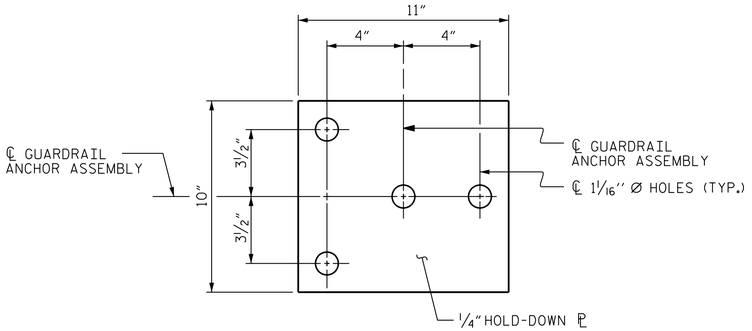
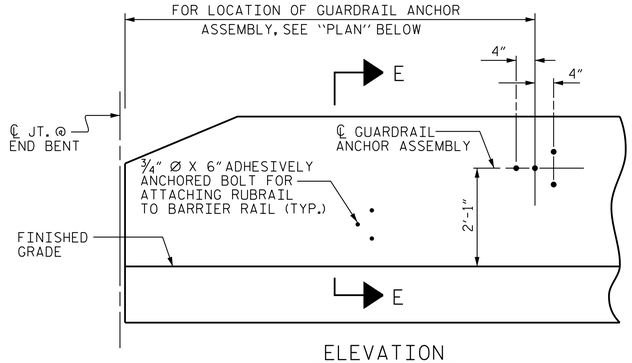


PLAN



ELEVATION

NOTES

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

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

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

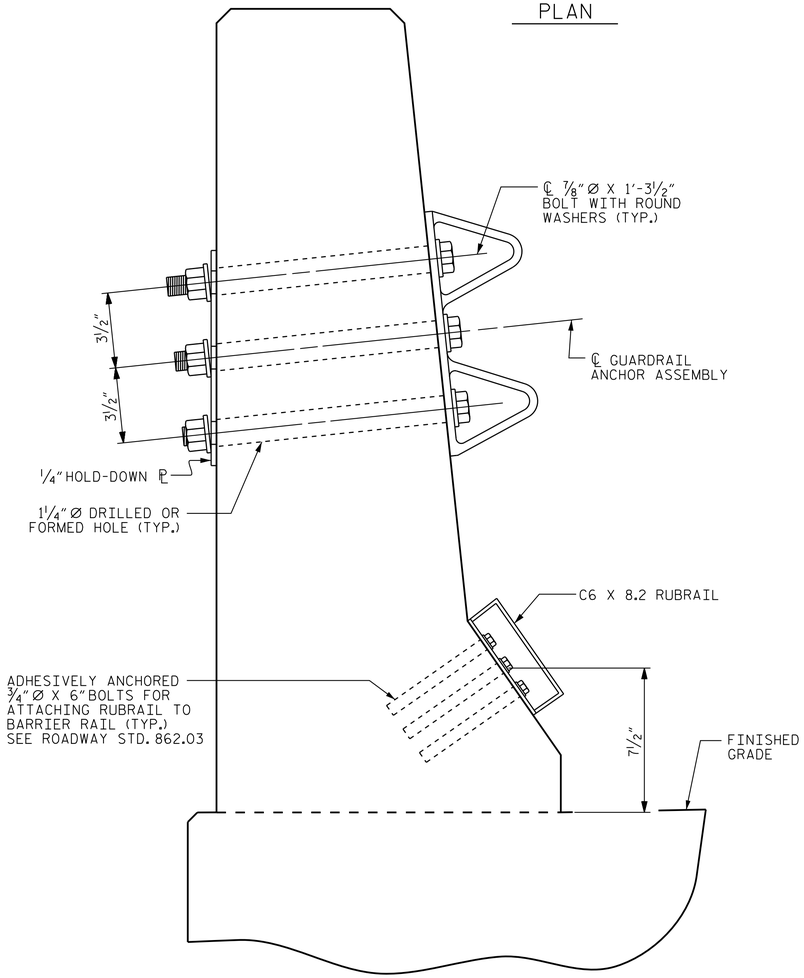
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

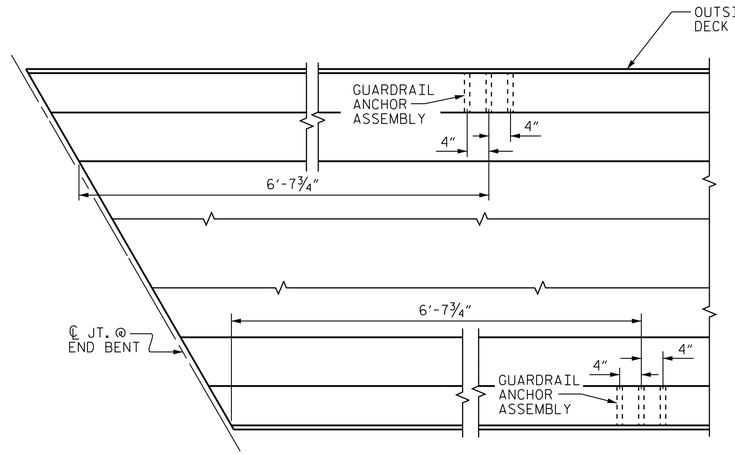
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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



SECTION E-E

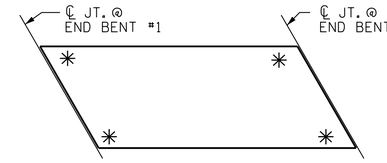
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

END BENT 1 SHOWN, END BENT 2 SIMILAR BY ROTATION.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 23+21.80 -Y3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-23
1			3			TOTAL SHEETS
2			4			36

STD. NO. GRA2

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA
5/16/2023

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ASSEMBLED BY : J. B. GEILE DATE : 03/20/18
CHECKED BY : V. E. FRAGA DATE : 06/04/18

DRAWN BY : TLA 5/06
CHECKED BY : GM 5/06

REV. 7/12 MAA/GM
REV. 6/13 MAA/GM
REV. 12/17 MAA/THC

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DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/16/23

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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	1′-11″	1′-7″	1′-11″	1′-7″	2′-6″
#5	2′-5″	2′-0″	2′-5″	2′-0″	3′-1″
#6	2′-10″	2′-5″	3′-7″	2′-5″	3′-8″
#7	4′-2″	2′-9″			
#8	4′-9″	3′-2″			

CLASS AA CONC. BREAKDOWN

POUR #1	156.8 C.Y.
POUR #2	159.9 C.Y.
TOTAL CLASS AA CONC.	316.7 C.Y.

GROOVING BRIDGE FLOORS

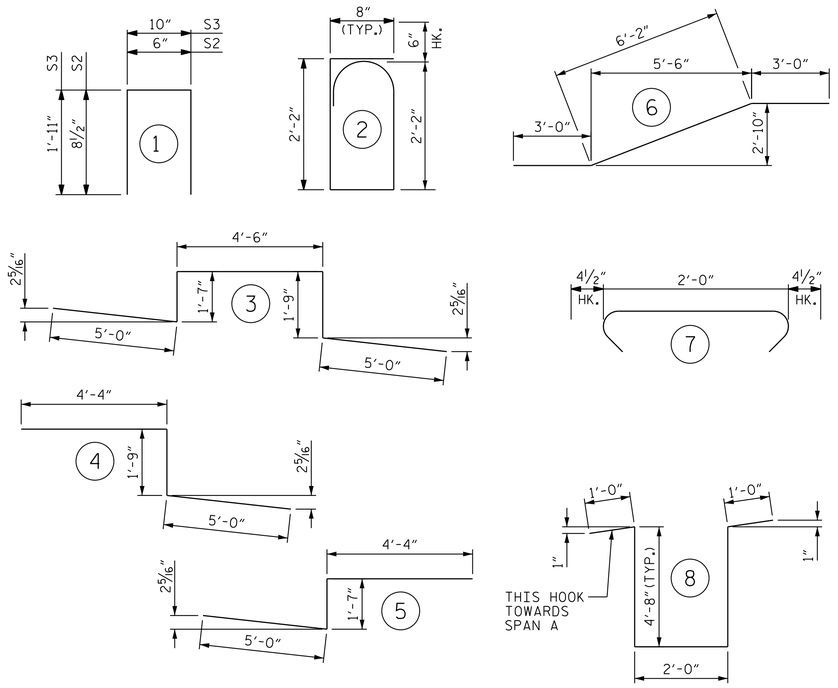
APPROACH SLABS	1,046 SQ.FT.
BRIDGE DECK	8,000 SQ.FT.
TOTAL	9,046 SQ.FT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
TOTALS **	316.7	27,140	27,068

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

BAR TYPES



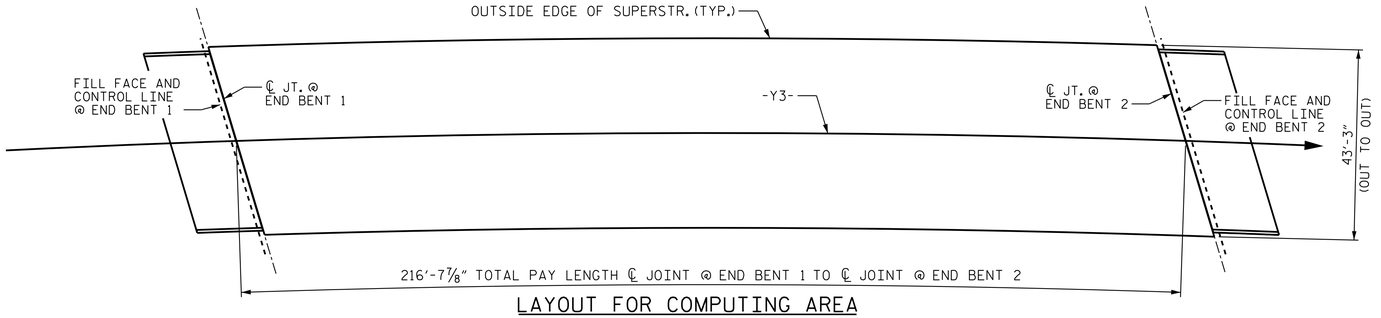
ALL BAR DIMENSIONS ARE OUT TO OUT

REINFORCING BAR SCHEDULE (DECK & DIAPHRAGM)

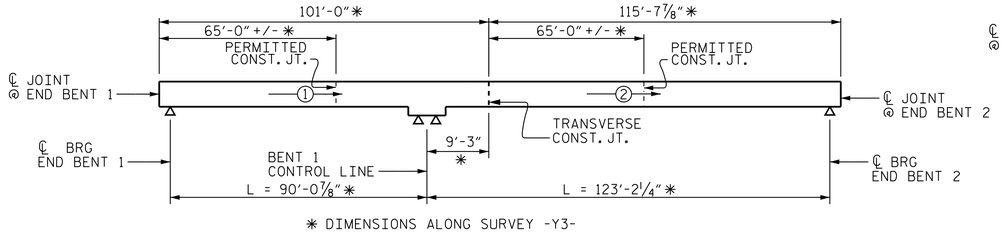
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	326	#5	STR	42′-11″	14,592
✳ A101	2	#5	STR	39′-0″	81
✳ A102	2	#5	STR	34′-10″	73
✳ A103	2	#5	STR	30′-7″	64
✳ A104	2	#5	STR	26′-5″	55
✳ A105	2	#5	STR	22′-2″	46
✳ A106	2	#5	STR	18′-0″	38
✳ A107	2	#5	STR	13′-9″	29
✳ A108	2	#5	STR	9′-7″	20
✳ A109	2	#5	STR	5′-4″	11
✳ A110	2	#5	STR	2′-0″	4
✳ A111	2	#5	STR	39′-1″	82
✳ A112	2	#5	STR	34′-11″	73
✳ A113	2	#5	STR	30′-10″	64
✳ A114	2	#5	STR	26′-8″	56
✳ A115	2	#5	STR	22′-7″	47
✳ A116	2	#5	STR	18′-5″	38
✳ A117	2	#5	STR	14′-4″	30
✳ A118	2	#5	STR	10′-2″	21
✳ A119	2	#5	STR	6′-0″	13
✳ A120	2	#5	STR	2′-0″	4
A2	326	#5	STR	42′-11″	14,592
A201	2	#5	STR	39′-0″	81
A202	2	#5	STR	34′-10″	73
A203	2	#5	STR	30′-7″	64
A204	2	#5	STR	26′-5″	55
A205	2	#5	STR	22′-2″	46
A206	2	#5	STR	18′-0″	38
A207	2	#5	STR	13′-9″	29
A208	2	#5	STR	9′-7″	20
A209	2	#5	STR	5′-4″	11
A210	2	#5	STR	2′-0″	4
A211	2	#5	STR	39′-1″	82
A212	2	#5	STR	34′-11″	73
A213	2	#5	STR	30′-10″	64
A214	2	#5	STR	26′-8″	56

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A215	2	#5	STR	22′-7″	47
A216	2	#5	STR	18′-5″	38
A217	2	#5	STR	14′-4″	30
A218	2	#5	STR	10′-2″	21
A219	2	#5	STR	6′-0″	13
A220	2	#5	STR	2′-0″	4
✳ B1	62	#4	STR	31′-10″	1,318
✳ B2	93	#4	STR	29′-7″	1,838
✳ B3	114	#5	STR	38′-4″	4,558
✳ B4	54	#5	STR	42′-2″	2,375
B5	184	#5	STR	55′-10″	10,715
✳ G1	1	#5	STR	44′-4″	46
✳ G2	1	#5	STR	45′-3″	47
✳ K1	12	#8	3	17′-10″	571
✳ K2	4	#8	4	11′-1″	118
✳ K3	4	#8	5	10′-11″	117
✳ K4	24	#6	STR	5′-0″	180
K5	64	#4	STR	5′-3″	224
K6	20	#4	6	12′-2″	163
K7	8	#4	STR	5′-0″	27
K8	24	#4	STR	8′-2″	131
K9	8	#4	STR	5′-4″	29
✳ S1	48	#5	2	6′-2″	309
S2	16	#4	1	1′-11″	20
✳ S3	48	#4	1	4′-8″	150
S4	96	#4	7	2′-9″	176
U1	24	#4	8	13′-4″	214

REINFORCING STEEL	27,140 LBS.
✳ EPOXY COATED REINFORCING STEEL	27,068 LBS.



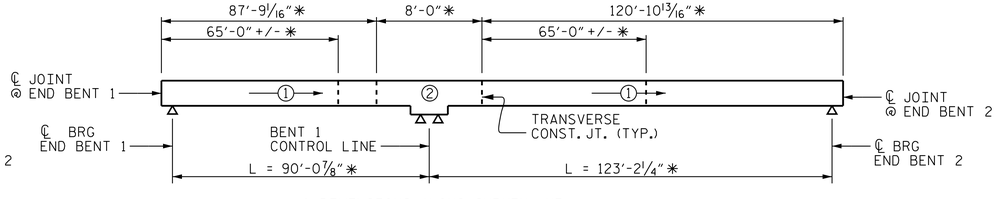
LAYOUT FOR COMPUTING AREA OF REINFORCED CONCRETE DECK SLAB (SQ.FT. = 9,367)



✳ DIMENSIONS ALONG SURVEY -Y3-

POURING SEQUENCE

(#) = INDICATES POUR NUMBER AND DIRECTION OF POUR



✳ DIMENSIONS ALONG SURVEY -Y3-

OPTIONAL POURING SEQUENCE

(#) = INDICATES POUR NUMBER AND DIRECTION OF POUR

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 23+21.80 -Y3-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIALS

Stantec
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DRAWN BY : J. B. GEILE DATE : 05/03/23
CHECKED BY : V. E. FRAGA DATE : 05/04/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/16/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA
5/16/2023

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2			4		

SHEET NO. S3-24
TOTAL SHEETS 36

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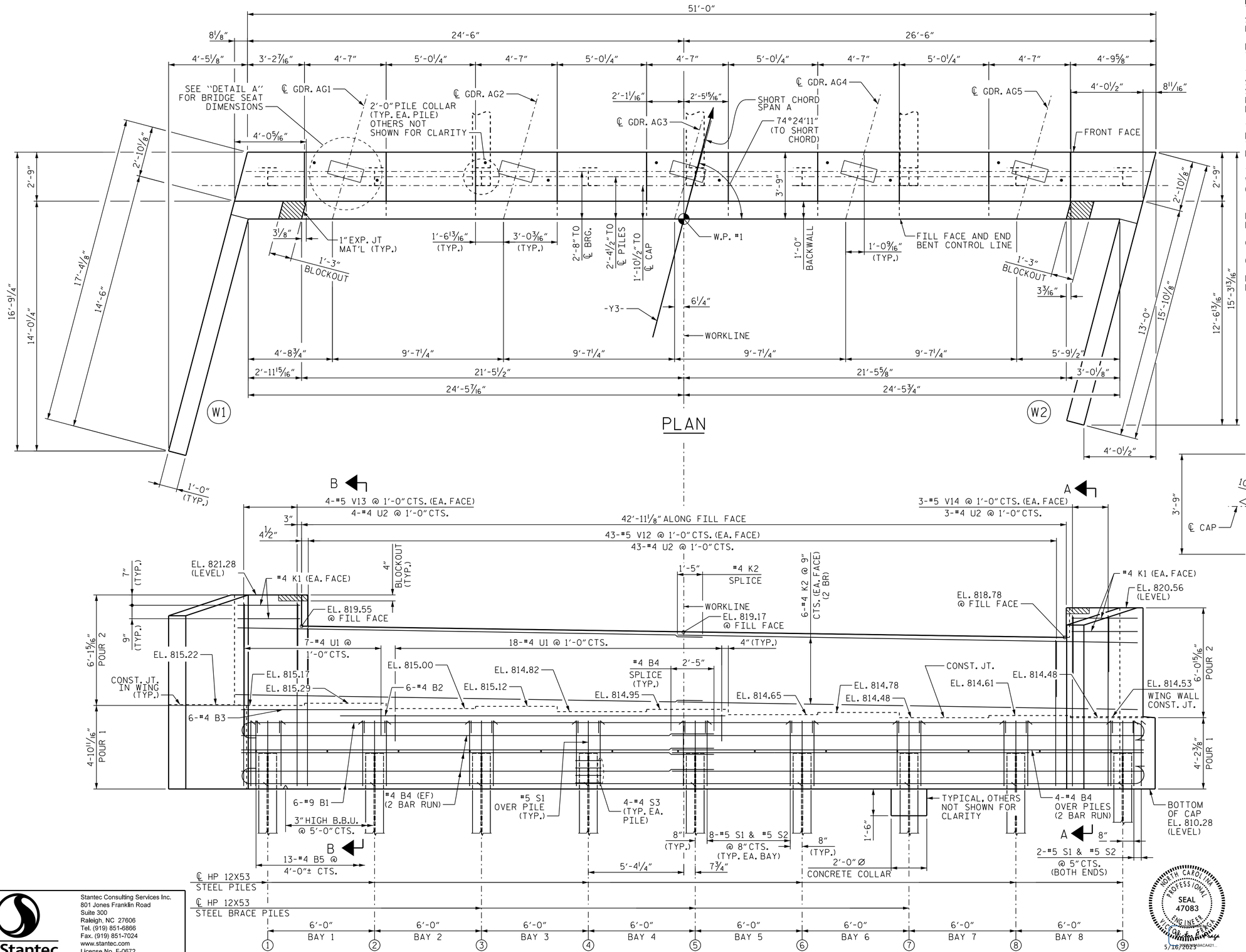

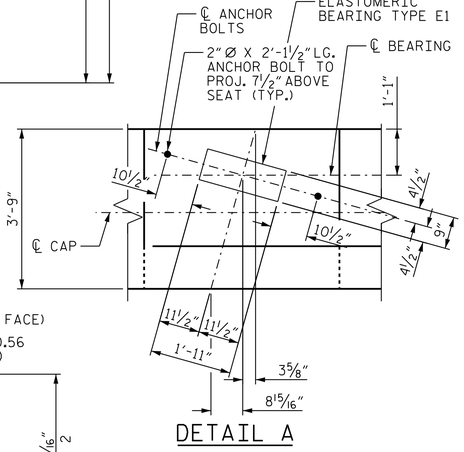

DETAIL A

NOTES

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

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

FOR WING WALL DETAILS, SEE "END BENT 1, DETAILS - WING WALLS" SHT. 2 OF 3.

(EF) - DENOTES EACH FACE

CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.

PILE CUTTOFF ELEVATION SHALL BE AT EL. 812.28.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 23+21.80 -Y3-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

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NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR EDUARDO FRAGA
5/16/2023

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2			4			36

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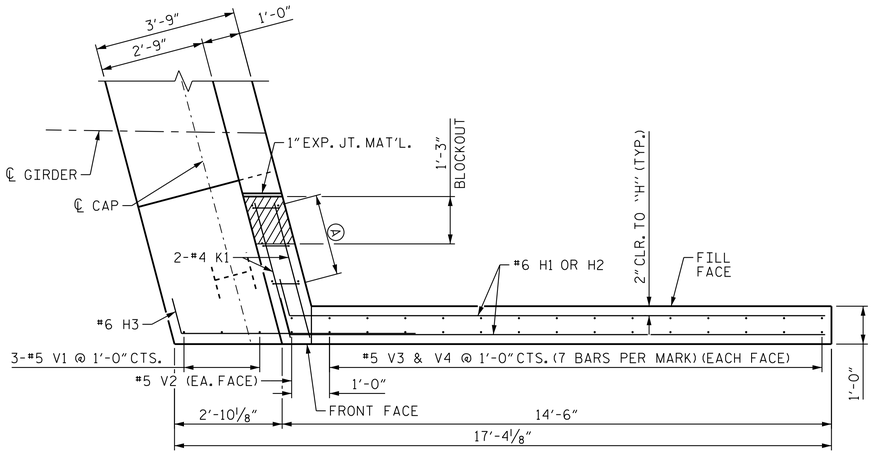
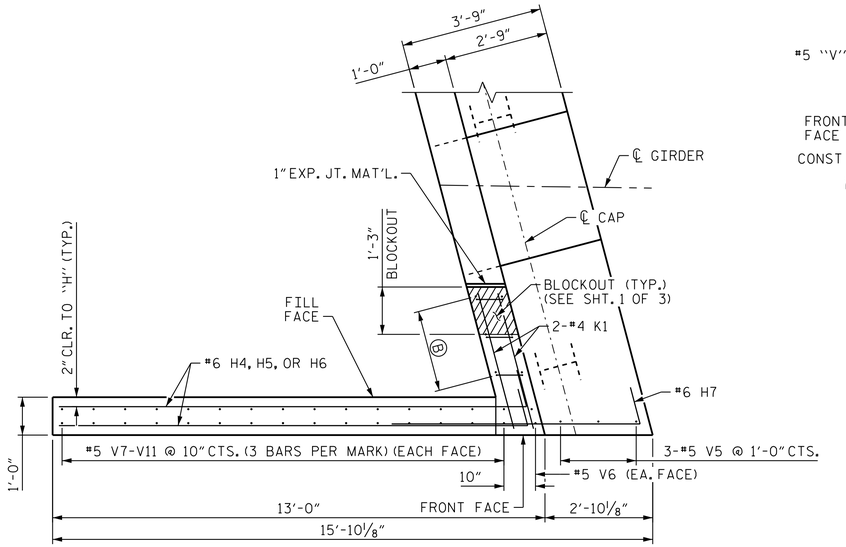


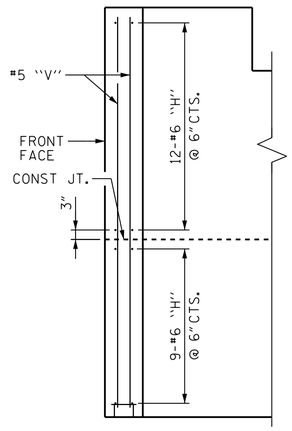
Ⓐ = 4-#5 V13 @ 1'-0" CTS. (EACH FACE) AND 4-#4 U2 @ 1'-0" CTS.

PLAN OF LEFT WING (W1)

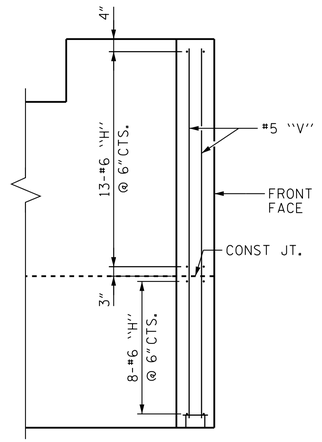


Ⓑ = 3-#5 V14 @ 1'-0" CTS. (EACH FACE) AND 3-#4 U2 @ 1'-0" CTS.

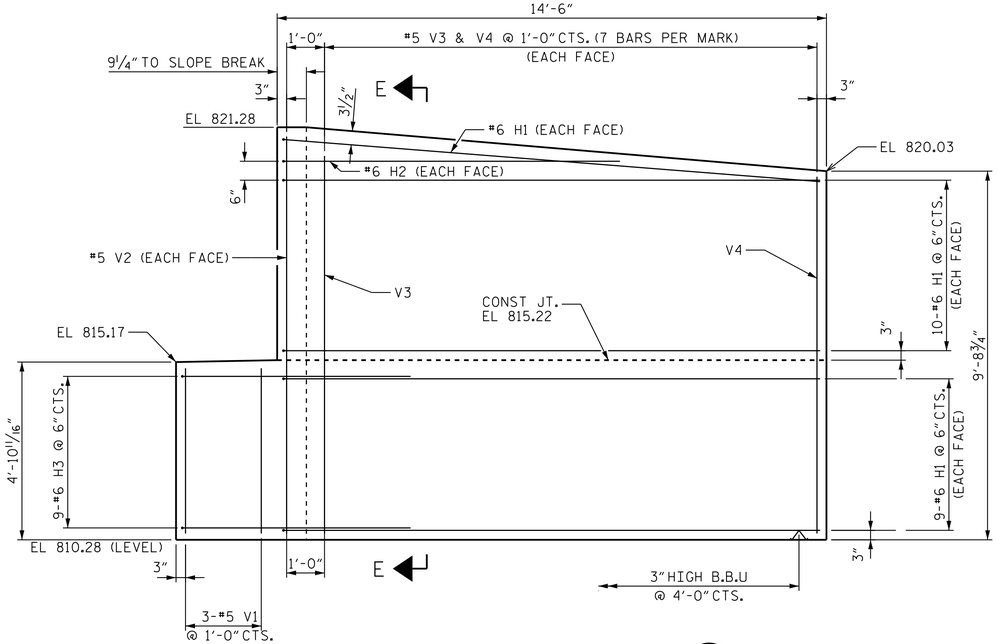
PLAN OF RIGHT WING (W2)



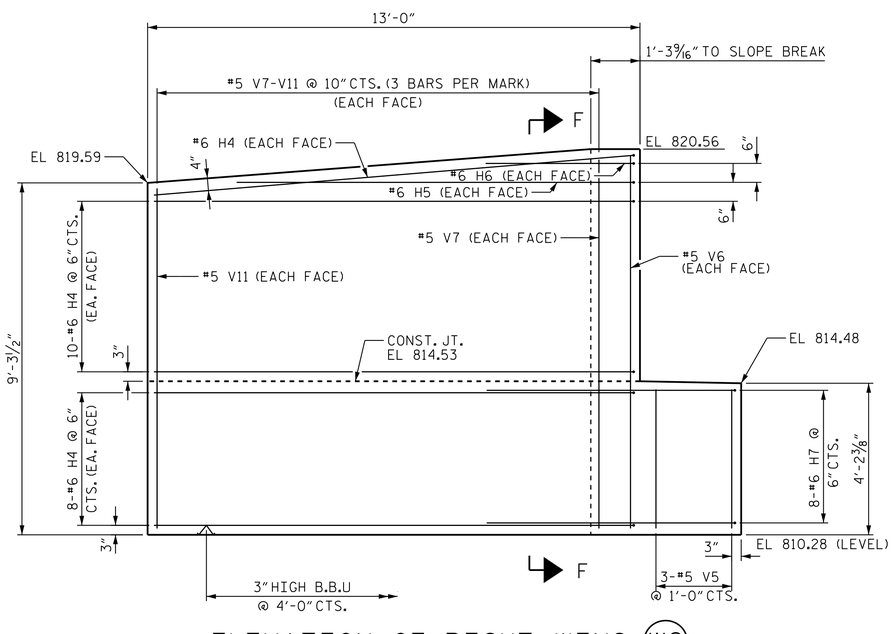
SECTION E-E



SECTION F-F



ELEVATION OF LEFT WING (W1)



ELEVATION OF RIGHT WING (W2)

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 23+21.80 -Y3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
WING WALL DETAILS

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CHECKED BY : V. E. FRAGA DATE : 05/05/23

DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/16/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA
5/16/2023

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1			3			TOTAL SHEETS
2			4			36

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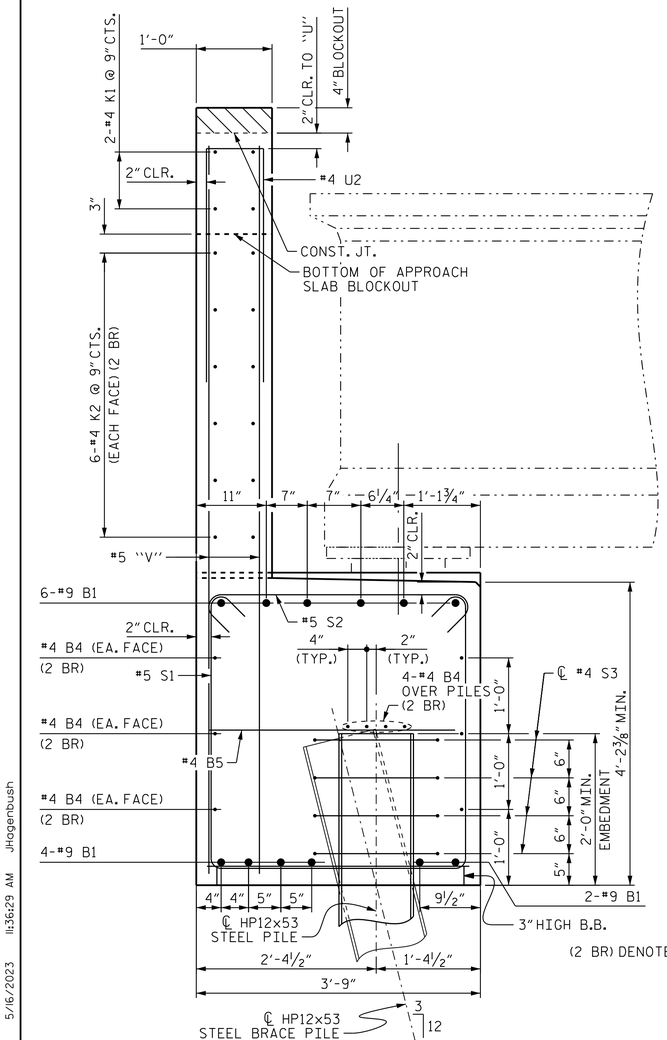
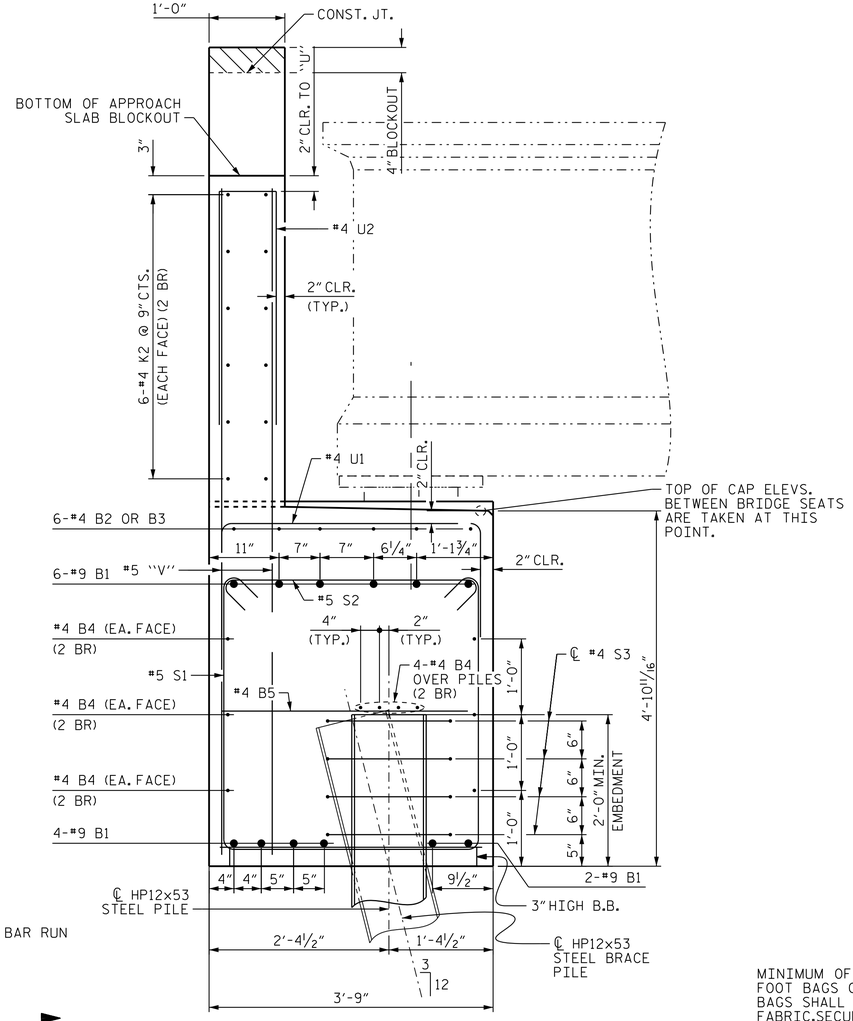
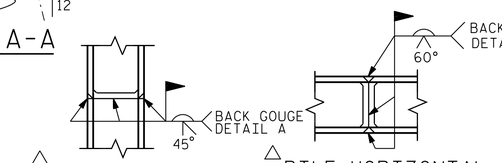


SECTION A-A

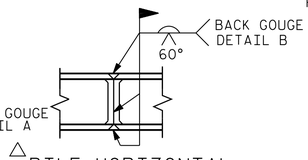
(2 BR) DENOTES TWO BAR RUN



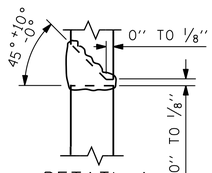
SECTION B-B



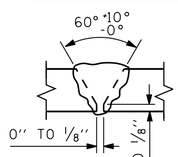
△ PILE VERTICAL



△ PILE HORIZONTAL OR VERTICAL



DETAIL A

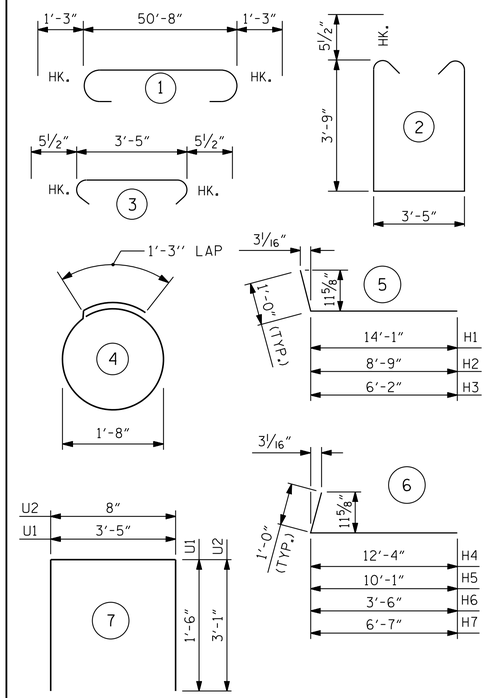


DETAIL B

△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



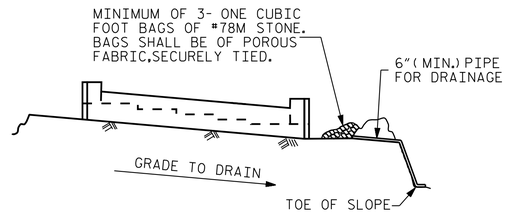
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	53'-2"	2,169
B2	6	#4	STR	21'-8"	87
B3	6	#4	STR	7'-5"	30
B4	20	#4	STR	26'-7"	355
B5	13	#4	STR	3'-5"	30
H1	40	#6	5	15'-1"	906
H2	2	#6	5	9'-9"	29
H3	9	#6	5	7'-2"	97
H4	38	#6	6	13'-4"	761
H5	2	#6	6	11'-1"	33
H6	2	#6	6	4'-6"	14
H7	8	#6	6	7'-7"	91
K1	8	#4	STR	3'-8"	20
K2	24	#4	STR	26'-9"	429
S1	77	#5	2	11'-10"	950
S2	68	#5	3	4'-4"	307
S3	36	#4	4	6'-6"	156
U1	25	#4	7	6'-5"	107
U2	50	#4	7	6'-10"	228
V1	3	#5	STR	4'-4"	14
V2	2	#5	STR	10'-5"	22
V3	14	#5	STR	9'-11"	145
V4	14	#5	STR	9'-5"	138
V5	3	#5	STR	3'-8"	11
V6	2	#5	STR	9'-10"	21
V7	6	#5	STR	9'-8"	60
V8	6	#5	STR	9'-6"	59
V9	6	#5	STR	9'-4"	58
V10	6	#5	STR	9'-2"	57
V11	6	#5	STR	8'-11"	56
V12	86	#5	STR	8'-2"	733
V13	8	#5	STR	10'-3"	64
V14	6	#5	STR	9'-7"	60

REINFORCING STEEL	8,297 LBS.
CLASS A CONCRETE BREAKDOWN:	
POUR #1: CAP, COLLARS, ETC.	37.8 C.Y.
POUR #2: BACKWALL	14.2 C.Y.
CLASS A CONCRETE TOTAL	52.0 C.Y.



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

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

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

TEMPORARY DRAINAGE AT END BENT

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CHECKED BY : V. E. FRAGA DATE : 05/05/23

DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/16/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA
5/16/2023

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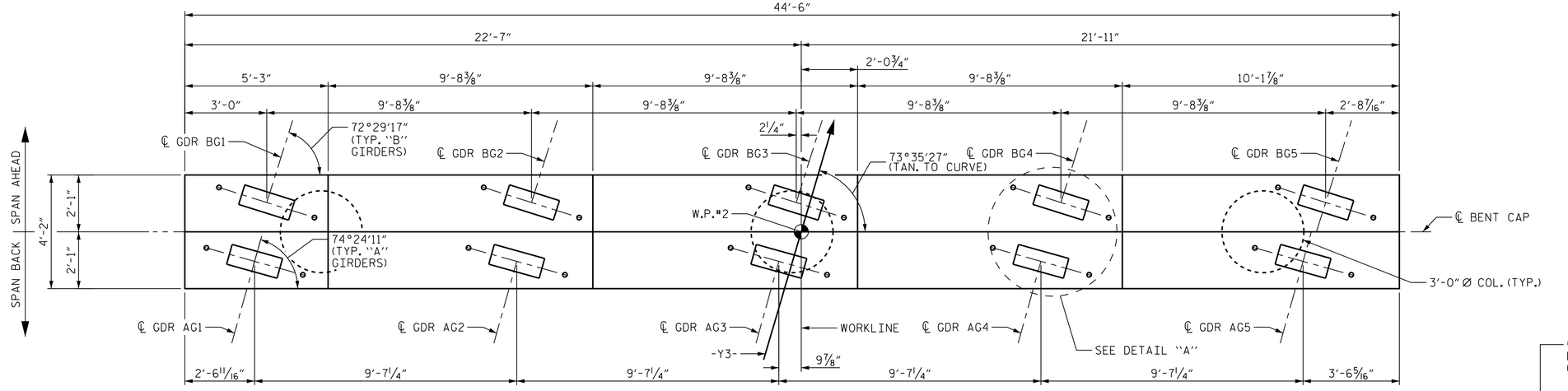
PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 23+21.80 -Y3-

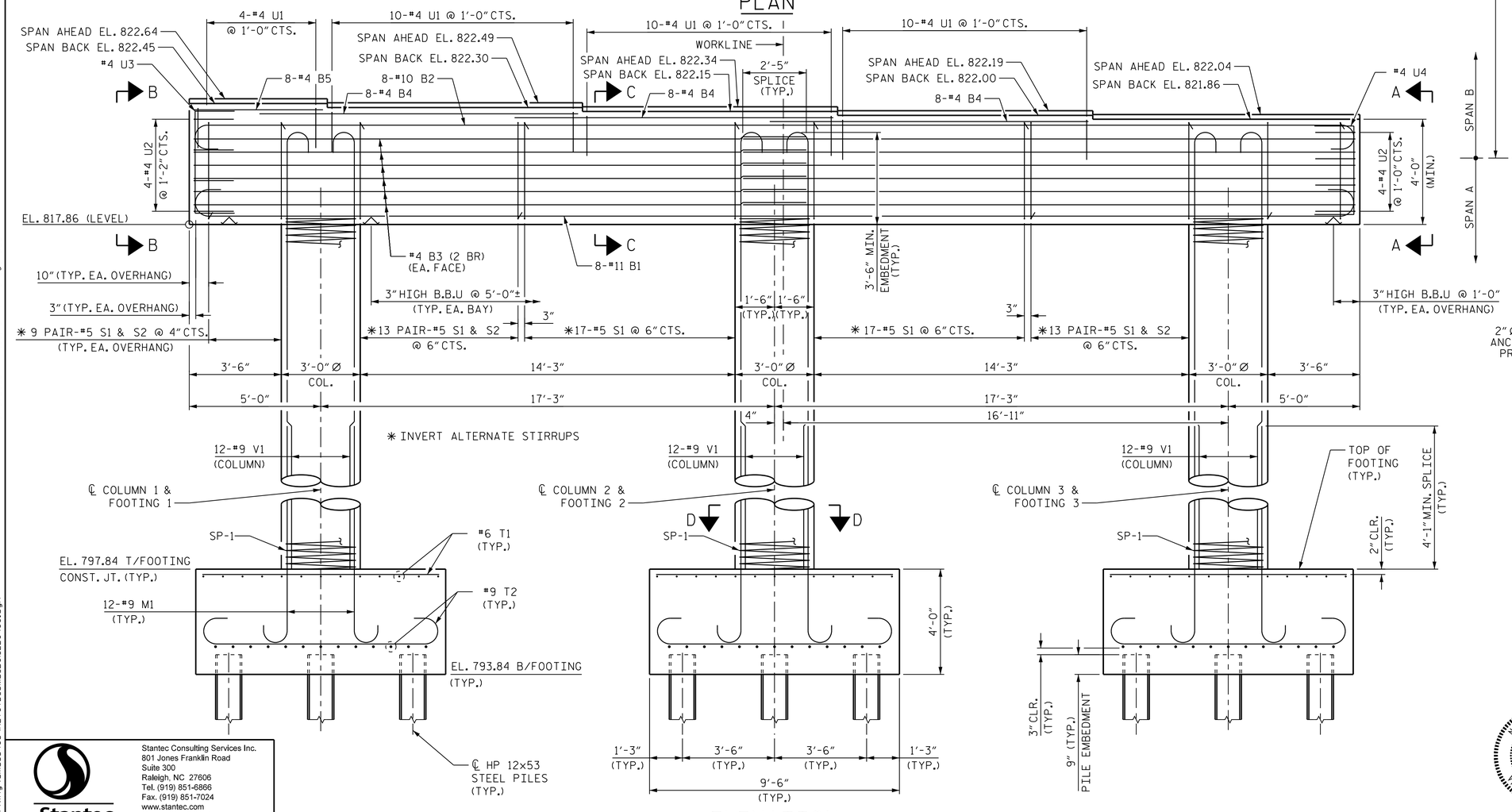
SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
END BENT 1
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-27
1			3			TOTAL SHEETS
2			4			36



PLAN



ELEVATION

NOTES:

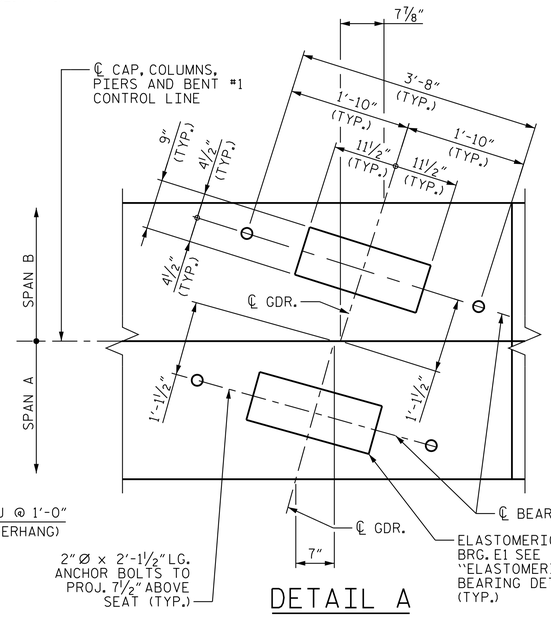
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS AND COLUMN REINFORCEMENT.

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

FOR VIEW A-A, VIEW B-B, AND SECTION C-C, SEE "BENT 1" SHEET 3 OF 3.

FOR SECTION D-D, SEE "BENT 1" SHEET 2 OF 3.

(2 BR) - DENOTES 2 BAR RUN.



DETAIL A

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SHEET 1 OF 3

STATE OF NORTH CAROLINA
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RALEIGH

SUBSTRUCTURE

BENT 1

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-28
1			3			TOTAL SHEETS
2			4			36

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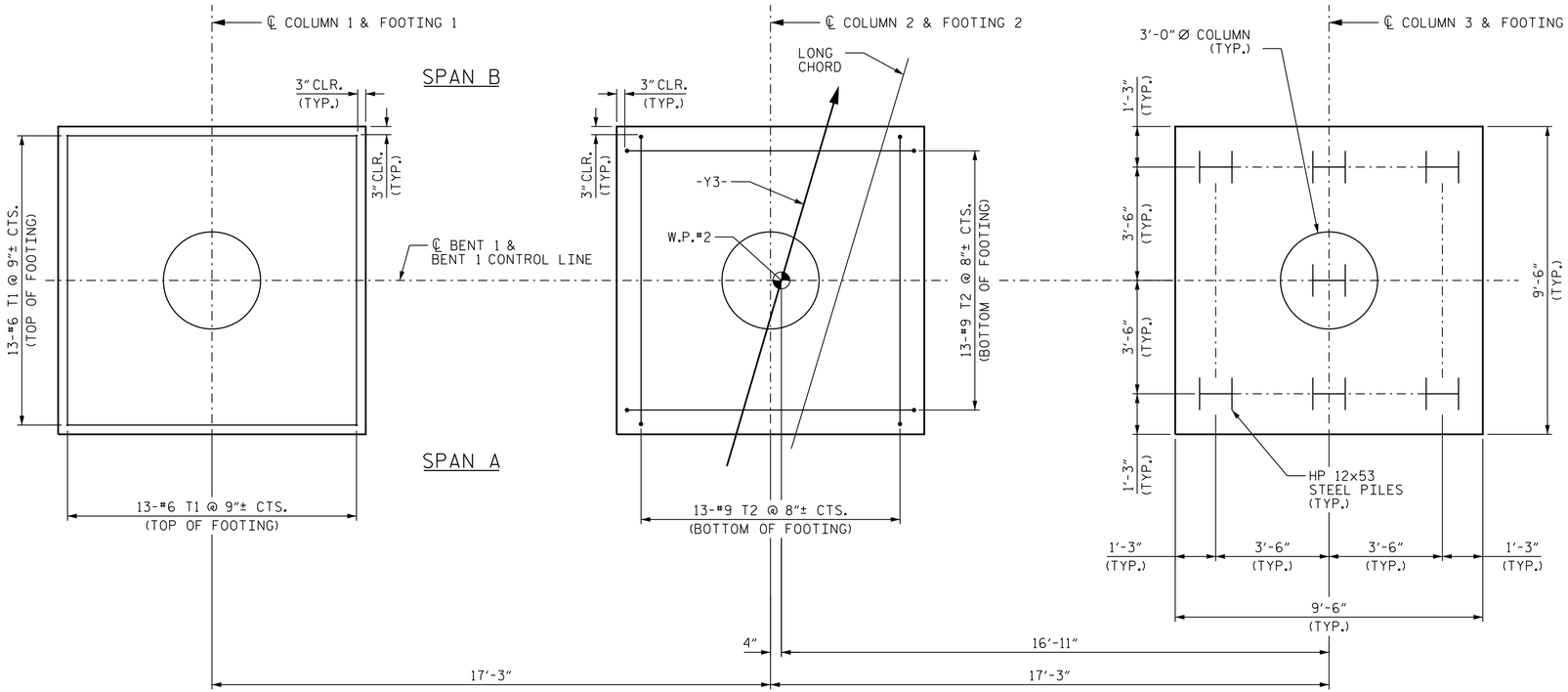
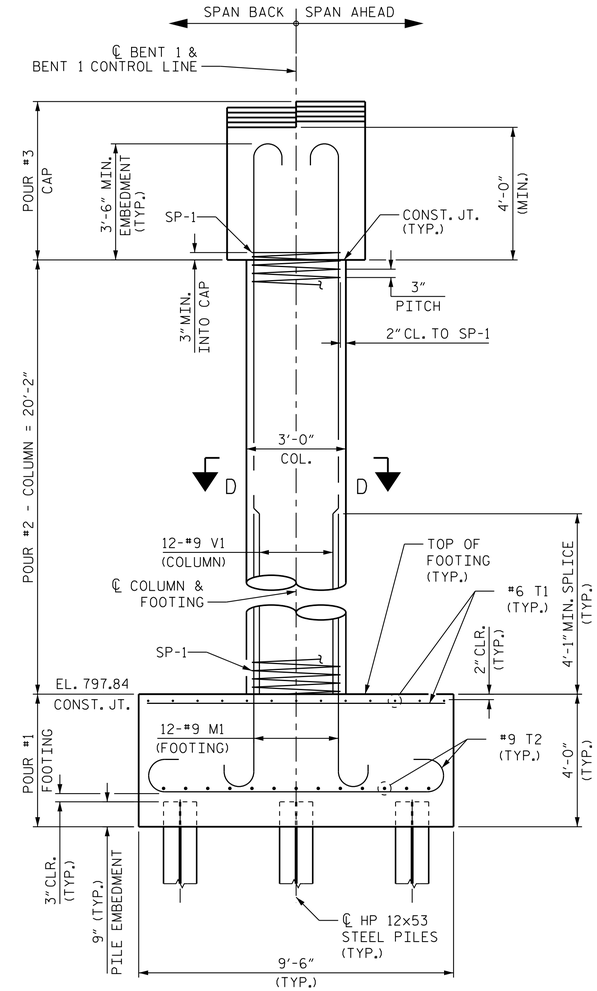
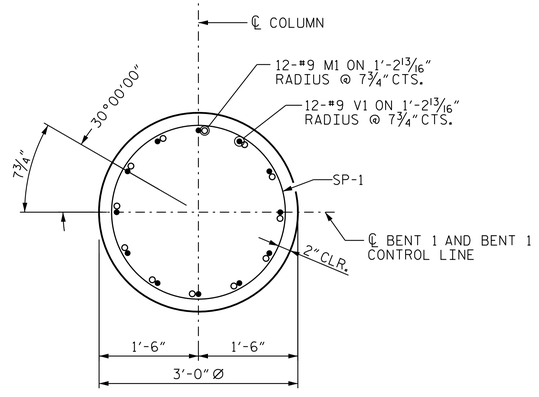




END ELEVATION

PLAN OF FOOTINGS

ALL DIMENSIONS AND DETAILS SHOWN FOR FOOTINGS ARE TYPICAL FOR EACH FOOTING UNLESS NOTED OTHERWISE.



SECTION D-D

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 23+21.80 -Y3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-29
1			3			TOTAL SHEETS
2			4			36

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NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA
5/16/2023

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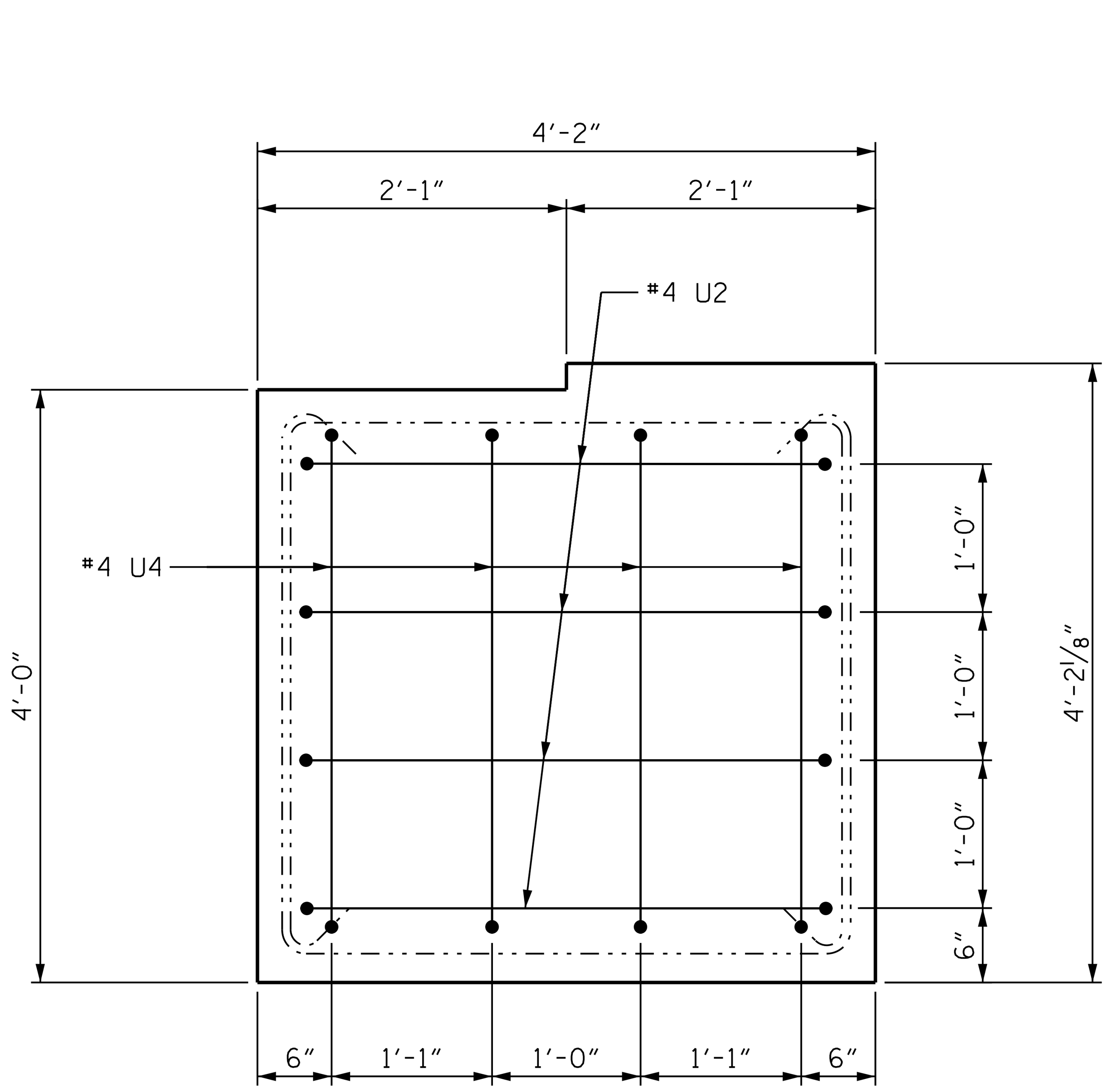
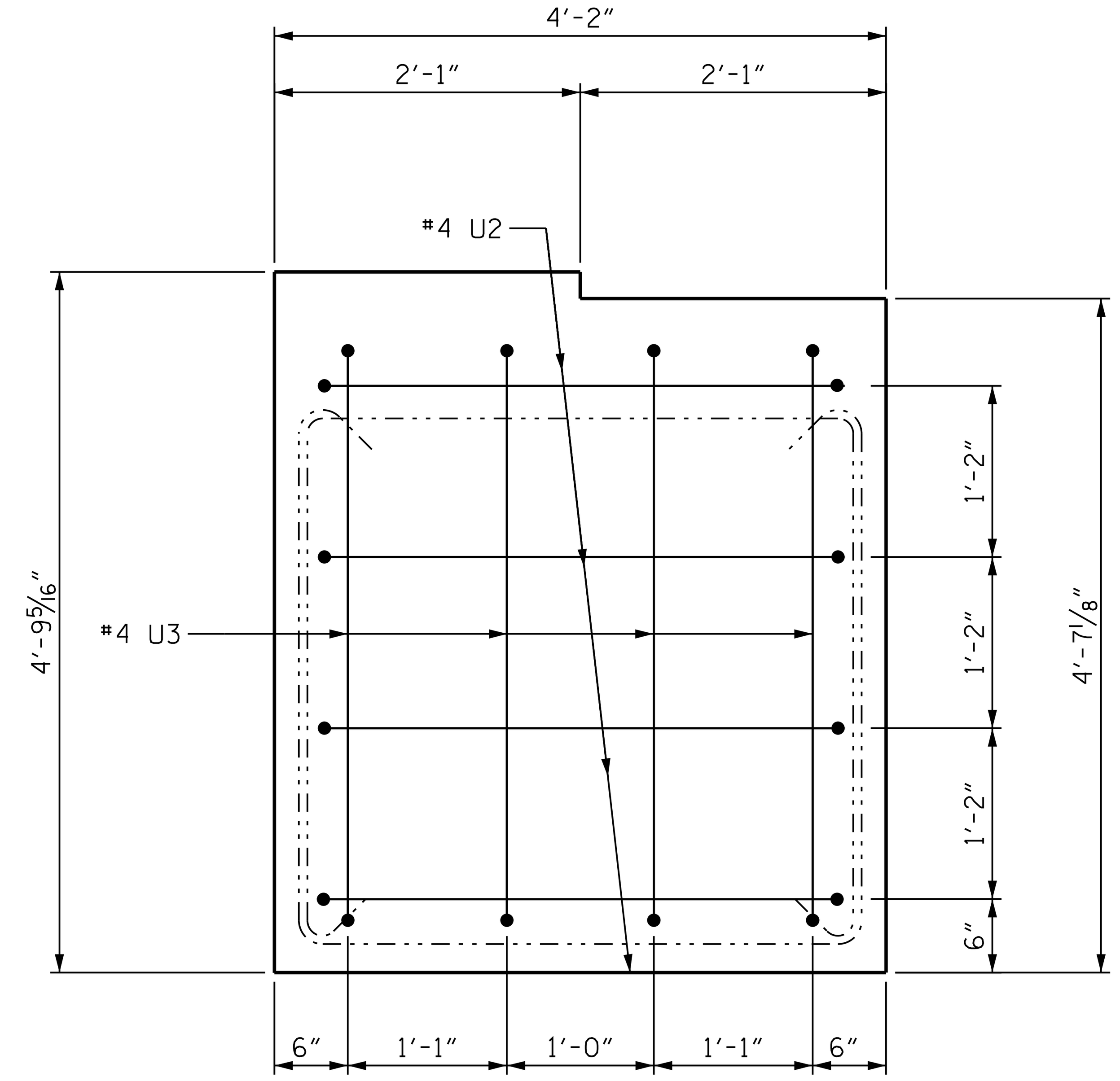
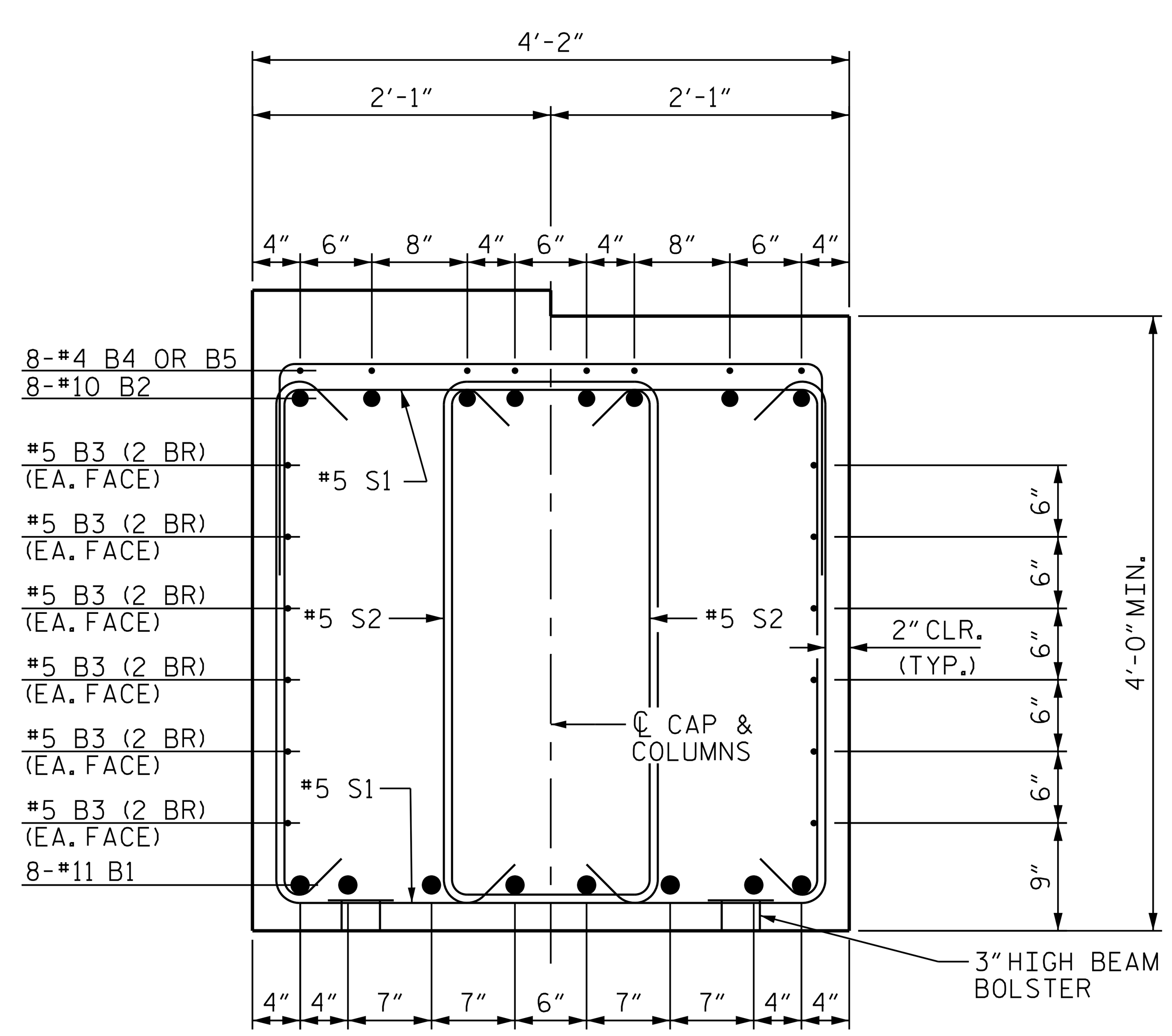


VIEW A-A

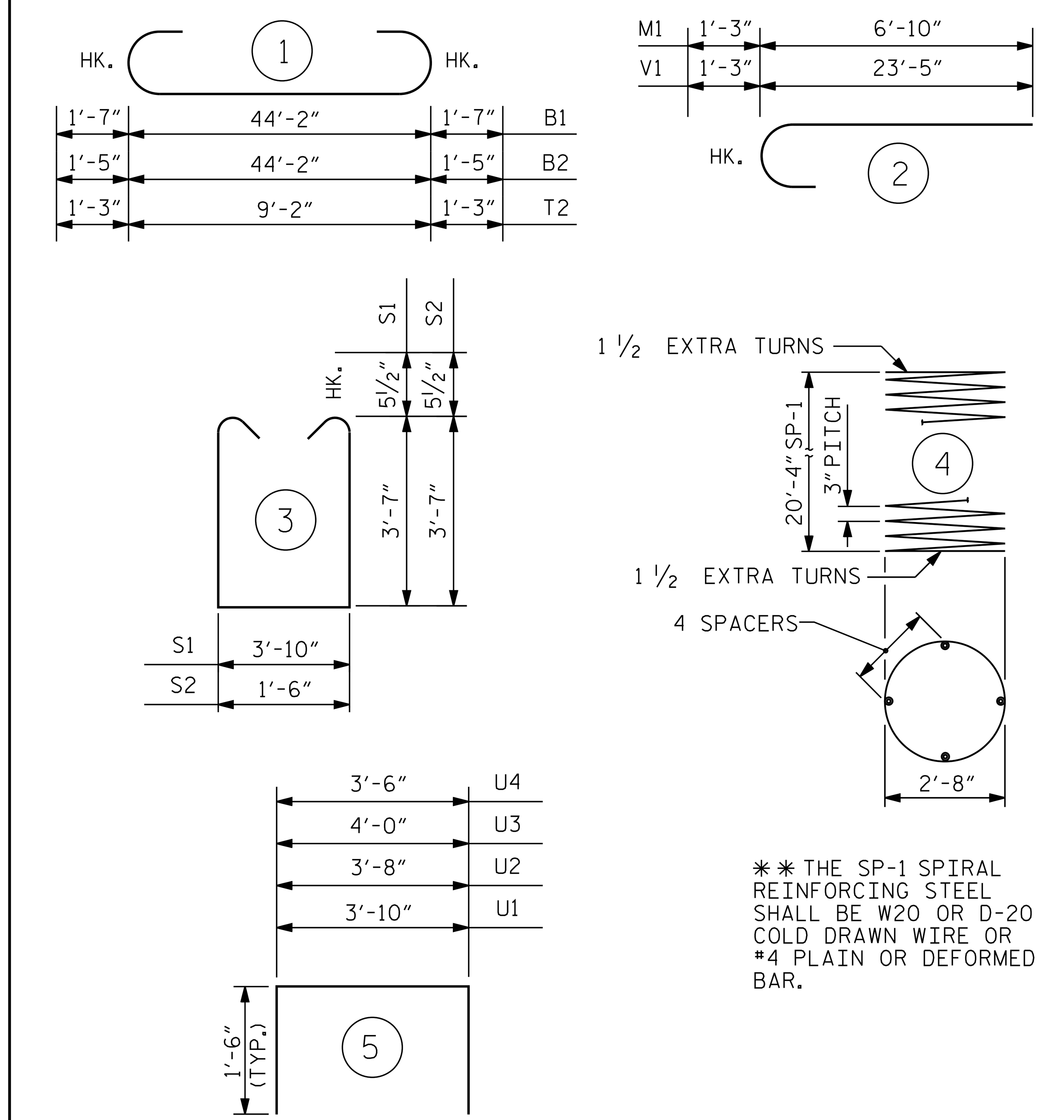


VIEW B-B



SECTION C-C

BAR TYPES



** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#11	1	47'-4"	2,012
B2	8	#10	1	47'-0"	1,618
B3	24	#4	STR	23'-8"	379
B4	24	#4	STR	12'-2"	195
B5	8	#4	STR	4'-11"	26
M1	36	#9	2	8'-1"	989
S1	78	#5	3	11'-11"	969
S2	44	#5	3	9'-7"	440
T1	78	#6	STR	9'-2"	1,074
T2	78	#9	1	11'-8"	3,094
U1	34	#4	5	6'-10"	155
U2	8	#4	5	6'-8"	36
U3	4	#4	5	7'-0"	19
U4	4	#4	5	6'-6"	17
V1	36	#9	2	24'-8"	3,019
REINFORCING STEEL				LBS.	14,042
SP-1	3	**	4	699'-11"	1,403
SPIRAL COLUMN REINFORCING STEEL				LBS.	1,403

CLASS A CONCRETE BREAKDOWN		
POUR #1 FOOTINGS	C.Y.	40.1
POUR #2 COLUMNS	C.Y.	15.7
POUR #3 CAP	C.Y.	30.2
TOTAL CLASS A CONC.	C.Y.	86.0

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 23+21.80 -Y3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER
5/16/2023

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1			3			TOTAL SHEETS	36
2			4				

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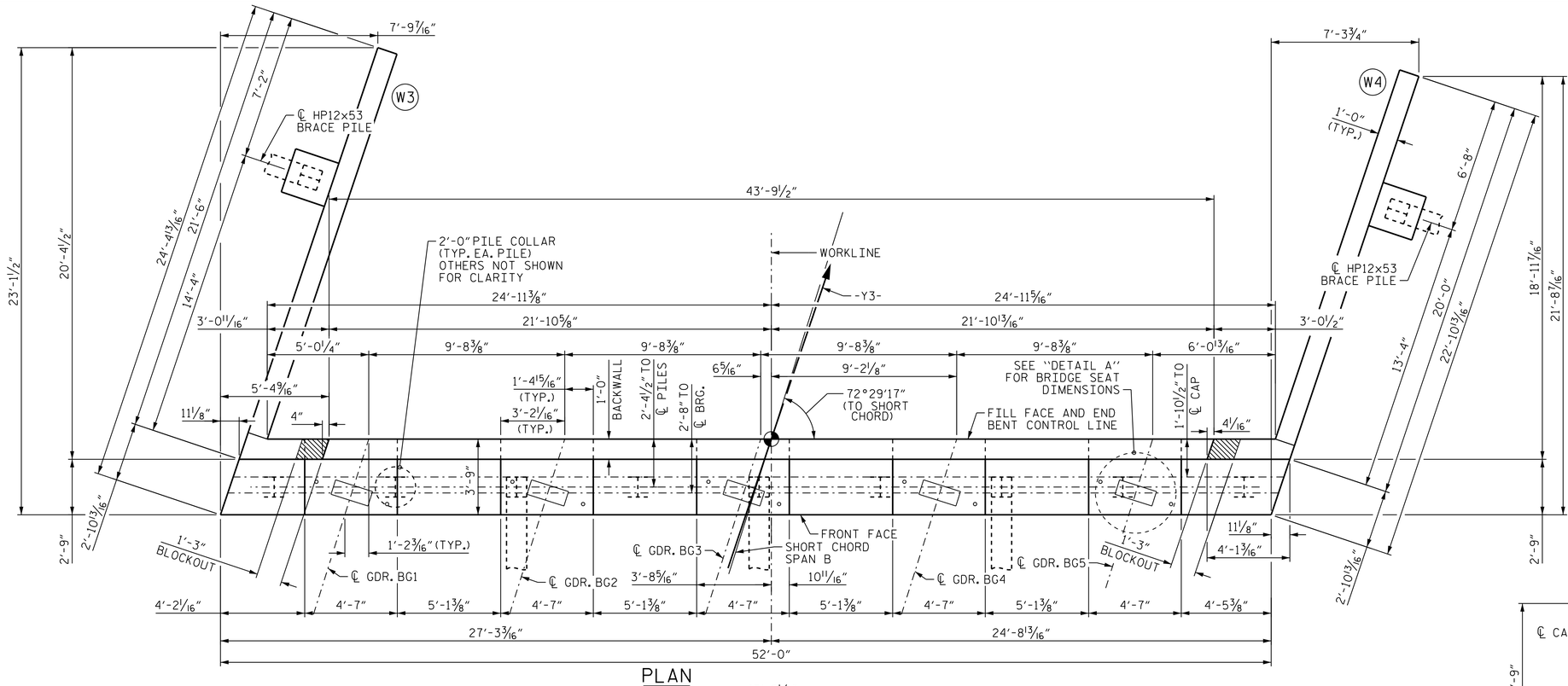
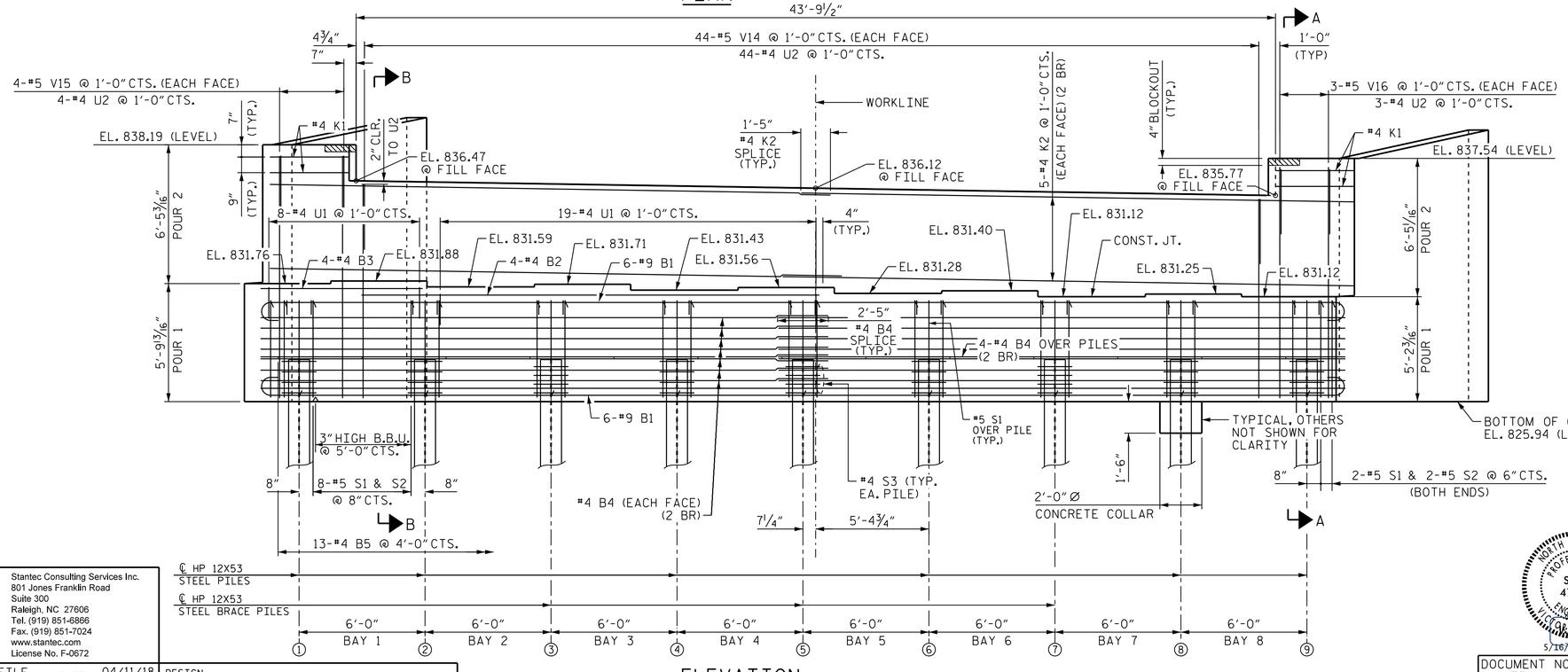


PLAN



ELEVATION

NOTES

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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

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

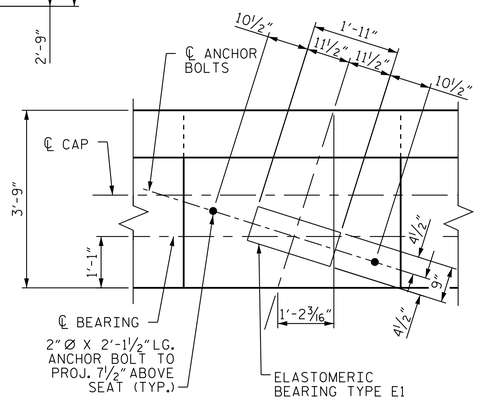
THE CONCRETE IN THE SHADED AREA OF THE WING WALL SHALL BE POURED AFTER THE CONCRETE BARRIER IS CAST IF SLIP FORMING IS USED.

FOR WING WALL DETAILS, SEE "END BENT 1, DETAILS - WING WALLS" SHT. 2 OF 3.

2 BR DENOTES TWO BAR RUN.

CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.

PILE CUTOFF ELEVATION SHALL BE AT EL. 827.95



DETAIL A

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 23+21.80 -Y3-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-31
1			3			TOTAL SHEETS
2			4			36

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NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA
5/16/2023

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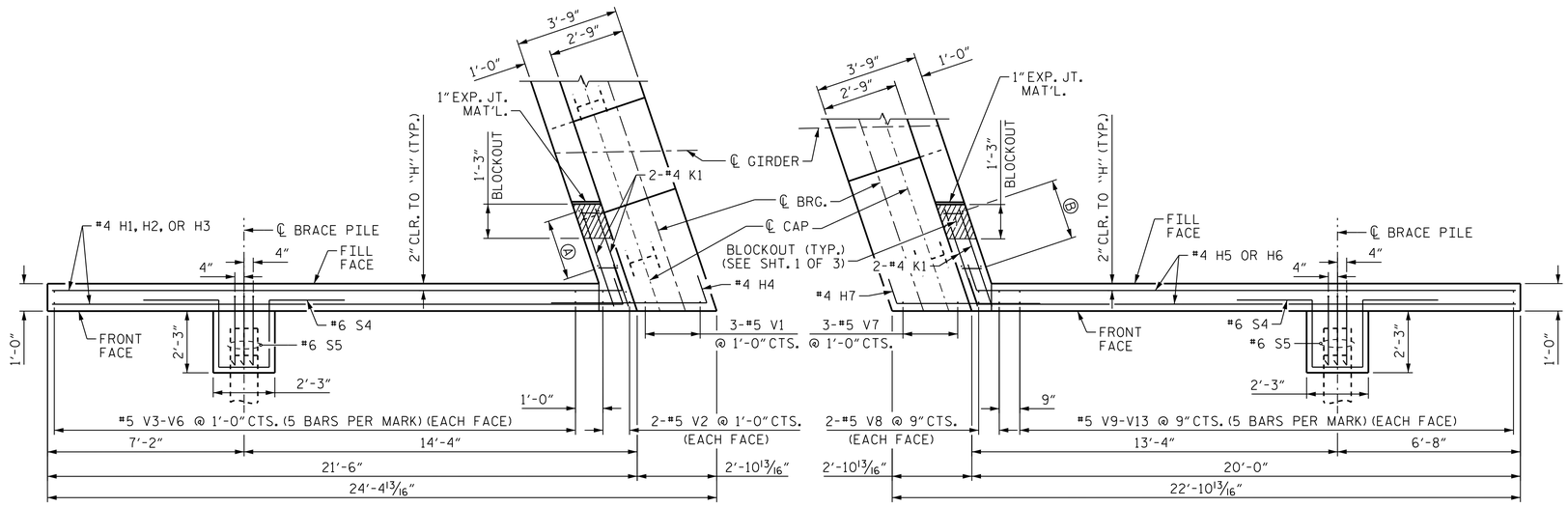
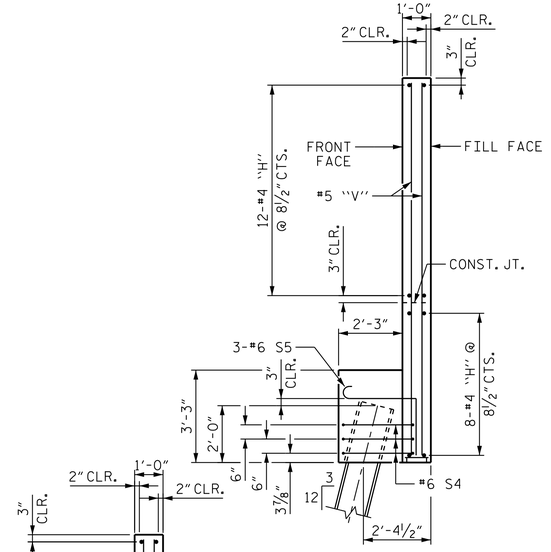


Ⓐ = 4-#5 V15 @ 1'-0"CTS. (EACH FACE) AND 4-#4 U2 @ 1'-0"CTS.

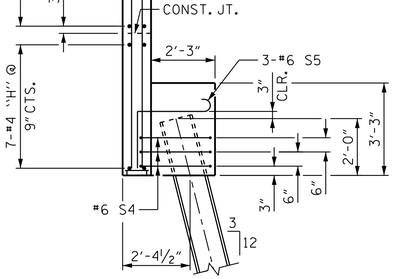
PLAN OF LEFT WING (W3)

Ⓑ = 3-#5 V16 @ 1'-0"CTS. (EACH FACE) AND 3-#4 U2 @ 1'-0"CTS.

