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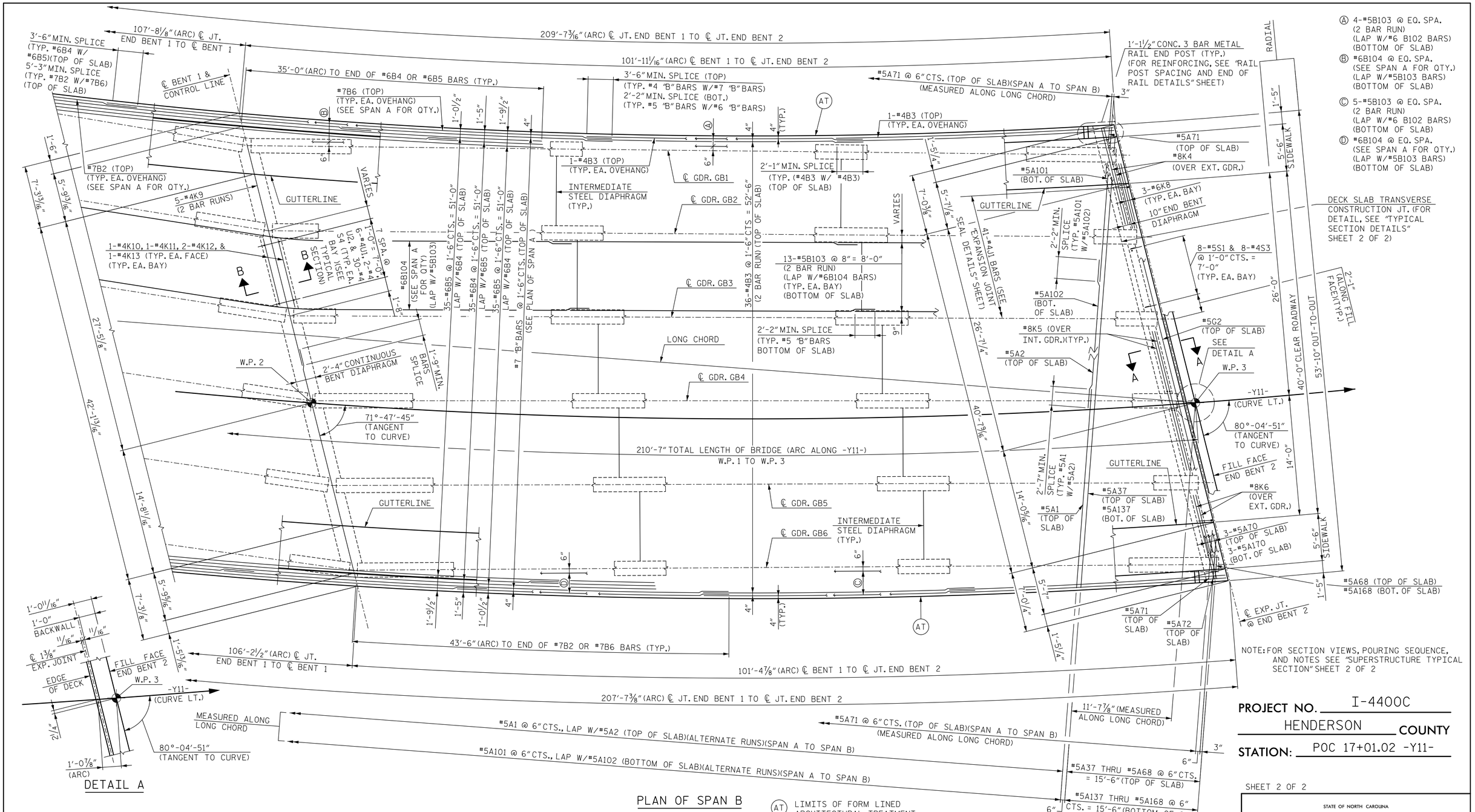
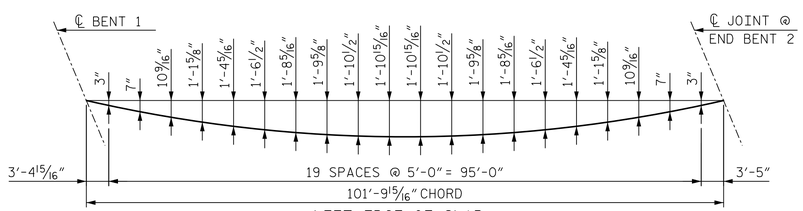
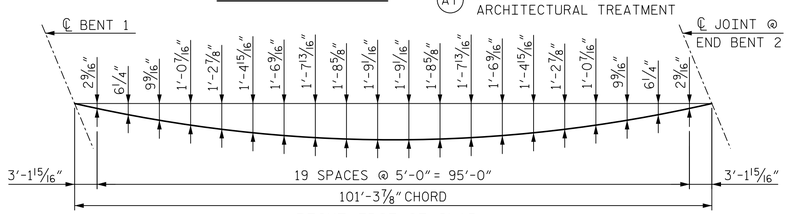






ARC OFFSETS SPAN B

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 6/7/2019 ENGINEER PAUL J. BARBER — Digitally signed by: Paul J. Barber

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

DRAWN BY	M. WRIGHT	DATE	1/19
CHECKED BY	N. HART	DATE	3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	5/19

DWG. NO. 9

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: POC 17+01.02 -Y11-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN "B"

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-9
1			3			TOTAL SHEETS
2			4			41

NOTES:

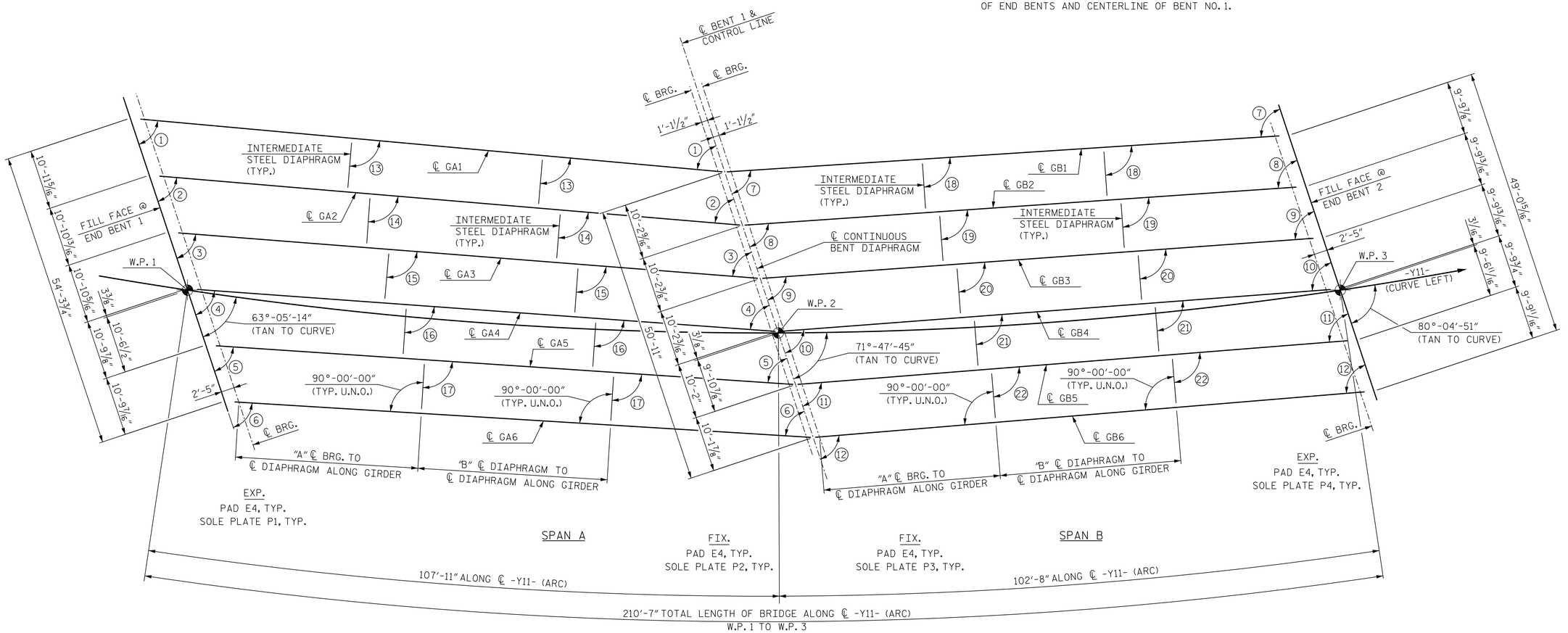
ALL DIMENSIONS MEASURED ALONG ℄ GIRDER UNLESS NOTED OTHERWISE.

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

FOR GIRDER ELEVATIONS AND DETAILS, SEE PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET.

GIRDERS ARE SET ON CONCENTRIC ARCS AT FILL FACE OF END BENTS AND CENTERLINE OF BENT NO. 1.

U.NO.	UNLESS NOTED OTHERWISE
"EXP."	DENOTES EXPANSION BEARING ASSEMBLY.
"FIX."	DENOTES FIXED BEARING ASSEMBLY.
"E"	DENOTES ELASTOMERIC BEARING PAD MARK.
"P"	DENOTES STEEL SOLE PLATE MARK.



FRAMING PLAN

①	66°-24'-27"	⑫	76°-18'-57"
②	66°-45'-36"	⑬	89°-38'-51"
③	67°-06'-06"	⑭	89°-39'-30"
④	67°-25'-59"	⑮	89°-40'-07"
⑤	67°-45'-17"	⑯	89°-40'-42"
⑥	68°-04'-02"	⑰	89°-41'-16"
⑦	75°-19'-02"	⑱	89°-47'-19"
⑧	75°-31'-43"	⑲	89°-47'-41"
⑨	75°-44'-02"	⑳	89°-48'-02"
⑩	75°-56'-00"	㉑	89°-48'-22"
⑪	76°-07'-38"	㉒	89°-48'-41"

GIRDER DIMENSIONS

GIRDER	"A"	"B"
GA1	37'-10 5/8"	34'-10 3/16"
GA2	37'-8 11/16"	34'-9 1/8"
GA3	37'-6 7/8"	34'-8 1/16"
GA4	37'-5 1/8"	34'-7 1/8"
GA5	37'-3 1/2"	34'-6 3/16"
GA6	33'-3 3/16"	34'-6 3/16"
GB1	34'-10"	33'-1 5/16"
GB2	34'-9 3/16"	33'-0 15/16"
GB3	34'-8 7/16"	33'-0 5/8"
GB4	34'-7 3/4"	33'-0 1/4"
GB5	34'-7 1/16"	32'-11 15/16"
GB6	32'-2 1/4"	32'-11 15/16"

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER — 5/24/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE FRAMING PLAN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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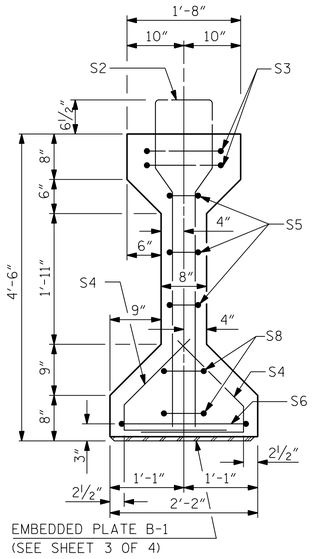
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 10/18
CHECKED BY	N. HART	DATE 10/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

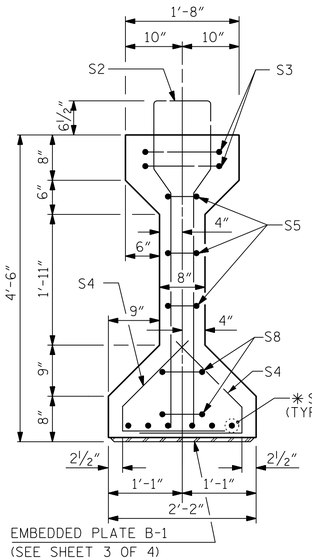
DWG. NO. 10

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-10
1			3			TOTAL SHEETS
2			4			41



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

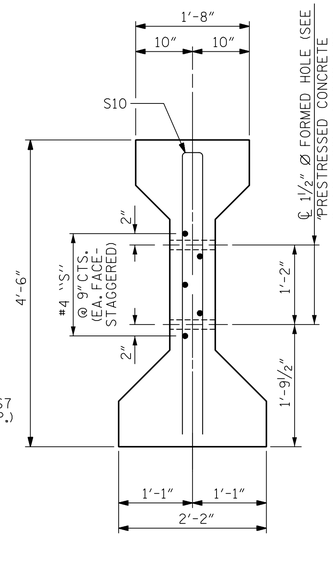
SECTION A-A



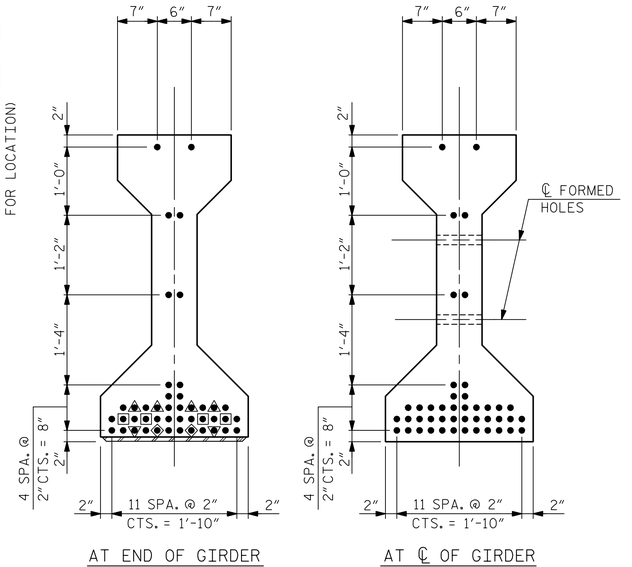
EMBEDDED PLATE B-1
(SEE SHEET 3 OF 4)

SECTION B-B

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



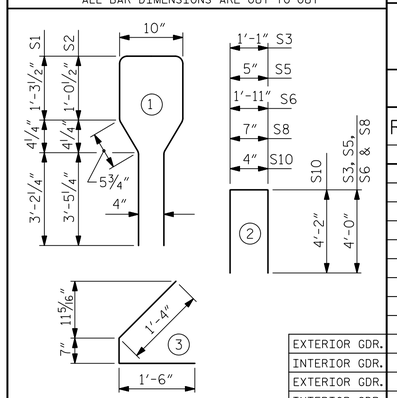
SECTION C-C
(S1 BARS NOT SHOWN)



0.6"Ø LOW RELAXATION STRAND LAYOUT

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



EXTERIOR GDR.	S10	4	#5	2	8'-8"	36
INTERIOR GDR.	S10	8	#5	2	8'-8"	72
EXTERIOR GDR.	S11	10	#4	STR	7'-0"	47
INTERIOR GDR.	S12	10	#4	STR	11'-2"	75

DEBONDING LEGEND

- FULLY BONDED STRANDS
- STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER
- STRANDS DEBONDED FOR 22'-0" FROM END OF GIRDER

0.6" Ø L. R. GRADE 270 STRANDS

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

REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	86	#4	1	10'-9"	618
S2	14	#6	1	10'-9"	226
S3	4	#4	2	9'-1"	24
S4	68	#4	3	3'-5"	155
S5	6	#4	2	8'-5"	34
S6	1	#4	2	9'-11"	7
✱S7	6	#5	STR	3'-8"	23
S8	4	#4	2	8'-7"	23
S9	1	#3	STR	1'-10"	1

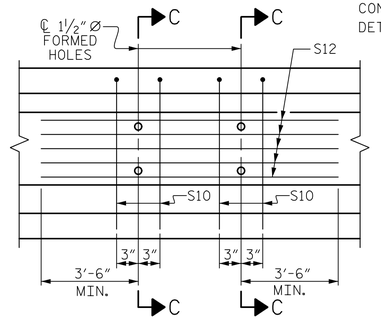
✱NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

QUANTITIES FOR ONE GIRDER

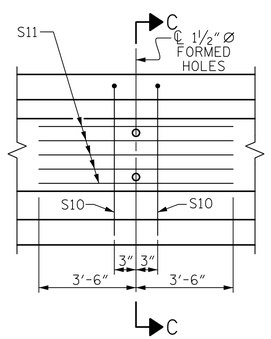
	REINFORCING STEEL	9,000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
GA1	1,194	21.6	44
GA2	1,258	21.5	44
GA3-GA4	1,258	21.4	44
GA5	1,258	21.3	44
GA6	1,194	21.3	44

GIRDERS REQUIRED

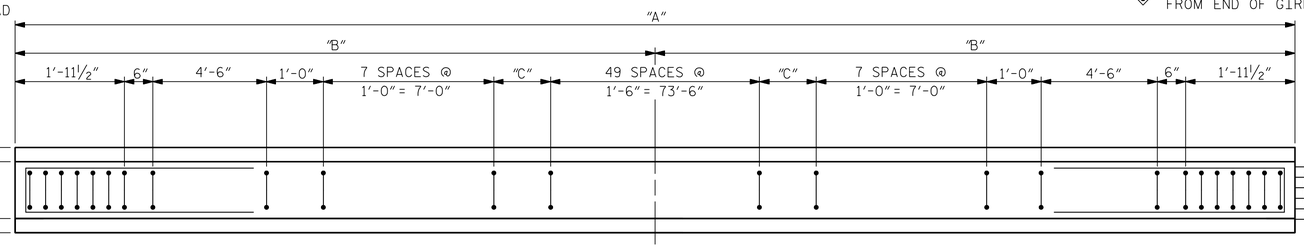
NUMBER	LENGTH	TOTAL LENGTH
GA1	106'-2⅜"	106'-2⅜"
GA2	105'-11"	105'-11"
GA3	105'-7 13/16"	105'-7 13/16"
GA4	105'-4 13/16"	105'-4 13/16"
GA5	105'-1 15/16"	105'-1 15/16"
GA6	104'-11 13/16"	104'-11 13/16"



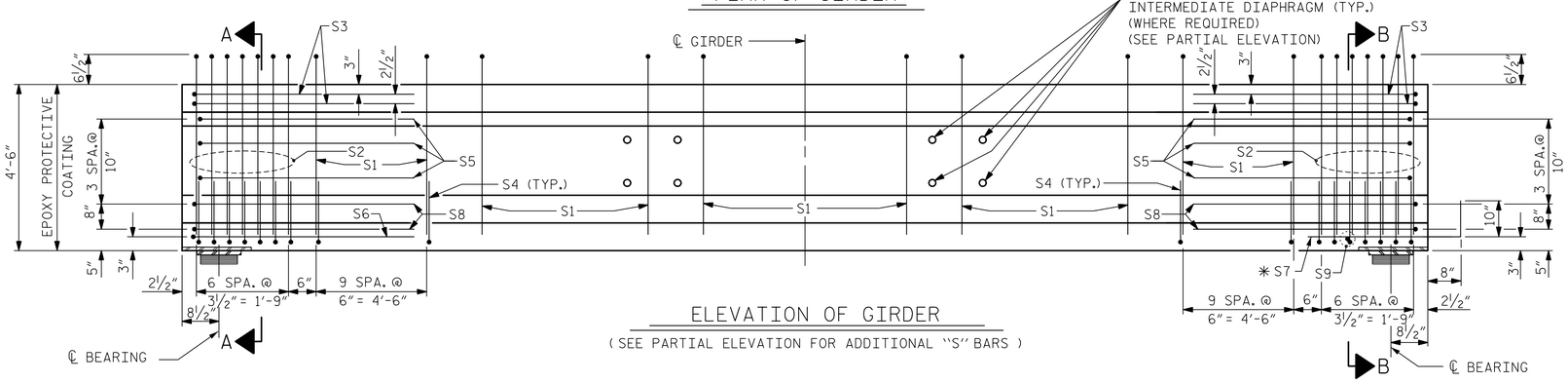
PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDERS GA2-GA5



PARTIAL ELEVATION
SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDERS GA1 & GA6



PLAN OF GIRDER



EXPANSION END
(END BENT 1 @ SPAN A)

ELEVATION OF GIRDER
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

CONTINUOUS END
(BENT 1 END @ SPAN A)

GIRDER DIMENSION TABLE			
GIRDERS	"A"	"B"	"C"
GA1	106'-2⅜"	53'-1 3/16"	1'-4 11/16"
GA2	105'-11"	52'-11½"	1'-3"
GA3	105'-7 13/16"	52'-9⅞"(+)	1'-1⅜"(+)
GA4	105'-4 13/16"	52'-8⅜"(+)	11⅞"(+)
GA5	105'-1 15/16"	52'-6 15/16"(+)	10 7/16"(+)
GA6	104'-11 13/16"	52'-5 9/16"(+)	9 1/16"(+)

NOTES:

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,600 PSI.

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

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER — 5/24/2019

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: POC 17+01.02 -Y11-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

ASSEMBLED BY : M. WRIGHT	DATE : 10/18
CHECKED BY : N. SALAS ZAMUDIO	DATE : 11/18
DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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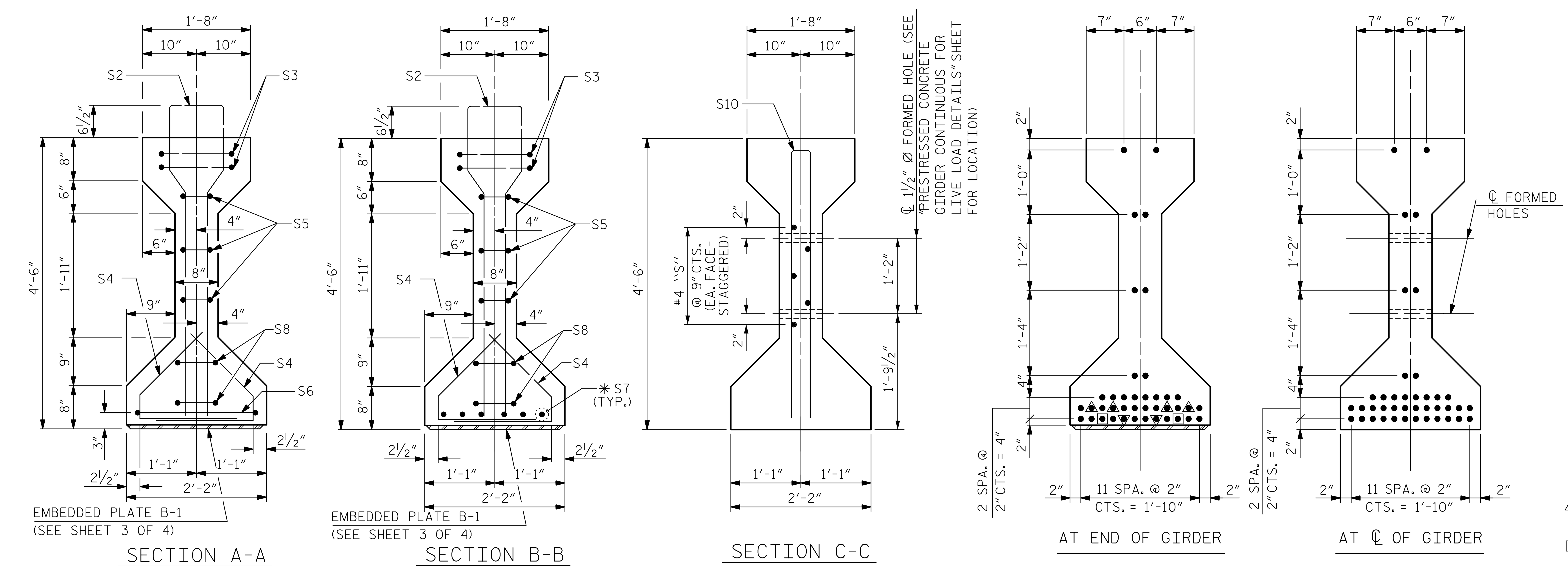
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 10/18
CHECKED BY	N. SALAS ZAMUDIO	DATE 11/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 11

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-11
1			3			TOTAL SHEETS
2			4			41

STD. NO. PCG6



SECTION A-A

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

SECTION B-B

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

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

SECTION C-C

(S1 BARS NOT SHOWN)

℄ 1½" Ø FORMED HOLE (SEE "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET FOR LOCATION)

AT END OF GIRDER — AT ℄ OF GIRDER

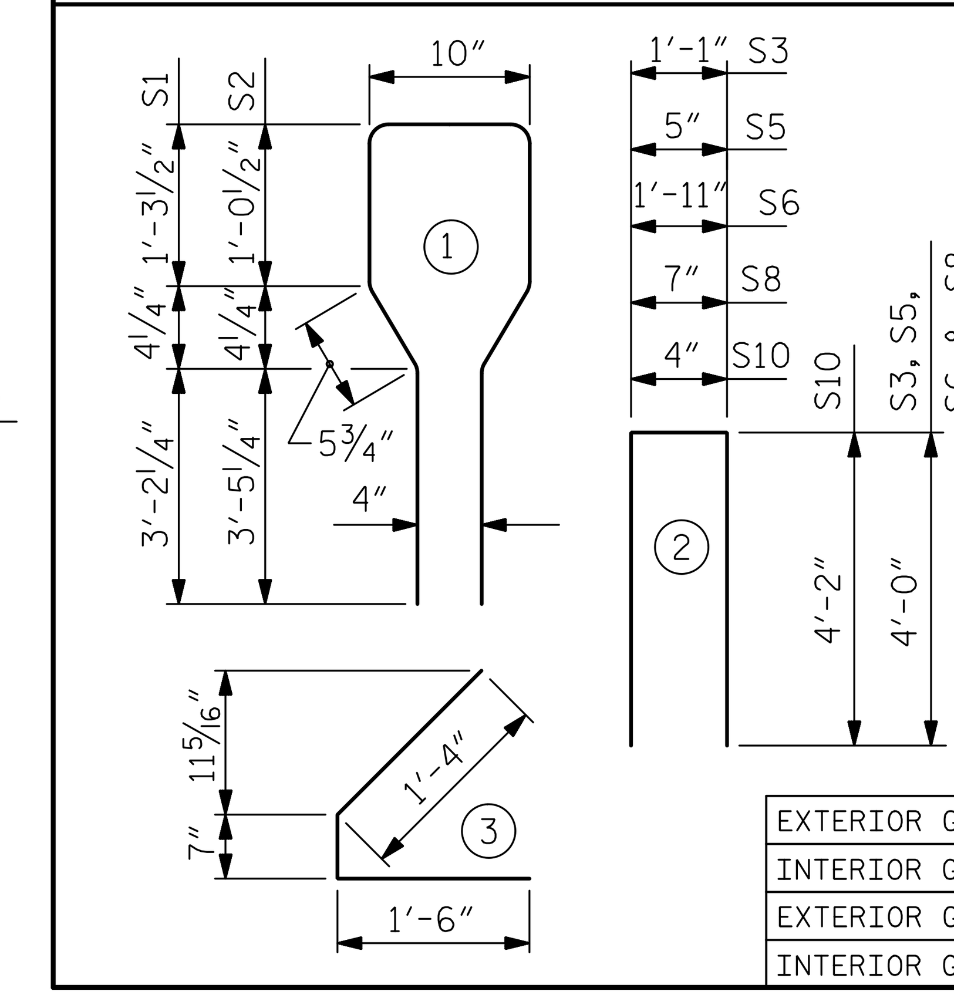
0.6" Ø LOW RELAXATION STRAND LAYOUT

DEBONDING LEGEND

- • FULLY BONDED STRANDS
- ▲ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER
- ▣ STRANDS DEBONDED FOR 8'-0" FROM END OF GIRDER
- ▼ STRANDS DEBONDED FOR 12'-0" FROM END OF GIRDER

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



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

REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	83	#4	1	10'-9"	596
	S2	14	#6	1	10'-9"	226
	S3	4	#4	2	9'-1"	24
	S4	68	#4	3	3'-5"	155
	S5	6	#4	2	8'-5"	34
	S6	1	#4	2	9'-11"	7
	* S7	6	#5	STR	3'-8"	23
	S8	4	#4	2	8'-7"	23
	S9	1	#3	STR	1'-10"	1
EXTERIOR GDR.	S10	4	#5	2	8'-8"	36
INTERIOR GDR.	S10	8	#5	2	8'-8"	72
EXTERIOR GDR.	S11	10	#4	STR	7'-0"	47
INTERIOR GDR.	S12	10	#4	STR	9'-6"	63

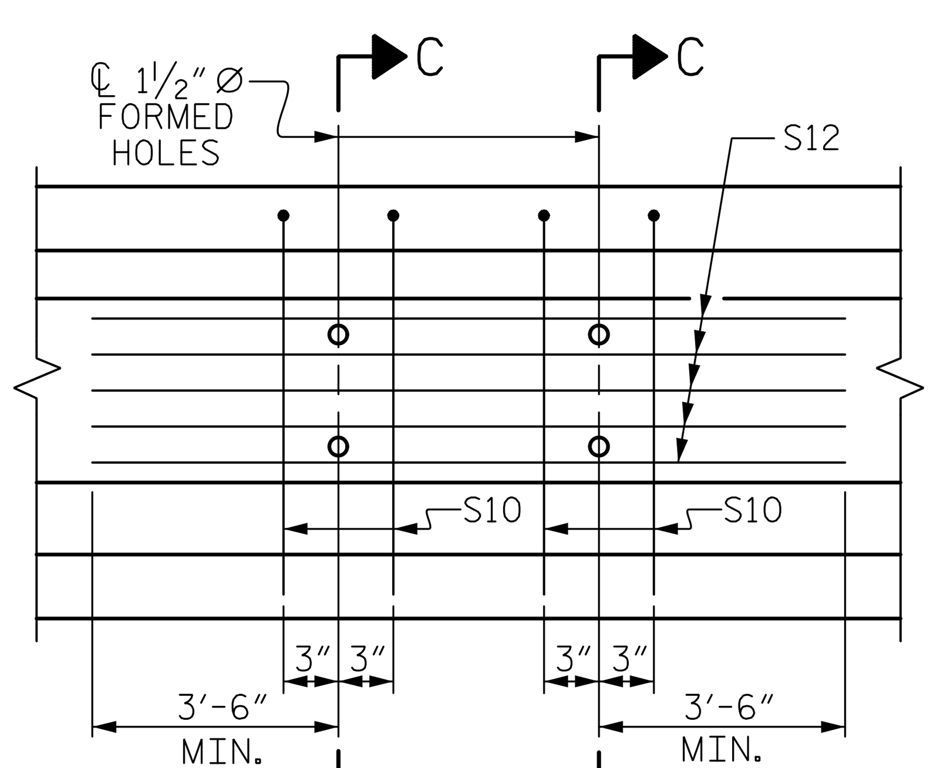
* NOTE: S7 BARS SHALL BE BENT BEFORE SHIPMENT. HEAT BENDING SHALL NOT BE ALLOWED.

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	9,000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
GB1	1,172	20.4	40
GB2-GB4	1,224	20.4	40
GB5	1,224	20.3	40
GB6	1,172	20.3	40

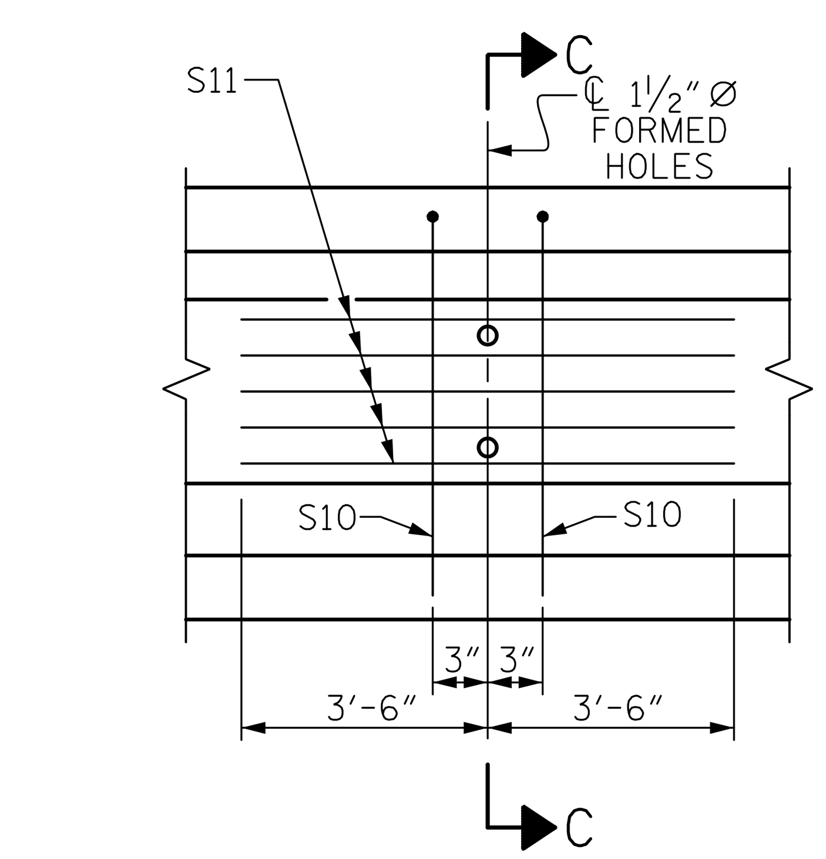
GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
GB1	100'-7 7/16"	100'-7 7/16"
GB2	100'-6 1/4"	100'-6 1/4"
GB3	100'-5 3/16"	100'-5 3/16"
GB4	100'-4 1/8"	100'-4 1/8"
GB5	100'-3 1/8"	100'-3 1/8"
GB6	100'-2 3/16"	100'-2 3/16"



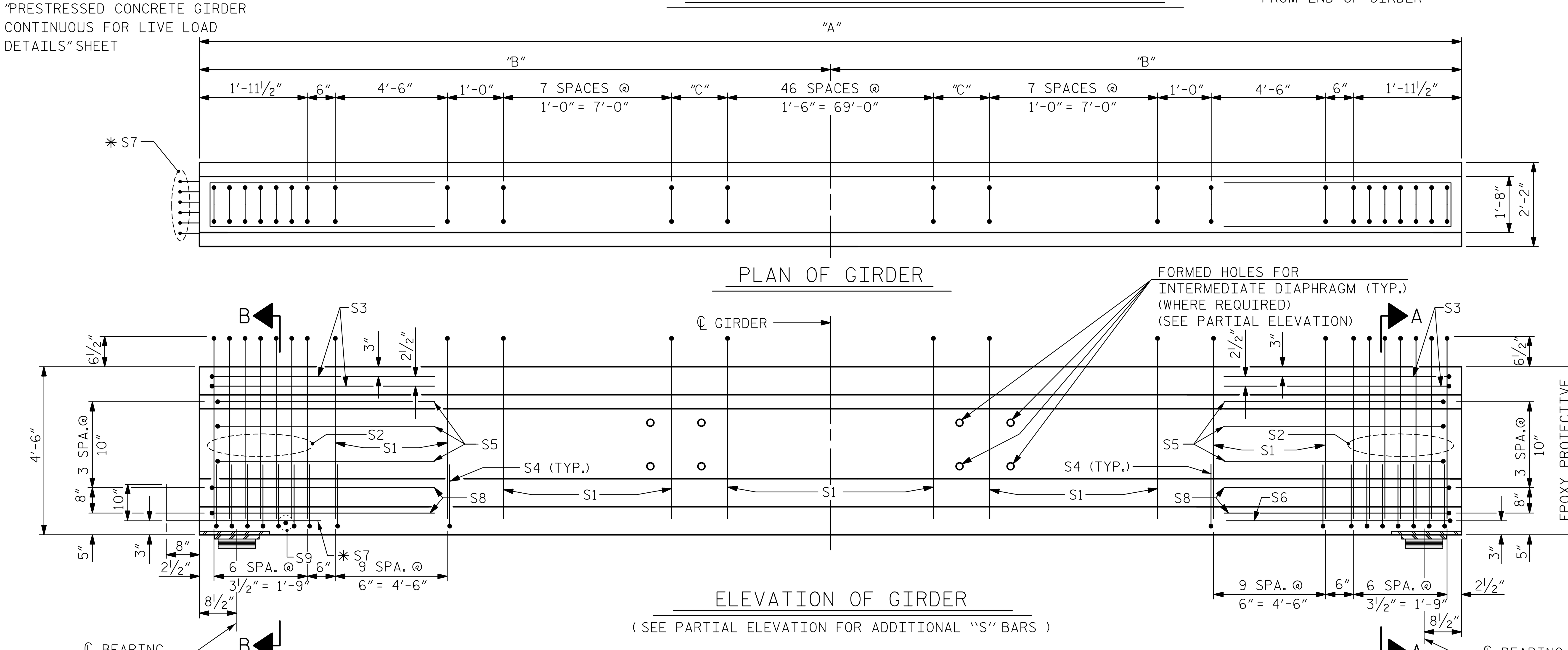
PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDERS GB2-GB5



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDERS GB1 & GB6



PLAN OF GIRDER

ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

CONTINUOUS END (BENT 1 END @ SPAN B)

EXPANSION END (END BENT 2 @ SPAN B)

GIRDER DIMENSION TABLE			
GIRDERS	"A"	"B"	"C"
GB1	100'-7 7/16"	50'-3 11/16"(+)	10 3/16"(+)
GB2	100'-6 1/4"	50'-3 1/8"	9 5/8"
GB3	100'-5 3/16"	50'-2 9/16"(+)	9 1/16"(+)
GB4	100'-4 1/8"	50'-2 1/16"	8 9/16"
GB5	100'-3 1/8"	50'-1 9/16"	8 1/16"
GB6	100'-2 3/16"	50'-1 1/16"(+)	7 9/16"(+)

NOTES:

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,600 PSI.

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

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER 5/24/2019

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

DRAWN BY	M. WRIGHT	DATE 10/18
CHECKED BY	N. SALAS ZAMUDIO	DATE 11/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 12

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ASSEMBLED BY : M. WRIGHT DATE : 10/18
CHECKED BY : N. SALAS ZAMUDIO DATE : 11/18

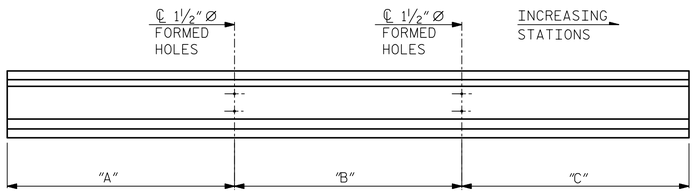
DRAWN BY : ELR 8/91 — REV. 10/1/11 MAA/GM
CHECKED BY : GRP 8/91 — REV. 1/15 MAA/TMG — REV. 12/17 MAA/THC

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

SHEET NO. S3-12

TOTAL SHEETS 41

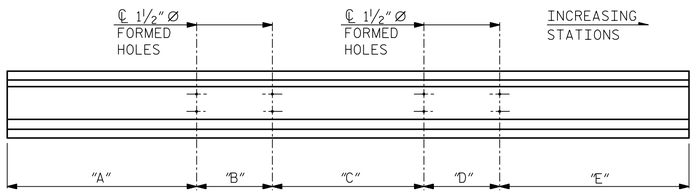
STD. NO. PCG6



GIRDER ELEVATION

GA1,GA6 & GB1,GB6

GIRDER	"A"	"B"	"C"
GA1	38′-7⅛"	34′-10⅛"	32′-9⅛"
GA6	33′-11 11/16"	34′-6 3/16"	36′-5 5/16"
GB1	35′-6½"	33′-1 5/16"	31′-11⅝"
GB6	32′-10¾"	32′-11 5/16"	34′-3½"

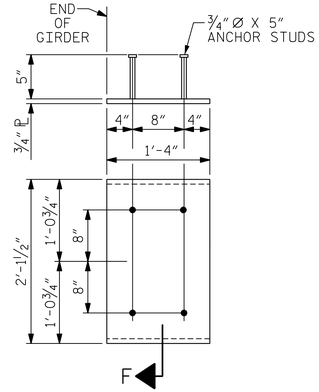


GIRDER ELEVATION

GA2-GA5 & GB2-GB5

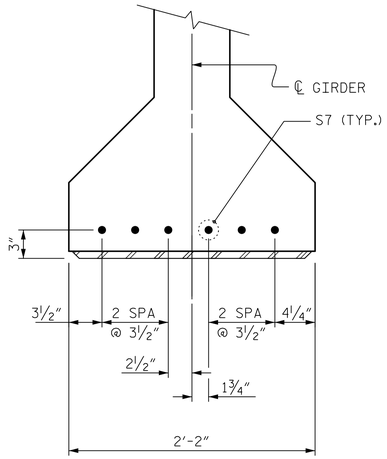
GIRDER	"A"	"B"	"C"	"D"	"E"
GA2	34′-3⅜"	4′-1 13/16"	30′-8 5/16"	4′-0¾"	32′-8¾"
GA3	34′-2⅜"	4′-1"	30′-8 1/16"	4′-0"	32′-8⅜"
GA4	34′-1 7/16"	4′-0 3/16"	30′-7⅞"	3′-11¼"	32′-8 1/16"
GA5	34′-0 9/16"	3′-11 7/16"	30′-7⅝"	3′-10 9/16"	32′-7¾"
GB2	32′-11⅞"	2′-5 13/16"	30′-7½"	2′-5 7/16"	31′-11⅝"
GB3	32′-11 9/16"	2′-5 7/16"	30′-7½"	2′-5 1/16"	31′-11⅝"
GB4	32′-11¼"	2′-5"	30′-7⅝"	2′-4⅝"	31′-11⅝"
GB5	32′-11"	2′-4 9/16"	30′-7 11/16"	2′-4¼"	31′-11⅝"

1½" Ø FORMED HOLE LOCATIONS



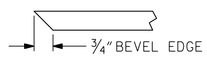
EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)



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.

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.

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".

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

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036741 Paul J. Barber 12916 5/24/2019 ENGINEER PAUL J. BARBER

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-13
1			3			TOTAL SHEETS
2			4			41

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

DRAWN BY M. WRIGHT DATE 10/18
CHECKED BY N. SALAS ZAMUDIO DATE 11/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 5/19

DWG. NO. 13

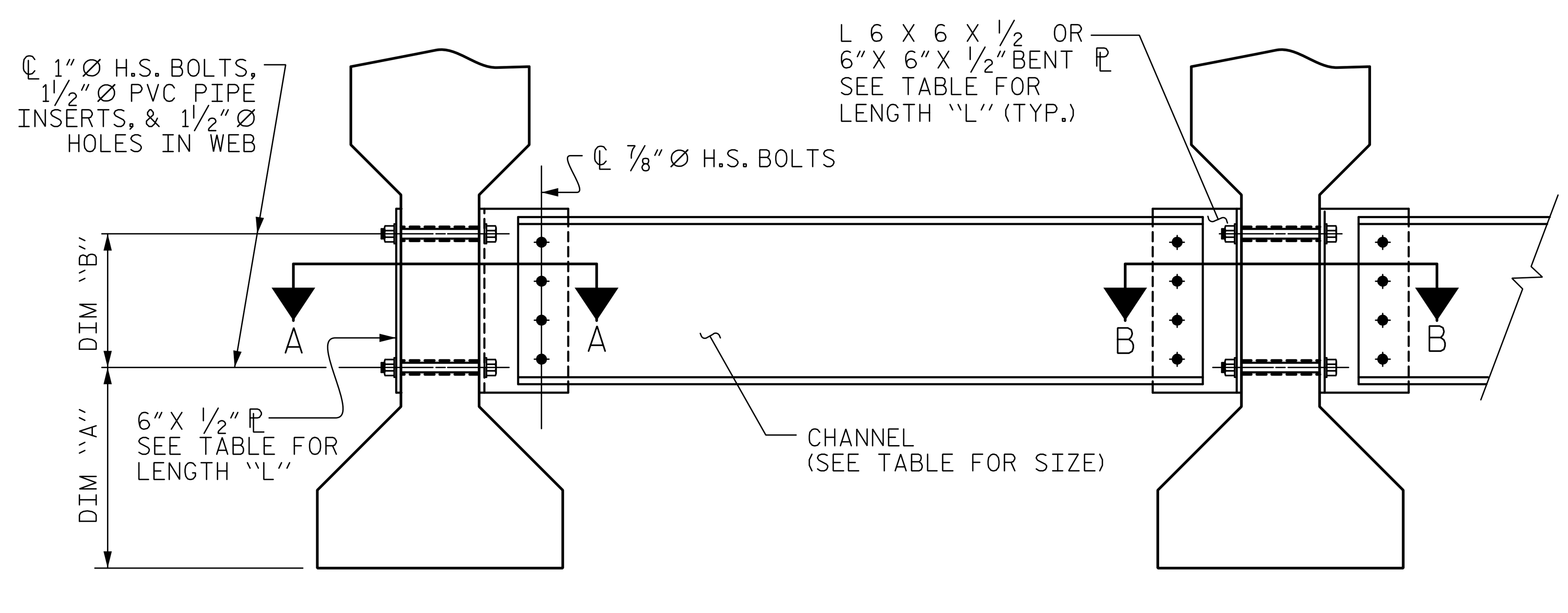
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : M. WRIGHT DATE : 10/18
CHECKED BY : N. SALAS ZAMUDIO DATE : 11/18

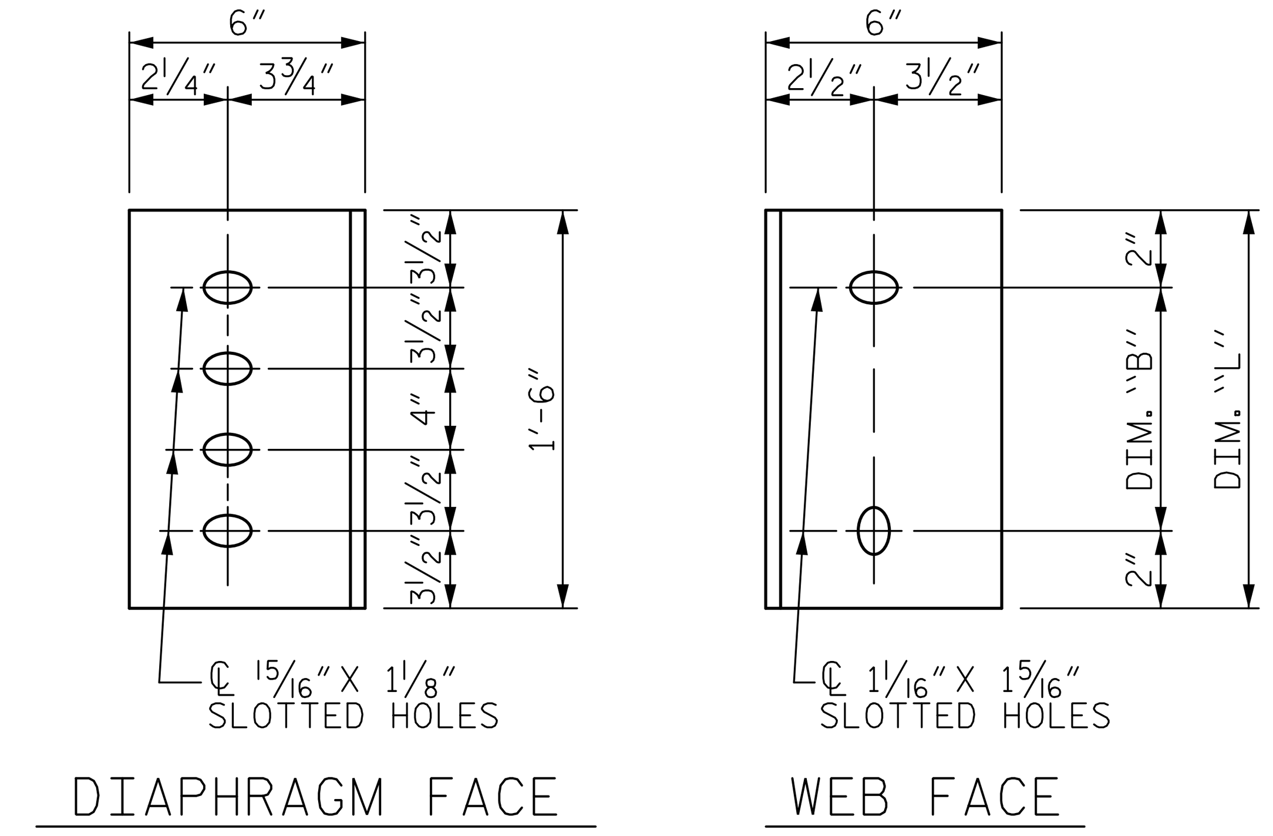
DRAWN BY : ELR 11/91
CHECKED BY : GRP 11/91

REV. 1/15 MAA/TMQ
REV. 2/15 MAA/TMQ
REV. 12/17 MAA/THC

STD. NO. PCG9



PART SECTION AT INTERMEDIATE DIAPHRAGM



CONNECTOR PLATE DETAILS

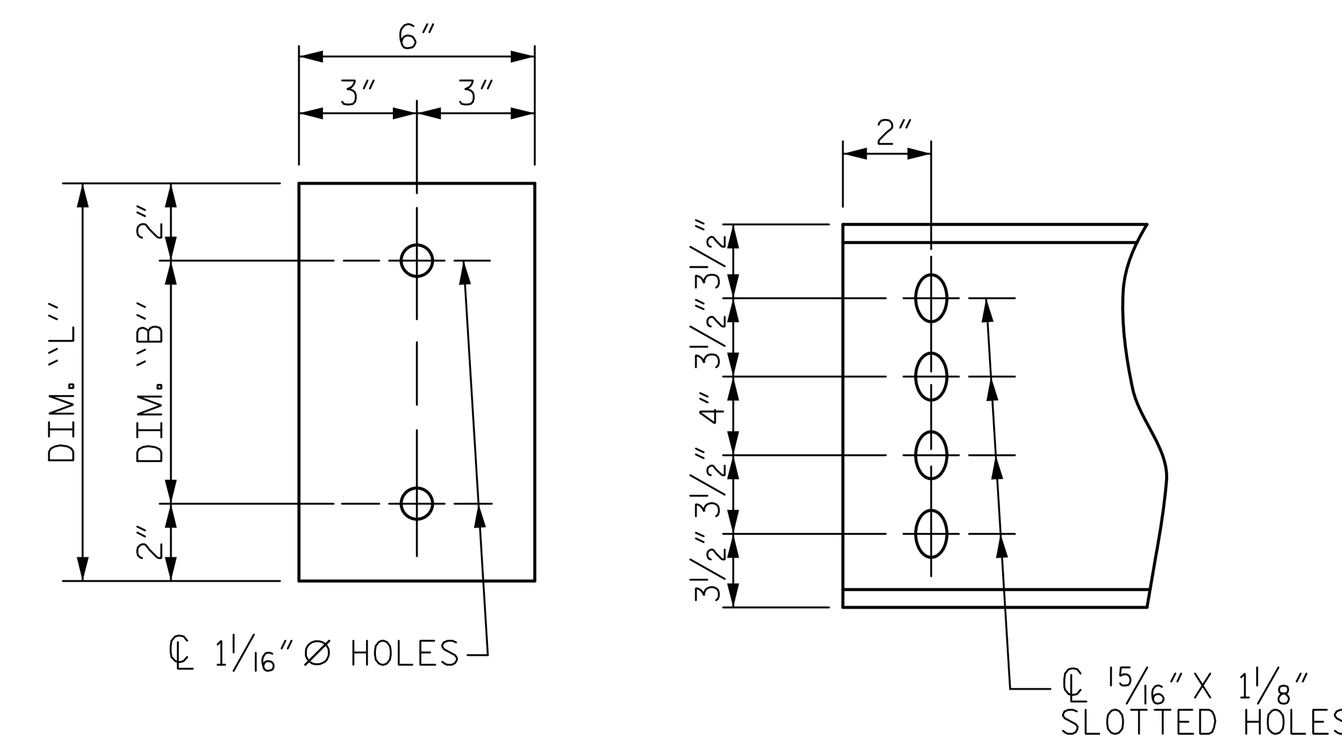


PLATE DETAILS CHANNEL END

STRUCTURAL STEEL NOTES

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

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

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

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

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

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

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

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

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

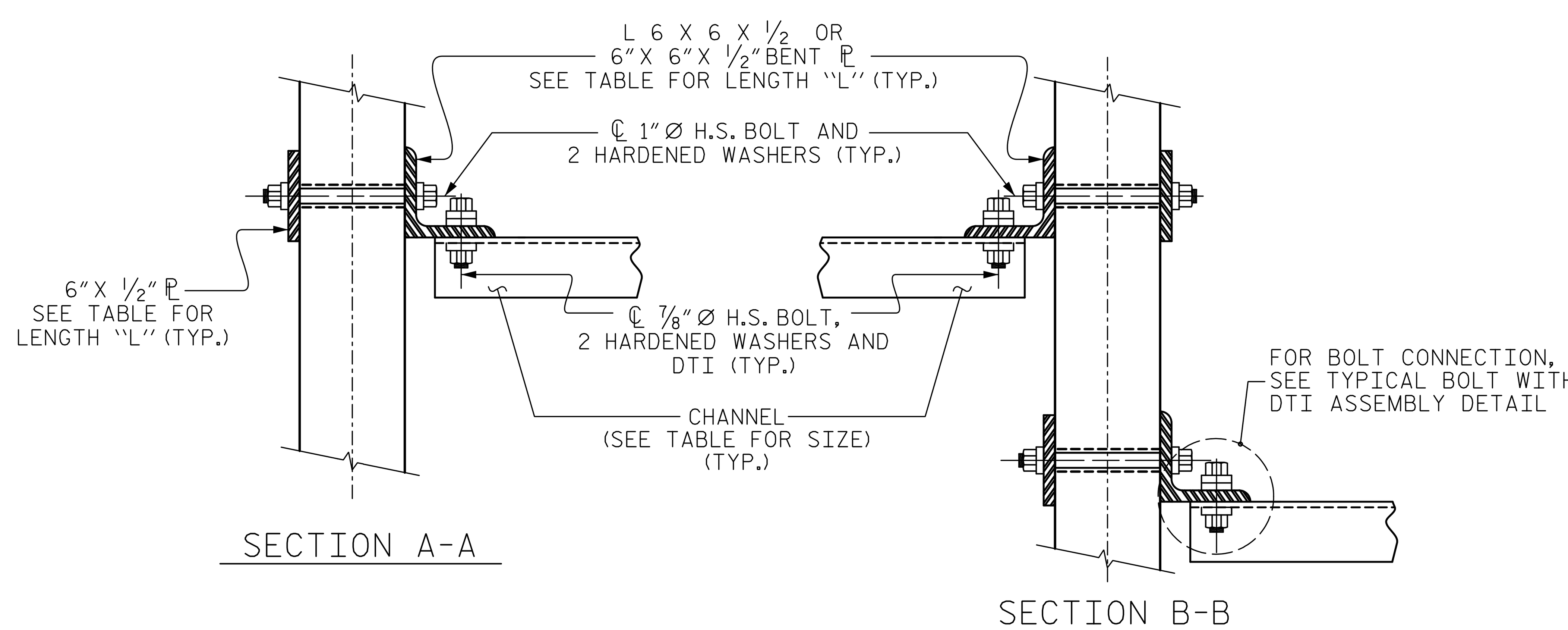
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

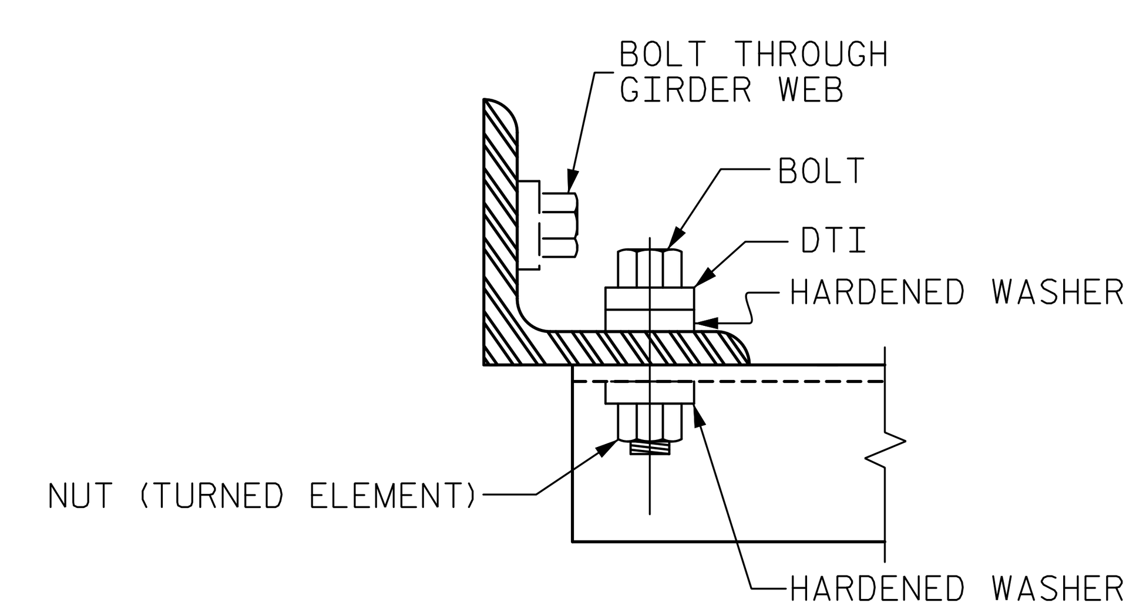
THE COST OF THE STEEL DIAPHRAGMS AND ASSEMBLIES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR PRESTRESSED CONCRETE GIRDERS.

TABLE

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



CONNECTION DETAILS



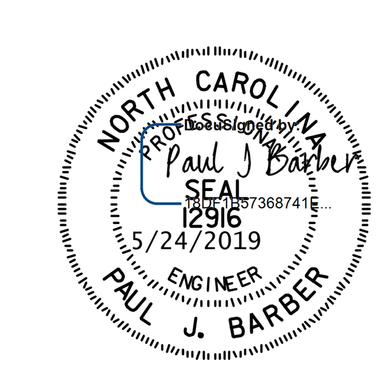
BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 4 OF 4



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS

ASSEMBLED BY : M. WRIGHT		DATE : 10/18	
CHECKED BY : N. HART		DATE : 10/18	
DRAWN BY : TLA 6/05	REV. 5/1/06RRR	KMM/GM	
CHECKED BY : VC 6/05	REV. 10/1/11	MAA/GM	
	REV. 12/17	MAA/THC	

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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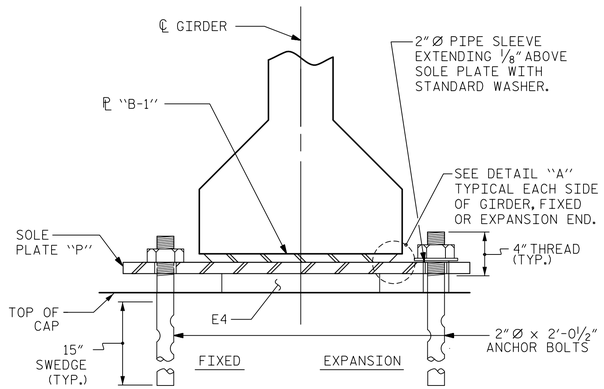
DRAWN BY	M. WRIGHT	DATE 10/18	DWG. NO. 14
CHECKED BY	N. HART	DATE 10/18	
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19	

REVISIONS

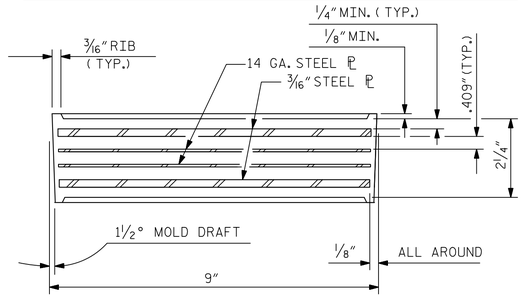
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. S3-14
TOTAL SHEETS 41

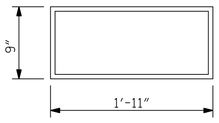
STD. NO. PCG10



SECTION AT FIXED / EXPANSION BEARING



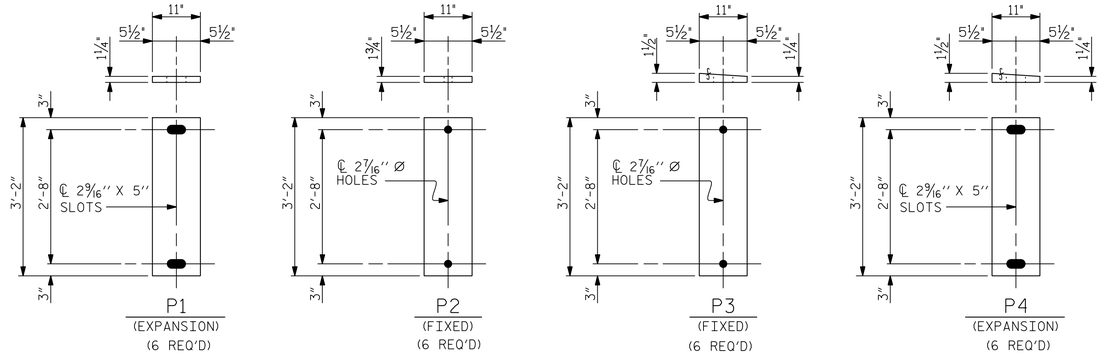
TYPICAL SECTION OF ELASTOMERIC BEARINGS



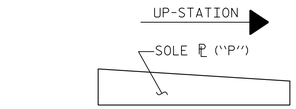
E4 (24 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

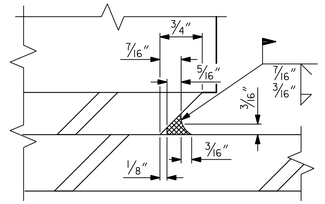
TYPE V



SOLE PLATE DETAILS ("P")



SOLE ℄ PLACEMENT DETAIL



DETAIL "A"

NOTES

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

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

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

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

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

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

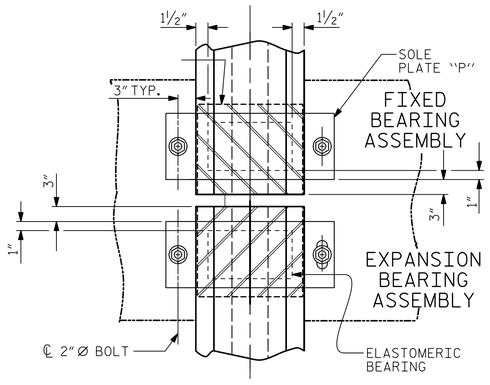
ANCHOR BOLTS SHALL MEET THE REQUIREMENTS OF ASTM A449. NUTS SHALL MEET THE REQUIREMENTS OF AASHTO M291-DH OR AASHTO M292-2H. WASHERS SHALL MEET THE REQUIREMENTS OF AASHTO M293. NO SHOP DRAWINGS ARE REQUIRED FOR ANCHOR BOLTS, NUTS AND WASHERS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.



TYPICAL PLAN

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

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 Paul J Barber 5/24/2019 ENGINEER PAUL J. BARBER

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY	B. STEIB	DATE 2/19
CHECKED BY	D. HAWKINS	DATE 3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 15

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-15
1			3			TOTAL SHEETS
2			4			41

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6"Ø LOW RELAXATION STRANDS	GIRDER 1																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.040	0.079	0.116	0.150	0.180	0.206	0.226	0.241	0.250	0.253	0.250	0.241	0.226	0.206	0.180	0.150	0.116	0.079	0.040	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.029	0.057	0.085	0.111	0.134	0.154	0.170	0.181	0.188	0.190	0.188	0.181	0.170	0.154	0.134	0.111	0.085	0.057	0.029	0.000
FINAL CAMBER ↑	0	1/8	1/4	3/8	7/16	9/16	5/8	11/16	3/4	3/4	3/4	3/4	3/4	11/16	5/8	9/16	7/16	3/8	1/4	1/8	0

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6"Ø LOW RELAXATION STRANDS	GIRDER 2 THRU 5																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.040	0.079	0.116	0.150	0.180	0.205	0.226	0.240	0.249	0.253	0.249	0.240	0.226	0.205	0.180	0.150	0.116	0.079	0.040	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.034	0.069	0.102	0.134	0.162	0.186	0.205	0.219	0.228	0.230	0.228	0.219	0.204	0.186	0.160	0.134	0.100	0.063	0.033	0.000
FINAL CAMBER ↑	0	1/16	1/8	3/16	3/16	3/16	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	1/4	3/16	3/16	3/16	1/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN A

0.6"Ø LOW RELAXATION STRANDS	GIRDER 6																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.040	0.079	0.116	0.150	0.179	0.205	0.225	0.240	0.249	0.252	0.249	0.240	0.225	0.205	0.179	0.150	0.116	0.079	0.040	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.032	0.063	0.095	0.124	0.150	0.172	0.190	0.203	0.211	0.213	0.211	0.203	0.190	0.172	0.150	0.124	0.095	0.063	0.032	0.000
FINAL CAMBER ↑	0	1/8	3/16	1/4	5/16	3/8	3/8	7/16	7/16	7/16	7/16	7/16	7/16	7/16	7/16	3/8	3/8	5/16	1/4	3/16	1/8	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6"Ø LOW RELAXATION STRANDS	GIRDER 1																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.034	0.067	0.098	0.126	0.152	0.173	0.190	0.202	0.210	0.213	0.210	0.202	0.190	0.173	0.152	0.126	0.098	0.067	0.034	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.023	0.046	0.068	0.090	0.108	0.124	0.137	0.146	0.152	0.153	0.152	0.146	0.137	0.124	0.108	0.090	0.068	0.046	0.023	0.000
FINAL CAMBER ↑	0	1/8	1/4	3/8	7/16	1/2	9/16	5/8	11/16	11/16	3/4	11/16	11/16	5/8	9/16	1/2	7/16	3/8	1/4	1/8	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6"Ø LOW RELAXATION STRANDS	GIRDER 2 THRU 5																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.034	0.067	0.098	0.126	0.152	0.173	0.190	0.202	0.210	0.213	0.210	0.202	0.190	0.173	0.152	0.126	0.098	0.067	0.034	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.027	0.054	0.081	0.106	0.128	0.148	0.162	0.174	0.181	0.183	0.181	0.174	0.162	0.148	0.128	0.106	0.081	0.054	0.027	0.000
FINAL CAMBER ↑	0	1/16	1/8	3/16	1/4	5/16	5/16	5/16	5/16	3/8	3/8	3/8	5/16	5/16	5/16	5/16	1/4	3/16	1/8	1/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6"Ø LOW RELAXATION STRANDS	GIRDER 6																					
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.034	0.067	0.098	0.126	0.151	0.173	0.190	0.202	0.210	0.212	0.210	0.202	0.190	0.173	0.151	0.126	0.098	0.067	0.034	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. * ↓	0.000	0.025	0.050	0.075	0.098	0.118	0.135	0.149	0.160	0.166	0.168	0.166	0.160	0.149	0.135	0.118	0.098	0.075	0.050	0.025	0.000
FINAL CAMBER ↑	0	1/8	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	1/8	0

* INCLUDES FUTURE WEARING SURFACE IN SUPERIMPOSED DEAD LOAD. DOES NOT INCLUDE WEIGHT OF FORM LINER.

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

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 6/7/2019 ENGINEER PAUL J. BARBER

Digitally signed by: Paul J. Barber

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

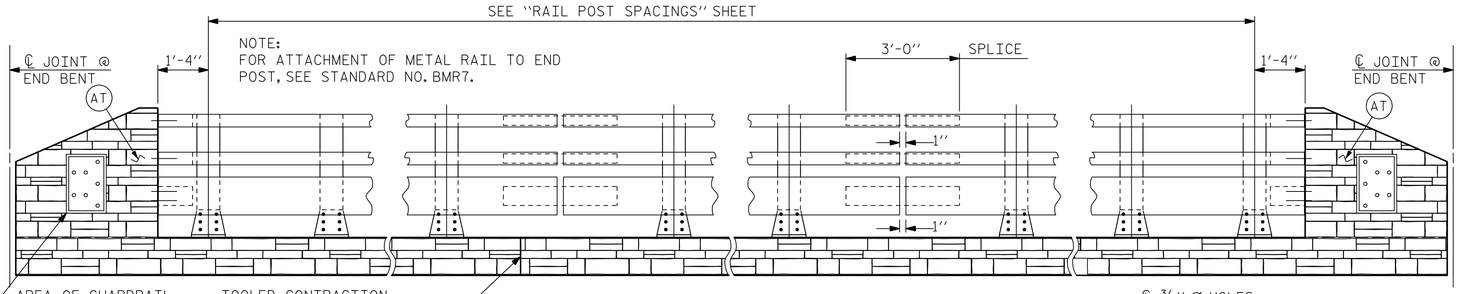
DRAWN BY D.WITHERSPOON DATE 2/19
CHECKED BY N.HART DATE 2/19
DESIGN ENGINEER OF RECORD P. BARBER DATE 5/19

DWG. NO. 16

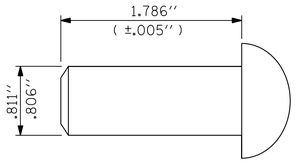
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DEAD LOAD DEFLECTIONS

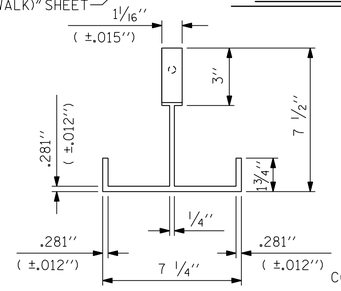
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-16
1			3			TOTAL SHEETS
2			4			41



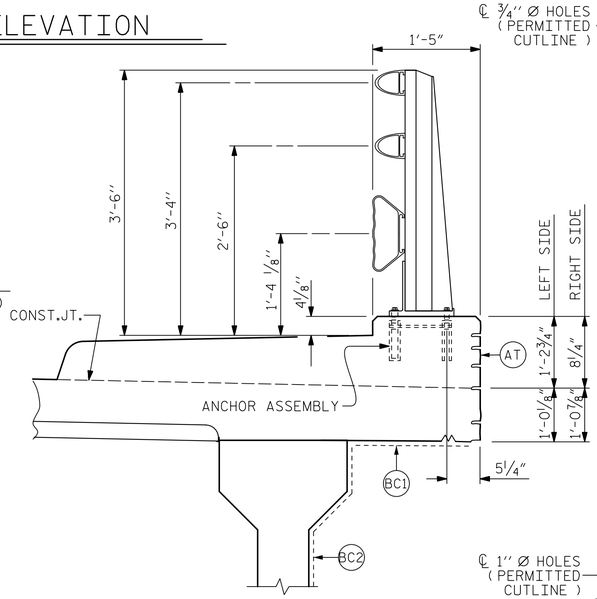
ELEVATION



RIVET DETAIL



PLAN



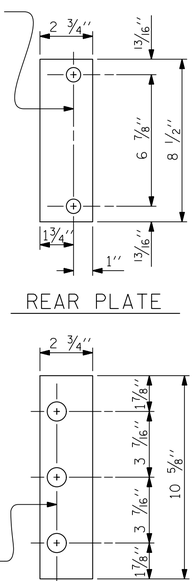
SECTION THRU RAIL

FOR ANCHOR ASSEMBLY, SEE "3 BAR METAL RAIL" STD.No.BMR6

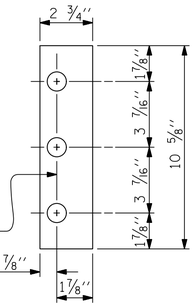
(AT) LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

(BC1) LIMITS OF BRIDGE COATING (LIGHT GRAY)

(BC2) LIMITS OF BRIDGE COATING (DARK GRAY)



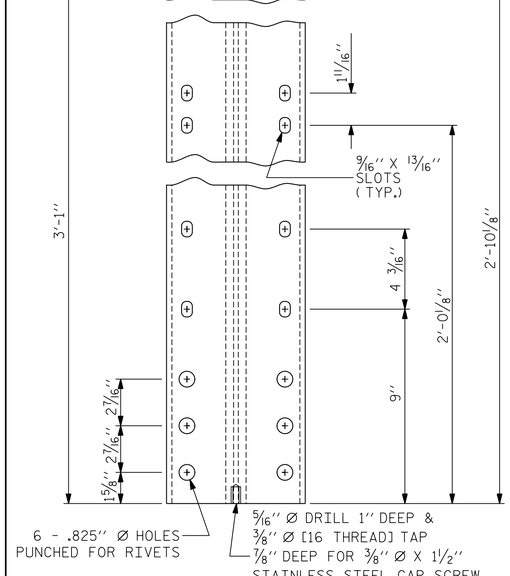
REAR PLATE



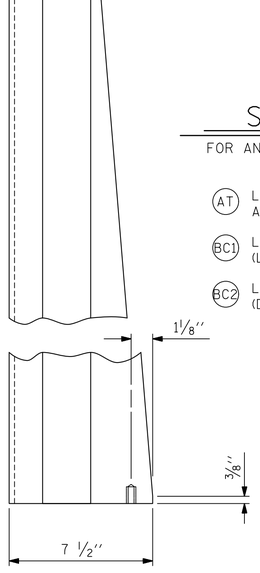
FRONT PLATE

SHIM DETAILS

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

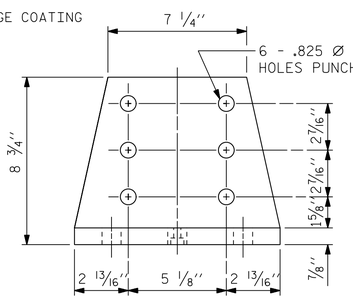


FRONT ELEVATION

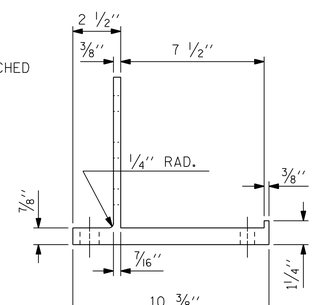


SIDE ELEVATION

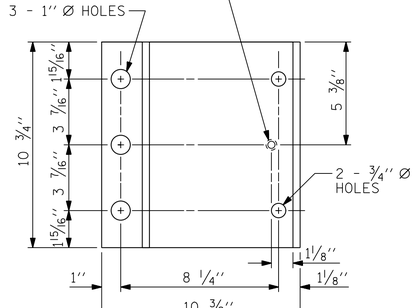
DETAILS OF POST



FRONT ELEVATION



SIDE ELEVATION



PLAN

POST BASE DETAILS

DETAILS OF POST

NOTES

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B221 ALLOY 6061-T6, AND ANODIZED

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

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

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

GENERAL NOTES

RAILING SHALL BE CONTINUOUS FROM END POST TO END POST OF BRIDGE. EACH JOINT IN RAIL LENGTH SHALL BE SPLICED AS DETAILED. PANEL LENGTHS OF RAIL SHALL BE ATTACHED TO A MINIMUM OF THREE POSTS. PLACE ONE JOINT SPLICE JUST BEYOND THE 3RD RAIL POST FROM EACH END, TYPICALLY 14' FROM THE END. PLACE OTHER JOINTS AS NEEDED.

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE STANDARD NO. BMR7.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

FOR ANODIZED THREE BAR METAL RAIL, SEE SPECIAL PROVISIONS

PAY LENGTH = 401.17 LIN.FT.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ANODIZED
3 BAR METAL RAIL

ASSEMBLED BY : M. WRIGHT	DATE : 10/18
CHECKED BY : N. HART	DATE : 10/18
DRAWN BY : JMB 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : GGH 1/88	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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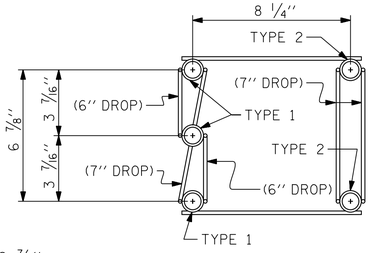
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT	DATE 10/18
CHECKED BY N. HART	DATE 10/18
DESIGN ENGINEER OF RECORD P. BARBER	DATE 5/19

DWG. NO. 17

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-17
1			3			TOTAL SHEETS
2			4			41

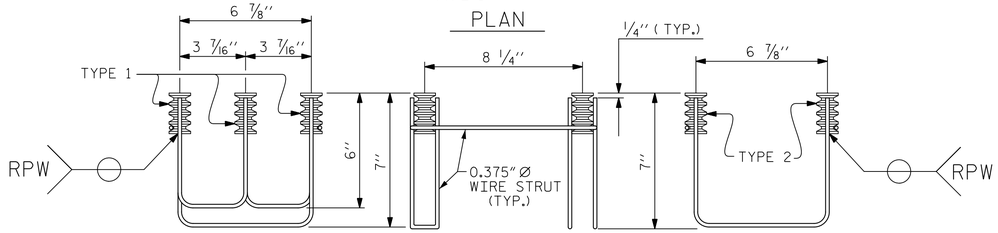
STD. NO. BMR5



TYPE 1 FERRULE — THREADED STEEL FERRULES WITH CLOSED BOTTOM TO FIT 3/4'' Ø BOLT WITH ROUND WASHER.

TYPE 2 FERRULE — THREADED STEEL FERRULES WITH CLOSED BOTTOM TO FIT 5/8'' Ø BOLT WITH ROUND WASHER.

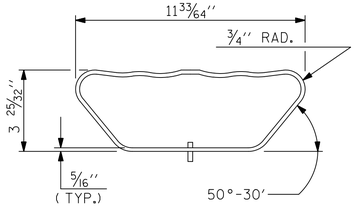
PLAN



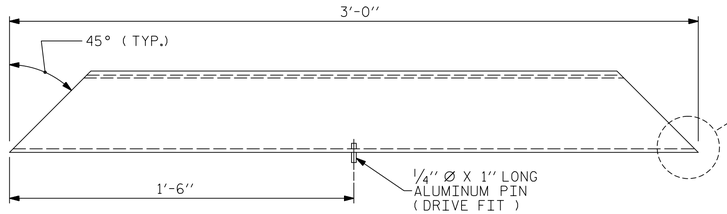
LEFT SIDE VIEW — ELEVATION — RIGHT SIDE VIEW

5-BOLT METAL RAIL ANCHOR ASSEMBLY

(72 ASSEMBLIES REQUIRED)

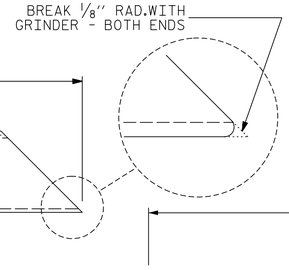


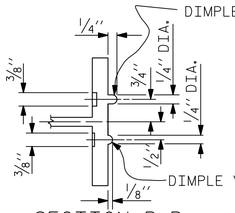
END VIEW



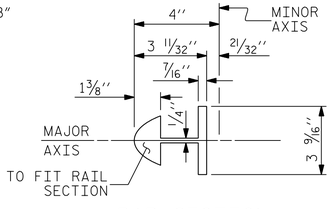
PLAN VIEW

BOTTOM RAIL EXPANSION BAR

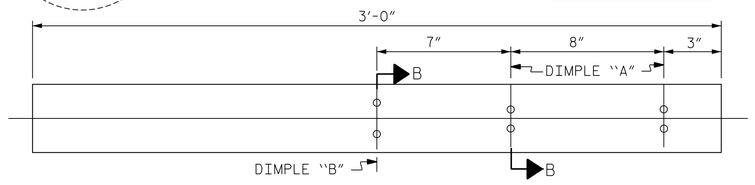




SECTION B-B

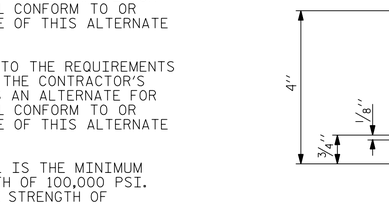


BAR SECTION



BACK ELEVATION

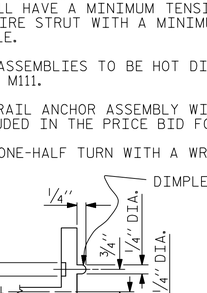
TOP & MIDDLE RAIL EXPANSION BAR



TOP & MIDDLE RAIL CAP

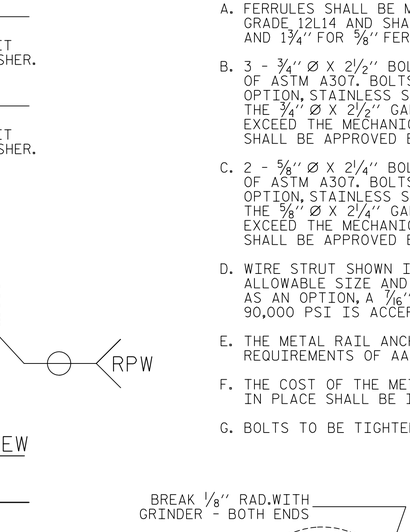
CLAMP ASSEMBLY

TOP RAIL SHOWN
(MIDDLE & BOTTOM RAIL ARE SIMILAR)



BOTTOM RAIL CAP

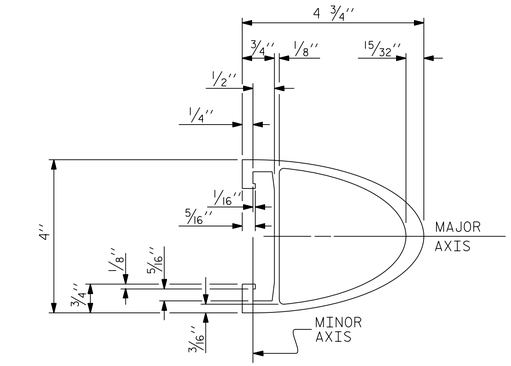
ELEVATION



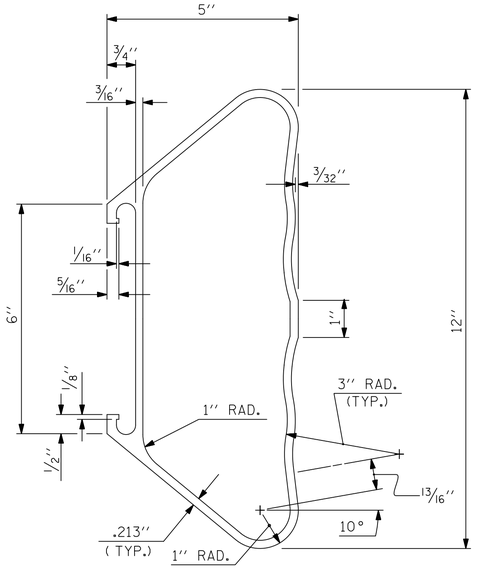
SECTION X-X

CLAMP BAR DETAIL

(6 REQUIRED PER POST)



TOP & MIDDLE RAIL SECTION



BOTTOM RAIL SECTION

PROJECT NO. I-4400C

HENDERSON **COUNTY**

STATION: POC 17+01.02 -Y11-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
ANODIZED
3 BAR METAL RAIL

Signed by: P. Barber

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 6/7/2019 ENGINEER PAUL J. BARBER

ASSEMBLED BY : M. WRIGHT	DATE : 10/18
CHECKED BY : N. HART	DATE : 10/18
DRAWN BY : JMB 1/88	REV. 5/1/06 TLA/GM
CHECKED BY : GGH 1/88	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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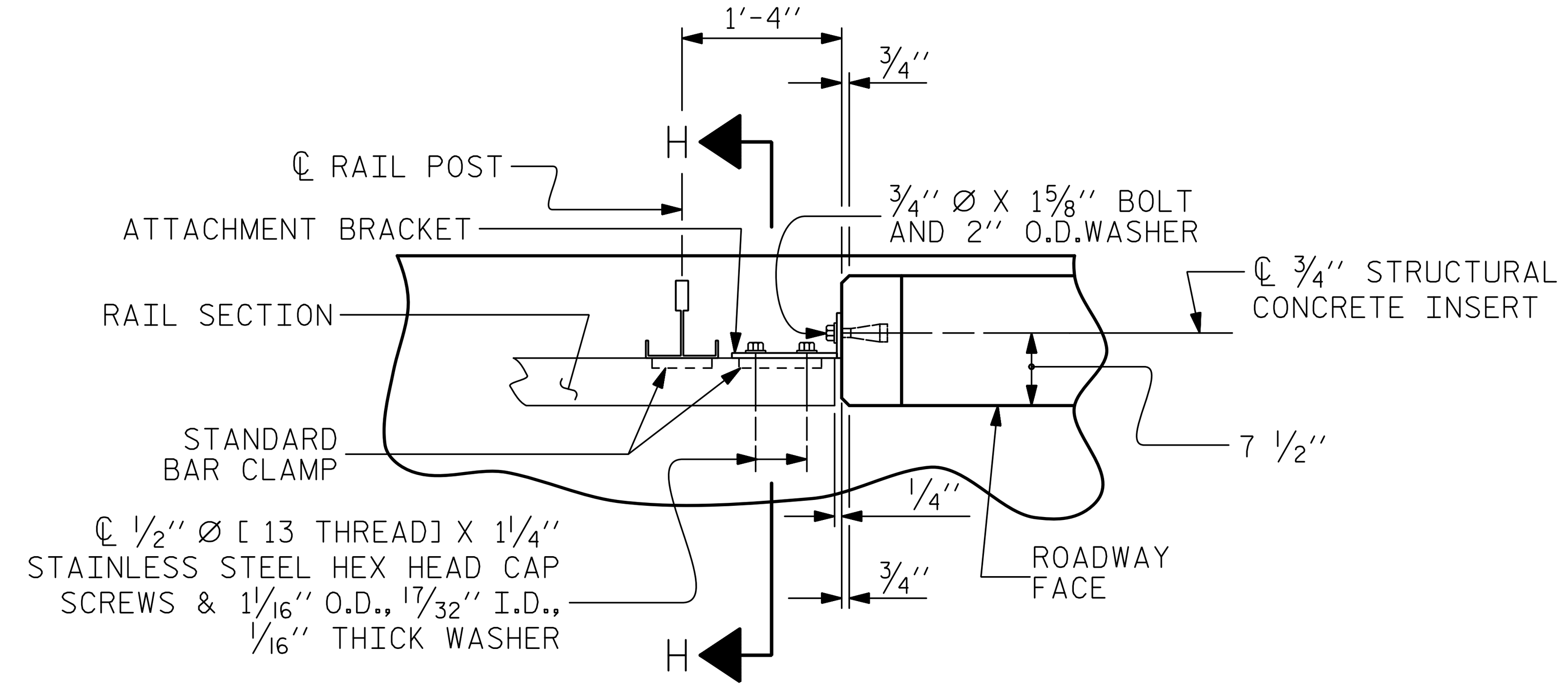
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 10/18
CHECKED BY	N. HART	DATE 10/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 18

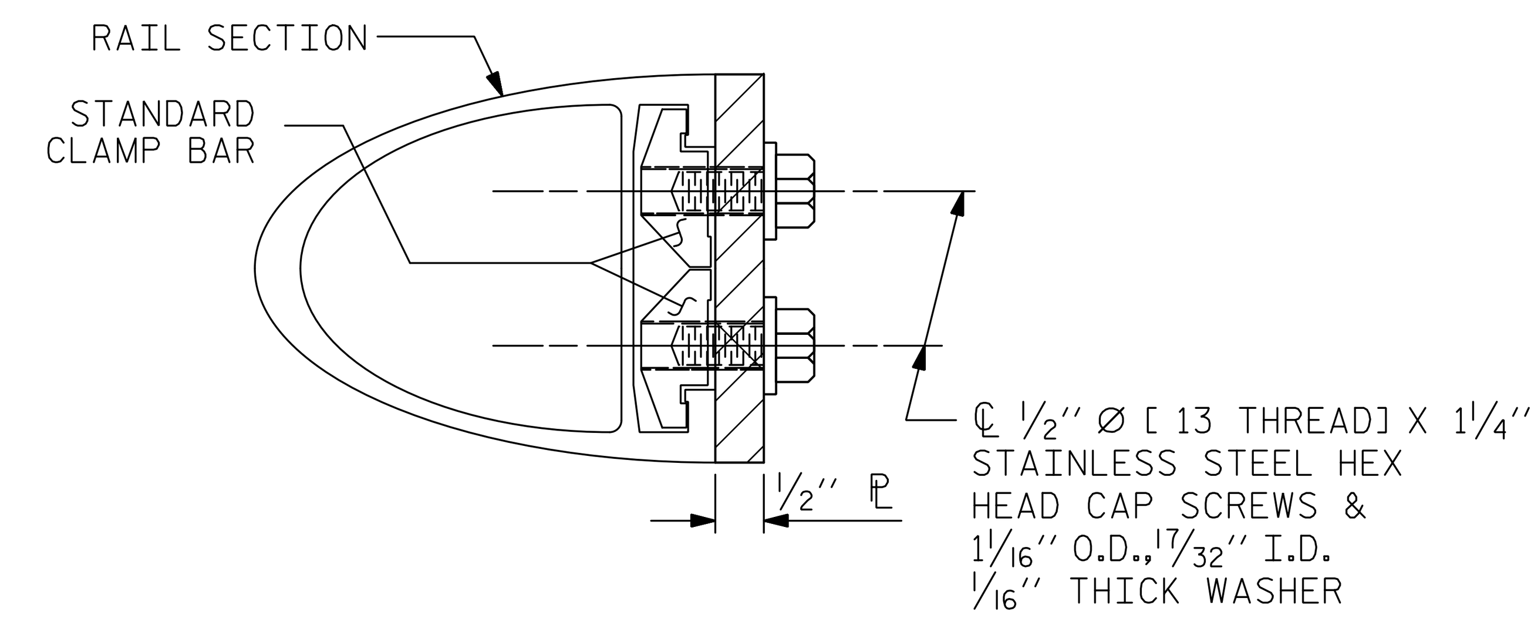
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-18
1			3			TOTAL SHEETS
2			4			41

STD. NO. BMR6



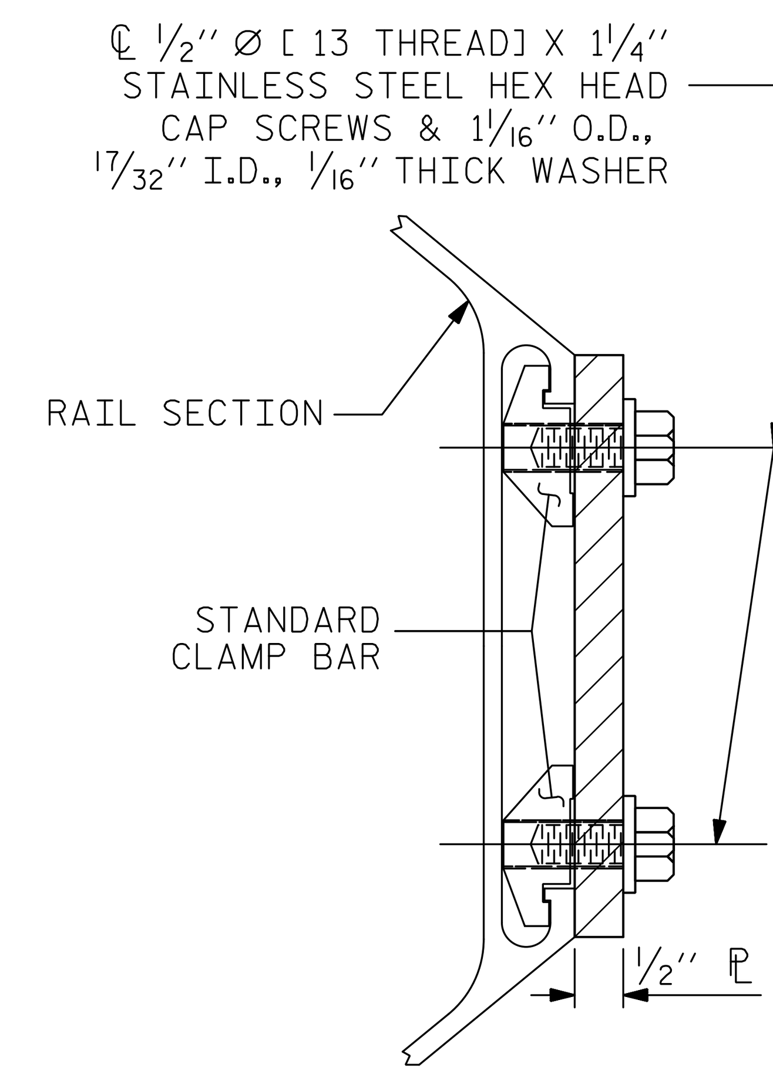
PLAN OF RAIL AND END POST

(STIFFENER ON 1/2" ℙ NOT SHOWN FOR CLARITY)



SECTION H-H

(FOR TOP & MIDDLE RAIL)



SECTION H-H

(FOR BOTTOM RAIL)

NOTES

METAL RAIL TO END POST CONNECTION

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

A. 1/2" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. 3/4" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A 3/4" Ø X 1 5/8" BOLT WITH 2" O.D. WASHER IN PLACE. THE 3/4" Ø X 1 5/8" BOLT SHALL HAVE N. C. THREADS.

C. CAP SCREWS FOR RAIL ATTACHMENT TO ANGLE SHALL CONFORM TO THE REQUIREMENTS OF ASTM F593 ALLOY 305 STAINLESS STEEL. CAP SCREWS TO BE CENTERED IN SLOTS AT 60°F. WASHERS FOR RAIL ATTACHMENT SHALL MEET THE REQUIREMENTS OF ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL.

D. STANDARD CLAMP BARS (STD. No. BMR6).

THE COST OF THE STANDARD CLAMP BARS AND CAP SCREWS USED IN THE METAL RAIL TO END POST CONNECTION SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE BID FOR LINEAR FEET OF 3 BAR METAL RAIL.

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

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

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

NOTES

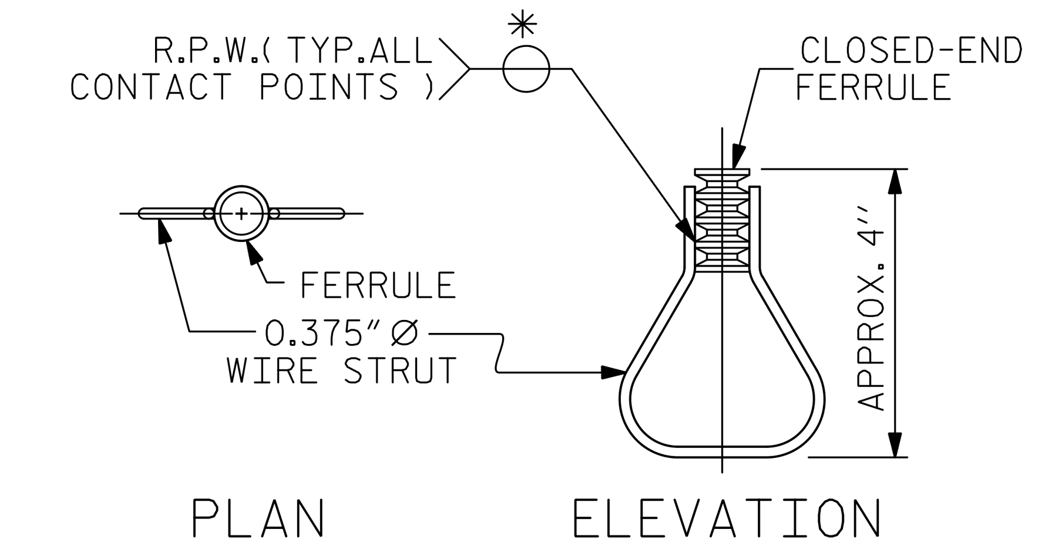
STRUCTURAL CONCRETE INSERT

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 1 1/2".

