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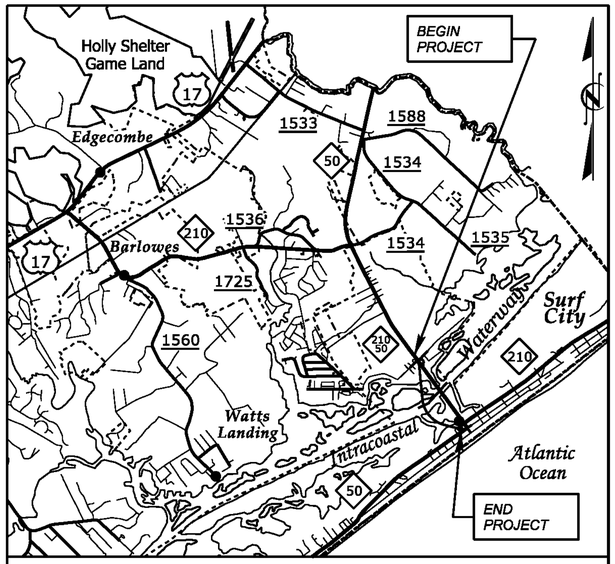
TIP PROJECT: B-4929

CONTRACT: C203789

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4929	1	278

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
40233.1.1	N/A	P.E.
40233.2.1	N/A	CONST.
40233.2.U1	N/A	CONST.



VICINITY MAP N.T.S.

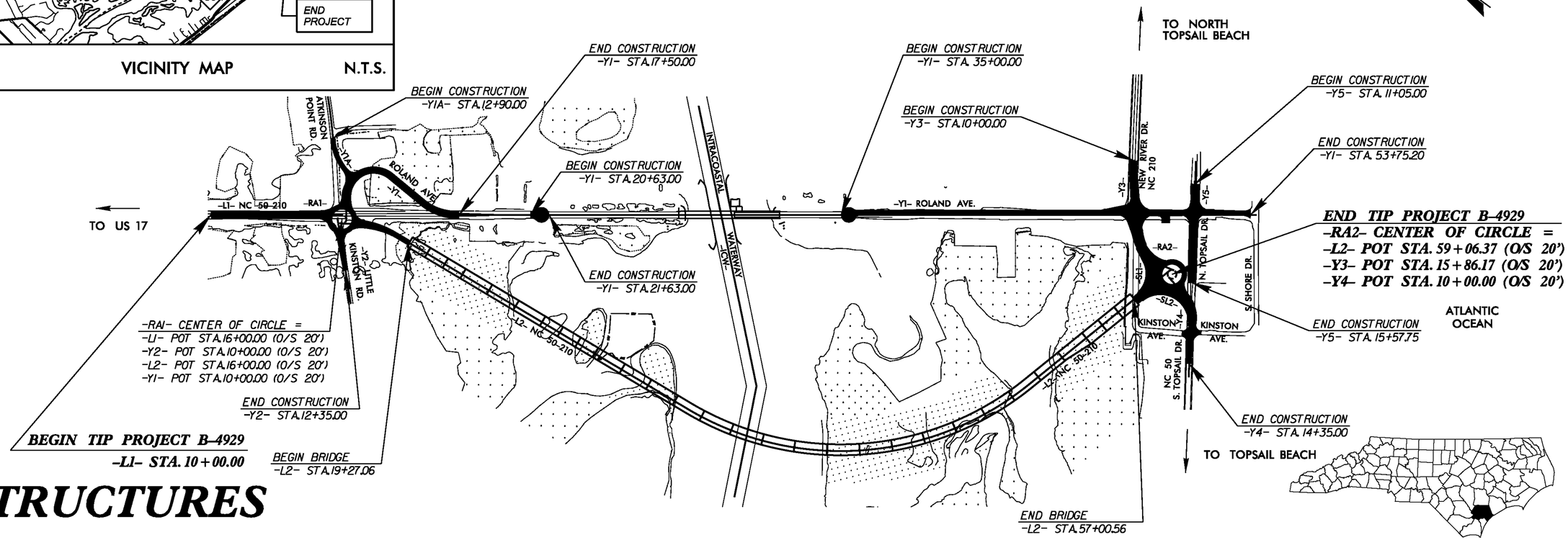
STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

PENDER COUNTY

LOCATION: BRIDGE NO. 16 OVER THE INTRACOASTAL WATERWAY ON NC 50-210

TYPE OF WORK: GRADING, PAVING, RESURFACING, DRAINAGE, STRUCTURE AND WALLS



STRUCTURES

DESIGN DATA

ADT 2016 = 17,200
ADT 2036 = 30,000
K = 9 %
D = 55 %
T = 3 % **
* V = 40 MPH
** (TTST 1 %, DUAL 2 %)

FUNC CLASS = MAJOR COLLECTOR

STATEWIDE - TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4929 = 0.214 MILES
LENGTH STRUCTURE TIP PROJECT B-4929 = 0.715 MILES

TOTAL LENGTH TIP PROJECT B-4929 = 0.929 MILES

Prepared for the Office of:

DIVISION OF HIGHWAYS

STRUCTURES MANAGEMENT UNIT

1000 BIRCH RIDGE DR.

RALEIGH, N.C. 27610

2012 STANDARD SPECIFICATIONS

LETTING DATE :
AUGUST 16, 2016

Plans prepared by:

PARSONS BRINCKERHOFF

434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

JASON R. DOUGHTY, PE
DESIGN ENGINEER OF RECORD

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16

DocuSigned by:
Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX OF DRAWINGS

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

DESIGNED BY:	B. LOFLIN — DATE : MAR 2016
DRAWN BY:	KEW/MAH — DATE : MAR 2016
CHECKED BY:	J. DOUGHTY — DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY — DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

INDEX OF DRAWINGS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-2
1			3			TOTAL SHEETS
2			4			278

5/9/2016
400_003_B4929_SMU_IN.dgn

INDEX OF DRAWINGS (CONT.)

STEEL ALTERNATE:

MSE RETAINING WALLS:

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

INDEX OF DRAWINGS

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
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LICENSE NO. F-0165

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DESIGNED BY:	B. LOFLIN	DATE :	MAR 2016
DRAWN BY:	KEW/MAH	DATE :	MAR 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-3
1			3			TOTAL SHEETS
2			4			278

5/9/2016
400.004_B4929_SMU_IN2.dgn

19+00 20+00 21+00 22+00

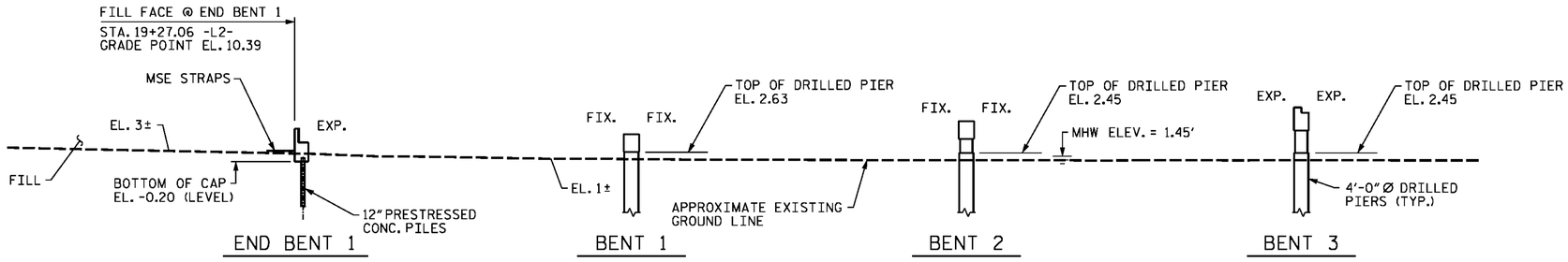
GRADE DATA -L2-

PI = 18+20.00
EL = 6.03'
VC = 300'

(-)2.0667% (+)3.9000%

80 70 60 50 40 30 20 10 0 -10 -20 -30

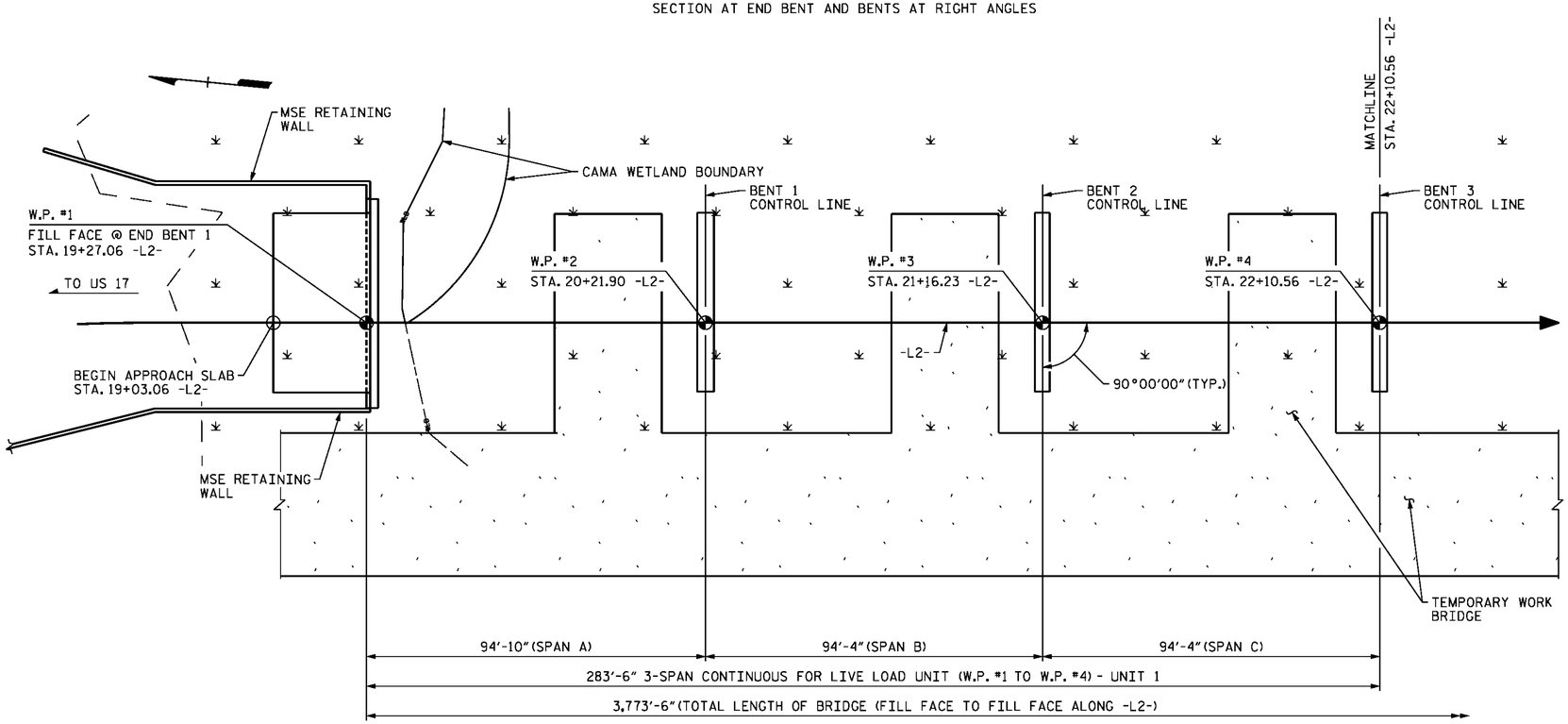
SPAN A SPAN B SPAN C



END BENT 1 BENT 1 BENT 2 BENT 3

SECTION ALONG -L2-

SECTION AT END BENT AND BENTS AT RIGHT ANGLES



PLAN

PILES, DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 9 REPLACES BRIDGE NO. 16

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-4
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C864482747...

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DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016
DRAWN BY:	K. WHITE	DATE :	JAN 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/9/2016
400.005_B4929_SMU_GD1.dgn

22+00 23+00 24+00 25+00 26+00

GRADE DATA -L2-

PI = 18+20.00
EL = 6.03'
VC = 300'

(-)2.0667% (+)3.9000%

80 70 60 50 40 30 20 10 0 -10 -20 -30

SPAN D SPAN E SPAN F

EXP. EXP. TOP OF DRILLED PIER EL. 2.45

APPROXIMATE EXISTING GROUND LINE

4'-0" Ø DRILLED PIERS (TYP.)

FIX. FIX. TOP OF DRILLED PIER EL. 2.45

EL. 1±

EL. 0±

EL. -1±

FIX. FIX. TOP OF DRILLED PIER EL. 2.45

MHW ELEV. = 1.45'

BOTTOM OF FOOTING EL. 2.45

EXP. EXP.

EL. -1±

EL. -3±

BENT 3 BENT 4 BENT 5 BENT 6

SECTION ALONG -L2-

SECTION AT BENTS AT RIGHT ANGLES

MATCHLINE STA. 22+10.56 -L2-

MATCHLINE STA. 26+35.06 -L2-

BENT 3 CONTROL LINE

BENT 4 CONTROL LINE

BENT 5 CONTROL LINE

BENT 6 CONTROL LINE

W.P. #4 STA. 22+10.56 -L2-

W.P. #5 STA. 23+52.06 -L2-

W.P. #6 STA. 24+93.56 -L2-

W.P. #7 STA. 26+35.06 -L2-

-L2-

90°00'00" (TYP.)

TEMPORARY WORK BRIDGE

141'-6" (SPAN D) 141'-6" (SPAN E) 141'-6" (SPAN F)

424'-6" 3-SPAN CONTINUOUS FOR LIVE LOAD UNIT (W.P. #4 TO W.P. #7) - UNIT 2

3,773'-6" (TOTAL LENGTH OF BRIDGE (FILL FACE TO FILL FACE ALONG -L2-)

PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-5
1			3			TOTAL SHEETS
2			4			278

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

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DRAWN BY:	K. WHITE	DATE :	JAN 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/9/2016
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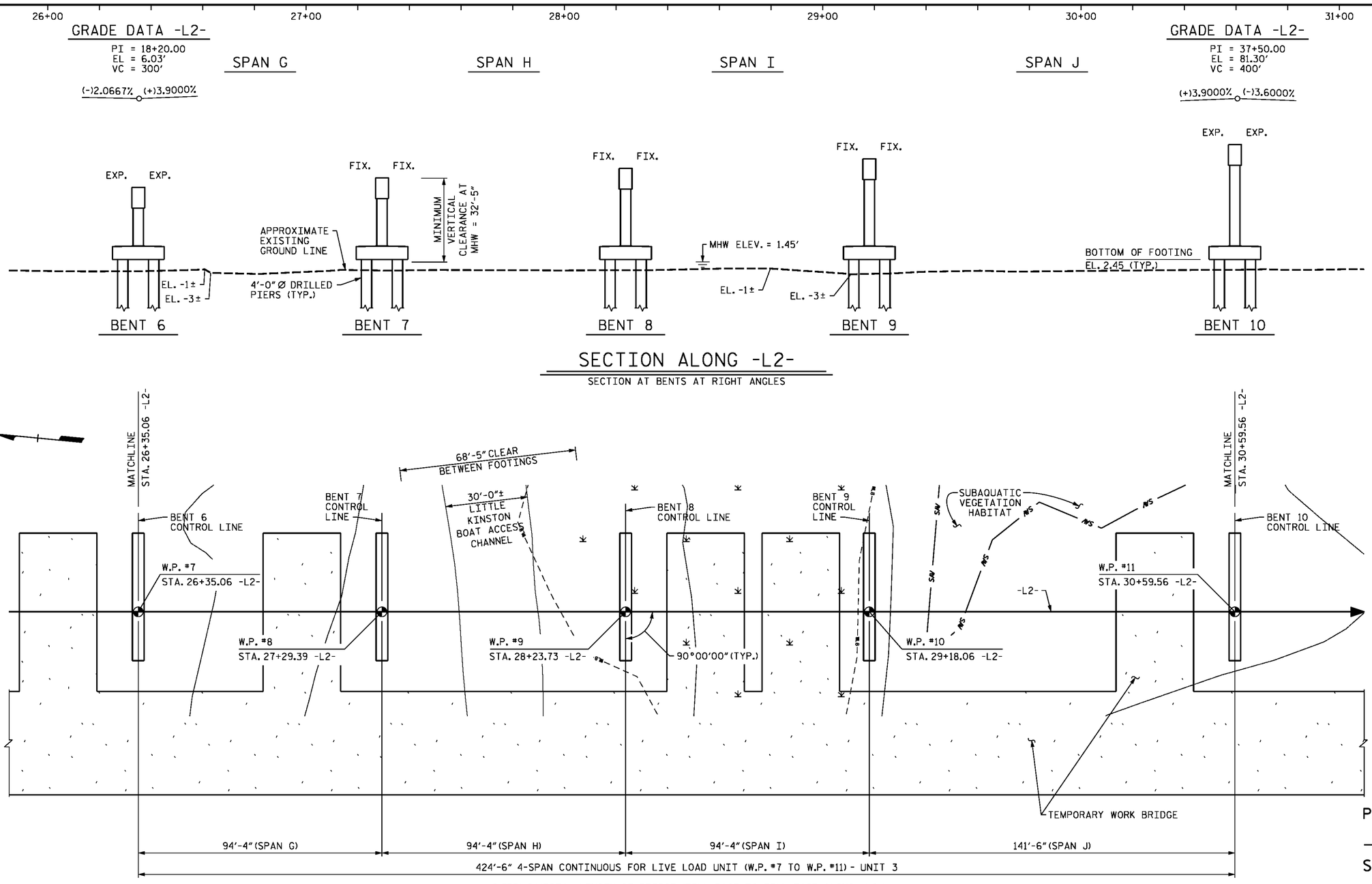

PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 9

DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016		
DRAWN BY:	K. WHITE	DATE :	JAN 2016		
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY 5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

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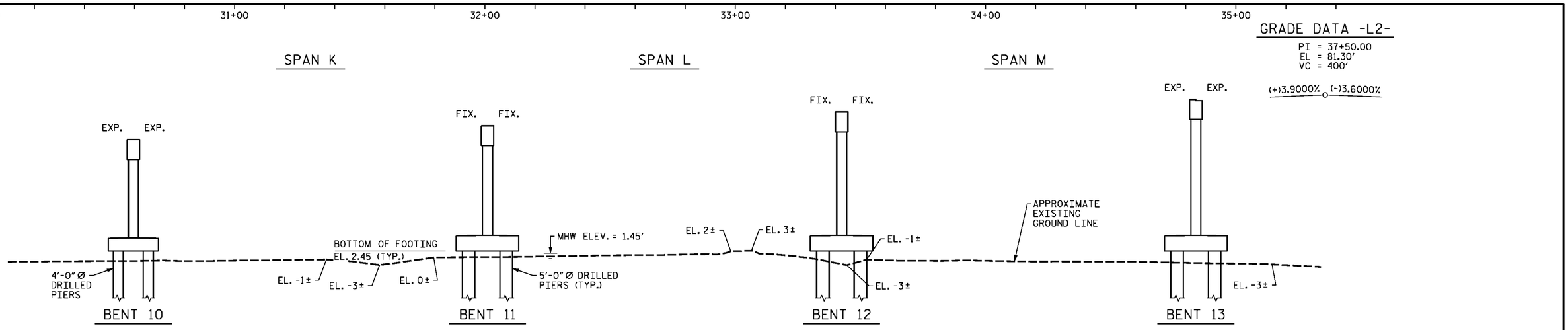
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

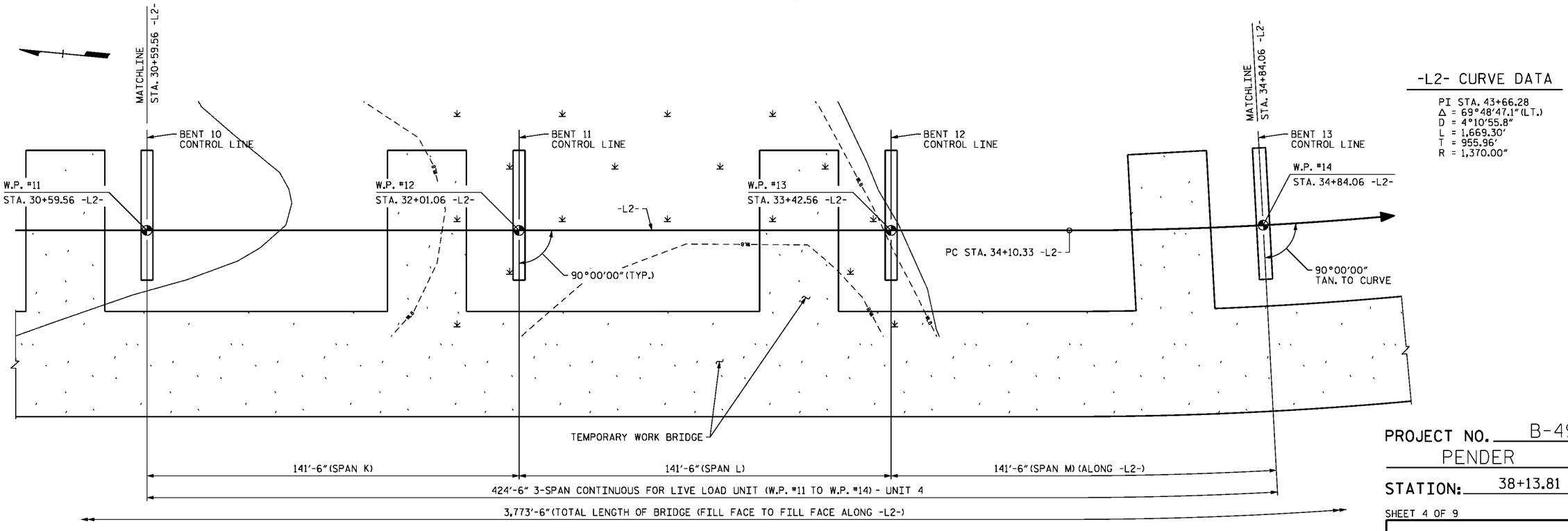
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-6
1			3			TOTAL SHEETS
2			4			278

5/9/2016
400_009_B4929_SMU_GD3.dgn



SECTION ALONG -L2-

SECTION AT BENTS AT RIGHT ANGLES



PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

GRADE DATA -L2-

PI = 37+50.00
EL = 81.30'
VC = 400'
(+)3.9000% (-)3.6000%

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00"

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 4 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-7
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/9/2016
400_011_B4929_SMU_GD4.dgn

35+00 36+00 37+00 38+00 39+00

80 70 60 50 40 30 20 10 0 -10 -20 -30

GRADE DATA -L2-

PI = 37+50.00
EL = 81.30'
VC = 400'

(+)3.9000% (-)3.6000%

SPAN N SPAN O SPAN P

EXP. EXP. FIX. FIX. FIX. FIX. EXP. EXP.

Q100 WSEL = 11.3'

MINIMUM VERTICAL CLEARANCE AT MHW = 65.0'

BOTTOM OF FOOTING EL. 2.45 (TYP.)

MTL ELEV. = -0.45'

MHW ELEV. = 1.45'

MAX. WAVE CREST ELEV. = 14.1'

APPROXIMATE EXISTING GROUND LINE

EL. -3±

EL. -16±

EL. -3±

5'-0"Ø DRILLED PIERS (TYP.)

BENT 13 BENT 14 BENT 15 BENT 16

SECTION ALONG -L2-

SECTION AT BENTS AT RIGHT ANGLES

MATCHLINE STA. 34+84.06 -L2-

BENT 13 CONTROL LINE

W.P. #14 STA. 34+84.06 -L2-

90°00'00" TAN. TO CURVE (TYP.)

BENT 14 CONTROL LINE

MINIMUM HORIZONTAL CLEARANCE = 120'-0"

60'-0" 60'-0"

-ICW- (℄ CHANNEL)

INTRACOASTAL WATERWAY

POC STA. 37+09.05 -L2-

POT STA. 25+43.65 -ICW-

W.P. #15 STA. 36+34.06 -L2-

FLOOD EBB

82°55'53" TAN. TO CURVE

EDGE OF CHANNEL (TYP.)

BENT 15 CONTROL LINE

W.P. #16 STA. 37+84.06 -L2-

BRIDGE I.D. STATION STA. 38+13.81 -L2-

MATCHLINE STA. 39+34.06 -L2-

BENT 16 CONTROL LINE

W.P. #17 STA. 39+34.06 -L2-

TEMPORARY WORK BRIDGE (TYP.)

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00"

150'-0" (SPAN N) (ALONG ARC)

74'-11⅞" 75'-0⅛" 29'-9" 120'-3"

150'-0" (SPAN O) (ALONG ARC)

150'-0" (SPAN P) (ALONG ARC)

450'-0" 3-SPAN CONTINUOUS FOR LIVE LOAD UNIT (W.P. #14 TO W.P. #17) - UNIT 5

3,773'-6" (TOTAL LENGTH OF BRIDGE (FILL FACE TO FILL FACE ALONG -L2-)

PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 9

DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016
DRAWN BY:	K. WHITE	DATE :	JAN 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C864482747...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

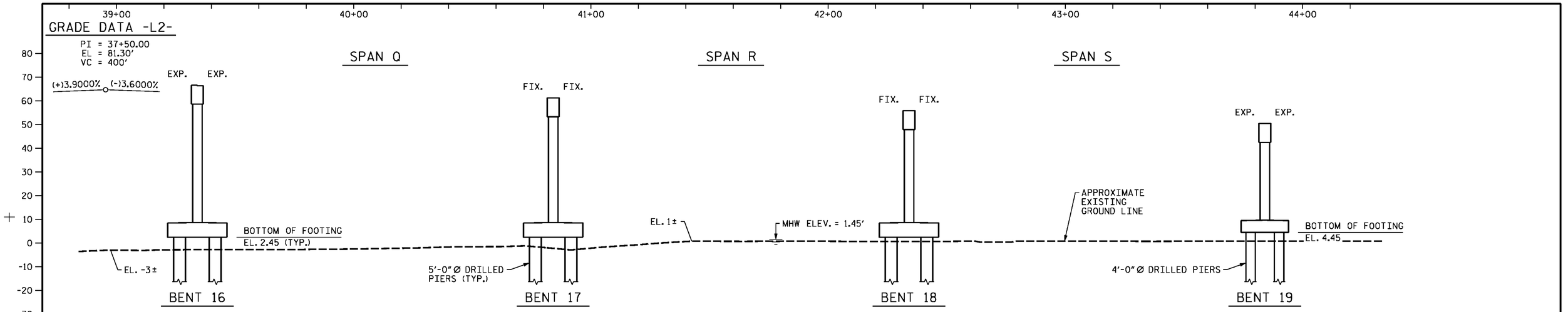
FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-8
1			3			TOTAL SHEETS
2			4			278

5/9/2016
400.013_B4929_SMU_GD5.dgn

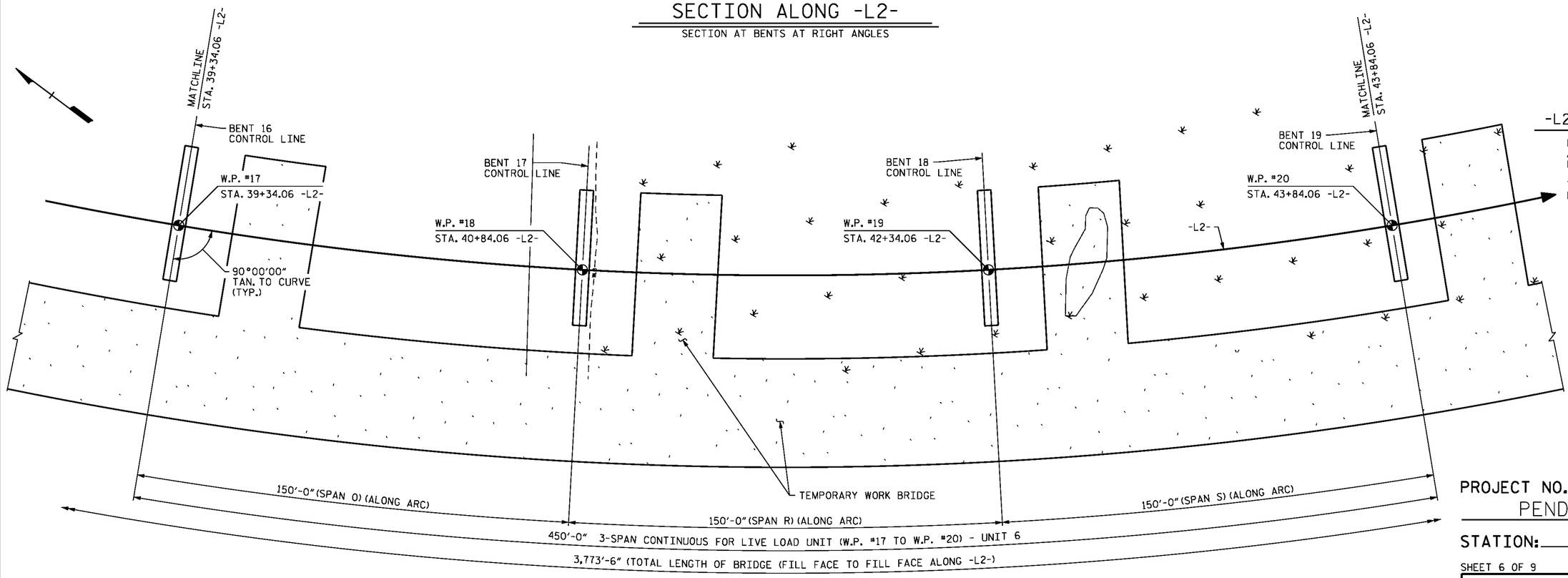
GRADE DATA -L2-

PI = 37+50.00
EL = 81.30'
VC = 400'
(+)3.9000% (-)3.6000%



SECTION ALONG -L2-

SECTION AT BENTS AT RIGHT ANGLES



PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00"

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 6 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-9
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
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LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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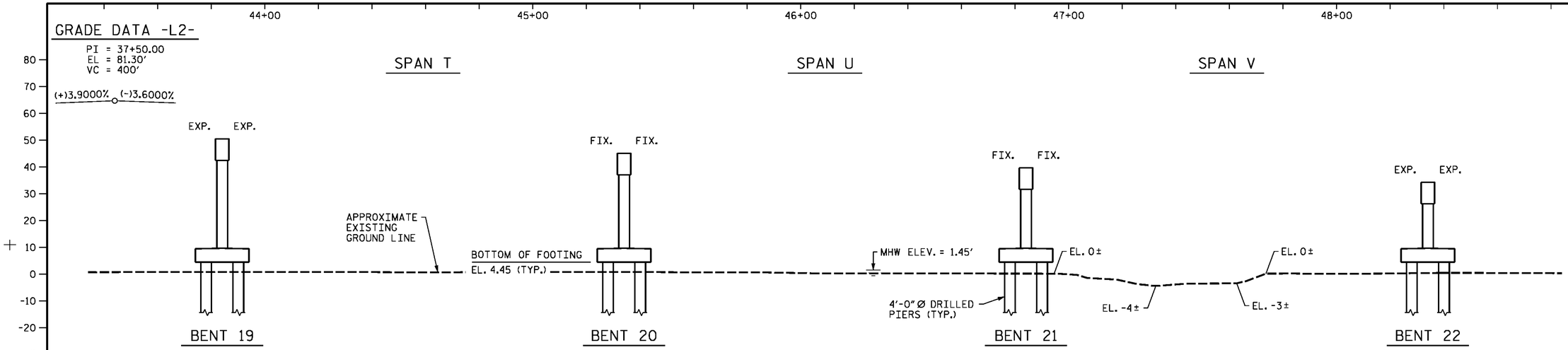
DESIGNED BY:	B. LOFLIN	DATE : JAN 2016
DRAWN BY:	K. WHITE	DATE : JAN 2016
CHECKED BY:	J. DOUGHTY	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/10/2016
400_015_B4929_SMU_GD6.dgn

GRADE DATA -L2-

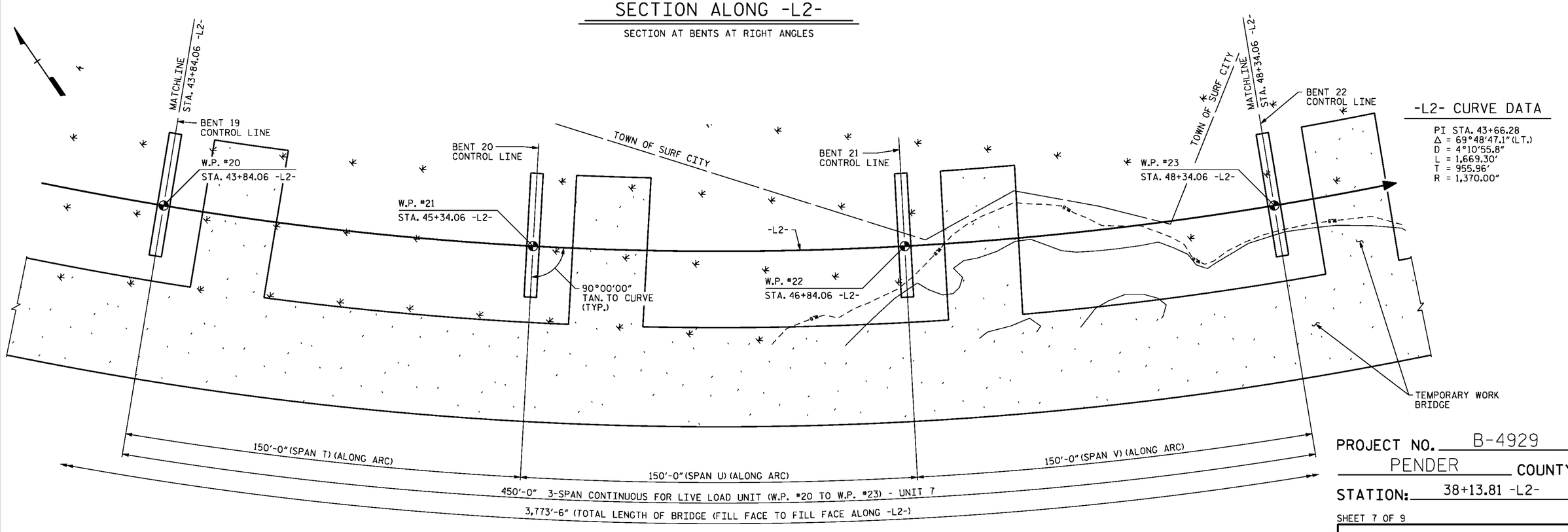
PI = 37+50.00
EL = 81.30'
VC = 400'

(+)3.9000% (-)3.6000%



SECTION ALONG -L2-

SECTION AT BENTS AT RIGHT ANGLES



-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00"

PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 7 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-10
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
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5/9/2016
400_017_B4929_SMU_GD7.dgn

48+00 49+00 50+00 51+00 52+00 53+00

80 70 60 50 40 30 20 10 0 -10 -20 -30

SPAN W SPAN X SPAN Y

GRADE DATA -L2-

PI = 56+00.00
EL = 14.70'
VC = 200'

(-)3.6000% (-)1.9998%

EXP. EXP. FIX. FIX. FIX. FIX. EXP. EXP.

BOTTOM OF FOOTING
EL. 4.45

APPROXIMATE EXISTING GROUND LINE

EL. 1±

TOP OF DRILLED PIER EL. 2.45 (TYP.)

MHW ELEV. = 1.45'

EL. 0±

4'-0" Ø DRILLED PIERS

4'-0" Ø DRILLED PIERS (TYP.)

BENT 22 BENT 23 BENT 24 BENT 25

SECTION ALONG -L2-

SECTION AT BENTS AT RIGHT ANGLES

MATCHLINE STA. 48+34.06 -L2-

BENT 22 CONTROL LINE

W.P. #23
STA. 48+34.06 -L2-

BENT 23 CONTROL LINE

W.P. #24
STA. 49+84.06 -L2-

BENT 24 CONTROL LINE

W.P. #25
STA. 51+34.06 -L2-

MATCHLINE STA. 52+75.56 -L2-

BENT 25 CONTROL LINE

W.P. #26
STA. 52+75.56 -L2-

-L2-

90°00'00" TAN. TO CURVE (TYP.)

PT STA. 50+79.63 -L2-

90°00'00" (TYP.)

TEMPORARY WORK BRIDGE

150'-0" (SPAN W) (ALONG ARC)

150'-0" (SPAN X) (ALONG -L2-)

141'-6" (SPAN Y)

441'-6" 3-SPAN CONTINUOUS FOR LIVE LOAD UNIT (W.P. #23 TO W.P. #26) - UNIT 8

3,773'-6" (TOTAL LENGTH OF BRIDGE (FILL FACE TO FILL FACE ALONG -L2-)

PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00"

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 8 OF 9

DESIGNED BY:	B. LOFLIN — DATE : JAN 2016
DRAWN BY:	K. WHITE — DATE : JAN 2016
CHECKED BY:	J. DOUGHTY — DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY — DATE : MAY 2016

5/9/2016
400_019_B4929_SMU_GD8.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-11
1			3			TOTAL SHEETS
2			4			278

53+00 54+00 55+00 56+00 57+00

80 70 60 50 40 30 20 10 0 -10 -20 -30

SPAN Z SPAN AA SPAN AB SPAN AC

GRADE DATA -L2-
PI = 56+00.00
EL = 14.70'
VC = 200'
(-)3.6000% (-)1.9998%

EXP. EXP. FIX. EXP. FIX. FIX. FIX. FIX. EXP.

TOP OF DRILLED PIER
EL. 2.45 (TYP.)

APPROXIMATE EXISTING GROUND LINE

MHW ELEV. = 1.45'

4'-0" Ø DRILLED PIERS (TYP.)

TOP OF DRILLED PIER
EL. 3.43

EL. 1±

EL. 4±
EL. 2±

FILL FACE @ END BENT 2
STA. 57+00.56 -L2-
GRADE POINT EL. 12.69

MSE STRAPS

FILL

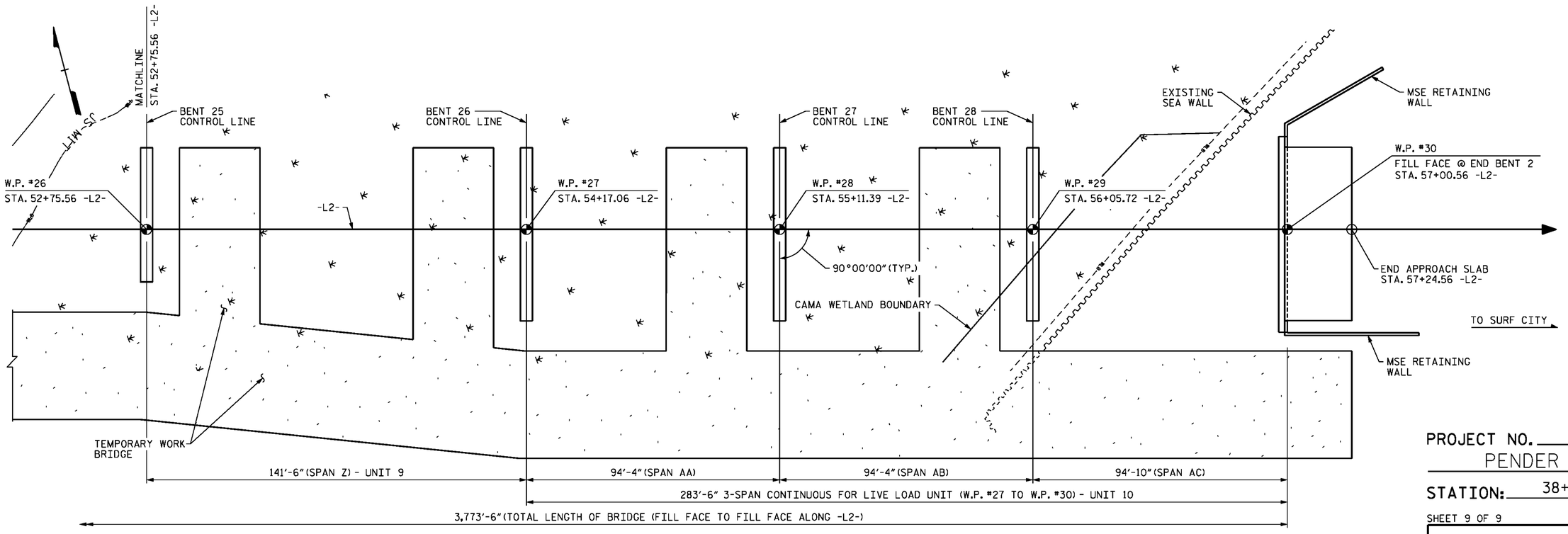
BOTTOM OF CAP EL. 2.05 (LEVEL)

12" PRESTRESSED CONC. PILES

BENT 25 BENT 26 BENT 27 BENT 28 END BENT 2

SECTION ALONG -L2-

SECTION AT END BENT AND BENTS AT RIGHT ANGLES



PLAN

PILES, DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 9 OF 9

DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016		
DRAWN BY:	K. WHITE	DATE :	JAN 2016		
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

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5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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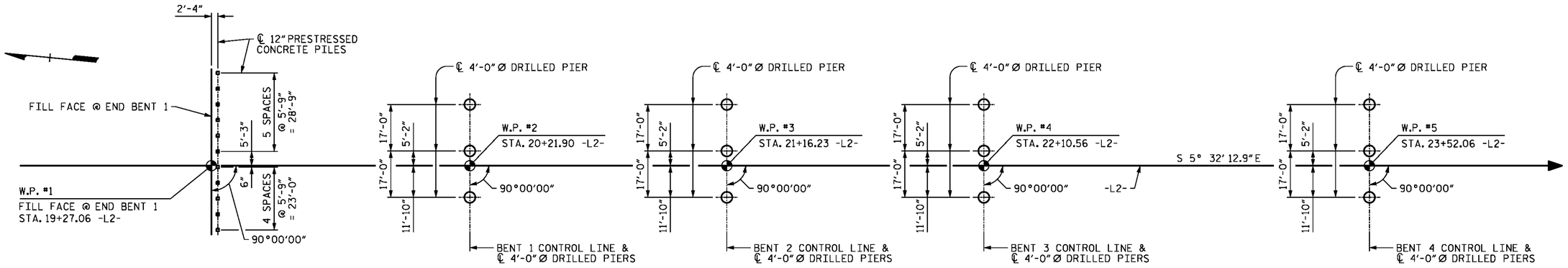
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

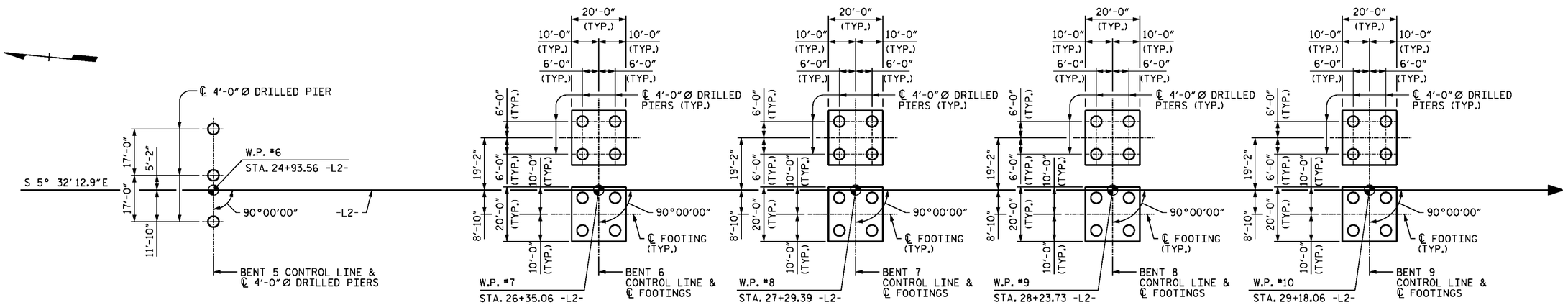
FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-12
1			3			TOTAL SHEETS
2			4			278

5/9/2016
400_021_B4929_SMU_GD9.dgn



PLAN



PLAN

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 4

DESIGNED BY:	J. DOUGHTY	DATE :	DEC 2015
DRAWN BY:	K. WHITE	DATE :	DEC 2015
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
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00F1C86448274F7...

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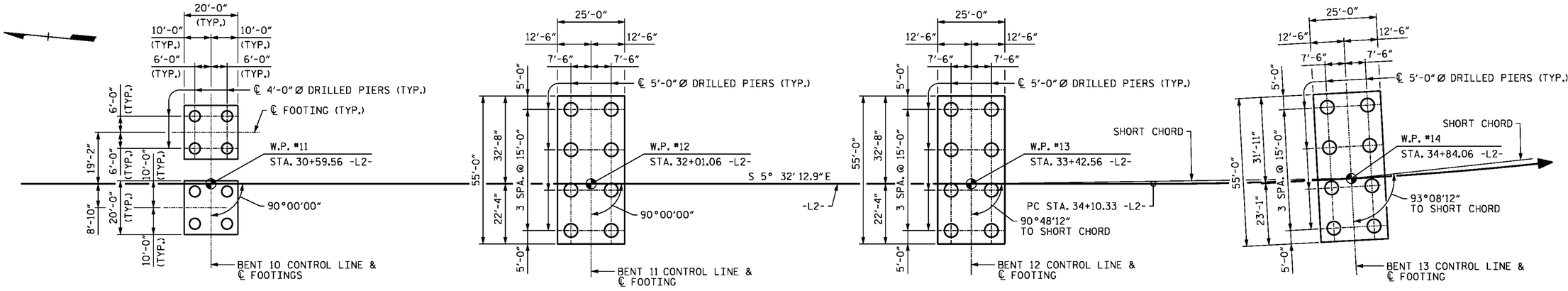
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

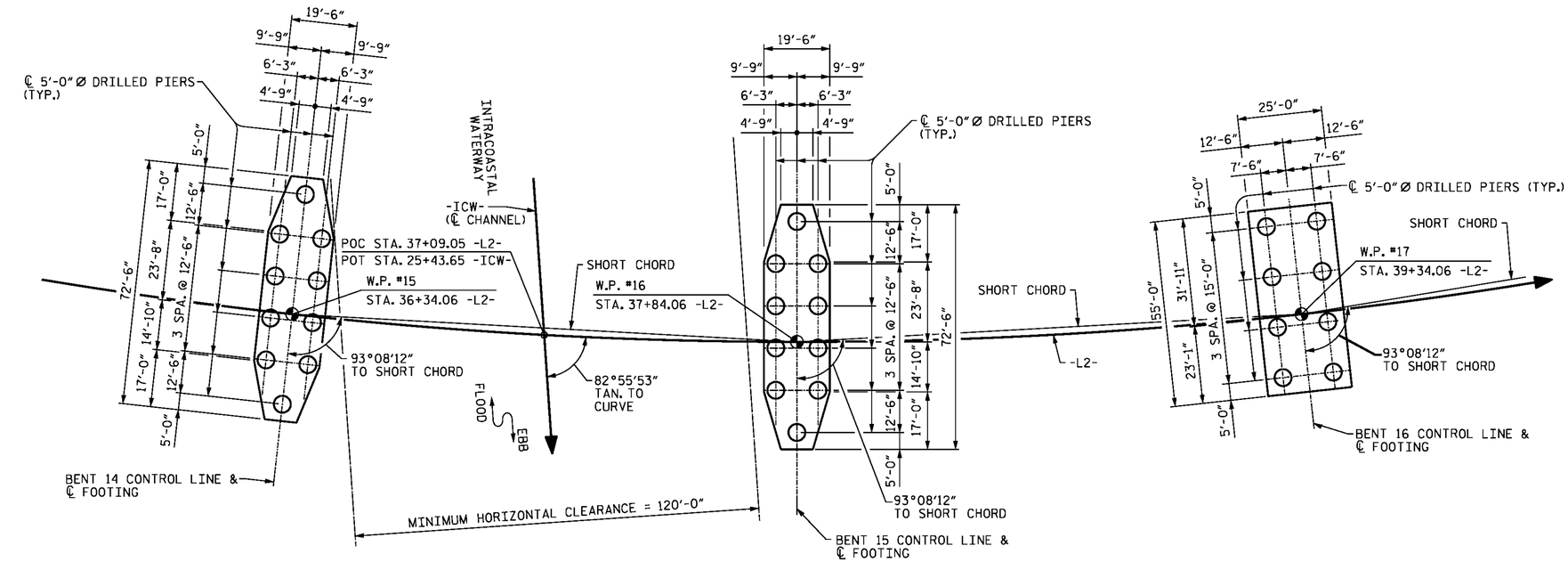
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-13
1			3			TOTAL SHEETS
2			4			278

5/9/2016
400_023_B4929_SMU_FL1.dgn



BENT 10 BENT 11 BENT 12 BENT 13

PLAN



BENT 14 BENT 15 BENT 16

PLAN

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

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:	S-14
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
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SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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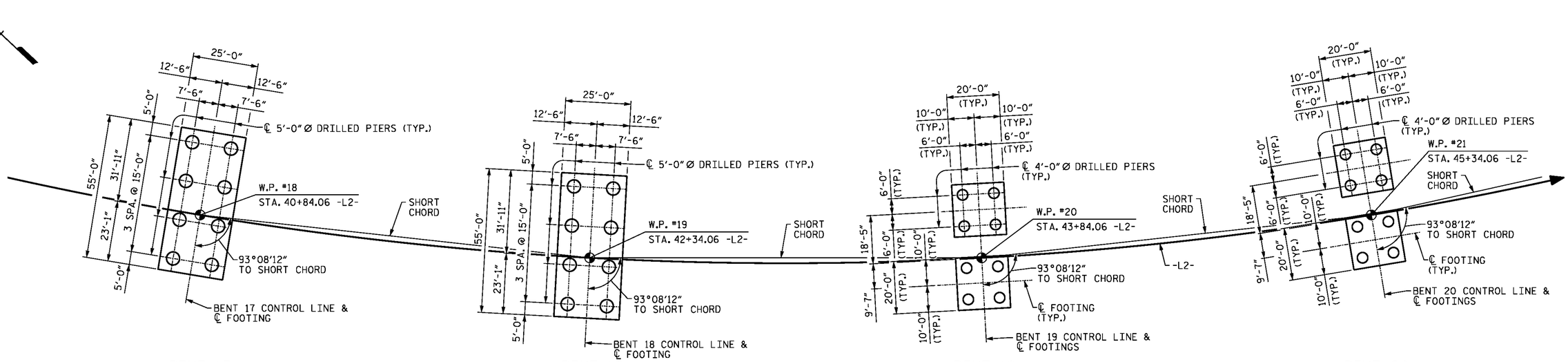
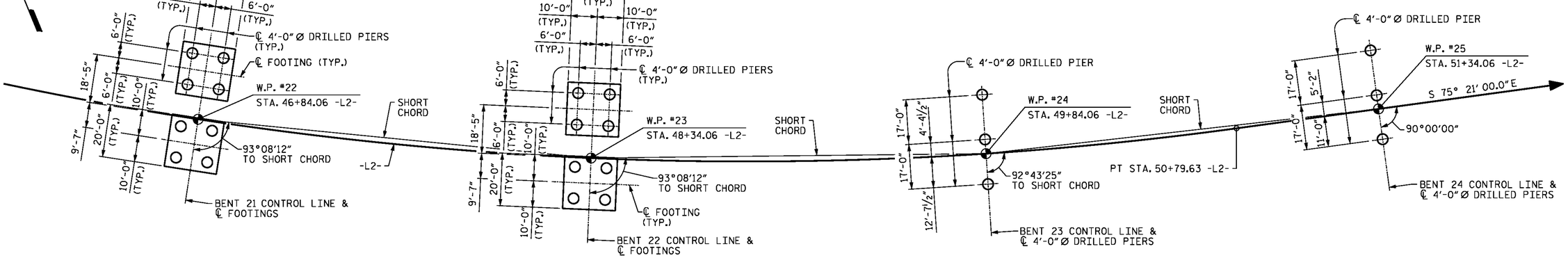
DESIGNED BY:	J. DOUGHTY	DATE :	DEC 2015
DRAWN BY:	KEW/MAH	DATE :	JAN 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/9/2016
400_025_B4929_SMU_FL2.dgn



PLAN



PLAN

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

PARSONS BRINCKERHOFF
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SUITE 1500
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LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
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00F1C86448274F7...

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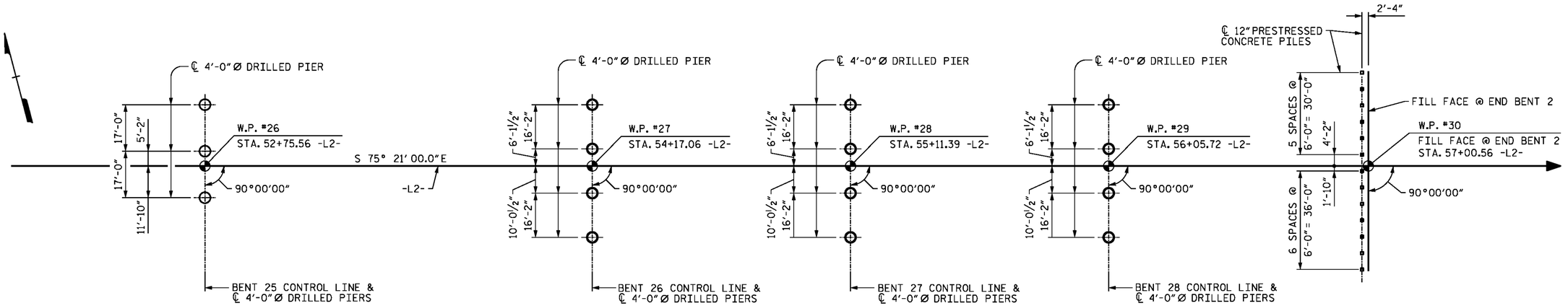
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-15
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. DOUGHTY	DATE : DEC 2015
DRAWN BY:	KEW/MAH	DATE : DEC 2015
CHECKED BY:	B. LOFLIN	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/9/2016
400_027_B4929_SMU_FL3.dgn



BENT 25 | BENT 26 | BENT 27 | BENT 28 | END BENT 2

PLAN

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

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NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

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DESIGNED BY: J. DOUGHTY DATE : DEC 2015
DRAWN BY: K. WHITE DATE : DEC 2015
CHECKED BY: B. LOFLIN DATE : MAR 2016
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE : MAY 2016

5/9/2016
400_029_B4929_SMU_FL4.dgn

FOUNDATION NOTES

THE FOLLOWING FOUNDATION NOTES HAVE BEEN PROVIDED BY THE NCDOT GEOTECHNICAL UNIT:

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

PILES AT END BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 120 TONS PER PILE.

DRIVE PILES AT END BENT 1 TO A REQUIRED DRIVING RESISTANCE OF 160 TONS PER PILE.

PILES AT END BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 100 TONS PER PILE.

DRIVE PILES AT END BENT 2 TO A REQUIRED DRIVING RESISTANCE OF 295 TONS PER PILE. THIS REQUIRED DRIVING RESISTANCE INCLUDES ADDITIONAL RESISTANCE FOR DOWNDRAG.

IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 55,000 TO 65,000 FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT 2. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.

TESTING THE FIRST PRODUCTION PILE WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING IS REQUIRED AT END BENT 1 AND END BENT 2. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

OBSERVE A 1 MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT, AND REINFORCED BRIDGE APPROACH FILL, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT 1 AND END BENT 2. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SPECIAL PROVISIONS.

FOR DRILLED PIERS, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

DRILLED PIERS AT BENT 1 ARE DESIGNED FOR A FACTORED RESISTANCE OF 650 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 650 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 3 ARE DESIGNED FOR A FACTORED RESISTANCE OF 800 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 4 ARE DESIGNED FOR A FACTORED RESISTANCE OF 1,000 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 5 ARE DESIGNED FOR A FACTORED RESISTANCE OF 1,000 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 6 ARE DESIGNED FOR A FACTORED RESISTANCE OF 495 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 7 ARE DESIGNED FOR A FACTORED RESISTANCE OF 545 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 8 ARE DESIGNED FOR A FACTORED RESISTANCE OF 495 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 9 ARE DESIGNED FOR A FACTORED RESISTANCE OF 545 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 10 ARE DESIGNED FOR A FACTORED RESISTANCE OF 545 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 11 ARE DESIGNED FOR A FACTORED RESISTANCE OF 550 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 12 ARE DESIGNED FOR A FACTORED RESISTANCE OF 550 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 13 ARE DESIGNED FOR A FACTORED RESISTANCE OF 520 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 14 ARE DESIGNED FOR A FACTORED RESISTANCE OF 650 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 15 ARE DESIGNED FOR A FACTORED RESISTANCE OF 575 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 16 ARE DESIGNED FOR A FACTORED RESISTANCE OF 520 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 17 ARE DESIGNED FOR A FACTORED RESISTANCE OF 600 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 18 ARE DESIGNED FOR A FACTORED RESISTANCE OF 600 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 19 ARE DESIGNED FOR A FACTORED RESISTANCE OF 575 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 20 ARE DESIGNED FOR A FACTORED RESISTANCE OF 575 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 21 ARE DESIGNED FOR A FACTORED RESISTANCE OF 575 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 22 ARE DESIGNED FOR A FACTORED RESISTANCE OF 450 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 23 ARE DESIGNED FOR A FACTORED RESISTANCE OF 1,000 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 24 ARE DESIGNED FOR A FACTORED RESISTANCE OF 1,000 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 25 ARE DESIGNED FOR A FACTORED RESISTANCE OF 1,000 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 26 ARE DESIGNED FOR A FACTORED RESISTANCE OF 800 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 30 TSF.

DRILLED PIERS AT BENT 27 ARE DESIGNED FOR A FACTORED RESISTANCE OF 665 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

DRILLED PIERS AT BENT 28 ARE DESIGNED FOR A FACTORED RESISTANCE OF 665 TONS PER PIER. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE OF 20 TSF.

PERMANENT STEEL CASINGS ARE REQUIRED FOR DRILLED PIERS AT BENTS 1 THROUGH 28. DO NOT EXTEND PERMANENT CASINGS BELOW ELEVATION -15.0, -23.0, -28.0, -23.0, -15.0, -22.0, -22.0, -22.0, -26.0, -26.0, -22.0, -22.0, -28.0, -40.0, -40.0, -28.0, -22.0, -29.0, -29.0, -29.0, -29.0, -15.0, -15.0, -15.0, -15.0, -15.0, -15.0, AND -15.0 FEET, RESPECTIVELY, WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

INSTALL PERMANENT STEEL CASINGS AT BENTS 1 THROUGH 5, 10, 18 THROUGH 21, AND 23 THROUGH 28 BY VIBRATING, SCREWING, OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION -11.6, -11.6, -12.5, -12.4, -14.5, -25.5, -23.4, -17.1, -15.3, -17.2, -11.8, -11.3, -8.8, -10.1, -10.5, AND -10.4 FEET, RESPECTIVELY.

INSTALL DRILLED PIERS AT BENTS 1 THROUGH 28 TO A TIP ELEVATION NO HIGHER THAN -91.0, -92.0, -93.0, -97.0, -97.0, -87.0, -94.0, -93.0, -94.0, -96.0, -92.0, -93.0, -90.0, -104.0, -104.0, -90.0, -89.0, -89.0, -89.0, -93.0, -93.0, -96.0, -115.0, -106.0, -105.0, -98.0, -103.0, AND -103.0 FEET, RESPECTIVELY, WITH THE REQUIRED TIP RESISTANCE.

THE SCOUR CRITICAL ELEVATION FOR BENT 1, BENT 2, BENT 23, AND BENT 24 IS ELEVATION -14.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 3 AND BENT 4 IS ELEVATION -15.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 5 IS ELEVATION -17.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 6 AND BENT 18 IS ELEVATION -26.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 7 AND BENT 8 IS ELEVATION -27.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 9 AND BENT 10 IS ELEVATION -28.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 11 AND BENT 16 IS ELEVATION -34.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 12 IS ELEVATION -36.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 13 IS ELEVATION -39.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 14 IS ELEVATION -47.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 15 IS ELEVATION -50.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 17 IS ELEVATION -30.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 19 AND BENT 21 IS ELEVATION -20.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 20 AND BENT 22 IS ELEVATION -18.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 25 IS ELEVATION -11.0 FEET.

THE SCOUR CRITICAL ELEVATION FOR BENT 26, BENT 27, AND BENT 28 IS ELEVATION -13.0 FEET.

SCOUR CRITICAL ELEVATIONS ARE USED TO MONITOR POSSIBLE SCOUR PROBLEMS DURING THE LIFE OF THE STRUCTURE.

POLYMER SLURRY IS REQUIRED FOR DRILLED PIERS AT BENTS 1 THROUGH 28.

SPT IS REQUIRED FOR DRILLED PIERS AT BENTS 14, 20 THROUGH 25, 27, AND 28. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SPT TESTING MAY BE REQUIRED FOR DRILLED PIERS AT BENTS 1 THROUGH 13, 15 THROUGH 19, AND 26. THE ENGINEER WILL DETERMINE THE NEED FOR SPT TESTING. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SID INSPECTIONS MAY BE REQUIRED FOR DRILLED PIERS. THE ENGINEER WILL DETERMINE THE NEED FOR SID INSPECTIONS. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

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

DRILLED PIER TIP ELEVATIONS MAY BE ADJUSTED HIGHER OR LOWER, A MAXIMUM OF 10 FEET BASED UPON THE RESULTS OF THE AXIAL LOAD TESTS ON THE DEMONSTRATION PIERS. SEE AXIAL LOAD TEST SPECIAL PROVISION.

CONSTRUCT DEMONSTRATION PIERS IN ACCORDANCE WITH THE GEOTECHNICAL SPECIAL PROVISIONS, STANDARD SPECIFICATIONS, AND AXIAL LOAD TEST SPECIAL PROVISION.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

DESIGNED BY:	J. DOUGHTY	DATE :	MAR 2016
DRAWN BY:	K. WHITE	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

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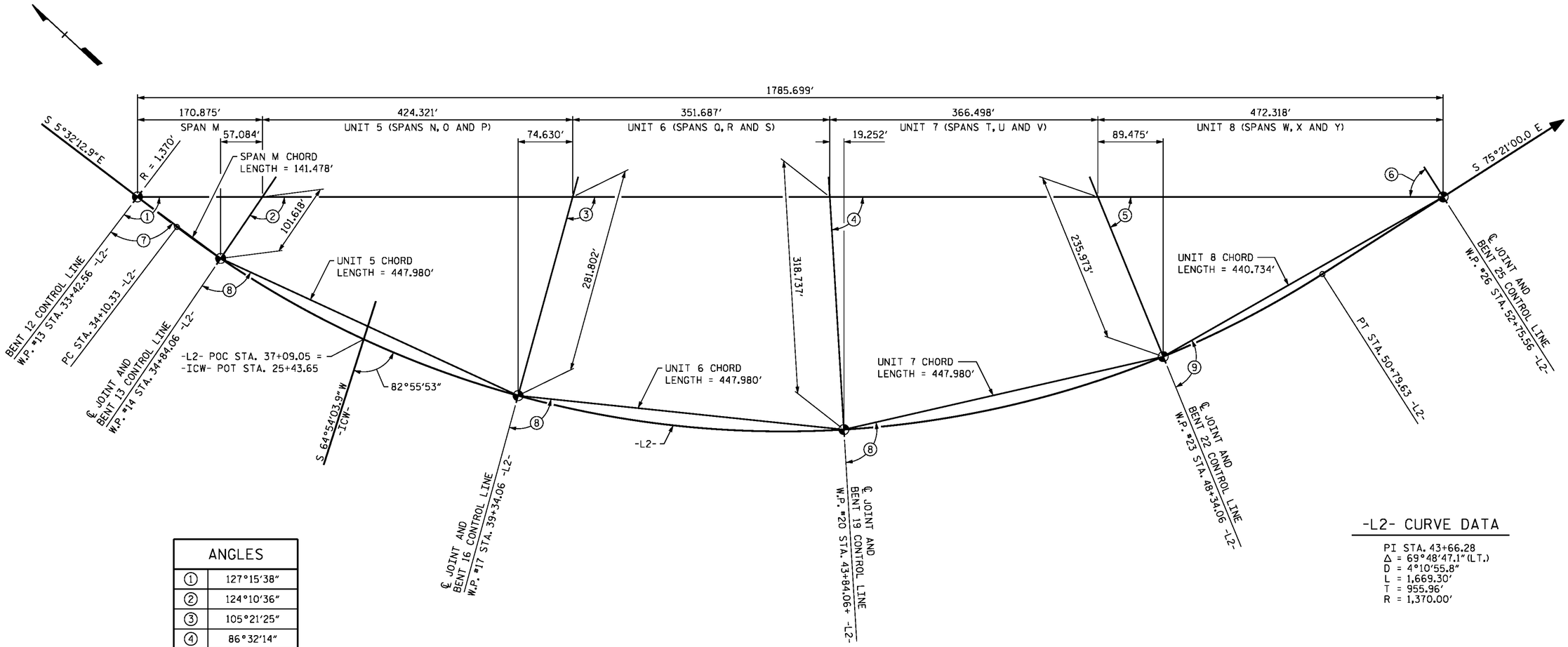
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING FOUNDATION NOTES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-17
1			3			TOTAL SHEETS
2			4			278

5/9/2016
400_031_B4929_SMU_FN.dgn



ANGLES	
①	127°15'38"
②	124°10'36"
③	105°21'25"
④	86°32'14"
⑤	67°43'3"
⑥	57°26'51"
⑦	90°48'12"
⑧	99°24'36"
⑨	97°24'55"

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00'

LONG CHORD LAYOUT - SPANS M TO Y

ALL BENTS IN CURVE ARE RADIAL

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 1 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
LONG CHORD LAYOUT
SPANS M TO Y

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-18
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	B. LOFLIN	DATE : OCT 2015
DRAWN BY:	K. WHITE	DATE : OCT 2015
CHECKED BY:	J. DOUGHTY	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/9/2016
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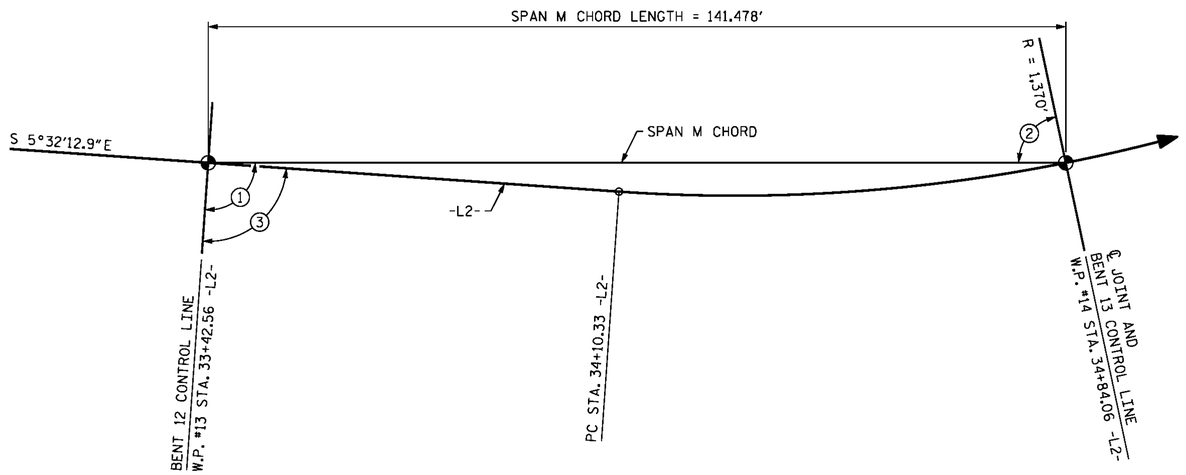

CHORD LAYOUT - SPAN M

BENT 13 IS RADIAL TO -L2-

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1"(LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00'

ANGLES	
①	90°48'12"
②	87°43'11"
③	90°00'00"

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
CHORD LAYOUT
SPAN M

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-19
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C8644B274F7...

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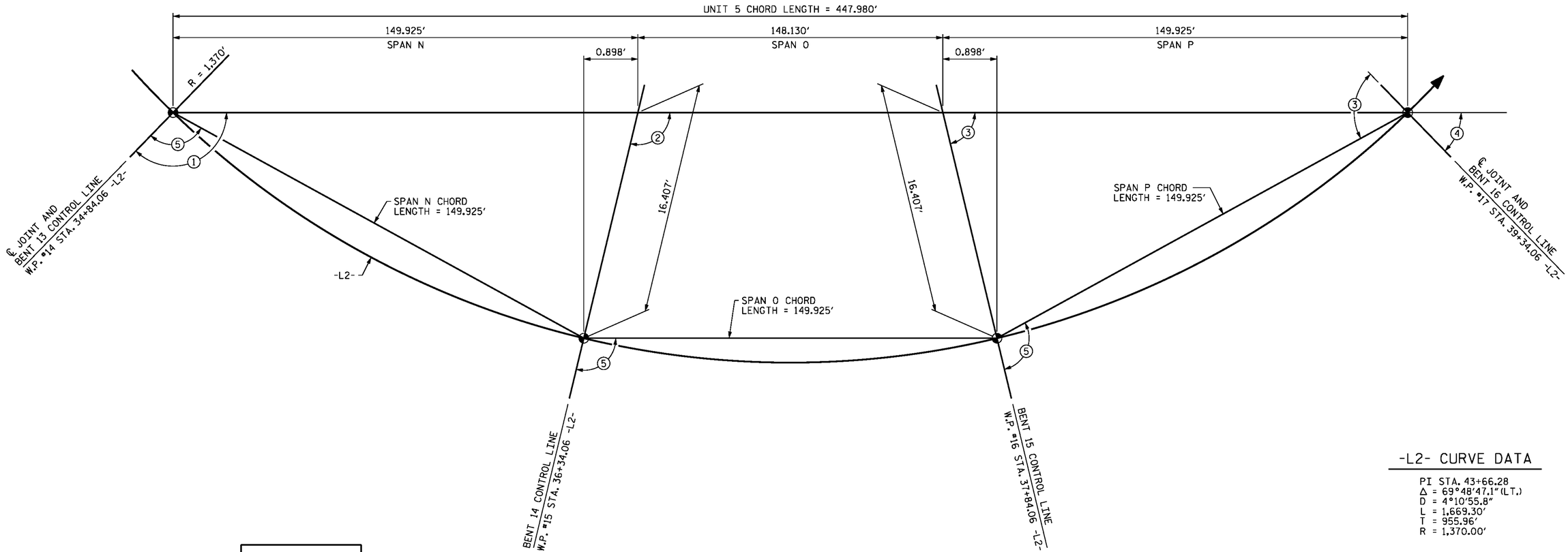
UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	B. LOFLIN	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/9/2016
400_035_B4929_SWU_LC2.dgn



CHORD LAYOUT - UNIT 5

ALL BENTS IN CURVE ARE RADIAL

ANGLES	
①	99°24'36"
②	93°08'12"
③	86°51'48"
④	80°35'24"
⑤	93°08'12"

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00'

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
CHORD LAYOUT
UNIT 5

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-20
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	B. LOFLIN	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/9/2016
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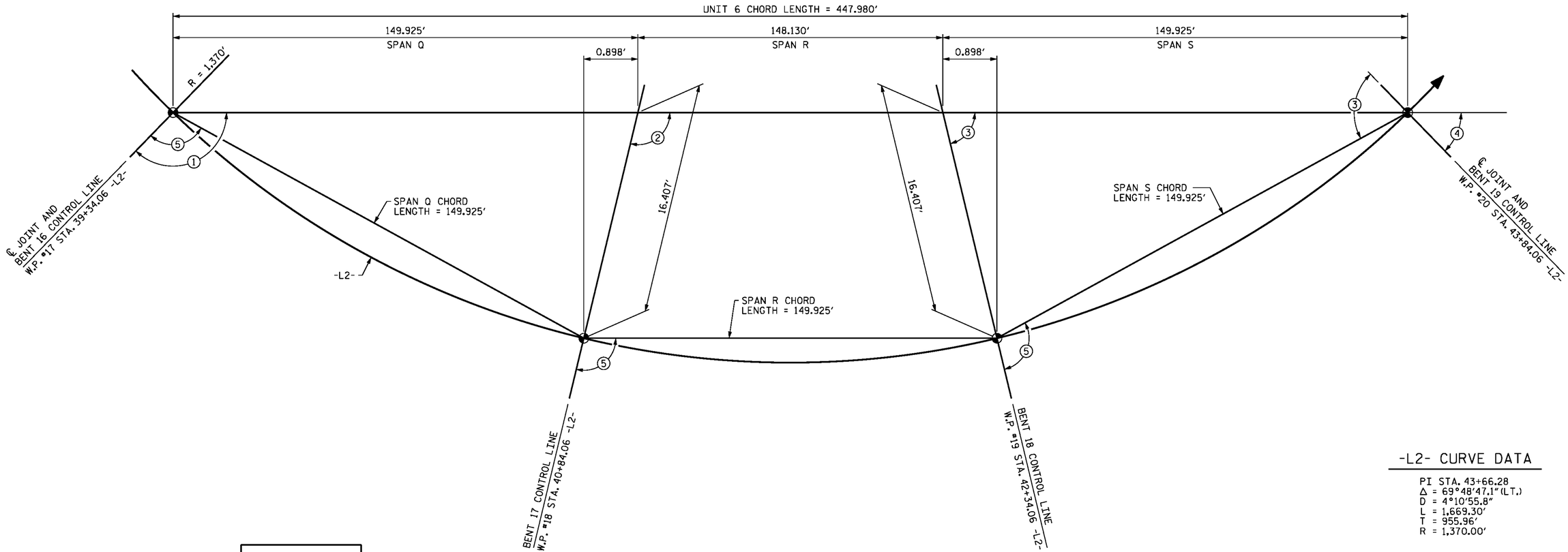

CHORD LAYOUT - UNIT 6

ALL BENTS IN CURVE ARE RADIAL

ANGLES	
①	99°24'36"
②	93°08'12"
③	86°51'48"
④	80°35'24"
⑤	93°08'12"

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00'

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
CHORD LAYOUT
UNIT 6

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-21
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	B. LOFLIN	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/9/2016
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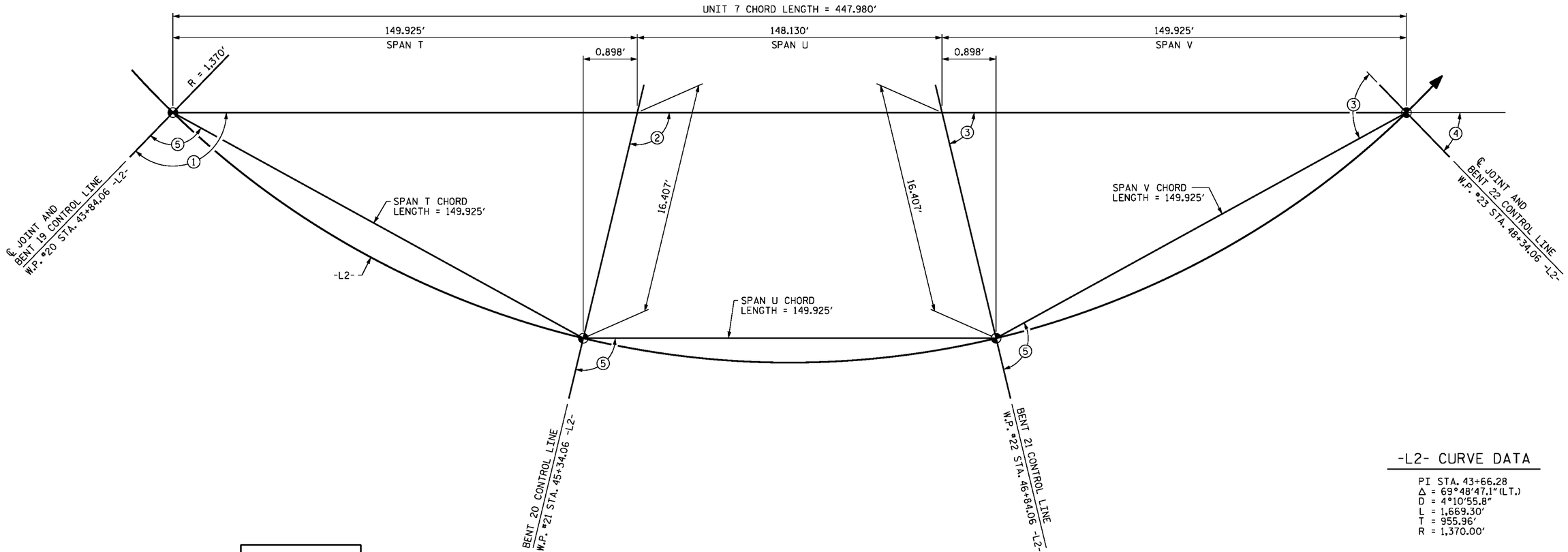

CHORD LAYOUT - UNIT 7

ALL BENTS IN CURVE ARE RADIAL

ANGLES	
①	99°24'36"
②	93°08'12"
③	86°51'48"
④	80°35'24"
⑤	93°08'12"

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00'

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
CHORD LAYOUT
UNIT 7

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-22
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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DESIGNED BY:	B. LOFLIN	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/9/2016
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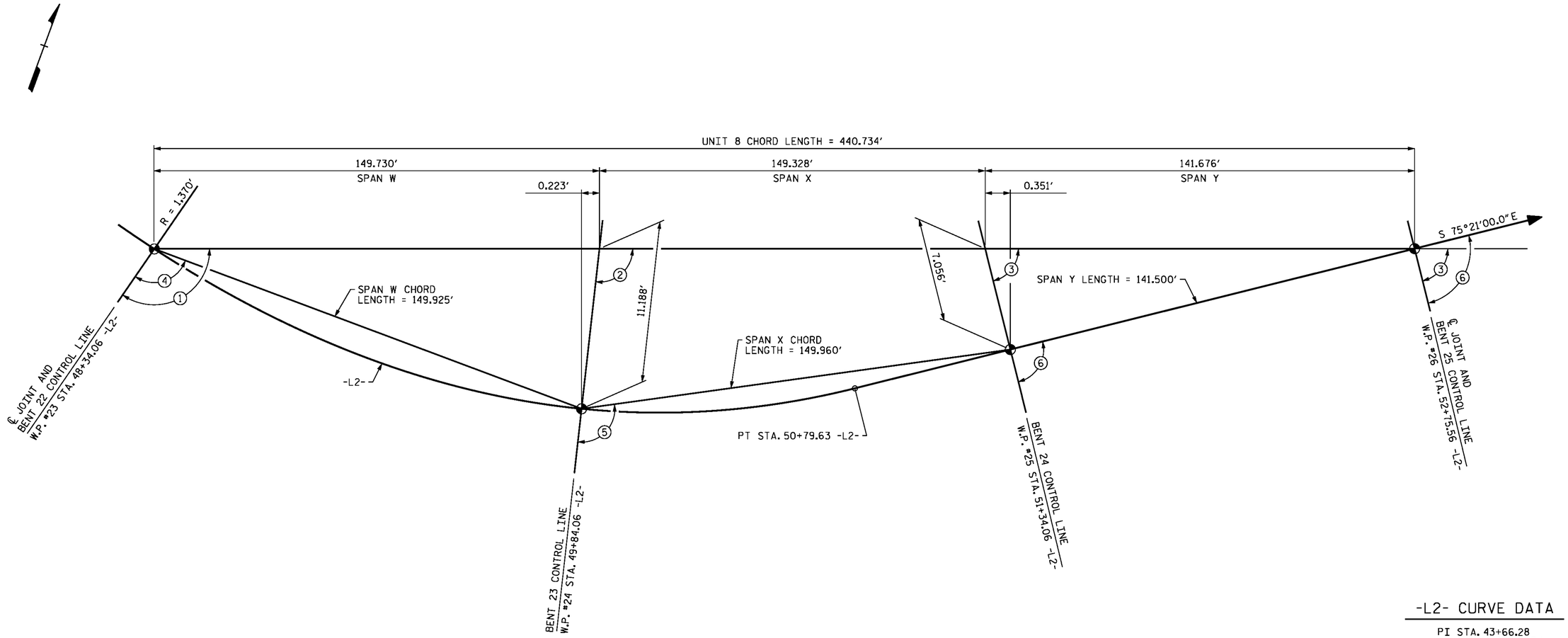

ANGLES	
①	97°24'55"
②	91°08'32"
③	87°08'43"
④	93°08'12"
⑤	92°43'25"
⑥	90°00'00"

CHORD LAYOUT - UNIT 8

ALL BENTS IN CURVE ARE RADIAL

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00'

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
CHORD LAYOUT
UNIT 8

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-23
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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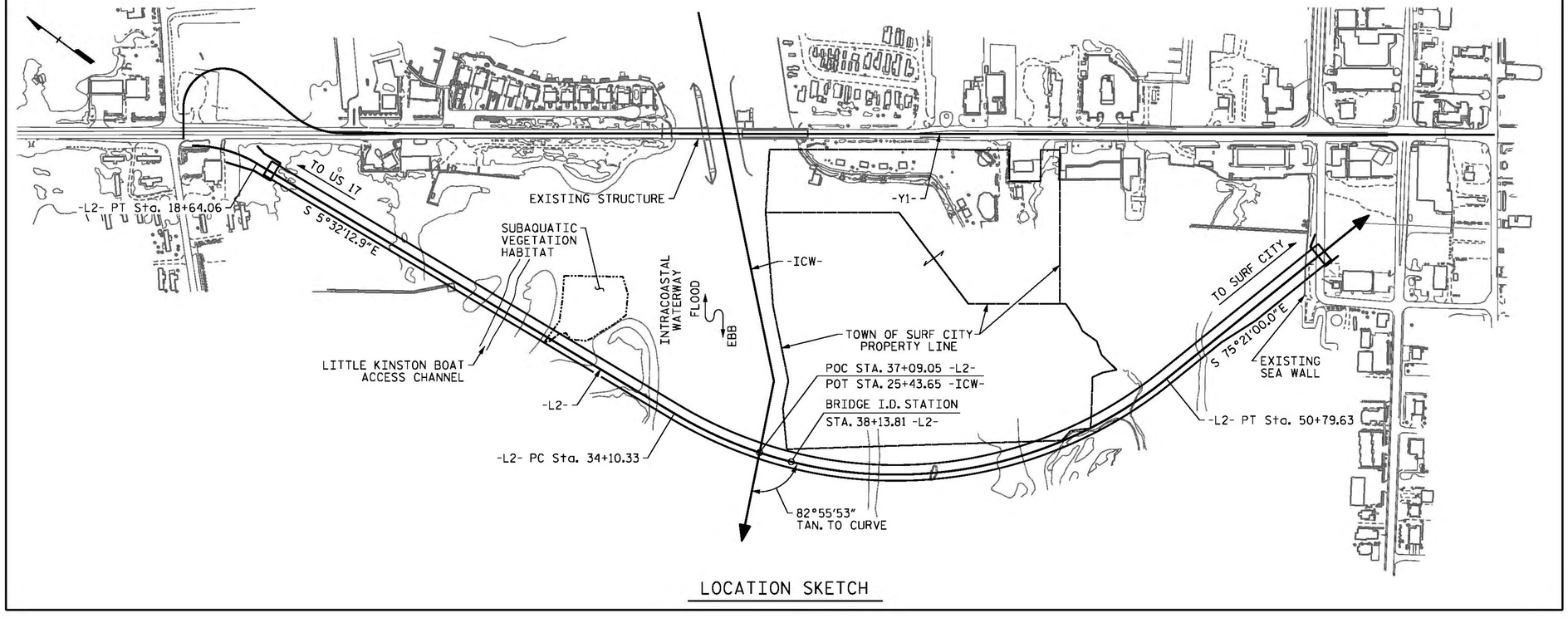
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	B. LOFLIN	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/9/2016
400_043_B4929_SMU_LC6.dgn

BM #1: STA. 11+22.59 -L1-, 30.59' RT., EL. 8.45



LOCATION SKETCH

HYDRAULIC DATA

DESIGN DISCHARGE ..... 83,000 CFS
FREQUENCY OF DESIGN DISCHARGE ..... 50 YRS
DESIGN HIGH WATER ELEVATION ..... 10.0'
DRAINAGE AREA ..... N/A
BASE DISCHARGE (Q100) ..... 113,000 CFS
BASE HIGH WATER ELEVATION ..... 11.3'

HYDRAULIC DATA AND SCOUR DATA USED IN DESIGN AND SHOWN ON THESE PLANS ARE FROM BRIDGE SURVEY REPORT (BSR) DATED 8/18/15 PROVIDED BY NCDOT AND FROM REVISED SCOUR CALCULATIONS RECEIVED FROM NCDOT ON JANUARY 8, 2016.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE ..... N/A
FREQUENCY OF OVERTOPPING FLOOD ..... N/A
OVERTOPPING FLOOD ELEVATION ..... N/A

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

DESIGNED BY:	B. LOFLIN	DATE :	JULY 2015
DRAWN BY:	K. WHITE	DATE :	JULY 2015
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-24
1			3			TOTAL SHEETS
2			4			278

5/9/2016
400_045_B4929_SMU_LS.dgn

GENERAL NOTES

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

ASSUMED LIVE LOAD = HL-93 OR ALTERNATIVE LOADING.

THIS BRIDGE HAS BEEN DESIGNED FOR V_{30} = 105 MPH. V_{30} IS THE WIND VELOCITY AT 30 FT. ABOVE LOW GROUND OR ABOVE DESIGN WATER LEVEL IN ACCORDANCE WITH SECTION 3.8 OF THE 2014 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (7TH EDITION).

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

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

THIS BRIDGE HAS BEEN DESIGNED FOR VESSEL COLLISION (CV) IN ACCORDANCE WITH SECTION 3.14 OF THE 2014 AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (7TH EDITION). THIS BRIDGE HAS AN OPERATIONAL CLASSIFICATION OF "CRITICAL". THE FOLLOWING CONTROLLING DESIGN CV LOADS WERE USED. CV LOADS LISTED ARE APPLIED PARALLEL TO CHANNEL CENTERLINE.

BENT NO.	CV LOAD (KIPS)
1 THROUGH 5, 19 THROUGH 28	70
6 THROUGH 11, 18	800
12, 13, 16, 17	1700
14, 15	2500

THE SUBSTRUCTURE UNITS SUPPORTING UNIT 1 (END BENT 1 AND BENT 1 THROUGH 3) AND UNIT 10 (BENT 26 THROUGH BENT 28 AND END BENT 2) HAVE BEEN DESIGNED FOR SUPERSTRUCTURE WAVE FORCES. THESE FORCES WERE ESTIMATED USING THE 2008 AASHTO GUIDE SPECIFICATIONS FOR BRIDGES VULNERABLE TO COASTAL STORMS AS A REFERENCE. THE FORCES USED FOR DESIGN ARE PRESENTED IN THE TABLE BELOW; FORCES FOR EACH CASE SHALL BE APPLIED CONCURRENTLY AT THE TRAILING BEAM EDGE. THIS BRIDGE IS DESIGNATED AS BEING "CRITICAL / ESSENTIAL" FOR PURPOSES OF DESIGNING FOR WAVE FORCES.

		VERTICAL (KIPS/FT)	HORIZONTAL (KIPS/FT)	MOMENT (KIP-FT/FT)
UNIT 1	CASE 1	7.5	0.2	240
	CASE 2	4.9	0.4	180
UNIT 10	CASE 1	8.1	0.2	330
	CASE 2	6.1	0.6	290

CASE 1 = MAXIMUM QUASI-STATIC VERTICAL FORCE AND ASSOCIATED FORCES AND MOMENT
CASE 2 = MAXIMUM HORIZONTAL WAVE FORCE AND ASSOCIATED FORCES AND MOMENT

FOR SUBMITTAL OF WORKING DRAWINGS, SEE SPECIAL PROVISIONS.

FOR CRANE SAFETY, SEE SPECIAL PROVISIONS.

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

FOR EROSION CONTROL MEASURES SEE EROSION CONTROL PLANS.

FOR BRIDGE DECK RIDEABLILITY AND GROOVING, SEE SPECIAL PROVISIONS.

FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.

THE CONTRACTOR WILL BE REQUIRED TO CONSTRUCT, MAINTAIN AND AFTERWARDS REMOVE A TEMPORARY ACCESS AT STATION 38+13.81 -L2- FOR USE DURING CONSTRUCTION OF THE PROPOSED STRUCTURE. FOR CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS, SEE SPECIAL PROVISIONS.

FOR GROUT FOR STRUCTURES, SEE SPECIAL PROVISIONS.

FOR MAINTENANCE OF WATER TRAFFIC, SEE SPECIAL PROVISIONS.

FOR SECURING OF VESSELS, SEE SPECIAL PROVISIONS.

FOR WORK IN, OVER, OR ADJACENT TO NAVIGABLE WATERS, SEE SPECIAL PROVISIONS.

FOR VERTICAL CLEARANCE GAGES, SEE SPECIAL PROVISIONS.

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

FOR EPOXY RESIN INJECTION, SEE SPECIAL PROVISIONS.

FOR PLASTIC LUMBER FENDER BOARDS AT CHANNEL BENTS, SEE SPECIAL PROVISIONS.

FOR F.I.B 72" AND F.I.B. 78" PRESTRESSED CONCRETE GIRDERS, SEE SPECIAL PROVISIONS.

FOR UTILITY INFORMATION, SEE UTILITY PLANS AND SPECIAL PROVISIONS.

FOR FALSEWORK AND FORMWORK, SEE SPECIAL PROVISIONS.

THE EXACT LOCATION, AND COMPLETE DESCRIPTION OF ALL INSERTS SHALL BE SHOWN ON WORKING DRAWINGS AND SUBMITTED TO THE DEPARTMENT FOR APPROVAL PRIOR TO THE CASTING OF THE CONCRETE MEMBER.

FOR PLACING LOAD ON STRUCTURE MEMBERS, SEE SPECIAL PROVISIONS.

FOR NAVIGATIONAL CLEARANCE VERIFICATION AND WATERWAY INSPECTION, SEE SPECIAL PROVISIONS.

AFTER SERVING AS A TEMPORARY STRUCTURE THE EXISTING STRUCTURE CONSISTING OF ONE 250-FT THROUGH TRUSS SWING SPAN WITH SIX 35-FT REINFORCED CONCRETE DECK GIRDER APPROACH SPANS; 24-FT CLEAR ROADWAY WIDTH, SUPPORTED ON A MASS CONCRETE PIVOT PIER AND PILE BENTS (APPROACH SPANS) SHALL BE REMOVED. THE EXISTING BRIDGE IS PRESENTLY POSTED FOR LOAD LIMIT. SHOULD THE STRUCTURAL INTEGRITY OF THE BRIDGE, DETERIORATE DURING CONSTRUCTION OF THE PROPOSED BRIDGE, A LOAD LIMIT MAY BE POSTED AND MAY BE REDUCED AS FOUND NECESSARY DURING THE LIFE OF THE PROJECT.

THE 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 CONTRCTOR, THE CONTRACTOR SHALL HAVE NO CLAIM WHATSOEVER AGAINST THE ENGINEER OR THE DEPARTMENT OF TRANSPORTATION FOR ANY DELAYS OR ADDITIONAL COST INCURRED BASED ON THE DIFFERENCE BETWEEN THE EXISTING BRIDGE SUBSTRUCTURE SHOWN ON THE PLANS AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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

CORROSION PROTECTION NOTES

FOR CORROSION PROTECTION OF BRIDGE, SEE SPECIAL PROVISIONS.

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

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

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

ALL BAR SUPPORTS USED IN THE PARAPET, VERTICAL FACED BARRIER RAIL, PEDESTRIAN RAILING CURBS AND CONCRETE POSTS, DECK, BENT CAPS, COLUMNS, PILE CAPS, FOOTINGS, STRUTS AND ALL INCIDENTIAL REINFORCING STEEL SHALL BE EPOXY COATED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

ALL INSERTS AND MISCELLANEOUS REINFORCING STEEL EMBEDDED IN CAST-IN-PLACE CONCRETE SHALL BE CORROSION PROTECTED. INSERTS MAY BE HOT DIP GALVANIZED OR EPOXY COATED. REINFORCING STEEL SHALL BE EPOXY COATED. ELECTROPLATING WILL NO BE ALLOWED.

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

CLASS AA CONCRETE SHALL BE USED IN ALL CAST-IN-PLACE COLUMNS, BENT CAPS, PILE CAPS, STRUTS AND FOOTINGS, AND SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR. FOR CALCIUM NITRITE CORROSION INHIBITOR, SEE STANDARD SPECIFICATIONS.

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

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

ALL METALLIZED SURFACES SHALL RECEIVE A SEAL COATING AS SPECIFIED IN THE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALIZATION).

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

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

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

DESIGNED BY:	J. DOUGHTY	DATE :	DEC 2015
DRAWN BY:	R. KHARWA	DATE :	DEC 2015
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/9/2016
400_047_B4929_SMU_GN.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C66448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
GENERAL NOTES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-25
1			3			TOTAL SHEETS
2			4			278

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS	REMOVAL OF EXISTING STRUCTURE	4'-0" DIA. DRILLED PIERS	5'-0" DIA. DRILLED PIERS	PERMANENT STEEL CASING FOR 4'-0" DIA. DRILLED PIER	PERMANENT STEEL CASING FOR 5'-0" DIA. DRILLED PIER	PDA TESTING	SID INSPECTION	SPT TESTING	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS AA CONCRETE	BRIDGE APPROACH SLABS	EPOXY COATED REINFORCING STEEL	EPOXY COATED SPIRAL REINFORCING STEEL
	LUMP SUM	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EA.	EA.	EA.	EA.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.
SUPERSTRUCTURE	LUMP SUM										202,470	169,397		LUMP SUM		
END BENT 1													49.6		6,784	
BENT 1			280.2		52.2			1	1	1			45.7		38,137	7,328
BENT 2			283.4		76.4			1	1	1			44.7		39,158	6,950
BENT 3			286.4		91.4			1	1	1			52.9		39,668	7,175
BENT 4			298.3		76.4			1	1	1			53.0		82,454	7,876
BENT 5			298.3		53.4			1	1	1			58.9		83,856	8,285
BENT 6			717.9		197.9			2	2	2			334.3		264,513	18,697
BENT 7			773.9		197.9			2	2	2			343.6		279,406	20,143
BENT 8			765.9		197.9			2	2	2			352.5		281,578	19,937
BENT 9			773.9		229.9			2	2	2			361.4		283,655	20,143
BENT 10			789.9		229.9			2	2	2			374.3		290,155	20,557
BENT 11				757.9		197.9		2	2	2			614.9		269,441	25,733
BENT 12				765.9		197.9		2	2	2			628.8		273,605	26,002
BENT 13				741.9		245.9		2	2	2			641.1		280,328	25,194
BENT 14				1,067.4		427.4		3	10	3			613.3		467,153	36,208
BENT 15				1,067.4		427.4		3	3	3			616.7		467,932	36,208
BENT 16				741.9		245.9		2	2	2			650.0		282,341	25,194
BENT 17				733.9		197.9		2	2	2			635.5		273,197	24,924
BENT 18				733.9		253.9		2	2	2			622.5		270,066	24,924
BENT 19			749.9		269.9			2	2	2			377.4		166,942	19,523
BENT 20			781.9		269.9			2	8	2			364.8		167,304	20,349
BENT 21			781.9		269.9			2	8	2			351.8		164,270	20,349
BENT 22			805.9		157.9			2	8	2			338.4		163,528	20,969
BENT 23			352.3		53.4			1	3	1			62.8		93,467	9,849
BENT 24			325.4		52.4			1	3	1			58.1		90,620	8,812
BENT 25			322.4		52.4			1	3	1			54.7		90,163	8,351
BENT 26			401.8		69.8			1	1	1			75.5		59,975	10,031
BENT 27			421.8		69.8			1	4	1			58.5		60,846	10,296
BENT 28			425.8		69.8			1	4	1			59.2		60,027	11,062
TEST PIER 1				95.5		22.0		1	1	1					11,016	3,207
TEST PIER 2			79.5		22.0			1	1	1					7,452	2,099
END BENT 2													62.9		8,158	
TOTAL	LUMP SUM	LUMP SUM	10,716.7	6,705.7	2,760.5	2,216.2	2	49	86	49	202,470	169,397	8,957.8	LUMP SUM	5,417,195	506,375

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

TOTAL BILL OF MATERIAL

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DESIGNED BY: J. DOUGHTY DATE : MAR 2016
DRAWN BY: K. WHITE DATE : MAR 2016
CHECKED BY: B. LOFLIN DATE : MAR 2016
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE : MAY 2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-26
1			3			TOTAL SHEETS
2			4			278

5/12/2016
400_049_B4929_SMU_TBM1.dgn

TOTAL BILL OF MATERIAL

	54" PRESTRESSED CONCRETE GIRDERS		72"F.I.B. PRESTRESSED CONCRETE GIRDERS		78"F.I.B. PRESTRESSED CONCRETE GIRDERS		12" PRESTRESSED CONCRETE PILES		PILE REDRIVES	TWO BAR METAL RAIL	1'-2" x 2'-6" CONCRETE PARAPET	VERTICAL CONCRETE BARRIER RAIL	PEDESTRIAN RAILING	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS	PLASTIC LUMBER FENDER BOARDS AT CHANNEL BENTS	AXIAL LOAD TEST No. 1	AXIAL LOAD TEST No. 2	ASBESTOS ASSESSMENT	PATH LIGHTING SYSTEM AT STA. 18+40 -L2-	PATH LIGHTING SYSTEM AT STA. 57+76 -L2-
	NO.	LIN. FT.	NO.	LIN. FT.	NO.	LIN. FT.	NO.	LIN. FT.	EA.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	36	3,360.75	56	7,175.37	60	8,882.80				3,789.00	3,804.06	3,796.99	3,813.16	LUMP SUM	LUMP SUM						
END BENT 1							11	220	6												
BENT 1																					
BENT 2																					
BENT 3																					
BENT 4																					
BENT 5																					
BENT 6																					
BENT 7																					
BENT 8																					
BENT 9																					
BENT 10																					
BENT 11																					
BENT 12																					
BENT 13																					
BENT 14																					
BENT 15																					
BENT 16																					
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BENT 18																					
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BENT 20																					
BENT 21																					
BENT 22																					
BENT 23																					
BENT 24																					
BENT 25																					
BENT 26																					
BENT 27																					
BENT 28																					
TEST PIER 1																					
TEST PIER 2																					
END BENT 2							13	650	7												
TOTAL	36	3,360.75	56	7,175.37	60	8,882.80	24	870	13	3,789.00	3,804.06	3,796.99	3,813.16	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

TOTAL BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-27
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. DOUGHTY	DATE : MAR 2016
DRAWN BY:	K. WHITE	DATE : MAR 2016
CHECKED BY:	B. LOFLIN	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/13/2016
400_051_B4929_SMU_TBM2.dgn

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)	1.20	--	1.75	0.909	1.81	B/C	ER	46.0	1.055	1.20	C	I	18.0	0.80	0.909	1.81	B/C	ER	46.0	1, 2, 3
		HL-93 (OPERATING)	N/A		1.58	--	1.35	0.909	2.35	B/C	ER	46.0	1.055	1.58	C	I	18.0	N/A	--	--	--	--	--	1, 2, 3
		HS-20 (INVENTORY)	36.000	(2)	1.61	58.0	1.75	0.909	2.48	B/C	ER	46.0	1.055	1.61	C	I	18.0	0.80	0.909	2.48	B/C	ER	46.0	1, 2, 3
		HS-20 (OPERATING)	36.000		2.11	76.0	1.35	0.909	3.22	B/C	ER	46.0	1.055	2.11	C	I	18.0	N/A	--	--	--	--	--	1, 2, 3
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		5.42	73.2	1.40	0.909	7.29	B/C	ER	46.0	1.055	5.42	C	I	18.0	0.80	0.909	5.81	B/C	ER	46.0	1, 2, 3
		SNGARBS2	20.000		3.78	75.6	1.40	0.909	5.31	B/C	ER	46.0	1.055	3.78	C	I	18.0	0.80	0.909	4.23	B/C	ER	46.0	1, 2, 3
		SNAGRIS2	22.000		3.48	76.6	1.40	0.909	4.98	B/C	ER	46.0	1.055	3.48	C	I	18.0	0.80	0.909	3.97	B/C	ER	46.0	1, 2, 3
		SNCOTTS3	27.250		2.62	71.4	1.40	0.909	3.62	B/C	ER	46.0	1.055	2.62	C	I	18.0	0.80	0.909	2.89	B/C	ER	46.0	1, 2, 3
		SNAGGRS4	34.925		2.06	71.9	1.40	0.909	2.98	B/C	ER	46.0	1.055	2.06	C	I	18.0	0.80	0.909	2.38	B/C	ER	46.0	1, 2, 3
		SNS5A	35.550		2.07	73.6	1.40	0.909	2.92	B/C	ER	46.0	1.055	2.07	C	I	18.0	0.80	0.909	2.33	B/C	ER	46.0	1, 2, 3
		SNS6A	39.950		1.87	74.7	1.40	0.909	2.66	B/C	ER	46.0	1.055	1.87	C	I	18.0	0.80	0.909	2.12	B/C	ER	46.0	1, 2, 3
		SNS7B	42.000		1.82	76.4	1.40	0.909	2.53	B/C	ER	46.0	1.055	1.82	C	I	18.0	0.80	0.909	2.02	B/C	ER	46.0	1, 2, 3
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.22	73.3	1.40	0.909	3.24	B/C	ER	46.0	1.055	2.22	C	I	18.0	0.80	0.909	2.58	B/C	ER	46.0	1, 2, 3
		TNT4A	33.075		2.33	77.1	1.40	0.909	3.24	B/C	ER	46.0	1.055	2.33	C	I	18.0	0.80	0.909	2.59	B/C	ER	46.0	1, 2, 3
		TNT6A	41.600		1.91	79.5	1.40	0.909	2.63	B/C	ER	46.0	1.055	1.91	C	I	18.0	0.80	0.909	2.10	B/C	ER	46.0	1, 2, 3
		TNT7A	42.000		1.88	79.0	1.40	0.909	2.64	B/C	ER	46.0	1.055	1.88	C	I	18.0	0.80	0.909	2.10	B/C	ER	46.0	1, 2, 3
		TNT7B	42.000		1.79	75.2	1.40	0.909	2.71	B/C	ER	46.0	1.055	1.79	C	I	18.0	0.80	0.909	2.16	B/C	ER	46.0	1, 2, 3
		TNAGRIT4	43.000		1.76	75.7	1.40	0.909	2.59	B/C	ER	46.0	1.055	1.76	C	I	18.0	0.80	0.909	2.07	B/C	ER	46.0	1, 2, 3
		TNAGT5A	45.000		1.68	75.6	1.40	0.909	2.45	B/C	ER	46.0	1.055	1.68	C	I	18.0	0.80	0.909	1.96	B/C	ER	46.0	1, 2, 3
		TNAGT5B	45.000	(3)	1.65	74.3	1.40	0.909	2.43	B/C	ER	46.0	1.055	1.65	C	I	18.0	0.80	0.909	1.94	B/C	ER	46.0	1, 2, 3

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. GIRDERS DESIGNED AS SIMPLE SPANS FOR FLEXURE. GIRDERS DESIGNED AS SIMPLE-MADE-CONTINUOUS (FOR LIVE LOAD AND SUPERIMPOSED DEAD LOAD) FOR SHEAR.
2. 3½" AVERAGE HAUNCH ASSUMED FOR ALL SPANS. HAUNCH CONCRETE IS NOT INCLUDED IN SECTION PROPERTIES.
3. Ec, GIRDER = 5,909 Ksi (FINAL, ALL SPANS)
   Ec, DECK = 3,834 Ksi
   Eps = 28,500 Ksi

(#) 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

TABLE OF SECTION RESISTANCES (SPAN A)

		CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
INTERIOR GIRDER (I)	ΦVn (KIPS)	789	402	318	323	332	320	337	332	332	409	977
	ΦMn (KIP-FT)	--	8843	10112	10445	10778	10932	10778	10445	10112	8843	--
EXTERIOR GIRDER (EL, ER)	ΦVn (KIPS)	788	401	317	321	330	318	336	331	334	411	976
	ΦMn (KIP-FT)	--	8766	9968	10301	10634	10788	10634	10301	9968	8766	--

TABLE OF SECTION RESISTANCES (SPANS B)

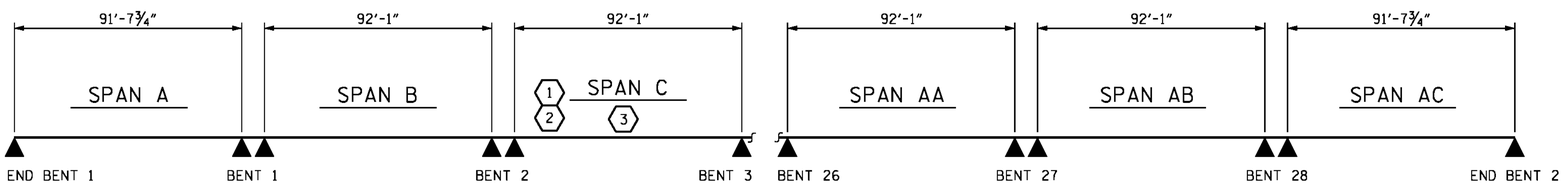
		CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
INTERIOR GIRDER (I)	ΦVn (KIPS)	976	410	333	334	341	325	341	334	333	410	976
	ΦMn (KIP-FT)	--	8860	10112	10445	10778	10932	10778	10445	10112	8860	--
EXTERIOR GIRDER (EL, ER)	ΦVn (KIPS)	975	412	334	334	340	324	340	334	335	412	975
	ΦMn (KIP-FT)	--	8783	9968	10301	10634	10789	10634	10301	9968	8783	--

TABLE OF SECTION RESISTANCES (SPANS C)

		CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
INTERIOR GIRDER (I)	ΦVn (KIPS)	1007	408	331	331	336	318	335	322	318	401	814
	ΦMn (KIP-FT)	--	8860	10112	10445	10778	10932	10778	10445	10112	8860	--
EXTERIOR GIRDER (EL, ER)	ΦVn (KIPS)	1007	411	332	330	334	316	333	334	316	400	814
	ΦMn (KIP-FT)	--	8783	9968	10301	10634	10789	10634	10301	9968	8783	--

SECTION DATA (ALL SPANS):

INTERIOR COMPOSITE Ixx = 727,479 IN^4
INTERIOR COMPOSITE y_b = 41.97 IN.
EXTERIOR COMPOSITE Ixx = 679,470 IN^4
EXTERIOR COMPOSITE y_b = 40.21 IN.
COMPOSITE SECTION PROPERTIES ARE TRANSFORMED TO EQUIVALENT GIRDER CONCRETE USING Ec = 5909 KSI
STRAND AREA NOT INCLUDED IN SECTION PROPERTIES.
y_b MEASURED FROM BOTTOM OF GIRDER



LRFR SUMMARY

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY 5/12/16
DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
AASHTO TYPE IV GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-28
1			3			TOTAL SHEETS
2			4			278

STD. NO. LRFR1

DESIGNED BY: J. BORUTA DATE: JAN 2016
DRAWN BY: M. HOBBS DATE: JAN 2016
CHECKED BY: M. WAGNER DATE: FEB 2016
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: MAY 2016

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

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

5/9/2016
400_053_B4929_SMU_LRFR1.dgn

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)	1.06	--	1.75	0.985	1.71	M	ER	70.1	1.044	1.19	M	I	27.61	0.80	0.985	1.06	M	ER	70.1	1,2,3
		HL-93 (OPERATING)	N/A		1.57	--	1.35	0.985	2.22	M	ER	70.1	1.044	1.57	M	I	27.61	N/A	--	--	--	--	--	1,2,3
		HS-20 (INVENTORY)	36.000	(2)	1.63	58.7	1.75	0.985	2.61	M	ER	70.1	1.044	1.78	M	I	27.61	0.80	0.985	1.63	M	ER	70.1	1,2,3
		HS-20 (OPERATING)	36.000		2.35	84.6	1.35	0.985	3.38	M	ER	70.1	1.044	2.35	M	I	27.61	N/A	--	--	--	--	--	1,2,3
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		4.00	54.0	1.40	0.985	8.03	M	ER	70.1	1.044	6.13	M	I	41.77	0.80	0.985	4.00	M	ER	70.1	1,2,3
		SNGARBS2	20.000		2.83	56.6	1.40	0.985	5.69	M	ER	70.1	1.044	4.20	M	I	41.77	0.80	0.985	2.83	M	ER	70.1	1,2,3
		SNAGRIS2	22.000		2.63	57.9	1.40	0.985	5.27	M	ER	70.1	1.044	3.85	M	I	41.77	0.80	0.985	2.63	M	ER	70.1	1,2,3
		SNCOTTS3	27.250		1.99	54.2	1.40	0.985	3.99	M	ER	70.1	1.044	3.11	M	I	27.61	0.80	0.985	1.99	M	ER	70.1	1,2,3
		SNAGGRS4	34.925		1.60	55.9	1.40	0.985	3.22	M	ER	70.1	1.044	2.36	M	I	27.61	0.80	0.985	1.60	M	ER	70.1	1,2,3
		SNS5A	35.550		1.57	55.8	1.40	0.985	3.15	M	ER	70.1	1.044	2.31	M	I	27.61	0.80	0.985	1.57	M	ER	70.1	1,2,3
		SNS6A	39.950		1.42	56.7	1.40	0.985	2.85	M	ER	70.1	1.044	2.07	M	I	27.61	0.80	0.985	1.42	M	ER	70.1	1,2,3
		SNS7B	42.000		1.35	56.7	1.40	0.985	2.71	M	ER	70.1	1.044	1.99	M	I	27.61	0.80	0.985	1.35	M	ER	70.1	1,2,3
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.72	56.8	1.40	0.985	3.46	M	ER	70.1	1.044	2.57	M	I	27.61	0.80	0.985	1.72	M	ER	70.1	1,2,3
		TNT4A	33.075		1.73	57.2	1.40	0.985	3.46	M	ER	70.1	1.044	2.45	M	I	27.61	0.80	0.985	1.73	M	ER	70.1	1,2,3
		TNT6A	41.600		1.39	57.8	1.40	0.985	2.79	M	ER	70.1	1.044	2.05	M	I	27.61	0.80	0.985	1.39	M	ER	70.1	1,2,3
		TNT7A	42.000		1.39	58.4	1.40	0.985	2.78	M	ER	70.1	1.044	2.06	M	I	27.61	0.80	0.985	1.39	M	ER	70.1	1,2,3
		TNT7B	42.000		1.41	59.2	1.40	0.985	2.83	M	ER	70.1	1.044	1.97	M	I	27.61	0.80	0.985	1.41	M	ER	70.1	1,2,3
		TNAGRIT4	43.000		1.36	58.5	1.40	0.985	2.73	M	ER	70.1	1.044	1.89	M	I	27.61	0.80	0.985	1.36	M	ER	70.1	1,2,3
		TNAGT5A	45.000		1.29	58.1	1.40	0.985	2.59	M	ER	70.1	1.044	1.84	M	I	27.61	0.80	0.985	1.29	M	ER	70.1	1,2,3
		TNAGT5B	45.000	(3)	1.28	57.6	1.40	0.985	2.58	M	ER	70.1	1.044	1.80	M	I	27.61	0.80	0.985	1.28	M	ER	70.1	1,2,3

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. GIRDERS DESIGNED AS SIMPLE SPANS FOR FLEXURE. GIRDERS DESIGNED AS SIMPLE-MADE-CONTINUOUS (FOR LIVE LOAD AND SUPERIMPOSED DEAD LOAD) FOR SHEAR.
2. 3" AVERAGE HAUNCH ASSUMED FOR SPANS D-F AND J. 3¾" AVERAGE HAUNCH ASSUMED FOR SPANS K-M AND Z. CONCRETE IS NOT INCLUDED IN SECTION PROPERTIES.
3. Ec, GIRDER = 6,062 Ksi (FINAL, ALL SPANS)
   Ec, DECK = 3,834 Ksi
   Eps = 28,500 Ksi

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93)

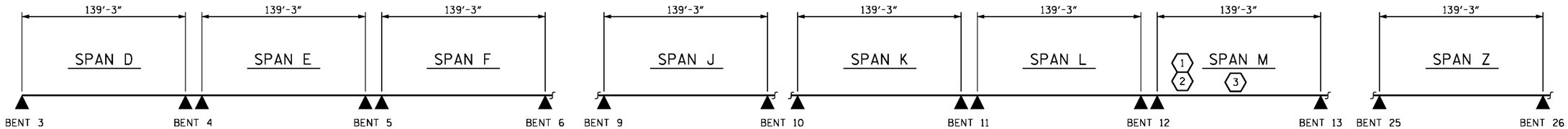
(2) DESIGN LOAD RATING (HS-20)

(3) LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

TABLE OF SECTION RESISTANCES (SPAN M)												
		CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
INTERIOR GIRDER (I)	ΦVn (KIPS)	1194	979	431	353	345	338	343	340	408	954	1138
	ΦMn (KIP-FT)	--	19140	23684	22764	22900	22991	22900	22764	23684	19140	--
EXTERIOR GIRDER (EL, ER)	ΦVn (KIPS)	1193	977	429	349	339	332	337	334	403	946	1137
	ΦMn (KIP-FT)	--	18956	23405	22494	22630	22721	22630	22494	23405	18956	--

SECTION DATA (ALL SPANS):

INTERIOR COMPOSITE Ixx = 1,586,384 IN^4
INTERIOR COMPOSITE y_b = 49.88 IN.
EXTERIOR COMPOSITE Ixx = 1,513,470 IN^4
EXTERIOR COMPOSITE y_b = 48.34 IN.
COMPOSITE SECTION PROPERTIES ARE TRANSFORMED TO EQUIVALENT GIRDER CONCRETE USING Ec = 6062 KSI
STRAND AREA NOT INCLUDED IN SECTION PROPERTIES.
y_b MEASURED FROM BOTTOM OF GIRDER

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY 5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
F.I.B. 72" FOR UNITS 2, 4 AND 9 AND SPAN J

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-29
1			3			TOTAL SHEETS
2			4			278

STD. NO. LRFR1

DESIGNED BY: E. DAVIS DATE: MAR 2016
DRAWN BY: M. HOBBS DATE: MAR 2016
CHECKED BY: J. BORUTA DATE: APR 2016
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: MAY 2016

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

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

5/9/2016
400_055_B4929_SMU_LRFR2.dgn

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⟩	1.18	--	1.75	0.946	1.56	G/H/I	I	46.0	1.044	1.97	G	I	55.39	0.80	0.946	1.18	G/H/I	I	46.0	1,2,3
		HL-93 (OPERATING)	N/A		2.03	--	1.35	0.946	2.03	G/H/I	I	46.0	1.044	2.76	G	I	64.74	N/A	--	--	--	--	--	1,2,3
		HS-20 (INVENTORY)	36.000	⟨2⟩	1.62	58.3	1.75	0.946	2.14	G/H/I	I	46.0	1.044	2.80	G	I	64.74	0.80	0.946	1.62	G/H/I	I	46.0	1,2,3
		HS-20 (OPERATING)	36.000		2.78	100.1	1.35	0.946	2.78	G/H/I	I	46.0	1.044	3.66	G	I	64.74	N/A	--	--	--	--	--	1,2,3
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.80	51.3	1.40	0.946	6.29	G/H/I	I	46.0	1.044	9.27	G	I	64.74	0.80	0.946	3.80	G/H/I	I	46.0	1,2,3
		SNGARBS2	20.000		2.76	55.2	1.40	0.946	4.58	G/H/I	I	46.0	1.044	6.53	G	I	64.74	0.80	0.946	2.76	G/H/I	I	46.0	1,2,3
		SNAGRIS2	22.000		2.59	57.0	1.40	0.946	4.29	G/H/I	I	46.0	1.044	6.04	G	I	64.74	0.80	0.946	2.59	G/H/I	I	46.0	1,2,3
		SNCOTTS3	27.250		1.89	51.5	1.40	0.946	3.13	G/H/I	I	46.0	1.044	4.49	G	I	64.74	0.80	0.946	1.89	G/H/I	I	46.0	1,2,3
		SNAGGRS4	34.925		1.55	54.1	1.40	0.946	2.57	G/H/I	I	46.0	1.044	3.55	G	I	64.74	0.80	0.946	1.55	G/H/I	I	46.0	1,2,3
		SNS5A	35.550		1.52	54.0	1.40	0.946	2.52	G/H/I	I	46.0	1.044	3.58	G	I	64.74	0.80	0.946	1.52	G/H/I	I	46.0	1,2,3
		SNS6A	39.950		1.38	55.1	1.40	0.946	2.29	G/H/I	I	46.0	1.044	3.25	G	I	64.74	0.80	0.946	1.38	G/H/I	I	46.0	1,2,3
		SNS7B	42.000		1.32	55.4	1.40	0.946	2.18	G/H/I	I	46.0	1.044	3.18	G	I	64.74	0.80	0.946	1.32	G/H/I	I	46.0	1,2,3
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.68	55.4	1.40	0.946	2.79	G/H/I	I	46.0	1.044	3.84	G	I	64.74	0.80	0.946	1.68	G/H/I	I	46.0	1,2,3
		TNT4A	33.075		1.69	55.9	1.40	0.946	2.80	G/H/I	I	46.0	1.044	4.07	G	I	64.74	0.80	0.946	1.69	G/H/I	I	46.0	1,2,3
		TNT6A	41.600		1.37	57.0	1.40	0.946	2.27	G/H/I	I	46.0	1.044	3.38	G	I	64.74	0.80	0.946	1.37	G/H/I	I	46.0	1,2,3
		TNT7A	42.000		1.37	57.5	1.40	0.946	2.28	G/H/I	I	46.0	1.044	3.31	G	I	64.74	0.80	0.946	1.37	G/H/I	I	46.0	1,2,3
		TNT7B	42.000		1.41	59.2	1.40	0.946	2.33	G/H/I	I	46.0	1.044	3.12	G	I	64.74	0.80	0.946	1.41	G/H/I	I	46.0	1,2,3
		TNAGRIT4	43.000		1.35	58.1	1.40	0.946	2.24	G/H/I	I	46.0	1.044	3.07	G	I	64.74	0.80	0.946	1.35	G/H/I	I	46.0	1,2,3
		TNAGT5A	45.000		1.28	57.6	1.40	0.946	2.11	G/H/I	I	46.0	1.044	2.93	G	I	64.74	0.80	0.946	1.28	G/H/I	I	46.0	1,2,3
		TNAGT5B	45.000	⟨3⟩	1.26	56.7	1.40	0.946	2.10	G/H/I	I	46.0	1.044	2.88	G	I	64.74	0.80	0.946	1.26	G/H/I	I	46.0	1,2,3

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. GIRDERS DESIGNED AS SIMPLE SPANS FOR FLEXURE. GIRDERS DESIGNED AS SIMPLE-MADE-CONTINUOUS (FOR LIVE LOAD AND SUPERIMPOSED DEAD LOAD) FOR SHEAR.
2. 3" AVERAGE HAUNCH ASSUMED FOR ALL SPANS. HAUNCH CONCRETE IS NOT INCLUDED IN SECTION PROPERTIES.
3. Ec, GIRDER = 6,062 Ksi (FINAL, ALL SPANS)
   Ec, DECK = 3,834 Ksi
   Eps = 28,500 Ksi

⟨#⟩ CONTROLLING LOAD RATING

⟨1⟩ DESIGN LOAD RATING (HL-93)

⟨2⟩ DESIGN LOAD RATING (HS-20)

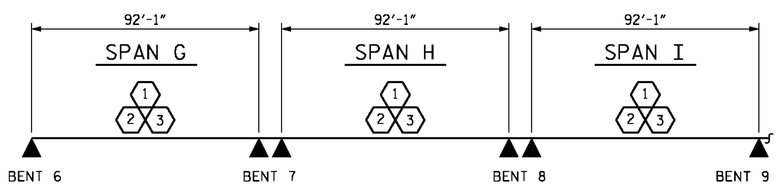
⟨3⟩ LEGAL LOAD RATING **

** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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

TABLE OF SECTION RESISTANCES (SPAN G)												
		CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
INTERIOR GIRDER (I)	ΦVn (KIPS)	1180	992	981	413	352	351	352	420	995	994	1183
	ΦMn (KIP-FT)	--	7602	10923	10582	10582	10582	10582	10582	10923	7602	--
EXTERIOR GIRDER (ER)	ΦVn (KIPS)	1202	991	977	412	351	351	352	419	409	995	1183
	ΦMn (KIP-FT)	--	7582	10853	10510	10510	10510	10510	10510	10853	7582	--



LRFR SUMMARY

SECTION DATA (ALL SPANS):

INTERIOR COMPOSITE Ixx = 1,586,384 IN^4
INTERIOR COMPOSITE y_b = 49.88 IN.
RIGHT EXTERIOR COMPOSITE Ixx = 1,491,072 IN^4
RIGHT EXTERIOR COMPOSITE y_b = 47.87 IN.
COMPOSITE SECTION PROPERTIES ARE TRANSFORMED TO EQUIVALENT GIRDER CONCRETE USING Ec = 6062 KSI
STRAND AREA NOT INCLUDED IN SECTION PROPERTIES.
y_b MEASURED FROM BOTTOM OF GIRDER

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
F.I.B. 72" FOR SPANS G, H AND I

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-30
1			3			TOTAL SHEETS
2			4			278

STD. NO. LRFR1

DESIGNED BY:	E. DAVIS	DATE :	MAR 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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

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

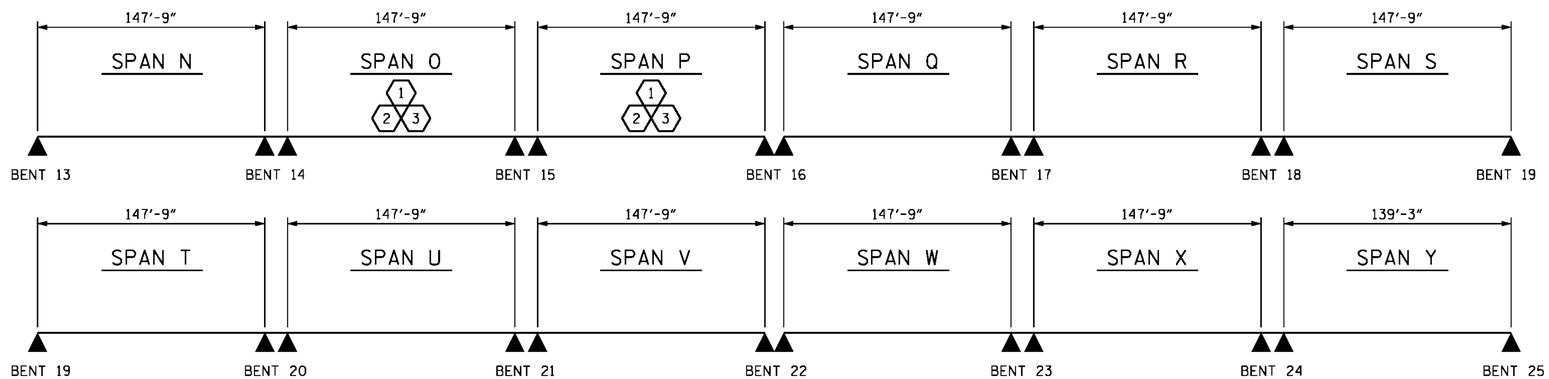
5/9/2016
400_057_B4929_SMU_LRFR3.dgn

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	1.03	--	1.75	1.026	1.76	O/P	ER	74.8	1.044	1.28	P	I	29.51	0.80	1.026	1.03	O/P	ER	74.8	1,2,3
		HL-93 (OPERATING)	N/A		1.68	--	1.35	1.026	2.28	O/P	ER	74.8	1.044	1.68	P	I	29.51	N/A	--	--	--	--	--	1,2,3
		HS-20 (INVENTORY)	36.000	2	1.61	58.0	1.75	1.026	2.74	O/P	ER	74.8	1.044	1.95	P	I	29.51	0.80	1.026	1.61	O/P	ER	74.8	1,2,3
		HS-20 (OPERATING)	36.000		2.57	92.5	1.35	1.026	3.56	O/P	ER	74.8	1.044	2.57	P	I	29.51	N/A	--	--	--	--	--	1,2,3
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		3.99	53.9	1.40	1.026	8.49	O/P	ER	74.8	1.044	6.51	P	I	29.51	0.80	1.026	3.99	O/P	ER	74.8	1,2,3
		SNGARBS2	20.000		2.82	56.4	1.40	1.026	6.00	O/P	ER	74.8	1.044	4.44	P	I	29.51	0.80	1.026	2.82	O/P	ER	74.8	1,2,3
		SNAGRIS2	22.000		2.61	57.4	1.40	1.026	5.55	O/P	ER	74.8	1.044	4.06	P	I	29.51	0.80	1.026	2.61	O/P	ER	74.8	1,2,3
		SNCOTTS3	27.250		1.98	54.0	1.40	1.026	4.22	O/P	ER	74.8	1.044	3.24	P	I	44.61	0.80	1.026	1.98	O/P	ER	74.8	1,2,3
		SNAGGRS4	34.925		1.59	55.5	1.40	1.026	3.39	O/P	ER	74.8	1.044	2.59	P	I	29.51	0.80	1.026	1.59	O/P	ER	74.8	1,2,3
		SNS5A	35.550		1.56	55.5	1.40	1.026	3.33	O/P	ER	74.8	1.044	2.53	P	I	29.51	0.80	1.026	1.56	O/P	ER	74.8	1,2,3
		SNS6A	39.950		1.41	56.3	1.40	1.026	3.00	O/P	ER	74.8	1.044	2.26	P	I	29.51	0.80	1.026	1.41	O/P	ER	74.8	1,2,3
		SNS7B	42.000		1.34	56.3	1.40	1.026	2.86	O/P	ER	74.8	1.044	2.14	P	I	29.51	0.80	1.026	1.34	O/P	ER	74.8	1,2,3
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		1.71	56.4	1.40	1.026	3.65	O/P	ER	74.8	1.044	2.81	P	I	29.51	0.80	1.026	1.71	O/P	ER	74.8	1,2,3
		TNT4A	33.075		1.71	56.6	1.40	1.026	3.65	O/P	ER	74.8	1.044	2.69	P	I	29.51	0.80	1.026	1.71	O/P	ER	74.8	1,2,3
		TNT6A	41.600		1.38	57.4	1.40	1.026	2.94	O/P	ER	74.8	1.044	2.20	P	I	29.51	0.80	1.026	1.38	O/P	ER	74.8	1,2,3
		TNT7A	42.000		1.37	57.5	1.40	1.026	2.93	O/P	ER	74.8	1.044	2.26	P	I	29.51	0.80	1.026	1.37	O/P	ER	74.8	1,2,3
		TNT7B	42.000		1.39	58.4	1.40	1.026	2.97	O/P	ER	74.8	1.044	2.16	P	I	29.51	0.80	1.026	1.39	O/P	ER	74.8	1,2,3
		TNAGRIT4	43.000		1.35	58.1	1.40	1.026	2.87	O/P	ER	74.8	1.044	2.08	P	I	29.51	0.80	1.026	1.35	O/P	ER	74.8	1,2,3
		TNAGT5A	45.000		1.28	57.6	1.40	1.026	2.72	O/P	ER	74.8	1.044	2.01	P	I	29.51	0.80	1.026	1.28	O/P	ER	74.8	1,2,3
		TNAGT5B	45.000	3	1.27	57.2	1.40	1.026	2.71	O/P	ER	74.8	1.044	1.97	P	I	29.51	0.80	1.026	1.27	O/P	ER	74.8	1,2,3

TABLE OF SECTION RESISTANCES (SPAN P)

		CL BRG.	0.1L	0.2L	0.3L	0.4L	0.5L	0.6L	0.7L	0.8L	0.9L	CL BRG.
INTERIOR GIRDER (I)	ΦVn (KIPS)	1328	1084	472	387	378	371	377	373	449	1056	1258
	ΦMn (KIP-FT)	--	23066	27799	27799	26857	26969	26857	26689	27799	23066	--
EXTERIOR GIRDER (EL, ER)	ΦVn (KIPS)	1326	1072	471	384	374	366	372	367	443	1037	1257
	ΦMn (KIP-FT)	--	23372	27565	26424	26592	26704	26592	26424	27565	23372	--



LRFR SUMMARY

SPAN LENGTHS ARE BEARING TO BEARING MEASURED ALONG -L2-

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. GIRDERS DESIGNED AS SIMPLE SPANS FOR FLEXURE.
   GIRDERS DESIGNED AS SIMPLE-MADE-CONTINUOUS (FOR LIVE LOAD AND SUPERIMPOSED DEAD LOAD) FOR SHEAR.
2. 6½" AVERAGE HAUNCH ASSUMED FOR SPANS N, O AND P.
   3¼" AVERAGE HAUNCH ASSUMED FOR SPANS Q THROUGH Y.
   HAUNCH CONCRETE IS NOT INCLUDED IN SECTION PROPERTIES.
   IN SPANS N, O AND P ONLY, 2½" OF HAUNCH IN INCLUDED IN THE ECCENTRICITY OF THE DECK.
3. Ec, GIRDER = 6,062 Ksi (FINAL, ALL SPANS)
   Ec, DECK = 3,834 Ksi
   Eps = 28,500 Ksi

(#) 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

SECTION DATA (SPANS N, O AND P):

INTERIOR COMPOSITE Ixx = 2,001,316 IN^4
INTERIOR COMPOSITE y_b = 54.45 IN.
EXTERIOR COMPOSITE Ixx = 1,938,329 IN^4
EXTERIOR COMPOSITE y_b = 53.31 IN.
COMPOSITE SECTION PROPERTIES ARE TRANSFORMED TO EQUIVALENT GIRDER CONCRETE USING Ec = 6062 KSI
STRAND AREA NOT INCLUDED IN SECTION PROPERTIES.
y_b MEASURED FROM BOTTOM OF GIRDER

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

DESIGNED BY: E. DAVIS DATE: MAR 2016
DRAWN BY: K. WHITE DATE: MAR 2016
CHECKED BY: B. LOFLIN DATE: MAR 2016
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: MAY 2016

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

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

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C8644827477...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD
LRFR SUMMARY FOR PRESTRESSED CONCRETE GIRDERS
F.I.B. 78" FOR UNITS 5, 6, 7 AND 8

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-31
1			3			TOTAL SHEETS
2			4			278

STD. NO. LRFR1

5/9/2016
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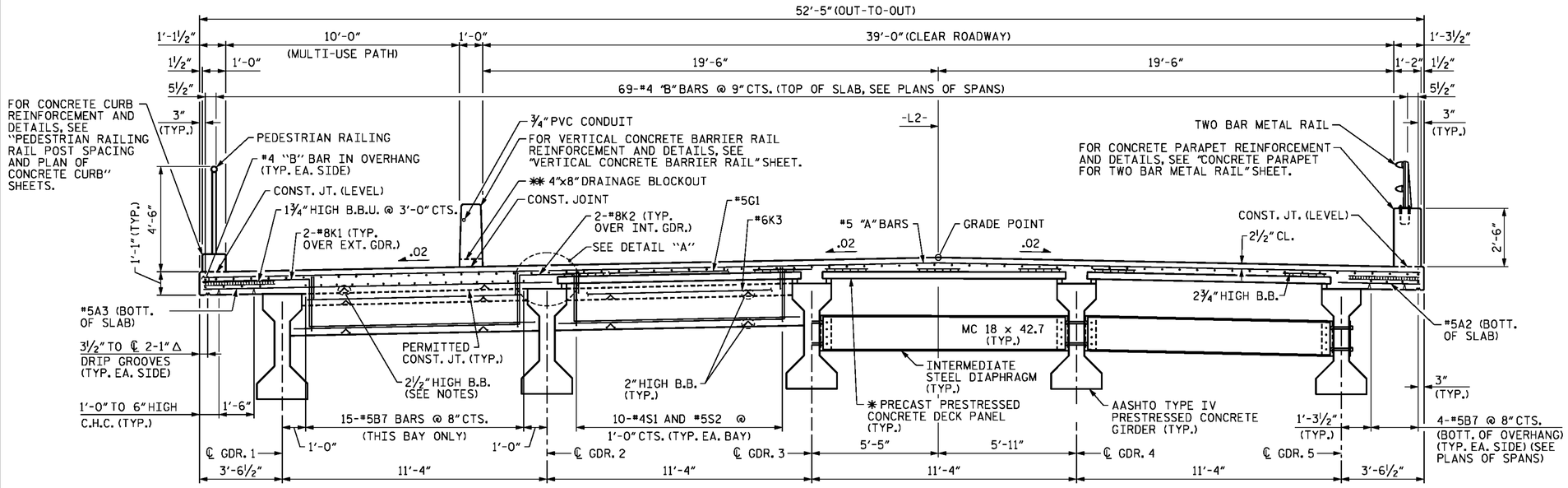
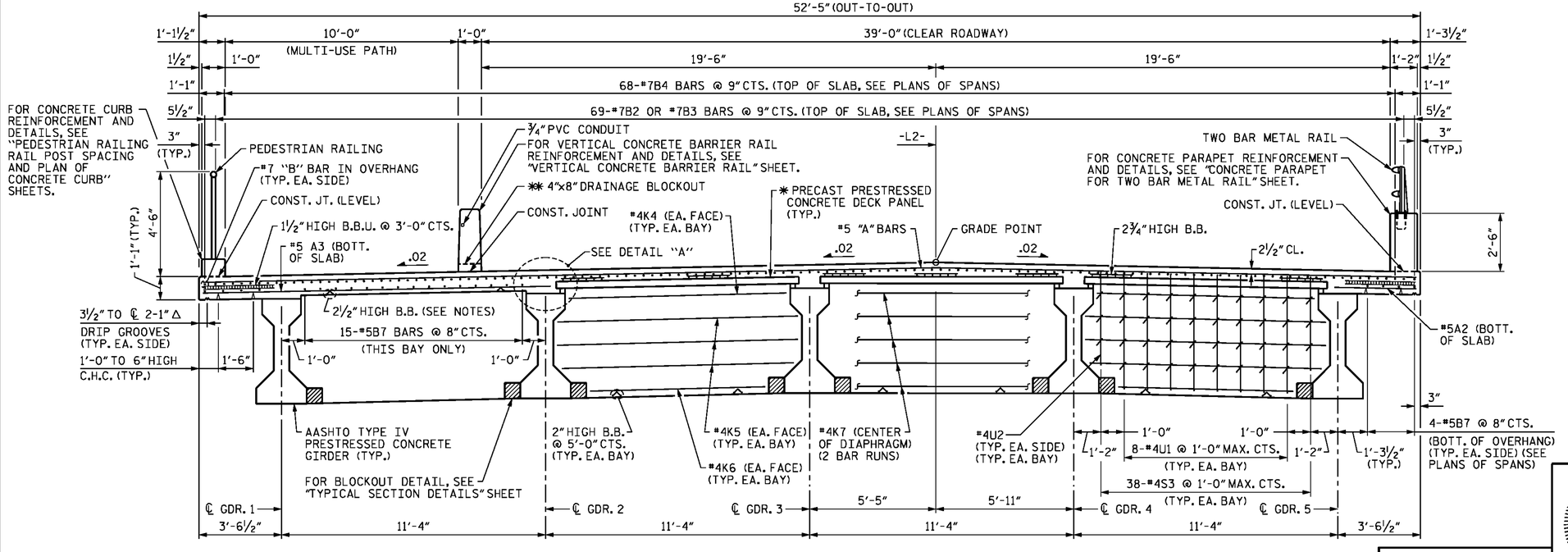


HALF SECTION AT END BENT AND BENT DIAPHRAGMS

HALF SECTION AT INTERMEDIATE STEEL DIAPHRAGMS

TYPICAL SECTION

(SPAN A SHOWN, SPANS B AND C SIMILAR)
FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.



SECTION AT CONTINUOUS BENT DIAPHRAGMS

TYPICAL SECTION

(BENT 1 SHOWN, BENT 2 SIMILAR)

NOTES

WHEN USING REMOVABLE FORMS, PROVIDE BEAM BOLSTERS @ 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.

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

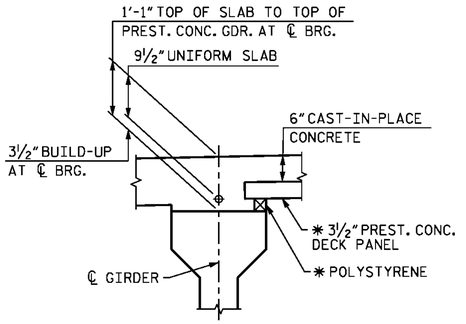
STRUCTURAL STEEL DIAPHRAGM ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

REMOVABLE FORMS ARE TO BE USED IN BAY 1.

FOR SUPERELEVATION TRANSITIONS, SEE ROADWAY PLANS.

* FOR PRECAST PRESTRESSED CONCRETE DECK PANEL AND POLYSTYRENE DETAILS AND NOTES, SEE "PRECAST PRESTRESSED CONCRETE DECK PANELS" SHEET.

** FOR 4"x8" DRAINAGE BLOCKOUT SPACING, SEE "VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT" SHEET.



DETAIL "A"

(DIMENSIONS TYP. EA. GIRDER)
(SPANS A, B, AND C)

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 1 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION SPANS A, B AND C

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-32
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. BORUTA	DATE : OCT 2015
DRAWN BY:	KEW / MAH	DATE : OCT 2015
CHECKED BY:	E. DAVIS	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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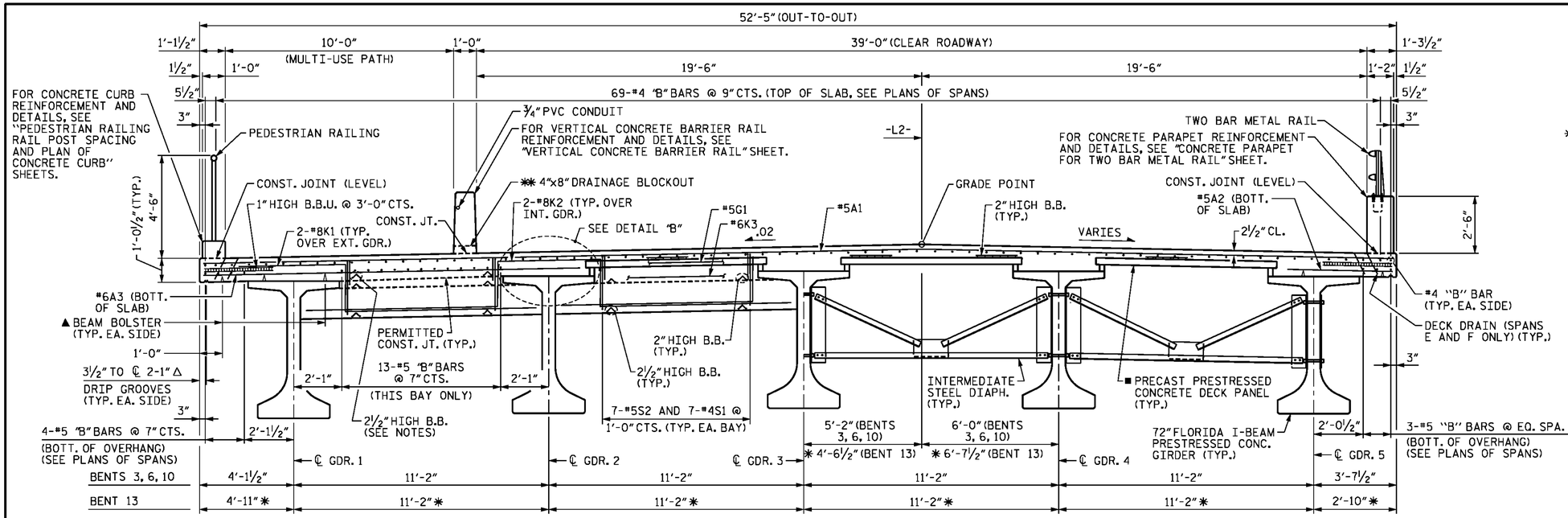
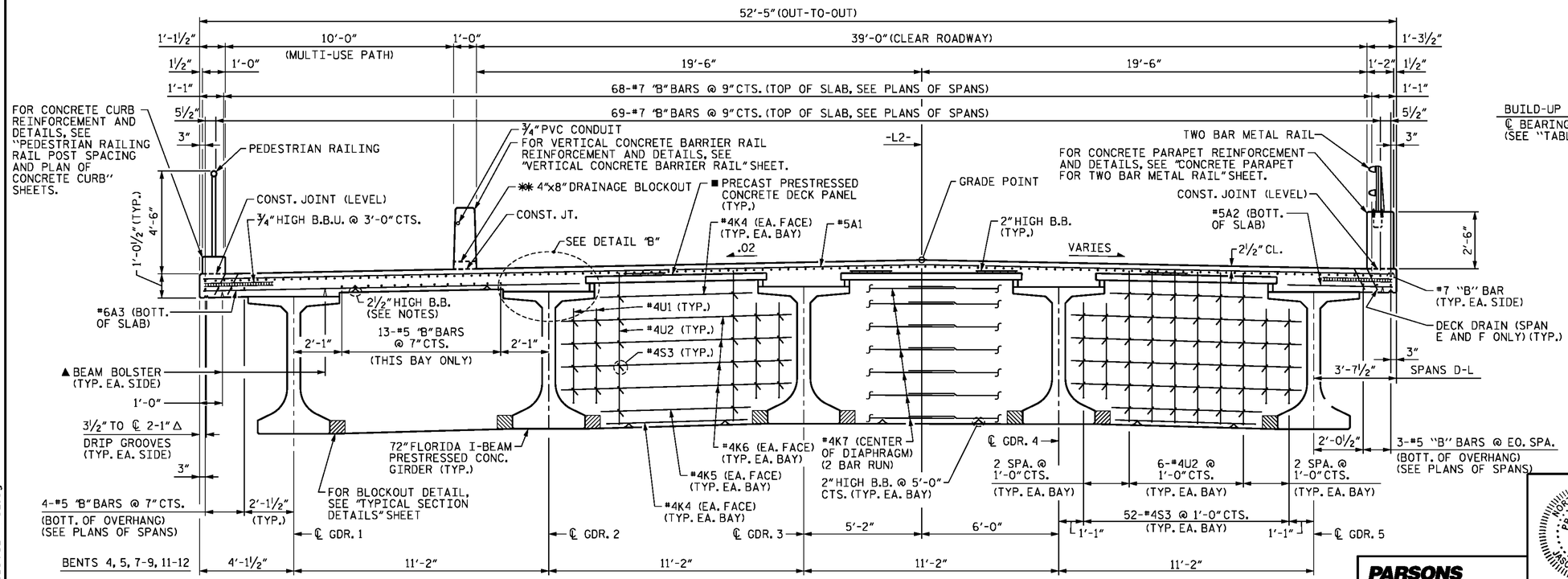


HALF SECTION AT BENT DIAPHRAGMS

HALF SECTION AT INTERMEDIATE STEEL DIAPHRAGMS

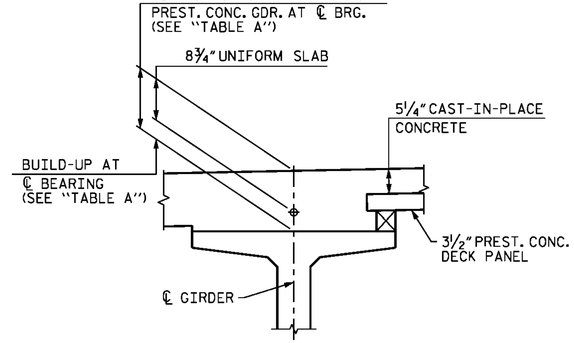
TYPICAL SECTION

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR FLORIDA I-BEAM PRESTRESSED CONCRETE GIRDERS" SHEET



SECTION AT CONTINUOUS BENT DIAPHRAGMS

TYPICAL SECTION



DETAIL "B"

NOTES

FOR NOTES, SEE SHEET 1 OF 13.

FOR DECK DRAIN DETAILS, SEE SHEET 4 OF 13.

✱ MEASURED RADIAL THROUGH WORK POINT.

✱✱ FOR 4"x8" DRAINAGE BLOCKOUT SPACING, SEE "VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT" SHEET.

▲ BEAM BOLSTER REQUIRED TO MAINTAIN 2½" CL. TO BOTTOM OF SLAB (BEAM BOLSTER HEIGHT WILL VARY WITH BUILD-UPS) (TYP. EA. OVERHANG)

■ FOR PRECAST PRESTRESSED CONCRETE DECK PANEL AND POLYSTYRENE DETAILS AND NOTES, SEE "PRECAST PRESTRESSED CONCRETE DECK PANELS" SHEET.

TABLE A		
SPAN	BUILD-UP	D
D-J	3"	11¾"
K-M	3¾"	1'-0½"

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PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 13

DESIGNED BY:	J. SMITH	DATE :	NOV 2015
DRAWN BY:	KEW / MAH	DATE :	NOV 2015
CHECKED BY:	E. DAVIS	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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434 FAYETTEVILLE STREET
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RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

TYPICAL SECTION SPANS D THROUGH M

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-33
1			3			TOTAL SHEETS
2			4			278

NOTES

FOR NOTES, SEE SHEET 1 OF 13.

FOR DECK DRAIN DETAILS, SEE SHEET 4 OF 13.

✱ MEASURED RADIAL THROUGH WORK POINT.

✱✱ FOR 4"x8" DRAINAGE BLOCKOUT SPACING, SEE "VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT" SHEET.

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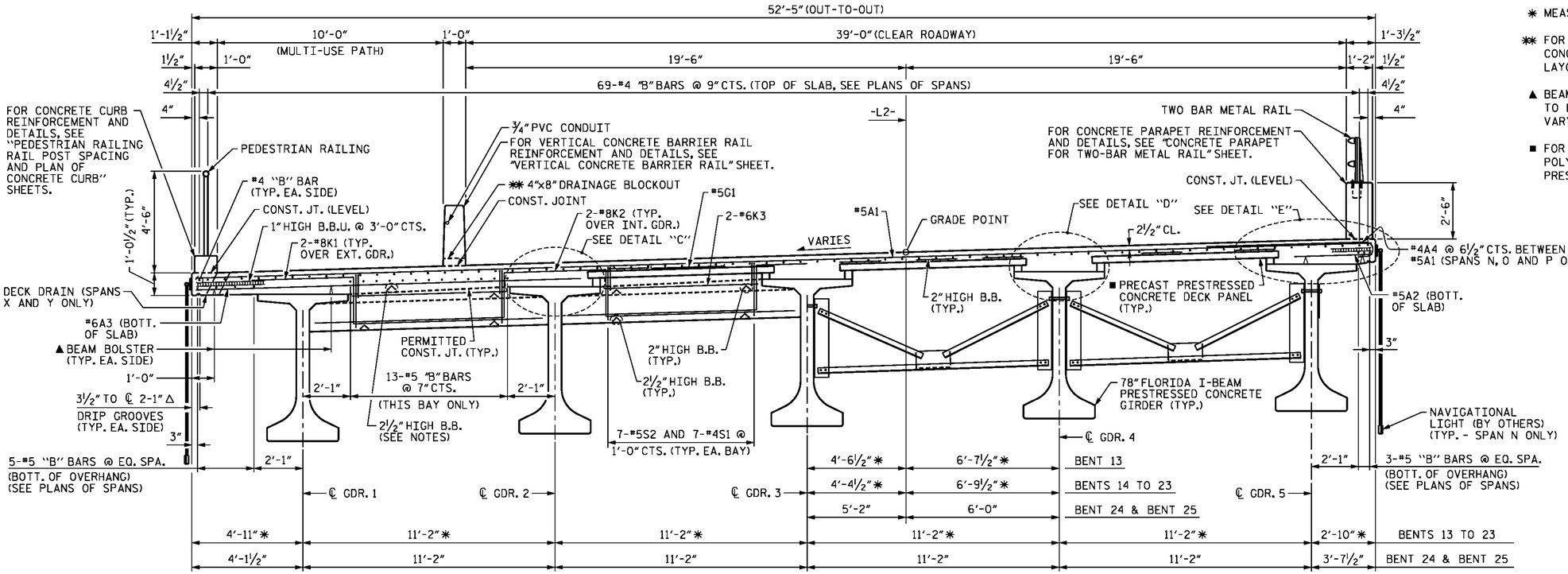
■ FOR PRECAST PRESTRESSED CONCRETE DECK PANEL AND POLYSTYRENE DETAILS AND NOTES, SEE "PRECAST PRESTRESSED CONCRETE DECK PANELS" SHEET.



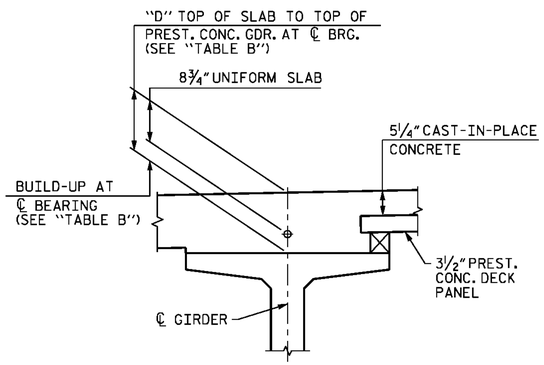
HALF SECTION AT BENT DIAPHRAGMS

HALF SECTION AT INTERMEDIATE STEEL DIAPHRAGMS

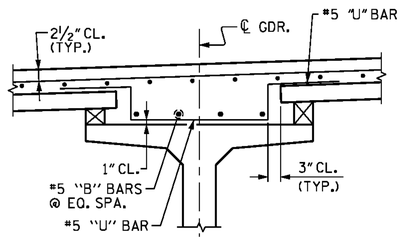
TYPICAL SECTION

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR FLORIDA I-BEAM PRESTRESSED CONCRETE GIRDERS" SHEET

TABLE B		
SPAN	BUILD-UP	D
N-P	2½"	11¼"
Q-Y	4½"	1'-1¼"



DETAIL "C"

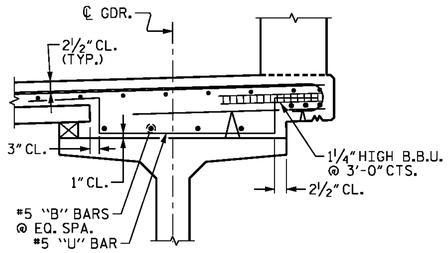


DETAIL "D"

BUILD-UP REINFORCEMENT GIRDERS 1 TO 4 ONLY IN SPANS O AND P.

FOR LOCATION OF #5 "U" BARS, SEE PLAN OF SPAN SHEETS.

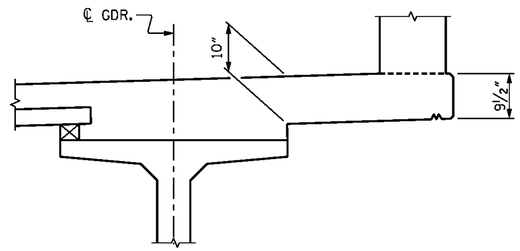
"U" BARS MAY BE SHIFTED AS REQUIRED TO CLEAR STIRRUPS AND DECK REINFORCEMENT.



DETAIL "E"

BUILD-UP REINFORCEMENT FOR GIRDERS IN SPANS N, O AND P ONLY

"U" BARS MAY BE SHIFTED AS REQUIRED TO CLEAR STIRRUPS AND DECK REINFORCEMENT.



DETAIL "E"

SPANS N, O AND P ONLY
SHOWN AT MIDSPAN
REBAR NOT SHOWN FOR CLARITY

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION SPANS N THROUGH Y

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434 FAYETTEVILLE STREET
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LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-34
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. SMITH	DATE : JAN 2016
DRAWN BY:	K. WHITE	DATE : JAN 2016
CHECKED BY:	B. LOFLIN	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/10/2016
400_065_B4929_SMU_TYP03.dgn

NOTES

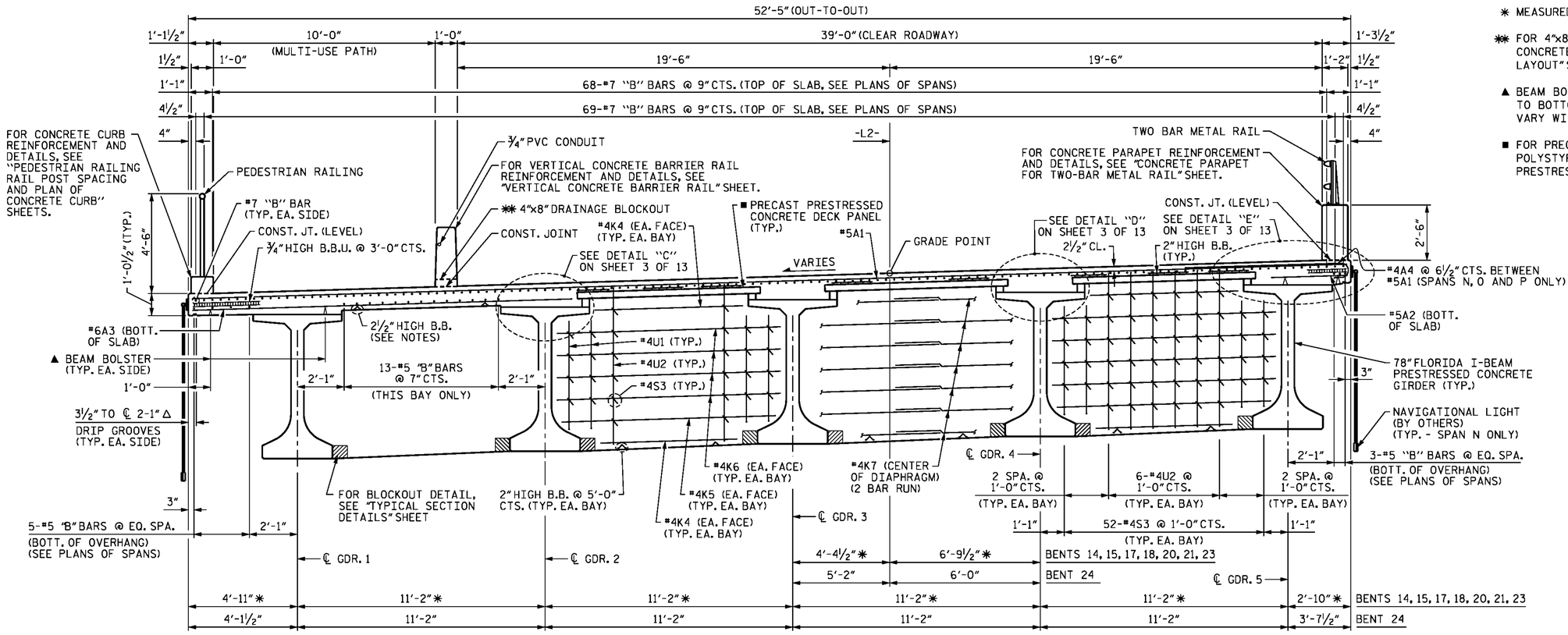
FOR NOTES, SEE SHEET 1 OF 13.

✳ MEASURED RADIAL THROUGH WORK POINT.

✳✳ FOR 4"x8" DRAINAGE BLOCKOUT SPACING, SEE "VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT" SHEET.

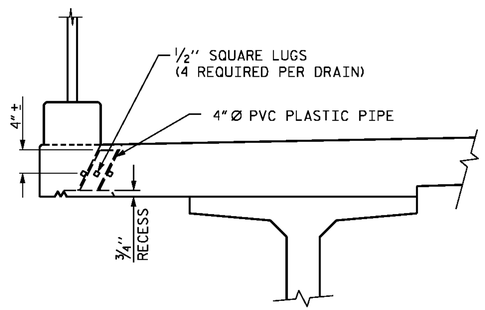
▲ BEAM BOLSTER REQUIRED TO MAINTAIN 2½" CL. TO BOTTOM OF SLAB (BEAM BOLSTER HEIGHT WILL VARY WITH BUILD-UPS) (TYP. EA. OVERHANG)

■ FOR PRECAST PRESTRESSED CONCRETE DECK PANEL AND POLYSTYRENE DETAILS AND NOTES, SEE "PRECAST PRESTRESSED CONCRETE DECK PANELS" SHEET.

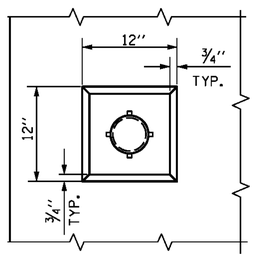


HALF SECTION AT CONTINUOUS BENT DIAPHRAGMS

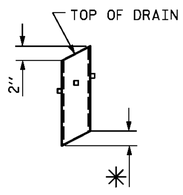
TYPICAL SECTION



ELEVATION



PLAN OF RECESS



✳ TO BE SET TO MATCH SLOPE OF BOTTOM OF OVERHANG (83 DRAINS REQUIRED)

PIPE DETAIL

DRAIN DETAILS

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

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

THE 4" Ø PVC PLASTIC PIPE AND FITTINGS SHALL BE SCHEDULE 40 AND CONFORM TO ASTM D1785.

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-
SHEET 4 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION SPANS N THROUGH Y

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-35
1			3			TOTAL SHEETS
2			4			278

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5/12/16
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DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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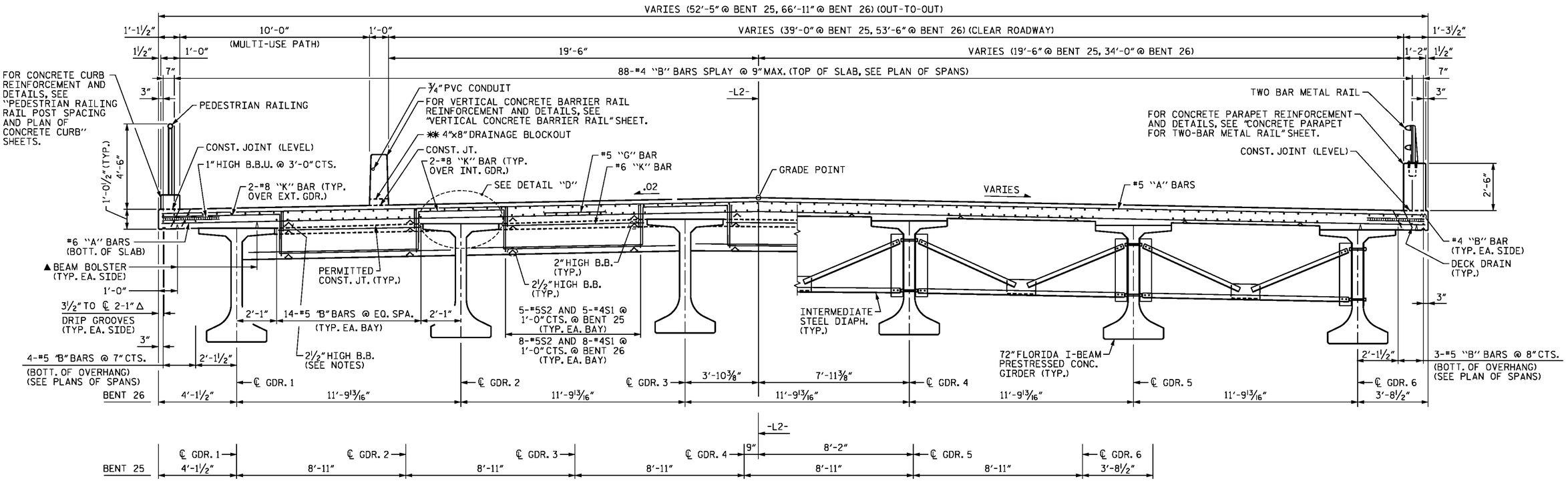
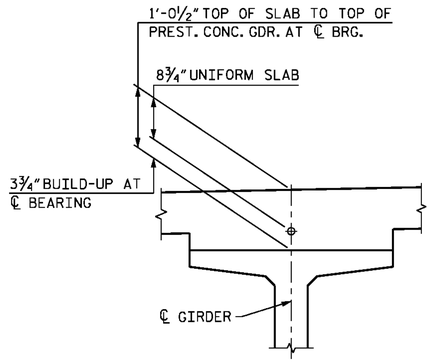


HALF SECTION AT BENT DIAPHRAGMS

HALF SECTION AT INTERMEDIATE STEEL DIAPHRAGMS

TYPICAL SECTION

FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR FLORIDA I-BEAM PRESTRESSED CONCRETE GIRDERS" SHEET



DETAIL "D"

NOTES

FOR NOTES, SEE SHEET 1 OF 13.

FOR DECK DRAIN DETAILS, SEE SHEET 4 OF 13.

✻✻ FOR 4"x8" DRAINAGE BLOCKOUT SPACING, SEE "VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT" SHEET.

▲ BEAM BOLSTER REQUIRED TO MAINTAIN 2½" CL. TO BOTTOM OF SLAB (BEAM BOLSTER HEIGHT WILL VARY WITH BUILD-UPS) (TYP. EA. OVERHANG).

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION SPAN Z

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-36
1			3			TOTAL SHEETS
2			4			278

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434 FAYETTEVILLE STREET
SUITE 1500
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NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

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DESIGNED BY:	J. SMITH	DATE :	DEC 2015
DRAWN BY:	K. WHITE	DATE :	DEC 2015
CHECKED BY:	E. DAVIS	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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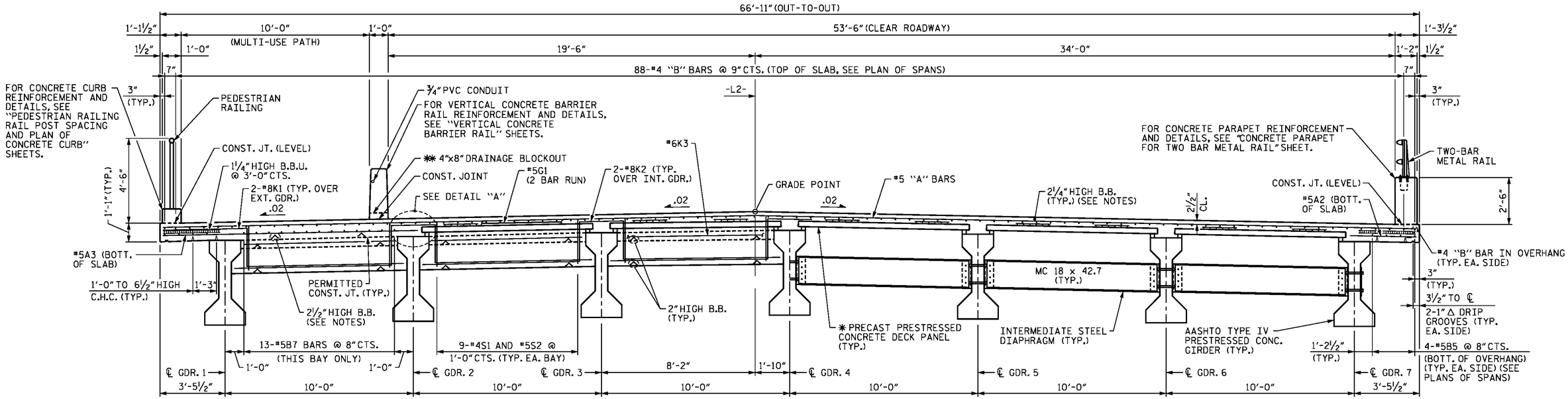
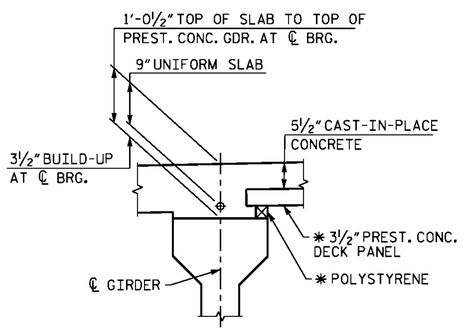


HALF SECTION AT END BENT AND BENT DIAPHRAGMS

HALF SECTION AT INTERMEDIATE DIAPHRAGMS

TYPICAL SECTION

(SPAN AC SHOWN, SPANS AA AND AB SIMILAR)
FOR INTERMEDIATE STEEL DIAPHRAGM DETAILS, SEE "INTERMEDIATE STEEL DIAPHRAGMS FOR TYPE IV PRESTRESSED CONCRETE GIRDERS" SHEET.



DETAIL "A"

(DIMENSIONS TYP. EA. GIRDER)
(SPANS AA, AB, AND AC)

NOTES

WHEN USING REMOVABLE FORMS, PROVIDE BEAM BOLSTERS @ 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.

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PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L-
SHEET 6 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
TYPICAL SECTION SPANS AA, AB AND AC

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-37
1			3			TOTAL SHEETS
2			4			278

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434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

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5/12/16
DocuSigned by: Jason R Doughty
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DESIGNED BY:	J. BORUTA	DATE :	OCT 2015
DRAWN BY:	M. HOBBS	DATE :	NOV 2015
CHECKED BY:	E. DAVIS	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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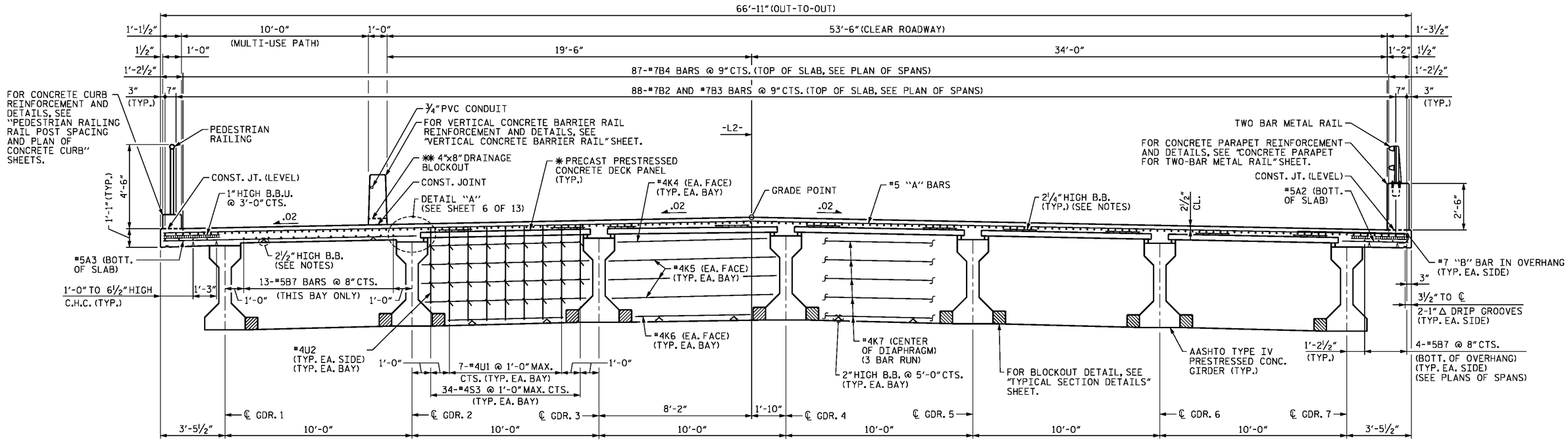

SECTION AT CONTINUOUS BENT DIAPHRAGMS

TYPICAL SECTION

FOR NOTES, SEE SHEET 6 OF 13

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 7 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION SPANS AA, AB AND AC

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SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

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NO.	BY:	DATE:	NO.	BY:	DATE:	S-38
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. BORUTA	DATE: OCT 2015
DRAWN BY:	M. HOBBS	DATE: NOV 2015
CHECKED BY:	E. DAVIS	DATE: FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE: MAY 2016

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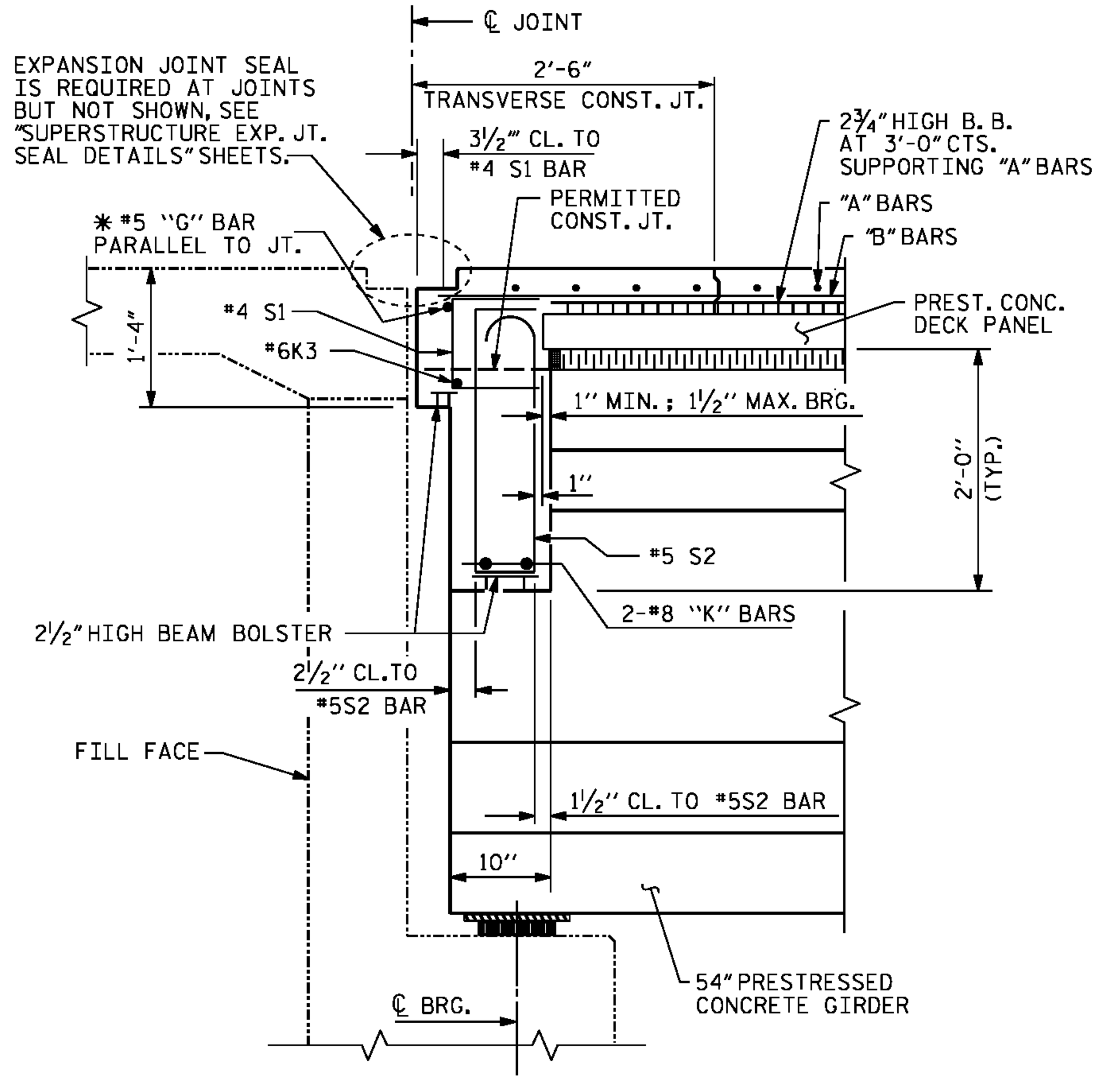
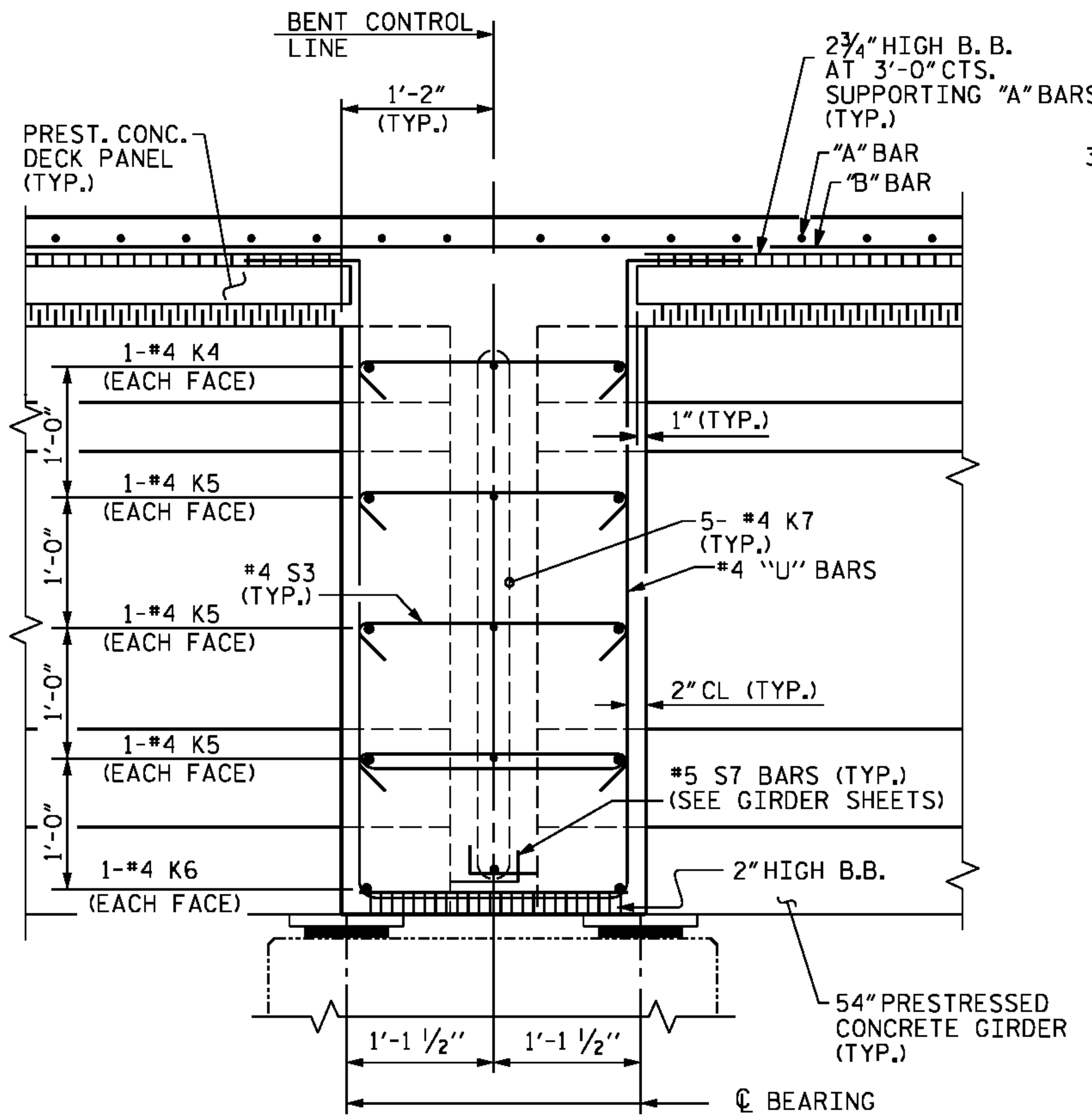
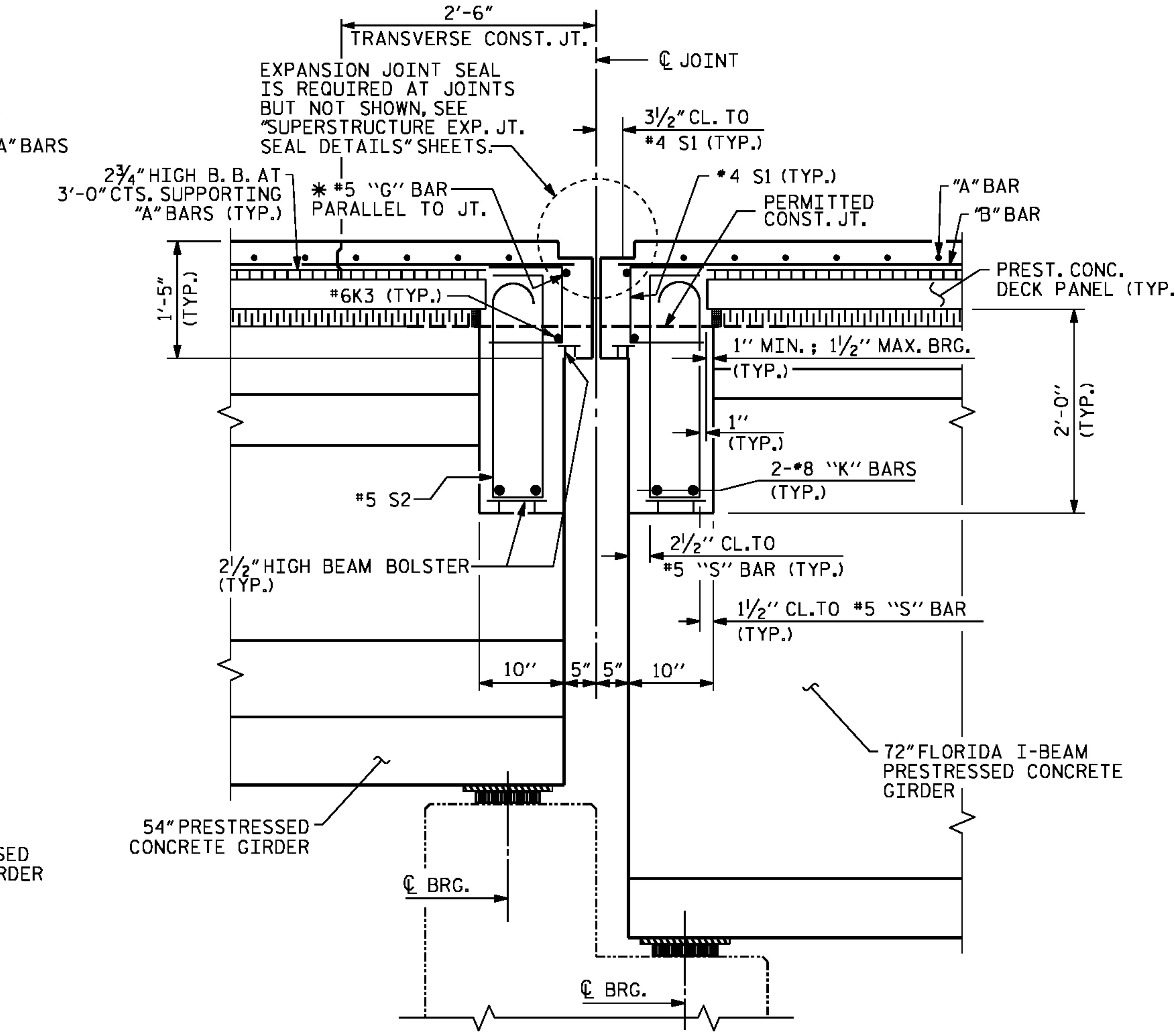


SECTION AT END BENT DIAPHRAGM

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

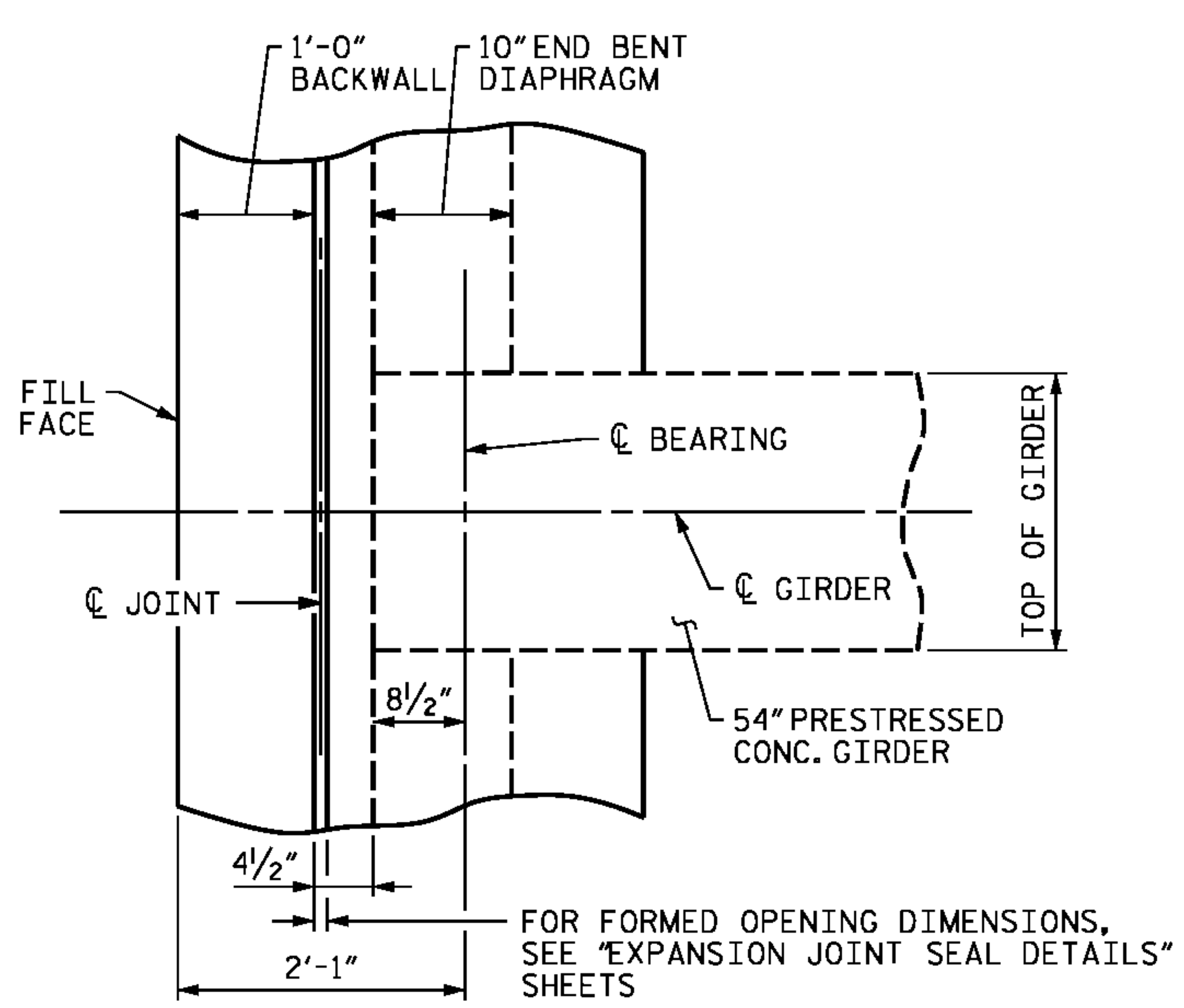


SECTION AT CONTINUOUS BENT DIAPHRAGM

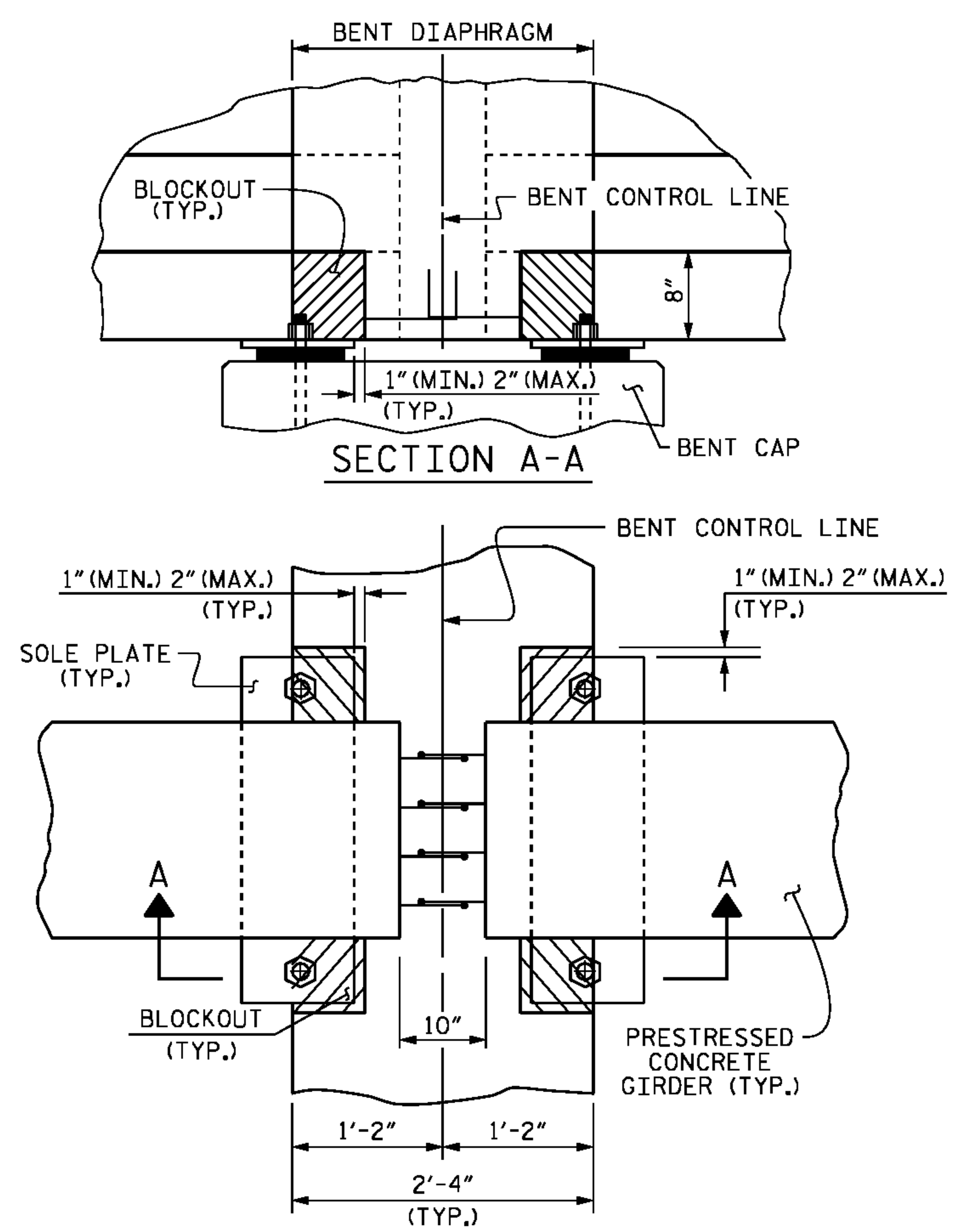


SECTION AT BENT DIAPHRAGM

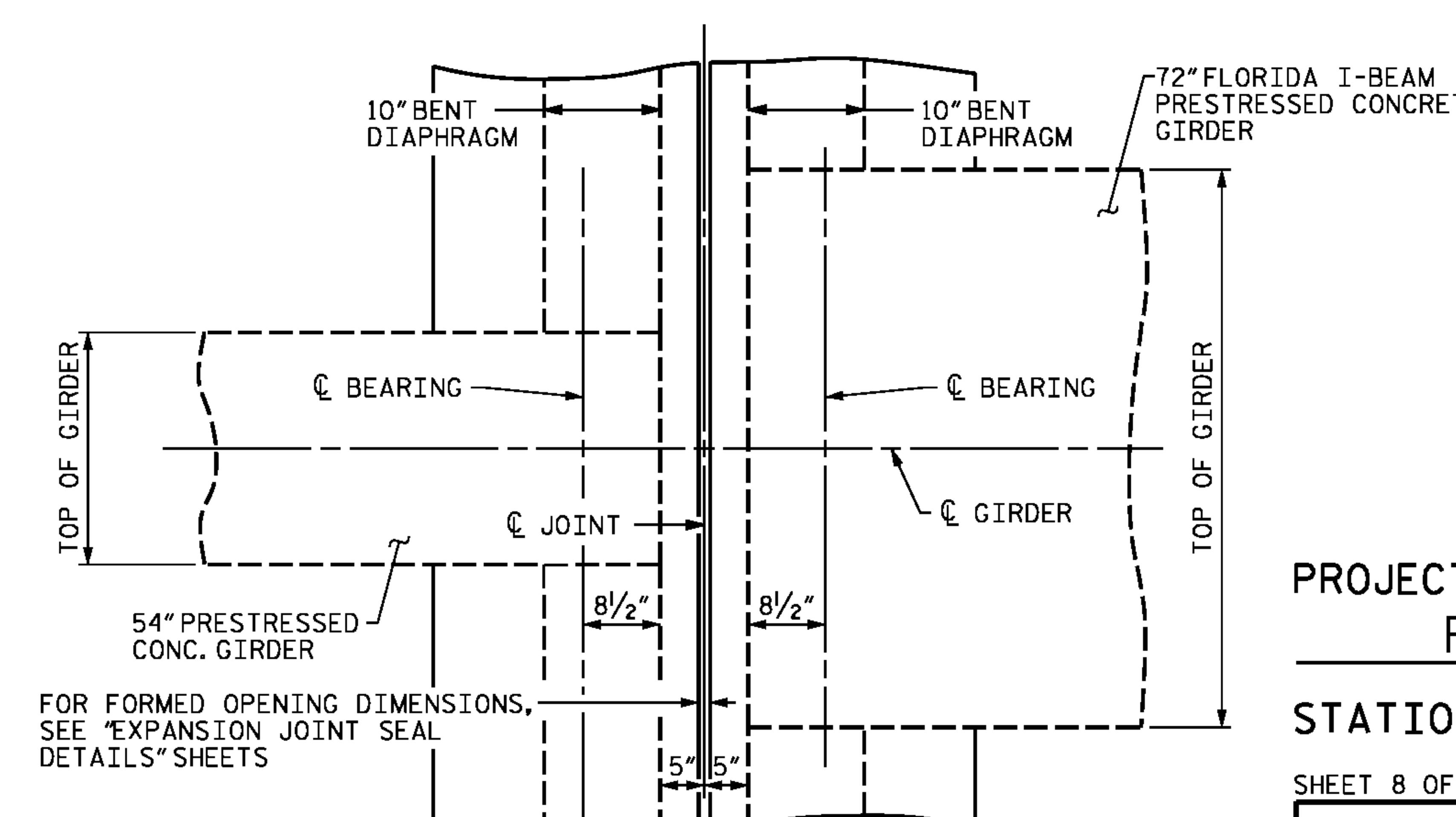
* #5G BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.



