS THE AREA UNDER THE DECK PANEL OVERHANGS. THEN PLACE AND VIBRATE THE REMAINING DECK CONCRETE.
9. PRECAST DECK PANELS SHALL BE DESIGNED FOR AN ALLOWABLE TENSILE STRESS OF 0 PSI IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.
10. PRECAST DECK PANELS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.
11. ALL BAR SUPPORTS AND INCIDENTAL REINFORCING STEEL USED IN THE PRECAST PANELS SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
12. ENDS OF PANELS AT INTERIOR BENTS SHALL NOT OVERHANG ANY PORTION OF THE GIRDER END BY MORE THAN 1", MEASURED PERPENDICULAR TO THE END OF THE GIRDER. PANELS EDGE SHALL BE PARALLEL TO INTERIOR BENT CONTROL LINES AND PROVIDE A MINIMUM 10" WIDE GAP TO ALLOW CAST-IN-PLACE TO BE INSTALLED. SEE SECTION B-B ON "TYPICAL SECTIONS" SHEET.

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

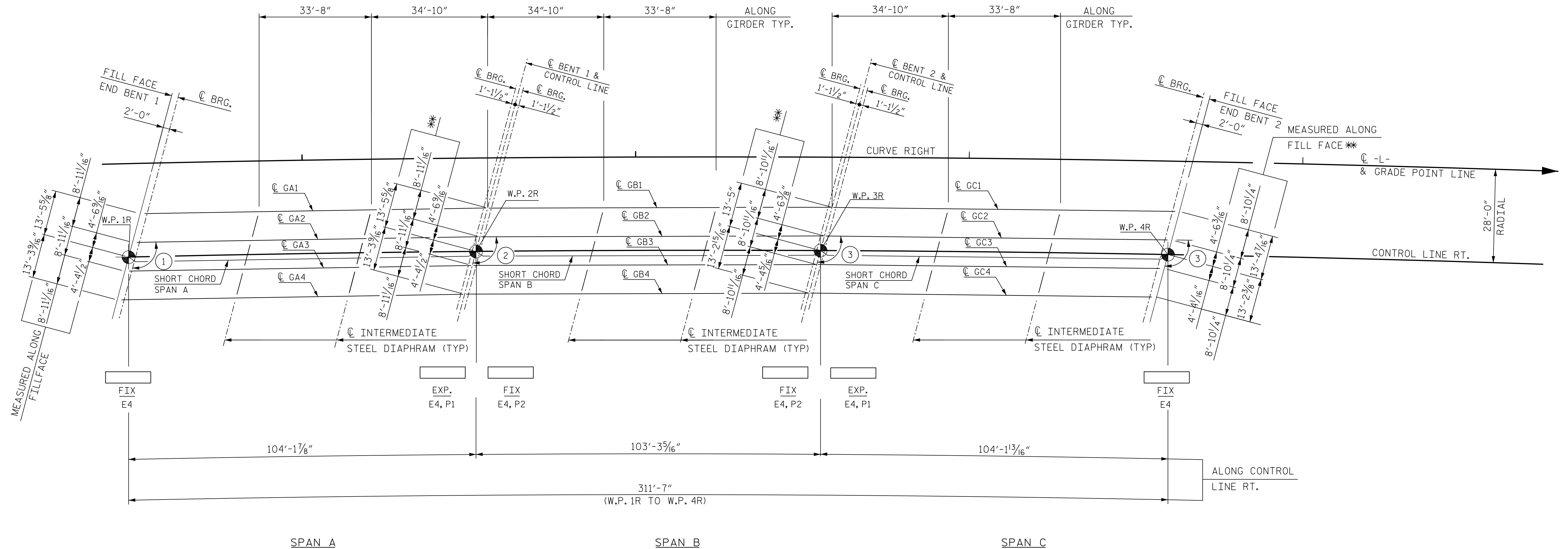


STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 PRECAST PRESTRESSED
 CONCRETE DECK PANELS
 RIGHT LANE

ASSEMBLED BY : B. NEUPANE	DATE : 8/17
CHECKED BY : B. EMAMI	DATE : 9/17
DRAWN BY : ELR 1/92	REV. 5/7/03R RWW/JTE
CHECKED BY : GRP 4/92	REV. 5/1/06R TLA/GM
	REV. 10/1/11 MAA/GM

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DRAWN BY : M. WRIGHT	DATE : 7/21	DWG. NO. II	
CHECKED BY : P. BARBER	DATE : 7/21		
DESIGN ENGINEER OF RECORD : P. BARBER	DATE : 7/21		

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S6-11
1			3			TOTAL SHEETS
2			4			39



FRAMING PLAN

ANGLES

- ① 105°-51'-10" (TYP. FOR SPAN A)
- ② 105°-03'-27" (TYP. FOR SPAN B)
- ③ 104°-15'-44" (TYP. FOR SPAN C)

SPAN *	LENGTH
A	100'-10 7/8"
B	100'-11 3/8"
C	100'-11 1/8"

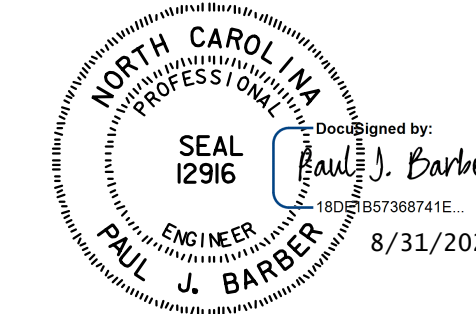
NOTES:

"FIX." DENOTES FIXED BEARING ASSEMBLY.
 "EXP." DENOTES EXPANSION BEARING ASSEMBLY.
 "E" DENOTES ELASTOMERIC BEARING PAD MARK.
 "P" DENOTES STEEL SOLE PLATE MARK.

* GIRDERS ARE SET PARALLEL TO THE SHORT CHORD. SPAN LENGTHS SHOWN ARE \bar{C} OF BEARINGS TO \bar{C} OF BEARINGS.

** DIMENSIONS ARE ALONG \bar{C} BENT AND ARE THE SAME FOR:
 EB1 AND PIER 1 (SPAN A)
 PIER 1 AND PIER 2 (SPAN B)
 PIER 2 AND EB2 (SPAN C)

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-



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DRAWN BY	M. WRIGHT	DATE	7/21
CHECKED BY	P. BARBER	DATE	7/21
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	7/21

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

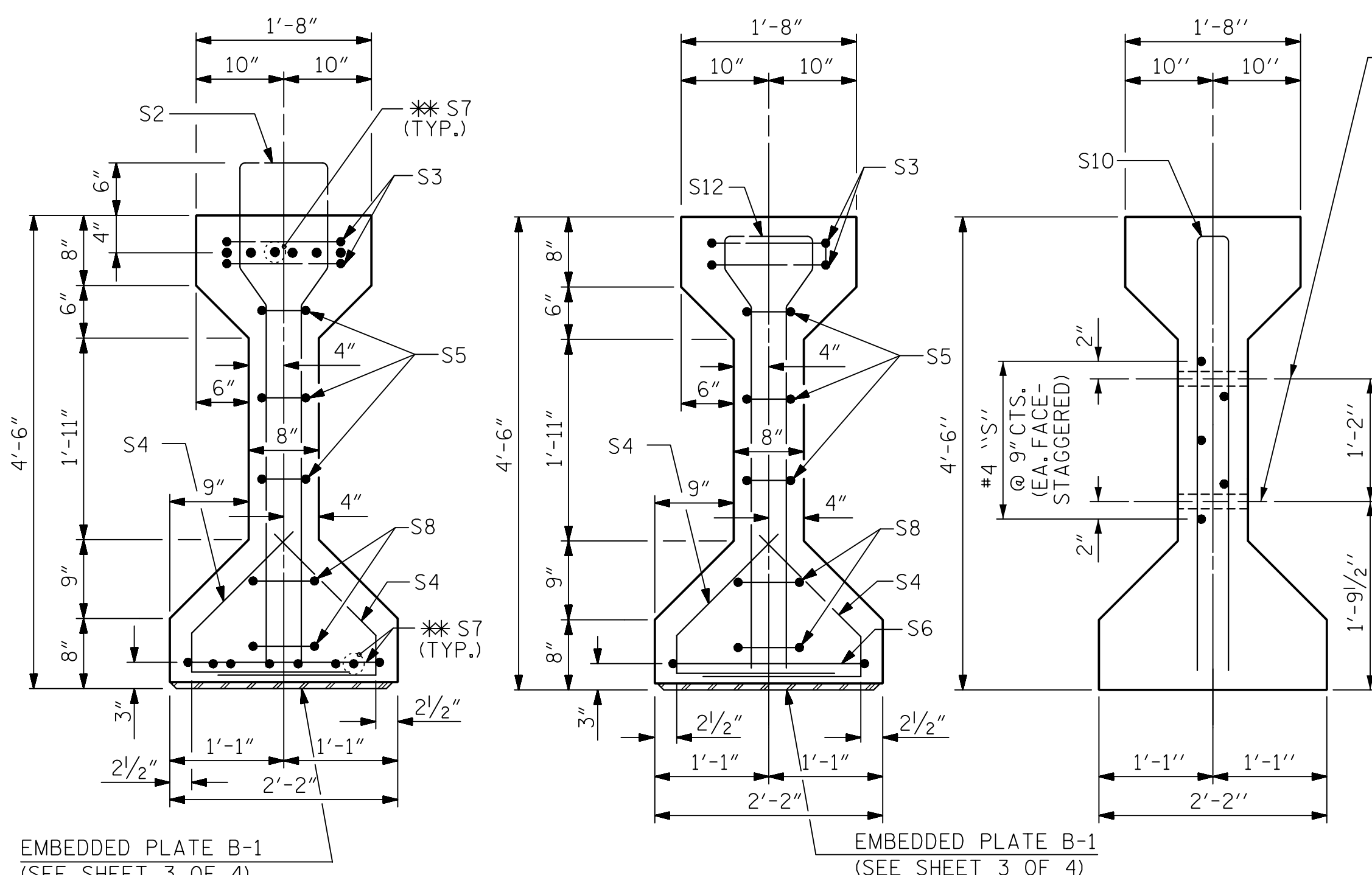
SUPERSTRUCTURE

FRAMING PLAN

RIGHT LANE

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

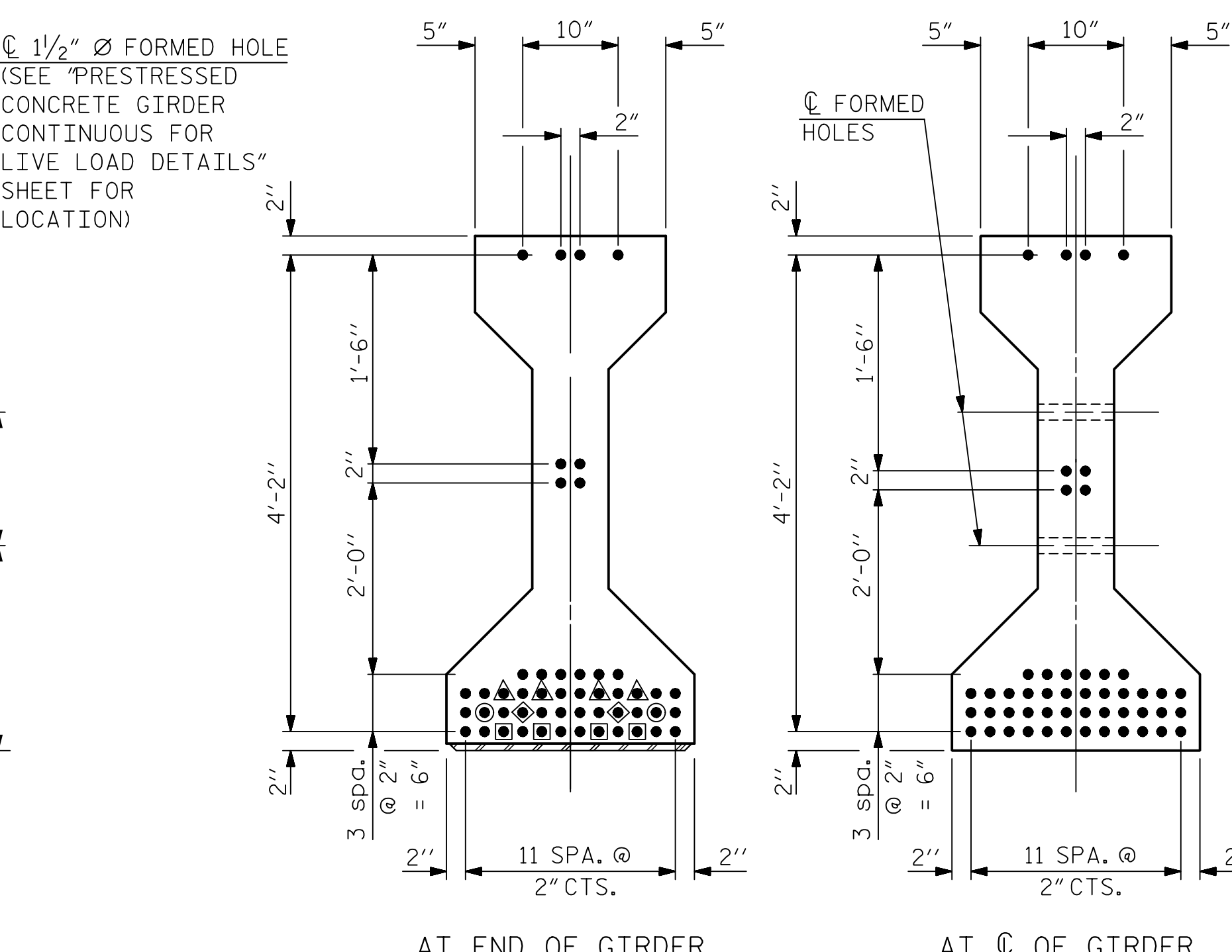
SHEET NO.	S6-12
TOTAL SHEETS	39



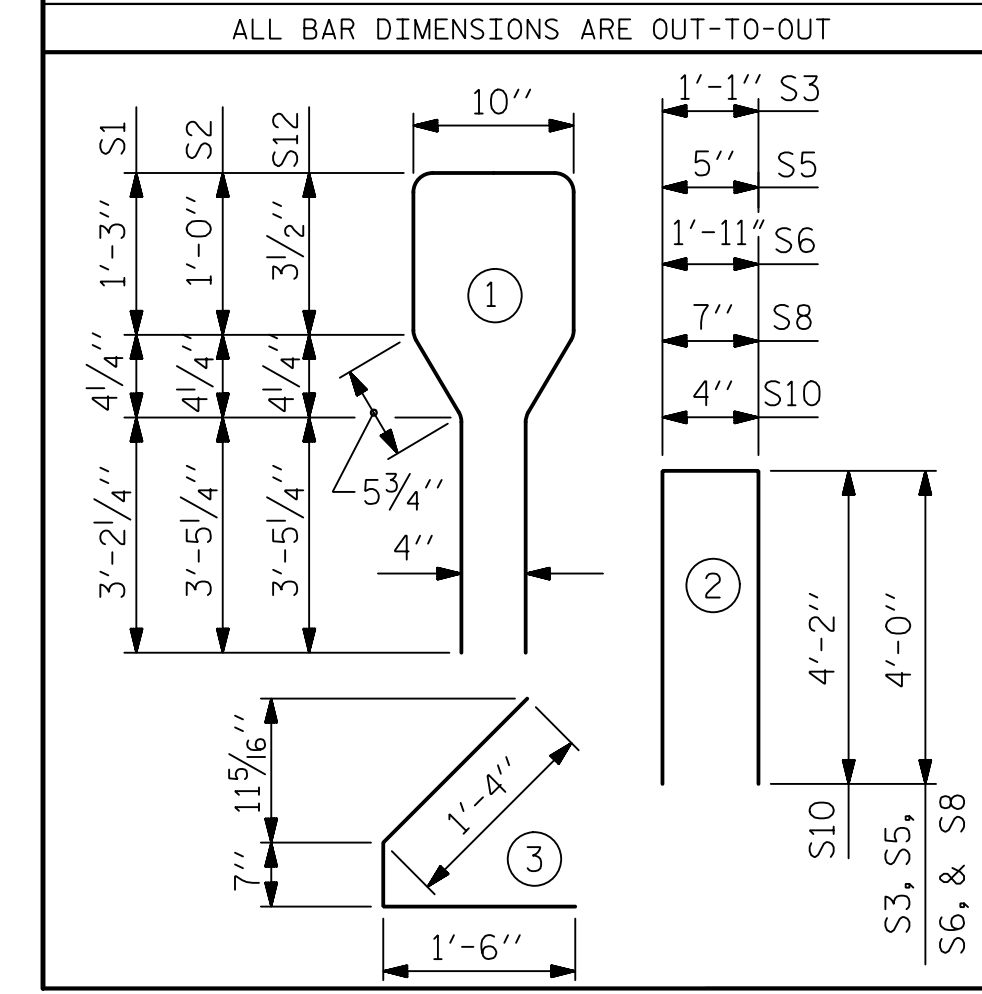
SECTION A-A
SECTION B-B
SECTION C-C
(S1 BARS NOT SHOWN)

EMBEDDED PLATE B-1 (SEE SHEET 3 OF 4)

** FOR S7 BARS, AT INTEGRAL END BENT, SEE DETAIL "A" ON SHEET 3 OF 4



AT END OF GIRDER
AT ϕ OF GIRDER
0.6" ϕ LOW RELAXATION STRAND LAYOUT



DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 22'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 30'-0" FROM END OF GIRDER

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

REINFORCING STEEL FOR ONE GIRDER					
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	71	#4	1	10'-8"	506
S2	21	#6	1	10'-8"	336
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
*S7	12	#5	STR	3'-8"	46
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1
S10	4	#5	2	8'-8"	36
S11	10	#4	STR	7'-0"	47
S12	11	#6	1	9'-3"	153

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

QUANTITIES FOR ONE GIRDER			
	REINFORCING STEEL LB.	9,000 PSI CONCRETE C.Y.	0.6" ϕ L. R. STRANDS No.
GA1-GA4	1,359	20.8	50
GC1-GC4	1,359	20.8	50

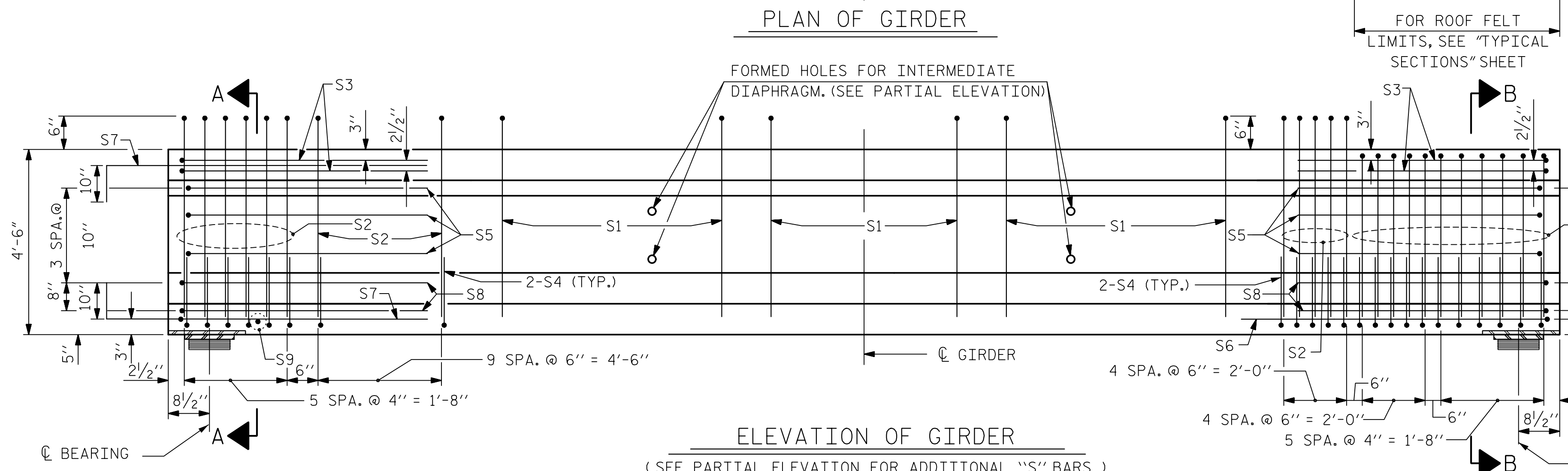
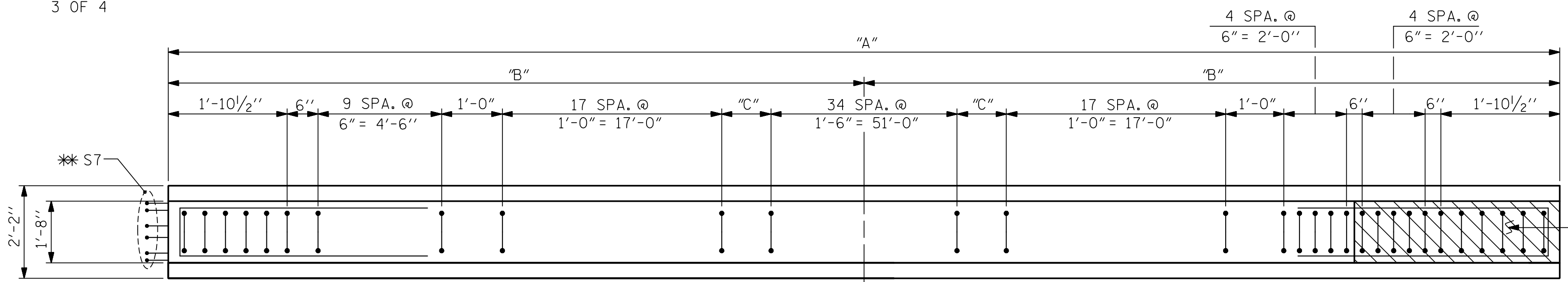
GIRDERS REQUIRED		
NUMBER	LENGTH	TOTAL LENGTH
4 (GA1-GA4)	102'-3 ⁷ / ₈ "	409.29'
4 (GC1-GC4)	102'-4 ¹ / ₈ "	409.38'

NOTES:
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,750 PSI FOR SPAN A AND SPAN C GIRDERS.

GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 9,000 PSI AT THE AGE OF 28 DAYS.

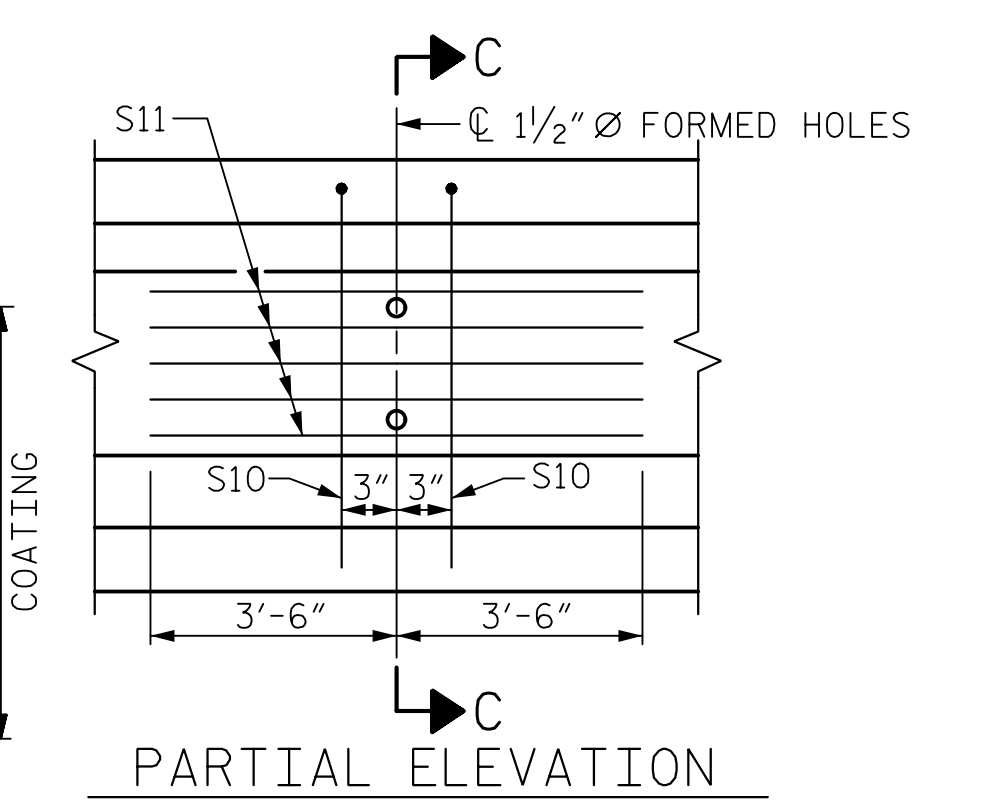
PRESTRESSED CONCRETE GIRDERS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PRESTRESSED CONCRETE GIRDERS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.



FIXED INTEGRAL END BENT (END BENT 1 AND END BENT 2)

GIRDER	"A"	"B"	"C"
GA1	102'-3 ⁷ / ₈ "	51'-11 ⁵ / ₁₆ "	9 ⁷ / ₁₆ "
GA2	102'-3 ⁷ / ₈ "	51'-11 ⁵ / ₁₆ "	9 ⁷ / ₁₆ "
GA3	102'-3 ⁷ / ₈ "	51'-11 ⁵ / ₁₆ "	9 ⁷ / ₁₆ "
GA4	102'-3 ⁷ / ₈ "	51'-11 ⁵ / ₁₆ "	9 ⁷ / ₁₆ "
GC1	102'-4 ¹ / ₈ "	51'-2 ¹ / ₁₆ "	9 ⁹ / ₁₆ "
GC2	102'-4 ¹ / ₈ "	51'-2 ¹ / ₁₆ "	9 ⁹ / ₁₆ "
GC3	102'-4 ¹ / ₈ "	51'-2 ¹ / ₁₆ "	9 ⁹ / ₁₆ "
GC4	102'-4 ¹ / ₈ "	51'-2 ¹ / ₁₆ "	9 ⁹ / ₁₆ "



SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER GA1 - GA4 AND GIRDERS GC1 - GC4

EXP.
(BENT 1 END @ SPAN "A")
(BENT 2 END @ SPAN "C")

PAUL J. BARBER
ENGINEER
8/31/2021

ASSEMBLED BY : BN DATE : 5/17
CHECKED BY : BE DATE : 8/17
DRAWN BY : ELR 8/91 REV. 5/1/06R TLA/GM
CHECKED BY : CRP 8/91 REV. 10/1/11 MAA/GM
REV. 1/15 MAA/TMG

HNTB HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY : M. WRIGHT DATE : 7/21
CHECKED BY : P. BARBER DATE : 7/21
DESIGN ENGINEER OF RECORD : P. BARBER DATE : 7/21

DWG. NO. 13

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

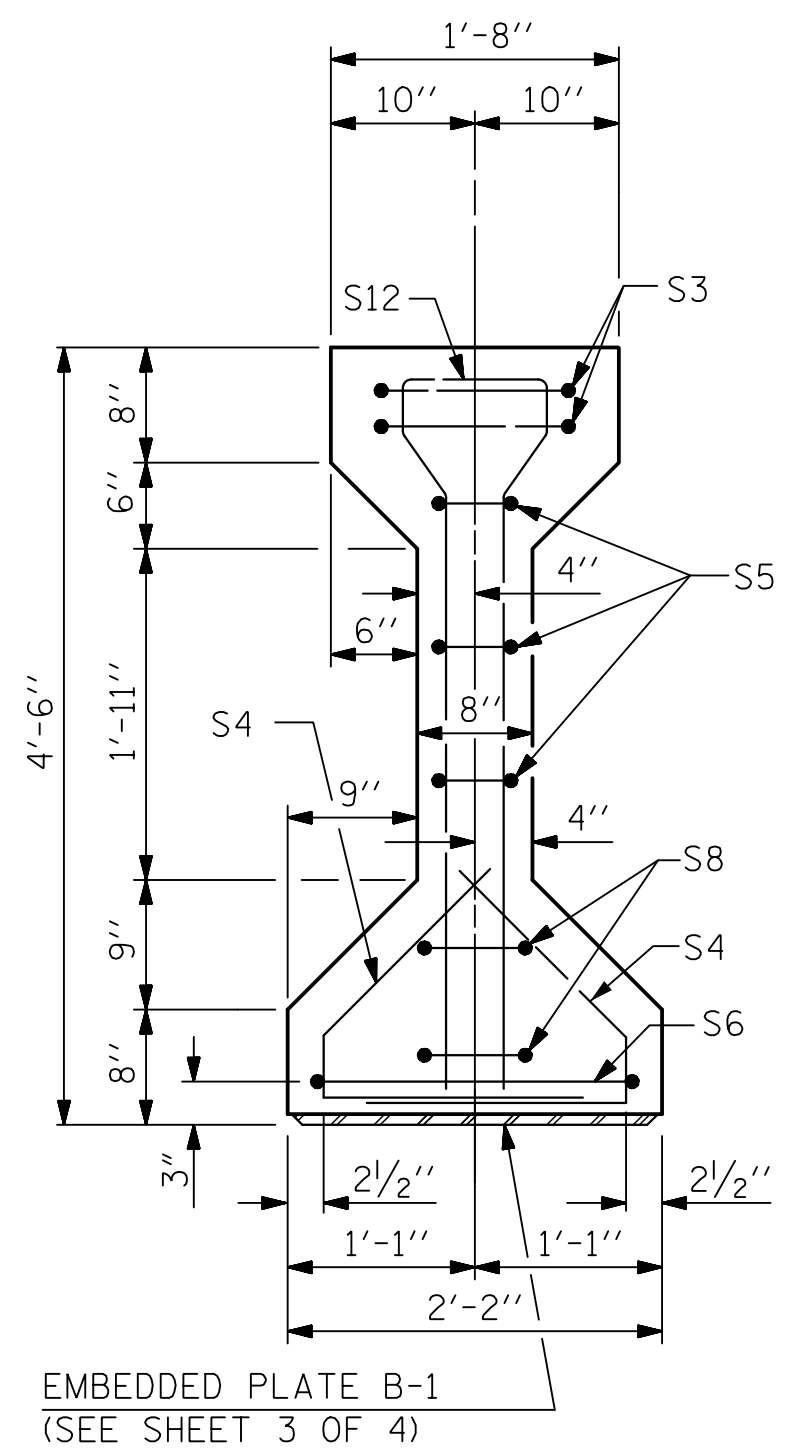
SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

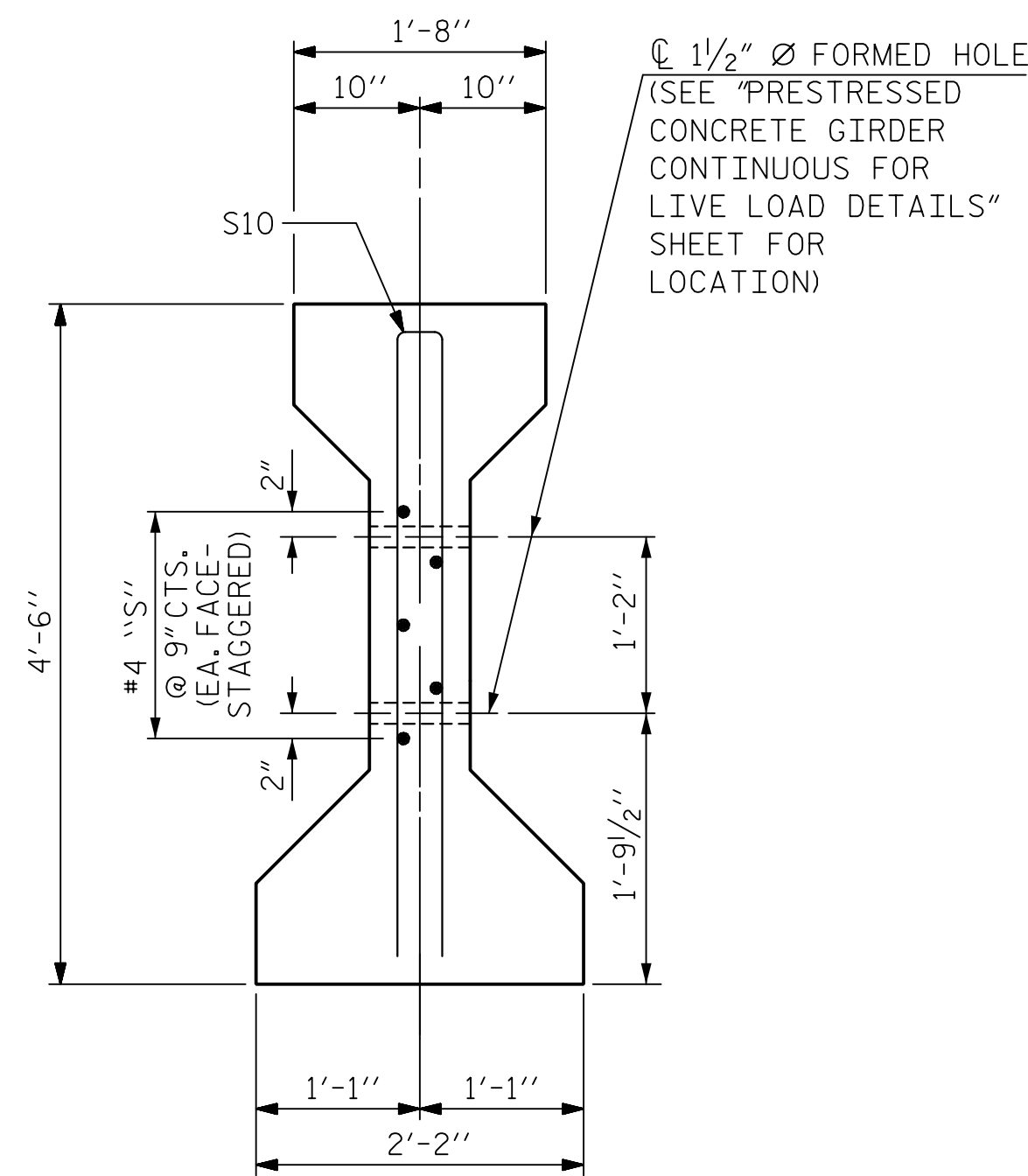
STANDARD
AASHTO TYPE IV
PRESTRESSED CONCRETE GIRDER
SPANS A & C
RIGHT LANE

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

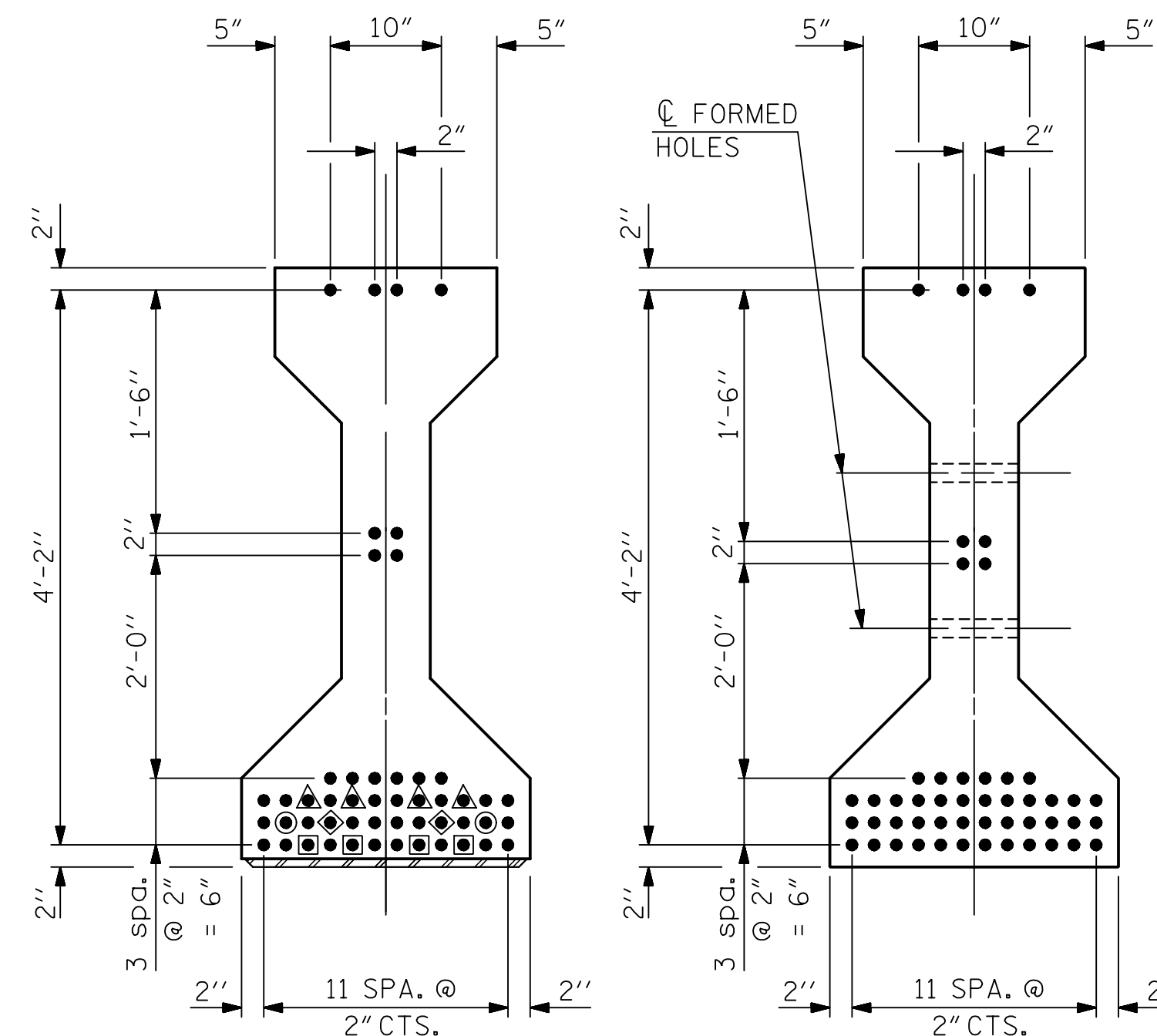
S6-13
TOTAL SHEETS 39



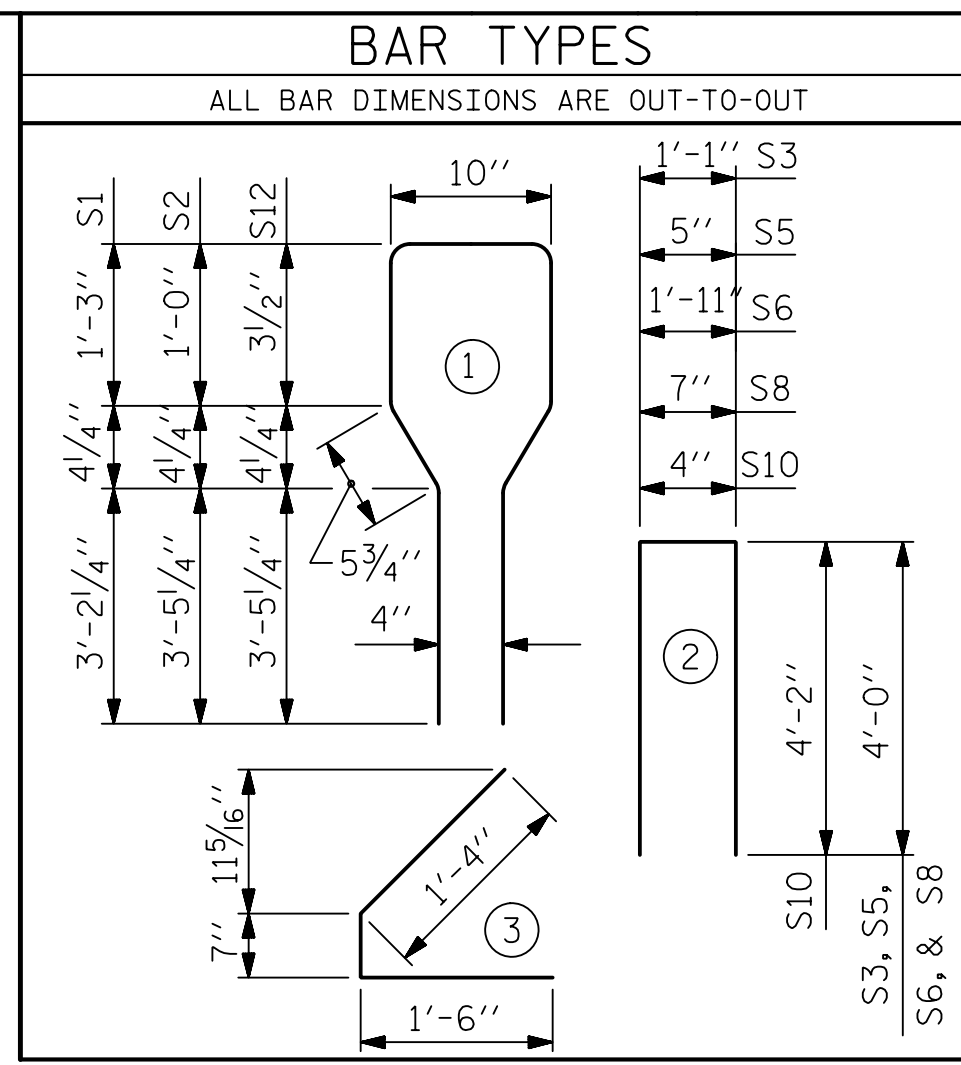
SECTION B-B



SECTION C-C
(S1 BARS NOT SHOWN)



AT END OF GIRDER AT C OF GIRDER
0.6" Ø LOW RELAXATION STRAND LAYOUT



- DEBONDING LEGEND
- FULLY BONDED STRANDS
 - ▲ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
 - STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
 - STRANDS DEBONDED FOR 22'-0" FROM END OF GIRDER
 - ◆ STRANDS DEBONDED FOR 30'-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 GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	71	#4	1	10'-8"	506
S2	10	#6	1	10'-8"	160
S3	4	#4	2	9'-1"	24
S4	64	#4	3	3'-5"	146
S5	6	#4	2	8'-5"	34
S6	2	#4	2	9'-11"	13
S8	4	#4	2	8'-7"	23
S10	4	#5	2	8'-8"	36
S11	10	#4	STR	7'-0"	47
S12	22	#6	1	9'-3"	306

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9,000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
GB1-GB4	1,295	20.8	50

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
4 (GB1-GB4)	102'-4 3/8"	409.46'

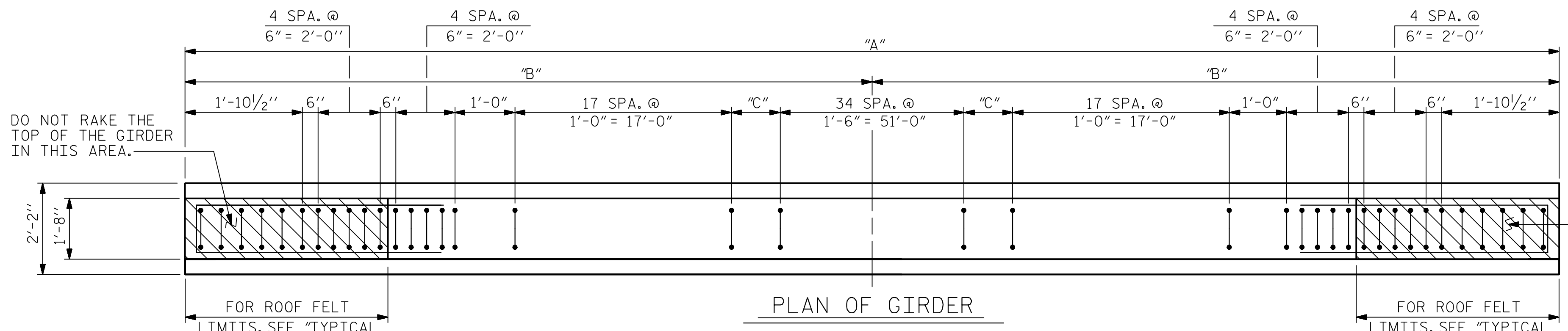
NOTES:

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,750 PSI FOR SPAN B GIRDERS.

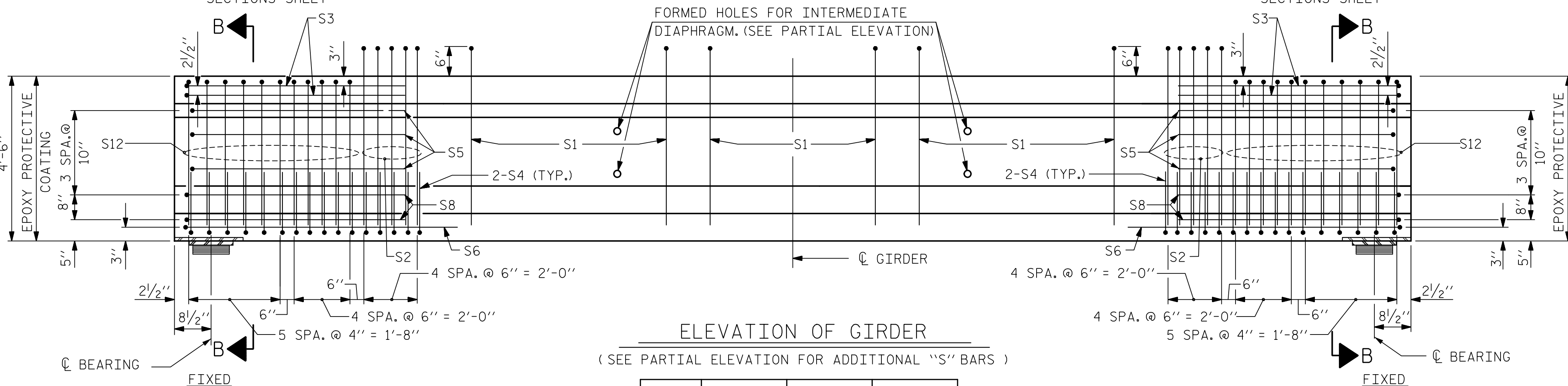
GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 9,000 PSI AT THE AGE OF 28 DAYS.

PRESTRESSED CONCRETE GIRDERS ARE DESIGNED FOR 0 PSI TENSION IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.

PRESTRESSED CONCRETE GIRDERS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.



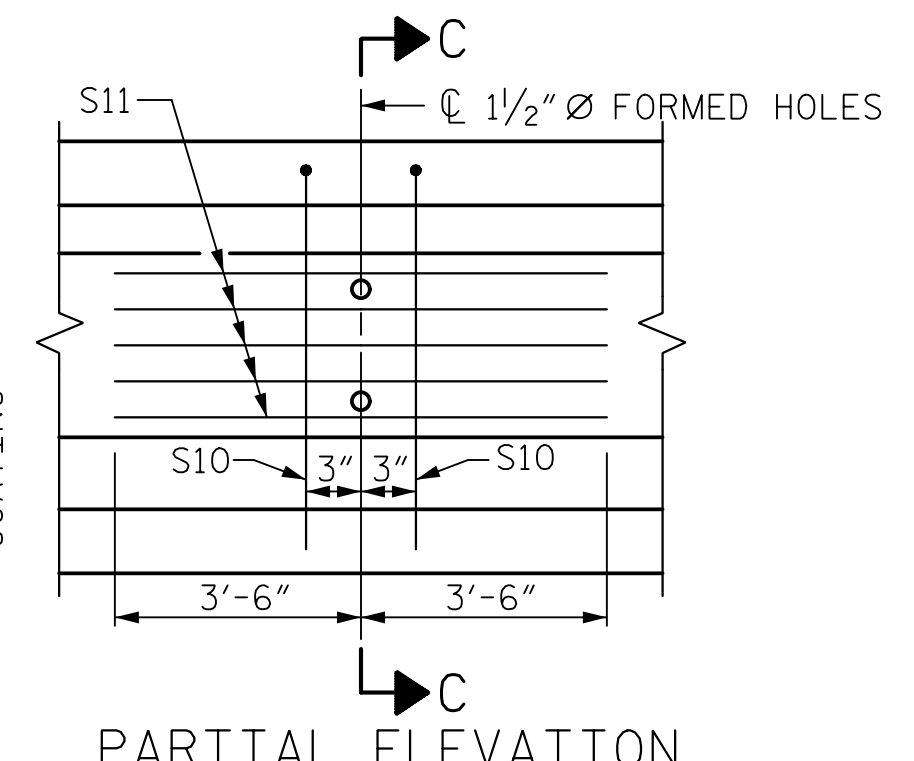
PLAN OF GIRDER



ELEVATION OF GIRDER

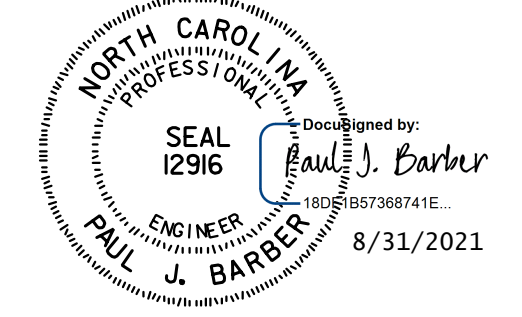
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

GIRDER	"A"	"B"	"C"
GB1	102'-4 3/8"	51'-2 3/16"	9 11/16"
GB2	102'-4 3/8"	51'-2 3/16"	9 11/16"
GB3	102'-4 3/8"	51'-2 3/16"	9 11/16"
GB4	102'-4 3/8"	51'-2 3/16"	9 11/16"



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER GB1 - GB4



PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 AASHTO TYPE IV
 PRESTRESSED CONCRETE GIRDER
 SPAN B
 RIGHT LANE

ASSEMBLED BY : AES DATE : 9/17
 CHECKED BY : BE DATE : 9/17

DRAWN BY : ELR 8/91 REV. 5/1/06R TLA/GM
 CHECKED BY : CRP 8/91 REV. 10/1/11 MAA/GM
 REV. 1/15 MAA/TMG

HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: M. WRIGHT DATE: 7/21
 CHECKED BY: P. BARBER DATE: 7/21
 DESIGN ENGINEER OF RECORD: P. BARBER DATE: 7/21

DWG. NO. 14

REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	DATE	S6-14
1			3		TOTAL SHEETS
2			4		39

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.

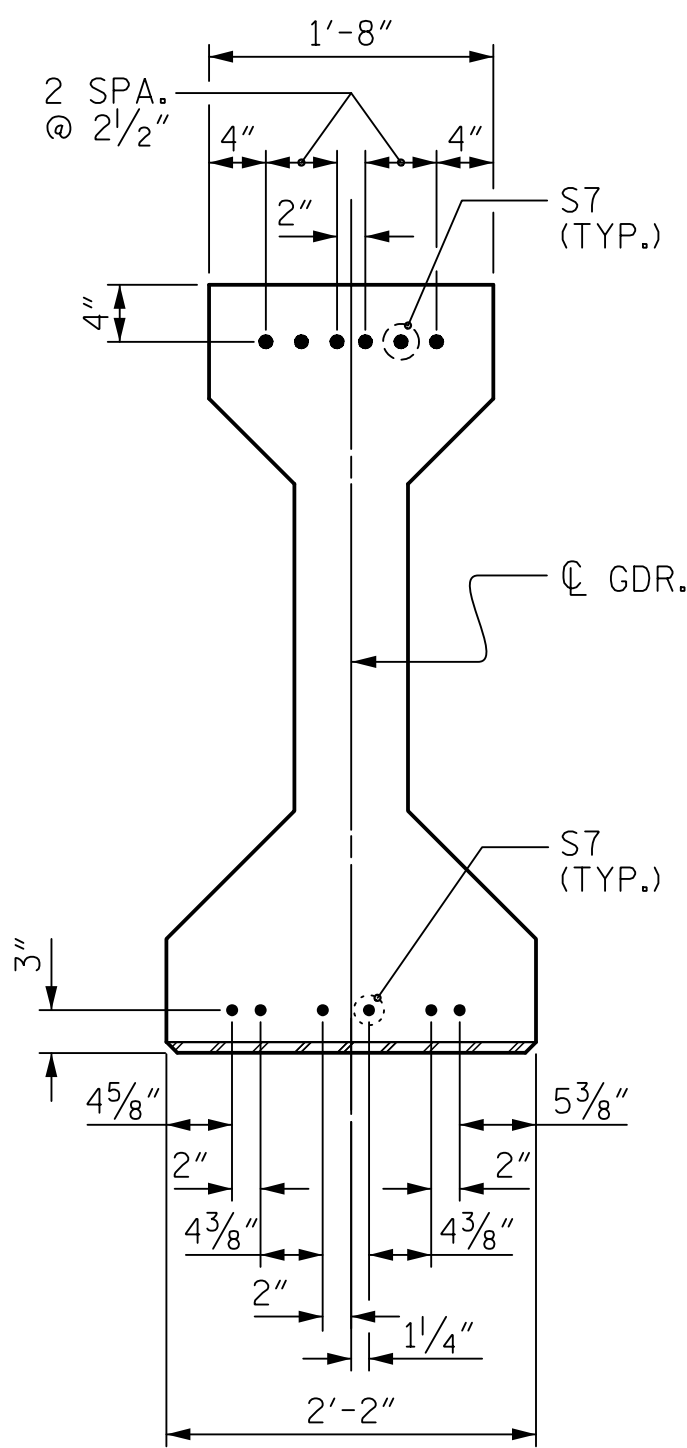
EMBEDDED PLATE "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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.

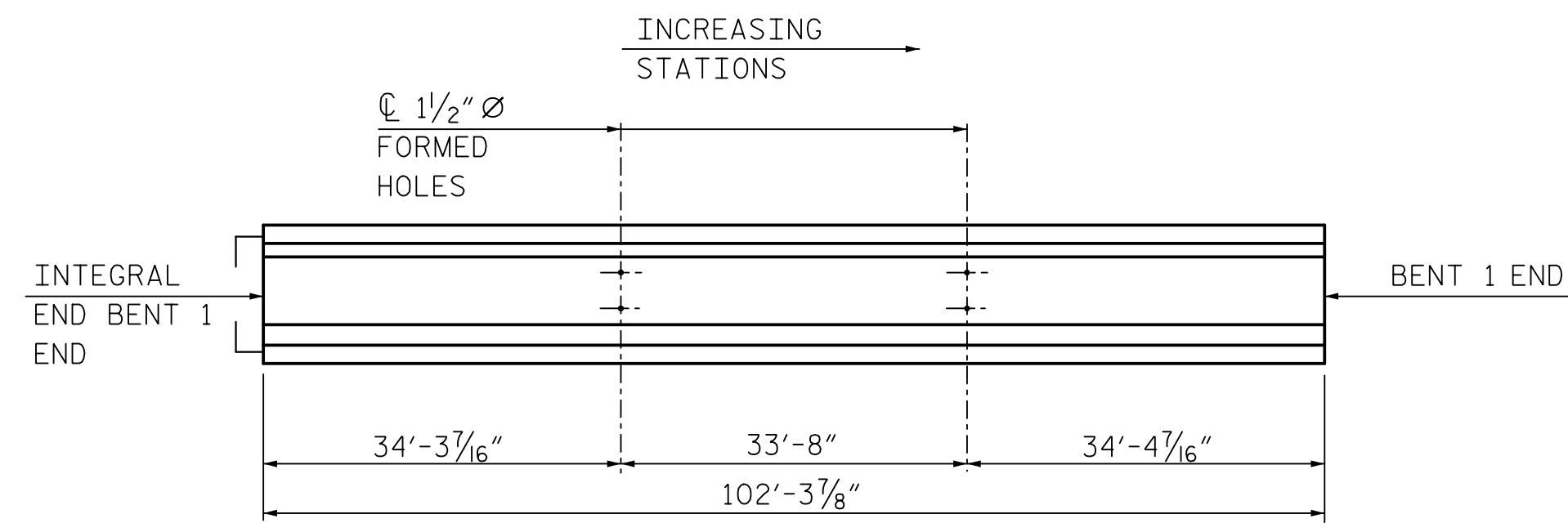
DEPENDING ON THE TYPE OF SYSTEM USED TO SUPPORT THE DECK SLAB FORMS, PRESET ANCHORS MAY BE NECESSARY IN THE PRESTRESSED CONCRETE GIRDER.

THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1/4", UNLESS NOTED OTHERWISE. SEE PRESTRESSED CONCRETE GIRDER SHEETS FOR AREA NOT TO BE RAKED.