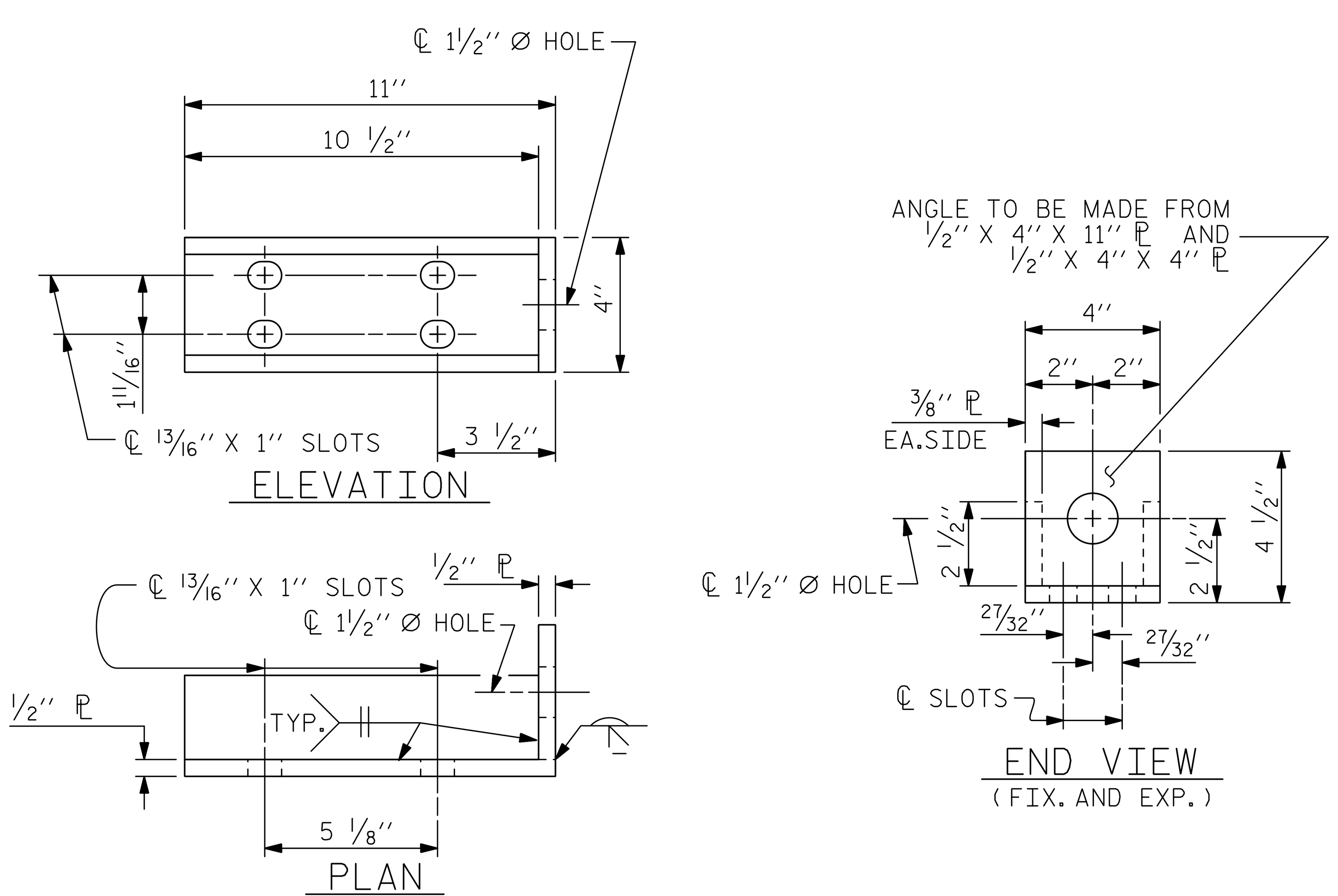
B. 1 - 3/4" Ø X 1 5/8" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. AT THE CONTRACTORS OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 1 5/8" GALVANIZED BOLT AND WASHER. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

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



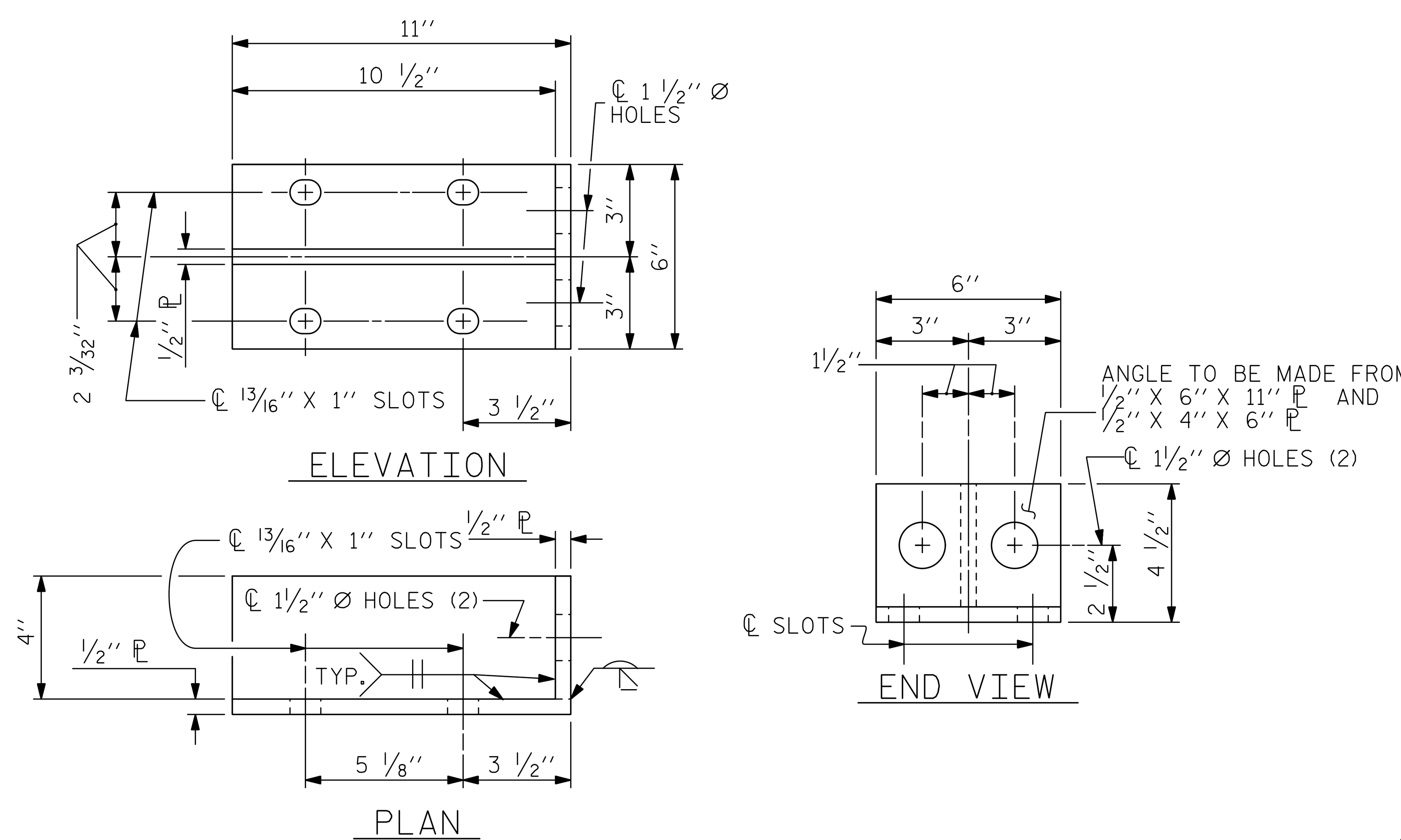
STRUCTURAL CONCRETE INSERT

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



DETAILS FOR ATTACHMENT BRACKET

(TOP & MIDDLE RAIL ONLY)



DETAILS FOR ATTACHMENT BRACKET

(BOTTOM RAIL ONLY)

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 3 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER 5/24/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

3 BAR METAL RAIL

ASSEMBLED BY : M. WRIGHT		DATE : 10/18	
CHECKED BY : N. HART		DATE : 10/18	
DRAWN BY : JMB 1/88	REV. 5/1/06	TLA/GM	
CHECKED BY : GGH 1/88	REV. 10/1/11	MAA/GM	
	REV. 12/17	MAA/THC	

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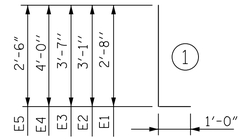
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE	10/18	DWG. NO. 19
CHECKED BY	N. HART	DATE	10/18	
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	5/19	

REVISIONS								SHEET NO.
NO.	BY	DATE	NO.	BY	DATE			S3-19
1			3					TOTAL SHEETS
2			4					41

STD. NO. BMR7

BAR TYPE



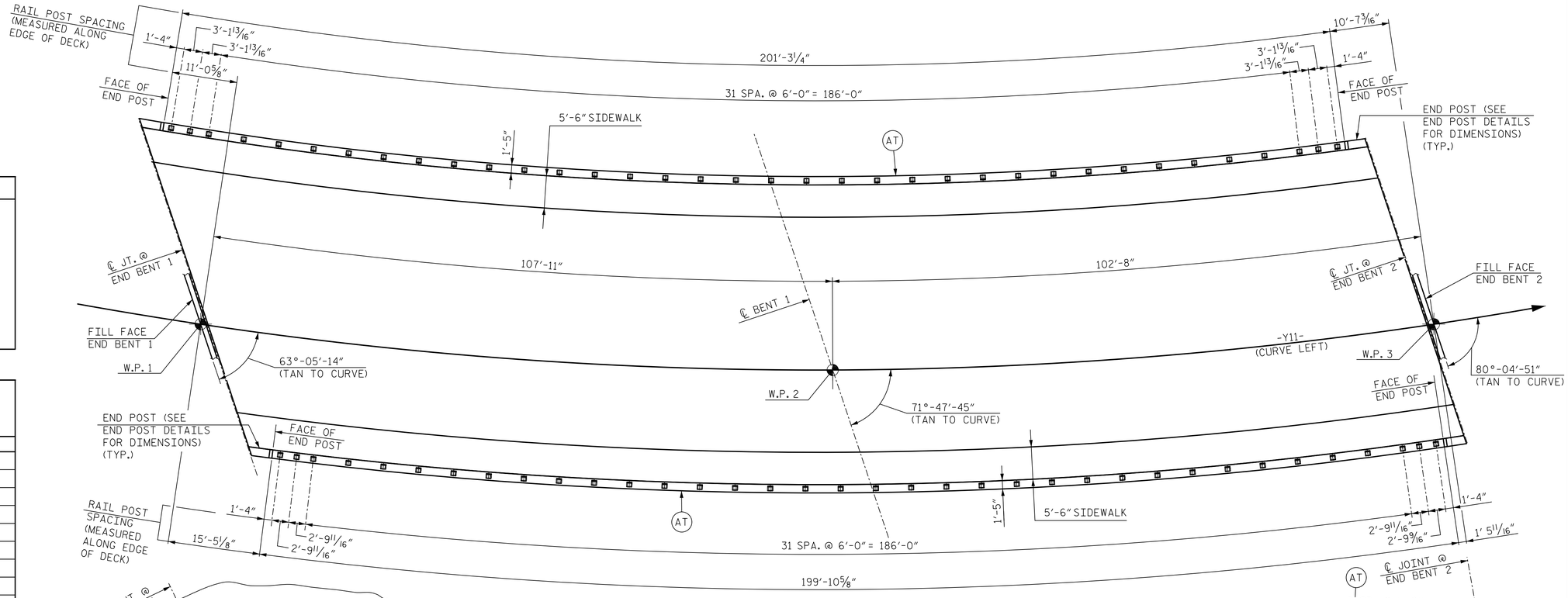
ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL FOR ONE END POST AT END BENT 1 (2 REQUIRED)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ E1	2	#7	1	3'-8"	15
✳ E2	2	#7	1	4'-1"	17
✳ E3	2	#7	1	4'-7"	19
✳ E4	2	#7	1	5'-0"	20
✳ E5	1	#7	1	3'-6"	7
✳ F1	2	#6	STR.	1'-9"	5
✳ F2	2	#6	STR.	3'-3"	10
✳ F3	2	#6	STR.	3'-11"	12
✳ F4	1	#6	STR.	4'-1"	6
✳ F5	2	#6	STR.	3'-6"	11
✳ F6	1	#6	STR.	3'-9"	6
✳ EPOXY COATED REINFORCING STEEL					128 LBS.
CLASS AA CONCRETE					0.6 CU. YDS.
ARCHITECTURAL CONCRETE SURFACE TREATMENT (2 POSTS)					22.0 SQ. FT.

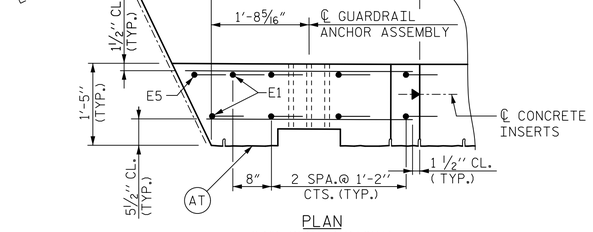
BILL OF MATERIAL FOR ONE END POST AT END BENT 2 (2 REQUIRED)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ E1	2	#7	1	3'-8"	15
✳ E2	2	#7	1	4'-1"	17
✳ E3	2	#7	1	4'-7"	19
✳ E4	2	#7	1	5'-0"	20
✳ E5	1	#7	1	3'-6"	7
✳ F1	2	#6	STR.	1'-9"	5
✳ F2	2	#6	STR.	3'-3"	10
✳ F3	2	#6	STR.	3'-6"	11
✳ F4	1	#6	STR.	3'-10"	6
✳ F5	2	#6	STR.	3'-7"	11
✳ F6	1	#6	STR.	3'-8"	6
✳ EPOXY COATED REINFORCING STEEL					127 LBS.
CLASS AA CONCRETE					0.5 CU. YDS.
ARCHITECTURAL CONCRETE SURFACE TREATMENT (2 POSTS)					20.9 SQ. FT.

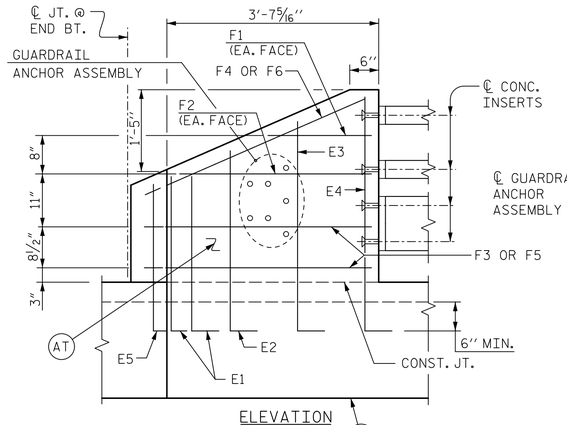


PLAN OF RAIL POST SPACINGS

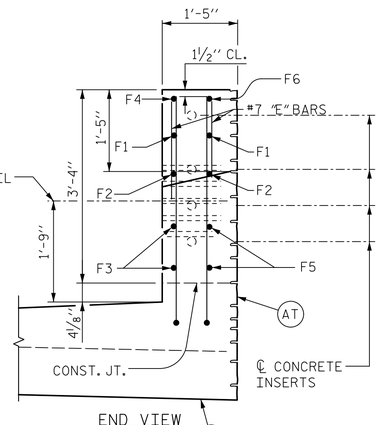
NOTE: POST CENTERLINE SHALL NOT BE LOCATED LESS THAN 1'-0" FROM CONTRACTION JOINT IN SIDEWALK AND PARAPET. FOR OTHER CONTRACTION JOINT REQUIREMENTS, SEE "SIDEWALK DETAILS" SHEET.



PLAN
(END BENT 1 RIGHT)



ELEVATION



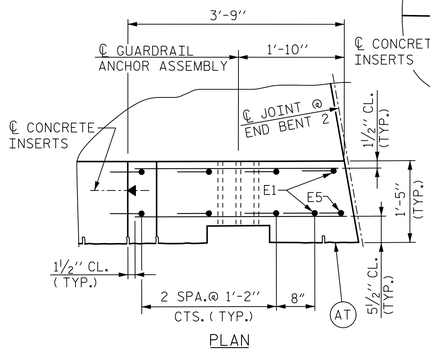
END VIEW

END POST DETAILS

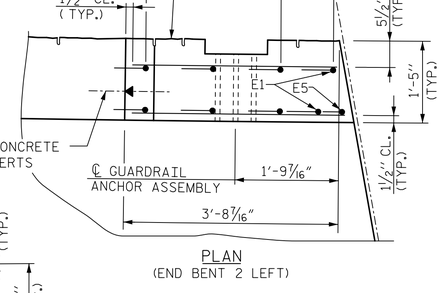
END POST AT END BENT 1 SHOWN
END POST AT END BENT 2 SIMILAR

(AT) LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

(BC1) LIMITS OF BRIDGE COATING (LIGHT GRAY)



PLAN
(END BENT 2 RIGHT SHOWN, END BENT 1 LEFT SIMILAR)



PLAN
(END BENT 2 LEFT)

PROJECT NO. I-4400C
HENDERSON **COUNTY**
STATION: POC 17+01.02 -Y11-

Digitally signed by: Paul J. Barber

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

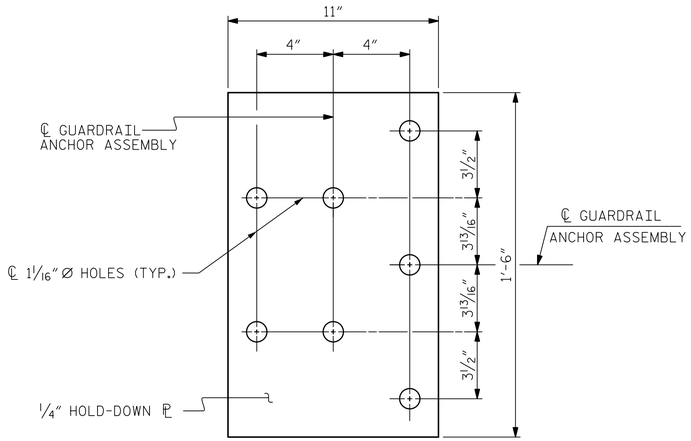
DRAWN BY	M. WRIGHT	DATE 10/18
CHECKED BY	N. HART	DATE 10/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 20

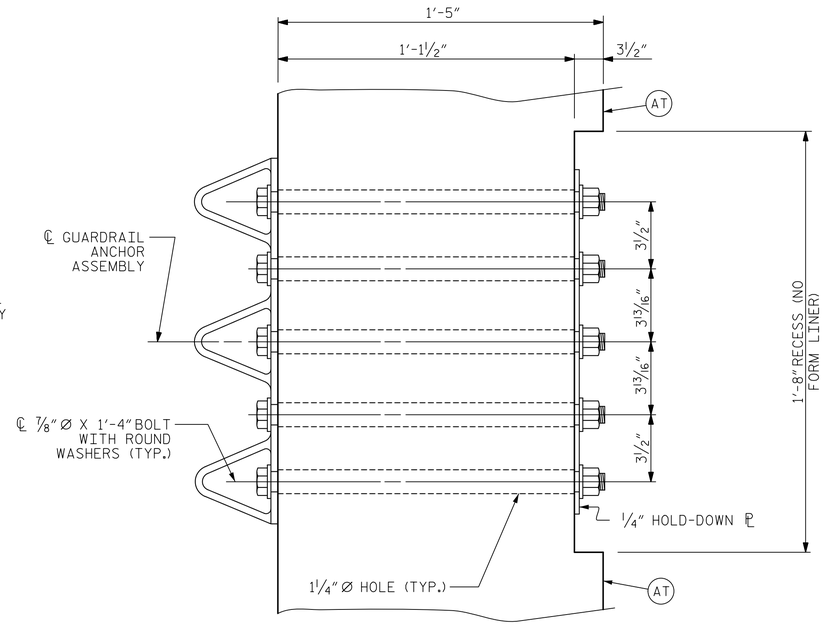
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE RAIL POST SPACING AND END OF RAIL DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-20
1			3			TOTAL SHEETS
2			4			41



PLAN



END VIEW

GUARDRAIL ANCHOR ASSEMBLY DETAILS

NOTES

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

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

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

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

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

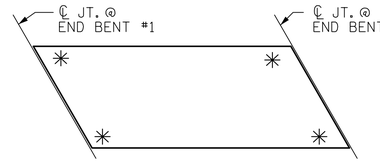
THE COST OF THE GUARDRAIL ANCHOR ASSEMBLIES WITH BOLTS, NUTS AND WASHERS COMPLETE IN PLACE, SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS.

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

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

RECESSED AREA BELOW HOLD DOWN PLATE SHALL BE FINISHED SMOOTH TO ALLOW FOR COMPLETE SEATING OF PLATE AGAINST BACK OF CONCRETE BARRIER.

FOR GUARDRAIL ANCHORAGE LOCATION, SEE "RAIL POST SPACING AND END OF RAIL DETAILS".

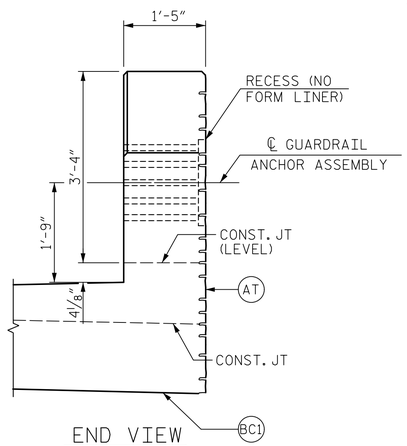


SKETCH SHOWING POINTS OF ATTACHMENT

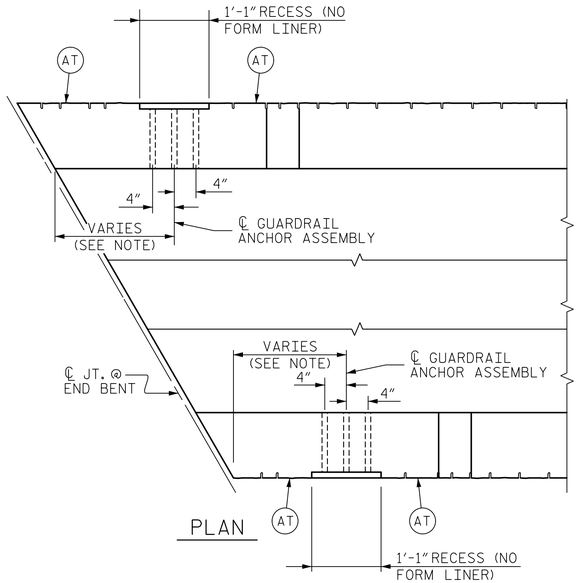
✳ LOCATION OF GUARDRAIL ATTACHMENT

(AT) LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

(BC1) LIMITS OF BRIDGE COATING (LIGHT GRAY)



END VIEW



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 29216 6/7/2019 PAUL J. BARBER

Digitally signed by: Paul N. Barber

ASSEMBLED BY : M. WRIGHT	DATE : 10/18		
CHECKED BY : N. HART	DATE : 10/18		
DRAWN BY : MAA 5/10	REV. 1/15	MAA/TMG	
CHECKED BY : GM 5/10	REV. 12/17	MAA/THC	
	REV. 5/18	MAA/THC	

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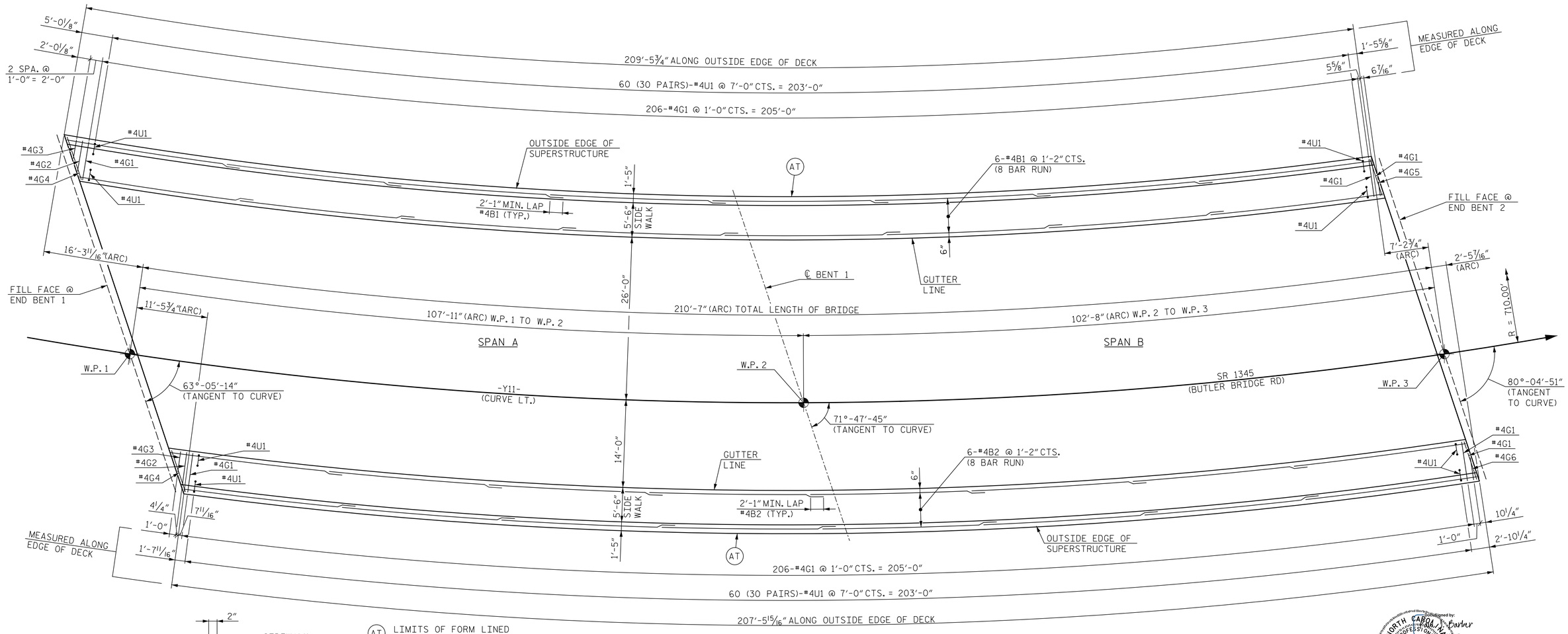
DRAWN BY	M. WRIGHT	DATE	10/18
CHECKED BY	N. HART	DATE	10/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	5/19

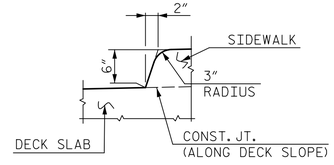
DWG. NO. 21

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-21
1			3			TOTAL SHEETS
2			4			41

STD. NO. GRA3



PLAN OF SIDEWALK

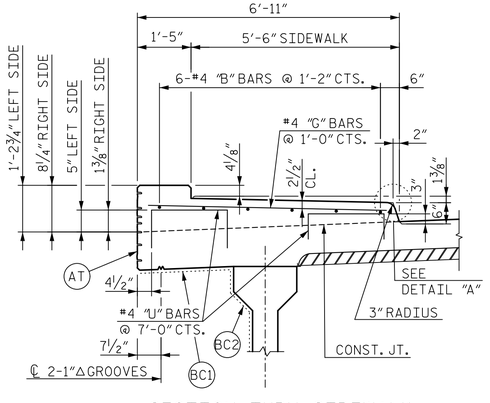


DETAIL "A"

(AT) LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

(BC1) LIMITS OF BRIDGE COATING (LIGHT GRAY)

(BC2) LIMITS OF BRIDGE COATING (DARK GRAY)



SECTION THRU SIDEWALK

NOTES:

ALL REINFORCING STEEL IN SIDEWALK SHALL BE EPOXY COATED.

PAYMENT FOR THE SIDEWALK SHALL BE INCLUDED IN THE SQUARE FEET PRICE BID FOR REINFORCED CONCRETE DECK SLAB.

FOR SIDEWALK COVER PLATE DETAILS AT END BENTS, SEE "EXPANSION JOINT SEAL DETALS FOR SIDEWALK" SHEETS.

GROOVED CONTRACTION JOINTS 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK OTHER THAN FACES WITH ARCHITECTURAL TREATMENT IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH. SEE "RAIL POST SPACING AND END OF RAIL DETAILS" SHEET FOR ADDITIONAL NOTES.

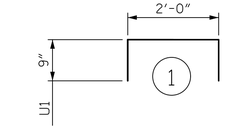
CONTRACTION JOINTS SHALL BE NORMAL TO WORKLINE.

REINFORCING BAR SCHEDULE

EPOXY COATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
B1	48	4	STR	28'-0"	898
B2	48	4	STR	27'-9"	890
G1	414	4	STR	6'-4"	1,751
G2	2	4	STR	5'-1"	7
G3	2	4	STR	3'-2"	4
G4	2	4	STR	7'-0"	9
G5	1	4	STR	2'-4"	2
G6	1	4	STR	3'-7"	2
U1	120	4	1	3'-6"	281
				EPOXY COATED TOTAL:	3,844

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SIDEWALK BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU.YDS.)	(LBS.)
SIDEWALK	66.3	3,844
TOTALS	66.3	3,844

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

SIDEWALK DETAILS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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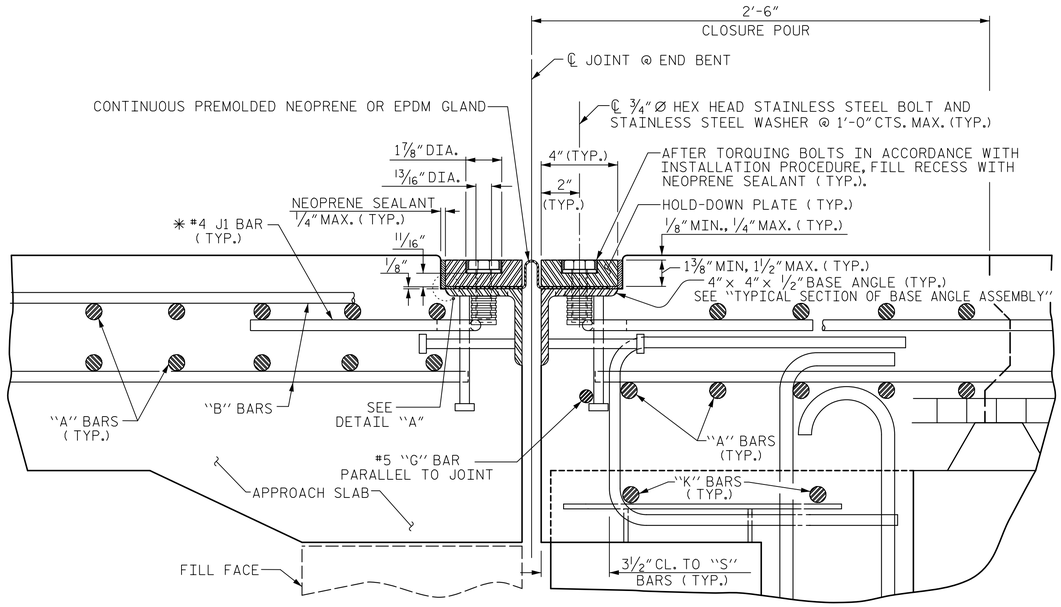
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 3/19
CHECKED BY	N. HART	DATE 3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 22

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-22
1			3			TOTAL SHEETS
2			4			41



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

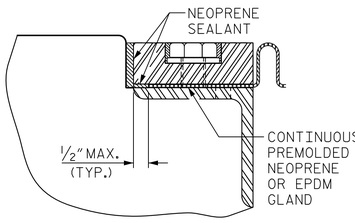
✳ THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

INSTALLATION PROCEDURE

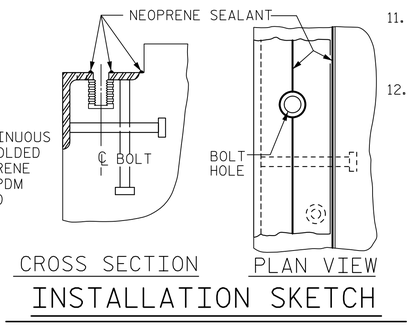
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4⅛" TO 4¼" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO 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 TORQUING, CLEAN THE BOLT HOLE RECESSES, THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, AND THE LIFTING HOLES IN THE HOLD-DOWN PLATE, AND COMPLETELY FILL THE RECESSES AND LIFTING HOLES WITH NEOPRENE SEALANT.

GENERAL NOTES

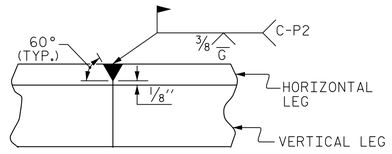
1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS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

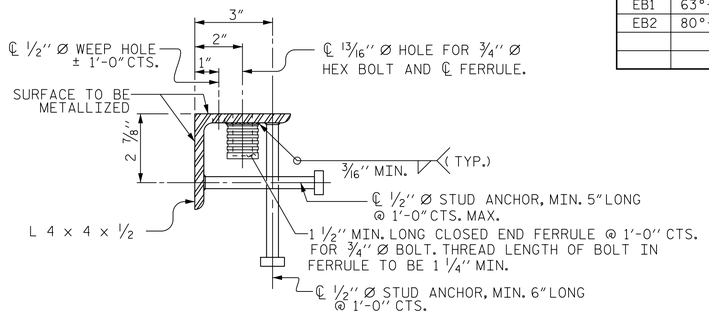


INSTALLATION SKETCH



DETAIL- FIELD WELD SPLICE OF BASE ANGLE

MOVEMENT AND SETTING AT JOINT					
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
EB1	63°-05'-14"	1 1/16"	1½"	1⅜"	1³⁄₁₆"
EB2	80°-04'-51"	⅝"	1½"	1⅜"	1³⁄₁₆"



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036736 Paul J Barber 12916 5/24/2019 ENGINEER PAUL J. BARBER

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS

ASSEMBLED BY : M. WRIGHT	DATE : 11/18
CHECKED BY : N. HART	DATE : 11/18
DRAWN BY : REK 9/87	REV. 10/1/11 MAA/GM
CHECKED BY : CRK 10/87	REV. 10/17 MAA/THC
	REV. 6/18 MAA/THC

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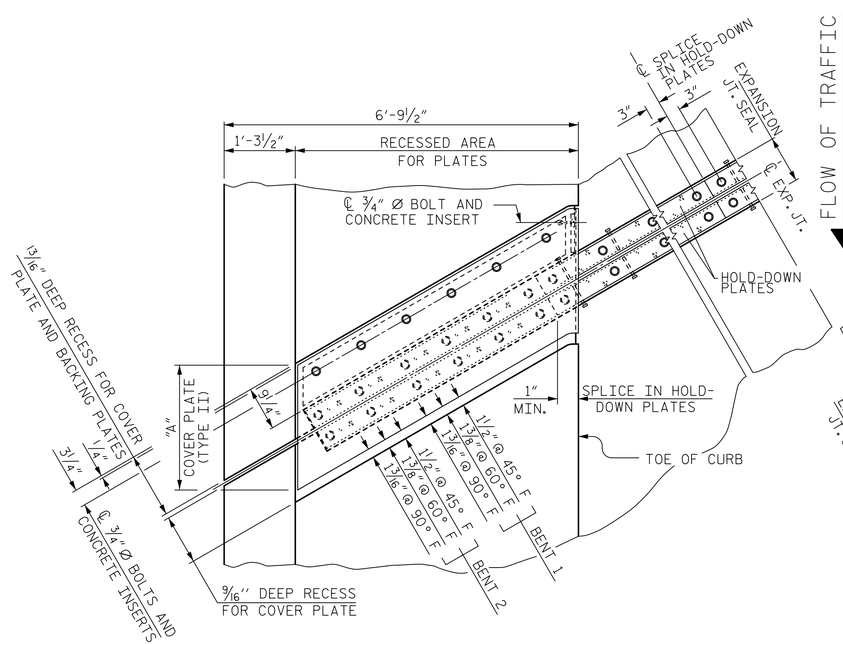
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY	M. WRIGHT	DATE 11/18
CHECKED BY	N. HART	DATE 11/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

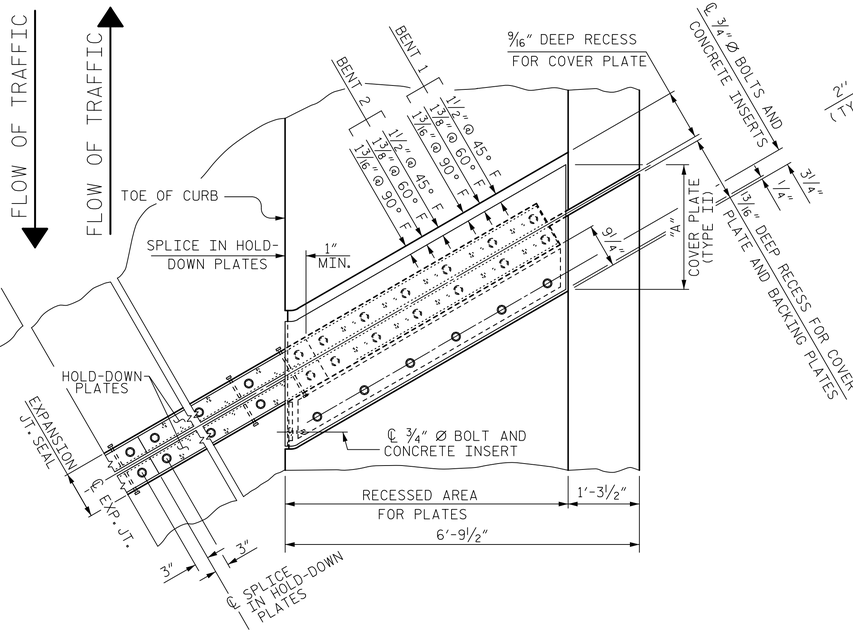
DWG. NO. 23

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-23
1			3			TOTAL SHEETS
2			4			41

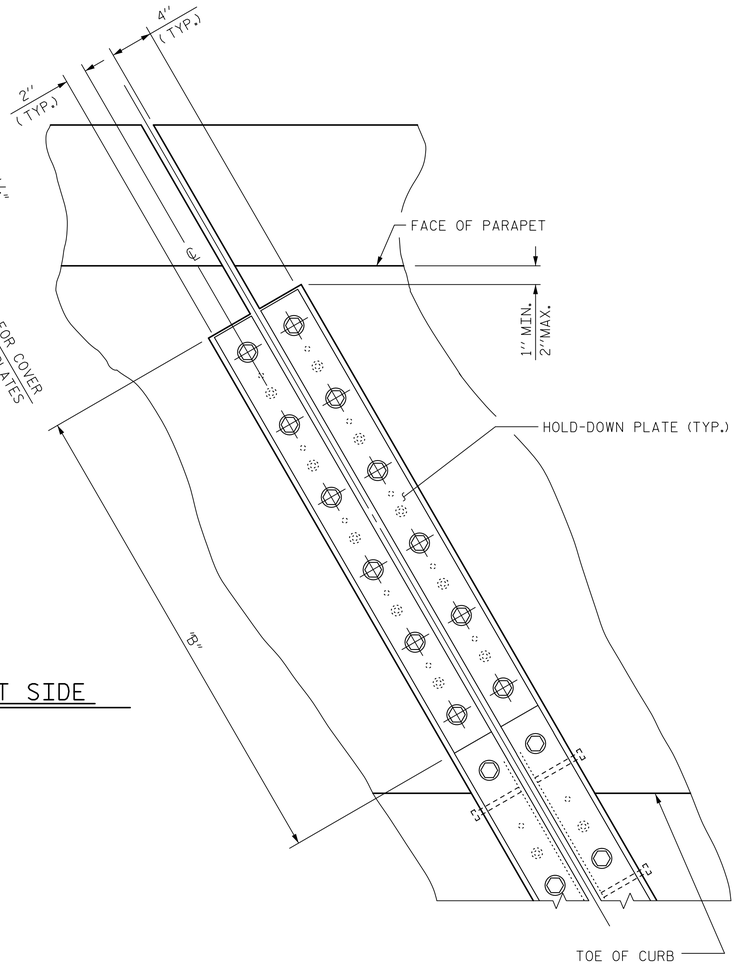
STD. NO. EJS1



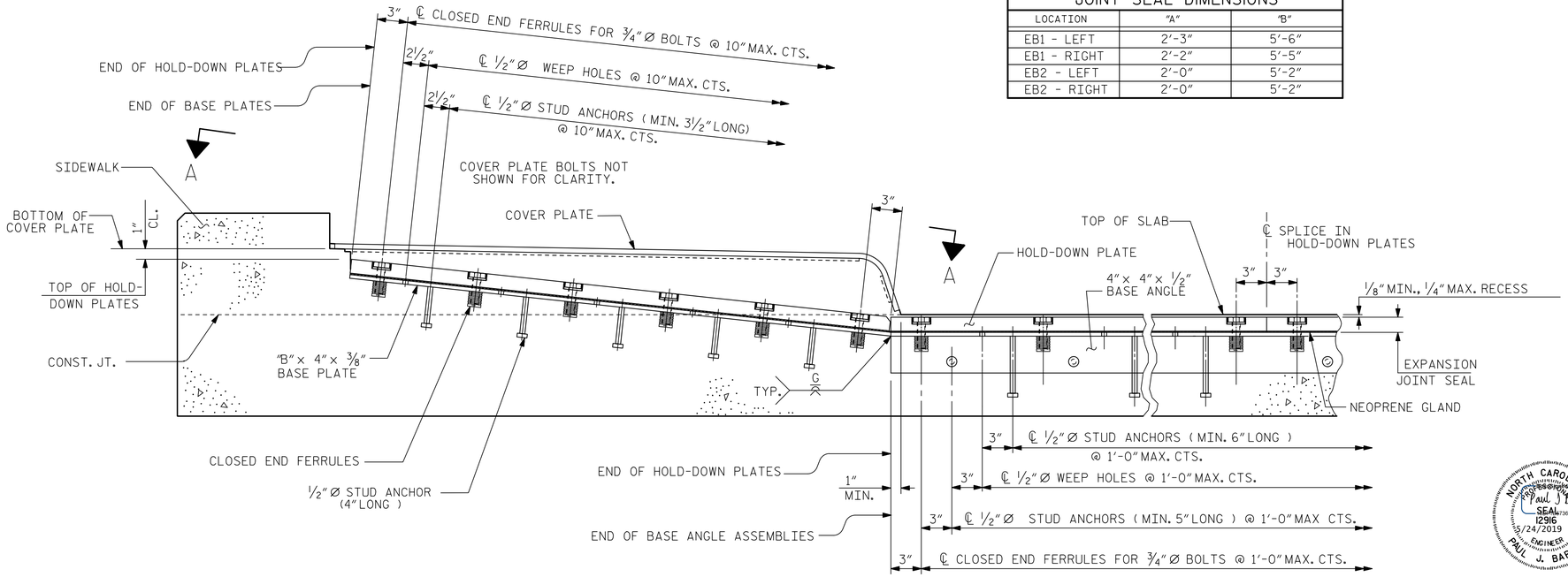
PLAN OF EXPANSION JOINT SEAL - LEFT SIDE



PLAN OF EXPANSION JOINT SEAL - RIGHT SIDE



JOINT SEAL DIMENSIONS		
LOCATION	"A"	"B"
EB1 - LEFT	2'-3"	5'-6"
EB1 - RIGHT	2'-2"	5'-5"
EB2 - LEFT	2'-0"	5'-2"
EB2 - RIGHT	2'-0"	5'-2"



SECTION THRU SIDEWALK NORMAL TO JOINT

SECTION A - A

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS FOR SIDEWALK

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-24
1			3			TOTAL SHEETS
2			4			41

ASSEMBLED BY : M. WRIGHT DATE : 11/18
CHECKED BY : N. HART DATE : 11/18

DRAWN BY : REK 10/87
CHECKED BY : CRK 1/88

REV.	5/1/06	TLA/GM
REV.	10/1/11	MAA/GM
REV.	12/17	MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

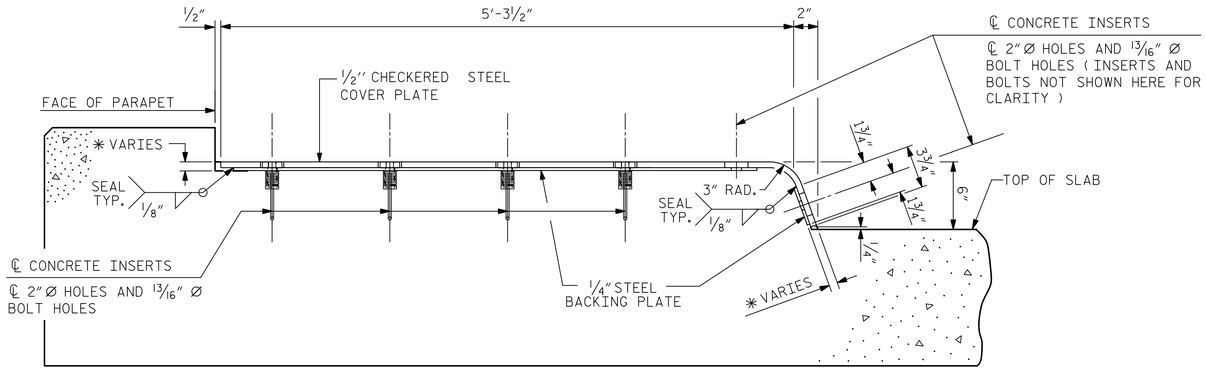
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY M. WRIGHT DATE 11/18
CHECKED BY N. HART DATE 11/18
DESIGN ENGINEER OF RECORD P. BARBER DATE 5/19

DWG. NO. 24

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 Paul J Barber 5/24/2019 ENGINEER PAUL J. BARBER

STD. NO. EJS3



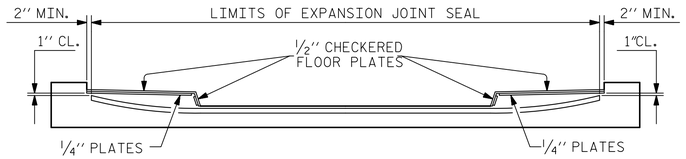
END VIEW

(NORMAL TO SIDEWALK)

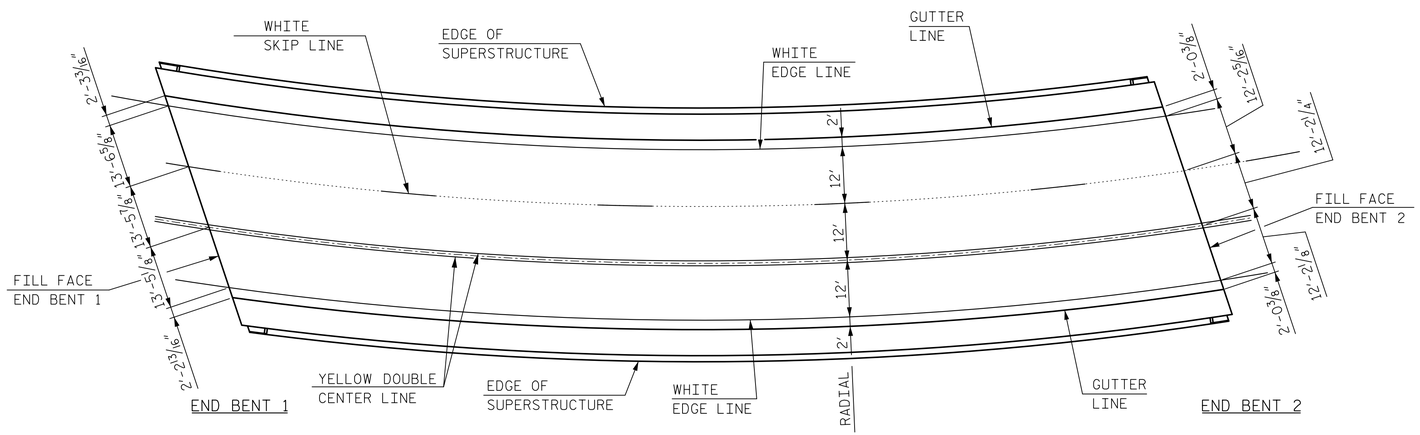
✳ CONCRETE RECESS DIMENSIONS:

13/16" FOR THE SIDE OF THE JOINT HAVING THE 1/2" COVER PLATE WITH A 1/4" BACKING PLATE.

9/16" FOR THE SIDE OF THE JOINT HAVING ONLY THE 1/2" COVER PLATE.

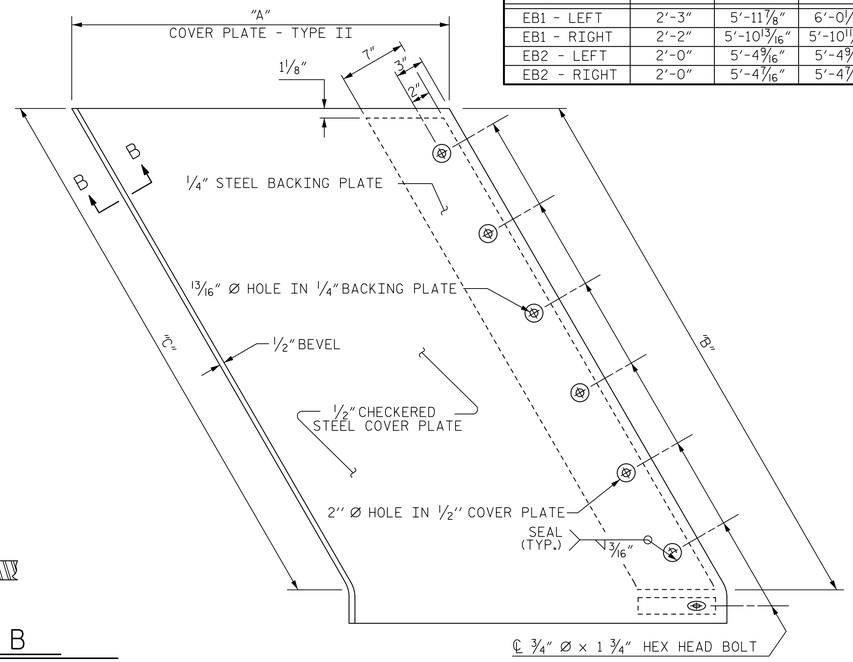


SKETCH SHOWING LIMITS OF EXPANSION JOINT SEAL

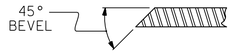


PAVEMENT MARKING ALIGNMENT

COVER PLATE DIMENSIONS			
LOCATION	"A"	"B"	"C"
EB1 - LEFT	2'-3"	5'-11 7/8"	6'-0 1/16"
EB1 - RIGHT	2'-2"	5'-10 13/16"	5'-10 11/16"
EB2 - LEFT	2'-0"	5'-4 9/16"	5'-4 9/16"
EB2 - RIGHT	2'-0"	5'-4 1/16"	5'-4 1/16"

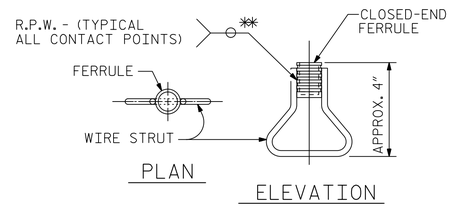


TYPE II - PLAN VIEW



SECTION B - B

COVER PLATE DETAILS



CONCRETE INSERT

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

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS FOR SIDEWALK

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-25
1			3			TOTAL SHEETS
2			4			41

STD. NO. EJS4

ASSEMBLED BY : M. WRIGHT	DATE : 11/18
CHECKED BY : N. HART	DATE : 11/18
DRAWN BY : REK 10/87	REV. 5/1/06 TLA/GM
CHECKED BY : CRK 1/88	REV. 10/1/11 MAA/GM
	REV. 12/17 MAA/THC

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

DRAWN BY	M. WRIGHT	DATE 11/18
CHECKED BY	N. HART	DATE 11/18
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 25

NORTH CAROLINA PROFESSIONAL SEAL 036781 ENGINEER PAUL J. BARBER
Paul J Barber
12916
5/24/2019

REINFORCING BAR SCHEDULE

EPOXY COATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A1	379	5	STR	18′-0″	7,115
A2	379	5	STR	38′-5″	15,186
A3	1	5	STR	51′-4″	54
A4	1	5	STR	49′-10″	52
A5	1	5	STR	48′-5″	50
A6	1	5	STR	47′-0″	49
A7	1	5	STR	45′-7″	48
A8	1	5	STR	44′-2″	46
A9	1	5	STR	42′-9″	45
A10	1	5	STR	41′-4″	43
A11	1	5	STR	39′-11″	42
A12	1	5	STR	38′-5″	40
A13	1	5	STR	37′-0″	39
A14	1	5	STR	35′-7″	37
A15	1	5	STR	34′-2″	36
A16	1	5	STR	32′-9″	34
A17	1	5	STR	31′-4″	33
A18	1	5	STR	29′-11″	31
A19	1	5	STR	28′-6″	30
A20	1	5	STR	27′-1″	28
A21	1	5	STR	25′-8″	27
A22	1	5	STR	24′-3″	25
A23	1	5	STR	22′-9″	24
A24	1	5	STR	21′-4″	22
A25	1	5	STR	19′-11″	21
A26	1	5	STR	18′-6″	19
A27	1	5	STR	17′-1″	18
A28	1	5	STR	15′-8″	16
A29	1	5	STR	14′-3″	15
A30	1	5	STR	12′-10″	13
A31	1	5	STR	11′-5″	12
A32	1	5	STR	10′-0″	10
A33	1	5	STR	8′-7″	9
A34	1	5	STR	7′-2″	7
A35	1	5	STR	5′-9″	6
A36	1	5	STR	4′-4″	5
A37	1	5	STR	52′-6″	55
A38	1	5	STR	50′-11″	53
A39	1	5	STR	49′-4″	51
A40	1	5	STR	47′-9″	50
A41	1	5	STR	46′-2″	48
A42	1	5	STR	44′-7″	47
A43	1	5	STR	43′-0″	45
A44	1	5	STR	41′-6″	43
A45	1	5	STR	39′-11″	42
A46	1	5	STR	38′-4″	40
A47	1	5	STR	36′-9″	38
A48	1	5	STR	35′-2″	37
A49	1	5	STR	33′-7″	35
A50	1	5	STR	32′-0″	33

REINFORCING BAR SCHEDULE

EPOXY COATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A51	1	5	STR	30′-6″	32
A52	1	5	STR	28′-11″	30
A53	1	5	STR	27′-4″	29
A54	1	5	STR	25′-9″	27
A55	1	5	STR	24′-2″	25
A56	1	5	STR	22′-7″	24
A57	1	5	STR	21′-0″	22
A58	1	5	STR	19′-6″	20
A59	1	5	STR	17′-11″	19
A60	1	5	STR	16′-4″	17
A61	1	5	STR	14′-9″	15
A62	1	5	STR	13′-2″	14
A63	1	5	STR	11′-7″	12
A64	1	5	STR	10′-0″	10
A65	1	5	STR	8′-6″	9
A66	1	5	STR	6′-11″	7
A67	1	5	STR	5′-4″	6
A68	1	5	STR	3′-9″	4
A69	3	5	STR	14′-8″	46
A70	3	5	STR	11′-8″	37
A71	821	5	STR	5′-9″	4,924
A72	1	5	STR	4′-9″	5
B1	76	4	STR	34′-9″	1,764
B2	38	7	STR	32′-4″	2,511
B3	76	4	STR	31′-11″	1,620
B4	105	6	STR	13′-2″	2,077
B5	105	6	STR	60′-0″	9,463
B6	38	7	STR	60′-0″	4,660
G1	1	5	STR	59′-9″	62
G2	1	5	STR	54′-1″	56
J1	86	4	5	1′-5″	81
K1	2	8	1	14′-6″	77
K2	8	8	2	22′-0″	470
K3	2	8	1	12′-11″	69
K4	2	8	1	13′-8″	73
K5	8	8	2	20′-11″	447
K6	2	8	1	12′-4″	66
S1	85	5	3	5′-11″	525
S2	45	4	4	3′-5″	103
S3	40	4	4	3′-1″	82
U1	30	4	2	13′-4″	267
U2	10	4	2	11′-4″	76
EPOXY COATED REINFORCING STEEL TOTAL:					53,787

REINFORCING BAR SCHEDULE

UNCOATED

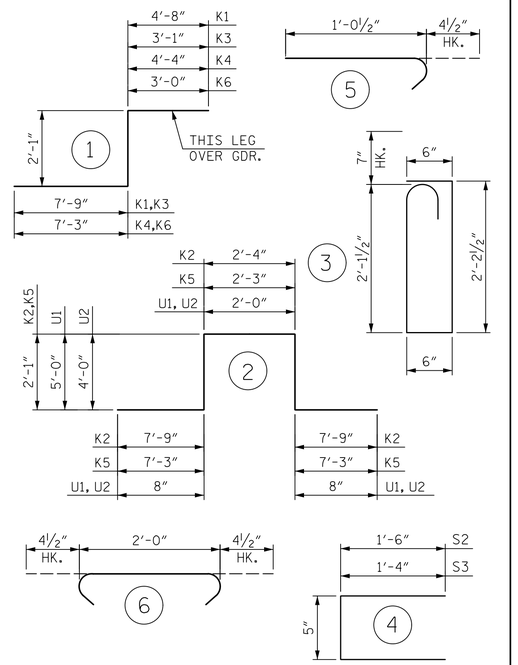
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A101	379	5	STR	23′-2″	9,158
A102	379	5	STR	32′-9″	12,946
A103	1	5	STR	52′-1″	54
A104	1	5	STR	50′-8″	53
A105	1	5	STR	49′-3″	51
A106	1	5	STR	47′-10″	50
A107	1	5	STR	46′-5″	48
A108	1	5	STR	45′-0″	47
A109	1	5	STR	43′-7″	45
A110	1	5	STR	42′-1″	44
A111	1	5	STR	40′-8″	42
A112	1	5	STR	39′-3″	41
A113	1	5	STR	37′-10″	39
A114	1	5	STR	36′-5″	38
A115	1	5	STR	35′-0″	37
A116	1	5	STR	33′-7″	35
A117	1	5	STR	32′-2″	34
A118	1	5	STR	30′-9″	32
A119	1	5	STR	29′-4″	31
A120	1	5	STR	27′-11″	29
A121	1	5	STR	26′-6″	28
A122	1	5	STR	25′-1″	26
A123	1	5	STR	23′-7″	25
A124	1	5	STR	22′-2″	23
A125	1	5	STR	20′-9″	22
A126	1	5	STR	19′-4″	20
A127	1	5	STR	17′-11″	19
A128	1	5	STR	16′-6″	17
A129	1	5	STR	15′-1″	16
A130	1	5	STR	13′-8″	14
A131	1	5	STR	12′-3″	13
A132	1	5	STR	10′-10″	11
A133	1	5	STR	9′-5″	10
A134	1	5	STR	8′-0″	8
A135	1	5	STR	6′-6″	7
A136	1	5	STR	5′-1″	5
A137	1	5	STR	53′-3″	56
A138	1	5	STR	51′-2″	53
A139	1	5	STR	50′-1″	52
A140	1	5	STR	48′-7″	51
A141	1	5	STR	47′-0″	49
A142	1	5	STR	45′-5″	47
A143	1	5	STR	43′-10″	46
A144	1	5	STR	42′-3″	44
A145	1	5	STR	40′-8″	42
A146	1	5	STR	39′-1″	41
A147	1	5	STR	37′-7″	39
A148	1	5	STR	36′-0″	38
A149	1	5	STR	34′-5″	36
A150	1	5	STR	32′-10″	34

REINFORCING BAR SCHEDULE

UNCOATED

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A151	1	5	STR	31′-3″	33
A152	1	5	STR	29′-8″	31
A153	1	5	STR	28′-1″	29
A154	1	5	STR	26′-7″	28
A155	1	5	STR	25′-0″	26
A156	1	5	STR	23′-5″	24
A157	1	5	STR	21′-10″	23
A158	1	5	STR	20′-3″	21
A159	1	5	STR	18′-8″	19
A160	1	5	STR	17′-1″	18
A161	1	5	STR	15′-7″	16
A162	1	5	STR	14′-0″	15
A163	1	5	STR	12′-5″	13
A164	1	5	STR	10′-10″	11
A165	1	5	STR	9′-3″	10
A166	1	5	STR	7′-8″	8
A167	1	5	STR	6′-1″	6
A168	1	5	STR	4′-7″	5
A169	3	5	STR	14′-8″	46
A170	3	5	STR	11′-8″	37
B101	148	5	STR	38′-5″	5,930
B102	74	6	STR	12′-2″	1,352
B103	148	5	STR	35′-7″	5,493
B104	74	6	STR	60′-0″	6,669
K7	15	6	STR	8′-8″	195
K8	15	6	STR	7′-9″	175
K9	10	4	STR	26′-8″	178
K10	10	4	STR	6′-2″	41
K11	10	4	STR	8′-6″	57
K12	20	4	STR	9′-0″	120
K13	10	4	STR	7′-11″	53
S4	150	4	6	2′-9″	276
UNCOATED REINFORCING STEEL TOTAL:					44,704

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)	(LBS.)
POUR 1	169.7	44,704	53,787
POUR 2	196.9		
TOTALS**	366.6	44,704	53,787

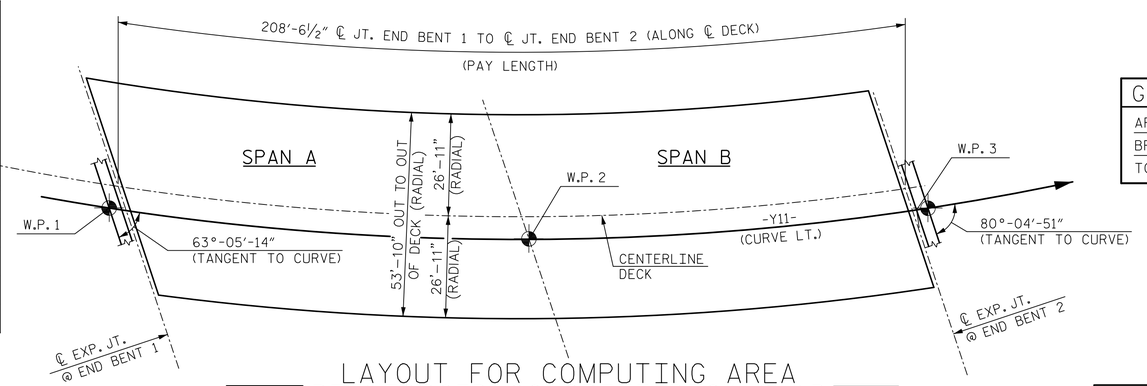
ARCHITECTURAL CONCRETE SURFACE TREATMENT		
EDGE OF DECK:	834.4	SQ. FT.
RAIL POSTS:	42.9	SQ. FT.
TOTAL:	877.3	SQ. FT.
APPLICATION OF BRIDGE COATING (LIGHT GRAY)	723.2	SQ. FT.
APPLICATION OF BRIDGE COATING (DARK GRAY)	2,959.6	SQ. FT.

** QUANTITIES FOR 3 BAR METAL RAIL END POSTS ARE NOT INCLUDED.

NOTES: CONCRETE IN CLOSURE POUR AT SLAB EXPANSION JOINTS IS INCLUDED IN THE ADJACENT POUR QUANTITY.

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

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



LAYOUT FOR COMPUTING AREA
REINFORCED CONCRETE DECK SLAB
(SQ. FT. = 11,227)

GROOVING BRIDGE FLOORS

APPROACH SLABS	1,772	SQ.FT.
BRIDGE DECK	7,679	SQ.FT.
TOTAL	9,451	SQ.FT.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SUPERSTRUCTURE BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-26
1			3			TOTAL SHEETS
2			4			41

ASSEMBLED BY : M. WRIGHT DATE : 1/19
CHECKED BY : N. HART DATE : 2/19

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

REV. 5/1/06 TLA/GM
REV. 10/1/11 MAA/GM
REV. 12/17 MAA/THC

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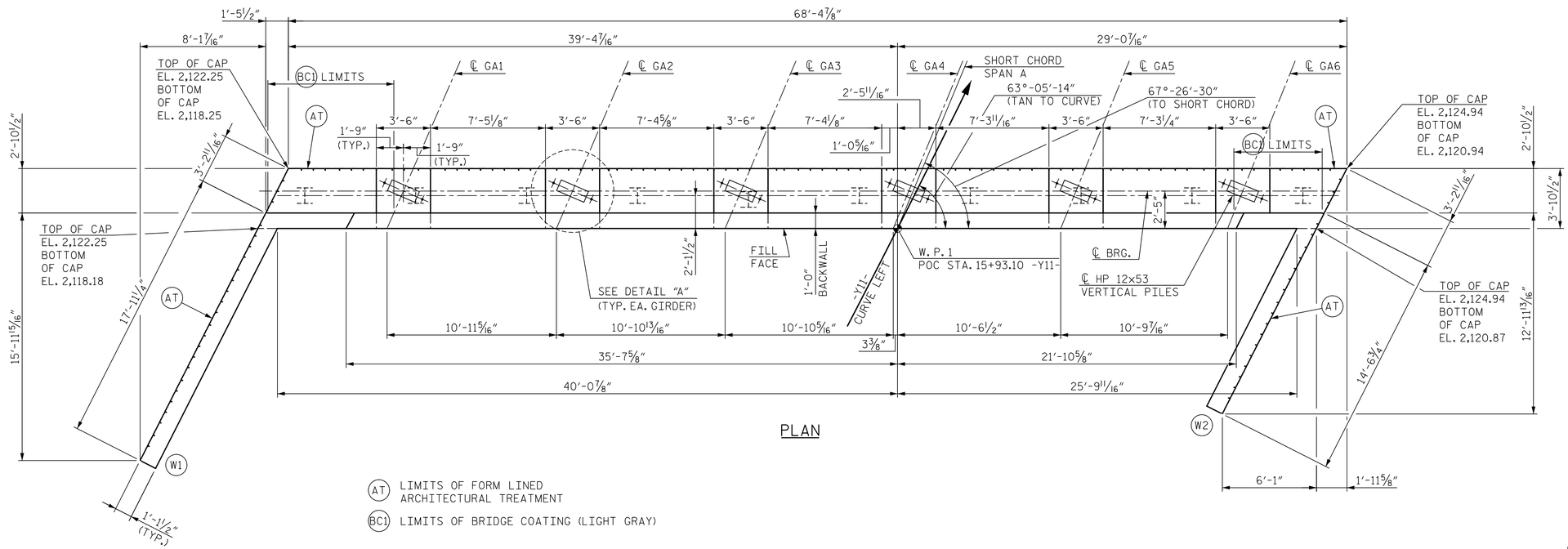
DRAWN BY M. WRIGHT DATE 1/19
CHECKED BY N. HART DATE 2/19
DESIGN ENGINEER OF RECORD P. BARBER DATE 5/19

DWG. NO. 26

STD. NO. BOM2



PLAN

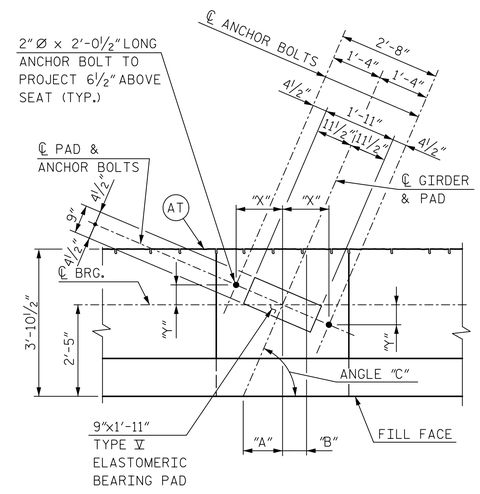
(AT) LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

(BC1) LIMITS OF BRIDGE COATING (LIGHT GRAY)

NOTES:

FOR NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 4.

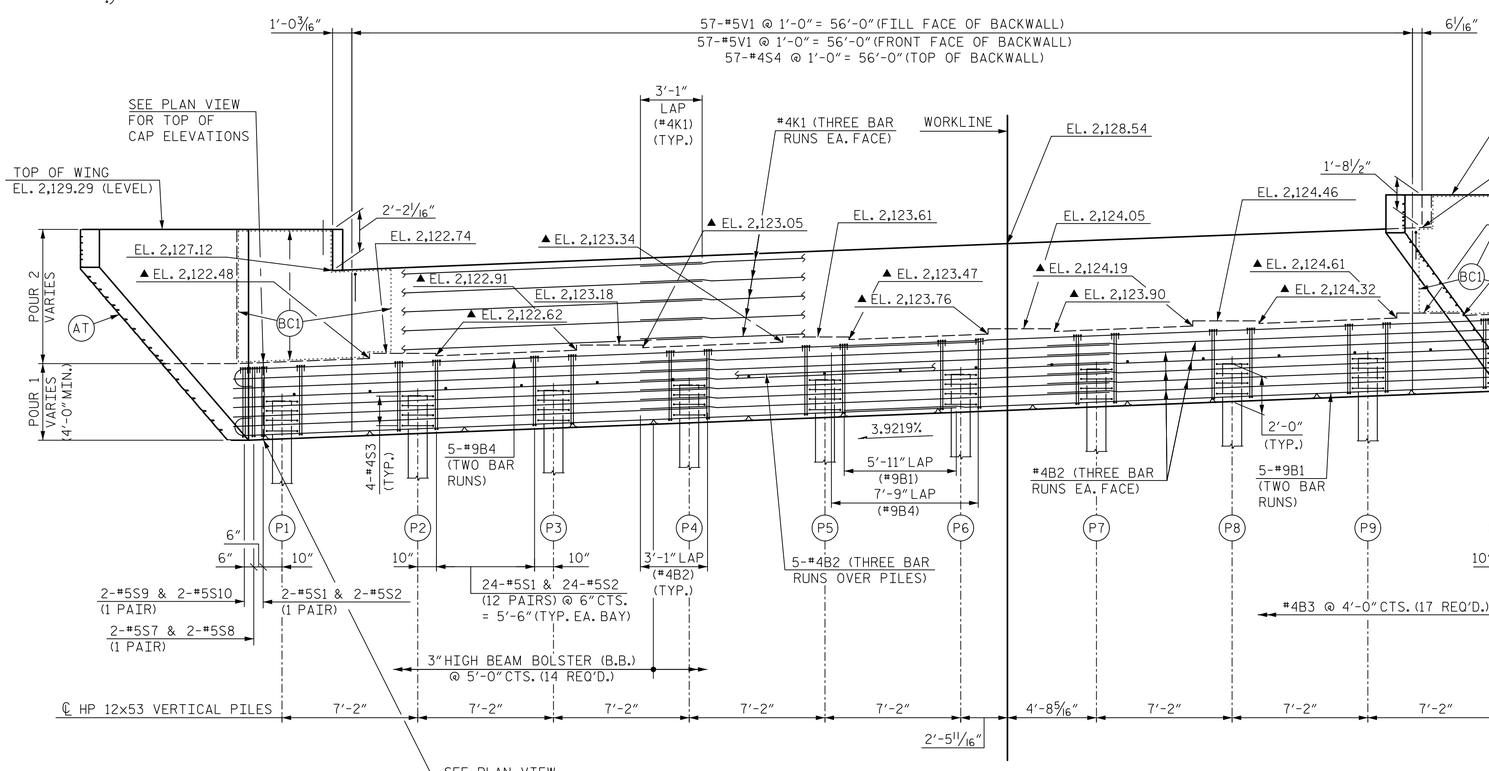
FOR WINGWALL DETAILS AND SECTION A-A, SEE SHEET 2 OF 4.



DETAIL A

GIRDER	"A"	"B"	ANGLE "C"	"X"	"Y"
GA1	1'-0¹¹/₁₆"	7⅝"	66°-24'-27"	1'-2¹¹/₁₆"	6⅞16"
GA2	1'-0⅞16"	7½"	66°-45'-36"	1'-2¹¹/₁₆"	6⅝16"
GA3	1'-0¼"	7⅜"	67°-06'-06"	1'-2¾"	6¼"
GA4	1'-0⅞16"	7¼"	67°-25'-59"	1'-2¾"	6⅛"
GA5	11⅞"	7⅛"	67°-45'-17"	1'-2¹⅝"	6⅞16"
GA6	11¹¹/₁₆"	7⅞16"	68°-04'-02"	1'-2⅞"	6"

▲ FOR ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A ON SHEET 2 OF 4.



ELEVATION

TOP OF PILE ELEVATIONS	
P1	2,120.30
P2	2,120.58
P3	2,120.86
P4	2,121.14
P5	2,121.43
P6	2,121.71
P7	2,121.99
P8	2,122.27
P9	2,122.55
P10	2,122.83

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

Digitally signed by: PAUL J. Barber
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 12916 6/7/2019 ENGINEER PAUL J. BARBER

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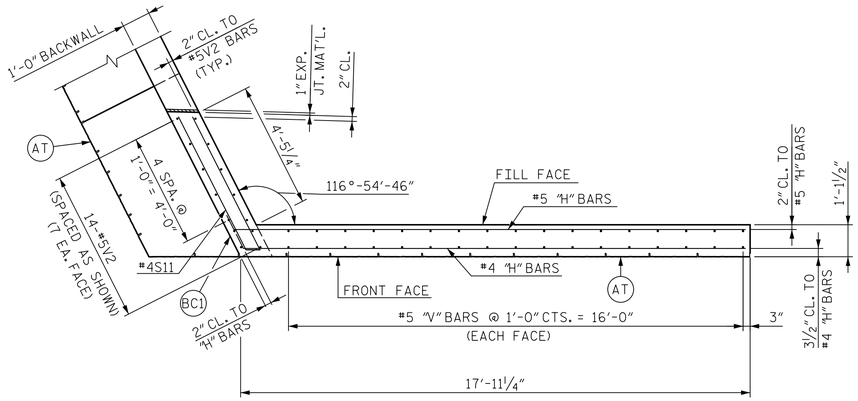
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

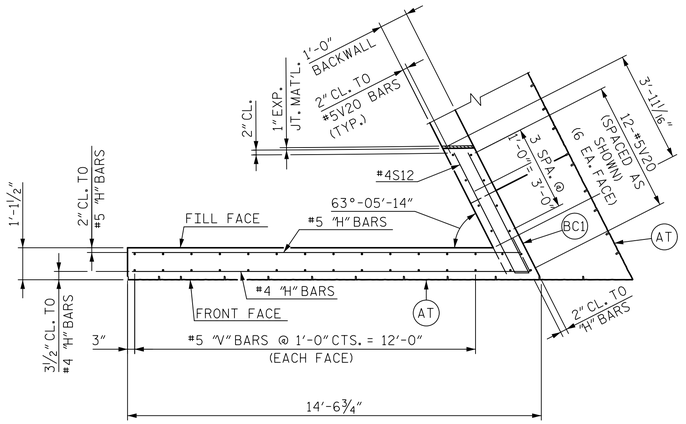
DRAWN BY	M. WRIGHT	DATE 2/19
CHECKED BY	N. HART	DATE 3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 27

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-27
1			3			TOTAL SHEETS
2			4			41



PLAN OF WING (W1)

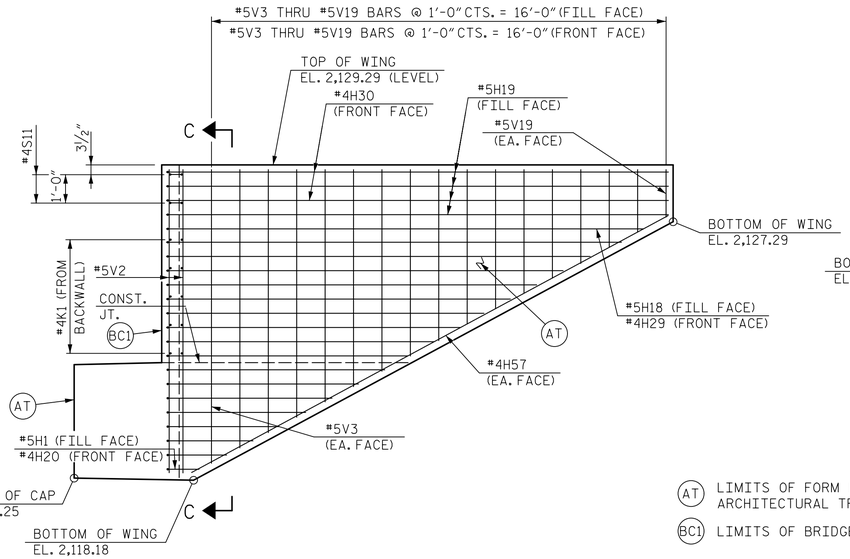


PLAN OF WING (W2)

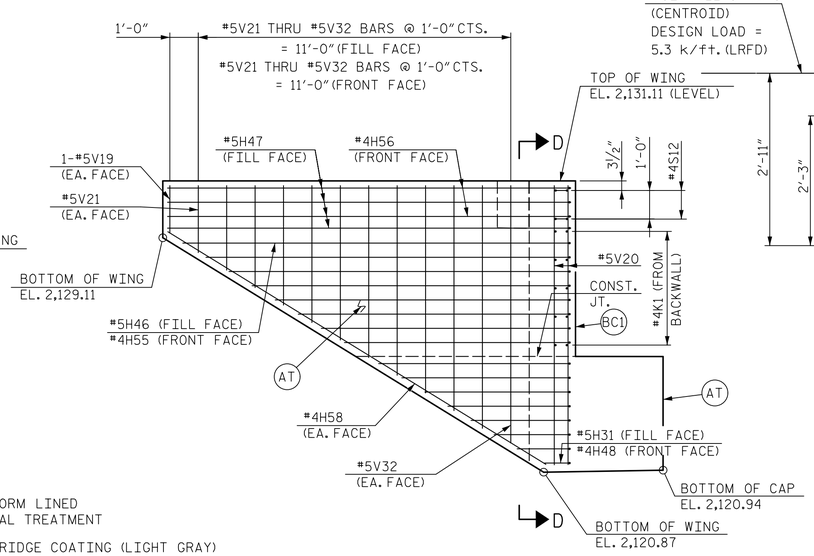
NOTES:

FOR NOTES, SEE SHEET 3 OF 4.

FOR BLOCKOUT IN WINGWALL, SEE SHEET 3 OF 4.



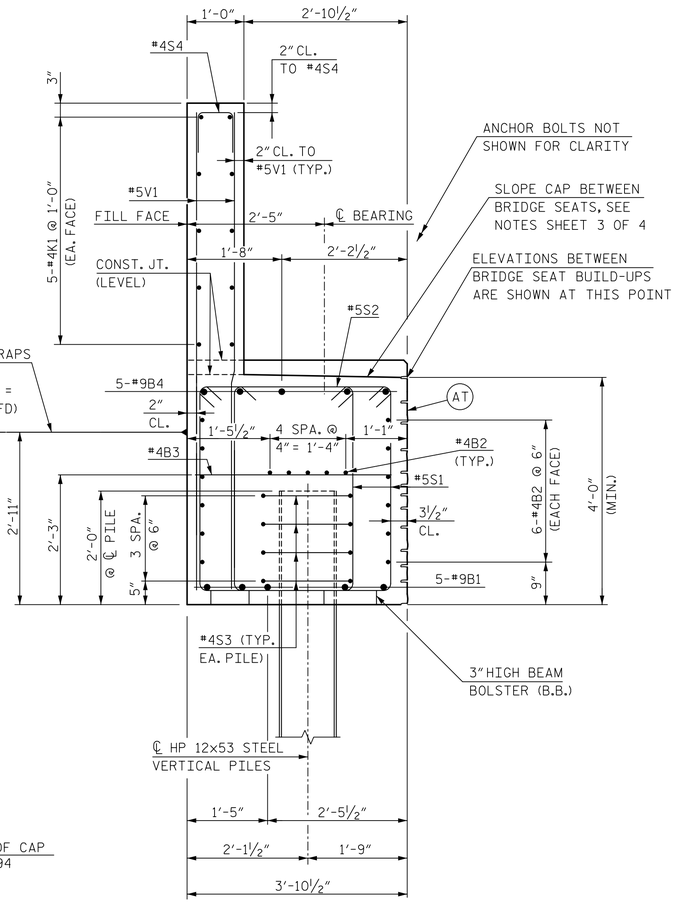
ELEVATION OF WING (W1)



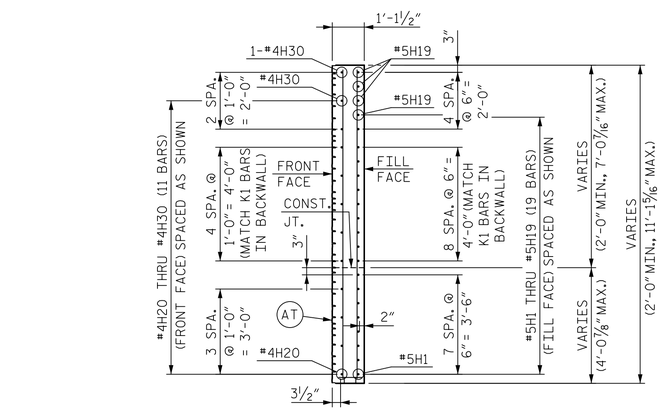
ELEVATION OF WING (W2)

(AT) LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

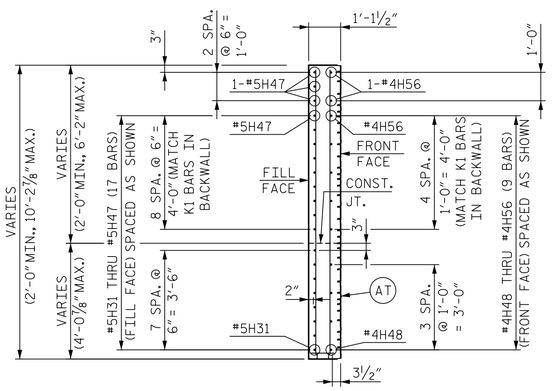
(BC1) LIMITS OF BRIDGE COATING (LIGHT GRAY)



SECTION A-A



SECTION C-C



SECTION D-D

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

Signed by: Paul J. Barber

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 PAUL J. BARBER
SEAL 12916 6/13/2019 ENGINEER

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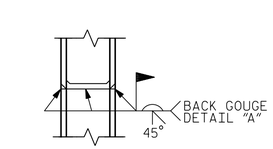
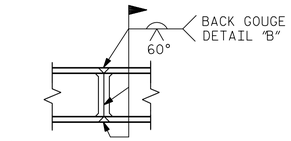
DRAWN BY	M. WRIGHT	DATE	2/19
CHECKED BY	N. HART	DATE	3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	5/19

DWG. NO. 28

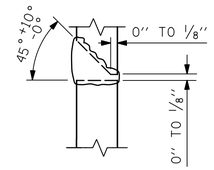
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-28
1			3			TOTAL SHEETS
2			4			41



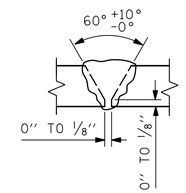
✳PILE VERTICAL



✳PILE HORIZONTAL
OR VERTICAL



DETAIL "A"



DETAIL "B"

✳ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

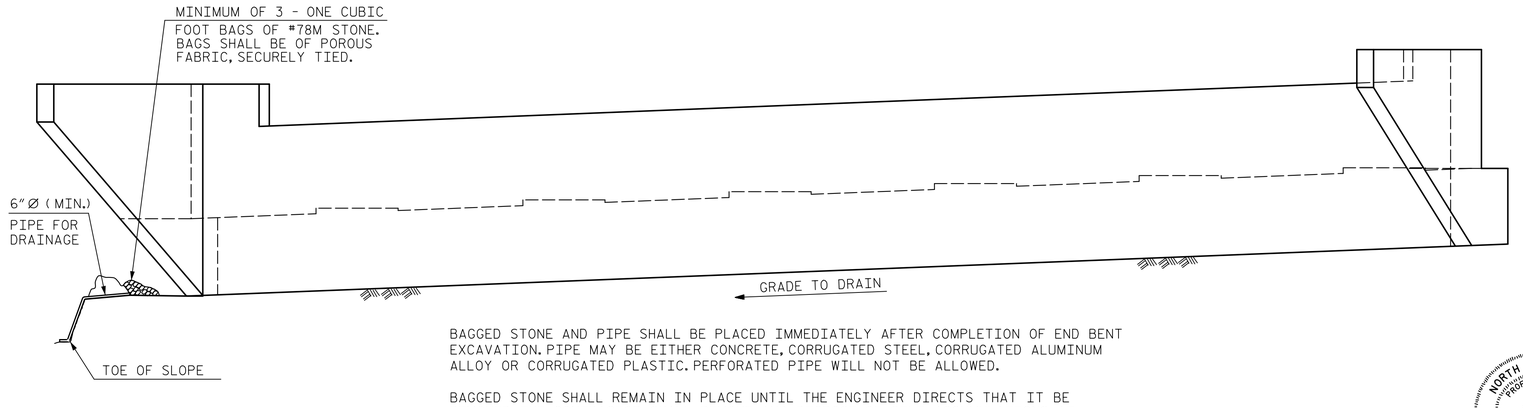
NOTES:

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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



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

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

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

TEMPORARY DRAINAGE AT END BENT 1

Digitally signed by: Paul J. Barber

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 6/7/2019 ENGINEER PAUL J. BARBER

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CHECKED BY	N. HART	DATE 3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 29

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

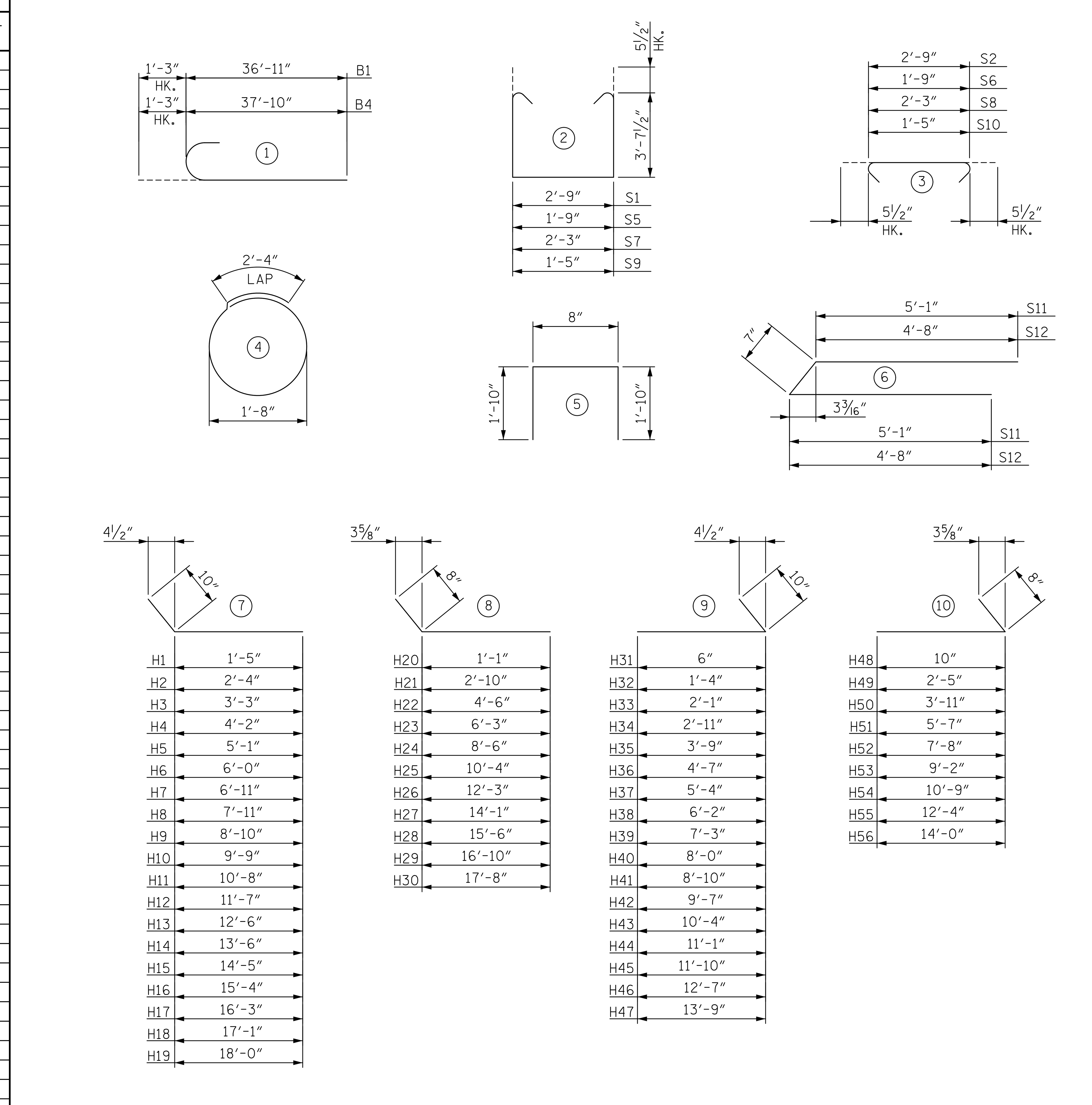
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-29
1			3			TOTAL SHEETS
2			4			41

REINFORCING BAR SCHEDULE

END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	9	1	38'-2"	1,298	H52	1	4	10	8'-4"	6
B2	51	4	STR	24'-10"	846	H53	1	4	10	9'-10"	7
B3	17	4	STR	3'-5"	39	H54	1	4	10	11'-5"	8
B4	10	9	1	39'-1"	1,329	H55	1	4	10	13'-0"	9
						H56	3	4	10	14'-8"	29
H1	1	5	7	2'-3"	2	H57	2	4	STR	19'-0"	25
H2	1	5	7	3'-2"	3	H58	2	4	STR	15'-7"	21
H3	1	5	7	4'-1"	4						
H4	1	5	7	5'-0"	5	K1	30	4	STR	24'-10"	498
H5	1	5	7	5'-11"	6						
H6	1	5	7	6'-10"	7	S1	220	5	2	10'-11"	2,505
H7	1	5	7	7'-9"	8	S2	220	5	3	3'-8"	841
H8	1	5	7	8'-9"	9	S3	40	4	4	7'-7"	203
H9	1	5	7	9'-8"	10	S4	57	4	5	4'-4"	165
H10	1	5	7	10'-7"	11	S5	2	5	2	9'-11"	21
H11	1	5	7	11'-6"	12	S6	2	5	3	2'-8"	6
H12	1	5	7	12'-5"	13	S7	2	5	2	10'-5"	22
H13	1	5	7	13'-4"	14	S8	2	5	3	3'-2"	7
H14	1	5	7	14'-4"	15	S9	2	5	2	9'-7"	20
H15	1	5	7	15'-3"	16	S10	2	5	3	2'-4"	5
H16	1	5	7	16'-2"	17	S11	2	4	6	10'-9"	14
H17	1	5	7	17'-1"	18	S12	2	4	6	9'-11"	13
H18	1	5	7	17'-11"	19						
H19	4	5	7	18'-10"	79	V1	114	5	STR	8'-2"	971
H20	1	4	8	1'-9"	1	V2	14	5	STR	10'-7"	155
H21	1	4	8	3'-6"	2	V3	2	5	STR	10'-3"	21
H22	1	4	8	5'-2"	3	V4	2	5	STR	9'-9"	20
H23	1	4	8	6'-11"	5	V5	2	5	STR	9'-2"	19
H24	1	4	8	9'-2"	6	V6	2	5	STR	8'-8"	18
H25	1	4	8	11'-0"	7	V7	2	5	STR	8'-1"	17
H26	1	4	8	12'-11"	9	V8	2	5	STR	7'-7"	16
H27	1	4	8	14'-9"	10	V9	2	5	STR	7'-0"	15
H28	1	4	8	16'-2"	11	V10	2	5	STR	6'-6"	14
H29	1	4	8	17'-6"	12	V11	2	5	STR	5'-11"	12
H30	2	4	8	18'-4"	24	V12	2	5	STR	5'-5"	11
H31	1	5	9	1'-4"	1	V13	2	5	STR	4'-10"	10
H32	1	5	9	2'-2"	2	V14	2	5	STR	4'-4"	9
H33	1	5	9	2'-11"	3	V15	2	5	STR	3'-9"	8
H34	1	5	9	3'-9"	4	V16	2	5	STR	3'-3"	7
H35	1	5	9	4'-7"	5	V17	2	5	STR	2'-8"	6
H36	1	5	9	5'-5"	6	V18	2	5	STR	2'-2"	5
H37	1	5	9	6'-2"	6	V19	4	5	STR	1'-8"	7
H38	1	5	9	7'-0"	7	V20	12	5	STR	9'-9"	122
H39	1	5	9	8'-1"	8	V21	2	5	STR	2'-3"	5
H40	1	5	9	8'-10"	9	V22	2	5	STR	2'-10"	6
H41	1	5	9	9'-8"	10	V23	2	5	STR	3'-6"	7
H42	1	5	9	10'-5"	11	V24	2	5	STR	4'-1"	9
H43	1	5	9	11'-2"	12	V25	2	5	STR	4'-8"	10
H44	1	5	9	11'-11"	12	V26	2	5	STR	5'-4"	11
H45	1	5	9	12'-8"	13	V27	2	5	STR	5'-11"	12
H46	1	5	9	13'-5"	14	V28	2	5	STR	6'-7"	14
H47	4	5	9	14'-7"	61	V29	2	5	STR	7'-2"	15
H48	1	4	10	1'-6"	1	V30	2	5	STR	7'-9"	16
H49	1	4	10	3'-1"	2	V31	2	5	STR	8'-5"	18
H50	1	4	10	4'-7"	3	V32	2	5	STR	9'-0"	19
H51	1	4	10	6'-3"	4					TOTAL:	10,094

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

QUANTITIES

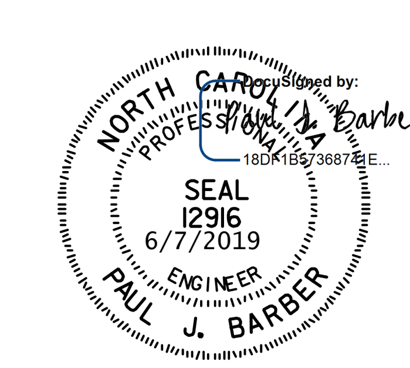
REINFORCING STEEL	LBS.	10,094
CLASS "A" CONCRETE BREAKDOWN		
POUR 1 - CAP, & BOT. OF WINGS	CU. YDS.	41.3
POUR 2 - TOP OF WINGS & BACKWALL	CU. YDS.	19.3
TOTAL	CU. YDS.	60.6
HP 12x53 STEEL PILES	NO.	10
	LIN. FT.	900
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	10
ARCHITECTURAL CONCRETE SURFACE TREATMENT	SQ. FT.	520.3
APPLICATION OF BRIDGE COATING (LIGHT GRAY)	SQ. FT.	84.3

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 4 OF 4



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1

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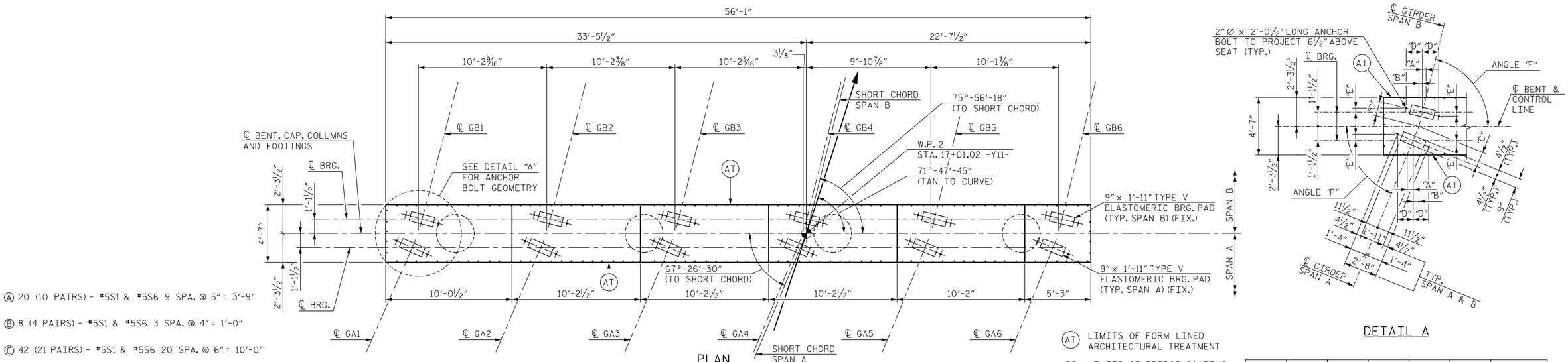
DWG. NO. 30

REVISIONS

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

SHEET NO. S3-30

TOTAL SHEETS 41



PLAN

Ⓐ 20 (10 PAIRS) - #5S1 & #5S6 9 SPA. @ 5" = 3'-9"

Ⓑ 8 (4 PAIRS) - #5S1 & #5S6 3 SPA. @ 4" = 1'-0"

Ⓒ 42 (21 PAIRS) - #5S1 & #5S6 20 SPA. @ 6" = 10'-0"

Ⓓ 8-#4S2 7 SPA. @ 6" CTS. = 3'-6" (TYP. EA. SEAT)

Ⓐ LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

BC1 LIMITS OF BRIDGE COATING (LIGHT GRAY)

DETAIL A

GIRDER	"A"	"B"	"C"	"D"	"E"	ANGLE "F"
GA1	6⅛"	5⅛"	1'-2¾"	1'-2¹¹⁄₁₆"	6⅜"	66°24'27"
GA2	6"	5¹³⁄₁₆"	1'-2¹¹⁄₁₆"	1'-2¹¹⁄₁₆"	6⅝"	66°45'37"
GA3	5¹⁵⁄₁₆"	5¹¹⁄₁₆"	1'-2⅝"	1'-2¾"	6¼"	67°06'07"
GA4	5¹³⁄₁₆"	5⅝"	1'-2⅝"	1'-2¾"	6⅛"	67°26'00"
GA5	5¾"	5½"	1'-2⁹⁄₁₆"	1'-2¹³⁄₁₆"	6⅛"	67°45'18"
GA6	5⅝"	5⅜"	1'-2⁹⁄₁₆"	1'-2¹³⁄₁₆"	6"	68°04'04"
GB1	3¹¹⁄₁₆"	3⅝"	1'-1¹⁵⁄₁₆"	1'-3½"	4¹⁄₁₆"	75°19'03"
GB2	3⅝"	3½"	1'-1¹⁵⁄₁₆"	1'-3½"	4"	75°31'45"
GB3	3⁹⁄₁₆"	3⅜"	1'-1¹⁵⁄₁₆"	1'-3½"	3¹⁵⁄₁₆"	75°44'04"
GB4	3½"	3⅜"	1'-1¹⁵⁄₁₆"	1'-3½"	3⅞"	75°56'01"
GB5	3⅜"	3⁵⁄₁₆"	1'-1⅞"	1'-3⁹⁄₁₆"	3¹³⁄₁₆"	76°07'40"
GB6	3⅜"	3⁵⁄₁₆"	1'-1⅞"	1'-3⁹⁄₁₆"	3¹³⁄₁₆"	76°18'58"

NOTES:

ALL DIMENSIONS SHOWN ARE PARALLEL OR NORMAL TO ℄ BENT UNLESS NOTED.

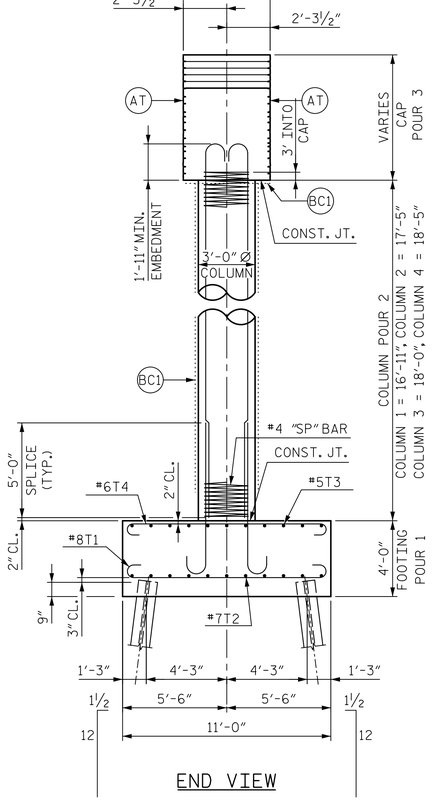
STIRRUPS IN CAP MAY BE SHIFTED AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

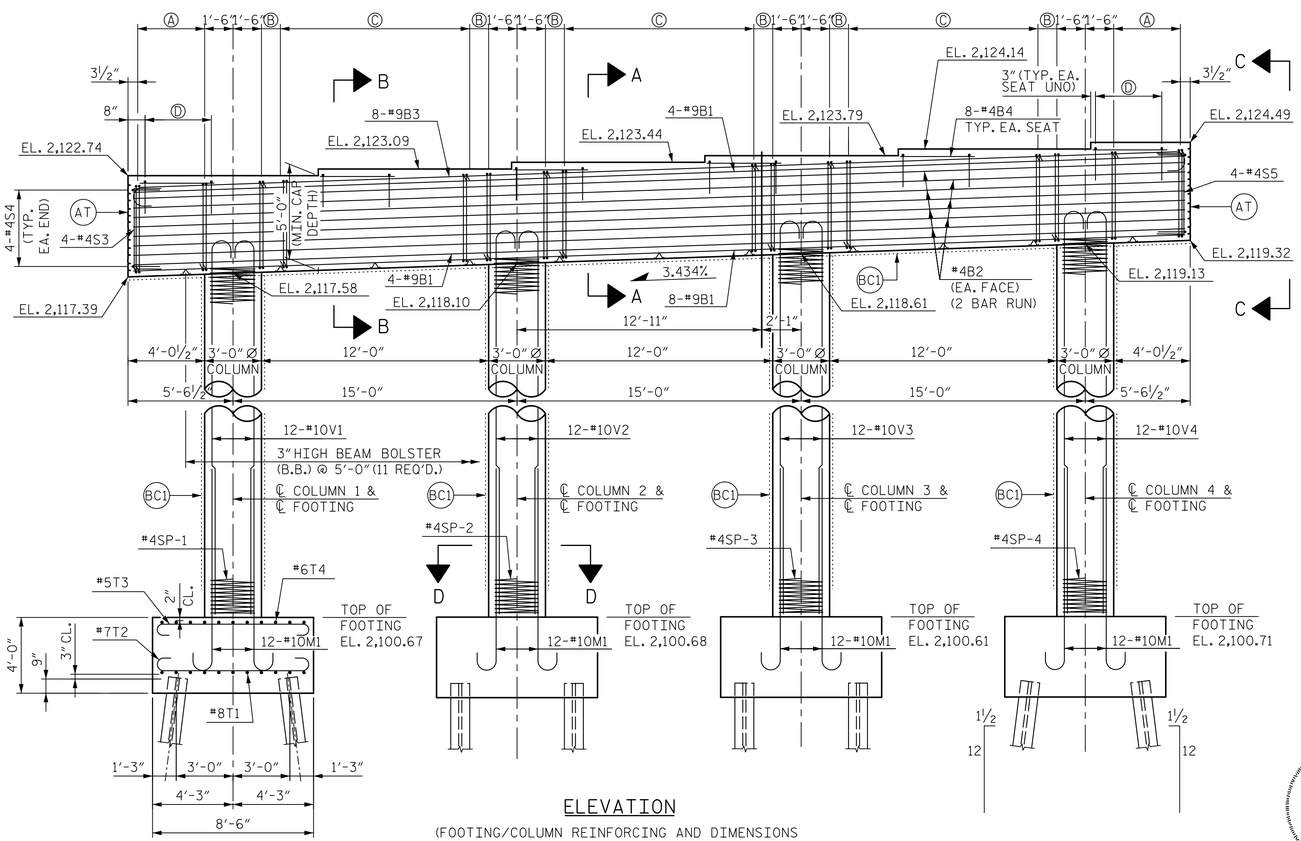
FOR PILE SPLICE DETAILS, SEE "SUBSTRUCTURE END BENT 1" SHEET 3 OF 4.

FOR SECTION VIEWS, SEE SHEET 2 OF 2.

LIMITS OF BRIDGE COATING SHALL EXTEND A MINIMUM OF 1 FT BELOW THE PROPOSED GROUND LINE.