SECTION AT END BENT DIAPHRAGM



BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION AT BENT DIAPHRAGM

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 8 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS
SPANS A, B AND C

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16

DocuSigned by: Jason R Doughty
60F1C86448274F7...

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

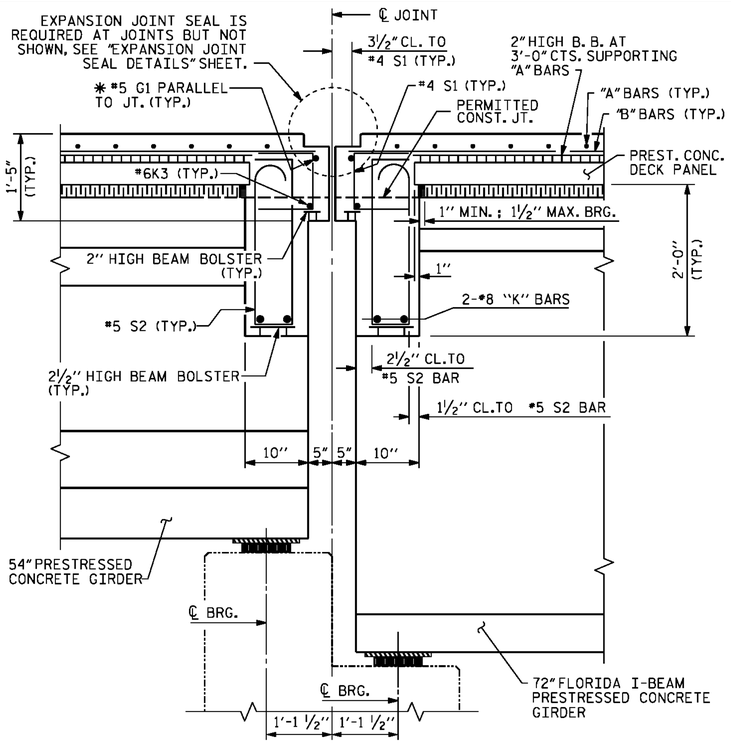
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SHEET NO. S-39
TOTAL SHEETS 278

DESIGNED BY:	J. BORUTA	DATE :	OCT 2015
DRAWN BY:	M. HOBBS	DATE :	OCT 2015
CHECKED BY:	E. DAVIS	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

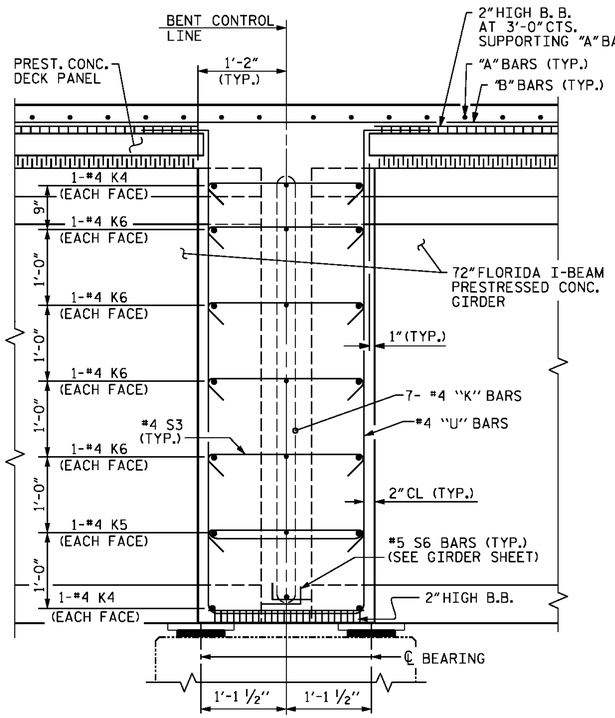
5/9/2016
400_075_B4929_SMU_TYPD1.dgn



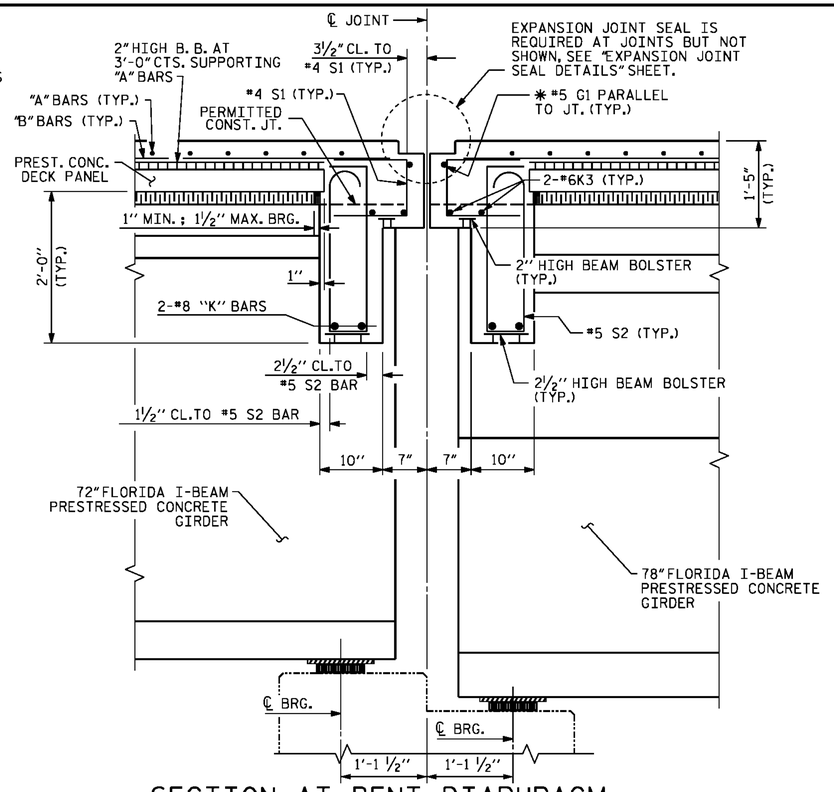
SECTION AT BENT DIAPHRAGM

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

BENT 3 SHOWN, BENTS 6 AND 10 SIMILAR.

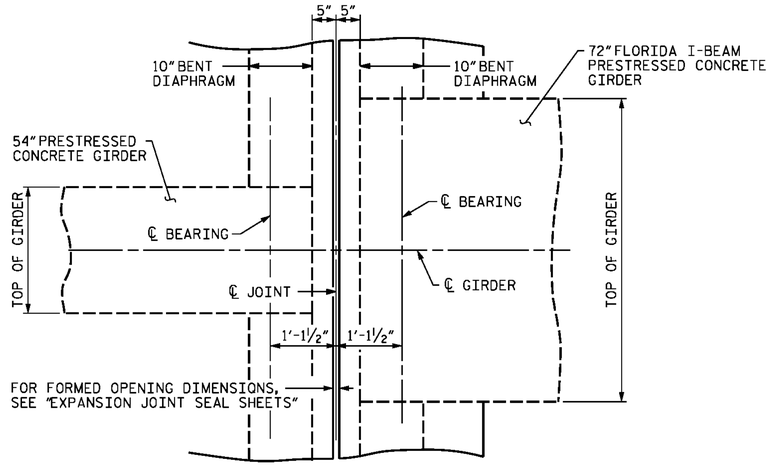


SECTION AT CONTINUOUS BENT DIAPHRAGM

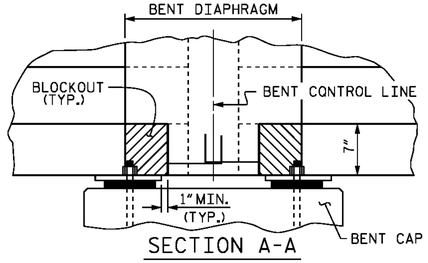


SECTION AT BENT DIAPHRAGM

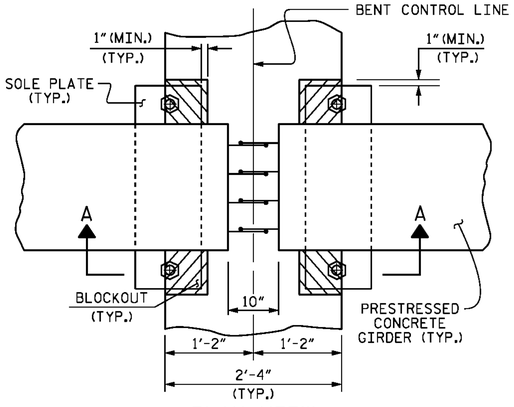
✱ #5G BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.



PLAN VIEW AT BENT DIAPHRAGM

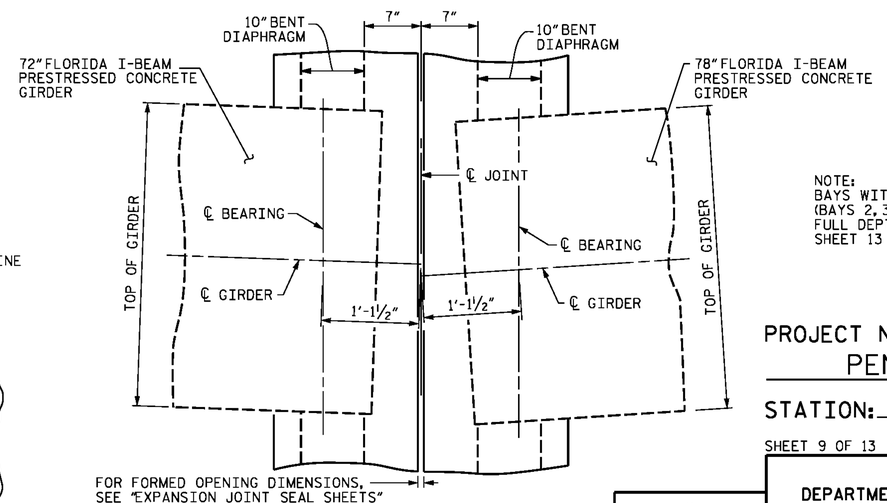


SECTION A-A



PLAN VIEW

BENT DIAPHRAGM BLOCKOUT DETAIL



PLAN VIEW AT BENT DIAPHRAGM

NOTE:
BAYS WITH PRECAST PANELS SHOWN (BAYS 2, 3 AND 4). FOR BAY WITH FULL DEPTH SLAB (BAY 1), SEE SHEET 13 OF 13.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 9 OF 13

DESIGNED BY:	J. SMITH	DATE : NOV 2015
DRAWN BY:	M. HOBBS	DATE : NOV 2015
CHECKED BY:	E. DAVIS	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/9/2016
400_077_B4929_SMU_TYPD2.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

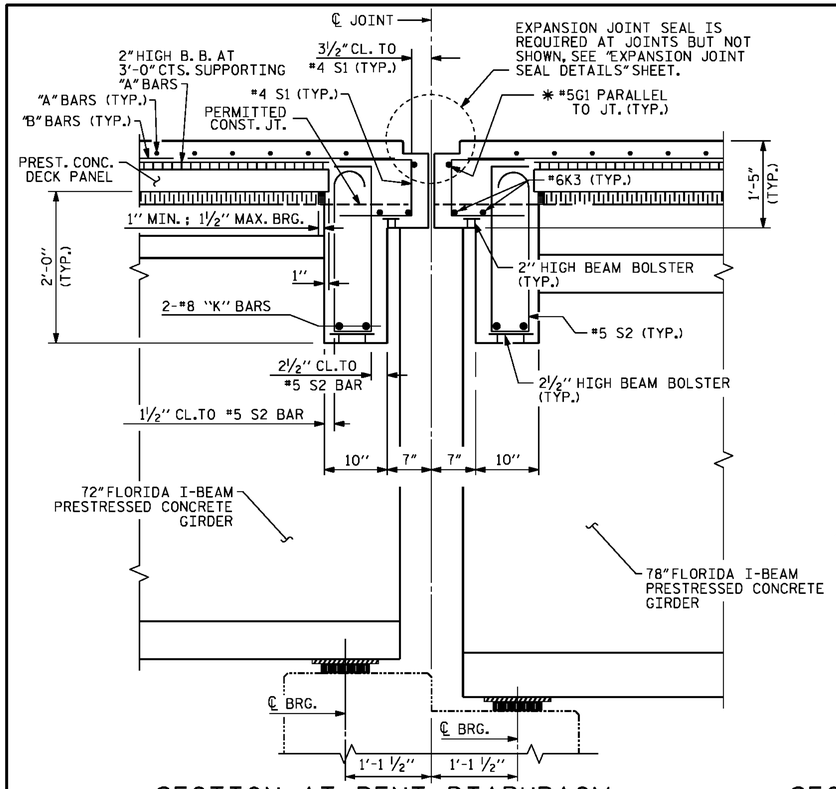
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

SPANS D THROUGH M

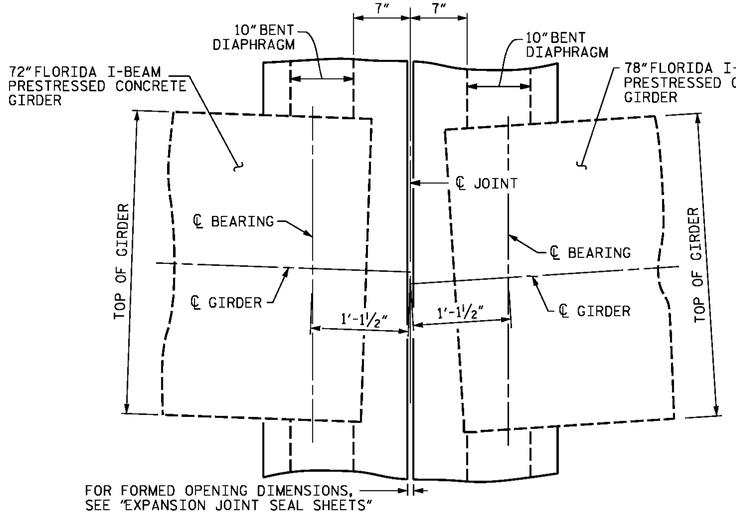
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-40
1			3			TOTAL SHEETS
2			4			278



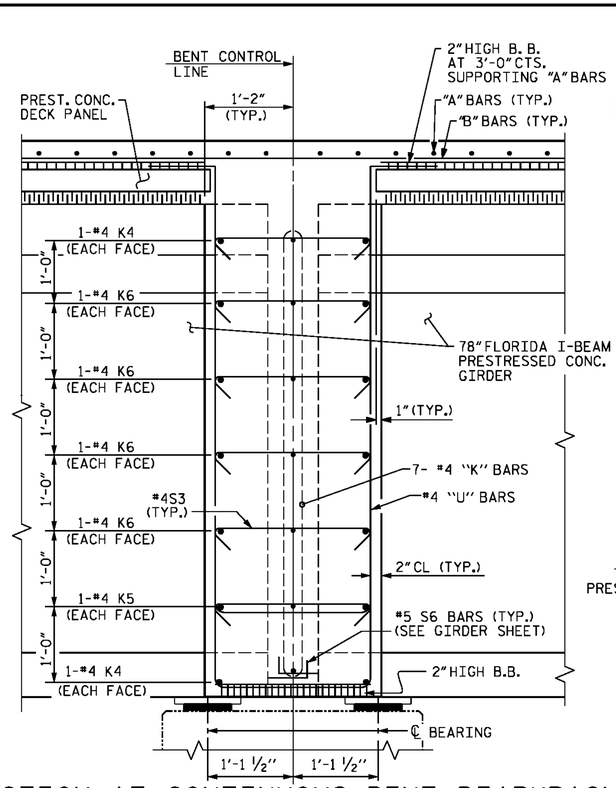
SECTION AT BENT DIAPHRAGM

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

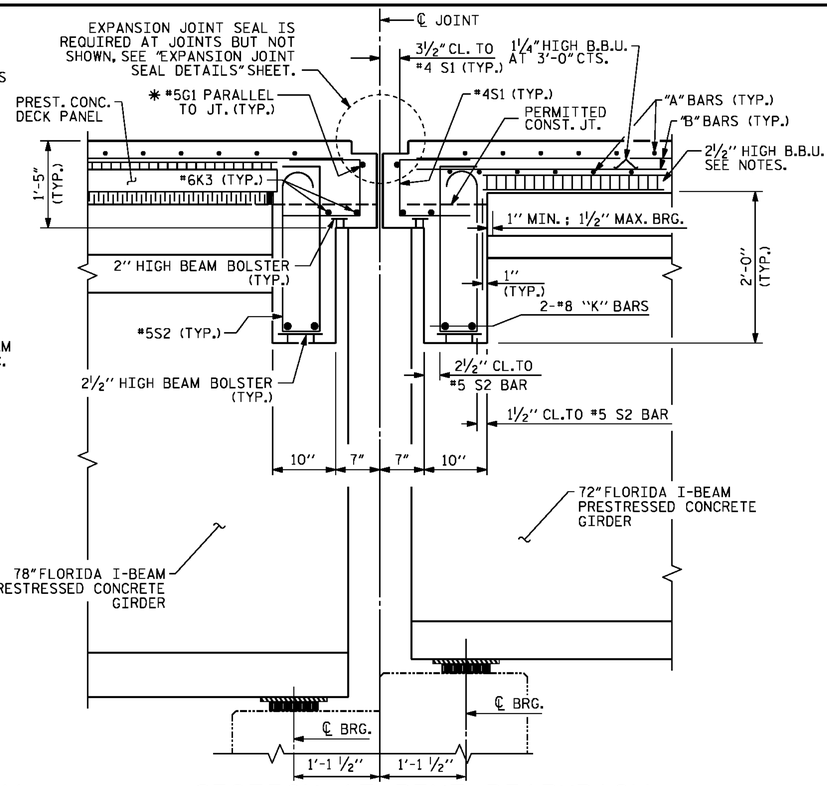
BENT 13 SHOWN, BENTS 16, 19 AND 22 SIMILAR.



PLAN VIEW AT BENT DIAPHRAGM

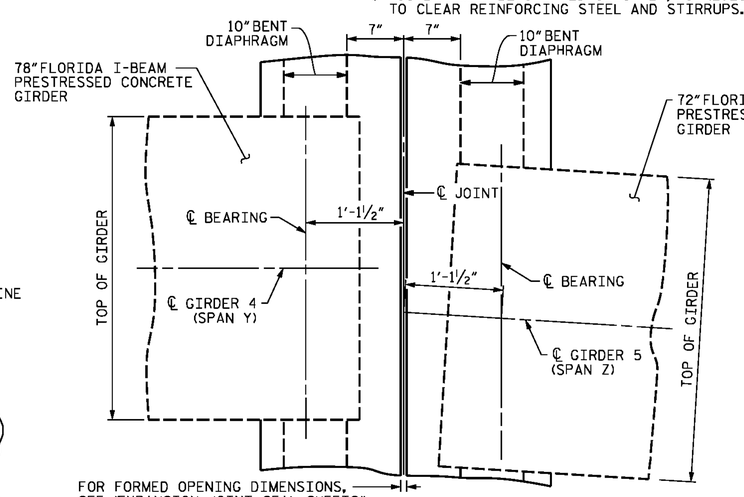


SECTION AT CONTINUOUS BENT DIAPHRAGM



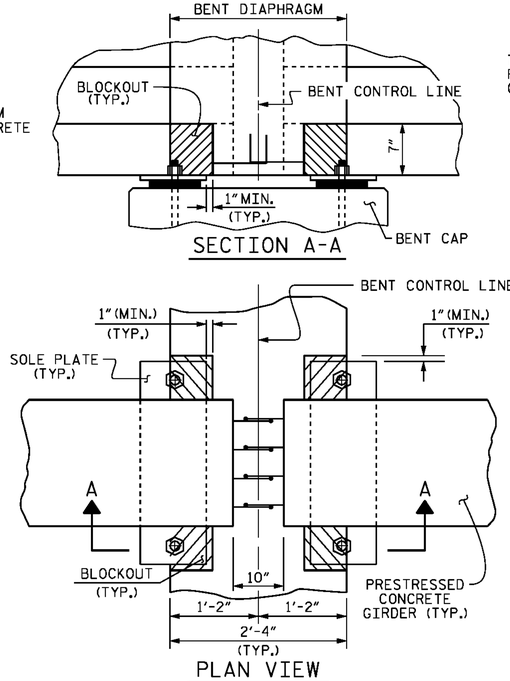
SECTION AT BENT DIAPHRAGM

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



PLAN VIEW AT BENT DIAPHRAGM

BENT 25 SHOWN



SECTION A-A

PLAN VIEW

CONTINUOUS BENT DIAPHRAGM BLOCKOUT DETAIL

NOTE:
BAYS WITH PRECAST PANELS SHOWN (BAYS 2, 3 AND 4). FOR BAY WITH FULL DEPTH SLAB (BAY 1), SEE SHEET 13 OF 13.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 10 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

SPANS N THROUGH Y

DESIGNED BY:	J. SMITH — DATE: NOV 2015
DRAWN BY:	M. HOBBS — DATE: NOV 2015
CHECKED BY:	B. LOFLIN — DATE: MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY — DATE: MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

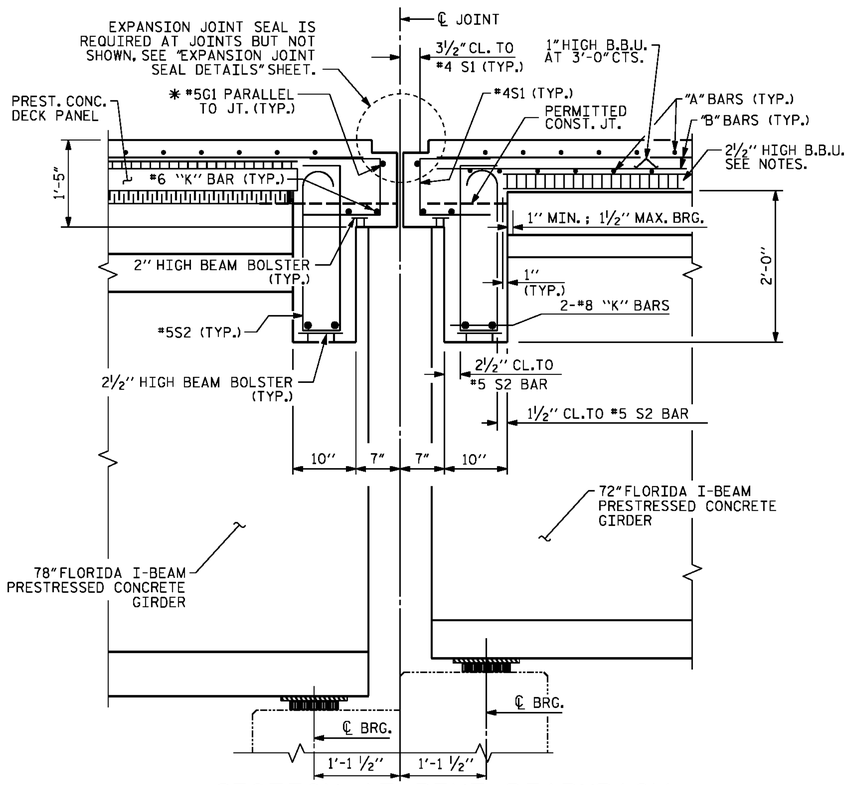
5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

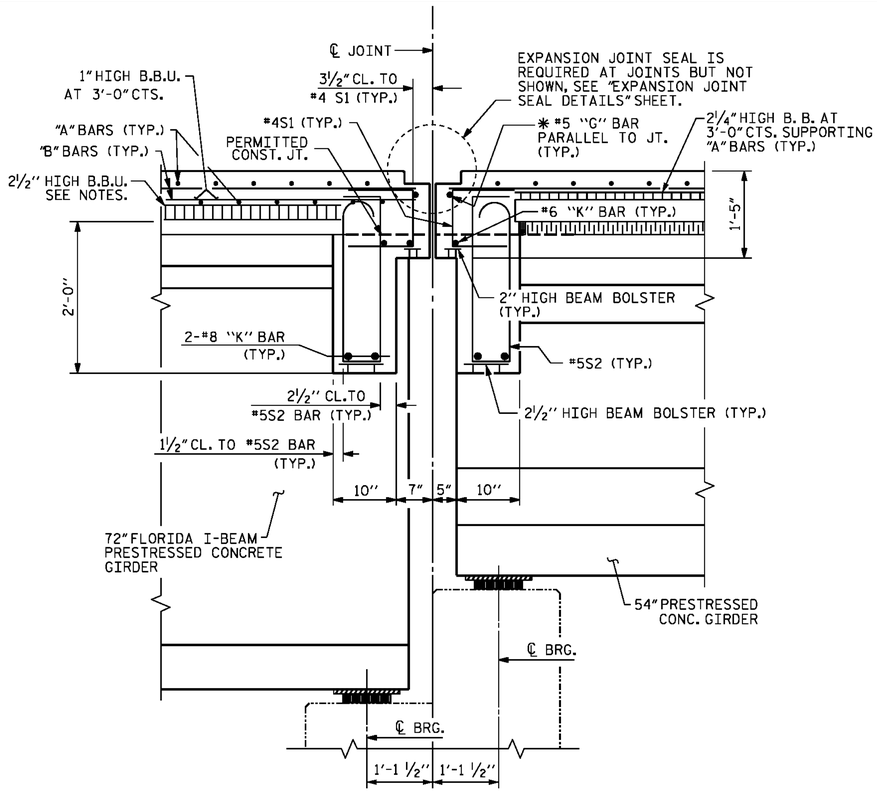
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-41
1			3			TOTAL SHEETS
2			4			278

5/9/2016
400_079_B4929_SMU_TYPD3.dgn



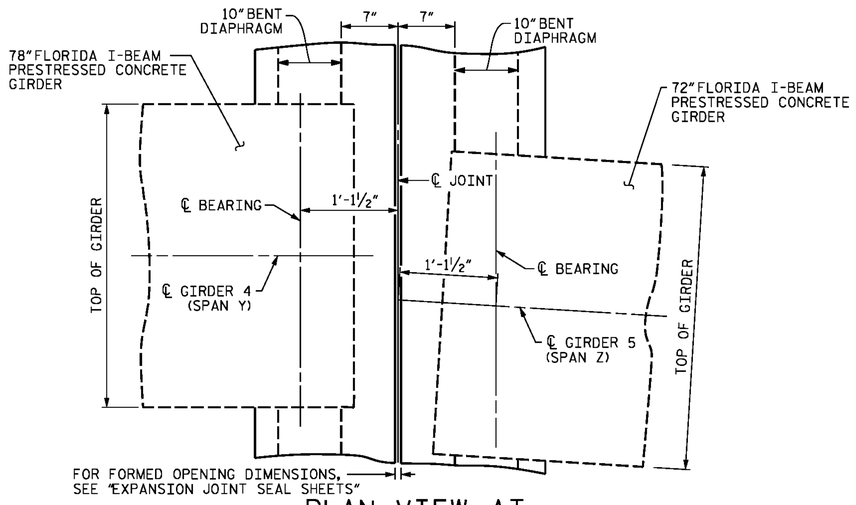
SECTION AT BENT DIAPHRAGM

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



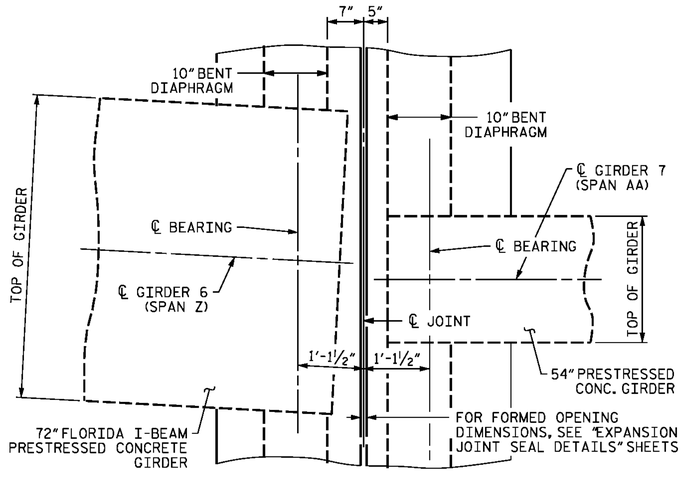
SECTION AT BENT DIAPHRAGM

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



PLAN VIEW AT BENT DIAPHRAGM

LOCATIONS VARY FROM GIRDER TO GIRDER BETWEEN SPANS, SEE "PLAN OF SPANS"



PLAN VIEW AT BENT DIAPHRAGM

LOCATIONS VARY FROM GIRDER TO GIRDER BETWEEN SPANS, SEE "PLAN OF SPANS"

DESIGNED BY:	J. SMITH	DATE :	MAR 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	E. DAVIS	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 11 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

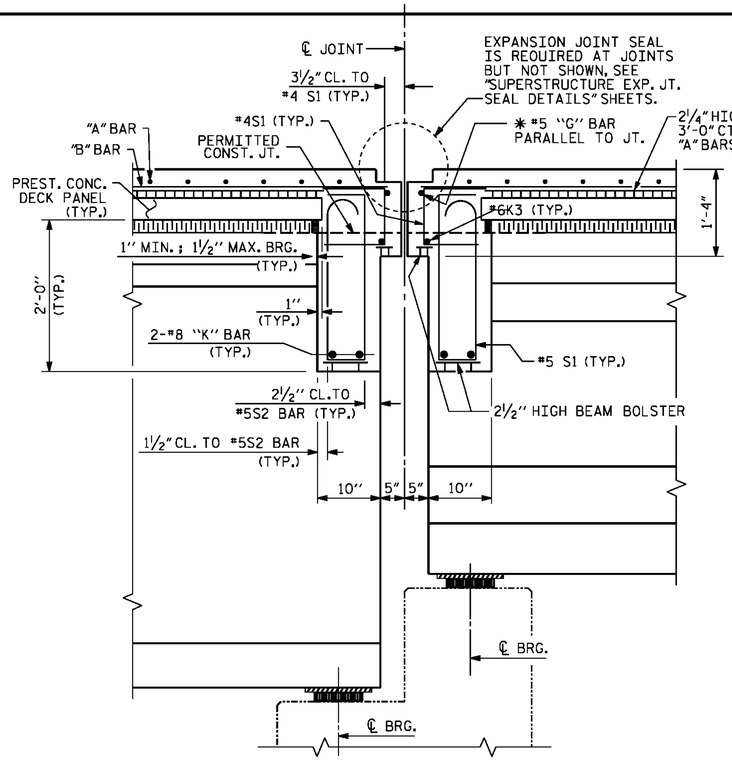
SUPERSTRUCTURE

TYPICAL SECTION DETAILS

SPAN Z

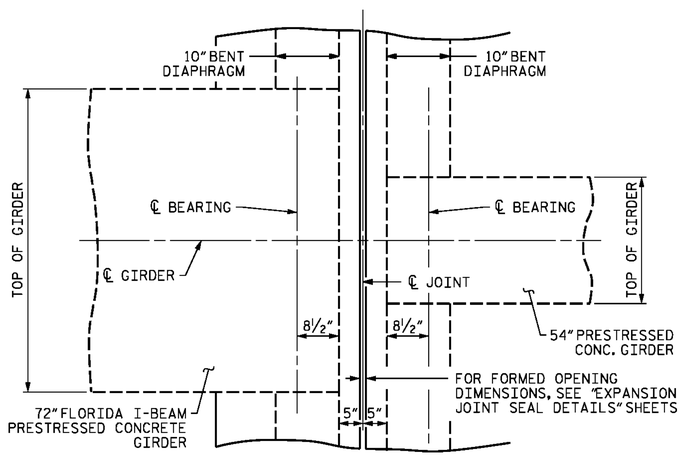
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-42
1			3			TOTAL SHEETS
2			4			278

5/9/2016
400_081_B4929_SMU_TYPD4.dgn

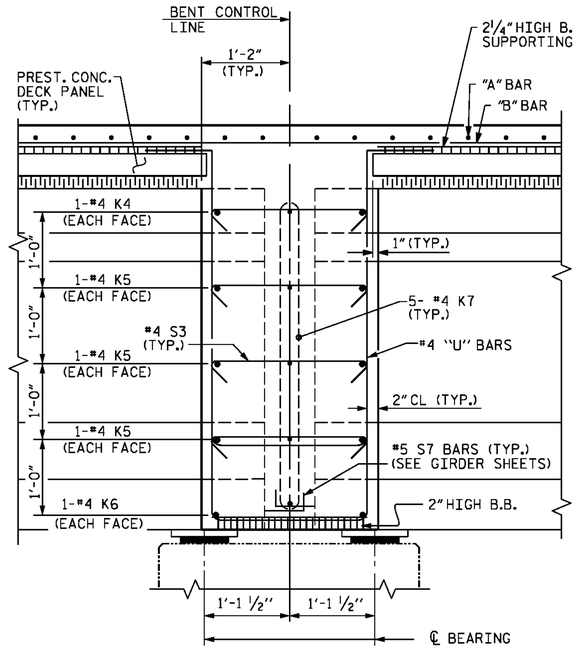


SECTION AT BENT DIAPHRAGM

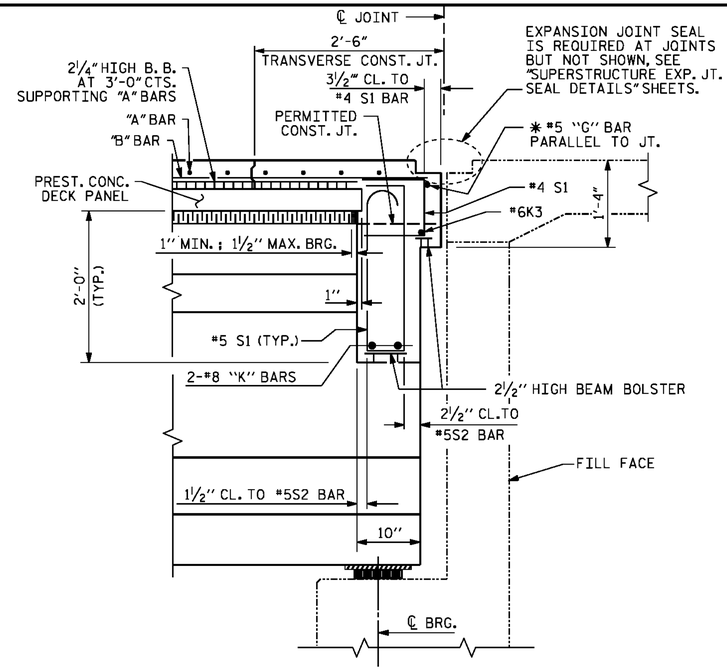
* #5G BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.



SECTION AT BENT DIAPHRAGM

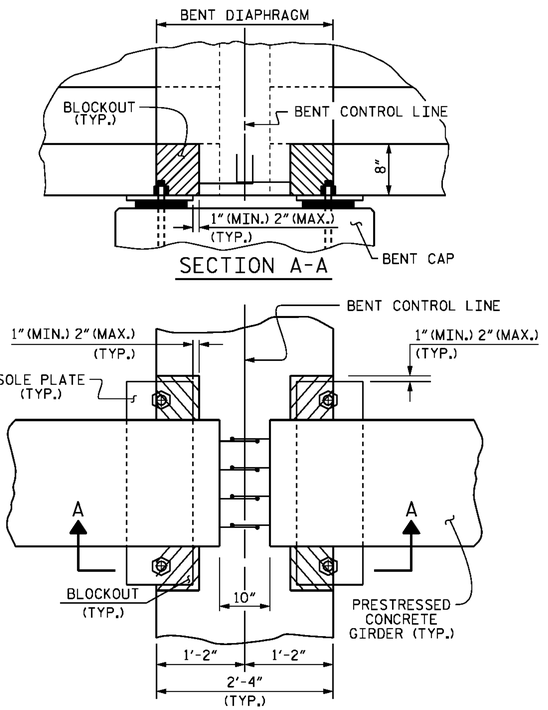


SECTION AT CONTINUOUS BENT DIAPHRAGM

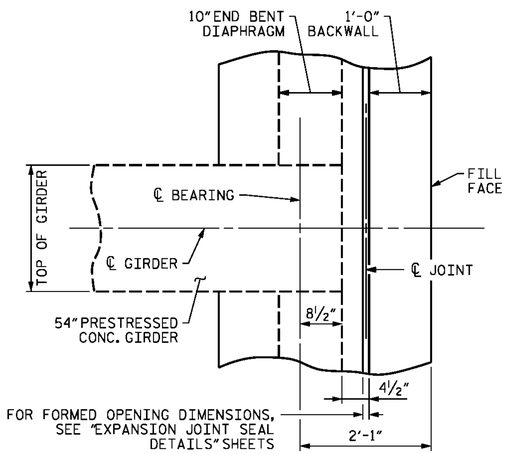


SECTION AT END BENT DIAPHRAGM

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



BENT DIAPHRAGM BLOCKOUT DETAIL



SECTION AT END BENT DIAPHRAGM

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 12 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

SPANS AA, AB AND AC

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16

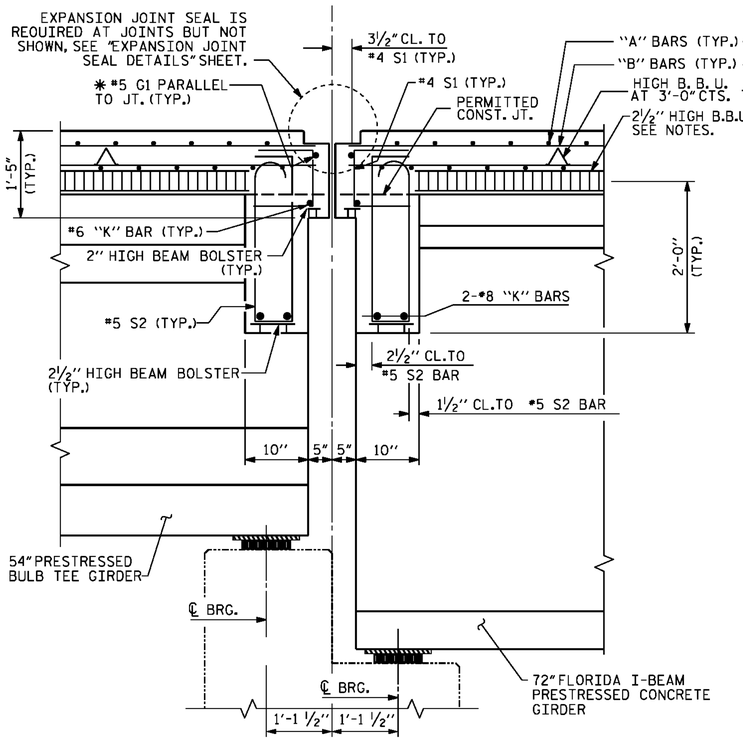
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-43
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. BORUTA	DATE : NOV 2015
DRAWN BY:	M. HOBBS	DATE : NOV 2015
CHECKED BY:	E. DAVIS	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

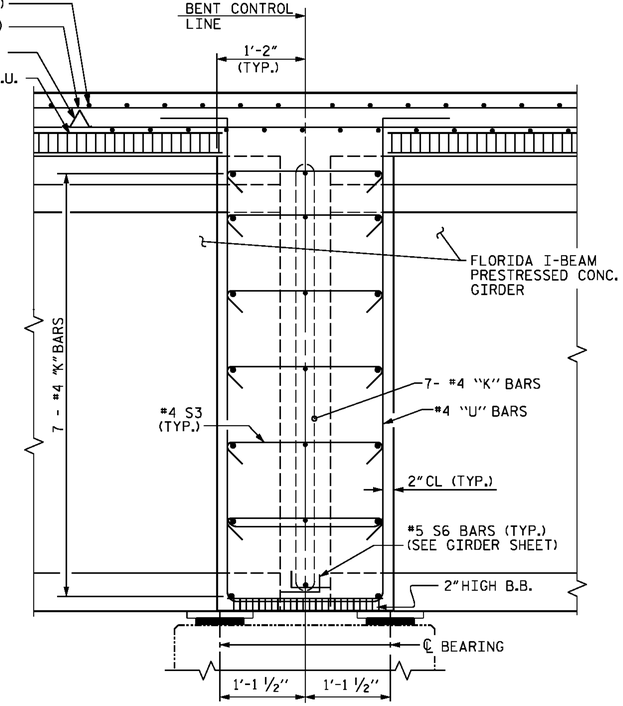
5/9/2016
400_083_B4929_SMU_TYPD5.dgn



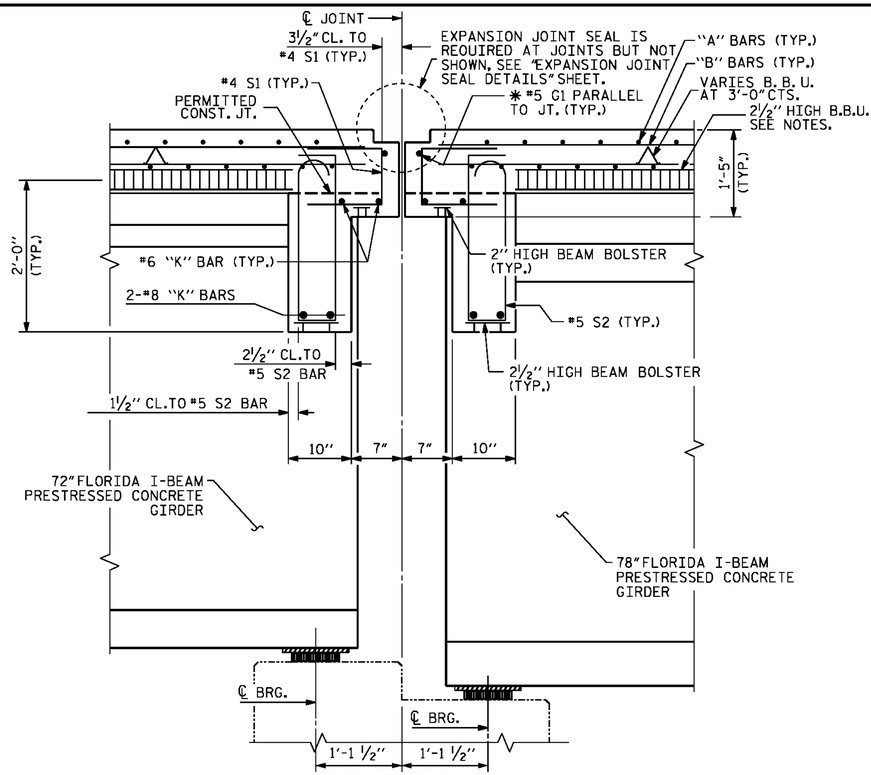
SECTION AT BENT DIAPHRAGM

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

BENT 3 SHOWN, OTHER BENTS SIMILAR



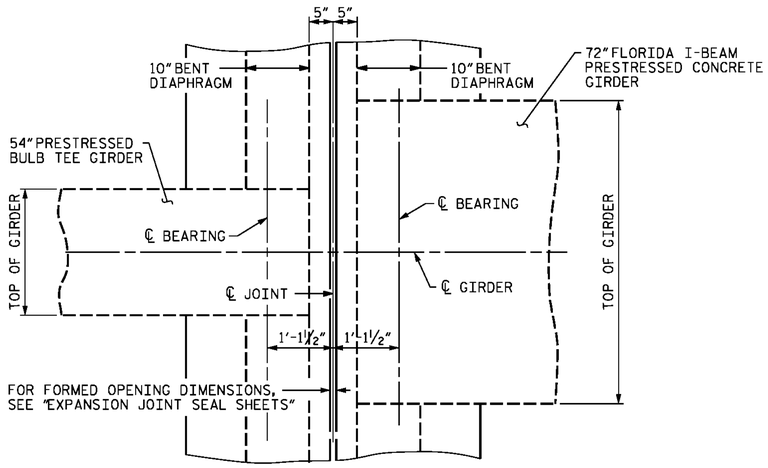
SECTION AT CONTINUOUS BENT DIAPHRAGM



SECTION AT BENT DIAPHRAGM

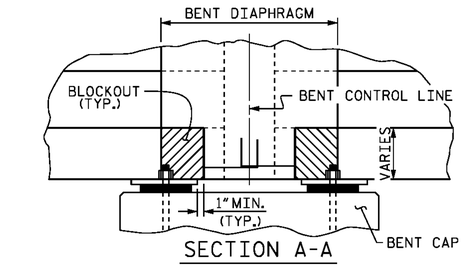
* #5G BAR MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR REINFORCING STEEL AND STIRRUPS.

BENT 25 SHOWN, OTHER BENTS SIMILAR

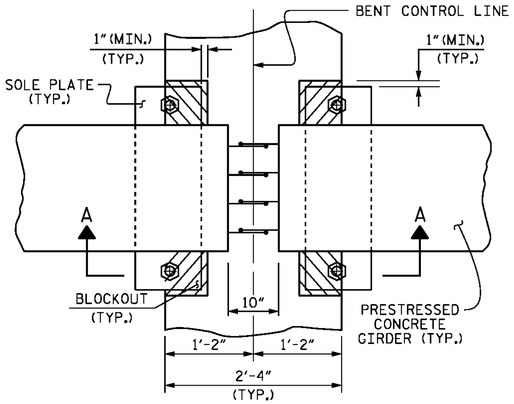


PLAN VIEW AT BENT DIAPHRAGM

BENT 3 SHOWN, OTHER BENTS SIMILAR

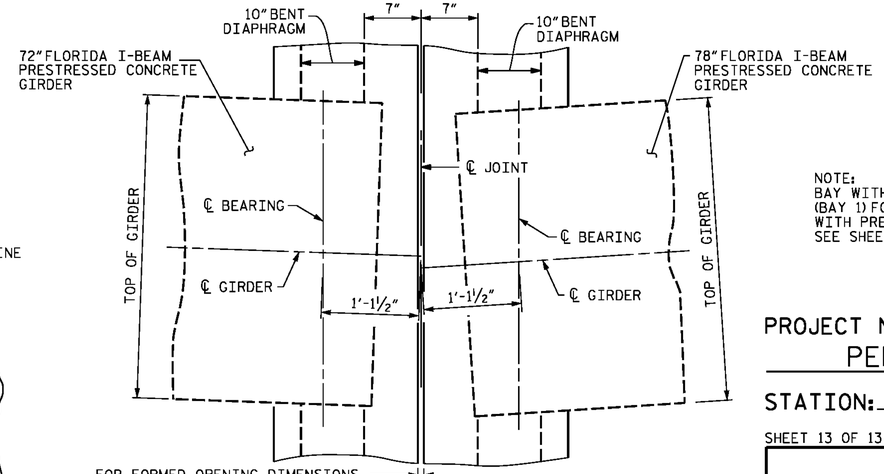


SECTION A-A



PLAN VIEW

BENT DIAPHRAGM BLOCKOUT DETAIL



PLAN VIEW AT BENT DIAPHRAGM

BENT 25 SHOWN, OTHER BENTS SIMILAR

NOTE:
BAY WITH FULL DEPTH SLAB SHOWN (BAY 1) FOR SELECT BENTS. FOR BAYS WITH PRECAST PANELS (BAY 2, 3 AND 4), SEE SHEETS 8, 9, 10 AND 12 OF 13.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 13 OF 13

DESIGNED BY:	J. SMITH — DATE : MAR 2016
DRAWN BY:	M. HOBBS — DATE : MAR 2016
CHECKED BY:	B. LOFLIN — DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY — DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

BAY 1 ALL SPANS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-44
1			3			TOTAL SHEETS
2			4			278

5/9/2016
400_085_B4929_SMU_TYP06.dgn

DECK PANEL SUPPORTS

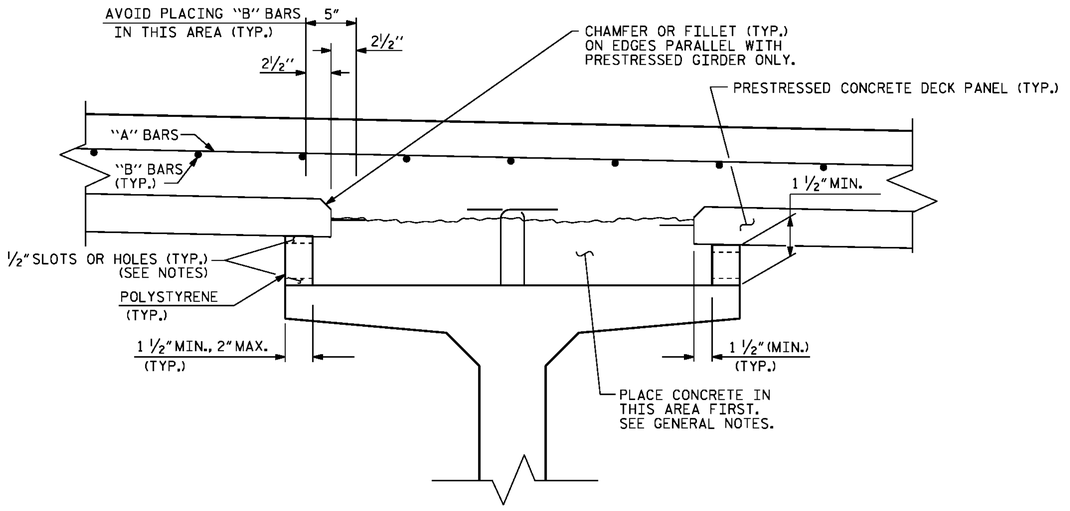
THE CONTRACTOR SHALL PROVIDE THE DECK PANEL SUPPORT SYSTEM SHOWN OR HE MAY SUBMIT A DECK PANEL SUPPORT SYSTEM OF HIS OWN DESIGN TO THE ENGINEER FOR APPROVAL.

POLYSTYRENE SUPPORT SYSTEM

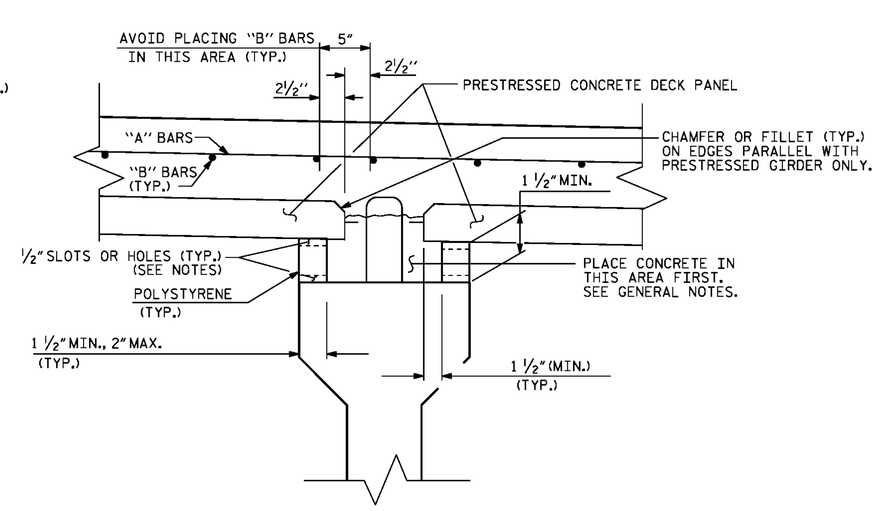
1. ALL POLYSTYRENE SHALL BE DOW STYROFOAM 60 HIGH-LOAD, UC INDUSTRIES FOAMULAR 600 OR APPROVED EQUAL.
2. THE POLYSTYRENE SUPPORT SYSTEM SHALL CONSIST OF ONE LAYER WITH A MINIMUM WIDTH OF 1½" AND A MAXIMUM WIDTH OF 2". THE POLYSTYRENE SHALL HAVE ½" X ½" WIDE SLOTS OR ½" DIAMETER HOLES AT 4'-0" CENTERS STAGGERED ALONG THE TOP AND BOTTOM.
3. THE POLYSTYRENE MAY BE CUT AND PLACED ON EDGE AS NECESSARY TO MATCH THE REQUIRED BUILDUP PROFILE ALONG THE GIRDER.
4. ADHESIVE, AS APPROVED BY THE ENGINEER, SHALL BE APPLIED TO THE TOP OF THE GIRDER IN A CONTINUOUS BEAD AND IN SUFFICIENT AMOUNT TO PREVENT THE POLYSTYRENE FROM BLOWING OUT AND TO PREVENT GAPS FROM FORMING BETWEEN THE POLYSTYRENE AND THE GIRDER. PRIOR TO PLACEMENT OF THE DECK PANELS, THE ADHESIVE SHALL ALSO BE APPLIED TO THE TOP OF THE POLYSTYRENE.
5. CONCRETE-FILLED BUCKETS, STACKS OF DECK PANELS, BUNDLED REINFORCING BARS OR OTHER HEAVY CONCENTRATED LOADS WILL NOT BE PERMITTED ON THE DECK PANEL ONCE THE PANEL HAS BEEN PLACED ON THE POLYSTYRENE SUPPORT SYSTEM.

GENERAL NOTES

1. THE DESIGN COMPRESSIVE STRENGTH (f'c) FOR THE CONCRETE IN PRESTRESSED PANELS SHALL BE 5000 PSI MINIMUM AT 28 DAYS. COMPRESSIVE STRENGTH OF CONCRETE AT TIME OF RELEASE OF STRANDS SHALL BE 4000 PSI MINIMUM.
2. THE PRECAST PRESTRESSED PANEL SHALL HAVE A THICKNESS OF 3 ½" WITH THE PRESTRESSED STRANDS LOCATED AT HALF THE DEPTH OF THE PANEL.
3. FOR SKEWED SPANS, TRAPEZOIDAL CLOSURE PANELS SHALL HAVE A MINIMUM WIDTH OF 2 FEET ON THE SHORT SIDE.
4. ALL PRESTRESSING STRANDS SHALL EXTEND 2" BEYOND THE PANEL EDGES.
5. SHEAR REINFORCING OF 0.60 SQ. INCHES OF REINFORCING STEEL PER 10 SQ. FEET OF PANEL SURFACE SHALL BE PROVIDED IN THE PANEL TO ENSURE COMPOSITE ACTION BETWEEN PANEL AND THE CAST-IN-PLACE CONCRETE. SHEAR REINFORCEMENT SHALL BE MADE OF WELDED WIRE HAVING A MINIMUM YIELD STRENGTH OF 60 KSI.
6. SHEAR REINFORCEMENT AND LIFTING DEVICES SHALL BE CONSTRUCTED AND PLACED SO AS TO AVOID ANY INTERFERENCE WITH REINFORCING STEEL IN THE CAST-IN-PLACE DECK SLAB AND TO ALLOW FOR PROPER CONCRETE CONSOLIDATION IN THE DECK PANEL.
7. SHIFT LONGITUDINAL "B" BARS AS NECESSARY TO OBTAIN A MINIMUM CLEAR DISTANCE OF 2 ½" TO THE RIGHT OR LEFT OF THE EDGE OF THE DECK PANEL. IF, IN SHIFTING TO OBTAIN THIS CLEARANCE, THE "B" BAR INTERFERES WITH THE STIRRUP IN THE TOP OF THE GIRDER THE "B" BAR MAY BE ELIMINATED.
8. WHEN CASTING THE DECK, PLACE CONCRETE FIRST OVER THE GIRDERS IN CONTINUOUS STRIPS A MINIMUM OF THREE PANEL LENGTHS AHEAD OF THE REST OF THE CONCRETE. CAREFULLY VIBRATE THE CONCRETE OVER THE GIRDERS SO THAT CONCRETE COMPLETELY FILLS THE AREA UNDER THE DECK PANEL OVERHANGS. THEN PLACE AND VIBRATE THE REMAINING DECK CONCRETE.
9. PRECAST PANELS SHALL BE DESIGNED FOR AN ALLOWABLE TENSILE STRESS OF 0 PSI IN THE PRECOMPRESSED TENSILE ZONE UNDER ALL LOADING CONDITIONS.
10. PRECAST PANELS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR. FOR CALCIUM NITRITE CORROSION INHIBITOR, SEE STANDARD SPECIFICATIONS.



F.I.B. PRESTRESSED CONCRETE GIRDER



AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER

POLYSTYRENE SUPPORT

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

5/10/2016
400_087_B4929_SMU_PDP.dgn

DESIGNED BY:	B. LOFLIN	DATE :	NOV 2015
DRAWN BY:	K. WHITE	DATE :	NOV 2015
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

DRAWN BY : ELR 1/2
CHECKED BY : GRP 4/9

REV.	BY	
5/7/03	R	RWW/JTE
5/1/06	R	TLA/GM
10/1/11		MAA/GM

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

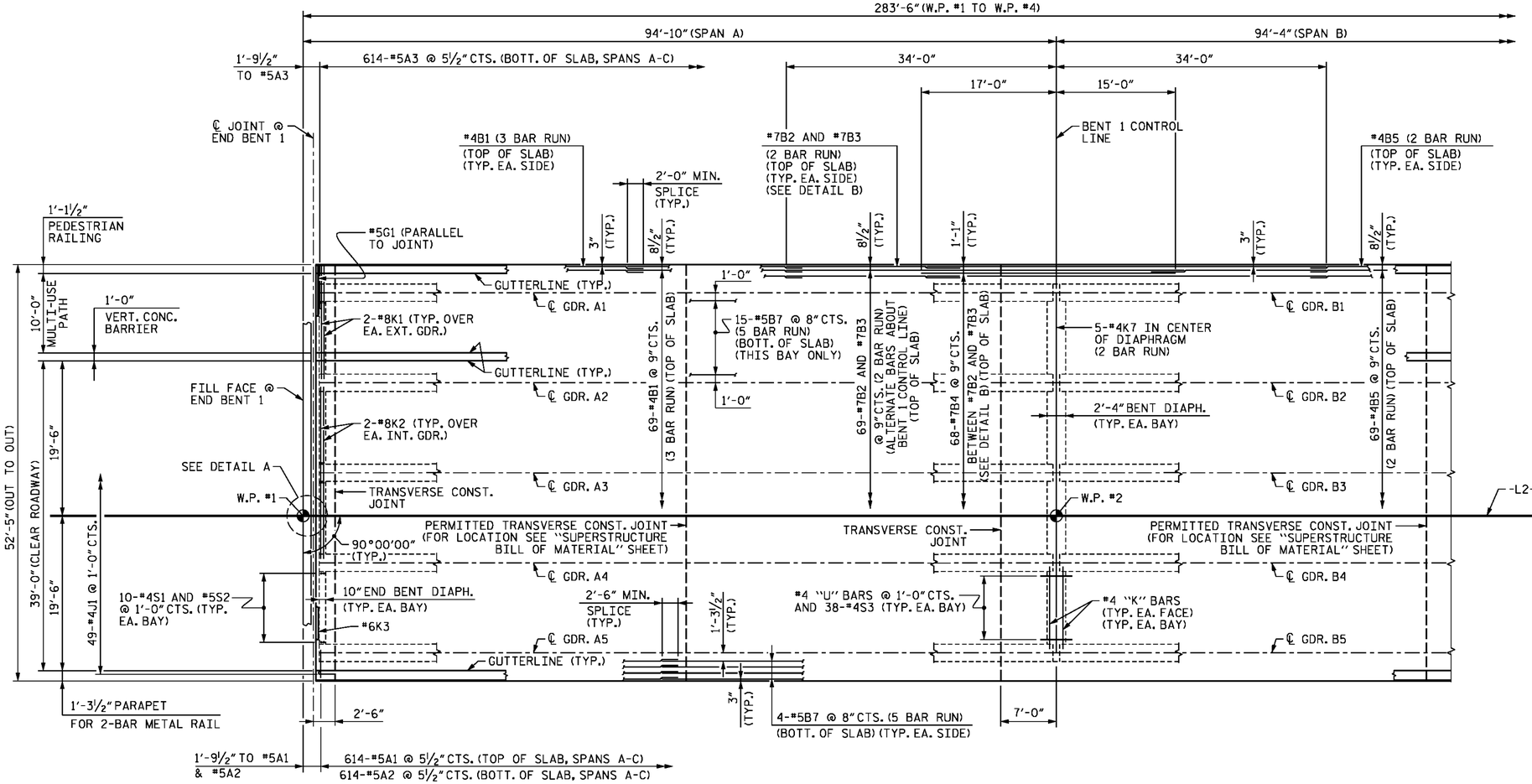
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

PRECAST PRESTRESSED CONCRETE DECK PANELS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-45
1			3			TOTAL SHEETS
2			4			278

STD. NO. PDP1



SPAN A SPAN B

PART PLAN OF SPANS - UNIT 1

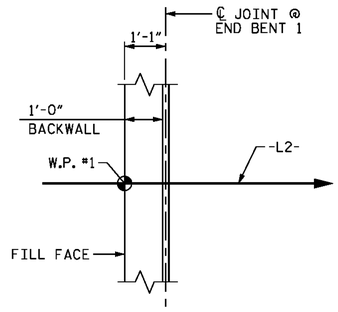
NOTES

FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL UNIT 1" SHEET.

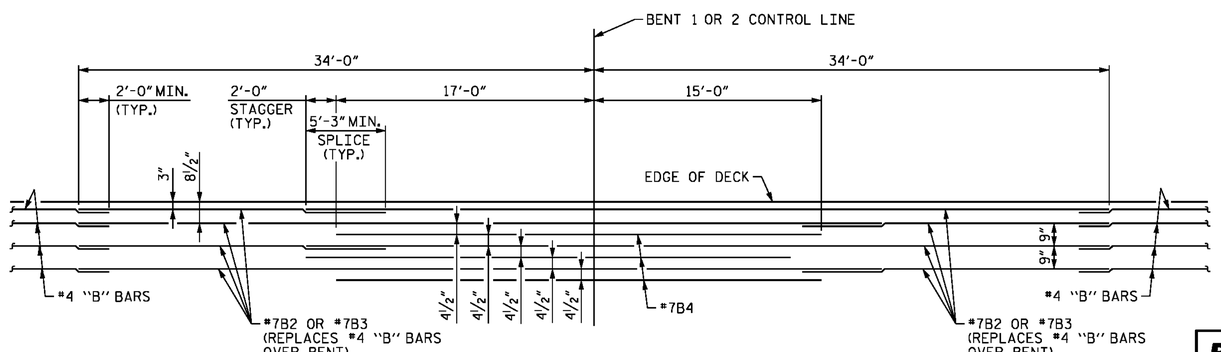
STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN SPAN A" AND "FRAMING PLAN SPANS B AND C" SHEETS.

FOR POURING SEQUENCE AND TRANSVERSE CONSTRUCTION JOINT, SEE "SUPERSTRUCTURE BILL OF MATERIAL UNIT 1" SHEET.

#4S1 AND #5S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR STUD ANCHORS.



DETAIL A



DETAIL B

(TOP OF SLAB BARS)

DESIGNED BY:	J. BORUTA	DATE :	NOV 2015
DRAWN BY:	M. HOBBS	DATE :	NOV 2015
CHECKED BY:	E. DAVIS	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/9/2016
400_089_B4929_SMU_PS11.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

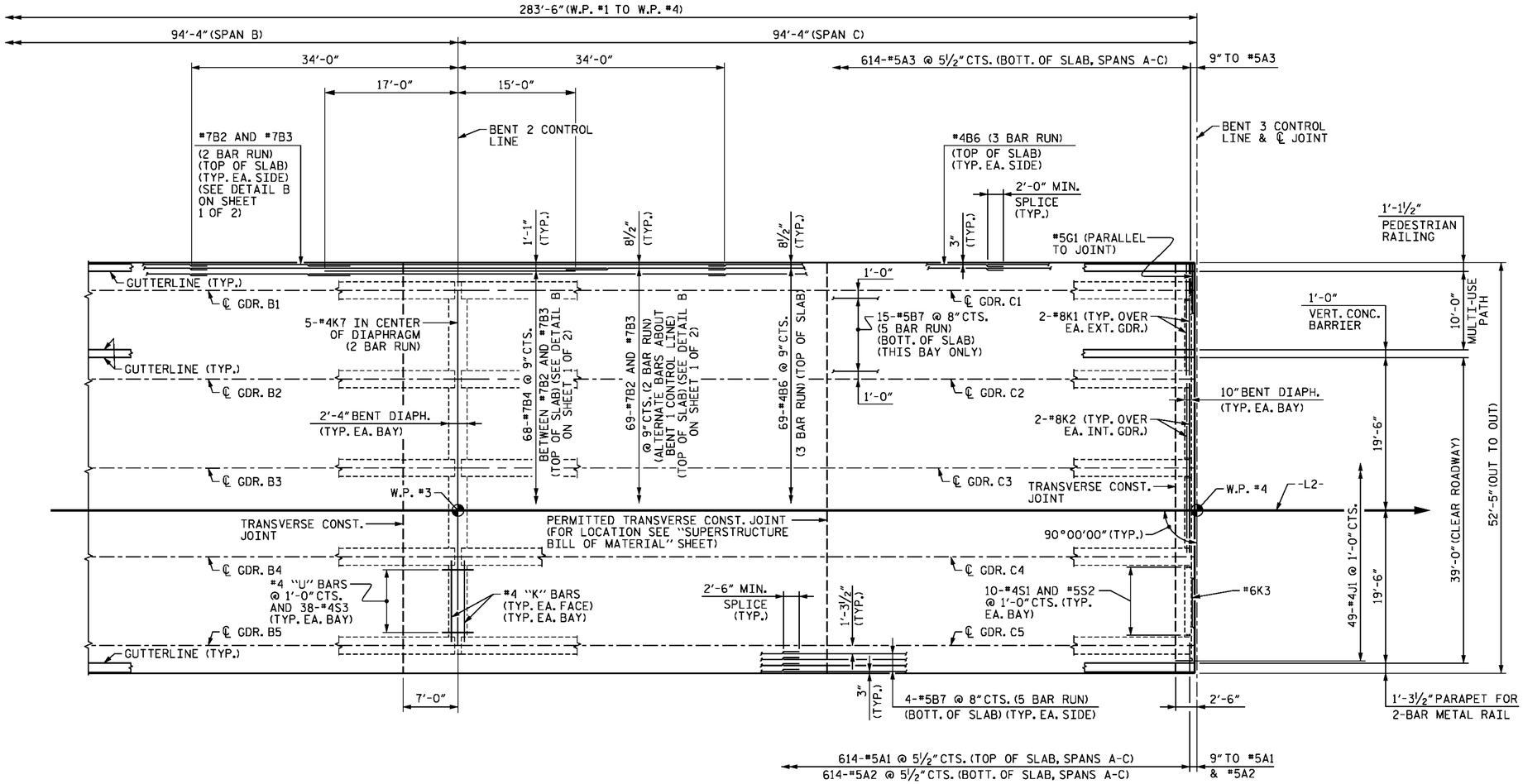
PLAN OF SPANS UNIT 1

SPANS A, B AND C

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-46
1			3			TOTAL SHEETS
2			4			278

NOTES

FOR NOTES, SEE SHEET 1 OF 2.



PART PLAN OF SPANS - UNIT 1

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS
UNIT 1

SPANS A, B AND C

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-47
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

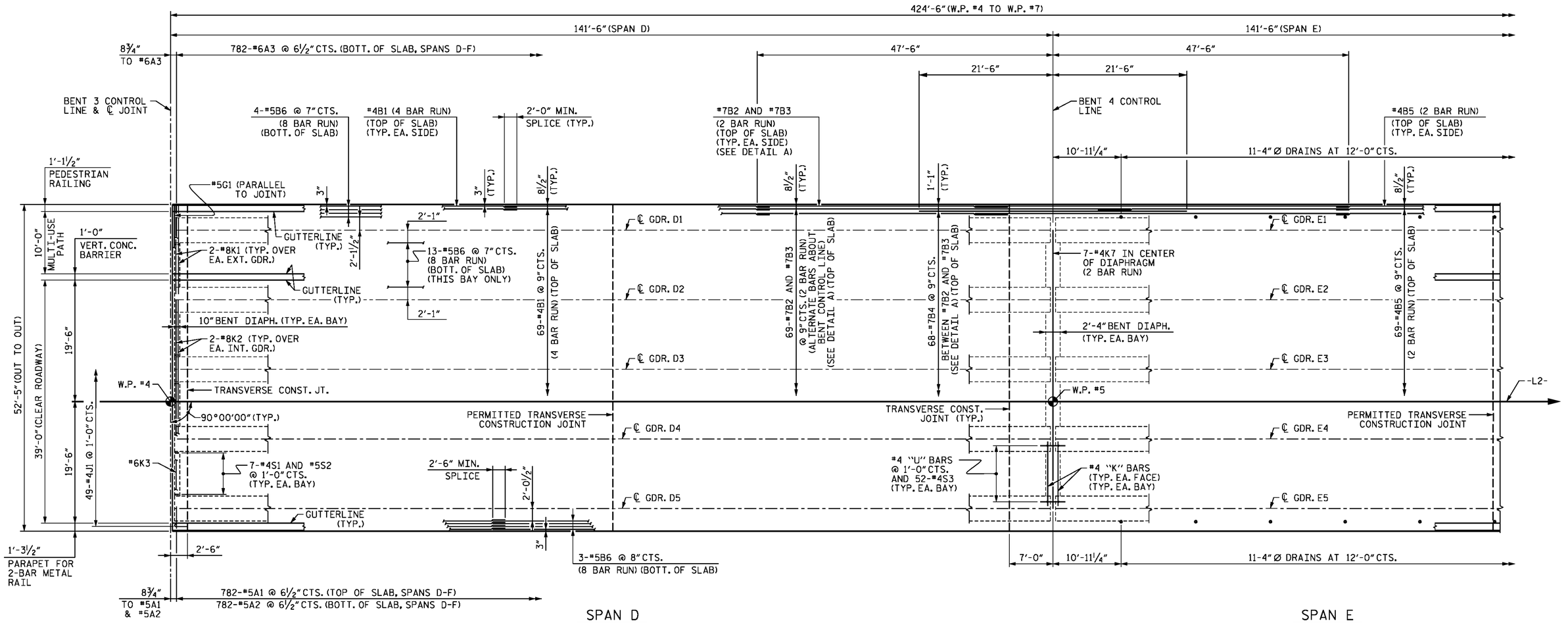
5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

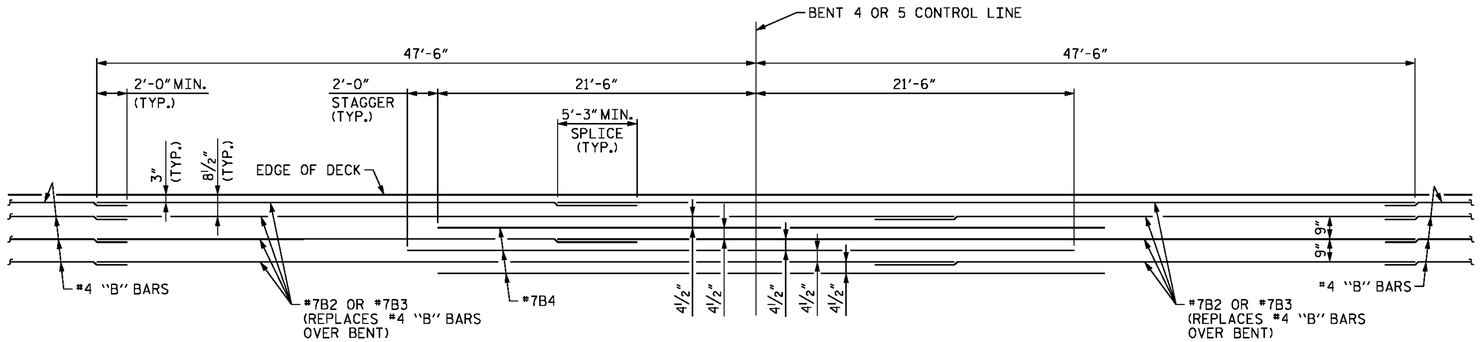
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. BORUTA	DATE :	NOV 2015
DRAWN BY:	M. HOBBS	DATE :	NOV 2015
CHECKED BY:	E. DAVIS	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_091_B4929_SMU_PS12.dgn



PART PLAN OF SPANS - UNIT 2



DETAIL A

(TOP OF SLAB BARS)

NOTES

FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE 'FRAMING PLAN" SHEETS.

FOR POURING SEQUENCE AND TRANSVERSE CONSTRUCTION JOINT, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

#4S1 AND #5S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR STUD ANCHORS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

DESIGNED BY:	J. SMITH — DATE: JAN 2016
DRAWN BY:	M. HOBBS — DATE: JAN 2016
CHECKED BY:	E. DAVIS — DATE: MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY — DATE: MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS UNIT 2

SPANS D THROUGH F

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-48
1			3			TOTAL SHEETS
2			4			278

5/9/2016
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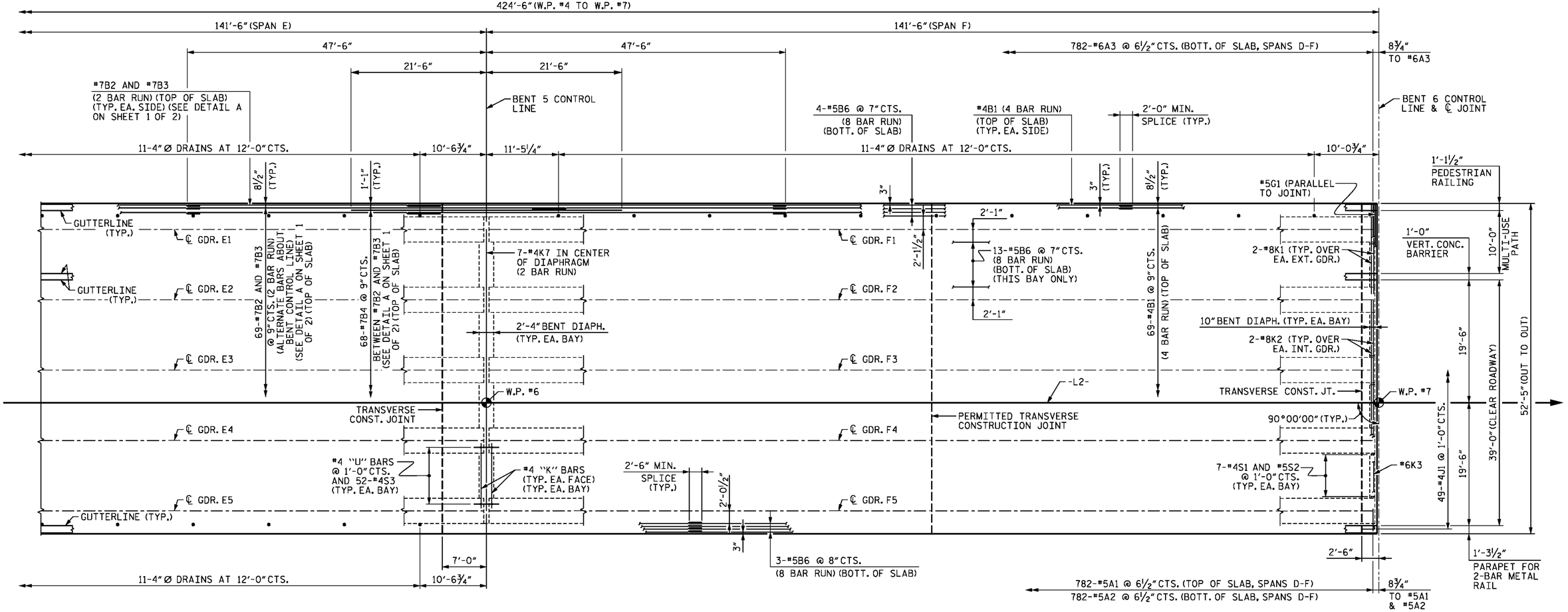

PART PLAN OF SPANS - UNIT 2

NOTES

FOR NOTES, SEE SHEET 1 OF 2.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS
UNIT 2

SPANS D THROUGH F

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-49
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. SMITH	DATE: JAN 2016
DRAWN BY:	M. HOBBS	DATE: JAN 2016
CHECKED BY:	E. DAVIS	DATE: MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE: MAY 2016

5/9/2016
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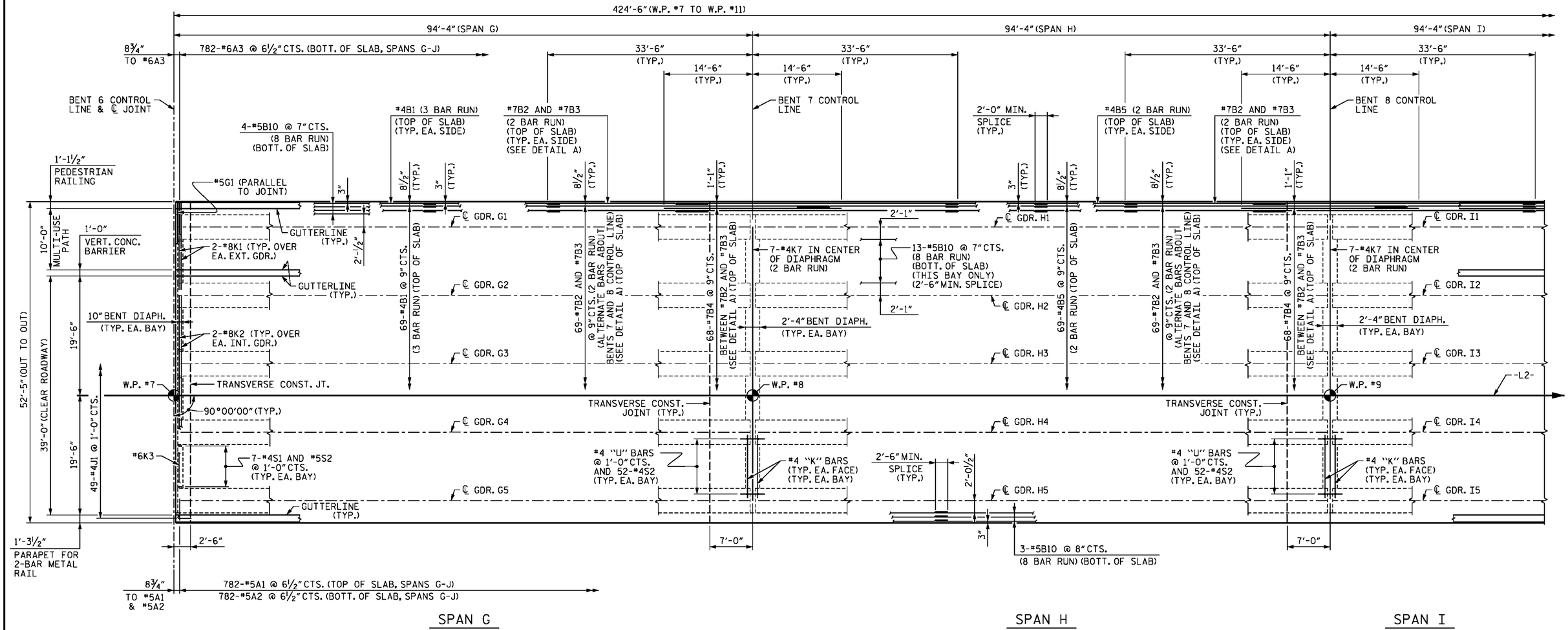
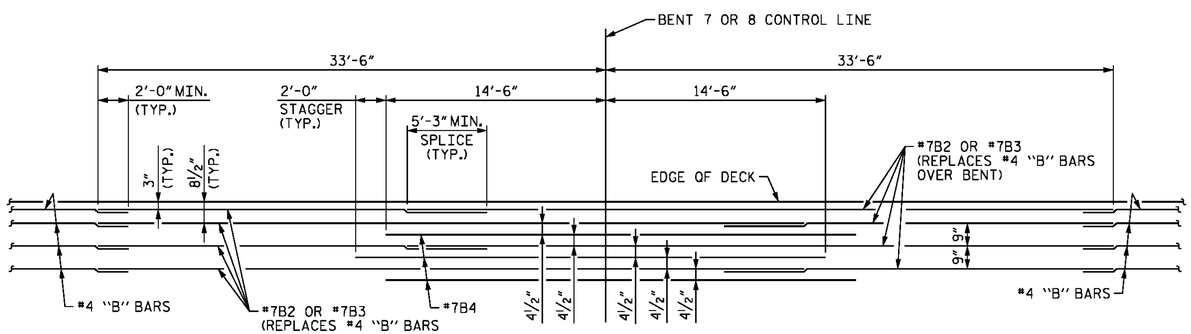


PART PLAN OF SPANS - UNIT 3



DETAIL A

(TOP OF SLAB BARS)

NOTES

FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "PARTIAL FRAMING PLAN - UNIT 3" SHEET.

FOR POURING SEQUENCE AND TRANSVERSE CONSTRUCTION JOINT, SEE "SUPERSTRUCTURE BILL OF MATERIAL - UNIT 3" SHEET.

#4S1 AND #5S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR STUD ANCHORS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

DESIGNED BY:	J. SMITH — DATE: JAN 2016
DRAWN BY:	M. HOBBS — DATE: JAN 2016
CHECKED BY:	E. DAVIS — DATE: FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY — DATE: MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE
PLAN OF SPANS UNIT 3
SPANS G THROUGH J

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-50
1			3			TOTAL SHEETS
2			4			278

5/9/2016
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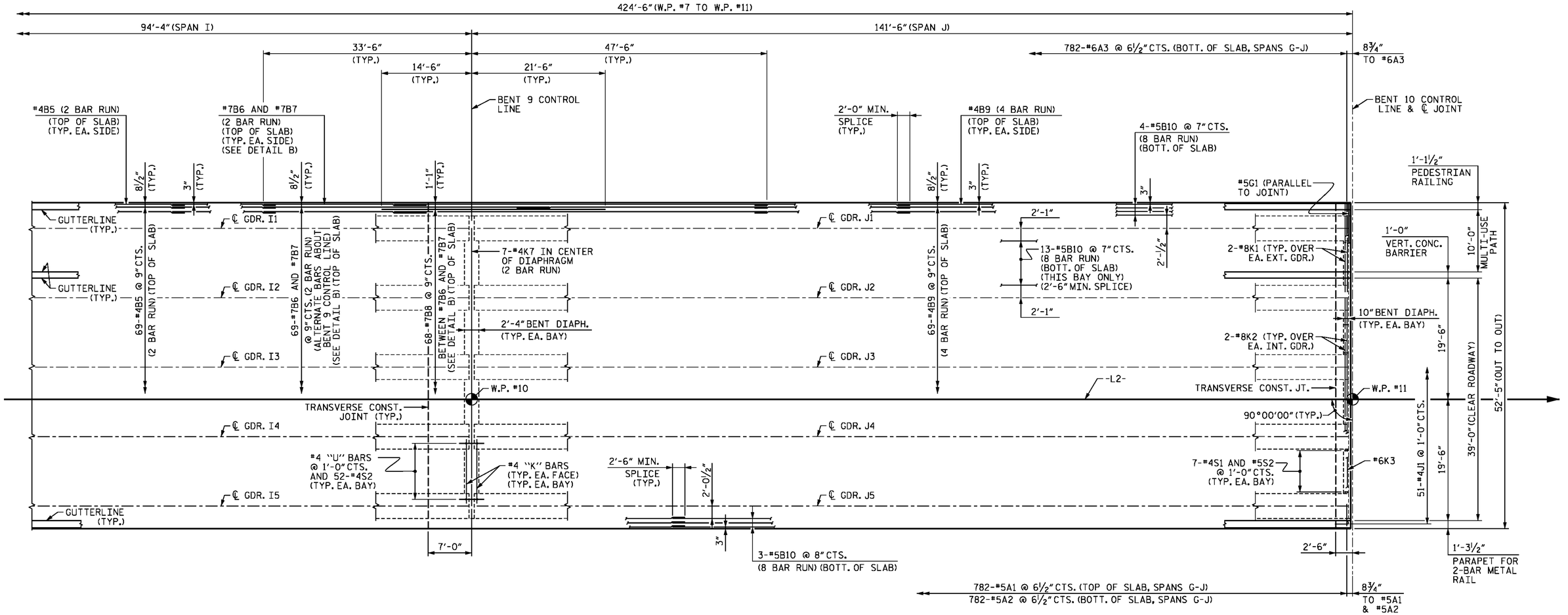


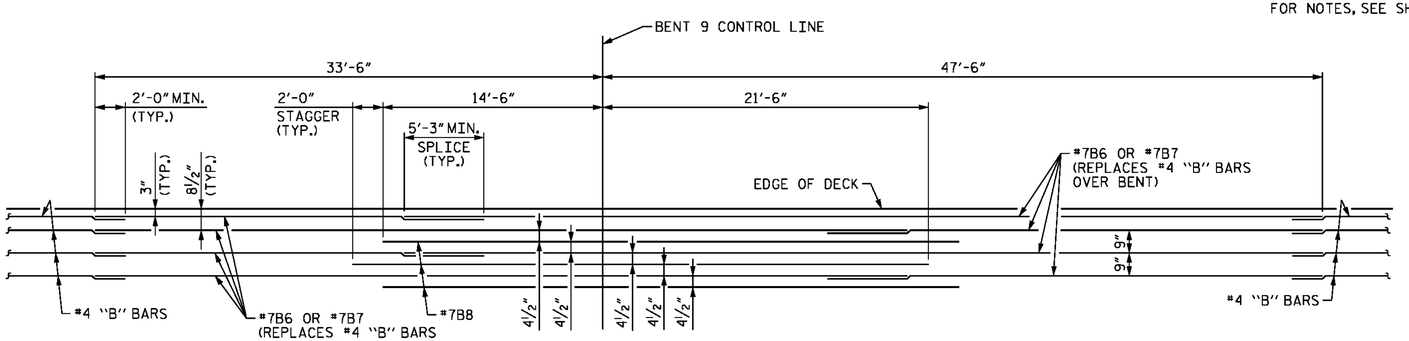
SPAN I

SPAN J

PART PLAN OF SPANS - UNIT 3

NOTES

FOR NOTES, SEE SHEET 1 OF 2



DETAIL B

(TOP OF SLAB BARS)

DESIGNED BY:	J. SMITH	DATE :	JAN 2016
DRAWN BY:	M. HOBBS	DATE :	JAN 2016
CHECKED BY:	E. DAVIS	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-
SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PLAN OF SPANS UNIT 3

SPANS G THROUGH J

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-51
1			3			TOTAL SHEETS
2			4			278

5/9/2016
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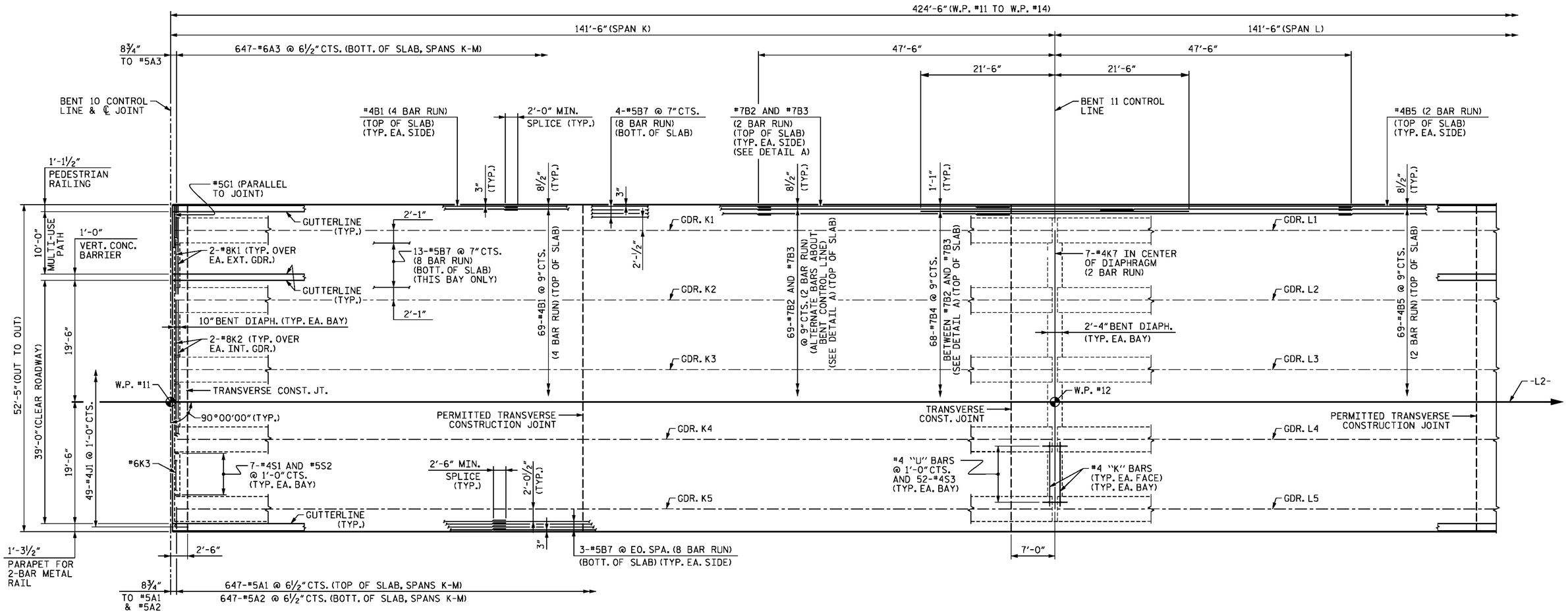
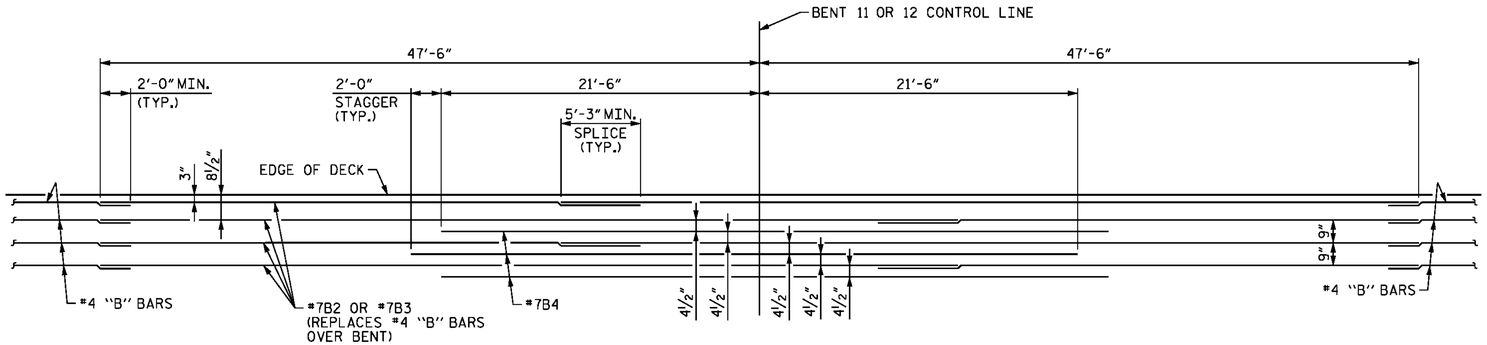


PART PLAN OF SPANS - UNIT 4



DETAIL A

(TOP OF SLAB BARS)

NOTES

FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN" SHEETS.

FOR POURING SEQUENCE AND TRANSVERSE CONSTRUCTION JOINT, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

#4S1 AND #5S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR STUD ANCHORS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS UNIT 4

SPANS K THROUGH M

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-52
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. SMITH	DATE :	JAN 2016
DRAWN BY:	M. HOBBS	DATE :	JAN 2016
CHECKED BY:	E. DAVIS	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/9/2016
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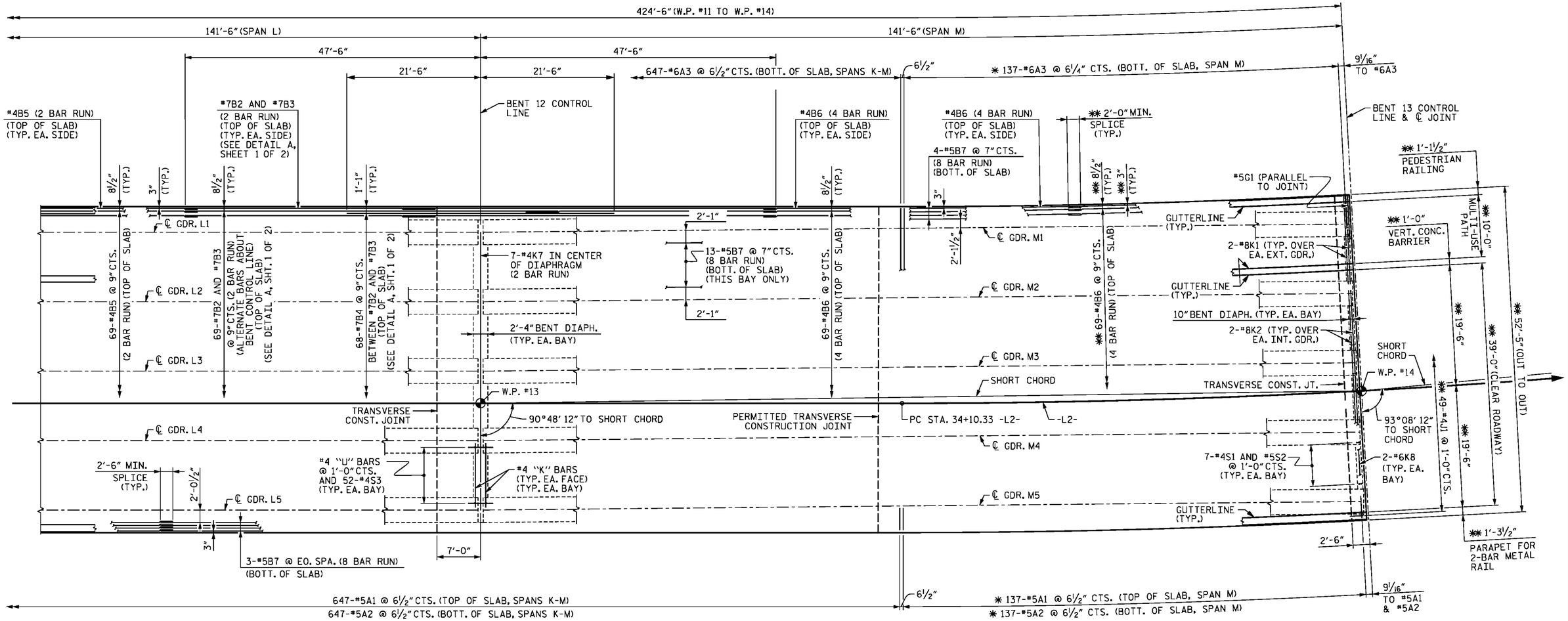


PART PLAN OF SPANS - UNIT 4

* - #5 "A" BARS ARE TO BE PLACED RADIALLY AT 6½" CTS. MEASURED ALONG RIGHT OUTSIDE EDGE OF SUPERSTRUCTURE AND TAPERED TO 6¼" ALONG LEFT OUTSIDE EDGE OF SUPERSTRUCTURE.

** - RADIAL DIMENSION

NOTES

FOR NOTES, SEE SHEET 1 OF 2.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

DESIGNED BY:	J. SMITH	DATE :	JAN 2016
DRAWN BY:	M. HOBBS	DATE :	JAN 2016
CHECKED BY:	E. DAVIS	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS UNIT 4

SPANS K THROUGH M

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-53
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400_103_B4929_SMU_PS42.dgn

NOTES

FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

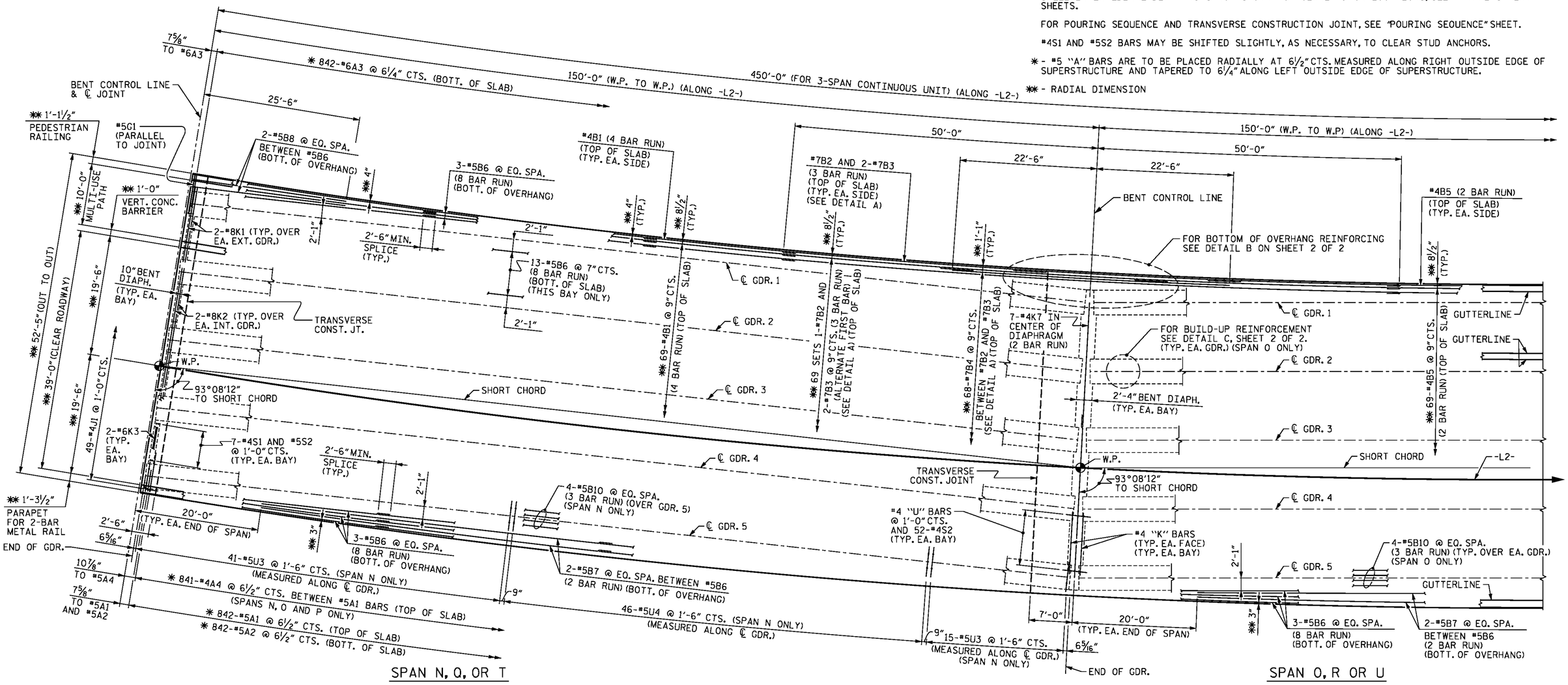
STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN" SHEETS.

FOR POURING SEQUENCE AND TRANSVERSE CONSTRUCTION JOINT, SEE "POURING SEQUENCE" SHEET.

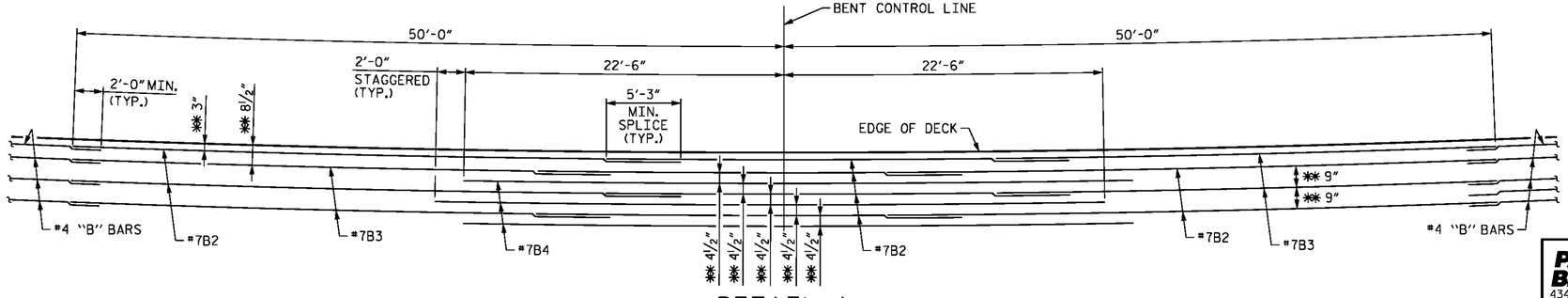
#4S1 AND #5S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR STUD ANCHORS.

* - #5 "A" BARS ARE TO BE PLACED RADIALLY AT 6½" CTS. MEASURED ALONG RIGHT OUTSIDE EDGE OF SUPERSTRUCTURE AND TAPERED TO 6¼" ALONG LEFT OUTSIDE EDGE OF SUPERSTRUCTURE.

** - RADIAL DIMENSION



PART PLAN OF SPANS - UNIT 5, 6 OR 7



PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS UNITS 5, 6 AND 7

SPANS N THROUGH V

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

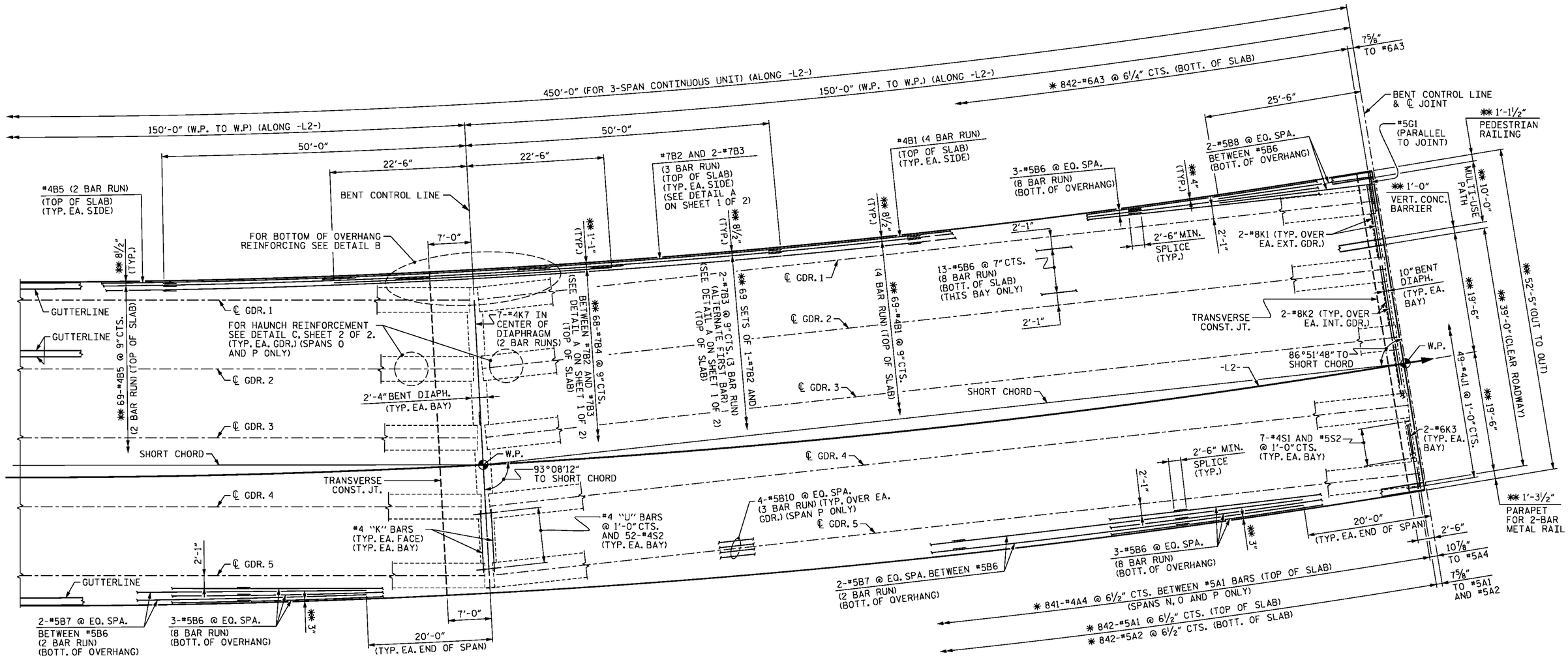
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-54
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. SMITH	DATE : JAN 2016
DRAWN BY:	M. HOBBS	DATE : JAN 2016
CHECKED BY:	B. LOFLIN	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/9/2016
400_105_B4929_SMU_PSS1.dgn



SPAN O, R OR U

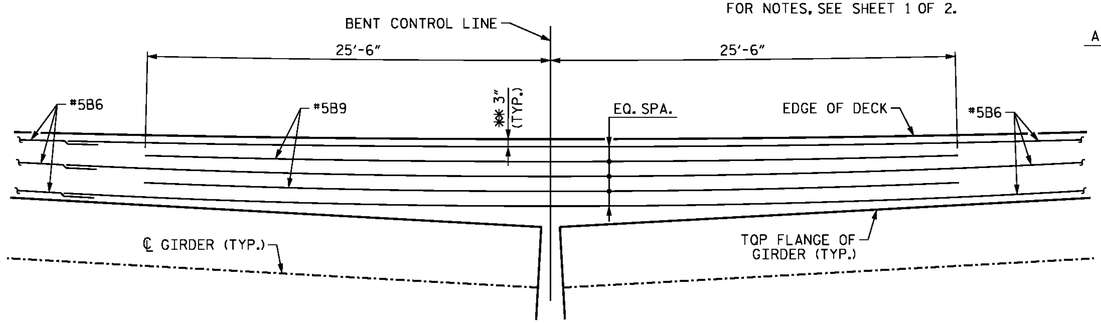
SPAN P, S, OR V

PART PLAN OF SPANS - UNIT 5, 6 OR 7

✱ - #5 "A" BARS ARE TO BE PLACED RADIALLY AT 6½" CTS. MEASURED ALONG RIGHT OUTSIDE EDGE OF SUPERSTRUCTURE AND TAPERED TO 6¼" ALONG LEFT OUTSIDE EDGE OF SUPERSTRUCTURE.

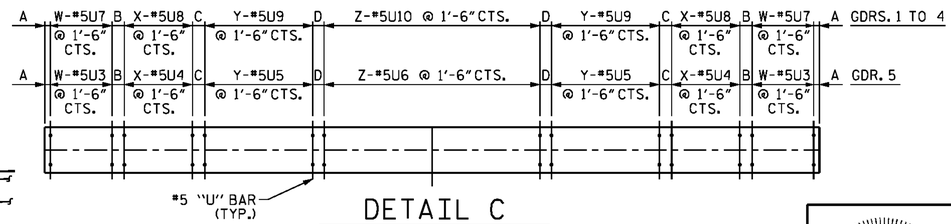
✱✱ - RADIAL DIMENSION

FOR NOTES, SEE SHEET 1 OF 2.



DETAIL B

(BOTTOM OF OVERHANG)



DETAIL C

PLAN OF GIRDER SHOWN

DIMENSION TABLE								
■ GDR.	A	B	C	D	W	X	Y	Z
1	3½"	1'-0"	1'-0"	1'-0"	10	9	11	40
2	4⅞"	1'-0"	1'-0"	1'-6"	9	9	9	47
3	3⅜"	9"	1'-0"	1'-0"	9	9	9	49
4	4½"	1'-0"	1'-3"	1'-0"	9	9	9	49
5	2¹³⁄₁₆"	1'-0"	9"	9"	9	9	9	51

■ - FOR SPANS O AND P ONLY.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

DESIGNED BY:	J. SMITH — DATE : JAN 2016
DRAWN BY:	M. HOBBS — DATE : JAN 2016
CHECKED BY:	B. LOFLIN — DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY — DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty

00F1C8644B274F7...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS UNITS 5, 6 AND 7

SPANS N THROUGH V

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-55
1			3			TOTAL SHEETS
2			4			278

5/9/2016
400_107_B4929_SMU_PS52.dgn

NOTES

FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN" SHEETS.

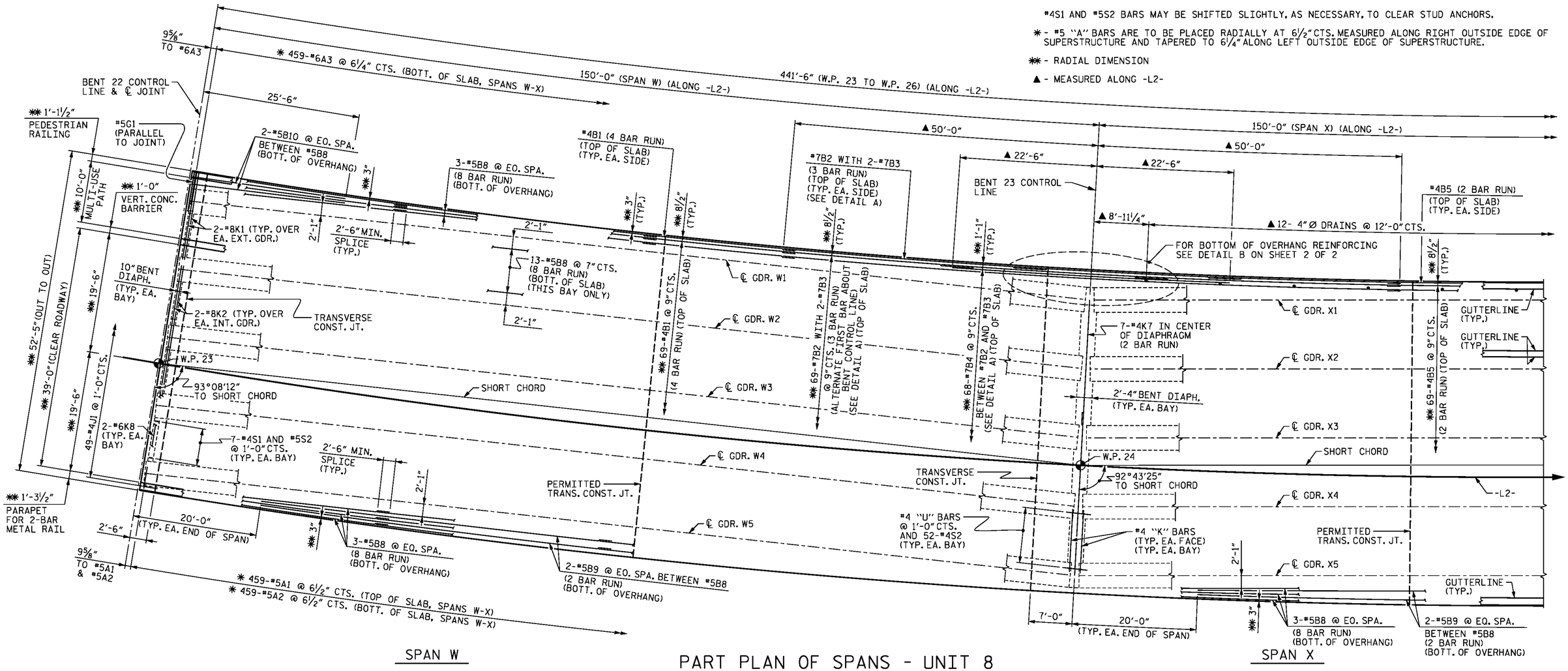
FOR POURING SEQUENCE AND TRANSVERSE CONSTRUCTION JOINT, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

*4S1 AND *5S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR STUD ANCHORS.

✱ - *5 "A" BARS ARE TO BE PLACED RADIALLY AT 6½" CTS. MEASURED ALONG RIGHT OUTSIDE EDGE OF SUPERSTRUCTURE AND TAPERED TO 6¼" ALONG LEFT OUTSIDE EDGE OF SUPERSTRUCTURE.

✱✱ - RADIAL DIMENSION

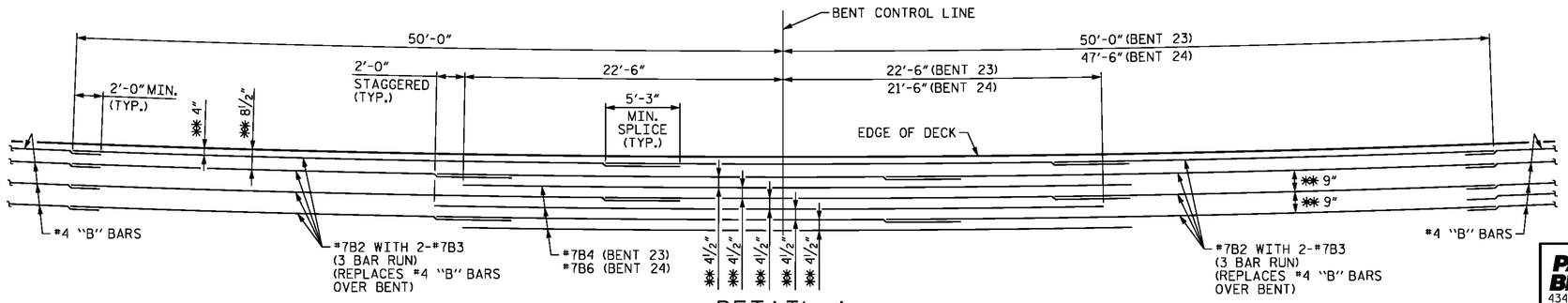
▲ - MEASURED ALONG -L2-



SPAN W

SPAN X

PART PLAN OF SPANS - UNIT 8



DETAIL A

(TOP OF SLAB BARS)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS UNIT 8

SPANS W, X, AND Y

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-56
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. SMITH	DATE : JAN 2016
DRAWN BY:	M. HOBBS	DATE : JAN 2016
CHECKED BY:	E. DAVIS	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C864482747...

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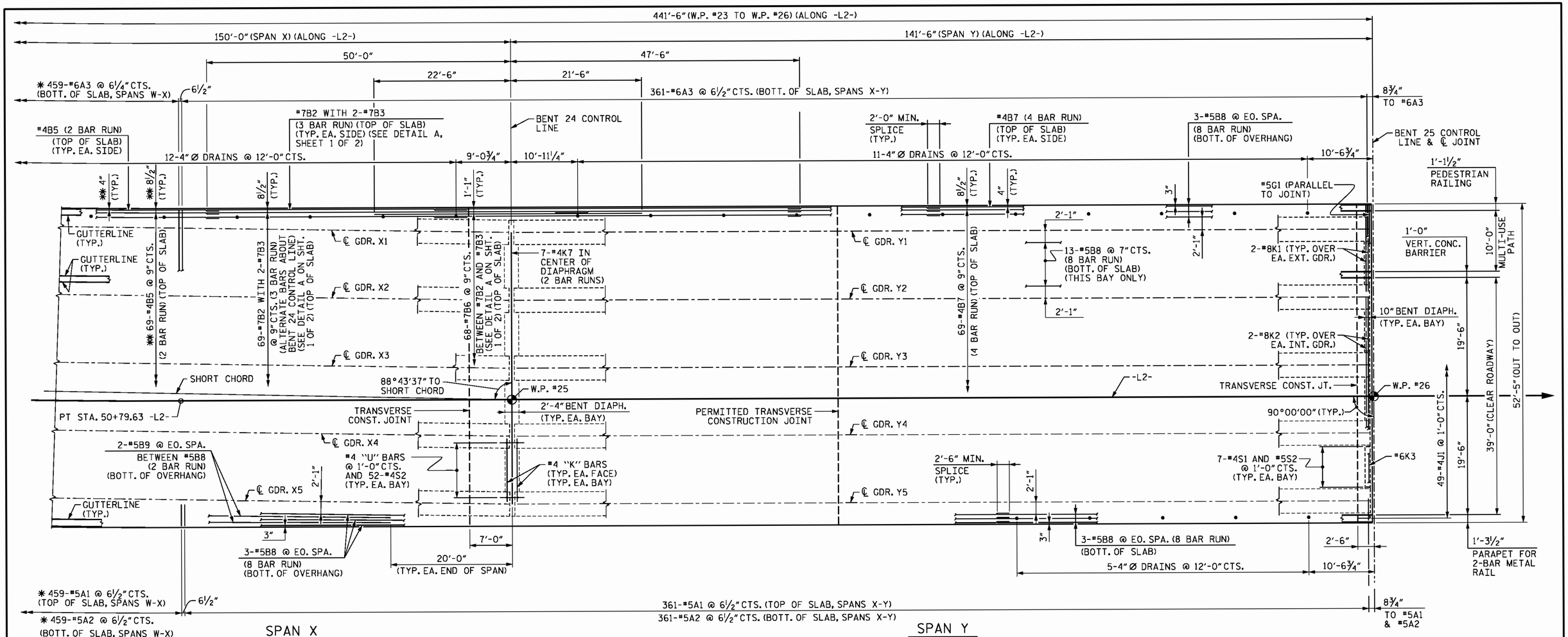
400_109_B4929_SMU_PS61.dgn

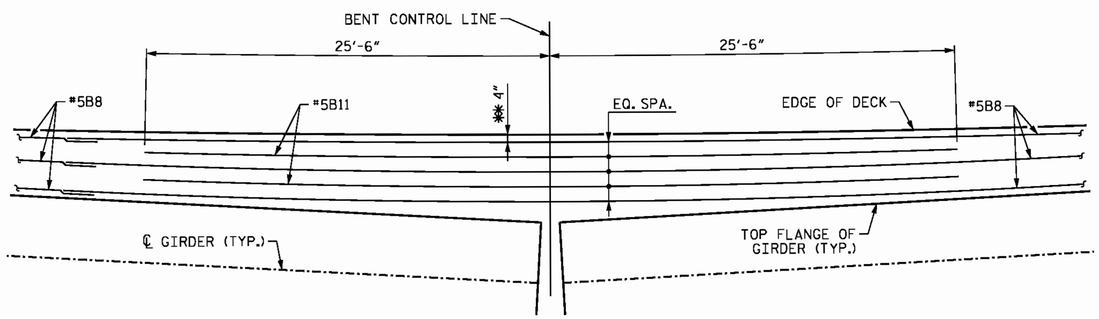


PART PLAN OF SPANS - UNIT 8

* - #5 "A" BARS ARE TO BE PLACED RADIALLY AT 6½" CTS. MEASURED ALONG LEFT OUTSIDE EDGE OF SUPERSTRUCTURE AND TAPERED TO 6¼" ALONG RIGHT OUTSIDE EDGE OF SUPERSTRUCTURE.

** - RADIAL DIMENSION

FOR NOTES, SEE SHEET 1 OF 2.



DETAIL B

(BOTTOM OF OVERHANG)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS UNIT 8

SPANS W, X, AND Y

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-57
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C8B448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. SMITH	DATE :	JAN 2016
DRAWN BY:	M. HOBBS	DATE :	JAN 2016
CHECKED BY:	E. DAVIS	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_111_B4929_SMU_PS62.dgn

NOTES

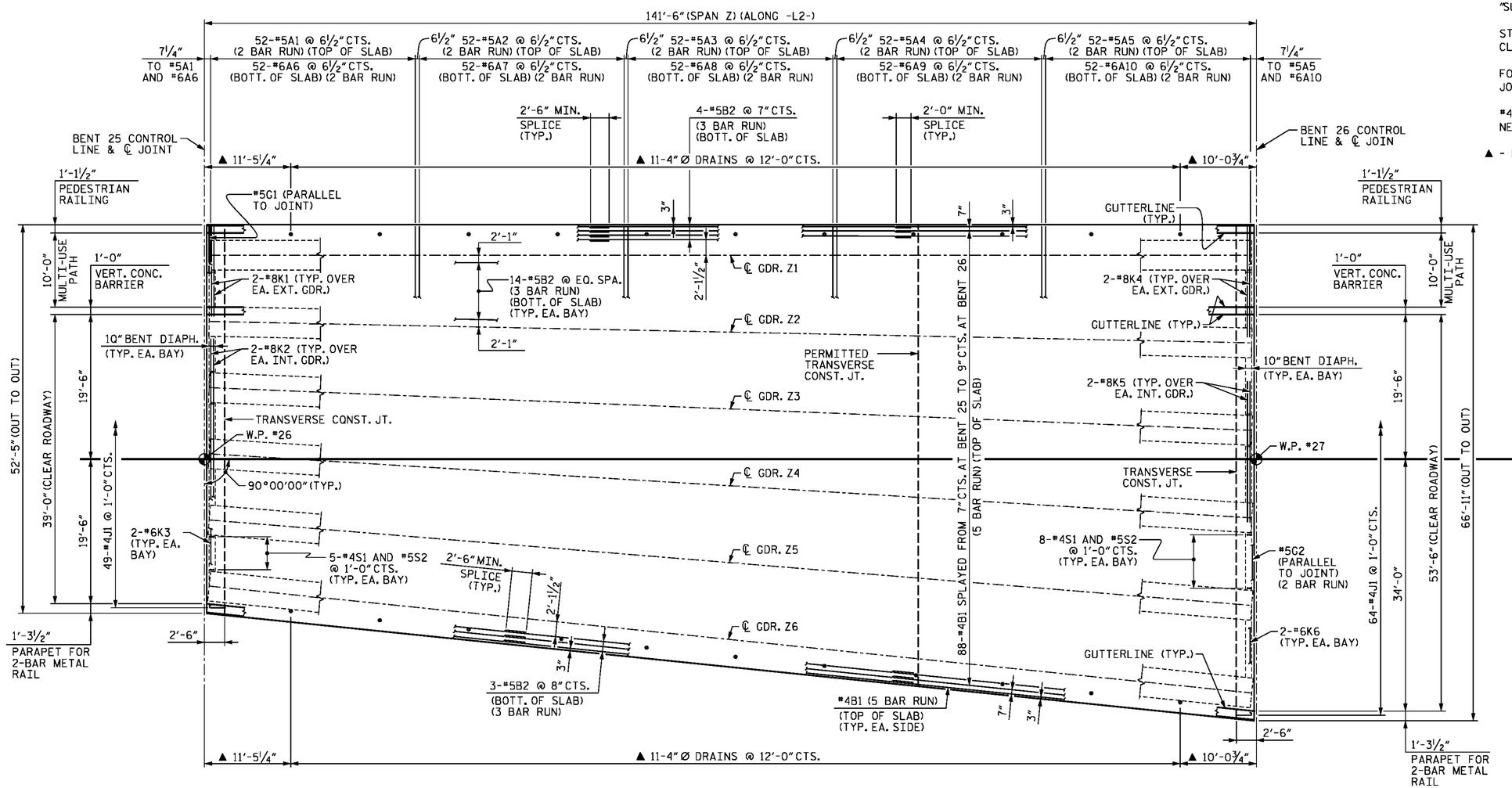
FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN" SHEETS.

FOR POURING SEQUENCE AND TRANSVERSE CONSTRUCTION JOINT, SEE "SUPERSTRUCTURE BILL OF MATERIAL" SHEET.

#4S1 AND #5S2 BARS MAT BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR STUD ANCHORS.

▲ - MEASURED ALONG -L2-



SPAN Z

PLAN OF SPAN - UNIT 9

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

DESIGNED BY:	J. SMITH	DATE :	JAN 2016		
DRAWN BY:	M. HOBBS	DATE :	JAN 2016		
CHECKED BY:	E. DAVIS	DATE :	MAR 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

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400_113_B4929_SMU_PST1.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN
UNIT 9

SPAN Z

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-58
1			3			TOTAL SHEETS
2			4			278

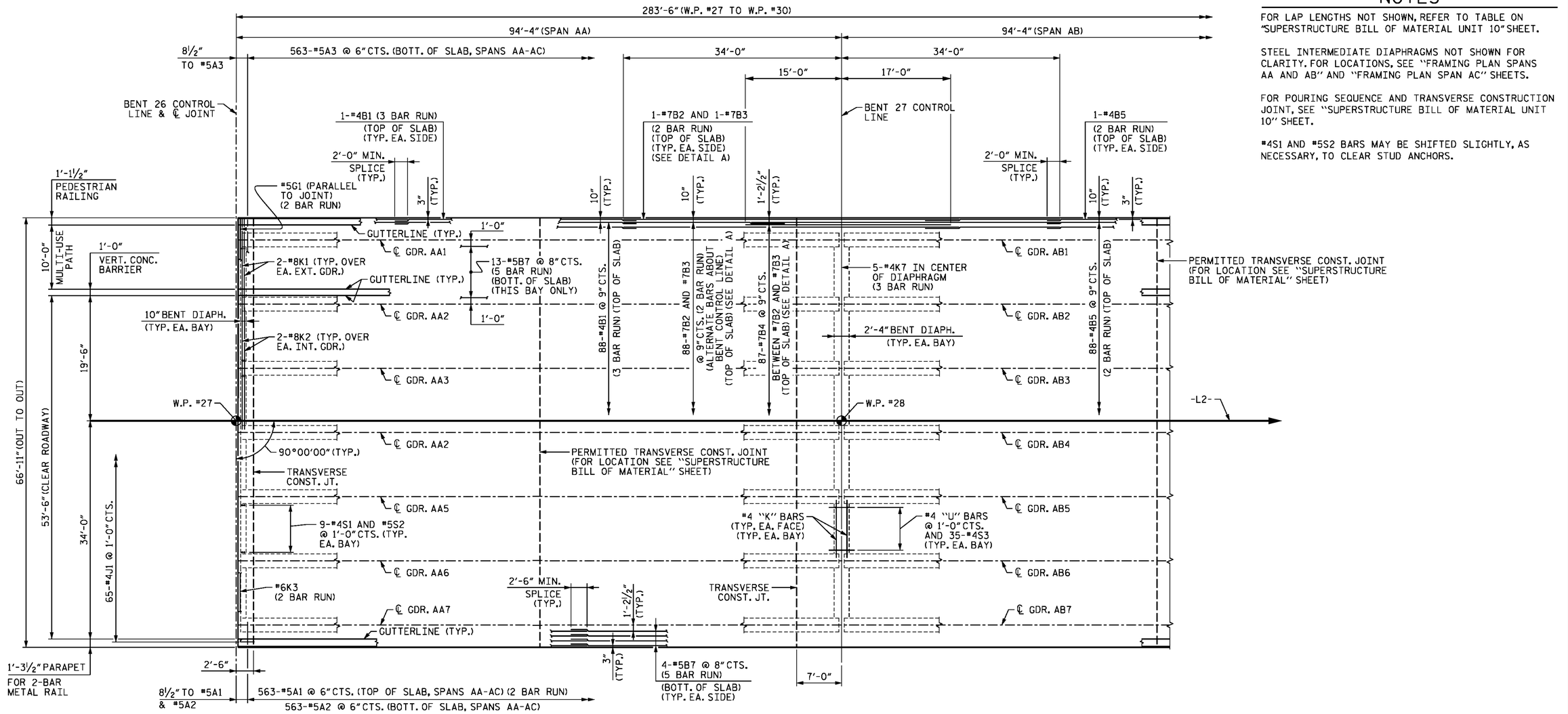
NOTES

FOR LAP LENGTHS NOT SHOWN, REFER TO TABLE ON "SUPERSTRUCTURE BILL OF MATERIAL UNIT 10" SHEET.

STEEL INTERMEDIATE DIAPHRAGMS NOT SHOWN FOR CLARITY. FOR LOCATIONS, SEE "FRAMING PLAN SPANS AA AND AB" AND "FRAMING PLAN SPAN AC" SHEETS.

FOR POURING SEQUENCE AND TRANSVERSE CONSTRUCTION JOINT, SEE "SUPERSTRUCTURE BILL OF MATERIAL UNIT 10" SHEET.

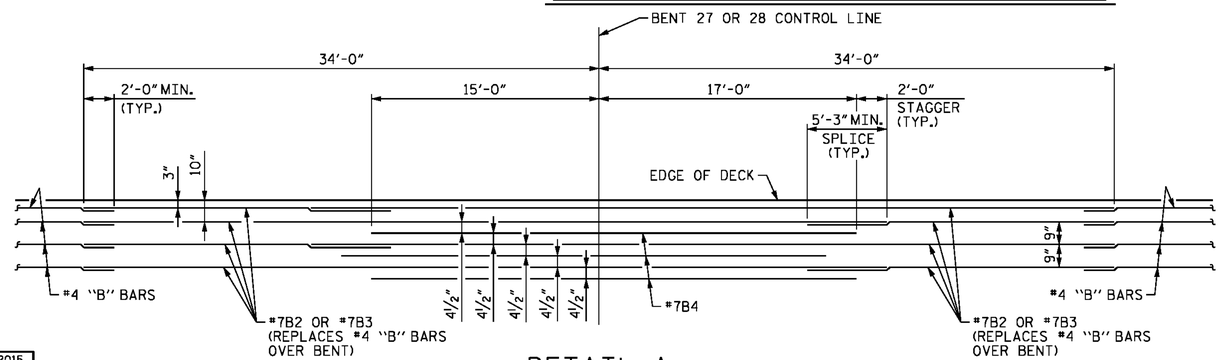
*4S1 AND *5S2 BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR STUD ANCHORS.



SPAN AA

SPAN AB

PART PLAN OF SPANS - UNIT 10



DETAIL A

(TOP OF SLAB BARS)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPANS UNIT 10

SPANS AA, AB AND AC

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-59
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

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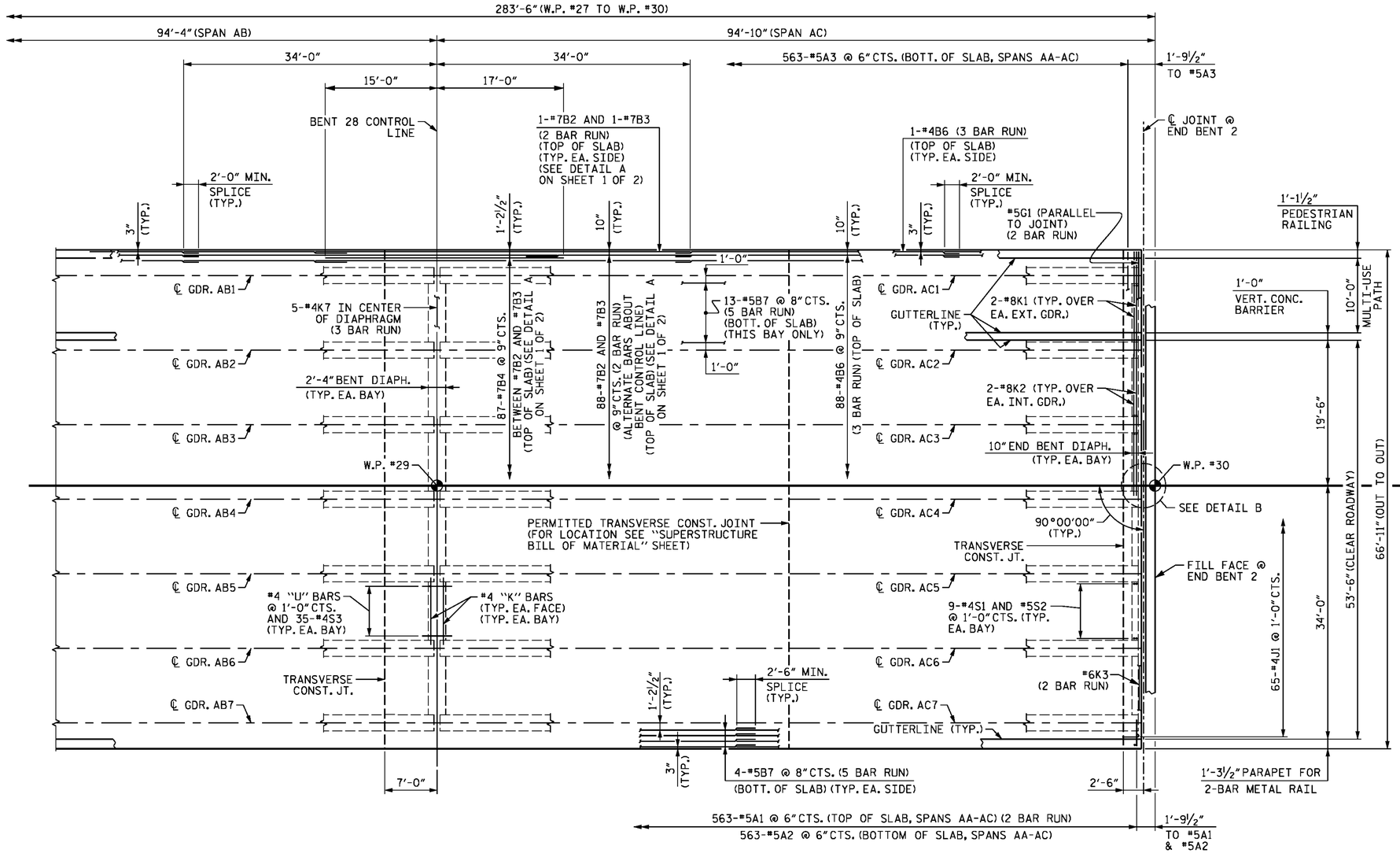
DESIGNED BY:	J. BORUTA	DATE :	NOV 2015
DRAWN BY:	M. HOBBS	DATE :	NOV 2015
CHECKED BY:	E. DAVIS	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

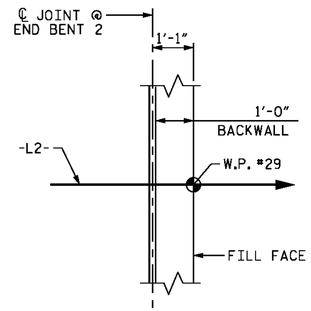
5/10/2016
400_115_B4929_SMU_PS81.dgn

NOTES

FOR NOTES, SEE SHEET 1 OF 2.



PART PLAN OF SPANS - UNIT 10



DETAIL B

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

DESIGNED BY:	J. BORUTA	DATE :	NOV 2015			
DRAWN BY:	M. HOBBS	DATE :	NOV 2015			
CHECKED BY:	E. DAVIS	DATE :	FEB 2016			
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016			

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

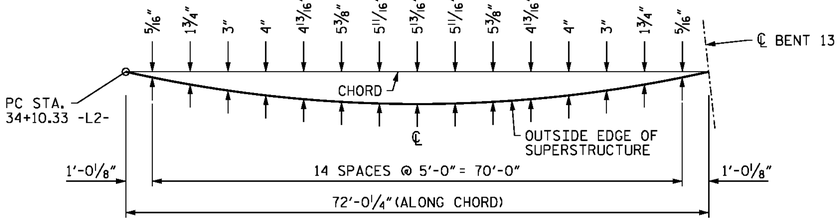
SUPERSTRUCTURE

PLAN OF SPANS
UNIT 10

SPANS AA, AB AND AC

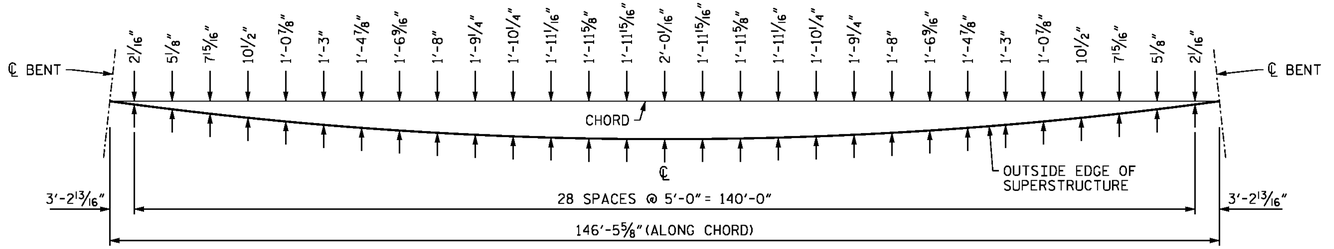
REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		S-60
1			3				TOTAL SHEETS
2			4				278

5/10/2016
400.117_B4929_SMU_PS82.dgn



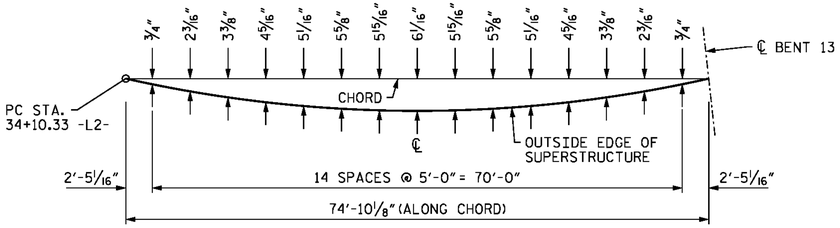
ARC OFFSETS (LEFT SIDE)

(SPAN M)



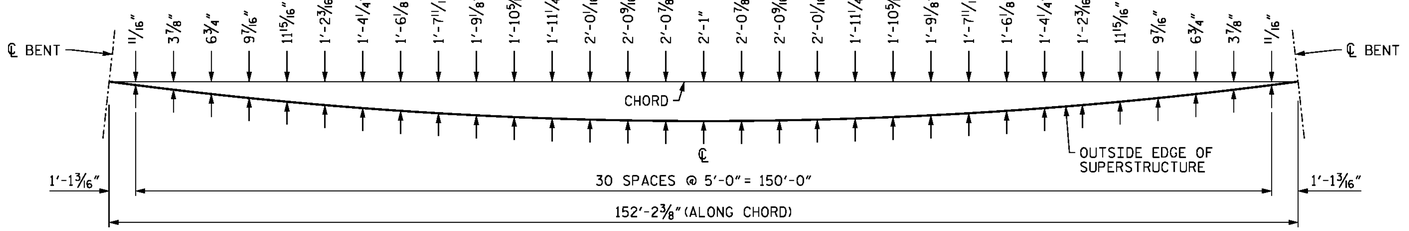
ARC OFFSETS (LEFT SIDE)

(SPANS N THROUGH W)



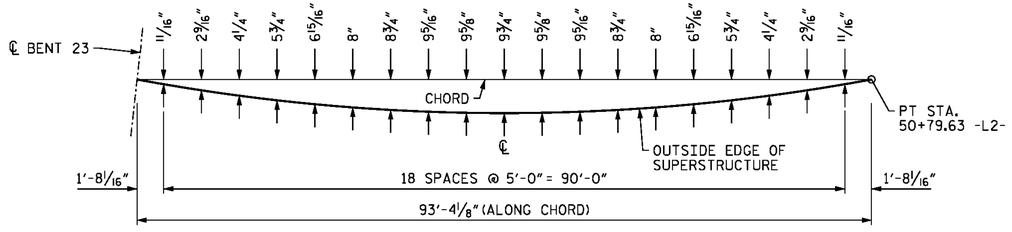
ARC OFFSETS (RIGHT SIDE)

(SPAN M)



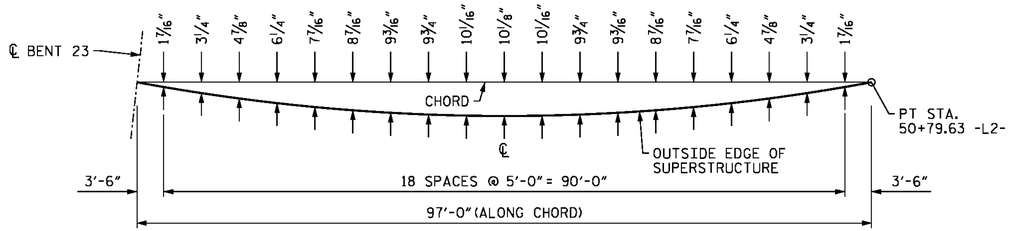
ARC OFFSETS (RIGHT SIDE)

(SPANS N THROUGH W)



ARC OFFSETS (LEFT SIDE)

(SPAN X)



ARC OFFSETS (RIGHT SIDE)

(SPAN X)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

ARC OFFSETS

DESIGNED BY:	J. SMITH	DATE :	DEC 2015		
DRAWN BY:	K. WHITE	DATE :	DEC 2015		
CHECKED BY:	B. LOFLIN	DATE :	JAN 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

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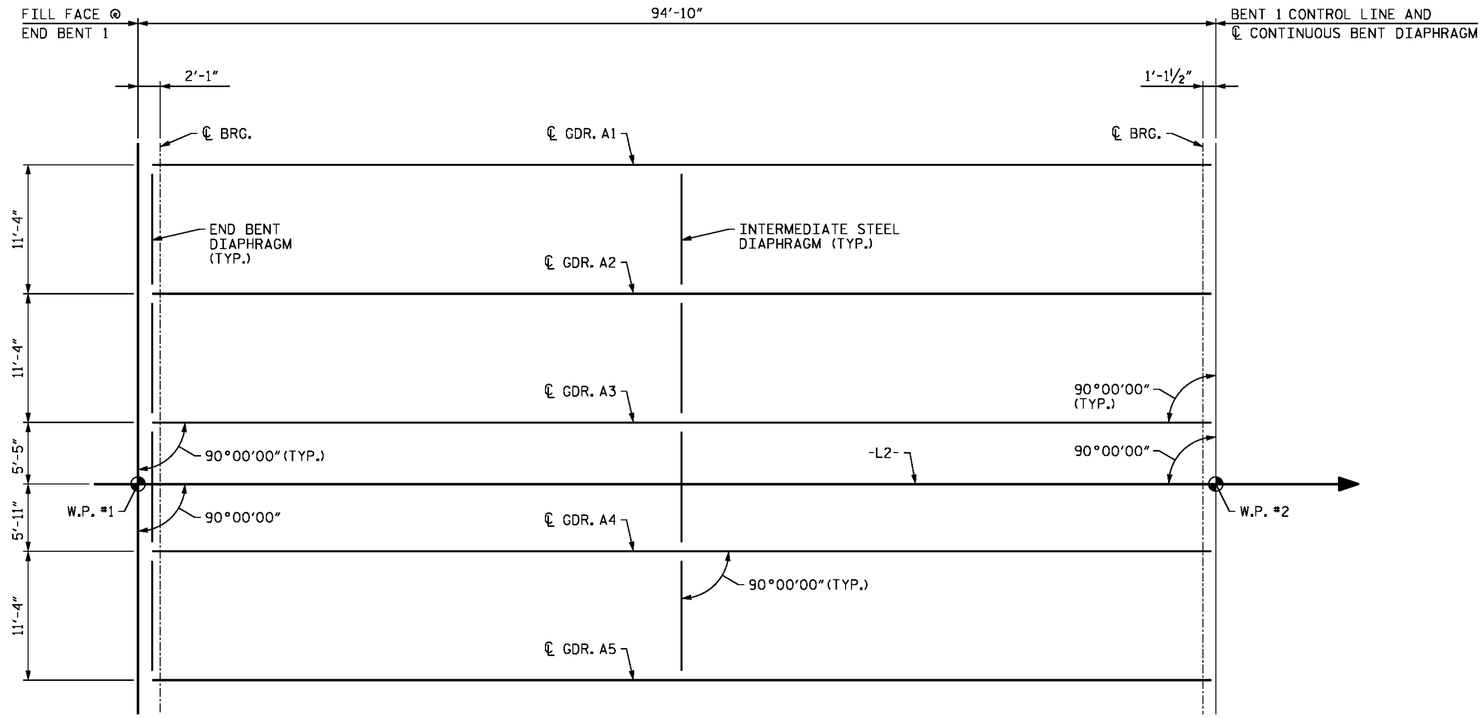
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-61
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400_119_B4929_SMU_A01.dgn

NOTES:

ALL DIMENSIONS ARE HORIZONTAL.

CONTRACTOR IS RESPONSIBLE FOR FURNISHING TEMPORARY BRACING OF GIRDERS DURING ERECTION AND PRIOR TO PLACING DIAPHRAGMS AND DECK.



FRAMING PLAN - SPAN A

FOR LOCATIONS OF INTERMEDIATE DIAPHRAGMS, SEE "AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER" SHEETS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
SPAN A

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

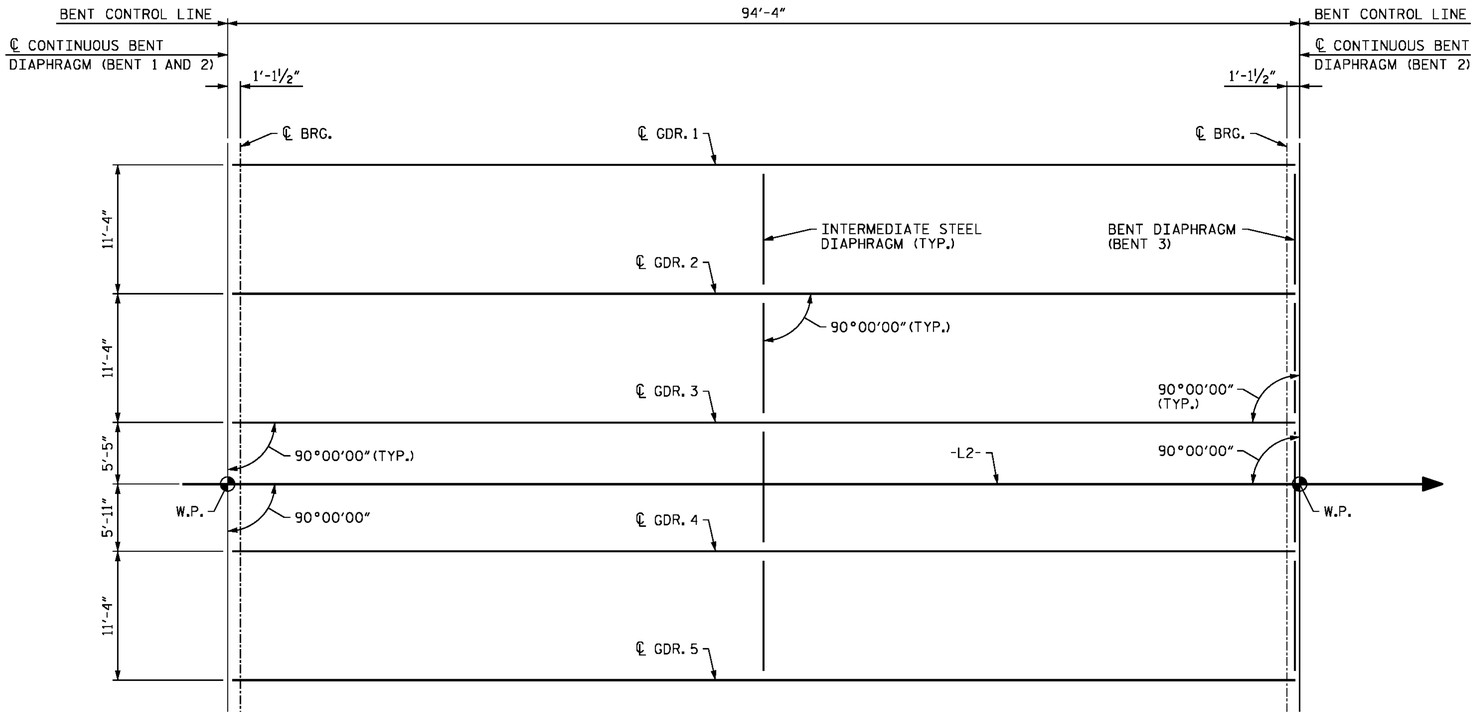
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-62
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	B. LOFLIN	DATE : OCT 2015
DRAWN BY:	K. WHITE	DATE : OCT 2015
CHECKED BY:	J. DOUGHTY	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/10/2016
400_121_B4929_SMU_FP01.dgn

NOTES:

FOR NOTES, SEE "FRAMING PLAN SPAN A" SHEET.



FIX. (E1, PB1-F) (BENT 1)
FIX. (E1, PC1-F) (BENT 2)

FIX. (E1, PB2-F) (BENT 2)
EXP. (E1, PC2-E) (BENT 3)

FRAMING PLAN - SPANS B AND C

FOR LOCATIONS OF INTERMEDIATE DIAPHRAGMS, SEE "AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER" SHEETS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
SPANS B AND C

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16

DocuSigned by:
Jason R Doughty
00F1C86448274F7...

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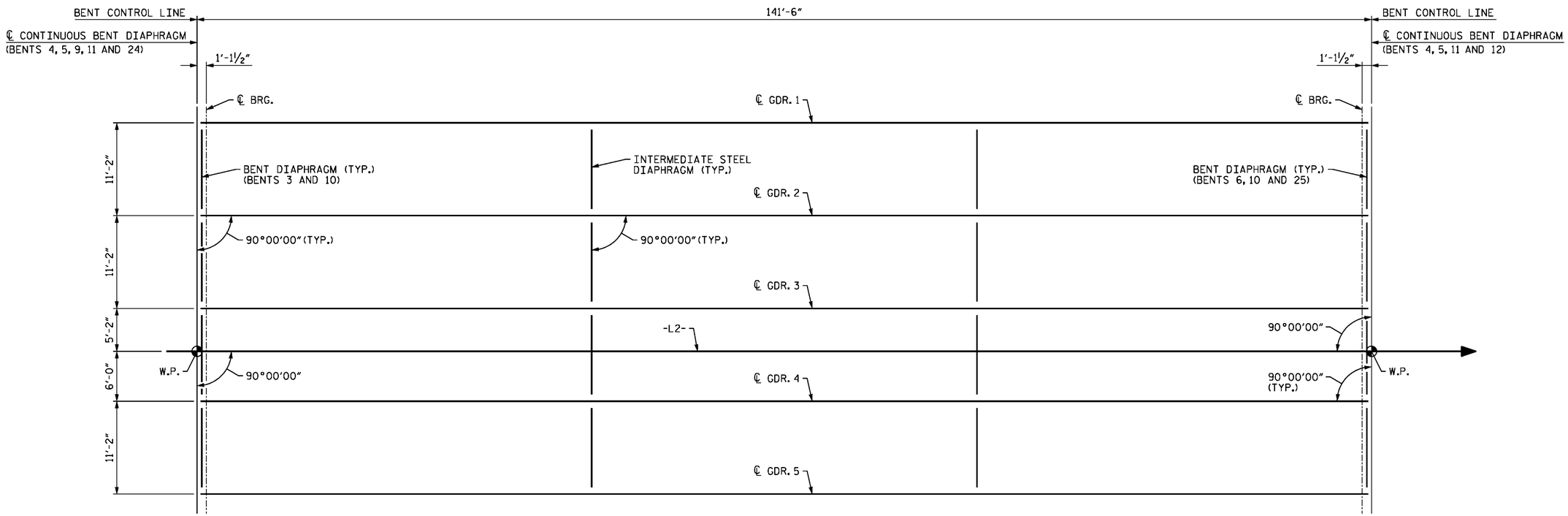
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-63
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	B. LOFLIN	DATE : OCT 2015
DRAWN BY:	K. WHITE	DATE : OCT 2015
CHECKED BY:	J. DOUGHTY	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/10/2016
400.123_B4929_SMU_FP02.dgn

NOTES:

FOR NOTES, SEE "FRAMING PLAN SPAN A" SHEET.



EXP. (E2, PD1-E) (BENT 3)
FIX. (E3, PE1-F) (BENT 4)
FIX. (E3, PF1-F) (BENT 5)
FIX. (E3, PJ1-F) (BENT 9)
EXP. (E2, PK1-E) (BENT 10)
FIX. (E3, PL1-F @ GDRS. L1, L2, L4 AND L5, PL3-F @ GDR. L3) (BENT 11)
FIX. (E3, PY1-F) (BENT 24)

FIX. (E3, PD2-F) (BENT 4)
FIX. (E3, PE2-F) (BENT 5)
EXP. (E2, PF2-E) (BENT 6)
EXP. (E2, PJ2-E) (BENT 10)
FIX. (E3, PK2-F @ GDRS. K1, K2, K4 AND K5, PK3-F @ GDR. K3) (BENT 11)
FIX. (E3, PL2-F) (BENT 12)
EXP. (E2, PY2-E) (BENT 25)

FRAMING PLAN - SPANS D, E, F, J, K, L AND Y

FOR LOCATIONS OF INTERMEDIATE DIAPHRAGMS IN SPANS D, E, F, J, K AND L,
SEE "F.I.B. 72" PRESTRESSED CONCRETE GIRDER" SHEETS.

FOR LOCATIONS OF INTERMEDIATE DIAPHRAGMS IN SPAN Y,
SEE "F.I.B. 78" PRESTRESSED CONCRETE GIRDER" SHEETS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
SPANS D, E, F,
J, K, L AND Y

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-64
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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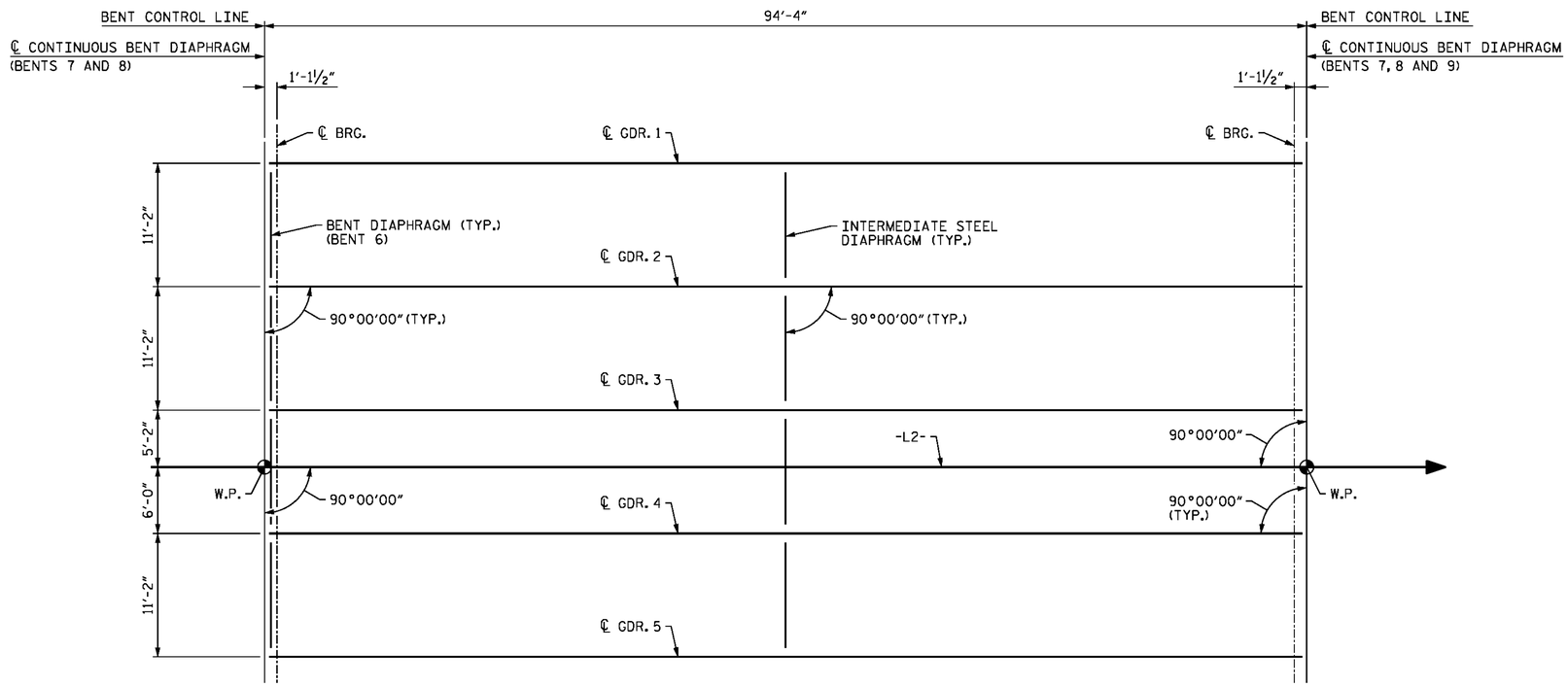
UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	B. LOFLIN	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400.125_B4929_SWU_FP03.dgn

NOTES:

FOR NOTES, SEE "FRAMING PLAN SPAN A" SHEET.



FRAMING PLAN - SPANS G, H AND I

FOR LOCATIONS OF INTERMEDIATE DIAPHRAGMS,
SEE "F.I.B. 72" PRESTRESSED CONCRETE GIRDER" SHEETS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

FRAMING PLAN
SPANS G, H AND I

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by:
Jason R Doughty
00F1C86448274F7...

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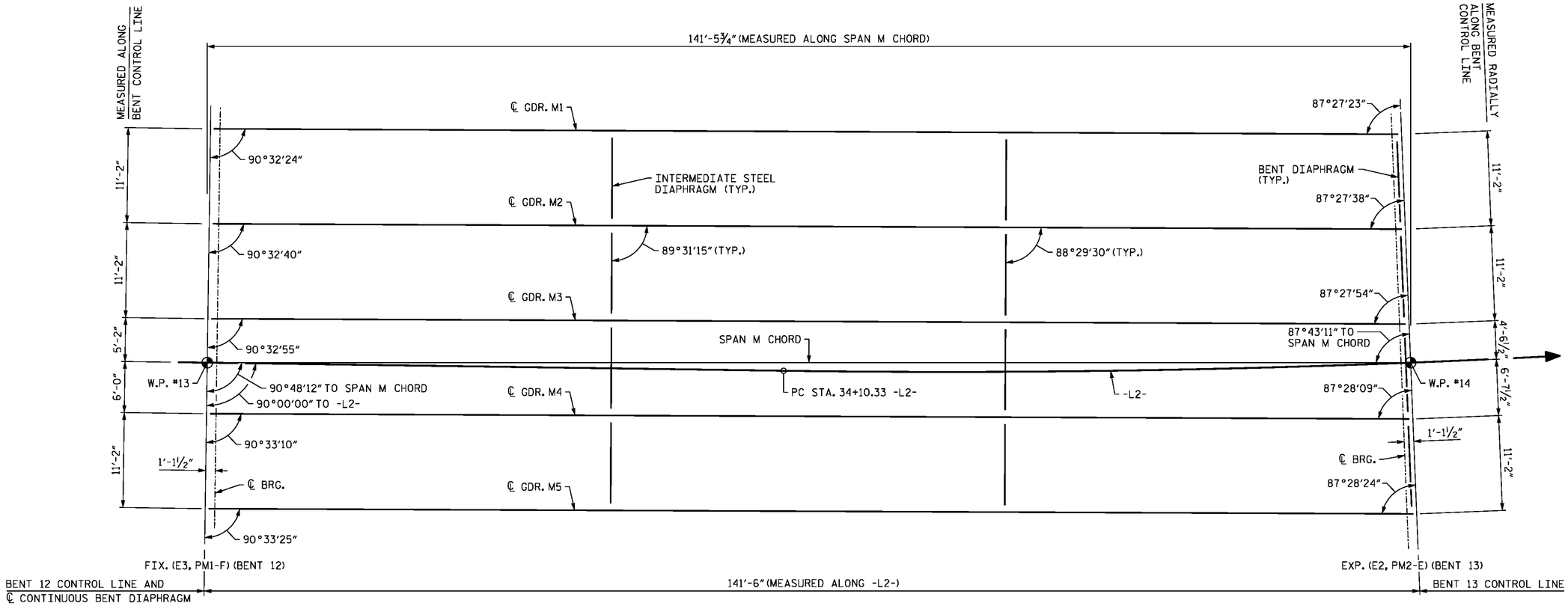
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-65
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	B. LOFLIN	DATE: OCT 2015
DRAWN BY:	K. WHITE	DATE: OCT 2015
CHECKED BY:	J. DOUGHTY	DATE: FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE: MAY 2016

5/10/2016
400_127_B4929_SMU_FP04.dgn

NOTES:

FOR NOTES, SEE "FRAMING PLAN SPAN A" SHEET.



FRAMING PLAN - SPAN M

FOR LOCATIONS OF INTERMEDIATE DIAPHRAGMS, SEE "F.I.B. 72" PRESTRESSED CONCRETE GIRDER" SHEETS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
SPAN M

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

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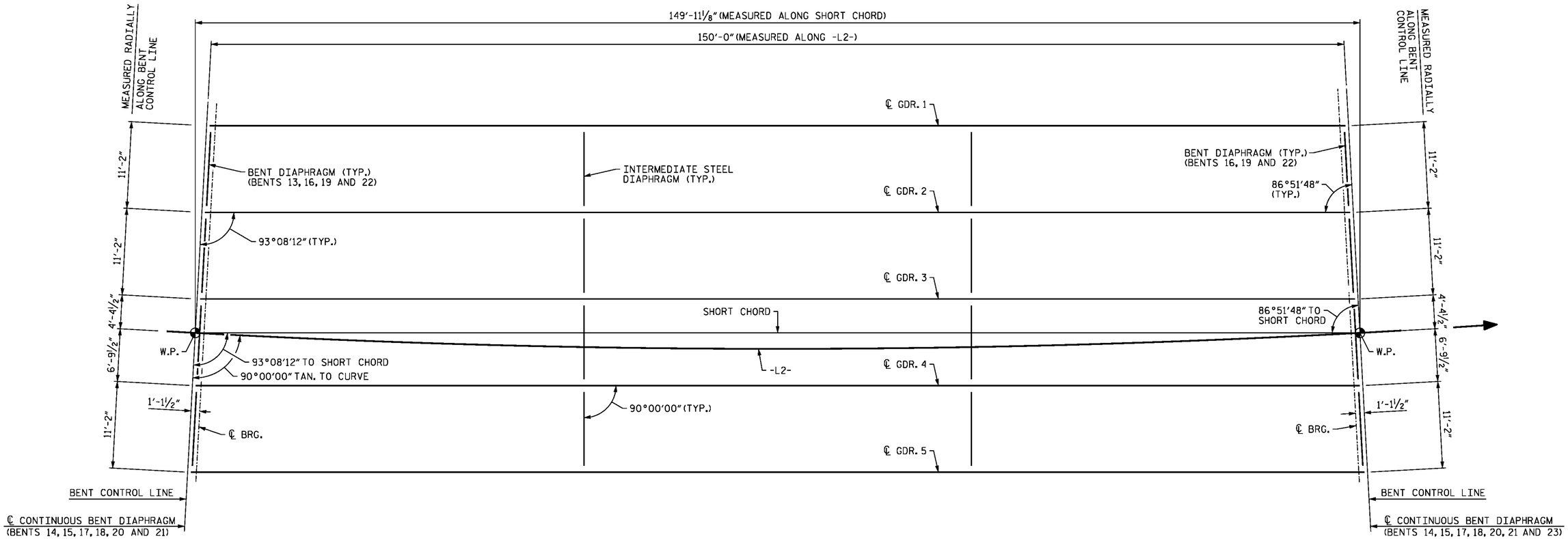
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-66
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	B. LOFLIN	DATE : OCT 2015
DRAWN BY:	K. WHITE	DATE : OCT 2015
CHECKED BY:	J. DOUGHTY	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/10/2016
400_129_B4929_SMU_FP05.dgn

NOTES:

FOR NOTES, SEE "FRAMING PLAN SPAN A" SHEET.



EXP. (E2, PN1-E) (BENT 13)
FIX. (E3, PO1-F) (BENT 14)
FIX. (E3, PP1-F) (BENT 15)
EXP. (E2, PQ1-E) (BENT 16)
FIX. (E3, PR1-F) (BENT 17)
FIX. (E3, PS1-F) (BENT 18)
EXP. (E2, PT1-E) (BENT 19)
FIX. (E3, PU1-F) (BENT 20)
FIX. (E3, PV1-F) (BENT 21)
EXP. (E2, PW1-E (BENT 22)

FRAMING PLAN - SPANS N THROUGH W

GIRDERS ARE PARALLEL TO SHORT CHORD.

FOR LOCATIONS OF INTERMEDIATE DIAPHRAGMS, SEE "F.I.B. 78" PRESTRESSED CONCRETE GIRDER" SHEETS.

FIX. (E3, PN2-F) (BENT 14)
FIX. (E3, PO2-F) (BENT 15)
EXP. (E2, PP2-E) (BENT 16)
FIX. (E3, PQ2-F) (BENT 17)
FIX. (E3, PR2-F) (BENT 18)
EXP. (E2, PS2-E) (BENT 19)
FIX. (E3, PT2-F) (BENT 20)
FIX. (E3, PU2-F) (BENT 21)
EXP. (E2, PV2-E) (BENT 22)
FIX. (E3, PW2-F (BENT 23)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 6 OF 10

DESIGNED BY:	B. LOFLIN	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
SPANS N THROUGH W

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

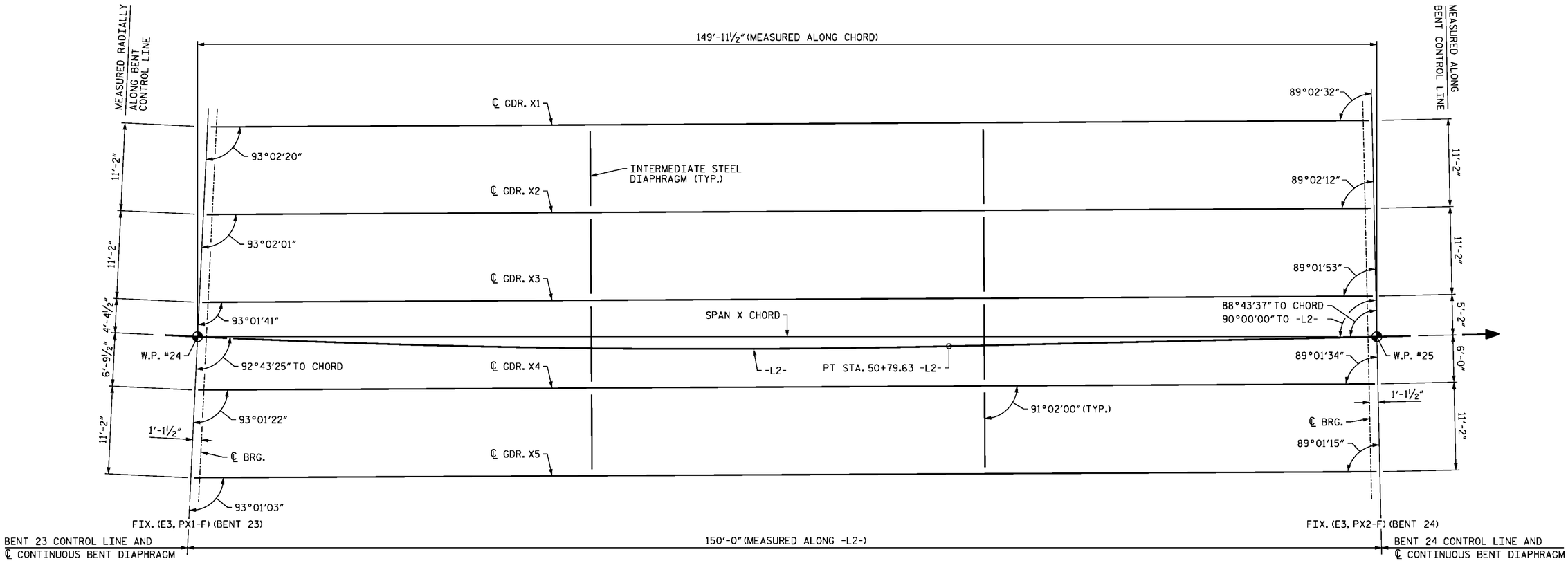
SHEET NO. S-67

TOTAL SHEETS 278

5/10/2016
400_131_B4929_SMU_FP06.dgn

NOTES:

FOR NOTES, SEE "FRAMING PLAN SPAN A" SHEET.



FRAMING PLAN - SPAN X

FOR LOCATIONS OF INTERMEDIATE DIAPHRAGMS, SEE "F.I.B. 78" PRESTRESSED CONCRETE GIRDER" SHEETS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 7 OF 10

DESIGNED BY:	B. LOFLIN	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

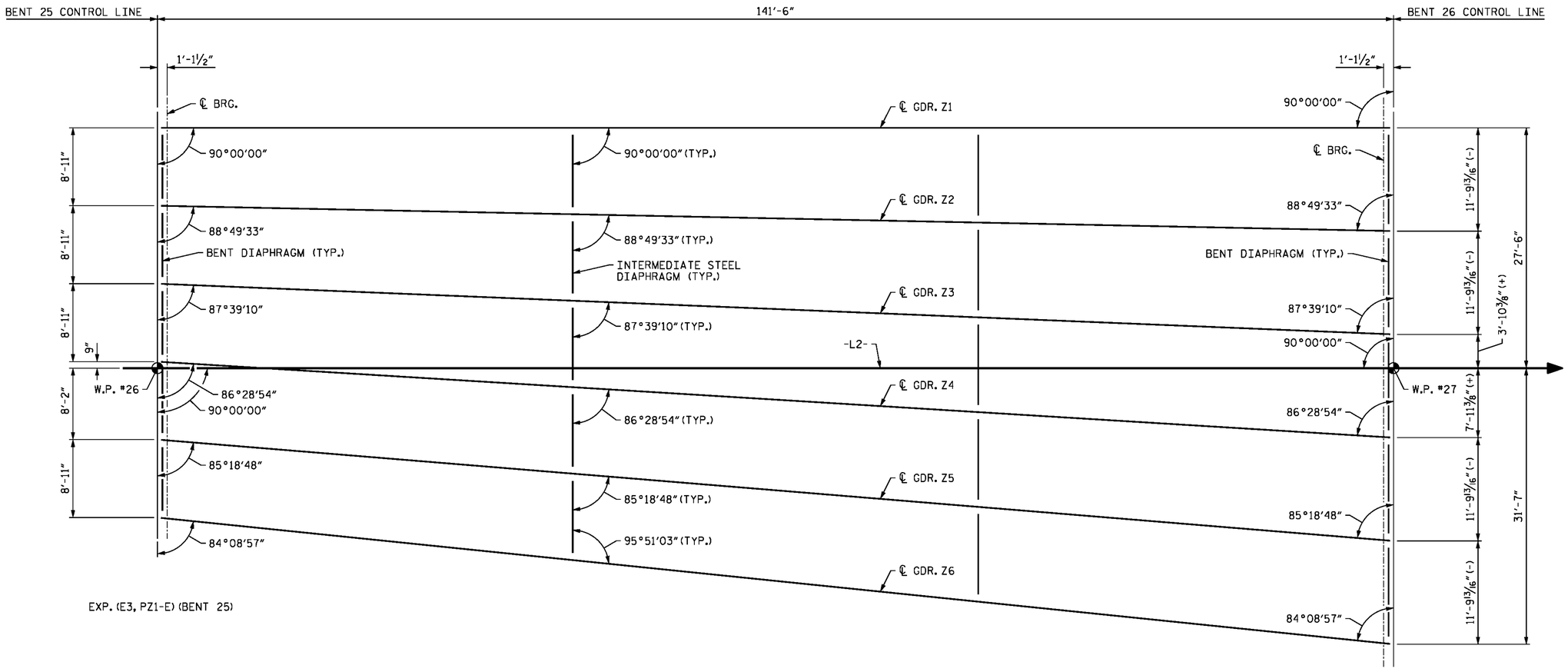
FRAMING PLAN SPAN X

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-68
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400.133_B4929_SWU_FP07.dgn

NOTES:

FOR NOTES, SEE "FRAMING PLAN SPAN A" SHEET.



EXP. (E3, PZ1-E) (BENT 25)

FIX. (E3, PZ2-F) (BENT 26)

FRAMING PLAN - SPAN Z

FOR LOCATIONS OF INTERMEDIATE DIAPHRAGMS, SEE "F.I.B. 72" PRESTRESSED CONCRETE GIRDER" SHEETS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 8 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
SPAN Z

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
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PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

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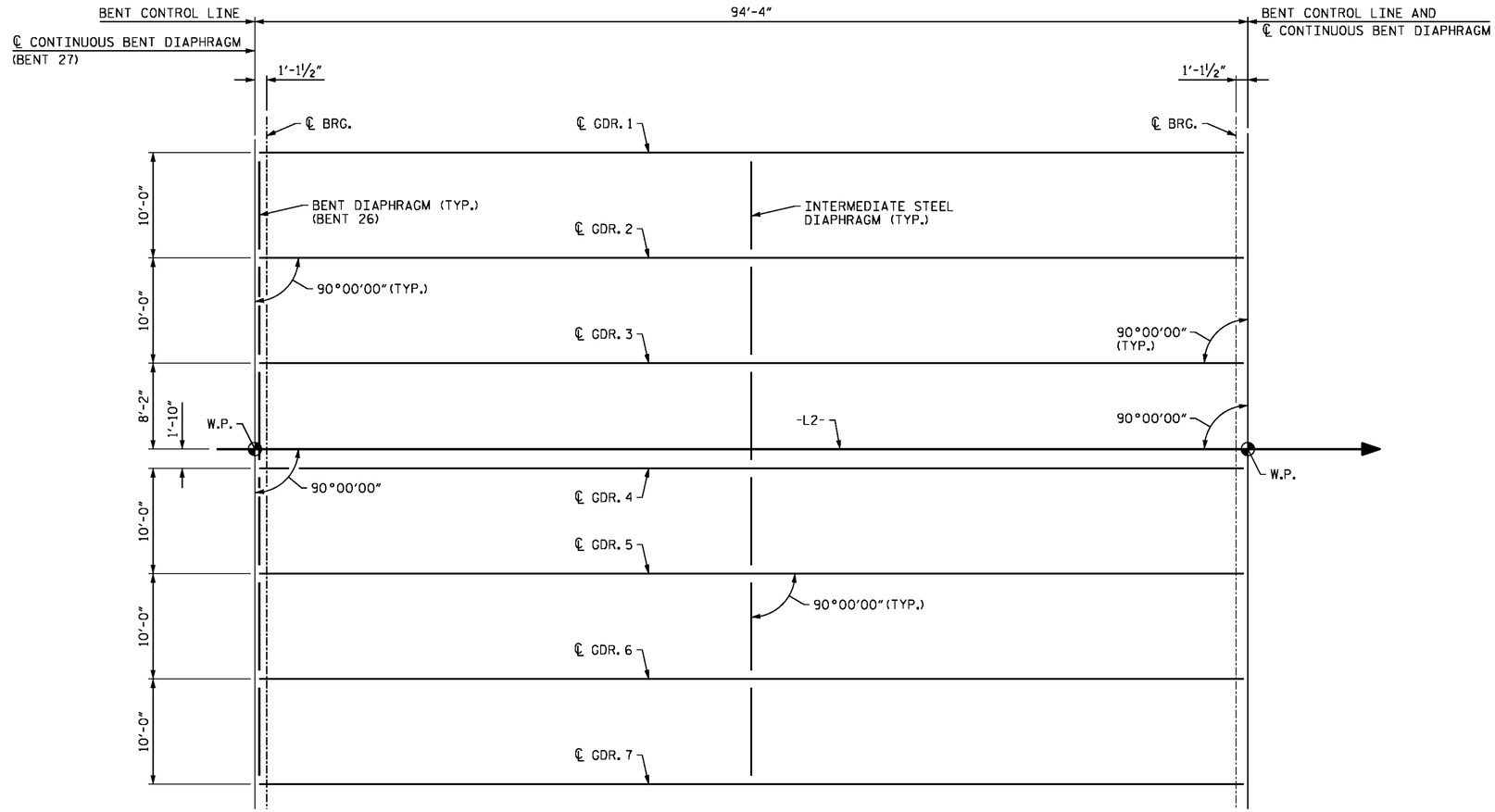
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-69
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	B. LOFLIN	DATE : OCT 2015
DRAWN BY:	K. WHITE	DATE : OCT 2015
CHECKED BY:	J. DOUGHTY	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/10/2016
400135_B4929_SMU_FP08.dgn

NOTES:

FOR NOTES, SEE "FRAMING PLAN SPAN A" SHEET.