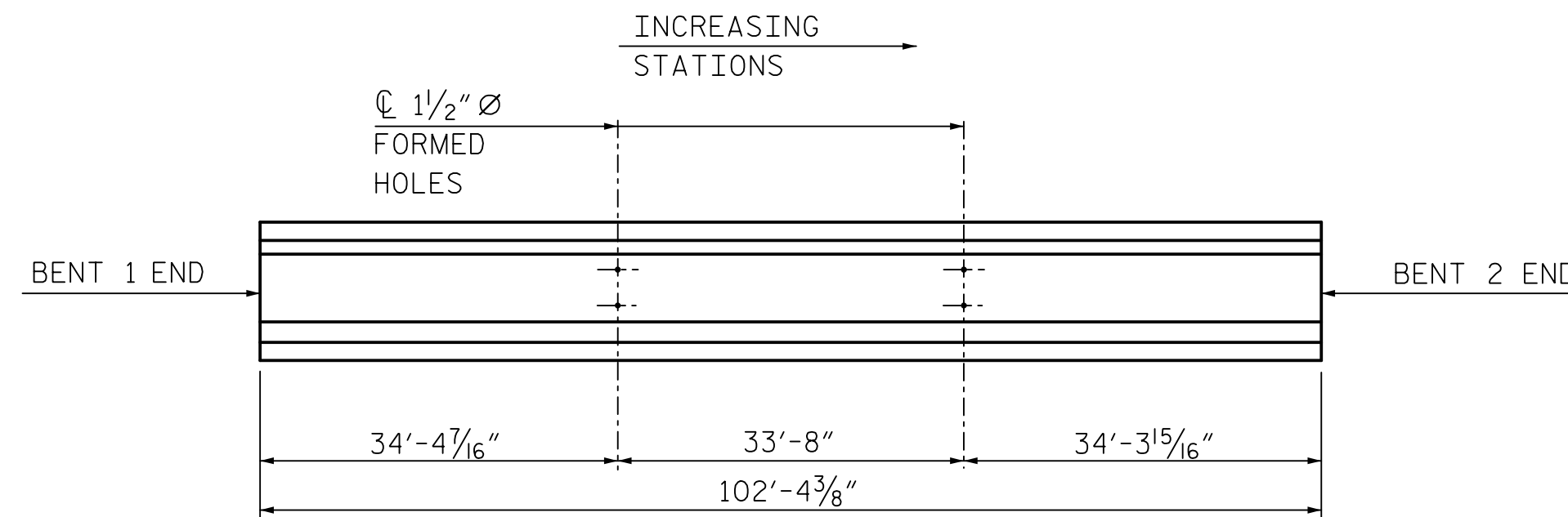


DETAIL "A"

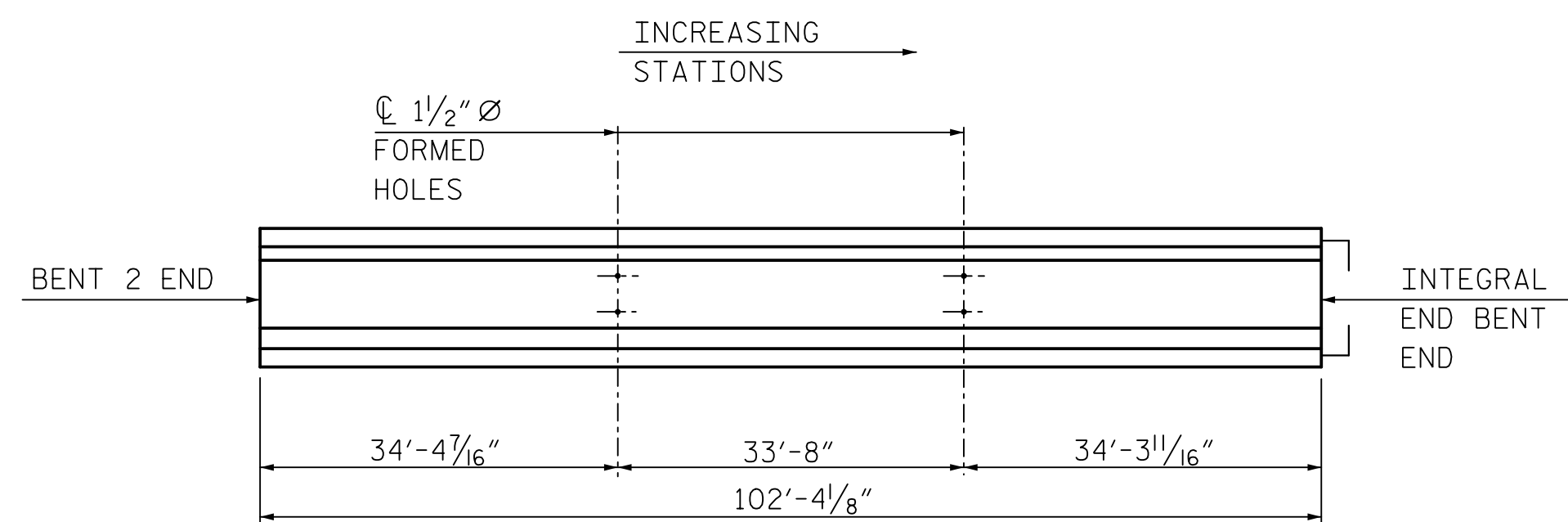
(FOR AASHTO TYPE IV GIRDERS AT INTEGRAL END BENT)



GIRDER ELEVATION (SPAN A GIRDERS)

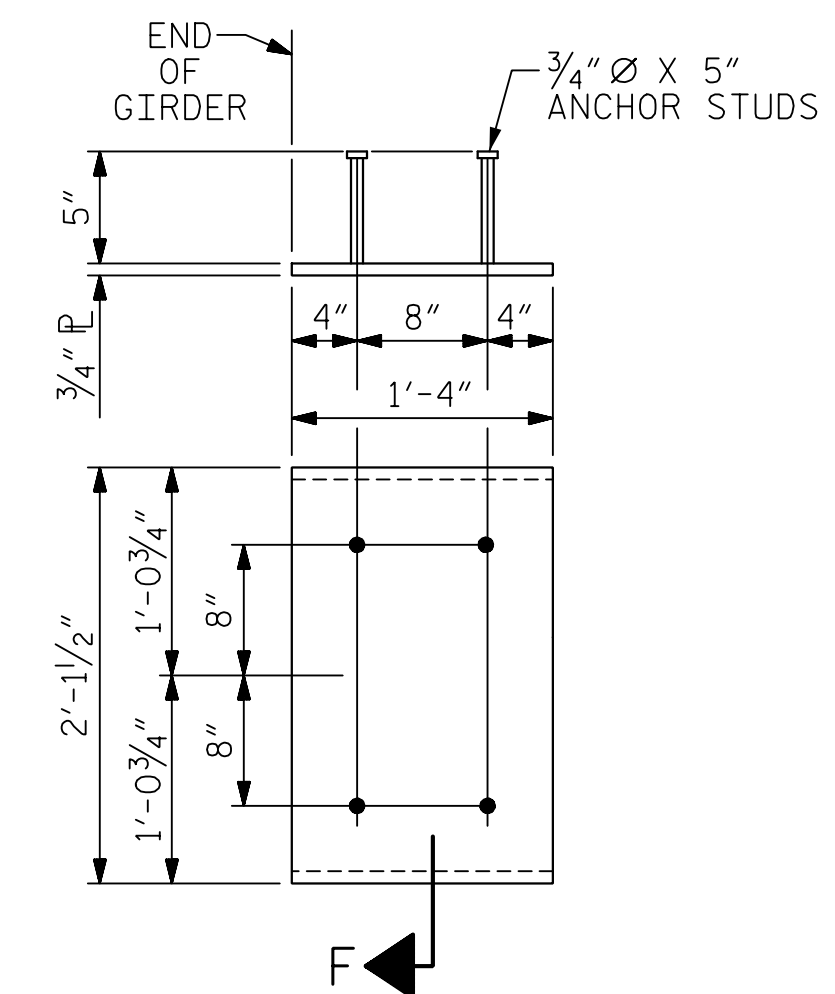


GIRDER ELEVATION (SPAN B GIRDERS)



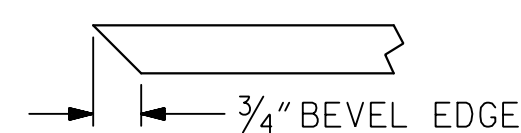
GIRDER ELEVATION (SPAN C GIRDERS)

1/2" Ø FORMED HOLE LOCATIONS



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

(2 REQ'D PER GIRDER)



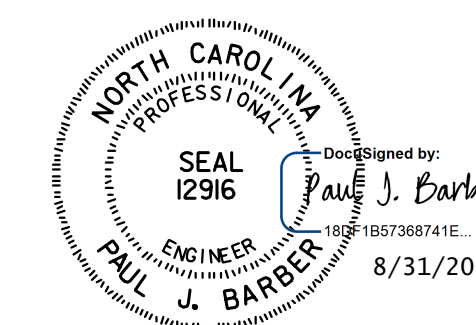
SECTION "F" (SEE NOTES)

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
 PRESTRESSED CONCRETE GIRDER
 DETAILS
 RIGHT LANE



HNTB	HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
DRAWN BY: M. WRIGHT	DATE: 7/21
CHECKED BY: P. BARBER	DATE: 7/21
DESIGN ENGINEER OF RECORD: P. BARBER	DATE: 7/21

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

ASSEMBLED BY: AES	DATE: 9/17
CHECKED BY: BE	DATE: 9/17
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

STRUCTURAL STEEL NOTES

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

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

TENSION ON THE ASTM A449 BOLTS THROUGH THE GIRDER WEB SHALL BE SNUG TIGHTENED FOLLOWED BY AN ADDITIONAL 1/4 TURN.

THE PLATES, BENT PLATES, CHANNELS, AND ANGLES SHALL BE 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.

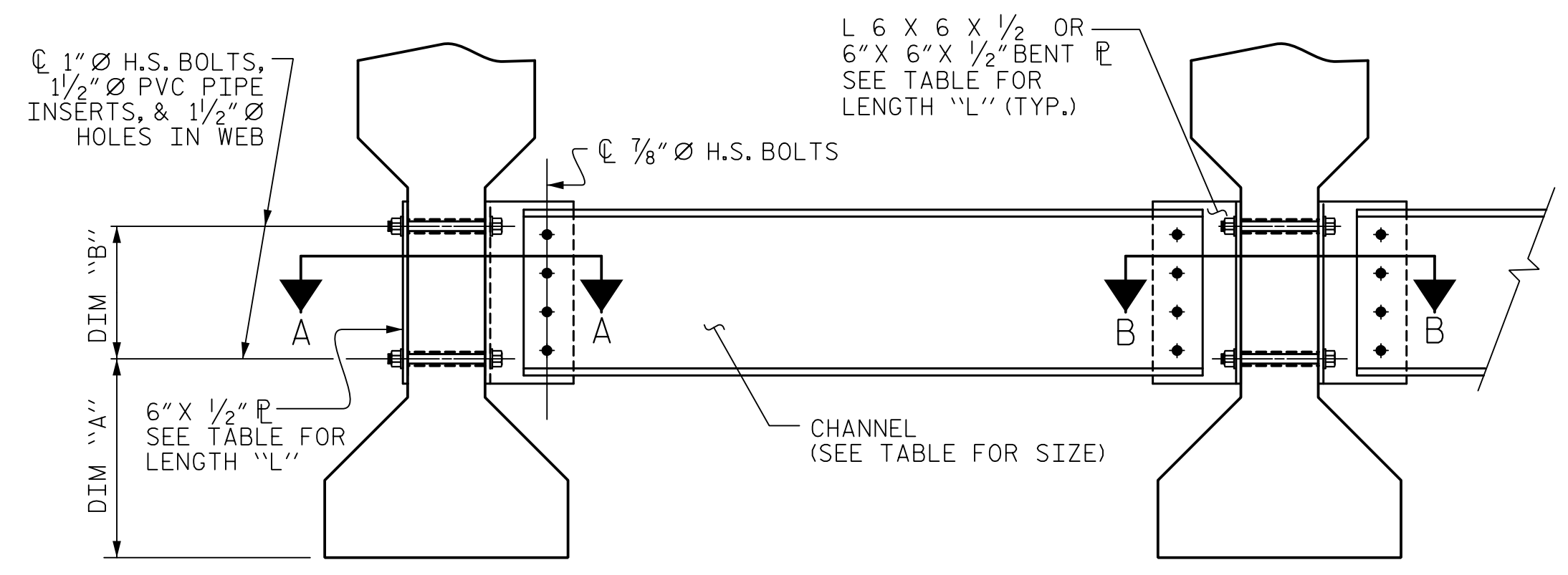
FOR BOLTS THROUGH THE GIRDER WEB, PROVIDE SUFFICIENT LENGTH OF THREADS ON ALL BOLTS TO ACCOMMODATE WASHERS AND THE THICKNESS OF CONNECTING MEMBER PLUS AT LEAST 1/4" PROJECTION BEYOND THE NUT.

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

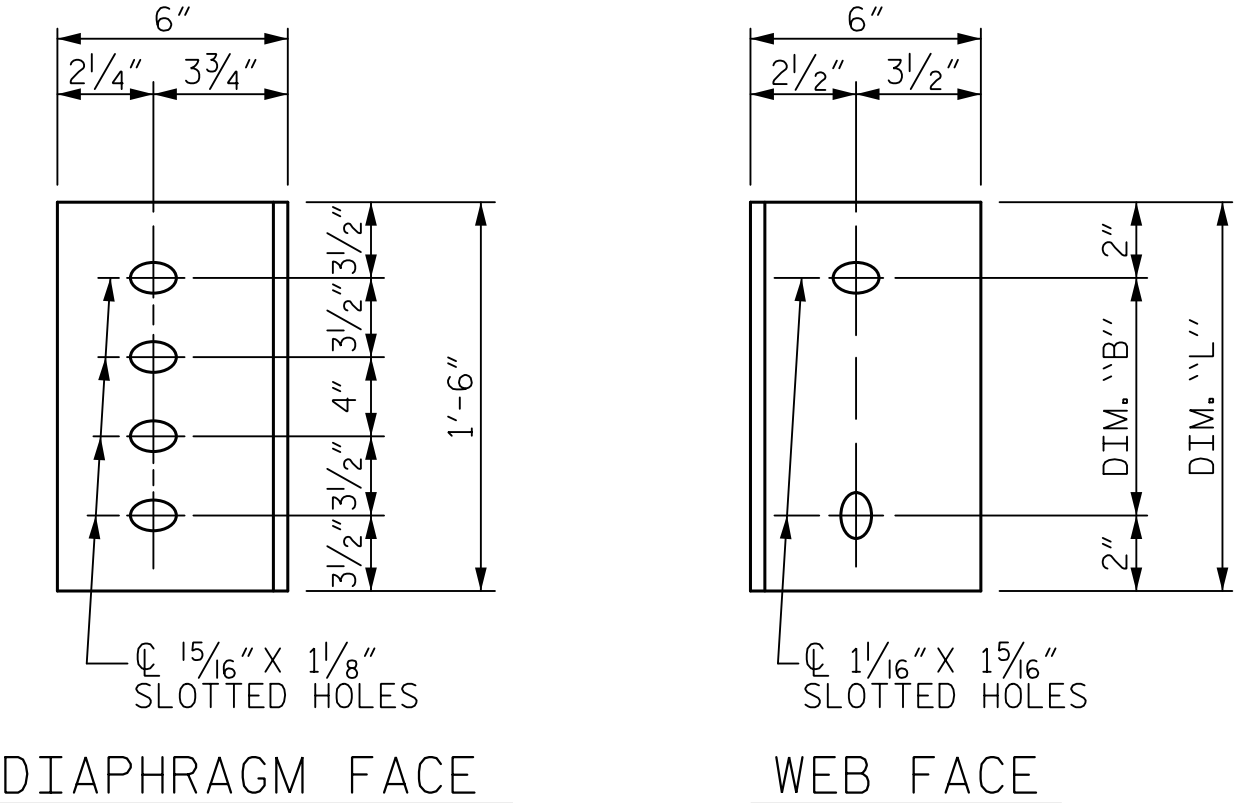
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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.



PART SECTION AT INTERMEDIATE DIAPHRAGM



CONNECTOR PLATE DETAILS

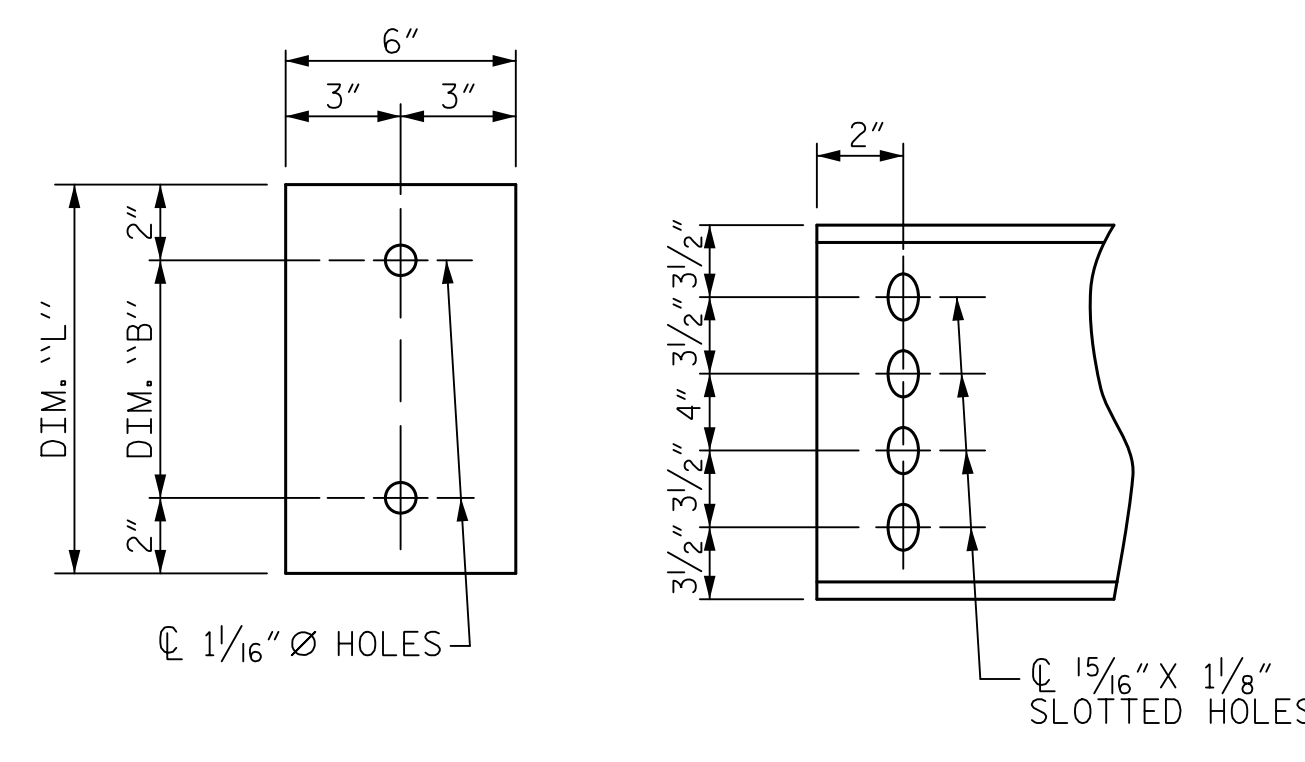
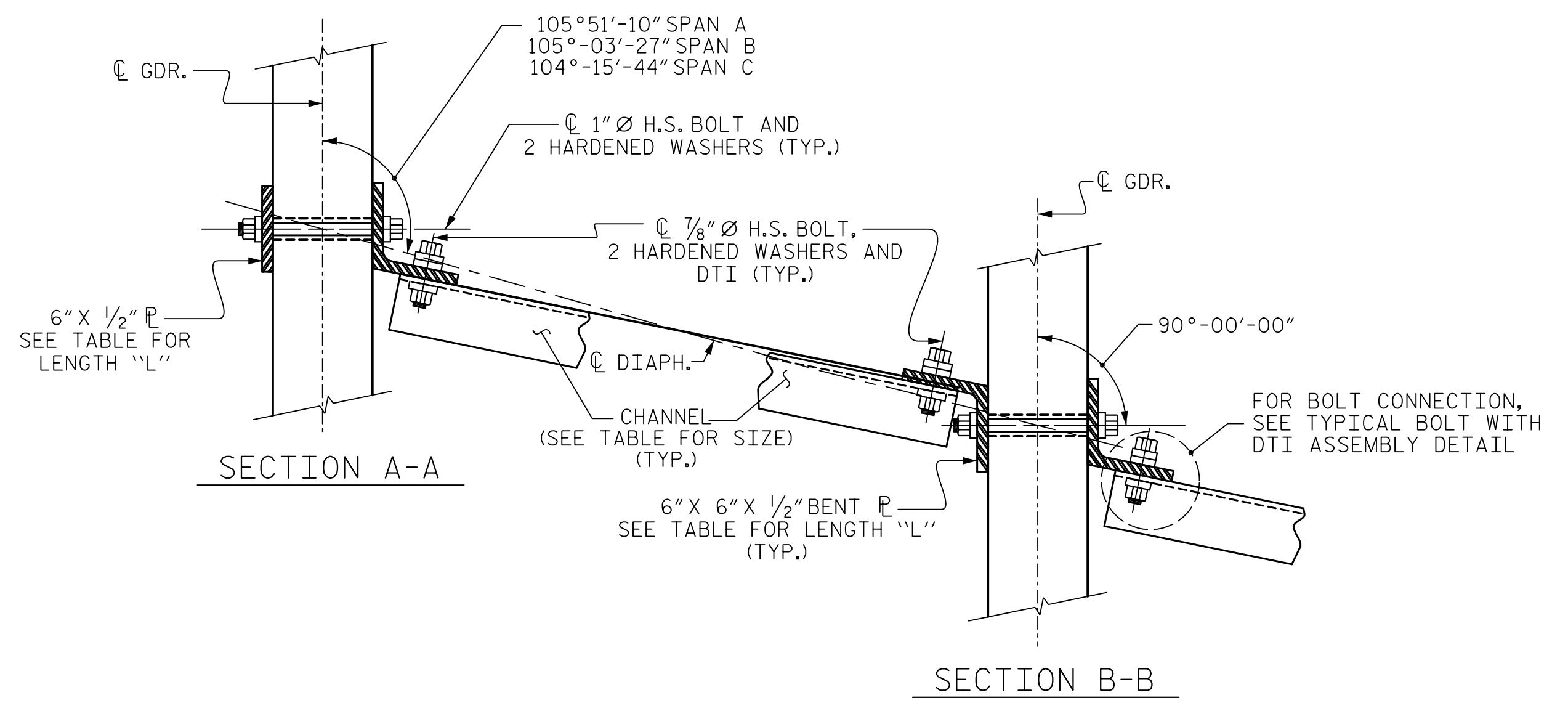
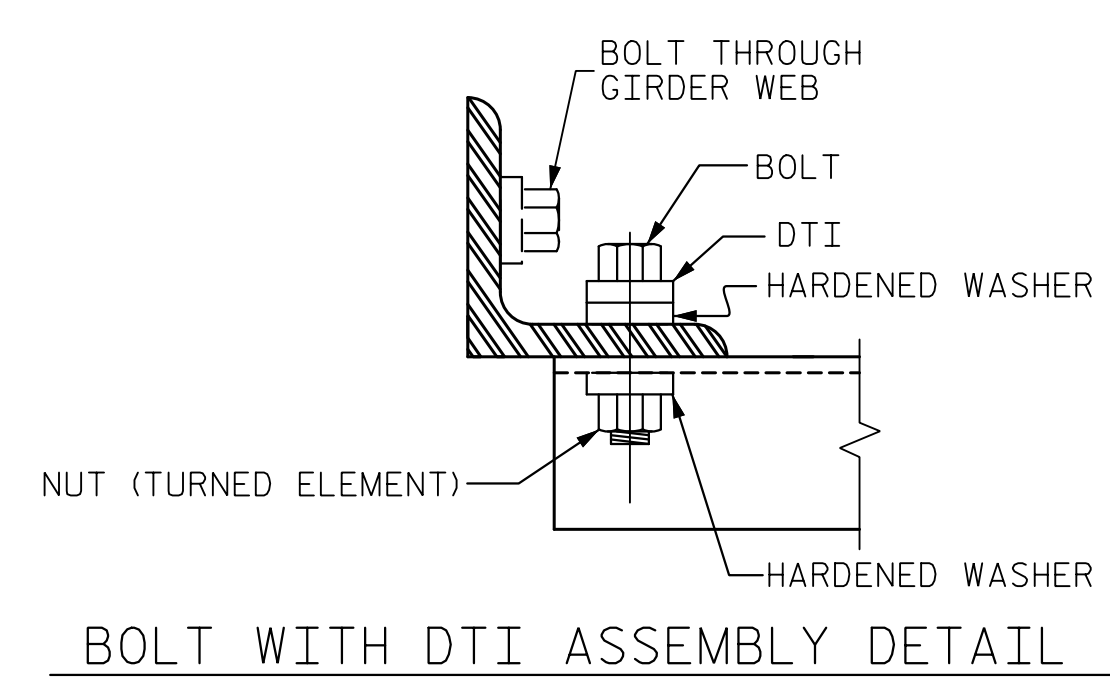


PLATE DETAILS CHANNEL END



CONNECTION DETAILS

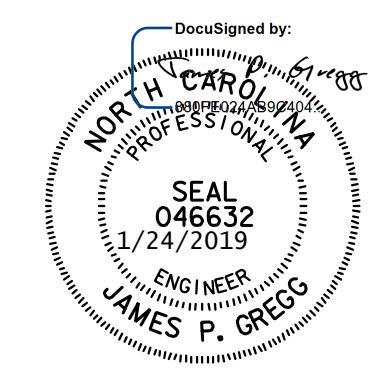


TABLE

GIRDER TYPE	CHANNEL SIZE	DIM "A"	DIM "B"	DIM "L"
IV	MC 18 x 42.7	1'-9 1/2"	1'-2"	1'-6"

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 4 OF 4



STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 INTERMEDIATE STEEL
 DIAPHRAGMS FOR TYPE IV
 PRESTRESSED CONCRETE GIRDERS
 RIGHT LANE

ASSEMBLED BY : AES	DATE : 9/17
CHECKED BY : BE	DATE : 9/17
DRAWN BY : TLA 6/05	ADDED 10/21/05
CHECKED BY : VC 6/05	REV. 5/1/06RRR KMM/GM
	REV. 10/1/11 MAA/GM

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY : A. SMITH	DATE : 9/17	DWG. NO. 16	
CHECKED BY : B. EMAMI	DATE : 9/17		
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18		

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

TOTAL SHEETS: 39

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.

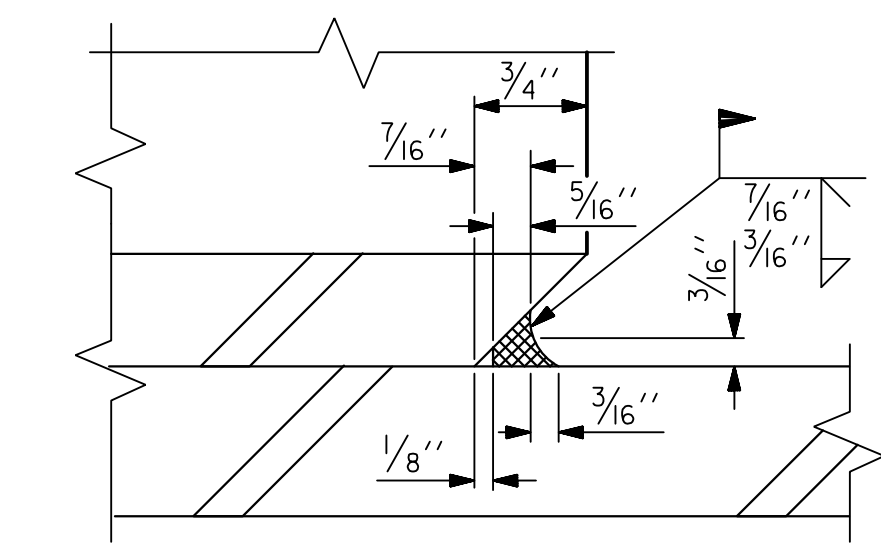
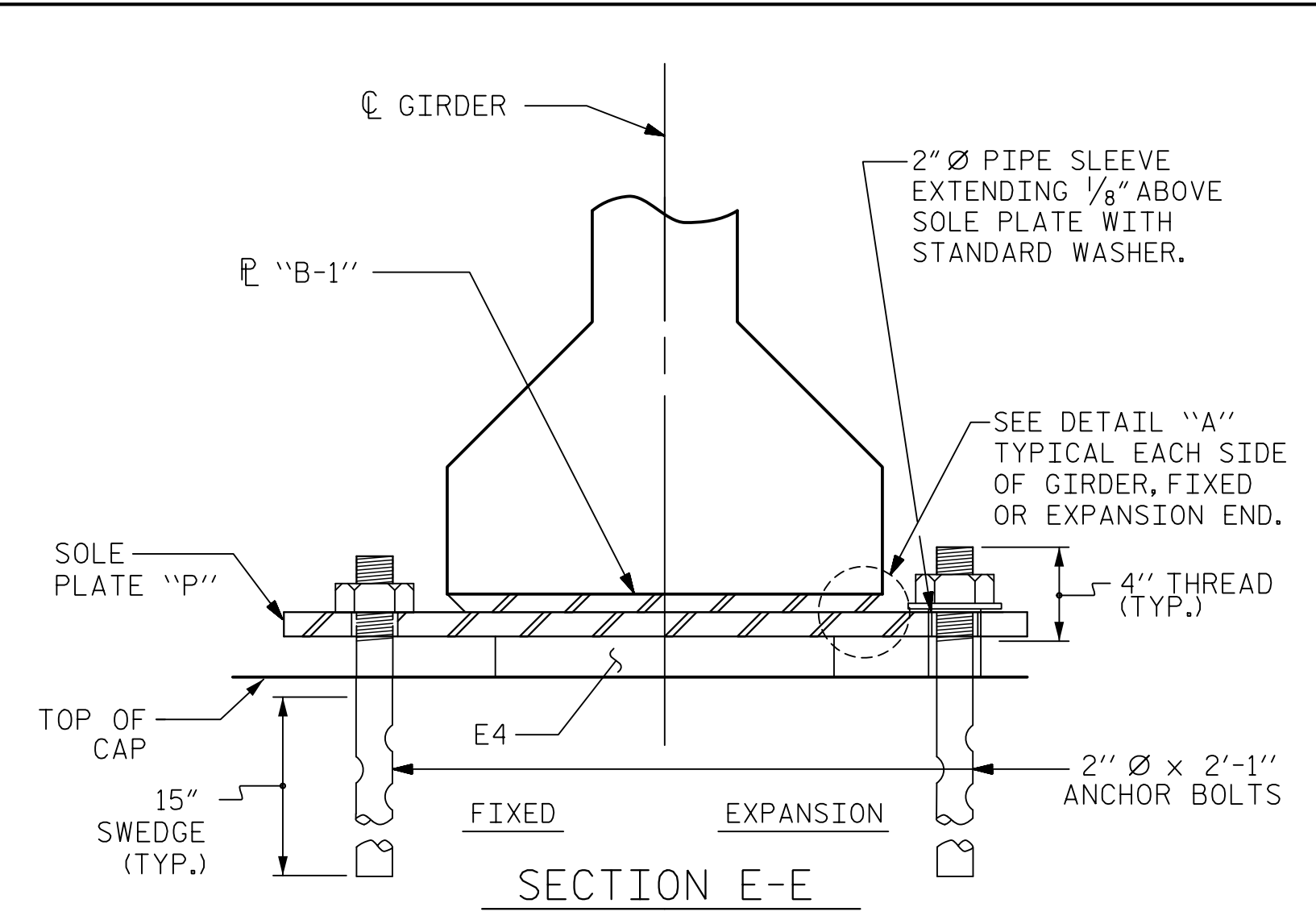
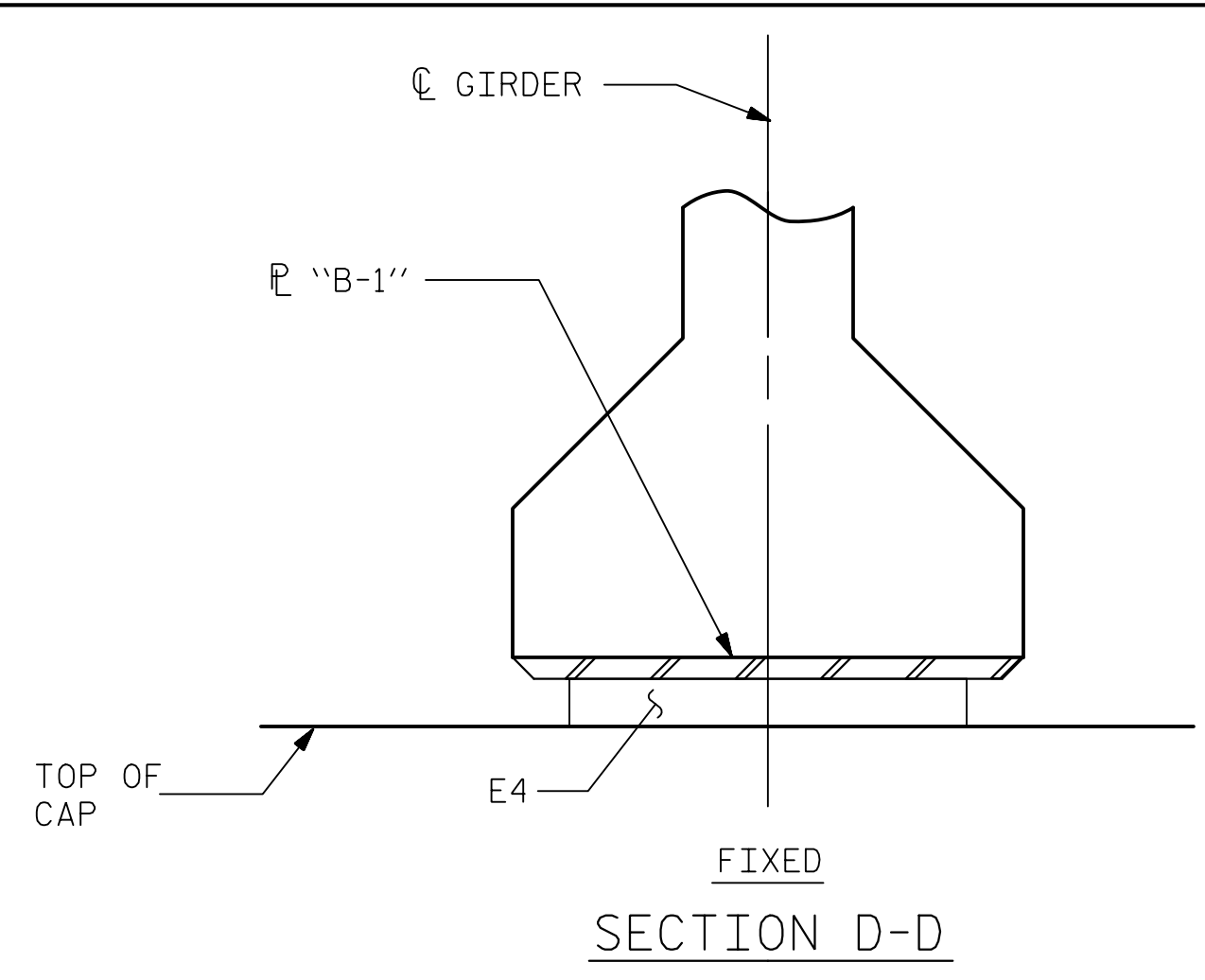
ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251, AND SHALL BE 60 DUROMETER HARDNESS.

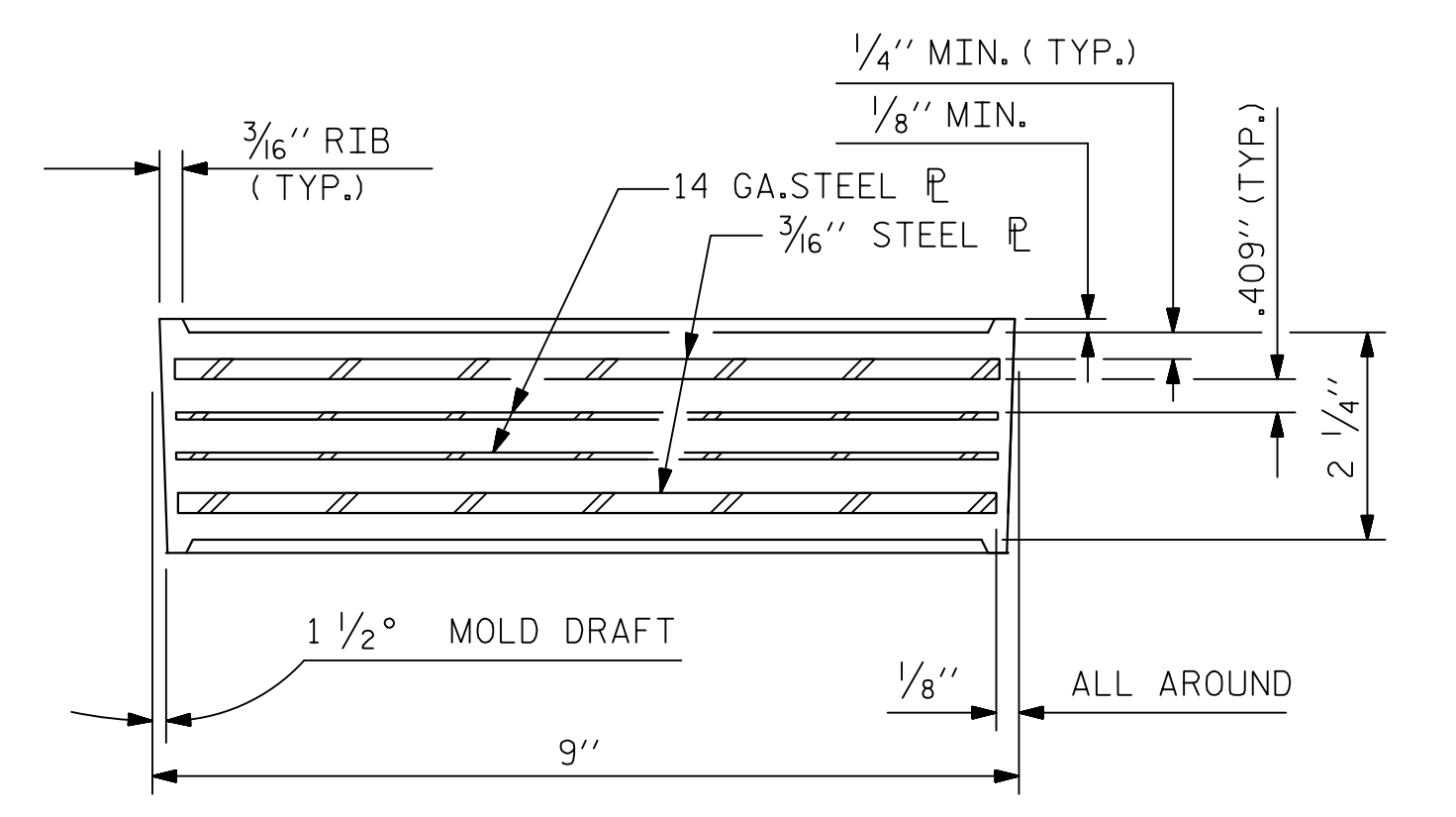
FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

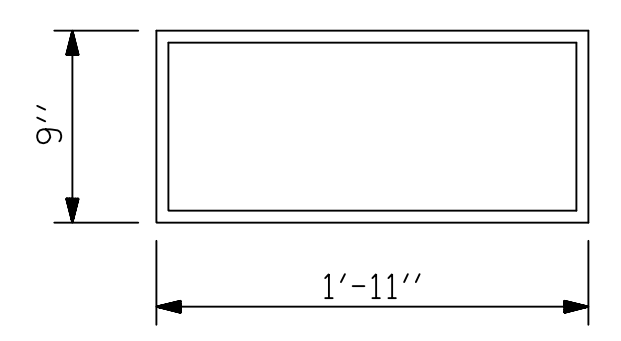
FOR BEARING AND SOLE PLATE LOCATIONS, SEE "FRAMING PLAN" SHEET.



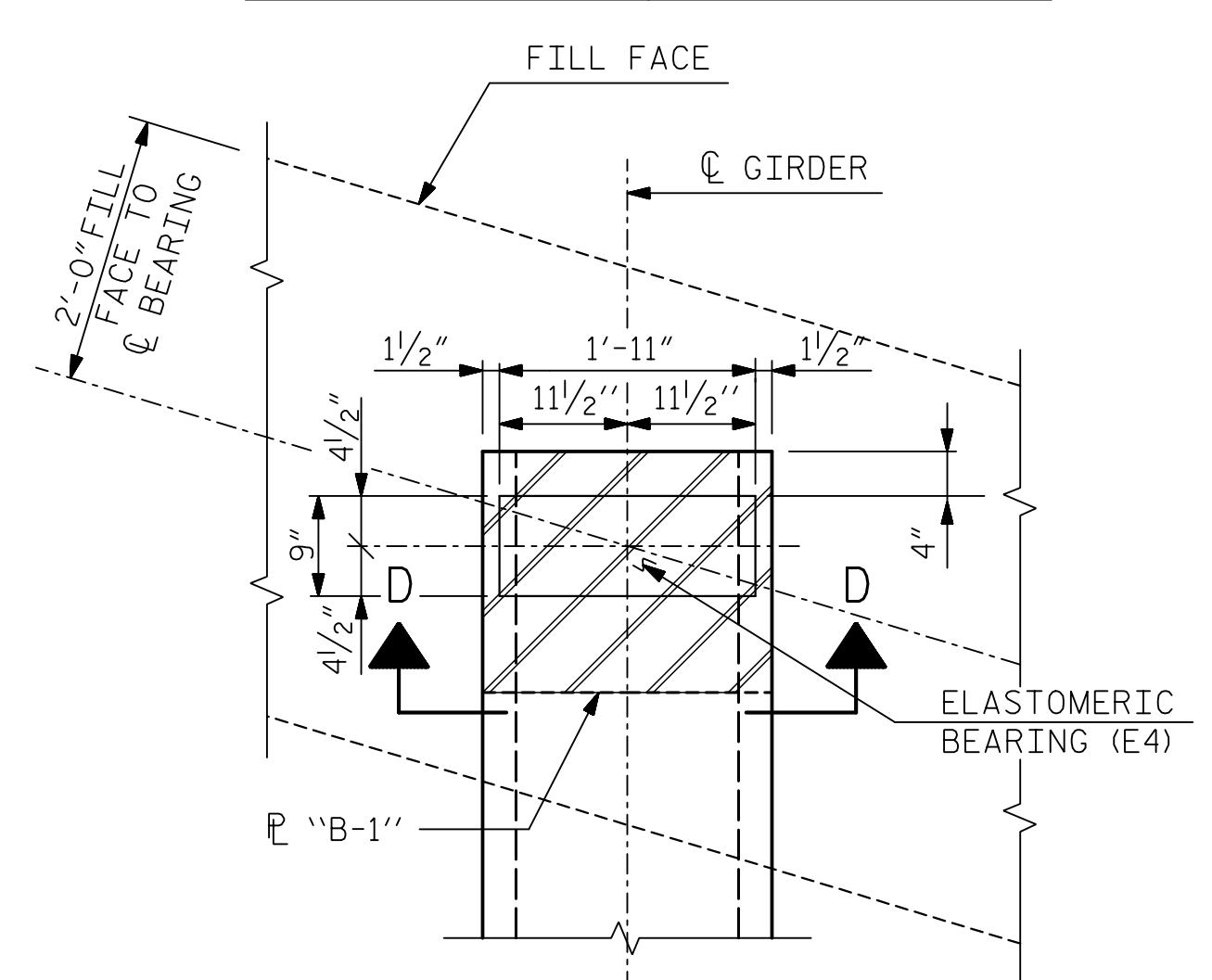
DETAIL "A"



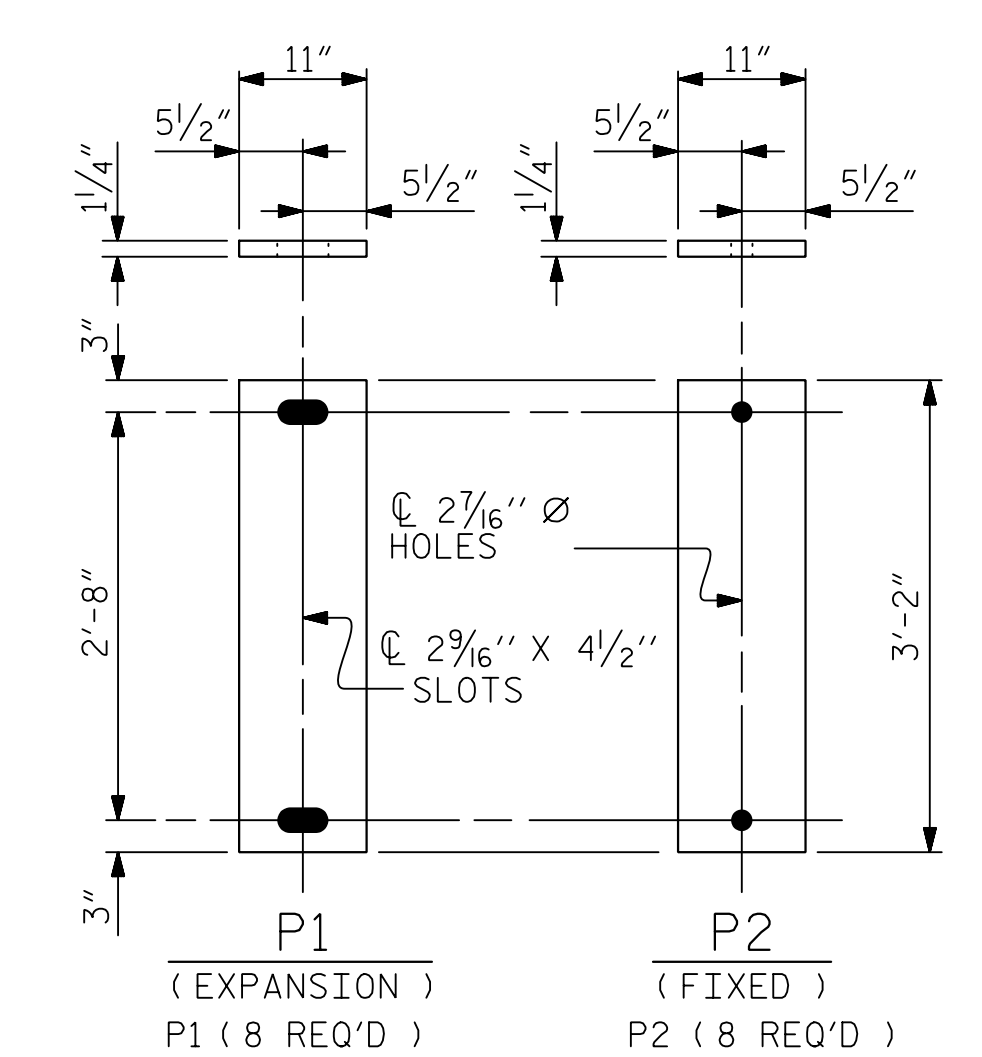
TYPICAL SECTION OF ELASTOMERIC BEARINGS



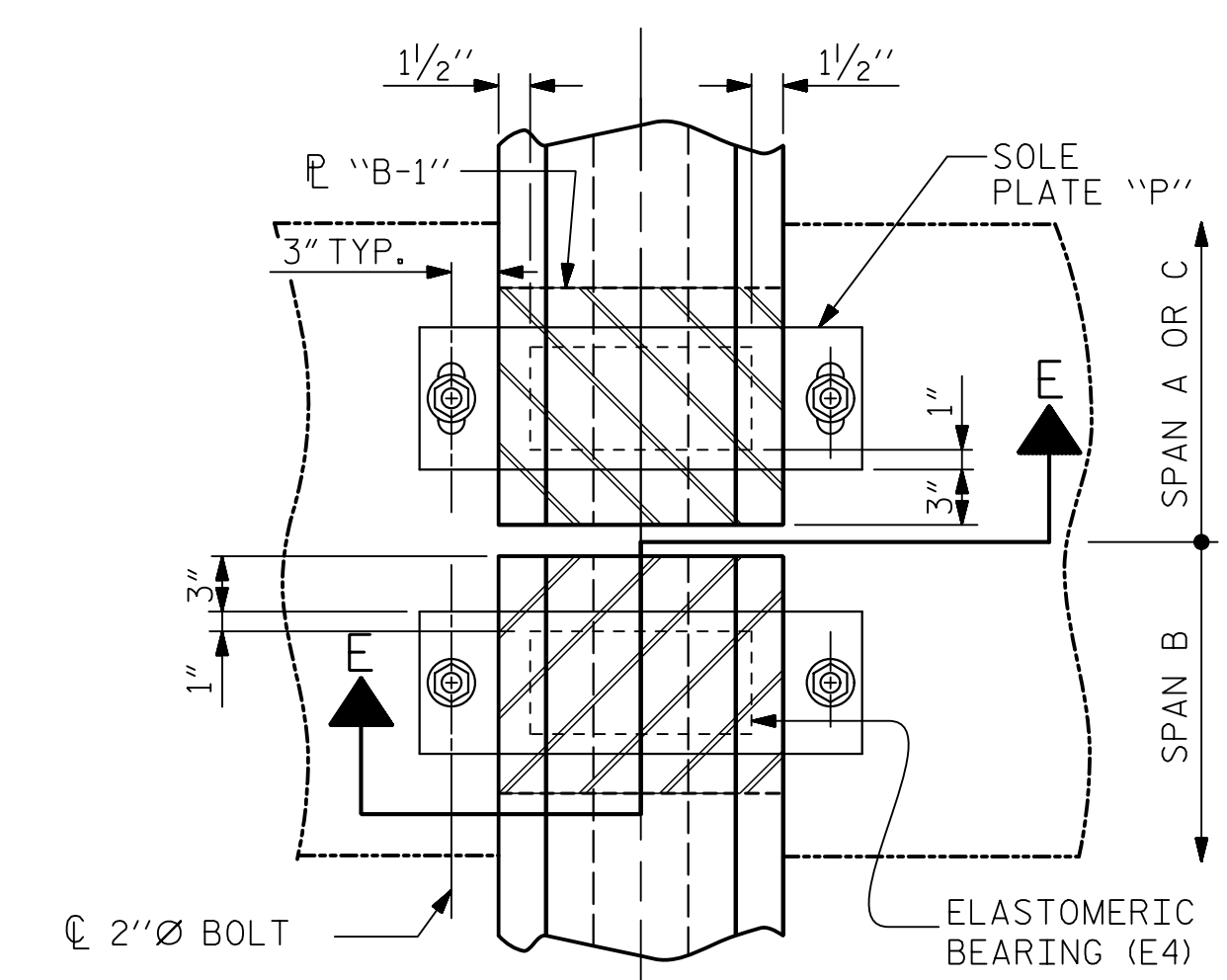
E4 (24 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING
TYPE V



PLAN VIEW AT INTEGRAL END BENTS

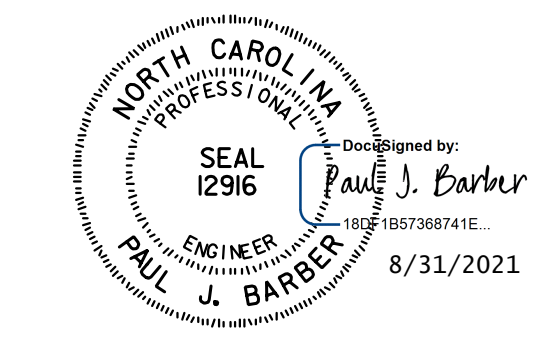


SOLE PLATE DETAILS ("P")



PLAN VIEW @ BENT

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



HNTB HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY: M. WRIGHT DATE: 7/21
CHECKED BY: P. BARBER DATE: 7/21
DESIGN ENGINEER OF RECORD: P. BARBER DATE: 7/21

DWG. NO. 17

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
ELASTOMERIC BEARING
DETAILS
PRESTRESSED CONCRETE GIRDER
SUPERSTRUCTURE
RIGHT LANE

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S6-17
1			3			TOTAL SHEETS
2			4			39

ASSEMBLED BY : AES	DATE : 9/17
CHECKED BY : BE	DATE : 9/17
DRAWN BY : EEM 2/97	REV. 10/1/11 MAA/GM
CHECKED BY : VAP 2/97	REV. 10/13 AAC/MAA
	REV. 1/15 MAA/TMG

DEAD LOAD DEFLECTION TABLE FOR SPANS A & C																						
0.6" Ø LOW RELAXATION STRANDS		GIRDER 1																				
TENTH POINTS		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.066	0.123	0.175	0.218	0.255	0.286	0.308	0.324	0.334	0.336	0.334	0.324	0.308	0.286	0.255	0.218	0.175	0.123	0.066	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L.	* ↓	0.000	0.025	0.049	0.073	0.095	0.114	0.132	0.145	0.155	0.161	0.163	0.161	0.155	0.146	0.132	0.116	0.096	0.074	0.050	0.025	0.000
FINAL CAMBER	↑	0	1/2	7/8	1/4	1/2	1 1/16	1 7/8	1 5/16	2	2 1/16	2 1/16	2 1/16	2	1 5/16	1 3/16	1 1 1/16	1 7/16	1 3/16	7/8	1/2	0

DEAD LOAD DEFLECTION TABLE FOR SPANS A & C																						
0.6" Ø LOW RELAXATION STRANDS		GIRDER 2 & 3																				
TENTH POINTS		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.066	0.123	0.175	0.218	0.255	0.286	0.308	0.324	0.334	0.336	0.334	0.324	0.308	0.286	0.255	0.218	0.175	0.123	0.066	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L.	* ↓	0.000	0.024	0.048	0.072	0.094	0.113	0.130	0.143	0.153	0.159	0.161	0.160	0.154	0.144	0.131	0.114	0.095	0.073	0.050	0.025	0.000
FINAL CAMBER	↑	0	1/2	7/8	1/4	1/2	1 1/16	1 7/8	2	2 1/16	2 1/8	2 1/8	2 1/16	2 1/16	1 5/16	1 7/8	1 1 1/16	1 1/2	1 3/16	7/8	1/2	0

DEAD LOAD DEFLECTION TABLE FOR SPANS A & C																						
0.6" Ø LOW RELAXATION STRANDS		GIRDER 4																				
TENTH POINTS		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.066	0.123	0.175	0.218	0.255	0.286	0.308	0.324	0.334	0.336	0.334	0.324	0.308	0.286	0.255	0.218	0.175	0.123	0.066	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L.	* ↓	0.000	0.025	0.049	0.074	0.096	0.116	0.133	0.146	0.157	0.163	0.165	0.163	0.157	0.147	0.134	0.117	0.097	0.075	0.051	0.026	0.000
FINAL CAMBER	↑	0	1/2	7/8	1 3/16	1 1/16	1 1 1/16	1 3/16	1 5/16	2	2 1/16	2 1/16	2 1/16	2	1 5/16	1 3/16	1 5/8	1 7/16	1 3/16	7/8	1/2	0

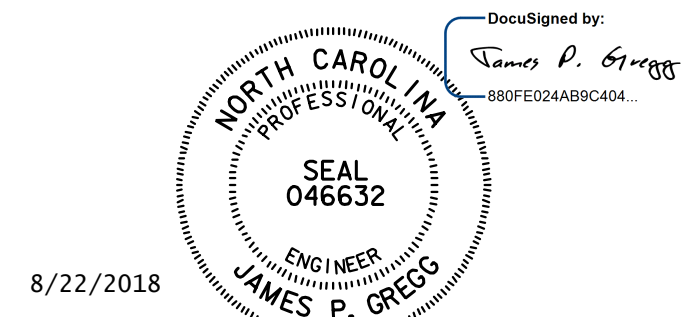
DEAD LOAD DEFLECTION TABLE FOR SPAN B																						
0.6" Ø LOW RELAXATION STRANDS		GIRDER 1																				
TENTH POINTS		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.066	0.123	0.175	0.218	0.255	0.286	0.308	0.324	0.334	0.336	0.334	0.324	0.308	0.286	0.255	0.218	0.175	0.123	0.066	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L.	* ↓	0.000	0.024	0.048	0.072	0.094	0.114	0.131	0.144	0.154	0.160	0.162	0.160	0.154	0.144	0.131	0.114	0.095	0.073	0.049	0.025	0.000
FINAL CAMBER	↑	0	1/2	7/8	1/4	1/2	1 1/16	1 7/8	1 5/16	2 1/16	2 1/16	2 1/8	2 1/16	2 1/16	1 5/16	1 7/8	1 1 1/16	1 1/2	1 1/4	7/8	1/2	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B																						
0.6" Ø LOW RELAXATION STRANDS		GIRDER 2 & 3																				
TENTH POINTS		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.066	0.123	0.175	0.218	0.255	0.286	0.308	0.324	0.334	0.336	0.334	0.324	0.308	0.286	0.255	0.218	0.175	0.123	0.066	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L.	* ↓	0.000	0.024	0.048	0.072	0.094	0.113	0.130	0.143	0.153	0.159	0.161	0.159	0.153	0.143	0.130	0.113	0.094	0.072	0.049	0.025	0.000
FINAL CAMBER	↑	0	1/2	7/8	1/4	1/2	1 1/16	1 7/8	2	2 1/16	2 1/8	2 1/8	2 1/8	2 1/16	2	1 7/8	1 1 1/16	1 1/2	1 1/4	7/8	1/2	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B																						
0.6" Ø LOW RELAXATION STRANDS		GIRDER 4																				
TENTH POINTS		0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE)	↑	0.000	0.066	0.123	0.175	0.218	0.255	0.286	0.308	0.324	0.334	0.336	0.334	0.324	0.308	0.286	0.255	0.218	0.175	0.123	0.066	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L.	* ↓	0.000	0.025	0.049	0.074	0.096	0.116	0.133	0.146	0.156	0.163	0.165	0.163	0.157	0.147	0.133	0.116	0.097	0.074	0.050	0.025	0.000
FINAL CAMBER	↑	0	1/2	7/8	1 3/16	1 1/16	1 1 1/16	1 3/16	1 5/16	2	2 1/16	2 1/16	2 1/16	2	1 5/16	1 3/16	1 1 1/16	1 7/16	1 3/16	7/8	1/2	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-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-



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DRAWN BY: B. NEUPANE DATE: 8/17
 CHECKED BY: B. EMAMI DATE: 9/17
 DESIGN ENGINEER OF RECORD: J. GREGG DATE: 8/18