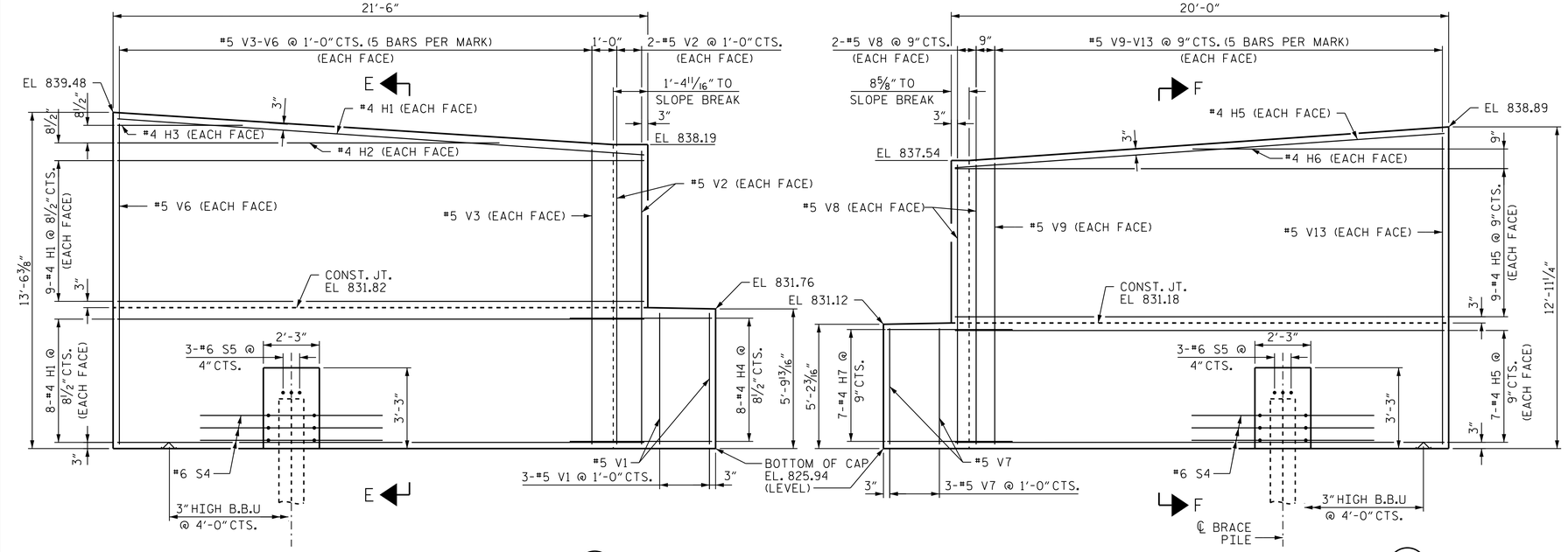
PLAN OF RIGHT WING (W4)



SECTION E-E



SECTION F-F



ELEVATION OF LEFT WING (W3)

ELEVATION OF RIGHT WING (W4)

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 23+21.80 -Y3-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
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SUBSTRUCTURE

END BENT 2
WING WALL DETAILS

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NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA
5/16/2023

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REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			36

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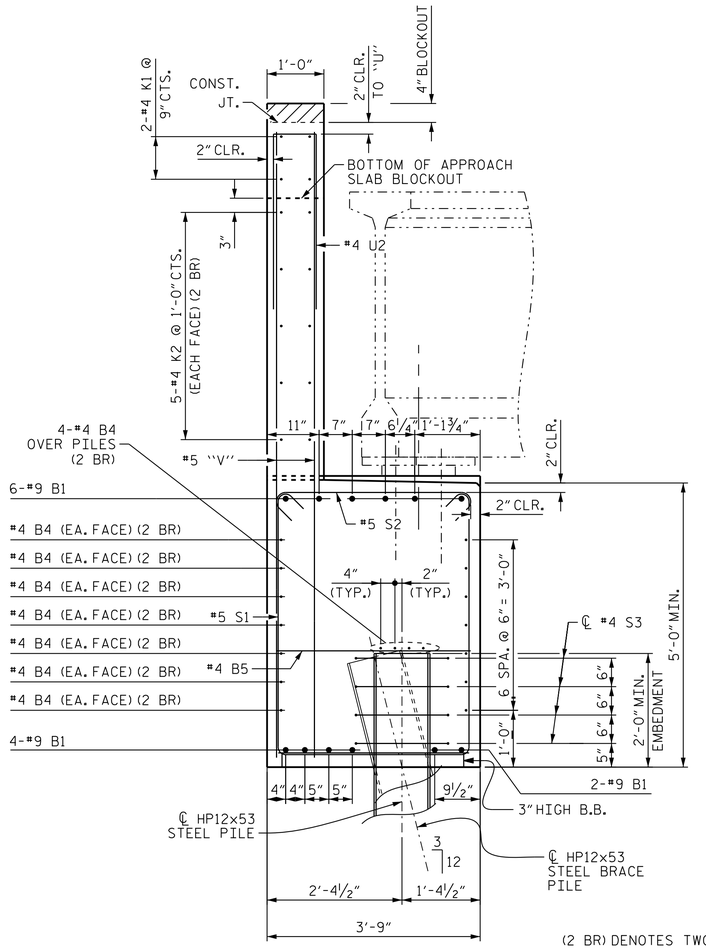
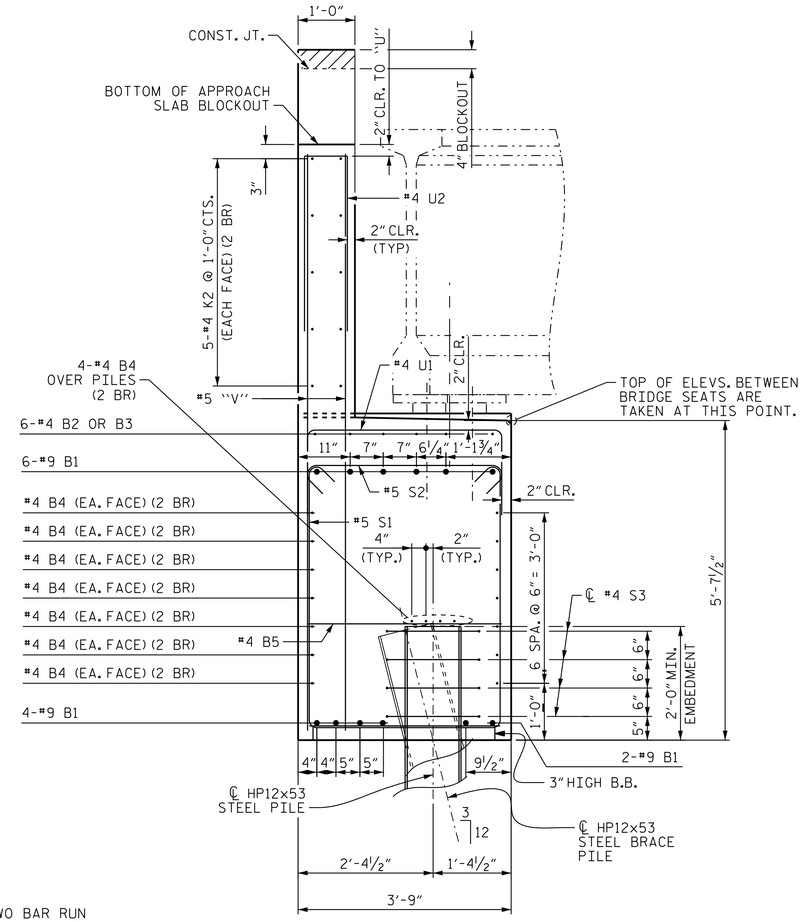
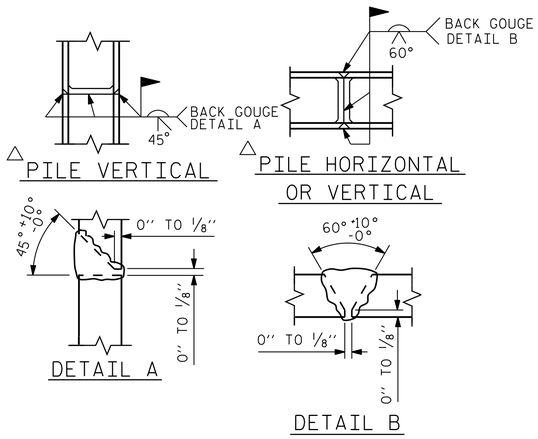


(2 BR) DENOTES TWO BAR RUN

SECTION A-A

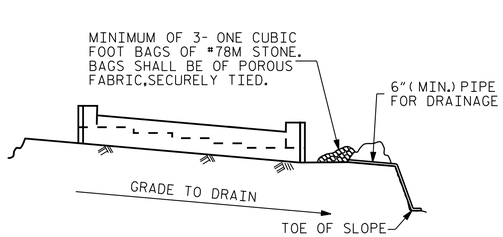


SECTION B-B



△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS



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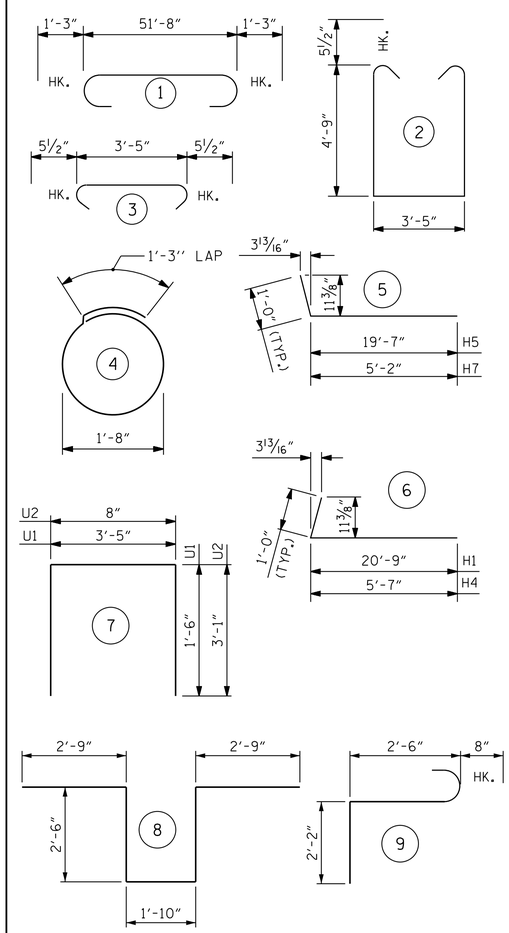
NO SEPARATE PAYMENT WILL BE MADE FOR THIS WORK AND THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR THE SEVERAL PAY ITEMS.

TEMPORARY DRAINAGE AT END BENT

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#9	1	54'-2"	2,210
B2	6	#4	STR	21'-8"	87
B3	6	#4	STR	7'-7"	30
B4	36	#4	STR	27'-1"	651
B5	13	#4	STR	3'-5"	30
H1	36	#4	6	21'-9"	523
H2	2	#4	STR	16'-0"	21
H3	2	#4	STR	5'-8"	8
H4	8	#4	6	6'-7"	35
H5	34	#4	5	20'-7"	467
H6	2	#4	STR	11'-1"	15
H7	7	#4	5	6'-2"	29
K1	8	#4	STR	3'-8"	20
K2	20	#4	STR	27'-3"	364
S1	77	#5	2	13'-10"	1,111
S2	68	#5	3	4'-4"	307
S3	36	#4	4	6'-6"	156
S4	6	#6	8	12'-4"	111
S5	6	#6	9	5'-4"	48
U1	27	#4	7	6'-5"	116
U2	51	#4	7	6'-10"	233
V1	3	#5	STR	5'-3"	16
V2	4	#5	STR	11'-9"	49
V3	10	#5	STR	11'-10"	123
V4	10	#5	STR	12'-2"	127
V5	10	#5	STR	12'-6"	130
V6	10	#5	STR	12'-10"	134
V7	3	#5	STR	4'-8"	15
V8	4	#5	STR	11'-3"	47
V9	10	#5	STR	11'-4"	118
V10	10	#5	STR	11'-7"	121
V11	10	#5	STR	11'-10"	123
V12	10	#5	STR	12'-1"	126
V13	10	#5	STR	12'-4"	129
V14	88	#5	STR	9'-5"	864
V15	8	#5	STR	11'-7"	72
V16	6	#5	STR	11'-0"	69

REINFORCING STEEL	8,835 LBS.
CLASS A CONCRETE BREAKDOWN:	
POUR #1: CAP, COLLARS, ETC.	50.6 C.Y.
POUR #2: BACKWALL	20.4 C.Y.
CLASS A CONCRETE TOTAL	71.0 C.Y.

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5/16/2023

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CLEVELAND COUNTY
STATION: 23+21.80 -Y3-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-33
1			3			TOTAL SHEETS
2			4			36

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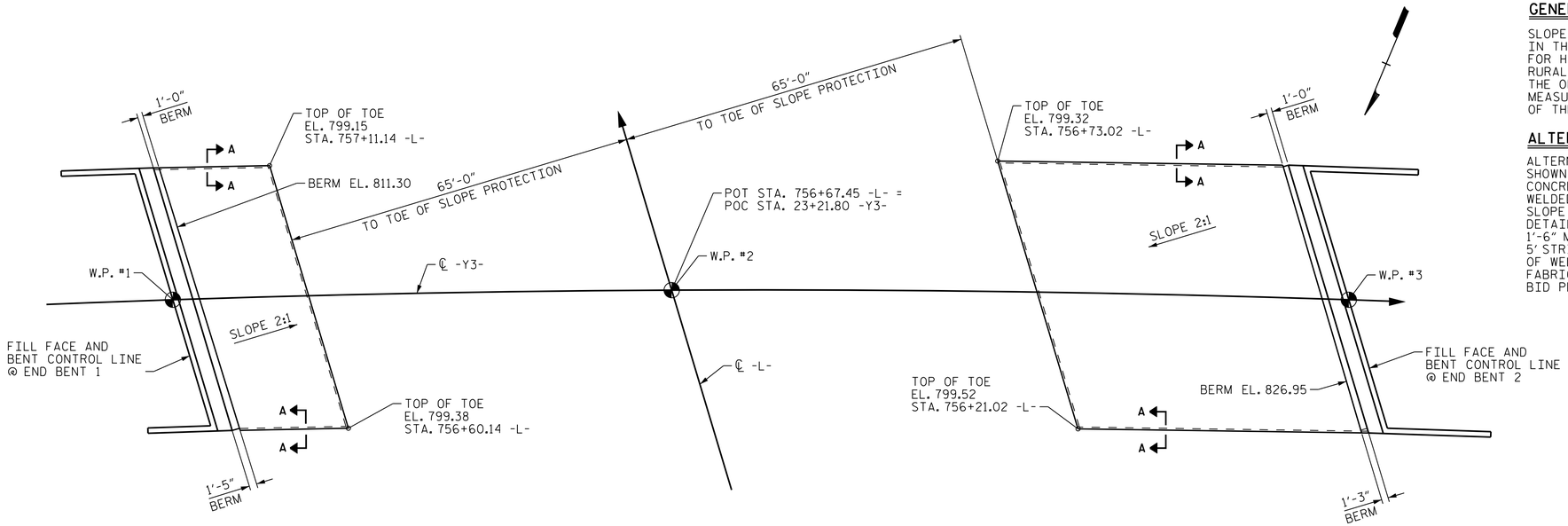


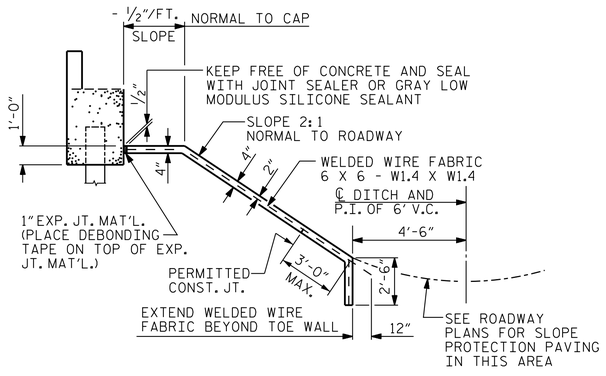
PLAN

GENERAL NOTES

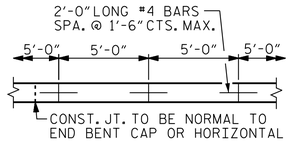
SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. THE CONTRACTOR, AT HIS OPTION, MAY USE ALTERNATE "B" ONLY FOR HIGHWAY OVER HIGHWAY GRADE SEPARATIONS WITH 2:1 END BENT SLOPE IN RURAL, UNPOPULATED AREAS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

ALTERNATE "A"

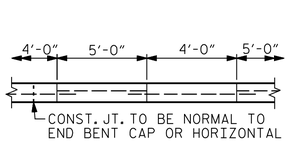
ALTERNATE "A" SHALL CONSIST OF 4" POURED-IN-PLACE CONCRETE PAVING AS SHOWN IN THE DETAILS ON THIS SHEET. CONCRETE SHALL BE CLASS "B". THE CONCRETE SURFACE SHALL BE FLOATED WITH A WOODEN FLOAT AND FINISHED. WELDED WIRE FABRIC REINFORCING SHALL BE 6 X 6 - W1.4 X W1.4, 60" WIDE. SLOPE PROTECTION SHALL BE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



SECTION ALONG ℄ SURVEY WHEN FILL CATCHES IN DITCH



POURING DETAIL



POUR A 4'-0" STRIP FIRST.

OPTIONAL POURING DETAIL

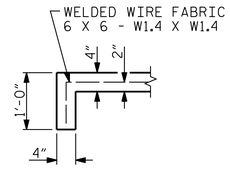
BRIDGE @ STA. 23+21.80 -Y3-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	132	238
END BENT 2	333	600
TOTAL	465	838

* QUANTITY SHOWN IS BASED ON 5' POURS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 23+21.80 -Y3-



SECTION A-A

Stantec
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DRAWN BY : J. B. GEILE DATE : 03/09/18
CHECKED BY : V. E. FRAGA DATE : 05/05/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/16/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA
5/16/2023

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-34
1			3			TOTAL SHEETS
2			4			36

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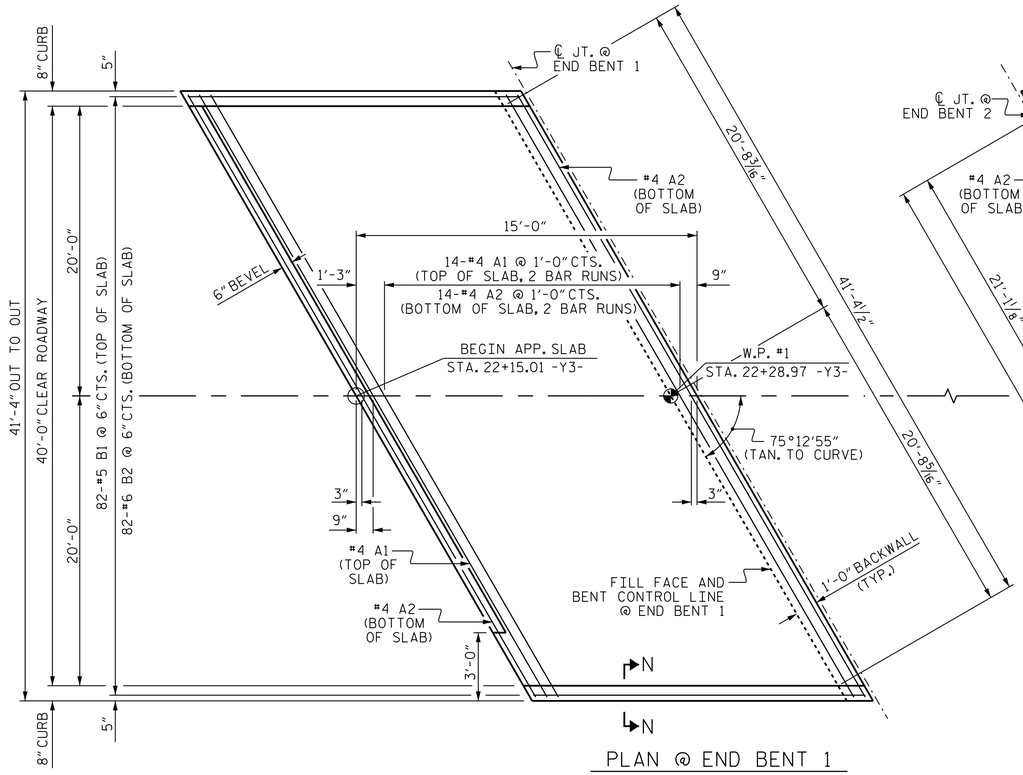
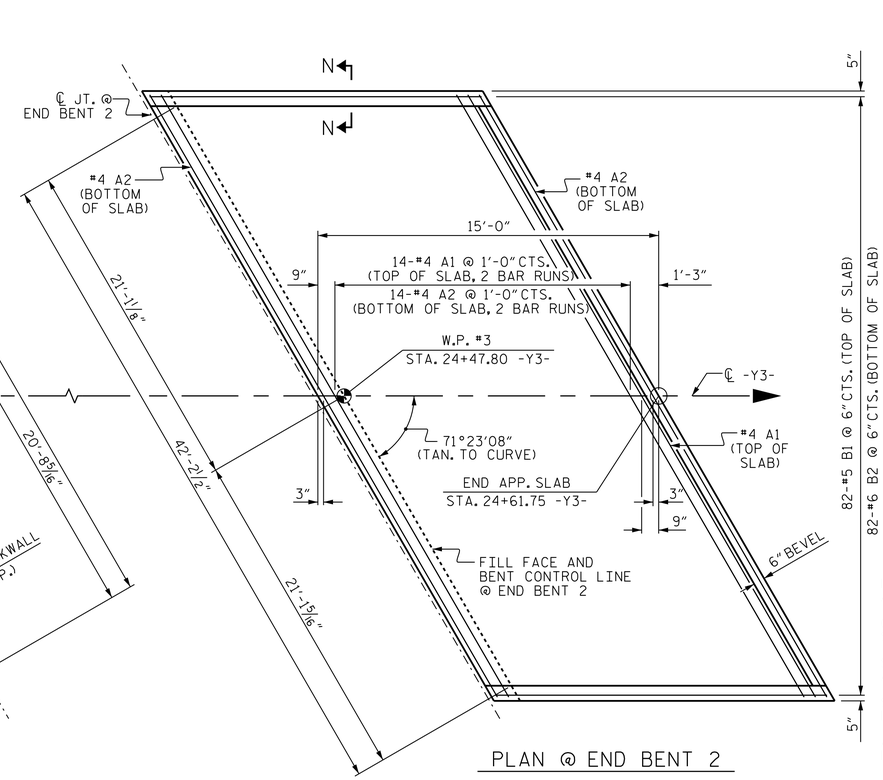
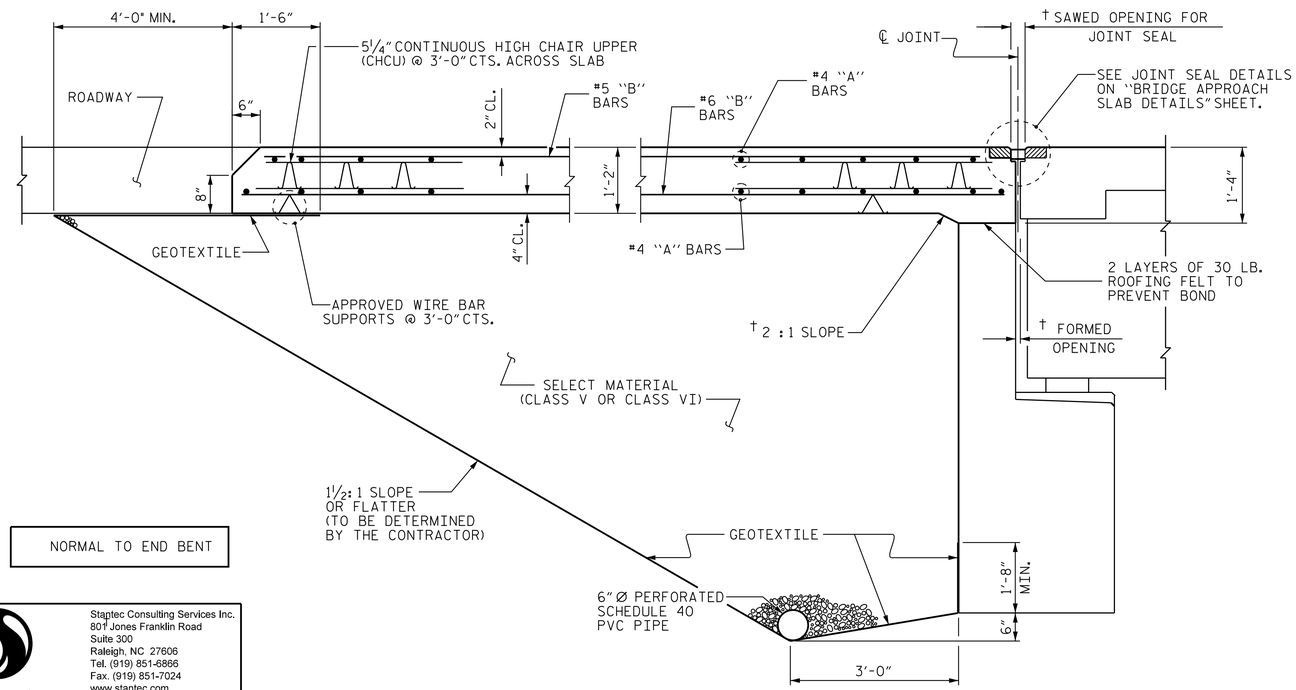


PLAN @ END BENT 1



PLAN @ END BENT 2

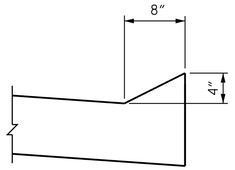


NORMAL TO END BENT

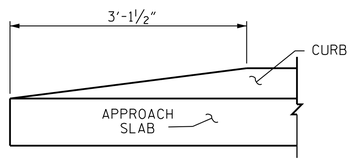
SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)

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



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

BILL OF MATERIAL

APPROACH SLAB - END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	30	#4	STR	22'-3"	446
A2	32	#4	STR	22'-1"	472
✳ B1	82	#5	STR	14'-1"	1,204
B2	82	#6	STR	14'-8"	1,806
REINFORCING STEEL				LBS.	2,278
✳ EPOXY COATED REINFORCING STEEL				LBS.	1,650
CLASS AA CONCRETE				C. Y.	27.0

APPROACH SLAB - END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A3	30	#4	STR	22'-8"	454
A4	32	#4	STR	22'-6"	481
✳ B1	82	#5	STR	14'-1"	1,204
B2	82	#6	STR	14'-8"	1,806
REINFORCING STEEL				LBS.	2,287
✳ EPOXY COATED REINFORCING STEEL				LBS.	1,658
CLASS AA CONCRETE				C. Y.	27.2

NOTES

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

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

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL OR PARAPET AND END POST.

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.

WITH FOAM JOINT SEAL

FOR FOAM JOINT SEALS, SEE SPECIAL PROVISIONS.

THE NOMINAL UNCOMPRESSED SEAL WIDTH OF THE FOAM JOINT SEAL SHALL BE 2".

FOR ELASTOMERIC CONCRETE, SEE SPECIAL PROVISIONS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 23+21.80 -Y3-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

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ASSEMBLED BY : V. E. FRAGA DATE : 06/06/18
CHECKED BY : T. N. ENNIS DATE : 09/11/18

DRAWN BY : EEM 3/95
CHECKED BY : VAP 3/95

REV. 6/13 MAA/GM
REV. 12/17 MAA/THC
REV. 06/19 BNB/THC

DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/16/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER
5/16/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-35
1			3			TOTAL SHEETS
2			4			36

STD. NO. BAS2 (SHT 1a)

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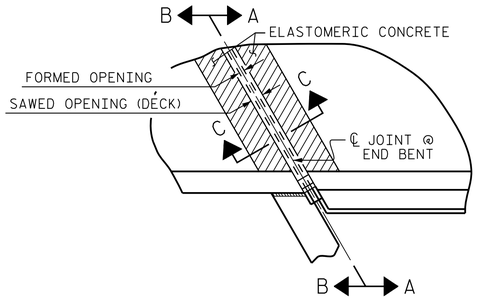
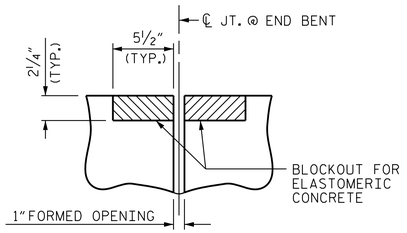
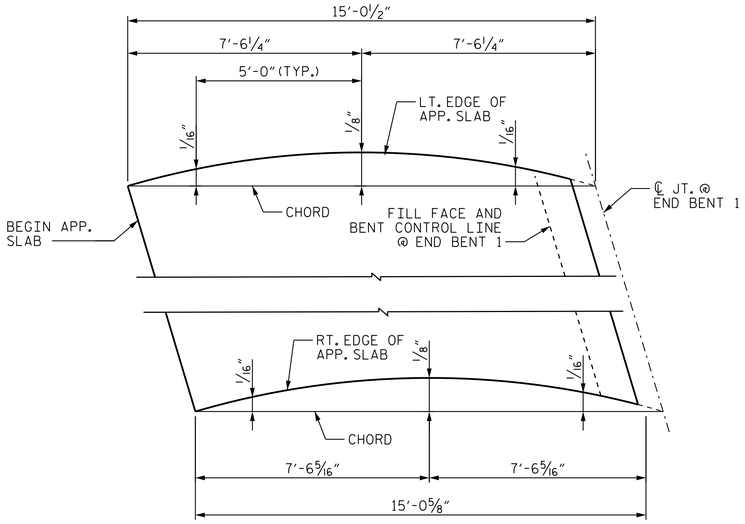


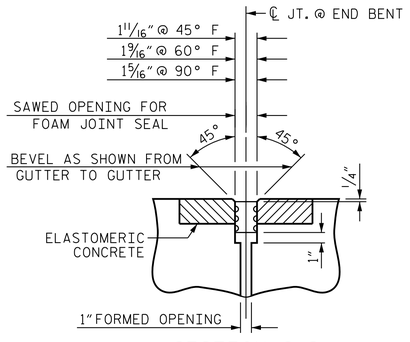
PLAN



SECTION C-C
FOAM JOINT SEAL
(PRE-SAWED ELASTOMERIC CONCRETE DIMENSIONS)



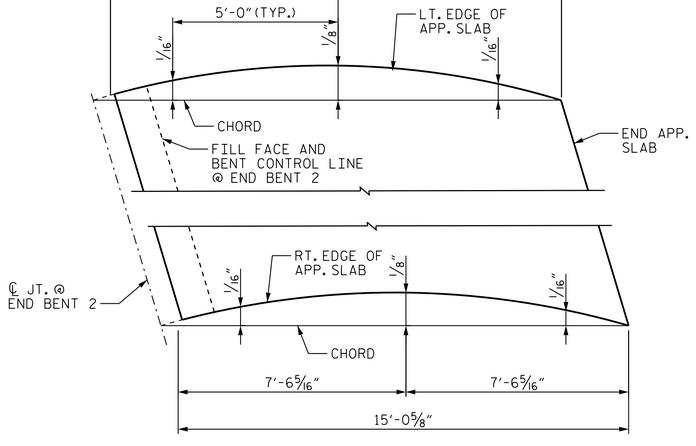
APPROACH SLAB @ END BENT 1



SECTION C-C
FOAM JOINT SEAL
(EXPANSION)

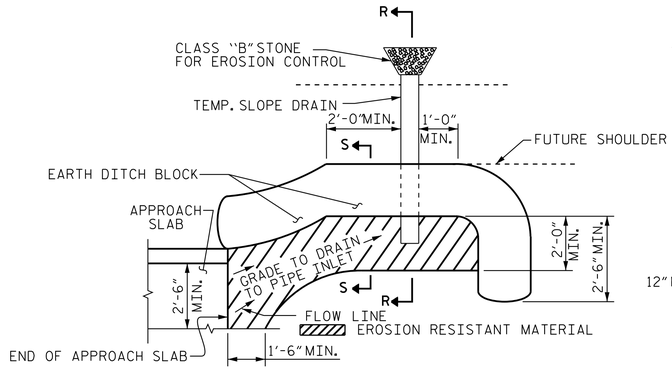
ELASTOMERIC CONCRETE	
END BENT NO.	ELASTOMERIC CONCRETE * (CU. FT.)
1	3.56
2	3.63
TOTAL	7.19

* BASED ON THE MINIMUM BLOCKOUT SHOWN.



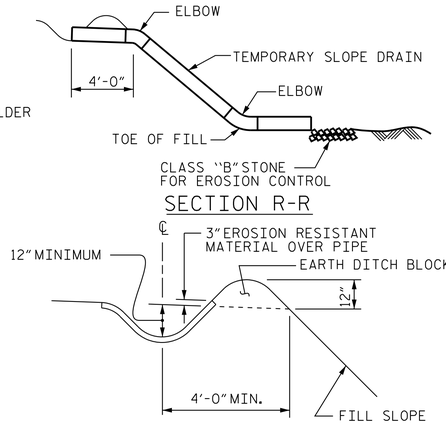
APPROACH SLAB @ END BENT 2

CHORD TO ARC OFFSETS



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.

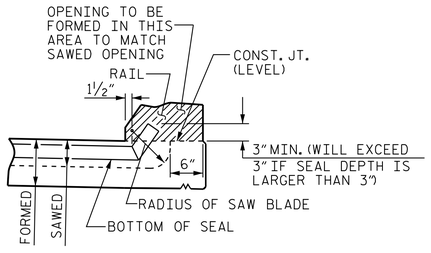
PLAN VIEW



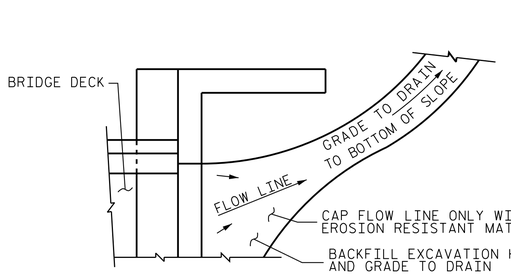
SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

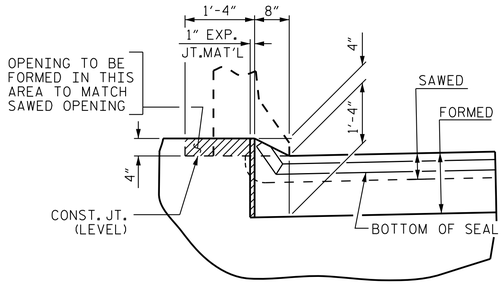


SECTION A-A



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



SECTION B-B

JOINT SEAL DETAILS @ END BENT

FOAM JOINT SEAL TO BE CUT, HEAT WELDED AND TURNED UP PARALLEL TO SLOPED FACE OF THE BARRIER RAIL.

THE JOINT SHALL BE SAWED PRIOR TO THE CASTING OF THE BARRIER RAIL.

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA
5/16/2023

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PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 23+21.80 -Y3-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S3-36
1			3			TOTAL SHEETS
2			4			36

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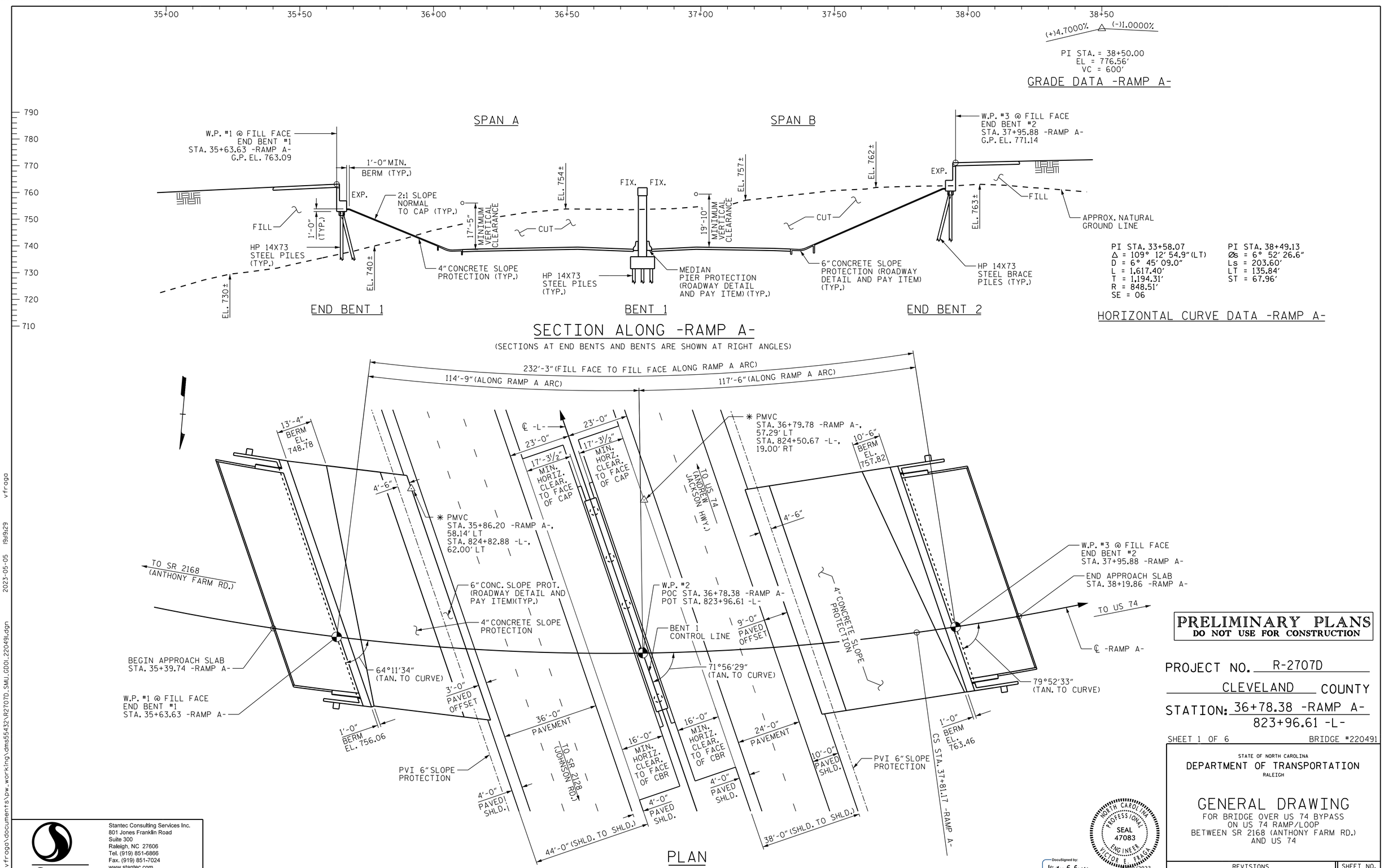
ASSEMBLED BY : J. B. GEILE DATE : 06/06/18
CHECKED BY : V. E. FRAGA DATE : 06/11/18

DRAWN BY : FCJ 11/88
CHECKED BY : ARB 11/88

REV. 6/13 MAA/GM
REV. 12/17 MAA/THC
REV. 5/18 MAA/THC

DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/16/23

STD. NO. BAS4 (SHT 1a)



PI STA. 33+58.07
Δ = 109° 12' 54.9" (LT)
D = 6° 45' 09.0"
L = 1,617.40'
T = 1,194.31'
R = 848.51'
SE = 06

PI STA. 38+49.13
Øs = 6° 52' 26.6"
Ls = 203.60'
LT = 135.84'
ST = 67.96'

HORIZONTAL CURVE DATA -RAMP A-

SECTION ALONG -RAMP A-

(SECTIONS AT END BENTS AND BENTS ARE SHOWN AT RIGHT ANGLES)

PLAN

(PILES NOT SHOWN FOR CLARITY)

* PMVC DENOTES PT. OF MIN. VERTICAL CLEARANCE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-
823+96.61 -L-

SHEET 1 OF 6 BRIDGE #220491

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER US 74 BYPASS
ON US 74 RAMP/LOOP
BETWEEN SR 2168 (ANTHONY FARM RD.)
AND US 74

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DRAWN BY : J. B. GEILE DATE : 10/16/17
CHECKED BY : T.N. ENNIS DATE : 01/10/18
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47083 VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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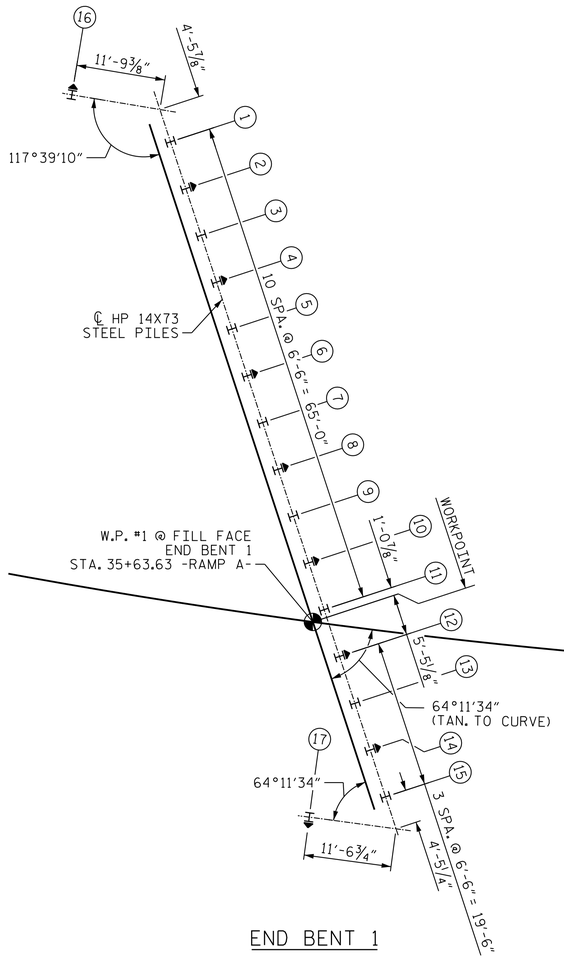
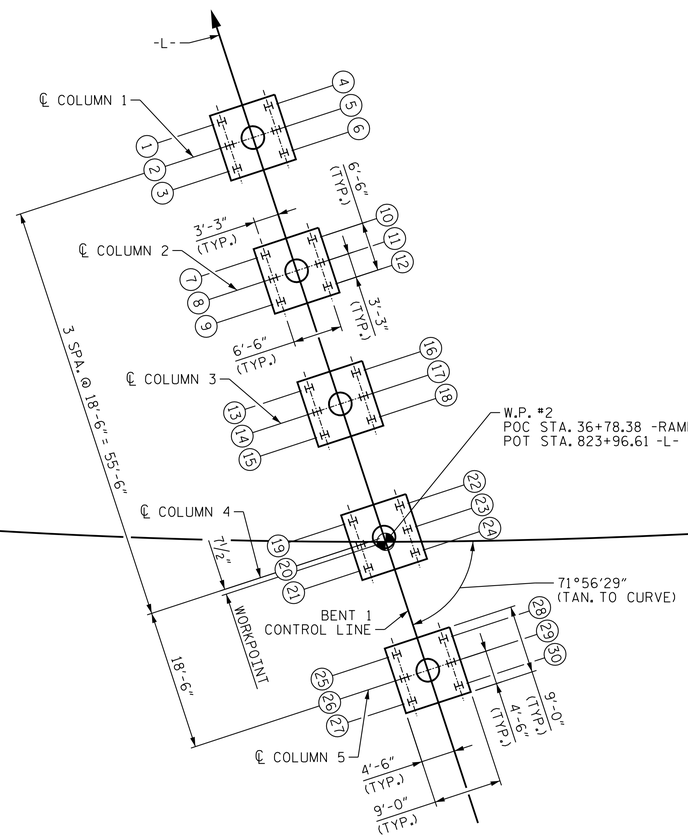
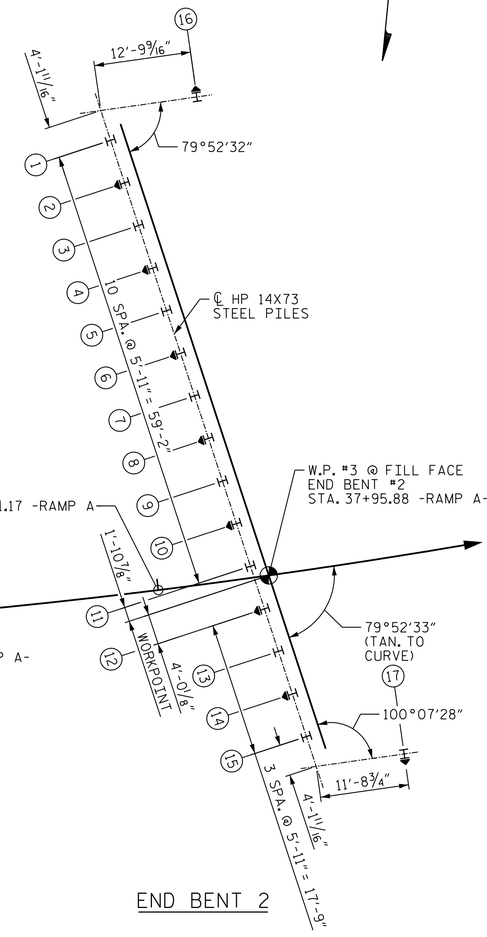


END BENT 1



BENT 1



END BENT 2

FOUNDATION LAYOUT

ALL SUBSTRUCTURE WORK LINES PASS THROUGH WORK POINTS.
DIMENSIONS & PILE LAYOUT ARE TYPICAL FOR EACH FOOTING.

DIMENSIONS LOCATING PILES ARE SHOWN TO THE PILE CENTERLINES

↥ INDICATES DIRECTION OF BATTER

ALL PILES ARE HP 14X73 STEEL PILES

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 2 OF 6

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DRAWN BY : V. E. FRAGA DATE : 12/20/22
CHECKED BY : K. A. WOYAHN DATE : 02/02/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER US 74 BYPASS
ON US 74 RAMP/LOOP
BETWEEN SR 2168 (ANTHONY FARM RD.)
AND US 74

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-02
1			3			TOTAL SHEETS
2			4			43

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SUMMARY OF PILE INFORMATION/INSTALLATION

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (s) #-# (e.g., "BENT 1, PILES 1-5")	FACTORED RESISTANCE PER PILE TONS	PILE CUT-OFF (TOP OF PILE) ELEVATION FT	ESTIMATED PILE LENGTH PER PILE FT	SCOUR CRITICAL ELEVATION FT	DRIVEN PILES			PREDRILLING FOR PILES ✳			DRILLED-IN PILES		
					MIN. PILE TIP (TIP NO HIGHER THAN) ELEV FT	REQUIRED DRIVING RESISTANCE (RDR)✳✳ PER PILE TONS	TOTAL PILE REDRIVES QUANTITY EACH	PREDRILLING LENGTH PER PILE LIN FT	PREDRILLING ELEVATION (ELEV NOT TO PREDRILL BELOW) FT	MAXIMUM PREDRILLING DIA INCHES	PILE EXCAVATION (BOTTOM OF HOLE) ELEV FT	PILE EXC NOT IN SOIL PER PILE LIN FT	PILE EXC IN SOIL PER PILE LIN FT
END BENT 1, PILES 1-5	125	SEE SUBSTRUCTURE PLANS	80			210							
END BENT 1, PILES 6-15	125		70			210							
END BENT 1, PILES 16-17	15		70			25							
END BENT 2, PILES 1-10	125		50			210							
END BENT 2, PILES 11-15	125		35			210							
END BENT 2, PILES 16-17	15		35			25							
BENT 1, PILES 1-18	135		35			225							
BENT 1, PILES 19-30	135		25			225							

✳ PREDRILLING FOR PILES IS REQUIRED FOR END BENTS/ BENT WITH A PREDRILLING LENGTH AND AT THE CONTRACTOR'S OPTION FOR END BENTS/ BENTS WITH PREDRILLING INFORMATION BUT NO PREDRILLING LENGTH.

✳✳ $RDR = \frac{\text{FACTORED RESISTANCE + FACTORED DOWNDRAY LOAD + FACTORED DEAD LOAD}}{\text{DYNAMIC RESISTANCE FACTOR}} + \text{NORMAL DOWNDRAG RESISTANCE} + \frac{\text{NORMAL SCOUR RESISTANCE}}{\text{SCOUR RESISTANCE FACTOR}}$

SUMMARY OF PDA/ PILE ORDER LENGTHS

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

PILE DRIVING ANALYZER (PDA)				PILE ORDER LENGTHS	
END BENT/ BENT NO.	PDA TESTING REQUIRED? YES OR MAYBE	PDA TEST PILE LENGTH FT	TOTAL PDA TESTING QUANTITY EACH	END BENT/ BENT NO(s)	PILE ORDER LENGTH BASIS✳ EST OR PDA
END BENT 1, PILES 1-5	MAYBE	85	1		
END BENT 1, PILES 6-15	MAYBE	75			
END BENT 2, PILES 1-10	MAYBE	55			
END BENT 2, PILES 11-15	MAYBE	40			
BENT 1, PILES 1-18	MAYBE	40			
BENT 1, PILES 19-30	MAYBE	30			

✳ EST=PILE ORDER LENGTHS FROM ESTIMATED PILE LENGTHS: PDA=PILE ORDER LENGTHS BASED ON PDA TESTING. FOR GROUPS OF END BENTS/BENTS WITH PILE ORDER LENGTHS BASED ON PDA TESTING, THE FIRST END BENT/ BENT NO. LISTED FOR EACH GROUP IS THE REPRESENTATIVE END BENT/ BENT WITH THE PDA.

PILE DESIGN INFORMATION

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (s) #-# (e.g., "BENT 1, PILES 1-5")	FACTORED AXIAL LOAD PER PILE TONS	FACTORED DOWNDRAG LOAD PER PILE TONS	FACTORED DEAD LOAD✳ PER PILE TONS	DYNAMIC RESISTANCE FACTOR	NOMINAL DOWNDRAG RESISTANCE PER PILE TONS	NOMINAL SCOUR RESISTANCE PER PILE TONS	SCOUR RESISTANCE FACTOR (DEFAULT=1.00)
END BENT 1, PILES 1-15	124			0.60			
END BENT 1, PILES 16-17	15			0.60			
END BENT 2, PILES 1-15	125			0.60			
END BENT 2, PILES 16-17	15			0.60			
BENT 1, PILES 1-30	135			0.60			

✳ FACTORED DEAD LOAD IS FACTORED WEIGHT OF PILE ABOVE THE GROUND LINE.

FOUNDATION NOTES:

1. FOR PILES, SEE PILES PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.
2. CONSTRUCT THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENTS NO. 1 AND NO. 2.

NOTES:

1. THE PILE FOUNDATION TABLES ARE BASED ON THE BRIDGE SUBSTRUCTURE DESIGN AND FOUNDATION RECOMMENDATIONS SEALED BY A NORTH CAROLINA PROFESSIONAL ENGINEER (STEPHEN C. CROCKETT, 048207) ON 4-28-23.
2. TOTAL PILE DRIVING EQUIPMENT SETUP QUANTITY (NOT SHOWN IN PILE FOUNDATION TABLES) EQUALS THE NUMBER OF DRIVEN PILES, I.E., THE NUMBER OF PILES WITH A REQUIRED DRIVING RESISTANCE.
3. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING WHEN PDAs MAY BE REQUIRED.

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DRAWN BY : V. E. FRAGA DATE : 01/11/23
CHECKED BY : K. A. WOYAHN DATE : 02/02/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA 5/10/2023

DocuSigned by: Victor E. Fraga

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 36+78.38 -RAMP A-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
PILE FOUNDATION TABLES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-03
1			3			TOTAL SHEETS
2			4			43

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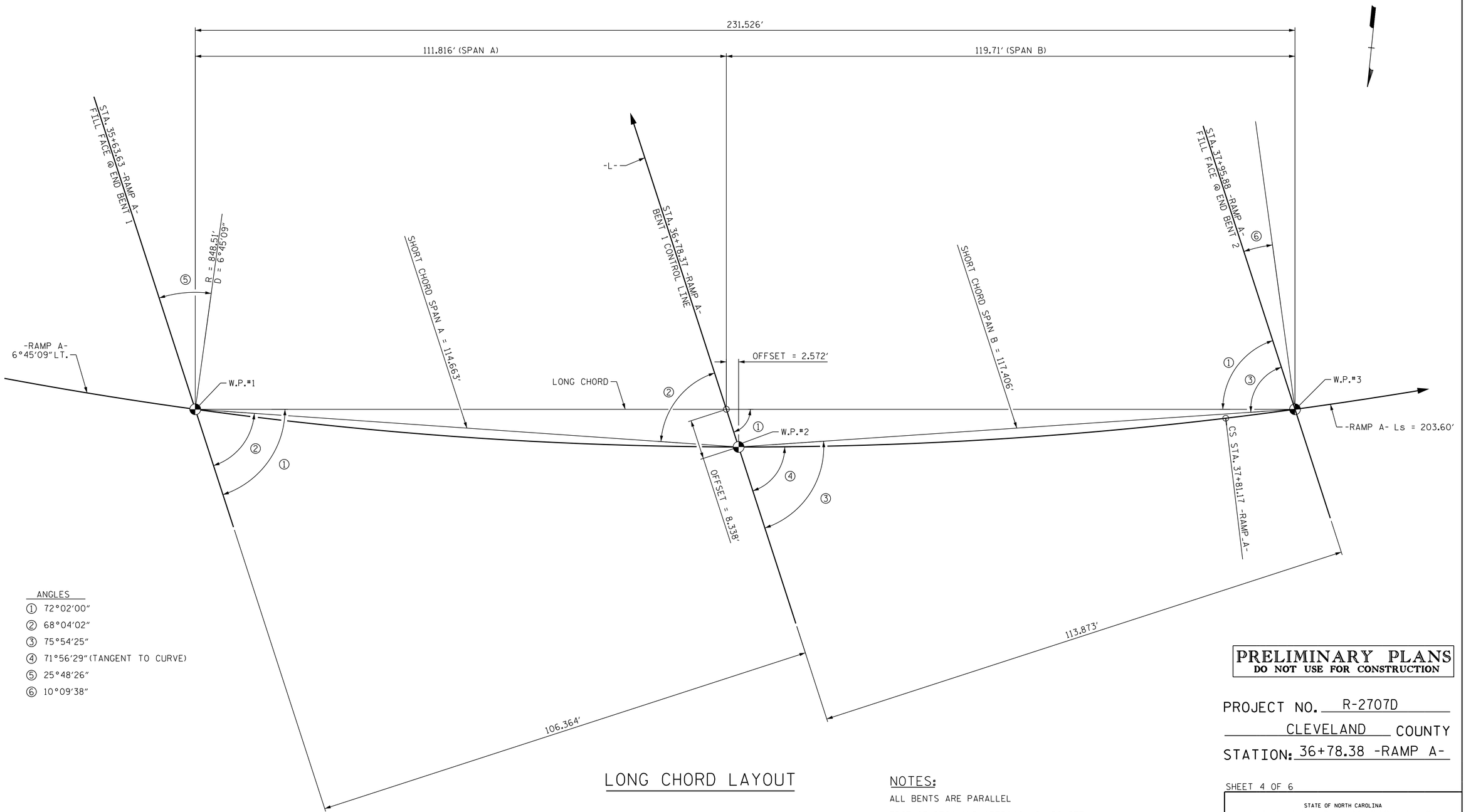

ANGLES

① 72°02'00"
② 68°04'02"
③ 75°54'25"
④ 71°56'29" (TANGENT TO CURVE)
⑤ 25°48'26"
⑥ 10°09'38"

LONG CHORD LAYOUT

NOTES:

ALL BENTS ARE PARALLEL

EDGE OF DECK AND APPROACH SLABS SET PARALLEL/CONCENTRIC TO -RAMP A-

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER US 74 BYPASS
ON US 74 RAMP/LOOP
BETWEEN SR 2168 (ANTHONY FARM RD.)
AND US 74

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www.stantec.com
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DRAWN BY : V. E. FRAGA DATE : 12/20/22
CHECKED BY : K. A. WOYAHN DATE : 02/02/23

DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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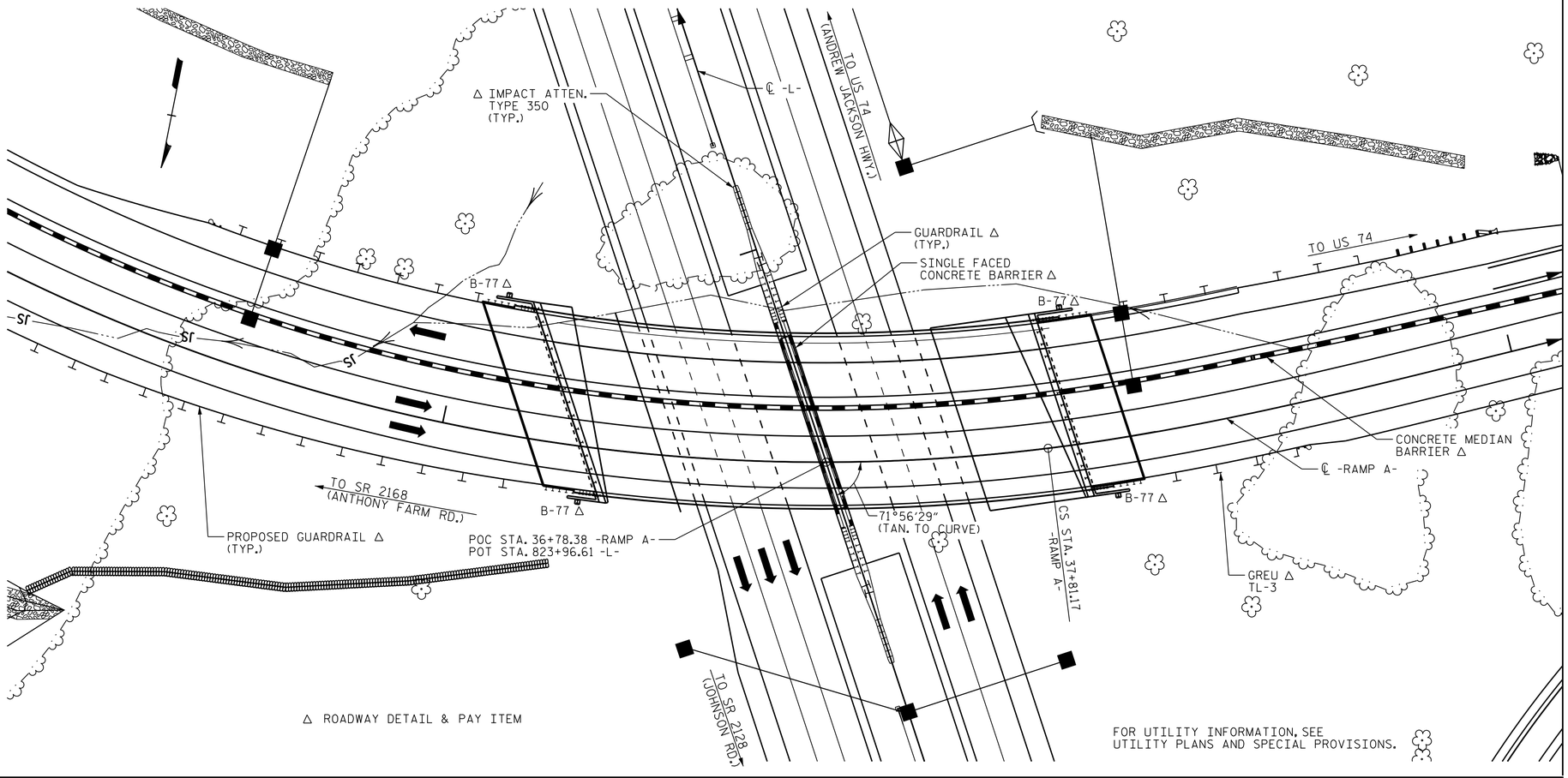
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-04
1			3			TOTAL SHEETS
2			4			43

BENCH MARK #29 : N 1259149, E 573591 -BY23- STA. 11+32.41, 111.18' LEFT, ELEV. 853.86



LOCATION SKETCH

NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE ASSHTO LRFD BRIDGE DESIGN SPECIFICATION.

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.

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

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

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

WORK SHALL NOT BE STARTED ON THIS BRIDGE UNTIL ROADWAY SECTION HAS BEEN EXCAVATED.

FOR 54" PRESTRESSED CONCRETE FLORIDA I-BEAM GIRDERS, SEE SPECIAL PROVISIONS.

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLAN.

TOTAL BILL OF MATERIAL

	FOUNDATION EXCAVATION	PDA TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL	PILE DRIVING EQUIPMENT SETUP FOR HP 14 X 73 STEEL PILES	HP 14 X 73 STEEL PILES		CONCRETE BARRIER RAIL	CONCRETE MEDIAN BARRIER	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS	54" PRESTRESSED CONCRETE FLORIDA I-BEAM GIRDERS	
	LUMP SUM	EA.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	EA.	NO.	LIN. FT	LIN. FT	LIN. FT	SQ. YDS	LUMP SUM	LUMP SUM	NO.	LIN. FT
SUPERSTRUCTURE			18,727	19,395		LUMP SUM						501.4	280.7		LUMP SUM	LUMP SUM	18	2,043.9
END BENT 1					94.5		13,635		17	17	1,240			371				
BENT 1	LUMP SUM				165.7		31,245	2,174	30	30	930							
END BENT 2					90.3		12,783		17	17	745			491				
TOTAL	LUMP SUM	1	18,727	19,395	350.5	LUMP SUM	57,663	2,174	64	64	2,915	501.4	280.7	862	LUMP SUM	LUMP SUM	18	2,043.9

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER US 74 BYPASS
ON US 74 RAMP/LOOP
BETWEEN SR 2168 (ANTHONY FARM RD.)
AND US 74

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DRAWN BY : J. B. GEILE DATE : 04/27/18
CHECKED BY : T. R. DUDECK DATE : 01/30/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-05
1			3			TOTAL SHEETS
2			4			43

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	1.15	--	1.75	0.609	1.31	B	ER	57.30	0.719	1.36	B	ER	34.40	0.80	0.609	1.15	B	ER	57.30	
		HL-93 (OPERATING)	N/A		1.70	--	1.35	0.609	1.70	B	ER	57.30	0.789	1.91	B	ER	22.90	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.67	60.1	1.75	0.609	1.90	B	ER	57.30	0.789	1.99	B	ER	22.90	0.80	0.609	1.67	B	ER	57.30	
		HS-20 (OPERATING)	36.000		2.46	88.6	1.35	0.609	2.46	B	ER	57.30	0.789	2.66	B	ER	22.90	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.03	54.4	1.40	0.609	5.75	B	ER	57.30	0.789	6.68	B	ER	22.90	0.80	0.609	4.03	B	ER	57.30	
		SNGARBS2	20.000		1.63	32.6	1.40	0.609	2.32	B	ER	57.30	0.789	2.55	B	ER	22.90	0.80	0.609	1.63	B	ER	57.30	
		SNAGRIS2	22.000		1.44	31.7	1.40	0.609	2.06	B	ER	57.30	0.789	2.29	B	ER	22.90	0.80	0.609	1.44	B	ER	57.30	
		SNCOTTS3	27.250		1.59	43.3	1.40	0.609	2.27	B	ER	57.30	0.789	2.56	B	ER	22.90	0.80	0.609	1.59	B	ER	57.30	
		SNAGGRS4	34.925		1.37	47.8	1.40	0.609	1.96	B	ER	57.30	0.789	2.22	B	ER	22.90	0.80	0.609	1.37	B	ER	57.30	
		SNS5A	35.550		2.00	71.1	1.40	0.609	2.86	B	ER	57.30	0.789	3.20	B	ER	22.90	0.80	0.609	2.00	B	ER	57.30	
		SNS6A	39.950		2.68	107.1	1.40	0.609	3.83	B	ER	57.30	0.789	4.21	B	ER	22.90	0.80	0.609	2.68	B	ER	57.30	
		SNS7B	42.000		2.88	121.0	1.40	0.609	4.11	B	ER	57.30	0.789	4.59	B	ER	22.90	0.80	0.609	2.88	B	ER	57.30	
	TRUCK TRACTOR SEMI-TRAILER (TTST1)	TNAGRIT3	33.000		1.76	58.1	1.40	0.609	2.50	B	ER	57.30	0.789	2.79	B	ER	22.90	0.80	0.609	1.76	B	ER	57.30	
		TNT4A	33.075		1.45	48.0	1.40	0.609	2.06	B	ER	57.30	0.789	2.18	B	ER	22.90	0.80	0.609	1.45	B	ER	57.30	
		TNT6A	41.600		1.39	57.8	1.40	0.609	1.98	B	ER	57.30	0.789	2.11	B	ER	22.90	0.80	0.609	1.39	B	ER	57.30	
		TNT7A	42.000		1.32	55.4	1.40	0.609	1.88	B	ER	57.30	0.789	2.07	B	ER	22.90	0.80	0.609	1.32	B	ER	57.30	
		TNT7B	42.000	3	1.31	55.0	1.40	0.609	1.87	B	ER	57.30	0.789	2.00	B	ER	22.90	0.80	0.609	1.31	B	ER	57.30	
		TNAGRIT4	43.000		1.76	75.7	1.40	0.609	2.51	B	ER	57.30	0.789	2.74	B	ER	22.90	0.80	0.609	1.76	B	ER	57.30	
		TNAGT5A	45.000		1.42	63.9	1.40	0.609	2.03	B	ER	57.30	0.789	2.33	B	ER	22.90	0.80	0.609	1.42	B	ER	57.30	
		TNAGT5B	45.000		1.42	63.9	1.40	0.609	2.02	B	ER	57.30	0.789	2.29	B	ER	22.90	0.80	0.609	1.42	B	ER	57.30	

LOAD FACTORS:

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

NOTES:

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

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

LOAD RATING BASED ON SIMPLY SUPPORTED SPAN ANALYSIS.

SPAN LENGTHS IN LRFR SUMMARY SKETCH BELOW ARE THOSE USED IN ANALYSIS MODEL AND REPRESENT PLAN VIEW SPAN LENGTHS FROM ℄ BEARING TO ℄ BEARING.

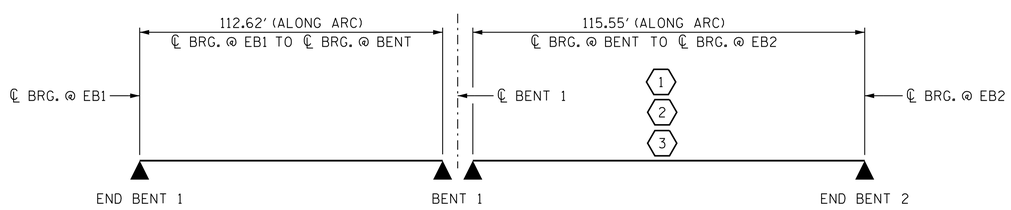
(#) CONTROLLING LOAD RATING

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

GIRDER

54"PRESTRESSED CONCRETE FLORIDA I-BEAM GIRDER

AREA = 933 SQ. IN.
WEIGHT = 972 LB/FT.
Y_{bottom} = 24.04 IN.
Y_{top} = 29.96 IN.
Ixx = 359,929 IN.^{4}
Iyy = 81,584 IN.^{4}
V/S = 3.84 IN.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 36+78.38 -RAMP A-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-06
1			3			TOTAL SHEETS
2			4			43

STD. NO. LRFR1

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ASSEMBLED BY : V. E. FRAGA DATE : 6/2/18
CHECKED BY : T. N. ENNIS DATE : 8/14/18

DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08

REV.		
REV. 11/12/08RR	MAA/GM	
REV. 10/1/11	MAA/GM	
REV. 12/17	MAA/THC	

DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE .05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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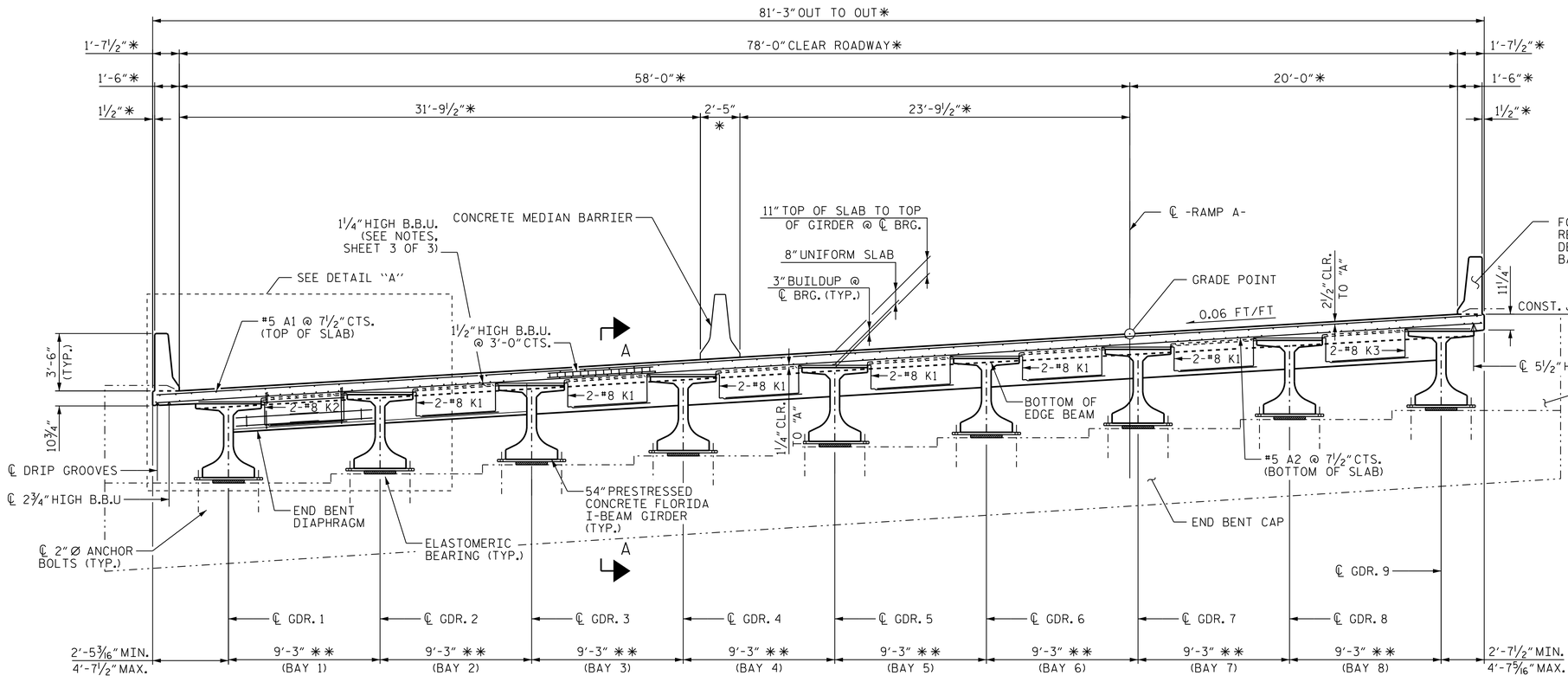


NOTES

SEE "SUPERSTRUCTURE TYPICAL SECTION", SHEET 3 OF 3 FOR NOTES.

FOR #4 B1 (2 BR) OR B2 (3 BR) SPACING, SEE TYPICAL SECTION (MIDSPAN) SHEET 2 OF 3.

FOR #6 B5 (5 BR) SPACING, SEE TYPICAL SECTION (MIDSPAN) SHEET 2 OF 3.

* DENOTES RADIAL DIMENSION

** NOMINAL DIMENSION. GIRDERS ARE PLACED ALONG CHORDS INTERSECTING CONCENTRIC ARCS AT END BENT FILL FACES AND BENT CONTROL LINE. SEE FRAMING PLAN FOR MORE DETAIL ON GIRDER PLACEMENT.

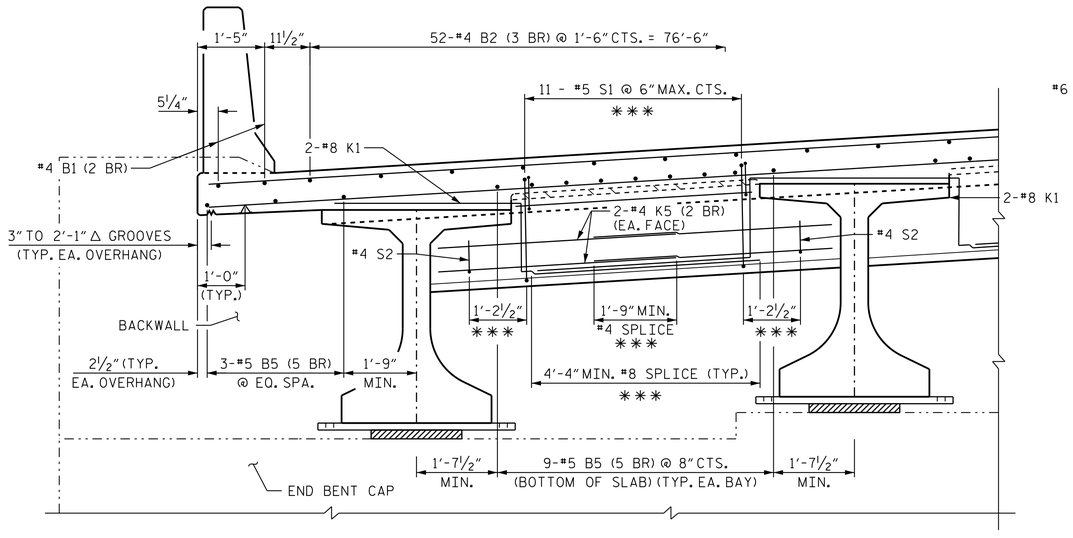
*** DIMENSION IS MEASURED ALONG ℄ END BENT.

(2 BR) DENOTES 2 BAR RUN
(3 BR) DENOTES 3 BAR RUN
(5 BR) DENOTES 5 BAR RUN

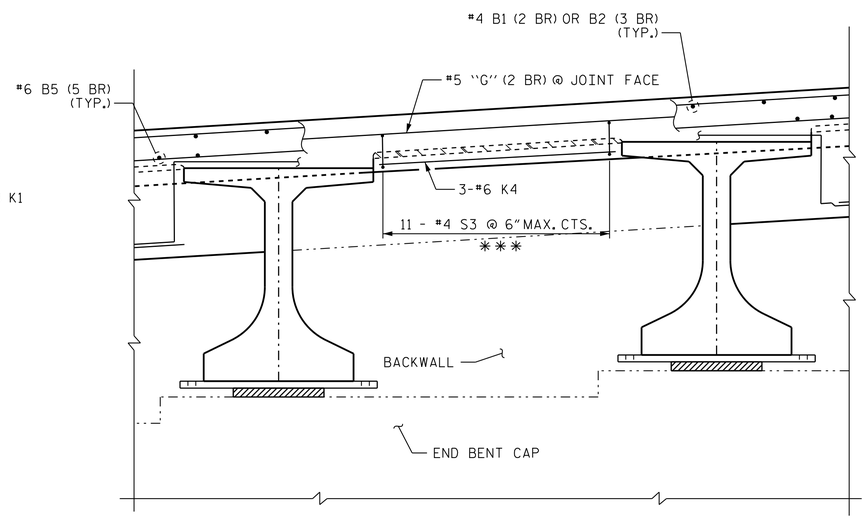
SEE SHEET 3 OF 3 FOR SECTION A-A.

TYPICAL SECTION - AT END BENTS

SECTION AT END BENT 2, END BENT 1 SECTION SIMILAR



DETAIL "A"



DETAIL BEHIND END BENT DIAPHRAGM

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION (END BENTS)

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www.stantec.com
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DRAWN BY : M. B. ISENHOUR DATE : 12/20/22
CHECKED BY : V. E. FRAGA DATE : 01/05/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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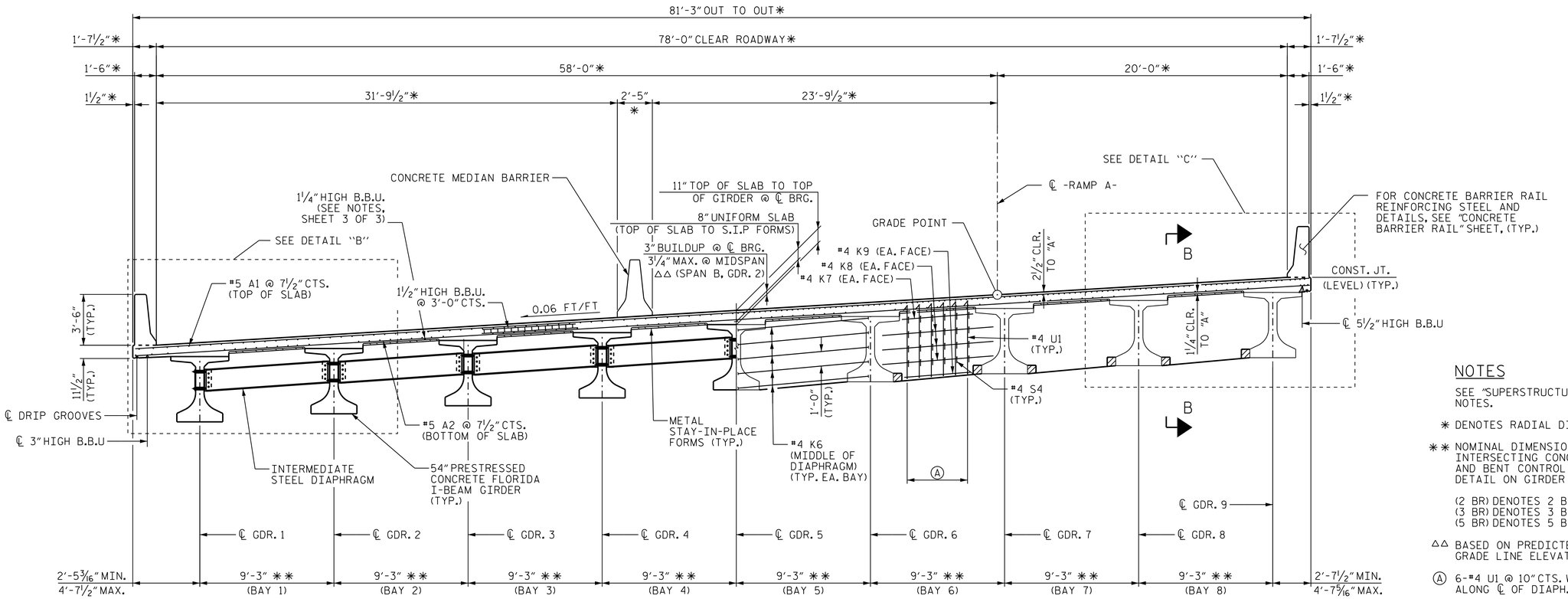
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-07
1			3			TOTAL SHEETS
2			4			43



MIDSPAN SECTION

SECTION AT INTERIOR BENT DIAPHRAGM

NOTES

SEE "SUPERSTRUCTURE TYPICAL SECTION", SHEET 3 OF 3 FOR NOTES.

* DENOTES RADIAL DIMENSION

** NOMINAL DIMENSION. GIRDERS ARE PLACED ALONG CHORDS INTERSECTING CONCENTRIC ARCS AT END BENT FILL FACES AND BENT CONTROL LINE. SEE FRAMING PLAN FOR MORE DETAIL ON GIRDER PLACEMENT.

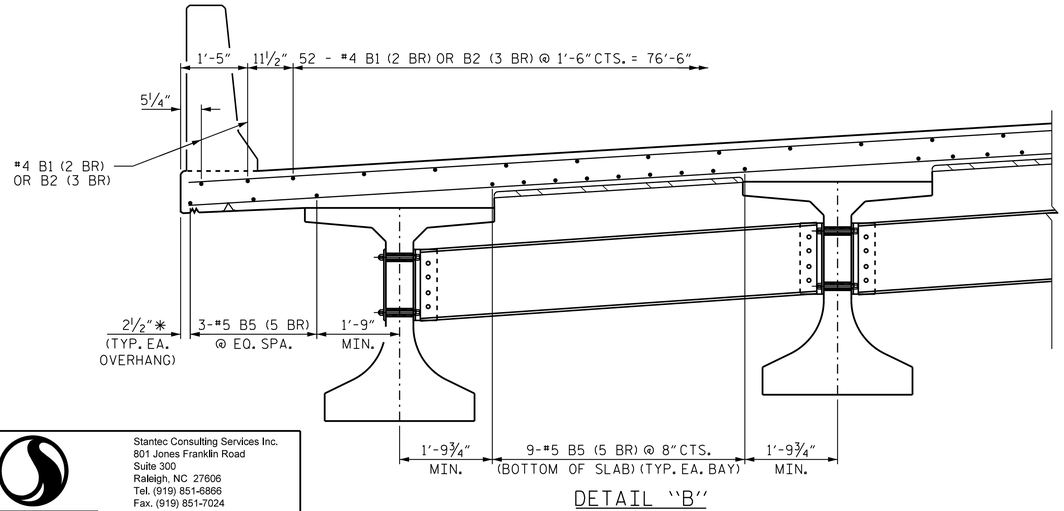
(2 BR) DENOTES 2 BAR RUN
(3 BR) DENOTES 3 BAR RUN
(5 BR) DENOTES 5 BAR RUN

△△ BASED ON PREDICTED FINAL CAMBER AND THEORETICAL GRADE LINE ELEVATIONS

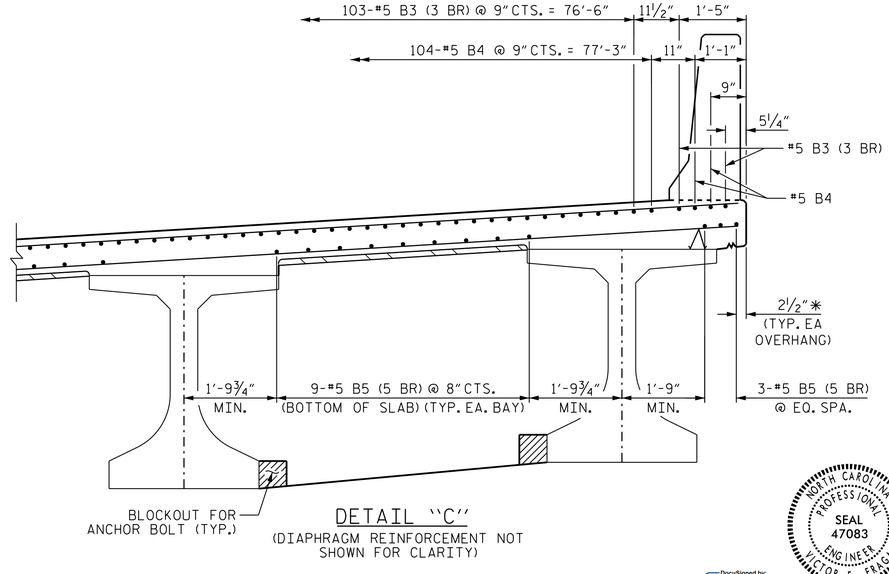
Ⓐ 6-#4 U1 @ 10" CTS. W/ 24-#4 S4 PLACED AS SHOWN (SPA. ALONG ℄ OF DIAPH.) (TYP. EA. BAY)

SEE SHEET 3 OF 3 FOR SECTION B-B

TYPICAL SECTION - SPAN A OR SPAN B



DETAIL "B"



DETAIL "C"
(DIAPHRAGM REINFORCEMENT NOT SHOWN FOR CLARITY)

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION (MIDSPAN)

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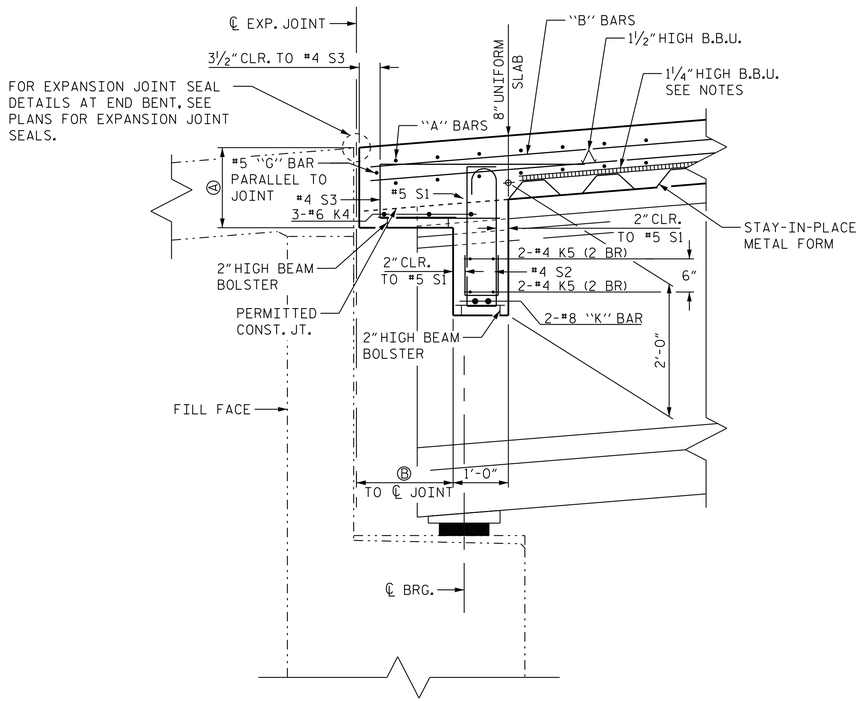
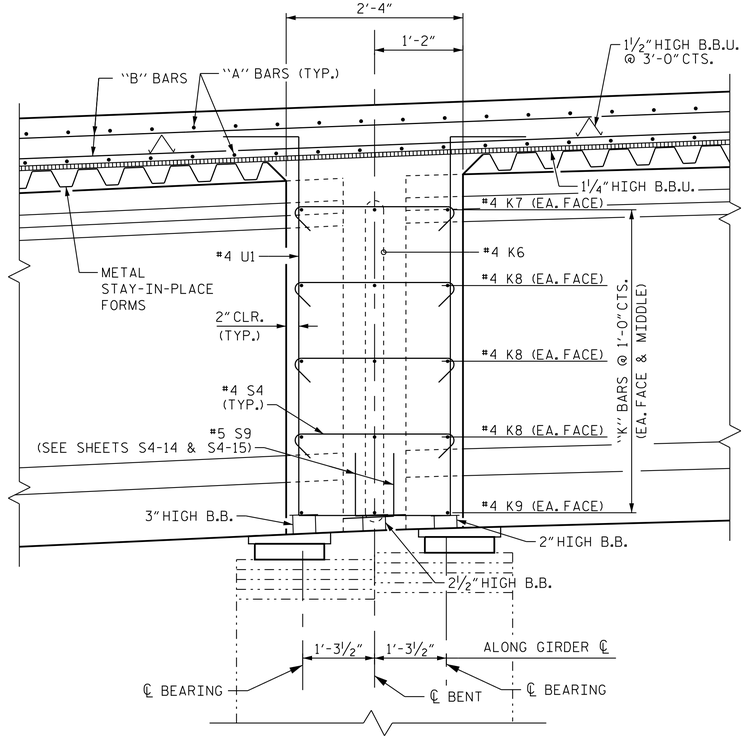


Ⓐ : 1'-2" @ END BENT 1; 1'-3" @ END BENT 2
Ⓑ : 1'-10" @ END BENT 1; 1'-10" @ END BENT 2

SECTION A-A

SECTION THROUGH END BENT DIAPHRAGM



SECTION B-B

SECTION THROUGH INTERIOR BENT DIAPHRAGM

NOTES

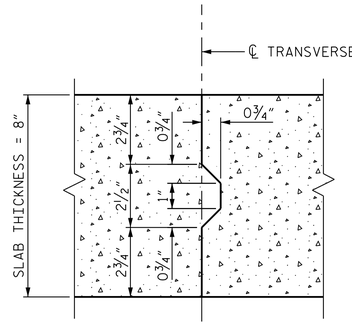
PROVIDE 1¼" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF "A" BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE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

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

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILDUPS.

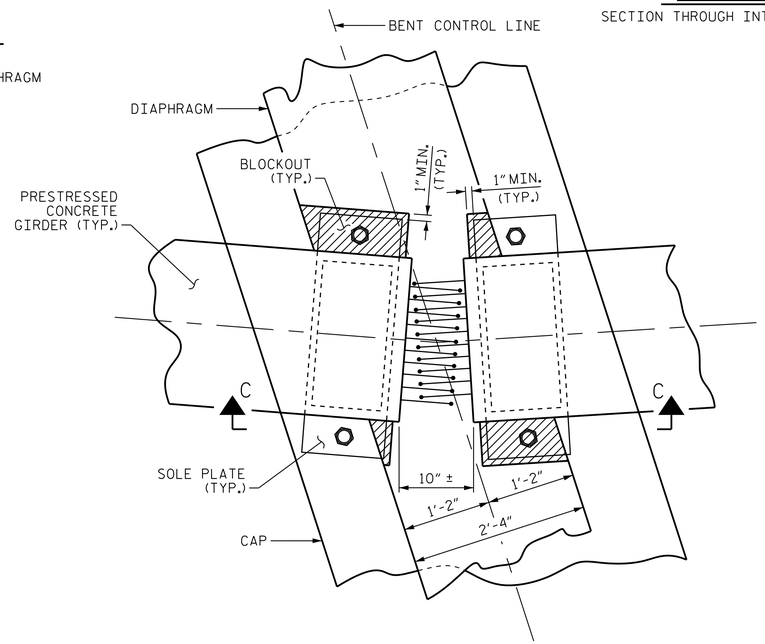
PREVIOUSLY CAST CONCRETE IN A CONTINUOUS UNIT SHALL HAVE ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI BEFORE ADDITIONAL CONCRETE IS CAST IN THE UNIT.

#5 G1 BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.