EXP. (E1, PAA1-E) (BENT 26)
FIX. (E1, PAB1-F) (BENT 27)

FIX. (E1, PAA2-F) (BENT 27)
FIX. (E1, PAB2-F) (BENT 28)

FRAMING PLAN - SPANS AA AND AB

FOR LOCATIONS OF INTERMEDIATE DIAPHRAGMS, SEE "AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER" SHEETS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 9 OF 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
SPANS AA AND AB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-70
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

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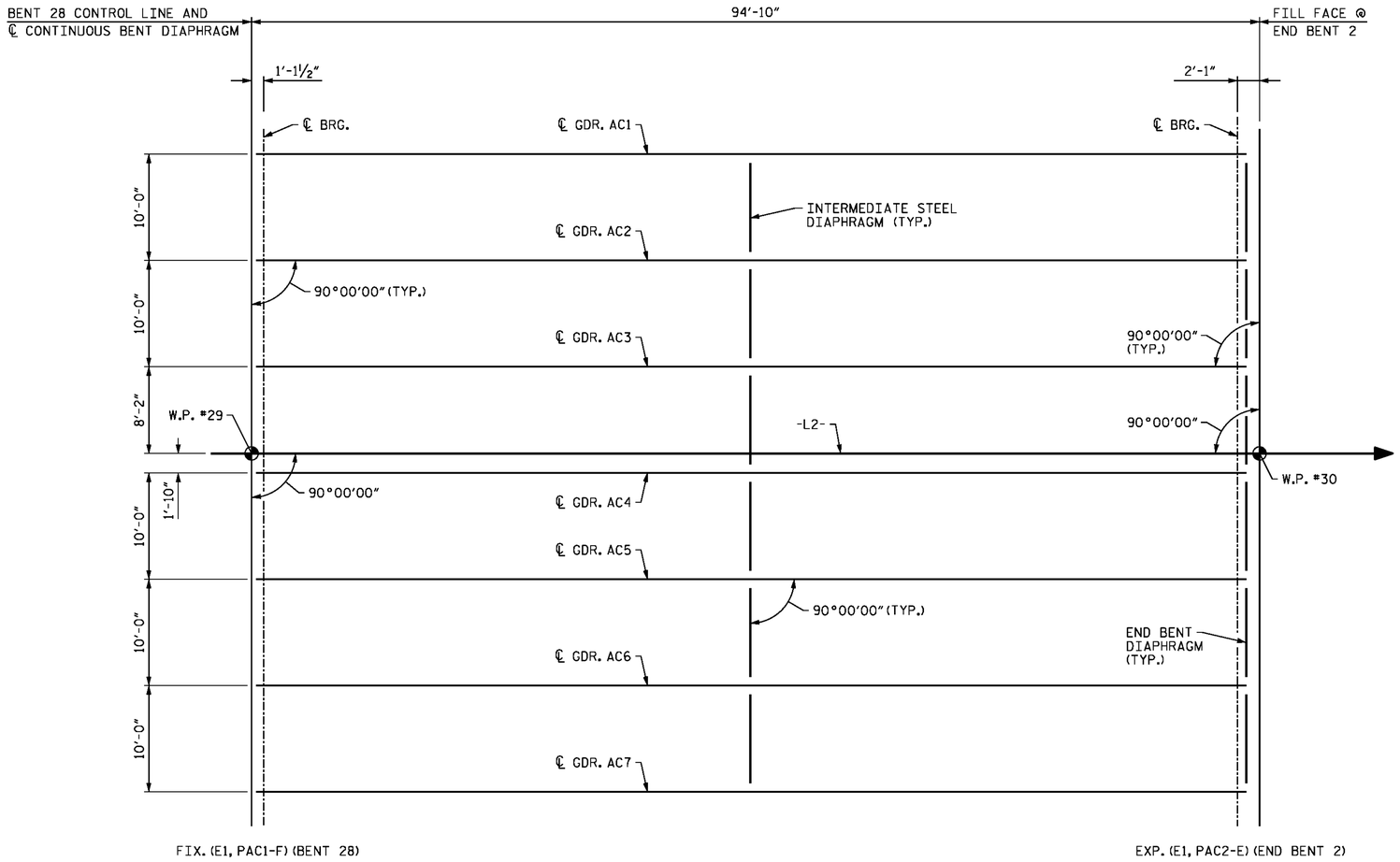
DESIGNED BY:	B. LOFLIN	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_137_B4929_SMU_FP09.dgn

NOTES:

FOR NOTES, SEE "FRAMING PLAN SPAN A" SHEET.



FRAMING PLAN - SPAN AC

FOR LOCATIONS OF INTERMEDIATE DIAPHRAGMS, SEE
"AASHTO TYPE IV PRESTRESSED CONCRETE GIRDER" SHEETS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 10 OF 10

DESIGNED BY:	B. LOFLIN	DATE :	OCT 2015		
DRAWN BY:	K. WHITE	DATE :	OCT 2015		
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by:
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00F1C864482274F7...

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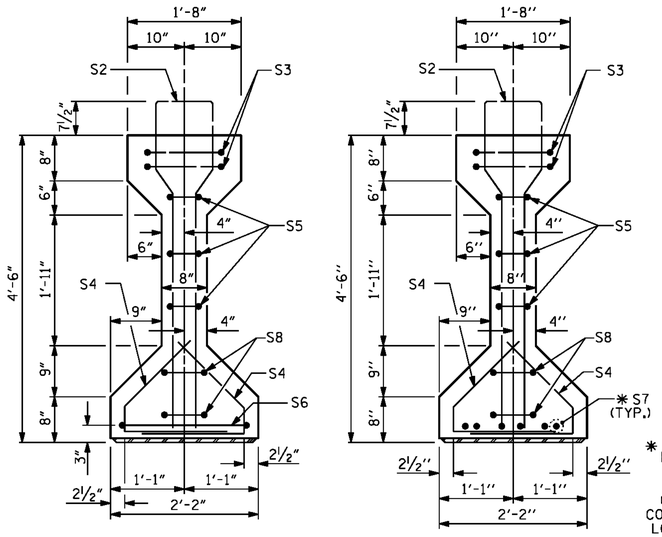
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN
SPAN AC

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-71
1			3			TOTAL SHEETS
2			4			278

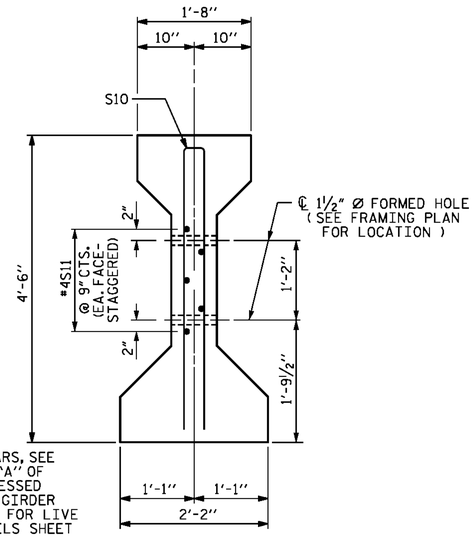
5/10/2016
400_139_B4929_SWU_FP10.dgn



SECTION A-A

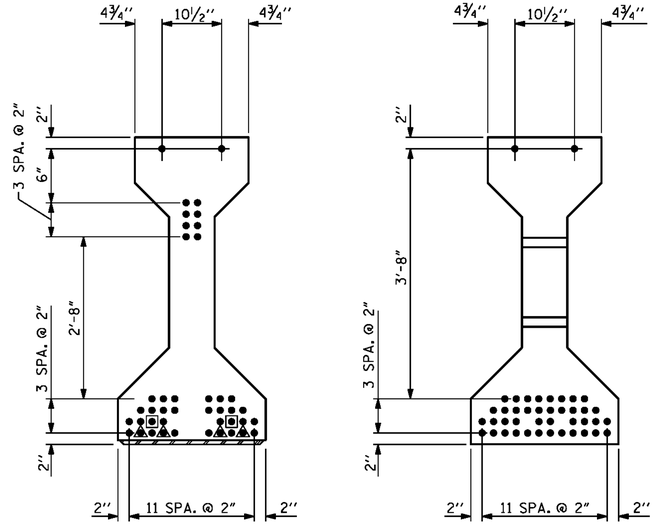
SECTION B-B

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



SECTION C-C

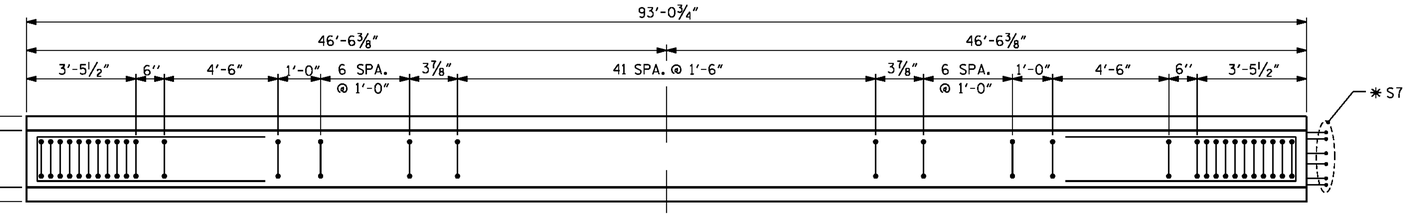
(S12 BARS NOT SHOWN)



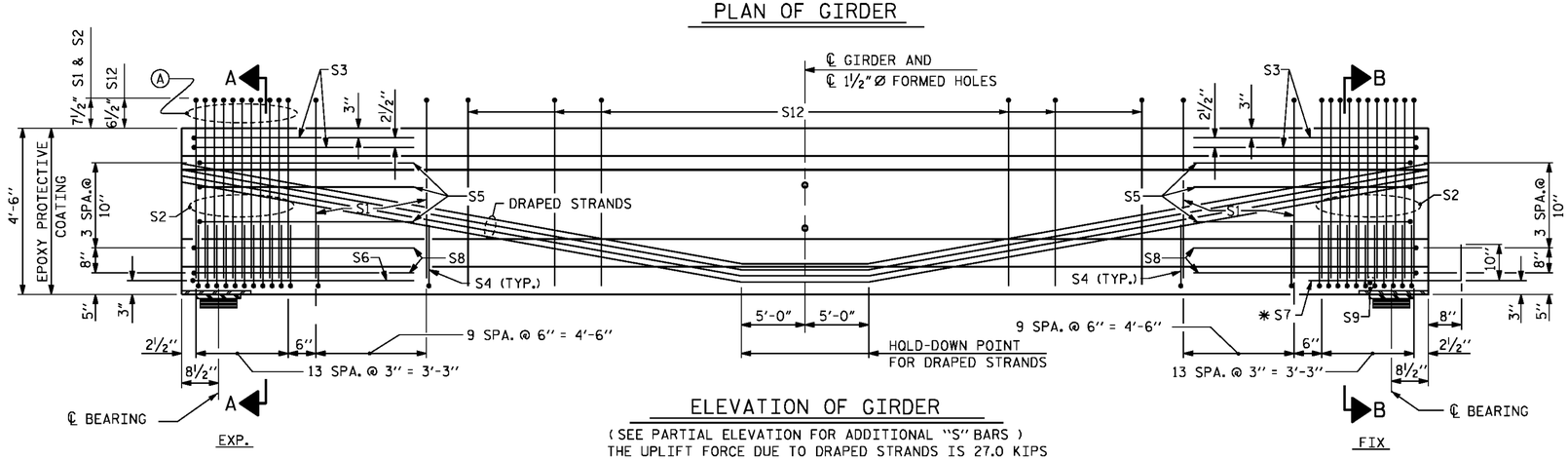
AT END OF GIRDER AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(42 STRANDS REQUIRED)



PLAN OF GIRDER



ELEVATION OF GIRDER

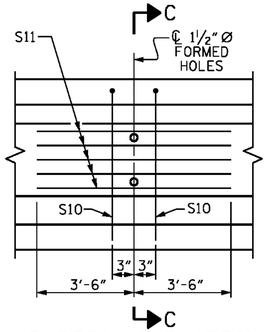
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
THE UPLIFT FORCE DUE TO DRAPED STRANDS IS 27.0 KIPS

SEE END BEVEL DETAIL ON PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET.

Ⓐ WHEN END BEVEL IS REQUIRED, ROTATE END S2 BAR SUCH THAT THEY ARE PLACED PARALLEL TO THE END BEVEL WHILE MAINTAINING 2" OF CONCRETE COVER. TAPER SPACING OF ADJACENT S2 BARS SUCH THAT THE CLEAR DISTANCE BETWEEN THE BARS EXCEEDS 1½".

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ▣ STRANDS DEBONDED FOR 2'-0" FROM END OF GIRDER
- ◬ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. A1 TO A5

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

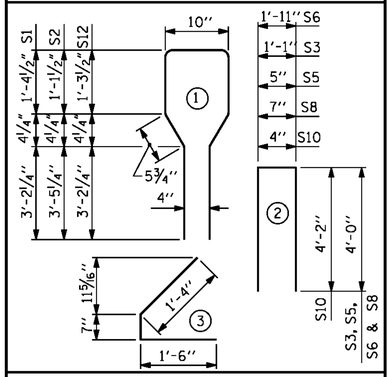
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	20	#4	1	10'-11"	146
S2	28	#6	1	10'-11"	459
S3	4	#4	2	9'-1"	24
S4	96	#4	3	3'-5"	219
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
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S12	56	#4	1	10'-9"	402

✱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	9500 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	No.
	1379	18.89	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	93.06'	465.31'

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-72
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. BORUTA	DATE : OCT 2015
DRAWN BY:	M. HOBBS	DATE : OCT 2015
CHECKED BY:	M. WAGNER	DATE : JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

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

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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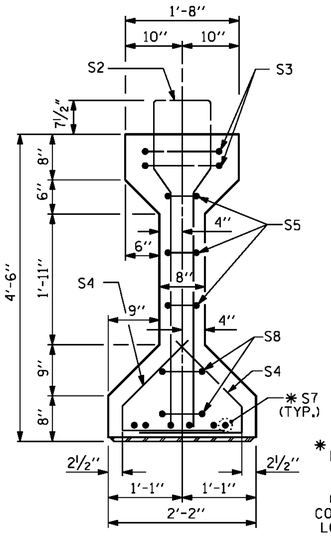
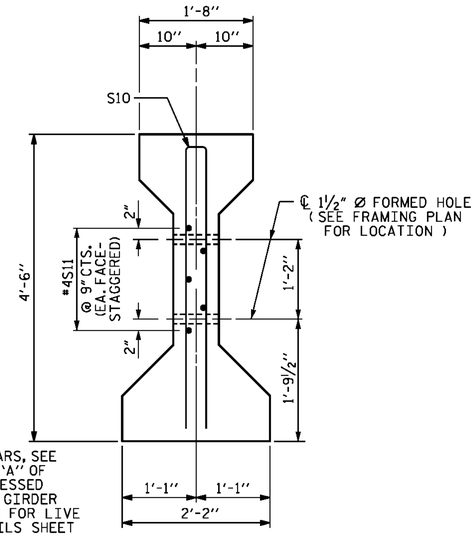
STD. NO. PCG6

5/11/2016
400_141_B4929_SMU_G1.dgn



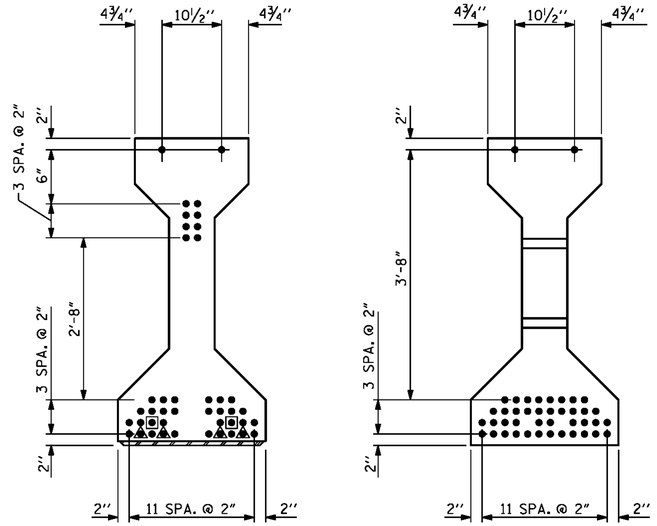
SECTION B-B

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



SECTION C-C

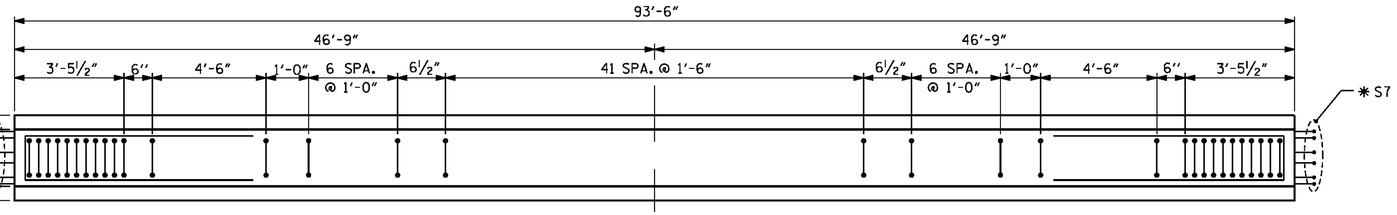
(S1 BARS NOT SHOWN)



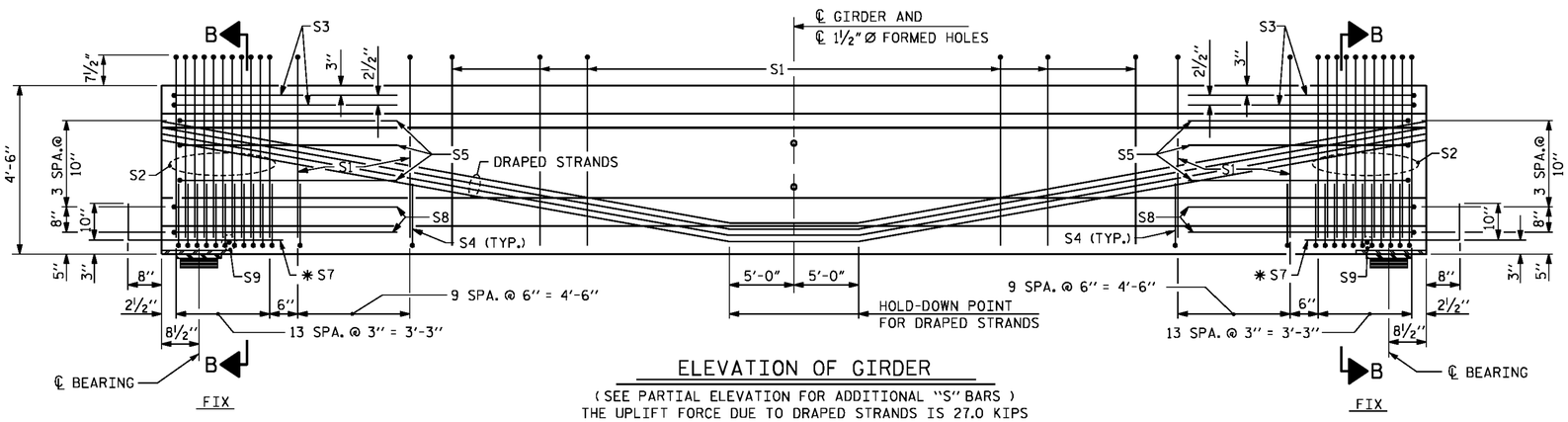
AT END OF GIRDER — AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(42 STRANDS REQUIRED)



PLAN OF GIRDER

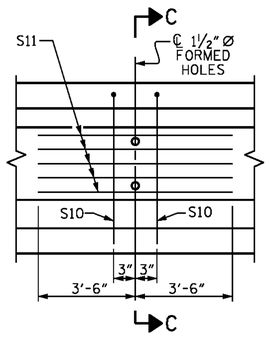


ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
THE UPLIFT FORCE DUE TO DRAPED STRANDS IS 27.0 KIPS

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ▣ STRANDS DEBONDED FOR 2'-0" FROM END OF GIRDER
- ◬ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. B1 TO B5

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

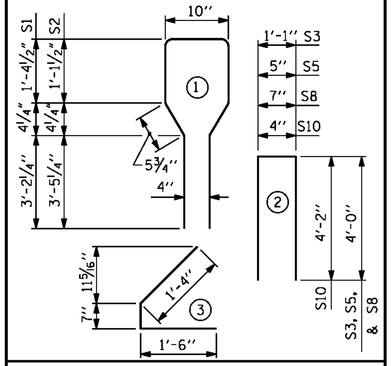
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	76	#4	1	10'-11"	554
S2	28	#6	1	10'-11"	459
S3	4	#4	2	9'-1"	24
S4	96	#4	3	3'-5"	219
S5	6	#4	2	8'-5"	34
✱S7	12	#5	STR	3'-8"	46
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"	23

✱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 LB.	9500 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
.	1401	18.98	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	93.50'	467.50'

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-73
1			3			TOTAL SHEETS
2			4			278

STD. NO. PCG6

DESIGNED BY:	J. BORUTA	DATE :	OCT 2015
DRAWN BY:	M. HOBBS	DATE :	OCT 2015
CHECKED BY:	M. WAGNER	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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

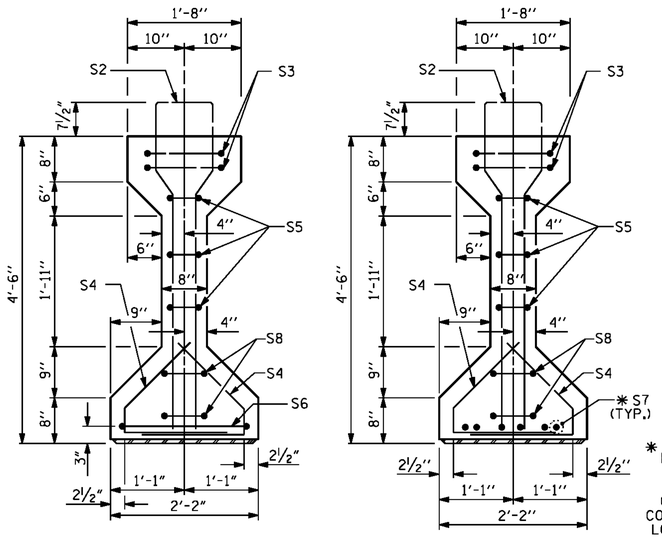
5/11/2016
400.143.B4929_SMU_G2.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16

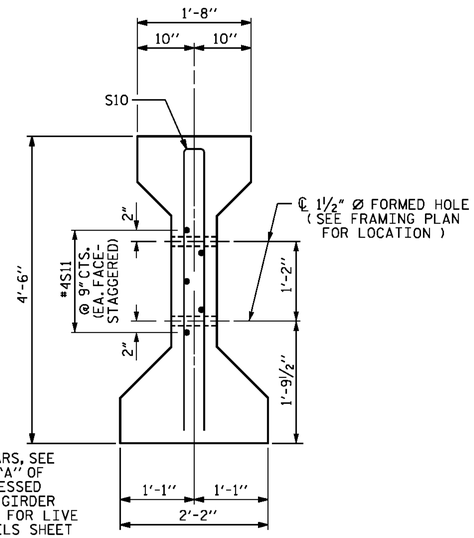
DocuSigned by: Jason R Doughty
00F1C864482747...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SECTION A-A

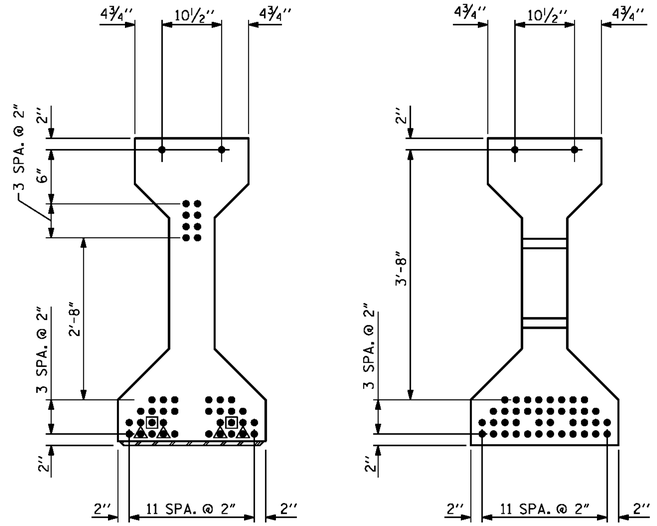
SECTION B-B



SECTION C-C

(S1 BARS NOT SHOWN)

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

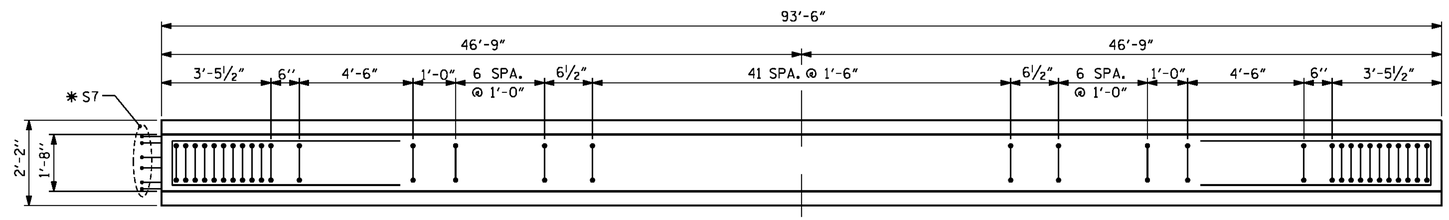


AT END OF GIRDER

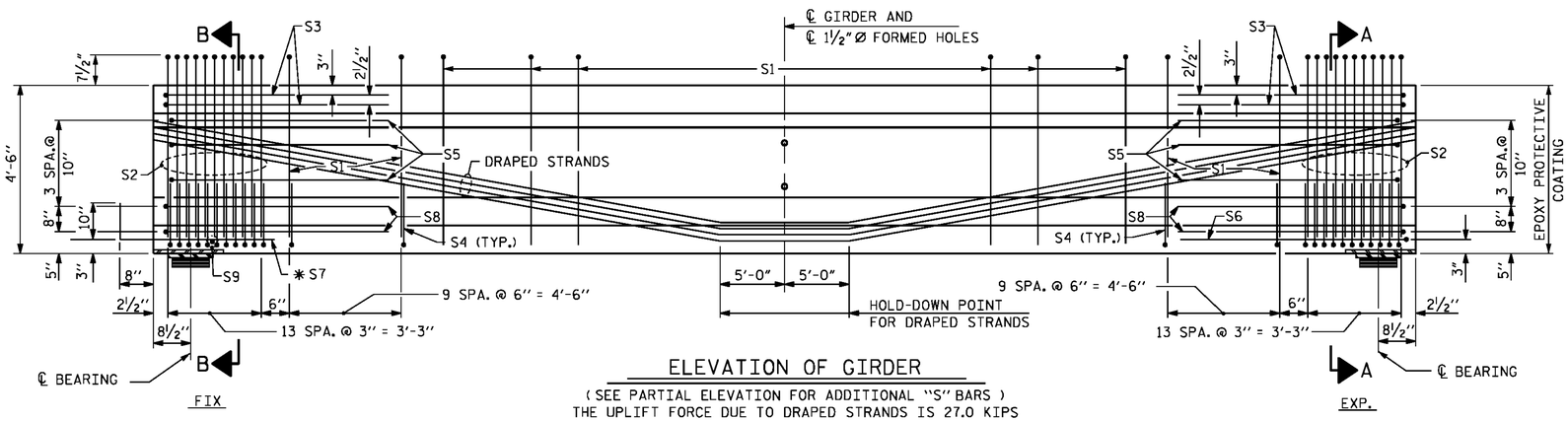
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(42 STRANDS REQUIRED)



PLAN OF GIRDER

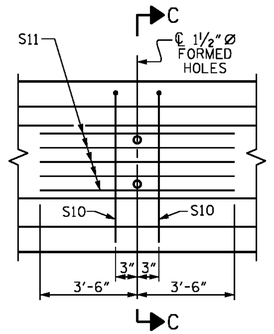


ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
THE UPLIFT FORCE DUE TO DRAPED STRANDS IS 27.0 KIPS

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ▣ STRANDS DEBONDED FOR 2'-0" FROM END OF GIRDER
- ◬ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos. C1 TO C5

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

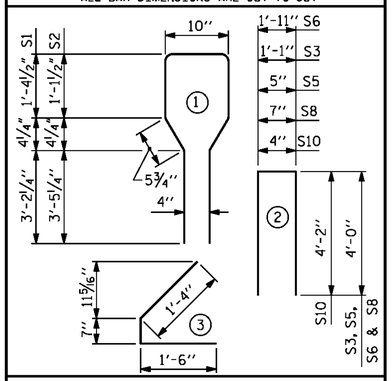
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	76	#4	1	10'-11"	554
S2	28	#6	1	10'-11"	459
S3	4	#4	2	9'-1"	24
S4	96	#4	3	3'-5"	219
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
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23

* 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 LB.	9500 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
	1385	18.98	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	93.50'	467.50'

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

DESIGNED BY:	J. BORUTA	DATE : OCT 2015
DRAWN BY:	M. HOBBS	DATE : OCT 2015
CHECKED BY:	M. WAGNER	DATE : JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

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

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

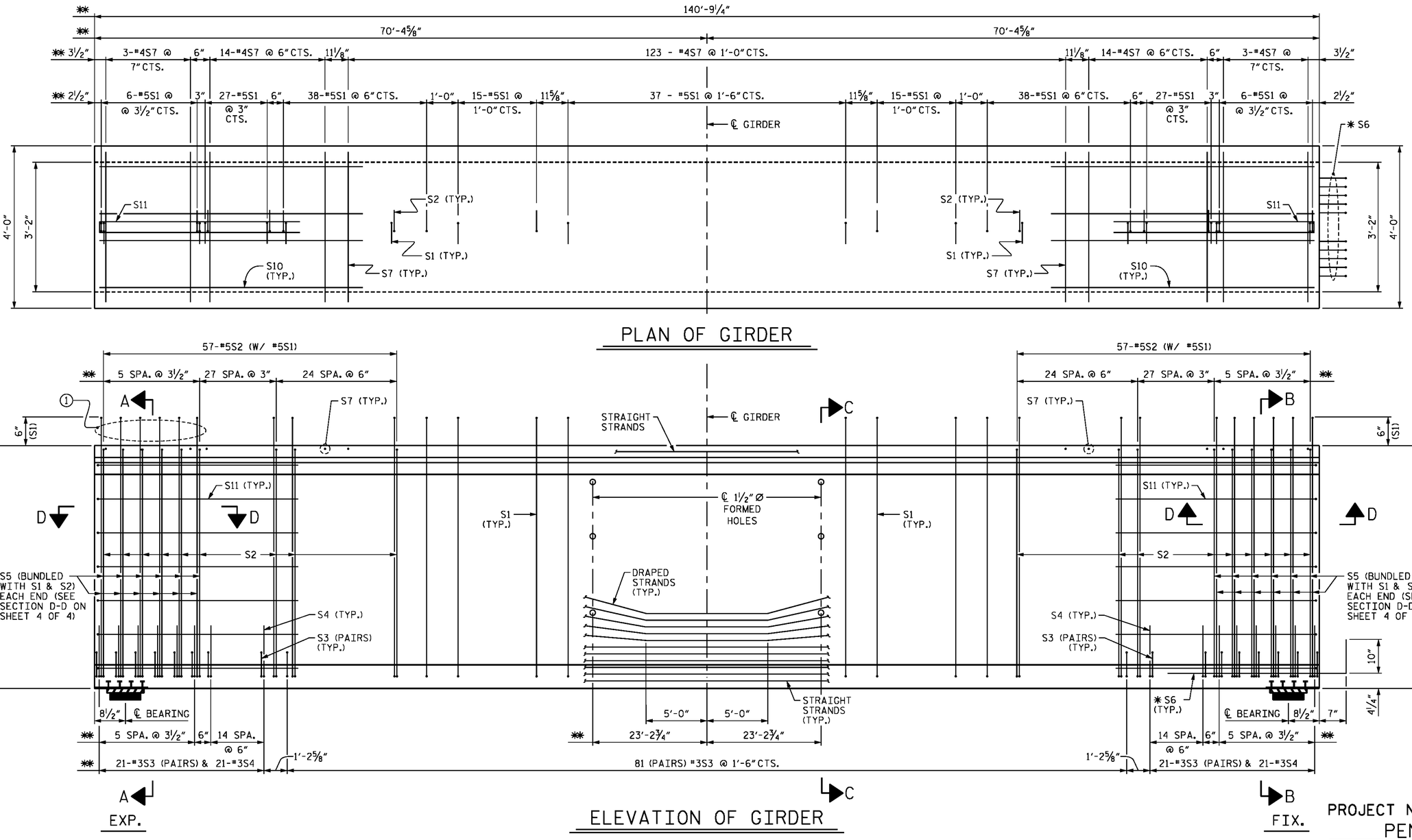
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C864482747...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-74
1			3			TOTAL SHEETS
2			4			278

STD. NO. PCG6

5/10/2016
400.145_B4929_SMU_G3.dgn



NOTES

SEE PARTIAL ELEVATION ON SHEET 4 OF 4 FOR ADDITIONAL "S" BARS.

** MEASURED AND SPACE ALONG GIRDER BOTTOM FLANGE. SEE GIRDER LENGTH DETAIL ON "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS - F.I.B GIRDERS" SHEET.

① ROTATE END "S" BARS SUCH THAT THEY ARE PLACED PARALLEL TO THE END BEVEL WHILE MAINTAINING 2" OF CONCRETE COVER. TAPER SPACING OF ADJACENT "S" BARS SUCH THAT THE CLEAR DISTANCE BETWEEN THE BARS EXCEEDS 1½".

ALTERNATE DIRECTION OF #5S1 AND #5S2 BARS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 72" PRESTRESSED CONCRETE GIRDER (SPANS D AND K)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-75
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. BORUTA	DATE :	JAN 2016
DRAWN BY:	KEW/MAH	DATE :	JAN 2016
CHECKED BY:	B. LOFLIN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
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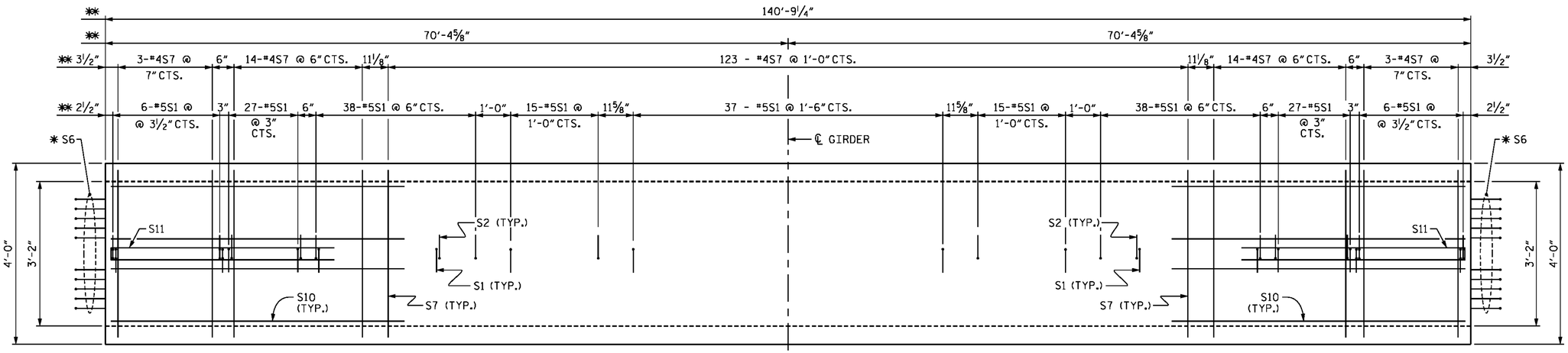
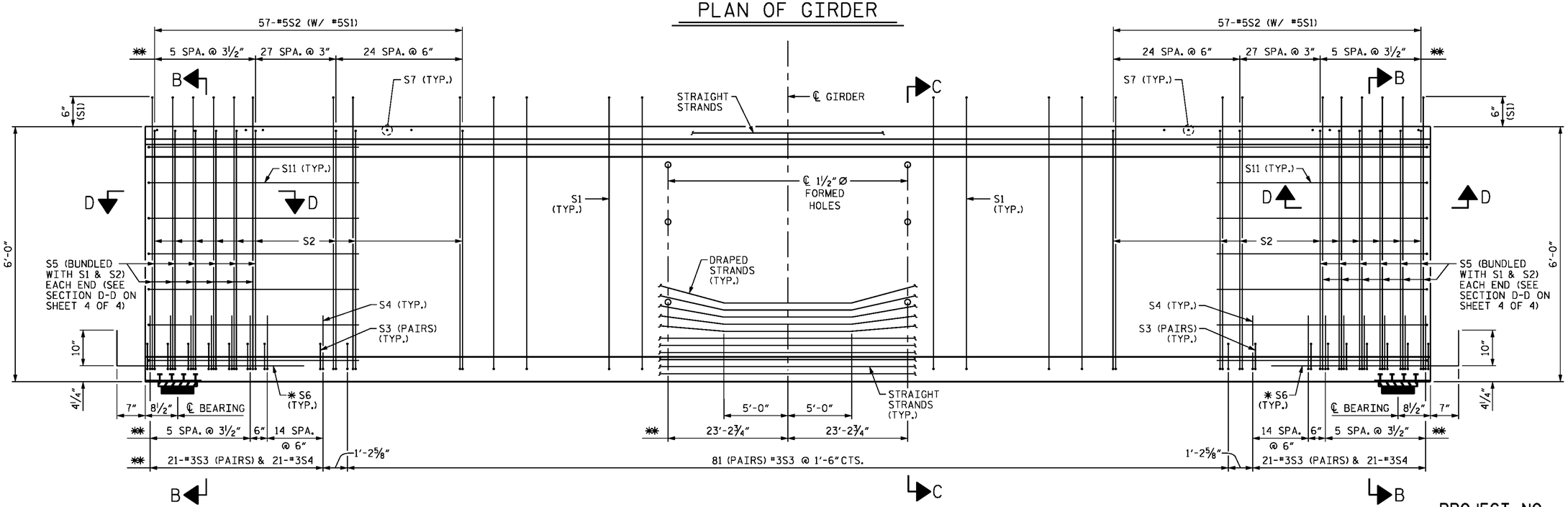


PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE NOTES, SHEET 1 OF 4)

B FIX.

C

B FIX.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 72" PRESTRESSED CONCRETE GIRDER
(SPANS E AND L)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-76
1			3			TOTAL SHEETS
2			4			278

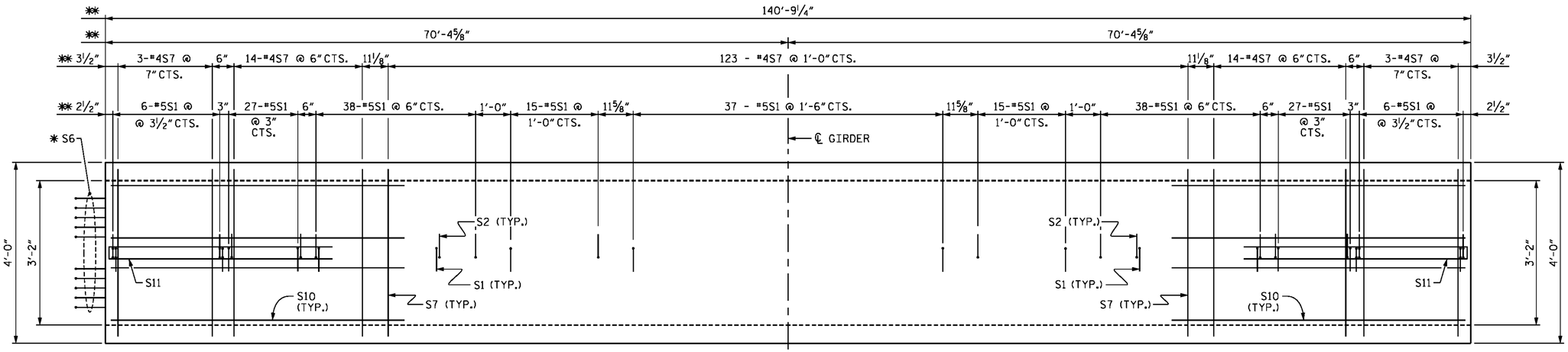
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

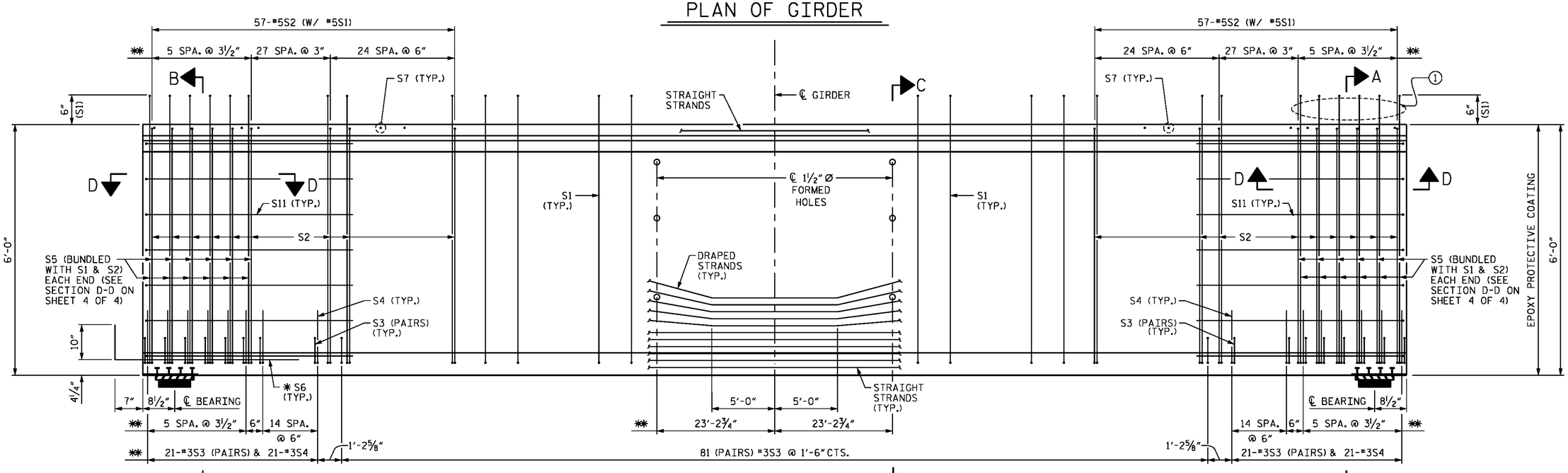
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. BORUTA	DATE :	JAN 2016
DRAWN BY:	KEW/MAH	DATE :	JAN 2016
CHECKED BY:	B. LOFLIN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400.149_B4929_SMU_FIB72_02.dgn



PLAN OF GIRDER



B FIX.

C

A EXP.

ELEVATION OF GIRDER

(SEE NOTES, SHEET 1 OF 4)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 72" PRESTRESSED CONCRETE GIRDER
(SPANS F AND J)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-77
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. BORUTA	DATE :	JAN 2016
DRAWN BY:	KEW/MAH	DATE :	JAN 2016
CHECKED BY:	B. LOFLIN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
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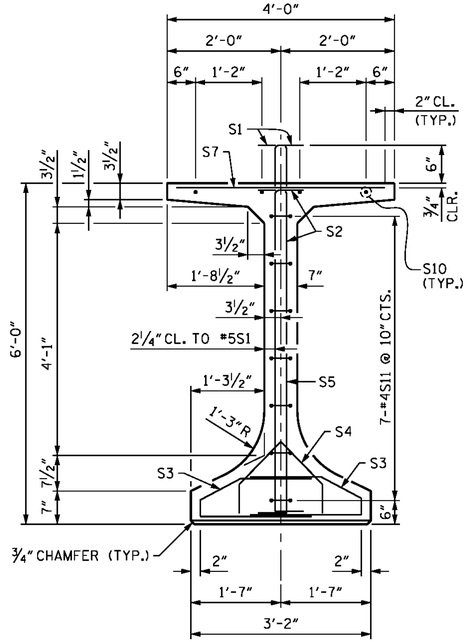
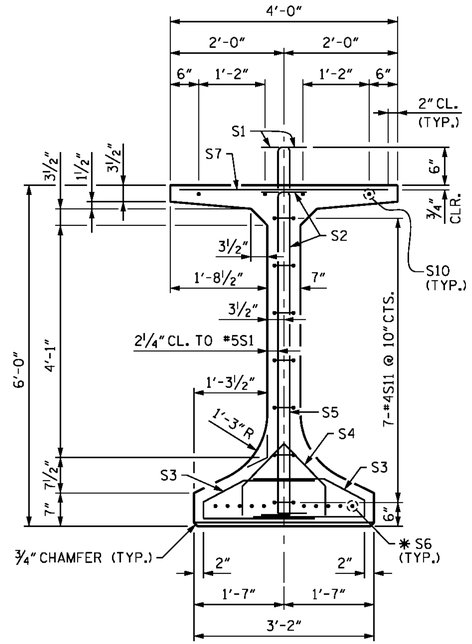
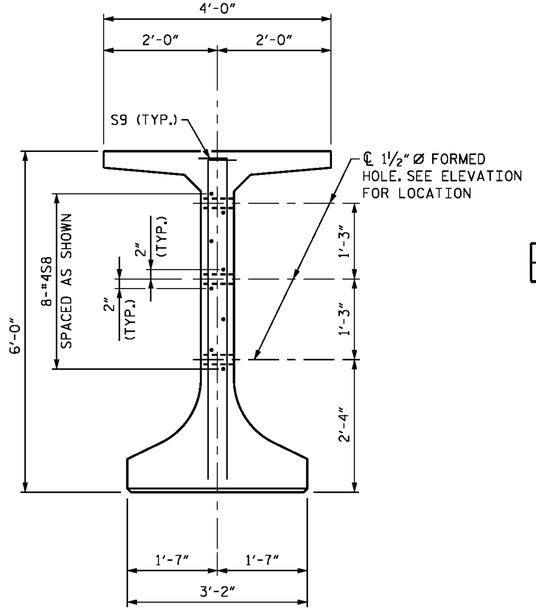


SECTION A-A

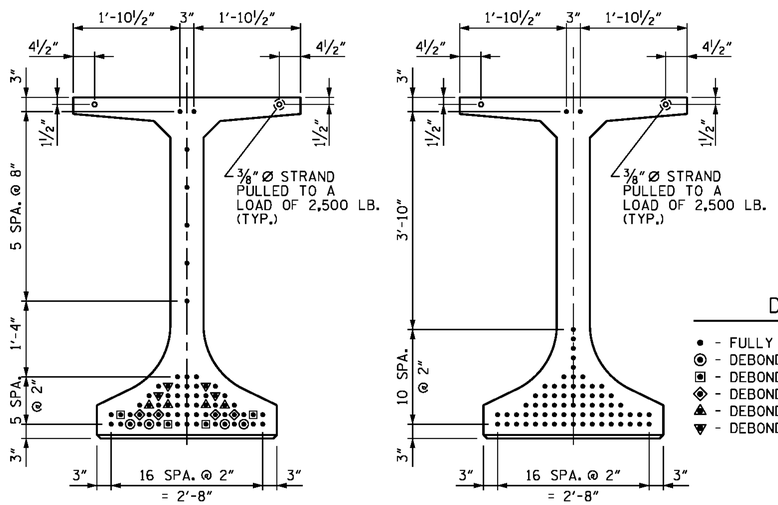


SECTION B-B



SECTION C-C

(S1, S3 AND S7 BARS NOT SHOWN)



AT END OF GIRDER

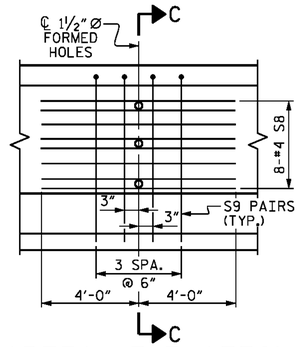
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(71 STRANDS REQUIRED)

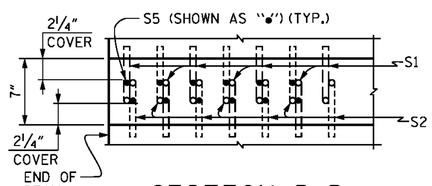
DEBONDING LEGEND

- ● - FULLY BONDED STRANDS
- ◉ - DEBONDED FOR 20'-0" FROM END OF GIRDER
- ▣ - DEBONDED FOR 16'-0" FROM END OF GIRDER
- ◈ - DEBONDED FOR 12'-0" FROM END OF GIRDER
- ▲ - DEBONDED FOR 8'-0" FROM END OF GIRDER
- ▼ - DEBONDED FOR 4'-0" FROM END OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL SPANS.



SECTION D-D

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

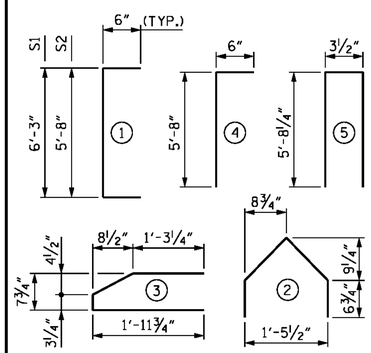
REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	209	#5	1	7'-3"	1580
	S2	114	#5	1	6'-8"	793
	S3	246	#3	3	4'-4"	401
	S4	42	#3	2	3'-3"	51
	S5	24	#5	STR	5'-6"	138
SPANS D, K, F AND J	✱S6	10	#5	STR	3'-8"	38
SPANS E AND L	✱S6	20	#5	STR	3'-8"	76
	S7	157	#4	STR	3'-8"	385
	S8	16	#4	STR	8'-0"	86
	S9	16	#4	4	6'-2"	66
	S10	8	#6	STR	26'-0"	312
	S11	14	#4	5	11'-8"	109

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	10,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	NO.
SPANS D, K, F AND J	3959	38.33	71
SPANS E AND L	3997	38.33	71

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
30	140.77'	4223.13'

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 72" PRESTRESSED CONCRETE GIRDER
(SPANS D, E, F, J, K AND L)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-78
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. BORUTA	DATE : JAN 2016
DRAWN BY:	KEW/MAH	DATE : JAN 2016
CHECKED BY:	B. LOFLIN	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

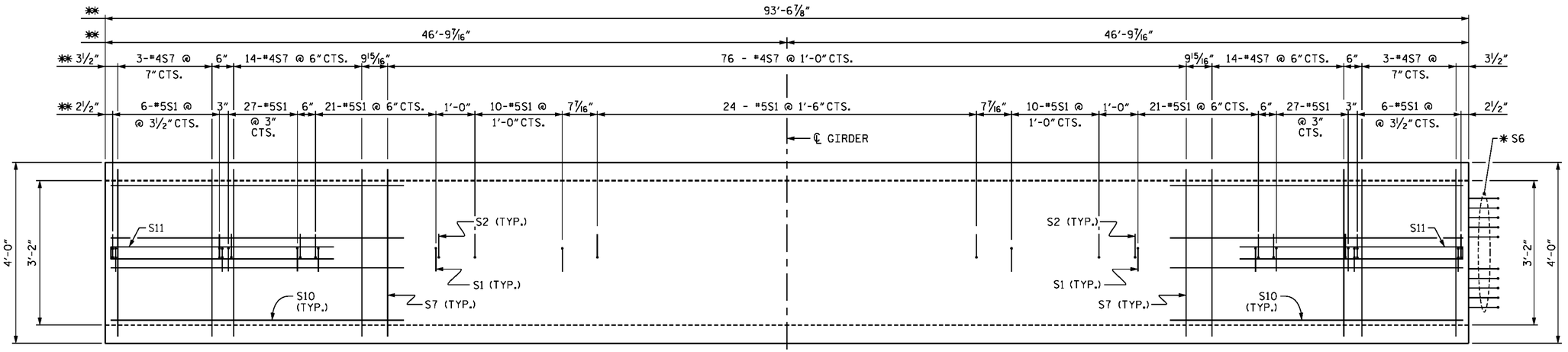
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

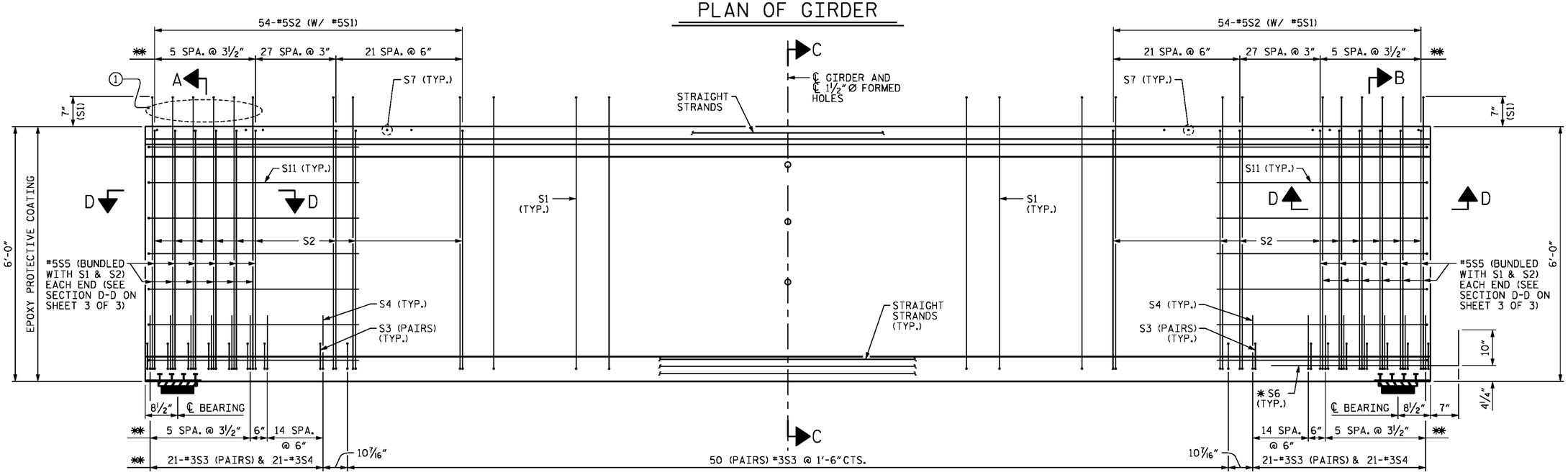
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

5/10/2016
400.153_B4929_SMU_FIB72_04.dgn



PLAN OF GIRDER



ELEVATION OF GIRDER

NOTES

SEE PARTIAL ELEVATION ON SHEET 3 OF 3 FOR ADDITIONAL "S" BARS.

** MEASURED AND SPACED ALONG GIRDER BOTTOM FLANGE. SEE GIRDER LENGTH DETAIL ON "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS - F.I.B GIRDERS" SHEET.

(1) ROTATE END "S" BARS SUCH THAT THEY ARE PLACED PARALLEL TO THE END BEVEL WHILE MAINTAINING 2" OF CONCRETE COVER. TAPER SPACING OF ADJACENT "S" BARS SUCH THAT THE CLEAR DISTANCE BETWEEN THE BARS EXCEEDS 1 1/2".

ALTERNATE DIRECTION OF *5S1 AND *5S2 BARS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 3

DESIGNED BY:	E. DAVIS	DATE :	FEB 2016		
DRAWN BY:	M. HOBBS	DATE :	FEB 2016		
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

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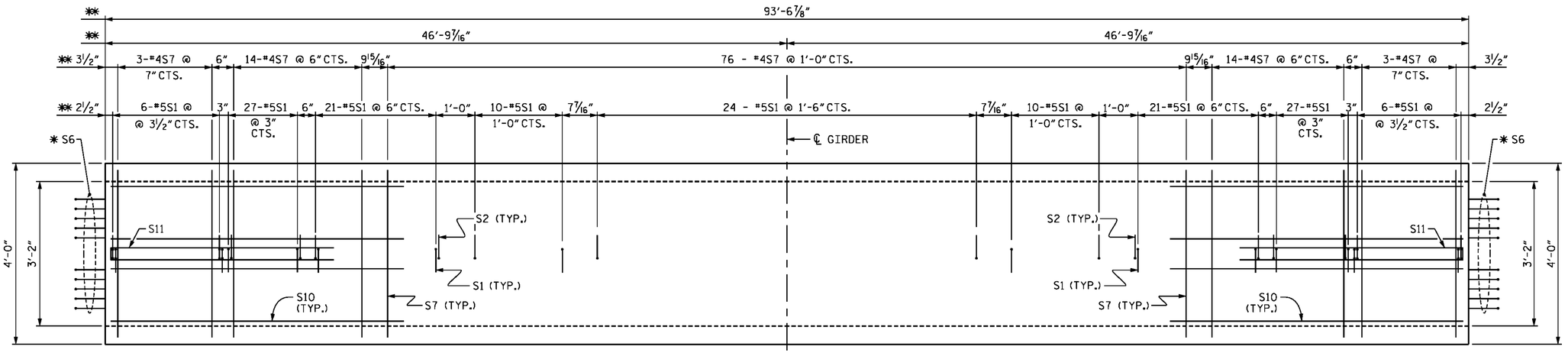
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

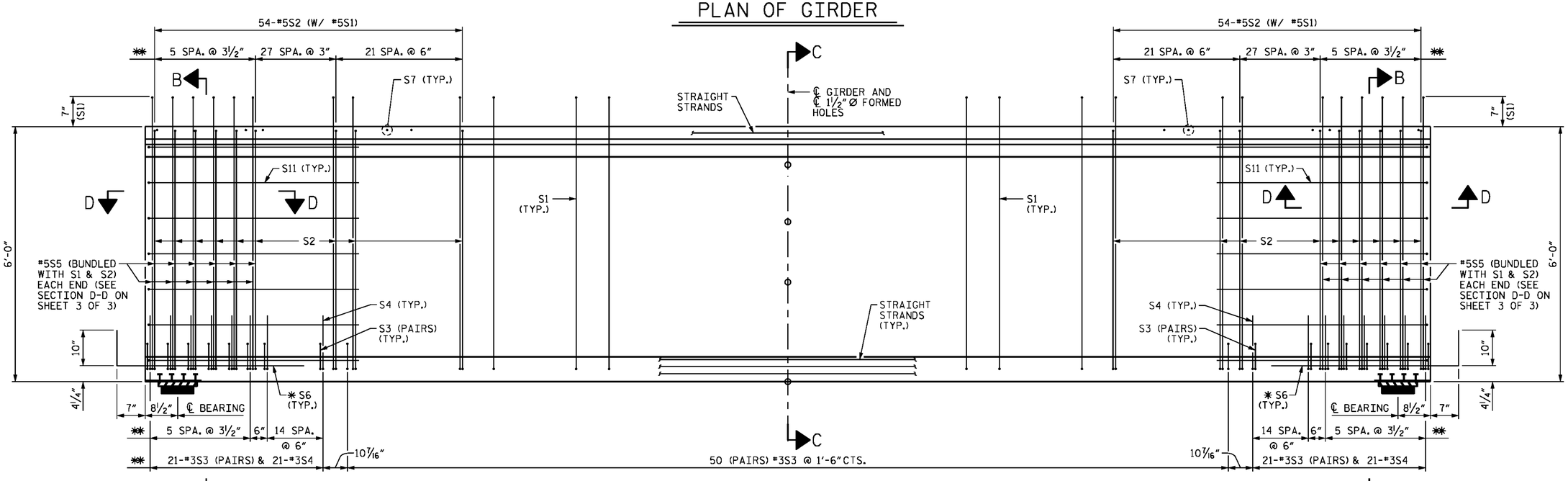
F.I.B. 72" PRESTRESSED CONCRETE GIRDER (SPAN G)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-79
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400_155_B4929_SMU_F1B72_05.dgn



PLAN OF GIRDER



ELEVATION OF GIRDER

(SEE NOTES, SHEET 1 OF 3)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 72"
PRESTRESSED
CONCRETE GIRDER
(SPANS H AND I)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-80
1			3			TOTAL SHEETS
2			4			278

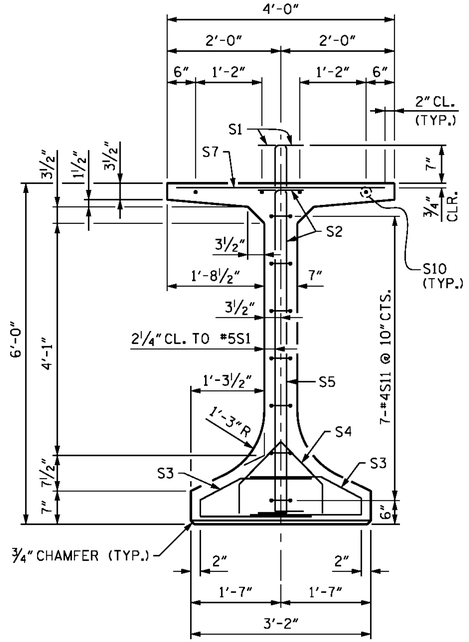
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

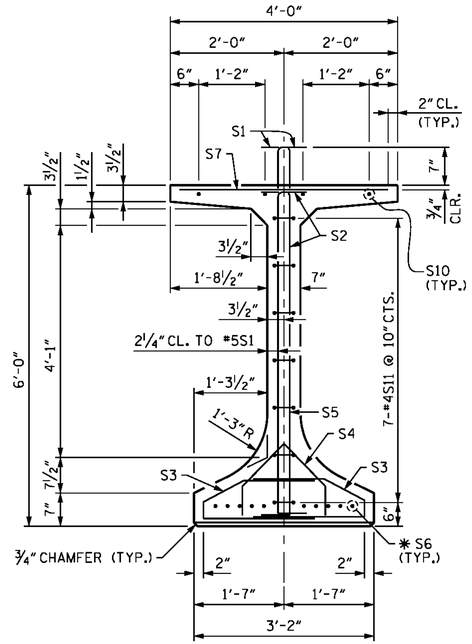
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	E. DAVIS	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	FEB 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

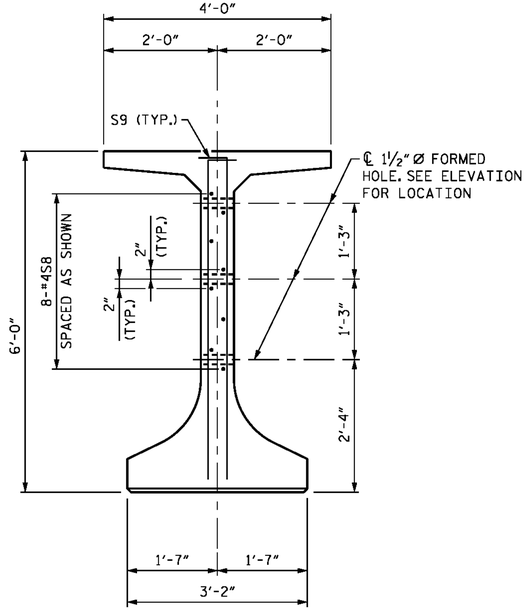
5/10/2016
400_157_B4929_SMU_FIB72_06.dgn



SECTION A-A

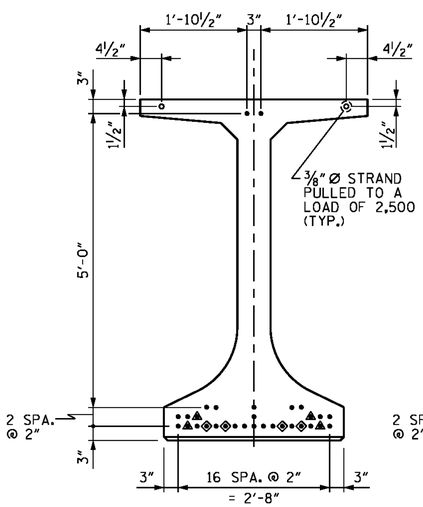


SECTION B-B

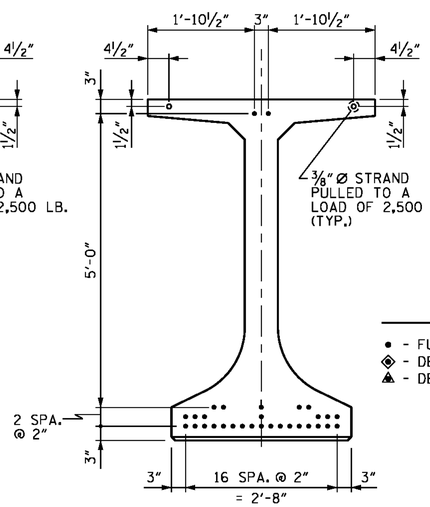


SECTION C-C

(S1, S3 AND S7 BARS NOT SHOWN)



AT END OF GIRDER



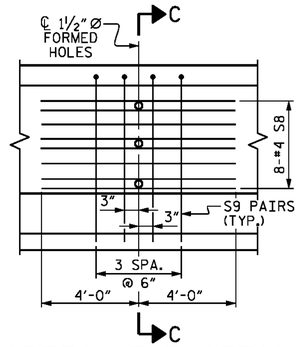
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(31 STRANDS REQUIRED)

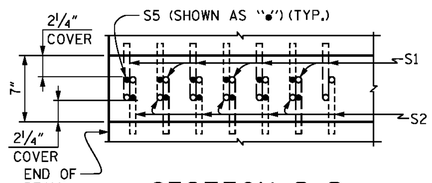
DEBONDING LEGEND

- ● - FULLY BONDED STRANDS
- ◈ - DEBONDED FOR 12'-0" FROM END OF GIRDER
- ◬ - DEBONDED FOR 8'-0" FROM END OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL SPANS.



SECTION D-D

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

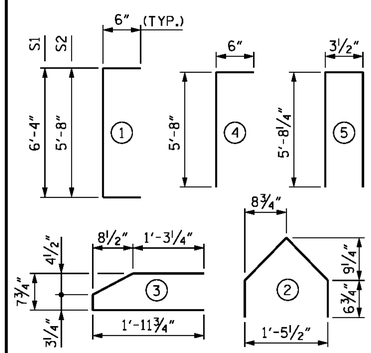
REINFORCING STEEL FOR ONE GIRDER

	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	152	#5	1	7'-4"	1163
	S2	108	#5	1	6'-8"	751
	S3	184	#3	3	4'-4"	300
	S4	42	#3	2	3'-3"	51
	S5	24	#5	STR	5'-6"	138
SPAN G	* S6	10	#5	STR	3'-8"	38
SPANS H AND I	* S6	20	#5	STR	3'-8"	76
	S7	110	#4	STR	3'-8"	269
	S8	8	#4	STR	8'-0"	43
	S9	8	#4	4	6'-2"	33
	S10	8	#6	STR	26'-0"	312
	S11	14	#4	5	11'-8"	109

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

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



QUANTITIES FOR ONE GIRDER

	REINFORCING STEEL	10,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	NO.
SPAN G	3207	25.5	31
SPANS H AND I	3245	25.5	31

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
15	93.57'	1403.55'

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 3

DESIGNED BY:	E. DAVIS — DATE: FEB 2016
DRAWN BY:	M. HOBBS — DATE: FEB 2016
CHECKED BY:	B. LOFLIN — DATE: MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY — DATE: MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

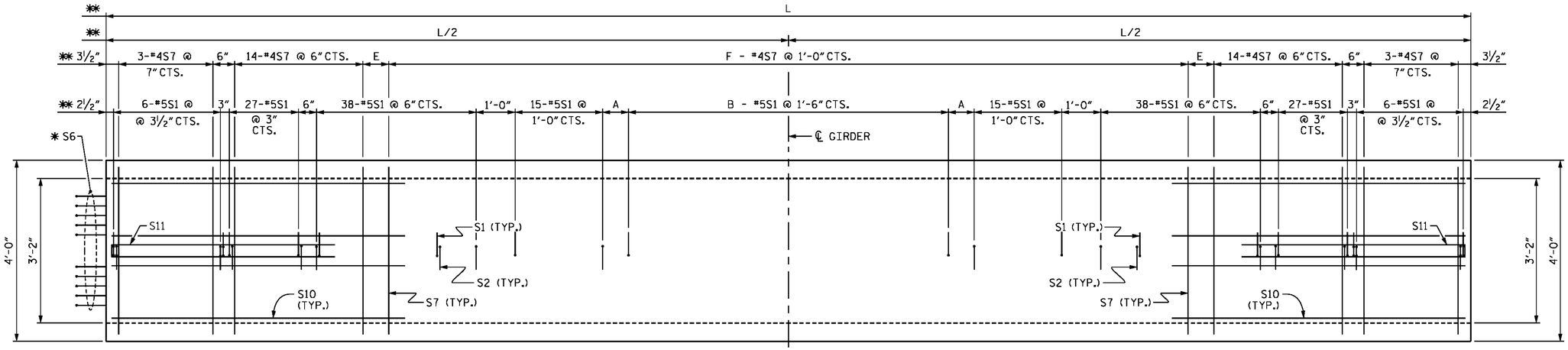
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

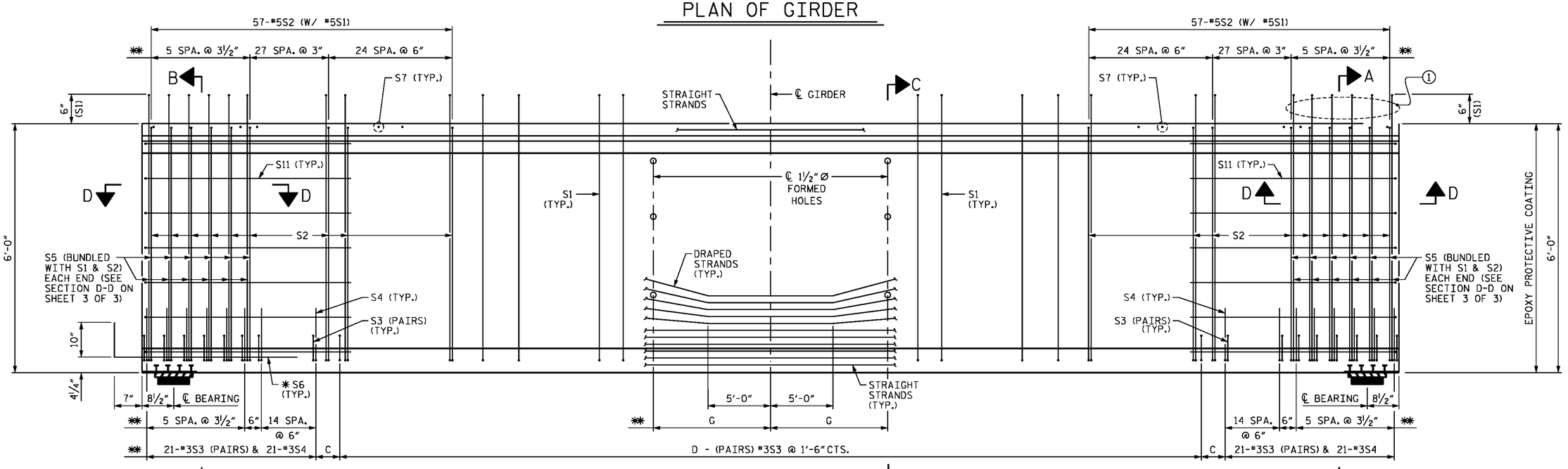
F.I.B. 72" PRESTRESSED CONCRETE GIRDER
(SPANS G, H AND I)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-81
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400.159_B4929_SMU_FIB72_07.dgn



PLAN OF GIRDER



ELEVATION OF GIRDER

SPAN M GIRDER DIMENSIONS								
GIRDER	L	A	B	C	D	E	F	G
GDR. M1	139'-3½"	11¾"	36	11¾"	81	8¼"	122	22'-11¾"
GDR. M2	139'-10¾"	6⅜"	37	6⅜"	82	5⅞"	123	23'-1"
GDR. M3	140'-6"	10"	37	10"	82	9½"	123	23'-2³⁄₁₆"
GDR. M4	141'-1¼"	1'-1⅝"	37	1'-1⅝"	82	7⅛"	124	23'-3⅜"
GDR. M5	141'-8½"	1'-5¼"	37	1'-5¼"	82	10¾"	124	23'-4⁹⁄₁₆"

NOTES

SEE PARTIAL ELEVATION ON SHEET 3 OF 3 FOR ADDITIONAL "S" BARS.

✱✱ MEASURED AND SPACE ALONG GIRDER BOTTOM FLANGE. SEE GIRDER LENGTH DETAIL ON "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS - F.I.B GIRDERS" SHEET.

① ROTATE END "S" BARS SUCH THAT THEY ARE PLACED PARALLEL TO THE END BEVEL WHILE MAINTAINING 2" OF CONCRETE COVER. TAPER SPACING OF ADJACENT "S" BARS SUCH THAT THE CLEAR DISTANCE BETWEEN THE BARS EXCEEDS 1½".

ALTERNATE DIRECTION OF #5S1 AND #5S2 BARS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 72" PRESTRESSED CONCRETE GIRDER (SPAN M)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-82
1			3			TOTAL SHEETS
2			4			278

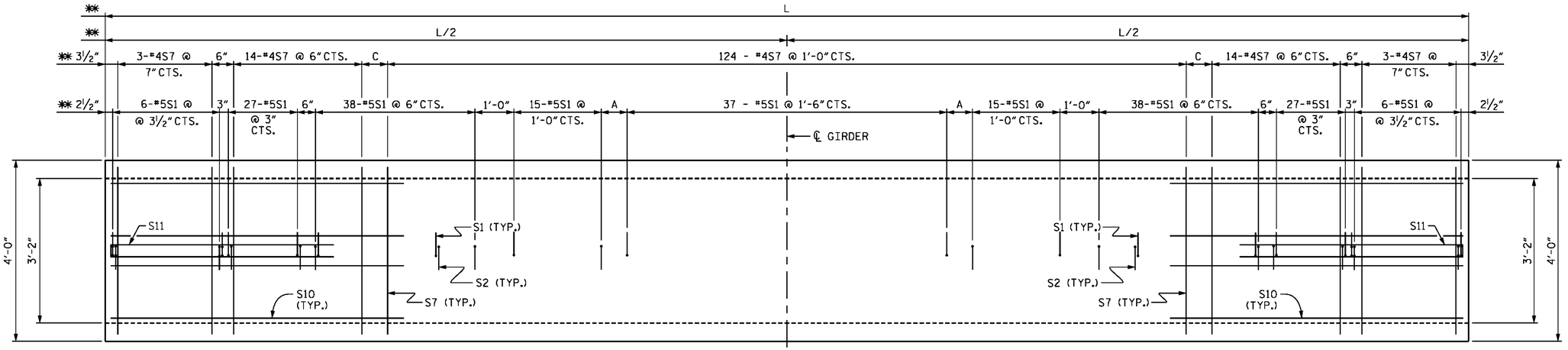
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

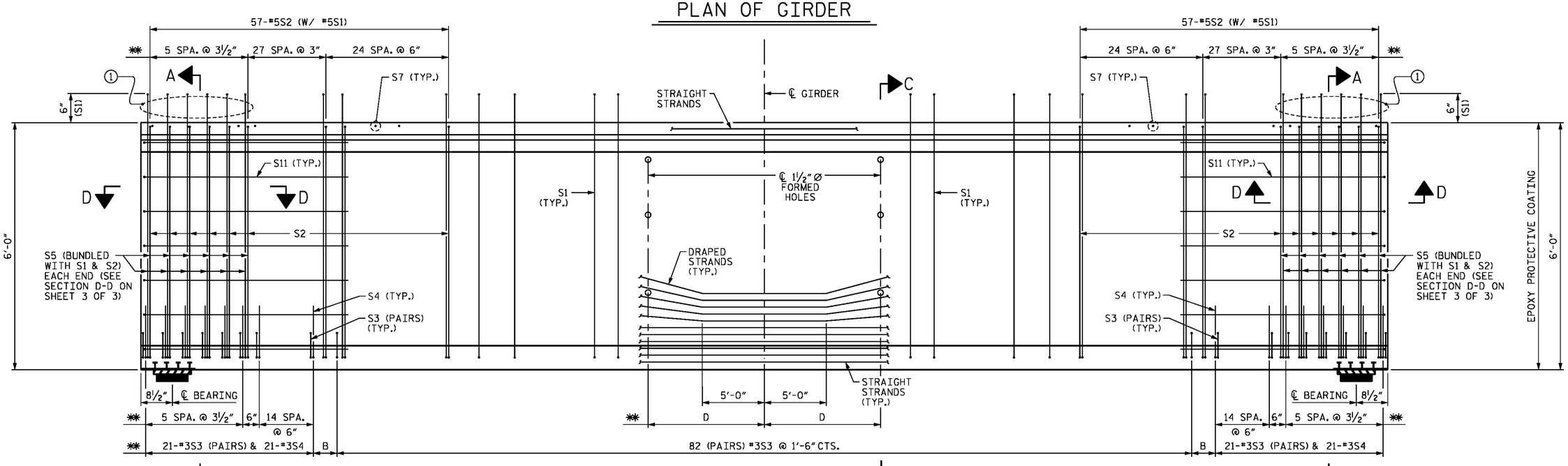
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. BORUTA	DATE :	JAN 2016
DRAWN BY:	KEW, MAH	DATE :	JAN 2016
CHECKED BY:	B. LOFLIN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_161_B4929_SMU_FIB72_08.dgn



PLAN OF GIRDER



A EXP.

C

A FIX.

ELEVATION OF GIRDER

SPAN Z GIRDER DIMENSIONS					
GIRDER	L	A	B	C	D
GDR. Z1	140'-9"	11½"	5½"	5"	23'-2 11/16"
GDR. Z2	140'-9 3/8"	11 11/16"	5 11/16"	5 3/16"	23'-2 3/4"
GDR. Z3	140'-10½"	1'-0 1/4"	6 1/4"	5 3/4"	23'-2 7/8"
GDR. Z4	141'-0 3/8"	1'-1 3/16"	7 3/16"	6 11/16"	23'-3 3/16"
GDR. Z5	141'-2 7/8"	1'-2 7/16"	8 7/16"	7 15/16"	23'-3 9/16"
GDR. Z6	141'-6 1/8"	1'-4 1/16"	10 1/16"	9 9/16"	23'-4 1/8"

NOTES

SEE PARTIAL ELEVATION ON SHEET 3 OF 3 FOR ADDITIONAL "S" BARS.

** MEASURED AND SPACE ALONG GIRDER BOTTOM FLANGE. SEE GIRDER LENGTH DETAIL ON "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS - F.I.B GIRDERS" SHEET.

(1) ROTATE END "S" BARS SUCH THAT THEY ARE PLACED PARALLEL TO THE END BEVEL WHILE MAINTAINING 2" OF CONCRETE COVER. TAPER SPACING OF ADJACENT "S" BARS SUCH THAT THE CLEAR DISTANCE BETWEEN THE BARS EXCEEDS 1½".

ALTERNATE DIRECTION OF #5S1 AND #5S2 BARS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 72" PRESTRESSED CONCRETE GIRDER (SPAN Z)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-83
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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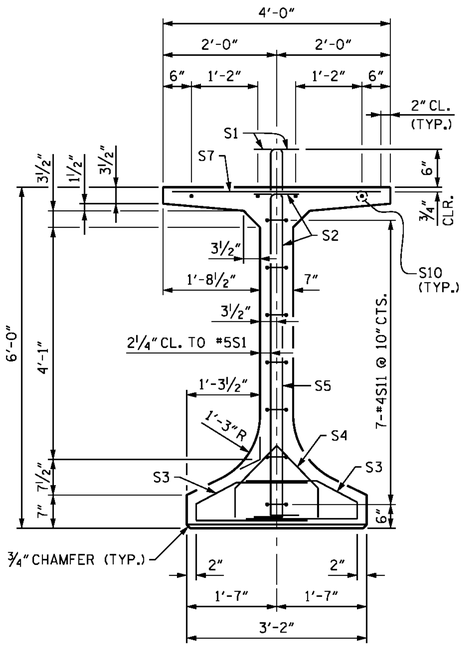
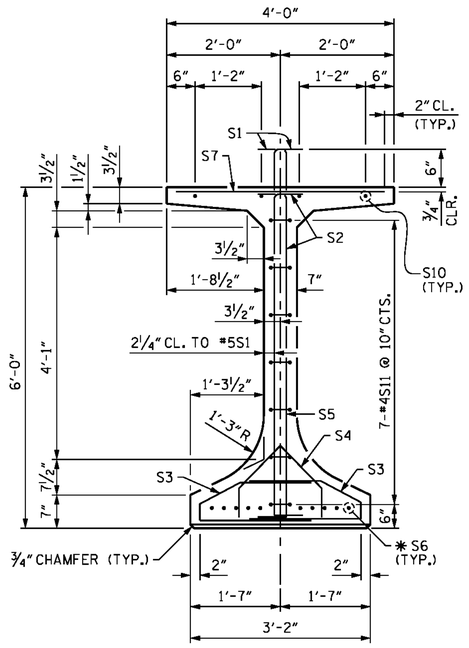
DESIGNED BY:	J. BORUTA	DATE :	JAN 2016
DRAWN BY:	KEW, MAH	DATE :	JAN 2016
CHECKED BY:	B. LOFLIN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

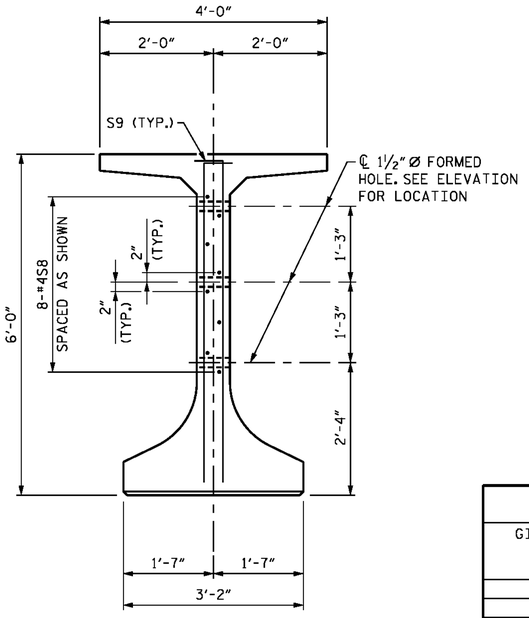
5/10/2016
400_163_B4929_SMU_FIB72_09.dgn



SECTION A-A



SECTION B-B



SECTION C-C

(S1, S3 AND S7 BARS NOT SHOWN)

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
GDRS. M1	S1	208	#5	1	7'-3"	1573
GDRS. M2-M5, Z1-Z6	S1	209	#5	1	7'-3"	1580
	S2	114	#5	1	6'-8"	793
GDRS. M1	S3	246	#3	3	4'-4"	401
GDRS. M2-M5, Z1-Z6	S3	248	#3	3	4'-4"	404
	S4	42	#3	2	3'-3"	51
	S5	24	#5	STR	5'-6"	138
GDRS. M1-M6	* S6	10	#5	STR	3'-8"	38
GDR. M1	S7	156	#4	STR	3'-8"	382
GDRS. M2 AND M3	S7	157	#4	STR	3'-8"	385
GDRS. M4, M5, Z1-Z6	S7	158	#4	STR	3'-8"	387
	S8	16	#4	STR	8'-0"	86
	S9	16	#4	4	6'-2"	66
	S10	8	#6	STR	26'-0"	312
	S11	14	#4	5	11'-8"	109

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

QUANTITIES FOR ONE GIRDER

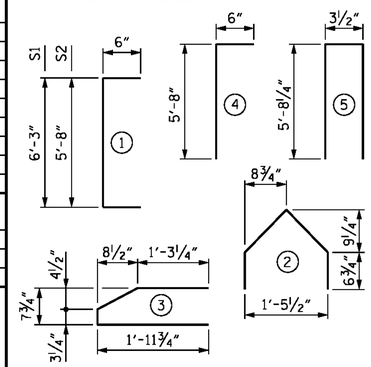
GIRDERS	REINFORCING STEEL	10,000 PSI CONCRETE	0.6" Ø L.R. STRANDS
	LB.	C.Y.	NO.
M1	3949	37.9	71
M2	3962	38.1	71
M3	3962	38.2	71
M4	3964	38.4	71
M5	3964	38.6	71
Z1, Z2, Z3	3926	38.3	71
Z4, Z5	3926	38.4	71
Z6	3926	38.5	71

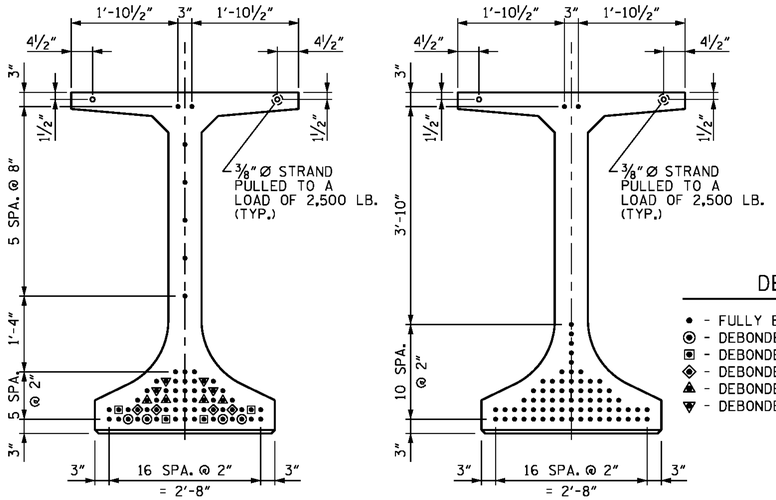
GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
11	VARIES	1548.69'

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT





AT END OF GIRDER

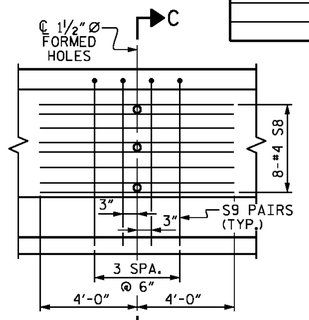
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(71 STRANDS REQUIRED)

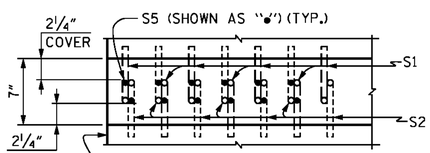
DEBONDING LEGEND

- ● - FULLY BONDED STRANDS
- ◉ - DEBONDED FOR 20'-0" FROM END OF GIRDER
- ▣ - DEBONDED FOR 16'-0" FROM END OF GIRDER
- ◈ - DEBONDED FOR 12'-0" FROM END OF GIRDER
- ▲ - DEBONDED FOR 8'-0" FROM END OF GIRDER
- ▼ - DEBONDED FOR 4'-0" FROM END OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL SPANS.



SECTION D-D

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 72" PRESTRESSED CONCRETE GIRDER
(SPANS M AND Z)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-84
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

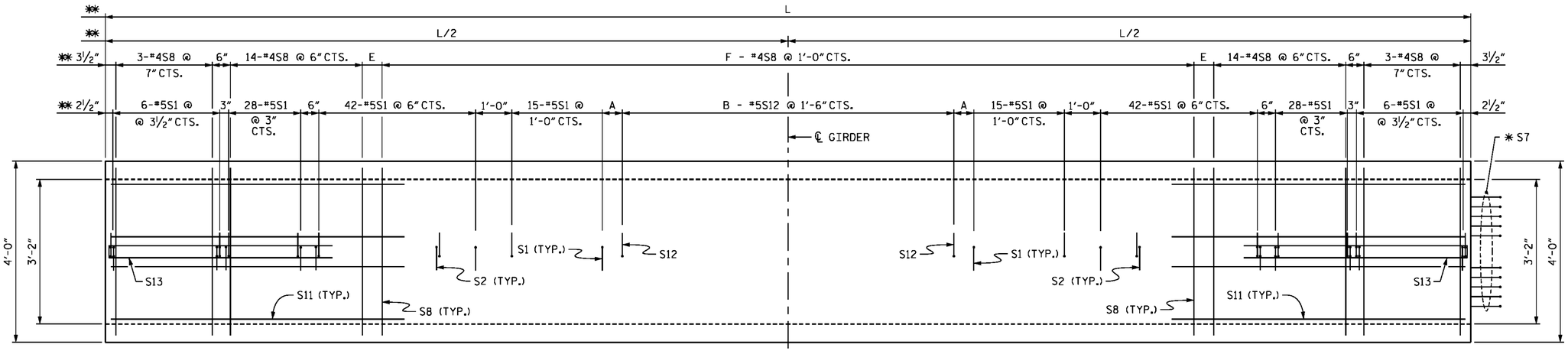
5/12/16

DocuSigned by: Jason R Doughty 00F1C86449274F7...

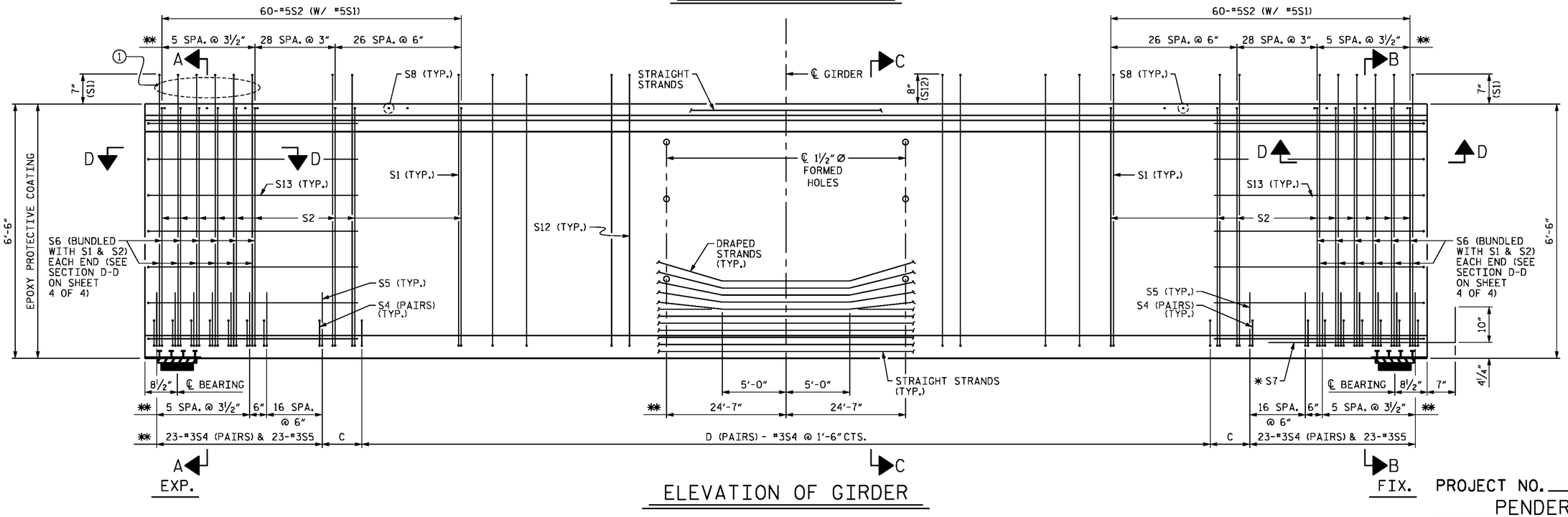
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. BORUTA	DATE :	JAN 2016
DRAWN BY:	KEW/MAH	DATE :	JAN 2016
CHECKED BY:	B. LOFLIN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_165_B4929_SMU_FIB72_10.dgn



PLAN OF GIRDER



ELEVATION OF GIRDER

SPAN N GIRDER DIMENSIONS							
GIRDER	L	A	B	C	D	E	F
GDR. N1	146'-3⅛"	1'-5⅝"	37	1'-5⅝"	83	8¹/₁₆"	129
GDR. N2	147'-5¾"	1'-3⅞"	38	1'-3⅞"	84	9⅜"	130
GDR. N3	148'-8⅜"	1'-2⅜"	39	1'-2⅜"	85	10¹¹/₁₆"	131
GDR. N4	149'-11⅛"	1'-0⅝"	40	1'-0⅝"	86	6¹/₁₆"	133
GDR. N5	151'-1¾"	10⅞"	41	10⅞"	87	7⅜"	134

NOTES

SEE PARTIAL ELEVATION ON SHEET 4 OF 4 FOR ADDITIONAL "S" BARS.

** MEASURED AND SPACE ALONG GIRDER BOTTOM FLANGE. SEE GIRDER LENGTH DETAIL ON "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS - F.I.B GIRDERS" SHEET.

(1) ROTATE END "S" BARS SUCH THAT THEY ARE PLACED PARALLEL TO THE END BEVEL WHILE MAINTAINING 2" OF CONCRETE COVER. TAPER SPACING OF ADJACENT "S" BARS SUCH THAT THE CLEAR DISTANCE BETWEEN THE BARS EXCEEDS 1½".

ALTERNATE DIRECTION OF #5S1, #5S2, #5S3 AND #5S12 BARS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 78" PRESTRESSED CONCRETE GIRDER (SPAN N)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-85
1			3			TOTAL SHEETS
2			4			278

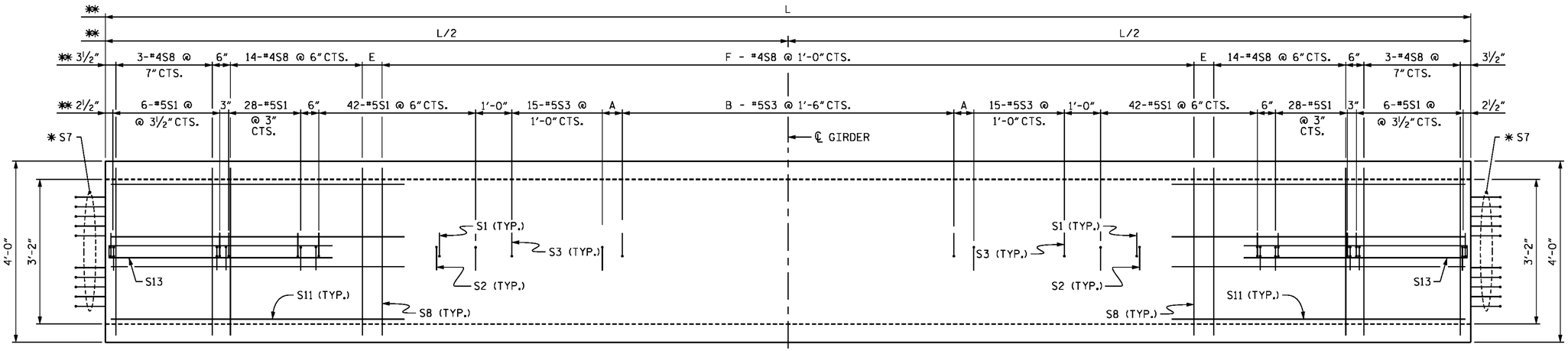
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

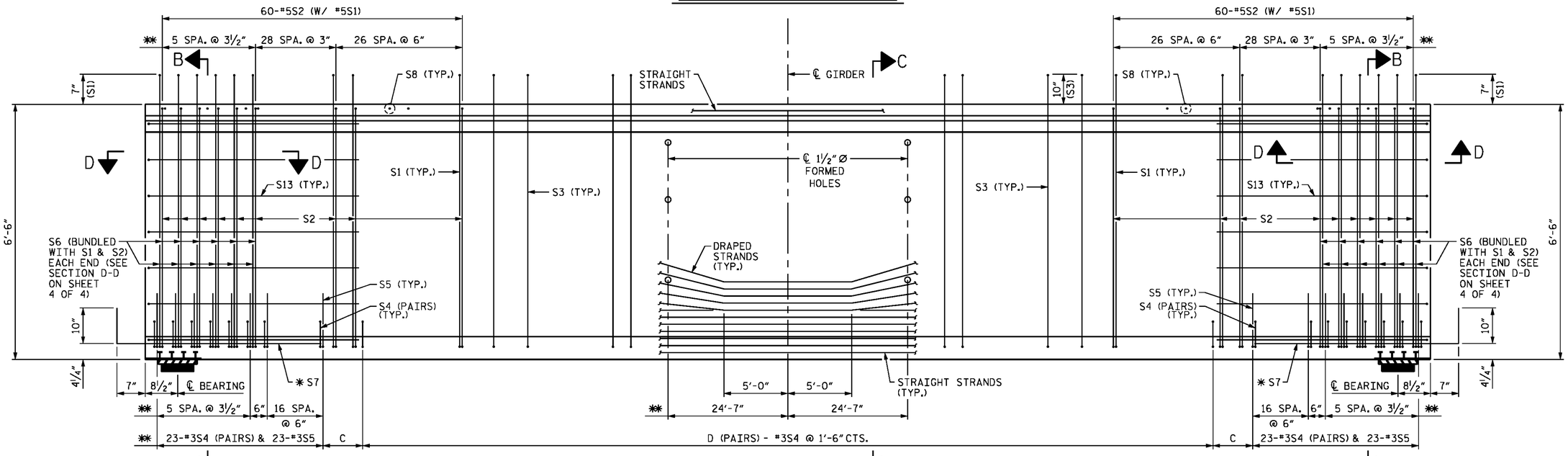
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016
DRAWN BY:	M. HOBBS	DATE :	JAN 2016
CHECKED BY:	J. SHERMAN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_167_B4929_SMU_FIB78_01.dgn



PLAN OF GIRDER



ELEVATION OF GIRDER

(FOR NOTES, SEE SHEET 1 OF 4)

SPAN O GIRDER DIMENSIONS							
GIRDER	L	A	B	C	D	E	F
GDR. 01	146'-2"	1'-5"	37	1'-5"	83	7½"	129
GDR. 02	147'-4¾"	1'-3⅜"	38	1'-3⅜"	84	8⅞"	130
GDR. 03	148'-7⅜"	1'-1 11/16"	39	1'-1 11/16"	85	10 3/16"	131
GDR. 04	149'-10"	1'-0"	40	1'-0"	86	5½"	133
GDR. 05	151'-0⅝"	10 5/16"	41	10 5/16"	87	6 13/16"	134

DESIGNED BY: B. LOFLIN DATE : JAN 2016
DRAWN BY: M. HOBBS DATE : JAN 2016
CHECKED BY: J. SHERMAN DATE : FEB 2016
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE : MAY 2016

5/10/2016
400.169_B4929_SMU_FIB78_02.dgn

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 2 OF 4

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
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00F1C86448274F7...

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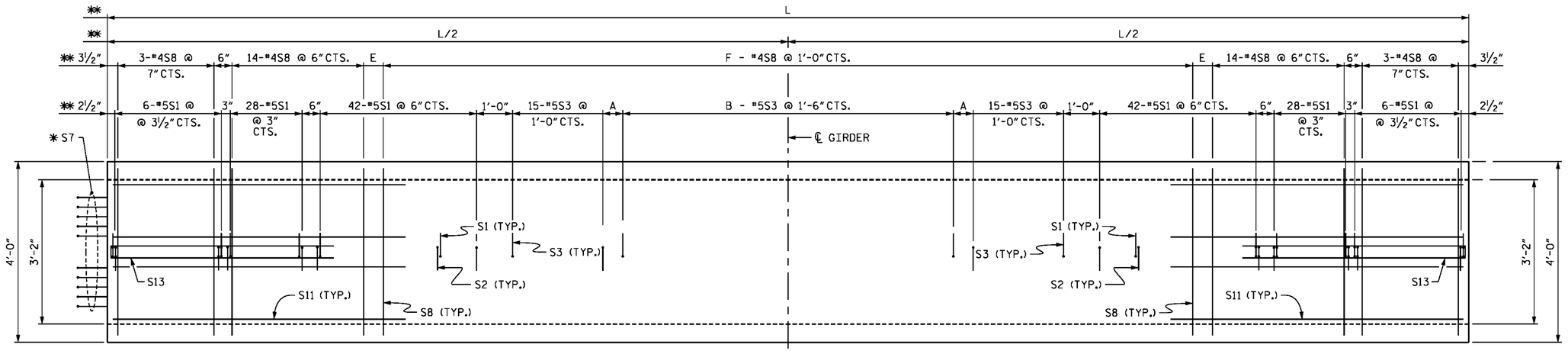
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

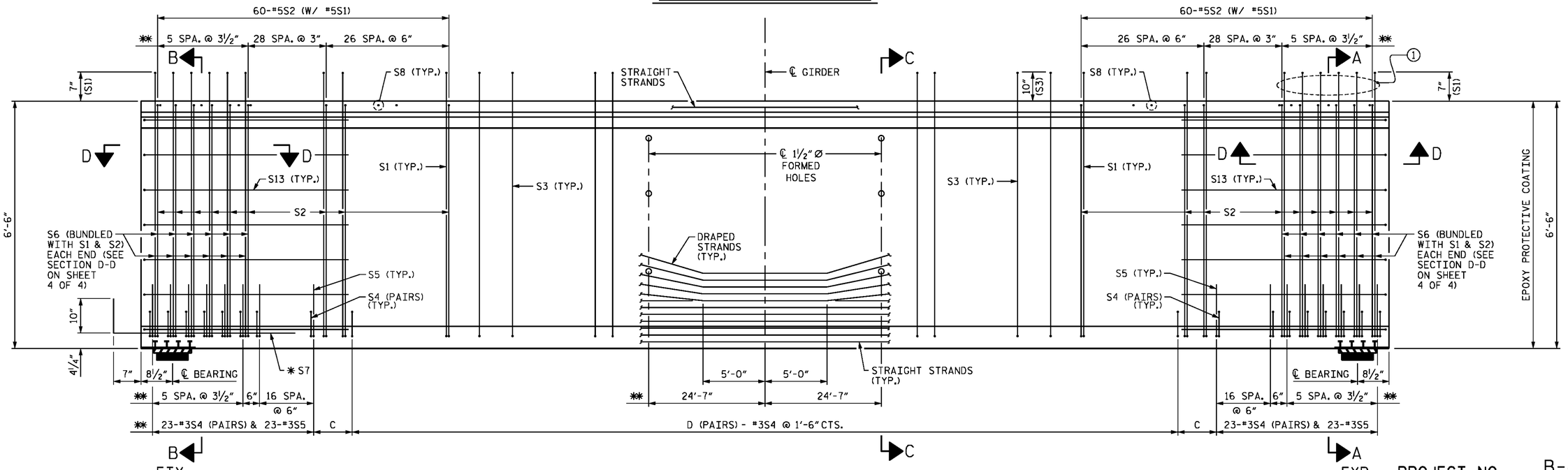
SUPERSTRUCTURE

F.I.B. 78" PRESTRESSED CONCRETE GIRDER
(SPAN O)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-86
1			3			TOTAL SHEETS
2			4			278



PLAN OF GIRDER



ELEVATION OF GIRDER

(FOR NOTES, SEE SHEET 1 OF 4)

SPAN P GIRDER DIMENSIONS							
GIRDER	L	A	B	C	D	E	F
GDR. P1	146'-2"	1'-5"	37	1'-5"	83	7½"	129
GDR. P2	147'-4¾"	1'-3⅜"	38	1'-3⅜"	84	8⅞"	130
GDR. P3	148'-7⅜"	1'-1 11/16"	39	1'-1 11/16"	85	10 3/16"	131
GDR. P4	149'-10"	1'-0"	40	1'-0"	86	5½"	133
GDR. P5	151'-0⅝"	10 5/16"	41	10 5/16"	87	6 13/16"	134

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 78" PRESTRESSED CONCRETE GIRDER
(SPAN P)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-87
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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DRAWN BY:	M. HOBBS	DATE :	JAN 2016
CHECKED BY:	J. SHERMAN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
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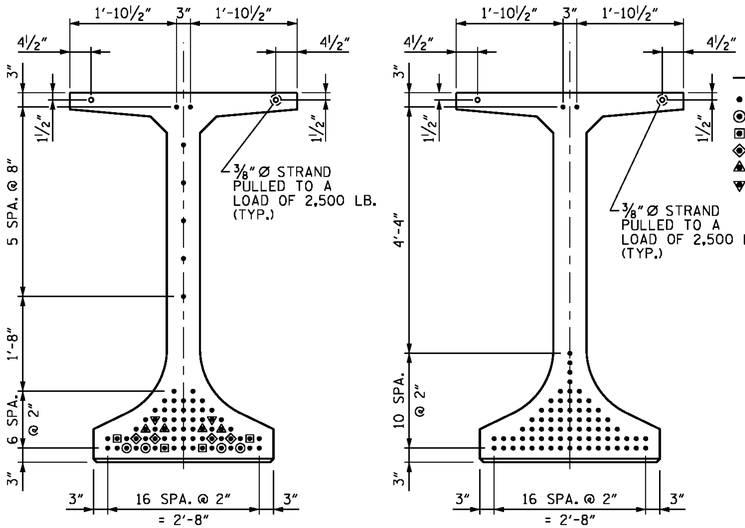
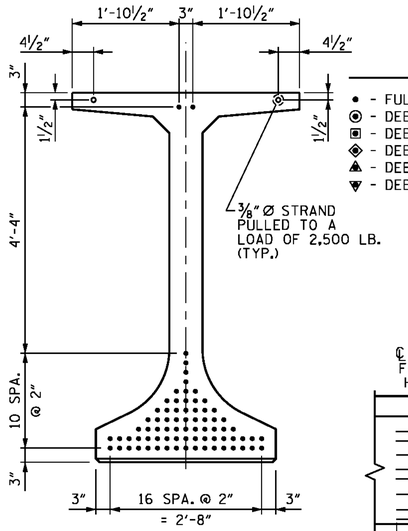


AT END OF GIRDER



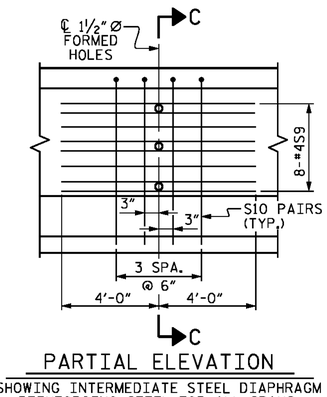
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(75 STRANDS REQUIRED)

DEBONDING LEGEND

- ● - FULLY BONDED STRANDS
- ◉ - DEBONDED FOR 20'-0" FROM END OF GIRDER
- ▣ - DEBONDED FOR 16'-0" FROM END OF GIRDER
- ◈ - DEBONDED FOR 12'-0" FROM END OF GIRDER
- ▲ - DEBONDED FOR 8'-0" FROM END OF GIRDER
- ▼ - DEBONDED FOR 4'-0" FROM END OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL SPANS.

SPAN N

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	182	5	1	7'-10"	1487
	S2	120	5	1	7'-2"	897
GDR. 1	S4	258	3	3	4'-4"	420
GDR. 2	S4	260	3	3	4'-4"	424
GDR. 3	S4	262	3	3	4'-4"	427
GDR. 4	S4	264	3	3	4'-4"	430
GDR. 5	S4	266	3	3	4'-4"	433
	S5	46	3	2	3'-3"	56
	S6	24	5	STR	6'-0"	150
	✱ S7	10	5	STR	4'-0"	42
GDR. 1	S8	163	4	STR	3'-8"	399
GDR. 2	S8	164	4	STR	3'-8"	402
GDR. 3	S8	165	4	STR	3'-8"	404
GDR. 4	S8	167	4	STR	3'-8"	409
GDR. 5	S8	168	4	STR	3'-8"	411
	S9	16	4	STR	8'-0"	86
	S10	16	4	4	6'-8"	71
	S11	8	6	STR	28'-0"	336
GDR. 1	S12	37	5	1	7'-11"	306
GDR. 2	S12	38	5	1	7'-11"	314
GDR. 3	S12	39	5	1	7'-11"	322
GDR. 4	S12	40	5	1	7'-11"	330
GDR. 5	S12	41	5	1	7'-11"	339
	S13	14	5	5	12'-8"	185

QUANTITIES FOR ONE GIRDER

GIRDER	REINFORCING STEEL LB.	10,000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS NO.
GDR. 1	4435	41.4	75
GDR. 2	4450	41.7	75
GDR. 3	4463	42.1	75
GDR. 4	4479	42.4	75
GDR. 5	4493	42.8	75

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	VARIES	743.50'

SPAN O

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	152	5	1	7'-10"	1242
	S2	120	5	1	7'-2"	897
GDR. 1	S3	67	5	1	8'-1"	565
GDR. 2	S3	68	5	1	8'-1"	573
GDR. 3	S3	69	5	1	8'-1"	582
GDR. 4	S3	70	5	1	8'-1"	590
GDR. 5	S3	71	5	1	8'-1"	599
GDR. 1	S4	258	3	3	4'-4"	420
GDR. 2	S4	260	3	3	4'-4"	424
GDR. 3	S4	262	3	3	4'-4"	427
GDR. 4	S4	264	3	3	4'-4"	430
GDR. 5	S4	266	3	3	4'-4"	433
	S5	46	3	2	3'-3"	56
	S6	24	5	STR	6'-0"	150
	✱ S7	20	5	STR	4'-0"	83
GDR. 1	S8	163	4	STR	3'-8"	399
GDR. 2	S8	164	4	STR	3'-8"	402
GDR. 3	S8	165	4	STR	3'-8"	404
GDR. 4	S8	167	4	STR	3'-8"	409
GDR. 5	S8	168	4	STR	3'-8"	411
	S9	16	4	STR	8'-0"	86
	S10	16	4	4	6'-8"	71
	S11	8	6	STR	28'-0"	336
	S13	14	5	5	12'-8"	185

QUANTITIES FOR ONE GIRDER

GIRDER	REINFORCING STEEL LB.	10,000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS NO.
GDR. 1	4490	41.4	75
GDR. 2	4505	41.7	75
GDR. 3	4519	42.1	75
GDR. 4	4535	42.4	75
GDR. 5	4549	42.8	75

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	VARIES	743.07'

SPAN P

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

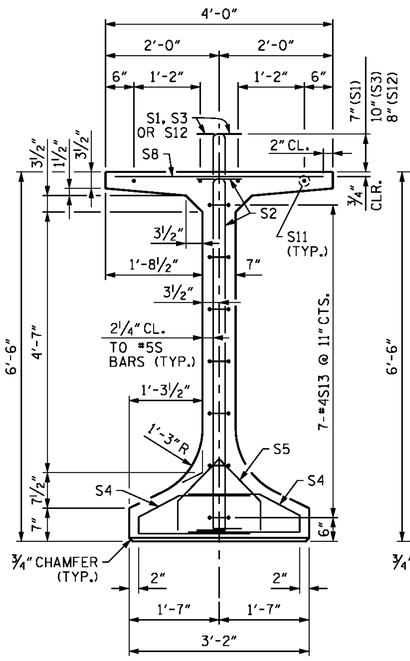
	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
	S1	152	5	1	7'-10"	1242
	S2	120	5	1	7'-2"	897
GDR. 1	S3	67	5	1	8'-1"	565
GDR. 2	S3	68	5	1	8'-1"	573
GDR. 3	S3	69	5	1	8'-1"	582
GDR. 4	S3	70	5	1	8'-1"	590
GDR. 5	S3	71	5	1	8'-1"	599
GDR. 1	S4	258	3	3	4'-4"	420
GDR. 2	S4	260	3	3	4'-4"	424
GDR. 3	S4	262	3	3	4'-4"	427
GDR. 4	S4	264	3	3	4'-4"	430
GDR. 5	S4	266	3	3	4'-4"	433
	S5	46	3	2	3'-3"	56
	S6	24	5	STR	6'-0"	150
	✱ S7	10	5	STR	4'-0"	42
GDR. 1	S8	163	4	STR	3'-8"	399
GDR. 2	S8	164	4	STR	3'-8"	402
GDR. 3	S8	165	4	STR	3'-8"	404
GDR. 4	S8	167	4	STR	3'-8"	409
GDR. 5	S8	168	4	STR	3'-8"	411
	S9	16	4	STR	8'-0"	86
	S10	16	4	4	6'-8"	71
	S11	8	6	STR	28'-0"	336
	S13	14	5	5	12'-8"	185

QUANTITIES FOR ONE GIRDER

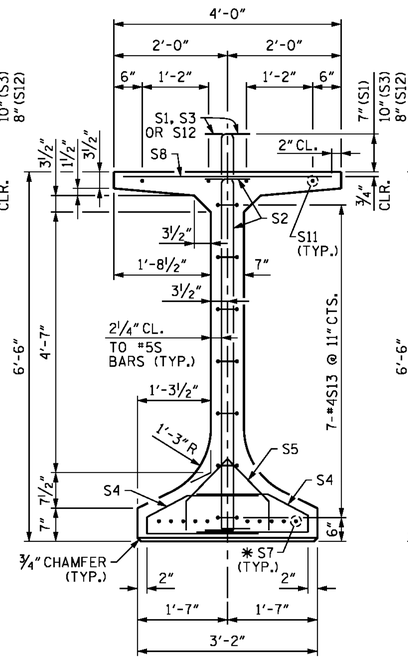
GIRDER	REINFORCING STEEL LB.	10,000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS NO.
GDR. 1	4449	41.4	75
GDR. 2	4464	41.7	75
GDR. 3	4478	42.1	75
GDR. 4	4494	42.4	75
GDR. 5	4508	42.8	75

GIRDERS REQUIRED

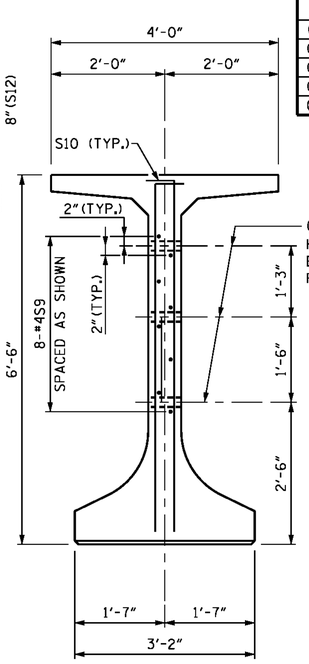
NUMBER	LENGTH	TOTAL LENGTH
5	VARIES	743.07'



SECTION A-A



SECTION B-B

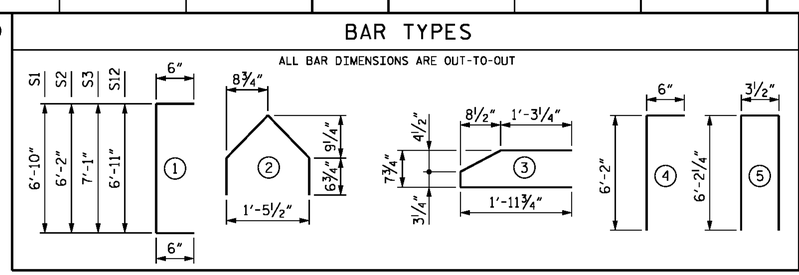


SECTION C-C

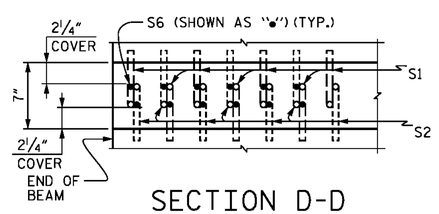
(S3, S12, S4 AND S8 BARS NOT SHOWN)

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



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



SECTION D-D

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 4

DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016
DRAWN BY:	M. HOBBS	DATE :	JAN 2016
CHECKED BY:	J. SHERMAN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty

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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

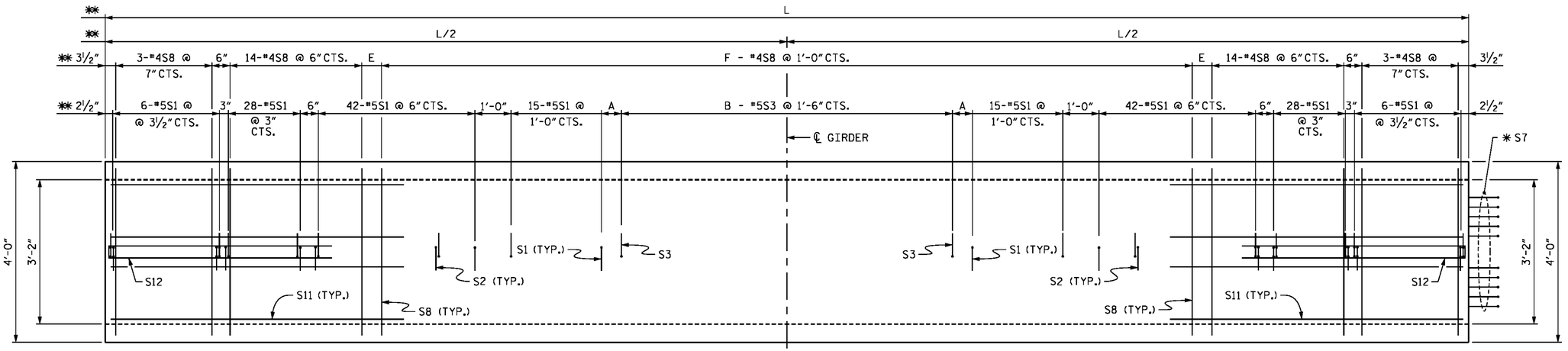
SUPERSTRUCTURE

F.I.B. 78" PRESTRESSED CONCRETE GIRDER

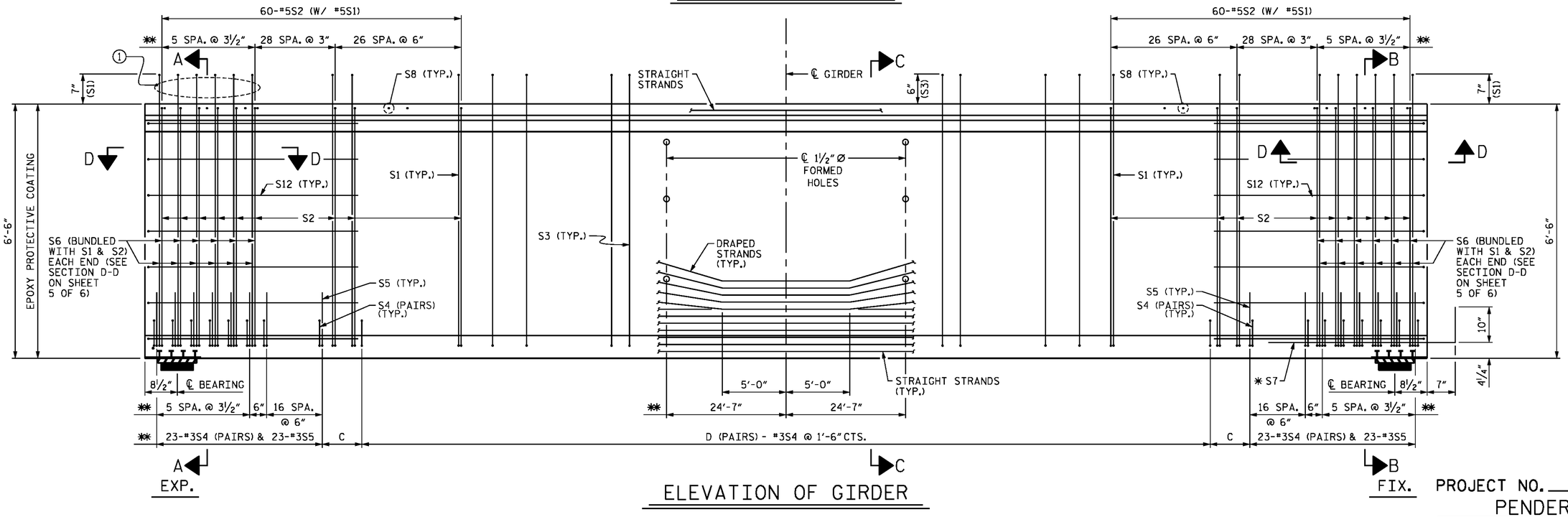
(SPANS N, O AND P)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-88
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400.173.B4929_SMU_FIB78_04.dgn



PLAN OF GIRDER



ELEVATION OF GIRDER

SPANS Q, T AND W GIRDER DIMENSIONS							
GIRDER	L	A	B	C	D	E	F
GDR. 01, T1 AND W1	146'-3¼"	1'-5⅝"	37	1'-5⅝"	83	8⅛"	129
GDR. 02, T2 AND W2	147'-5⅞"	1'-3¹⁵⁄₁₆"	38	1'-3¹⁵⁄₁₆"	84	9⅞"	130
GDR. 03, T3 AND W3	148'-8½"	1'-2¼"	39	1'-2¼"	85	10¾"	131
GDR. 04, T4 AND W4	149'-11⅛"	1'-0⅜"	40	1'-0⅜"	86	6⅛"	133
GDR. 05, T5 AND W5	151'-1⅞"	10¹⁵⁄₁₆"	41	10¹⁵⁄₁₆"	87	7⅛"	134

NOTES

SEE PARTIAL ELEVATION ON SHEET 5 OF 6 FOR ADDITIONAL "S" BARS.

** MEASURED AND SPACED ALONG GIRDER BOTTOM FLANGE. SEE GIRDER LENGTH DETAIL ON "PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS - F.I.B GIRDERS" SHEET.

(1) ROTATE END "S" BARS SUCH THAT THEY ARE PLACED PARALLEL TO THE END BEVEL WHILE MAINTAINING 2" OF CONCRETE COVER. TAPER SPACING OF ADJACENT "S" BARS SUCH THAT THE CLEAR DISTANCE BETWEEN THE BARS EXCEEDS 1½".

ALTERNATE DIRECTION OF #5S1, #5S2 AND #5S3 BARS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 78" PRESTRESSED CONCRETE GIRDER
(SPAN Q, T AND W)

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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NO.	BY:	DATE:	NO.	BY:	DATE:	S-89
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	B. LOFLIN	DATE : JAN 2016
DRAWN BY:	M. HOBBS	DATE : JAN 2016
CHECKED BY:	J. SHERMAN	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/10/2016
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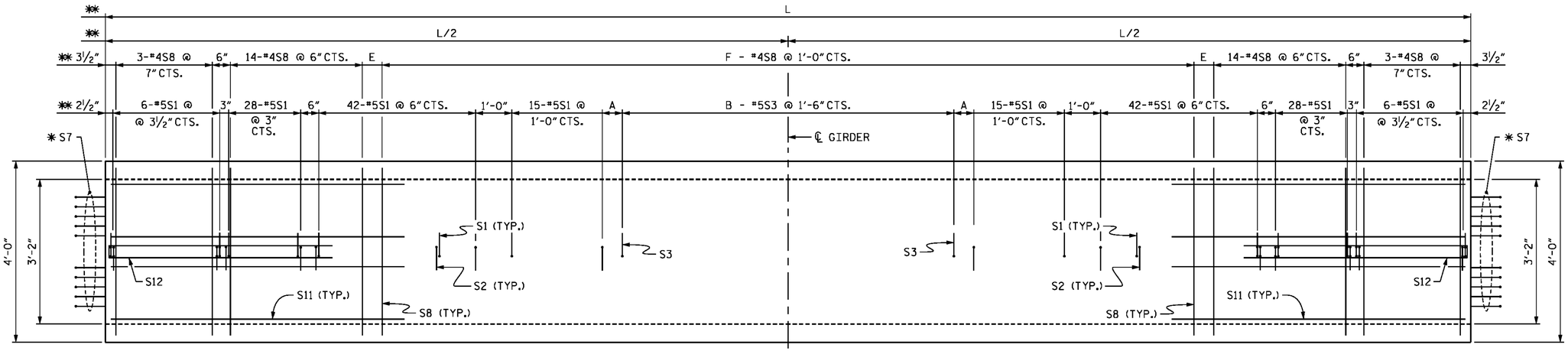
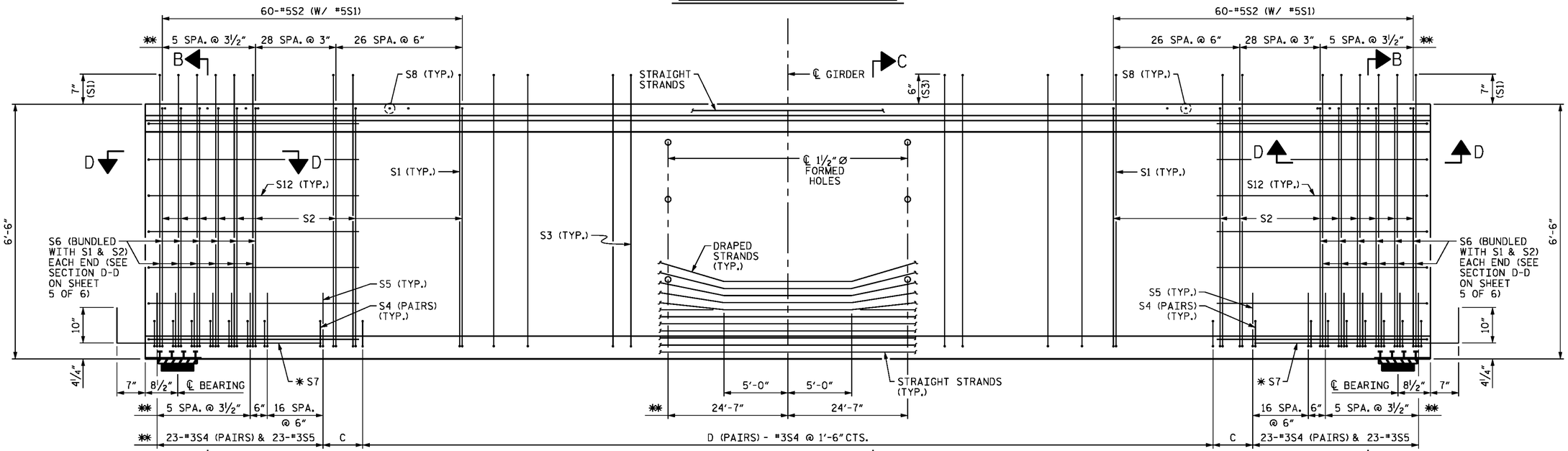


PLAN OF GIRDER



ELEVATION OF GIRDER

(FOR NOTES, SEE SHEET 1 OF 6)

SPANS R AND U GIRDER DIMENSIONS							
GIRDER	L	A	B	C	D	E	F
GDR. R1 AND U1	146'-3¼"	1'-5⅝"	37	1'-5⅝"	83	8⅛"	129
GDR. R2 AND U2	147'-5⅞"	1'-3 15/16"	38	1'-3 15/16"	84	9 7/16"	130
GDR. R3 AND U3	148'-8½"	1'-2¼"	39	1'-2¼"	85	10¾"	131
GDR. R4 AND U4	149'-11⅛"	1'-0 9/16"	40	1'-0 9/16"	86	6 1/16"	133
GDR. R5 AND U5	151'-1⅞"	10 15/16"	41	10 15/16"	87	7 7/16"	134

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 78"
PRESTRESSED
CONCRETE GIRDER
(SPANS R AND U)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-90
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
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NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
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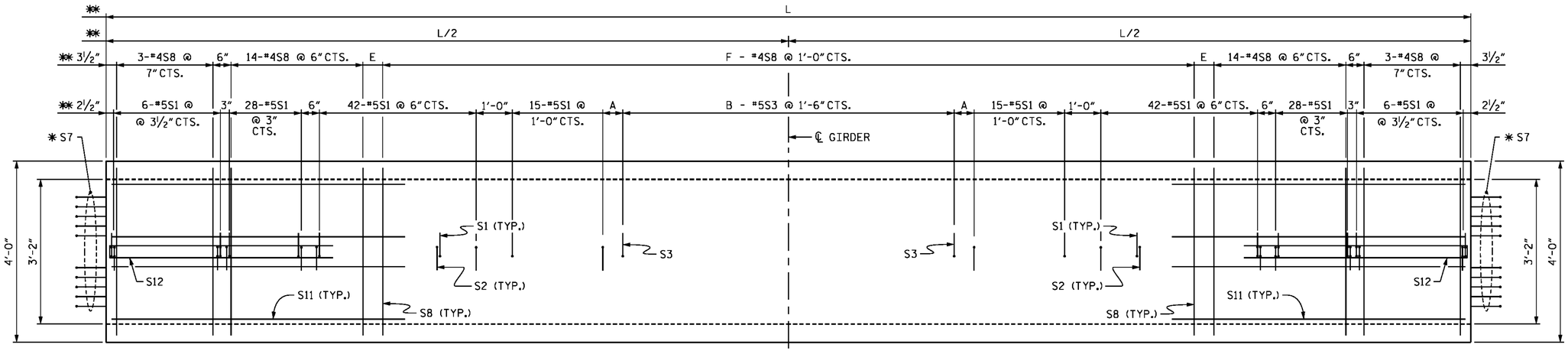
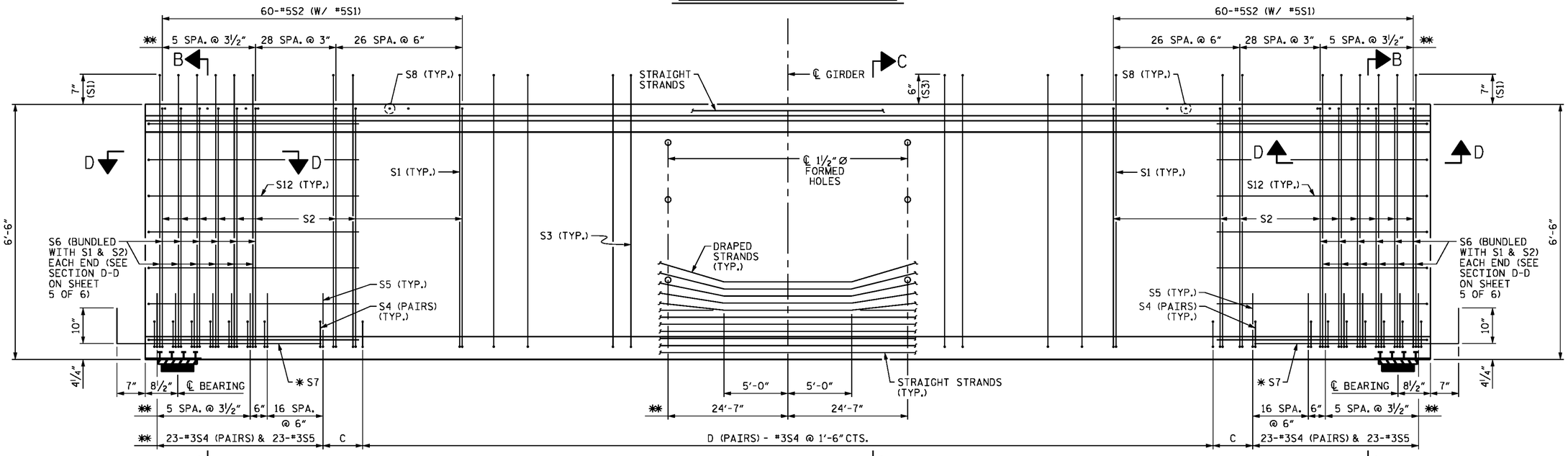
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	B. LOFLIN	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	FEB 2016
CHECKED BY:	J. SHERMAN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400.177_B4929_SMU_FIB78_06.dgn



PLAN OF GIRDER



ELEVATION OF GIRDER

(FOR NOTES, SEE SHEET 1 OF 6)

SPAN X GIRDER DIMENSIONS							
GIRDER	L	A	B	C	D	E	F
GDR. X1	147'-4"	1'-3"	38	1'-3"	84	8½"	130
GDR. X2	148'-1⅜"	10 11/16"	39	10 11/16"	85	7⅜"	131
GDR. X3	148'-10¾"	1'-3⅜"	39	1'-3⅜"	85	11⅞"	131
GDR. X4	149'-8¼"	11⅛"	40	11⅛"	86	10⅝"	132
GDR. X5	150'-5⅝"	1'-3 13/16"	40	1'-3 13/16"	86	9 5/16"	133

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 78"
PRESTRESSED
CONCRETE GIRDER
(SPAN X)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-91
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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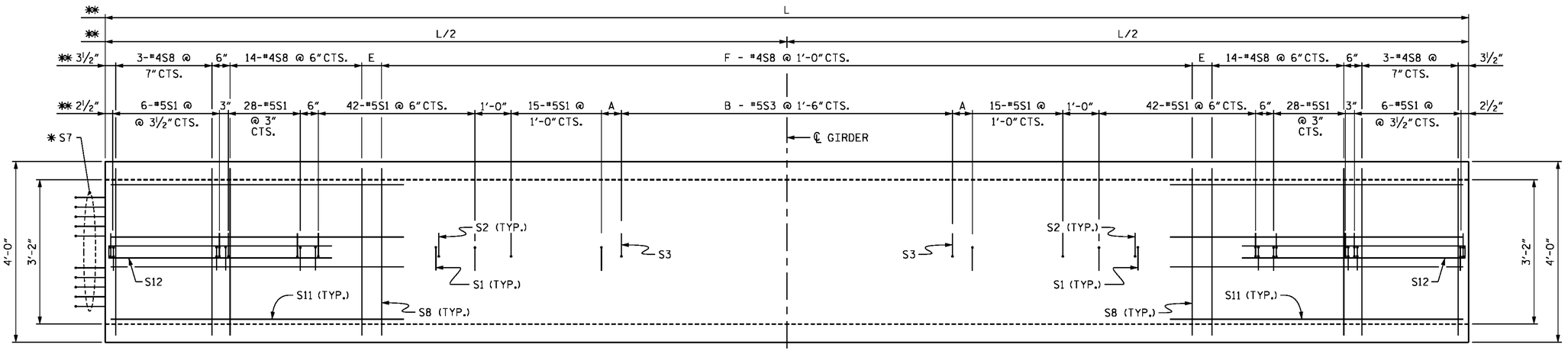
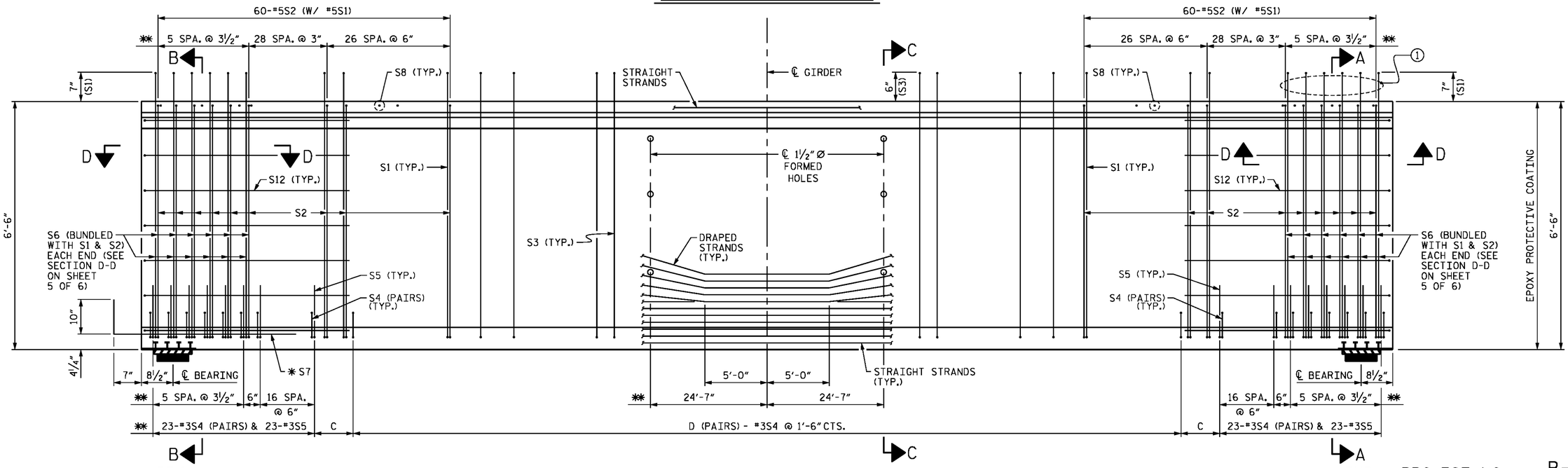
DESIGNED BY:	B. LOFLIN	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : FEB 2016
CHECKED BY:	J. SHERMAN	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/10/2016
400.179_B4929_SMU_FIB78_07.dgn



PLAN OF GIRDER



ELEVATION OF GIRDER

(FOR NOTES, SEE SHEET 1 OF 6)

SPANS S, V AND Y GIRDER DIMENSIONS							
GIRDER	L	A	B	C	D	E	F
GDRS. S1 AND V1	146'-3¼"	1'-5⅝"	37	1'-5⅝"	83	8⅛"	129
GDRS. S2 AND V2	147'-5⅞"	1'-3¹⁵⁄₁₆"	38	1'-3¹⁵⁄₁₆"	84	9⅞"	130
GDRS. S3 AND V3	148'-8½"	1'-2¼"	39	1'-2¼"	85	10¾"	131
GDRS. S4 AND V4	149'-11⅛"	1'-0⅝"	40	1'-0⅝"	86	6¹⁄₁₆"	133
GDRS. S5 AND V5	151'-1⅞"	10¹⁵⁄₁₆"	41	10¹⁵⁄₁₆"	87	7⅞"	134
GDRS. Y1 - Y5	140'-9⅛"	11⅜"	34	11⅜"	80	11¹⁄₁₆"	123

DESIGNED BY:	B. LOFLIN	DATE :	FEB 2016
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DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C864482274F7

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PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

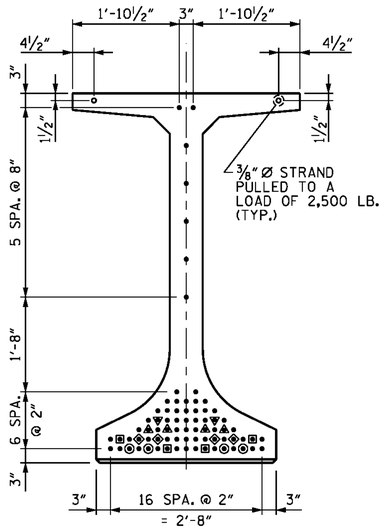
SHEET 4 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

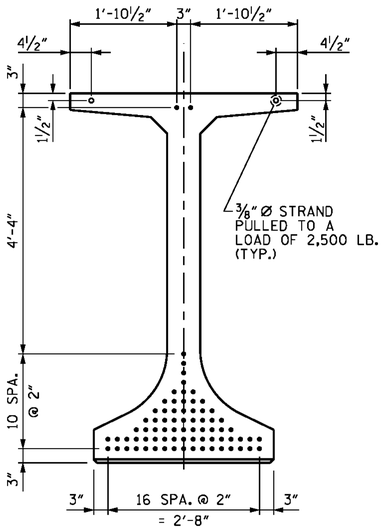
F.I.B. 78" PRESTRESSED CONCRETE GIRDER
(SPANS S, V AND Y)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-92
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400_181_B4929_SMU_FIB78_08.dgn



AT END OF GIRDER



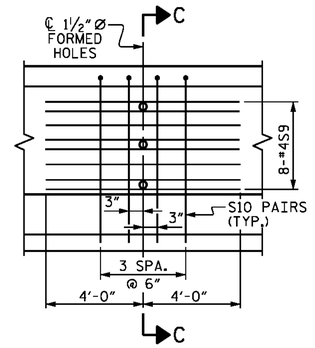
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(75 STRANDS REQUIRED)

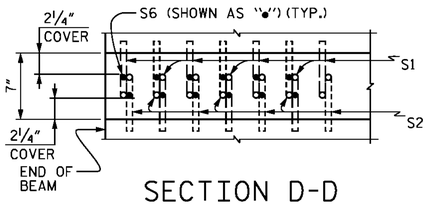
DEBONDING LEGEND

- • - FULLY BONDED STRANDS
- ◉ - DEBONDED FOR 20'-0" FROM END OF GIRDER
- ▣ - DEBONDED FOR 16'-0" FROM END OF GIRDER
- ◈ - DEBONDED FOR 12'-0" FROM END OF GIRDER
- ▲ - DEBONDED FOR 8'-0" FROM END OF GIRDER
- ▼ - DEBONDED FOR 4'-0" FROM END OF GIRDER

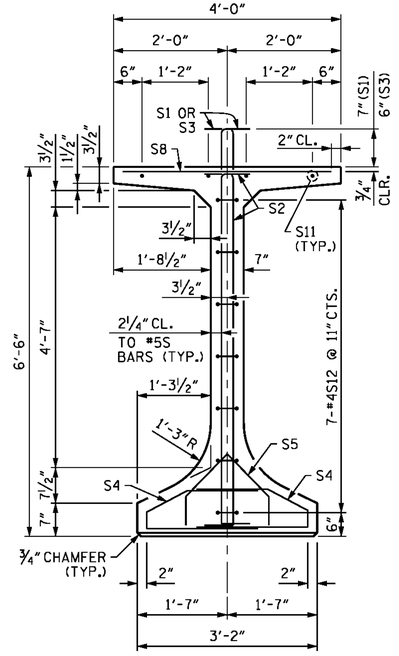


PARTIAL ELEVATION

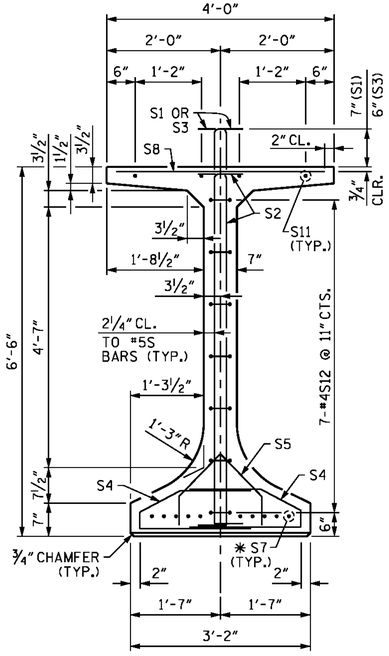
SHOWING INTERMEDIATE STEEL DIAPHRAGM REINFORCING STEEL FOR ALL SPANS.



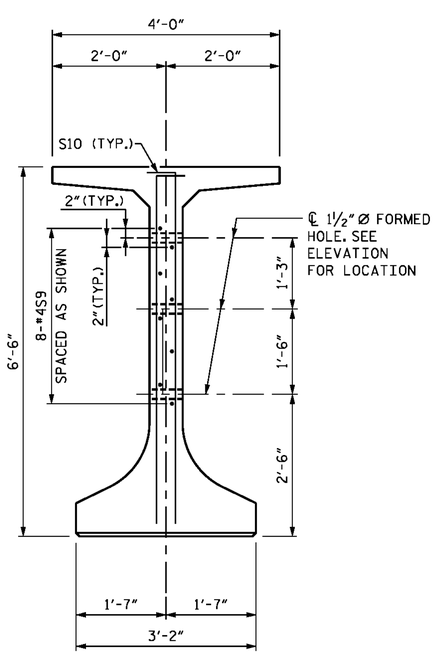
SECTION D-D



SECTION A-A



SECTION B-B



SECTION C-C

(S3, S4 AND S8 BARS NOT SHOWN)

DESIGNED BY:	B. LOFLIN	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	FEB 2016
CHECKED BY:	J. SHERMAN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
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LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 78" PRESTRESSED CONCRETE GIRDER

(SPANS Q THROUGH Y)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-93
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400183_B4929_SMU_FIB78_09.dgn

SPANS Q, S, T, V AND W

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	182	5	1	7′-10″	1487
	S2	120	5	1	7′-2″	897
GDR. 1	S3	37	5	1	7′-9″	299
GDR. 2	S3	38	5	1	7′-9″	307
GDR. 3	S3	39	5	1	7′-9″	315
GDR. 4	S3	40	5	1	7′-9″	323
GDR. 5	S3	41	5	1	7′-9″	331
GDR. 1	S4	258	3	3	4′-4″	420
GDR. 2	S4	260	3	3	4′-4″	424
GDR. 3	S4	262	3	3	4′-4″	427
GDR. 4	S4	264	3	3	4′-4″	430
GDR. 5	S4	266	3	3	4′-4″	433
	S5	46	3	2	3′-3″	56
	S6	24	5	STR	6′-0″	150
	✱S7	10	5	STR	4′-0″	42
GDR. 1	S8	163	4	STR	3′-8″	399
GDR. 2	S8	164	4	STR	3′-8″	402
GDR. 3	S8	165	4	STR	3′-8″	404
GDR. 4	S8	167	4	STR	3′-8″	409
GDR. 5	S8	168	4	STR	3′-8″	411
	S9	16	4	STR	8′-0″	86
	S10	16	4	4	6′-8″	71
	S11	8	6	STR	28′-0″	336
	S12	14	5	5	12′-8″	185

QUANTITIES FOR ONE GIRDER

GIRDER	REINFORCING STEEL LB.	10,000 PSI CONCRETE C.Y.	0.6″Ø L.R. STRANDS NO.
GDR. 1	4428	41.4	75
GDR. 2	4443	41.7	75
GDR. 3	4456	42.1	75
GDR. 4	4472	42.4	75
GDR. 5	4485	42.8	75

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
25	VARIES	3717.76′

SPANS R AND U

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	182	5	1	7′-10″	1487
	S2	120	5	1	7′-2″	897
GDR. 1	S3	37	5	1	7′-9″	299
GDR. 2	S3	38	5	1	7′-9″	307
GDR. 3	S3	39	5	1	7′-9″	315
GDR. 4	S3	40	5	1	7′-9″	323
GDR. 5	S3	41	5	1	7′-9″	331
GDR. 1	S4	258	3	3	4′-4″	420
GDR. 2	S4	260	3	3	4′-4″	424
GDR. 3	S4	262	3	3	4′-4″	427
GDR. 4	S4	264	3	3	4′-4″	430
GDR. 5	S4	266	3	3	4′-4″	433
	S5	46	3	2	3′-3″	56
	S6	24	5	STR	6′-0″	150
	✱S7	20	5	STR	4′-0″	83
GDR. 1	S8	163	4	STR	3′-8″	399
GDR. 2	S8	164	4	STR	3′-8″	402
GDR. 3	S8	165	4	STR	3′-8″	404
GDR. 4	S8	167	4	STR	3′-8″	409
GDR. 5	S8	168	4	STR	3′-8″	411
	S9	16	4	STR	8′-0″	86
	S10	16	4	4	6′-8″	71
	S11	8	6	STR	28′-0″	336
	S12	14	5	5	12′-8″	185

QUANTITIES FOR ONE GIRDER

GIRDER	REINFORCING STEEL LB.	10,000 PSI CONCRETE C.Y.	0.6″Ø L.R. STRANDS NO.
GDR. 1	4469	41.4	75
GDR. 2	4484	41.7	75
GDR. 3	4497	42.1	75
GDR. 4	4513	42.4	75
GDR. 5	4526	42.8	75

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
10	VARIES	1487.10′

SPAN X

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	182	5	1	7′-10″	1487
	S2	120	5	1	7′-2″	897
GDR. 1	S3	38	5	1	7′-9″	307
GDR. 2	S3	39	5	1	7′-9″	315
GDR. 3	S3	39	5	1	7′-9″	315
GDR. 4	S3	40	5	1	7′-9″	323
GDR. 5	S3	40	5	1	7′-9″	323
GDR. 1	S4	260	3	3	4′-4″	424
GDR. 2	S4	262	3	3	4′-4″	427
GDR. 3	S4	262	3	3	4′-4″	427
GDR. 4	S4	264	3	3	4′-4″	430
GDR. 5	S4	264	3	3	4′-4″	430
	S5	46	3	2	3′-3″	56
	S6	24	5	STR	6′-0″	150
	✱S7	20	5	STR	4′-0″	83
GDR. 1	S8	164	4	STR	3′-8″	402
GDR. 2	S8	165	4	STR	3′-8″	404
GDR. 3	S8	165	4	STR	3′-8″	404
GDR. 4	S8	166	4	STR	3′-8″	407
GDR. 5	S8	167	4	STR	3′-8″	409
	S9	16	4	STR	8′-0″	86
	S10	16	4	4	6′-8″	71
	S11	8	6	STR	28′-0″	336
	S12	14	5	5	12′-8″	185

QUANTITIES FOR ONE GIRDER

GIRDER	REINFORCING STEEL LB.	10,000 PSI CONCRETE C.Y.	0.6″Ø L.R. STRANDS NO.
GDR. 1	4484	41.7	75
GDR. 2	4497	41.9	75
GDR. 3	4497	42.1	75
GDR. 4	4511	42.4	75
GDR. 5	4513	42.6	75

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	VARIES	744.50′

SPAN Y

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	182	5	1	7′-10″	1487
S2	120	5	1	7′-2″	897
S3	34	5	1	7′-9″	275
S4	252	3	3	4′-4″	411
S5	46	3	2	3′-3″	56
S6	24	5	STR	6′-0″	150
✱S7	10	5	STR	4′-0″	42
S8	157	4	STR	3′-8″	385
S9	16	4	STR	8′-0″	86
S10	16	4	4	6′-8″	71
S11	8	6	STR	28′-0″	336
S12	14	5	5	12′-8″	185

QUANTITIES FOR ONE GIRDER

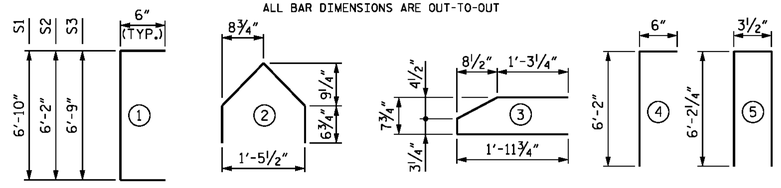
REINFORCING STEEL LB.	10,000 PSI CONCRETE C.Y.	0.6″Ø L.R. STRANDS NO.
4381	39.8	75

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	140.76′	703.80′

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



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

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 6 OF 6

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 78″ PRESTRESSED CONCRETE GIRDER
(SPANS Q THROUGH Y)

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

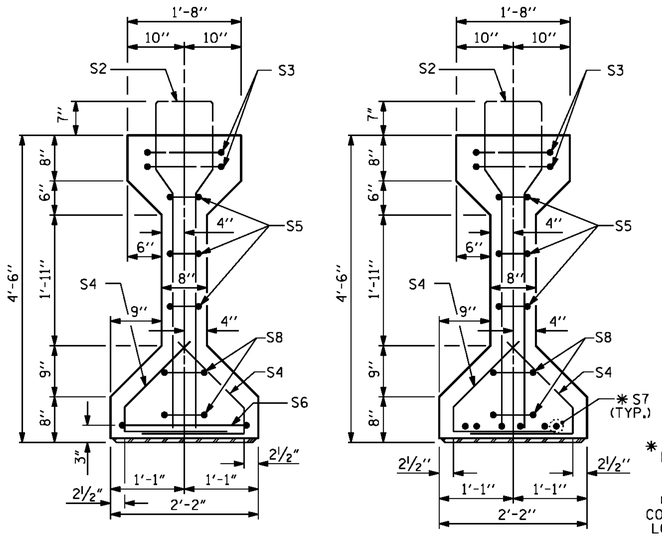
DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-94
1			3			TOTAL SHEETS
2			4			278

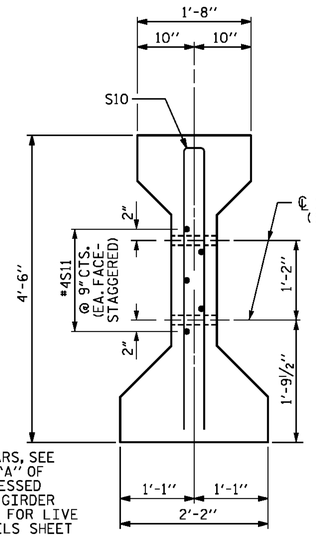
DESIGNED BY: B. LOFLIN DATE: FEB 2016
DRAWN BY: M. HOBBS DATE: FEB 2016
CHECKED BY: J. SHERMAN DATE: FEB 2016
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: MAY 2016

5/10/2016
400_185_B4929_SMU_FIB78_10.dgn



SECTION A-A

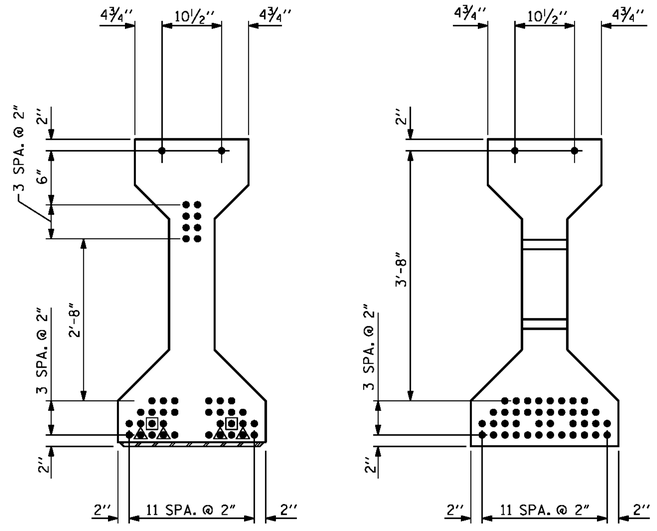
SECTION B-B



SECTION C-C

(S1 BARS NOT SHOWN)

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

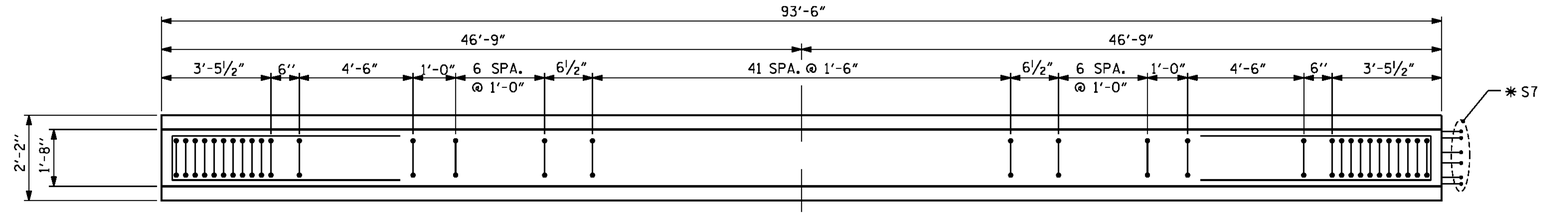


AT END OF GIRDER

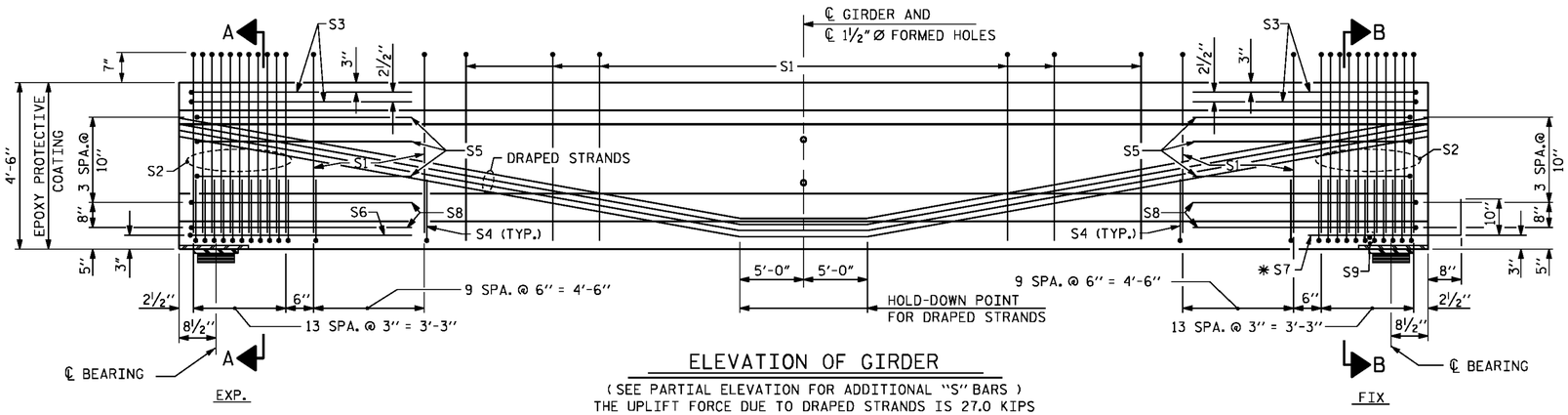
AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(42 STRANDS REQUIRED)



PLAN OF GIRDER

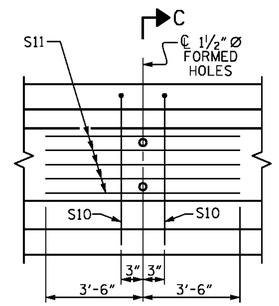


ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
THE UPLIFT FORCE DUE TO DRAPED STRANDS IS 27.0 KIPS

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ▣ STRANDS DEBONDED FOR 2'-0" FROM END OF GIRDER
- ◬ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos. AA1 TO AA7

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

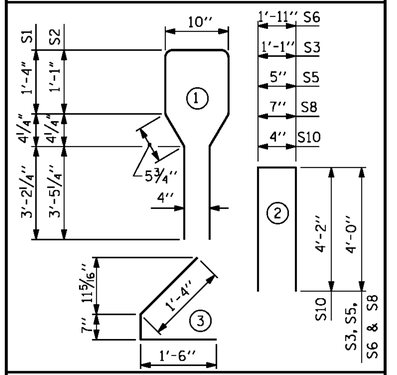
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	76	#4	1	10'-10"	550
S2	28	#6	1	10'-10"	456
S3	4	#4	2	9'-1"	24
S4	96	#4	3	3'-5"	219
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
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23

✱ 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	9000 PSI CONCRETE	0.6" Ø L. R. STRANDS
	LB.	C.Y.	No.
	1378	18.98	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
7	93.50'	654.50'

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-95
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. BORUTA	DATE : OCT 2015
DRAWN BY:	M. HOBBS	DATE : OCT 2015
CHECKED BY:	M. WAGNER	DATE : JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

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

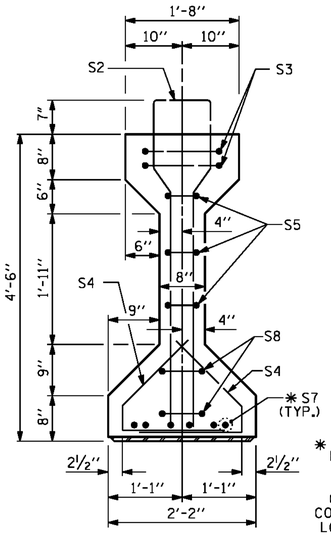
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

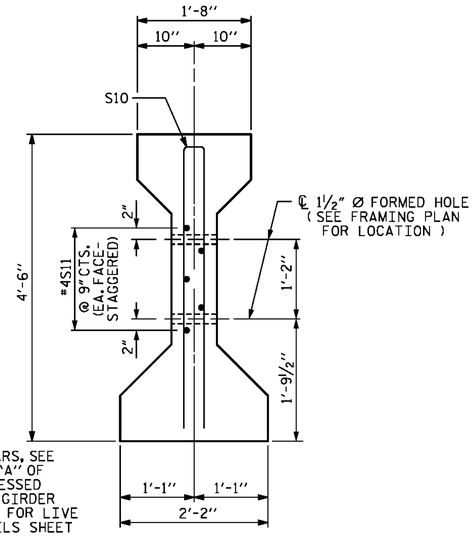
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STD. NO. PCG6

5/11/2016
400_187_B4929_SMU_G4.dgn



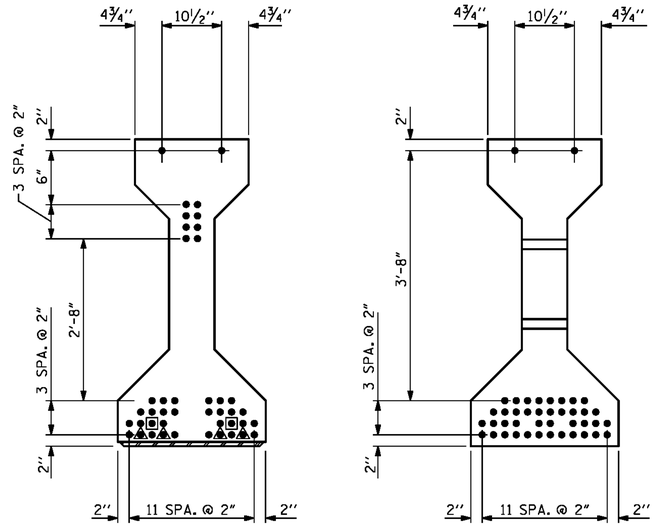
SECTION B-B



SECTION C-C

(S1 BARS NOT SHOWN)

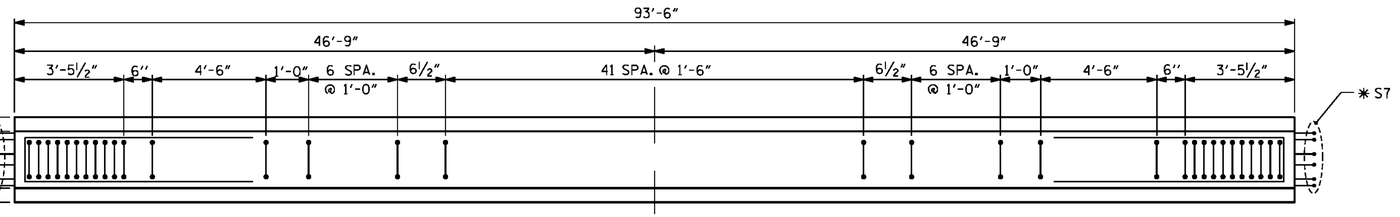
✱ FOR S7 BARS, SEE DETAIL "A" OF PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET



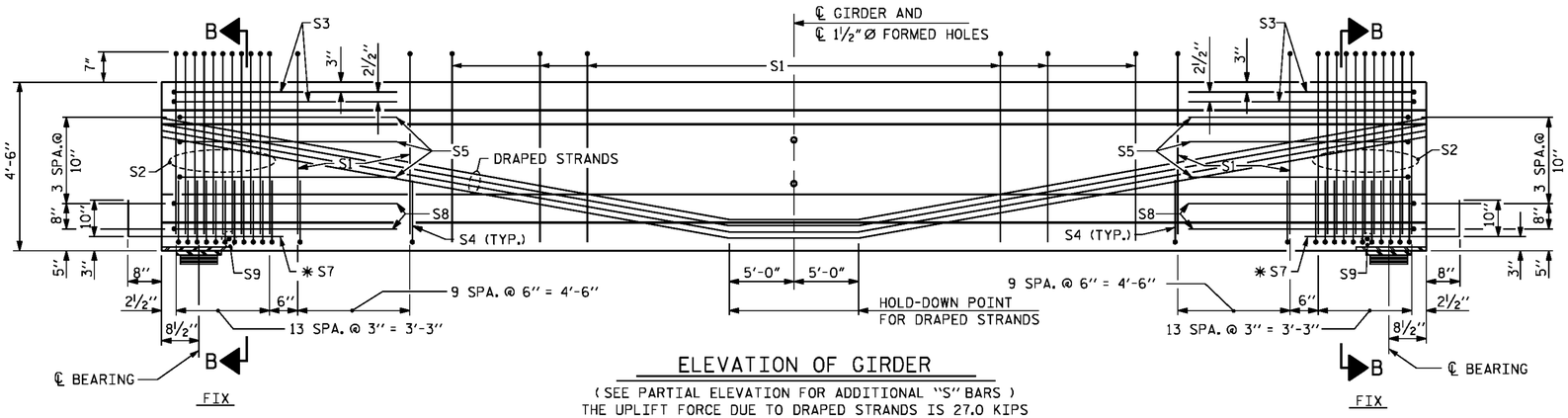
AT END OF GIRDER AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(42 STRANDS REQUIRED)



PLAN OF GIRDER

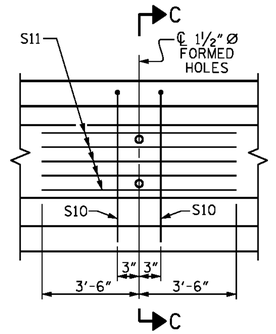


ELEVATION OF GIRDER

(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
THE UPLIFT FORCE DUE TO DRAPED STRANDS IS 27.0 KIPS

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ◙ STRANDS DEBONDED FOR 2'-0" FROM END OF GIRDER
- ◬ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM
REINFORCING STEEL FOR GIRDER Nos. AB1 TO AB7

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

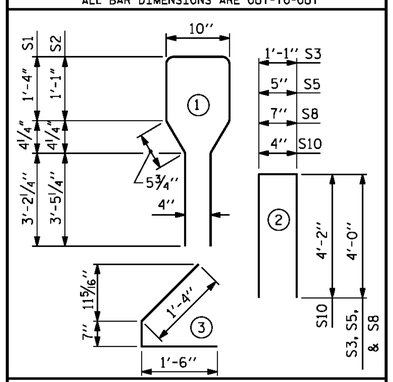
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	76	#4	1	10'-10"	550
S2	28	#6	1	10'-10"	456
S3	4	#4	2	9'-1"	24
S4	96	#4	3	3'-5"	219
S5	6	#4	2	8'-5"	34
✱ S7	12	#5	STR	3'-8"	46
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"	23

✱ 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 LB.	9000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
.	1394	18.98	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
7	93.50'	654.50'

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-96
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. BORUTA	DATE :	OCT 2015
DRAWN BY:	M. HOBBS	DATE :	OCT 2015
CHECKED BY:	M. WAGNER	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

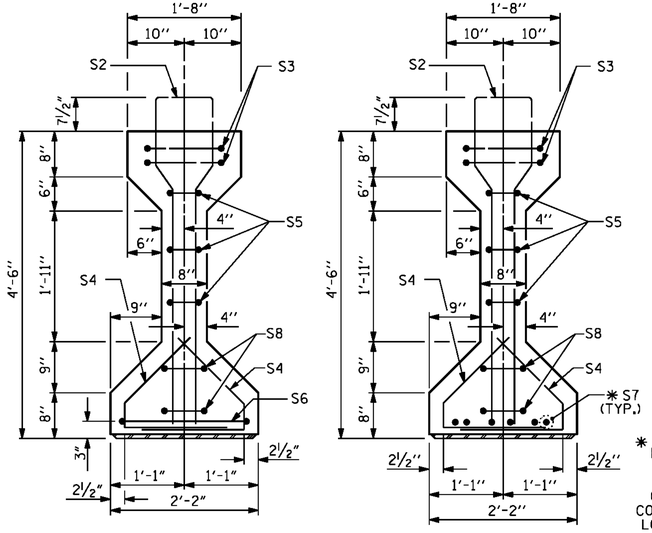
5/12/16

DocuSigned by:
Jason R Doughty
00F1C88448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

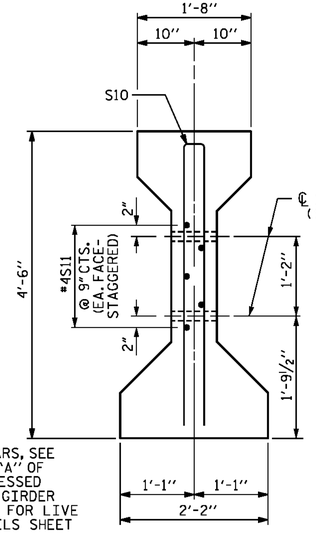
STD. NO. PCG6

5/11/2016
400.189_B4929_SMU_G5.dgn



SECTION A-A

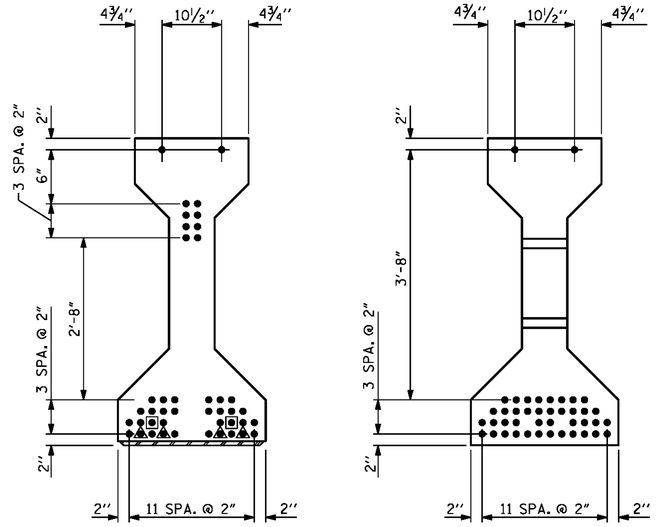
SECTION B-B



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

SECTION C-C

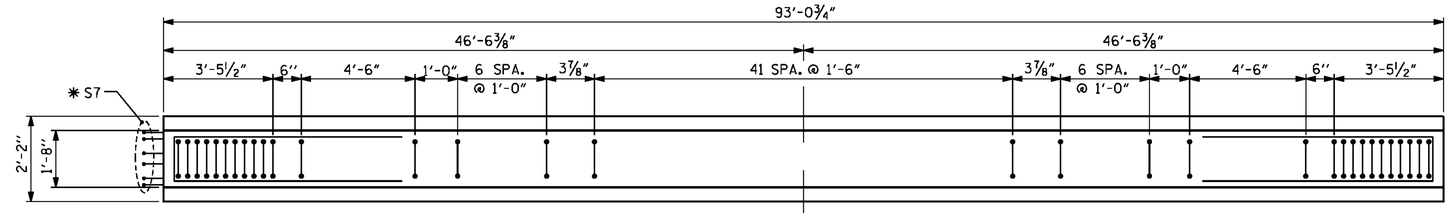
(S12 BARS NOT SHOWN)



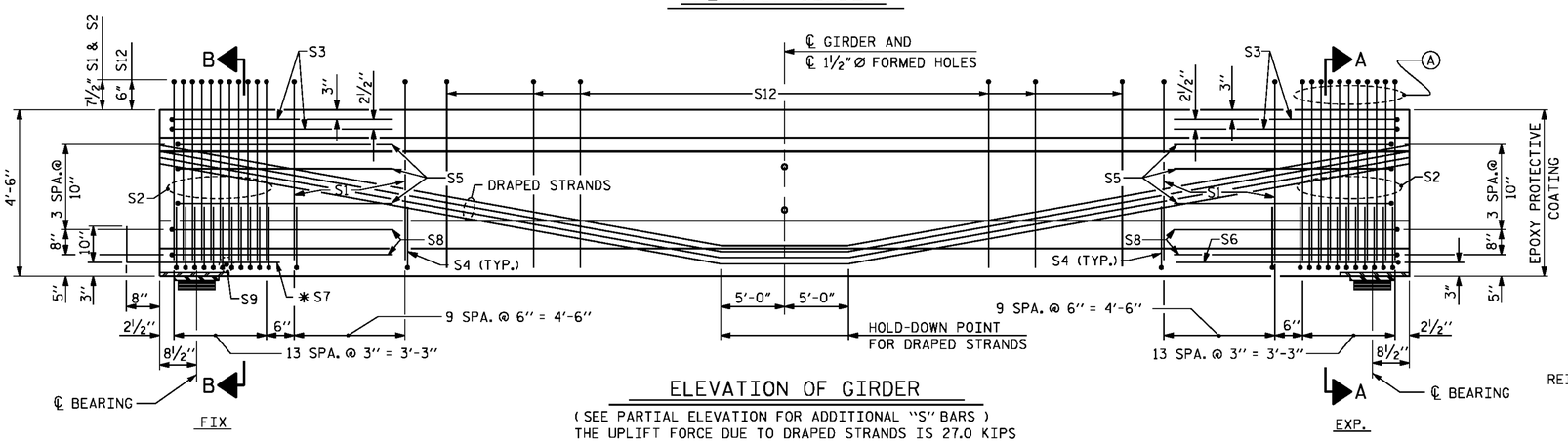
AT END OF GIRDER AT ℄ OF GIRDER

0.6" Ø LOW RELAXATION STRAND LAYOUT

(42 STRANDS REQUIRED)



PLAN OF GIRDER



ELEVATION OF GIRDER

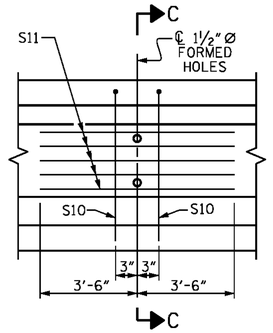
(SEE PARTIAL ELEVATION FOR ADDITIONAL "S" BARS)
THE UPLIFT FORCE DUE TO DRAPED STRANDS IS 27.0 KIPS

SEE END BEVEL DETAIL ON PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS SHEET.

Ⓐ WHEN END BEVEL IS REQUIRED, ROTATE END S2 BAR SUCH THAT THEY ARE PLACED PARALLEL TO THE END BEVEL WHILE MAINTAINING 2" OF CONCRETE COVER. TAPER SPACING OF ADJACENT S2 BARS SUCH THAT THE CLEAR DISTANCE BETWEEN THE BARS EXCEEDS 1½".

DEBONDING LEGEND

- ● FULLY BONDED STRANDS
- ▣ STRANDS DEBONDED FOR 2'-0" FROM END OF GIRDER
- ◬ STRANDS DEBONDED FOR 4'-0" FROM END OF GIRDER



PARTIAL ELEVATION

SHOWING INTERMEDIATE DIAPHRAGM REINFORCING STEEL FOR GIRDER Nos. AC1 TO AC7

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

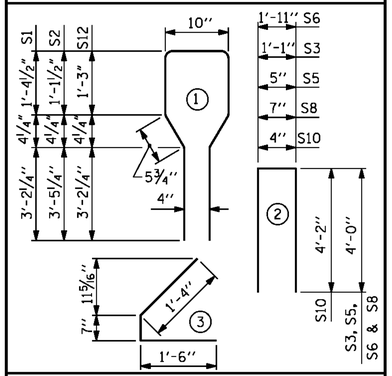
REINFORCING STEEL FOR ONE GIRDER

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	20	#4	1	10'-11"	146
S2	28	#6	1	10'-11"	459
S3	4	#4	2	9'-1"	24
S4	96	#4	3	3'-5"	219
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
S10	2	#5	2	8'-8"	18
S11	5	#4	STR	7'-0"	23
S12	56	#4	1	10'-8"	399

✱ 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 LB.	9000 PSI CONCRETE C.Y.	0.6" Ø L.R. STRANDS No.
.	1376	18.89	42

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
7	93.06'	651.44'

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

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

DESIGNED BY:	J. BORUTA	DATE : OCT 2015
DRAWN BY:	M. HOBBS	DATE : OCT 2015
CHECKED BY:	M. WAGNER	DATE : JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

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

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-97
1			3			TOTAL SHEETS
2			4			278

STD. NO. PCG6

5/11/2016
400_191_B4929_SMU_G6.dgn

DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS IN UNIT 1

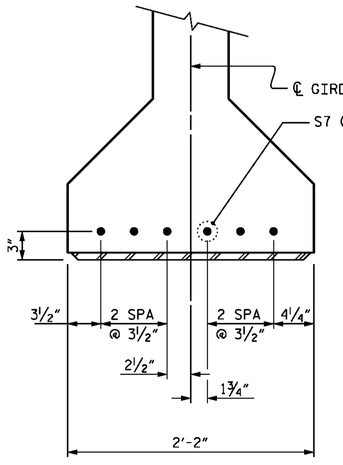
	0.6"Ø LOW RELAXATION	SPAN A											SPAN B											SPAN C										
	TENTH POINTS	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.
GIRDERS 1 AND 5	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.061	0.115	0.157	0.184	0.193	0.184	0.157	0.115	0.061	0.000	0.000	0.061	0.115	0.157	0.184	0.193	0.184	0.157	0.115	0.061	0.000	0.000	0.061	0.115	0.157	0.184	0.193	0.184	0.157	0.115	0.061	0.000
	✱DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.038	0.074	0.103	0.122	0.128	0.122	0.103	0.074	0.038	0.000	0.000	0.038	0.076	0.105	0.124	0.130	0.124	0.105	0.076	0.038	0.000	0.000	0.038	0.076	0.105	0.124	0.130	0.124	0.105	0.076	0.038	0.000
	FINAL CAMBER ↑	0	1/4"	1/2"	5/8"	3/4"	13/16"	3/4"	5/8"	1/2"	1/4"	0	0	1/4"	7/16"	5/8"	3/4"	3/4"	3/4"	5/8"	7/16"	1/4"	0	0	1/4"	7/16"	5/8"	3/4"	3/4"	3/4"	5/8"	7/16"	1/4"	0

DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS IN UNIT 1

	0.6"Ø LOW RELAXATION	SPAN A											SPAN B											SPAN C										
	TENTH POINTS	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.
GIRDERS 2-4	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.061	0.115	0.157	0.184	0.193	0.184	0.157	0.115	0.061	0.000	0.000	0.061	0.115	0.157	0.184	0.193	0.184	0.157	0.115	0.061	0.000	0.000	0.061	0.115	0.157	0.184	0.193	0.184	0.157	0.115	0.061	0.000
	✱DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.041	0.081	0.113	0.133	0.140	0.133	0.113	0.081	0.041	0.000	0.000	0.042	0.083	0.115	0.135	0.142	0.135	0.115	0.083	0.042	0.000	0.000	0.042	0.083	0.115	0.135	0.142	0.135	0.115	0.083	0.042	0.000
	FINAL CAMBER ↑	0	1/4"	3/8"	9/16"	5/8"	5/8"	5/8"	9/16"	3/8"	1/4"	0	0	1/4"	3/8"	1/2"	9/16"	5/8"	9/16"	1/2"	3/8"	1/4"	0	0	1/4"	3/8"	1/2"	9/16"	5/8"	9/16"	1/2"	3/8"	1/4"	0

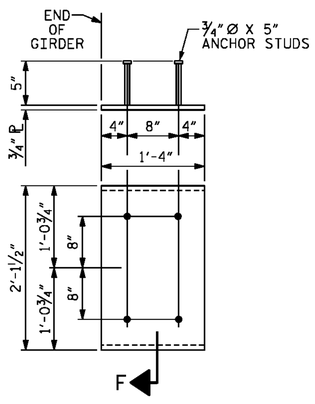
✱ INCLUDES FUTURE WEARING SURFACE.

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



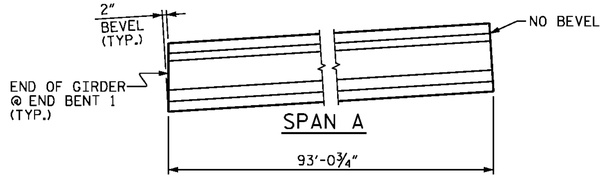
DETAIL "A"

(FOR AASHTO TYPE IV GIRDERS)

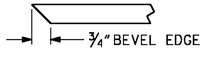


EMBEDDED PLATE "B-1" DETAILS FOR AASHTO TYPE IV GIRDER

(2 REQ'D PER GIRDER)



GIRDER END BEVEL



SECTION "F"

(SEE NOTES)

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW- ELAXATION 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 PLATES "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. BEVEL EDGES OF PLATE "B-1" TO GIVE CLOSE FIT BUT NOT TIGHT FIT TO STEEL CASTING FORM.

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 END 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 GIRDERS ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,600 PSI.

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

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

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

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.

GIRDER CAMBER PREDICTED USING REFINED METHOD FOR CAMBER, PER NCDOT POLICY MEMO (8-28-14).

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

DESIGNED BY:	J. BORUTA	DATE :	JAN 2016
DRAWN BY:	M. HOBBS	DATE :	JAN 2016
CHECKED BY:	M. WAGNER	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_193_B4929_SMU_DL01.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty

00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS - UNIT 1

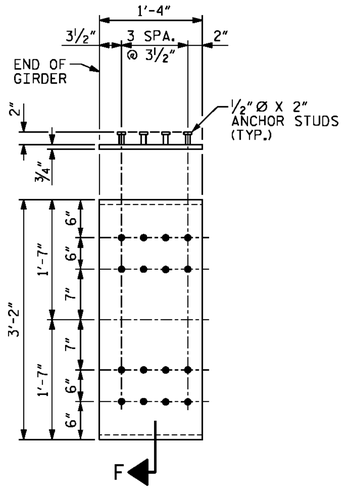
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-98
1			3			TOTAL SHEETS
2			4			278

GIRDER LENGTH TABLE - F.I.B. 72"

GIRDERS	A	B	C	D
D1-D5	140'-8"	140'-9 1/4"	2 1/2"	-
E1-E5	140'-8"	140'-9 1/4"	-	-
F1-F5	140'-8"	140'-9 1/4"	-	2 1/2"
G1-G5	93'-6"	93'-6 7/8"	2 1/2"	-
H1-H5	93'-6"	93'-6 7/8"	-	-
I1-I5	93'-6"	93'-6 7/8"	-	-
J1-J5	140'-8"	140'-9 1/4"	-	2 1/2"
K1-K5	140'-8"	140'-9 1/4"	2 1/2"	-
L1-L5	140'-8"	140'-9 1/4"	-	-
M1	139'-2 3/8"	139'-3 1/2"	-	2 1/2"
M2	139'-9 9/16"	139'-10 3/4"	-	2 1/2"
M3	140'-4 3/4"	140'-6"	-	2 1/2"
M4	141'-0"	141'-1 1/4"	-	2 1/2"
M5	141'-7 1/8"	141'-8 1/2"	-	2 1/2"
Z1	140'-8"	140'-9"	2 1/2"	2 1/2"
Z2	140'-8 3/8"	140'-9 3/8"	2 1/2"	2 1/2"
Z3	140'-9 3/8"	140'-10 1/2"	2 1/2"	2 1/2"
Z4	140'-11 1/8"	141'-0 3/8"	2 1/2"	2 1/2"
Z5	141'-1 3/4"	141'-2 7/8"	2 1/2"	2 1/2"
Z6	141'-4 7/8"	141'-6 1/8"	2 1/2"	2 1/2"

GIRDER LENGTH TABLE - F.I.B. 78"

GIRDERS	A	B	C	D
N1	146'-2"	146'-3 1/8"	2 1/2"	-
N2	147'-4 3/4"	147'-5 3/4"	2 1/2"	-
N3	148'-7 3/8"	148'-8 3/8"	2 1/2"	-
N4	149'-10"	149'-11 1/8"	2 1/2"	-
N5	151'-0 5/8"	151'-1 3/4"	2 1/2"	-
O1	146'-2"	146'-2"	-	-
O2	147'-4 3/4"	147'-4 3/4"	-	-
O3	148'-7 3/8"	148'-7 3/8"	-	-
O4	149'-10"	149'-10"	-	-
O5	151'-0 5/8"	151'-0 5/8"	-	-
P1	146'-2"	146'-2"	-	1 1/2"
P2	147'-4 3/4"	147'-4 3/4"	-	1 1/2"
P3	148'-7 3/8"	148'-7 3/8"	-	1 1/2"
P4	149'-10"	149'-10"	-	1 1/2"
P5	151'-0 5/8"	151'-0 5/8"	-	1 1/2"
Q1, T1, W1	146'-2"	146'-3 1/4"	2 1/2"	-
Q2, T2, W2	147'-4 3/4"	147'-5 7/8"	2 1/2"	-
Q3, T3, W3	148'-7 3/8"	148'-8 1/2"	2 1/2"	-
Q4, T4, W4	149'-10"	149'-11 1/8"	2 1/2"	-
Q5, T5, W5	151'-0 5/8"	151'-1 3/4"	2 1/2"	-
R1 AND U1	146'-2"	146'-3 1/4"	-	-
R2 AND U2	147'-4 3/4"	147'-5 7/8"	-	-
R3 AND U3	148'-7 3/8"	148'-8 1/2"	-	-
R4 AND U4	149'-10"	149'-11 1/8"	-	-
R5 AND U5	151'-0 5/8"	151'-1 3/4"	-	-
S1 AND V1	146'-2"	146'-3 1/4"	-	2 1/2"
S2 AND V2	147'-4 3/4"	147'-5 7/8"	-	2 1/2"
S3 AND V3	148'-7 3/8"	148'-8 1/2"	-	2 1/2"
S4 AND V4	149'-10"	149'-11 1/8"	-	2 1/2"
S5 AND V5	151'-0 5/8"	151'-1 3/4"	-	2 1/2"
X1	147'-3"	147'-4"	-	-
X2	148'-0 3/8"	148'-1 3/8"	-	-
X3	148'-9 5/8"	148'-10 3/4"	-	-
X4	149'-7"	149'-8 1/4"	-	-
X5	150'-4 3/8"	150'-5 5/8"	-	-
Y1-Y5	140'-8"	140'-9 1/8"	-	2 1/2"



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.

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. BEVEL EDGES OF PLATE "B-1" TO GIVE CLOSE FIT BUT NOT TIGHT FIT TO STEEL CASTING FORM.

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 8,000 PSI.

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

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

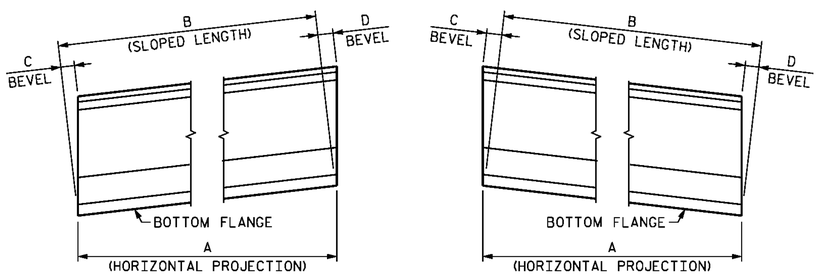
WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN 1/2" OF THE THEORETICAL LOCATION SHOWN.