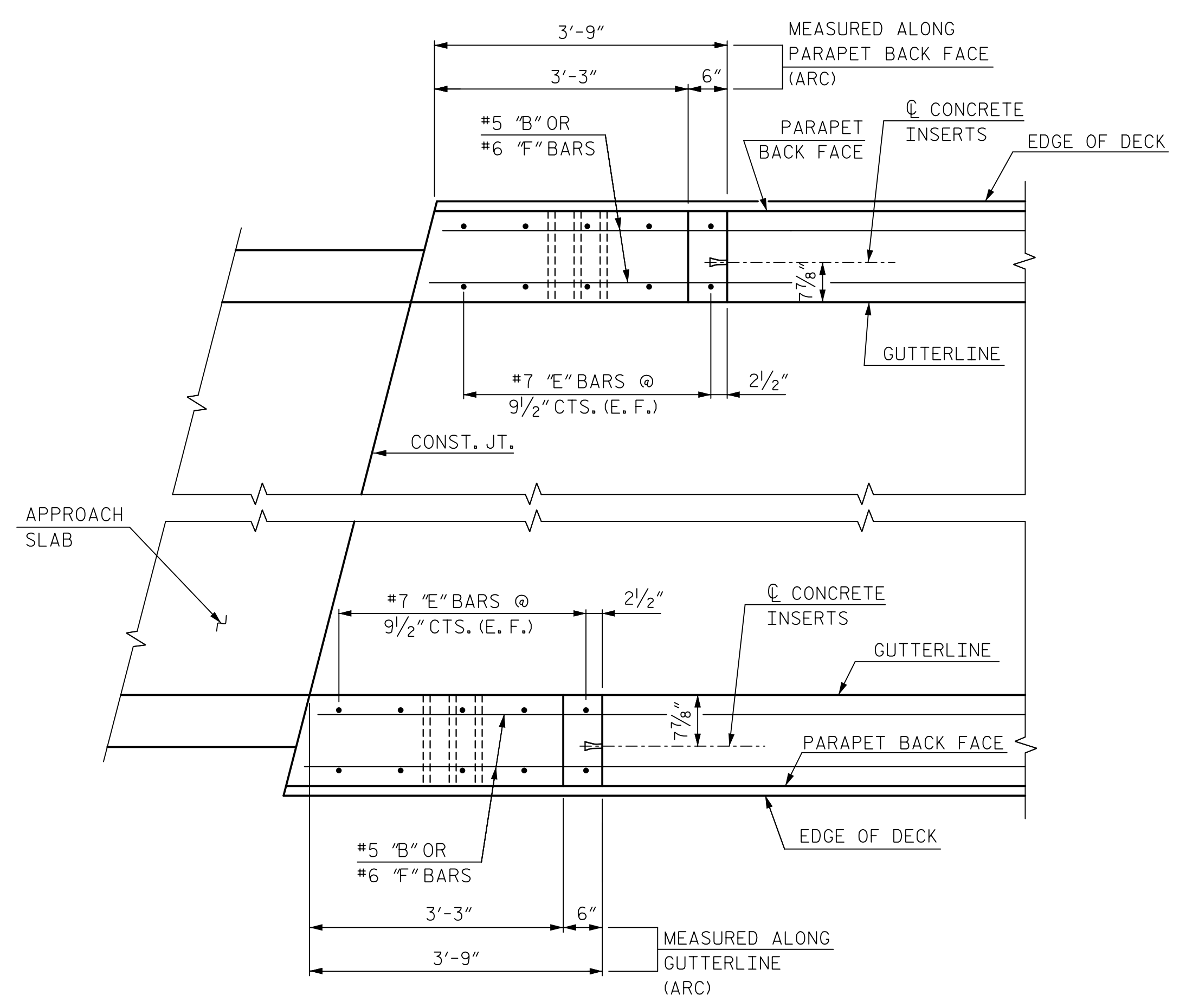
DWG. NO. 18

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

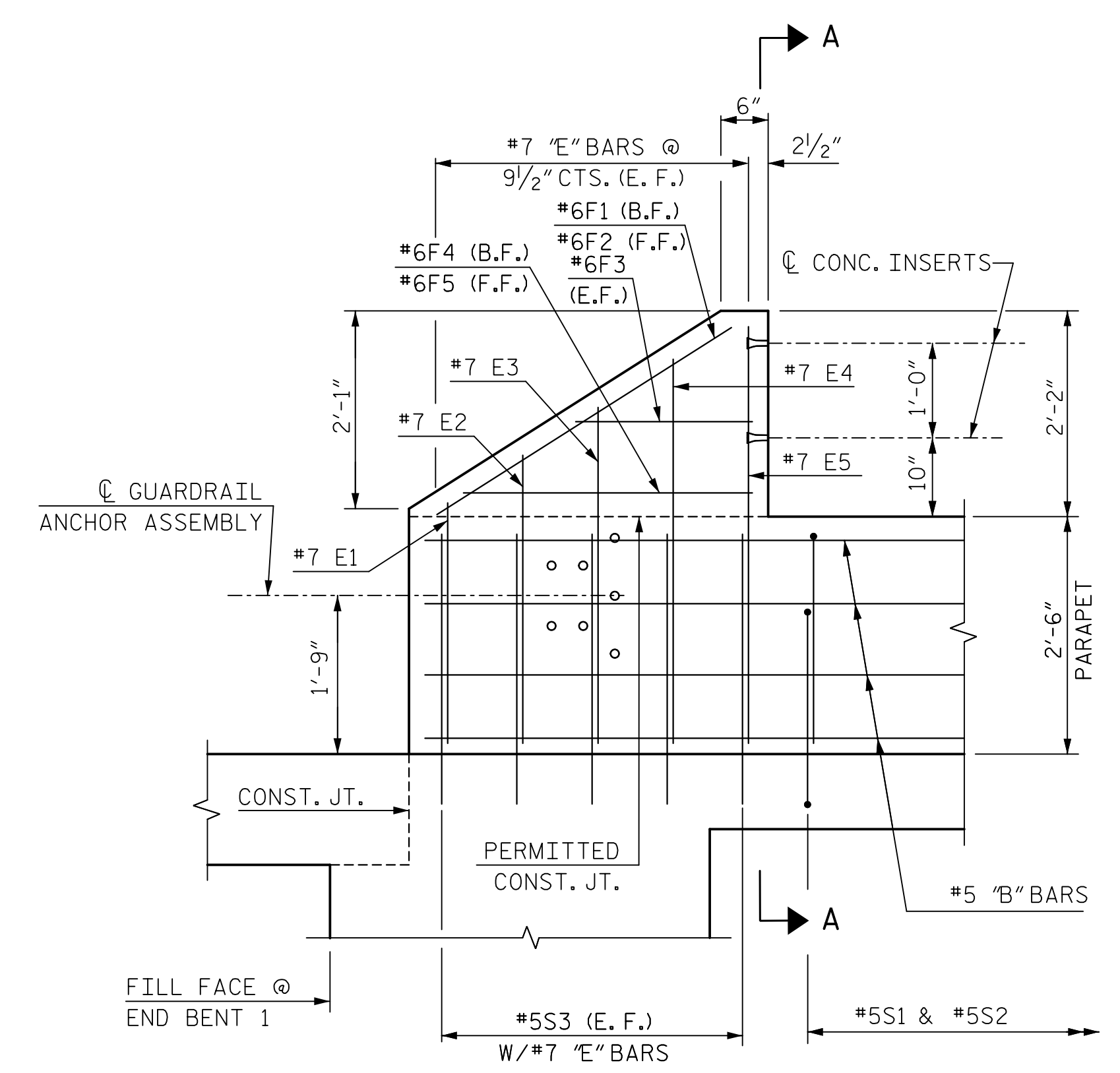
SUPERSTRUCTURE
 DEAD LOAD DEFLECTIONS

RIGHT LANE

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

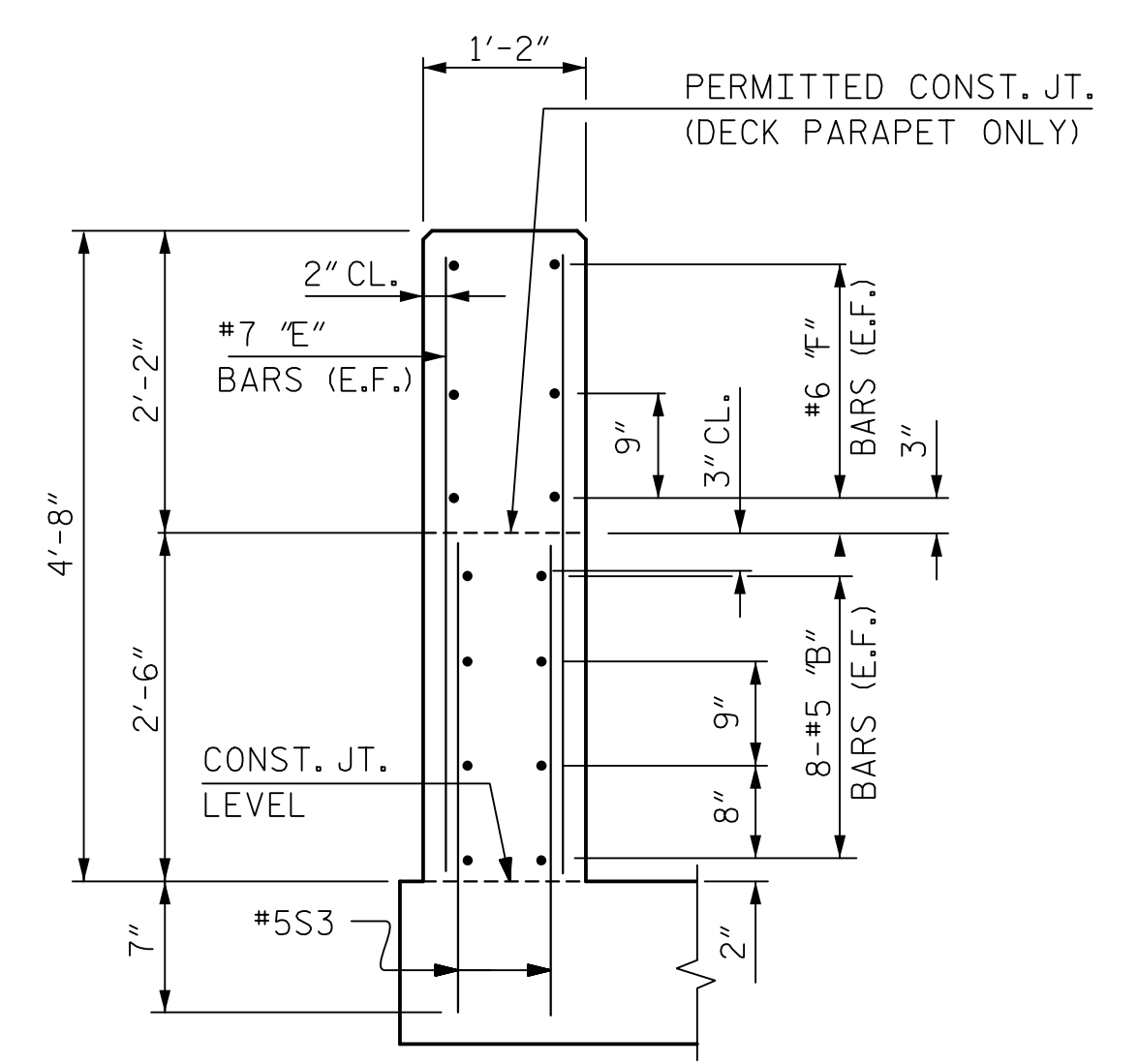


END OF RAIL PLAN
END BENT 1 SHOWN END BENT 2 SIMILAR



ELEVATION
END BENT 1 SHOWN END BENT 2 SIMILAR

NOTE: E.F. DENOTES EACH FACE.
B.F. DENOTES BACK FACE.
F.F. DENOTES FRONT FACE.

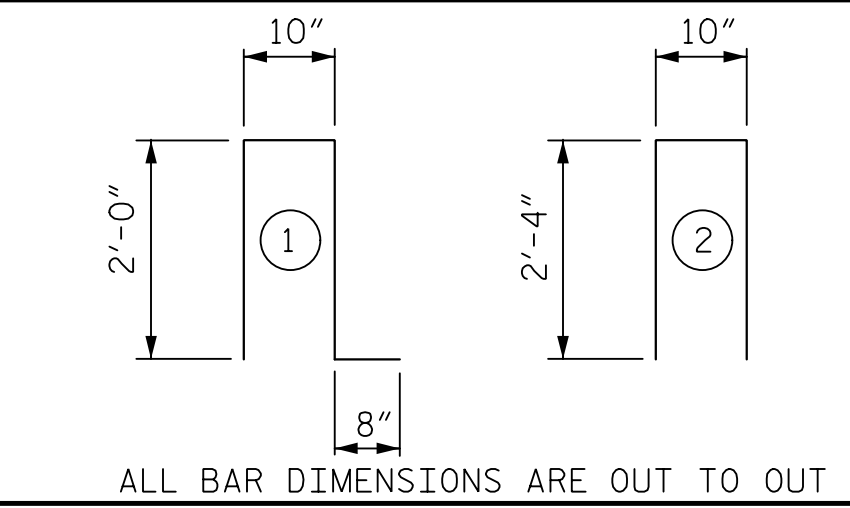


SECTION A-A

BILL OF MATERIAL FOR TWO PARAPETS AND FOUR END POSTS

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
*B1	8	5	STR	25'-11"	216	F1	4	6	STR	3'-8"	22
*B2	32	5	STR	25'-8"	857	F2	4	6	STR	3'-6"	21
*B3	152	5	STR	25'-5"	4,029	F3	8	6	STR	1'-10"	22
						F4	4	6	STR	3'-1"	19
*E1	8	7	STR	2'-7"	42	F5	4	6	STR	3'-3"	20
*E2	8	7	STR	3'-1"	50						
*E3	8	7	STR	3'-7"	59	S1	602	5	1	5'-6"	3,453
*E4	8	7	STR	4'-1"	67	S2	602	5	2	5'-6"	3,453
*E5	8	7	STR	4'-6"	74	S3	40	5	STR	2'-11"	122

BAR TYPES



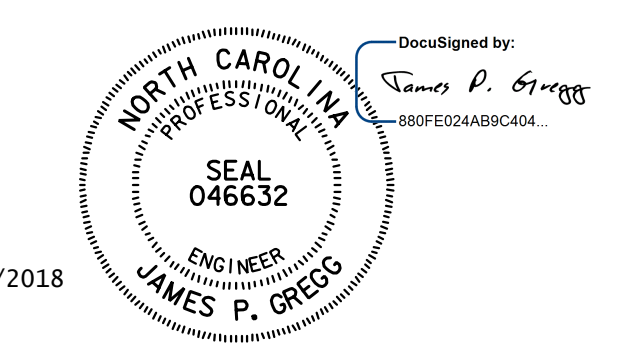
QUANTITIES

EPOXY COATED REINFORCING STEEL	LBS.	12,526
CLASS "AA" CONCRETE	CU. YDS.	67.800
CONCRETE PARAPET	L.F.	619.71

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
CONCRETE PARAPET AND
END POST DETAILS
RIGHT LANE

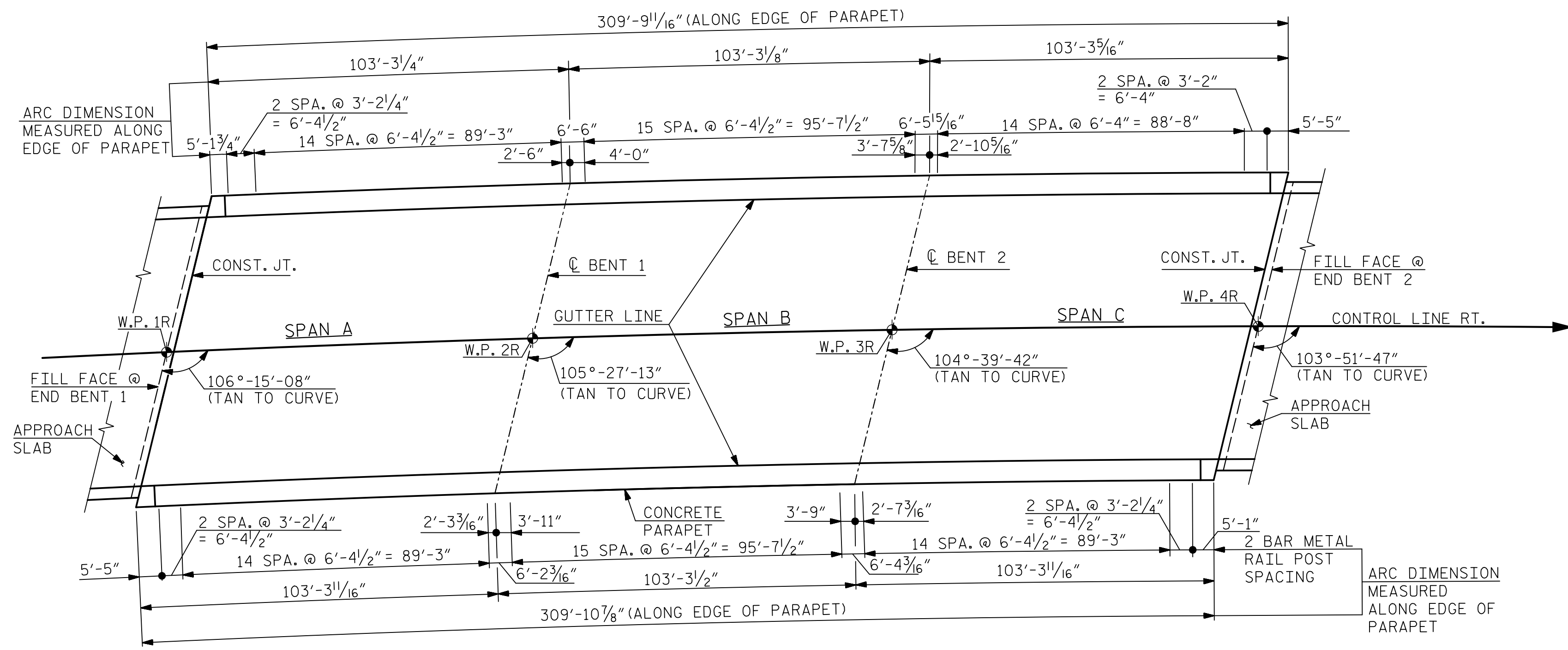


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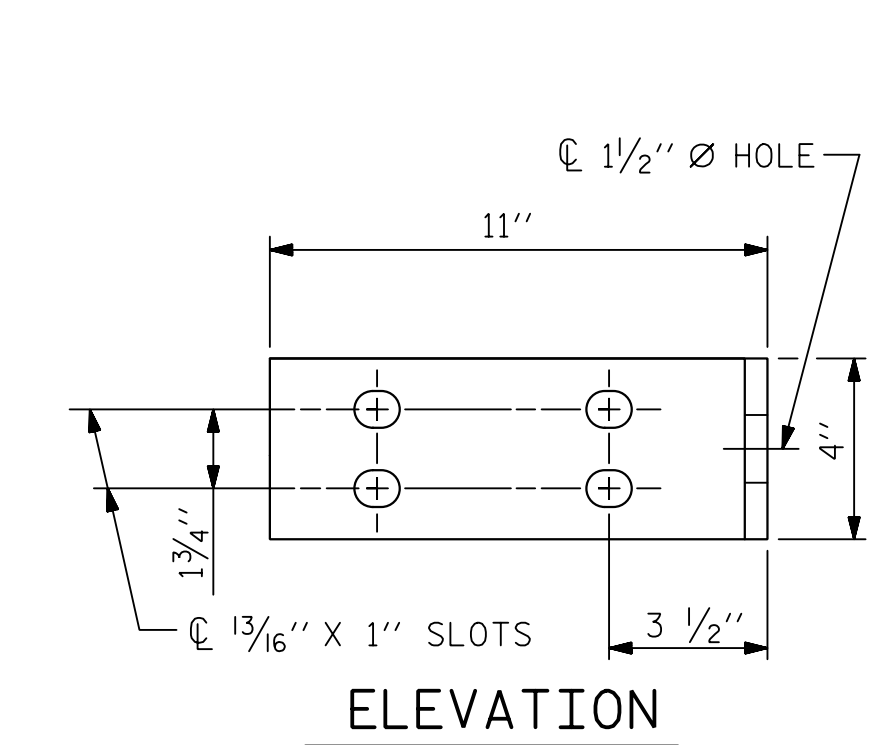
DRAWN BY: B. NEUPANE DATE: 8/17
CHECKED BY: B. EMAMI DATE: 9/17
DESIGN ENGINEER OF RECORD: J. GREGG DATE: 8/18

DWG. NO. 20

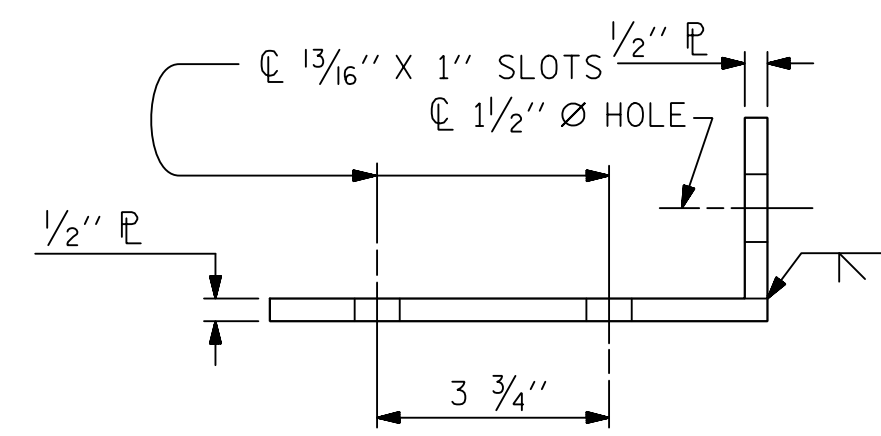
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S6-20
1			3			TOTAL SHEETS
2			4			39



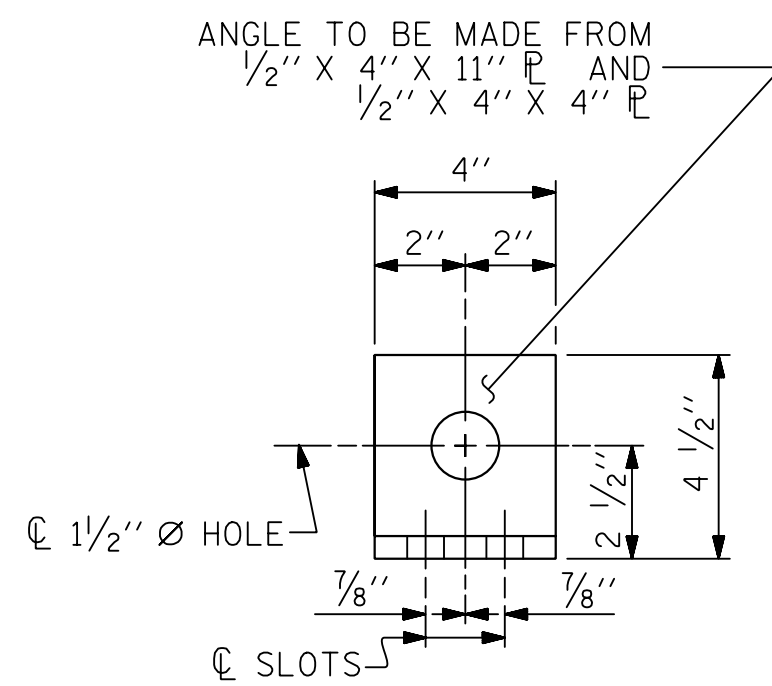
PLAN OF RAIL POST SPACINGS



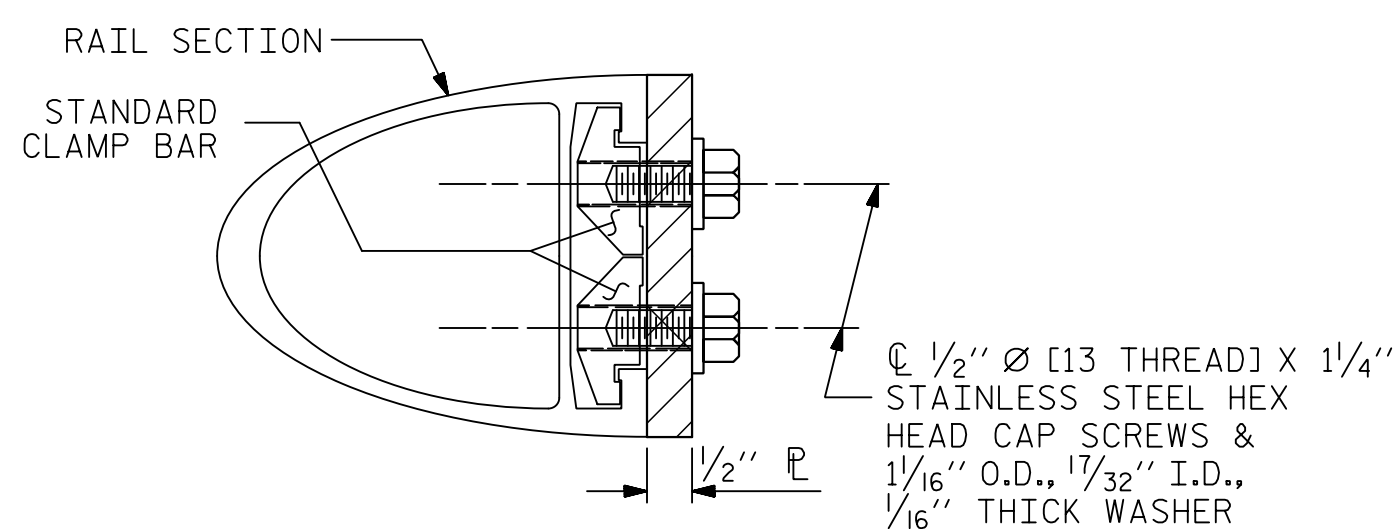
ELEVATION



TOP VIEW

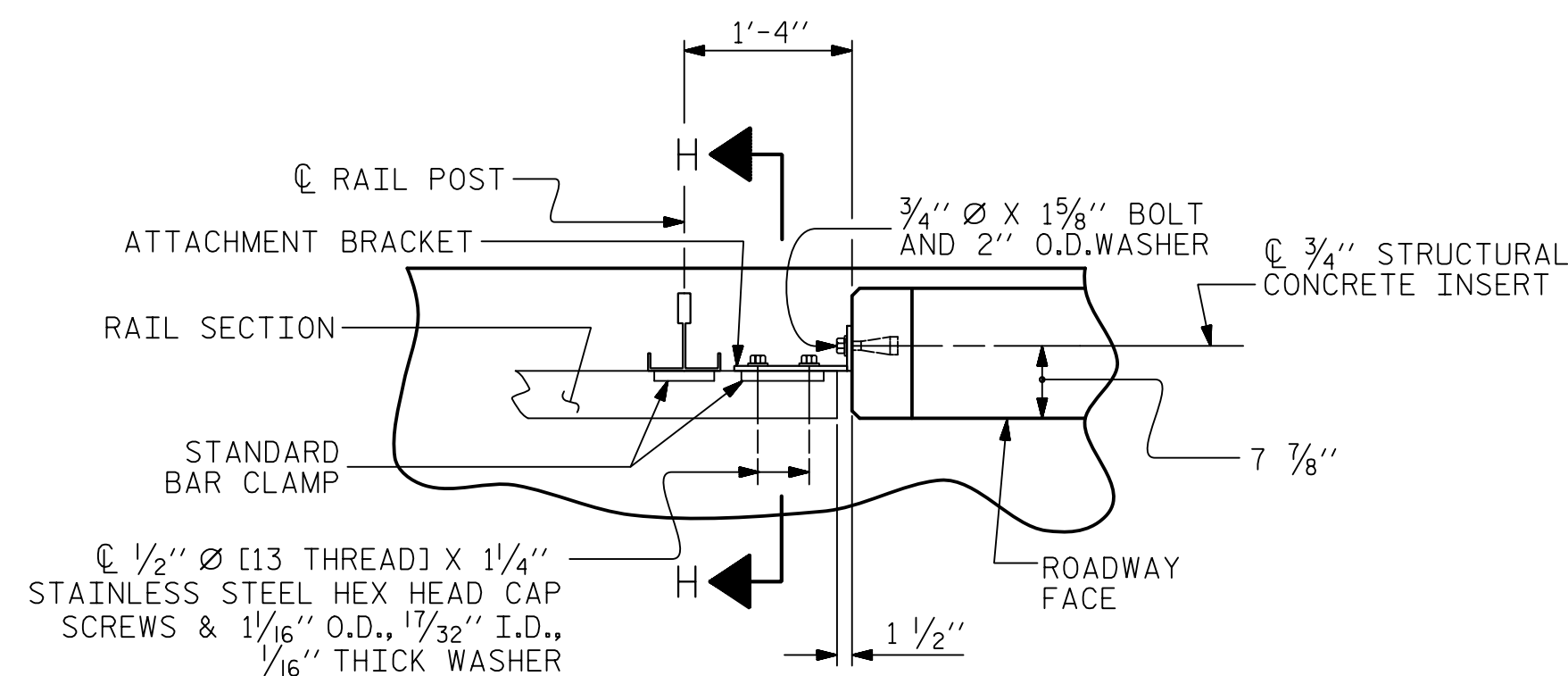


END VIEW (FIX AND EXP.)



SECTION H-H (FIX)

FIXED



PLAN - RAIL AND END POST

NOTES
STRUCTURAL CONCRETE INSERT

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

NOTES
METAL RAIL TO END POST CONNECTION

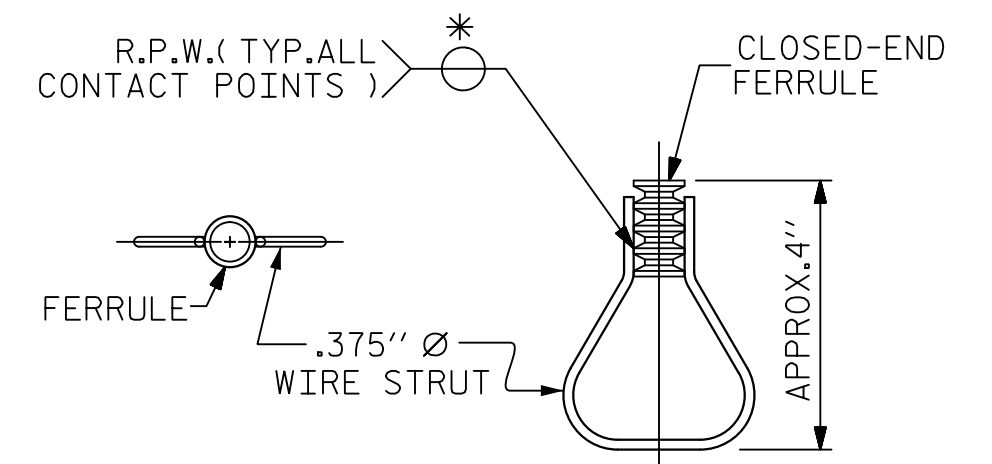
- THE METAL RAIL TO END POST CONNECTION SHALL CONSIST OF THE FOLLOWING COMPONENTS:
- 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.
 - 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø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

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

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

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

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



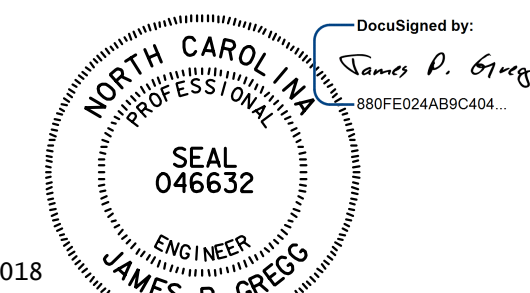
PLAN ELEVATION
STRUCTURAL CONCRETE INSERT

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

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
RAIL POST SPACINGS
AND
END OF RAIL DETAILS
FOR ONE OR TWO BAR METAL RAILS
RIGHT LANE



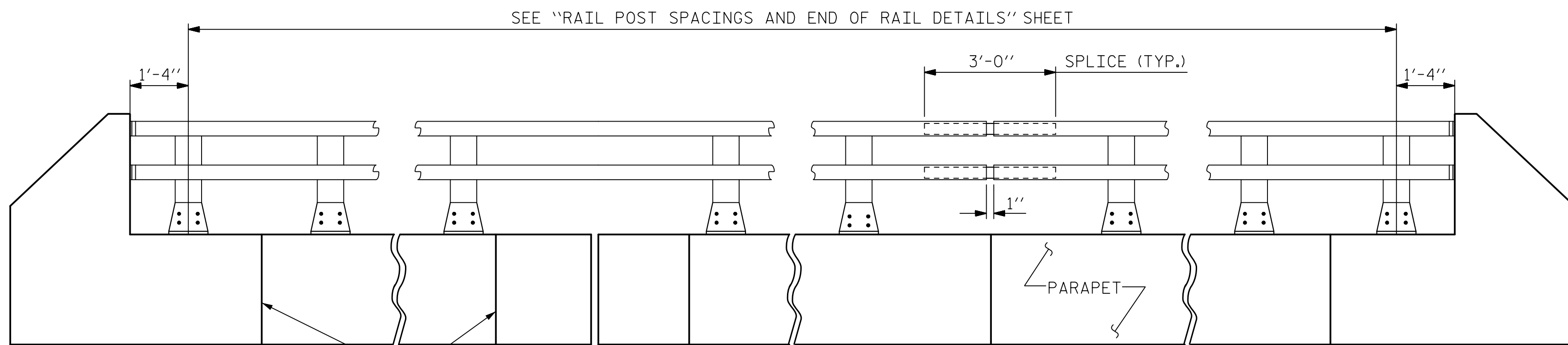
8/22/2018

ASSEMBLED BY : BN	DATE : 8/17
CHECKED BY : BE	DATE : 9/17
DRAWN BY : FCJ 1/88	REV. 5/7/03 RWW/JTE
CHECKED BY : CRK 3/89	REV. 5/1/06 TLX/GM
	REV. 10/1/11 MAA/GM

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DRAWN BY : B. NEUPANE	DATE : 8/17	DWG. NO. 21	
CHECKED BY : B. EMAMI	DATE : 9/17		
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18		

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

STD. NO. BMR2



ELEVATION

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

NOTES

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

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

ALUMINUM RAILS

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

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

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

GALVANIZED STEEL RAILS

MATERIAL AND GALVANIZING ARE TO CONFORM TO THE FOLLOWING SPECIFICATIONS:

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

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

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

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

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

GENERAL NOTES

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

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

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

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

PAY LENGTH = 604.71 LIN. FT.

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

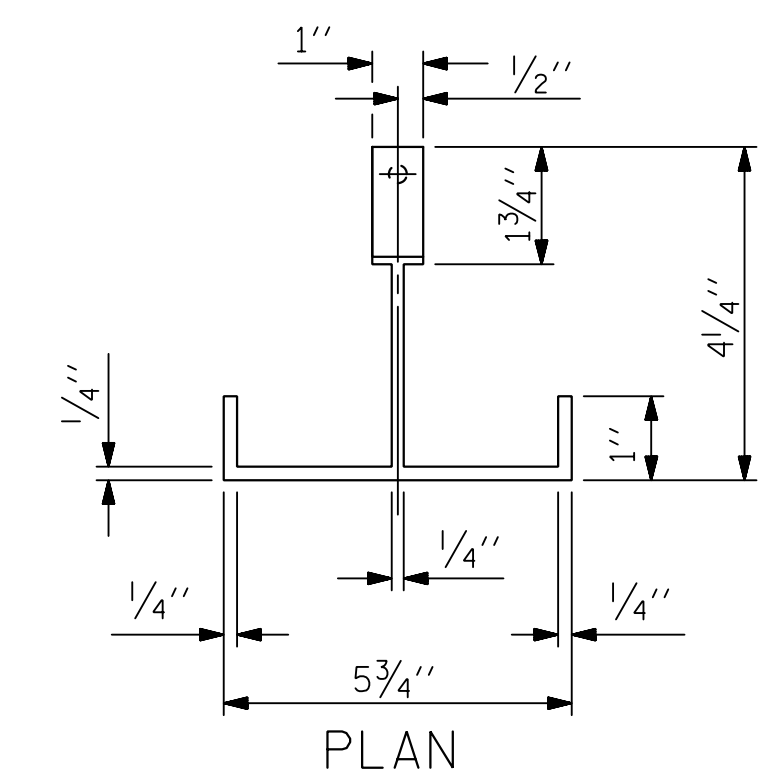
SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

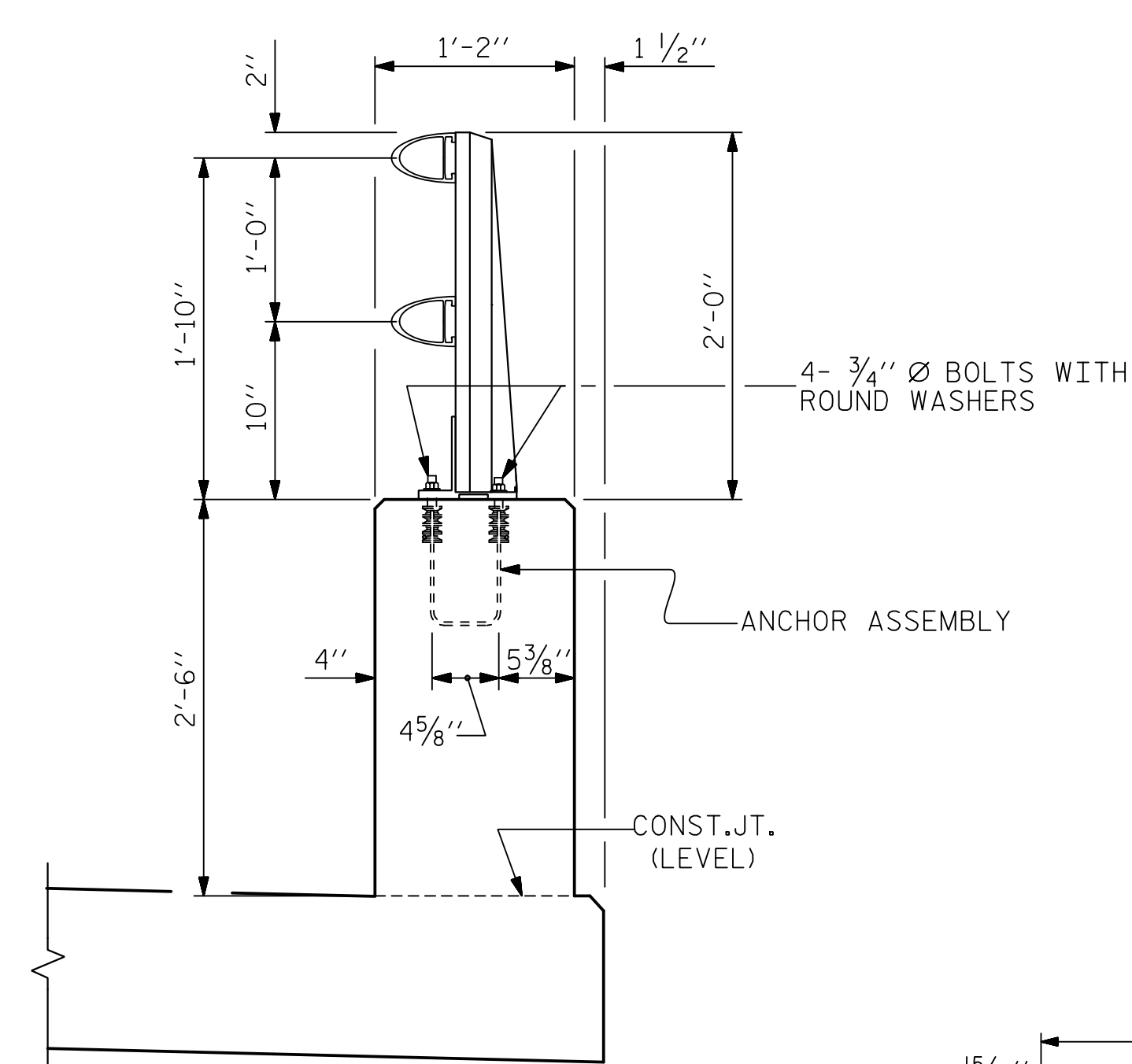
STANDARD
 2 BAR METAL RAIL

RIGHT LANE

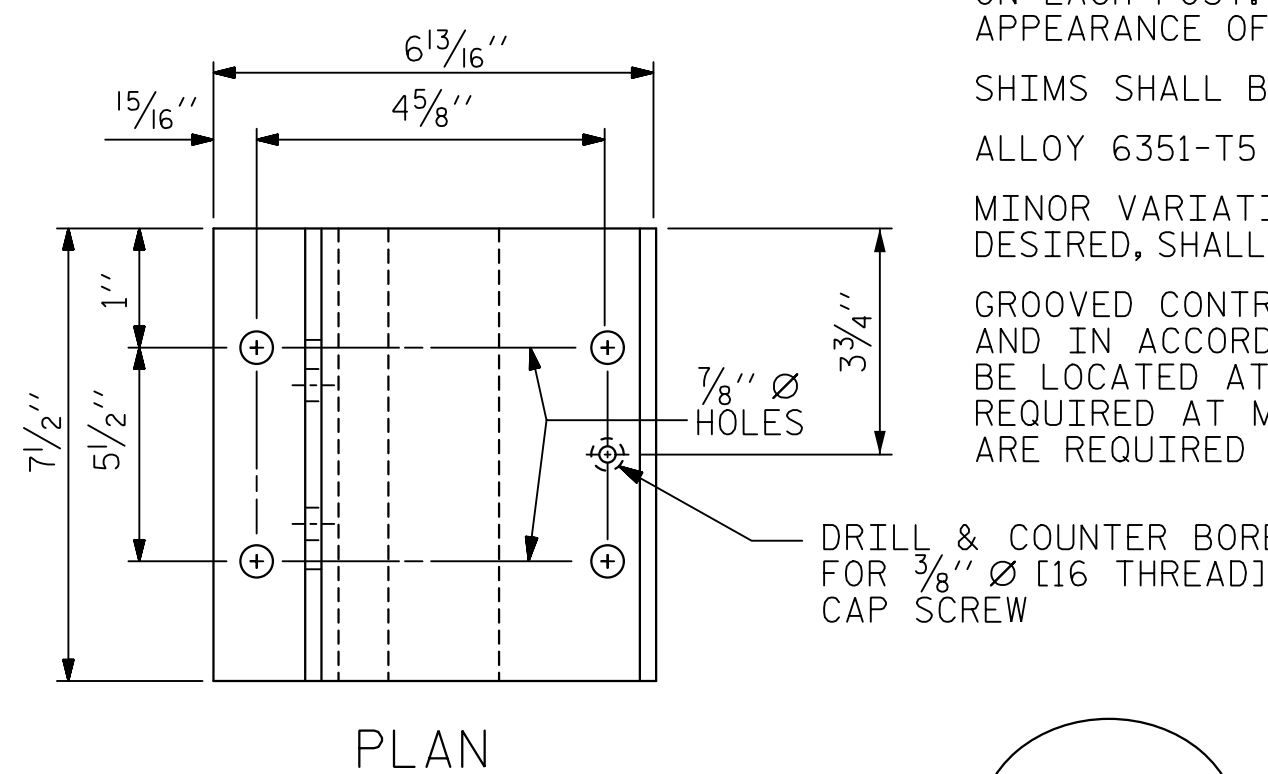
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S6-22
1			3			TOTAL SHEETS
2			4			39



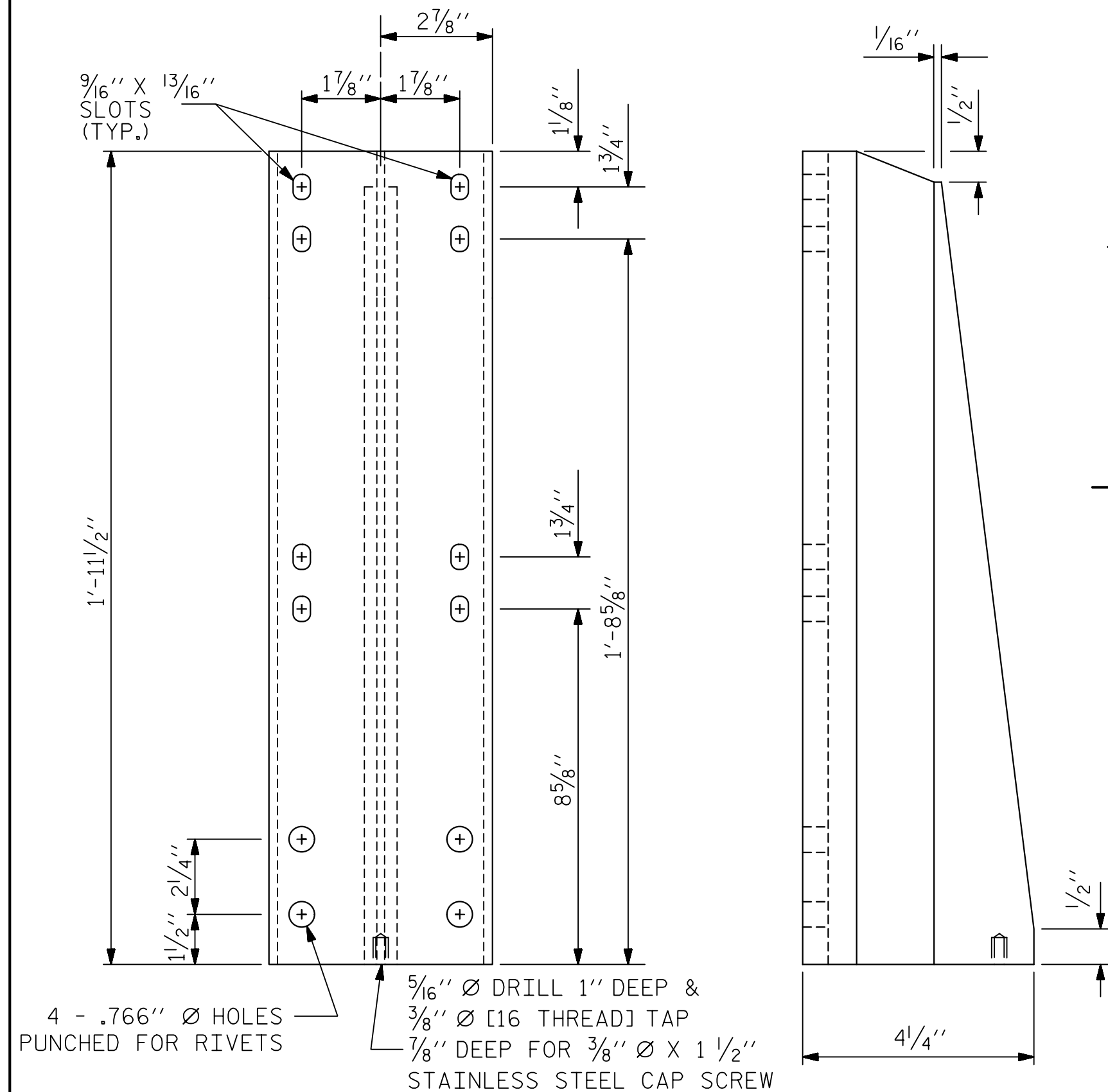
PLAN



SECTION THRU PARAPET AND RAIL



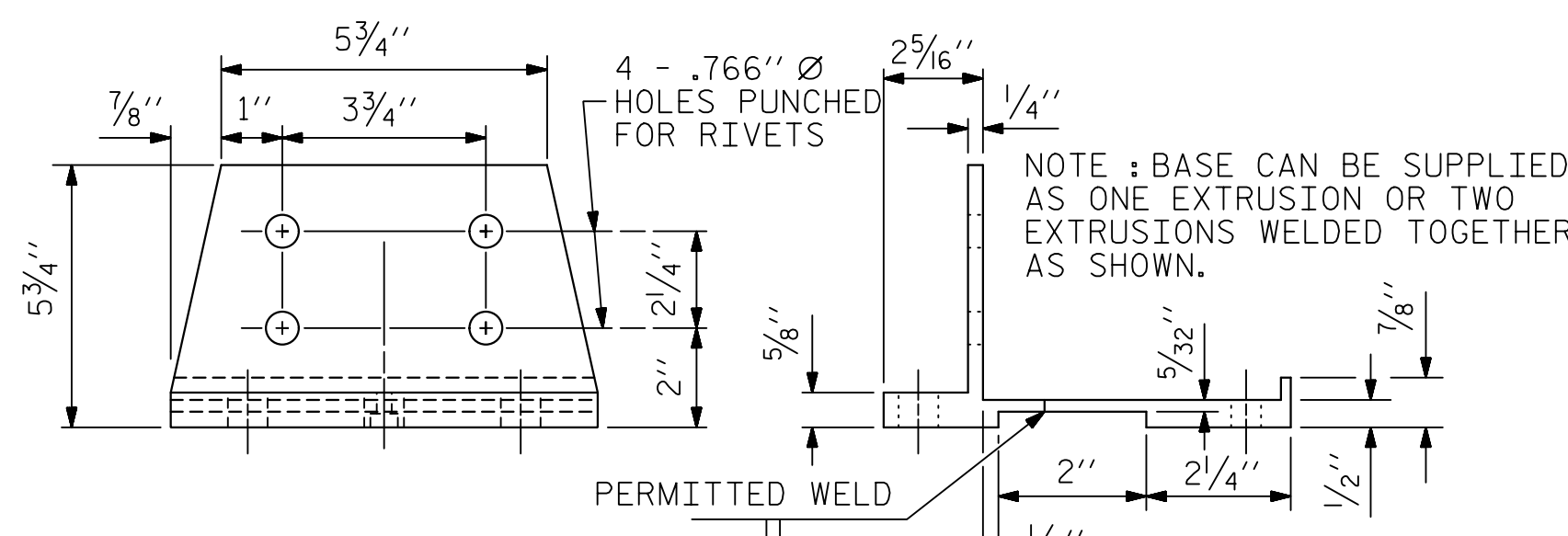
PLAN



FRONT ELEVATION

SIDE ELEVATION

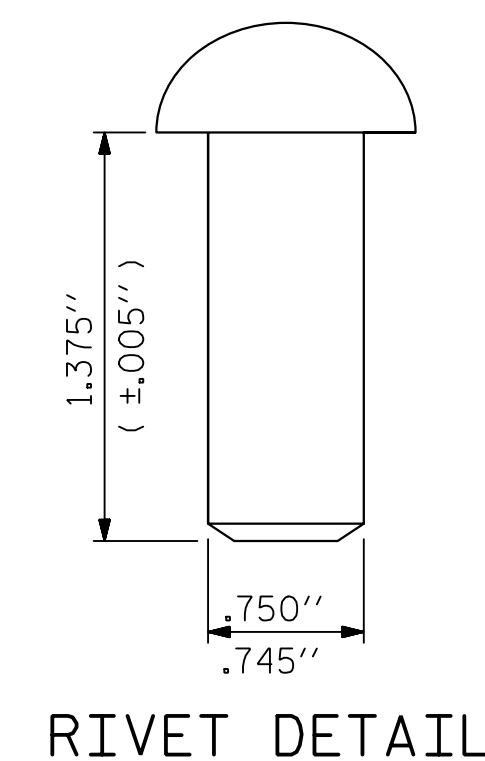
DETAILS OF POST



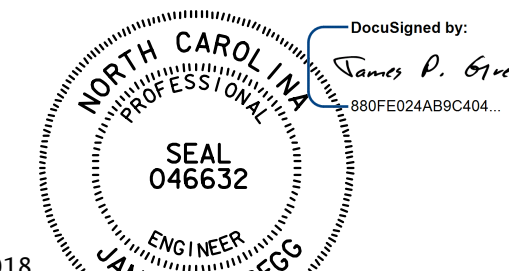
FRONT ELEVATION

SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL



ASSEMBLED BY : BN	DATE : 8/17	TLA/GM
CHECKED BY : BE	DATE : 9/17	MAA/GM
DRAWN BY : EEM 6/94	REV. 5/1/06	REV. 10/1/11
CHECKED BY : RGW 6/94	REV. 6/13	MAA/GM

HNTB	HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
DRAWN BY : B. NEUPANE	DATE : 8/17
CHECKED BY : B. EMAMI	DATE : 9/17
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18

NOTES

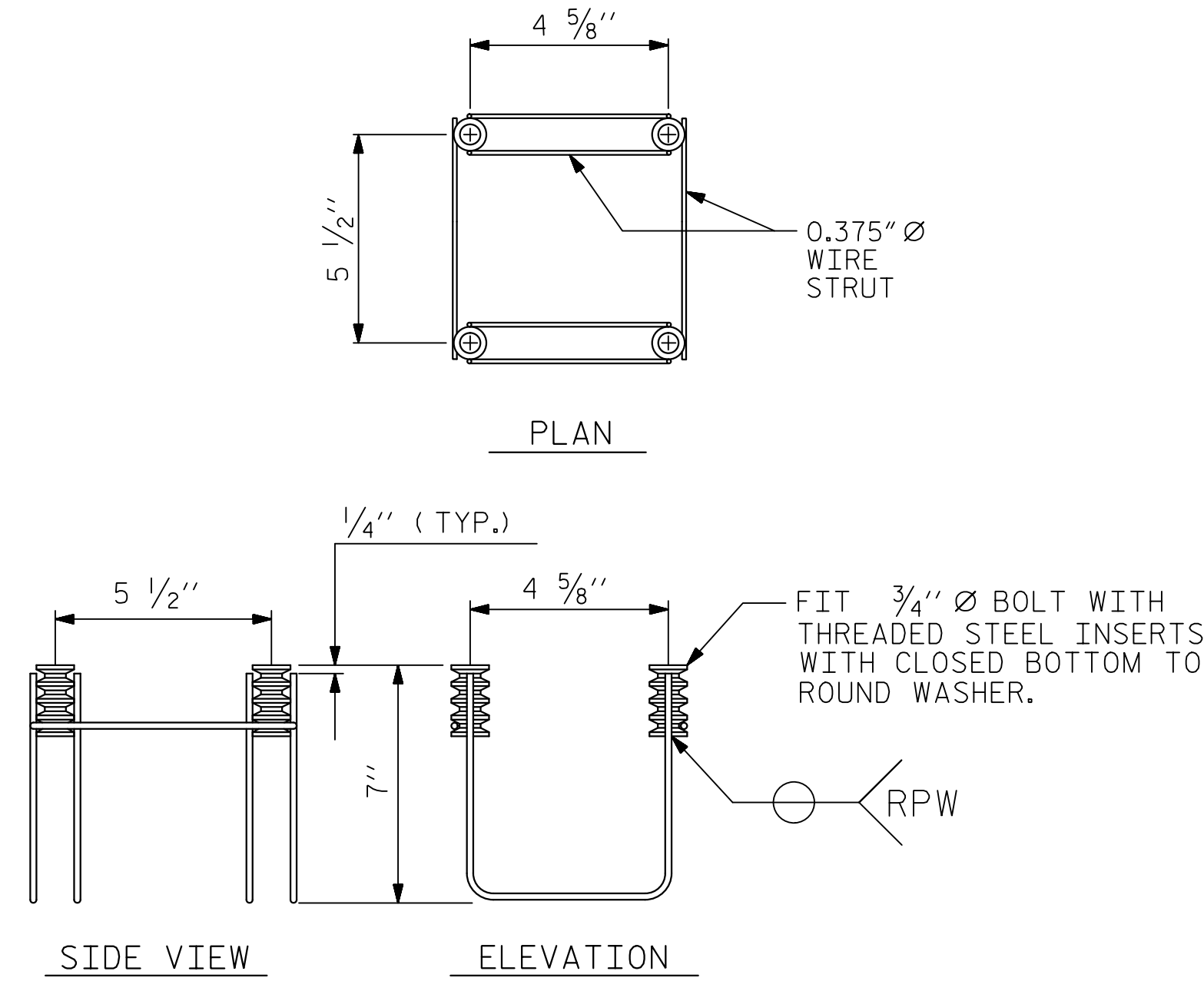
STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

- A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.
- B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.
- C. WIRE STRUT SHOWN IN THE CONCRETE ANCHOR ASSEMBLY DETAIL IS THE MINIMUM ALLOWABLE SIZE AND SHALL HAVE A MINIMUM TENSILE STRENGTH OF 100,000 PSI. AS AN OPTION, A 7/16" Ø WIRE STRUT WITH A MINIMUM TENSILE STRENGTH OF 90,000 PSI IS ACCEPTABLE.
- D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.
- E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.
- F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

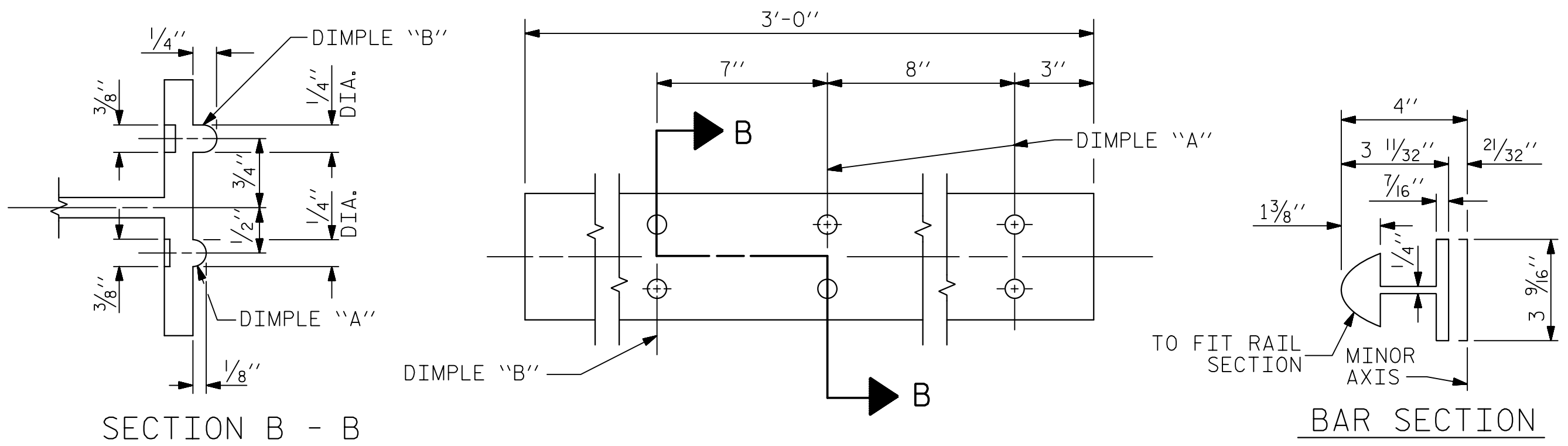
THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF THE METAL RAIL ANCHOR ASSEMBLY. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE 3/4" Ø BOLT IS 10 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