END VIEW



ELEVATION

(FOOTING/COLUMN REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING/COLUMN)

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 6/7/2019 PAUL J. BARBER

Digitally signed by: Paul J. Barber

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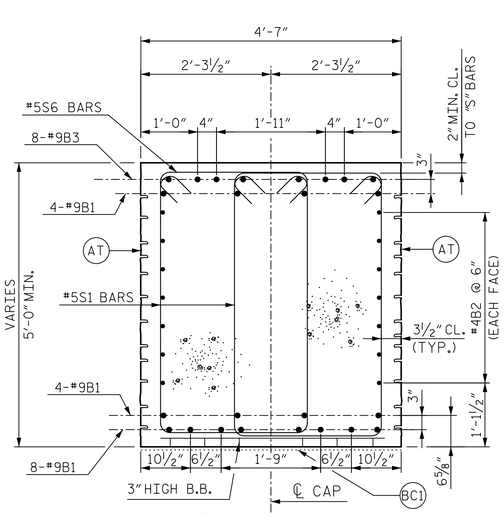
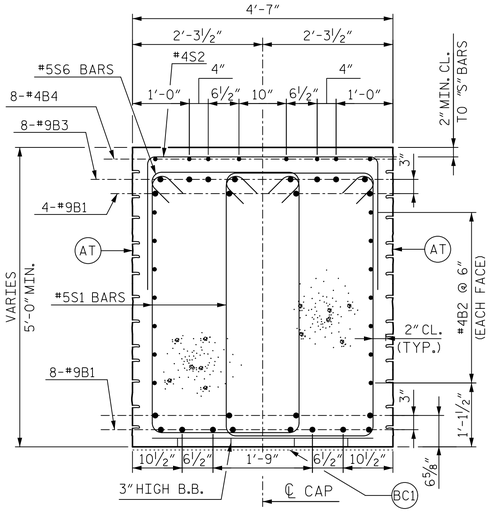
CHECKED BY	M. BARRAGAN	DATE 3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 31

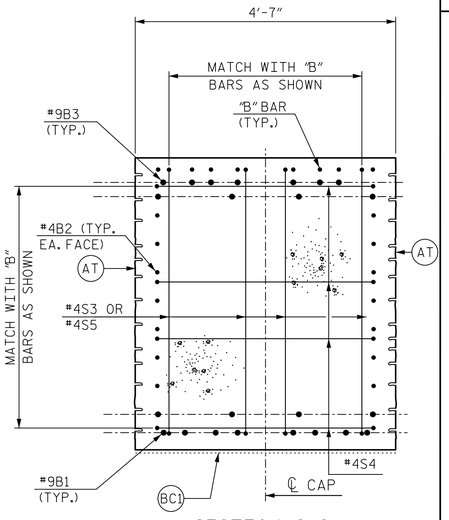
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-31
1			3			TOTAL SHEETS
2			4			41



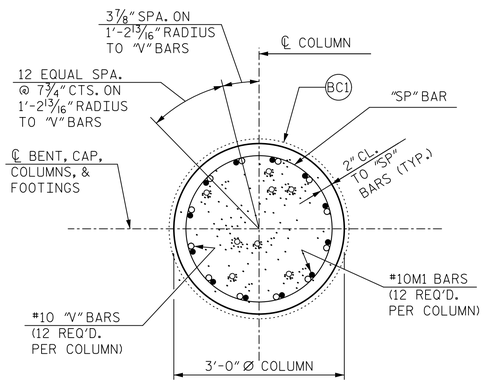
SECTION A-A



SECTION B-B



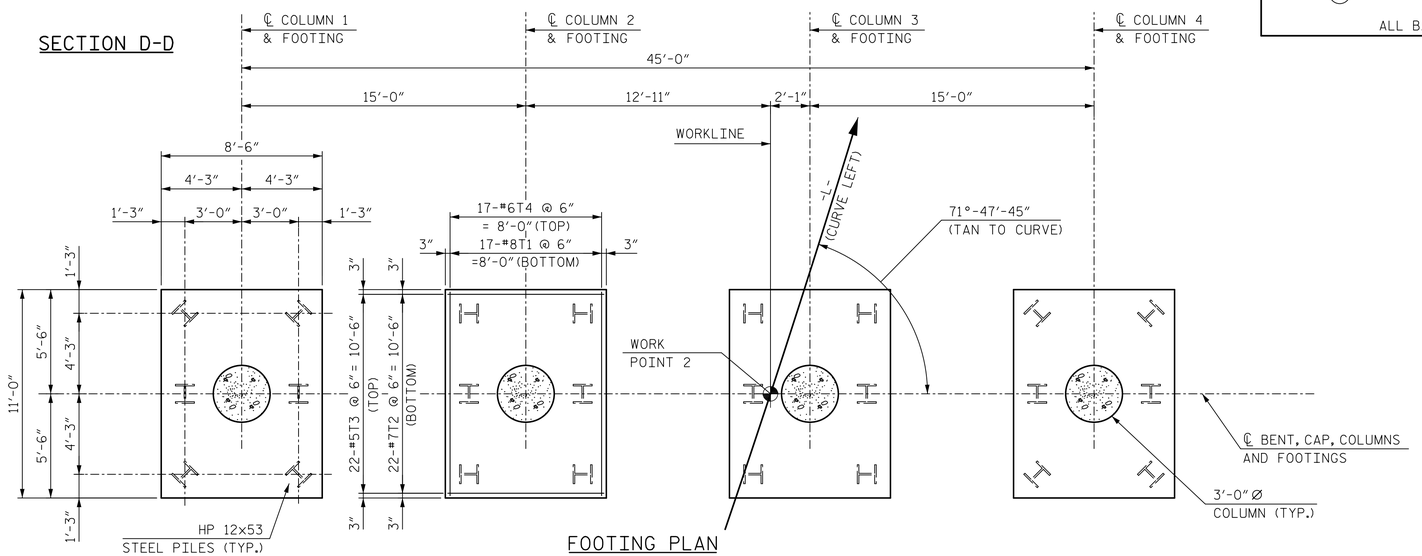
SECTION C-C



SECTION D-D

AT LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

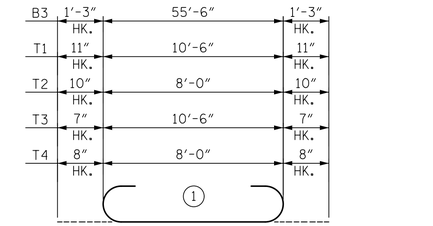
BC1 LIMITS OF BRIDGE COATING (LIGHT GRAY)

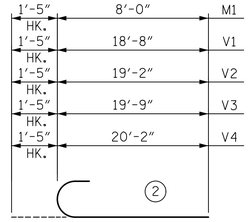


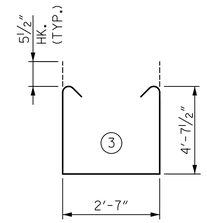
FOOTING PLAN

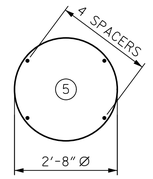
(FOOTING REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH FOOTING)
(SEE FOUNDATION LAYOUT SHEET FOR PILE INFORMATION)

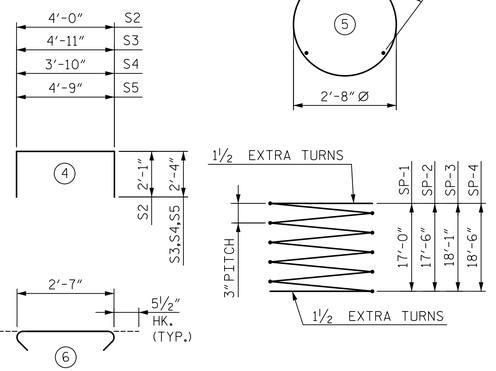
BAR TYPES











ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF REINFORCING

BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	16	9	STR	55'-6"	3,019
B2	28	4	STR	29'-4"	549
B3	8	9	1	58'-0"	1,578
B4	48	4	STR	3'-11"	126
M1	48	10	2	9'-5"	1,945
S1	214	5	3	12'-9"	2,846
S2	48	4	4	8'-2"	262
S3	4	4	4	9'-7"	26
S4	8	4	4	8'-6"	45
S5	4	4	4	9'-5"	25
S6	214	5	6	3'-6"	781
T1	68	8	1	12'-4"	2,239
T2	88	7	1	9'-8"	1,739
T3	88	5	1	11'-8"	1,071
T4	68	6	1	9'-4"	953
V1	12	10	2	20'-1"	1,037
V2	12	10	2	20'-7"	1,063
V3	12	10	2	21'-2"	1,093
V4	12	10	2	21'-7"	1,114
SP-1	1	✳	5	585'-9"	391
SP-2	1	✳	5	602'-3"	402
SP-3	1	✳	5	627'-0"	419
SP-4	1	✳	5	635'-3"	424

QUANTITIES

REINFORCING STEEL	LBS.	21,511
SPIRAL COLUMN REINFORCING STEEL	LBS.	1,636
CLASS A CONCRETE		
FOOTING POUR 1	CU. YDS.	55.4
COLUMN POUR 2	CU. YDS.	18.5
CAP POUR 3	CU. YDS.	49.4
TOTAL	CU. YDS.	123.3
HP 12x53 STEEL PILES	NO.	24
	LIN. FT.	1,560
FOUNDATION EXCAVATION FOR BENT	LUMP SUM	LUMP SUM
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	24
ARCHITECTURAL CONCRETE SURFACE TREATMENT	SQ. FT.	629.7
APPLICATION OF BRIDGE COATING (LIGHT GRAY)	SQ. FT.	857.8

✳ THE SP SPIRAL REINFORCING STEEL SHALL BE W20 OR D20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 6/7/2019 ENGINEER PAUL J. BARBER — Digitally signed by: Paul N. Barber

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

DRAWN BY	M. WRIGHT	DATE	3/19
CHECKED BY	M. BARRAGAN	DATE	3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	5/19

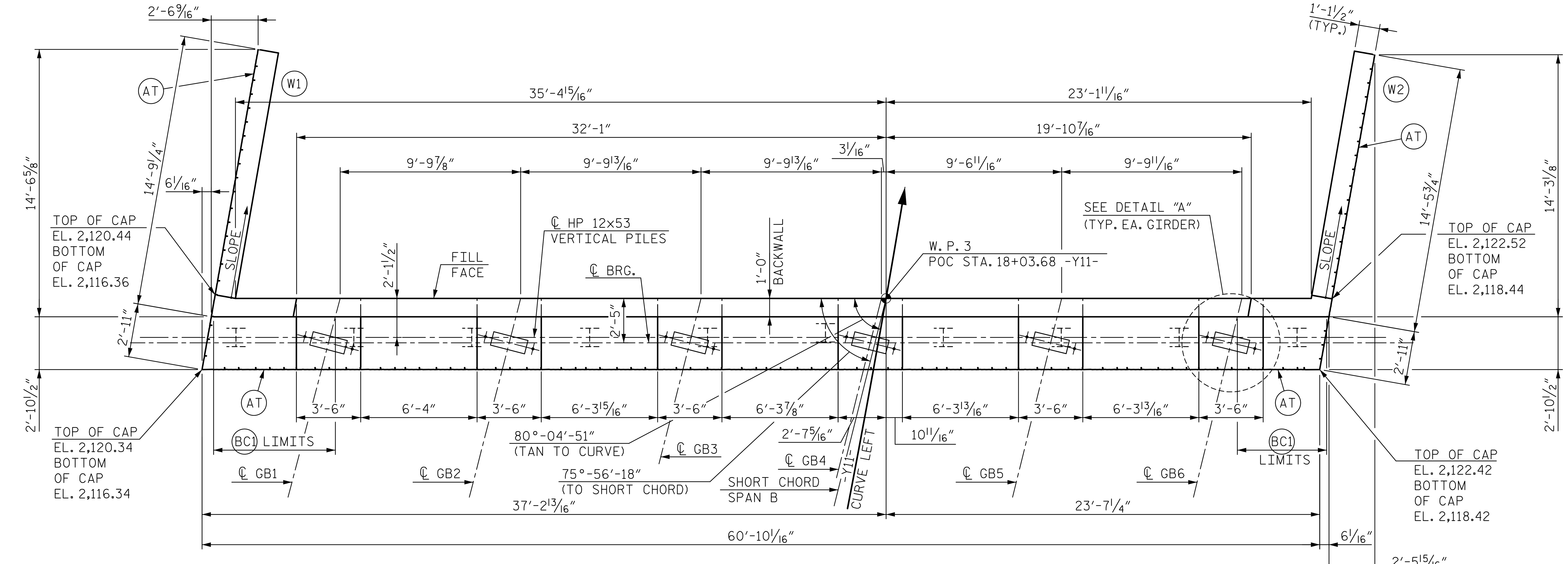
DWG. NO. 32

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-32
1			3			TOTAL SHEETS
2			4			41

NOTES:

FOR NOTES AND PILE SPLICE DETAILS, SEE SHEET 3 OF 4.

FOR WINGWALL DETAILS AND SECTION A-A, SEE SHEET 2 OF 4.

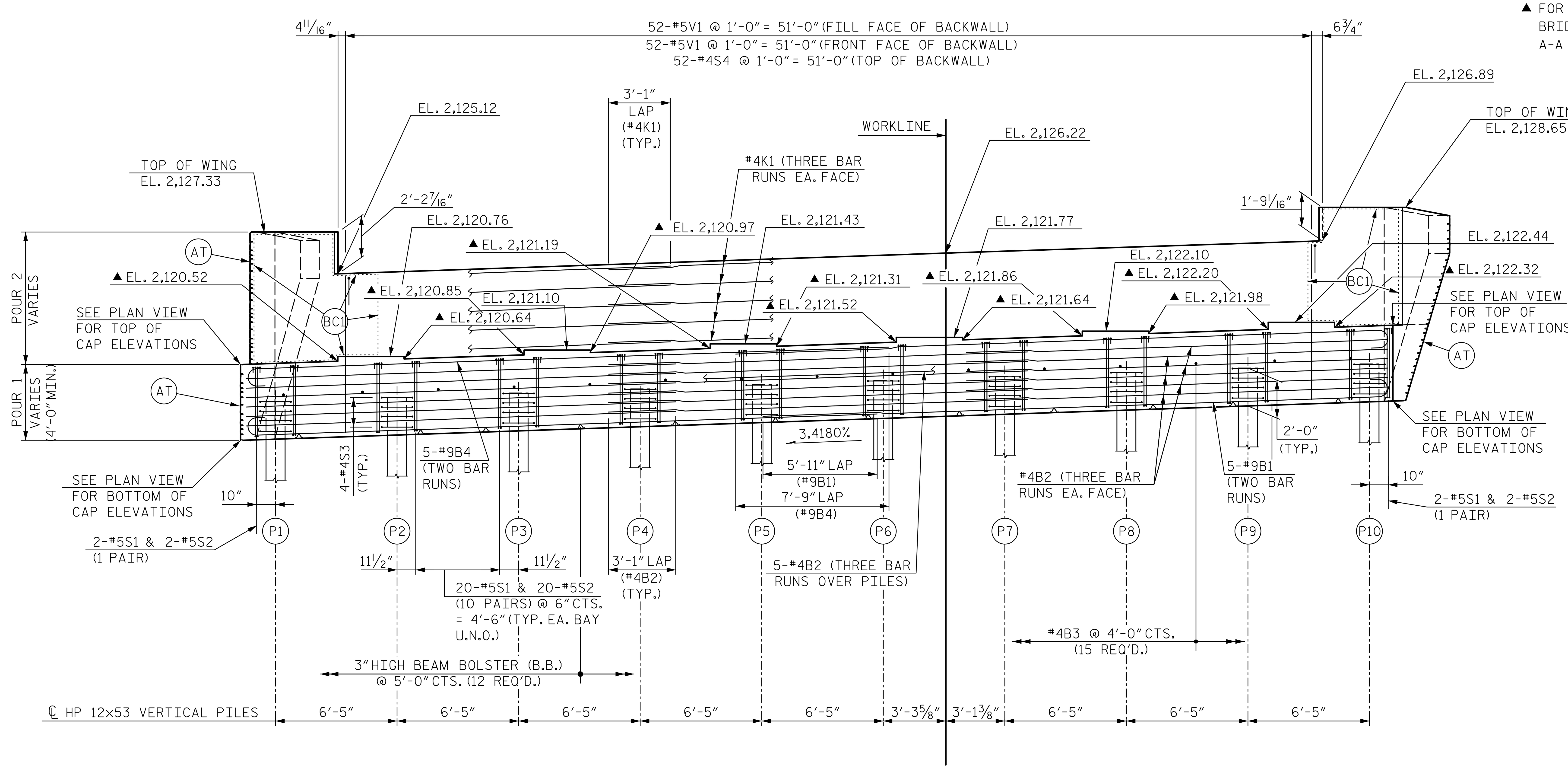


PLAN

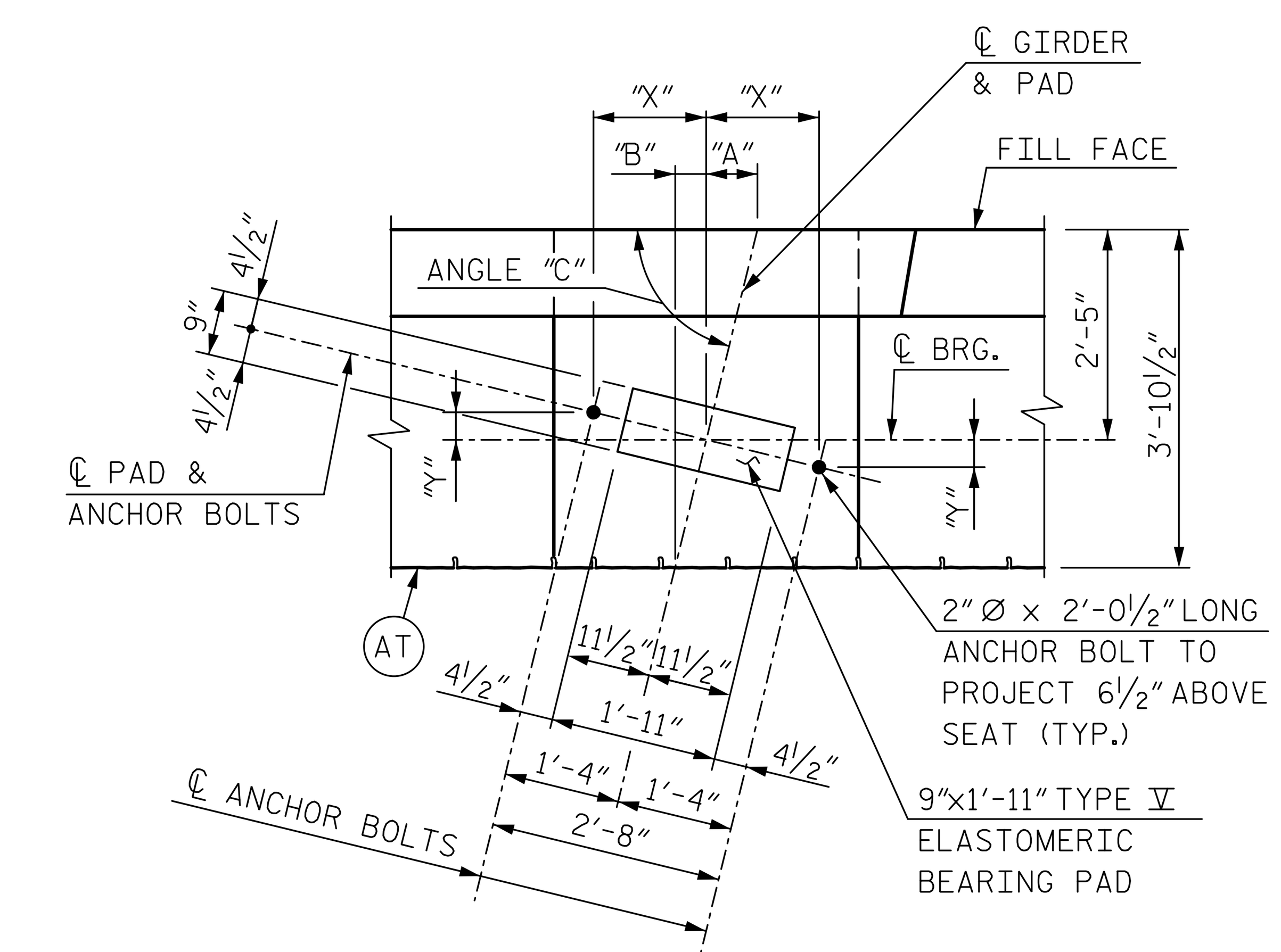
(AT) LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

(BC1) LIMITS OF BRIDGE COATING (LIGHT GRAY)

▲ FOR ELEVATIONS BETWEEN BRIDGE SEATS, SEE SECTION A-A ON SHEET 2 OF 4.



ELEVATION



DETAIL A

GIRDER	"A"	"B"	ANGLE "C"	"X"	"Y"
GB1	7⅝″	4 9/16″	75°-19′-02″	1′-3½″	4 1/16″
GB2	7½″	4½″	75°-31′-43″	1′-3½″	4″
GB3	7⅜″	4 7/16″	75°-44′-02″	1′-3½″	3 15/16″
GB4	7¼″	4⅜″	75°-56′-00″	1′-3½″	3⅞″
GB5	7 3/16″	4 5/16″	76°-07′-38″	1′-3½″	3 13/16″
GB6	7 1/16″	4¼″	76°-18′-57″	1′-3 9/16″	3¾″

TOP OF PILE ELEVATIONS	
P1	2,118.41
P2	2,118.63
P3	2,118.85
P4	2,119.06
P5	2,119.28
P6	2,119.50
P7	2,119.72
P8	2,119.94
P9	2,120.16
P10	2,120.38

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER 6/7/2019

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DRAWN BY	M. WRIGHT	DATE	3/19
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DESIGN ENGINEER OF RECORD	P. BARBER	DATE	5/19

DWG. NO. 33

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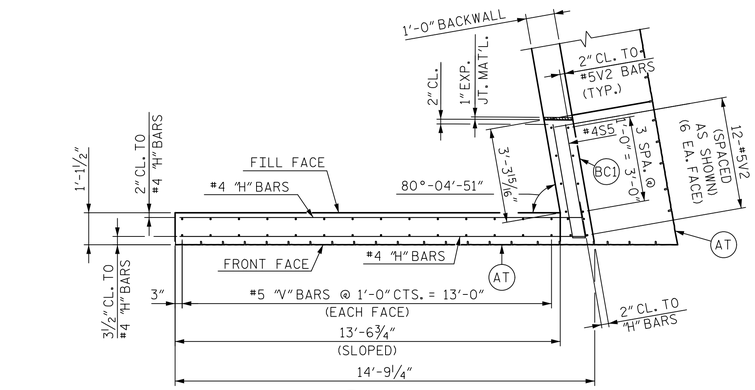
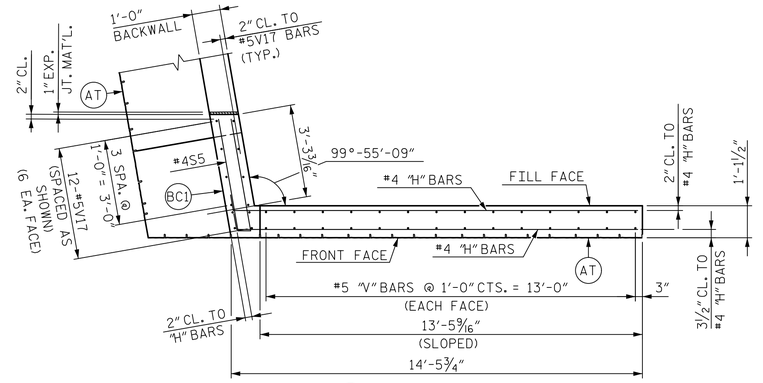
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. S3-33

TOTAL SHEETS 41



W1 PLAN OF WING

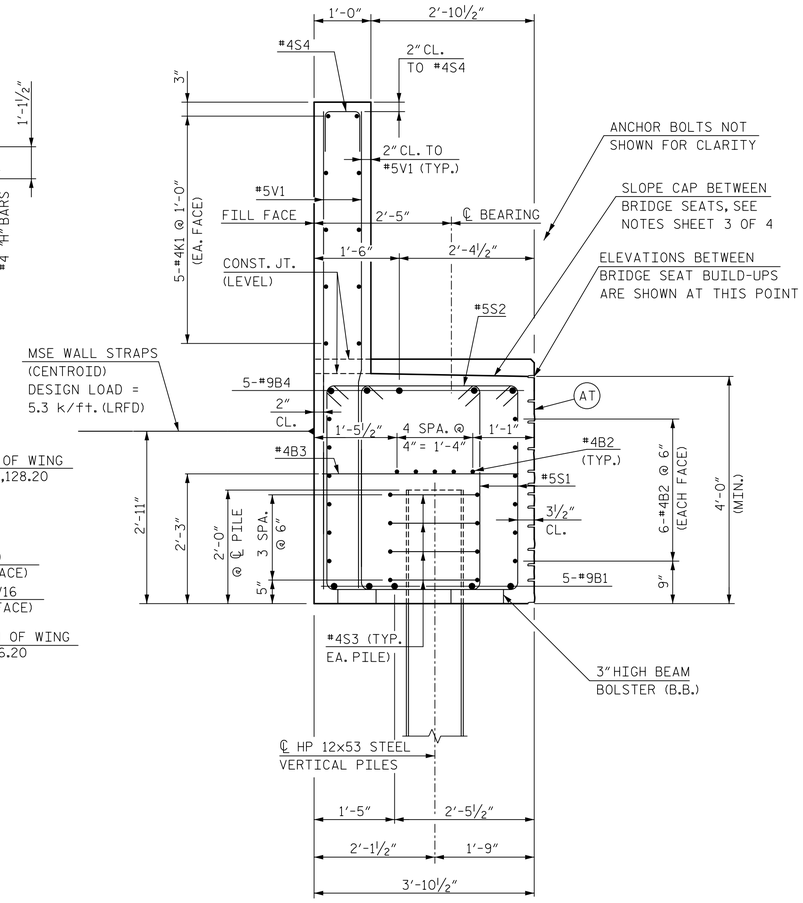


W2 PLAN OF WING

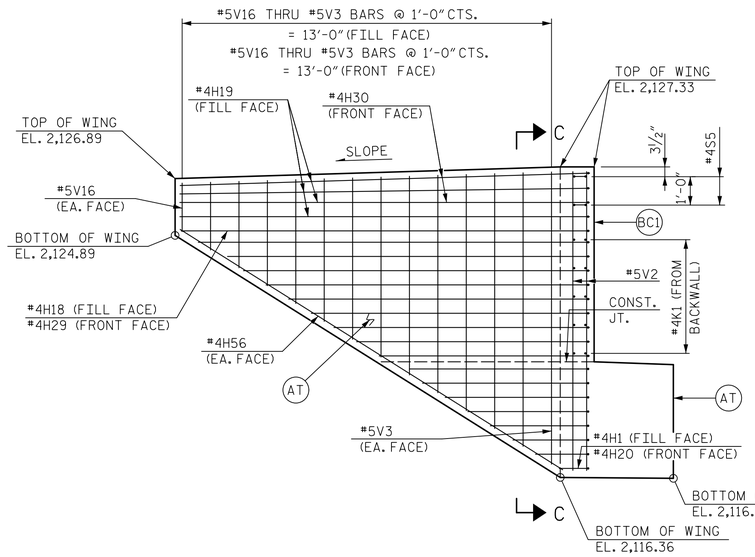
NOTES:

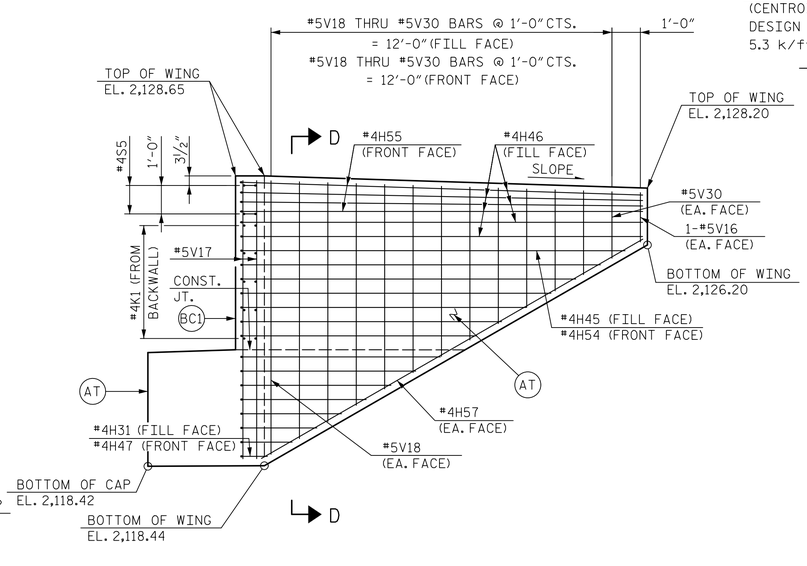
FOR NOTES, SEE SHEET 3 OF 4.

FOR BLOCKOUT IN WINGWALL, SEE SHEET 3 OF 4.

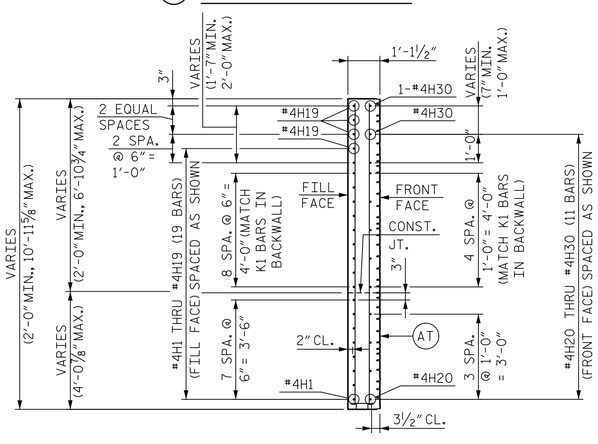


SECTION A-A





W1 ELEVATION OF WING

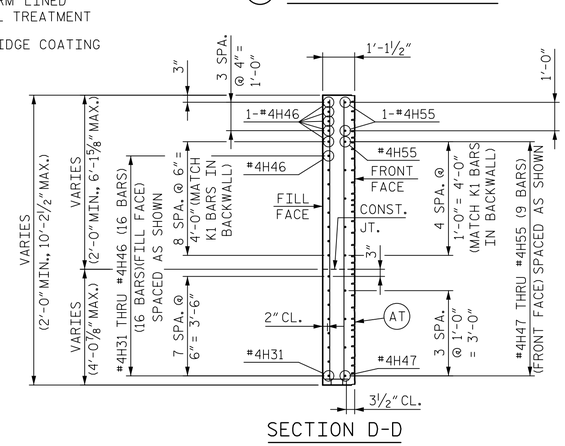


SECTION C-C

AT LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

BC1 LIMITS OF BRIDGE COATING (LIGHT GRAY)

W2 ELEVATION OF WING



SECTION D-D

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 6/13/2019 ENGINEER PAUL J. BARBER

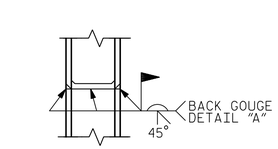
Developed by: Barber

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

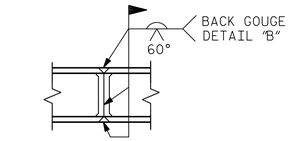
DRAWN BY	M. WRIGHT	DATE 3/19
CHECKED BY	N. HART	DATE 3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 34

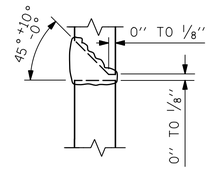
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-34
1			3			TOTAL SHEETS
2			4			41



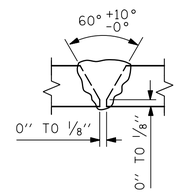
✳PILE VERTICAL



✳PILE HORIZONTAL
OR VERTICAL



DETAIL "A"



DETAIL "B"

✳ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

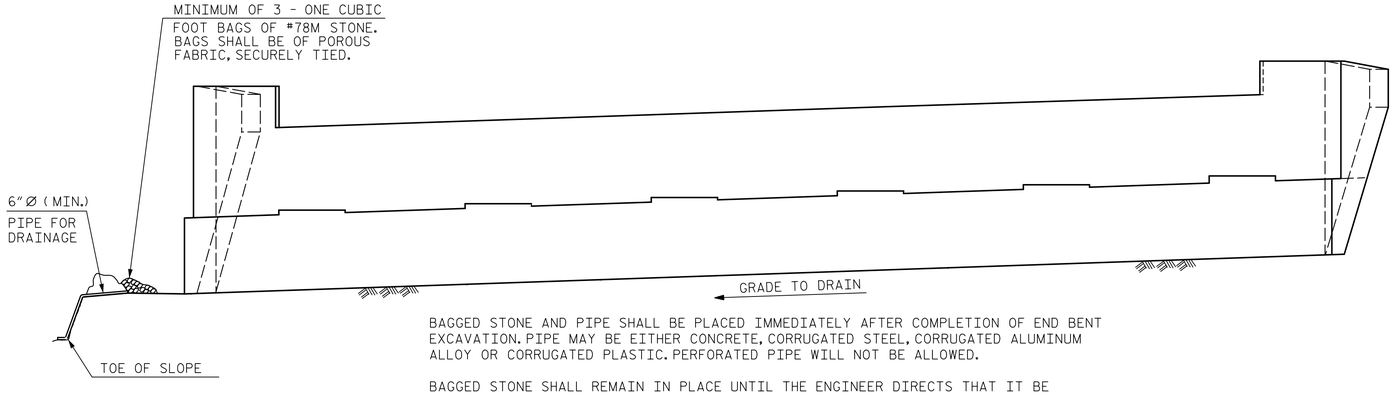
NOTES:

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

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



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

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

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

TEMPORARY DRAINAGE AT END BENT 2

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 6/7/2019 PAUL J. BARBER
Digitally signed by: Paul J. Barber

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

DRAWN BY	M. WRIGHT	DATE 3/19
CHECKED BY	N. HART	DATE 3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 35

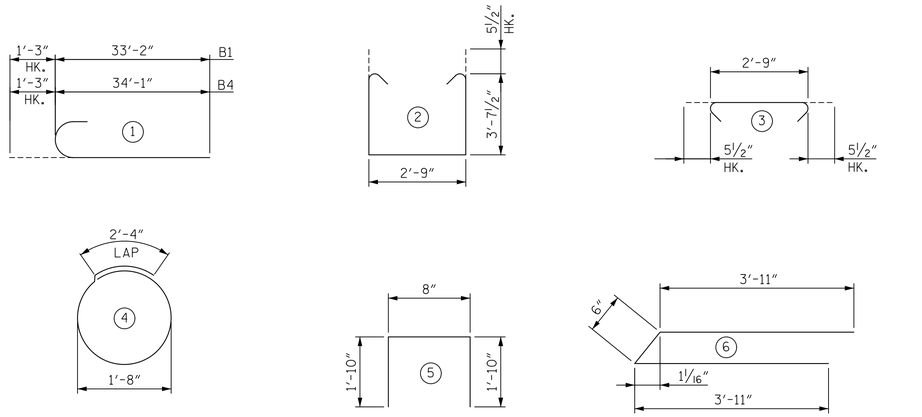
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-35
1			3			TOTAL SHEETS
2			4			41

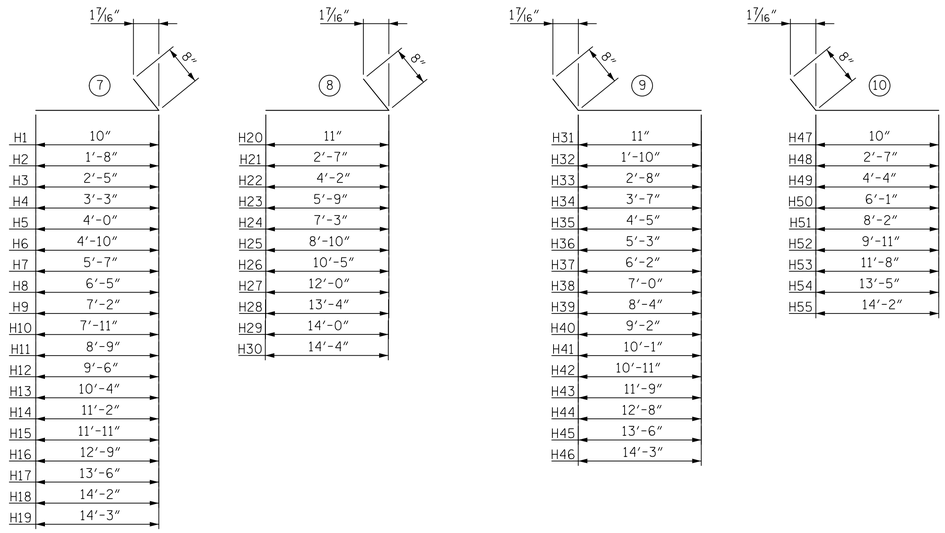
REINFORCING BAR SCHEDULE

END BENT 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	10	9	1	34′-5″	1,170	H51	1	4	10	8′-10″	6
B2	51	4	STR	22′-3″	758	H52	1	4	10	10′-7″	7
B3	15	4	STR	3′-5″	34	H53	1	4	10	12′-4″	8
B4	10	9	1	35′-4″	1,201	H54	1	4	10	14′-1″	9
						H55	3	4	10	14′-10″	30
H1	1	4	7	1′-6″	1	H56	2	4	STR	15′-10″	21
H2	1	4	7	2′-4″	2	H57	2	4	STR	15′-5″	21
H3	1	4	7	3′-1″	2						
H4	1	4	7	3′-11″	3	K1	30	4	STR	22′-3″	446
H5	1	4	7	4′-8″	3						
H6	1	4	7	5′-6″	4	S1	184	5	2	10′-11″	2,095
H7	1	4	7	6′-3″	4	S2	184	5	3	3′-8″	704
H8	1	4	7	7′-1″	5	S3	40	4	4	7′-7″	203
H9	1	4	7	7′-10″	5	S4	52	4	5	4′-4″	151
H10	1	4	7	8′-7″	6	S5	4	4	6	8′-4″	22
H11	1	4	7	9′-5″	6						
H12	1	4	7	10′-2″	7	V1	104	5	STR	8′-2″	886
H13	1	4	7	11′-0″	7	V2	12	5	STR	10′-5″	130
H14	1	4	7	11′-10″	8	V3	2	5	STR	10′-3″	21
H15	1	4	7	12′-7″	8	V4	2	5	STR	9′-7″	20
H16	1	4	7	13′-5″	9	V5	2	5	STR	8′-11″	19
H17	1	4	7	14′-2″	9	V6	2	5	STR	8′-3″	17
H18	1	4	7	14′-10″	10	V7	2	5	STR	7′-7″	16
H19	4	4	7	14′-11″	40	V8	2	5	STR	6′-11″	14
H20	1	4	8	1′-7″	1	V9	2	5	STR	6′-3″	13
H21	1	4	8	3′-3″	2	V10	2	5	STR	5′-7″	12
H22	1	4	8	4′-10″	3	V11	2	5	STR	4′-11″	10
H23	1	4	8	6′-5″	4	V12	2	5	STR	4′-3″	9
H24	1	4	8	7′-11″	5	V13	2	5	STR	3′-7″	7
H25	1	4	8	9′-6″	6	V14	2	5	STR	2′-11″	6
H26	1	4	8	11′-1″	7	V15	2	5	STR	2′-3″	5
H27	1	4	8	12′-8″	8	V16	4	5	STR	1′-8″	7
H28	1	4	8	14′-0″	9	V17	12	5	STR	9′-8″	121
H29	1	4	8	14′-8″	10	V18	2	5	STR	9′-7″	20
H30	2	4	8	15′-0″	20	V19	2	5	STR	8′-11″	19
H31	1	4	9	1′-7″	1	V20	2	5	STR	8′-4″	17
H32	1	4	9	2′-6″	2	V21	2	5	STR	7′-8″	16
H33	1	4	9	3′-4″	2	V22	2	5	STR	7′-1″	15
H34	1	4	9	4′-3″	3	V23	2	5	STR	6′-6″	14
H35	1	4	9	5′-1″	3	V24	2	5	STR	5′-10″	12
H36	1	4	9	5′-11″	4	V25	2	5	STR	5′-3″	11
H37	1	4	9	6′-10″	5	V26	2	5	STR	4′-8″	10
H38	1	4	9	7′-8″	5	V27	2	5	STR	4′-1″	9
H39	1	4	9	9′-0″	6	V28	2	5	STR	3′-5″	7
H40	1	4	9	9′-10″	7	V29	2	5	STR	2′-10″	6
H41	1	4	9	10′-9″	7	V30	2	5	STR	2′-3″	5
H42	1	4	9	11′-7″	8						
H43	1	4	9	12′-5″	8						
H44	1	4	9	13′-4″	9						
H45	1	4	9	14′-2″	9						
H46	6	4	9	14′-11″	60						
H47	1	4	10	1′-6″	1						
H48	1	4	10	3′-3″	2						
H49	1	4	10	5′-0″	3						
H50	1	4	10	6′-9″	5						
									TOTAL:		8,724

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT

QUANTITIES

REINFORCING STEEL	LBS.	8,724
CLASS "A" CONCRETE BREAKDOWN		
POUR 1 - CAP, & BOT. OF WINGS	CU. YDS.	36.9
POUR 2 - TOP OF WINGS & BACKWALL	CU. YDS.	17.0
TOTAL	CU. YDS.	53.9
HP 12x53 STEEL PILES	NO.	10
	LIN. FT.	700
PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	NO.	10
ARCHITECTURAL CONCRETE SURFACE TREATMENT	SQ. FT.	464.8
APPLICATION OF BRIDGE COATING (LIGHT GRAY)	SQ. FT.	68.8

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DRAWN BY	M. WRIGHT	DATE	3/19
CHECKED BY	N. HART	DATE	3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	5/19

DWG. NO. 36

PROJECT NO. I-4400C

HENDERSON **COUNTY**

STATION: POC 17+01.02 -Y11-

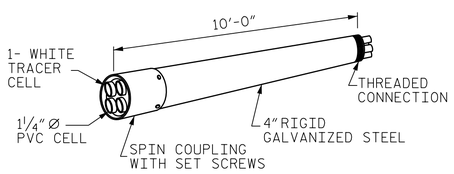
SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

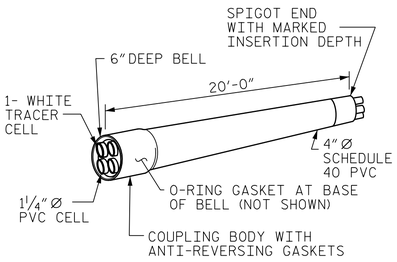
SUBSTRUCTURE

END BENT 2

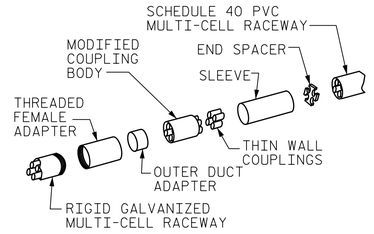
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-36
1			3			TOTAL SHEETS
2			4			41



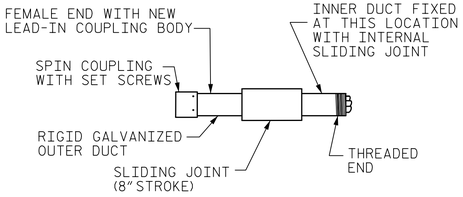
RIGID GALVANIZED (RGC)
MULTI-CELL RACEWAY



SCHEDULE 40 PVC
MULTI-CELL RACEWAY



TRANSITION ADAPTER



EXPANSION JOINT FITTING

DETAIL "D"
4" MULTI-CELL COMPONENTS

NOTES

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

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

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

SEE DETAIL "C" FOR HANGER ASSEMBLY INSTALLATION.

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

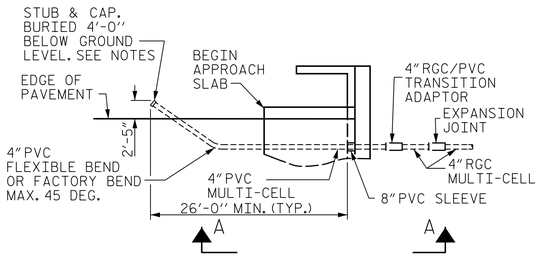
PROVIDE TRANSITION ADAPTOR (AND EXPANSION JOINT) FOR CONDUIT AT END BENT 1 (AND END BENT 2).

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

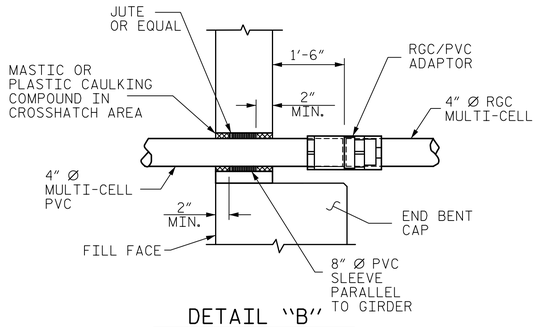
INSTALL EXPANSION JOINTS AT END BENT #1 AND END BENT #2.

THE CONCRETE SCREW INSERT SHALL HAVE A ROD SIZE OF ⅝" AND A PULL FORCE OF 1260 lbs.

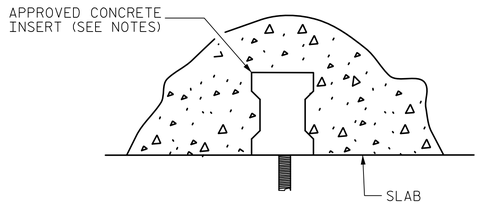
FOR ELECTRICAL CONDUIT SYSTEM FOR SIGNALS, SEE SPECIAL PROVISIONS.

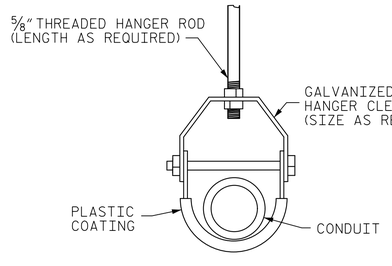


DETAIL "A"
TERMINATION OF CONDUIT AT WING WALL
END BENT 1 SHOWN, END BENT 2 SIMILAR

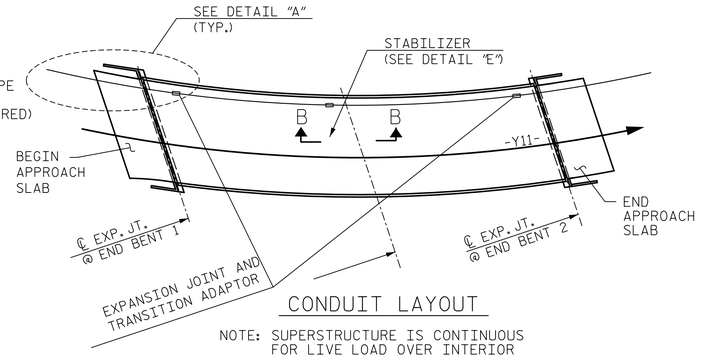


DETAIL "B"
PVC SLEEVE INSTALLATION & RGC/PVC ADAPTOR AT BACKWALL.



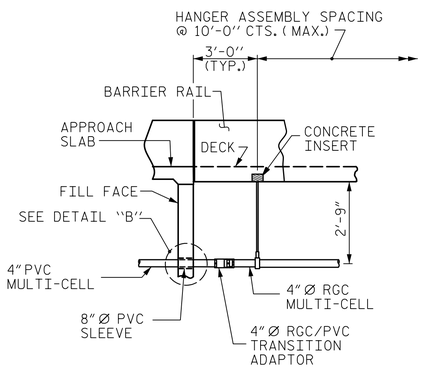


DETAIL "C"
HANGER ASSEMBLY

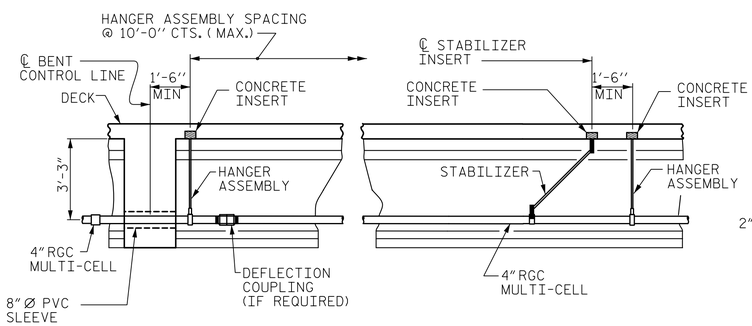


CONDUIT LAYOUT

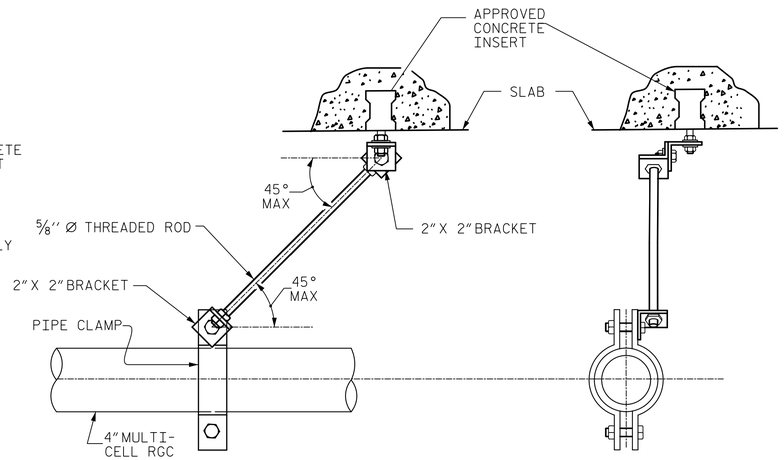
NOTE: SUPERSTRUCTURE IS CONTINUOUS FOR LIVE LOAD OVER INTERIOR BENT.



VIEW A-A



VIEW B-B
PRESTRESSED GIRDERS
CONTINUOUS FOR LIVE LOAD



DETAIL "E"
STABILIZER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 Paul J. Barber 5/24/2019 ENGINEER PAUL J. BARBER

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: POC 17+01.02 -Y11-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

ELECTRICAL CONDUIT SYSTEM FOR SIGNALS

ELECTRIC CONDUIT DETAILS

ASSEMBLED BY : M. WRIGHT	DATE : 3/19		
CHECKED BY : D. HAWKINS	DATE : 3/19		
DRAWN BY : RWW 2-4-03	REV. 5/1/06	TLA/GM	
CHECKED BY : DBM 2-4-03	REV. 10/1/11	MAA/GM	
	REV. 12/17	MAA/THC	

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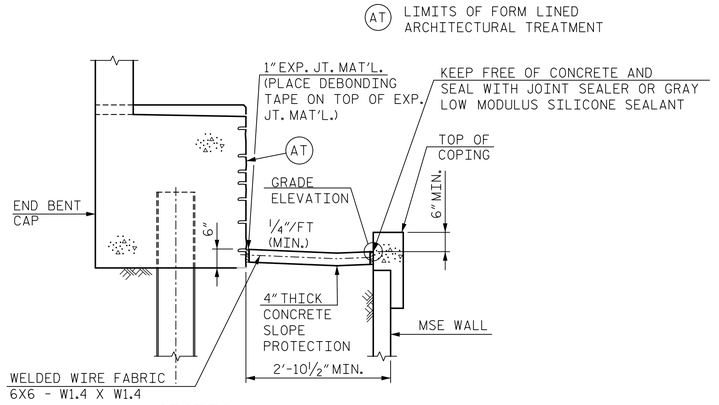
DRAWN BY	M. WRIGHT	DATE 3/19
CHECKED BY	D. HAWKINS	DATE 3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

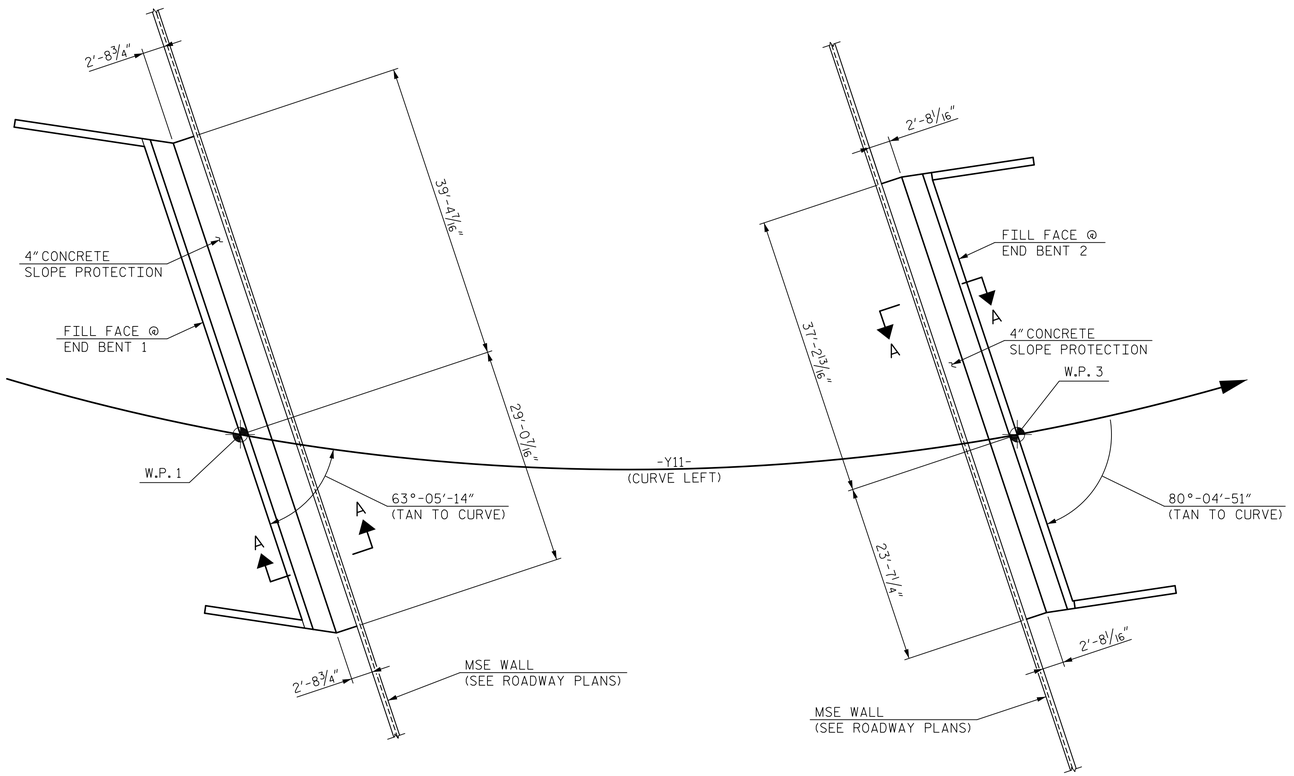
DWG. NO. 37

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-37
1			3			TOTAL SHEETS
2			4			41

STD. NO. ECS1



SECTION A-A



PLAN

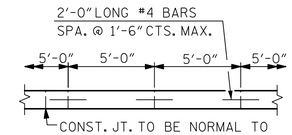
NOTES:

FOR BERM ELEVATIONS, SEE GENERAL DRAWING.

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

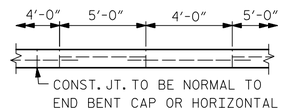
BRIDGE @ STA. POC 17+01.02 -Y11-	4 INCH SLOPE PROTECTION	✳ WELDED WIRE FABRIC 60 INCHES WIDE
	SQUARE YARDS	APPROX. L.F.
END BENT 1	21	45
END BENT 2	19	40

✳ QUANTITY SHOWN IS BASED ON 5' POURS.



STRIP WIDTHS MAY VARY IN CURVED PORTION.

POURING DETAIL



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

OPTIONAL POURING DETAIL

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 6/7/2019 PAUL J. BARBER

Digitally signed by: P. Barber

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SLOPE PROTECTION DETAILS

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DRAWN BY M. WRIGHT DATE 3/19
CHECKED BY N. HART DATE 3/19
DESIGN ENGINEER OF RECORD P. BARBER DATE 5/19

DWG. NO. 38

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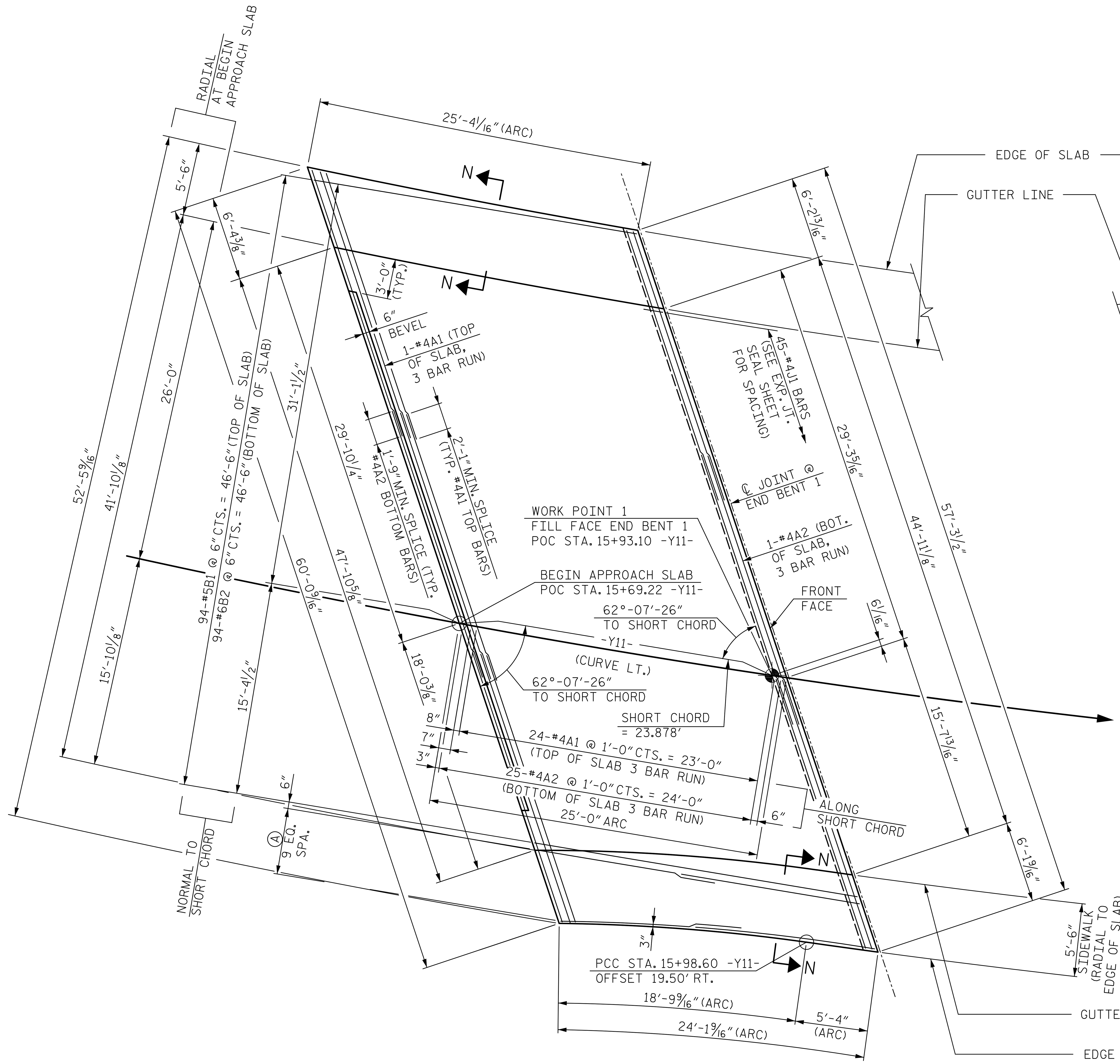
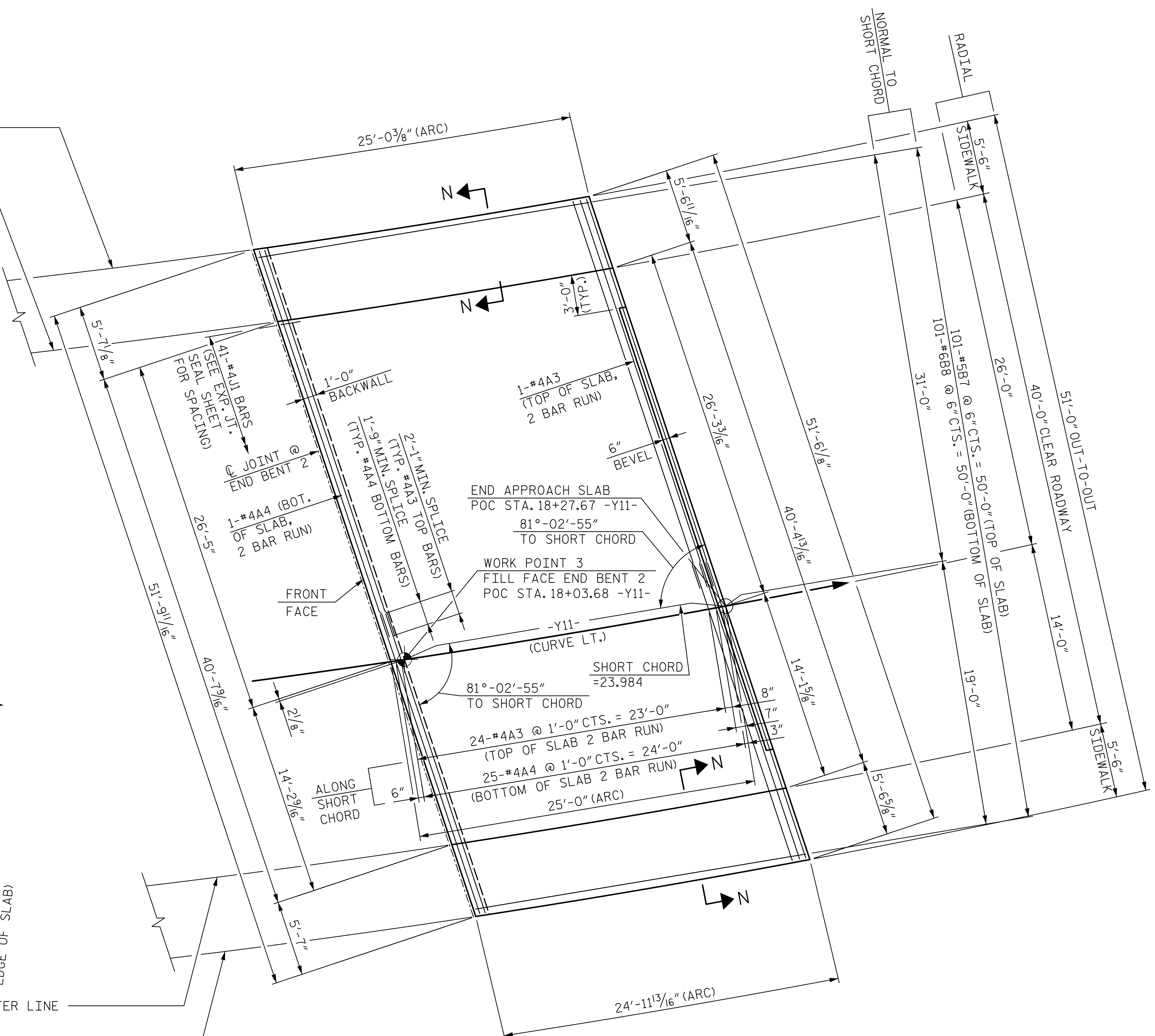
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-38
1			3			TOTAL SHEETS
2			4			41



Ⓐ 10-#5B3(TOP)(2 BAR RUN)
10-#6B4(BOTTOM)(2 BAR RUN)

PLAN AT END BENT 1



NOTE: "B" BARS SHALL BE PLACED PARALLEL TO APPROACH SLAB SHORT CHORD UNLESS NOTED OTHERWISE.

PLAN AT END BENT 2

NOTES:

FOR SECTION N-N, SEE SHEET 3 OF 3.

FOR APPROACH SLAB BILL OF MATERIALS, SEE SHEET 2 OF 3.

FOR STANDARD EXPANSION JOINT SEAL DETAILS, SEE "EXPANSION JOINT SEAL DETAILS" SHEET.

FOR SIDEWALK QUANTITIES, SEE BILL OF MATERIAL FOR APPROACH SLABS ON "BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT" SHEET 2 OF 3. THE PAYMENT FOR SIDEWALK ON APPROACH SLAB SHALL BE INCLUDED IN THE LUMP SUM BID PRICE FOR "BRIDGE APPROACH SLABS, POC STA. 17+01.02 -Y11-.

FOR SIDEWALK REINFORCING STEEL PLACEMENT, SEE SHEET 3 OF 3.

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER 5/24/2019

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: POC 17+01.02 -Y11-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BRIDGE APPROACH SLAB LAYOUT

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DRAWN BY	M. WRIGHT	DATE	3/19
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DESIGN ENGINEER OF RECORD	P. BARBER	DATE	5/19

DWG. NO. 39

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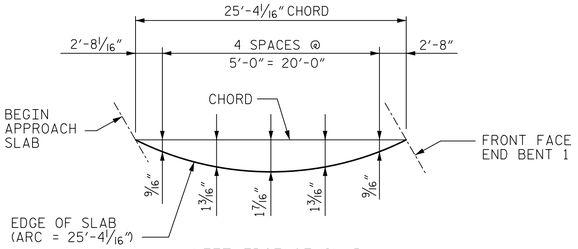
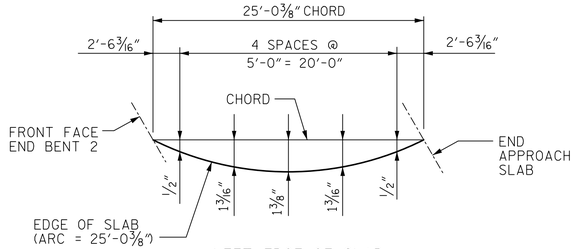
REVISIONS

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

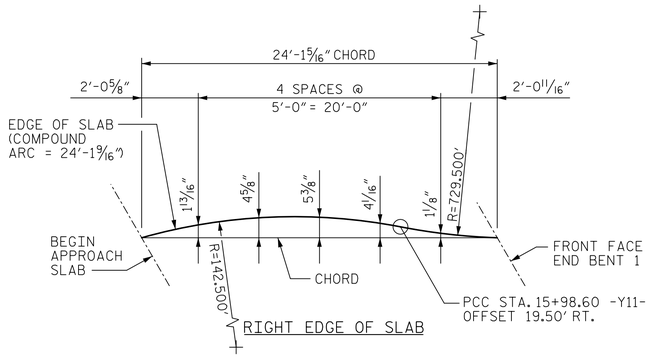
SHEET NO. S3-39
TOTAL SHEETS 41



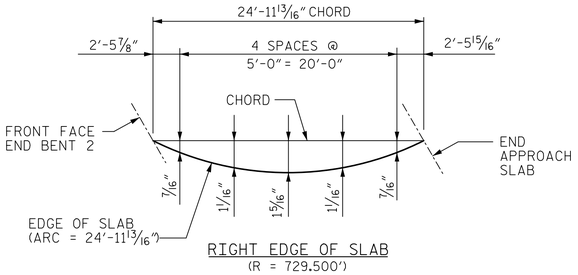
LEFT EDGE OF SLAB
(R = 678.500′)



LEFT EDGE OF SLAB
(R = 678.500′)

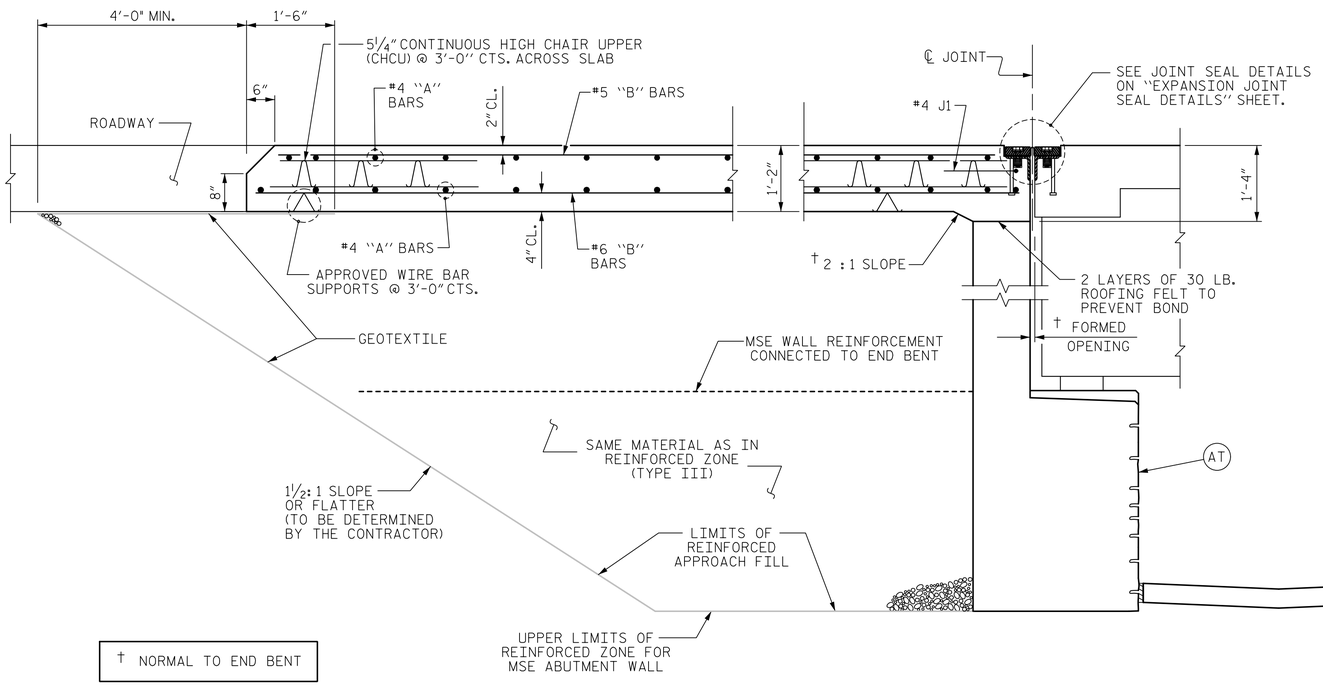


CURVE OFFSETS - APPROACH SLAB AT END BENT 1



RIGHT EDGE OF SLAB
(R = 729.500′)

CURVE OFFSETS - APPROACH SLAB AT END BENT 2



† NORMAL TO END BENT

SECTION THRU SLAB
(TYPE III - REINFORCED APPROACH FILL)

(AT) LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

BILL OF MATERIAL

APPROACH SLAB AT END BENT 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	75	#4	STR	21′-4″	1,069
A2	78	#4	STR	21′-1″	1,099
✳ B1	94	#5	STR	23′-9″	2,328
B2	94	#6	STR	24′-7″	3,471
✳ B3	20	#5	STR	13′-2″	275
B4	20	#6	STR	13′-7″	408
✳ B5	4	#4	STR	24′-9″	66
✳ B6	4	#4	STR	23′-6″	63
✳ G1	25	#4	STR	5′-9″	96
✳ G2	24	#4	STR	5′-4″	86
✳ J1	45	#4	1	1′-5″	43
✳ U1	16	#4	2	3′-4″	36

REINFORCING STEEL	LBS.	4,978
✳ EPOXY COATED REINFORCING STEEL	LBS.	4,062
CLASS AA CONCRETE		
APPROACH SLAB ✳✳	C. Y.	55.5
SIDEWALK ✳✳	C. Y.	5.5
TOTAL CLASS AA CONCRETE	C. Y.	61.0

APPROACH SLAB AT END BENT 2

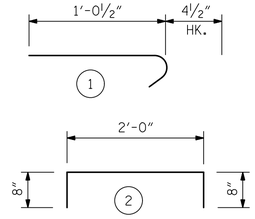
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A3	50	#4	STR	26′-10″	896
A4	52	#4	STR	26′-8″	926
✳ B7	101	#5	STR	23′-10″	2,511
B8	101	#6	STR	24′-7″	3,729
✳ B9	8	#4	STR	24′-6″	131
✳ G3	50	#4	STR	5′-1″	170
✳ J1	41	#4	1	1′-5″	39
✳ U1	16	#4	2	3′-4″	36

REINFORCING STEEL	LBS.	4,655
✳ EPOXY COATED REINFORCING STEEL	LBS.	3,783
CLASS AA CONCRETE		
APPROACH SLAB ✳✳	C. Y.	55.3
SIDEWALK ✳✳	C. Y.	5.6
TOTAL CLASS AA CONCRETE	C. Y.	60.9

SPLICE LENGTHS

BAR SIZE	EPOXY COATED	UNCOATED
#4	2′-1″	1′-9″
#5	2′-7″	2′-2″
#6	3′-10″	2′-7″

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

NOTES

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

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

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

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

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

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

FOR SIDEWALK QUANTITIES, SEE BILL OF MATERIAL.

THE PAYMENT FOR SIDEWALK ON APPROACH SLAB SHALL BE INCLUDED IN THE LUMP SUM BID PRICE FOR "BRIDGE APPROACH SLABS, POC STA. 17+01.02 -Y11-.

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.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 12916 6/7/2019 PAUL J. BARBER — Digitally signed by: Paul J. Barber

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

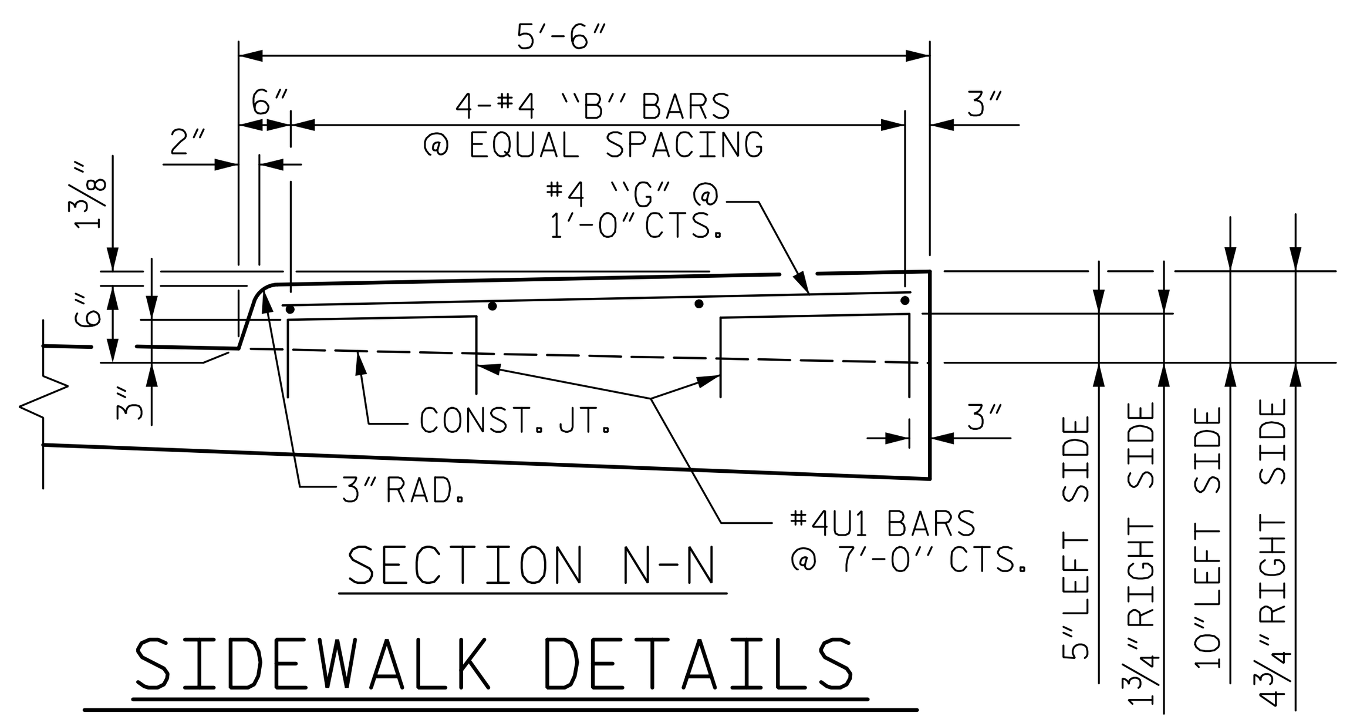
DRAWN BY	M. WRIGHT	DATE 3/19
CHECKED BY	D. HAWKINS	DATE 3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE 5/19

DWG. NO. 40

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S3-40
1			3			TOTAL SHEETS
2			4			41

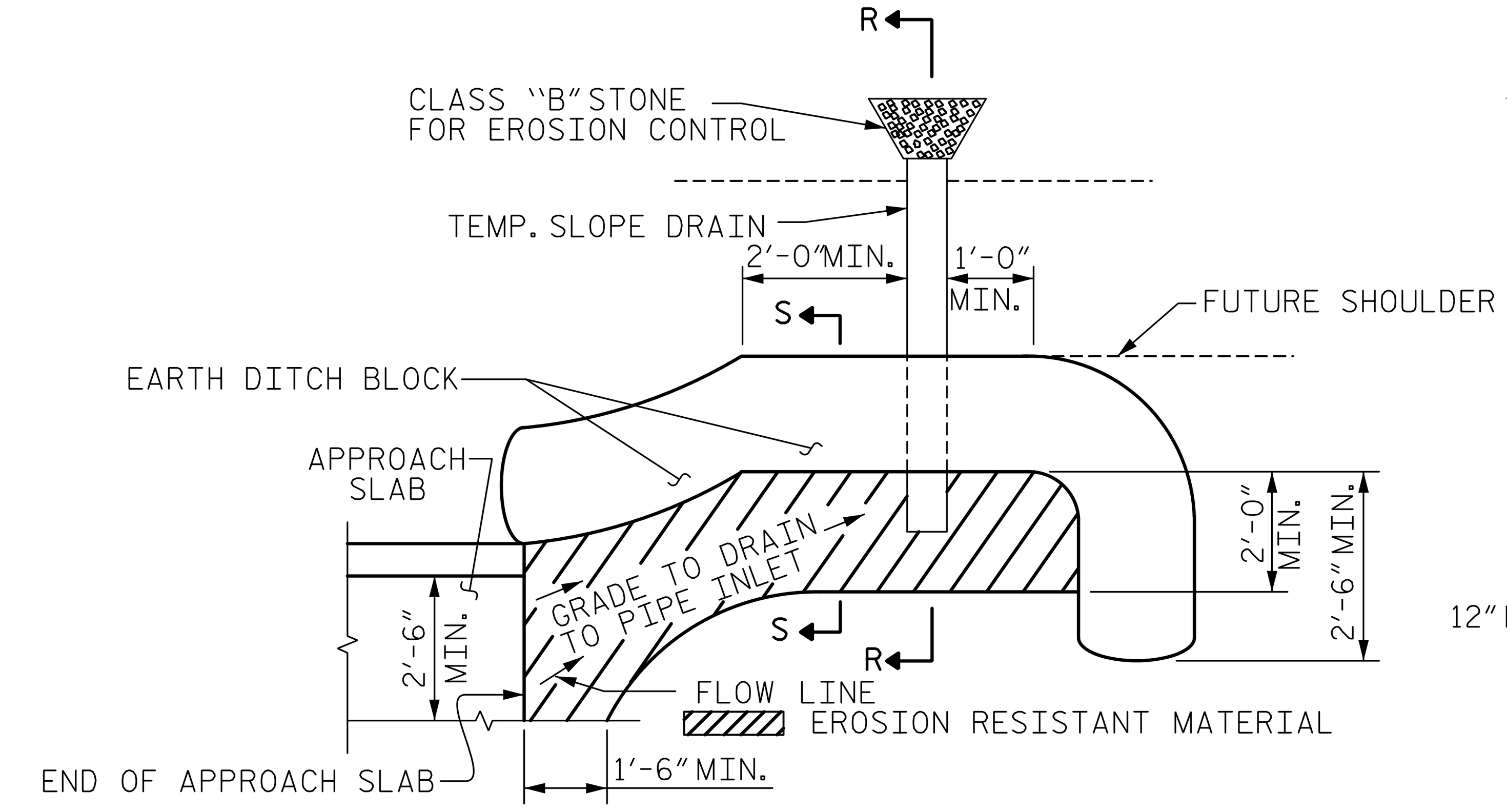
ASSEMBLED BY : M. WRIGHT	DATE : 3/19		
CHECKED BY : D. HAWKINS	DATE : 3/19		
DRAWN BY : EEM 3/95	REV. 12/21/11	MAA/GM	
CHECKED BY : VAP 3/95	REV. 6/13	MAA/GM	
	REV. 12/17	MAA/THC	

STD. NO. BAS2 (SHT 3a)



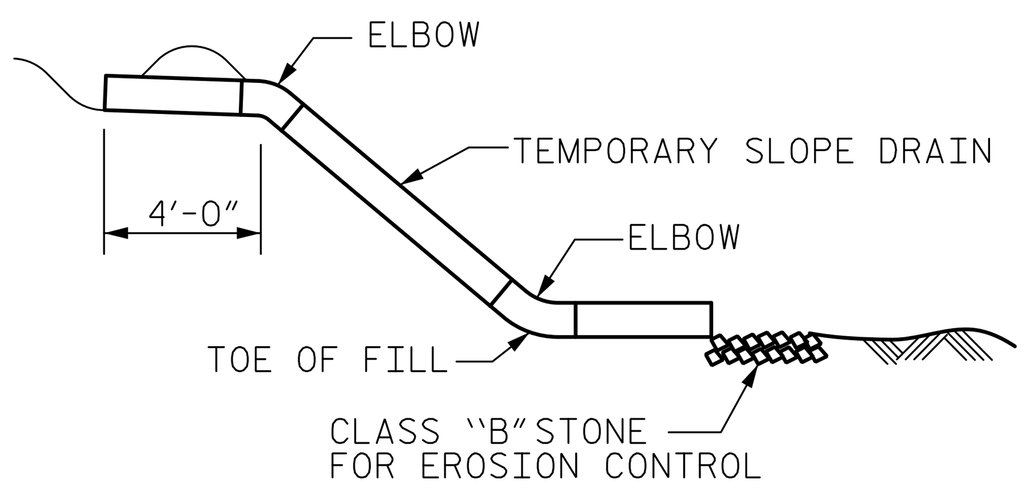
SECTION N-N

SIDEWALK DETAILS

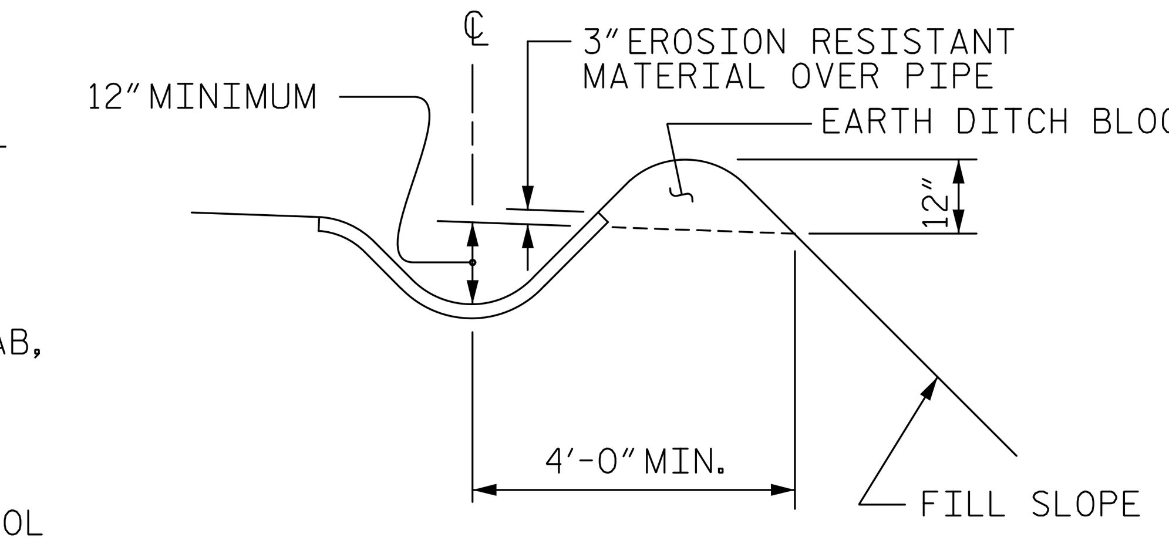


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN.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

PLAN VIEW



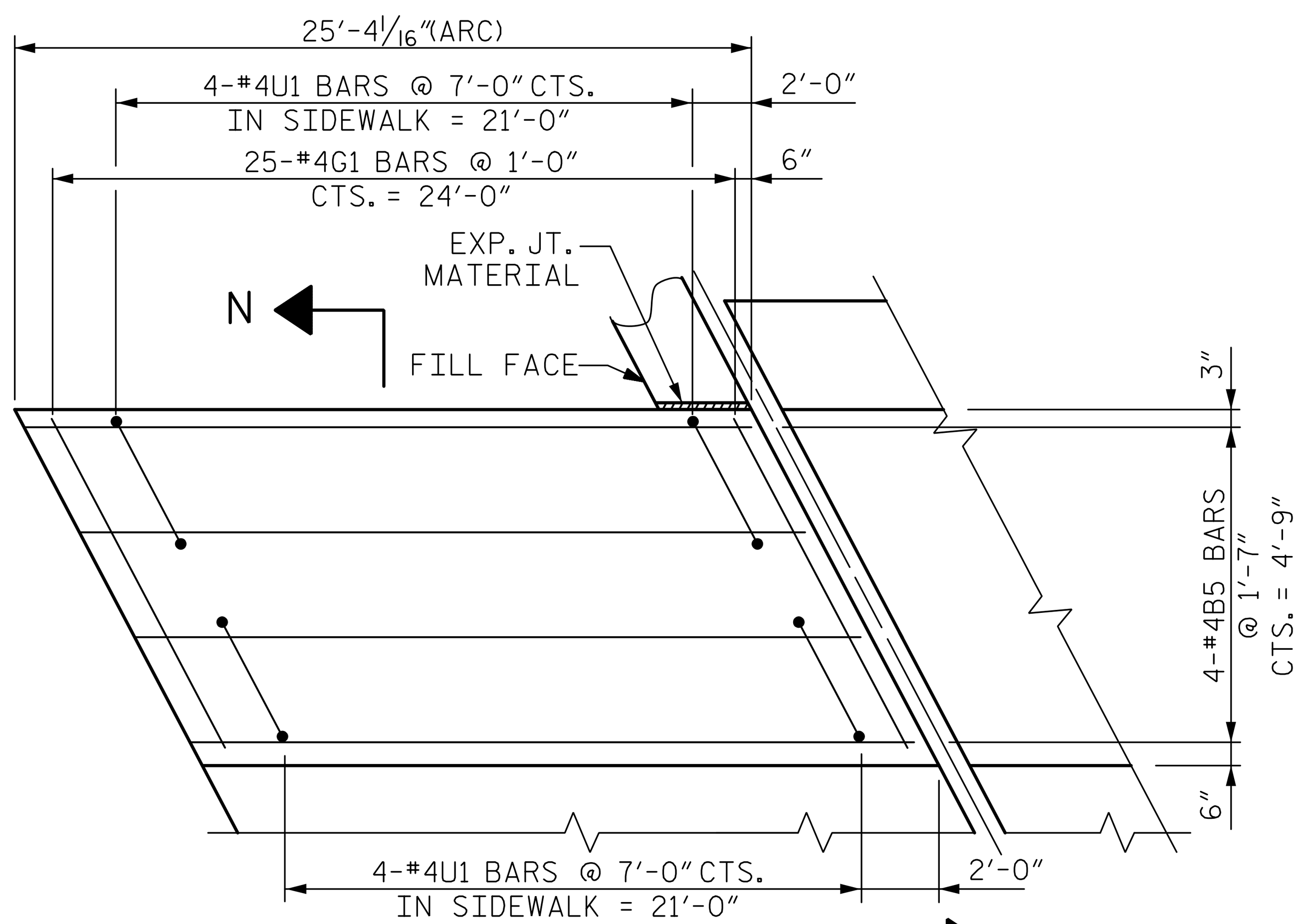
SECTION R-R

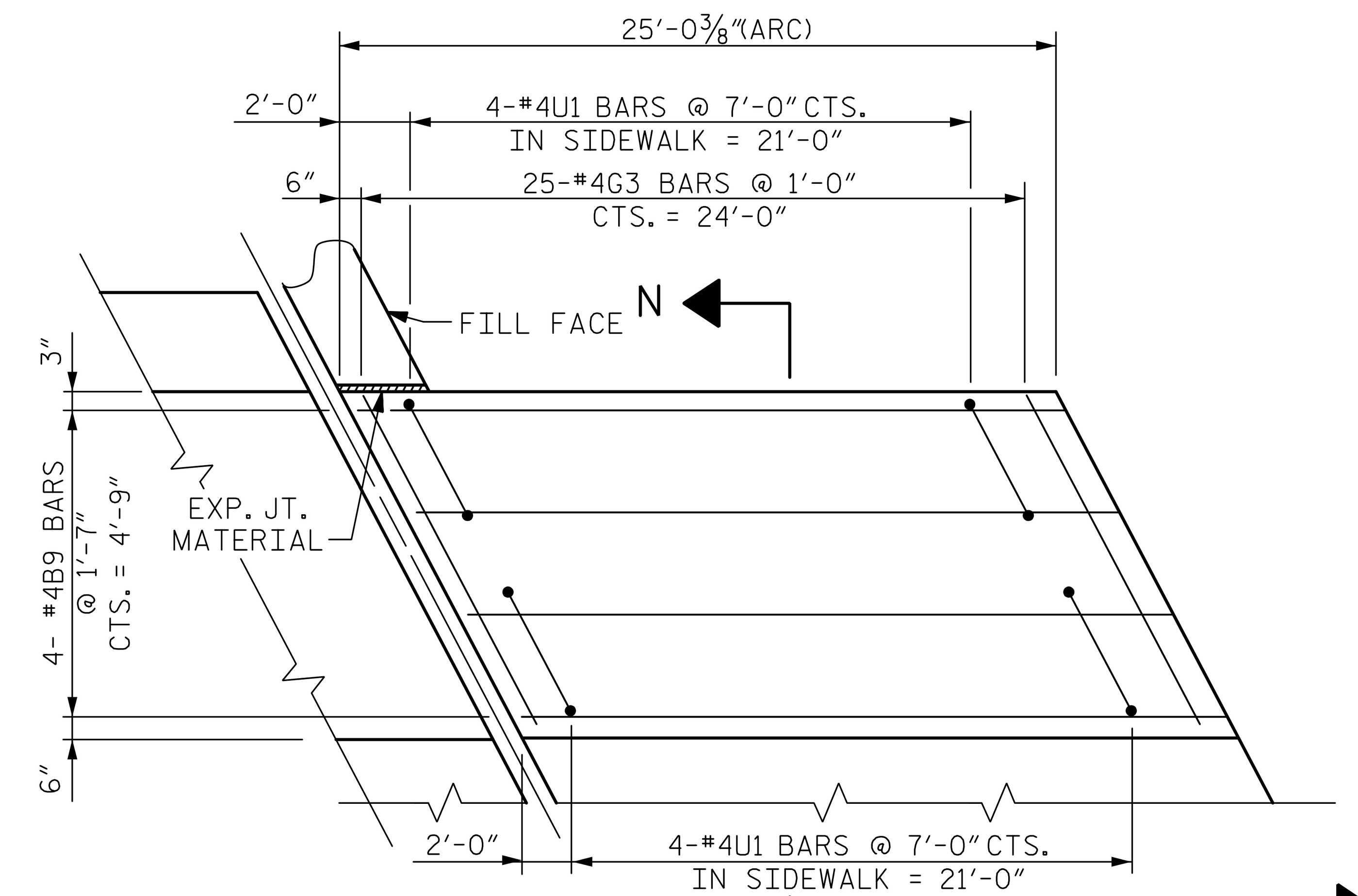


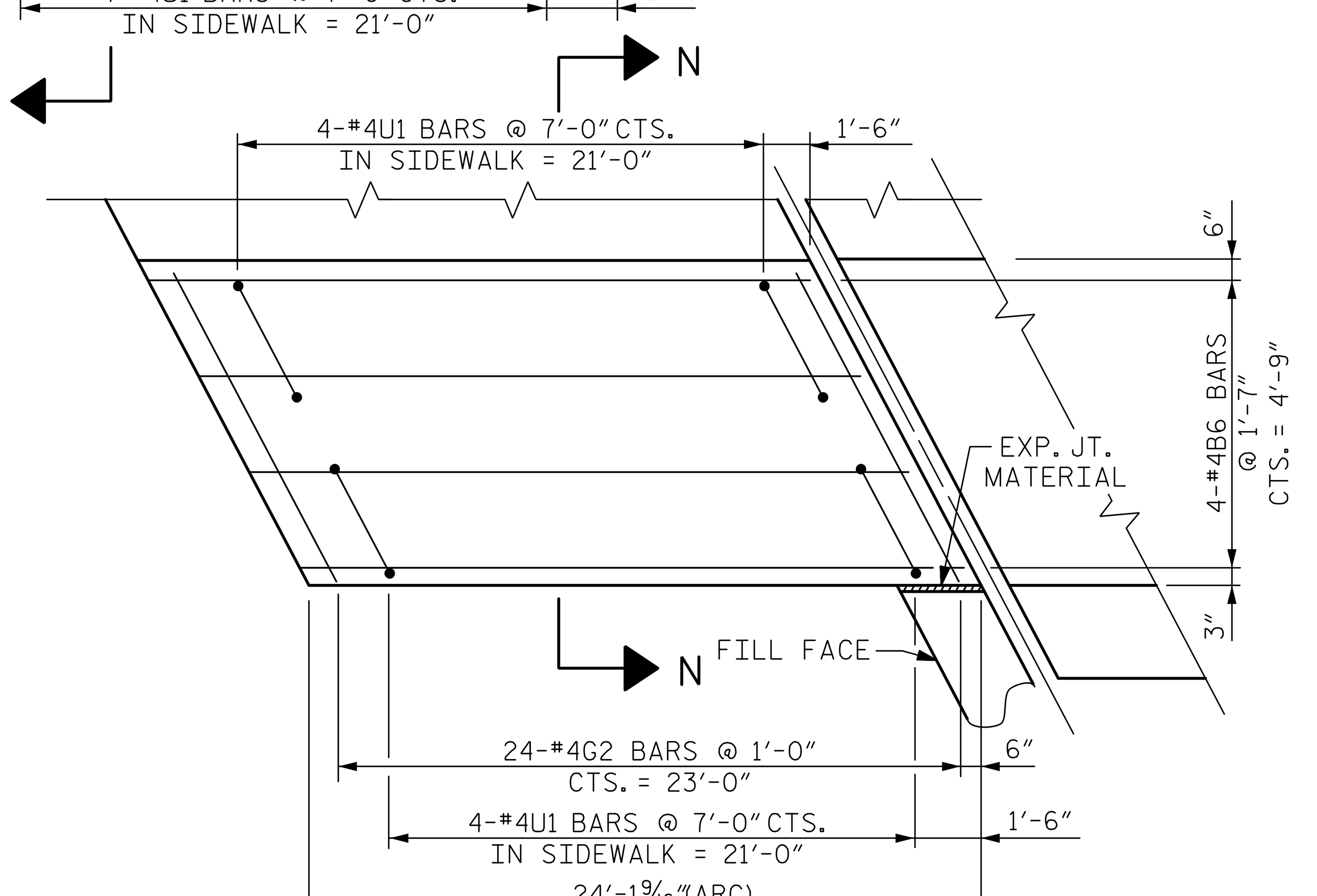
SECTION S-S

TEMPORARY BERM AND SLOPE DRAIN DETAILS

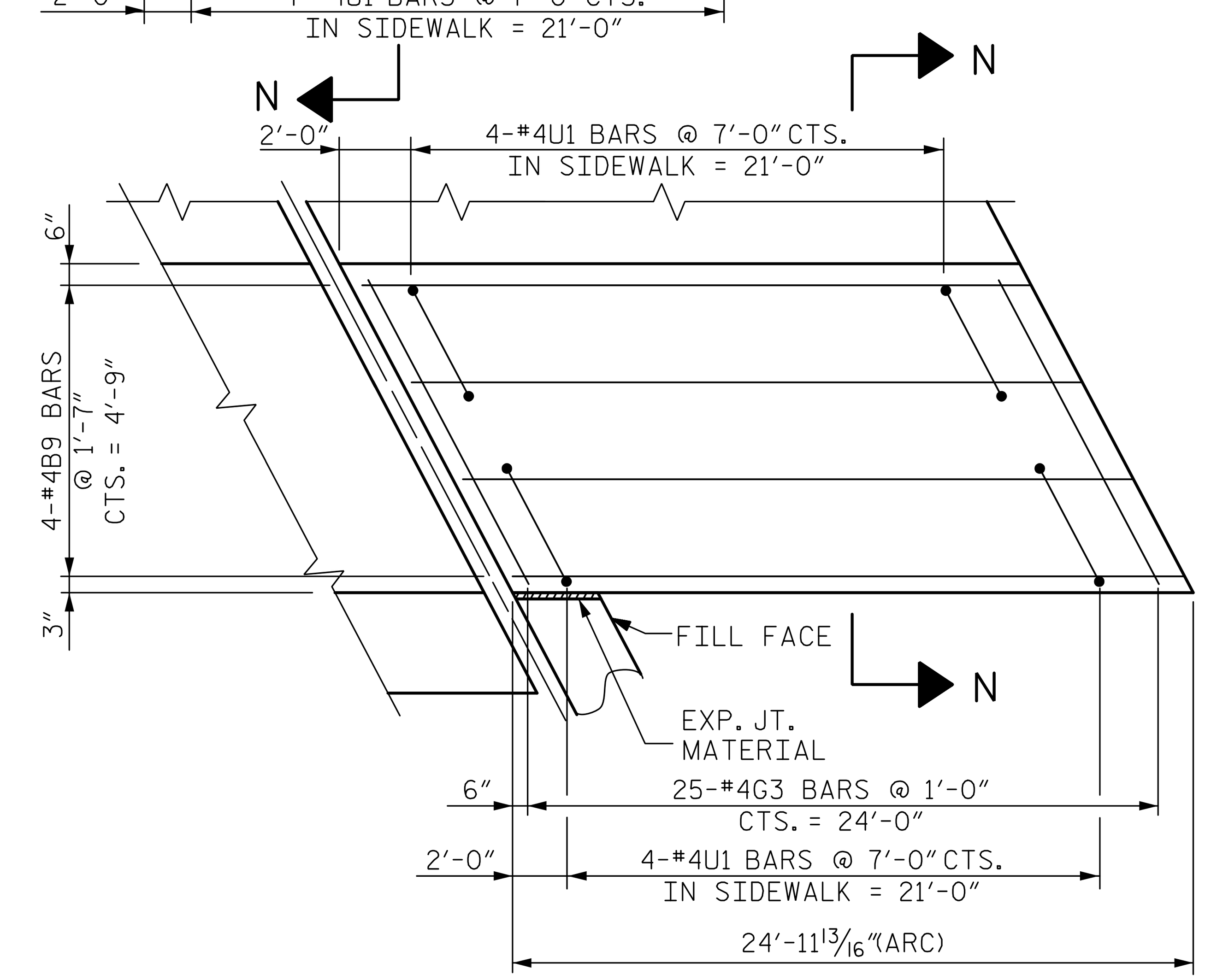
(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)





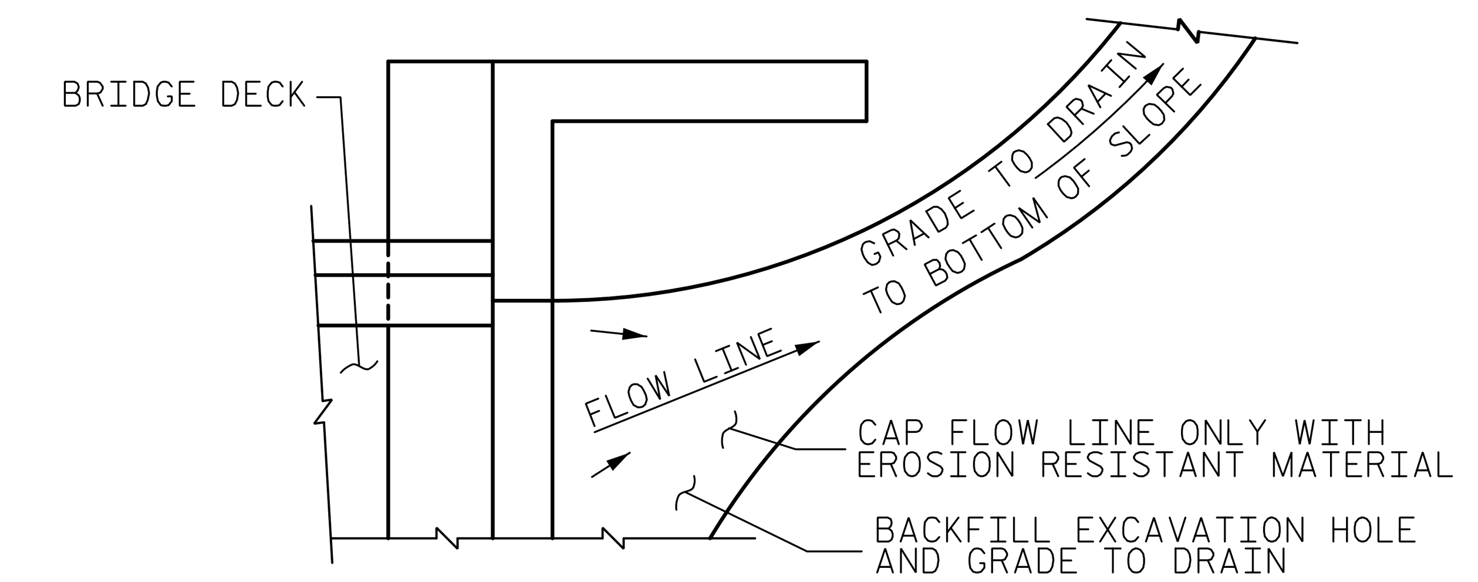


PLAN AT END BENT 1



PLAN AT END BENT 2

DETAILS OF SIDEWALK ON APPROACH SLAB



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

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: POC 17+01.02 -Y11-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH
SLAB DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 12916 ENGINEER PAUL J. BARBER 5/24/2019

ASSEMBLED BY : M. WRIGHT		DATE : 3/19	
CHECKED BY : D. HAWKINS		DATE : 3/19	
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

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DRAWN BY	M. WRIGHT	DATE	3/19
CHECKED BY	D. HAWKINS	DATE	3/19
DESIGN ENGINEER OF RECORD	P. BARBER	DATE	5/19

DWG. NO. 41

REVISIONS

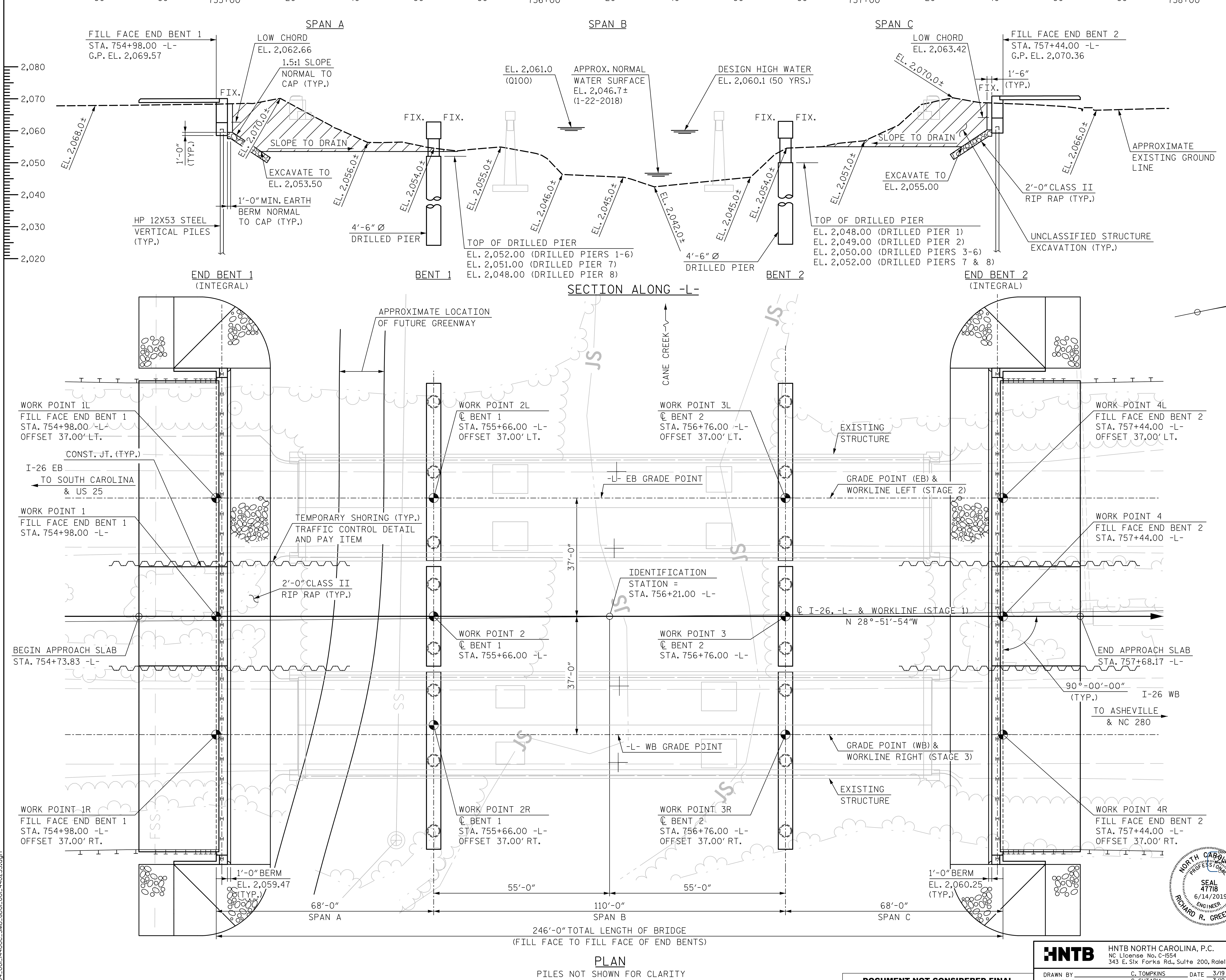
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

SHEET NO. S3-41

TOTAL SHEETS 41

STD. NO. BAS4

F.A. PROJECT NO. NHPP-026-1(200)13

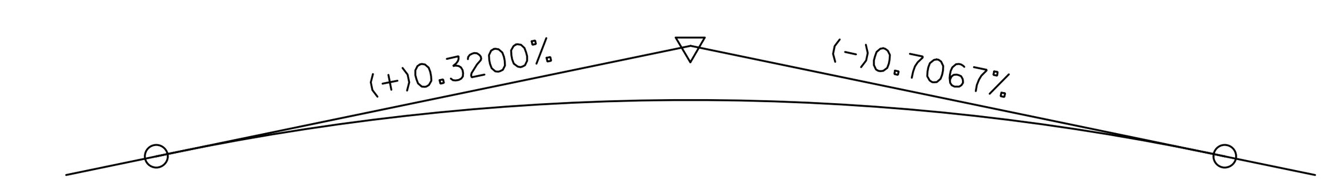


NOTES:

FOR GENERAL NOTES, SEE SHEET 4 OF 4.