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

PRESTRESSED CONCRETE GIRDERS SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR. FOR CALCIUM NITRITE CORROSION INHIBITOR, SEE STANDARD SPECIFICATIONS.

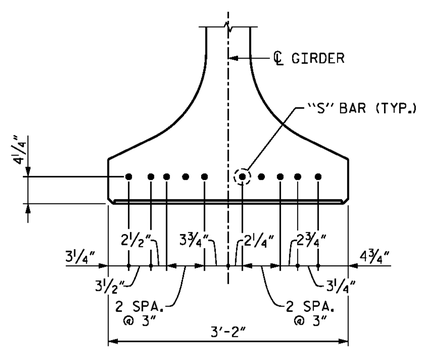
THE COST OF ALL CONCRETE, REINFORCING STEEL, PRESTRESSED STRANDS, INSERTS EMBEDDED IN THE CONCRETE, EMBEDDED PLATES, TEMPORARY BRACING AND INCIDENTIAL ITEMS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE FOR PRESTRESSED CONCRETE GIRDERS.

PRIOR TO CASTING THE GIRDERS, THE CONTRACTOR SHALL SUBMIT COMPLETE WORKING DRAWINGS WITH EXACT LOCATION, AND COMPLETE DESCRIPTION OF ALL INSERTS CAST IN THE GIRDERS, TO THE DEPARTMENT FOR APPROVAL. SUCH INSERTS INCLUDE BUT ARE NOT LIMITED TO, INSERTS FOR SUPPORTING FALSEWORK AND FORMWORK, INSERT FOR ATTACHING DIAPHRAGMS, INSERT FOR CONNECTING TEMPORARY BRACING, AND LIFTING INSERTS.



GIRDER LENGTH DETAIL

(SEE GIRDER LENGTH TABLE)



DETAIL A-A

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

DESIGNED BY:	JDB/BJL	DATE :	JAN 2016		
DRAWN BY:	M. HOBBS	DATE :	JAN 2016		
CHECKED BY:	BJL/JPS	DATE :	FEB 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty

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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS F.I.B. GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-99
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400.195_B4929_SMU_FIB_DTL.dgn

DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS IN UNIT 10

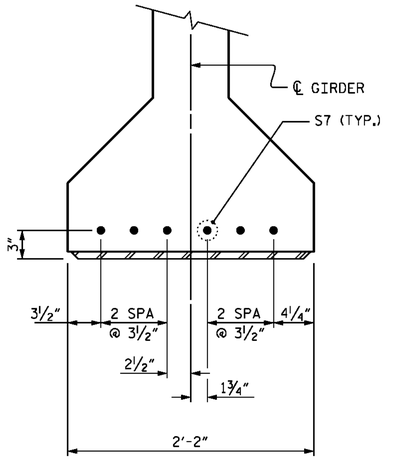
	0.6"Ø LOW RELAXATION	SPAN AA											SPAN AB											SPAN AC										
	TENTH POINTS	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.
GIRDERS 1,4 & 7	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.062	0.117	0.160	0.188	0.197	0.188	0.160	0.117	0.062	0.000	0.000	0.062	0.117	0.160	0.188	0.197	0.188	0.160	0.117	0.062	0.000	0.000	0.062	0.117	0.160	0.188	0.197	0.188	0.160	0.117	0.062	0.000
	✱DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.036	0.071	0.098	0.115	0.121	0.115	0.098	0.071	0.036	0.000	0.000	0.036	0.071	0.098	0.115	0.121	0.115	0.098	0.071	0.036	0.000	0.000	0.035	0.069	0.096	0.113	0.119	0.113	0.096	0.069	0.035	0.000
	FINAL CAMBER ↑	0	5/16"	9/16"	3/4"	7/8"	15/16"	7/8"	3/4"	9/16"	5/16"	0	0	5/16"	9/16"	3/4"	7/8"	15/16"	7/8"	3/4"	9/16"	5/16"	0	0	5/16"	9/16"	3/4"	7/8"	15/16"	7/8"	3/4"	9/16"	5/16"	0

DEAD LOAD DEFLECTION AND CAMBER TABLE FOR GIRDERS IN UNIT 10

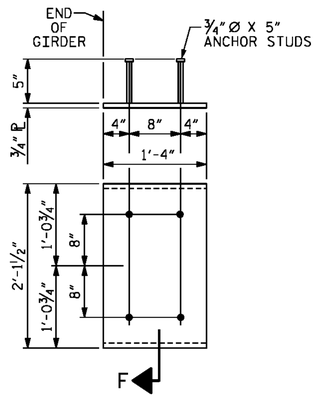
	0.6"Ø LOW RELAXATION	SPAN AA											SPAN AB											SPAN AC										
	TENTH POINTS	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.	℄ BRG.	.1	.2	.3	.4	.5	.6	.7	.8	.9	℄ BRG.
GIRDERS 2,3,5 & 6	CAMBER (GIRDER ALONE IN PLACE) ↑	0.000	0.062	0.117	0.160	0.184	0.197	0.188	0.160	0.117	0.062	0.000	0.000	0.062	0.117	0.160	0.184	0.197	0.188	0.160	0.117	0.062	0.000	0.000	0.062	0.117	0.160	0.188	0.197	0.188	0.160	0.117	0.062	0.000
	✱DEFLECTION DUE TO SUPERIMPOSED D.L. ↓	0.000	0.037	0.073	0.102	0.120	0.126	0.120	0.102	0.073	0.037	0.000	0.000	0.037	0.073	0.102	0.120	0.126	0.120	0.102	0.073	0.037	0.000	0.000	0.037	0.072	0.100	0.118	0.124	0.118	0.100	0.072	0.037	0.000
	FINAL CAMBER ↑	0	5/16"	1/2"	11/16"	13/16"	7/8"	13/16"	11/16"	1/2"	5/16"	0	0	5/16"	1/2"	11/16"	13/16"	7/8"	13/16"	11/16"	1/2"	5/16"	0	0	5/16"	9/16"	3/4"	13/16"	7/8"	13/16"	3/4"	9/16"	5/16"	0

✱ INCLUDES FUTURE WEARING SURFACE.

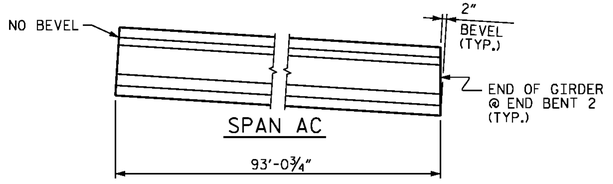
ALL VALUES ARE SHOWN IN FEET (DECIMAL FORM) EXCEPT FINAL CAMBER; WHICH IS GIVEN IN INCHES (FRACTION FORM).



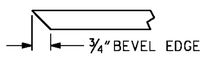
DETAIL "A"
(FOR AASHTO TYPE IV GIRDERS)



EMBEDDED PLATE "B-1" DETAILS
FOR AASHTO TYPE IV GIRDER
(2 REQ'D PER GIRDER)



GIRDER END BEVEL



SECTION "F"
(SEE NOTES)

NOTES

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW- ELAXATION 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 PLATES "B-1" SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. BEVEL EDGES OF PLATE "B-1" TO GIVE CLOSE FIT BUT NOT TIGHT FIT TO STEEL CASTING FORM.

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 END 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 GIRDERS ENDS.

THE TRANSFER OF LOAD FROM THE ANCHORAGES TO THE GIRDER SHALL BE DONE WHEN CONCRETE HAS REACHED A COMPRESSIVE STRENGTH OF NOT LESS THAN 7,200 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".

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.

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.

GIRDER CAMBER PREDICTED USING REFINED METHOD FOR CAMBER, PER NCDOT POLICY MEMO (8-28-14).

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

DESIGNED BY:	J. BORUTA	DATE :	JAN 2016
DRAWN BY:	M. HOBBS	DATE :	JAN 2016
CHECKED BY:	M. WAGNER	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_197_B4929_SMU_DL10.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PRESTRESSED CONCRETE GIRDER CONTINUOUS FOR LIVE LOAD DETAILS - UNIT 10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-100
1			3			TOTAL SHEETS
2			4			278

SPANS D, E, F AND J

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	0.00
	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.054	0.106	0.156	0.201	0.242	0.276	0.303	0.323	0.335	0.339	0.335	0.323	0.303	0.276	0.242	0.201	0.156	0.106	0.054	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.036	0.072	0.107	0.139	0.168	0.193	0.212	0.226	0.235	0.238	0.235	0.226	0.212	0.193	0.168	0.139	0.107	0.072	0.036	0.000
	FINAL CAMBER (IN.)	0	3/16"	7/16"	9/16"	3/4"	7/8"	1"	1 1/16"	1 3/16"	1 3/16"	1 3/16"	1 3/16"	1 3/16"	1 1/16"	1"	7/8"	3/4"	9/16"	7/16"	3/16"	0
GIRDERS 2-4	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.054	0.106	0.156	0.201	0.242	0.276	0.303	0.323	0.335	0.339	0.335	0.323	0.303	0.276	0.242	0.201	0.156	0.106	0.054	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.038	0.076	0.114	0.148	0.179	0.205	0.226	0.241	0.250	0.253	0.250	0.241	0.226	0.205	0.179	0.148	0.114	0.076	0.038	0.000
	FINAL CAMBER (IN.)	0	3/16"	3/8"	1/2"	5/8"	3/4"	13/16"	15/16"	1"	1"	1"	1"	1"	15/16"	13/16"	3/4"	5/8"	1/2"	3/8"	3/16"	0
GIRDER 5	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.054	0.106	0.156	0.201	0.242	0.276	0.303	0.323	0.335	0.339	0.335	0.323	0.303	0.276	0.242	0.201	0.156	0.106	0.054	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.034	0.069	0.102	0.133	0.160	0.184	0.202	0.216	0.224	0.227	0.224	0.216	0.202	0.184	0.160	0.133	0.102	0.069	0.034	0.000
	FINAL CAMBER (IN.)	0	1/4"	7/16"	5/8"	13/16"	1"	1 1/8"	1 3/16"	1 5/16"	1 5/16"	1 3/8"	1 5/16"	1 5/16"	1 3/16"	1 1/8"	1"	13/16"	5/8"	7/16"	1/4"	0

SPANS G, H AND I

GIRDERS 1-5	TENTH POINTS	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0.00
	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.025	0.047	0.065	0.076	0.080	0.076	0.065	0.047	0.025	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.014	0.027	0.037	0.044	0.046	0.044	0.037	0.027	0.014	0.000
	FINAL CAMBER (IN.)	0	1/8"	1/4"	5/16"	3/8"	3/8"	3/8"	5/16"	1/4"	1/8"	0

SPANS K AND L

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	0.00
	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.054	0.106	0.156	0.201	0.242	0.276	0.303	0.323	0.335	0.339	0.335	0.323	0.303	0.276	0.242	0.201	0.156	0.106	0.054	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.037	0.075	0.112	0.146	0.176	0.202	0.223	0.237	0.246	0.250	0.246	0.237	0.223	0.202	0.176	0.146	0.112	0.075	0.037	0.000
	FINAL CAMBER (IN.)	0	3/16"	3/8"	1/2"	11/16"	13/16"	7/8"	15/16"	1"	1 1/16"	1 1/16"	1 1/16"	1"	15/16"	7/8"	13/16"	11/16"	1/2"	3/8"	3/16"	0
GIRDERS 2-4	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.054	0.106	0.156	0.201	0.242	0.276	0.303	0.323	0.335	0.339	0.335	0.323	0.303	0.276	0.242	0.201	0.156	0.106	0.054	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.039	0.078	0.116	0.151	0.182	0.209	0.230	0.245	0.255	0.258	0.255	0.245	0.230	0.209	0.182	0.151	0.116	0.078	0.039	0.000
	FINAL CAMBER (IN.)	0	3/16"	5/16"	1/2"	5/8"	11/16"	13/16"	7/8"	15/16"	15/16"	1"	15/16"	15/16"	7/8"	13/16"	11/16"	5/8"	1/2"	5/16"	3/16"	0
GIRDER 5	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.054	0.106	0.156	0.201	0.242	0.276	0.303	0.323	0.335	0.339	0.335	0.323	0.303	0.276	0.242	0.201	0.156	0.106	0.054	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.036	0.072	0.107	0.139	0.168	0.192	0.212	0.226	0.235	0.238	0.235	0.226	0.212	0.192	0.168	0.139	0.107	0.072	0.036	0.000
	FINAL CAMBER (IN.)	0	3/16"	7/16"	9/16"	3/4"	7/8"	1"	1 1/16"	1 3/16"	1 3/16"	1 3/16"	1 3/16"	1 3/16"	1 1/16"	1"	7/8"	3/4"	9/16"	7/16"	3/16"	0

✱ INCLUDES FUTURE WEARING SURFACE

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

72" F.I.B. GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-101
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	JDB/EMD	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	FEB 2016
CHECKED BY:	B. LOFLIN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400199_B4929_SMU_DL72_01.dgn

SPAN M

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	0.00
	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.054	0.106	0.156	0.201	0.241	0.275	0.302	0.322	0.334	0.338	0.334	0.322	0.302	0.275	0.241	0.201	0.156	0.106	0.054	0.000
	✳ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.035	0.071	0.106	0.138	0.167	0.191	0.210	0.224	0.232	0.236	0.232	0.224	0.210	0.191	0.167	0.138	0.106	0.071	0.035	0.000
	FINAL CAMBER (IN.)	0	1/4"	7/16"	5/8"	3/4"	7/8"	1"	1 1/8"	1 3/16"	1 1/4"	1 1/4"	1 1/4"	1 3/16"	1 1/8"	1"	7/8"	3/4"	5/8"	7/16"	1/4"	0
GIRDERS 2-4	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.054	0.107	0.156	0.202	0.242	0.276	0.303	0.323	0.335	0.339	0.335	0.323	0.303	0.276	0.242	0.202	0.156	0.107	0.054	0.000
	✳ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.038	0.077	0.115	0.150	0.181	0.207	0.228	0.244	0.253	0.256	0.253	0.244	0.228	0.207	0.181	0.150	0.115	0.077	0.038	0.000
	FINAL CAMBER (IN.)	0	3/16"	3/8"	1/2"	5/8"	3/4"	13/16"	7/8"	15/16"	1"	1"	1"	15/16"	7/8"	13/16"	3/4"	5/8"	1/2"	3/8"	3/16"	0
GIRDER 5	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.054	0.107	0.156	0.202	0.242	0.276	0.304	0.323	0.336	0.340	0.336	0.323	0.304	0.276	0.242	0.202	0.156	0.107	0.054	0.000
	✳ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.039	0.078	0.116	0.152	0.183	0.210	0.231	0.247	0.256	0.259	0.256	0.247	0.231	0.210	0.183	0.152	0.116	0.078	0.039	0.000
	FINAL CAMBER (IN.)	0	3/16"	5/16"	1/2"	5/8"	11/16"	13/16"	7/8"	15/16"	15/16"	15/16"	15/16"	15/16"	7/8"	13/16"	11/16"	5/8"	1/2"	5/16"	3/16"	0

SPAN Z

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	0.00
	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.054	0.106	0.156	0.201	0.242	0.276	0.303	0.323	0.335	0.339	0.335	0.323	0.303	0.276	0.242	0.201	0.156	0.106	0.054	0.000
	✳ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.036	0.073	0.108	0.141	0.170	0.195	0.215	0.229	0.238	0.241	0.238	0.229	0.215	0.195	0.170	0.141	0.108	0.073	0.036	0.000
	FINAL CAMBER (IN.)	0	3/16"	3/8"	9/16"	11/16"	7/8"	15/16"	1 1/16"	1 1/8"	1 3/16"	1 3/16"	1 3/16"	1 1/8"	1 1/16"	15/16"	7/8"	11/16"	9/16"	3/8"	3/16"	0
GIRDERS 2-5	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.054	0.106	0.156	0.201	0.242	0.276	0.303	0.323	0.335	0.339	0.335	0.323	0.303	0.276	0.242	0.201	0.156	0.106	0.054	0.000
	✳ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.035	0.070	0.104	0.136	0.164	0.188	0.208	0.221	0.230	0.233	0.230	0.221	0.208	0.188	0.164	0.136	0.104	0.070	0.035	0.000
	FINAL CAMBER (IN.)	0	1/4"	7/16"	5/8"	13/16"	15/16"	1 1/16"	1 1/8"	1 3/16"	1 1/4"	1 1/4"	1 1/4"	1 3/16"	1 1/8"	1 1/16"	15/16"	13/16"	5/8"	7/16"	1/4"	0
GIRDER 6	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.054	0.106	0.156	0.201	0.242	0.276	0.303	0.323	0.335	0.339	0.335	0.323	0.303	0.276	0.242	0.201	0.156	0.106	0.054	0.000
	✳ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.035	0.071	0.105	0.137	0.165	0.189	0.208	0.222	0.231	0.234	0.231	0.222	0.208	0.189	0.165	0.137	0.105	0.071	0.035	0.000
	FINAL CAMBER (IN.)	0	1/4"	7/16"	5/8"	3/4"	15/16"	1 1/16"	1 1/8"	1 3/16"	1 1/4"	1 1/4"	1 1/4"	1 3/16"	1 1/8"	1 1/16"	15/16"	3/4"	5/8"	7/16"	1/4"	0

✳ INCLUDES FUTURE WEARING SURFACE.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

72" F.I.B. GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-102
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. BORUTA	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	FEB 2016
CHECKED BY:	B. LOFLIN	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_201_B4929_SMU_DL72_02.dgn

SPANS N, O AND P

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	0.00
	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.056	0.111	0.163	0.211	0.253	0.289	0.317	0.338	0.351	0.355	0.351	0.338	0.317	0.289	0.253	0.211	0.163	0.111	0.056	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.038	0.076	0.114	0.148	0.179	0.205	0.225	0.240	0.249	0.253	0.249	0.240	0.225	0.205	0.179	0.148	0.114	0.076	0.038	0.000
	FINAL CAMBER (IN.)	0	1/4"	7/16"	5/8"	3/4"	7/8"	1"	1 1/8"	1 3/16"	1 3/16"	1 1/4"	1 3/16"	1 3/16"	1 1/8"	1"	7/8"	3/4"	5/8"	7/16"	1/4"	0
GIRDERS 2-4	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.057	0.112	0.164	0.212	0.255	0.291	0.320	0.340	0.353	0.357	0.353	0.340	0.320	0.291	0.255	0.212	0.164	0.112	0.057	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.043	0.086	0.128	0.166	0.201	0.230	0.253	0.270	0.280	0.284	0.280	0.270	0.253	0.230	0.201	0.166	0.128	0.086	0.043	0.000
	FINAL CAMBER (IN.)	0	3/16"	5/16"	7/16"	9/16"	5/8"	3/4"	13/16"	7/8"	7/8"	7/8"	7/8"	7/8"	13/16"	3/4"	5/8"	9/16"	7/16"	5/16"	3/16"	0
GIRDER 5	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.057	0.113	0.165	0.213	0.256	0.292	0.321	0.342	0.355	0.359	0.355	0.342	0.321	0.292	0.256	0.213	0.165	0.113	0.057	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.044	0.087	0.130	0.169	0.204	0.234	0.258	0.275	0.285	0.289	0.285	0.275	0.258	0.234	0.204	0.169	0.130	0.087	0.044	0.000
	FINAL CAMBER (IN.)	0	3/16"	5/16"	7/16"	1/2"	5/8"	11/16"	3/4"	13/16"	13/16"	7/8"	13/16"	13/16"	3/4"	11/16"	5/8"	1/2"	7/16"	5/16"	3/16"	0

SPANS Q THROUGH X

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	0.00
	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.056	0.111	0.163	0.211	0.253	0.289	0.317	0.338	0.351	0.355	0.351	0.338	0.317	0.289	0.253	0.211	0.163	0.111	0.056	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.030	0.061	0.091	0.119	0.143	0.164	0.181	0.192	0.200	0.202	0.200	0.192	0.181	0.164	0.143	0.119	0.091	0.061	0.030	0.000
	FINAL CAMBER (IN.)	0	5/16"	5/8"	7/8"	1 1/8"	1 5/16"	1 1/2"	1 5/8"	1 3/4"	1 13/16"	1 13/16"	1 13/16"	1 3/4"	1 5/8"	1 1/2"	1 5/16"	1 1/8"	7/8"	5/8"	5/16"	0
GIRDERS 2-4	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.057	0.112	0.164	0.212	0.255	0.291	0.320	0.340	0.353	0.357	0.353	0.340	0.320	0.291	0.255	0.212	0.164	0.112	0.057	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.039	0.079	0.117	0.152	0.184	0.210	0.232	0.247	0.256	0.260	0.256	0.247	0.232	0.210	0.184	0.152	0.117	0.079	0.039	0.000
	FINAL CAMBER (IN.)	0	3/16"	3/8"	9/16"	3/4"	7/8"	15/16"	1 1/16"	1 1/8"	1 3/16"	1 3/16"	1 3/16"	1 1/8"	1 1/16"	15/16"	7/8"	3/4"	9/16"	3/8"	3/16"	0
GIRDER 5	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.057	0.113	0.165	0.213	0.256	0.292	0.321	0.342	0.355	0.359	0.355	0.342	0.321	0.292	0.256	0.213	0.165	0.113	0.057	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.042	0.085	0.126	0.165	0.199	0.228	0.250	0.267	0.277	0.281	0.277	0.267	0.250	0.228	0.199	0.165	0.126	0.085	0.042	0.000
	FINAL CAMBER (IN.)	0	3/16"	5/16"	7/16"	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"	7/16"	5/16"	3/16"	0

SPAN Y

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	0.00
	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.055	0.109	0.160	0.206	0.248	0.282	0.311	0.331	0.343	0.347	0.343	0.331	0.311	0.282	0.248	0.206	0.160	0.109	0.055	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.029	0.059	0.087	0.114	0.137	0.158	0.173	0.185	0.192	0.195	0.192	0.185	0.173	0.158	0.137	0.114	0.087	0.059	0.029	0.000
	FINAL CAMBER (IN.)	0	5/16"	5/8"	7/8"	1 1/8"	1 5/16"	1 1/2"	1 5/8"	1 3/4"	1 13/16"	1 13/16"	1 13/16"	1 3/4"	1 5/8"	1 1/2"	1 5/16"	1 1/8"	7/8"	5/8"	5/16"	0
GIRDERS 2-4	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.055	0.109	0.160	0.206	0.248	0.282	0.311	0.331	0.343	0.347	0.343	0.331	0.311	0.282	0.248	0.206	0.160	0.109	0.055	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.030	0.061	0.091	0.119	0.144	0.165	0.181	0.193	0.201	0.203	0.201	0.193	0.181	0.165	0.144	0.119	0.091	0.061	0.030	0.000
	FINAL CAMBER (IN.)	0	5/16"	9/16"	13/16"	1 1/16"	1 1/4"	1 7/16"	1 9/16"	1 5/8"	1 11/16"	1 3/4"	1 11/16"	1 5/8"	1 9/16"	1 7/16"	1 1/4"	1 1/16"	13/16"	9/16"	5/16"	0
GIRDER 5	CAMBER (GIRDER ALONE IN PLACE) (FT.)	0.000	0.055	0.109	0.160	0.206	0.248	0.282	0.311	0.331	0.343	0.347	0.343	0.331	0.311	0.282	0.248	0.206	0.160	0.109	0.055	0.000
	✱ DEFLECTION DUE TO SUPERIMPOSED D.L. (FT.)	0.000	0.028	0.056	0.083	0.109	0.131	0.150	0.166	0.177	0.183	0.186	0.183	0.177	0.166	0.150	0.131	0.109	0.183	0.056	0.028	0.000
	FINAL CAMBER (IN.)	0	5/16"	5/8"	15/16"	1 3/16"	1 3/8"	1 9/16"	1 3/4"	1 7/8"	1 15/16"	1 15/16"	1 15/16"	1 7/8"	1 3/4"	1 9/16"	1 3/8"	1 3/16"	15/16"	5/8"	5/16"	0

✱ INCLUDES FUTURE WEARING SURFACE

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

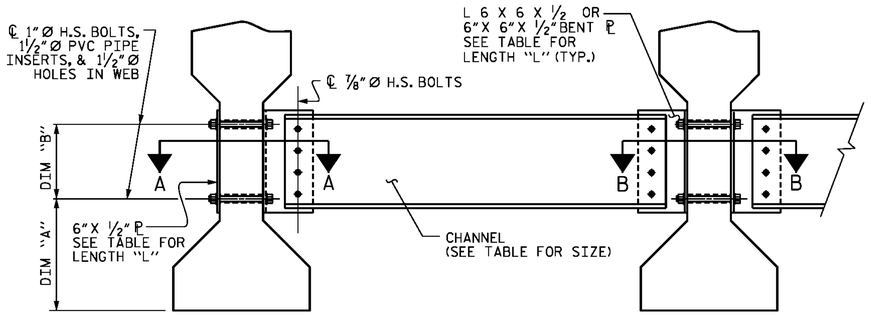
DEAD LOAD DEFLECTIONS

78" F.I.B. GIRDERS

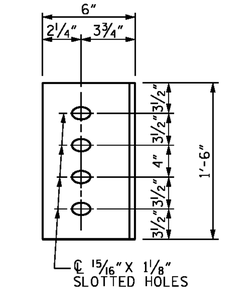
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-103
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	B. LOFLIN	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : FEB 2016
CHECKED BY:	J. SHERMAN	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

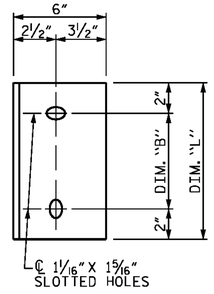
5/10/2016
400_203_B4929_SMU_DL78_01.dgn



PART SECTION AT INTERMEDIATE DIAPHRAGM

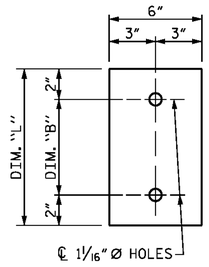


DIAPHRAGM FACE



WEB FACE

CONNECTION PLATE DETAILS



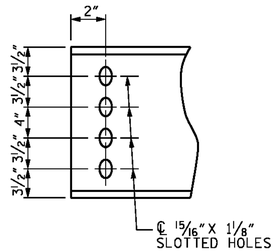
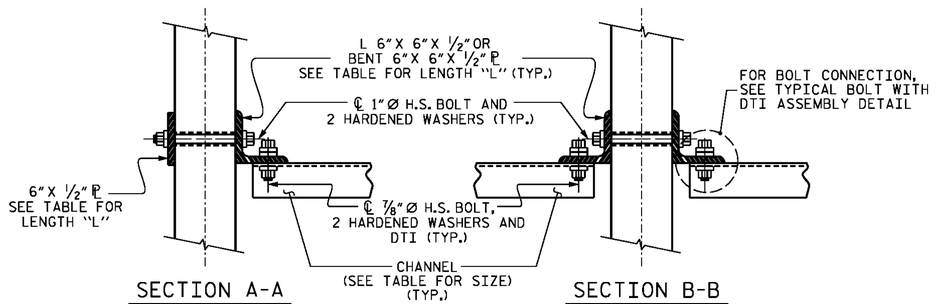
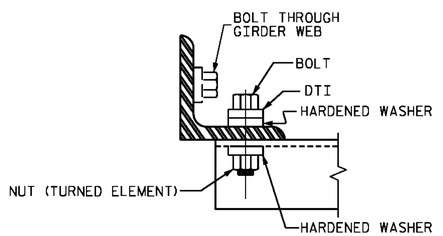


PLATE DETAILS CHANNEL END



CONNECTION DETAILS



BOLT WITH DTI ASSEMBLY DETAIL

STRUCTURAL STEEL NOTES

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

TENSION ON THE ASTM A325 BOLTS THROUGH THE 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 METALLIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ALUMINUM (W-AL-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

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

APPLY 1 COAT EACH OF 1080-12 GREEN AND 1080-12 GRAY PAINT ON THE EDGES AND THE WEB FACE OF THE CONNECTOR PLATE WHICH COMES IN CONTACT WITH THE CONCRETE GIRDER IN ACCORDANCE WITH SECTION 442 OF THE STANDARD SPECIFICATIONS.

TABLE

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

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

5/10/2016
400_205_B4929_SMU_ISD.dgn

DESIGNED BY:	J. BORUTA	DATE :	OCT 2015
DRAWN BY:	M. HOBBS	DATE :	OCT 2015
CHECKED BY:	M. WAGNER	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

DRAWN BY : TLA 6/05
CHECKED BY : VC 6/05

ADDED 10/21/05
REV. 5/1/06RRR KMM/GM
REV. 10/1/11 MAA/GM

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
60F1C864482747...

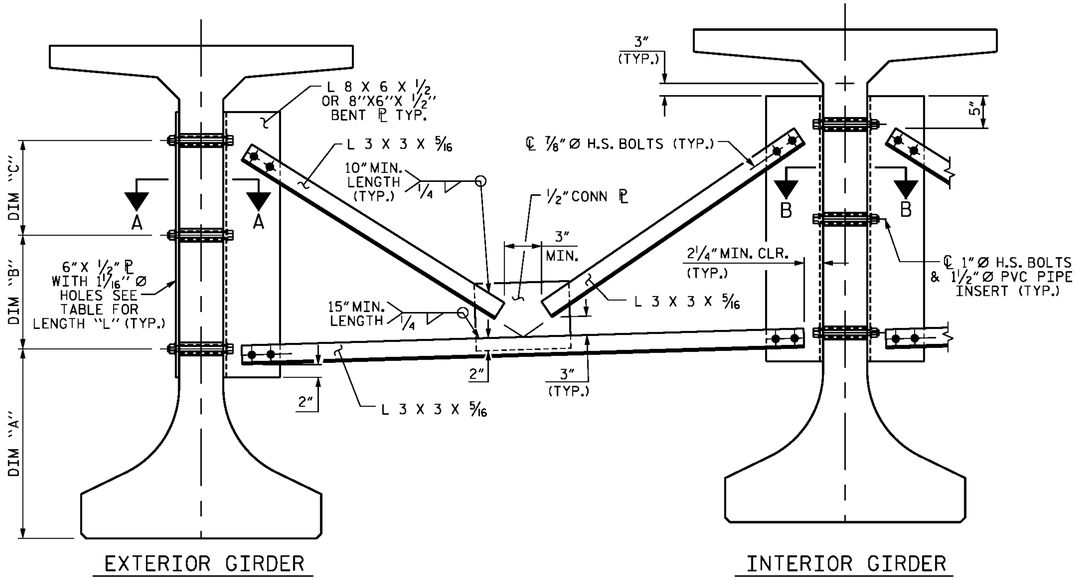
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

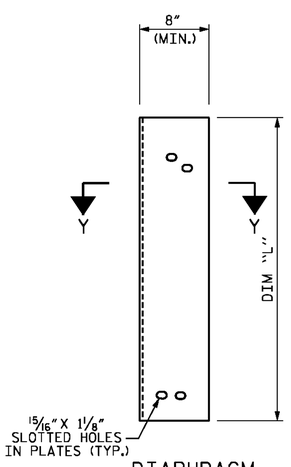
STANDARD
INTERMEDIATE
STEEL DIAPHRAGMS
FOR TYPE IV
PRESTRESSED CONCRETE
GIRDERS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-104
1			3			TOTAL SHEETS
2			4			278

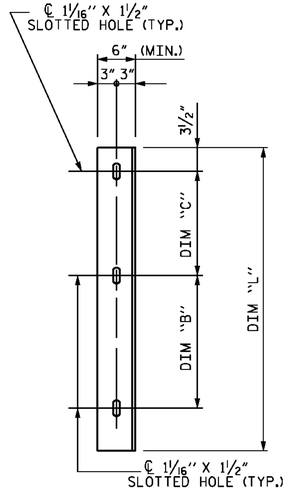
STD. NO. PCG10



PART SECTION AT INTERMEDIATE DIAPHRAGM



DIAPHRAGM FACE



WEB FACE

STRUCTURAL STEEL NOTES

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

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

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

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

FOR METALLIZATION, APPLY AN 8 MIL THICK 99.99 PERCENT ALUMINIUM (W-AL-1) THERMAL SPRAYED COATING WITH A 0.5 MIL THICK SEAL COAT TO ALL STEEL DIAPHRAGM SURFACES IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS SPECIAL PROVISION AND SECTION 442 OF THE STANDARD SPECIFICATIONS.

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

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

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

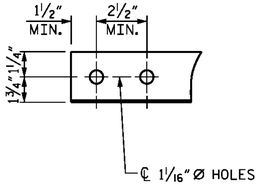
INTERMEDIATE DIAPHRAGM ASSEMBLY SHALL COMPLY WITH SECTION 1072 OF THE STANDARD SPECIFICATIONS.

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.

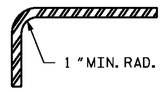
IN THE EXTERIOR BAYS, PLACE TEMPORARY STRUTS BETWEEN PRESTRESSED GIRDERS ADJACENT TO THE STEEL DIAPHRAGMS. STRUTS SHALL REMAIN IN PLACE 3 DAYS AFTER CONCRETE IS PLACED.

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

APPLY 1 COAT EACH OF 1080-12 GREEN AND 1080-12 GRAY PAINT ON THE EDGES AND THE WEB FACE OF THE CONNECTOR PLATE WHICH COMES IN CONTACT WITH THE CONCRETE GIRDER IN ACCORDANCE WITH SECTION 442 OF THE STANDARD SPECIFICATIONS.



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

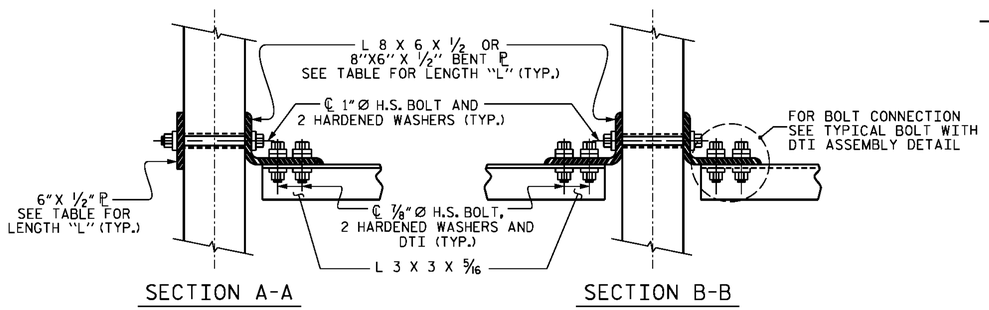


SECTION Y-Y

CONNECTOR PLATE DETAIL

TABLE

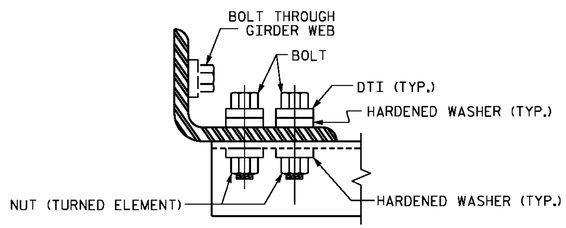
GIRDER TYPE	DIM "A"	DIM "B"	DIM "C"	DIM "L"
72"FIB	2'-4"	1'-3"	1'-3"	3'-1"
78"FIB	2'-6"	1'-6"	1'-3"	3'-6"



SECTION A-A SECTION B-B

CONNECTION DETAILS

FOR LOCATIONS WHERE DIAPHRAGM IS NOT 90°00'00" TO ℄ OF GIRDER, USE 8" X 6" X ½" BENT ℙ.



BOLT WITH DTI ASSEMBLY DETAIL

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

INTERMEDIATE STEEL DIAPHRAGMS FOR F.I.B. PRESTRESSED CONCRETE GIRDERS

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

SHEET NO. S-105
TOTAL SHEETS 278

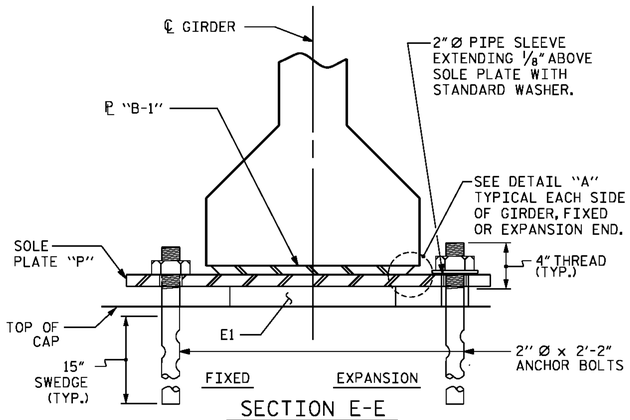
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

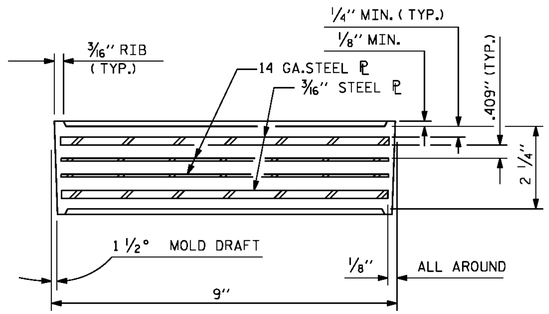
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	BJL/JDB	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. SHERMAN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

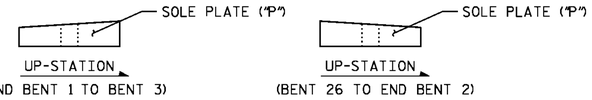
5/10/2016
400_207_B4929_SMU_PCGD1.dgn



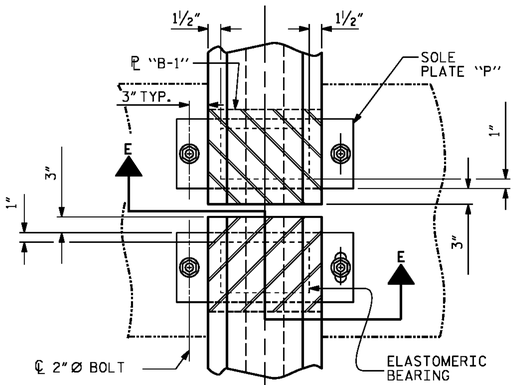
SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS



SOLE PLATE PLACEMENT DETAIL



TYPICAL HALF-PLAN (SHOWING CONTINUOUS BENT)

TYPICAL HALF-PLAN (SHOWING SIMPLE SPAN BENT)

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.

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, AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

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

SOLE PLATE "P", BOLTS, 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 AND NUTS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 36 OR GRADE 50.

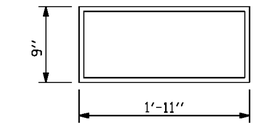
WHEN DRAPED STRANDS ARE DETAILED, THE LONGITUDINAL LOCATION OF THE HOLD DOWN DEVICES SHALL BE WITHIN 6" OF THE LOCATION SHOWN AND THE CENTER OF GRAVITY OF THE GROUP OF DRAPED STRANDS SHALL BE LOCATED WITHIN ½" OF THE THEORETICAL LOCATION SHOWN.

SOLE PLATE SCHEDULE (EXPANSION)

MARK	T1	T2	# REQ'D.
PA1-E	1¼"	1¹¹⁄₁₆"	5
PC2-E	1¼"	1⅝"	5
PAA1-E	1⅝"	1¼"	7
PAC2-E	1⁹⁄₁₆"	1¼"	7

SOLE PLATE SCHEDULE (FIXED)

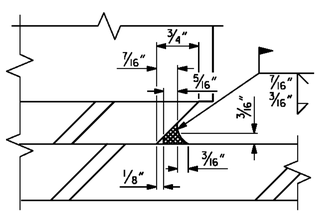
MARK	T1	T2	# REQ'D.
PA2-F	1¼"	1⅝"	5
PB1-F	2¼"	2¹¹⁄₁₆"	5
PB2-F	1¼"	1⅝"	5
PC1-F	2¼"	2¹¹⁄₁₆"	5
PAA2-F	2⁹⁄₁₆"	2⅛"	7
PAB1-F	1⁹⁄₁₆"	1¼"	7
PAB2-F	2⁵⁄₁₆"	1¹⁵⁄₁₆"	7
PAC1-F	1½"	1¼"	7



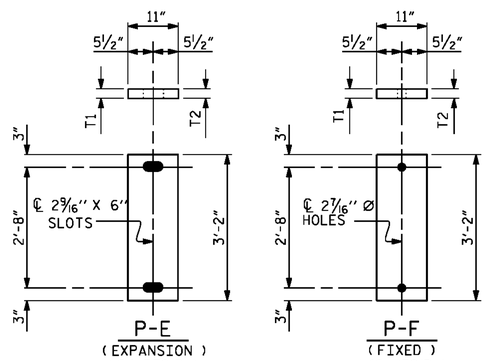
E1 (72 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE V



DETAIL "A"



SOLE PLATE DETAILS ("P")

SERVICE I DESIGN REACTION	
MAX.D.L.+ L.L. (NO IMPACT)	
TYPE V	365 K

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 3

DESIGNED BY:	J. BORUTA	DATE :	OCT 2015
DRAWN BY:	M. HOBBS	DATE :	OCT 2015
CHECKED BY:	M. WAGNER	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

DRAWN BY : EEM 2/97	REV. 10/1/11	MAA/GM
CHECKED BY : VAP 2/97	REV. 6/13	AAC/MAA
	REV. 1/15	MAA/TMC

5/10/2016
400_209_B4929_SMU_BG1.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C864482747...

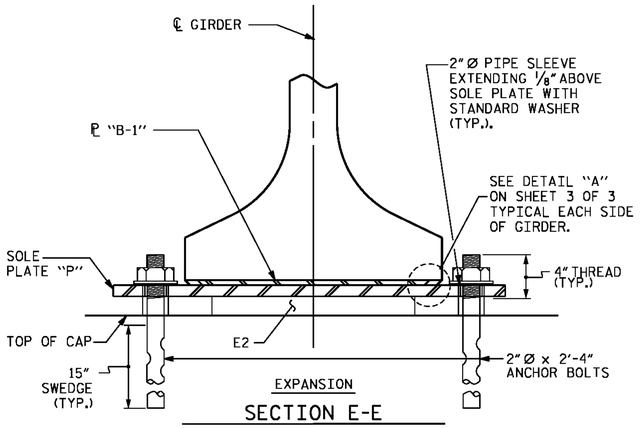
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

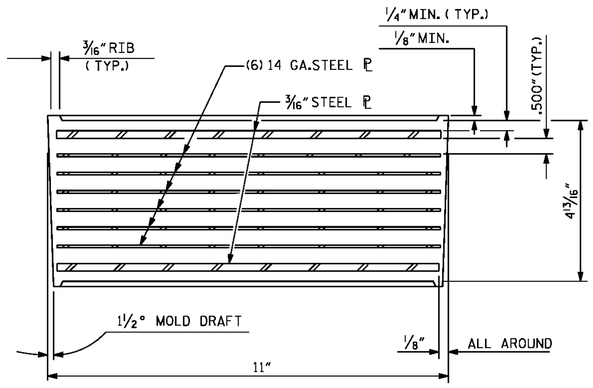
ELASTOMERIC BEARING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-106
1			3			TOTAL SHEETS
2			4			278

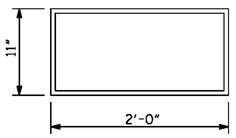
STD. NO. EB4



SECTION E-E



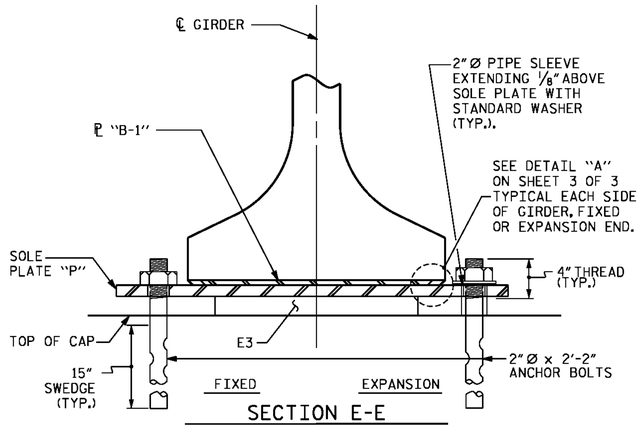
TYPICAL SECTION OF ELASTOMERIC BEARINGS



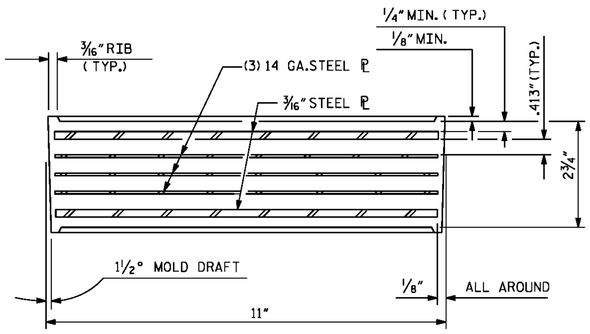
E2 (70 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

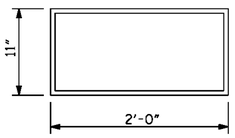
TYPE VIII



SECTION E-E



TYPICAL SECTION OF ELASTOMERIC BEARINGS



E3 (162 REQ'D)

PLAN VIEW OF ELASTOMERIC BEARING

TYPE VII

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, AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

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

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

SOLE PLATE "P", BOLTS, 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 AND NUTS. SHOP INSPECTION IS REQUIRED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

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

FOR STEEL REINFORCED ELASTOMERIC BEARINGS, SEE SPECIAL PROVISIONS.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 36 OR GRADE 50.

SERVICE I DESIGN REACTION	
MAX.D.L.+ L.L.(NO IMPACT)	
TYPE VII	470 K
TYPE VIII	350 K

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

ELASTOMERIC BEARING DETAILS

PRESTRESSED CONCRETE GIRDER SUPERSTRUCTURE

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-107
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	JDB/BJL	DATE :	JAN 2016
DRAWN BY:	M. HOBBS	DATE :	JAN 2016
CHECKED BY:	J. SHERMAN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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

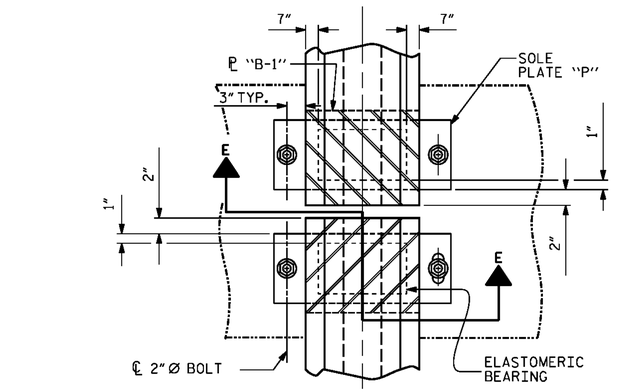
REV. 10/1/11	MAA/GM
REV. 6/13	AAC/MAA
REV. 1/15	MAA/TMG

5/10/2016
400_211_B4929_SMU_BG2.dgn

STD. NO. EB4

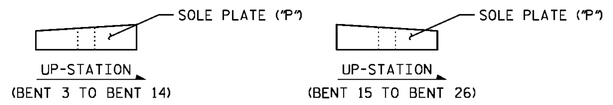
SOLE PLATE SCHEDULE (EXPANSION)			
MARK	T1	T2	# REQ'D.
PD1-E	1¼"	1 13/16"	5
PF2-E	1¼"	1¾"	5
PG1-E	2¼"	2 13/16"	5
PJ2-E	1¼"	1¾"	5
PK1-E	1½"	2 1/16"	5
PM2-E	1¼"	1¾"	5
PN1-E	1¼"	1¾"	5
PP2-E	1 9/16"	1¼"	5
PO1-E	1 11/16"	1¼"	5
PS2-E	2¾"	2¼"	5
PT1-E	1 11/16"	1¼"	5
PV2-E	2¾"	2¼"	5
PW1-E	1 11/16"	1¼"	5
PY2-E	1¾"	1¼"	5
PZ1-E	1 11/16"	1¼"	6

SOLE PLATE SCHEDULE (FIXED)			
MARK	T1	T2	# REQ'D.
PD2-F	1¼"	1¾"	5
PE1-F	2¼"	2 13/16"	5
PE2-F	1¼"	1¾"	5
PF1-F	2¼"	2 13/16"	5
PG2-F	1¼"	1 11/16"	5
PH1-F	2¼"	2 13/16"	5
PH2-F	1¼"	1 11/16"	5
PI1-F	2¼"	2 13/16"	5
PI2-F	1¼"	1 11/16"	5
PJ1-F	2¼"	2 13/16"	5
PK2-F	1¼"	1¾"	4
PK3-F	1¾"	2¼"	1
PL1-F	2¼"	2 13/16"	4
PL2-F	1¼"	1¾"	5
PL3-F	2 13/16"	3⅜"	1
PM1-F	2¼"	2 13/16"	5
PN2-F	1¼"	1⅝"	5
PO1-F	2"	2 3/16"	5
PO2-F	1½"	1½"	5
PP1-F	1 7/16"	1¼"	5
PQ2-F	2¾"	2¼"	5
PR1-F	1 11/16"	1¼"	5
PR2-F	2¾"	2¼"	5
PS1-F	1 11/16"	1¼"	5
PT2-F	2¾"	2¼"	5
PU1-F	1 11/16"	1¼"	5
PU2-F	2¾"	2¼"	5
PV1-F	1 11/16"	1¼"	5
PW2-F	2¾"	2¼"	5
PX1-F	1 11/16"	1¼"	5
PX2-F	2¾"	2¼"	5
PY1-F	1⅝"	1¼"	5
PZ2-F	1¾"	1¼"	6

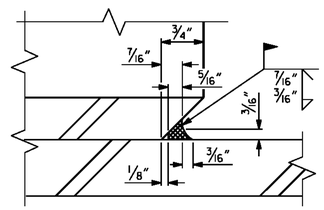


TYPICAL HALF-PLAN
(SHOWING CONTINUOUS BENT)

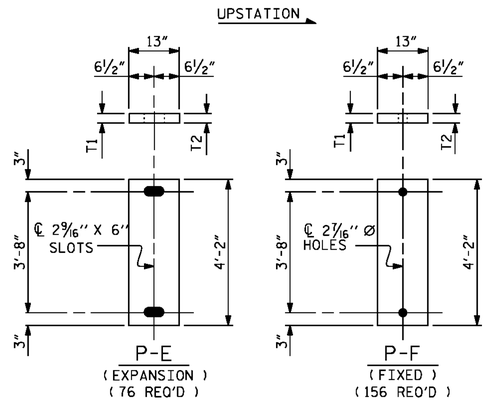
TYPICAL HALF-PLAN
(SHOWING SIMPLE SPAN BENT)



SOLE PLATE PLACEMENT DETAIL



DETAIL "A"



SOLE PLATE DETAILS ("P")

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-
SHEET 3 OF 3

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-108
1			3			TOTAL SHEETS
2			4			278

STD. NO. EB4

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C864482274F7...

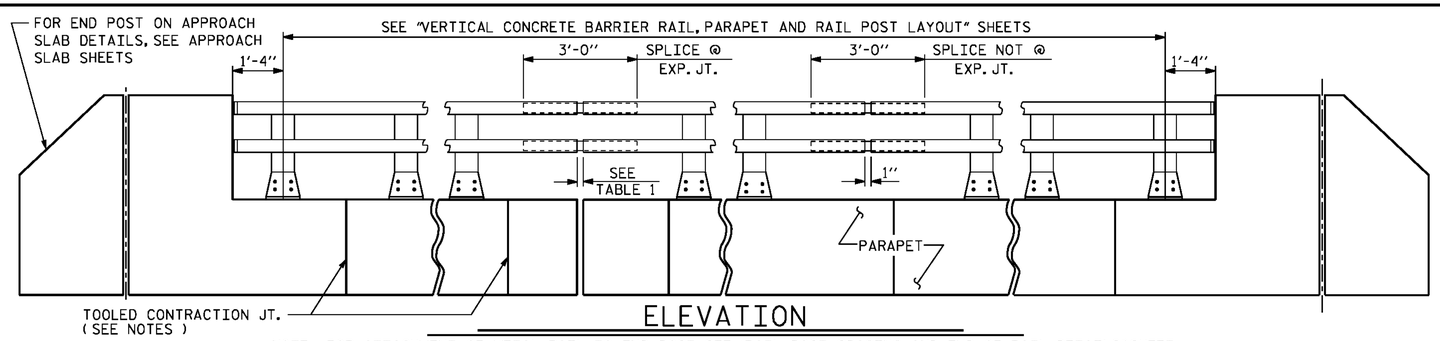
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	JDB/BJL	DATE :	JAN 2016
DRAWN BY:	KEW/MAH	DATE :	FEB 2016
CHECKED BY:	JPS/BJL	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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

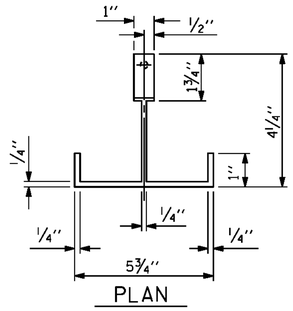
REV. 10/1/11 MAA/GM
REV. 6/13 AAC/MAA
REV. 1/15 MAA/TMG

5/10/2016
400.213_B4929_SMU_BG3.dgn

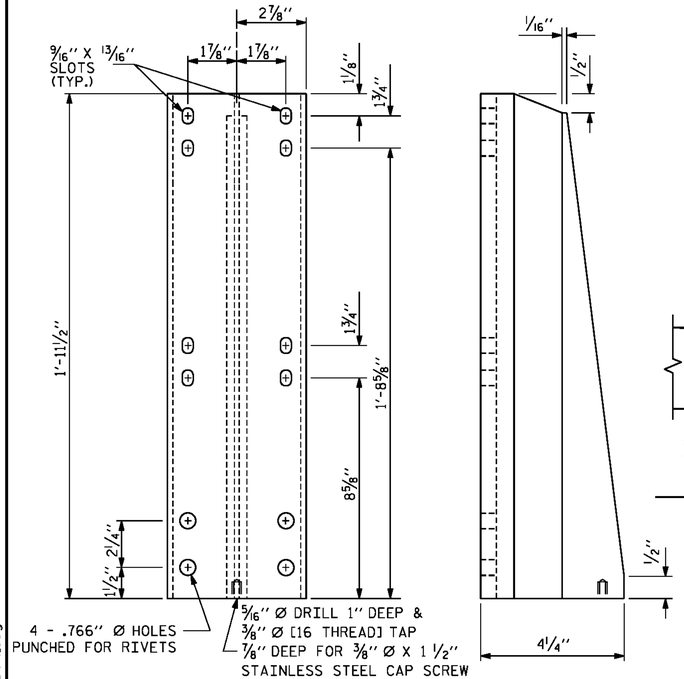


ELEVATION

NOTE : FOR ATTACHMENT OF METAL RAIL TO END POST, SEE "RAIL POST SPACING AND END OF RAIL DETAILS" SHEET.



PLAN



FRONT ELEVATION — SIDE ELEVATION

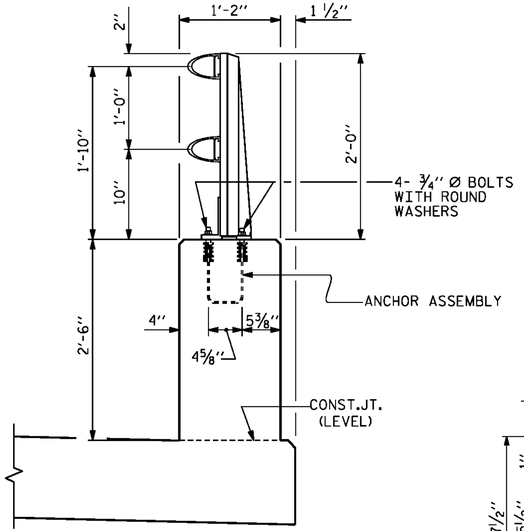
DETAILS OF POST

ANODIZING

ALUMINUM FOR POSTS, BASES, RAILS, EXPANSION BARS, CLAMP BARS, RIVETS, CAPS, SHIMS, ATTACHMENT BRACKETS AND HOLD-DOWN PLATES (ETC.) SHALL BE ANODIZED. THE COLOR SHALL BE DETERMINED BY THE ENGINEER. THE CONTRACTOR SHALL PROVIDE A SAMPLE TO THE ENGINEER FOR COORDINATION WITH THE TOWN OF SURF CITY.

AFTER A COLOR HAS BEEN SELECTED FOR THE RAILING, THE CONTRACTOR SHALL SUBMIT A SAMPLE OF COMPATIBLE EXTERIOR ACRYLIC HOUSE PAINT TO THE ENGINEER. THIS PAINT SHALL MATCH THE ANODIZED RAIL COLOR AS CLOSELY AS POSSIBLE. AFTER ERECTION OF THE ANODIZED RAILING, ALL EXPOSED ANCHOR BOLTS, NUTS, WASHERS, MACHINE SCREWS, CAP SCREWS, BOLTS, AND BUILT UP ANGLES SHALL BE COATED WITH TWO COATS OF THIS ACRYLIC PAINT.

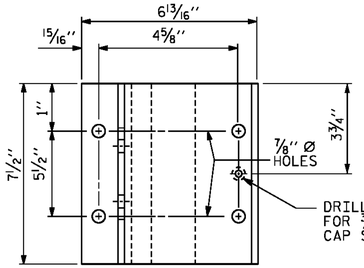
ANY DAMAGE TO THE ANODIZED SURFACE OF THE RAIL OR COMPONENTS DURING THE CONSTRUCTION SHALL BE REPAIRED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AT THE DIRECTION OF THE ENGINEER AND AT THE CONTRACTOR'S EXPENSE.



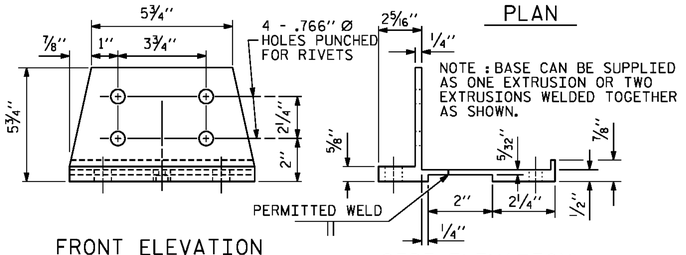
SECTION THRU PARAPET AND RAIL

FOR ANCHOR ASSEMBLY, SEE SHEET 2 OF 4.

TABLE 1	
℄ EXP. JT. @	RAIL OPENING
END BENT No. 1	2"
BENT No. 3	2"
BENT No. 6	2"
BENT No. 10	2"
BENT No. 13	2"
BENT No. 16	2"
BENT No. 19	2"
BENT No. 22	2"
BENT No. 25	2"
BENT No. 26	2"
END BENT No. 2	2"

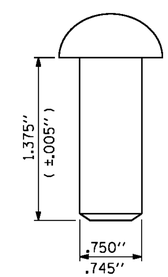


PLAN



FRONT ELEVATION — SIDE ELEVATION

POST BASE DETAILS



RIVET DETAIL

NOTES

METAL RAIL SHALL BE ALUMINUM IN ACCORDANCE WITH THE REQUIREMENTS OF THE GENERAL NOTES AND THE FOLLOWING SPECIFICATIONS FOR THE ALTERNATE MATERIALS; HOWEVER, THE CONTRACTOR WILL BE REQUIRED TO USE THE SAME RAIL MATERIAL ON ALL STRUCTURES ON THE PROJECT FOR WHICH METAL RAIL IS DESIGNATED.

ALUMINUM RAILS

MATERIAL FOR POSTS, BASES AND RAILS, EXPANSION BARS AND CLAMP BARS SHALL BE ASTM B-221 ALLOY 6061-T6.

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

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

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

GENERAL NOTES

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

FOR END OF RAIL TO CLEAR FACE OF CONCRETE END POST DIMENSION, SEE "RAIL POST SPACING AND END OF RAIL DETAILS" SHEET.

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

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

METAL RAIL POSTS SHALL BE SET NORMAL TO CURB GRADE.

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

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

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

SHIMS SHALL BE USED AS NECESSARY FOR POST ALIGNMENT.

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

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

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

PAY LENGTH = 3789.00 LIN. FT.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

2 BAR METAL RAIL

DESIGNED BY:	J. SMITH	DATE : DEC 2015
DRAWN BY:	K. WHITE	DATE : DEC 2015
CHECKED BY:	E. DAVIS	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

DRAWN BY : EEM 6/94
CHECKED BY : RGW 6/94

REV. 5/1/06 TLA/GM
REV. 10/1/11 MAA/GM
REV. 6/13 MAA/GM

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

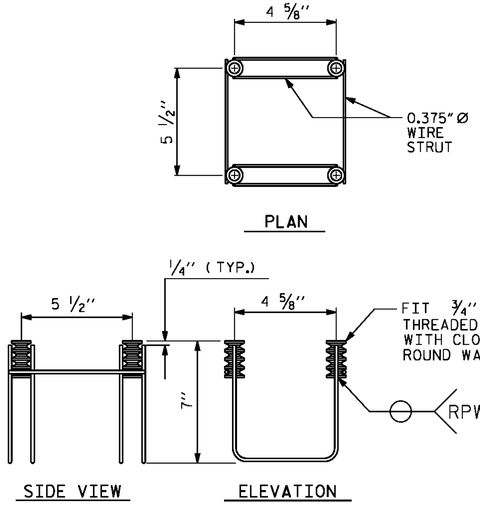
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-109
1			3			TOTAL SHEETS
2			4			278

STD. NO. BMR3

5/10/2016
400_215_B4929_SMU_2BMR1.dgn



4-BOLT METAL RAIL ANCHOR ASSEMBLY

(589 ASSEMBLIES REQUIRED)

NOTES

STRUCTURAL CONCRETE ANCHOR ASSEMBLY

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

A. FERRULES SHALL BE MADE FROM STEEL MEETING THE REQUIREMENTS OF AASHTO M169, GRADE 12L14 AND SHALL HAVE A MINIMUM LENGTH OF THREADS OF 2" FOR 3/4" FERRULES.

B. 4 - 3/4" Ø X 2 1/2" BOLTS WITH WASHERS. BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLTS AND WASHERS SHALL BE GALVANIZED. AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLTS AND WASHERS MAY BE USED AS AN ALTERNATE FOR THE 3/4" Ø X 2 1/2" GALVANIZED BOLTS AND WASHERS. THEY SHALL CONFORM TO OR EXCEED THE MECHANICAL REQUIREMENTS OF ASTM A307. THE USE OF THIS ALTERNATE SHALL BE APPROVED BY THE ENGINEER.

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

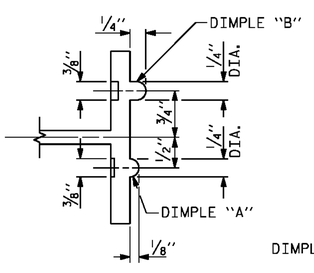
D. THE METAL RAIL ANCHOR ASSEMBLIES TO BE HOT DIPPED GALVANIZED TO CONFORM TO REQUIREMENTS OF AASHTO M111.

E. THE COST OF THE METAL RAIL ANCHOR ASSEMBLY WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF METAL RAIL.

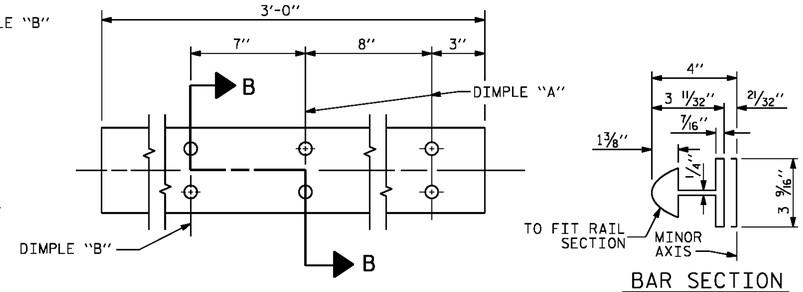
F. BOLTS TO BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

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

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

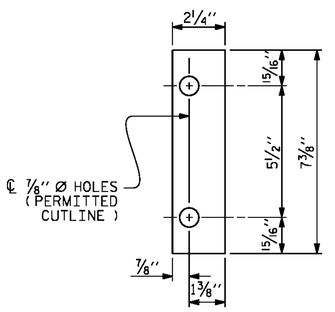


SECTION B - B

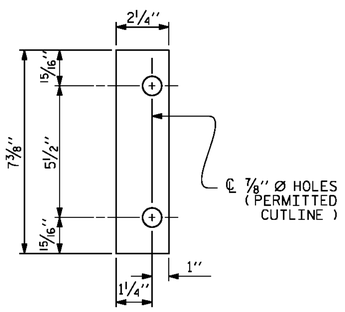


BAR SECTION

EXPANSION BAR DETAILS



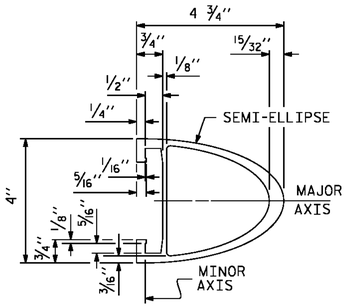
FRONT PLATE



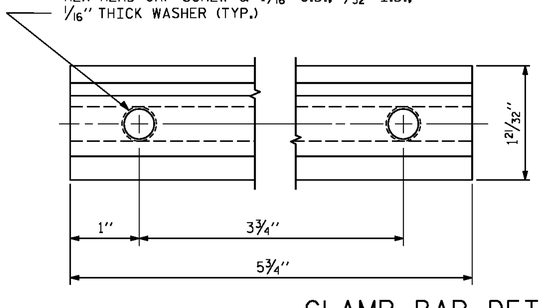
REAR PLATE

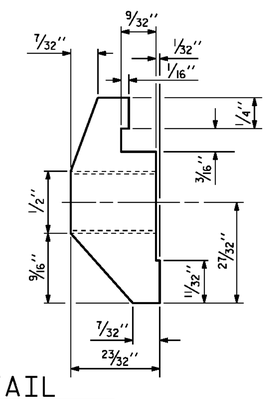
SHIM DETAILS

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



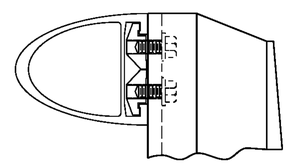
RAIL SECTION



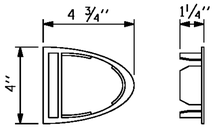


CLAMP BAR DETAIL

(4 REQUIRED PER POST)



CLAMP ASSEMBLY



RAIL CAP

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-
SHEET 2 OF 4

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

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-110
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. SMITH	DATE :	DEC 2015
DRAWN BY:	K. WHITE	DATE :	DEC 2015
CHECKED BY:	E. DAVIS	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

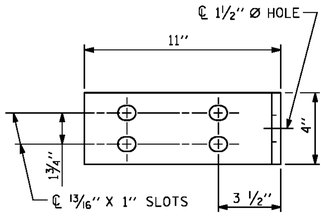
DRAWN BY :	EEM	6/94
CHECKED BY :	RGW	6/94

REV.	8/16/99	MAB/LES
REV.	5/1/06R	KMM/GM
REV.	10/1/11	MAA/GM

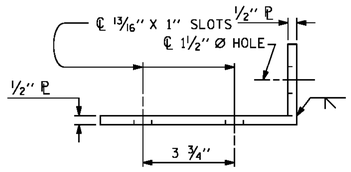
5/10/2016
400.217_B4929_SMU_2BMR2.dgn

STD. NO. BMR4

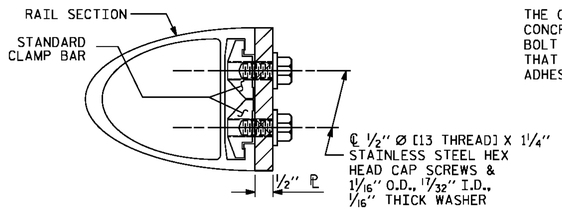
FOR RAIL POST SPACING, SEE "VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT" SHEETS.



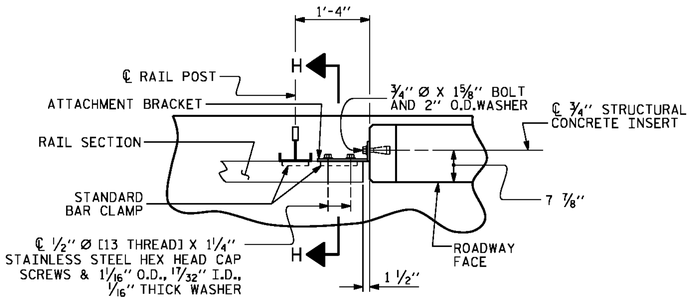
ELEVATION



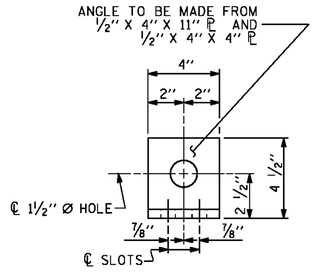
TOP VIEW



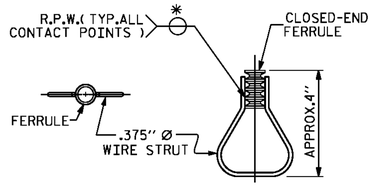
SECTION H-H (FIX)



PLAN - RAIL AND END POST



END VIEW



PLAN ELEVATION

STRUCTURAL CONCRETE INSERT

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

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 1½".

B. 1 - ¾" Ø X 1⅝" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø X 1⅝" 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.

NOTES

METAL RAIL TO END POST CONNECTION

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

A. ½" PLATES SHALL CONFORM TO AASHTO M270 GRADE 36 AND SHALL BE GALVANIZED AFTER FABRICATION.

B. ¾" STRUCTURAL CONCRETE INSERT SHALL HAVE A WORKING LOAD SHEAR CAPACITY OF 4800 LBS. THE FERRULES SHALL ENGAGE A ¾"Ø X 1⅝" BOLT WITH 2" O.D. WASHER IN PLACE. THE ¾"Ø X 1⅝" 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.

D. STANDARD CLAMP BARS (SEE "2 BAR METAL RAIL" SHEET 2 OF 4).

E. ½" Ø PIPE SLEEVES (IF REQUIRED) TO BE GALVANIZED.

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

THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾" STRUCTURAL CONCRETE INSERT ASSEMBLY, AND THE ½" 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 ¾" Ø X 1⅝" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 1⅝" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

DETAILS FOR ATTACHING METAL RAIL TO END POST

DESIGNED BY:	J. SMITH	DATE :	DEC 2015
DRAWN BY:	K. WHITE	DATE :	DEC 2015
CHECKED BY:	E. DAVIS	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

DRAWN BY :	FCJ	1/88
CHECKED BY :	CRK	3/89

REV. 5/7/03	RWW/JTE
REV. 5/1/06	TLA/GM
REV. 10/1/11	MAA/GM

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

RAIL POST SPACING AND END OF RAIL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-111
1			3			TOTAL SHEETS
2			4			278

STD. NO. BMR2

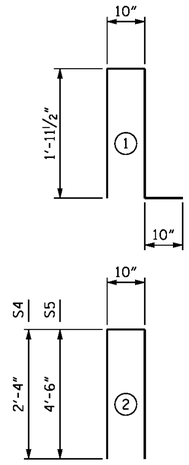
5/10/2016
400_219_B4929_SMU_2BMR3.dgn

NOTES

ALL REINFORCING STEEL IN CONCRETE PARAPET AND END POST FOR TWO BAR METAL RAIL SHALL BE EPOXY COATED.

FOR PARAPET LAYOUT, SEE "VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT" SHEETS.

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

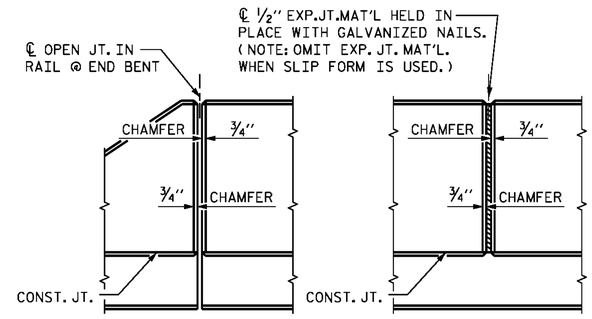
FOR CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B201	952	#5	STR	27'-9"	27554
B202	16	#5	STR	14'-0"	234
B203	16	#5	STR	28'-4"	473
B204	16	#5	STR	29'-2"	487
B205	8	#5	STR	15'-1"	126
B206	8	#5	STR	15'-4"	128
B207	32	#5	STR	16'-7"	553
B208	8	#5	STR	17'-1"	143
B209	8	#5	STR	16'-2"	135
B210	8	#5	STR	24'-10"	207
B211	8	#5	STR	25'-1"	209
B212	16	#5	STR	28'-5"	474
B213	8	#5	STR	28'-7"	238
B214	8	#5	STR	27'-7"	230
B215	12	#6	STR	3'-5"	62
S3	3804	#5	1	5'-7"	22152
S4	3794	#5	2	5'-6"	21764
S5	10	#5	2	9'-10"	103

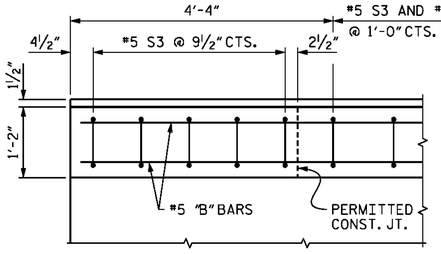
* EPOXY COATED
REINFORCING STEEL LBS. 75,272

CLASS AA CONCRETE C.Y. 412.1

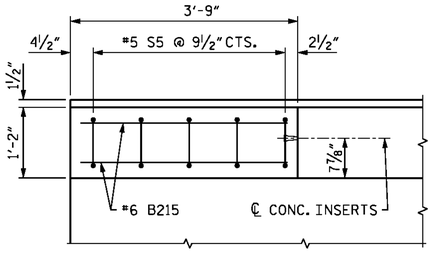
1'-2" x 2'-6" CONCRETE PARAPET SUPERSTRUCTURE L.F. 3796.56



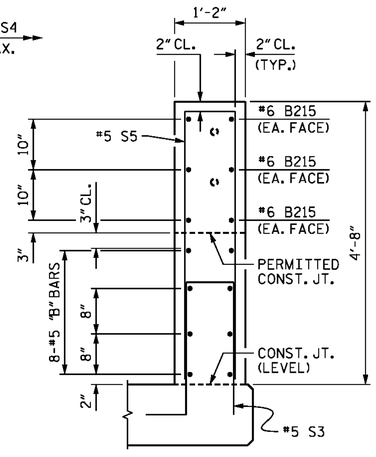
ELEVATION AT EXPANSION JOINTS



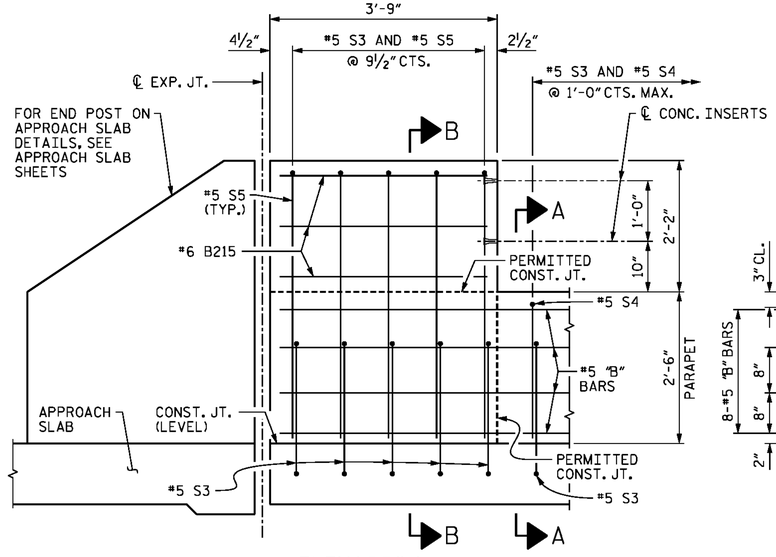
PLAN OF PARAPET



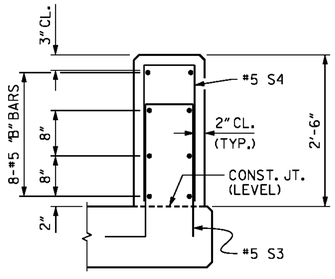
PLAN OF END POST



SECTION B-B



ELEVATION



SECTION A-A

PARAPET AND END POST FOR TWO BAR RAIL

PARAPET DETAILS

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

CONCRETE PARAPET FOR TWO BAR METAL RAIL

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

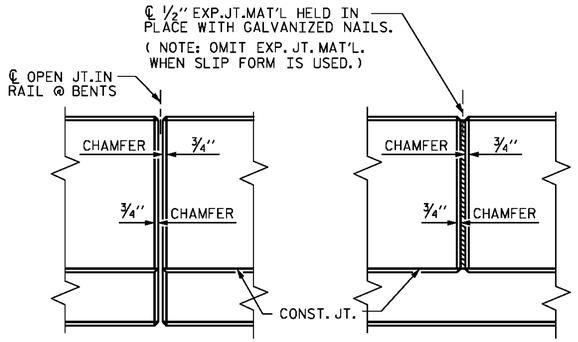
DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-112
1			3			TOTAL SHEETS
2			4			278

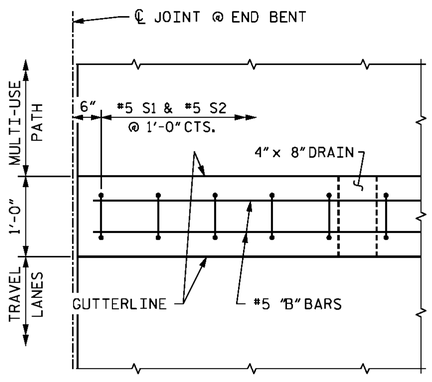
DESIGNED BY:	J. SMITH	DATE : JAN 2016
DRAWN BY:	K. WHITE	DATE : JAN 2016
CHECKED BY:	E. DAVIS	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/10/2016
400.221_B4929_SMU_2BMR4.dgn

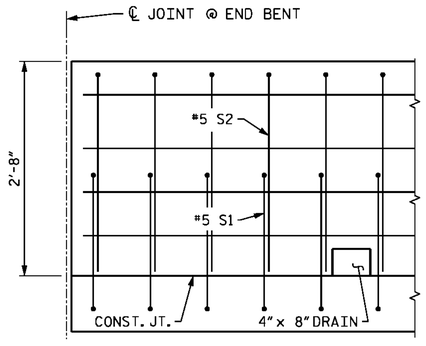


ELEVATION AT EXPANSION JOINTS

BARRIER RAIL DETAILS



PLAN



ELEVATION

END OF RAIL DETAILS

NOTES

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

ALL REINFORCING STEEL IN BARRIER RAILS SHALL BE EPOXY COATED.

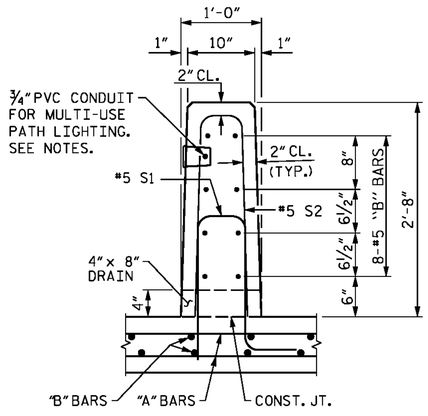
GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE BARRIER RAIL AND IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT EACH THIRD POINT BETWEEN BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED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

#5 S1 AND #5 S2 BARS MAY BE SHIFTED SLIGHTLY AS NECESSARY TO AVOID GIRDER REINFORCING.

CONTRACTOR SHALL HAVE THE OPTION OF ADHESIVELY ANCHORING THE VERTICAL CONCRETE BARRIER RAIL TO THE DECK AT NO ADDITIONAL COST TO THE DEPARTMENT. IF THE CONTRACTOR ELECTS TO USE ADHESIVE ANCHORS, SECTION 420-13 OF THE STANDARD SPECIFICATIONS SHALL APPLY AND LEVEL TWO FIELD TESTING IS REQUIRED. THE YIELD LOAD OF THE #5 BAR IS 18.6 KIPS. IN ADDITION, IF THE OPTION TO USE ADHESIVE ANCHORS IS CHOSEN, THE CONTRACTOR SHALL SUBMIT DESIGN CALCULATIONS PREPARED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NORTH CAROLINA THAT DEMONSTRATES THAT THE COMBINATION OF THE CHOSEN ADHESIVE AND EMBEDMENT DEPTH OF THE POST-INSTALLED #5 BARS IS SATISFACTORY FOR BARRIER RAIL ANCHORAGE CONSISTENT WITH TL-3 SELECTION CRITERIA PRESCRIBED IN THE AASHTO LRFD DESIGN SPECIFICATIONS.

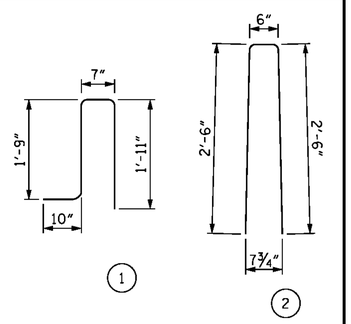
FOR MULTI-USE PATH LIGHTING DETAILS, SEE ELECTRICAL PLANS.

FOR VERTICAL CONCRETE BARRIER RAIL LAYOUT, SEE "VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT" SHEET.



SECTION THRU RAIL

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

FOR VERTICAL CONCRETE BARRIER RAIL ONLY

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B101	888	#5	STR	29'-7"	27400
B102	16	#5	STR	5'-9"	96
B103	8	#5	STR	15'-7"	130
B104	8	#5	STR	18'-1"	151
B105	16	#5	STR	16'-10"	281
B106	16	#5	STR	16'-0"	267
B107	48	#5	STR	26'-3"	1314
B108	8	#5	STR	21'-7"	180
B109	8	#5	STR	25'-6"	213
B110	8	#5	STR	23'-7"	197
B111	8	#5	STR	27'-1"	226
B112	16	#5	STR	20'-8"	345
S1	3752	#5	1	5'-1"	19893
S2	3752	#5	2	5'-6"	21523

EPOXY COATED REINFORCING STEEL	LBS.	72,216
CLASS AA CONCRETE	C.Y.	340.0
VERTICAL CONCRETE BARRIER RAIL	L.F.	3,746.99

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
VERTICAL CONCRETE BARRIER RAIL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-113
1			3			TOTAL SHEETS
2			4			278

STD. NO. CBR2

DESIGNED BY:	J. SMITH	DATE :	FEB 2016
DRAWN BY:	K. WHITE	DATE :	FEB 2016
CHECKED BY:	E. DAVIS	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

DRAWN BY :	MAA	5/10
CHECKED BY :	GM	5/10

REV. 10/1/11	MAA/GM
REV. 12/5/11	MAA/GM
REV. 6/13	MAA/GM

5/10/2016
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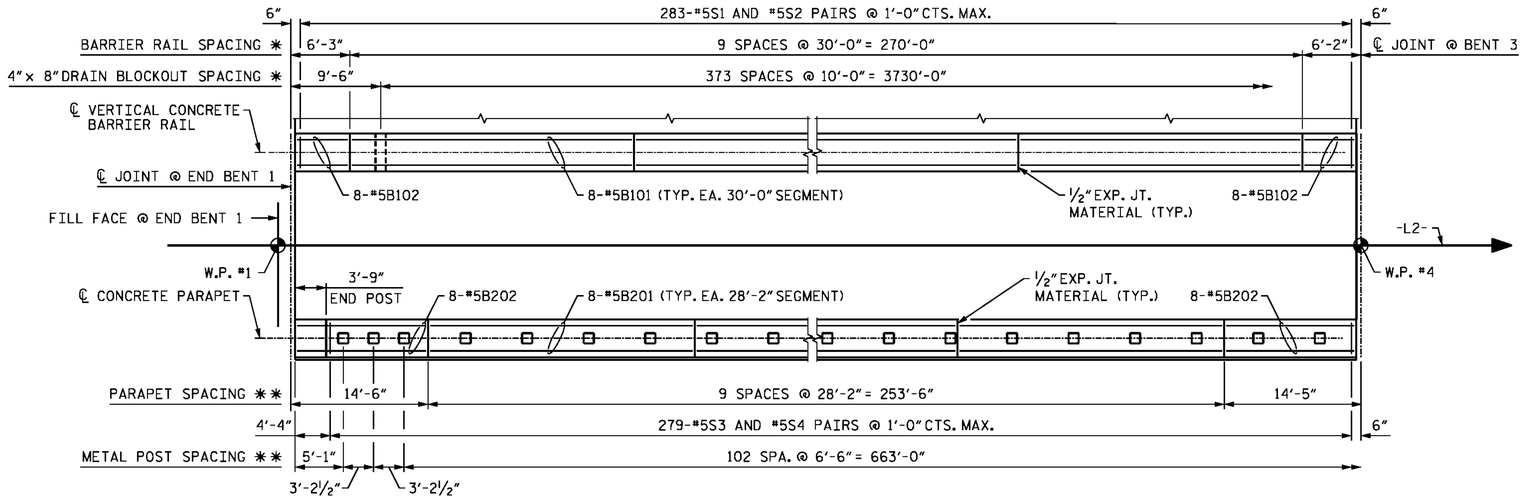
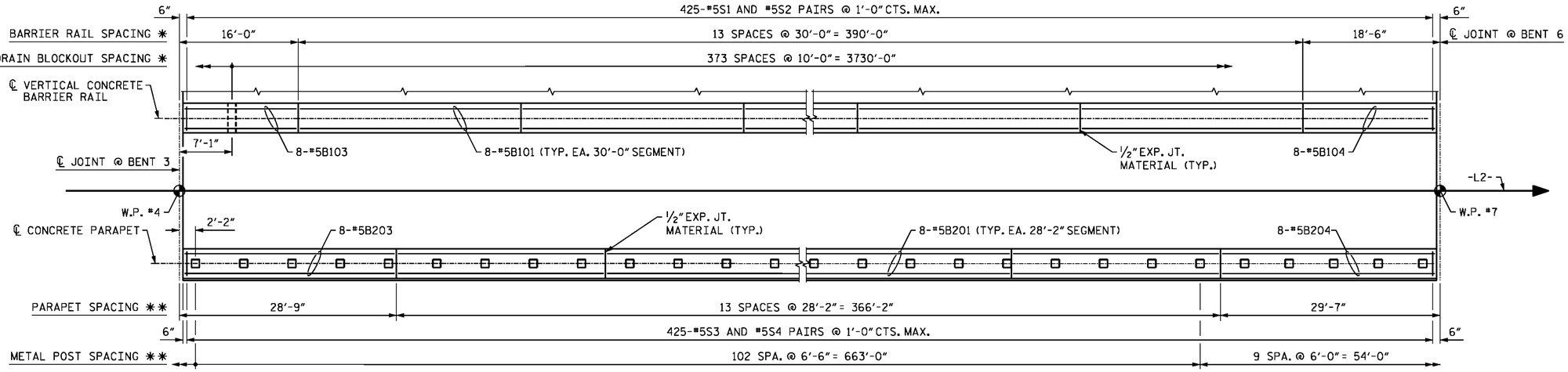


PLAN - UNIT 1

* MEASURED ALONG ℄ BARRIER
** MEASURED ALONG ℄ PARAPET



PLAN - UNIT 2

* MEASURED ALONG ℄ BARRIER
** MEASURED ALONG ℄ PARAPET

NOTES

ALL DIMENSIONS ARE HORIZONTAL UNLESS OTHERWISE NOTED.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT

DESIGNED BY:	J. SMITH	DATE :	NOV 2015
DRAWN BY:	K. WHITE	DATE :	NOV 2015
CHECKED BY:	E. DAVIS	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16

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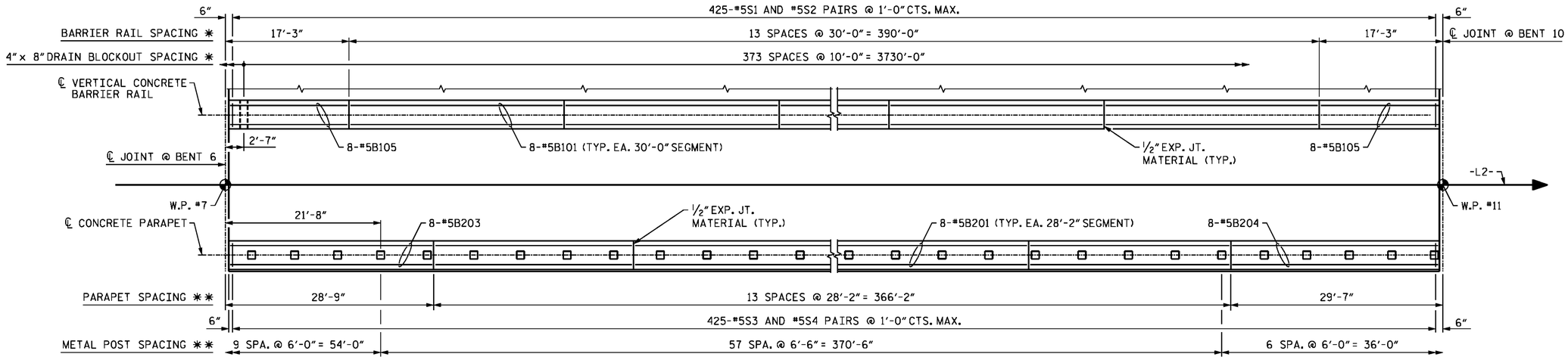
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-114

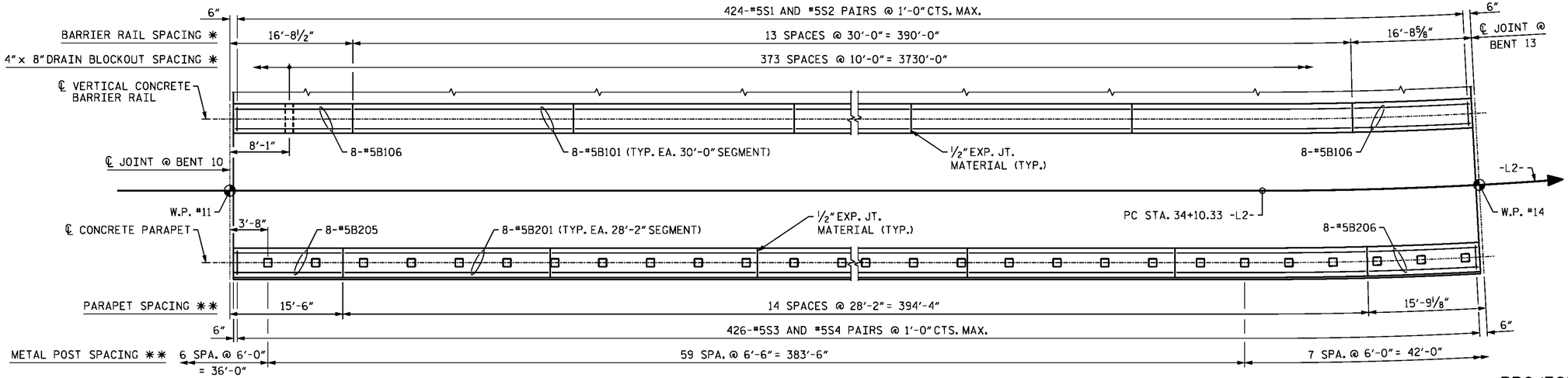
TOTAL SHEETS 278

5/10/2016
400.225_B4929_SMU_RPS01.dgn



PLAN - UNIT 3

* MEASURED ALONG ℄ BARRIER
** MEASURED ALONG ℄ PARAPET



PLAN - UNIT 4

* MEASURED ALONG ℄ BARRIER
** MEASURED ALONG ℄ PARAPET

NOTES

ALL DIMENSIONS ARE HORIZONTAL UNLESS OTHERWISE NOTED.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 5

DESIGNED BY:	J. SMITH	DATE :	NOV 2015
DRAWN BY:	K. WHITE	DATE :	NOV 2015
CHECKED BY:	E. DAVIS	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY 5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-115
1			3			TOTAL SHEETS
2			4			278

5/10/2016
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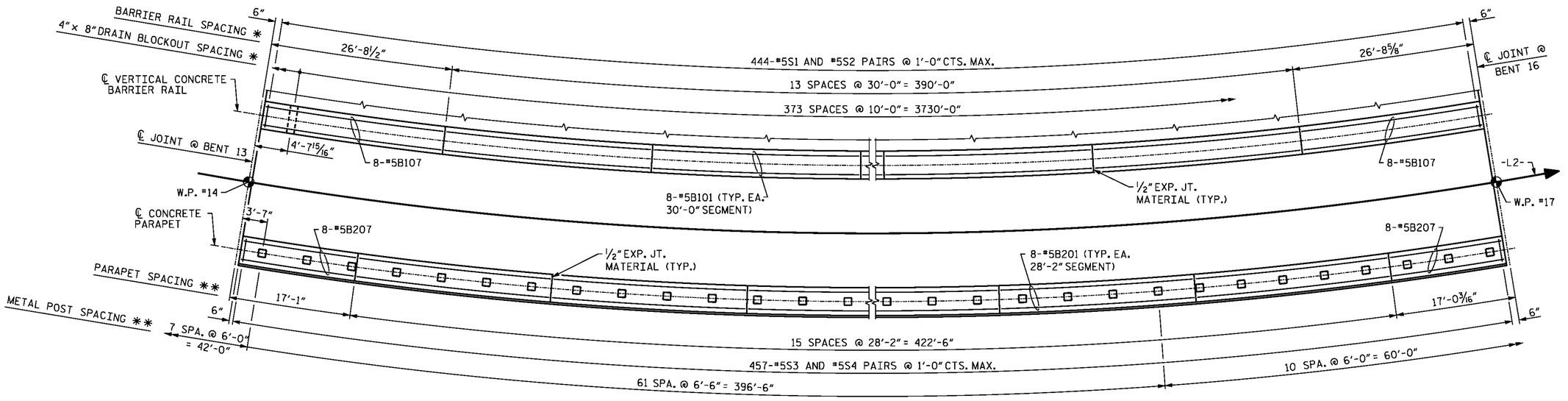
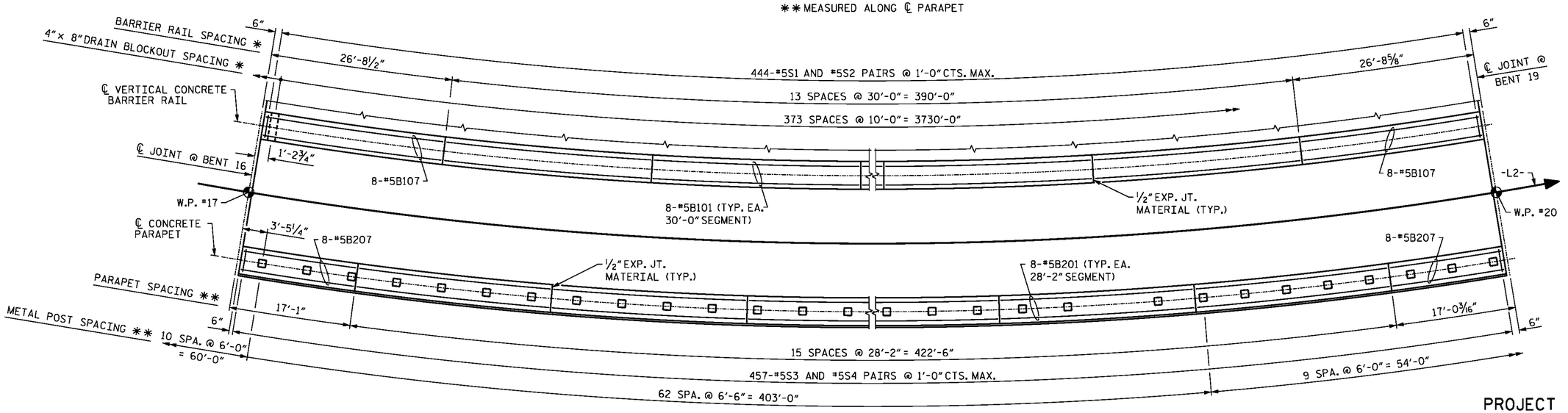


PLAN - UNIT 5

* MEASURED ALONG ℄ BARRIER
** MEASURED ALONG ℄ PARAPET



PLAN - UNIT 6

* MEASURED ALONG ℄ BARRIER
** MEASURED ALONG ℄ PARAPET

NOTES

ALL DIMENSIONS ARE HORIZONTAL UNLESS OTHERWISE NOTED.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-116
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. SMITH	DATE :	NOV 2015
DRAWN BY:	K. WHITE	DATE :	NOV 2015
CHECKED BY:	E. DAVIS	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
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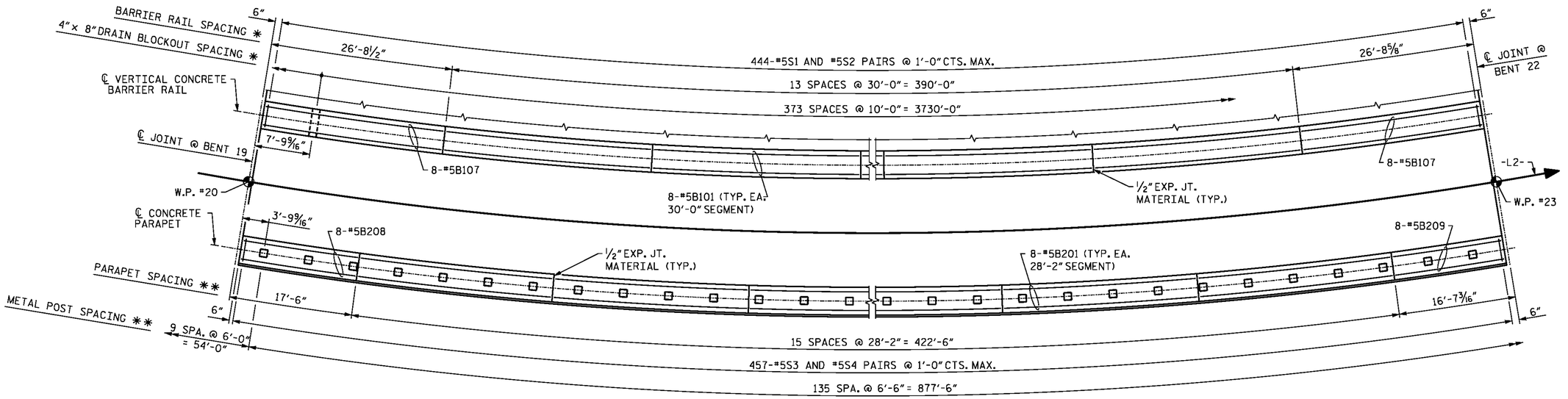
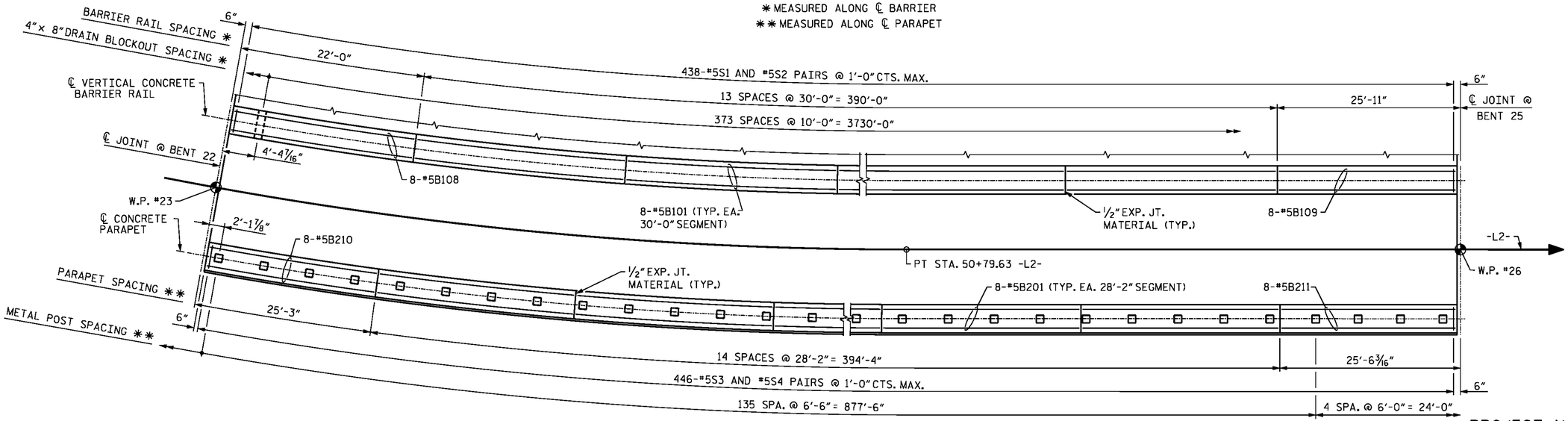


PLAN - UNIT 7

✱ MEASURED ALONG ℄ BARRIER
✱✱ MEASURED ALONG ℄ PARAPET



PLAN - UNIT 8

✱ MEASURED ALONG ℄ BARRIER
✱✱ MEASURED ALONG ℄ PARAPET

NOTES

ALL DIMENSIONS ARE HORIZONTAL UNLESS OTHERWISE NOTED.

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-117
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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DESIGNED BY:	J. SMITH	DATE :	NOV 2015
DRAWN BY:	K. WHITE	DATE :	NOV 2015
CHECKED BY:	E. DAVIS	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
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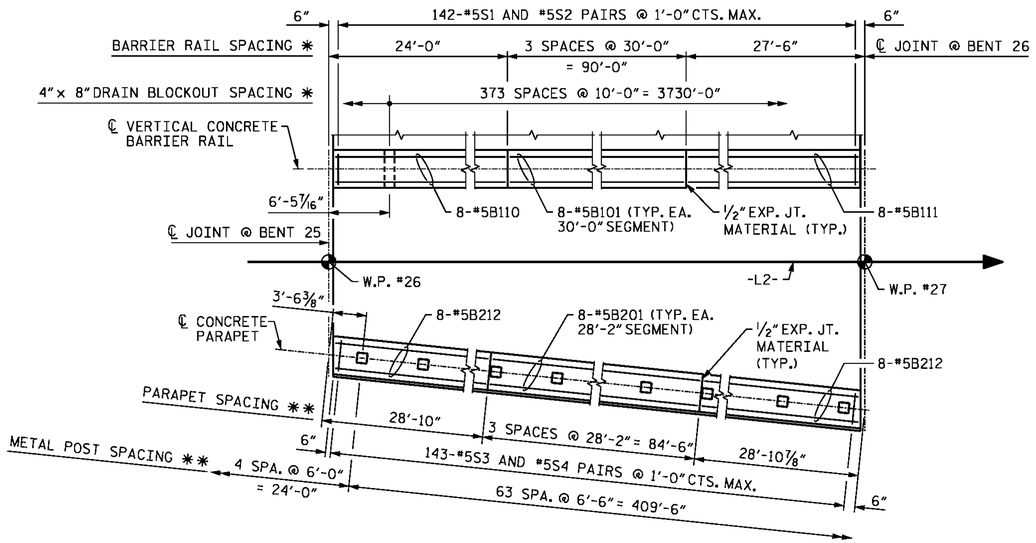
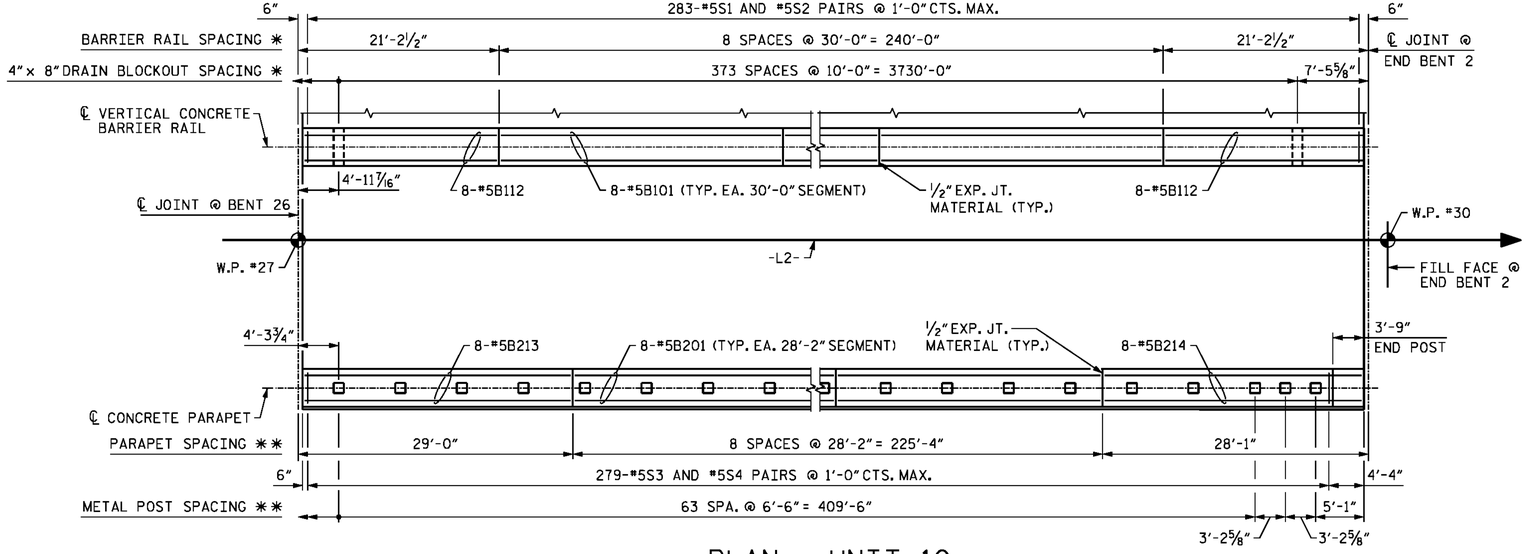


PLAN - UNIT 9

* MEASURED ALONG ℄ BARRIER
** MEASURED ALONG ℄ PARAPET



PLAN - UNIT 10

* MEASURED ALONG ℄ BARRIER
** MEASURED ALONG ℄ PARAPET

NOTES

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PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-118
1			3			TOTAL SHEETS
2			4			278

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RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
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DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
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NOTES

DESIGN CRITERIA:

AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 7th EDITION, 2014.

THE ALUMINUM ASSOCIATION, ALUMINUM DESIGN MANUAL 2015 (FOR SUPPLEMENTAL ALUMINUM DESIGN INFORMATION ONLY).

DESIGN LOADS:

DEAD LOAD: SELF-WEIGHT = 200 LBS/FT, WHICH INCLUDES 9" TALL CURB AND CONCRETE POSTS.

LIVE LOADS :
POST AND BASE PLATE = 450 LBS/FT TRANSVERSE POINT LOAD AT TOP RAIL CONNECTION.

TOP, INTERMEDIATE AND BOTTOM RAILS =
50 LB./FT. UNIFORM LOAD APPLIED SIMULTANEOUSLY VERTICALLY AND TRANSVERSELY AND 200 LB. CONCENTRATED POINT LOAD APPLIED AT ANY POINT AND IN ANY DIRECTION TO PRODUCE MAXIMUM STRESS AND DEFLECTION.

PICKETS = CONCENTRATED 200 LB. LOAD APPLIED TRANSVERSELY OVER AN AREA OF 1.0 SF.

ALUMINUM RAILS AND POSTS:

STRUCTURAL EXTRUSIONS, TUBE, PIPE AND BAR SHALL BE IN ACCORDANCE WITH TABLE 1 AND ASTM B221 OR ASTM B429.

POSTS SHALL BE FABRICATED AND INSTALLED PLUMB, ± 1" TOLERANCE WHEN MEASURED AT 3'-9" ABOVE THE CURB. AT ALL LOCATIONS, THE MAXIMUM ON CENTER SPACING BETWEEN ALUMINUM POSTS SHALL BE 5'-0" (MEASURED HORIZONTAL). PICKETS SHALL BE FABRICATED PARALLEL TO THE POSTS AND SHALL BE SPACED 6½" ON CENTER.

THE RAILING SHALL BE FABRICATED AND INSTALLED PLUMB LONGITUDINALLY AND VERTICAL TRANSVERSELY. THE TOP, INTERMEDIATE AND BOTTOM RAIL SHALL RUN PARALLEL TO THE TOP OF THE CURB THROUGHOUT THE LENGTH OF BRIDGE. THE TOP OF THE TOP RAIL SHALL BE AT A CONSTANT DISTANCE OF 3'-9" FROM TOP OF CURB.

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.

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

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.

CONCRETE POSTS:

CONCRETE SHALL BE CLASS AA IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. CONCRETE POSTS SHALL BE INSTALLED PLUMB. THE MAXIMUM SPACING BETWEEN AN ALUMINUM POST AND A CONCRETE POST SHALL BE 5'-0" (MEASURED HORIZONTAL).

BASE PLATES, STIFFENER, FILLER PLATES, RAIL AND SLEEVE CAPS:

BASE PLATES, STIFFENER PLATES, FILLER PLATES, SLEEVE CAP PLATES AND ALL RAIL CAP PLATES SHALL BE IN ACCORDANCE WITH ASTM B209, ALLOY 6061-T6.

SHIM PLATES:

SHIM PLATES SHALL BE ALUMINUM IN ACCORDANCE WITH ASTM B209, ALLOY 6061 OR 6063. SHIM PLATES SHALL BE USED FOR FOUNDATION HEIGHT ADJUSTMENTS GREATER THAN ¼" AND LOCALIZED IRREGULARITIES GREATER THAN ¾". FIELD TRIM SHIM PLATES WHEN NECESSARY TO MATCH THE CONTOURS OF THE FOUNDATION.

BEVELED SHIM PLATES MAY BE USED IN LIEU OF TRIMMED FLAT SHIM PLATES SHOWN. STACKED SHIM PLATES MUST BE BONDED TOGETHER WITH ADHESIVE BONDING MATERIAL AND LIMITED TO A MAXIMUM TOTAL THICKNESS OF ½", UNLESS LONGER ANCHOR BOLTS ARE PROVIDED FOR THE EXPOSED THREAD LENGTH.

ANCHOR BOLTS:

ANCHOR BOLTS SHALL BE IN ACCORDANCE WITH ASTM F1554 GRADE 36 AND GALVANIZED. HEADLESS ANCHOR BOLTS FOR ADHESIVE ANCHORS SHALL BE THREADED FULL LENGTH AND GALVANIZED. "U" BARS SHALL BE SHIFTED SLIGHTLY AS NECESSARY TO AVOID CONFLICTS WITH DRILLED HOLE INSTALLATION FOR POST-INSTALLED ANCHORAGE. EXPANSION ANCHORS ARE NOT PERMITTED. ALL ANCHOR BOLTS SHALL HAVE SINGLE SELF-LOCKING HEX NUTS. TACK WELDING OF THE NUT TO THE ANCHOR BOLT MAY BE USED IN LIEU OF SELF-LOCKING NUTS. ALL NUTS SHALL BE IN ACCORDANCE WITH ASTM A563 OR ASTM A194. FLAT WASHERS SHALL BE IN ACCORDANCE WITH ASTM F436 AND PLATE WASHERS (FOR LONG SLOTTED HOLES ONLY), SHALL BE IN ACCORDANCE WITH ASTM A36 OR ASTM A709 GRADE 36. AFTER THE NUTS HAVE BEEN SNUG TIGHTENED, THE ANCHOR BOLT THREADS SHALL BE DISTORTED TO PREVENT REMOVAL OF THE NUTS. DISTORTED THREADS AND TACK WELDS SHALL BE COATED WITH AN APPROVED GALVANIZING REPAIR MATERIAL IN ACCORDANCE WITH SECTION 1076-7 OF THE STANDARD SPECIFICATIONS. THE CONTRACTOR SHALL INSTALL ANCHOR BOLTS PERPENDICULAR TO BASE PLATE WITH FLAT WASHERS.

CONCRETE CURB:

CONCRETE SHALL BE CLASS AA IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. CONSTRUCT CONCRETE CURB PLUMB WITH THE TOP SURFACE FINISHED LEVEL TRANSVERSELY. SEE POST SPACING SHEETS AND CURB EXPANSION JOINT DETAIL ON SHEET 6 OF 13. ¾" V-GROOVES SHALL BE INSTALLED IN BOTH FACES AND TOP OF CONCRETE CURB AT A MAXIMUM SPACING OF 30'-0".

JOINTS:

ALL WELDED JOINTS ARE TO BE GROUND SMOOTH.

WELDING:

ALL WELDING SHALL BE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY STRUCTURAL WELDING CODE (ALUMINUM) ANSI/AWS D1.2 (CURRENT EDITION). FILLER METAL SHALL BE EITHER ER5183, ER5356 OR ER5556. NONDESTRUCTIVE TESTING OF WELDS IS NOT REQUIRED. FILLER METAL FOR PLUG WELDS AND BEND SPLICES MAY BE ER4043.

ANODIZING:

ALUMINUM FOR POSTS, BASES, RAILS, EXPANSION BARS, CLAMP BARS, RIVETS, CAPS, SHIMS, ATTACHMENT BRACKETS AND HOLD-DOWN PLATES (ETC.) SHALL BE ANODIZED. THE COLOR SHALL BE DETERMINED BY THE ENGINEER. THE CONTRACTOR SHALL PROVIDE A SAMPLE TO THE ENGINEER FOR COORDINATION WITH THE TOWN OF SURF CITY.

AFTER A COLOR HAS BEEN SELECTED FOR THE RAILING, THE CONTRACTOR SHALL SUBMIT A SAMPLE OF COMPATIBLE EXTERIOR ACRYLIC HOUSE PAINT TO THE ENGINEER. THIS PAINT SHALL MATCH THE ANODIZED RAIL COLOR AS CLOSELY AS POSSIBLE. AFTER ERECTION OF THE ANODIZED RAILING, ALL EXPOSED ANCHOR BOLTS, NUTS, WASHERS, MACHINE SCREWS, CAP SCREWS, BOLTS AND BUILT-UP ANGLES SHALL BE COATED WITH TWO COATS OF THIS ACRYLIC PAINT.

ANY DAMAGE TO THE ANODIZED SURFACE OF THE RAIL OR COMPONENTS DURING THE CONSTRUCTION SHALL BE REPAIRED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AT THE DIRECTION OF THE ENGINEER AND AT THE CONTRACTOR'S EXPENSE.

WORKING DRAWINGS:

DETAILS ADDRESSING PROJECT SPECIFIC GEOMETRY (LINE & GRADE) SHOWING POST AND EXPANSION JOINT LOCATIONS, ANCHOR BOLT INSTALLATION DETAILS, MUST BE SUBMITTED BY THE CONTRACTOR FOR THE ENGINEER'S REVIEW AND APPROVAL PRIOR TO FABRICATION OF THE RAILING. WORKING DRAWINGS SHALL BE IN ACCORDANCE WITH THE SPECIAL PROVISIONS.

FOR ADDITIONAL REQUIREMENTS REFER TO SECTIONS 460 AND 1074-5 OF THE STANDARD SPECIFICATIONS.

THE COST OF THE PEDESTRIAN RAILING SYSTEM, INCLUDING CURB AND POSTS WITH BOLTS AND WASHERS COMPLETE IN PLACE SHALL BE INCLUDED IN THE PRICE BID FOR LINEAR FEET OF PEDESTRIAN RAILING.

PAY LENGTH = 3813.16 LIN.FT. (1)
(1) INCLUDES PEDESTRIAN RAILING MOUNTED ON END BENT BACKWALL AND RETAINING WALLS.

TABLE 1 - ALUMINUM RAILING MEMBERS

MEMBER	ALLOY (1)	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
POSTS	6061-T6	RT 2x2x.250	2.00" x 2.00"	0.250"
TOP RAIL	6061-T6	2½" NPS (SCH. 10)	2.875"	0.120"
TOP RAIL JOINT SLEEVES	6063-T5	2.50 OD x 0.125 WALL	2.500"	0.125"
INTERMEDIATE AND BOTTOM RAIL	6061-T6	RT 2x2x.250	2.00" x 2.00"	0.250"
INT. AND BOTTOM RAIL POST CONNECTION SLEEVE	6063-T5	1.50 OD x 0.125 WALL	1.500"	0.125"
PICKETS	6061-T6	¾" Ø ROUND BAR	0.750"	N/A

(1) ALLOY 6061-T6 OR 6063-T52 AND T6 MAY BE SUBSTITUTED FOR ALLOY 6063-T5.

PROJECT NO. B-4929
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SHEET 1 OF 13

DESIGNED BY:	JRD / EMD	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. SHERMAN	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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STATE OF NORTH CAROLINA
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RALEIGH
SUPERSTRUCTURE

PEDESTRIAN RAILING NOTES

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-119
1			3			TOTAL SHEETS
2			4			278

5/10/2016
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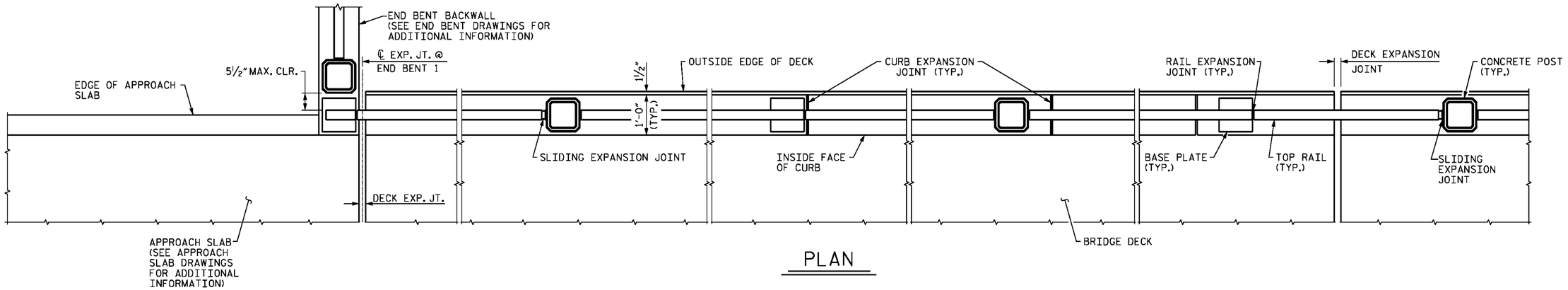
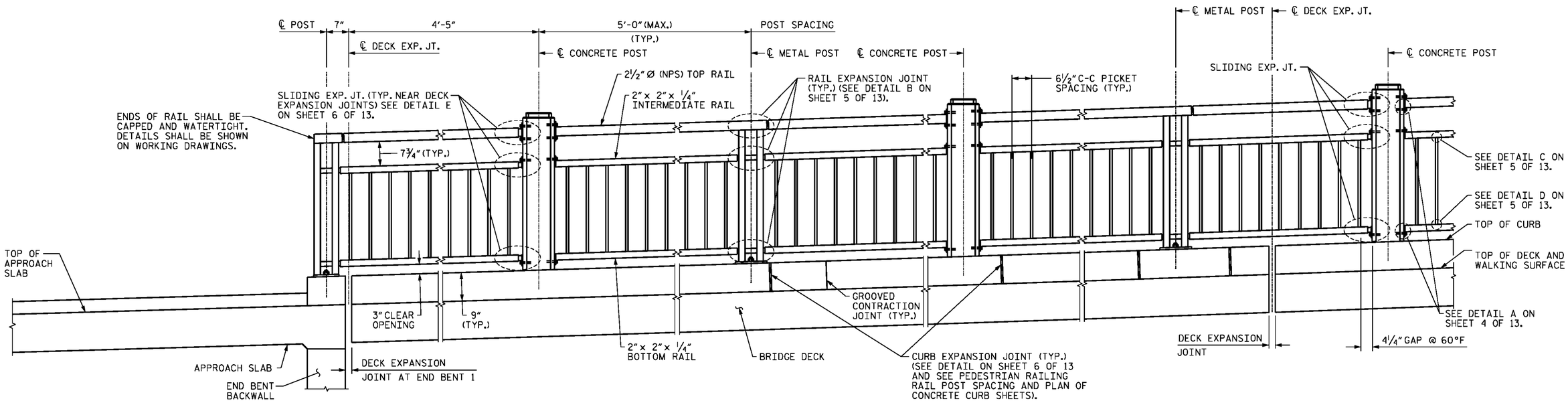


PLAN



ELEVATION OF INSIDE FACE OF RAILING

END BENT 1 SHOWN, END BENT 2 SIMILAR

NOTES

FOR NOTES SEE SHEET 1 OF 13.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE CURB IN ACCORDANCE WITH ARTICLE 825-10(B) OF THE STANDARD SPECIFICATIONS. THE CONTRACTION JOINT SHALL BE LOCATED AT A SPACING OF 8 FT. TO 10 FT. BETWEEN CURB EXPANSION JOINTS. NO CONTRACTION JOINTS WILL BE REQUIRED FOR SEGMENTS LESS THAN 10 FEET IN LENGTH.

FOR CONCRETE POST, METAL POST AND CURB LAYOUT, SEE PEDESTRIAN RAILING RAIL POST SPACING AND PLAN OF CONCRETE CURB SHEETS.

DECK EXPANSION JOINT DETAILS NOT SHOWN FOR CLARITY.

THE CURB 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.

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PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PEDESTRIAN RAILING PLAN AND ELEVATION

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
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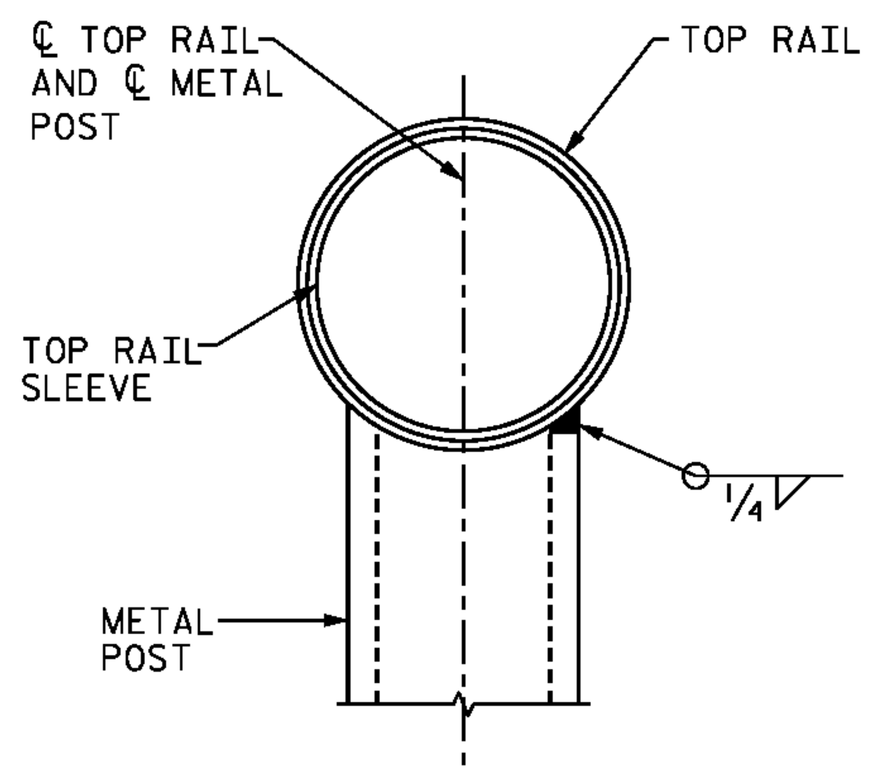
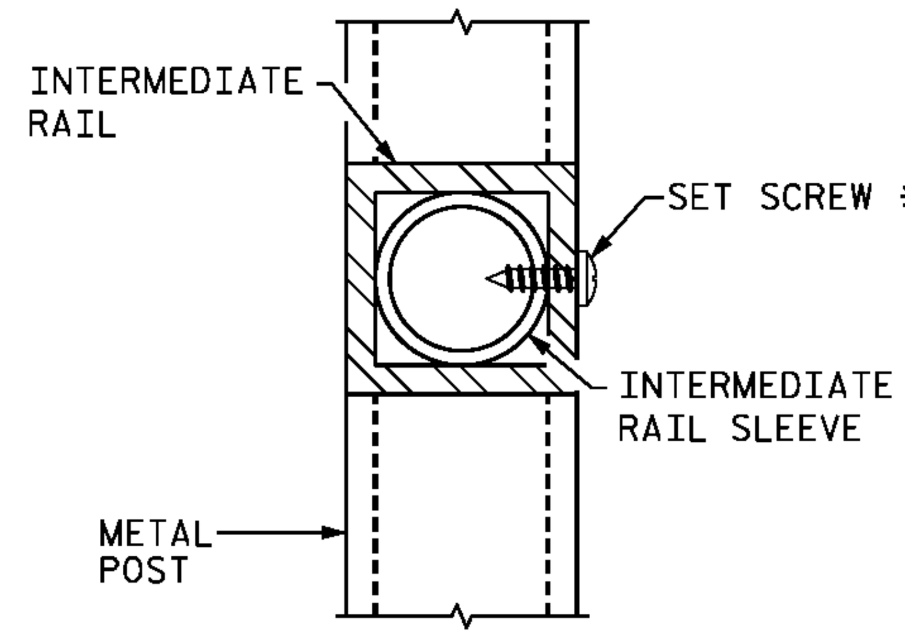
NO.	BY:	DATE:	NO.	BY:	DATE:	S-120
1			3			TOTAL SHEETS
2			4			278



SECTION A-A
(TOP RAIL CONNECTION)



SECTION B-B
(INTERMEDIATE RAIL CONNECTION)

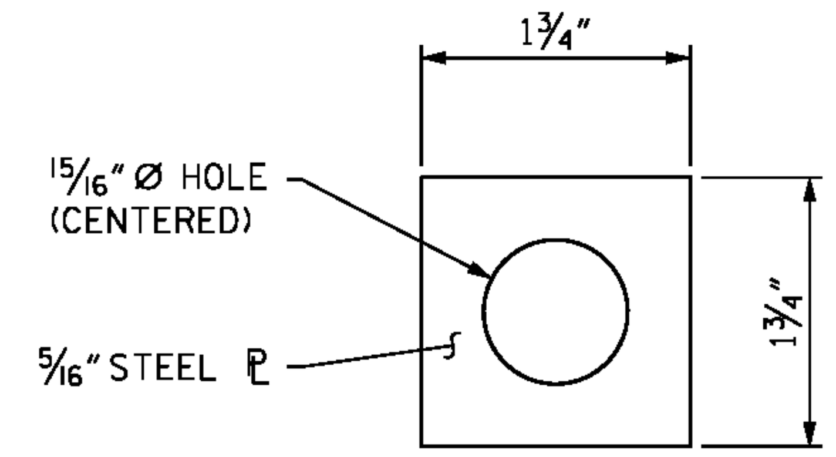
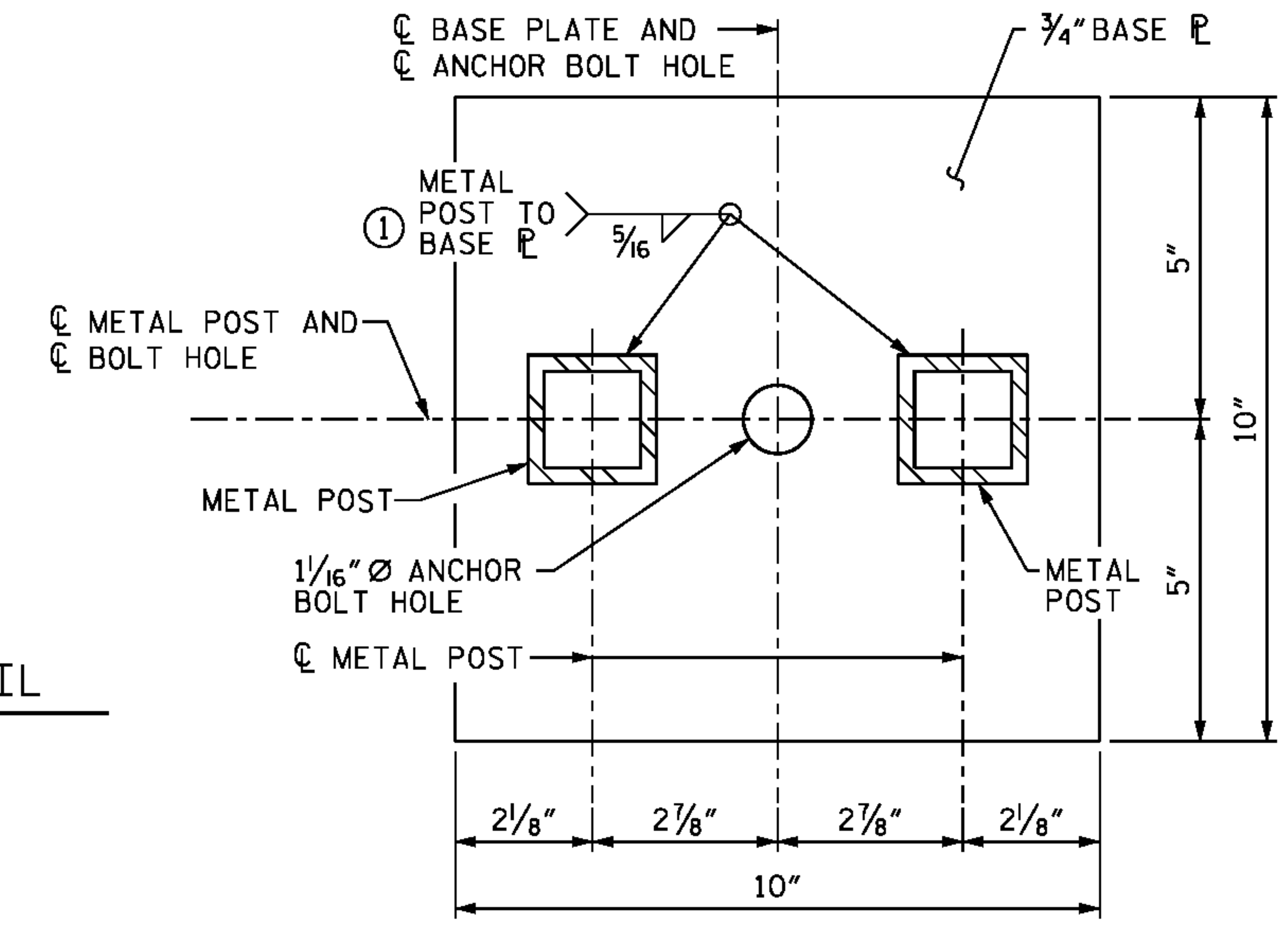
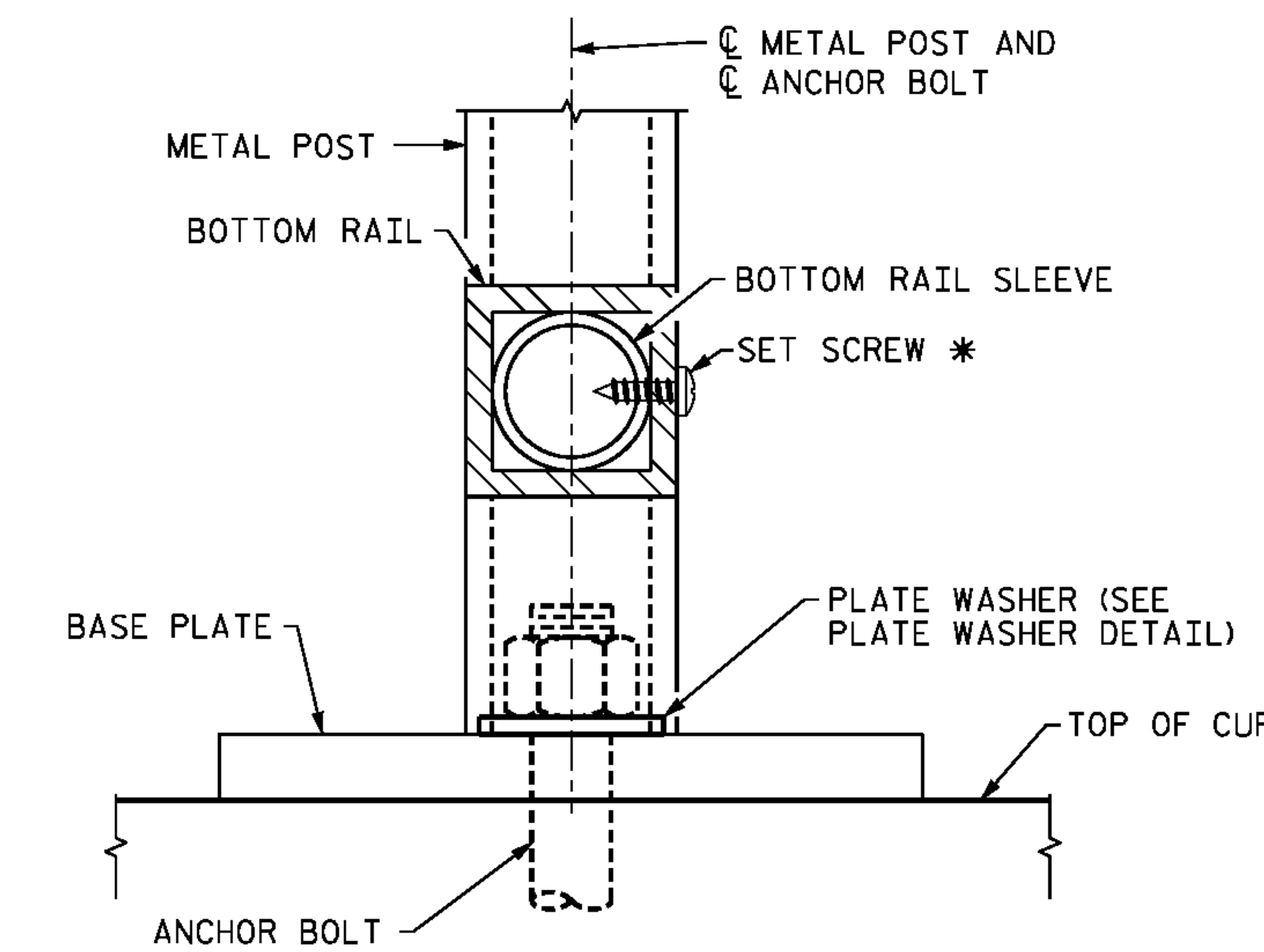


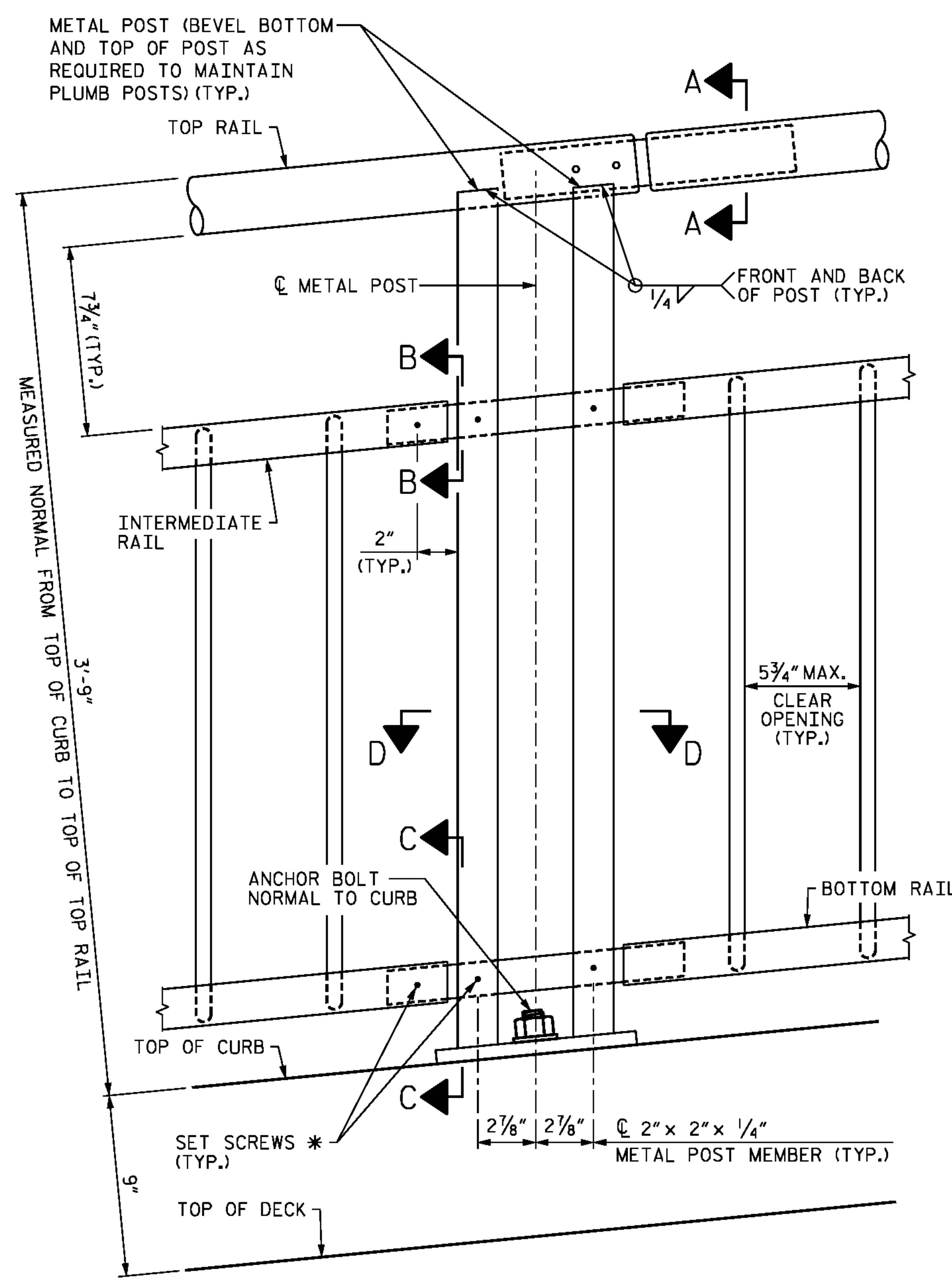
PLATE WASHER DETAIL



SECTION D-D
(BASE PLATE DETAIL)
(BOTTOM RAIL NOT SHOWN FOR CLARITY)
① WELD SHALL BE BUILT OUT TO OBTAIN FULL THROAT THICKNESS.



SECTION C-C
(BOTTOM RAIL CONNECTION)



RAIL CONNECTIONS AT METAL POSTS

✱ ¼" Ø × ¾" PAN HEAD ALUMINUM (ALLOY 2024-T4 OR 7075-T73) OR STAINLESS STEEL (TYPE 316 OR 18-8 ALLOY) SET SCREWS. SCREWS MUST BE SET FLUSH AGAINST THE OUTSIDE FACE OF RAILS AND POSTS. A SINGLE ¾" Ø PLUG WELD MAY BE SUBSTITUTED FOR THE SET SCREWS.

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PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 3 OF 13

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032967 JASON R. DOUGHTY
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STATE OF NORTH CAROLINA
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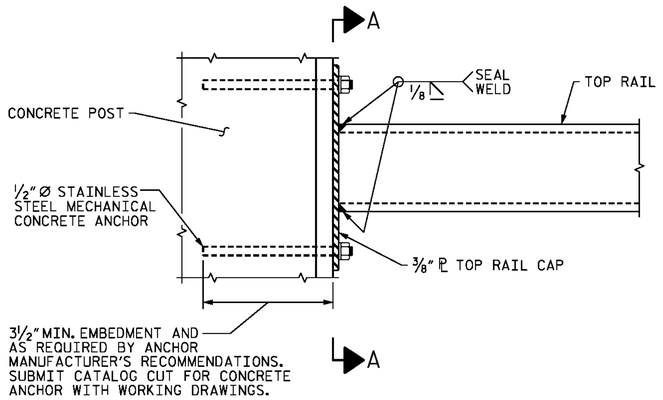
RALEIGH

SUPERSTRUCTURE

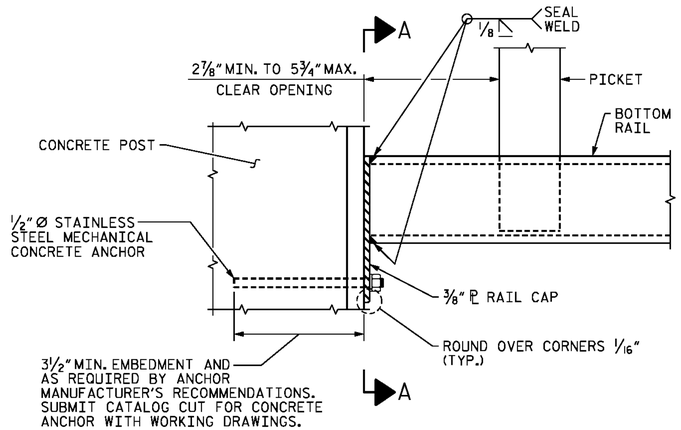
PEDESTRIAN RAILING DETAILS

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

SHEET NO. S-121
TOTAL SHEETS 278



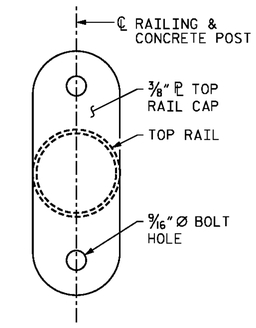
TOP RAIL



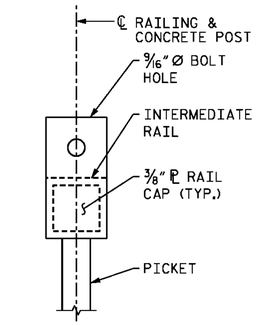
INTERMEDIATE AND BOTTOM RAIL

BOTTOM RAIL SHOWN, INTERMEDIATE RAIL SIMILAR

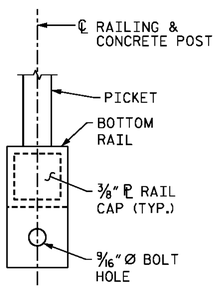
DETAIL A - ELEVATION VIEW RAIL TERMINATION



TOP RAIL

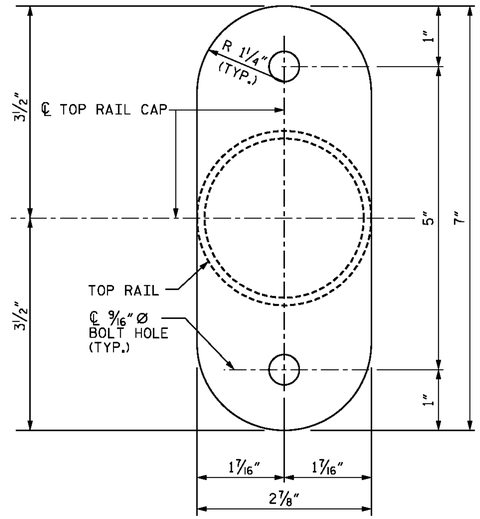


INTERMEDIATE RAIL

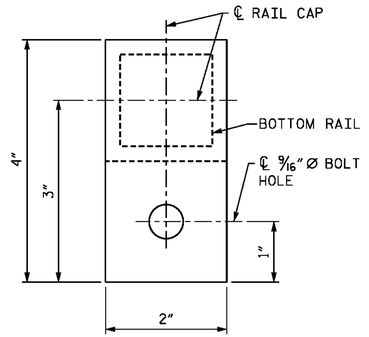


BOTTOM RAIL

VIEW A-A



3/8" ℙ TOP RAIL CAP



3#8" ℙ BOTTOM AND INTERMEDIATE RAIL CAP

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 13

STATE OF NORTH CAROLINA
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RALEIGH

SUPERSTRUCTURE

PEDESTRIAN RAILING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-122
1			3			TOTAL SHEETS
2			4			278

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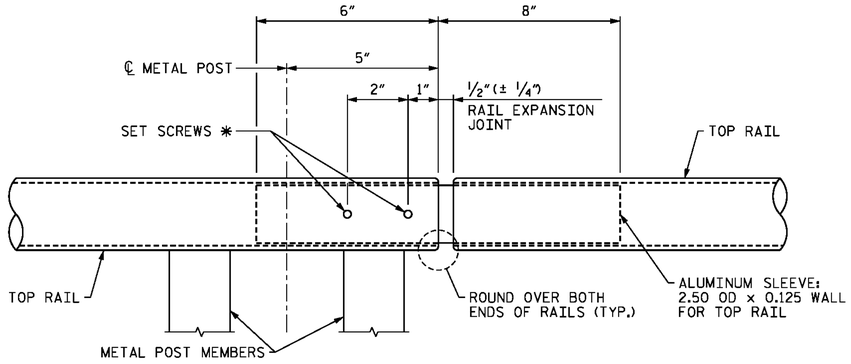
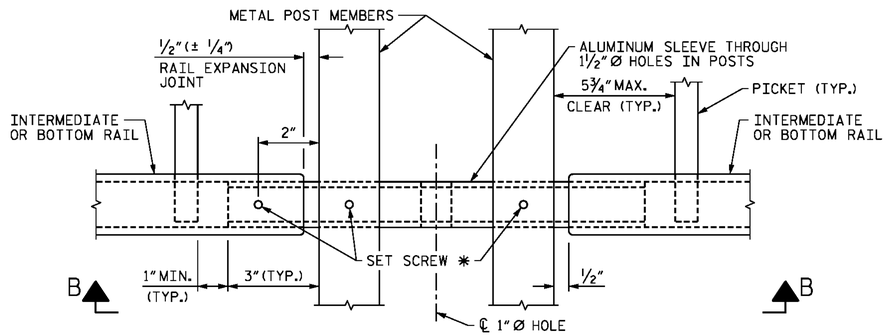


TOP RAIL

TOP RAIL AT EXPANSION JOINT SHOWN

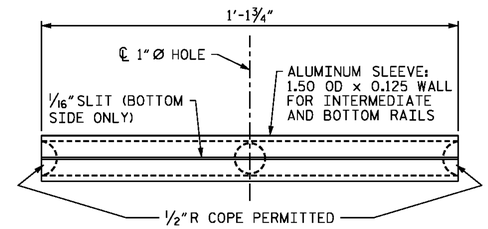


INTERMEDIATE OR BOTTOM RAIL

BOTTOM RAIL AT RAIL EXPANSION JOINT SHOWN

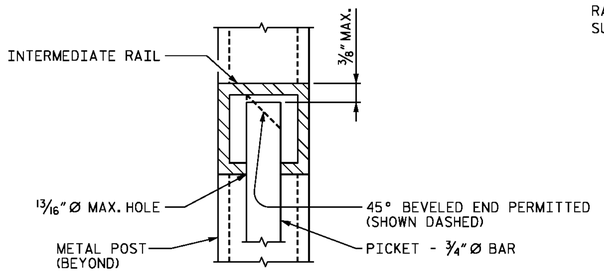
DETAIL B - RAIL EXPANSION JOINT

* 1/4"Ø x 3/4" PAN HEAD ALUMINUM (ALLOY 2024-T4 OR 7075-T73) OR STAINLESS STEEL (TYPE 316 OR 18-8 ALLOY) SET SCREWS. SCREWS MUST BE SET FLUSH AGAINST THE OUTSIDE FACE OF RAILS AND POSTS. A SINGLE 3/4"Ø PLUG WELD MAY BE SUBSTITUTED FOR THE SET SCREWS.



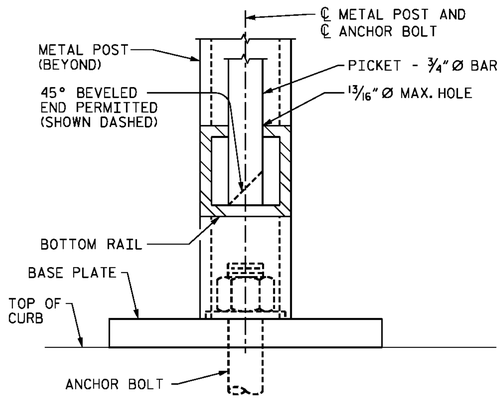
VIEW B-B
INTERMEDIATE OR BOTTOM RAIL - ALUMINUM SLEEVE DETAIL

BOTTOM SIDE SHOWN



DETAIL C

SECTION AT TOP OF PICKET



DETAIL D

SECTION AT BOTTOM OF PICKET

DESIGNED BY:	JRD/EMD	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. SHERMAN	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_243_B4929_SMU_PED05.dgn

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 13

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty

00F1C86448274F7...

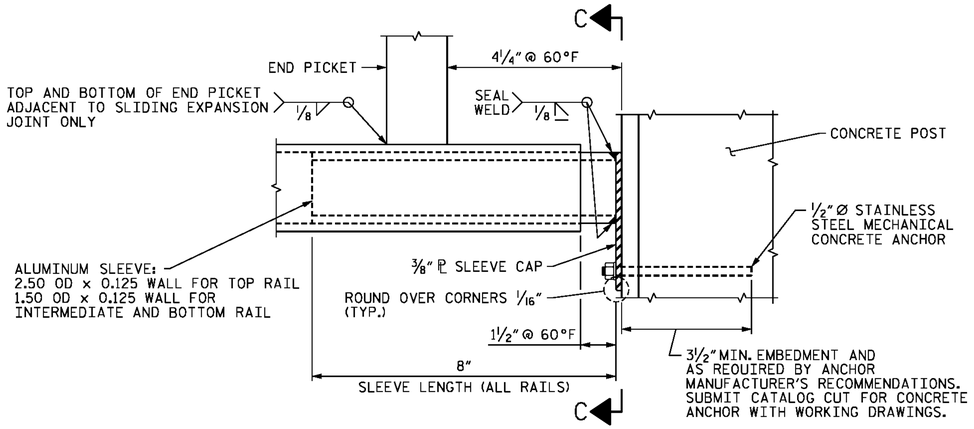
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PEDESTRIAN RAILING DETAILS

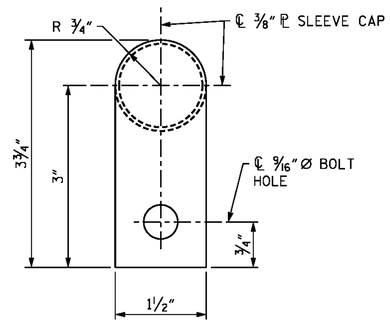
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-123
1			3			TOTAL SHEETS
2			4			278



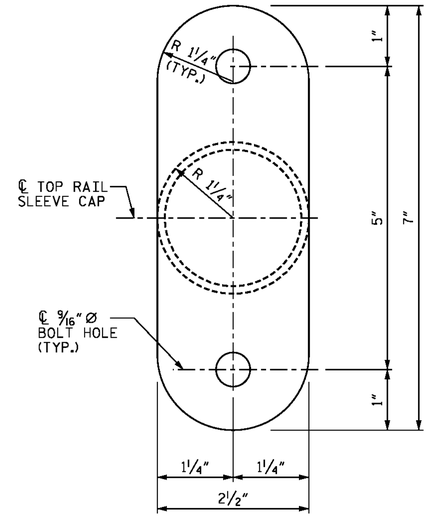
DETAIL E - SLIDING EXPANSION JOINT

BOTTOM RAIL SHOWN, TOP AND INTERMEDIATE RAILS SIMILAR.

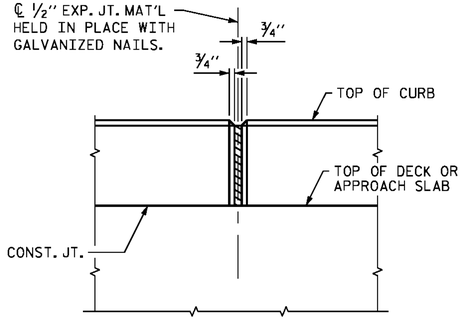
BACK-STATION SIDE OF CONCRETE POST SHOWN, AHEAD-STATION SIDE SIMILAR.



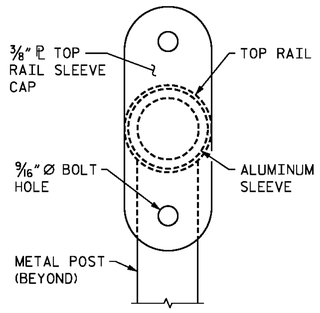
3#8" ℙ BOTTOM AND INTERMEDIATE RAIL SLEEVE CAP



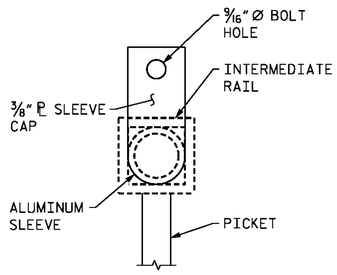
⅜" ℙ TOP RAIL SLEEVE CAP



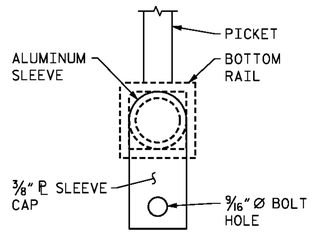
CURB EXPANSION JOINT DETAIL



TOP RAIL



INTERMEDIATE RAIL



BOTTOM RAIL

VIEW C-C

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 6 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PEDESTRIAN RAILING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-124
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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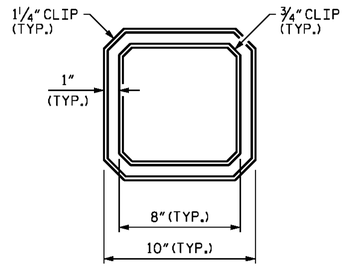
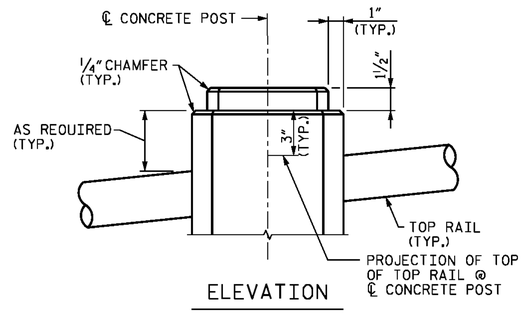
DESIGNED BY:	JRD/EMD	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. SHERMAN	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_245_B4929_SMU_PED06.dgn



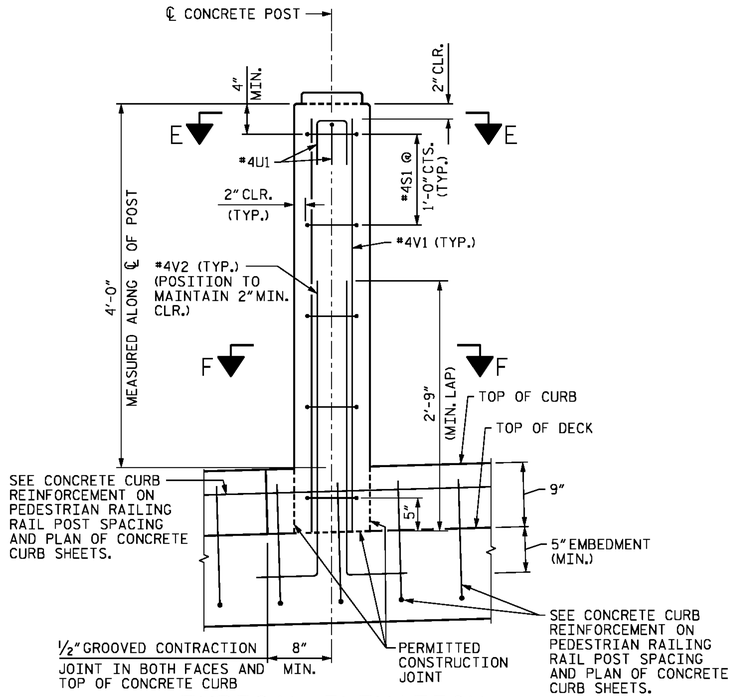
PLAN



ELEVATION

TOP OF CONCRETE POST

(REINFORCEMENT AND TOP RAIL CONNECTION ℄ NOT SHOWN FOR CLARITY)



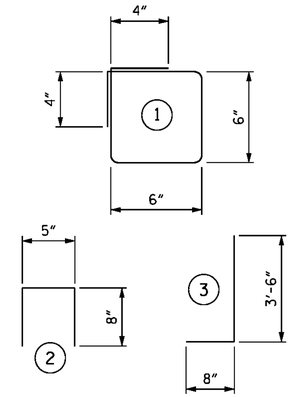
TYPICAL ELEVATION

(ELEVATION ON BRIDGE DECK IS SHOWN. FOR ELEVATION ON END BENT BACKWALL, SEE END BENT DETAILS SHEETS.)

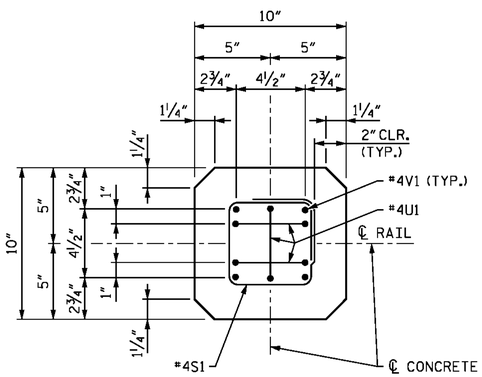
BILL OF MATERIAL (1 CONCRETE POST)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S1	5	#4	1	2'-8"	9
U1	3	#4	2	1'-9"	4
V1	4	#4	STR	4'-5"	12
V2	4	#4	3	4'-2"	11
EPOXY COATED REINFORCING STEEL				LBS.	36.0
CLASS AA CONCRETE:				C.Y.	0.1

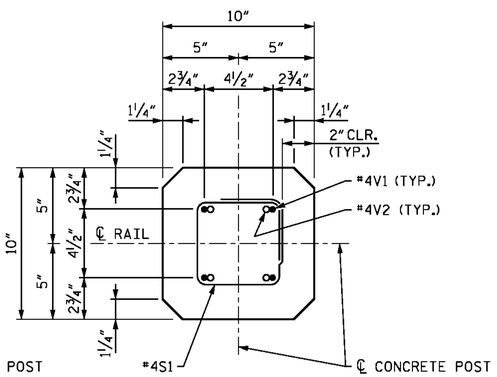
BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.



SECTION E-E



SECTION F-F

NOTE

THE CONTRACTOR IS PERMITTED TO SHIFT THE POSITION OF CONCRETE CURB REINFORCEMENT BY 2" MAXMIUM TO AVOID ANY CONFLICTS WITH THE REINFORCING STEEL FROM THE CONCRETE POST AND DECK DRAINS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 7 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PEDESTRIAN RAILING CONCRETE POST DETAILS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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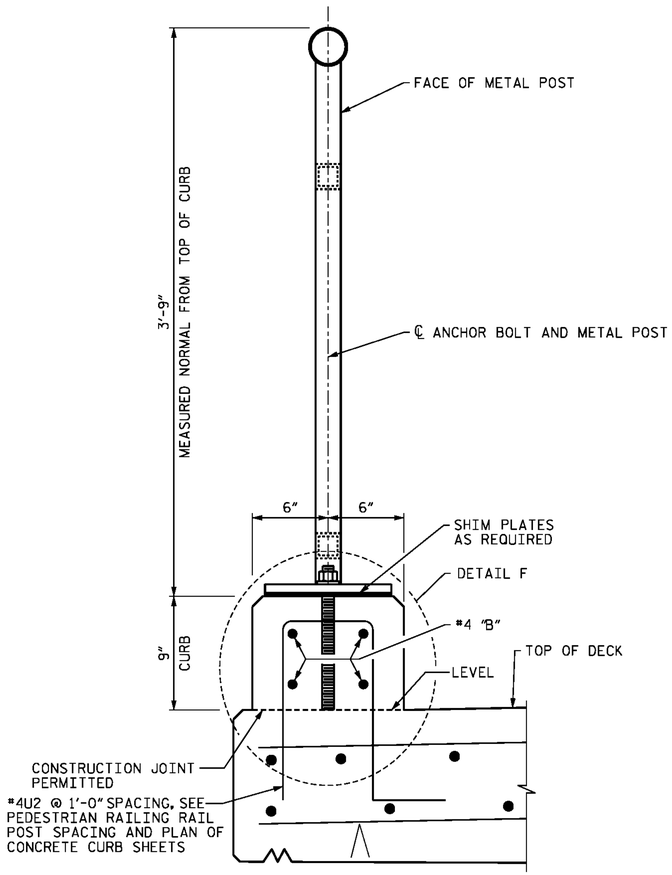
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-125
TOTAL SHEETS 278

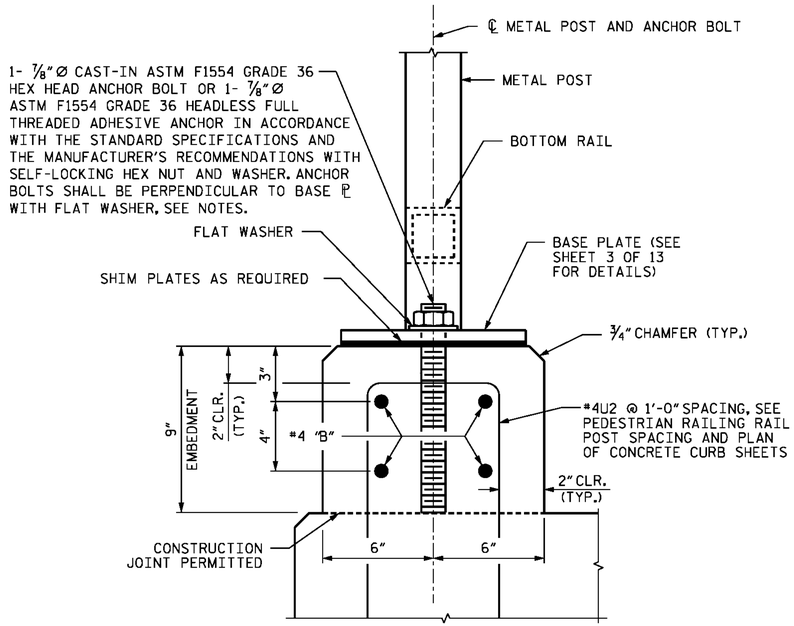
DESIGNED BY:	JRD / EMD	DATE : OCT 2015
DRAWN BY:	K. WHITE	DATE : OCT 2015
CHECKED BY:	J. SHERMAN	DATE : JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/10/2016
400_247_B4929_SMU_PED07.dgn



CONCRETE CURB TYPICAL SECTION

(ELEVATION ON BRIDGE DECK IS SHOWN.
FOR ELEVATION ON APPROACH SLAB, SEE APPROACH SLAB DETAILS SHEET.)



DETAIL F

(ADHESIVE ANCHOR BOLTS SHOWN,
CAST-IN-PLACE ANCHOR BOLT SIMILAR)

NOTES

FOR LAYOUT OF CONCRETE CURB AND REINFORCEMENT, SEE PEDESTRIAN RAILING RAIL POST SPACING AND PLAN OF CONCRETE CURB SHEETS.

ANCHOR BOLT NUTS SHALL BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.

THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN LIEU OF THE CAST-IN ANCHOR BOLTS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ⅞" Ø ANCHOR BOLT IS 21.6 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.

IF CONTRACTOR ELECTS TO USE ADHESIVELY ANCHORED ANCHOR BOLTS AS SHOWN IN DETAIL F, THE ADHESIVE MATERIAL SHALL SATISFY THE NCDOT STANDARD SPECIFICATIONS AND SHALL HAVE MINIMUM CHARACTERISTIC BOND STRENGTH, τ_{cr} OF 1000 PSI.

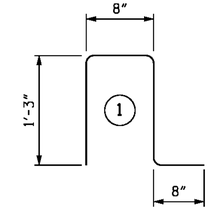
FOR PEDESTRIAN HANDRAIL MOUNTED ON RETAINING WALL COPING, SEE END BENT DETAILS SHEETS.

BILL OF MATERIAL (CONCRETE CURB)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	440	#4	STR	29'-6"	8671
B2	8	#4	STR	20'-9"	111
B3	8	#4	STR	15'-7"	83
B4	8	#4	STR	18'-1"	97
B5	8	#4	STR	16'-0"	86
B6	24	#4	STR	24'-5"	391
B7	4	#4	STR	22'-1"	59
B8	4	#4	STR	23'-0"	61
B9	8	#4	STR	25'-4"	135
B10	4	#4	STR	19'-7"	52
B11	4	#4	STR	22'-0"	59
U2	3737	#4	1	3'-10"	9569

EPOXY COATED REINFORCING STEEL	LBS.	19,374
CLASS AA CONCRETE:	C.Y.	103.7

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL INCLUDES CLASS AA CONCRETE AND EPOXY COATED REINFORCING STEEL FOR CONCRETE CURB ON BRIDGE DECK ONLY. CONCRETE AND REINFORCING STEEL FOR THE CONCRETE CURB ON APPROACH SLAB IS INCLUDED IN THE APPROACH SLAB BILL OF MATERIAL.

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 8 OF 13

DESIGNED BY:	JRD / EMD	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. SHERMAN	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PEDESTRIAN RAILING CURB DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-126
1			3			TOTAL SHEETS
2			4			278

5/10/2016
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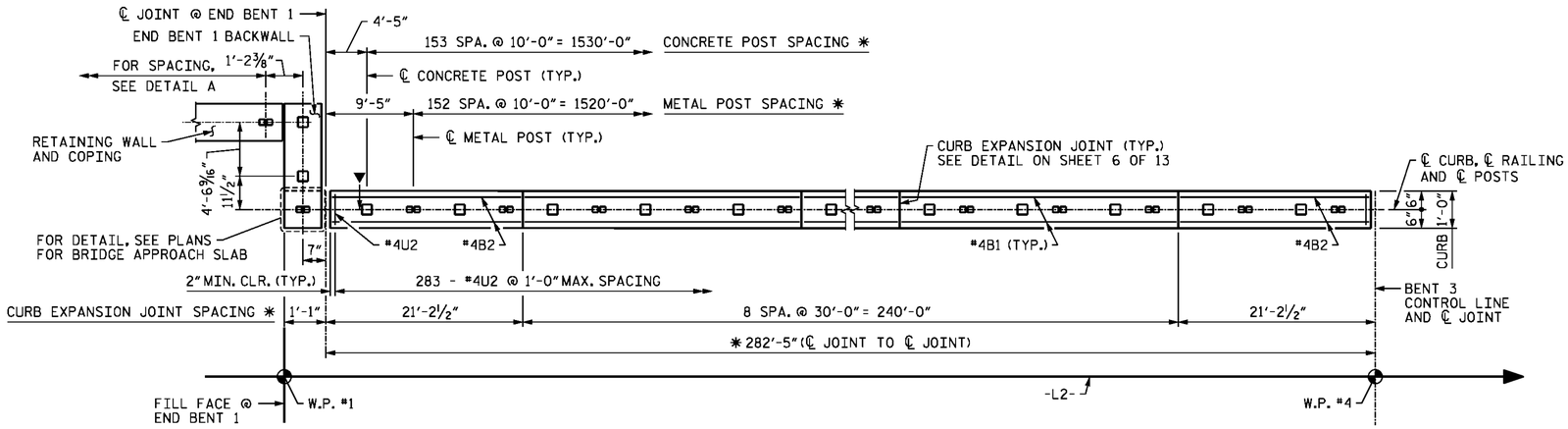
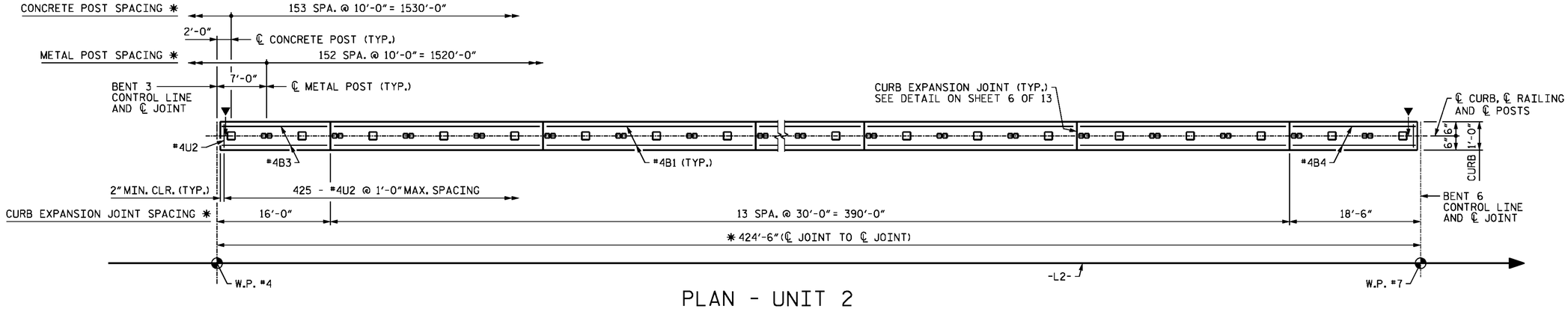


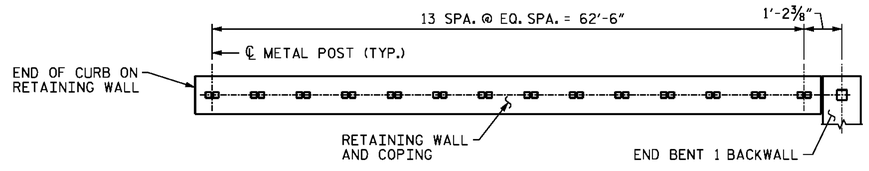
PLAN - UNIT 1

* MEASURED ALONG ℄ CURB



PLAN - UNIT 2

* MEASURED ALONG ℄ CURB



DETAIL A

NOTES

▼ - INDICATES LOCATION OF SLIDING EXPANSION JOINT. SEE DETAIL E ON SHEET 6 OF 13.

ALL DIMENSIONS ARE HORIZONTAL UNLESS OTHERWISE NOTED.

#4 "B" BARS AND #4U2 BARS MAY BE SHIFTED OR TRIMMED AS NECESSARY TO PROVIDE 2" MIN. CLEAR TO EXPANSION JOINT BLOCKOUT AND DECK DRAINS.

SEE END BENT DRAWINGS FOR ADDITIONAL INFORMATION.

OUTSIDE EDGE OF BRIDGE DECK NOT SHOWN FOR CLARITY.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 9 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PEDESTRIAN RAILING RAIL POST SPACING AND PLAN OF CONCRETE CURB

DESIGNED BY:	J. SMITH	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. SHERMAN	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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REVISIONS						SHEET NO.
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1			3			TOTAL SHEETS
2			4			278

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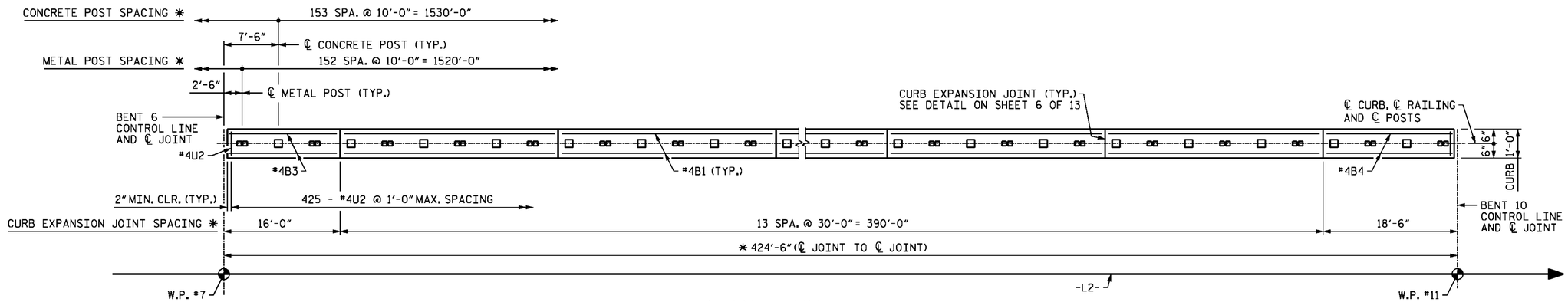
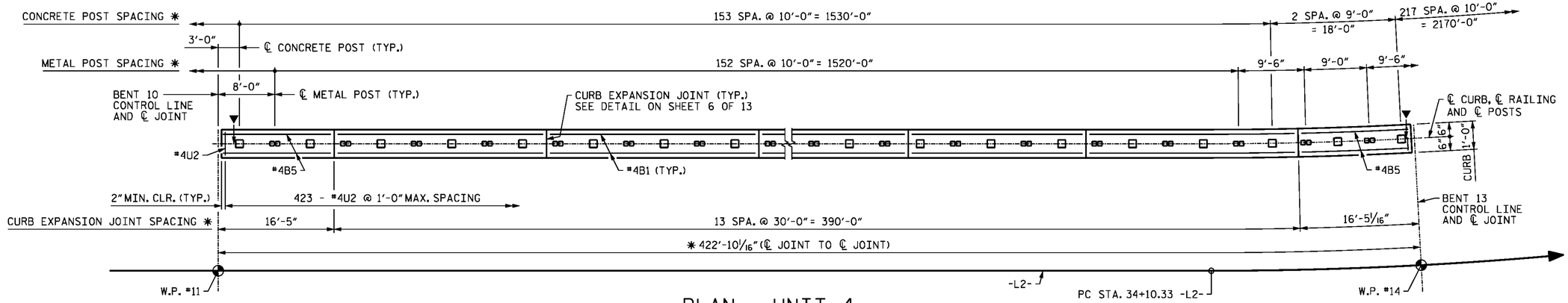


PLAN - UNIT 3

✱ MEASURED ALONG ℄ CURB



PLAN - UNIT 4

✱ MEASURED ALONG ℄ CURB

NOTES

▼ - INDICATES LOCATION OF SLIDING EXPANSION JOINT. SEE DETAIL E ON SHEET 6 OF 13.

ALL DIMENSIONS ARE HORIZONTAL UNLESS OTHERWISE NOTED.

#4 "B" BARS AND #4U2 BARS MAY BE SHIFTED OR TRIMMED AS NECESSARY TO PROVIDE 2" MIN. CLEAR TO EXPANSION JOINT BLOCKOUT.

OUTSIDE EDGE OF BRIDGE DECK NOT SHOWN FOR CLARITY.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 10 OF 13

DESIGNED BY:	J. SMITH	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. SHERMAN	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

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RALEIGH

SUPERSTRUCTURE

PEDESTRIAN RAILING RAIL POST SPACING AND PLAN OF CONCRETE CURB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-128
1			3			TOTAL SHEETS
2			4			278

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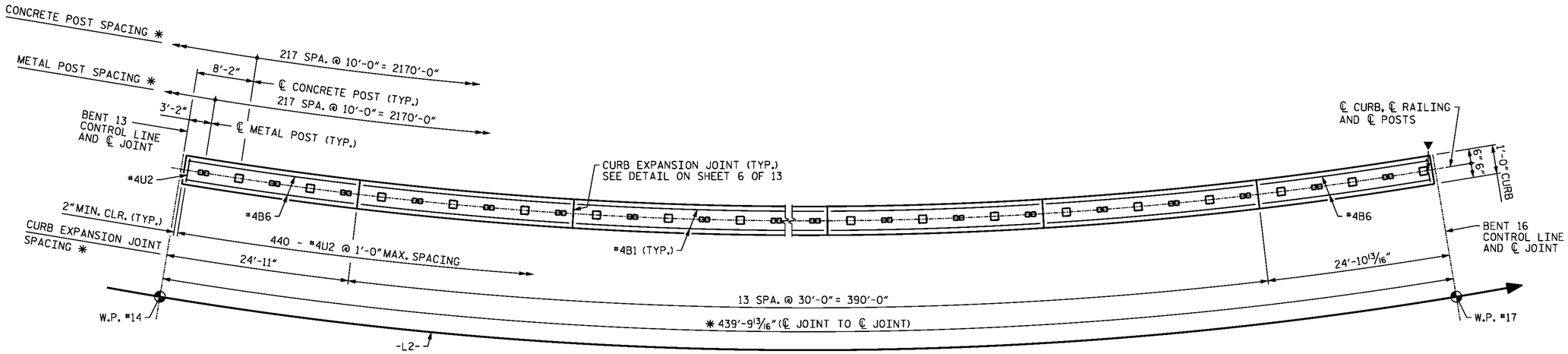
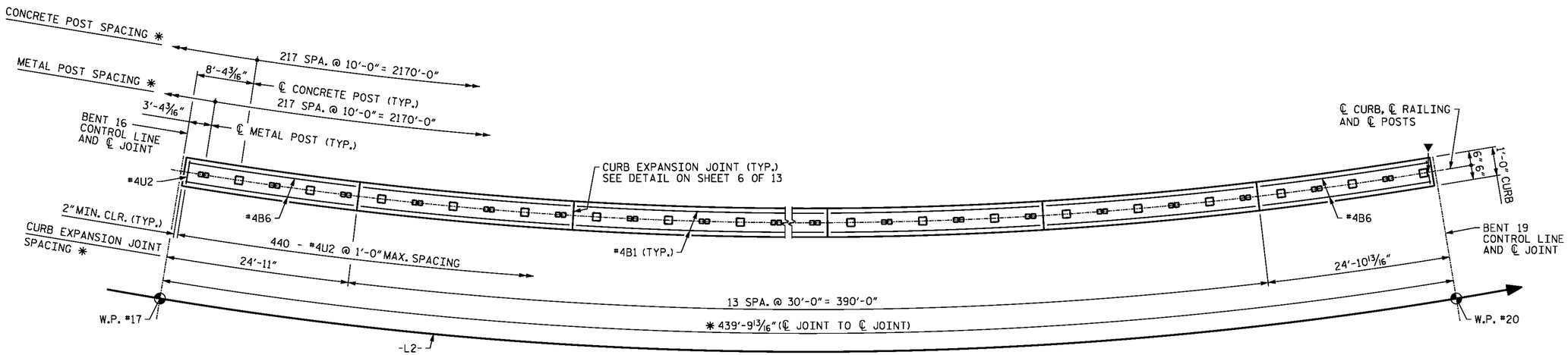


PLAN - UNIT 5

*MEASURED ALONG ℄ CURB



PLAN - UNIT 6

*MEASURED ALONG ℄ CURB

NOTES

▼ - INDICATES LOCATION OF SLIDING EXPANSION JOINT. SEE DETAIL E ON SHEET 6 OF 13.

ALL DIMENSIONS ARE HORIZONTAL UNLESS OTHERWISE NOTED.

*4 "B" BARS AND *4U2 BARS MAY BE SHIFTED OR TRIMMED AS NECESSARY TO PROVIDE 2" MIN. CLEAR TO EXPANSION JOINT BLOCKOUT.

OUTSIDE EDGE OF BRIDGE DECK NOT SHOWN FOR CLARITY.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 11 OF 13

DESIGNED BY:	J. SMITH	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. SHERMAN	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032987 ENGINEER JASON R. DOUGHTY

5/12/16

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DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

PEDESTRIAN RAILING RAIL POST SPACING AND PLAN OF CONCRETE CURB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-129
1			3			TOTAL SHEETS
2			4			278

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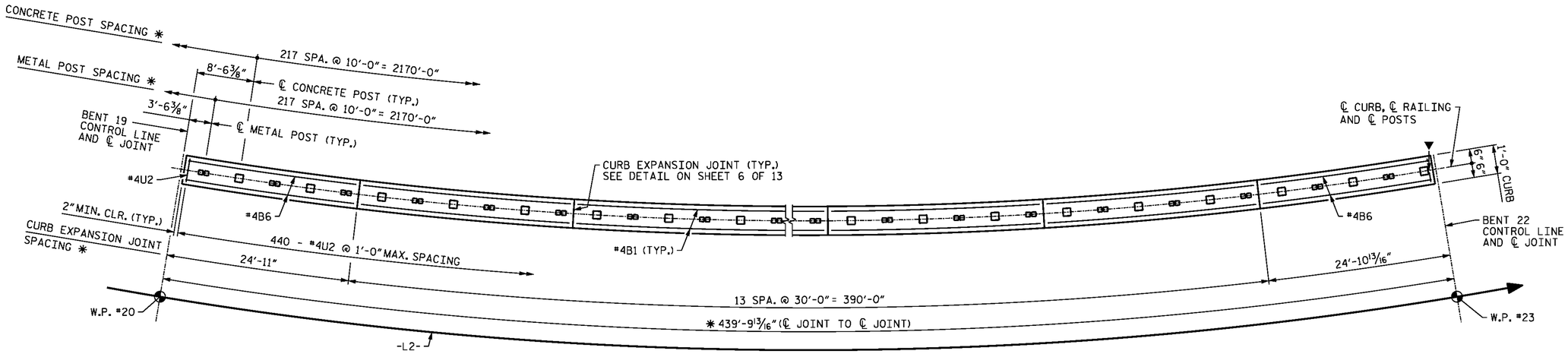
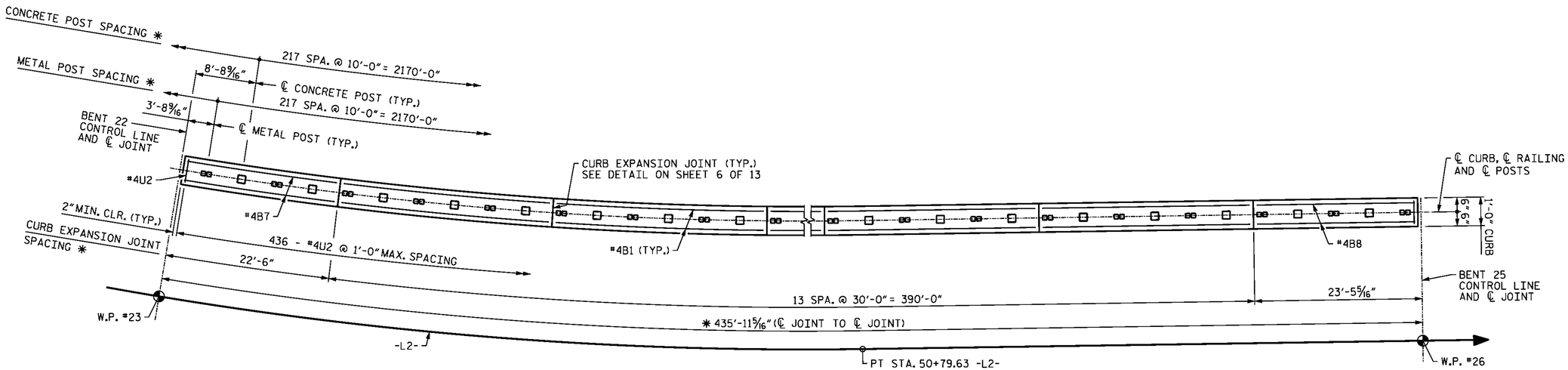


PLAN - UNIT 7

* MEASURED ALONG ℄ CURB



PLAN - UNIT 8

* MEASURED ALONG ℄ CURB

NOTES

▼ - INDICATES LOCATION OF SLIDING EXPANSION JOINT. SEE DETAIL E ON SHEET 6 OF 13.

ALL DIMENSIONS ARE HORIZONTAL UNLESS OTHERWISE NOTED.

#4 "B" BARS AND #4U2 BARS MAY BE SHIFTED OR TRIMMED AS NECESSARY TO PROVIDE 2" MIN. CLEAR TO EXPANSION JOINT BLOCKOUT AND DECK DRAINS.