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

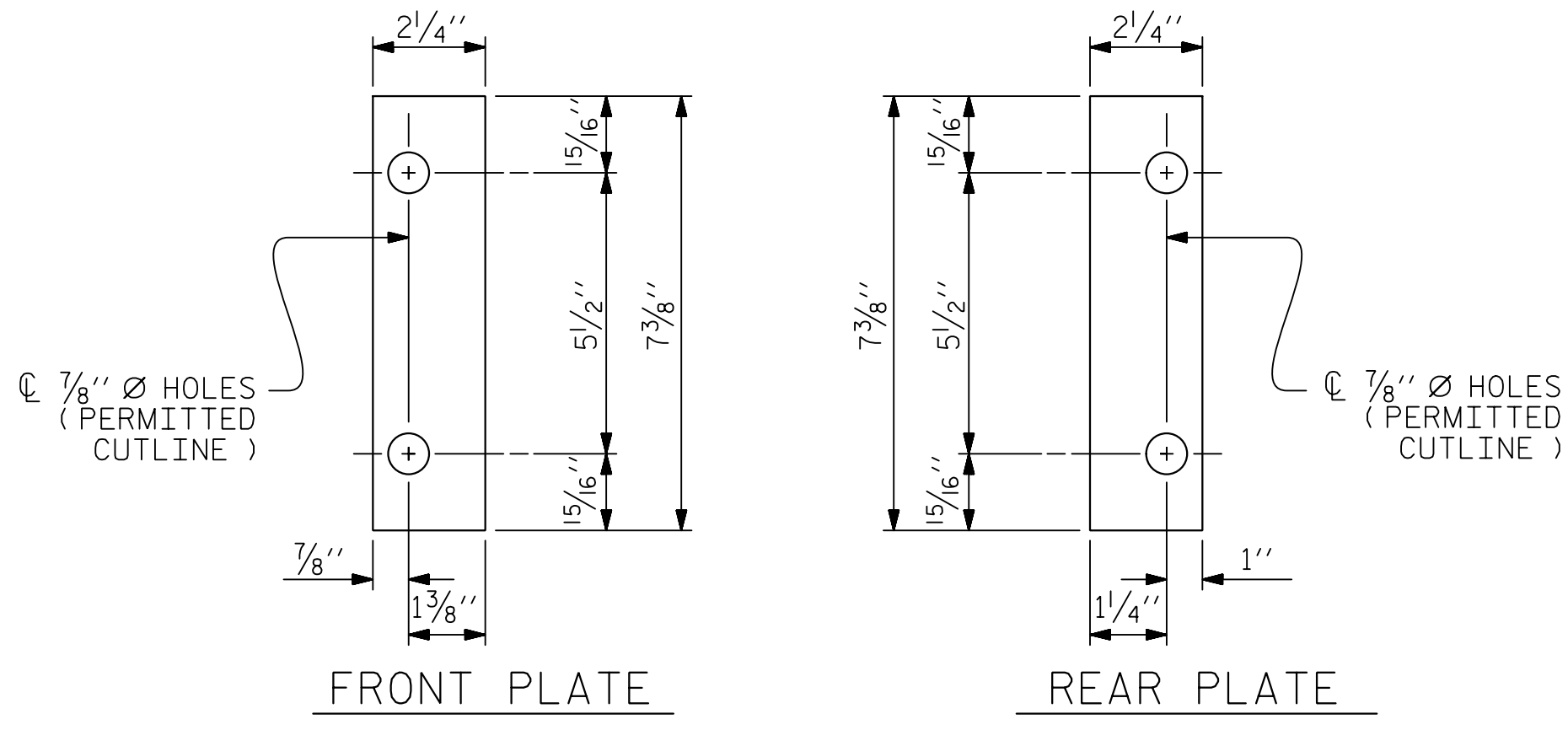


4-BOLT METAL RAIL ANCHOR ASSEMBLY

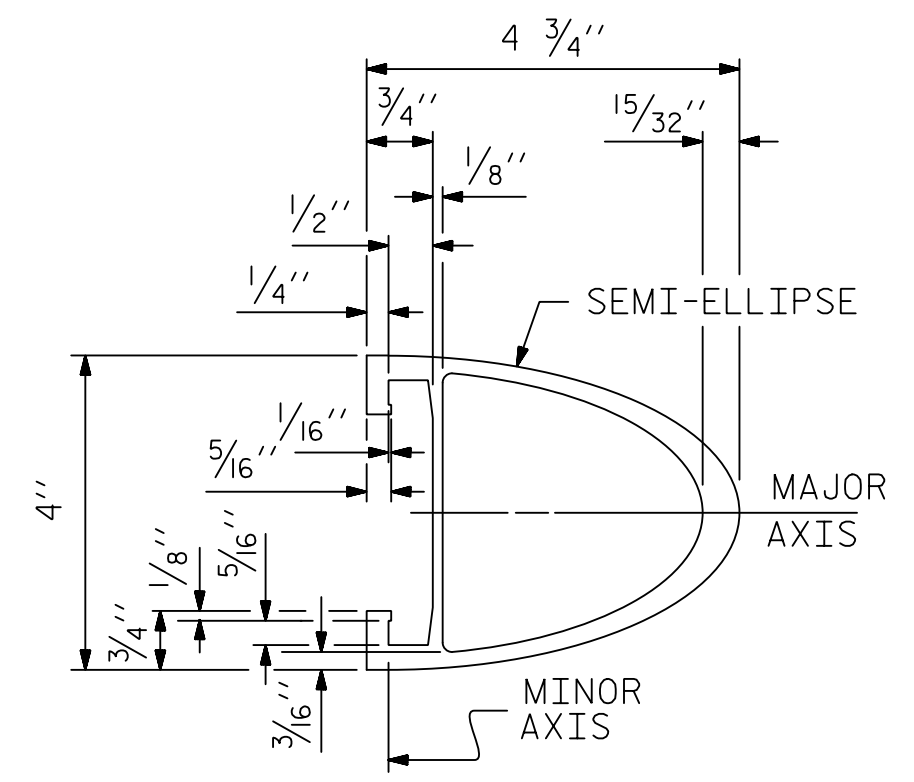
(100 ASSEMBLIES REQUIRED)



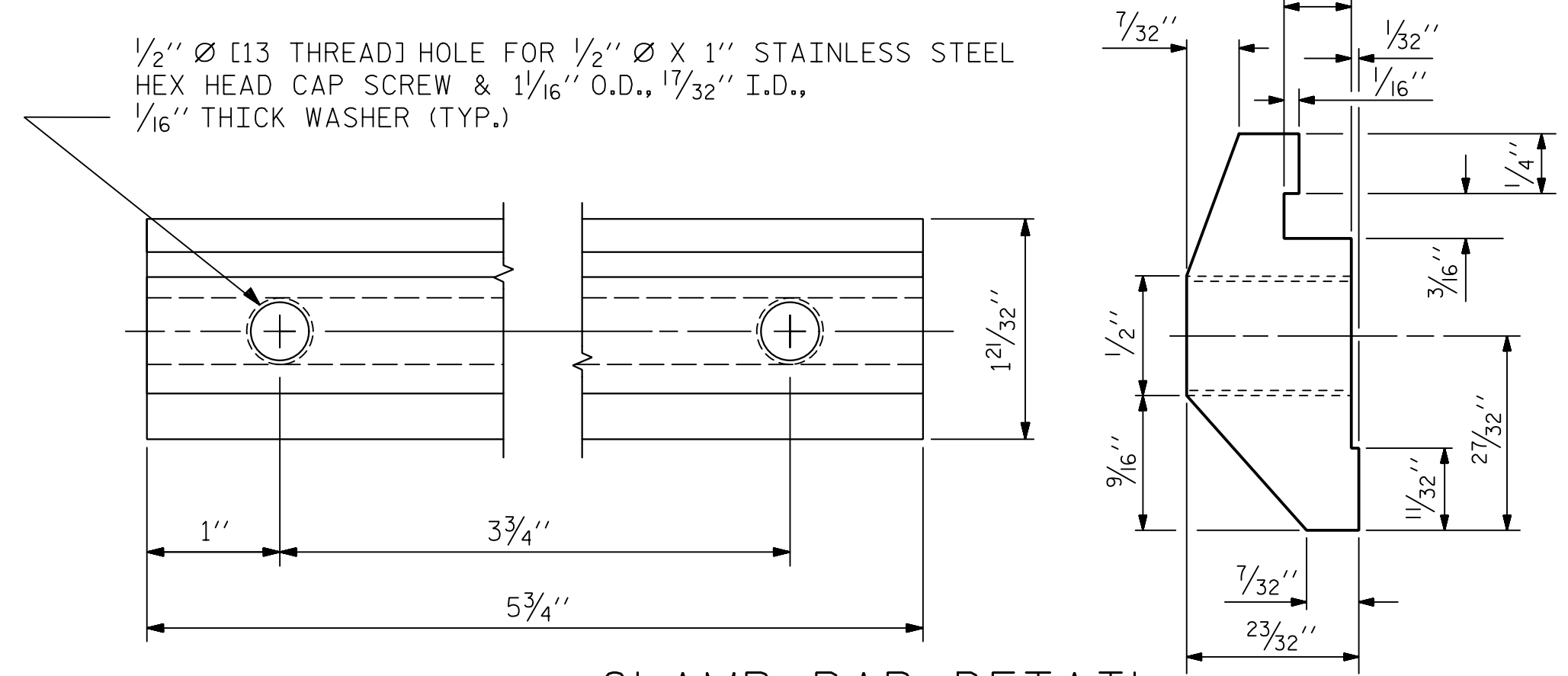
EXPANSION BAR DETAILS



SHIM DETAILS

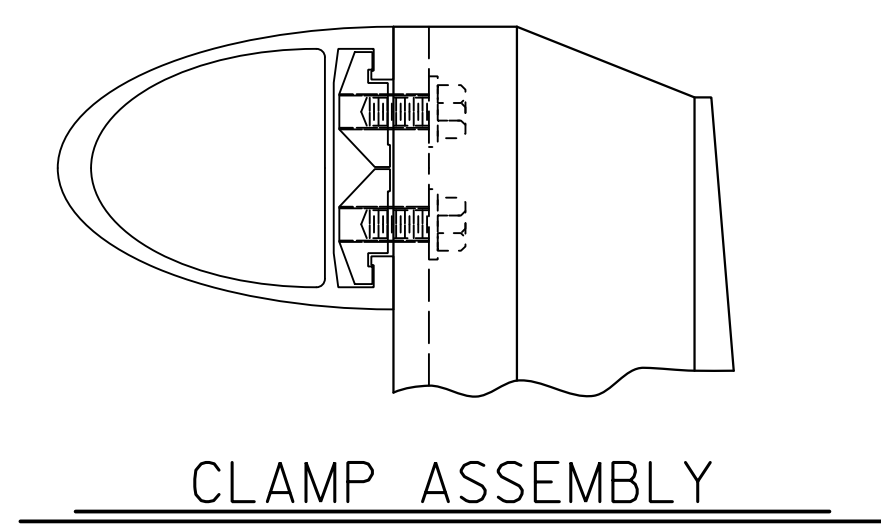


RAIL SECTION

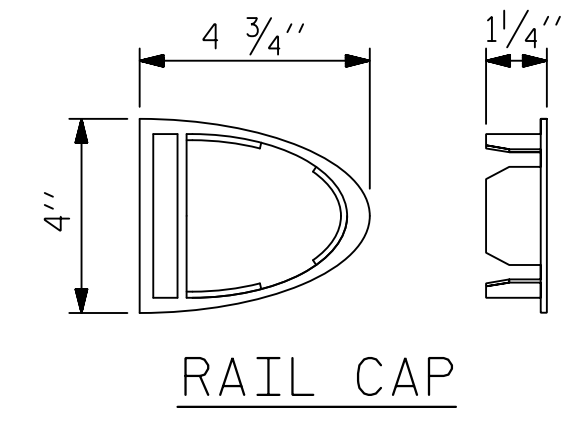


CLAMP BAR DETAIL

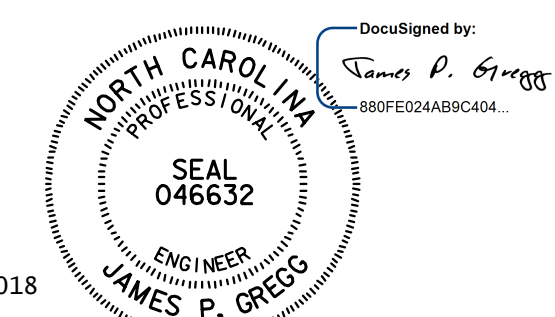
(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP



PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

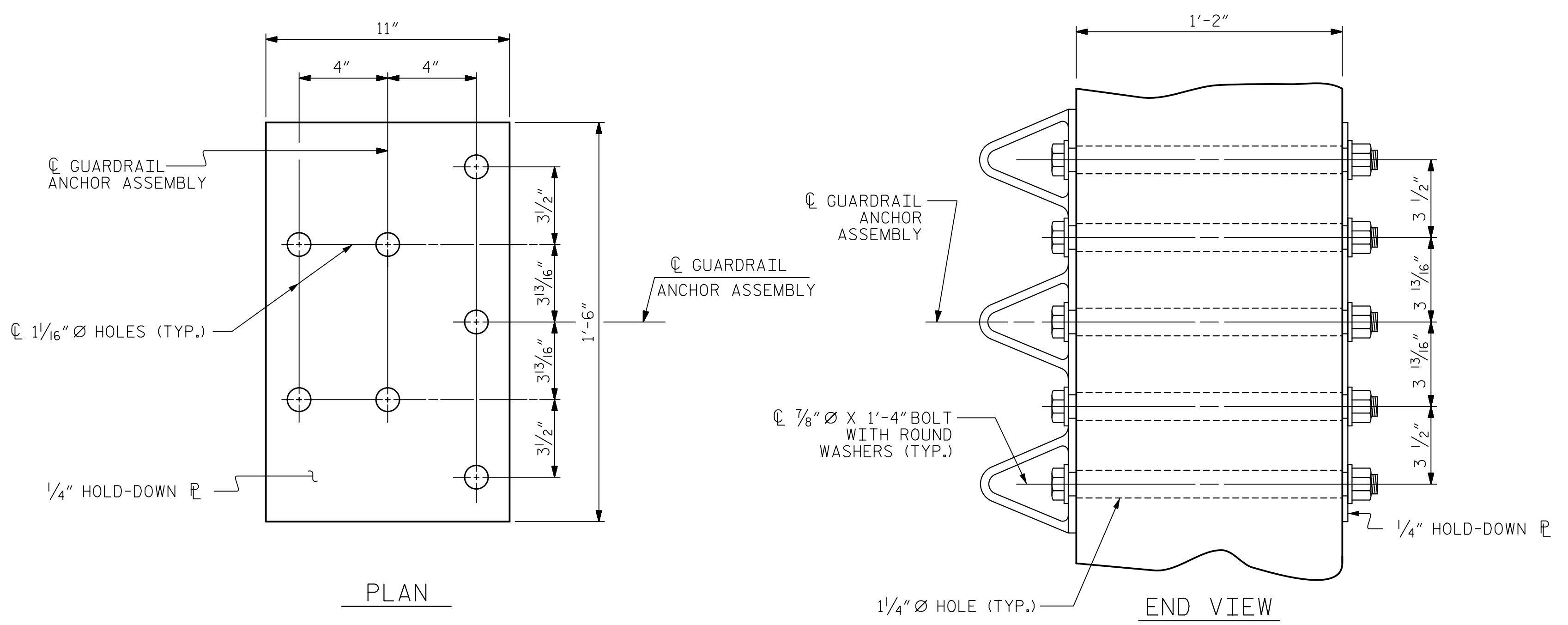
SHEET 3 OF 3

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

ASSEMBLED BY : BN	DATE : 8/17
CHECKED BY : BE	DATE : 9/17
DRAWN BY : EEM 6/94	REV. 8/16/99 MAB/LES
CHECKED BY : RGW 6/94	REV. 5/1/06R KMM/GM
	REV. 10/1/11 MAA/GM

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DRAWN BY : B. NEUPANE	DATE : 8/17
CHECKED BY : B. EMAMI	DATE : 9/17
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18
DWG. NO. 23	

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



GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

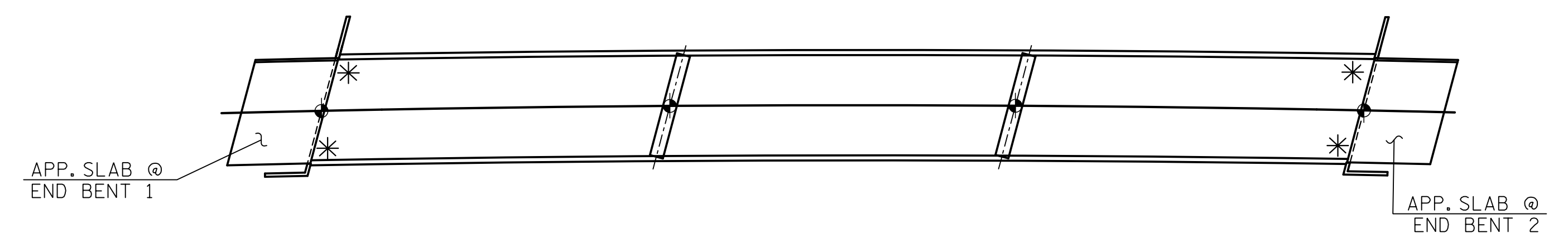
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

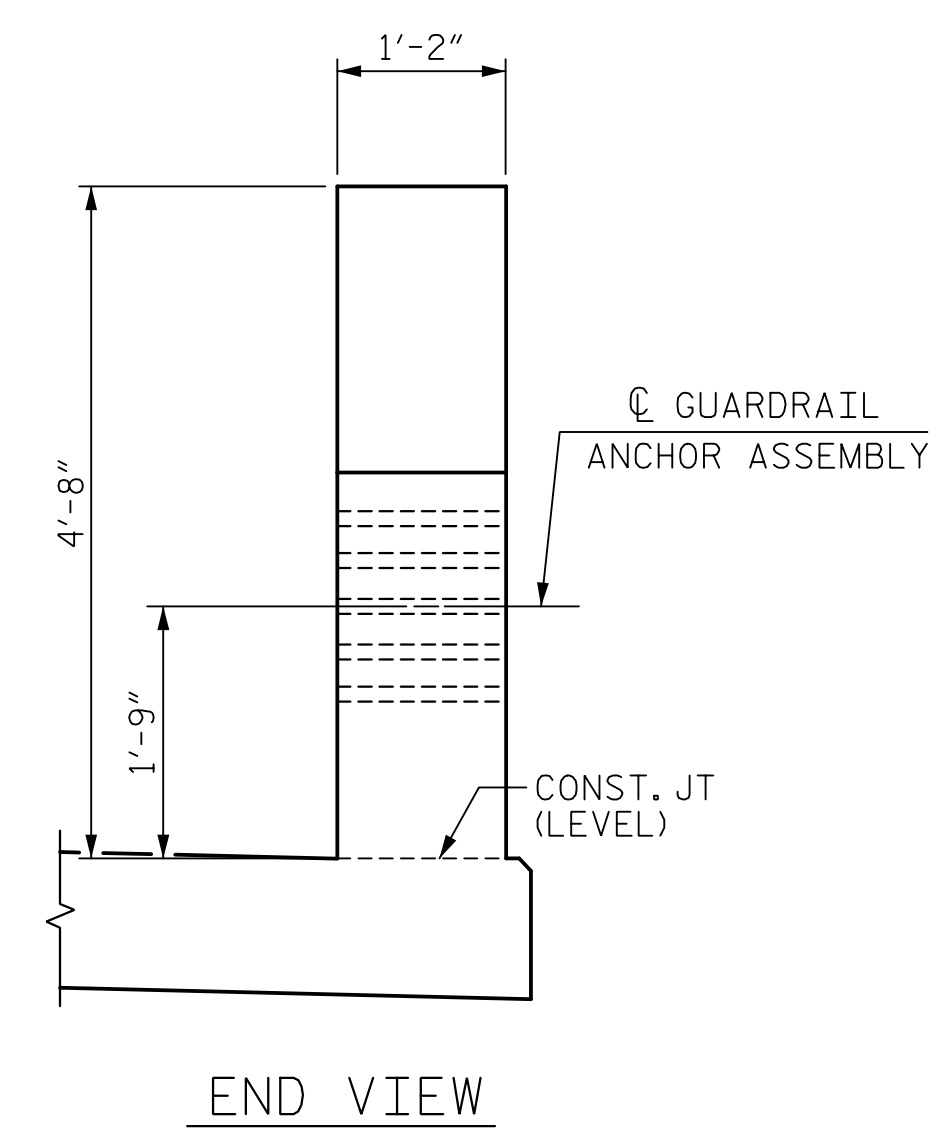
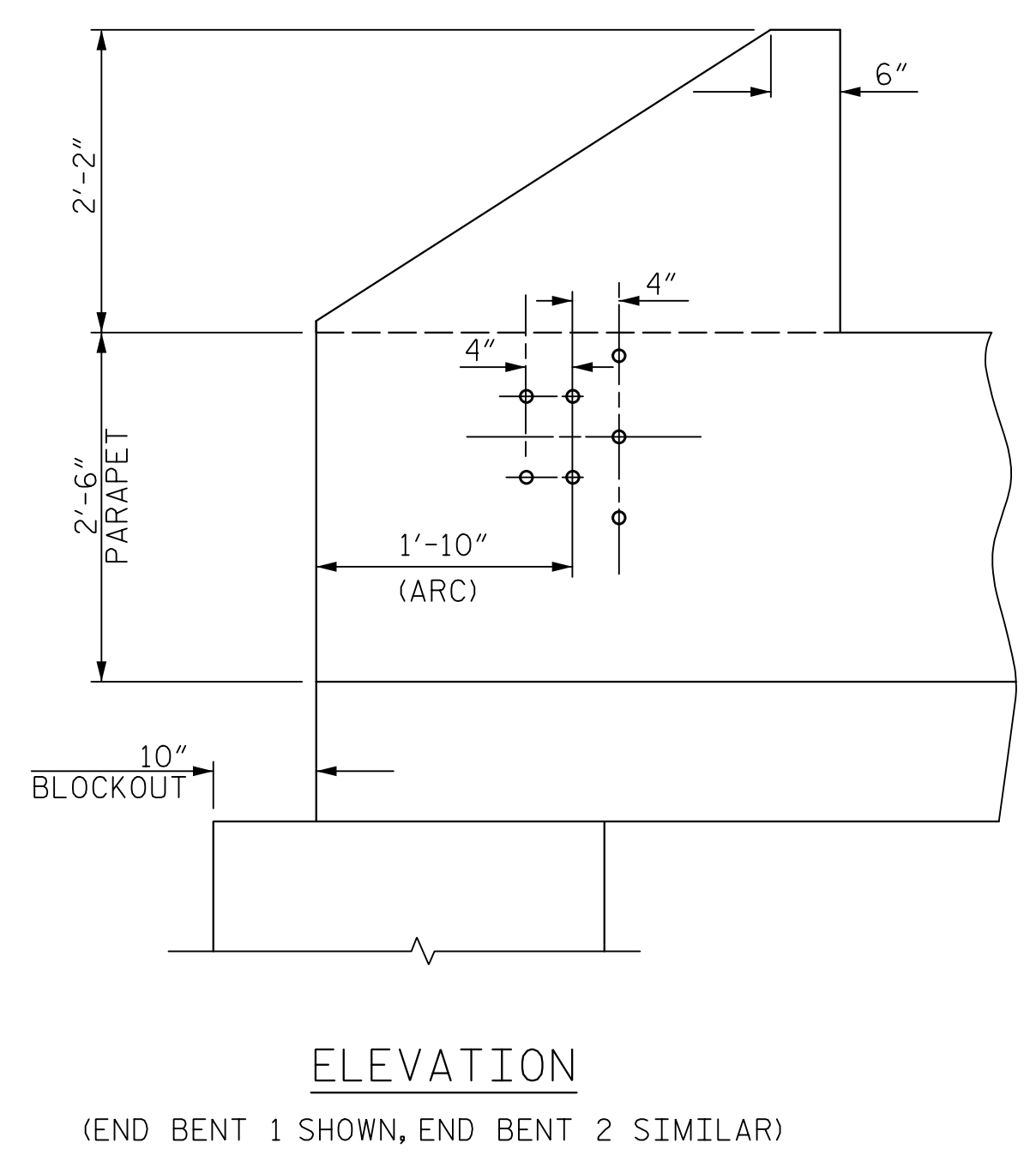
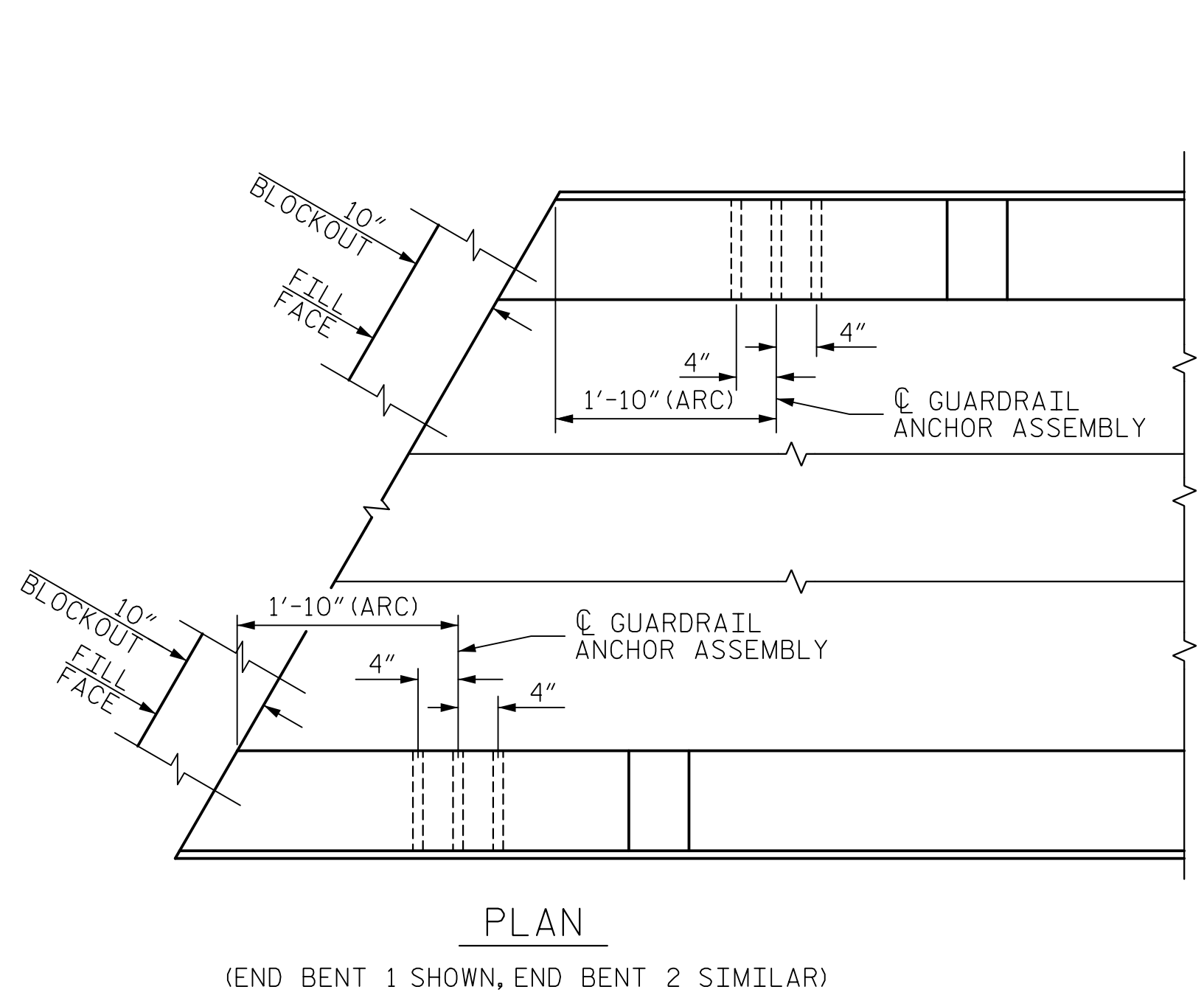
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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



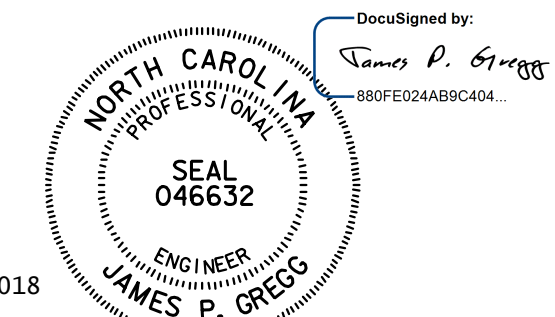
SKETCH SHOWING POINTS OF ATTACHMENT

* LOCATION OF GUARDRAIL ATTACHMENT
(4 REQUIRED)



LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-



ASSEMBLED BY : BN	DATE : 8/17
CHECKED BY : BE	DATE : 9/17
DRAWN BY : MAA 5/10	REV. 12/5/11 MAA/GM
CHECKED BY : GM 5/10	REV. 6/13 MAA/GM
	REV. 1/15 MAA/TMG

HNTB		HNTB NORTH CAROLINA, P.C.	
NC License No. C-1554		343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY : B. NEUPANE	DATE : 8/17	DWG. NO. 24	
CHECKED BY : B. EMAMI	DATE : 9/17		
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18		

STATE OF NORTH CAROLINA					
DEPARTMENT OF TRANSPORTATION					
RALEIGH					
STANDARD					
GUARDRAIL ANCHORAGE					
DETAILS					
FOR METAL RAILS					
RIGHT LANE					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		
				SHEET NO.	S6-24
				TOTAL SHEETS	39

BILL OF MATERIAL					
EPOXY COATED REINFORCING STEEL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	601	5	STR.	32'-3"	20,216
A2	2	5	STR.	32'-3"	67
A3	2	5	STR.	32'-0"	67
A4	2	5	STR.	30'-3"	63
A5	2	5	STR.	28'-6"	59
A6	2	5	STR.	26'-10"	56
A7	2	5	STR.	25'-1"	52
A8	2	5	STR.	23'-4"	49
A9	2	5	STR.	21'-8"	45
A10	2	5	STR.	19'-11"	42
A11	2	5	STR.	18'-3"	38
A12	2	5	STR.	16'-6"	34
A13	2	5	STR.	14'-9"	31
A14	2	5	STR.	13'-1"	27
A15	2	5	STR.	11'-4"	24
A16	2	5	STR.	9'-7"	20
A17	2	5	STR.	7'-11"	17
A18	412	4	STR.	3'-9"	1,032

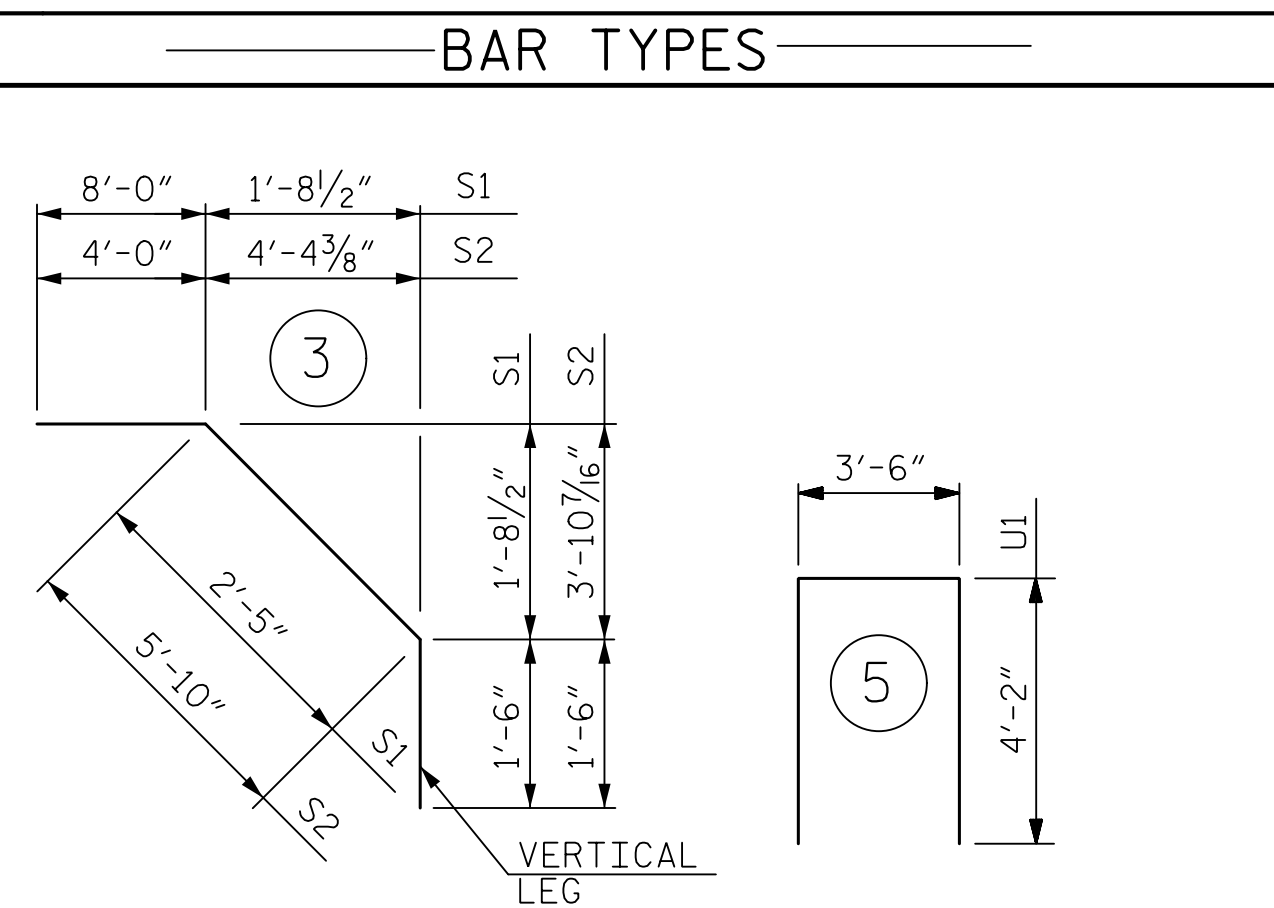
BILL OF MATERIAL					
EPOXY COATED REINFORCING STEEL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	86	6	STR.	19'-9"	2,551
B2	352	4	STR.	32'-7"	7,662
B3	44	4	STR.	22'-5"	659
B4	88	6	STR.	25'-6"	3,370
B5	86	6	STR.	31'-6"	4,069
B6	84	5	STR.	54'-0"	4,731
S1	54	4	3	11'-11"	430
S2	54	4	3	11'-4"	409
U1	44	5	5	11'-10"	543

BILL OF MATERIAL					
EPOXY COATED REINFORCING STEEL					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
K1	10	5	STR.	39'-8"	414
K2	6	5	STR.	6'-4"	40
K3	6	5	STR.	7'-3"	45
K4	12	5	STR.	7'-10"	98
K5	6	5	STR.	6'-10"	43
K6	4	5	STR.	2'-0"	8
K7	4	5	STR.	2'-6"	10
K8	8	5	STR.	2'-9"	23
K9	4	5	STR.	2'-3"	9
TOTAL					47,053

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	1,350 SQ.FT.
BRIDGE DECK	8,366 SQ.FT.
TOTAL	9,716 SQ.FT.



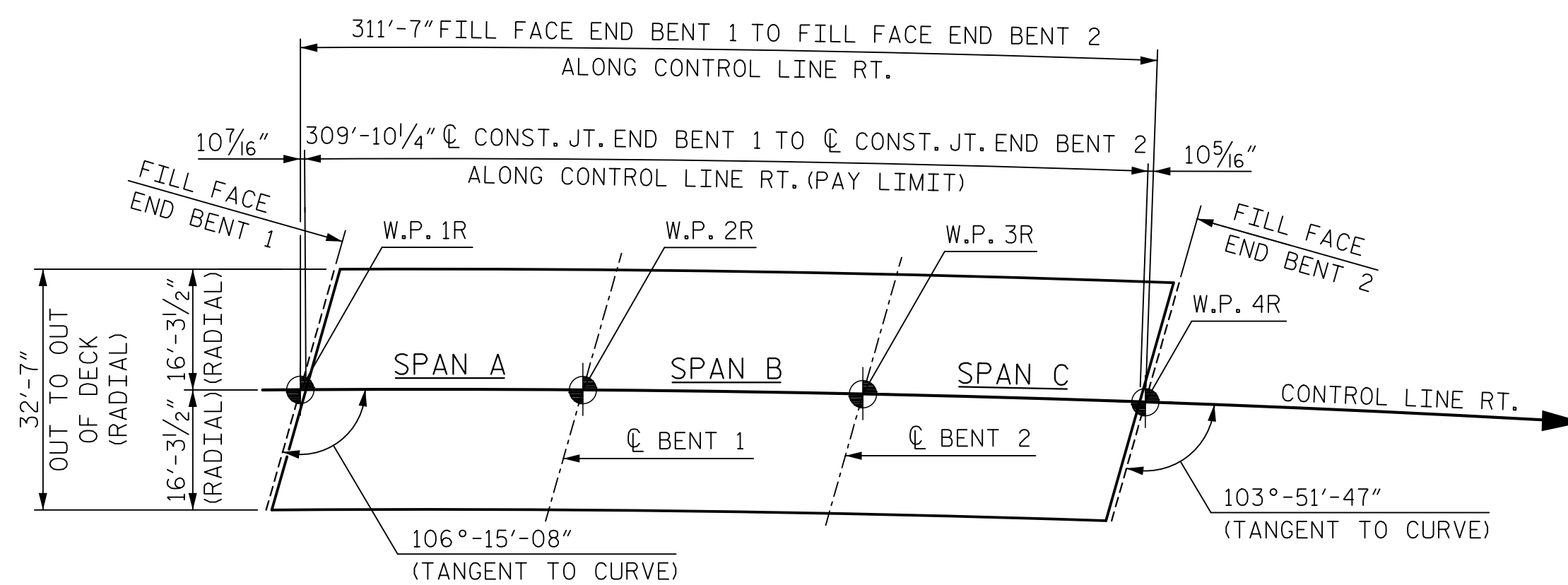
ALL BAR DIMENSIONS ARE OUT TO OUT

—SUPERSTRUCTURE BILL OF MATERIAL—

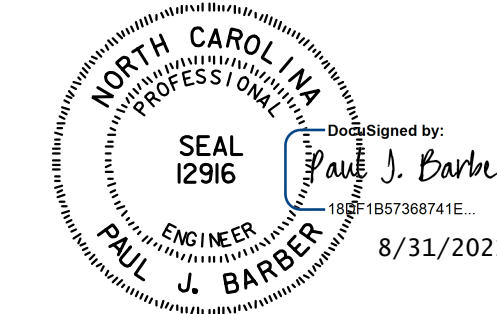
	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	190.4		
POUR 2	27.4		
POUR 3	56.2		
TOTALS**	274.0		47,053

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED
NOTE: QUANTITIES INCLUDE THE CONCRETE AND REINFORCING STEEL FOR THE UPPER PORTION OF THE INTEGRAL END BENTS.

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-



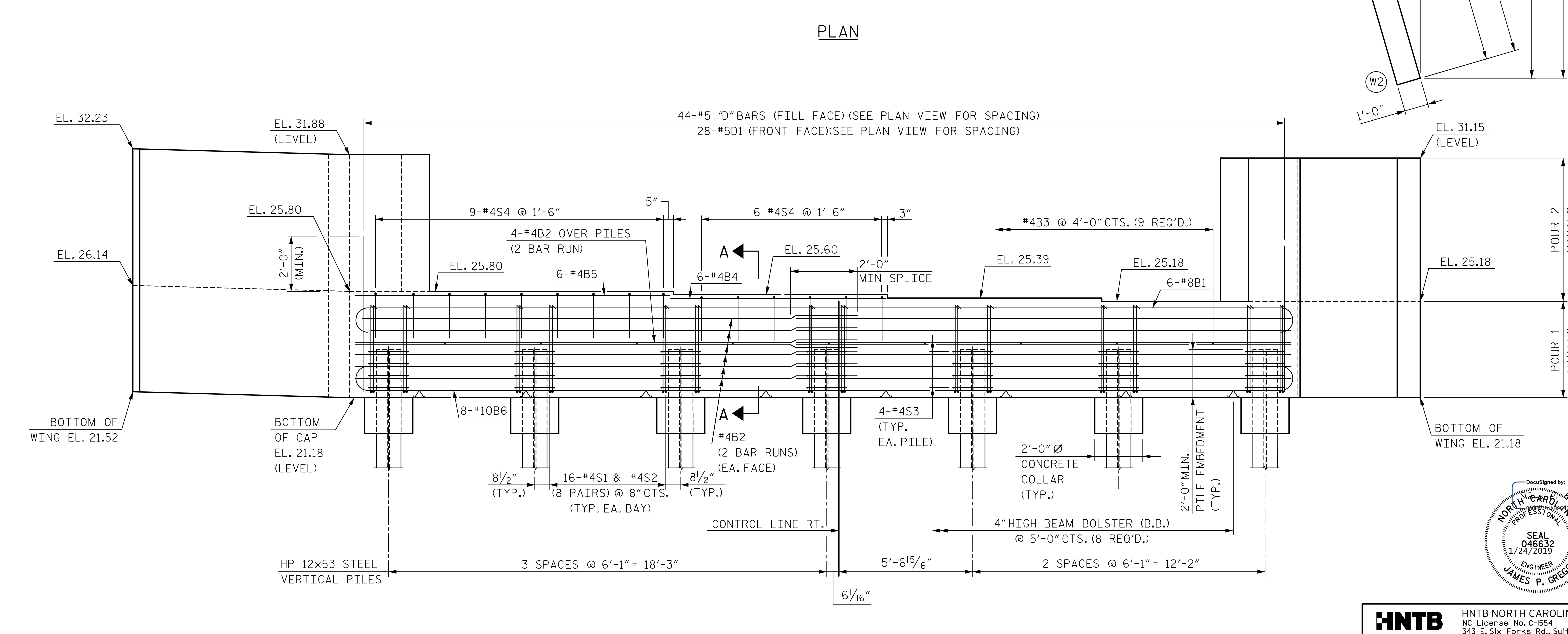
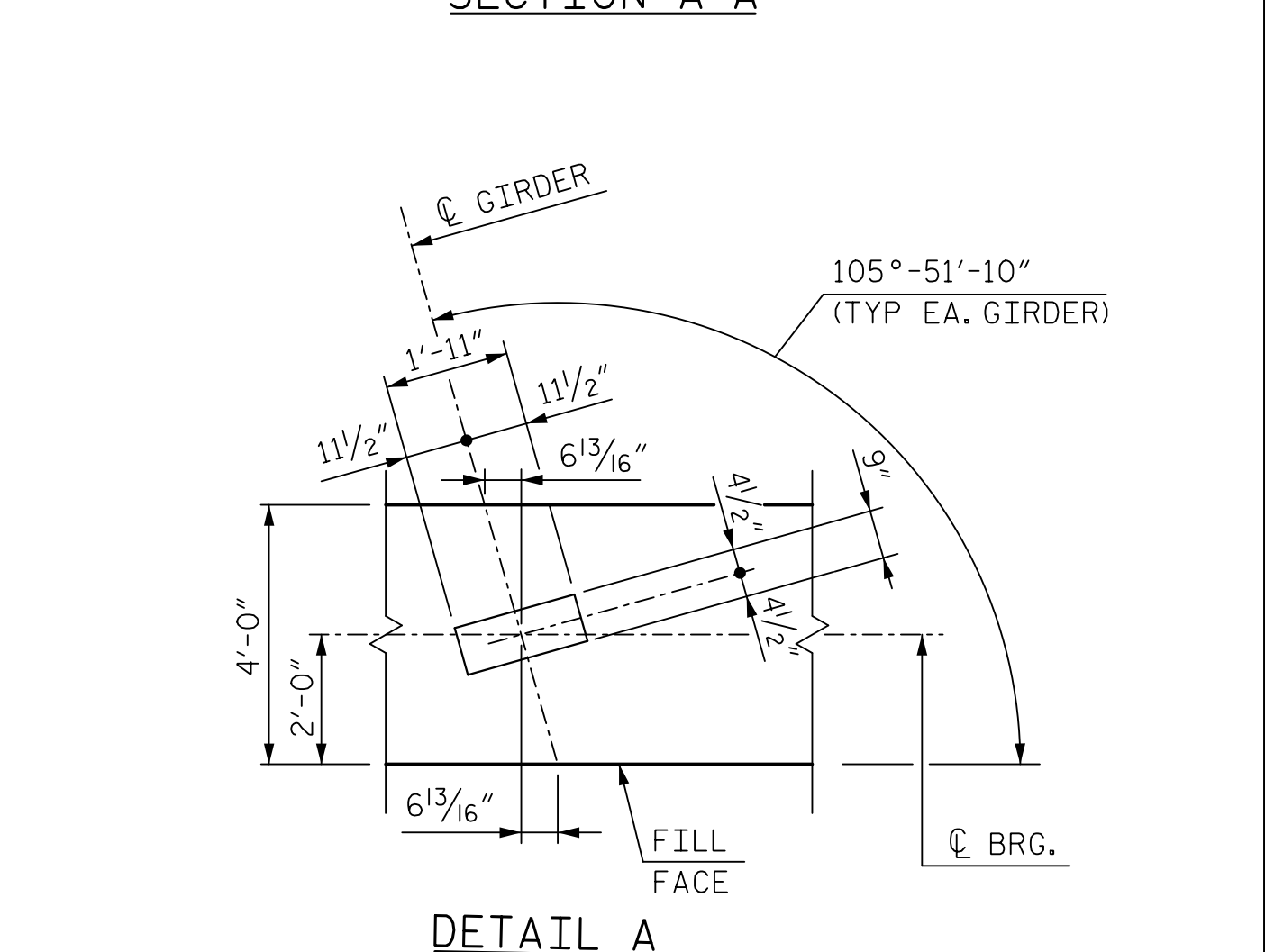
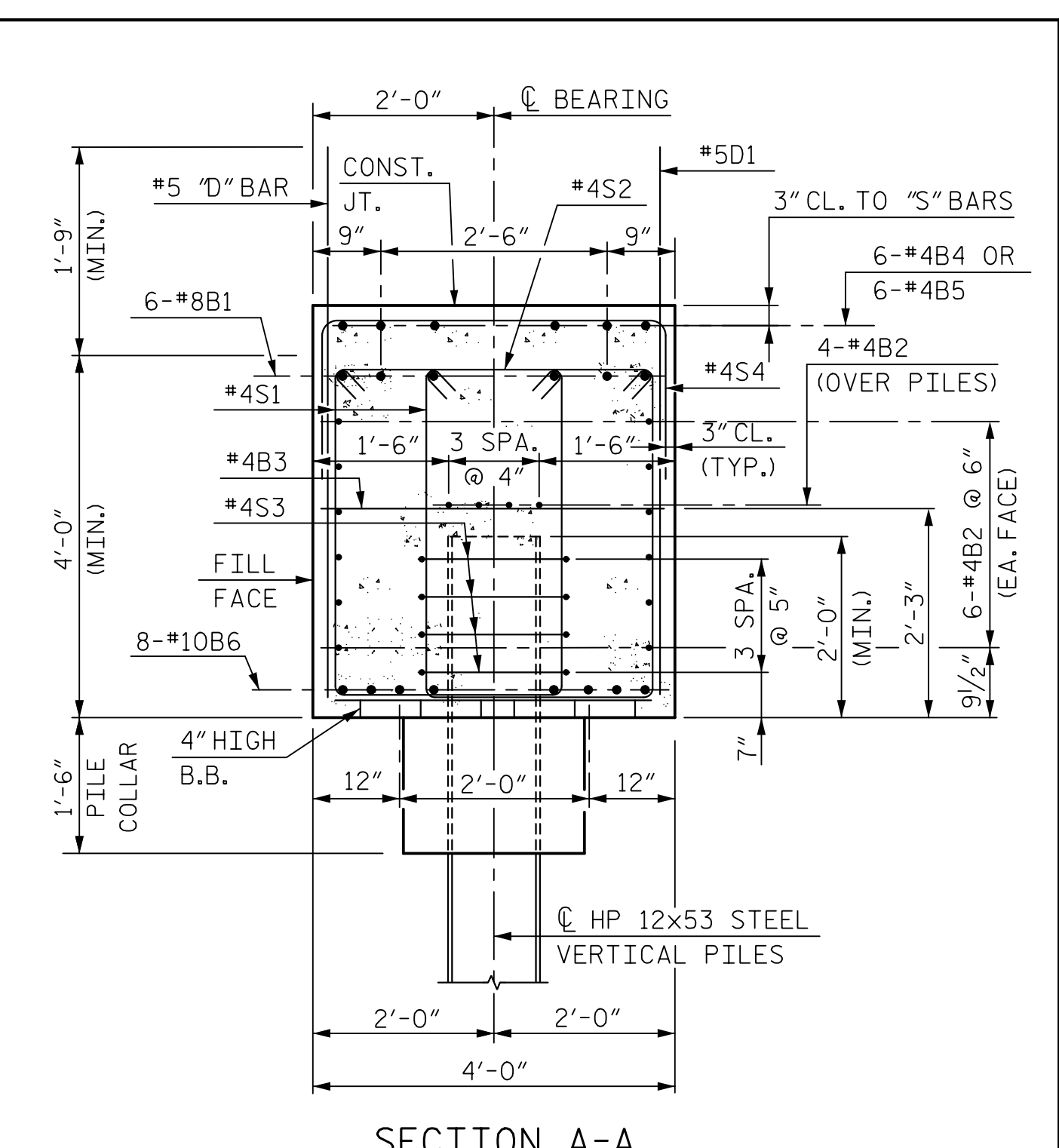
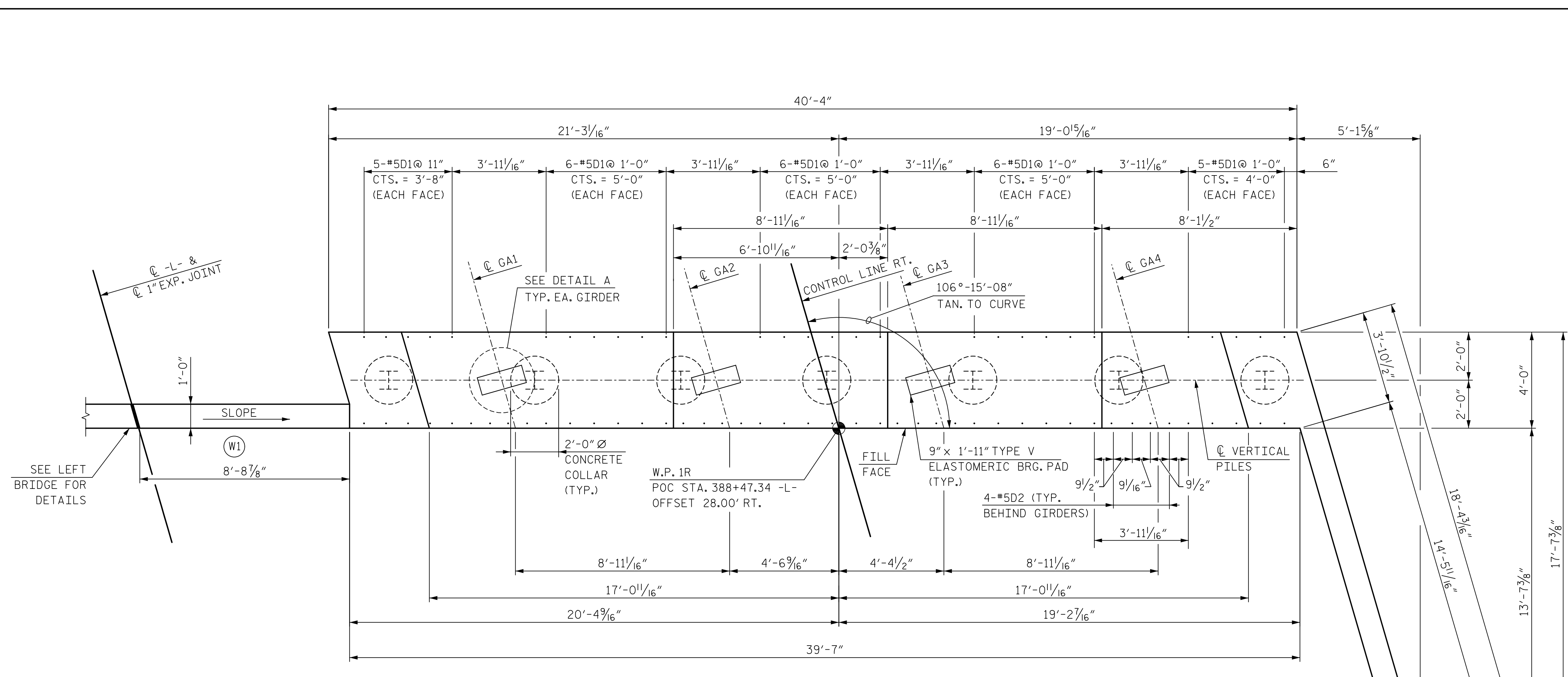
LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 10,096)



ASSEMBLED BY : BN	DATE : 8/17
CHECKED BY : BE	DATE : 9/17
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

HNTB	HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
DRAWN BY : M. WRIGHT	DATE : 7/21
CHECKED BY : P. BARBER	DATE : 7/21
DESIGN ENGINEER OF RECORD : P. BARBER	DATE : 7/21

REVISIONS						SHEET NO. S6-25
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 39
2			4			



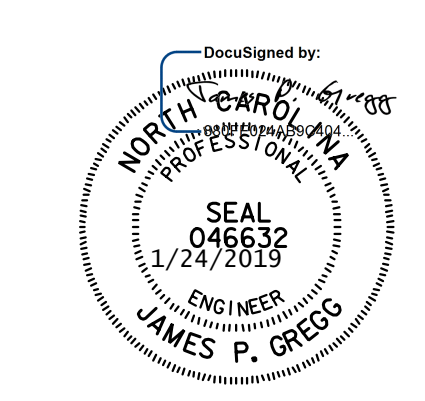
NOTES:
 FOR NOTES, SEE SHEET 3 OF 3.
 FOR WINGWALL DETAILS, SEE SHEET 2 OF 3.