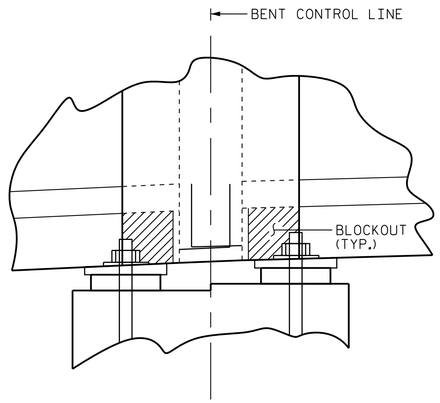


TRANSVERSE CONST. JOINT DETAIL

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



BENT DIAPHRAGM BLOCK-OUT DETAIL



SECTION C-C

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 36+78.38 -RAMP A-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
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SUPERSTRUCTURE

TYPICAL SECTION DETAILS

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NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E FRAGA

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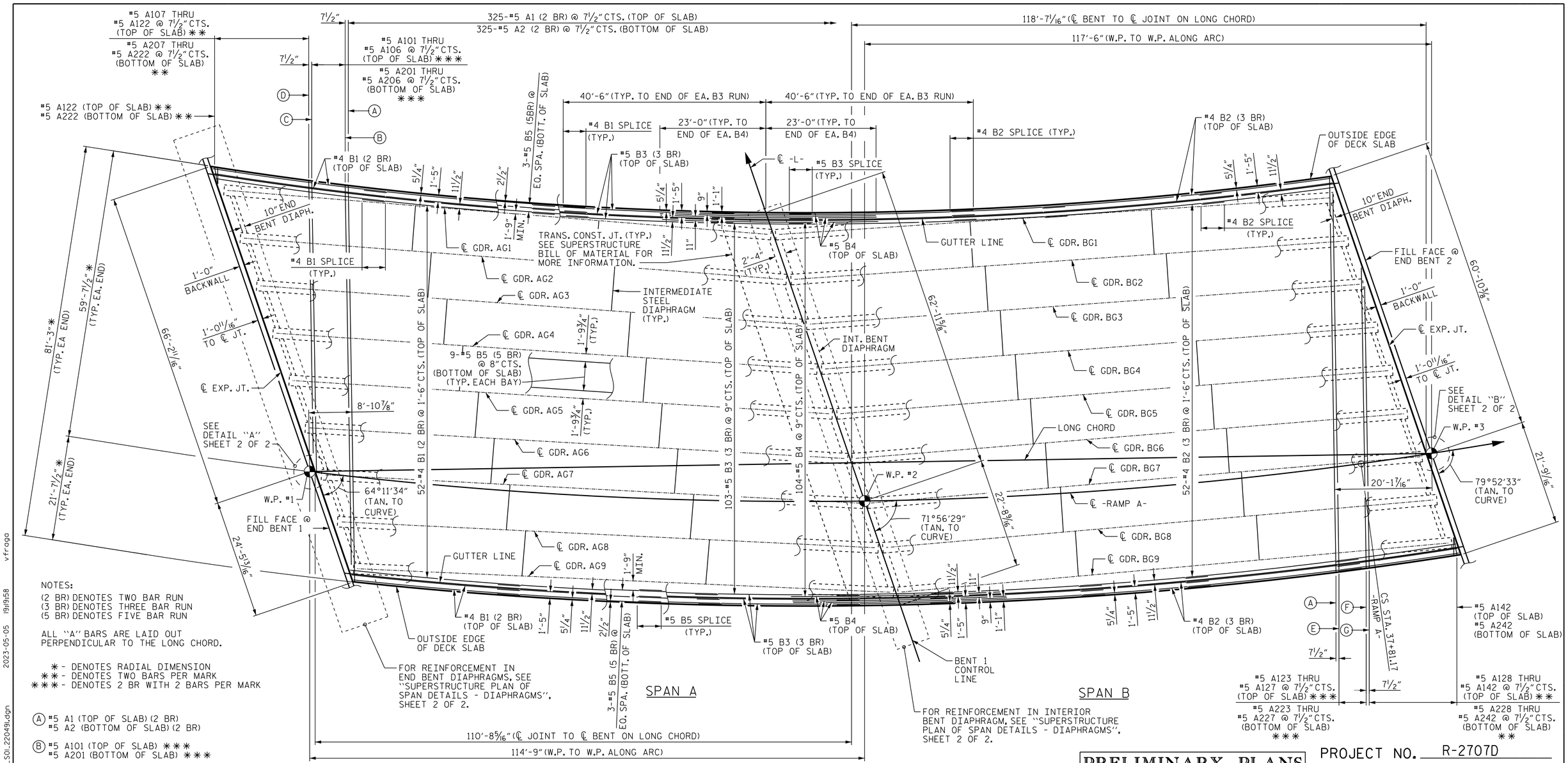

NOTES:

(2 BR) DENOTES TWO BAR RUN
(3 BR) DENOTES THREE BAR RUN
(5 BR) DENOTES FIVE BAR RUN

ALL "A" BARS ARE LAID OUT PERPENDICULAR TO THE LONG CHORD.

* - DENOTES RADIAL DIMENSION
** - DENOTES TWO BARS PER MARK
*** - DENOTES 2 BR WITH 2 BARS PER MARK

Ⓐ #5 A1 (TOP OF SLAB) (2 BR)
#5 A2 (BOTTOM OF SLAB) (2 BR)

Ⓑ #5 A101 (TOP OF SLAB) ***
#5 A201 (BOTTOM OF SLAB) ***

Ⓒ #5 A106 (TOP OF SLAB) ***
#5 A206 (BOTTOM OF SLAB) ***

Ⓓ #5 A107 (TOP OF SLAB) **
#5 A207 (BOTTOM OF SLAB) **

Ⓔ #5 A123 (TOP OF SLAB) ***
#5 A223 (BOTTOM OF SLAB) ***

Ⓕ #5 A127 (TOP OF SLAB) ***
#5 A227 (BOTTOM OF SLAB) ***

Ⓖ #5 A128 (TOP OF SLAB) **
#5 A228 (BOTTOM OF SLAB) **

SPLICES

BAR	SIZE	MIN. SPLICE
B1, B2	#4	1'-11"
B3	#5	2'-5"
B5	#5	2'-0"
G1, G2	#5	2'-5"
A1, A101-A106, A123-A127	#5	2'-5"
A2, A201-A206, A223-A227	#5	2'-0"
K5	#4	1'-7"

PLAN OF SPANS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 36+78.38 -RAMP A-

SHEET 1 OF 2

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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SUPERSTRUCTURE

PLAN OF SPANS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47083 VICTOR E. FRAGA
DocuSigned by: Victor E. Fraga 5/9/2023

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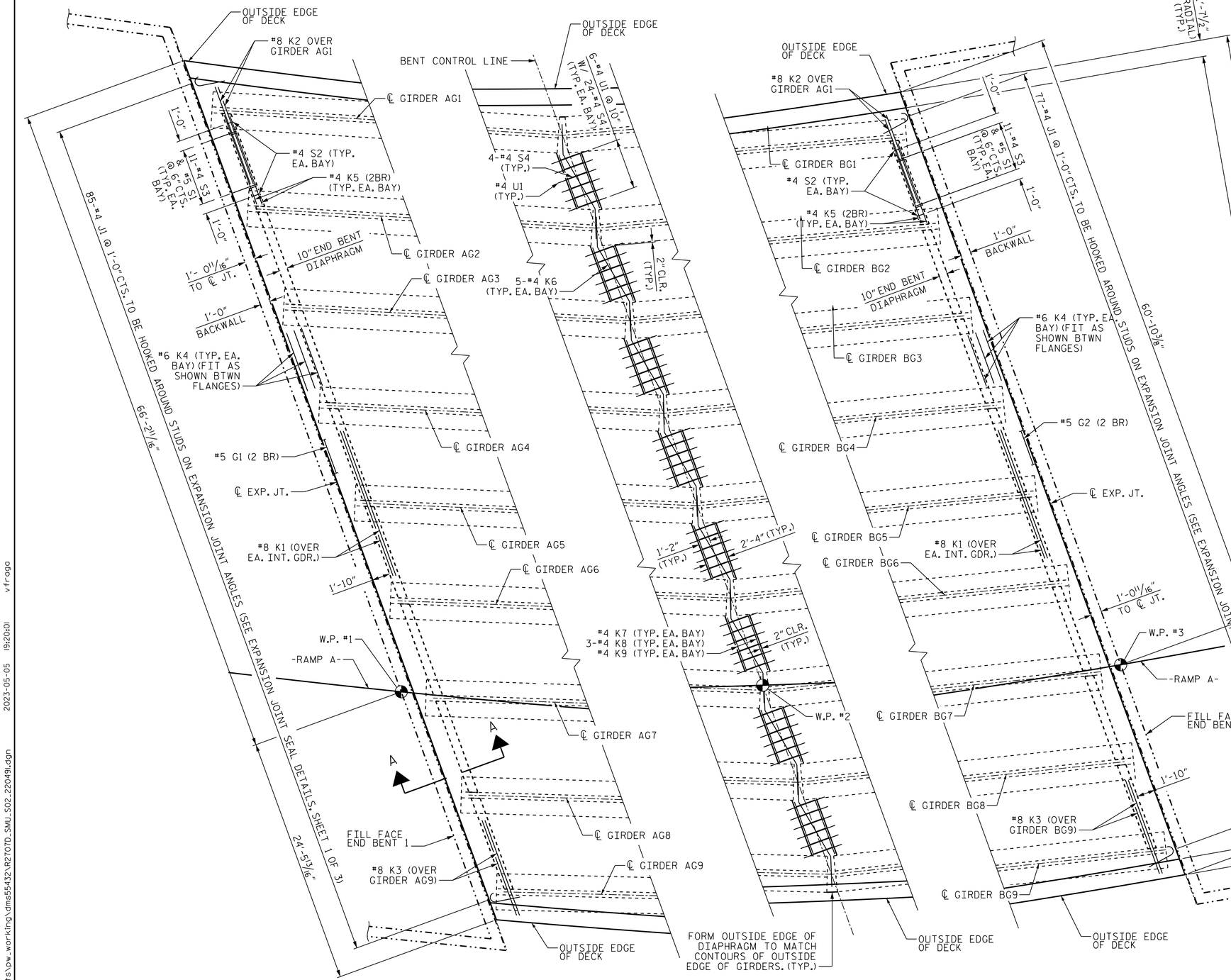


END BENT 1
DIAPHRAGM
REINFORCING

INTERIOR BENT 1
DIAPHRAGM
REINFORCING

END BENT 2
DIAPHRAGM
REINFORCING

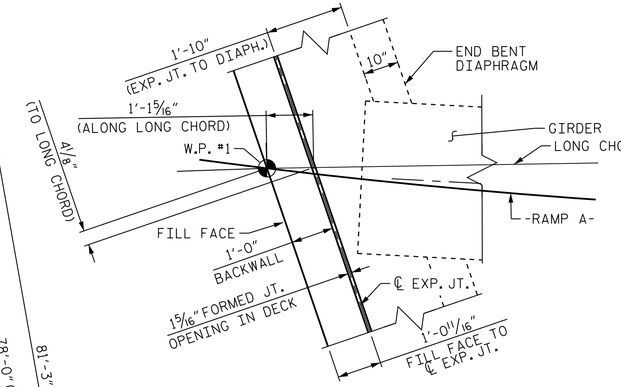
NOTES

REINFORCEMENT IN DECK AND BARRIER RAIL NOT SHOWN FOR CLARITY.

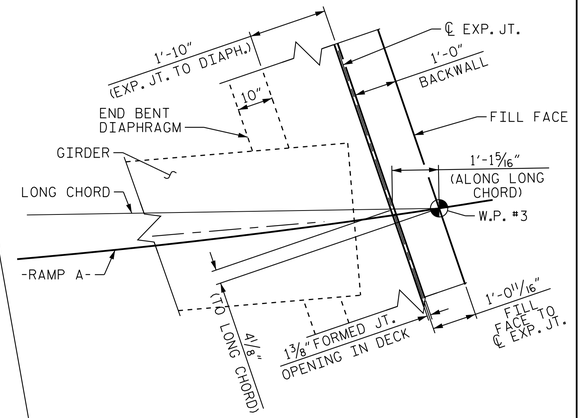
FOR SECTION A-A, SEE SUPERSTRUCTURE "TYPICAL SECTION DETAILS", SH 3 OF 3.

(2 BR) DENOTES TWO BAR RUN

SHIFT "U" AND "S" BARS IN INTERIOR BENT DIAPHRAGM AS NECESSARY TO PROVIDE MINIMUM 2" CLEARANCE TO TOP FLANGE.



DETAIL "A"



DETAIL "B"

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
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SUPERSTRUCTURE

PLAN OF SPANS
DETAILS - DIAPHRAGMS

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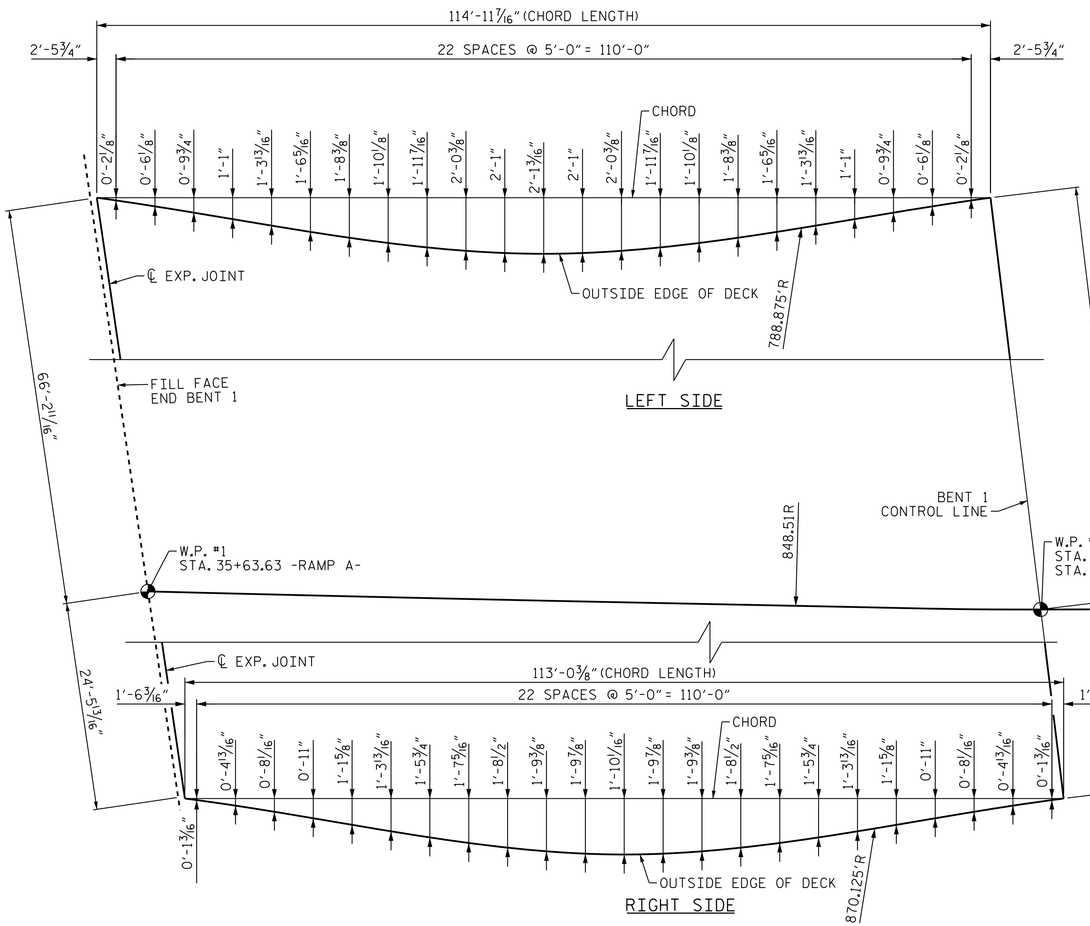
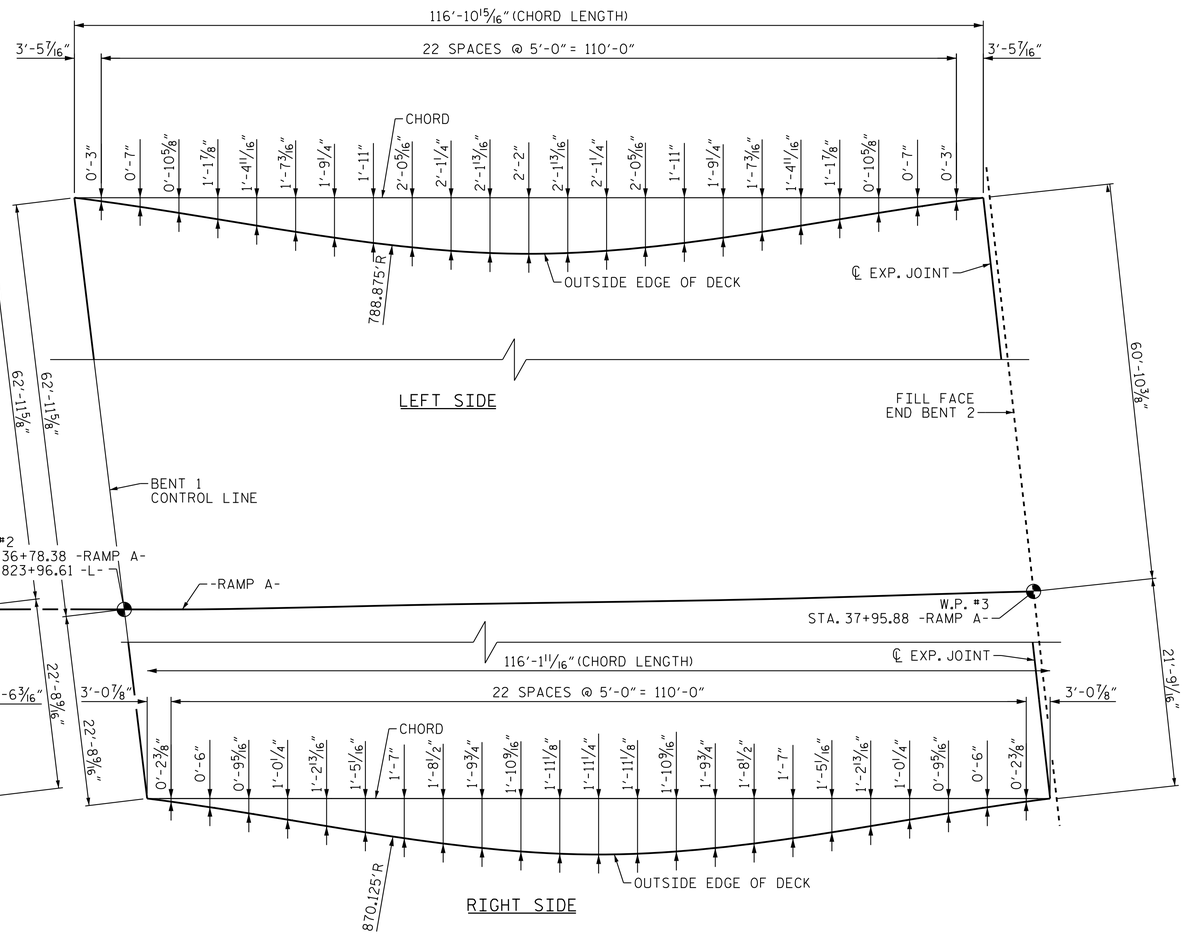


ARC OFFSETS- SPAN A



ARC OFFSETS- SPAN B

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SUPERSTRUCTURE

CHORD TO ARC OFFSETS

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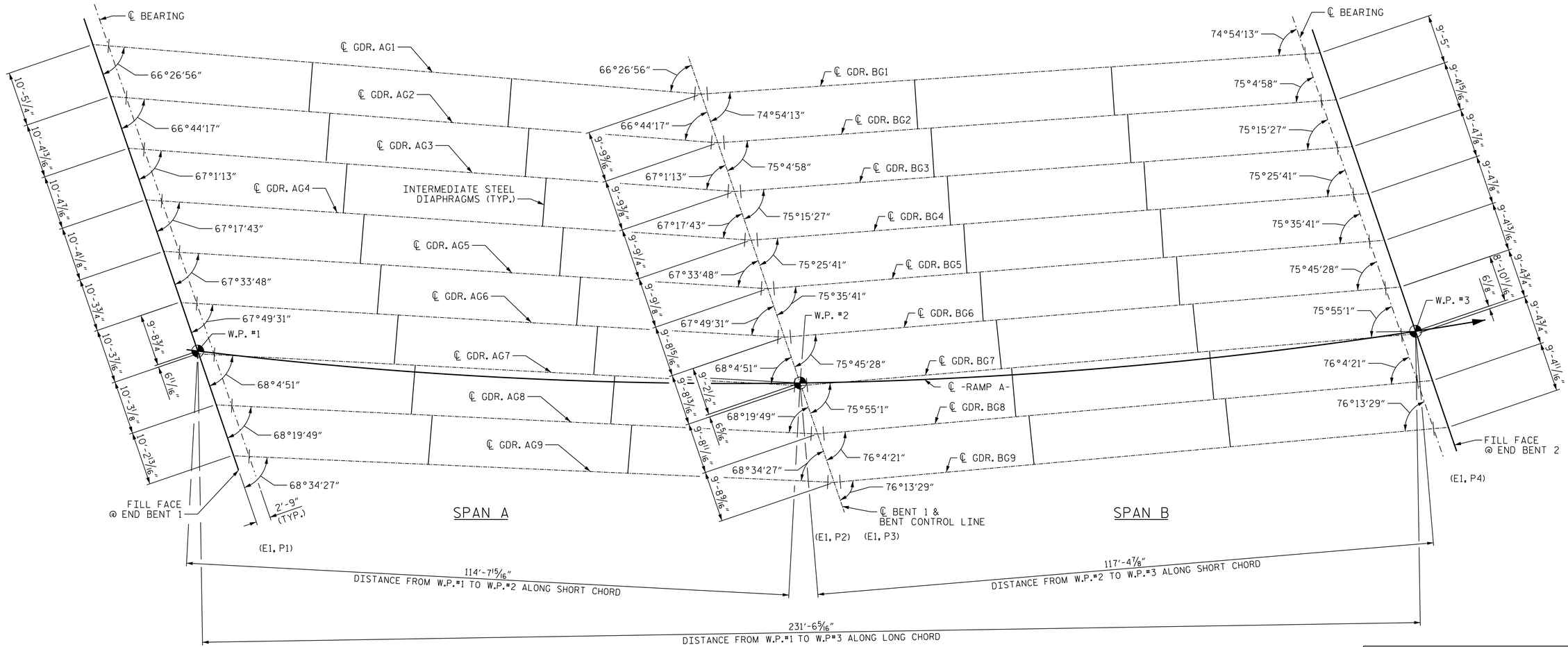

FRAMING PLAN

SEE GIRDER DETAILS FOR DIAPHRAGM LOCATIONS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

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SUPERSTRUCTURE

FRAMING PLAN

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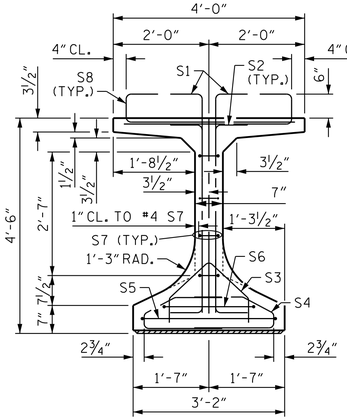
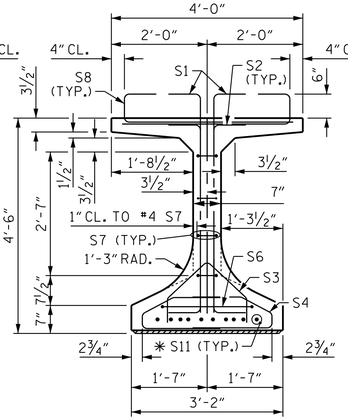
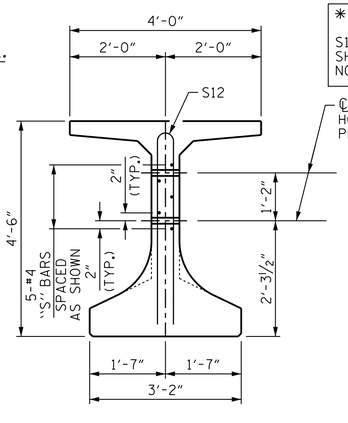


SECTION A-A



SECTION B-B



SECTION C-C

(S8, S9, AND S10 BARS NOT SHOWN)

* FOR S11 BARS, SEE DETAIL "C" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET.

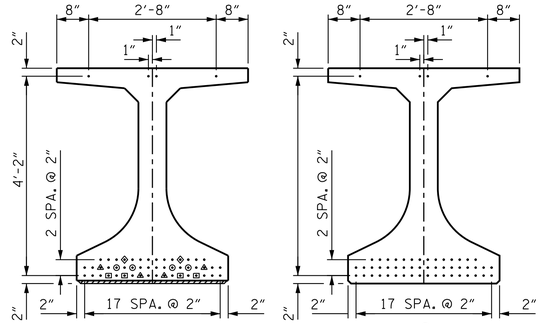
* NOTE:

S11 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

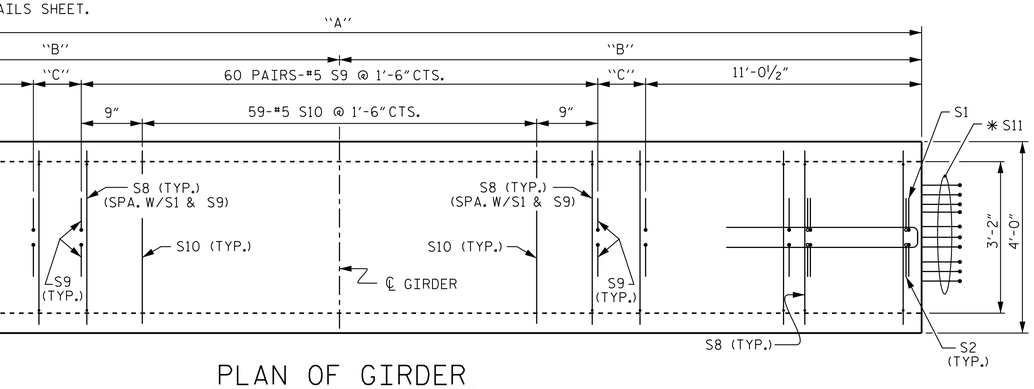
℄ 1½" * FORMED HOLE. (SEE FRAMING PLAN FOR LOCATION)

DEBONDING LEGEND

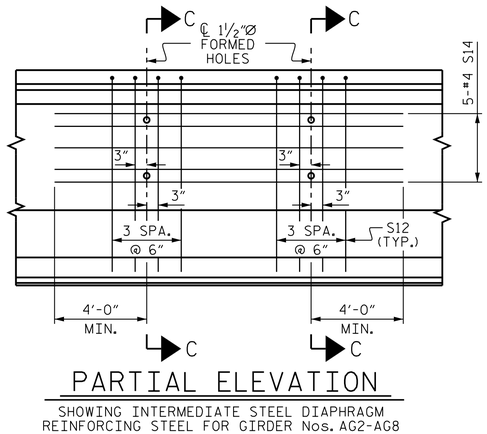
- ● FULLY BONDED STRANDS
- ▣ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ▲ STRANDS DEBONDED FOR 7'-0" FROM END OF GIRDER
- ◉ STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- ◈ STRANDS DEBONDED FOR 13'-0" FROM END OF GIRDER



0.6"Ø LOW RELAXATION STAND LAYOUT

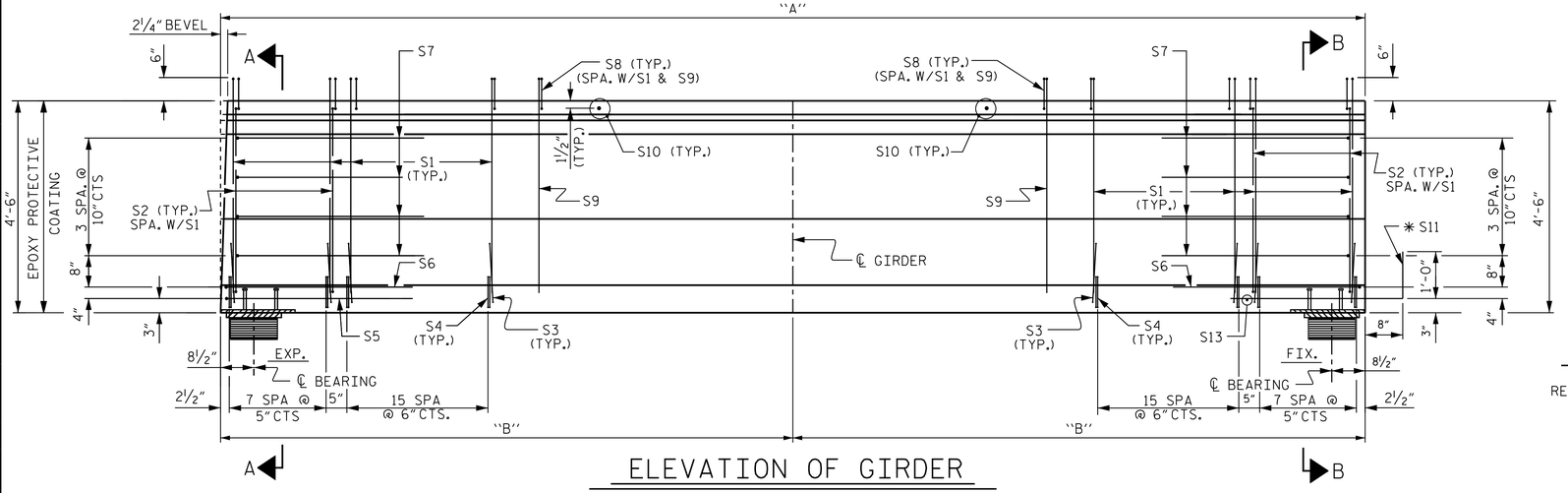


PLAN OF GIRDER

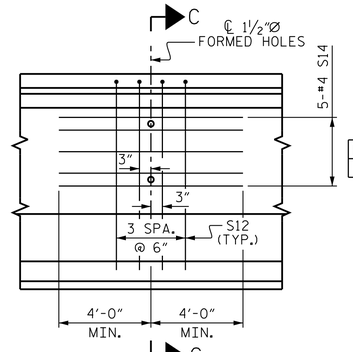


PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. AG2-AG8



ELEVATION OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. AG1 & AG9

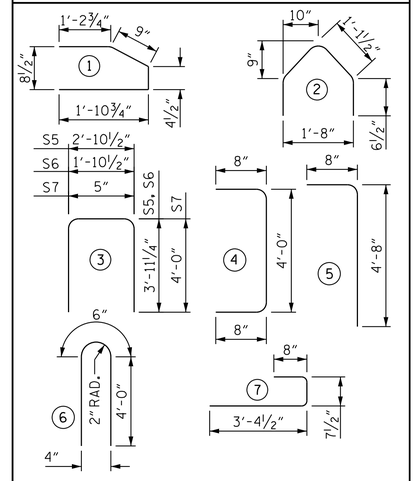
0.6"Ø L.R. GRADE 270 STRANDS

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

REINFORCING STEEL FOR ONE GDR

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	96	#5	5	5'-4"	534
	S2	32	#5	4	5'-4"	178
	S3	48	#3	2	3'-4"	60
	S4	96	#3	1	4'-3"	153
	S5	1	#5	3	10'-9"	11
	S6	2	#5	3	9'-9"	20
	S7	8	#4	3	8'-5"	45
	S8	216	#5	7	4'-8"	1,051
	S9	120	#5	5	5'-4"	668
	S10	59	#5	STR	3'-8"	226
	S11	10	#6	STR	4'-8"	70
EXTERIOR GDR.	S12	8	#5	6	8'-6"	71
INTERIOR GDR.	S12	16	#5	6	8'-6"	142
	S13	1	#3	STR	2'-10"	1
	S14	10	#4	STR	12'-0"	80

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9,000 PSI CONCRETE	0.6"* L.R. STRANDS
	LB.	AVERAGE C.Y.	No.
EXT. GDR.	3,168	26.9	54
INT. GDR.	3,239		

GIRDERS REQUIRED

NUMBER	AVERAGE LENGTH	TOTAL LENGTH
9	112'-3 3/16"	1,010.3

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

54" PRESTRESSED CONCRETE FLORIDA I-BEAM GIRDER CONTINUOUS FOR LIVE LOAD

(SPAN A)

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DRAWN BY : M. B. ISENHOUR DATE : 12/6/22
CHECKED BY : V. E. FRAGA DATE : 05/05/23

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GIRDER DIMENSION TABLE (ALONG SLOPE)

	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9
"A"	113'-2"	112'-11"	112'-8 1/8"	112'-5 3/8"	112'-2 3/4"	112'-0 1/4"	111'-9 3/4"	111'-7 3/8"	111'-5 1/8"
"B"	56'-7"	56'-5 1/2"	56'-4 1/16"	56'-2 11/16"	56'-1 3/8"	56'-0 1/8"	55'-10 7/8"	55'-9 11/16"	55'-8 9/16"
"C"	1'-3 1/2"	1'-2"	1'-0 9/16"	11 3/16"	9 1/8"	8 5/8"	7 3/8"	6 3/16"	5 1/16"

STATE OF NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

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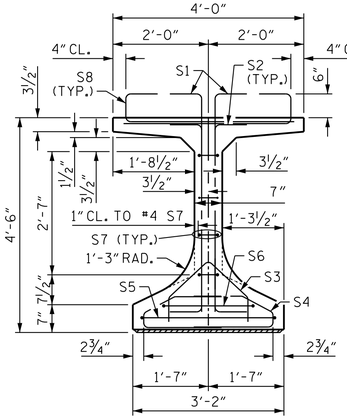
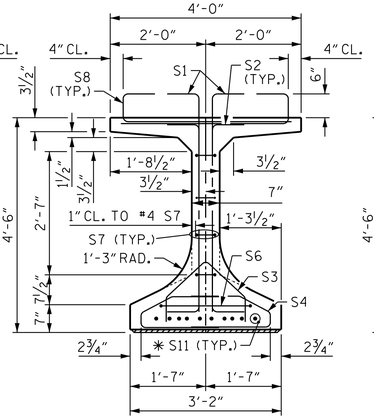
1			3			TOTAL SHEETS
2			4			43

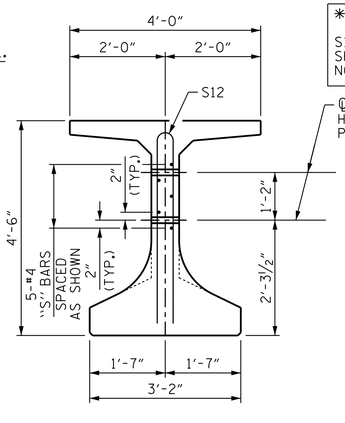


SECTION A-A



SECTION B-B

✱ FOR S11 BARS, SEE DETAIL "C" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET.



SECTION C-C

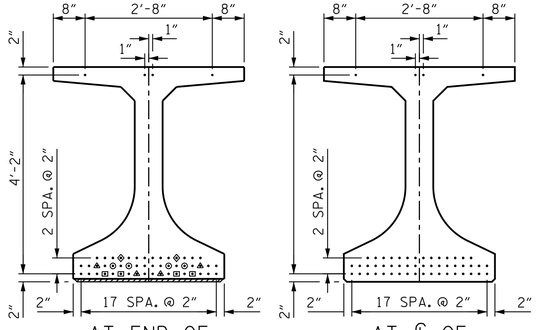
(S8, S9, AND S10 BARS NOT SHOWN)

✱ NOTE:

S11 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

DEBONDING LEGEND

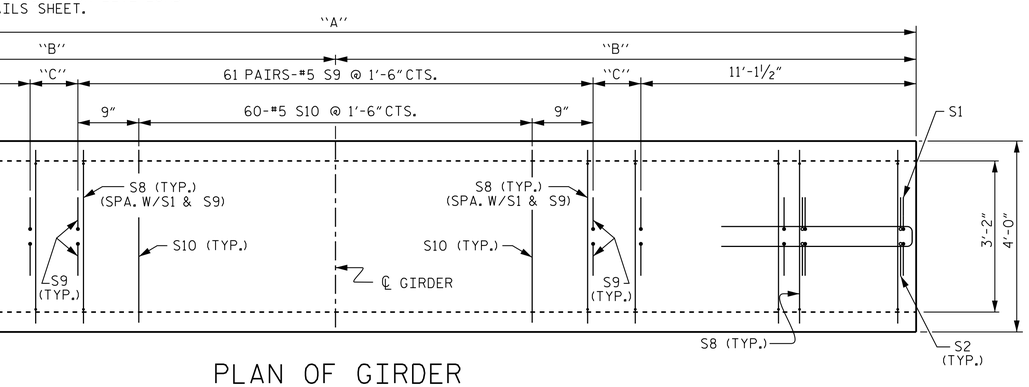
- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 7'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 10'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 13'-0" FROM END OF GIRDER



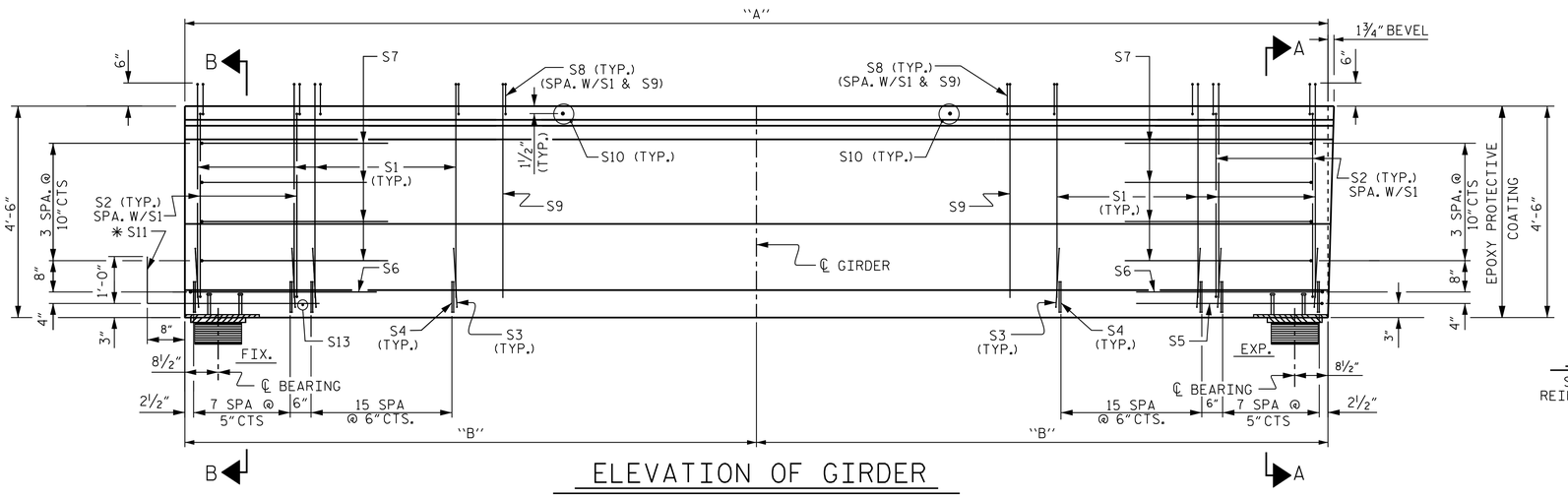
AT END OF GIRDER

AT ℄ OF GIRDER

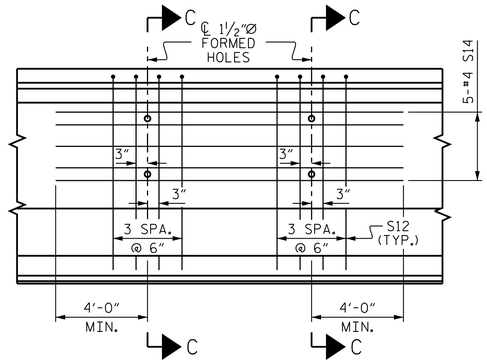
0.6"Ø LOW RELAXATION STAND LAYOUT



PLAN OF GIRDER

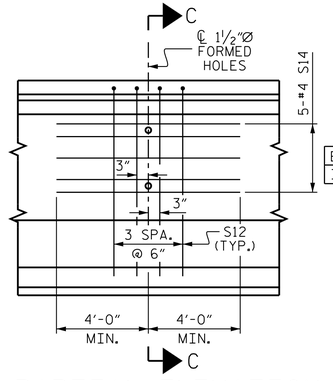


ELEVATION OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. BG2-BG8



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. BG1 & BG9

0.6"Ø L. R. GRADE 270 STRANDS

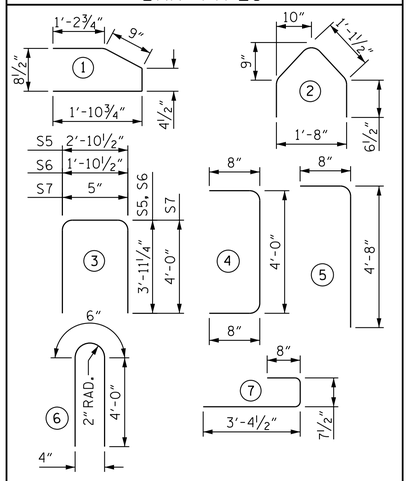
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	96	#5	5	5'-4"	534
S2	32	#5	4	5'-4"	178
S3	48	#3	2	3'-4"	60
S4	96	#3	1	4'-3"	153
S5	1	#5	3	10'-9"	11
S6	2	#5	3	9'-9"	20
S7	8	#4	3	8'-5"	45
S8	218	#5	7	4'-8"	1,061
S9	122	#5	5	5'-4"	679
S10	60	#5	STR	3'-8"	229
S11	10	#6	STR	4'-8"	70
S12	8	#5	6	8'-6"	71
S12	16	#5	6	8'-6"	142
S13	1	#3	STR	2'-10"	1
S14	10	#4	STR	12'-0"	80

EXTERIOR GDR.
INTERIOR GDR.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

REINFORCING STEEL	9,000 PSI CONCRETE	0.6"✱ L.R. STRANDS
LB.	AVERAGE C.Y.	No.
EXT. GDR. 3,192	27.6	54
INT. GDR. 3,263		

GIRDERS REQUIRED

NUMBER	AVERAGE LENGTH	TOTAL LENGTH
9	114'-10 3/16"	1033.6

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

54" PRESTRESSED CONCRETE FLORIDA I-BEAM GIRDER CONTINUOUS FOR LIVE LOAD

(SPAN B)

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DRAWN BY : M. B. ISENHOUR DATE : 12/07/22
CHECKED BY : V. E. FRAGA DATE : 01/12/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

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GIRDER DIMENSION TABLE (ALONG GIRDER SLOPE)

	GIRDER 1	GIRDER 2	GIRDER 3	GIRDER 4	GIRDER 5	GIRDER 6	GIRDER 7	GIRDER 8	GIRDER 9
"A"	115'-2 7/8"	115'-1¾"	115'-0 5/8"	114'-10 7/16"	114'-9⅛"	114'-8 5/16"	114'-7 7/16"	114'-7"	114'-6"
"B"	57'-7 7/16"	57'-6⅞"	57'-6 5/16"	57'-5 7/16"	57'-4 5/16"	57'-4 5/16"	57'-3 15/16"	57'-3½"	57'-3"
"C"	1'-5 15/16"	1'-5⅜"	1'-4 13/16"	1'-3 15/16"	1'-3 7/16"	1'-2 13/16"	1'-2 7/16"	1'-2"	1'-1½"

DocuSigned by: Victor E. Fraga
5/10/2023

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NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

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1			3			TOTAL SHEETS
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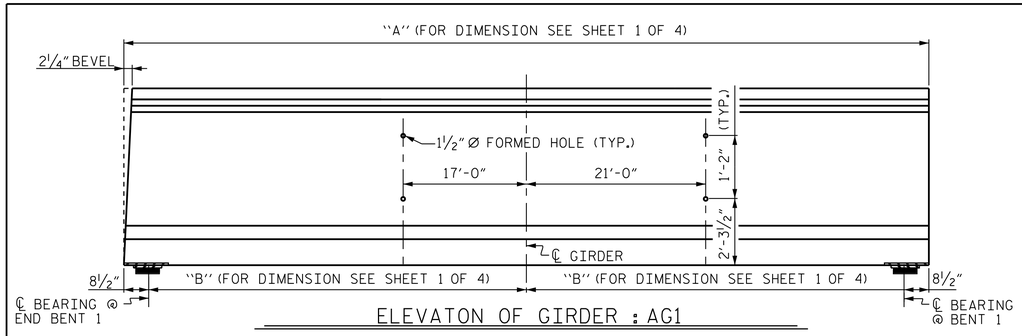
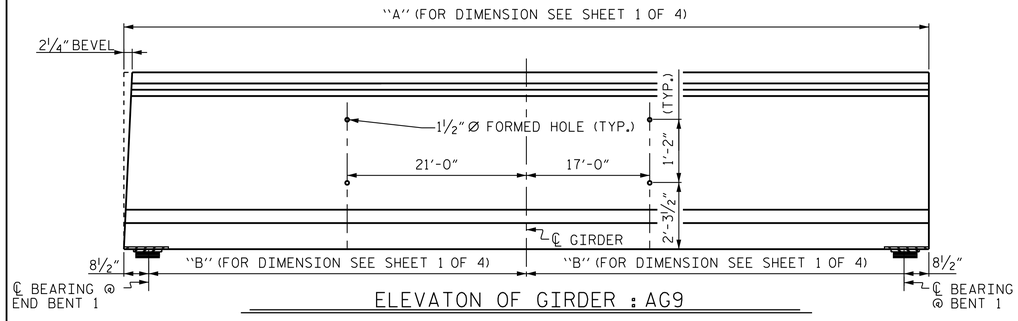
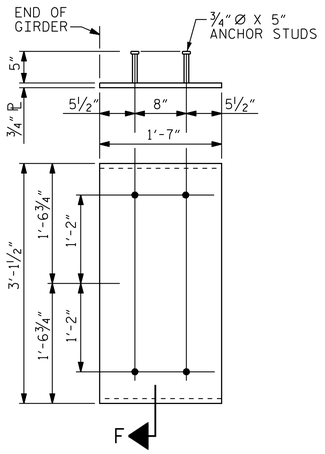


ELEVATON OF GIRDER : AG1

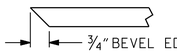


ELEVATON OF GIRDER : AG9



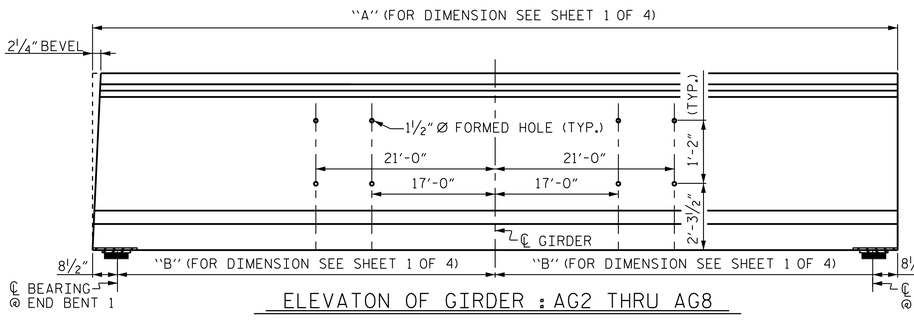
EMBEDDED PLATE "B-1" DETAILS FOR FIB GIRDER

(2 REQ'D PER GIRDER)



SECTION "F"

(SEE NOTES)



ELEVATON OF GIRDER : AG2 THRU AG8

NOTES

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

ALL REINFORCING STEEL SHALL BE GRADE 60.

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

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

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

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

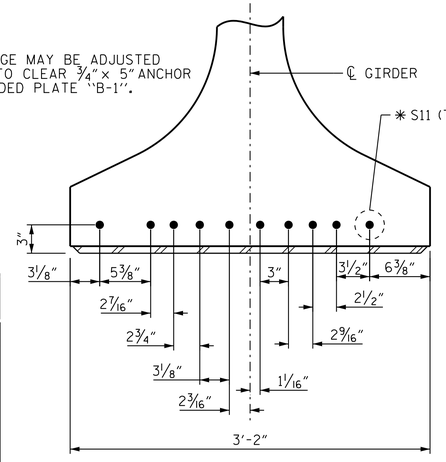
THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,000 PSI.

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

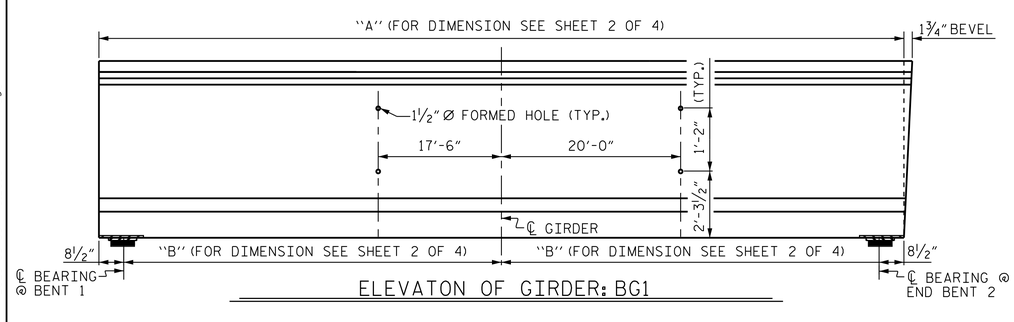
THE TOP SURFACE OF THE GIRDER, EXCLUDING THE OUTSIDE 4", SHALL BE RAKED TO A DEPTH OF 1"±4", UNLESS NOTED OTHERWISE.

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

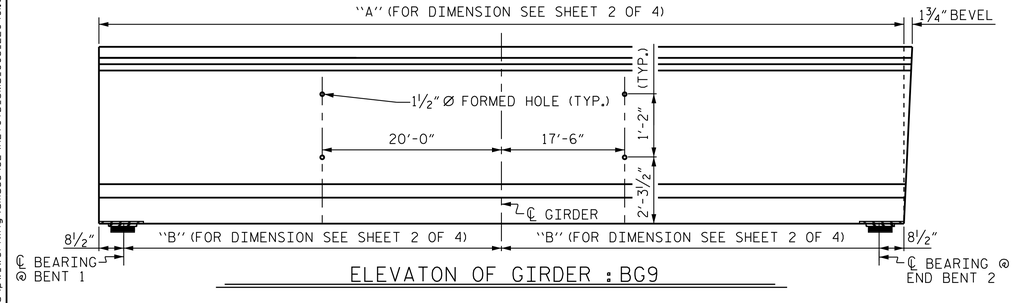
S11 BARS IN BOTTOM FLANGE MAY BE ADJUSTED SLIGHTLY AS NECESSARY TO CLEAR ¾" x 5" ANCHOR STUDS MOUNTED ON EMBEDDED PLATE "B-1".



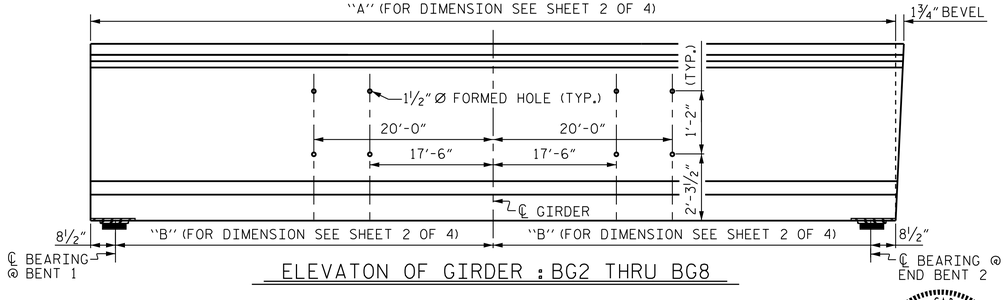
DETAIL "C"



ELEVATON OF GIRDER: BG1



ELEVATON OF GIRDER : BG9



ELEVATON OF GIRDER : BG2 THRU BG8

DIAPHRAGM HOLE LOCATION PER GIRDER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

54" PRESTRESSED CONCRETE FLORIDA I-BEAM GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

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CHECKED BY : V. E. FRAGA DATE : 01/12/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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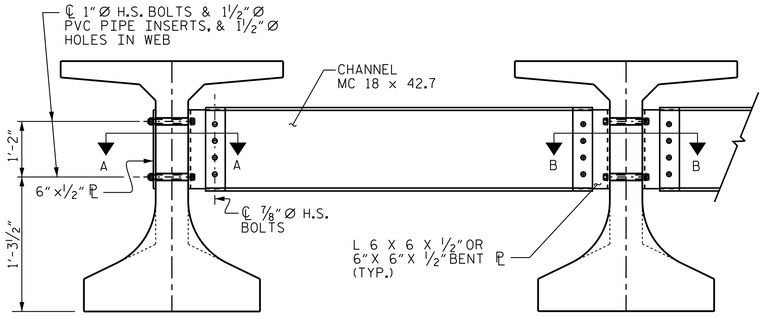
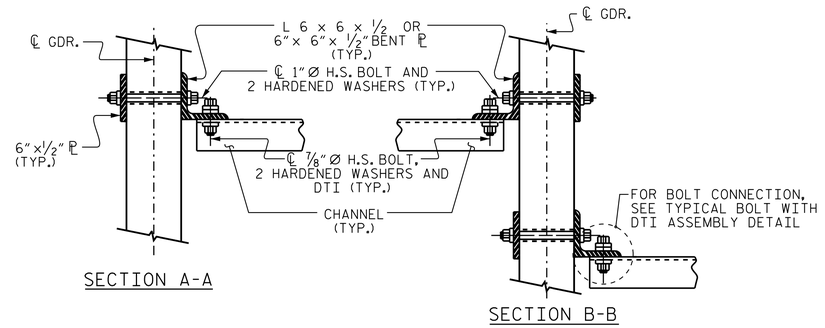


EXTERIOR GIRDER INTERIOR GIRDER

PART SECTION AT INTERMEDIATE DIAPHRAGM

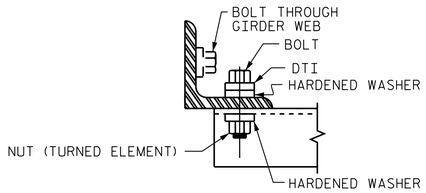


SECTION A-A

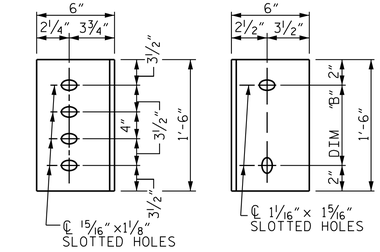
SECTION B-B

CONNECTION DETAILS

(SKEW > 110° SHOWN, SKEW < 70° SIM.)

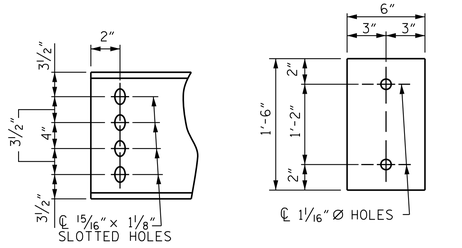


BOLT WITH DTI ASSEMBLY DETAIL



DIAPHRAGM FACE WEB FACE

CONNECTOR PLATE DETAILS



CHANNEL END PLATE DETAILS

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 ¼ 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 ¼" PROJECTION BEYOND THE NUT.

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

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

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

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
INTERMEDIATE STEEL DIAPHRAGMS FOR 54" PRESTRESSED CONCRETE FLORIDA I-BEAM GIRDERS

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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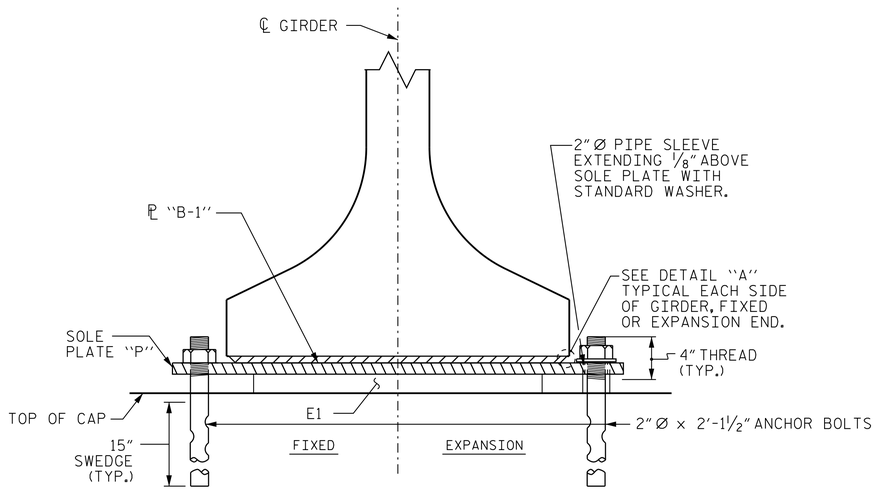
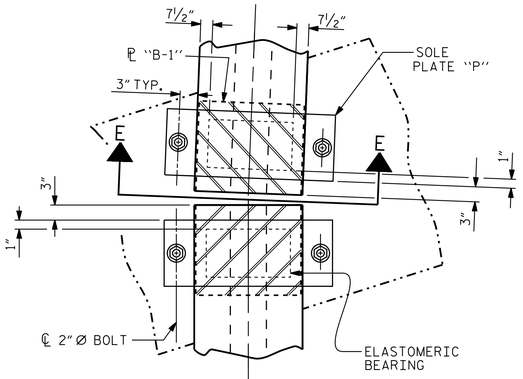
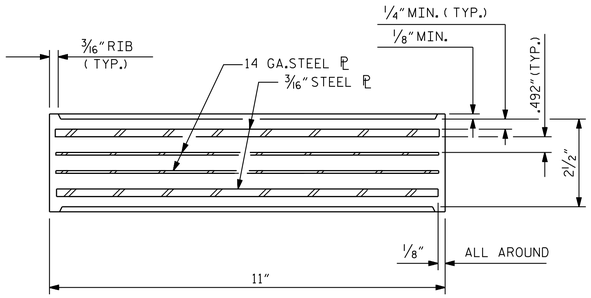


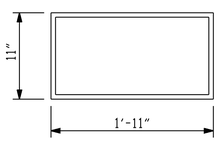
SECTION E-E



TYPICAL PLAN
(SHOWING FIXED INTERIOR BENT)

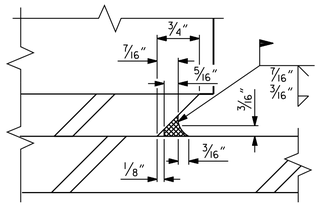


TYPICAL SECTION OF ELASTOMERIC BEARINGS

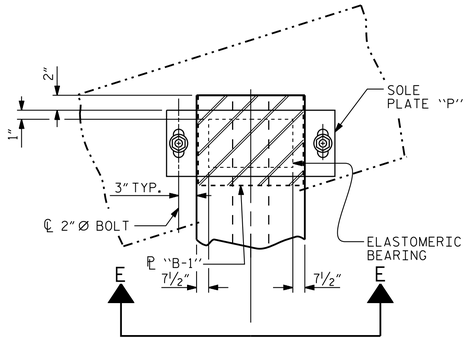


E1 (36 REQ'D)
PLAN VIEW OF ELASTOMERIC BEARING

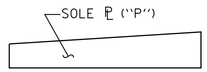
TYPE VI



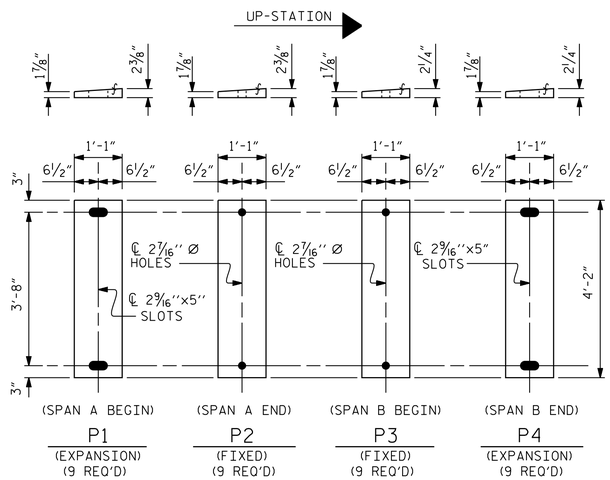
DETAIL "A"



TYPICAL PLAN
(SHOWING EXPANSION END BENT)



SOLE ℄ PLACEMENT DETAIL



SOLE PLATE DETAILS ("P")

UP-STATION

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. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLT, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE VI	420 k

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 36+78.38 -RAMP A-

Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

ASSEMBLED BY : J. B. GEILE DATE : 05/14/18
CHECKED BY : V. E. FRAGA DATE : 01/06/23

DRAWN BY : WJH 8/89
CHECKED BY : CRK 8/89

REV. 6/13 AAC/MAA
REV. 1/15 MAA/TMG
REV. 12/17 MAA/THC

DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

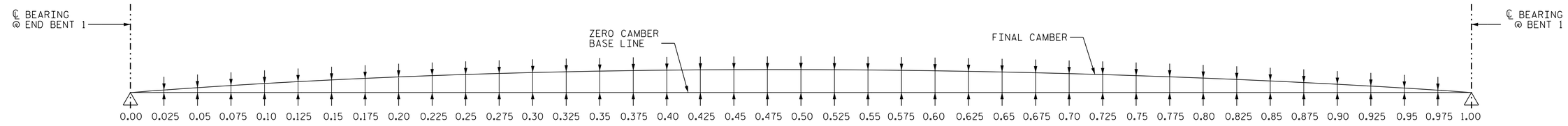
NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-18
1			3			TOTAL SHEETS
2			4			43

STD. NO. EB3



GIRDER 1

	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.021	0.042	0.062	0.083	0.102	0.122	0.139	0.157	0.173	0.188	0.202	0.215	0.225	0.236	0.244	0.251	0.256	0.261	0.263	0.264	0.263	0.261	0.256	0.251	0.244	0.236	0.225	0.215	0.202	0.188	0.173	0.157	0.139	0.122	0.102	0.083	0.062	0.042	0.021	0.000
DEFL. DUE TO SUPERIMPOSED DL ** ↓	0.000	-0.015	-0.029	-0.044	-0.058	-0.071	-0.084	-0.097	-0.110	-0.121	-0.131	-0.141	-0.152	-0.158	-0.165	-0.171	-0.178	-0.180	-0.182	-0.185	-0.187	-0.185	-0.182	-0.180	-0.178	-0.171	-0.165	-0.158	-0.152	-0.141	-0.131	-0.121	-0.110	-0.097	-0.084	-0.071	-0.058	-0.044	-0.029	-0.015	0.000
FINAL CAMBER ↑	0″	1/16″	1/8″	1/4″	5/16″	3/8″	7/16″	1/2″	9/16″	5/8″	11/16″	3/4″	3/4″	13/16″	7/8″	7/8″	7/8″	15/16″	15/16″	15/16″	15/16″	15/16″	15/16″	15/16″	15/16″	7/8″	7/8″	7/8″	13/16″	3/4″	3/4″	11/16″	5/8″	9/16″	1/2″	7/16″	3/8″	5/16″	1/4″	1/8″	1/16″	0″

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

GIRDER 2-4

	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.021	0.042	0.063	0.083	0.102	0.122	0.139	0.157	0.173	0.188	0.202	0.214	0.225	0.236	0.244	0.251	0.256	0.261	0.263	0.264	0.263	0.261	0.256	0.251	0.244	0.236	0.225	0.214	0.202	0.188	0.173	0.157	0.139	0.122	0.102	0.083	0.062	0.042	0.021	0.000
DEFL. DUE TO SUPERIMPOSED DL ** ↓	0.000	-0.017	-0.033	-0.050	-0.066	-0.081	-0.096	-0.110	-0.125	-0.136	-0.148	-0.160	-0.171	-0.178	-0.186	-0.193	-0.200	-0.203	-0.205	-0.208	-0.210	-0.205	-0.228	-0.203	-0.200	-0.193	-0.186	-0.178	-0.171	-0.159	-0.148	-0.136	-0.125	-0.110	-0.096	-0.081	-0.066	-0.050	-0.033	-0.017	0.000
FINAL CAMBER ↑	0″	0″	1/16″	1/8″	3/16″	1/4″	5/16″	3/8″	3/8″	7/16″	1/2″	1/2″	1/2″	9/16″	5/8″	5/8″	5/8″	5/8″	11/16″	5/8″	5/8″	5/8″	11/16″	5/8″	5/8″	5/8″	5/8″	9/16″	1/2″	1/2″	1/2″	7/16″	3/8″	3/8″	5/16″	1/4″	3/16″	1/8″	1/8″	1/16″	0″

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

GIRDER 5-8

	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.021	0.042	0.062	0.083	0.102	0.121	0.139	0.156	0.172	0.188	0.201	0.214	0.225	0.235	0.243	0.251	0.255	0.260	0.262	0.263	0.262	0.260	0.255	0.251	0.243	0.235	0.225	0.214	0.201	0.188	0.172	0.156	0.139	0.121	0.102	0.083	0.062	0.042	0.021	0.000
DEFL. DUE TO SUPERIMPOSED DL ** ↓	0.000	-0.016	-0.032	-0.048	-0.064	-0.078	-0.092	-0.106	-0.120	-0.131	-0.143	-0.154	-0.165	-0.172	-0.179	-0.186	-0.193	-0.195	-0.198	-0.200	-0.203	-0.200	-0.198	-0.195	-0.193	-0.186	-0.179	-0.172	-0.165	-0.154	-0.143	-0.131	-0.120	-0.106	-0.092	-0.078	-0.064	-0.048	-0.032	-0.016	0.000
FINAL CAMBER ↑	0″	1/16″	1/8″	3/16″	1/4″	5/16″	3/8″	3/8″	7/16″	1/2″	9/16″	9/16″	9/16″	5/8″	11/16″	11/16″	11/16″	3/4″	3/4″	3/4″	3/4″	3/4″	3/4″	3/4″	11/16″	11/16″	11/16″	5/8″	9/16″	9/16″	9/16″	1/2″	7/16″	3/8″	3/8″	5/16″	1/4″	3/16″	1/8″	1/16″	0″

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

GIRDER 9

	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.021	0.042	0.062	0.083	0.102	0.121	0.139	0.156	0.172	0.188	0.201	0.214	0.225	0.235	0.243	0.250	0.255	0.260	0.262	0.263	0.262	0.260	0.255	0.250	0.243	0.235	0.225	0.214	0.201	0.188	0.172	0.156	0.139	0.121	0.102	0.083	0.062	0.042	0.021	0.000
DEFL. DUE TO SUPERIMPOSED DL ** ↓	0.000	-0.016	-0.033	-0.049	-0.066	-0.080	-0.094	-0.109	-0.123	-0.135	-0.146	-0.157	-0.169	-0.176	-0.183	-0.190	-0.197	-0.200	-0.202	-0.205	-0.207	-0.205	-0.202	-0.200	-0.197	-0.190	-0.183	-0.176	-0.169	-0.157	-0.146	-0.135	-0.124	-0.109	-0.095	-0.080	-0.066	-0.049	-0.033	-0.016	0.000
FINAL CAMBER ↑	0″	1/16″	1/8″	3/16″	3/16″	1/4″	5/16″	3/8″	3/8″	7/16″	1/2″	1/2″	9/16″	9/16″	5/8″	5/8″	5/8″	11/16″	11/16″	11/16″	11/16″	11/16″	11/16″	11/16″	5/8″	5/8″	5/8″	9/16″	9/16″	1/2″	1/2″	7/16″	3/8″	3/8″	5/16″	1/4″	3/16″	3/16″	1/8″	1/16″	0″

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

SCHEMATIC CAMBER ORDINATES SPAN A

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT
"FINAL CAMBER" WHICH IS SHOWN IN INCHES.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN A

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-19
1			3			TOTAL SHEETS
2			4			43

Stantec
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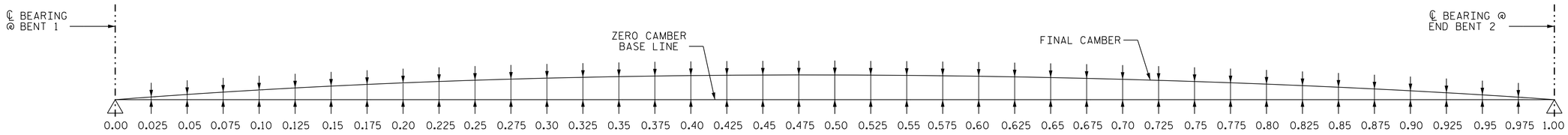
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

DRAWN BY : K. A. WOYAHN DATE : 12/14/22
CHECKED BY : T. R. DUDECK DATE : 01/30/23

DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23



GIRDER 1

	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.021	0.042	0.063	0.083	0.103	0.122	0.140	0.157	0.173	0.189	0.202	0.215	0.226	0.237	0.245	0.252	0.257	0.262	0.263	0.265	0.263	0.262	0.257	0.252	0.245	0.237	0.226	0.215	0.202	0.189	0.173	0.157	0.140	0.122	0.103	0.083	0.063	0.042	0.021	0.000
DEFL. DUE TO SUPERIMPOSED DL ** ↓	0.000	-0.016	-0.032	-0.047	-0.063	-0.077	-0.092	-0.106	-0.120	-0.131	-0.142	-0.153	-0.164	-0.172	-0.179	-0.186	-0.193	-0.195	-0.198	-0.200	-0.203	-0.200	-0.198	-0.195	-0.193	-0.185	-0.178	-0.171	-0.164	-0.153	-0.142	-0.130	-0.119	-0.105	-0.091	-0.077	-0.063	-0.047	-0.031	-0.016	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	7/16"	1/2"	9/16"	9/16"	5/8"	5/8"	11/16"	11/16"	11/16"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	11/16"	11/16"	11/16"	11/16"	5/8"	5/8"	9/16"	1/2"	7/16"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

GIRDER 2-4

	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.021	0.042	0.063	0.083	0.103	0.122	0.140	0.157	0.173	0.189	0.202	0.215	0.226	0.237	0.245	0.252	0.257	0.262	0.263	0.265	0.263	0.262	0.257	0.252	0.245	0.237	0.226	0.215	0.202	0.189	0.173	0.157	0.140	0.122	0.103	0.083	0.063	0.042	0.021	0.000
DEFL. DUE TO SUPERIMPOSED DL ** ↓	0.000	-0.018	-0.037	-0.055	-0.073	-0.090	-0.106	-0.122	-0.138	-0.151	-0.164	-0.176	-0.189	-0.197	-0.205	-0.214	-0.222	-0.224	-0.227	-0.230	-0.233	-0.230	-0.227	-0.224	-0.222	-0.213	-0.205	-0.197	-0.189	-0.176	-0.164	-0.151	-0.138	-0.122	-0.106	-0.089	-0.073	-0.055	-0.037	-0.018	0.000
FINAL CAMBER ↑	0"	1/16"	1/16"	1/16"	1/8"	1/8"	3/16"	3/16"	1/4"	1/4"	5/16"	5/16"	5/16"	3/8"	3/8"	3/8"	3/8"	3/8"	7/16"	3/8"	3/8"	3/8"	7/16"	3/8"	3/8"	3/8"	3/8"	3/8"	5/16"	5/16"	5/16"	1/4"	1/4"	3/16"	3/16"	3/16"	1/8"	1/16"	1/16"	1/16"	0"

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

GIRDER 5-8

	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.021	0.042	0.063	0.083	0.102	0.122	0.140	0.157	0.173	0.189	0.202	0.215	0.226	0.237	0.244	0.252	0.257	0.262	0.263	0.265	0.263	0.262	0.257	0.252	0.244	0.237	0.226	0.215	0.202	0.189	0.173	0.157	0.140	0.122	0.102	0.083	0.063	0.042	0.021	0.000
DEFL. DUE TO SUPERIMPOSED DL ** ↓	0.000	-0.018	-0.036	-0.054	-0.072	-0.088	-0.103	-0.119	-0.135	-0.148	-0.160	-0.173	-0.185	-0.193	-0.201	-0.209	-0.217	-0.220	-0.222	-0.225	-0.228	-0.225	-0.222	-0.220	-0.217	-0.209	-0.201	-0.193	-0.185	-0.173	-0.160	-0.148	-0.135	-0.119	-0.103	-0.088	-0.072	-0.054	-0.036	-0.018	0.000
FINAL CAMBER ↑	0"	1/16"	1/16"	1/8"	1/8"	3/16"	1/4"	1/4"	1/4"	5/16"	5/16"	3/8"	3/8"	3/8"	7/16"	7/16"	7/16"	7/16"	1/2"	7/16"	7/16"	7/16"	1/2"	7/16"	7/16"	7/16"	7/16"	3/8"	3/8"	3/8"	5/16"	5/16"	1/4"	1/4"	1/4"	3/16"	1/8"	1/8"	1/16"	1/16"	0"

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

GIRDER 9

	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	0.375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.021	0.042	0.063	0.083	0.102	0.122	0.140	0.157	0.173	0.189	0.202	0.215	0.226	0.237	0.244	0.252	0.257	0.262	0.263	0.265	0.263	0.262	0.257	0.252	0.244	0.237	0.226	0.215	0.202	0.189	0.173	0.157	0.140	0.122	0.102	0.083	0.063	0.042	0.021	0.000
DEFL. DUE TO SUPERIMPOSED DL ** ↓	0.000	-0.019	-0.038	-0.056	-0.075	-0.092	-0.108	-0.125	-0.142	-0.155	-0.168	-0.181	-0.194	-0.202	-0.210	-0.218	-0.227	-0.230	-0.232	-0.235	-0.238	-0.235	-0.233	-0.230	-0.227	-0.219	-0.210	-0.202	-0.194	-0.181	-0.168	-0.155	-0.142	-0.125	-0.109	-0.092	-0.076	-0.057	-0.038	-0.019	0.000
FINAL CAMBER ↑	0"	0"	1/16"	1/16"	1/8"	1/8"	3/16"	3/16"	3/16"	1/4"	1/4"	1/4"	1/4"	5/16"	5/16"	5/16"	5/16"	5/16"	3/8"	5/16"	5/16"	5/16"	3/8"	5/16"	5/16"	5/16"	5/16"	5/16"	1/4"	1/4"	1/4"	3/16"	3/16"	3/16"	3/16"	1/8"	1/16"	1/16"	1/16"	0"	0"

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

SCHEMATIC CAMBER ORDINATES SPAN B

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN INCHES.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS SPAN B

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DRAWN BY : K. A. WOYAHN DATE : 12/14/22
CHECKED BY : T. R. DUDECK DATE : 01/30/23

DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-20
1			3			TOTAL SHEETS
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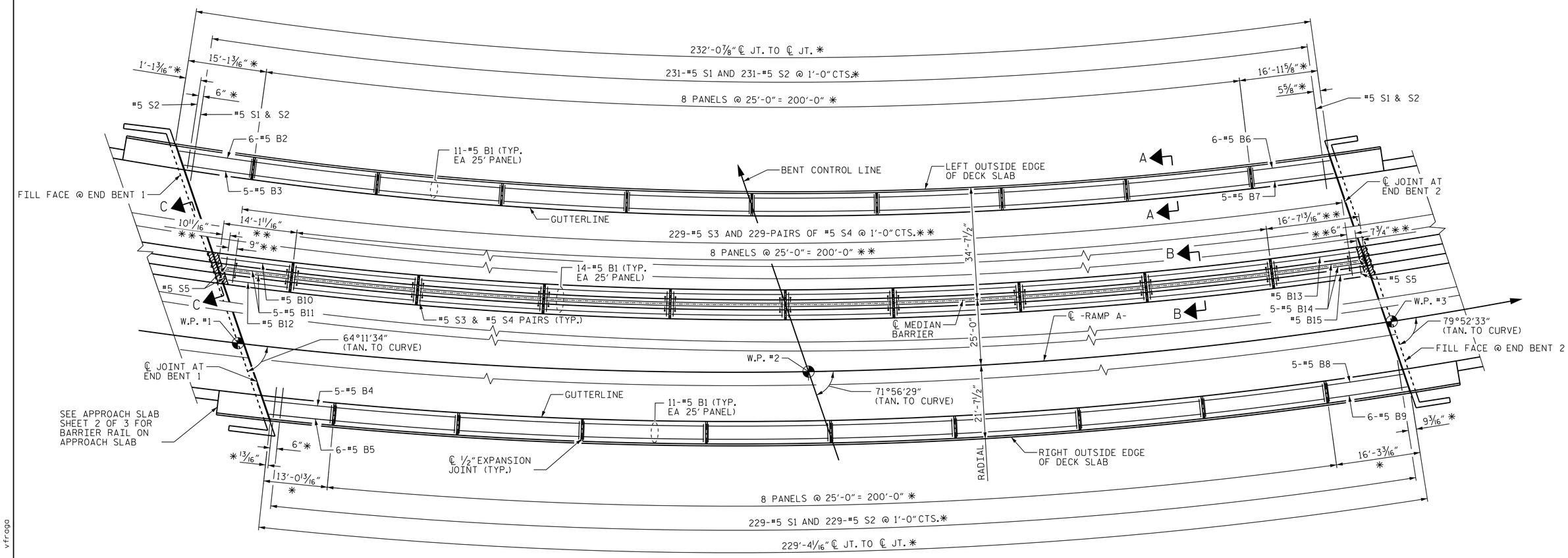

SPAN A

SPAN B

BARRIER RAIL PLAN

* MEASURED ALONG OUTSIDE EDGE OF DECK.

** MEASURED ALONG ℄ OF MEDIAN.

BLOCKOUT FOR EXPANSION JOINT SEAL AT MEDIAN BARRIER. FOR ADDITIONAL DETAILS SEE EXPANSION JOINT SEAL AT MEDIAN BARRIER RAIL SHEET.

SEE SHEET 2 OF 2 FOR SECTION A-A, B-B, AND C-C.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE BARRIER RAIL

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E FRAGA

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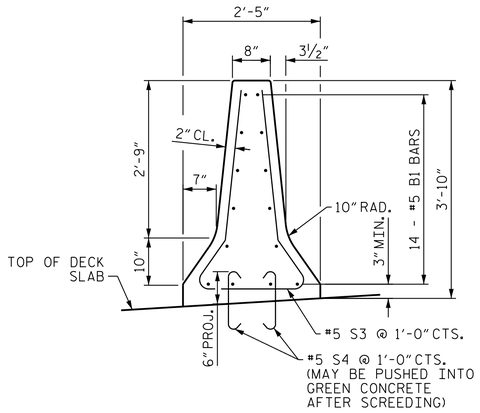
DRAWN BY : J. B. GEILE DATE : 05/16/18
CHECKED BY : M. B. ISENHOUR DATE : 01/10/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NOTES

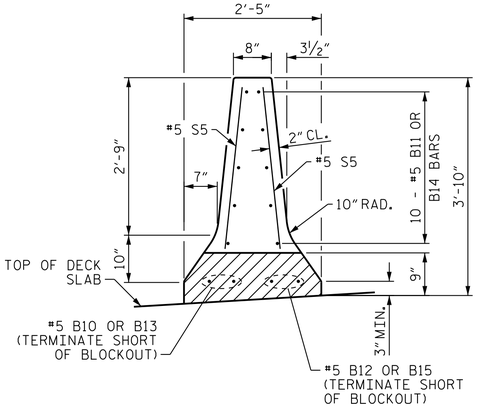
THE BARRIER RAIL AND MEDIAN RAIL IN EACH SPAN SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT SPAN HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

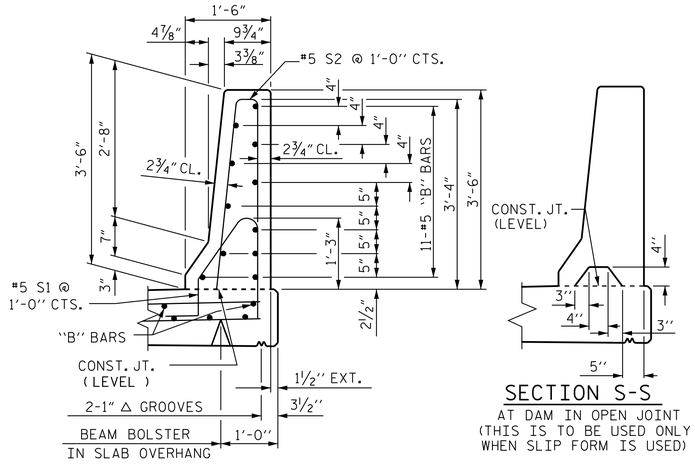
GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.



SECTION B-B



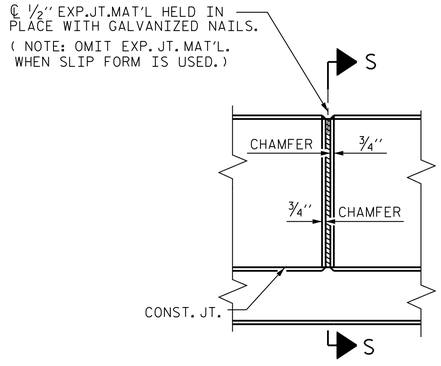
SECTION C-C



SECTION A-A

SECTION S-S

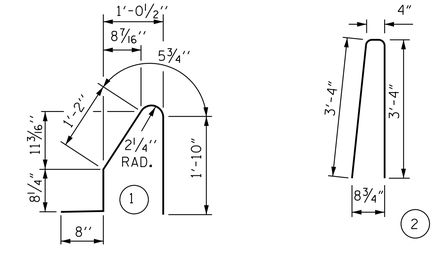
AT DAM IN OPEN JOINT
(THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL AND MEDIAN

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ B1	288	#5	STR	24'-6"	7,359
✳ B2	6	#5	STR	14'-3"	89
✳ B3	5	#5	STR	13'-9"	72
✳ B4	5	#5	STR	12'-9"	66
✳ B5	6	#5	STR	12'-6"	78
✳ B6	6	#5	STR	16'-5"	103
✳ B7	5	#5	STR	16'-6"	86
✳ B8	5	#5	STR	15'-5"	80
✳ B9	6	#5	STR	15'-7"	98
✳ B10	2	#5	STR	12'-8"	26
✳ B11	10	#5	STR	13'-5"	140
✳ B12	2	#5	STR	12'-1"	25
✳ B13	2	#5	STR	15'-0"	31
✳ B14	10	#5	STR	16'-0"	167
✳ B15	2	#5	STR	15'-3"	32
✳ S1	461	#5	1	4'-10"	2,324
✳ S2	462	#5	2	7'-0"	3,373
✳ S3	229	#5	3	8'-10"	2,110
✳ S4	458	#5	4	1'-10"	876
✳ S5	4	#5	STR	2'-10"	12

✳ EPOXY COATED REINFORCING STEEL	17,147 LBS.
CLASS AA CONCRETE	104.9 CU. YDS.
CONCRETE BARRIER RAIL	461.1 LIN. FT.
CONCRETE MEDIAN RAIL	230.7 LIN. FT.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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SUPERSTRUCTURE

CONCRETE BARRIER RAIL DETAILS

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ASSEMBLED BY : J. B. GEILE DATE : 05/23/18
CHECKED BY : V. E. FRAGA DATE : 01/23/23

DRAWN BY : ARB 5/87
CHECKED BY : SJD 9/87

REV. 7/12 MAA/GM
REV. 6/13 MAA/CM
REV. 12/17 MAA/THC

DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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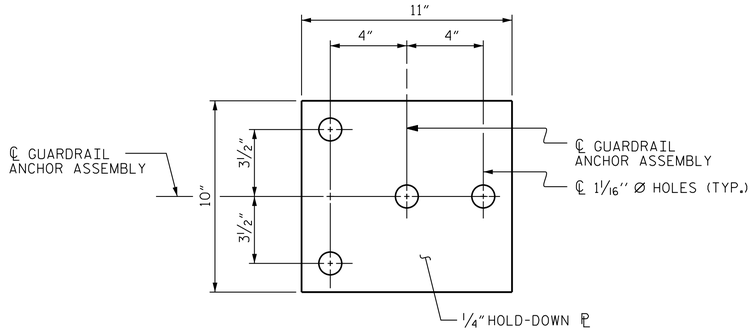
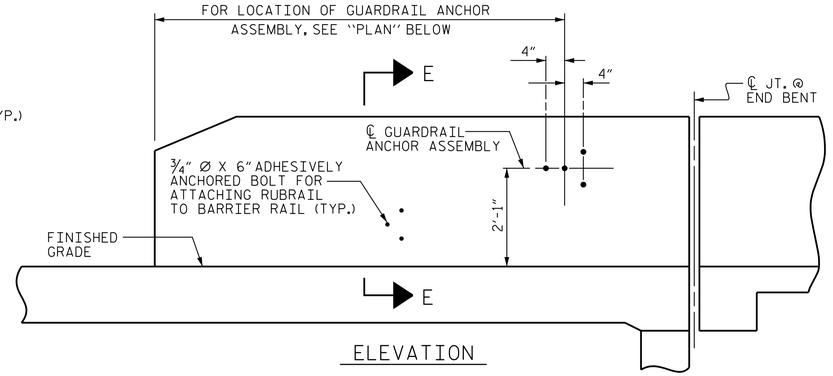
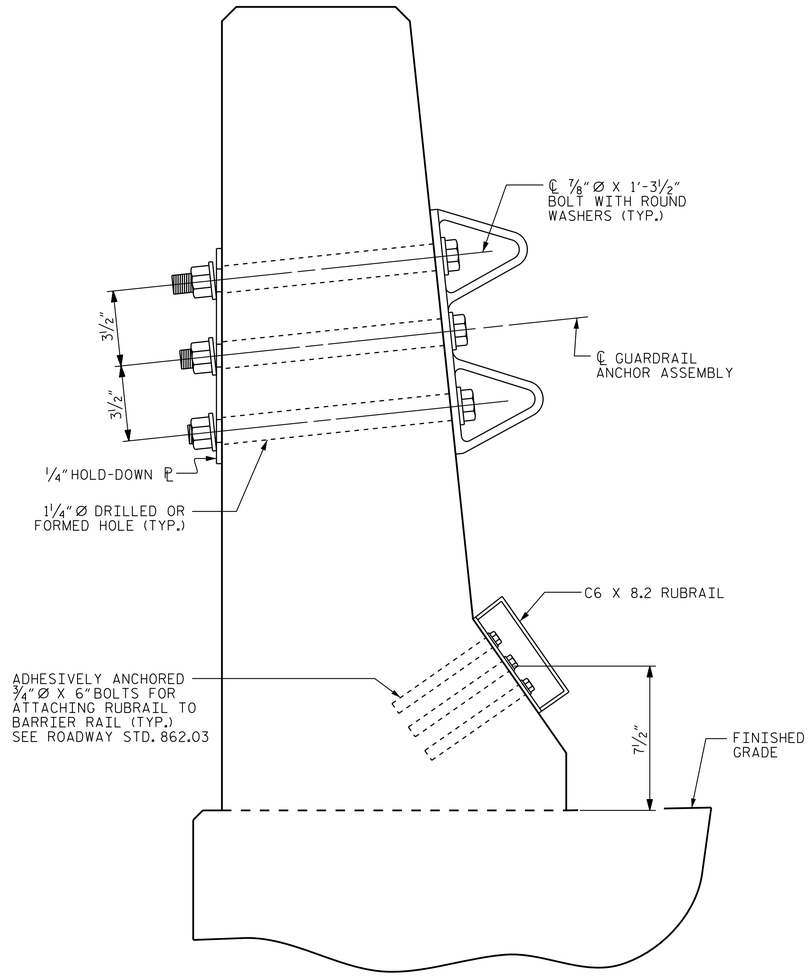


PLAN

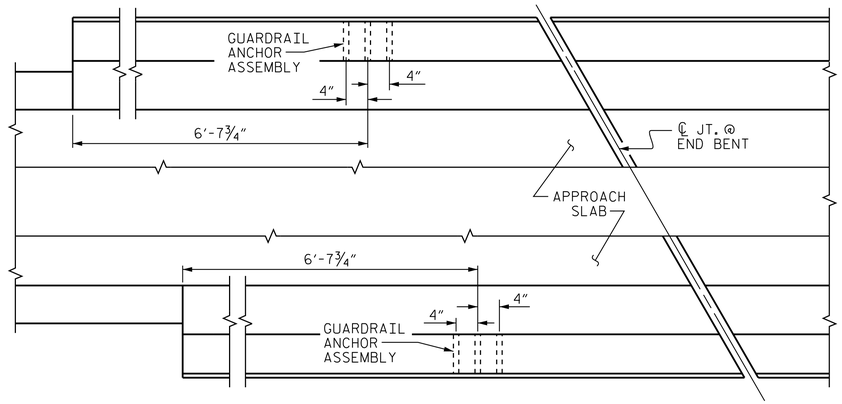


ELEVATION



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

LOCATION OF ANCHORS FOR GUARDRAIL

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

NOTES

THE GUARDRAIL ANCHOR ASSEMBLY SHALL CONSIST OF A ¼″ HOLD-DOWN PLATE AND 4 - ⅞″ 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 ⅞″ 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.)