OUTSIDE EDGE OF BRIDGE DECK NOT SHOWN FOR CLARITY.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 12 OF 13

DESIGNED BY:	J. SMITH	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. SHERMAN	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty

00F1C864482F4F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

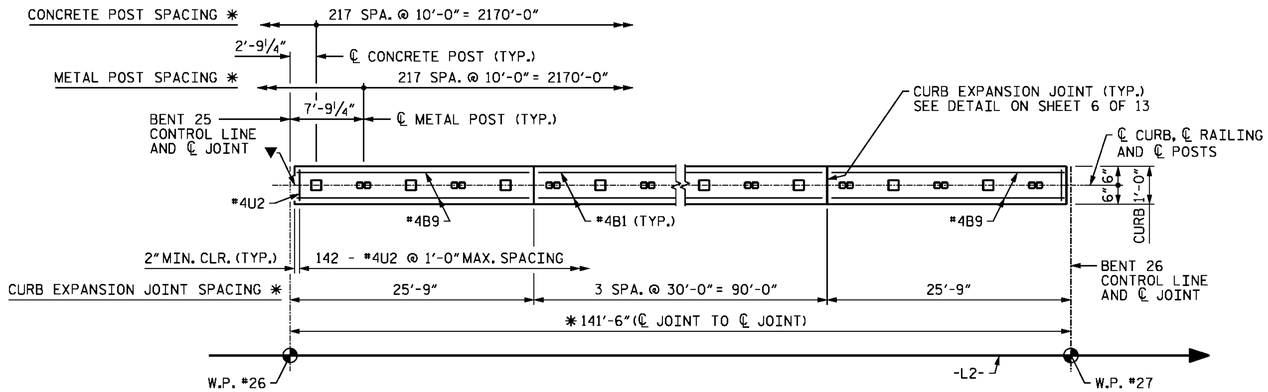
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PEDESTRIAN RAILING RAIL POST SPACING AND PLAN OF CONCRETE CURB

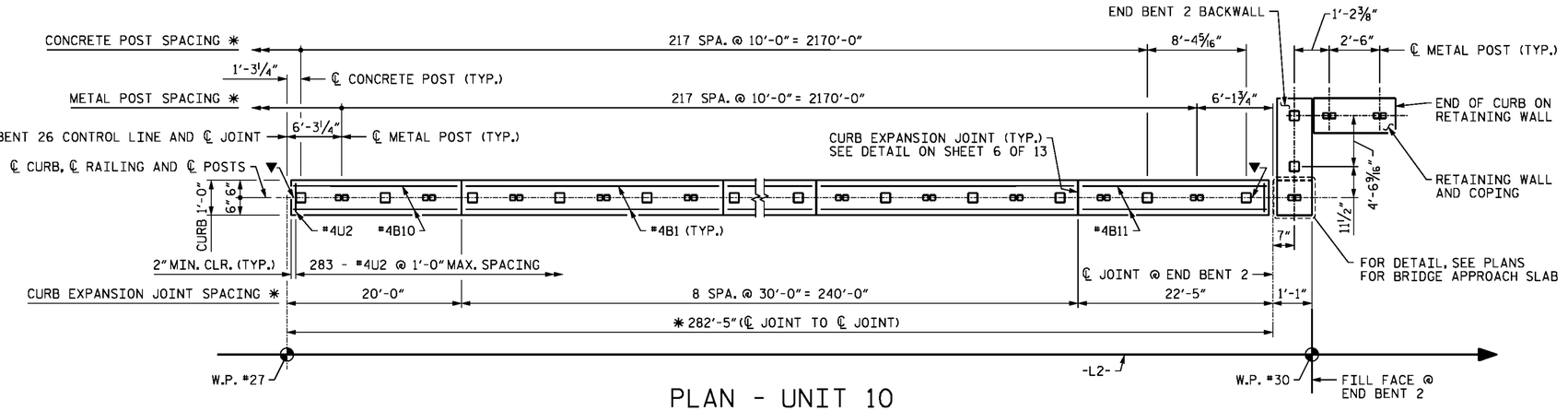
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-130
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400.257_B4929_SMU_PED12.dgn



PLAN - UNIT 9

✱ MEASURED ALONG ℄ CURB



PLAN - UNIT 10

✱ MEASURED ALONG ℄ CURB

NOTES

▼ - INDICATES LOCATION OF SLIDING EXPANSION JOINT. SEE DETAIL E ON SHEET 6 OF 13.

ALL DIMENSIONS ARE HORIZONTAL UNLESS OTHERWISE NOTED.

#4 "B" BARS AND #4U2 BARS MAY BE SHIFTED OR TRIMMED AS NECESSARY TO PROVIDE 2" MIN. CLEAR TO EXPANSION JOINT BLOCKOUT AND DECK DRAINS.

SEE END BENT DRAWINGS FOR ADDITIONAL INFORMATION.

OUTSIDE EDGE OF BRIDGE DECK NOT SHOWN FOR CLARITY.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 13 OF 13

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PEDESTRIAN RAILING RAIL POST SPACING AND PLAN OF CONCRETE CURB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-131
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. SMITH	DATE :	OCT 2015
DRAWN BY:	K. WHITE	DATE :	OCT 2015
CHECKED BY:	J. SHERMAN	DATE :	JAN 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
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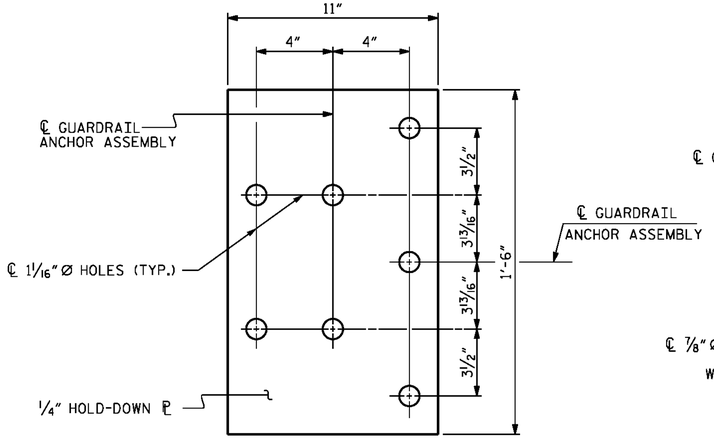
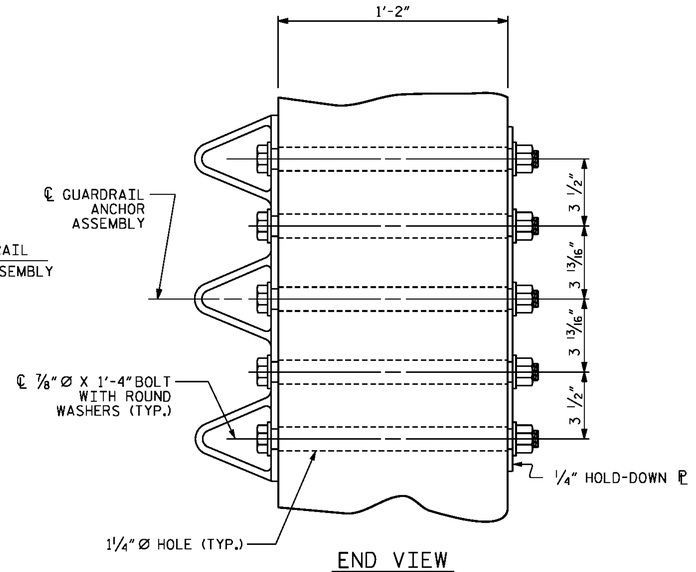


PLAN



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.

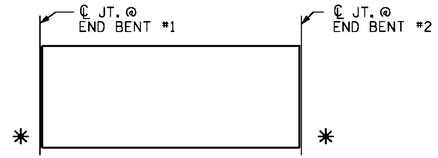
THE GUARDRAIL ANCHOR ASSEMBLY IS REQUIRED AT ALL POINTS WHERE APPROACH GUARDRAIL IS TO BE ATTACHED TO THE END OF THE PARAPET. FOR POINTS OF ATTACHMENT, SEE SKETCH.

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.

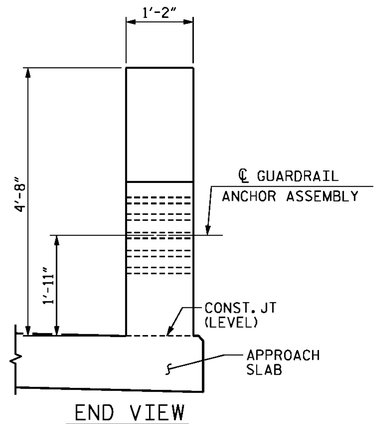
THE VERTICAL REINFORCING BARS MAY BE SHIFTED SLIGHTLY IN THE END POST TO CLEAR ASSEMBLY BOLTS.

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.

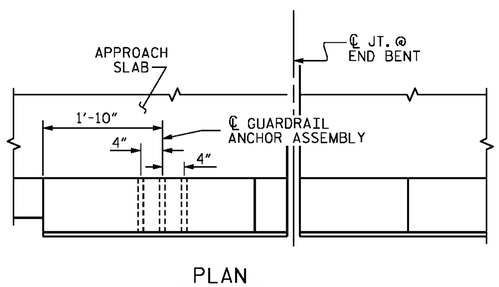


SKETCH SHOWING POINTS OF ATTACHMENT

*LOCATION OF GUARDRAIL ATTACHMENT



END VIEW



PLAN

LOCATION OF GUARDRAIL ANCHOR AT END POST

END POST ON APPROACH SLAB @ END BENT #1 SHOWN
END POST ON APPROACH SLAB @ END BENT #2 SIMILAR

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
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RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

GUARDRAIL ANCHORAGE DETAILS FOR METAL RAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-132
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. SMITH	DATE : JAN 2016
DRAWN BY:	K. WHITE	DATE : JAN 2016
CHECKED BY:	E. DAVIS	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

DRAWN BY :	MAA	5/16
CHECKED BY :	GM	5/16

REV.	12/5/11	MAA/GM
REV.	6/13	MAA/GM
REV.	1/15	MAA/TMG

5/10/2016
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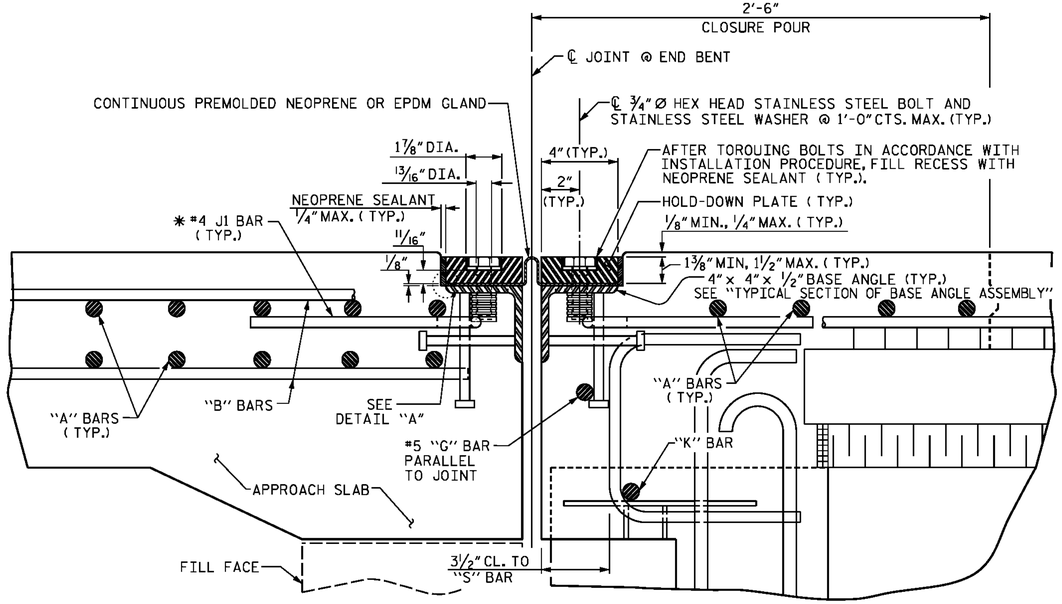
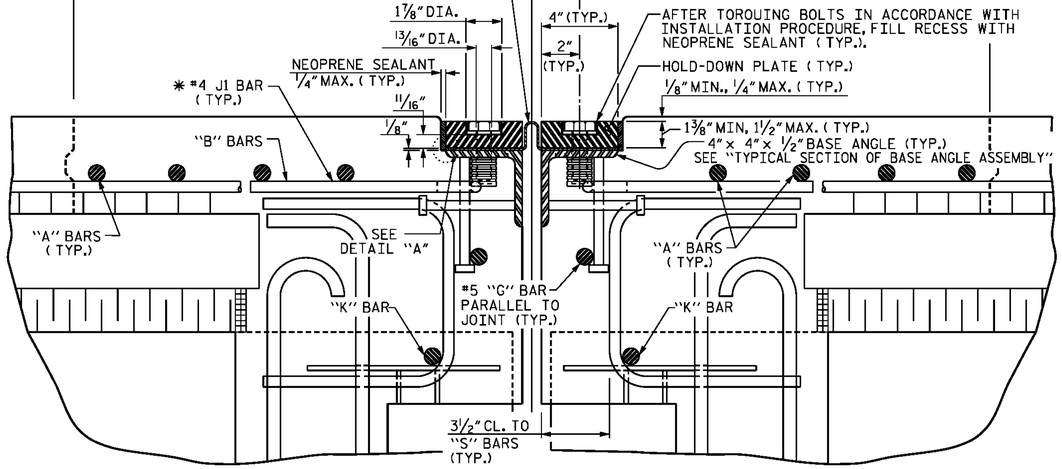
(SHT 5) STD. NO. GRA3



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.



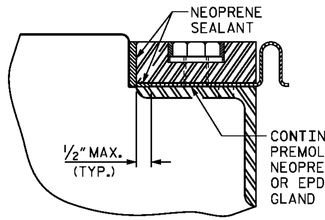
EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- PRESTRESSED GIRDER SUPERSTRUCTURE

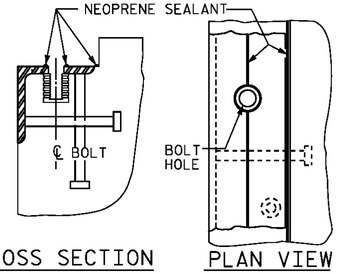
* THE QUANTITY OF #4 J1 BARS ON THE BILL OF MATERIAL IS BASED ON 1'-0" CENTERS. J1 BARS SHALL BE PLACED AT EACH VERTICAL STUD ANCHOR BOLT. IN THE EVENT THAT THE NUMBER OF VERTICAL STUD ANCHORS EXCEEDS THE NUMBER OF J1 BARS SPECIFIED, ADDITIONAL J1 BARS WILL NOT BE REQUIRED.

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



DETAIL "A"



CROSS SECTION PLAN VIEW

INSTALLATION SKETCH

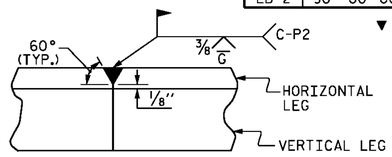
GENERAL NOTES

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

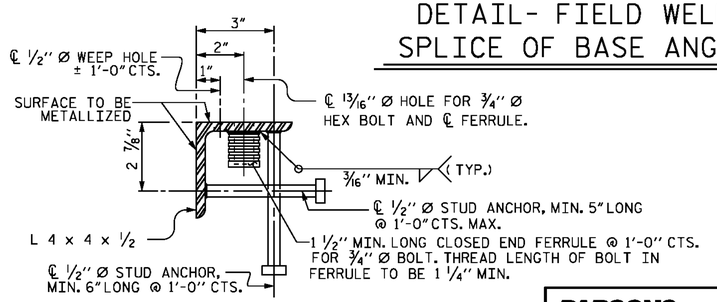
MOVEMENT AND SETTING AT JOINT

BENT NO.	SKEW ANGLE	TOTAL MOVEMENT (ALONG ℄ RDWY)	PERPENDICULAR JOINT OPENING AT 45°F	AT 60°F	AT 90°F
EB 1	90°-00'-00"	⅞"	2⅛"	2"	1 11/16"
3	90°-00'-00"	2 3/16"	2⅜"	2"	1¼"
6	90°-00'-00"	2⅝"	2 7/16"	2"	1 1/16"
10	90°-00'-00"	2⅝"	2 7/16"	2"	1 1/16"
▼ 13	90°-00'-00"	2 11/16"	2½"	2"	1 1/16"
▼ 16	90°-00'-00"	2¾"	2½"	2"	1"
▼ 19	90°-00'-00"	2¾"	2½"	2"	1"
▼ 22	90°-00'-00"	2¾"	2½"	2"	1 1/16"
25	90°-00'-00"	2 3/16"	2⅜"	2"	1 3/16"
26	90°-00'-00"	⅞"	2⅛"	2"	1 11/16"
EB 2	90°-00'-00"	⅞"	2⅛"	2"	1 11/16"

▼ CENTERLINE OF EXPANSION JOINT IS RADIAL TO -L2-



DETAIL- FIELD WELD SPLICE OF BASE ANGLE



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

EXPANSION JOINT SEAL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-133
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
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5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. SMITH	DATE :	NOV 2015
DRAWN BY:	K. WHITE	DATE :	NOV 2015
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

DRAWN BY : REK 9/08
CHECKED BY : CRK 10/08

REV. 5/7/03R RWW/JTE
REV. 5/1/06R TLA/GM
REV. 10/1/11 MAA/GM

5/10/2016
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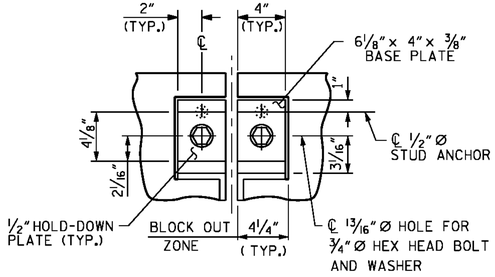
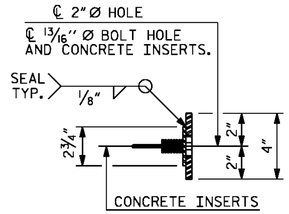
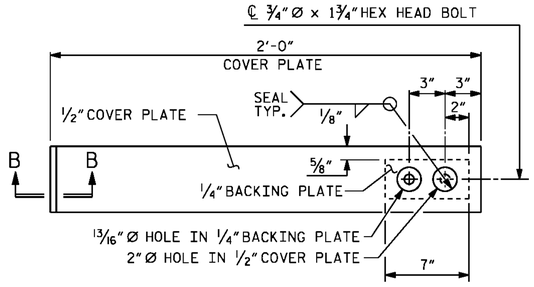
STD. NO. EJS1





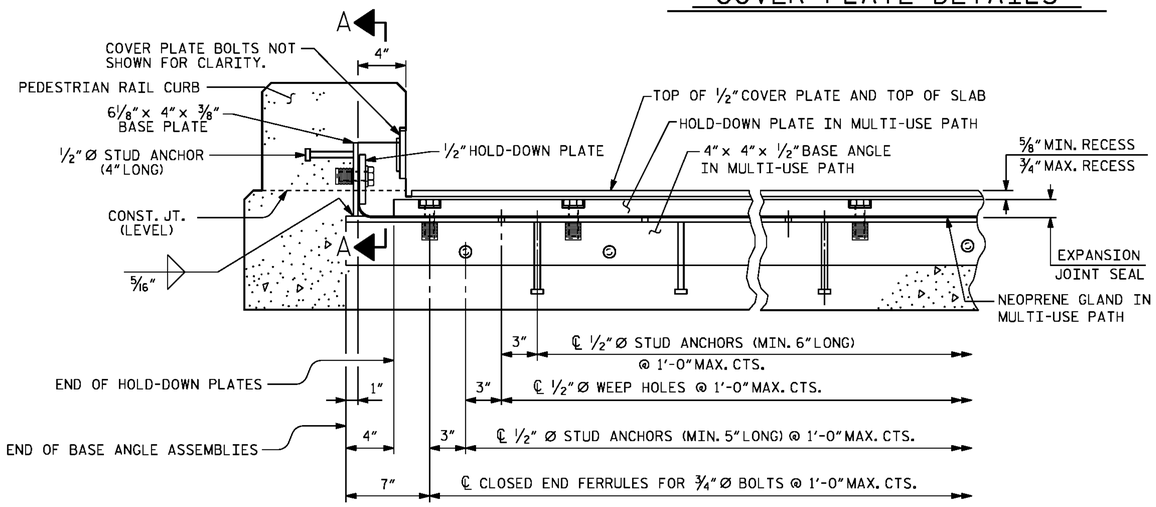
END VIEW

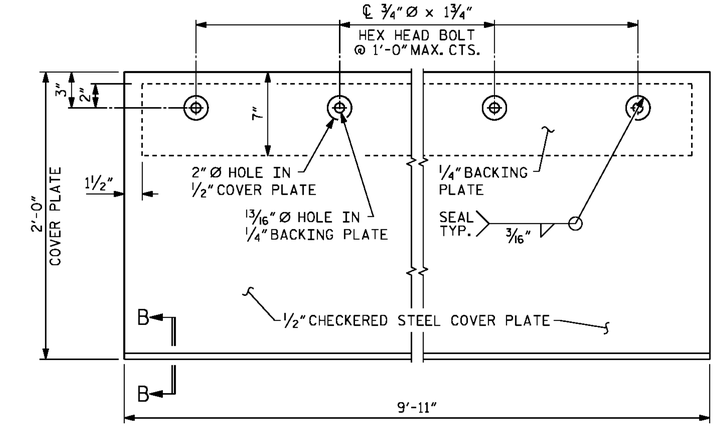


TYPE II - ELEVATION VIEW

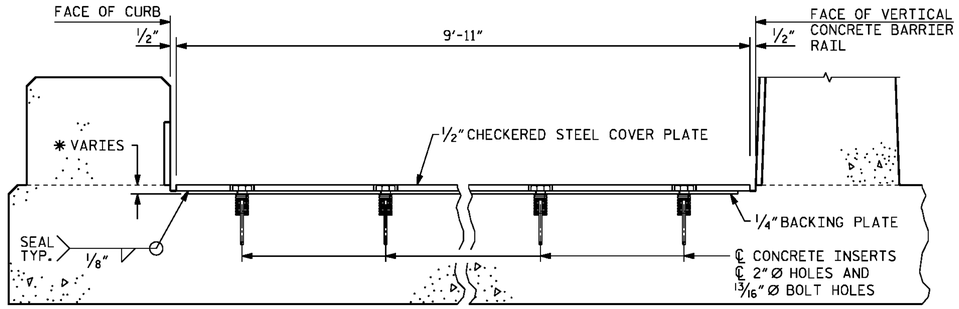
COVER PLATE DETAILS

SECTION A - A





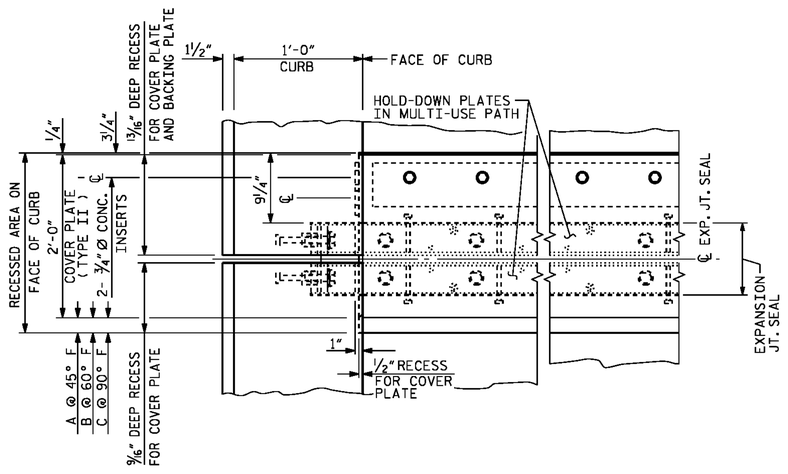
TYPE II - PLAN VIEW



SECTION VIEW

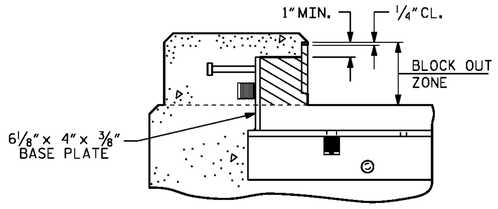
* 13⁄16" FOR THE SIDE OF THE JOINT HAVING THE ½" COVER PLATE WITH ¼" BACKING PLATE
9⁄16" FOR THE SIDE OF THE JOINT HAVING ONLY THE ½" COVER PLATE

SECTION THRU RAIL NORMAL TO JOINT @ MULTI-USE PATH



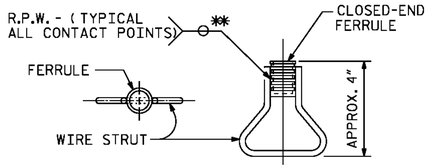
PLAN OF EXPANSION JOINT SEAL @ MULTI-USE PATH

COVER PLATE SHALL BE MOUNTED ON BRIDGE SIDE OF EXPANSION JOINT @ BOTH END BENTS



BLOCK OUT DETAIL

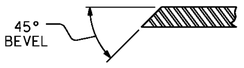
SEE " SECTION A - A " FOR OTHER DETAILS.



PLAN ELEVATION

CONCRETE INSERT

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



SECTION B - B

TABLE OF JOINT OPENINGS			
BENT NO.	Ⓐ	Ⓑ	Ⓒ
EB1	1⅝"	1½"	1⅜16"
3	2⅛"	1¾"	1"
6	2⅞16"	2"	1⅛16"
10	2⅞16"	2"	1⅛16"
13	2½"	2"	1⅛16"
16	2½"	2"	1"
19	2½"	2"	1"
22	2½"	2"	1⅛16"
25	2⅜16"	2"	1⅜16"
26	1⅝"	1½"	1⅜16"
EB2	1⅝"	1½"	1⅜16"

NOTES

INSTALLATION PROCEDURE SHOWN ON SHEET 1 OF 4 SHALL BE COMPLETE PRIOR TO INSTALLATION OF CHECKERED STEEL COVER PLATE.

NO FIELD SPLICE IN HOLD-DOWN PLATES IN MULTI-USE PATH PERMITTED.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 4

DESIGNED BY:	J. SMITH	DATE :	NOV 2015
DRAWN BY:	K. WHITE	DATE :	NOV 2015
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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

REV. 10/1/11	MAA /GM
REV. 7/12	MAA /GM
REV. 6/13	MAA /GM

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C8644B274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

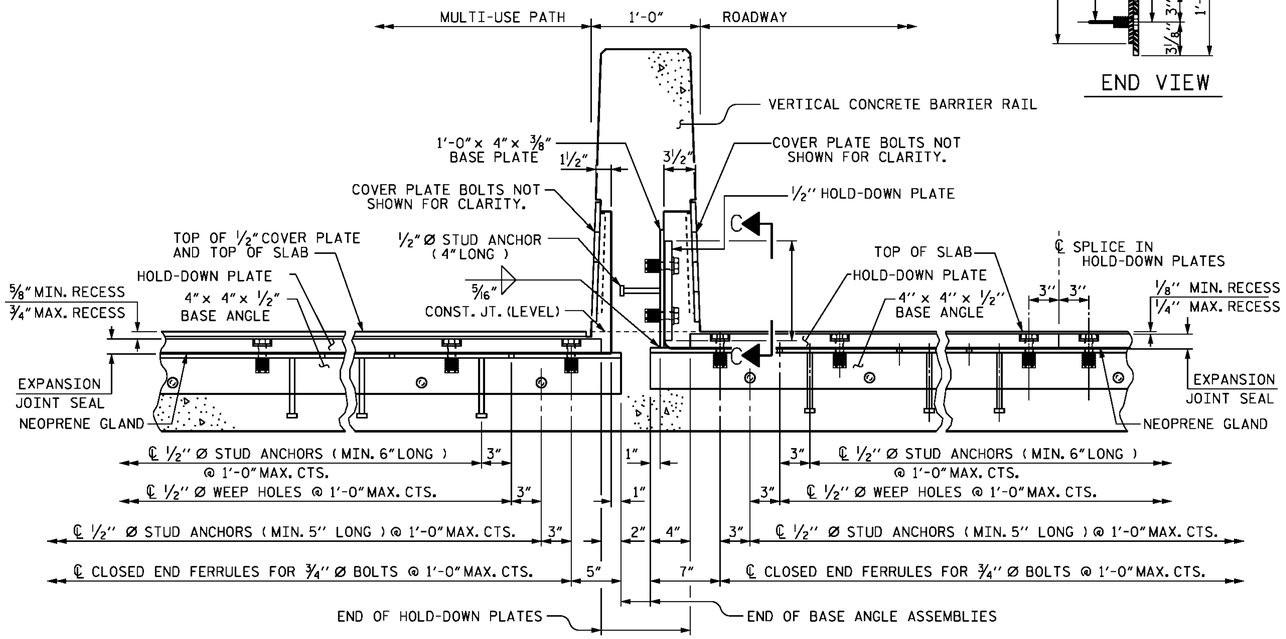
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

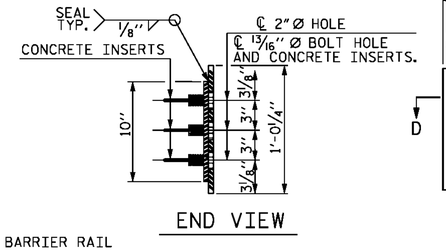
EXPANSION JOINT SEAL DETAILS FOR PEDESTRIAN RAIL CURB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-134
1			3			TOTAL SHEETS
2			4			278

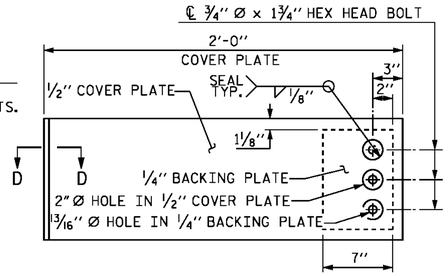
5/10/2016
400.265_B4929_SMU_EJS2.dgn



SECTION THRU RAIL NORMAL TO JOINT

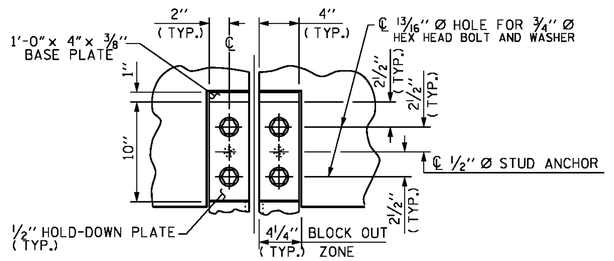


END VIEW

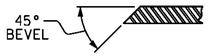


TYPE II - ELEVATION VIEW

COVER PLATE DETAILS

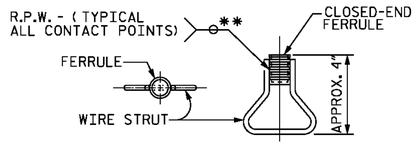


SECTION C - C



SECTION D - D

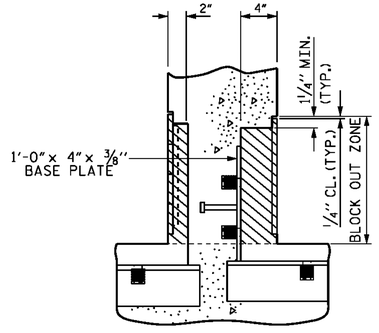
TABLE OF JOINT OPENINGS			
BENT NO.	Ⓐ	Ⓑ	Ⓒ
EB1	1 5/8"	1 1/2"	1 3/16"
3	2 1/8"	1 3/4"	1"
6	2 7/16"	2"	1 1/16"
10	2 7/16"	2"	1 1/16"
13	2 1/2"	2"	1 1/16"
16	2 1/2"	2"	1"
19	2 1/2"	2"	1"
22	2 1/2"	2"	1 1/16"
25	2 3/16"	2"	1 3/16"
26	1 5/8"	1 1/2"	1 3/16"
EB2	1 5/8"	1 1/2"	1 3/16"



PLAN ELEVATION

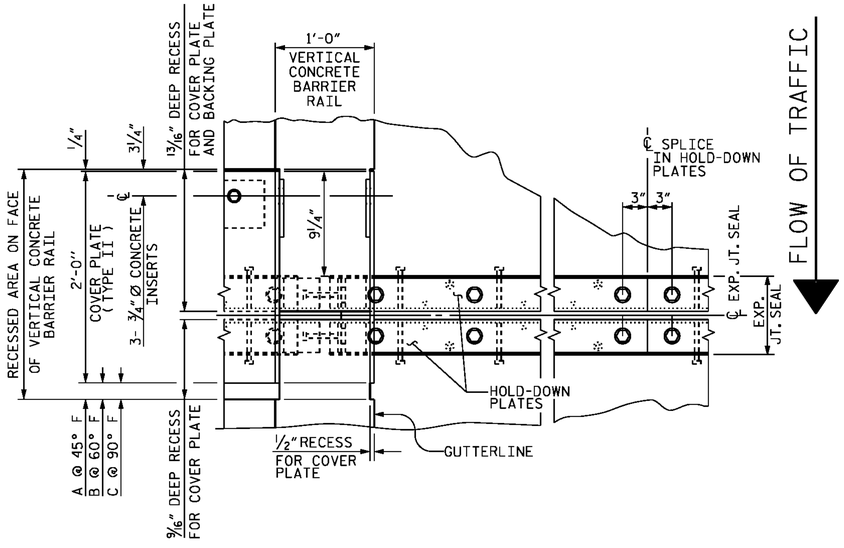
CONCRETE INSERT

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



BLOCK OUT DETAIL

SEE "SECTION C-C" FOR OTHER DETAILS.



PLAN OF EXPANSION JOINT SEAL

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

EXPANSION JOINT SEAL DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

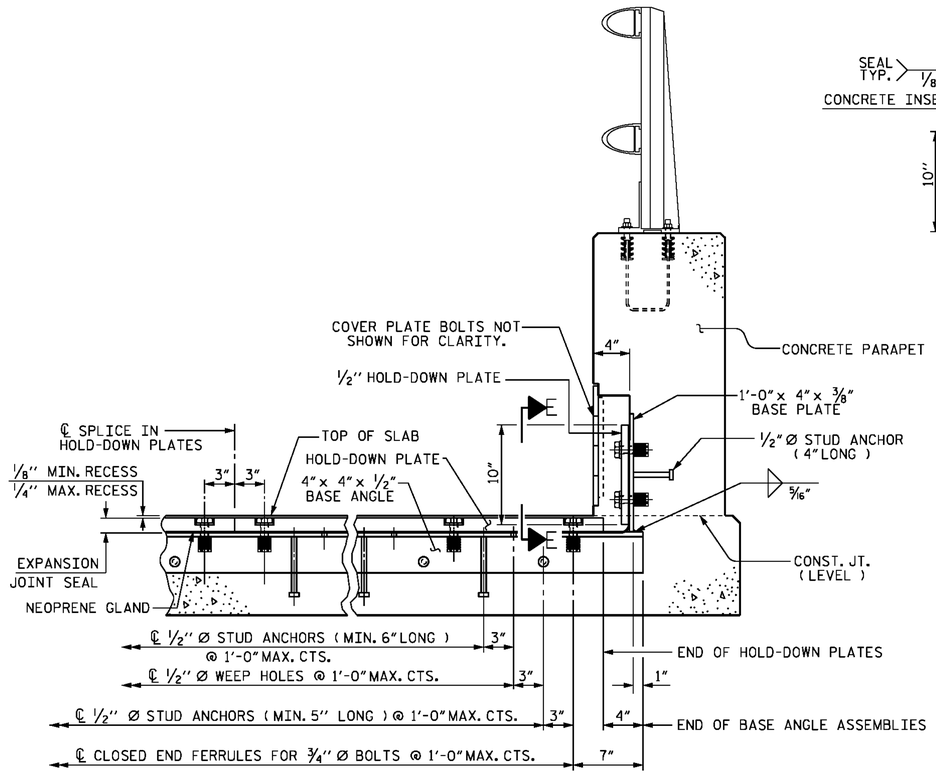
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C8644B274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

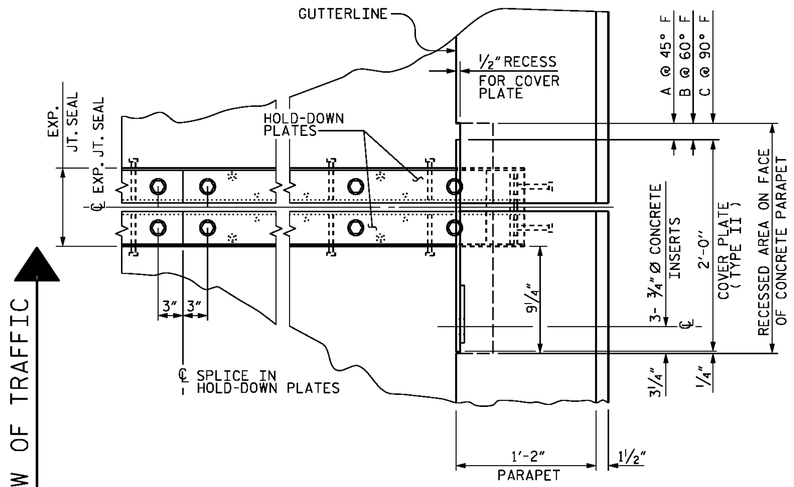
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-135
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. SMITH	DATE : NOV 2015
DRAWN BY:	K. WHITE	DATE : NOV 2015
CHECKED BY:	J. DOUGHTY	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

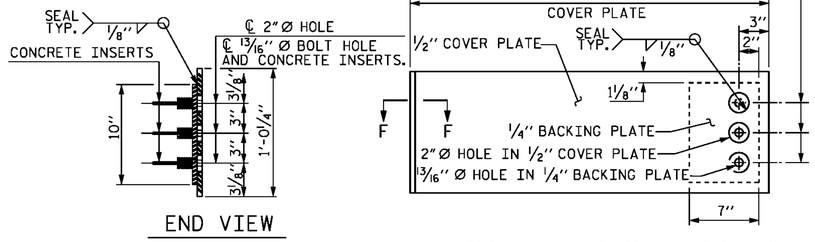
5/10/2016
400.267_B4929_SMU_EJS3.dgn



SECTION THRU PARAPET NORMAL TO JOINT



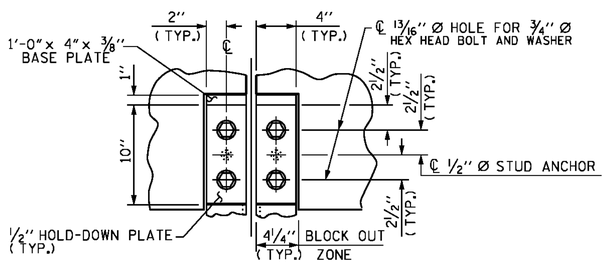
PLAN OF EXPANSION JOINT SEAL - RIGHT SIDE



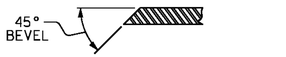
END VIEW

TYPE II - ELEVATION VIEW

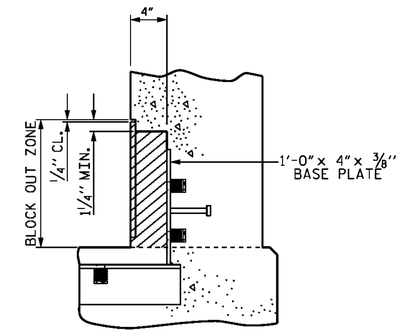
COVER PLATE DETAILS



SECTION E - E

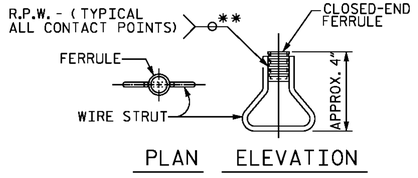


SECTION F - F



BLOCK OUT DETAIL

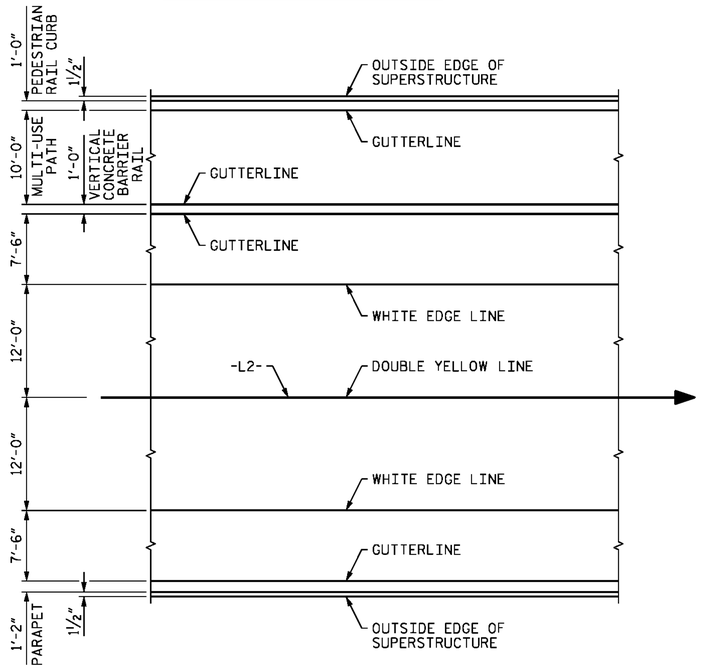
SEE "SECTION E-E" FOR OTHER DETAILS.



PLAN ELEVATION

CONCRETE INSERT

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



PAVEMENT MARKING ALIGNMENT

TABLE OF JOINT OPENINGS			
BENT NO.	Ⓐ	Ⓑ	Ⓒ
EB1	1⅝"	1½"	1 3/16"
3	2⅛"	1¾"	1"
6	2 7/16"	2"	1 1/16"
10	2 7/16"	2"	1 1/16"
13	2½"	2"	1 1/16"
16	2½"	2"	1"
19	2½"	2"	1"
22	2½"	2"	1 1/16"
25	2 3/16"	2"	1 3/16"
26	1⅝"	1½"	1 3/16"
EB2	1⅝"	1½"	1 3/16"

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 4

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

EXPANSION JOINT SEAL DETAILS FOR CONCRETE PARAPET

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-136
1			3			TOTAL SHEETS
2			4			278

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

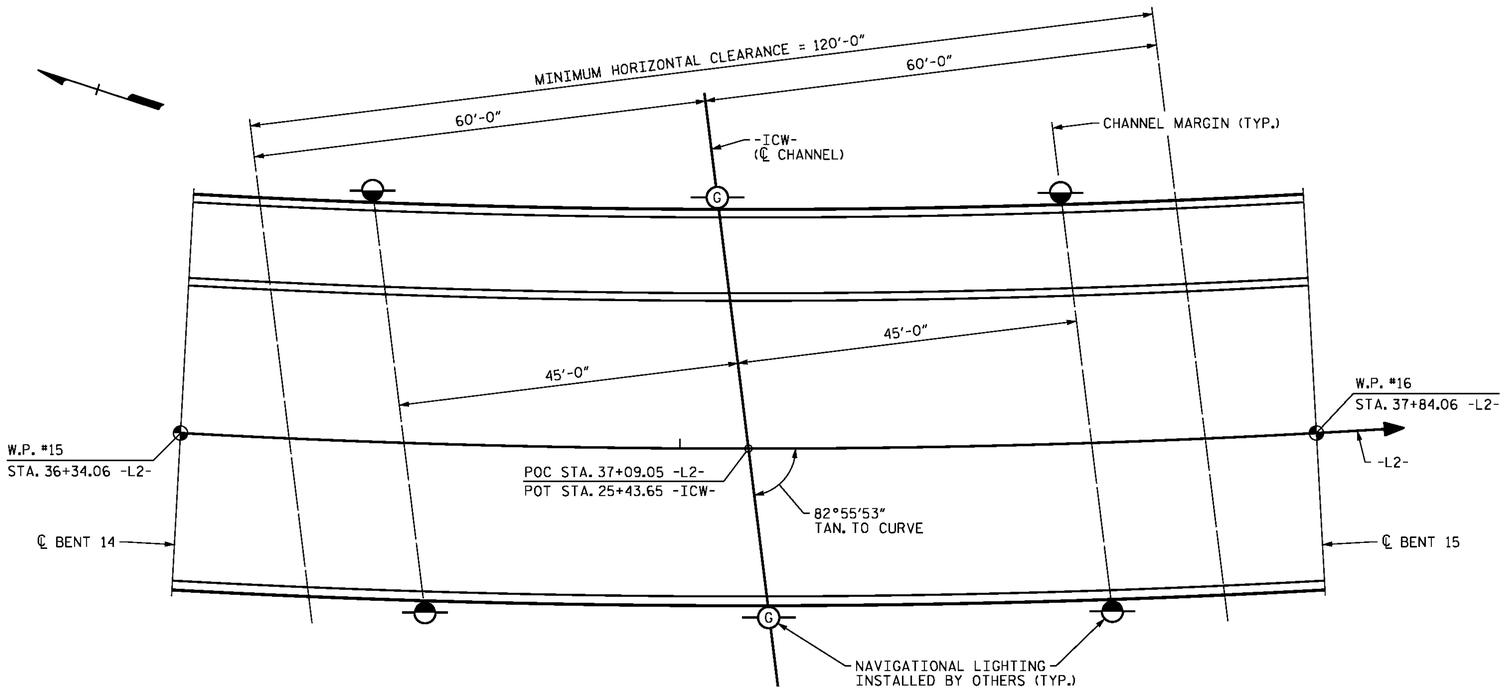
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. SMITH	DATE :	NOV 2015
DRAWN BY:	K. WHITE	DATE :	NOV 2015
CHECKED BY:	J. DOUGHTY	DATE :	FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400269_B4929_SMU_EJS4.dgn

NOTES:

FOR NAVIGATIONAL LIGHTING SYSTEM, SEE SPECIAL PROVISIONS.



PLAN

G — 360° GREEN NAVIGATIONAL LIGHT - CHANNEL CENTERLINE

180° RED NAVIGATIONAL LIGHT - CHANNEL MARGIN

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

NAVIGATIONAL LIGHTING LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-137
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. DOUGHTY	DATE :	DEC 2015
DRAWN BY:	K. WHITE	DATE :	DEC 2015
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_271_B4929_SMU_SAP1.dgn

USE FOR LIGHTING CONSTRUCTION ONLY

PROJECT REFERENCE NO.	SHEET NO.
B-4929	PLS-1

LOAD SCHEDULE

1Ø, 3W, 120/240 VAC — CONTROL SYSTEM "A"

CIRCUIT ID	PATH LIGHTS 15 W LED	AMPS @ 240V	KW LOAD	BREAKER SIZE (AMPS)
A1	L1 - L160	10.0	2.4	15
SPARE				15
TOTAL	160	10.0	2.4	

ESTIMATED BILL OF MATERIALS

UNIT	ITEM	QNTY
EA	PCJB: 12"X11"X18" POLYMER CONCRETE JUNCTION BOX	4
EA	LED PATH LIGHT	320
FT	2 AWG SIZE 8 CONDUCTOR (BK & WH) 1 AWG SIZE 10 GROUNDING CONDUCTOR	4600
FT	3/4" PVC CONDUIT	4250
EA	3/4" PVC 90° BELL ELBOW	10
EA	3/4" PVC 45° BELL ELBOW	4
EA	3/4" PVC EXPANSION FITTINGS	11
EA	LIGHT CONTROL SYSTEM (1)	2

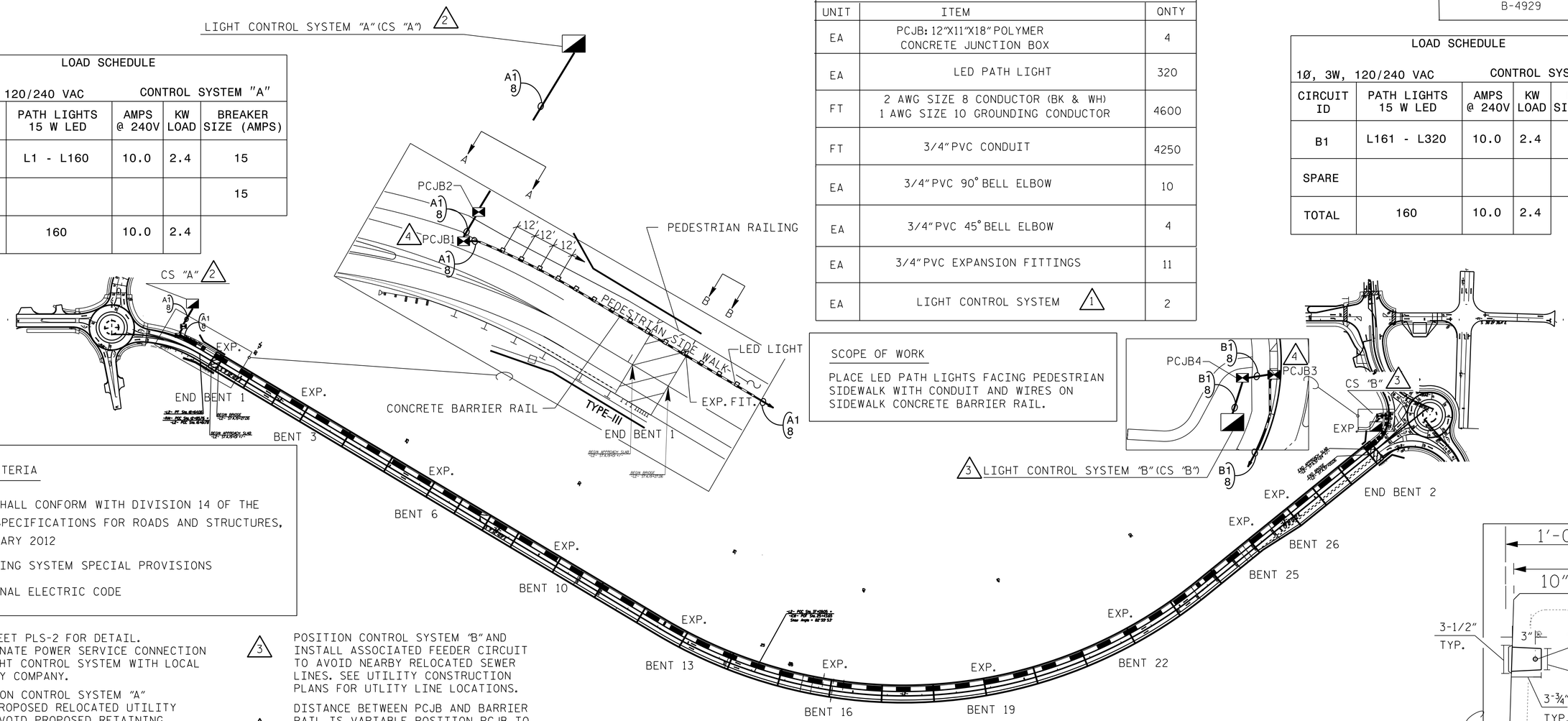
LOAD SCHEDULE

1Ø, 3W, 120/240 VAC — CONTROL SYSTEM "B"

CIRCUIT ID	PATH LIGHTS 15 W LED	AMPS @ 240V	KW LOAD	BREAKER SIZE (AMPS)
B1	L161 - L320	10.0	2.4	15
SPARE				15
TOTAL	160	10.0	2.4	

SCOPE OF WORK

PLACE LED PATH LIGHTS FACING PEDESTRIAN SIDEWALK WITH CONDUIT AND WIRES ON SIDEWALK CONCRETE BARRIER RAIL.



DESIGN CRITERIA

ALL WORK SHALL CONFORM WITH DIVISION 14 OF THE STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES, DATED JANUARY 2012

PATH LIGHTING SYSTEM SPECIAL PROVISIONS

2014 NATIONAL ELECTRIC CODE

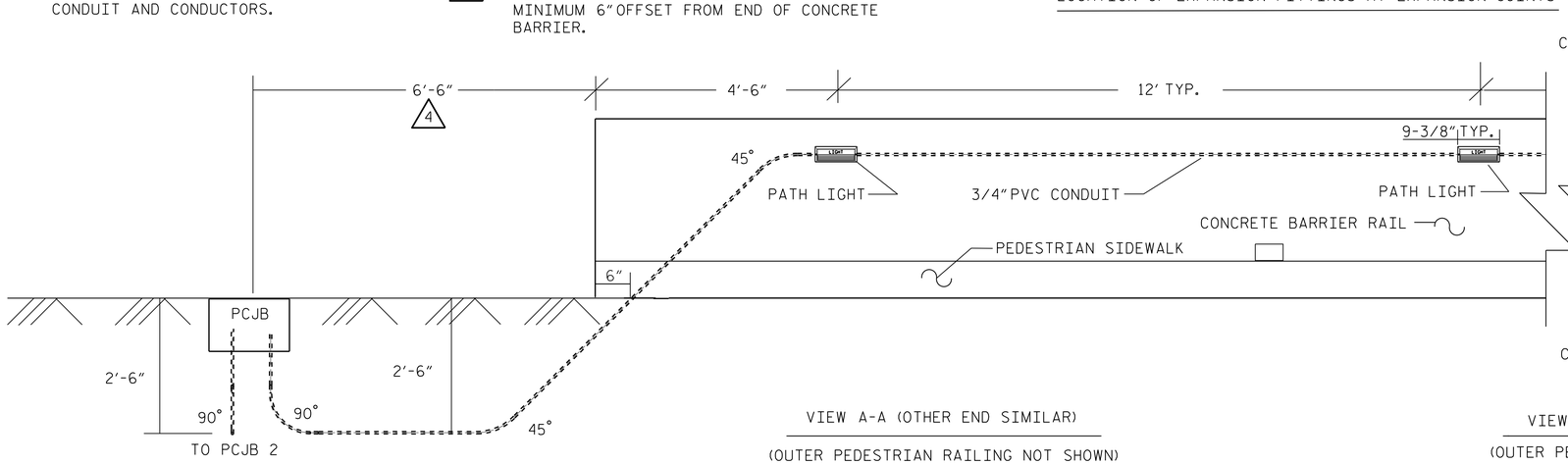
(1) SEE SHEET PLS-2 FOR DETAIL. COORDINATE POWER SERVICE CONNECTION TO LIGHT CONTROL SYSTEM WITH LOCAL UTILITY COMPANY.

(2) POSITION CONTROL SYSTEM "A" NEAR PROPOSED RELOCATED UTILITY LINE. AVOID PROPOSED RETAINING WALL WHEN INSTALLING FEEDER CIRCUIT CONDUIT AND CONDUCTORS.

(3) POSITION CONTROL SYSTEM "B" AND INSTALL ASSOCIATED FEEDER CIRCUIT TO AVOID NEARBY RELOCATED SEWER LINES. SEE UTILITY CONSTRUCTION PLANS FOR UTLITY LINE LOCATIONS.

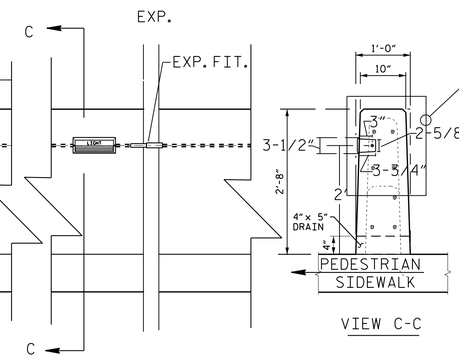
(4) DISTANCE BETWEEN PCJB AND BARRIER RAIL IS VARIABLE. POSITION PCJB TO ALLOW FOR CONDUIT SWEEPS AND MINIMUM 6" OFFSET FROM END OF CONCRETE BARRIER.

LOCATION OF EXPANSION FITTINGS AT EXPANSION JOINTS



VIEW A-A (OTHER END SIMILAR)

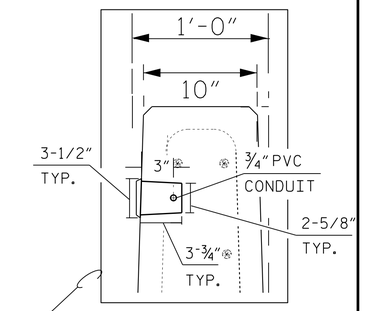
(OUTER PEDESTRIAN RAILING NOT SHOWN)



VIEW B-B (OTHER END SIMILAR)

(OUTER PEDESTRIAN RAILING NOT SHOWN)

VIEW C-C



EXPANDED VIEW OF LUMINAIRE BOX

PROJECT NO. B-4929

PENDER COUNTY

STATION: 22+62.50 -L-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PEDESTRIAN LIGHTING ON BRIDGE ON NC50/NC210 OVER THE INTERCOASTAL WATERWAY

NORTH CAROLINA PROFESSIONAL SEAL 022582 ENGINEER PAUL KI-BUN CHAN

DocuSigned by: Paul Chan F83C4985EEEF4A2... 6/2/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-138
1			3			TOTAL SHEETS 278

DRAWN BY : SKS DATE : 06/01/16

CHECKED BY : PKC DATE : 06/01/16

02-JUN-2016 11:05
sksaha RD214523

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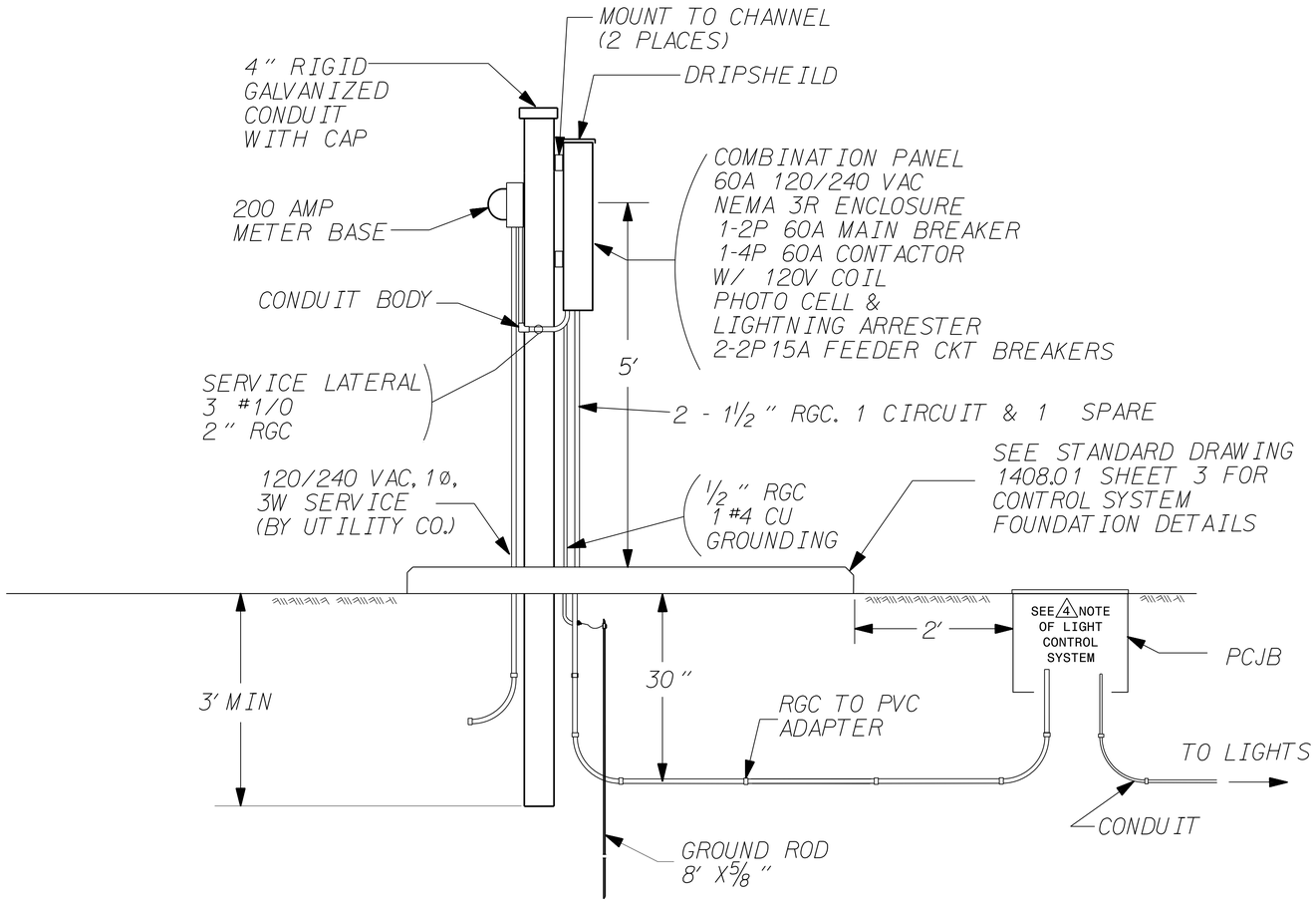
PROJECT REFERENCE NO.	SHEET NO.
B-4929	PLS-2



LIGHTING CONTROLLER/SERVICE ENTRANCE EQUIPMENT

SQUARE D NIGHT-MASTER CLASS 8903 LONG VERSION OR APPROVED EQUAL

PROJECT NO. B-4929

PENDER COUNTY

STATION: 22+62.50 -L-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PEDESTRIAN LIGHTING ON BRIDGE ON NC50/NC210 OVER THE INTERCOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-139
1			3			TOTAL SHEETS 278

NORTH CAROLINA PROFESSIONAL SEAL 022582 ENGINEER PAUL KI-BUN CHAN

DocuSigned by: Paul Chan 6/1/2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
LIGHT CONTROL SYSTEM
SCHEMATIC

SHEET 1 OF 3 **1408D01**

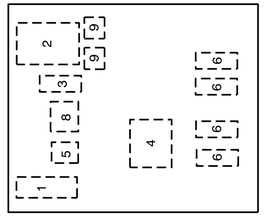
NOTES

1. EQUIPMENT GROUNDS (G) SHALL BE SIZED ACCORDING TO CIRCUIT DESCRIPTION. SEE PLANS.
2. SYSTEM GROUND (SG) SHALL BE CONTINUOUS FROM THE NEUTRAL BAR TO THE GROUNDING ELECTRODE (GROUND ROD).
3. THE NEUTRAL BAR SHALL BE BONDED TO THE PANEL.
4. SPARE CONDUIT SHALL BE INSTALLED, AND RUN TO NEAREST JUNCTION BOX AND CAPPED.
5. INSTALL A GROUNDING BUSHING ON EACH METAL CONDUIT. CONNECT BONDING JUMPER AS REQUIRED BY NEC.
6. SEE STANDARD DRAWING 1408.01 SHEET 3 OF 3 FOR ENCLOSURE.
7. THE CONTROL SYSTEM MUST BE LABELED "SUITABLE FOR USE AS SERVICE EQUIPMENT." REFER TO STANDARD SPECIFICATION 1408-2 FOR OTHER REQUIREMENTS.
8. SEE PLANS FOR BREAKER SIZES.
9. PROVIDE MULTI-TAP LOAD LUGS OR POWER DISTRIBUTION BLOCKS.
10. PROVIDE MANUFACTURER SUPPLIED MOUNTING BRACKETS OR SCREW STUDS PERMANENTLY ATTACHED TO THE BACK PANEL, FOR MOUNTING COMPONENTS.
11. INSTALL LIGHTNING ARRESTOR ON OUTSIDE OF CABINET ASSEMBLY.

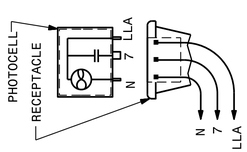
COMPONENT LIST

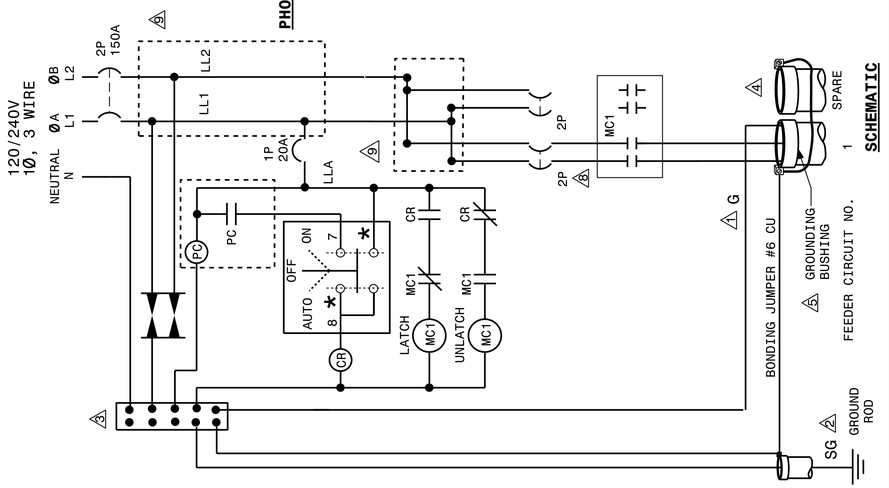
#	QTY	DESCRIPTION	SPECIFICATIONS
1	1	NEUTRAL BAR	
2	1	SERVICE CIRCUIT BREAKER	2P, 240V, 60A
3	1	CONTROL CIRCUIT BREAKER	1P, 120V, 15A
4	1	MECHANICALLY HELD CONTACTORS	4P, 240V, 60A W/120V COIL
5	1	CONTROL RELAY W/NC & NO CONTACT	120V, 10A, W/120V COIL
6	2	FEEDER CIRCUIT BREAKERS	2P, 240V, 15A
7	1	LIGHTNING ARRESTER	
8	1	SELECTOR SWITCH (ON-OFF-AUTO)	120V, 10A
9	4	POWER DISTRIBUTION LUGS OR BLOCKS	
		MOUNTING BRACKETS OR SCREW STUDS	

INTERIOR PANEL
COMPONENT LAYOUT
6 7 10 11



PHOTOCELL CONNECTIONS





STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	1-12	ENGLISH STANDARD DRAWING FOR **LIGHT CONTROL SYSTEM** SCHEMATIC	SHEET 1 OF 3 **1408D01**

DRAWN BY : SKS DATE : 06/01/16
CHECKED BY : PKC DATE : 06/01/16

01-JUN-2016 13:56
sksaha RD214523

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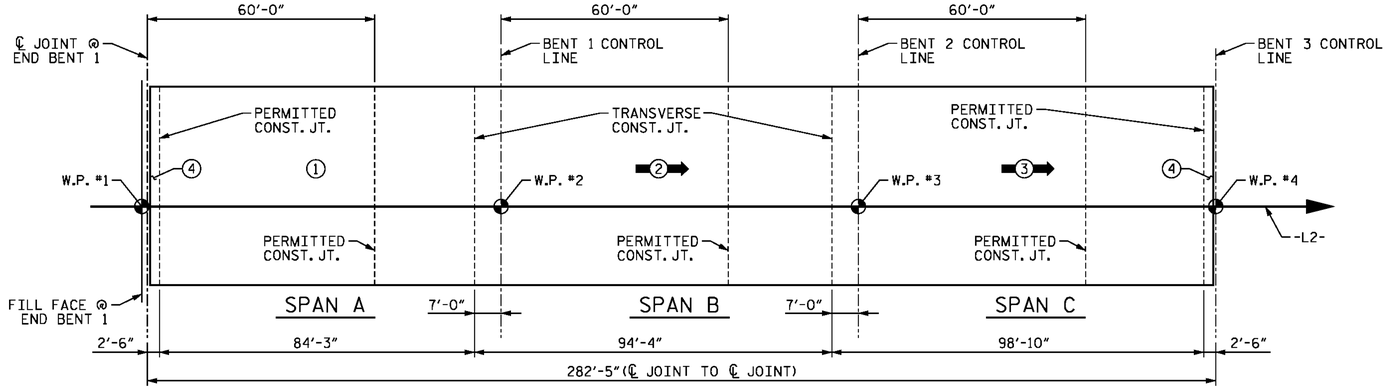
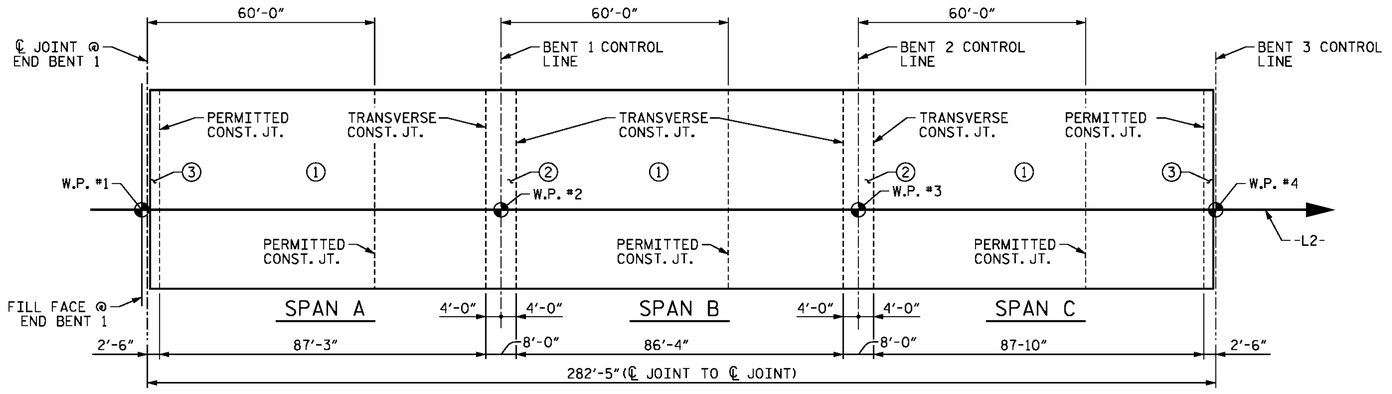


POURING SEQUENCE - UNIT 1

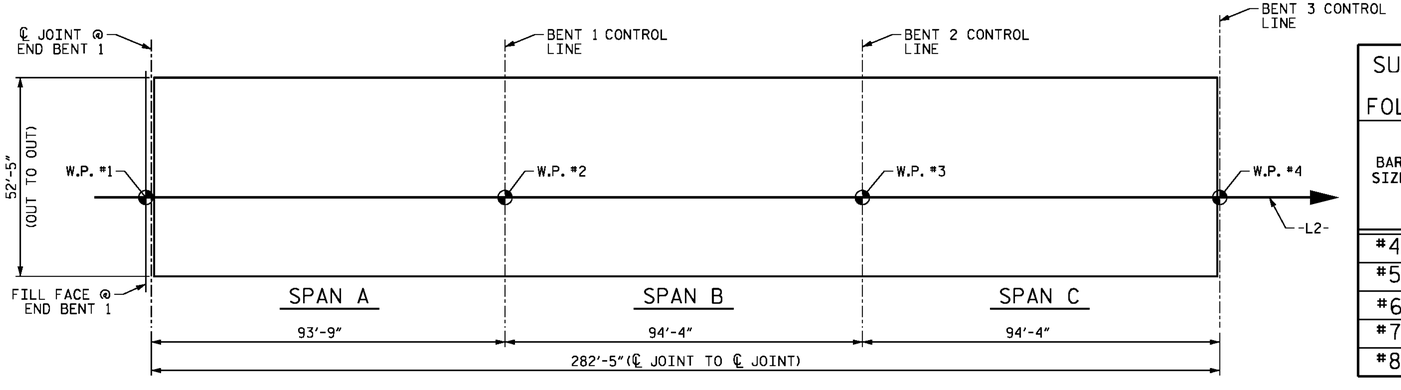
(N) INDICATES THE NUMBER AND DIRECTION OF POUR

DO NOT START POURS UNTIL ADJACENT POURS REACH A MINIMUM OF 3,000 PSI.



OPTIONAL POURING SEQUENCE - UNIT 1

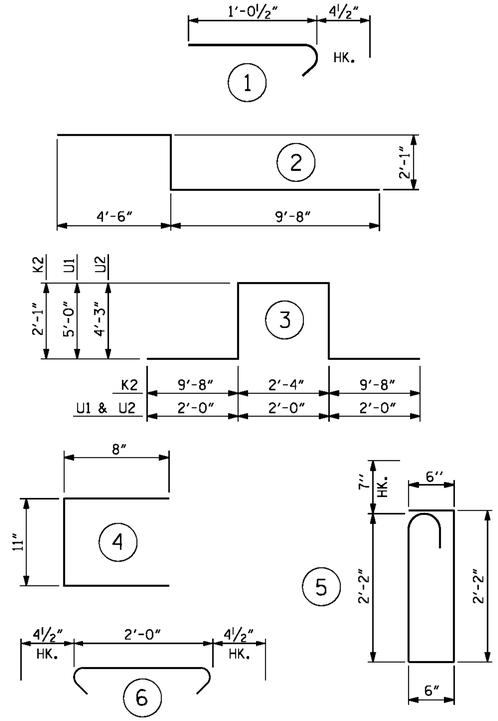
POUR (2) CANNOT BE STARTED UNTIL BOTH ADJACENT POUR (1)'S REACH A MINIMUM OF 3,000 PSI.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB

(SQ. FT. = 14,803 SF)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)
POUR 1	111.1	-
POUR 2	142.3	-
POUR 3	148.2	-
POUR 4	12.2	-
TOTALS**	413.8	95,140

**QUANTITIES FOR BARRIER RAIL AND PARAPET ARE NOT INCLUDED.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	614	#5	STR	52'-0"	33301
* A2	614	#5	STR	3'-8"	2348
* A3	614	#5	STR	15'-0"	9606
* B1	213	#4	STR	21'-11"	3118
* B2	142	#7	STR	24'-0"	6966
* B3	142	#7	STR	49'-3"	14295
* B4	136	#7	STR	34'-0"	9451
* B5	142	#4	STR	16'-2"	1534
* B6	213	#4	STR	22'-1"	3142
* B7	115	#5	STR	58'-4"	6997
* G1	2	#5	STR	52'-0"	108
* J1	98	#4	1	1'-5"	93
* K1	8	#8	2	16'-3"	347
* K2	12	#8	3	25'-10"	828
* K3	2	#6	STR	52'-0"	156
* K4	16	#4	STR	9'-4"	100
* K5	48	#4	STR	10'-4"	331
* K6	16	#4	STR	7'-10"	84
* K7	20	#4	STR	24'-3"	324
* S1	80	#4	4	2'-3"	120
* S2	80	#5	5	5'-11"	494
* S3	304	#4	6	2'-9"	558
* U1	64	#4	3	16'-0"	684
* U2	16	#4	3	14'-6"	155

* EPOXY COATED REINFORCING STEEL (LBS.) 95,140

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

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

GROOVING BRIDGE FLOORS

APPROACH SLABS	1061	SQ.FT.
BRIDGE DECK	12109	SQ.FT.
TOTAL	13,170	SQ.FT.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

UNIT 1

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-140
1			3			TOTAL SHEETS
2			4			278

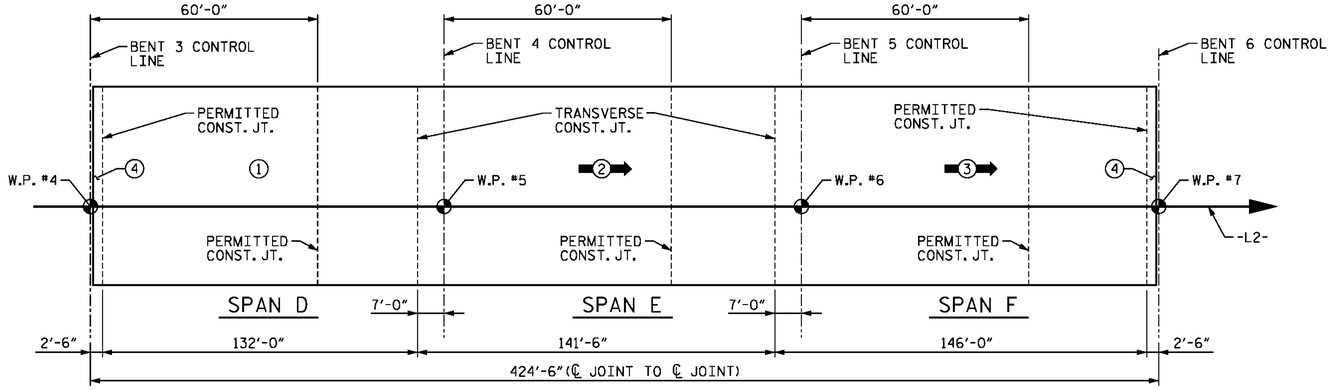
STD. NO. BOM2

DESIGNED BY:	J. SMITH	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	E. DAVIS	DATE : APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

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

REV. 8/16/99 RWW/LES
REV. 5/1/06 TLA/GM
REV. 10/1/11 MAA/GM

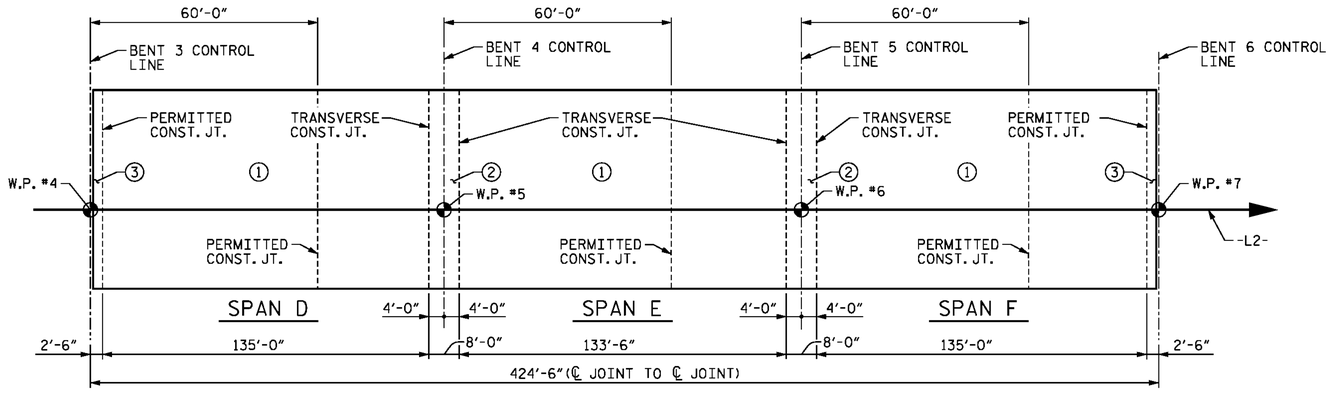
5/11/2016
400.273.B4929_SMU_BOM_01.dgn



POURING SEQUENCE - UNIT 2

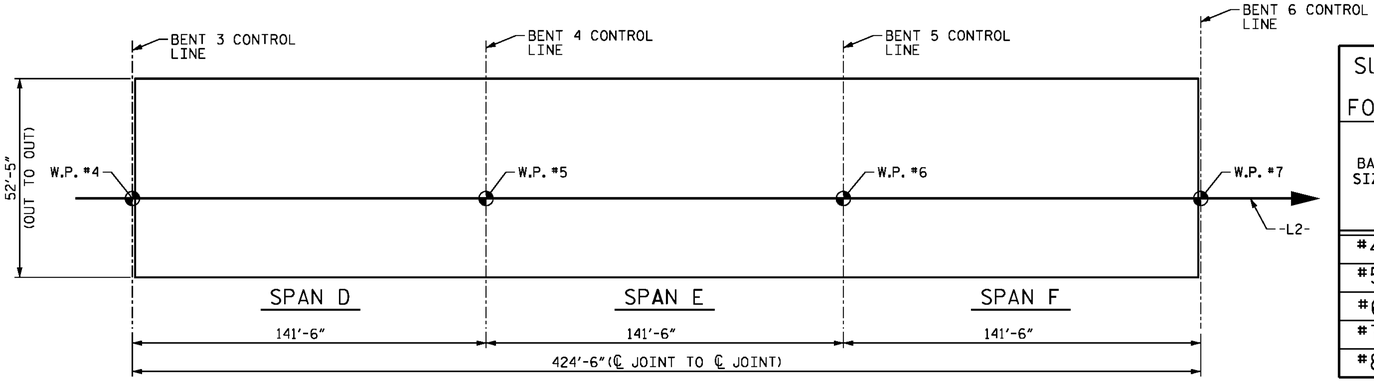
(n) INDICATES THE NUMBER AND DIRECTION OF POUR

DO NOT START POURS UNTIL ADJACENT POURS REACH A MINIMUM OF 3,000 PSI.



OPTIONAL POURING SEQUENCE - UNIT 2

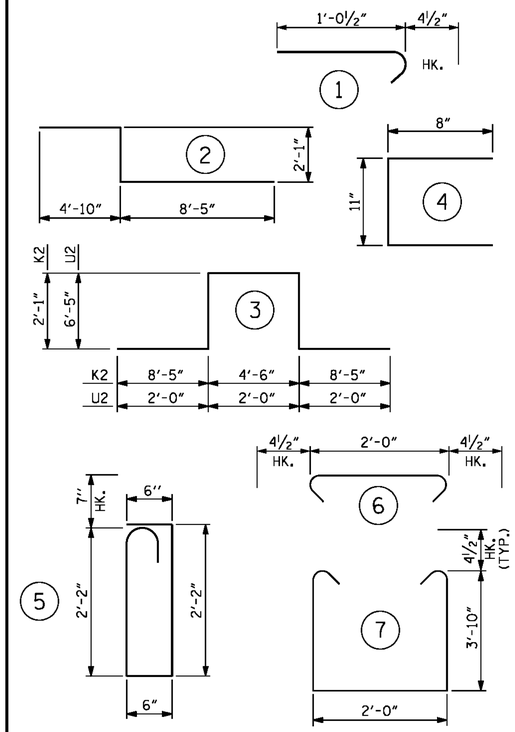
POUR (2) CANNOT BE STARTED UNTIL BOTH ADJACENT POUR (1)'S REACH A MINIMUM OF 3,000 PSI.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB

(SQ. FT. = 22,251 SF)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)
POUR 1	179.8	-
POUR 2	216.9	-
POUR 3	223.1	-
POUR 4	12.3	-
TOTALS**	632.1	133,241

**QUANTITIES FOR BARRIER RAIL AND PARAPET ARE NOT INCLUDED.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	782	#5	STR	52'-0"	42413
* A2	782	#5	STR	4'-4"	3534
* A3	782	#6	STR	16'-9"	19674
* B1	568	#4	STR	25'-6"	9675
* B2	142	#7	STR	40'-3"	11682
* B3	142	#7	STR	60'-0"	17415
* B4	136	#7	STR	45'-0"	12509
* B5	142	#4	STR	26'-3"	2490
* B6	160	#5	STR	55'-3"	9220
* G1	2	#5	STR	52'-0"	108
* J1	98	#4	1	1'-5"	93
* K1	8	#8	2	15'-4"	328
* K2	12	#8	3	25'-6"	817
* K3	2	#6	STR	52'-0"	156
* K4	32	#4	STR	6'-6"	139
* K5	16	#4	STR	7'-8"	82
* K6	64	#4	STR	10'-3"	438
* K7	28	#4	STR	23'-11"	447
* S1	56	#4	4	2'-3"	84
* S2	56	#5	5	5'-11"	346
* S3	416	#4	6	2'-9"	764
* U1	32	#4	7	10'-5"	223
* U2	48	#4	3	18'-10"	604

* EPOXY COATED REINFORCING STEEL (LBS.) 133,241

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

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

GROOVING BRIDGE FLOORS

BRIDGE DECK	18218 SQ.FT.
TOTAL	18,218 SQ.FT.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

UNIT 2

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-141
1			3			TOTAL SHEETS
2			4			278

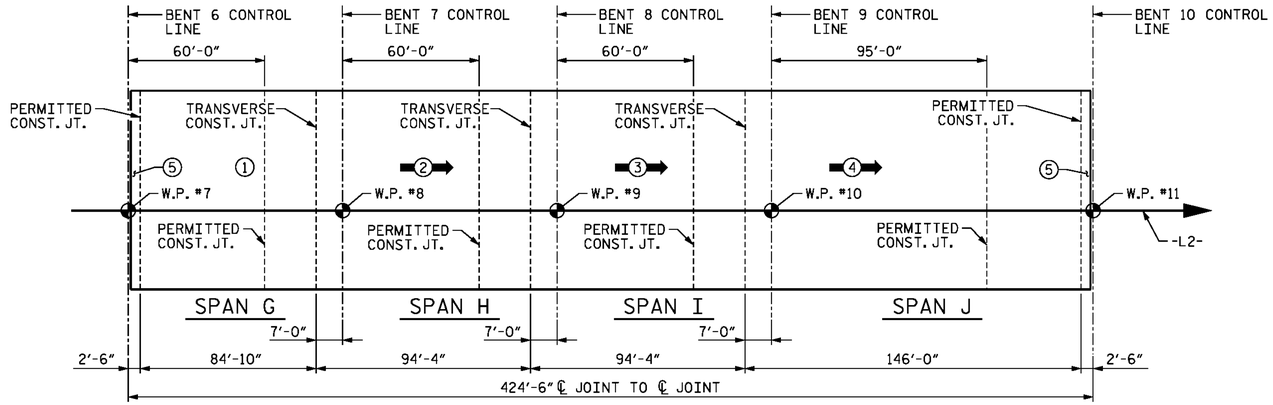
STD. NO. BOM2

DESIGNED BY:	J. SMITH	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	E. DAVIS	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

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

REV.	8/16/99	RWW/LES
REV.	5/1/06	TLA/GM
REV.	10/1/11	MAA/GM

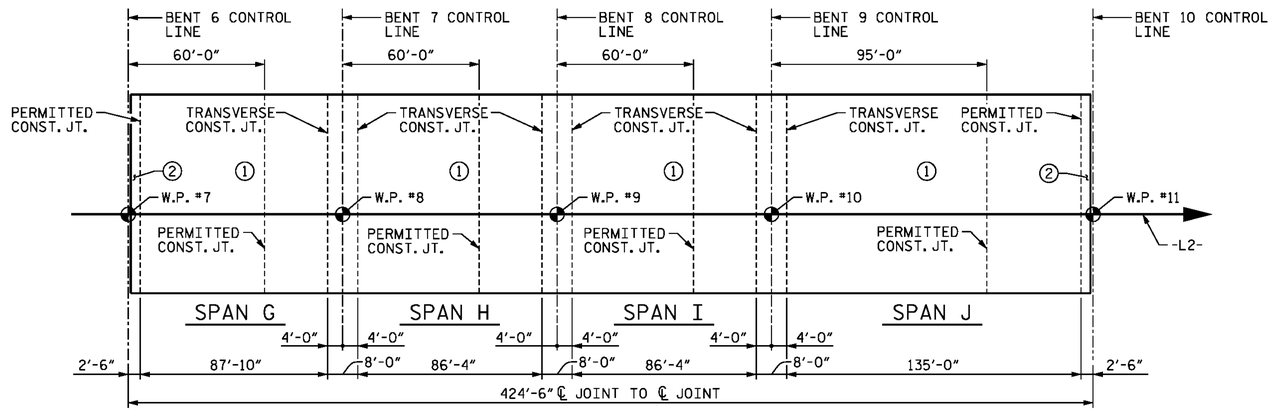
5/11/2016
400.275_B4929_SMU_BOM_02.dgn



POURING SEQUENCE - UNIT 3

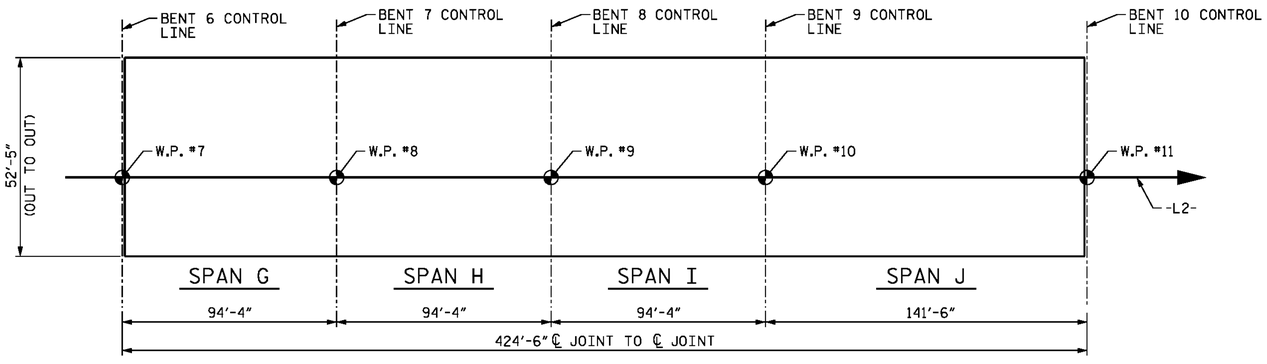
(*) INDICATES THE NUMBER AND DIRECTION OF POUR

DO NOT START POURS UNTIL ADJACENT POURS REACH A MINIMUM OF 3,000 PSI.



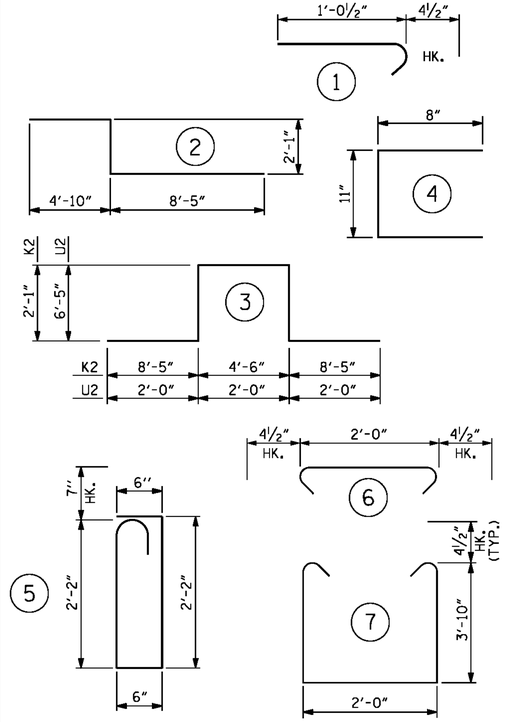
OPTIONAL POURING SEQUENCE - UNIT 3

POUR (2) CANNOT BE STARTED UNTIL BOTH ADJACENT POUR (1)'S REACH A MINIMUM OF 3,000 PSI.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 22,251 SF)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	782	#5	STR	52'-0"	42413
✳ A2	782	#5	STR	4'-11"	4010
✳ A3	782	#6	STR	16'-7"	19478
✳ B1	213	#4	STR	22'-3"	3166
✳ B2	142	#7	STR	23'-6"	6821
✳ B3	142	#7	STR	48'-9"	14150
✳ B4	136	#7	STR	31'-0"	8618
✳ B5	284	#4	STR	16'-8"	3162
✳ B6	71	#7	STR	26'-3"	3810
✳ B7	71	#7	STR	60'-0"	8707
✳ B8	68	#7	STR	38'-0"	5282
✳ B9	284	#4	STR	25'-6"	4838
✳ B10	160	#5	STR	55'-3"	9220
✳ G1	2	#5	STR	52'-0"	108
✳ J1	98	#4	1	1'-5"	93
✳ K1	8	#8	2	15'-4"	328
✳ K2	12	#8	3	25'-6"	817
✳ K3	2	#6	STR	52'-0"	156
✳ K4	48	#4	STR	6'-6"	208
✳ K5	24	#4	STR	7'-8"	123
✳ K6	96	#4	STR	10'-3"	657
✳ K7	42	#4	STR	23'-11"	671
✳ S1	56	#4	4	2'-3"	84
✳ S2	56	#5	5	5'-11"	346
✳ S3	624	#4	6	2'-9"	1146
✳ U1	48	#4	7	10'-5"	334
✳ U2	72	#4	3	18'-10"	906

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)
POUR 1	115.5	-
POUR 2	152.7	-
POUR 3	152.7	-
POUR 4	223.1	-
POUR 5	12.3	-
TOTALS✳✳	656.3	139,652

✳ EPOXY COATED REINFORCING STEEL (LBS.) 139,652

✳✳QUANTITIES FOR BARRIER RAIL AND PARAPET ARE NOT INCLUDED.

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

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

GROOVING BRIDGE FLOORS

BRIDGE DECK	18218 SQ.FT.
TOTAL	18,218 SQ.FT.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

UNIT 3

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-142
1			3			TOTAL SHEETS
2			4			278

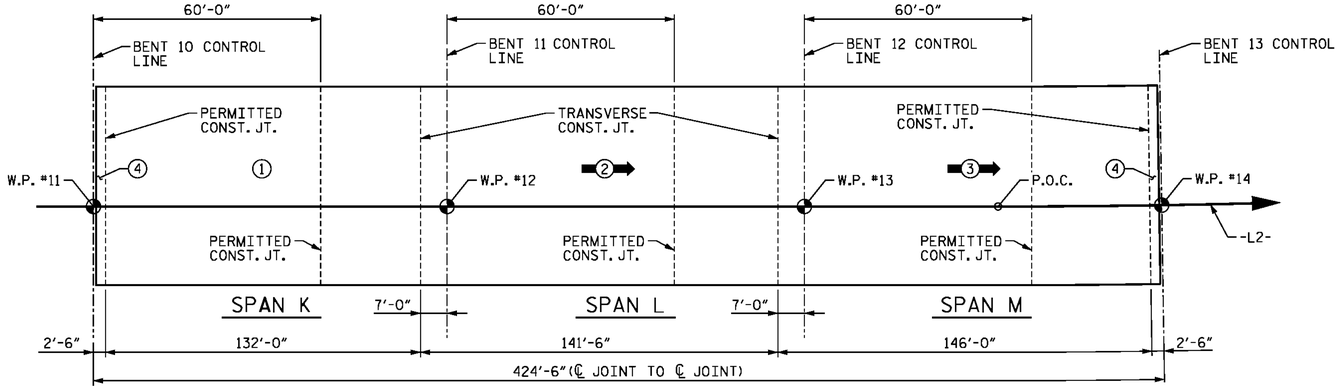
DESIGNED BY:	J. SMITH	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	E. DAVIS	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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

REV. 8/16/99 RWW/LES
REV. 5/1/06 TLA/GM
REV. 10/1/11 MAA/GM

5/11/2016
400_277_B4929_SMU_BOM_03.dgn

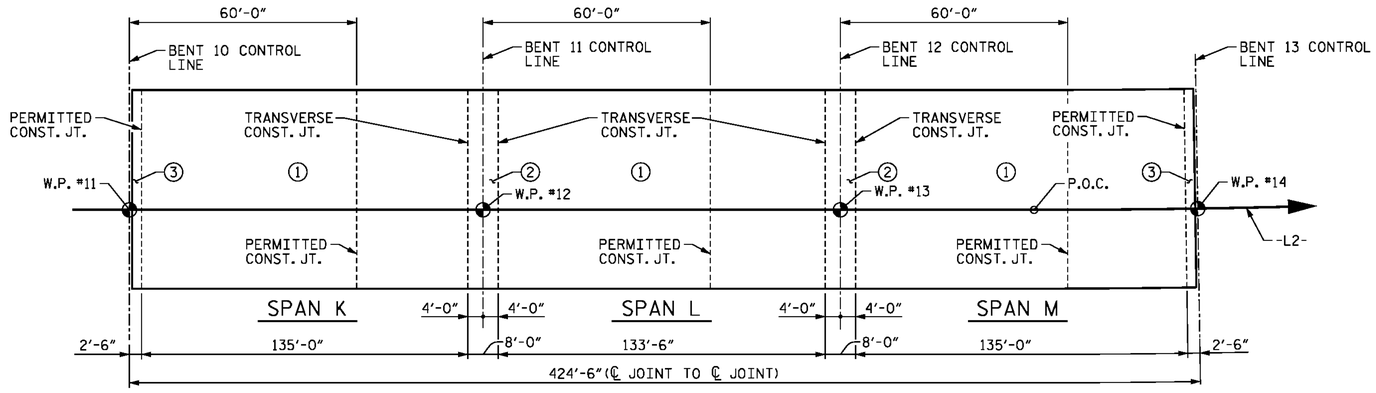
STD. NO. BOM2



POURING SEQUENCE - UNIT 4

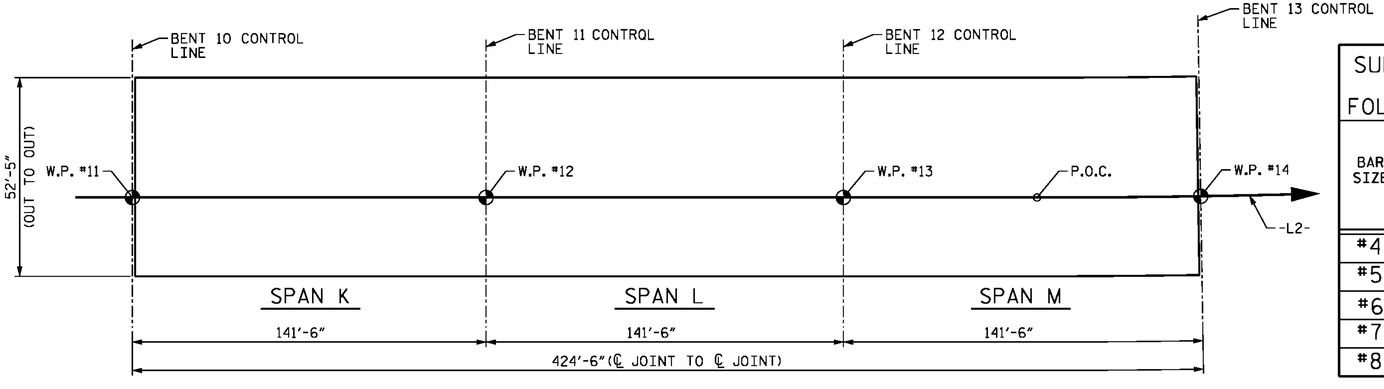
(n) INDICATES THE NUMBER AND DIRECTION OF POUR

DO NOT START POURS UNTIL ADJACENT POURS REACH A MINIMUM OF 3,000 PSI.



OPTIONAL POURING SEQUENCE - UNIT 4

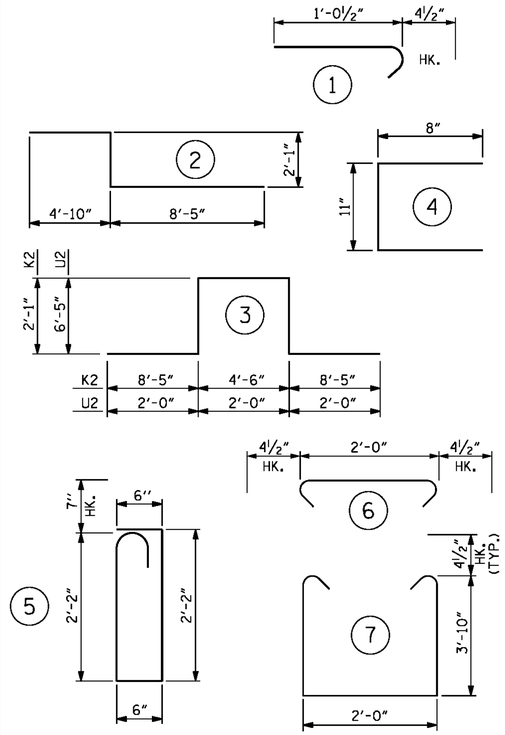
POUR (2) CANNOT BE STARTED UNTIL BOTH ADJACENT POUR (1)'S REACH A MINIMUM OF 3,000 PSI.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB

(SQ. FT. = 22,251 SF)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)
POUR 1	185.1	-
POUR 2	222.7	-
POUR 3	229.0	-
POUR 4	12.5	-
TOTALS**	649.3	133,182

**QUANTITIES FOR BARRIER RAIL AND PARAPET ARE NOT INCLUDED.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	784	#5	STR	52'-0"	42521
* A2	784	#5	STR	4'-4"	3543
* A3	784	#6	STR	16'-7"	19528
* B1	284	#4	STR	25'-6"	4838
* B2	142	#7	STR	40'-3"	11682
* B3	142	#7	STR	60'-0"	17415
* B4	136	#7	STR	45'-0"	12509
* B5	142	#4	STR	26'-3"	2490
* B6	284	#4	STR	25'-9"	4885
* B7	160	#5	STR	55'-3"	9220
		#			
* G1	2	#5	STR	52'-0"	108
* J1	98	#4	1	1'-5"	93
* K1	8	#8	2	15'-4"	328
* K2	12	#8	3	25'-6"	817
* K3	1	#6	STR	52'-0"	78
* K4	32	#4	STR	6'-6"	139
* K5	16	#4	STR	7'-8"	82
* K6	64	#4	STR	10'-3"	438
* K7	28	#4	STR	23'-11"	447
* K8	8	#6	STR	6'-10"	82
* S1	56	#4	4	2'-3"	84
* S2	56	#5	5	5'-11"	346
* S3	416	#4	6	2'-9"	764
* U1	32	#4	7	10'-5"	223
* U2	48	#4	3	18'-10"	604

* EPOXY COATED REINFORCING STEEL (LBS.) 133,182

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

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

GROOVING BRIDGE FLOORS

BRIDGE DECK	18218 SQ.FT.
TOTAL	18,218 SQ.FT.

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-
SHEET 4 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SUPERSTRUCTURE BILL OF MATERIAL
UNIT 4

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-143
1			3			TOTAL SHEETS
2			4			278

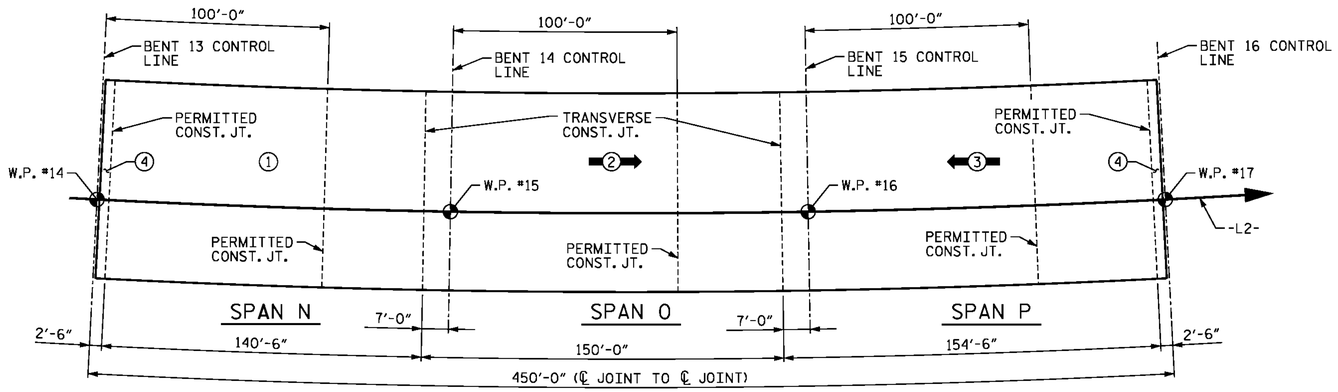
STD. NO. BOM2

DESIGNED BY:	J. SMITH	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	E. DAVIS	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

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

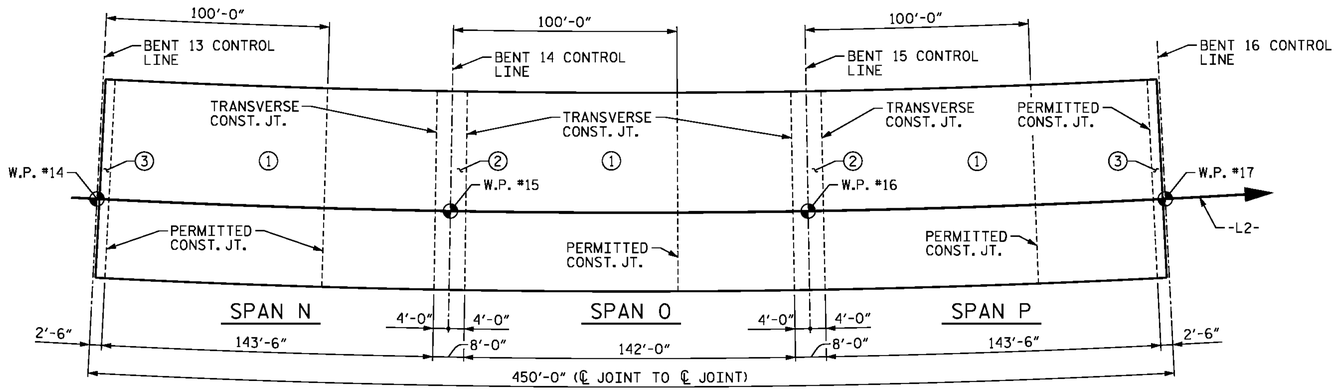
REV. 8/16/99 RWW/LES
REV. 5/1/06 TLA/GM
REV. 10/1/11 MAA/GM

5/11/2016
400.279_B4929_SMU_BOM_04.dgn



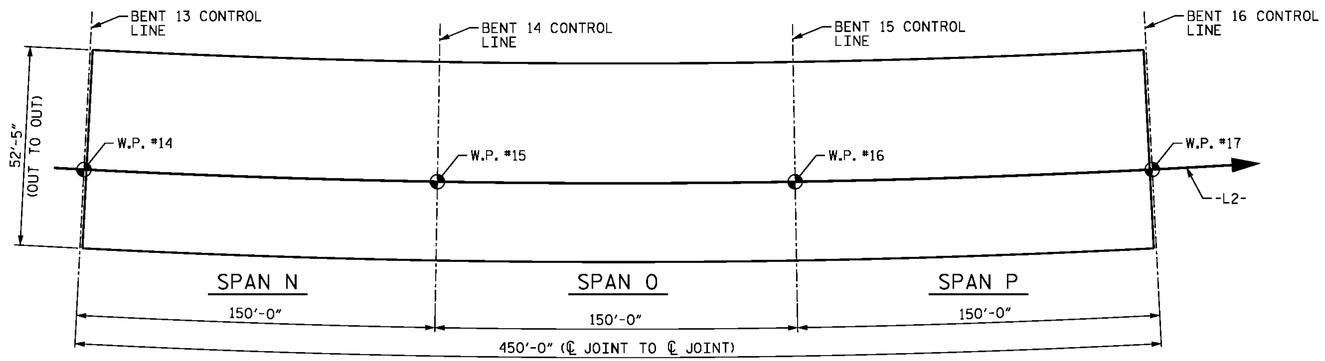
POURING SEQUENCE - UNIT 5

INDICATES THE NUMBER AND DIRECTION OF POUR



OPTIONAL POURING SEQUENCE - UNIT 5

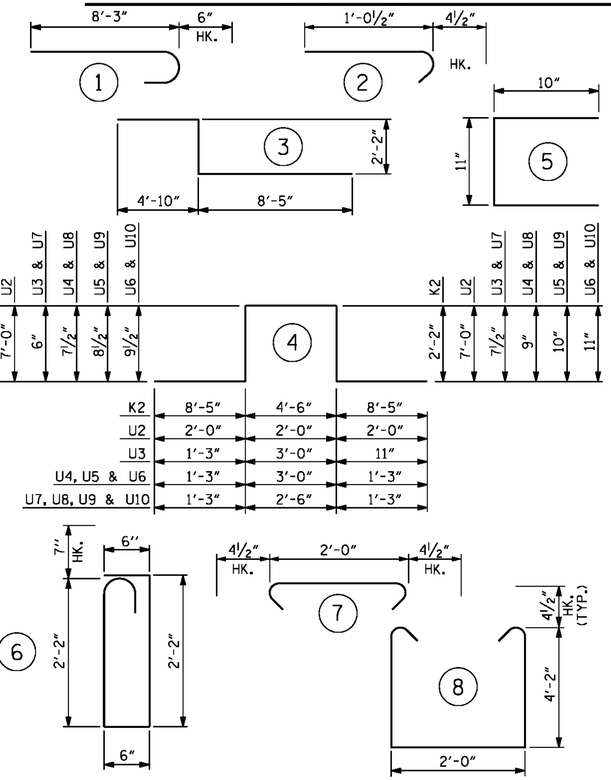
POUR ② CANNOT BE STARTED UNTIL BOTH ADJACENT POUR ①'S REACH A MINIMUM OF 3,000 PSI.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB

(SQ. FT. = 23,494 SF)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)
POUR 1	202.7	-
POUR 2	239.8	-
POUR 3	246.3	-
POUR 4	12.7	-
TOTALS **	701.5	158,538

** QUANTITIES FOR BARRIER RAIL AND PARAPET ARE NOT INCLUDED.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✱ A1	842	#5	STR	52'-0"	45667
✱ A2	842	#5	STR	4'-0"	3513
✱ A3	842	#6	STR	15'-1"	19076
✱ A4	841	#4	1	8'-9"	4916
✱ B1	568	#4	STR	27'-7"	10466
✱ B2	142	#7	STR	40'-6"	11755
✱ B3	284	#7	STR	35'-0"	20317
✱ B4	136	#7	STR	47'-0"	13065
✱ B5	142	#4	STR	30'-0"	2846
✱ B6	152	#5	STR	59'-3"	9393
✱ B7	12	#5	STR	57'-6"	720
✱ B8	4	#5	STR	25'-0"	104
✱ B9	4	#5	STR	51'-0"	213
✱ B10	132	#5	STR	52'-0"	7159
✱ G1	2	#5	STR	52'-0"	108
✱ J1	98	#4	2	1'-5"	93
✱ K1	8	#8	3	15'-5"	329
✱ K2	12	#8	4	25'-8"	822
✱ K3	16	#6	STR	6'-10"	164
✱ K4	32	#4	STR	6'-4"	135
✱ K5	16	#4	STR	9'-6"	102
✱ K6	64	#4	STR	10'-3"	438
✱ K7	28	#4	STR	23'-7"	441
✱ S1	56	#4	5	2'-7"	97
✱ S2	56	#5	6	5'-11"	346
✱ S3	416	#4	7	2'-9"	764
✱ U1	32	#4	8	11'-1"	237
✱ U2	48	#4	4	20'-0"	641
✱ U3	74	#5	4	6'-4"	489
✱ U4	64	#5	4	6'-11"	462
✱ U5	18	#5	4	7'-1"	133
✱ U6	51	#5	4	7'-3"	386
✱ U7	74	#5	4	6'-2"	476
✱ U8	72	#5	4	6'-5"	482
✱ U9	76	#5	4	6'-7"	522
✱ U10	236	#5	4	6'-9"	1661

✱ EPOXY COATED REINFORCING STEEL (LBS.) 158,538

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

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

GROOVING BRIDGE FLOORS

BRIDGE DECK	19315 SQ.FT.
TOTAL	19,315 SQ.FT.

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C864482747...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 5 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SUPERSTRUCTURE BILL OF MATERIAL
UNIT 5

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-144
1			3			TOTAL SHEETS
2			4			278

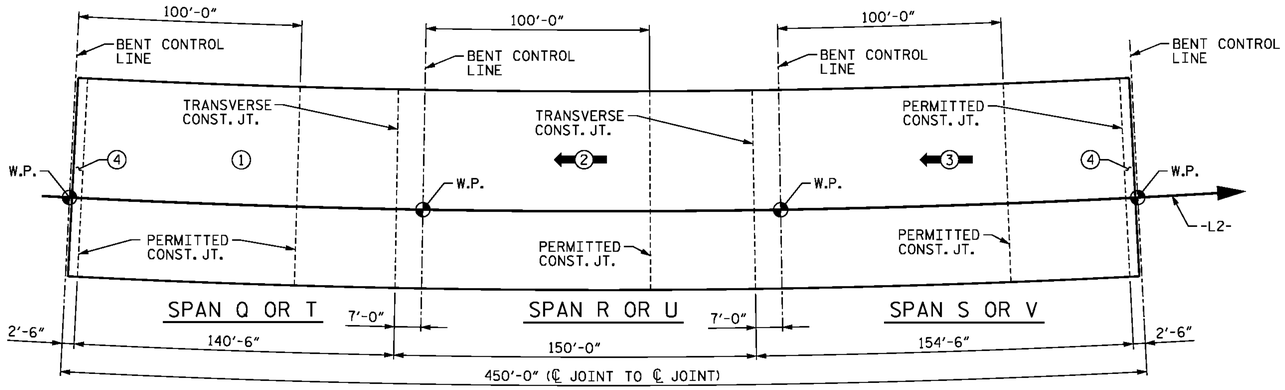
STD. NO. BOM2

DESIGNED BY:	J. SMITH	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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

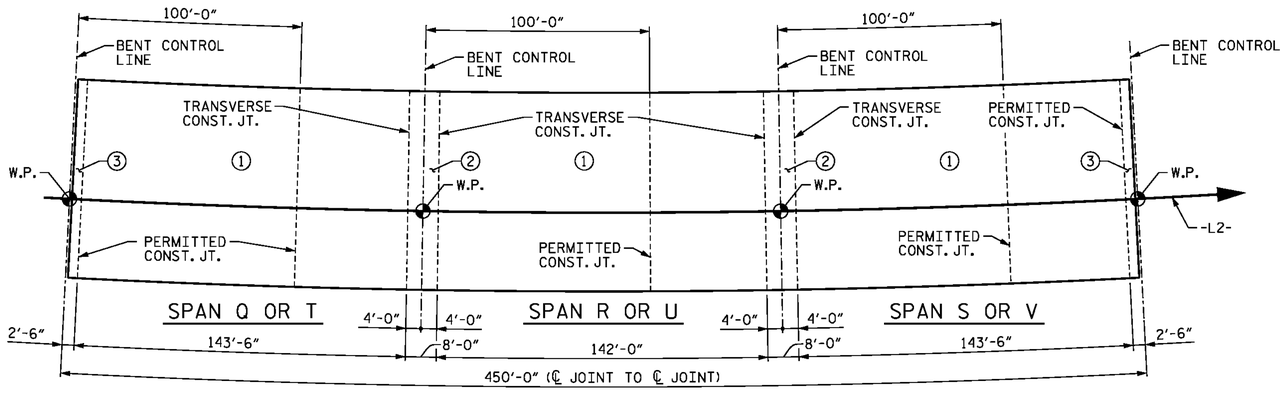
REV. 8/16/99 RWW/LES
REV. 5/1/06 TLA/GM
REV. 10/1/11 MAA/GM

5/11/2016
400_281_B4929_SWU_BOM_05.dgn



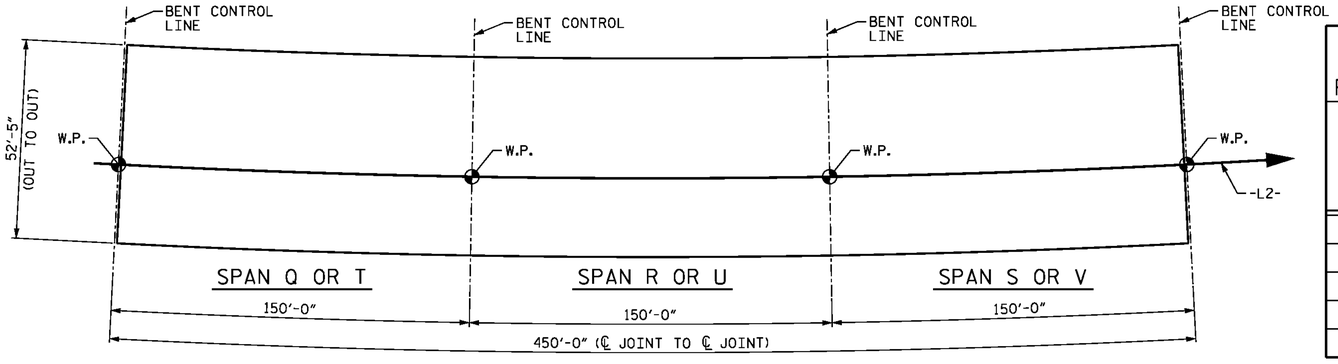
POURING SEQUENCE - UNIT 6 OR 7

INDICATES THE NUMBER AND DIRECTION OF POUR



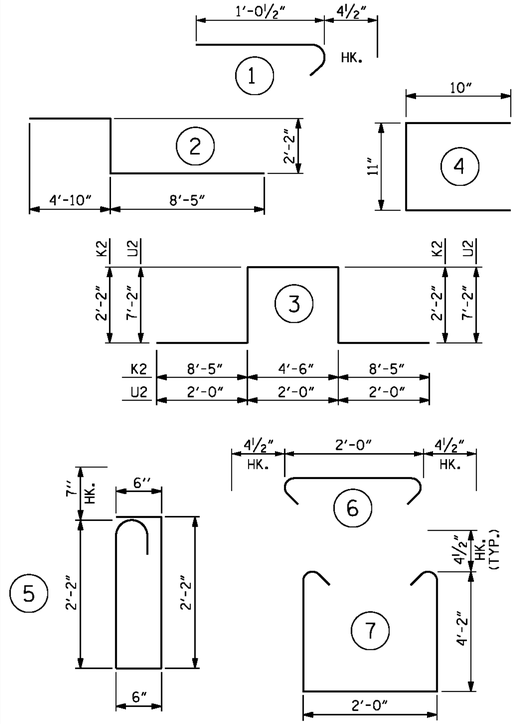
OPTIONAL POURING SEQUENCE - UNIT 6 OR 7

POUR ② CANNOT BE STARTED UNTIL BOTH ADJACENT POUR ①'S REACH A MINIMUM OF 3,000 PSI.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 23,494 SF)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)
POUR 1	193.3	-
POUR 2	229.8	-
POUR 3	236.0	-
POUR 4	12.4	-
TOTALS**	671.5	141,863

** QUANTITIES FOR BARRIER RAIL AND PARAPET ARE NOT INCLUDED.

NOTE: QUANTITIES ARE FOR ONE UNIT ONLY

BILL OF MATERIAL

FOR ONE UNIT

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	842	#5	STR	52'-0"	45667
* A2	842	#5	STR	4'-0"	3513
* A3	842	#6	STR	15'-1"	19076
* B1	568	#4	STR	27'-7"	10466
* B2	142	#7	STR	40'-6"	11755
* B3	284	#7	STR	35'-0"	20317
* B4	136	#7	STR	47'-0"	13065
* B5	142	#4	STR	30'-0"	2846
* B6	152	#5	STR	59'-3"	9393
* B7	12	#5	STR	57'-6"	720
* B8	4	#5	STR	25'-0"	104
* B9	4	#5	STR	51'-0"	213
* G1	2	#5	STR	52'-0"	108
* J1	98	#4	1	1'-5"	93
* K1	8	#8	2	15'-5"	329
* K2	12	#8	3	25'-8"	822
* K3	16	#6	STR	6'-10"	164
* K4	32	#4	STR	6'-4"	135
* K5	16	#4	STR	9'-6"	102
* K6	64	#4	STR	10'-3"	438
* K7	28	#4	STR	23'-7"	441
* S1	56	#4	4	2'-7"	97
* S2	56	#5	5	5'-11"	346
* S3	416	#4	6	2'-9"	764
* U1	32	#4	7	11'-1"	237
* U2	48	#4	3	20'-4"	652

* EPOXY COATED REINFORCING STEEL (LBS.) 141,863

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

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

GROOVING BRIDGE FLOORS

BRIDGE DECK	19315 SQ.FT.
TOTAL	19,315 SQ.FT.

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 6 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SUPERSTRUCTURE BILL OF MATERIAL
UNITS 6 AND 7

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-145
1			3			TOTAL SHEETS
2			4			278

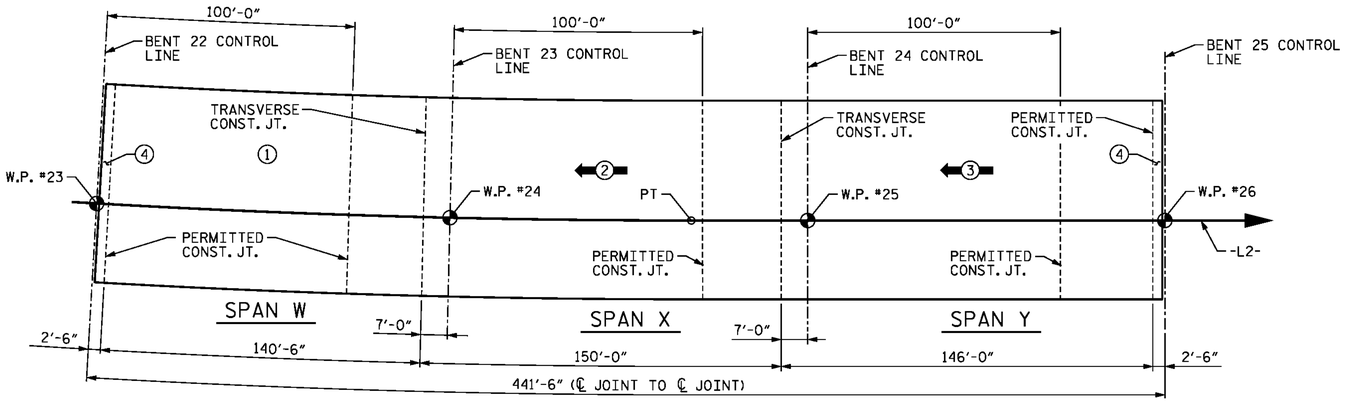
STD. NO. BOM2

DESIGNED BY:	J. SMITH	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	B. LOFLIN	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

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

REV. 8/16/99 RWW/LES
REV. 5/1/06 TLA/GM
REV. 10/1/11 MAA/GM

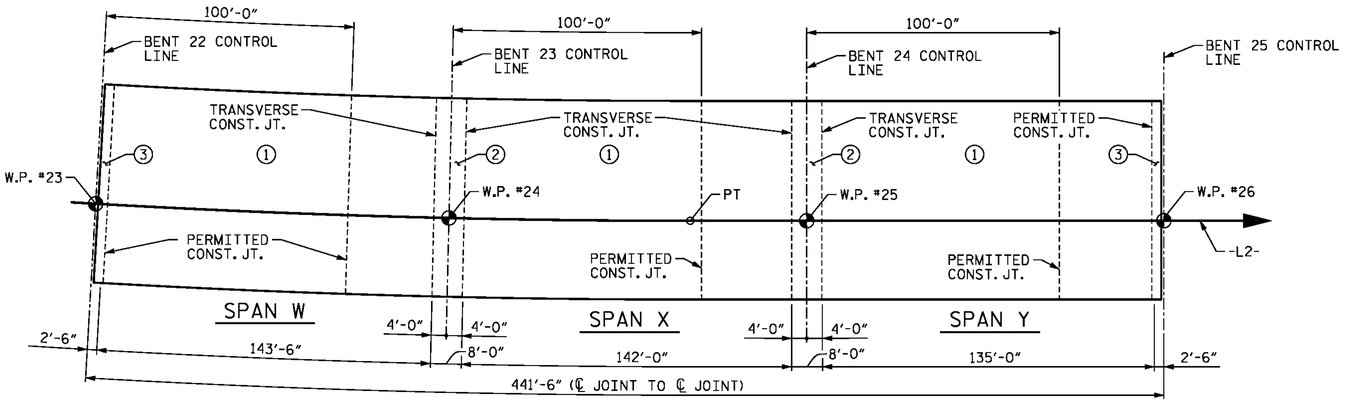
5/11/2016
400.283.B4929_SMU_BOM_06.dgn



POURING SEQUENCE - UNIT 8

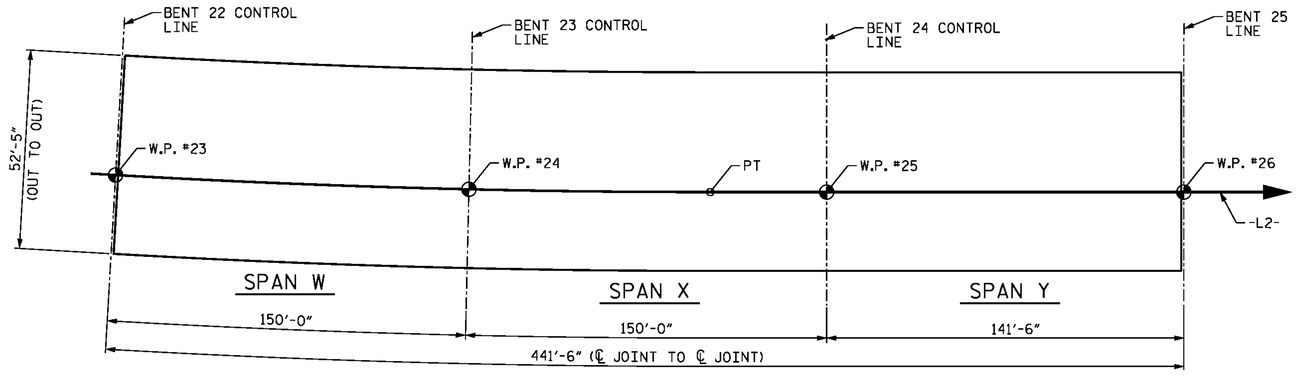
(#) INDICATES THE NUMBER AND DIRECTION OF POUR

DO NOT START POURS UNTIL ADJACENT POURS REACH A MINIMUM OF 3,000 PSI.



OPTIMAL POURING SEQUENCE - UNIT 8

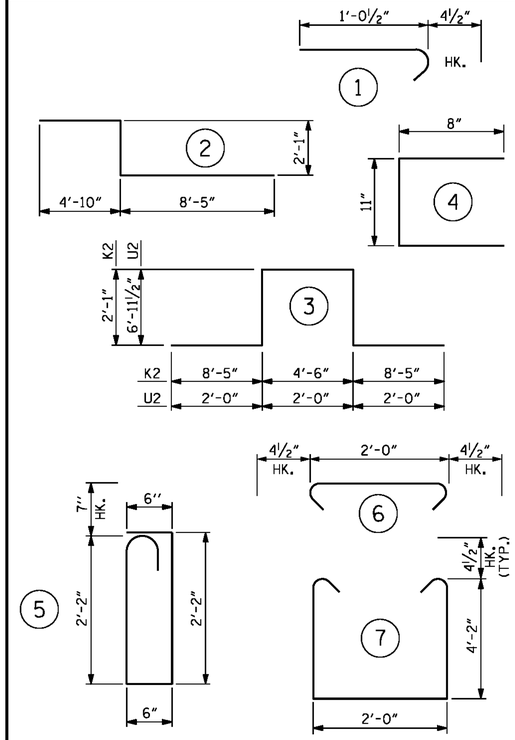
POUR (2) CANNOT BE STARTED UNTIL BOTH ADJACENT POUR (1)'S REACH A MINIMUM OF 3,000 PSI.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB

(SQ. FT. = 23,091 SF)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)
POUR 1	202.7	-
POUR 2	242.7	-
POUR 3	236.9	-
POUR 4	12.7	-
TOTALS**	695.0	139,293

**QUANTITIES FOR BARRIER RAIL AND PARAPET ARE NOT INCLUDED.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	820	#5	STR	52'-0"	44474
* A2	820	#5	STR	4'-4"	3706
* A3	820	#6	STR	15'-4"	18885
* B1	284	#4	STR	27'-5"	5201
* B2	142	#7	STR	40'-0"	11610
* B3	284	#7	STR	35'-3"	20462
* B4	68	#7	STR	47'-0"	6533
* B5	142	#4	STR	29'-6"	2798
* B6	68	#7	STR	46'-0"	6394
* B7	284	#4	STR	25'-6"	4838
* B8	152	#5	STR	57'-4"	9089
* B9	8	#5	STR	56'-3"	469
* B10	2	#5	STR	25'-0"	52
* B11	2	#5	STR	51'-0"	106
* G1	2	#5	STR	52'-0"	108
* J1	98	#4	1	1'-5"	93
* K1	8	#8	2	15'-4"	328
* K2	12	#8	3	25'-6"	817
* K3	1	#6	STR	52'-0"	78
* K4	32	#4	STR	6'-6"	139
* K5	16	#4	STR	7'-8"	82
* K6	64	#4	STR	10'-3"	438
* K7	28	#4	STR	23'-7"	441
* K8	8	#6	STR	6'-10"	82
* S1	56	#4	4	2'-3"	84
* S2	56	#5	5	5'-11"	346
* S3	416	#4	6	2'-9"	764
* U1	32	#4	7	11'-1"	237
* U2	48	#4	3	19'-11"	639

* EPOXY COATED REINFORCING STEEL (LBS.) 139,293

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

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

GROOVING BRIDGE FLOORS

BRIDGE DECK	18949 SQ.FT.
TOTAL	18,949 SQ.FT.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 7 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

UNIT 8

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY 5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-146
1			3			TOTAL SHEETS
2			4			278

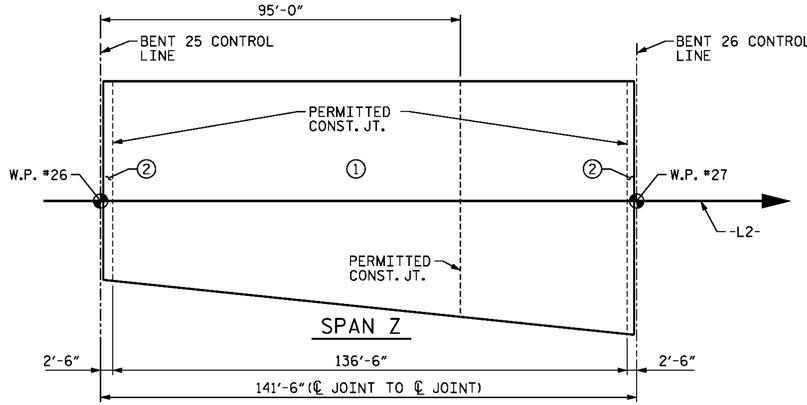
DESIGNED BY:	J. SMITH	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	E. DAVIS	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

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

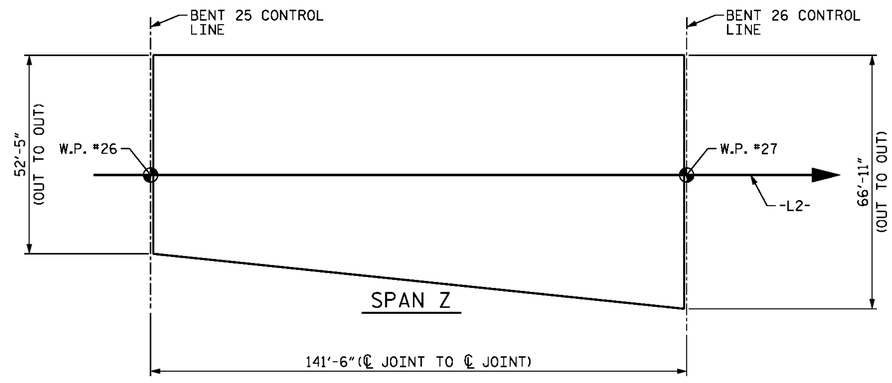
REV.	8/16/99	RWW/LES
REV.	5/1/06	TLA/GM
REV.	10/1/11	MAA/GM

5/11/2016
400.285_B4929_SMU_BOM_08.dgn

STD. NO. BOM2

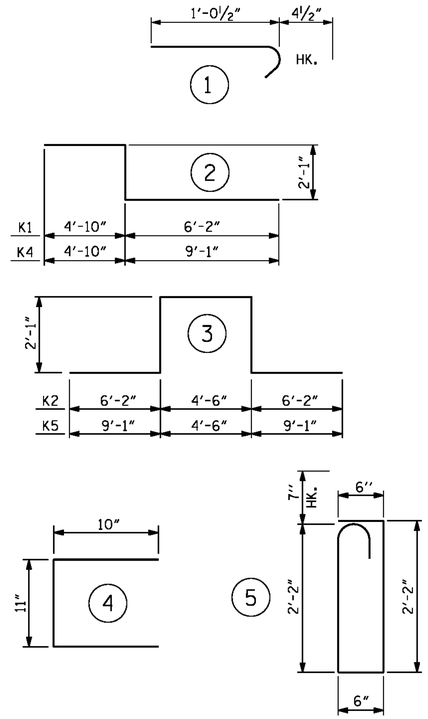


POURING SEQUENCE - UNIT 9



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 8,443 SF)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)
POUR 1	265.6	-
POUR 2	16.1	-
TOTALS**	281.7	65,361

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
✳ A1	104	#5	STR	28'-9"	3119
✳ A2	104	#5	STR	30'-2"	3272
✳ A3	104	#5	STR	31'-7"	3426
✳ A4	104	#5	STR	33'-1"	3589
✳ A5	104	#5	STR	34'-6"	3742
✳ A6	104	#6	STR	29'-0"	4530
✳ A7	104	#6	STR	30'-5"	4751
✳ A8	104	#6	STR	31'-10"	4973
✳ A9	104	#6	STR	33'-4"	5207
✳ A10	104	#6	STR	34'-9"	5428
✳ B1	450	#4	STR	30'-0"	9018
✳ B2	231	#5	STR	50'-0"	12047
✳ G1	1	#5	STR	52'-0"	54
✳ G2	2	#5	STR	34'-6"	72
✳ J1	113	#4	1	1'-5"	107
✳ K1	4	#8	2	13'-1"	140
✳ K2	8	#8	3	21'-0"	449
✳ K3	10	#6	STR	4'-7"	69
✳ K4	4	#8	2	16'-0"	171
✳ K5	8	#8	3	26'-10"	573
✳ K6	10	#6	STR	7'-5"	111
✳ S1	65	#4	4	2'-7"	112
✳ S2	65	#5	5	5'-11"	401

✳ EPOXY COATED REINFORCING STEEL 65,361 (LBS.)

**QUANTITIES FOR BARRIER RAIL AND PARAPET ARE NOT INCLUDED.

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

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

GROOVING BRIDGE FLOORS

BRIDGE DECK	7069 SQ.FT.
TOTAL	7,069 SQ.FT.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 8 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

SUPERSTRUCTURE BILL OF MATERIAL

UNIT 9

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-147
1			3			TOTAL SHEETS
2			4			278

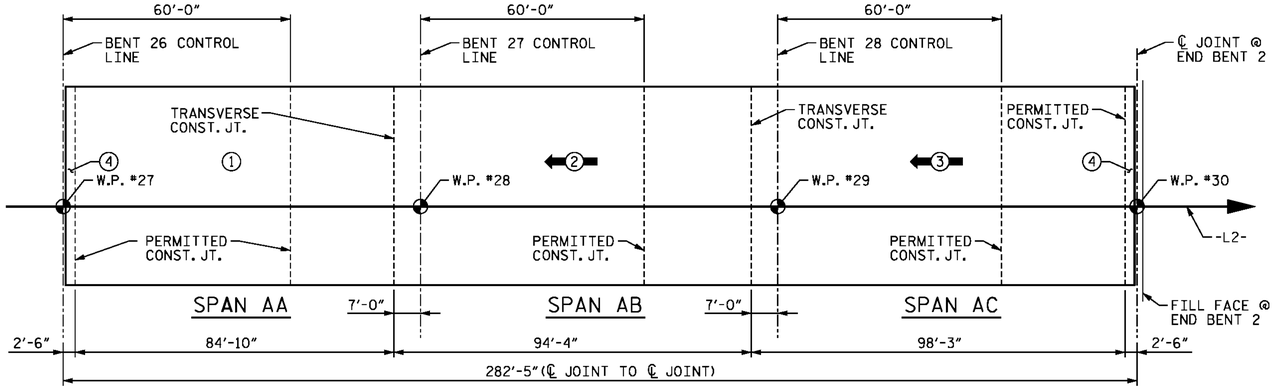
STD. NO. BOM2

DESIGNED BY:	J. SMITH	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	E. DAVIS	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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

REV. 8/16/99	RWW/LES
REV. 5/1/06	TLA/GM
REV. 10/1/11	MAA/GM

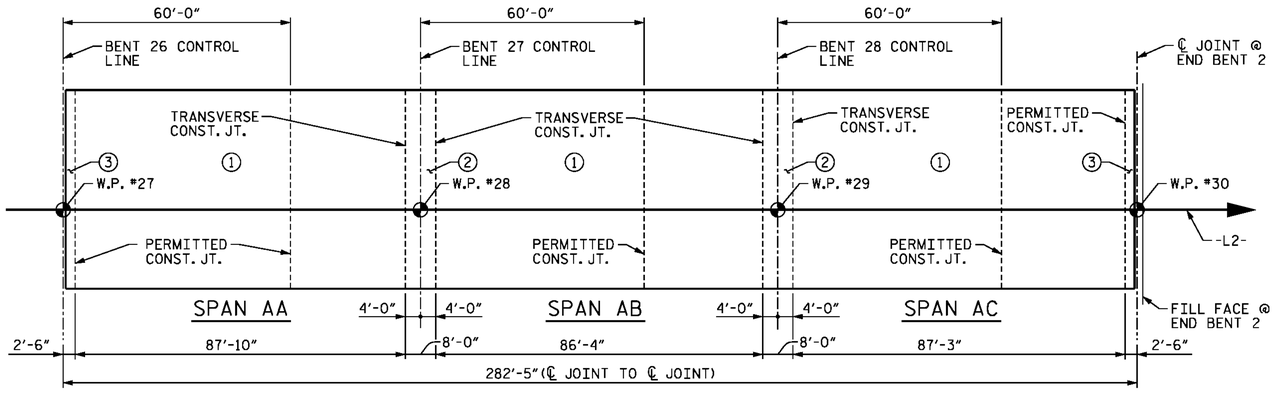
5/11/2016
400_287_B4929_SMU_BOM_09.dgn



POURING SEQUENCE - UNIT 10

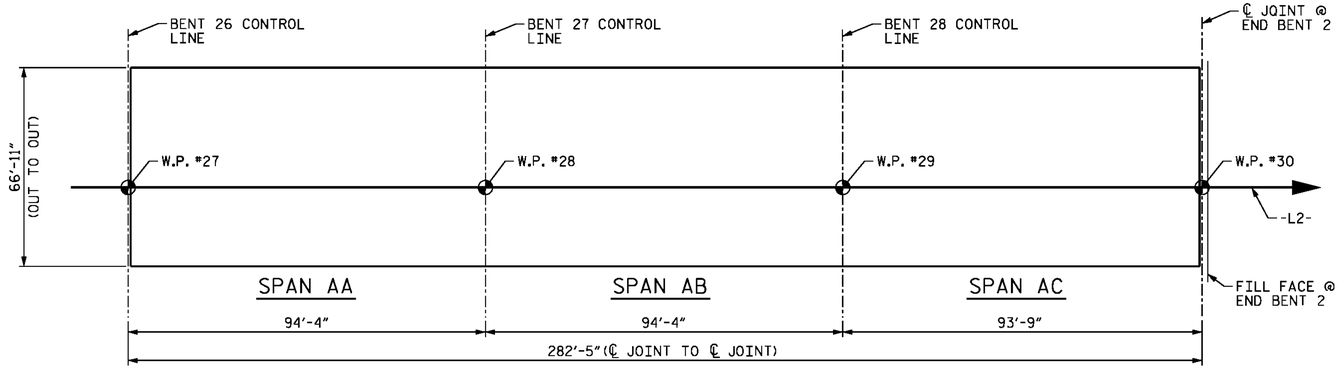
(n) INDICATES THE NUMBER AND DIRECTION OF POUR

DO NOT START POURS UNTIL ADJACENT POURS REACH A MINIMUM OF 3,000 PSI.



OPTIONAL POURING SEQUENCE - UNIT 10

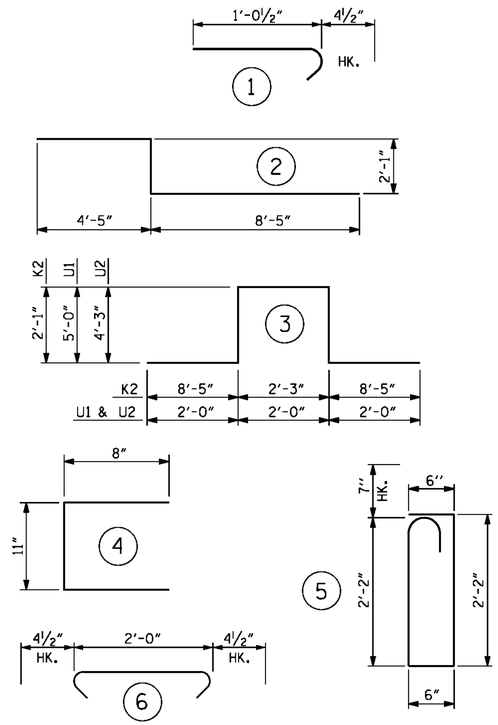
POUR (2) CANNOT BE STARTED UNTIL BOTH ADJACENT POUR (1)'S REACH A MINIMUM OF 3,000 PSI.



LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB

(SQ. FT. = 18,898 SF)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

SUPERSTRUCTURE BILL OF MATERIAL

	CLASS AA CONCRETE	EPOXY COATED REINFORCING STEEL
	(CU. YDS.)	(LBS.)
POUR 1	129.3	-
POUR 2	167.2	-
POUR 3	173.1	-
POUR 4	15.0	-
TOTALS**	484.6	91,539

**QUANTITIES FOR BARRIER RAIL AND PARAPET ARE NOT INCLUDED.

BILL OF MATERIAL

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
* A1	563	#5	STR	34'-7"	20308
* A2	563	#5	STR	3'-7"	2104
* A3	563	#5	STR	13'-7"	7976
* B1	270	#4	STR	22'-1"	3983
* B2	180	#7	STR	24'-0"	8830
* B3	180	#7	STR	49'-3"	18120
* B4	174	#7	STR	34'-0"	12092
* B5	180	#4	STR	16'-2"	1944
* B6	270	#4	STR	21'-10"	3938
* B7	105	#5	STR	58'-5"	6398
* G1	4	#5	STR	34'-6"	144
* J1	128	#4	1	1'-5"	121
* K1	8	#8	2	14'-11"	319
* K2	20	#8	3	23'-3"	1242
* K3	4	#6	STR	34'-10"	209
* K4	24	#4	STR	8'-0"	128
* K5	72	#4	STR	9'-0"	433
* K6	24	#4	STR	6'-4"	102
* K7	30	#4	STR	22'-0"	441
* S1	108	#4	4	2'-3"	162
* S2	108	#5	5	5'-11"	666
* S3	408	#4	6	2'-9"	749
* U1	84	#4	3	16'-0"	898
* U2	24	#4	3	14'-6"	232

* EPOXY COATED REINFORCING STEEL (LBS.) 91,539

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

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

GROOVING BRIDGE FLOORS

APPROACH SLABS	1418 SQ.FT.
BRIDGE DECK	16192 SQ.FT.
TOTAL	17,610 SQ.FT.

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 9 OF 9

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD
SUPERSTRUCTURE BILL OF MATERIAL
UNIT 10

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-148
1			3			TOTAL SHEETS
2			4			278

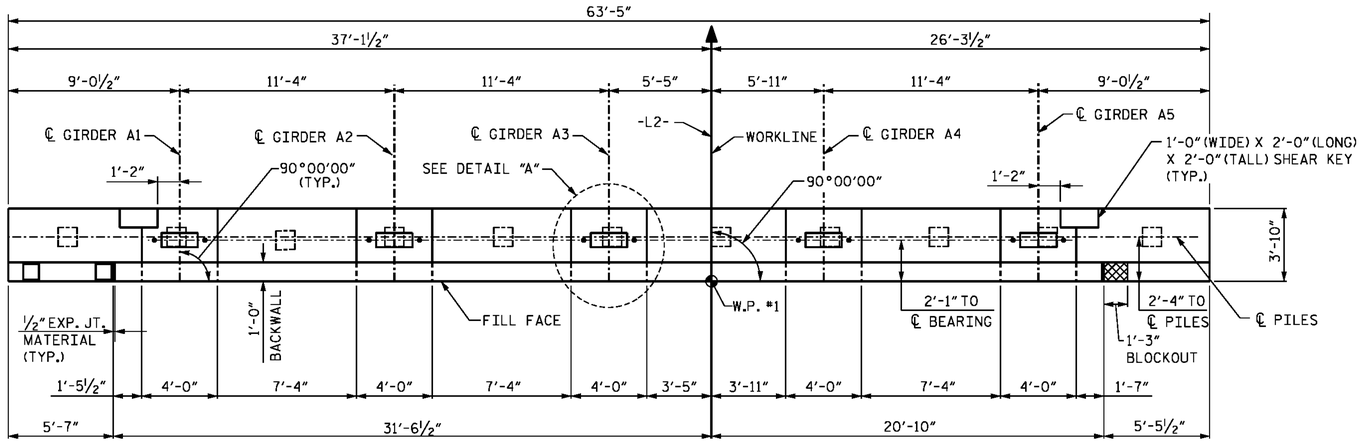
STD. NO. BOM2

DESIGNED BY:	J. SMITH	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	E. DAVIS	DATE : APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

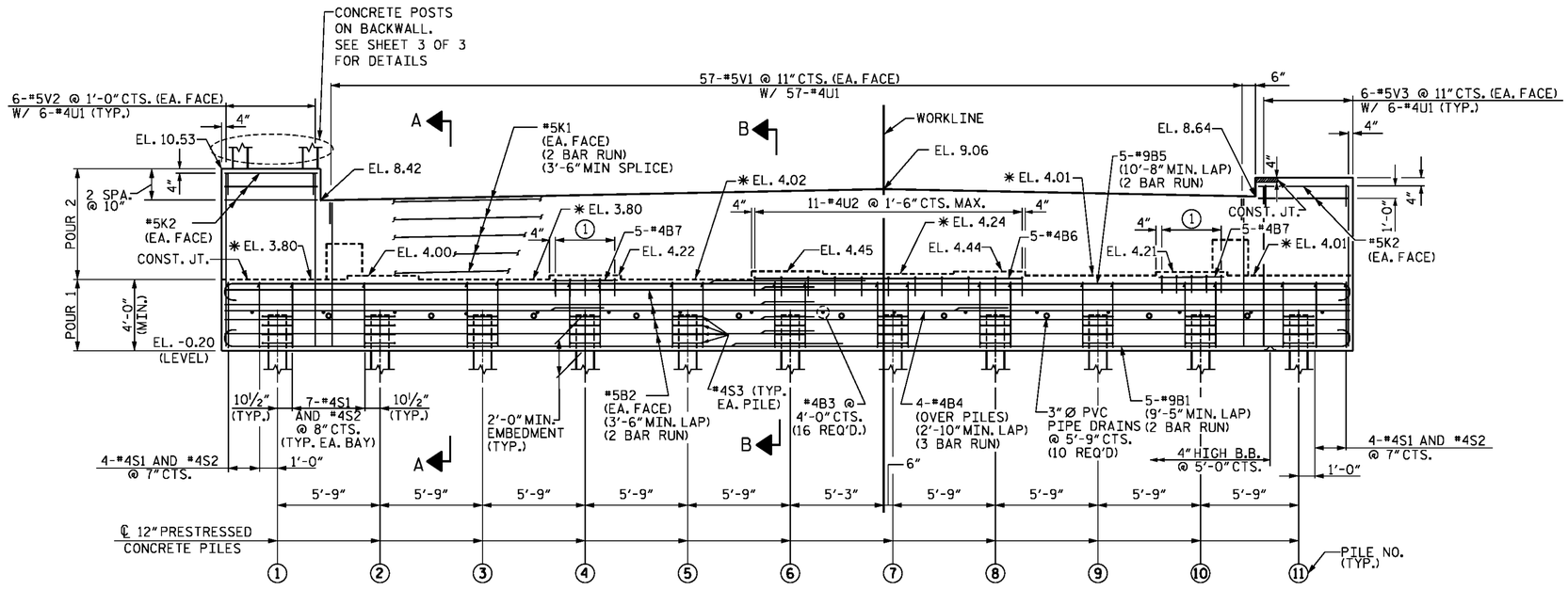
DRAWN BY :	JMB 5/87
CHECKED BY :	SJD 9/87

REV. 8/16/99	RWW/LES
REV. 5/1/06	TLA/GM
REV. 10/1/11	MAA/GM

5/11/2016
400.289_B4929_SMU_BOM_10.dgn



PLAN



ELEVATION

✱ FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A AND B-B ON SHEET 2 OF 3. (REINFORCEMENT IN SHEAR KEY AND CONCRETE POSTS NOT SHOWN FOR CLARITY)

① 5-#4U2 @ 10" CTS. (TYP.)

NOTES:

FOR SECTIONS A-A, B-B AND SHEAR KEY DETAIL SEE SHEET 2 OF 3.

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

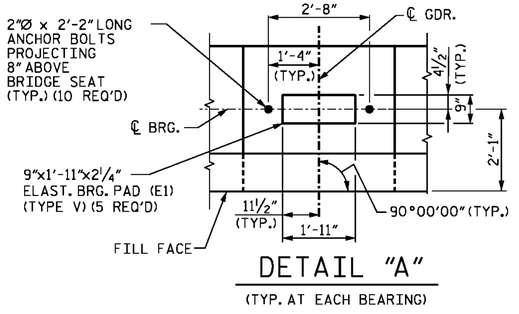
THE TOP SURFACE AREAS OF THE END BENT CAP, EXCEPT THE BRIDGE SEAT BUILDUPS, SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE AT THE RATE OF 2%.

THE #5 "V" BARS SHALL BE PLACED WITH 2" CLEAR SPACING FROM TOP OF BACKWALL

THE CONCRETE IN THE SHADED AREA OF THE BACKWALL SHALL BE POURED AFTER THE PARAPET IS CAST IF SLIP FORMING IS USED.

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

FOR PIPE DRAIN DETAILS, SEE SHEET 2 OF 3.



DETAIL "A"

(TYP. AT EACH BEARING)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 PLAN AND ELEVATION

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-149
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	M. WAGNER	DATE :	DEC. 2015
DRAWN BY:	B. CALDWELL	DATE :	DEC. 2015
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
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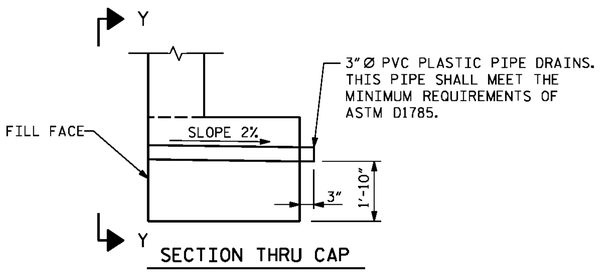
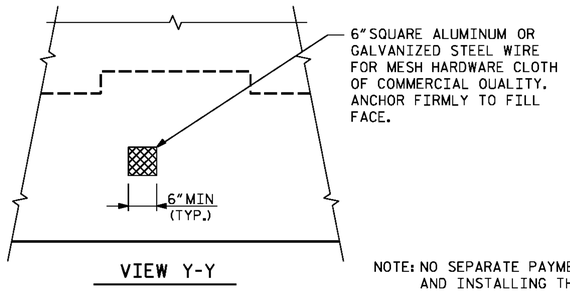


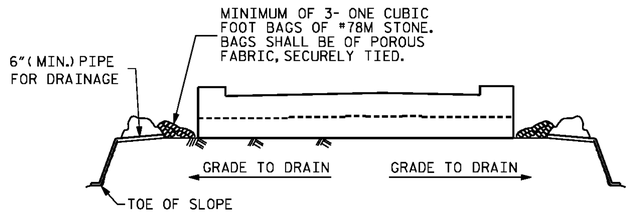
SECTION THRU CAP



VIEW Y-Y

NOTE: NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE PVC PLASTIC PIPE DRAINS, HARDWARE CLOTH AND FASTENERS. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS.

PIPE DRAIN DETAILS



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

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

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

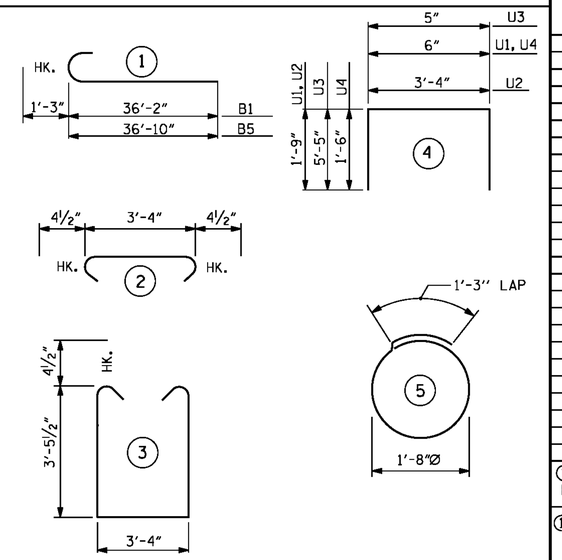
TEMPORARY DRAINAGE AT END BENT

NOTES

DESIGN REINFORCEMENT CONNECTED TO END BENT CAP FOR FACTORED STRAP LOAD OF 4.5 KIPS/FT ACTING 3'-0" ABOVE BOTTOM OF CAP ELEVATION. CAST REINFORCEMENT CONNECTORS INTO CAP AND MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN CONNECTOR AND REINFORCEMENT STEEL IN CAP.

SEE RETAINING WALL DRAWINGS FOR ADDITIONAL REQUIREMENTS.

BAR TYPES



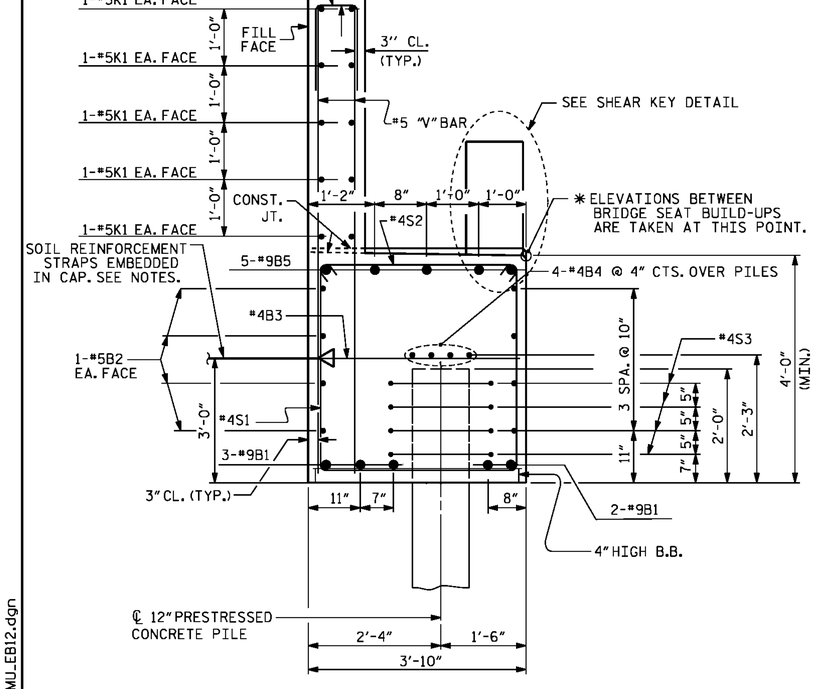
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
END BENT 1

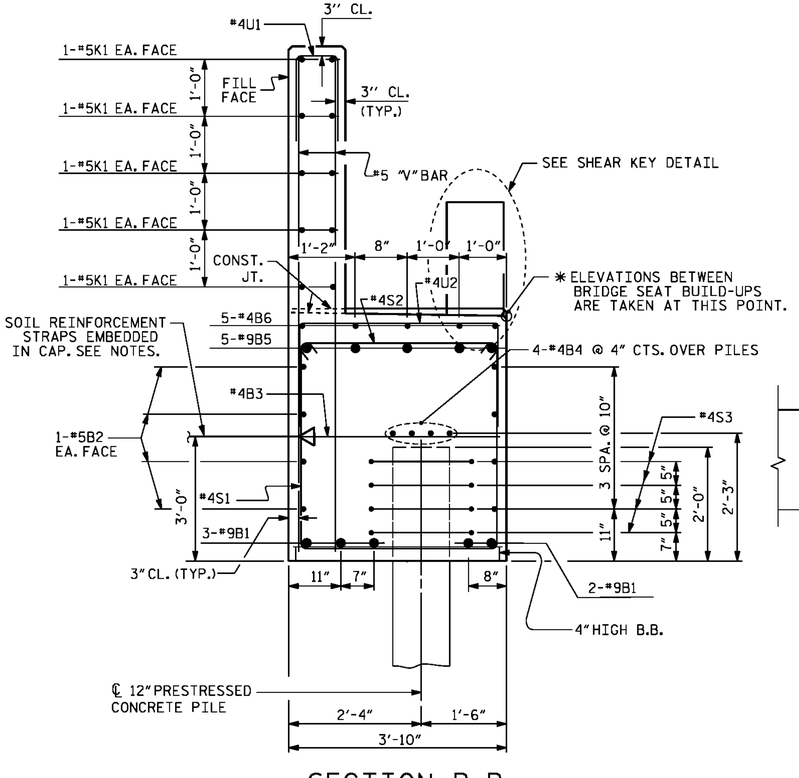
BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	37'-5"	1272
B2	16	#5	STR	33'-3"	555
B3	16	#4	STR	3'-4"	36
B4	12	#4	STR	22'-10"	183
B5	10	#9	1	38'-1"	1295
B6	5	#4	STR	14'-10"	50
B7	10	#4	STR	3'-6"	23
K1	20	#5	STR	33'-1"	690
K2	10	#5	STR	4'-11"	51
S1	78	#4	3	11'-0"	573
S2	78	#4	2	4'-1"	213
S3	44	#4	5	6'-6"	191
U1	69	#4	4	4'-0"	184
U2	21	#4	4	6'-10"	96
U3	10	#6	4	11'-3"	169
U4	12	#4	4	3'-6"	28
V1	114	#5	STR	7'-10"	931
V2	12	#5	STR	9'-11"	124
V3	12	#5	STR	9'-7"	120

①EPOXY COATED REINFORCING STEEL	LBS.	6784
①CLASS AA CONCRETE:		
POUR #1 - CAP	C.Y.	38.1
POUR #2 - BACKWALL	C.Y.	11.5
CLASS AA CONCRETE	C.Y.	49.6
12" PRESTR. CONCRETE PILES 11 REQUIRED	LIN. FT.	220
PILE REDRIVES	EA.	6

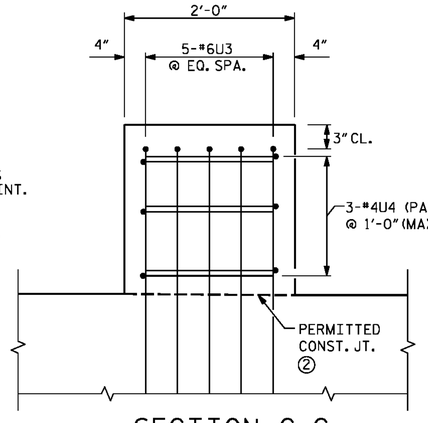
①DOES NOT INCLUDE CONCRETE POSTS



SECTION A-A

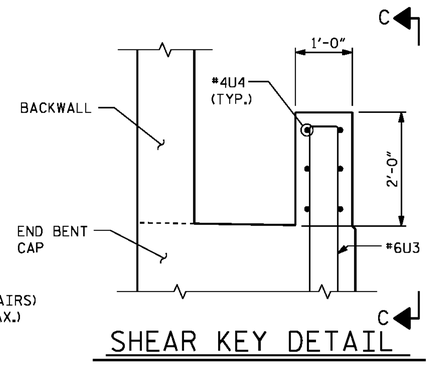


SECTION B-B



SECTION C-C

② TOP SURFACE OF PERMITTED CONST. JT. SHALL BE RAKED TO A DEPTH OF ¼"



SHEAR KEY DETAIL

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1
SECTIONS AND DETAILS

DESIGNED BY:	M. WAGNER	DATE :	DEC. 2015
DRAWN BY:	B. CALDWELL	DATE :	DEC. 2015
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-150
1			3			TOTAL SHEETS
2			4			278

5/10/2016
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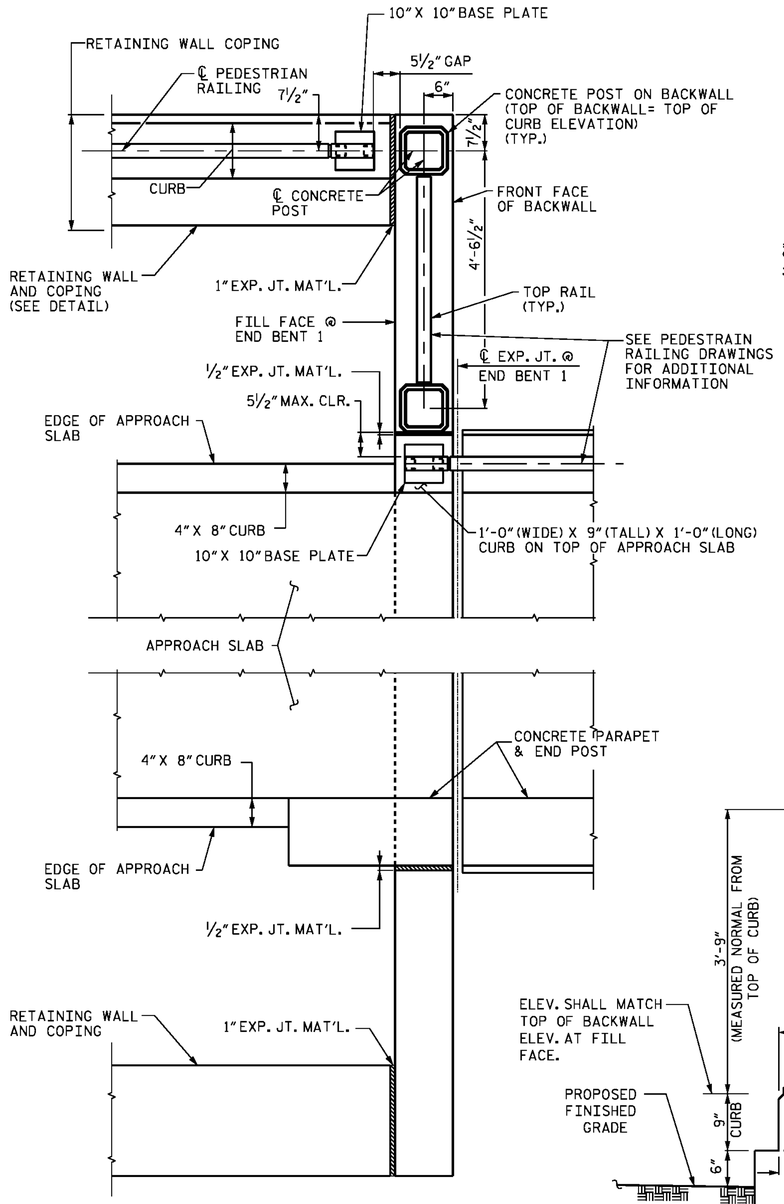
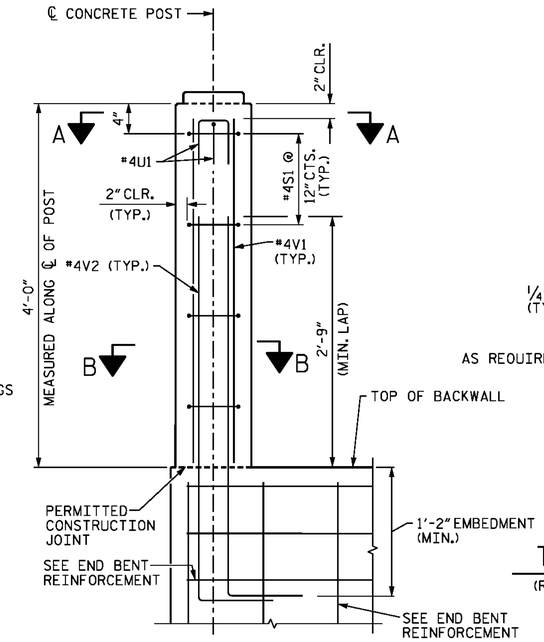
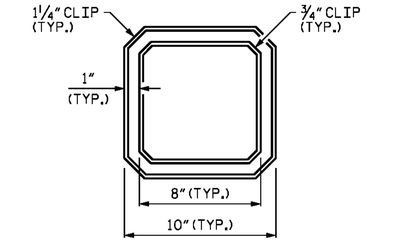


PLAN AT END BENT 1

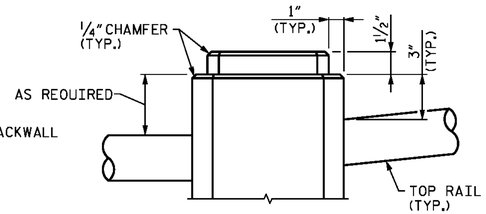
(PEDESTRIAN HANDRAIL MOUNTED ON BACKWALL AND COPING)



TYPICAL ELEVATION



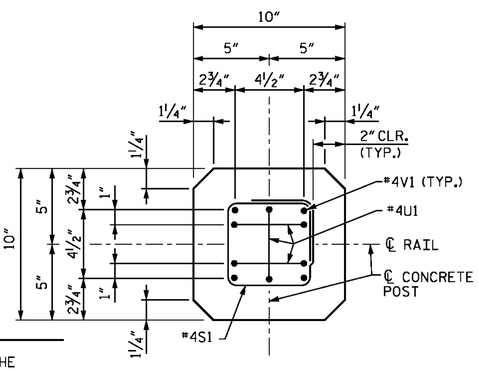
PLAN



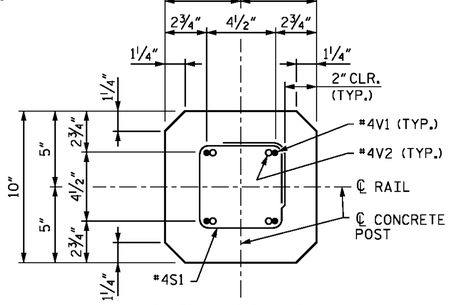
ELEVATION

TOP OF CONCRETE POST

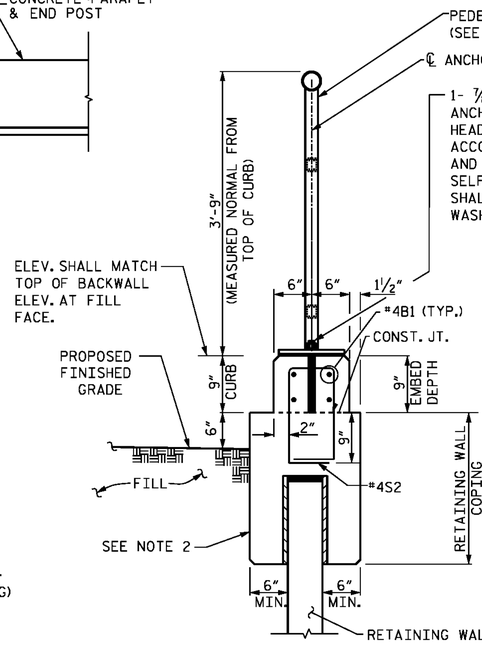
(REINFORCEMENT AND TOP RAIL CONNECTION ℄ NOT SHOWN FOR CLARITY)



SECTION A-A



SECTION B-B



PEDESTRIAN HANDRAIL MOUNTED ON RETAINING WALL COPING

(ADHESIVE ANCHOR BOLTS SHOWN, CAST-IN-PLACE ANCHOR BOLTS SIMILAR)

NOTES

1. THE CONTRACTOR IS PERMITTED TO SHIFT THE POSITION OF CONCRETE CURB REINFORCEMENT BY 2" MAXMIUM TO AVOID ANY CONFLICTS WITH THE REINFORCING STEEL FROM THE CONCRETE POST.
2. WALL MANUFACTURER SHALL BE RESPONSIBLE FOR THE DESIGN OF THE COPING AND THE CONNECTION BETWEEN THE COPING AND RETAINING WALL TO MEET ALL REQUIREMENTS PER CURRENT AASHTO LRFD.
3. FOR ADDITIONAL DETAILS AND NOTES SEE PEDESTRIAN RAILING DRAWINGS.
4. ANCHOR BOLT NUTS SHALL BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.
5. THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN LIEU OF THE CAST-IN ANCHOR BOLTS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ⅞"Ø ANCHOR BOLT IS 21.6 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.
6. IF CONTRACTOR ELECTS TO USE ADHESIVELY ANCHORED ANCHOR BOLTS AS SHOWN IN DETAIL, THE ADHESIVE MATERIAL SHALL SATISFY THE NCDOT STANDARD SPECIFICATIONS AND SHALL HAVE MINIMUM CHARACTERISTIC BOND STRENGTH, τ_{CR} OF 1000 PSI.

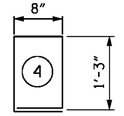
BILL OF MATERIAL Ⓐ (30' SECTION OF CURB)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
✳B1	4	#4	STR	29'-6"	79
✳S2	30	#4	4	4'-6"	90

✳EPOXY COATED REINFORCING STEEL LBS. 169

CLASS AA CONCRETE: C.Y. 0.9

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

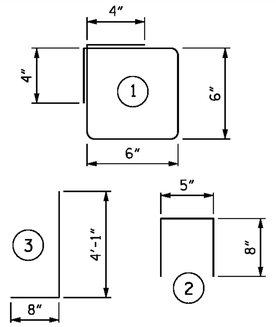
BILL OF MATERIAL (1 POST)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
✳S1	4	#4	1	2'-8"	7
✳U1	3	#4	2	1'-9"	4
✳V1	4	#4	STR	3'-8"	10
✳V2	4	#4	3	4'-9"	13

✳EPOXY COATED REINFORCING STEEL LBS. 34.0

CLASS AA CONCRETE: C.Y. 0.1

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

Ⓐ BILL OF MATERIAL FOR CURB IS BASED ON A 30'-0" SECTION OF CURB. SHORTER SECTIONS OF CURB ARE ALLOWED PROVIDED A MINIMUM OF 2" CLEAR IS PROVIDED TO THE REINFORCING STEEL ON ALL FACES OF THE CURB AND NO SECTION OF CURB IS LESS THAN 10'-0" IN TOTAL LENGTH. 1" OF EXP. JT. MAT'L SHALL BE PROVIDED BETWEEN EACH SECTION OF CURB. EXPANSION JOINTS SHALL CLEAR BASE PLATES FOR PEDESTRIAN RAIL. SEE PEDESTRIAN RAILING RAIL POST SPACING AND PLAN OF CURB DRAWINGS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 1 DETAILS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

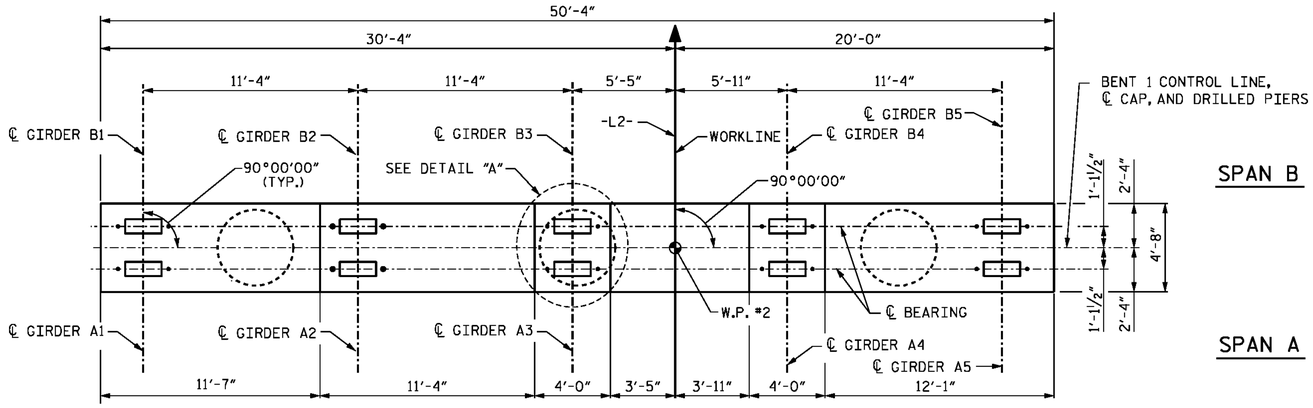
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

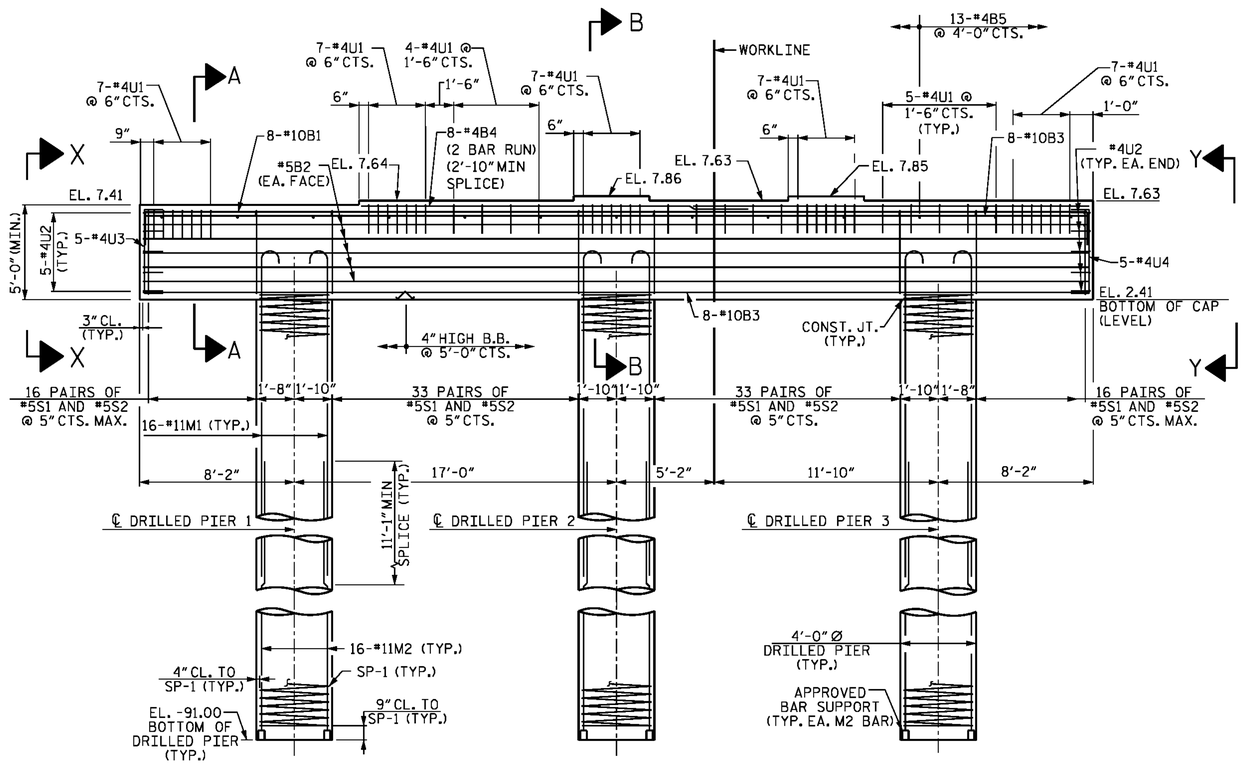
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-151
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	M. WAGNER	DATE : DEC. 2015
DRAWN BY:	B. CALDWELL	DATE : DEC. 2015
CHECKED BY:	J. SHERMAN	DATE : MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

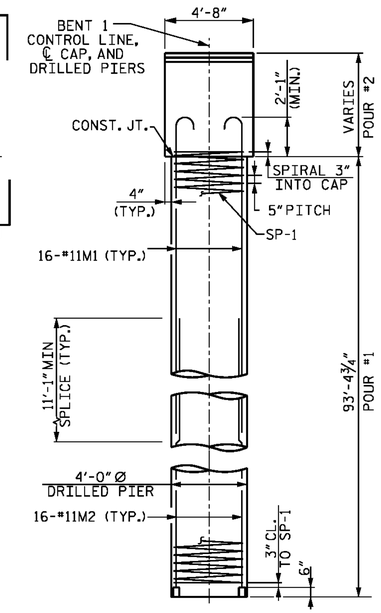
5/10/2016
400_295_B4929_SMU_EB13.dgn



PLAN



ELEVATION



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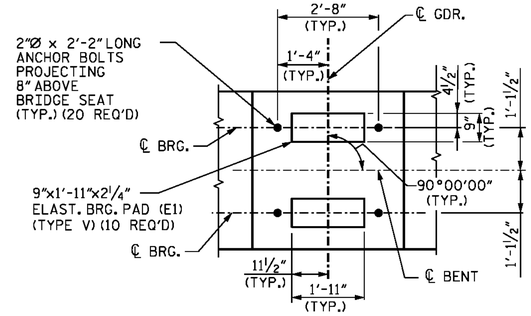

DETAIL "A"

(TYP. AT EACH BEARING)

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS IN #11M1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL. HOOKS MUST BE PLACED SUCH THAT 3" MIN. CONCRETE COVER IS PROVIDED TO THE FACE OF CAP.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR SECTIONS A-A AND B-B AND VIEWS X-X AND Y-Y SEE SHEET 2 OF 2.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 1

PLAN AND ELEVATION

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

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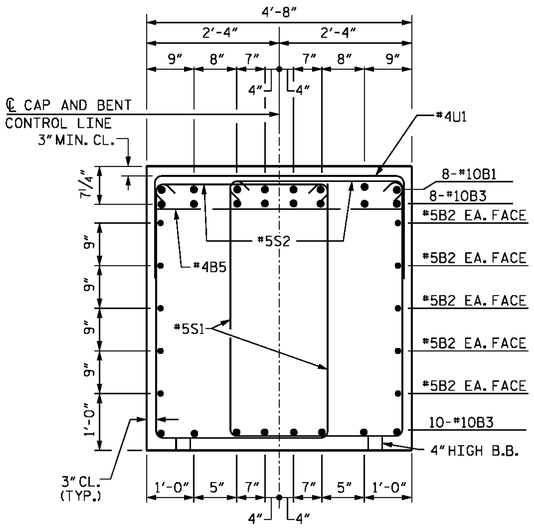
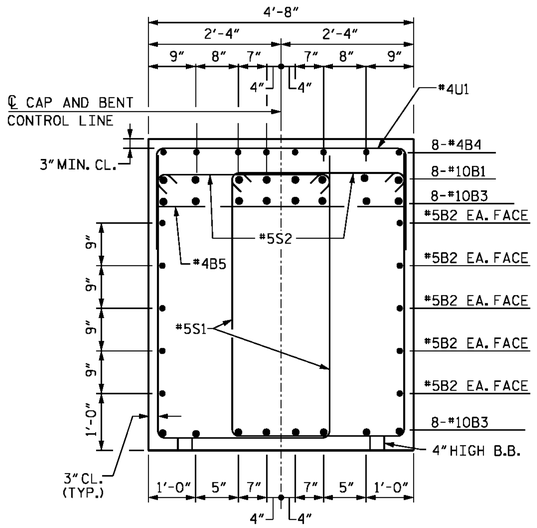
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-152
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	MJW/AMD	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	FEB. 2016
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

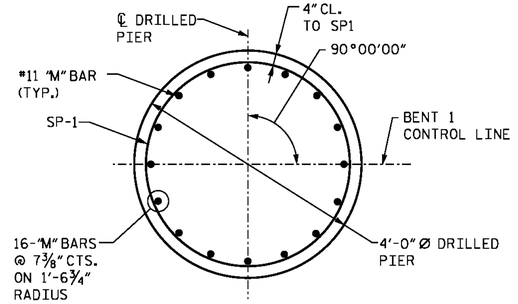
5/12/2016
400_297_B4929_SMU_IB11.dgn



SECTION A-A



SECTION B-B



DRILLED PIER DETAIL

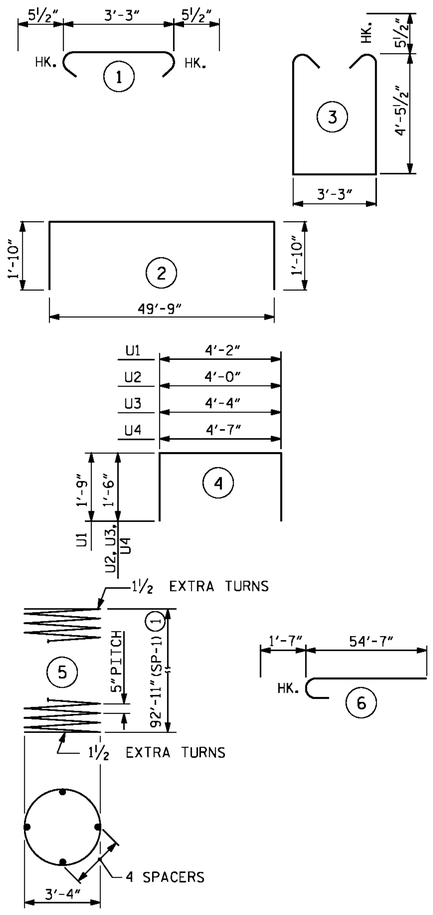
VIEW X-X

VIEW Y-Y

PLAN OF DRILLED PIERS

(REINFORCING STEEL ARE TYPICAL FOR EACH DRILLED PIER)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 1

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	2	53'-5	1839
B2	10	#5	STR	49'-6"	516
B3	16	#10	STR	49'-6"	3408
B4	16	#4	STR	20'-7"	220
B5	13	#4	STR	4'-2"	36
M1	48	#11	6	56'-2"	14,324
M2	48	#11	STR	54'-7"	13,920
S1	196	#5	3	13'-1"	2675
S2	196	#5	1	4'-2"	852
U1	49	#4	4	7'-8"	251
U2	10	#4	4	7'-0"	47
U3	5	#4	4	7'-4"	24
U4	5	#4	4	7'-7"	25

EPOXY COATED REINFORCING STEEL	LBS. 38,137

SP1	3	*	5	2341'-11"	7328

EPOXY COATED SPIRAL REINFORCING STEEL	LBS. 7328
CLASS "AA" CONCRETE BREAKDOWN	
POUR #2 - CAP	45.7 C.Y.
CLASS "AA" CONCRETE	45.7 C.Y.

DRILLED PIER QUANTITIES

POUR #1 - DRILLED PIER CONCRETE	130.4 C.Y.
4'-0" Ø DRILLED PIERS	280.2 L.F.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	52.2 L.F.
SPT TESTING	1 EA.
SID INSPECTIONS	1 EA.
CSL TUBES	1140 L.F.