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

**SUBSTRUCTURE
 END BENT 1
 RIGHT LANE**

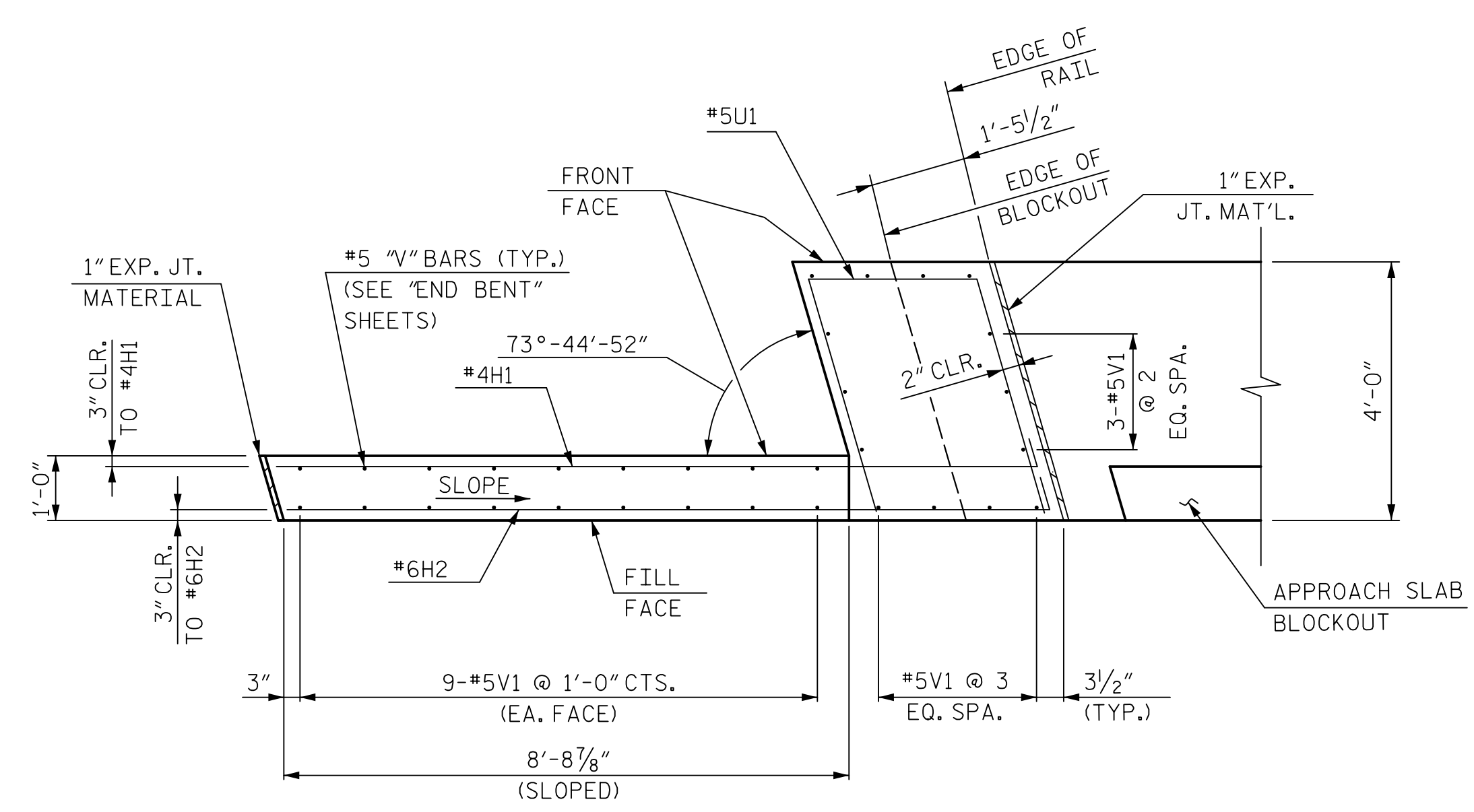


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 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

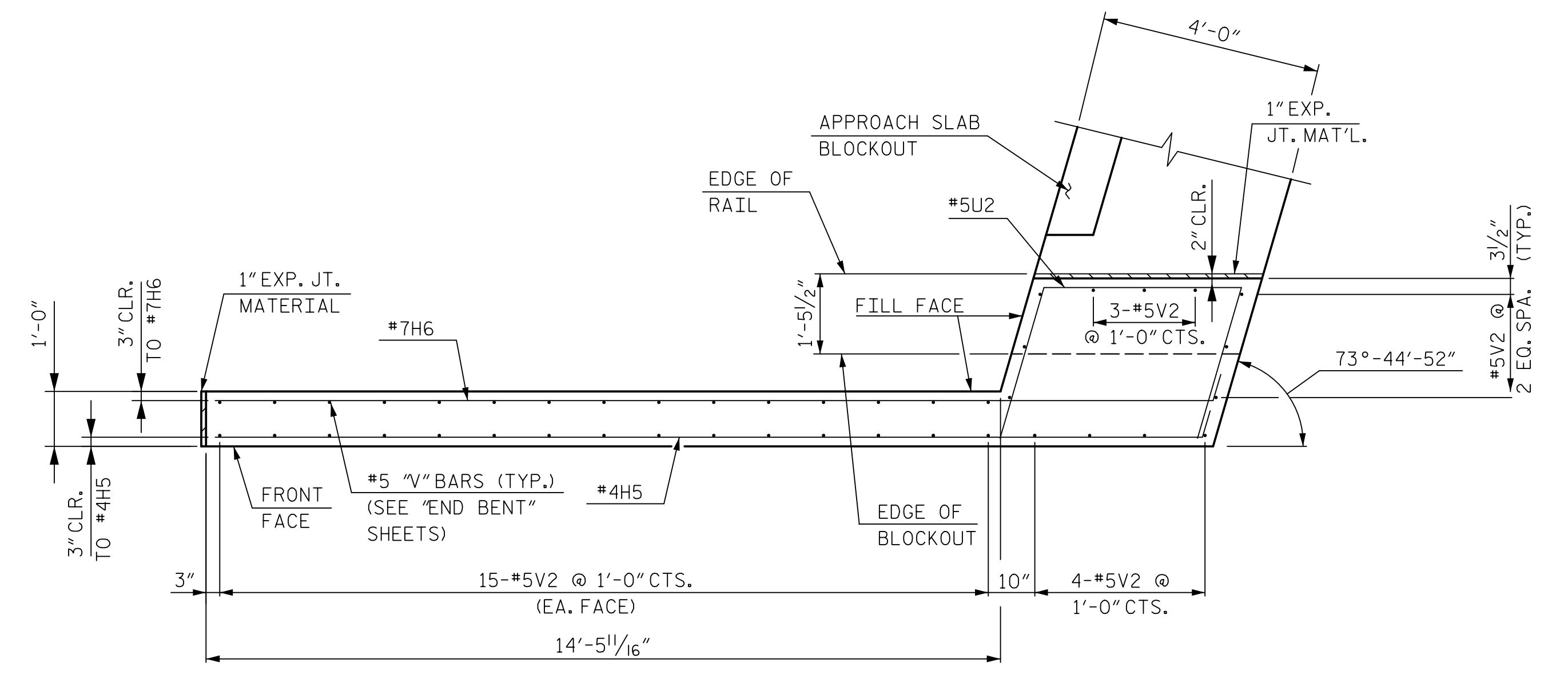
DRAWN BY: B. NEUPANE	DATE: 8/17
CHECKED BY: B. EMAMI	DATE: 9/17
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18

DWG. NO. 26

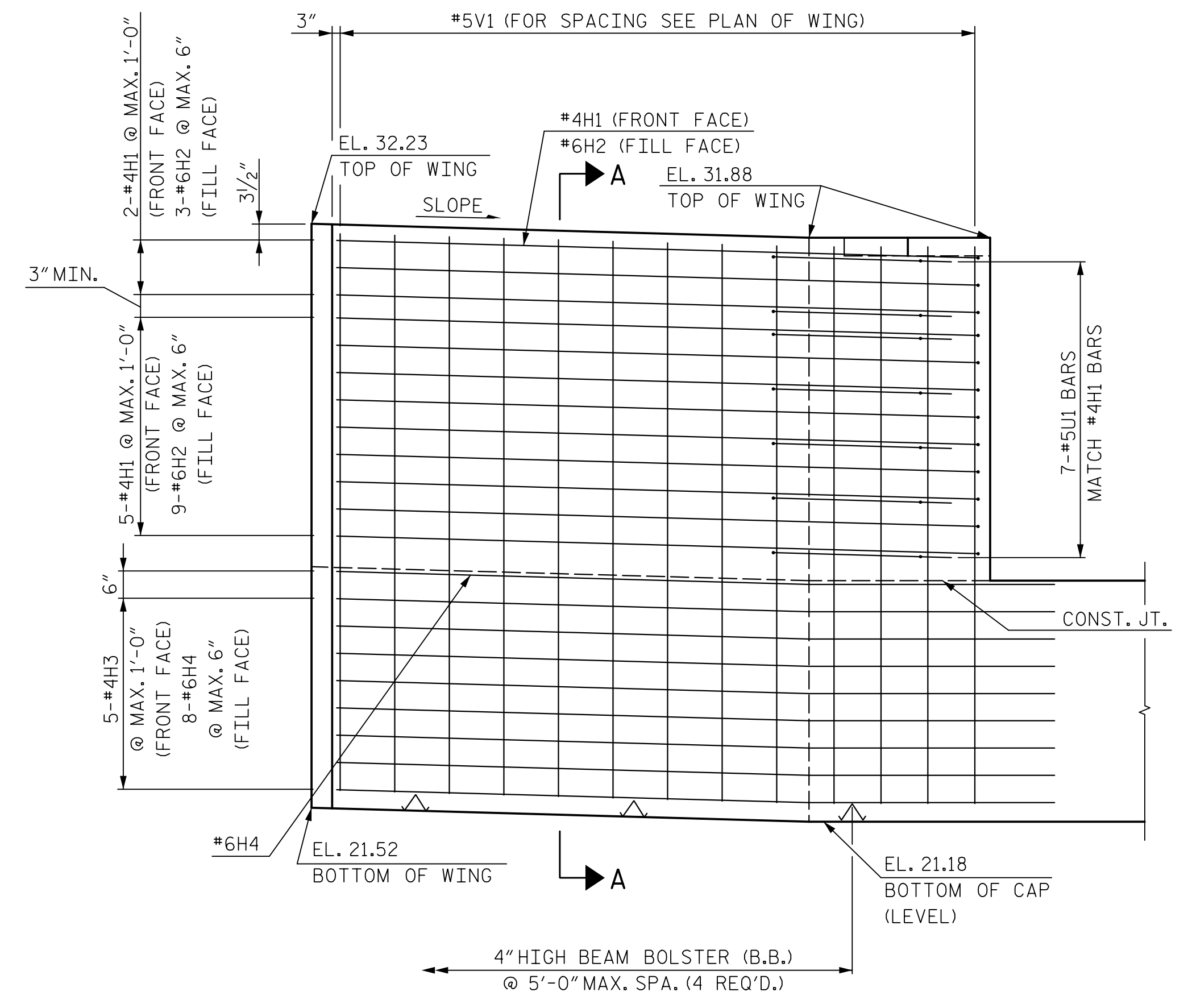
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	TOTAL SHEETS
1			3			39
2			4			



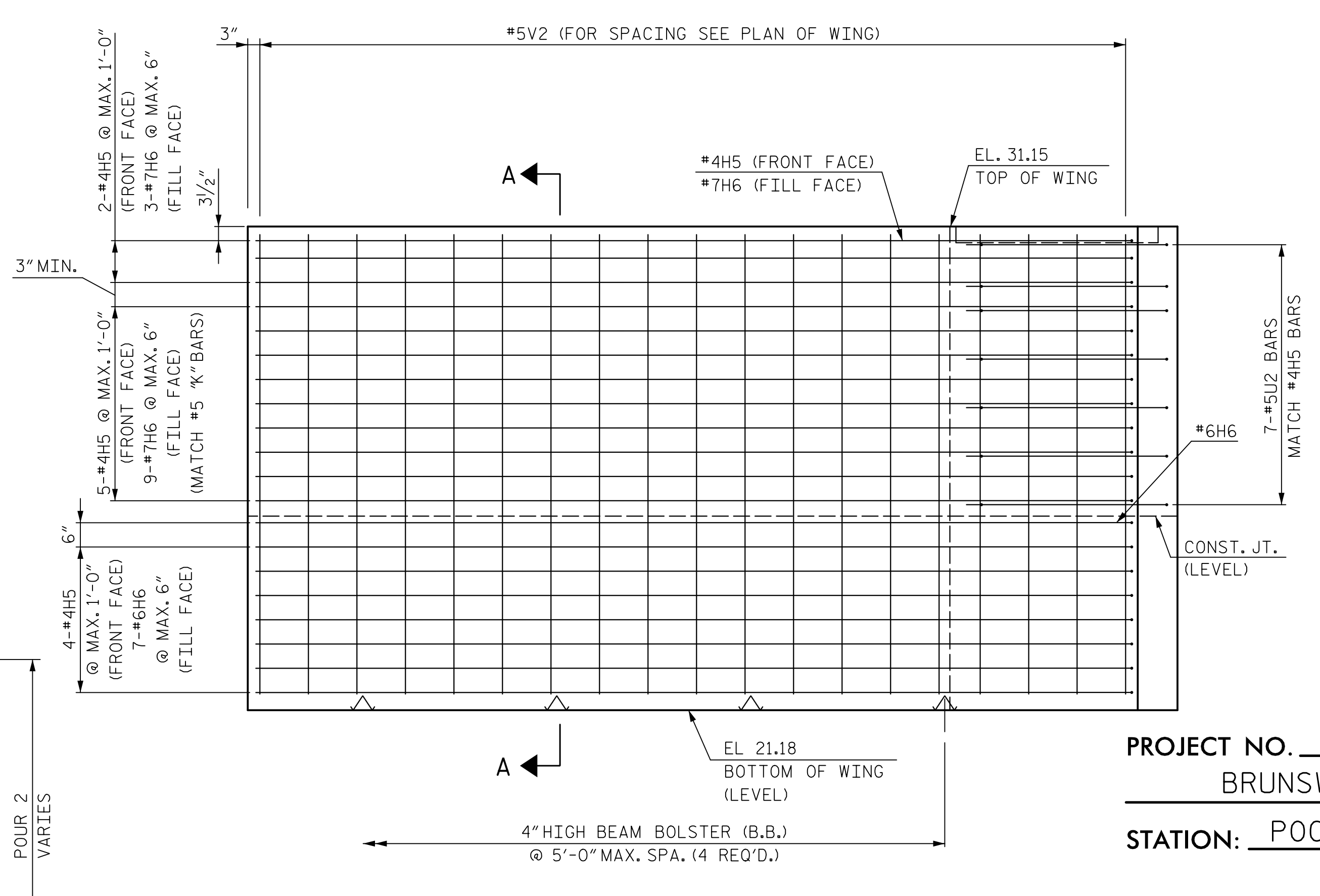
PLAN OF LEFT WING (W1)



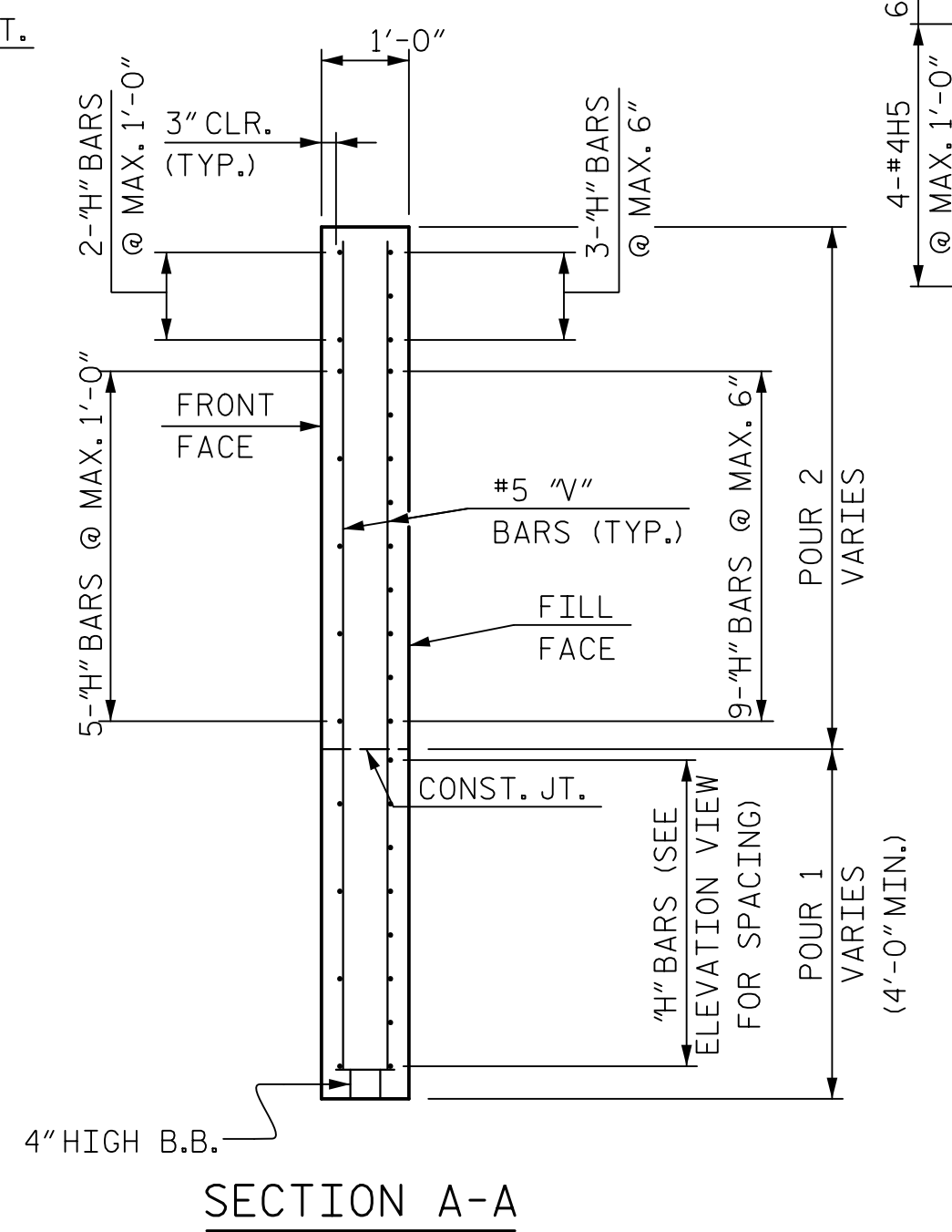
PLAN OF RIGHT WING (W2)



ELEVATION OF LEFT WING (W1)



ELEVATION OF RIGHT WING (W2)

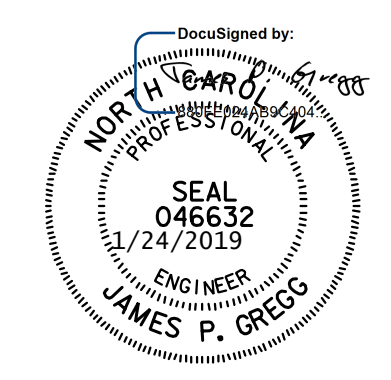


SECTION A-A

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

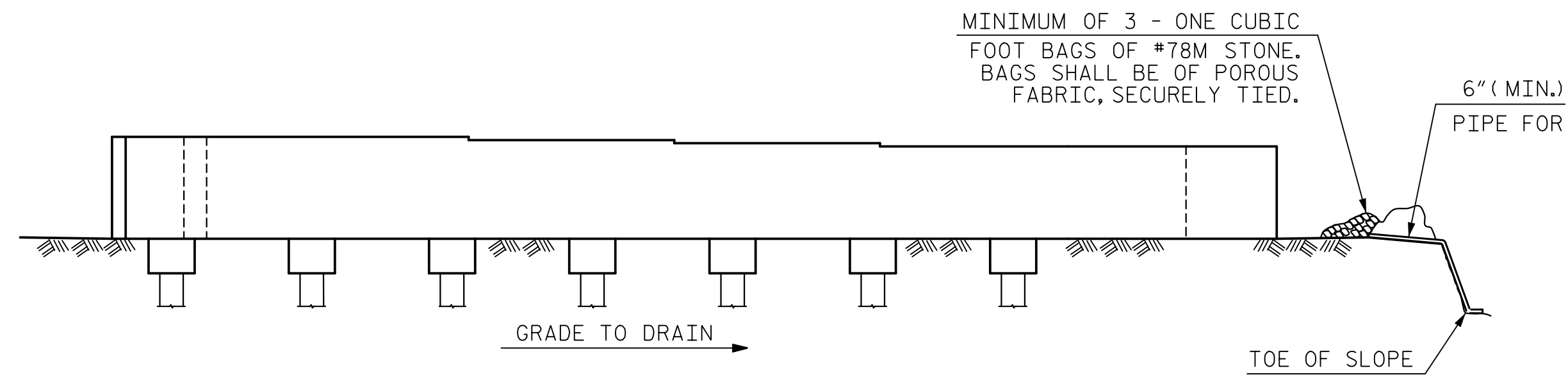
SHEET 2 OF 3

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



HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609																	
DRAWN BY: B. NEUPANE	DATE: 8/17	DWG. NO. 27	<table border="1"> <tr> <th colspan="4">REVISIONS</th> </tr> <tr> <th>NO.</th> <th>BY</th> <th>DATE</th> <th>NO.</th> </tr> <tr> <td>1</td> <td>B. EMAMI</td> <td>9/17</td> <td>3</td> </tr> <tr> <td>2</td> <td></td> <td></td> <td>4</td> </tr> </table>	REVISIONS				NO.	BY	DATE	NO.	1	B. EMAMI	9/17	3	2			4
REVISIONS																			
NO.	BY			DATE	NO.														
1	B. EMAMI	9/17	3																
2			4																
CHECKED BY: B. EMAMI	DATE: 9/17																		
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18																		

SHEET NO. S6-27	
TOTAL SHEETS 39	

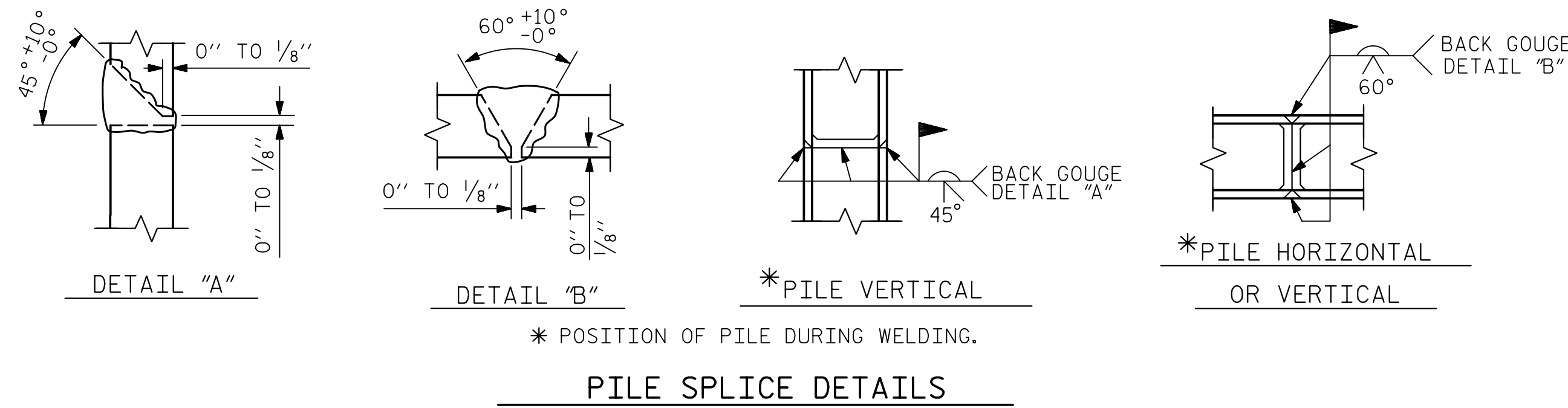


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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 FOR THE SEVERAL PAY ITEMS.

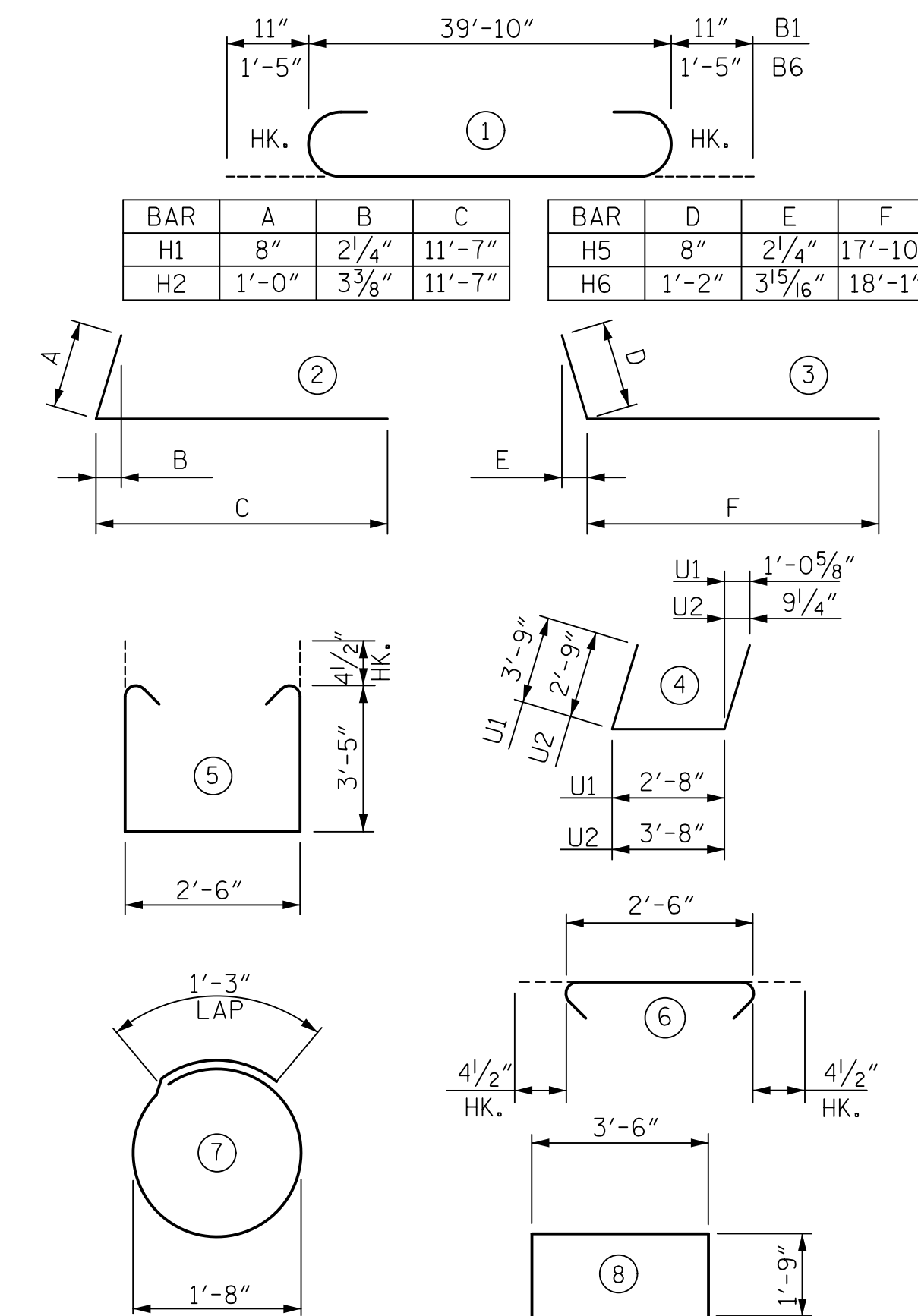
TEMPORARY DRAINAGE AT END BENT 1



* POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING

END BENT 1

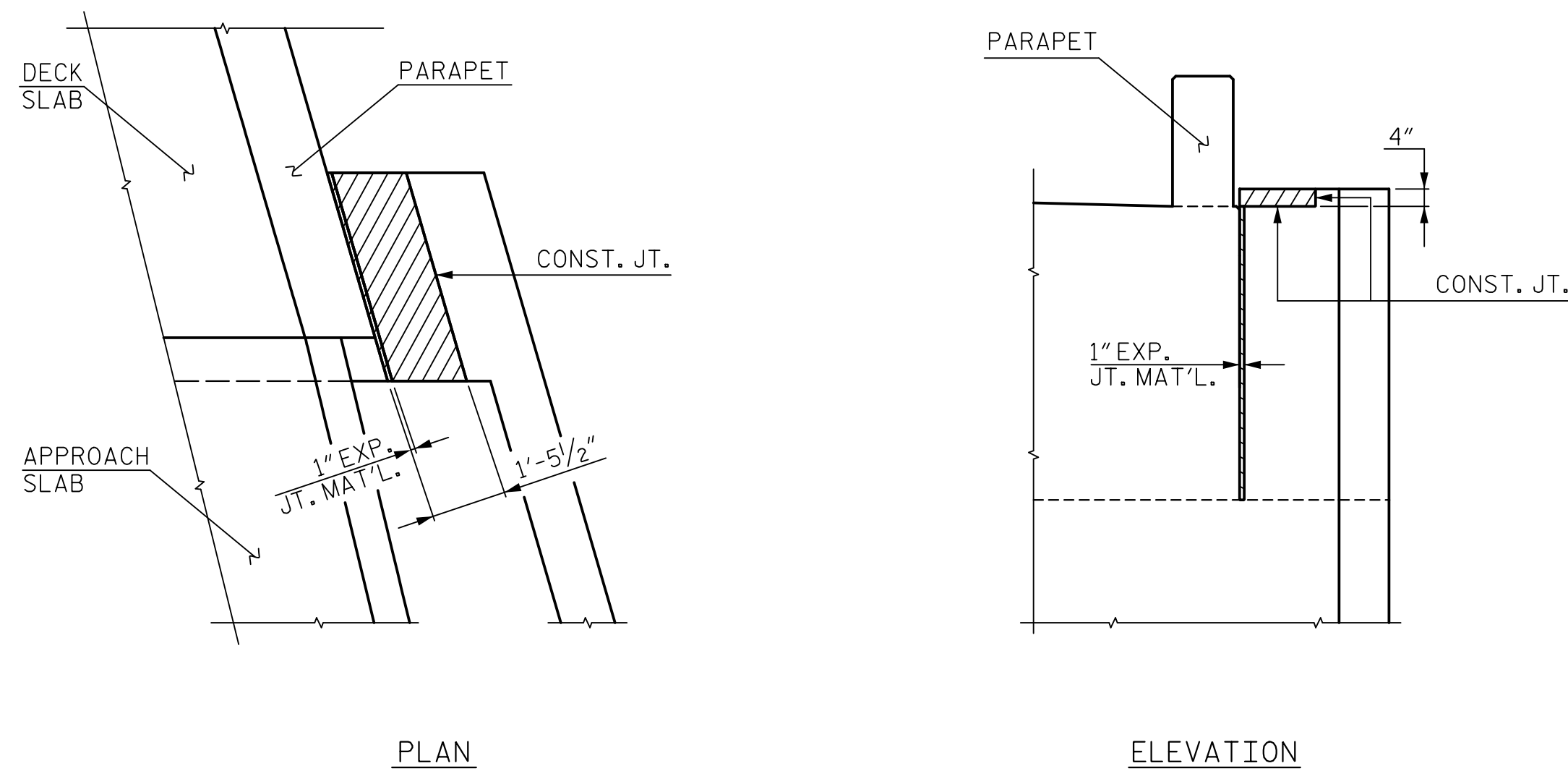
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#8	1	41'-8"	668
B2	32	#4	STR.	21'-2"	452
B3	9	#4	STR.	3'-6"	21
B4	6	#4	STR.	9'-0"	36
B5	6	#4	STR.	13'-1"	52
B6	8	#10	1	42'-8"	1,469
D1	56	#5	STR.	6'-5"	375
D2	16	#5	STR.	8'-3"	138
H1	7	#4	2	12'-3"	57
H2	12	#6	2	12'-7"	227
H3	5	#4	STR.	13'-3"	44
H4	9	#6	STR.	13'-0"	176
H5	11	#4	3	18'-6"	136
H6	20	#7	3	19'-3"	787
S1	100	#4	5	10'-1"	674
S2	100	#4	6	3'-3"	217
S3	28	#4	7	6'-6"	122
S4	15	#4	8	7'-0"	70
V1	32	#5	STR.	10'-1"	337
V2	43	#5	STR.	9'-4"	419
U1	7	#5	4	10'-2"	74
U2	7	#5	4	9'-2"	67

QUANTITIES

EPOXY COATED REINFORCING STEEL	LBS.	6,618
CLASS AA CONCRETE BREAKDOWN		
POUR 1 - CAP	CU. YDS.	30.9
POUR 2 - WINGS	CU. YDS.	10.5
TOTAL:	CU. YDS.	41.4
HP 12x53 STEEL PILES	NO.	7
	LIN. FT.	525

NOTES:

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



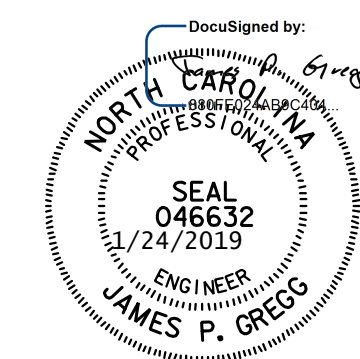
BLOCKOUT IN WINGWALL

PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 1
 RIGHT LANE

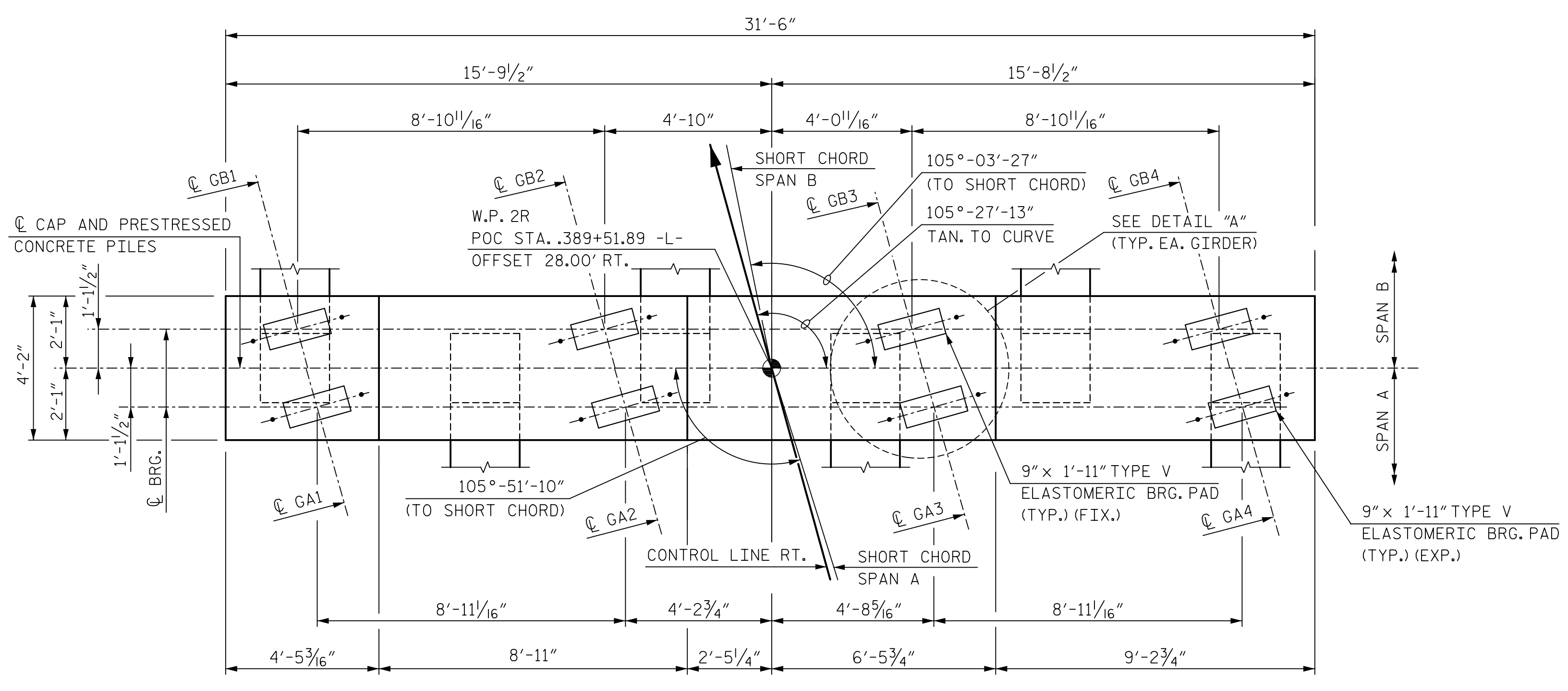


HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

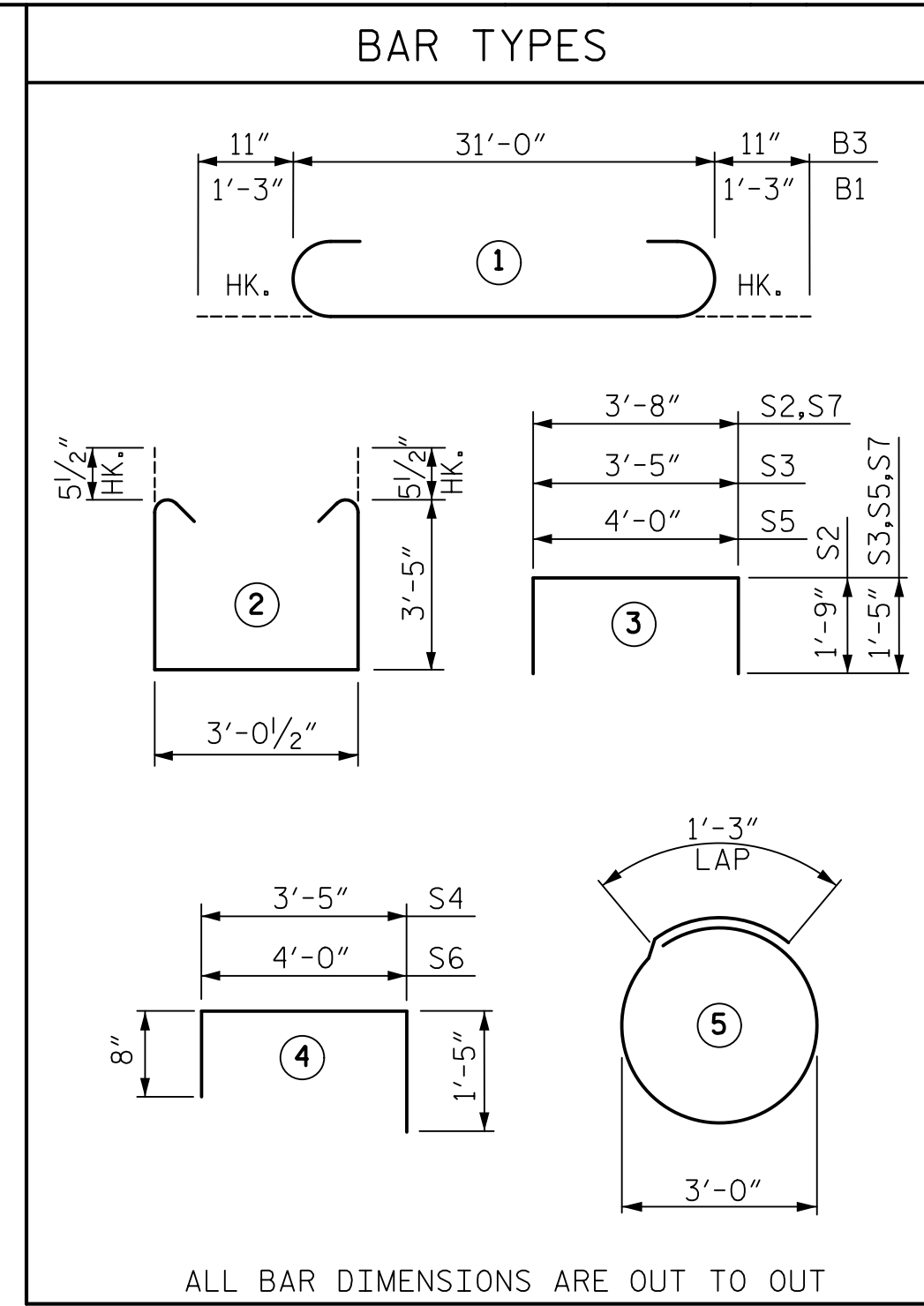
DRAWN BY: B. NEUPANE DATE: 8/17
 CHECKED BY: B. EMAMI DATE: 9/17
 DESIGN ENGINEER OF RECORD: J. GREGG DATE: 8/18

DWG. NO. 28

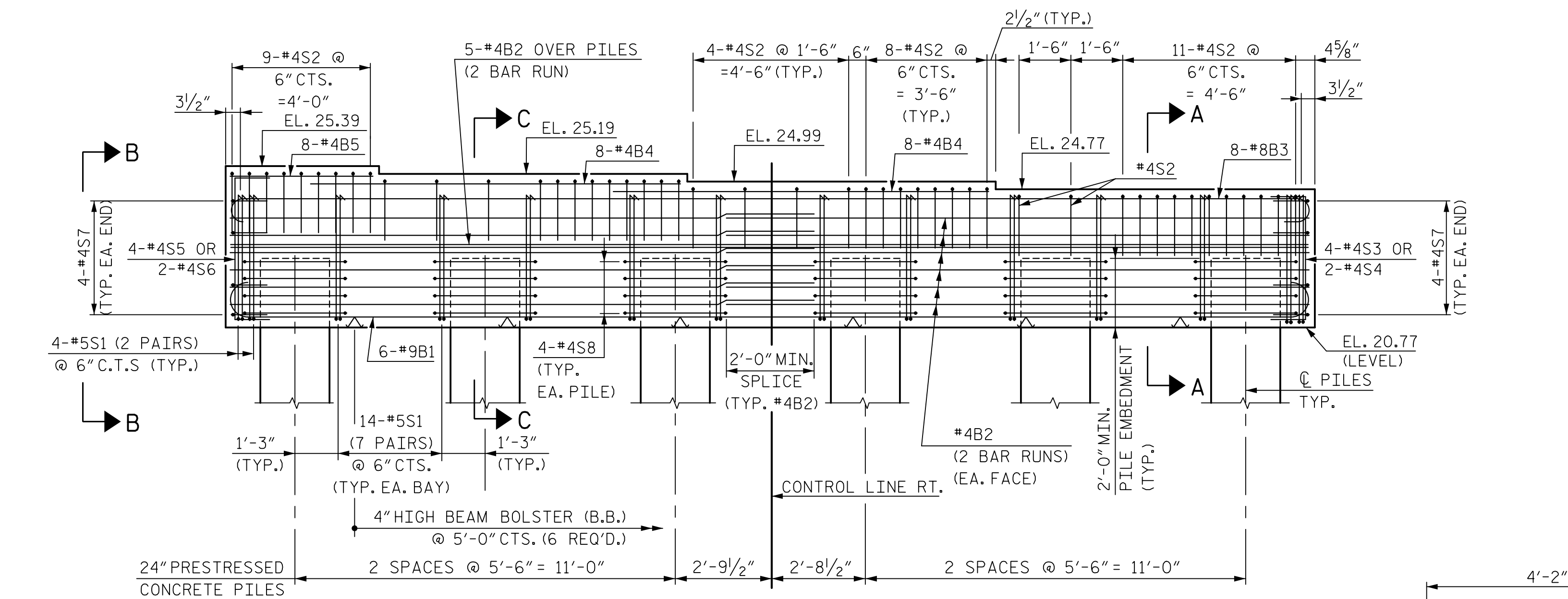
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S6-28
1			3			TOTAL SHEETS
2			4			39



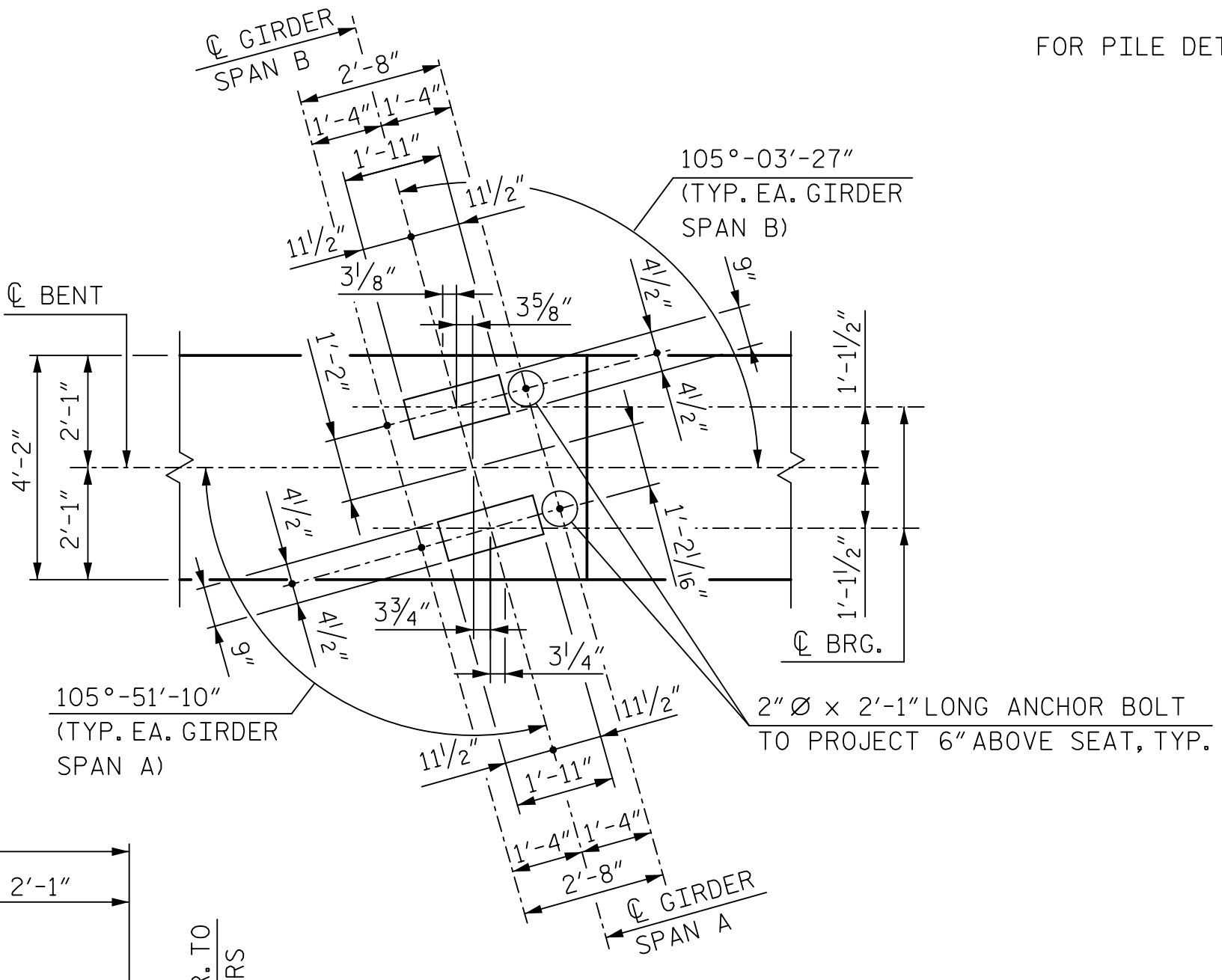
PLAN



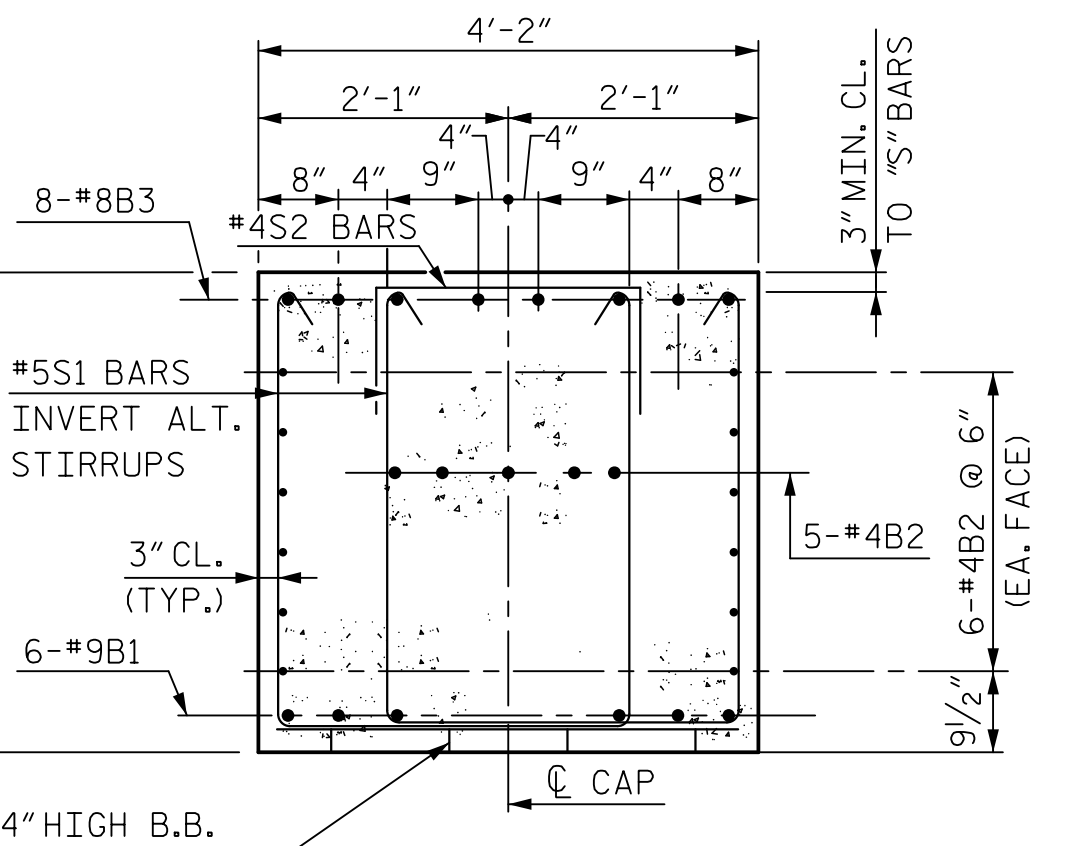
BILL OF REINFORCING						
BENT 2						
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	
B1	6	9	1	33'-6"	683	
B2	34	4	STR.	16'-6"	375	
B3	8	8	1	32'-10"	701	
B4	16	4	STR.	10'-10"	116	
B5	8	4	STR.	4'-1"	22	
S1	78	5	2	10'-10"	881	
S2	46	4	3	7'-2"	220	
S3	4	4	3	6'-3"	17	
S4	2	4	4	5'-6"	7	
S5	4	4	3	6'-10"	18	
S6	2	4	4	6'-1"	8	
S7	8	4	3	6'-6"	35	
S8	24	4	5	10'-8"	171	
QUANTITIES						
EPOXY COATED REINFORCING STEEL					LBS.	3,254
CLASS AA CONCRETE						
CAP POUR 1					CU. YDS.	18.4
PRESTRESSED CONCRETE PILE					NO.	6
					FEET	630.0



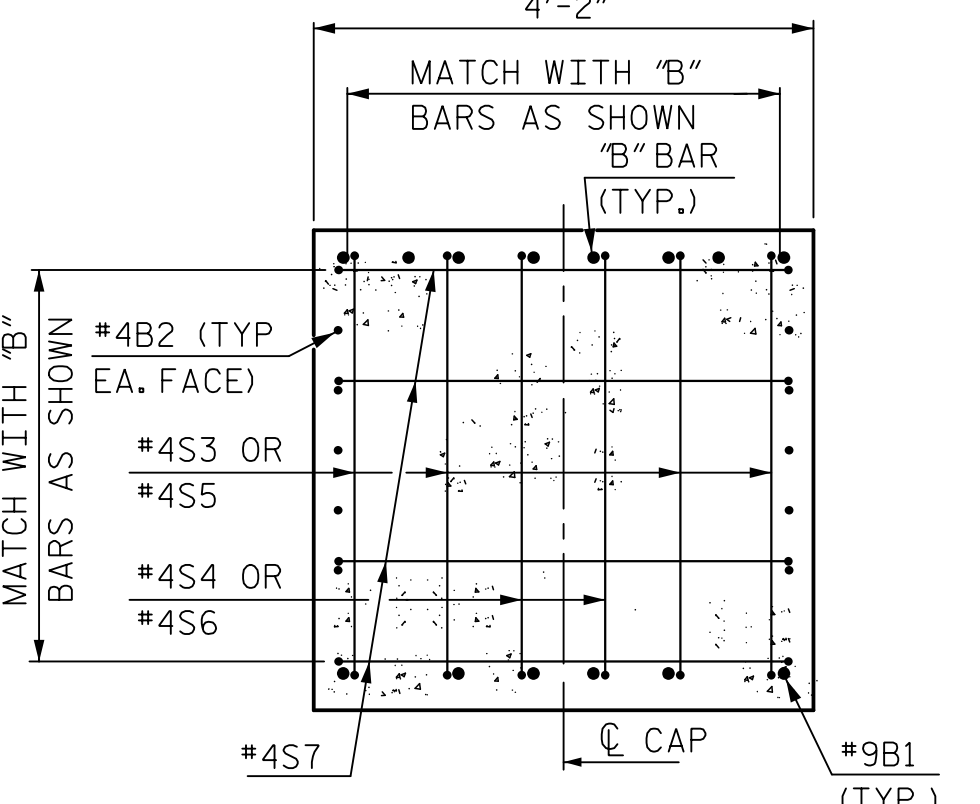
ELEVATION



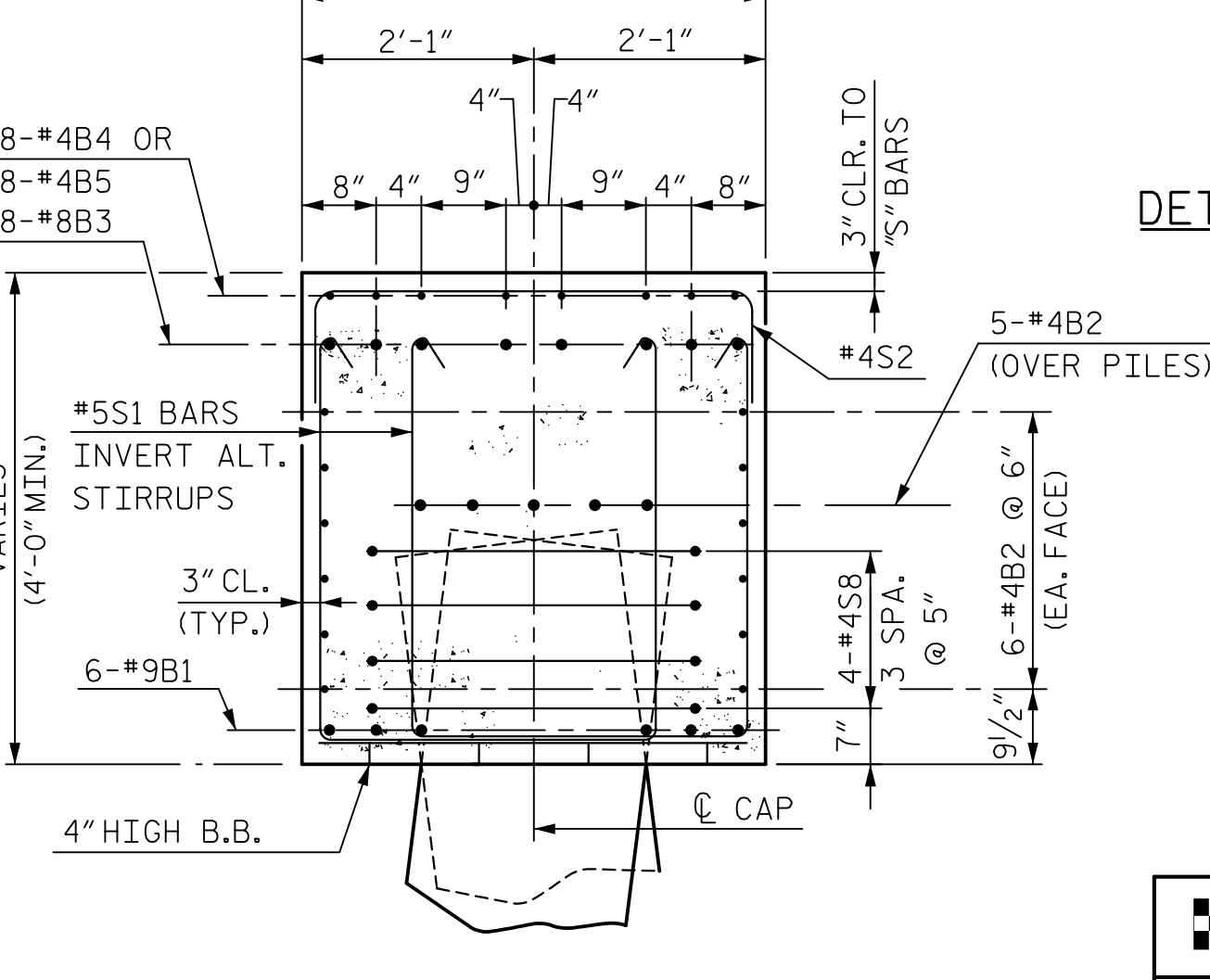
DETAIL A



SECTION A-A



VIEW B-B

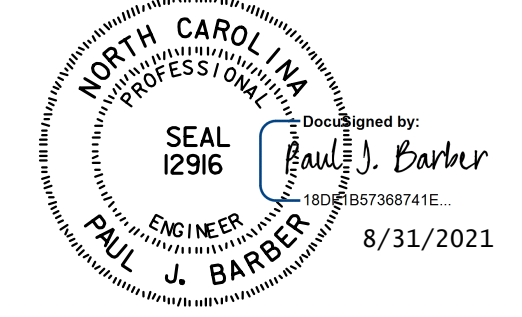


SECTION C-C

NOTES:
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 FOR PILE DETAILS, SEE SHEET S6-34.