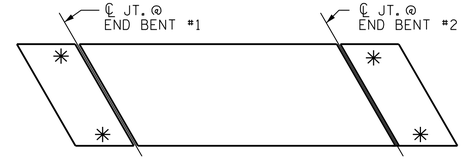
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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 ¼″ 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 ¾″ Ø X 6″ BOLTS WITH WASHERS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ¾″ 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.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY

PRELIMINARY PLANS
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PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

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DRAWN BY : K. A. WOYAHN DATE : 01/06/23
CHECKED BY : V. E. FRAGA DATE : 01/23/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 7/10/2023

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STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

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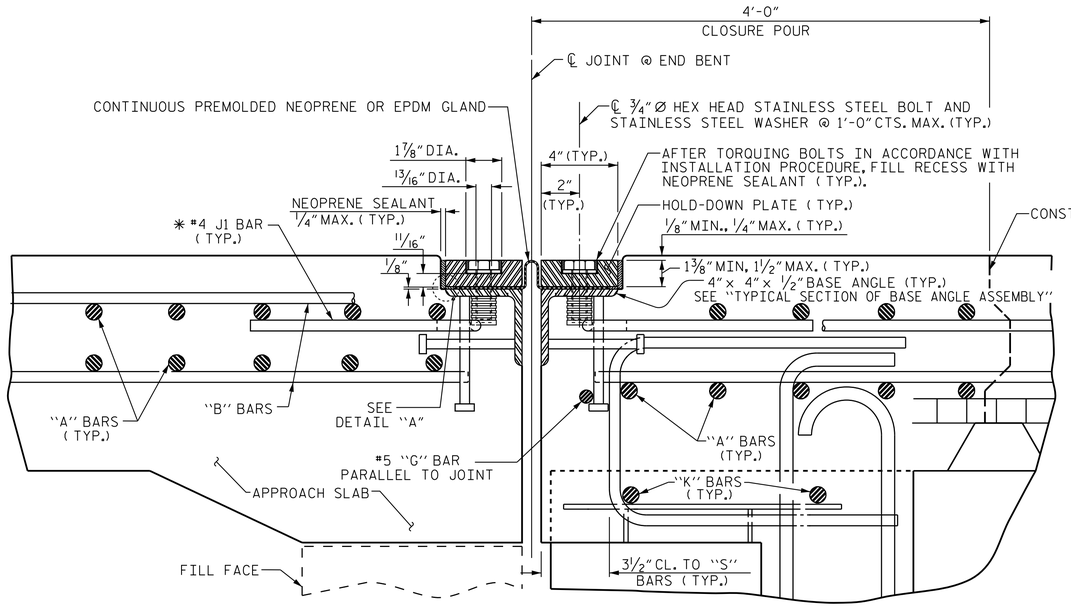
(SHT 1a) STD. NO. GRA2



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

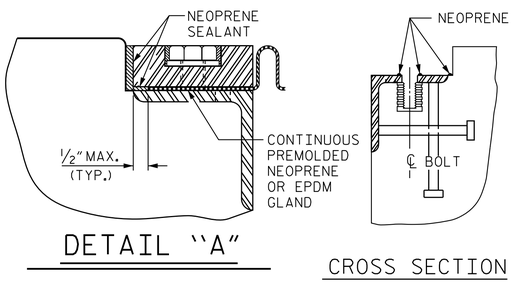
* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

INSTALLATION PROCEDURE

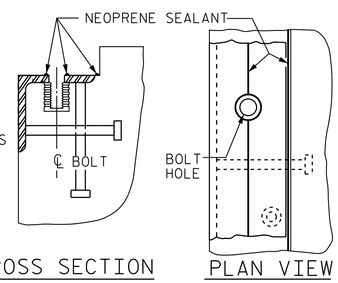
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4⅛" TO 4¼" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO THE BASE ANGLE ASSEMBLY WITH THE ¾" Ø HEX HEAD BOLTS PROVIDED FOR THE HOLD-DOWN PLATES. A 1" Ø HOLE SHALL BE PROVIDED IN THE TEMPLATE CENTERED OVER EACH WEEP HOLE IN THE 4" X 4" X ½" BASE ANGLE. OTHER METHODS OF INSURING DRAINAGE THROUGH WEEP HOLES MAY BE EMPLOYED SUBJECT TO ENGINEER'S APPROVAL.
2. AFTER THE CONCRETE HAS BEEN CAST ON BOTH SIDES OF THE JOINT, REMOVE THE TEMPLATE. THOROUGHLY CLEAN THE BOLT HOLES AND THE ANGLE PLATE. REMOVE ANY EXCESS CONCRETE THAT COMES OUT OF THE WEEP HOLES. ANY DAMAGED STEEL SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED ⅞" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TOROUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

GENERAL NOTES

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3000 LBS. MINIMUM.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD-DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
7. THE COVER PLATES SHALL BE GALVANIZED OR METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.
8. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE REPAIRED IN ACCORDANCE WITH THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
9. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
10. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
11. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE ¾" Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.
12. THE FABRICATOR SHALL PROVIDE ½" Ø THREADED HOLES IN THE HOLD-DOWN PLATES TO ASSIST IN LIFTING AND PLACING. THE HOLES SHALL BE ¾" DEEP AT 6'-0" MAXIMUM SPACING AND A MINIMUM OF TWO HOLES PER PLATE.



DETAIL "A"

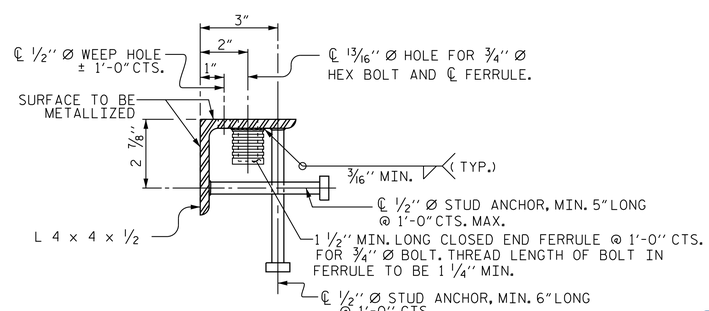


CROSS SECTION

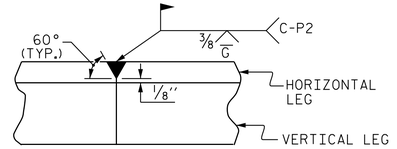
PLAN VIEW

INSTALLATION SKETCH

MOVEMENT AND SETTING AT JOINT					
END BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG ℄ RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
1	64°11'34"	⅝"	1⅜"	1⅝"	1⅛"
2	79°52'32"	11/16"	1½"	1⅜"	1⅛"



TYPICAL SECTION OF BASE ANGLE ASSEMBLY



DETAIL- FIELD WELD SPLICE OF BASE ANGLE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

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EXPANSION JOINT SEAL DETAILS

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NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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ASSEMBLED BY : K. A. WOYAHN DATE : 12/15/22
CHECKED BY : M. B. ISENHOUR DATE : 01/03/23
DRAWN BY : REK 9/87
CHECKED BY : CRK 10/87
REV. 10/1/11 MAA/GM
REV. 10/17 MAA/THC
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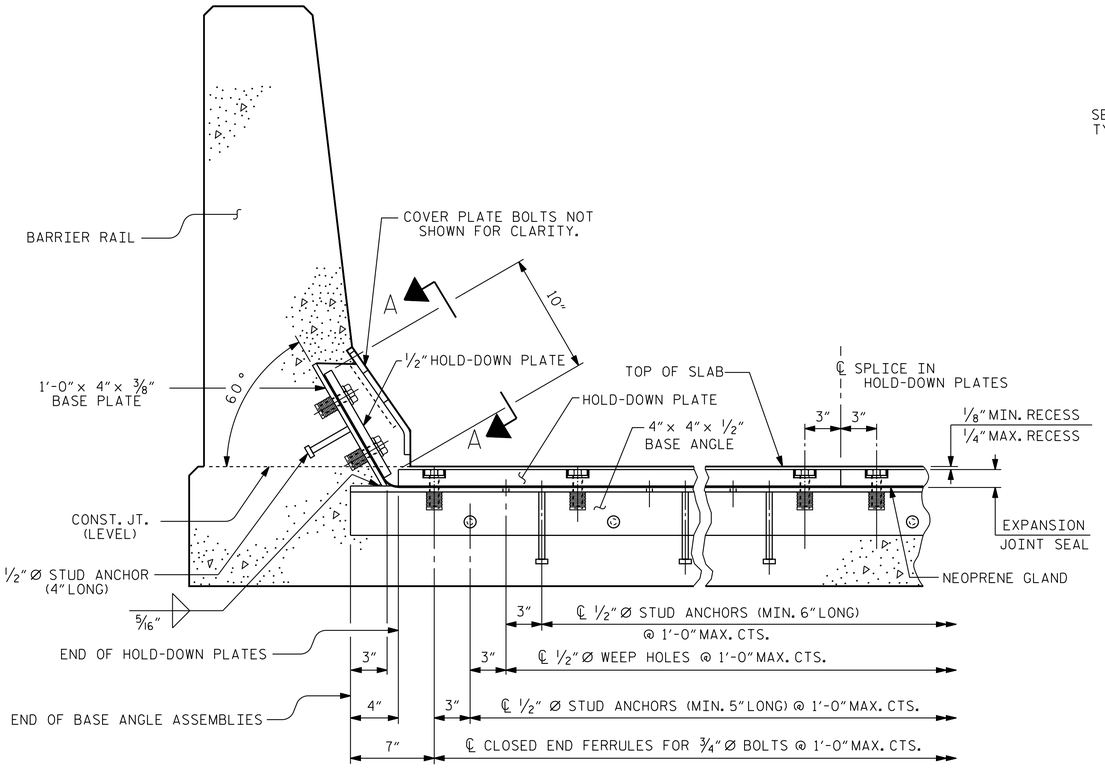
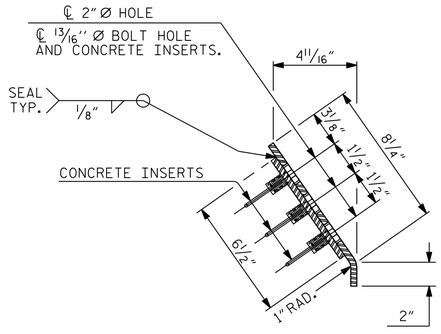
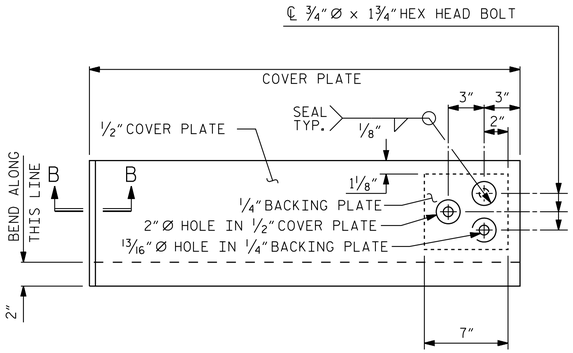


SECTION THRU RAIL NORMAL TO JOINT

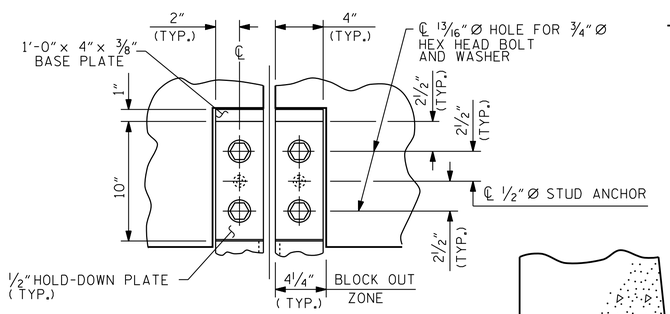


END VIEW

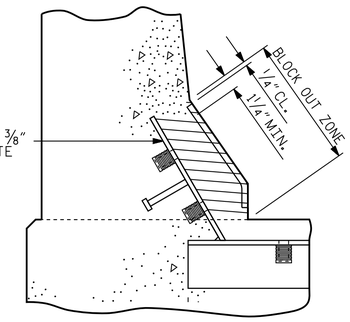


TYPE II - ELEVATION VIEW

COVER PLATE DETAILS

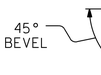


SECTION A - A

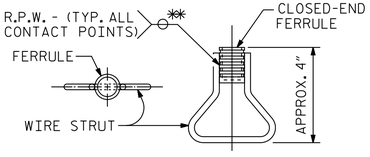


BLOCK OUT DETAIL

SEE " SECTION A - A " FOR OTHER DETAILS.



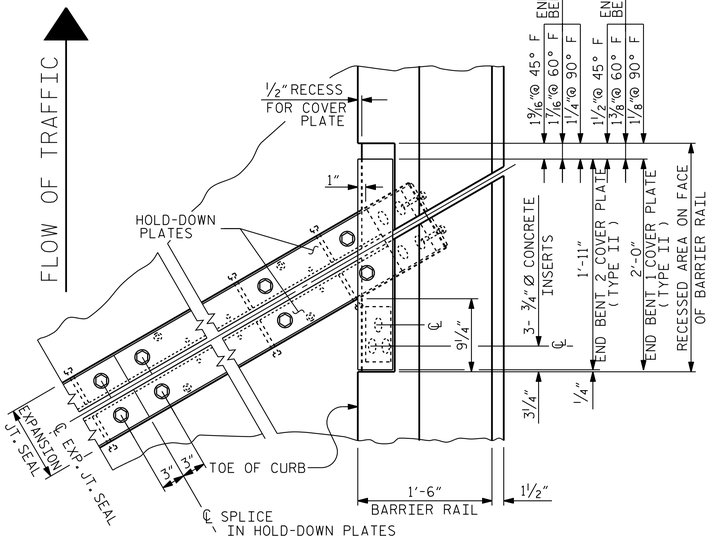
SECTION B - B



PLAN ELEVATION

CONCRETE INSERT

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



PLAN OF EXPANSION JOINT SEAL

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS FOR BARRIER RAIL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47083 VICTOR E. FRAGA

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-25
1			3			TOTAL SHEETS
2			4			43

ASSEMBLED BY : K. A. WOYAHN DATE : 12/16/22
CHECKED BY : M. B. ISENHOUR DATE : 01/03/23

DRAWN BY : REK 9/87
CHECKED BY : CRK 10/87

REV. 7/12 MAA/GM
REV. 6/13 MAA/GM
REV. 12/17 MAA/THC

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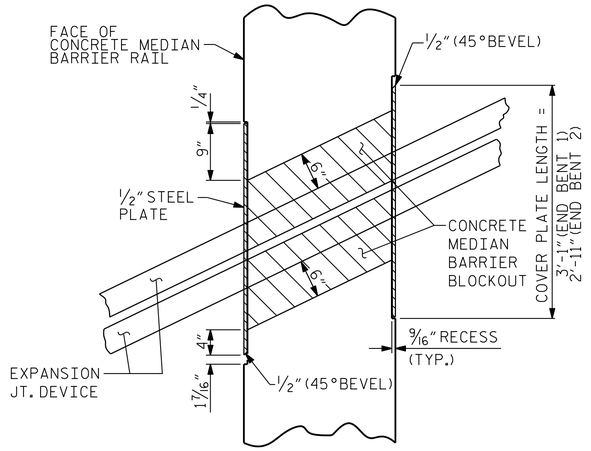
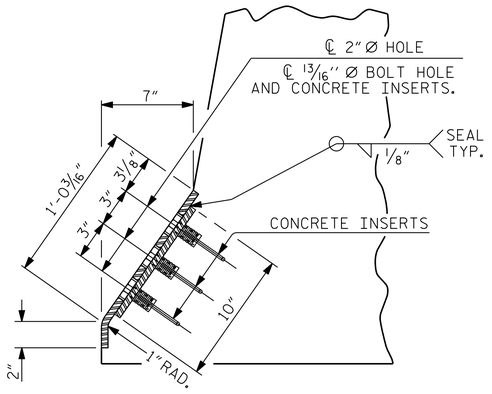
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

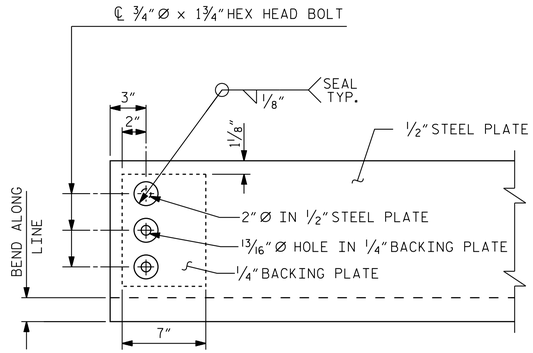
STD. NO. EJS2



PLAN OF EXPANSION JOINT SEAL

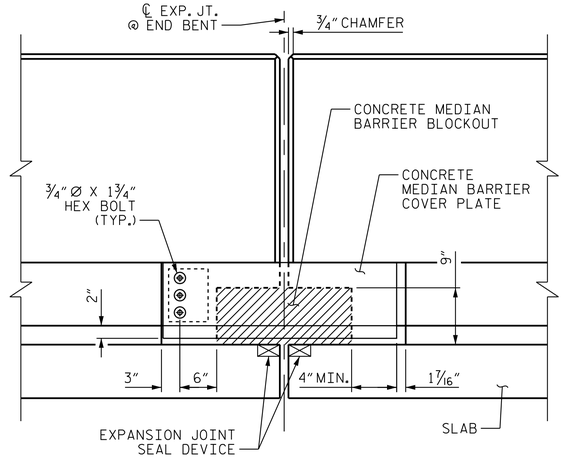


SECTION THRU RAIL NORMAL TO JOINT

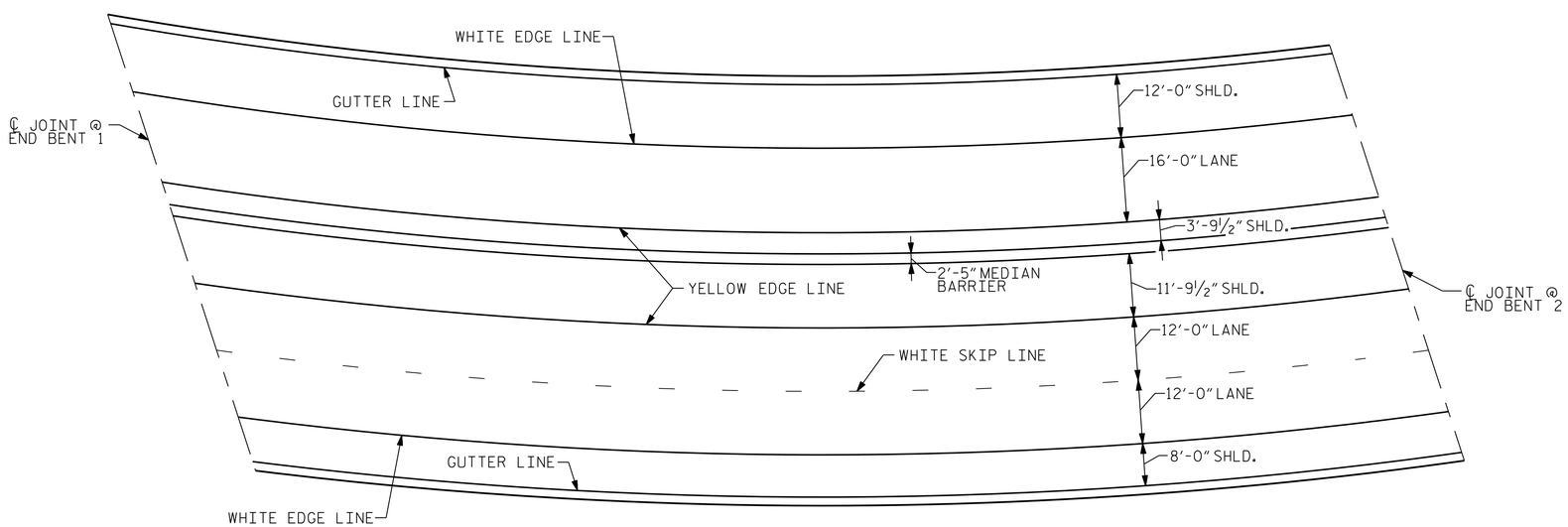


COVER PLATE DETAILS

NOTE:
NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE COVER PLATE. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE LUMP SUM PRICE FOR "EXPANSION JOINT SEAL".



ELEVATION @ EXPANSION JOINT



PAVEMENT MARKING ALIGNMENT

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 36+78.38 -RAMP A-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

EXPANSION JOINT SEAL DETAILS FOR MEDIAN BARRIER RAIL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47083 VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/9/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-26
1			3			TOTAL SHEETS
2			4			43

ASSEMBLED BY : K. A. WOYAHN DATE : 01/05/23
CHECKED BY : V. E. FRAGA DATE : 01/12/23

DRAWN BY : REK 9/87
CHECKED BY : CRK 10/87

REV. 7/12 MAA/GM
REV. 6/13 MAA/GM
REV. 12/17 MAA/THC

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DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

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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	1′-11″	1′-7″	1′-11″	1′-7″	2′-6″
#5	2′-5″	2′-0″	2′-5″	2′-0″	3′-1″
#6	2′-10″	2′-5″	3′-7″	2′-5″	3′-8″
#7	4′-2″	2′-9″			
#8	4′-9″	3′-2″			

CLASS AA CONC. BREAKDOWN

POUR #1	188.9 C.Y.
POUR #2	167.7 C.Y.
POUR #3	188.9 C.Y.
POUR #4	73.5 C.Y.
POUR #5	31.4 C.Y.
TOTAL CLASS AA CONC.	650.4 C.Y.

GROOVING BRIDGE FLOORS

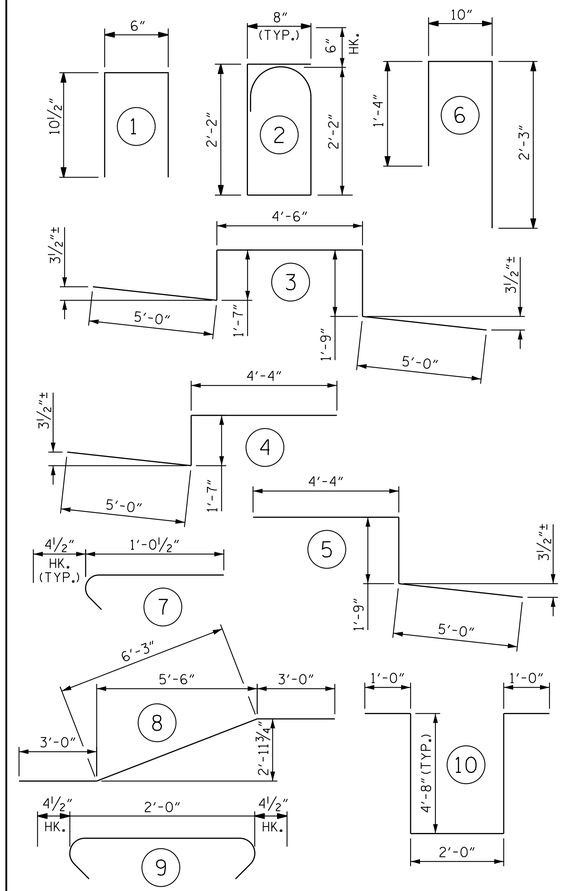
APPROACH SLABS	3,337 SQ.FT.
BRIDGE DECK	16,058 SQ.FT.
TOTAL	19,395 SQ.FT.

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINF. STEEL	EPOXY COATED REINF. STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
✳ TOTALS ✳✳	650.4	53,427	56,318

✳QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

BAR TYPES

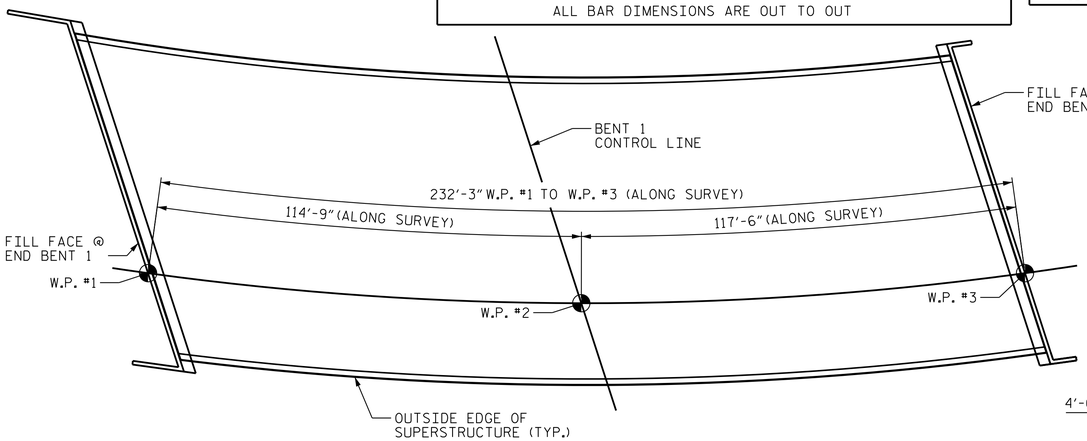


ALL BAR DIMENSIONS ARE OUT TO OUT

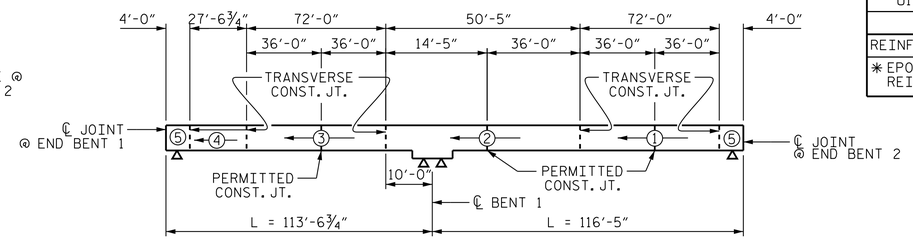
REINFORCING BAR SCHEDULE (DECK & DIAPHRAGM)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	650	#5	STR	42′-1″	28,530
✳ A101	4	#5	STR	40′-6″	169
✳ A102	4	#5	STR	38′-8″	161
✳ A103	4	#5	STR	36′-10″	154
✳ A104	4	#5	STR	35′-0″	146
✳ A105	4	#5	STR	33′-2″	138
✳ A106	4	#5	STR	31′-3″	130
✳ A107	2	#5	STR	56′-4″	118
✳ A108	2	#5	STR	52′-8″	110
✳ A109	2	#5	STR	49′-0″	102
✳ A110	2	#5	STR	45′-4″	95
✳ A111	2	#5	STR	41′-8″	87
✳ A112	2	#5	STR	38′-0″	79
✳ A113	2	#5	STR	34′-4″	72
✳ A114	2	#5	STR	30′-8″	64
✳ A115	2	#5	STR	27′-0″	56
✳ A116	2	#5	STR	23′-4″	49
✳ A117	2	#5	STR	19′-8″	41
✳ A118	2	#5	STR	16′-1″	34
✳ A119	2	#5	STR	12′-5″	26
✳ A120	2	#5	STR	8′-9″	18
✳ A121	2	#5	STR	5′-1″	11
✳ A122	2	#5	STR	3′-3″	7
✳ A123	4	#5	STR	40′-4″	168
✳ A124	4	#5	STR	38′-3″	160
✳ A125	4	#5	STR	36′-3″	151
✳ A126	4	#5	STR	34′-3″	143
✳ A127	4	#5	STR	32′-3″	135
✳ A128	2	#5	STR	58′-0″	121
✳ A129	2	#5	STR	54′-0″	113
✳ A130	2	#5	STR	50′-0″	104
✳ A131	2	#5	STR	46′-0″	96
✳ A132	2	#5	STR	41′-11″	87
✳ A133	2	#5	STR	37′-11″	79
✳ A134	2	#5	STR	33′-11″	71
✳ A135	2	#5	STR	29′-11″	62
✳ A136	2	#5	STR	25′-10″	54
✳ A137	2	#5	STR	21′-10″	46
✳ A138	2	#5	STR	17′-10″	37
✳ A139	2	#5	STR	13′-9″	29
✳ A140	2	#5	STR	9′-9″	20
✳ A141	2	#5	STR	5′-9″	12
✳ A142	2	#5	STR	3′-8″	8
A2	650	#5	STR	41′-11″	28,417
A201	4	#5	STR	40′-3″	168
A202	4	#5	STR	38′-5″	160
A203	4	#5	STR	36′-7″	153
A204	4	#5	STR	34′-9″	145
A205	4	#5	STR	32′-11″	137
A206	4	#5	STR	31′-1″	130
A207	2	#5	STR	56′-4″	118
A208	2	#5	STR	52′-8″	110
A209	2	#5	STR	49′-0″	102
A210	2	#5	STR	45′-4″	95
A211	2	#5	STR	41′-8″	87
A212	2	#5	STR	38′-0″	79
A213	2	#5	STR	34′-4″	72
A214	2	#5	STR	30′-8″	64
A215	2	#5	STR	27′-0″	56
A216	2	#5	STR	23′-4″	49
A217	2	#5	STR	19′-8″	41
A218	2	#5	STR	16′-1″	34
A219	2	#5	STR	12′-5″	26
A220	2	#5	STR	8′-9″	18
A221	2	#5	STR	5′-1″	11
A222	2	#5	STR	3′-3″	7
A223	4	#5	STR	40′-1″	167
A224	4	#5	STR	38′-1″	159
A225	4	#5	STR	36′-1″	151
A226	4	#5	STR	34′-1″	142
A227	4	#5	STR	32′-1″	134
A228	2	#5	STR	58′-0″	121
A229	2	#5	STR	54′-0″	113
A230	2	#5	STR	50′-0″	104
A231	2	#5	STR	46′-0″	96
A232	2	#5	STR	41′-11″	87
A233	2	#5	STR	37′-11″	79
A234	2	#5	STR	33′-11″	71
A235	2	#5	STR	29′-11″	62
A236	2	#5	STR	25′-10″	54
A237	2	#5	STR	21′-10″	46
A238	2	#5	STR	17′-10″	37
A239	2	#5	STR	13′-9″	29
A240	2	#5	STR	9′-9″	20
A241	2	#5	STR	5′-9″	12
A242	2	#5	STR	3′-8″	8
✳ B1	112	#4	STR	39′-9″	2,974
✳ B2	168	#4	STR	27′-7″	3,096
✳ B3	321	#5	STR	28′-1″	9,402
✳ B4	108	#5	STR	44′-8″	5,031
B5	390	#5	STR	48′-0″	19,525
✳ G1	2	#5	STR	46′-6″	97
✳ G2	2	#5	STR	42′-6″	89
✳ J1	162	#4	7	1′-5″	153
✳ K1	24	#8	3	17′-10″	1,143
✳ K2	4	#8	4	10′-11″	117
✳ K3	4	#8	5	11′-1″	118
✳ K4	48	#6	STR	5′-9″	415
K5	128	#4	STR	4′-9″	406
K6	40	#4	8	12′-3″	327
K7	16	#4	STR	5′-1″	54
K8	48	#4	STR	8′-5″	270
K9	16	#4	STR	4′-10″	52
✳ S1	176	#5	2	5′-10″	1,071
S2	32	#4	1	1′-11″	41
✳ S3	176	#4	6	4′-5″	519
S4	192	#4	9	2′-9″	353
U1	48	#4	10	13′-4″	428

REINFORCING STEEL	53,427 LBS.
✳ EPOXY COATED REINFORCING STEEL	56,318 LBS.



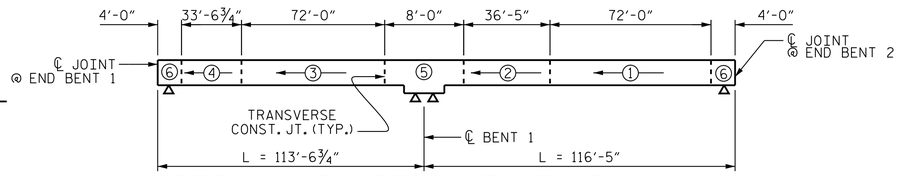
LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 18,727)



POURING SEQUENCE

ALONG -RAMP_A-

(#) = INDICATES POUR NUMBER AND DIRECTION OF POUR



OPTIONAL POURING SEQUENCE

ALONG -RAMP_A-

(#) = INDICATES POUR NUMBER AND DIRECTION OF POUR

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL

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DRAWN BY : J. B. GEILE DATE : 05/30/18
CHECKED BY : V. E. FRAGA DATE : 03/23/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA
DocuSigned by: Victor E. Fraga 5/10/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-27
1			3			TOTAL SHEETS
2			4			43

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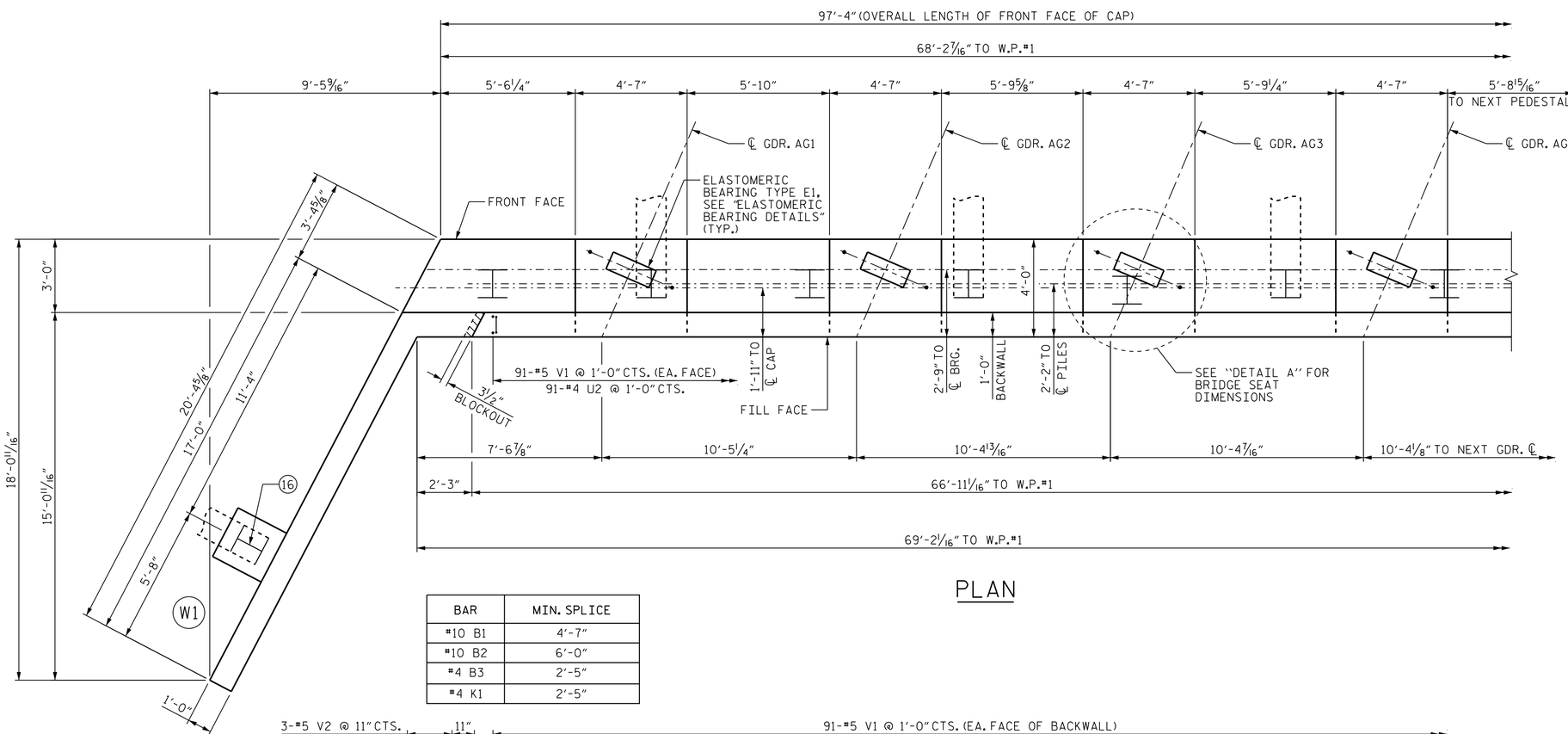
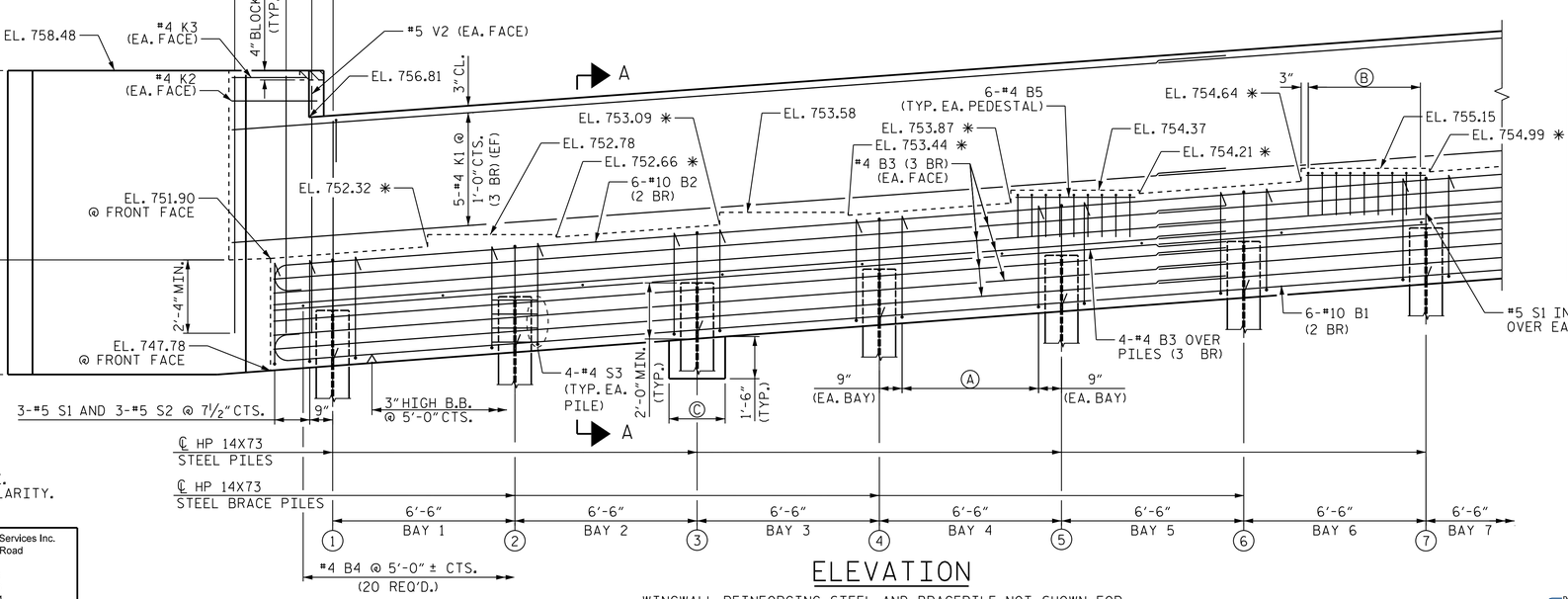


PLAN

BAR	MIN. SPLICE
#10 B1	4'-7"
#10 B2	6'-0"
#4 B3	2'-5"
#4 K1	2'-5"



ELEVATION

Ⓐ 9-#5 S1 AND 9-#5 S2 @ 7 1/2" CTS. (TYP. EA. BAY)

Ⓑ 9-#4 U1 @ 6" CTS. (TYP. EA. PEDESTAL)

Ⓒ PILE COLLAR, TYP. EA. PILE. OTHERS NOT SHOWN FOR CLARITY.

WINGWALL REINFORCING STEEL AND BRACEPILE NOT SHOWN FOR CLARITY. SEE "END BENT 1 WING WALL DETAILS" SHEET 3 OF 4.

NOTES

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

BACKWALL SHALL BE PLACED BEFORE APPLYING EPOXY PROTECTIVE COATING.

THE CONCRETE IN THE SHADED AREA OF THE WING SHALL BE POURED AFTER THE JOINT BETWEEN THE DECK AND THE APPROACH SLAB HAS BEEN SAWED AND THE BARRIER RAILS ARE CAST IF SLIP FORMING IS USED.

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

FOR WING DETAILS, SEE SHEET 3 OF 4.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

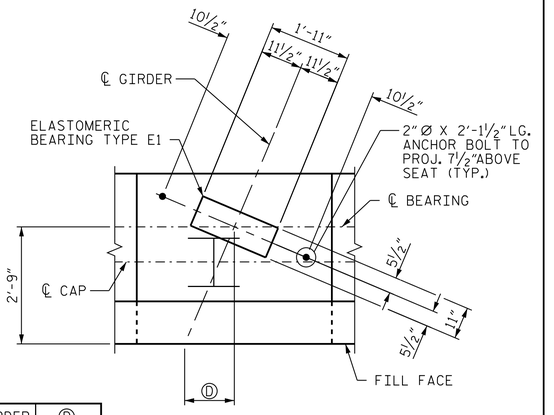
(2 BR) DENOTES 2 BAR RUN.

(3 BR) DENOTES 3 BAR RUN.

* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEATS, SEE "SECTION A-A" ON SHEET 4 OF 4.

TOP SURFACE OF END BENT CAP BETWEEN BRIDGE SEAT PEDESTALS SHALL BE SLOPED TRANSVERSELY FROM FILL FACE TO FRONT FACE AT A RATE OF 1/4" / FT.

FOR TOP OF PILE ELEVATIONS, SEE SHEET 4 OF 4.



GIRDER	Ⓓ
AG1	1'-2 3/8"
AG2	1'-2 3/16"
AG3	1'-2"
AG4	1'-1 13/16"
AG5	1'-1 5/8"
AG6	1'-1 7/16"
AG7	1'-1 1/4"
AG8	1'-1 1/8"
AG9	1'-0 15/16"

DETAIL A

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
PLAN AND ELEVATION (LEFT)

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DRAWN BY : J. B. GEILE DATE : 12/28/22
CHECKED BY : V. E. FRAGA DATE : 12/29/22
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-28
1			3			TOTAL SHEETS
2			4			43

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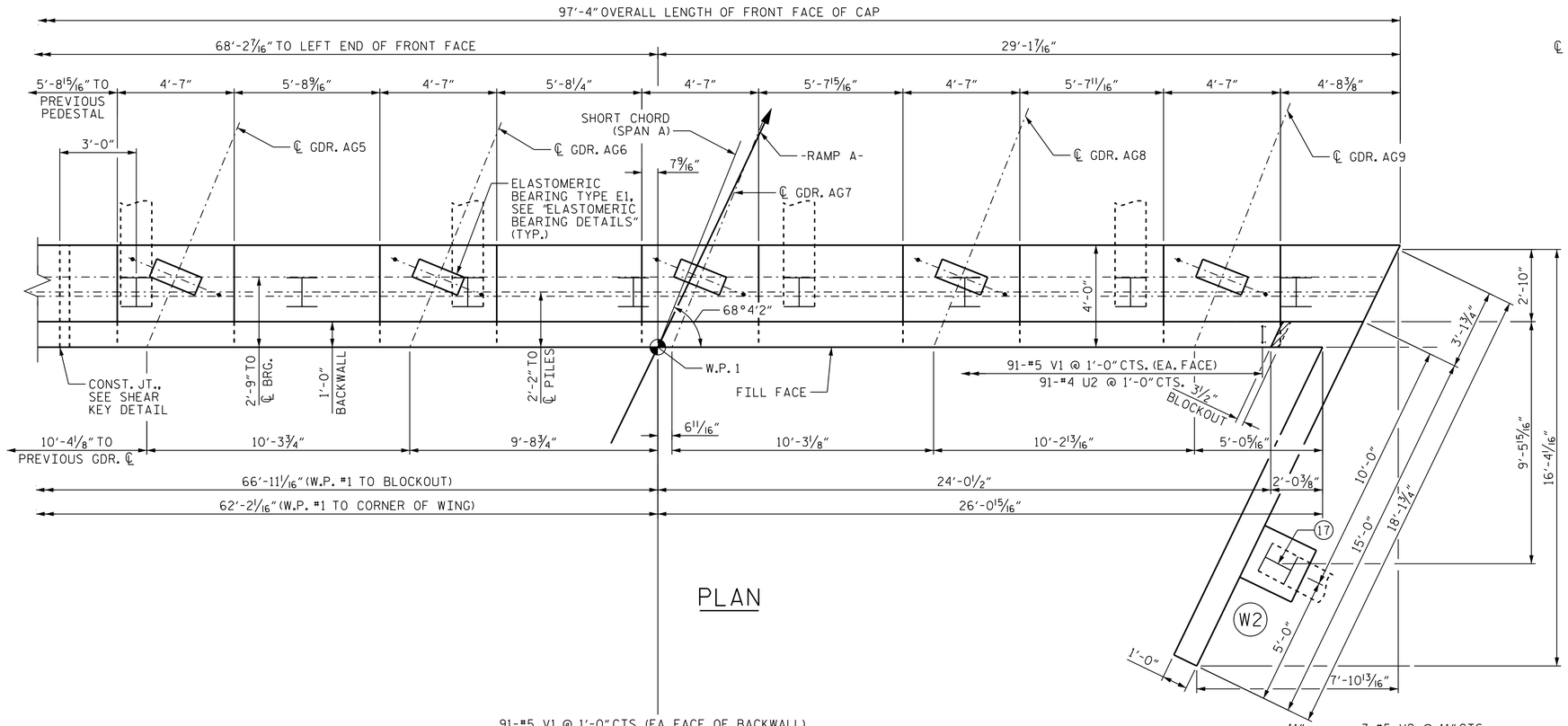


PLAN

ELEVATION

* FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEATS, SEE "SECTION A-A" ON SHEET 4 OF 4.

REINFORCING STEEL NOT SHOWN IN WING AND BRACE PILE CAP FOR CLARITY, SEE "END BENT 1 WING WALL DETAILS" SHEET 3 OF 4.

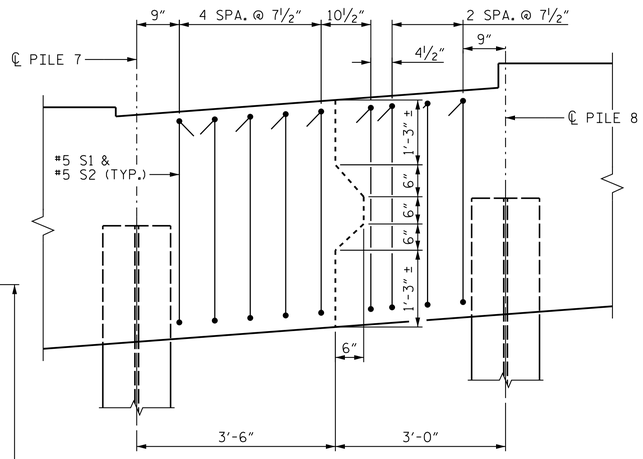
(2 BR) DENOTES 2 BAR RUN.

(3 BR) DENOTES 3 BAR RUN.

Ⓐ 9-#5 S1 AND 9-#5 S2 @ 7½" CTS. (TYP. EA. BAY)

Ⓑ 9-#4 U1 @ 6" CTS. (TYP. EA. PEDESTAL)

Ⓒ PILE COLLAR, TYP. EA. PILE. OTHERS NOT SHOWN FOR CLARITY.



SHEAR KEY DETAIL

"B" BARS NOT SHOWN FOR CLARITY. REINFORCING STEEL SHALL BE CONTINUOUS THRU SHEAR KEY.

BAR	MIN. SPLICE
#10 B1	4'-7"
#10 B2	6'-0"
#4 B3	2'-5"
#4 K1	2'-5"

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DRAWN BY : J. B. GEILE DATE : 12/13/22
CHECKED BY : V. E. FRAGA DATE : 01/26/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47083 VICTOR E. FRAGA
DocuSigned by: Victor E. Fraga 5/10/2023

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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 36+78.38 -RAMP A-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 1
PLAN AND ELEVATION (RIGHT)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-29
1			3			TOTAL SHEETS
2			4			43

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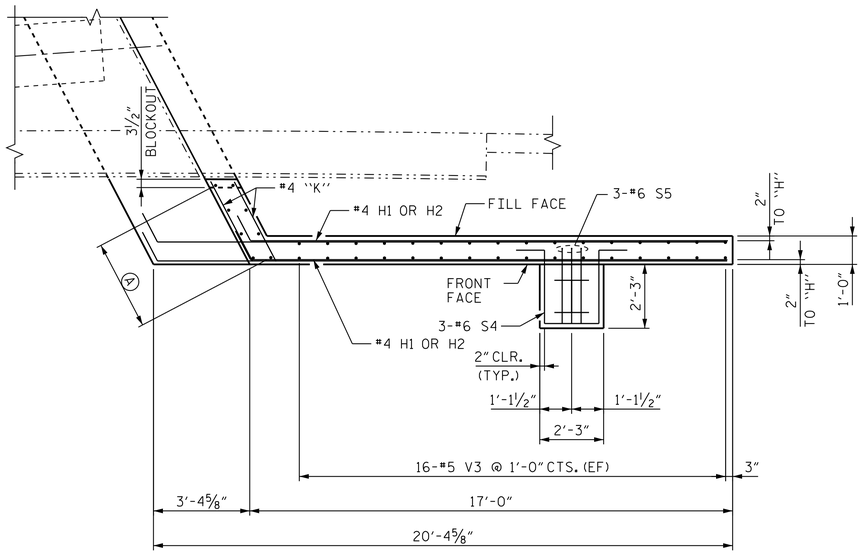
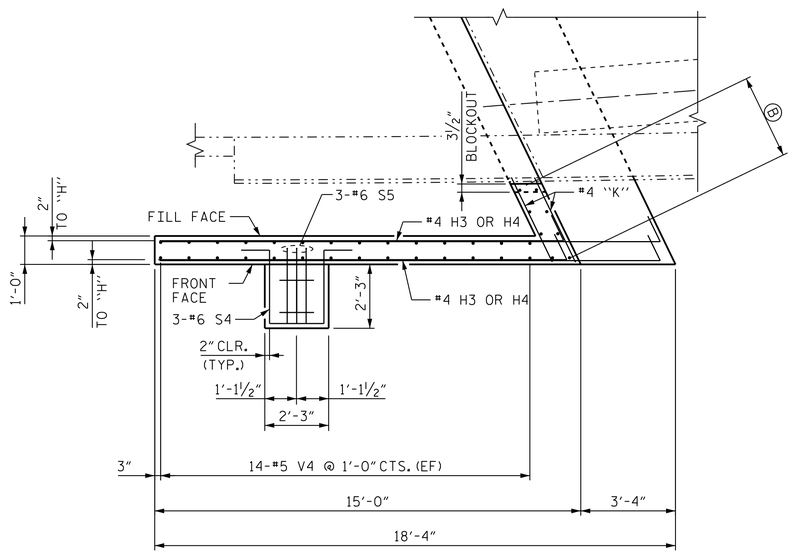


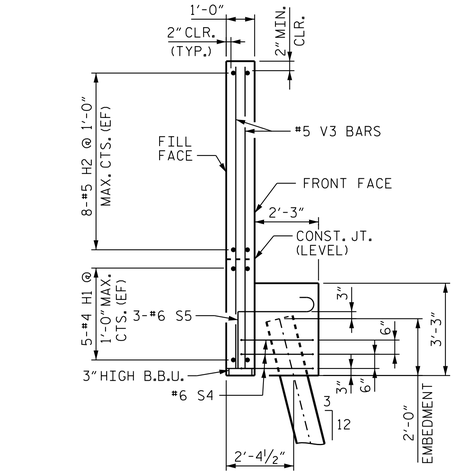
Ⓐ 8-#5 V2 @ 1'-0" MAX. CTS. (EF) (SPA. AS SHOWN)

PLAN OF LEFT WING (W1)

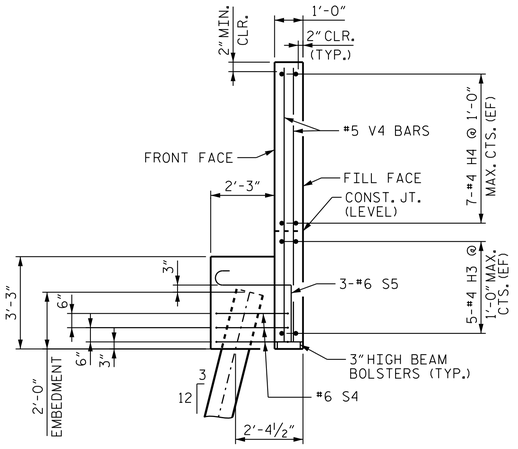


Ⓑ 8-#5 V2 @ 1'-0" MAX. CTS. (EF) (SPA. AS SHOWN)

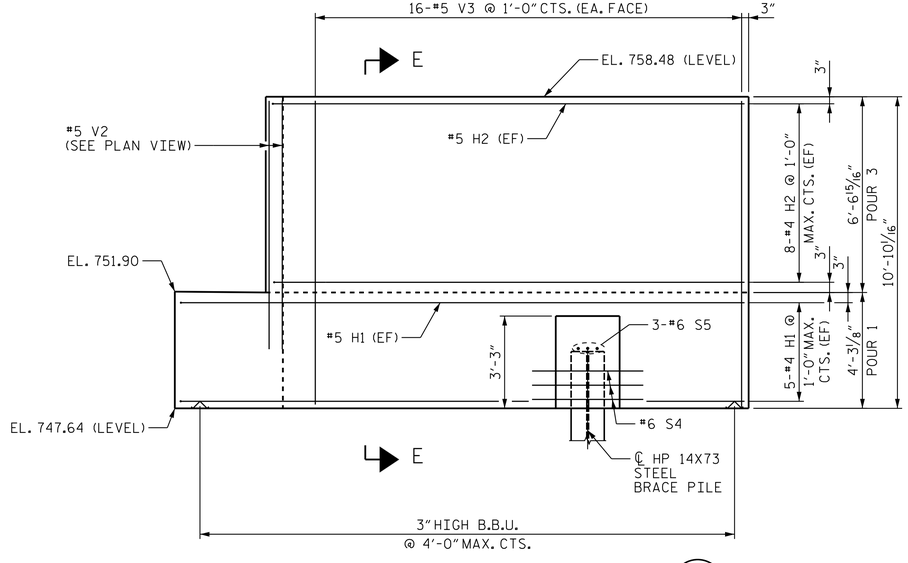
PLAN OF RIGHT WING (W2)



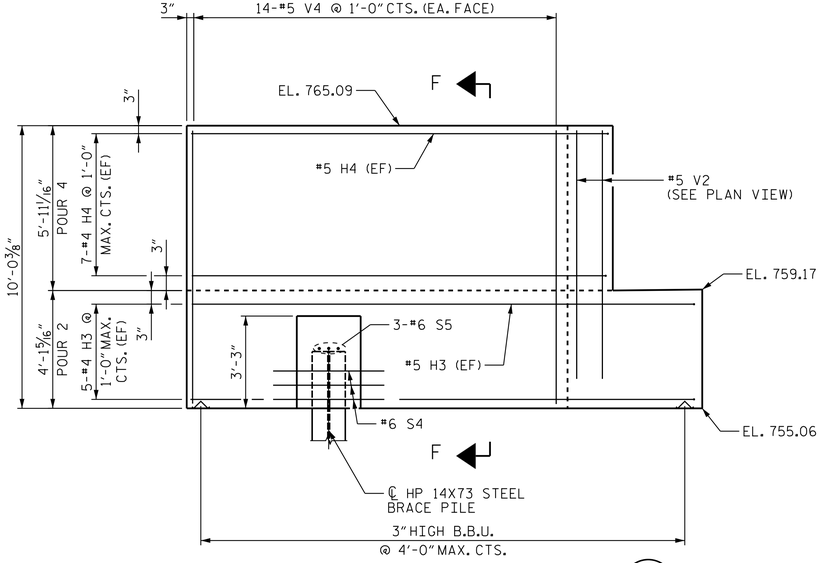
SECTION E-E



SECTION F-F



ELEVATION OF LEFT WING (W1)



ELEVATION OF RIGHT WING (W2)

(EF) DENOTES EACH FACE.

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NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 36+78.38 -RAMP A-

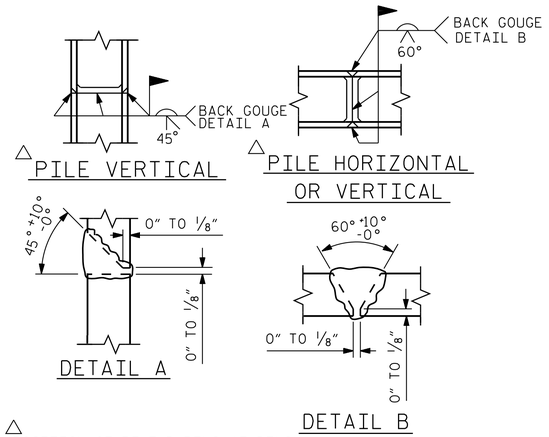
SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

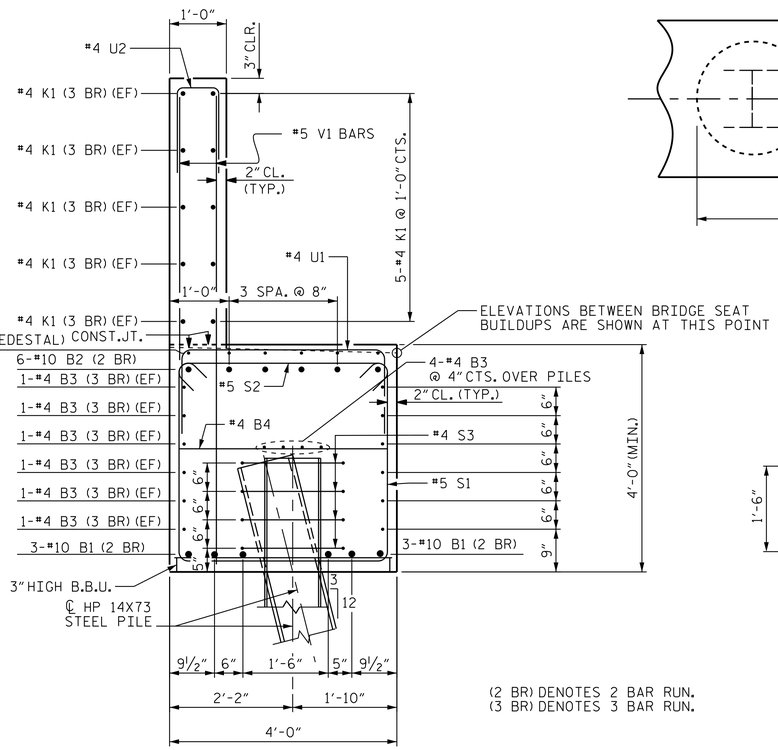
END BENT 1
WING WALL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-30
1			3			TOTAL SHEETS
2			4			43



PILE SPLICE DETAILS

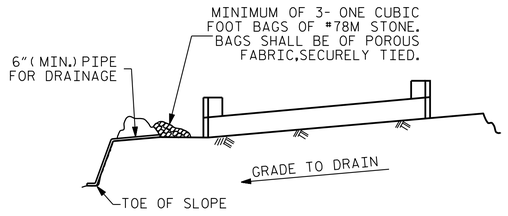
PILE	CUTOFF EL.
1	749.99
2	750.48
3	750.96
4	751.45
5	751.93
6	752.42
7	752.91
8	753.39
9	753.88
10	754.36
11	754.85
12	755.34
13	755.82
14	756.31
15	756.79
16	749.64
17	757.06



(2 BR) DENOTES 2 BAR RUN.
(3 BR) DENOTES 3 BAR RUN.

SECTION A-A

ANCHOR BOLTS NOT SHOWN FOR CLARITY
SEE "END BENT 1" SHEET 1 OF 4.

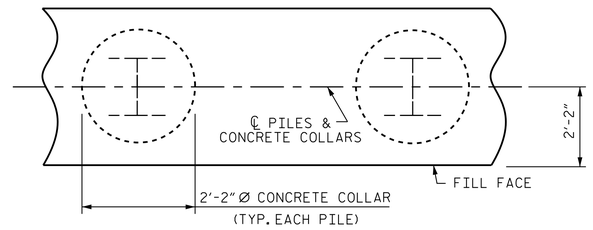


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

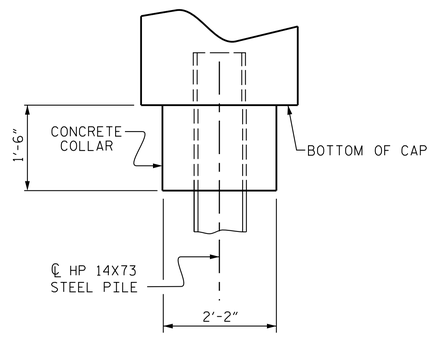
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

TEMPORARY DRAINAGE AT END BENT



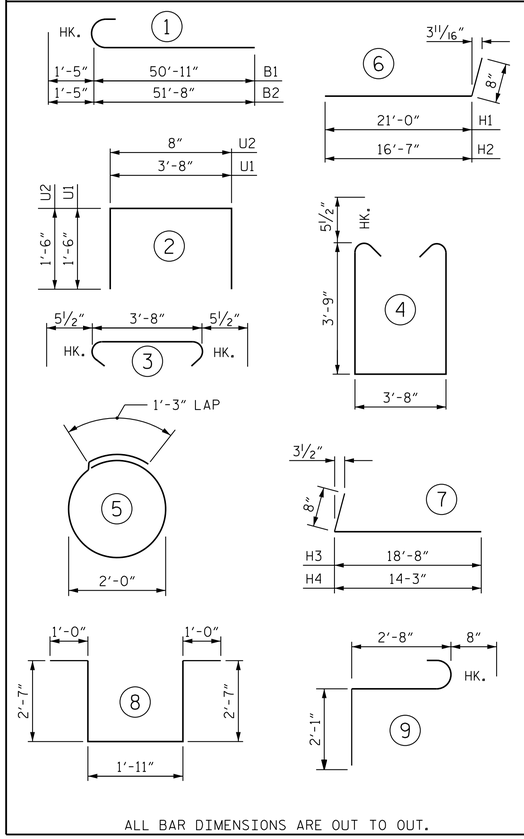
PLAN



ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#10	1	52'-4"	2,702
B2	12	#10	1	53'-1"	2,741
B3	48	#4	STR	34'-1"	1,093
B4	20	#4	STR	3'-6"	47
B5	54	#4	STR	4'-3"	153
H1	10	#4	6	21'-8"	145
H2	16	#4	6	17'-3"	184
H3	10	#4	7	19'-4"	129
H4	14	#4	7	14'-11"	140
K1	30	#4	STR	34'-1"	683
K2	2	#4	STR	3'-0"	4
K3	2	#4	STR	2'-8"	4
K4	2	#4	STR	2'-9"	4
K5	2	#4	STR	2'-5"	3
S1	147	#5	3	12'-1"	1,853
S2	132	#5	4	4'-7"	631
S3	60	#4	5	7'-0"	281
S4	6	#6	8	9'-1"	82
S5	6	#6	9	5'-5"	49
U1	81	#4	2	6'-8"	361
U2	91	#4	2	3'-8"	223
V1	182	#5	STR	7'-1"	1,345
V2	16	#5	STR	8'-9"	146
V3	32	#5	STR	10'-6"	350
V4	28	#5	STR	9'-8"	282

REINFORCING STEEL 13,635 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1	(LT) CAP, LOWER PART OF WINGS & COLLARS	32.3 C.Y.
POUR #2	(RT) CAP, LOWER PART OF WINGS & COLLARS	36.8 C.Y.
POUR #3	(LT) UPPER PART OF WINGS & BACKWALL	12.8 C.Y.
POUR #4	(RT) UPPER PART OF WINGS & BACKWALL	12.6 C.Y.
TOTAL CLASS A CONCRETE		94.5 C.Y.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 36+78.38 -RAMP A-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

END BENT 1 DETAILS

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DRAWN BY : J. B. GEILE DATE : 12/16/22
CHECKED BY : V. E. FRAGA DATE : XX/XX/XX
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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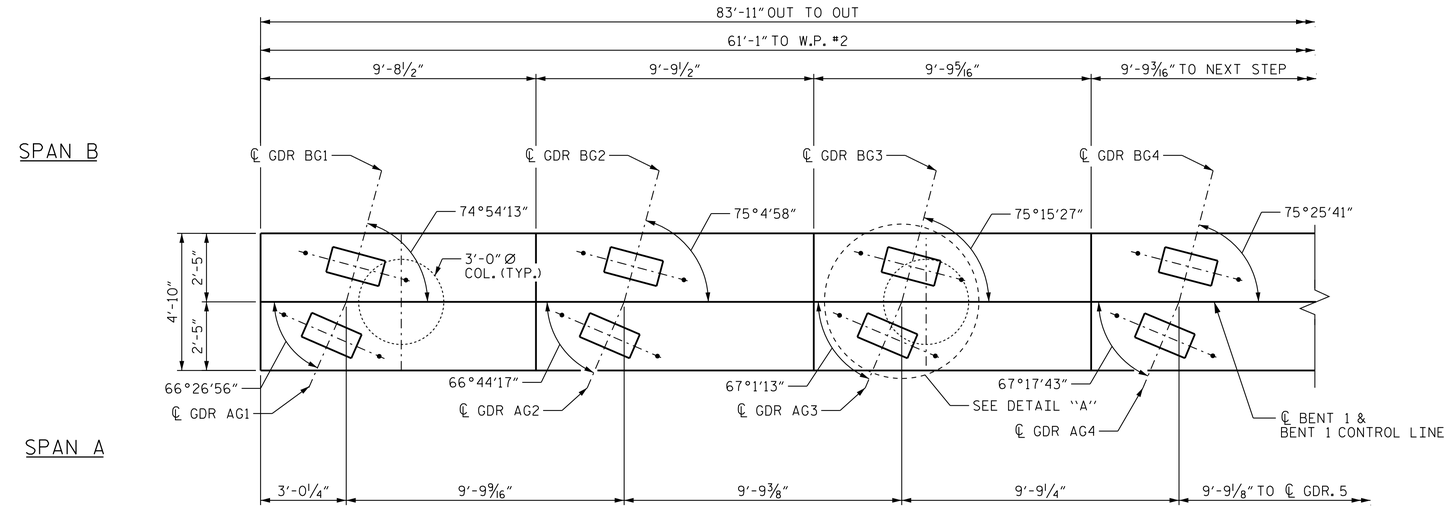
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-31
1			3			TOTAL SHEETS
2			4			43



NOTES:

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

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

(2 BR) DENOTES 2 BAR RUN.

Ⓐ 3-#5 S1 & 3-#5 S2 @ 1'-0" CTS. (TYP. EA. OVERHANG)

Ⓑ 4-#5 S1 & 4-#5 S2 @ 4" CTS. (TYP. EA. OVERHANG)

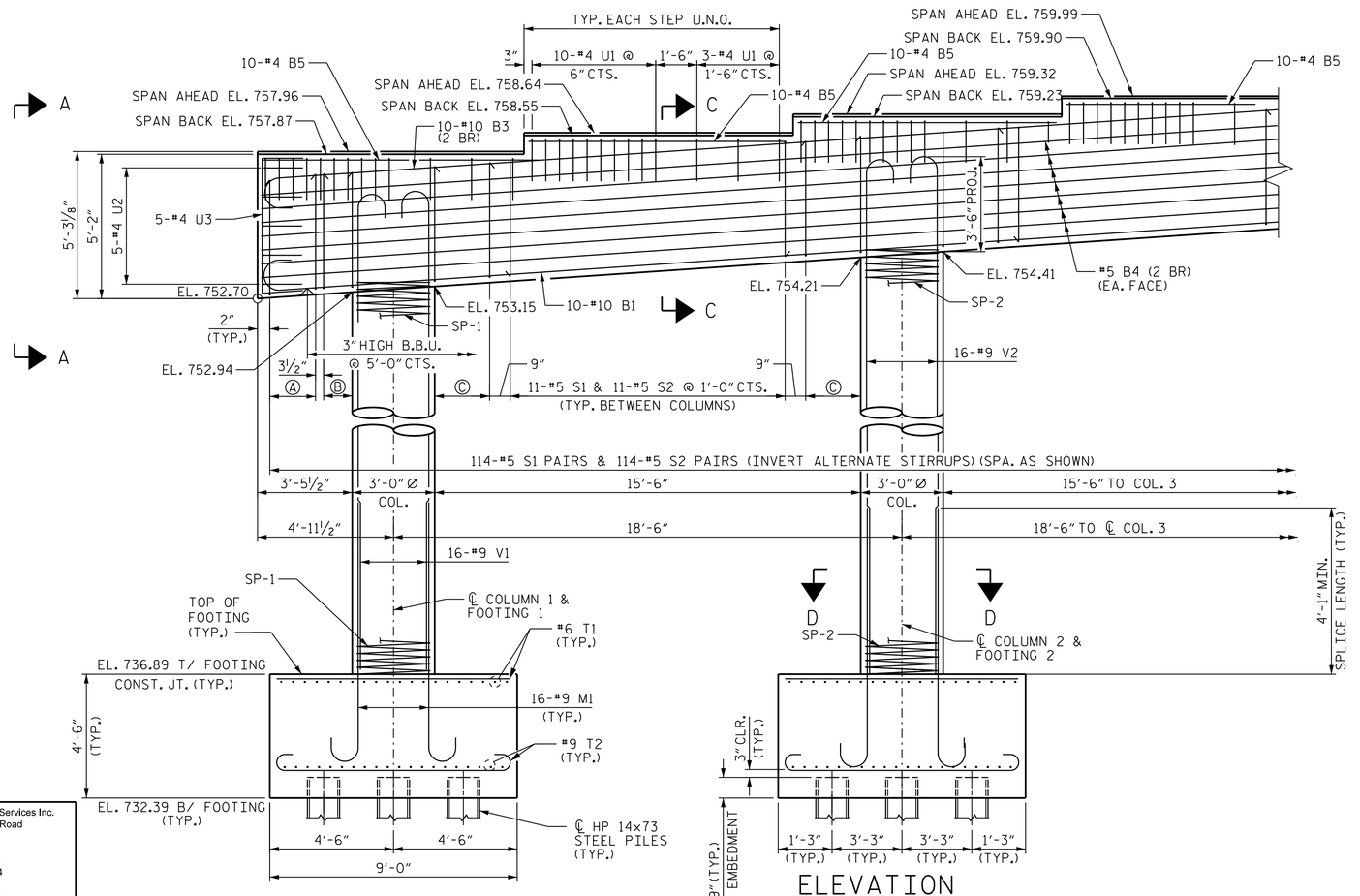
Ⓒ 7-#5 S1 & 7-#5 S2 @ 4" CTS. (TYP. BETWEEN COLUMNS)

FOR SECTION D-D, SEE "BENT 1 DETAILS" SHEET 3 OF 4.

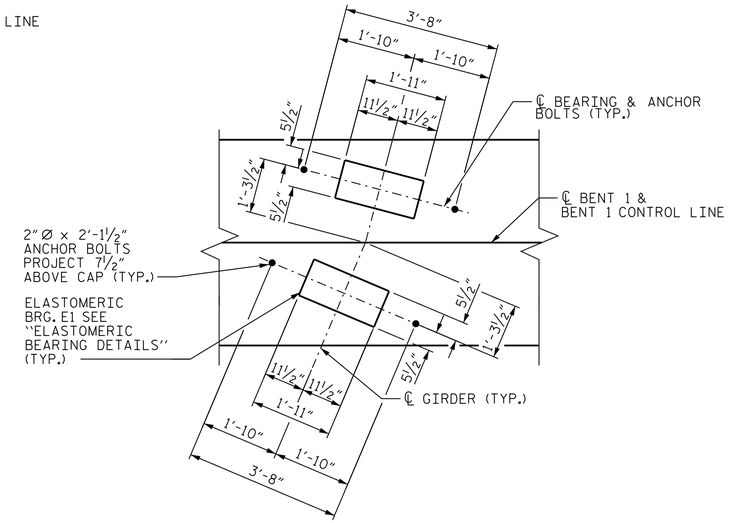
FOR VIEW A-A AND SECTION C-C, SEE "BENT 1 DETAILS" SHEET 4 OF 4.

U.N.O. DENOTES UNLESS NOTED OTHERWISE.

PLAN



ELEVATION



DETAIL "A"

DIMENSIONS TYPICAL FOR EACH BEARING

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1
PLAN AND ELEVATION (LEFT)

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CHECKED BY : M. B. ISENHOUR DATE : 01/23/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

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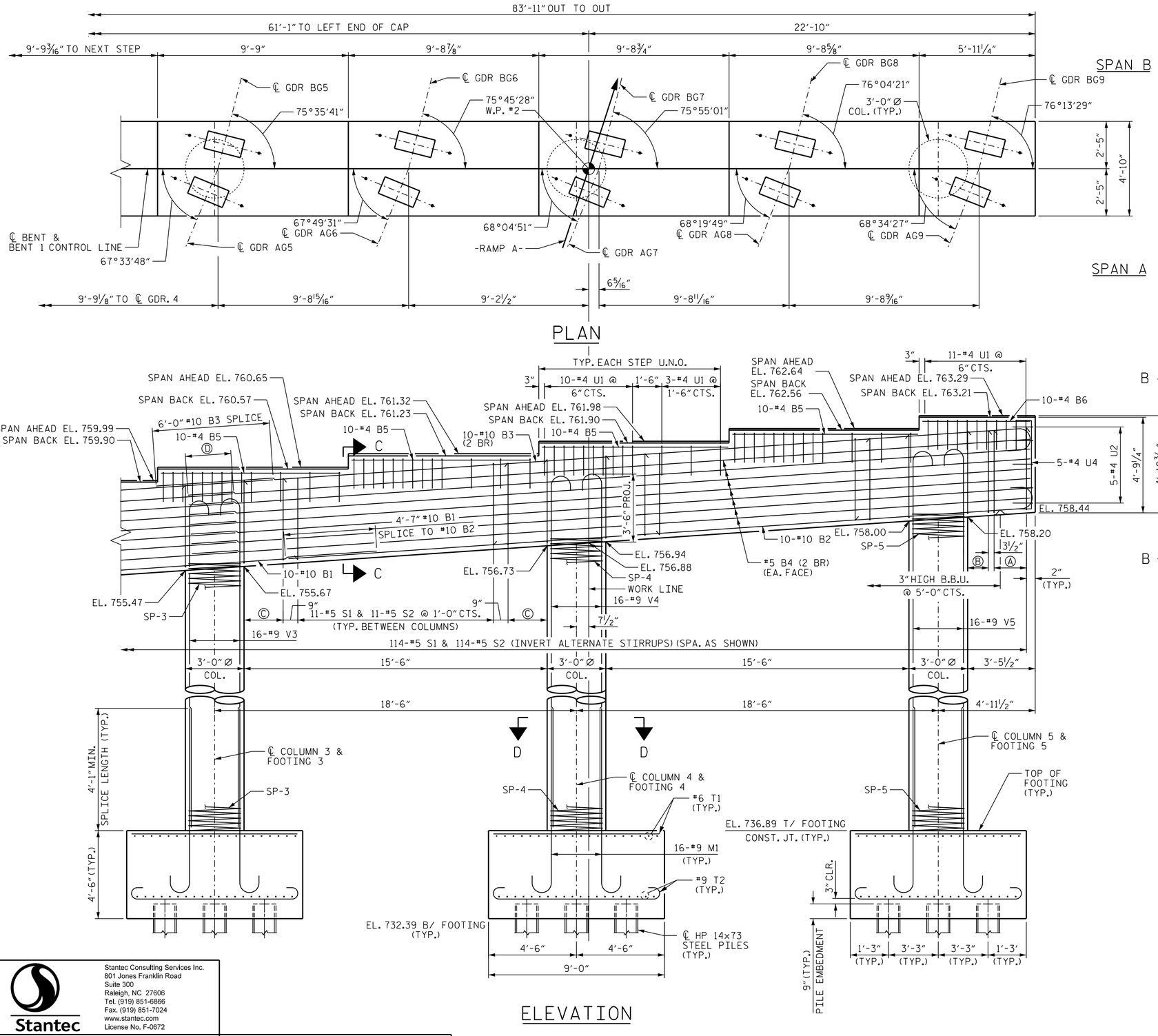
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-32
1			3			TOTAL SHEETS
2			4			43



ELEVATION

NOTES:

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

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

(2 BR) DENOTES 2 BAR RUN.

Ⓐ 3-#5 S1 & 3-#5 S2 @ 1'-0" CTS. (TYP. EA. OVERHANG)

Ⓑ 4-#5 S1 & 4-#5 S2 @ 4" CTS. (TYP. EA. OVERHANG)

Ⓒ 7-#5 S1 & 7-#5 S2 @ 4" CTS. (TYP. BETWEEN COLUMNS)

Ⓓ 3'-0" #4 B4 SPLICE (TYP.)

U.N.O DENOTES UNLESS NOTED OTHERWISE.

FOR SECTION D-D, SEE "BENT 1 DETAILS" SHEET 3 OF 4.