* THE SP-1 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

(1) CONTRACTOR MAY PROVIDE 3'-0" MIN. SPLICE AT MID HIEGHT OF EPOXY COATED SPIRAL REINFORCING STEEL. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR SPLICES.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
BENT 1
SECTIONS AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-153
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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DESIGNED BY:	MJW/AMD	DATE :	JAN. 2016
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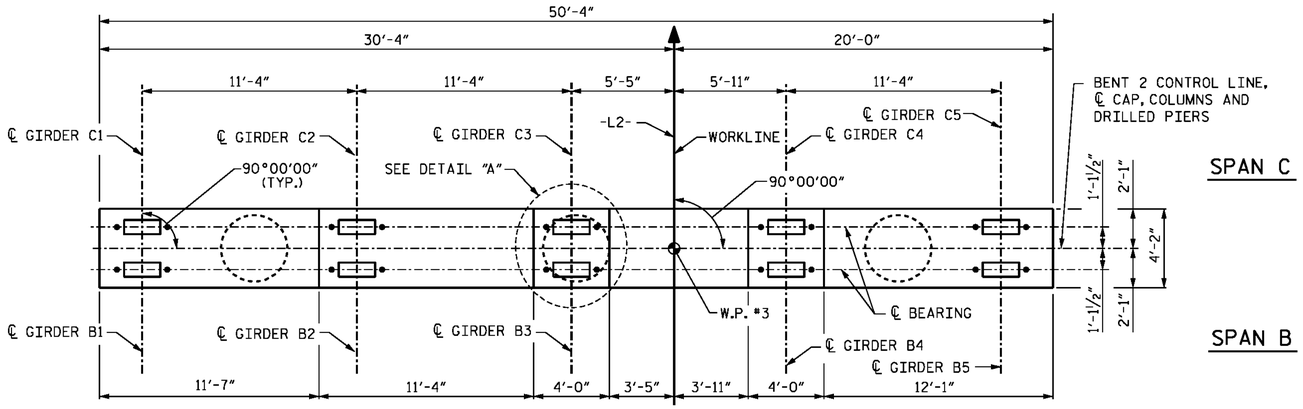
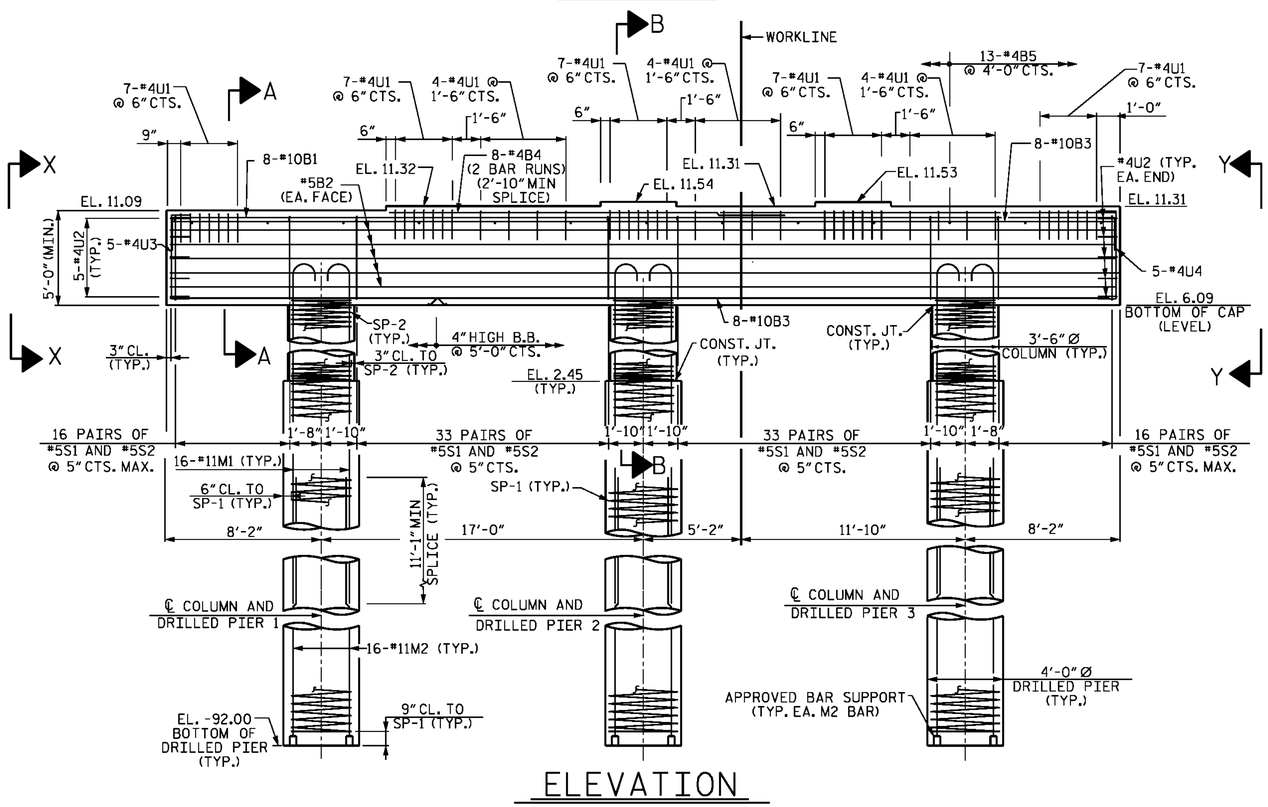
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

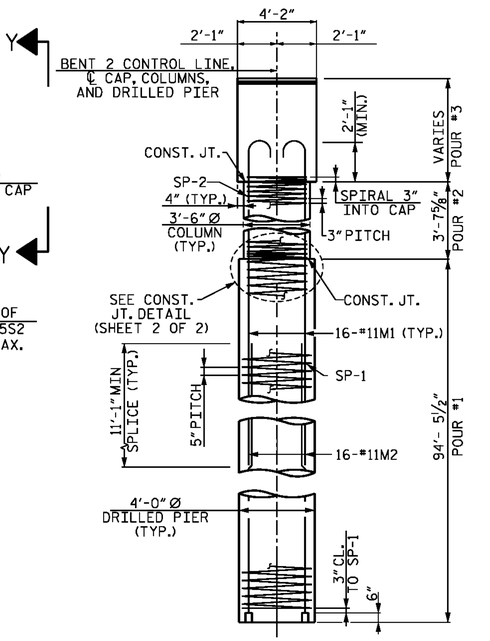
5/10/2016
400.299_B4929_SMU_IB12.dgn



PLAN



ELEVATION



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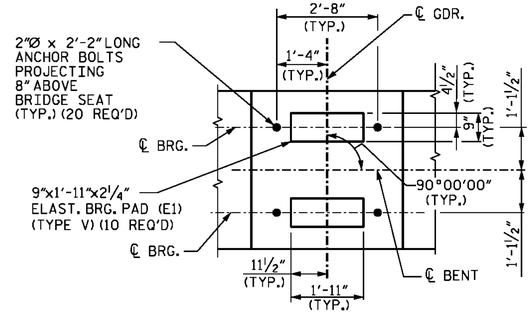

DETAIL "A"

(TYP. AT EACH BEARING)

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS IN #11M1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL. HOOKS MUST BE PLACED SUCH THAT 3" MIN. CONCRETE COVER IS PROVIDED TO THE FACE OF CAP.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR SECTIONS A-A AND B-B AND VIEWS X-X AND Y-Y SEE SHEET 2 OF 2.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

DESIGNED BY:	MJW/AMD	DATE :	JAN. 2016		
DRAWN BY:	B. CALDWELL	DATE :	FEB. 2016		
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

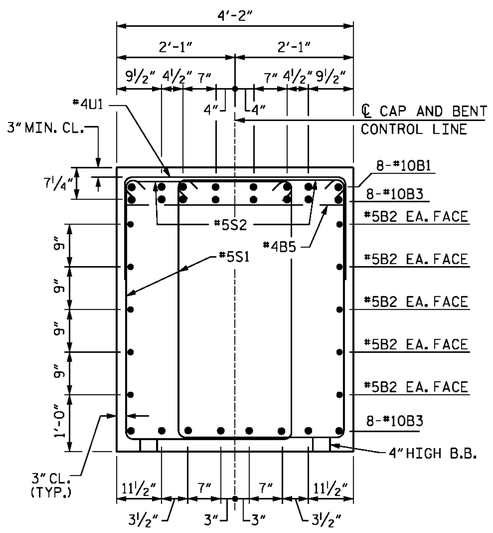
SUBSTRUCTURE

BENT 2

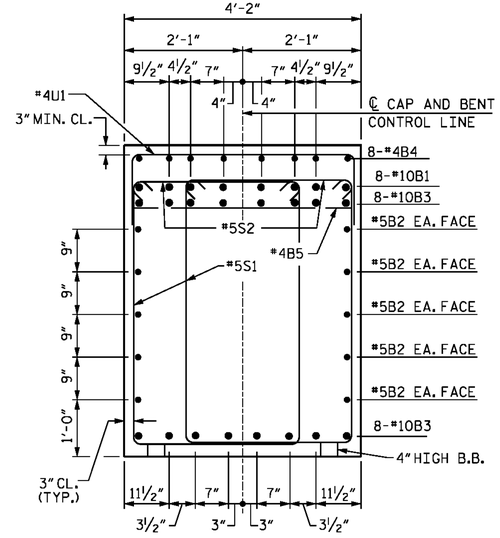
PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-154
1			3			TOTAL SHEETS
2			4			278

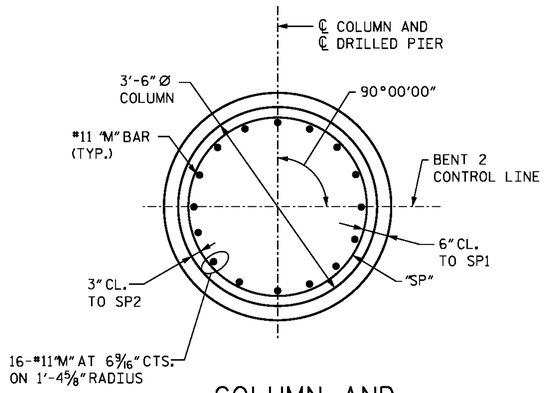
5/12/2016
400.301_B4929_SMU_IB21.dgn



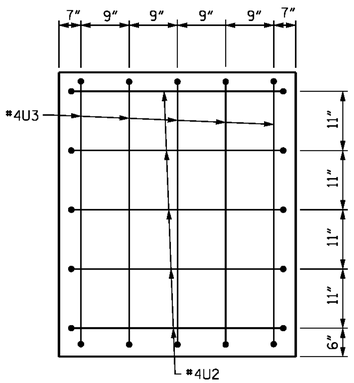
SECTION A-A



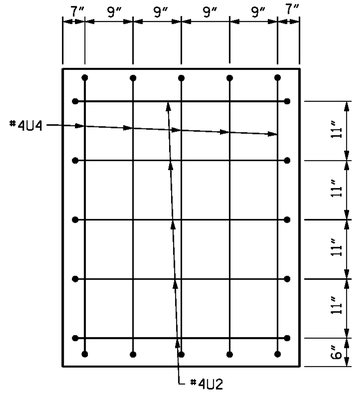
SECTION B-B



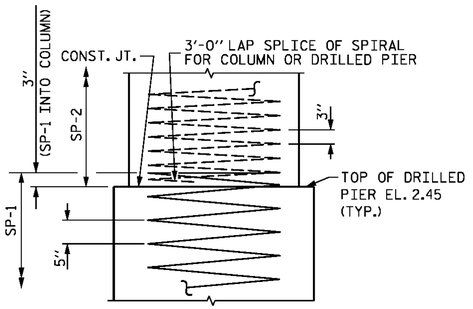
COLUMN AND DRILLED PIER DETAIL



VIEW X-X

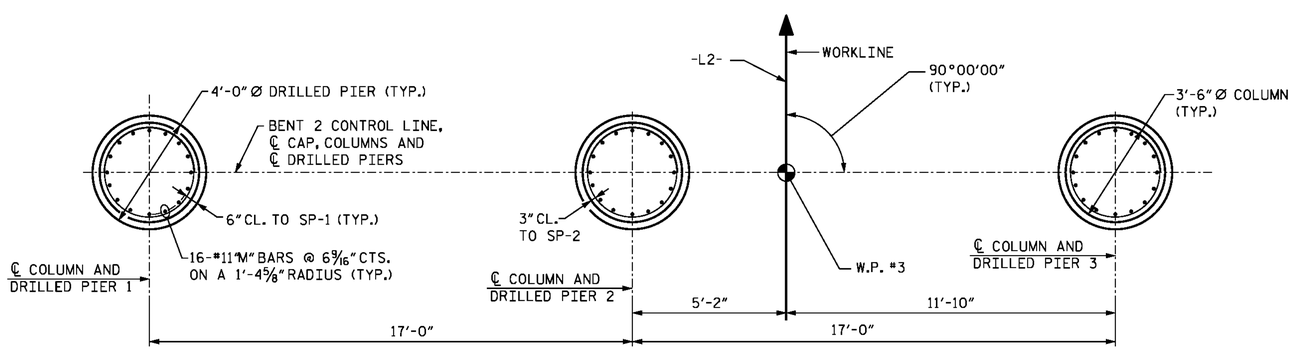


VIEW Y-Y



CONSTRUCTION JOINT DETAIL

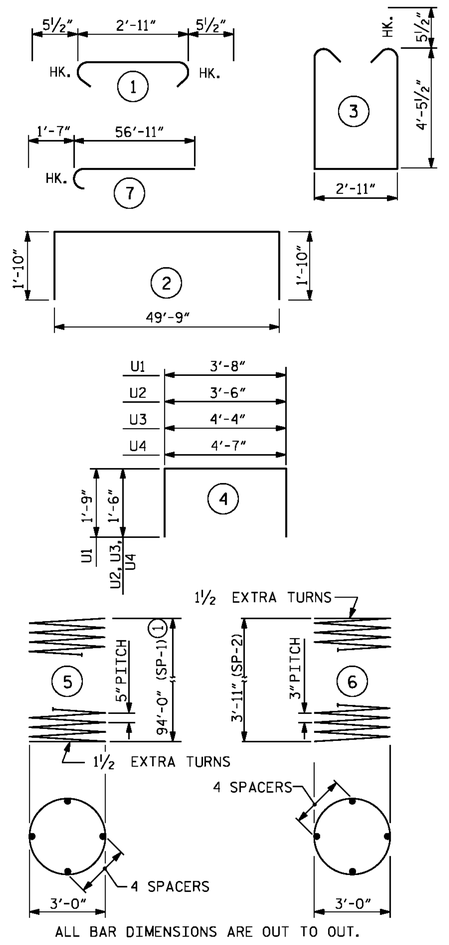
"M" BARS NOT SHOWN FOR CLARITY



PLAN OF COLUMNS AND DRILLED PIERS

(REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 2

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	2	53'-5"	1839
B2	10	#5	STR	49'-6"	516
B3	16	#10	STR	49'-6"	3408
B4	16	#4	STR	20'-7"	220
B5	13	#4	STR	3'-8"	32
M1	48	#11	7	58'-6"	14,919
M2	48	#11	STR	56'-11"	14,515
S1	196	#5	3	12'-9"	2606
S2	196	#5	1	3'-10"	784
U1	47	#4	4	7'-2"	225
U2	10	#4	4	6'-6"	45
U3	5	#4	4	7'-4"	24
U4	5	#4	4	7'-7"	25
SP1	3	*	5	2113'-9"	6614
SP2	3	**	6	167'-5"	336

EPOXY COATED REINFORCING STEEL LBS. 39,158

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 6950

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - COLUMNS	3.9 C.Y.
POUR #3 - CAP	40.8 C.Y.
CLASS "AA" CONCRETE	44.7 C.Y.

DRILLED PIER QUANTITIES

POUR #1 - DRILLED PIER CONCRETE	131.9 C.Y.
4'-0" Ø DRILLED PIERS	283.4 L.F.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	76.4 L.F.
SPT TESTING	1 EA.
SID INSPECTIONS	1 EA.
CSL TUBES	1152 L.F.

** THE SP-2 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

* THE SP-1 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

(1) CONTRACTOR MAY PROVIDE 3'-0" MIN. SPLICE AT MID HEIGHT OF EPOXY COATED SPIRAL REINFORCING STEEL. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR SPLICES.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 2

SECTIONS AND DETAILS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
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DocuSigned by: Jason R Doughty
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1			3			TOTAL SHEETS
2			4			278

DESIGNED BY: MJW/AMD DATE: JAN. 2016
DRAWN BY: B. CALDWELL DATE: FEB. 2016
CHECKED BY: J. SHERMAN DATE: MAR. 2016
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: MAY 2016

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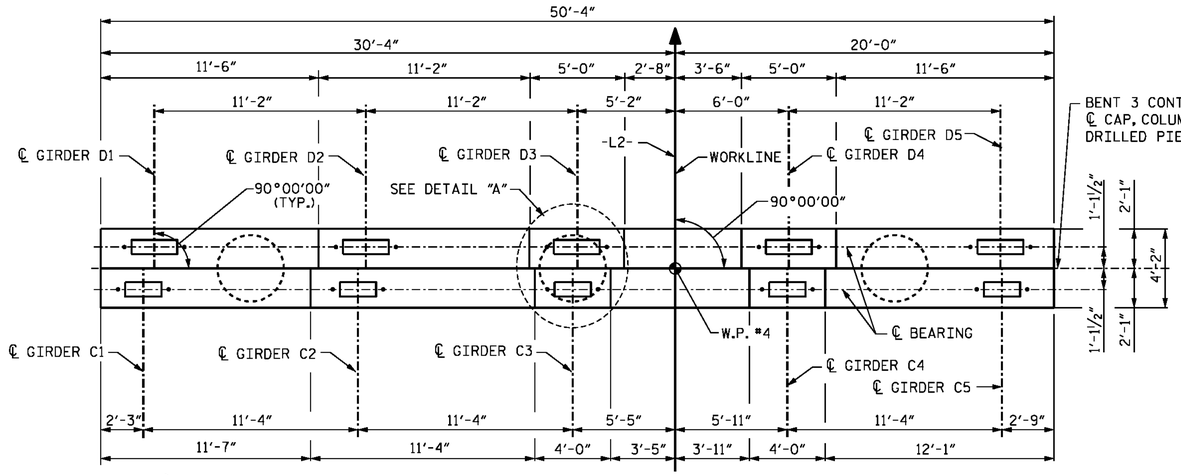
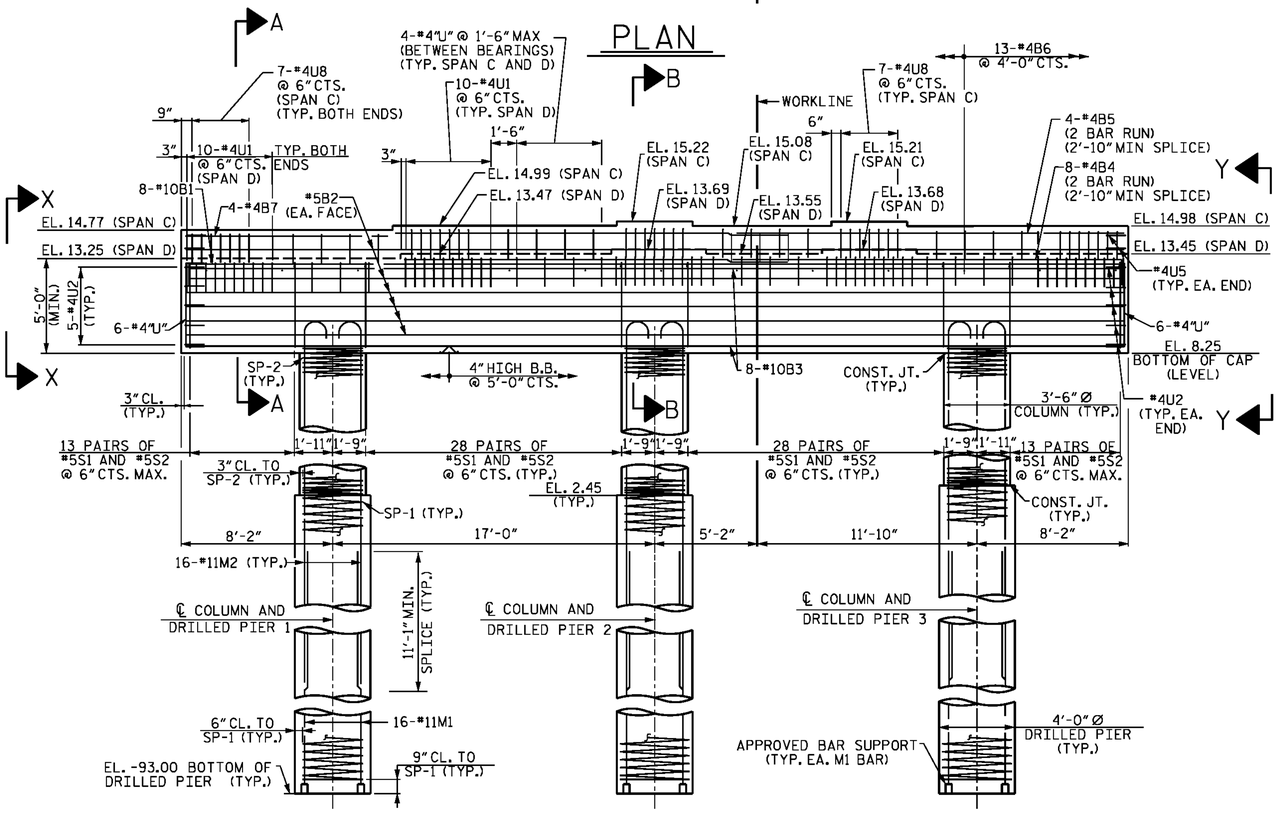
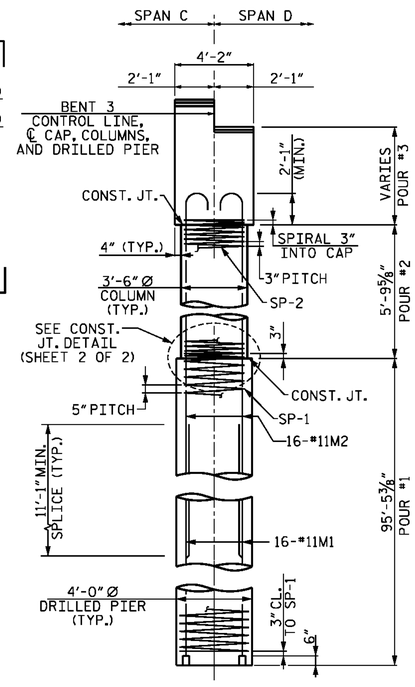


PLAN



ELEVATION



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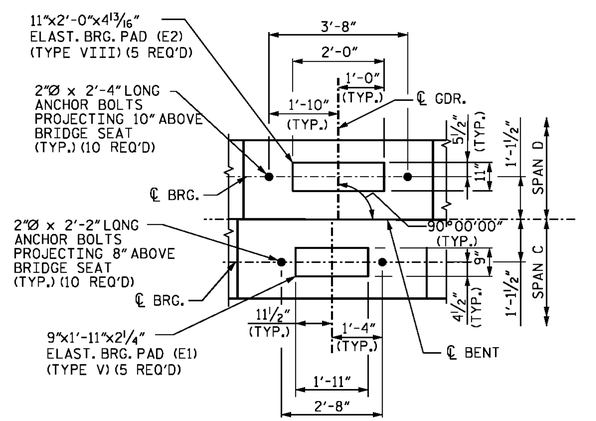

DETAIL "A"

(TYP. AT EACH BEARING)

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS IN #11M2 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL. HOOKS MUST BE PLACED SUCH THAT 3" MIN. CONCRETE COVER IS PROVIDED TO THE FACE OF CAP.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR SECTIONS A-A AND B-B AND VIEWS X-X AND Y-Y SEE SHEET 2 OF 2.

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

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 3

PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-156
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	M. WAGNER	DATE : JAN. 2016
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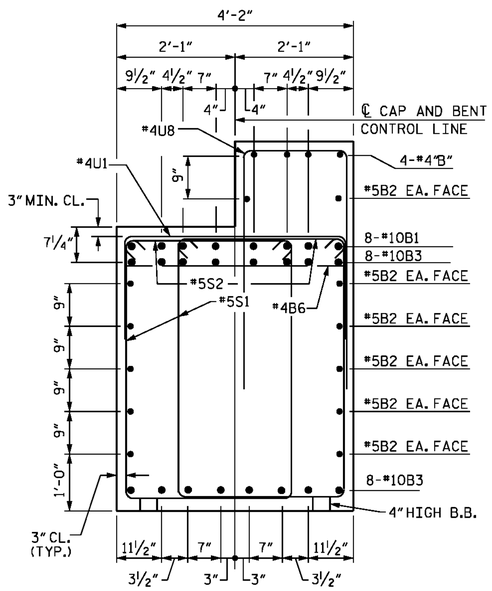
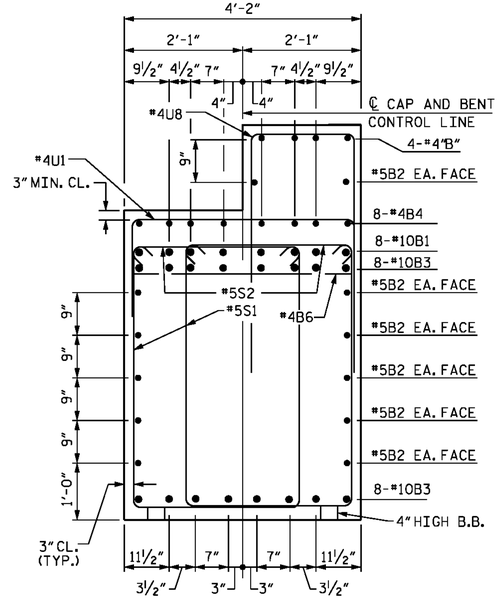
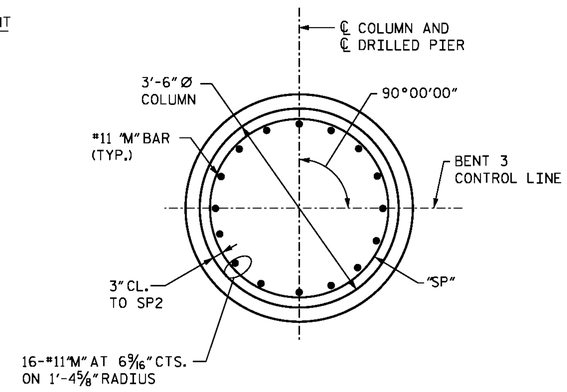


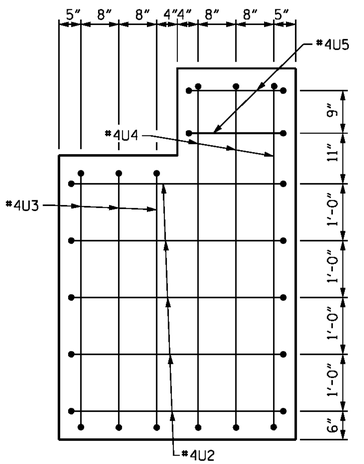
SECTION A-A



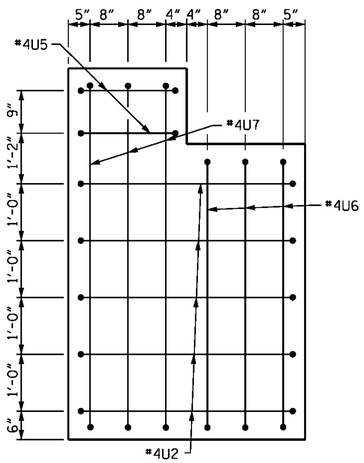
SECTION B-B



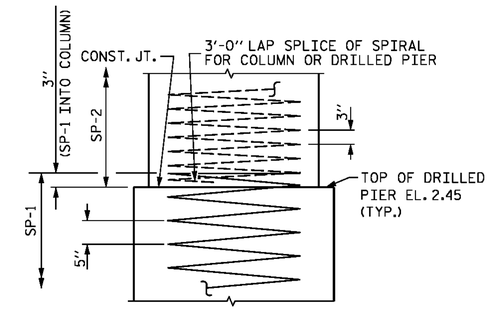
COLUMN AND DRILLED PIER DETAIL



VIEW X-X

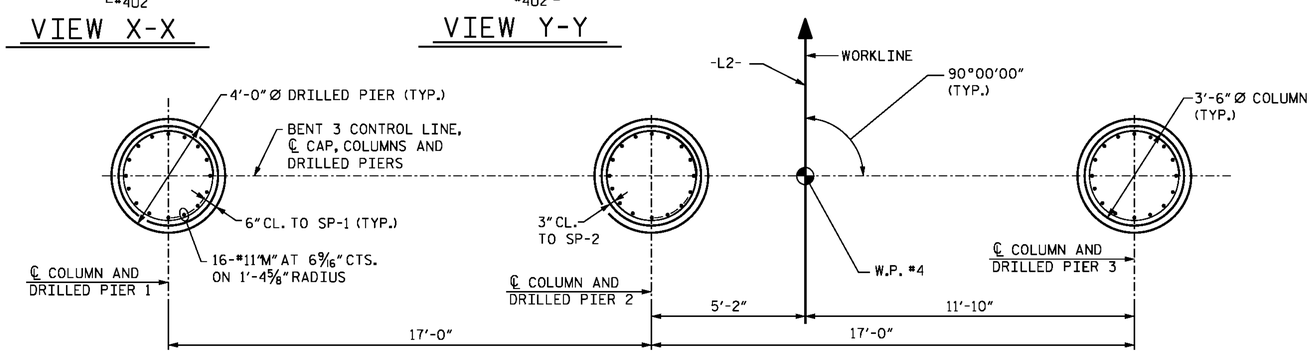


VIEW Y-Y



CONSTRUCTION JOINT DETAIL

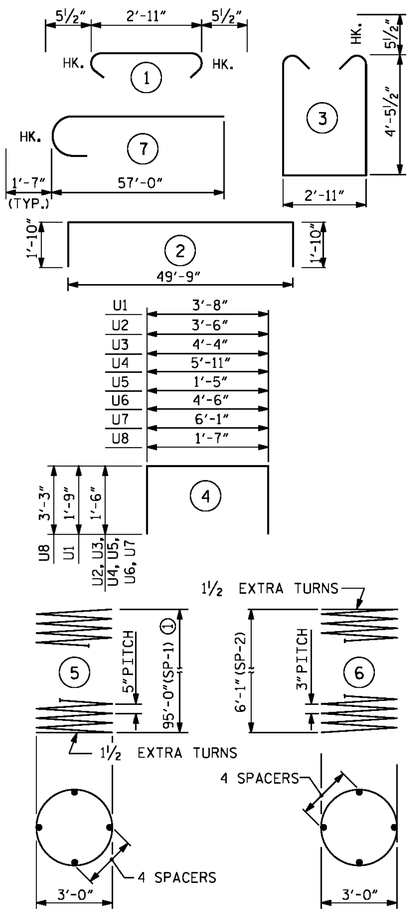
"M" BARS NOT SHOWN FOR CLARITY



PLAN OF COLUMNS AND DRILLED PIERS

(REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 3

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	2	53'-5"	1839
B2	12	#5	STR	49'-6"	620
B3	16	#10	STR	49'-6"	3408
B4	16	#4	STR	20'-7"	220
B5	8	#4	STR	20'-10"	111
B6	13	#4	STR	3'-8"	32
B7	4	#4	STR	11'-3"	30
M1	48	#11	STR	58'-6"	14,919
M2	48	#11	7	58'-7"	14,940
S1	164	#5	3	12'-9"	2181
S2	164	#5	1	3'-10"	656
U1	66	#4	4	7'-2"	316
U2	10	#4	4	6'-6"	43
U3	3	#4	4	7'-4"	15
U4	3	#4	4	8'-11"	18
U5	4	#4	4	4'-5"	12
U6	3	#4	4	7'-6"	15
U7	3	#4	4	9'-1"	18
U8	51	#4	4	8'-1"	275

EPOXY COATED REINFORCING STEEL — LBS. 39,668

SP1	3	*	5	2132'-3"	6672
SP2	3	**	6	251'-1"	503

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL — LBS. 7175

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - COLUMNS	6.2 C.Y.
POUR #3 - CAP	46.7 C.Y.
CLASS "AA" CONCRETE	52.9 C.Y.

DRILLED PIER QUANTITIES

POUR #1 - DRILLED PIER CONCRETE	133.2 C.Y.
4'-0" Ø DRILLED PIERS	286.4 L.F.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	91.4 L.F.
SPT TESTING	1 EA.
SID INSPECTIONS	1 EA.
CSL TUBES	1164 L.F.

** THE SP-2 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

* THE SP-1 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR,

①CONTRACTOR MAY PROVIDE 3'-0" MIN SPLICE AT MID HEIGHT OF EPOXY COATED SPIRAL REINFORCING STEEL. NO ADDITONAL PAYMENT WILL BE PROVIDE FOR SPLICES.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
BENT 3

SECTIONS AND DETAILS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

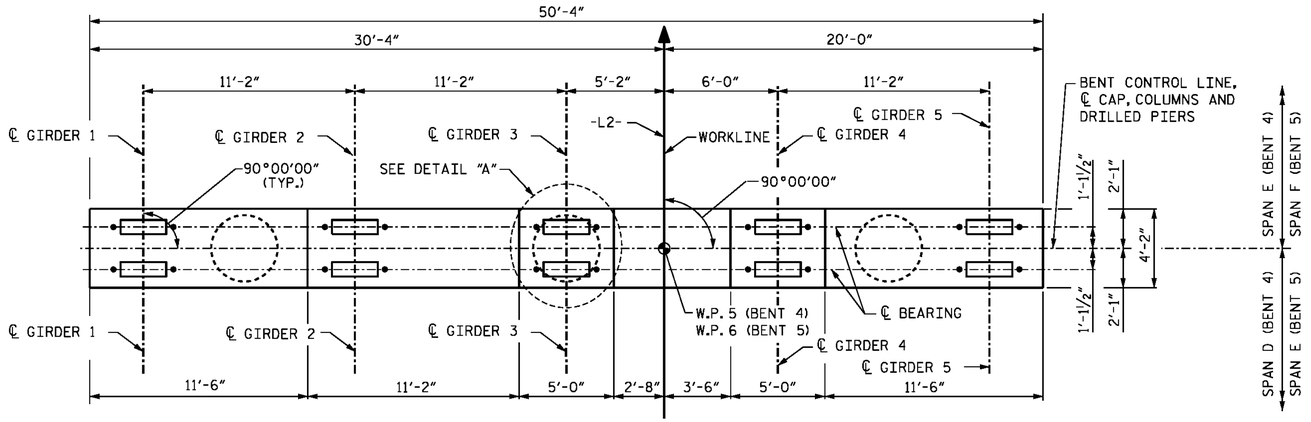
DocuSigned by: Jason R Doughty
00F1C864482274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-157
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	M. WAGNER	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	FEB. 2016
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400.307_B4929_SMU_IB32.dgn



BENTS 4 AND 5		
	BENT 4	BENT 5
EL. "A"	18.85	24.37
EL. "B"	19.08	24.60
EL. "C"	19.30	24.82
EL. "D"	19.15	24.68
EL. "E"	19.28	24.80
EL. "F"	19.06	24.58
EL. "G"	13.85	19.37
DIM. "A"	11'-4¾"	16'-11"

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS IN #11V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

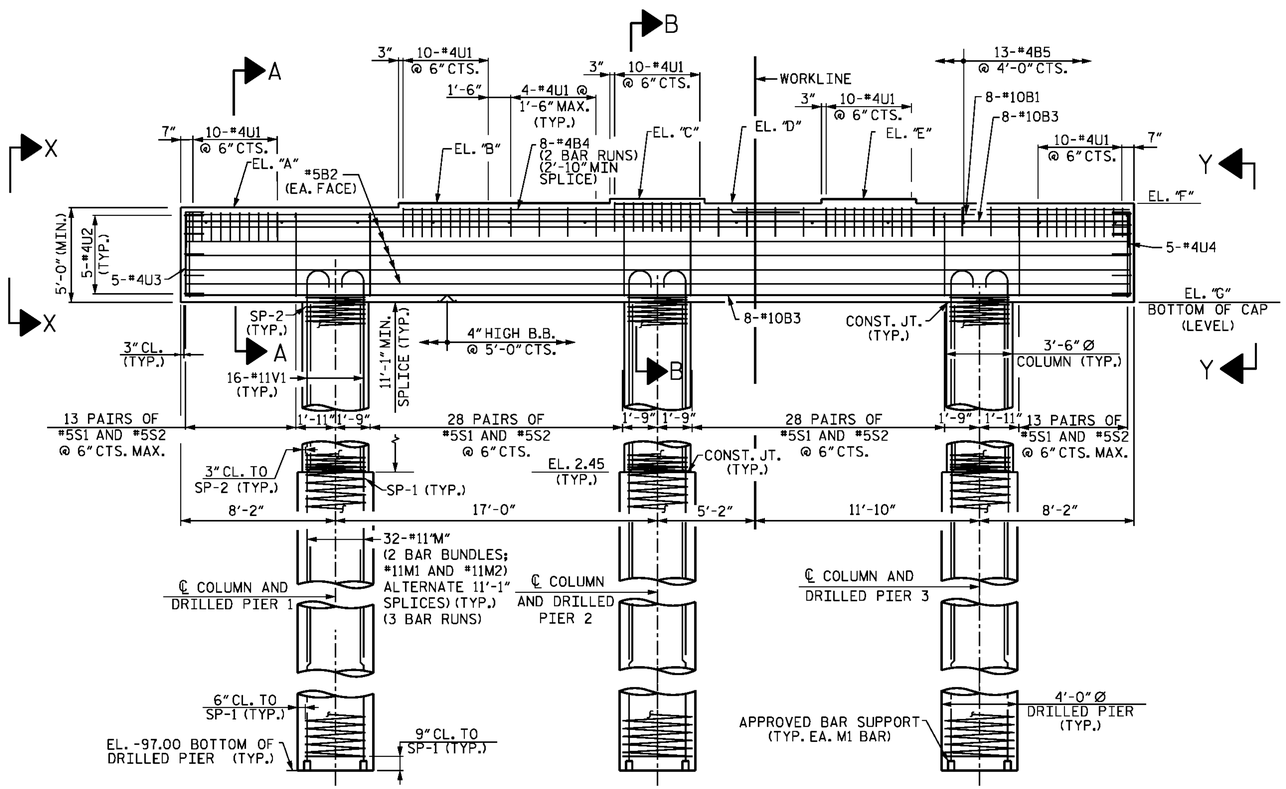
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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

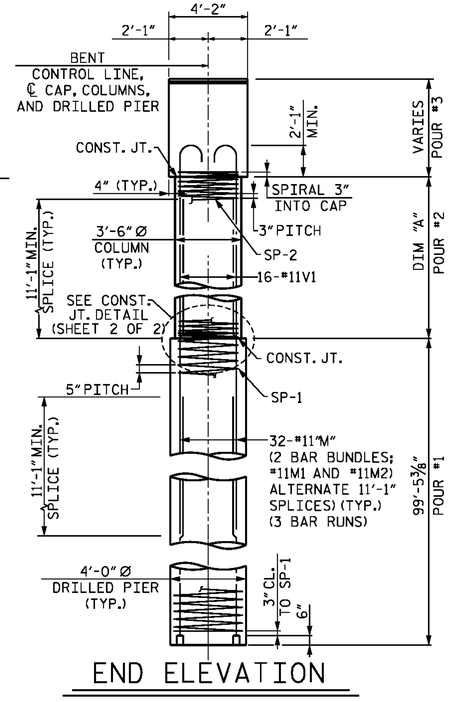
NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR SECTIONS A-A AND B-B AND VIEWS X-X AND Y-Y SEE SHEET 2 OF 2.

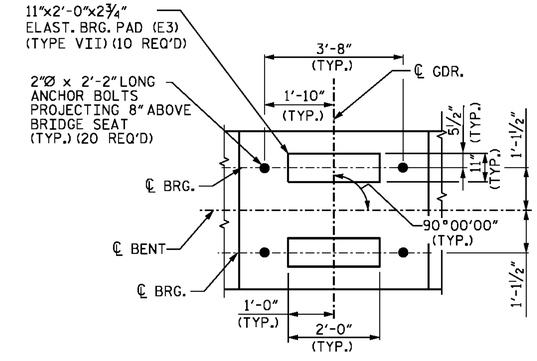
PLAN



ELEVATION



END ELEVATION



DETAIL "A"

(TYP. AT EACH BEARING)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 4 & 5

PLAN AND ELEVATION

DESIGNED BY:	M. WAGNER	DATE : JAN. 2016
DRAWN BY:	B. CALDWELL	DATE : FEB. 2016
CHECKED BY:	J. SHERMAN	DATE : MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

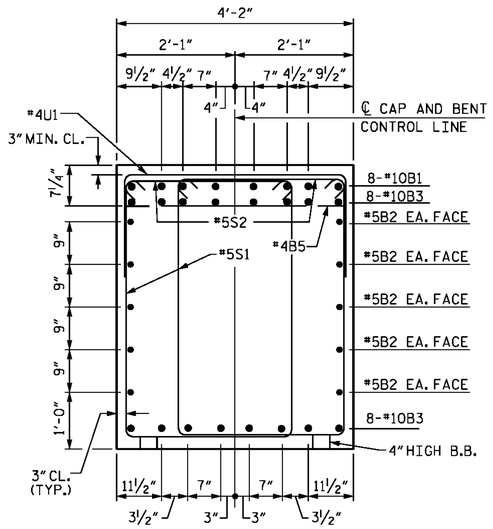
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

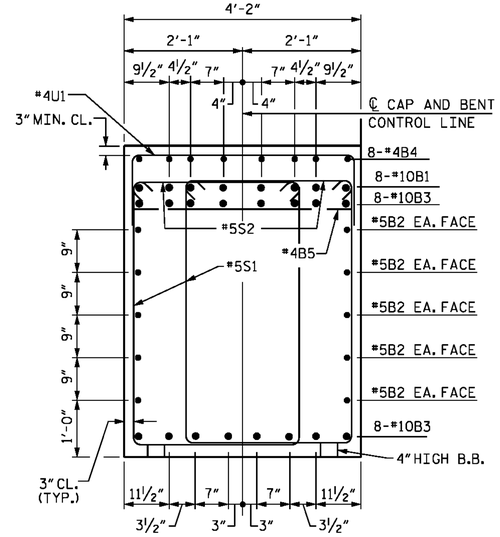
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-158
1			3			TOTAL SHEETS
2			4			278

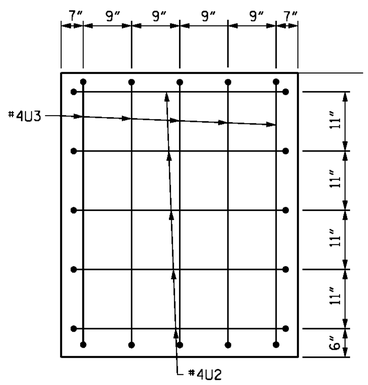
5/12/2016
400_309_B4929_SMU_IB4-51.dgn



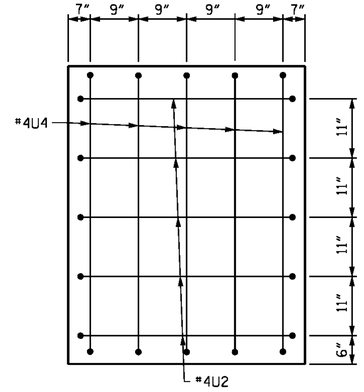
SECTION A-A



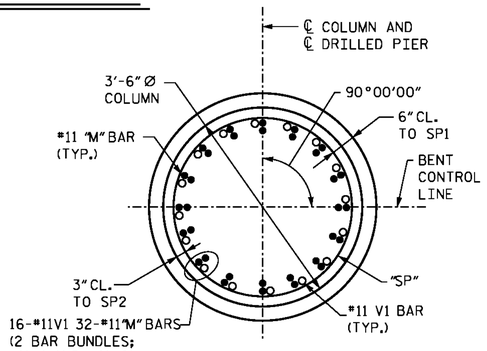
SECTION B-B



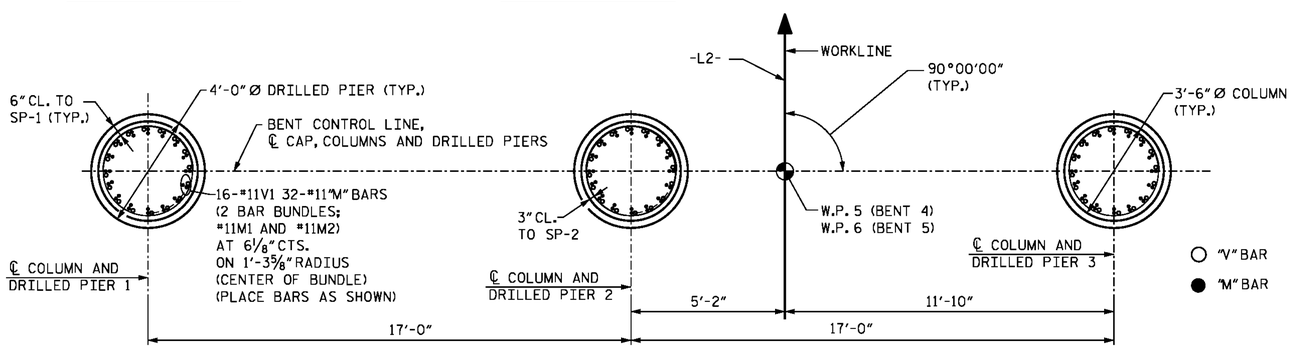
VIEW X-X



VIEW Y-Y



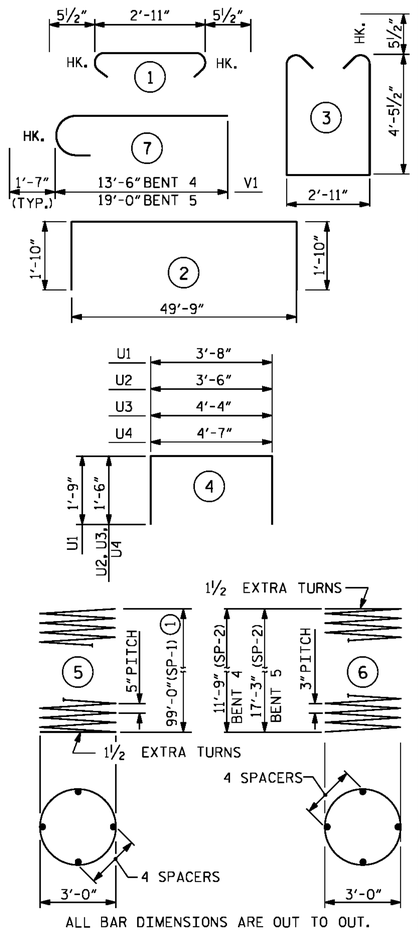
COLUMN AND DRILLED PIER DETAIL



PLAN OF COLUMNS AND DRILLED PIERS

(REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL — BENT 4

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	2	53'-5"	1839
B2	10	#5	STR	49'-6"	516
B3	16	#10	STR	49'-6"	3408
B4	16	#4	STR	20'-7"	220
B5	13	#4	STR	3'-8"	32
M1	96	#11	STR	25'-4"	12,921
M2	192	#11	STR	55'-4"	56,445
S1	164	#5	3	12'-9"	2181
S2	164	#5	1	3'-10"	656
U1	62	#4	4	7'-2"	297
U2	10	#4	4	6'-6"	43
U3	5	#4	4	7'-4"	24
U4	5	#4	4	7'-7"	25
V1	48	#11	7	15'-1"	3847

EPOXY COATED REINFORCING STEEL LBS. 82,454

SP1	3	*	5	2225'-0"	6962
SP2	3	**	6	456'-0"	914

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 7876

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - COLUMNS	12.2 C.Y.
POUR #3 - CAP	40.8 C.Y.
CLASS "AA" CONCRETE	53.0 C.Y.

DRILLED PIER QUANTITIES

POUR #1 - DRILLED PIER CONCRETE	138.9 C.Y.
4'-0" Ø DRILLED PIERS	298.3 L.F.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	76.4 L.F.
SPT TESTING	1 EA.
SID INSPECTIONS	1 EA.
CSL TUBES	1212 L.F.

BILL OF MATERIAL — BENT 5

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	2	53'-5"	1839
B2	10	#5	STR	49'-6"	516
B3	16	#10	STR	49'-6"	3408
B4	16	#4	STR	20'-7"	220
B5	13	#4	STR	3'-8"	32
M1	96	#11	STR	25'-4"	12,921
M2	192	#11	STR	55'-4"	56,445
S1	164	#5	3	12'-9"	2181
S2	164	#5	1	3'-10"	656
U1	62	#4	4	7'-2"	297
U2	10	#4	4	6'-6"	43
U3	5	#4	4	7'-4"	24
U4	5	#4	4	7'-7"	25
V1	48	#11	7	20'-7"	5249

EPOXY COATED REINFORCING STEEL LBS. 83,856

SP1	3	*	5	2225'-0"	6962
SP2	3	**	6	660'-0"	1323

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 8285

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - COLUMNS	18.1 C.Y.
POUR #3 - CAP	40.8 C.Y.
CLASS "AA" CONCRETE	58.9 C.Y.

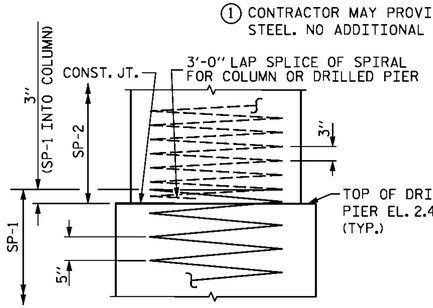
DRILLED PIER QUANTITIES

POUR #1 - DRILLED PIER CONCRETE	138.9 C.Y.
4'-0" Ø DRILLED PIERS	298.3 L.F.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	53.4 L.F.
SPT TESTING	1 EA.
SID INSPECTIONS	1 EA.
CSL TUBES	1212 L.F.

** THE SP-2 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

* THE SP-1 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR,

(1) CONTRACTOR MAY PROVIDE 3'-0" MIN. SPLICE AT MID HEIGHT OF EPOXY COATED SPIRAL REINFORCING STEEL. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR SPLICES.



CONSTRUCTION JOINT DETAIL

"M" AND "V" BARS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 4 AND 5

SECTIONS AND DETAILS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

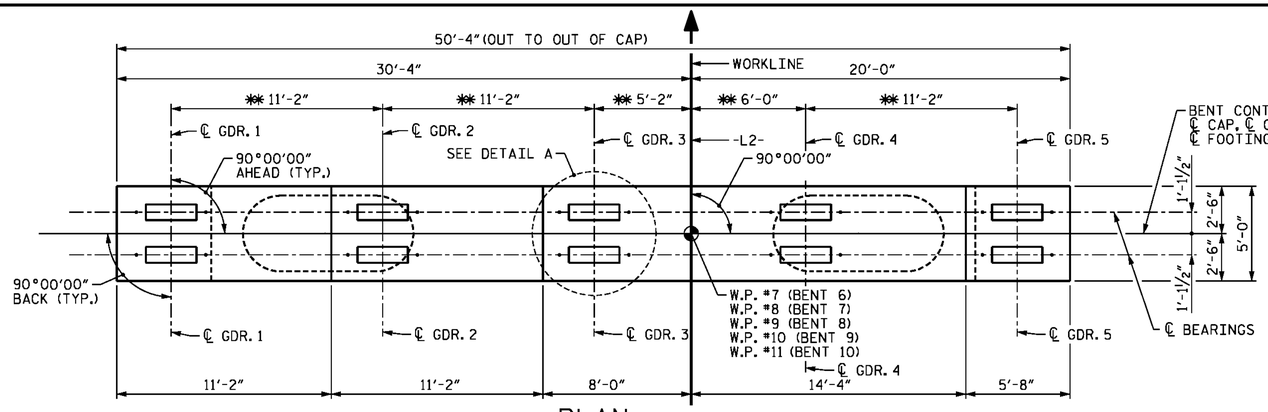
DocuSigned by: Jason R Doughty 00F1C8644B274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-159
1			3			TOTAL SHEETS
2			4			278

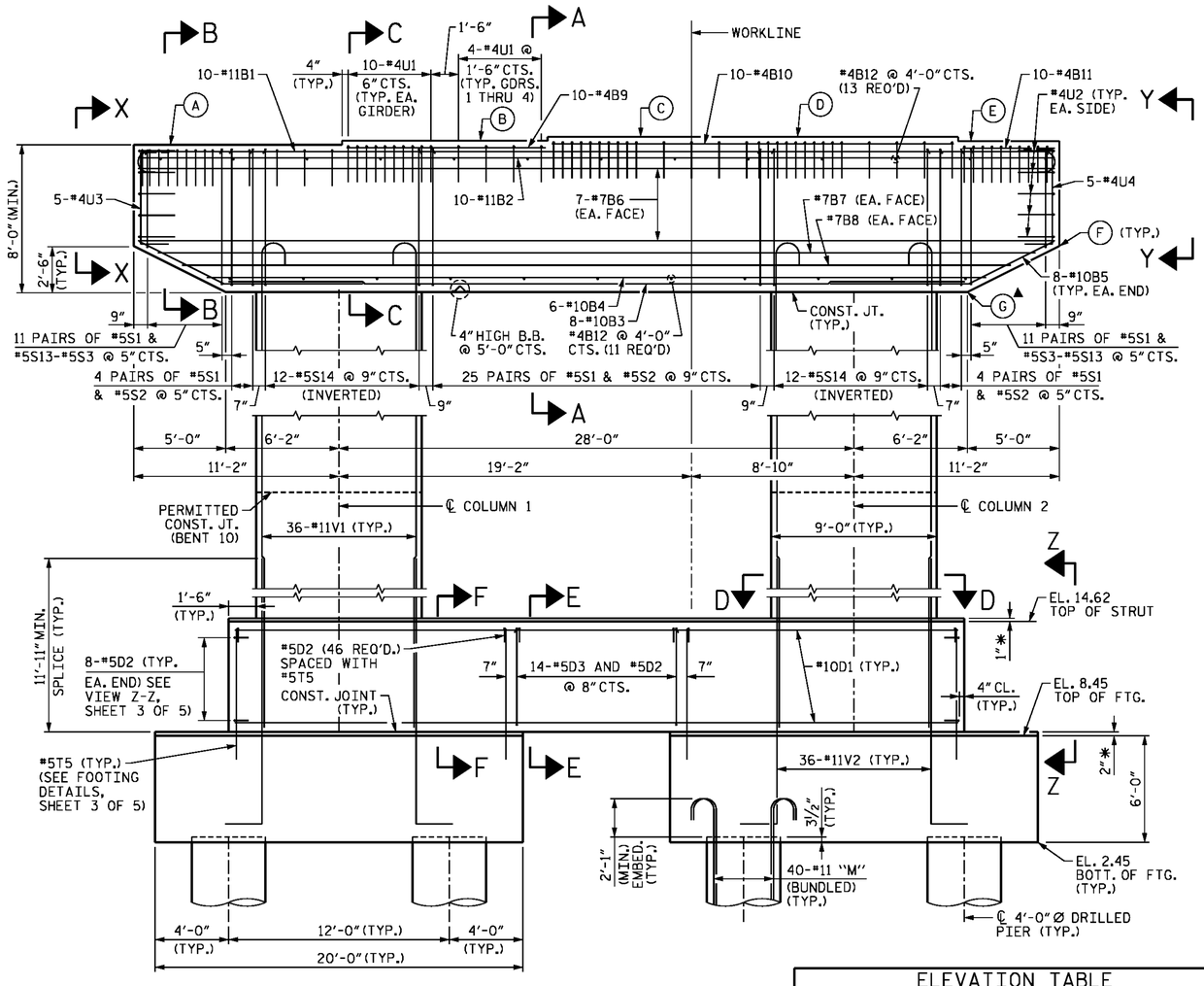
DESIGNED BY:	M. WAGNER	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	FEB. 2016
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_311_B4929_SMU_IB4-52.dgn



PLAN

✱✱ MEASURED ALONG BENT CONTROL LINE



ELEVATION

FOOTING REINFORCEMENT NOT SHOWN FOR CLARITY, SEE SHEET 3 OF 5.

ELEVATION TABLE							
BENT	A	B	C	D	E	F	G▲
6	29.72	29.94	30.15	30.15	29.92	24.22	21.72
7	33.57	33.80	34.00	34.00	33.78	28.07	25.57
8	37.25	37.47	37.68	37.68	37.46	31.75	29.25
9	40.93	41.15	41.36	41.36	41.14	35.43	32.93
10	46.27	46.50	46.70	46.70	46.48	40.77	38.27

▲BOTTOM OF CAP LEVEL

BAR QUANTITY	
LOCATION	QUANTITY "A"
BENT 6 COLUMN 1	27
BENT 6 COLUMN 2	27
BENT 7 COLUMN 1	34
BENT 7 COLUMN 1	34
BENT 8 COLUMN 1	42
BENT 8 COLUMN 2	42
BENT 9 COLUMN 1	49
BENT 9 COLUMN 2	49

NOTES:

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

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

"T" BARS IN FOOTING MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN AND DRILLED PIER REINFORCEMENT.

FOR FOUNDATION NOTES, SEE "FOUNDATION NOTES" SHEET.

FOR SECTIONS AND VIEWS, SEE SHEET 2 OF 5 AND SHEET 3 OF 5.

FOR FOOTING AND DRILLED PIER REINFORCING DETAILS, SEE SHEET 3 OF 5 AND SHEET 4 OF 5.

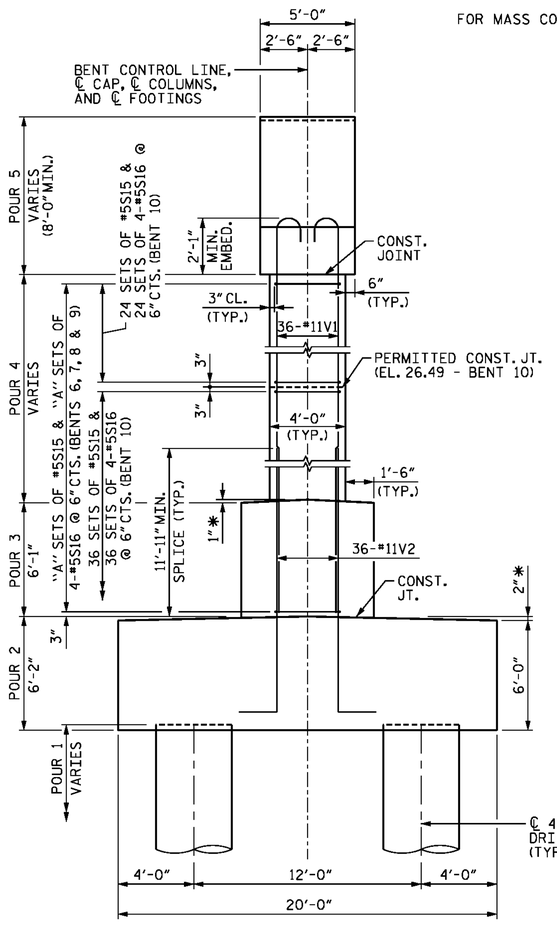
✱ FOOTING AND STRUT ARE SLOPED TO DRAIN.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

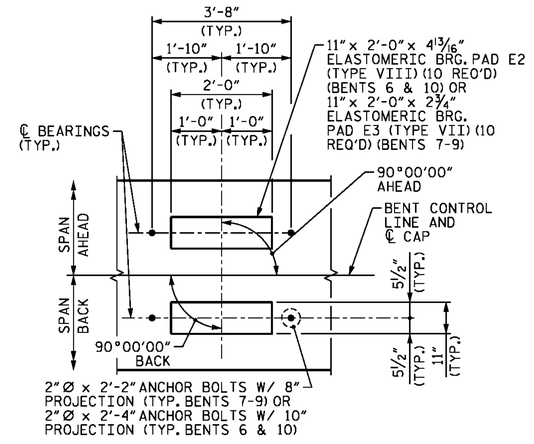
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS ARE DETAILED WITH 3 FEET OF EXTRA LENGTH.

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.



END VIEW



DETAIL A

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 6 THROUGH 10 PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-160
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. BORUTA	DATE : MAR 2016
DRAWN BY:	MAH/KEW	DATE : MAR 2016
CHECKED BY:	J. DOUGHTY	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

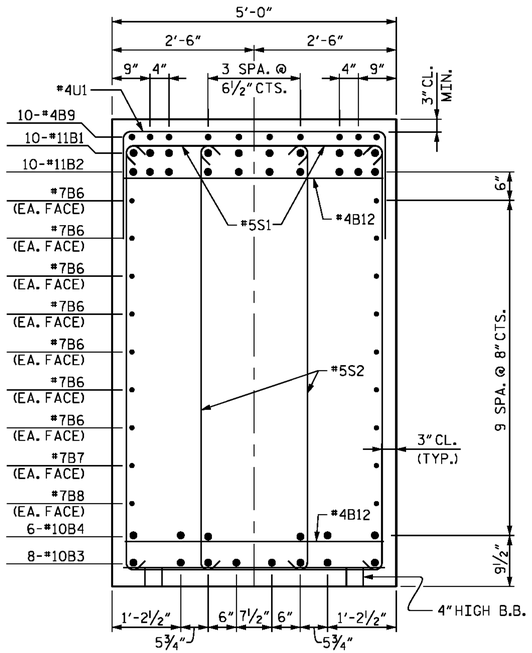
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

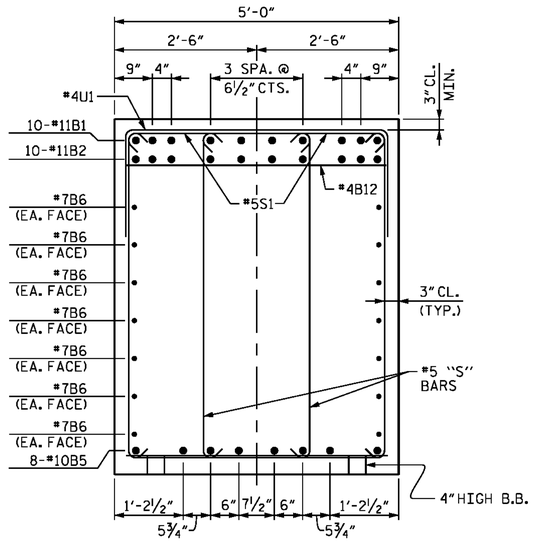
DocuSigned by: Jason R Doughty

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

5/10/2016
400.313_B4929_SMU_IB6_1.dgn



SECTION A-A



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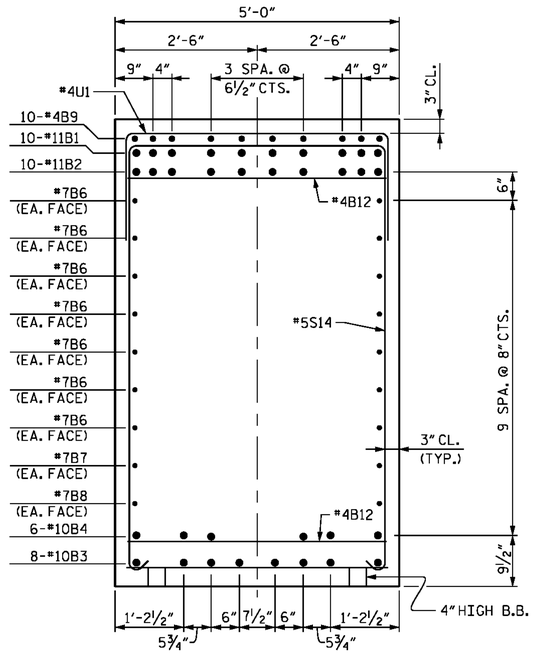
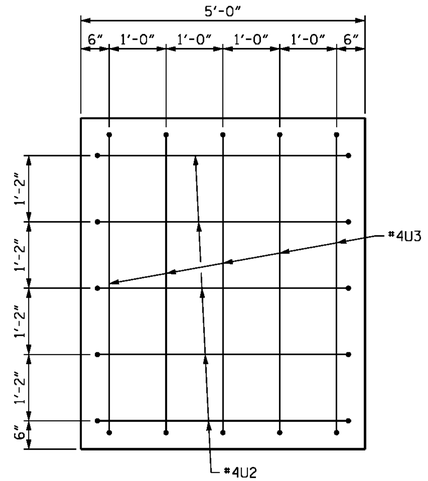
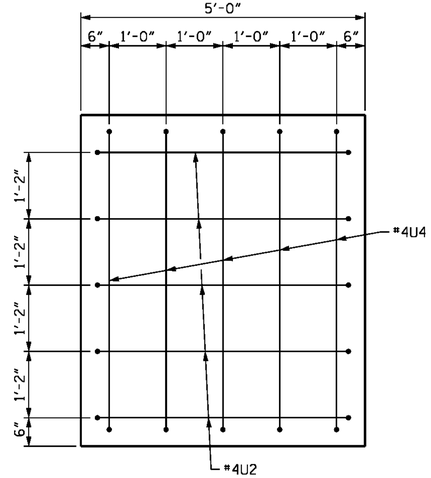


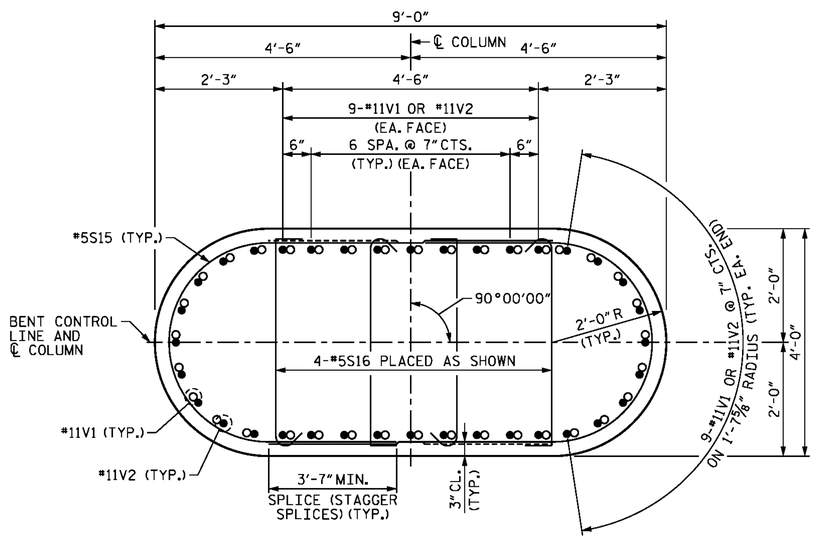
SECTION C-C



VIEW X-X



VIEW Y-Y



SECTION D-D

WHEN PLACING #5S16 BARS, ALTERNATE THE POSITION OF THE 135° HOOK HORIZONTALLY AND VERTICALLY.

ALTERNATE DIRECTION OF #5S15 TO STAGGER LAPS.

NOTES:

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 6 THROUGH 10 SECTIONS AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-161
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

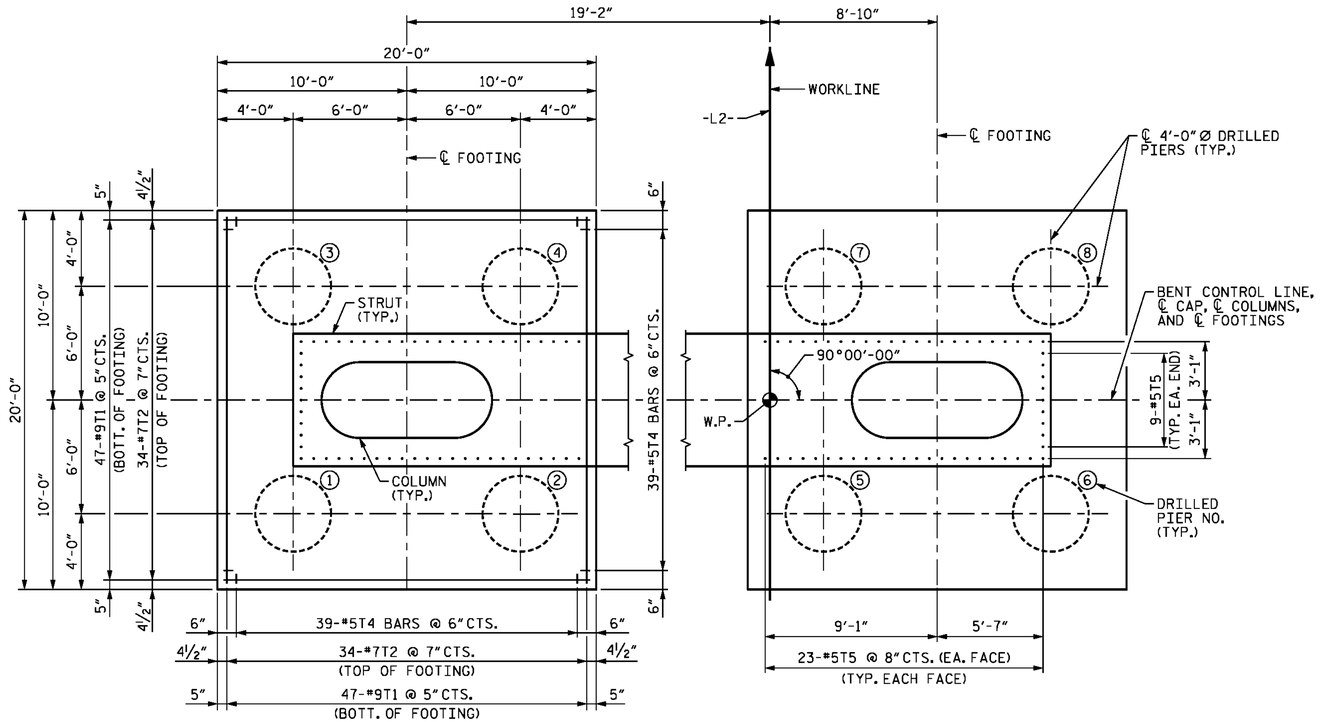
5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

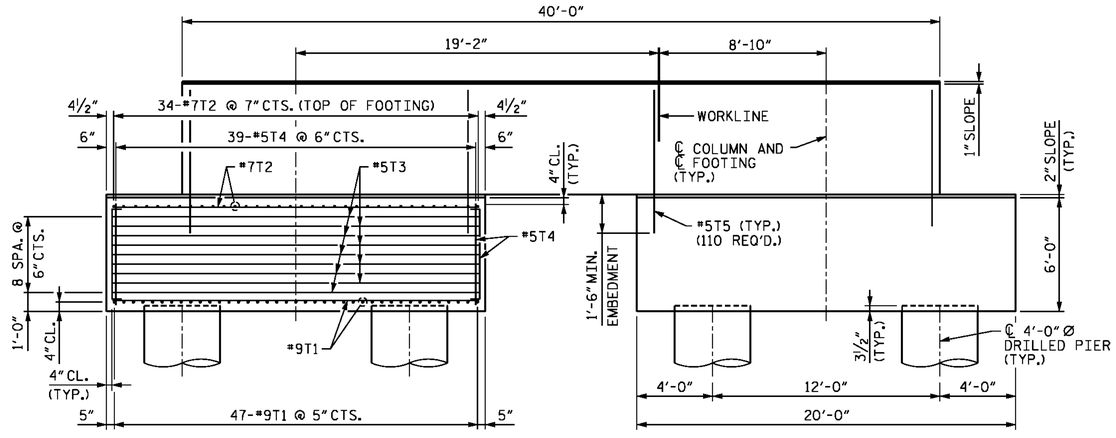
DESIGNED BY:	J. BORUTA	DATE :	FEB 2016
DRAWN BY:	MAH/KEW	DATE :	MAR 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400.315_B4929_SMU_IB6_2.dgn



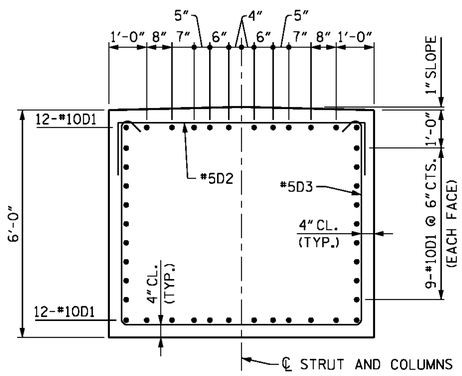
FOOTING PLAN

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



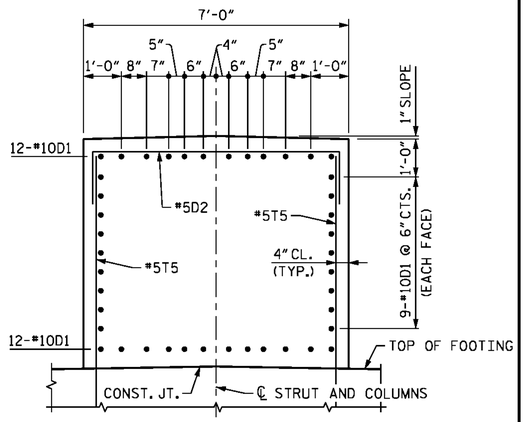
ELEVATION

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



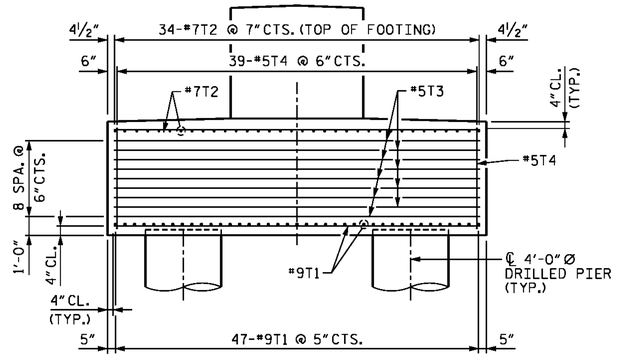
SECTION E-E

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.

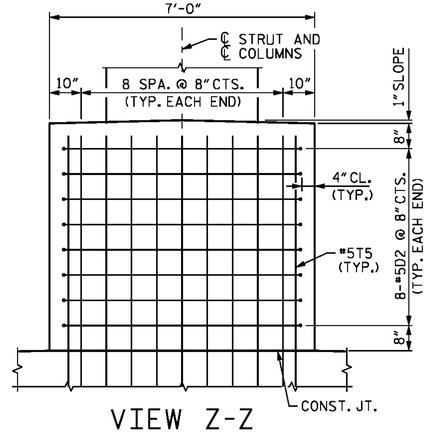


SECTION F-F

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.



SIDE ELEVATION



VIEW Z-Z

NOTES:

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 5

DESIGNED BY:	J. BORUTA	DATE :	MAR 2016		
DRAWN BY:	MAH/KEW	DATE :	MAR 2016		
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

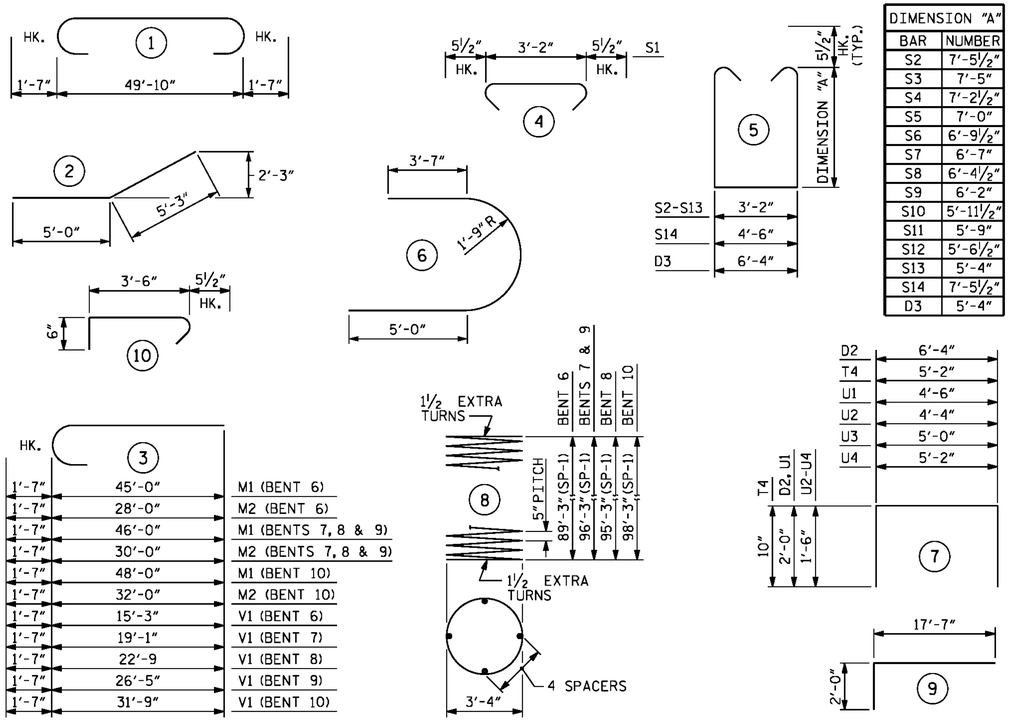
SUBSTRUCTURE

BENTS 6 THROUGH 10 FOOTING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-162
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400_317_B4929_SMU_IB6_3.dgn

BAR TYPES



DIMENSION "A"	
BAR	NUMBER
S2	7'-5½"
S3	7'-5"
S4	7'-2½"
S5	7'-0"
S6	6'-9½"
S7	6'-7"
S8	6'-4½"
S9	6'-2"
S10	5'-11½"
S11	5'-9"
S12	5'-6½"
S13	5'-4"
S14	7'-5½"
D3	5'-4"

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 6

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-4"	1093
B5	8	#10	2	10'-4"	356
B6	14	#7	STR	49'-10"	1426
B7	2	#7	STR	47'-8"	195
B8	2	#7	STR	45'-0"	184
B9	10	#4	STR	10'-11"	73
B10	10	#4	STR	21'-10"	146
B11	10	#4	STR	5'-5"	36
B12	24	#4	STR	4'-6"	72
D1	42	#10	STR	39'-4"	7109
D2	76	#5	7	10'-4"	819
D3	14	#5	5	17'-11"	262
M1	160	#11	3	46'-7"	39600
M2	160	#11	3	29'-7"	25148
M3	480	#11	STR	45'-0"	114761
M4	160	#11	STR	28'-4"	24086
S1	110	#5	4	4'-1"	468
S2	66	#5	5	19'-0"	1308
S3	4	#5	5	18'-11"	79
S4	4	#5	5	18'-6"	77
S5	4	#5	5	18'-1"	75
S6	4	#5	5	17'-8"	74
S7	4	#5	5	17'-3"	72
S8	4	#5	5	16'-10"	70
S9	4	#5	5	16'-5"	68
S10	4	#5	5	16'-0"	67
S11	4	#5	5	15'-7"	65
S12	4	#5	5	15'-2"	63
S13	4	#5	5	14'-9"	62
S14	24	#5	5	20'-4"	509
S15	108	#5	6	14'-1"	1586
S16	216	#5	10	4'-6"	1014

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
T1	188	#9	STR	19'-4"	12358
T2	136	#7	STR	19'-4"	5374
T3	72	#5	STR	19'-4"	1452
T4	312	#5	7	6'-10"	2224
T5	110	#5	STR	7'-2"	822
U1	66	#4	7	8'-6"	375
U2	10	#4	7	7'-4"	49
U3	5	#4	7	8'-0"	27
U4	5	#4	7	8'-2"	27
V1	72	#11	3	16'-10"	6439
V2	72	#11	9	19'-7"	7491

EPOXY COATED REINFORCING STEEL LBS. 264,513

SP-1	8	✱	8	2240'-10"	18697

EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 18,697

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 179.8
POUR #3 - STRUT	C.Y. 62.7
POUR #4 - COLUMNS	C.Y. 17.1
POUR #5 - CAP	C.Y. 74.7
CLASS "AA" CONCRETE	C.Y. 334.3

4'-0" Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN. FT. 717.9
POUR 1 - DRILLED PIER	C.Y. 334.1
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	LIN. FT. 197.9
CSL TUBES	LIN. FT. 2919.7

BENT 7

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-4"	1093
B5	8	#10	2	10'-4"	356
B6	14	#7	STR	49'-10"	1426
B7	2	#7	STR	47'-8"	195
B8	2	#7	STR	45'-0"	184
B9	10	#4	STR	10'-11"	73
B10	10	#4	STR	21'-10"	146
B11	10	#4	STR	5'-5"	36
B12	24	#4	STR	4'-6"	72
D1	42	#10	STR	39'-4"	7109
D2	76	#5	7	10'-4"	819
D3	14	#5	5	17'-11"	262
M1	160	#11	3	47'-7"	40450
M2	160	#11	3	31'-7"	26848
M3	480	#11	STR	48'-0"	122412
M4	160	#11	STR	31'-4"	26636
S1	110	#5	4	4'-1"	468
S2	66	#5	5	19'-0"	1308
S3	4	#5	5	18'-11"	79
S4	4	#5	5	18'-6"	77
S5	4	#5	5	18'-1"	75
S6	4	#5	5	17'-8"	74
S7	4	#5	5	17'-3"	72
S8	4	#5	5	16'-10"	70
S9	4	#5	5	16'-5"	68
S10	4	#5	5	16'-0"	67
S11	4	#5	5	15'-7"	65
S12	4	#5	5	15'-2"	63
S13	4	#5	5	14'-9"	62
S14	24	#5	5	20'-4"	509
S15	136	#5	6	14'-1"	1998
S16	272	#5	10	4'-6"	1277

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
T1	188	#9	STR	19'-4"	12358
T2	136	#7	STR	19'-4"	5374
T3	72	#5	STR	19'-4"	1452
T4	312	#5	7	6'-10"	2224
T5	110	#5	STR	7'-2"	822
U1	66	#4	7	8'-6"	375
U2	10	#4	7	7'-4"	49
U3	5	#4	7	8'-0"	27
U4	5	#4	7	8'-2"	27
V1	72	#11	3	20'-8"	7906
V2	72	#11	9	19'-7"	7491

EPOXY COATED REINFORCING STEEL LBS. 279,406

SP-1	8	✱	8	2414'-2"	20143

EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 20,143

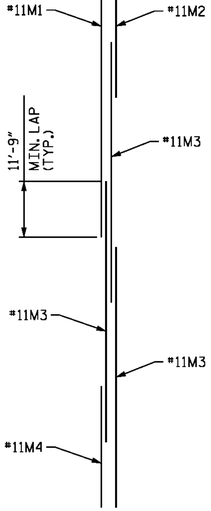
CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 179.8
POUR #3 - STRUT	C.Y. 62.7
POUR #4 - COLUMNS	C.Y. 26.4
POUR #5 - CAP	C.Y. 74.7
CLASS "AA" CONCRETE	C.Y. 343.6

4'-0" Ø DRILLED PIERS QUANTIES:

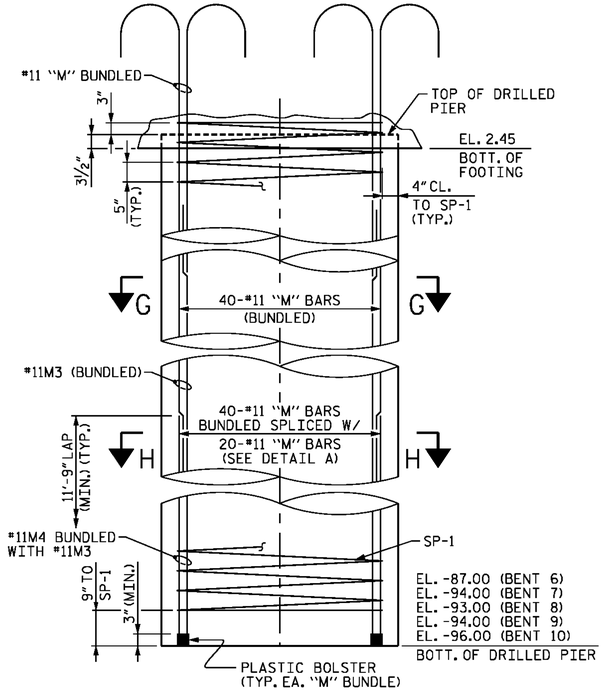
DRILLED PIER	LIN. FT. 773.9
POUR 1 - DRILLED PIER	C.Y. 360.2
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	LIN. FT. 197.9
CSL TUBES	LIN. FT. 3143.7

✱ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-20 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

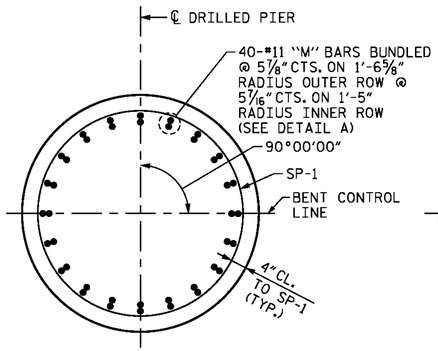


DETAIL A

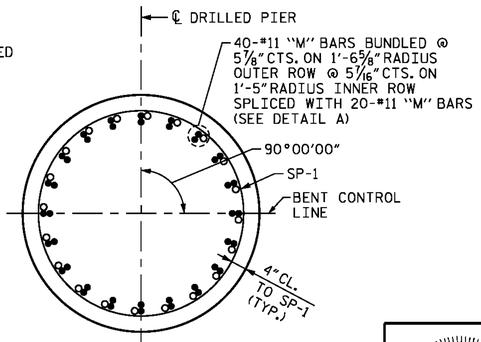
ONE BUNDLE SHOWN, REINFORCING STEEL IS TYPICAL FOR EACH BUNDLE.



DRILLED PIER ELEVATION



SECTION G-G



SECTION H-H

NOTES:

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 6 THROUGH 10
BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-163
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. BORUTA	DATE : MAR 2016
DRAWN BY:	K. WHITE	DATE : MAR 2016
CHECKED BY:	J. DOUGHTY	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

5/10/2016
400_319_B4929_SMU_TB6_4.dgn

BILL OF MATERIAL

BENT 8

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-4"	1093
B5	8	#10	2	10'-4"	356
B6	14	#7	STR	49'-10"	1426
B7	2	#7	STR	47'-8"	195
B8	2	#7	STR	45'-0"	184
B9	10	#4	STR	10'-11"	73
B10	10	#4	STR	21'-10"	146
B11	10	#4	STR	5'-5"	36
B12	24	#4	STR	4'-6"	72
D1	42	#10	STR	39'-4"	7109
D2	76	#5	7	10'-4"	819
D3	14	#5	5	17'-11"	262
M1	160	#11	3	47'-7"	40450
M2	160	#11	3	31'-7"	26848
M3	480	#11	STR	48'-0"	122412
M4	160	#11	STR	31'-4"	26636
S1	110	#5	4	4'-1"	468
S2	66	#5	5	19'-0"	1308
S3	4	#5	5	18'-11"	79
S4	4	#5	5	18'-6"	77
S5	4	#5	5	18'-1"	75
S6	4	#5	5	17'-8"	74
S7	4	#5	5	17'-3"	72
S8	4	#5	5	16'-10"	70
S9	4	#5	5	16'-5"	68
S10	4	#5	5	16'-0"	67
S11	4	#5	5	15'-7"	65
S12	4	#5	5	15'-2"	63
S13	4	#5	5	14'-9"	62
S14	24	#5	5	20'-4"	509
S15	168	#5	6	14'-1"	2468
S16	336	#5	10	4'-6"	1577

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
T1	188	#9	STR	19'-4"	12358
T2	136	#7	STR	19'-4"	5374
T3	72	#5	STR	19'-4"	1452
T4	312	#5	7	6'-10"	2224
T5	110	#5	STR	7'-2"	822
U1	66	#4	7	8'-6"	375
U2	10	#4	7	7'-4"	49
U3	5	#4	7	8'-0"	27
U4	5	#4	7	8'-2"	27
V1	72	#11	3	24'-4"	9308
V2	72	#11	9	19'-7"	7491

EPOXY COATED REINFORCING STEEL LBS. 281,578

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
SP-1	8	*	8	2389'-5"	19937

EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 19,937

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 179.8
POUR #3 - STRUT	C.Y. 62.7
POUR #4 - COLUMNS	C.Y. 35.3
POUR #5 - CAP	C.Y. 74.7
CLASS "AA" CONCRETE	C.Y. 352.5

4'-0" Ø DRILLED PIERS QUANTITIES:

DRILLED PIER	LIN. FT. 765.9
POUR 1 - DRILLED PIER	C.Y. 356.5
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	LIN. FT. 197.9
CSL TUBES	LIN. FT. 3111.7

BENT 9

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-4"	1093
B5	8	#10	2	10'-4"	356
B6	14	#7	STR	49'-10"	1426
B7	2	#7	STR	47'-8"	195
B8	2	#7	STR	45'-0"	184
B9	10	#4	STR	10'-11"	73
B10	10	#4	STR	21'-10"	146
B11	10	#4	STR	5'-5"	36
B12	24	#4	STR	4'-6"	72
D1	42	#10	STR	39'-4"	7109
D2	76	#5	7	10'-4"	819
D3	14	#5	5	17'-11"	262
M1	160	#11	3	47'-7"	40450
M2	160	#11	3	31'-7"	26848
M3	480	#11	STR	48'-0"	122412
M4	160	#11	STR	31'-4"	26636
S1	110	#5	4	4'-1"	468
S2	66	#5	5	19'-0"	1308
S3	4	#5	5	18'-11"	79
S4	4	#5	5	18'-6"	77
S5	4	#5	5	18'-1"	75
S6	4	#5	5	17'-8"	74
S7	4	#5	5	17'-3"	72
S8	4	#5	5	16'-10"	70
S9	4	#5	5	16'-5"	68
S10	4	#5	5	16'-0"	67
S11	4	#5	5	15'-7"	65
S12	4	#5	5	15'-2"	63
S13	4	#5	5	14'-9"	62
S14	24	#5	5	20'-4"	509
S15	196	#5	6	14'-1"	2879
S16	392	#5	10	4'-6"	1840

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
T1	188	#9	STR	19'-4"	12358
T2	136	#7	STR	19'-4"	5374
T3	72	#5	STR	19'-4"	1452
T4	312	#5	7	6'-10"	2224
T5	110	#5	STR	7'-2"	822
U1	66	#4	7	8'-6"	375
U2	10	#4	7	7'-4"	49
U3	5	#4	7	8'-0"	27
U4	5	#4	7	8'-2"	27
V1	72	#11	3	28'-0"	10711
V2	72	#11	9	19'-7"	7491

EPOXY COATED REINFORCING STEEL LBS. 283,655

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
SP-1	8	*	8	2414'-2"	20143

EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 20,143

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 179.8
POUR #3 - STRUT	C.Y. 62.7
POUR #4 - COLUMNS	C.Y. 44.2
POUR #5 - CAP	C.Y. 74.7
CLASS "AA" CONCRETE	C.Y. 361.4

4'-0" Ø DRILLED PIERS QUANTITIES:

DRILLED PIER	LIN. FT. 773.9
POUR 1 - DRILLED PIER	C.Y. 360.2
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	LIN. FT. 229.9
CSL TUBES	LIN. FT. 3143.7

BENT 10

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-4"	1093
B5	8	#10	2	10'-4"	356
B6	14	#7	STR	49'-10"	1426
B7	2	#7	STR	47'-8"	195
B8	2	#7	STR	45'-0"	184
B9	10	#4	STR	10'-11"	73
B10	10	#4	STR	21'-10"	146
B11	10	#4	STR	5'-5"	36
B12	24	#4	STR	4'-6"	72
D1	42	#10	STR	39'-4"	7109
D2	76	#5	7	10'-4"	819
D3	14	#5	5	17'-11"	262
M1	160	#11	3	49'-7"	42150
M2	160	#11	3	33'-7"	28549
M3	480	#11	STR	48'-0"	122412
M4	160	#11	STR	31'-4"	26636
S1	110	#5	4	4'-1"	468
S2	66	#5	5	19'-0"	1308
S3	4	#5	5	18'-11"	79
S4	4	#5	5	18'-6"	77
S5	4	#5	5	18'-1"	75
S6	4	#5	5	17'-8"	74
S7	4	#5	5	17'-3"	72
S8	4	#5	5	16'-10"	70
S9	4	#5	5	16'-5"	68
S10	4	#5	5	16'-0"	67
S11	4	#5	5	15'-7"	65
S12	4	#5	5	15'-2"	63
S13	4	#5	5	14'-9"	62
S14	24	#5	5	20'-4"	509
S15	240	#5	6	14'-1"	3525
S16	480	#5	10	4'-6"	2253

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
T1	188	#9	STR	19'-4"	12358
T2	136	#7	STR	19'-4"	5374
T3	72	#5	STR	19'-4"	1452
T4	312	#5	7	6'-10"	2224
T5	110	#5	STR	7'-2"	822
U1	66	#4	7	8'-6"	375
U2	10	#4	7	7'-4"	49
U3	5	#4	7	8'-0"	27
U4	5	#4	7	8'-2"	27
V1	72	#11	3	33'-4"	12751
V2	72	#11	9	19'-7"	7491

EPOXY COATED REINFORCING STEEL LBS. 290,155

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
SP-1	8	*	8	2463'-8"	20557

EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 20,557

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 179.8
POUR #3 - STRUT	C.Y. 62.7
POUR #4 - COLUMNS	C.Y. 57.1
POUR #5 - CAP	C.Y. 74.7
CLASS "AA" CONCRETE	C.Y. 374.3

4'-0" Ø DRILLED PIERS QUANTITIES:

DRILLED PIER	LIN. FT. 789.9
POUR 1 - DRILLED PIER	C.Y. 367.7
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	LIN. FT. 229.9
CSL TUBES	LIN. FT. 3207.7

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-20 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

NOTES:

FOR NOTES, SEE SHEET 1 OF 5.

FOR BAR TYPES, SEE SHEET 4 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 6 THROUGH 10
BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-164
1			3			TOTAL SHEETS
2			4			278

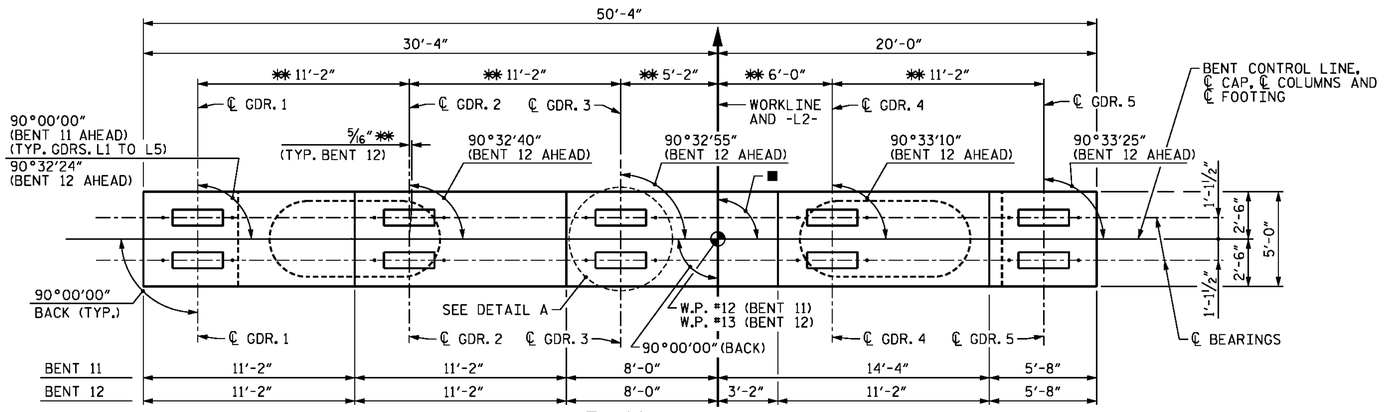
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. BORUTA	DATE :	MAR 2016
DRAWN BY:	K. WHITE	DATE :	MAR 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

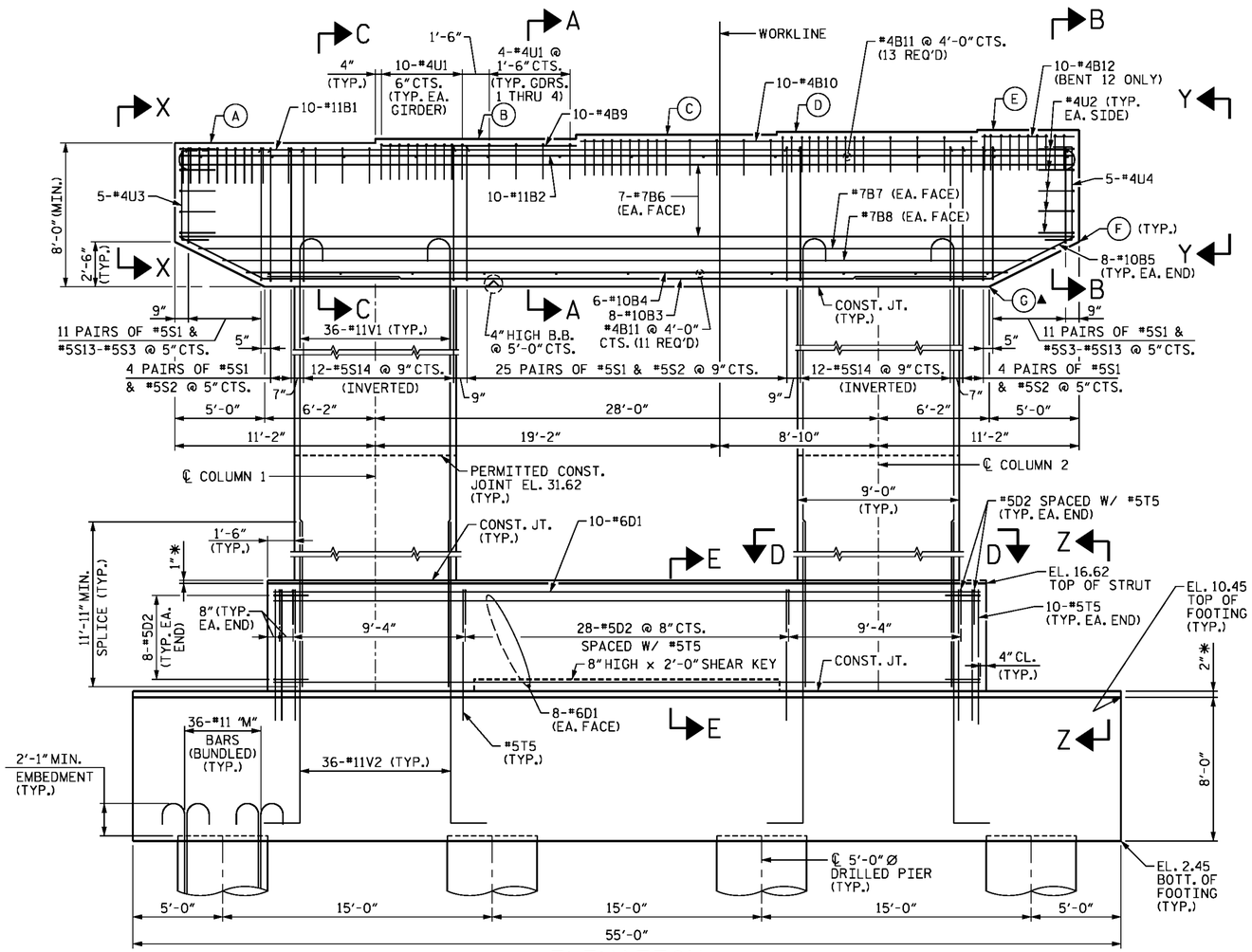
5/10/2016
400_321_B4929_SMU_IB6_5.dgn



PLAN

■ 90°00'00" (BENT 11 AHEAD)
90°48'12" TO SHORT CHORD (BENT 12 AHEAD)

✱✱ MEASURED ALONG BENT CONTROL LINE



ELEVATION

FOOTING REINFORCEMENT NOT SHOWN FOR CLARITY, SEE SHEET 3 OF 5.

BENT 12 SHOWN, BENT 11 SIMILAR.

▲ BOTTOM OF CAP LEVEL

ELEVATION TABLE								
BENT	A	B	C	D	E	F	G
11	51.90	52.12	52.35	52.35	52.28	46.40	43.90
12	57.42	57.64	57.87	58.03	58.14	51.92	49.42

NOTES

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

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

"T" BARS IN FOOTING MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN AND DRILLED PIER REINFORCEMENT.

FOR FOUNDATION NOTES, SEE "FOUNDATION NOTES" SHEET.

FOR SECTIONS AND VIEWS, SEE SHEET 2 OF 5 AND SHEET 3 OF 5.

FOR FOOTING AND DRILLED PIER REINFORCING DETAILS, SEE SHEET 3 OF 5 AND SHEET 4 OF 5.

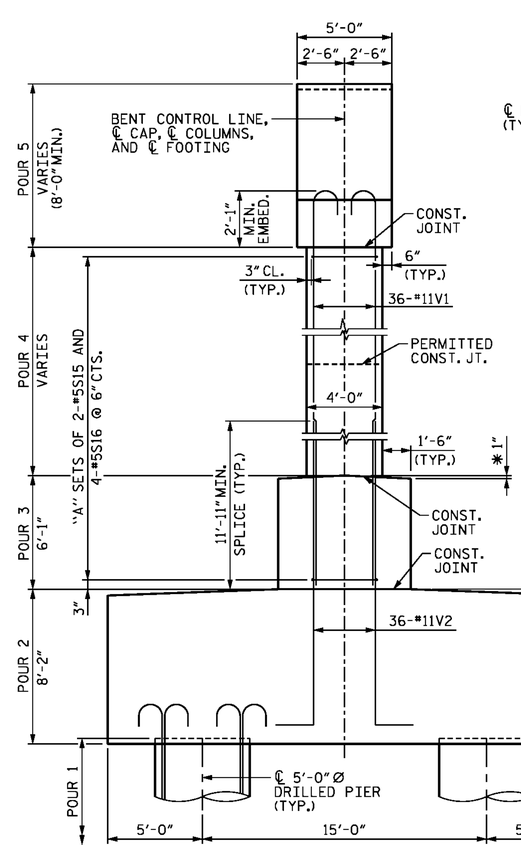
✱ THE FOOTING AND STRUT ARE SLOPED TO DRAIN.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

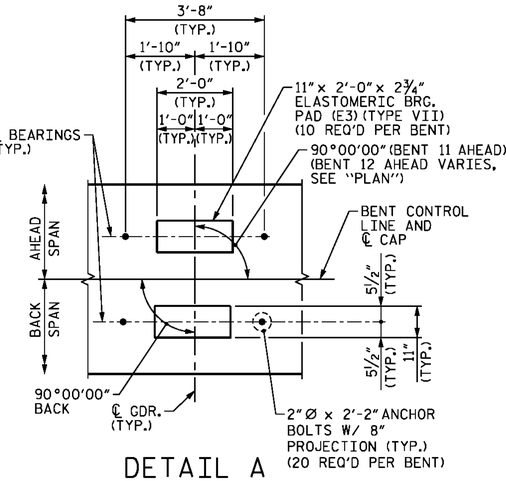
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.



END VIEW



DETAIL A

BAR QUANTITY "A"	
BENT 11 COLUMN 1	66
BENT 11 COLUMN 2	66
BENT 12 COLUMN 1	77
BENT 12 COLUMN 2	77

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 5

DESIGNED BY:	E. ULLMER	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

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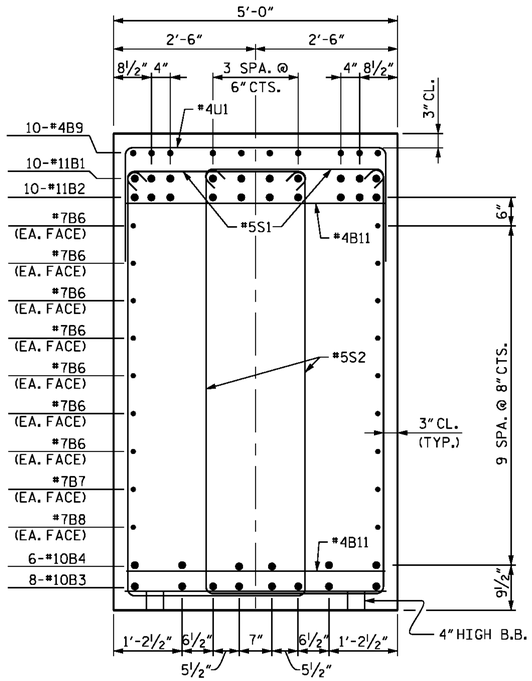
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

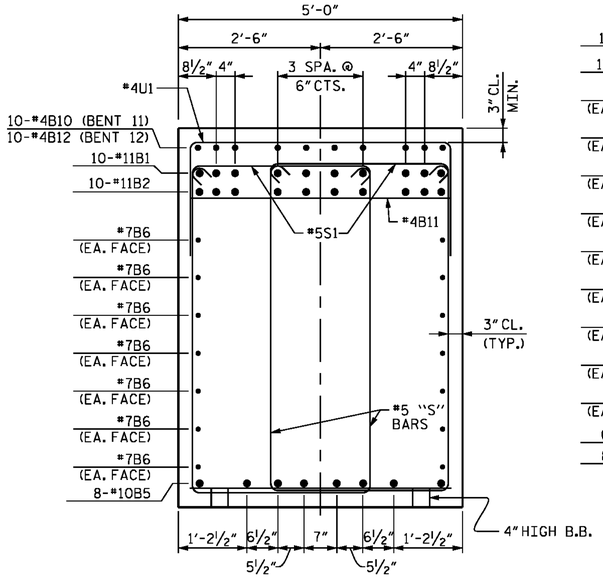
BENTS 11 AND 12 PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-165
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400.323.B4929_SMU_IB11.1.dgn

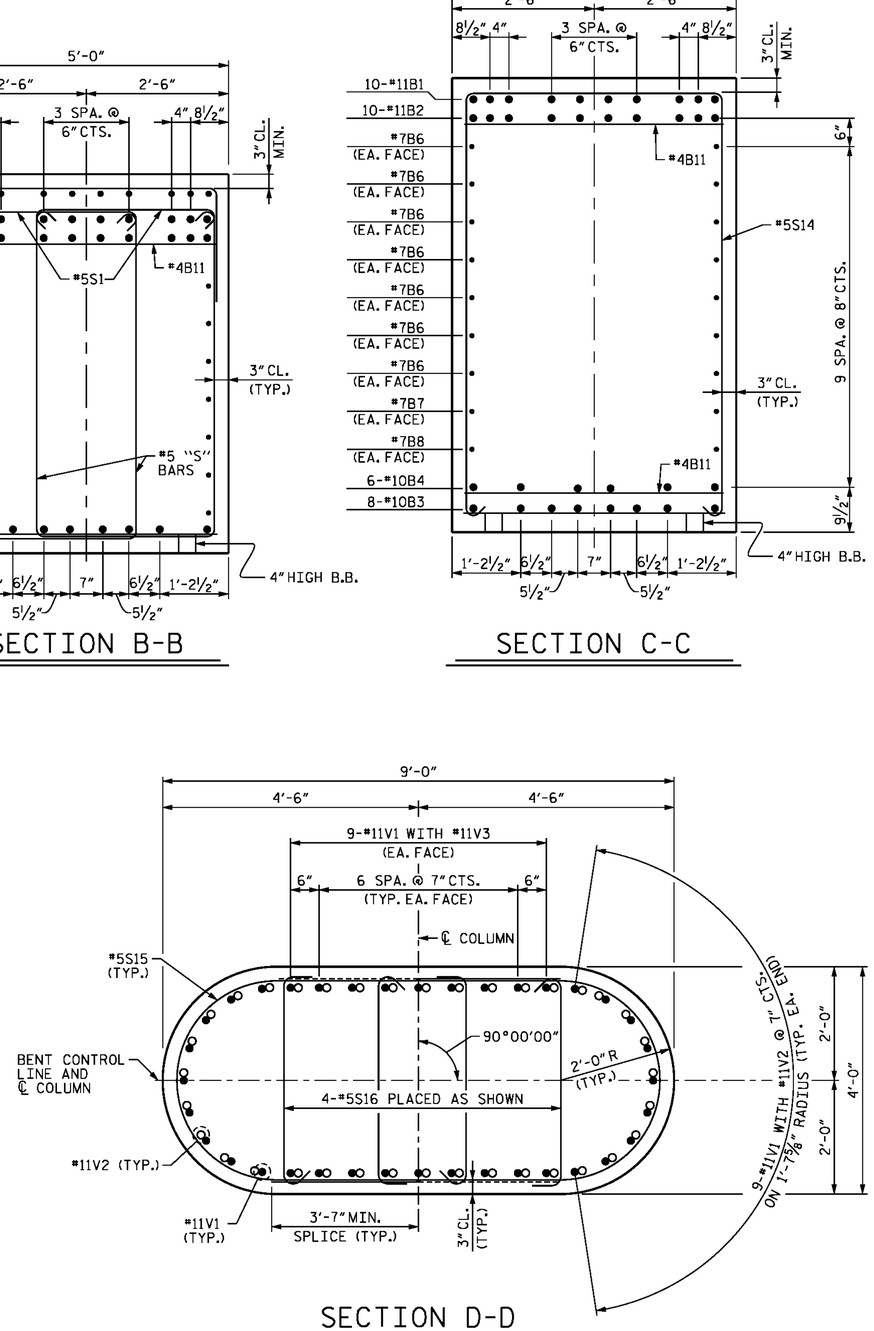


SECTION A-A



SECTION B-B

SECTION C-C



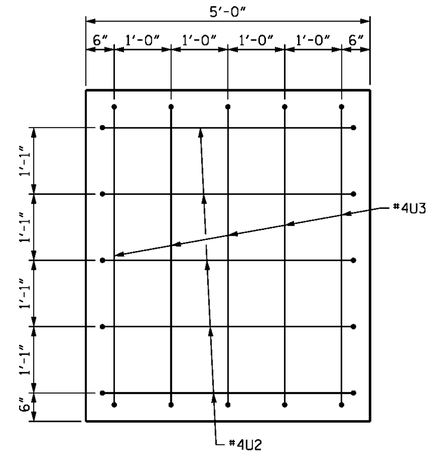
SECTION D-D

WHEN PLACING #5S16 BARS, ALTERNATE THE POSITION OF THE 135° HOOK HORIZONTALLY AND VERTICALLY.

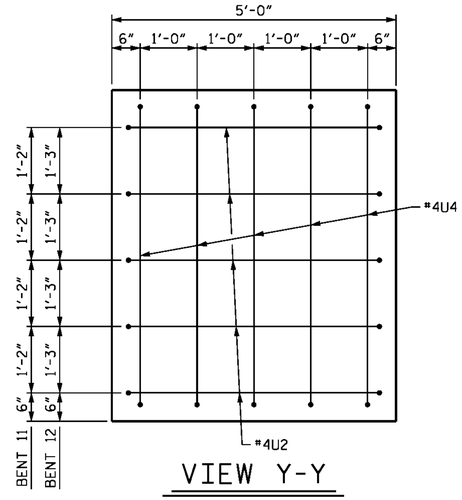
ALTERNATE DIRECTION OF #5S15 TO STAGGER LAPS.

NOTES

FOR NOTES, SEE SHEET 1 OF 5.



VIEW X-X



VIEW Y-Y

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 11 AND 12 SECTIONS AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-166
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C8644B274F7...

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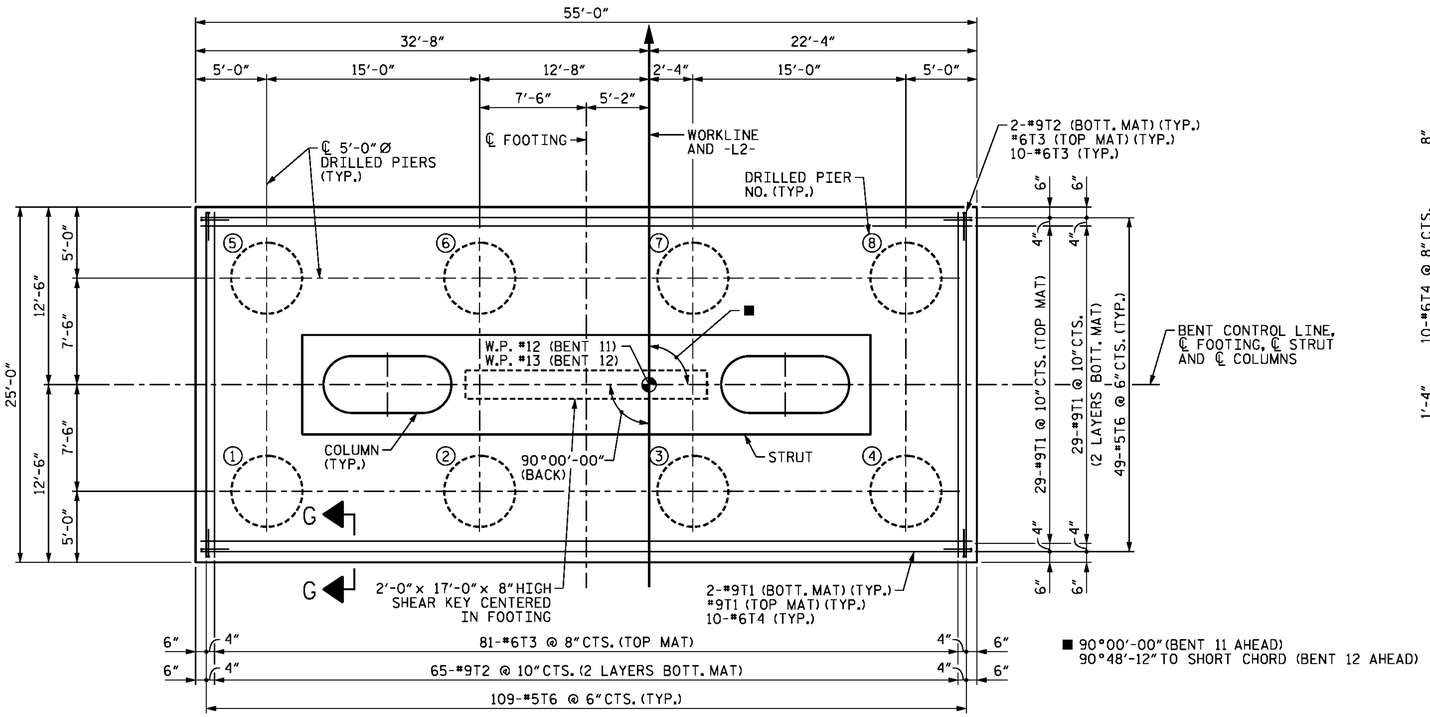
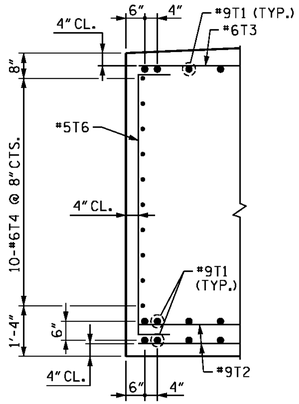
DESIGNED BY:	E. ULLMER	DATE :	MAR 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_325_B4929_SMU_IB11_2.dgn



FOOTING PLAN

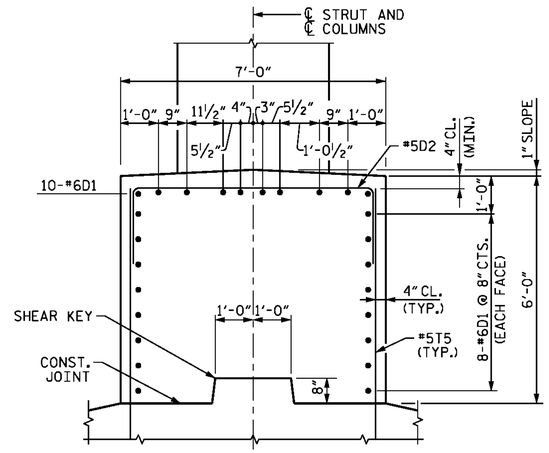
■ 90°00'-00" (BENT 11 AHEAD)
90°48'-12" TO SHORT CHORD (BENT 12 AHEAD)



SECTION G-G

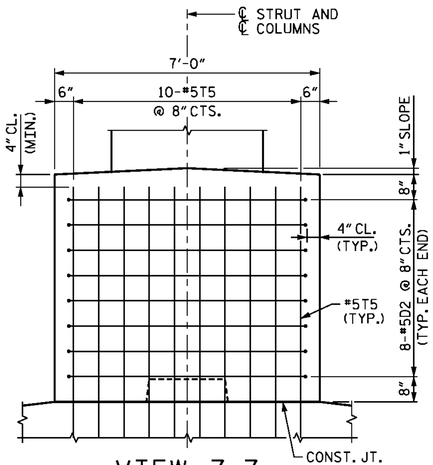
NOTES

FOR NOTES, SEE SHEET 1 OF 5.

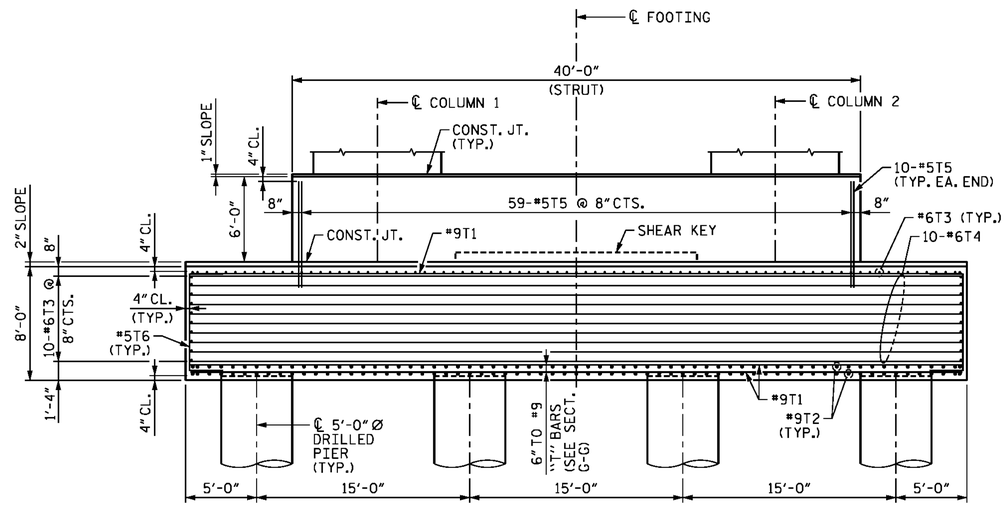


SECTION E-E

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.

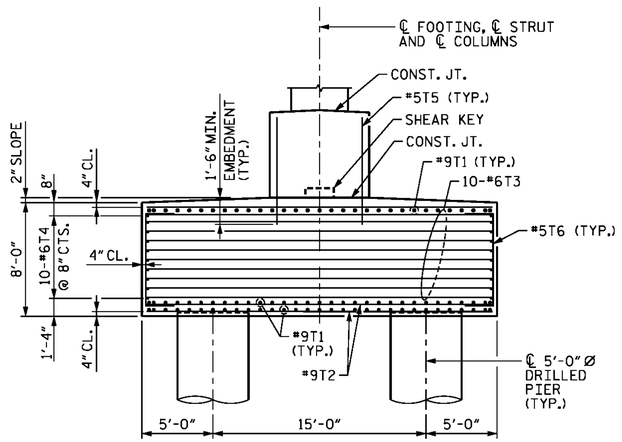


VIEW Z-Z



FOOTING AND STRUT ELEVATION

COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.



SIDE ELEVATION

COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 5

DESIGNED BY:	E. ULLMER	DATE :	FEB 2016		
DRAWN BY:	M. HOBBS	DATE :	MAR 2016		
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 11 AND 12 SECTIONS AND DETAILS

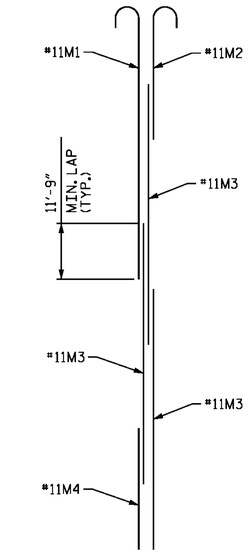
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-167
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400.327.B4929_SMU_IB11_3.dgn

NOTES

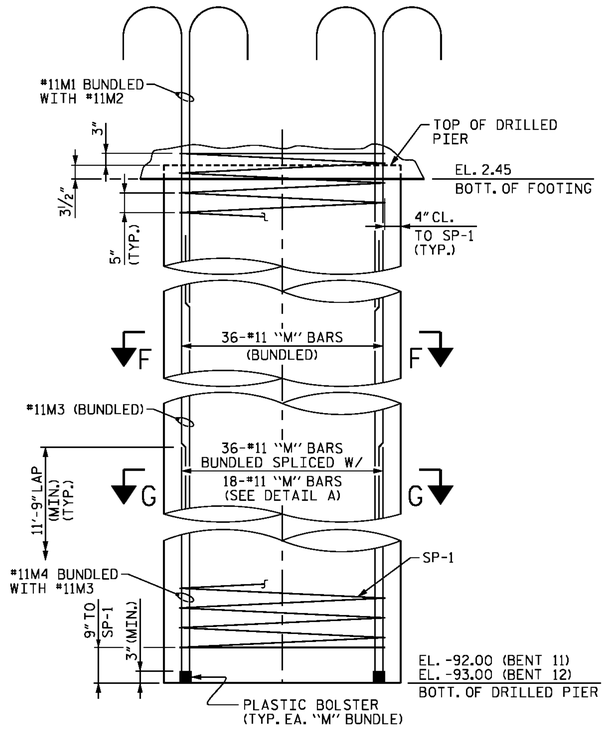
FOR NOTES, SEE SHEET 1 OF 5.

FOR BAR TYPES, SEE SHEET 5 OF 5.

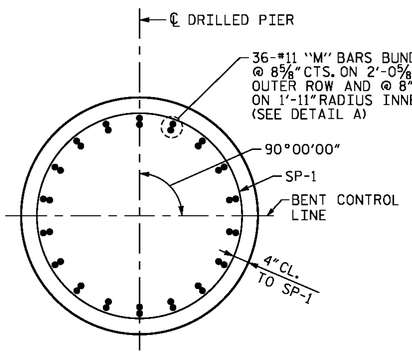


DETAIL A

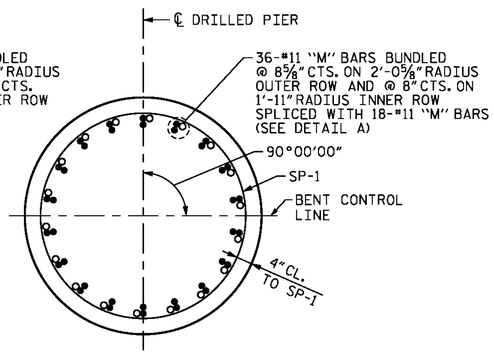
ONE BUNDLE SHOWN, REINFORCING STEEL IS TYPICAL FOR EACH BUNDLE.



DRILLED PIER ELEVATION



SECTION F-F



SECTION G-G

BILL OF MATERIAL

BENT 11

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816	T1	93	#9	STR	54'-4"	17180
B2	10	#11	STR	49'-10"	2648	T2	134	#9	STR	24'-4"	11086
B3	8	#10	STR	40'-4"	1388	T3	83	#6	STR	24'-4"	3034
B4	6	#10	STR	42'-0"	1084	T4	20	#6	STR	54'-4"	1632
B5	16	#10	2	10'-3"	706	T5	138	#5	STR	7'-2"	1032
B6	14	#7	STR	49'-10"	1426	T6	316	#5	7	8'-6"	2801
B7	2	#7	STR	47'-4"	193						
B8	2	#7	STR	44'-8"	183	U1	66	#4	7	8'-6"	375
B9	10	#4	STR	10'-11"	73	U2	10	#4	7	7'-4"	49
B10	10	#4	STR	27'-6"	184	U3	5	#4	7	7'-9"	26
B11	24	#4	STR	4'-6"	72	U4	5	#4	7	8'-4"	28
D1	26	#6	STR	39'-4"	1536	V1	72	#11	3	37'-0"	14154
D2	48	#5	7	10'-4"	517	V2	72	#11	9	21'-2"	8097
M1	144	#11	3	46'-2"	35321						
M2	144	#11	3	24'-8"	18872						
M3	432	#11	STR	50'-0"	114761						
M4	144	#11	STR	28'-8"	21932						
S1	110	#5	4	4'-1"	468						
S2	66	#5	4	19'-0"	1308						
S3	4	#5	5	18'-11"	79						
S4	4	#5	5	18'-6"	77						
S5	4	#5	5	18'-1"	75						
S6	4	#5	5	17'-8"	74						
S7	4	#5	5	17'-3"	72						
S8	4	#5	5	16'-10"	70	EPOXY COATED REINFORCING STEEL				LBS.	269,441
S9	4	#5	5	16'-5"	68						
S10	4	#5	5	16'-0"	67						
S11	4	#5	5	15'-7"	65	SP-1	8	*	8	3,084'-0"	25,733
S12	4	#5	5	15'-2"	63						
S13	4	#5	5	14'-9"	62						
S14	24	#5	5	20'-4"	509						
S15	132	#5	6	14'-1"	1939	EPOXY COATED SPIRAL COLUMN REINFORCING STEEL				LBS.	25,733
S16	264	#5	10	4'-6"	1239						

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 412.4
POUR #3 - STRUT	C.Y. 61.5
POUR #4 - COLUMNS	C.Y. 66.0
POUR #5 - CAP	C.Y. 75.0
CLASS "AA" CONCRETE	C.Y. 614.9

5'-0" Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN. FT.	757.9
POUR 1 - DRILLED PIER	C.Y.	551.2
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	LIN. FT.	197.9
CSL TUBES	LIN. FT.	3,850

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 5

DESIGNED BY:	E. ULLMER	DATE :	MAR 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_329_B4929_SMU_IB11_4.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty

00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

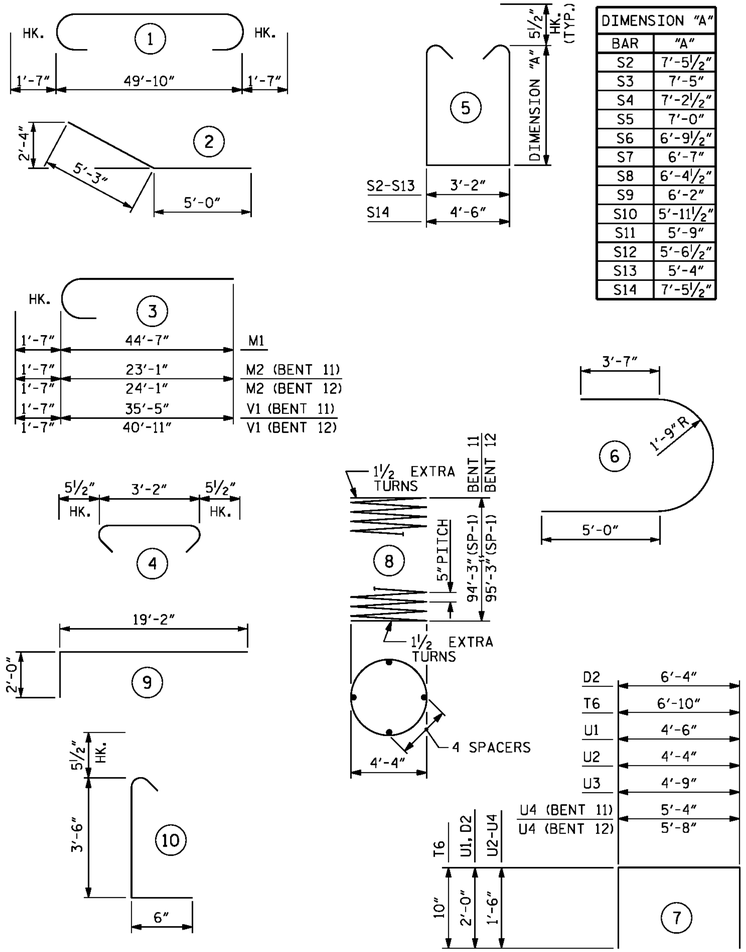
BENTS 11 AND 12 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-168
1			3			TOTAL SHEETS
2			4			278

NOTES

FOR NOTES, SEE SHEET 1 OF 5.

BAR TYPES



DIMENSION "A"	
BAR	"A"
S2	7'-5½"
S3	7'-5"
S4	7'-2½"
S5	7'-0"
S6	6'-9½"
S7	6'-7"
S8	6'-4½"
S9	6'-2"
S10	5'-11½"
S11	5'-9"
S12	5'-6½"
S13	5'-4"
S14	7'-5½"

ALL BAR DIMENSIONS ARE OUT TO OUT.

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

BILL OF MATERIAL

BENT 12

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-0"	1084
B5	16	#10	2	10'-3"	706
B6	14	#7	STR	49'-10"	1426
B7	2	#7	STR	47'-4"	193
B8	2	#7	STR	44'-8"	183
B9	10	#4	STR	10'-11"	73
B10	10	#4	STR	22'-1"	148
B11	24	#4	STR	4'-6"	72
B12	10	#4	STR	5'-2"	35
D1	26	#6	STR	39'-4"	1536
D2	48	#5	7	10'-4"	517
M1	144	#11	3	46'-2"	35321
M2	144	#11	3	25'-8"	19637
M3	432	#11	STR	50'-0"	114761
M4	144	#11	STR	29'-8"	22697
S1	110	#5	4	4'-1"	468
S2	66	#5	4	19'-0"	1308
S3	4	#5	5	18'-11"	79
S4	4	#5	5	18'-6"	77
S5	4	#5	5	18'-1"	75
S6	4	#5	5	17'-8"	74
S7	4	#5	5	17'-3"	72
S8	4	#5	5	16'-10"	70
S9	4	#5	5	16'-5"	68
S10	4	#5	5	16'-0"	67
S11	4	#5	5	15'-7"	65
S12	4	#5	5	15'-2"	63
S13	4	#5	5	14'-9"	62
S14	24	#5	5	20'-4"	509
S15	154	#5	6	14'-1"	2262
S16	308	#5	10	4'-6"	1446

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
T1	93	#9	STR	54'-4"	17180
T2	134	#9	STR	24'-4"	11086
T3	83	#6	STR	24'-4"	3034
T4	20	#6	STR	54'-4"	1632
T5	138	#5	STR	7'-2"	1032
T6	316	#5	7	8'-6"	2801
U1	66	#4	7	8'-6"	375
U2	10	#4	7	7'-4"	49
U3	5	#4	7	7'-9"	26
U4	5	#4	7	8'-8"	29
V1	72	#11	3	42'-6"	16258
V2	72	#11	9	21'-2"	8097

EPOXY COATED REINFORCING STEEL LBS. 273,605

SP-1	8	*	8	3116'-3"	26,002

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 26,002

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 412.4
POUR #3 - STRUT	C.Y. 61.5
POUR #4 - COLUMNS	C.Y. 79.2
POUR #5 - CAP	C.Y. 75.7
CLASS "AA" CONCRETE	C.Y. 628.8

5'-0" Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN. FT.	765.9
POUR 1 - DRILLED PIER	C.Y.	557.1
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	LIN. FT.	197.9
CSL TUBES	LIN. FT.	3,890

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 11 AND 12 BILL OF MATERIALS

DESIGNED BY:	E. ULLMER	DATE :	MAR 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C864482F74F7...

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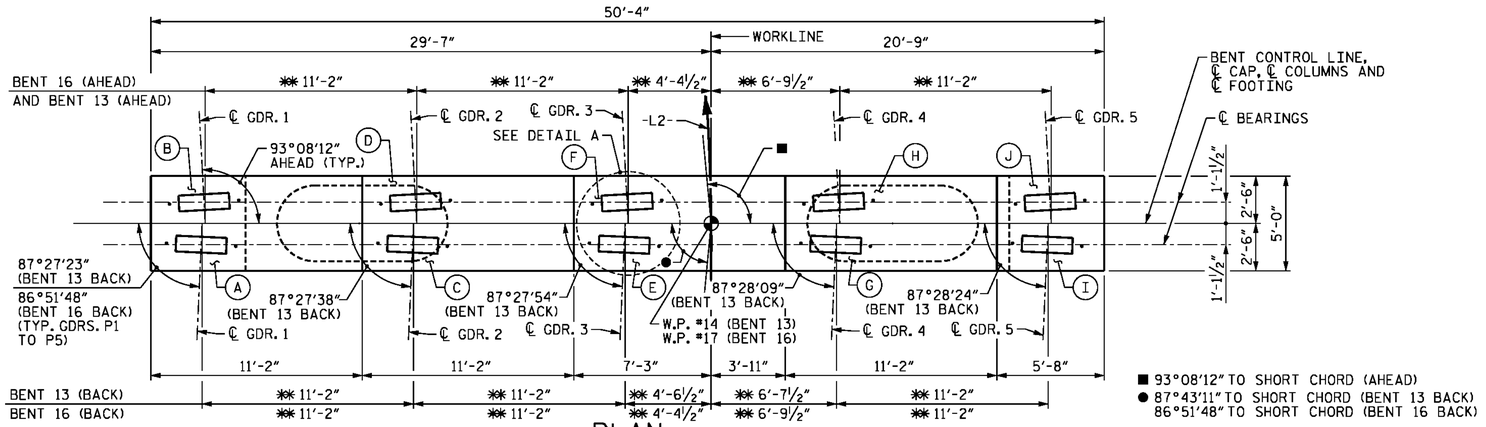
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-169
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400.331_B4929_SMU_TB11_5.dgn



■ 93°08'12" TO SHORT CHORD (AHEAD)
● 87°43'11" TO SHORT CHORD (BENT 13 BACK)
86°51'48" TO SHORT CHORD (BENT 16 BACK)

NOTES

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

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

"T" BARS IN FOOTING MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN AND DRILLED PIER REINFORCEMENT.

FOR FOUNDATION NOTES, SEE "FOUNDATION NOTES" SHEET.

FOR SECTIONS AND VIEWS, SEE SHEET 2 OF 5 AND SHEET 3 OF 5.

FOR FOOTING AND DRILLED PIER REINFORCING DETAILS, SEE SHEET 3 OF 5 AND SHEET 4 OF 5.

✱ THE FOOTING AND STRUT ARE SLOPED TO DRAIN.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

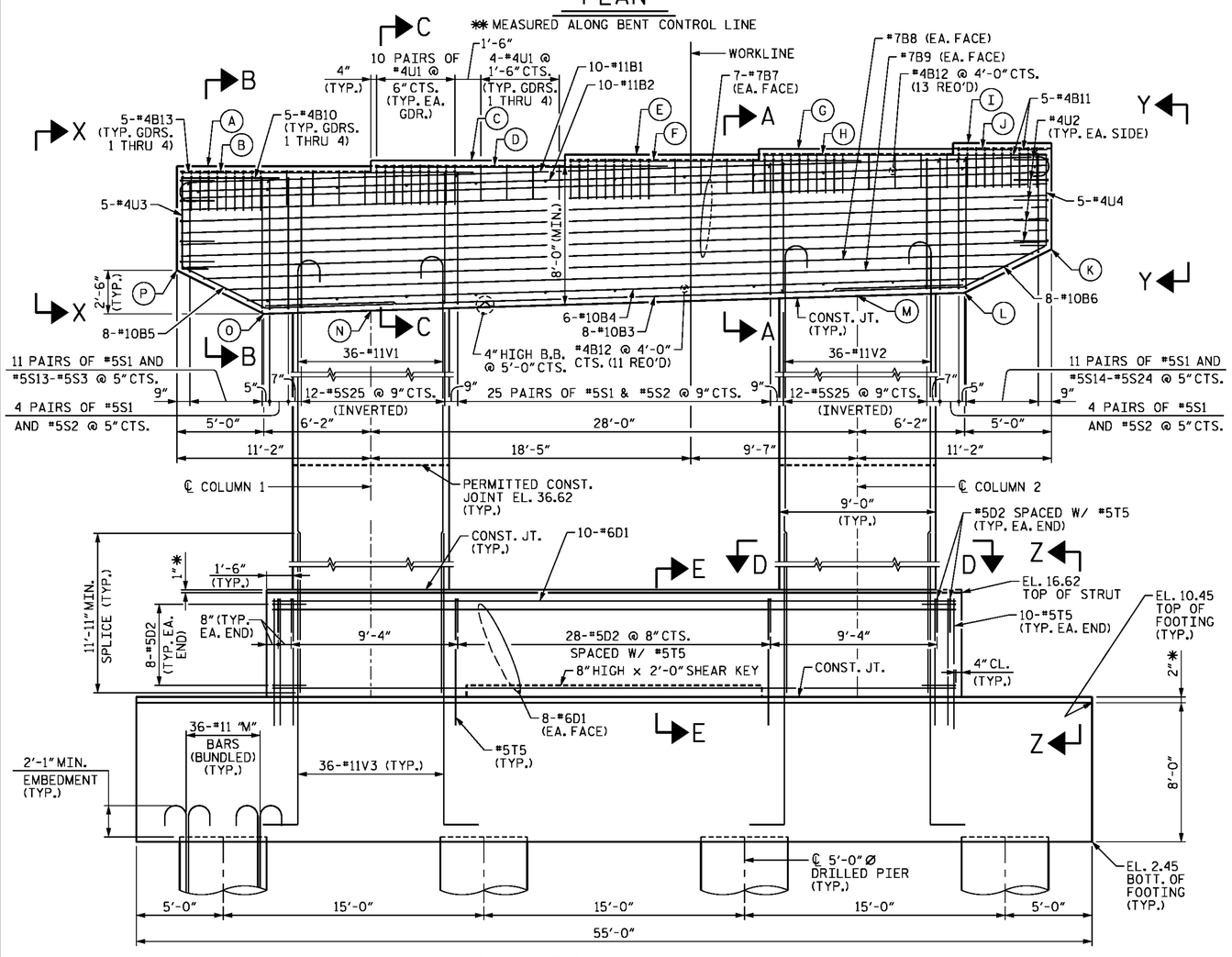
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.

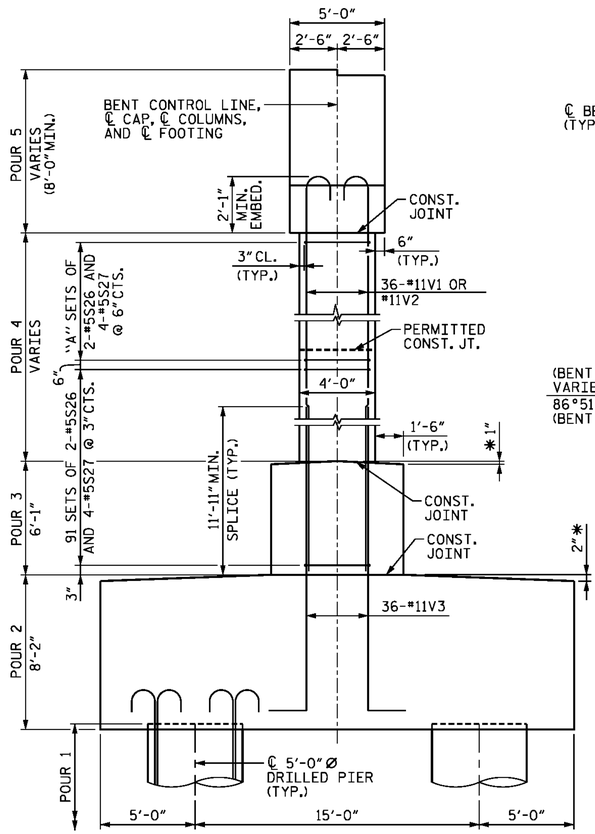
THE TOP SURFACE AREAS OF THE BENT CAP SHALL BE CURED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS EXCEPT THE MEMBRANE COMPOUND METHOD SHALL NOT BE USED.

PLAN

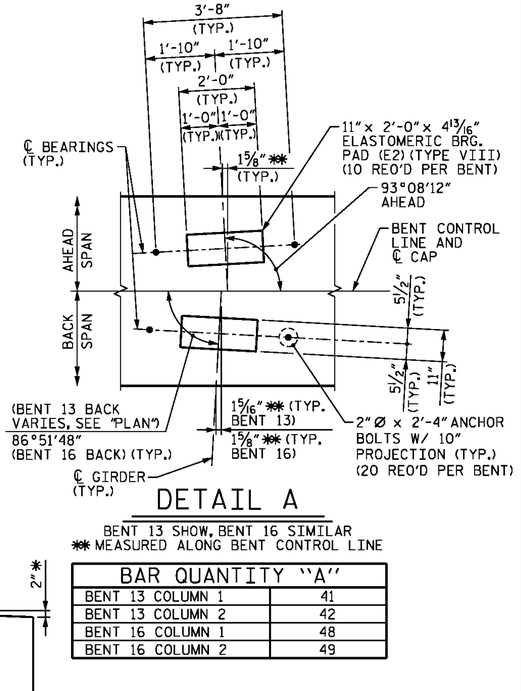


ELEVATION

FOOTING REINFORCEMENT NOT SHOWN FOR CLARITY, SEE SHEET 3 OF 5.



END VIEW



DETAIL A

BENT 13 SHOW, BENT 16 SIMILAR
✱✱ MEASURED ALONG BENT CONTROL LINE

BAR QUANTITY "A"	
BENT 13 COLUMN 1	41
BENT 13 COLUMN 2	42
BENT 16 COLUMN 1	48
BENT 16 COLUMN 2	49

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-
SHEET 1 OF 5

ELEVATION TABLE																
BENT	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
13	62.51	62.21	62.85	62.54	63.18	62.88	63.51	63.21	63.85	63.54	57.73	55.23	55.04	54.21	54.02	56.52
16	65.93	65.68	66.26	66.02	66.60	66.35	66.93	66.69	67.27	67.02	61.21	58.71	58.52	57.67	57.48	59.98

DESIGNED BY: E. ULLMER DATE : MAR 2016
DRAWN BY: M. HOBBS DATE : MAR 2016
CHECKED BY: B. LOFLIN DATE : MAR 2016
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C864482747...

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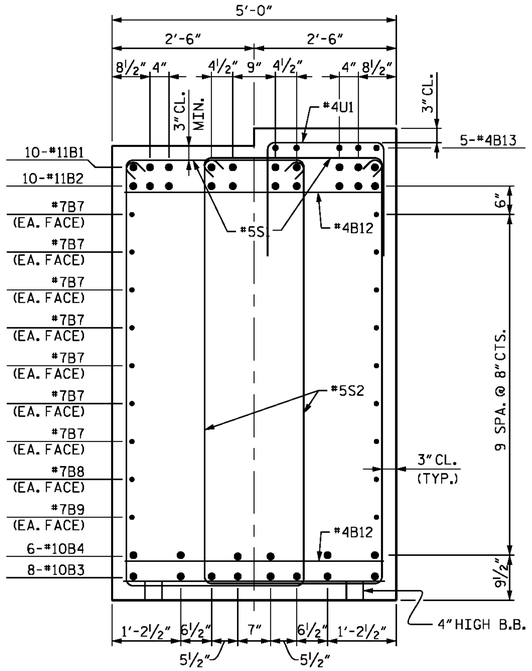
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

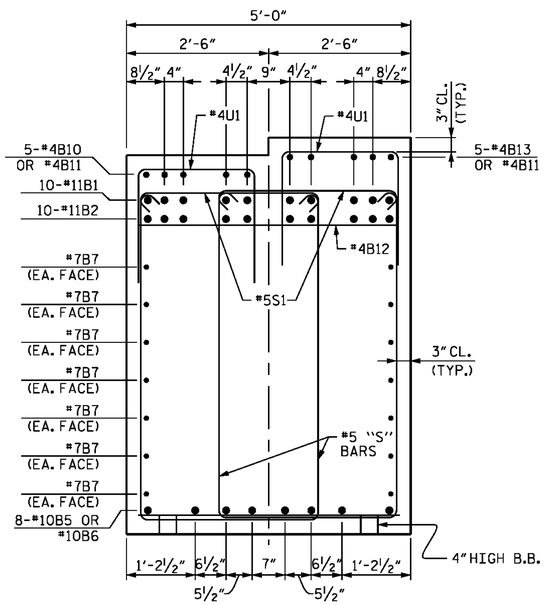
BENTS 13 AND 16 PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-170
1			3			TOTAL SHEETS
2			4			278

5/11/2016
400.333.B4929.SMU_IB13_1.dgn



SECTION A-A



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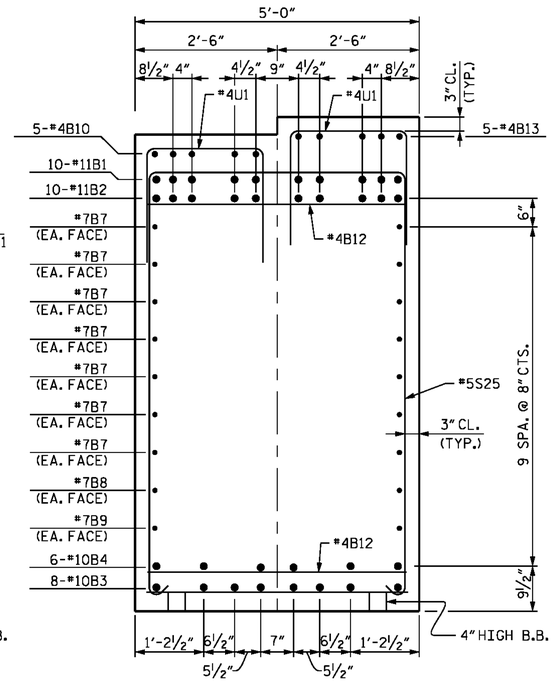
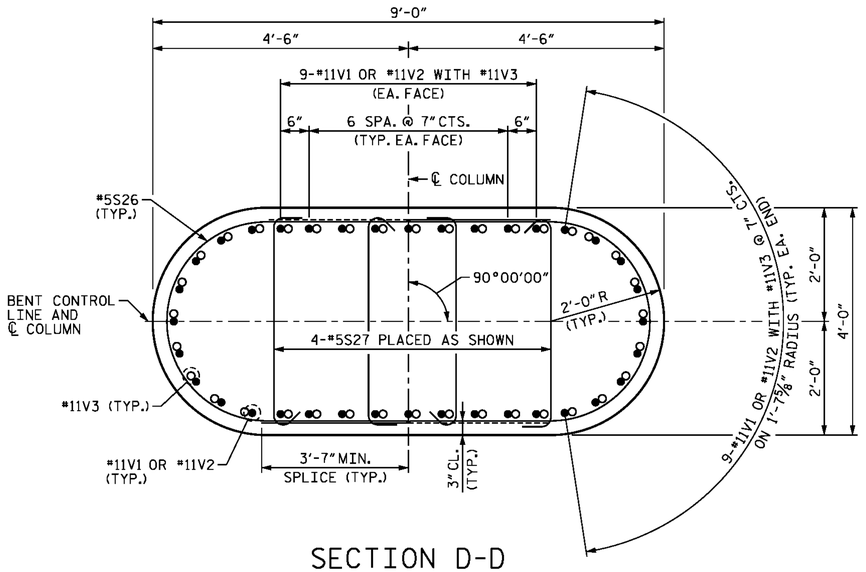


SECTION C-C



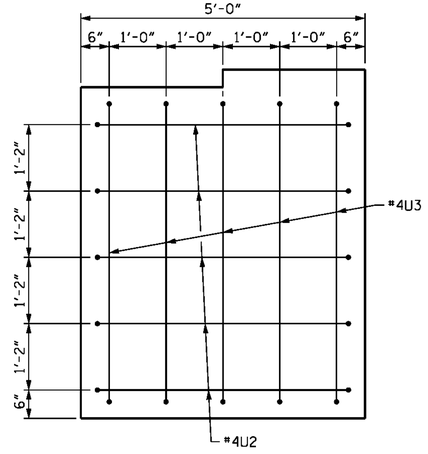
SECTION D-D

WHEN PLACING #5S27 BARS, ALTERNATE THE POSITION OF THE 135° HOOK HORIZONTALLY AND VERTICALLY.

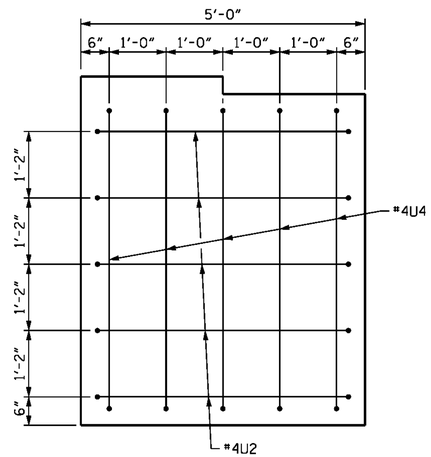
ALTERNATE DIRECTION OF #5S26 TO STAGGER LAPS.

NOTES

FOR NOTES, SEE SHEET 1 OF 5.



VIEW X-X



VIEW Y-Y

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 13 AND 16 SECTIONS AND DETAILS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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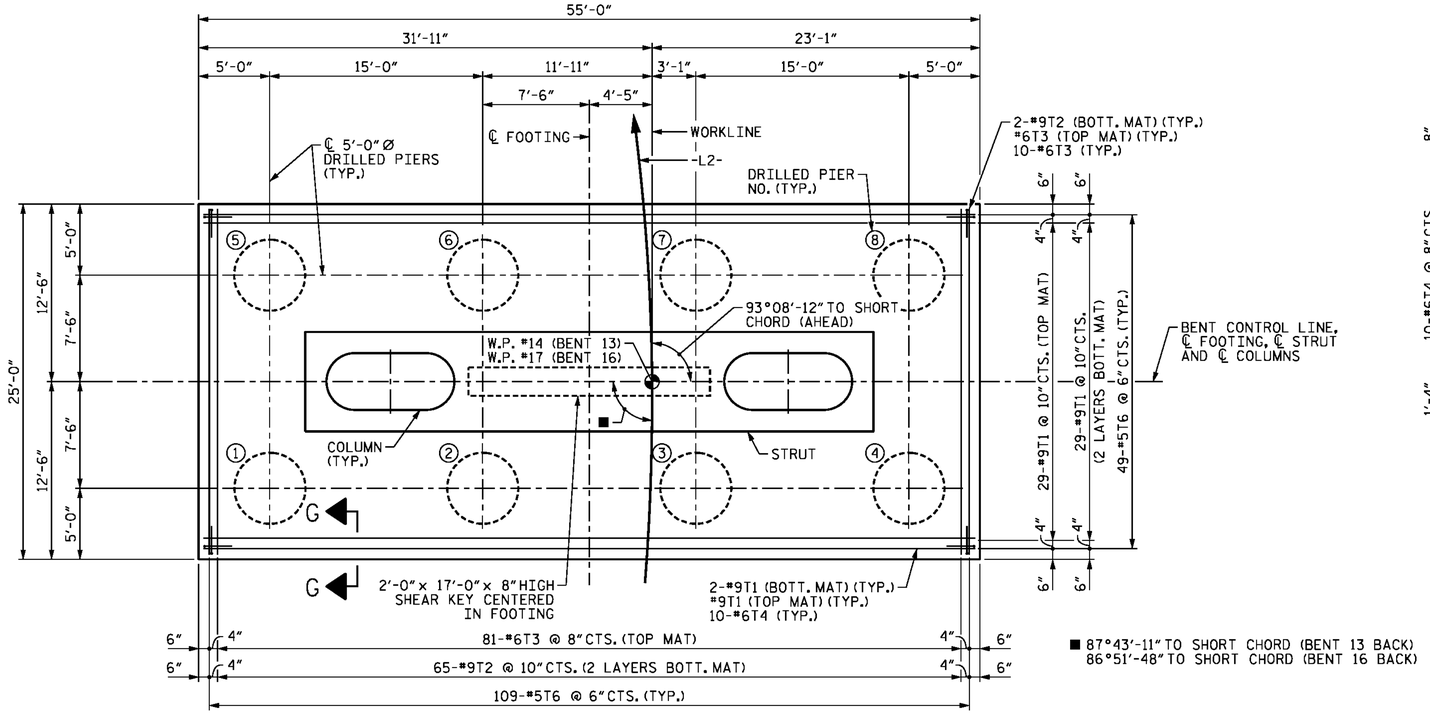
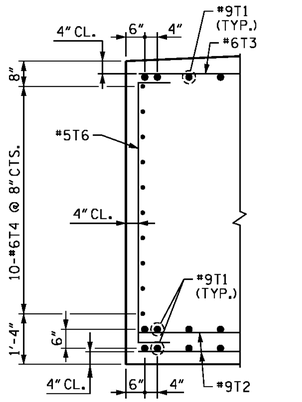
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-171
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	E. ULLMER	DATE : MAR 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	B. LOFLIN	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

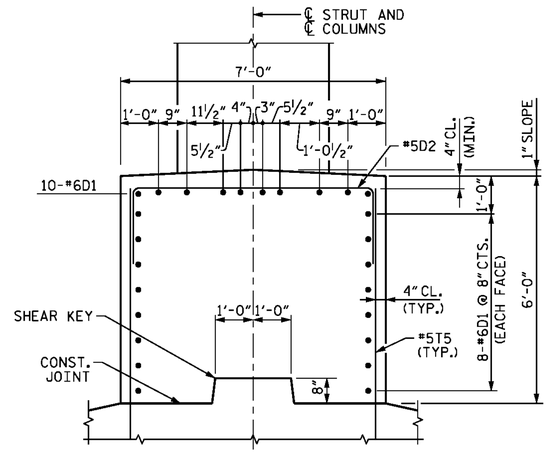
5/10/2016
400_335_B4929_SMU_IB13_2.dgn



FOOTING PLAN

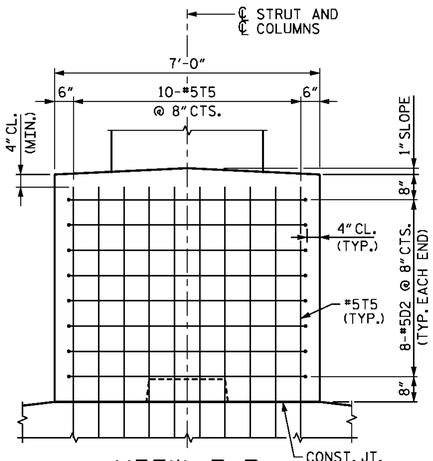


SECTION G-G

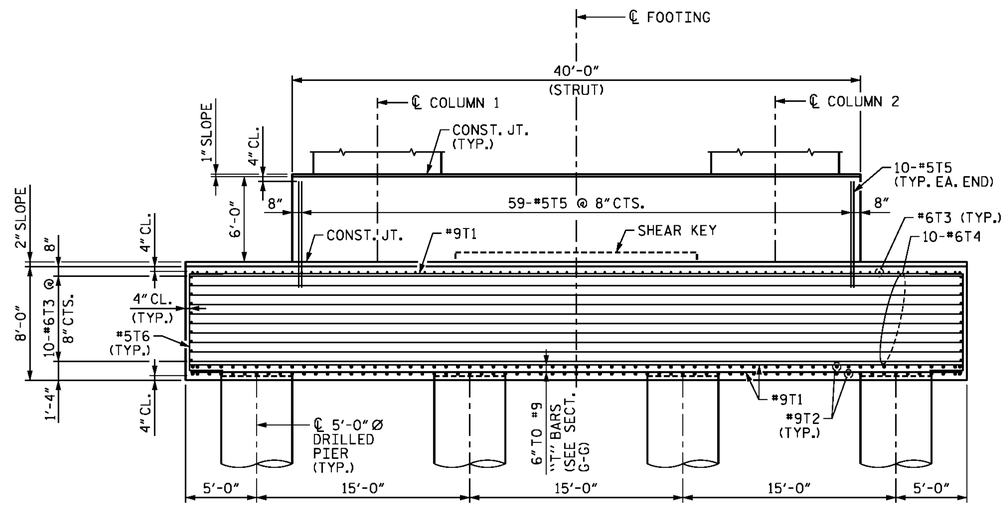


SECTION E-E

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.

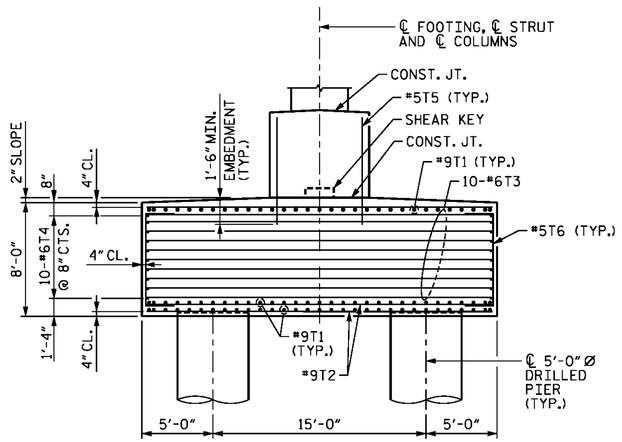


VIEW Z-Z



FOOTING AND STRUT ELEVATION

COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.



SIDE ELEVATION

COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.

NOTES

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 13 AND 16 SECTIONS AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-172
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

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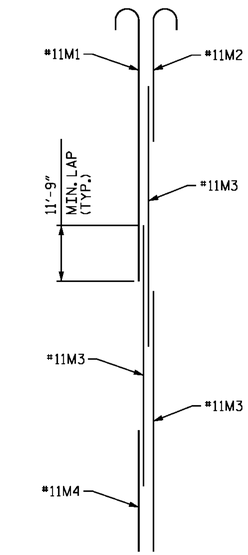
DESIGNED BY:	E. ULLMER	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	FEB 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/12/2016
400.337.B4929_SMU_IB13_3.dgn

NOTES

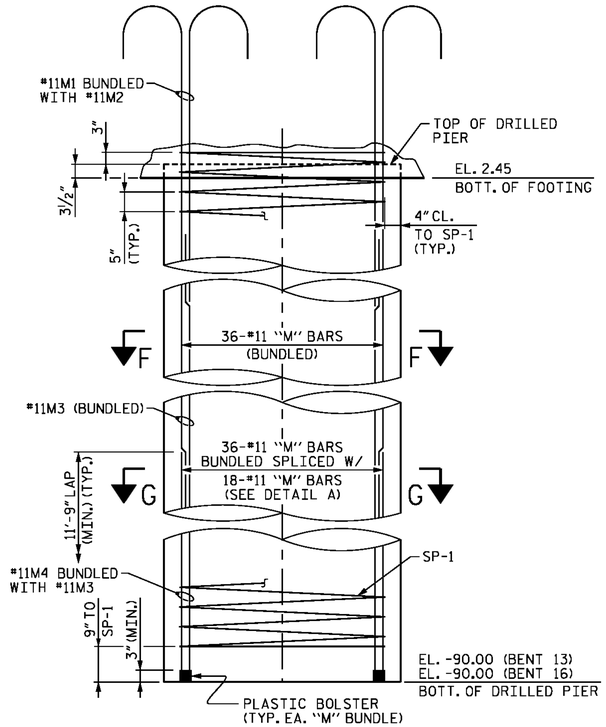
FOR NOTES, SEE SHEET 1 OF 5.

FOR BAR TYPES, SEE SHEET 5 OF 5.

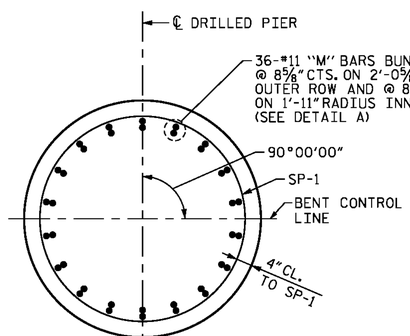


DETAIL A

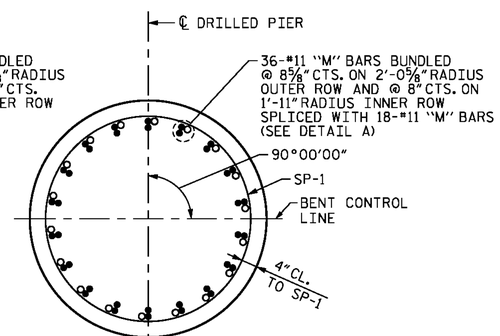
ONE BUNDLE SHOWN, REINFORCING STEEL IS TYPICAL FOR EACH BUNDLE.



DRILLED PIER ELEVATION



SECTION F-F



SECTION G-G

BILL OF MATERIAL

BENT 13

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-0"	1084
B5	8	#10	2	10'-0"	344
B6	8	#10	3	10'-0"	344
B7	14	#7	STR	49'-10"	1426
B8	2	#7	STR	47'-4"	193
B9	2	#7	STR	44'-8"	183
B10	20	#4	STR	6'-3"	84
B11	10	#4	STR	5'-2"	35
B12	24	#4	STR	4'-6"	72
B13	20	#4	STR	12'-2"	163
D1	26	#6	STR	39'-4"	1536
D2	48	#5	9	10'-4"	517
M1	144	#11	4	46'-2"	35321
M2	144	#11	4	22'-10"	17469
M3	432	#11	STR	50'-0"	114761
M4	144	#11	STR	26'-8"	20402
S1	110	#5	5	4'-1"	468
S2	66	#5	6	19'-0"	1308
S3	2	#5	6	18'-9"	39
S4	2	#5	6	18'-4"	38
S5	2	#5	6	17'-11"	37
S6	2	#5	6	17'-5"	36
S7	2	#5	6	17'-0"	35
S8	2	#5	6	16'-7"	35
S9	2	#5	6	16'-2"	34
S10	2	#5	6	15'-8"	33
S11	2	#5	6	15'-3"	32
S12	2	#5	6	14'-10"	31
S13	2	#5	6	14'-5"	30
S14	2	#5	6	18'-11"	39
S15	2	#5	6	18'-7"	39
S16	2	#5	6	18'-3"	38
S17	2	#5	6	17'-9"	37
S18	2	#5	6	17'-5"	36
S19	2	#5	6	17'-0"	35
S20	2	#5	6	16'-7"	35
S21	2	#5	6	16'-3"	34
S22	2	#5	6	15'-10"	33
S23	2	#5	6	15'-5"	32
S24	2	#5	6	15'-0"	31
S25	24	#5	6	20'-4"	509
S26	530	#5	7	14'-1"	7785
S27	1060	#5	11	4'-6"	4975

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
T1	93	9	STR	54'-4"	17180
T2	134	9	STR	24'-4"	11086
T3	83	6	STR	24'-4"	3034
T4	20	6	STR	54'-4"	1632
T5	138	5	STR	7'-2"	1032
T6	316	5	9	8'-6"	2801
U1	116	4	9	6'-0"	465
U2	10	4	9	7'-4"	49
U3	5	4	9	8'-2"	27
U4	5	4	9	8'-0"	27
V1	36	11	4	47'-5"	9069
V2	36	11	4	48'-3"	9229
V3	72	11	8	21'-2"	8097

EPOXY COATED REINFORCING STEEL LBS. 280,328

SP-1	8	*	10	3,019'-5"	25,194

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 25,194

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 412.4
POUR #3 - STRUT	C.Y. 61.5
POUR #4 - COLUMNS	C.Y. 91.8
POUR #5 - CAP	C.Y. 75.4
CLASS "AA" CONCRETE	C.Y. 641.1

5'-0"Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN. FT.	741.9
POUR 1 - DRILLED PIER	C.Y.	539.6
PERMANENT STEEL CASING FOR 5'-0"Ø DRILLED PIERS	LIN. FT.	245.9
CSL TUBES	LIN. FT.	3,770

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 5

DESIGNED BY:	E. ULLMER	DATE :	MAR 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

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PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

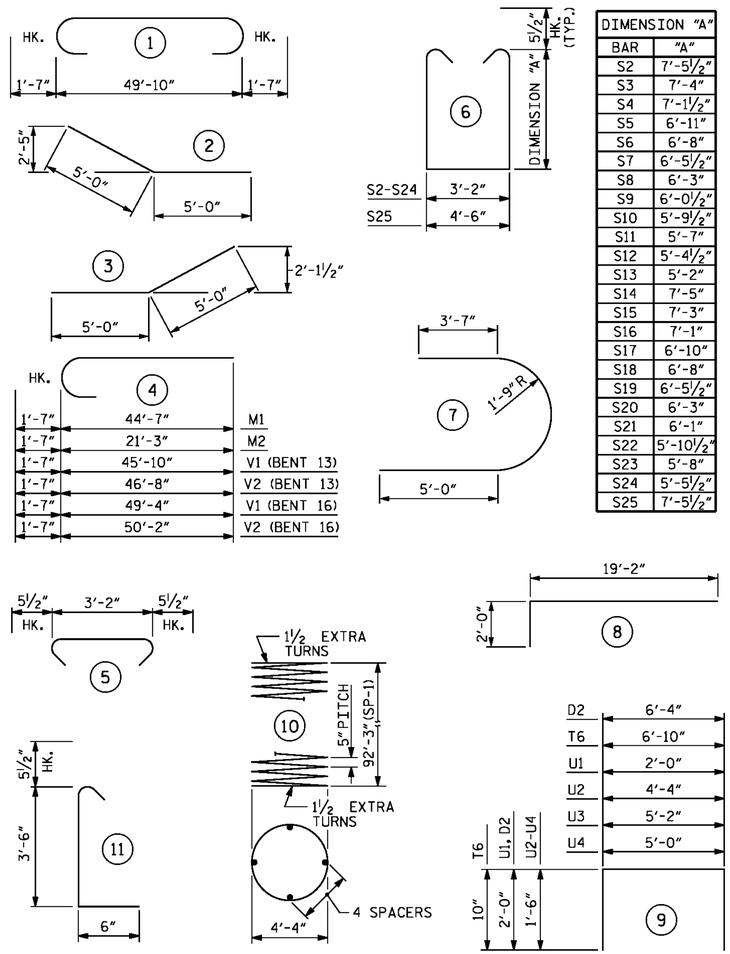
BENTS 13 AND 16 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-173
1			3			TOTAL SHEETS
2			4			278

NOTES

FOR NOTES, SEE SHEET 1 OF 5.

BAR TYPES



DIMENSION "A"	
BAR	"A"
S2	7'-5½"
S3	7'-4"
S4	7'-1½"
S5	6'-11"
S6	6'-8"
S7	6'-5½"
S8	6'-3"
S9	6'-0½"
S10	5'-9½"
S11	5'-7"
S12	5'-4½"
S13	5'-2"
S14	7'-5"
S15	7'-3"
S16	7'-1"
S17	6'-10"
S18	6'-8"
S19	6'-5½"
S20	6'-3"
S21	6'-1"
S22	5'-10½"
S23	5'-8"
S24	5'-5½"
S25	7'-5½"

ALL BAR DIMENSIONS ARE OUT TO OUT.

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

BILL OF MATERIAL

BENT 16

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-0"	1084
B5	8	#10	2	10'-0"	344
B6	8	#10	3	10'-0"	344
B7	14	#7	STR	49'-10"	1426
B8	2	#7	STR	47'-4"	193
B9	2	#7	STR	44'-8"	183
B10	20	#4	STR	6'-3"	84
B11	10	#4	STR	5'-2"	35
B12	24	#4	STR	4'-6"	72
B13	20	#4	STR	12'-2"	163
D1	26	#6	STR	39'-4"	1536
D2	48	#5	9	10'-4"	517
M1	144	#11	4	46'-2"	35321
M2	144	#11	4	22'-10"	17469
M3	432	#11	STR	50'-0"	114761
M4	144	#11	STR	26'-8"	20402
S1	110	#5	5	4'-1"	468
S2	66	#5	6	19'-0"	1308
S3	2	#5	6	18'-9"	39
S4	2	#5	6	18'-4"	38
S5	2	#5	6	17'-11"	37
S6	2	#5	6	17'-5"	36
S7	2	#5	6	17'-0"	35
S8	2	#5	6	16'-7"	35
S9	2	#5	6	16'-2"	34
S10	2	#5	6	15'-8"	33
S11	2	#5	6	15'-3"	32
S12	2	#5	6	14'-10"	31
S13	2	#5	6	14'-5"	30
S14	2	#5	6	18'-11"	39
S15	2	#5	6	18'-7"	39
S16	2	#5	6	18'-3"	38
S17	2	#5	6	17'-9"	37
S18	2	#5	6	17'-5"	36
S19	2	#5	6	17'-0"	35
S20	2	#5	6	16'-7"	35
S21	2	#5	6	16'-3"	34
S22	2	#5	6	15'-10"	33
S23	2	#5	6	15'-5"	32
S24	2	#5	6	15'-0"	31
S25	24	#5	6	20'-4"	509
S26	558	#5	7	14'-1"	8196
S27	1116	#5	11	4'-6"	5238

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
T1	93	#9	STR	54'-4"	17180
T2	134	#9	STR	24'-4"	11086
T3	83	#6	STR	24'-4"	3034
T4	20	#6	STR	54'-4"	1632
T5	138	#5	STR	7'-2"	1032
T6	316	#5	9	8'-6"	2801
U1	116	#4	9	6'-0"	465
U2	10	#4	9	7'-4"	49
U3	5	#4	9	8'-2"	27
U4	5	#4	9	8'-0"	27
V1	36	#11	4	50'-11"	9739
V2	36	#11	4	51'-9"	9898
V3	72	#11	8	21'-2"	8097

SP-1	8	*	10	3,019'-5"	25,194

EPOXY COATED REINFORCING STEEL LBS. 282,341

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 25,194

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 412.4
POUR #3 - STRUT	C.Y. 61.5
POUR #4 - COLUMNS	C.Y. 100.7
POUR #5 - CAP	C.Y. 75.4

CLASS "AA" CONCRETE C.Y. 650.0

5'-0" Ø DRILLED PIERS QUANTITIES:

DRILLED PIER	LIN. FT.	741.9
POUR 1 - DRILLED PIER	C.Y.	539.6
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	LIN. FT.	245.9
CSL TUBES	LIN. FT.	3,730

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 5

DESIGNED BY:	E. ULLMER	DATE :	MAR 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
C0F1C8644B274F7...

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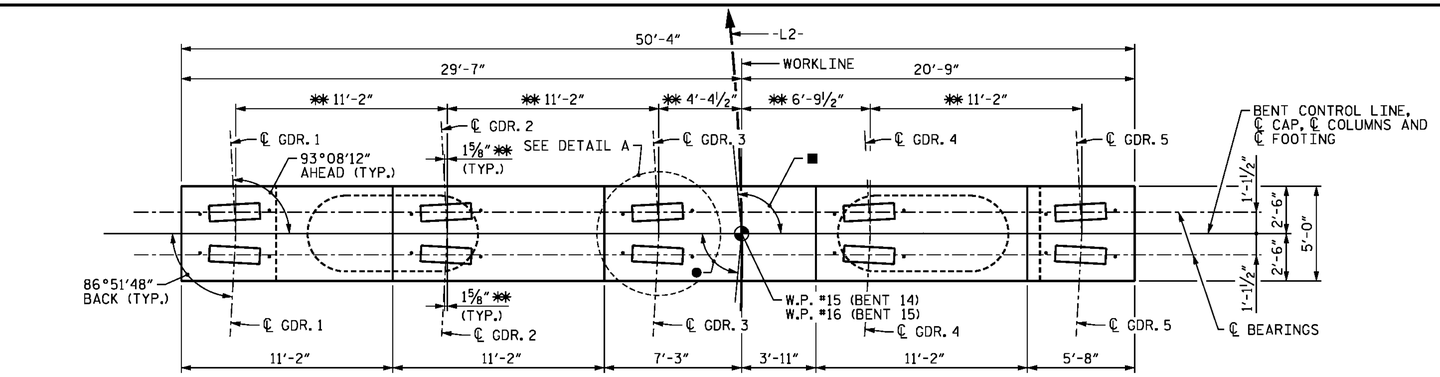
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 13 AND 16 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-174
1			3			TOTAL SHEETS
2			4			278

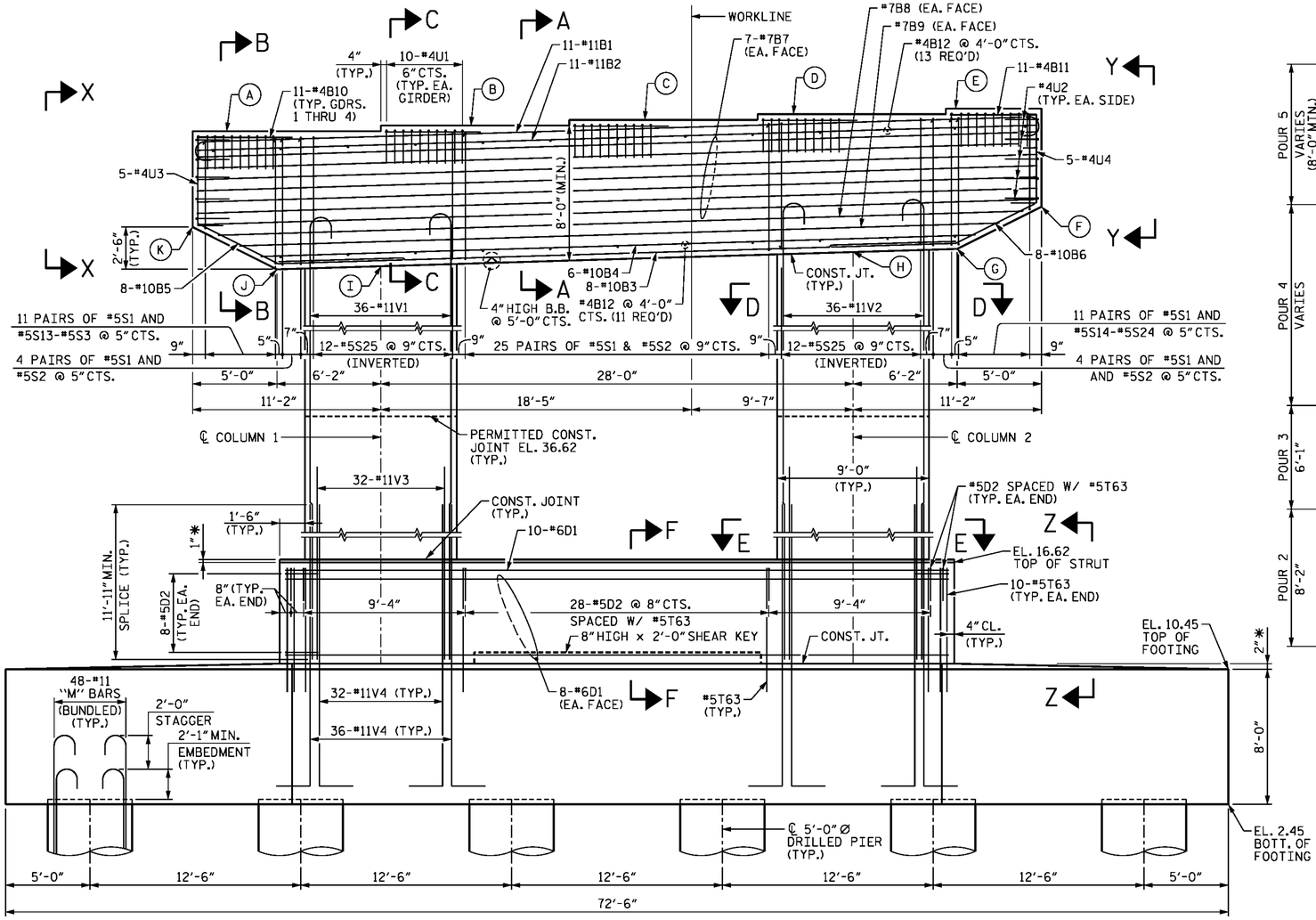
5/10/2016
400.341_B4929_SMU_IB13.5.dgn



■ 93°08'12" TO SHORT CHORD (AHEAD)
● 86°51'48" TO SHORT CHORD (BACK)

PLAN

✱✱ MEASURED ALONG BENT CONTROL LINE



ELEVATION

FOOTING REINFORCEMENT NOT SHOWN FOR CLARITY, SEE SHEET 3 OF 5.

ELEVATION TABLE												
BENT	A	B	C	D	E	F	G	H	I	J	K
14	67.50	67.83	68.17	68.50	68.84	63.02	60.52	60.34	59.50	59.31	61.81
15	68.90	69.24	69.57	69.91	70.24	64.42	61.92	61.74	60.90	60.71	63.21

NOTES

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

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

"T" BARS IN FOOTING MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN AND DRILLED PIER REINFORCEMENT.

FOR FOUNDATION NOTES, SEE "FOUNDATION NOTES" SHEET.

FOR SECTIONS AND VIEWS, SEE SHEET 2 OF 5 AND SHEET 3 OF 5.

FOR FOOTING AND DRILLED PIER REINFORCING DETAILS, SEE SHEET 3 OF 5 AND SHEET 4 OF 5.

✱ THE FOOTING AND STRUT ARE SLOPED TO DRAIN.

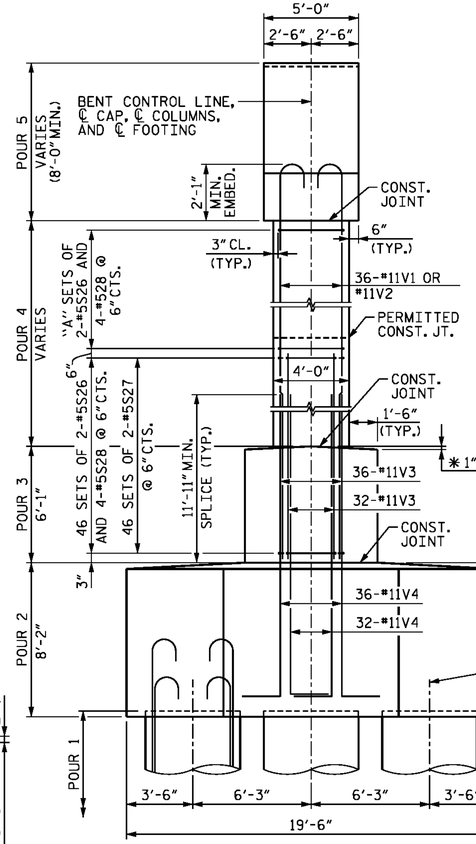
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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.

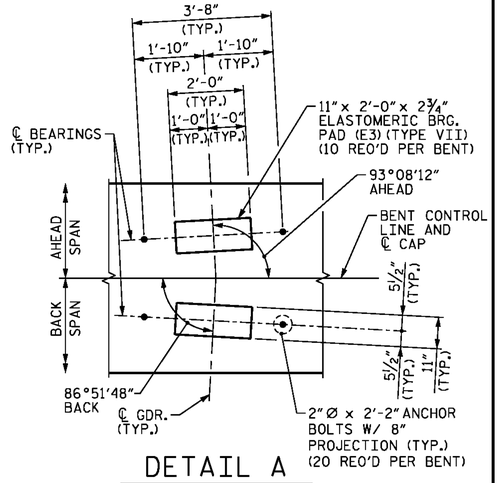
NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.

PLASTIC LUMBER FENDER SYSTEM IS REQUIRED AT BENTS 14 AND 15 BUT IS NOT SHOWN. SEE "PLASTIC LUMBER FENDERING SYSTEM" SHEET FOR DETAILS.



END VIEW



DETAIL A

BAR QUANTITY "A"	
BENT 14 COLUMN 1	51
BENT 14 COLUMN 2	53
BENT 15 COLUMN 1	54
BENT 15 COLUMN 2	56

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 14 AND 15 PLAN AND ELEVATION

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

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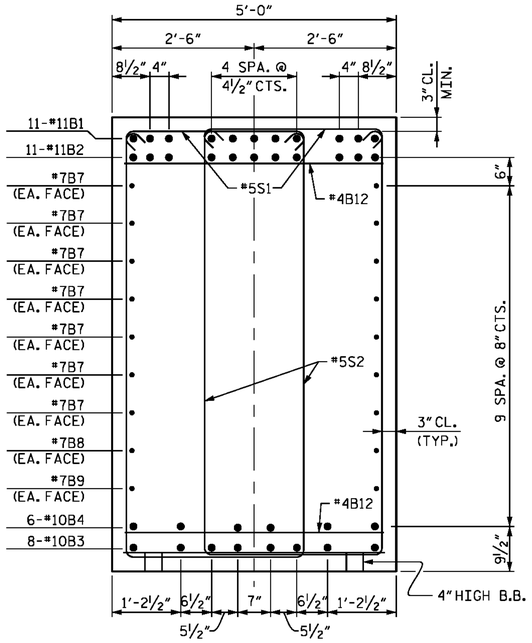
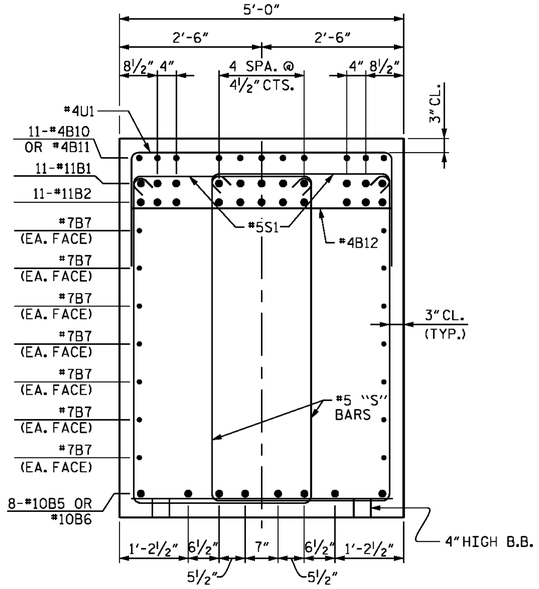
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY: E. ULLMER DATE: FEB 2016
DRAWN BY: M. HOBBS DATE: FEB 2016
CHECKED BY: B. LOFLIN DATE: MAR 2016
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE: MAY 2016

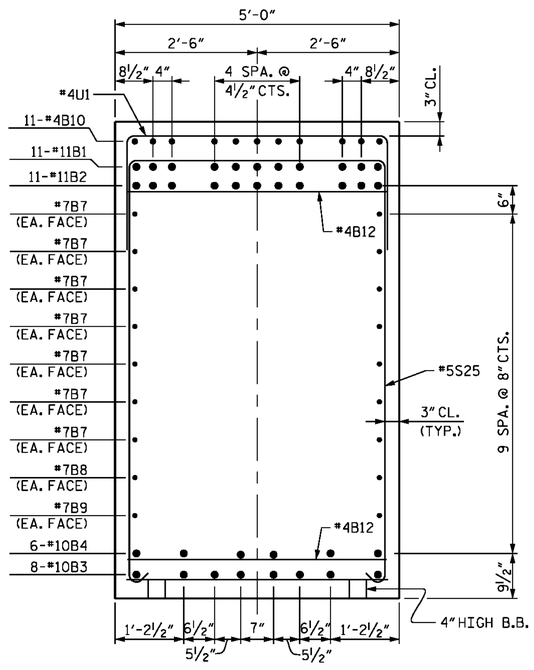
5/11/2016
400_343_B4929_SMU_TB14_1.dgn



SECTION A-A



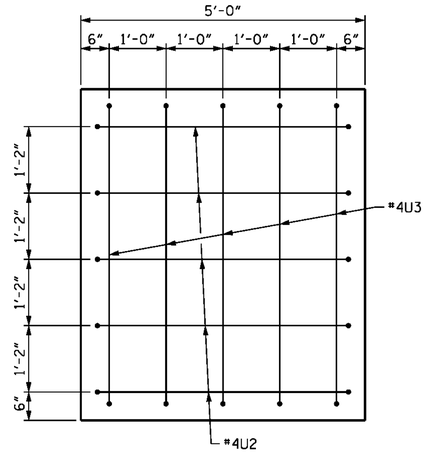
SECTION B-B



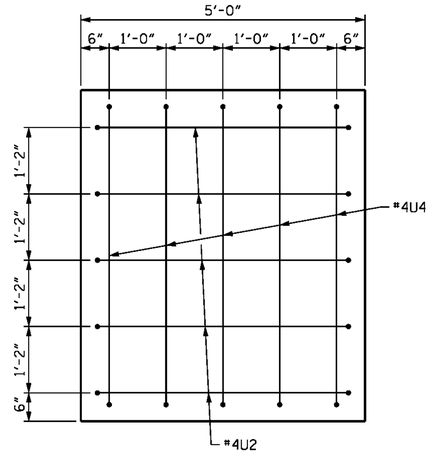
SECTION C-C

NOTES

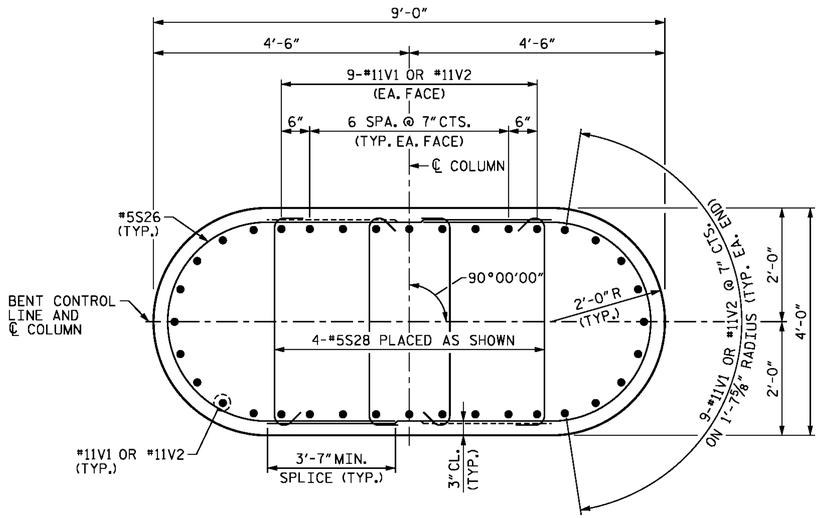
FOR NOTES, SEE SHEET 1 OF 5.