INDICATES 1/2:12 PILE BATTERED IN DIRECTION SHOWN

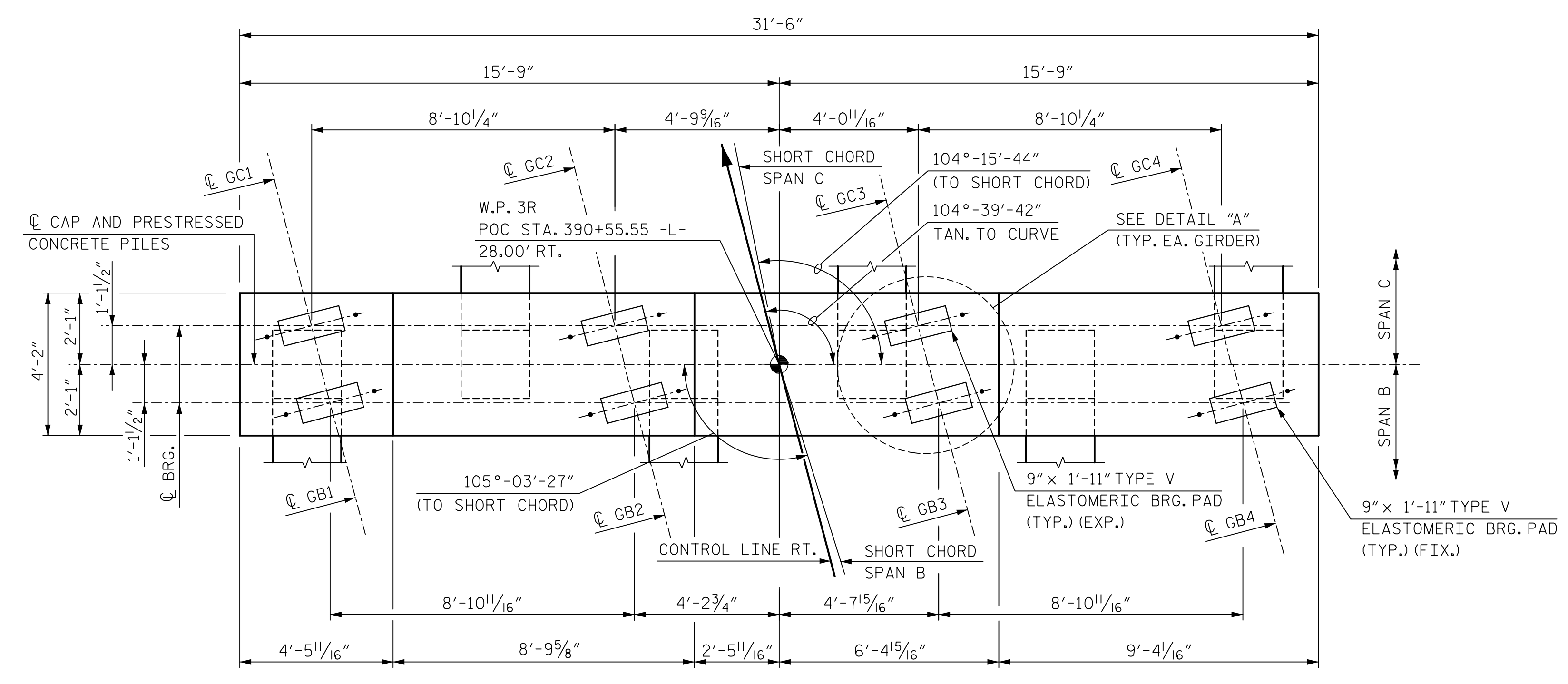
PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-



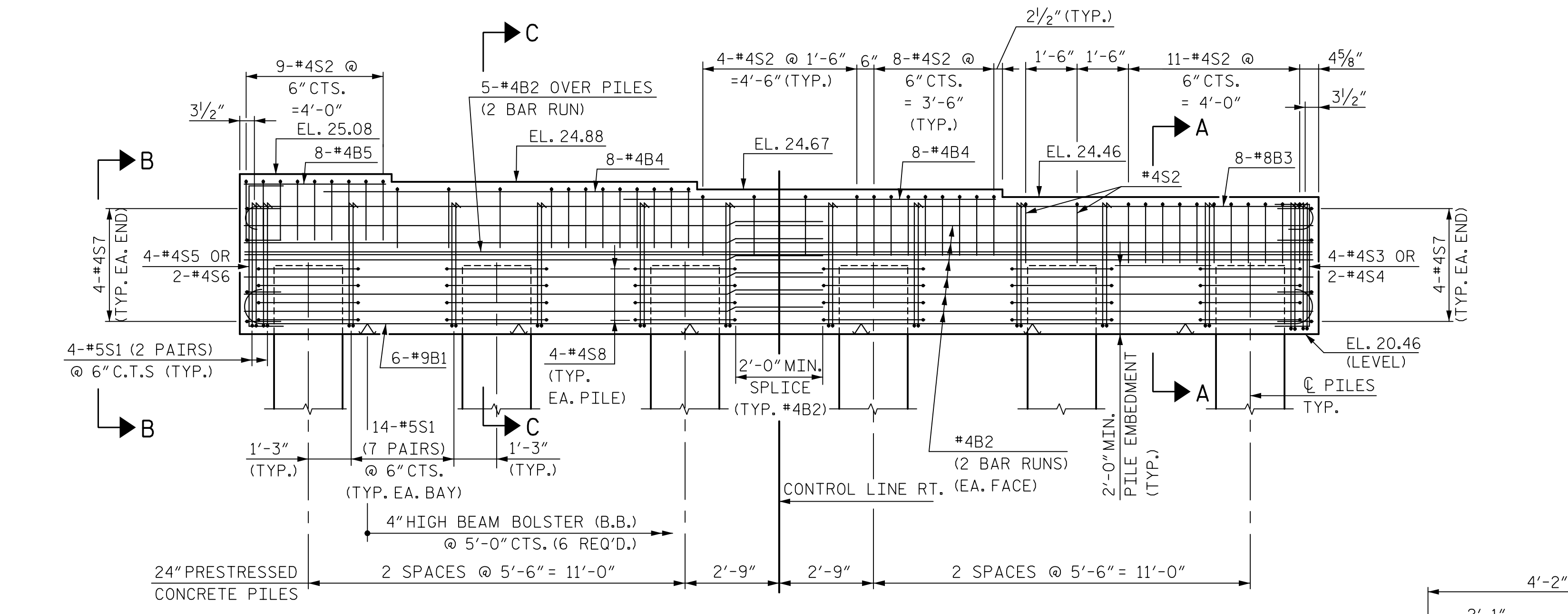
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 SUBSTRUCTURE
 BENT 1
 RIGHT LANE

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: M. WRIGHT	DATE: 7/21	DWG. NO. 29	SHEET NO. S6-29
CHECKED BY: P. BARBER	DATE: 7/21		
DESIGN ENGINEER OF RECORD: P. BARBER	DATE: 7/21		

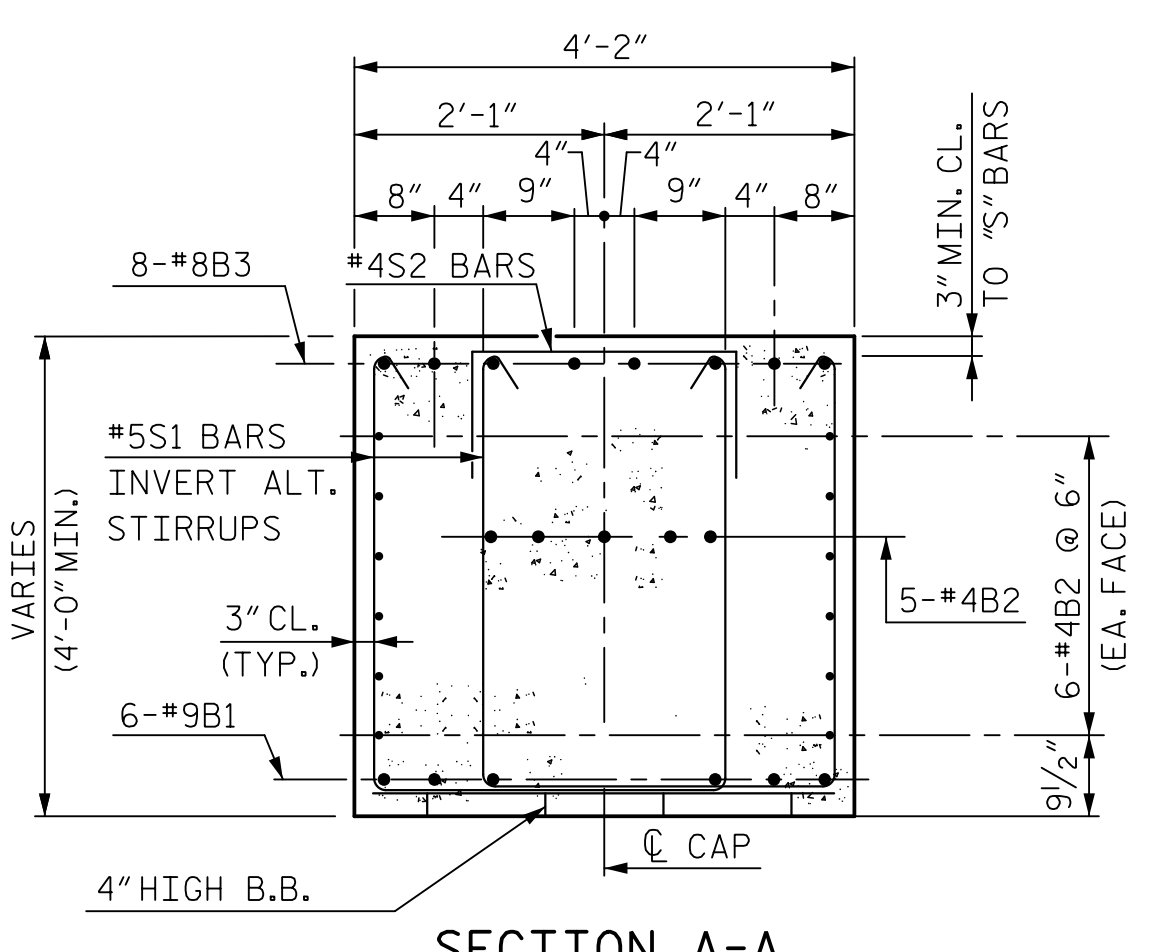
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 39
2			4			



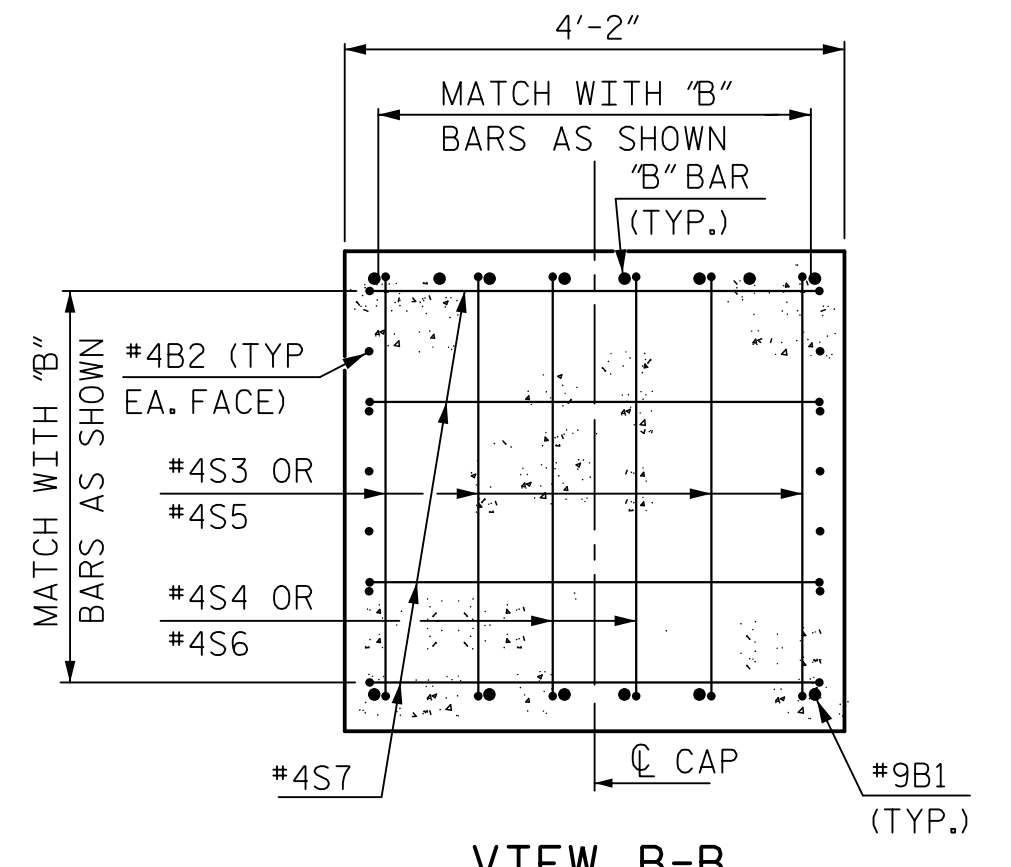
PLAN



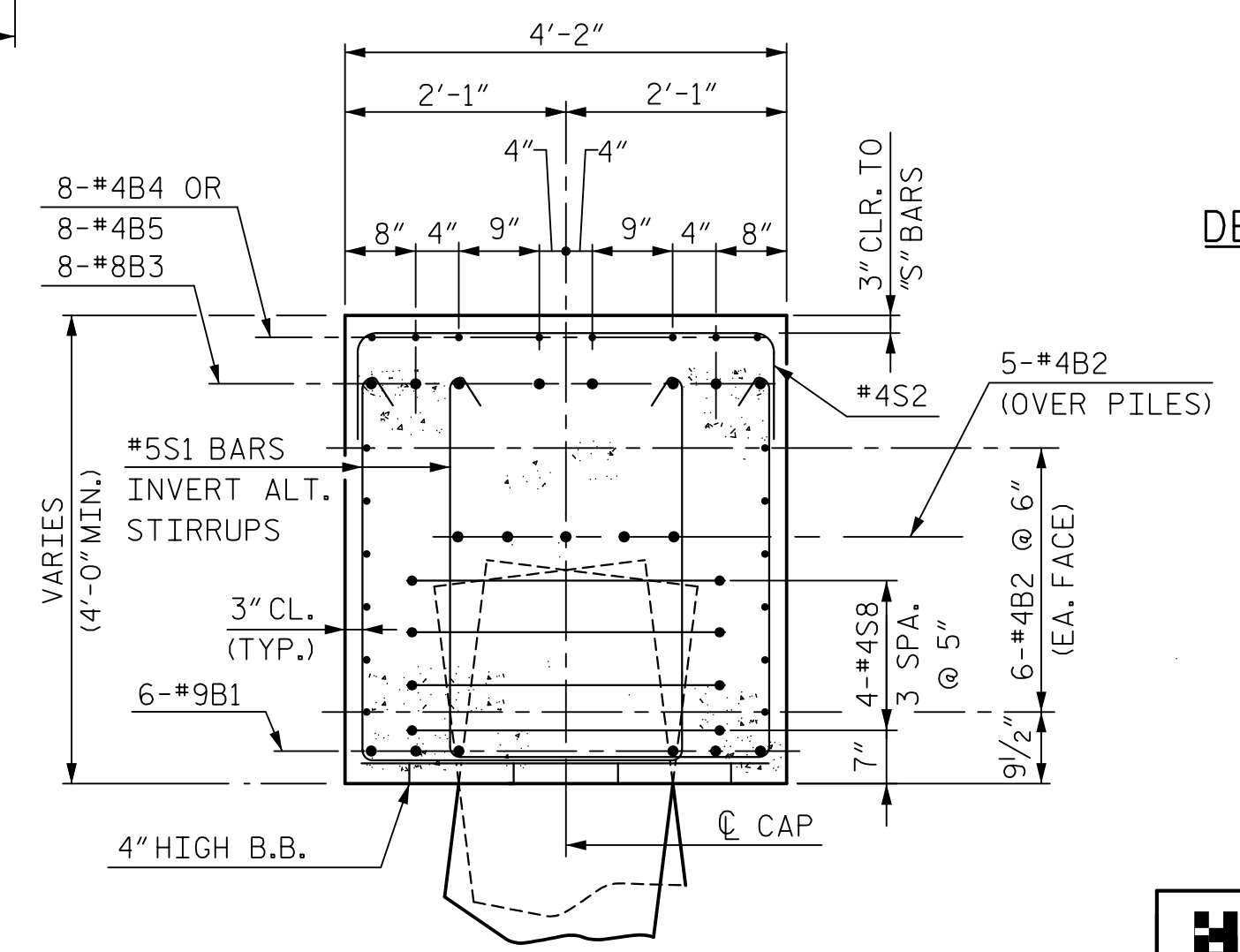
ELEVATION



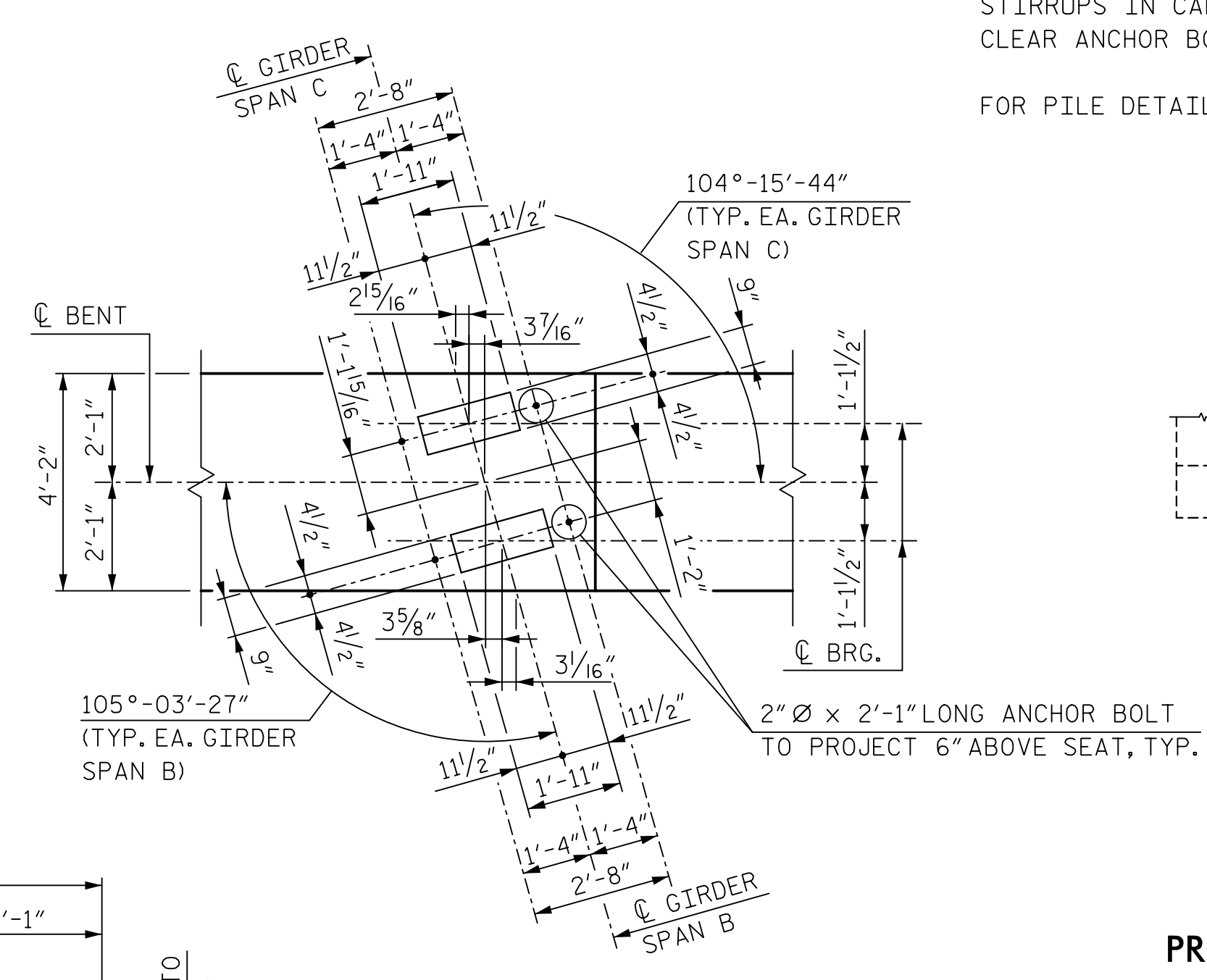
SECTION A-A



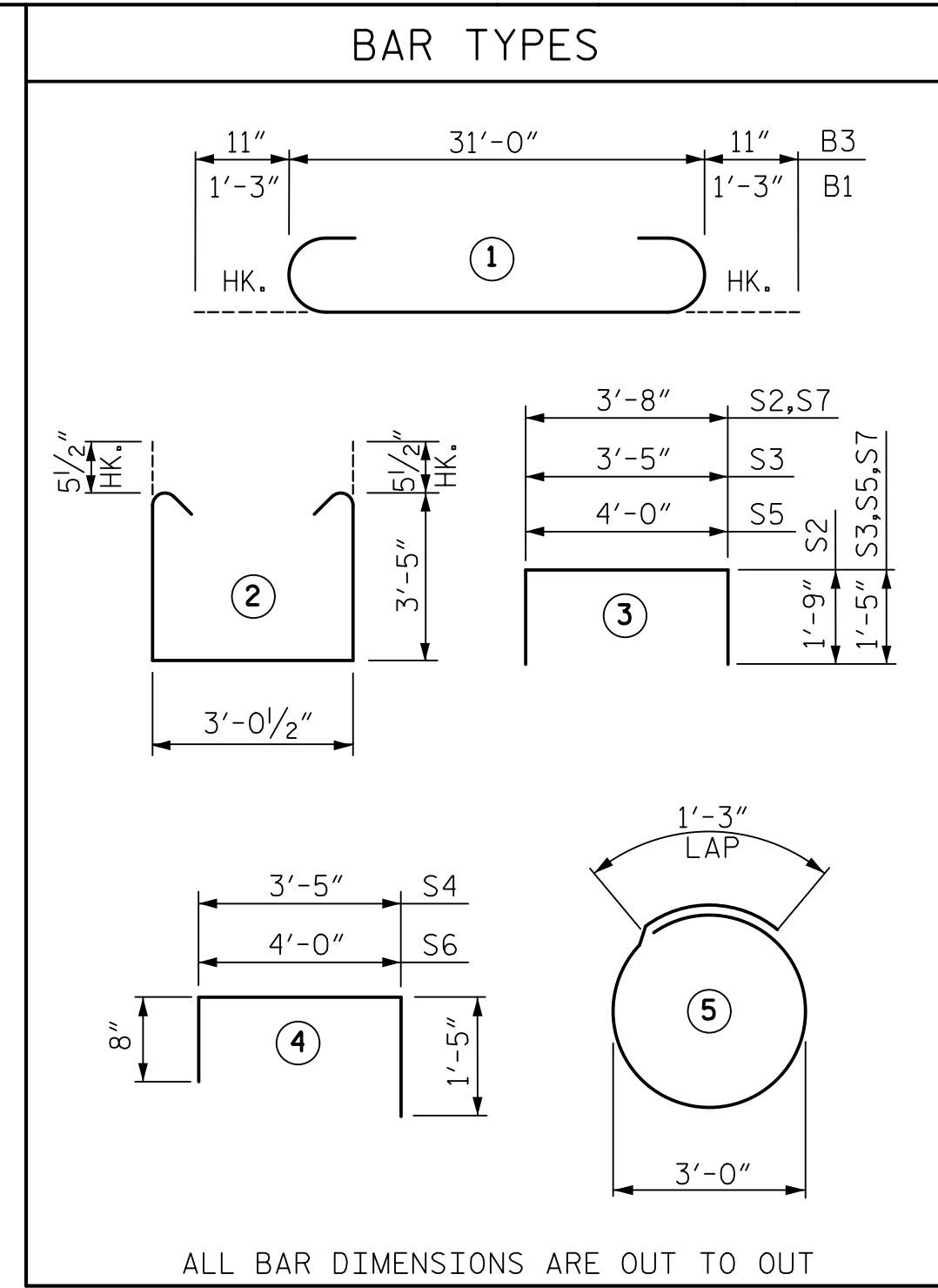
VIEW B-B



SECTION C-C



DETAIL A



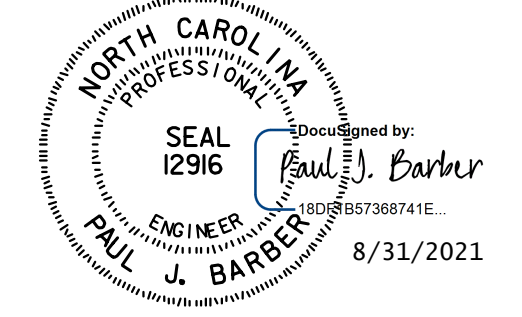
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING					
BENT 2					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	9	1	33'-6"	683
B2	34	4	STR.	16'-6"	375
B3	8	8	1	32'-10"	701
B4	16	4	STR.	10'-10"	116
B5	8	4	STR.	4'-1"	22
S1	78	5	2	10'-10"	881
S2	46	4	3	7'-2"	220
S3	4	4	3	6'-3"	17
S4	2	4	4	5'-6"	7
S5	4	4	3	6'-10"	18
S6	2	4	4	6'-1"	8
S7	8	4	3	6'-6"	35
S8	24	4	5	10'-8"	171
QUANTITIES					
EPOXY COATED REINFORCING STEEL				LBS.	3,254
CLASS AA CONCRETE					
CAP POUR 1				CU. YDS.	18.4
PRESTRESSED CONCRETE PILE				NO.	6
				FEET	630.0

NOTES:
 STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.
 FOR PILE DETAILS, SEE SHEET S6-34.

INDICATES 1/2:12 PILE BATTERED IN DIRECTION SHOWN

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-



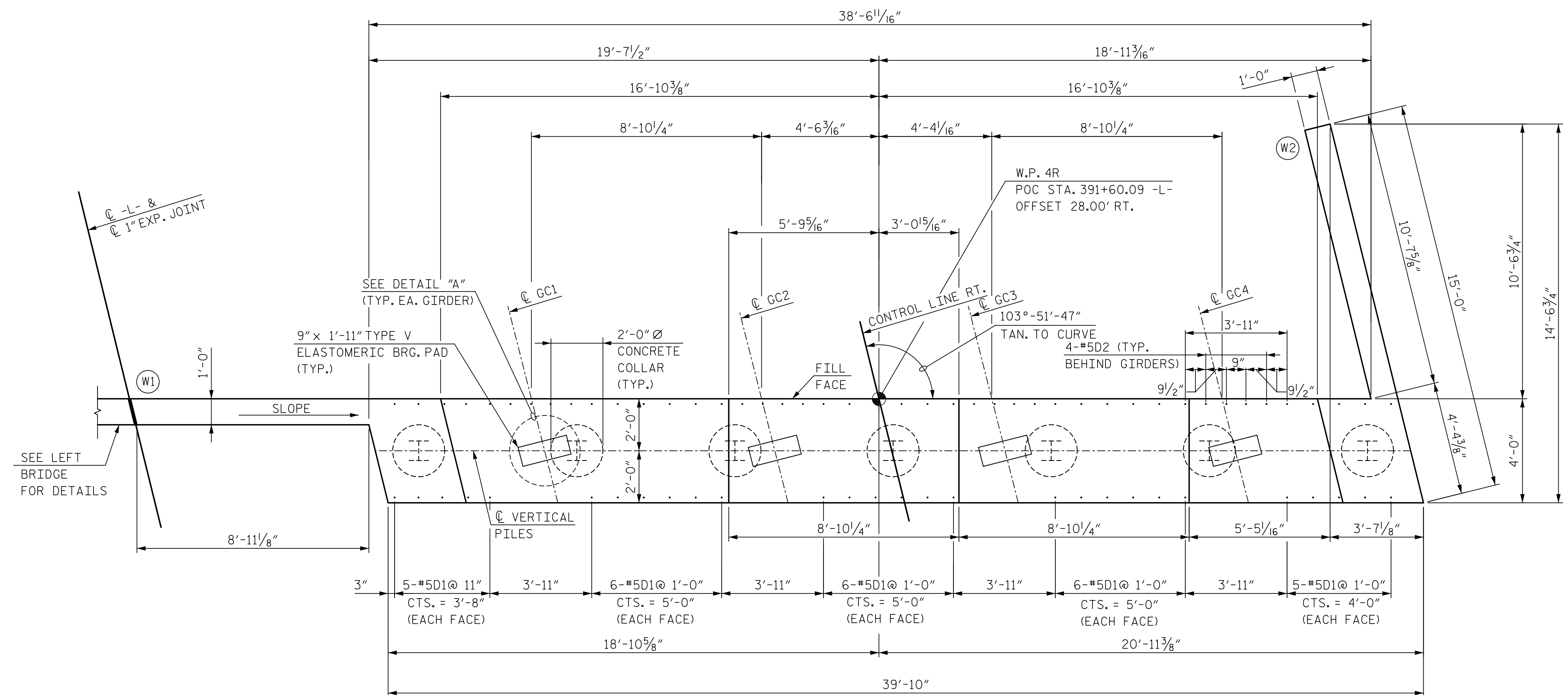
HNTB HNTB NORTH CAROLINA, P.C.
 NC License No. C-1554
 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	7/21
CHECKED BY	P. BARBER	DATE	7/21
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	7/21

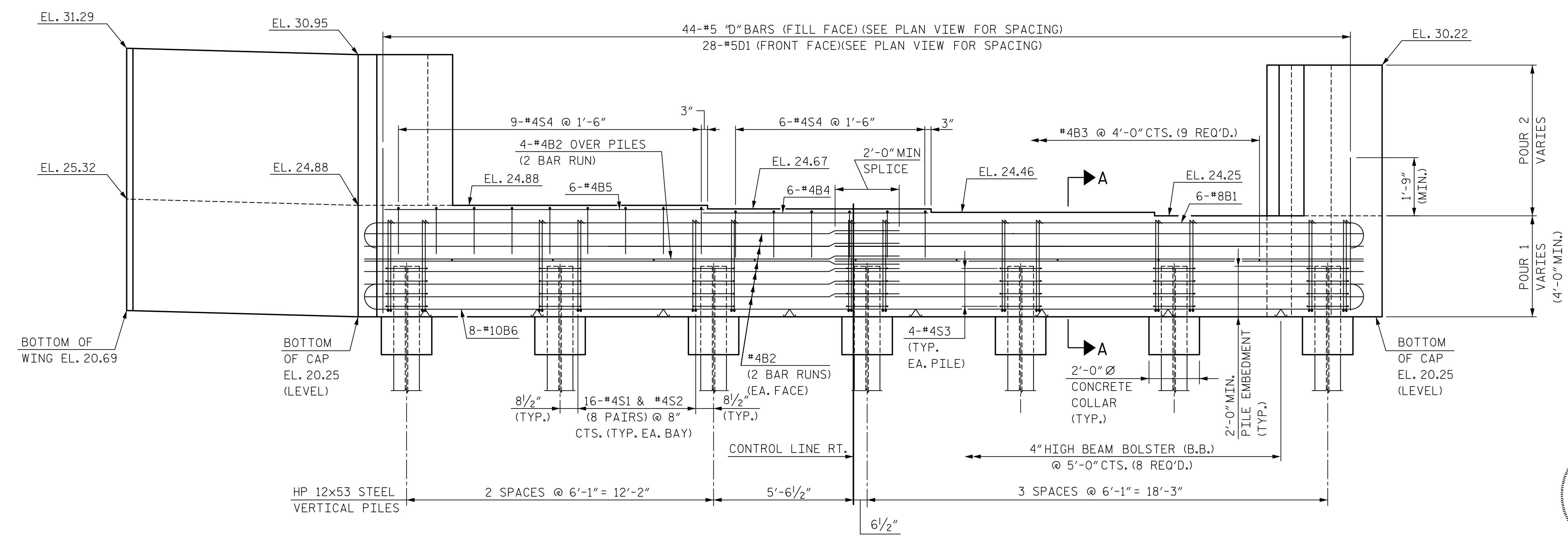
DWG. NO. 30

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH					
SUBSTRUCTURE BENT 2 RIGHT LANE					
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

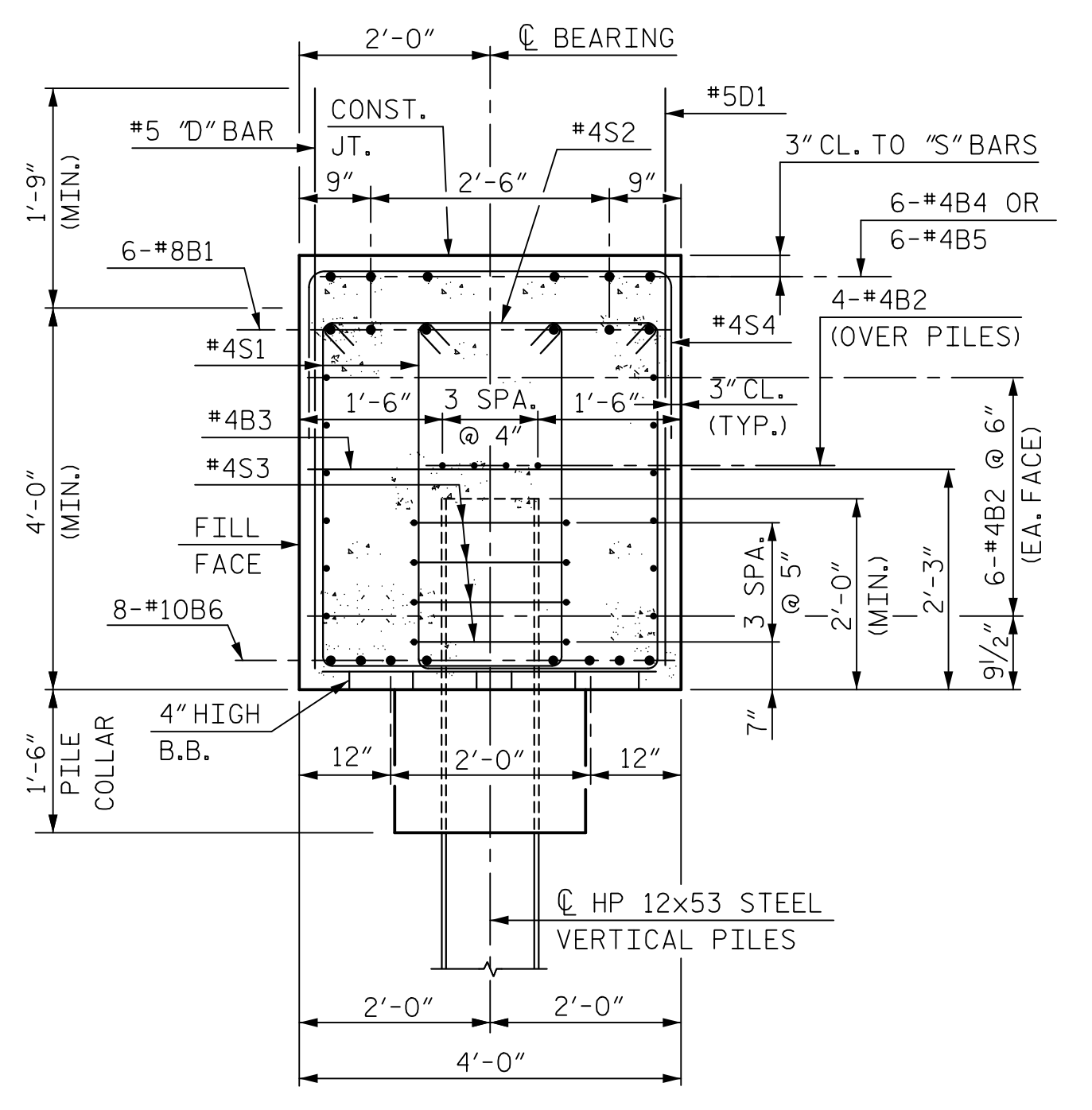
SHEET NO.		S6-30
TOTAL SHEETS		39



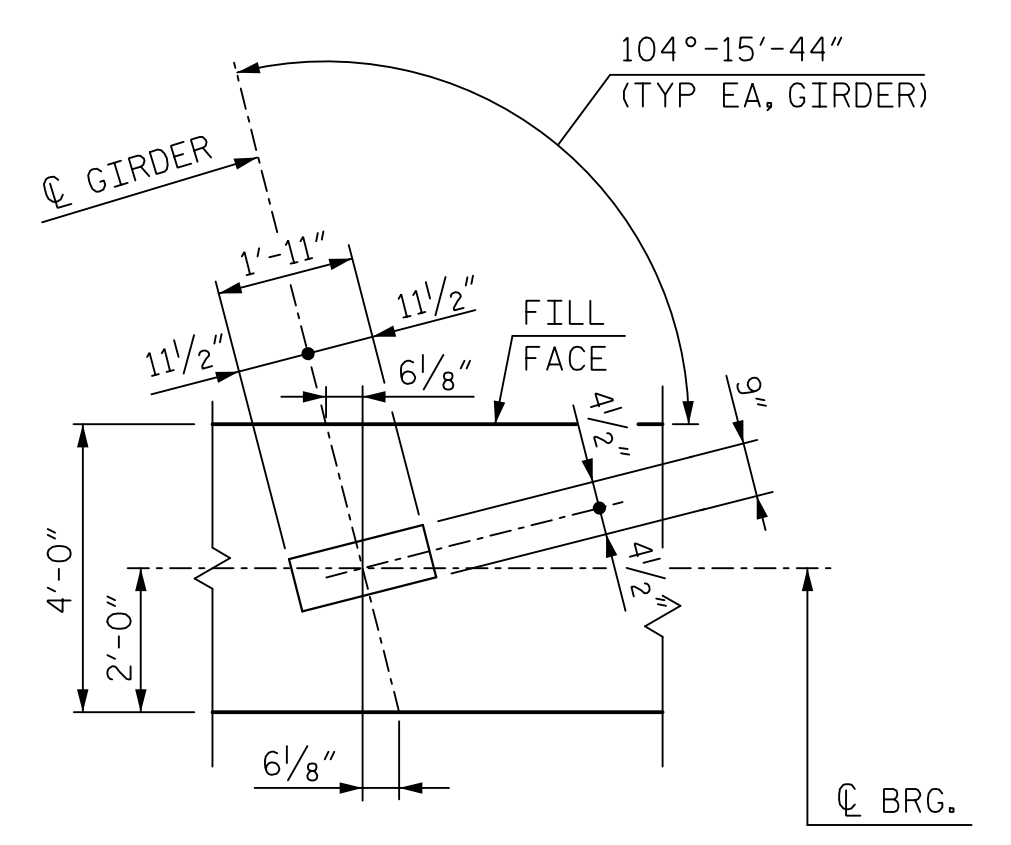
PLAN



ELEVATION



SECTION A-A

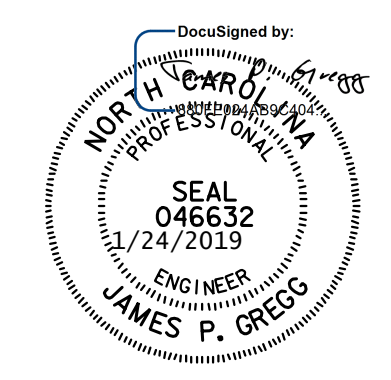


DETAIL A

NOTES:
FOR NOTES, SEE SHEET 3 OF 3.
FOR WINGWALL DETAILS, SEE SHEET 2 OF 3.

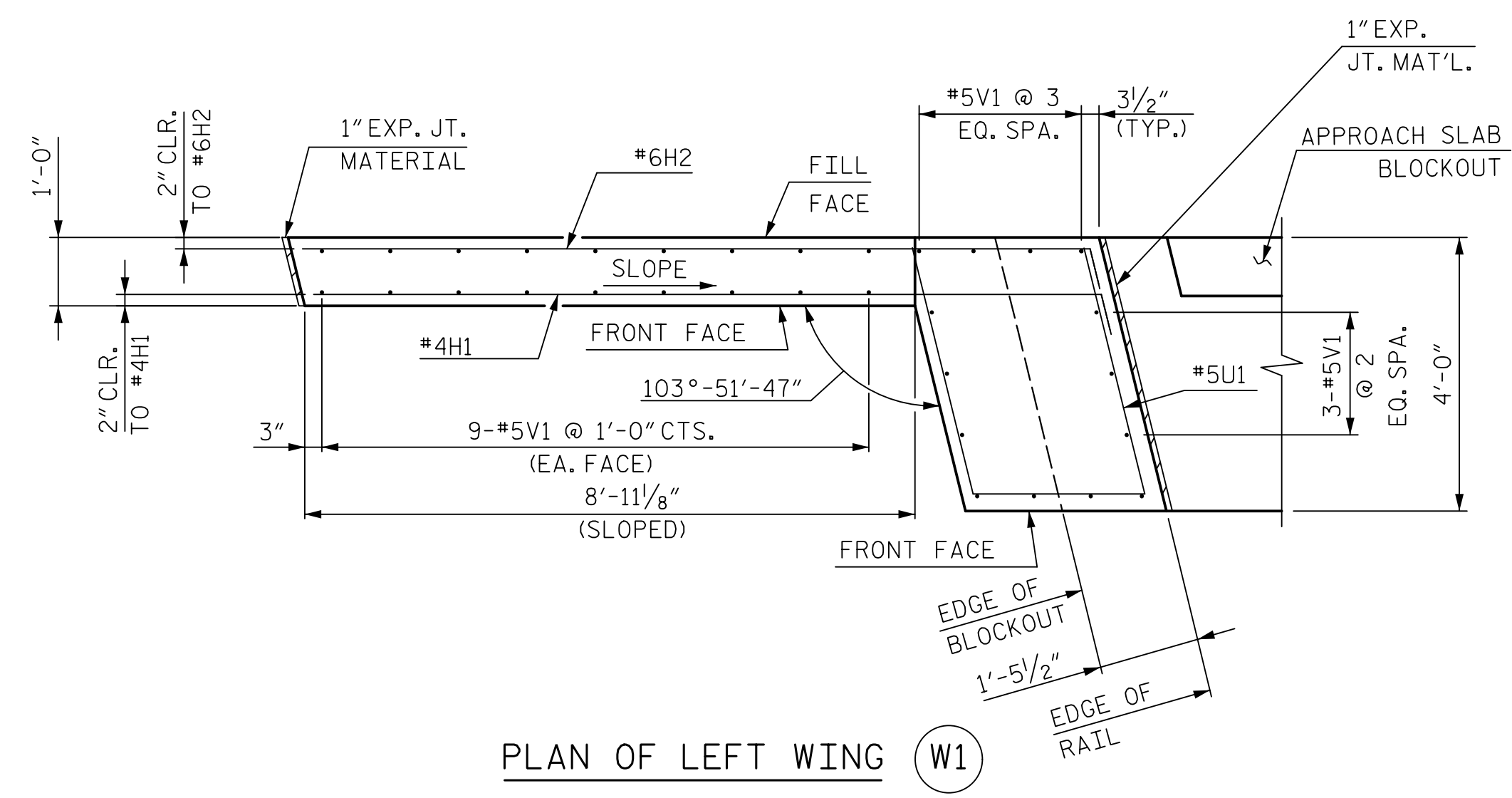
PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 1 OF 3

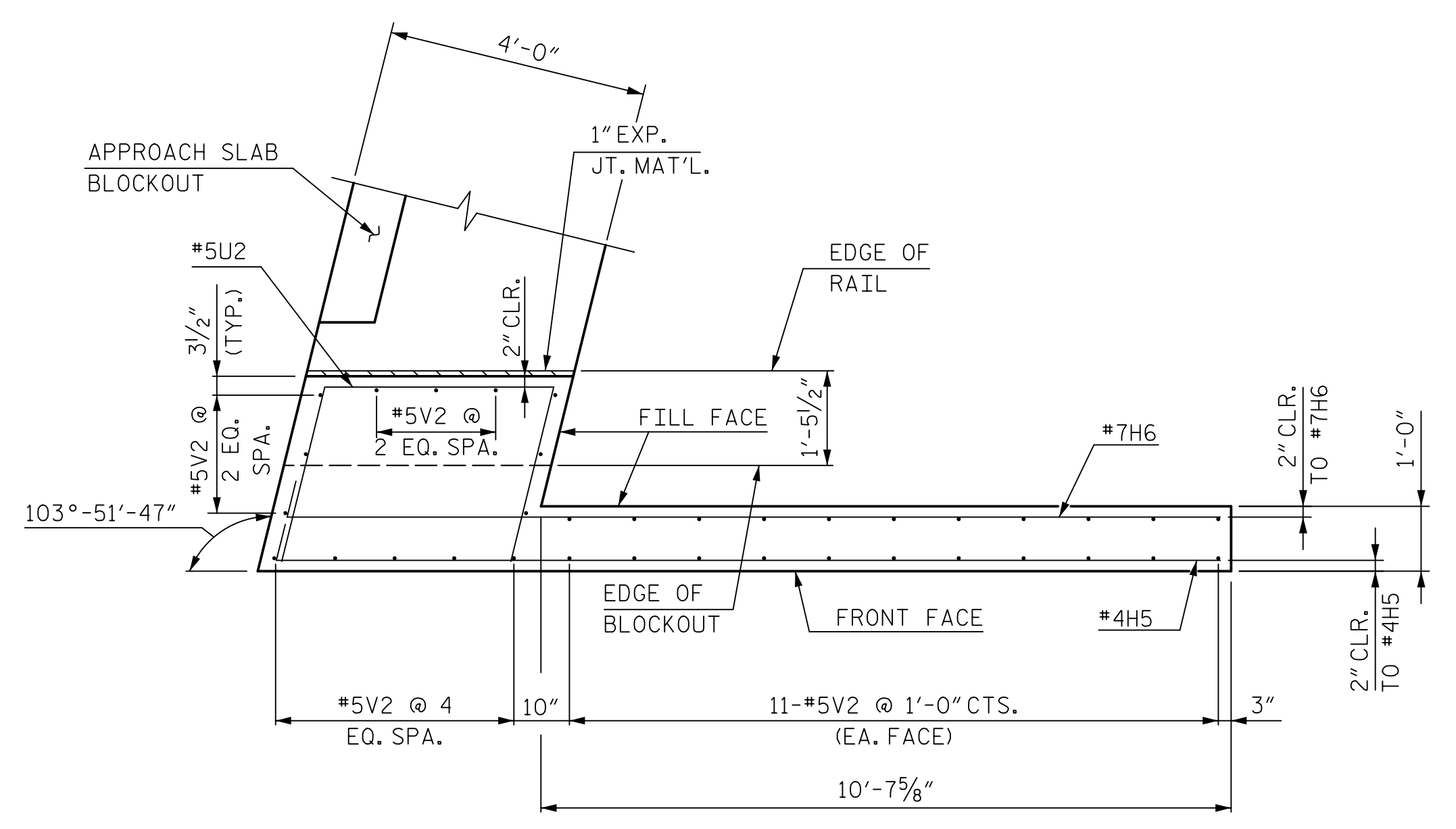


HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY: A. SMITH	DATE: 6/17	DWG. NO. 31	TOTAL SHEETS: 39
CHECKED BY: B. EMAMI	DATE: 9/17		
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18		

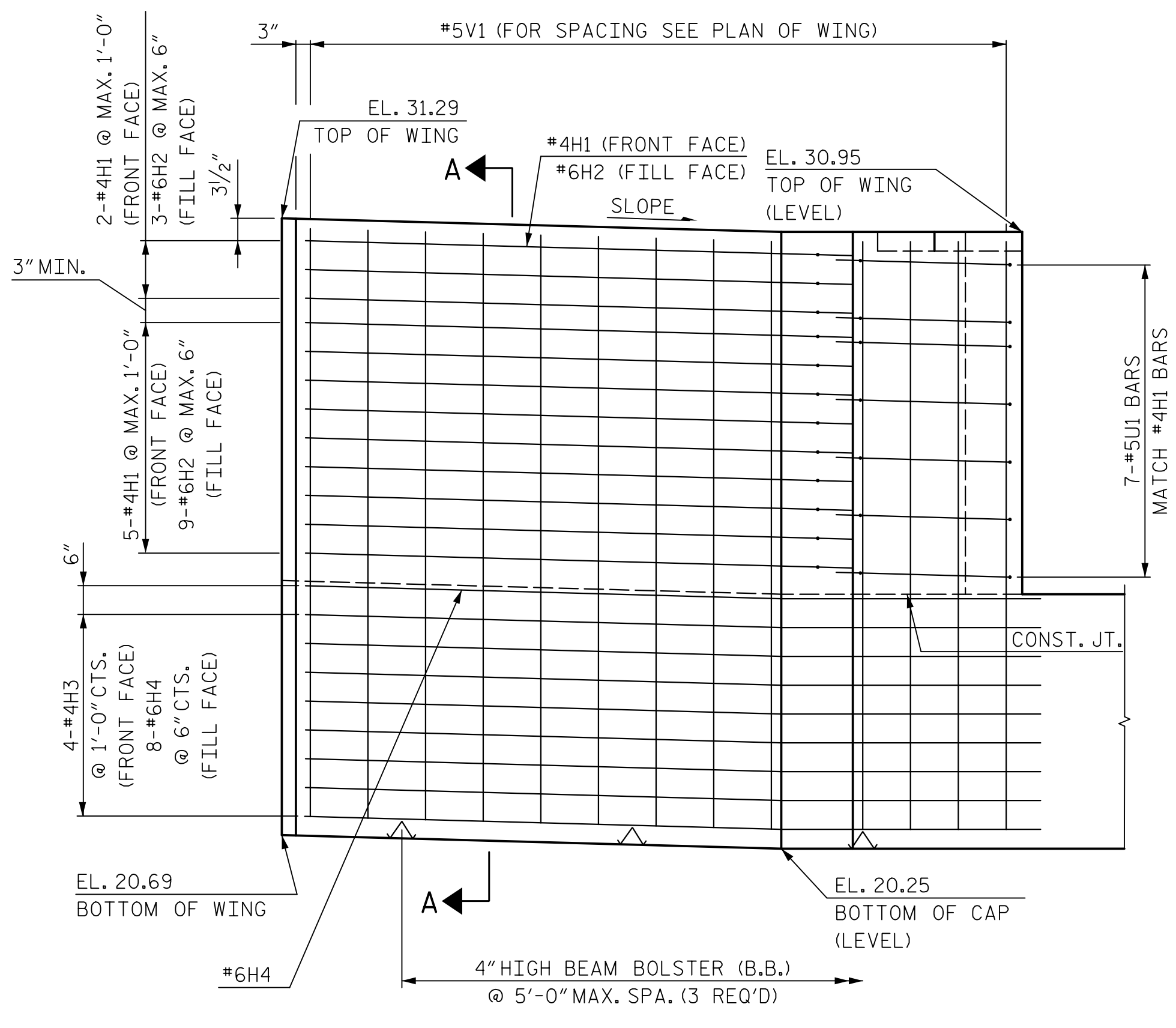
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		SUBSTRUCTURE END BENT 2 RIGHT LANE		SHEET NO. S6-31
				TOTAL SHEETS 39
REVISIONS				NO.
NO.	BY	DATE	NO.	
1			3	
2			4	



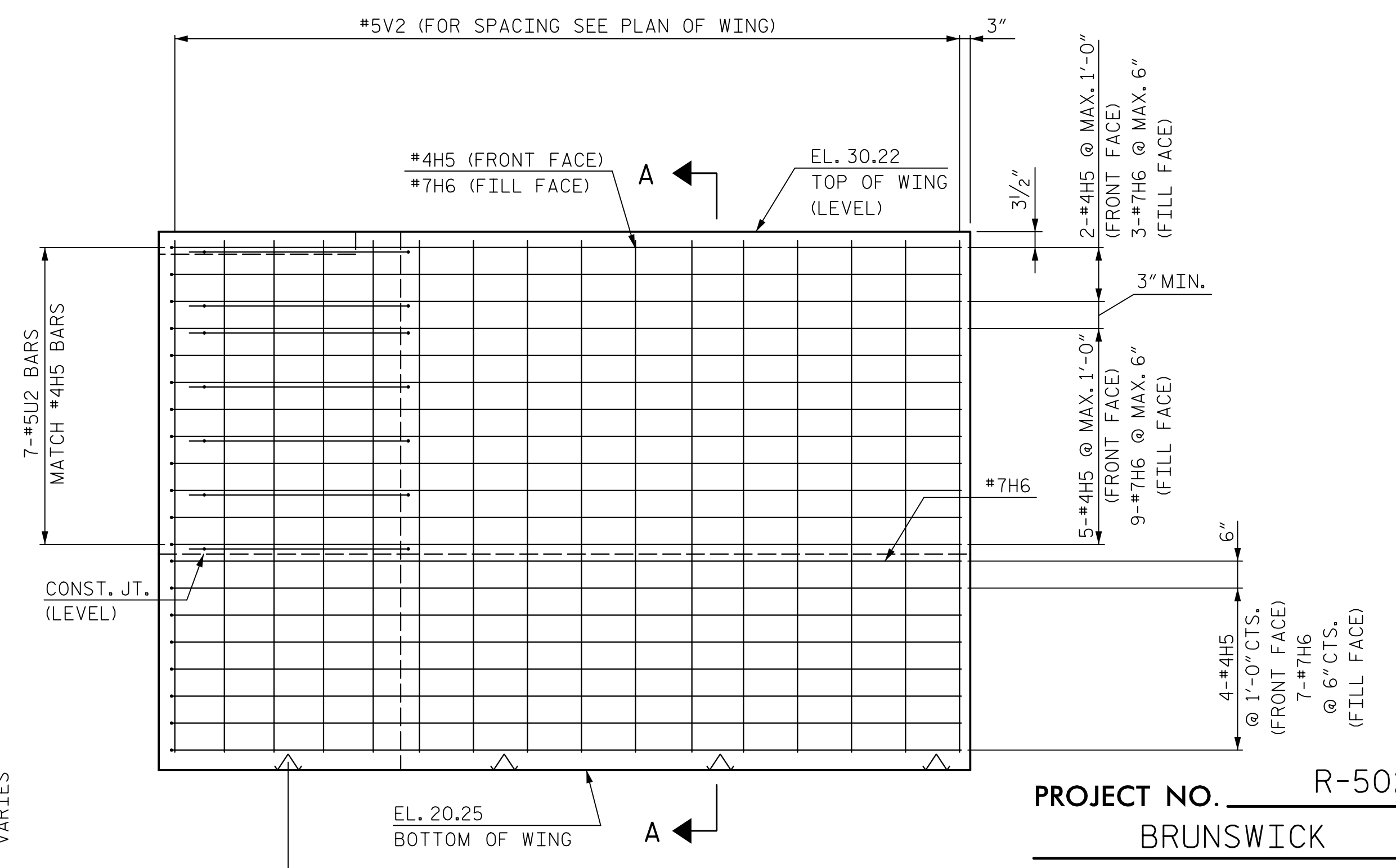
PLAN OF LEFT WING (W1)



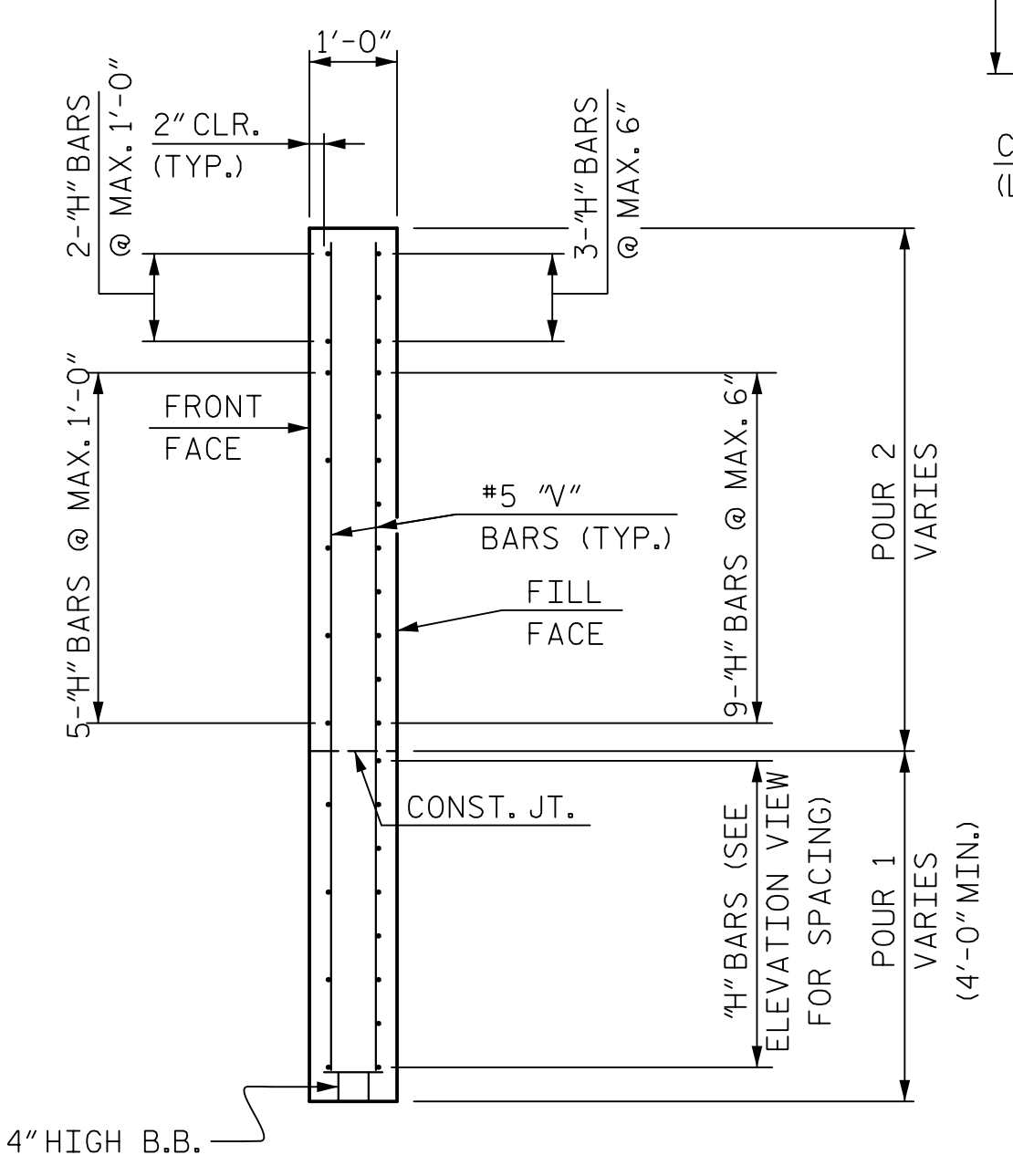
PLAN OF RIGHT WING (W2)



ELEVATION OF LEFT WING (W1)



ELEVATION OF RIGHT WING (W2)

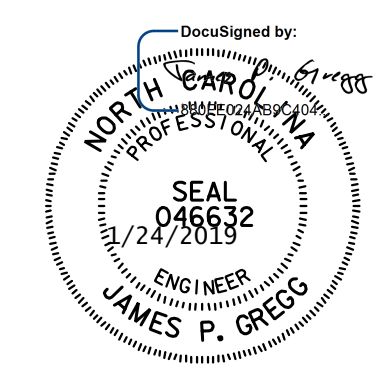


SECTION A-A

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

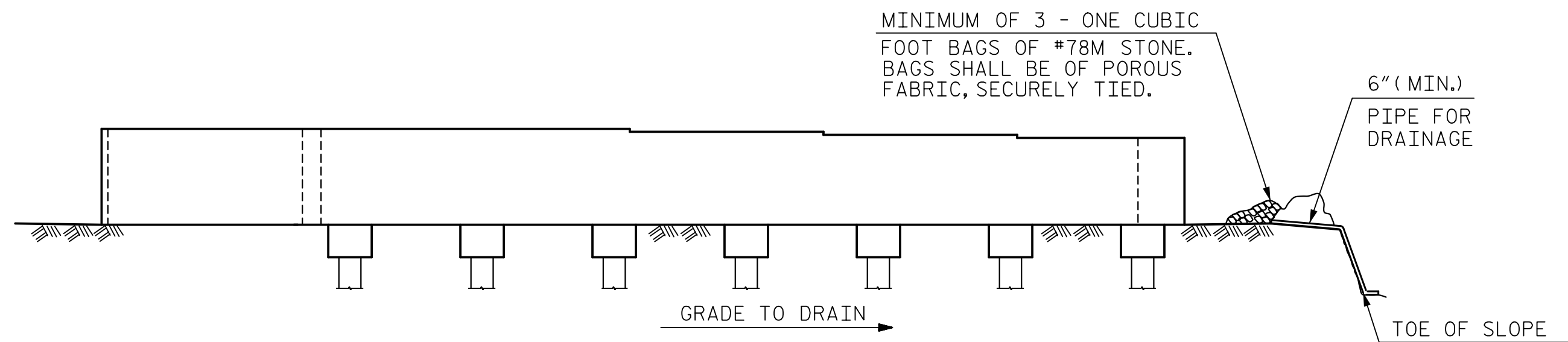
SHEET 2 OF 3

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



HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609																	
DRAWN BY: A. SMITH	DATE: 8/17	DWG. NO. 32	<table border="1"> <tr> <th colspan="4">REVISIONS</th> </tr> <tr> <th>NO.</th> <th>BY</th> <th>DATE</th> <th>NO.</th> </tr> <tr> <td>1</td> <td>B. EMAMI</td> <td>9/17</td> <td>3</td> </tr> <tr> <td>2</td> <td>J. GREGG</td> <td>8/18</td> <td>4</td> </tr> </table>	REVISIONS				NO.	BY	DATE	NO.	1	B. EMAMI	9/17	3	2	J. GREGG	8/18	4
REVISIONS																			
NO.	BY			DATE	NO.														
1	B. EMAMI	9/17	3																
2	J. GREGG	8/18	4																
CHECKED BY: B. EMAMI	DATE: 9/17																		
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18																		

SHEET NO. S6-32	
TOTAL SHEETS 39	

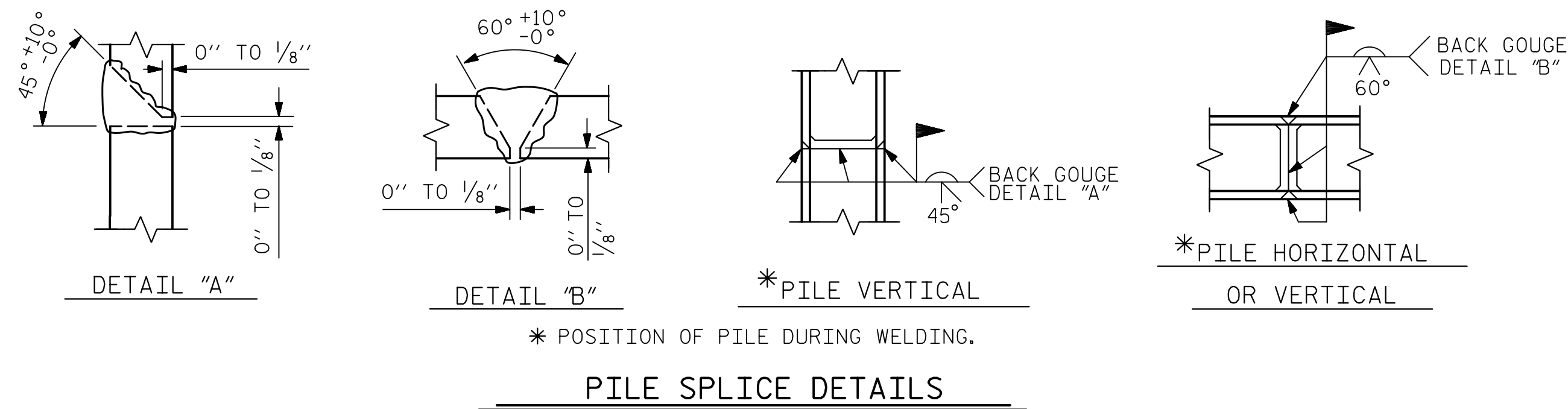


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

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.