FOR BRIDGE HYDRAULIC DATA, SEE SHEET 3 OF 4.

PI STA. = 759+00.00
ELEV = 2,070.86
V.C. = 300'



GRADE DATA -L- (EB & WB)

I HEREBY CERTIFY THESE PLANS ARE THE AS-BUILT PLANS

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 1 OF 4

REPLACES BRIDGE NOS. 233 & 234

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
I-26 MAINLINE BRIDGE
OVER CANE CREEK
BETWEEN NC 280 AND US 25

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 6/14/2019 RICHARD R. GREENFIELD

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY C. TOMPKINS DATE 3/19
CHECKED BY C. SUTARIA DATE 3/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 1

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

SHEET NO. S4-1
TOTAL SHEETS 60

6/14/2019
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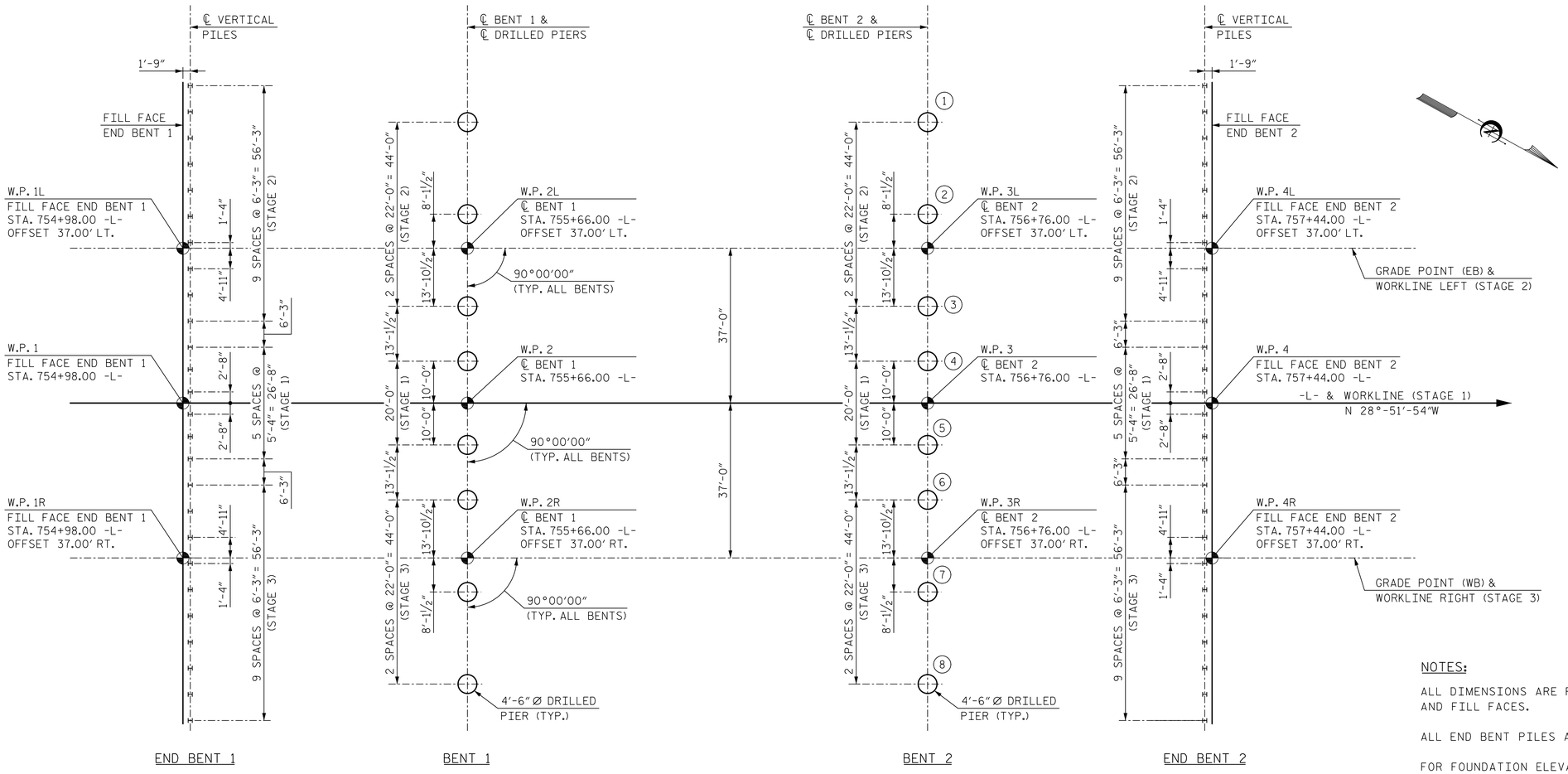

END BENT 1 BENT 1 BENT 2 END BENT 2

FOUNDATION LAYOUT

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT 1 AND END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 90 TONS PER PILE.

DRIVE PILES AT END BENT 1 AND END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 150 TONS PER PILE.

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

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 675 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 40 TSF.

INSTALL DRILLED PIERS AT BENT 1 TO A TIP ELEVATION NO HIGHER THAN 2,025 FT., SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 15 FT. INTO ROCK OR WEATHERED ROCK.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 700 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

INSTALL DRILLED PIERS AT BENT 2 TO A TIP ELEVATION NO HIGHER THAN 2,005 FT (PIERS 1-2); 2,022 FT. (PIERS 3-6); 2,025 FT. (PIERS 7-8), SATISFY THE REQUIRED TIP RESISTANCE AND HAVE A PENETRATION OF AT LEAST 15 FT. INTO ROCK OR WEATHERED ROCK.

FOUNDATION NOTES (CONT'D.):

PERMANENT STEEL CASINGS MAY BE REQUIRED FOR DRILLED PIERS AT BENT 1 AND BENT 2. IF REQUIRED, DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION 2,041 FT. (BENT 1) AND ELEVATION 2,038 FT. (BENT 2) WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

THE SCOUR CRITICAL ELEVATION IS 2,038.0 FT. (BENT 1) AND 2,035.0 FT. (BENT 2). SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

SID INSPECTIONS ARE REQUIRED FOR DRILLED PIERS AT BENT 1 AND BENT 2. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATION.

CSL TUBES ARE REQUIRED AND CSL TESTING MAY BE REQUIRED FOR THE DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR CSL TESTING. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

NOTES:

ALL DIMENSIONS ARE PARALLEL OR NORMAL TO ℄ BENTS AND FILL FACES.

ALL END BENT PILES ARE HP 12x53 STEEL PILES.

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

ALL PILE DIMENSIONS ARE TO ℄ OF PILES AT BOTTOM OF CAP.

(X) DENOTES PIER NUMBER.

PROJECT NO. I-4400C

HENDERSON **COUNTY**

STATION: STA. 756+21.00 -L-

SHEET 2 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

Signed by: R. Greenfield

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

DRAWN BY C. TOMPKINS DATE 2/19
CHECKED BY A. WAGNER DATE 3/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

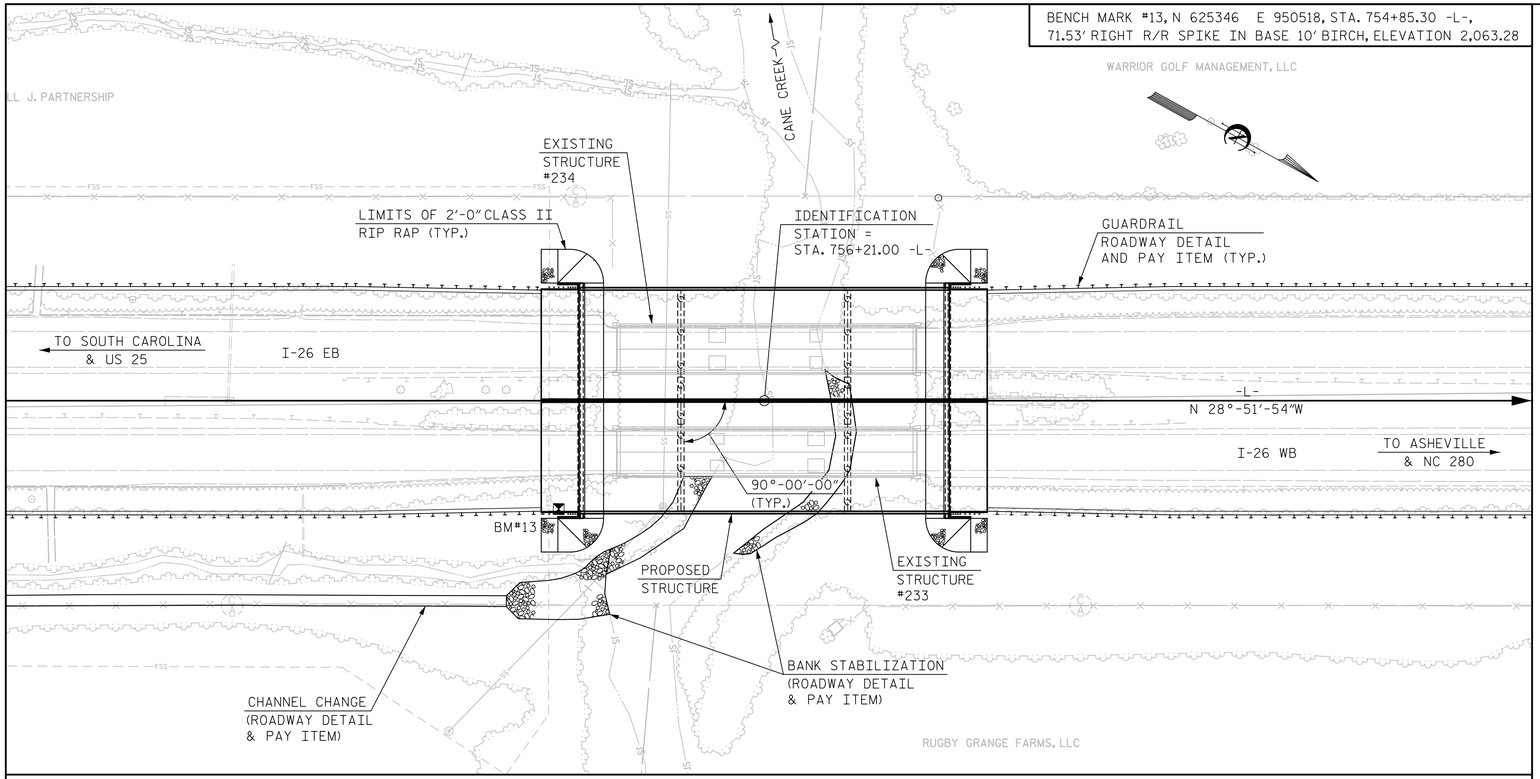
GENERAL DRAWING

FOUNDATION LAYOUT

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-2
1			3			TOTAL SHEETS
2			4			60

4/30/2019
...\404_003_I4400C_SMU_0002_002_440233.dgn

BENCH MARK #13, N 625346 E 950518, STA. 754+85.30 -L-,
71.53' RIGHT R/R SPIKE IN BASE 10' BIRCH, ELEVATION 2,063.28



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

NOTES:

FOR GENERAL NOTES, SEE SHEET 4 OF 4.

FOR TOTAL BILL OF MATERIAL, SEE SHEET 4 OF 4.

HYDRAULIC DATA

DESIGN DISCHARGE	=	10,450 CFS
FREQUENCY OF DESIGN DISCHARGE	=	50 YRS
DESIGN HIGH WATER ELEVATION	=	2,060.1 FT.
DRAINAGE AREA	=	84.0 SQ. MI.
BASE DISCHARGE (Q100)	=	11,600 CFS
BASE HIGH WATER ELEVATION	=	2,061.0 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	=	> 14,760 (+) CFS
FREQUENCY OF OVERTOPPING FLOOD	=	> 500 (+) YRS
OVERTOPPING FLOOD ELEVATION	=	2,068.5 FT.

NOTE: ROADWAY OVERTOPS AT STA. 753+30.00 -L-.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 3 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

Signed by: R. Greenfield

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DRAWN BY C. TOMPKINS DATE 3/19
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DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LOCATION SKETCH

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-3
1			3			TOTAL SHEETS
2			4			60

4/30/2019
...\404_005_I4400C_SMU_GD03_003_440233.dgn

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

THE USE OF A TEMPORARY CAUSEWAY OR WORK BRIDGE IS NOT PERMITTED.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

THE 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.

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

REMOVABLE FORMS MAY BE USED IN LEIU 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 MATERIAL SHOWN IN THE CROSS-HATCHED AREA SHALL BE EXCAVATED FOR A DISTANCE OF 77.625 FT. EACH SIDE OF CENTERLINE ROADWAY AS DIRECTED BY THE ENGINEER. THIS WORK WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR UNCLASSIFIED STRUCTURE EXCAVATION. SEE SECTION 412 OF THE STANDARD SPECIFICATIONS.

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIALS CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURES AT STATION 756+21.00 -L-".

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.

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.

TWO EXISTING STRUCTURES EACH CONSISTING OF 3 SPANS AT 66'-6", 65'-3" AND 66'-6" WITH REINFORCED CONCRETE DECK; ON 4 LINES OF 36" STEEL I-BEAMS WITH A CLEAR ROADWAY WIDTH OF 28'-0"; ON REINFORCED CONCRETE END BENTS WITH PILE FOOTINGS AND REINFORCED CONCRETE POST AND BEAM BENTS WITH PILE AND SPREAD FOOTINGS, LOCATED AT THE PROPOSED STRUCTURE SITE SHALL BE REMOVED. THE EXISTING BRIDGES ARE PRESENTLY NOT POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF EITHER 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.

REMOVAL OF THE EXISTING BRIDGES 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 BRIDGES 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.

TEMPORARY ASPHALT PAVEMENT IS INCLUDED IN ROADWAY QUANTITY ON ROADWAY PLANS.

CONTRACTOR SHALL REMOVE TEMPORARY ASPHALT PAVEMENT FROM STA. 754+73.83 TO STA. 757+68.17 TO WITHIN 1/4" OF CONCRETE BRIDGE DECK AND APPROACH SLAB BY MILLING. THE REMAINING ASPHALT THICKNESS IS TO BE REMOVED IN PREPARATION FOR SILANE DECK TREATMENT. SEE SILANE DECK TREATMENT SPECIAL PROVISIONS FOR PREPARATION REQUIREMENTS.

FOR SILANE DECK TREATMENT, SEE SPECIAL PROVISIONS.

THE LOCATION OF THE CONSTRUCTION JOINT IN THE DRILLED PIERS IS BASED ON AN APPROXIMATE GROUND LINE ELEVATION. IF THE CONSTRUCTION JOINT IS ABOVE THE ACTUAL GROUND ELEVATION, THE CONTRACTOR SHALL PLACE THE CONSTRUCTION JOINT 1 FT. BELOW THE GROUND LINE.

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

NOTE:
SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND fy = 60ksi. BAR LENGTHS IN THIS TABLE ARE A GUIDE. THE ENGINEER SHALL APPROVE FINAL LENGTHS BASED ON THE TYPE AND LOCATION OF SAMPLE BAR.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURES AT STATION 756+21.00 -L-	ASBESTOS ASSESSMENT	4'-6" DIA. DRILLED PIERS IN SOIL	4'-6" DIA. DRILLED PIERS NOT IN SOIL	PERMANENT STEEL CASING FOR 4'-6" DIA. DRILLED PIER	SID INSPECTIONS	CSL TESTING	UNCLASSIFIED STRUCTURE EXCAVATION AT STATION 756+21.00 -L-	REINFORCED CONCRETE DECK SLAB	CLASS A CONCRETE	BRIDGE APPROACH SLABS, STATION 756+21.00 -L-	REINFORCING STEEL	SPIRAL COLUMN REINFORCING STEEL
	LUMP SUM	LUMP SUM	L.F.	L.F.	L.F.	EACH	EACH	LUMP SUM	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.
SUPERSTRUCTURE	———	———	———	———	———	———	———	———	36,467	———	LUMP SUM	———	———
END BENT 1	———	———	———	———	———	———	———	———	———	101.9	———	16,007	———
BENT 1	———	———	98.0	113.0	91.0	8	———	———	———	148.7	———	47,175	8,568
BENT 2	———	———	151.0	102.0	105.0	8	———	———	———	153.3	———	51,333	10,097
END BENT 2	———	———	———	———	———	———	———	———	———	101.9	———	16,007	———
TOTAL	LUMP SUM	LUMP SUM	249.0	215.0	196.0	16	1	LUMP SUM	36,467	505.8	LUMP SUM	130,522	18,665

TOTAL BILL OF MATERIAL

	MODIFIED 63" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12x53 STEEL PILES	HP 12x53 STEEL PILES		CONCRETE BARRIER RAIL	CONCRETE MEDIAN BARRIER	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE	ELASTOMERIC BEARINGS	MILLING ASPHALT PAVEMENT 7 1/2" TO 1/4"	DIAMOND GRINDING	SILANE DECK TREATMENT
	NO.	L.F.	EACH	NO.	L.F.	L.F.	L.F.	TONS	SQ. YDS.	LUMP SUM	SQ. YDS.	SQ. YDS.	SQ. YDS.
SUPERSTRUCTURE	48	3,876.00	———	—	———	488.70	244.30	———	———	LUMP SUM	850	4,775	4,710
END BENT 1	—	———	26	26	570	———	———	474	533	———	———	———	———
BENT 1	—	———	———	—	———	———	———	———	———	———	———	———	———
BENT 2	—	———	———	—	———	———	———	———	———	———	———	———	———
END BENT 2	—	———	26	26	900	———	———	439	495	———	———	———	———
TOTAL	48	3,876.00	52	52	1,470	488.70	244.30	913	1,028	LUMP SUM	850	4,775	4,710

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

GENERAL NOTES AND TOTAL BILL OF MATERIAL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 6/14/2019 RICHARD R. GREENFIELD

Digitally signed by: Richard R. Greenfield

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DRAWN BY C. TOMPKINS DATE 3/19
CHECKED BY C. SUTARIA DATE 3/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 4

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-4
1			3			TOTAL SHEETS
2			4			60

6/14/2019
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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	1.09	--	1.75	0.88	1.14	A	I	32.4	0.98	1.17	A	I	39.1	0.80	0.88	1.09	B	EL/ER	53.9	
		HL-93 (OPERATING)	N/A	--	1.47	--	1.35	0.88	1.47	A	I	32.4	0.98	2.04	A	I	39.1	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	2	1.47	52.9	1.75	0.88	1.47	A	I	32.4	0.98	1.66	A	I	39.1	0.80	0.88	1.56	B	EL/ER	53.9	
		HS-20 (OPERATING)	36.000	--	1.91	68.8	1.35	0.88	1.91	A	I	32.4	0.98	2.90	A	I	39.1	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SH	12.500	--	4.07	50.9	1.40	0.88	4.45	A	I	32.4	0.98	8.91	B	I	21.1	0.80	0.88	4.07	B	EL/ER	53.9	
		S3C	21.500	--	2.38	51.2	1.40	0.88	2.61	A	I	32.4	0.98	5.09	B	I	21.1	0.80	0.88	2.38	B	EL/ER	53.9	
		S3A	22.750	--	2.25	51.2	1.40	0.88	2.48	A	I	32.4	0.98	4.82	B	I	21.1	0.80	0.88	2.25	B	EL/ER	53.9	
		S4A	26.750	--	1.97	52.7	1.40	0.88	2.21	A	I	32.4	0.98	3.96	B	I	21.1	0.80	0.88	1.97	B	EL/ER	53.9	
		S5A	30.500	--	1.73	52.8	1.40	0.88	1.95	A	I	32.4	0.98	3.50	B	I	21.1	0.80	0.88	1.73	B	EL/ER	53.9	
		S6A	34.500	--	1.56	53.8	1.40	0.88	1.79	A	I	32.4	0.98	3.09	A	I	39.1	0.80	0.88	1.56	B	EL/ER	53.9	
		S7B	38.500	--	1.42	54.7	1.40	0.88	1.63	A	I	32.4	0.98	2.93	B	I	21.1	0.80	0.88	1.42	B	EL/ER	53.9	
		S7A	40.000	3	1.39	55.6	1.40	0.88	1.63	A	I	32.4	0.98	2.93	B	I	21.1	0.80	0.88	1.39	B	EL/ER	53.9	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	T4A	28.250	--	1.92	54.2	1.40	0.88	2.21	A	I	32.4	0.98	4.03	A	I	39.1	0.80	0.88	1.92	B	EL/ER	53.9	
		T5B	32.000	--	1.69	54.1	1.40	0.88	1.93	A	I	32.4	0.98	3.62	B	I	21.1	0.80	0.88	1.69	B	EL/ER	53.9	
		T6A	36.000	--	1.54	55.4	1.40	0.88	1.79	A	I	32.4	0.98	3.17	B	I	21.1	0.80	0.88	1.54	B	EL/ER	53.9	
		T7A	40.000	--	1.41	56.4	1.40	0.88	1.68	A	I	32.4	0.98	2.93	B	I	21.1	0.80	0.88	1.41	B	EL/ER	53.9	
		T7B	40.000	--	1.48	59.2	1.40	0.88	1.83	A	I	32.4	0.98	2.70	A	I	39.1	0.80	0.88	1.48	B	EL/ER	53.9	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

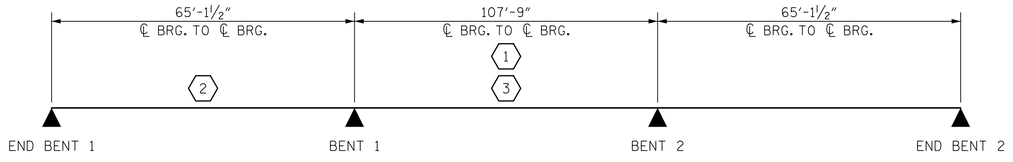
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



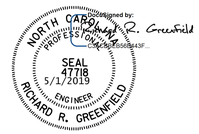
LRFR SUMMARY

NOTE: SPAN LENGTHS PROVIDED ARE BEARING TO BEARING LENGTHS

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-



Signed by: R. Greenfield

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DRAWN BY T. THOMPSON DATE 11/18
CHECKED BY A. WAGNER DATE 11/18
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS

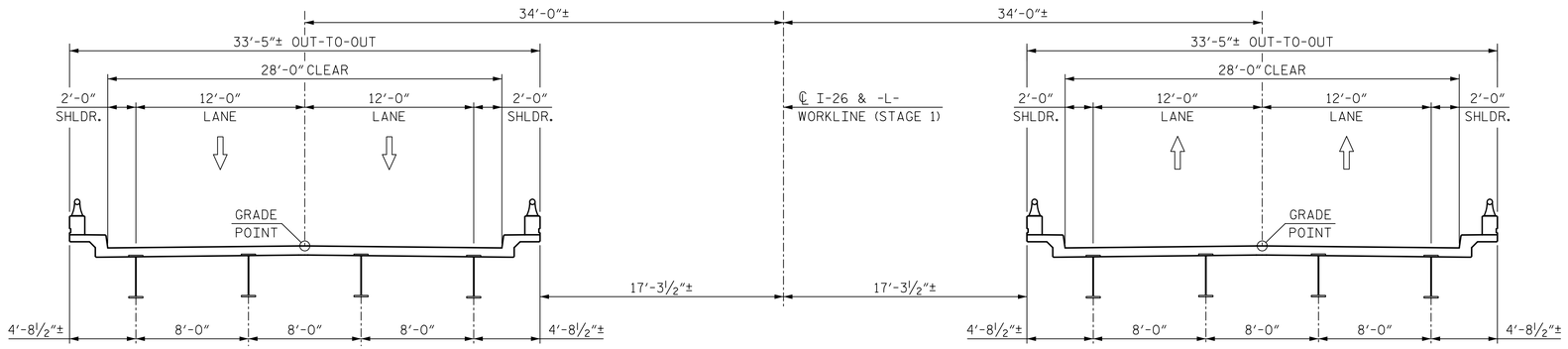
(INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-5
1			3			TOTAL SHEETS
2			4			60

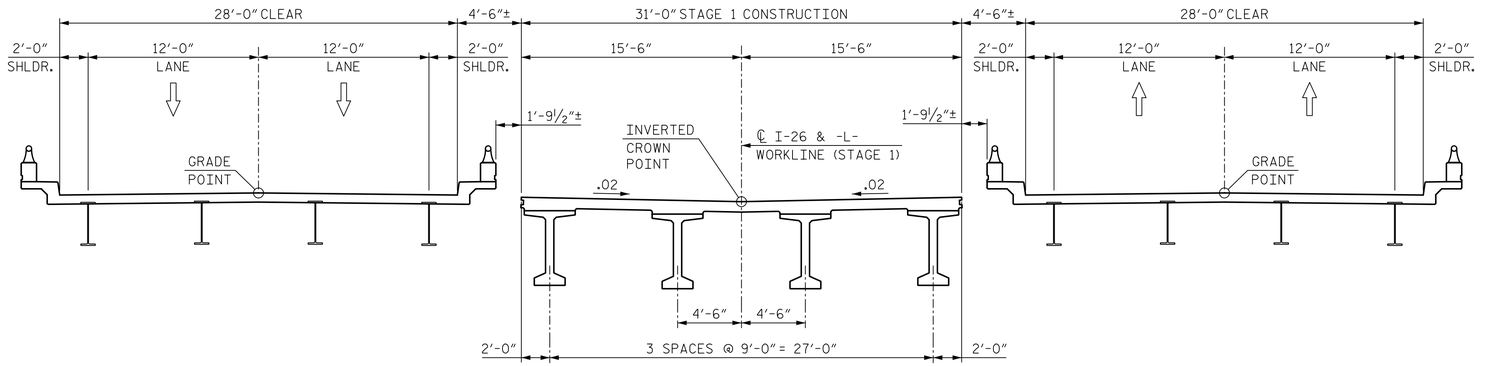
4/30/2019
...\404_009_I4400C_SMU_0005_005_440233.dgn

LEFT LANE BRIDGE (EB)

RIGHT LANE BRIDGE (WB)



EXISTING CONDITION



STAGE 1

(BUILD MEDIAN BRIDGE SECTION AND
MAINTAIN TRAFFIC ON EXISTING BRIDGES)

NOTES:

EXISTING CONDITION:

DIMENSIONS SHOWN FOR THE EXISTING STRUCTURES ARE FROM THE BEST INFORMATION AVAILABLE. 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 STRUCTURES SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE. IF FIELD CONDITIONS VARY FROM THE PLANS, MODIFICATIONS MAY BE MADE AS NECESSARY AS DIRECTED BY THE ENGINEER.

STAGE 1:

CONSTRUCT 31′-0″ OF MEDIAN BRIDGE DECK WIDTH.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONSTRUCTION SEQUENCE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 RICHARD R. GREENFIELD

Designed by: Richard R. Greenfield

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DWG. NO. 6

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-6
1			3			TOTAL SHEETS
2			4			60

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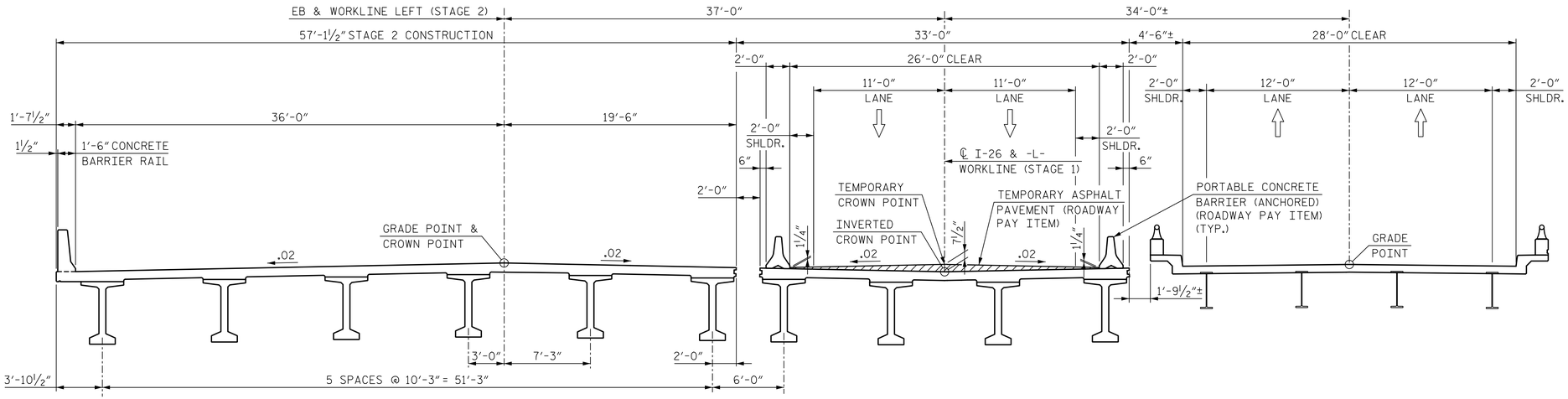
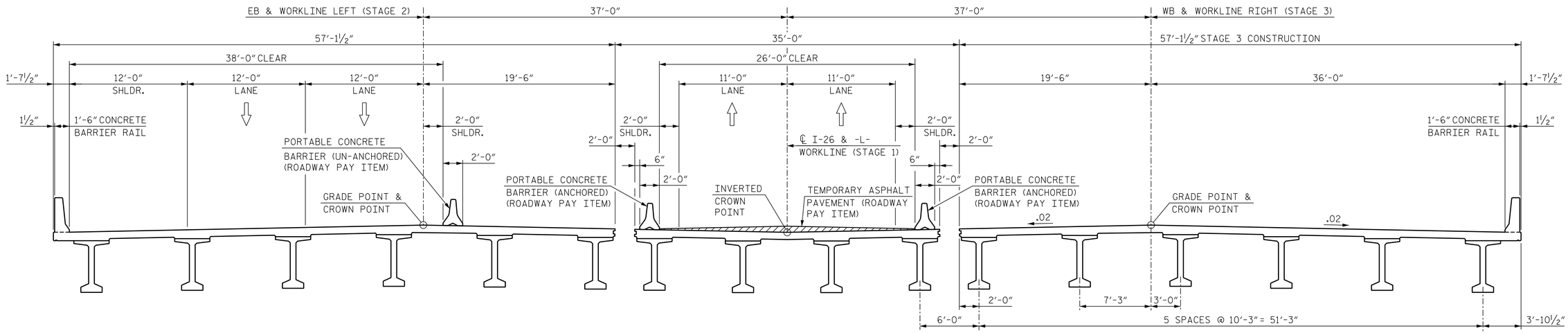


STAGE 2

(PLACE PORTABLE CONCRETE BARRIERS, TACKCOAT AND TEMPORARY ASPHALT PAVEMENT IN STAGE 1 MEDIAN CONSTRUCTION FOR TEMPORARY TRAFFIC CONFIGURATION.
SHIFT LEFT LANE BRIDGE TRAFFIC TO MEDIAN BRIDGE SECTION.
REPLACE AND WIDEN EXISTING LEFT LANE BRIDGE.)



STAGE 3

(PLACE PORTABLE CONCRETE BARRIER IN STAGE 2 CONSTRUCTION.
SHIFT TRAFFIC TO NEW LEFT LANE BRIDGE AND REVERSE TRAFFIC IN MEDIAN BRIDGE SECTION.
REPLACE AND WIDEN EXISTING RIGHT LANE BRIDGE.)

NOTES:

STAGE 2

INSTALL TEMPORARY ANCHORED BARRIERS. PLACE TACKCOAT AND ASPHALT PAVEMENT IN STAGE 1 MEDIAN CONSTRUCTION FOR TEMPORARY TRAFFIC CONFIGURATION.

SHIFT TRAFFIC FROM EXISTING LEFT LANE BRIDGE ONTO NEWLY CONSTRUCTED MEDIAN BRIDGE SECTION. REMOVE EXISTING LEFT LANE BRIDGE. CONSTRUCT 57'-1½" OF LEFT LANE BRIDGE DECK WIDTH.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE ANCHORED PORTABLE CONCRETE BARRIER.

STAGE 3:

INSTALL TEMPORARY UN-ANCHORED BARRIER ON NEWLY CONSTRUCTED LEFT LANE BRIDGE SECTION. SHIFT TRAFFIC FROM MEDIAN BRIDGE SECTION TO NEWLY CONSTRUCTED LEFT LANE BRIDGE SECTION.

SHIFT TRAFFIC FROM EXISTING RIGHT LANE BRIDGE ONTO MEDIAN BRIDGE SECTION. REMOVE EXISTING RIGHT LANE BRIDGE. CONSTRUCT 57'-1½" OF RIGHT LANE BRIDGE DECK WIDTH.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE PORTABLE CONCRETE BARRIER.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
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RALEIGH

SUPERSTRUCTURE

CONSTRUCTION SEQUENCE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

Digitally signed by: Richard R. Greenfield

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REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-7
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2			4			60

4/30/2019
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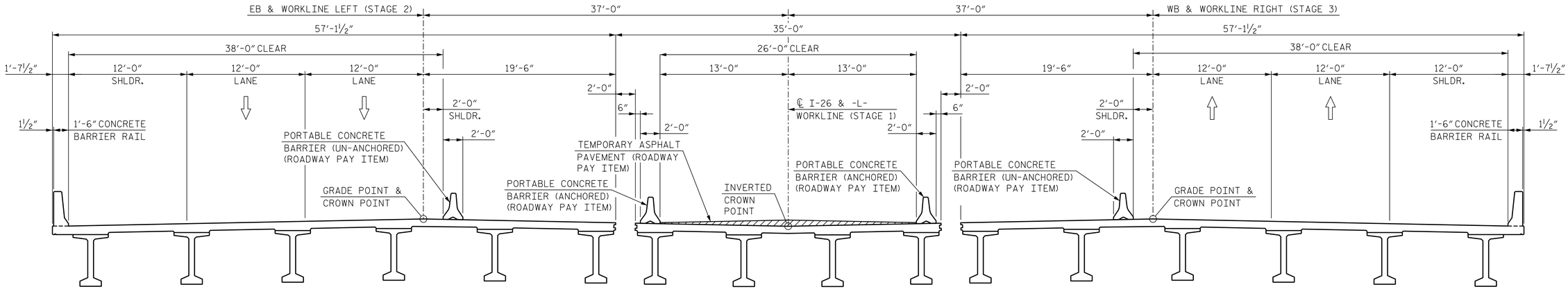
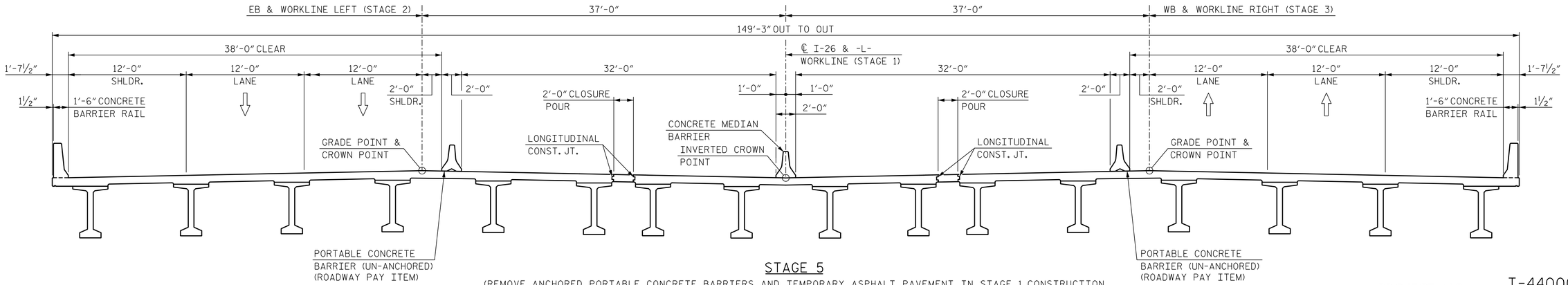


STAGE 4

(PLACE PORTABLE CONCRETE BARRIER IN STAGE 3 CONSTRUCTION.
SHIFT TRAFFIC FROM MEDIAN BRIDGE SECTION TO NEW RIGHT LANE BRIDGE.)



STAGE 5

(REMOVE ANCHORED PORTABLE CONCRETE BARRIERS AND TEMPORARY ASPHALT PAVEMENT IN STAGE 1 CONSTRUCTION.
BUILD CLOSURE POURS AND CONCRETE MEDIAN BARRIER.)

NOTES:

STAGE 4

INSTALL TEMPORARY UN-ANCHORED BARRIER ON NEWLY CONSTRUCTED RIGHT LANE BRIDGE SECTION. SHIFT TRAFFIC FROM MEDIAN BRIDGE SECTION TO NEWLY CONSTRUCTED RIGHT LANE BRIDGE SECTION.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE PORTABLE CONCRETE BARRIER.

STAGE 5:

REMOVE TWO TEMPORARY ANCHORED BARRIERS. REMOVE TEMPORARY ASPHALT PAVEMENT TO WITHIN ¼" OF CONCRETE BRIDGE DECK BY MILLING. TIE ALL STAGES OF BRIDGE TOGETHER WITH 2'-0" CLOSURE POURS.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE PORTABLE CONCRETE BARRIER.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONSTRUCTION SEQUENCE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

Signed by: Richard R. Greenfield

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REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-8
1			3			TOTAL SHEETS
2			4			60

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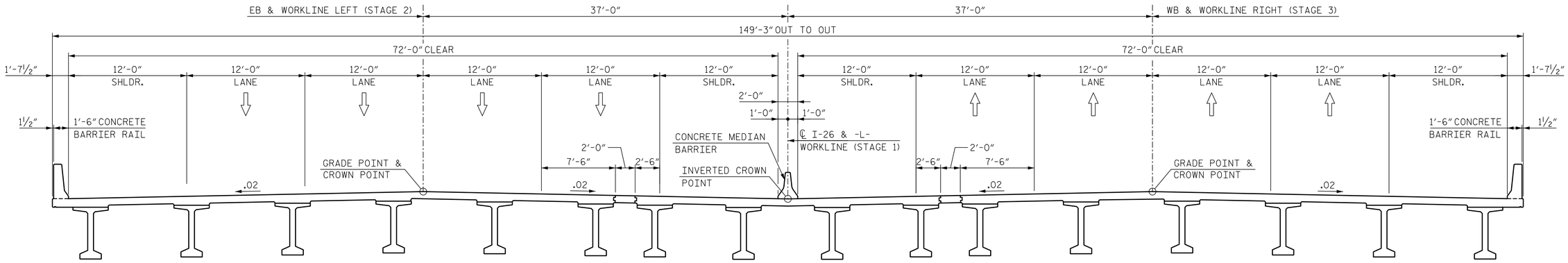

FINAL CONDITION

NOTES:
FINAL CONDITION
REMOVE TWO TEMPORARY UN-ANCHORED BARRIERS AND SHIFT TRAFFIC TO THE FINAL CONFIGURATION.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE PORTABLE CONCRETE BARRIER.

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONSTRUCTION SEQUENCE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD
Digitally signed by: R. Greenfield

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DWG. NO. 9

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-9
1			3			TOTAL SHEETS
2			4			60

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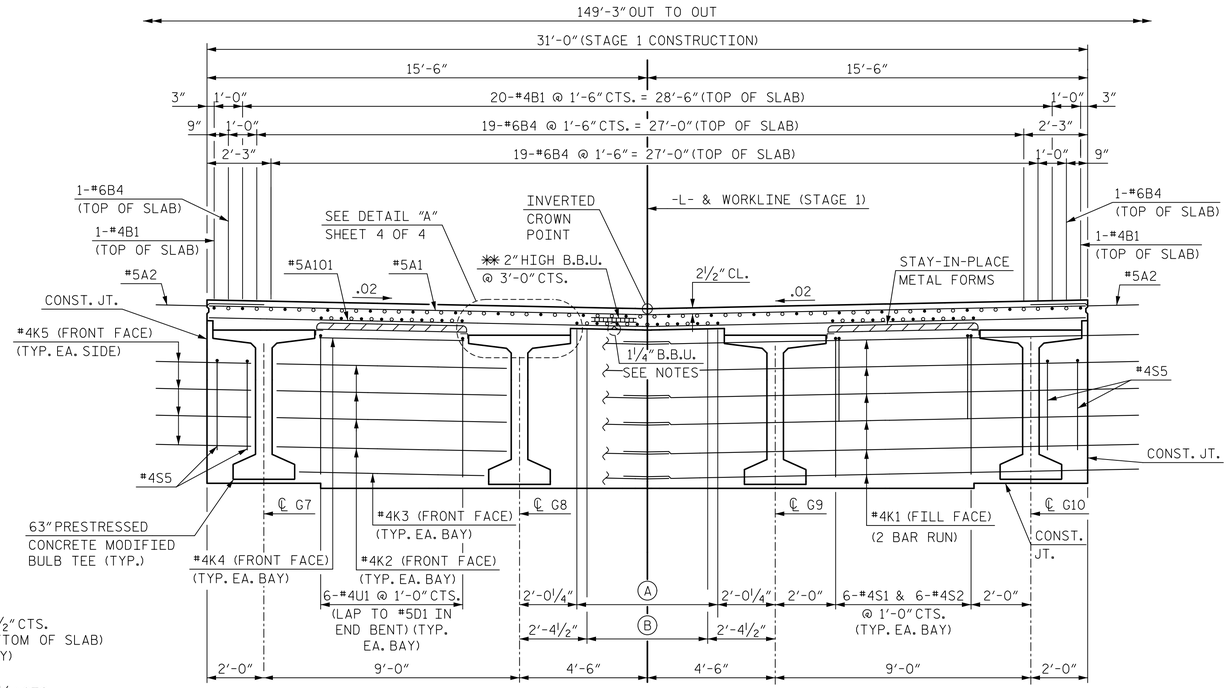
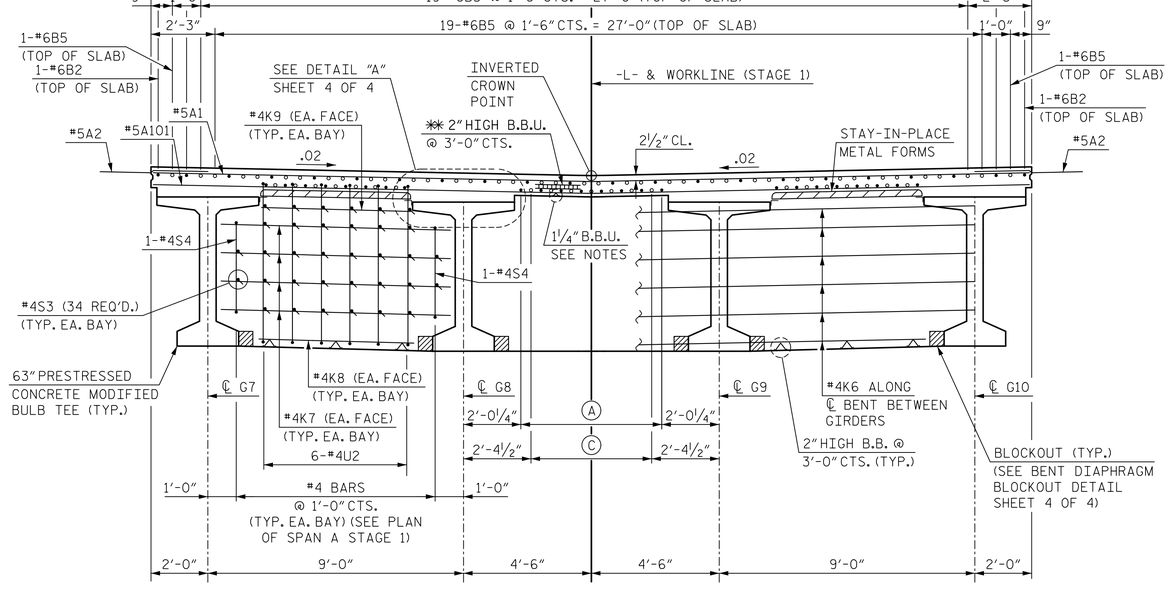


TYPICAL SECTION AT INTEGRAL END BENT
(STAGE 1 CONSTRUCTION)

Ⓐ 8-#5B101 @ 8½" CTS.
= 4'-11½" (BOTTOM OF SLAB)
(TYP. EACH BAY)

Ⓑ 7-#4B102 @ 8½" CTS.
= 4'-3" (BOTTOM OF SLAB)
(TYP. EA. BAY)

Ⓒ 7-#4B103 @ 8½" CTS.
= 4'-3" (BOTTOM OF SLAB)
(TYP. EA. BAY)



TYPICAL SECTION AT CONTINUOUS BENT DIAPHRAGM
(STAGE 1 CONSTRUCTION)
NOTE: NO BENT DIAPHRAGM AT CLOSURE POUR BAY.

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 (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

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

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

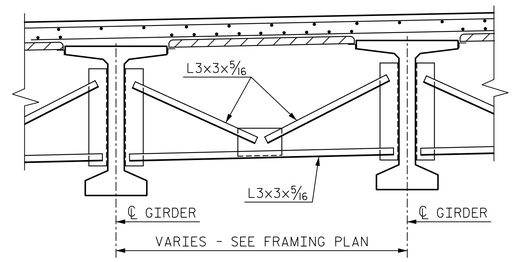
BARRIER RAIL IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

NO CHAMFER IS REQUIRED ON CORNERS OF GIRDER BUILDUPS.

✻✻ TO MAINTAIN PROPER LOCATION OF "A" BARS IN THE TOP OF SLAB, B.B.U. DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE "B" BARS IN THE TOP OF THE SLAB VARIES. A 2¼" B.B.U. SHALL BE USED WHERE ONLY #4 "B" BARS ARE PRESENT. WHERE #6 "B" BARS ARE PRESENT, A 2" B.B.U. SHALL BE USED.

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

EXTEND #4K1 BARS 1'-10" FOR SPLICE IN STAGES 2 AND 3



PART SECTION AT INTERMEDIATE DIAPHRAGM
(FOR DETAILS OF DIAPHRAGM, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS")
NOTE: NO INTERMEDIATE STEEL DIAPHRAGMS AT CLOSURE POUR BAY.

"B" BAR KEY

- ● CONTINUOUS BAR RUN
  SEE PLAN OF SPAN SHEETS.
- ○ NON-CONTINUOUS BAR RUN
  FOR NEGATIVE MOMENT REGIONS,
  SEE PLAN OF SPAN SHEETS.

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS STAGE 1

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 RICHARD R. GREENFIELD

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NO.	BY	DATE	NO.	BY	DATE	S4-10
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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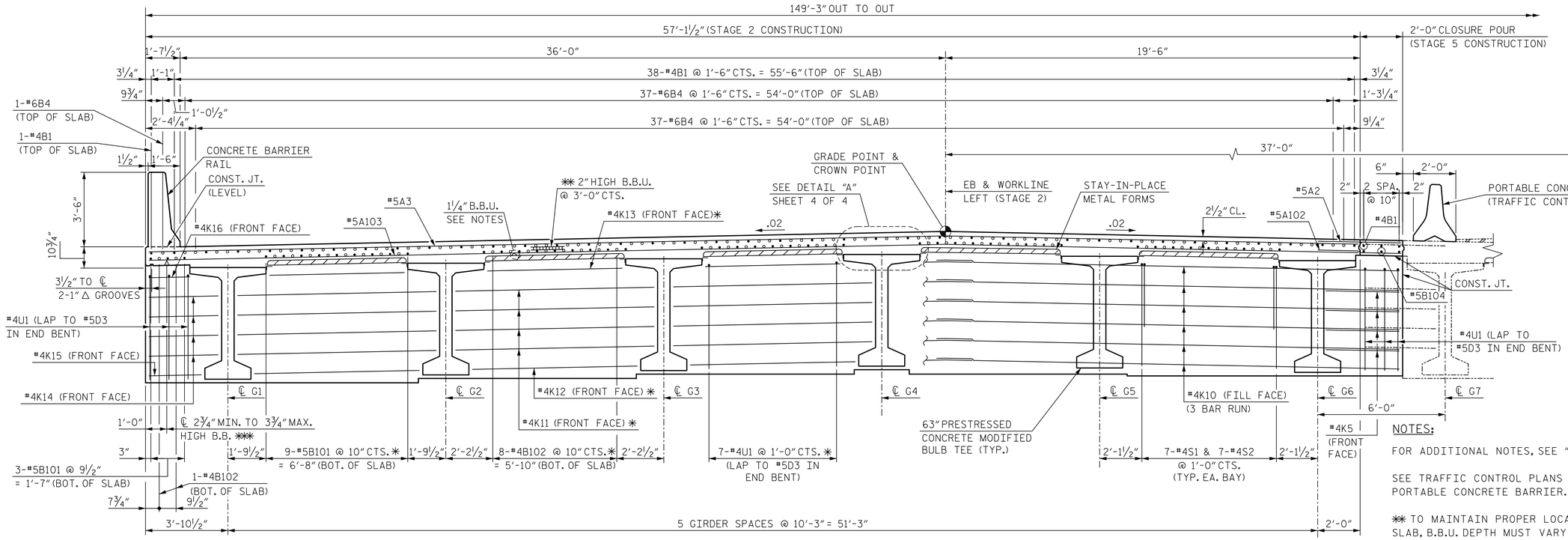
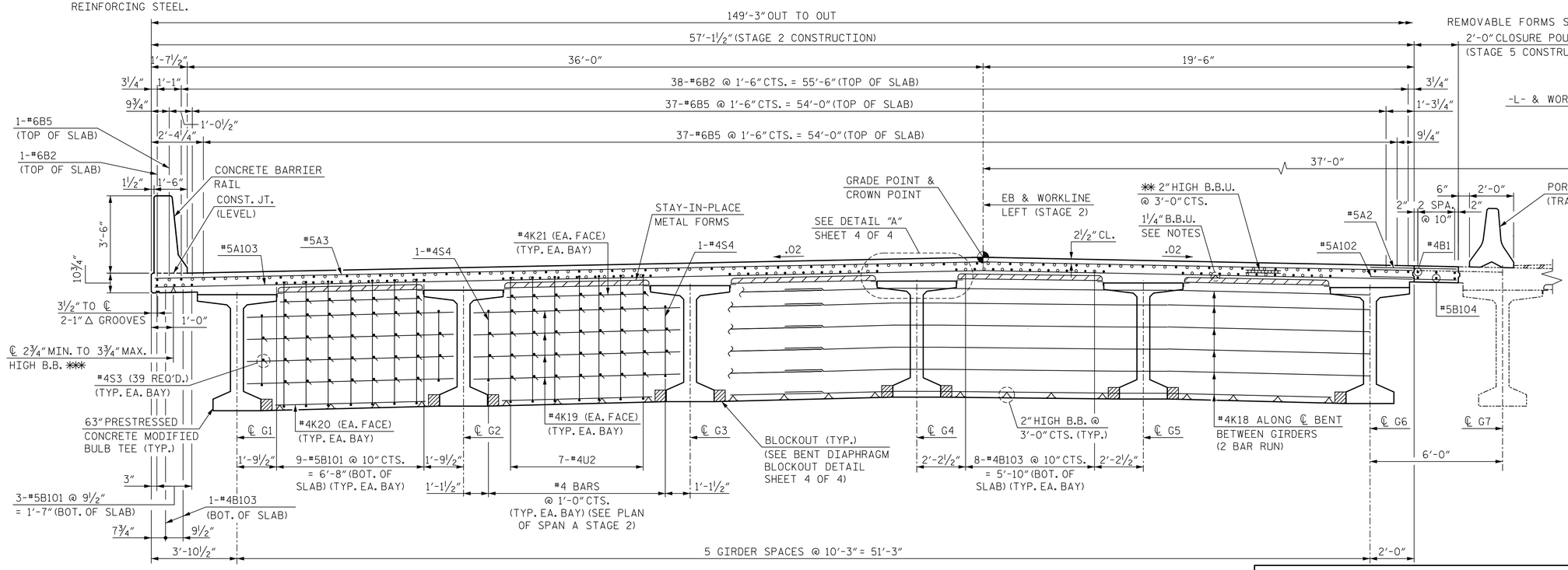


✱✱✱ THE HEIGHT OF THE BEAM BOLSTER VARIES ALONG THE LENGTH OF THE SPAN DUE TO CAMBER AND THE VARYING HEIGHT REQUIRED FOR THE BUILDUP. THE CONTRACTOR SHALL HAVE SUFFICIENT SIZES TO PROPERLY SUPPORT THE REINFORCING STEEL.

TYPICAL SECTION AT INTEGRAL END BENT



TYPICAL SECTION AT CONTINUOUS BENT DIAPHRAGM

NOTE: NO BENT DIAPHRAGM AT CLOSURE BAY.

"B" BAR KEY

- ● CONTINUOUS BAR RUN SEE PLAN OF SPAN SHEETS.
- ○ NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS, SEE PLAN OF SPAN SHEETS.

✱ (TYP. EACH BAY EXCEPT AT CLOSURE POUR)

NOTES:

FOR ADDITIONAL NOTES, SEE "TYPICAL SECTIONS STAGE 1" SHEET.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF PORTABLE CONCRETE BARRIER.

✱✱ TO MAINTAIN PROPER LOCATION OF "A" BARS IN THE TOP OF SLAB, B.B.U. DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE "B" BARS IN THE TOP OF THE SLAB VARIES. A 2¼" B.B.U. SHALL BE USED WHERE ONLY #4 "B" BARS ARE PRESENT. WHERE #6 "B" BARS ARE PRESENT, A 2" B.B.U. SHALL BE USED.

REMOVABLE FORMS SHALL BE USED AT CLOSURE BAY.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS STAGE 2

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1			3			TOTAL SHEETS
2			4			60

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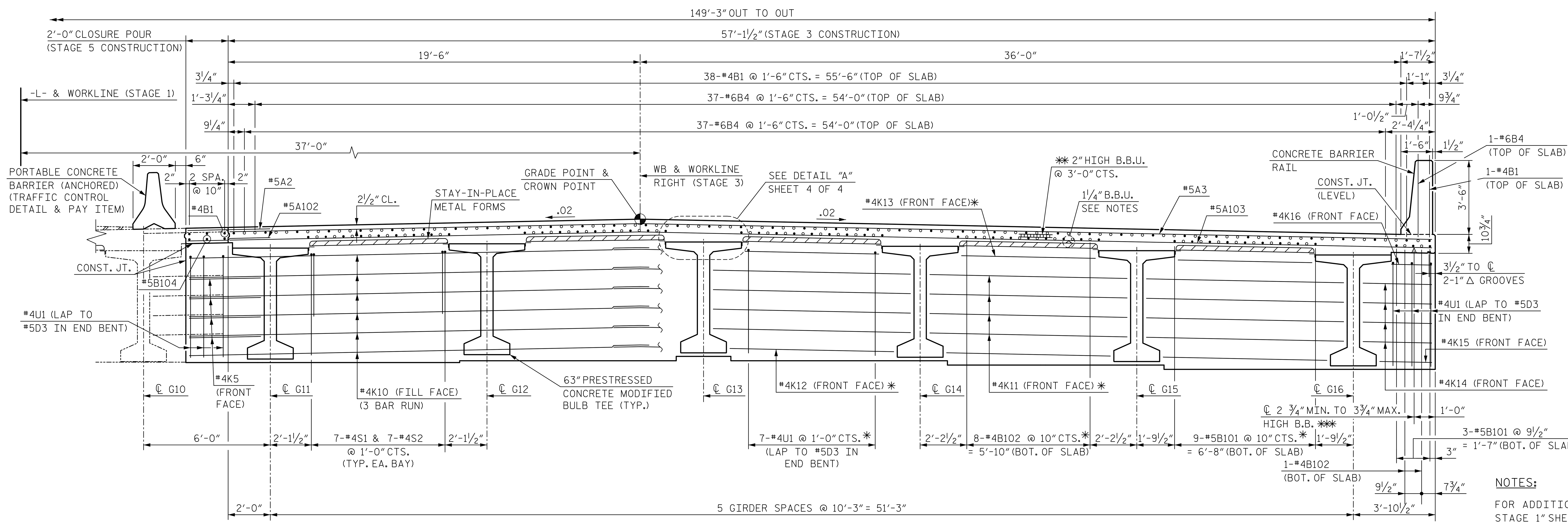
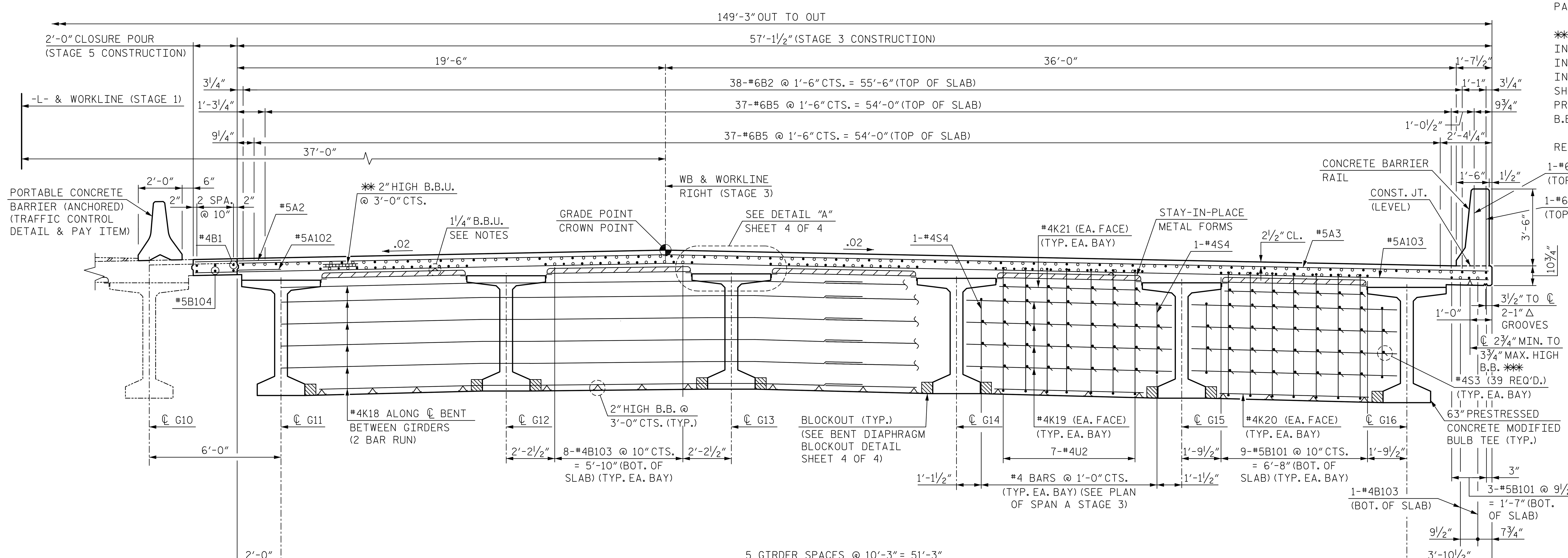


TYPICAL SECTION AT INTEGRAL END BENT



TYPICAL SECTION AT CONTINUOUS BENT DIAPHRAGM

NOTE: NO BENT DIAPHRAGM AT CLOSURE BAY.

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

"B" BAR KEY

- ● CONTINUOUS BAR RUN SEE PLAN OF SPAN SHEETS.
- ○ NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS, SEE PLAN OF SPAN SHEETS.

* (TYP. EACH BAY EXCEPT AT CLOSURE POUR)

NOTES:

FOR ADDITIONAL NOTES, SEE "TYPICAL SECTIONS STAGE 1" SHEET.

SEE TRAFFIC CONTROL PLANS FOR LOCATION AND PAY LIMITS OF THE PORTABLE CONCRETE BARRIER.

** TO MAINTAIN PROPER LOCATION OF "A" BARS IN THE TOP OF SLAB, B.B.U. DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE "B" BARS IN THE TOP OF THE SLAB VARIES. A 2¼" B.B.U. SHALL BE USED WHERE ONLY #4 "B" BARS ARE PRESENT. WHERE #6 "B" BARS ARE PRESENT, A 2" B.B.U. SHALL BE USED.

REMOVAL FORMS SHALL BE USED AT CLOSURE BAY.

SEAL 47718 5/1/2019 NORTH CAROLINA PROFESSIONAL ENGINEER RICHARD R. GREENFIELD

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS
STAGE 3

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REVISIONS

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

SHEET NO. S4-12
TOTAL SHEETS 60

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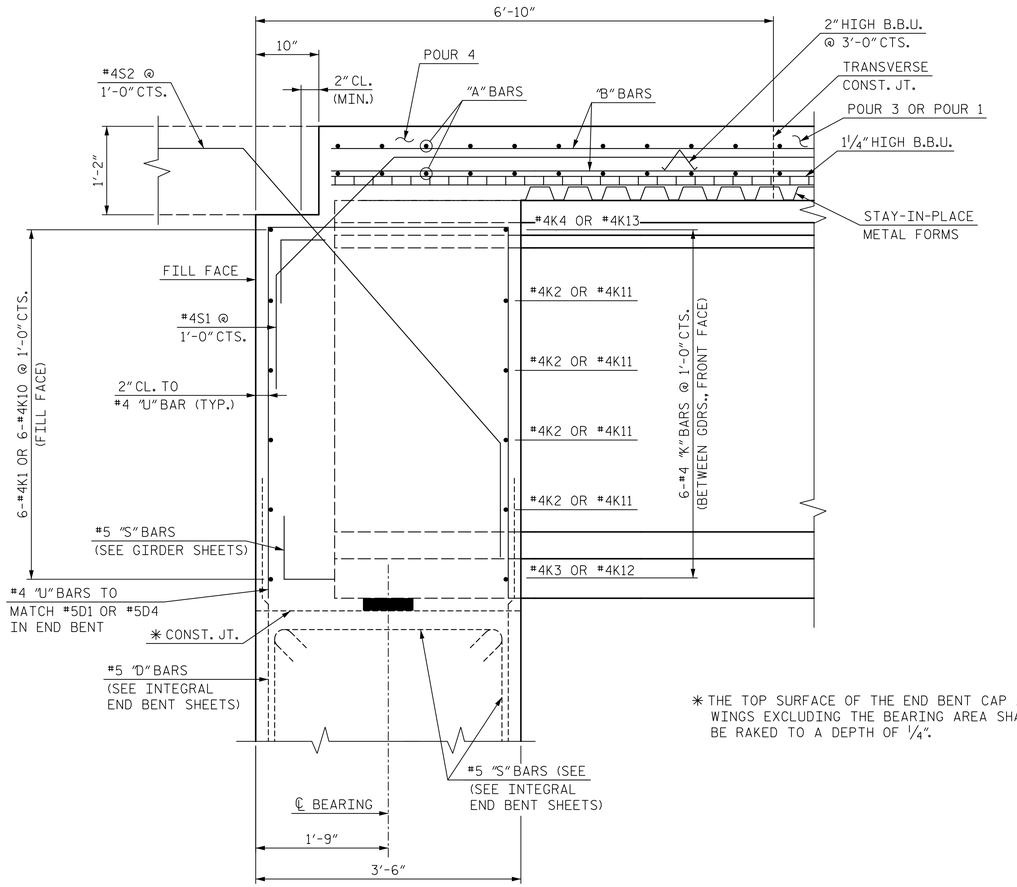
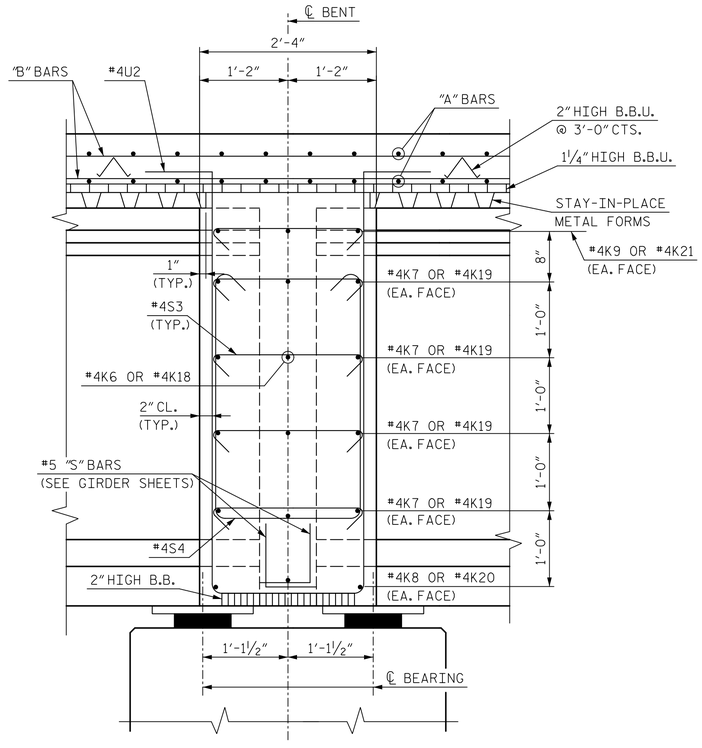


✳ THE TOP SURFACE OF THE END BENT CAP AND WINGS EXCLUDING THE BEARING AREA SHALL BE RAKED TO A DEPTH OF ¼".

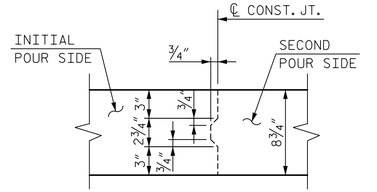
SECTION A-A

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



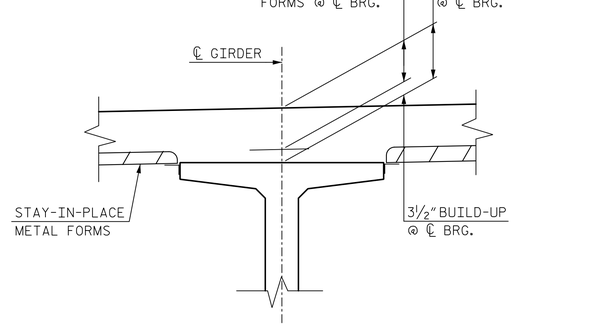
SECTION B-B

NOTE: BENT DIAPHRAGM SHALL BE CAST MONOLITHICALLY WITH DECK SLAB.

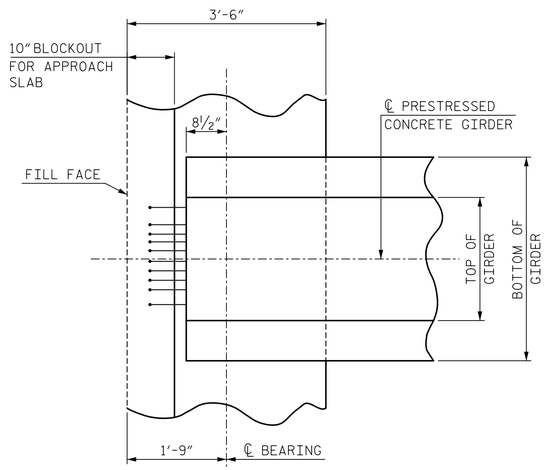


TRANSVERSE OR LONGITUDINAL CONSTRUCTION JOINT DETAIL

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

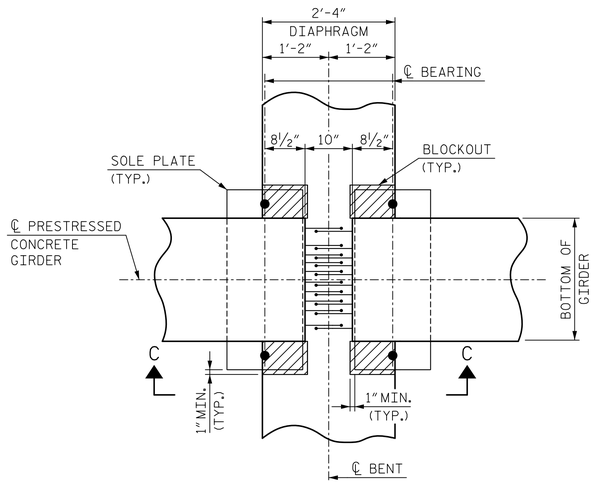


DETAIL "A"

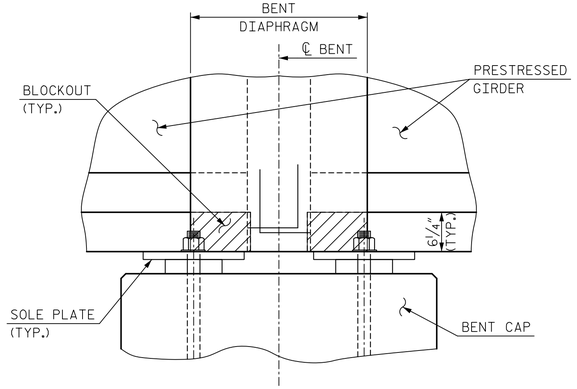


PLAN OF GIRDER AT INTEGRAL END BENT 1

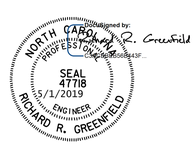
(END BENT 2 SIMILAR)



BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION C-C



DocuSigned by: Richard R. Greenfield

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

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

DRAWN BY C. TOMPKINS DATE 10/18
CHECKED BY L. DICKENS DATE 11/18
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 13

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REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-13
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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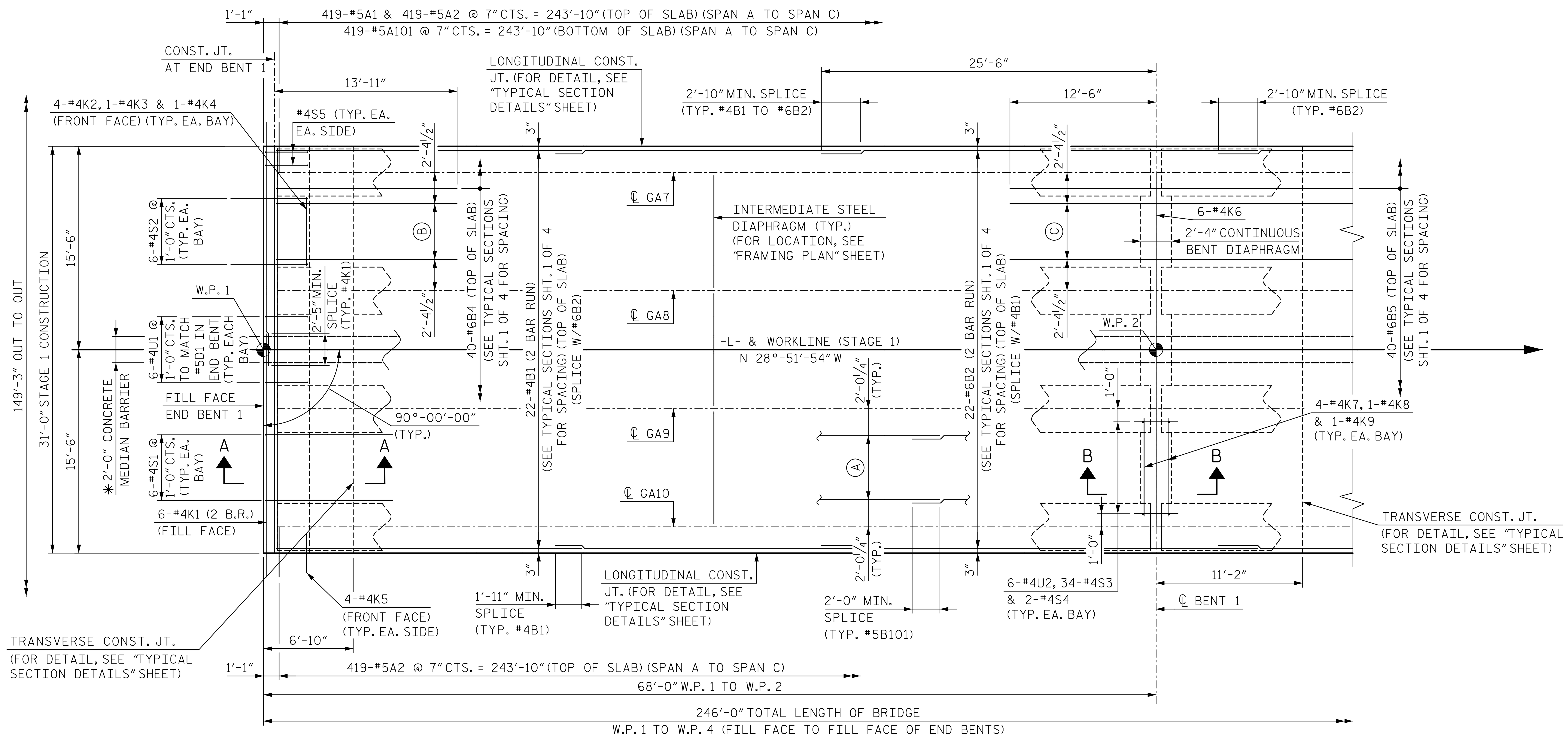

PLAN OF SPAN A STAGE 1

(A) 8-#5B101 @ 8½" CTS. = 4'-11½"
(5 BAR RUN)
(TYP. EACH BAY) (BOTTOM OF SLAB)

(B) 7-#4B102 @ 8½" CTS. =4'-3"
(TYP. EACH BAY) (BOTTOM OF SLAB)

(C) #4B103 @ 8½" CTS.
(SEE PLAN OF SPAN B STAGE 1)
(TYP. EACH BAY) (BOTTOM OF SLAB)

NOTES:

FOR CONCRETE MEDIAN BARRIER DIMENSIONS, REINFORCING STEEL, AND JOINT SPACING, SEE "CONCRETE MEDIAN BARRIER" SHEET.

FOR SECTION VIEWS, SEE "TYPICAL SECTION DETAILS" SHEET.

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET FOR DETAILS. FOR LOCATION, SEE "FRAMING PLAN" SHEET.

✱ BUILD CONCRETE MEDIAN BARRIER DURING STAGE 5 OF THE CONSTRUCTION SEQUENCE. FOR CONSTRUCTION SEQUENCE, SEE "CONSTRUCTION SEQUENCE" SHEETS.

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 1 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A
STAGE 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 RICHARD R. GREENFIELD 5/1/2019

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DESIGN ENGINEER OF RECORD	R. GREENFIELD	DATE	4/19

DWG. NO. 14

REVISIONS

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

SHEET NO. S4-14
TOTAL SHEETS 60

4/30/2019
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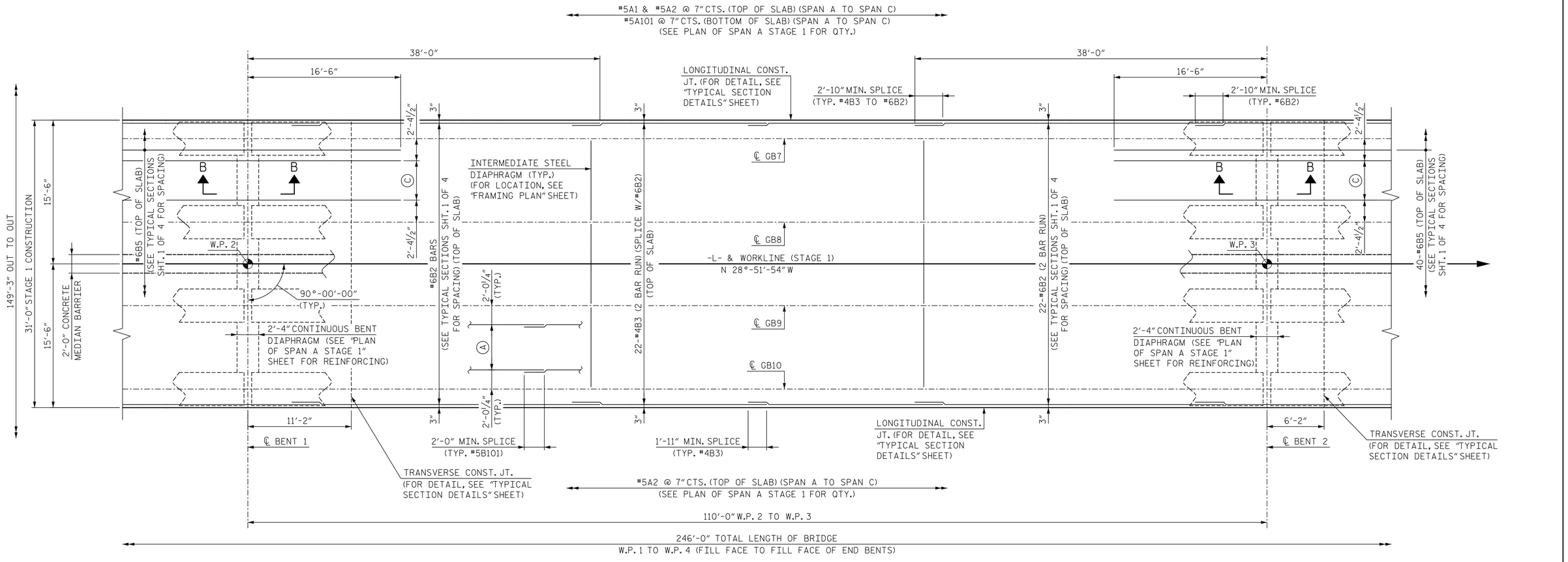

PLAN OF SPAN B STAGE 1

Ⓐ #5B101 @ 8½" CTS.
(SEE PLAN OF SPAN A STAGE 1)
(TYP. EACH BAY) (BOTTOM OF SLAB)

Ⓒ 7-#4B103 @ 8½" CTS. = 4'-3"
(TYP. EACH BAY) (BOTTOM OF SLAB)

NOTE:

FOR NOTES, SEE "PLAN OF SPAN A STAGE 1" SHEET.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 2 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN B
STAGE 1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD
Digitally signed by: Richard R. Greenfield

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DWG. NO. 15

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-15
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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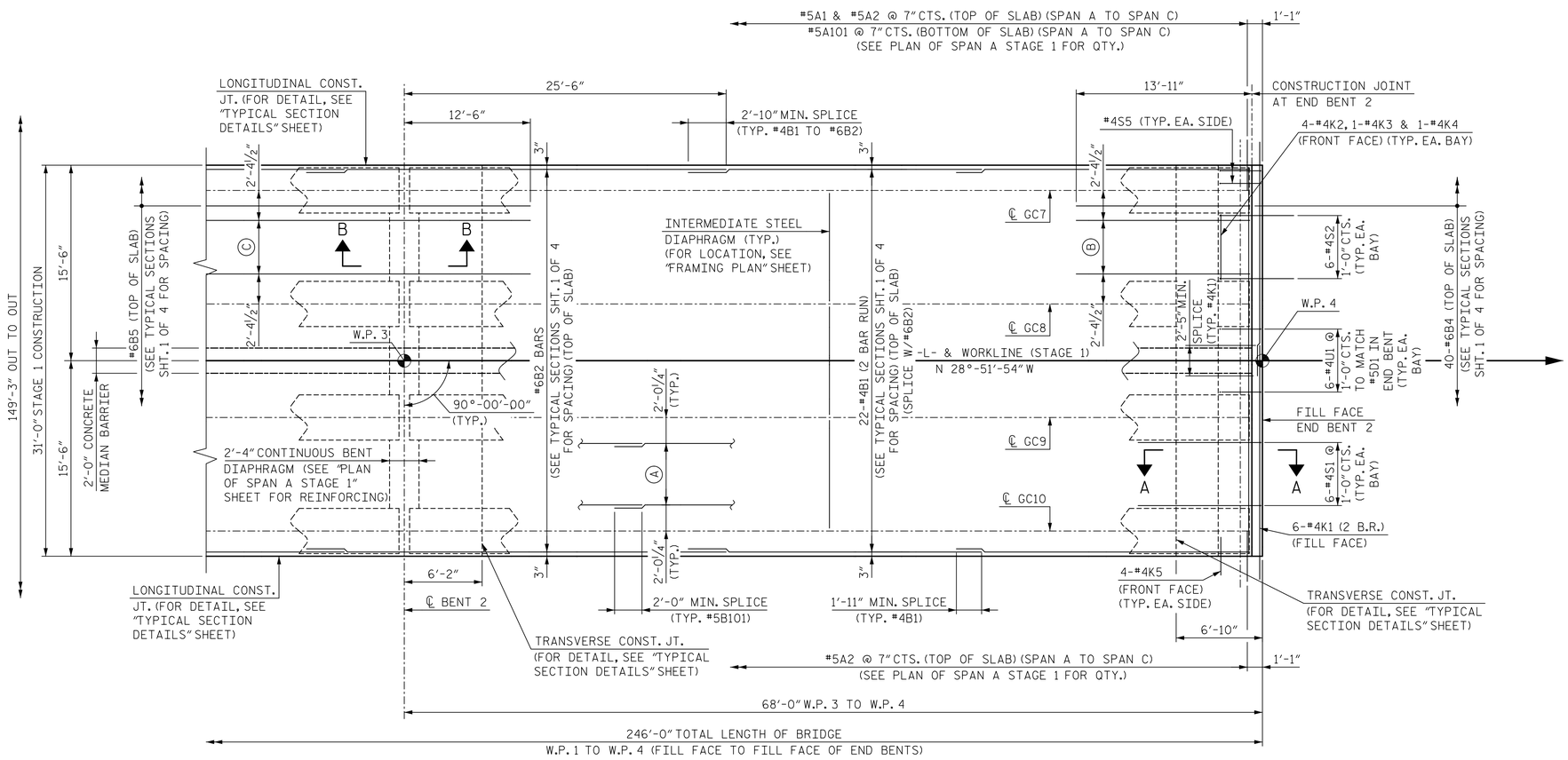

PLAN OF SPAN C STAGE 1

(A) #5B101 @ 8½" CTS.
(SEE PLAN OF SPAN A STAGE 1)
(TYP. EACH BAY) (BOTTOM OF SLAB)

(B) 7-#4B102 @ 8½" CTS. =4'-3"
(TYP. EACH BAY) (BOTTOM OF SLAB)

(C) #4B103 @ 8½" CTS.
(SEE PLAN OF SPAN B STAGE 1)
(TYP. EACH BAY) (BOTTOM OF SLAB)

NOTE:

FOR NOTES, SEE "PLAN OF SPAN A STAGE 1" SHEET.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 3 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN C
STAGE 1

Signed by: Richard R. Greenfield
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

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DWG. NO. 16

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-16
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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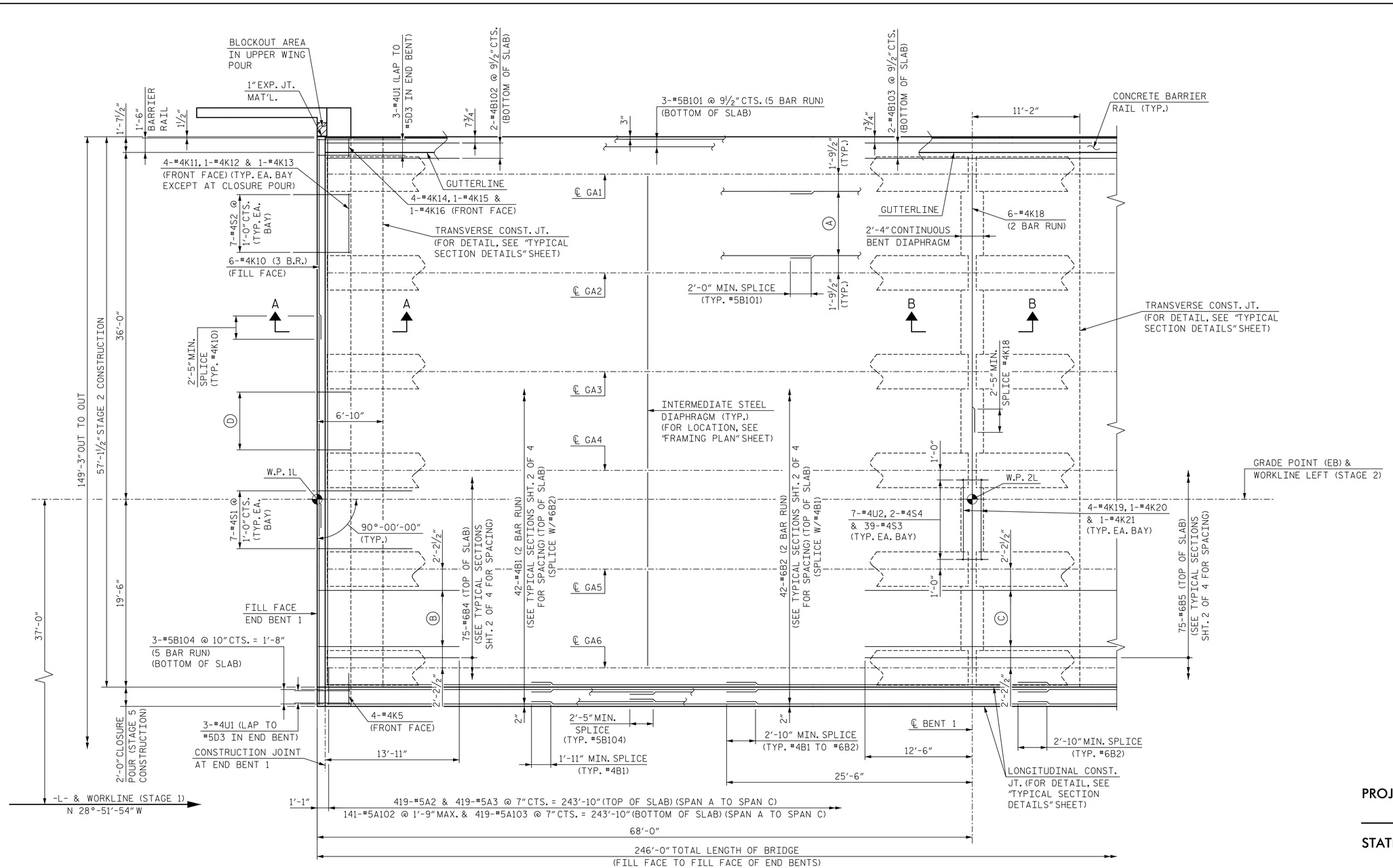

PLAN OF SPAN A STAGE 2

Ⓐ 9-#5B101 @ 10" CTS. = 6'-8" (5 BAR RUN)
(TYP. EA. BAY EXCEPT AT CLOSURE POUR)
(BOTTOM OF SLAB)

Ⓑ 8-#4B102 @ 10" CTS. = 5'-10"
(TYP. EA. BAY EXCEPT AT CLOSURE POUR)
(BOTTOM OF SLAB)

Ⓒ #4B103 @ 10" CTS.
(SEE PLAN OF SPAN B STAGE 2)
(TYP. EACH BAY) (BOTTOM OF SLAB)

Ⓓ 7-#4U1 @ 1'-0" CTS. TO MATCH #5D3 IN END BENT (TYP. EA. BAY EXCEPT AT CLOSURE POUR)

NOTES:

FOR CONCRETE BARRIER RAIL DIMENSIONS, REINFORCING STEEL, AND JOINT SPACING, SEE "CONCRETE BARRIER RAIL" SHEETS.

FOR SECTION VIEWS, SEE "TYPICAL SECTION DETAILS" SHEET.

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET FOR DETAILS. FOR LOCATION, SEE "FRAMING PLAN" SHEET.

SEE "END BENT 1 DETAILS" SHEETS FOR ADDITIONAL REINFORCING IN WINGS.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

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DWG. NO. 17

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 4 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A STAGE 2

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-17
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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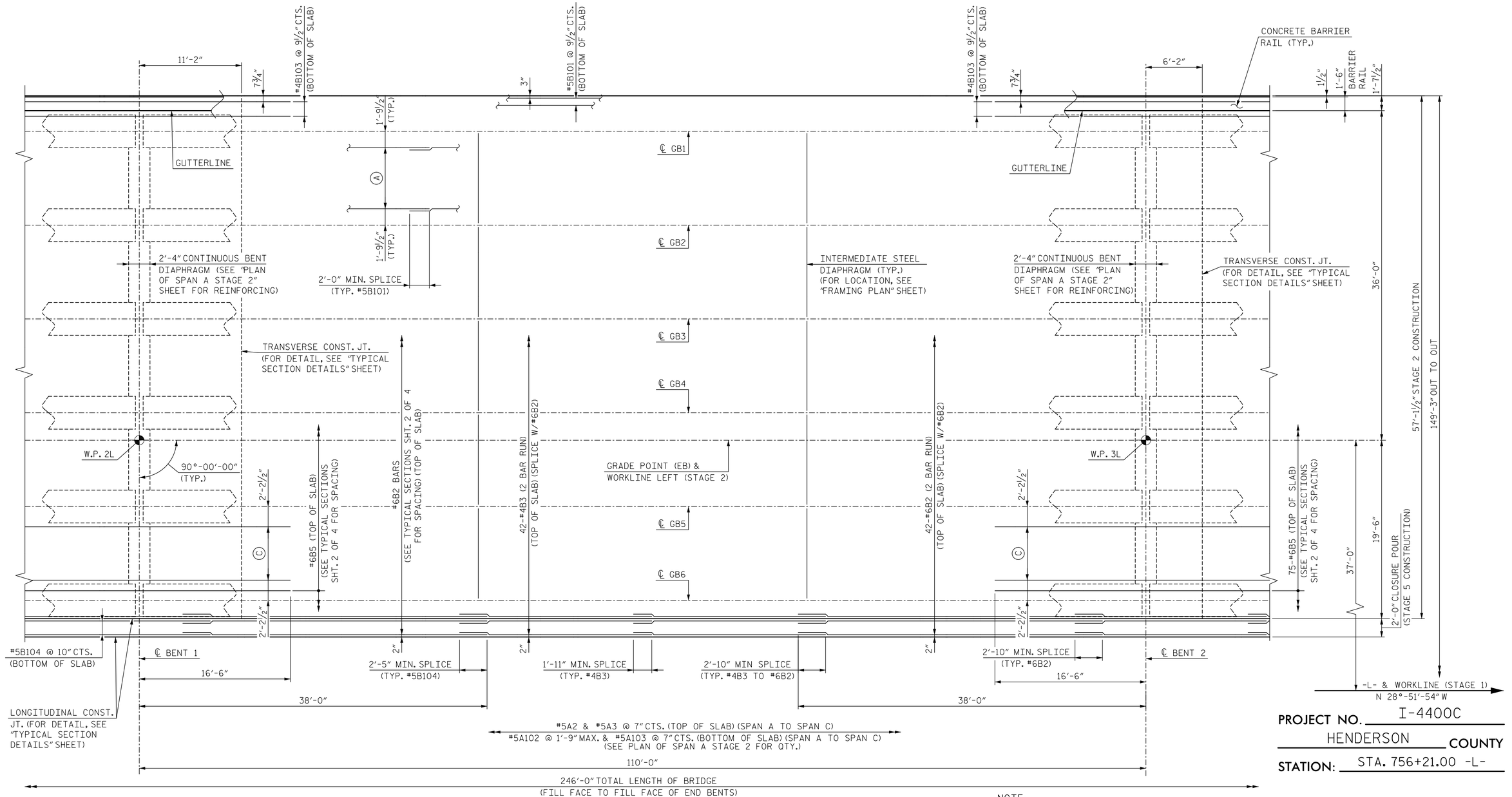

Ⓐ #5B101 @ 10" CTS.
(SEE PLAN OF SPAN A STAGE 2)
(TYP. EACH BAY) (BOTTOM OF SLAB)

Ⓒ 8-#4B103 @ 10" CTS. = 5'-10"
(TYP. EACH BAY) (BOTTOM OF SLAB)

PLAN OF SPAN B STAGE 2

NOTE:

FOR NOTES, SEE "PLAN OF SPAN A STAGE 2" SHEET.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 5 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN B
STAGE 2

Digitally signed by: RICHARD R. GREENFIELD
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718
SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

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DWG. NO. 18

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-18
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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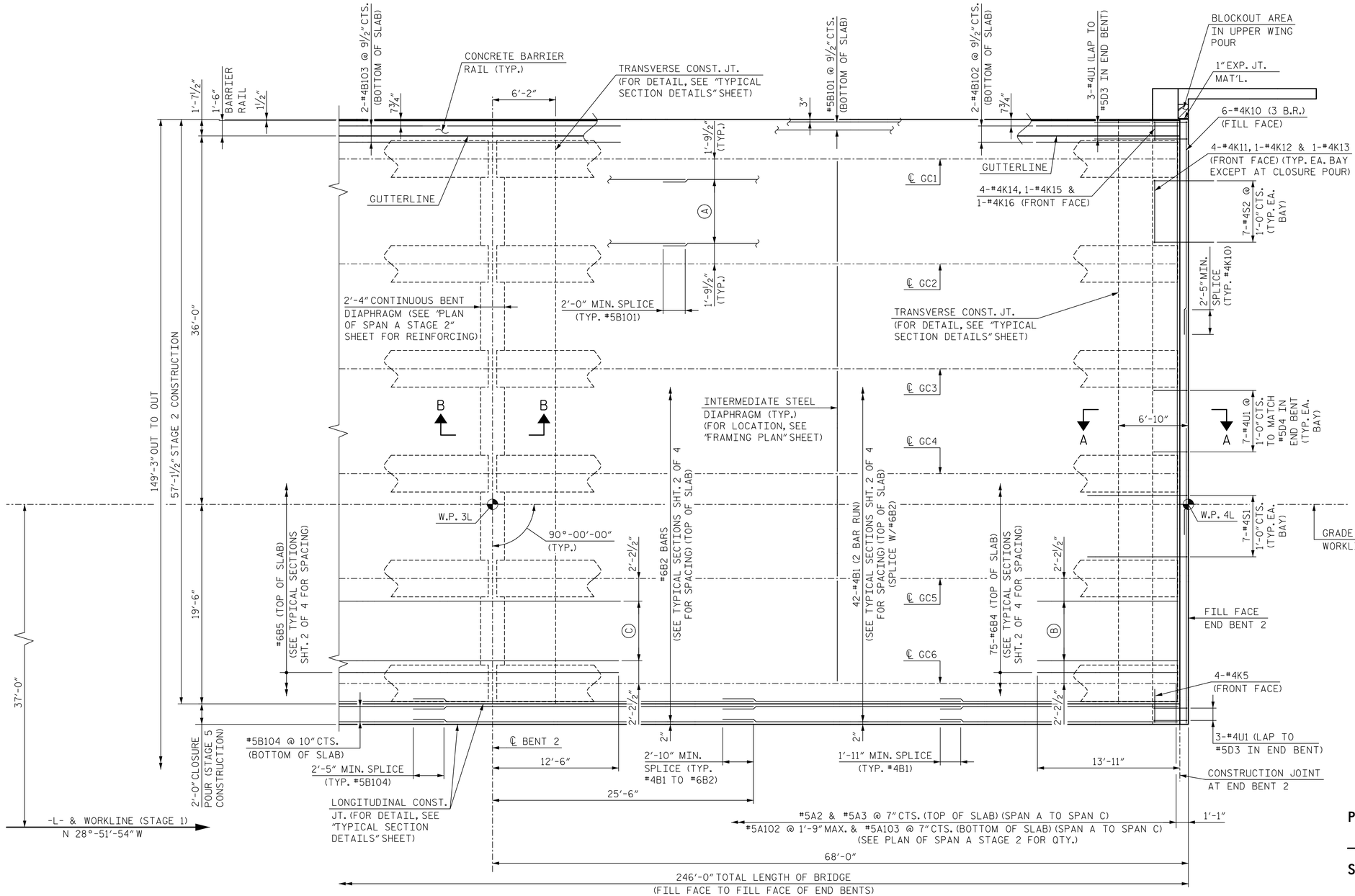

PLAN OF SPAN C STAGE 2

Ⓐ #5B101 @ 10" CTS.
(SEE PLAN OF SPAN A STAGE 2)
(TYP. EACH BAY) (BOTTOM OF SLAB)

Ⓑ 8-#4B102 @ 10" CTS. = 5'-10"
(TYP. EA. BAY EXCEPT AT CLOSURE POUR)
(BOTTOM OF SLAB)

Ⓒ #4B103 @ 10" CTS.
(SEE PLAN OF SPAN B STAGE 2)
(TYP. EACH BAY) (BOTTOM OF SLAB)

Ⓓ 7-#4U1 @ 1'-0" CTS. TO MATCH #5D3 IN END BENT (TYP. EA. BAY EXCEPT AT CLOSURE POUR)

NOTES:

FOR NOTES, SEE "PLAN OF SPAN A STAGE 2" SHEET.