FOR VIEW B-B, SEE "BENT 1 DETAILS" SHEET 4 OF 4.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1
PLAN AND ELEVATION (RIGHT)

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

SHEET NO. S4-33
TOTAL SHEETS 43

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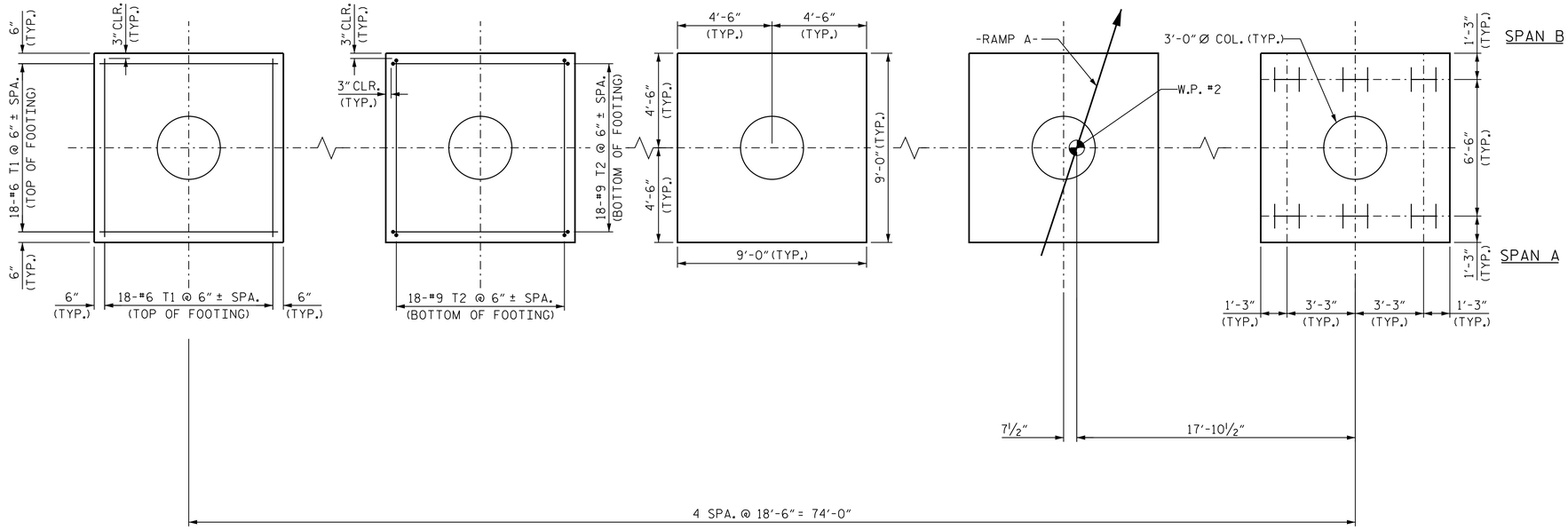
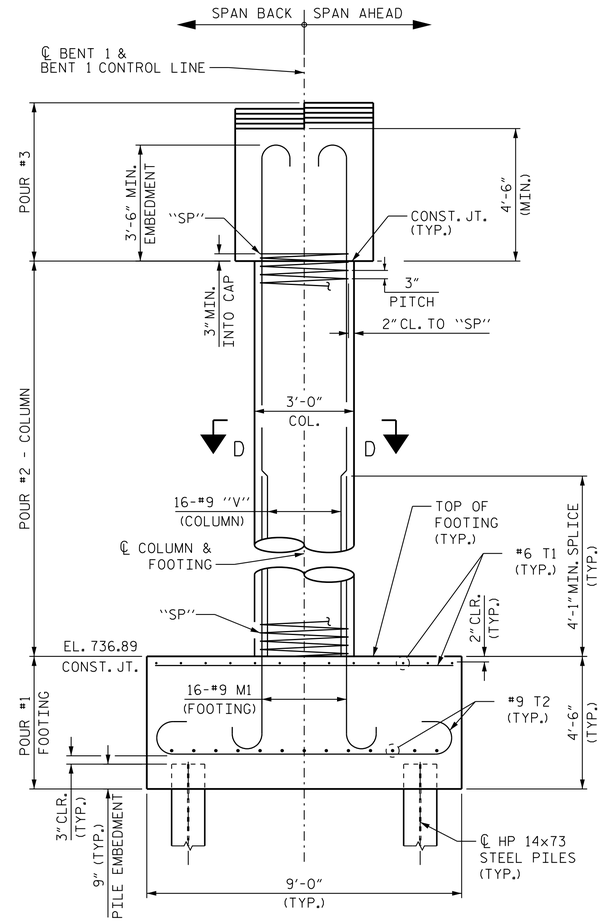
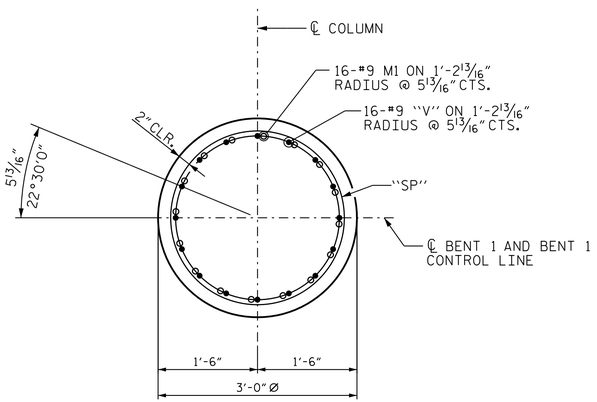




END ELEVATION

COLUMN HEIGHTS			
COLUMN	℄ HEIGHT	LT. HEIGHT	RT. HEIGHT
1	16'-1 13/16"	16'-0 5/8"	16'-3 1/16"
2	17'-5"	17'-3 13/16"	17'-6 1/4"
3	18'-8 3/16"	18'-6 15/16"	18'-9 7/16"
4	19'-11 3/8"	19'-10 1/8"	20'-0 9/16"
5	21'-2 1/2"	21'-1 5/16"	21'-3 3/4"



SECTION D-D

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

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2			4			43

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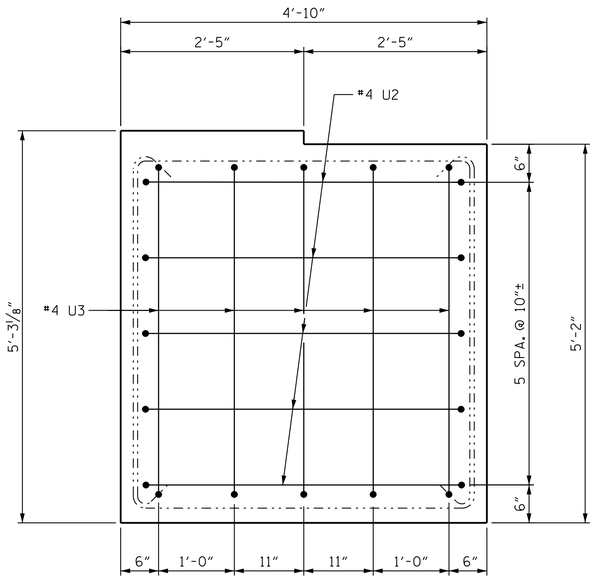
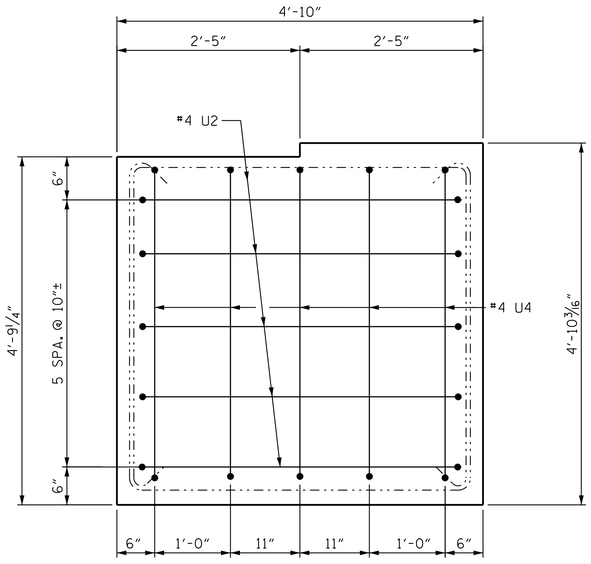
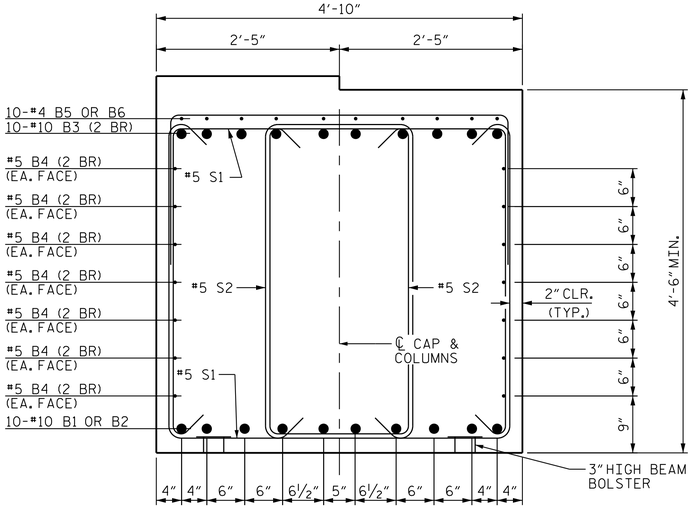


VIEW A-A

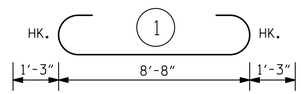


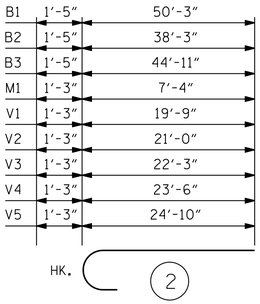
VIEW B-B

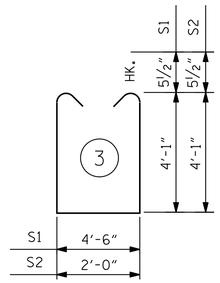


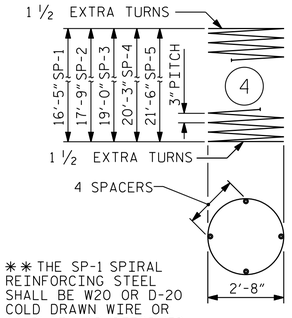
SECTION C-C

BAR TYPES

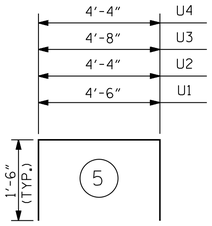








** THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#10	2	51'-8"	2,223
B2	10	#10	2	39'-8"	1,707
B3	20	#10	2	46'-4"	3,987
B4	28	#5	STR	43'-5"	1,268
B5	80	#4	STR	9'-6"	508
B6	10	#4	STR	5'-7"	37
M1	80	#9	2	8'-7"	2,335
S1	114	#5	3	13'-7"	1,615
S2	114	#5	3	11'-1"	1,318
T1	180	#6	STR	8'-8"	2,343
T2	180	#9	1	11'-2"	6,834
U1	115	#4	5	7'-6"	576
U2	10	#4	5	7'-4"	49
U3	5	#4	5	7'-8"	26
U4	5	#4	5	7'-4"	24
V1	16	#9	2	21'-0"	1,142
V2	16	#9	2	22'-3"	1,210
V3	16	#9	2	23'-6"	1,278
V4	16	#9	2	24'-9"	1,346
V5	16	#9	2	26'-1"	1,419
REINFORCING STEEL				LBS.	31,245
SP-1	1	**	4	568'-2"	380
SP-2	1	**	4	609'-4"	407
SP-3	1	**	4	650'-6"	435
SP-4	1	**	4	691'-8"	462
SP-5	1	**	4	732'-11"	490
SPIRAL COLUMN REINFORCING STEEL				LBS.	2,174
CLASS A CONCRETE BREAKDOWN					
POUR #1 FOOTINGS				C.Y.	67.5
POUR #2 COLUMNS				C.Y.	24.5
POUR #3 CAP				C.Y.	73.7
TOTAL CLASS A CONC.				C.Y.	165.7

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

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DRAWN BY : J. B. GEILE DATE : 12/20/23
CHECKED BY : M. B . ISENHOUR DATE : 01/23/23
DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA
DocuSigned by: Victor E. Fraga 5/10/2023

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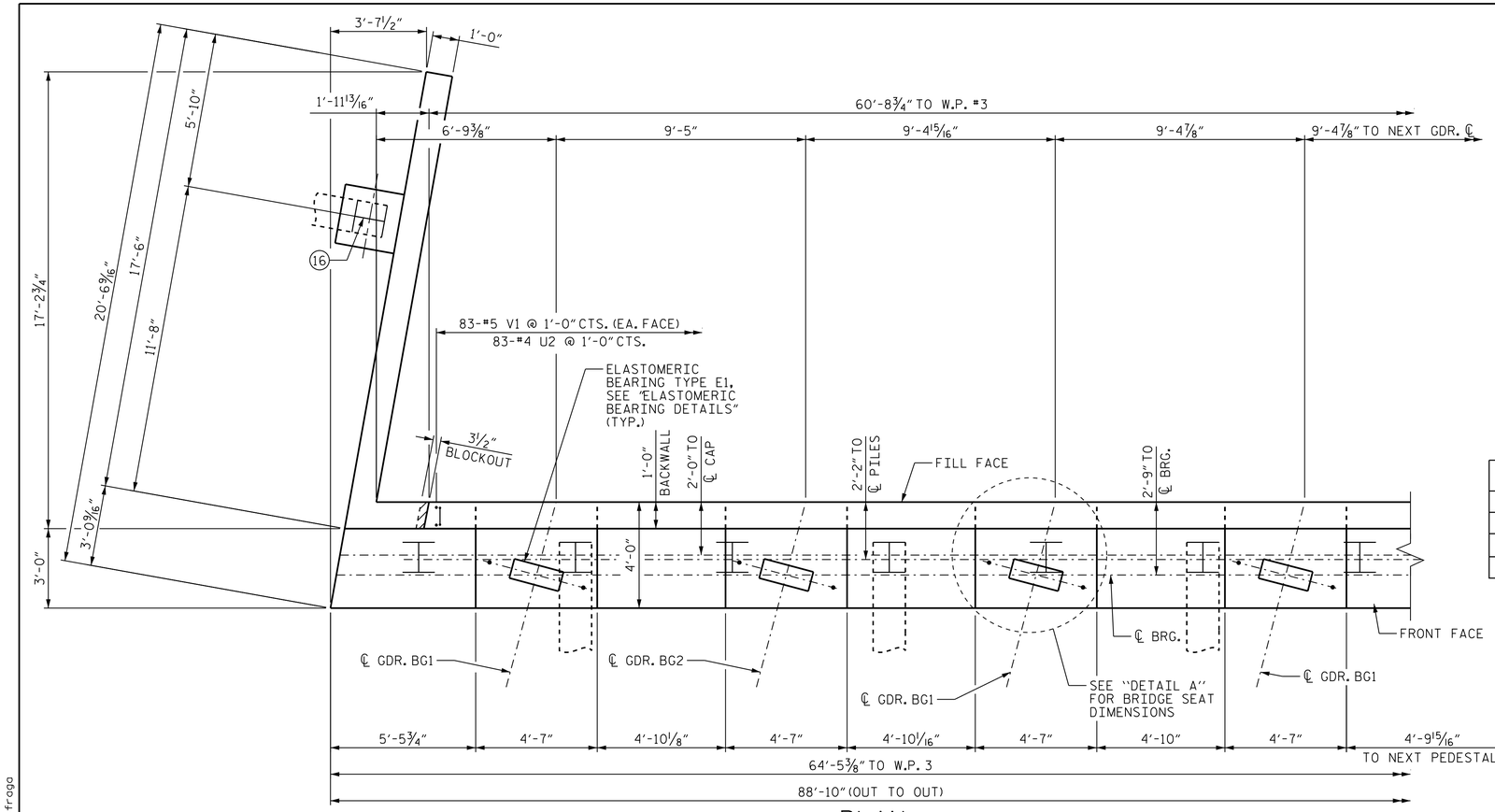
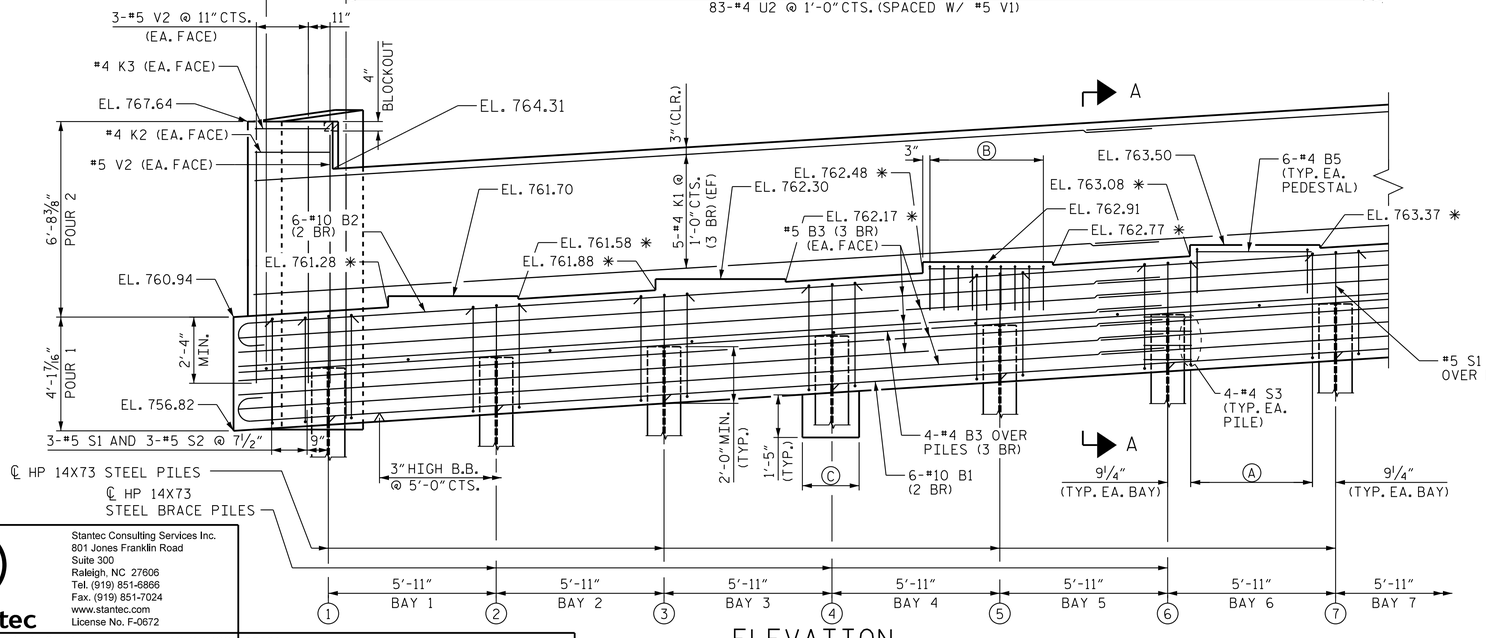
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-35
1			3			TOTAL SHEETS
2			4			43



PLAN



ELEVATION

Ⓐ 8-#5 S1 AND 8-#5 S2 @ 7½" CTS. (TYP. EA. BAY)

Ⓑ 9-#4 U1 @ 6" CTS. (TYP. EA. PEDESTAL)

Ⓒ PILE COLLAR, TYP. EA. PILE. OTHERS NOT SHOWN FOR CLARITY.

NOTES

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

BACKWALL SHALL BE PLACED BEFORE APPLYING EPOXY PROTECTIVE COATING.

FOR WING DETAILS, SEE SHEET 3 OF 4.

FOR PILE SPLICE DETAILS, SEE SHEET 4 OF 4.

FOR PILE CUT OFF ELEVATION SEE TABLE SHEET 4 OF 4.

(2 BR) DENOTES 2 BAR RUN.

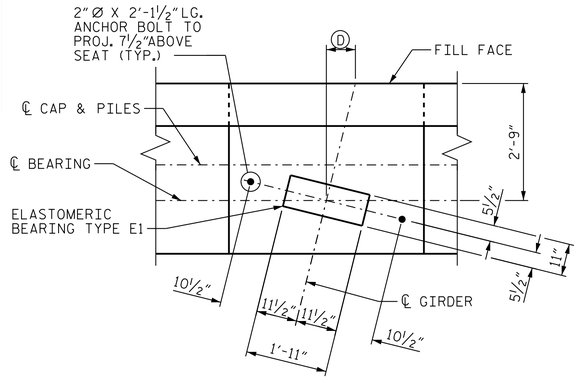
✳ FOR LOCATION OF ELEVATION BETWEEN BRIDGE SEATS, SEE "SECTION A-A" ON SHEET 4 OF 4.

TOP SURFACE OF END BENT CAP BETWEEN BRIDGE SEAT PEDESTALS SHALL BE SLOPED TRANSVERSELY FROM FILL FACE TO FRONT FACE AT A RATE OF 1"#4" / FT.

FOR TOP OF PILE ELEVATIONS, SEE SHEET 4 OF 4.

BAR	MIN. SPLICE
#10 B1	4'-7"
#10 B2	6'-0"
#4 B3	2'-5"
#4 K1	2'-5"

GIRDER	Ⓓ
BG1	8⅞"
BG2	8 13/16"
BG3	8 11/16"
BG4	8 9/16"
BG5	8½"
BG6	8⅜"
BG7	8¼"
BG8	8 3/16"
BG9	8 1/16"



DETAIL A

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
PLAN AND ELEVATION (LEFT)

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

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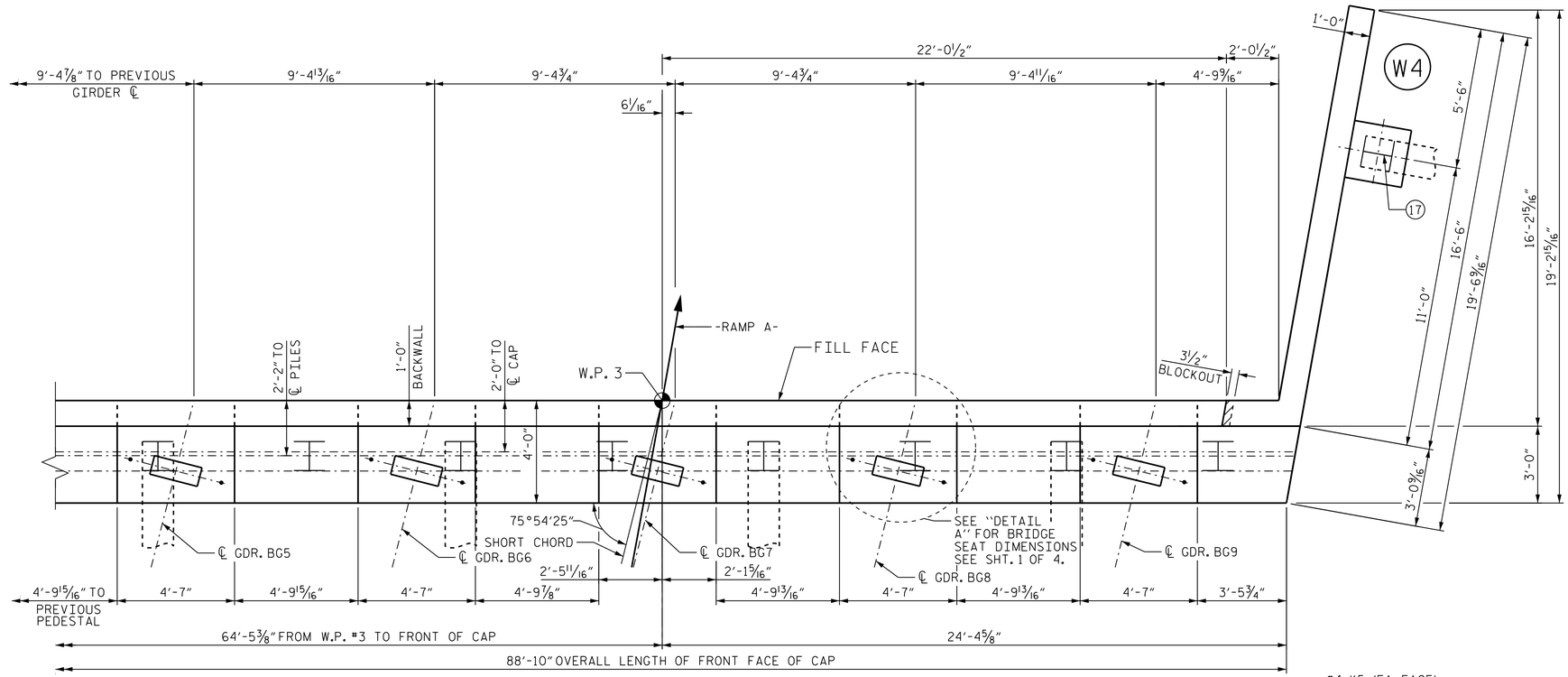
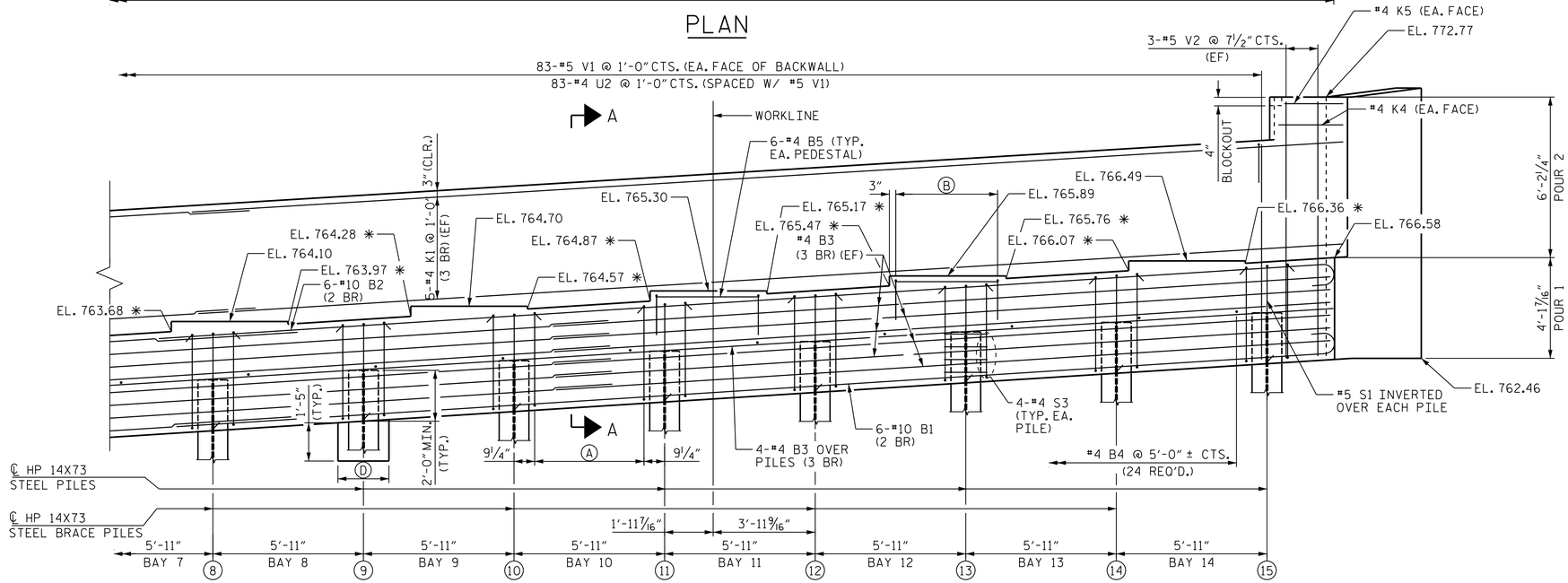


BAR	MIN. SPLICE
#10 B1	4′-7″
#10 B2	6′-0″
#4 B3	2′-5″
#4 K1	2′-5″

PLAN



ELEVATION

REINFORCING STEEL NOT SHOWN IN WING AND BRACE PILE CAP FOR CLARITY, SEE "END BENT 2 WING WALL DETAILS" SHEET 3 OF 4.

Ⓐ 8-#5 S1 AND 8-#5 S2 @ 7 1/2″ CTS. (TYP. EA. BAY)

Ⓑ 9-#4 U1 @ 6″ CTS. (TYP. EA. PEDESTAL)

Ⓒ PILE COLLAR, TYP. EA. PILE. OTHERS NOT SHOWN FOR CLARITY.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
PLAN AND ELEVATION (RIGHT)

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47083 VICTOR E. FRAGA

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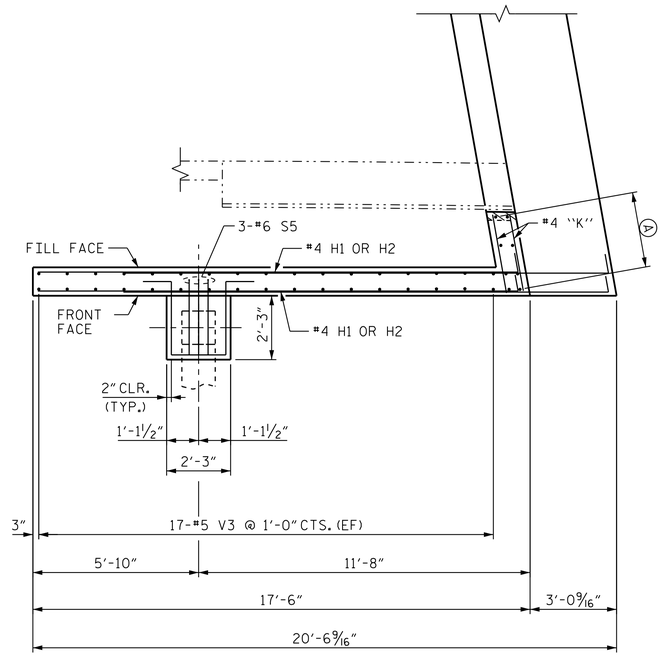
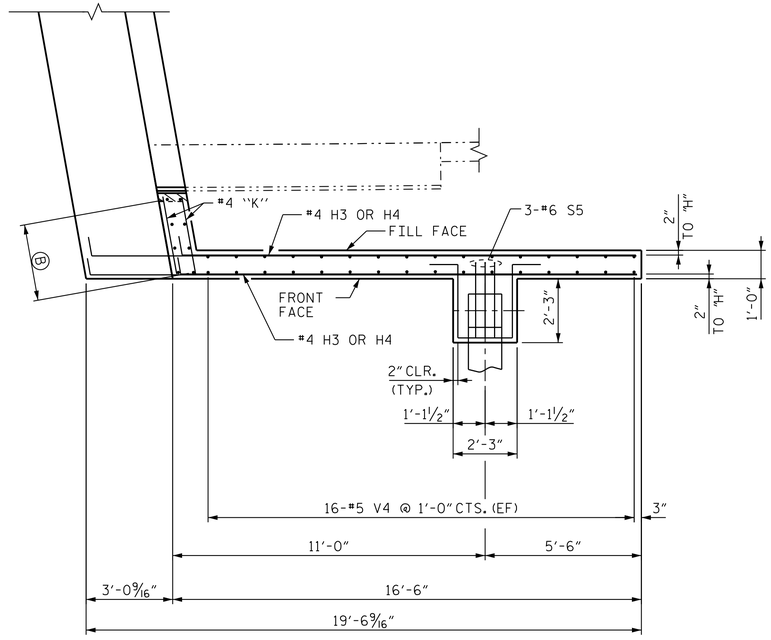


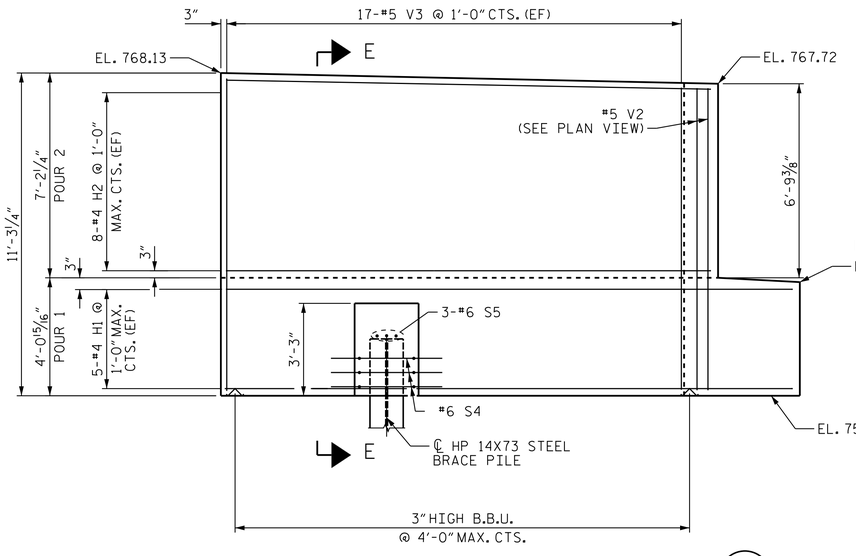
Ⓐ 8-#5 V2 @ 1'-0" MAX. CTS. (EF) (SPA. AS SHOWN)

PLAN OF LEFT WING (W3)

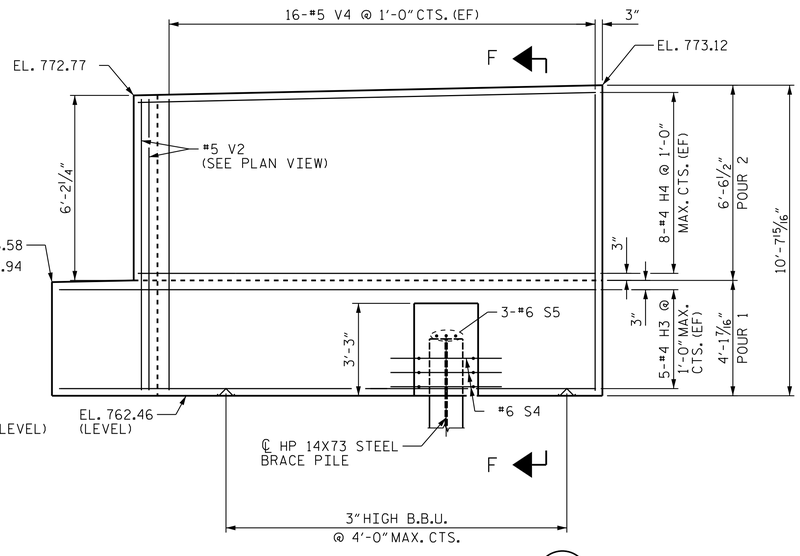


Ⓑ 8-#5 V2 @ 1'-0" MAX. CTS. (EF) (SPA. AS SHOWN)

PLAN OF RIGHT WING (W4)

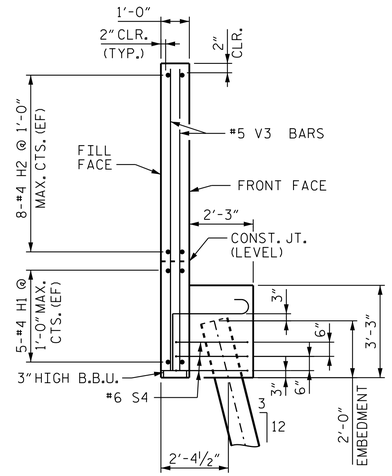


ELEVATION OF LEFT WING (W3)

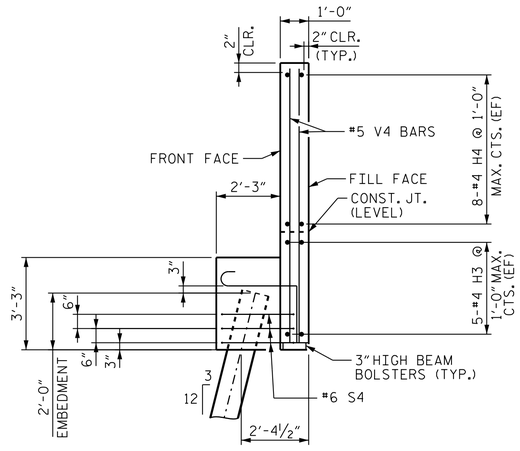


ELEVATION OF RIGHT WING (W4)

(EF) DENOTES EACH FACE



SECTION E-E



SECTION F-F

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
WING WALL DETAILS

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2			4			43

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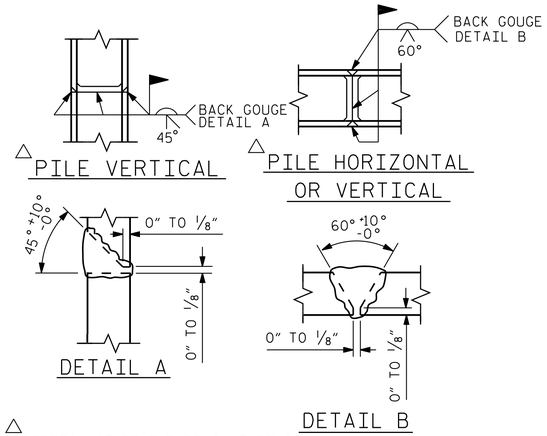
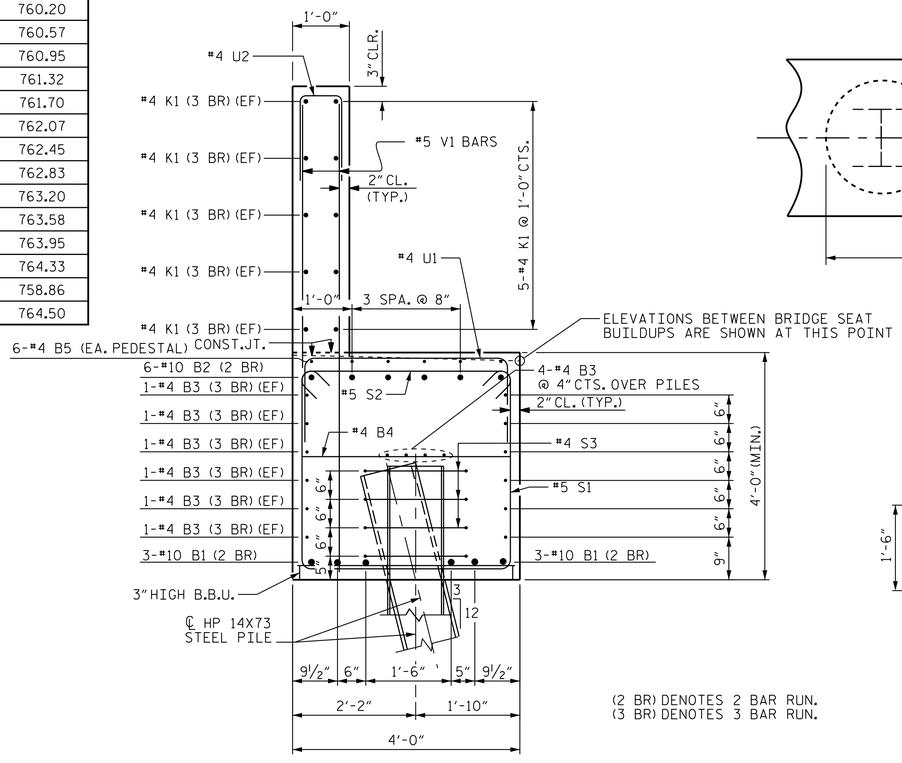


△ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

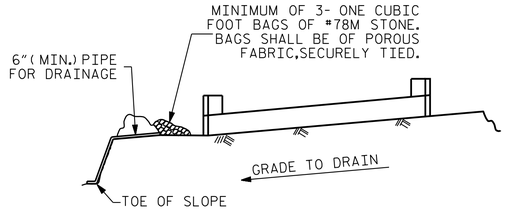
PILE	CUTOFF EL.
1	759.07
2	759.44
3	759.82
4	760.20
5	760.57
6	760.95
7	761.32
8	761.70
9	762.07
10	762.45
11	762.83
12	763.20
13	763.58
14	763.95
15	764.33
16	758.86
17	764.50



(2 BR) DENOTES 2 BAR RUN.
(3 BR) DENOTES 3 BAR RUN.

SECTION A-A

ANCHOR BOLTS NOT SHOWN FOR CLARITY
SEE "END BENT 2" SHEET 1 OF 4.

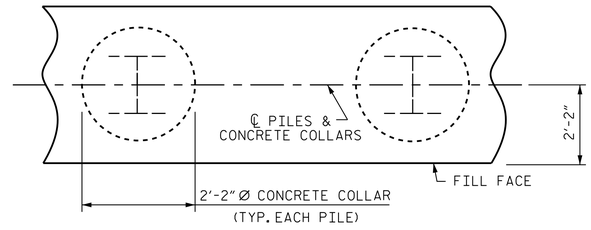


BAGGED STONE AND PIPE SHALL BE PLACED IMMEDIATELY AFTER COMPLETION OF END BENT EXCAVATION. PIPE MAY BE EITHER CONCRETE, CORRUGATED STEEL, CORRUGATED ALUMINUM ALLOY, OR CORRUGATED PLASTIC. PERFORATED PIPE WILL NOT BE ALLOWED.

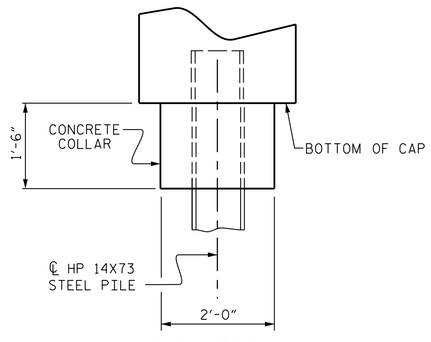
BAGGED STONE SHALL REMAIN IN PLACE UNTIL THE ENGINEER DIRECTS THAT IT BE REMOVED. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF SILT ACCUMULATIONS AT BAGGED STONE WHEN SO DIRECTED BY THE ENGINEER. BAGS SHALL BE REMOVED AND REPLACED WHENEVER THE ENGINEER DETERMINES THAT THEY HAVE DETERIORATED AND LOST THEIR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

TEMPORARY DRAINAGE AT END BENT



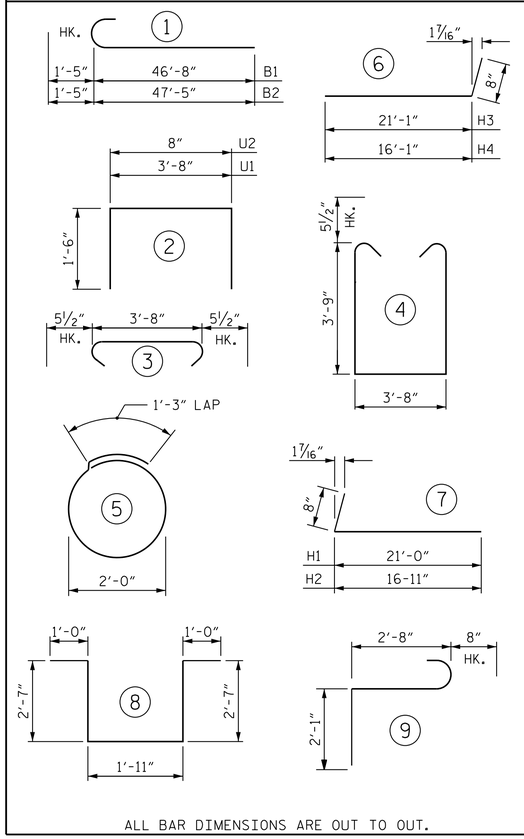
PLAN



ELEVATION

CORROSION PROTECTION FOR STEEL PILES DETAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	#10	1	48'-1"	2,483
B2	12	#10	1	48'-10"	2,522
B3	48	#4	STR	31'-3"	1,002
B4	18	#4	STR	3'-6"	42
B5	54	#4	STR	4'-3"	153
H1	10	#4	7	21'-8"	145
H2	16	#4	7	17'-7"	188
H3	10	#4	6	20'-9"	139
H4	16	#4	6	16'-9"	179
K1	30	#4	STR	31'-3"	626
K2	2	#4	STR	2'-7"	3
K3	2	#4	STR	2'-4"	3
K4	2	#4	STR	2'-8"	4
K5	2	#4	STR	2'-5"	3
S1	133	#5	3	12'-1"	1,676
S2	118	#5	4	4'-7"	564
S3	60	#4	5	7'-0"	281
S4	6	#6	8	9'-1"	82
S5	6	#6	9	5'-5"	49
U1	81	#4	2	6'-8"	361
U2	83	#4	2	3'-8"	203
V1	166	#5	STR	7'-1"	1,226
V2	16	#5	STR	8'-9"	146
V3	34	#5	STR	10'-6"	372
V4	32	#5	STR	9'-11"	331

REINFORCING STEEL 12,783 LBS.

CLASS A CONCRETE BREAKDOWN

POUR #1 CAP, LOWER PART OF WINGS & COLLARS 65.3 C.Y.

POUR #2 UPPER PART OF WINGS & BACKWALL 25.0 C.Y.

TOTAL CLASS A CONCRETE 90.3 C.Y.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
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SUBSTRUCTURE

END BENT 2 DETAILS

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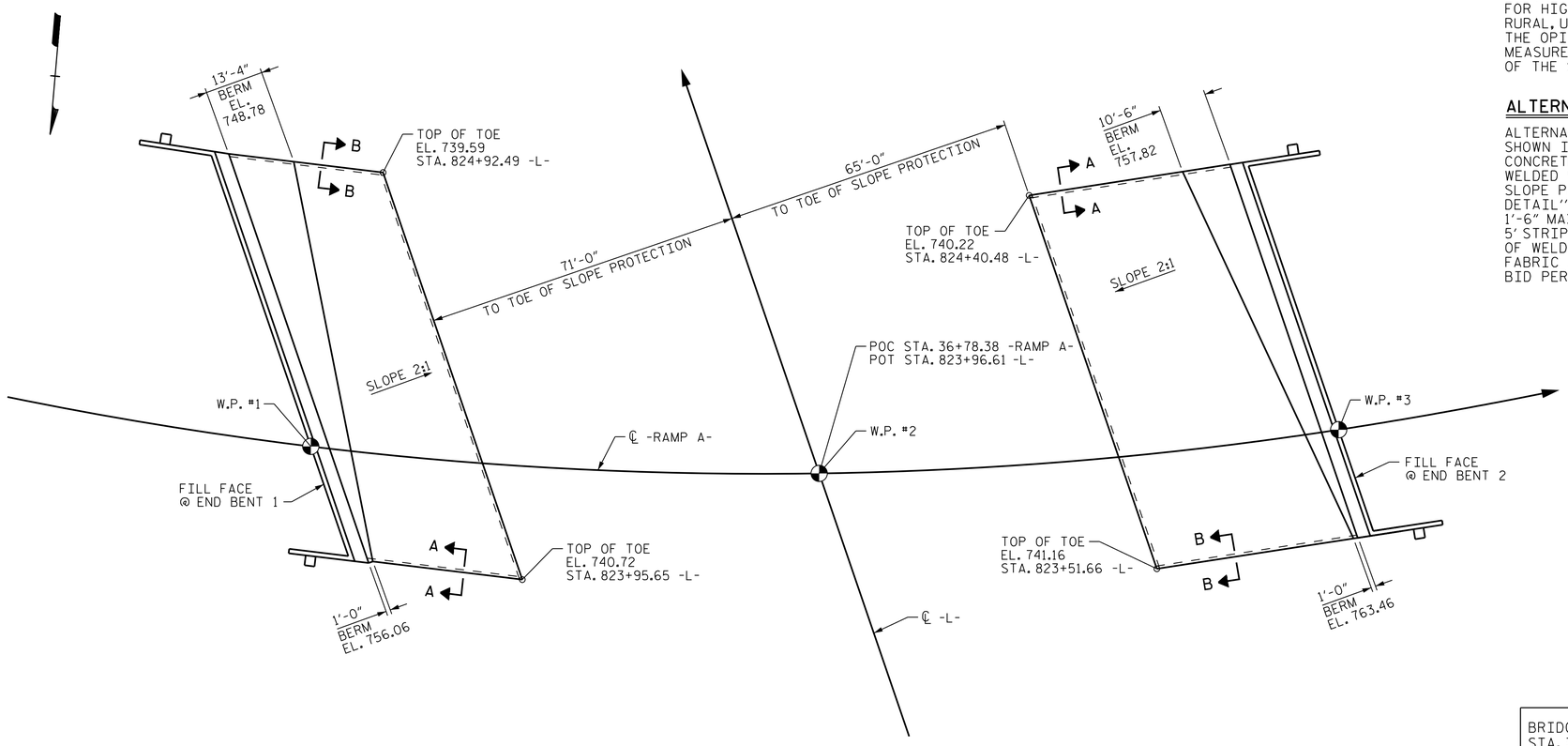
GENERAL NOTES

SLOPE PROTECTION SHALL BE PLACED UNDER THE ENDS OF THE BRIDGE AS SHOWN IN THE DETAILS. THE CONTRACTOR, AT HIS OPTION, MAY USE ALTERNATE "B" ONLY FOR HIGHWAY OVER HIGHWAY GRADE SEPARATIONS WITH 2:1 END BENT SLOPE IN RURAL, UNPOPULATED AREAS. STRAIGHT EDGING WILL NOT BE REQUIRED UNLESS, IN THE OPINION OF THE ENGINEER, VISUAL INSPECTION INDICATES A NEED FOR IT. MEASUREMENT AND PAYMENT SHALL BE AS PRESCRIBED IN SECTION 462 OF THE STANDARD SPECIFICATIONS. FOR BERM WIDTH, SEE GENERAL DRAWING.

ALTERNATE "A"

ALTERNATE "A" 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.



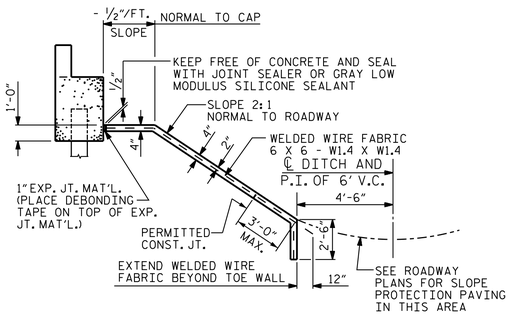
SPAN A

SPAN B

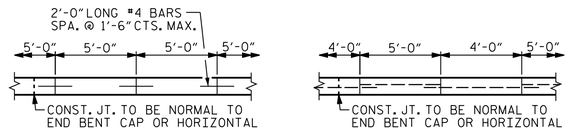
PLAN

BRIDGE @ STA. 36+78.38 -RAMP A-	4 INCH SLOPE PROTECTION	* WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	371	668
END BENT 2	491	884
TOTAL	862	1552

* QUANTITY SHOWN IS BASED ON 5' POURS.

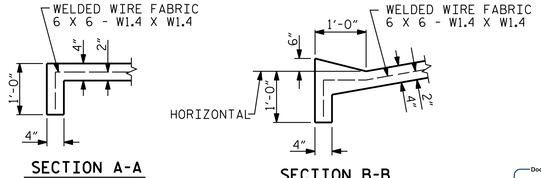


SECTION ALONG ℄ SURVEY WHEN FILL CATCHES IN DITCH



POURING DETAIL

OPTIONAL POURING DETAIL



SECTION A-A

SECTION B-B

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

STATE OF NORTH CAROLINA
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SLOPE PROTECTION LAYOUT AND DETAILS

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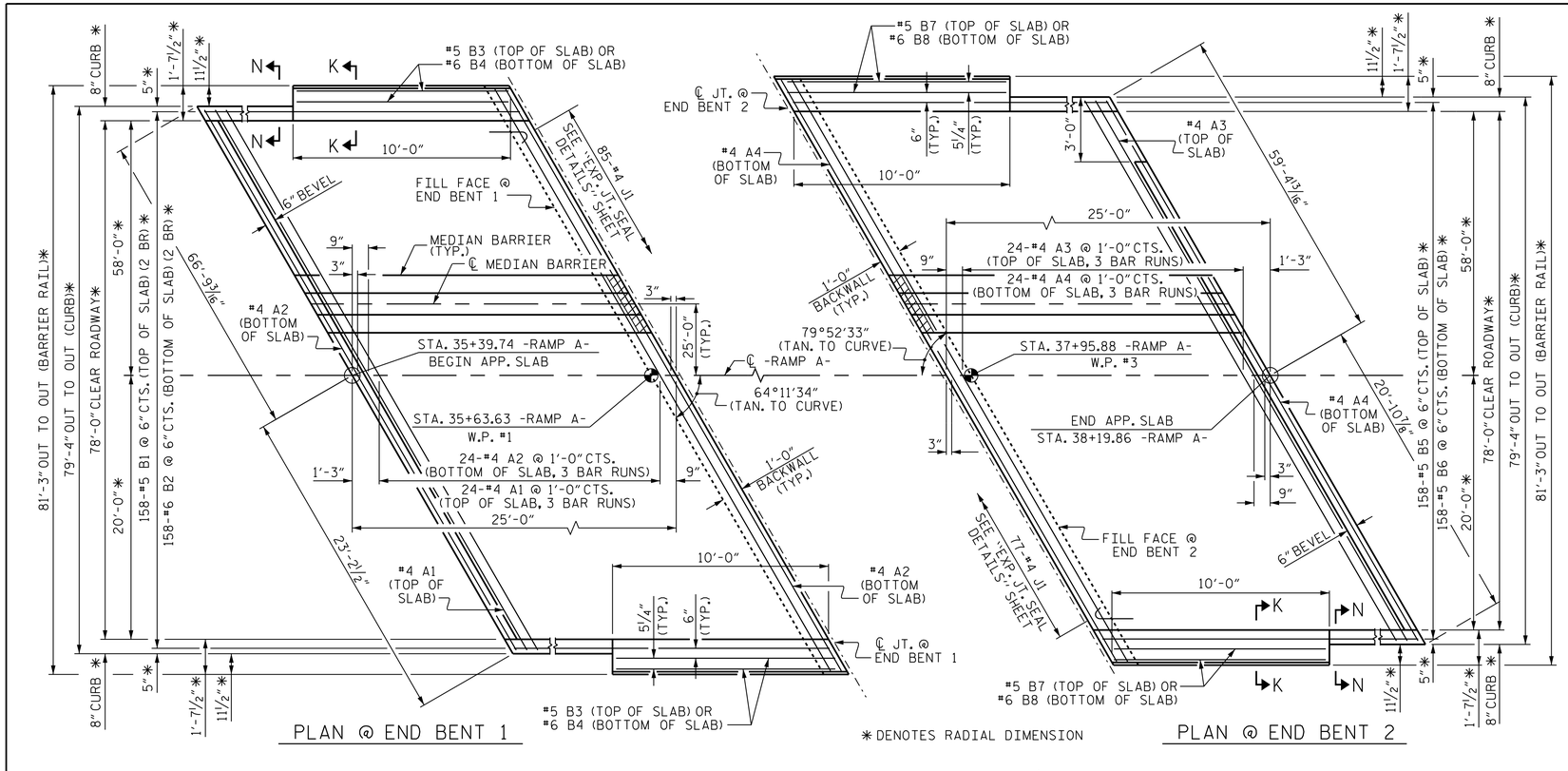
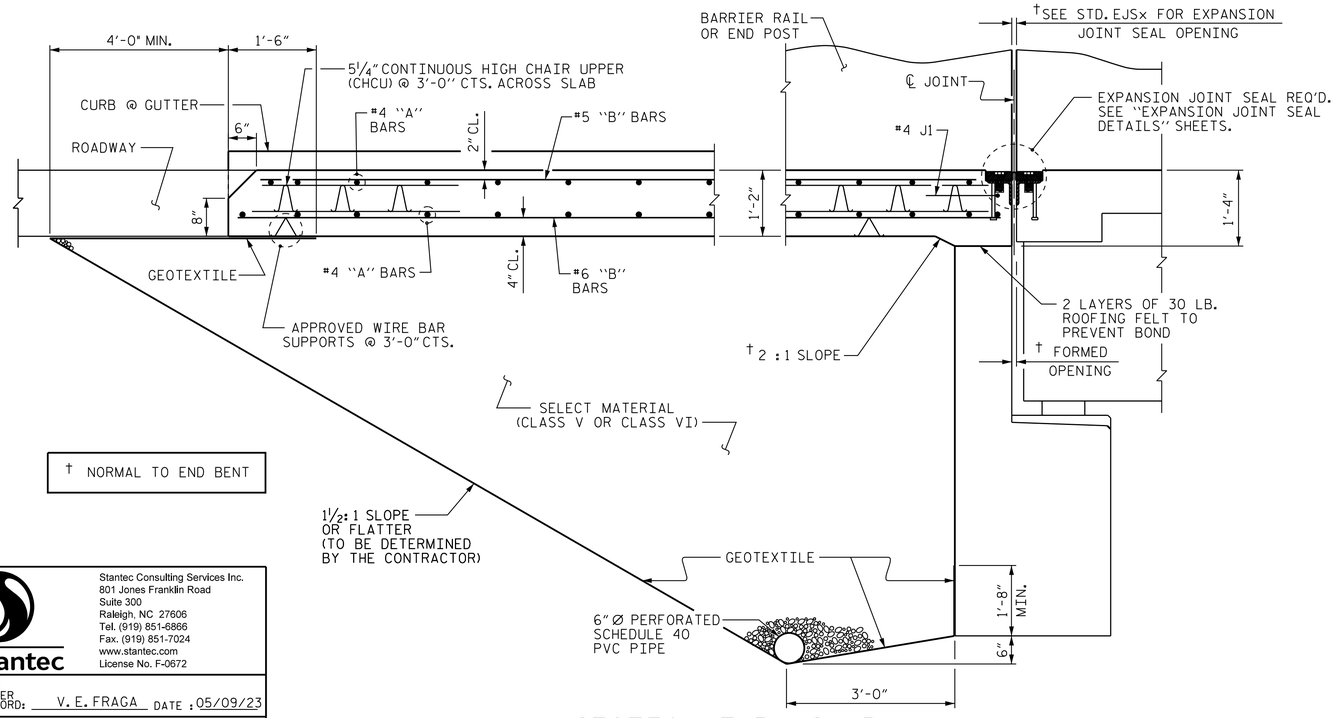
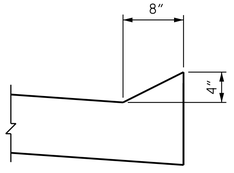


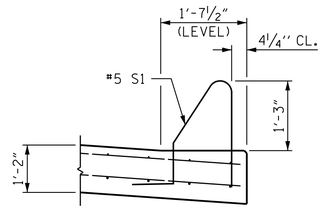


SECTION THRU SLAB

(TYPE I - STANDARD APPROACH FILL)



SECTION N-N



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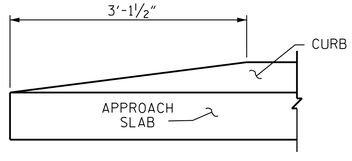


END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

NOTES

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

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

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

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

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

SPLICE LENGTHS

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

BILL OF MATERIAL

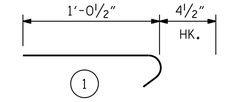
BEGIN APPROACH SLAB

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	75	#4	STR	31'-6"	1,578
A2	78	#4	STR	31'-3"	1,628
✱ B1	316	#5	STR	13'-6"	4,449
B2	316	#6	STR	13'-7"	6,447
✱ B3	4	#5	STR	9'-9"	41
B4	4	#6	STR	9'-9"	59
✱ J1	85	#4	1	1'-5"	80
REINFORCING STEEL					8,134 LBS.
✱ EPOXY COATED REINFORCING STEEL					6,148 LBS.
CLASS AA CONCRETE					87.5 C. Y.

END APPROACH SLAB

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A3	75	#4	STR	28'-10"	1,445
A4	78	#4	STR	28'-7"	1,489
✱ B5	158	#5	STR	24'-1"	3,969
B6	158	#6	STR	24'-7"	5,834
✱ B7	4	#5	STR	9'-8"	40
B8	4	#6	STR	9'-8"	58
✱ J1	77	#4	1	1'-5"	73
REINFORCING STEEL					7,381 LBS.
✱ EPOXY COATED REINFORCING STEEL					5,527 LBS.
CLASS AA CONCRETE					87.0 C. Y.

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

✱✱ QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED. SEE SHEET 2 OF 3.

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

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License No. F-0672

DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE: 05/09/23

ASSEMBLED BY: K. A. WOYAHN DATE: 12/19/22
CHECKED BY: M. B. ISENHOUR DATE: 01/05/23

DRAWN BY: EEM 3/95
CHECKED BY: VAP 3/95

REV.	
12/21/11	MAA/GM
6/13	MAA/GM
12/17	MAA/THC

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA
DocuSigned by: Victor E. Fraga 5/10/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-41
1			3			TOTAL SHEETS
2			4			43

STD. NO. BAS2 (SHT 3b)

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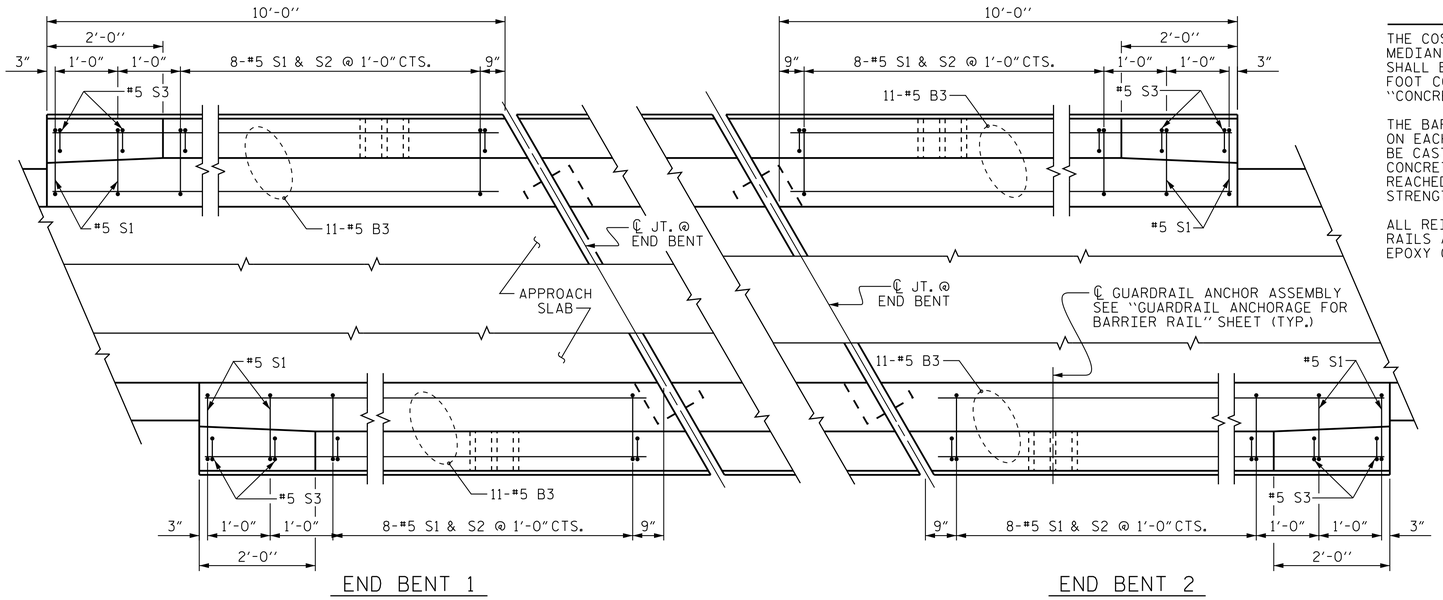
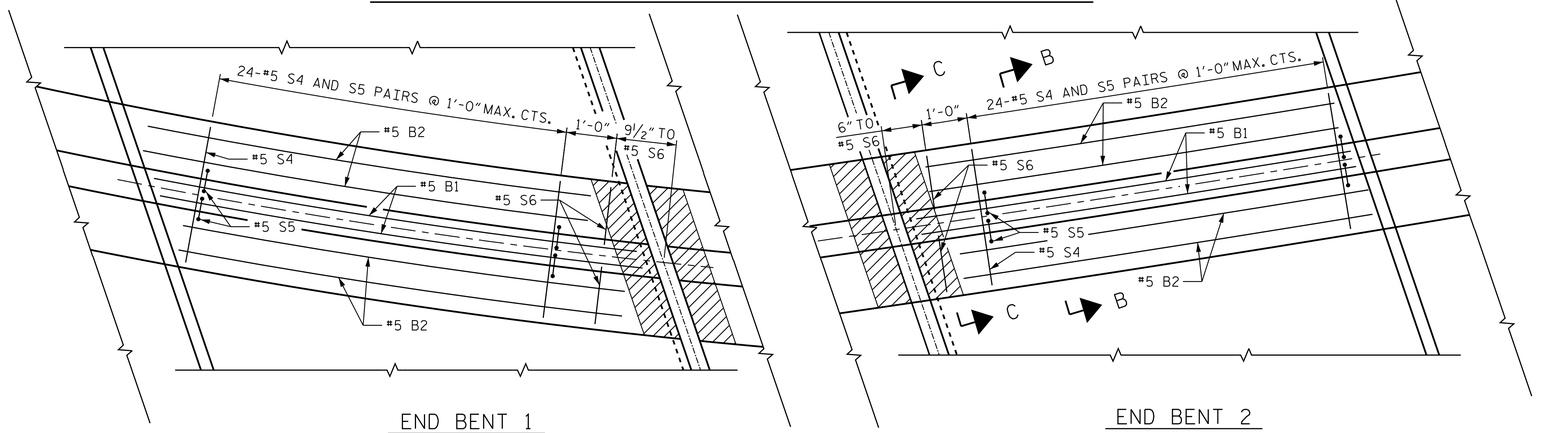


PLAN OF BARRIER RAIL



END BENT 1 END BENT 2

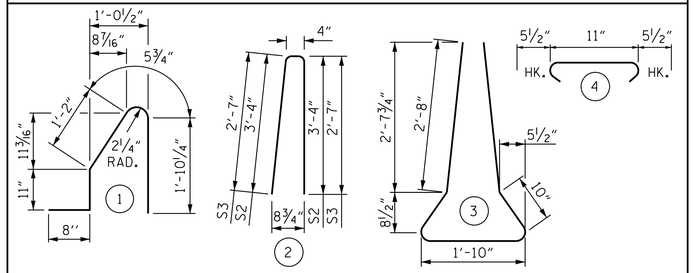
NOTES

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

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

ALL REINFORCING STEEL IN BARRIER RAILS AND MEDIAN RAIL SHALL BE EPOXY COATED.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

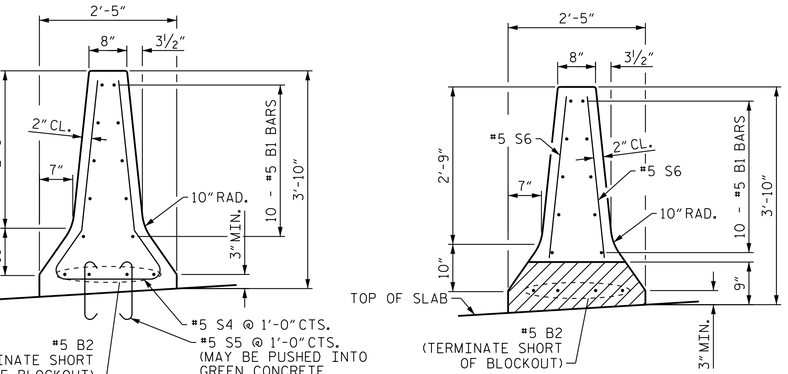
BILL OF MATERIAL

BARRIER RAIL AND MEDIAN

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳B1	20	#5	STR	24'-8"	515
✳B2	8	#5	STR	23'-9"	198
✳B3	44	#5	STR	9'-8"	444
✳S1	40	#5	1	5'-1"	212
✳S2	32	#5	2	7'-0"	234
✳S3	8	#5	2	5'-6"	46
✳S4	48	#5	3	8'-10"	442
✳S5	96	#5	4	1'-10"	184
✳S6	4	#5	STR	2'-10"	12

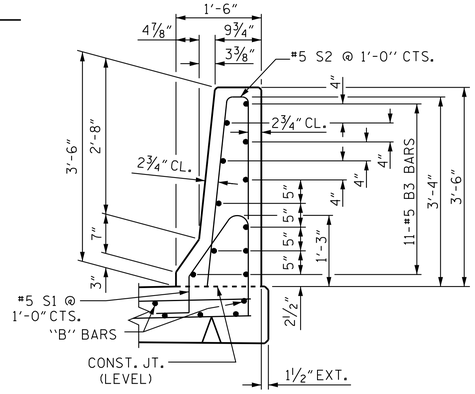
✳EPOXY COATED REINFORCING STEEL	2,287 LBS.
CLASS AA CONCRETE	14.6 C.Y.
CONCRETE BARRIER RAIL	40 LIN. FT.
CONCRETE MEDIAN RAIL	50 LIN. FT.

PLAN OF MEDIAN RAIL

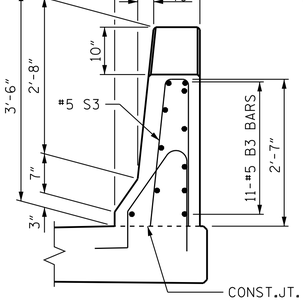


SECTION B-B

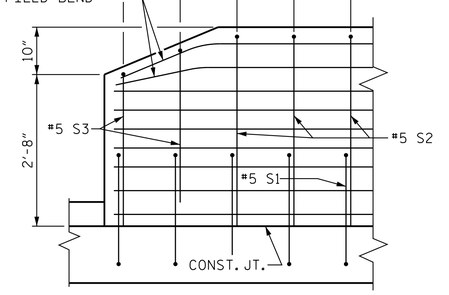
SECTION C-C



SECTION THRU RAIL



END VIEW



SIDE VIEW

END OF RAIL DETAILS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 36+78.38 -RAMP A-

SHEET 2 OF 3

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

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www.stantec.com
License No. F-0672

DESIGN ENGINEER OF RECORD: V. E. FRAGA DATE: 05/09/23
ASSEMBLED BY: K. A. WOYAHN DATE: 12/19/22
CHECKED BY: M. B. ISENHOUR DATE: 01/09/23
DRAWN BY: FCJ 11/88
CHECKED BY: ARB 11/88
REV. 6/13 MAA/GM
REV. 12/17 MAA/THC
REV. 5/18 MAA/THC

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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

SHEET NO. S4-42
TOTAL SHEETS 43

STD. NO. BAS4 (SHT 3)

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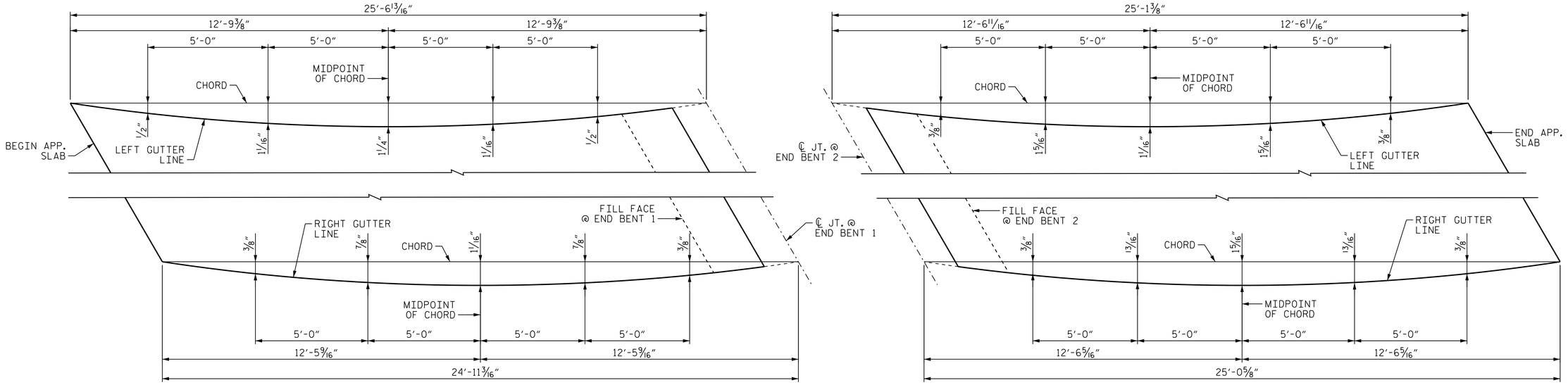
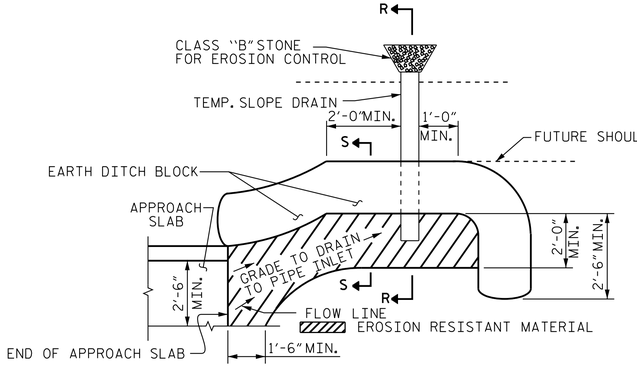


APPROACH SLAB @ END BENT 1

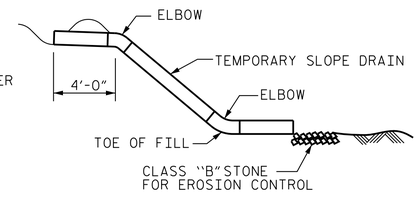
APPROACH SLAB @ END BENT 2

CHORD OFFSETS

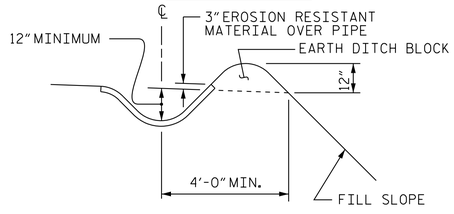


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

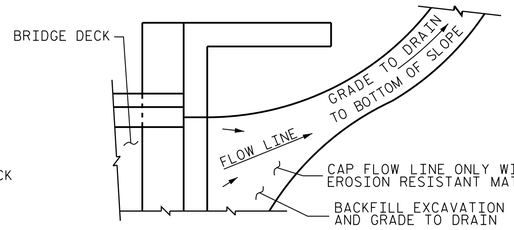
PLAN VIEW



SECTION R-R



SECTION S-S



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)

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DESIGN ENGINEER OF RECORD: V. E. FRAGA	DATE : 05/09/23	
ASSEMBLED BY : K. A. WOYAHN	DATE : 12/19/22	
CHECKED BY : M. B. ISENHOUR	DATE : 01/09/23	
DRAWN BY : FCJ 11/88	REV. 6/13	MAA/GM
CHECKED BY : ARB 11/88	REV. 12/17	MAA/THC
	REV. 5/18	MAA/THC

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 36+78.38 -RAMP A-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 47083 ENGINEER VICTOR E. FRAGA

DocuSigned by: Victor E. Fraga 5/10/2023

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S4-43
1			3			TOTAL SHEETS
2			4			43

STD. NO. BAS4 (SHT 3)

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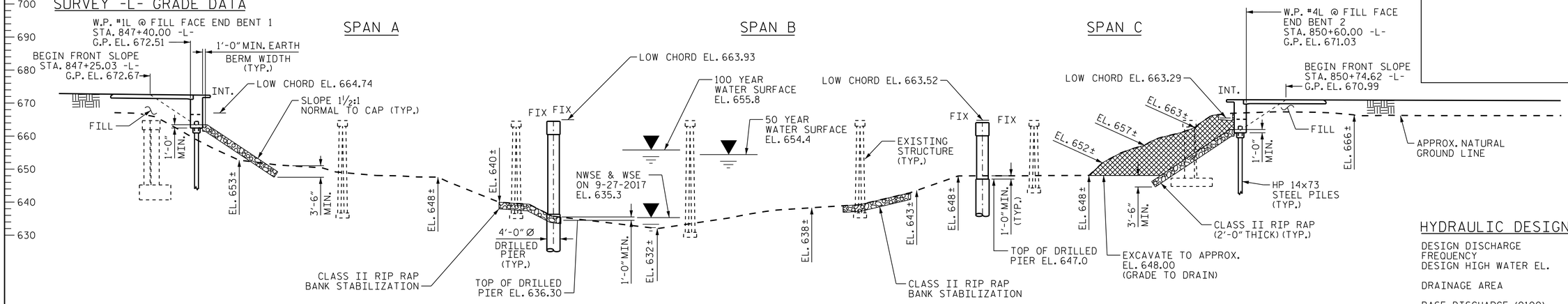
I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

SURVEY -L- GRADE DATA



SECTION ALONG BRIDGE CONTROL LINE

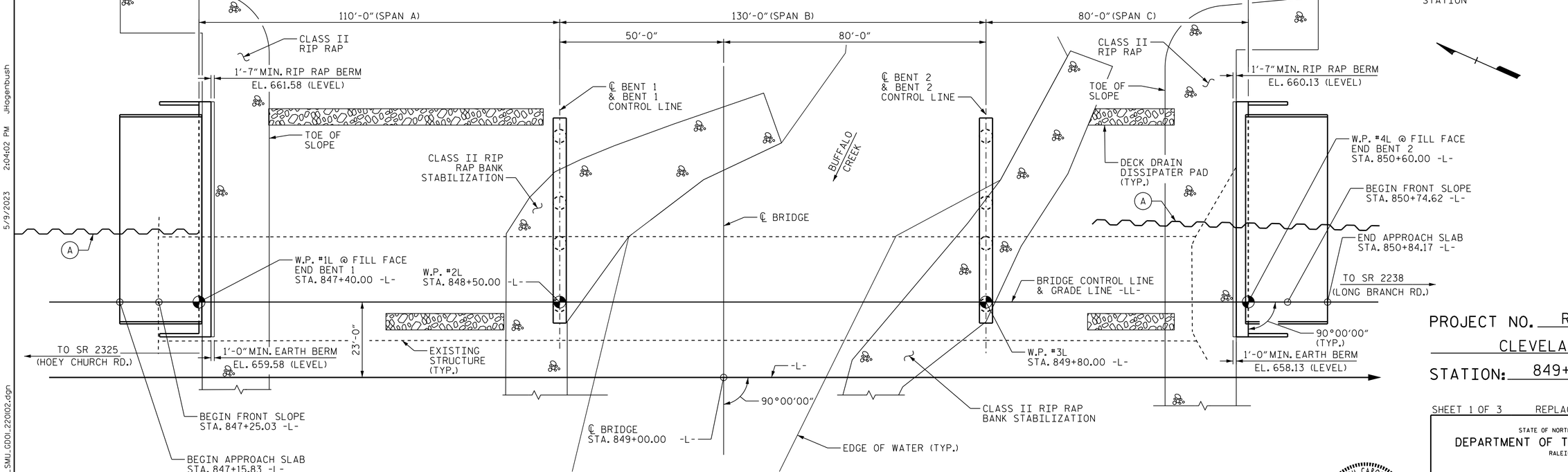
DENOTES UNCLASSIFIED STRUCTURE EXCAVATION

HYDRAULIC DESIGN DATA

DESIGN DISCHARGE	14,290 CFS.
FREQUENCY	50 YR.
DESIGN HIGH WATER EL.	654.4
DRAINAGE AREA	116 SQ. MI
BASE DISCHARGE (Q100)	16,860 CFS.
BASE HIGH WATER EL.	655.8

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	55,000 CFS.
FREQUENCY	>500 YR.
OVERTOPPING EL.	671.2
STATION	851+66.00 -L-



PLAN

(PILES NOT SHOWN FOR CLARITY)

(A) - TEMPORARY SHORING APPROX. LOCATION SHOWN. SEE TRANSPORTATION MANAGEMENT PLANS FOR SHORING DETAILS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 3 REPLACES BRIDGE NO. 220102

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER BUFFALO CREEK
ON US 74 BETWEEN
SR 2325 (HOEY CHURCH RD.) AND
SR 2238 (LONG BRANCH RD.)

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-01
1			3			TOTAL SHEETS
2			4			56

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/9/2023

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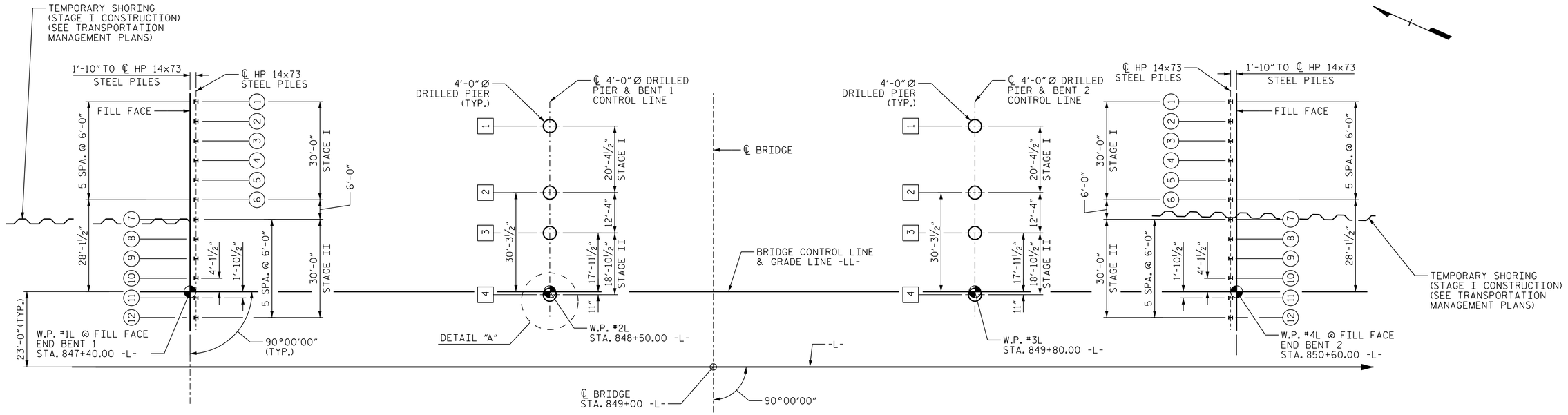
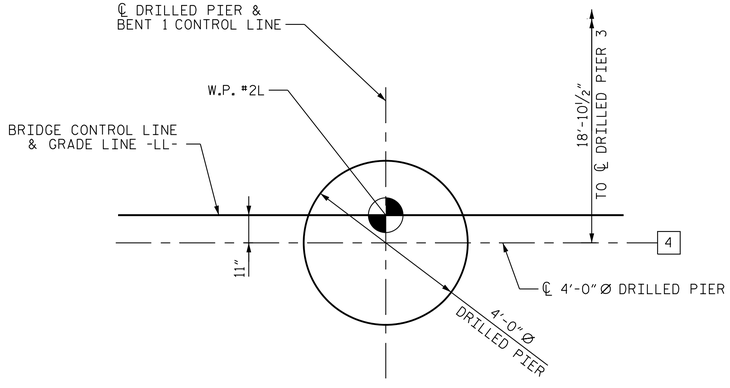
DRAWN BY :	J. B. GEILE	DATE :	09/20/18
CHECKED BY :	S. S. POOLE	DATE :	12/10/22
DESIGN ENGINEER OF RECORD:	S.S. POOLE	DATE :	05/09/23



END BENT 1 BENT 1 BENT 2 END BENT 2



DETAIL "A"

PLAN @ BENT 1 SHOWN, BENT 2 TYPICAL

FOUNDATION LAYOUT

ALL SUBSTRUCTURE WORK LINES PASS THROUGH WORK POINTS.

(#) - DENOTES PILE NUMBER.

[#] - DENOTES DRILLED PIER NUMBER.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 3

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DRAWN BY : J. B. GEILE DATE : 10/10/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/9/2023

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER BUFFALO CREEK
ON US 74 BETWEEN
SR 2325 (HOEY CHURCH RD.) AND
SR 2238 (LONG BRANCH RD.)

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-02
1			3			TOTAL SHEETS
2			4			56

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SUMMARY OF PILE INFORMATION/ INSTALLATION

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (S) #-# (e.g., "BENT 1, PILES 1-5")	FACTORED RESISTANCE PER PILE TONS	PILE CUT-OFF (TOP OF PILE) ELEVATION FT	ESTIMATED PILE LENGTH PER PILE FT	SCOUR CRITICAL ELEVATION FT	DRIVEN PILES			PREDRILLING FOR PILES*			DRILLED-IN PILES		
					MIN. PILE TIP (TIP NO HIGHER THAN) ELEV FT	REQUIRED DRIVING RESISTANCE (RDR)** PER PILE TONS	TOTAL PILE REDRIVES QUANTITY EACH	PREDRILLING LENGTH PER PILE LIN FT	PREDRILLING ELEVATION (ELEV NOT TO PREDRILL BELOW) FT	MAXIMUM PREDRILLING DIA INCHES	PILE EXCAVATION (BOTTOM OF HOLE) ELEV FT	PILE EXC NOT IN SOIL PER PILE LIN FT	PILE EXC IN SOIL PER PILE LIN FT
END BENT NO. 1, PILES 1-6	145	662.58	45			245							
END BENT NO. 1, PILES 7-12	145	662.58	40			245							
END BENT NO. 2, PILES 1-12	125	661.13	25			210							

* PREDRILLING FOR PILES IS REQUIRED FOR END BENTS/ BENTS WITH A PREDRILLING LENGTH AND AT THE CONTRACTOR'S OPTION FOR END BENTS/ BENTS WITH PREDRILLING INFORMATION BUT NO PREDRILLING LENGTH.

** RDR= $\frac{\text{FACTORED RESISTANCE + FACTORED DOWNDRAG LOAD + FACTORED DEAD LOAD}}{\text{DYNAMIC RESISTANCE FACTOR}}$ + NOMINAL DOWNDRAG RESISTANCE + $\frac{\text{NOMINAL SCOUR RESISTANCE}}{\text{SCOUR RESISTANCE FACTOR}}$

PILE DESIGN INFORMATION

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (S) #-# (e.g., "BENT 1, PILES 1-5")	FACTORED AXIAL LOAD PER PILE TONS	FACTORED DOWNDRAG LOAD PER PILE TONS	FACTORED DEAD LOAD* PER PILE TONS	DYNAMIC RESISTANCE FACTOR	NOMINAL DOWNDRAG RESISTANCE PER PILE TONS	NOMINAL SCOUR RESISTANCE PER PILE TONS	SCOUR RESISTANCE FACTOR (DEFAULT=1.00)
END BENT 1, PILES 1-12	145			0.60			
END BENT 2, PILES 1-12	125			0.60			

* FACTORED DEAD LOAD IS FACTORED WEIGHT OF PILE ABOVE THE GROUND LINE.

SUMMARY OF DRILLED PIER INFORMATION/ INSTALLATION

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (S) #-# (e.g., "BENT 1, PILES 1-5")	FACTORED RESISTANCE PER PIER TONS	MIN. PIER TIP (TIP NO HIGHER THAN) ELEV FT	REQUIRED TIP RESISTANCE PER PIER TSF	SCOUR CRITICAL ELEVATION FT	MIN. DRILLED PIER PENETRATION INTO ROCK PER PIER LIN FT	DRILLED PIER LENGTH* PER PIER LIN FT	DRILLED PIER LENGTH NOT IN SOIL* PER PIER LIN FT	DRILLED PIER LENGTH IN SOIL* PER PIER LIN FT	PERMANENT STEEL CASING REQUIRED? YES OR MAYBE	PERMANENT STEEL CASING TIP ELEVATION (ELEV NOT TO EXTEND CASING BELOW) FT	PERMANENT STEEL CASING LENGTH** PER PIER LIN FT
BENT NO. 1, PIERS 1-2	750	606.0	35	622	9.4		16.6	13.7	YES	625.0	11.0
BENT NO. 1, PIERS 3-4	750	612.0	55	622	7.4		11.7	12.7	YES	625.0	11.0
BENT NO. 2, PIERS 1-4	675	629.0	40	635	8.6		8.7	9.3	YES	637.6	9.4
TOTAL QTY.							91.4	90.0			81.6

* DRILLED PIER LENGTH, DRILLED PIER LENGTH NOT IN SOIL AND DRILLED PIER LENGTH IN SOIL REPRESENT ESTIMATED DRILLED PIER QUANTITIES AND ARE MEASURED AND PAID FOR AS EITHER "48 IN. DIA. DRILLED PIERS" OR "48 IN. DIA. DRILLED PIERS NOT IN SOIL" AND "48 IN. DIA. DRILLED PIERS IN SOIL" IN ACCORDANCE WITH ARTICLE 411-7 OF THE NCDOT STANDARD SPECIFICATIONS.

** PERMANENT STEEL CASING LENGTH EQUALS THE DIFFERENCE BETWEEN THE GROUND LINE OR TOP OF DRILLED PIER ELEVATION, WHICHEVER IS HIGHER, AND THE PERMANENT CASING TIP ELEVATION AND IS MEASURED AND PAID FOR AS "PERMANENT STEEL CASTING FOR 48 IN.DIA. DRILLED PIER" IN ACCORDANCE WITH ARTICLE 411-7 OF THE NCDOT STANDARD SPECIFICATIONS.