VIEW X-X



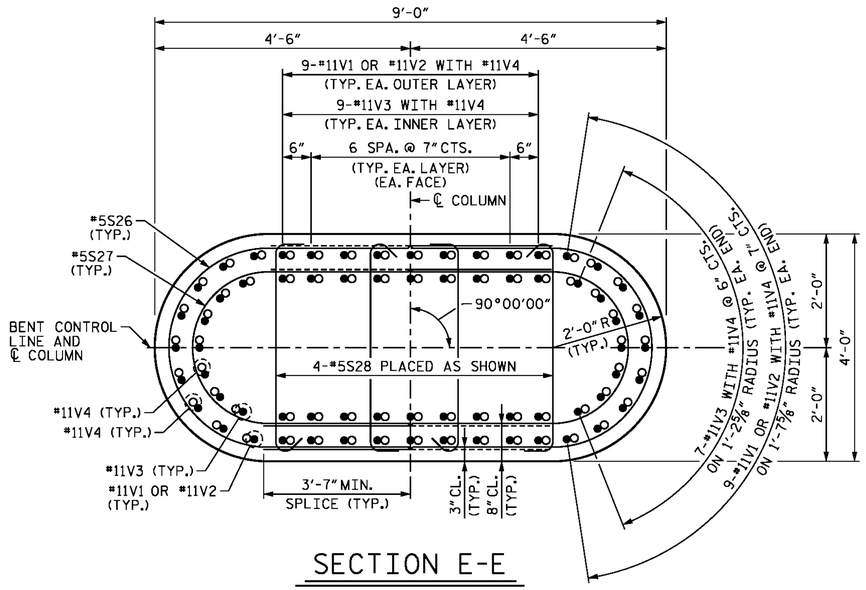
VIEW Y-Y



SECTION D-D

WHEN PLACING #5S28 BARS, ALTERNATE THE POSITION OF THE 135° HOOK HORIZONTALLY AND VERTICALLY.

ALTERNATE DIRECTION OF #5S26 TO STAGGER LAPS.



SECTION E-E

WHEN PLACING #5S28 BARS, ALTERNATE THE POSITION OF THE 135° HOOK HORIZONTALLY AND VERTICALLY.

ALTERNATE DIRECTION OF #5S26 AND #5S27 TO STAGGER LAPS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 14 AND 15 SECTIONS AND DETAILS

DESIGNED BY:	E. ULLMER	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1CB644B274F7...

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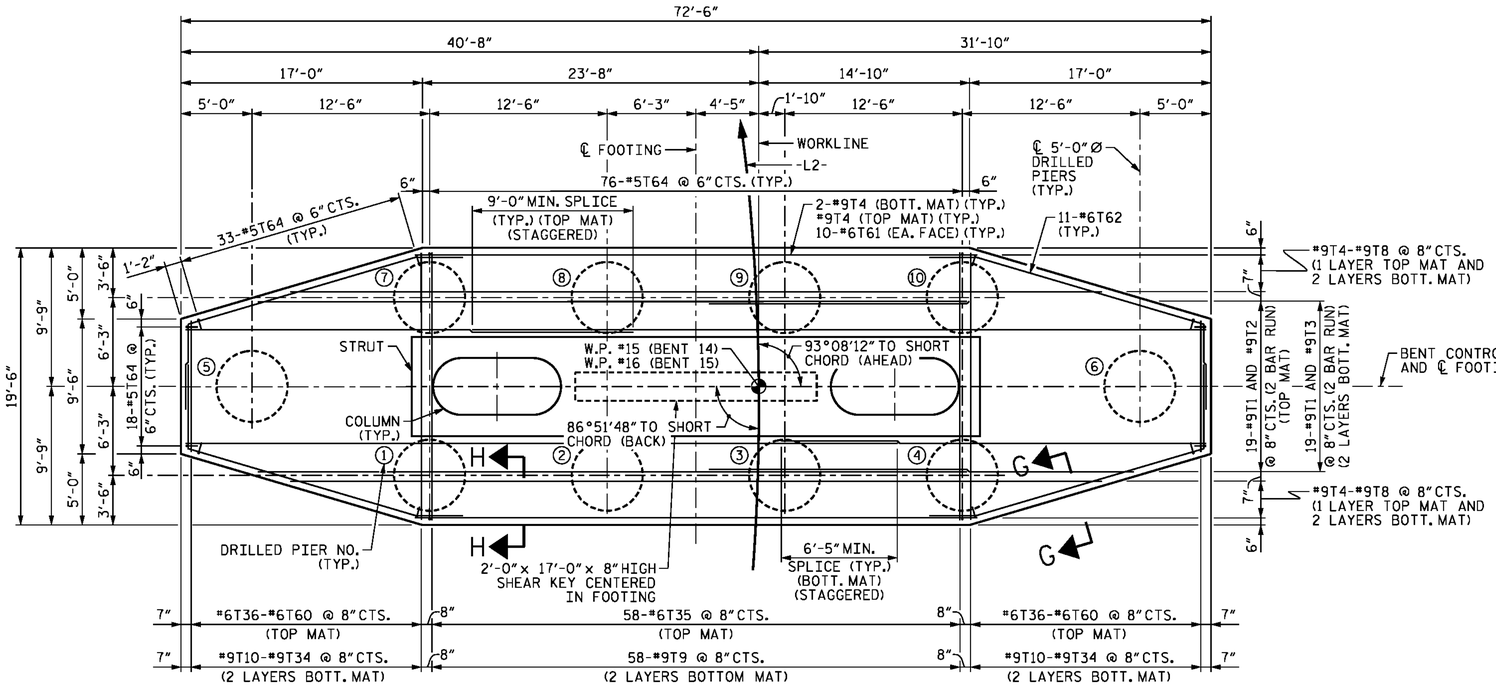
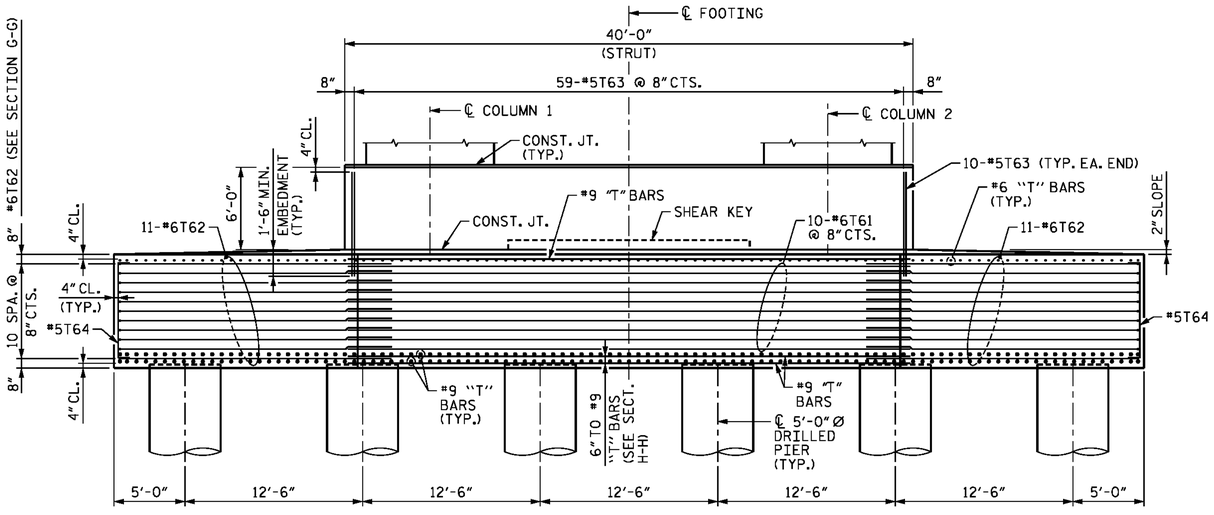
NO.	BY:	DATE:	NO.	BY:	DATE:	S-176
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400_345_B4929_SMU_IB14_2.dgn

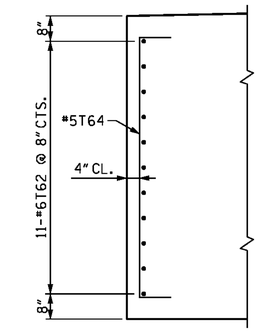


FOOTING PLAN

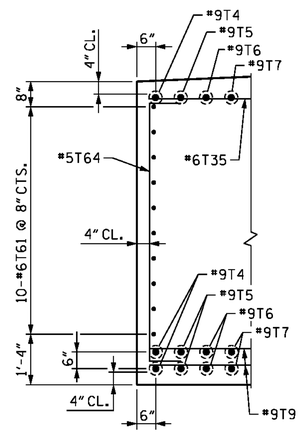


FOOTING AND STRUT ELEVATION

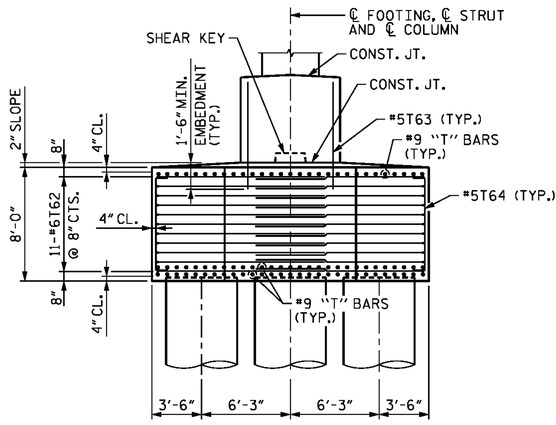
COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.



SECTION G-G



SECTION H-H

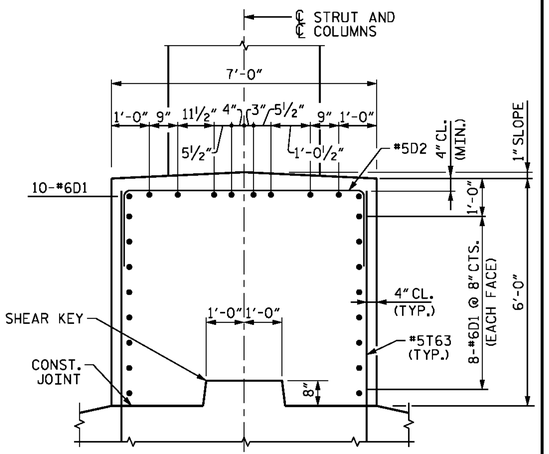


SIDE ELEVATION

COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.

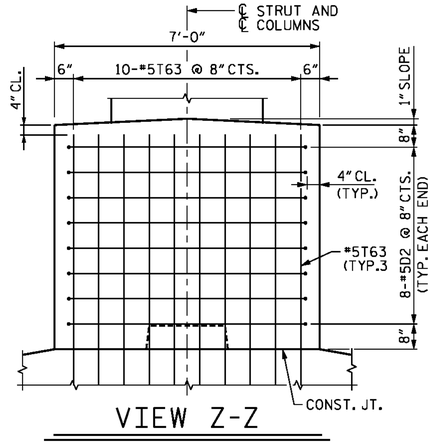
NOTES

FOR NOTES, SEE SHEET 1 OF 5.



SECTION F-F

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.



VIEW Z-Z

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 5

DESIGNED BY:	E. ULLMER	DATE :	FEB 2016		
DRAWN BY:	M. HOBBS	DATE :	MAR 2016		
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
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NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 14 AND 15 FOOTING DETAILS

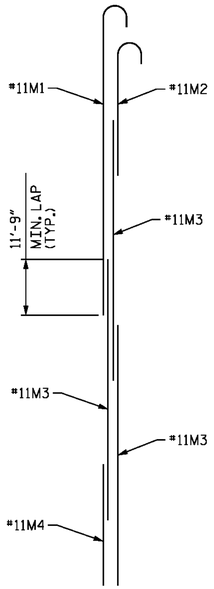
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-177
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400_347_B4929_SMU_IB14_3.dgn

NOTES

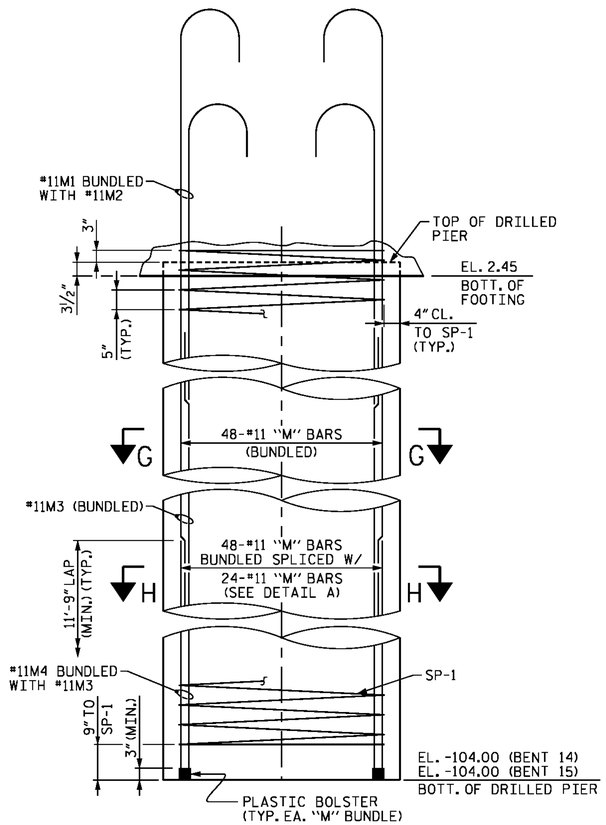
FOR NOTES, SEE SHEET 1 OF 5.

FOR BAR TYPES, SEE SHEET 5 OF 5.

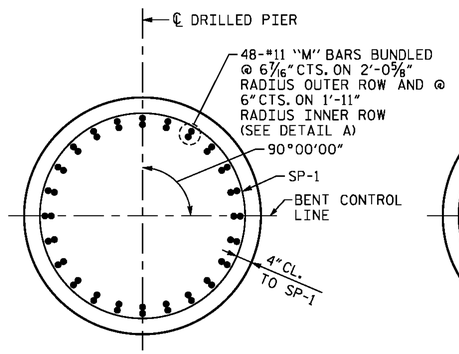


DETAIL A

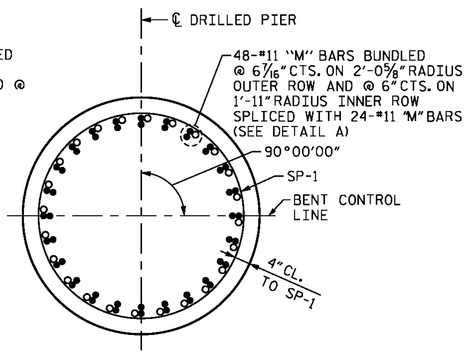
ONE BUNDLE SHOWN, REINFORCING STEEL IS TYPICAL FOR EACH BUNDLE.



DRILLED PIER ELEVATION



SECTION G-G



SECTION H-H

BILL OF MATERIAL

BENT 14

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	11	11	1	53'-0"	3097	T1	57	9	STR	50'-3"	9738	T51	2	#6	STR	15'-0"	45
B2	11	11	STR	49'-10"	2912	T2	38	9	STR	30'-7"	3951	T52	2	#6	STR	15'-5"	46
B3	8	10	STR	40'-4"	1388	T3	38	9	STR	28'-0"	3618	T53	2	#6	STR	15'-9"	47
B4	6	10	STR	42'-0"	1084	T4	6	9	STR	39'-6"	806	T54	2	#6	STR	16'-2"	49
B5	8	10	2	10'-0"	344	T5	6	9	STR	44'-0"	898	T55	2	#6	STR	16'-7"	50
B6	8	10	3	10'-0"	344	T6	6	9	STR	48'-7"	991	T56	2	#6	STR	17'-0"	51
B7	14	7	STR	49'-10"	1426	T7	6	9	STR	53'-1"	1083	T57	2	#6	STR	17'-4"	52
B8	2	7	STR	47'-4"	193	T8	6	9	STR	57'-8"	1176	T58	2	#6	STR	17'-9"	53
B9	2	7	STR	44'-8"	183	T9	116	9	STR	18'-10"	7428	T59	2	#6	STR	18'-2"	55
B10	44	4	STR	6'-3"	184	T10	4	9	STR	9'-1"	124	T60	2	#6	STR	18'-6"	56
B11	11	4	STR	5'-2"	38	T11	4	9	STR	9'-6"	129	T61	20	#6	STR	38'-6"	1157
B12	24	4	STR	4'-6"	72	T12	4	9	STR	9'-11"	135	T62	44	#6	8	28'-5"	1878
						T13	4	9	STR	10'-3"	139	T63	138	#5	STR	7'-2"	1032
D1	26	6	STR	39'-4"	1536	T14	4	9	STR	10'-8"	145	T64	320	#5	9	8'-6"	2837
D2	48	5	9	10'-4"	517	T15	4	9	STR	11'-1"	151						
						T16	4	9	STR	11'-6"	156	U1	50	#4	9	8'-6"	284
M1	240	11	4	55'-1"	70238	T17	4	9	STR	11'-10"	161	U2	10	#4	9	7'-4"	49
M2	240	11	4	26'-8"	34003	T18	4	9	STR	12'-3"	167	U3	5	#4	9	8'-2"	27
M3	720	11	STR	55'-0"	210395	T19	4	9	STR	12'-8"	172	U4	5	#4	9	8'-0"	27
M4	240	11	STR	28'-7"	36447	T20	4	9	STR	13'-0"	177						
						T21	4	9	STR	13'-5"	182	V1	36	#11	4	52'-8"	10073
S1	110	5	5	4'-1"	468	T22	4	9	STR	13'-10"	188	V2	36	#11	4	53'-7"	10249
S2	66	5	6	19'-0"	1308	T23	4	9	STR	14'-3"	194	V3	64	#11	STR	23'-0"	7821
S3	2	5	6	18'-9"	39	T24	4	9	STR	14'-7"	198	V4	136	#11	12	21'-2"	15294
S4	2	5	6	18'-4"	38	T25	4	9	STR	15'-0"	204						
S5	2	5	6	17'-11"	37	T26	4	9	STR	15'-5"	210						
S6	2	5	6	17'-5"	36	T27	4	9	STR	15'-9"	214						
S7	2	5	6	17'-0"	35	T28	4	9	STR	16'-2"	220						
S8	2	5	6	16'-7"	35	T29	4	9	STR	16'-7"	226						
S9	2	5	6	16'-2"	34	T30	4	9	STR	17'-0"	231						
S10	2	5	6	15'-8"	33	T31	4	9	STR	17'-4"	236						
S11	2	5	6	15'-3"	32	T32	4	9	STR	17'-9"	241						
S12	2	5	6	14'-10"	31	T33	4	9	STR	18'-2"	247						
S13	2	5	6	14'-5"	30	T34	4	9	STR	18'-6"	252						
S14	2	5	6	18'-11"	39	T35	58	6	STR	18'-10"	1641	SP-1	10	*	10	3,471'-6"	36,208
S15	2	5	6	18'-7"	39	T36	2	6	STR	9'-1"	27						
S16	2	5	6	18'-3"	38	T37	2	6	STR	9'-6"	29						
S17	2	5	6	17'-9"	37	T38	2	6	STR	9'-11"	30						
S18	2	5	6	17'-5"	36	T39	2	6	STR	10'-3"	31						
S19	2	5	6	17'-0"	35	T40	2	6	STR	10'-8"	32						
S20	2	5	6	16'-7"	35	T41	2	6	STR	11'-1"	33						
S21	2	5	6	16'-3"	34	T42	2	6	STR	11'-6"	35						
S22	2	5	6	15'-10"	33	T43	2	6	STR	11'-10"	36						
S23	2	5	6	15'-5"	32	T44	2	6	STR	12'-3"	37						
S24	2	5	6	15'-0"	31	T45	2	6	STR	12'-8"	38						
S25	24	5	6	20'-4"	509	T46	2	6	STR	13'-0"	39						
S26	392	5	7	14'-1"	5758	T47	2	6	STR	13'-5"	40						
S27	184	5	7	12'-10"	2463	T48	2	6	STR	13'-10"	42						
S28	784	5	11	4'-6"	3680	T49	2	6	STR	14'-3"	43						
						T50	2	6	STR	14'-7"	44						

EPOXY COATED REINFORCING STEEL LBS. 467,153

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 36,208

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y.	373.2
POUR #3 - STRUT	C.Y.	61.5
POUR #4 - COLUMNS	C.Y.	104.6
POUR #5 - CAP	C.Y.	74.0
CLASS "AA" CONCRETE	C.Y.	613.3

5'-0" Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN. FT.	1067.4
POUR 1 - DRILLED PIER	C.Y.	776.3
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	LIN. FT.	427.4
CSL TUBES	LIN. FT.	5,412
SPT TESTING	EA.	10

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 14 AND 15 BILL OF MATERIALS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

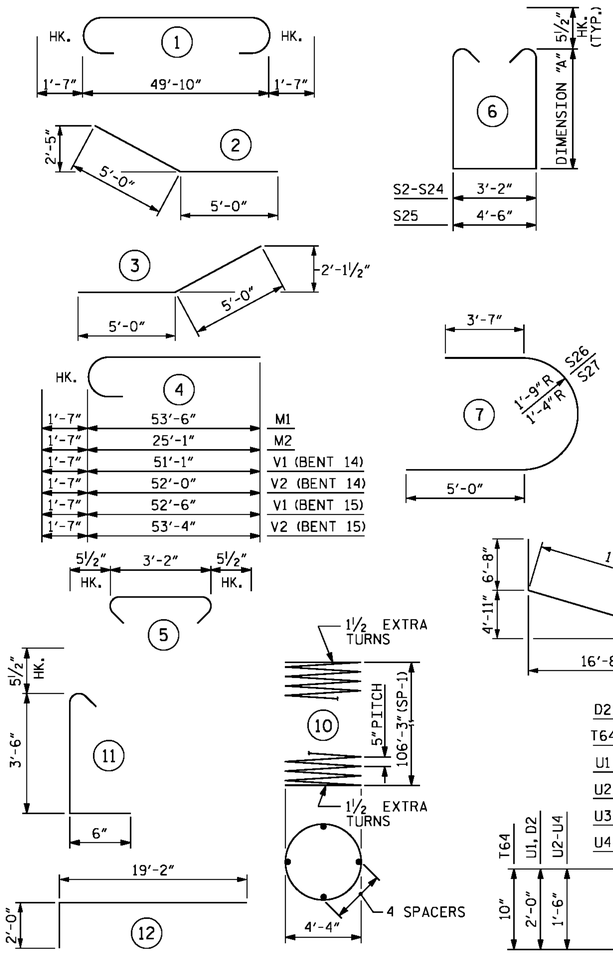
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-178
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	E. ULLMER	DATE : MAR 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	B. LOFLIN	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/10/2016
400_349_B4929_SMU_IB14_4.dgn

BAR TYPES



DIMENSION "A"	
BAR	"A"
S2	7'-5½"
S3	7'-4"
S4	7'-1½"
S5	6'-11"
S6	6'-8"
S7	6'-5½"
S8	6'-3"
S9	6'-0½"
S10	5'-9½"
S11	5'-7"
S12	5'-4½"
S13	5'-2"
S14	7'-5"
S15	7'-3"
S16	7'-1"
S17	6'-10"
S18	6'-8"
S19	6'-5½"
S20	6'-3"
S21	6'-1"
S22	5'-10½"
S23	5'-8"
S24	5'-5½"
S25	7'-5½"

ALL BAR DIMENSIONS ARE OUT TO OUT.

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

BILL OF MATERIAL

BENT 15

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	11	11	1	53'-0"	3097	T1	57	9	STR	50'-3"	9738	T51	2	6	STR	15'-0"	45
B2	11	11	STR	49'-10"	2912	T2	38	9	STR	30'-7"	3951	T52	2	6	STR	15'-5"	46
B3	8	10	STR	40'-4"	1388	T3	38	9	STR	28'-0"	3618	T53	2	6	STR	15'-9"	47
B4	6	10	STR	42'-0"	1084	T4	6	9	STR	39'-6"	806	T54	2	6	STR	16'-2"	49
B5	8	10	2	10'-0"	344	T5	6	9	STR	44'-0"	898	T55	2	6	STR	16'-7"	50
B6	8	10	3	10'-0"	344	T6	6	9	STR	48'-7"	991	T56	2	6	STR	17'-0"	51
B7	14	7	STR	49'-10"	1426	T7	6	9	STR	53'-1"	1083	T57	2	6	STR	17'-4"	52
B8	2	7	STR	47'-4"	193	T8	6	9	STR	57'-8"	1176	T58	2	6	STR	17'-9"	53
B9	2	7	STR	44'-8"	183	T9	116	9	STR	18'-10"	7428	T59	2	6	STR	18'-2"	55
B10	44	4	STR	6'-3"	184	T10	4	9	STR	9'-1"	124	T60	2	6	STR	18'-6"	56
B11	11	4	STR	5'-2"	38	T11	4	9	STR	9'-6"	129	T61	20	6	STR	38'-6"	1157
B12	24	4	STR	4'-6"	72	T12	4	9	STR	9'-11"	135	T62	44	6	8	28'-5"	1878
						T13	4	9	STR	10'-3"	139	T63	138	5	STR	7'-2"	1032
D1	26	6	STR	39'-4"	1536	T14	4	9	STR	10'-8"	145	T64	320	5	9	8'-6"	2837
D2	48	5	9	10'-4"	517	T15	4	9	STR	11'-1"	151						
						T16	4	9	STR	11'-6"	156	U1	50	4	9	8'-6"	284
M1	240	11	4	55'-1"	70238	T17	4	9	STR	11'-10"	161	U2	10	4	9	7'-4"	49
M2	240	11	4	26'-8"	34003	T18	4	9	STR	12'-3"	167	U3	5	4	9	8'-2"	27
M3	720	11	STR	55'-0"	210395	T19	4	9	STR	12'-8"	172	U4	5	4	9	8'-0"	27
M4	240	11	STR	28'-7"	36447	T20	4	9	STR	13'-0"	177						
						T21	4	9	STR	13'-5"	182	V1	36	11	4	54'-1"	10344
S1	110	5	5	4'-1"	468	T22	4	9	STR	13'-10"	188	V2	36	11	4	54'-11"	10504
S2	66	5	6	19'-0"	1308	T23	4	9	STR	14'-3"	194	V3	64	11	STR	23'-0"	7821
S3	2	5	6	18'-9"	39	T24	4	9	STR	14'-7"	198	V4	136	11	12	21'-2"	15294
S4	2	5	6	18'-4"	38	T25	4	9	STR	15'-0"	204						
S5	2	5	6	17'-11"	37	T26	4	9	STR	15'-5"	210						
S6	2	5	6	17'-5"	36	T27	4	9	STR	15'-9"	214						
S7	2	5	6	17'-0"	35	T28	4	9	STR	16'-2"	220						
S8	2	5	6	16'-7"	35	T29	4	9	STR	16'-7"	226						
S9	2	5	6	16'-2"	34	T30	4	9	STR	17'-0"	231						
S10	2	5	6	15'-8"	33	T31	4	9	STR	17'-4"	236						
S11	2	5	6	15'-3"	32	T32	4	9	STR	17'-9"	241	SP-1	10	*	10	3471'-6"	36,208
S12	2	5	6	14'-10"	31	T33	4	9	STR	18'-2"	247						
S13	2	5	6	14'-5"	30	T34	4	9	STR	18'-6"	252						
S14	2	5	6	18'-11"	39	T35	58	6	STR	18'-10"	1641						
S15	2	5	6	18'-7"	39	T36	2	6	STR	9'-1"	27						
S16	2	5	6	18'-3"	38	T37	2	6	STR	9'-6"	29						
S17	2	5	6	17'-9"	37	T38	2	6	STR	9'-11"	30						
S18	2	5	6	17'-5"	36	T39	2	6	STR	10'-3"	31						
S19	2	5	6	17'-0"	35	T40	2	6	STR	10'-8"	32						
S20	2	5	6	16'-7"	35	T41	2	6	STR	11'-1"	33						
S21	2	5	6	16'-3"	34	T42	2	6	STR	11'-6"	35						
S22	2	5	6	15'-10"	33	T43	2	6	STR	11'-10"	36						
S23	2	5	6	15'-5"	32	T44	2	6	STR	12'-3"	37						
S24	2	5	6	15'-0"	31	T45	2	6	STR	12'-8"	38						
S25	24	5	6	20'-4"	509	T46	2	6	STR	13'-0"	39						
S26	404	5	7	14'-1"	5934	T47	2	6	STR	13'-5"	40						
S27	184	5	7	12'-10"	2463	T48	2	6	STR	13'-10"	42						
S28	808	5	11	4'-6"	3757	T49	2	6	STR	14'-3"	43						
						T50	2	6	STR	14'-7"	44						

EPOXY COATED REINFORCING STEEL LBS. 467,932

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 36,208

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 373.2
POUR #3 - STRUT	C.Y. 61.5
POUR #4 - COLUMNS	C.Y. 108.0
POUR #5 - CAP	C.Y. 74.0
CLASS "AA" CONCRETE	C.Y. 616.7

5'-0" Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN. FT. 1,067.4
POUR 1 - DRILLED PIER	C.Y. 776.3
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	LIN. FT. 427.4
CSL TUBES	LIN. FT. 5,412

NOTES

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 5

DESIGNED BY:	E. ULLMER	DATE :	MAR 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

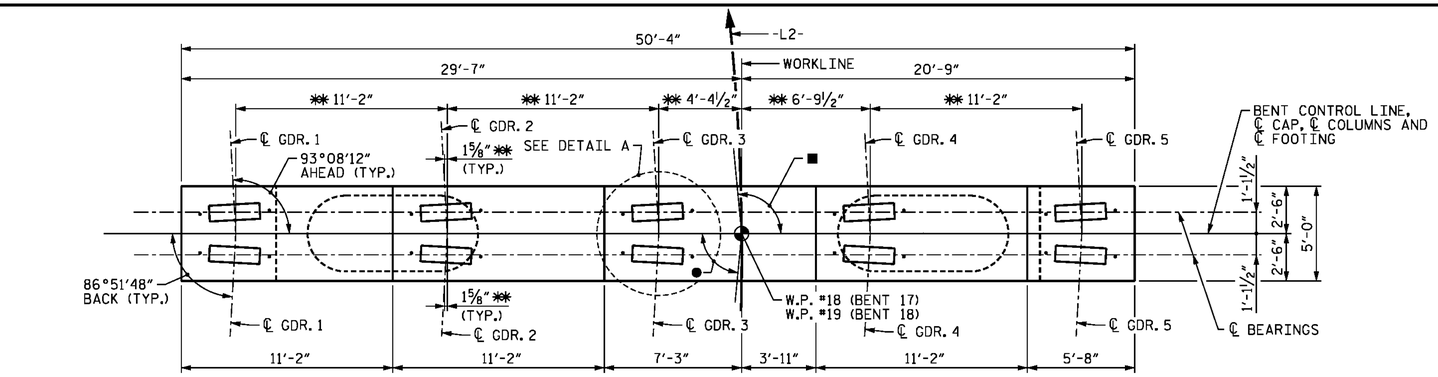
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 14 AND 15 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-179
1			3			TOTAL SHEETS
2			4			278

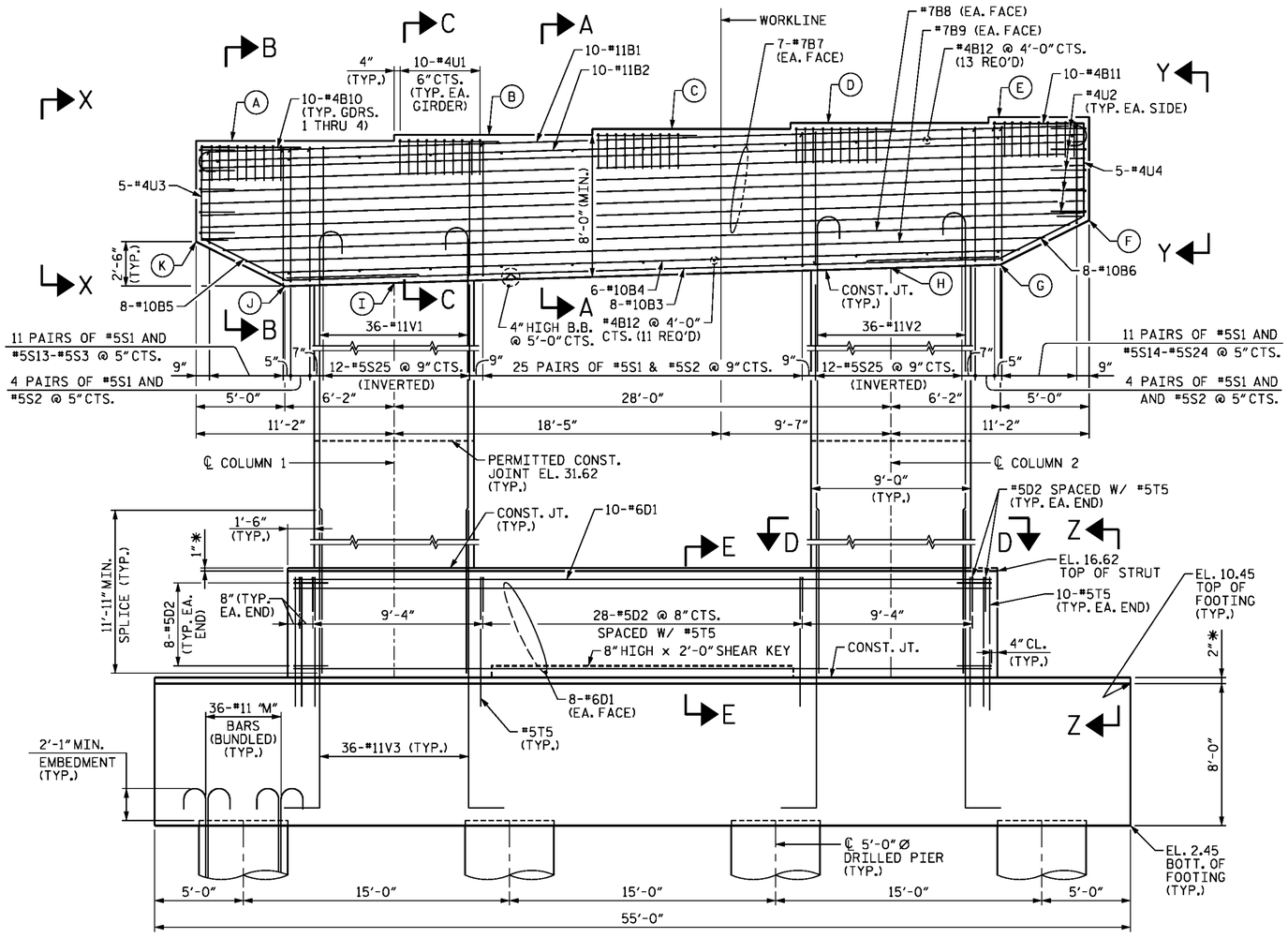
5/10/2016
400_351_B4929_SMU_IB14_5.dgn



■ 93°08'12" TO SHORT CHORD (AHEAD)
● 86°51'48" TO SHORT CHORD (BACK)

PLAN

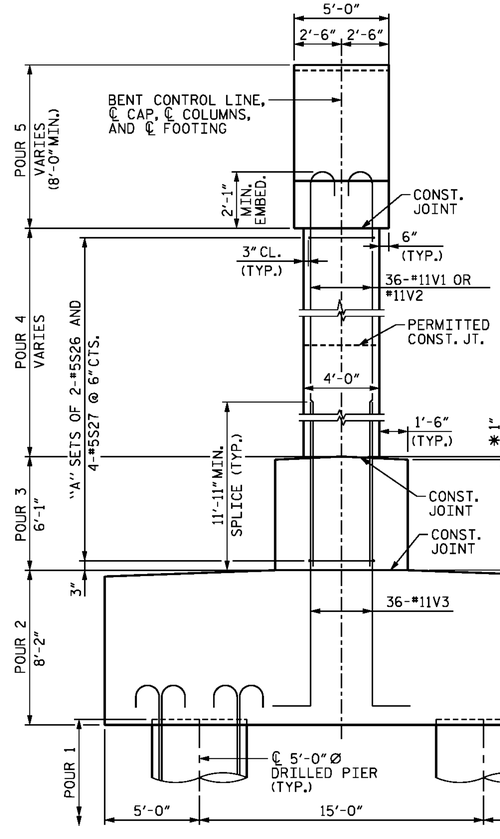
✱✱ MEASURED ALONG BENT CONTROL LINE



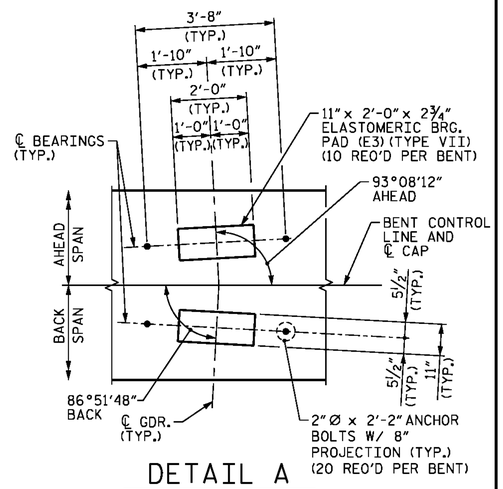
ELEVATION

FOOTING REINFORCEMENT NOT SHOWN FOR CLARITY, SEE SHEET 3 OF 5.

ELEVATION TABLE											
BENT	A	B	C	D	E	F	G	H	I	J	K
17	60.47	60.80	61.14	61.47	61.81	55.99	53.49	53.31	52.47	52.29	54.79
18	55.07	55.40	55.74	56.07	56.41	50.60	48.10	47.91	47.07	46.89	49.39



END VIEW



DETAIL A

BAR QUANTITY "A"	
BENT 17 COLUMN 1	83
BENT 17 COLUMN 2	85
BENT 18 COLUMN 1	72
BENT 18 COLUMN 2	74

NOTES

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

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

"T" BARS IN FOOTING MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN AND DRILLED PIER REINFORCEMENT.

FOR FOUNDATION NOTES, SEE "FOUNDATION NOTES" SHEET.

FOR SECTIONS AND VIEWS, SEE SHEET 2 OF 5 AND SHEET 3 OF 5.

FOR FOOTING AND DRILLED PIER REINFORCING DETAILS, SEE SHEET 3 OF 5 AND SHEET 4 OF 5.

✱ THE FOOTING AND STRUT ARE SLOPED TO DRAIN.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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.

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 17 AND 18 PLAN AND ELEVATION

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-180
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	E. ULLMER	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	B. LOFLIN	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

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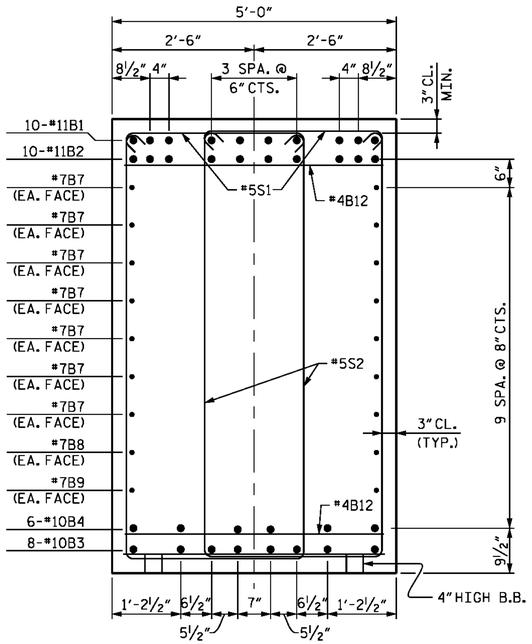
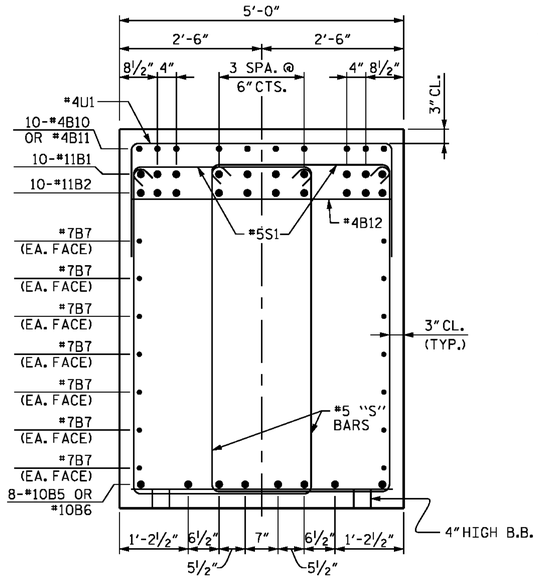
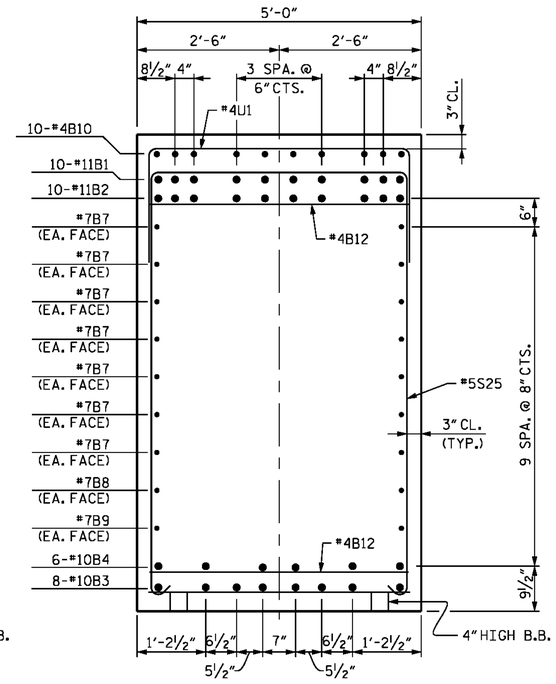


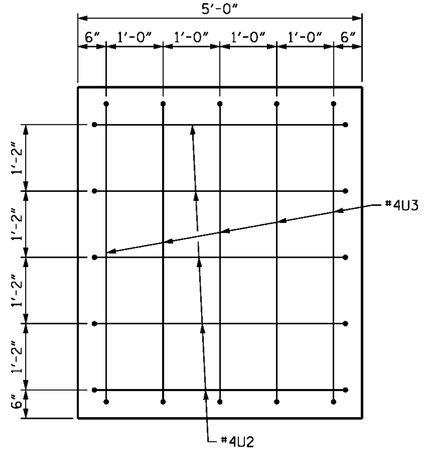
SECTION A-A



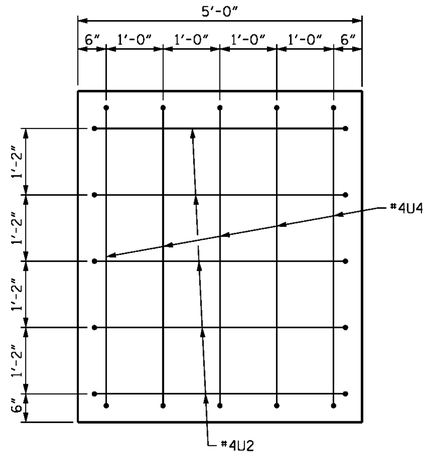
SECTION B-B



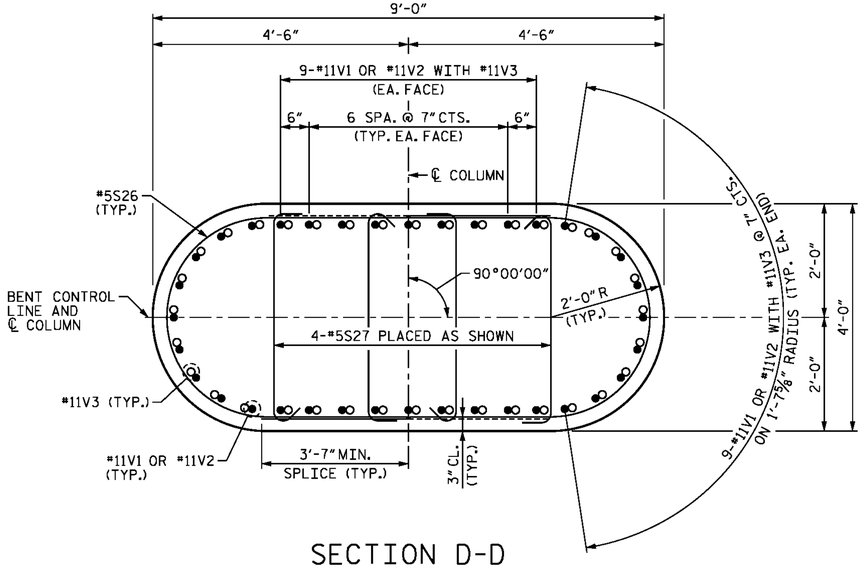
SECTION C-C



VIEW X-X



VIEW Y-Y



SECTION D-D

WHEN PLACING #5S27 BARS, ALTERNATE THE POSITION OF THE 135° HOOK HORIZONTALLY AND VERTICALLY.

ALTERNATE DIRECTION OF #5S26 TO STAGGER LAPS.

NOTES

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 17 AND 18 SECTIONS AND DETAILS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C8644B274F7...

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-181
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	E. ULLMER	DATE : MAR 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	B. LOFLIN	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

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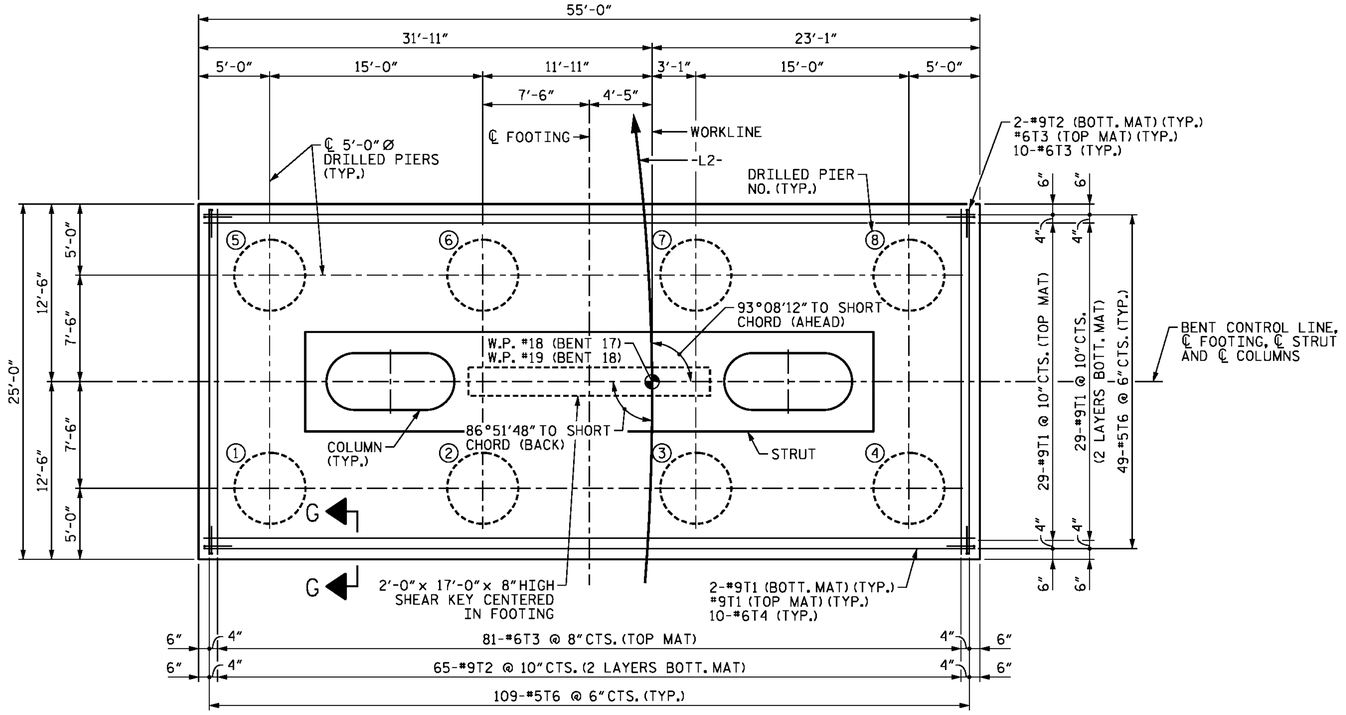
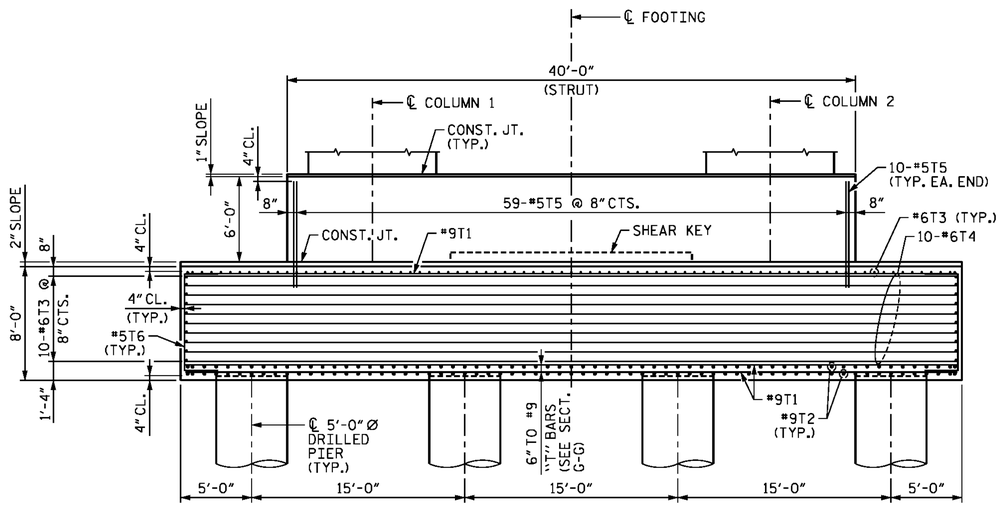
400_355_B4929_SMU_IB17_2.dgn

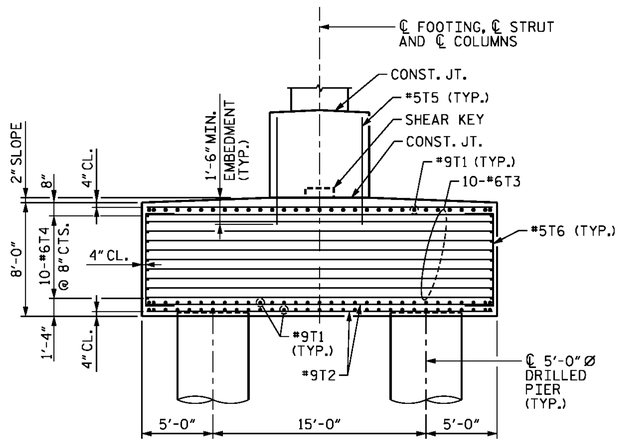


FOOTING PLAN



FOOTING AND STRUT ELEVATION

COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.

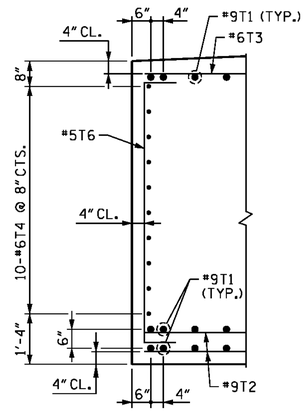


SIDE ELEVATION

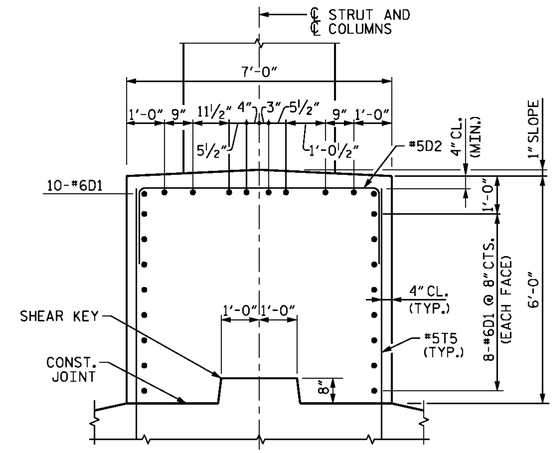
COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.

NOTES

FOR NOTES, SEE SHEET 1 OF 5.

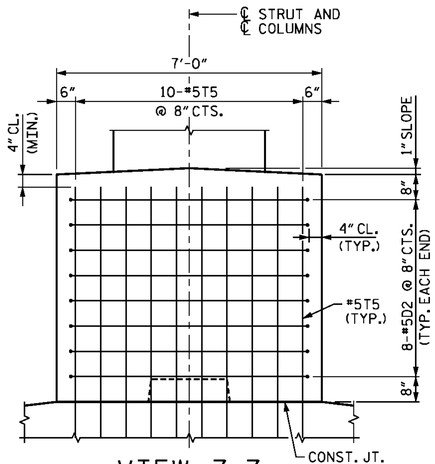


SECTION G-G



SECTION E-E

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.



VIEW Z-Z

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-
SHEET 3 OF 5

DESIGNED BY:	E. ULLMER — DATE: FEB 2016
DRAWN BY:	M. HOBBS — DATE: MAR 2016
CHECKED BY:	B. LOFLIN — DATE: MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY — DATE: MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

BENTS 17 AND 18 SECTIONS AND DETAILS

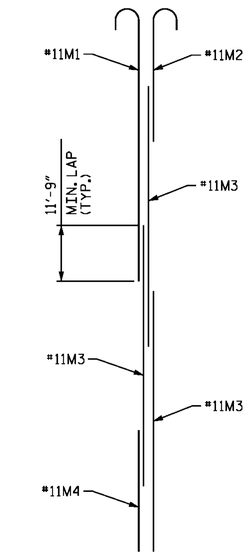
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-182
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400.357_B4929_SMU_IB17_3.dgn

NOTES

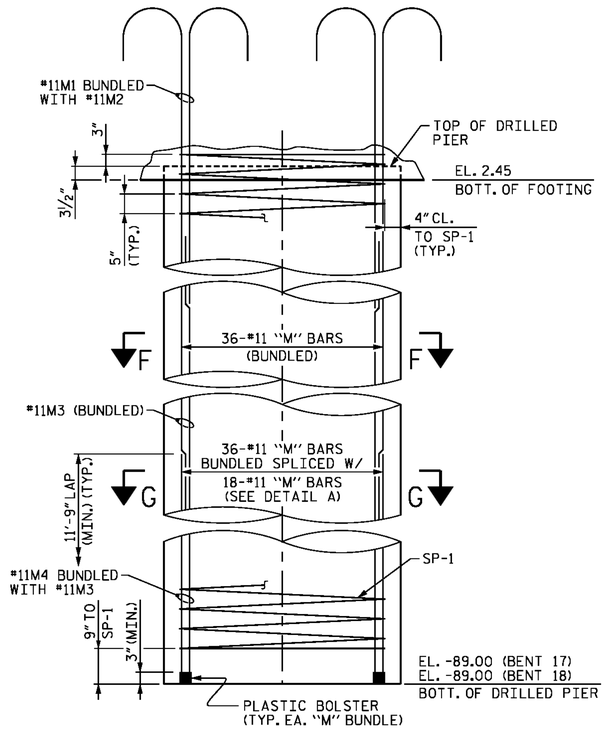
FOR NOTES, SEE SHEET 1 OF 5.

FOR BAR TYPES, SEE SHEET 5 OF 5.

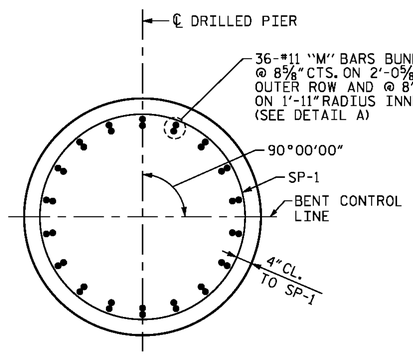


DETAIL A

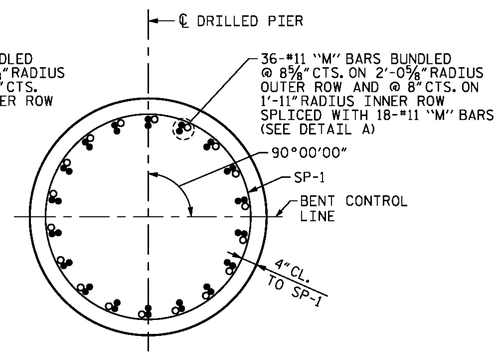
ONE BUNDLE SHOWN, REINFORCING STEEL IS TYPICAL FOR EACH BUNDLE.



DRILLED PIER ELEVATION



SECTION F-F



SECTION G-G

BILL OF MATERIAL

BENT 17

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-0"	1084
B5	8	#10	2	10'-0"	344
B6	8	#10	3	10'-0"	344
B7	14	#7	STR	49'-10"	1426
B8	2	#7	STR	47'-4"	193
B9	2	#7	STR	44'-8"	183
B10	40	#4	STR	6'-3"	167
B11	10	#4	STR	5'-2"	35
B12	24	#4	STR	4'-6"	72
D1	26	#6	STR	39'-4"	1536
D2	48	#5	9	10'-4"	517
M1	144	#11	4	46'-2"	35321
M2	144	#11	4	21'-10"	16704
M3	432	#11	STR	50'-0"	114761
M4	144	#11	STR	25'-8"	19637
S1	110	#5	5	4'-1"	468
S2	66	#5	6	19'-0"	1308
S3	2	#5	6	18'-9"	39
S4	2	#5	6	18'-4"	38
S5	2	#5	6	17'-11"	37
S6	2	#5	6	17'-5"	36
S7	2	#5	6	17'-0"	35
S8	2	#5	6	16'-7"	35
S9	2	#5	6	16'-2"	34
S10	2	#5	6	15'-8"	33
S11	2	#5	6	15'-3"	32
S12	2	#5	6	14'-10"	31
S13	2	#5	6	14'-5"	30
S14	2	#5	6	18'-11"	39
S15	2	#5	6	18'-7"	39
S16	2	#5	6	18'-3"	38
S17	2	#5	6	17'-9"	37
S18	2	#5	6	17'-5"	36
S19	2	#5	6	17'-0"	35
S20	2	#5	6	16'-7"	35
S21	2	#5	6	16'-3"	34
S22	2	#5	6	15'-10"	33
S23	2	#5	6	15'-5"	32
S24	2	#5	6	15'-0"	31
S25	24	#5	6	20'-4"	509
S26	336	#5	7	14'-1"	4935
S27	672	#5	11	4'-6"	3154

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
T1	93	#9	STR	54'-4"	17180
T2	134	#9	STR	24'-4"	11086
T3	83	#6	STR	24'-4"	3034
T4	20	#6	STR	54'-4"	1632
T5	138	#5	STR	7'-2"	1032
T6	316	#5	9	8'-6"	2801
U1	50	#4	9	8'-6"	284
U2	10	#4	9	7'-4"	49
U3	5	#4	9	8'-2"	27
U4	5	#4	9	8'-0"	27
V1	36	#11	4	45'-8"	8735
V2	36	#11	4	46'-6"	8894
V3	72	#11	8	21'-2"	8097

EPOXY COATED REINFORCING STEEL				LBS.	273,197
SP-1	8	*	10	2,987'-1"	24,924

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS.	24,924
CLASS "AA" CONCRETE BREAKDOWN	
POUR #2 - FOOTING C.Y.	412.4
POUR #3 - STRUT C.Y.	61.5
POUR #4 - COLUMNS C.Y.	87.6
POUR #5 - CAP C.Y.	74.0
CLASS "AA" CONCRETE C.Y.	635.5

5'-0" Ø DRILLED PIERS QUANTITIES:		
DRILLED PIER	LIN. FT.	733.9
POUR 1 - DRILLED PIER	C.Y.	533.8
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	LIN. FT.	197.9
CSL TUBES	LIN. FT.	3,730

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

DESIGNED BY:	E. ULLMER	DATE :	MAR 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/10/2016
400_359_B4929_SMU_IB17_4.dgn

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 5

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C864482274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

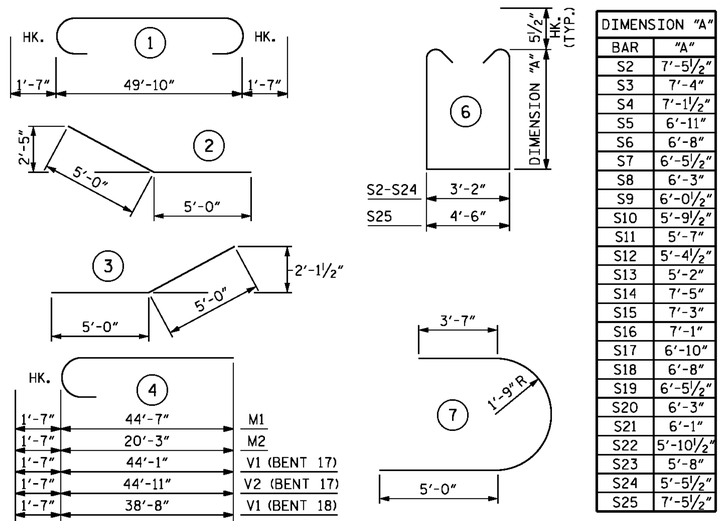
BENTS 17 AND 18 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-183
1			3			TOTAL SHEETS
2			4			278

NOTES

FOR NOTES, SEE SHEET 1 OF 5.

BAR TYPES



DIMENSION "A"	
BAR	"A"
S2	7'-5½"
S3	7'-4"
S4	7'-1½"
S5	6'-11"
S6	6'-8"
S7	6'-5½"
S8	6'-3"
S9	6'-0½"
S10	5'-9½"
S11	5'-7"
S12	5'-4½"
S13	5'-2"
S14	7'-5"
S15	7'-3"
S16	7'-1"
S17	6'-10"
S18	6'-8"
S19	6'-5½"
S20	6'-3"
S21	6'-1"
S22	5'-10½"
S23	5'-8"
S24	5'-5½"
S25	7'-5½"

ALL BAR DIMENSIONS ARE OUT TO OUT.

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

BILL OF MATERIAL

BENT 18

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-0"	1084
B5	8	#10	2	10'-0"	344
B6	8	#10	3	10'-0"	344
B7	14	#7	STR	49'-10"	1426
B8	2	#7	STR	47'-4"	193
B9	2	#7	STR	44'-8"	183
B10	40	#4	STR	6'-3"	167
B11	10	#4	STR	5'-2"	35
B12	24	#4	STR	4'-6"	72
D1	26	#6	STR	39'-4"	1536
D2	48	#5	9	10'-4"	517
M1	144	#11	4	46'-2"	35321
M2	144	#11	4	21'-10"	16704
M3	432	#11	STR	50'-0"	114761
M4	144	#11	STR	25'-8"	19637
S1	110	#5	5	4'-1"	468
S2	66	#5	6	19'-0"	1308
S3	2	#5	6	18'-9"	39
S4	2	#5	6	18'-4"	38
S5	2	#5	6	17'-11"	37
S6	2	#5	6	17'-5"	36
S7	2	#5	6	17'-0"	35
S8	2	#5	6	16'-7"	35
S9	2	#5	6	16'-2"	34
S10	2	#5	6	15'-8"	33
S11	2	#5	6	15'-3"	32
S12	2	#5	6	14'-10"	31
S13	2	#5	6	14'-5"	30
S14	2	#5	6	18'-11"	39
S15	2	#5	6	18'-7"	39
S16	2	#5	6	18'-3"	38
S17	2	#5	6	17'-9"	37
S18	2	#5	6	17'-5"	36
S19	2	#5	6	17'-0"	35
S20	2	#5	6	16'-7"	35
S21	2	#5	6	16'-3"	34
S22	2	#5	6	15'-10"	33
S23	2	#5	6	15'-5"	32
S24	2	#5	6	15'-0"	31
S25	24	#5	6	20'-4"	509
S26	292	#5	7	14'-1"	4289
S27	584	#5	11	4'-6"	2741

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
T1	93	#9	STR	54'-4"	17180
T2	134	#9	STR	24'-4"	11086
T3	83	#6	STR	24'-4"	3034
T4	20	#6	STR	54'-4"	1632
T5	138	#5	STR	7'-2"	1032
T6	316	#5	9	8'-6"	2801
U1	50	#4	9	8'-6"	284
U2	10	#4	9	7'-4"	49
U3	5	#4	9	8'-2"	27
U4	5	#4	9	8'-0"	27
V1	36	#11	4	40'-3"	7699
V2	36	#11	4	41'-1"	7858
V3	72	#11	8	21'-2"	8097

EPOXY COATED REINFORCING STEEL LBS. 270,066

SP-1	8	*	10	2,987'-1"	24,924

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 24,924

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 412.4
POUR #3 - STRUT	C.Y. 61.5
POUR #4 - COLUMNS	C.Y. 74.6
POUR #5 - CAP	C.Y. 74.0

CLASS "AA" CONCRETE C.Y. 622.5

5'-0" Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN. FT. 733.9
POUR 1 - DRILLED PIER	C.Y. 533.8
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	LIN. FT. 253.9
CSL TUBES	LIN. FT. 3,730

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 5

DESIGNED BY:	E. ULLMER	DATE :	MAR 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16

DocuSigned by: Jason R Doughty
00F1CB644B274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

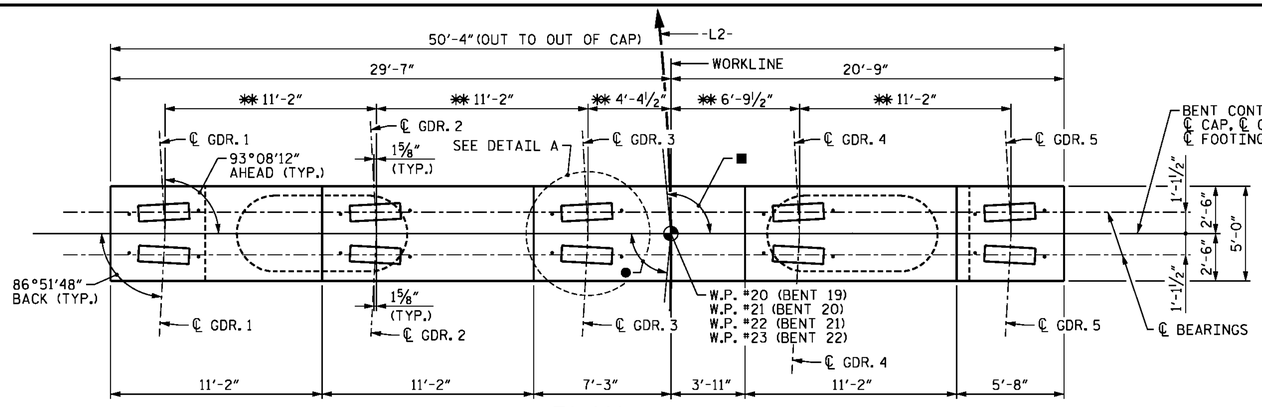
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 17 AND 18 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-184
1			3			TOTAL SHEETS
2			4			278

5/10/2016
400_361_B4929_SMU_IB17_5.dgn



■ 93°08'12" TO SHORT CHORD (AHEAD)
● 86°51'48" TO SHORT CHORD (BACK)

PLAN

✱✱ MEASURED ALONG BENT CONTROL LINE

BAR QUANTITY		
LOCATION	QUANTITY "A"	QUANTITY "B"
BENT 19 COLUMN 1	38	24
BENT 19 COLUMN 2	38	26
BENT 20 COLUMN 1	51	--
BENT 20 COLUMN 2	53	--
BENT 21 COLUMN 1	41	--
BENT 21 COLUMN 2	43	--
BENT 22 COLUMN 1	29	--
BENT 22 COLUMN 2	31	--

NOTES:

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

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

"T" BARS IN FOOTING MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN AND DRILLED PIER REINFORCEMENT.

FOR FOUNDATION NOTES, SEE "FOUNDATION NOTES" SHEET.

FOR SECTIONS AND VIEWS, SEE SHEET 2 OF 5 AND SHEET 3 OF 5.

FOR FOOTING AND DRILLED PIER REINFORCING DETAILS, SEE SHEET 3 OF 5 AND SHEET 4 OF 5.

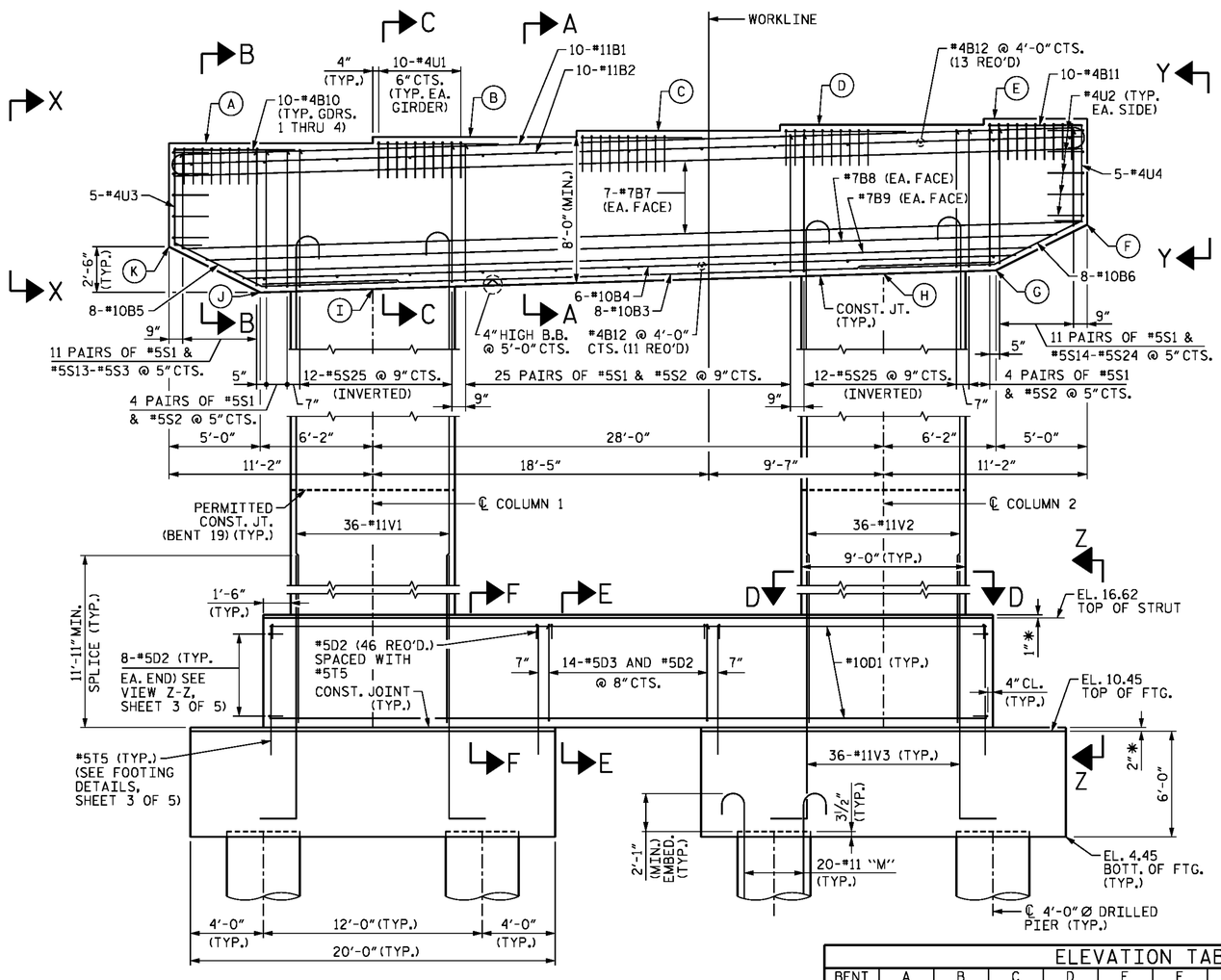
✱ FOOTING AND STRUT ARE SLOPED TO DRAIN.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

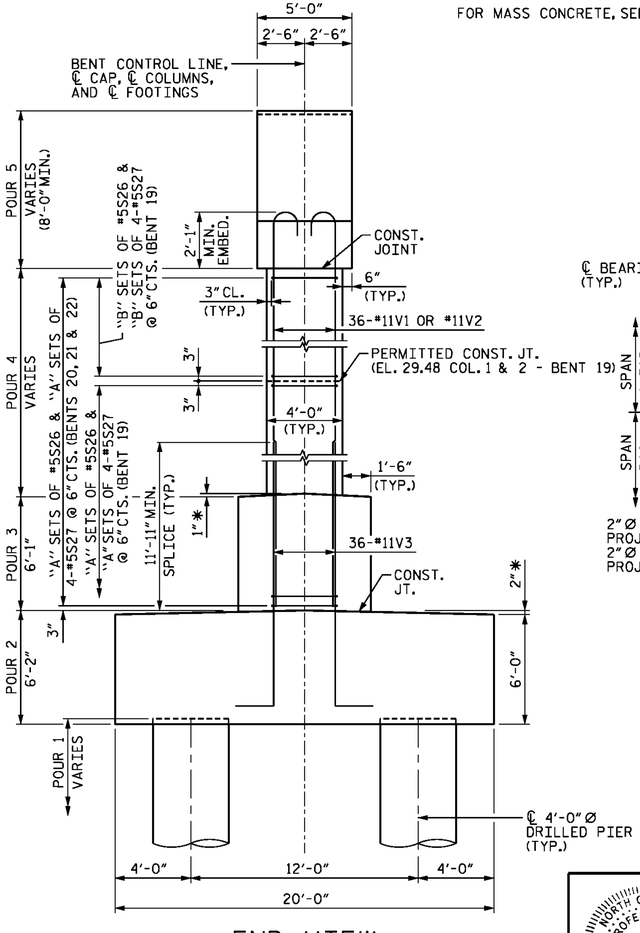
FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.



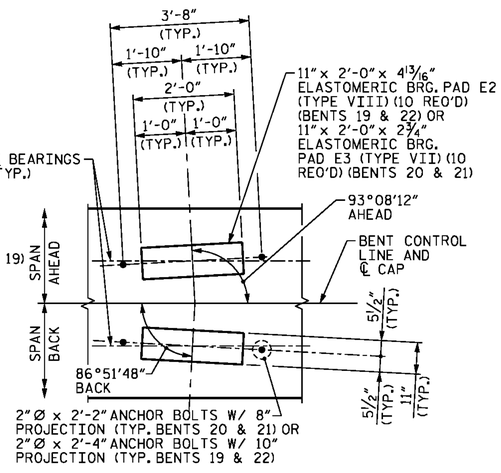
ELEVATION

FOOTING REINFORCEMENT NOT SHOWN FOR CLARITY, SEE SHEET 3 OF 5.

ELEVATION TABLE												
BENT	A	B	C	D	E	F	G	H	I	J	K
19	49.50	49.84	50.17	50.51	50.84	45.02	42.52	42.33	41.49	41.31	43.81
20	44.27	44.61	44.94	45.28	45.62	39.80	37.30	37.11	36.27	36.09	38.59
21	38.87	39.21	39.54	39.88	40.22	34.40	31.90	31.71	30.87	30.69	33.19
22	33.30	33.63	33.97	34.31	34.64	28.82	26.32	26.13	25.29	25.11	27.61



END VIEW



DETAIL A

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 5

DESIGNED BY:	J. BORUTA	DATE : MAR 2016
DRAWN BY:	K. WHITE	DATE : MAR 2016
CHECKED BY:	J. DOUGHTY	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

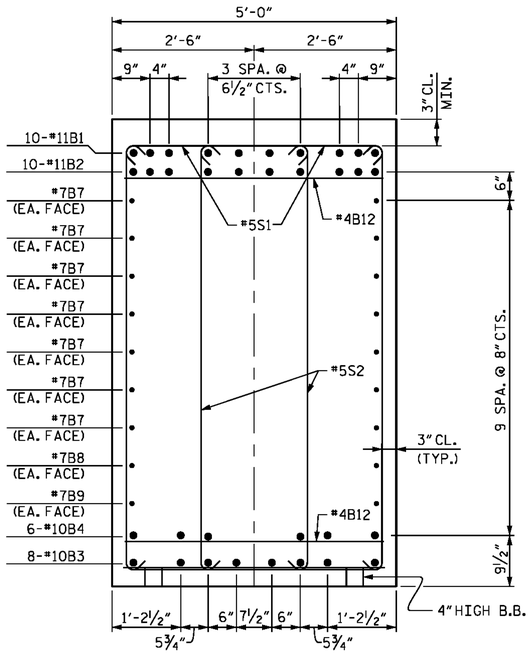
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

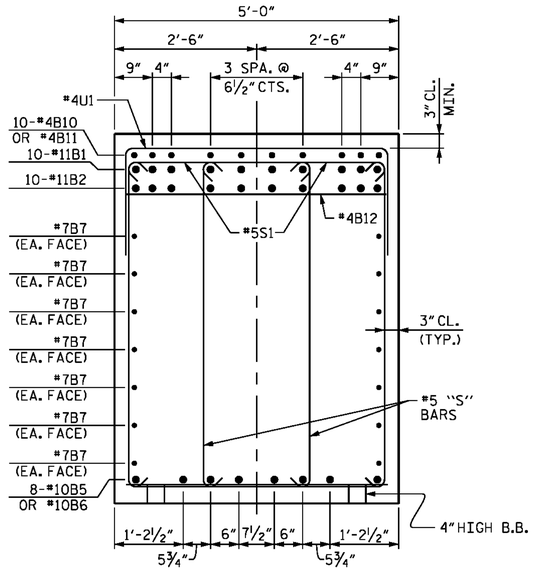
BENTS 19 THROUGH 22 PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-185
1			3			TOTAL SHEETS
2			4			278

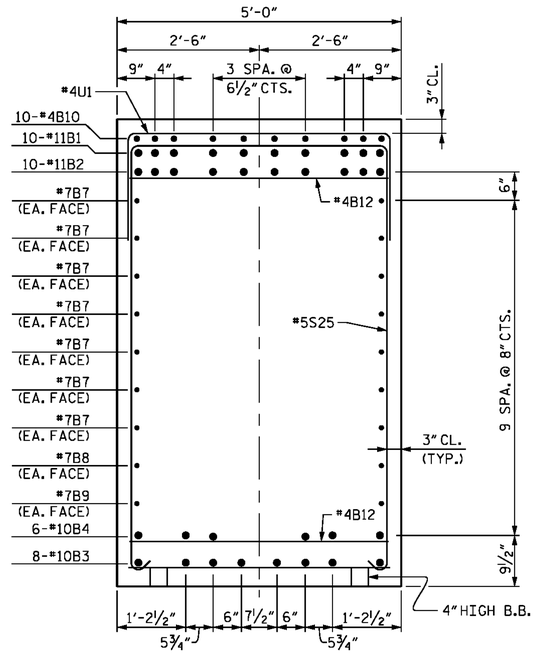
5/11/2016
400_363_B4929_SMU_IB19_1.dgn



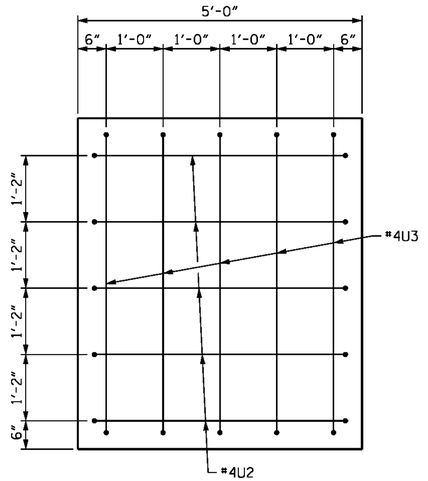
SECTION A-A



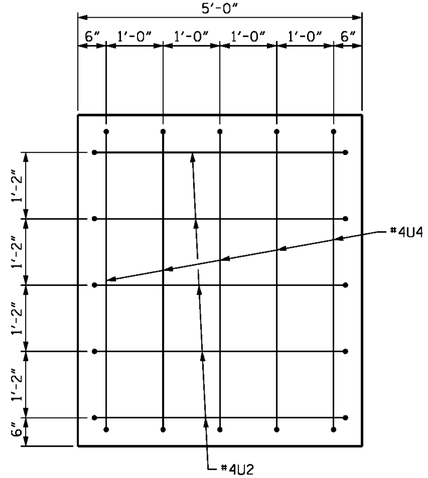
SECTION B-B



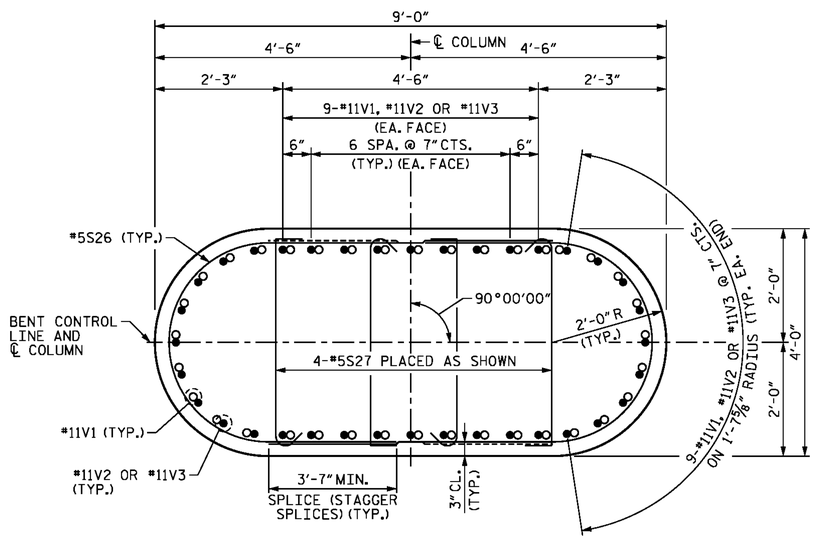
SECTION C-C



VIEW X-X



VIEW Y-Y



SECTION D-D

WHEN PLACING #5S27 BARS, ALTERNATE THE POSITION OF THE 135° HOOK HORIZONTALLY AND VERTICALLY.

ALTERNATE DIRECTION OF #5S26 TO STAGGER LAPS.

NOTES:

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 19 AND 22 SECTIONS AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-186
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

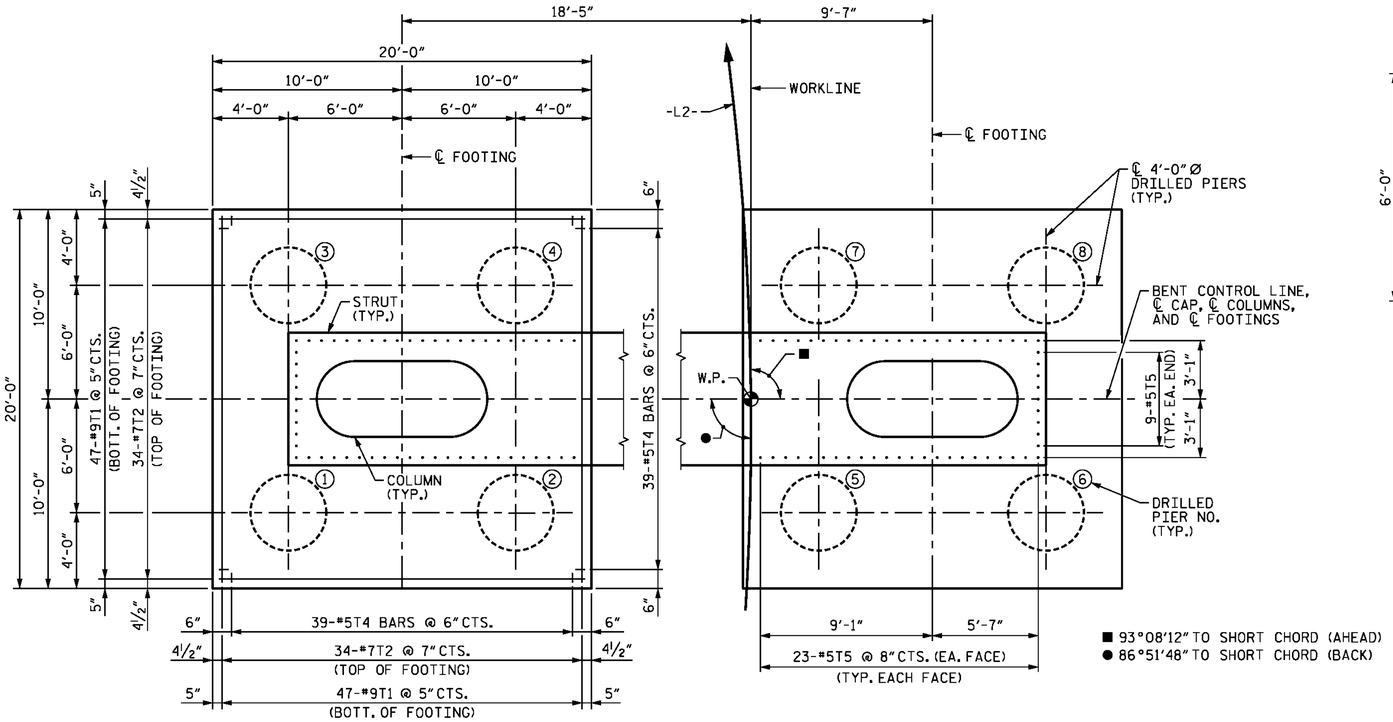
5/12/16

DocuSigned by: Jason R Doughty
C0F1C8644B274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

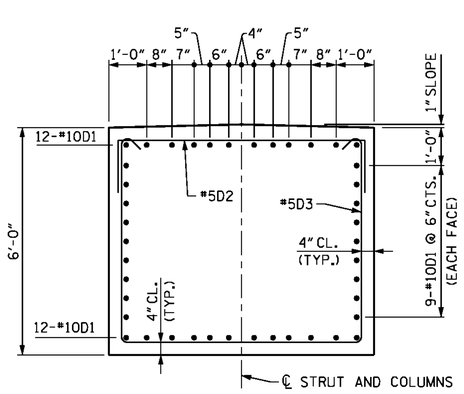
DESIGNED BY:	J. BORUTA	DATE :	FEB 2016
DRAWN BY:	MAH/KEW	DATE :	MAR 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/11/2016
400.365.B4929_SMU_IB19_2.dgn



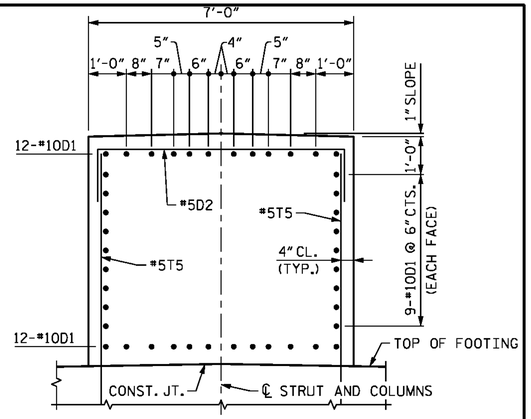
FOOTING PLAN

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



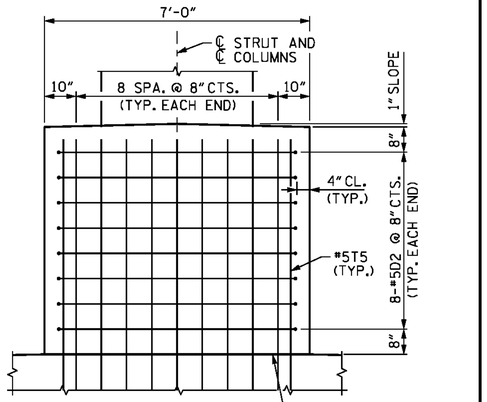
SECTION E-E

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.

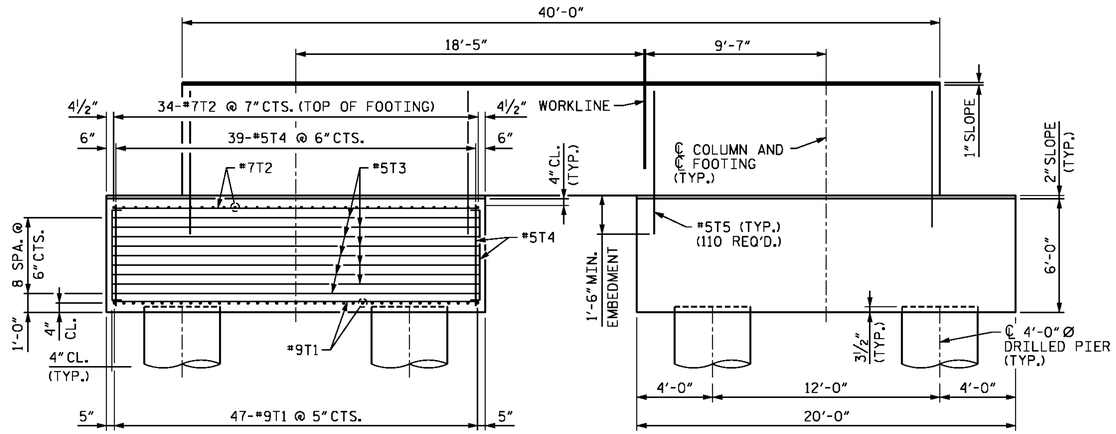


SECTION F-F

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.

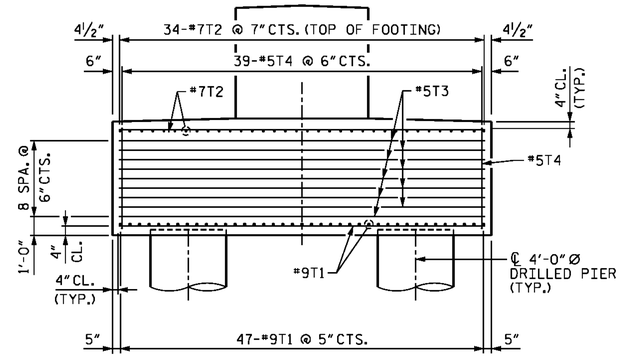


VIEW Z-Z



ELEVATION

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



SIDE ELEVATION

NOTES:

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 5

DESIGNED BY:	J. BORUTA	DATE :	MAR 2016		
DRAWN BY:	MAH/KEW	DATE :	MAR 2016		
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY 5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

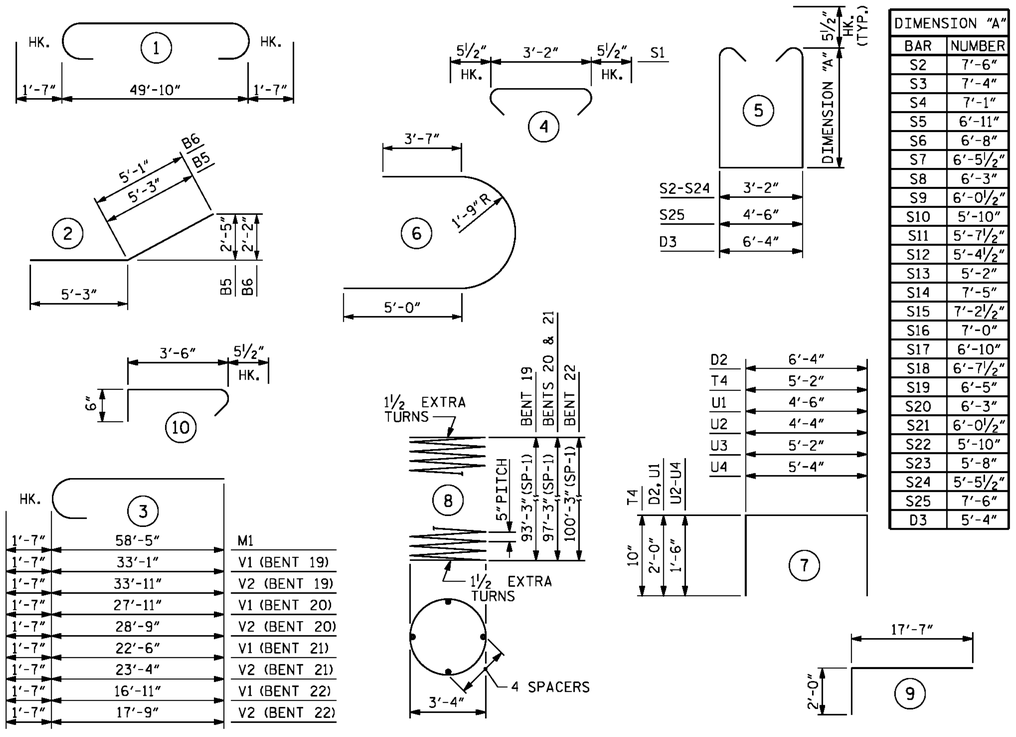
SUBSTRUCTURE

BENTS 19 AND 22 FOOTING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-187
1			3			TOTAL SHEETS
2			4			278

5/12/2016
400.367_B4929_SMU_IB19_3.dgn

BAR TYPES



DIMENSION "A"	
BAR	NUMBER
S2	7'-6"
S3	7'-4"
S4	7'-1"
S5	6'-11"
S6	6'-8"
S7	6'-5½"
S8	6'-3"
S9	6'-0½"
S10	5'-10"
S11	5'-7½"
S12	5'-4½"
S13	5'-2"
S14	7'-5"
S15	7'-2½"
S16	7'-0"
S17	6'-10"
S18	6'-7½"
S19	6'-5"
S20	6'-3"
S21	6'-0½"
S22	5'-10"
S23	5'-8"
S24	5'-5½"
S25	7'-6"
D3	5'-4"

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 19

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-4"	1093
B5	8	#10	2	10'-6"	361
B6	8	#10	2	10'-4"	356
B7	14	#7	STR	49'-10"	1426
B8	2	#7	STR	47'-8"	195
B9	2	#7	STR	45'-0"	184
B10	40	#4	STR	6'-3"	167
B11	10	#4	STR	5'-2"	35
B12	24	#4	STR	4'-6"	72
D1	42	#10	STR	39'-4"	7109
D2	76	#5	7	10'-4"	819
D3	14	#5	5	17'-11"	262
M1	160	#11	3	60'-0"	51005
M2	160	#11	STR	52'-2"	44346
S1	110	#5	4	4'-1"	468
S2	66	#5	5	19'-1"	1314
S3	2	#5	5	18'-9"	39
S4	2	#5	5	18'-3"	38
S5	2	#5	5	17'-11"	37
S6	2	#5	5	17'-5"	36
S7	2	#5	5	17'-0"	35
S8	2	#5	5	16'-7"	35
S9	2	#5	5	16'-2"	34
S10	2	#5	5	15'-9"	33
S11	2	#5	5	15'-4"	32
S12	2	#5	5	14'-10"	31
S13	2	#5	5	14'-5"	30
S14	2	#5	5	18'-11"	39
S15	2	#5	5	18'-6"	39
S16	2	#5	5	18'-1"	38
S17	2	#5	5	17'-9"	37
S18	2	#5	5	17'-4"	36
S19	2	#5	5	16'-11"	35
S20	2	#5	5	16'-7"	35
S21	2	#5	5	16'-2"	34
S22	2	#5	5	15'-9"	33
S23	2	#5	5	15'-5"	32
S24	2	#5	5	15'-0"	31

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S25	24	#5	5	20'-5"	511
S26	252	#5	6	14'-1"	3702
S27	504	#5	10	4'-6"	2366
T1	188	#9	STR	19'-4"	12358
T2	136	#7	STR	19'-4"	5374
T3	72	#5	STR	19'-4"	1452
T4	312	#5	7	6'-10"	2224
T5	110	#5	STR	7'-2"	822
U1	50	#4	7	8'-6"	284
U2	10	#4	7	7'-4"	49
U3	5	#4	7	8'-2"	27
U4	5	#4	7	8'-4"	28
V1	36	#11	3	34'-8"	6631
V2	36	#11	3	35'-6"	6790
V3	72	#11	9	19'-7"	7491
SP-1	8	*	8	2339'-9"	19523

EPOXY COATED REINFORCING STEEL LBS. 166,942

EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 19,523

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 179.8
POUR #3 - STRUT	C.Y. 62.7
POUR #4 - COLUMNS	C.Y. 61.0
POUR #5 - CAP	C.Y. 73.9
CLASS "AA" CONCRETE	C.Y. 377.4

4'-0" Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN. FT. 749.9
POUR 1 - DRILLED PIER	C.Y. 349.0
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	LIN. FT. 269.9
CSL TUBES	LIN. FT. 3047.7

BENT 20

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-4"	1093
B5	8	#10	2	10'-6"	361
B6	8	#10	2	10'-4"	356
B7	14	#7	STR	49'-10"	1426
B8	2	#7	STR	47'-8"	195
B9	2	#7	STR	45'-0"	184
B10	40	#4	STR	6'-3"	167
B11	10	#4	STR	5'-2"	35
B12	24	#4	STR	4'-6"	72
D1	42	#10	STR	39'-4"	7109
D2	76	#5	7	10'-4"	819
D3	14	#5	5	17'-11"	262
M1	160	#11	3	60'-0"	51005
M2	160	#11	STR	56'-2"	47746
S1	110	#5	4	4'-1"	468
S2	66	#5	5	19'-1"	1314
S3	2	#5	5	18'-9"	39
S4	2	#5	5	18'-3"	38
S5	2	#5	5	17'-11"	37
S6	2	#5	5	17'-5"	36
S7	2	#5	5	17'-0"	35
S8	2	#5	5	16'-7"	35
S9	2	#5	5	16'-2"	34
S10	2	#5	5	15'-9"	33
S11	2	#5	5	15'-4"	32
S12	2	#5	5	14'-10"	31
S13	2	#5	5	14'-5"	30
S14	2	#5	5	18'-11"	39
S15	2	#5	5	18'-6"	39
S16	2	#5	5	18'-1"	38
S17	2	#5	5	17'-9"	37
S18	2	#5	5	17'-4"	36
S19	2	#5	5	16'-11"	35
S20	2	#5	5	16'-7"	35
S21	2	#5	5	16'-2"	34
S22	2	#5	5	15'-9"	33
S23	2	#5	5	15'-5"	32
S24	2	#5	5	15'-0"	31

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
S25	24	#5	5	20'-5"	511
S26	208	#5	6	14'-1"	3055
S27	416	#5	10	4'-6"	1952
T1	188	#9	STR	19'-4"	12358
T2	136	#7	STR	19'-4"	5374
T3	72	#5	STR	19'-4"	1452
T4	312	#5	7	6'-10"	2224
T5	110	#5	STR	7'-2"	822
U1	50	#4	7	8'-6"	284
U2	10	#4	7	7'-4"	49
U3	5	#4	7	8'-2"	27
U4	5	#4	7	8'-4"	28
V1	36	#11	3	29'-6"	5642
V2	36	#11	3	30'-4"	5802
V3	72	#11	9	19'-7"	7491
SP-1	8	*	8	2438'-9"	20349

EPOXY COATED REINFORCING STEEL LBS. 167,304

EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 20,349

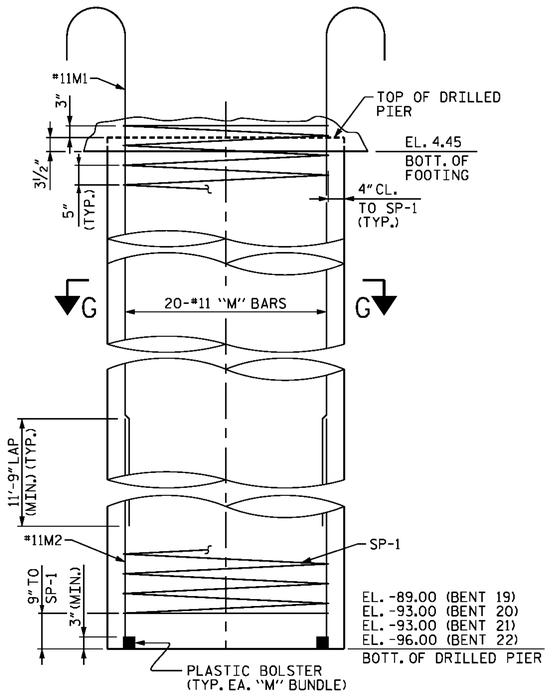
CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 179.8
POUR #3 - STRUT	C.Y. 62.7
POUR #4 - COLUMNS	C.Y. 48.4
POUR #5 - CAP	C.Y. 73.9
CLASS "AA" CONCRETE	C.Y. 364.8

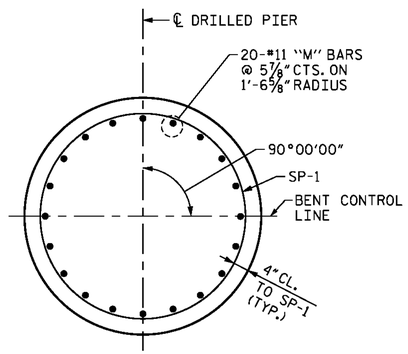
4'-0" Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN. FT. 781.9
POUR 1 - DRILLED PIER	C.Y. 363.9
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	LIN. FT. 269.9
CSL TUBES	LIN. FT. 3175.7
SPT TESTING	EA. 8

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-20 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.



DRILLED PIER ELEVATION



SECTION G-G

NOTES:

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 5

DESIGNED BY:	J. BORUTA	DATE :	MAR 2016
DRAWN BY:	K. WHITE	DATE :	MAR 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 19 THROUGH 22 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-188
1			3			TOTAL SHEETS
2			4			278

5/12/2016
400.363_B4929_SMU_IB19_4.dgn

BILL OF MATERIAL

BENT 21

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-4"	1093
B5	8	#10	2	10'-6"	361
B6	8	#10	2	10'-4"	356
B7	14	#7	STR	49'-10"	1426
B8	2	#7	STR	47'-8"	195
B9	2	#7	STR	45'-0"	184
B10	40	#4	STR	6'-3"	167
B11	10	#4	STR	5'-2"	35
B12	24	#4	STR	4'-6"	72
D1	42	#10	STR	39'-4"	7109
D2	76	#5	7	10'-4"	819
D3	14	#5	5	17'-11"	262
M1	160	#11	3	60'-0"	51005
M2	160	#11	STR	56'-2"	47746
S1	110	#5	4	4'-1"	468
S2	66	#5	5	19'-1"	1314
S3	2	#5	5	18'-9"	39
S4	2	#5	5	18'-3"	38
S5	2	#5	5	17'-11"	37
S6	2	#5	5	17'-5"	36
S7	2	#5	5	17'-0"	35
S8	2	#5	5	16'-7"	35
S9	2	#5	5	16'-2"	34
S10	2	#5	5	15'-9"	33
S11	2	#5	5	15'-4"	32
S12	2	#5	5	14'-10"	31
S13	2	#5	5	14'-5"	30
S14	2	#5	5	18'-11"	39
S15	2	#5	5	18'-6"	39
S16	2	#5	5	18'-1"	38
S17	2	#5	5	17'-9"	37
S18	2	#5	5	17'-4"	36
S19	2	#5	5	16'-11"	35
S20	2	#5	5	16'-7"	35
S21	2	#5	5	16'-2"	34
S22	2	#5	5	15'-9"	33
S23	2	#5	5	15'-5"	32
S24	2	#5	5	15'-0"	31
S25	24	#5	5	20'-5"	511
S26	168	#5	6	14'-1"	2468
S27	336	#5	10	4'-6"	1577
T1	188	#9	STR	19'-4"	12358
T2	136	#7	STR	19'-4"	5374
T3	72	#5	STR	19'-4"	1452
T4	312	#5	7	6'-10"	2224
T5	110	#5	STR	7'-2"	822
U1	50	#4	7	8'-6"	284
U2	10	#4	7	7'-4"	49
U3	5	#4	7	8'-2"	27
U4	5	#4	7	8'-4"	28
V1	36	#11	3	24'-1"	4606
V2	36	#11	3	24'-11"	4766
V3	72	#11	9	19'-7"	7491

EPOXY COATED REINFORCING STEEL LBS. 164,270

SP-1	8	*	8	2438'-9"	20349

EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 20,349

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 179.8
POUR #3 - STRUT	C.Y. 62.7
POUR #4 - COLUMNS	C.Y. 35.4
POUR #5 - CAP	C.Y. 73.9
CLASS "AA" CONCRETE	C.Y. 351.8

4'-0" Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN. FT. 781.9
POUR 1 - DRILLED PIER	C.Y. 363.9
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	LIN. FT. 269.9
CSL TUBES	LIN. FT. 3175.7
SPT TESTING	EA. 8

BENT 22

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	8	#10	STR	40'-4"	1388
B4	6	#10	STR	42'-4"	1093
B5	8	#10	2	10'-6"	361
B6	8	#10	2	10'-4"	356
B7	14	#7	STR	49'-10"	1426
B8	2	#7	STR	47'-8"	195
B9	2	#7	STR	45'-0"	184
B10	40	#4	STR	6'-3"	167
B11	10	#4	STR	5'-2"	35
B12	24	#4	STR	4'-6"	72
D1	42	#10	STR	39'-4"	7109
D2	76	#5	7	10'-4"	819
D3	14	#5	5	17'-11"	262
M1	160	#11	3	60'-0"	51005
M2	160	#11	STR	59'-2"	50296
S1	110	#5	4	4'-1"	468
S2	66	#5	5	19'-1"	1314
S3	2	#5	5	18'-9"	39
S4	2	#5	5	18'-3"	38
S5	2	#5	5	17'-11"	37
S6	2	#5	5	17'-5"	36
S7	2	#5	5	17'-0"	35
S8	2	#5	5	16'-7"	35
S9	2	#5	5	16'-2"	34
S10	2	#5	5	15'-9"	33
S11	2	#5	5	15'-4"	32
S12	2	#5	5	14'-10"	31
S13	2	#5	5	14'-5"	30
S14	2	#5	5	18'-11"	39
S15	2	#5	5	18'-6"	39
S16	2	#5	5	18'-1"	38
S17	2	#5	5	17'-9"	37
S18	2	#5	5	17'-4"	36
S19	2	#5	5	16'-11"	35
S20	2	#5	5	16'-7"	35
S21	2	#5	5	16'-2"	34
S22	2	#5	5	15'-9"	33
S23	2	#5	5	15'-5"	32
S24	2	#5	5	15'-0"	31
S25	24	#5	5	20'-5"	511
S26	120	#5	6	14'-1"	1763
S27	240	#5	10	4'-6"	1126
T1	188	#9	STR	19'-4"	12358
T2	136	#7	STR	19'-4"	5374
T3	72	#5	STR	19'-4"	1452
T4	312	#5	7	6'-10"	2224
T5	110	#5	STR	7'-2"	822
U1	50	#4	7	8'-6"	284
U2	10	#4	7	7'-4"	49
U3	5	#4	7	8'-2"	27
U4	5	#4	7	8'-4"	28
V1	36	#11	3	18'-6"	3538
V2	36	#11	3	19'-4"	3698
V3	72	#11	9	19'-7"	7491

EPOXY COATED REINFORCING STEEL LBS. 163,528

SP-1	8	*	8	2513'-1"	20969

EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 20,969

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 179.8
POUR #3 - STRUT	C.Y. 62.7
POUR #4 - COLUMNS	C.Y. 22.0
POUR #5 - CAP	C.Y. 73.9
CLASS "AA" CONCRETE	C.Y. 338.4

4'-0" Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN. FT. 805.9
POUR 1 - DRILLED PIER	C.Y. 375.1
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	LIN. FT. 157.9
CSL TUBES	LIN. FT. 3271.7
SPT TESTING	EA. 8

NOTES:

FOR NOTES, SEE SHEET 1 OF 5.

FOR BAR TYPES, SEE SHEET 4 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 5

DESIGNED BY:	J. BORUTA	DATE :	MAR 2016
DRAWN BY:	K. WHITE	DATE :	MAR 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C864482747

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

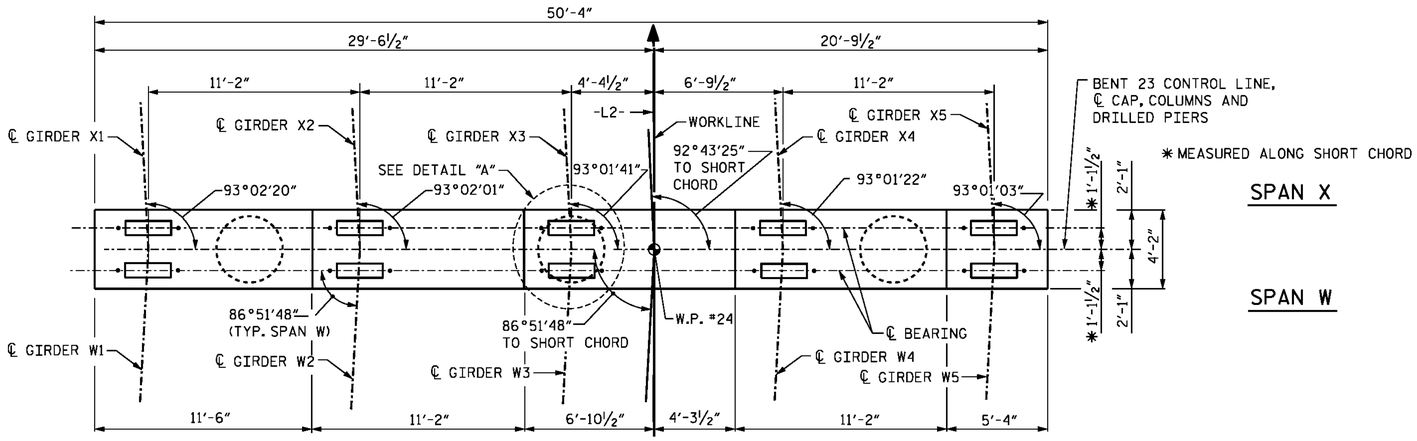
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

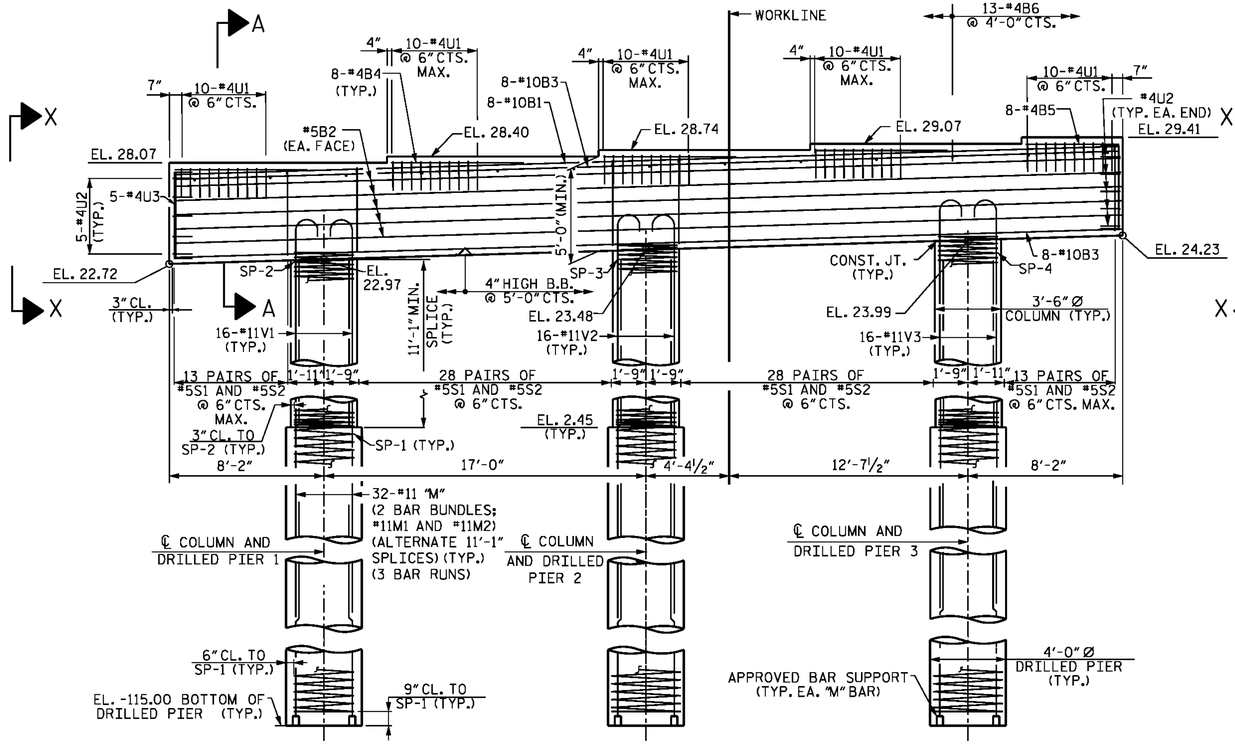
BENTS 19 THROUGH 22 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-189
1			3			TOTAL SHEETS
2			4			278

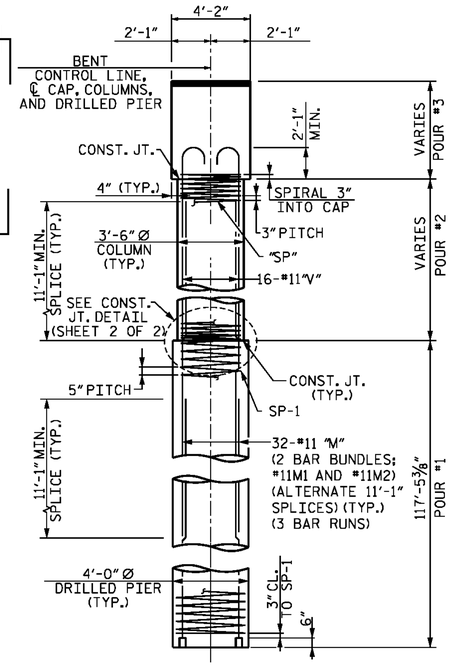
5/12/2016
400.371_B4929_SMU_1B19_5.dgn



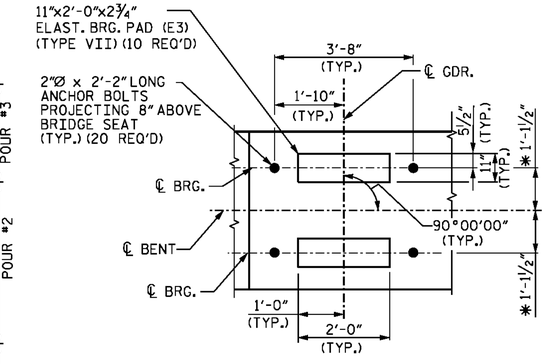
PLAN



ELEVATION



END ELEVATION



DETAIL "A"

(TYP. AT EACH BEARING)

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.

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

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR SECTIONS A-A AND B-B AND VIEWS X-X SEE SHEET 2 OF 2.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 23

PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-190
1			3			TOTAL SHEETS
2			4			278

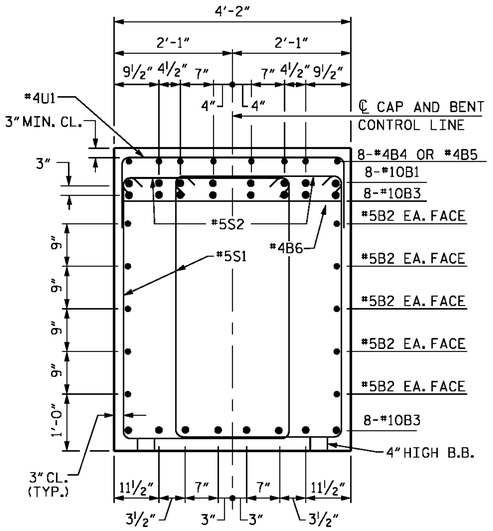
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

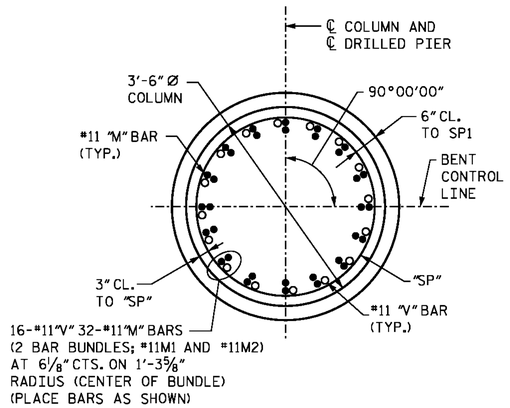
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	M. WAGNER	DATE: JAN. 2016
DRAWN BY:	B. CALDWELL	DATE: FEB. 2016
CHECKED BY:	J. SHERMAN	DATE: MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE: MAY 2016

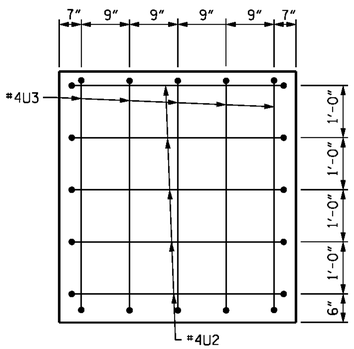
5/12/2016
400_373_B4929_SMU_IB231.dgn



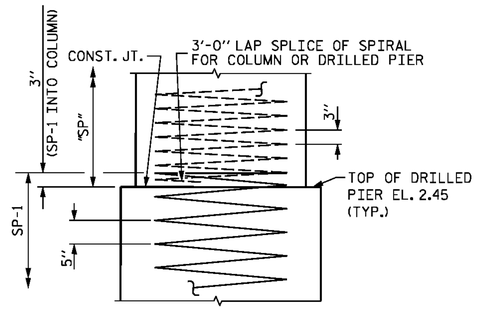
SECTION A-A



COLUMN AND DRILLED PIER DETAIL

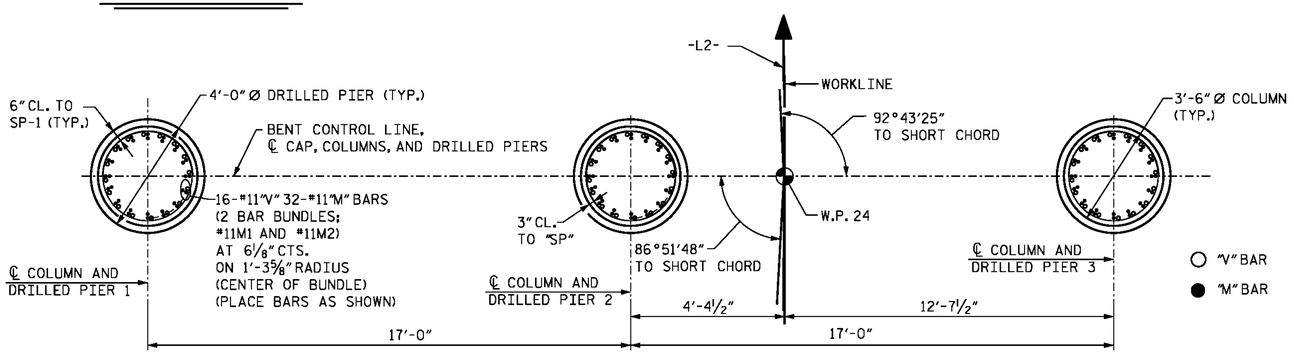


VIEW X-X



CONSTRUCTION JOINT DETAIL

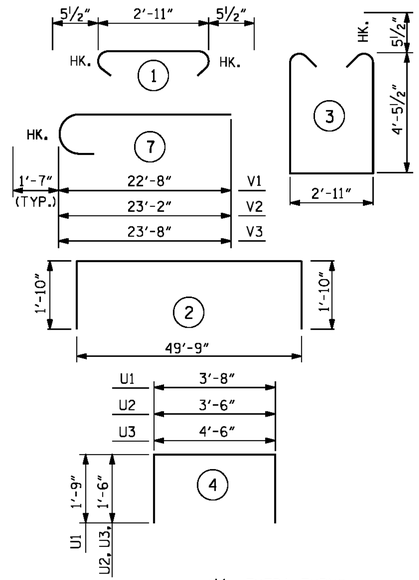
"M" OR "V" BARS NOT SHOWN FOR CLARITY

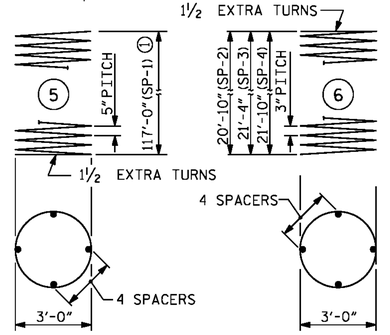


PLAN OF COLUMNS AND DRILLED PIERS

(REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER)

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 23

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	2	53'-5"	1839
B2	10	#5	STR	49'-6"	516
B3	16	#10	STR	49'-6"	3408
B4	32	#4	STR	6'-0"	128
B5	8	#4	STR	4'-10"	26
B6	13	#4	STR	3'-8"	32
M1	96	#11	STR	33'-0"	16,832
M2	192	#11	STR	60'-0"	61,206
S1	164	#5	3	12'-9"	2181
S2	164	#5	1	3'-10"	656
U1	50	#4	4	7'-2"	239
U2	10	#4	4	6'-6"	43
U3	10	#4	4	7'-6"	50
V1	16	#11	7	24'-3"	2061
V2	16	#11	7	24'-9"	2104
V3	16	#11	7	25'-3"	2146

EPOXY COATED REINFORCING STEEL — LBS. 93,467

SP1	3	*	5	2623'-7"	8209
SP2	1	**	6	799'-7"	534
SP3	1	**	6	818'-2"	547
SP4	1	**	6	836'-9"	559

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL — LBS. 9849

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - COLUMNS	22.5 C.Y.
POUR #3 - CAP	40.3 C.Y.
CLASS "AA" CONCRETE	62.8 C.Y.

DRILLED PIER QUANTITIES

POUR #1 - DRILLED PIER CONCRETE	164.0 C.Y.
4'-0" Ø DRILLED PIERS	352.3 L.F.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	53.4 L.F.
SPT TESTING	3 EA.
SID INSPECTIONS	1 EA.
CSL TUBES	1428 L.F.

** THE SP-2, SP-3 AND SP-4 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

* THE SP-1 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR,

① CONTRACTOR MAY PROVIDE 3'-0" MIN SPLICE AT MID HEIGHT OF EPOXY COATED SPIRAL REINFORCING STEEL. NO ADDITONAL PAYMENT WILL BE PROVIDE FOR SPLICES.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
BENT 23
SECTIONS AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-191
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C864482747...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	M. WAGNER	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	FEB. 2016
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/11/2016
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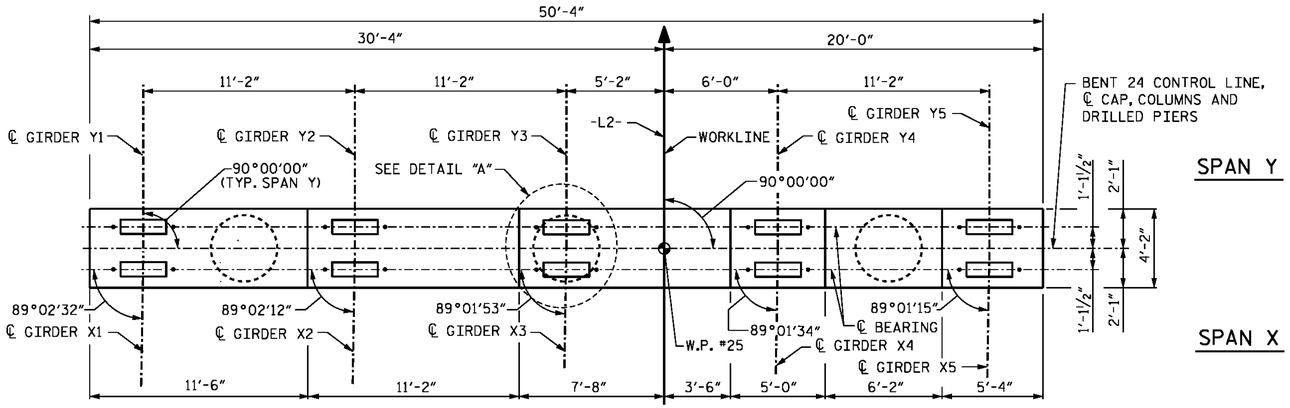
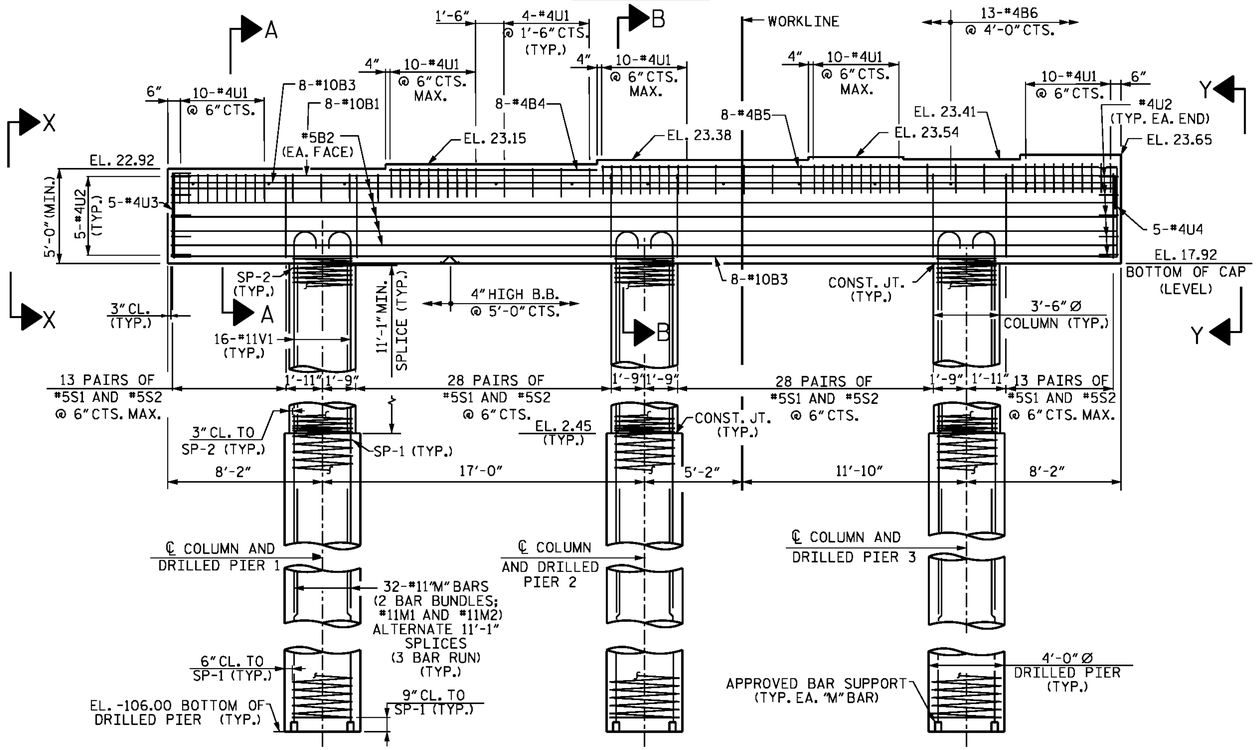
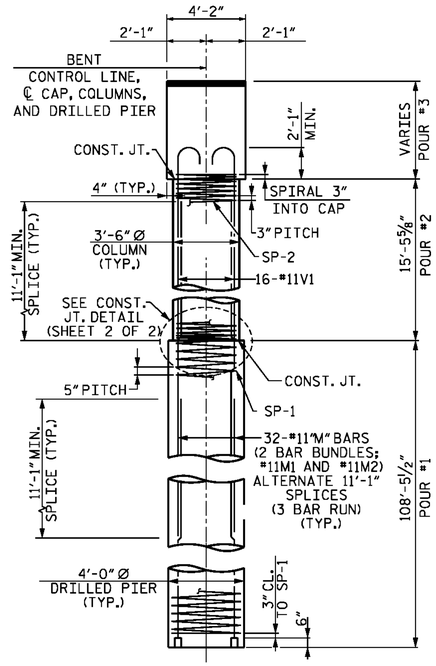


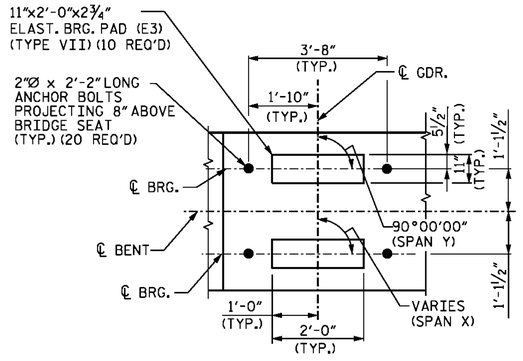
PLAN



ELEVATION



END ELEVATION



DETAIL "A"

(TYP. AT EACH BEARING)

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS IN #11V1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR SECTIONS A-A AND B-B AND VIEWS X-X AND Y-Y SEE SHEET 2 OF 2.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 24

PLAN AND ELEVATION

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

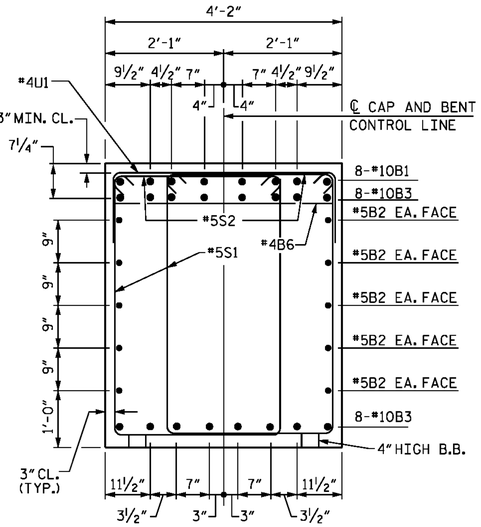
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

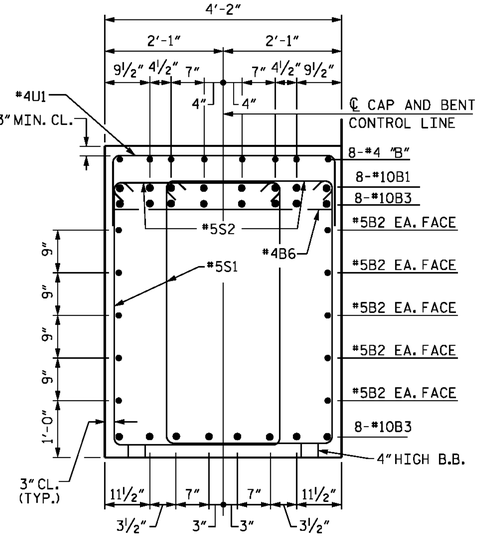
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-192
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	M. WAGNER	DATE : JAN. 2016
DRAWN BY:	B. CALDWELL	DATE : FEB. 2016
CHECKED BY:	J. SHERMAN	DATE : MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

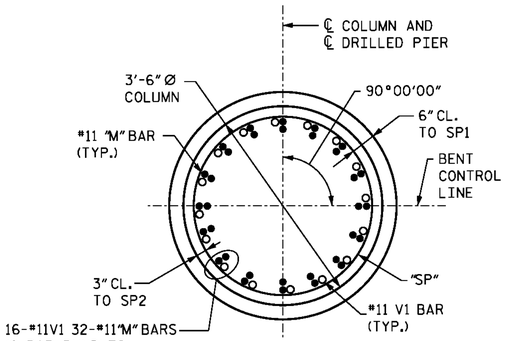
5/12/2016
400.377_B4929_SMU_IB241.dgn



SECTION A-A

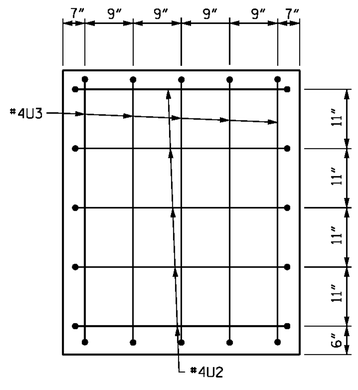


SECTION B-B

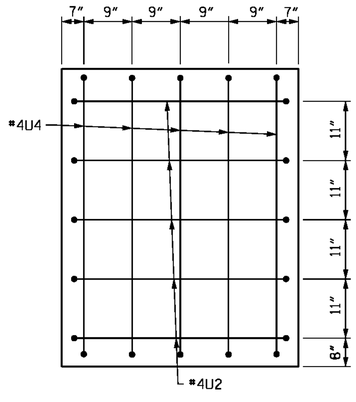


16-*11V1 32-*11"M" BARS
(2 BAR BUNDLES;
*11M1 AND *11M2)
AT 6⅛" CTS.
ON 1'-3⅝" RADIUS
(CENTER OF BUNDLE)
(PLACE BARS AS SHOWN)

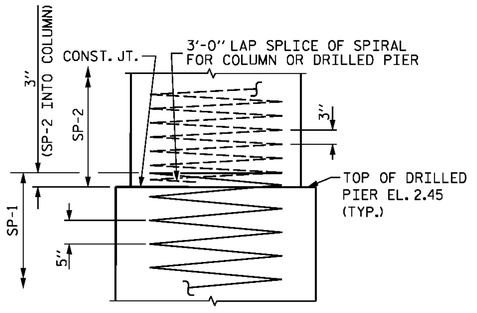
COLUMN AND DRILLED PIER DETAIL



VIEW X-X



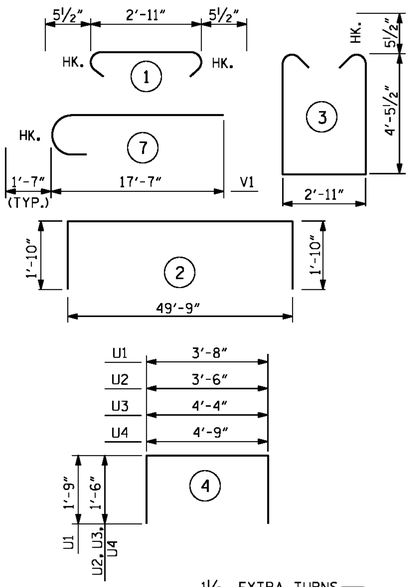
VIEW Y-Y

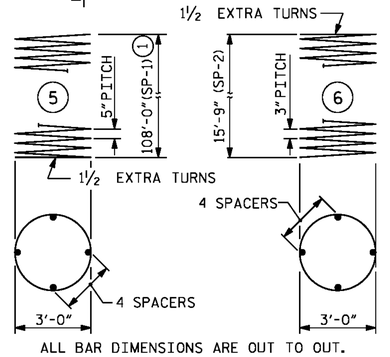


CONSTRUCTION JOINT DETAIL

"M" OR "V" BARS NOT SHOWN FOR CLARITY

BAR TYPES





ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 24

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	2	53'-5"	1839
B2	10	#5	STR	49'-6"	516
B3	16	#10	STR	49'-6"	3408
B4	8	#4	STR	10'-11"	58
B5	8	#4	STR	27'-2"	145
B6	13	#4	STR	3'-8"	32
M1	96	#11	STR	30'-0"	15,301
M2	192	#11	STR	60'-0"	61,206
S1	164	#5	3	12'-9"	2181
S2	164	#5	1	3'-10"	656
U1	62	#4	4	7'-2"	297
U2	10	#4	4	6'-6"	43
U3	5	#4	4	7'-4"	24
U4	5	#4	4	7'-9"	26
V1	48	#11	7	19'-2"	4888

EPOXY COATED REINFORCING STEEL LBS. 90,620

SP1	3	*	5	2429'-0"	7600
SP2	3	**	6	605'-0"	1212

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 8812

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - COLUMNS	16.5 C.Y.
POUR #3 - CAP	41.6 C.Y.
CLASS "AA" CONCRETE	58.1 C.Y.

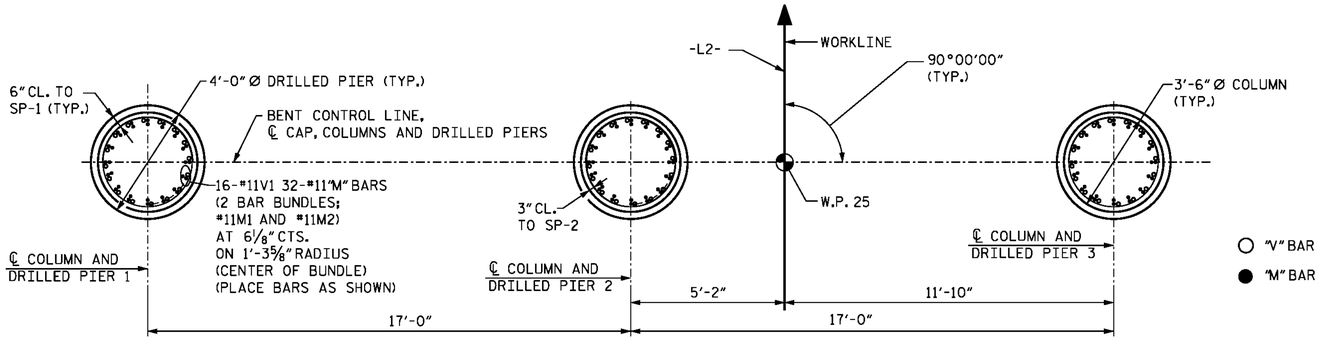
DRILLED PIER QUANTITIES

POUR #1 - DRILLED PIER CONCRETE	151.5 C.Y.
4'-0" Ø DRILLED PIERS	325.4 L.F.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	52.4 L.F.
SPT TESTING	3 EA.
SID INSPECTIONS	1 EA.
CSL TUBES	1320 L.F.

** THE SP-2 EPOXT COATED SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

* THE SP-1 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

(1) CONTRACTOR MAY PROVIDE 3'-0" MIN. SPLICE AT MID HIEGHT OF EPOXY COATED SPIRAL REINFORCING STEEL. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR SPLICES.



PLAN OF COLUMNS AND DRILLED PIERS

(REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 24

SECTIONS AND DETAILS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-193
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	M. WAGNER	DATE : JAN. 2016
DRAWN BY:	B. CALDWELL	DATE : FEB. 2016
CHECKED BY:	J. SHERMAN	DATE : MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/11/2016
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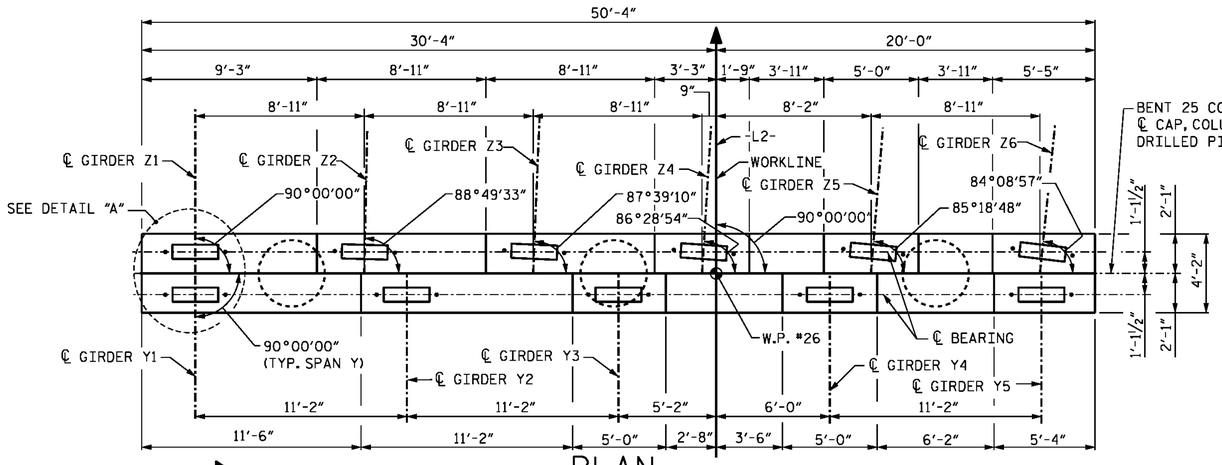
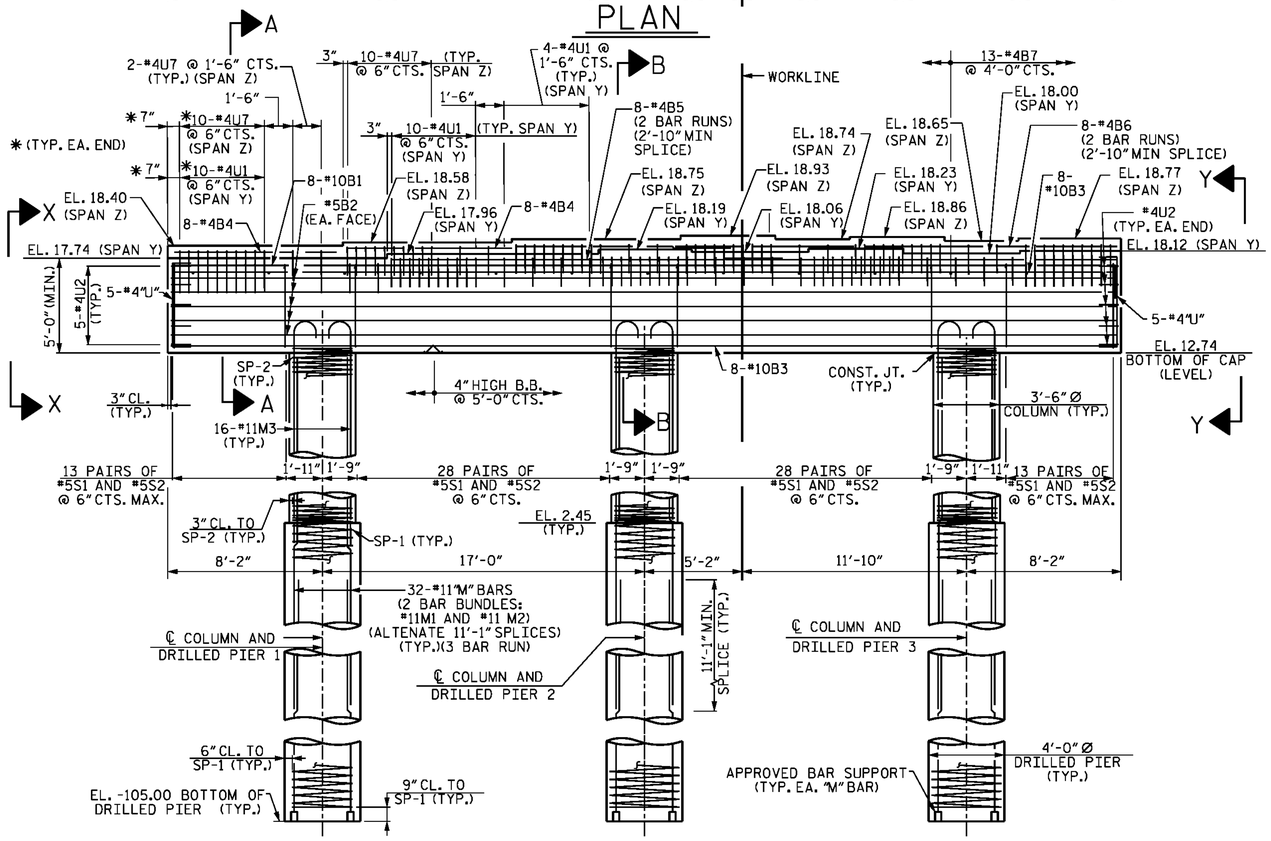
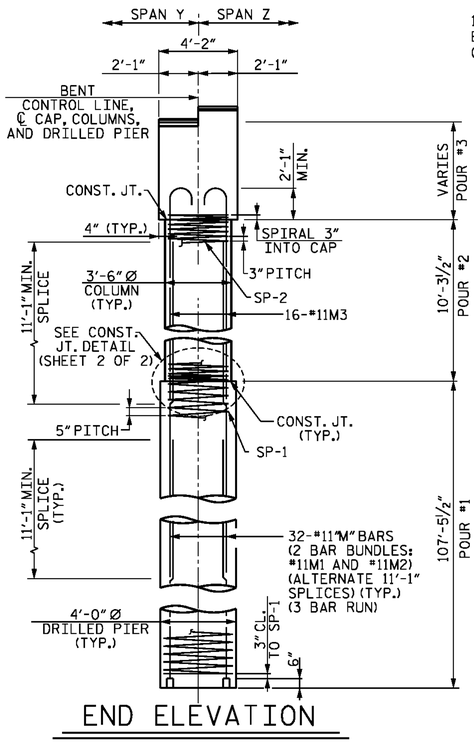


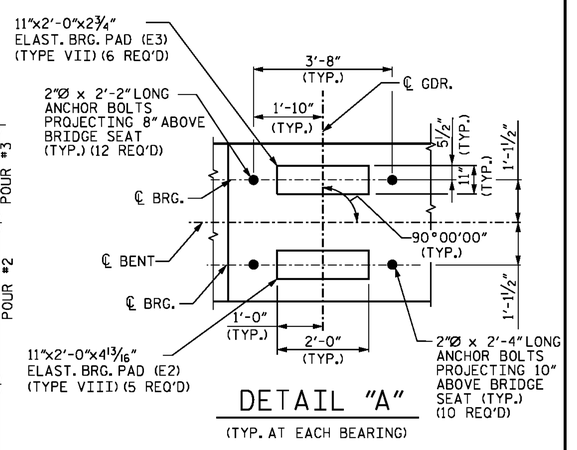
PLAN



ELEVATION



END ELEVATION



DETAIL "A"

(TYP. AT EACH BEARING)

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS IN #11M3 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR SECTIONS A-A AND B-B AND VIEWS X-X AND Y-Y SEE SHEET 2 OF 2.

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

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 25

PLAN AND ELEVATION

DESIGNED BY:	M. WAGNER	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	FEB. 2016
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

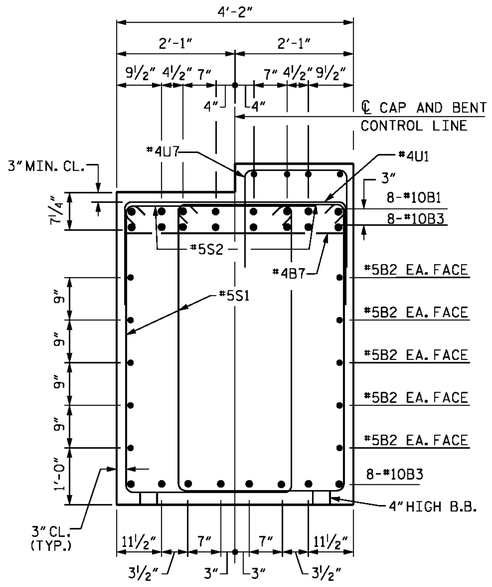
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

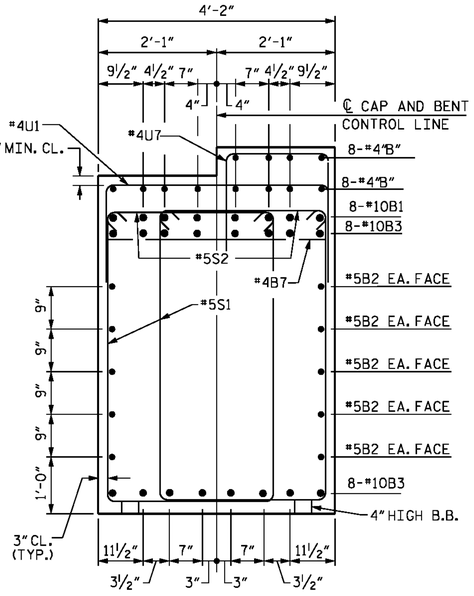
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-194
1			3			TOTAL SHEETS
2			4			278

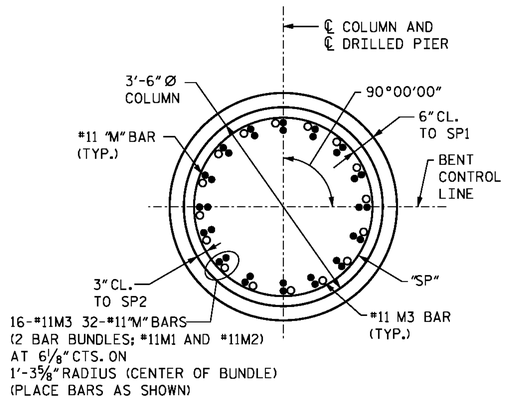
5/12/2016
400.381_B4929_SMU_IB251.dgn



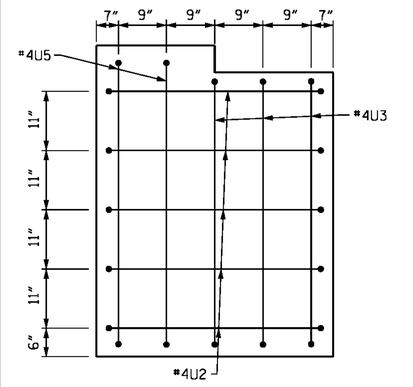
SECTION A-A



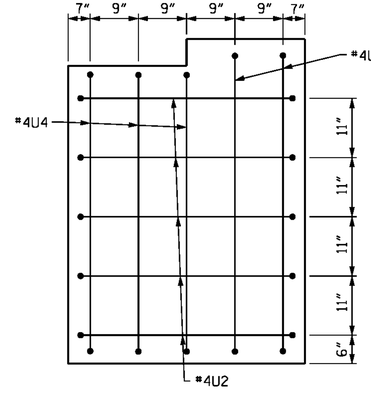
SECTION B-B



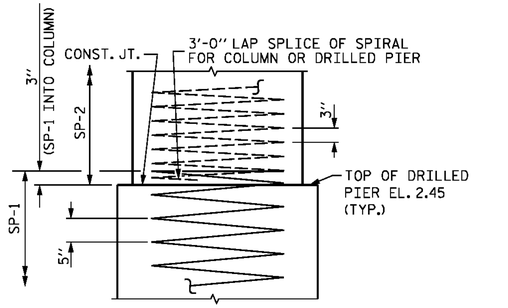
COLUMN AND DRILLED PIER DETAIL



VIEW X-X

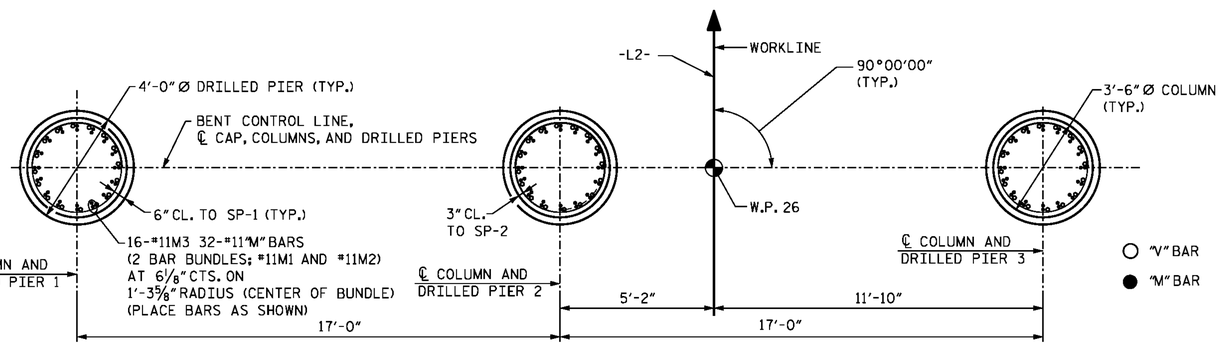


VIEW Y-Y



CONSTRUCTION JOINT DETAIL

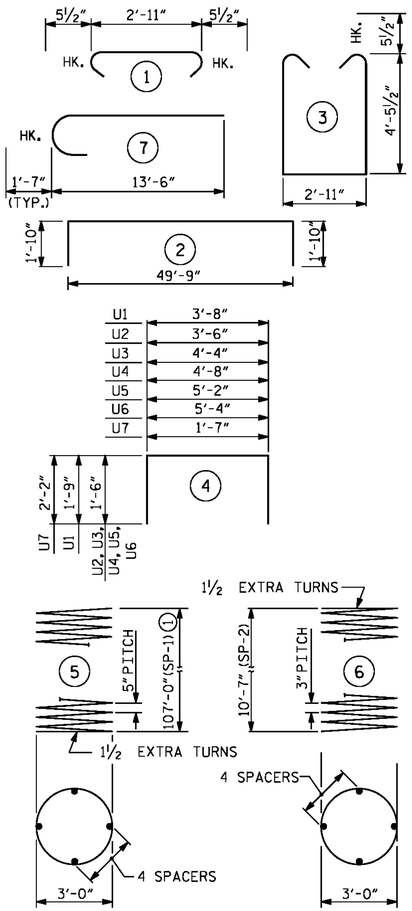
"M" BARS NOT SHOWN FOR CLARITY



PLAN OF COLUMNS AND DRILLED PIERS

(REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 25

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	8	#10	2	53'-5"	1839
B2	10	#5	STR	49'-6"	516
B3	16	#10	STR	49'-6"	3408
B4	16	#4	STR	9'-0"	96
B5	16	#4	STR	19'-7"	209
B6	16	#4	STR	17'-3"	184
B7	13	#4	STR	3'-8"	32
M1	192	#11	STR	60'-0"	61,206
M2	96	#11	STR	30'-0"	15,301
M3	48	#11	STR	15'-1"	3847
S1	164	#5	3	12'-9"	2181
S2	164	#5	1	3'-10"	656
U1	66	#4	4	7'-2"	316
U2	10	#4	4	6'-6"	43
U3	3	#4	4	7'-4"	15
U4	3	#4	4	7'-8"	15
U5	2	#4	4	8'-2"	11
U6	2	#4	4	8'-4"	11
U7	70	#4	4	5'-11"	277
SP1	3	*	5	2401'-1"	7513
SP2	3	**	6	418'-4"	838

EPOXY COATED REINFORCING STEEL LBS. 90,163

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 8351

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - COLUMNS	11.0 C.Y.
POUR #3 - CAP	43.7 C.Y.
CLASS "AA" CONCRETE	54.7 C.Y.

DRILLED PIER QUANTITIES

POUR #1 - DRILLED PIER CONCRETE	150.0 C.Y.
4'-0" Ø DRILLED PIERS	322.4 L.F.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	52.4 L.F.
SPT TESTING	3 EA.
SID INSPECTIONS	1 EA.
CSL TUBES	1308 L.F.

** THE SP-2 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

* THE SP-1 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR,

① CONTRACTOR MAY PROVIDE 3'-0" MIN SPLICE AT MID HEIGHT OF EPOXY COATED SPIRAL REINFORCING STEEL. NO ADDITONAL PAYMENT WILL BE PROVIDE FOR SPLICES.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 25

SECTIONS AND DETAILS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

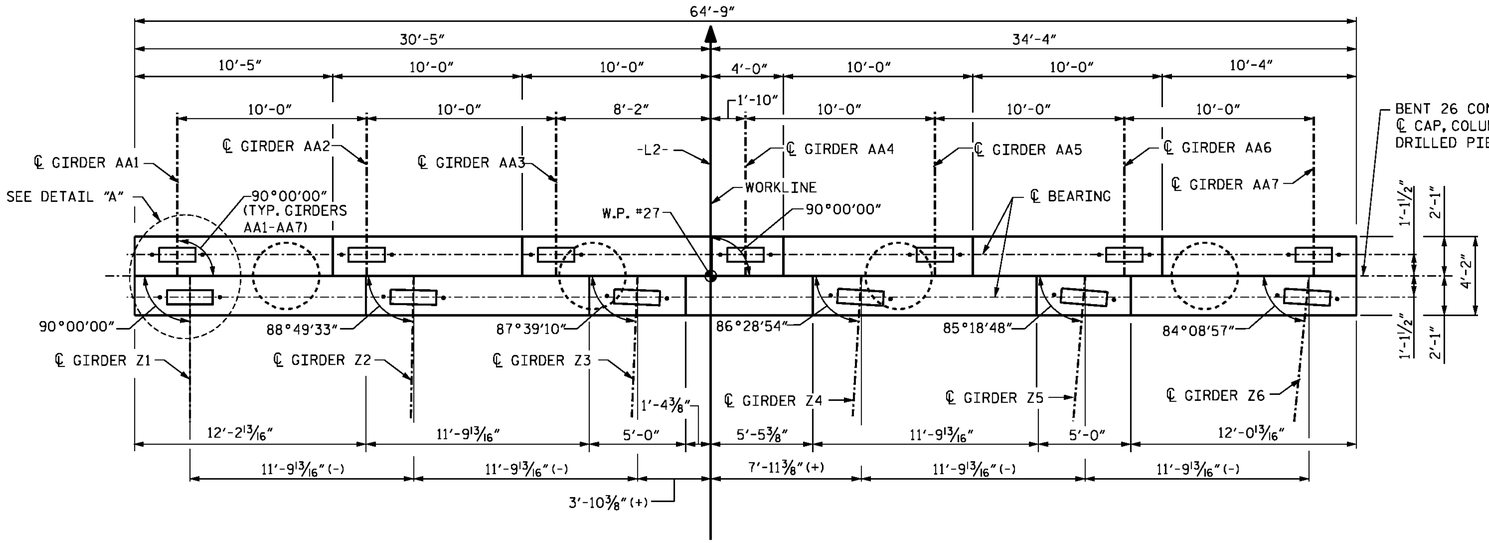
DocuSigned by: Jason R Doughty 00F1C864492747...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

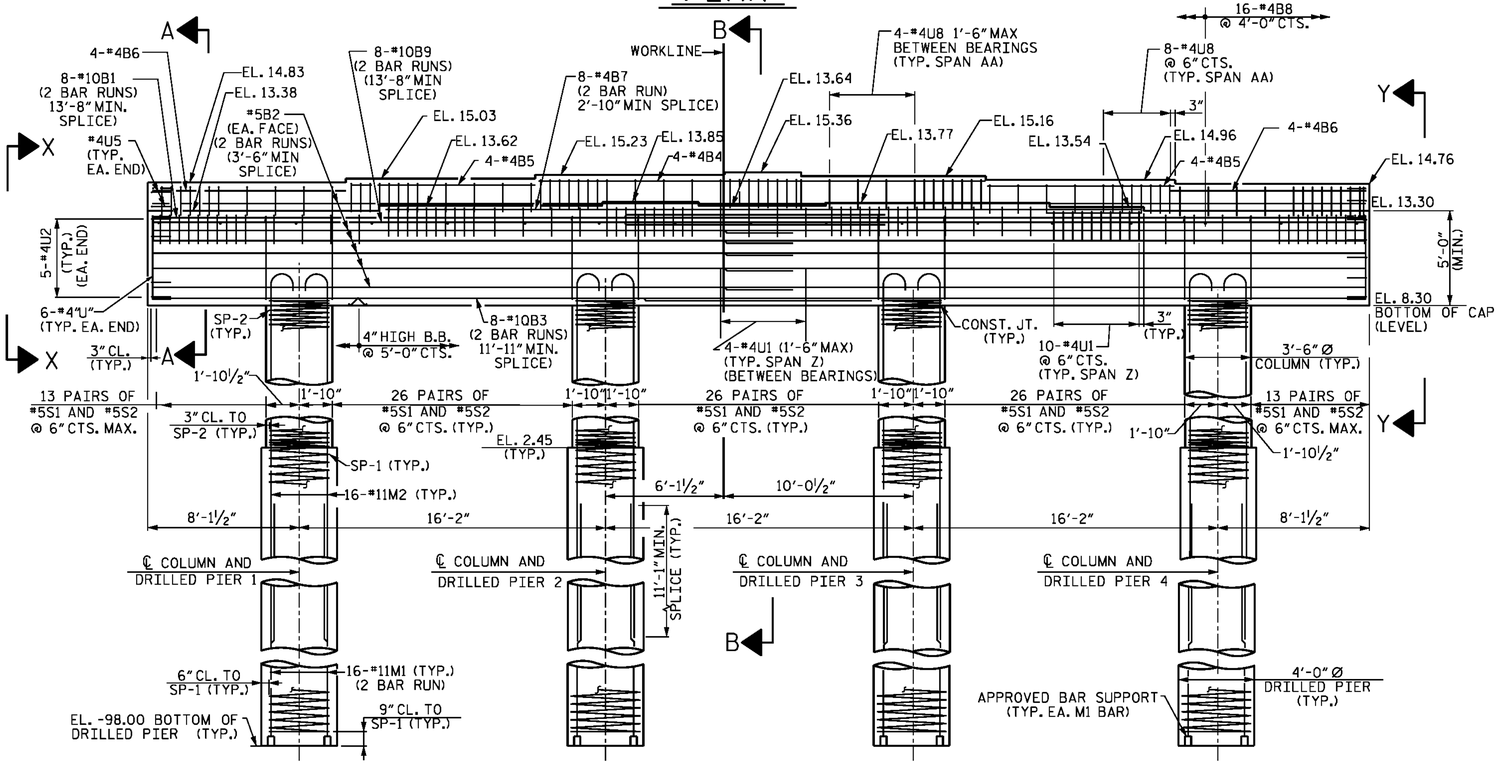
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-195
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	M. WAGNER	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	FEB. 2016
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

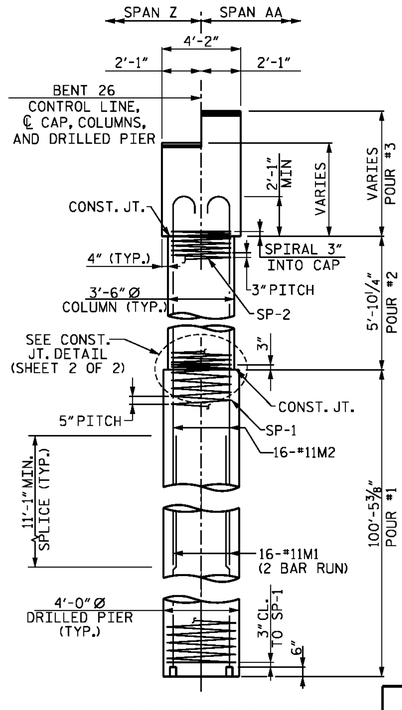
5/11/2016
400_383_B4929_SMU_IB252.dgn



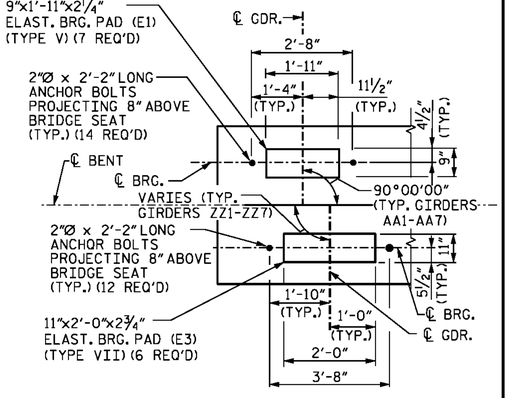
PLAN



ELEVATION



END ELEVATION



DETAIL "A"

(TYP. AT EACH BEARING)

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS IN #11M2 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL. HOOKS MUST BE PLACED SUCH THAT 3" MIN. CONCRETE COVER IS PROVIDED TO THE FACE OF CAP.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR SECTIONS A-A AND B-B AND VIEWS X-X AND Y-Y SEE SHEET 2 OF 2.

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

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 26

PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-196
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

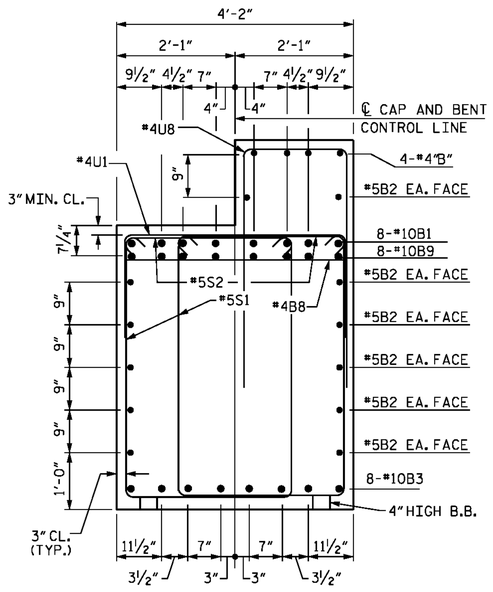
5/12/16

DocuSigned by: Jason R Doughty
00F1C864482747...

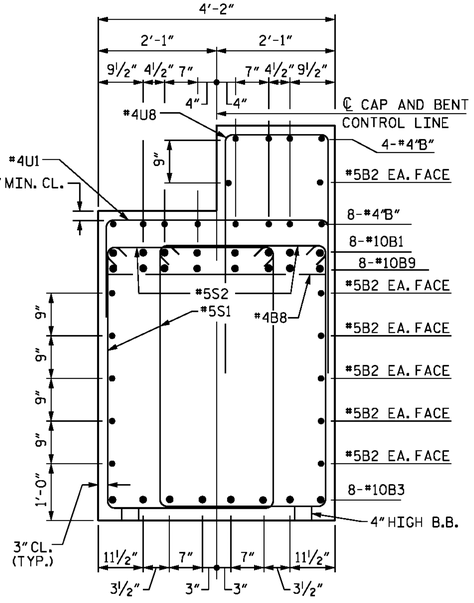
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	M. WAGNER	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	FEB. 2016
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

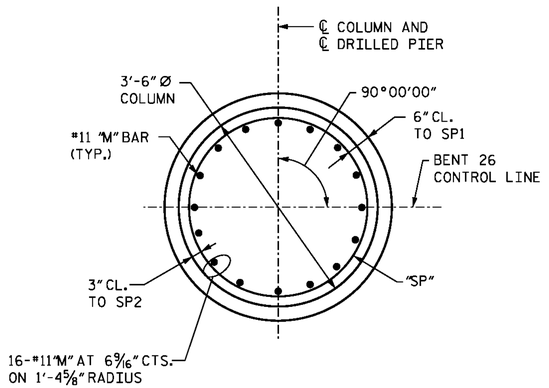
5/12/2016
400_385_B4929_SMU_IB261.dgn



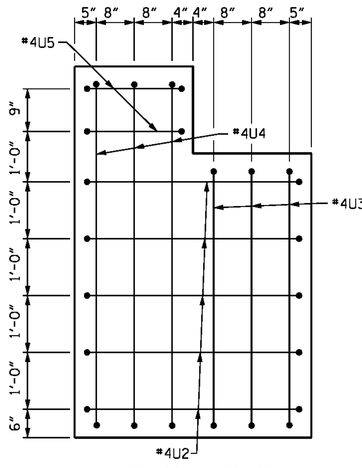
SECTION A-A



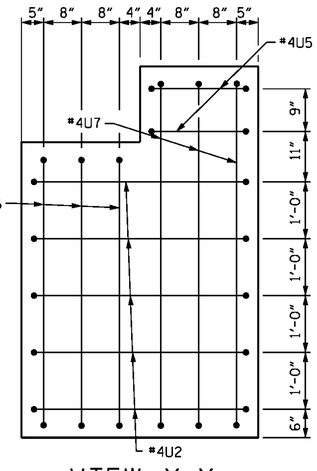
SECTION B-B



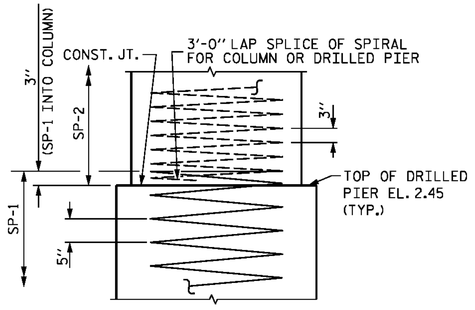
COLUMN AND DRILLED PIER DETAIL



VIEW X-X



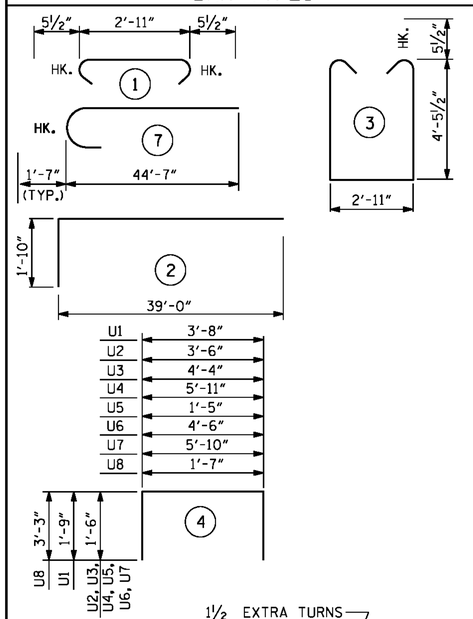
VIEW Y-Y



CONSTRUCTION JOINT DETAIL

"M" BARS NOT SHOWN FOR CLARITY

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 26

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#10	2	40'-10"	2811
B2	24	#5	STR	33'-11"	849
B3	16	#10	STR	38'-1"	2622
B4	4	#4	STR	23'-6"	63
B5	8	#4	STR	9'-9"	52
B6	8	#4	STR	10'-2"	54
B7	16	#4	STR	23'-2"	248
B8	16	#4	STR	3'-8"	39
B9	16	#10	STR	39'-0"	2685
M1	128	#11	STR	44'-7"	30,320
M2	64	#11	7	46'-2"	15,698
S1	208	#5	3	12'-9"	2766
S2	208	#5	1	3'-10"	832
U1	80	#4	4	7'-2"	383
U2	10	#4	4	6'-6"	43
U3	3	#4	4	7'-4"	15
U4	3	#4	4	8'-11"	18
U5	4	#4	4	4'-5"	12
U6	3	#4	4	7'-3"	15
U7	3	#4	4	8'-10"	18
U8	80	#4	4	8'-1"	432
SP1	4	*	5	2243'-6"	9360
SP2	4	**	6	251'-1"	671

EPOXY COATED REINFORCING STEEL — LBS. 59,975

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL — LBS. 10,031

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - COLUMNS	8.4 C.Y.
POUR #3 - CAP	67.1 C.Y.
CLASS "AA" CONCRETE	75.5 C.Y.

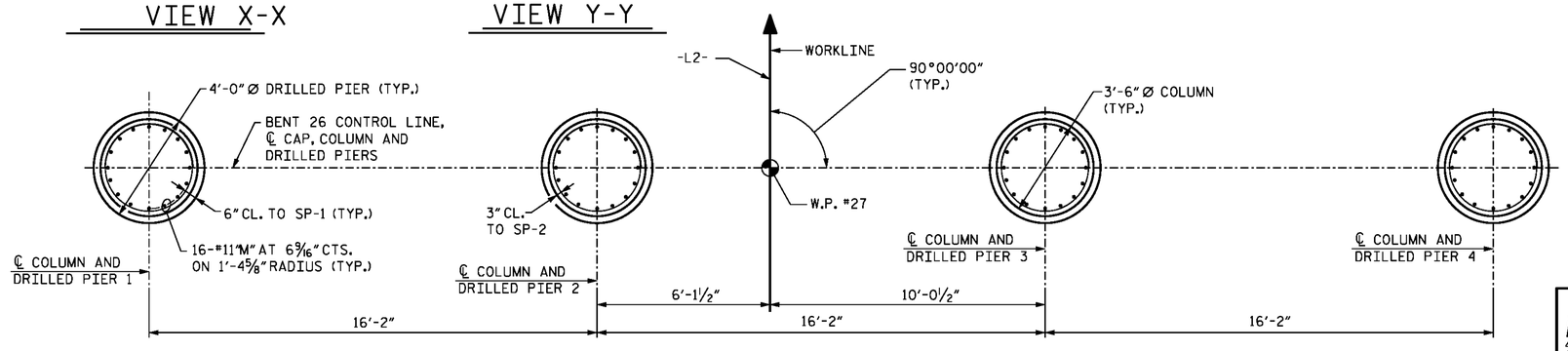
DRILLED PIER QUANTITIES

POUR #1 - DRILLED PIER CONCRETE	187.0 C.Y.
4'-0" Ø DRILLED PIERS	401.8 L.F.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	69.8 L.F.
SID INSPECTIONS	1 EA.
CSL TUBES	1631.2 L.F.

** THE SP-2 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

* THE SP-1 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR,

(1) CONTRACTOR MAY PROVIDE 3'-0" MIN. SPLICE AT MID HEIGHT OF EPOXY COATED SPIRAL REINFORCING STEEL. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR SPLICES.



PLAN OF COLUMNS AND DRILLED PIERS

(REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 26

SECTIONS AND DETAILS

DESIGNED BY:	M. WAGNER	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	FEB. 2016
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-197
1			3			TOTAL SHEETS
2			4			278

5/12/2016
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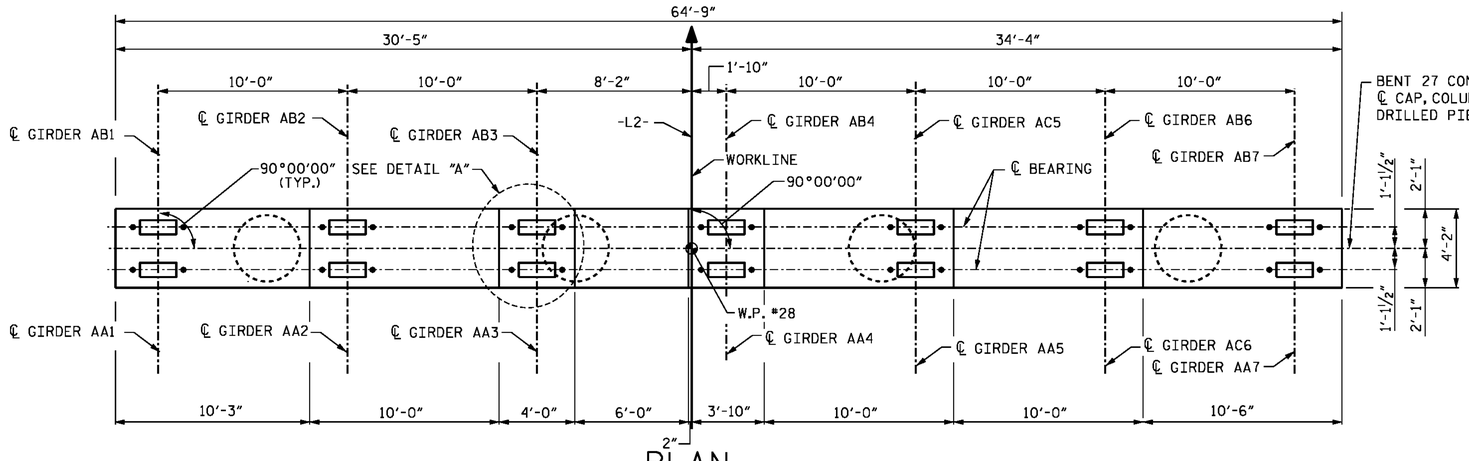
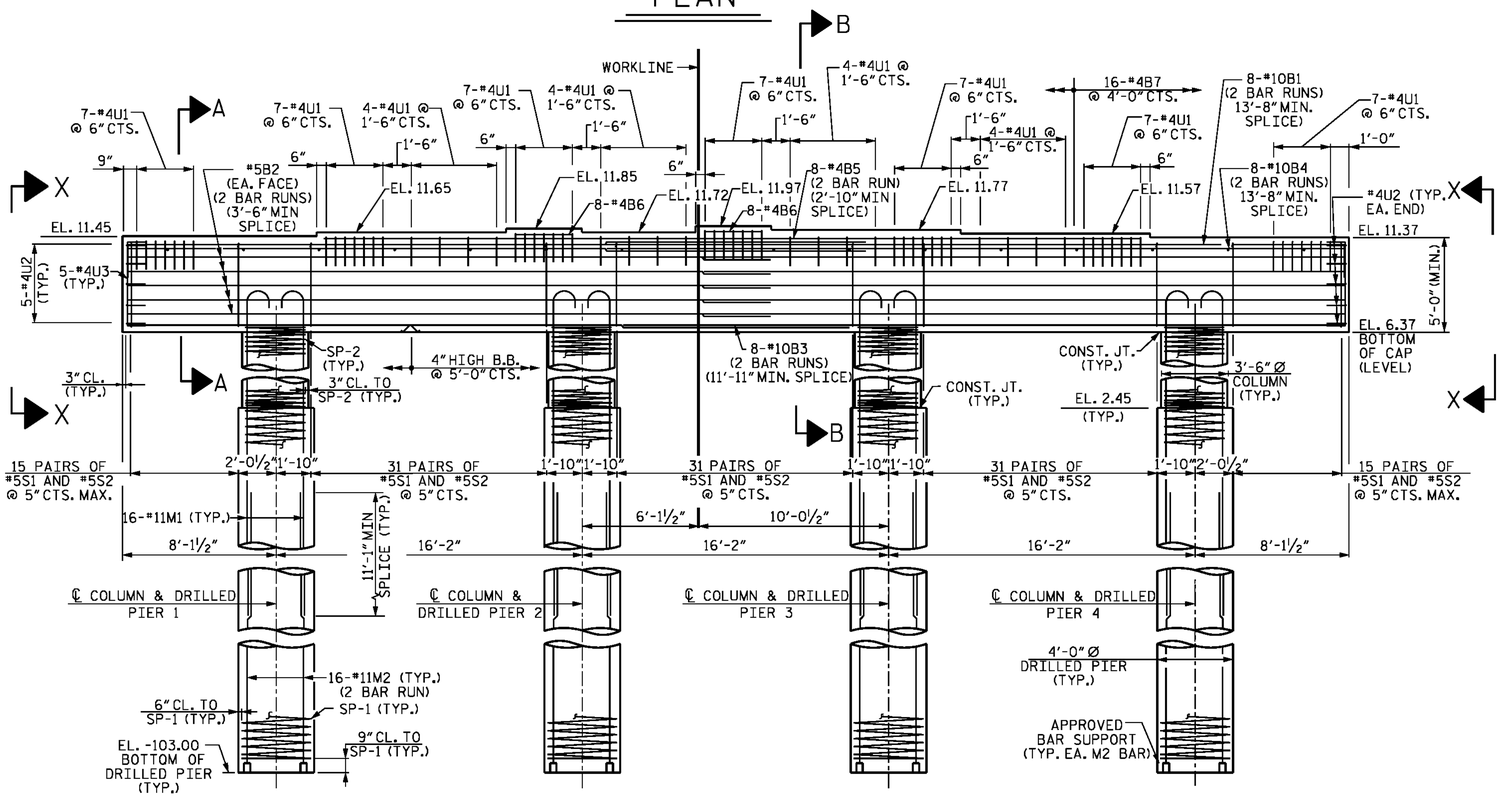
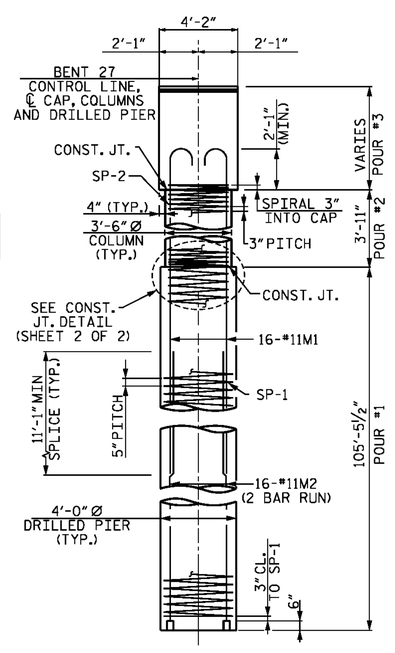


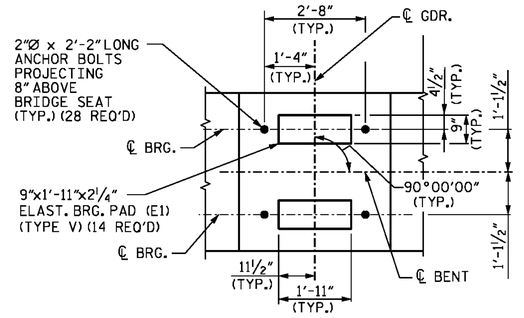
PLAN



ELEVATION



END ELEVATION



DETAIL "A"

(TYP. AT EACH BEARING)

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS IN #11M1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL. HOOKS MUST BE PLACED SUCH THAT 3" MIN. CONCRETE COVER IS PROVIDED TO THE FACE OF CAP.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR SECTIONS A-A AND B-B AND VIEWS X-Y SEE SHEET 2 OF 2.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 27

PLAN AND ELEVATION

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

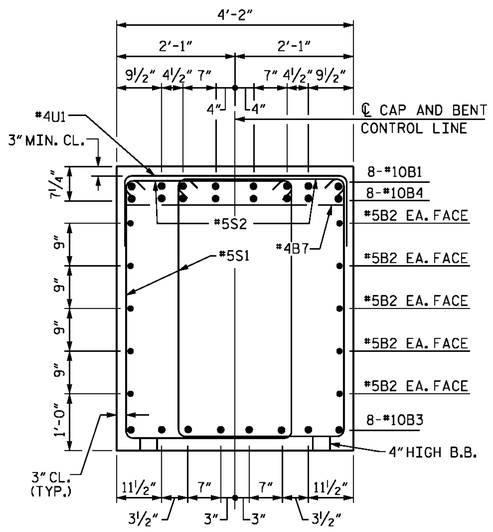
DocuSigned by: Jason R Doughty

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

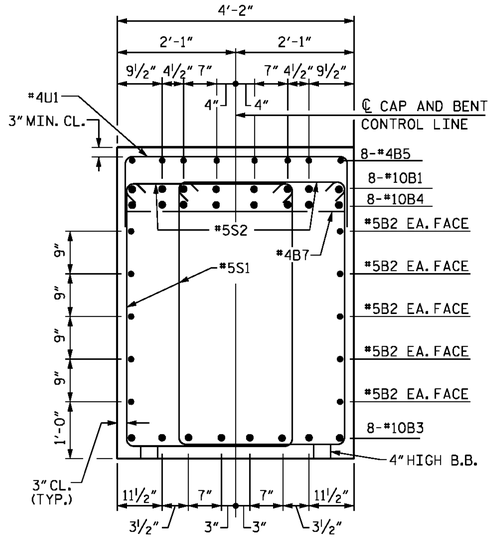
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-198
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	MJW/AMD	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	FEB. 2016
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

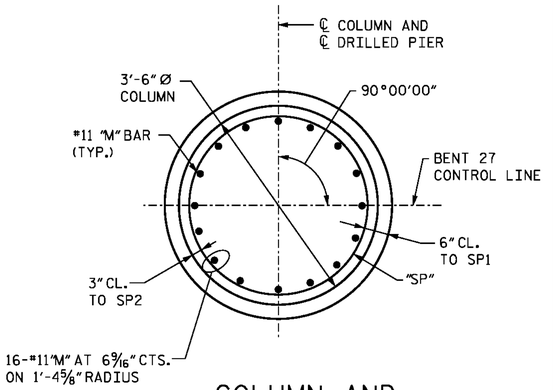
5/12/2016
400.389_B4929_SMU_IB271.dgn



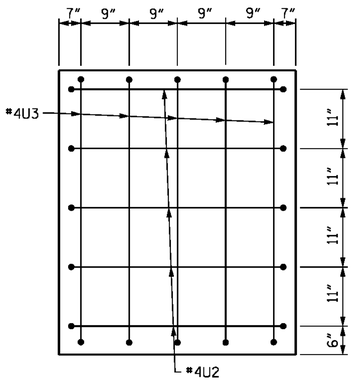
SECTION A-A



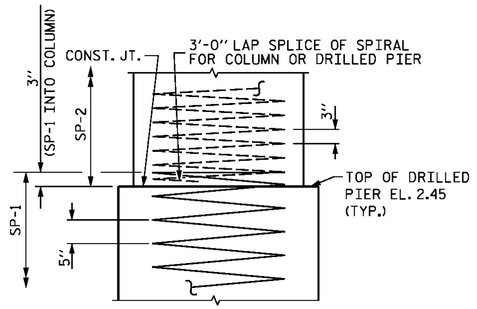
SECTION B-B



COLUMN AND DRILLED PIER DETAIL

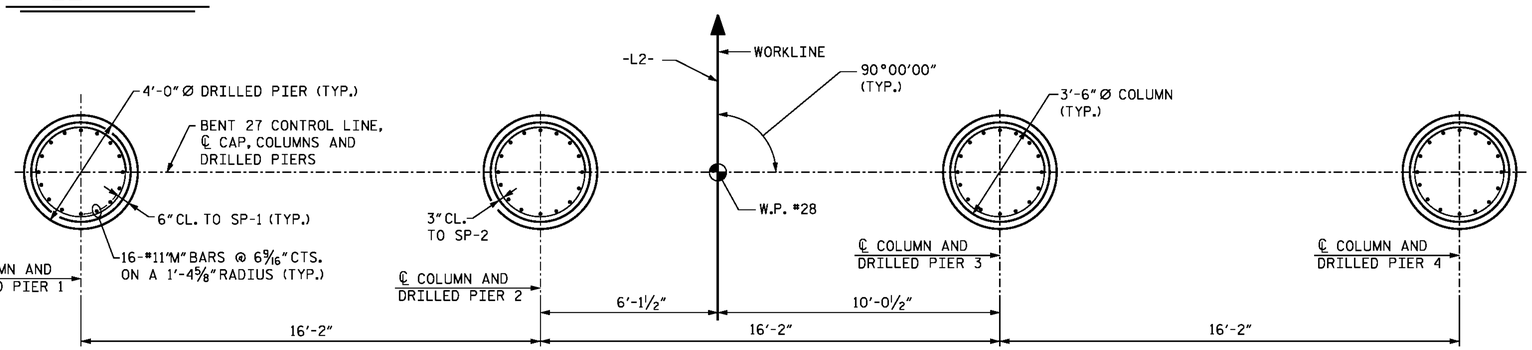


VIEW X-X



CONSTRUCTION JOINT DETAIL

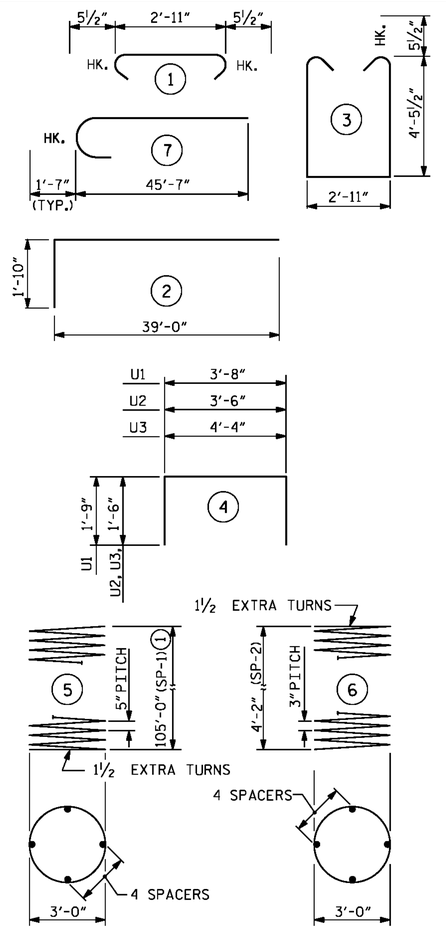
"M" BARS NOT SHOWN FOR CLARITY



PLAN OF COLUMNS AND DRILLED PIERS

(REINFORCING STEEL ARE TYPICAL FOR EACH COLUMN AND DRILLED PIER)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 27

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#10	2	40'-10"	2811
B2	20	#5	STR	33'-11"	708
B3	16	#10	STR	38'-1"	2622
B4	16	#10	STR	39'-0"	2685
B5	16	#4	STR	23'-2"	248
B6	16	#4	STR	3'-6"	37
B7	16	#4	STR	3'-8"	39
M1	64	#11	7	47'-2"	16,038
M2	128	#11	STR	45'-7"	31,000
S1	246	#5	3	12'-9"	3271
S2	246	#5	1	3'-10"	984
U1	65	#4	4	7'-2"	311
U2	10	#4	4	6'-6"	43
U3	10	#4	4	7'-4"	49
SP1	4	*	5	2354'-9"	9824
SP2	4	**	6	176'-8"	472

EPOXY COATED REINFORCING STEEL LBS. 60,846

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 10296

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - COLUMNS	5.6 C.Y.
POUR #3 - CAP	52.9 C.Y.
CLASS "AA" CONCRETE	58.5 C.Y.