SEE "END BENT 2 DETAILS" SHEETS FOR ADDITIONAL REINFORCING IN WINGS.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47118 5/1/2019 ENGINEER RICHARD R. GREENFIELD
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DWG. NO. 19

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 6 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN C
STAGE 2

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-19
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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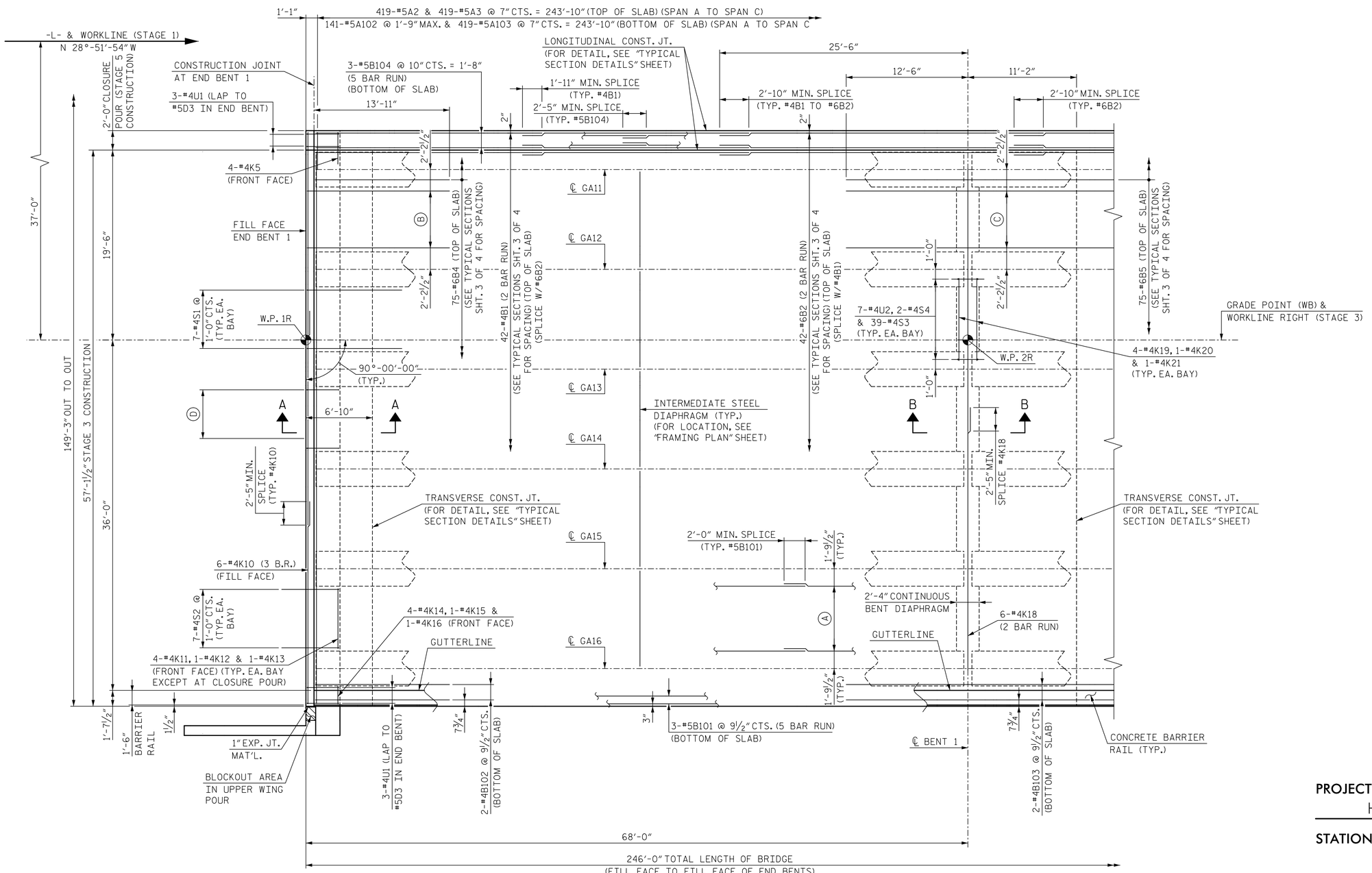

Ⓐ 9-#5B101 @ 10" CTS. = 6'-8" (5 BAR RUN)
(TYP. EA. BAY EXCEPT AT CLOSURE POUR)
(BOTTOM OF SLAB)

Ⓑ 8-#4B102 @ 10" CTS. = 5'-10"
(TYP. EA. BAY EXCEPT AT CLOSURE POUR)
(BOTTOM OF SLAB)

Ⓒ #4B103 @ 10" CTS.
(SEE PLAN OF SPAN B STAGE 3)
(TYP. EACH BAY) (BOTTOM OF SLAB)

Ⓓ 7-#4U1 @ 1'-0" CTS. TO MATCH #5D3 IN END BENT (TYP. EA. BAY EXCEPT AT CLOSURE POUR)

PLAN OF SPAN A STAGE 3

NOTES:

FOR CONCRETE BARRIER RAIL DIMENSIONS, REINFORCING STEEL, AND JOINT SPACING, SEE "CONCRETE BARRIER RAIL" SHEETS.

FOR SECTION VIEWS, SEE "TYPICAL SECTION DETAILS" SHEET.

FOR INTERMEDIATE STEEL DIAPHRAGMS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDERS" SHEET FOR DETAILS. FOR LOCATION, SEE "FRAMING PLAN" SHEET.

SEE "END BENT 1 DETAILS" SHEETS FOR ADDITIONAL REINFORCING IN WINGS.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 RICHARD R. GREENFIELD
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DWG. NO. 20

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 7 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A STAGE 3

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-20
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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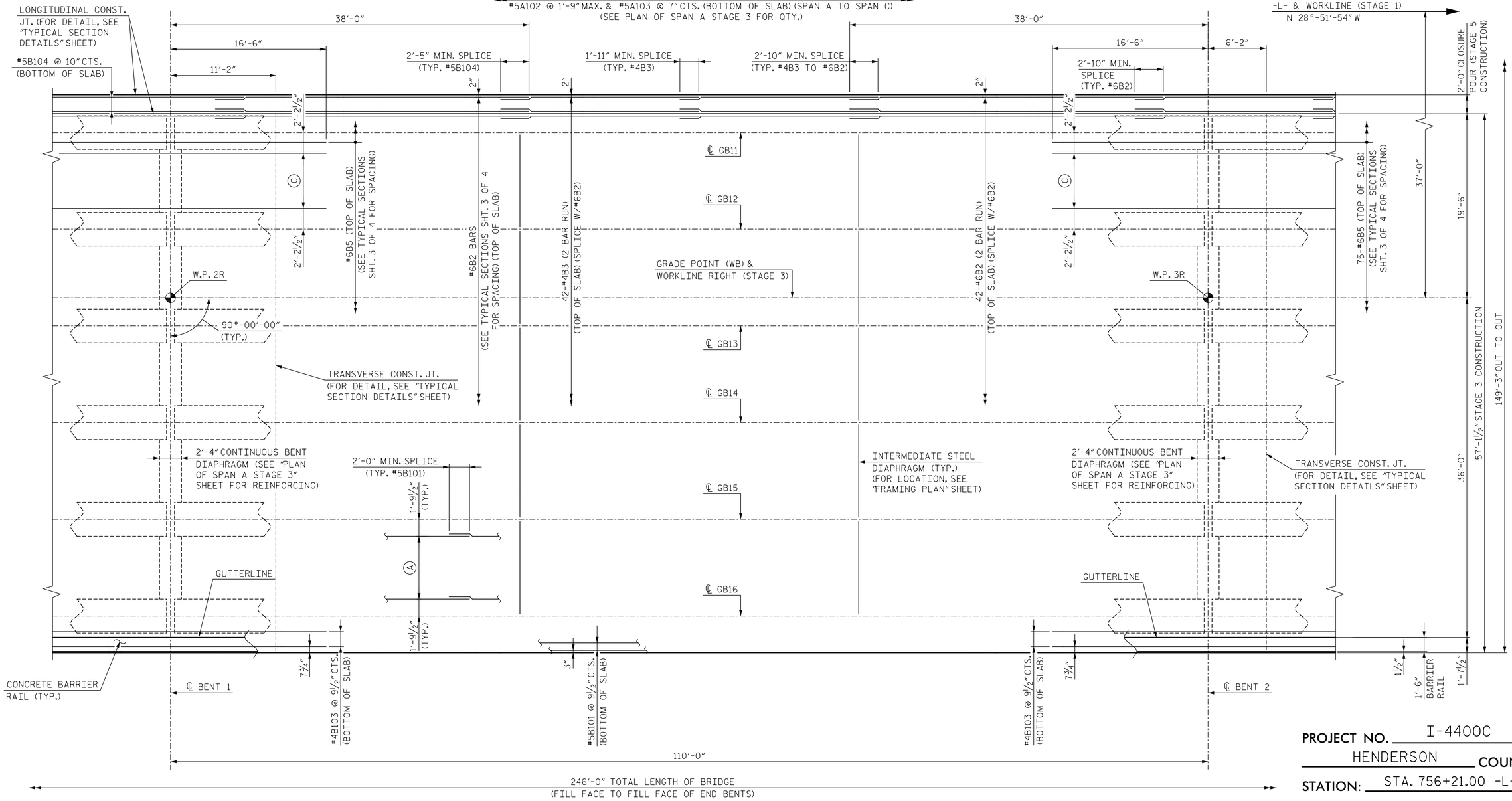

PLAN OF SPAN B STAGE 3

Ⓐ #5B101 @ 10" CTS.
(SEE PLAN OF SPAN A STAGE 3)
(TYP. EACH BAY) (BOTTOM OF SLAB)

Ⓒ 8-#4B103 @ 10" CTS. = 5'-10"
(TYP. EACH BAY) (BOTTOM OF SLAB)

NOTE:

FOR NOTES, SEE "PLAN OF SPAN A STAGE 3" SHEET.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 8 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN B
STAGE 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD
Digitally signed by: Richard R. Greenfield

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DWG. NO. 21

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-21
1			3			TOTAL SHEETS
2			4			60

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4/30/2019
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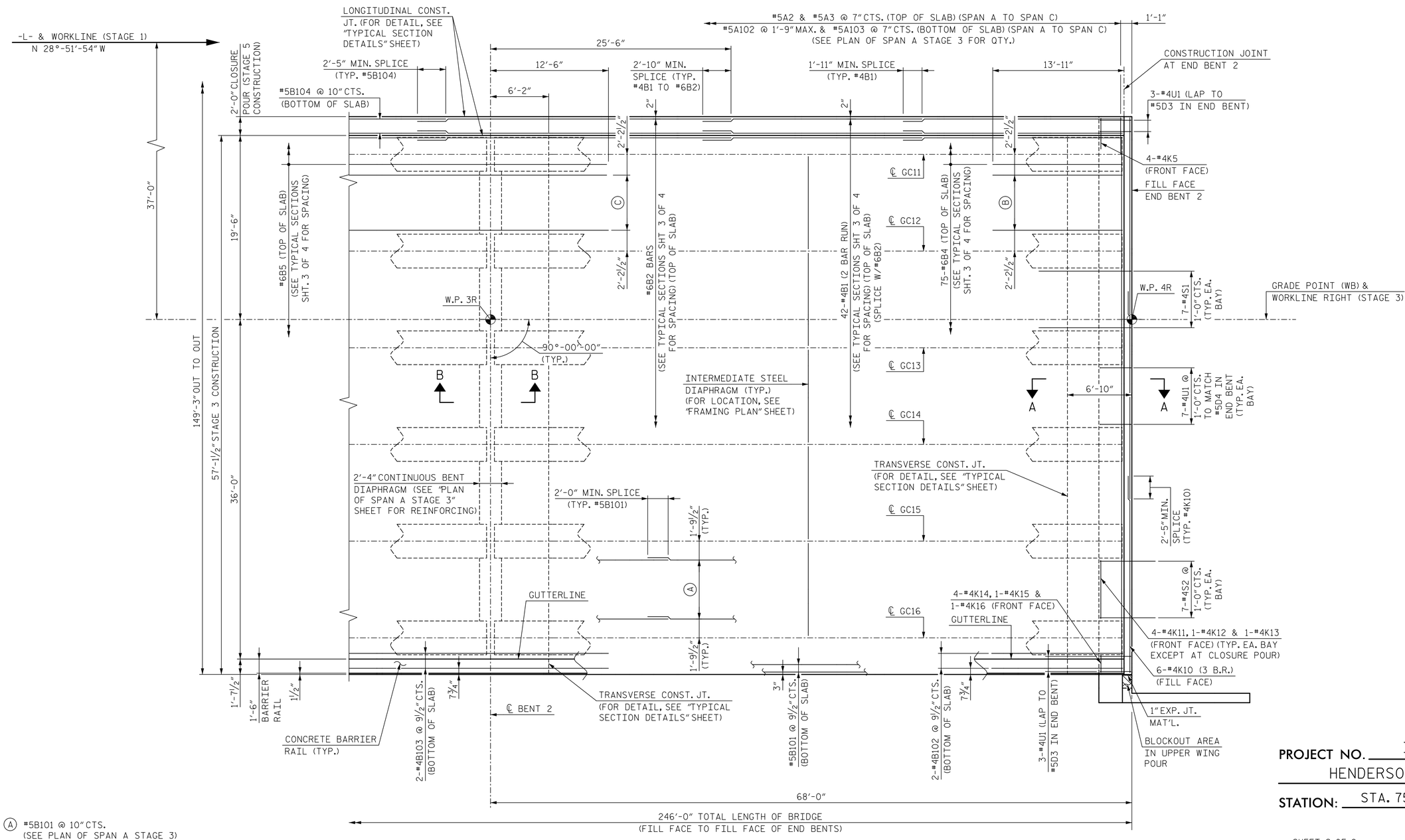

Ⓐ #5B101 @ 10" CTS.
(SEE PLAN OF SPAN A STAGE 3)
(TYP. EACH BAY) (BOTTOM OF SLAB)

Ⓑ 8-#4B102 @ 10" CTS. = 5'-10"
(TYP. EA. BAY EXCEPT AT CLOSURE POUR)
(BOTTOM OF SLAB)

Ⓒ #4B103 @ 10" CTS.
(SEE PLAN OF SPAN B STAGE 3)
(TYP. EACH BAY) (BOTTOM OF SLAB)

Ⓓ 7-#4U1 @ 1'-0" CTS. TO MATCH #5D3 IN END BENT (TYP. EA. BAY EXCEPT AT CLOSURE POUR)

PLAN OF SPAN C STAGE 3

NOTES:

FOR NOTES, SEE "PLAN OF SPAN A STAGE 3" SHEET.

SEE "END BENT 2 DETAILS" SHEETS FOR ADDITIONAL REINFORCING IN WINGS.

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 9 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN C
STAGE 3

Prepared by R. Greenfield
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

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CHECKED BY C. SUTARIA DATE 12/18
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19
DWG. NO. 22

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-22
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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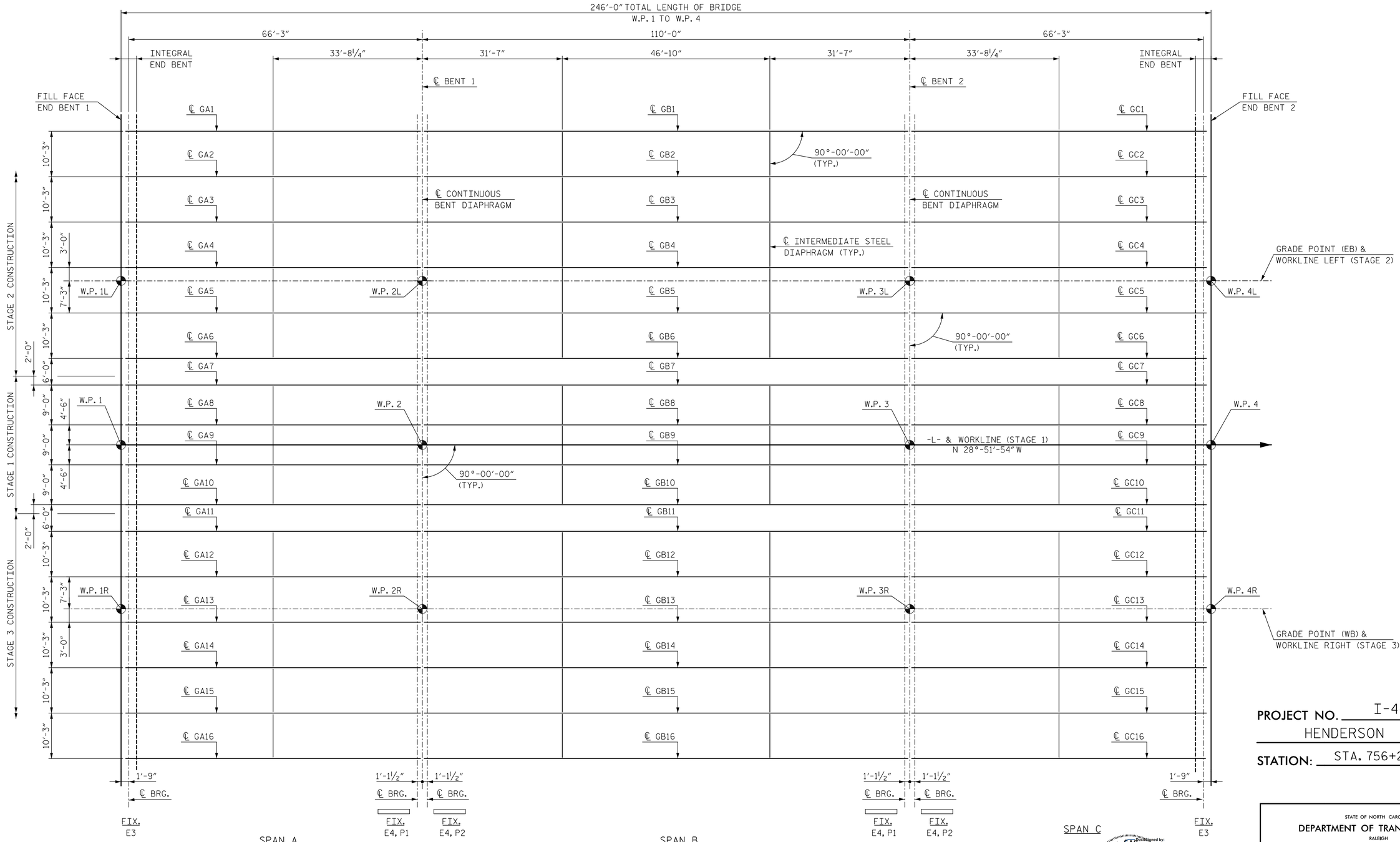

FRAMING PLAN

NOTES:

ALL DIMENSIONS ARE MEASURED ALONG ℄ GIRDER UNLESS NOTED OTHERWISE.

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR 63" MODIFIED BULB TEE PRESTRESSED CONCRETE GIRDER" SHEET.

FOR GIRDER ELEVATIONS AND DETAILS, SEE "63" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD" SHEETS.

"FIX." DENOTES FIXED BEARING ASSEMBLY.

"E" DENOTES ELASTOMERIC BEARING PAD MARK.

"P" DENOTES STEEL SOLE PLATE MARK.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 RICHARD R. GREENFIELD

Digitally signed by: Richard R. Greenfield

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CHECKED BY C. SUTARIA DATE 11/18
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 23

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-23
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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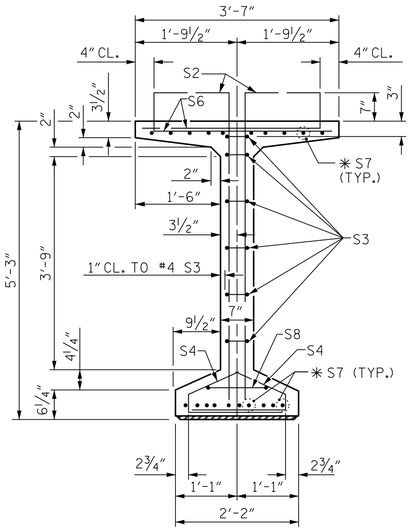
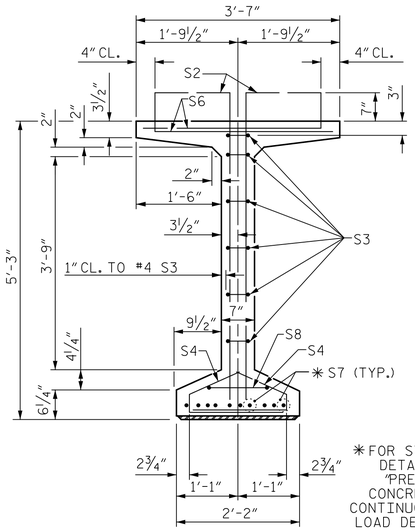
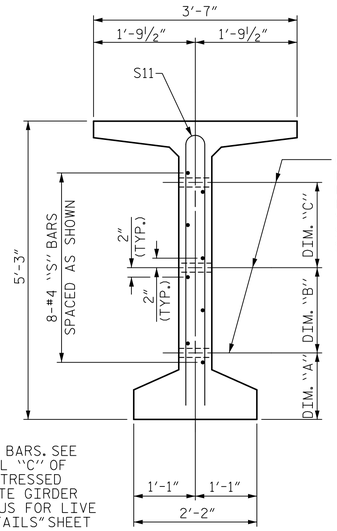


SECTION A-A



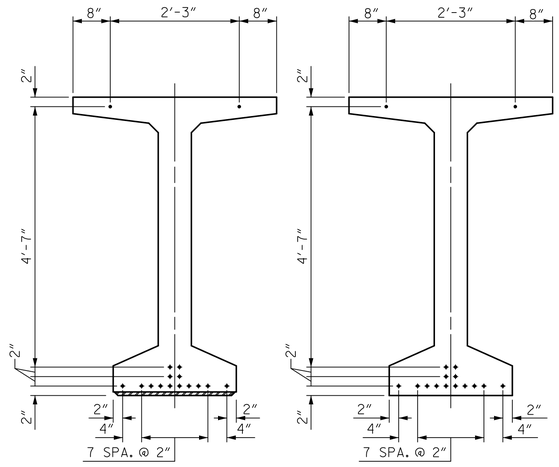
SECTION B-B



SECTION C-C

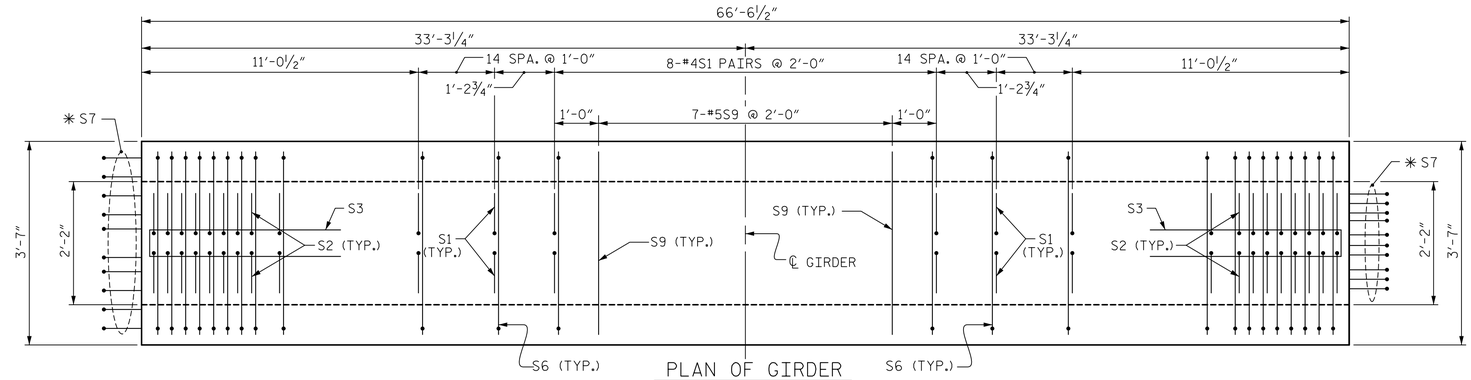
(S1, S6 AND S9 BARS NOT SHOWN)

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

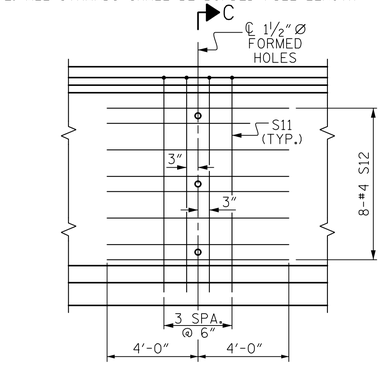


0.6" Ø LOW RELAXATION STRAND LAYOUT

NOTE: ALL STRANDS SHALL BE BONDED FULL LENGTH

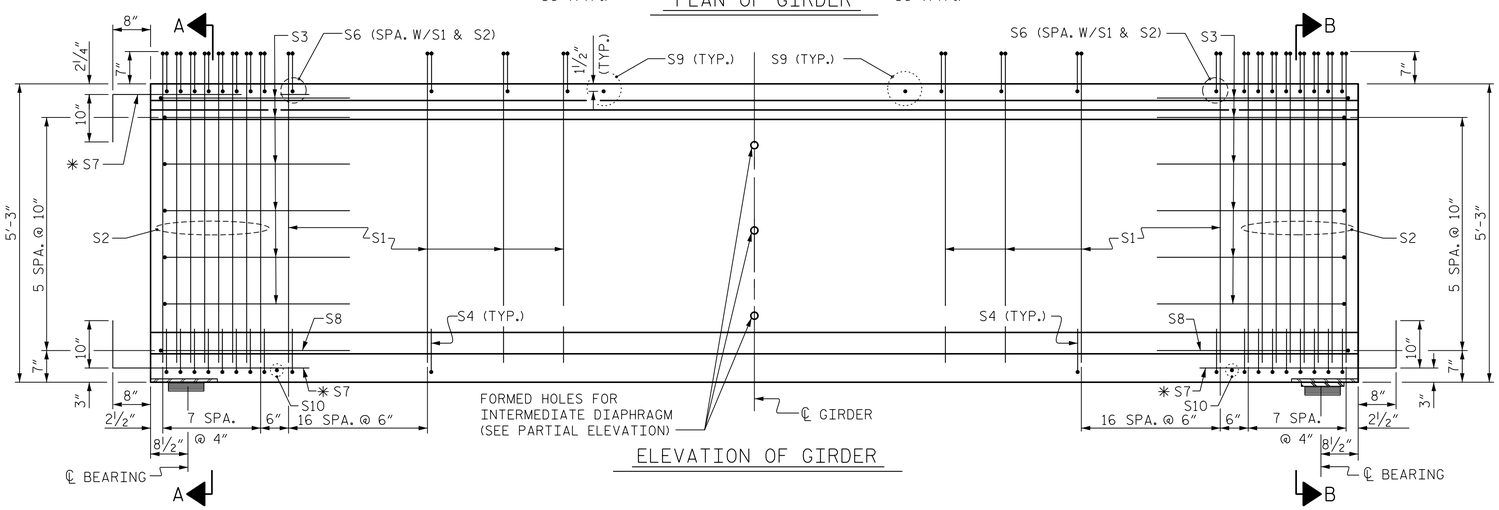


PLAN OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDERS GA1-GA16 AND GC1-GC16



ELEVATION OF GIRDER

INTEGRAL END BENT

(END BENT 1 @ SPAN A)
(END BENT 2 @ SPAN C)

CONTINUOUS BENT

(BENT 1 END @ SPAN A)
(BENT 2 END @ SPAN C)

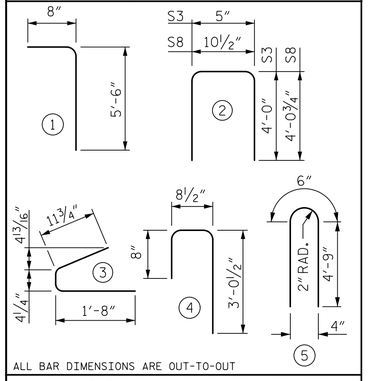
0.6" Ø L. R. GRADE 270 STRANDS		
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	140	#4	1	6'-2"	577
S2	32	#5	1	6'-2"	206
S3	12	#4	2	8'-5"	67
S4	100	#4	3	3'-0"	200
S6	172	#5	4	4'-5"	792
✱S7	30	#5	STR	4'-4"	136
S8	2	#5	2	9'-0"	19
S9	7	#5	STR	3'-3"	24
S10	2	#3	STR	1'-10"	1
S11	4	#5	5	10'-0"	42
S12	8	#4	STR	8'-0"	43

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

BAR TYPES



ALL BAR DIMENSIONS ARE OUT-TO-OUT

QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	6,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
SPAN A	2,107	13.2	16
SPAN C	2,107	13.2	16

GIRDERS REQUIRED

SPAN	NUMBER	LENGTH	TOTAL LENGTH
A	16	66'-6½"	1,064'-8"
C	16	66'-6½"	1,064'-8"

NOTES:

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 4,500 PSI FOR SPAN A AND SPAN C GIRDERS.

GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 6,000 PSI AT THE AGE OF 28 DAYS.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD 63" PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPANS A AND C

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 RICHARD R. GREENFIELD

Digitally signed by: R. Greenfield

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

DRAWN BY T. THOMPSON DATE 10/18
CHECKED BY C. SUTARIA DATE 10/18
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 24

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REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-24
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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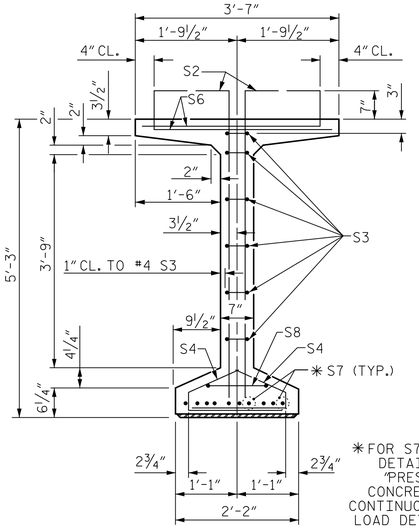
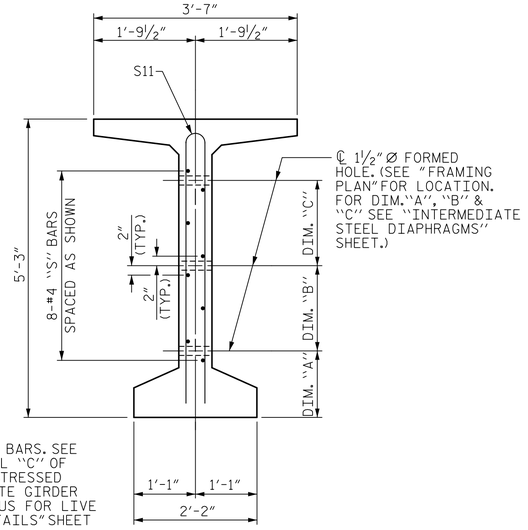


✳FOR S7 BARS, SEE DETAIL "C" OF "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS" SHEET

SECTION A-A

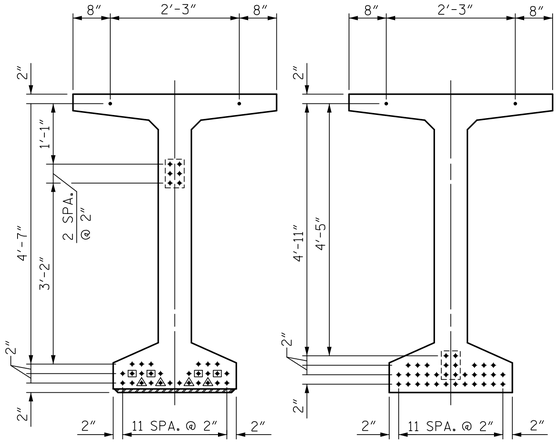


SECTION C-C

(S14 AND S16 BARS NOT SHOWN)

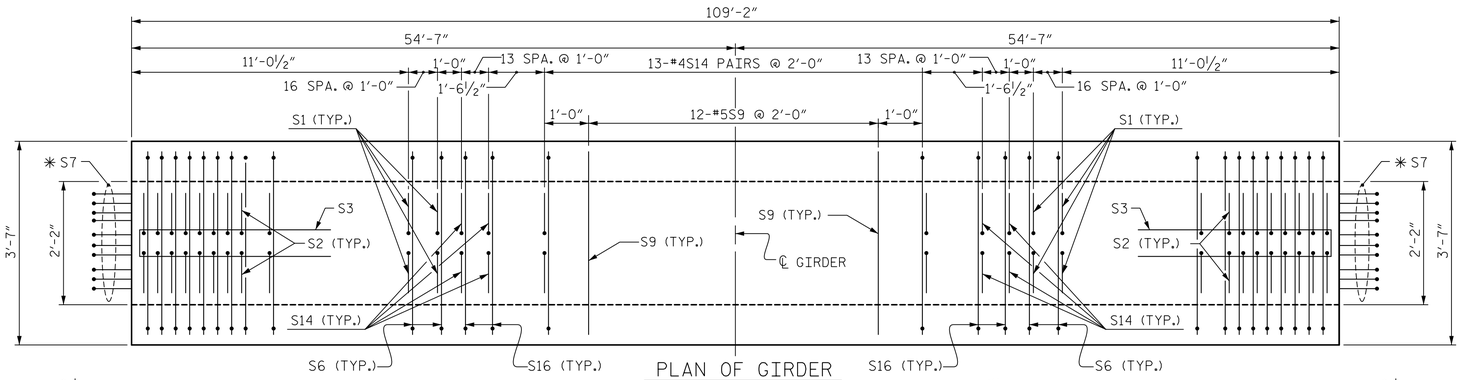
DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ▣ STRANDS DEBONDED FOR 4′-0″ FROM END OF GIRDER
- △ STRANDS DEBONDED FOR 6′-0″ FROM END OF GIRDER
- ⊡ DRAPED STRANDS

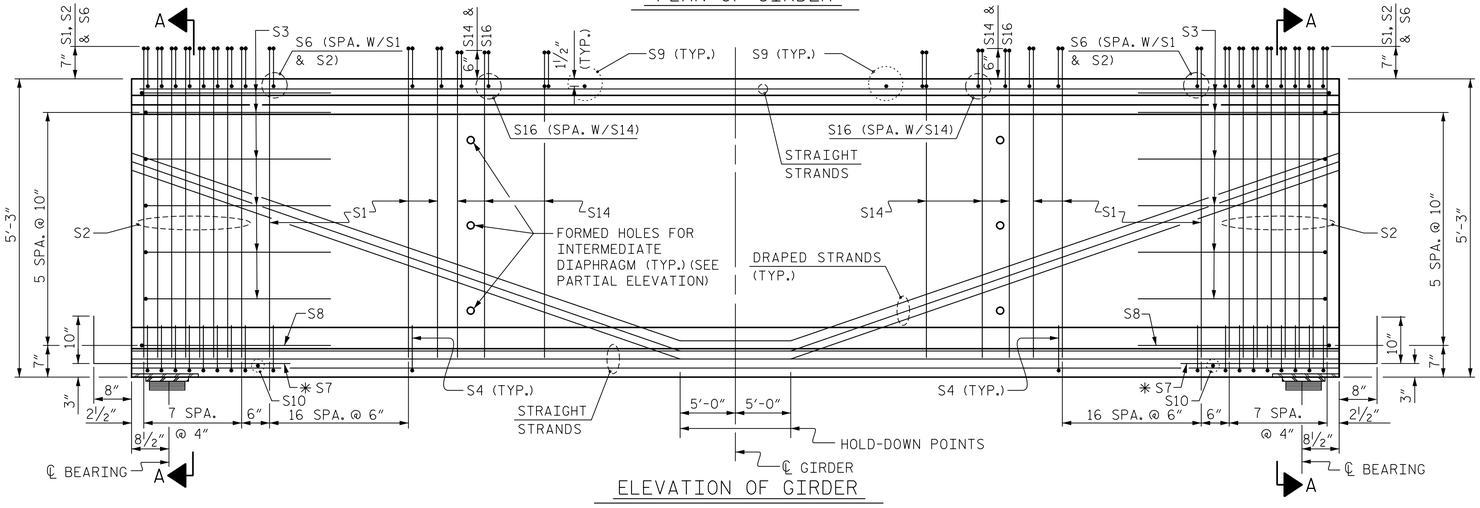


AT END OF GIRDER AT ℄ OF GIRDER

0.6″Ø LOW RELAXATION STRAND LAYOUT



PLAN OF GIRDER



CONTINUOUS BENT

ELEVATION OF GIRDER

CONTINUOUS BENT

PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR GIRDERS GB1 - GB16

NOTES:

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 6,000 PSI FOR SPAN B GIRDERS.

GIRDER CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 8,000 PSI AT THE AGE OF 28 DAYS.

THE UPLIFT FORCE DUE TO DRAPED STRANDS IS 17.7 KIPS.

0.6″Ø L. R. GRADE 270 STRANDS

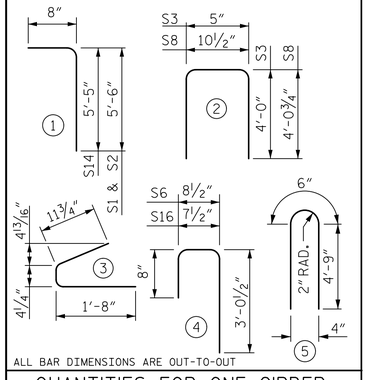
AREA (SQUARE INCHES)	ULTIMATE STRENGTH (LBS. PER STRAND)	APPLIED PRESTRESS (LBS. PER STRAND)
0.217	58,600	43,950

REINFORCING STEEL FOR ONE GDR

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	132	#4	1	6′-2″	544
S2	32	#5	1	6′-2″	206
S3	12	#4	2	8′-5″	67
S4	100	#4	3	3′-0″	200
S6	164	#5	4	4′-5″	755
✳S7	20	#5	STR	4′-4″	90
S8	2	#5	2	9′-0″	19
S9	12	#5	STR	3′-3″	41
S10	2	#3	STR	1′-10″	1
S11	8	#5	5	10′-0″	83
S12	16	#4	STR	8′-0″	86
S14	82	#4	1	6′-1″	333
S16	82	#5	4	4′-4″	371

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

BAR TYPES



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8,000 PSI CONCRETE	0.6″Ø L.R. STRANDS
	LB.	C.Y.	No.
SPAN B	2,796	21.6	36

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
16	109′-2″	1,746′-8″

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD 63″ PRESTRESSED CONCRETE MODIFIED BULB TEE CONTINUOUS FOR LIVE LOAD SPAN B

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 6/14/2019 ENGINEER RICHARD R. GREENFIELD

Digitally signed by R. Greenfield

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY T. THOMPSON DATE 10/18
CHECKED BY C. SUTARIA DATE 10/18
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 25

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-25
1			3			TOTAL SHEETS
2			4			60

6/14/2019
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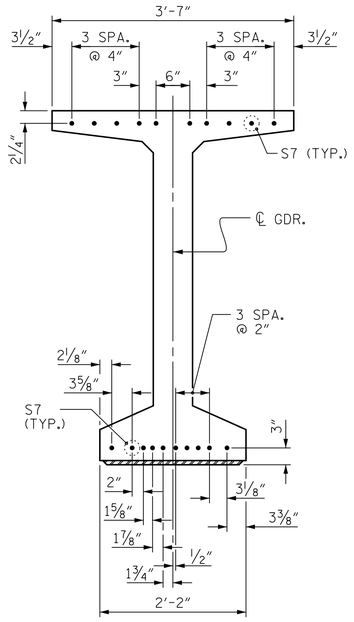
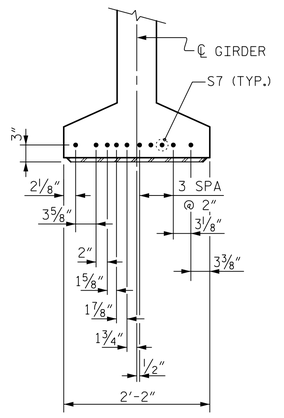


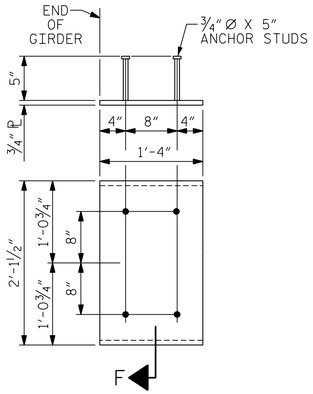
DETAIL "C"

(AT INTEGRAL END BENT)



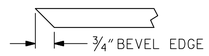
DETAIL "C"

(AT BENT)



EMBEDDED PLATE "B-1" DETAILS

(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.

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

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

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

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

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

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 3 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 RICHARD R. GREENFIELD

Signed by: Richard R. Greenfield

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY T. THOMPSON DATE 10/18
CHECKED BY C. SUTARIA DATE 10/18
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 26

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-26
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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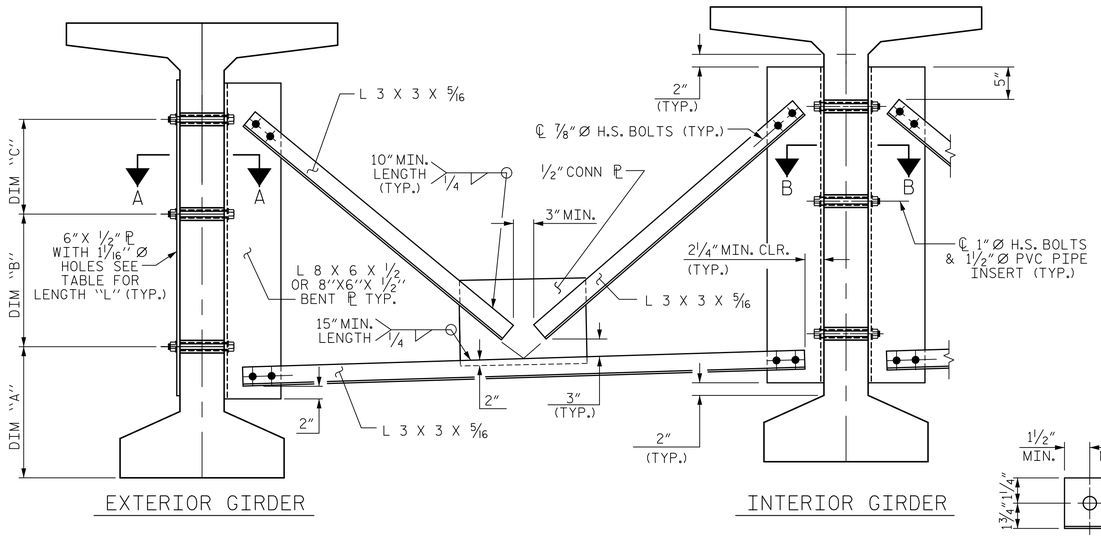
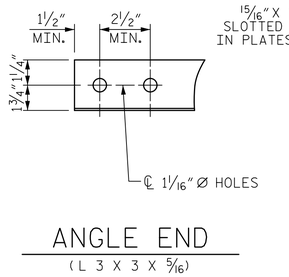


PART SECTION AT INTERMEDIATE DIAPHRAGM



ANGLE END
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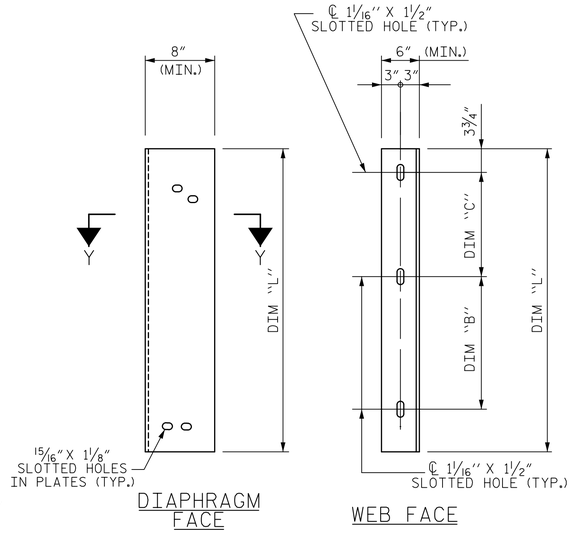
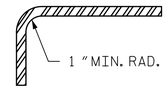




SECTION Y-Y

CONNECTOR PLATE DETAIL

STRUCTURAL STEEL NOTES

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

TENSION ON THE ASTM F3125 A325 TYPE 1 BOLTS THROUGH THE ANGLE MEMBER SHALL BE CALIBRATED USING DIRECT TENSION INDICATOR WASHERS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

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

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

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

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

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

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

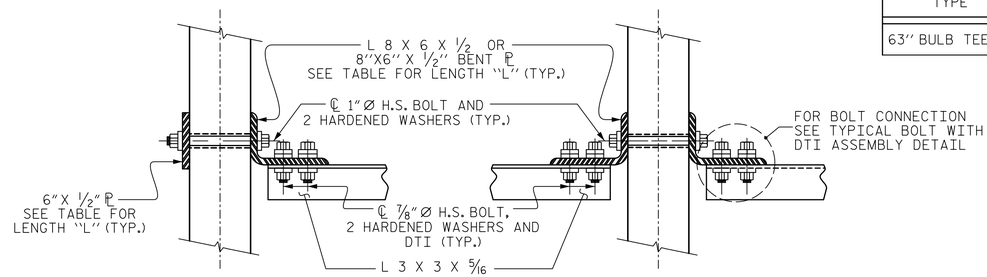
SUBMIT TWO SETS OF WORKING DRAWINGS FOR THE INTERMEDIATE DIAPHRAGM ASSEMBLY FOR REVIEW, COMMENTS AND ACCEPTANCE. AFTER REVIEW, COMMENTS, AND ACCEPTANCE, SUBMIT SEVEN SETS FOR DISTRIBUTION.

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

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

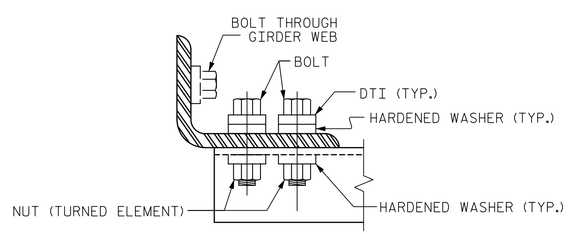
TABLE

GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
63" BULB TEE	1'-4 1/4"	1'-4 3/4"	1'-4 3/4"	3'-5"



SECTION A-A SECTION B-B

CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

Digitally signed by: Richard R. Greenfield
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

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

DRAWN BY C. TOMPKINS DATE 10/18
CHECKED BY C. SUTARIA DATE 10/18
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 27

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-27
1			3			TOTAL SHEETS
2			4			60

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

4/30/2019
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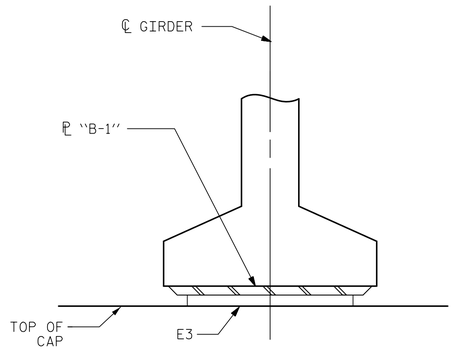
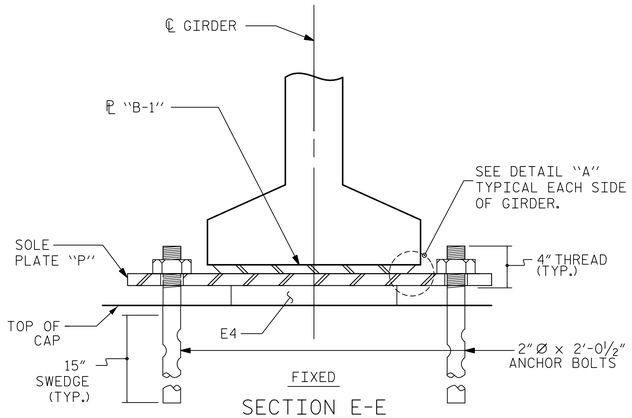
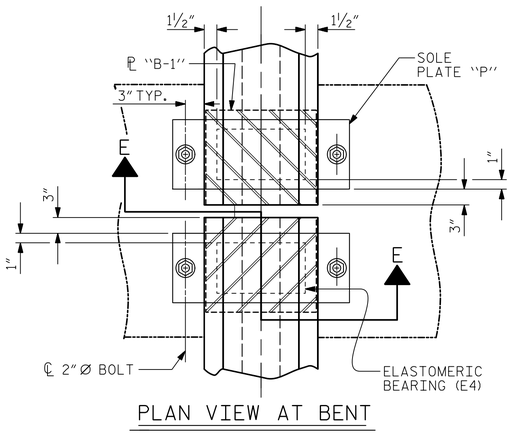


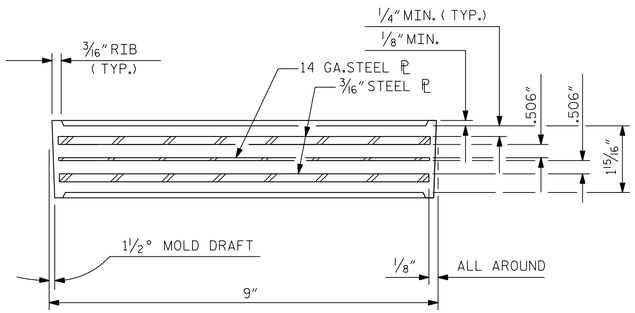
SECTION D-D



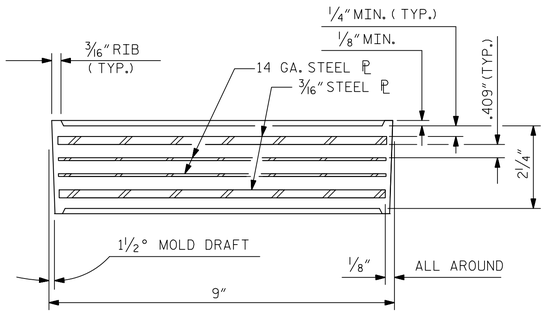
SECTION E-E



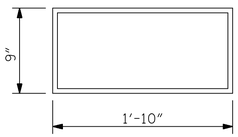
PLAN VIEW AT BENT



TYPICAL SECTION OF ELASTOMERIC BEARINGS



TYPICAL SECTION OF ELASTOMERIC BEARINGS

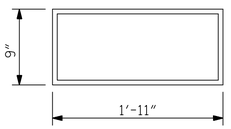


E3 (32 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE IV

(END BENTS 1 & 2)

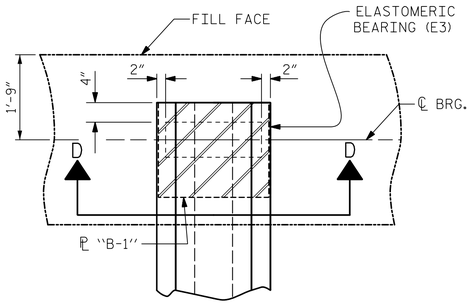


E4 (64 REQ'D)

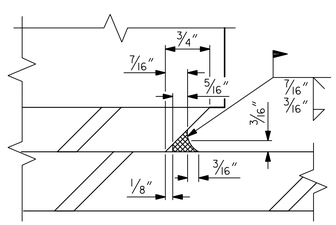
PLAN VIEW OF ELASTOMERIC BEARING

TYPE V

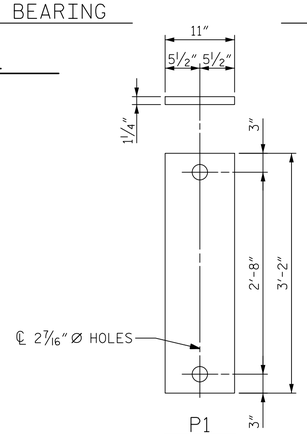
(BENTS 1 & 2)



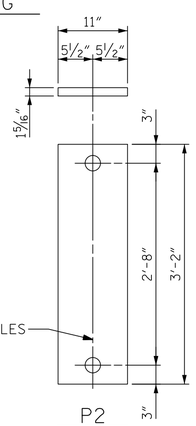
TYPICAL PLAN @ END BENT



DETAIL "A"



P1 (32 REQ'D)



P2 (32 REQ'D)

SOLE PLATE DETAILS ("P")

(BENTS 1 & 2)

MAXIMUM ALLOWABLE SERVICE LOADS	
D.L.+L.L. (NO IMPACT)	
TYPE IV	225 k
TYPE V	365 k

NOTES

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

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

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

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

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

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

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL SOLE PLATES SHALL BE AASHTO M270 GRADE 36.

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

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 6/14/2019 ENGINEER RICHARD R. GREENFIELD

Signed by: Richard R. Greenfield

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY T. THOMPSON DATE 11/18
CHECKED BY C. SUTARIA DATE 12/18
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 28

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-28
1			3			TOTAL SHEETS
2			4			60

6/14/2019
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DEAD LOAD DEFLECTION TABLE FOR SPANS A & C

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 1 & 16										
TENTH POINTS	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.020	0.038	0.053	0.062	0.065	0.062	0.053	0.038	0.020	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.008	0.015	0.021	0.024	0.025	0.024	0.021	0.015	0.008	0.000
FINAL CAMBER ↑	0	1/8	1/4	3/8	7/16	1/2	7/16	3/8	1/4	1/8	0

DEAD LOAD DEFLECTION TABLE FOR SPANS A & C

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 6, 7, 10 & 11										
TENTH POINTS	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.020	0.038	0.053	0.062	0.065	0.062	0.053	0.038	0.020	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.006	0.012	0.017	0.020	0.021	0.020	0.017	0.012	0.006	0.000
FINAL CAMBER ↑	0	3/16	5/16	7/16	1/2	9/16	1/2	7/16	5/16	3/16	0

DEAD LOAD DEFLECTION TABLE FOR SPANS A & C

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 2 THRU 5 & 12 THRU 15										
TENTH POINTS	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.020	0.038	0.053	0.062	0.065	0.062	0.053	0.038	0.020	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.008	0.016	0.022	0.026	0.028	0.026	0.022	0.016	0.008	0.000
FINAL CAMBER ↑	0	1/8	1/4	3/8	7/16	7/16	7/16	3/8	1/4	1/8	0

DEAD LOAD DEFLECTION TABLE FOR SPANS A & C

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 8 & 9										
TENTH POINTS	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.020	0.038	0.053	0.062	0.065	0.062	0.053	0.038	0.020	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.007	0.014	0.020	0.023	0.024	0.023	0.020	0.014	0.007	0.000
FINAL CAMBER ↑	0	1/8	5/16	3/8	1/2	1/2	1/2	3/8	5/16	1/8	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 1 & 16																				
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.043	0.084	0.124	0.160	0.192	0.219	0.240	0.256	0.266	0.269	0.266	0.256	0.240	0.219	0.192	0.160	0.124	0.084	0.043	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.026	0.053	0.077	0.102	0.121	0.141	0.153	0.165	0.170	0.174	0.170	0.165	0.153	0.141	0.121	0.102	0.077	0.053	0.026	0.000
FINAL CAMBER ↑	0	3/16	3/8	9/16	11/16	13/16	15/16	1 1/16	1 1/16	1 1/8	1 1/8	1 1/8	1 1/16	1 1/16	1 5/16	1 3/16	1 1/16	9/16	3/8	3/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 2 & 15																				
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.043	0.084	0.124	0.160	0.192	0.219	0.240	0.256	0.266	0.269	0.266	0.256	0.240	0.219	0.192	0.160	0.124	0.084	0.043	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.029	0.057	0.084	0.111	0.132	0.154	0.167	0.181	0.185	0.190	0.185	0.181	0.167	0.154	0.132	0.111	0.084	0.057	0.029	0.000
FINAL CAMBER ↑	0	3/16	5/16	1/2	9/16	11/16	3/4	7/8	7/8	15/16	15/16	15/16	7/8	7/8	3/4	11/16	9/16	1/2	5/16	3/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 3, 4, 5, 12, 13 & 14																				
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.043	0.084	0.124	0.160	0.192	0.219	0.240	0.256	0.266	0.269	0.266	0.256	0.240	0.219	0.192	0.160	0.124	0.084	0.043	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.028	0.056	0.083	0.109	0.130	0.151	0.164	0.177	0.182	0.186	0.182	0.177	0.164	0.151	0.130	0.109	0.083	0.056	0.028	0.000
FINAL CAMBER ↑	0	3/16	5/16	1/2	5/8	3/4	13/16	15/16	15/16	1	1	1	15/16	15/16	13/16	3/4	5/8	1/2	5/16	3/16	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 6 & 11																				
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.043	0.084	0.124	0.160	0.192	0.219	0.240	0.256	0.266	0.269	0.266	0.256	0.240	0.219	0.192	0.160	0.124	0.084	0.043	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.021	0.042	0.062	0.081	0.097	0.113	0.122	0.132	0.135	0.139	0.135	0.132	0.122	0.113	0.097	0.081	0.062	0.042	0.021	0.000
FINAL CAMBER ↑	0	1/4	1/2	3/4	15/16	1 1/8	1 1/4	1 7/16	1 1/2	1 9/16	1 9/16	1 9/16	1 1/2	1 7/16	1 1/4	1 1/8	15/16	3/4	1/2	1/4	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 7 & 10																				
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.043	0.084	0.124	0.160	0.192	0.219	0.240	0.256	0.266	0.269	0.266	0.256	0.240	0.219	0.192	0.160	0.124	0.084	0.043	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.021	0.041	0.061	0.080	0.095	0.111	0.120	0.130	0.133	0.137	0.133	0.130	0.120	0.111	0.095	0.080	0.061	0.041	0.021	0.000
FINAL CAMBER ↑	0	1/4	1/2	3/4	15/16	1 1/8	1 5/16	1 7/16	1 1/2	1 9/16	1 9/16	1 9/16	1 1/2	1 7/16	1 5/16	1 1/8	15/16	3/4	1/2	1/4	0

DEAD LOAD DEFLECTION TABLE FOR SPAN B

0.6"Ø LOW RELAXATION STRANDS	GIRDERS 8 & 9																				
TWENTIETH POINTS	0.00	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.00
CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.043	0.084	0.124	0.160	0.192	0.219	0.240	0.256	0.266	0.269	0.266	0.256	0.240	0.219	0.192	0.160	0.124	0.084	0.043	0.000
DEFLECTION DUE TO SUPERIMPOSED D.L. ✳ ↓	0.000	0.025	0.049	0.073	0.096	0.114	0.133	0.144	0.156	0.160	0.164	0.160	0.156	0.144	0.133	0.114	0.096	0.073	0.049	0.025	0.000
FINAL CAMBER ↑	0	3/16	7/16	5/8	3/4	15/16	1	1 1/8	1 3/16	1 1/4	1 1/4	1 1/4	1 3/16	1 1/8	1	15/16	3/4	5/8	7/16	3/16	0

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

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

Digitally signed by: Richard R. Greenfield
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 RICHARD R. GREENFIELD

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE
GIRDER
DEAD LOAD DEFLECTIONS AND CAMBER

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

DRAWN BY T. THOMPSON DATE 11/18
CHECKED BY A. WAGNER DATE 11/18
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 29

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-29
1			3			TOTAL SHEETS
2			4			60

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

4/30/2019
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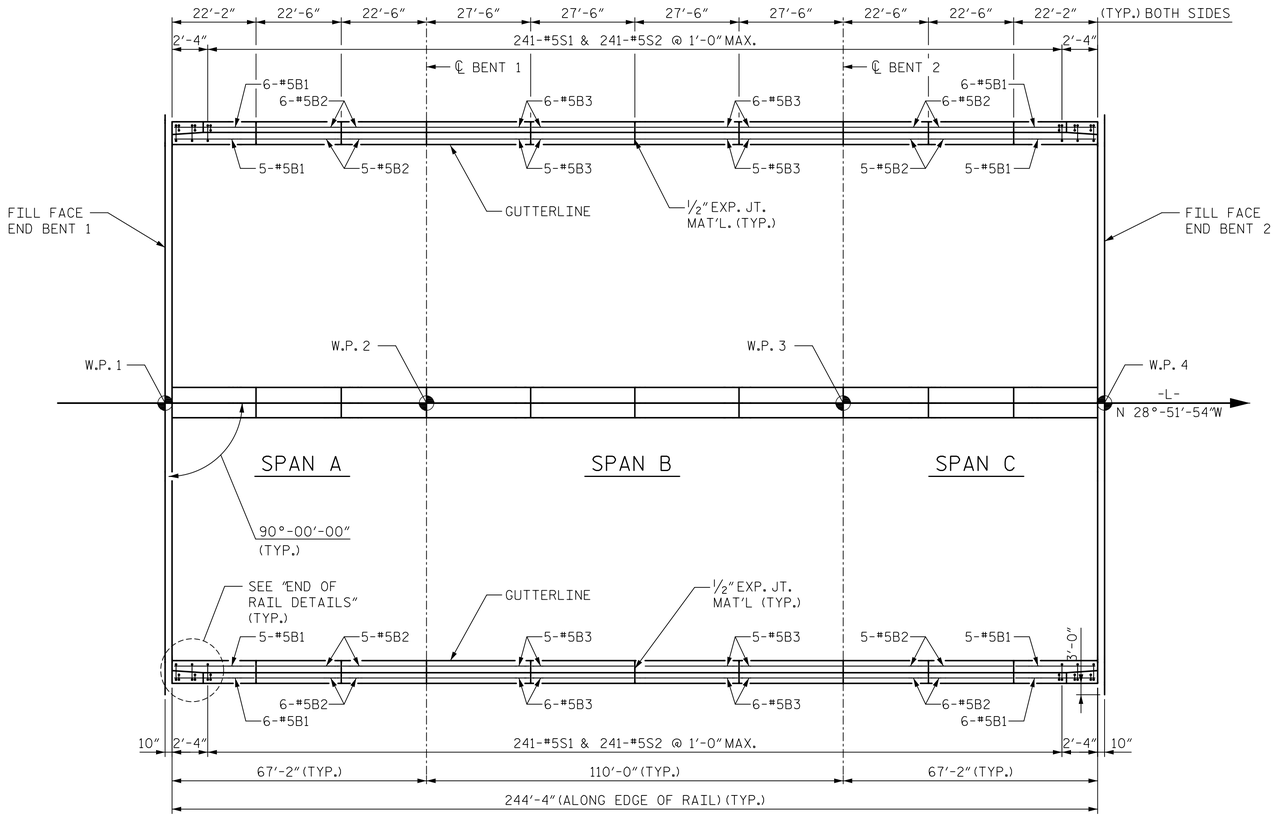


PLAN OF BARRIER RAIL

NOTE: EDGE OF SLAB NOT SHOWN FOR CLARITY.

FOR MEDIAN REINFORCING SEE SHEET "CONCRETE MEDIAN BARRIER".

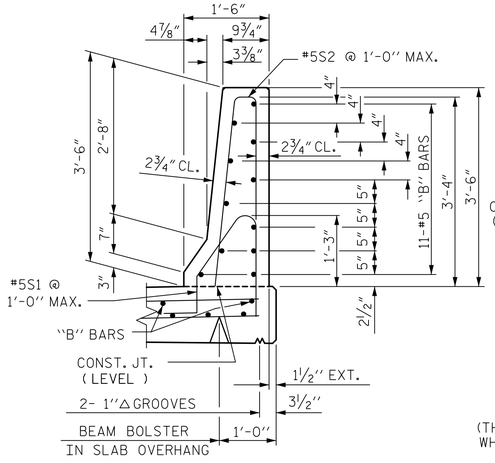
NOTES

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

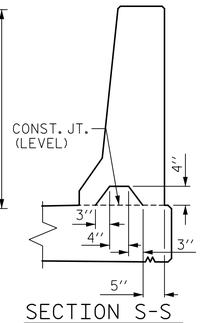
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

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

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

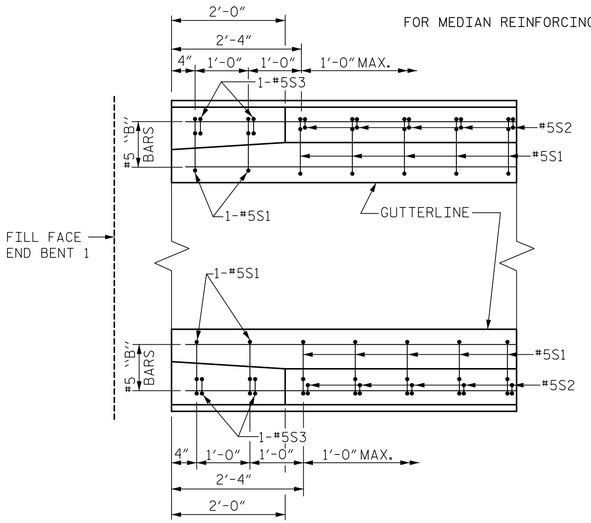


SECTION THRU RAIL

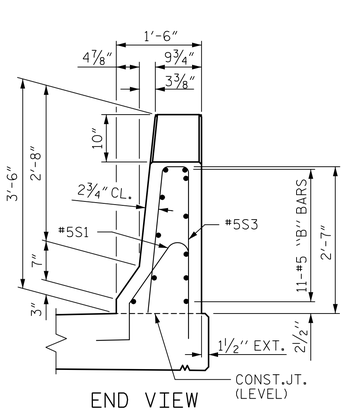


SECTION S-S

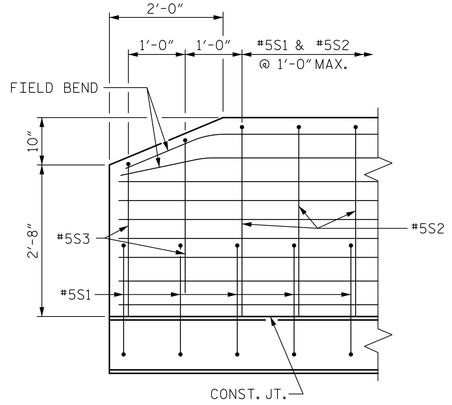
AT DAM IN OPEN JOINT (THIS IS TO BE USED ONLY WHEN SLIP FORM IS USED)



PLAN

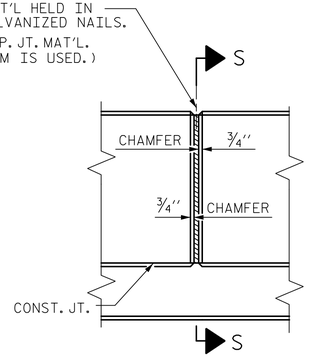


END VIEW



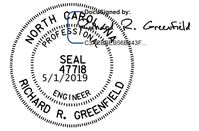
SIDE VIEW

END OF RAIL DETAILS

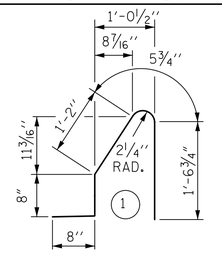


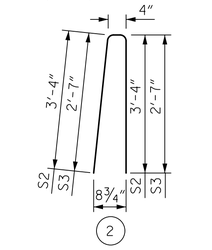
ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS



BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ S1	490	#5	1	4'-6 1/2"	2,321
✳ S2	482	#5	2	7'-0"	3,519
✳ S3	8	#5	2	5'-6"	46
✳ B1	44	#5	STR	21'-10"	1,002
✳ B2	88	#5	STR	22'-2"	2,035
✳ B3	88	#5	STR	27'-2"	2,493

✳ EPOXY COATED REINFORCING STEEL	LBS.	11,416
CLASS AA CONCRETE	CU. YDS.	66.5
CONCRETE BARRIER RAIL	LIN. FT.	488.70

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

CONCRETE BARRIER RAIL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY T. THOMPSON DATE 11/18
CHECKED BY C. SUTARIA DATE 12/18
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 30

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-30
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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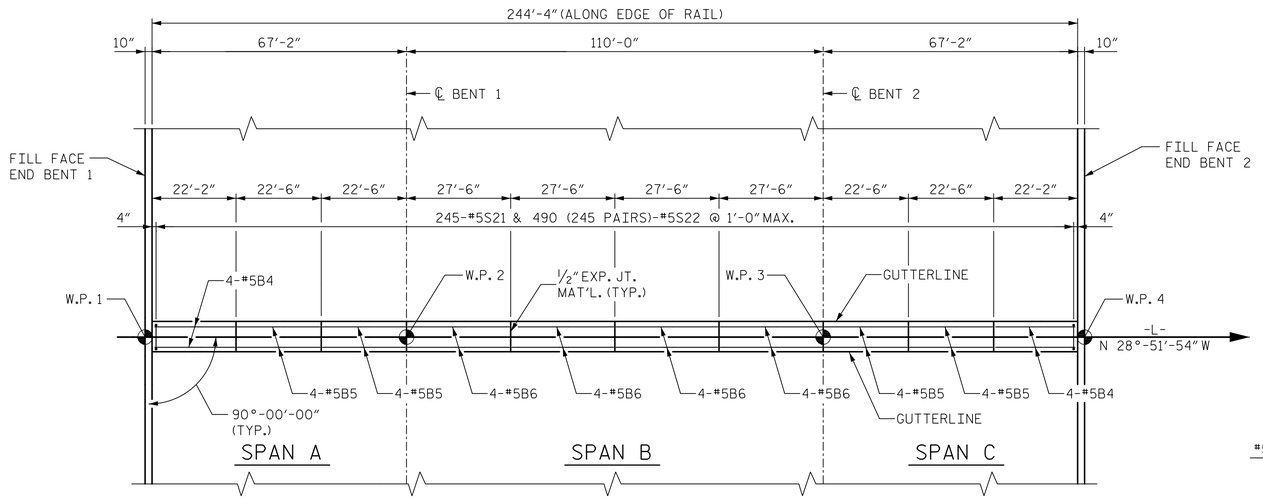


PLAN OF MEDIAN BARRIER RAIL

NOTE: EDGE OF SLAB NOT SHOWN FOR CLARITY.

NOTES

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

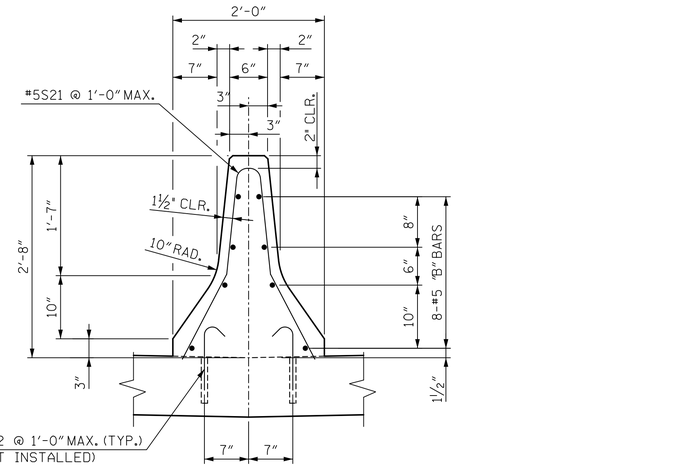
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5S22 BARS SHALL BE POST-INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, DURING THE PRESCRIBED CONSTRUCTION STAGE. THE YIELD LOAD FOR THE #5S22 BARS IS 18.6 KIPS. TYPICAL EMBEDMENT OF #5S22 BARS IS 5". THIS LENGTH SHALL BE ADJUSTED IN ORDER TO ACHIEVE FULL YIELD OF THE BAR BASED ON THE ADHESIVE SYSTEM USED. LEVEL TWO FIELD TESTING IS REQUIRED FOR THE ADHESIVE BONDING SYSTEM.

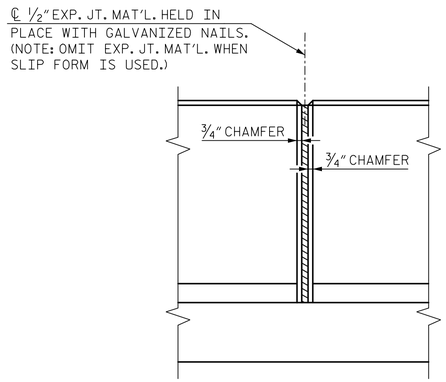
GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS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

THE #5S21 BARS MAT BE SHIFTED SLIGHTLY AS REQUIRED TO PROVIDE 2" MINIMUM CONCRETE COVER AT THE 1/2" EXPANSION JOINTS IN THE BARRIER RAIL.

BAR LIST AND QUANTITIES SHOWN ON THIS SHEET DO NOT INCLUDE MEDIAN BARRIERS ON APPROACH SLABS. FOR MEDIAN BARRIERS ON APPROACH SLABS, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET.



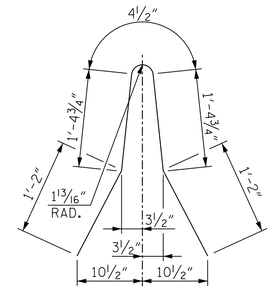
SECTION THRU CONCRETE MEDIAN BARRIER



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

BAR TYPES



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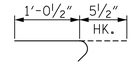

4

ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ S21	245	#5	3	5'-6"	1,405
✳ S22	490	#5	4	1'-6"	767
✳ B4	16	#5	STR	21'-10"	364
✳ B5	32	#5	STR	22'-2"	740
✳ B6	32	#5	STR	27'-2"	907

✳ EPOXY COATED REINFORCING STEEL	LBS.	4,183
CLASS AA CONCRETE	CU. YDS.	25.0
CONCRETE BARRIER RAIL	LIN. FT.	244.30

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE MEDIAN BARRIER

Digitally signed by: Richard R. Greenfield

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

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

DRAWN BY A. WAGNER DATE 2/19
CHECKED BY L. DICKENS DATE 2/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 31

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-31
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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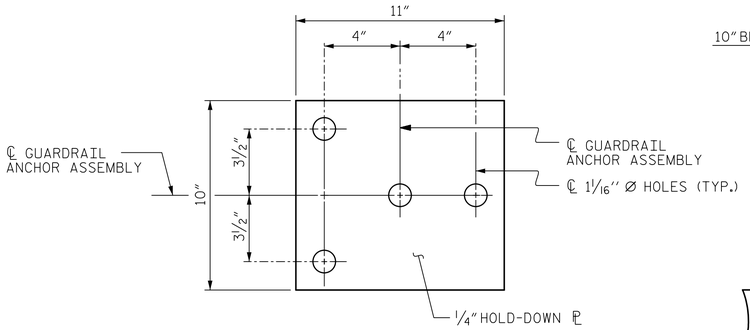
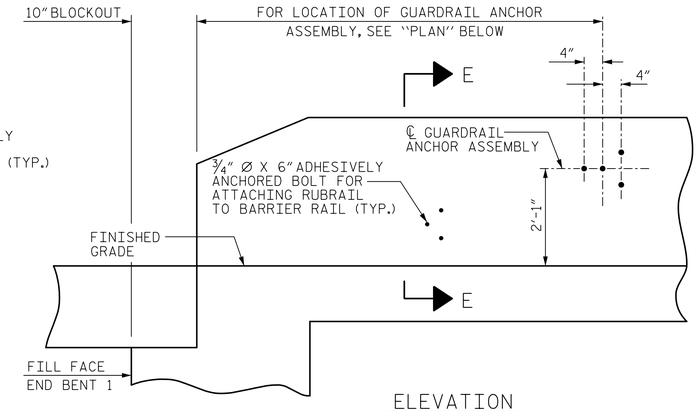
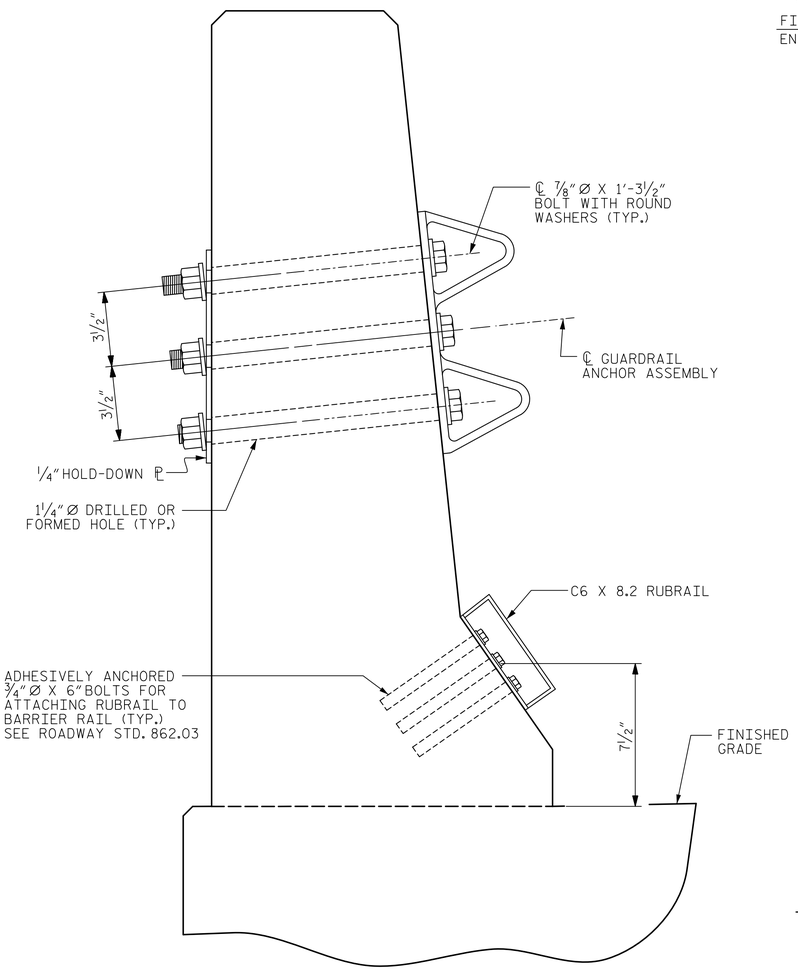


PLAN



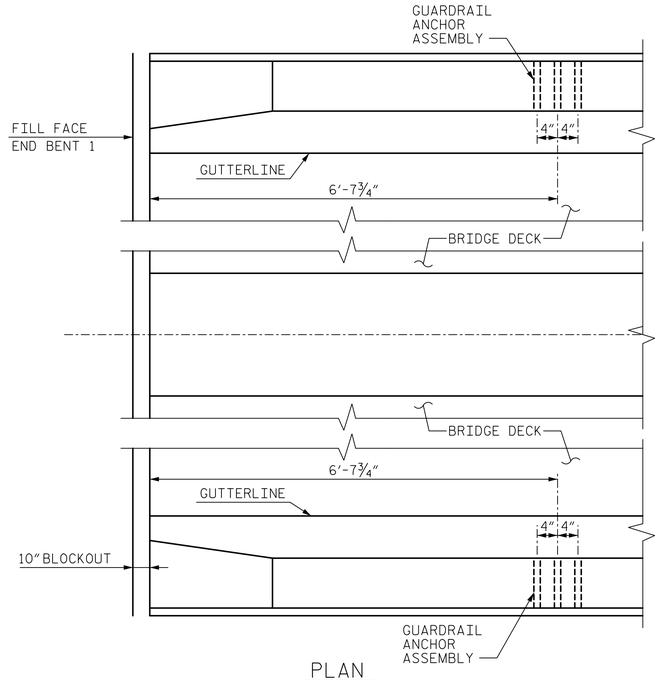
ELEVATION

(END BENT 1 SHOWN, END BENT 2 SIMILAR)



SECTION E-E

GUARDRAIL ANCHOR ASSEMBLY DETAILS



PLAN

END BENT 1 SHOWN, END BENT 2 SIMILAR

LOCATION OF ANCHORS FOR GUARDRAIL

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.)

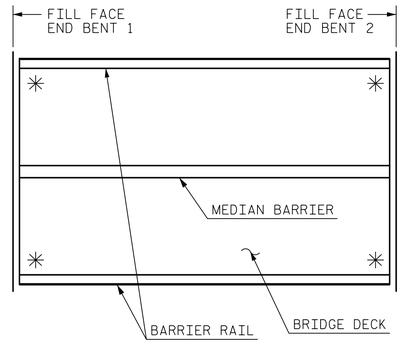
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF BARRIER RAIL. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.



SKETCH SHOWING POINTS OF ATTACHMENTS

✳ DENOTES GUARDRAIL ANCHOR ASSEMBLY (4 REQUIRED)

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

Digitally signed by: Richard R. Greenfield

NORTH CAROLINA PROFESSIONAL SEAL 47718 ENGINEER RICHARD R. GREENFIELD 5/1/2019

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CHECKED BY C. SUTARIA DATE 12/18
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 32

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE FOR BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-32
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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REINFORCING BAR SCHEDULE

EPOXY COATED-STAGE 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A1	419	5	STR.	30′-8″	13,402
A2	838	5	STR.	3′-10″	3,350
B1	88	4	STR.	23′-5″	1,377
B2	88	6	STR.	33′-6″	4,428
B3	44	4	STR.	20′-10″	612
B4	80	6	STR.	13′-9″	1,652
B5	80	6	STR.	29′-0″	3,485
K1	24	4	STR.	18′-7″	298
K5	16	4	STR.	3′-0″	32
S1	36	4	1	11′-11″	287
S2	36	4	1	10′-6″	253
U2	36	4	2	14′-10″	357
EPOXY COATED REINFORCING STEEL TOTAL:					29,533

REINFORCING BAR SCHEDULE

EPOXY COATED-STAGE 2

BAR	NO.	SIZE	TYPE		WEIGHT (LBS.)
A2	419	5	STR.	3′-10″	1,675
A3	419	5	STR.	56′-10″	24,837
A102	141	5	STR.	3′-10″	564
B1	168	4	STR.	23′-5″	2,628
B2	168	6	STR.	33′-6″	8,453
B3	84	4	STR.	20′-10″	1,169
B4	150	6	STR.	13′-9″	3,098
B5	150	6	STR.	29′-0″	6,534
B104	15	5	STR.	50′-9″	794
S1	70	4	1	11′-11″	557
S2	70	4	1	10′-6″	491
U2	70	4	2	14′-10″	694
EPOXY COATED REINFORCING STEEL TOTAL:					51,494

REINFORCING BAR SCHEDULE

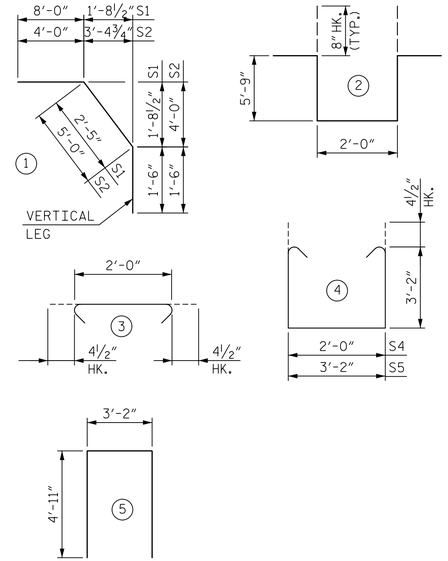
EPOXY COATED-STAGE 3

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A2	419	5	STR.	3′-10″	1,675
A3	419	5	STR.	56′-10″	24,837
A102	141	5	STR.	3′-10″	564
B1	168	4	STR.	23′-5″	2,628
B2	168	6	STR.	33′-6″	8,453
B3	84	4	STR.	20′-10″	1,169
B4	150	6	STR.	13′-9″	3,098
B5	150	6	STR.	29′-0″	6,534
B104	15	5	STR.	50′-9″	794
S1	70	4	1	11′-11″	557
S2	70	4	1	10′-6″	491
U2	70	4	2	14′-10″	694
EPOXY COATED REINFORCING STEEL TOTAL:					51,494

SILANE DECK TREATMENT

	DIAMOND GRINDING (SQ. YD.)	SILANE DECK TREATMENT (SQ. YD.)
STAGE 1		
APPROACH SLABS	172	161
BRIDGE DECK	842	788
TOTAL	1,014	949
STAGE 2		
APPROACH SLABS	319	319
BRIDGE DECK	1,507	1,507
TOTAL	1,826	1,826
STAGE 3		
APPROACH SLABS	319	319
BRIDGE DECK	1,507	1,507
TOTAL	1,826	1,826
STAGE 5		
APPROACH SLABS	——	——
BRIDGE DECK	109	109
TOTAL	109	109
TOTAL		
APPROACH SLABS	810	799
BRIDGE DECK	3,965	3,911
TOTAL	4,775	4,710

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

REINFORCING BAR SCHEDULE

UNCOATED-STAGE 1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A101	419	5	STR.	30′-8″	13,402
B101	120	5	STR.	50′-5″	6,310
B102	42	4	STR.	13′-9″	386
B103	42	4	STR.	29′-0″	814
K2	24	4	STR.	8′-1″	130
K3	6	4	STR.	6′-6″	26
K4	6	4	STR.	5′-1″	20
K6	12	4	STR.	26′-8″	214
K7	48	4	STR.	8′-1″	259
K8	12	4	STR.	5′-4″	43
K9	12	4	STR.	5′-1″	41
S3	204	4	3	2′-9″	375
S4	12	4	4	9′-1″	73
S5	8	4	4	10′-3″	55
U1	36	4	5	13′-0″	313
UNCOATED REINFORCING STEEL TOTAL:					22,461

REINFORCING BAR SCHEDULE

UNCOATED-STAGE 2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A103	419	5	STR.	56′-10″	24,837
B101	240	5	STR.	50′-5″	12,620
B102	84	4	STR.	13′-9″	772
B103	84	4	STR.	29′-0″	1,627
K5	8	4	STR.	3′-4″	18
K10	36	4	STR.	21′-3″	511
K11	40	4	STR.	9′-4″	249
K12	10	4	STR.	7′-9″	52
K13	10	4	STR.	6′-4″	42
K14	8	4	STR.	3′-3″	17
K15	2	4	STR.	2′-5″	3
K16	2	4	STR.	1′-9″	2
K18	24	4	STR.	26′-6″	425
K19	80	4	STR.	9′-4″	499
K20	20	4	STR.	6′-7″	88
K21	20	4	STR.	6′-4″	85
S3	390	4	3	2′-9″	716
S4	20	4	4	9′-1″	121
U1	82	4	5	13′-0″	712
UNCOATED REINFORCING STEEL TOTAL:					43,396

REINFORCING BAR SCHEDULE

UNCOATED-STAGE 3

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT (LBS.)
A103	419	5	STR.	56′-10″	24,837
B101	240	5	STR.	50′-5″	12,620
B102	84	4	STR.	13′-9″	772
B103	84	4	STR.	29′-0″	1,627
K5	8	4	STR.	3′-4″	18
K10	36	4	STR.	21′-3″	511
K11	40	4	STR.	9′-4″	249
K12	10	4	STR.	7′-9″	52
K13	10	4	STR.	6′-4″	42
K14	8	4	STR.	3′-3″	17
K15	2	4	STR.	2′-5″	3
K16	2	4	STR.	1′-9″	2
K18	24	4	STR.	26′-6″	425
K19	80	4	STR.	9′-4″	499
K20	20	4	STR.	6′-7″	88
K21	20	4	STR.	6′-4″	85
S3	390	4	3	2′-9″	716
S4	20	4	4	9′-1″	121
U1	82	4	5	13′-0″	712
UNCOATED REINFORCING STEEL TOTAL:					43,396

SUPERSTRUCTURE BILL OF MATERIAL — STAGE 3

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	102.0	43,396	51,494
POUR 2	213.7		
POUR 3	157.0		
POUR 4	95.7		
TOTALS**	568.4	43,396	51,494

SUPERSTRUCTURE BILL OF MATERIAL — STAGE 5

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
	26.6	***	***
TOTALS**	26.6	***	***

** QUANTITES FOR BARRIER RAIL ARE NOT INCLUDED.

*** QUANTITY INCLUDED IN STAGES 2 AND 3.

SUPERSTRUCTURE BILL OF MATERIAL — STAGE 1

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	56.7	22,461	29,533
POUR 2	117.6		
POUR 3	86.3		
POUR 4	49.8		
TOTALS**	310.4	22,461	29,533

SUPERSTRUCTURE BILL OF MATERIAL — STAGE 2

	CLASS AA CONCRETE (CU. YDS.)	REINFORCING STEEL (LBS.)	EPOXY COATED REINFORCING STEEL (LBS.)
POUR 1	102.0	43,396	51,494
POUR 2	213.7		
POUR 3	157.0		
POUR 4	95.7		
TOTALS**	568.4	43,396	51,494

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

Digitally signed by: Richard R. Greenfield

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

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DRAWN BY C. TOMPKINS DATE 12/18
CHECKED BY L. DICKENS DATE 2/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 33

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-33
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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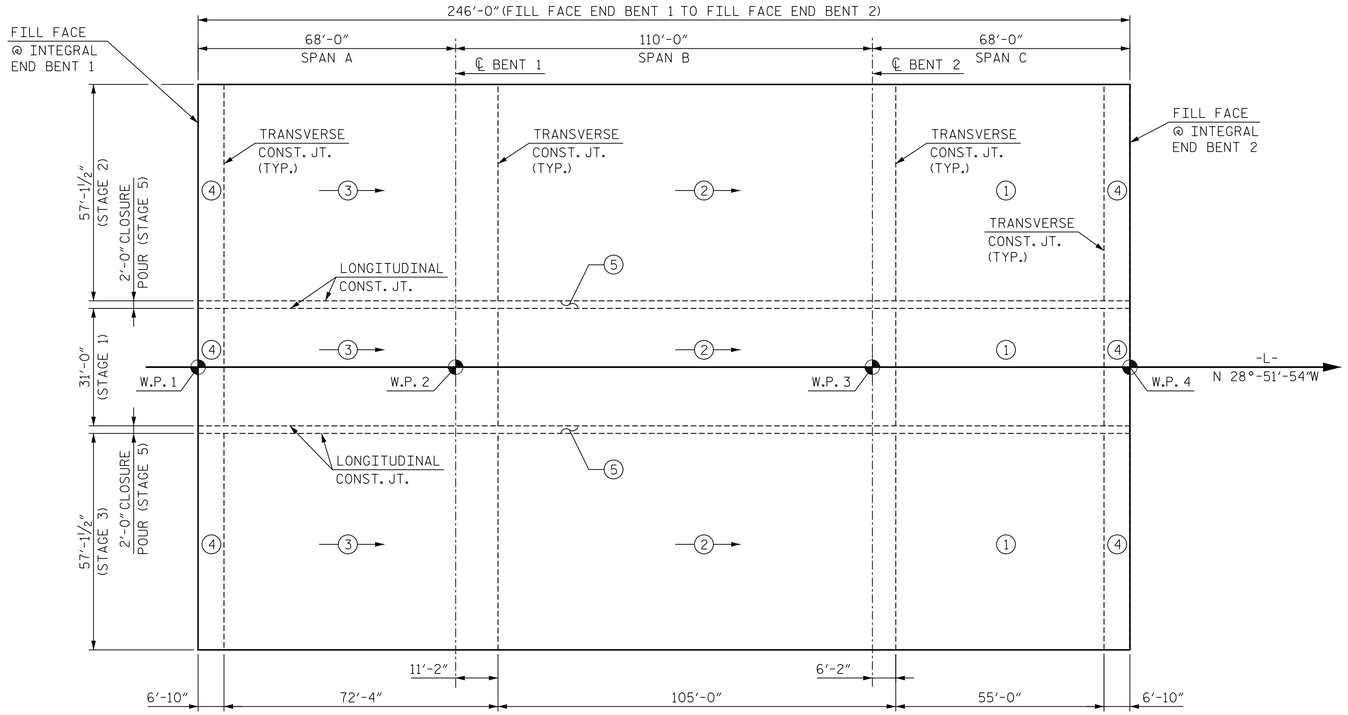
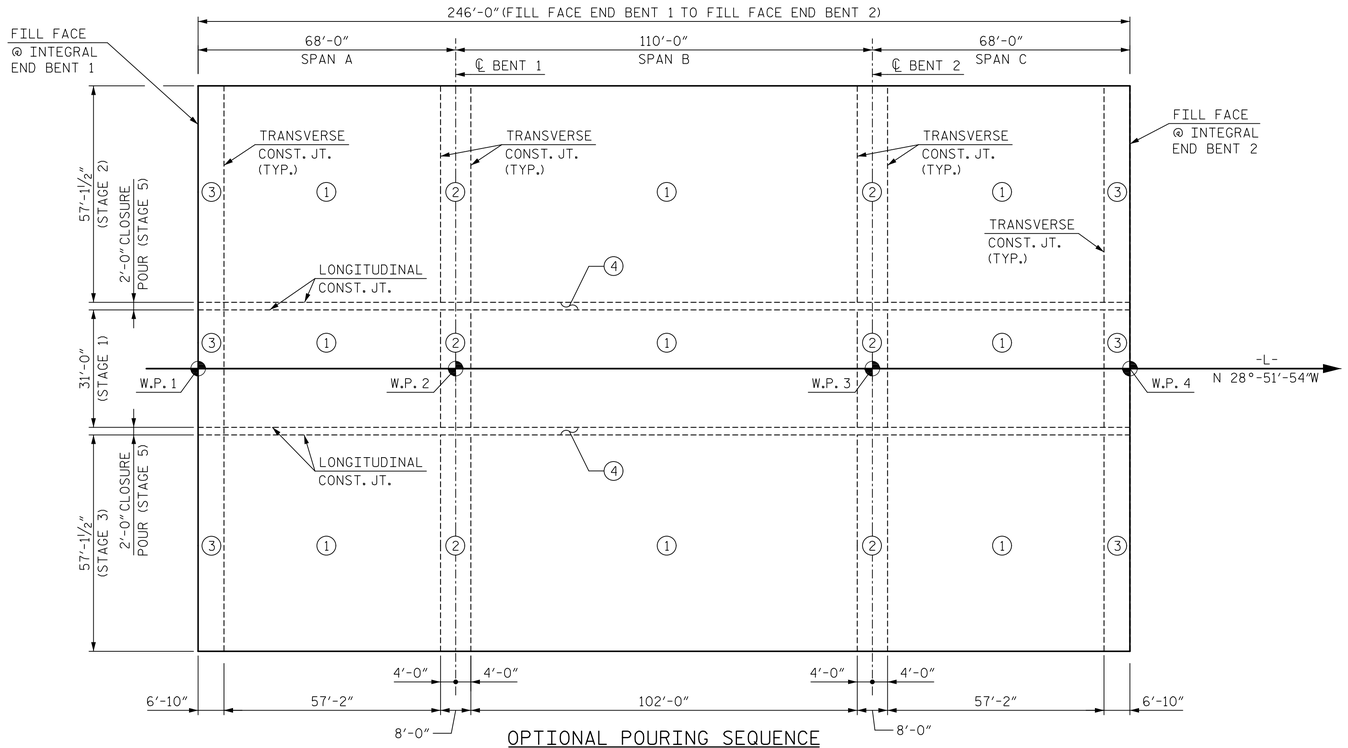


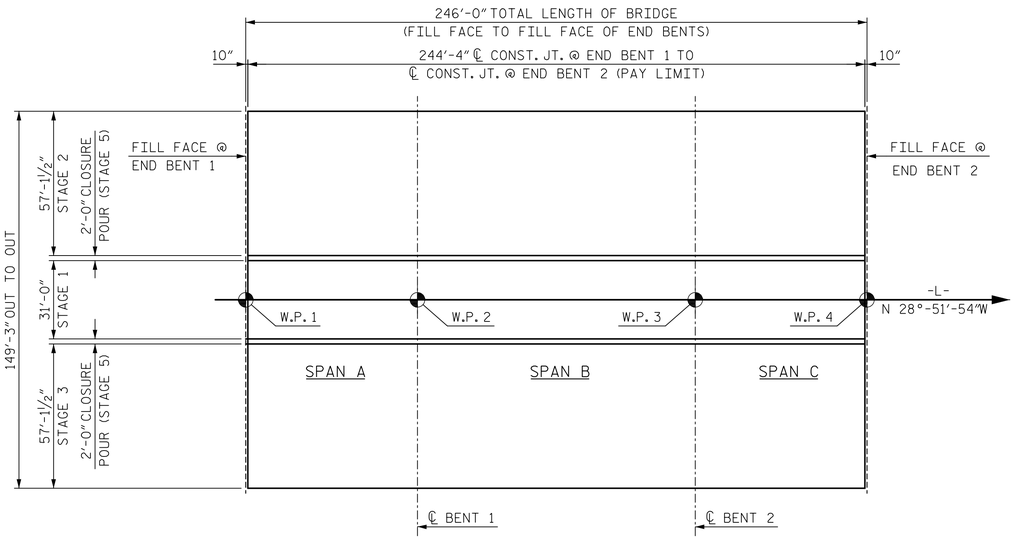
POURING SEQUENCE

(#) DENOTES POUR NUMBER AND DIRECTION



OPTIONAL POURING SEQUENCE

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



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 36,467)

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

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL AND POURING SEQUENCE

Digitally signed by: Richard R. Greenfield
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

HNTB NORTH CAROLINA, P.C.
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DRAWN BY C. TOMPKINS DATE 12/18
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REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-34
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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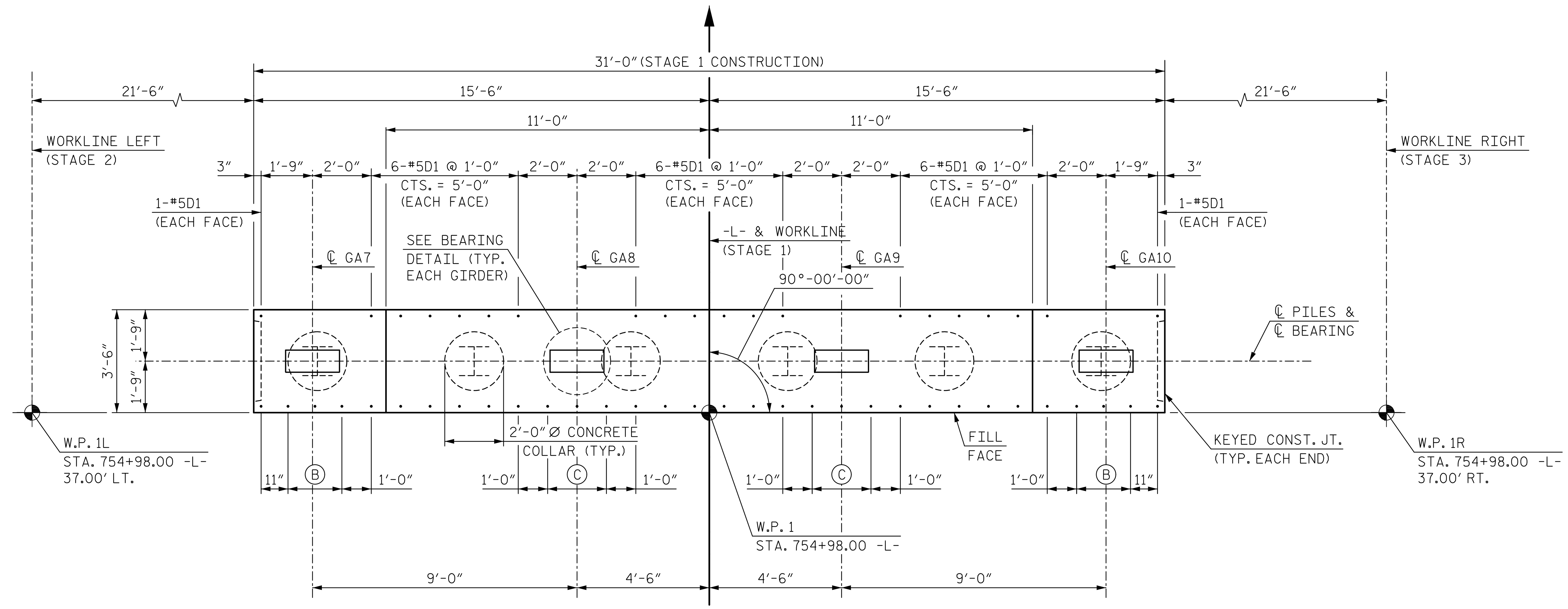
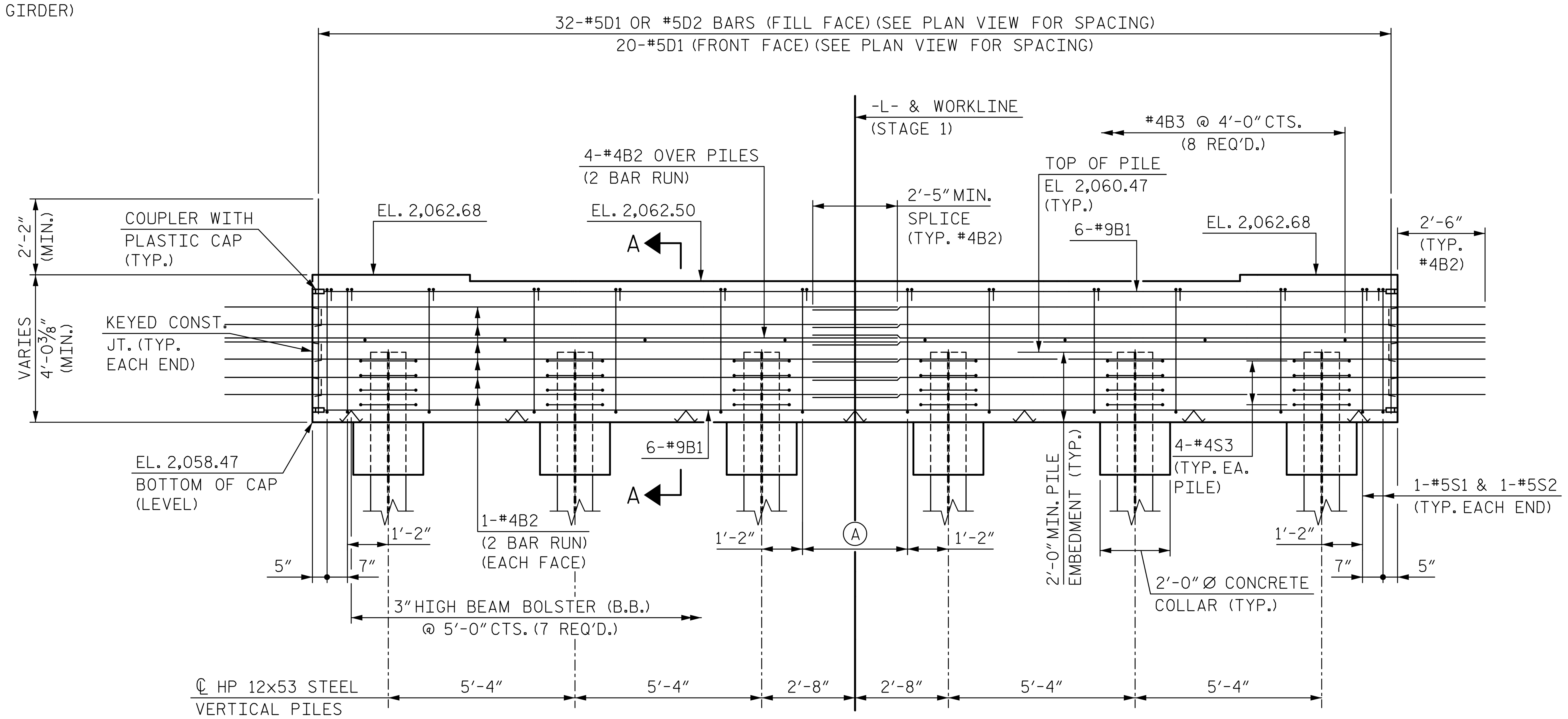


Ⓐ 4-#5S1 & 4-#5S2 @ 1'-0" CTS. = 3'-0" (TYP. EACH BAY)

Ⓑ 3-#5D2 @ 11" CTS. = 1'-10" (BEHIND GIRDER)

Ⓒ 3-#5D2 @ 1'-0" CTS. = 2'-0" (BEHIND GIRDER)

PLAN



ELEVATION

NOTES:

FOR BEARING DETAIL, SEE SHEET 4 OF 6.