SUMMARY OF PDA/ PILE ORDER LENGTHS

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

PILE DRIVING ANALYZER (PDA)				PILE ORDER LENGTHS	
END BENT/ BENT NO.	PDA TESTING REQUIRED? YES OR MAYBE	PDA TEST PILE LENGTH FT	TOTAL PDA TESTING QUANTITY EACH	END BENT/ BENT NO(S)	PILE ORDER LENGTH BASIS* EST OR PDA

* EST=PILE ORDER LENGTHS FROM ESTIMATED PILE LENGTHS; PDA=PILE ORDER LENGTHS BASED ON PDA TESTING. FOR GROUPS OF END BENTS/BENTS WITH PILE ORDER LENGHTS BASED ON PDA TESTING, THE FIRST END BENT/ BENT NO. LISTED FOR EACH GROUP IS THE REPRESENTATIVE END BENT/ BENT WITH THE PDA.

SUMMARY OF PILE ACCESSORIES

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (S) #-# (e.g., "BENT 1, PILES 1-5")	PIPE PILE PLATES REQUIRED YES OR MAYBE	STEEL PILE POINTS			STEEL PILE TIPS REQUIRED? YES
		PIPE PILE CUTTING SHOES REQUIRED? YES	PIPE PILE CONICAL POINTS REQUIRED? YES	H-PILE POINTS REQUIRED? YES	
END BENT 1, PILES 1-6				YES	
TOTAL QTY.				6	

SUMMARY OF DRILLED PIER TESTING

(BLANK ENTRIES INDICATE ITEM IS NOT APPLICABLE TO STRUCTURE)

END BENT/ BENT NO. PILE (S) #-# (e.g., "BENT 1, PILES 1-5")	STANDARD PENETRATION TEST (SPT) REQUIRED? YES OR MAYBE	CROSSHOLE SONIC LOGGING (CSL) REQUIRED?* YES OR MAYBE	TOTAL CSL TUBE LENGTH (FOR ALL TUBES) PER PIER LIN FT	SHAFT INSPECTION DEVICE (SID) REQUIRED? YES OR MAYBE	PILE INTEGRITY TEST (PIT) REQUIRED? MAYBE
BENT 1, PIERS 1-2		MAYBE	127.2	MAYBE	
BENT 1, PIERS 3-4		MAYBE	103.6	MAYBE	
BENT 2, PIERS 1-4		MAYBE	78.0	MAYBE	
TOTAL QTY.		1	773.6		

* CSL TUBES ARE REQUIRED IF CSL TESTING IS OR MAY BE REQUIRED. THE NUMBER OF CSL TUBES PER DRILLED PIER IS EQUAL TO ONE TUBE PER FOOT OF DESIGN PIER DIAMETER WITH AT LEAST 4 TUBES PER PIER. THE LENGTH OF EACH CSL TUBE IS EQUAL TO THE DRILLED PIER LENGTH PLUS 1.5 FT.

NOTES:

1. THE PILE AND DRILLED PIER FOUNDATION TABLES ARE BASED ON THE BRIDGE SUBSTRUCTURE DESIGN AND FOUNDATION RECOMMENDATIONS SEALED BY A NORTH CAROLINA PROFESSIONAL ENGINEER (STEPHEN CROCKETT #048207) ON 02-23-2023.
2. TOTAL PILE DRIVING EQUIPMENT SETUP QUANTITY (NOT SHOWN IN PILE FOUNDATION TABLES) EQUALS THE NUMBER OF DRIVEN PILES, I.E., THE NUMBER OF PILES WITH A REQUIRED DRIVING RESISTANCE.
3. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING, PERMANENT STEEL CASING, SPT'S, CSL TESTING, SID INSPECTIONS AND PITS WHEN THESE ITEMS MAY BE REQUIRED.

FOUNDATION NOTES:

1. FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
2. SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS FOR THE SETTLEMENT GAUGES AT END BENT NO. 1.
3. OBSERVE A 3 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 1. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.
4. OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.
5. FOR PILES, SEE PILES PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.
6. THE SCOUR CRITICAL ELEVATION FOR BENT NO. 1 IS ELEVATION 628.0 AND BENT NO. 2 IS ELEVATION 637.6. SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
PILE AND DRILLED PIER FOUNDATION TABLES

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: 5/9/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-03
1			3			TOTAL SHEETS
2			4			56

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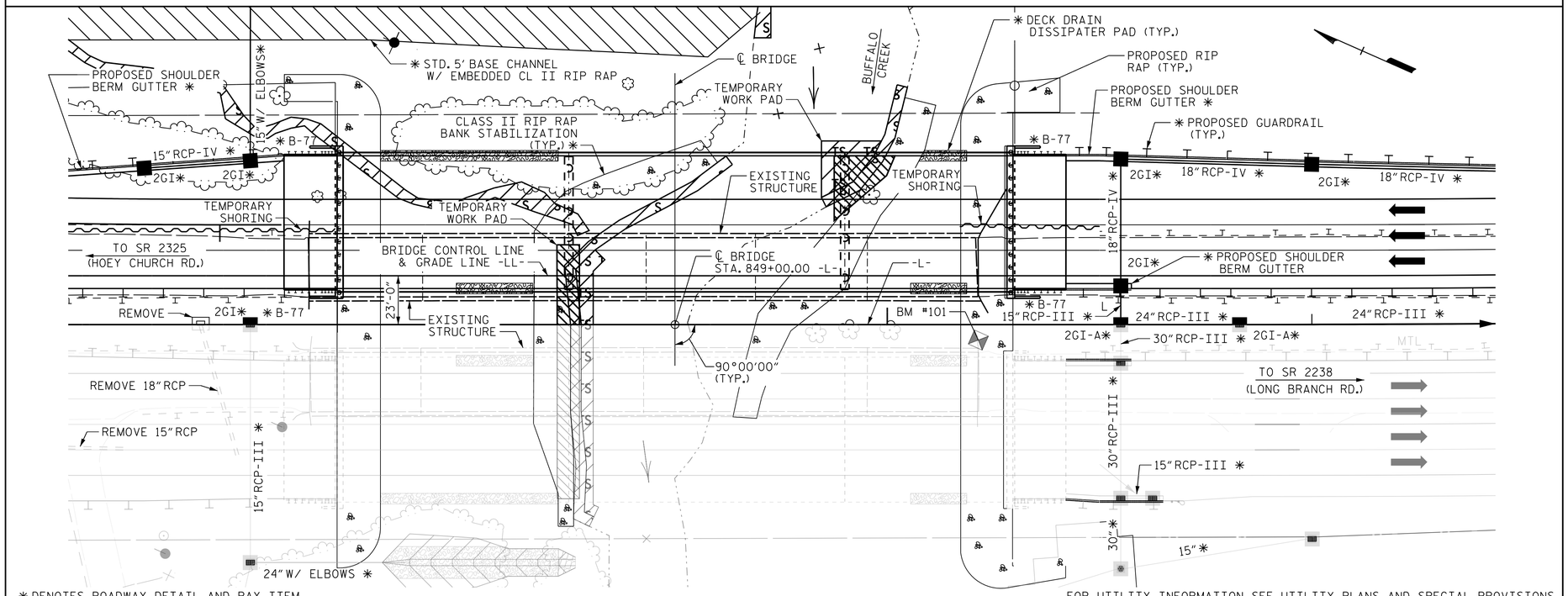
DRAWN BY : J.E.HAGENBUSH DATE : 05/17/22
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23



* DENOTES ROADWAY DETAIL AND PAY ITEM

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

LOCATION SKETCH

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	ASBESTOS ASSESSMENT	4'-0" DIA DRILLED PIERS IN SOIL	4'-0" DIA DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 4'-0" DIA DRILLED PIERS	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPROACH SLABS	REINFORCING STEEL
	LUMP SUM	LUMP SUM	LUMP SUM	L.F.	L.F.	L.F.	EA.	EA.	LUMP SUM	SQ.FT.	SQ.FT.	CU.YDS.	LUMP SUM	LBS.
SUPERSTRUCTURE										21,040	21,857		LUMP SUM	
END BENT NO.1												65.5		12,530
BENT NO.1				52.8	56.6	45.2	1					85.3		25,442
BENT NO.2				37.2	34.8	41.6						69.0		20,998
END BENT NO.2									LUMP SUM			65.5		12,530
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	90.0	91.4	86.8	1	1	LUMP SUM	21,040	21,857	285.3	LUMP SUM	71,500

TOTAL BILL OF MATERIAL (CONT'D)

	SPIRAL COLUMN REINFORCING STEEL	MODIFIED 72" PRESTRESSED CONC. GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 14X73 STEEL PILES	HP14x73 STEEL PILES		STEEL PILE POINTS	CONCRETE BARRIER RAIL	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS
	LBS.	NO.	LIN.FT.	EA.	NO.	LIN.FT.	EA.	LIN.FT.	TON	SY	LUMP SUM
SUPERSTRUCTURE		24	2,528.67					636.67			LUMP SUM
END BENT NO.1				12	12	510.00	6		278	310	
BENT NO.1	5,146										
BENT NO.2	3,068										
END BENT NO.2				12	12	300.00			341	385	
TOTAL	8,214	24	2,528.67	24	24	810.00	6	636.67	619	695	LUMP SUM

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DRAWN BY : J. B. GEILE DATE : 09/20/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

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

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

FOR EROSION CONTROL MEASURES, SEE EROSION CONTROL PLANS.

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

NOTES

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

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.

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

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

AT THE CONTRACTOR'S OPTION, AND UPON REMOVAL OF THE CAUSEWAY, THE CLASS II RIP RAP USED IN THE CAUSEWAY MAY BE PLACED AS RIP RAP SLOPE PROTECTION. SEE SPECIAL PROVISIONS FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS AT STATION 849+00.

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

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

THE MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 23 FT RIGHT OF THE BRIDGE CONTROL LINE AND 25 FT LEFT OF THE BRIDGE CONTROL LINE 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.

TEMPORARY SHORING WILL BE REQUIRED IN THE AREA INDICATED IN THE PLAN.

FOR LIMITS OF TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE TRAFFIC CONTROL PLANS. FOR PAY ITEM FOR TEMPORARY SHORING FOR MAINTENANCE OF TRAFFIC, SEE ROADWAY PLANS.

(AFTER SERVING AS A TEMPORARY STRUCTURE) THE EXISTING STRUCTURE CONSISTING OF 6 SPANS; 6 @ 52'-6", TOTAL LENGTH 313' W/ 28 FEET CLEAR ROADWAY PROVIDED BY CAST IN PLACE REINFORCED CONCRETE DECK GIRDERS SUPPORTED ON CONCRETE SOLID WEB PIERS AND CONCRETE ABUTMENTS, LOCATED AT THE PROPOSED BRIDGE, 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.

NOTES (CONT. AT LEFT)

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

Signed by: [signature] 5/9/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE OVER BUFFALO CREEK
ON US 74 BETWEEN
SR 2325 (HOEY CHURCH RD.) AND
SR 2238 (LONG BRANCH RD.)
(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-04
1			3			TOTAL SHEETS
2			4			56

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⟩	1.08	-	1.75	0.880	1.13	A	EL	53.50	0.880	2.04	B	EL	12.20	0.80	0.880	1.08	B	EL	63.90	
		HL-93 (OPERATING)	N/A		1.47	-	1.35	0.880	1.47	A	EL	53.50	0.880	2.70	B	EL	12.20	N/A	--	--	-	-	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.62	58.3	1.75	0.880	1.62	A	EL	53.50	0.880	3.03	B	EL	12.20	0.80	0.880	1.62	B	EL	63.90	
		HS-20 (OPERATING)	36.000		2.10	75.6	1.35	0.880	2.10	A	EL	53.50	0.880	3.99	B	EL	12.20	N/A	--	--	-	-	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		1.59	21.5	1.40	0.880	1.96	A	EL	53.50	0.880	3.80	B	EL	12.20	0.80	0.880	1.59	B	EL	63.90	
		SNGARBS2	20.000		2.61	52.2	1.40	0.880	3.25	A	EL	53.50	0.880	6.60	B	EL	12.20	0.80	0.880	2.61	B	EL	63.90	
		SNAGRIS2	22.000		1.97	43.3	1.40	0.880	2.41	A	EL	53.50	0.880	4.93	B	EL	12.20	0.80	0.880	1.97	B	EL	63.90	
		SNCOTTS3	27.250		2.82	76.8	1.40	0.880	3.49	A	EL	53.50	0.880	7.19	B	EL	12.20	0.80	0.880	2.82	B	EL	63.90	
		SNAGGRS4	34.925		1.56	54.5	1.40	0.880	1.92	A	EL	53.50	0.880	3.65	B	EL	12.20	0.80	0.880	1.56	B	EL	63.90	
		SNS5A	35.550		1.41	50.1	1.40	0.880	1.75	A	EL	53.50	0.880	3.27	B	EL	12.20	0.80	0.880	1.41	B	EL	63.90	
		SNS6A	39.950		1.34	53.5	1.40	0.880	1.66	A	EL	53.50	0.880	3.16	B	EL	12.20	0.80	0.880	1.34	B	EL	63.90	
		SNS7B	42.000		3.96	166.3	1.40	0.880	4.87	A	EL	53.50	0.880	10.41	B	EL	12.20	0.80	0.880	3.96	B	EL	63.90	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.40	46.2	1.40	0.880	1.75	A	EL	53.50	0.880	3.12	B	EL	12.20	0.80	0.880	1.40	B	EL	63.90	
		TNT4A	33.075		1.38	45.6	1.40	0.880	1.72	A	EL	53.50	0.880	3.23	B	EL	12.20	0.80	0.880	1.38	B	EL	63.90	
		TNT6A	41.600		1.38	57.4	1.40	0.880	1.72	A	EL	53.50	0.880	3.43	B	EL	12.20	0.80	0.880	1.38	B	EL	63.90	
		TNT7A	42.000		1.71	71.8	1.40	0.880	2.13	A	EL	53.50	0.880	4.02	B	EL	12.20	0.80	0.880	1.71	B	EL	63.90	
		TNT7B	42.000	⟨3⟩	1.28	53.8	1.40	0.880	1.60	A	EL	53.50	0.880	3.04	B	EL	12.20	0.80	0.880	1.28	B	EL	63.90	
		TNAGRIT4	43.000		1.30	55.9	1.40	0.880	1.60	A	EL	53.50	0.880	3.07	B	EL	12.20	0.80	0.880	1.30	B	EL	63.90	
		TNAGT5A	45.000		1.28	57.6	1.40	0.880	1.59	A	EL	53.50	0.880	3.13	B	EL	12.20	0.80	0.880	1.28	B	EL	63.90	
		TNAGT5B	45.000		1.71	77.0	1.40	0.880	2.13	A	EL	53.50	0.880	4.08	B	EL	12.20	0.80	0.880	1.71	B	EL	63.90	

LOAD FACTORS:

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

NOTES:

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

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

SPAN LENGTH AND SUPPORT CONDITIONS SHOWN IN THE LRFR SKETCH CONFORMS TO THE ANALYSIS MODEL USED FOR ALL LOAD CONDITIONS.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

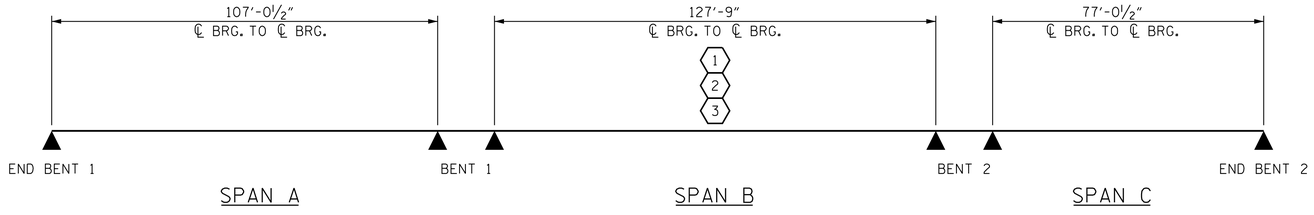
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

Stantec
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Suite 300
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ASSEMBLED BY : J.E. HAGENBUSH DATE : 9/26/18
CHECKED BY : S. S. POOLE DATE : 12/10/22

DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08

REV.		
REV.	11/12/08RR	MAA/GM
REV.	10/1/11	MAA/GM
REV.	12/17	MAA/THC

DESIGN ENGINEER OF RECORD: S. S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S POOLE
5/9/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

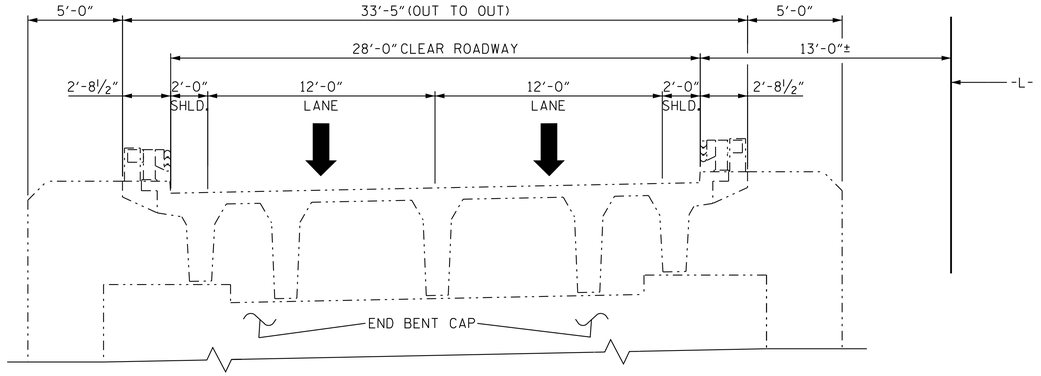
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-05
1			3			TOTAL SHEETS
2			4			52

STD. NO. LRFR1



EXISTING CONDITION

NOTES:

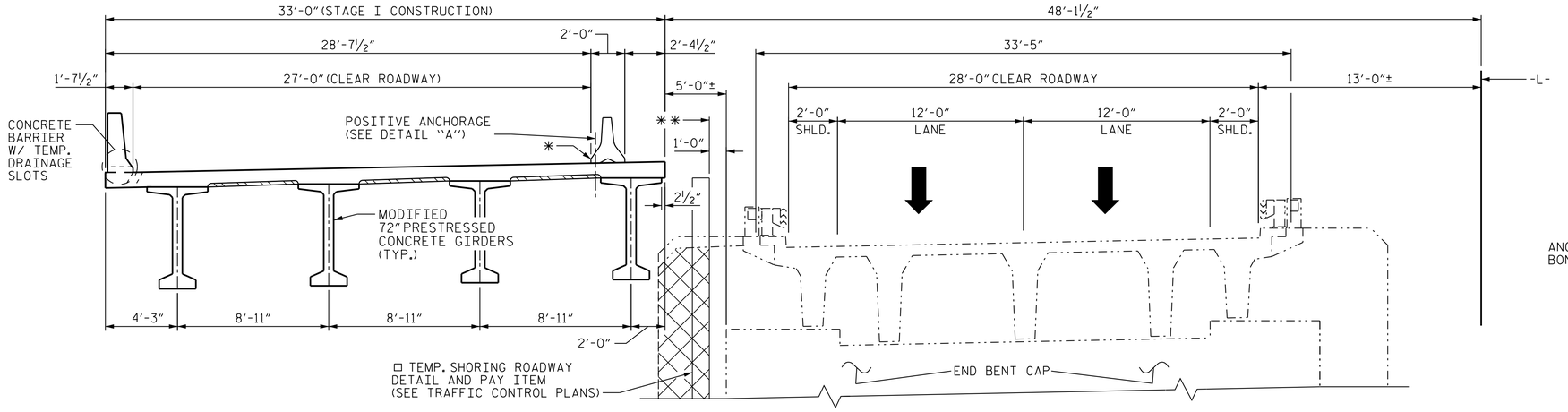
* PORTABLE PRECAST CONCRETE MEDIAN BARRIER ANCHORED TO BRIDGE DECK, (SEE NCDOT STD. 854.04 & 1170.01)

** END BENT WING WALL MAY BE REMOVED LEFT OF THIS LINE

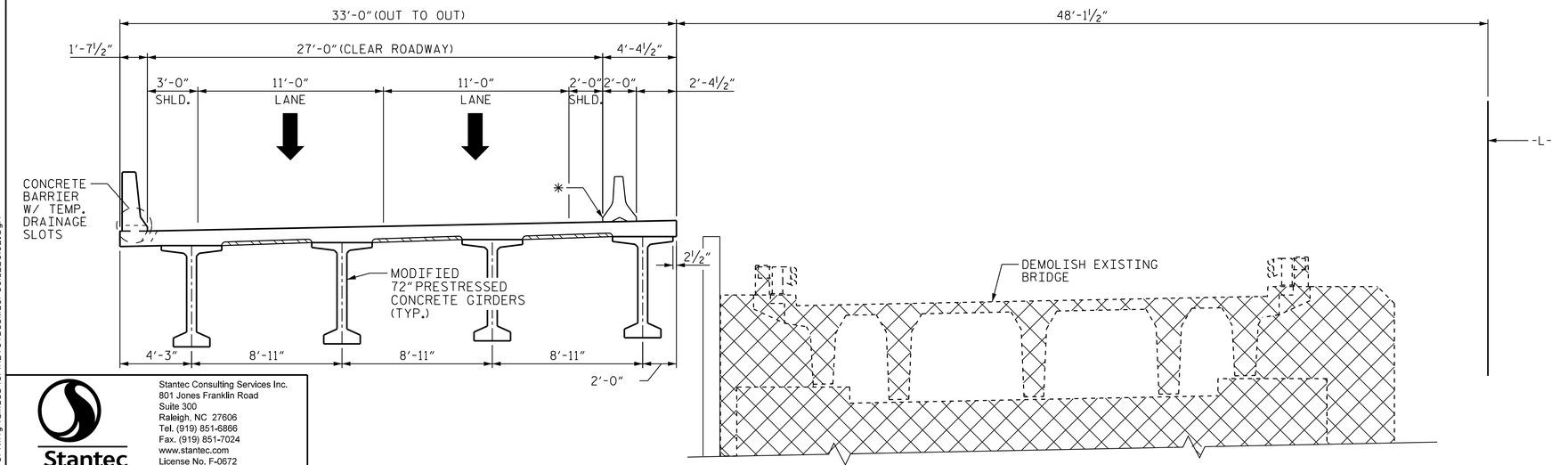
DIMENSIONS SHOWN FOR EXISTING STRUCTURE ARE APPROXIMATE AND SHOULD BE FIELD VERIFIED

□ CONTRACTOR'S ATTENTION IS DIRECTED TO SHORING REQUIREMENTS AT SOUTHEAST EARWALL. THE EXISTING FOOTING MAY INTERFERE WITH SHEET PILE DRIVING OPERATIONS AT END BENT 2. CONTRACTOR SHALL DESIGN TEMPORARY SHORING TO ACCOMMODATE REMOVAL OF EXISTING WING WALL AND FOOTING.

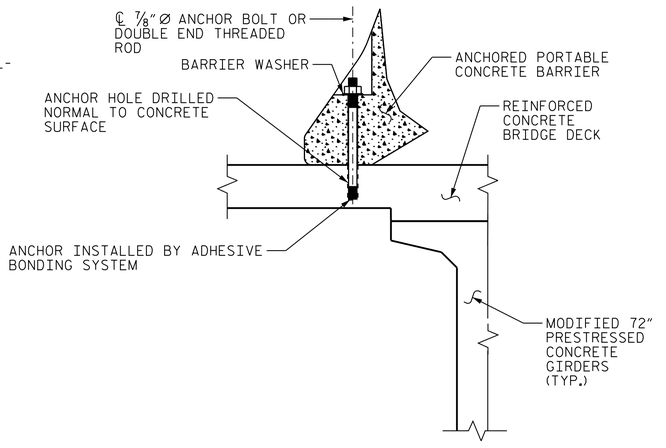
DENOTES STRUCTURE DEMOLITION



PHASE I TRAFFIC/STAGE I CONSTRUCTION



PHASE III TRAFFIC/EXISTING BRIDGE DEMO



DETAIL "A"

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION SEQUENCE
(FOR STAGED CONSTRUCTION)

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DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

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5/9/2023

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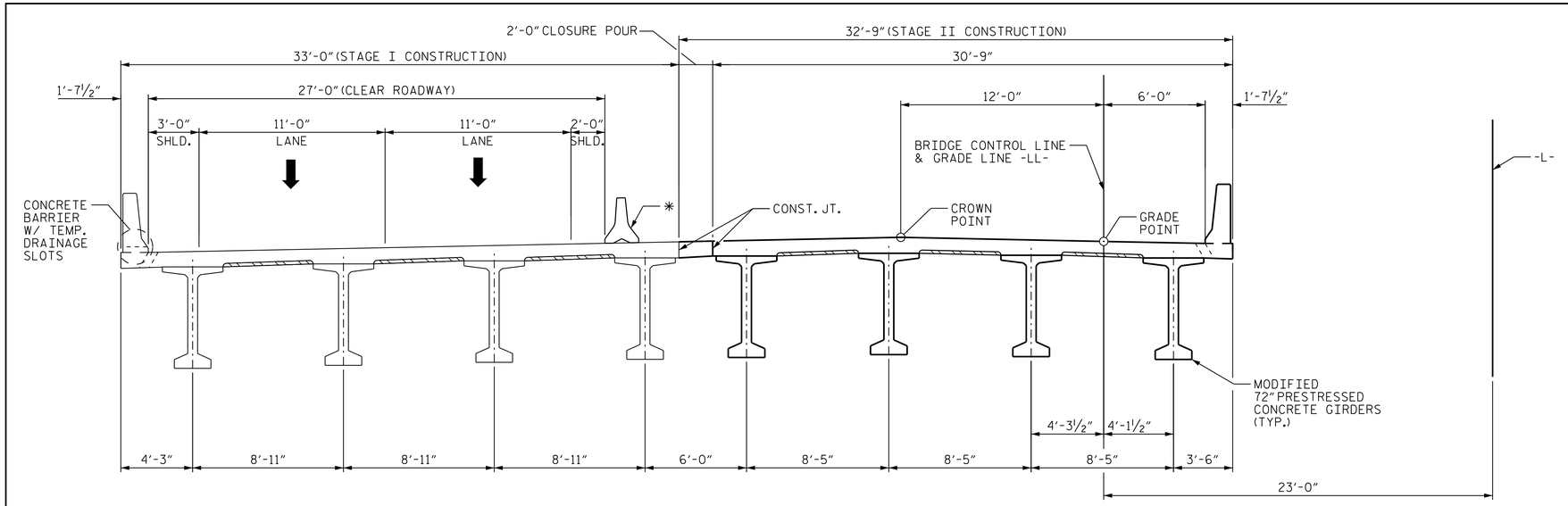
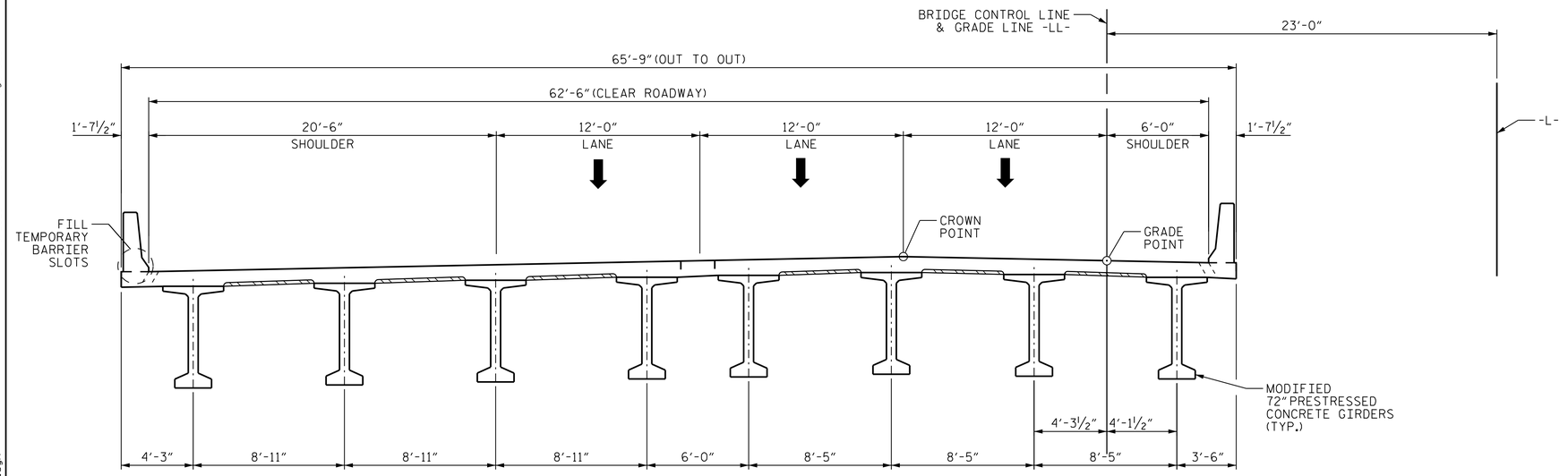


PHASE III TRAFFIC/STAGE II CONSTRUCTION

NOTES:

* PORTABLE PRECAST CONCRETE MEDIAN BARRIER ANCHORED TO BRIDGE DECK, (SEE NCDOT STD. 854.04 & 1170.01)



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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

CONSTRUCTION SEQUENCE
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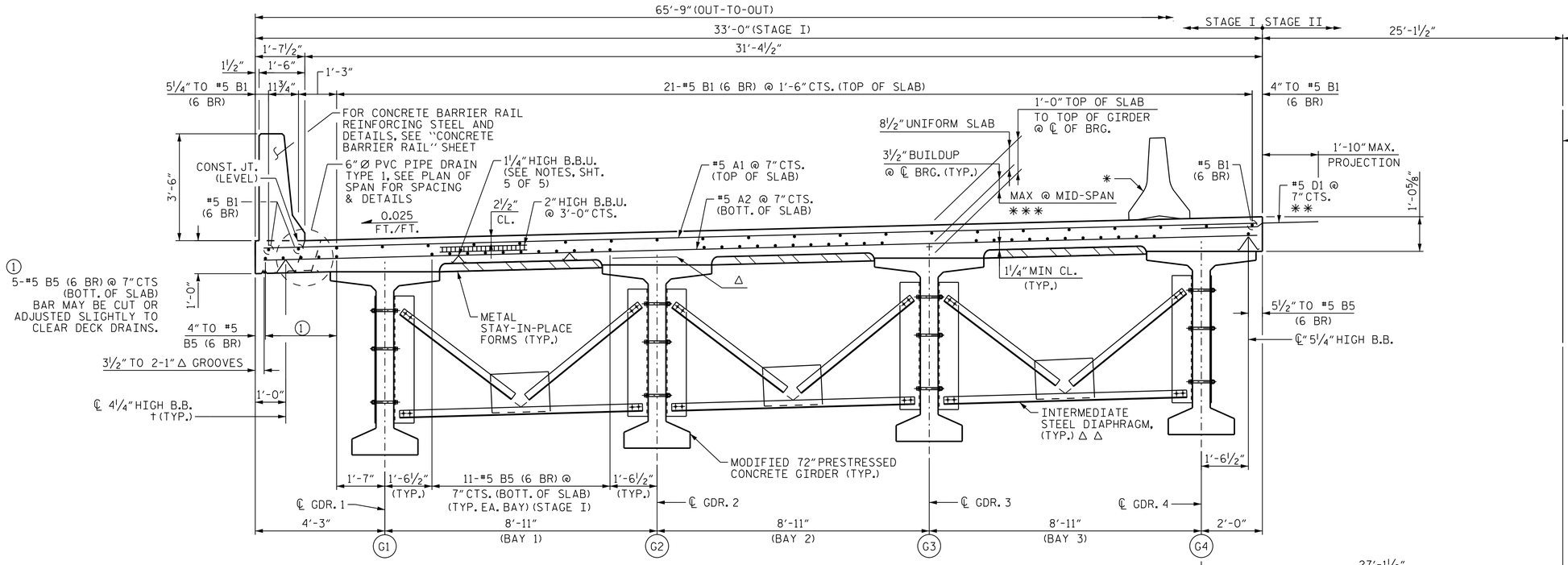
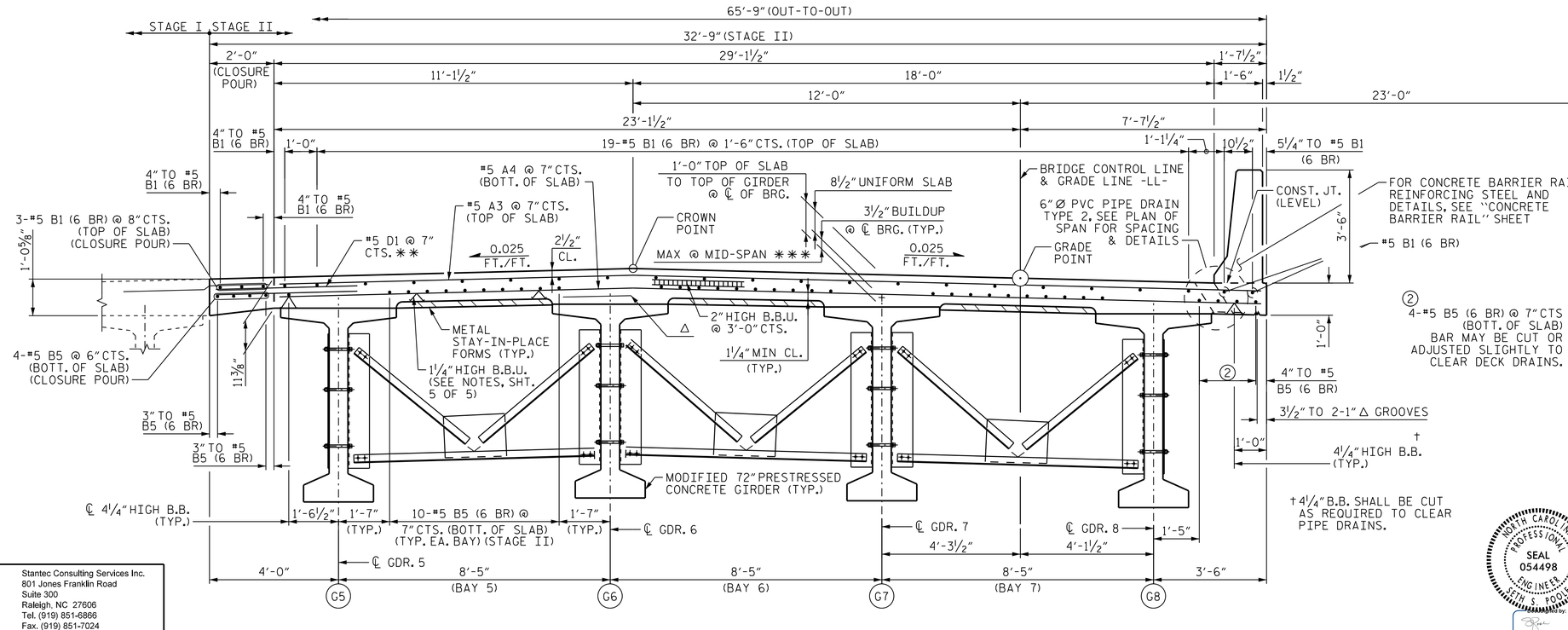


SECTION AT INTERMEDIATE DIAPHRAGMS (STAGE I)
TYPICAL SECTION



SECTION AT INTERMEDIATE DIAPHRAGMS (STAGE II)
TYPICAL SECTION

† 4¼" B.B. SHALL BE CUT AS REQUIRED TO CLEAR PIPE DRAINS.

NOTES

SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5 FOR ADDITIONAL NOTES.

(6 BR) DENOTES 6 BAR RUN.

#5 B5 (6 BR) MAY BE REPOSITIONED AS NECESSARY TO CLEAR PIPE DRAINS.

△ TOP OF METAL SIP FORMS TO MATCH REQUIRED BOTTOM OF SLAB.

△ △ FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDERS" SHEET.

✳ PORTABLE PRECAST CONCRETE MEDIAN BARRIER ANCHORED TO BRIDGE DECK. (SEE NCDOT STD. 854.04 & 1170.01)

✳✳ DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP SLAB REINFORCING STEEL.

✳✳✳ SEE DETAIL "A" ON "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

(LEFT LANE)

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5/9/2023

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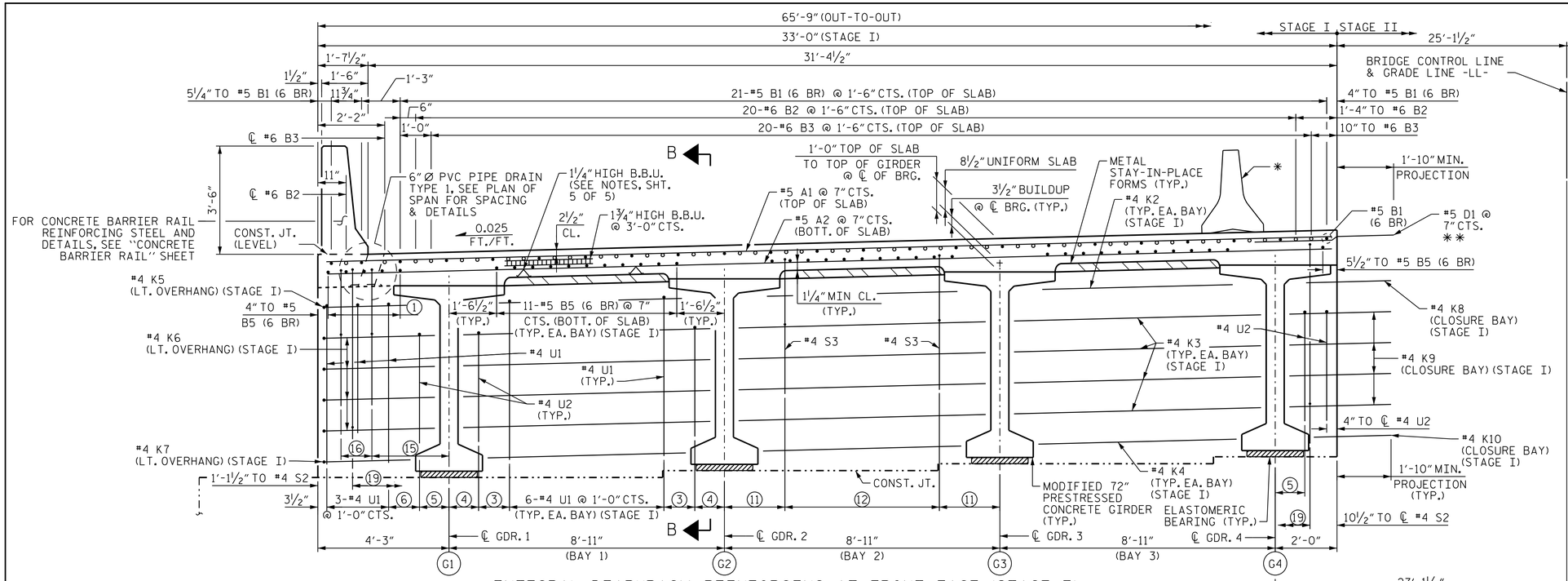
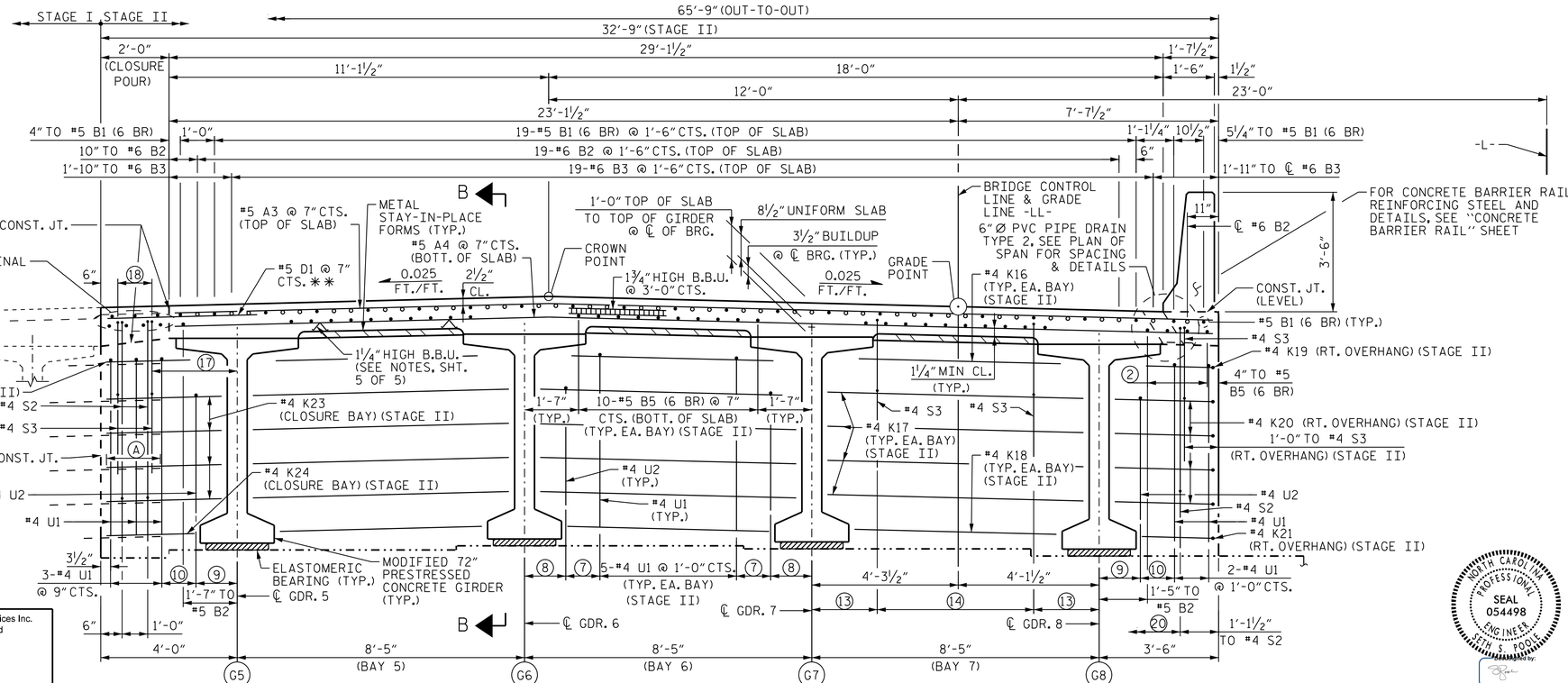


INTEGRAL DIAPHRAGM REINFORCING AT FRONT FACE (STAGE I)
TYPICAL SECTION



INTEGRAL DIAPHRAGM REINFORCING AT FRONT FACE (STAGE II)
TYPICAL SECTION

Ⓐ 1'-7" MIN. SPLICE LENGTH (TYP.)

① 5-#5 B5 (6 BR) @ 7" CTS (BOTT. OF SLAB) (STAGE I) BAR MAY BE CUT OR ADJUSTED SLIGHTLY TO CLEAR DECK DRAINS.

② 4-#5 B5 (6 BR) @ 7" CTS (BOTT. OF SLAB) (STAGE II) BAR MAY BE CUT OR ADJUSTED SLIGHTLY TO CLEAR DECK DRAINS.

③ 1'-0" TO #4 U1 (TYP. EA. BAY) (STAGE I)

④ 11½" TO #4 U2 (TYP. EA. BAY) (STAGE I)

⑤ 11½" TO #4 U2 (STAGE I)

⑥ 1'-0" TO #4 U1 (LT. OVERHANG) (STAGE I)

⑦ 1'-0" TO #4 U1 (TYP. EA. BAY) (STAGE II)

⑧ 1'-2½" TO #4 U2 (TYP. EA. BAY) (STAGE II)

⑨ 1'-2½" TO #4 U2 (STAGE II)

⑩ 1'-0" TO #4 U1 (STAGE II)

⑪ 1'-11½" TO #4 S3 (TYP. EA. BAY) (STAGE I)

⑫ 6-#4 S3 @ 1'-0" CTS. (TYP. EA. BAY) (STAGE I)

⑬ 1'-11" TO #4 S3 (TYP. EA. BAY) (STAGE II)

⑭ 6-#4 S3 @ 11" CTS. (TYP. EA. BAY) (STAGE II)

⑮ 2'-6" TO #4 S3 (LT. OVERHANG) (STAGE I)

⑯ 2-#4 S3 @ 1'-0" MAX. CTS. (LT. OVERHANG) (STAGE I)

⑰ 2'-6" TO #4 S2 & #4 S3 (CLOSURE BAY) (STAGE II)

⑱ #4 S3 @ 1'-0" MAX. CTS. (CLOSURE BAY) (STAGE II)

⑲ 32-#4 S2 @ 1'-0"± CTS. (STAGE I)

⑳ 30-#4 S2 @ 1'-0"± CTS. (STAGE II), SEE PLAN OF SPANS DETAILS, SHEET 7 OF 8 FOR PLACEMENT.

NOTES

SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5 FOR ADDITIONAL NOTES.

FOR APPROACH SLAB PAVEMENT NOTCH DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

• DENOTES CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

○ DENOTES NON-CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

#4 S2 MAY BE REPOSITIONED AS NECESSARY TO CLEAR GIRDERS.

(6 BR) DENOTES 6 BAR RUN.

* PORTABLE PRECAST CONCRETE MEDIAN BARRIER ANCHORED TO BRIDGE DECK. (SEE NCDOT STD. 854.04 & 1170.01)

** DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP SLAB REINFORCING STEEL.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION

(LEFT LANE)

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Signed by: 5/9/2023

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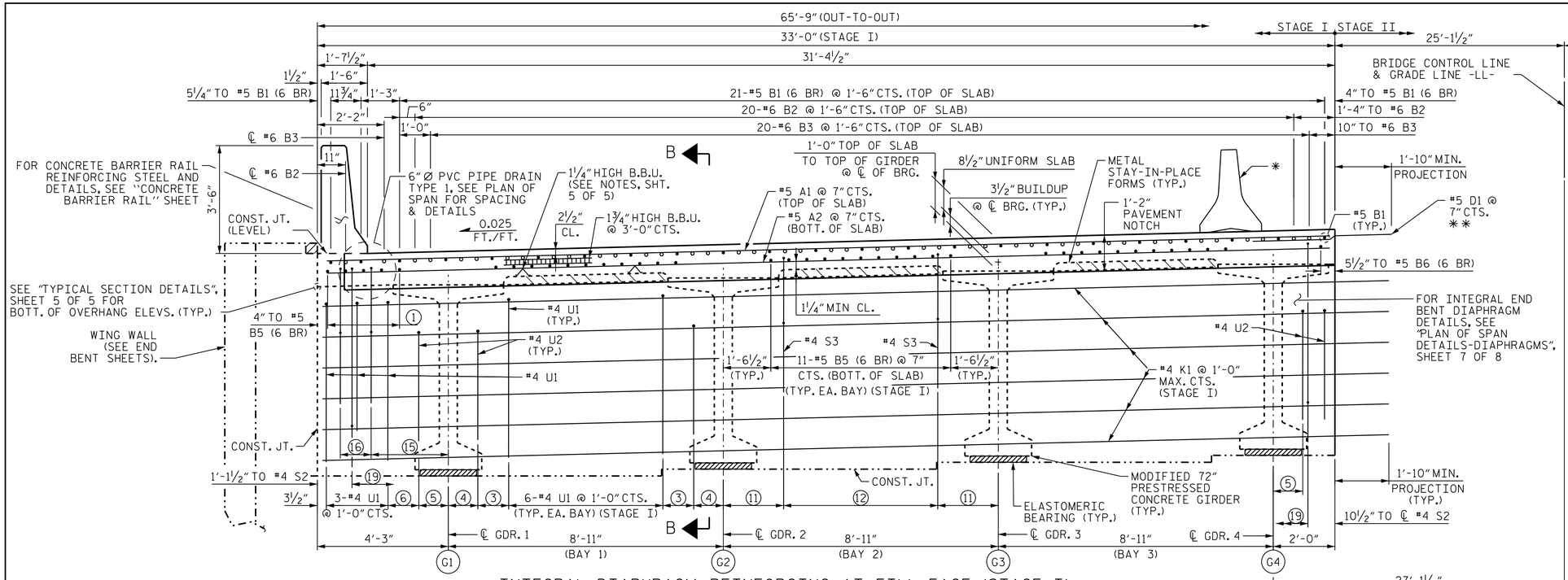


INTEGRAL DIAPHRAGM REINFORCING AT FILL FACE (STAGE I)
TYPICAL SECTION

1. 5-#5 B5 (6 BR) @ 7" CTS (BOTT. OF SLAB) (STAGE I) BAR MAY BE CUT OR ADJUSTED SLIGHTLY TO CLEAR DECK DRAINS.
2. 4-#5 B5 (6 BR) @ 7" CTS (BOTT. OF SLAB) (STAGE II) BAR MAY BE CUT OR ADJUSTED SLIGHTLY TO CLEAR DECK DRAINS.
3. 1'-0" TO #4 U1 (TYP. EA. BAY) (STAGE I)
4. 11½" TO #4 U2 (TYP. EA. BAY) (STAGE I)
5. 11½" TO #4 U2 (STAGE I)
6. 1'-0" TO #4 U1 (LT. OVERHANG) (STAGE I)
7. 1'-0" TO #4 U1 (TYP. EA. BAY) (STAGE II)
8. 1'-2½" TO #4 U2 (TYP. EA. BAY) (STAGE II)
9. 1'-2½" TO #4 U2 (STAGE II)
10. 1'-0" TO #4 U1 (STAGE II)
11. 1'-11½" TO #4 S3 (TYP. EA. BAY) (STAGE I)
12. 6-#4 S3 @ 1'-0" CTS. (TYP. EA. BAY) (STAGE I)
13. 1'-11" TO #4 S3 (TYP. EA. BAY) (STAGE II)
14. 6-#4 S3 @ 11" CTS. (TYP. EA. BAY) (STAGE II)
15. 2'-6" TO #4 S3 (LT. OVERHANG) (STAGE I)
16. 2-#4 S3 @ 1'-0" MAX. CTS. (LT. OVERHANG) (STAGE I)
17. 2'-6" TO #4 S2 & #4 S3 (CLOSURE BAY) (STAGE II)
18. #4 S3 @ 1'-0" MAX. CTS. (CLOSURE BAY) (STAGE II)
19. 32-#4 S2 @ 1'-0"± CTS. (STAGE I)
20. 32-#4 S2 @ 1'-0"± CTS. (STAGE II)

NOTES

SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5 FOR ADDITIONAL NOTES.

FOR APPROACH SLAB PAVEMENT NOTCH DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

• DENOTES CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

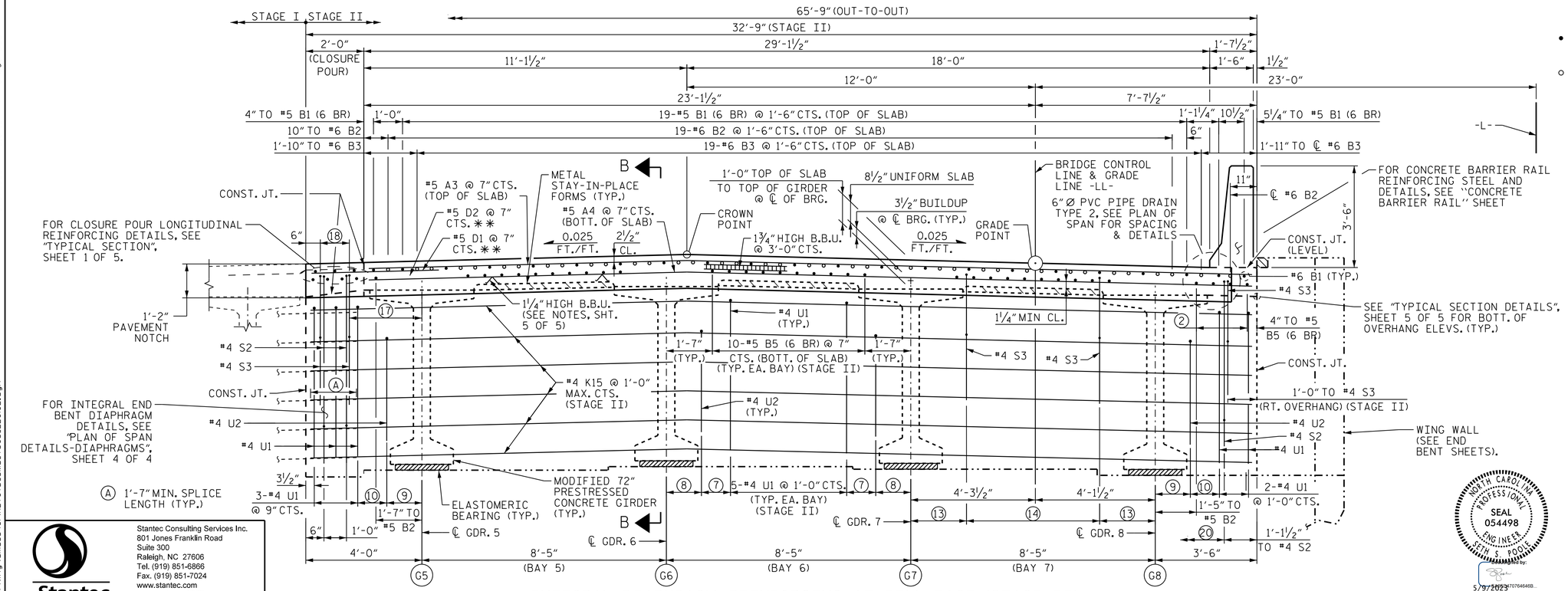
○ DENOTES NON-CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

#4 S2 MAY BE REPOSITIONED AS NECESSARY TO CLEAR GIRDERS.

(6 BR) DENOTES 6 BAR RUN.

✱ PORTABLE PRECAST CONCRETE MEDIAN BARRIER ANCHORED TO BRIDGE DECK. (SEE NCDOT STD. 854.04 & 1170.01)

✱✱ DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP SLAB REINFORCING STEEL.



INTEGRAL DIAPHRAGM REINFORCING AT FILL FACE (STAGE II)
TYPICAL SECTION

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION

(LEFT LANE)

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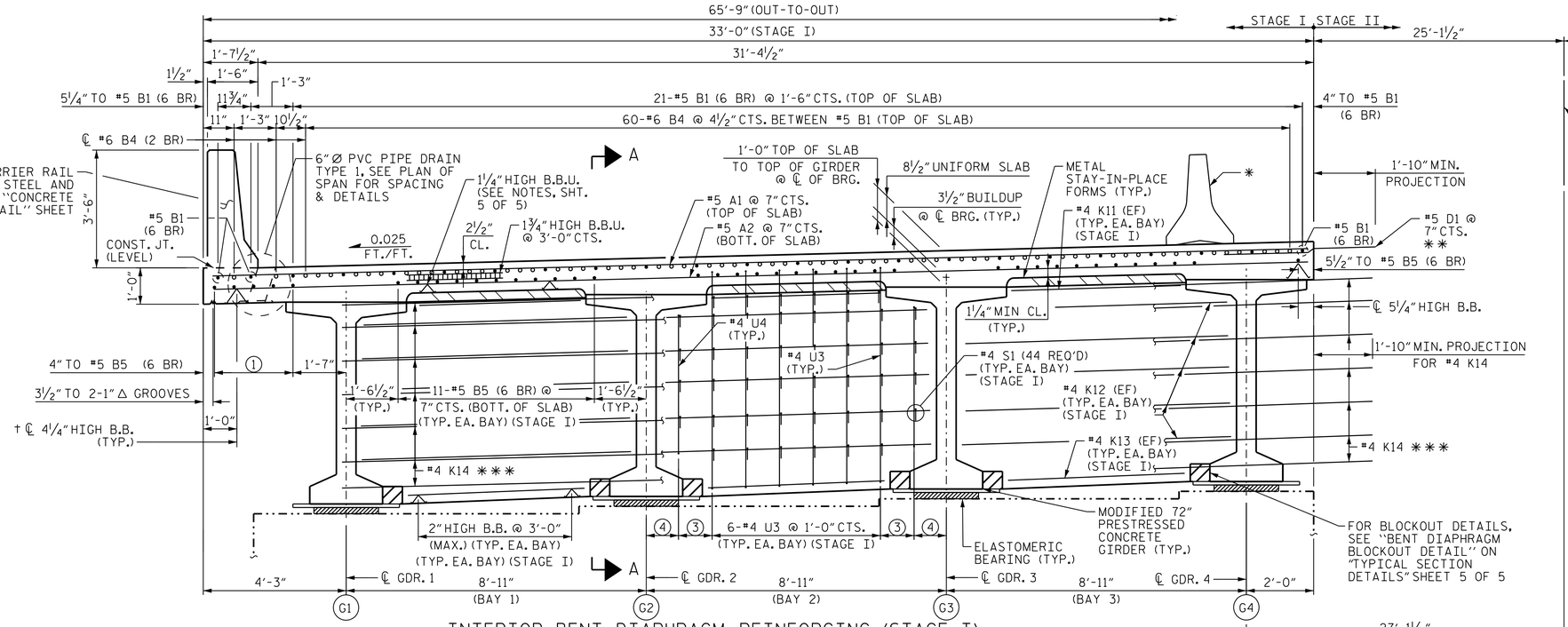
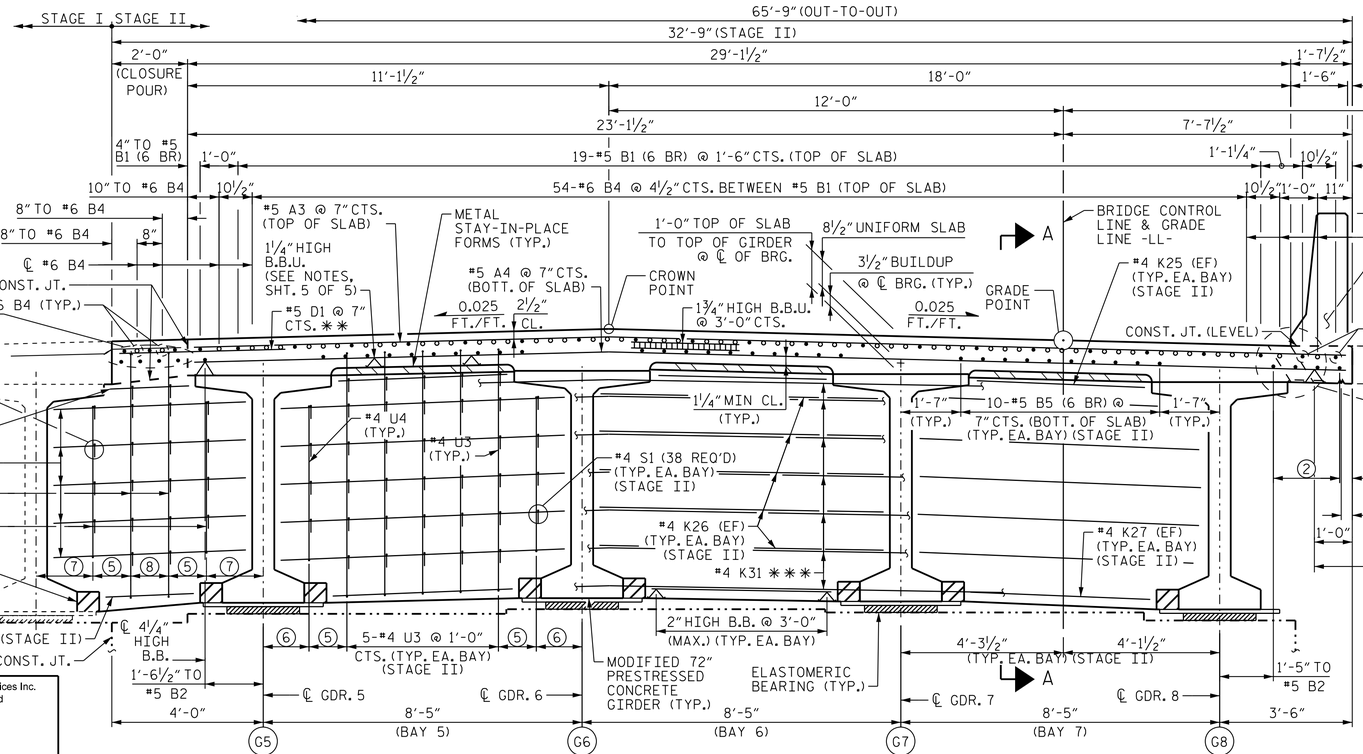


INTERIOR BENT DIAPHRAGM REINFORCING (STAGE I)
TYPICAL SECTION



INTERIOR BENT DIAPHRAGM REINFORCING (STAGE II)
TYPICAL SECTION

① 5-#5 B5 (6 BR) @ 7" CTS (BOTT. OF SLAB) (STAGE I)
② 4-#5 B5 (6 BR) @ 7" CTS (BOTT. OF SLAB) (STAGE II)
③ 1'-0" TO #4 U3 (TYP. EA. BAY) (STAGE I)
④ 11½" TO #4 U4 (TYP. EA. BAY) (STAGE I)
⑤ 1'-0" TO #4 U3 (STAGE II)
⑥ 1'-2½" TO #4 U4 (TYP. EA. BAY) (STAGE II)
⑦ 1'-6" TO #4 U4 (CLOSURE BAY) (STAGE II)
⑧ 2-#4 U3 @ 1'-0" MAX. CTS. (CLOSURE BAY) (STAGE II)

NOTES

SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5 FOR ADDITIONAL NOTES.

• DENOTES CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

○ DENOTES NON-CONTINUOUS LONGITUDINAL DECK REINFORCEMENT.

#5 B5 (6 BR) MAY BE REPOSITIONED AS NECESSARY TO CLEAR PIPE DRAINS.

(6 BR) DENOTES 6 BAR RUN.

(EF) DENOTE EACH FACE.

* PORTABLE PRECAST CONCRETE MEDIAN BARRIER ANCHORED TO BRIDGE DECK. (SEE NCDOT STD. 854.04 & 1170.01)

** DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLANE AS THE TOP SLAB REINFORCING STEEL.

*** FOR "K" BAR PLACEMENT, SEE "PLAN OF SPANS DETAILS - DIAPGRAM", SHEET 8 OF 8.

† 4¼" B.B. SHALL BE CUT AS REQUIRED TO CLEAR PIPE DRAINS.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION

(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
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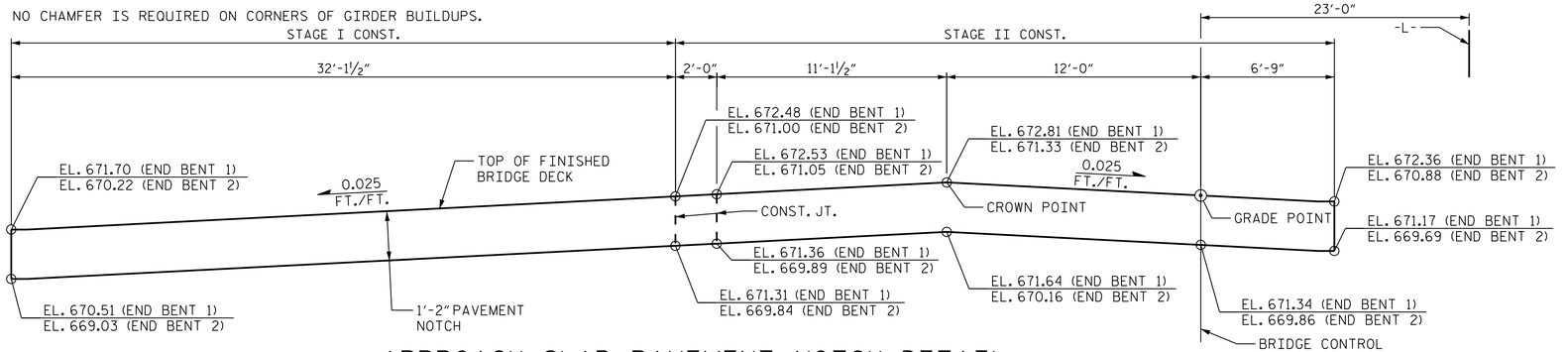
NOTES:

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

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

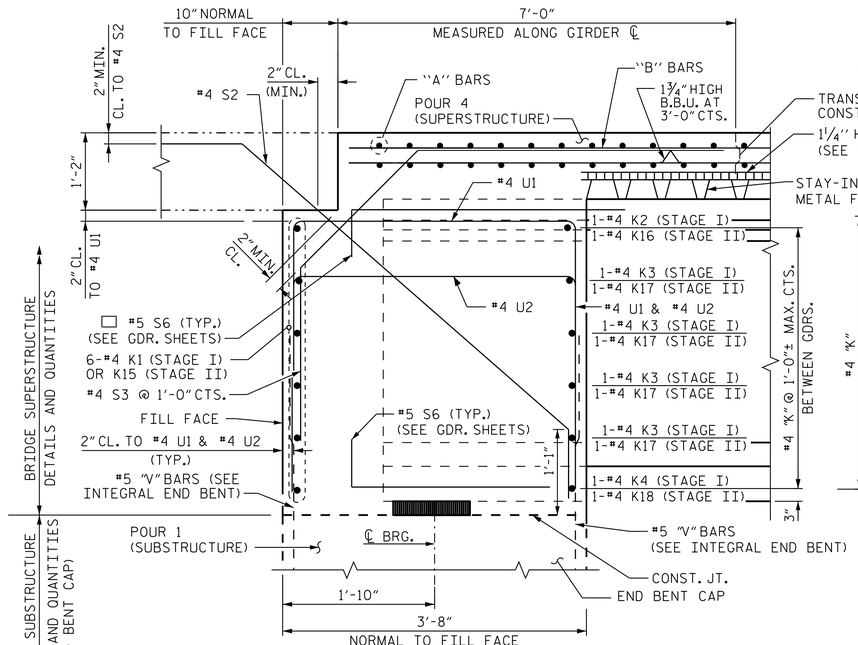
NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILDUPS.

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.



APPROACH SLAB PAVEMENT NOTCH DETAIL

ELEVATIONS ARE ALONG FILL FACE OF END BENT
DIMENSIONS ARE NORMAL TO -L-

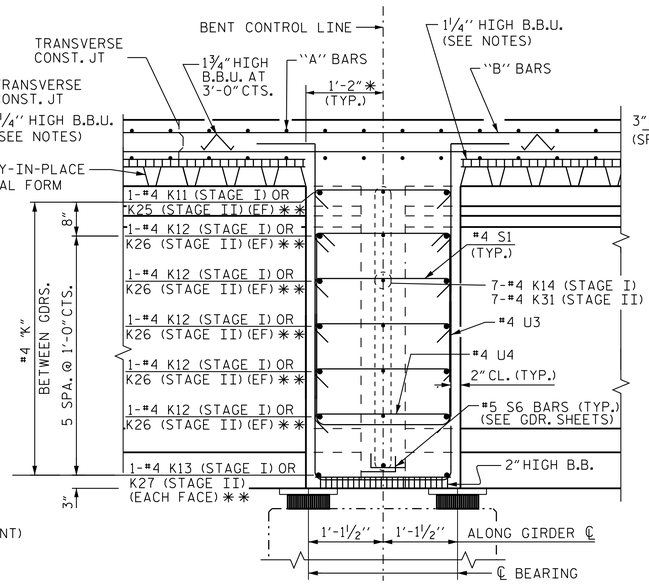


SECTION B-B

SECTION THRU INTEGRAL END BENT DIAPHRAGM
SEE "PLAN OF SPANS - END BENT DIAPHRAGMS", SHEET 7 OF 8

#4 S2 & S3 BARS MAY BE REPOSITIONED AS NECESSARY TO CLEAR SLAB REINFORCING STEEL AND GIRDERS.

☐ #5 S6 MAY BE FIELD BENT TO CLEAR 1'-2" DEEP PAVEMENT NOTCH.



SECTION A-A

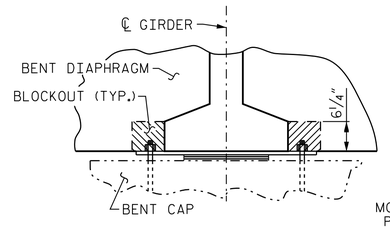
SECTION THRU DIAPHRAGM @ INTERIOR BENT
SEE "PLAN OF SPANS DETAILS - INTERIOR BENT DIAPHRAGMS", SHEET 8 OF 8

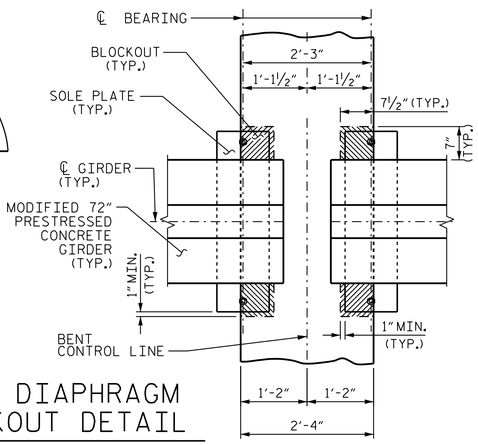
(EF) DENOTES EACH FACE

* NORMAL TO ℄ BENT
** TYP. EA. BAY, EXCEPT FOR STAGE II CLOSURE BAY.

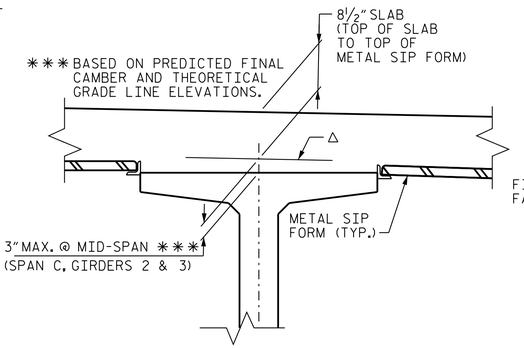
BOTTOM OF OVERHANG ELEVS. @ OUTSIDE EDGE OF SUPERSTR.

OVERHANG	END BENT	ELEV.
LEFT SIDE	1	670.66
RIGHT SIDE	1	671.32
LEFT SIDE	2	669.23
RIGHT SIDE	2	669.89



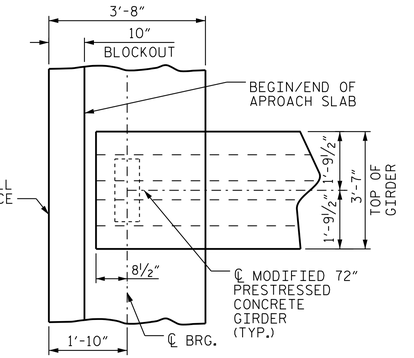


BENT DIAPHRAGM BLOCKOUT DETAIL

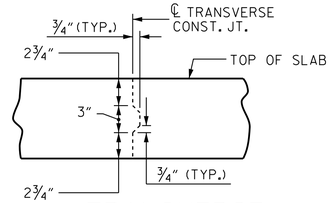


DETAIL "A"

△ TOP OF METAL STAY-IN-PLACE FORMS TO MATCH BOTTOM OF SLAB (TYP.)



PLAN OF INTEGRAL END BENT



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

(LEFT LANE)

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DRAWN BY : J. B. GEILE DATE : 10/17/18
CHECKED BY : S. S. POOLE DATE : 12/10/22

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/9/2023

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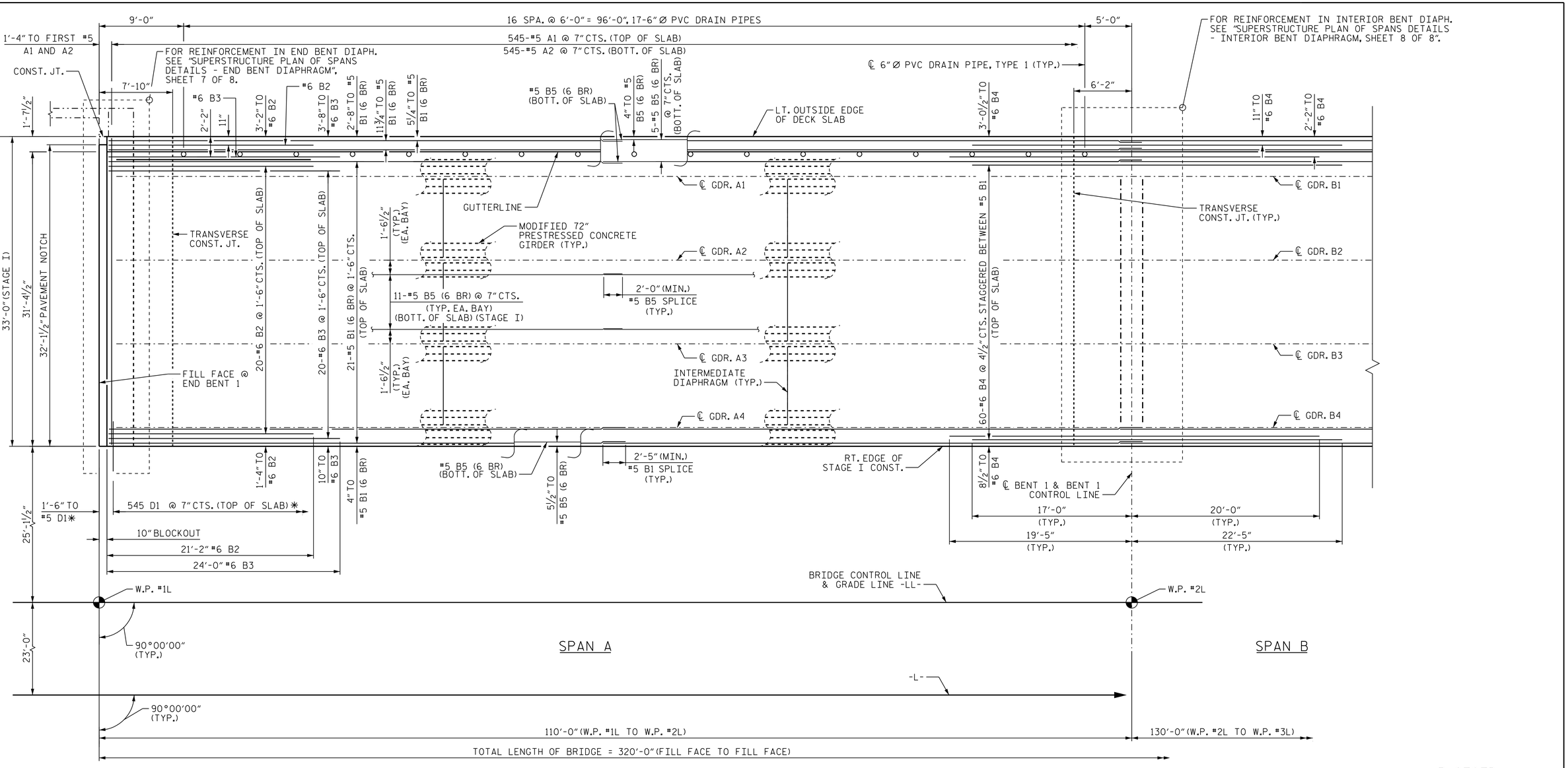
1			3			TOTAL SHEETS
2			4			56



PLAN OF SPANS (STAGE I CONSTRUCTION)
(SPAN A & PARTIAL SPAN B)

NOTE: (6 BR) DENOTES 6 BAR RUN

✳ D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLACE AS THE TOP (A1) SLAB REINFORCING STEEL.

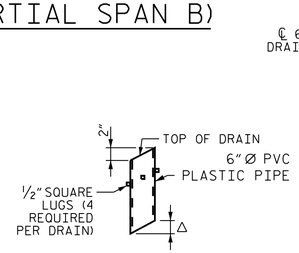
FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

FOR POUR SEQUENCE, SEE SHEET "BILL OF MATERIALS"

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER" SHEET.

TRANSVERSE AND LONGITUDINAL REINFORCING MAY BE ADJUSTED HORIZONTALLY IN THE VICINITY OF THE DRAIN PIPE.



DRAIN PIPE

PLAN OF RECESS

△ TO BE SET TO MATCH SLOPE OF BOTTOM OF OVERHANG (25 DRAINS REQUIRED)

DRAIN PIPE NOTES:

TOP OF FLOOR DRAIN TO BE SET ⅜" BELOW SURFACE OF SLAB.

4 - ½" SQUARE LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF PIPE.

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

TYPE 1 DRAIN DETAILS

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
5/9/2023

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CLEVELAND COUNTY
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SHEET 1 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS
(SPAN A)
(STAGE I)
(LEFT LANE)

REVISIONS						SHEET NO.
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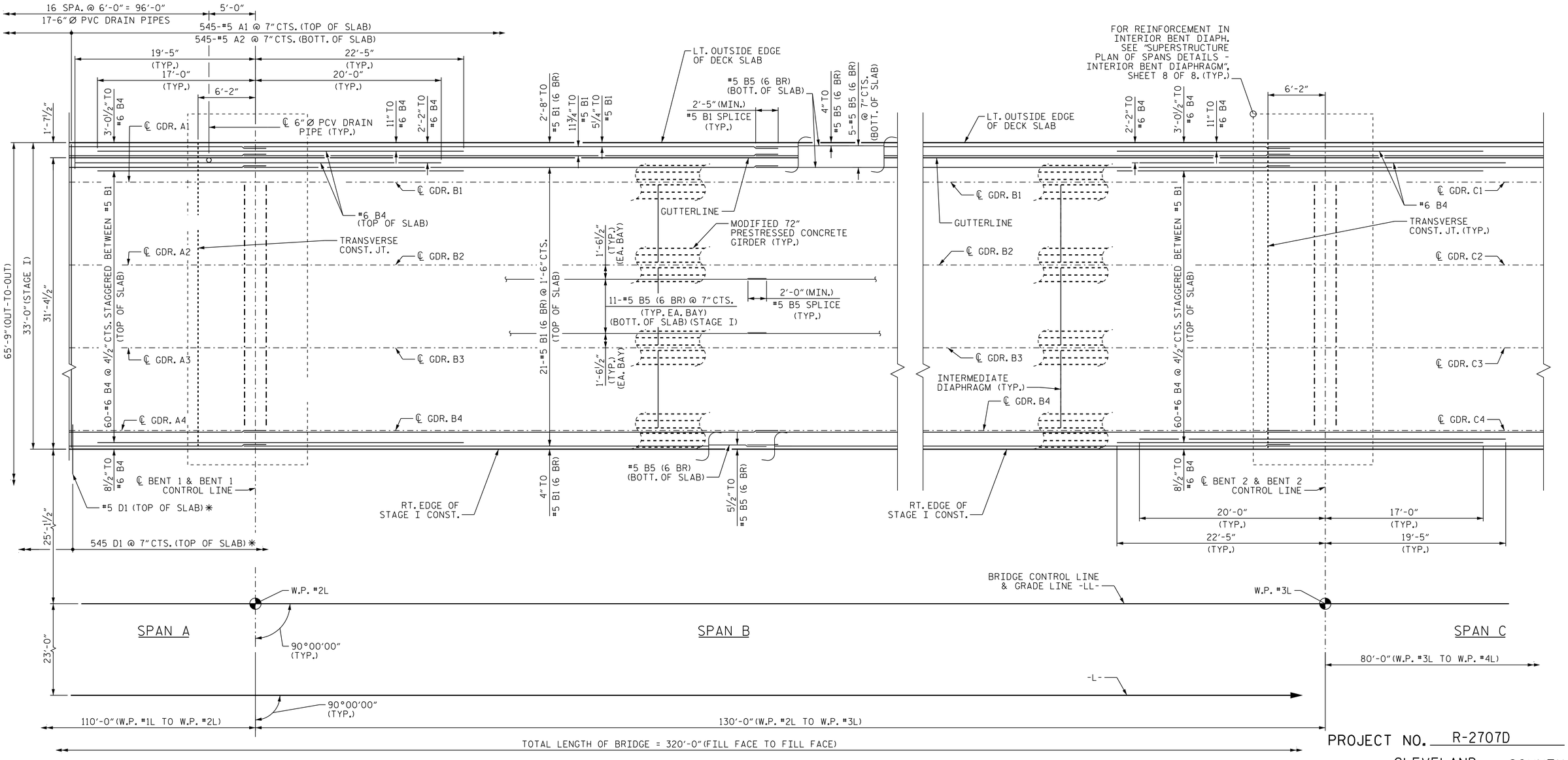
1			3			TOTAL SHEETS
2			4			56



PLAN OF SPANS (STAGE I CONSTRUCTION)
(SPAN B & PARTIAL SPAN A & C)

NOTE: (6 BR) DENOTES 6 BAR RUN

✳ D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLACE AS THE TOP (A1) SLAB REINFORCING STEEL.

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

FOR POUR SEQUENCE, SEE SHEET "BILL OF MATERIALS"

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER" SHEET.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS
(SPAN B)
(STAGE I)
(LEFT LANE)

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1			3			TOTAL SHEETS
2			4			56

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Signed by: 5/9/2023

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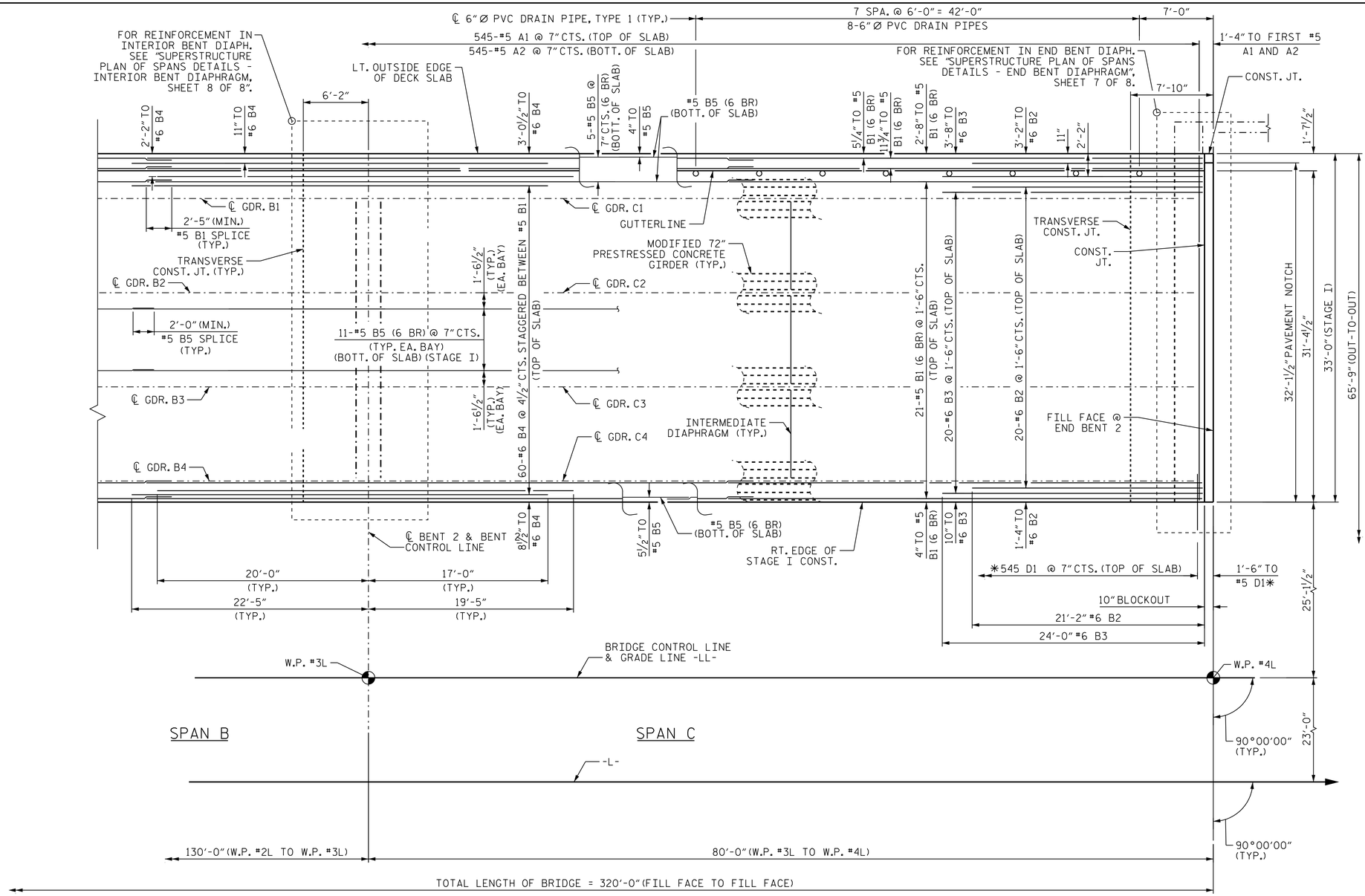

PLAN OF SPANS (STAGE I CONSTRUCTION)
(SPAN C & PARTIAL SPAN B)

NOTE: (6 BR) DENOTES 6 BAR RUN

* D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLACE AS THE TOP (A1) SLAB REINFORCING STEEL.

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

FOR POUR SEQUENCE, SEE SHEET "BILL OF MATERIALS"

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS , SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER" SHEET.