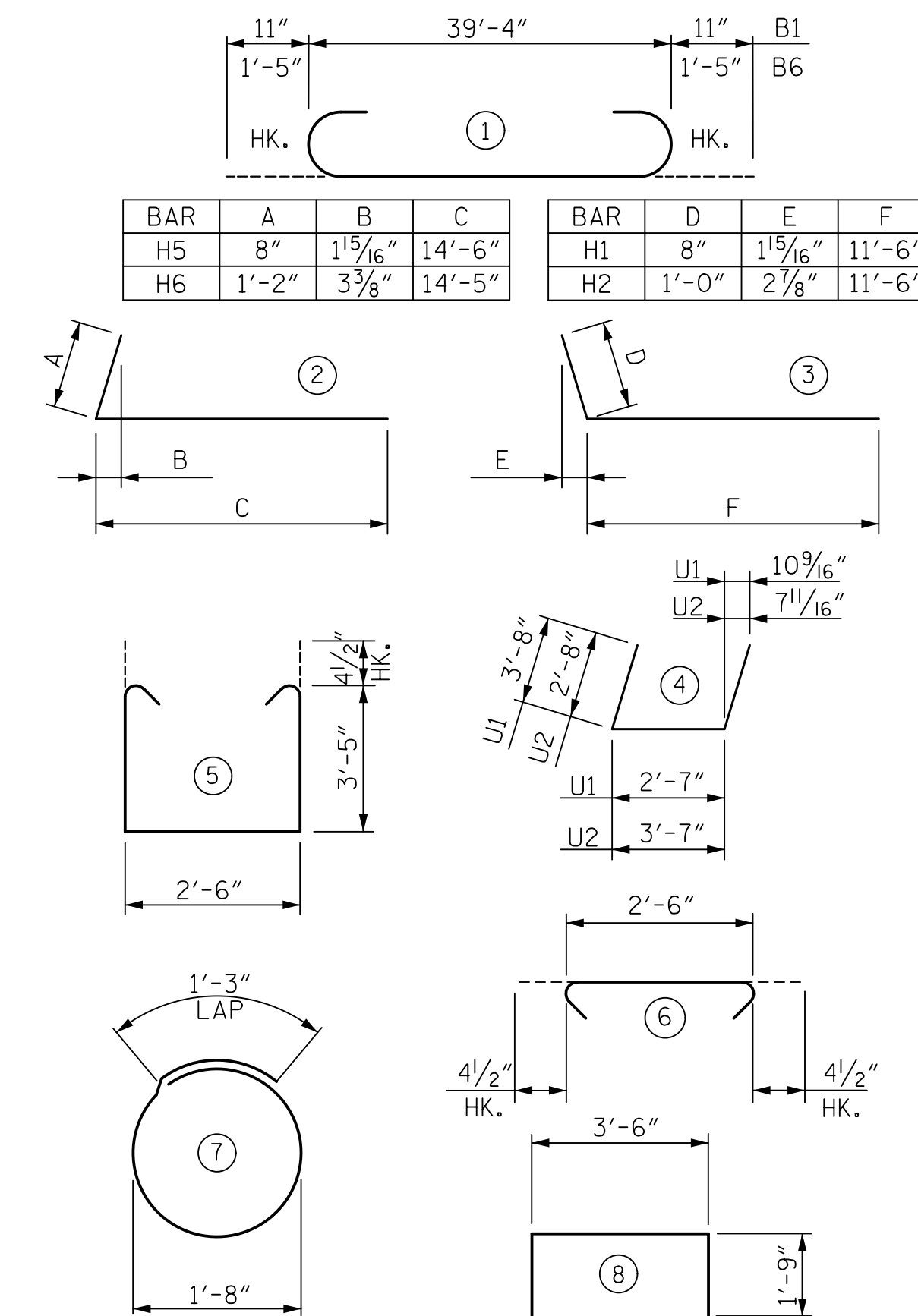
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT 2



PILE SPLICE DETAILS

BAR TYPES



BAR	A	B	C	BAR	D	E	F
H5	8"	1 ⁵ / ₁₆ "	14'-6"	H1	8"	1 ⁵ / ₁₆ "	11'-6"
H6	1'-2"	3 ³ / ₈ "	14'-5"	H2	1'-0"	2 ⁷ / ₈ "	11'-6"

BILL OF REINFORCING

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	6	#8	1	41'-2"	659
B2	32	#4	STR.	20'-10"	445
B3	9	#4	STR.	3'-6"	21
B4	6	#4	STR.	9'-0"	36
B5	6	#4	STR.	12'-8"	51
B6	8	#10	1	42'-2"	1,452
D1	56	#5	STR.	6'-5"	375
D2	16	#5	STR.	8'-3"	138
H1	7	#4	3	12'-2"	57
H2	12	#6	3	12'-6"	225
H3	5	#4	STR.	13'-2"	44
H4	9	#6	STR.	13'-5"	181
H5	11	#4	2	15'-2"	111
H6	20	#7	2	15'-7"	637
S1	100	#4	5	10'-1"	674
S2	100	#4	6	3'-3"	217
S3	28	#4	7	6'-6"	122
S4	15	#4	8	7'-0"	70
V1	32	#5	STR.	10'-0"	334
V2	36	#5	STR.	9'-4"	350
U1	7	#5	4	9'-11"	72
U2	7	#5	4	8'-11"	65

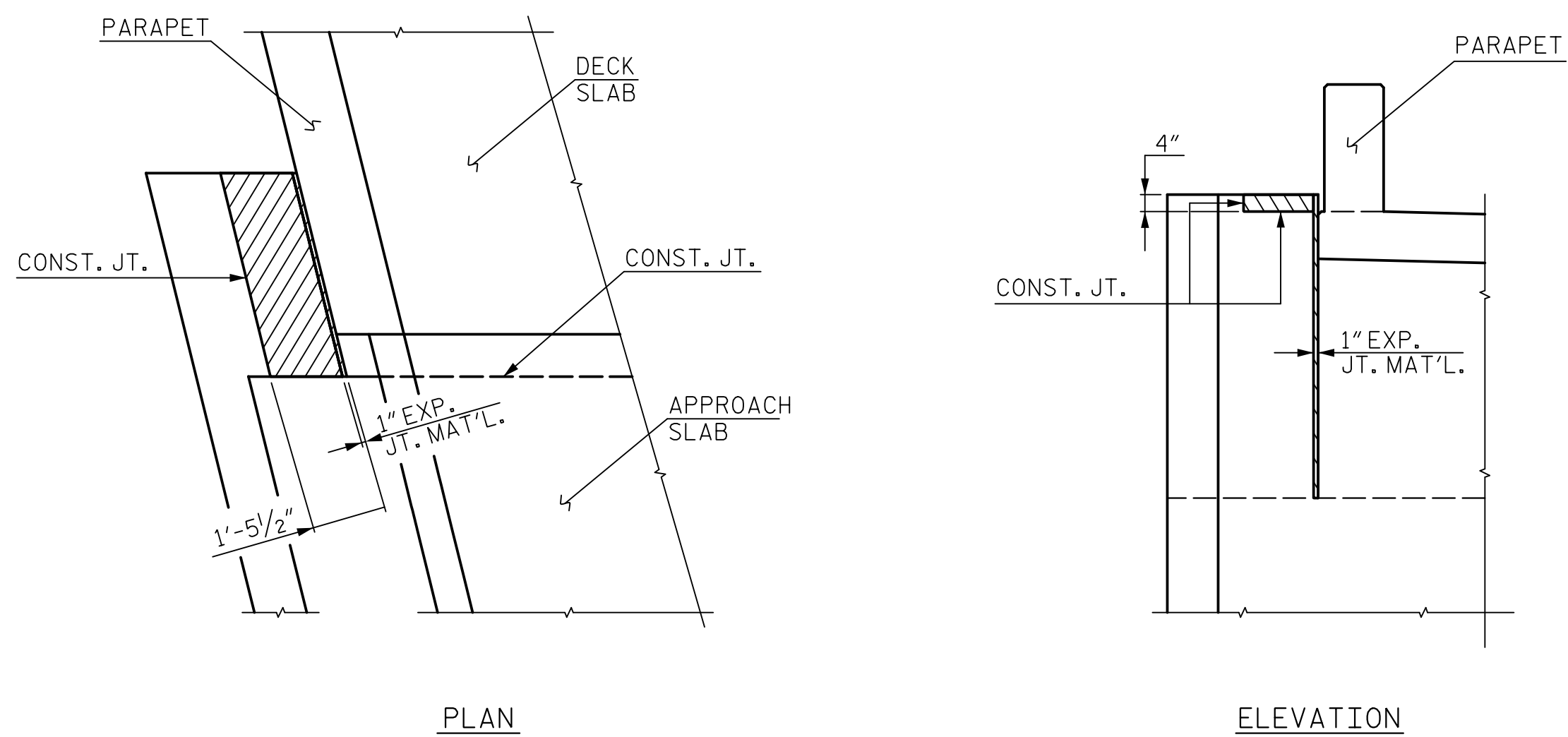
QUANTITIES

EPOXY COATED REINFORCING STEEL	LBS.	6,336
CLASS AA CONCRETE BREAKDOWN		
POUR 1 - CAP	CU. YDS.	30.1
POUR 2 - WINGS	CU. YDS.	9.6
TOTAL:	CU. YDS.	39.7
HP 12x53 STEEL PILES	NO.	7
	LN. FT.	560

ALL BAR DIMENSIONS ARE OUT TO OUT

NOTES:

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

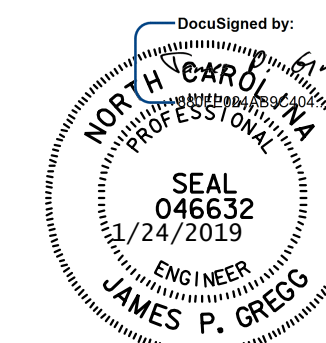


PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 3 OF 3

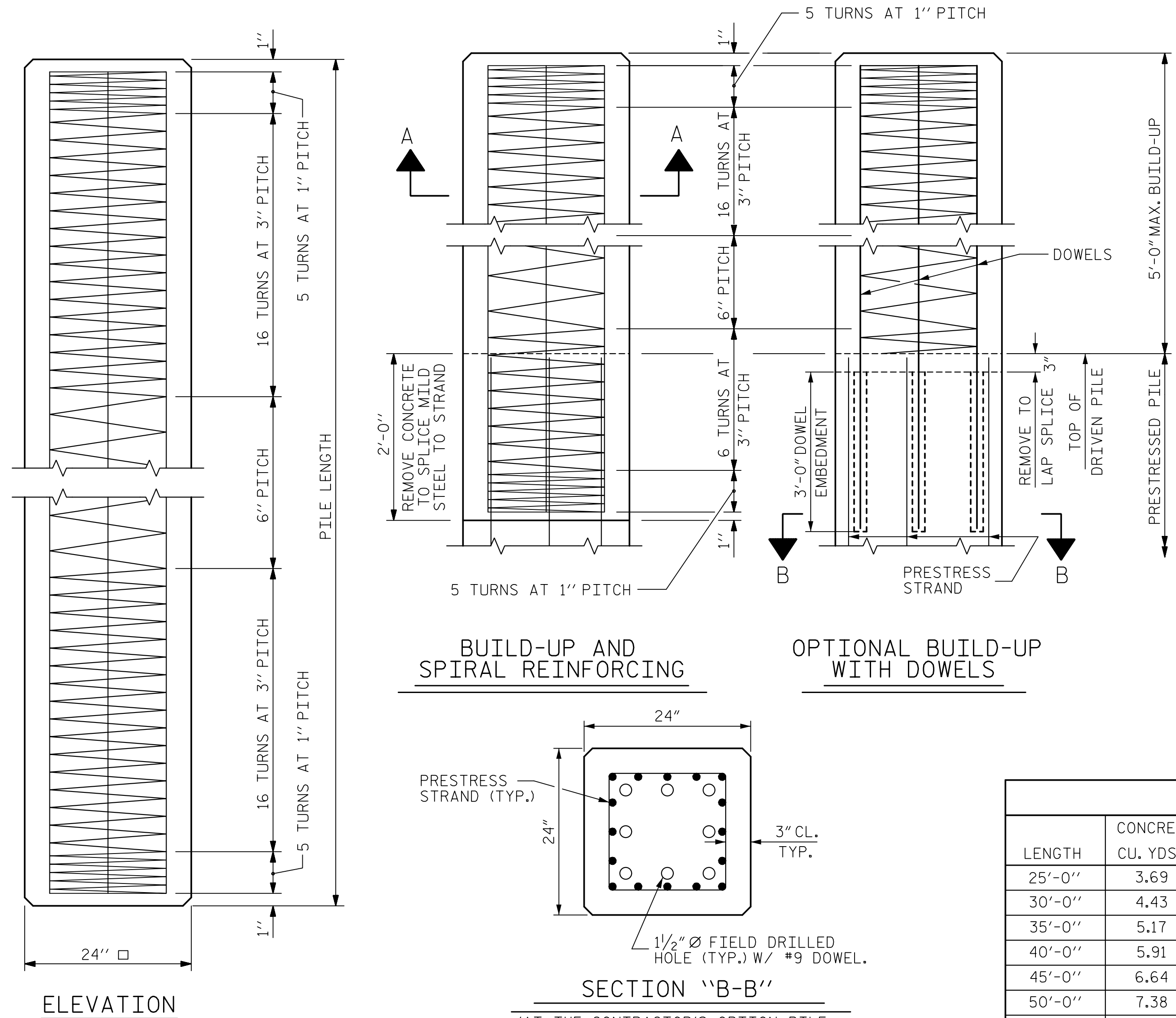
STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

SUBSTRUCTURE
 END BENT 2
 RIGHT LANE



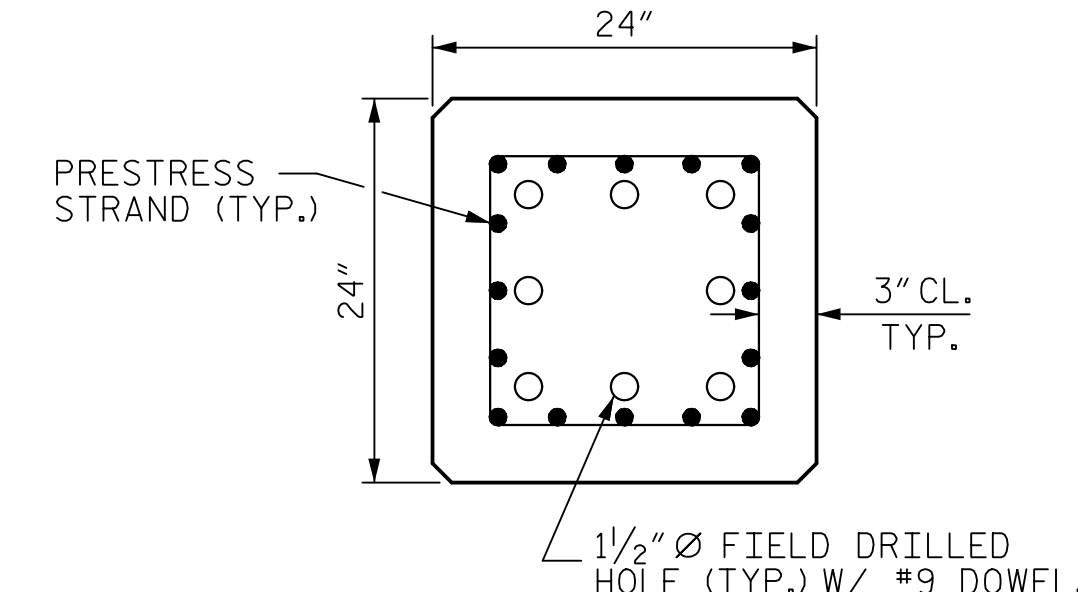
HNTB	HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609
DRAWN BY: A. SMITH	DATE: 9/17
CHECKED BY: B. EMAMI	DATE: 9/17
DESIGN ENGINEER OF RECORD: J. GREGG	DATE: 8/18
DWG. NO. 33	

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S6-33
1			3			TOTAL SHEETS
2			4			39

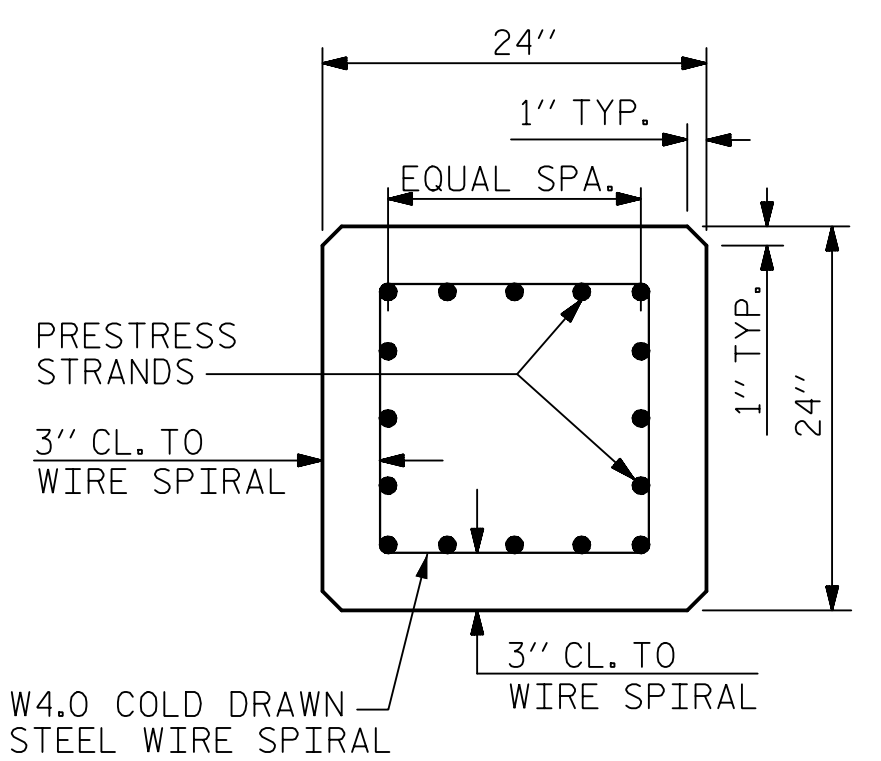


BUILD-UP AND SPIRAL REINFORCING

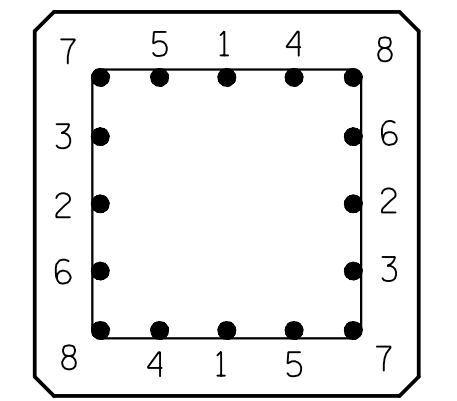
OPTIONAL BUILD-UP WITH DOWELS



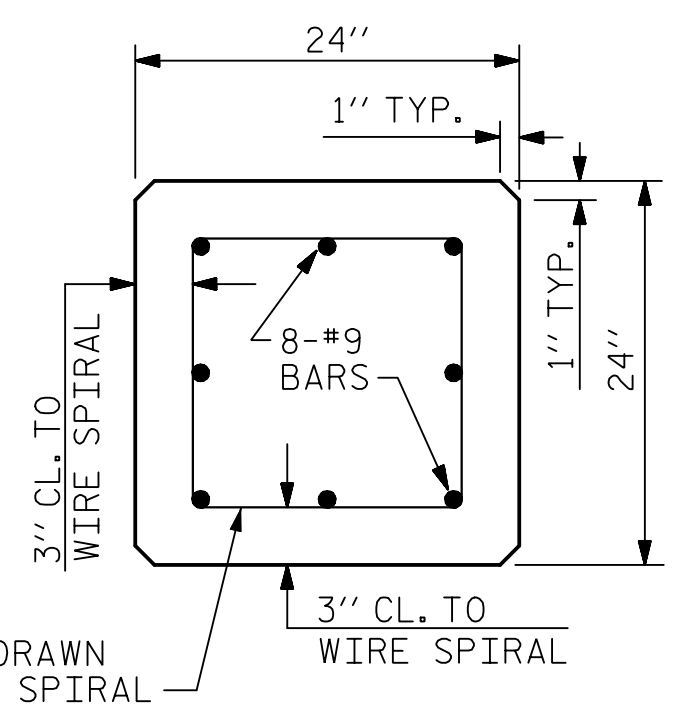
SECTION "B-B"
(AT THE CONTRACTOR'S OPTION, PILE BUILD-UP MAY BE CONSTRUCTED WITH DOWELS.)



TYPICAL SECTION

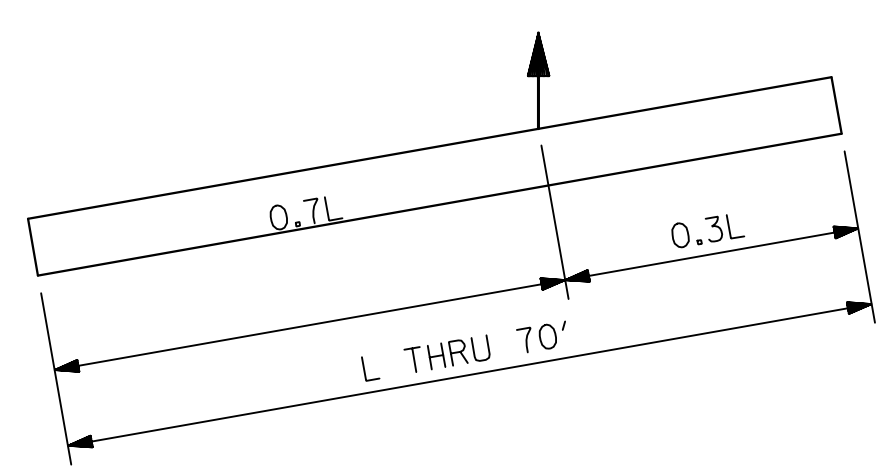


TYPICAL PATTERN FOR BURNING STRANDS

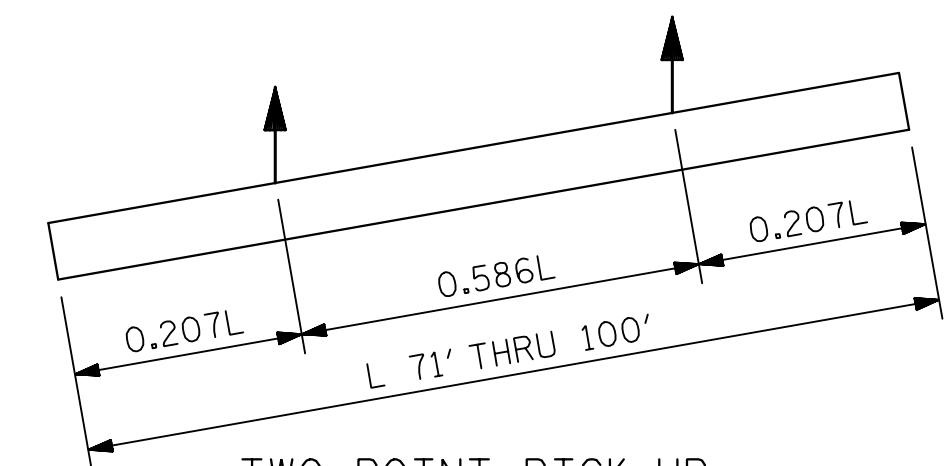


SECTION A-A

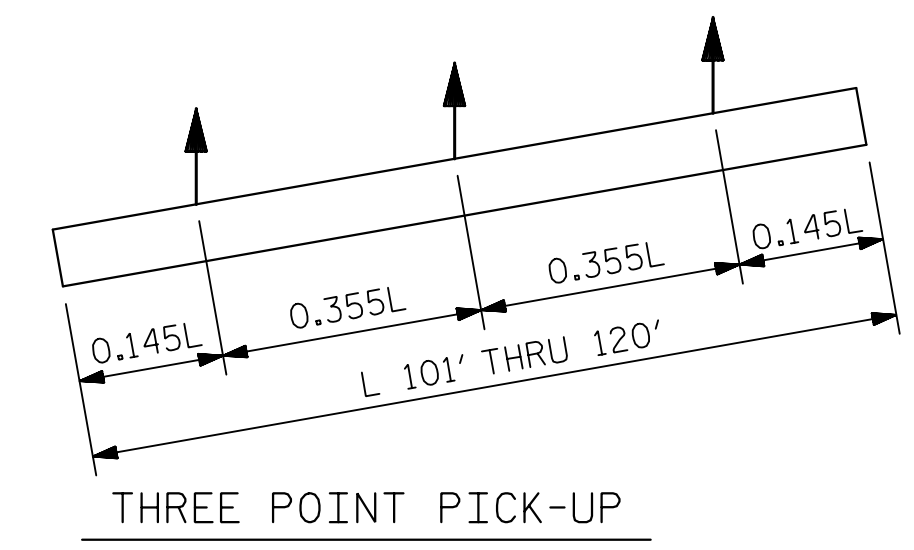
1/2" OR 0.6" Ø GRADE 270 L.R. PRESTRESS STRANDS



ONE POINT PICK-UP



TWO POINT PICK-UP

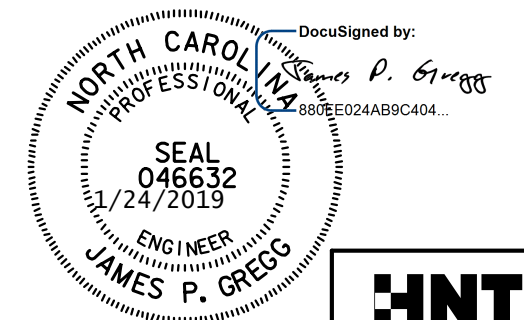


THREE POINT PICK-UP

LENGTH	CONCRETE CU. YDS.	PILE WT. TONS	QUANTITIES FOR ONE 24" SQUARE PILE					
			ONE POINT PICK-UP 0.3L	ONE POINT PICK-UP 0.7L	TWO POINT PICK-UP 0.207L	TWO POINT PICK-UP 0.586L	THREE POINT PICK-UP 0.145L	THREE POINT PICK-UP 0.355L
25'-0"	3.69	7.47	7'-6"	17'-6"				
30'-0"	4.43	8.97	9'-0"	21'-0"				
35'-0"	5.17	10.46	10'-6"	24'-6"				
40'-0"	5.91	11.96	12'-0"	28'-0"				
45'-0"	6.64	13.45	13'-6"	31'-6"				
50'-0"	7.38	14.95	15'-0"	35'-0"				
55'-0"	8.12	16.44	16'-6"	38'-6"				
60'-0"	8.86	17.94	18'-0"	42'-0"				
65'-0"	9.60	19.43	19'-6"	45'-6"				
70'-0"	10.33	20.93	21'-0"	49'-0"				
75'-0"	11.07	22.42			15'-6 1/2"	43'-11"		
80'-0"	11.81	23.92			16'-6 1/2"	46'-11"		
85'-0"	12.55	25.41			17'-7"	49'-10"		
90'-0"	13.29	26.91			18'-7 1/2"	52'-9"		
95'-0"	14.03	28.40			19'-8"	55'-8"		
100'-0"	14.76	29.90			20'-8 1/2"	58'-7"		
105'-0"	15.50	31.39					15'-3"	37'-3"
110'-0"	16.24	32.89					15'-11 1/2"	39'-0 1/2"
115'-0"	16.98	34.38					16'-8"	40'-10"
120'-0"	17.72	35.87					17'-5"	42'-7"

STRAND DATA:

SIZE	GRADE	AREA	ULTIMATE STRENGTH	APPLIED PRESTRESS FORCE
1/2"	270 L.R.	0.153	41,300# PER STRAND	30,980# PER STRAND
0.6"	270 L.R.	0.217	58,600# PER STRAND	43,940# PER STRAND



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DRAWN BY: B. NEUPANE DATE: 8/17
 CHECKED BY: B. EMAMI DATE: 9/17
 DESIGN ENGINEER OF RECORD: J. GREGG DATE: 8/18

DWG. NO. 34

NOTES

PRESTRESSED CONCRETE STRENGTH : $f'_c = 7,500$ PSI
 BUILD-UP CONCRETE STRENGTH : $f'_c = 7,500$ PSI

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS CONFORMING TO AASHTO M203. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. AT THE CONTRACTOR'S OPTION, "OR 0.6" STRANDS MAY BE USED IN THE STRAND CONFIGURATION SHOWN IN THE TYPICAL SECTION DETAIL. MIXING OF STRAND SIZE IS NOT ALLOWED. THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED. TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN OPPOSITE PAIRS AS INDICATED IN THE TYPICAL PATTERN SHOWN. FOR ANY NUMBER OF STRANDS, BURN IN OPPOSITE PAIRS AND SYMMETRICALLY ABOUT BOTH THE VERTICAL AND HORIZONTAL AXES, STRANDS 1-1 SHALL BE BURNED BEFORE 2-2, ETC. NOT MORE THAN 4 STRANDS, SAY 5-5 AND 6-6, MAY BE BURNED AT ANY ONE SECTION BEFORE THESE SAME PAIRS OF STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

PROPOSED DEVICES FOR LIFTING PILES, RECESS DETAILS, AND PATCHING MATERIAL SHALL BE DETAILED IN SHOP DRAWINGS. AFTER ATTACHMENTS HAVE BEEN REMOVED, OPENINGS SHALL BE REPAIRED SUCH THAT THE APPEARANCE OF THE PILE IS UNIFORM.

WHERE CAST-IN-PLACE LIFTING DEVICES ARE NOT USED, PICK-UP POINTS ARE TO BE INDICATED WITH A 2" WIDE BLACK MARK.

DRIVE PILES USING A METHOD APPROVED BY THE ENGINEER, WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED.

DRIVING OF THE BUILT-UP PILE WILL NOT BE PERMITTED UNTIL THE CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF 5,000 PSI AND UNTIL A PERIOD OF SEVEN DAYS HAS ELAPSED SINCE CASTING OF THE BUILD-UP.

THE WATER/CEMENT RATIO FOR CONCRETE PILES SHALL NOT EXCEED 0.40.

THE CONCRETE IN THE PILES OF BENT NO. 1 AND 2 SHALL CONTAIN SILICA FUME. SILICA FUME SHALL BE SUBSTITUTED FOR 5% OF THE PORTLAND CEMENT BY WEIGHT. IF THE OPTION OF ARTICLE 1024-1 OF THE STANDARD SPECIFICATIONS TO PARTIALLY SUBSTITUTE CLASS F FLY ASH FOR PORTLAND CEMENT IS EXERCISED, THEN THE RATE OF FLY ASH SUBSTITUTION SHALL BE REDUCED TO 1.0 LB OF FLY ASH PER 1.0 LB OF CEMENT. NO PAYMENT WILL BE MADE FOR THIS SUBSTITUTION AS IT IS CONSIDERED INCIDENTAL TO THE VARIOUS PAY ITEMS.

PRESTRESSED PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR.

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

GROUT COMPRESSIVE STRENGTH: $f'_c = 5,000$ PSI

BEFORE DRILLING DOWEL HOLES, REMOVE THE UPPER 3" OF CONCRETE FROM THE TOP OF THE PILE WITHOUT DAMAGE TO THE REINFORCING STEEL. THE REMOVAL PLANE SHOULD BE NORMAL TO THE EDGE OF THE PILE.

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN 1/2" CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

FIELD DRILLED HOLES SHALL BE CLEAN AND FREE OF ANY OBSTRUCTIONS BEFORE GROUTING OF DOWELS. DOWEL BARS SHALL BE INSTALLED AND GROUTED WITH AN APPROVED NON-SHRINK GROUT.

THE SPIRAL REINFORCING IN ALL BUILD-UPS SHALL BE W4.0 COLD DRAWN WIRE WHICH SHALL BE SECURED TO THE LONGITUDINAL REINFORCEMENT TO MAINTAIN PITCH.

THE SPIRAL REINFORCING IN THE BUILD-UP AND THE PRESTRESSED CONCRETE PILE SHALL BE SPLICED BY OVERLAPPING A MIN. OF ONE TURN.

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

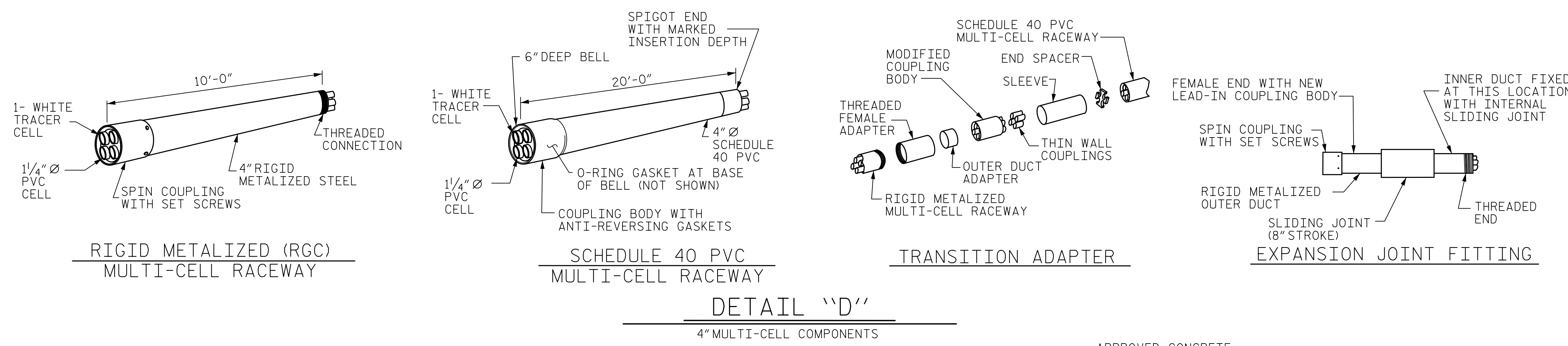
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
 RALEIGH

STANDARD
24" PRESTRESSED CONCRETE PILE

RIGHT LANE

REVISIONS						SHEET NO. S6-34
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 39
2			4			

ASSEMBLED BY : BN	DATE : 8/17
CHECKED BY : BE	DATE : 9/17
DRAWN BY : WJH 1/89	REV. 11/30/10 WMC/GM
CHECKED BY : CRK 3/89	REV. 10/1/11 MAA/GM
	REV. 12/14 MAA/TMG



NOTES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE TOTAL QUANTITY OF CONDUIT NEEDED TO COMPLETE THE WORK AND THAT THE CONDUIT(S) ARE PLACED AT THE NOTED DIMENSION AND ABOVE THE BOTTOM OF THE GIRDER.

THE INSTALLATION OF THE CONDUIT SYSTEM SHALL BE PAID FOR AS LUMP SUM. THE PRICE SHALL INCLUDE ALL CONDUIT, HANGERS, STABILIZERS, EXPANSION JOINTS, CONCRETE INSERTS, PVC SLEEVES AND ALL NECESSARY HARDWARE TO COMPLETE THE WORK.

THE CONTRACTOR SHALL FIELD VERIFY THAT THE CONDUIT SYSTEM IS NOT IN CONFLICT WITH THE GUARDRAIL POSTS.

SEE DETAIL "C" FOR HANGER ASSEMBLY INSTALLATION.

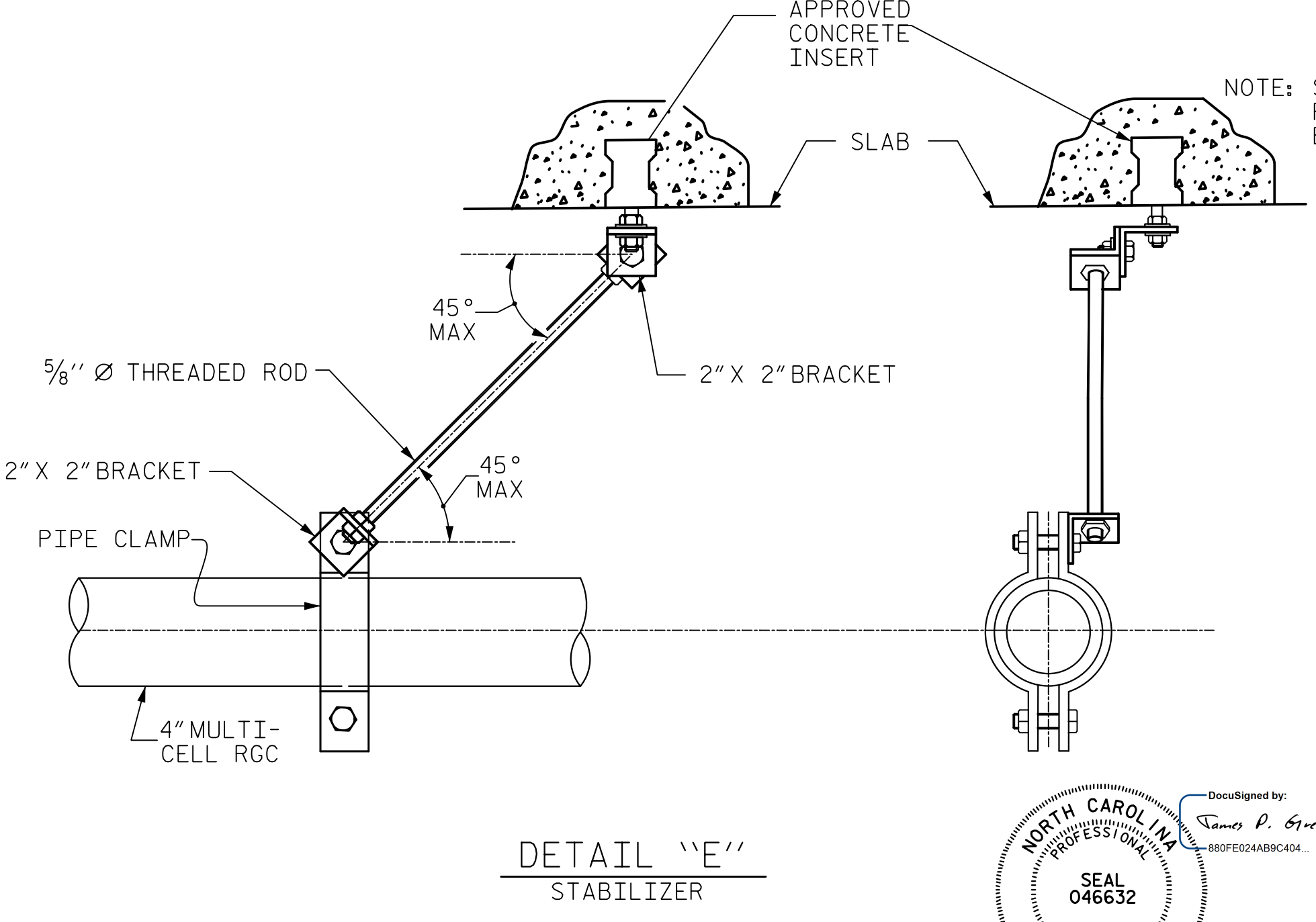
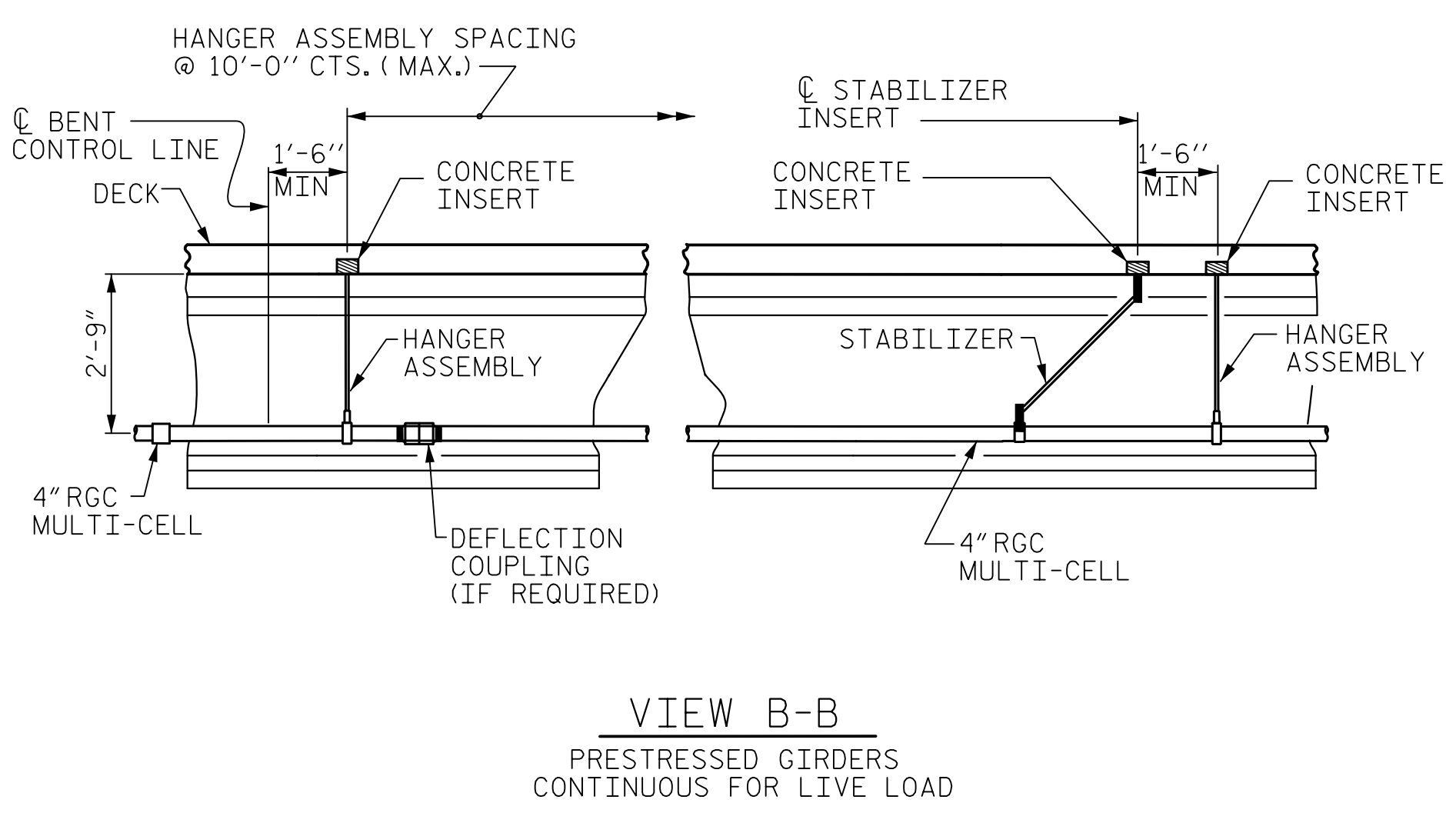
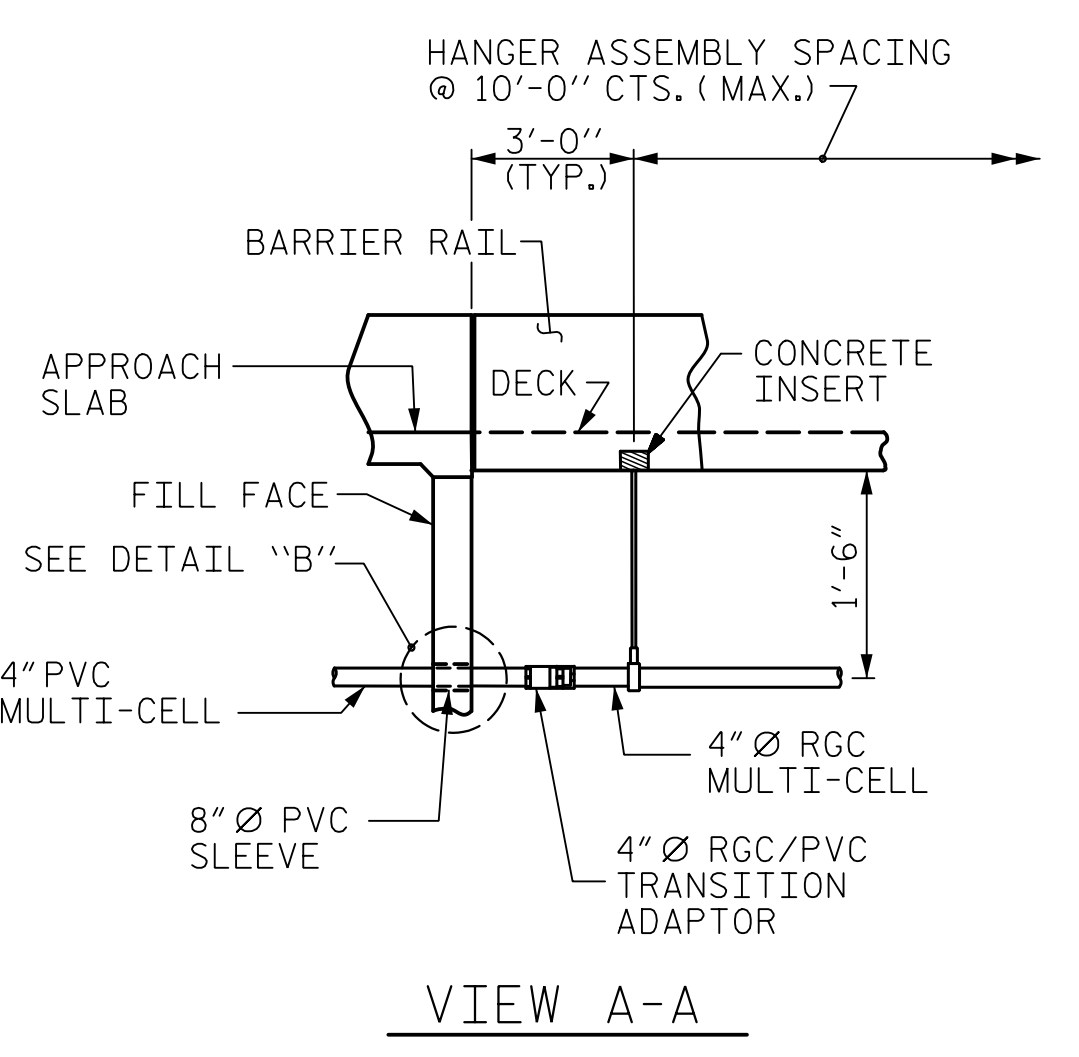
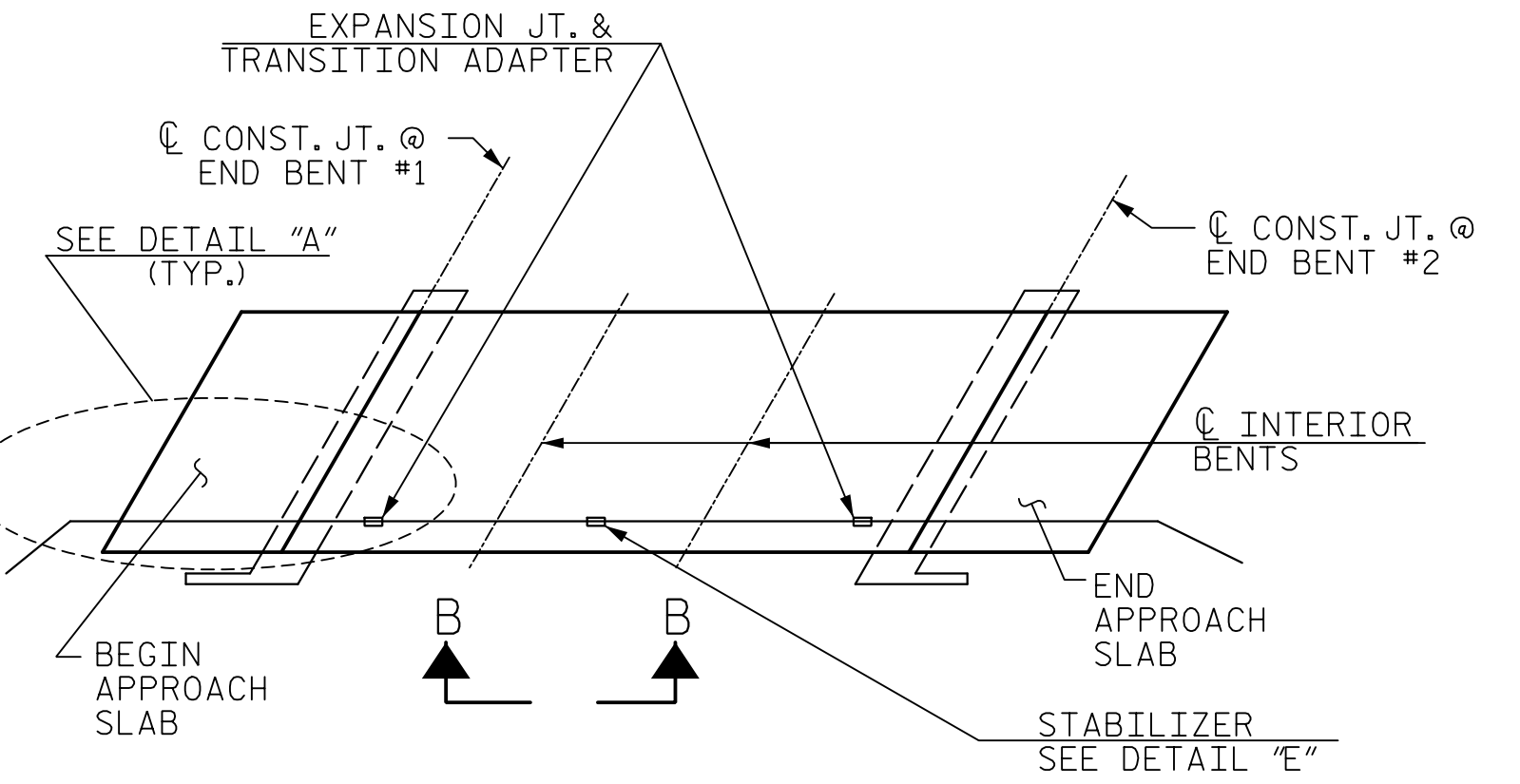
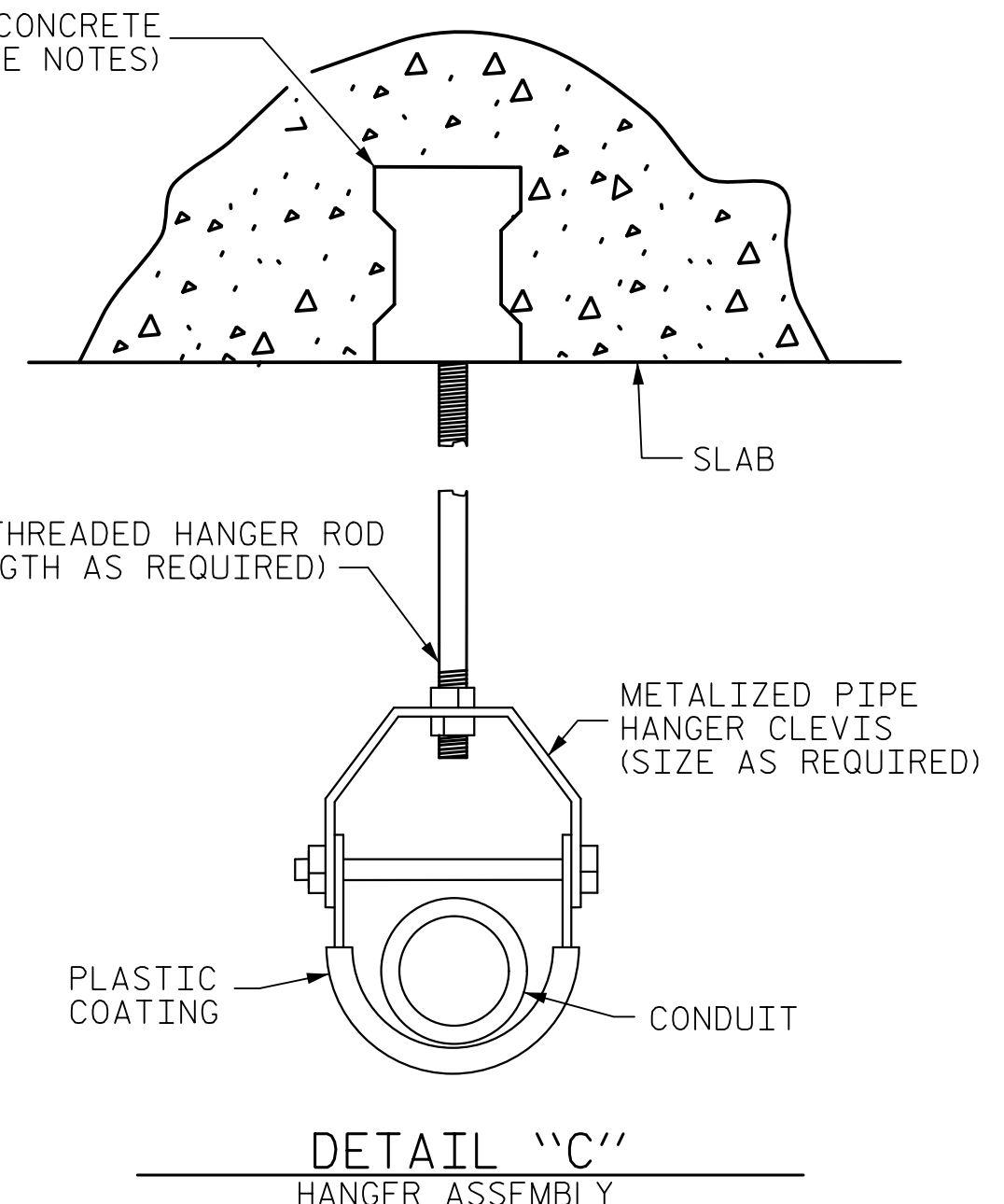
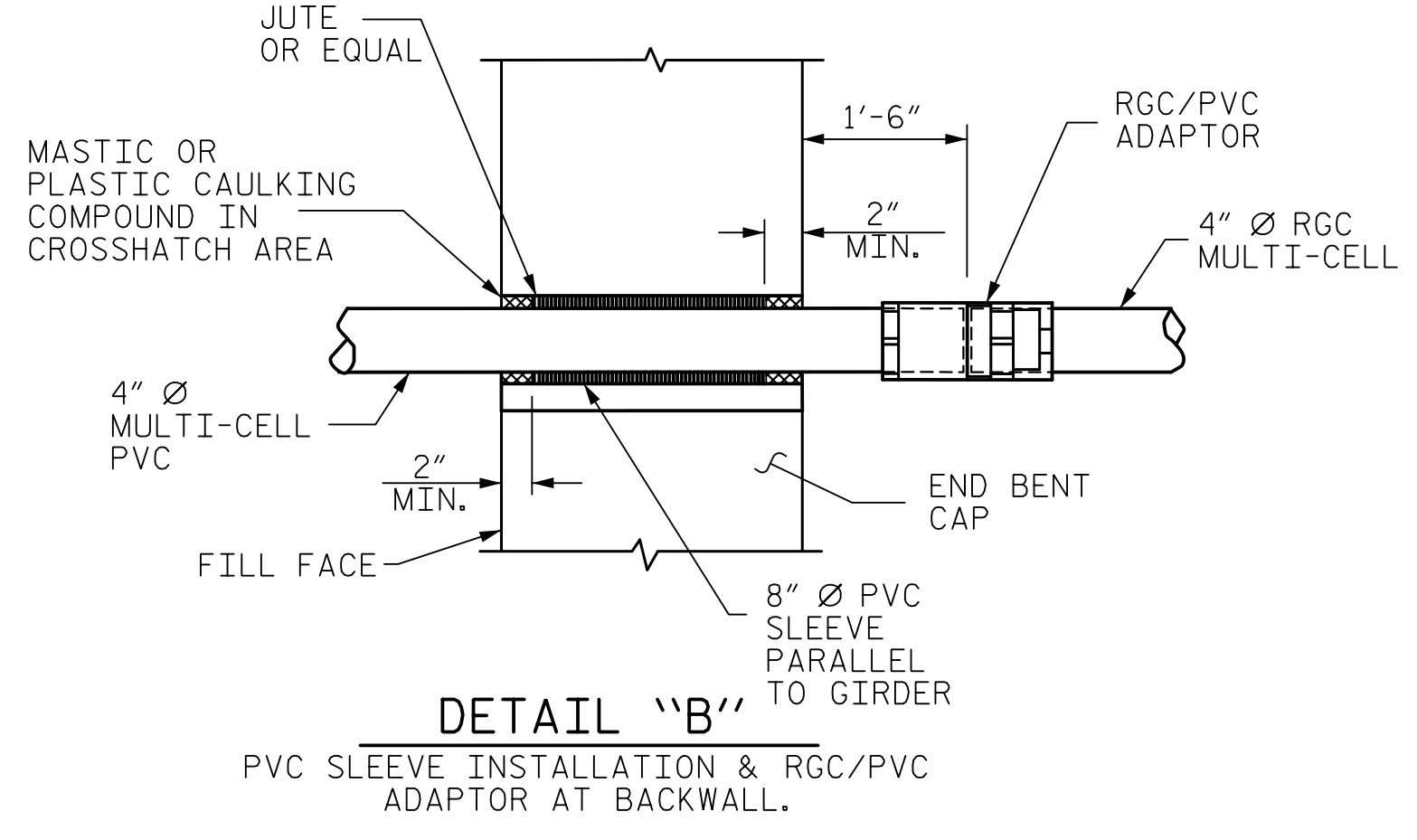
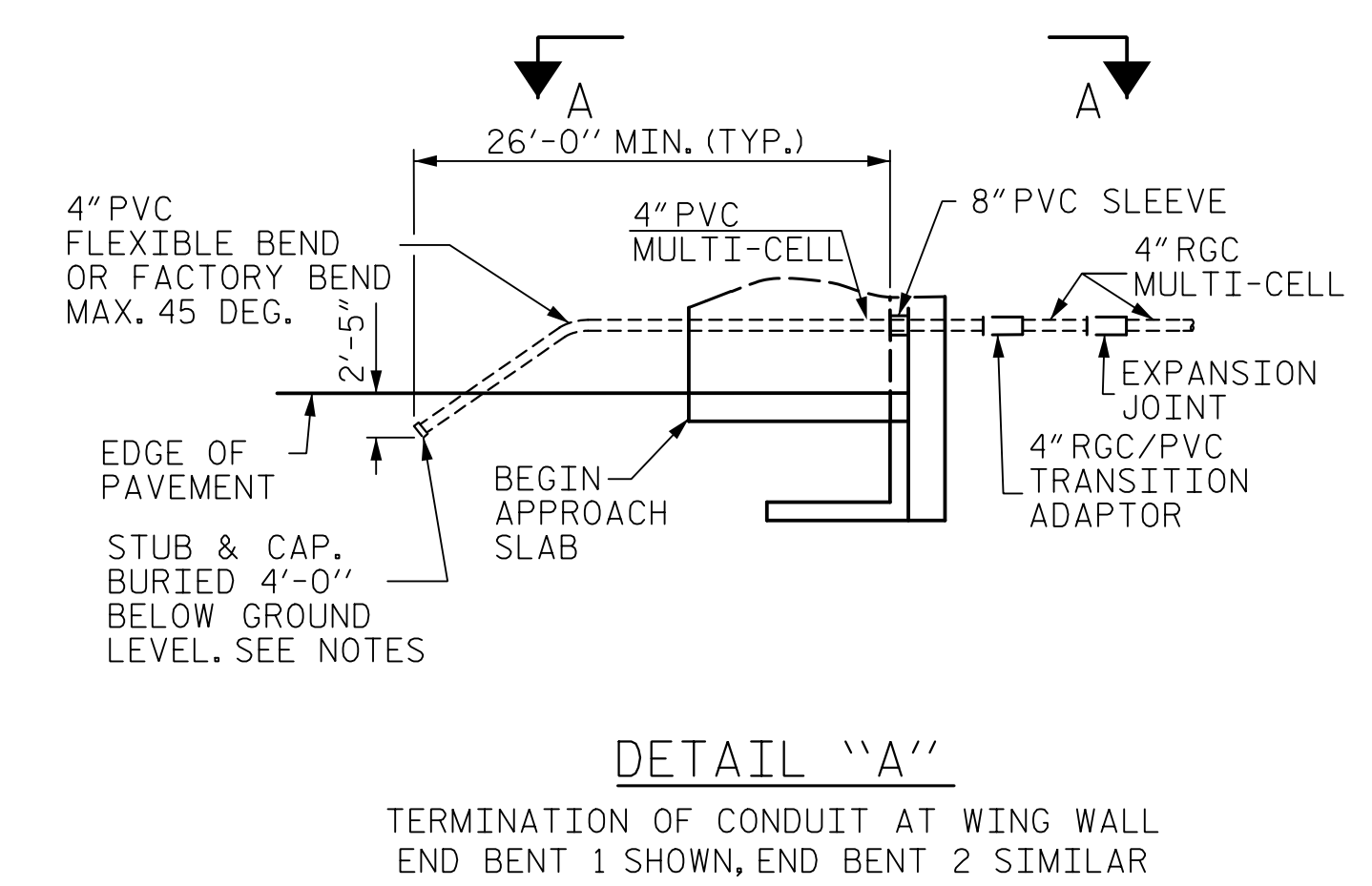
INSTALL SLEEVES PARALLEL TO GIRDERS. SEE DETAIL "B" FOR SLEEVE INSTALLATION.