FOR KEYED CONSTRUCTION JOINT DETAILS, SEE SHEET 4 OF 6.

FOR SECTION A-A, SEE SHEET 4 OF 6.

FOR PILE SPLICE DETAILS, SEE SHEET 6 OF 6.

FOR ADDITIONAL NOTES, SEE SHEET 5 OF 6.

PROJECT NO. I-4400C

HENDERSON COUNTY

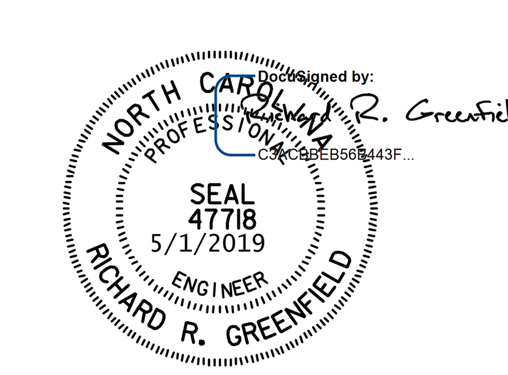
STATION: STA. 756+21.00 -L-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
STAGE 1



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

DRAWN BY	C. TOMPKINS	DATE	2/19
CHECKED BY	A. WAGNER	DATE	2/19
DESIGN ENGINEER OF RECORD	R. GREENFIELD	DATE	4/19

DWG. NO. 35

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REVISIONS

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

SHEET NO. S4-35

TOTAL SHEETS 60

4/30/2019
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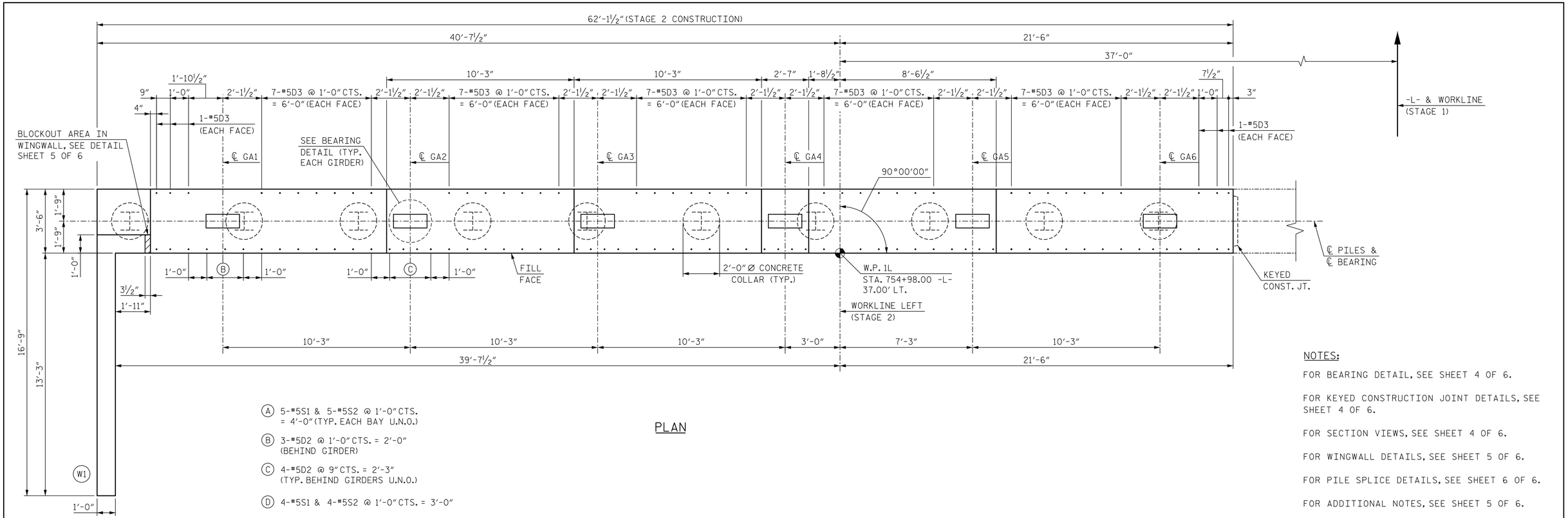


(A) 5-#5S1 & 5-#5S2 @ 1'-0" CTS. = 4'-0" (TYP. EACH BAY U.N.O.)

(B) 3-#5D2 @ 1'-0" CTS. = 2'-0" (BEHIND GIRDER)

(C) 4-#5D2 @ 9" CTS. = 2'-3" (TYP. BEHIND GIRDERS U.N.O.)

(D) 4-#5S1 & 4-#5S2 @ 1'-0" CTS. = 3'-0"

PLAN

NOTES:

FOR BEARING DETAIL, SEE SHEET 4 OF 6.

FOR KEYED CONSTRUCTION JOINT DETAILS, SEE SHEET 4 OF 6.

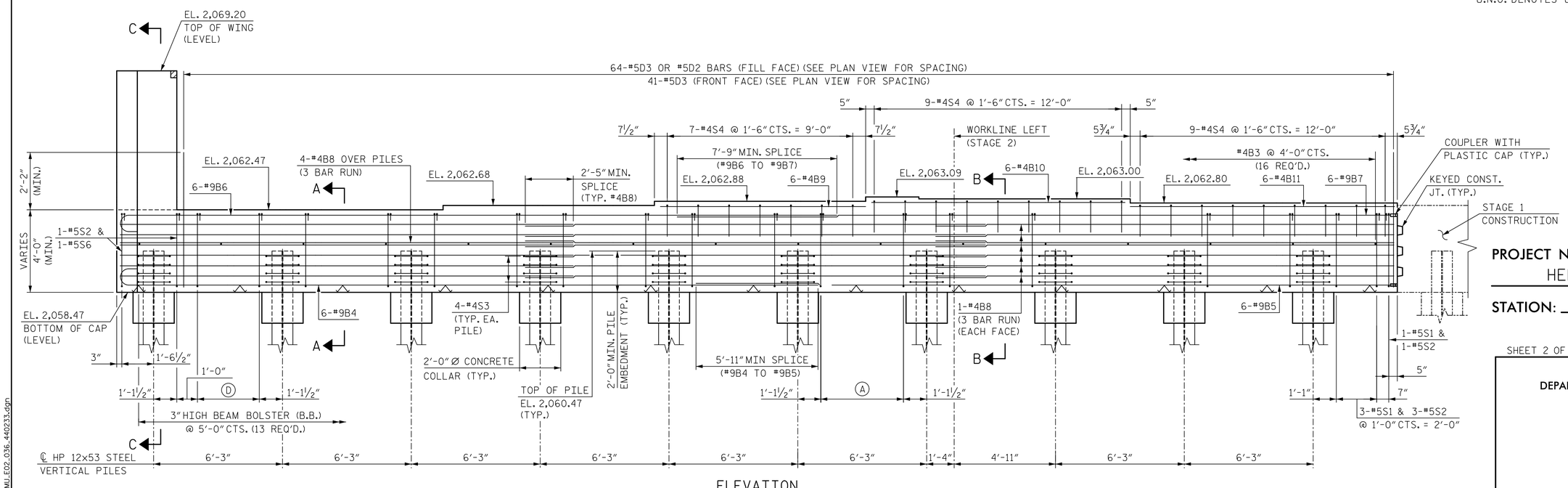
FOR SECTION VIEWS, SEE SHEET 4 OF 6.

FOR WINGWALL DETAILS, SEE SHEET 5 OF 6.

FOR PILE SPLICE DETAILS, SEE SHEET 6 OF 6.

FOR ADDITIONAL NOTES, SEE SHEET 5 OF 6.

U.N.O. DENOTES UNLESS NOTED OTHERWISE.



ELEVATION

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DRAWN BY C. TOMPKINS DATE 2/19
CHECKED BY A. WAGNER DATE 2/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 36

Digitally signed by R. Greenfield
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
STAGE 2

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-36
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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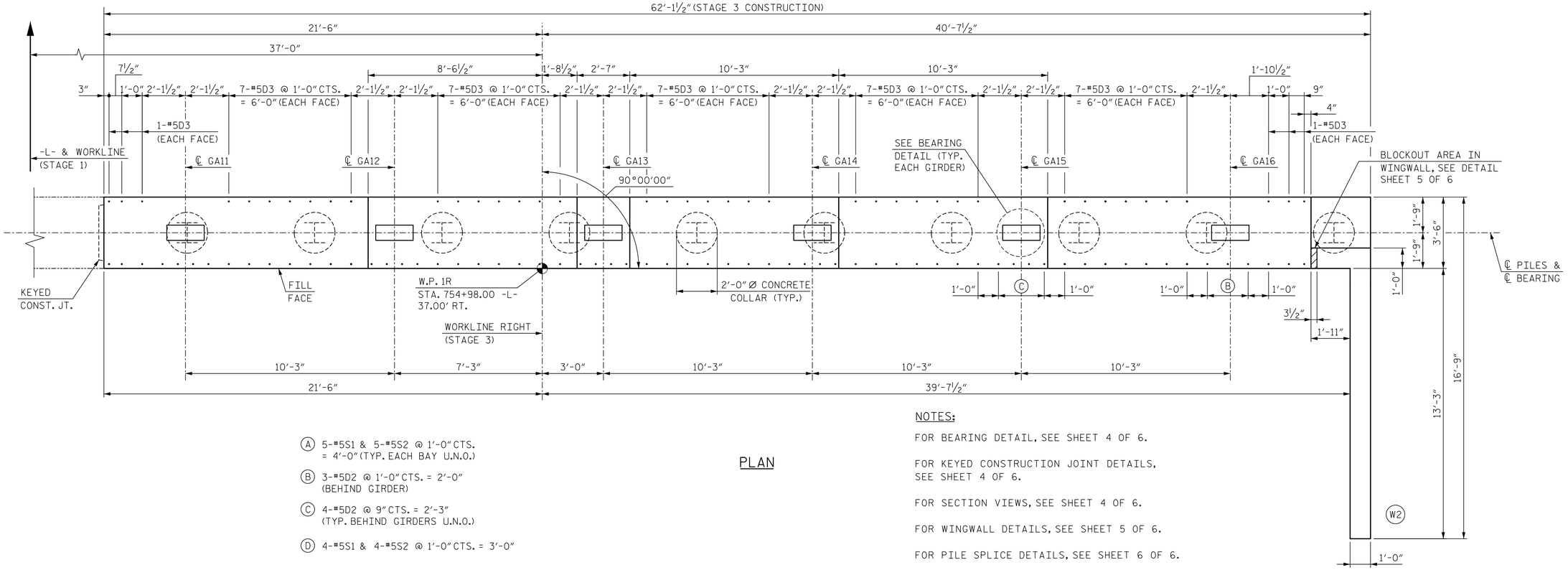


Ⓐ 5-#5S1 & 5-#5S2 @ 1'-0" CTS. = 4'-0" (TYP. EACH BAY U.N.O.)

Ⓑ 3-#5D2 @ 1'-0" CTS. = 2'-0" (BEHIND GIRDER)

Ⓒ 4-#5D2 @ 9" CTS. = 2'-3" (TYP. BEHIND GIRDERS U.N.O.)

Ⓓ 4-#5S1 & 4-#5S2 @ 1'-0" CTS. = 3'-0"

PLAN

NOTES:

FOR BEARING DETAIL, SEE SHEET 4 OF 6.

FOR KEYED CONSTRUCTION JOINT DETAILS, SEE SHEET 4 OF 6.

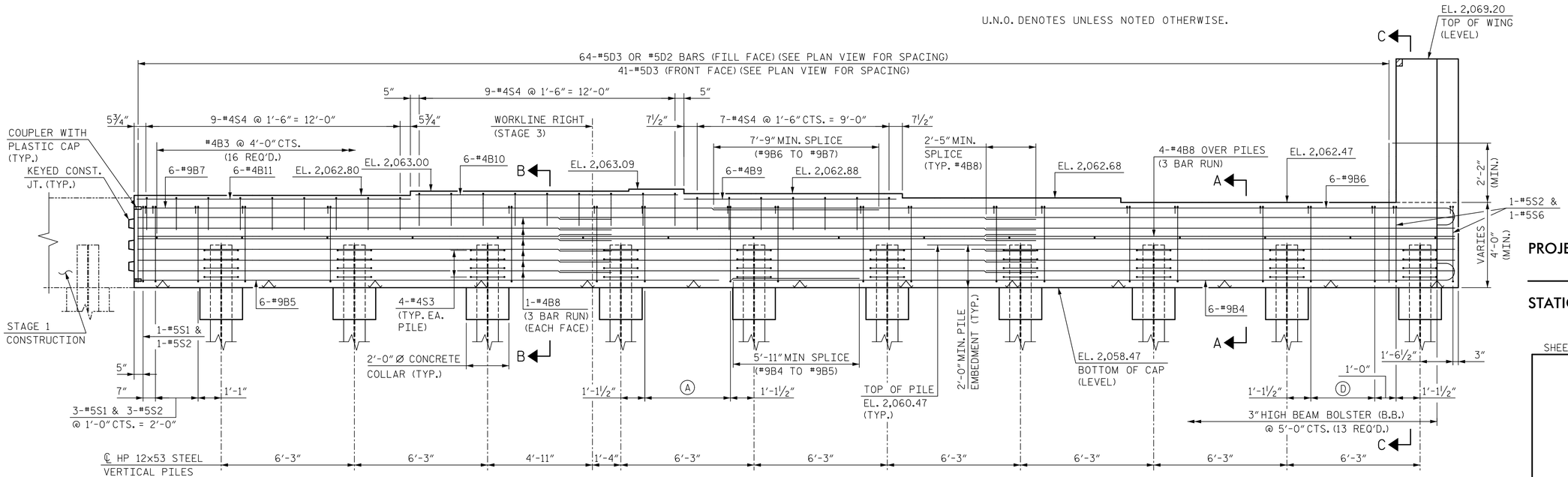
FOR SECTION VIEWS, SEE SHEET 4 OF 6.

FOR WINGWALL DETAILS, SEE SHEET 5 OF 6.

FOR PILE SPLICE DETAILS, SEE SHEET 6 OF 6.

FOR ADDITIONAL NOTES, SEE SHEET 5 OF 6.

U.N.O. DENOTES UNLESS NOTED OTHERWISE.



ELEVATION

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DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 37

Digitally signed by: Richard R. Greenfield
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 RICHARD R. GREENFIELD

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
STAGE 3

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-37
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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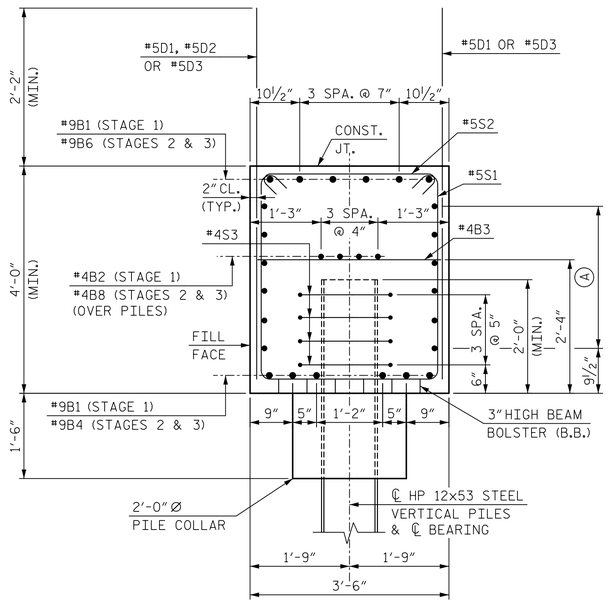
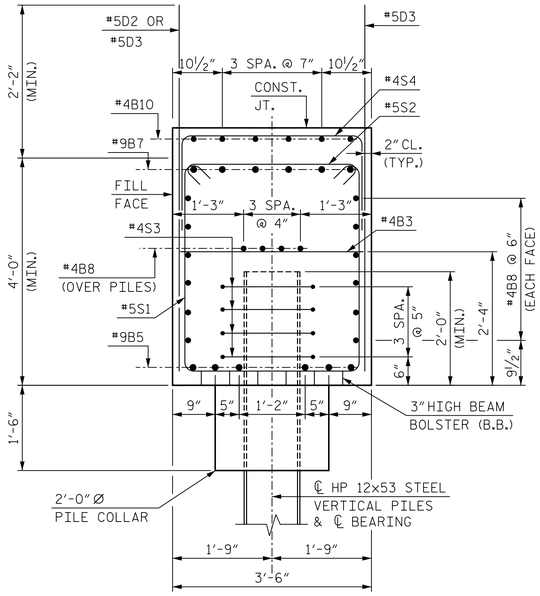
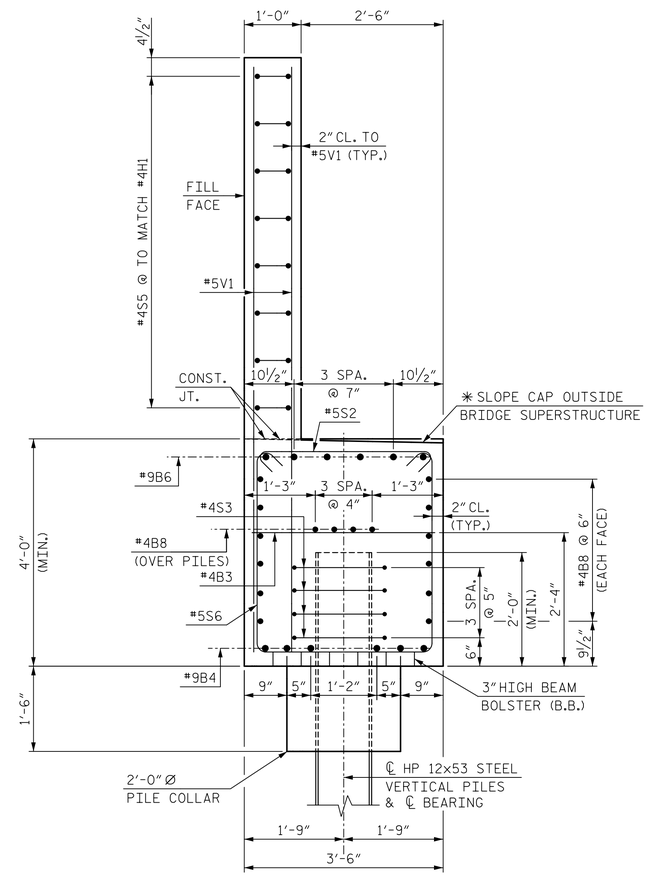


SECTION A-A

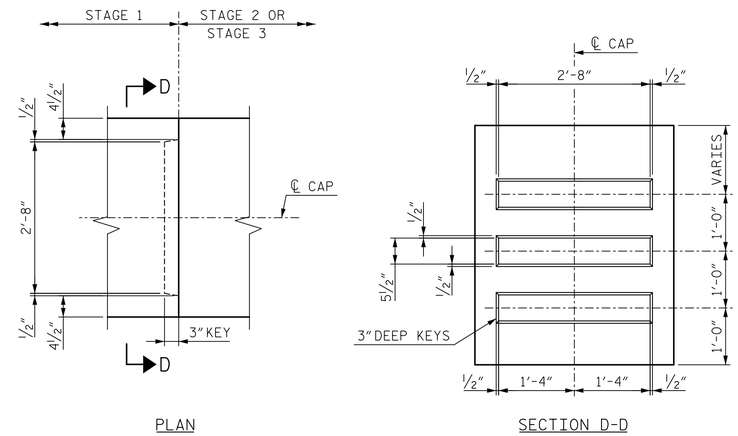


SECTION B-B

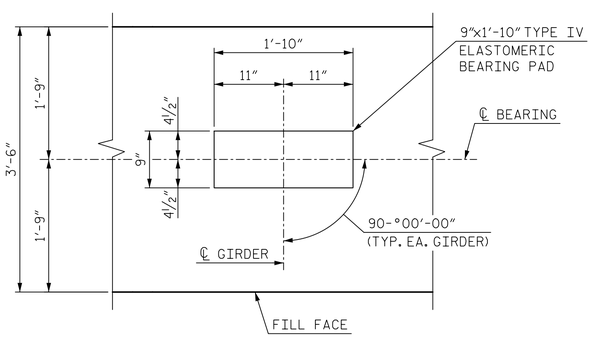


SECTION C-C

Ⓐ #4B2 @ 6"(STAGE 1)
#4B8 @ 6"(STAGES 2 & 3)
(EACH FACE)



KEYED CONSTRUCTION JOINT DETAILS



BEARING DETAIL

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 RICHARD R. GREENFIELD

Signed by: Richard R. Greenfield

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DESIGN ENGINEER OF RECORD	R. GREENFIELD	DATE	4/19

DWG. NO. 38

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-38
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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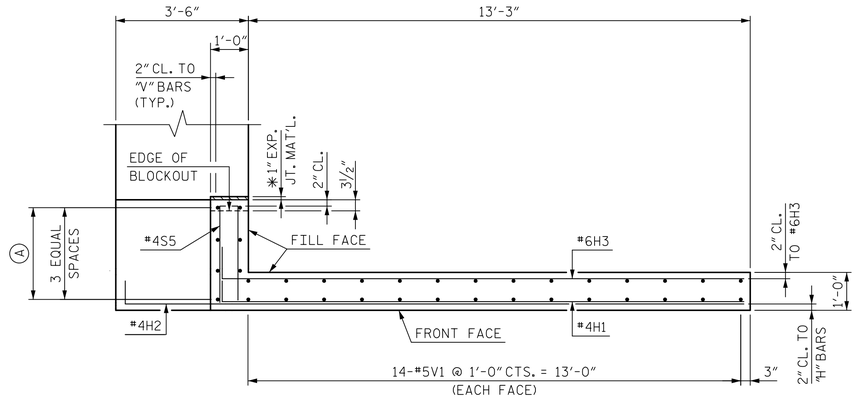
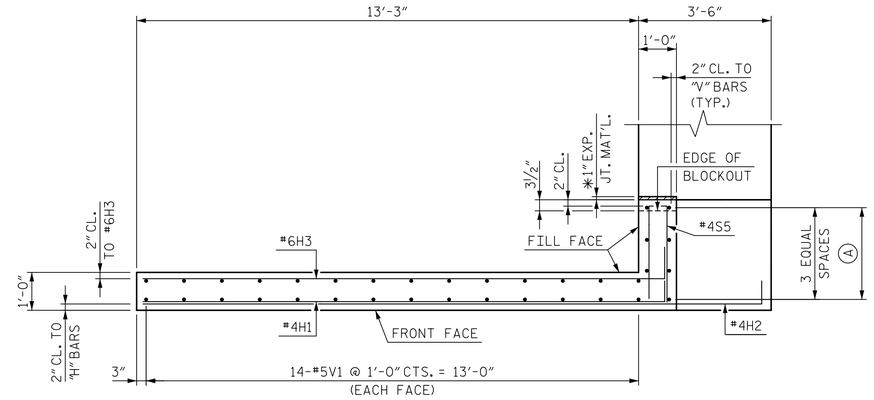


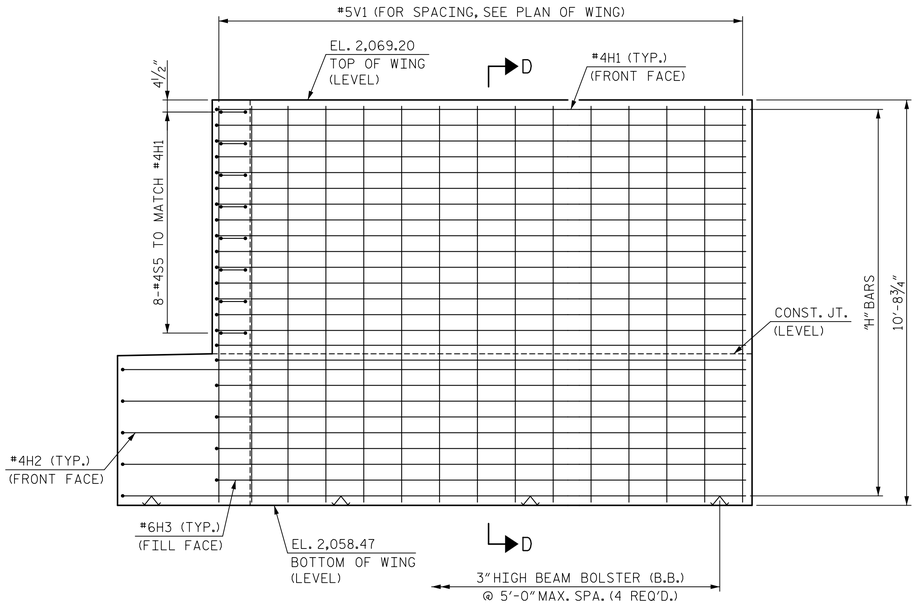
PLAN OF WING (W1)

✱1″EXP. JT. MAT'L BETWEEN END BENT DIAPHRAGM AND WING

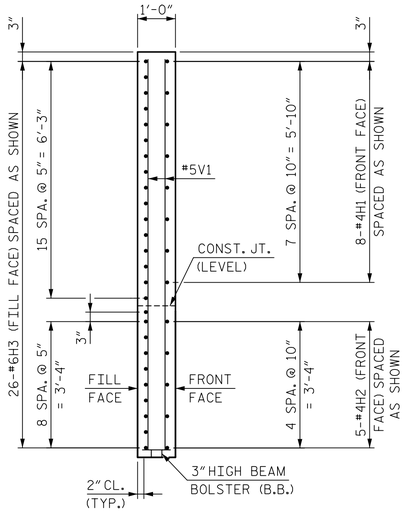
Ⓐ 7-#5V1 (4 FRONT FACE)
(3 FILL FACE)
SPACED AS SHOWN



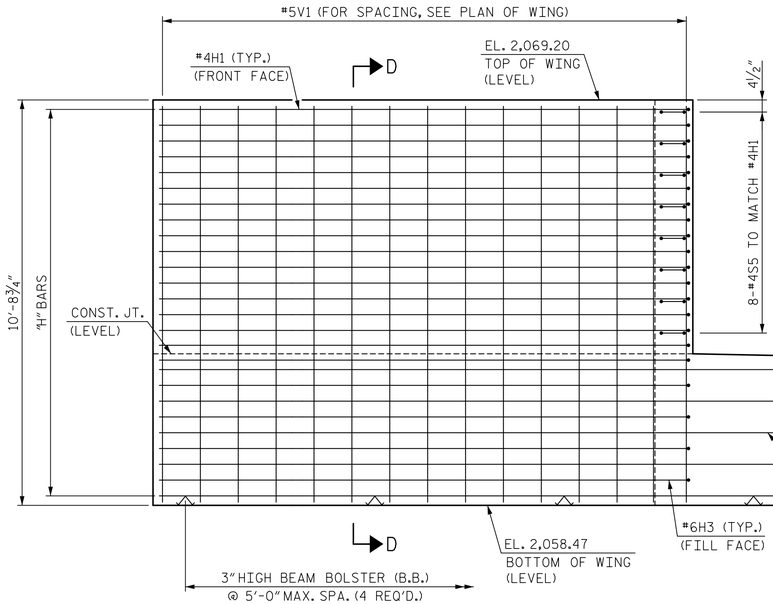
PLAN OF WING (W2)



ELEVATION OF WING (W1)
(STAGE 2 CONSTRUCTION)



SECTION D-D

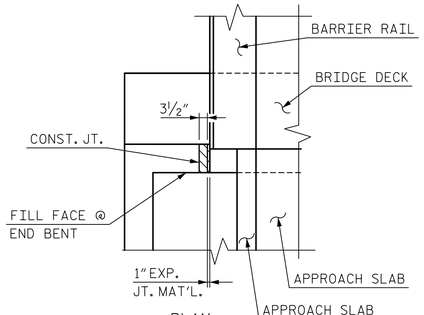


ELEVATION OF WING (W2)
(STAGE 3 CONSTRUCTION)

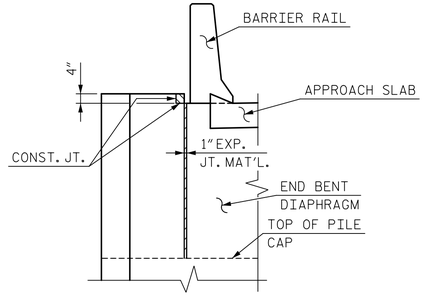
NOTES:

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

THE END BENT DIAPHRAGM SHALL BE POURED MONOLITHICALLY WITH THE SUPERSTRUCTURE. CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED IN THE SUPERSTRUCTURE BILL OF MATERIAL. FOR DETAILS, SEE SUPERSTRUCTURE SHEETS.



PLAN



ELEVATION

BLOCKOUT IN WINGWALL

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

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PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 6/14/2019 ENGINEER RICHARD R. GREENFIELD
Digitally signed by: Richard R. Greenfield

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

DRAWN BY C. TOMPKINS DATE 2/19
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DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 39

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-39
1			3			TOTAL SHEETS
2			4			60

6/14/2019
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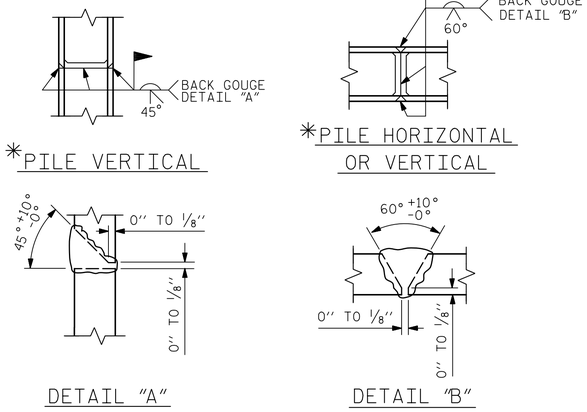
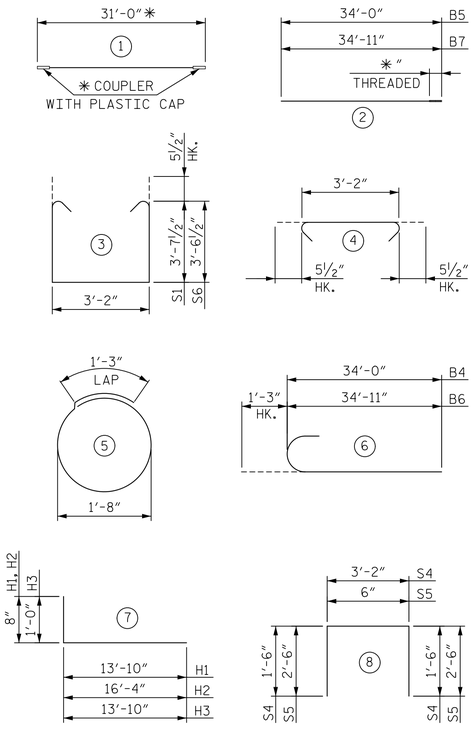


✳ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

UNCOATED

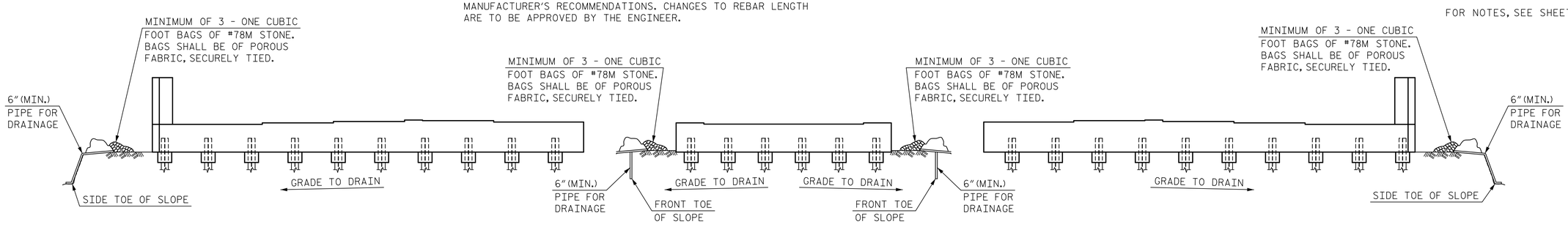
STAGE 1						STAGE 2						STAGE 3					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	9	1	31'-0"	1,265	B3	16	4	STR.	3'-2"	34	B3	16	4	STR.	3'-2"	34
B2	32	4	STR.	19'-3"	411	B4	6	9	6	35'-3"	719	B4	6	9	6	35'-3"	719
B3	8	4	STR.	3'-2"	17	B5	6	9	2	34'-0"	694	B5	6	9	2	34'-0"	694
						B6	6	9	6	36'-2'	738	B6	6	9	6	36'-2'	738
D1	40	5	STR.	6'-2"	257	B7	6	9	2	34'-11"	712	B7	6	9	2	34'-11"	712
D2	12	5	STR.	9'-2"	115	B8	48	4	STR.	22'-4"	716	B8	48	4	STR.	22'-4"	716
						B9	6	4	STR.	10'-1"	40	B9	6	4	STR.	10'-1"	40
S1	24	5	3	11'-4"	284	B10	6	4	STR.	12'-6"	50	B10	6	4	STR.	12'-6"	50
S2	24	5	4	4'-1"	102	B11	6	4	STR.	12'-10"	51	B11	6	4	STR.	12'-10"	51
S3	24	4	5	6'-6"	104												
						D2	23	5	STR.	9'-2"	220	D2	23	5	STR.	9'-2"	220
						D3	82	5	STR.	6'-6"	556	D3	82	5	STR.	6'-6"	556
						H1	8	4	7	14'-6"	77	H1	8	4	7	14'-6"	77
						H2	5	4	7	17'-0"	57	H2	5	4	7	17'-0"	57
						H3	26	6	7	14'-10"	579	H3	26	6	7	14'-10"	579
						S1	48	5	3	11'-4"	567	S1	48	5	3	11'-4"	567
						S2	50	5	4	4'-1"	213	S2	50	5	4	4'-1"	213
						S3	40	4	5	6'-6"	174	S3	40	4	5	6'-6"	174
						S4	25	4	8	6'-2"	103	S4	25	4	8	6'-2"	103
						S5	8	4	8	5'-6"	29	S5	8	4	8	5'-6"	29
						S6	2	5	3	11'-2"	23	S6	2	5	3	11'-2"	23
						V1	35	5	STR.	10'-3"	374	V1	35	5	STR.	10'-3"	374

QUANTITIES			QUANTITIES			QUANTITIES		
REINFORCING STEEL	LBS.	2,555	REINFORCING STEEL	LBS.	6,726	REINFORCING STEEL	LBS.	6,726
CLASS "A" CONCRETE BREAKDOWN			CLASS "A" CONCRETE BREAKDOWN			CLASS "A" CONCRETE BREAKDOWN		
CAP	CU. YDS.	17.5	POUR 1 - CAP & BOT. OF WINGS	CU. YDS.	38.2	POUR 1 - CAP & BOT. OF WINGS	CU. YDS.	38.2
			POUR 2 - TOP OF WINGS	CU. YDS.	4.0	POUR 2 - TOP OF WINGS	CU. YDS.	4.0
			TOTAL	CU. YDS.	42.2	TOTAL	CU. YDS.	42.2
HP 12x53 STEEL PILES	NO.	6	HP 12x53 STEEL PILES	NO.	10	HP 12x53 STEEL PILES	NO.	10
	LIN. FT.	120		LIN. FT.	250		LIN. FT.	200

✳ THE CONTRACTOR MAY MODIFY NOTED BAR DIMENSIONS AS NEEDED TO INSTALL MECHANICAL REBAR COUPLERS PER MANUFACTURER'S RECOMMENDATIONS. CHANGES TO REBAR LENGTH ARE TO BE APPROVED BY THE ENGINEER.

NOTE:

FOR NOTES, SEE SHEET 5 OF 6.



STAGE 2 CONSTRUCTION | STAGE 1 CONSTRUCTION | STAGE 3 CONSTRUCTION

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

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

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

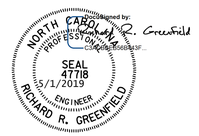
TEMPORARY DRAINAGE AT END BENT 1

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 6 OF 6



Digitally signed by: Richard R. Greenfield

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 DETAILS

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

DRAWN BY C. TOMPKINS DATE 2/19
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DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 40

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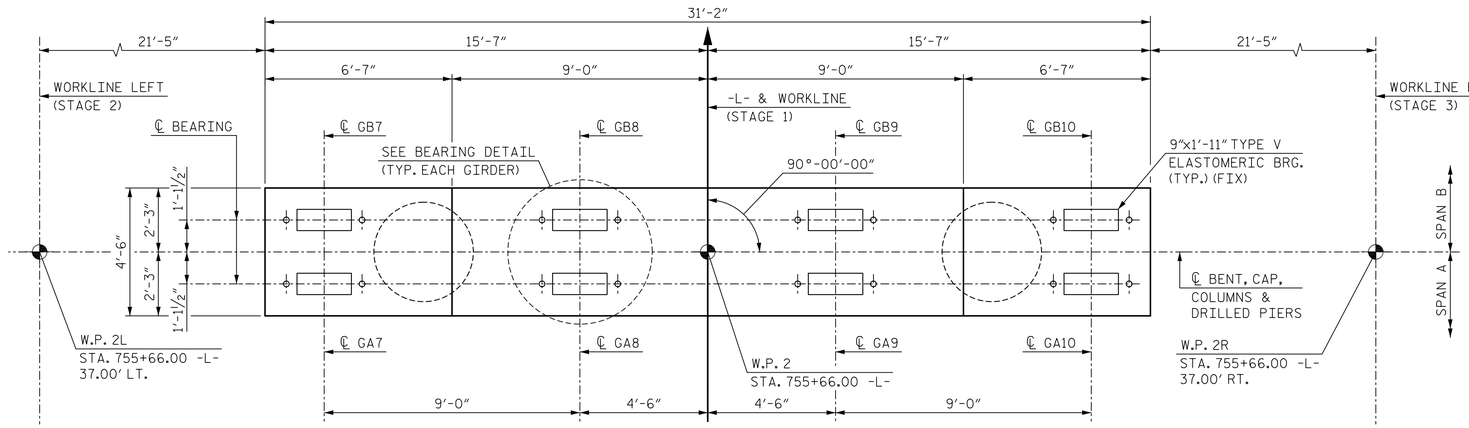
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-40
1			3			TOTAL SHEETS
2			4			60

4/30/2019
...\404_079_I4400C_SMU_E06_040_440233.dgn



PLAN

NOTES:

FOR NOTES, SEE SHEET 4 OF 5.

FOR DRILLED PIER PLAN, SEE SHEET 4 OF 5.

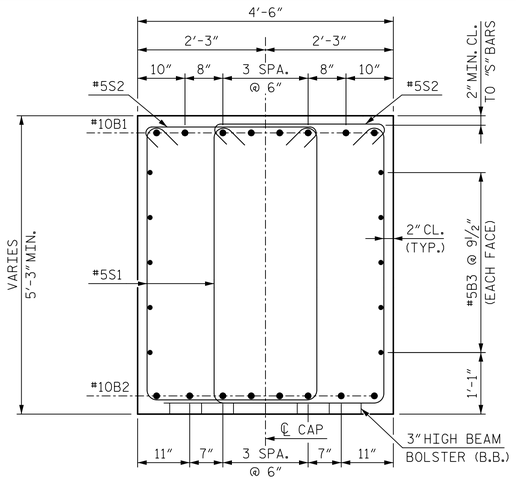
FOR DOWEL DETAIL, SEE SHEET 4 OF 5.

FOR SECTIONS C-C, D-D & E-E, SEE SHEET 5 OF 5.

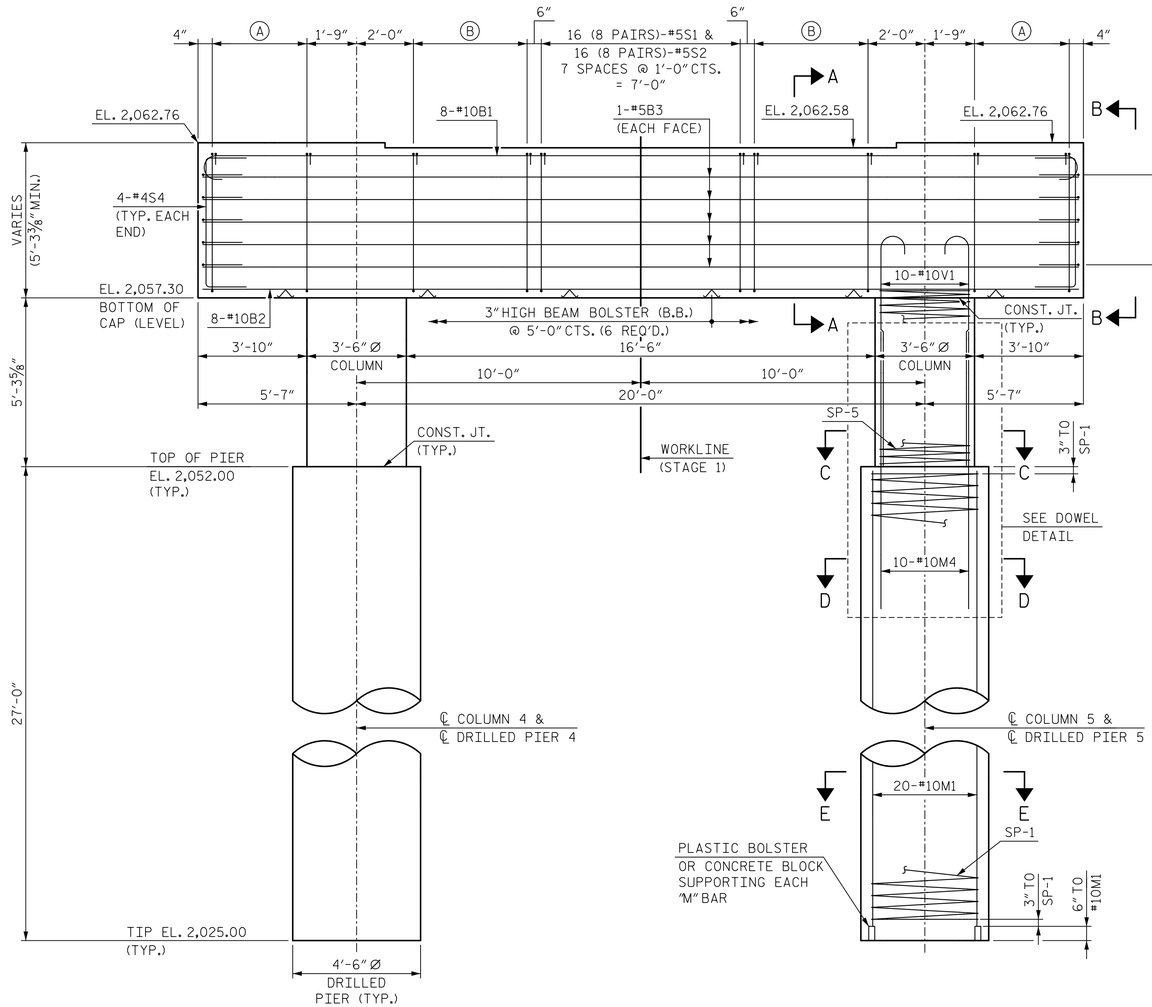
FOR BEARING DETAIL, SEE SHEET 5 OF 5.

Ⓐ 16 (8 PAIRS)-#5S1 & 16 (8 PAIRS)-#5S2 7 SPACES @ 6" CTS. = 3'-6"

Ⓑ 18 (9 PAIRS)-#5S1 & 18 (9 PAIRS)-#5S2 8 SPACES @ 6" CTS. = 4'-0"



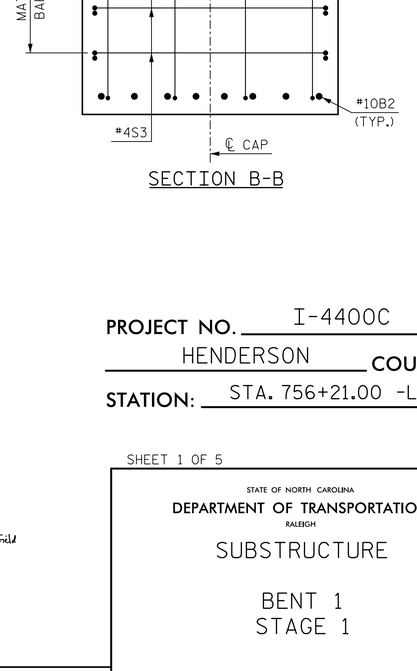
SECTION A-A



ELEVATION

(DRILLED PIER/COLUMN REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH DRILLED PIER/COLUMN.)

END VIEW



SECTION B-B

Documents prepared by: Richard R. Greenfield

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

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NC License No. C-1554
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DRAWN BY	C. TOMPKINS	DATE	3/19
CHECKED BY	R. GREENFIELD	DATE	3/19
DESIGN ENGINEER OF RECORD	R. GREENFIELD	DATE	4/19

DWG. NO. 41

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1
STAGE 1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-41
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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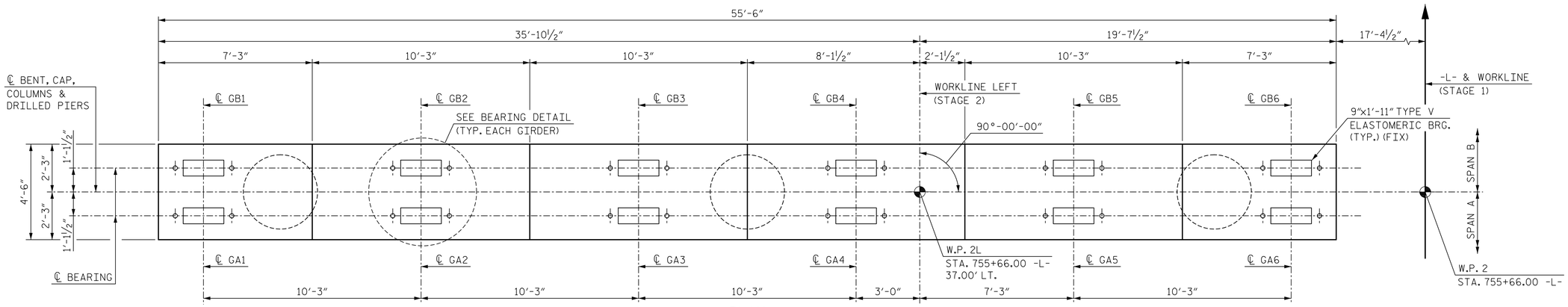
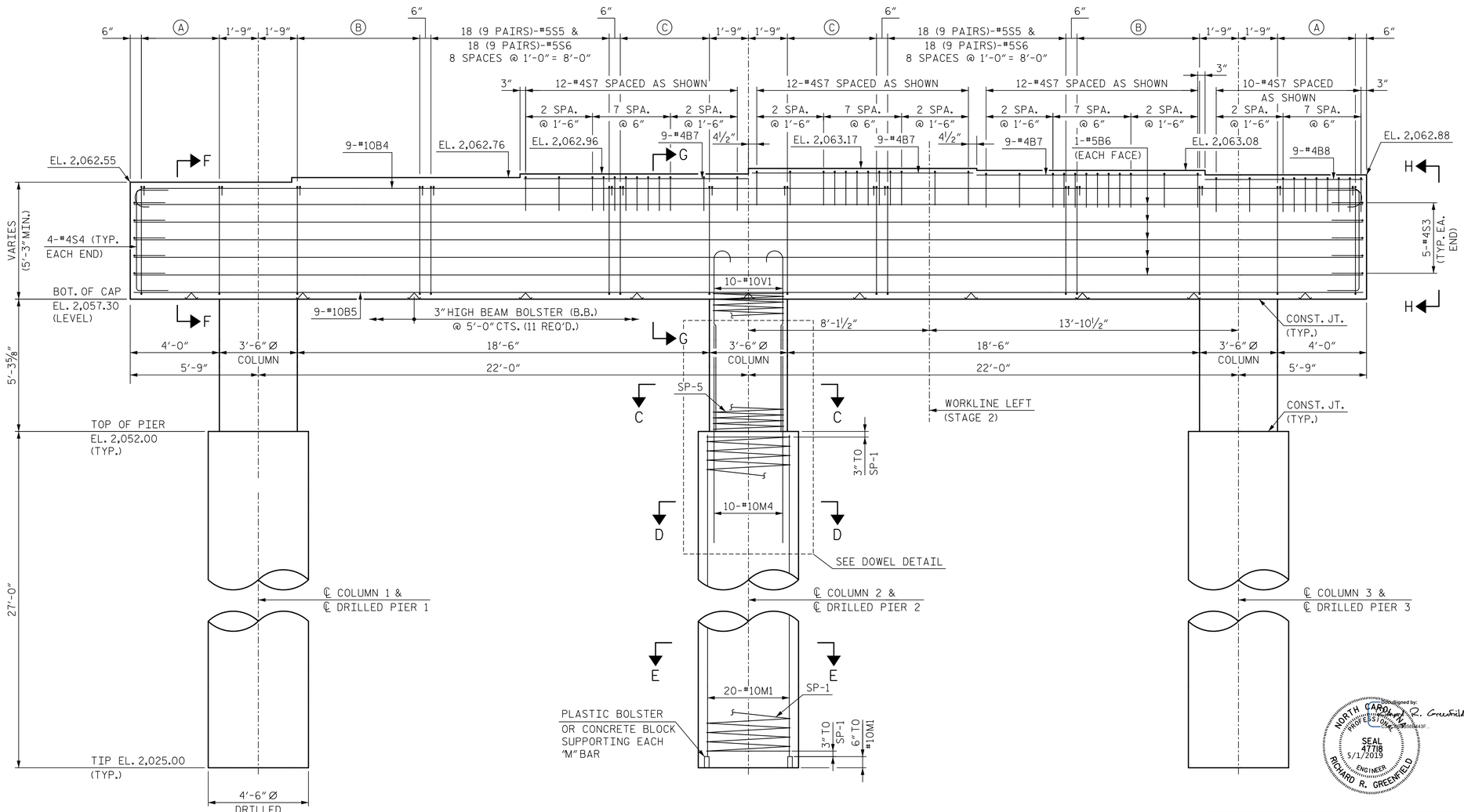


PLAN



ELEVATION

(DRILLED PIER/COLUMN REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH DRILLED PIER/COLUMN.)

Ⓐ 16 (8 PAIRS)-#5S5 & 16 (8 PAIRS)-#5S6 7 SPACES @ 6″CTS. = 3′-6″

Ⓑ 24 (12 PAIRS)-#5S5 & 24 (12 PAIRS)-#5S6 11 SPACES @ 6″CTS. = 5′-6″

Ⓒ 18 (9 PAIRS)-#5S5 & 18 (9 PAIRS)-#5S6 8 SPACES @ 6″CTS. = 4′-0″

NOTES:

FOR NOTES, SEE SHEET 4 OF 5.

FOR DRILLED PIER PLAN, SEE SHEET 4 OF 5.

FOR DOWEL DETAIL, SEE SHEET 4 OF 5.

FOR END VIEW, SEE SHEET 5 OF 5.

FOR SECTIONS C-C, D-D & E-E, SEE SHEET 5 OF 5.

FOR SECTIONS F-F, G-G & H-H, SEE SHEET 4 OF 5.

FOR BEARING DETAIL, SEE SHEET 5 OF 5.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1
STAGE 2

Digitally signed by: R. Greenfield

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

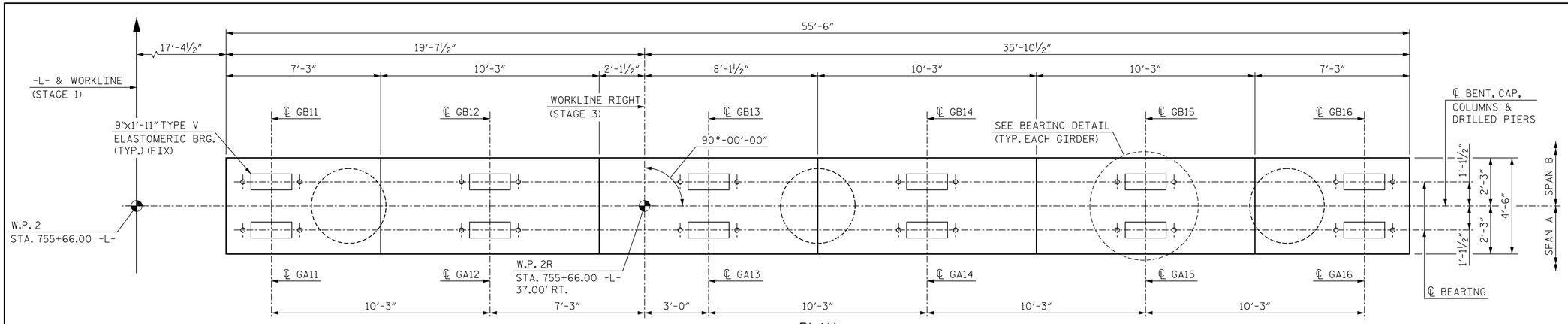
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY C. TOMPKINS DATE 3/19
CHECKED BY R. GREENFIELD DATE 3/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

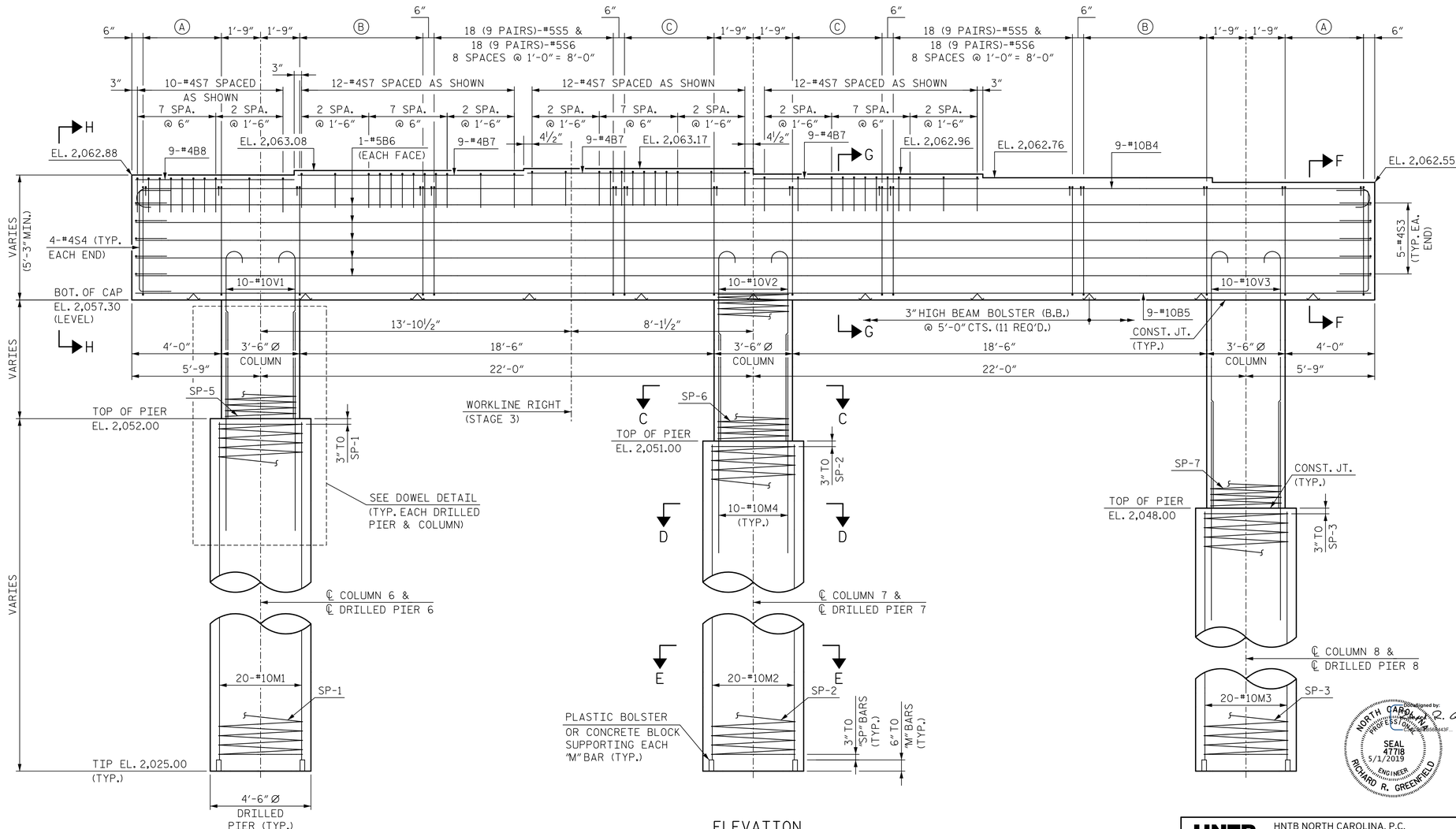
DWG. NO. 42

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-42
1			3			TOTAL SHEETS
2			4			60

4/30/2019
...\404.083_I4400C_SMU_B02_042_440233.dgn



PLAN



ELEVATION

Ⓐ 16 (8 PAIRS)-#5S5 &
16 (8 PAIRS)-#5S6
7 SPACES @ 6"CTS. = 3'-6"

Ⓑ 24 (12 PAIRS)-#5S5 &
24 (12 PAIRS)-#5S6
11 SPACES @ 6"CTS. = 5'-6"

Ⓒ 18 (9 PAIRS)-#5S5 &
18 (9 PAIRS)-#5S6
8 SPACES @ 6"CTS. = 4'-0"

NOTES:

FOR NOTES, SEE SHEET 4 OF 5.

FOR DRILLED PIER PLAN, SEE SHEET 4 OF 5.

FOR DOWEL DETAIL, SEE SHEET 4 OF 5.

FOR END VIEW, SEE SHEET 5 OF 5.

FOR SECTIONS C-C, D-D & E-E, SEE SHEET 5 OF 5.

FOR SECTIONS F-F, G-G & H-H, SEE SHEET 4 OF 5.

FOR BEARING DETAIL, SEE SHEET 5 OF 5.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1
STAGE 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD
Digitally signed by: Richard R. Greenfield

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY	C. TOMPKINS	DATE	3/19
CHECKED BY	R. GREENFIELD	DATE	3/19
DESIGN ENGINEER OF RECORD	R. GREENFIELD	DATE	4/19

DWG. NO. 43

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-43
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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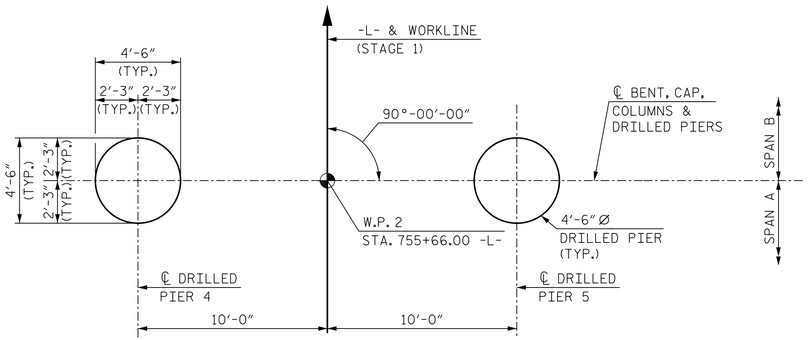
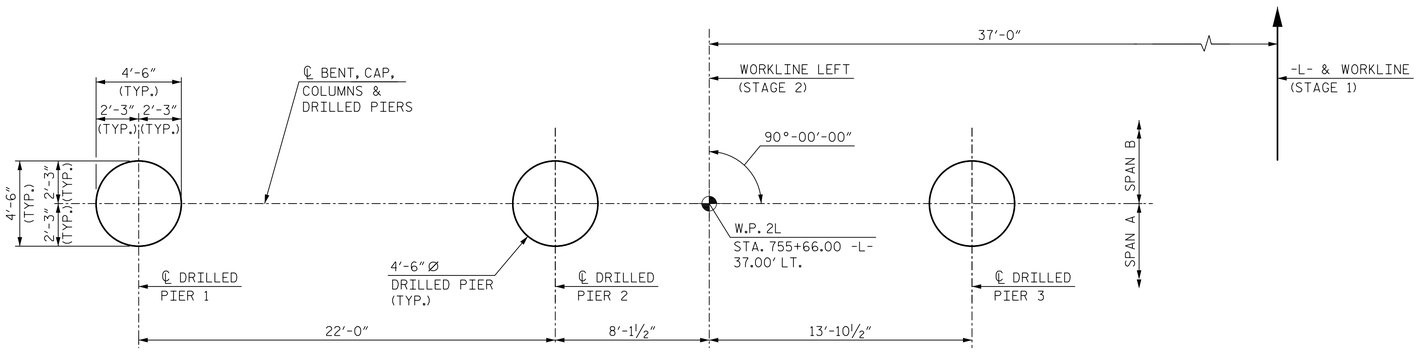
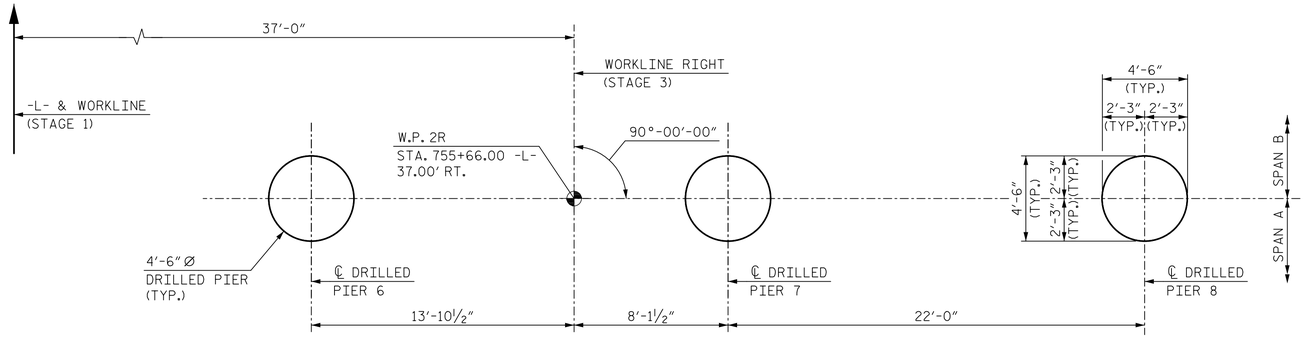


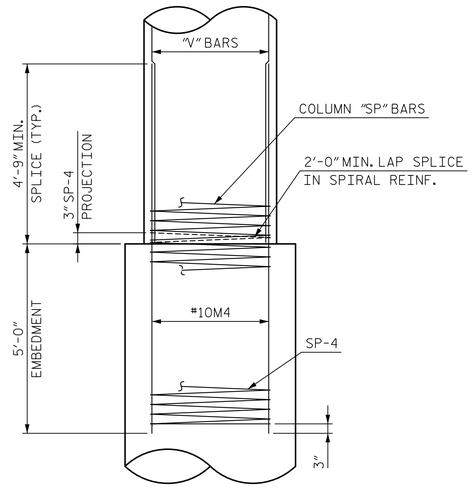
DRILLED PIER PLAN - STAGE 1



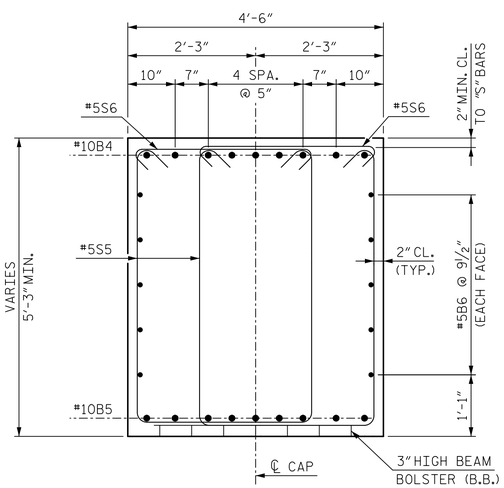
DRILLED PIER PLAN - STAGE 2



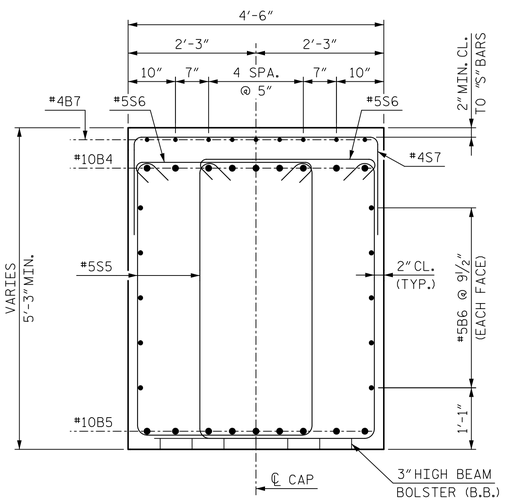
DRILLED PIER PLAN - STAGE 3



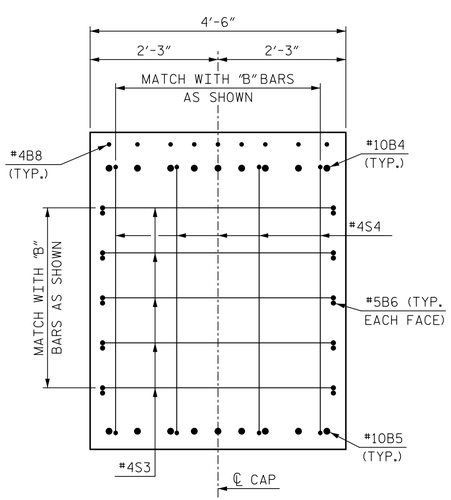
DOWEL DETAIL



SECTION F-F



SECTION G-G



SECTION H-H

NOTES:

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

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

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL" SHOWN IN THE BILL OF MATERIAL ON SHEET 5 OF 5.

CONCRETE QUANTITY FOR DRILLED PIERS SHOWN IN CU. YDS. IN THE BILL OF MATERIAL ON SHEET 5 OF 5 IS FOR REFERENCE ONLY. THIS QUANTITY IS NOT INCLUDED IN THE TOTAL CU. YDS. OF CONCRETE.

SEE SECTION E-E ON SHEET 5 OF 5 FOR TYPICAL DRILLED PIER REINFORCING.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

Digitally signed by: Richard R. Greenfield
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

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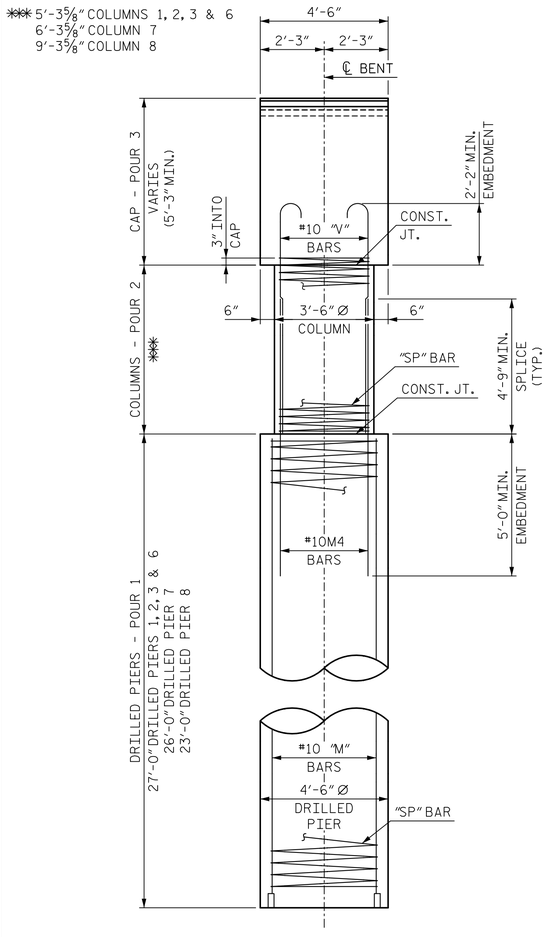
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY C. TOMPKINS DATE 3/19
CHECKED BY R. GREENFIELD DATE 3/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 44

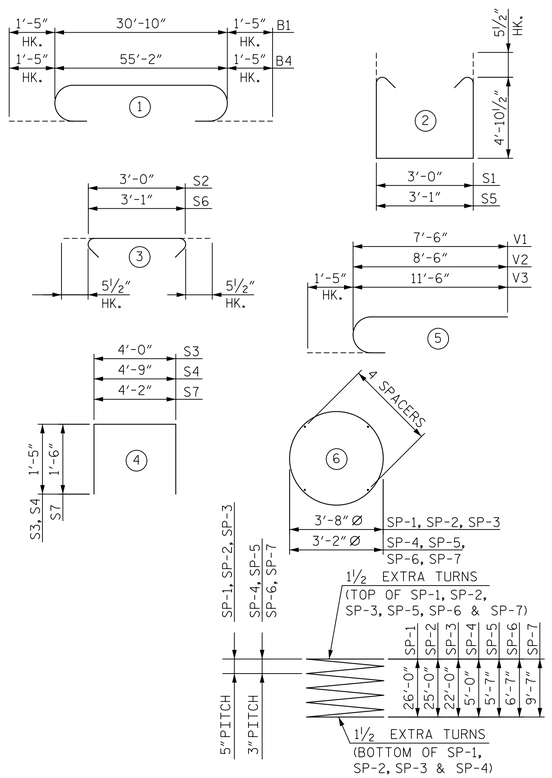
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-44
1			3			TOTAL SHEETS
2			4			60

4/30/2019
...\04_087_I4400C_SMU_B04_044_440233.dgn



END VIEW - STAGES 2 & 3

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

UNCOATED

STAGE 1						STAGE 2						STAGE 3					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	10	1	33'-8"	1,159	B4	9	10	1	58'-0"	2,246	B4	9	10	1	58'-0"	2,246
B2	8	10	STR.	30'-10"	1,061	B5	9	10	STR.	55'-2"	2,136	B5	9	10	STR.	55'-2"	2,136
B3	10	5	STR.	30'-10"	322	B6	10	5	STR.	55'-2"	575	B6	10	5	STR.	55'-2"	575
						B7	27	4	STR.	9'-11"	179	B7	27	4	STR.	9'-11"	179
M1	40	10	STR.	29'-4"	5,049	B8	9	4	STR.	7'-1"	43	B8	9	4	STR.	7'-1"	43
M4	20	10	STR.	9'-9"	839												
						M1	60	10	STR.	29'-4"	7,573	M1	20	10	STR.	29'-4"	2,524
S1	84	5	2	13'-8"	1,197	M4	30	10	STR.	9'-9"	1,259	M2	20	10	STR.	28'-4"	2,438
S2	84	5	3	3'-11"	343							M3	20	10	STR.	25'-4"	2,180
S3	10	4	4	6'-10"	46	S3	10	4	4	6'-10"	46	M4	30	10	STR.	9'-9"	1,259
S4	8	4	4	7'-7"	41	S4	8	4	4	7'-7"	41						
						S5	152	5	2	13'-9"	2,180	S3	10	4	4	6'-10"	46
V1	20	10	5	8'-11"	767	S6	152	5	3	4'-0"	634	S4	8	4	4	7'-7"	41
						S7	46	4	4	7'-2"	220	S5	152	5	2	13'-9"	2,180
SP-1	2	✳	6	743'-2"	1,550							S6	152	5	3	4'-0"	634
SP-4	2	✳✳	6	211'-2"	282	V1	30	10	5	8'-11"	1,151	S7	46	4	4	7'-2"	220
SP-5	2	✳✳	6	234'-1"	313												
						SP-1	3	✳	6	743'-2"	2,325	V1	10	10	5	8'-11"	384
						SP-4	3	✳✳	6	211'-2"	423	V2	10	10	5	9'-11"	427
						SP-5	3	✳✳	6	234'-1"	469	V3	10	10	5	12'-11"	556
												SP-1	1	✳	6	743'-2"	775
												SP-2	1	✳	6	715'-11"	747
												SP-3	1	✳	6	634'-1"	661
												SP-4	1	✳✳	6	211'-2"	423
												SP-5	1	✳✳	6	234'-1"	156
												SP-6	1	✳✳	6	273'-5"	183
												SP-7	1	✳✳	6	391'-3"	261

QUANTITIES		
REINFORCING STEEL	LBS.	10,824
SPIRAL COLUMN REINFORCING STEEL	LBS.	2,145
CLASS "A" CONCRETE BREAKDOWN		
COLUMN POUR 2	CU. YDS.	3.8
CAP POUR 3	CU. YDS.	27.8
TOTAL	CU. YDS.	31.6
DRILLED PIER POUR 1	CU. YDS.	31.8
4'-6" DIA. DRILLED PIERS		
IN SOIL	LIN. FT.	25.8
NOT IN SOIL	LIN. FT.	28.2
PERMANENT STEEL CASING	LIN. FT.	24.0
SID INSPECTIONS	EA.	2
CSL TUBES	LIN. FT.	285.0

QUANTITIES		
REINFORCING STEEL	LBS.	18,283
SPIRAL COLUMN REINFORCING STEEL	LBS.	3,217
CLASS "A" CONCRETE BREAKDOWN		
COLUMN POUR 2	CU. YDS.	5.7
CAP POUR 3	CU. YDS.	52.0
TOTAL	CU. YDS.	57.7
DRILLED PIER POUR 1	CU. YDS.	47.7
4'-6" DIA. DRILLED PIERS		
IN SOIL	LIN. FT.	38.6
NOT IN SOIL	LIN. FT.	42.4
PERMANENT STEEL CASING	LIN. FT.	36.0
SID INSPECTIONS	EA.	3
CSL TUBES	LIN. FT.	427.5

QUANTITIES		
REINFORCING STEEL	LBS.	18,068
SPIRAL COLUMN REINFORCING STEEL	LBS.	3,206
CLASS "A" CONCRETE BREAKDOWN		
COLUMN POUR 2	CU. YDS.	7.4
CAP POUR 3	CU. YDS.	52.0
TOTAL	CU. YDS.	59.4
DRILLED PIER POUR 1	CU. YDS.	44.8
4'-6" DIA. DRILLED PIERS		
IN SOIL	LIN. FT.	33.6
NOT IN SOIL	LIN. FT.	42.4
PERMANENT STEEL CASING	LIN. FT.	31.0
SID INSPECTIONS	EA.	3
CSL TUBES	LIN. FT.	402.5

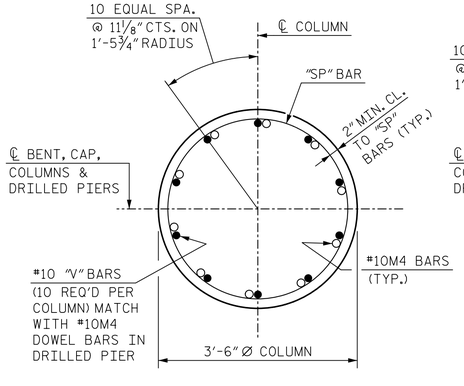
NOTES:

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

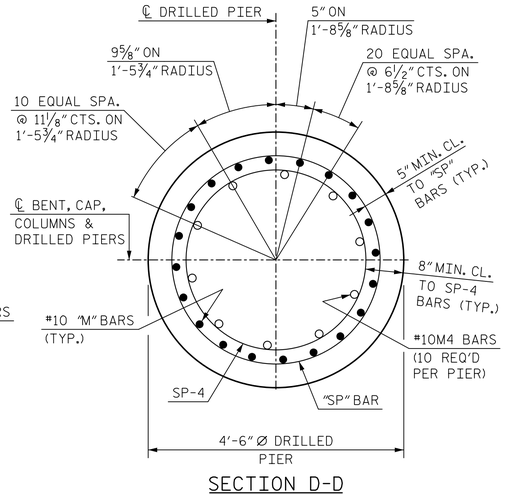
FOR ADDITIONAL NOTES, SEE SHEET 4 OF 5.

✳ THE SP-1, SP-2 AND SP-3 SPIRAL REINFORCING STEEL SHALL BE W31 OR D31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

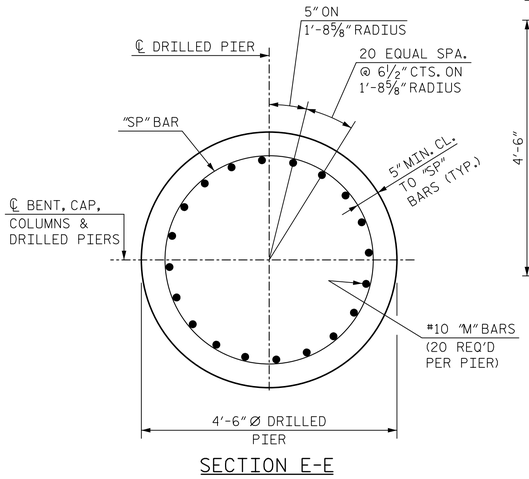
✳✳ THE SP-4 THRU SP-7 SPIRAL REINFORCING STEEL SHALL BE W20 OR D20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



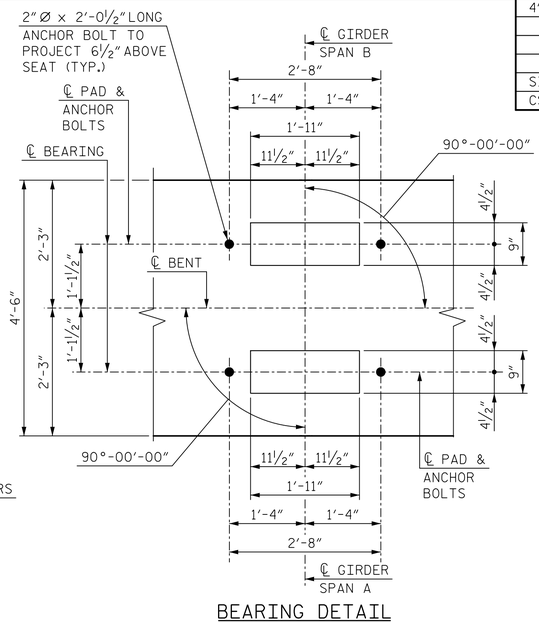
SECTION C-C



SECTION D-D



SECTION E-E



BEARING DETAIL

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 6/14/2019 RICHARD R. GREENFIELD

Digitally signed by: Richard R. Greenfield

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1 DETAILS

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

DRAWN BY C. TOMPKINS DATE 3/19
CHECKED BY R. GREENFIELD DATE 3/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 45

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-45
1			3			TOTAL SHEETS
2			4			60

6/13/2019
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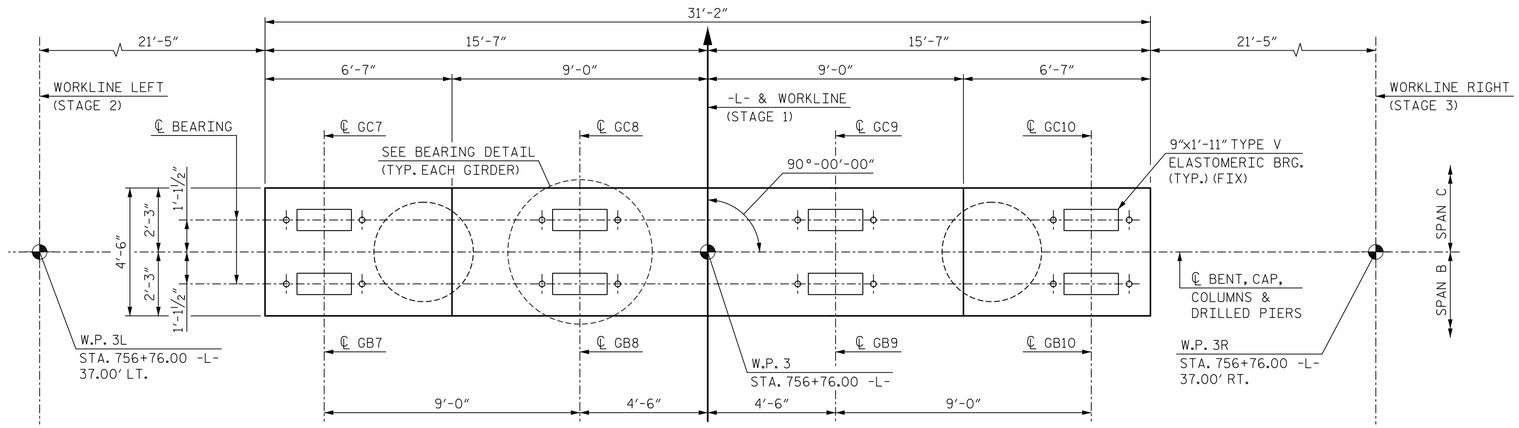


PLAN

NOTES:

FOR NOTES, SEE SHEET 4 OF 5.

FOR DRILLED PIER PLAN, SEE SHEET 4 OF 5.

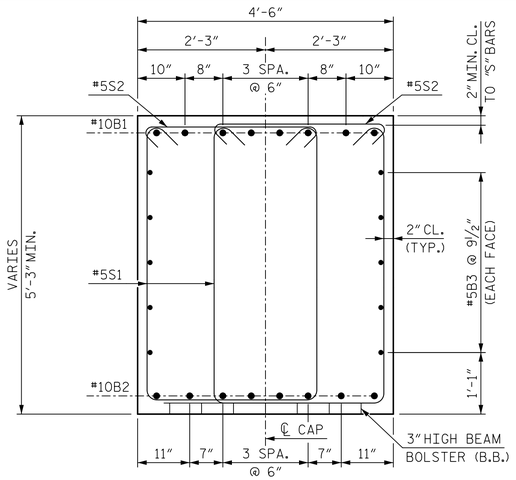
FOR DOWEL DETAIL, SEE SHEET 4 OF 5.

FOR SECTIONS C-C, D-D & E-E, SEE SHEET 5 OF 5.

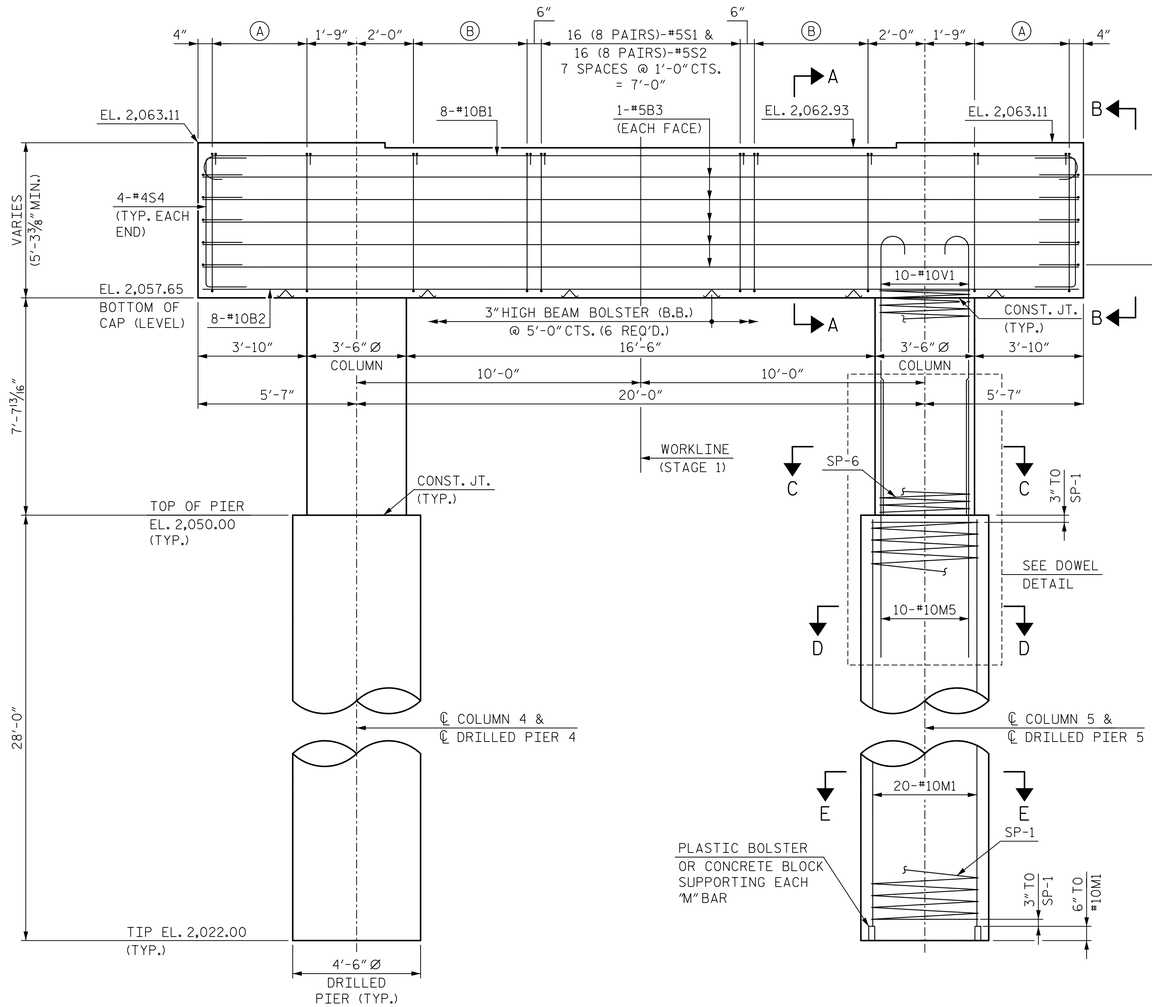
FOR BEARING DETAIL, SEE SHEET 5 OF 5.

Ⓐ 16 (8 PAIRS)-#5S1 & 16 (8 PAIRS)-#5S2 7 SPACES @ 6" CTS. = 3'-6"

Ⓑ 18 (9 PAIRS)-#5S1 & 18 (9 PAIRS)-#5S2 8 SPACES @ 6" CTS. = 4'-0"

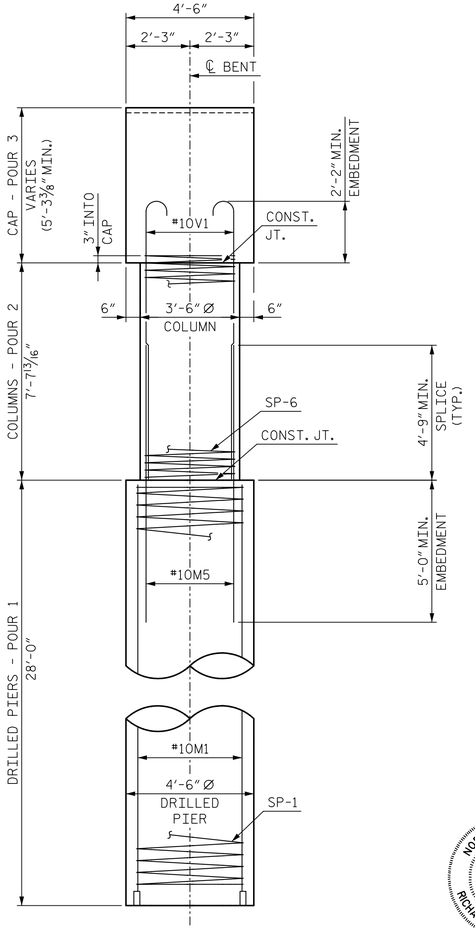


SECTION A-A

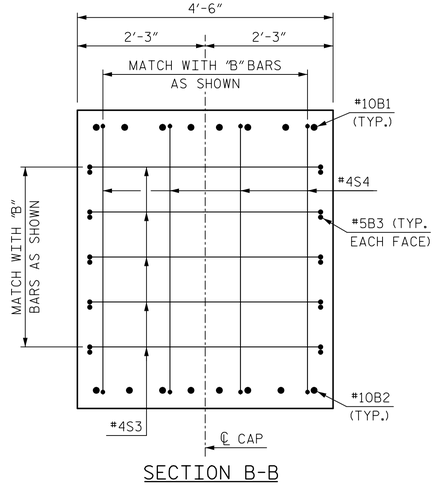


ELEVATION

(DRILLED PIER/COLUMN REINFORCING AND DIMENSIONS ARE TYPICAL FOR EACH DRILLED PIER/COLUMN.)



END VIEW



SECTION B-B

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2
STAGE 1

Digitally signed by: Richard R. Greenfield
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

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

DRAWN BY	C. TOMPKINS	DATE	3/19
CHECKED BY	R. GREENFIELD	DATE	3/19
DESIGN ENGINEER OF RECORD	R. GREENFIELD	DATE	4/19

DWG. NO. 46

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-46
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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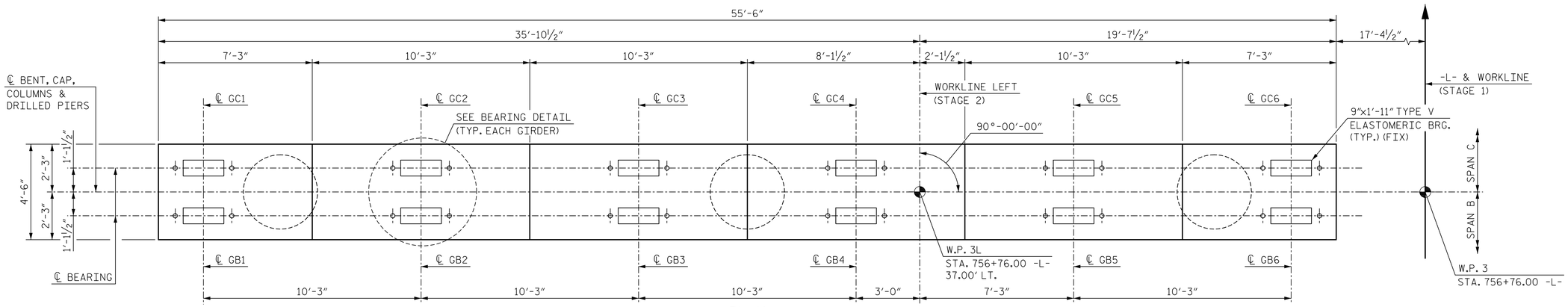
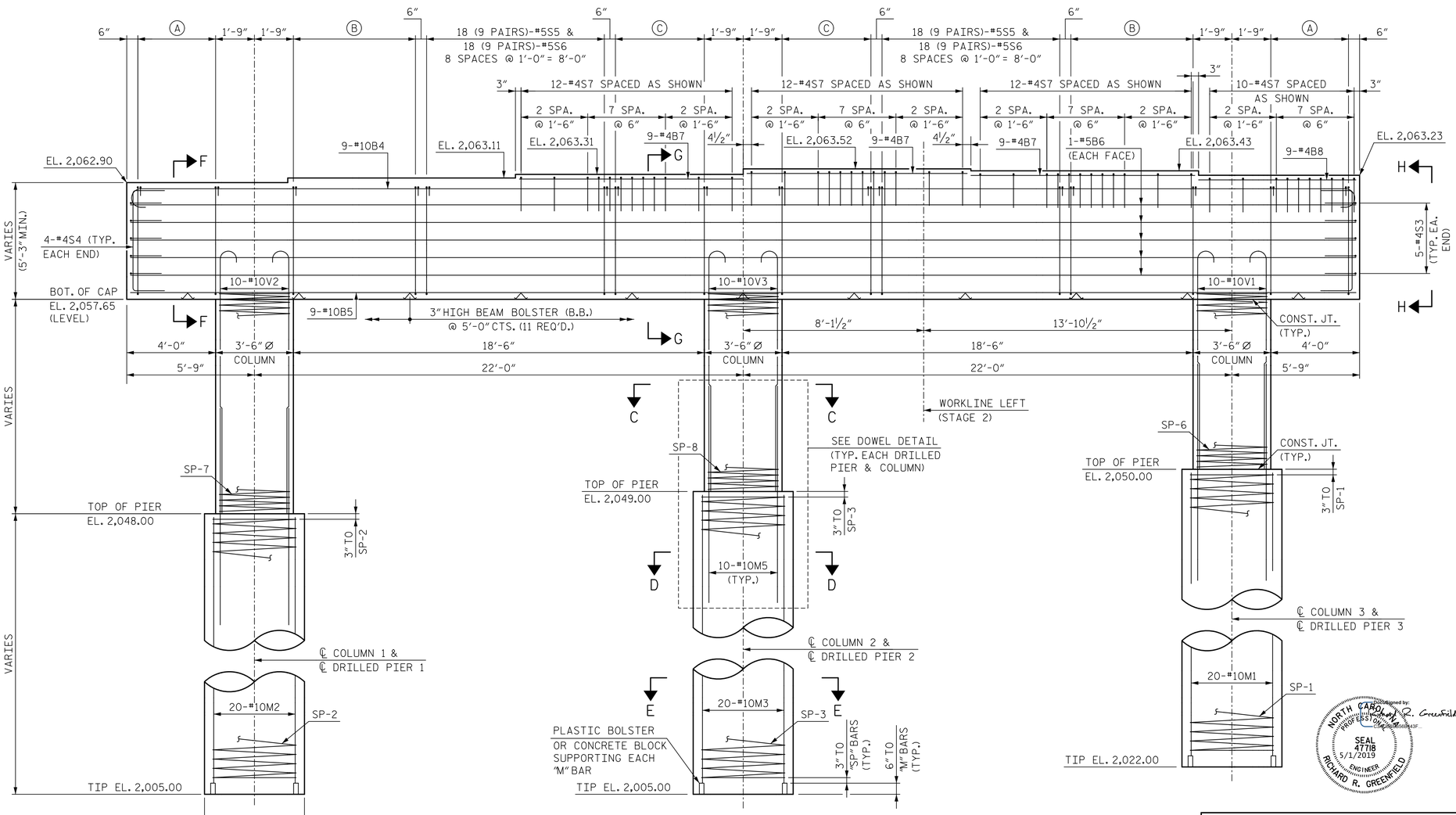


PLAN



ELEVATION

Ⓐ 16 (8 PAIRS)-#5S5 & 16 (8 PAIRS)-#5S6 7 SPACES @ 6"CTS. = 3'-6"

Ⓑ 24 (12 PAIRS)-#5S5 & 24 (12 PAIRS)-#5S6 11 SPACES @ 6"CTS. = 5'-6"

Ⓒ 18 (9 PAIRS)-#5S5 & 18 (9 PAIRS)-#5S6 8 SPACES @ 6"CTS. = 4'-0"

NOTES:

FOR NOTES, SEE SHEET 4 OF 5.

FOR DRILLED PIER PLAN, SEE SHEET 4 OF 5.

FOR DOWEL DETAIL, SEE SHEET 4 OF 5.

FOR END VIEW, SEE SHEET 5 OF 5.

FOR SECTIONS C-C, D-D & E-E, SEE SHEET 5 OF 5.

FOR SECTIONS F-F, G-G & H-H, SEE SHEET 4 OF 5.

FOR BEARING DETAIL, SEE SHEET 5 OF 5.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2
STAGE 2

Signed by: Richard R. Greenfield

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

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

DRAWN BY C. TOMPKINS DATE 3/19
CHECKED BY R. GREENFIELD DATE 3/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 47

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-47
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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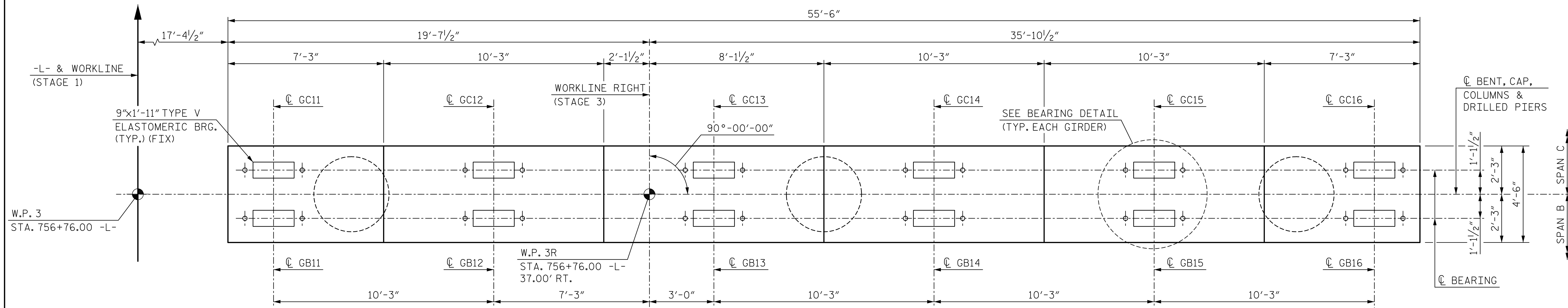
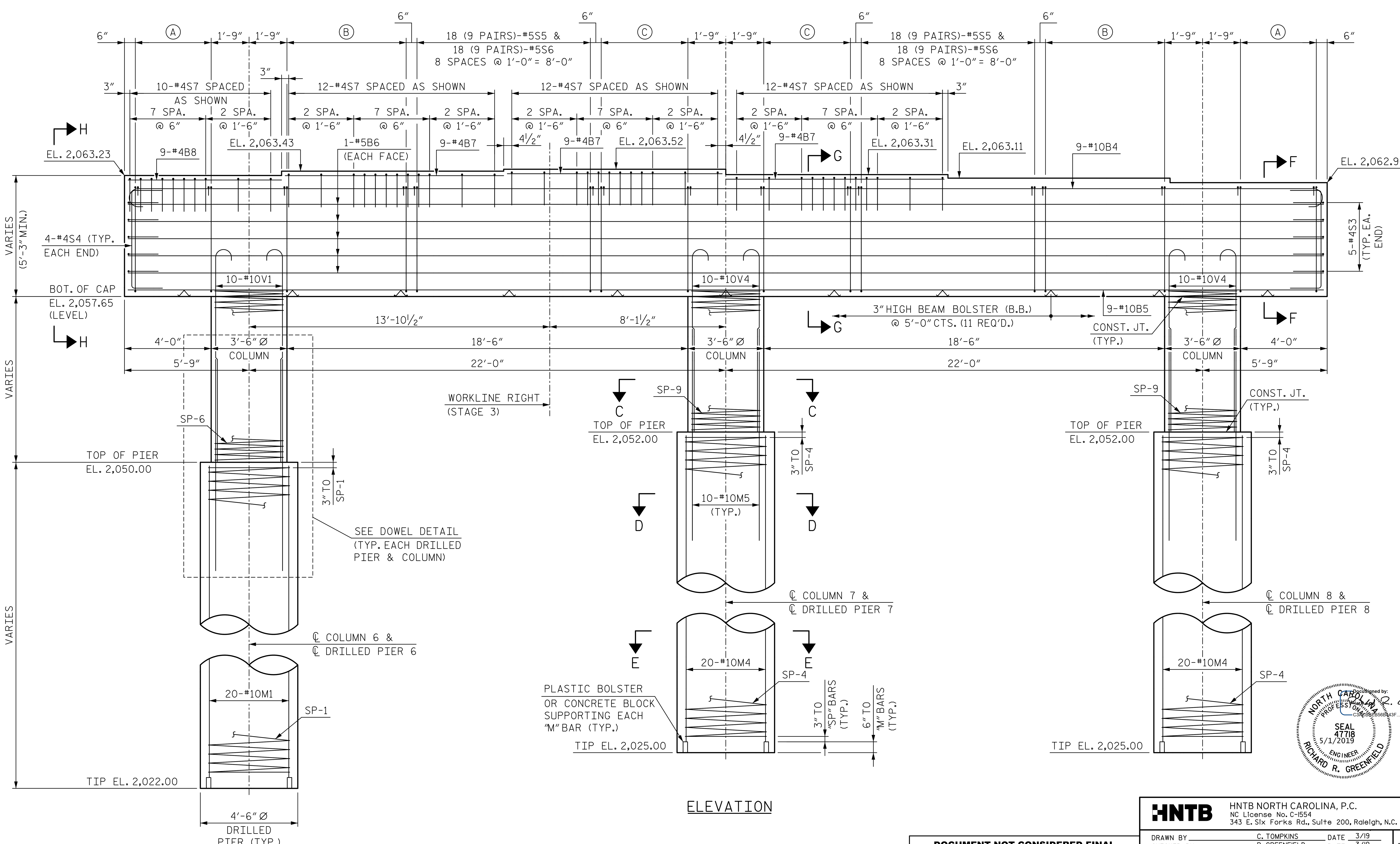


PLAN



ELEVATION

Ⓐ 16 (8 PAIRS)-#5S5 & 16 (8 PAIRS)-#5S6 7 SPACES @ 6" CTS. = 3'-6"

Ⓑ 24 (12 PAIRS)-#5S5 & 24 (12 PAIRS)-#5S6 11 SPACES @ 6" CTS. = 5'-6"

Ⓒ 18 (9 PAIRS)-#5S5 & 18 (9 PAIRS)-#5S6 8 SPACES @ 6" CTS. = 4'-0"

NOTES:

FOR NOTES, SEE SHEET 4 OF 5.