FOR TYPE 1 DRAIN PIPE DETAILS, SEE "PLAN OF SPANS", SHEET 1 OF 8.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS
(SPAN C)
(STAGE I)
(LEFT LANE)

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			56

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
5/9/2023

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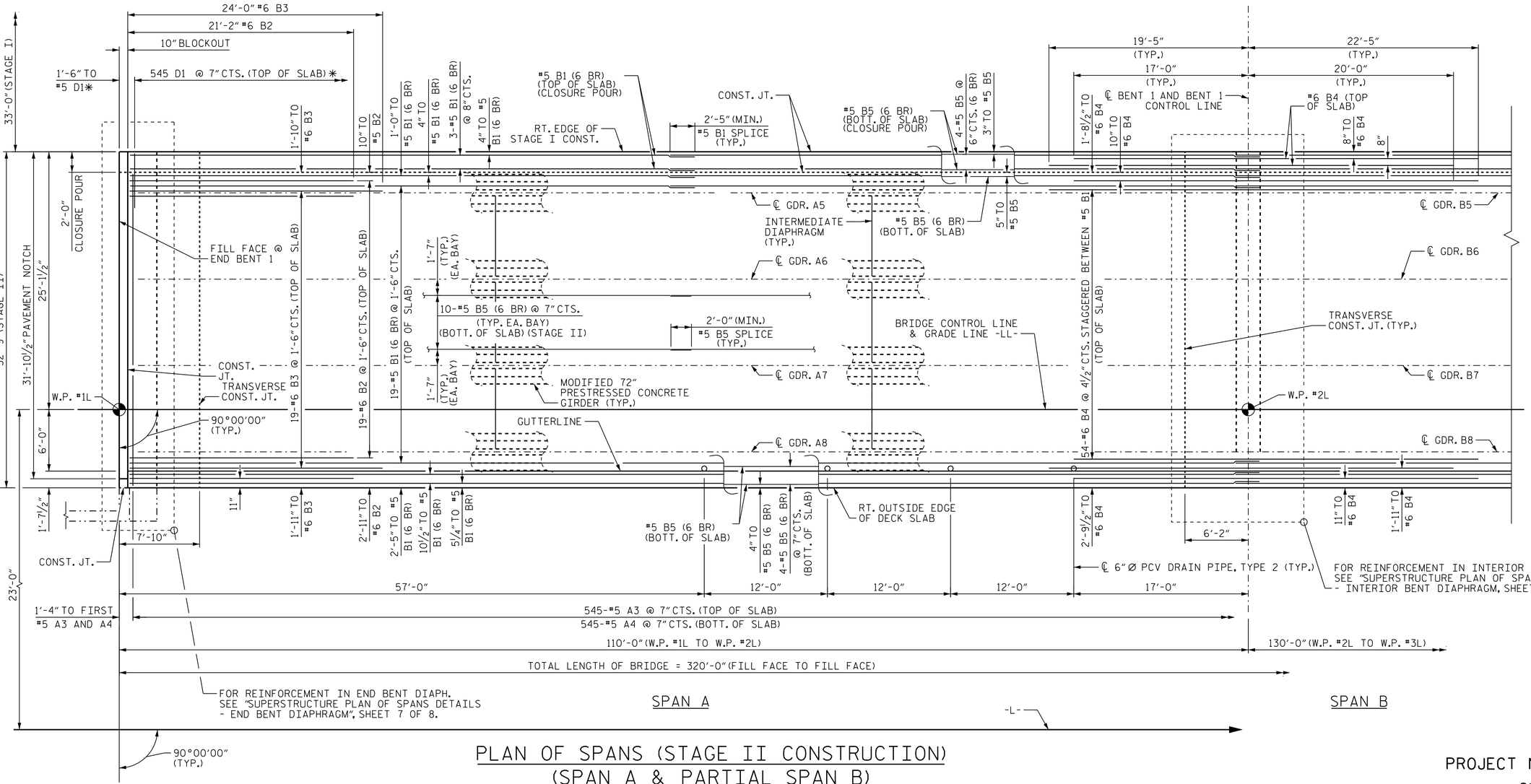


PLAN OF SPANS (STAGE II CONSTRUCTION)
(SPAN A & PARTIAL SPAN B)

NOTE: (6 BR) DENOTES 6 BAR RUN

* D1 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLACE AS THE TOP (A3) SLAB REINFORCING STEEL.

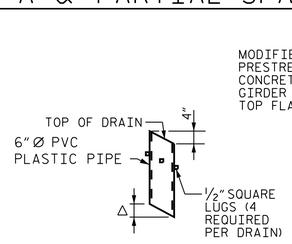
FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

FOR POUR SEQUENCE, SEE SHEET "BILL OF MATERIALS"

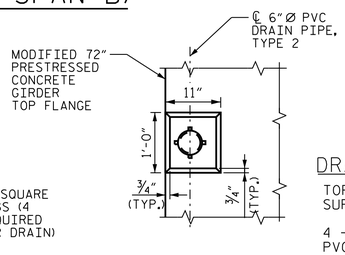
FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS , SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER" SHEET.

TRANSVERSE AND LONGITUDINAL REINFORCING MAY BE ADJUSTED HORIZONTALLY IN THE VICINITY OF THE DRAIN PIPE.



DRAIN PIPE

△ TO BE SET TO MATCH SLOPE OF BOTTOM OF OVERHANG (8 DRAINS REQUIRED)



PLAN OF RECESS

TYPE 2 DRAIN DETAILS

DRAIN PIPE NOTES:

TOP OF FLOOR DRAIN TO BE SET ⅜" BELOW SURFACE OF SLAB.

4 - ½" SQUARE LUGS TO BE GLUED TO THE PVC PLASTIC PIPE AT EQUAL SPACES AROUND THE PIPE DRAIN APPROXIMATELY 4" FROM THE TOP OF PIPE.

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

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
5/9/2023

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

SHEET 4 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS (SPAN A) (STAGE II)
(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-16
1			3			TOTAL SHEETS
2			4			56

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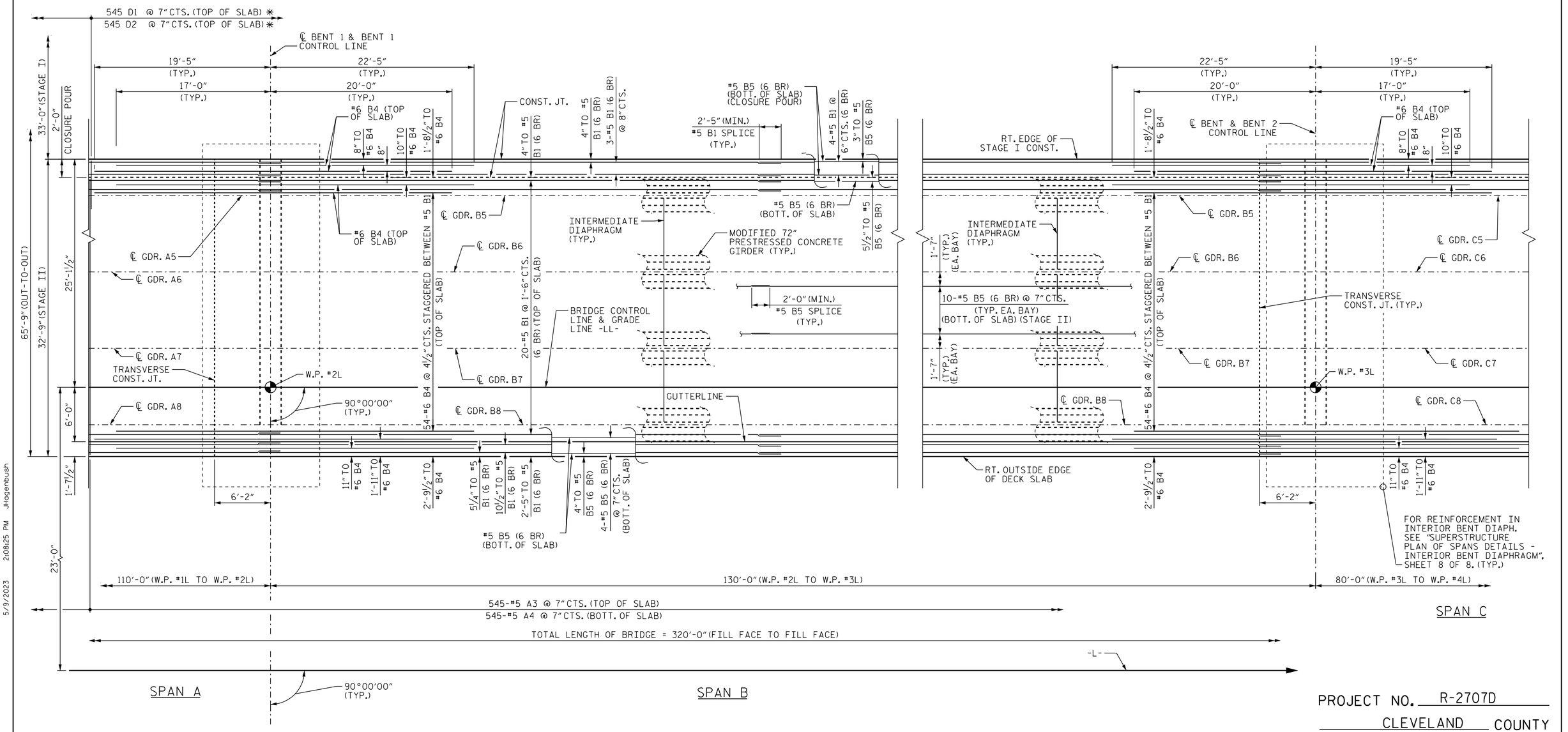

PLAN OF SPANS (STAGE II CONSTRUCTION)
(SPAN B & PARTIAL SPAN A & C)

NOTE: (6 BR) DENOTES 6 BAR RUN

* D3 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLACE AS THE TOP (A3) SLAB REINFORCING STEEL.

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

FOR POUR SEQUENCE, SEE SHEET "BILL OF MATERIALS"

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS , SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER" SHEET.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 5 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS
(SPAN B)
(STAGE II)

(LEFT LANE)

REVISIONS						SHEET NO.
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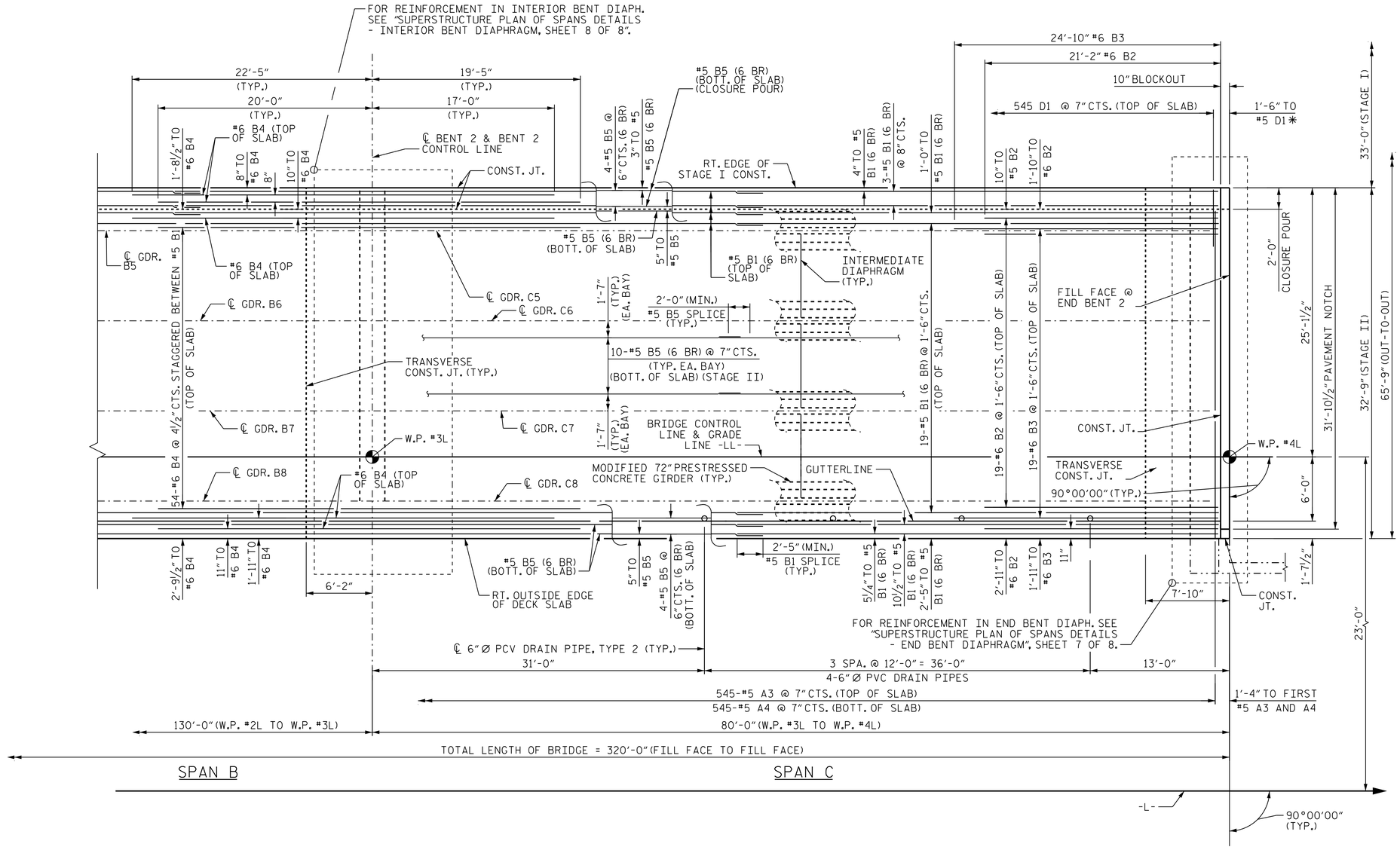

PLAN OF SPANS (STAGE II CONSTRUCTION)
(SPAN C & PARTIAL SPAN B)

NOTE: (6 BR) DENOTES 6 BAR RUN

* D3 DOWELS SHALL BE PLACED IN THE SAME HORIZONTAL PLACE AS THE TOP (A3) SLAB REINFORCING STEEL.

FOR BARRIER RAIL DETAILS AND REINFORCING STEEL, SEE "CONCRETE BARRIER RAIL" SHEET.

FOR TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

FOR POUR SEQUENCE, SEE SHEET "BILL OF MATERIALS"

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS , SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER" SHEET.

FOR TYPE 2 DRAIN PIPE DETAILS, SEE "PLAN OF SPANS", SHEET 4 OF 8.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 6 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
PLAN OF SPANS
(SPAN C)
(STAGE II)

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-18
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2			4			56

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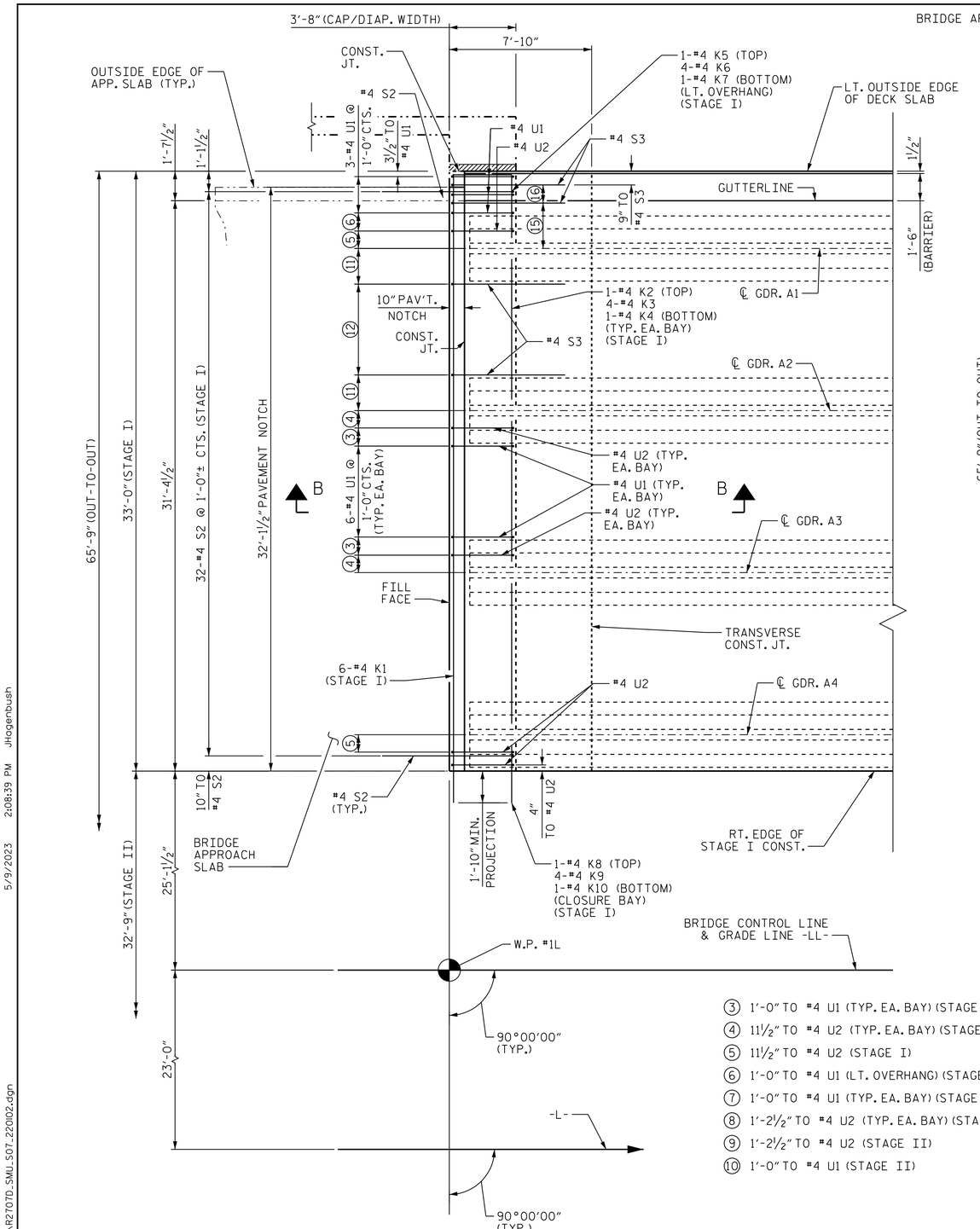
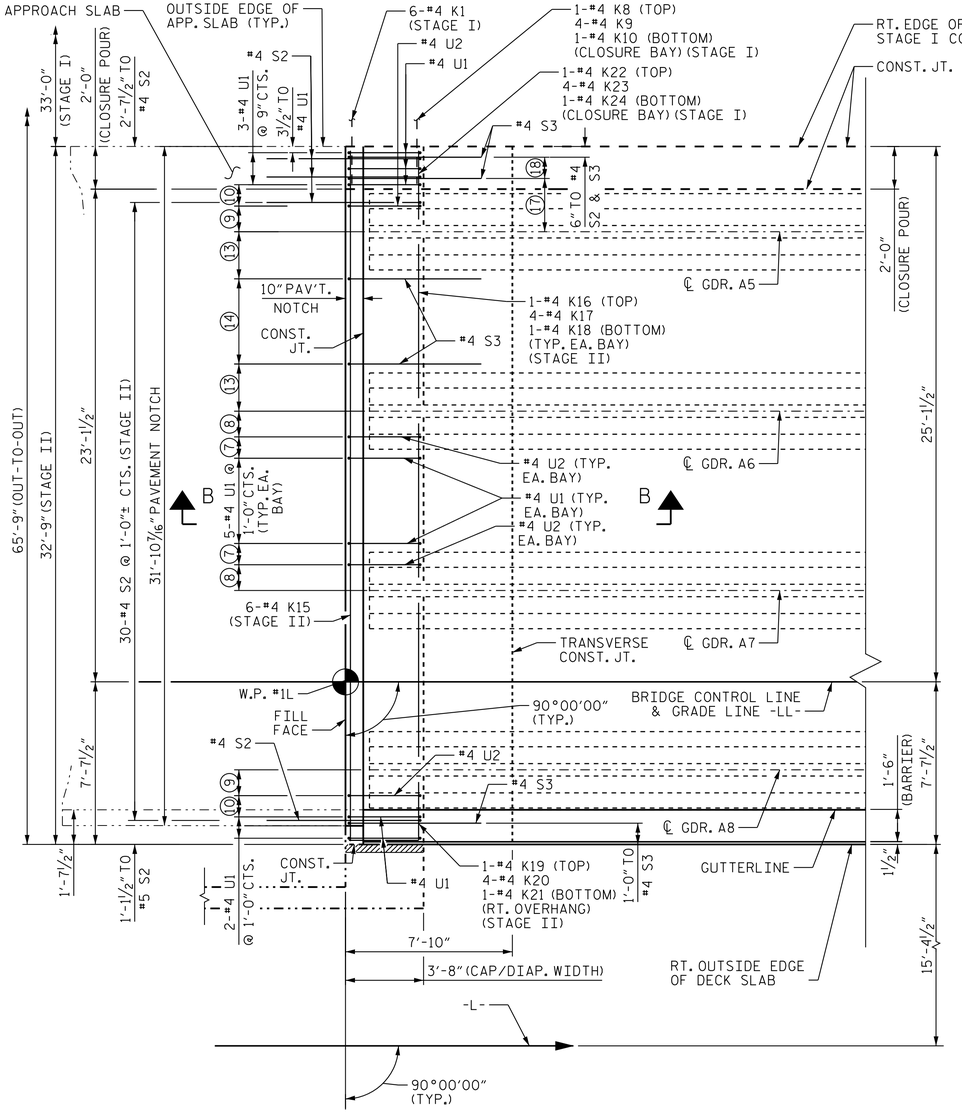


STAGE I



STAGE II

NOTES:

S2 AND S3 BARS MAY BE REPOSITIONED AS NECESSARY TO CLEAR PRESTRESSED GIRDERS AND OTHER REINFORCING BAR CONFLICTS.

SEE "END BENT 1 DETAILS - WING WALLS" AND "END BENT 2 DETAILS - WING WALLS" FOR REINFORCMENT IN WINGS.

FOR SECTION B-B, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

③ 1'-0" TO #4 U1 (TYP. EA. BAY) (STAGE I)
④ 11½" TO #4 U2 (TYP. EA. BAY) (STAGE I)
⑤ 11½" TO #4 U2 (STAGE I)
⑥ 1'-0" TO #4 U1 (LT. OVERHANG) (STAGE I)
⑦ 1'-0" TO #4 U1 (TYP. EA. BAY) (STAGE II)
⑧ 1'-2½" TO #4 U2 (TYP. EA. BAY) (STAGE II)
⑨ 1'-2½" TO #4 U2 (STAGE II)
⑩ 1'-0" TO #4 U1 (STAGE II)
⑪ 1'-11½" TO #4 S3 (TYP. EA. BAY) (STAGE I)
⑫ 6-#4 S3 @ 1'-0" CTS. (TYP. EA. BAY) (STAGE I)
⑬ 2'-2½" TO #4 S3 (TYP. EA. BAY) (STAGE II)
⑭ 6-#4 S3 @ 11" CTS. (TYP. EA. BAY) (STAGE II)
⑮ 2'-6" TO #4 S3 (LT. OVERHANG) (STAGE I)
⑯ 2-#4 S3 @ 1'-0" MAX. CTS. (LT. OVERHANG) (STAGE I)
⑰ 2'-6" TO #4 S2 & #4 S3 (CLOSURE BAY) (STAGE II)
⑱ 2-#4 S2 & 2-#4 S3 @ 1'-0" MAX. CTS. (CLOSURE BAY) (STAGE II)

TYPICAL END BENT DIAPHRAGM REINFORCING DETAIL

DETAILS AT END BENT 1 SHOWN.

DETAILS AT END BENT 2 ARE SIMILAR BY ROTATION.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 7 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPANS DETAILS - END BENT DIAPHRAGMS

(LEFT LANE)

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1			3			TOTAL SHEETS
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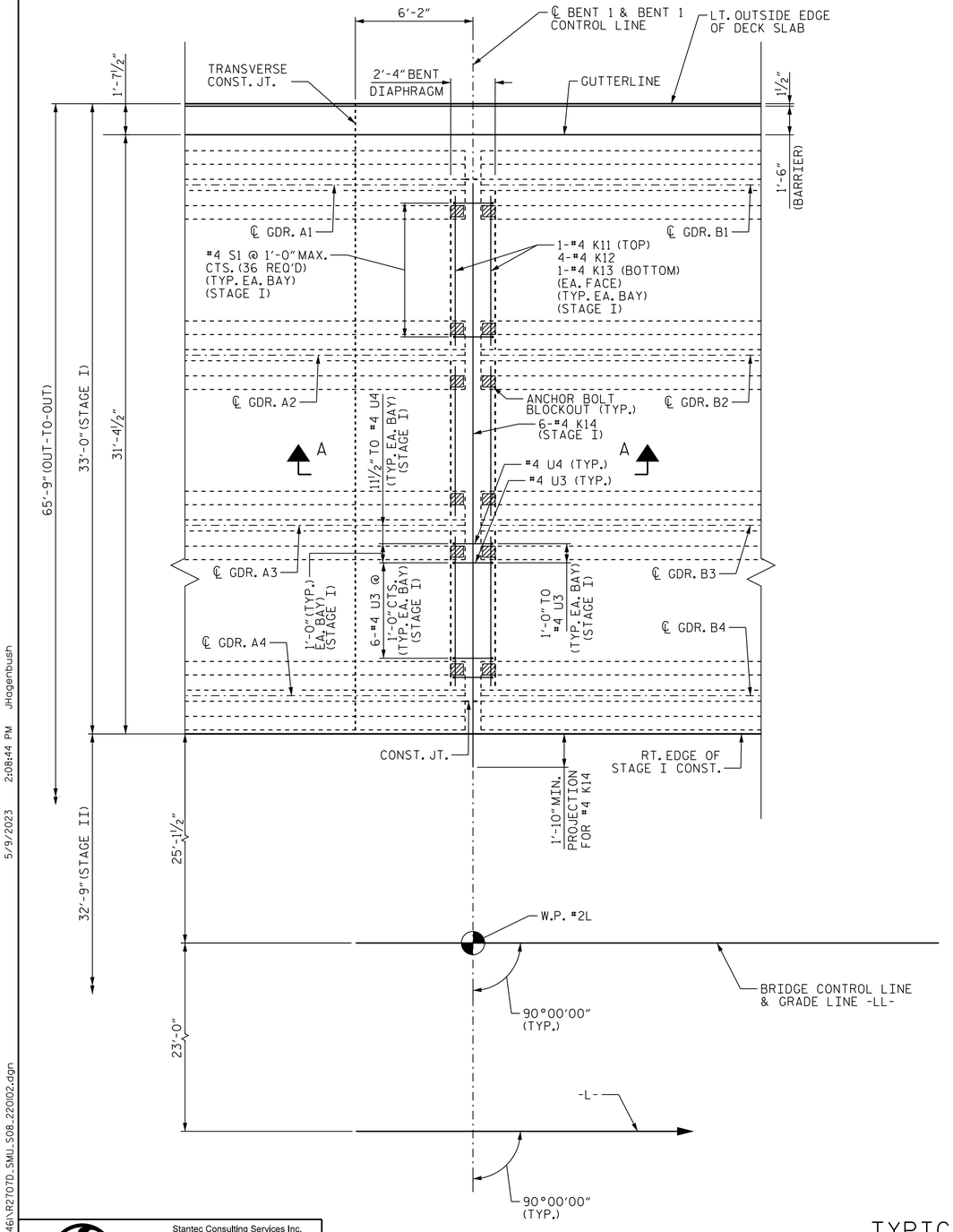
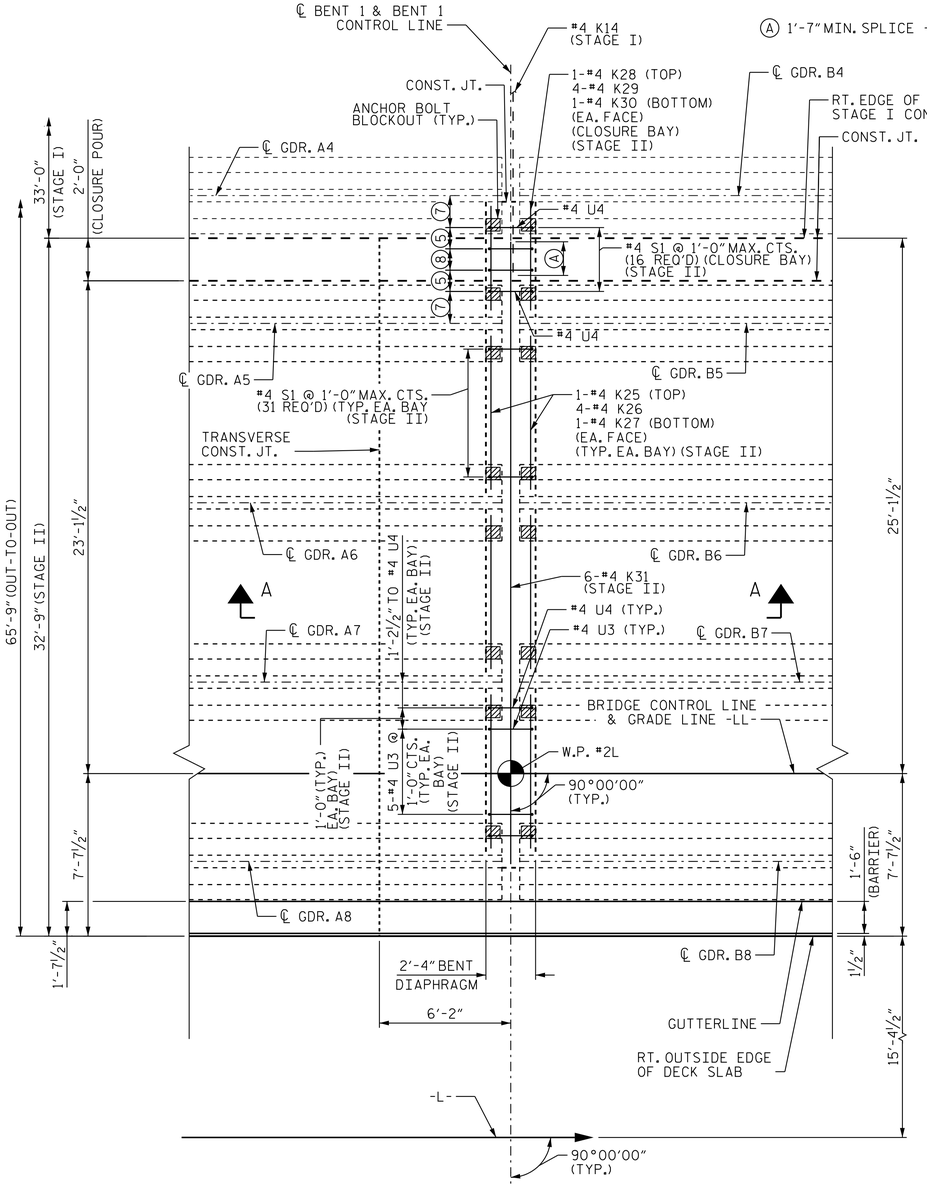


STAGE I



NOTES:

FOR SECTION A-A, SEE "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

▨ DENOTES CONC. BLOCKOUT. SEE END BENT SHEETS AND "TYPICAL SECTION DETAILS", SHEET 5 OF 5.

Ⓢ 1'-0" TO #4 U3 (STAGE II)
⑦ 1'-6" TO #4 U4 (CLOSURE BAY) (STAGE II)
⑧ 2-#4 U3 @ 1'-0" MAX. CTS. (CLOSURE BAY) (STAGE II)

STAGE II

TYPICAL INTERIOR BENT DIAPHRAGM REINFORCING DETAIL

DETAILS AT BENT 1 SHOWN.

DETAILS AT BENT 2 SIMILAR.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 8 OF 8

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS DETAILS - INTERIOR BENT DIAPHRAGMS
(LEFT LANE)

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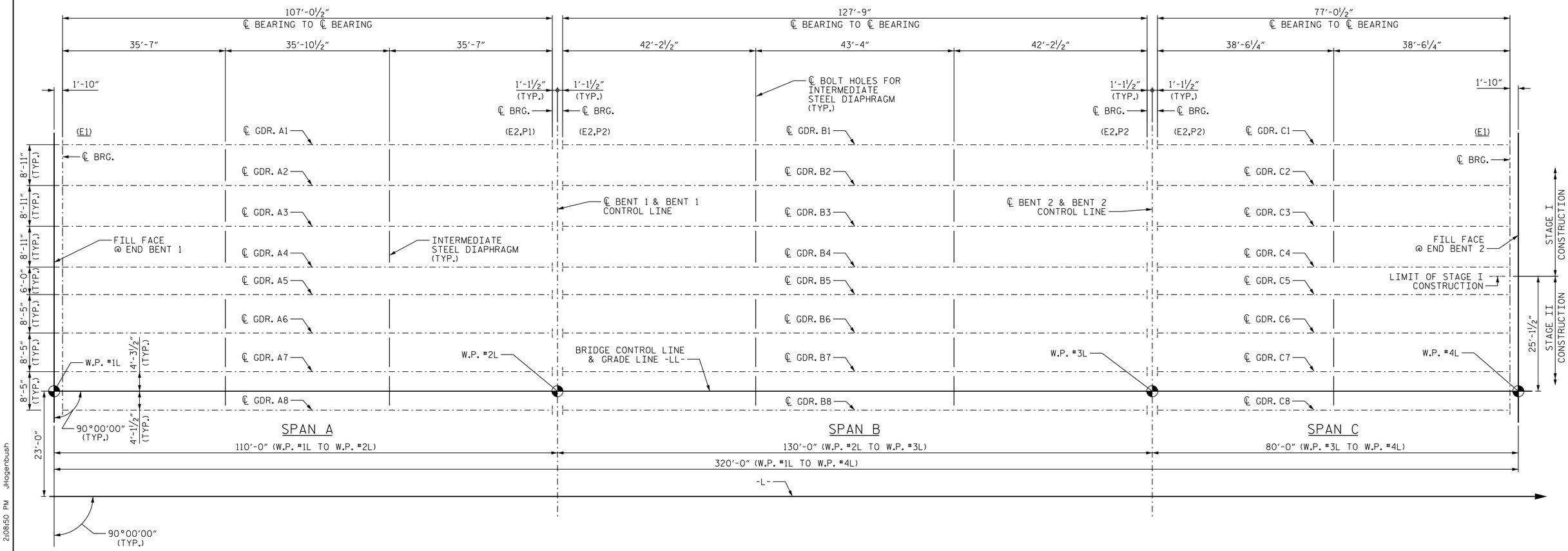

FRAMING PLAN

NOTES:

(E1, E2, P1, P2, & P3) DENOTES ELASTOMERIC BEARING OR SOLE PLATE. SEE "ELASTOMERIC BEARING DETAILS".

REFER TO "PLAN OF SPANS DETAILS - END BENT DIAPRAGMS" AND "PLAN OF SPANS DETAILS - INTERIOR BENT DIAPGRAMS", SHEETS 7 OF 8 AND 8 OF 8, FOR END BENT AND INTERIOR BENT DIAPHRAGM DETAILS.

ALL DIMENSIONS ARE HORIZONTAL.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

Stantec
Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
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Tel. (919) 851-6866
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License No. F-0672

DRAWN BY : J.E. HAGENBUSH DATE : 10/08/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/9/2023

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

FRAMING PLAN

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-21
1			3			TOTAL SHEETS
2			4			56

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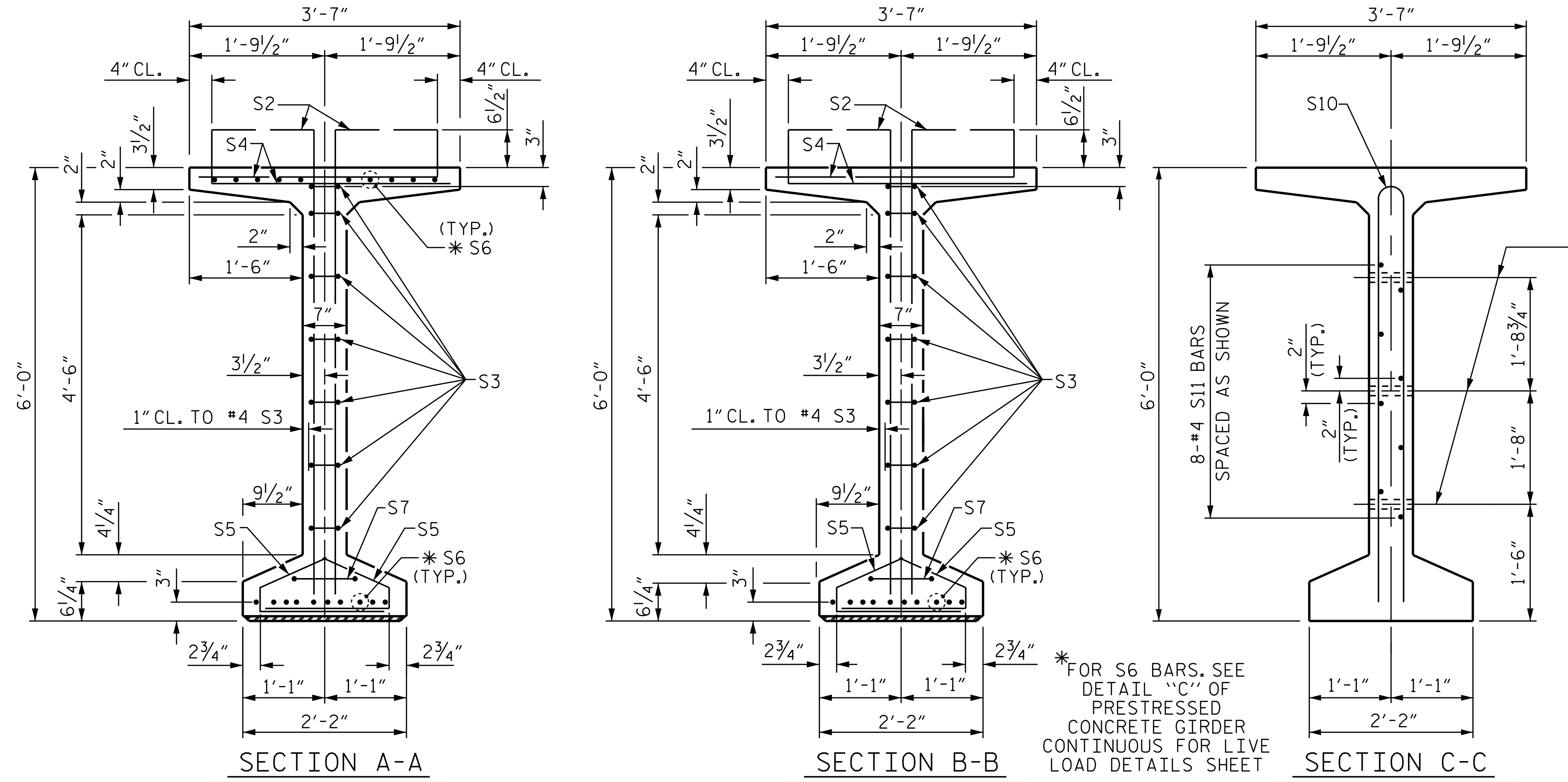


SECTION A-A

SECTION B-B

✱FOR S6 BARS, SEE DETAIL "C" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

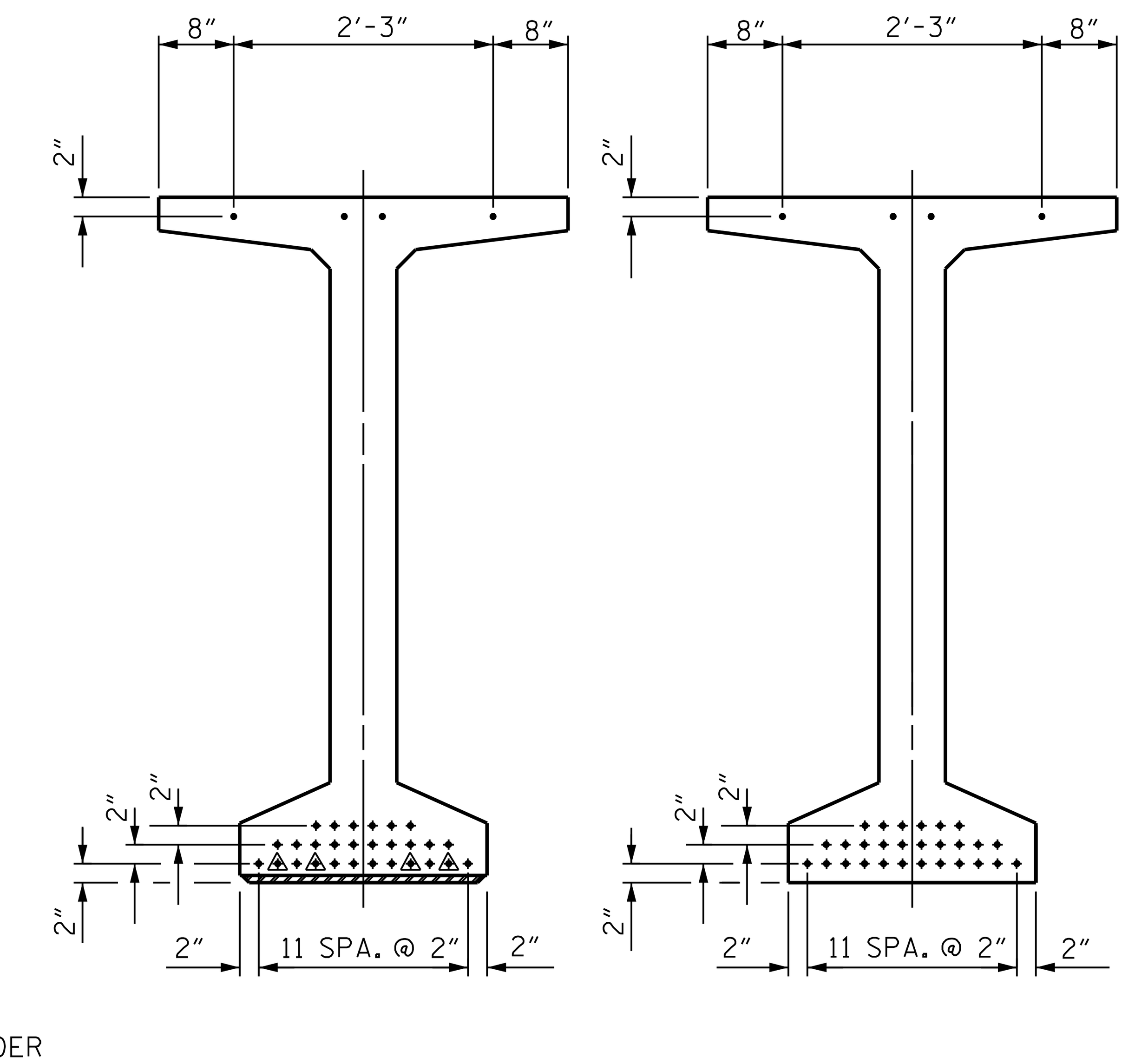
SECTION C-C

(S1, S4 AND S9 BARS NOT SHOWN)

DEBONDING LEGEND

● FULLY BONDED STRANDS

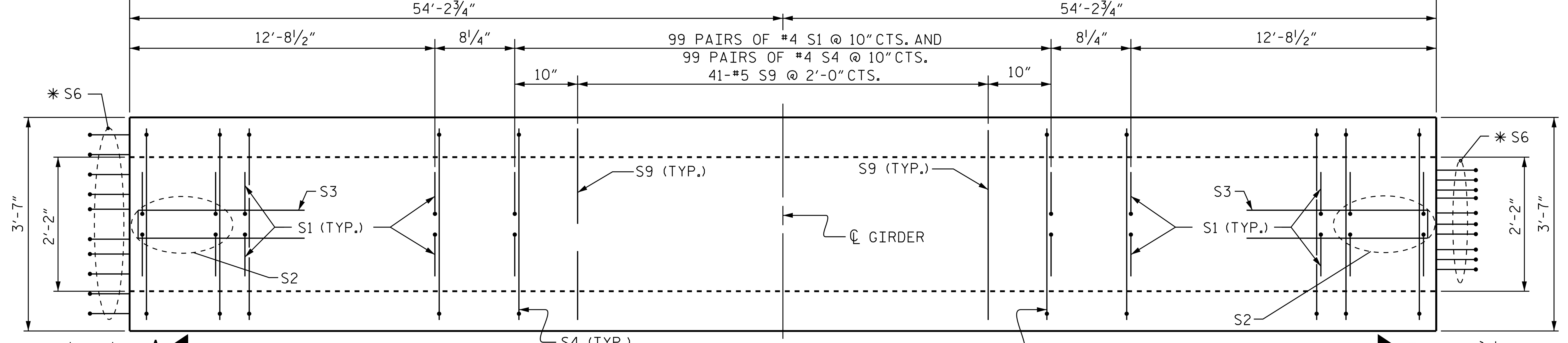
▲ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER



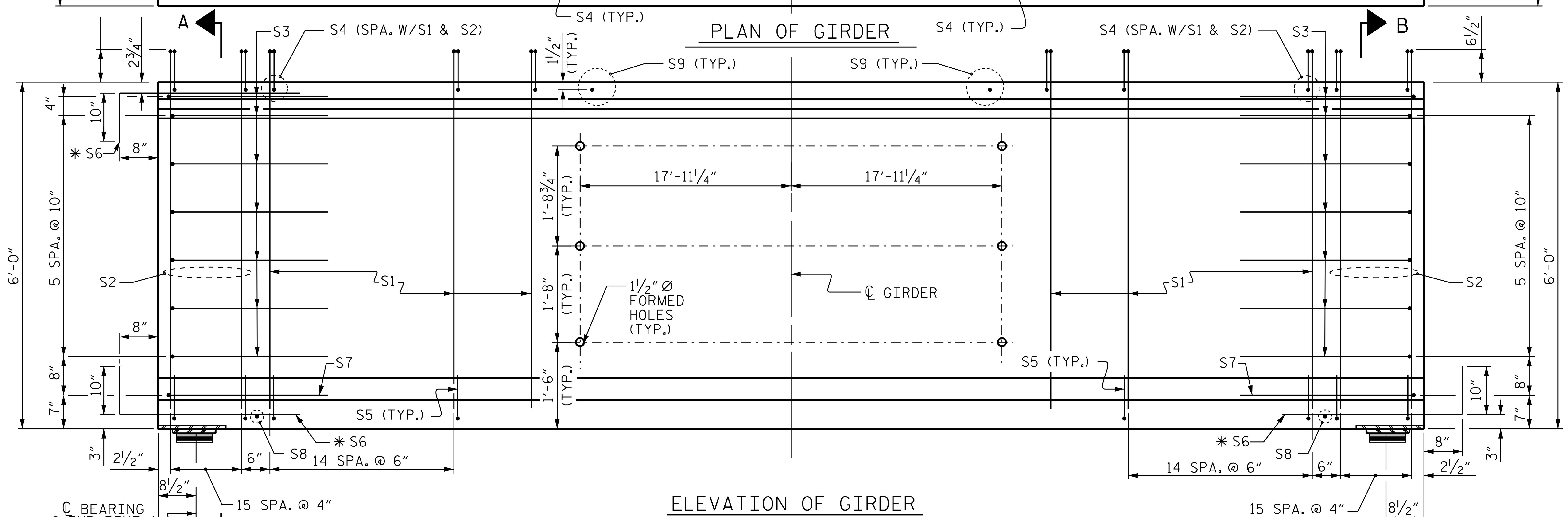
AT END OF GIRDER

AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

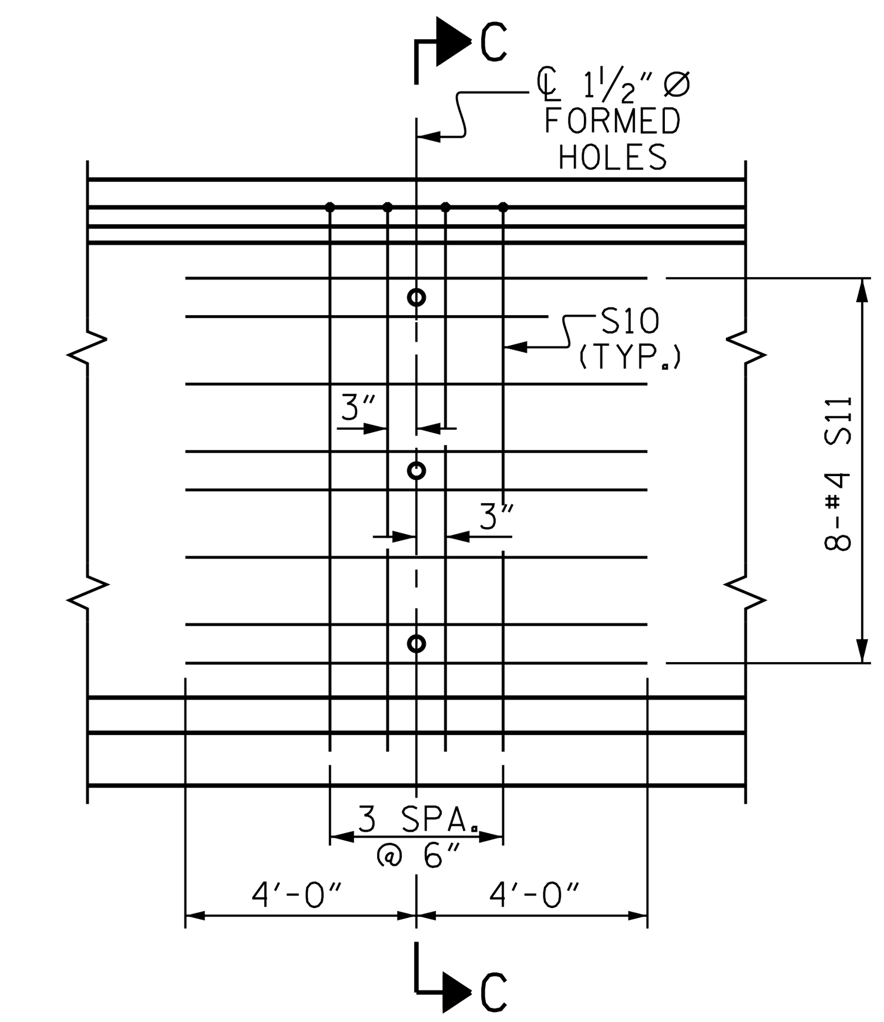


PLAN OF GIRDER



ELEVATION OF GIRDER

NOTE: S6 BARS AT TOP OF THE GIRDER MAY BE FIELD BENT AS REQUIRED TO CLEAR APPROACH SLAB PAVEMENT NOTCH.



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

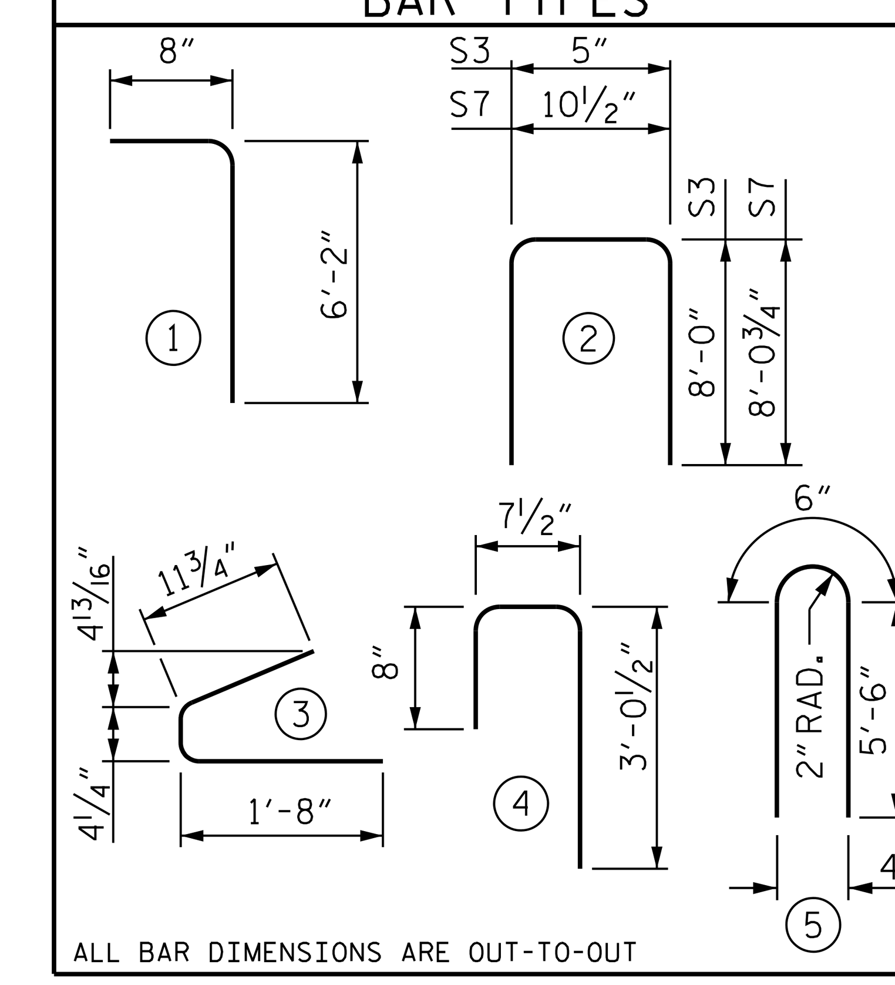
0.6" Ø L.R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	258	#4	1	6'-10"	1178
S2	64	#5	1	6'-10"	457
S3	14	#4	2	16'-5"	154
S4	322	#4	4	4'-4"	933
S5	124	#4	3	3'-0"	249
✱ S6	30	#5	STR	3'-8"	115
S7	2	#5	2	17'-0"	36
S8	2	#3	STR	1'-10"	2
S9	41	#5	STR	3'-3"	139
S10	8	#5	5	11'-6"	96
S11	16	#4	STR	8'-0"	86

✱ NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
	3445	23.2	32

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	108'-5½"	867'-8"

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MODIFIED 72" PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

SPAN A
(LEFT LANE)

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 054498 SETH S. POOLE

5/9/2023

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

SHEET NO. S5-22

TOTAL SHEETS 56

ASSEMBLED BY : J. B. GEILE DATE : 09/18/18
CHECKED BY : S. S. POOLE DATE : 12/10/22

DRAWN BY : EEM 2/6/97
CHECKED BY : VAP 2/6/97

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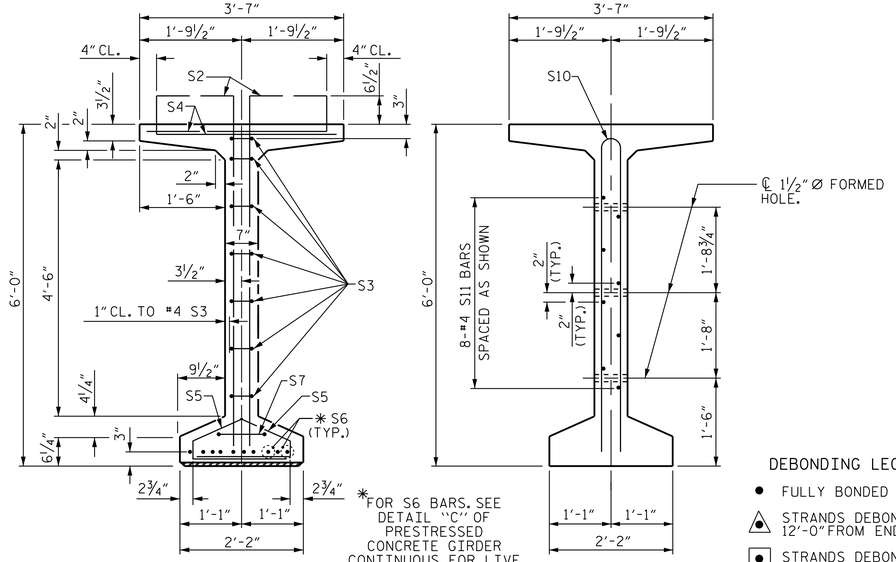


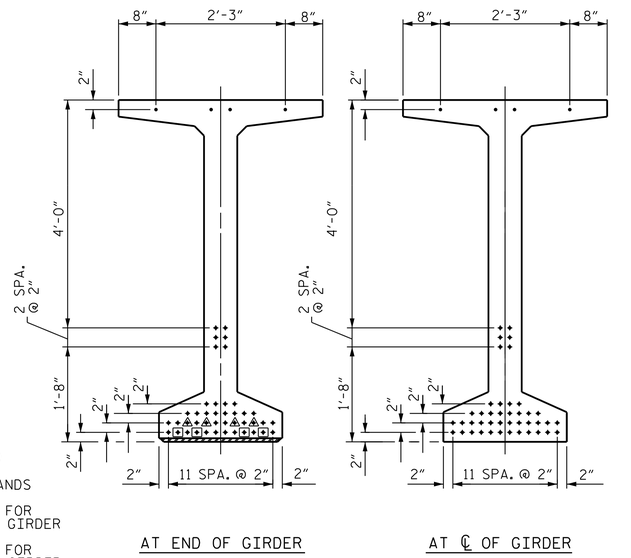
SECTION A-A

SECTION C-C

(S1, S4 AND S9 BARS NOT SHOWN)

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ◬ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- ⊡ STRANDS DEBONDED FOR 16'-0" FROM END OF GIRDER



AT END OF GIRDER

AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

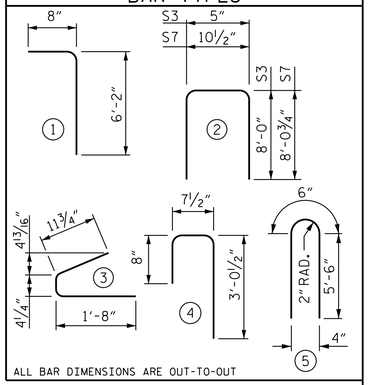
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

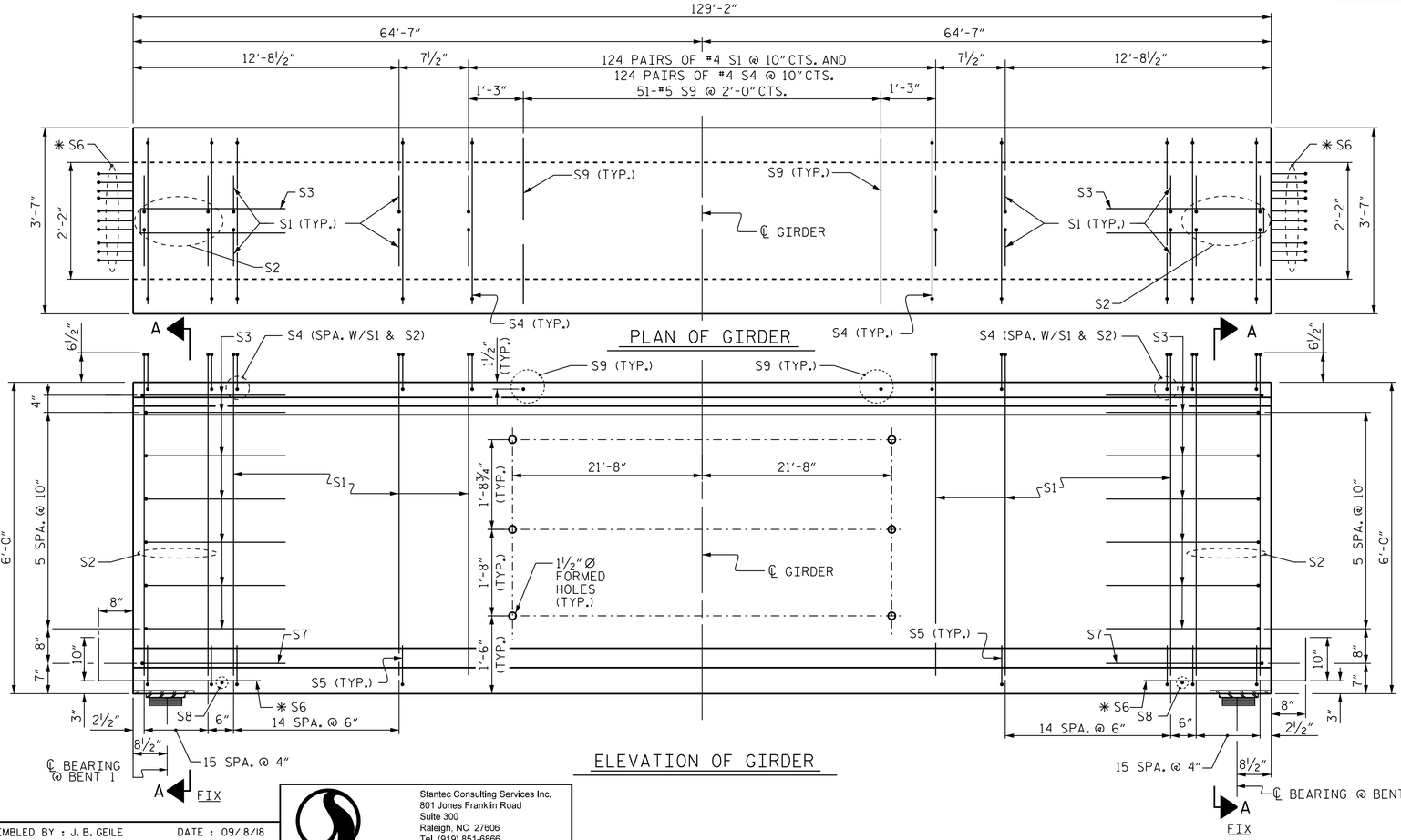
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	308	#4	1	6'-10"	1406
S2	64	#6	1	6'-10"	657
S3	14	#4	2	16'-5"	154
S4	380	#4	4	4'-4"	1100
S5	132	#4	3	3'-0"	265
✱S6	20	#5	STR	3'-8"	77
S7	2	#5	2	17'-0"	36
S8	2	#3	STR	1'-10"	2
S9	51	#5	STR	3'-3"	173
S10	8	#5	5	11'-6"	96
S11	16	#4	STR	8'-0"	86

✱NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES

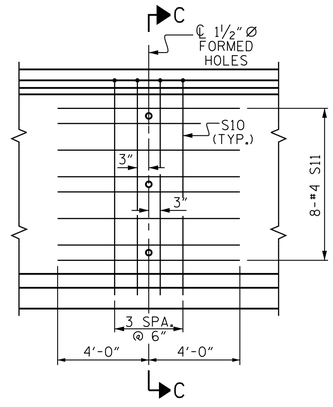


ALL BAR DIMENSIONS ARE OUT-TO-OUT



PLAN OF GIRDER

ELEVATION OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	10,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
	4052	27.7	46

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	129'-2"	1,033'-4"

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MODIFIED 72" PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD

SPAN B
(LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S POOLE

Signed by: 5/9/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			56

ASSEMBLED BY : J. B. GEILE DATE : 09/18/18
CHECKED BY : S. S. POOLE DATE : 12/10/22

DRAWN BY : EEM 2/6/97
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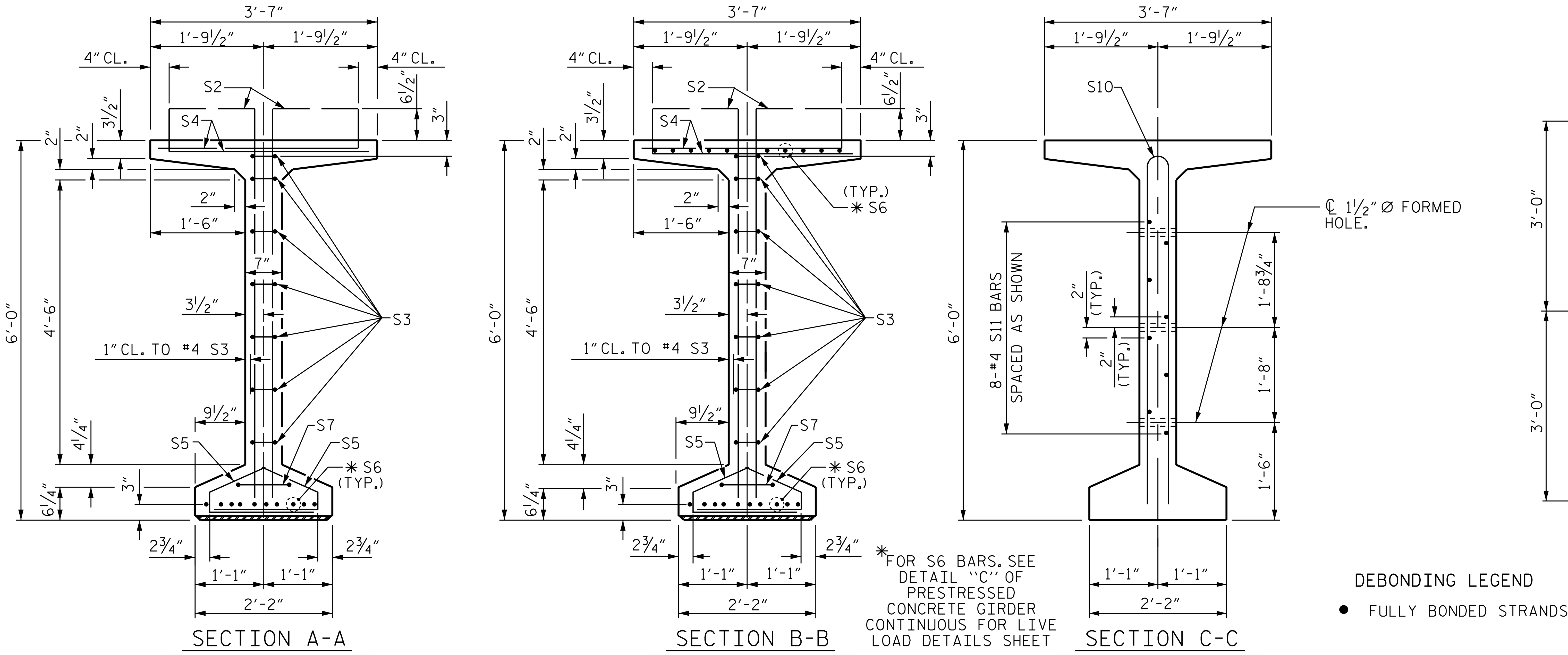
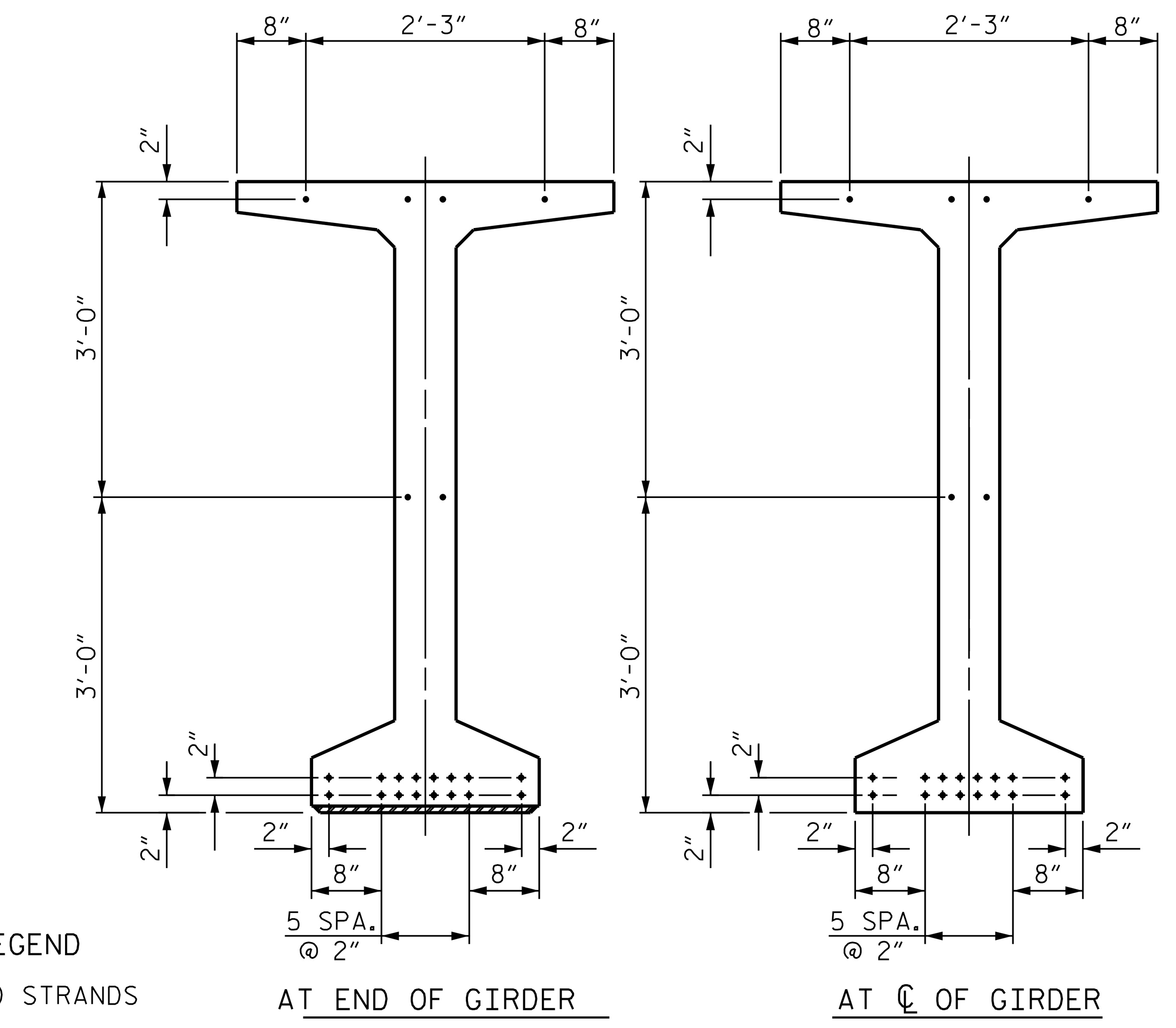
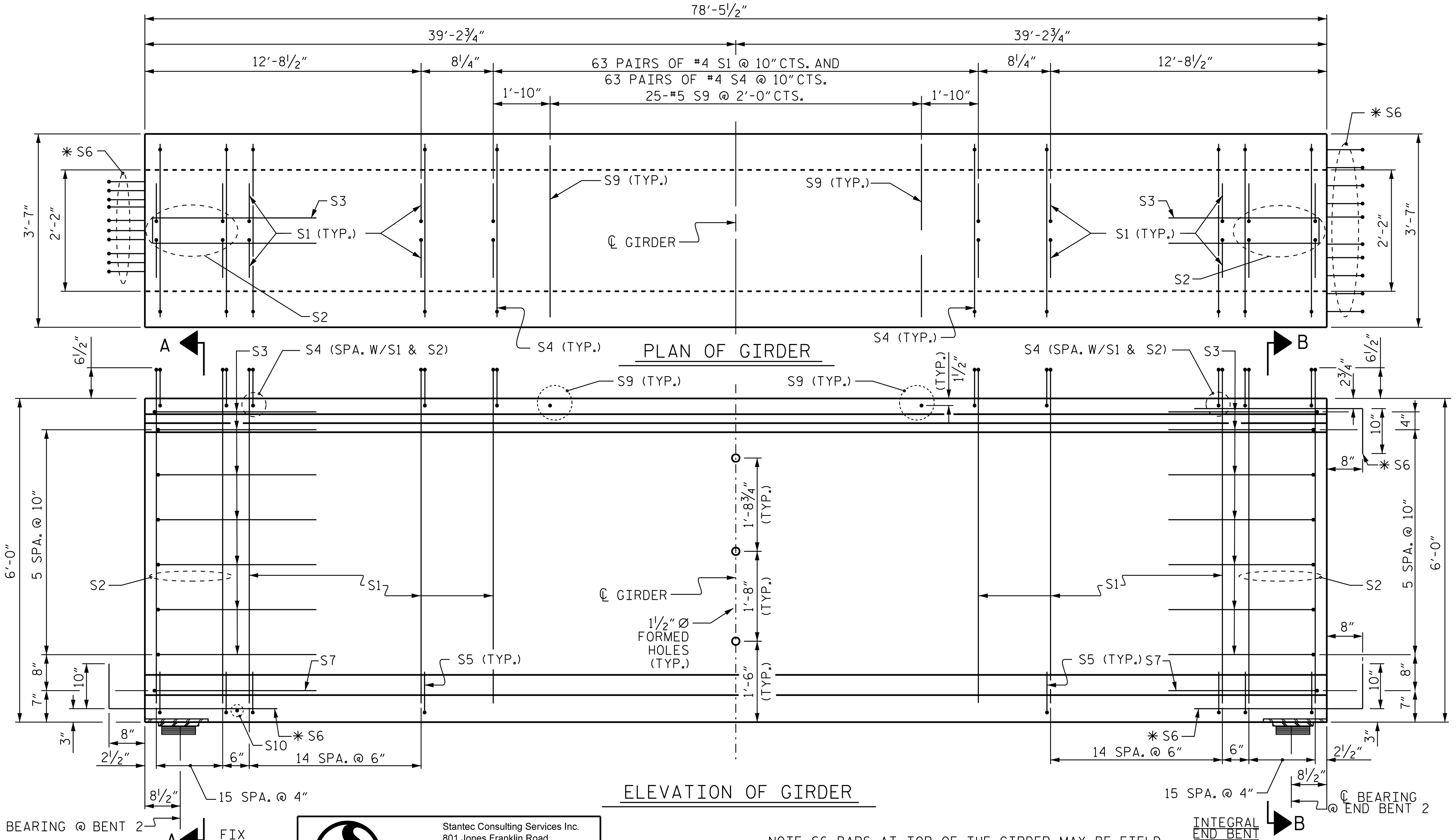


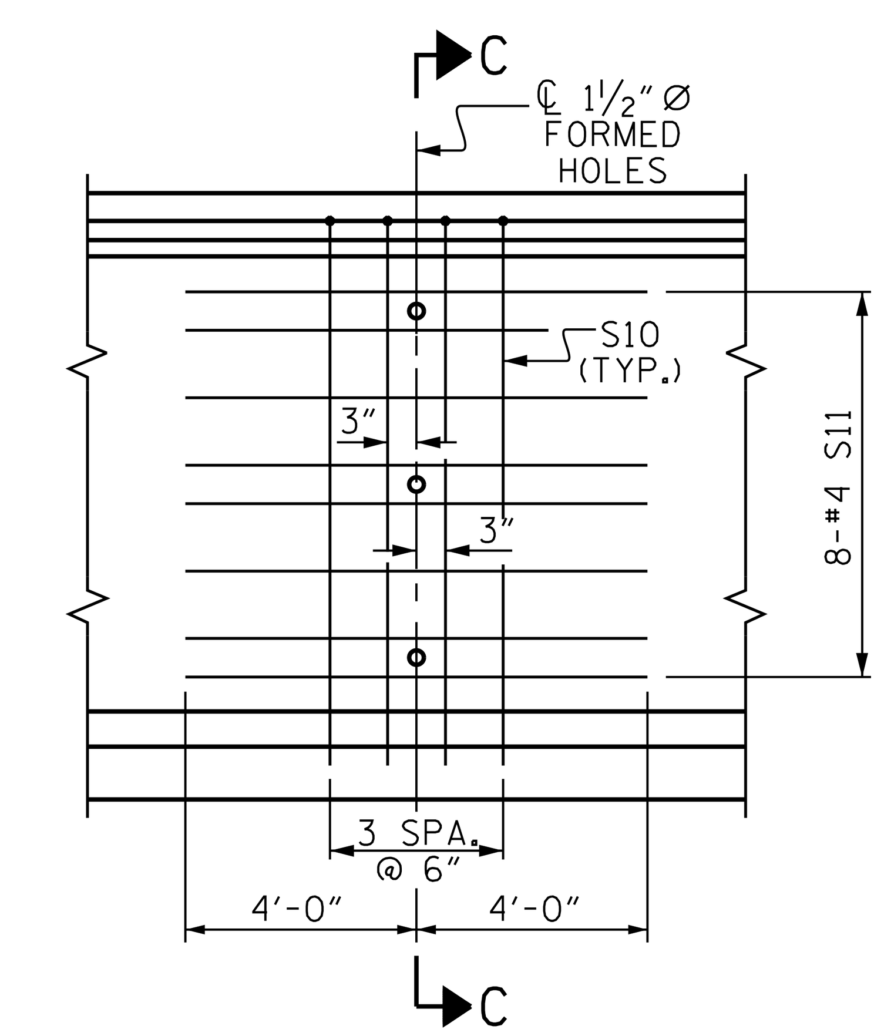
✱FOR S6 BARS. SEE DETAIL "C" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET

DEBONDING LEGEND

● FULLY BONDED STRANDS







PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL GIRDERS

NOTE: S6 BARS AT TOP OF THE GIRDER MAY BE FIELD BENT AS REQUIRED TO CLEAR APPROACH SLAB PAVEMENT NOTCH.

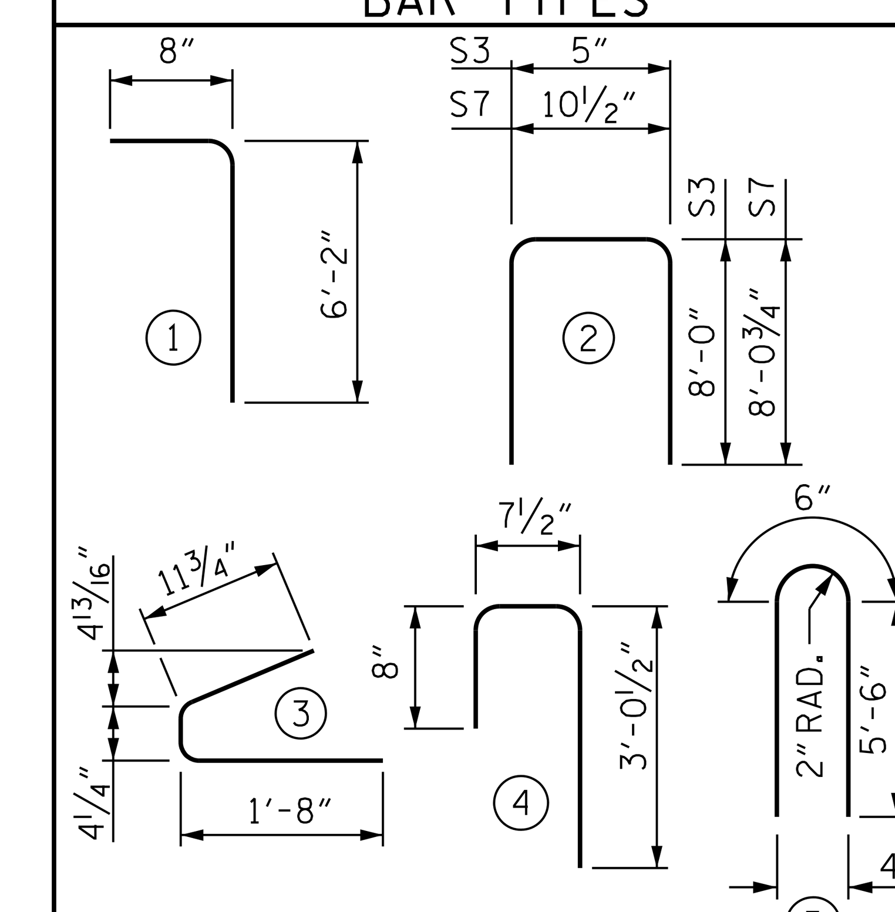
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	186	#4	1	6'-10"	850
S2	64	#5	1	6'-10"	457
S3	14	#4	2	16'-5"	154
S4	250	#4	4	4'-4"	724
S5	124	#4	3	3'-0"	249
✱ S6	30	#5	STR	3'-8"	115
S7	2	#5	2	17'-0"	36
S8	2	#3	STR	1'-10"	2
S9	25	#5	STR	3'-3"	85
S10	4	#5	5	11'-6"	48
S11	8	#4	STR	8'-0"	43

✱ NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	5,500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
	2763	16.8	22

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
8	78'-5½"	627'-8"

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MODIFIED 72" PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD SPAN C (LEFT LANE)

SEAL 054498 NORTH CAROLINA PROFESSIONAL ENGINEER SETH S. POOLE
5/9/2023

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S5-24
1			3				TOTAL SHEETS
2			4				56

ASSEMBLED BY : J. B. GEILE DATE : 09/18/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DRAWN BY : EEM 2/6/97
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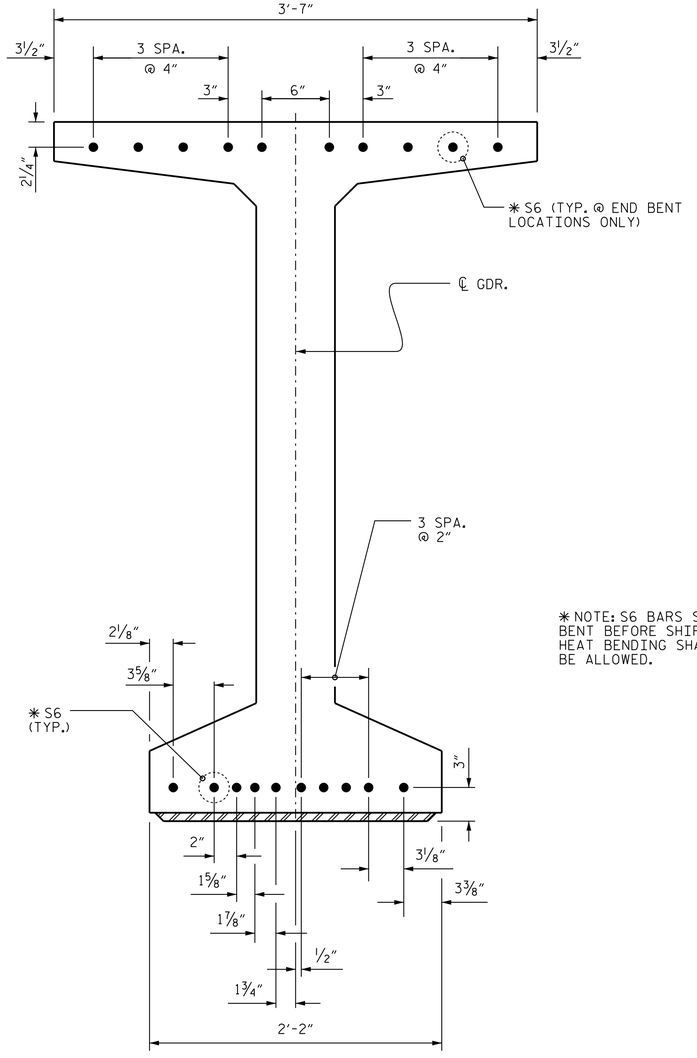
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

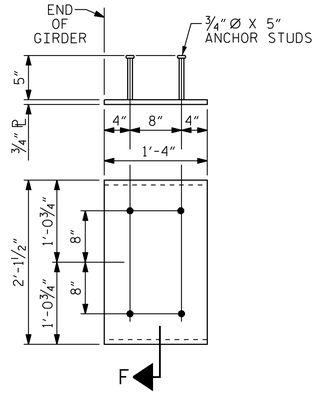
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DETAIL "C"

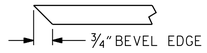
S6 BARS IN BOTTOM FLANGE MAY BE ADJUSTED SLIGHTLY AS NECESSARY TO CLEAR ¾"X5" ANCHOR STUDS MOUNTED ON EMBEDDED PLATE B-1.

✱NOTE: S6 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.



EMBEDDED PLATE "B-1" DETAILS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDER

(2 REQ'D PER GIRDER)



SECTION "F"

(SEE NOTES)

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.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,500, 8,000, AND 4,000 PSI FOR SPANS A, B, AND C, RESPECTIVELY.

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

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

A 2" x 2" CHAMFER IS ALLOWED AT THE INTERSECTION OF THE WEB AND THE BOTTOM FLANGE.