PROVIDE TRANSITION ADAPTOR AND EXPANSION JOINT FOR CONDUIT AT END BENT 1 AND END BENT 2.

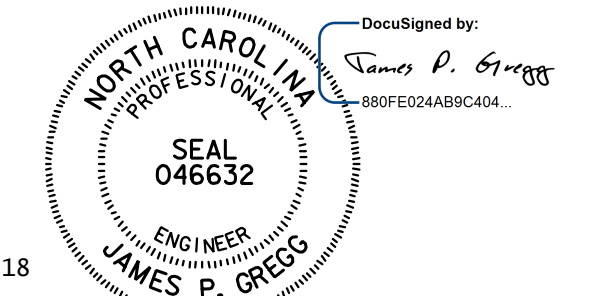
INSTALL STABILIZER'S MIDWAY BETWEEN DECK EXPANSION JOINTS. STABILIZER CAN NOT BE USED INSTEAD OF A HANGER ASSEMBLY.

THE CONCRETE SCREW INSERT SHALL HAVE A ROD SIZE OF 5/8" AND A PULL FORCE OF 1260 lbs.

FOR ELECTRICAL CONDUIT SYSTEM FOR SIGNALS, SEE SPECIAL PROVISIONS.



PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

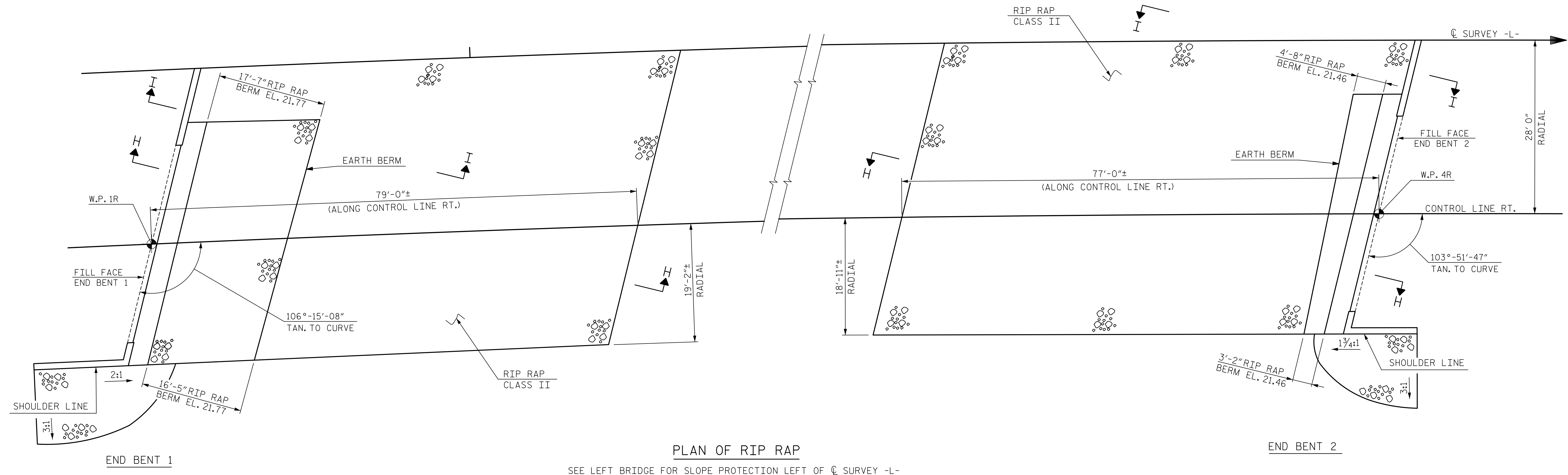


ASSEMBLED BY : BN	DATE : 8/17
CHECKED BY : BE	DATE : 9/17
DRAWN BY : RWW	2-4-03
CHECKED BY : DBM	2-4-03
REV. 5/1/06	TLA/GM
REV. 10/1/11	MAA/GM

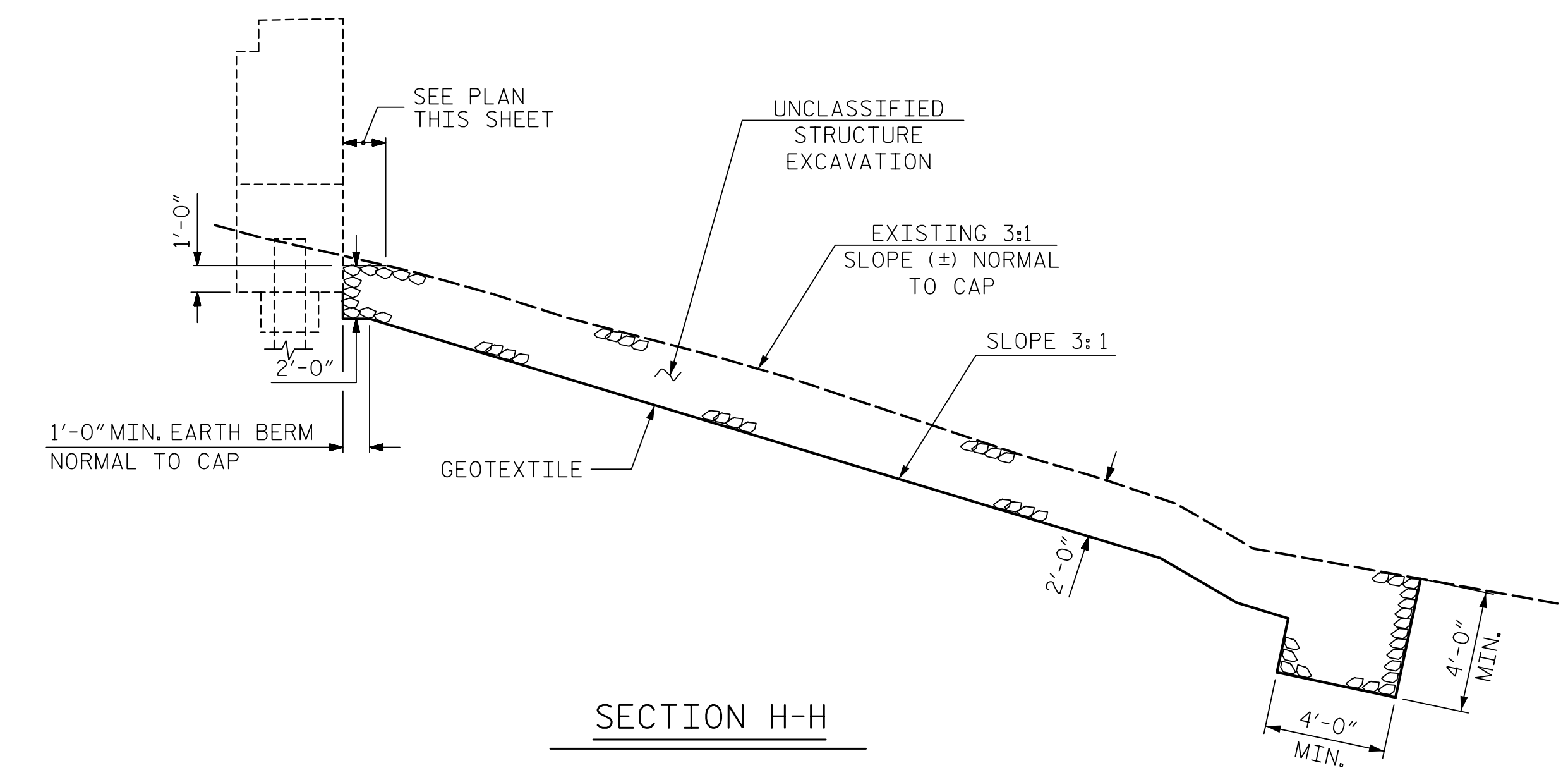
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DRAWN BY : B. NEUPANE	DATE : 8/17	DWG. NO. 35	
CHECKED BY : B. EMAMI	DATE : 9/17		
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18		

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH			
STANDARD			
ELECTRICAL CONDUIT SYSTEM FOR SIGNALS			
RIGHT LANE			
REVISIONS			
NO.	BY	DATE	NO.
1			3
2			4
			SHEET NO. S6-35
			TOTAL SHEETS 39

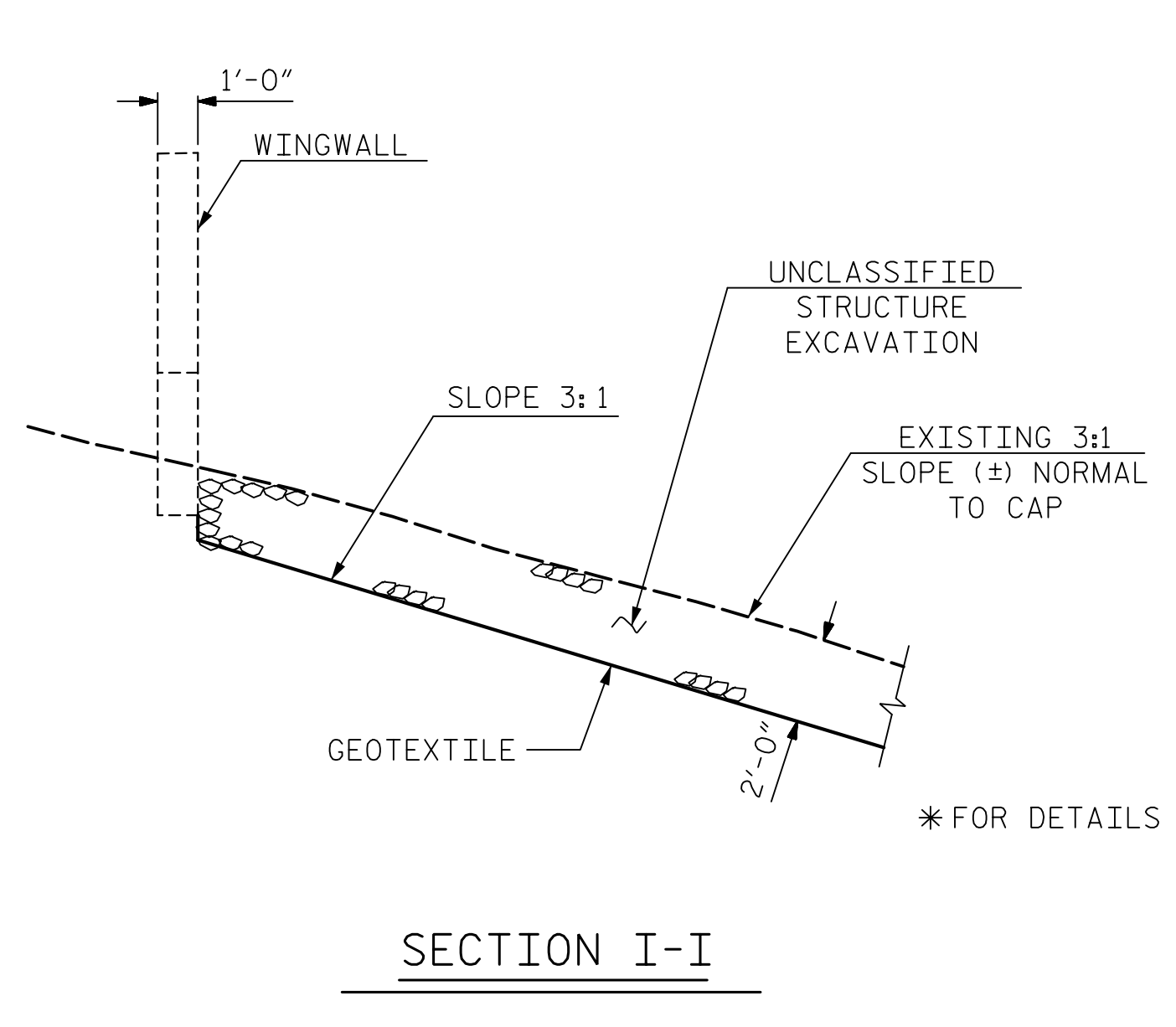
ELECTRIC CONDUIT DETAILS



PLAN OF RIP RAP
SEE LEFT BRIDGE FOR SLOPE PROTECTION LEFT OF C SURVEY -L-



SECTION H-H

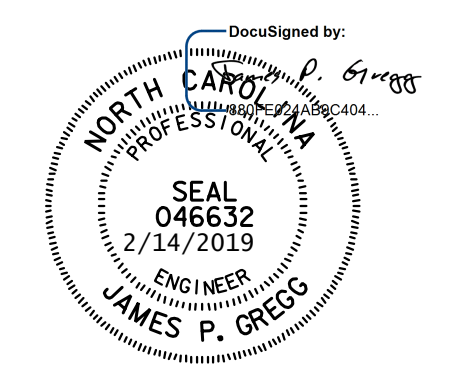


SECTION I-I

NOTES :
RIP RAP SHALL MEET THE REQUIREMENTS OF SECTION 1042 OF THE STANDARD SPECIFICATIONS. THE USE OF MARL SHALL NOT BE ALLOWED. THE RIP RAP SHALL BE PLACED WITHIN UNCLASSIFIED STRUCTURE EXCAVATION LIMITS TO KEY RIP RAP INTO EXISTING GROUND.

ESTIMATED QUANTITIES		
BRIDGE @ POC STA. 390+15.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	420	465
END BENT 2	405	450

PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
RIP RAP DETAILS

RIGHT LANE

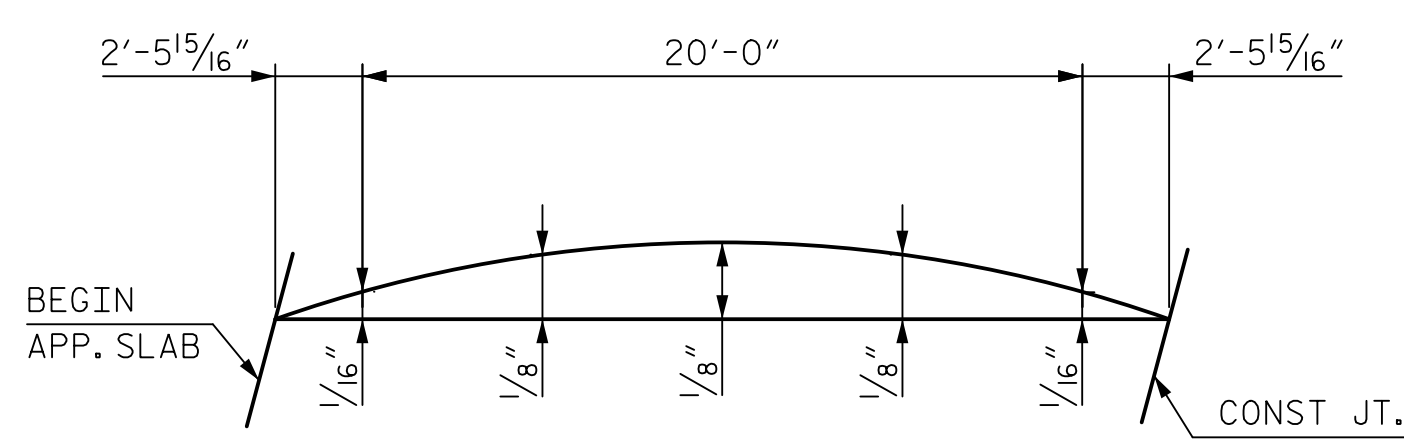
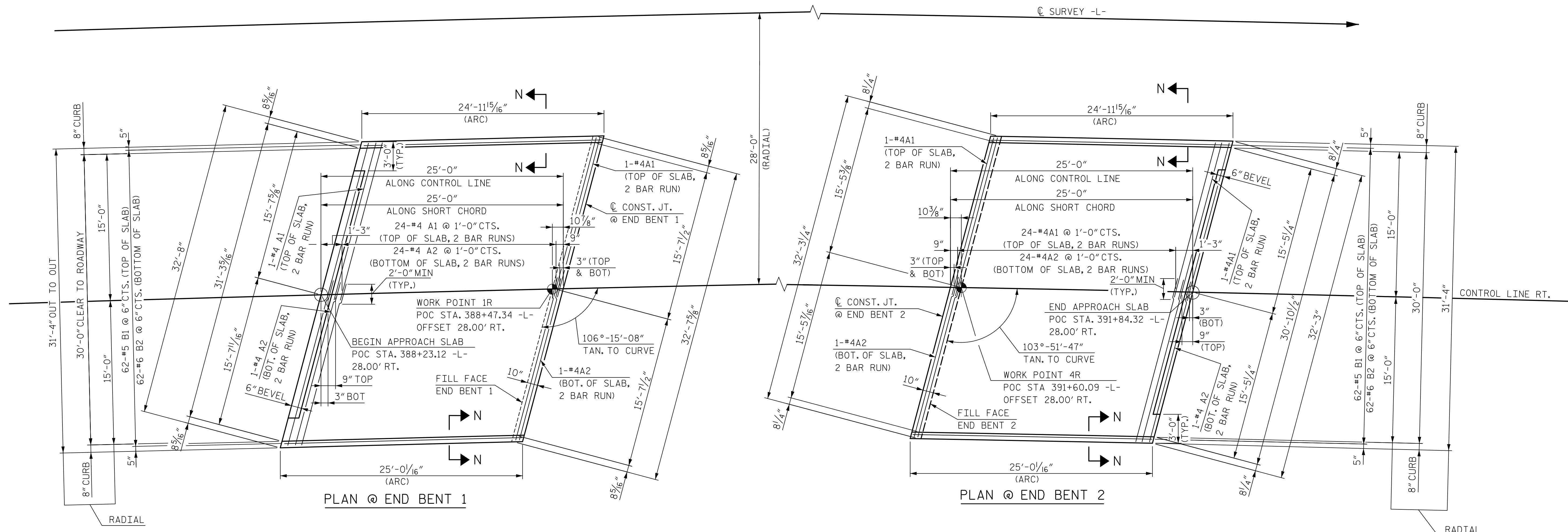
REVISIONS						SHEET NO. S6-36
NO.	BY	DATE	NO.	BY	DATE	
1			3			TOTAL SHEETS 39
2			4			

ASSEMBLED BY : BN	DATE : 8/17
CHECKED BY : BE	DATE : 9/17
DRAWN BY : REK 1/84	REV. 5/1/06R TLA/GM
CHECKED BY : RDU 1/84	REV. 10/1/11 MAA/GM
	REV. 12/2/11 MAA/GM

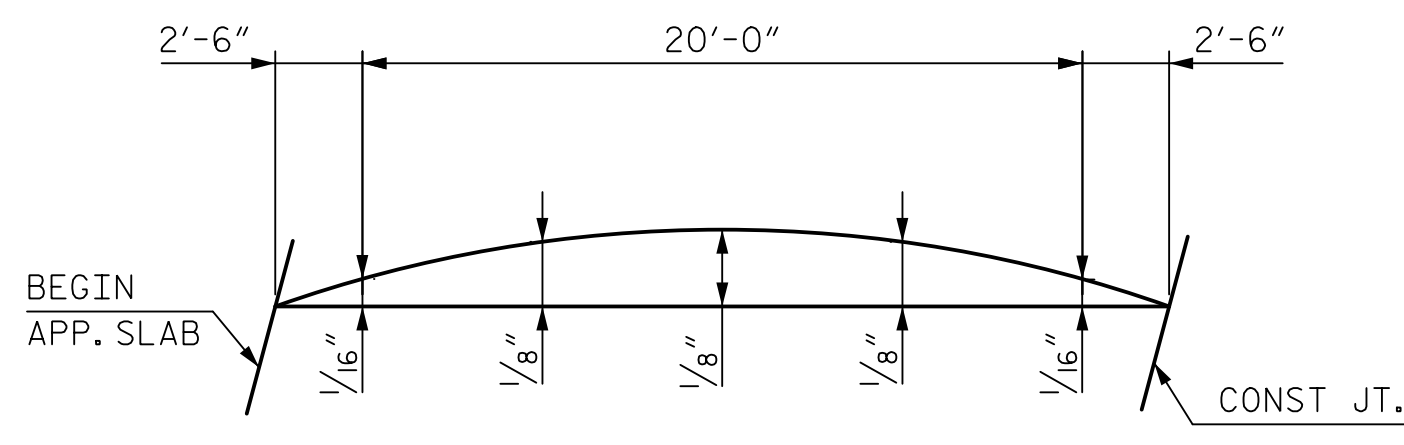
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NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY : B. NEUPANE	DATE : 8/17
CHECKED BY : B. EMAMI	DATE : 9/17
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18

DWG. NO. 36

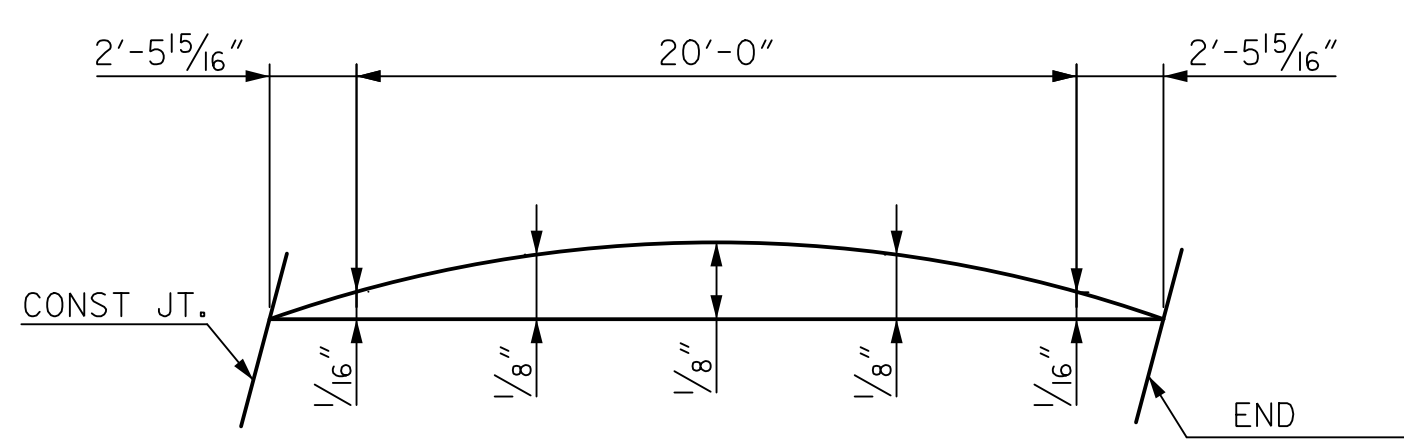


LEFT CURVE OFFSET

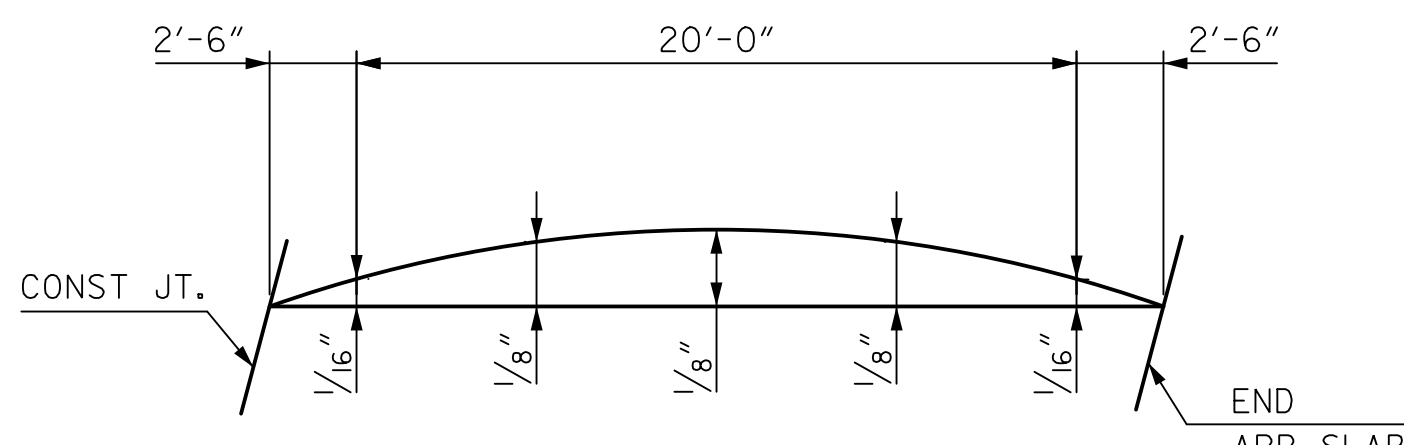


RIGHT CURVE OFFSET

CURVE OFFSET - APPROACH SLAB @ END BENT 1



LEFT CURVE OFFSET



RIGHT CURVE OFFSET

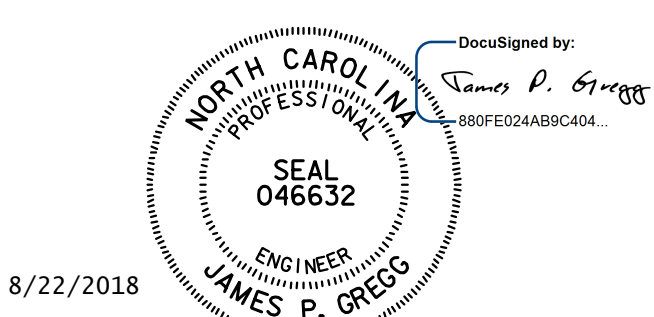
CURVE OFFSET - APPROACH SLAB @ END BENT 2

NOTES:
 FOR SECTION N-N, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEET 2 OF 3.
 FOR APPROACH SLAB BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEET 2 OF 3.

FOR SECTION THROUGH SLAB, SEE "BRIDGE APPROACH SLAB FOR INTEGRAL ABUTMENT" SHEET 2 OF 3.

PROJECT NO. R-5021
 BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 1 OF 3



HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609																	
DRAWN BY: A. SMITH	DATE: 9/17	DWG. NO. 37	<table border="1"> <thead> <tr> <th colspan="4">REVISIONS</th> </tr> <tr> <th>NO.</th> <th>BY</th> <th>DATE</th> <th>NO.</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>BLMAMI</td> <td>9/17</td> <td>3</td> </tr> <tr> <td>2</td> <td></td> <td>8/18</td> <td>4</td> </tr> </tbody> </table>	REVISIONS				NO.	BY	DATE	NO.	1	BLMAMI	9/17	3	2		8/18	4
REVISIONS																			
NO.	BY			DATE	NO.														
1	BLMAMI	9/17	3																
2		8/18	4																
CHECKED BY: J. GREGG	DATE: 8/18																		
DESIGN ENGINEER OF RECORD																			

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH

BRIDGE APPROACH
 SLAB PLAN

RIGHT LANE

NO.	BY	DATE	NO.	BY	DATE
1	BLMAMI	9/17	3		
2		8/18	4		

SHEET NO. S6-37
 TOTAL SHEETS 39

NOTES

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

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

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

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

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

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

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

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

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

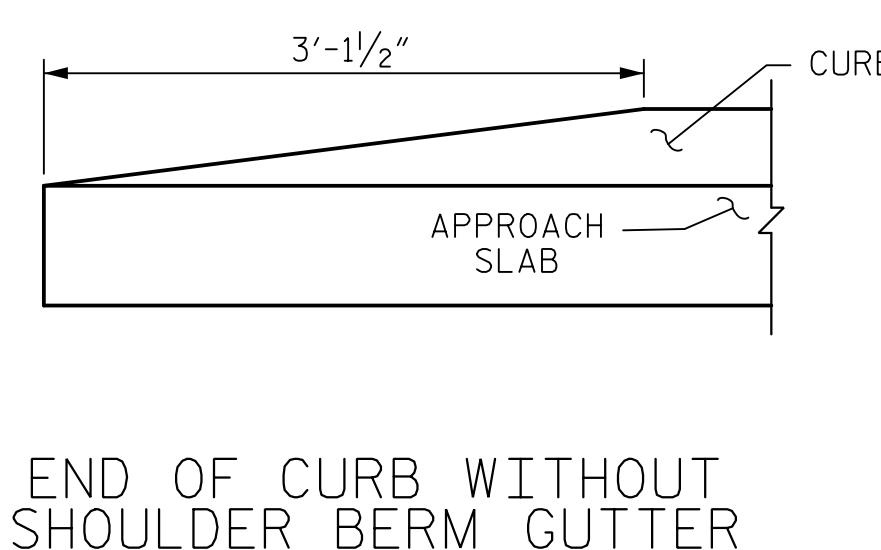
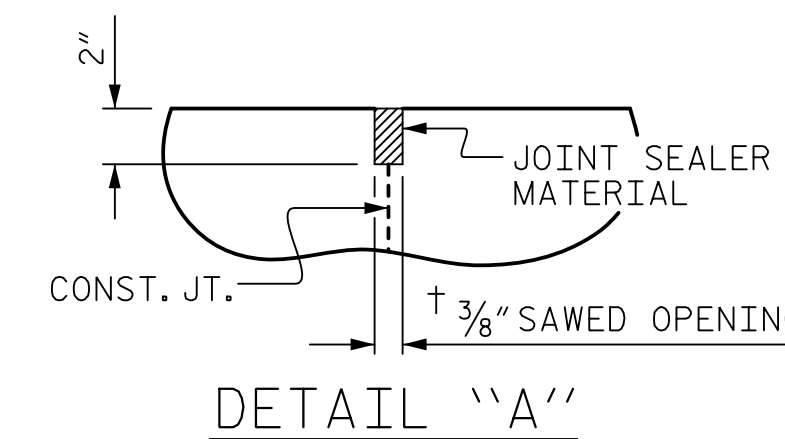
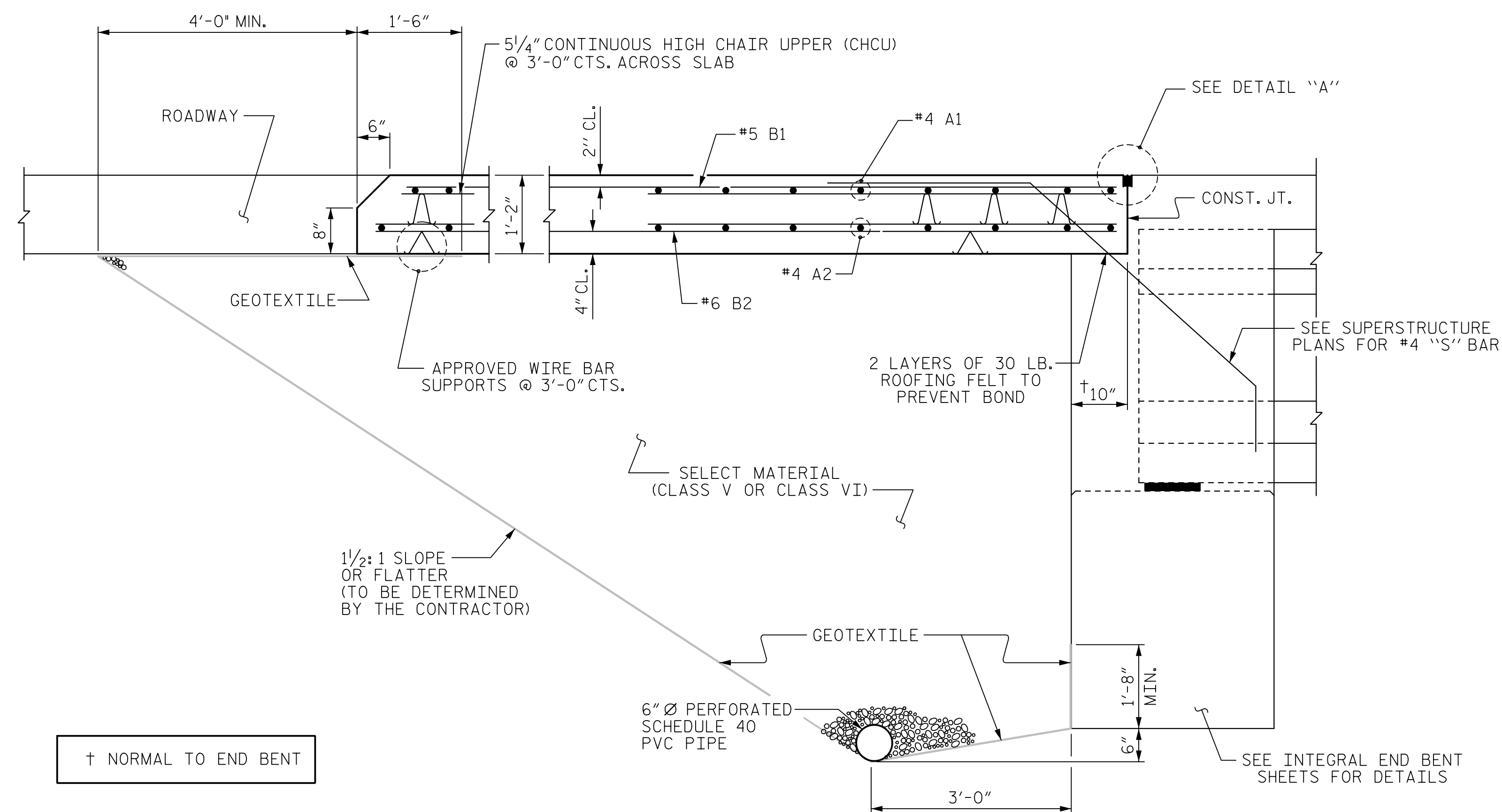
BILL OF MATERIAL

FOR ONE APPROACH SLAB (2 REQ'D)

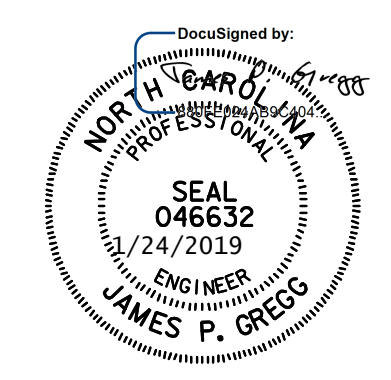
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	52	#4	STR	17'-2"	596
A2	52	#4	STR	17'-2"	596
B1	62	#5	STR	24'-1"	1557
B2	62	#6	STR	24'-7"	2289

EPOXY COATED REINFORCING STEEL 5,038 LBS.

CLASS AA CONCRETE 33.9 C. Y.



END OF CURB WITHOUT SHOULDER BERM GUTTER



PROJECT NO. R-5021
BRUNSWICK COUNTY
 STATION: POC 390+15.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 RALEIGH
 STANDARD
 BRIDGE APPROACH SLAB
 FOR INTEGRAL ABUTMENT
 WITH FLEXIBLE PAVEMENT
 RIGHT LANE

ASSEMBLED BY : BN	DATE : 8/17
CHECKED BY : BE	DATE : 9/17
DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

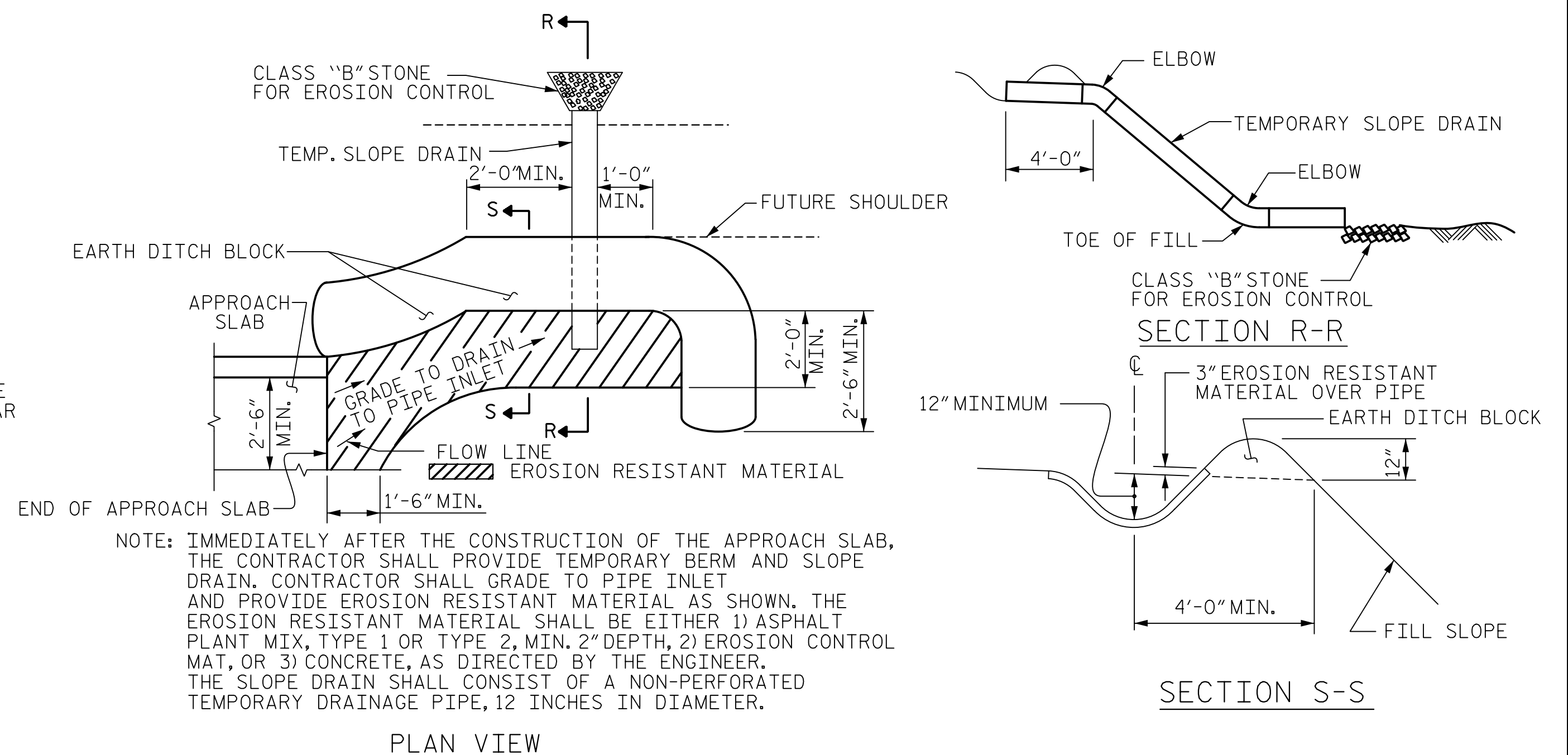
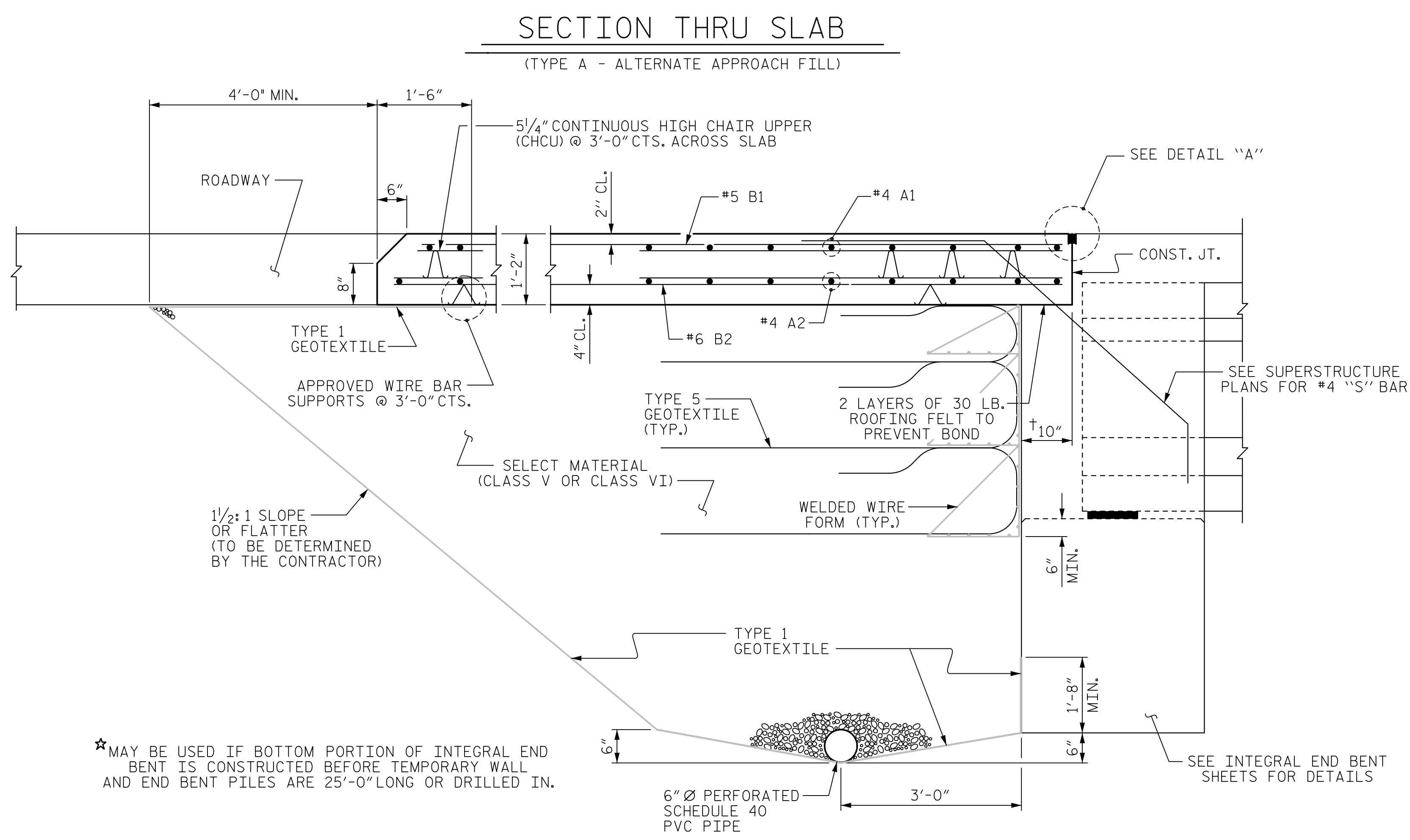
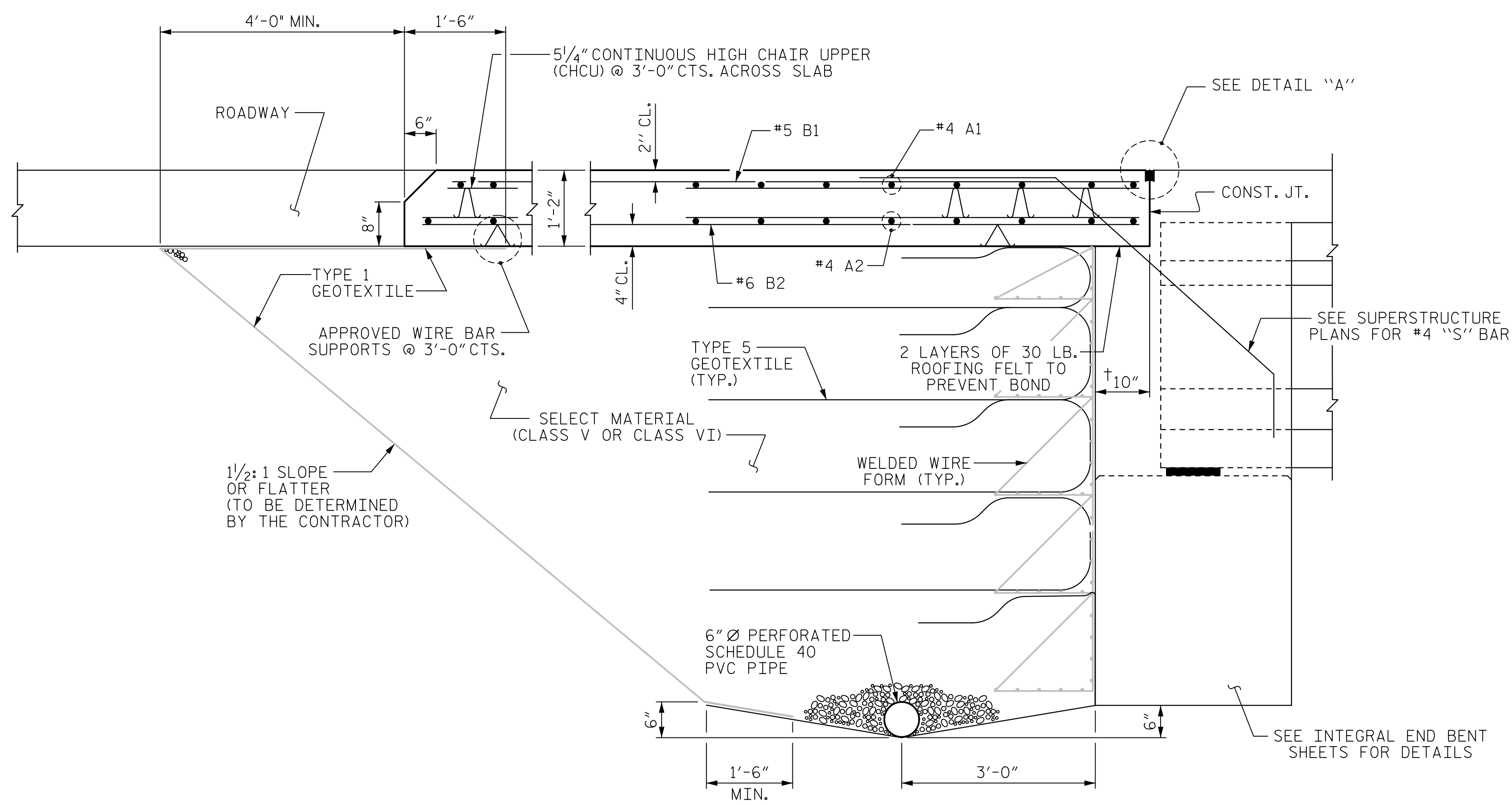
SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

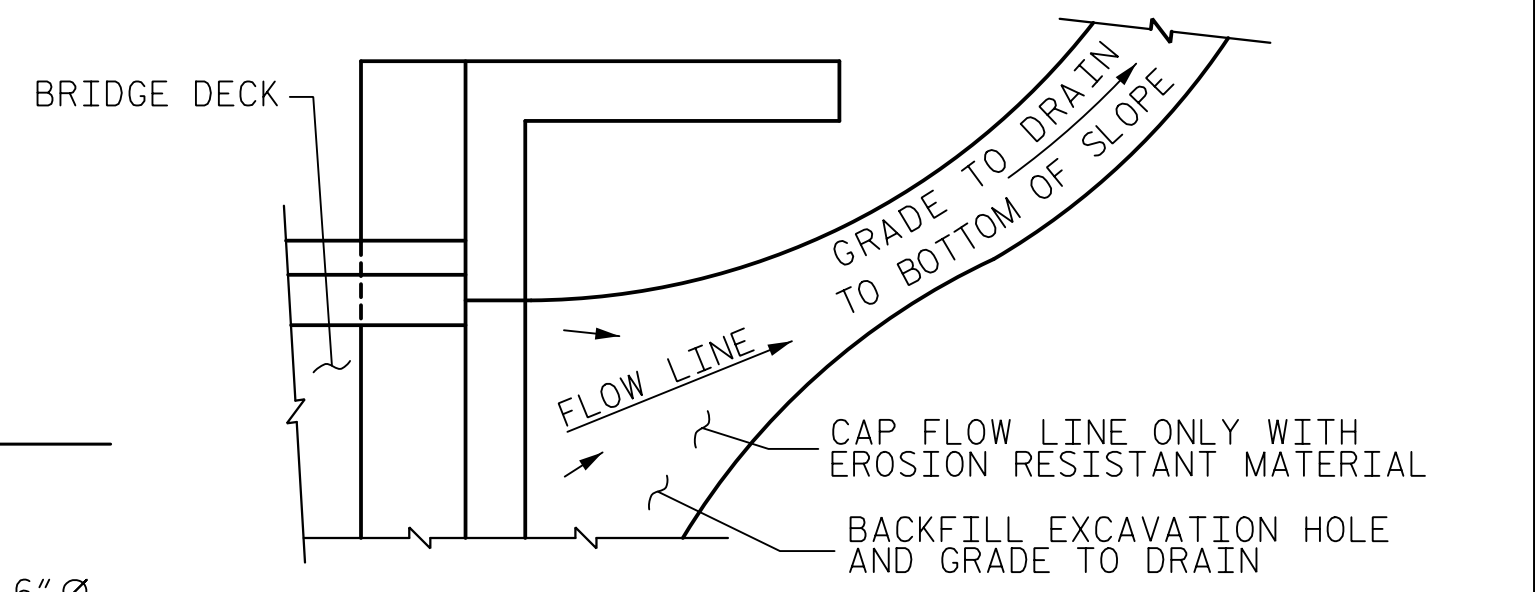
HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY : B. NEUPANE	DATE : 8/17	DWG. NO. 38	
CHECKED BY : B. EMAMI	DATE : 9/17		
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18		

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

TOTAL SHEETS 39



TEMPORARY BERM AND SLOPE DRAIN DETAILS
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)



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

NOTES

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

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

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

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

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

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

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

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

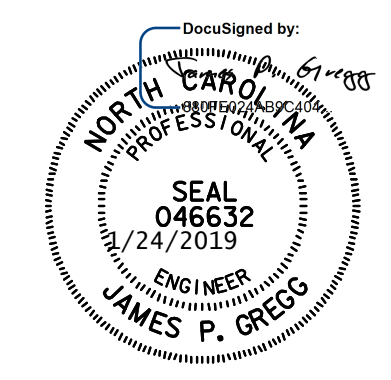
PROJECT NO. R-5021
BRUNSWICK COUNTY
STATION: POC 390+15.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
BRIDGE APPROACH
SLAB DETAILS

RIGHT LANE



ASSEMBLED BY : BN	DATE : 8/17
CHECKED BY : BE	DATE : 9/17
DRAWN BY : TLA 10/05	REV. 12/21/11 MAA/GM
CHECKED BY : GM 5/06	REV. 6/13 MAA/GM
	REV. 12/17 MAA/THC

SECTION THRU SLAB
(TYPE A - ALTERNATE APPROACH FILL)

HNTB		HNTB NORTH CAROLINA, P.C. NC License No. C-1554 343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609	
DRAWN BY : B. NEUPANE	DATE : 8/17	DWG. NO. 39	
CHECKED BY : B. EMAMI	DATE : 8/17		
DESIGN ENGINEER OF RECORD : J. GREGG	DATE : 8/18		

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

TOTAL SHEETS: 39