FOR DRILLED PIER PLAN, SEE SHEET 4 OF 5.

FOR DOWEL DETAIL, SEE SHEET 4 OF 5.

FOR END VIEW, SEE SHEET 5 OF 5.

FOR SECTIONS C-C, D-D & E-E, SEE SHEET 5 OF 5.

FOR SECTIONS F-F, G-G & H-H, SEE SHEET 4 OF 5.

FOR BEARING DETAIL, SEE SHEET 5 OF 5.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2
STAGE 3

SEAL 47718 — RICHARD R. GREENFIELD — 5/1/2019

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

DRAWN BY	C. TOMPKINS	DATE 3/19
CHECKED BY	R. GREENFIELD	DATE 3/19
DESIGN ENGINEER OF RECORD	R. GREENFIELD	DATE 4/19

DWG. NO. 48

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REVISIONS

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

SHEET NO. S4-48

TOTAL SHEETS 60

4/30/2019
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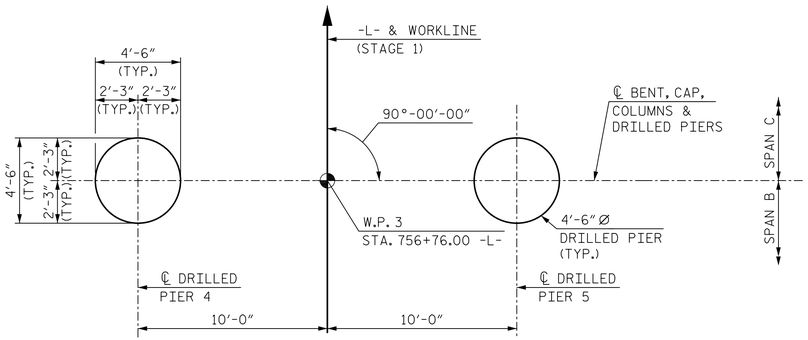
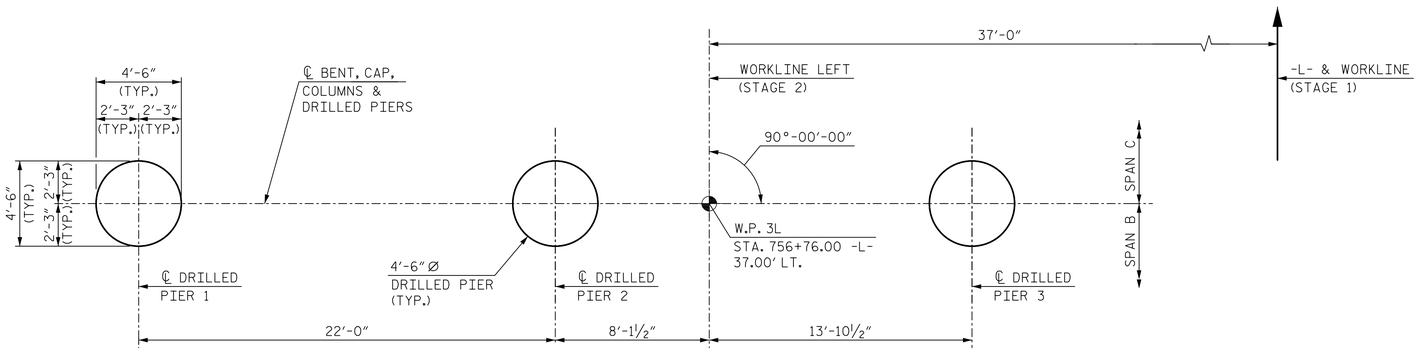
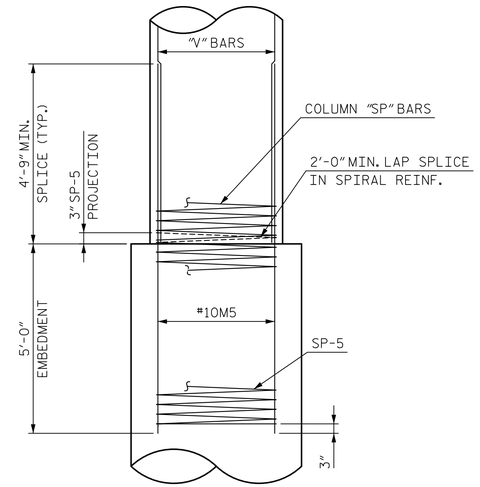


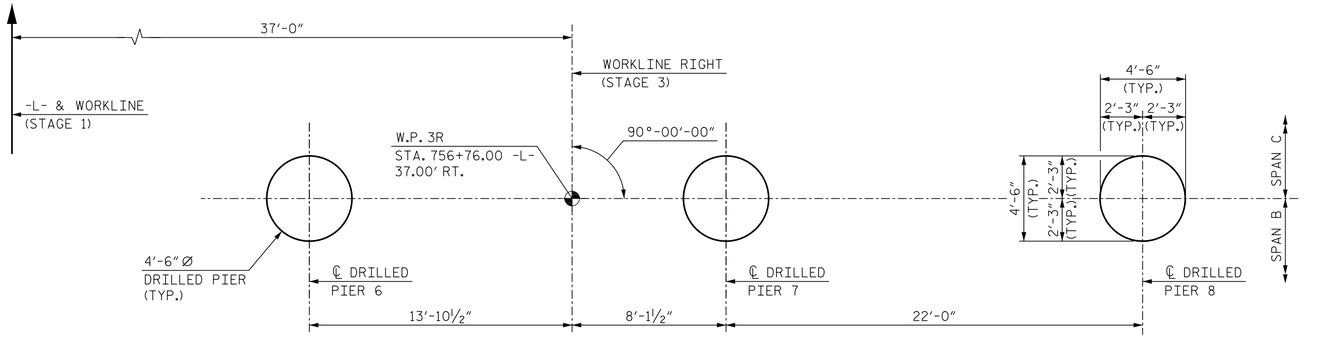
DRILLED PIER PLAN - STAGE 1



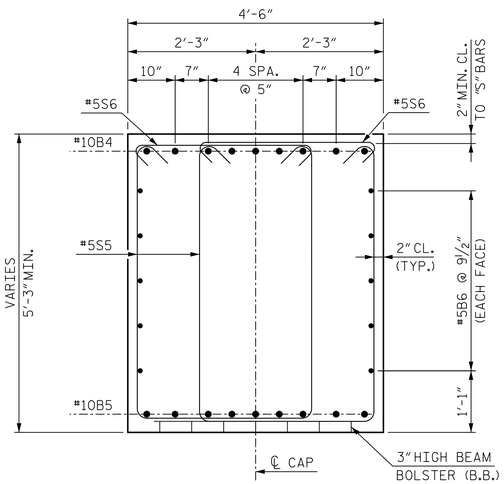
DRILLED PIER PLAN - STAGE 2



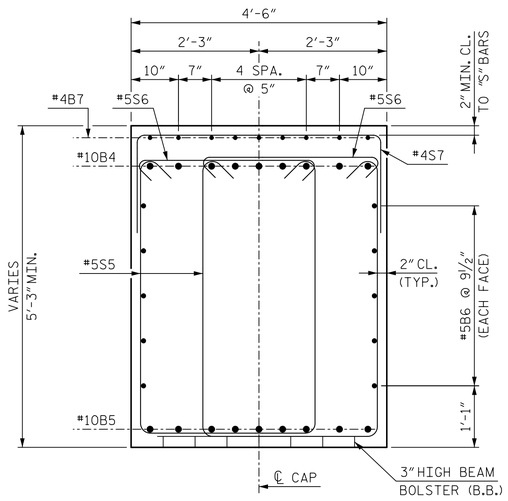
DOWEL DETAIL



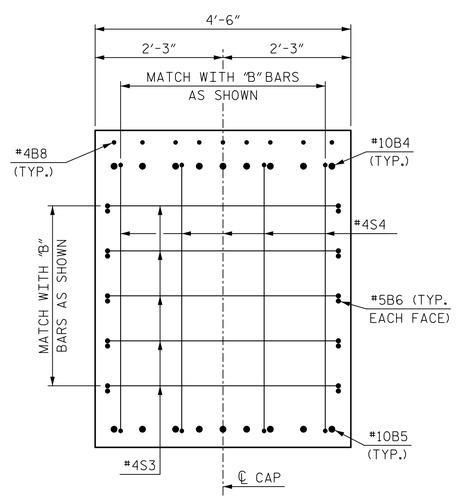
DRILLED PIER PLAN - STAGE 3



SECTION F-F



SECTION G-G



SECTION H-H

NOTES:

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

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

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "REINFORCING STEEL" AND "SPIRAL COLUMN REINFORCING STEEL" SHOWN IN THE BILL OF MATERIAL ON SHEET 5 OF 5.

CONCRETE QUANTITY FOR DRILLED PIERS SHOWN IN CU. YDS. IN THE BILL OF MATERIAL ON SHEET 5 OF 5 IS FOR REFERENCE ONLY. THIS QUANTITY IS NOT INCLUDED IN THE TOTAL CU. YDS. OF CONCRETE.

SEE SECTION E-E ON SHEET 5 OF 5 FOR TYPICAL DRILLED PIER REINFORCING.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2 DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 10/1/2019 RICHARD R. GREENFIELD

Digitally signed by: Richard R. Greenfield

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY C. TOMPKINS DATE 3/19
CHECKED BY R. GREENFIELD DATE 3/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 49

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-49
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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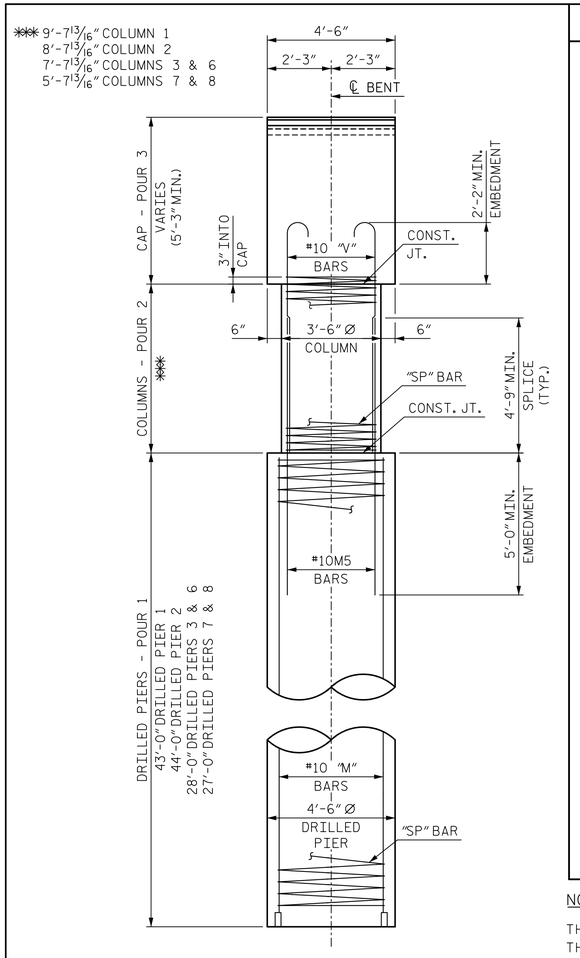
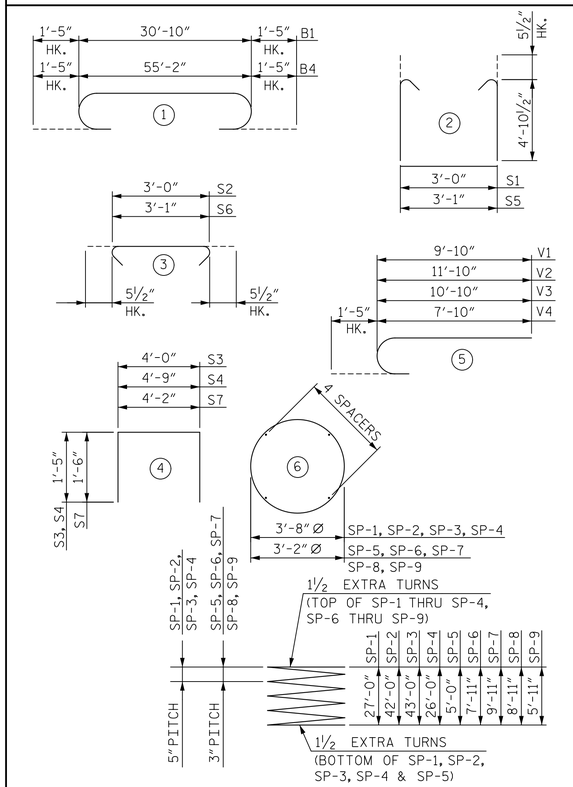


END VIEW - STAGES 2 & 3

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

UNCOATED

STAGE 1						STAGE 2						STAGE 3					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	8	10	1	33'-8"	1,159	B4	9	10	1	58'-0"	2,246	B4	9	10	1	58'-0"	2,246
B2	8	10	STR.	30'-10"	1,061	B5	9	10	STR.	55'-2"	2,136	B5	9	10	STR.	55'-2"	2,136
B3	10	5	STR.	30'-10"	322	B6	10	5	STR.	55'-2"	575	B6	10	5	STR.	55'-2"	575
						B7	27	4	STR.	9'-11"	179	B7	27	4	STR.	9'-11"	179
M1	40	10	STR.	30'-4"	5,221	B8	9	4	STR.	7'-1"	43	B8	9	4	STR.	7'-1"	43
M5	20	10	STR.	9'-9"	839	M1	20	10	STR.	30'-4"	2,610						
						M2	20	10	STR.	45'-4"	3,901	M1	20	10	STR.	30'-4"	2,610
S1	84	5	2	13'-8"	1,197	M3	20	10	STR.	46'-4"	3,987	M4	40	10	STR.	29'-4"	5,049
S2	84	5	3	3'-11"	343	M5	30	10	STR.	9'-9"	1,259	M5	30	10	STR.	9'-9"	1,259
S3	10	4	4	6'-10"	46	S3	10	4	4	6'-10"	46						
S4	8	4	4	7'-7"	41	S4	8	4	4	7'-7"	41	S3	10	4	4	6'-10"	46
						S5	152	5	2	13'-9"	2,180	S4	8	4	4	7'-7"	41
V1	20	10	5	11'-3"	968	S6	152	5	3	4'-0"	634	S5	152	5	2	13'-9"	2,180
						S7	46	4	4	7'-2"	220	S6	152	5	3	4'-0"	634
SP-1	2	✳	6	770'-5"	1,607	V1	10	10	5	11'-3"	484	S7	46	4	4	7'-2"	220
SP-5	2	✳✳	6	211'-2"	282	V2	10	10	5	13'-3"	570						
SP-6	2	✳✳	6	325'-9"	435	V3	10	10	5	12'-3"	527	V1	10	10	5	11'-3"	484
						SP-1	1	✳	6	770'-5"	804	V4	20	10	5	9'-3"	796
						SP-2	1	✳	6	1,179'-6"	1,230						
						SP-3	1	✳	6	1,206'-10"	1,259	SP-1	1	✳	6	770'-5"	804
						SP-5	3	✳✳	6	211'-2"	423	SP-4	2	✳	6	743'-2"	1,550
						SP-6	1	✳✳	6	325'-9"	218	SP-5	3	✳✳	6	211'-2"	423
						SP-7	1	✳✳	6	404'-4"	270	SP-6	1	✳✳	6	325'-9"	218
						SP-8	1	✳✳	6	365'-0"	244	SP-9	2	✳✳	6	247'-2"	330

QUANTITIES			QUANTITIES			QUANTITIES		
REINFORCING STEEL	LBS.	11,197	REINFORCING STEEL	LBS.	21,638	REINFORCING STEEL	LBS.	18,498
SPIRAL COLUMN REINFORCING STEEL	LBS.	2,324	SPIRAL COLUMN REINFORCING STEEL	LBS.	4,448	SPIRAL COLUMN REINFORCING STEEL	LBS.	3,325
CLASS "A" CONCRETE BREAKDOWN			CLASS "A" CONCRETE BREAKDOWN			CLASS "A" CONCRETE BREAKDOWN		
COLUMN POUR 2	CU. YDS.	5.5	COLUMN POUR 2	CU. YDS.	9.2	COLUMN POUR 2	CU. YDS.	6.8
CAP POUR 3	CU. YDS.	27.8	CAP POUR 3	CU. YDS.	52.0	CAP POUR 3	CU. YDS.	52.0
TOTAL	CU. YDS.	33.3	TOTAL	CU. YDS.	61.2	TOTAL	CU. YDS.	58.8
DRILLED PIER POUR 1	CU. YDS.	33.0	DRILLED PIER POUR 1	CU. YDS.	67.7	DRILLED PIER POUR 1	CU. YDS.	48.3
4'-6" DIA. DRILLED PIERS			4'-6" DIA. DRILLED PIERS			4'-6" DIA. DRILLED PIERS		
IN SOIL	LIN. FT.	36.1	IN SOIL	LIN. FT.	62.7	IN SOIL	LIN. FT.	52.2
NOT IN SOIL	LIN. FT.	19.9	NOT IN SOIL	LIN. FT.	52.3	NOT IN SOIL	LIN. FT.	29.8
PERMANENT STEEL CASING	LIN. FT.	26.0	PERMANENT STEEL CASING	LIN. FT.	36.0	PERMANENT STEEL CASING	LIN. FT.	43.0
SID INSPECTIONS	EA.	2	SID INSPECTIONS	EA.	3	SID INSPECTIONS	EA.	3
CSL TUBES	LIN. FT.	295.0	CSL TUBES	LIN. FT.	597.5	CSL TUBES	LIN. FT.	432.5

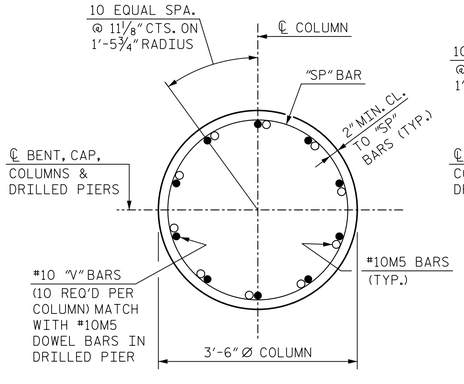
NOTES:

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

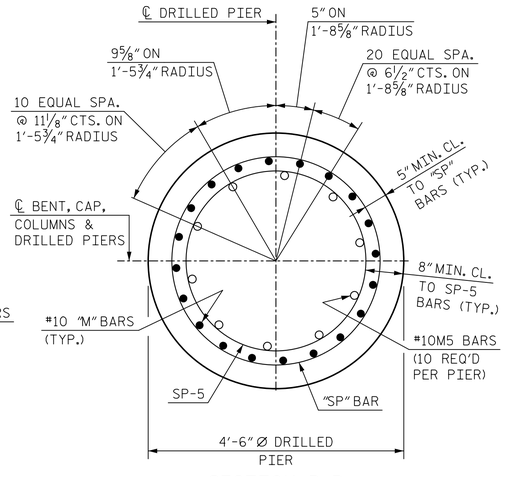
FOR ADDITIONAL NOTES, SEE SHEET 4 OF 5.

✳ THE SP-1 THRU SP-4 SPIRAL REINFORCING STEEL SHALL BE W31 OR D31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

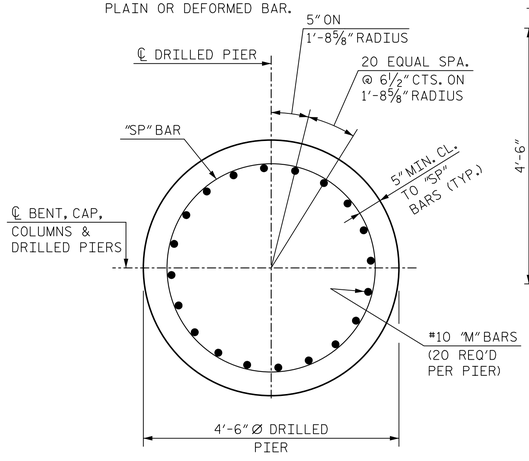
✳✳ THE SP-5 THRU SP-9 SPIRAL REINFORCING STEEL SHALL BE W20 OR D20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.



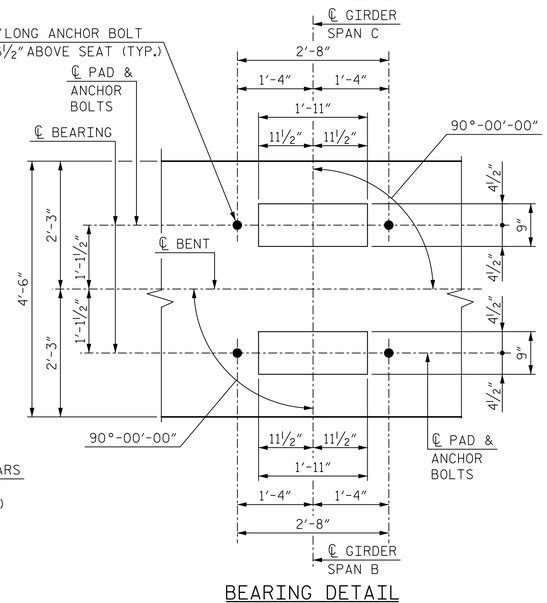
SECTION C-C



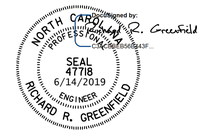
SECTION D-D



SECTION E-E



BEARING DETAIL



PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2 DETAILS

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

DRAWN BY C. TOMPKINS DATE 3/19
CHECKED BY R. GREENFIELD DATE 3/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 50

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REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-50
1			3			TOTAL SHEETS
2			4			60

6/13/2019
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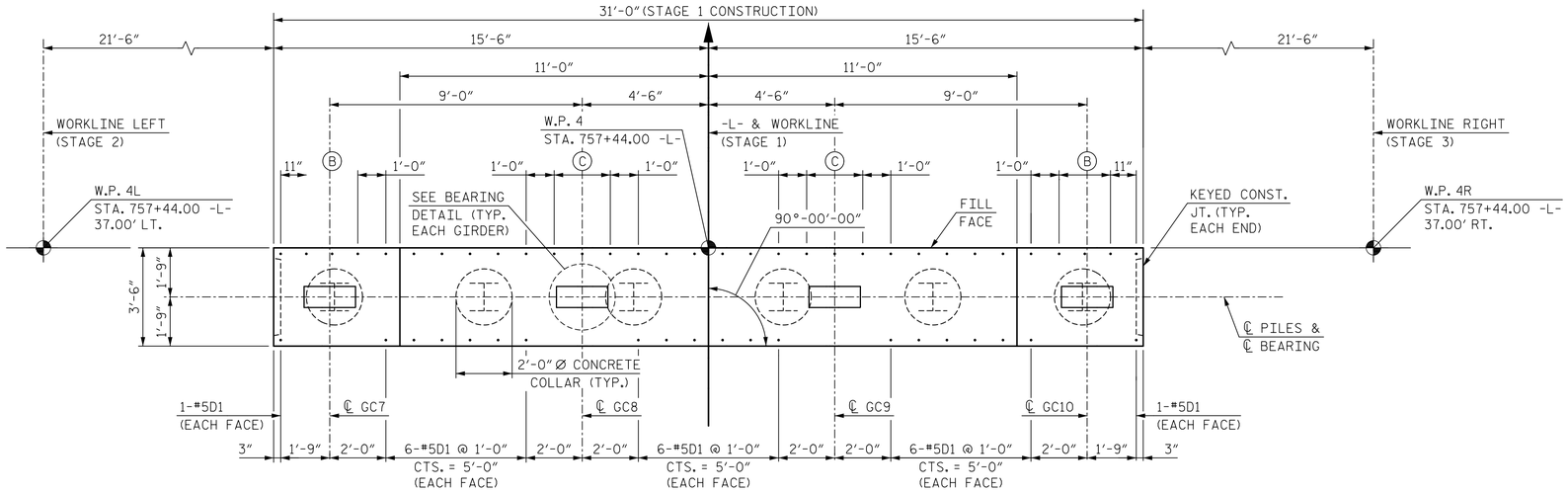
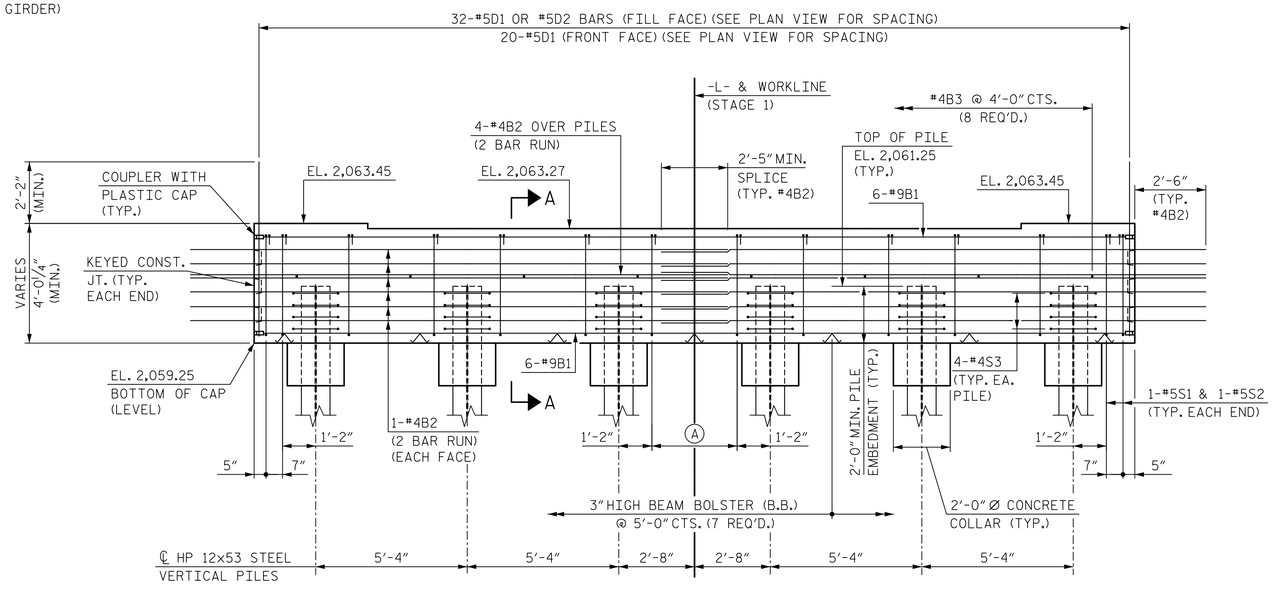


PLAN

Ⓐ 4-#5S1 & 4-#5S2 @ 1′-0″ CTS.
= 3′-0″ (TYP. EACH BAY)

Ⓑ 3-#5D2 @ 11″ CTS. = 1′-10″
(BEHIND GIRDER)

Ⓒ 3-#5D2 @ 1′-0″ CTS. = 2′-0″
(BEHIND GIRDER)



ELEVATION

NOTES:

FOR BEARING DETAIL, SEE SHEET 4 OF 6.

FOR KEYED CONSTRUCTION JOINT DETAILS, SEE SHEET 4 OF 6.

FOR SECTION A-A, SEE SHEET 4 OF 6.

FOR ADDITIONAL NOTES, SEE SHEET 5 OF 6.

FOR PILE SPLICE DETAILS, SEE SHEET 6 OF 6.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 1 OF 6

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

Digitally signed by: Richard R. Greenfield

DocuSigned by:

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DRAWN BY A. WAGNER DATE 2/19
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DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 51

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
STAGE 1

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-51
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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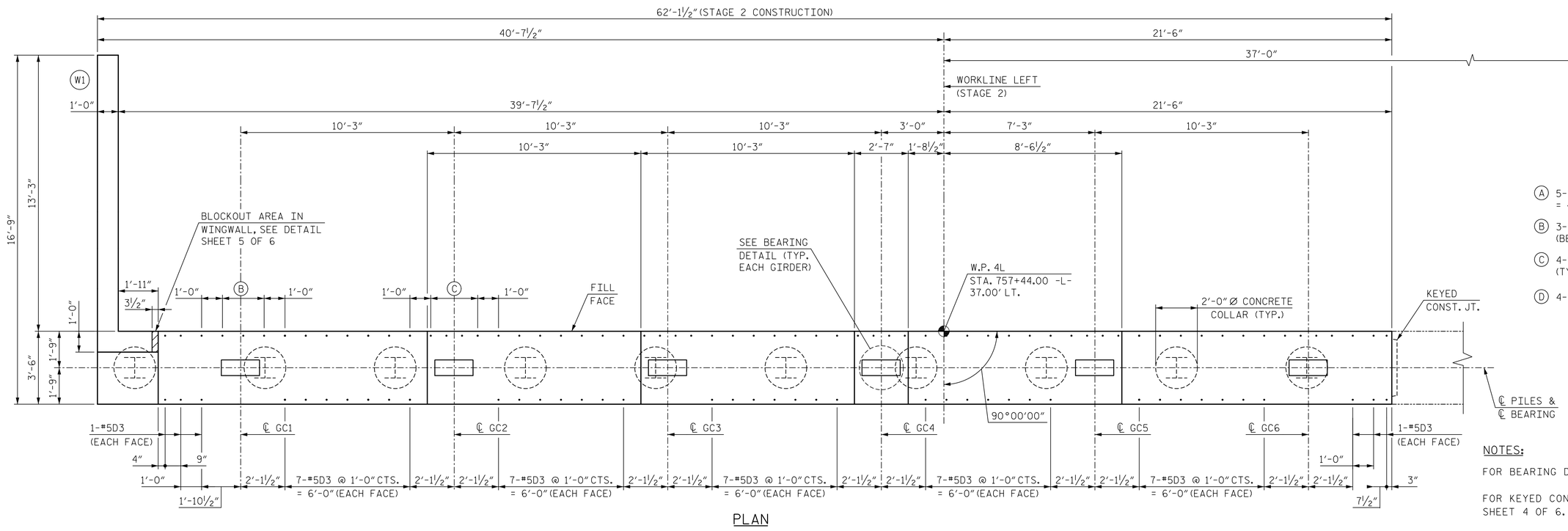


PLAN

Ⓐ 5-#5S1 & 5-#5S2 @ 1'-0" CTS. = 4'-0" (TYP. EACH BAY) U.N.O.

Ⓑ 3-#5D2 @ 1'-0" CTS. = 2'-0" (BEHIND GIRDER)

Ⓒ 4-#5D2 @ 9" CTS. = 2'-3" (TYP. BEHIND GIRDERS U.N.O.)

Ⓓ 4-#5S1 & 4-#5S2 @ 1'-0" CTS. = 3'-0"

NOTES:

FOR BEARING DETAIL, SEE SHEET 4 OF 6.

FOR KEYED CONSTRUCTION JOINT DETAILS, SEE SHEET 4 OF 6.

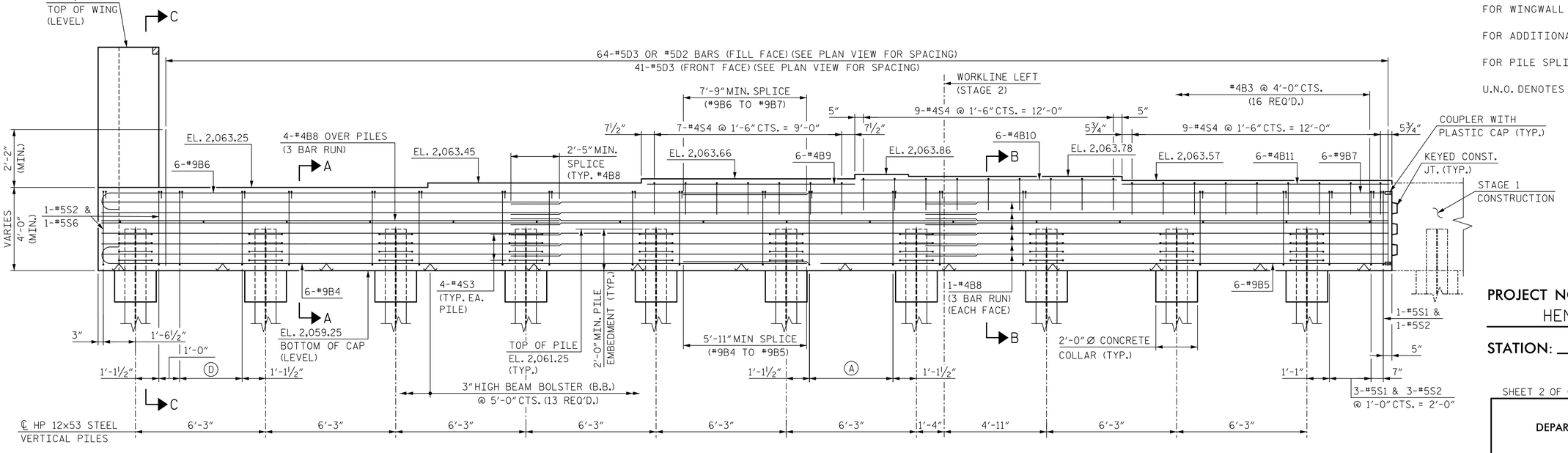
FOR SECTION VIEWS, SEE SHEET 4 OF 6.

FOR WINGWALL DETAILS, SEE SHEET 5 OF 6.

FOR ADDITIONAL NOTES, SEE SHEET 5 OF 6.

FOR PILE SPLICE DETAILS, SEE SHEET 6 OF 6.

U.N.O. DENOTES UNLESS NOTED OTHERWISE



ELEVATION

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
STAGE 2

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DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 52

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-52
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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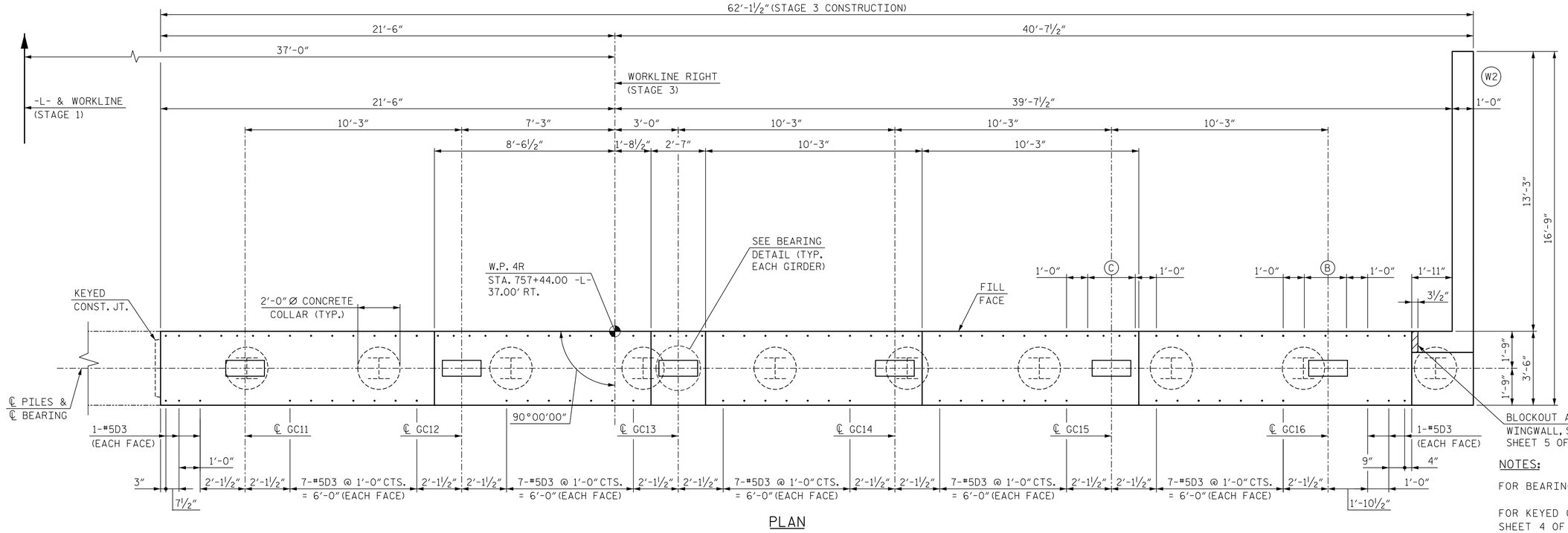


PLAN

(A) 5-#5S1 & 5-#5S2 @ 1'-0" CTS. = 4'-0" (TYP. EACH BAY) U.N.O.

(B) 3-#5D2 @ 1'-0" CTS. = 2'-0" (BEHIND GIRDER)

(C) 4-#5D2 @ 9" CTS. = 2'-3" (TYP. BEHIND GIRDERS U.N.O.)

(D) 4-#5S1 & 4-#5S2 @ 1'-0" CTS. = 3'-0"

NOTES:

FOR BEARING DETAIL, SEE SHEET 4 OF 6.

FOR KEYED CONSTRUCTION JOINT DETAILS, SEE SHEET 4 OF 6.

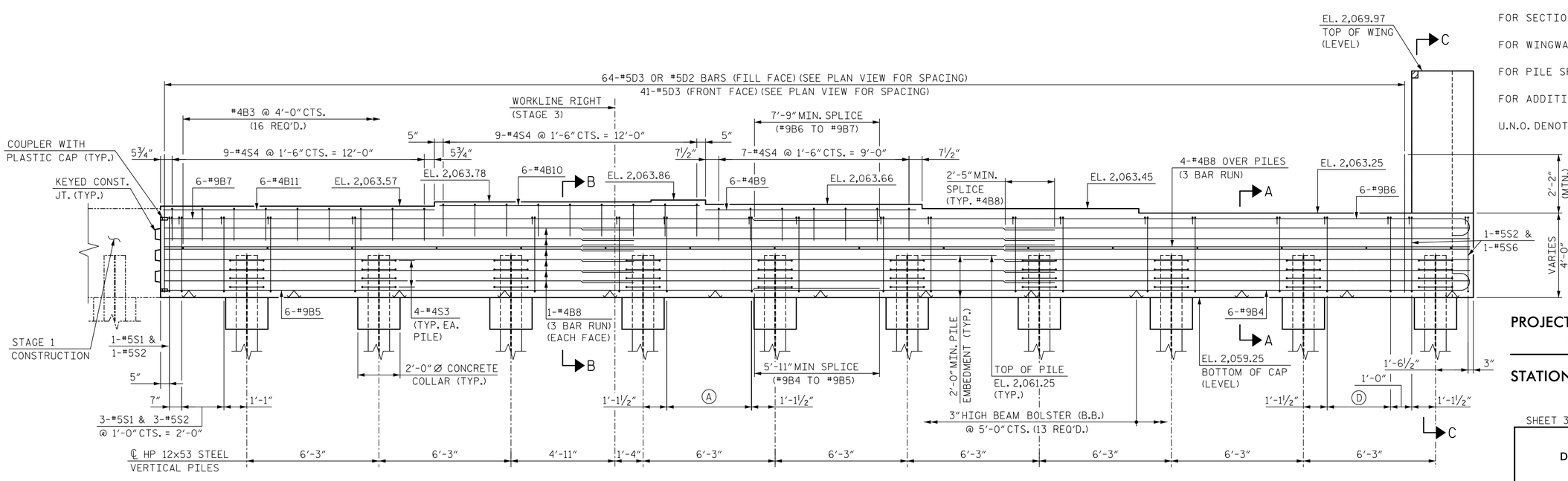
FOR SECTION VIEWS, SEE SHEET 4 OF 6.

FOR WINGWALL DETAILS, SEE SHEET 5 OF 6.

FOR PILE SPLICE DETAILS, SEE SHEET 6 OF 6.

FOR ADDITIONAL NOTES, SEE SHEET 5 OF 6.

U.N.O. DENOTES UNLESS NOTED OTHERWISE.



ELEVATION

Signed by: Richard R. Greenfield
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 6/1/2019 ENGINEER RICHARD R. GREENFIELD

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
STAGE 3

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

DRAWN BY A. WAGNER DATE 2/19
CHECKED BY L. DICKENS DATE 2/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 53

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-53
1			3			TOTAL SHEETS
2			4			60

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

4/30/2019
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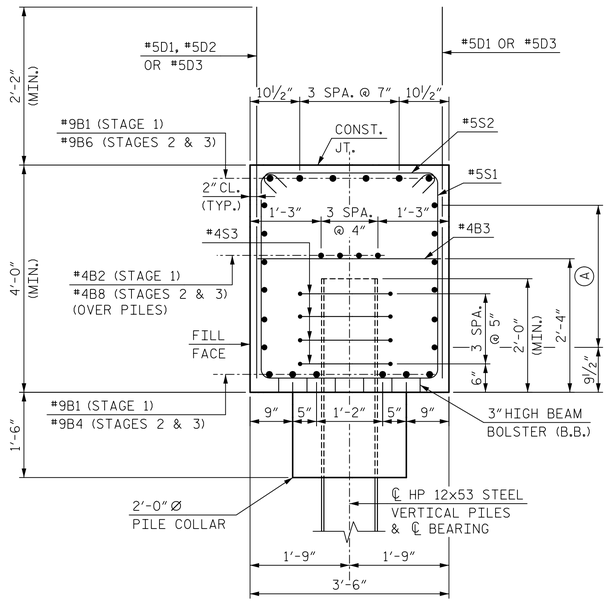
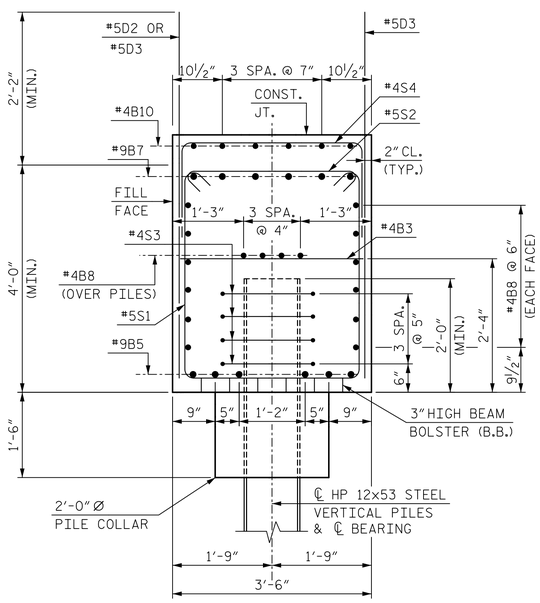
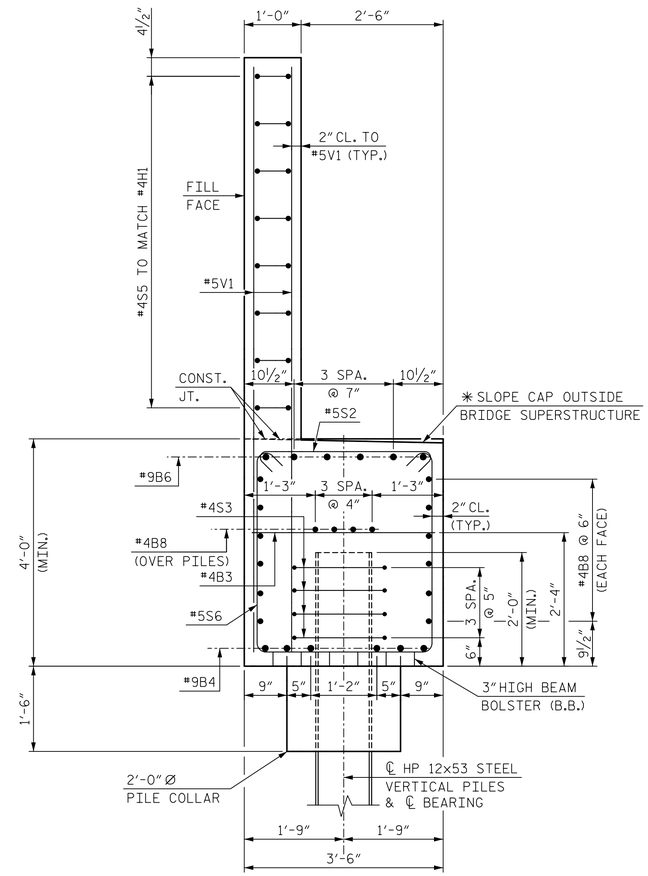


SECTION A-A

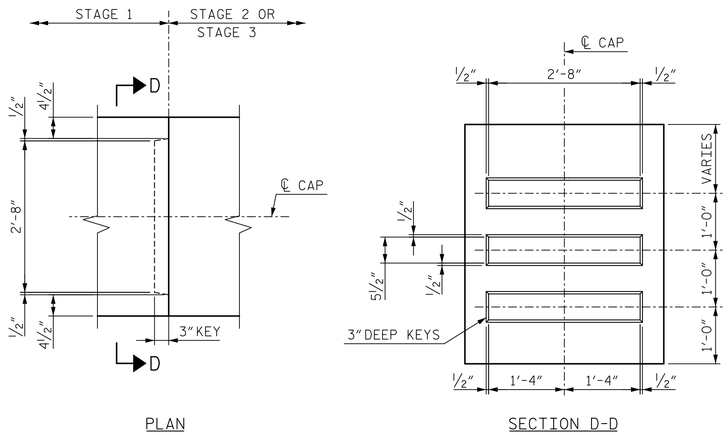
Ⓐ #4B2 @ 6" (STAGE 1)
#4B8 @ 6" (STAGES 2 & 3)
(EACH FACE)



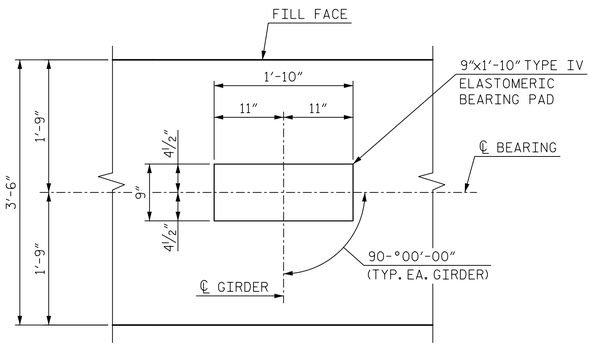
SECTION B-B



SECTION C-C



KEYED CONSTRUCTION JOINT DETAILS



BEARING DETAIL

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

Signed by: R. Greenfield

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HNTB

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

DRAWN BY A. WAGNER DATE 2/19
CHECKED BY L. DICKENS DATE 2/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 54

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-54
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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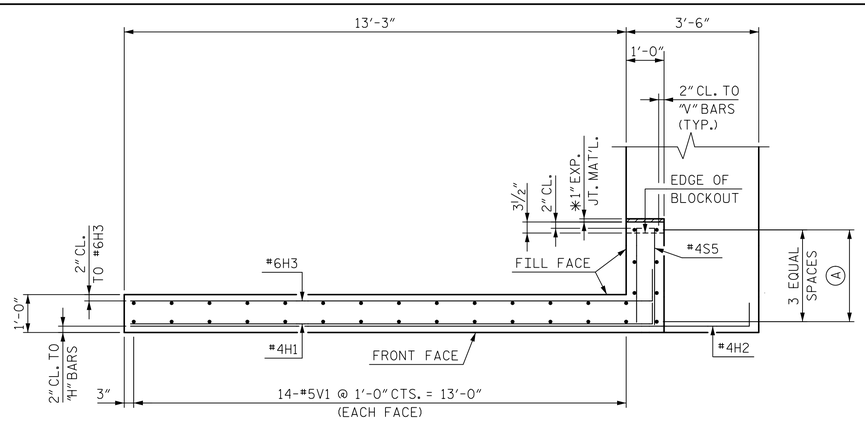
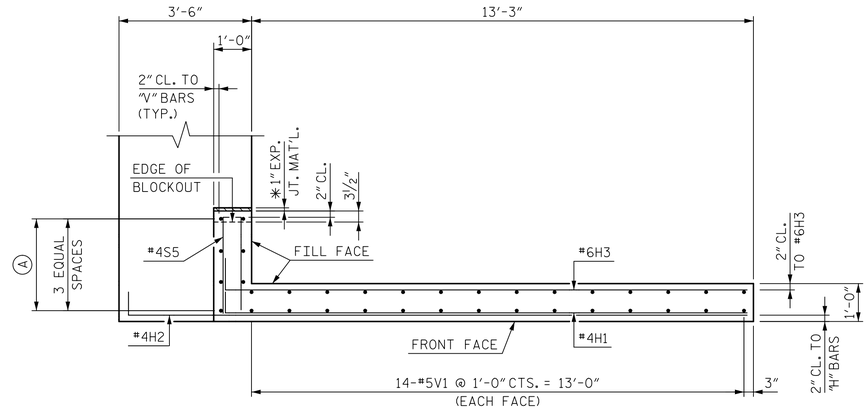


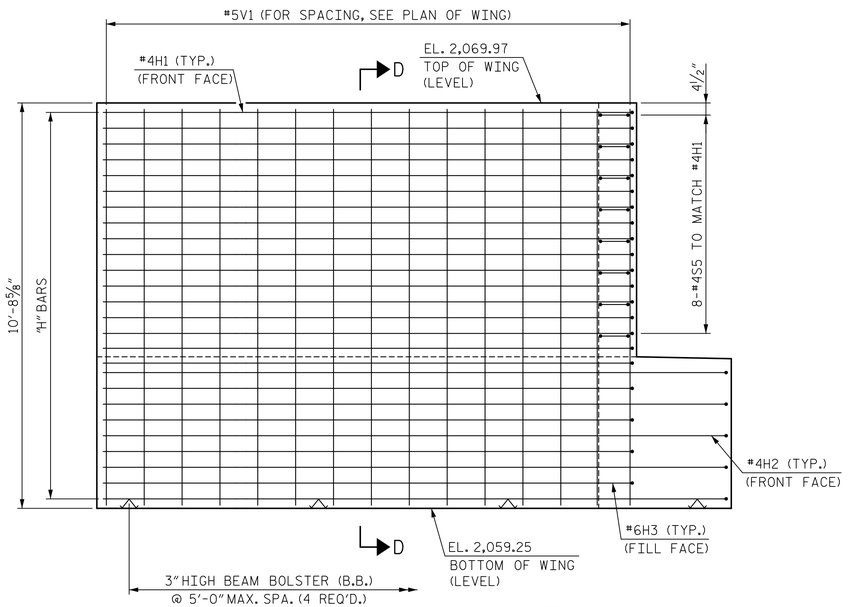
PLAN OF WING (W1)

✳1″ EXP. JT. MAT'L BETWEEN END BENT DIAPHRAGM AND WING

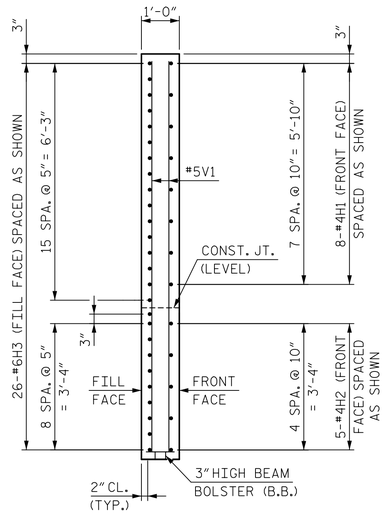
Ⓐ 7-#5V1 (4 FRONT FACE)
(3 FILL FACE)
SPACED AS SHOWN



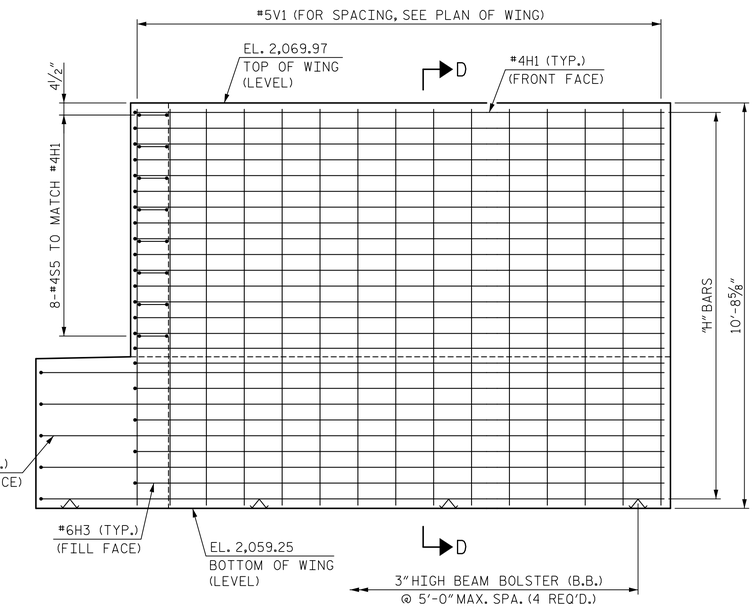
PLAN OF WING (W2)



ELEVATION OF WING (W1)
(STAGE 2 CONSTRUCTION)



SECTION D-D

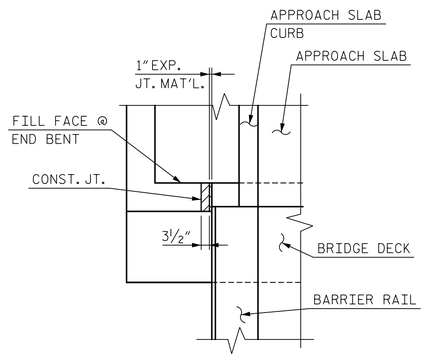


ELEVATION OF WING (W2)
(STAGE 3 CONSTRUCTION)

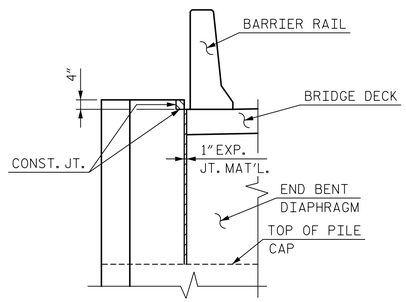
NOTES:

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

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



PLAN



ELEVATION

BLOCKOUT IN WINGWALL

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

Designed by: R. Greenfield

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 6/14/2019 ENGINEER RICHARD R. GREENFIELD

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

DRAWN BY A. WAGNER DATE 2/19
CHECKED BY L. DICKENS DATE 2/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 55

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-55
1			3			TOTAL SHEETS
2			4			60

6/14/2019
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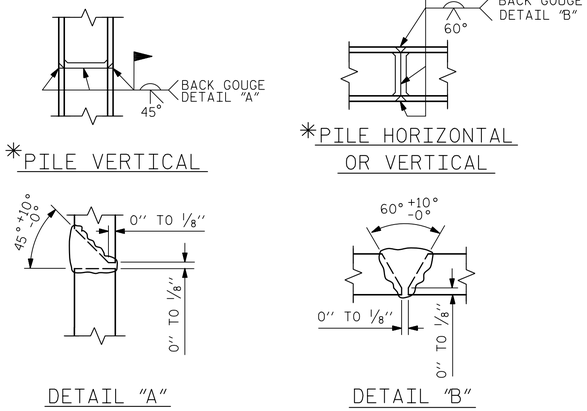


✳PILE VERTICAL

✳PILE HORIZONTAL OR VERTICAL

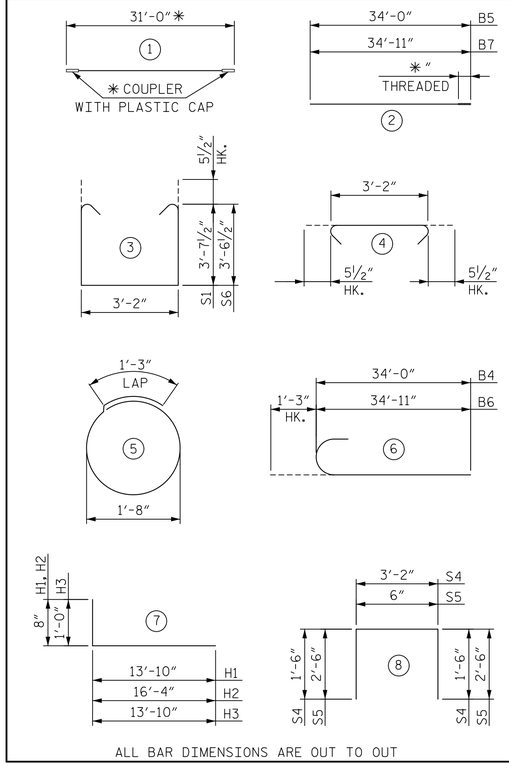
DETAIL "A"

DETAIL "B"

✳ POSITION OF PILE DURING WELDING.

PILE SPLICE DETAILS

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

UNCOATED

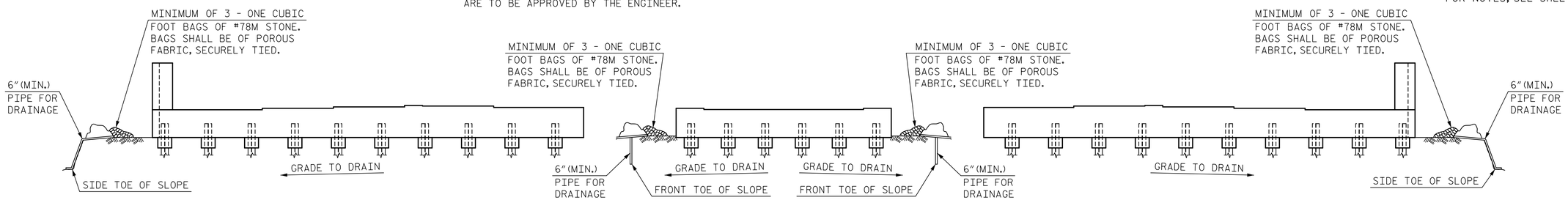
STAGE 1						STAGE 2						STAGE 3					
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT	BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B1	12	9	1	31'-0"	1,265	B3	16	4	STR.	3'-2"	34	B3	16	4	STR.	3'-2"	34
B2	32	4	STR.	19'-3"	411	B4	6	9	6	35'-3"	719	B4	6	9	6	35'-3"	719
B3	8	4	STR.	3'-2"	17	B5	6	9	2	34'-0"	694	B5	6	9	2	34'-0"	694
						B6	6	9	6	36'-2'	738	B6	6	9	6	36'-2'	738
D1	40	5	STR.	6'-2"	257	B7	6	9	2	34'-11"	712	B7	6	9	2	34'-11"	712
D2	12	5	STR.	9'-2"	115	B8	48	4	STR.	22'-4"	716	B8	48	4	STR.	22'-4"	716
						B9	6	4	STR.	10'-1"	40	B9	6	4	STR.	10'-1"	40
S1	24	5	3	11'-4"	284	B10	6	4	STR.	12'-6"	50	B10	6	4	STR.	12'-6"	50
S2	24	5	4	4'-1"	102	B11	6	4	STR.	12'-10"	51	B11	6	4	STR.	12'-10"	51
S3	24	4	5	6'-6"	104												
						D2	23	5	STR.	9'-2"	220	D2	23	5	STR.	9'-2"	220
						D3	82	5	STR.	6'-6"	556	D3	82	5	STR.	6'-6"	556
						H1	8	4	7	14'-6"	77	H1	8	4	7	14'-6"	77
						H2	5	4	7	17'-0"	57	H2	5	4	7	17'-0"	57
						H3	26	6	7	14'-10"	579	H3	26	6	7	14'-10"	579
						S1	48	5	3	11'-4"	567	S1	48	5	3	11'-4"	567
						S2	50	5	4	4'-1"	213	S2	50	5	4	4'-1"	213
						S3	40	4	5	6'-6"	174	S3	40	4	5	6'-6"	174
						S4	25	4	8	6'-2"	103	S4	25	4	8	6'-2"	103
						S5	8	4	8	5'-6"	29	S5	8	4	8	5'-6"	29
						S6	2	5	3	11'-2"	23	S6	2	5	3	11'-2"	23
						V1	35	5	STR.	10'-3"	374	V1	35	5	STR.	10'-3"	374

QUANTITIES			QUANTITIES			QUANTITIES		
REINFORCING STEEL	LBS.	2,555	REINFORCING STEEL	LBS.	6,726	REINFORCING STEEL	LBS.	6,726
CLASS "A" CONCRETE BREAKDOWN			CLASS "A" CONCRETE BREAKDOWN			CLASS "A" CONCRETE BREAKDOWN		
CAP	CU. YDS.	17.5	POUR 1 - CAP & BOT. OF WINGS	CU. YDS.	38.2	POUR 1 - CAP & BOT. OF WINGS	CU. YDS.	38.2
			POUR 2 - TOP OF WINGS	CU. YDS.	4.0	POUR 2 - TOP OF WINGS	CU. YDS.	4.0
			TOTAL	CU. YDS.	42.2	TOTAL	CU. YDS.	42.2
HP 12x53 STEEL PILES	NO.	6	HP 12x53 STEEL PILES	NO.	10	HP 12x53 STEEL PILES	NO.	10
	LIN. FT.	150		LIN. FT.	450		LIN. FT.	300

✳ THE CONTRACTOR MAY MODIFY NOTED BAR DIMENSIONS AS NEEDED TO INSTALL MECHANICAL REBAR COUPLERS PER MANUFACTURER'S RECOMMENDATIONS. CHANGES TO REBAR LENGTH ARE TO BE APPROVED BY THE ENGINEER.

NOTE:

FOR NOTES, SEE SHEET 5 OF 6.



STAGE 2 CONSTRUCTION

STAGE 1 CONSTRUCTION

STAGE 3 CONSTRUCTION

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

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

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

TEMPORARY DRAINAGE AT END BENT 2

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

Digitally signed by: Richard R. Greenfield

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY	A. WAGNER	DATE	2/19
CHECKED BY	L. DICKENS	DATE	2/19
DESIGN ENGINEER OF RECORD	R. GREENFIELD	DATE	4/19

DWG. NO. 56

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-56
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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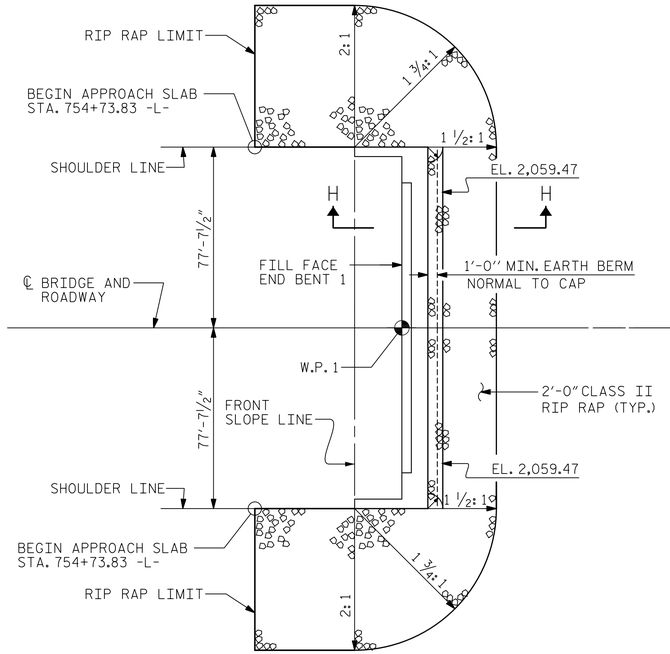
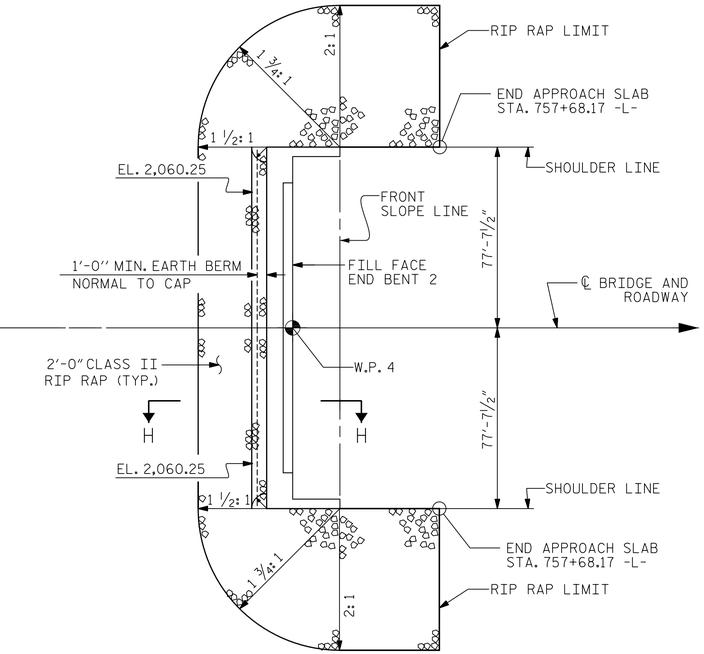
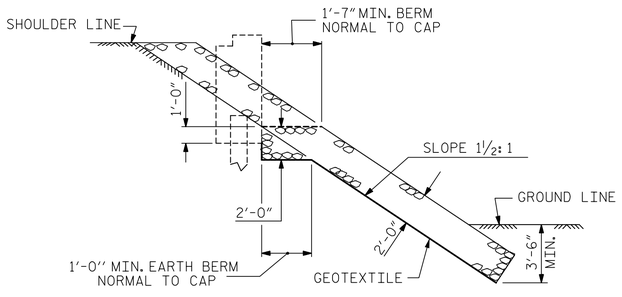


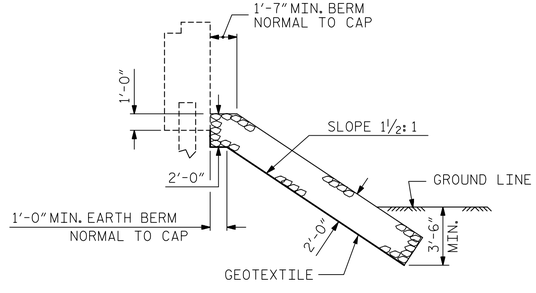
END BENT 1



END BENT 2



SECTION H-H



℄ SECTION
BERM RIP RAPPED

ESTIMATED QUANTITIES

BRIDGE @ STA. 756+21.00 -L-	RIP RAP CLASS II (2'-0" THICK)	GEOTEXTILE FOR DRAINAGE
	TONS	SQUARE YARDS
END BENT 1	474	533
END BENT 2	439	495

NOTE:

FOR GROUND LINE ELEVATIONS, SEE "I-26 MAINLINE BRIDGE OVER CANE CREEK BETWEEN NC 280 AND US 25" SHEET.

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

Digitally signed by: R. Greenfield

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY A. WAGNER DATE 12/18
CHECKED BY R. GREENFIELD DATE 3/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 57

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RIP RAP DETAILS

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-57
1			3			TOTAL SHEETS
2			4			60

4/30/2019
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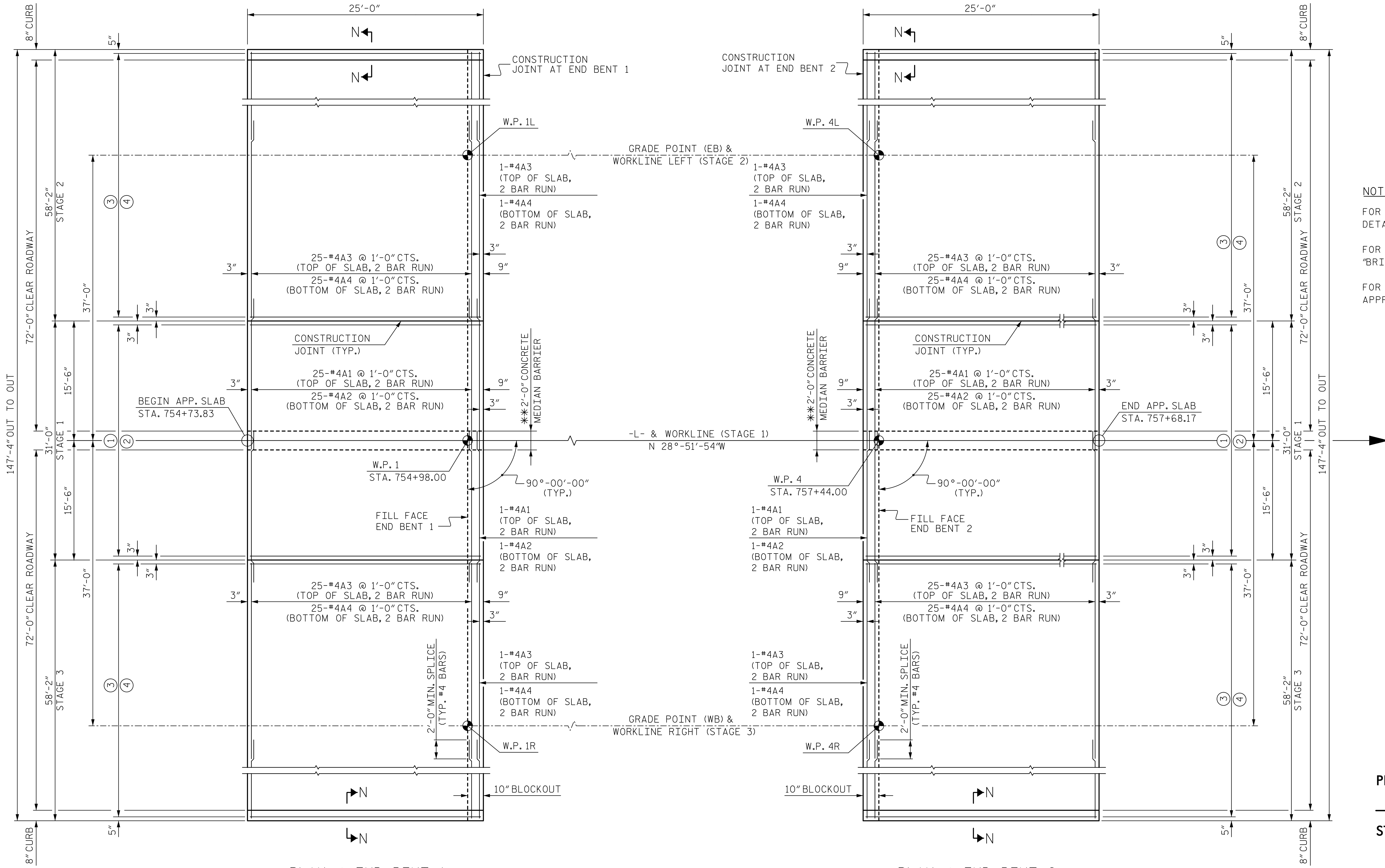

PLAN @ END BENT 1

PLAN @ END BENT 2

NOTES:

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

FOR APPROACH SLAB BILL OF MATERIAL, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET 2 OF 3.

FOR SECTION THROUGH SLAB, SEE "BRIDGE APPROACH SLAB DETAILS" SHEET 2 OF 3.

(1) 62-#5B1 @ 6" CTS. (TOP OF SLAB)
(2) 62-#6B2 @ 6" CTS. (BOTTOM OF SLAB)
(3) 116-#5B3 @ 6" CTS. (TOP OF SLAB)
(4) 116-#6B4 @ 6" CTS. (BOTTOM OF SLAB)

✻✻ BUILD CONCRETE MEDIAN BARRIER DURING STAGE 5 OF THE CONSTRUCTION SEQUENCE. FOR CONSTRUCTION SEQUENCE, SEE "CONSTRUCTION SEQUENCE" SHEETS.

PROJECT NO. I-4400C
HENDERSON COUNTY
STATION: STA. 756+21.00 -L-

SHEET 1 OF 3

NORTH CAROLINA PROFESSIONAL SEAL 47718 ENGINEER RICHARD R. GREENFIELD 5/1/2019
Signed by: R. Greenfield

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

DRAWN BY C. TOMPKINS DATE 2/19
CHECKED BY L. DICKENS DATE 2/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 58

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR INTEGRAL END BENT

REVISIONS							
NO.	BY	DATE	NO.	BY	DATE	SHEET NO.	S4-58
1			3			TOTAL SHEETS	60
2			4				

4/30/2019
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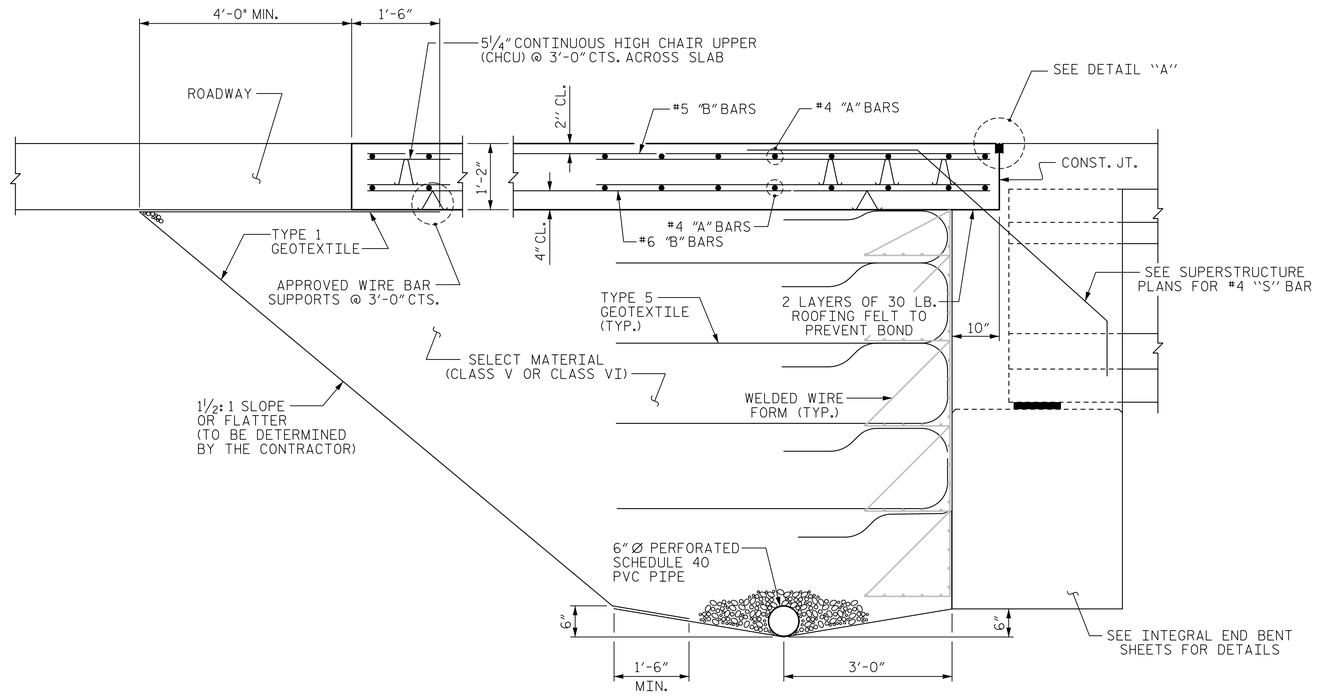
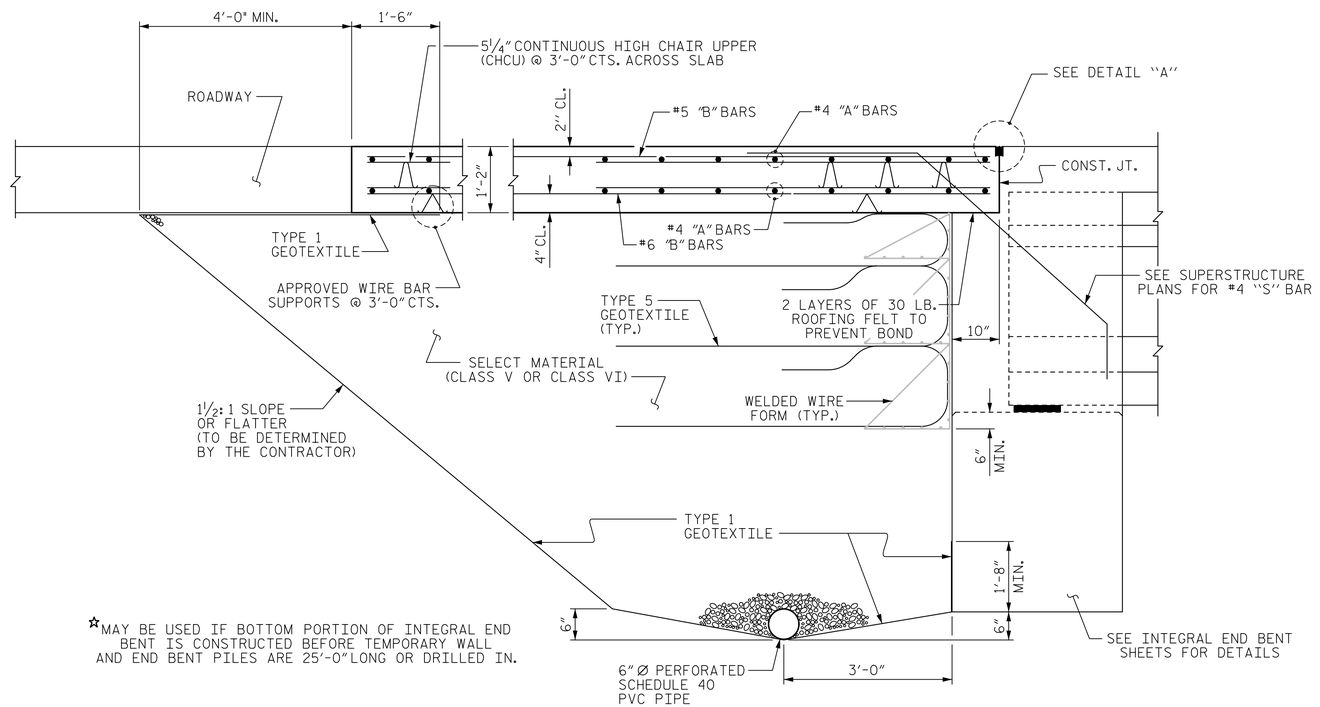


SECTION THRU SLAB

(TYPE A - ALTERNATE APPROACH FILL)



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

SECTION THRU SLAB

☆(TYPE A - ALTERNATE APPROACH FILL)

NOTES

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

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

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

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

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

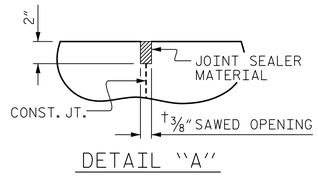
FOR THE 6" Ø DRAINAGE PIPE OUTLET(S), SEE ROADWAY STANDARD DRAWINGS.

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

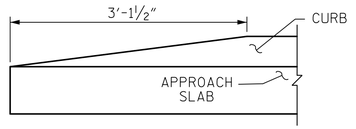
THE JOINT OPENING AT THE APPROACH SLAB/DECK INTERFACE SHALL BE SAWED NO MORE THAN 12 HOURS AFTER THE APPROACH SLAB IS CAST. THE JOINT SHALL BE CLEANED OF ALL DEBRIS BEFORE THE SEALANT IS APPLIED. THE JOINT SEALER MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF SECTION 1028-3 OF THE STANDARD SPECIFICATIONS.

FOR BARRIERS ON APPROACH SLAB SEE "BRIDGE APPROACH SLAB DETAILS" SHEET 3 OF 3.

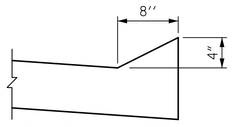
SPLICE LENGTHS		
BAR SIZE	EPOXY COATED	UNCOATED
#4	2'-0"	1'-8"
#5	2'-5"	2'-0"
#6	3'-7"	2'-5"



DETAIL "A"



END OF CURB WITHOUT SHOULDER BERM GUTTER



SECTION N-N

BILL OF MATERIAL

FOR ONE STAGE 1 APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	52	4	STR	18'-8"	648
✳ A2	52	4	STR	18'-8"	648
✳ B1	62	5	STR	24'-8"	1,595
B2	62	6	STR	24'-8"	2,297
REINFORCING STEEL				LBS.	2,297
✳ EPOXY COATED REINFORCING STEEL				LBS.	2,891
CLASS AA CONCRETE				C.Y.	33.5

FOR ONE STAGE 2 APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A3	52	4	STR	30'-0"	1,042
A4	52	4	STR	29'-9"	1,033
✳ B3	116	5	STR	24'-8"	2,984
B4	116	6	STR	24'-8"	4,298
REINFORCING STEEL				LBS.	5,331
✳ EPOXY COATED REINFORCING STEEL				LBS.	4,026
CLASS AA CONCRETE				C.Y.	62.9

FOR ONE STAGE 3 APPROACH SLAB (2 REQ'D)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A3	52	4	STR	30'-0"	1,042
A4	52	4	STR	29'-9"	1,033
✳ B3	116	5	STR	24'-8"	2,984
B4	116	6	STR	24'-8"	4,298
REINFORCING STEEL				LBS.	5,331
✳ EPOXY COATED REINFORCING STEEL				LBS.	4,026
CLASS AA CONCRETE				C.Y.	62.9

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 2 OF 3

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 RICHARD R. GREENFIELD

Signed by: R. Greenfield

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

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

DRAWN BY A. WAGNER DATE 2/19
CHECKED BY L. DICKENS DATE 2/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 59

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-59
1			3			TOTAL SHEETS
2			4			60

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4/30/2019
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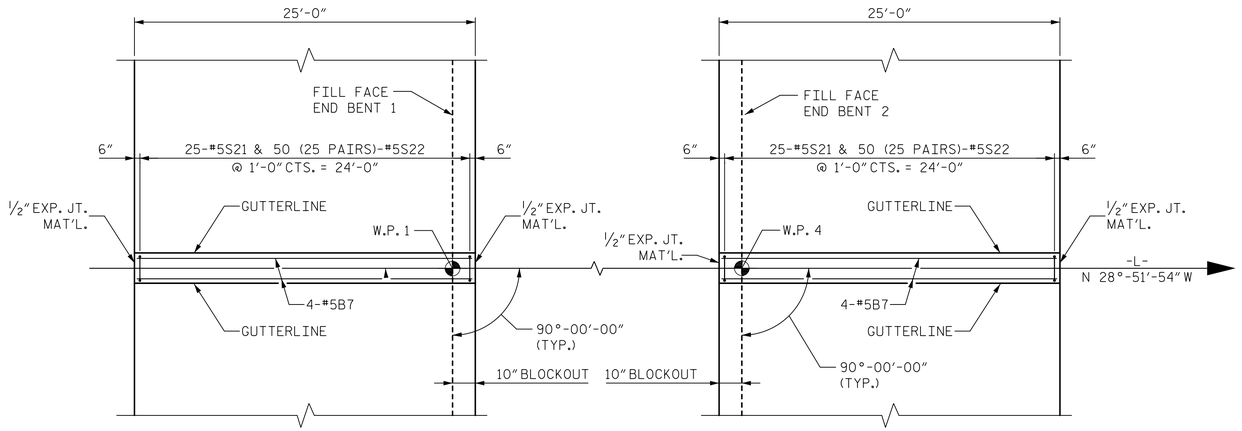
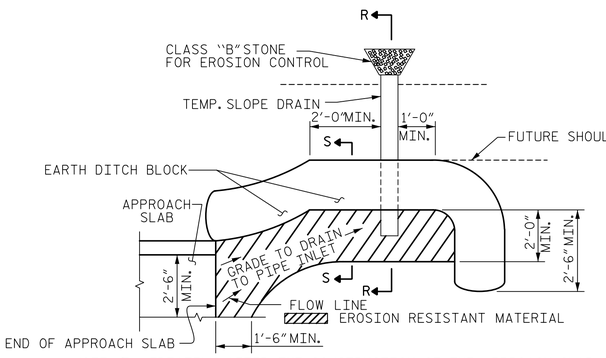
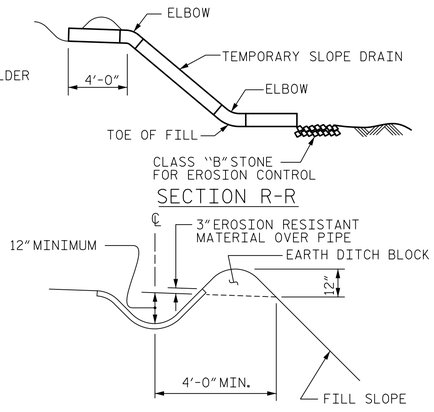


PLAN OF MEDIAN BARRIER RAIL AT APPROACH SLABS



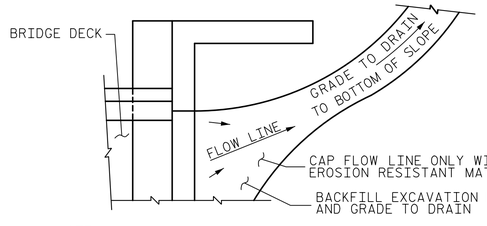
NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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)

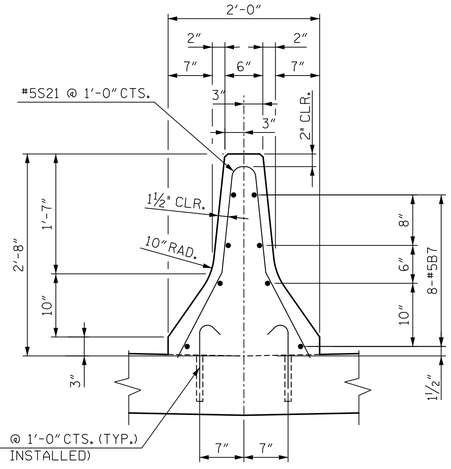
NOTES

BUILD CONCRETE MEDIAN BARRIER DURING STAGE 5 OF THE CONSTRUCTION SEQUENCE. FOR CONSTRUCTION SEQUENCE, SEE "CONSTRUCTION SEQUENCE SHEETS.

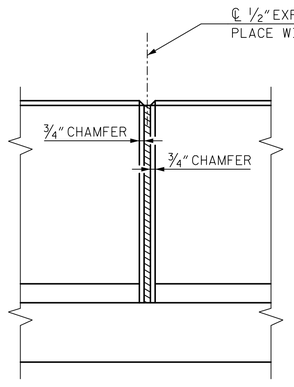
ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

THE #5S22 BARS SHALL BE POST-INSTALLED, USING AN ADHESIVE ANCHORING SYSTEM, DURING THE PRESCRIBED CONSTRUCTION STAGE. THE YIELD LOAD FOR THE #5S22 BARS IS 18.6 KIPS. TYPICAL EMBEDMENT OF #5S22 BARS IS 5". THIS LENGTH SHALL BE ADJUSTED IN ORDER TO ACHIEVE FULL YIELD OF THE BAR BASED ON THE ADHESIVE SYSTEM USED. LEVEL TWO FIELD TESTING IS REQUIRED FOR THE ADHESIVE BONDING SYSTEM.

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



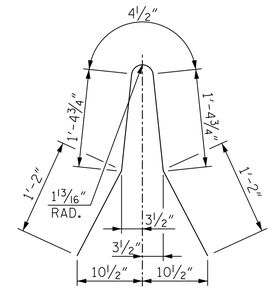
SECTION THRU CONCRETE MEDIAN BARRIER



ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS

BAR TYPES



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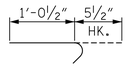

4

ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL
FOR ONE APPROACH SLAB
(2 REQ'D.)

FOR CONCRETE MEDIAN BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳S21	25	#5	3	5'-6"	143
✳S22	50	#5	4	1'-6"	78
✳B7	8	#5	STR	24'-8"	206

✳ EPOXY COATED REINFORCING STEEL	LBS.	427
CLASS AA CONCRETE	CU. YDS.	2.6
CONCRETE BARRIER RAIL	LIN. FT.	25.0

PROJECT NO. I-4400C

HENDERSON COUNTY

STATION: STA. 756+21.00 -L-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB DETAILS

Digitally signed by: Richard R. Greenfield
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47718 5/1/2019 ENGINEER RICHARD R. GREENFIELD

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

DRAWN BY A. WAGNER DATE 2/19
CHECKED BY L. DICKENS DATE 2/19
DESIGN ENGINEER OF RECORD R. GREENFIELD DATE 4/19

DWG. NO. 60

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S4-60
1			3			TOTAL SHEETS
2			4			60

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4/30/2019
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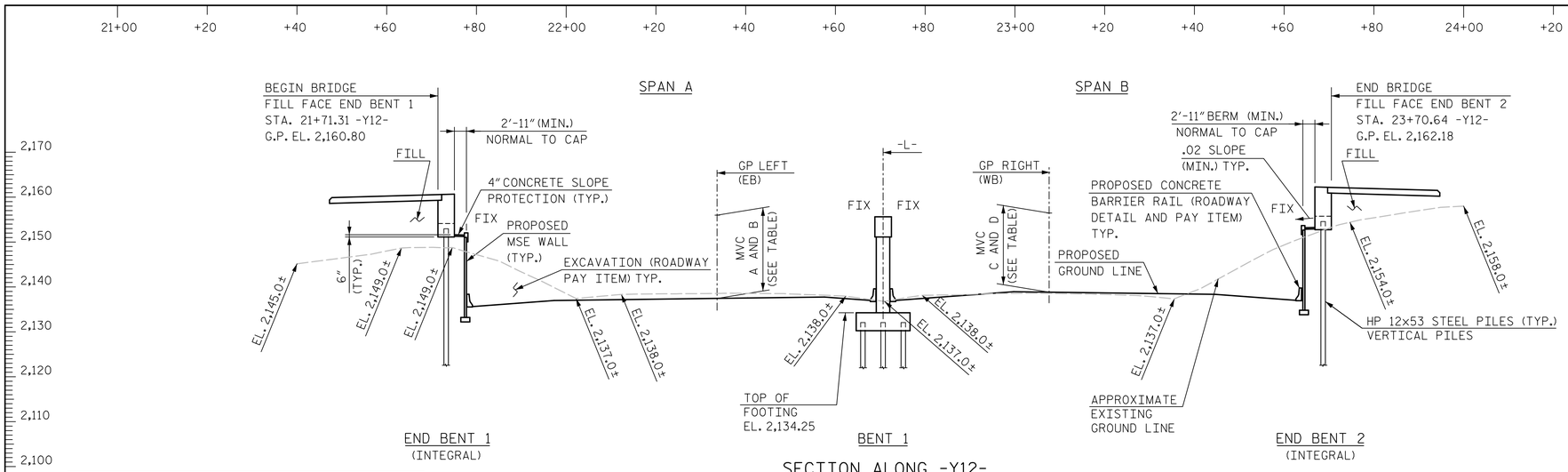
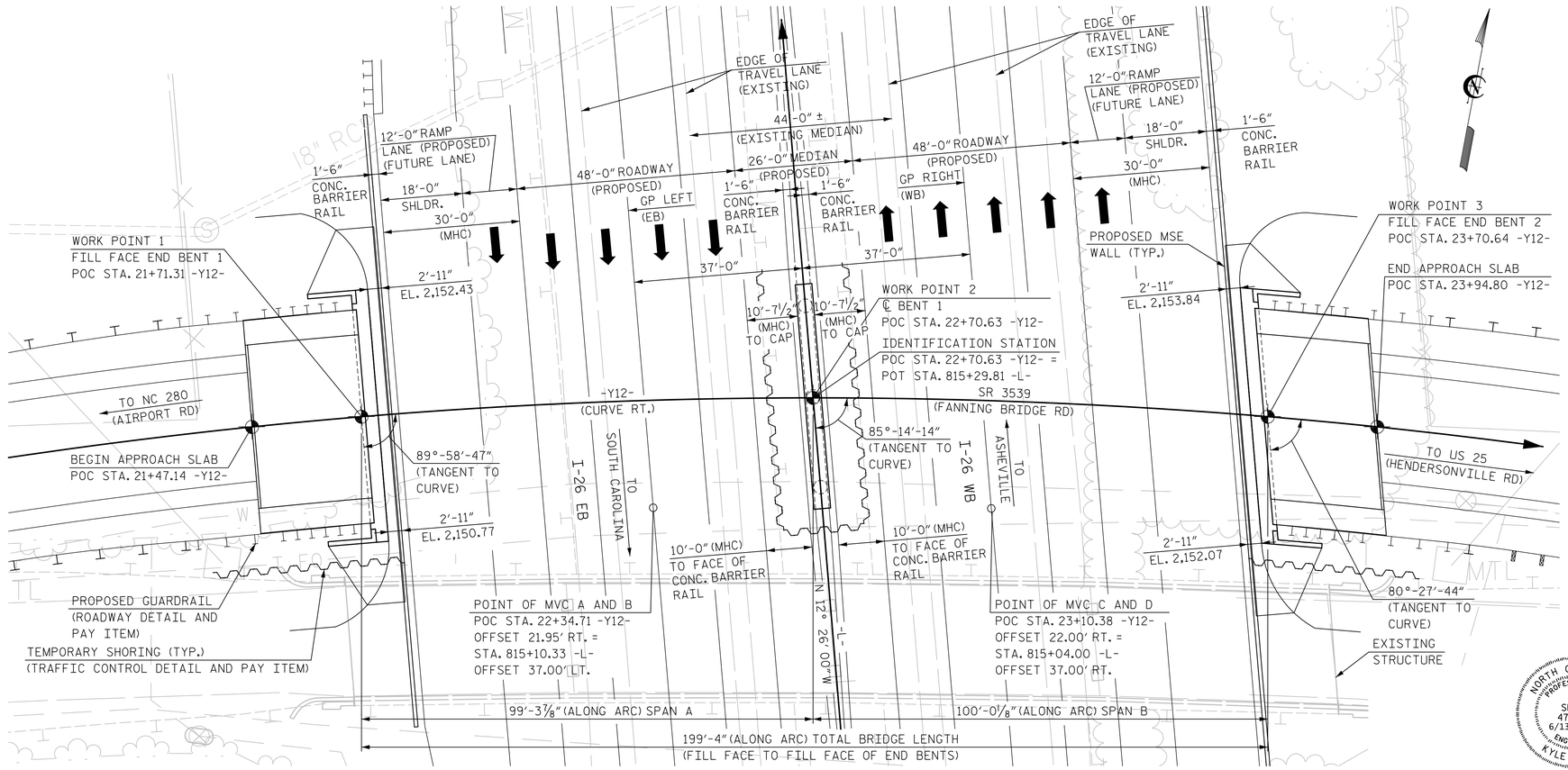
F.A. PROJECT NO. NHPP-026-1(200)13



SECTION ALONG -Y12-

(END BENTS AND BENT SHOWN ON SECTION AT RIGHT ANGLES TO END BENTS AND BENT)

MINIMUM VERTICAL CLEARANCES		
A	PROPOSED BRIDGE TO EXISTING GROUND	17.228
B	PROPOSED BRIDGE TO PROPOSED GROUND	17.193
C	PROPOSED BRIDGE TO EXISTING GROUND	17.655
D	PROPOSED BRIDGE TO PROPOSED GROUND	17.620



PLAN

PILES AND FOOTINGS NOT SHOWN FOR CLARITY
END BENTS AND BENT ARE PARALLEL

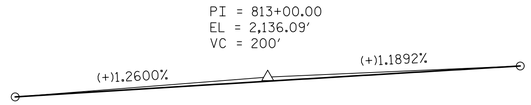
NOTES:

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

PIER HAS NOT BEEN DESIGNED FOR VEHICULAR IMPACT AND MUST BE PROTECTED.

MVC = MINIMUM VERTICAL CLEARANCE

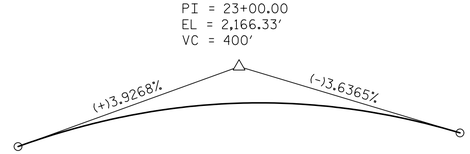
MHC = MINIMUM HORIZONTAL CLEARANCE



GRADE DATA -L- GP LEFT (EB)

PI = 817+00.00
EL = 2,141.13'
VC = 200'

GRADE DATA -L- GP RIGHT (WB)



GRADE DATA -Y12-

CURVE DATA -Y12-

PI STA. 22+86.73
Δ = 27° 24' 10.8" (RT.)
D = 4° 46' 28.7"
L = 573.93'
T = 292.56'
R = 1,200.00'
SE = .03

PROJECT NO. I-4400C

BUNCOMBE **COUNTY**

STATION: POC 22+70.63 -Y12- =
POT 815+29.81 -L-

SHEET 1 OF 4 REPLACES BRIDGE NO. 008

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

BRIDGE ON SR 3539 (FANNING BRIDGE ROAD) OVER I-26 BETWEEN NC 280 AND US 25

Digitally signed by: CARL K. ERVIN
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047328
SEAL 47328 6/13/2019 ENGINEER KYLE ERVIN

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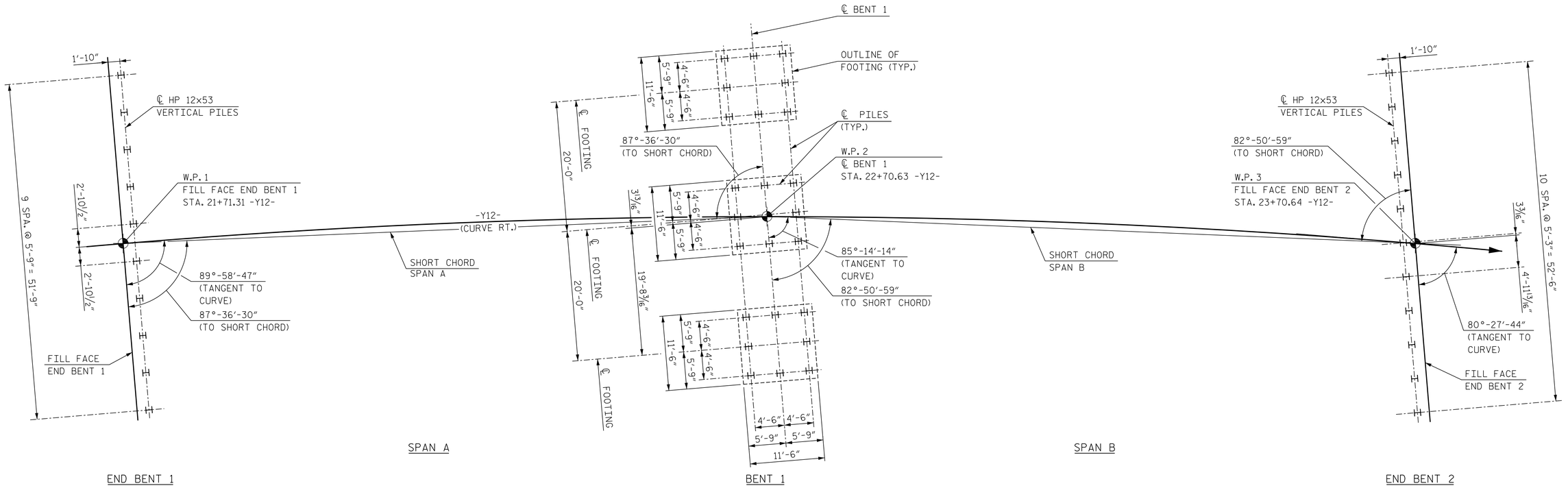
HNTB NORTH CAROLINA, P.C.
NC License No. C-1554
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

DRAWN BY B. VAUGHN DATE 11/18
CHECKED BY K. ERVIN DATE 11/18
DESIGN ENGINEER OF RECORD K. ERVIN DATE 11/18

DWG. NO. 1

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



FOUNDATION LAYOUT

NOTES:

ALL DIMENSIONS ARE PARALLEL OR NORMAL TO FILL FACES AT END BENTS AND ℄ BENT AT BENT NO. 1.

ALL PILE DIMENSIONS ARE TO CENTERS OF PILES.

ALL PILES ARE HP 12x53 STEEL PILES.

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

ALL PILES ARE VERTICAL.

FOUNDATION NOTES:

FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

PILES AT END BENT NO. 1 AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS AND 102 TONS PER PILE, RESPECTIVELY.

DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 185 TONS AND 170 TONS PER PILE, RESPECTIVELY.

PILES AT BENT NO. 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 110 TONS PER PILE.

DRIVE PILES AT BENT NO. 1 TO A REQUIRED DRIVING RESISTANCE OF 185 TONS PER PILE.