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NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/9/2023

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PROJECT NO. R-2707D
CLEVELAND COUNTY
STATION: 849+00.00 -L-

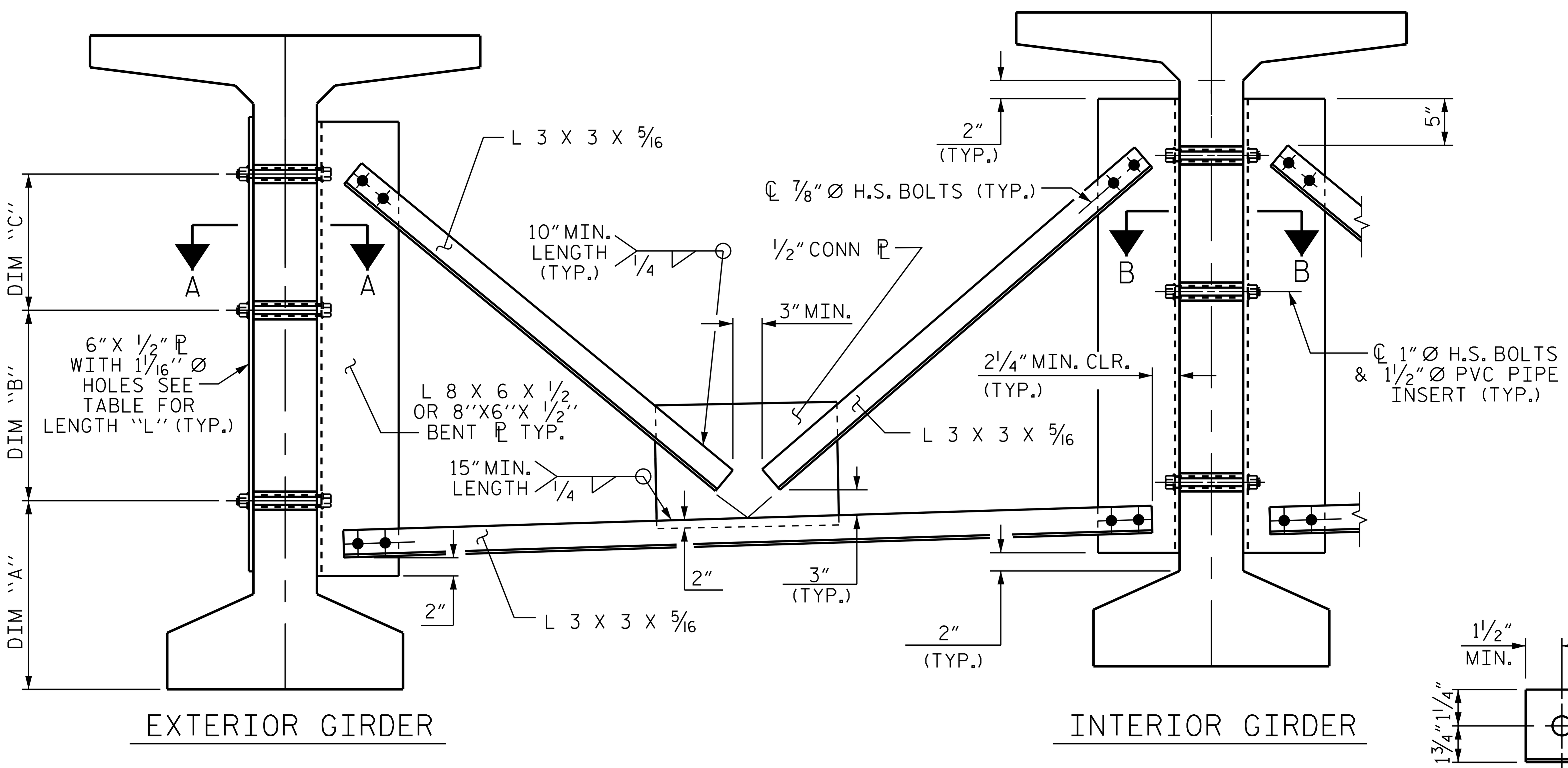
SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

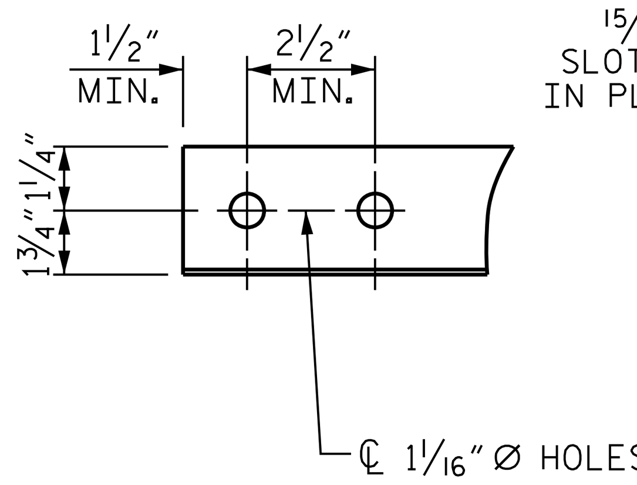
(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-25
1			3			TOTAL SHEETS
2			4			56



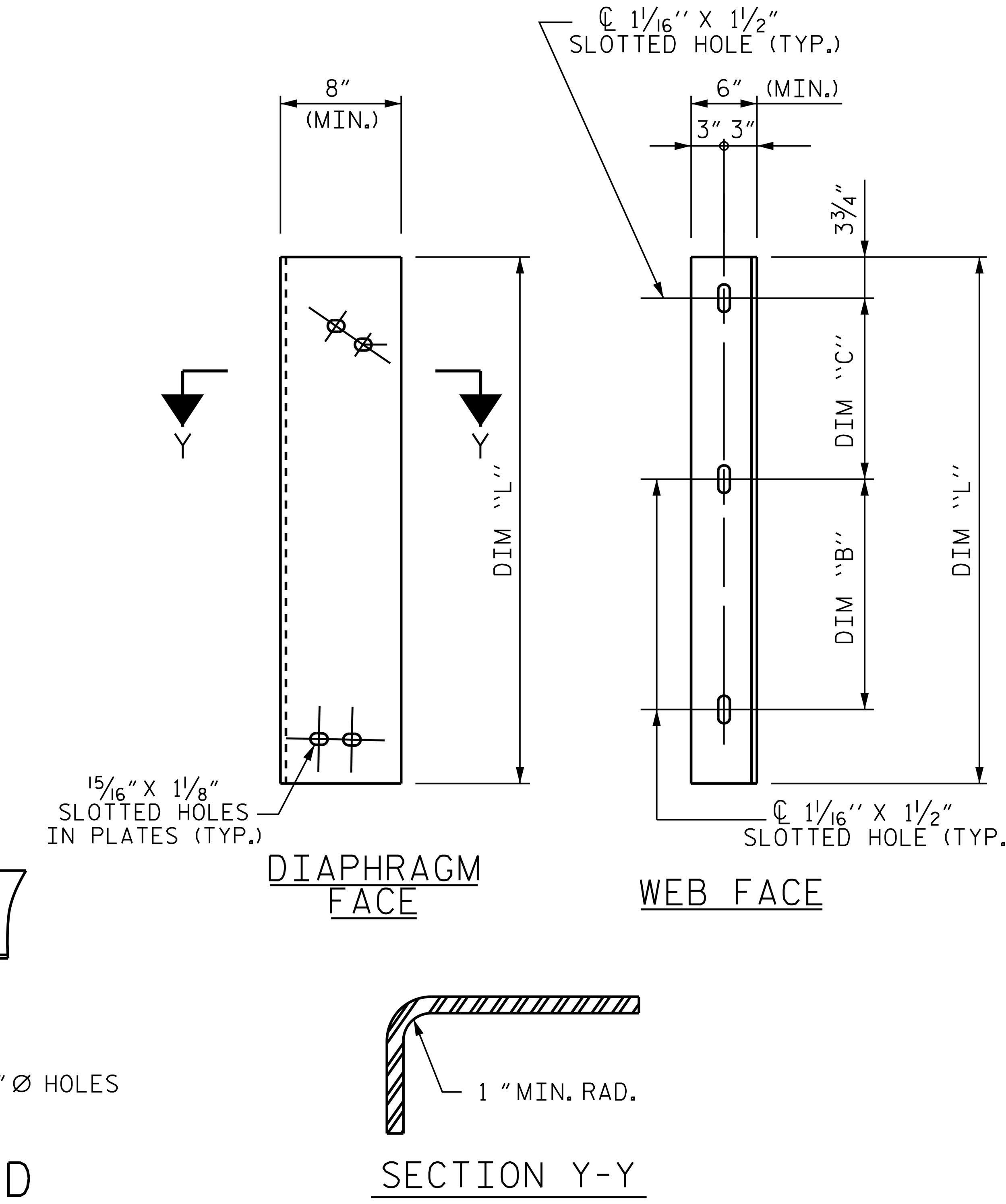
PART SECTION AT INTERMEDIATE DIAPHRAGM

(MODIFIED 72" PRESTRESSED CONC. GIRDER SHOWN)

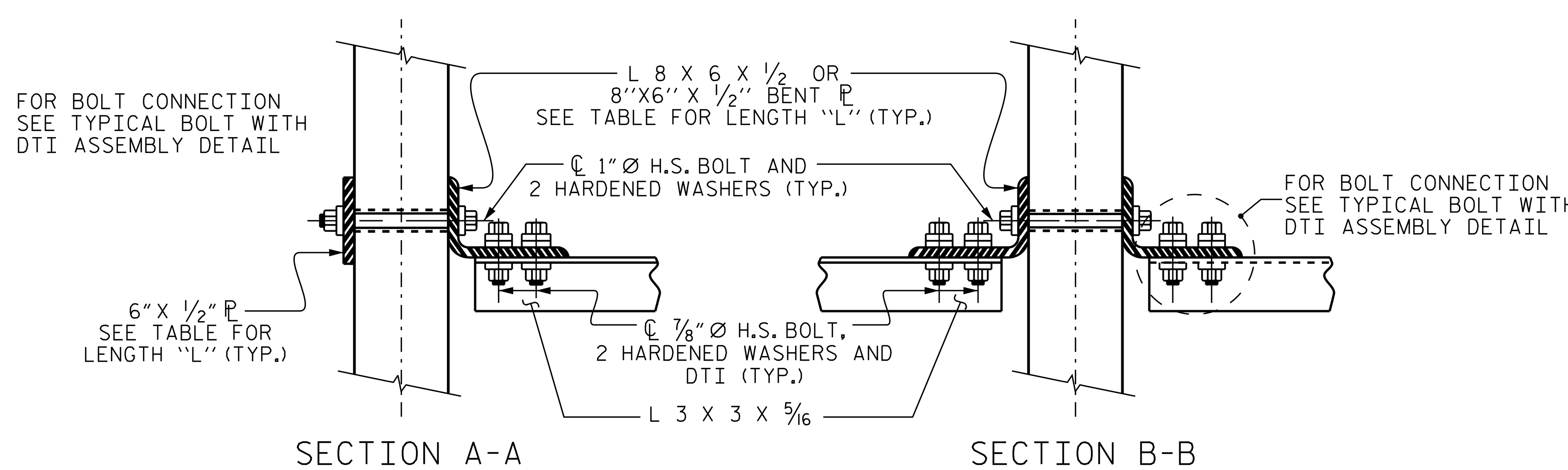


ANGLE END

(L 3 X 3 X 5/16)



CONNECTOR PLATE DETAIL



CONNECTION DETAILS

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.

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.

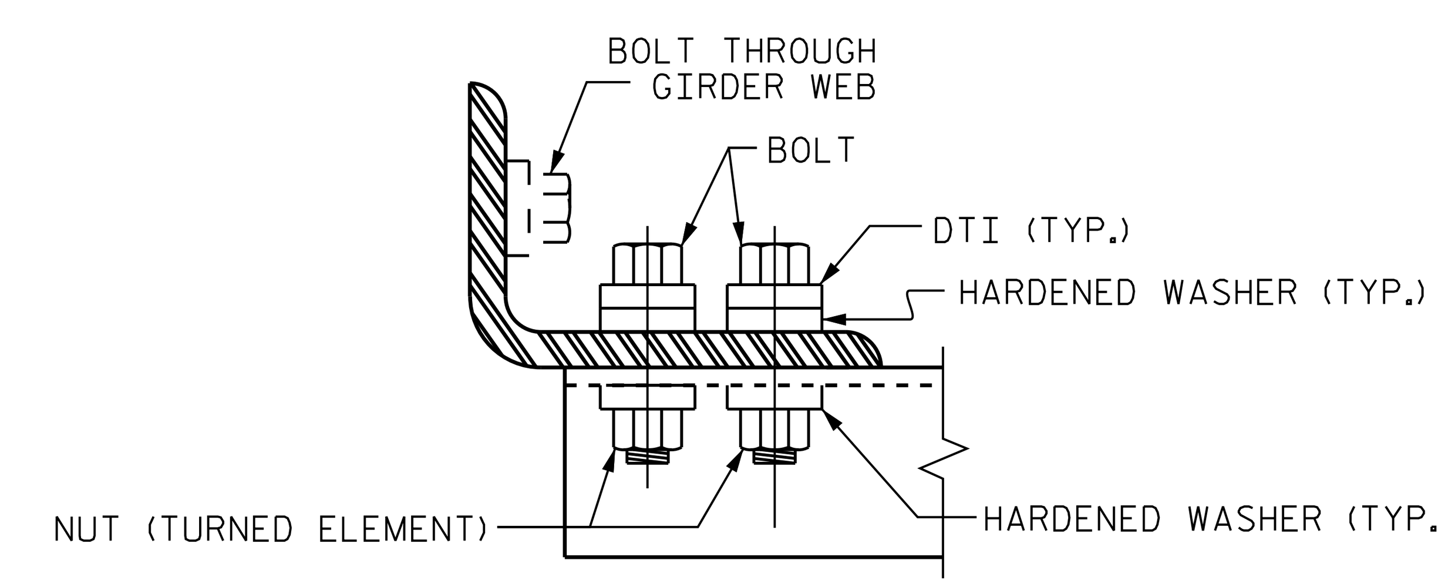
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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

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

TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
MODIFIED 72" PRESTRESSED CONCRETE GIRDER	1'-6"	1'-8"	1'-8 3/4"	4'-2"



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE INTERMEDIATE STEEL DIAPHRAGMS FOR MODIFIED 72" PRESTRESSED CONCRETE GIRDERS (LEFT LANE)

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

5/9/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S5-26

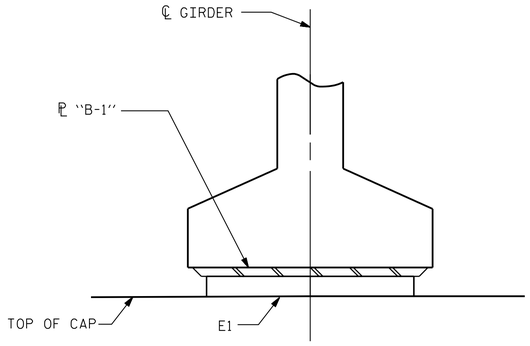
TOTAL SHEETS 56

Stantec

Stantec Consulting Services Inc.
801 Jones Franklin Road
Suite 300
Raleigh, NC 27606
Tel. (919) 851-6866
Fax. (919) 851-7024
www.stantec.com
License No. F-0672

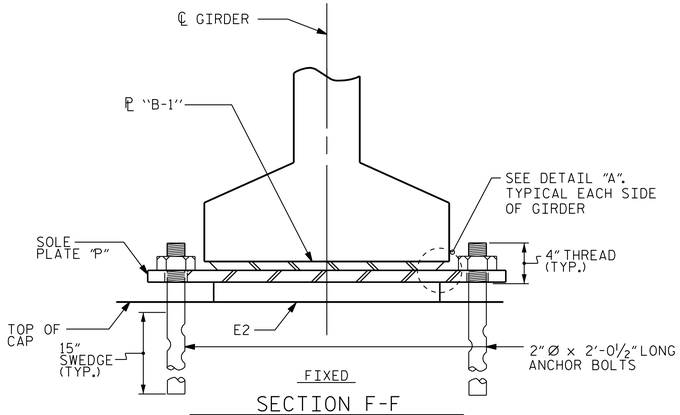
DRAWN BY : J. E. HAGENBUSH DATE : 10/10/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

c:\pw_working\dms55461\R2707D_SMU_005_220102.dgn 5/9/2023 2:09:23 PM JHagenbush



INTEGRAL

SECTION E-E



FIXED

SECTION F-F

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k
TYPE VI	420 k

NOTES

AT ALL FIXED POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS ARE TO BE TIGHTENED FINGER TIGHT AND THEN BACKED OFF ½ TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

STEEL SOLE PLATES, ANCHOR BOLTS, AND NUTS 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, AND NUTS SHALL BE INCLUDED IN THE PAY ITEM FOR PRESTRESSED CONCRETE GIRDERS.

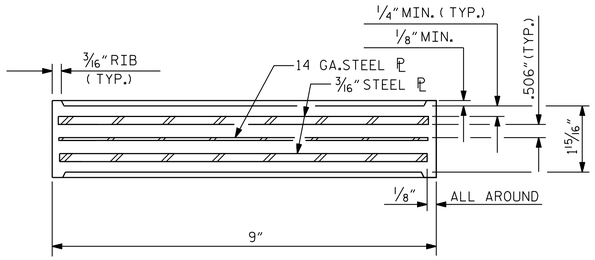
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. SHOP DRAWINGS ARE NOT REQUIRED FOR ANCHOR BOLTS AND NUTS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

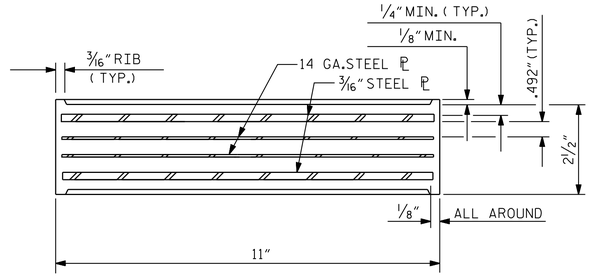
THE ELASTOMER IN THE STEEL REINFORCED BEARINGS SHALL HAVE A SHEAR MODULUS OF 0.160 KSI, IN ACCORDANCE WITH AASHTO M251.

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

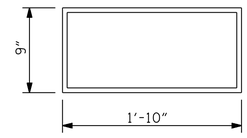
ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



TYPICAL SECTION OF ELASTOMERIC BEARINGS



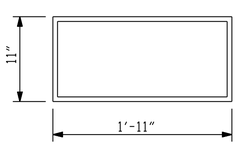
TYPICAL SECTION OF ELASTOMERIC BEARINGS



E1 (16 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

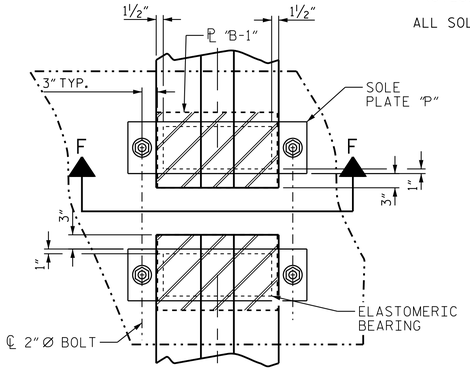
TYPE IV



E2 (32 REQ'D)

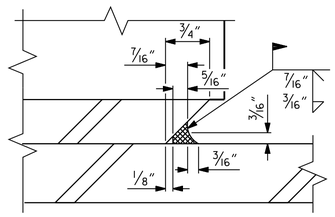
PLAN VIEW OF ELASTOMERIC BEARING

TYPE VI

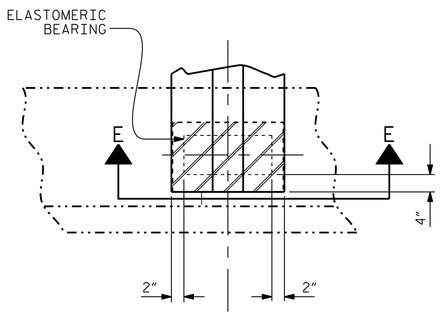


TYPICAL PLAN

(SHOWING BOTTOM FLANGE @ CONTINUOUS BENT)

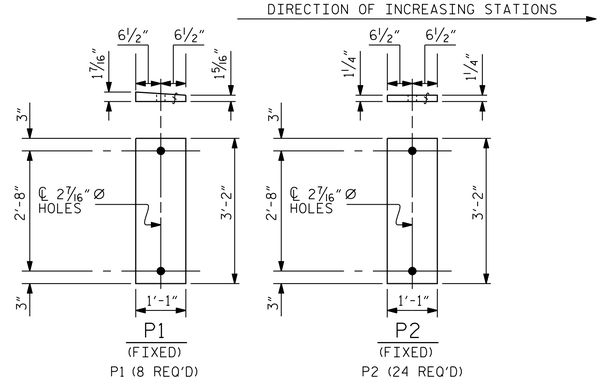


DETAIL "A"



TYPICAL PLAN

(SHOWING BOTTOM FLANGE @ INTEGRAL END BENT)



SOLE PLATE DETAILS ("P")

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-27
1			3			TOTAL SHEETS
2			4			56

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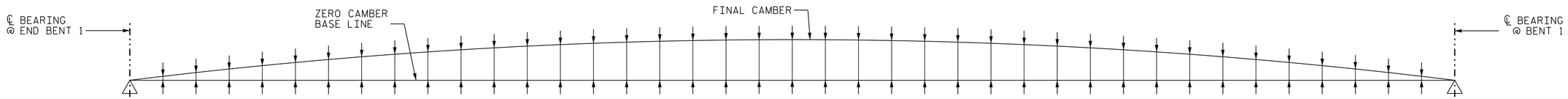

GIRDER 1

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.013	0.026	0.039	0.052	0.064	0.076	0.087	0.098	0.108	0.118	0.126	0.134	0.141	0.148	0.153	0.157	0.160	0.163	0.164	0.165	0.164	0.163	0.160	0.157	0.153	0.148	0.141	0.134	0.126	0.118	0.108	0.098	0.087	0.076	0.064	0.052	0.039	0.026	0.013	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.009	0.018	0.026	0.035	0.043	0.051	0.059	0.067	0.073	0.079	0.086	0.092	0.096	0.100	0.104	0.108	0.109	0.111	0.112	0.113	0.112	0.111	0.109	0.108	0.104	0.100	0.096	0.092	0.086	0.079	0.073	0.067	0.059	0.051	0.043	0.035	0.026	0.017	0.009	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	1/8"	3/16"	1/4"	5/16"	5/16"	3/8"	7/16"	7/16"	1/2"	1/2"	9/16"	9/16"	9/16"	9/16"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	9/16"	9/16"	9/16"	1/2"	1/2"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	3/16"	1/8"	1/16"	0"

GIRDERS 2 & 3

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.013	0.026	0.039	0.052	0.064	0.076	0.087	0.098	0.108	0.118	0.126	0.134	0.141	0.148	0.153	0.157	0.160	0.163	0.164	0.165	0.164	0.163	0.160	0.157	0.153	0.148	0.141	0.134	0.126	0.118	0.108	0.098	0.087	0.076	0.064	0.052	0.039	0.026	0.013	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.008	0.017	0.025	0.034	0.042	0.049	0.057	0.065	0.071	0.077	0.083	0.089	0.093	0.097	0.101	0.105	0.106	0.107	0.108	0.110	0.108	0.107	0.106	0.104	0.100	0.097	0.093	0.089	0.083	0.077	0.070	0.064	0.057	0.049	0.041	0.033	0.025	0.017	0.008	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	1/2"	1/2"	9/16"	9/16"	5/8"	5/8"	5/8"	5/8"	11/16"	11/16"	11/16"	11/16"	11/16"	11/16"	5/8"	5/8"	5/8"	9/16"	9/16"	1/2"	1/2"	7/16"	7/16"	3/8"	5/16"	1/4"	1/4"	3/16"	1/8"	1/16"	0"

GIRDERS 4 & 5

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.013	0.026	0.039	0.052	0.064	0.076	0.087	0.098	0.108	0.118	0.126	0.134	0.141	0.148	0.153	0.157	0.160	0.163	0.164	0.165	0.164	0.163	0.160	0.157	0.153	0.148	0.141	0.134	0.126	0.118	0.108	0.098	0.087	0.076	0.064	0.052	0.039	0.026	0.013	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.006	0.013	0.019	0.025	0.031	0.037	0.042	0.048	0.053	0.057	0.062	0.066	0.069	0.072	0.075	0.078	0.079	0.080	0.081	0.082	0.081	0.080	0.079	0.078	0.075	0.072	0.069	0.066	0.062	0.057	0.053	0.048	0.042	0.036	0.031	0.025	0.019	0.012	0.006	0.000
FINAL CAMBER ↑	0"	1/16"	3/16"	1/4"	5/16"	3/8"	1/2"	9/16"	5/8"	11/16"	3/4"	3/4"	13/16"	7/8"	15/16"	15/16"	15/16"	1"	1"	1"	1"	1"	1"	1"	15/16"	15/16"	15/16"	7/8"	13/16"	3/4"	3/4"	11/16"	5/8"	9/16"	1/2"	3/8"	5/16"	1/4"	3/16"	1/16"	0"

GIRDERS 6 & 7

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.013	0.026	0.039	0.052	0.064	0.076	0.087	0.098	0.108	0.118	0.126	0.134	0.141	0.148	0.153	0.157	0.160	0.163	0.164	0.165	0.164	0.163	0.160	0.157	0.153	0.148	0.141	0.134	0.126	0.118	0.108	0.098	0.087	0.076	0.064	0.052	0.039	0.026	0.013	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.008	0.016	0.024	0.032	0.040	0.047	0.054	0.062	0.067	0.073	0.079	0.085	0.089	0.092	0.096	0.100	0.101	0.102	0.103	0.105	0.103	0.102	0.101	0.099	0.096	0.092	0.088	0.085	0.079	0.073	0.067	0.061	0.054	0.047	0.039	0.032	0.024	0.016	0.008	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	1/2"	9/16"	9/16"	5/8"	5/8"	11/16"	11/16"	11/16"	11/16"	3/4"	3/4"	3/4"	3/4"	3/4"	11/16"	11/16"	11/16"	11/16"	5/8"	5/8"	9/16"	9/16"	1/2"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

GIRDER 8

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
FORTIETH PTS. BTWN. BRGS.	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
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** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

SCHEMATIC CAMBER ORDINATES SPAN A

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT
"FINAL CAMBER" WHICH IS SHOWN IN INCHES.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN A

(LEFT LANE)

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Signed by: 5/9/2023

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NO.	BY:	DATE:	NO.	BY:	DATE:	S5-28
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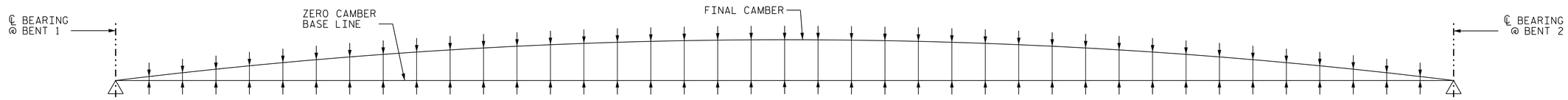
2			4			56



GIRDER 1

FORTIETH PTS. BTWN. BRGS.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.024	0.048	0.072	0.096	0.118	0.140	0.161	0.181	0.199	0.217	0.233	0.248	0.260	0.273	0.281	0.290	0.296	0.301	0.303	0.305	0.303	0.301	0.296	0.290	0.281	0.273	0.260	0.248	0.233	0.217	0.199	0.181	0.161	0.140	0.118	0.096	0.072	0.048	0.024	0.000
FINAL CAMBER ↑	0.000	0.018	0.035	0.053	0.070	0.086	0.102	0.118	0.134	0.146	0.159	0.171	0.184	0.192	0.200	0.208	0.216	0.219	0.222	0.225	0.227	0.225	0.222	0.219	0.216	0.208	0.200	0.192	0.184	0.171	0.159	0.146	0.134	0.118	0.102	0.086	0.070	0.053	0.035	0.018	0.000
	0"	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	9/16"	5/8"	11/16"	3/4"	3/4"	13/16"	7/8"	7/8"	7/8"	15/16"	15/16"	15/16"	15/16"	15/16"	15/16"	15/16"	7/8"	7/8"	7/8"	13/16"	3/4"	3/4"	11/16"	5/8"	9/16"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0"

GIRDERS 2 & 3

FORTIETH PTS. BTWN. BRGS.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.024	0.048	0.072	0.096	0.118	0.140	0.161	0.181	0.199	0.217	0.233	0.248	0.260	0.273	0.281	0.290	0.296	0.301	0.303	0.305	.0303	0.301	0.296	0.290	0.281	0.273	0.260	0.248	0.233	0.217	0.199	0.181	0.161	0.140	0.118	0.096	0.072	0.048	0.024	0.000
FINAL CAMBER ↑	0.000	0.016	0.033	0.049	0.066	0.081	0.096	0.111	0.126	0.138	0.150	0.162	0.173	0.181	0.189	0.196	0.204	0.206	0.209	0.212	0.214	0.212	0.209	0.206	0.204	0.196	0.189	0.181	0.173	0.162	0.150	0.138	0.126	0.111	0.096	0.081	0.066	0.049	0.033	0.016	0.000
	0"	1/8"	3/16"	1/4"	3/8"	7/16"	9/16"	5/8"	11/16"	3/4"	13/16"	7/8"	7/8"	15/16"	1"	1"	1 1/16"	1 1/16"	1 1/8"	1 1/8"	1 1/16"	1 1/8"	1 1/8"	1 1/16"	1 1/16"	1"	1"	15/16"	7/8"	7/8"	13/16"	3/4"	11/16"	5/8"	9/16"	7/16"	3/8"	1/4"	3/16"	1/8"	0"

GIRDERS 4 & 5

FORTIETH PTS. BTWN. BRGS.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.024	0.048	0.072	0.096	0.118	0.140	0.161	0.181	0.199	0.217	0.233	0.248	0.260	0.273	0.281	0.290	0.296	0.301	0.303	0.305	0.303	0.301	0.296	0.290	0.281	0.273	0.260	0.248	0.233	0.217	0.199	0.181	0.161	0.140	0.118	0.096	0.072	0.048	0.024	0.000
FINAL CAMBER ↑	0.000	0.012	0.025	0.037	0.050	0.061	0.072	0.084	0.095	0.104	0.113	0.122	0.131	0.137	0.142	0.148	0.154	0.156	0.158	0.160	0.162	0.160	0.158	0.156	0.154	0.148	0.142	0.137	0.131	0.122	0.113	0.104	0.095	0.084	0.072	0.061	0.050	0.037	0.025	0.012	0.000
	0"	1/8"	5/16"	7/16"	9/16"	11/16"	13/16"	15/16"	1 1/16"	1 1/8"	1 1/4"	1 5/16"	1 3/8"	1 1/2"	1 9/16"	1 5/8"	1 5/8"	1 11/16"	1 3/4"	1 3/4"	1 3/4"	1 3/4"	1 3/4"	1 11/16"	1 5/8"	1 5/8"	1 9/16"	1 1/2"	1 3/8"	1 5/16"	1 1/4"	1 1/8"	1 1/16"	15/16"	13/16"	11/16"	9/16"	7/16"	5/16"	1/8"	0"

GIRDERS 6 & 7

FORTIETH PTS. BTWN. BRGS.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.024	0.048	.072	0.096	0.118	0.140	0.161	0.181	0.199	0.217	0.233	0.248	0.260	0.273	0.281	0.290	0.296	0.301	0.303	0.305	0.303	0.301	0.296	0.290	0.281	0.273	0.260	0.248	0.233	0.217	0.199	0.181	0.161	0.140	0.118	0.096	0.072	0.048	0.024	0.000
FINAL CAMBER ↑	0.000	0.016	0.031	0.047	0.062	0.076	0.090	0.105	0.119	0.130	0.141	0.152	0.164	0.171	0.178	0.185	0.192	0.195	0.197	0.200	0.202	0.200	0.197	0.195	0.192	0.185	0.178	0.171	0.164	0.152	0.141	0.130	0.119	0.105	0.090	0.076	0.062	0.047	0.031	0.016	0.000
	0"	1/8"	3/16"	5/16"	3/8"	1/2"	5/8"	11/16"	3/4"	13/16"	15/16"	15/16"	1"	1 1/16"	1 1/8"	1 3/16"	1 3/16"	1 3/16"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 3/16"	1 3/16"	1 3/16"	1 1/8"	1 1/16"	1"	15/16"	15/16"	13/16"	3/4"	11/16"	5/8"	1/2"	3/8"	5/16"	3/16"	1/8"	0"

GIRDER 8

FORTIETH PTS. BTWN. BRGS.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.025	0.050	0.075	0.100	0.125	0.150	0.175	0.200	0.225	0.250	0.275	0.300	0.325	0.350	.0375	0.400	0.425	0.450	0.475	0.500	0.525	0.550	0.575	0.600	0.625	0.650	0.675	0.700	0.725	0.750	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.024	0.048	.072	0.096	0.118	0.140	0.161	0.181	0.199	0.217	0.233	0.248	0.260	0.273	0.281	0.290	0.296	0.301	0.303	0.305	0.303	0.301	0.296	0.290	0.281	0.273	0.260	0.248	0.233	0.217	0.199	0.181	0.161	0.140	0.118	0.096	0.072	0.048	0.024	0.000
FINAL CAMBER ↑	0.000	0.016	0.032	0.048	0.064	0.078	0.093	0.107	0.122	0.133	0.145	0.156	0.168	0.175	0.182	0.190	0.197	0.199	0.202	0.204	0.207	0.204	0.202	0.199	0.197	0.190	0.182	0.175	0.168	0.156	0.145	0.133	0.122	0.107	0.093	0.078	0.064	0.048	0.032	0.016	0.000
	0"	1/8"	3/16"	5/16"	3/8"	1/2"	9/16"	5/8"	11/16"	13/16"	7/8"	15/16"	15/16"	1"	1 1/16"	1 1/8"	1 1/8"	1 3/16"	1 3/16"	1 3/16"	1 3/16"	1 3/16"	1 3/16"	1 3/16"	1 1/8"	1 1/8"	1 1/16"	1"	15/16"	15/16"	7/8"	13/16"	11/16"	5/8"	9/16"	1/2"	3/8"	5/16"	3/16"	1/8"	0"

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

SCHEMATIC CAMBER ORDINATES SPAN B

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN INCHES.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN B

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-29
1			3			TOTAL SHEETS
2			4			56

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www.stantec.com
License No. F-0672

DRAWN BY : J.E. HAGENBUSH DATE : 09/27/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/9/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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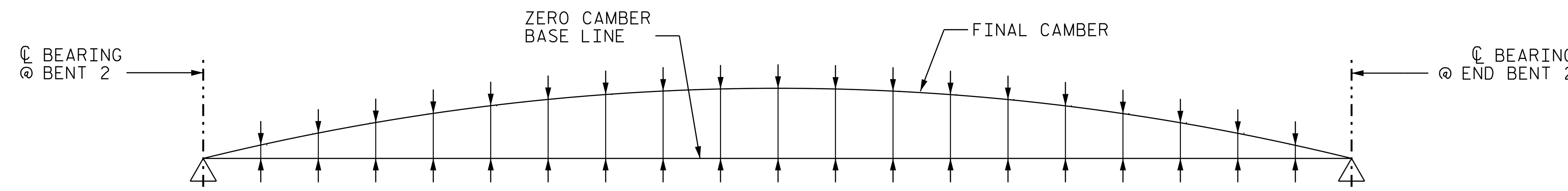

GIRDER 1

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TWENTIETH PTS. BTWN. BRGS.	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.011	0.022	0.032	0.041	0.050	0.057	0.062	0.066	0.069	0.070	0.069	0.066	0.062	0.057	0.050	0.041	0.032	0.022	0.011	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.005	0.010	0.015	0.020	0.024	0.028	0.031	0.033	0.034	0.035	0.034	0.033	0.031	0.028	0.024	0.020	0.016	0.011	0.005	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	5/16"	3/8"	3/8"	7/16"	7/16"	7/16"	3/8"	3/8"	5/16"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

GIRDERS 2 & 3

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TWENTIETH PTS. BTWN. BRGS.	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.011	0.022	0.032	0.041	0.050	0.057	0.062	0.066	0.069	0.070	0.069	0.066	0.062	0.057	0.050	0.041	0.032	0.022	0.011	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.005	0.010	0.015	0.020	0.024	0.027	0.030	0.032	0.033	0.034	0.033	0.032	0.030	0.027	0.024	0.020	0.015	0.010	0.005	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	3/8"	7/16"	7/16"	7/16"	7/16"	7/16"	3/8"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

GIRDERS 4 & 5

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TWENTIETH PTS. BTWN. BRGS.	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.011	0.022	0.032	0.041	0.050	0.057	0.062	0.066	0.069	0.070	0.069	0.066	0.062	0.057	0.050	0.041	0.032	0.022	0.011	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.004	0.008	0.011	0.015	0.018	0.021	0.023	0.025	0.025	0.026	0.025	0.025	0.023	0.021	0.018	0.015	0.011	0.008	0.004	0.000
FINAL CAMBER ↑	0"	1/16"	3/16"	1/4"	5/16"	3/8"	7/16"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	7/16"	3/8"	5/16"	1/4"	3/16"	1/16"	0"

GIRDERS 6 & 7

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TWENTIETH PTS. BTWN. BRGS.	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.011	0.022	0.032	0.041	0.050	0.057	0.062	0.066	0.069	0.070	0.069	0.066	0.062	0.057	0.050	0.041	0.032	0.022	0.011	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.005	0.010	0.014	0.019	0.022	0.026	0.028	0.031	0.031	0.032	0.032	0.031	0.028	0.026	0.023	0.019	0.014	0.010	0.005	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	3/8"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	7/16"	3/8"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

GIRDER 8

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
TWENTIETH PTS. BTWN. BRGS.	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.011	0.022	0.032	0.041	0.050	0.057	0.062	0.066	0.069	0.070	0.069	0.066	0.062	0.057	0.050	0.041	0.032	0.022	0.011	0.000
DEFLEC. DUE TO SUPERIMPOSED DL ** ↓	0.000	0.005	0.010	0.015	0.020	0.024	0.028	0.031	0.033	0.034	0.035	0.034	0.033	0.031	0.028	0.024	0.020	0.016	0.011	0.005	0.000
FINAL CAMBER ↑	0"	1/16"	1/8"	3/16"	1/4"	5/16"	5/16"	3/8"	3/8"	7/16"	7/16"	7/16"	3/8"	3/8"	5/16"	5/16"	1/4"	3/16"	1/8"	1/16"	0"

** INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD.

SCHEMATIC CAMBER ORDINATES SPAN C

ALL VALUES ARE SHOWN IN DECIMALS OF A FOOT EXCEPT "FINAL CAMBER" WHICH IS SHOWN IN INCHES.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS SPAN C

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-30
1			3			TOTAL SHEETS
2			4			56

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

5/9/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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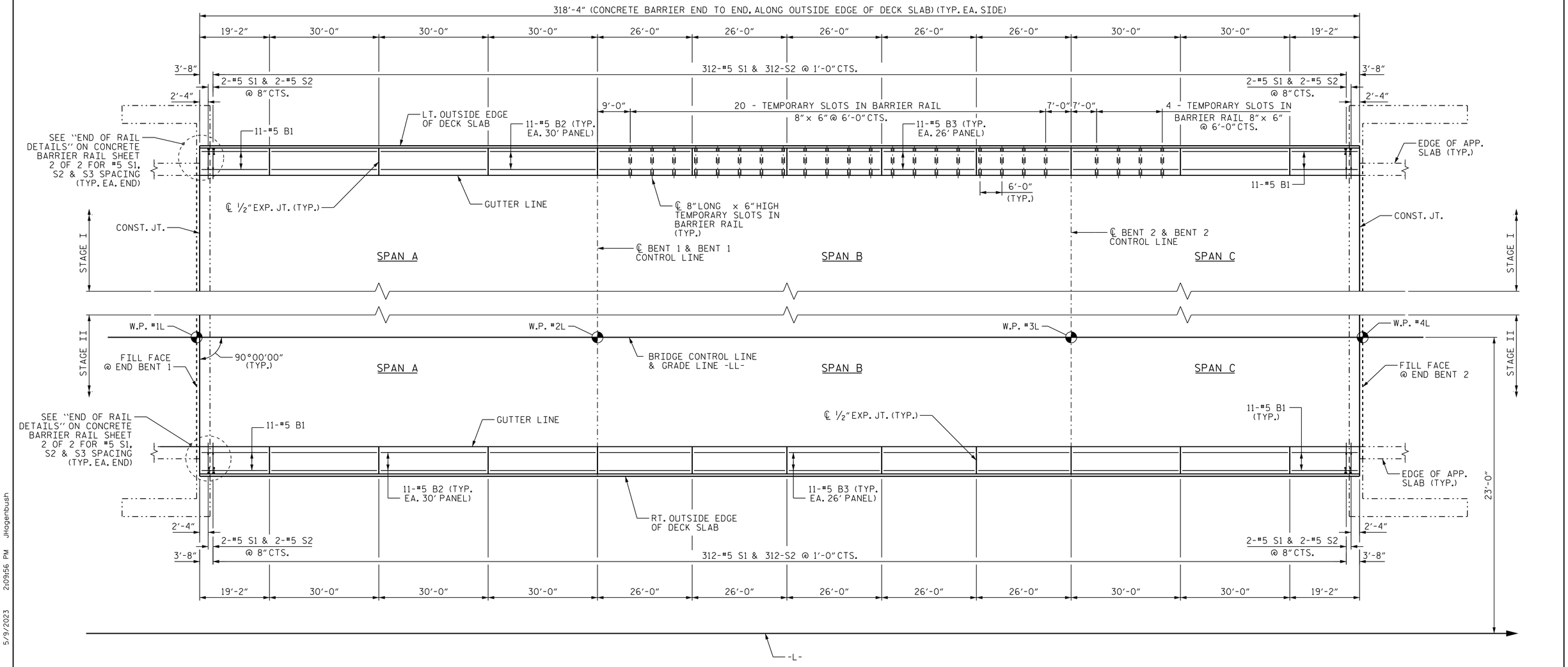
License No. F-0672

DRAWN BY : J.E. HAGENBUSH DATE : 09/27/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23



BARRIER RAIL PLAN

FOR REINFORCEMENT BILL OF MATERIALS, NOTES AND BARRIER RAIL DETAILS SEE "CONCRETE BARRIER RAIL DETAILS", SHEET 2 OF 2.

ALL HORIZONTAL DIMENSIONS ARE ALONG THE OUTSIDE EDGE OF DECK SLAB.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE BARRIER RAIL

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-31
1			3			TOTAL SHEETS
2			4			56

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DRAWN BY : J.E. HAGENBUSH DATE : 10/01/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
5/9/2023

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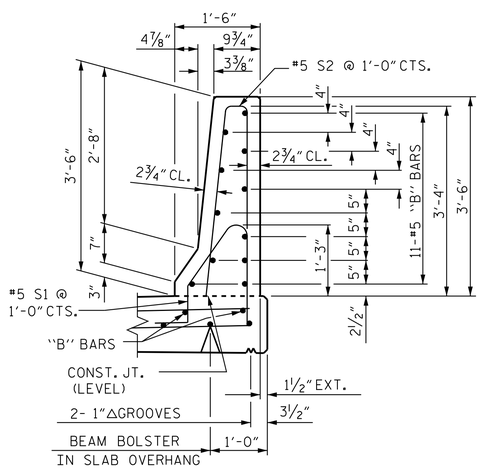
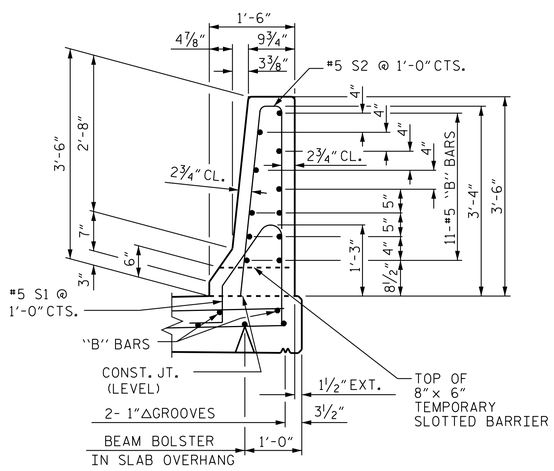


TYPICAL SECTION THRU RAIL



SECTION THRU RAIL WITH TEMPORARY SLOTS IN BARRIER RAIL

NOTES

TEMPORARY SLOTS MAY BE RE-POSITIONED SLIGHTLY AS NECESSARY TO PROVIDE 1" MINIMUM COVER TO #5 S1 AND #5 S2 BARS.

FOR TRAFFIC PHASING OPERATIONS, SEE TRAFFIC CONTROL PLANS AND SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

PRIOR TO PLACEMENT OF GROUT, ALL TEMPORARY SLOTS SHALL BE THROUGHLY CLEANED AND ALL INTERIOR SURFACES SAND BLASTED TO REMOVE LOOSE MATERIALS AND OTHER CONTAMINANTS. ALL WORK SHALL BE APPROVED BY THE ENGINEER.

ONCE TEMPORARY TRAFFIC ON THE BRIDGE HAS BEEN SHIFTED INTO THE FINAL PHASE, TEMPORARY SLOTS IN THE BARRIER RAIL SHALL BE FILLED WITH A NON-SHRINK, NON-METALLIC GROUT.

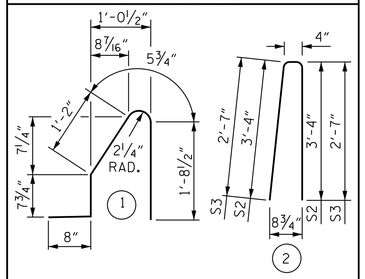
NO SEPARATE PAYMENT FOR MATERIALS, LABOR, AND EQUIPMENT REQUIRED TO FILL TEMPORARY SLOTS SHALL BE MADE. ALL COSTS FOR THIS WORK SHALL BE INCIDENTAL TO THE PRICE OF THE CONCRETE BARRIER RAIL.

THE BARRIER RAIL IN THE 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 BARRIER RAILS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF BARRIER RAIL SEGMENTS LESS THAN 20 FEET IN LENGTH AND NO CONTRACTION JOINTS ARE REQUIRED FOR THOSE SEGMENTS LESS THAN 10 FEET IN LENGTH.

BAR TYPES



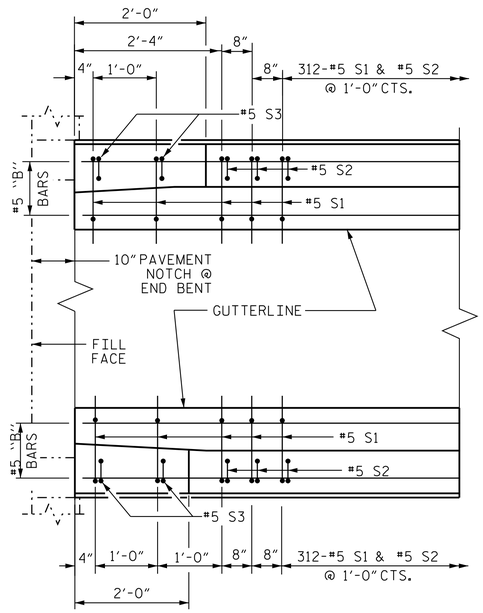
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

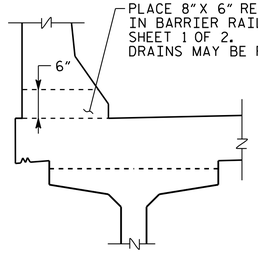
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ B1	44	#5	STR	18'-9"	861
✱ B2	110	#5	STR	29'-7"	3395
✱ B3	110	#5	STR	25'-7"	2936
✱ S1	640	#5	1	4'-8"	3116
✱ S2	632	#5	2	7'-0"	4615
✱ S3	8	#5	2	5'-6"	46

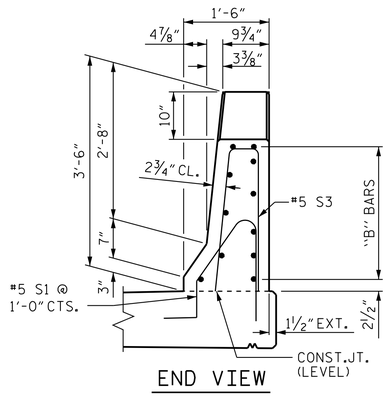
✱ EPOXY COATED REINFORCING STEEL	14,969 LBS.
CLASS AA CONCRETE	87.0 CU. YDS.
CONCRETE BARRIER RAIL	636.67 LIN. FT.



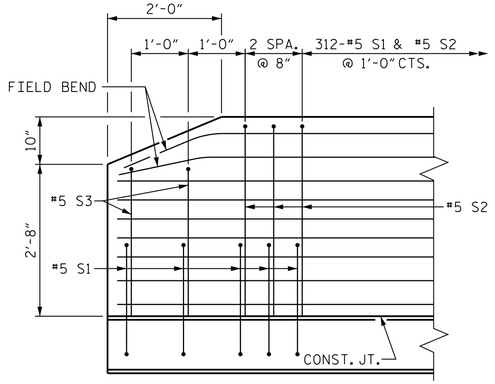
PLAN



TEMPORARY SLOTS IN BARRIER RAIL DETAIL



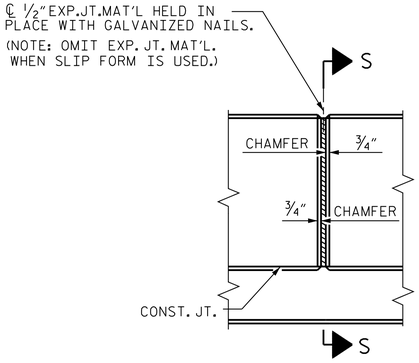
END VIEW



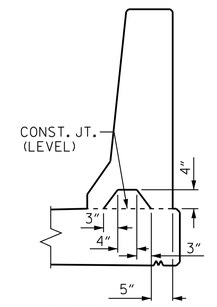
SIDE VIEW

END OF RAIL DETAILS

RIGHT SIDE AT END BENT 1 SHOWN, LEFT SIDE SIMILAR



ELEVATION AT EXPANSION JOINTS



SECTION S-S

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

BARRIER RAIL DETAILS

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-32
1			3			TOTAL SHEETS
2			4			56

STR. #9

STD. NO. CBR1

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ASSEMBLED BY : J.E. HAGENBUSH DATE : 09/28/18
CHECKED BY : S. S. POOLE DATE : 12/10/22

DRAWN BY : ARB 5/87
CHECKED BY : SJD 9/87

REV. 7/12 MAA/GM
REV. 6/13 MAA/GM
REV. 12/17 MAA/GM

DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/9/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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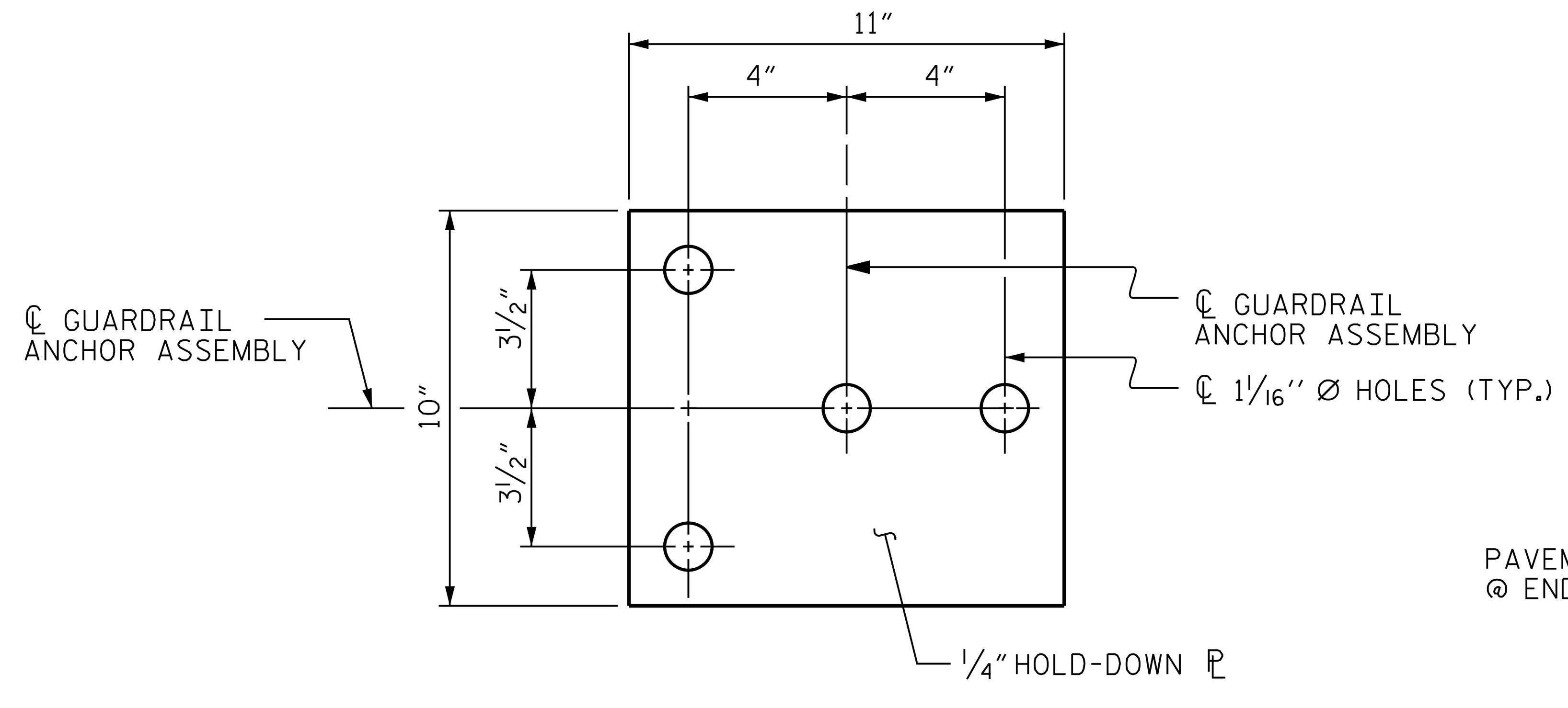
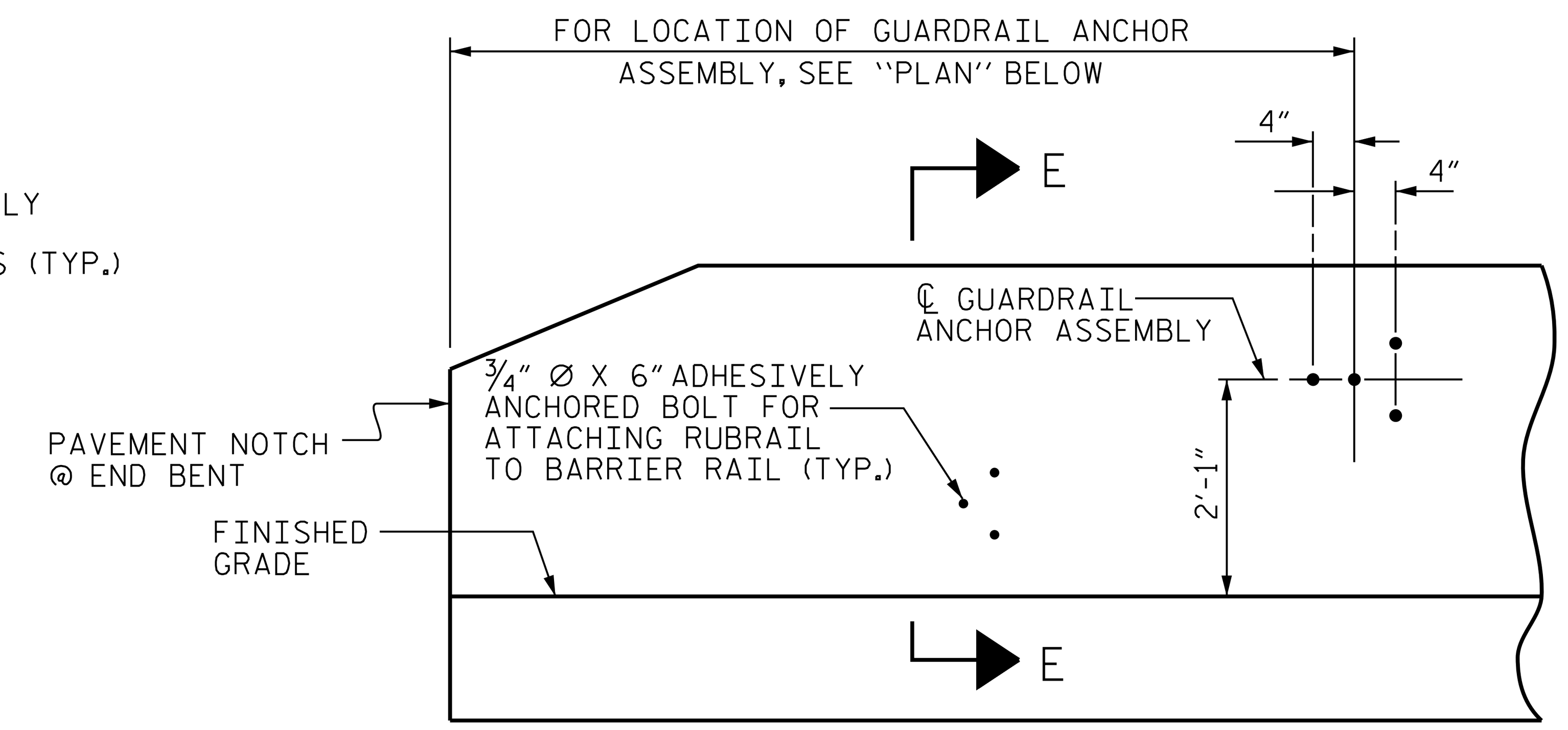


PLAN



ELEVATION

NOTES

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

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

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

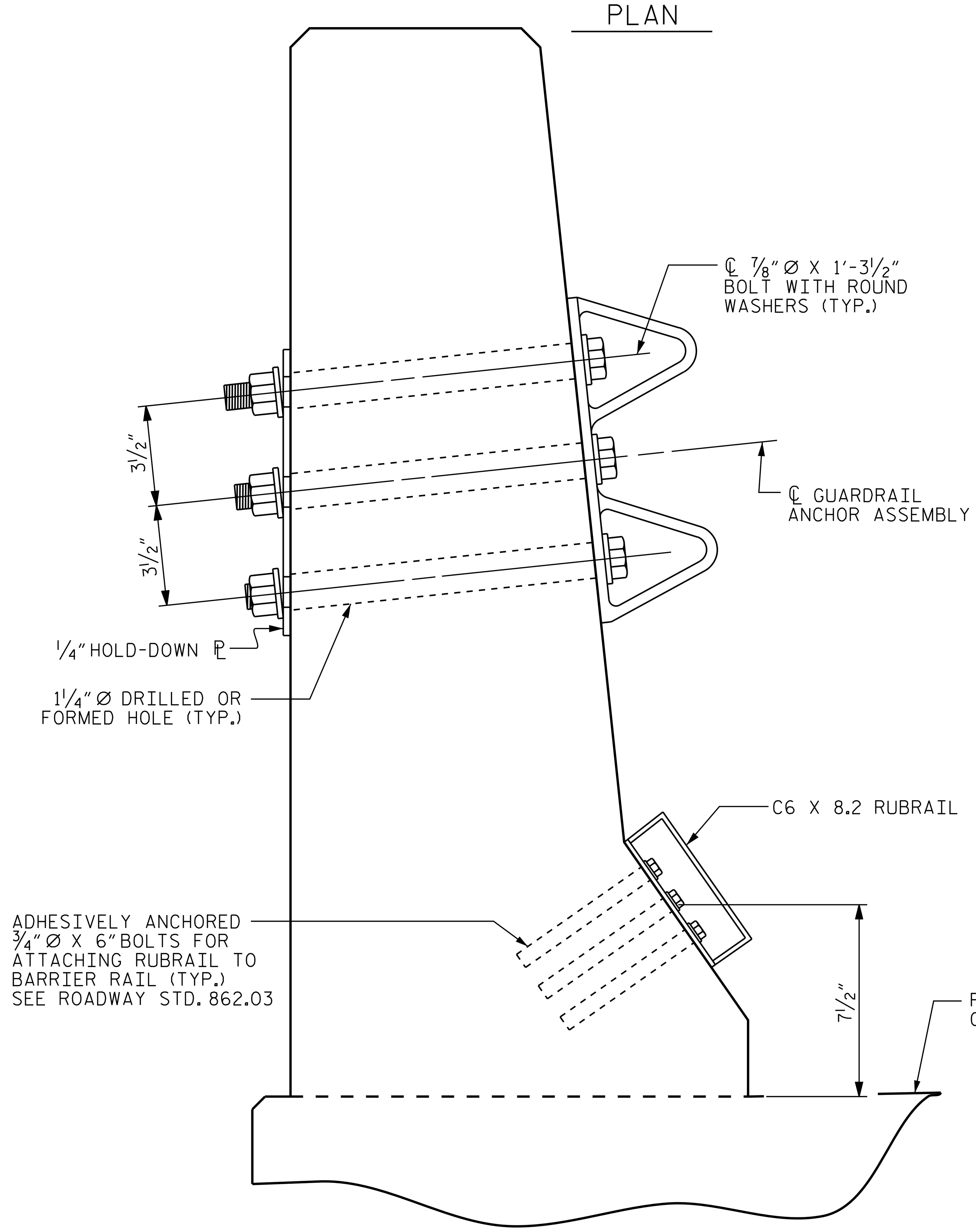
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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

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

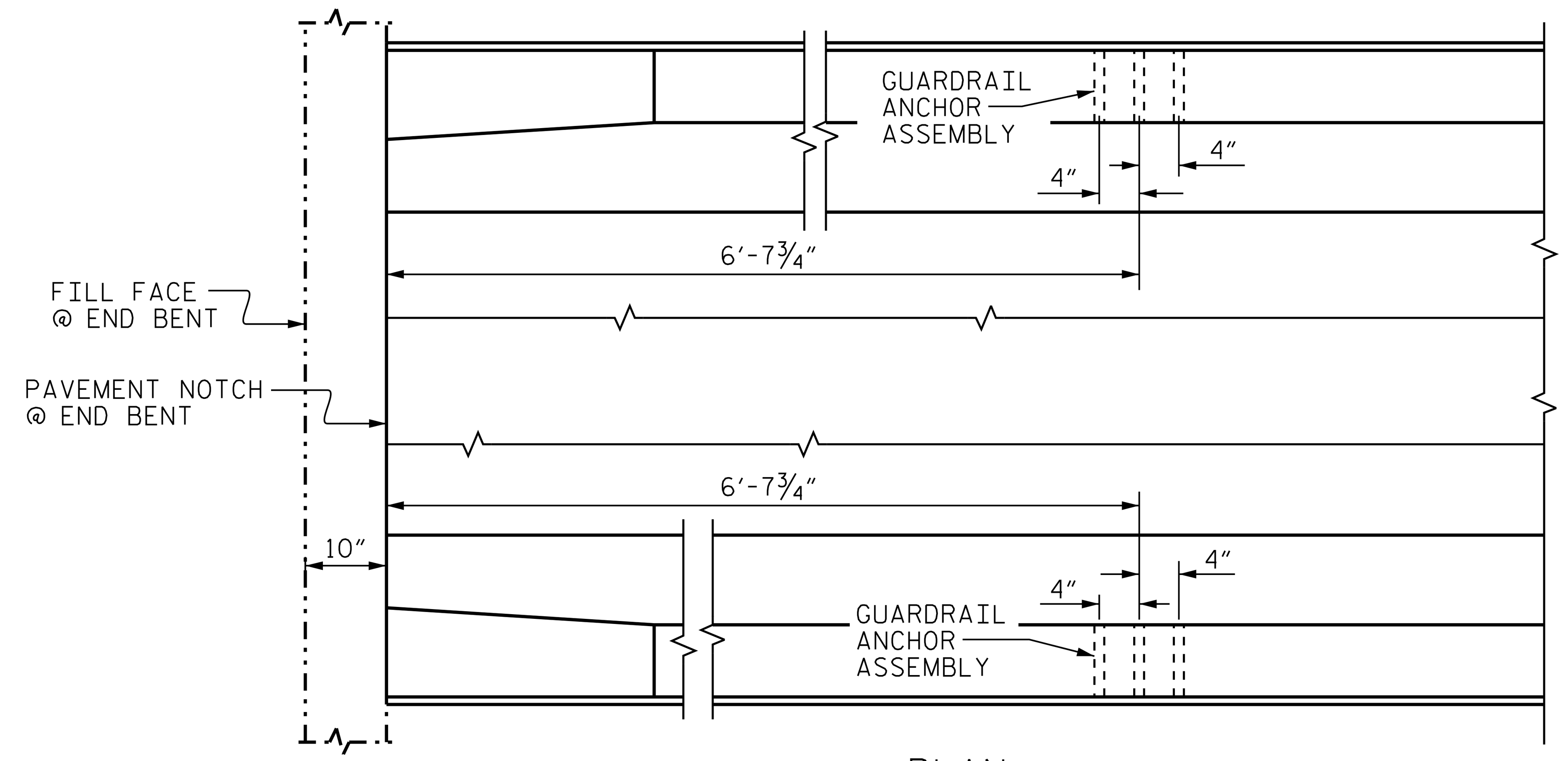
THE 1 1/4" Ø HOLES SHALL BE FORMED OR DRILLED WITH A CORE BIT. IMPACT TOOLS WILL NOT BE PERMITTED. ANY CONCRETE DAMAGED BY THIS WORK SHALL BE REPAIRED TO THE SATISFACTION OF THE ENGINEER.

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



SECTION E-E

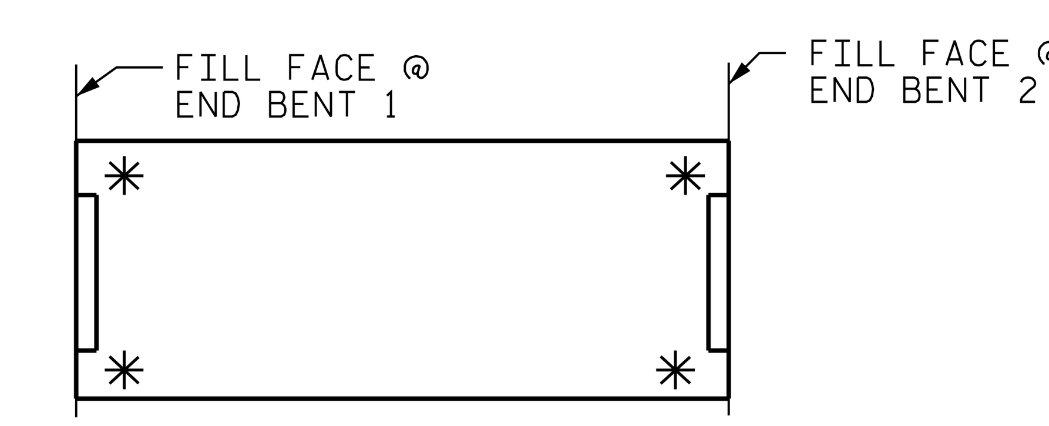
GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

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-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

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ASSEMBLED BY : J. E. HAGENBUSH	DATE : 10/04/18
CHECKED BY : S. S. POOLE	DATE : 12/10/22

DRAWN BY : TLA 5/06	REV. 7/12	MAA/GM
CHECKED BY : GM 5/06	REV. 6/13	MAA/GM
	REV. 12/17	MAA/THC

DESIGN ENGINEER OF RECORD: S. S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE

5/9/2023

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

(LEFT LANE)

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

SHEET NO. S5-33

TOTAL SHEETS 56

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SUPERSTRUCTURE BILL OF MATERIAL (STAGE I)

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1A	106.4		
POUR #2A	165.8		
POUR #3A	107.3		
POUR #4A	70.5		
TOTALS**	450.0	34,590	39,903

**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

SUPERSTRUCTURE BILL OF MATERIAL (STAGE II)

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR #1B	107.1		
POUR #2B	154.3		
POUR #3B	95.4		
POUR #4B	68.7		
POUR #5	23.6		
TOTALS**	449.1	34,337	38,767

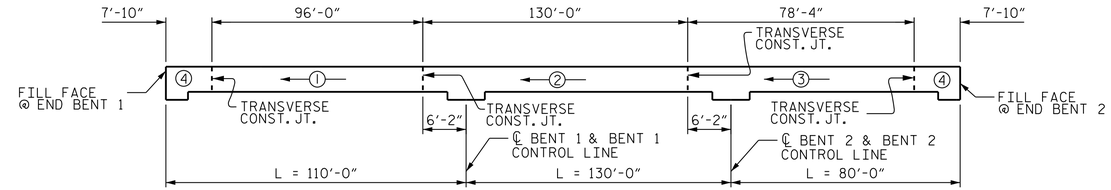
**QUANTITIES FOR BARRIER RAIL ARE NOT INCLUDED

GROOVING BRIDGE FLOORS

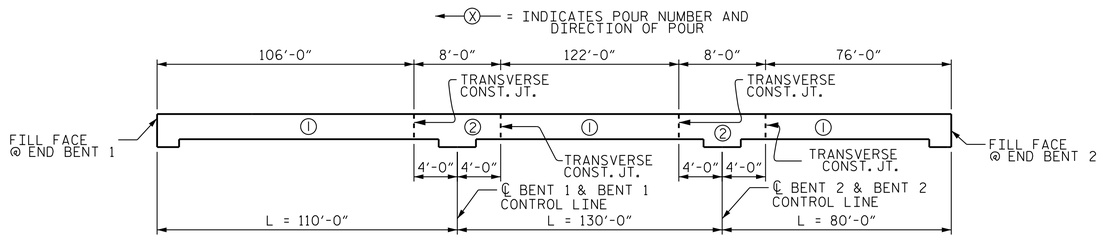
APPROACH SLABS	2,916 SQ.FT.
BRIDGE DECK	18,941 SQ.FT.
TOTAL	21,857 SQ.FT.

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	1'-11"	1'-7"	1'-11"	1'-7"	2'-6"
#5	2'-5"	2'-0"	2'-5"	2'-0"	3'-1"
#6	2'-10"	2'-5"	3'-7"	2'-5"	3'-8"
#7	4'-2"	2'-9"			
#8	4'-9"	3'-2"			

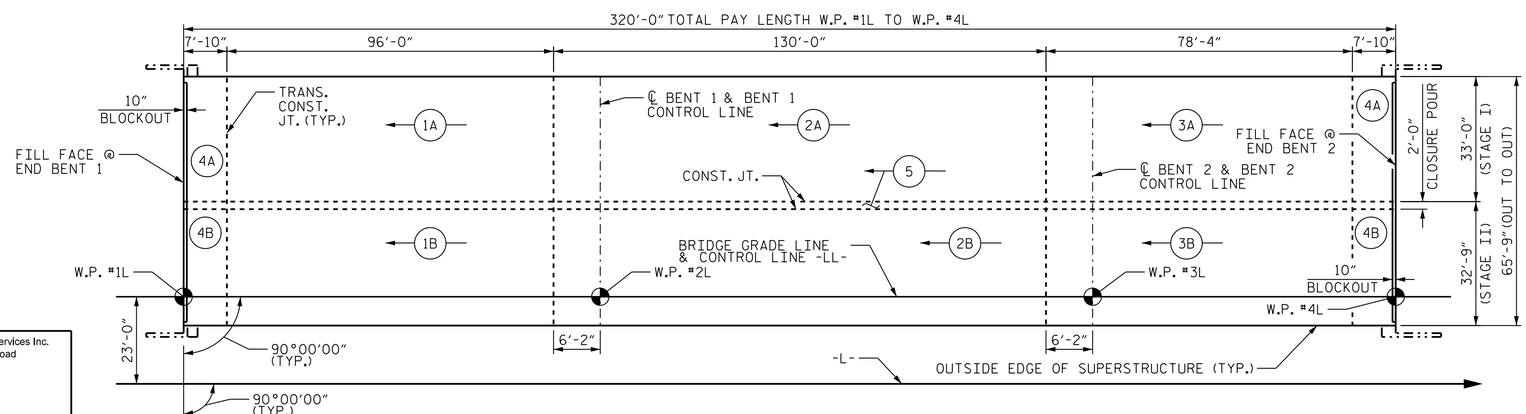


POURING SEQUENCE



POURING SEQUENCE

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



LAYOUT FOR COMPUTING AREA OF REINFORCED DECK SLAB (SQ.FT. = 21,040)

STAGE I REINF. BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A1	545	#5	STR	32'-8"	18569
A2	545	#5	STR	32'-8"	18569
✳B1	138	#5	STR	55'-1"	7929
✳B2	42	#6	STR	21'-0"	1325
✳B3	42	#6	STR	23'-10"	1504
✳B4	124	#6	STR	39'-5"	7342
B5	234	#5	STR	54'-6"	13302
✳D1	545	#5	STR	4'-3"	2416
K1	12	#4	STR	34'-8"	278
K2	6	#4	STR	6'-2"	25
K3	24	#4	STR	8'-0"	129
K4	6	#4	STR	6'-5"	26
K5	2	#4	3	5'-10"	8
K6	8	#4	3	6'-9"	37
K7	2	#4	3	6'-0"	9
K8	2	#4	STR	2'-9"	4
K9	8	#4	STR	3'-1"	17
K10	2	#4	STR	2'-4"	4
K11	12	#4	STR	5'-0"	41
K12	60	#4	STR	8'-0"	321
K13	12	#4	STR	5'-3"	43
K14	14	#4	STR	30'-7"	287
U1	42	#4	1	14'-8"	412
U2	18	#4	1	10'-8"	129
U3	36	#4	4	15'-8"	377
U4	12	#4	5	10'-9"	87
S1	264	#4	6	2'-9"	485
✳S2	64	#4	2	11'-8"	499
✳S3	40	#4	2	11'-11"	319

REINFORCING STEEL	34,590 LBS.
✳EPOXY COATED REINFORCING STEEL	39,903 LBS.

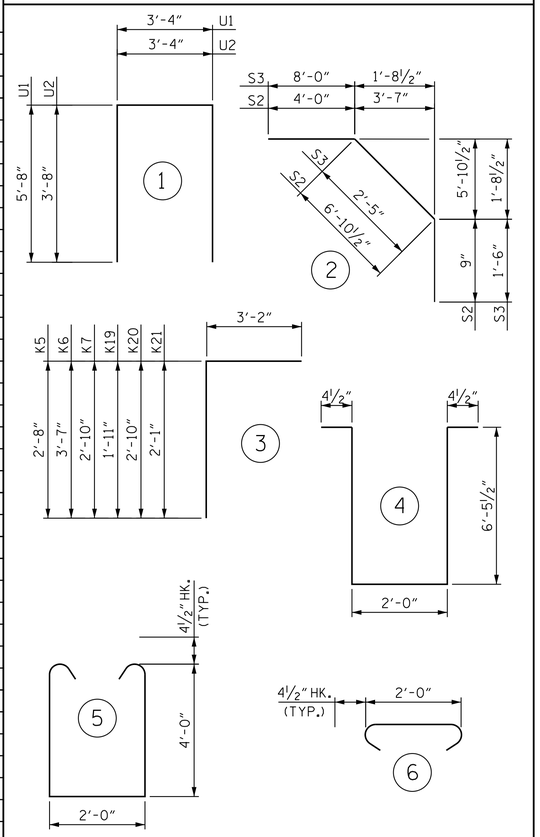
STAGE II REINF. BAR SCHEDULE

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳A3	545	#5	STR	30'-5"	17290
A4	545	#5	STR	30'-5"	17290
✳B1	150	#5	STR	55'-1"	8618
✳B2	40	#6	STR	21'-0"	1262
✳B3	38	#6	STR	23'-10"	1361
✳B4	118	#6	STR	39'-5"	6987
B5	252	#5	STR	54'-6"	14325
✳D1	545	#5	STR	4'-3"	2416
K15	12	#4	STR	32'-5"	260
K16	6	#4	STR	5'-8"	23
K17	24	#4	STR	7'-6"	121
K18	6	#4	STR	5'-11"	24
K19	2	#4	3	5'-1"	7
K20	8	#4	3	6'-0"	33
K21	2	#4	3	5'-3"	8
K22	2	#4	STR	2'-5"	4
K23	8	#4	STR	3'-4"	18
K24	2	#4	STR	2'-7"	4
K25	12	#4	STR	4'-5"	36
K26	60	#4	STR	7'-6"	301
K27	12	#4	STR	4'-9"	39
K28	4	#4	STR	2'-1"	6
K29	20	#4	STR	5'-1"	68
K30	4	#4	STR	2'-4"	7
K31	14	#4	STR	29'-0"	272
U1	42	#4	1	14'-8"	412
U2	16	#4	1	10'-8"	115
U3	34	#4	4	15'-8"	356
U4	16	#4	5	10'-9"	115
S1	268	#4	6	2'-9"	493
✳S2	68	#4	2	11'-8"	530
✳S3	38	#4	2	11'-11"	303

REINFORCING STEEL	34,337 LBS.
✳EPOXY COATED REINFORCING STEEL	38,767 LBS.

TOTAL STAGE I AND STAGE II	REINFORCING STEEL 68,927 LBS.
	EPOXY COATED REINFORCING STEEL 78,670 LBS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE BILL OF MATERIAL

(LEFT LANE)

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DRAWN BY : J. B. GEILE DATE : 10/11/18
CHECKED BY : S. S. POOLE DATE : 12/10/22
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
Signed by: 5/9/2023

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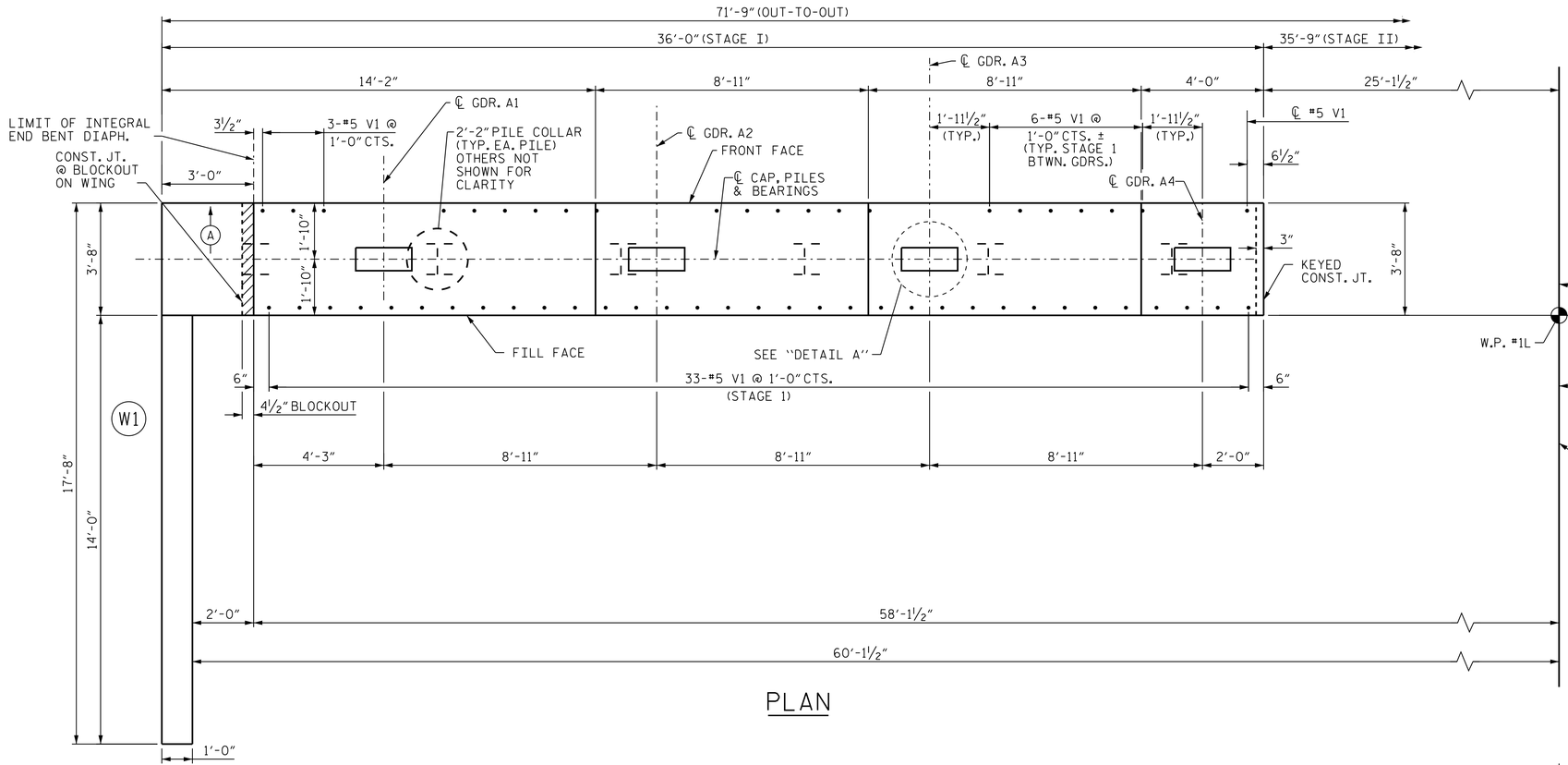
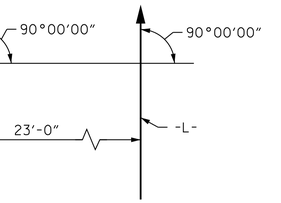
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S5-34
TOTAL SHEETS 56

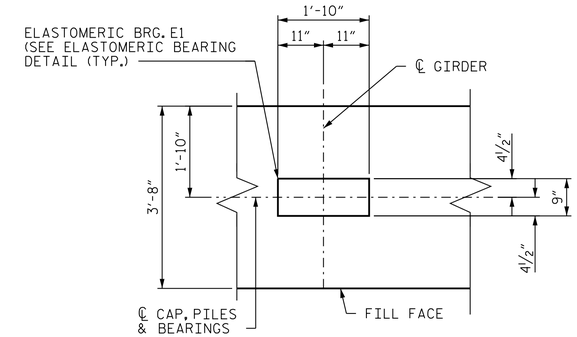


PLAN



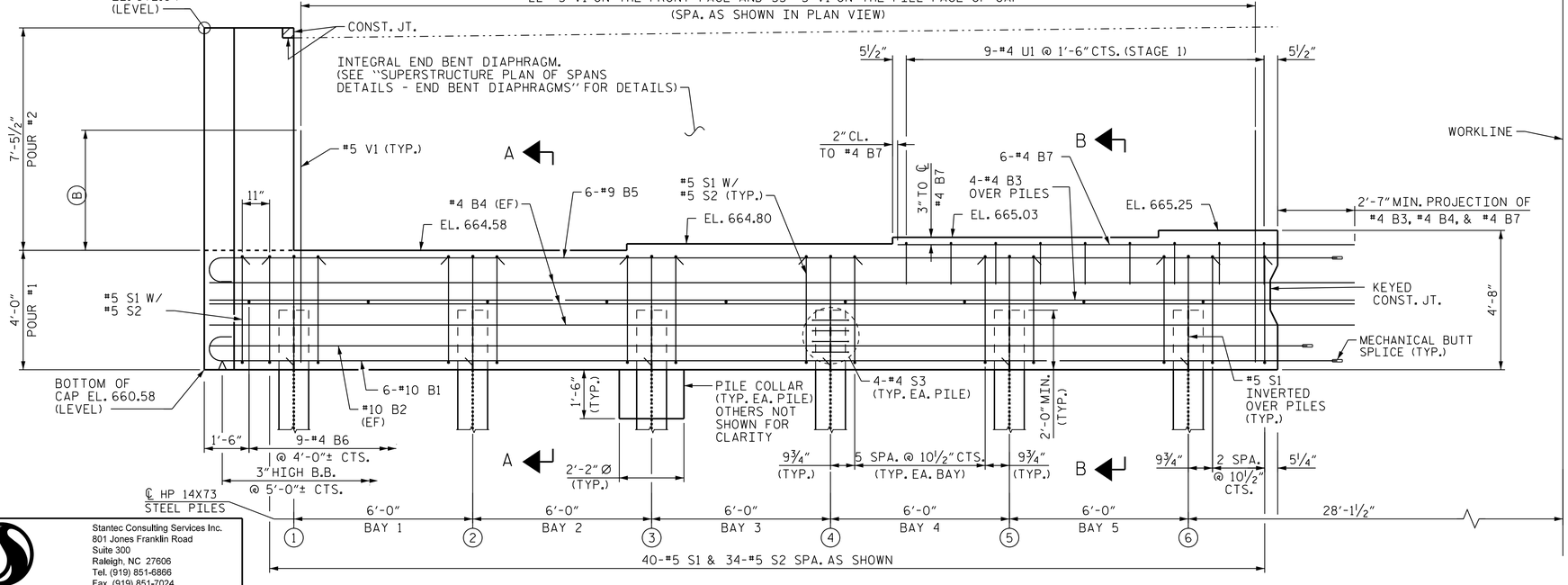
KEYED CONST. JT. DETAIL

REINFORCING STEEL NOT SHOWN FOR CLARITY. REINFORCING STEEL SHALL BE CONTINUOUS THROUGH KEYED CONSTRUCTION JOINT.



DETAIL A

DIMENSIONS TYPICAL FOR EACH BEARING



ELEVATION

NOTES

FOR WING WALL DETAILS, SEE "END BENT 1, DETAILS - WING WALLS" SHEET. 3 OF 5.

(EF) DENOTES EACH FACE

CHAMFERS ARE NOT REQUIRED EXCEPT AS NOTED.

FOR SECTIONS A-A AND B-B, SEE END BENT 1 DETAILS, SHEET 4 OF 5.

(A) SLOPED CAP SURFACE BEYOND LIMIT OF INTEGRAL DIAPH. SEE END BENT 1 WING WALL DETAILS, SHEET. 3 OF 5.

(B) #5 V1 3'-0" MIN. PROJ. ABOVE BRIDGE SEAT.

PROJECT NO. R-2707D

CLEVELAND COUNTY

STATION: 849+00.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 (STAGE I)

(LEFT LANE)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S5-35
1			3			TOTAL SHEETS
2			4			56

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DRAWN BY : J.B. GEILE DATE : 12/31/22
CHECKED BY : S.S. POOLE DATE : 01/10/23
DESIGN ENGINEER OF RECORD: S.S. POOLE DATE : 05/09/23

NORTH CAROLINA PROFESSIONAL SEAL 054498 ENGINEER SETH S. POOLE
5/9/2023

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