Digitally signed by CARLTON K. ERVIN
NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 47328 5/14/2019 ENGINEER KYLE ERVIN

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

DRAWN BY B. VAUGHN DATE 11/18
CHECKED BY K. ERVIN DATE 11/18
DESIGN ENGINEER OF RECORD K. ERVIN DATE 11/18

DWG. NO. 2

PROJECT NO. I-4400C
BUNCOMBE **COUNTY**
STATION: POC 22+70.63 -Y12-

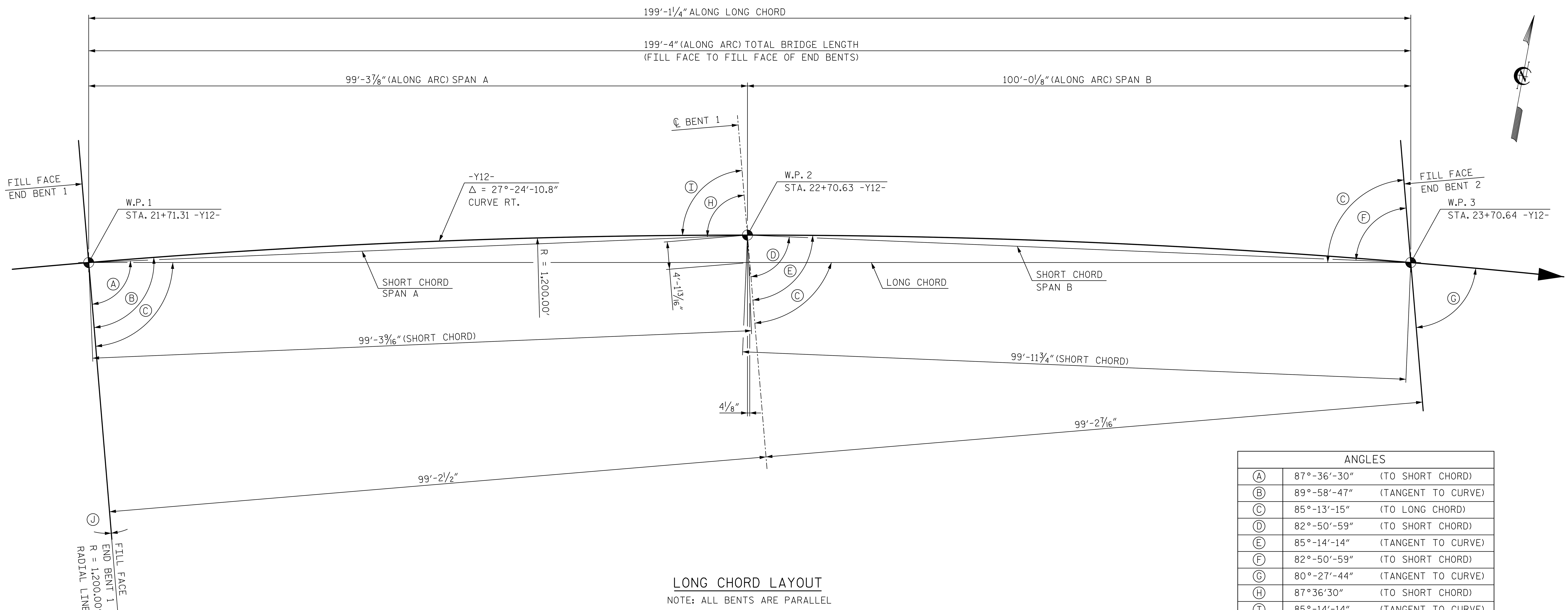
SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

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



LONG CHORD LAYOUT

NOTE: ALL BENTS ARE PARALLEL

ANGLES		
(A)	87°-36'-30"	(TO SHORT CHORD)
(B)	89°-58'-47"	(TANGENT TO CURVE)
(C)	85°-13'-15"	(TO LONG CHORD)
(D)	82°-50'-59"	(TO SHORT CHORD)
(E)	85°-14'-14"	(TANGENT TO CURVE)
(F)	82°-50'-59"	(TO SHORT CHORD)
(G)	80°-27'-44"	(TANGENT TO CURVE)
(H)	87°36'30"	(TO SHORT CHORD)
(I)	85°-14'-14"	(TANGENT TO CURVE)
(J)	00°-01'-13"	(TO RADIAL LINE)

PROJECT NO. I-4400C

BUNCOMBE COUNTY

STATION: POC 22+70.63 -Y12-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LONG CHORD LAYOUT

NORTH CAROLINA PROFESSIONAL SEAL 47328 5/14/2019 ENGINEER KYLE ERVIN

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

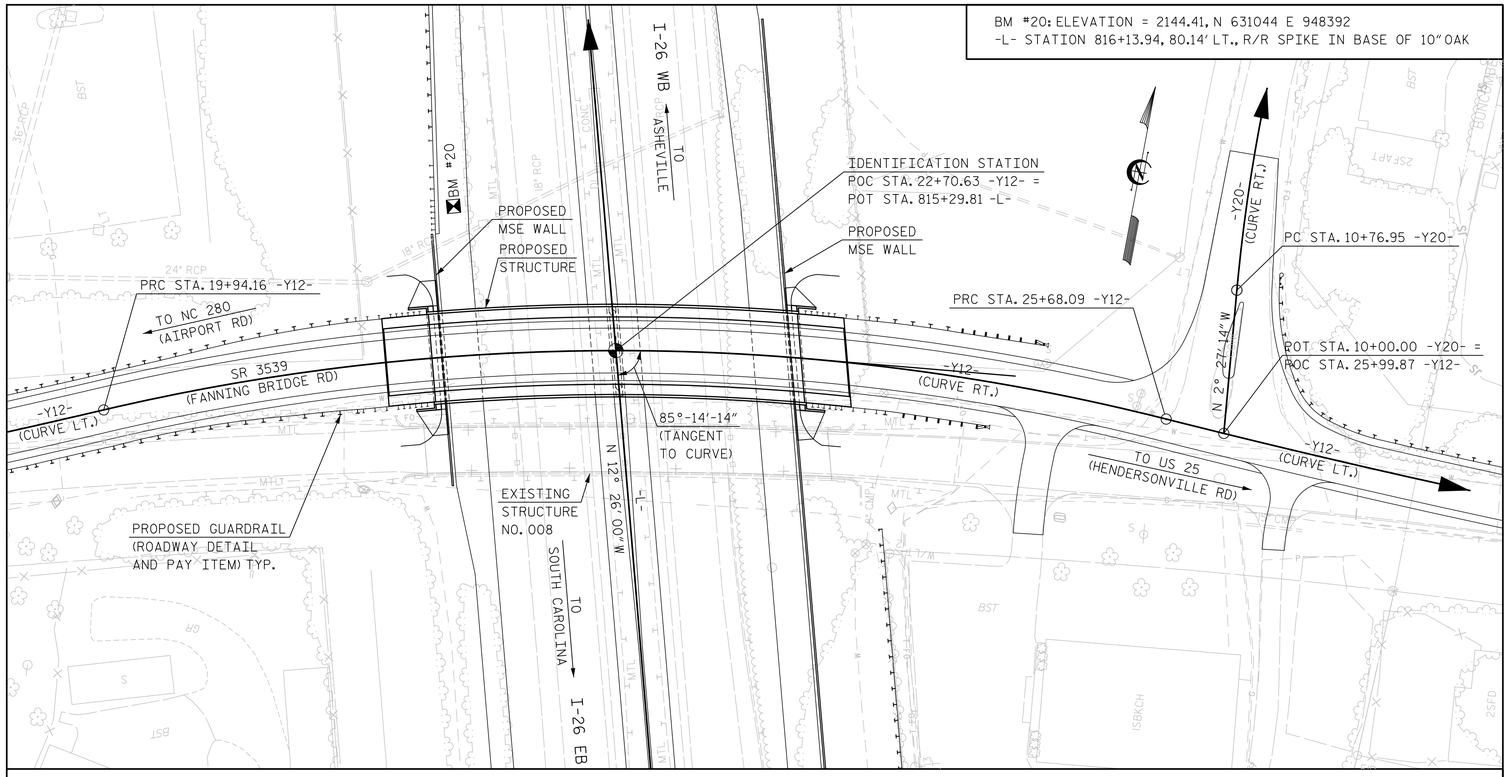
DRAWN BY B. VAUGHN DATE 11/18
CHECKED BY K. ERVIN DATE 1/19
DESIGN ENGINEER OF RECORD K. ERVIN DATE 11/18

DWG. NO. 3

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

SHEET NO. S5-3

TOTAL SHEETS 37



LOCATION SKETCH

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

TOTAL BILL OF MATERIAL

	REMOVAL OF EXISTING STRUCTURE AT STATION 22+70.63 -Y12-	ASBESTOS ASSESSMENT	FOUNDATION EXCAVATION FOR BENT 1 AT STA. 22+70.63 -Y12-	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS A CONCRETE	BRIDGE APPR. SLABS, STATION 22+70.63 -Y12-	REINFORCING STEEL
	LUMP SUM	LUMP SUM	LUMP SUM	SQ. FEET	SQ. FEET	CU. YARDS	LUMP SUM	LBS.
SUPERSTRUCTURE	———	———	———	9,933	8,107	———	LUMP SUM	———
END BENT 1	———	———	———	———	———	42.4	———	6,564
BENT 1	———	———	LUMP SUM	———	———	132.8	———	23,685
END BENT 2	———	———	———	———	———	42.8	———	6,531
TOTAL	LUMP SUM	LUMP SUM	LUMP SUM	9,933	8,107	218.0	LUMP SUM	36,780

TOTAL BILL OF MATERIAL

	SPIRAL COLUMN REINFORCING STEEL	54" PRESTRESSED CONCRETE GIRDERS		PILE DRIVING EQUIPMENT SETUP FOR HP 12 x 53 STEEL PILES	HP 12 x 53 STEEL PILES		ANODIZED THREE BAR METAL RAIL	4" SLOPE PROTECTION	ELASTOMERIC BEARINGS	ARCHITECTURAL CONCRETE SURFACE TREATMENT	APPLICATION OF BRIDGE COATING
	LBS.	NO.	L.F.	EACH	NO.	L.F.	L.F.	SQ. YARDS	LUMP SUM	SQ. FEET	LUMP SUM
SUPERSTRUCTURE	———	12	1,177.06	———	——	——	380.10	———	LUMP SUM	861	LUMP SUM
END BENT 1	———	——	——	10	10	695	———	56	———	509	———
BENT 1	1,158	——	——	24	24	1,098	———	———	———	668	LUMP SUM
END BENT 2	———	——	——	11	11	627	———	51	———	514	———
TOTAL	1,158	12	1,177.06	45	45	2,420	380.10	107	LUMP SUM	2,552	LUMP SUM

GENERAL NOTES:

ASSUMED LIVE LOAD = HL-93 OR ALTERNATE LOADING.

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

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR ARCHITECTURAL CONCRETE SURFACE TREATMENT, SEE SPECIAL PROVISIONS.

FOR APPLICATION OF BRIDGE COATING, SEE SPECIAL PROVISIONS.

FOR ANODIZED THREE BAR METAL RAIL, SEE SPECIAL PROVISIONS.

THE ELEVATION(S) AND CLEARANCE(S) SHOWN ON THE PLANS AT THE POINT(S) OF MINIMUM VERTICAL CLEARANCE ARE FROM THE BEST INFORMATION AVAILABLE. PRIOR TO BEGINNING BRIDGE CONSTRUCTION, VERIFY THE ELEVATION(S) ON THE EXISTING PAVEMENT AND CHECK THE CLEARANCE. REPORT ANY VARIATIONS TO THE ENGINEER. ANY PLAN REVISIONS NECESSARY TO ACHIEVE THE REQUIRED MINIMUM VERTICAL CLEARANCE WILL BE PROVIDED BY THE DEPARTMENT.

FOR MAINTENANCE AND PROTECTION OF TRAFFIC BENEATH PROPOSED STRUCTURE, SEE SPECIAL PROVISIONS.

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.

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.

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

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

AFTER SERVING AS A TEMPORARY STRUCTURE, THE EXISTING STRUCTURE CONSISTING OF 4 SPAN (51.0'-57.6'-57.6'-54.8') CONCRETE DECK ON STEEL I-GIRDERS, WITH 24.0' CLEAR ROADWAY WIDTH, SUPPORTED BY PILE BENT CONCRETE END BENTS AND CONCRETE POST AND BEAM BENTS ON PILE FOOTINGS, AND LOCATED ADJACENT TO THE PROPOSED STRUCTURE SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED 37T-SINGLE/40T-TRAILER. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, THE LOAD LIMIT MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

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.

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.

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

INASMUCH AS THE PAINT SYSTEM ON THE EXISTING STRUCTURAL STEEL CONTAINS LEAD, THE CONTRACTOR'S ATTENTION IS DIRECTED TO ARTICLE 107-1 OF THE STANDARD SPECIFICATIONS. ANY COSTS RESULTING FROM COMPLIANCE WITH APPLICABLE STATE OR FEDERAL REGULATIONS PERTAINING TO HANDLING OF MATERIAL CONTAINING LEAD BASED PAINT SHALL BE INCLUDED IN THE BID PRICE FOR "REMOVAL OF EXISTING STRUCTURES AT STATION 22+70.63 -Y12-".

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

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

NOTE:

SAMPLE BAR REPLACEMENT LENGTHS BASED ON 30" (SAMPLE LENGTH) PLUS TWO SPLICE LENGTHS AND fy = 60ksi. BAR LENGTHS IN THIS TABLE ARE A GUIDE. THE ENGINEER SHALL APPROVE FINAL LENGTHS BASED ON THE TYPE AND LOCATION OF SAMPLE BAR.

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47328 KYLE ERVIN 6/7/2019

PROJECT NO. I-4400C

BUNCOMBE COUNTY

STATION: POC 22+70.63 -Y12-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

LOCATION SKETCH, GENERAL NOTES, AND TOTAL BILL OF MATERIAL

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

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

LEVEL		VEHICLE	WEIGHT (W) (TONS)	⟨#⟩ CONTROLLING LOAD RATING	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE III LIMIT STATE						COMMENT NUMBER
								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⟩	1.10	--	1.75	0.73	1.42	B	ER	48.5	0.90	1.47	B	I	28.8	0.80	0.72	1.10	B	I	48.5	
		HL-93 (OPERATING)	N/A	--	1.84	--	1.35	0.73	1.84	B	ER	48.5	0.90	2.06	B	I	19.0	N/A	--	--	--	--	--	
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.54	55.4	1.75	0.73	1.98	B	ER	48.5	0.90	2.08	B	I	19.0	0.80	0.72	1.54	B	I	48.5	
		HS-20 (OPERATING)	36.000	--	2.57	92.5	1.35	0.73	2.57	B	ER	48.5	0.90	2.76	B	I	19.0	N/A	--	--	--	--	--	
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500	--	3.68	49.7	1.40	0.73	5.91	B	ER	48.5	0.90	7.11	B	I	19.0	0.80	0.72	3.68	B	I	48.5	
		SNGARBS2	20.000	--	2.65	53.0	1.40	0.73	4.26	B	ER	48.5	0.90	4.97	B	I	19.0	0.80	0.72	2.65	B	I	48.5	
		SNAGRIS2	22.000	--	2.47	54.3	1.40	0.73	3.97	B	ER	48.5	0.90	4.58	B	I	19.0	0.80	0.72	2.47	B	I	48.5	
		SNCOTTS3	27.250	--	1.82	49.6	1.40	0.73	2.92	B	ER	48.5	0.90	3.40	B	I	19.0	0.80	0.72	1.82	B	I	48.5	
		SNAGGRS4	34.925	--	1.49	52.0	1.40	0.73	2.39	B	ER	48.5	0.90	2.63	B	I	78.0	0.80	0.72	1.49	B	I	48.5	
		SNS5A	35.550	--	1.46	51.9	1.40	0.73	2.35	B	ER	48.5	0.90	2.65	B	I	78.0	0.80	0.72	1.46	B	I	48.5	
		SNS6A	39.950	--	1.33	53.1	1.40	0.73	2.13	B	ER	48.5	0.90	2.39	B	I	19.0	0.80	0.72	1.33	B	I	48.5	
		SNS7B	42.000	--	1.26	52.9	1.40	0.73	2.03	B	ER	48.5	0.90	2.29	B	I	78.0	0.80	0.72	1.26	B	I	48.5	
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000	--	1.62	53.5	1.40	0.73	2.60	B	ER	48.5	0.90	2.85	B	I	19.0	0.80	0.72	1.62	B	I	48.5	
		TNT4A	33.075	--	1.62	53.6	1.40	0.73	2.60	B	ER	48.5	0.90	3.01	B	I	19.0	0.80	0.72	1.62	B	I	48.5	
		TNT6A	41.600	--	1.31	54.5	1.40	0.73	2.10	B	ER	48.5	0.90	2.47	B	I	19.0	0.80	0.72	1.31	B	I	48.5	
		TNT7A	42.000	--	1.31	55.0	1.40	0.73	2.11	B	ER	48.5	0.90	2.42	B	I	19.0	0.80	0.72	1.31	B	I	48.5	
		TNT7B	42.000	--	1.34	56.3	1.40	0.73	2.15	B	ER	48.5	0.90	2.28	B	I	78.0	0.80	0.72	1.34	B	I	48.5	
		TNAGRIT4	43.000	--	1.29	55.5	1.40	0.73	2.07	B	ER	48.5	0.90	2.25	B	I	19.0	0.80	0.72	1.29	B	I	48.5	
		TNAGT5A	45.000	--	1.22	54.9	1.40	0.73	1.96	B	ER	48.5	0.90	2.14	B	I	19.0	0.80	0.72	1.22	B	I	48.5	
		TNAGT5B	45.000	⟨3⟩	1.21	54.5	1.40	0.73	1.94	B	ER	48.5	0.90	2.13	B	I	19.0	0.80	0.72	1.21	B	I	48.5	

LOAD FACTORS:

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

NOTES:

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

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

COMMENTS:

1.
2.
3.
4.

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

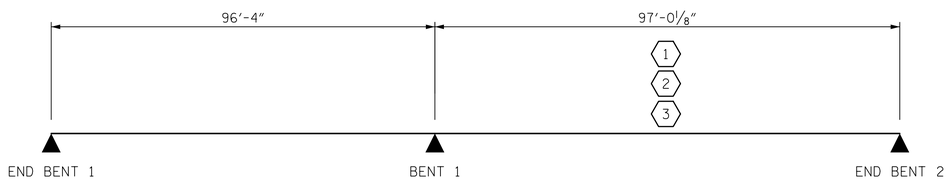
⟨2⟩ DESIGN LOAD RATING (HS-20)

⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

NOTE: SPAN LENGTHS ARE BEARING TO BEARING LENGTHS.

PROJECT NO. I-4400C

BUNCOMBE COUNTY

STATION: POC 22+70.63 -Y12-

Digitally signed by: KYLE R. ERVIN
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47328 ENGINEER KYLE ERVIN
SEAL 47328 5/14/2019

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

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

SHEET NO. S5-5

TOTAL SHEETS 37

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

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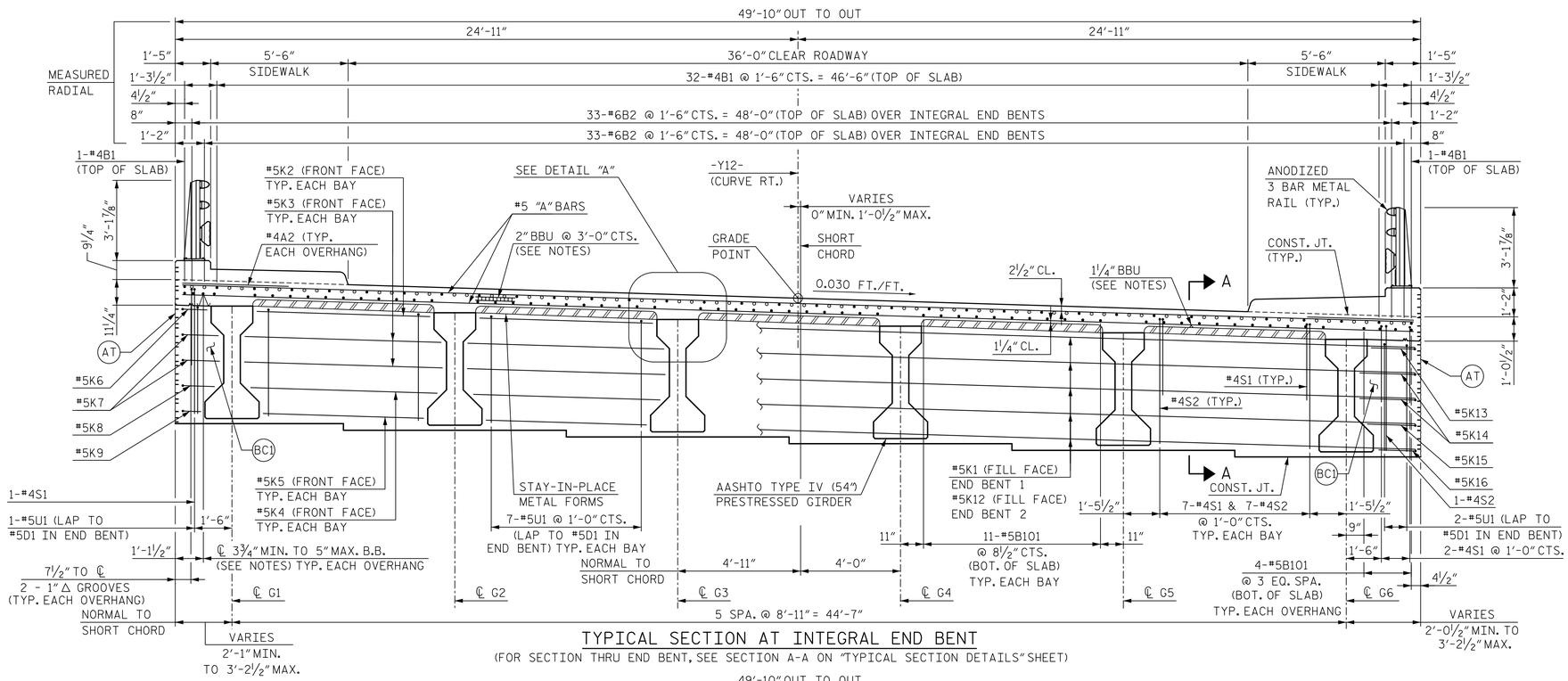
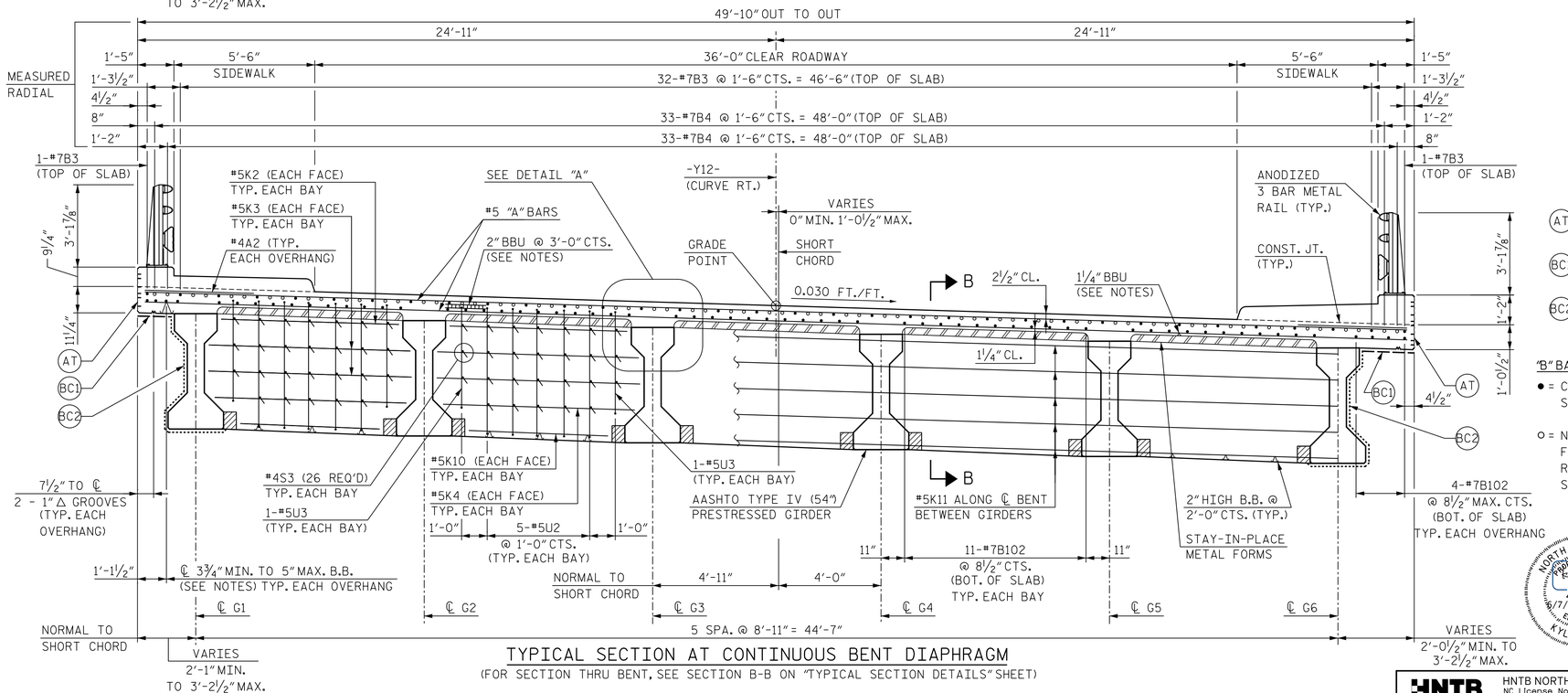
CHECKED BY : K. ERVIN	DATE : 2/19		
DRAWN BY : MAA 1/08	REV. 11/12/08RR	MAA/GM	
CHECKED BY : GM/DI 2/08	REV. 10/1/11	MAA/GM	
	REV. 12/17	MAA/THG	

STD. NO. LRFR1



TYPICAL SECTION AT INTEGRAL END BENT

(FOR SECTION THRU END BENT, SEE SECTION A-A ON "TYPICAL SECTION DETAILS" SHEET)



TYPICAL SECTION AT CONTINUOUS BENT DIAPHRAGM

(FOR SECTION THRU BENT, SEE SECTION B-B ON "TYPICAL SECTION DETAILS" SHEET)

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 (CHCM) AT 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF "A" BARS A CLEAR DISTANCE OF 2½" ABOVE THE TOP OF THE REMOVABLE FORM.

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

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

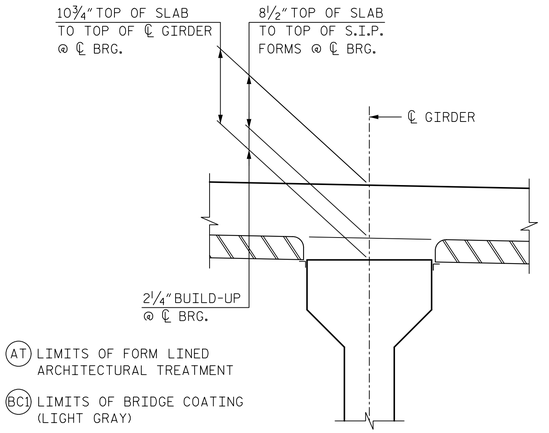
CONCRETE SIDEWALK AND CONCRETE PARAPET IN A CONTINUOUS UNIT SHALL NOT BE CAST UNTIL ALL SLAB CONCRETE IN THAT UNIT HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

TO MAINTAIN PROPER LOCATION OF "A" BARS IN THE TOP OF SLAB, BBU DEPTH MUST VARY IN UNIT AS THE MAXIMUM SIZE OF THE "B" BARS IN THE TOP OF THE SLAB VARIES. A 2¼" BBU SHALL BE USED WHERE ONLY #4 "B" BARS ARE PRESENT. WHERE #6 OR #7 "B" BARS ARE PRESENT, A 2" BBU SHALL BE USED.

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

FOR WING DETAILS, SEE "END BENT 1" AND "END BENT 2" SHEETS.

ALL REINFORCEMENT SHALL HAVE A 2" MIN. CLEAR UNLESS NOTED OTHERWISE.



DETAIL A

(AT) LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

(BC1) LIMITS OF BRIDGE COATING (LIGHT GRAY)

(BC2) LIMITS OF BRIDGE COATING (DARK GRAY)

"B" BAR KEY

● = CONTINUOUS BAR RUN, SEE PLAN OF SPAN SHEETS

○ = NON-CONTINUOUS BAR RUN FOR NEGATIVE MOMENT REGIONS, SEE PLAN OF SPAN SHEETS

PROJECT NO. I-4400C

BUNCOMBE COUNTY

STATION: POC 22+70.63 -Y12-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTIONS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047328 6/7/2019 ENGINEER KYLE ERVIN

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DWG. NO. 6

REVISIONS						SHEET NO.
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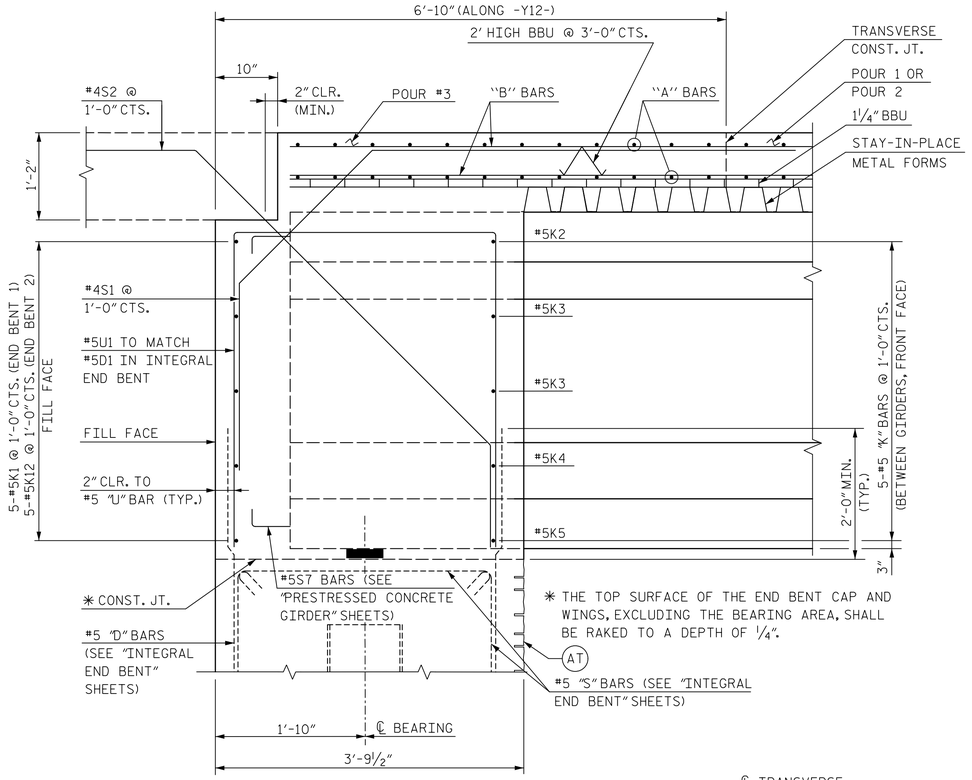
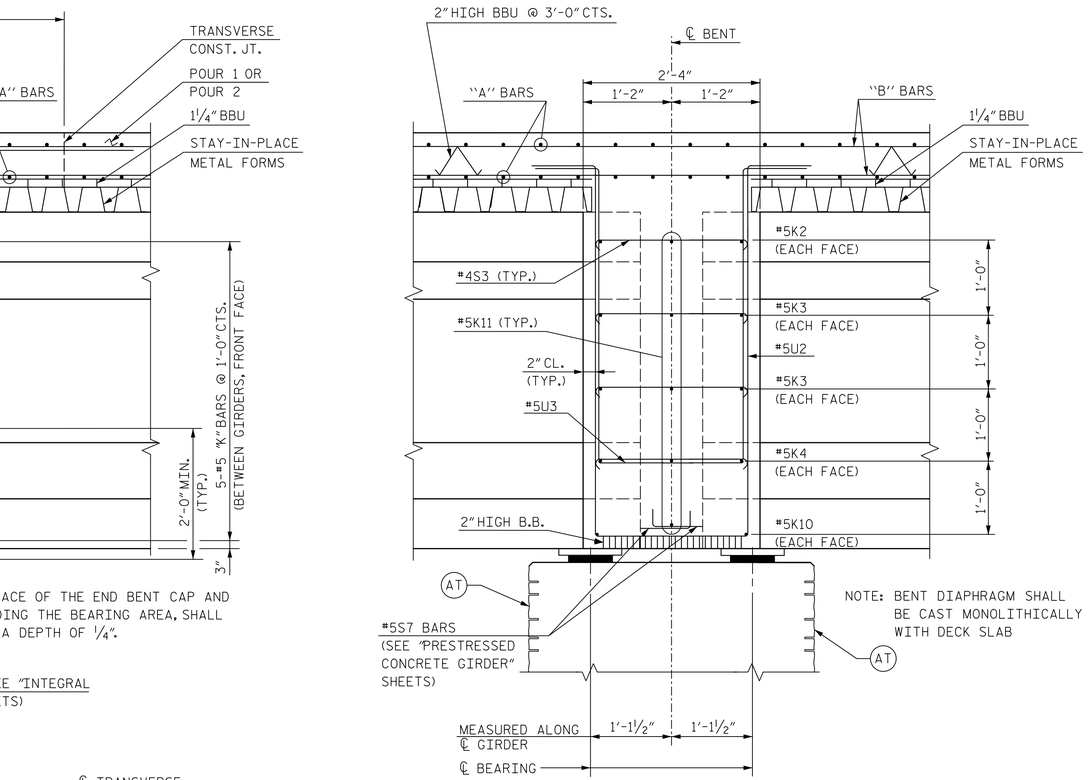
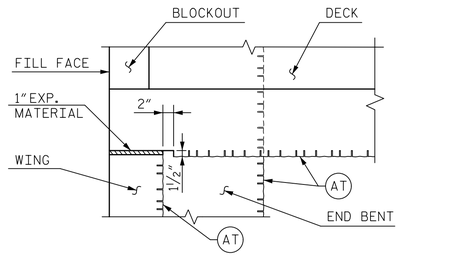
1			3			TOTAL SHEETS
2			4			37



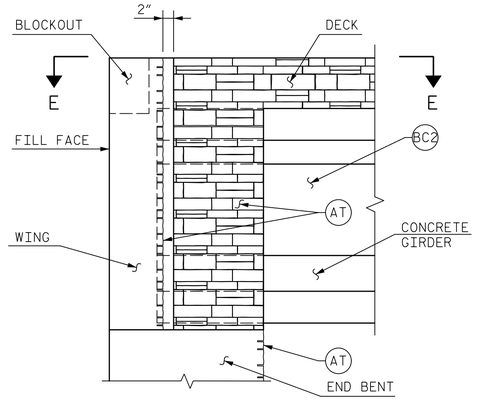
SECTION A-A
(END BENT 1 SHOWN, END BENT 2 SIMILAR, UNO)



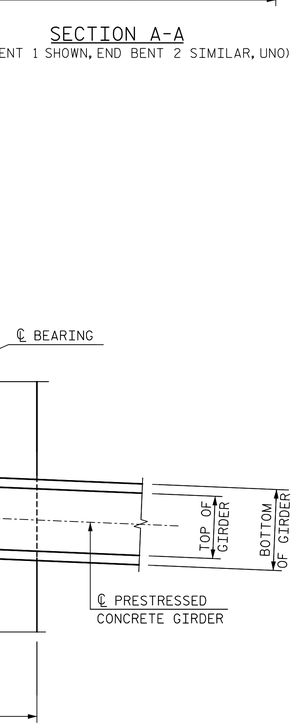
SECTION B-B



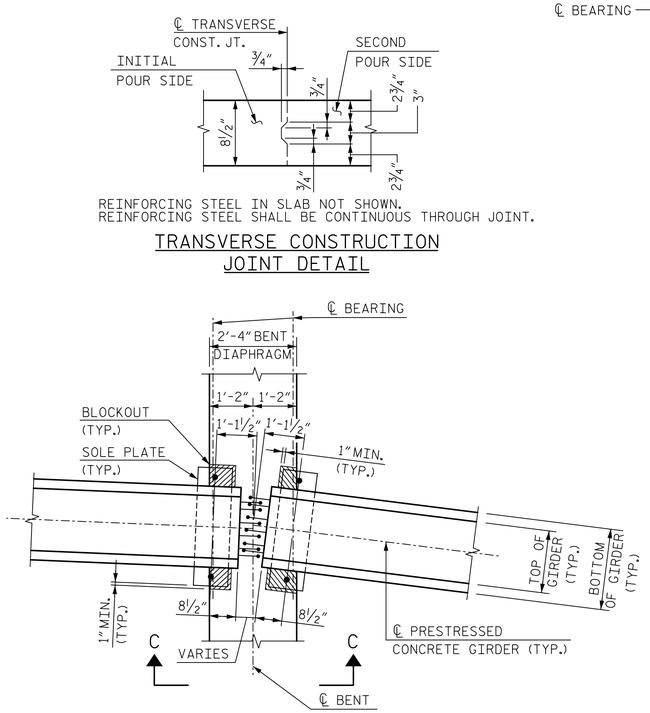
SECTION E-E



SECTION D-D



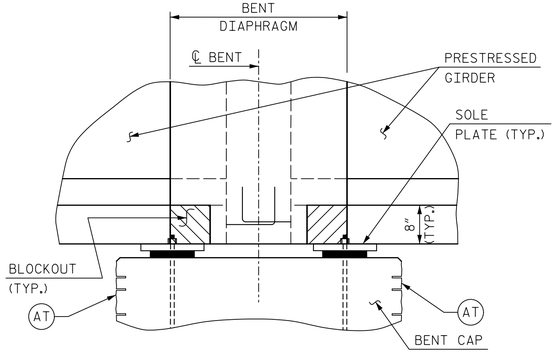
PLAN OF GIRDER AT INTEGRAL END BENT 1
(END BENT 2 SIMILAR)



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

TRANSVERSE CONSTRUCTION JOINT DETAIL

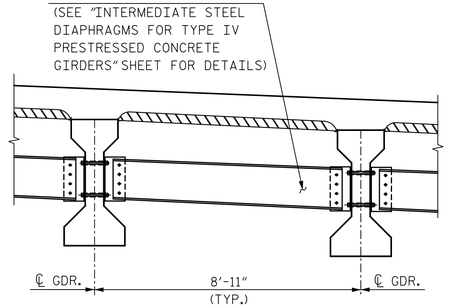
BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION C-C

(AT) LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

(BC2) LIMITS OF BRIDGE COATING (DARK GRAY)



PARTIAL TYPICAL SECTION
(SHOWING INTERMEDIATE DIAPHRAGM)

PROJECT NO. I-4400C

BUNCOMBE **COUNTY**

STATION: POC 22+70.63 -Y12-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47328 6/7/2019 KYLE ERVIN

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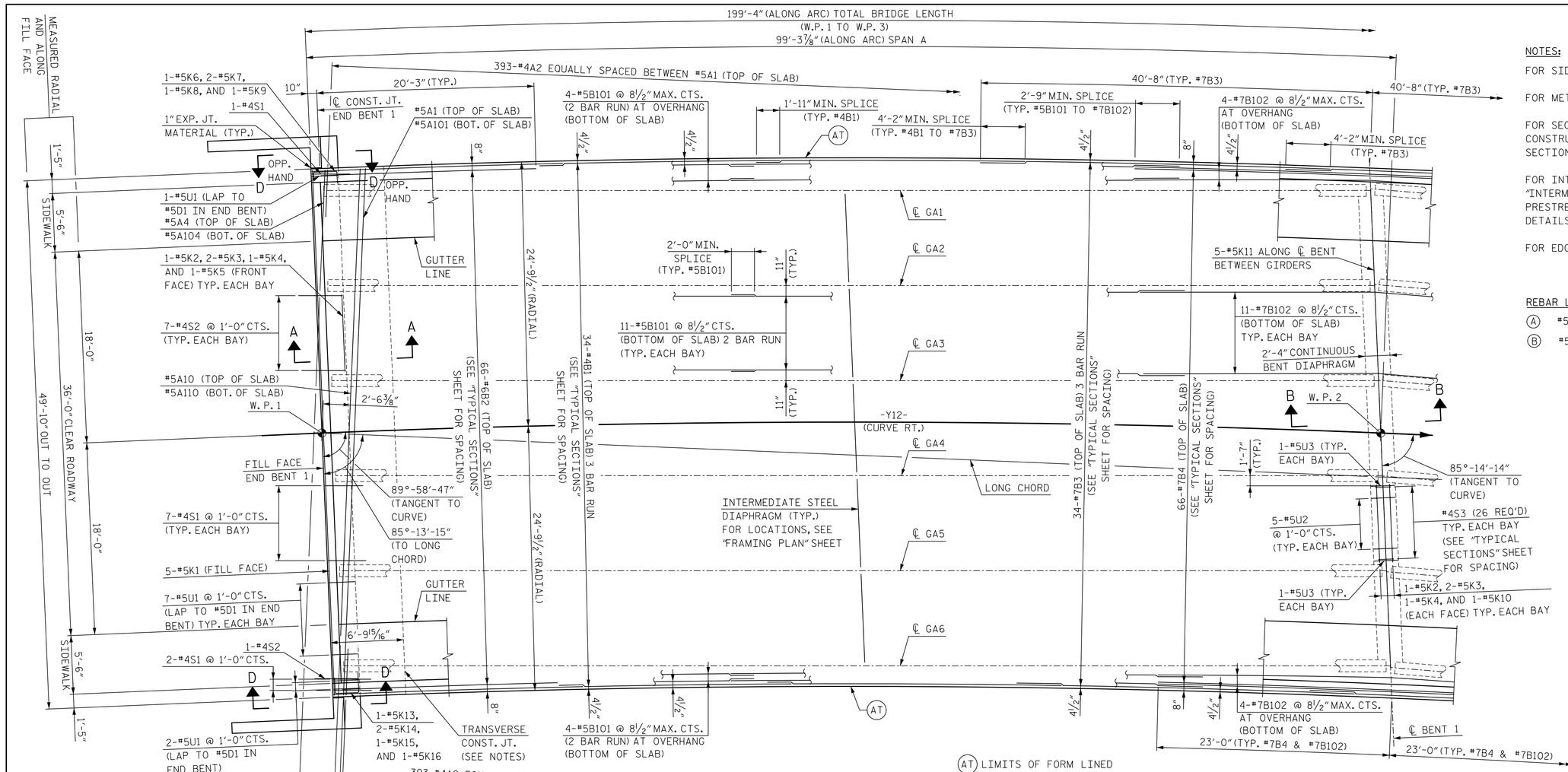
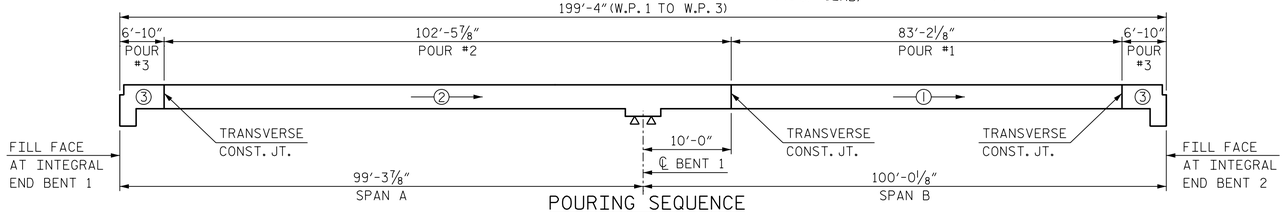
DWG. NO. 7

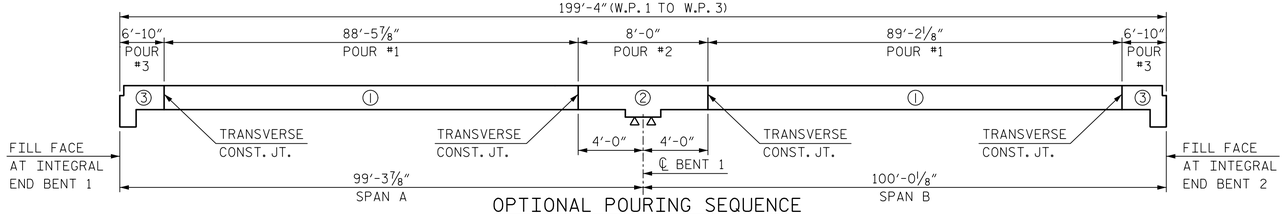
REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-7
1			3			TOTAL SHEETS
2			4			37



PLAN OF SPAN A



POURING SEQUENCE



OPTIONAL POURING SEQUENCE

NOTE: POUR ② CANNOT BE STARTED UNTIL BOTH ADJACENT ①POURS REACH A MINIMUM OF 3,000 PSI.
DIMENSION GIVEN ALONG -Y12-

NOTES:

FOR SIDEWALK REINFORCING, SEE SHEET 4 OF 4.

FOR METAL RAIL, SEE "3 BAR METAL RAIL" SHEETS.

FOR SECTION VIEWS AND TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS" SHEET.

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

FOR EDGE OF SLAB ARC OFFSETS, SEE SHEET 3 OF 4.

REBAR LEGEND:

(A) #5A4 THRU #5A10 @ 6" CTS. (TOP OF SLAB)

(B) #5A104 THRU #5A110 @ 6" CTS. (BOT. OF SLAB)

PROJECT NO. I-4400C

BUNCOMBE COUNTY

STATION: POC 22+70.63 -Y12-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN A

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47328 6/7/2019 ENGINEER KYLE ERVIN

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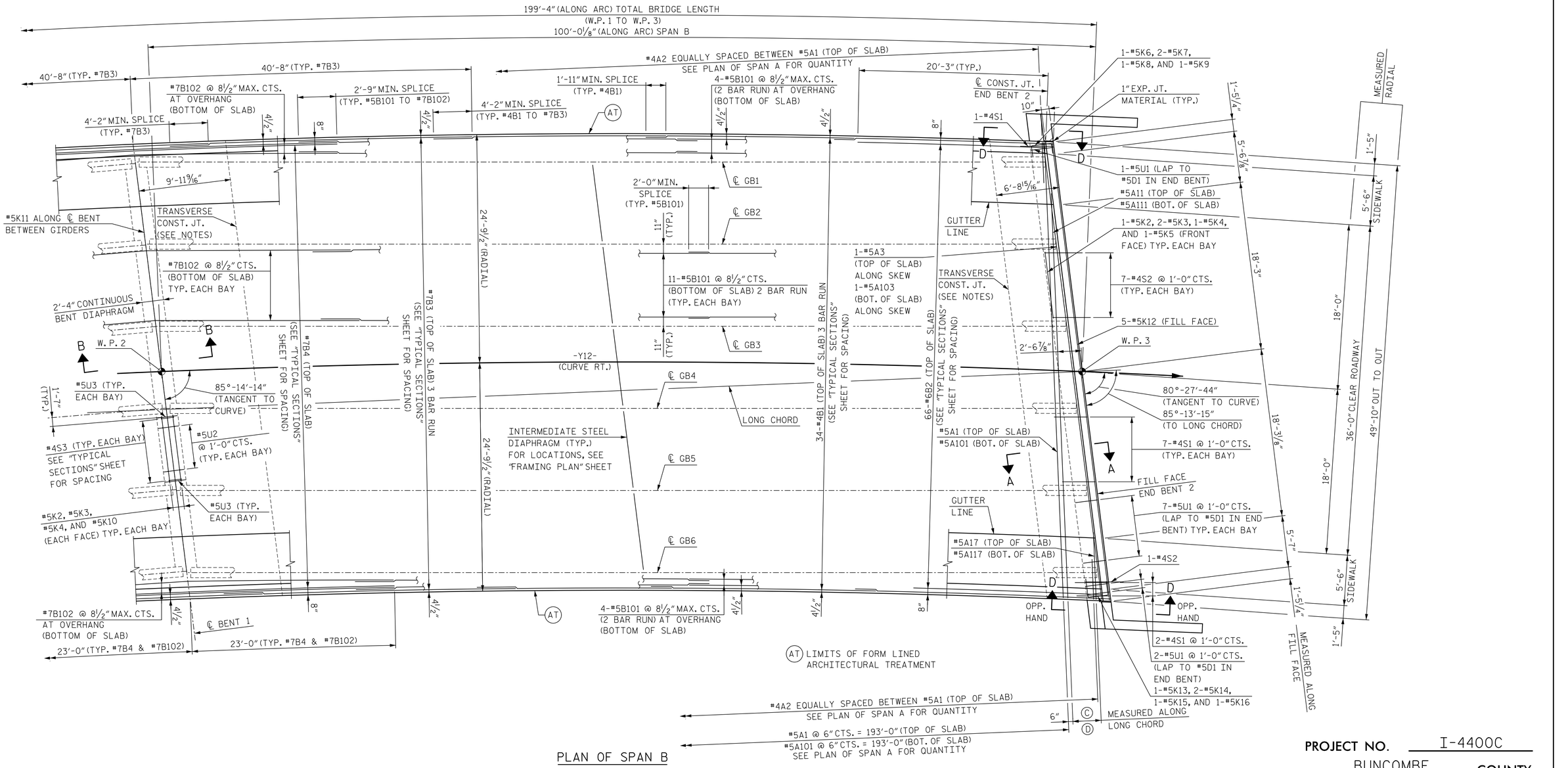
DESIGN ENGINEER OF RECORD K. ERVIN DATE 11/18

DWG. NO. 8

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-8
1			3			TOTAL SHEETS
2			4			37



PLAN OF SPAN B

NOTES:

FOR SIDEWALK REINFORCING, SEE SHEET 4 OF 4.

FOR METAL RAIL, SEE "3 BAR METAL RAIL" SHEETS.

FOR SECTION VIEWS AND TRANSVERSE CONSTRUCTION JOINT DETAIL, SEE "TYPICAL SECTION DETAILS" SHEET.

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

FOR EDGE OF SLAB ARC OFFSETS, SEE SHEET 3 OF 4.

REBAR LEGEND:

Ⓒ #5A11 THRU #5A17 @ 6" CTS. (TOP OF SLAB)

Ⓓ #5A111 THRU #5A117 @ 6" CTS. (BOT. OF SLAB)

PROJECT NO. I-4400C

BUNCOMBE COUNTY

STATION: POC 22+70.63 -Y12-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN B

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47328 KYLE ERVIN 6/7/2019 ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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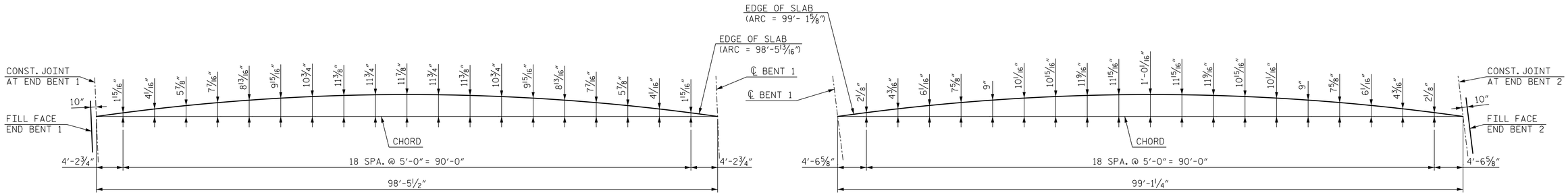
343 E. Six Forks Rd., Suite 200, Raleigh, N.C. 27609

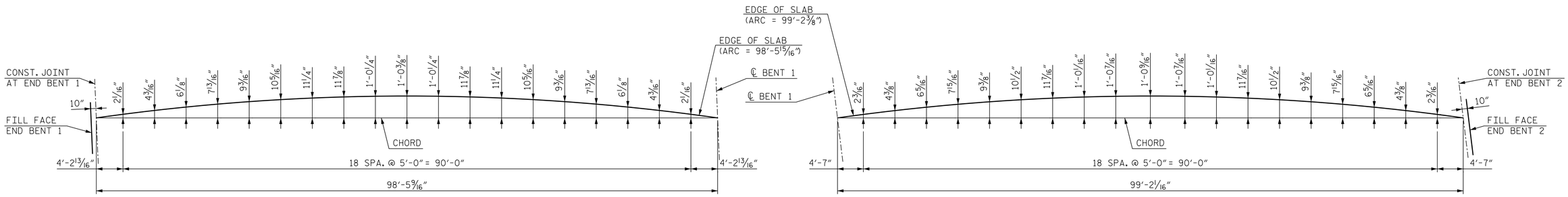
DRAWN BY B. VAUGHN DATE 11/18
CHECKED BY K. ERVIN DATE 11/18
DESIGN ENGINEER OF RECORD K. ERVIN DATE 11/18

DWG. NO. 9

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-9
1			3			TOTAL SHEETS
2			4			37



ARC OFFSETS - LEFT EDGE OF SLAB
(R = 1,224.9167')



ARC OFFSETS - RIGHT EDGE OF SLAB
(R = 1,175.0833')

PROJECT NO. I-4400C

BUNCOMBE **COUNTY**

STATION: POC 22+70.63 -Y12-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

ARC OFFSETS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047328 6/7/2019 ENGINEER KYLE ERVIN

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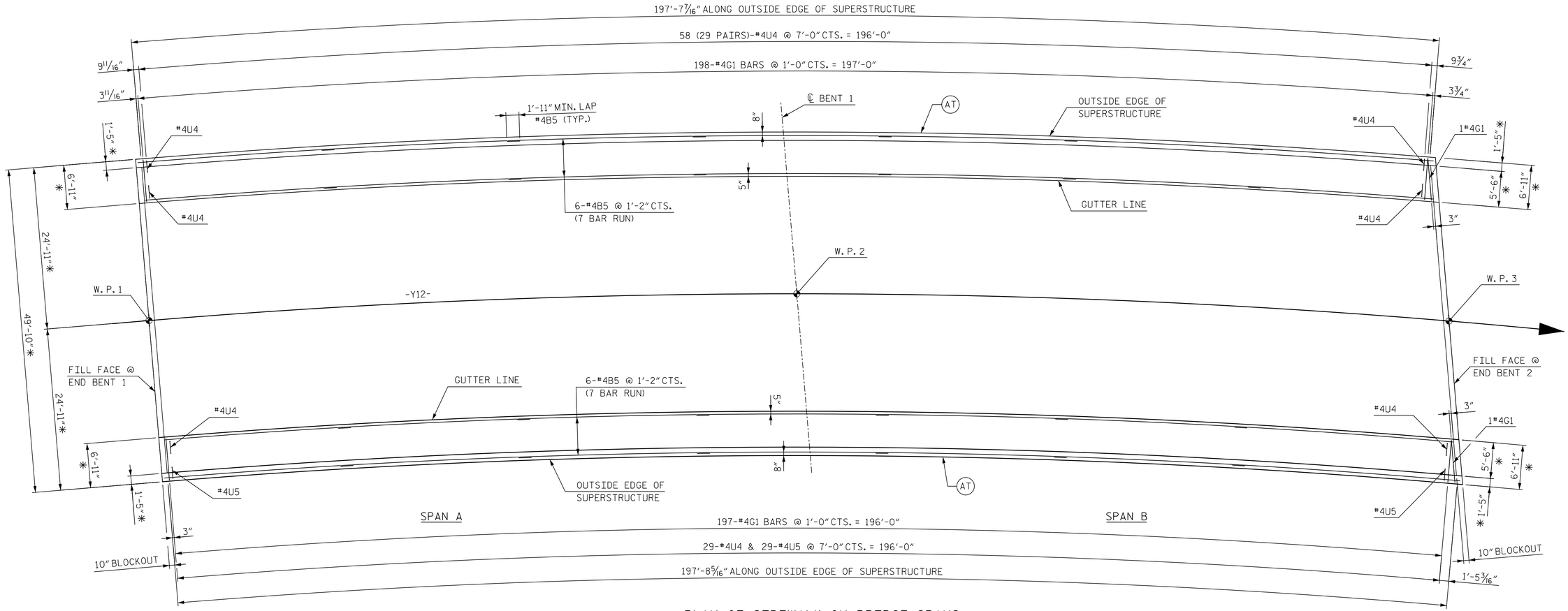
DRAWN BY B. VAUGHN DATE 5/19
CHECKED BY K. ERVIN DATE 5/19
DESIGN ENGINEER OF RECORD K. ERVIN DATE 5/19

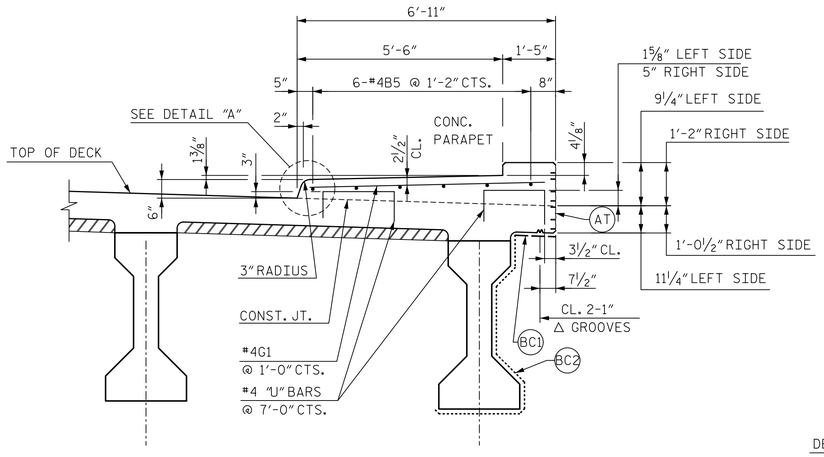
DWG. NO. 10

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-10
1			3			TOTAL SHEETS
2			4			37

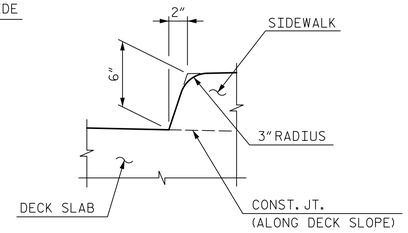


PLAN OF SIDEWALK ON BRIDGE SPANS

✱ RADIAL DIMENSION



SECTION THRU SIDEWALK



DETAIL "A"

NOTES:

ALL REINFORCING STEEL IN SIDEWALK SHALL BE EPOXY COATED.

FOR SIDEWALK QUANTITIES, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET. THE PAYMENT FOR THE SIDEWALK SHALL BE INCLUDED IN THE SQUARE FEET PRICE BID FOR REINFORCED CONCRETE DECK SLAB.

GROOVED CONTRACTION JOINTS, 1/2" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF SIDEWALK AND PARAPET OTHER THAN FACES WITH ARCHITECTURE TREATMENT IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINTS SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH. SEE "RAIL POST SPACING AND END OF RAIL DETAILS" SHEETS FOR ADDITIONAL NOTES.

CONTRACTION JOINTS SHALL BE NORMAL TO -Y12-.

FOR EDGE OF SLAB ARC OFFSETS, SEE SHEET 3 OF 4.

(AT) LIMITS OF FORM LINED ARCHITECTURAL TREATMENT

(BC1) LIMITS OF BRIDGE COATING (LIGHT GRAY)

(BC2) LIMITS OF BRIDGE COATING (DARK GRAY)

PROJECT NO. I-4400C

BUNCOMBE COUNTY

STATION: POC 22+70.63 -Y12-

SHEET 4 OF 4

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 47328 6/7/2019 KYLE ERVIN

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN DETAILS (SIDEWALKS)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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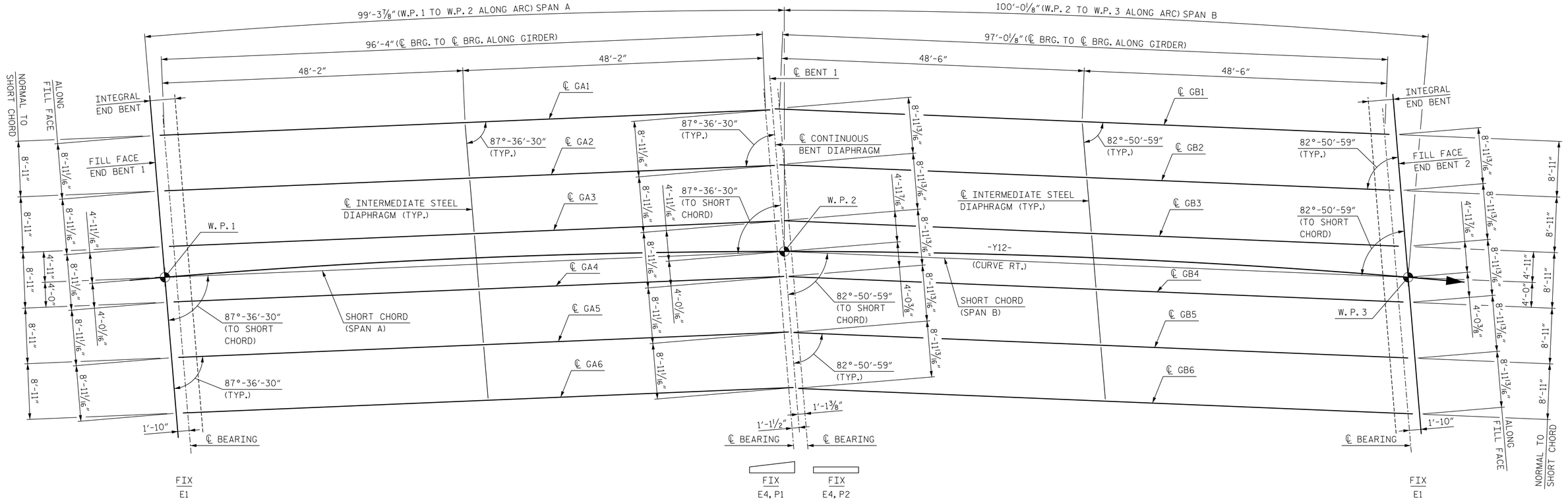
DWG. NO. 11

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-11
1			3			TOTAL SHEETS
2			4			37



FRAMING PLAN

(END BENT 1, BENT 1, AND END BENT 2 ARE PARALLEL)
ALL BEAMS ARE TO BE SET PARALLEL TO THE SHORT CHORD OF THEIR CORRESPONDING SPAN

NOTES:

"FIX" DENOTES FIXED BEARING ASSEMBLY.

"E" DENOTES ELASTOMERIC BEARING PAD MARK.

"P" DENOTES STEEL SOLE PLATE MARK.

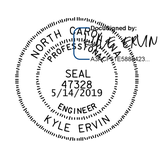
"W.P." DENOTES WORK POINT.

NO SOLE PLATES ARE REQUIRED AT INTEGRAL END BENTS.

PROJECT NO. I-4400C

BUNCOMBE **COUNTY**

STATION: POC 22+70.63 -Y12-



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DESIGN ENGINEER OF RECORD K. ERVIN DATE 11/18

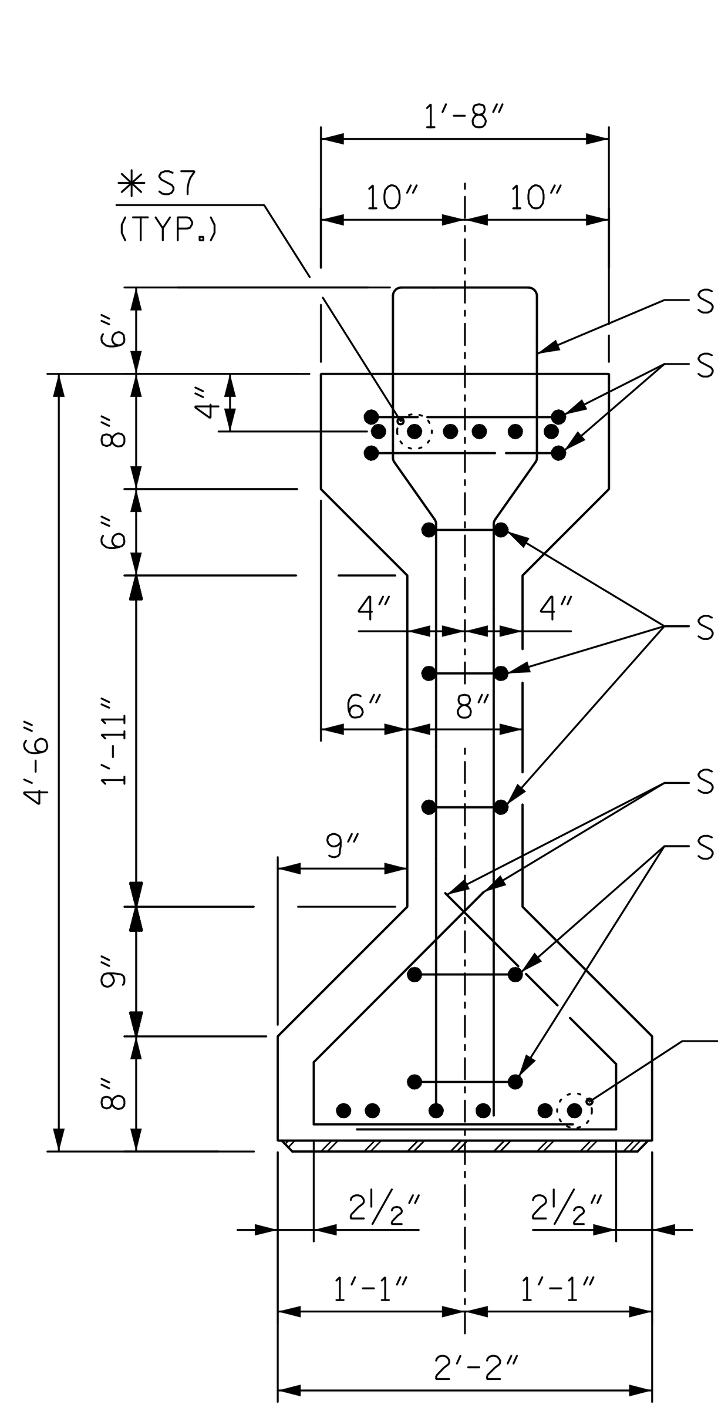
DWG. NO. 12

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

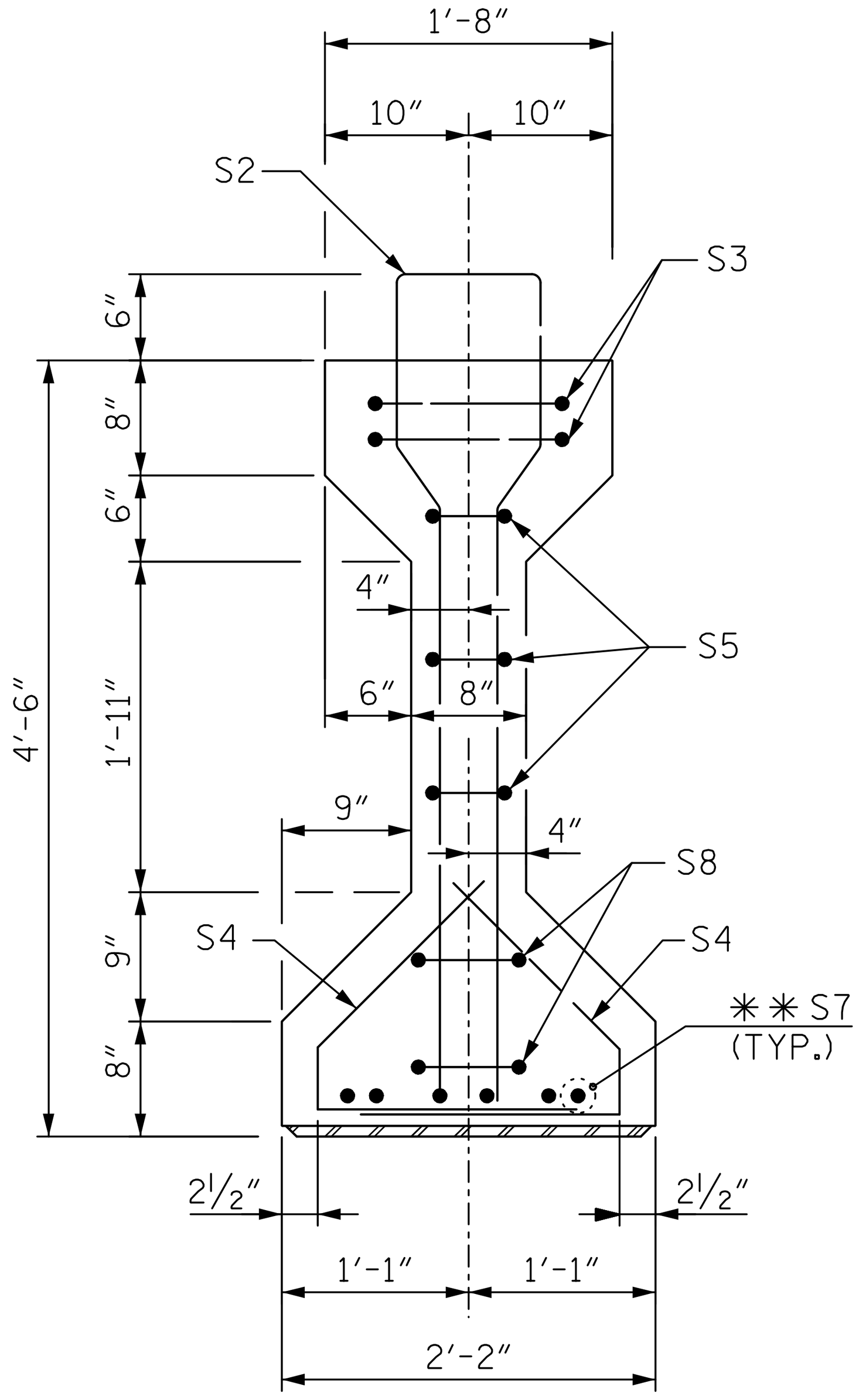
FRAMING PLAN

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-12
1			3			TOTAL SHEETS
2			4			37



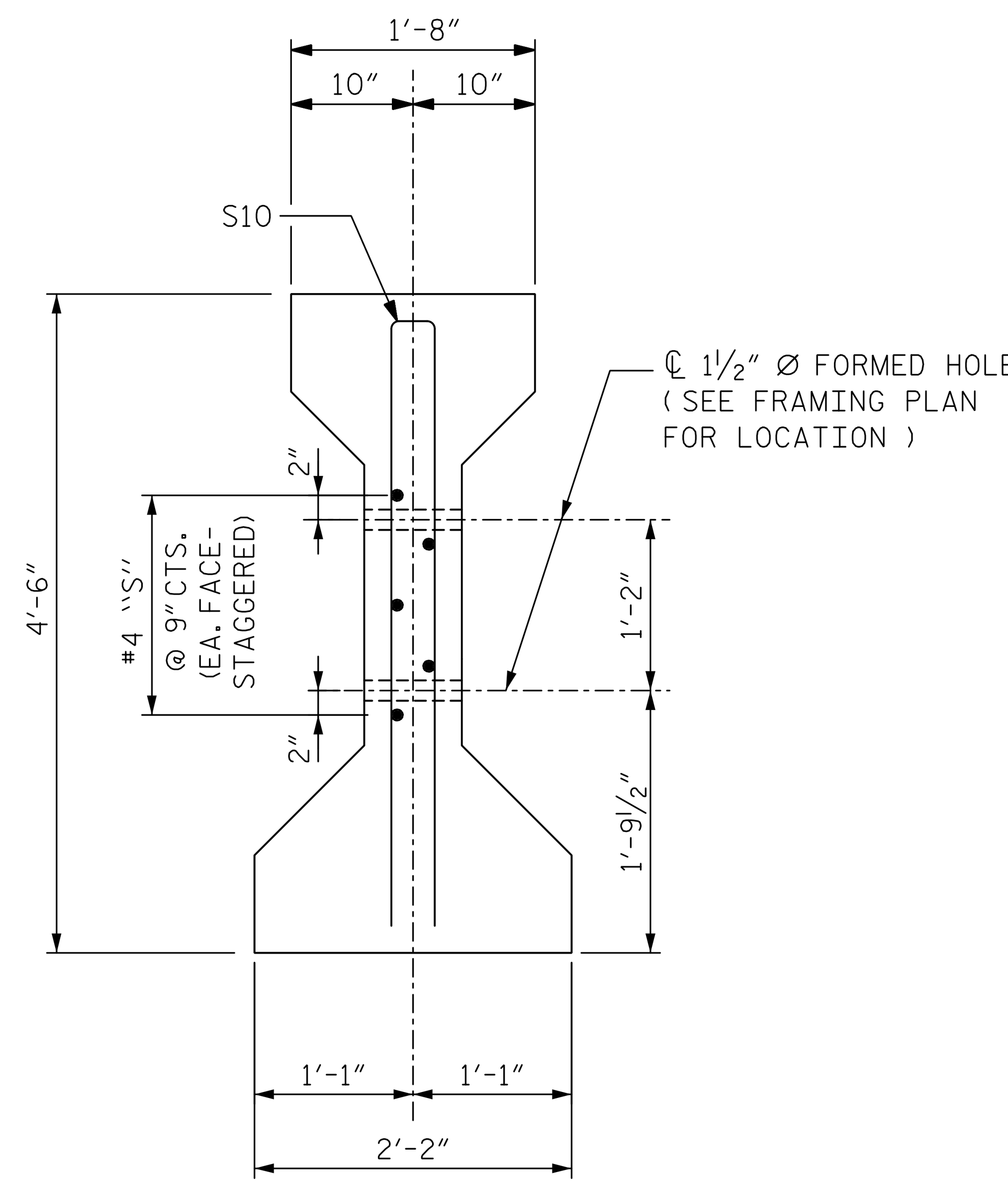
SECTION A-A

*FOR S7 BARS @ INTEGRAL END BENTS, SEE DETAIL A SHEET 3 OF 4



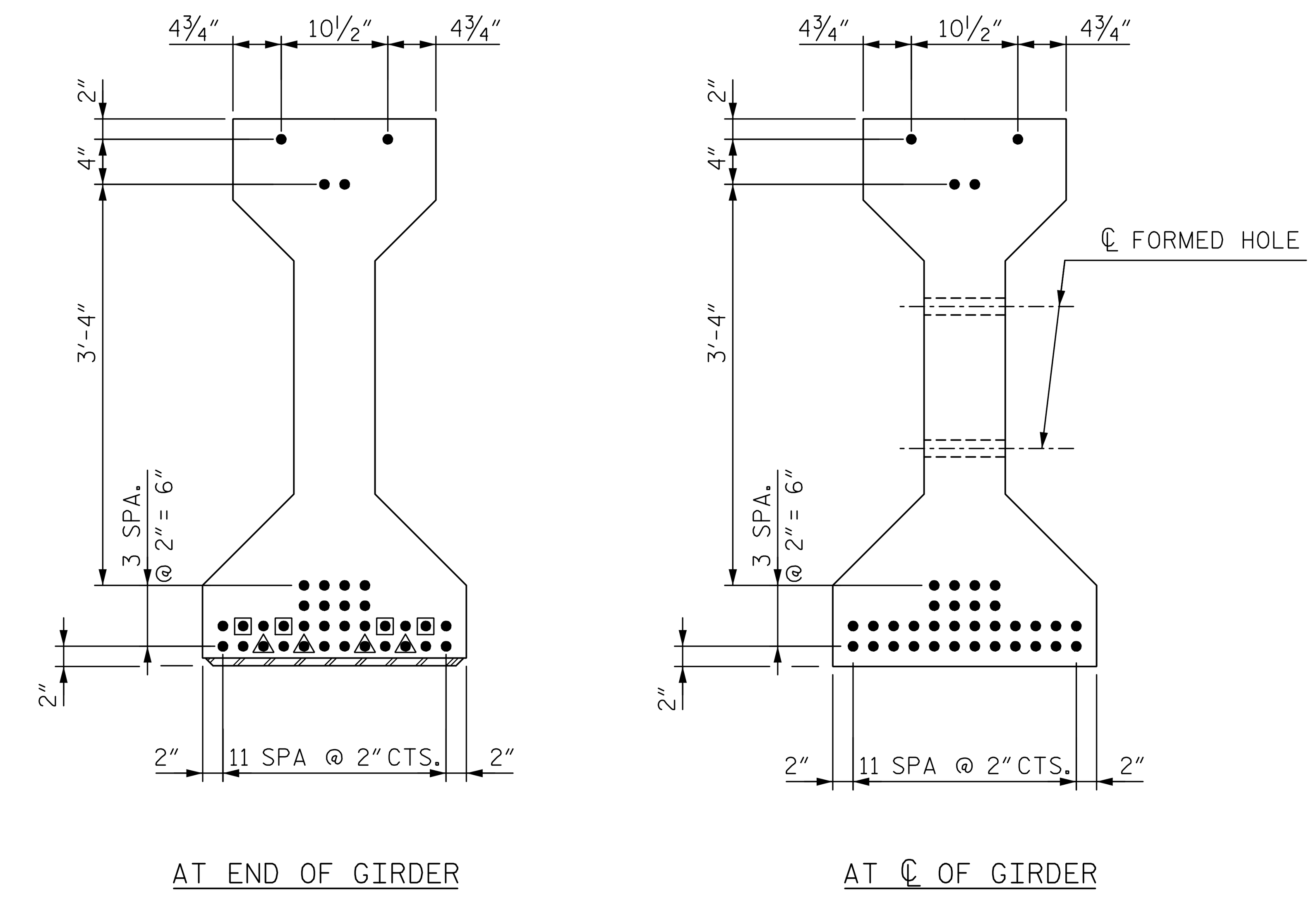
SECTION B-B

**FOR S7 BARS @ CONTINUOUS BENT, SEE DETAIL B SHEET 3 OF 4



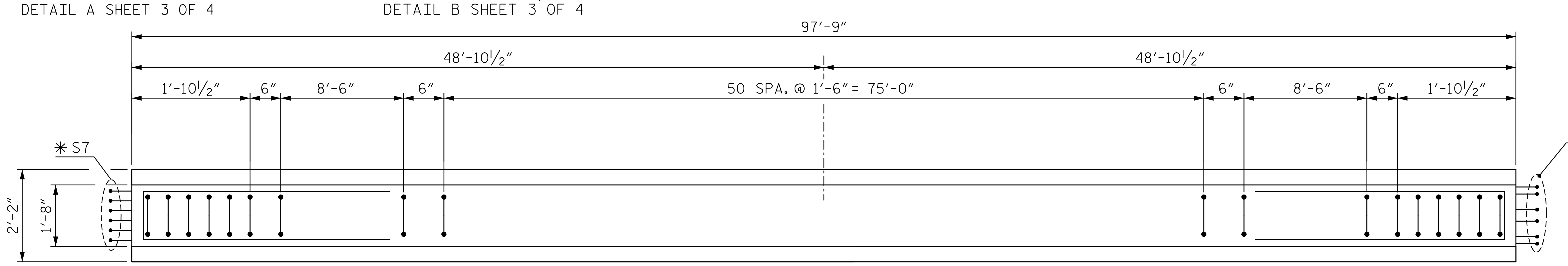
SECTION C-C

(S6 BARS NOT SHOWN)

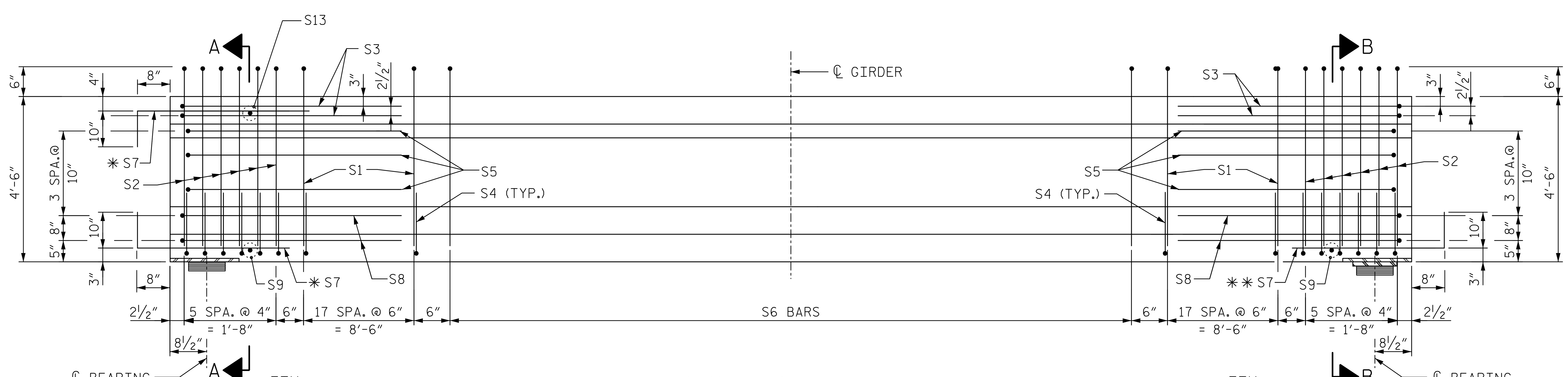


0.6" Ø LOW RELAXATION STRAND LAYOUT

- ● FULLY BONDED STRANDS
- ▲ STRANDS DEBONDED 10'-0" FROM END OF GIRDER
- ▣ STRANDS DEBONDED 6'-0" FROM END OF GIRDER



PLAN OF GIRDER



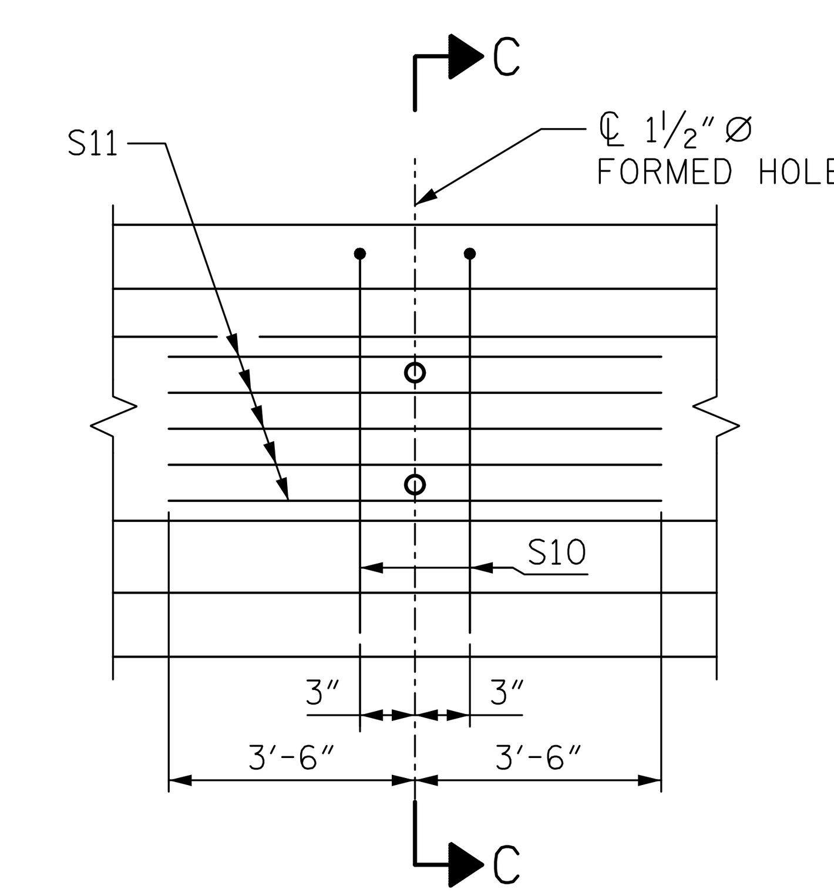
FIX
INTEGRAL END BENT

ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

FIX
CONTINUOUS BENT

NOTE: FOR LOCATION OF INTERMEDIATE DIAPHRAGM, SEE SHEET 3 OF 4.



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL

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

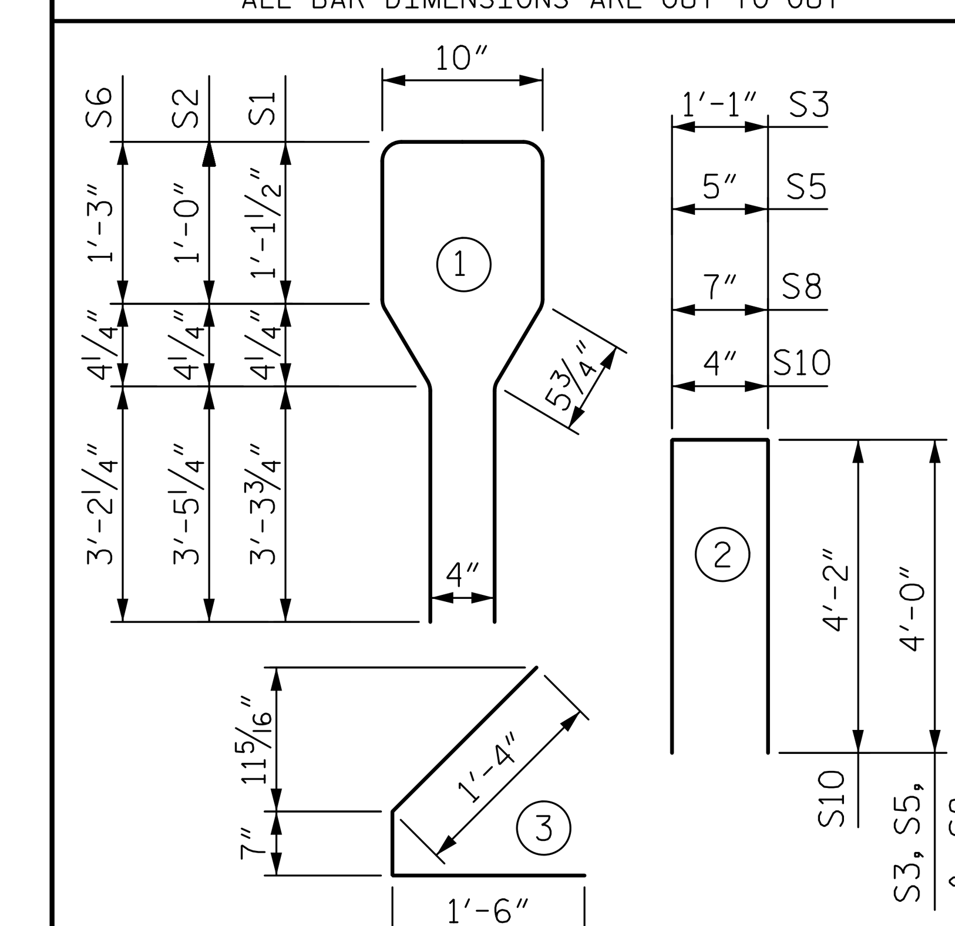
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	36	#5	1	10'-8"	401
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	96	#4	3	3'-5"	220
S5	6	#4	2	8'-5"	34
S6	51	#4	1	10'-8"	364
* S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	24
S13	1	#3	STR	1'-4"	1

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8,500 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
	1,371	19.9	36

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	97'-9"	586.50'

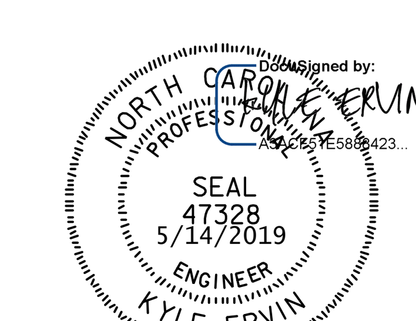
PROJECT NO. I-4400C

BUNCOMBE **COUNTY**

STATION: POC 22+70.63 -Y12-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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



ASSEMBLED BY : B. VAUGHN	DATE : 1/18
CHECKED BY : K. ERVIN	DATE : 2/19
DRAWN BY : ELR 8/91	REV. 10/1/11 MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15 MAA/TMG
	REV. 12/17 MAA/THC

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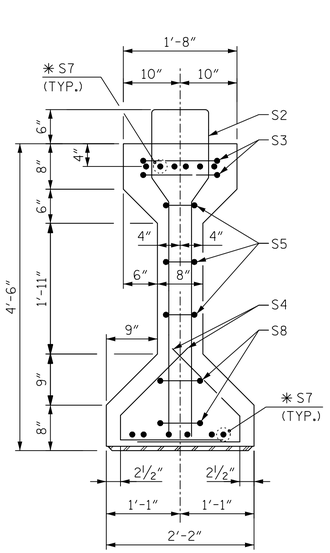
DESIGN ENGINEER OF RECORD K. ERVIN DATE 11/18
DWG. NO. 13

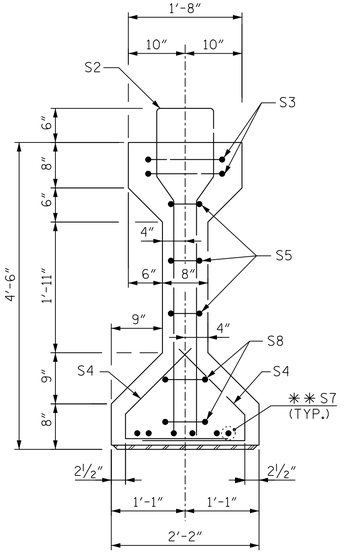
REVISIONS							
NO.	BY	DATE	NO.	BY	DATE	SHEET NO.	S5-13
1			3			TOTAL SHEETS	37
2			4				

STD. NO. PCG6



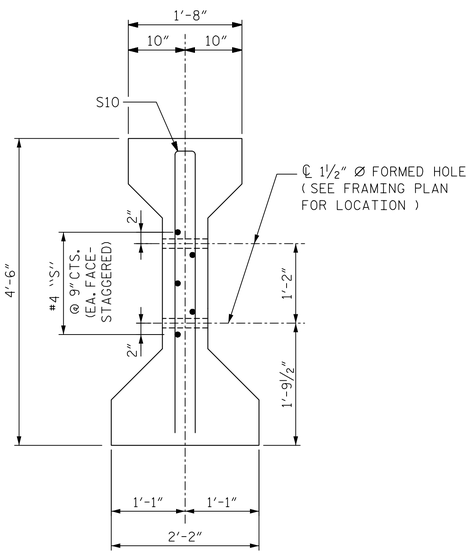
SECTION A-A

✳FOR S7 BARS @ INTEGRAL END BENTS, SEE DETAIL A SHEET 3 OF 4



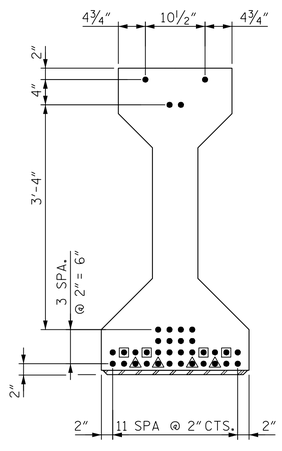
SECTION B-B

✳✳FOR S7 BARS @ CONTINUOUS BENT, SEE DETAIL B SHEET 3 OF 4

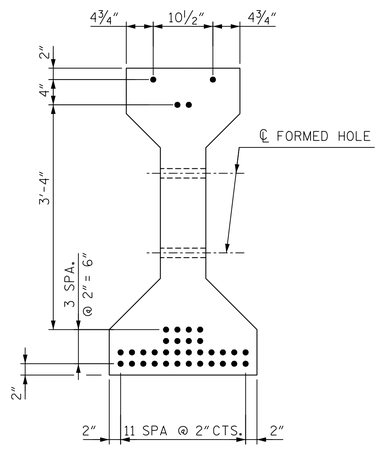


SECTION C-C

(S6 BARS NOT SHOWN)



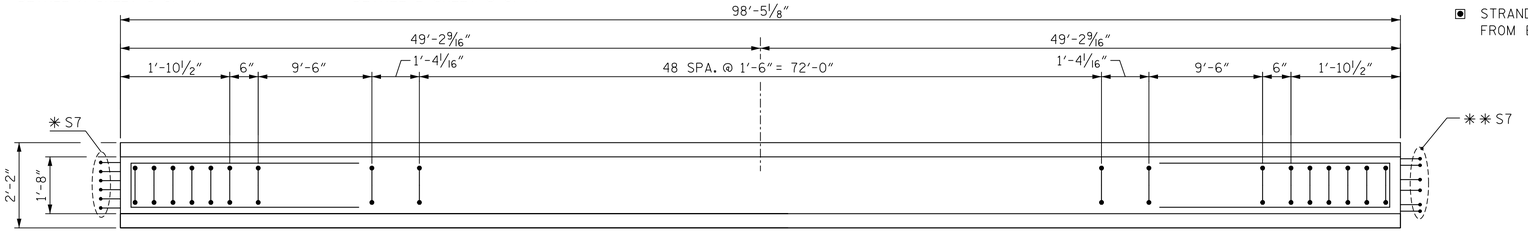
AT END OF GIRDER



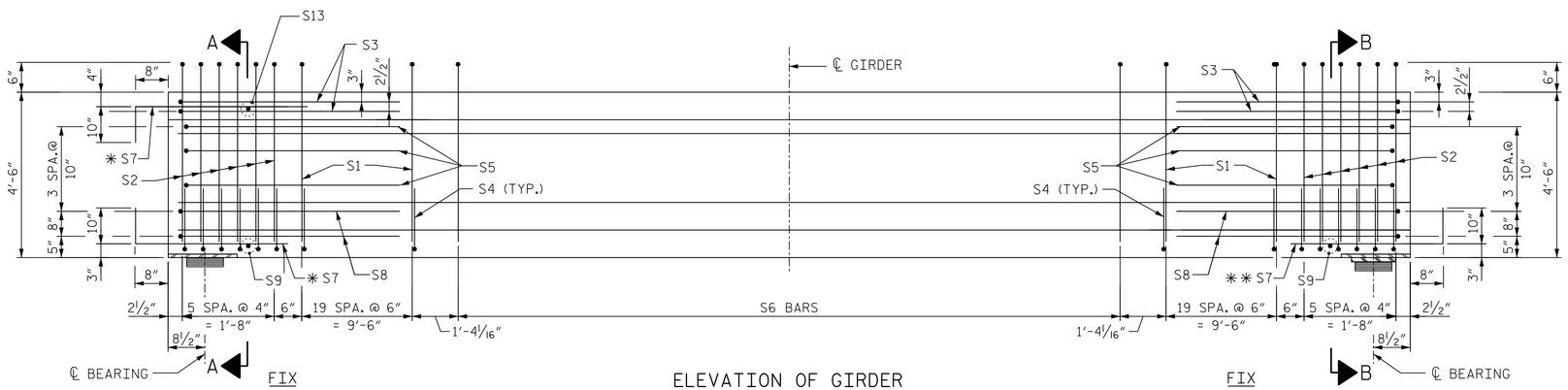
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

- ● FULLY BONDED STRANDS
- ▲ STRANDS DEBONDED 10'-0" FROM END OF GIRDER
- ▣ STRANDS DEBONDED 6'-0" FROM END OF GIRDER



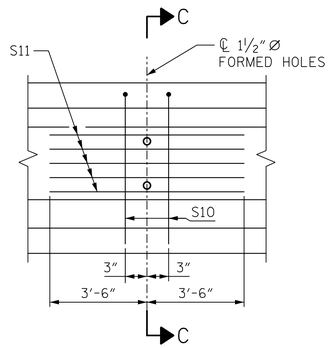
PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)

NOTE: FOR LOCATION OF INTERMEDIATE DIAPHRAGM, SEE SHEET 3 OF 4.



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL

0.6" Ø L. R. GRADE 270 STRANDS

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

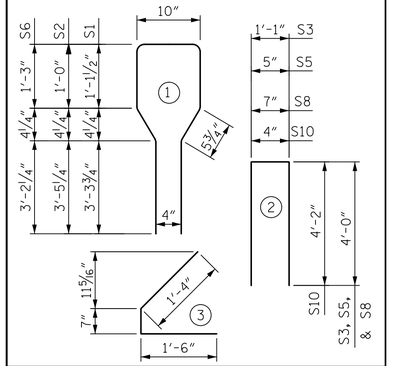
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	40	#5	1	10'-8"	445
S2	12	#6	1	10'-8"	192
S3	4	#4	2	9'-1"	24
S4	104	#4	3	3'-5"	238
S5	6	#4	2	8'-5"	34
S6	49	#4	1	10'-8"	350
✳S7	18	#5	STR	3'-8"	69
S8	4	#4	2	8'-7"	23
S9	2	#3	STR	1'-10"	1
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	24
S13	1	#3	STR	1'-4"	1

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	8,500 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
	1,419	20.0	36

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
6	98'-5⅛"	590.56'

PROJECT NO. I-4400C

BUNCOMBE COUNTY

STATION: POC 22+70.63 -Y12-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

Digitally signed by: KYLE ERVIN
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047328
SEAL 47328 5/14/2019 ENGINEER KYLE ERVIN

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-14
1			3			TOTAL SHEETS
2			4			37

STD. NO. PCG6

ASSEMBLED BY : B. VAUGHN	DATE : 1/18	
CHECKED BY : K. ERVIN	DATE : 2/19	
DRAWN BY : ELR 8/91	REV. 10/1/11	MAA/GM
CHECKED BY : GRP 8/91	REV. 1/15	MAA/TMG
	REV. 12/17	MAA/THC

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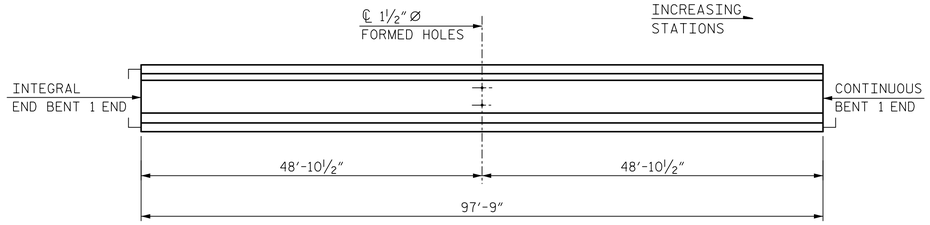
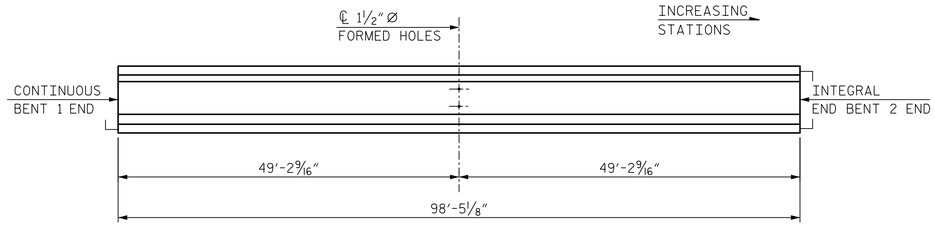
DESIGN ENGINEER OF RECORD K. ERVIN DATE 11/18

DWG. NO. 14

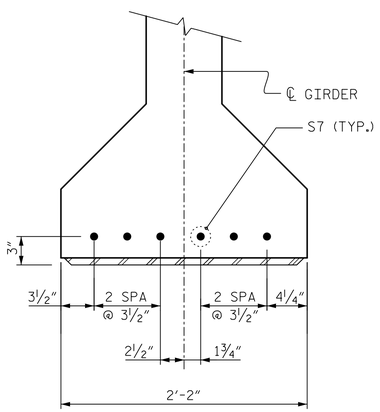


GIRDER ELEVATION
(SPAN A GIRDERS)

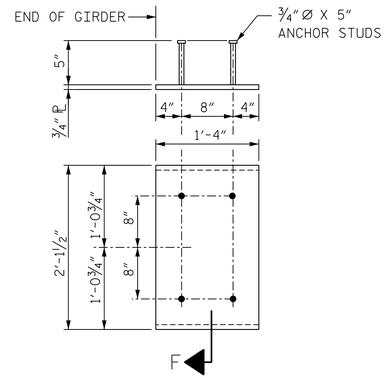


GIRDER ELEVATION
(SPAN B GIRDERS)

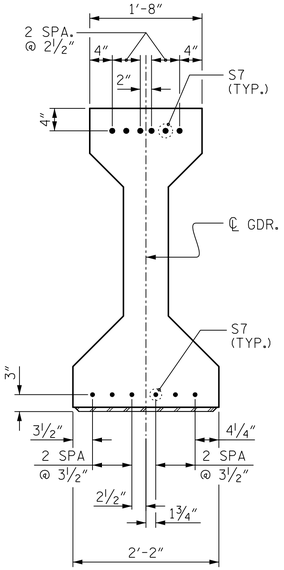
1½" Ø FORMED HOLE LOCATIONS



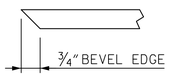
DETAIL "B"
(FOR AASHTO TYPE IV GIRDERS
AT CONTINUOUS BENT)



EMBEDDED PLATE "B-1" DETAILS
FOR AASHTO TYPE IV GIRDER
(2 REQ'D PER GIRDER)



DETAIL "A"
(FOR AASHTO TYPE IV GIRDERS
AT INTEGRAL END BENT)



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 6,500 PSI.

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

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

PROJECT NO. I-4400C

BUNCOMBE COUNTY

STATION: POC 22+70.63 -Y12-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS

ASSEMBLED BY : B. VAUGHN	DATE : 10/18
CHECKED BY : K. ERVIN	DATE : 1/19
DRAWN BY : ELR 11/91	REV. 1/15 MAA/TMG
CHECKED BY : GRP 11/91	REV. 2/15 MAA/TMG
	REV. 12/17 MAA/THC

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

DRAWN BY B. VAUGHN DATE 11/18
CHECKED BY K. ERVIN DATE 11/18
DESIGN ENGINEER OF RECORD K. ERVIN DATE 11/18

DWG. NO. 15

REVISIONS						SHEET NO.
NO.	BY	DATE	NO.	BY	DATE	S5-15
1			3			TOTAL SHEETS
2			4			37

STD. NO. PCG9

Digitally signed by: KYLE ERVIN
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 047328
SEAL
47328
5/14/2019
ENGINEER
KYLE ERVIN