DRILLED PIER QUANTITIES

POUR #1 - DRILLED PIER CONCRETE	196.3 C.Y.
4'-0" Ø DRILLED PIERS	421.8 L.F.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	69.8 L.F.
SPT TESTING	4 EA.
SID INSPECTIONS	1 EA.
CSL TUBES	1712 L.F.

** THE SP-2 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W20 OR D-20 COLD DRAWN WIRE OR #4 PLAIN OR DEFORMED BAR.

* THE SP-1 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

(1) CONTRACTOR MAY PROVIDE 3'-0" MIN. SPLICE AT MID HEIGHT OF EPOXY COATED SPIRAL REINFORCING STEEL. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR SPLICES.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 27

SECTIONS AND DETAILS

DESIGNED BY:	MJW/AMD	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	FEB. 2016
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-199
1			3			TOTAL SHEETS
2			4			278

5/11/2016
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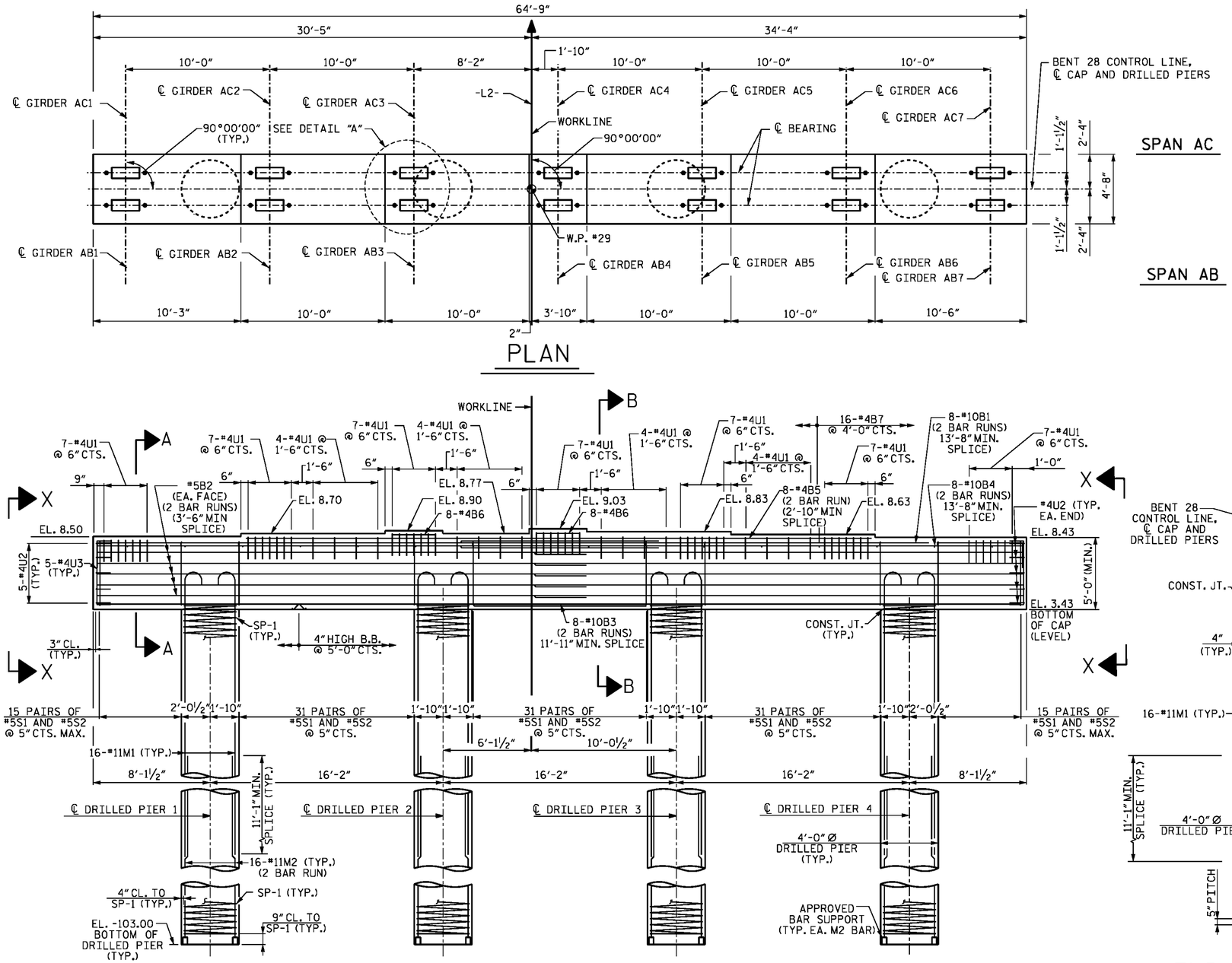
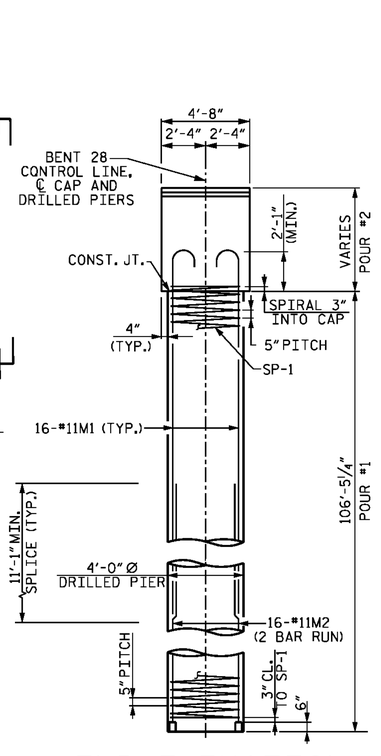
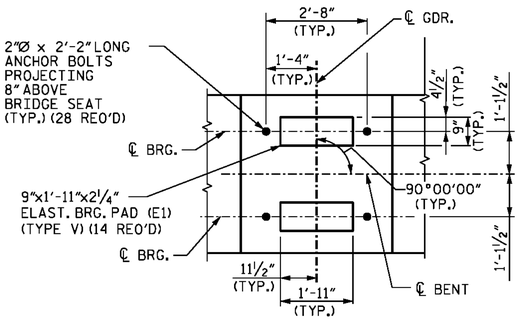


PLAN

ELEVATION



END ELEVATION



DETAIL "A"

(TYP. AT EACH BEARING)

NOTES:

STIRRUPS AND "U" BARS IN CAP MAY BE SHIFTED SLIGHTLY AS NECESSARY TO CLEAR ANCHOR BOLTS.

HOOKS IN #11M1 BARS MAY BE TURNED AS NECESSARY FOR PLACING REINFORCING STEEL. HOOKS MUST BE PLACED SUCH THAT 3" MIN. CONCRETE COVER IS PROVIDED TO THE FACE OF CAP.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR SECTIONS A-A AND B-B AND VIEWS X-Y AND Y-Y SEE SHEET 2 OF 2.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENT 28

PLAN AND ELEVATION

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

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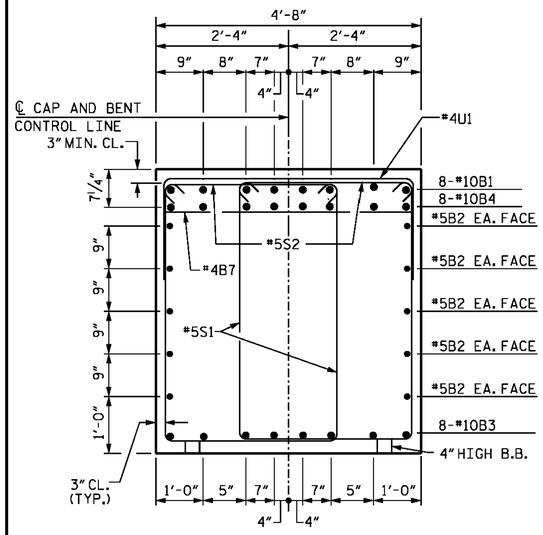
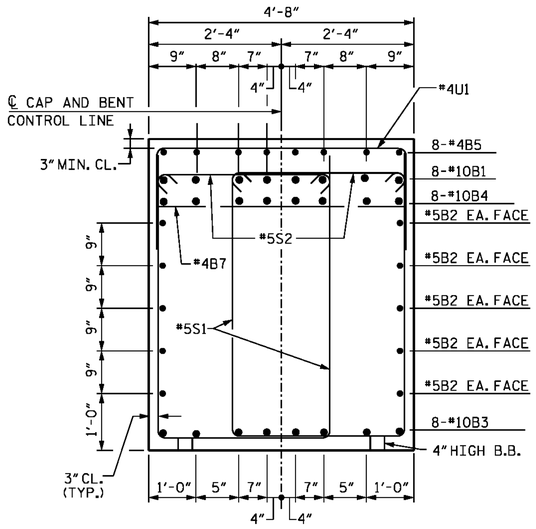
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-200
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	MJW/AMD	DATE : JAN. 2016
DRAWN BY:	B. CALDWELL	DATE : FEB. 2016
CHECKED BY:	J. SHERMAN	DATE : MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

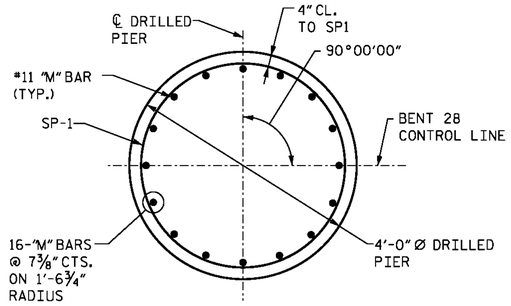
5/12/2016
400_393_B4929_SMU_IB281.dgn



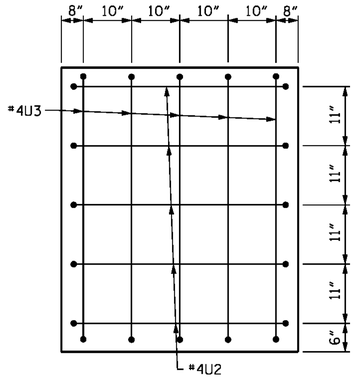
SECTION A-A



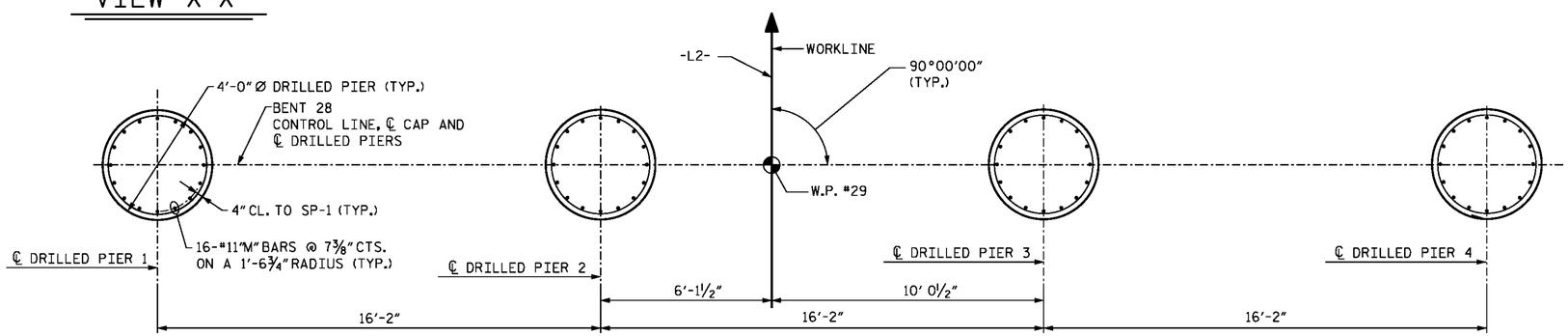
SECTION B-B



DRILLED PIER DETAIL



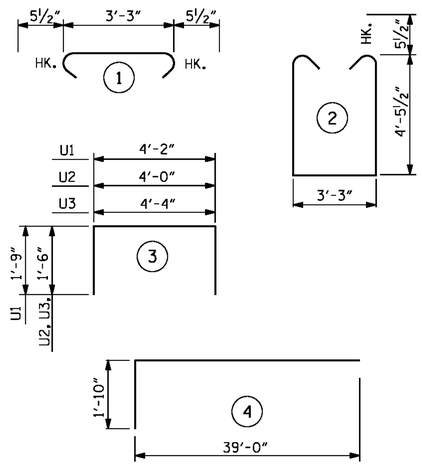
VIEW X-X



PLAN OF DRILLED PIERS

(REINFORCING STEEL ARE TYPICAL FOR EACH DRILLED PIER)

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

BENT 28

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	16	#10	4	40'-10"	2811
B2	20	#5	STR	33'-11"	708
B3	16	#10	STR	38'-1"	2622
B4	16	#10	STR	39'-0"	2685
B5	16	#4	STR	23'-2"	248
B6	16	#4	STR	3'-6"	37
B7	16	#4	STR	4'-2"	45
M1	64	#11	6	46'-2"	15,698
M2	128	#11	STR	44'-7"	30,320
S1	246	#5	3	13'-1"	3357
S2	246	#5	1	4'-2"	1069
U1	65	#4	4	7'-8"	333
U2	10	#4	4	7'-0"	47
U3	10	#4	4	7'-4"	49

EPOXY COATED REINFORCING STEEL — LBS. 60,027

SP1	4	*	5	2651'-5"	11,062

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL — LBS. 11,062

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - CAP	59.2 C.Y.
CLASS "AA" CONCRETE	59.2 C.Y.

DRILLED PIER QUANTITIES

POUR #1 - DRILLED PIER CONCRETE	198.2 C.Y.
4'-0" Ø DRILLED PIERS	425.8 L.F.
PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS	69.8 L.F.
SPT TESTING	4 EA.
SID INSPECTIONS	1 EA.
CSL TUBES	1728 L.F.

* THE SP-1 EPOXY COATED SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

(1) CONTRACTOR MAY PROVIDE 3'-0" MIN. SPLICE AT MID HEIGHT OF EPOXY COATED SPIRAL REINFORCING STEEL. NO ADDITIONAL PAYMENT WILL BE PROVIDED FOR SPLICES.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2

DESIGNED BY:	MJW/AMD	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	FEB. 2016
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
BENT 28
SECTIONS AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-201
1			3			TOTAL SHEETS
2			4			278

5/11/2016
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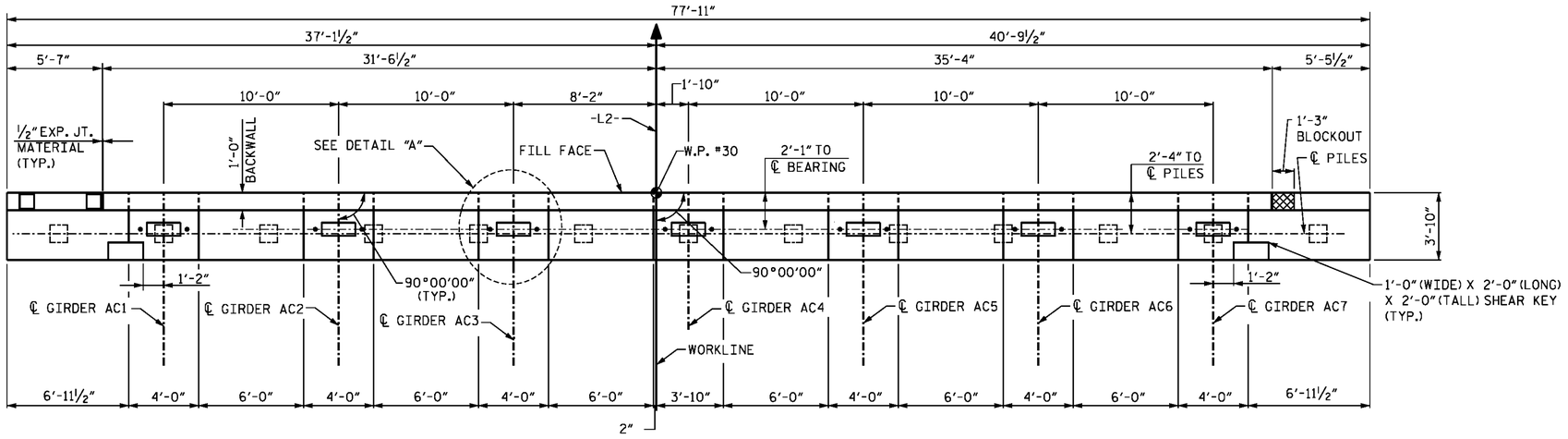
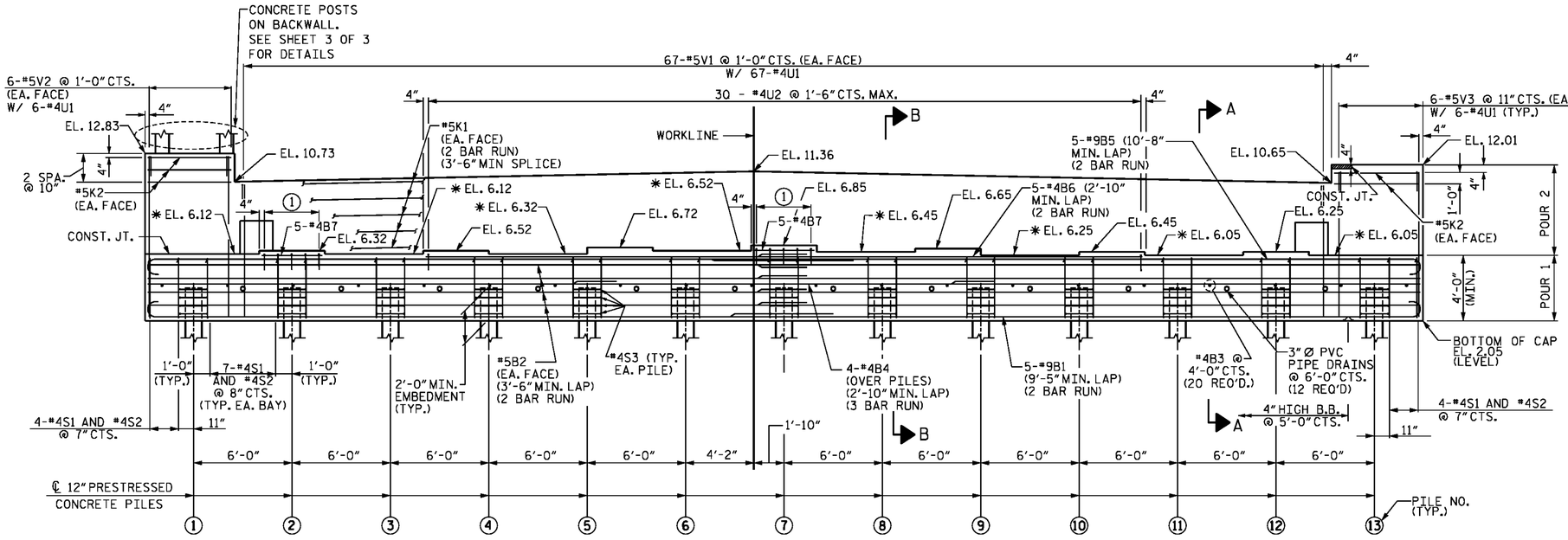


PLAN



ELEVATION

① 5-#4U2 @ 10" CTS. (TYP.)

* FOR LOCATION OF ELEVATIONS BETWEEN BRIDGE SEAT BUILDUPS, SEE SECTION A-A AND B-B ON SHEET 2 OF 3. (REINFORCEMENT IN SHEAR KEY AND CONCRETE POSTS NOT SHOWN FOR CLARITY)

NOTES:

FOR SECTIONS A-A, B-B AND SHEAR KEY DETAIL SEE SHEET 2 OF 3.

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

BACKWALL SHALL BE PLACED BEFORE APPLYING THE EPOXY PROTECTIVE COATING.

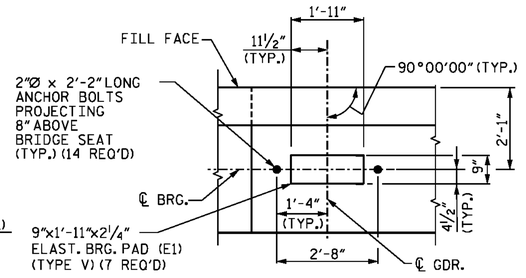
THE TOP SURFACE AREAS OF THE END BENT CAP, EXCEPT THE BRIDGE SEAT BUILDUPS, SHALL BE SLOPED TRANSVERSELY FROM THE FILL FACE AT THE RATE OF 2%.

THE #5 "V" BARS SHALL BE PLACED WITH 2" CLEAR SPACING FROM TOP OF BACKWALL

THE CONCRETE IN THE SHADED AREA OF THE BACKWALL SHALL BE POURED AFTER THE PARAPET IS CAST IF SLIP FORMING IS USED.

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

FOR PIPE DRAIN DETAILS, SEE SHEET 2 OF 3.



DETAIL "A"

(TYP. AT EACH BEARING)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2
PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-202
1			3			TOTAL SHEETS
2			4			278

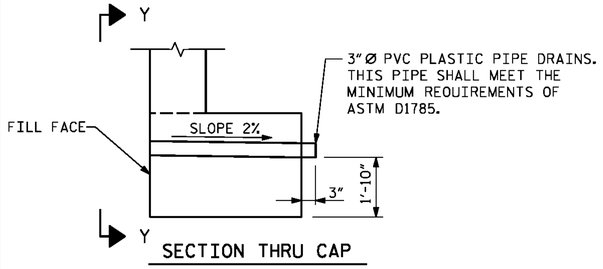
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

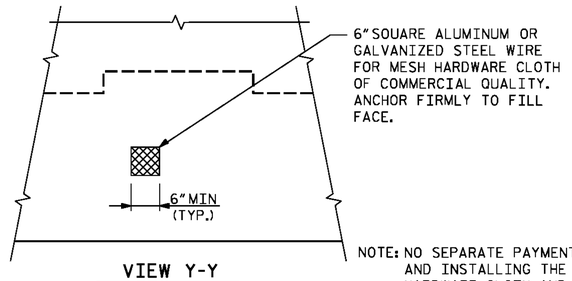
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	M. WAGNER	DATE :	DEC. 2015
DRAWN BY:	B. CALDWELL	DATE :	DEC. 2015
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/11/2016
400_397_B4929_SMU_EB2.dgn



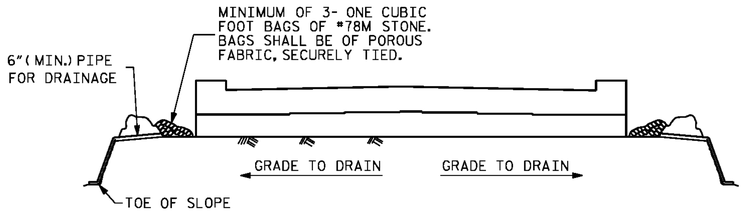
SECTION THRU CAP



VIEW Y-Y

NOTE: NO SEPARATE PAYMENT WILL BE MADE FOR FURNISHING AND INSTALLING THE PVC PLASTIC PIPE DRAINS, HARDWARE CLOTH AND FASTENERS. THE ENTIRE COST OF THIS WORK SHALL BE INCLUDED IN THE UNIT CONTRACT PRICE FOR THE SEVERAL PAY ITEMS.

PIPE DRAIN DETAILS



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

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

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

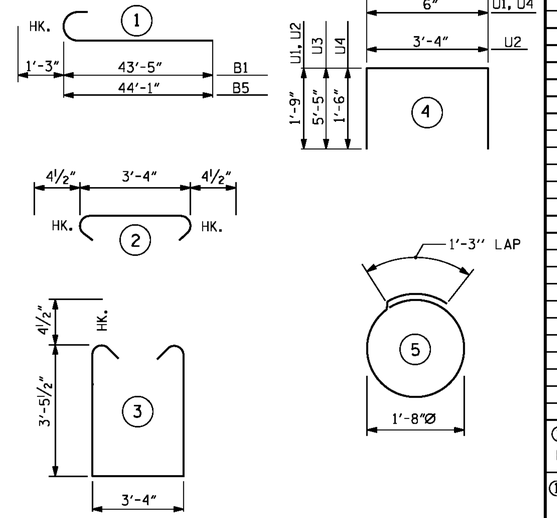
TEMPORARY DRAINAGE AT END BENT

NOTES

DESIGN REINFORCEMENT CONNECTED TO END BENT CAP FOR FACTORED STRAP LOAD OF 4.5 KIPS/FT ACTING 3'-0" ABOVE BOTTOM OF CAP ELEVATION. CAST REINFORCEMENT CONNECTORS INTO CAP AND MAINTAIN A CLEARANCE OF AT LEAST 3" BETWEEN CONNECTOR AND REINFORCEMENT STEEL IN CAP.

SEE RETAINING WALL DRAWINGS FOR ADDITIONAL REQUIREMENTS.

BAR TYPES



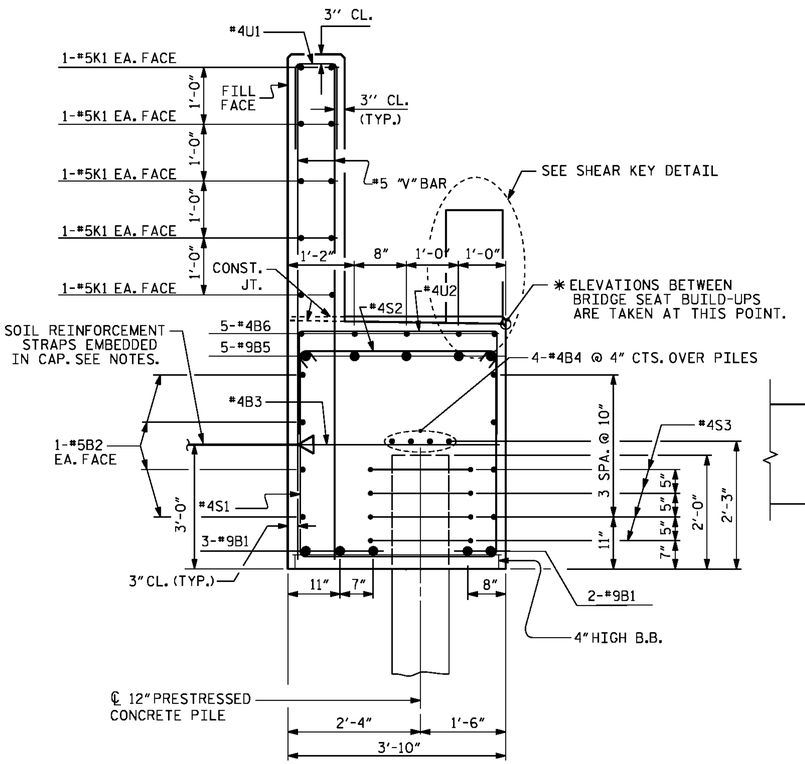
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL
END BENT 2

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#9	1	44'-8"	1519
B2	16	#5	STR	40'-6"	676
B3	20	#4	STR	3'-4"	45
B4	12	#4	STR	27'-9"	222
B5	10	#9	1	45'-4"	1541
B6	10	#4	STR	23'-2"	155
B7	10	#4	STR	3'-6"	23
K1	20	#5	STR	40'-5"	843
K2	10	#5	STR	4'-11"	51
S1	92	#4	3	11'-0"	676
S2	92	#4	2	4'-1"	251
S3	52	#4	5	6'-6"	226
U1	79	#4	4	4'-0"	211
U2	40	#4	4	6'-10"	183
U3	10	#6	4	11'-3"	169
U4	12	#4	4	3'-6"	28
V1	134	#5	STR	7'-10"	1095
V2	12	#5	STR	9'-11"	124
V3	12	#5	STR	9'-7"	120

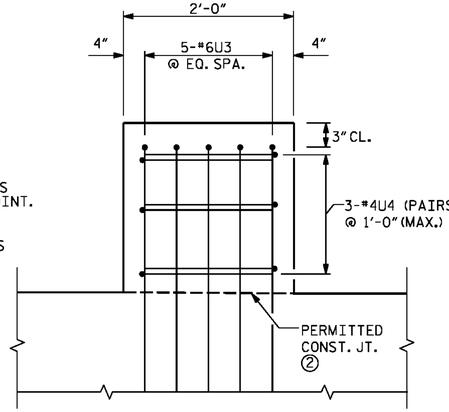
①EPOXY COATED REINFORCING STEEL	LBS.	8158
①CLASS AA CONCRETE:		
POUR #1 - CAP	C.Y.	48.0
POUR #2 - BACKWALL	C.Y.	14.9
CLASS AA CONCRETE	C.Y.	62.9
12" PRESTR. CONCRETE PILES 13 REQUIRED	LIN. FT.	650
PILE REDRIVES	EA.	7

①DOES NOT INCLUDE CONCRETE POSTS



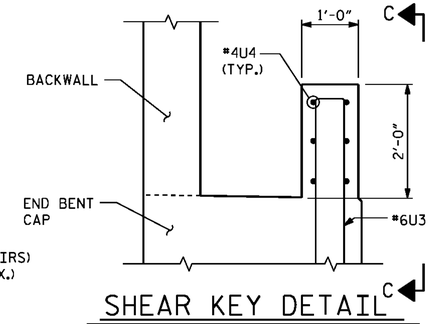
SECTION B-B

SECTION A-A



SECTION C-C

② TOP SURFACE OF PERMITTED CONST. JT. SHALL BE RAKED TO A DEPTH OF ¼"



SHEAR KEY DETAIL

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
END BENT 2
SECTIONS AND DETAILS

DESIGNED BY:	M. WAGNER	DATE :	DEC. 2015
DRAWN BY:	B. CALDWELL	DATE :	DEC. 2015
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C0644827 4F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-203
1			3			TOTAL SHEETS
2			4			278

5/11/2016
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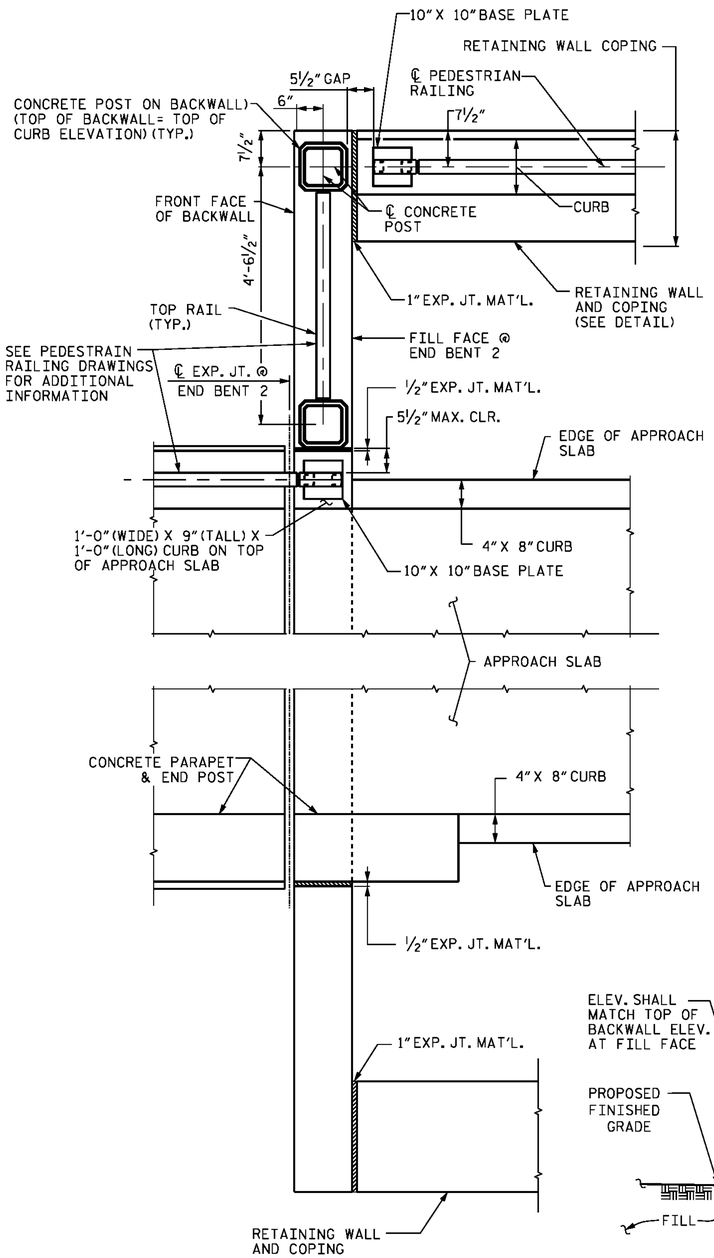
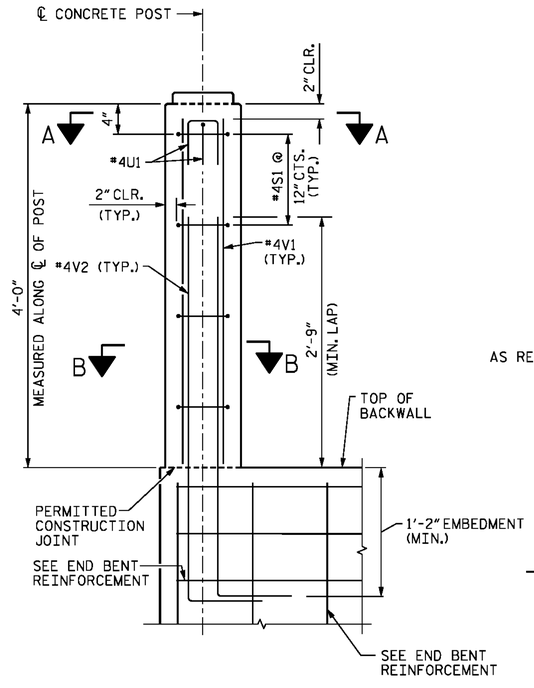
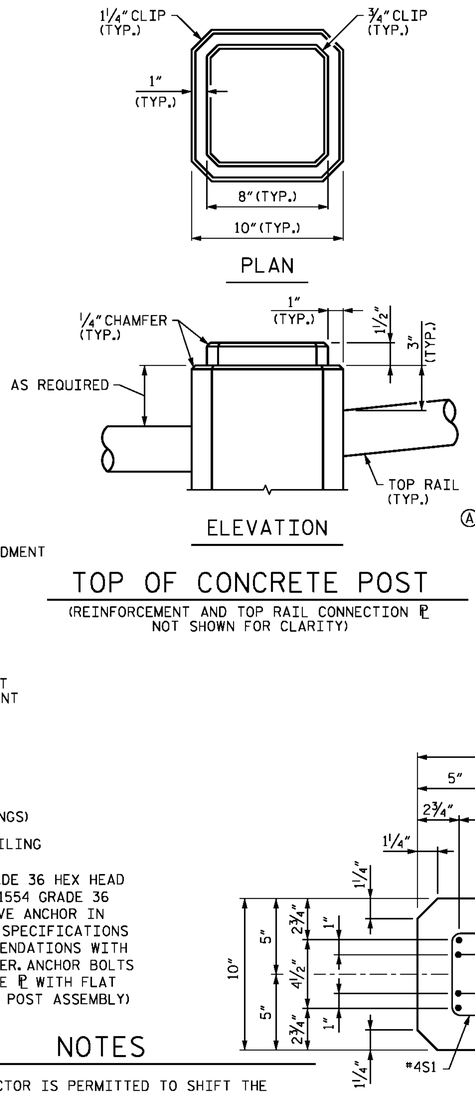


PLAN AT END BENT 2

(PEDESTRIAN HANDRAIL MOUNTED ON BACKWALL AND COPING)



TYPICAL ELEVATION



PEDESTRIAN HANDRAIL MOUNTED ON RETAINING WALL COPING

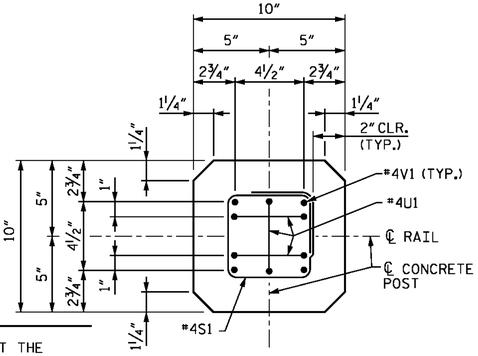
(ADHESIVE ANCHOR BOLTS SHOWN, CAST-IN-PLACE ANCHOR BOLTS SIMILAR)

PLAN

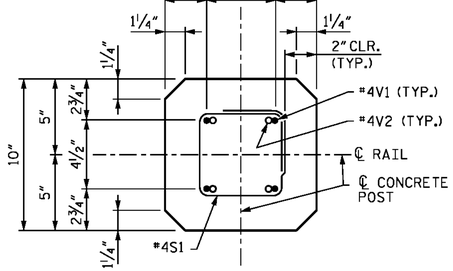
ELEVATION

TOP OF CONCRETE POST

(REINFORCEMENT AND TOP RAIL CONNECTION ℙ NOT SHOWN FOR CLARITY)



SECTION A-A



SECTION B-B

NOTES

1. THE CONTRACTOR IS PERMITTED TO SHIFT THE POSITION OF CONCRETE CURB REINFORCEMENT BY 2" MAXMIUM TO AVOID ANY CONFLICTS WITH THE REINFORCING STEEL FROM THE CONCRETE POST.
2. WALL MANUFACTURER SHALL BE RESPONSIBLE FOR THE DESIGN OF THE COPING AND THE CONNECTION BETWEEN THE COPING AND RETAINING WALL TO MEET ALL REQUIREMENTS PER CURRENT AASHTO LRFD.
3. FOR ADDITIONAL DETAILS AND NOTES SEE PEDESTRIAN RAILING DRAWINGS.
4. ANCHOR BOLT NUTS SHALL BE TIGHTENED ONE-HALF TURN WITH A WRENCH FROM A FINGER-TIGHT POSITION.
5. THE CONTRACTOR MAY USE ADHESIVELY ANCHORED ANCHOR BOLTS IN LIEU OF THE CAST-IN ANCHOR BOLTS. LEVEL ONE FIELD TESTING IS REQUIRED, AND THE YIELD LOAD OF THE ⅞"Ø ANCHOR BOLT IS 21.6 KIPS. FOR ADHESIVELY ANCHORED ANCHOR BOLTS OR DOWELS, SEE THE STANDARD SPECIFICATIONS.
6. IF CONTRACTOR ELECTS TO USE ADHESIVELY ANCHORED ANCHOR BOLTS AS SHOWN IN DETAIL, THE ADHESIVE MATERIAL SHALL SATISFY THE NCDOT STANDARD SPECIFICATIONS AND SHALL HAVE MINIMUM CHARACTERISTIC BOND STRENGTH, τ_{CR} OF 1000 PSI.

BILL OF MATERIAL Ⓐ (30' SECTION OF CURB)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
* B1	4	#4	STR	29'-6"	79
* S2	30	#4	4	4'-6"	90
* EPOXY COATED REINFORCING STEEL				LBS.	169
CLASS AA CONCRETE:				C.Y.	0.9

BAR TYPES

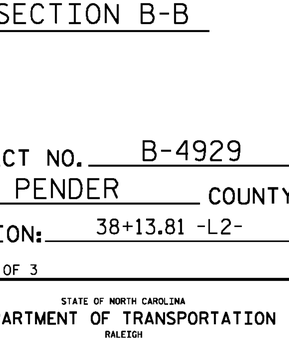
ALL BAR DIMENSIONS ARE OUT TO OUT.

Ⓐ BILL OF MATERIAL FOR CURB IS BASED ON A 30'-0" SECTION OF CURB. SHORTER SECTIONS OF CURB ARE ALLOWED PROVIDED A MINIMUM OF 2" CLEAR IS PROVIDED TO THE REINFORCING STEEL ON ALL FACES OF THE CURB AND NO SECTION OF CURB IS LESS THAN 10'-0" IN TOTAL LENGTH. 1" OF EXP. JT. MAT'L SHALL BE PROVIDED BETWEEN EACH SECTION OF CURB. EXPANSION JOINTS SHALL CLEAR BASE PLATES FOR PEDESTRIAN RAIL. SEE PEDESTRIAN RAILING RAIL POST SPACING AND PLAN OF CURB DRAWINGS.

BILL OF MATERIAL (1 POST)

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
* S1	4	#4	1	2'-8"	7
* U1	3	#4	2	1'-9"	4
* V1	4	#4	STR	3'-8"	10
* V2	4	#4	3	4'-9"	13
* EPOXY COATED REINFORCING STEEL				LBS.	34.0
CLASS AA CONCRETE:				C.Y.	0.1

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 3

DESIGNED BY:	M. WAGNER	DATE :	DEC. 2015
DRAWN BY:	B. CALDWELL	DATE :	DEC. 2015
CHECKED BY:	J. SHERMAN	DATE :	MAR. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

END BENT 2 DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-204
1			3			TOTAL SHEETS
2			4			278

5/11/2016
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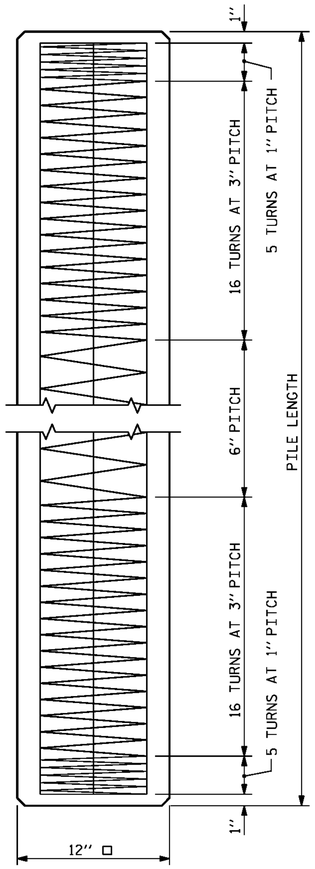
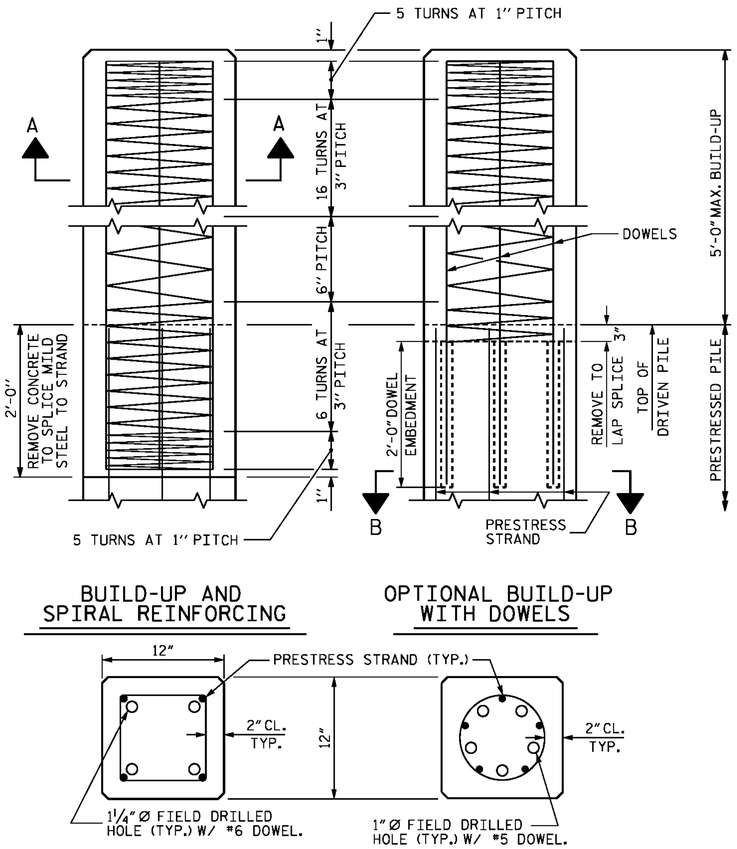


ELEVATION

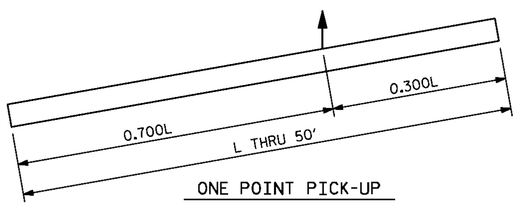


BUILD-UP AND SPIRAL REINFORCING

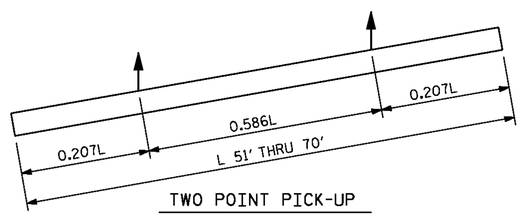
OPTIONAL BUILD-UP WITH DOWELS

SECTION ''B-B''

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

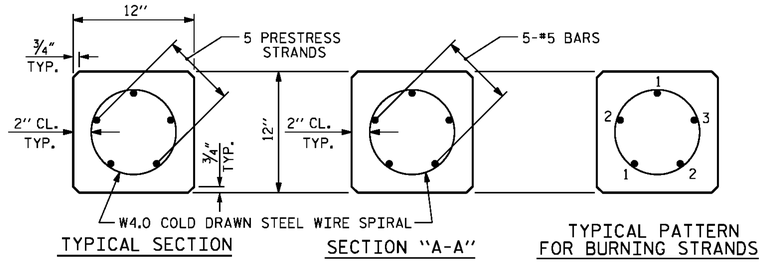


ONE POINT PICK-UP



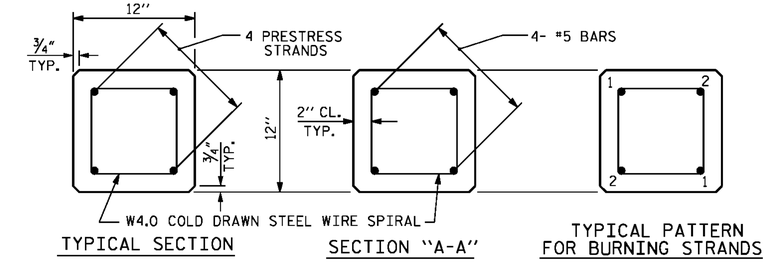
TWO POINT PICK-UP

PICK-UP POINTS



TYPICAL SECTION SECTION ''A-A'' TYPICAL PATTERN FOR BURNING STRANDS

½'' OR 0.6'' Ø GRADE 270 L.R. PRESTRESS STRANDS



TYPICAL SECTION SECTION ''A-A'' TYPICAL PATTERN FOR BURNING STRANDS

½'' OR 0.6'' Ø GRADE 270 L.R. PRESTRESS STRANDS

DOWEL INSTALLATION FOR OPTIONAL BUILD-UP

GROUT COMPRESSIVE STRENGTH: f'c= 5,000 PSI

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

DOWEL HOLES SHALL BE POSITIONED TO MAINTAIN ½" CLEAR TO ALL EXISTING PRESTRESSING STRANDS IN THE CONCRETE PILE.

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

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

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

NOTES

PRESTRESSED CONCRETE STRENGTH : f'c= 7,500 PSI

BUILD-UP CONCRETE STRENGTH : f'c= 7,500 PSI

STRAND DATA:

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

ALL PRESTRESSING STRANDS SHALL BE 7-WIRE LOW-RELAXATION GRADE 270 STRANDS CONFORMING TO AASHTO M203. STRAND SAMPLING REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.

AT THE CONTRACTOR'S OPTION, ½" OR 0.6" STRANDS MAY BE USED IN EITHER THE 4 OR 5 STRAND CONFIGURATION SHOWN IN THE TYPICAL SECTION DETAIL. MIXING OF STRAND SIZE IS NOT ALLOWED.

THE SLIP-FORM METHOD OF CASTING PILES WILL NOT BE PERMITTED.

TRANSFER THE LOAD FROM THE ANCHORAGES TO THE PILE AFTER THE CONCRETE HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI.

IF STRAND STRESS IS RELIEVED BY BURNING, THE STRANDS SHALL BE BURNED IN PAIRS, EXCEPT WHERE 5 STRANDS ARE USED, THE LAST STRAND MAY BE BURNED SINGLY ACCORDING TO BURNING PATTERNS SHOWN. NOT MORE THAN 4 STRANDS MAY BE BURNED AT ANY ONE SECTION BEFORE THE SAME STRANDS ARE BURNED AT BOTH ENDS OF THE BED AND BETWEEN EACH PAIR OF PILES IN THE BED.

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

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

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

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

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

PRESTRESSED CONCRETE PILES SHALL CONTAIN CALCIUM NITRITE CORROSION INHIBITOR. SEE STANDARD SPECIFICATIONS.

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

QUANTITIES FOR ONE 12'' PRESTRESSED PILE

LENGTH	CONCRETE CU. YDS.	PILE WT. TONS	ONE POINT PICK-UP 0.300L	ONE POINT PICK-UP 0.700L	TWO POINT PICK-UP 0.207L	TWO POINT PICK-UP 0.586L
25'-0''	0.91	1.85	7'-6''	17'-6''		
30'-0''	1.10	2.22	9'-0''	21'-0''		
35'-0''	1.28	2.59	10'-6''	24'-6''		
40'-0''	1.46	2.96	12'-0''	28'-0''		
45'-0''	1.64	3.33	13'-6''	31'-6''		
50'-0''	1.83	3.72	15'-0''	35'-0''		
55'-0''	2.01	4.09			11'-4½''	32'-3''
60'-0''	2.19	4.46			12'-5''	35'-2''
65'-0''	2.38	4.81			13'-5½''	38'-1''
70'-0''	2.57	5.18			14'-6''	41'-0''

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

DESIGNED BY: M. WAGNER DATE : DEC. 2015
DRAWN BY: B. CALDWELL DATE : DEC. 2015
CHECKED BY: J. SHERMAN DATE : MAR. 2016
DESIGN ENGINEER OF RECORD: J. DOUGHTY DATE : MAY 2016

DRAWN BY : FCJ 7/88
CHECKED BY : CRK 3/89

REV. 11/30/10 WMC/GM
REV. 10/1/11 MAA/GM
REV. 12/14 MAA/TMG

5/11/2016
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PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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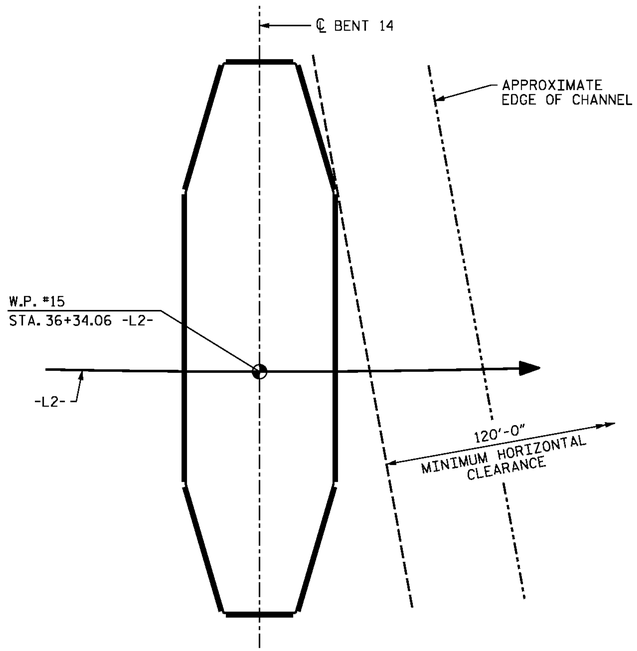
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

12'' PRESTRESSED CONCRETE PILE

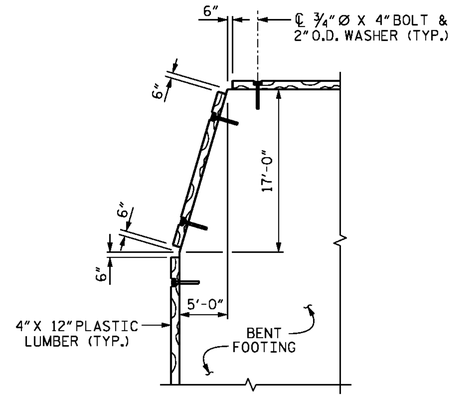
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-205
1			3			TOTAL SHEETS
2			4			278

STD. NO. PCP1

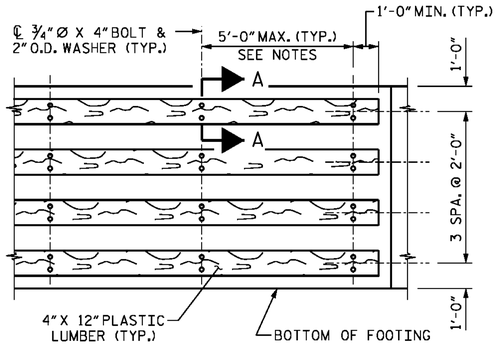


CHANNEL BENT FOOTING LAYOUT

BENT 14 SHOWN, BENT 15 SIMILAR
BENT COLUMNS AND DRILLED PIERS NOT SHOWN FOR CLARITY.
SEE BENT DRAWINGS FOR SIZE OF FOOTINGS.

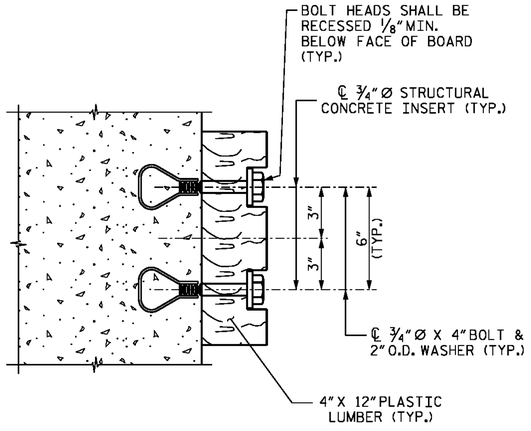


TYPICAL CORNER DETAIL



ELEVATION

TYPICAL FOR ALL FACES OF FOOTING
INCLUDING CHAMFERED FACES. PLASTIC
LUMBER FENDER BOARDS NOT SHOWN ON
OTHER FACES FOR CLARITY.



SECTION A-A

NOTES

PLASTIC LUMBER FENDER SYSTEM SHALL BE USED AT FOOTINGS FOR BENTS 14 AND 15 ONLY.

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 1½".

B. 1 - ¾" Ø X 4" BOLT WITH WASHER. BOLT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A307. BOLT AND WASHER SHALL BE GALVANIZED. (AT THE CONTRACTOR'S OPTION, STAINLESS STEEL BOLT AND WASHER MAY BE USED AS AN ALTERNATE FOR THE ¾" Ø X 4" 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.

EACH PLASTIC LUMBER BOARD SHALL NOT EXCEED 16'-0" IN LENGTH AND SHALL CONTAIN AT LEAST THREE SETS OF FASTENERS SPACED AT A MAXIMUM OF 5'-0"

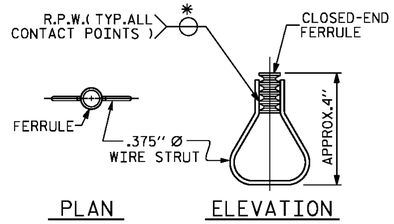
THE ¾" STRUCTURAL CONCRETE INSERT WITH BOLT SHALL BE ASSEMBLED IN THE SHOP.

THE COST OF THE ¾" STRUCTURAL CONCRETE INSERT ASSEMBLY 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 BENT FOOTING. IF THE ADHESIVE BONDING SYSTEM IS USED, THE ¾" Ø X 4" BOLT WITH WASHER SHALL BE REPLACED WITH A ¾"Ø X 6½" BOLT AND 2" O.D. WASHER. ALL SPECIFICATIONS THAT APPLY TO THE ¾" Ø X 4" BOLT SHALL APPLY TO THE ¾"Ø X 6 ½" BOLT. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

PLASTIC LUMBER DIMENSIONS SHOWN ARE BASED ON NOMINAL LUMBER DIMENSIONS AND MAY VARY DEPENDING ON ACTUAL LUMBER DIMENSIONS.

FOR PLASTIC LUMBER BOARDS AT CHANNEL BENTS, SEE SPECIAL PROVISIONS.



STRUCTURAL CONCRETE INSERT

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

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

DESIGNED BY:	J. DOUGHTY	DATE :	JAN 2016
DRAWN BY:	K. WHITE	DATE :	JAN 2016
CHECKED BY:	B. LOFLIN	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE
PLASTIC LUMBER FENDER SYSTEM

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-206
1			3			TOTAL SHEETS
2			4			278

5/11/2016
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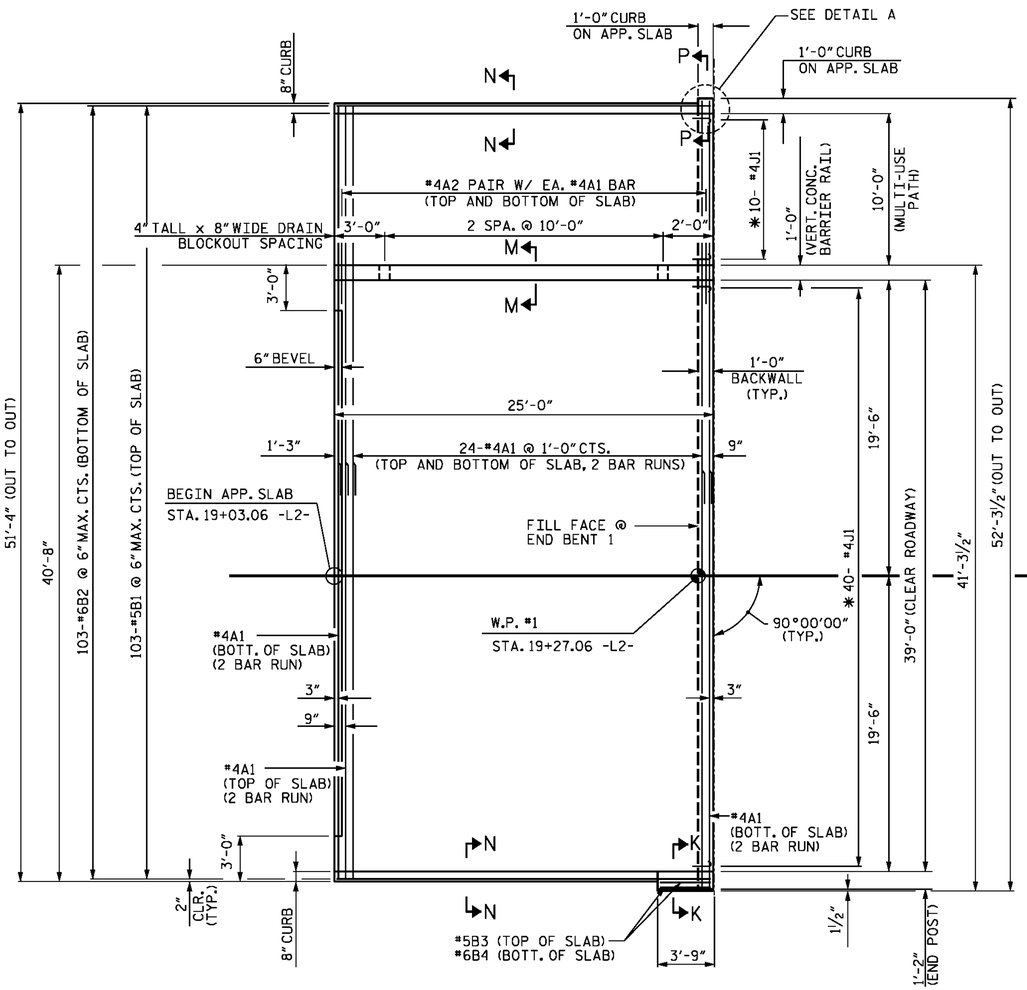
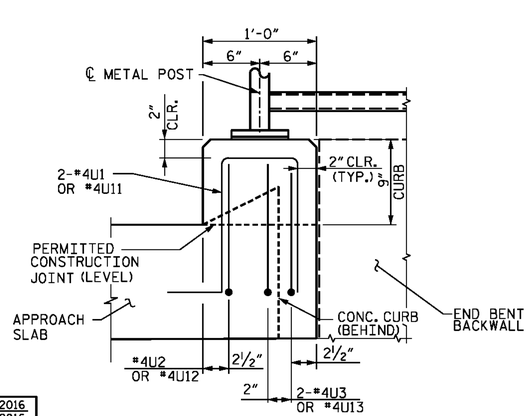
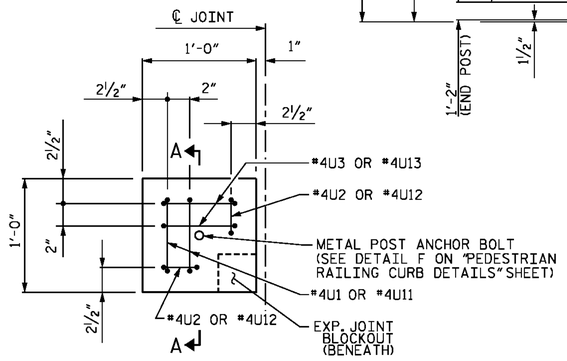


PLAN @ END BENT 1

✱ THE QUANTITY OF *4J1 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.

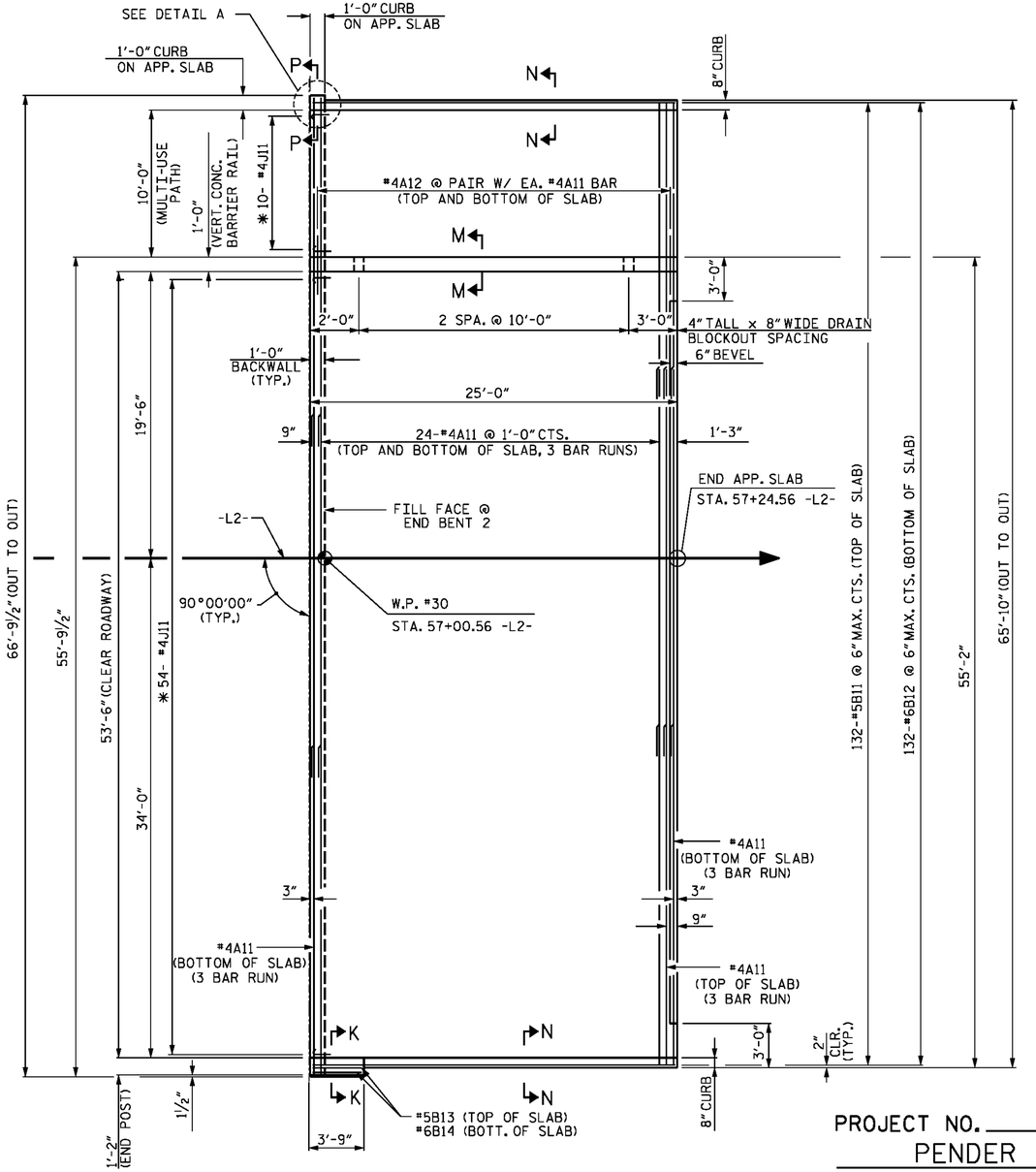


SECTION A-A



DETAIL A

(END BENT 1 SIDE SHOWN, END BENT 2 SIDE SIMILAR. END BENT BACKWALL NOT SHOWN FOR CLARITY, SEE END BENT SHEETS FOR ADDITIONAL INFORMATION.)



PLAN @ END BENT 2

NOTE: FOR SECTION K-K, M-M, N-N AND P-P SEE SHEET 2 OF 3.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 3

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
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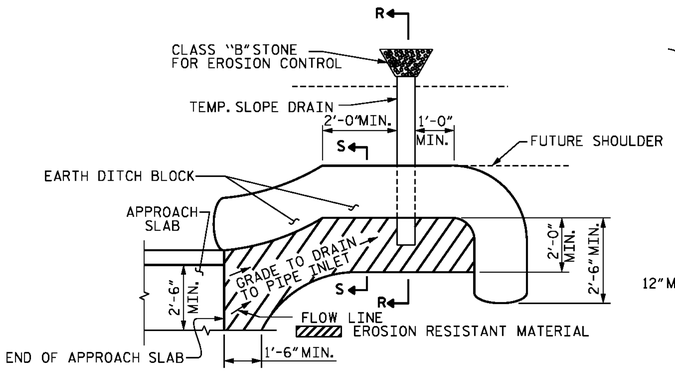
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-207
1			3			TOTAL SHEETS
2			4			278

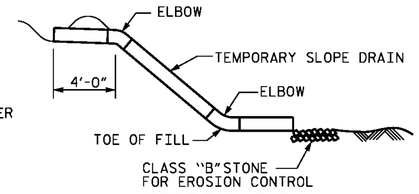
DESIGNED BY:	E. DAVIS	DATE : JAN. 2016
DRAWN BY:	B. CALDWELL	DATE : JAN. 2016
CHECKED BY:	J. SHERMAN	DATE : FEB. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/11/2016
400.407_B4929_SMU_ASI.dgn

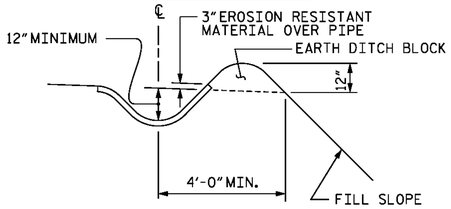


NOTE: IMMEDIATELY AFTER THE CONSTRUCTION OF THE APPROACH SLAB, THE CONTRACTOR SHALL PROVIDE TEMPORARY BERM AND SLOPE DRAIN. CONTRACTOR SHALL GRADE TO PIPE INLET AND PROVIDE EROSION RESISTANT MATERIAL AS SHOWN. THE EROSION RESISTANT MATERIAL SHALL BE EITHER 1) ASPHALT PLANT MIX, TYPE 1 OR TYPE 2, MIN. 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



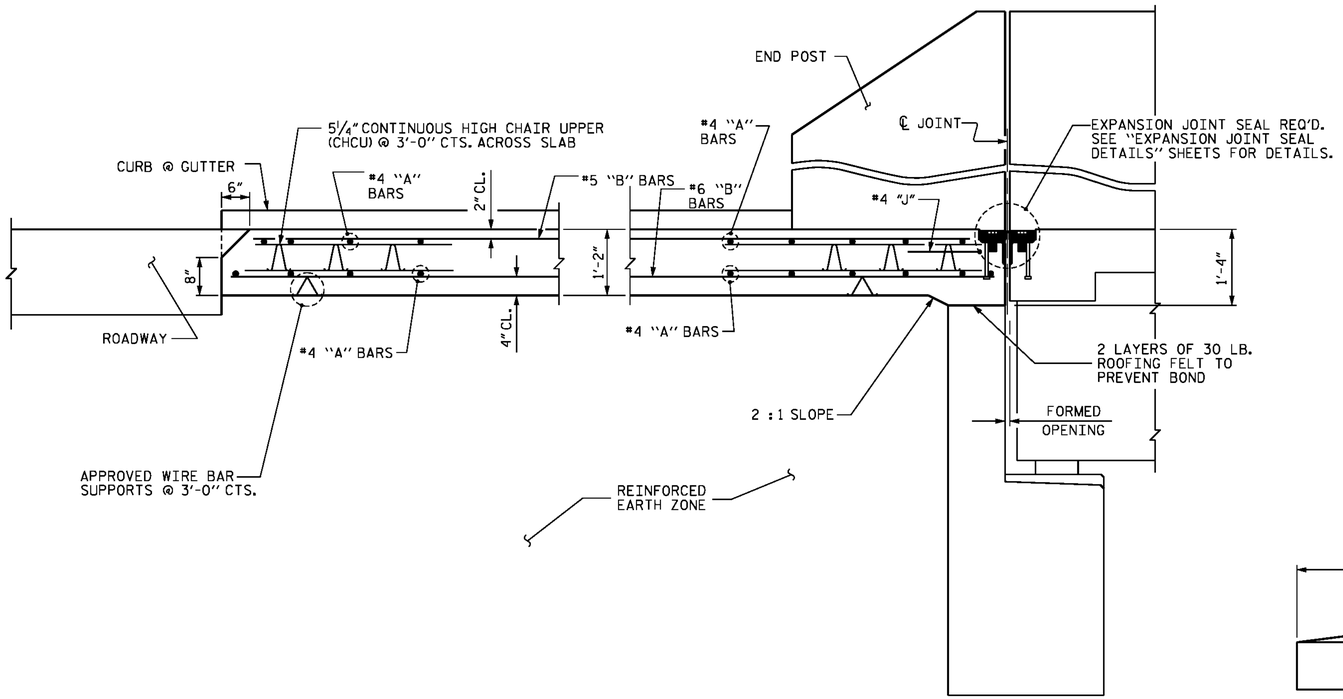
SECTION R-R



SECTION S-S

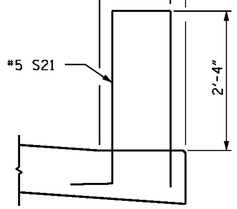
TEMPORARY BERM AND SLOPE DRAIN DETAILS

(TO BE USED WHEN SHOULDER BERM GUTTER IS REQUIRED)

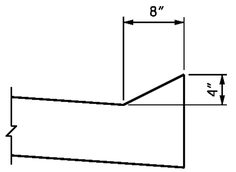


SECTION THRU SLAB

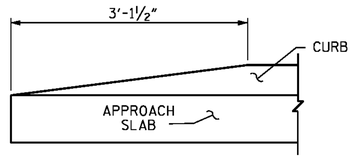
SECTION THRU SLAB SHOWN AT END POST FOR 2 BAR METAL RAIL. ALL OTHER SECTIONS SIMILIAR.



SECTION K-K



SECTION N-N



END OF CURB WITHOUT SHOULDER BERM GUTTER

CURB DETAILS

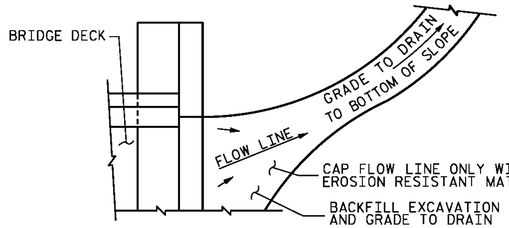
NOTES

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

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

FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.

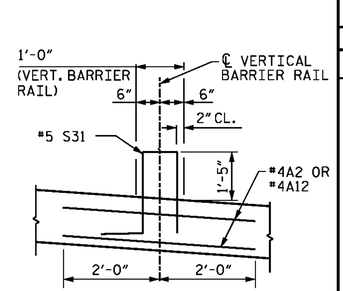
ALL REINFORCING STEEL SHALL BE EPOXY COATED.



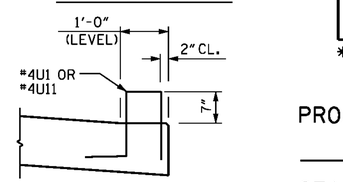
NOTE: IF THE APPROACH SLAB IS NOT CONSTRUCTED IMMEDIATELY AFTER THE BACKFILLING OF THE END BENT EXCAVATION, GRADE TO DRAIN TO THE BOTTOM OF THE SLOPE AND PROVIDE EROSION RESISTANT MATERIAL, SUCH AS FIBERGLASS ROVING OR AS DIRECTED BY THE ENGINEER TO PREVENT SOIL EROSION AND TO PROTECT THE AREA ADJACENT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

TEMPORARY DRAINAGE DETAIL

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



SECTION M-M



SECTION P-P

BILL OF MATERIAL

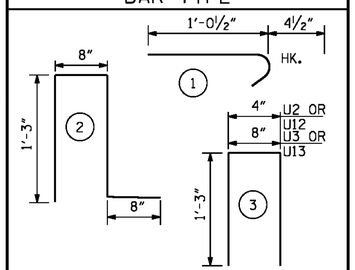
APPROACH SLAB AT EB #1

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	102	#4	STR	26'-6"	1806
A2	51	#4	STR	4'-0"	136
B1	103	#5	STR	23'-10"	2560
B2	103	#6	STR	24'-8"	3816
B3	2	#5	STR	3'-5"	7
B4	2	#6	STR	3'-5"	10
J1	50	#4	1	1'-5"	47
U1	2	#4	2	3'-10"	5
U2	2	#4	3	2'-10"	4
U3	2	#4	3	3'-2"	4
EPOXY COATED REINFORCING STEEL **				LBS.	8,395
CLASS AA CONCRETE **				C. Y.	55.8

APPROACH SLAB AT EB #2

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A11	153	#4	STR	23'-2"	2368
A12	51	#4	STR	4'-0"	136
B11	132	#5	STR	23'-10"	3281
B12	132	#6	STR	24'-8"	4891
B13	2	#5	STR	3'-5"	7
B14	2	#6	STR	3'-5"	10
J11	64	#4	1	1'-5"	61
U11	2	#4	2	3'-10"	5
U12	2	#4	3	2'-10"	4
U13	2	#4	3	3'-2"	4
EPOXY COATED REINFORCING STEEL **				LBS.	10,767
CLASS AA CONCRETE **				C. Y.	71.5

BAR TYPE



ALL BAR DIMENSIONS ARE OUT TO OUT

** QUANTITIES FOR VERTICAL CONCRETE BARRIER RAIL AND END POST ARE NOT INCLUDED. SEE SHEET 3 OF 3.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 3

DESIGNED BY:	E. DAVIS	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	JAN. 2016
CHECKED BY:	J. SHERMAN	DATE :	FEB. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

DRAWN BY : EEM 3/95	REV. 10/1/11	MAA/GM
CHECKED BY : VAP 3/95	REV. 12/21/11	MAA/GM
	REV. 6/13	MAA/GM

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty

00F1C864482747...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

BRIDGE APPROACH SLAB FOR FLEXIBLE PAVEMENT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-208
1			3			TOTAL SHEETS
2			4			278

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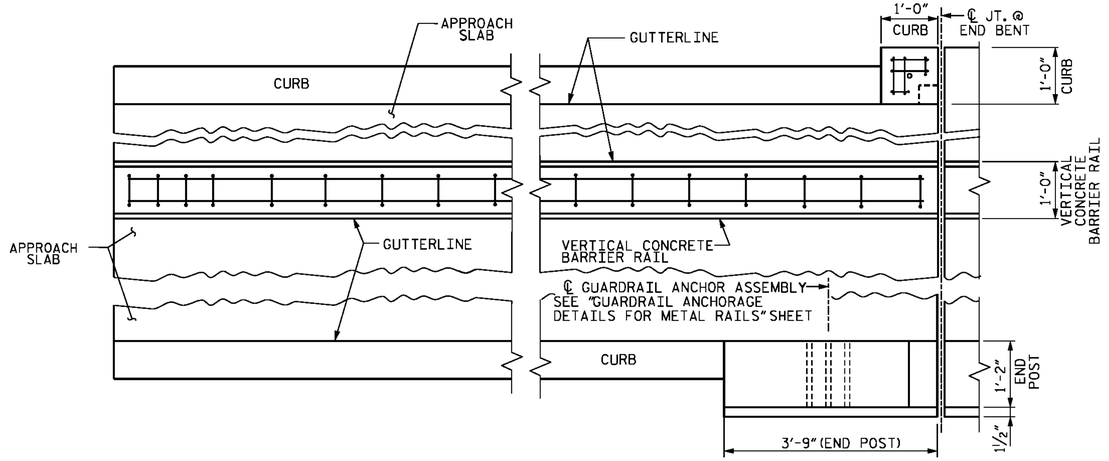
STD. NO. BAS2 (SHT 4)



VERT. CONC. BARRIER RAIL AND END POST PLAN ON APPROACH SLAB

(APPROACH SLAB @ END BENT 1 SHOWN, APPROACH SLAB @ END BENT 2 SIMILAR.)

NOTES

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

THE VERTICAL CONCRETE BARRIER RAIL, END POST AND 1'-0" x 1'-0" CURB ON EACH APPROACH SLAB SHALL NOT BE CAST UNTIL ALL APPROACH SLAB CONCRETE HAS BEEN CAST AND HAS REACHED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI.

ALL REINFORCING STEEL IN THE VERTICAL CONCRETE BARRIER RAILS, END POSTS, APPROACH SLABS AND CURBS SHALL BE EPOXY COATED.

GROOVED CONTRACTION JOINTS, ½" IN DEPTH, SHALL BE TOOLED IN ALL EXPOSED FACES OF THE VERTICAL CONCRETE 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 VERTICAL CONCRETE BARRIER RAIL EXPANSION JOINTS. ONLY ONE CONTRACTION JOINT IS REQUIRED AT MIDPOINT OF VERTICAL CONCRETE 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 COST OF THE END POST ON THE APPROACH SLABS SHALL BE INCLUDED IN THE LINEAR FOOT CONTRACT PRICE BID FOR "1'-2" x 2'-6" CONCRETE PARAPET".

SEE EXPANSION JOINT SEAL DETAILS SHEETS FOR ADDITIONAL INFORMATION. STEEL REINFORCEMENT IN THE END POST MAY BE SHIFTED SLIGHTLY AS NECESSARY TO ACCOMODATE JOINT SEAL DETAILS.

BILL OF MATERIAL

FOR END POST (ONE END POST ONLY)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B21	8	#5	STR	3'-5"	29
E21	2	#7	STR	2'-6"	10
E22	2	#7	STR	3'-0"	12
E23	2	#7	STR	3'-6"	14
E24	2	#7	STR	4'-0"	16
E25	2	#7	STR	4'-4"	18
F21	2	#6	STR	1'-10"	6
F22	2	#6	STR	3'-0"	9
F23	2	#6	STR	3'-9"	11
S21	5	#5	1	7'-10"	41

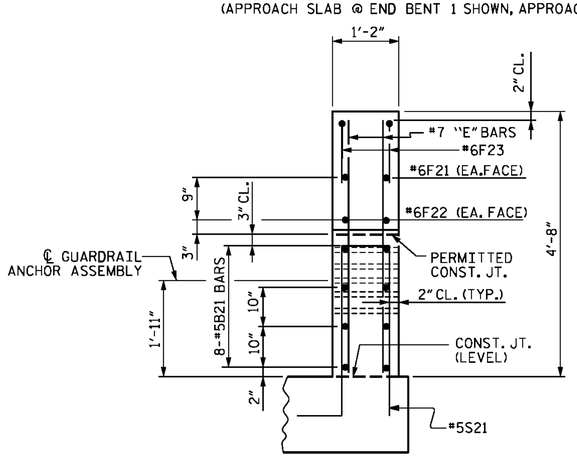
EPOXY COATED REINFORCING STEEL	LBS.	166
CLASS AA CONCRETE	C. Y.	0.8
1'-2" x 2'-6" CONCRETE PARAPET	L.F.	3.75

BILL OF MATERIAL

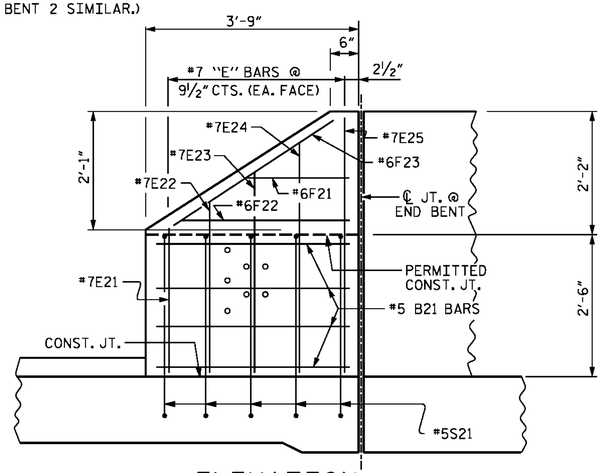
FOR VERTICAL CONCRETE BARRIER RAIL AT END BENT 1 (END BENT 2 SIMILIAR)

BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
B31	8	#5	STR	24'-8"	206
S31	27	#5	1	5'-1"	143
S32	27	#5	2	5'-6"	155

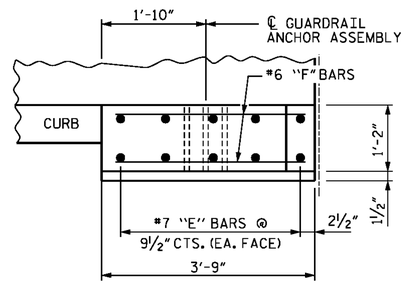
EPOXY COATED REINFORCING STEEL	LBS.	504
CLASS AA CONCRETE	C. Y.	2.3
VERTICAL CONCRETE BARRIER RAIL	L.F.	25



END VIEW



ELEVATION

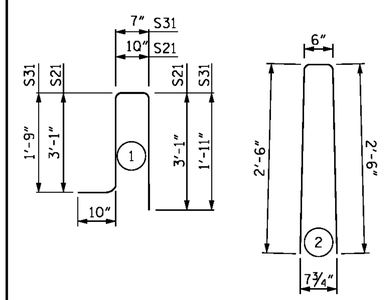


PLAN OF END POST

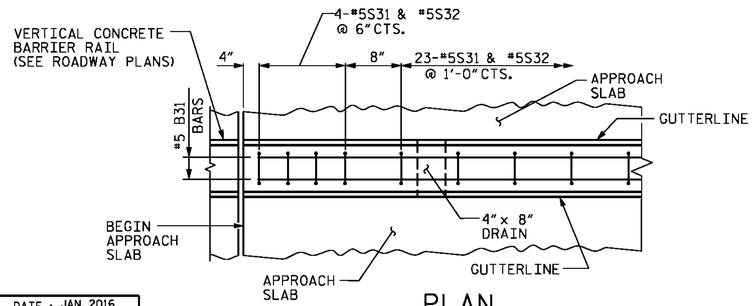
END POST FOR TWO BAR METAL RAIL

(APPROACH SLAB @ END BENT 1 SHOWN, APPROACH SLAB @ END BENT 2 SIMILAR.)

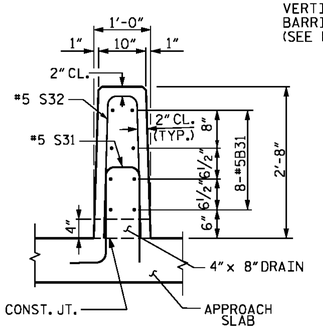
BAR TYPE



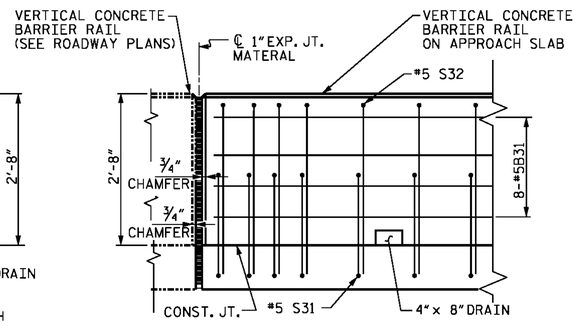
ALL BAR DIMENSIONS ARE OUT-TO-OUT



PLAN



ELEVATION



SIDE VIEW

VERTICAL CONCRETE BARRIER RAIL ON APPROACH SLAB

(APPROACH SLAB @ END BENT 1 SHOWN, APPROACH SLAB @ END BENT 2 SIMILAR.)

DESIGNED BY:	E. DAVIS	DATE :	JAN. 2016
DRAWN BY:	B. CALDWELL	DATE :	JAN. 2016
CHECKED BY:	J. SHERMAN	DATE :	FEB. 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

DRAWN BY : FCJ	11/88	
CHECKED BY : ARB	11/88	
REV. 10/1/11		MAA/GM
REV. 7/12		MAA/GM
REV. 6/13		MAA/GM

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C8644B274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

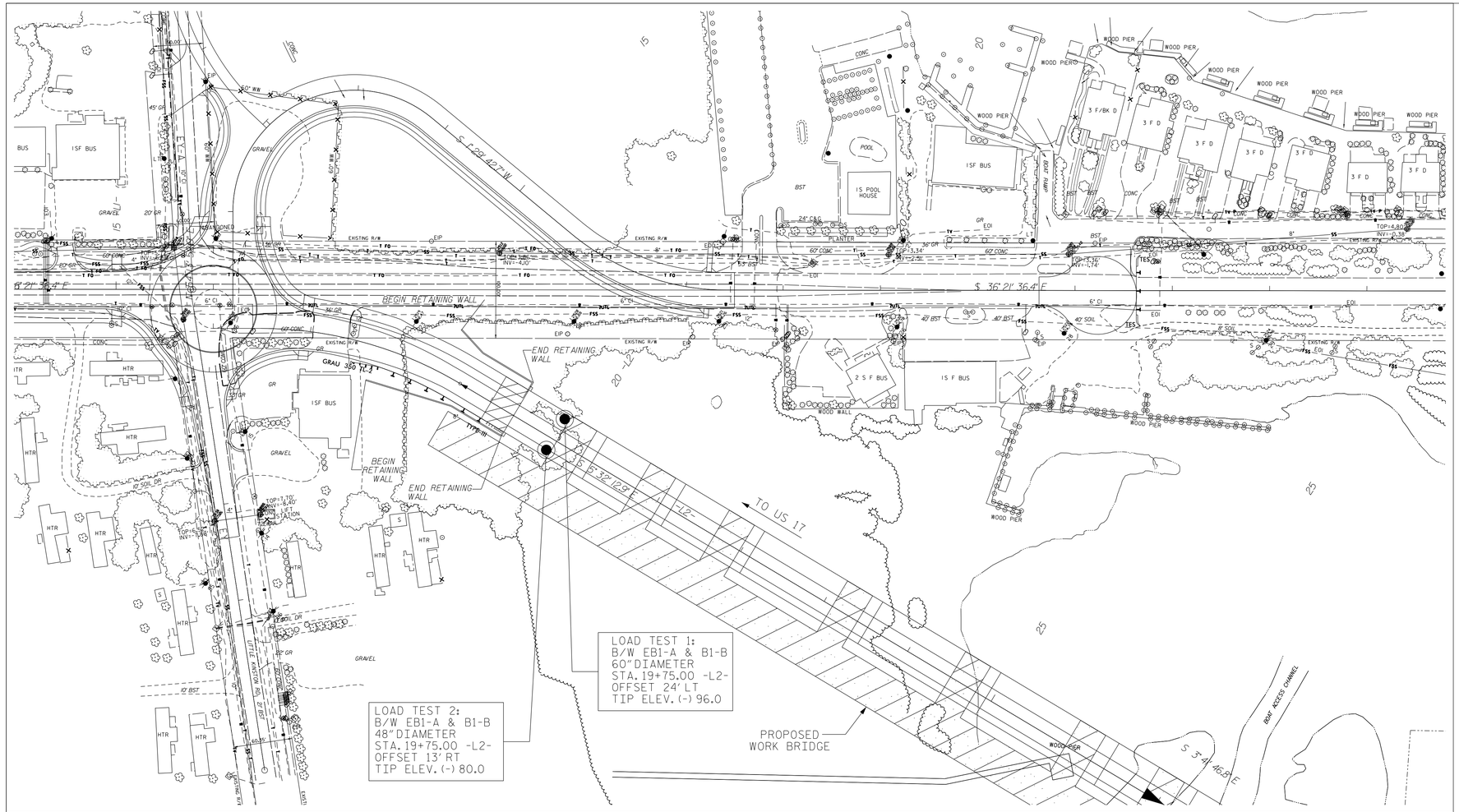
PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 3 OF 3

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

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-209
1			3			TOTAL SHEETS
2			4			278

STD. NO. BAS4



LOCATION SKETCH

NOTES

THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE V2 AND V4 BARS ARE DETAILED WITH 1.5 FEET OF EXTRA LENGTH.

FOR TEST PIERS, SEE GEOTECHNICAL SPECIAL PROVISIONS AND SECTION 411 OF THE STANDARD SPECIFICATIONS.

FOR AXIAL LOAD TESTS, SEE AXIAL LOAD TEST SPECIAL PROVISION.

THE LOCATIONS OF AXIAL LOAD TESTS SHALL BE WITHIN A 50 FT. RADIUS FROM THE PLANNED LOCATIONS AND CONSTRUCTED FROM THE TEMPORARY WORK BRIDGE. REVISED TEST LOCATIONS MUST BE APPROVED BY THE ENGINEER.

DEPARTMENT WILL PERFORM A SPT BORING AT EACH TEST PIER LOCATION BEFORE CONSTRUCTION OF TEST PIER NO. 1 AND NO. 2. THE ELEVATIONS OF TEST PIER TIPS, OSTERBERG CELLS, AND STRAIN GAUGES MAY BE ADJUSTED BY THE ENGINEER AFTER SPT BORINGS ARE PERFORMED.

THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING MATERIAL QUANTITIES NECESSARY TO CONSTRUCT THE TEST PIERS.

FOR WELDING OF BARS TO THE OSTERBERG CELLS, SEE SPECIAL PROVISION.

THE "SP" SPIRAL REINFORCING STEEL SHALL BE W31 OR D31 COLD DRAWN WIRE OR #5 PLAIN OR DEFORMED BAR.

60" DIAMETER TEST PIER NO. 1 SHALL EXTEND TO ELEVATION -96 FT.

48" DIAMETER TEST PIER NO. 2 SHALL EXTEND TO ELEVATION -80 FT.

PERMANENT STEEL CASING IS REQUIRED FOR TEST PIER NO. 1 AND NO. 2. IF REQUIRED, DO NOT EXTEND PERMANENT STEEL CASING BELOW ELEVATION -15 FT WITHOUT PRIOR APPROVAL FROM THE ENGINEER.

SPT MAY BE REQUIRED FOR TEST PIER NO. 1 AND NO. 2. FOR SPT TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

POLYMER SLURRY IS REQUIRED FOR TEST PIER NO. 1 AND NO. 2.

SID INSPECTIONS ARE REQUIRED FOR TEST PIER NO. 1 AND NO. 2. FOR SID INSPECTIONS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

CSL TUBES AND TESTING ARE REQUIRED FOR TEST PIER NO. 1 AND NO. 2. FOR CSL TESTING, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.

SONIC CALIPER TESTING (SCT) IS REQUIRED FOR TEST PIER NO. 1 AND NO. 2. FOR SCT, SEE SONIC CALIPER TESTING SPECIAL PROVISION.

PROVIDE 34 INCH DIAMETER OSTERBERG CELL WITH A RATED O-CELL CAPACITY OF 6,000 KIPS FOR TEST PIER NO. 1. INSTALL BOTTOM PLATE AT ELEVATION -87 FT.

PROVIDE 24 INCH DIAMETER OSTERBERG CELL WITH A RATED O-CELL CAPACITY OF 3,000 KIPS FOR TEST PIER NO. 2. INSTALL BOTTOM PLATE AT ELEVATION -47 FT.

PUMP CONCRETE IN A PIPE TO THE BOTTOM OF THE TEST PIER NO. 1 AND 2. THE INSIDE DIAMETER OF PIPE SHALL BE NO SMALLER THAN 6 INCHES.

THE NATURAL GROUND LINE ELEVATION SHOWN AT THE TEST PIERS IS AN APPROXIMATE GROUND LINE ELEVATION. IF THIS ARPPOXIMATE GROUND LINE ELEVATION IS ABOVE THE ACTUAL GROUND LINE ELEVATION, THE CONTRACTOR SHALL PLACE THE TOP OF PIER 1 FOOT BELOW THE GROUND LINE.

FOR LOAD TEST DETAILS, SEE SHEET 2 OF 2

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
AXIAL LOAD TEST

NORTH CAROLINA PROFESSIONAL SEAL 26936 ENGINEER DAVID S. STUTTS

6/14/2016

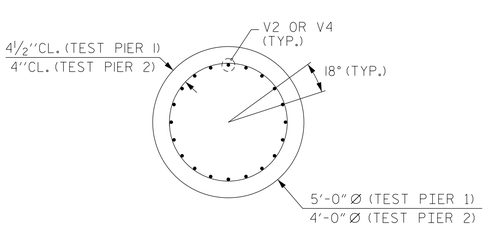
DocuSigned by: David Stutts A4A2999A88C64F2...

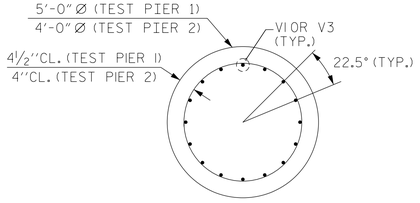
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-210
1			3			TOTAL SHEETS
2			4			278

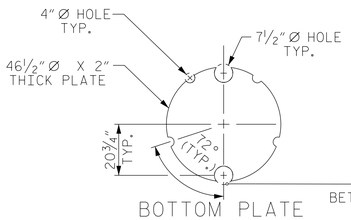
DRAWN BY : T.R. PETERSON DATE : 4/2016
CHECKED BY : W.D. CRUTCHER DATE : 4/2016
DESIGN ENGINEER OF RECORD: D.S. STUTTS DATE : 4/2016

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$





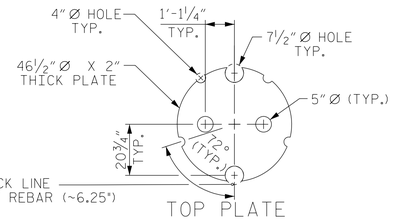
SECTION A-A



BOTTOM PLATE

SECTION B-B

FOR CLARITY, SECTIONS "A-A" AND "B-B" OMIT DETAILS OF TEST INSTRUMENTATION.

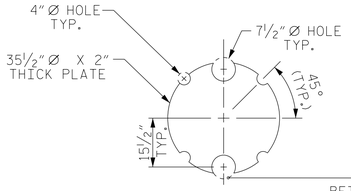


TOP PLATE

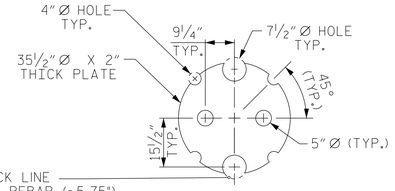
NOTE: NOMINAL 6" SLICK LINE BETWEEN O-CELL & INSIDE OF REBAR (~6.25")

46.50" Ø X 2" THICK PLATE

(46.50" OR INSIDE DIAMETER OF REBAR CAGE - TEST PIER 1)



BOTTOM PLATE

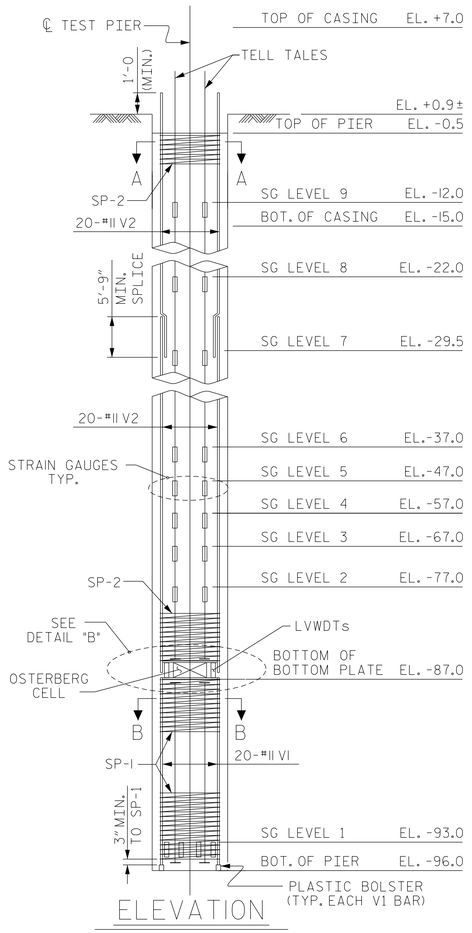


TOP PLATE

NOTE: NOMINAL 5" SLICK LINE BETWEEN O-CELL & INSIDE OF REBAR (~5.75")

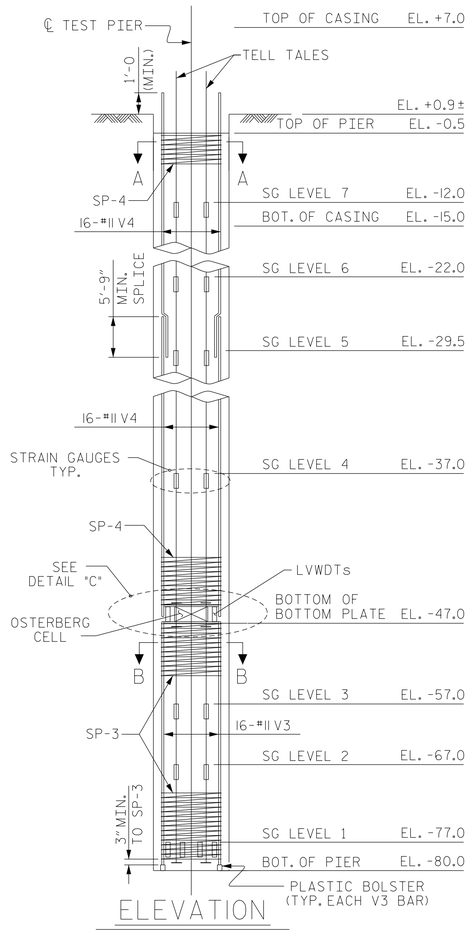
35.50" Ø X 2" THICK PLATE

(35.50" OR INSIDE DIAMETER OF REBAR CAGE - TEST PIER 2)



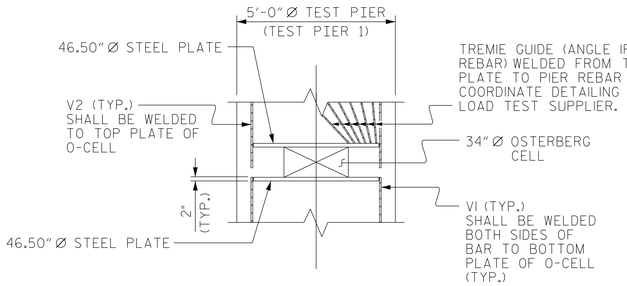
ELEVATION

(LOAD TEST #1 - TEST PIER 1)
SG LEVEL # DENOTES STRAIN GAUGE ELEVATIONS

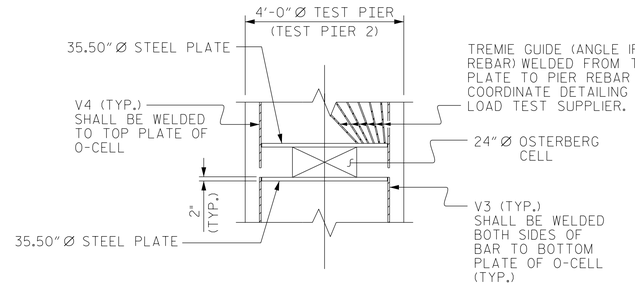


ELEVATION

(LOAD TEST #2 - TEST PIER 2)
SG LEVEL # DENOTES STRAIN GAUGE ELEVATIONS



DETAIL "B"

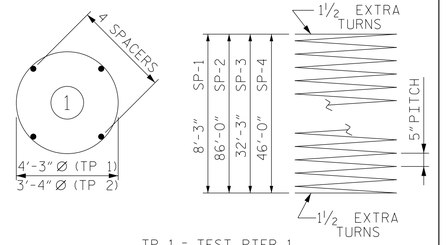


DETAIL "C"

ASSEMBLY STEPS:

1. O-CELL FITTED WITH TOP AND BOTTOM STEEL PLATES.
2. TOP AND BOTTOM STEEL PLATES OF O-CELL ASSEMBLY WELDED TO NON-CONTINUOUS REINFORCING CAGE WITH FILLET WELDS ON BOTH SIDES OF REBAR.
3. CONSTRUCT TREMIE GUIDE TO DIRECT TREMIE PAST THE O-CELL ASSEMBLY.
4. REINFORCING CAGE LOWERED INTO EXCAVATION AND SECURED AT REQUIRED ELEVATION.

BAR TYPES



TP 1 = TEST PIER 1
TP 2 = TEST PIER 2
ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

TEST PIER 1

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
V1	20	#11	STR	8'-8"	921
V2	40	#11	STR	47'-6"	10095
SP-1	1	#5	1	303'-6"	317
SP-2	1	#5	1	2770'-11"	2890

REINFORCING STEEL	(LBS.)	11016
SPIRAL REINFORCING STEEL	(LBS.)	3207
TEST PIER CONCRETE	(C.Y.)	69.4
5'-0"Ø TEST PIER	(LIN. FT.)	95.50
SID INSPECTIONS	EACH	1
SPT TESTING	EACH	1
CSL TESTING	EACH	1
SONIC CALIPER TESTING	EACH	1
PERMANENT STEEL CASING	(LIN. FT.)	22.0
CSL TUBES	(LIN. FT.)	388.0
AXIAL LOAD TEST NO. 1		LUMP SUM

TEST PIER 2

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
V3	16	#11	STR	32'-8"	2777
V4	32	#11	STR	27'-6"	4675
SP-3	1	#5	1	835'-8"	872
SP-4	1	#5	1	1176'-2"	1227

REINFORCING STEEL	(LBS.)	7452
SPIRAL REINFORCING STEEL	(LBS.)	2099
TEST PIER CONCRETE	(C.Y.)	37.0
4'-0"Ø TEST PIER	(LIN. FT.)	79.50
SID INSPECTIONS	EACH	1
SPT TESTING	EACH	1
CSL TESTING	EACH	1
SONIC CALIPER TESTING	EACH	1
PERMANENT STEEL CASING	(LIN. FT.)	22.0
CSL TUBES	(LIN. FT.)	324.0
AXIAL LOAD TEST NO. 2		LUMP SUM

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 2 OF 2

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE
AXIAL LOAD TEST

NORTH CAROLINA PROFESSIONAL SEAL 26936 ENGINEER DAVID S. STUTTS
6/14/2016
DocuSigned by: David Stutts AAA2999A8BC64F2...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-211
1			3			TOTAL SHEETS
2			4			278

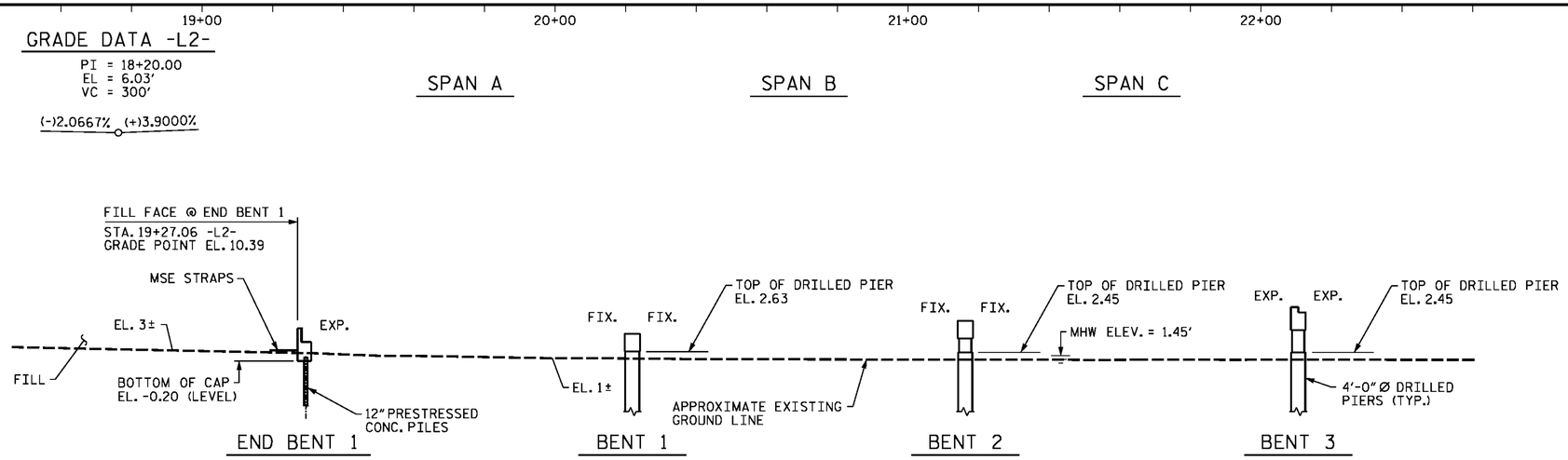
DRAWN BY : T.R. PETERSON DATE : 4/2016
CHECKED BY : W.D. CRUTCHER DATE : 4/2016
DESIGN ENGINEER OF RECORD: D.S. STUTTS DATE : 4/2016

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

GRADE DATA -L2-

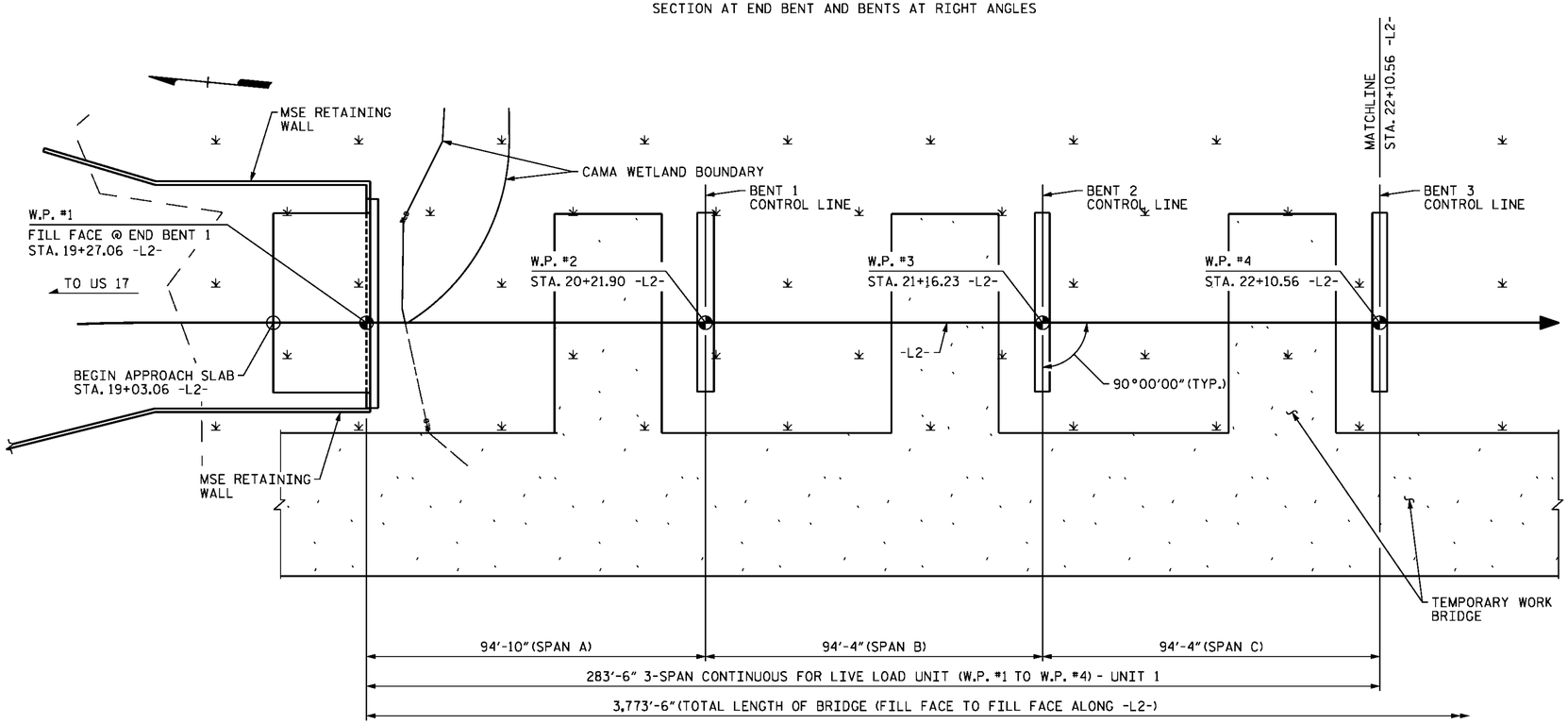
PI = 18+20.00
EL = 6.03'
VC = 300'

(-)2.0667% (+)3.9000%



SECTION ALONG -L2-

SECTION AT END BENT AND BENTS AT RIGHT ANGLES



PLAN

PILES, DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STEEL ALTERNATE

SHEET 1 OF 9 REPLACES BRIDGE NO. 16

DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016
DRAWN BY:	K. WHITE	DATE :	JAN 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-212
1			3			TOTAL SHEETS
2			4			278

5/11/2016
401_001_B4929_SMU_GDIS.dgn

22+00 23+00 24+00 25+00 26+00

GRADE DATA -L2-

PI = 18+20.00
EL = 6.03'
VC = 300'

(-)2.0667% (+)3.9000%

80 70 60 50 40 30 20 10 0 -10 -20 -30

SPAN D SPAN E SPAN F

EXP. EXP. TOP OF DRILLED PIER EL. 2.45

APPROXIMATE EXISTING GROUND LINE

4'-0" Ø DRILLED PIERS (TYP.)

FIX. FIX. TOP OF DRILLED PIER EL. 2.45

EL. 1±

EL. 0±

EL. -1±

FIX. FIX. TOP OF DRILLED PIER EL. 2.45

MHW ELEV. = 1.45'

BOTTOM OF FOOTING EL. 2.45

EXP. EXP.

EL. -1±

EL. -3±

BENT 3 BENT 4 BENT 5 BENT 6

SECTION ALONG -L2-

SECTION AT BENTS AT RIGHT ANGLES

MATCHLINE STA. 22+10.56 -L2-

MATCHLINE STA. 26+35.06 -L2-

BENT 3 CONTROL LINE

BENT 4 CONTROL LINE

BENT 5 CONTROL LINE

BENT 6 CONTROL LINE

W.P. #4 STA. 22+10.56 -L2-

W.P. #5 STA. 23+52.06 -L2-

W.P. #6 STA. 24+93.56 -L2-

W.P. #7 STA. 26+35.06 -L2-

-L2-

90°00'00" (TYP.)

TEMPORARY WORK BRIDGE

141'-6" (SPAN D) 141'-6" (SPAN E) 141'-6" (SPAN F)

424'-6" 3-SPAN CONTINUOUS FOR LIVE LOAD UNIT (W.P. #4 TO W.P. #7) - UNIT 2

3,773'-6" (TOTAL LENGTH OF BRIDGE (FILL FACE TO FILL FACE ALONG -L2-)

PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 9 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-213
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

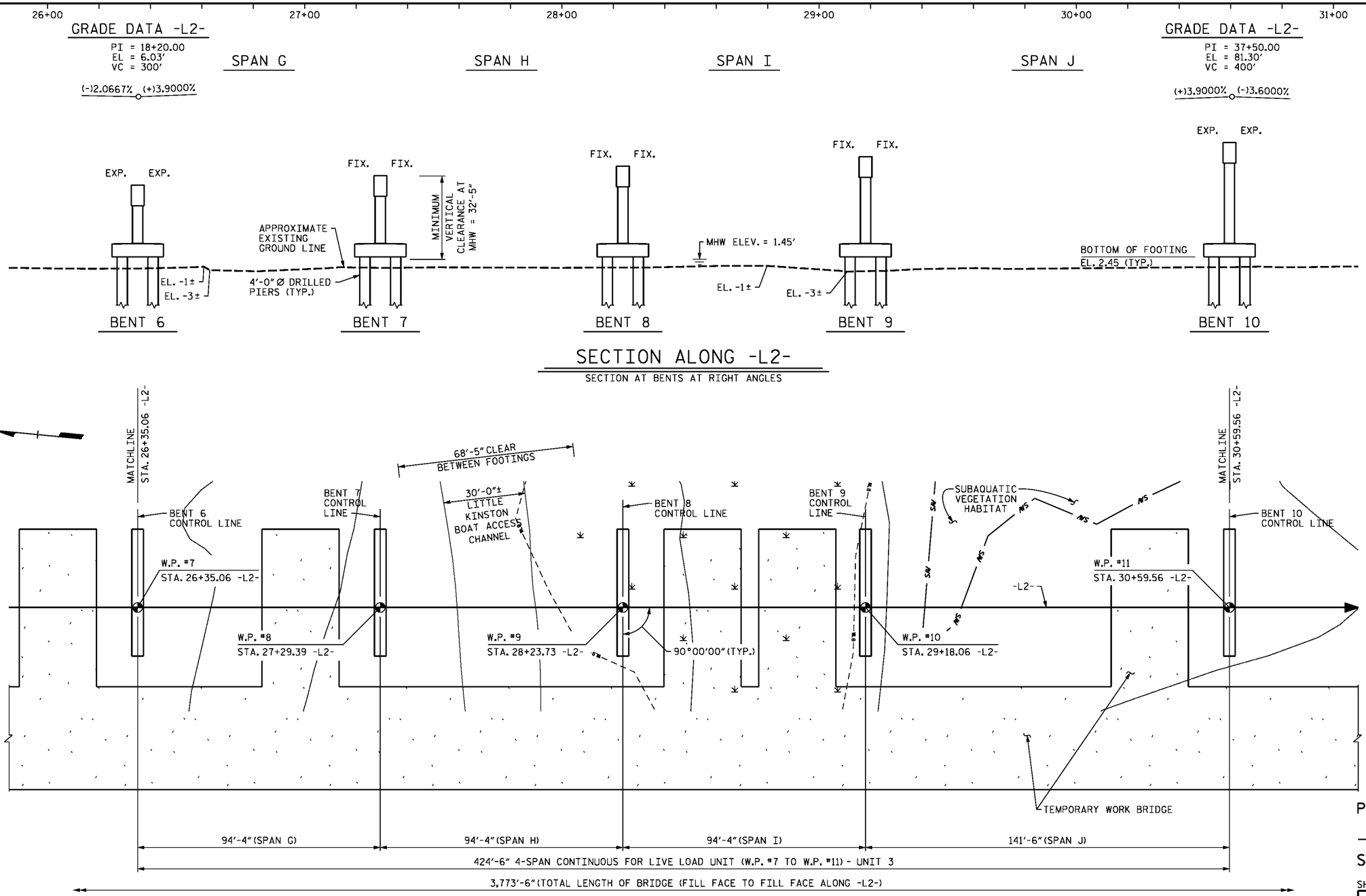
5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016
DRAWN BY:	K. WHITE	DATE :	JAN 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/11/2016
401_003_B4929_SMU_GD2S.dgn



PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 9 STEEL ALTERNATE

DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016		
DRAWN BY:	K. WHITE	DATE :	JAN 2016		
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

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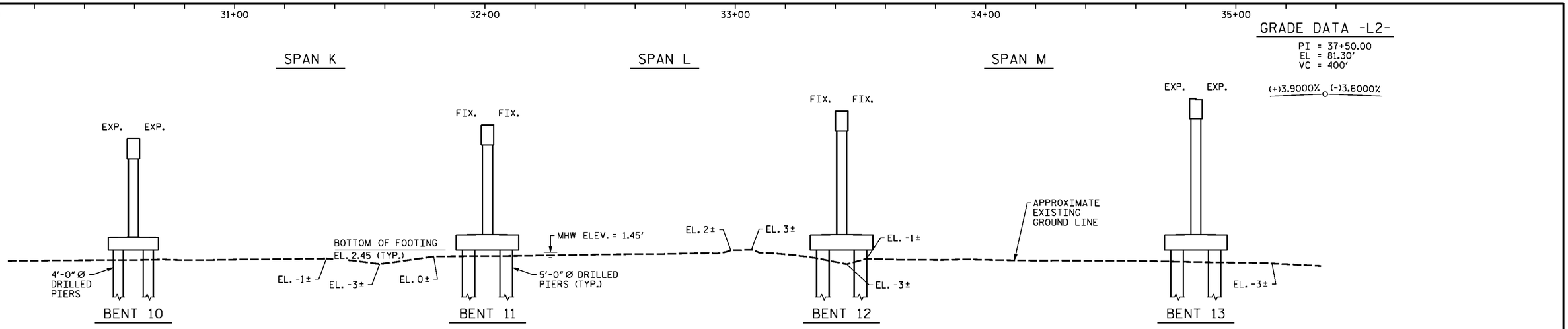
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-214
1			3			TOTAL SHEETS
2			4			278

5/11/2016
401_005_B4929_SMU_GD3S.dgn



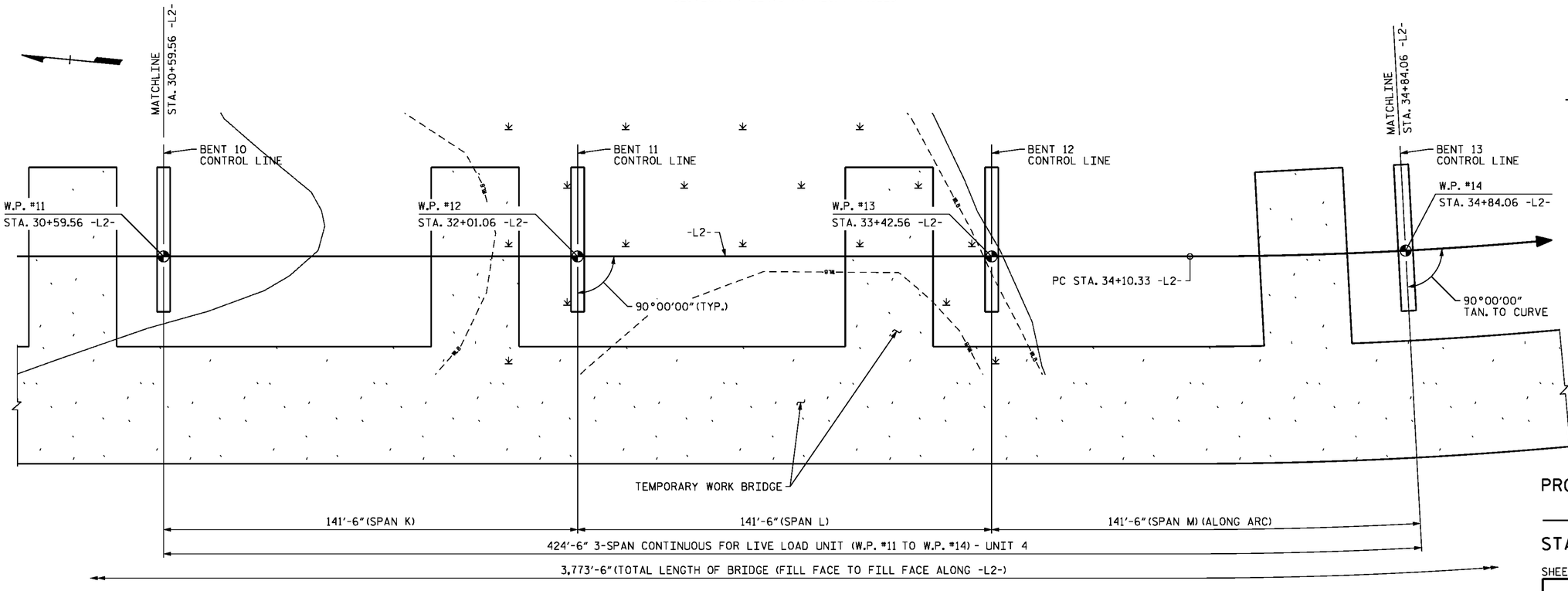
GRADE DATA -L2-

PI = 37+50.00
EL = 81.30'
VC = 400'

(+)3.9000% (-)3.6000%

SECTION ALONG -L2-

SECTION AT BENTS AT RIGHT ANGLES



PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00"

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 9 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-215
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016
DRAWN BY:	K. WHITE	DATE :	JAN 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/11/2016
401_007_B4929_SMU_GD4S.dgn

35+00 36+00 37+00 38+00 39+00

80 70 60 50 40 30 20 10 0 -10 -20 -30

GRADE DATA -L2-
PI = 37+50.00
EL = 81.30'
VC = 400'
(+)3.9000% (-)3.6000%

SPAN N SPAN O SPAN P

EXP. EXP. FIX. FIX. FIX. FIX. EXP. EXP.

Q100 WSEL = 11.3'

MINIMUM VERTICAL CLEARANCE AT MHW = 65.0'

BOTTOM OF FOOTING
EL. 2.45 (TYP.)

MTL ELEV. = -0.45'

MHW ELEV. = 1.45'

APPROXIMATE EXISTING GROUND LINE

MAX. WAVE CREST ELEV. = 14.1'

EL. -3±

5'-0" Ø DRILLED PIERS (TYP.)

EL. -16±

EL. -3±

BENT 13 BENT 14 BENT 15 BENT 16

SECTION ALONG -L2-

SECTION AT BENTS AT RIGHT ANGLES

MATCHLINE STA. 34+84.06 -L2-

BENT 13 CONTROL LINE

W.P. #14
STA. 34+84.06 -L2-

90°00'00"
TAN. TO CURVE
(TYP.)

BENT 14 CONTROL LINE

W.P. #15
STA. 36+22.06 -L2-

MINIMUM HORIZONTAL CLEARANCE = 120'-0"
SEE TABLE

60'-0" 60'-0"

-ICW-
(℄ CHANNEL)

INTRACOASTAL WATERWAY

FLOOD EBB

POC STA. 37+09.05 -L2-
POT STA. 25+43.65 -ICW-

82°55'53"
TAN. TO CURVE

EDGE OF CHANNEL
(TYP.)

BENT 15 CONTROL LINE

W.P. #16
STA. 37+96.06 -L2-

BRIDGE I.D. STATION
STA. 38+13.81 -L2-

-L2-

MATCHLINE STA. 39+34.06 -L2-

BENT 16 CONTROL LINE

W.P. #17
STA. 39+34.06 -L2-

138'-0" (SPAN N) (ALONG ARC)

86'-11⅞"

87'-0⅛"

17'-9"

120'-3"

138'-0" (SPAN P) (ALONG ARC)

174'-0" (SPAN O) (ALONG ARC)

450'-0" 3-SPAN CONTINUOUS FOR LIVE LOAD UNIT (W.P. #14 TO W.P. #17)

3,773'-6" (TOTAL LENGTH OF BRIDGE (FILL FACE TO FILL FACE ALONG -L2-)

PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00"

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 5 OF 9 STEEL ALTERNATE

DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016
DRAWN BY:	K. WHITE	DATE :	JAN 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAY 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-216
1			3			TOTAL SHEETS
2			4			278

5/11/2016
401_009_B4929_SMU_GD5S.dgn

GRADE DATA -L2-

PI = 37+50.00
EL = 81.30'
VC = 400'

(+)3.9000% (-)3.6000%

39+00 40+00 41+00 42+00 43+00 44+00

80 70 60 50 40 30 20 10 0 -10 -20 -30

SPAN Q SPAN R SPAN S

EXP. EXP. FIX. FIX. FIX. FIX. EXP. EXP.

BOTTOM OF FOOTING
EL. 2.45 (TYP.)

EL. -3±

EL. 1±

MHW ELEV. = 1.45'

APPROXIMATE EXISTING GROUND LINE

5'-0" Ø DRILLED PIERS (TYP.)

4'-0" Ø DRILLED PIERS

BENT 16 BENT 17 BENT 18 BENT 19

SECTION ALONG -L2-

SECTION AT BENTS AT RIGHT ANGLES

MATCHLINE STA. 39+34.06 -L2-

BENT 16 CONTROL LINE

W.P. #17
STA. 39+34.06 -L2-

90°00'00" TAN. TO CURVE (TYP.)

BENT 17 CONTROL LINE

W.P. #18
STA. 40+72.06 -L2-

BENT 18 CONTROL LINE

W.P. #19
STA. 42+46.06 -L2-

MATCHLINE STA. 43+84.06 -L2-

BENT 19 CONTROL LINE

W.P. #20
STA. 43+84.06 -L2-

-L2-

138'-0" (SPAN Q) (ALONG ARC)

174'-0" (SPAN R) (ALONG ARC)

138'-0" (SPAN S) (ALONG ARC)

450'-0" 3-SPAN CONTINUOUS FOR LIVE LOAD UNIT (W.P. #17 TO W.P. #20)

3,773'-6" (TOTAL LENGTH OF BRIDGE (FILL FACE TO FILL FACE ALONG -L2-)

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00"

PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 6 OF 9 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-217
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by:
Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

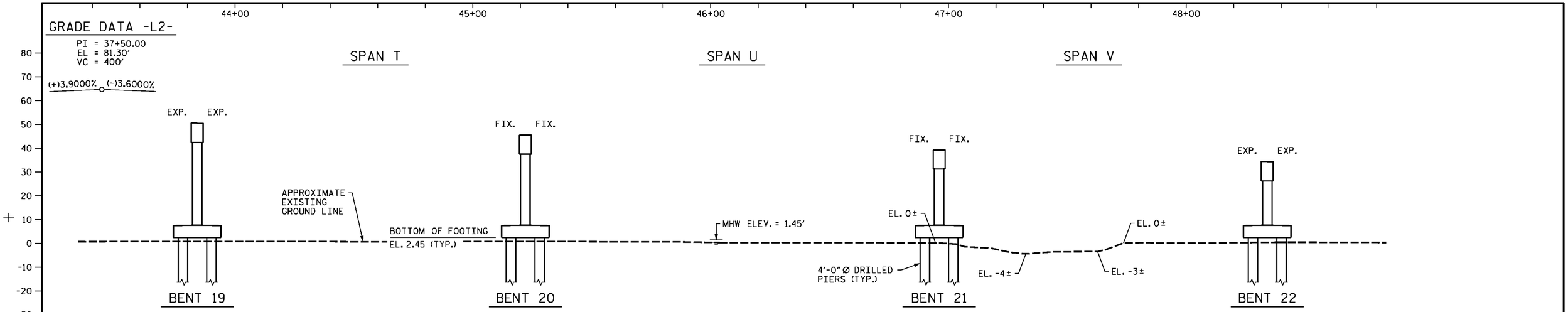
DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016
DRAWN BY:	K. WHITE	DATE :	JAN 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAY 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/11/2016
401_011_B4929_SMU_GD6S.dgn

GRADE DATA -L2-

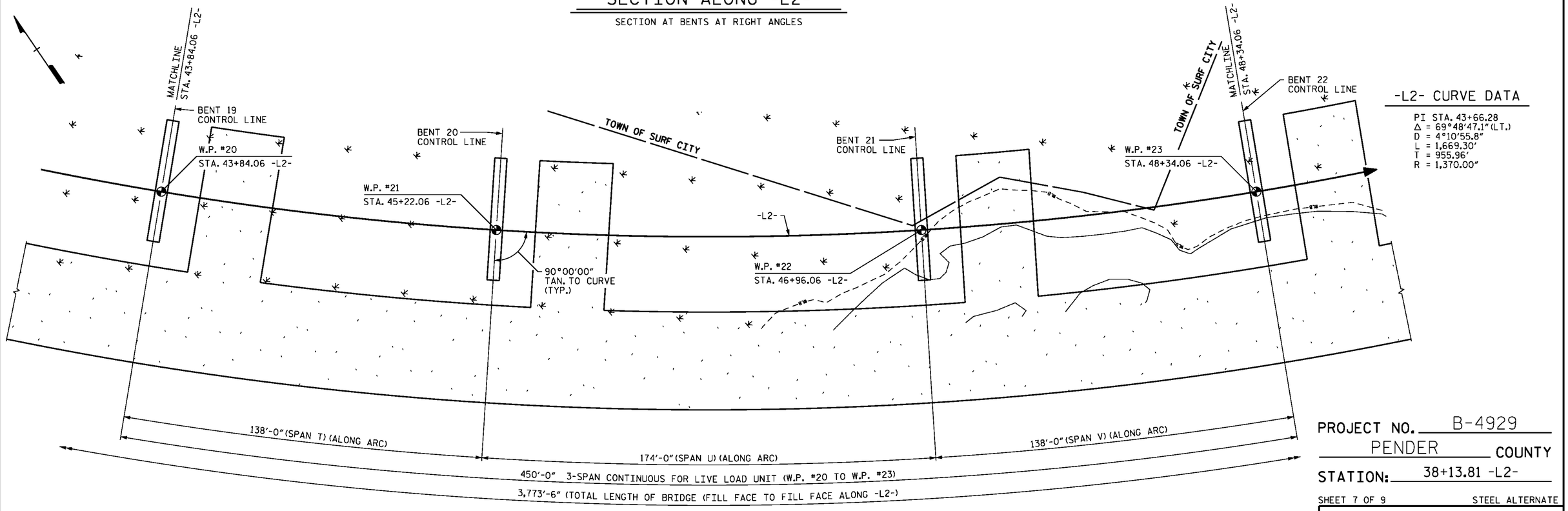
PI = 37+50.00
EL = 81.30'
VC = 400'

(+)3.9000% (-)3.6000%



SECTION ALONG -L2-

SECTION AT BENTS AT RIGHT ANGLES



-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00"

PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 7 OF 9 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-218
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C864482274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016
DRAWN BY:	K. WHITE	DATE :	JAN 2016
CHECKED BY:	J. DOUGHTY	DATE :	MAY 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/11/2016
401_013_B4929_SMU_GDTS.dgn

48+00 49+00 50+00 51+00 52+00 53+00

80 70 60 50 40 30 20 10 0 -10 -20 -30

SPAN W SPAN X SPAN Y

GRADE DATA -L2-

PI = 56+00.00
EL = 14.70'
VC = 200'

(-)3.6000% (-)1.9998%

EXP. EXP. FIX. FIX. FIX. FIX. EXP. EXP.

BOTTOM OF FOOTING
EL. 4.45

APPROXIMATE EXISTING GROUND LINE

EL. 1±

TOP OF DRILLED PIER EL. 2.45 (TYP.)

MHW ELEV. = 1.45'

EL. 0±

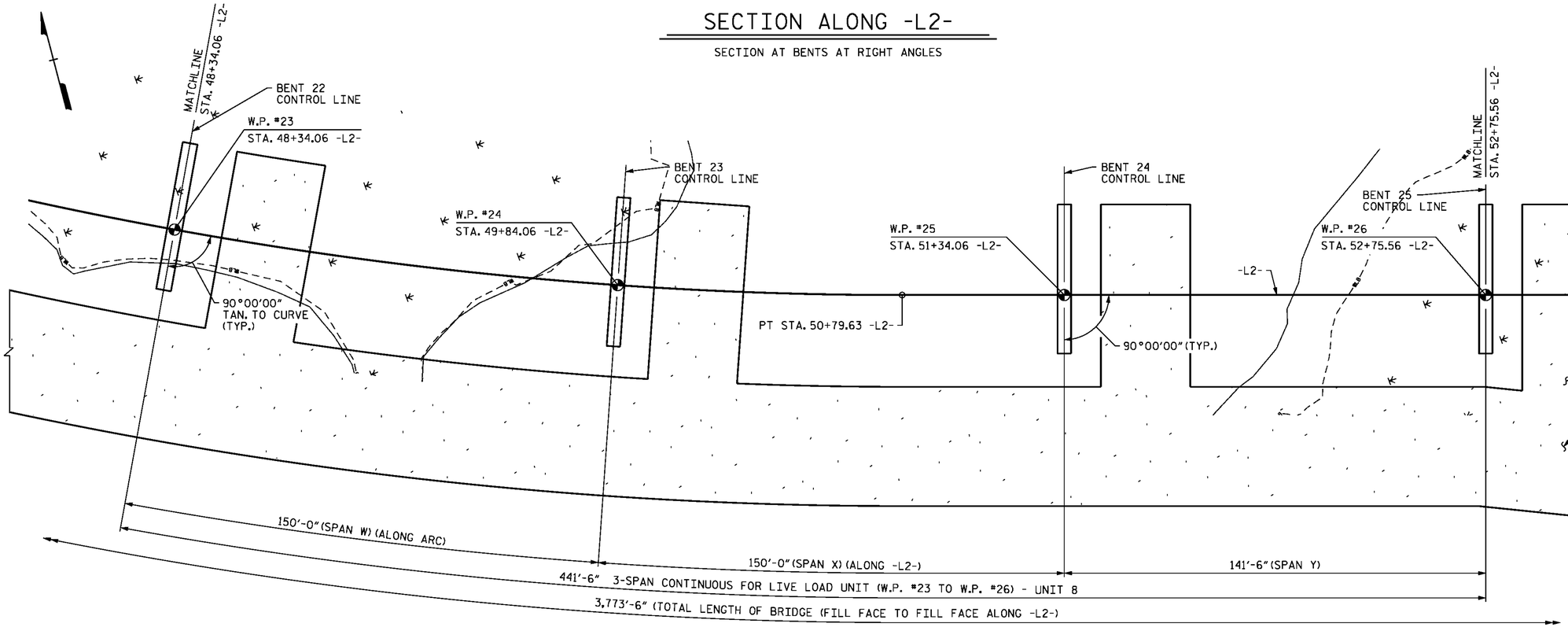
4'-0"Ø DRILLED PIERS

4'-0"Ø DRILLED PIERS (TYP.)

BENT 22 BENT 23 BENT 24 BENT 25

SECTION ALONG -L2-

SECTION AT BENTS AT RIGHT ANGLES



PLAN

DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

-L2- CURVE DATA

PI STA. 43+66.28
Δ = 69°48'47.1" (LT.)
D = 4°10'55.8"
L = 1,669.30'
T = 955.96'
R = 1,370.00"

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 8 OF 9 STEEL ALTERNATE

DESIGNED BY:	B. LOFLIN — DATE: JAN 2016
DRAWN BY:	K. WHITE — DATE: JAN 2016
CHECKED BY:	J. DOUGHTY — DATE: MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY — DATE: MAY 2016

5/11/2016
401.015_B4929_SMU_GD8S.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY 5/12/16

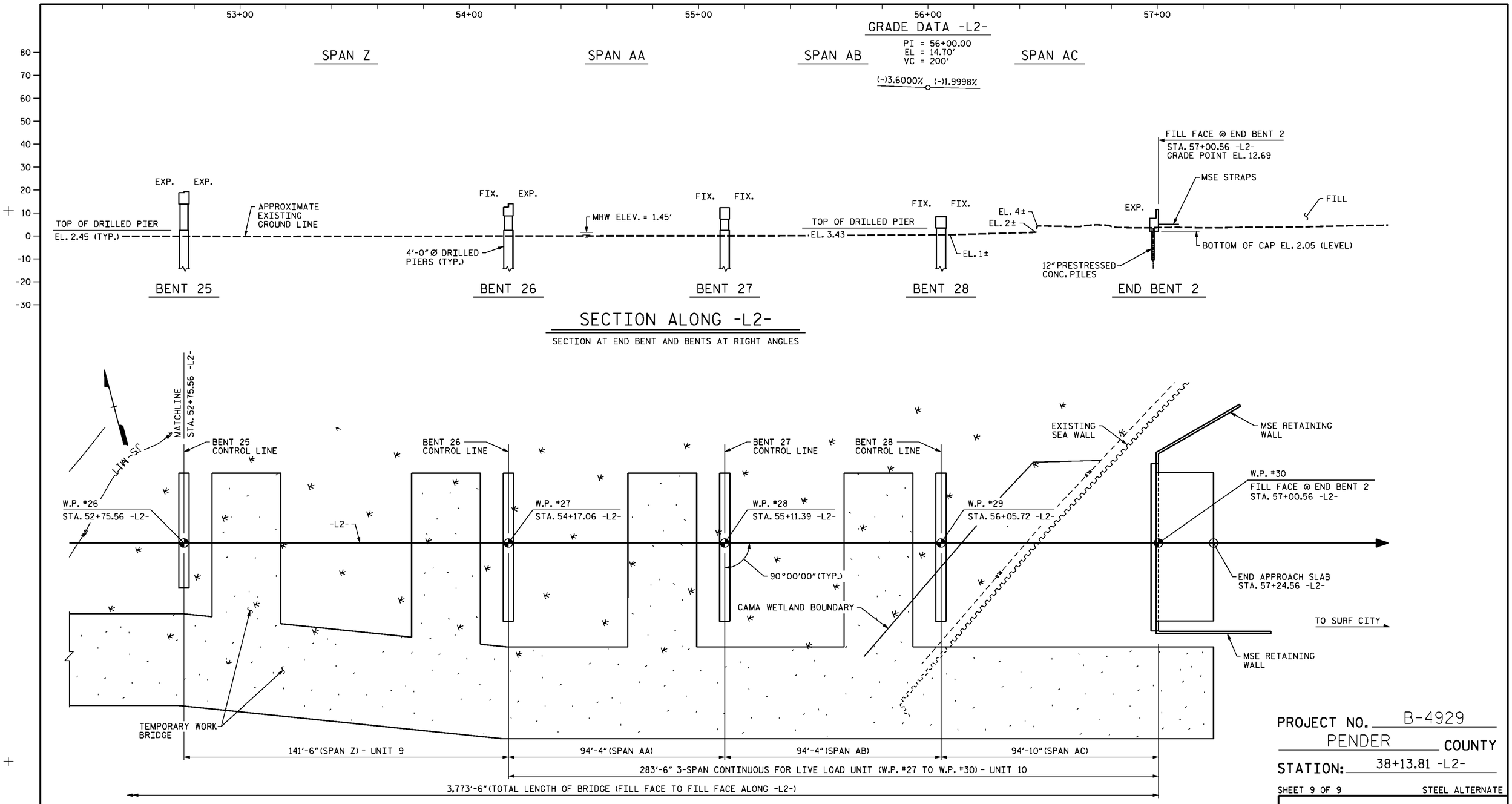
DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING
FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-219
1			3			TOTAL SHEETS
2			4			278



PLAN

PILES, DRILLED PIERS AND COLUMNS NOT SHOWN FOR CLARITY

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 9 OF 9 STEEL ALTERNATE

DESIGNED BY:	B. LOFLIN	DATE :	JAN 2016		
DRAWN BY:	K. WHITE	DATE :	JAN 2016		
CHECKED BY:	J. DOUGHTY	DATE :	MAR 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

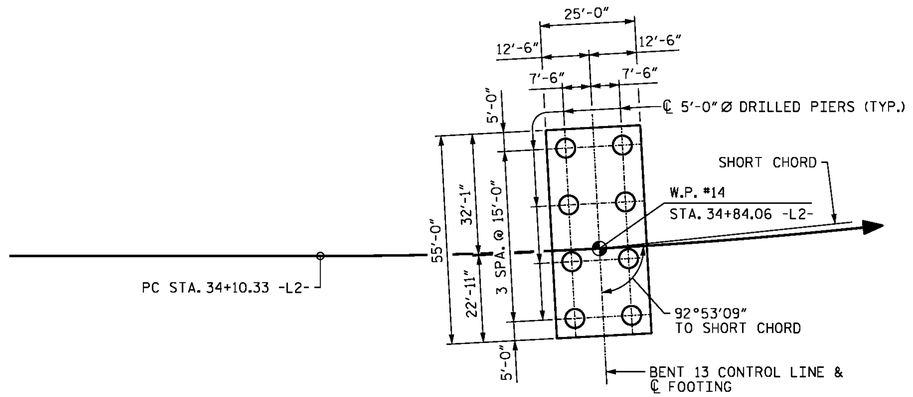
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOR BRIDGE ON
NC 50/NC 210 OVER THE
INTRACOASTAL WATERWAY

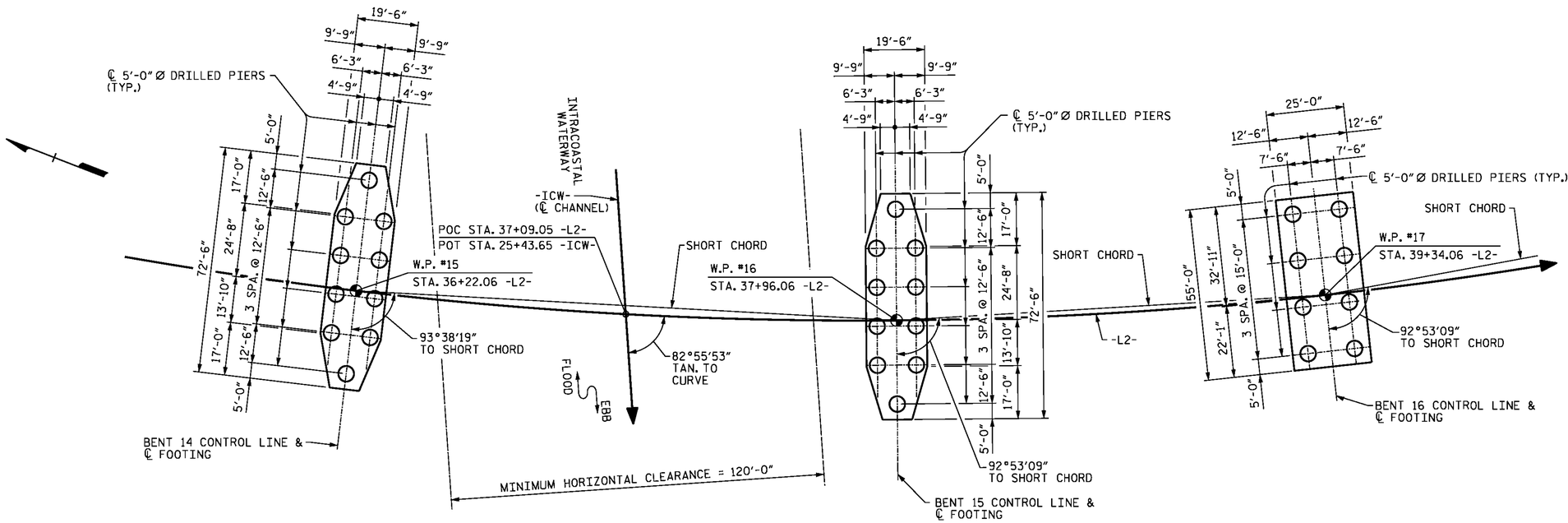
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-220
1			3			TOTAL SHEETS
2			4			278

5/12/2016
401_017_B4929_SMU_GD9S.dgn



BENT 13

PLAN



BENT 14 BENT 15 BENT 16

PLAN

NOTES:

FOR FOUNDATION LAYOUT FOR END BENTS, BENTS 1 THROUGH 12 AND BENTS 23 THROUGH 28, SEE SHEET NO.'S S-13 THROUGH S-16.

FOR FOUNDATION NOTES, SEE SHEET NO. S-17.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2 STEEL ALTERNATE

DESIGNED BY:	J. DOUGHTY — DATE : JAN 2016
DRAWN BY:	KEW/MAH — DATE : JAN 2016
CHECKED BY:	B. LOFLIN — DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY — DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

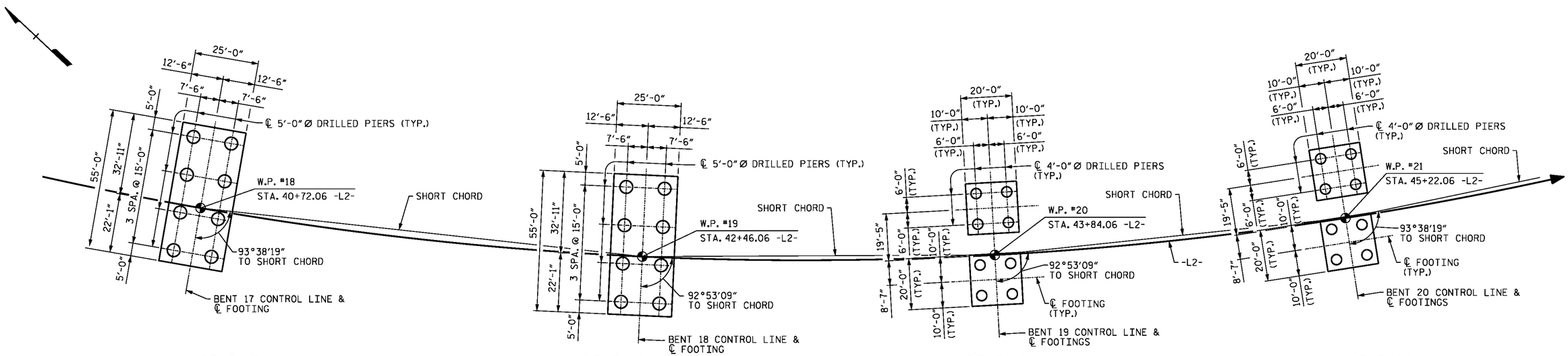
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

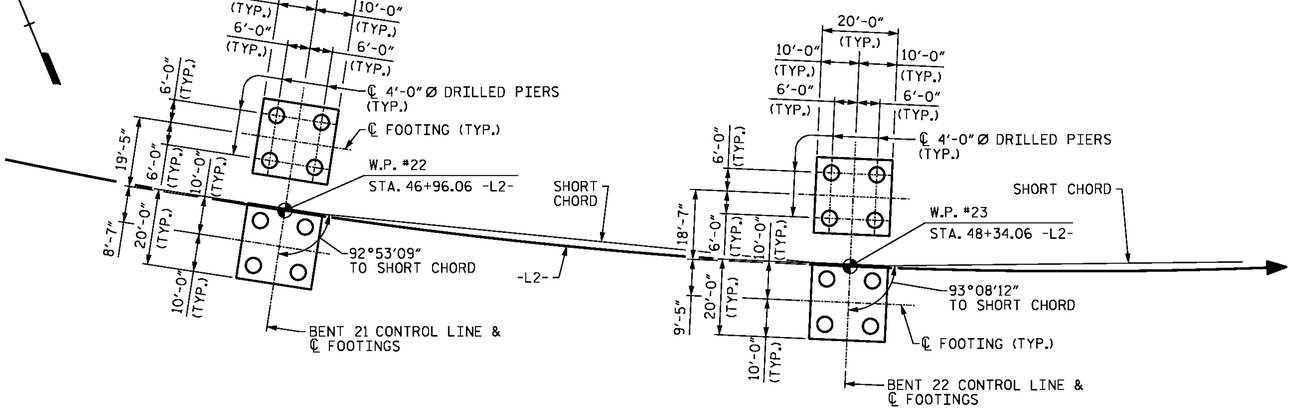
FOUNDATION LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-221
1			3			TOTAL SHEETS
2			4			278

5/12/2016
401_019_B4929_SMU_FL2.dgn



PLAN



PLAN

NOTES:

FOR NOTES, SEE SHEET NO. S-17.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

FOUNDATION LAYOUT

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

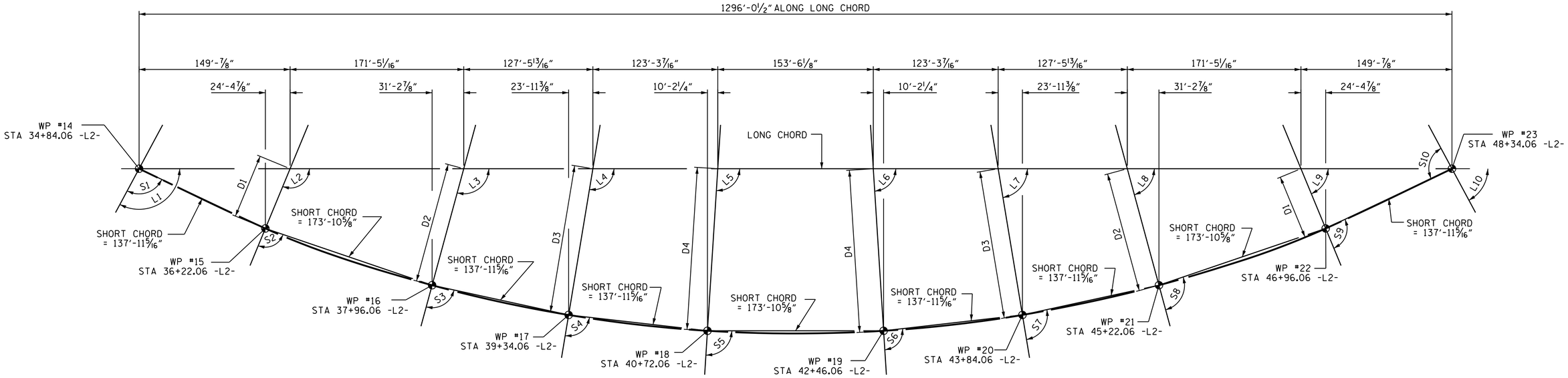
DocuSigned by:
Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-222
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. DOUGHTY	DATE : JAN 2016
DRAWN BY:	KEW/MAH	DATE : JAN 2016
CHECKED BY:	B. LOFLIN	DATE : MAR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/12/2016
401_021_B4929_SMU_FL3.dgn



LONG CHORD LAYOUT

HORIZONTAL CURVE DATA -L2-

P.I. = 43+66.28

DELTA = 69.8130833

L = 1669.300 FT

T = 955.960 FT

R = 1370.000 FT

Slope = 0.030 FT/FT

ANGLES			
	LONG CHORD	SHORT CHORD	
L1	118°13'47"	S1	92°53' 9"
L2	112°27'30"	S2	93°38'19"
L3	105°10'53"	S3	92°53' 9"
L4	99°24'36"	S4	92°53' 9"
L5	93°38'19"	S5	93°38'19"
L6	86°21'41"	S6	92°53' 9"
L7	80°35'24"	S7	92°53' 9"
L8	74°49' 7"	S8	93°38'19"
L9	67°32'30"	S9	92°53' 9"
L10	61°46'13"	S10	87° 6'51"

OFFSETS

D1=63'-10 11⁄16"

D2=119'-3 5⁄8"

D3=146'-5 13⁄16"

D4=160'-6 1⁄8"

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by:
Trey H. Carroll III
C61628E0D9C74BE...

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

LONG CHORD LAYOUT

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-223
1			3			TOTAL SHEETS
2			4			278

DRAWN BY : T. H. CARROLL DATE : 12/10/15

CHECKED BY : T. R. PETERSON DATE : 12/22/15

DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

01-JUN-2016 11:53
R:\Structures\Plans\Final Plans\DGN\STR\401_023_B4929_SMU_LC.dgn
thorcrall

TOTAL BILL OF MATERIAL

	CONSTRUCTION, MAINTENANCE AND REMOVAL OF TEMPORARY ACCESS	4'-0" DIA. DRILLED PIERS	5'-0" DIA. DRILLED PIERS	PERMANENT STEEL CASING FOR 4'-0" DIA. DRILLED PIER	PERMANENT STEEL CASING FOR 5'-0" DIA. DRILLED PIER	PDA TESTING	SID INSPECTION	SPT TESTING	CSL TESTING	REINFORCED CONCRETE DECK SLAB	GROOVING BRIDGE FLOORS	CLASS AA CONCRETE	BRIDGE APPROACH SLABS	EPOXY COATED REINFORCING STEEL	EPOXY COATED SPIRAL REINFORCING STEEL	ASTM A1010 STRUCTURAL STEEL
	LUMP SUM	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	EA.	EA.	EA.	EA.	SQ. FT.	SQ. FT.	CU. YDS.	LUMP SUM	LBS.	LBS.	LUMP SUM
SUPERSTRUCTURE	LUMP SUM									202,470	169,397		LUMP SUM			LUMP SUM
END BENT 1												49.6		6,784		
BENT 1		280.2		52.2			1	1	1			45.7		38,137	7,328	
BENT 2		283.4		76.4			1	1	1			44.7		39,158	6,950	
BENT 3		286.4		91.4			1	1	1			52.9		39,668	7,175	
BENT 4		298.3		76.4			1	1	1			53.0		82,454	7,876	
BENT 5		298.3		53.4			1	1	1			58.9		83,856	8,285	
BENT 6		717.9		197.9			2	2	2			334.3		264,513	18,697	
BENT 7		773.9		197.9			2	2	2			343.6		279,406	20,143	
BENT 8		765.9		197.9			2	2	2			352.5		281,578	19,937	
BENT 9		773.9		229.9			2	2	2			361.4		283,655	20,143	
BENT 10		789.9		229.9			2	2	2			374.3		290,155	20,557	
BENT 11			757.9		197.9		2	2	2			614.9		269,441	25,733	
BENT 12			765.9		197.9		2	2	2			628.8		273,605	26,002	
BENT 13			741.9		245.9		2	2	2			654.9		281,338	25,194	
BENT 14			1,067.4		427.4		3	10	3			625.3		468,147	36,208	
BENT 15			1,067.4		427.4		3	3	3			629.3		468,963	36,208	
BENT 16			741.9		245.9		2	2	2			662.4		283,432	24,924	
BENT 17			733.9		197.9		2	2	2			649.7		274,432	24,924	
BENT 18			733.9		253.9		2	2	2			634.7		271,060	24,924	
BENT 19		749.9		269.9			2	2	2			392.3		167,991	19,523	
BENT 20		781.9		269.9			2	8	2			379.1		168,353	20,349	
BENT 21		781.9		269.9			2	8	2			363.5		164,984	20,349	
BENT 22		805.9		157.9			2	8	2			353.0		164,629	20,969	
BENT 23		352.3		53.4			1	3	1			62.8		93,467	9,849	
BENT 24		325.4		52.4			1	3	1			58.1		90,620	8,812	
BENT 25		322.4		52.4			1	3	1			54.7		90,163	8,351	
BENT 26		401.8		69.8			1	1	1			75.5		59,975	10,031	
BENT 27		421.8		69.8			1	4	1			58.5		60,846	10,296	
BENT 28		425.8		69.8			1	4	1			59.2		60,027	11,062	
TEST PIER 1			95.5		22.0		1	1	1					11,016	3,207	
TEST PIER 2		79.5		22.0			1	1	1					7,452	2,099	
END BENT 2												62.9		8,158		
TOTAL	LUMP SUM	10,716.7	6,705.7	2,760.5	2,216.2	2	49	86	49	202,470	169,397	9,090.5	LUMP SUM	5,427,463	506,105	LUMP SUM

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

TOTAL BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-224
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16

DocuSigned by:
Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. DOUGHTY	DATE : MAR 2016
DRAWN BY:	K. WHITE	DATE : MAR 2016
CHECKED BY:	B. LOFLIN	DATE : APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/13/2016
401_025_B4929_SMU_TBMI.dgn

TOTAL BILL OF MATERIAL

	54" PRESTRESSED CONCRETE GIRDERS		72"F.I.B. PRESTRESSED CONCRETE GIRDERS		78"F.I.B. PRESTRESSED CONCRETE GIRDERS		12" PRESTRESSED CONCRETE PILES		PILE REDRIVES	TWO BAR METAL RAIL	1'-2"x 2'-6" CONCRETE PARAPET	VERTICAL CONCRETE BARRIER RAIL	PEDESTRIAN RAILING	DISC BEARINGS	ELASTOMERIC BEARINGS	EXPANSION JOINT SEALS	PLASTIC LUMBER FENDER BOARDS AT CHANNEL BENTS	AXIAL LOAD TEST No. 1	AXIAL LOAD TEST No. 2	ASBESTOS ASSESSMENT	PATH LIGHTING SYSTEM AT STA. 18+40 -L2-	PATH LIGHTING SYSTEM AT STA. 57+76 -L2-
	NO.	LIN. FT.	NO.	LIN. FT.	NO.	LIN. FT.	NO.	LIN. FT.	EA.	LIN. FT.	LIN. FT.	LIN. FT.	LIN. FT.	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM
SUPERSTRUCTURE	36	3,360.75	56	7,175.37	15	2,191.85				3,789.00	3,804.06	3,796.99	3,813.16		LUMP SUM	LUMP SUM						
END BENT 1							11	220	6													
BENT 1																						
BENT 2																						
BENT 3																						
BENT 4																						
BENT 5																						
BENT 6																						
BENT 7																						
BENT 8																						
BENT 9																						
BENT 10																						
BENT 11																						
BENT 12																						
BENT 13																						
BENT 14																						
BENT 15																						
BENT 16																						
BENT 17																						
BENT 18																						
BENT 19																						
BENT 20																						
BENT 21																						
BENT 22																						
BENT 23																						
BENT 24																						
BENT 25																						
BENT 26																						
BENT 27																						
BENT 28																						
TEST PIER 1																						
TEST PIER 2																						
END BENT 2							13	650	7													
TOTAL	36	3,360.75	56	7,175.37	15	2,191.85	24	870	13	3,789.00	3,804.06	3,796.99	3,813.16	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM	LUMP SUM

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GENERAL DRAWING

TOTAL BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-225
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. DOUGHTY	DATE : MAR 2016
DRAWN BY:	K. WHITE	DATE : MAR 2016
CHECKED BY:	B. LOFLIN	DATE : APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/13/2016
401_027_B4929_SMU_TBM2.dgn

LOAD AND RESISTANCE FACTOR RATING (LRFR) SUMMARY FOR STEEL GIRDERS

LEVEL		VEHICLE	WEIGHT (W) (TONS)	CONTROLLING LOAD RATING (#)	MINIMUM RATING FACTORS (RF)	TONS = W × RF	STRENGTH I LIMIT STATE											SERVICE II 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	1.26	--	1.75		1.26	N	ER	138.22						1.30						1,2,3
		HL-93 (OPERATING)	N/A		1.58	--	1.35		1.58	N	ER	138.22						1.00						1,2,3
		HS-20 (INVENTORY)	36.00	2	2.00	72.00	1.75		2.00	0	ER	78.08						1.30						1,2,3
		HS-20 (OPERATING)	36.00		2.59	93.24	1.35		2.59	0	ER	78.08						1.00						1,2,3
LEGAL LOAD RATING	SINGLE VEHICLE (SV)	SNSH	13.500		6.17	83.30	1.40		6.17	0	ER	78.08						1.30						1,2,3
		SNGARBS2	20.000		4.35	87.00	1.40		4.35	0	ER	78.08						1.30						1,2,3
		SNAGRIS2	22.000		4.03	88.66	1.40		4.03	0	ER	78.08						1.30						1,2,3
		SNCOTTS3	27.250		3.07	83.66	1.40		3.07	0	ER	78.08						1.30						1,2,3
		SNAGGRS4	34.925		2.47	86.26	1.40		2.47	0	ER	78.08						1.30						1,2,3
		SNS5A	35.550		2.43	86.39	1.40		2.43	0	ER	78.08						1.30						1,2,3
		SNS6A	39.950		2.19	87.49	1.40		2.19	0	ER	78.08						1.30						1,2,3
		SNS7B	42.000		2.09	87.78	1.40		2.09	0	ER	78.08						1.30						1,2,3
	TRUCK TRACTOR SEMI-TRAILER (TTST)	TNAGRIT3	33.000		2.67	88.11	1.40		2.67	0	ER	78.08						1.30						1,2,3
		TNT4A	33.075		2.66	87.98	1.40		2.66	0	ER	78.08						1.30						1,2,3
		TNT6A	41.600		2.14	89.02	1.40		2.14	0	ER	78.08						1.30						1,2,3
		TNT7A	42.000		2.14	89.88	1.40		2.14	0	ER	78.08						1.30						1,2,3
		TNT7B	42.000		2.16	90.72	1.40		2.16	0	ER	78.08						1.30						1,2,3
		TNAGRIT4	43.000		2.09	89.87	1.40		2.09	0	ER	78.08						1.30						1,2,3
		TNAGT5A	45.000		1.99	89.55	1.40		1.99	0	ER	78.08						1.30						1,2,3
		TNAGT5B	45.000	3	1.98	89.10	1.40		1.98	0	ER	78.08						1.30						1,2,3
FATIGUE		HL-93 (INVENTORY)	γ_{LL}=0.75																					

LOAD FACTORS:

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

NOTES:

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

ALLOWABLE STRESS FOR SERVICE II LIMIT STATE ARE AS REQUIRED FOR DESIGN.

COMMENTS:

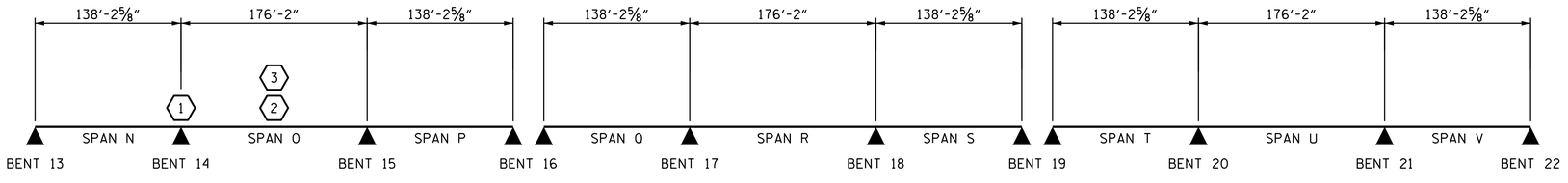
1. STRENGTH I SHEAR AND SERVICE II LIMIT STATES NOT PROVIDED DUE TO CURVED GIRDER ANALYSIS LIMITATIONS.
2. DISTRIBUTION FACTORS BASED ON A COMPLEX SYSTEM OF ANALYSIS FOR CURVED GIRDERS. THEREFORE, DISTRIBUTION FACTORS VARY AND ARE NOT SHOWN
3. SPANS Q-S AND T-V ARE IDENTICAL TO SPANS N-P.

(#) CONTROLLING LOAD RATING

(1) DESIGN LOAD RATING (HL-93) **
(2) DESIGN LOAD RATING (HS-20) **
(3) LEGAL LOAD RATING **
** SEE CHART FOR VEHICLE TYPE

GIRDER LOCATION

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



LRFR SUMMARY

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III
C61628E0D9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
STANDARD

LRFR SUMMARY FOR STEEL GIRDERS
(NON-INTERSTATE TRAFFIC)

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-226
1			3			TOTAL SHEETS
2			4			278

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

ASSEMBLED BY : T. H. CARROLL DATE : 12/1/2015
CHECKED BY : T. R. PETERSON DATE : 2/4/2016
DRAWN BY : MAA 1/08
CHECKED BY : GM/DI 2/08
REV. 11/12/08RR MAA/GM
REV. 10/1/11 MAA/GM

01-JUN-2016 11:53
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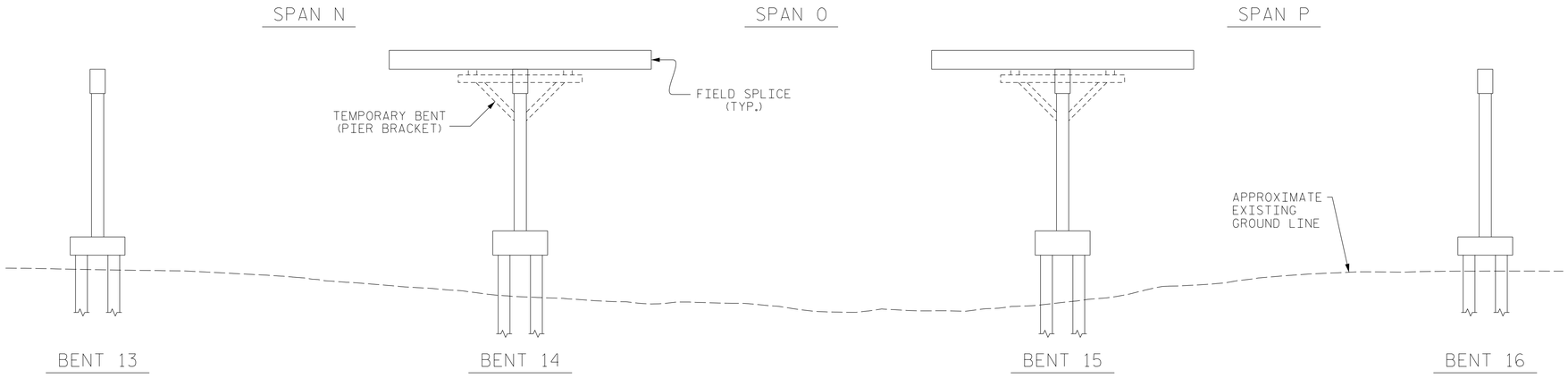
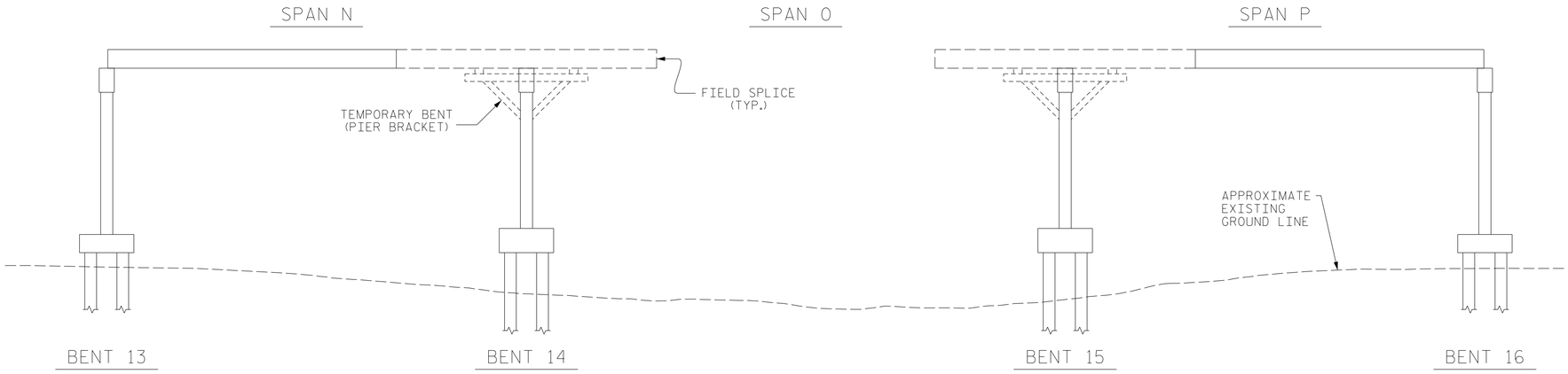
tbarrell

STD. NO. LRFR3



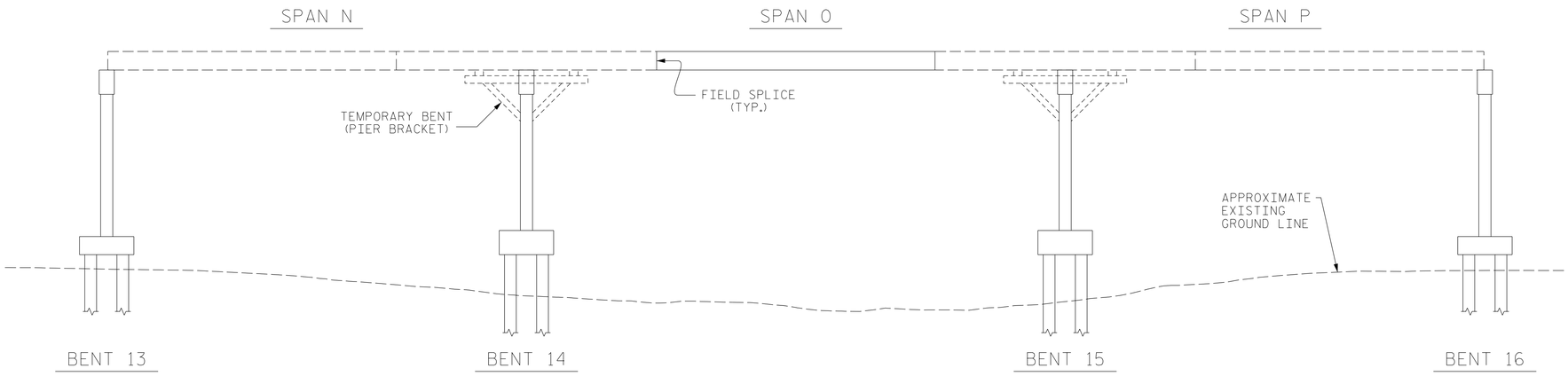
PHASE I GIRDER ERECTION

SPANS Q THROUGH S AND SPANS T THROUGH V SIMILAR



PHASE II GIRDER ERECTION

SPANS Q THROUGH S AND SPANS T THROUGH V SIMILAR



PHASE III GIRDER ERECTION

SPANS Q THROUGH S AND SPANS T THROUGH V SIMILAR

ERECTION NOTES

ERECT A MINIMUM OF TWO GIRDERS WITH ALL DIAPHRAGMS/CROSSFRAMES BETWEEN THE GIRDERS IN PLACE AND THE BOLTS TIGHTENED PRIOR TO RELEASING THE GIRDERS.

ERECT EACH SUBSEQUENT GIRDER WITH DIAPHRAGMS/CROSSFRAMES CONNECTING TO THE ADJACENT PREVIOUSLY ERECTED GIRDER AND TIGHTEN ALL BOLTS BEFORE RELEASING.

THE STRUCTURAL STEEL SHALL REMAIN SUPPORTED DURING ERECTION IN ITS CAMBERED POSITION. TEMPORARY SUPPORTS AS SHOWN SHALL BE USED.

TEMPORARY BENTS SHALL REMAIN IN PLACE UNTIL ALL DIAPHRAGMS/CROSSFRAMES ARE IN PLACE AND ALL HIGH STRENGTH BOLTS ARE TIGHTENED.

THE CONTRACTOR'S ERECTION PLANS SHALL INCLUDE A METHOD OF TEMPORARY BENT REMOVAL THAT WILL UNIFORMLY TRANSFER THE STRUCTURAL WEIGHT TO THE DIAPHRAGMS/CROSSFRAMES AND THE GIRDERS WILL REMAIN IN THE CAMBERED POSITIONS.

PLANS FOR TEMPORARY BENT ERECTION AND REMOVAL SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

THE CONTRACTOR IS RESPONSIBLE FOR DESIGNING THE TEMPORARY BENTS. THE DESIGN SHALL BE COMPLETED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF NORTH CAROLINA. THE CONTRACTOR SHALL SUBMIT SIGNED AND SEALED WORKING DRAWINGS AND CALCULATIONS FOR APPROVAL BY THE ENGINEER.

DURING GIRDER ERECTION PROCEDURE, THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LATERAL BRACING AND OTHER MEANS OF SUPPORT, AS REQUIRED TO ENSURE STABILITY OF THE GIRDERS, AVOID UPLIFT OF THE GIRDERS AND TEMPORARY BENTS AND TO ENSURE PLUMBNESS OF THE GIRDERS IN THE FINAL POSITION.

THE CONTRACTOR MAY SUBMIT AN ALTERNATE ERECTION METHOD TO THE ENGINEER FOR REVIEW AND APPROVAL.

FOR TEMPORARY BENTS, SEE SPECIAL PROVISIONS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III
C61628E0D9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

GIRDER ERECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-227
1			3			TOTAL SHEETS
2			4			278

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : T. H. CARROLL DATE : 2/8/2016
CHECKED BY : T. R. PETERSON DATE : 2/9/2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : 5/10/2016

$$$$$$SYSTIME$$$$$
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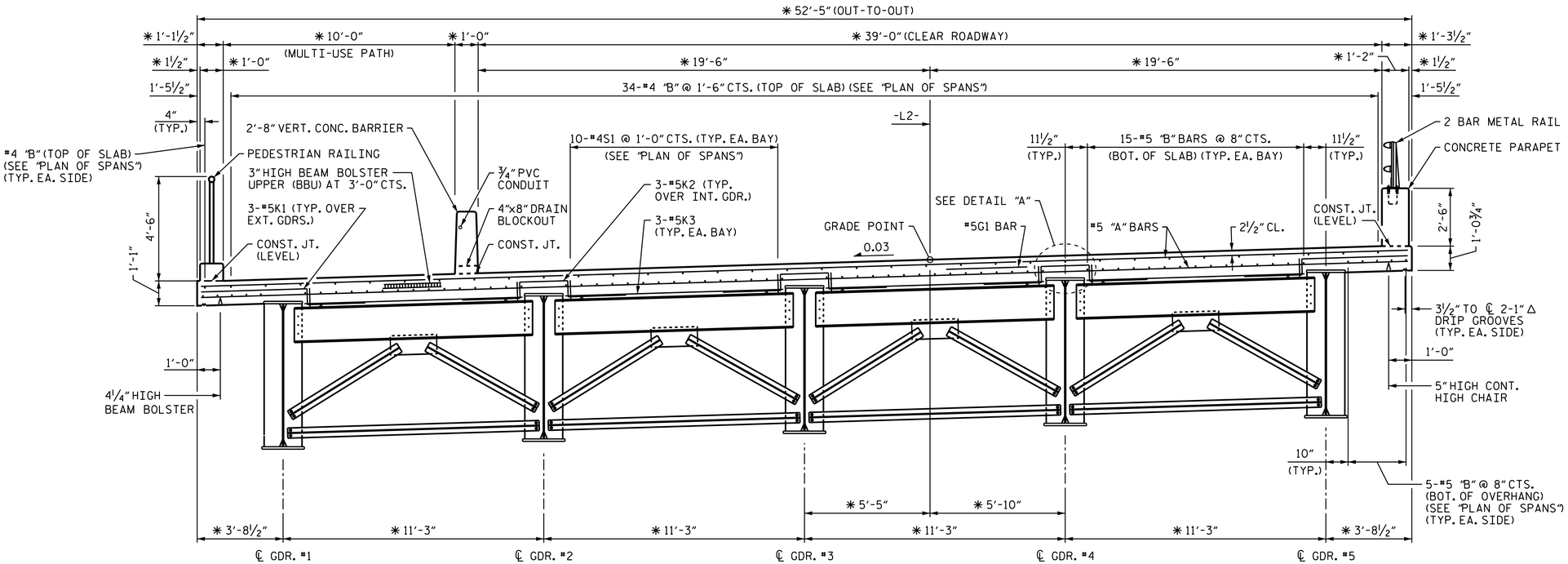
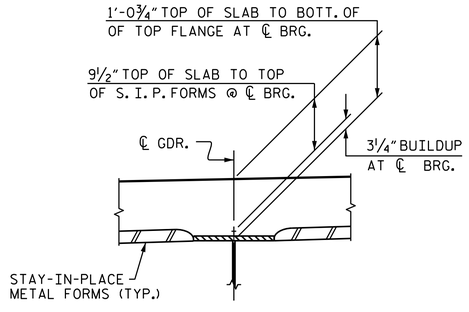
$$$$USERNAME$$$$



✳RADIAL DIMENSION

TYPICAL SECTION

SHOWING BENTS 13, 16, 19 AND 22



DETAIL A

(TYP. EA. GIRDER)

NOTES

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.

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

STRUCTURAL STEEL ERECTION IN A CONTINUOUS UNIT SHALL BE COMPLETE BEFORE FALSEWORK OR FORMS ARE PLACED ON THE UNIT.

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

METAL STAY-IN-PLACE FORMS SHALL NOT BE WELDED TO BEAM OR GIRDER FLANGES IN THE ZONES REQUIRING CHARPY V-NOTCH TEST. SEE STRUCTURAL STEEL DETAIL SHEETS.

PROVIDE 1 1/4" HIGH BEAM BOLSTERS UPPER AT 4'-0" CTS. ATOP THE METAL STAY-IN-PLACE FORMS TO SUPPORT THE BOTTOM MAT OF 'A' BARS. WHEN USING REMOVABLE FORMS, PROVIDE CONTINUOUS HIGH CHAIRS FOR METAL DECK (C.H.C.M.) @ 4'-0" CTS. WITH A HEIGHT TO SUPPORT THE BOTTOM MAT OF 'A' BARS A CLEAR DISTANCE OF 2 1/2" ABOVE THE TOP OF THE REMOVABLE FORM.

THE CONTRACTOR MAY, WHEN NECESSARY, PROPOSE A SCHEME FOR AVOIDING INTERFERENCE BETWEEN METAL STAY-IN-PLACE FORM SUPPORTS OR FORMS AND BEAM/GIRDER STIFFENERS OR CONNECTOR PLATES. THE PROPOSAL SHALL BE INDICATED, AS APPROPRIATE, ON EITHER THE STEEL WORKING DRAWINGS OR THE METAL STAY-IN-PLACE FORM WORKING DRAWINGS.

THE CONTRACTOR SHALL ADJUST THE GIRDER BUILDUPS AS NECESSARY TO INCORPORATE A MAXIMUM PERMISSIBLE VARIATION IN POT BEARING DEPTH OF 1/2", SEE SPECIAL PROVISION FOR POT BEARINGS.

METAL STAY-IN-PLACE FORMS SHALL INCLUDE A LAMINATE COATING FOR CORROSION RESISTANCE. FOR METAL STAY-IN-PLACE FORMS, SEE SPECIAL PROVISIONS.

FOR 4X8 DRAINAGE BLOCKOUT SPACING, SEE "VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT" SHEET.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 3 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III
C61628E0D9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION SPANS N THROUGH V

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-228
1			3			TOTAL SHEETS
2			4			278

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DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

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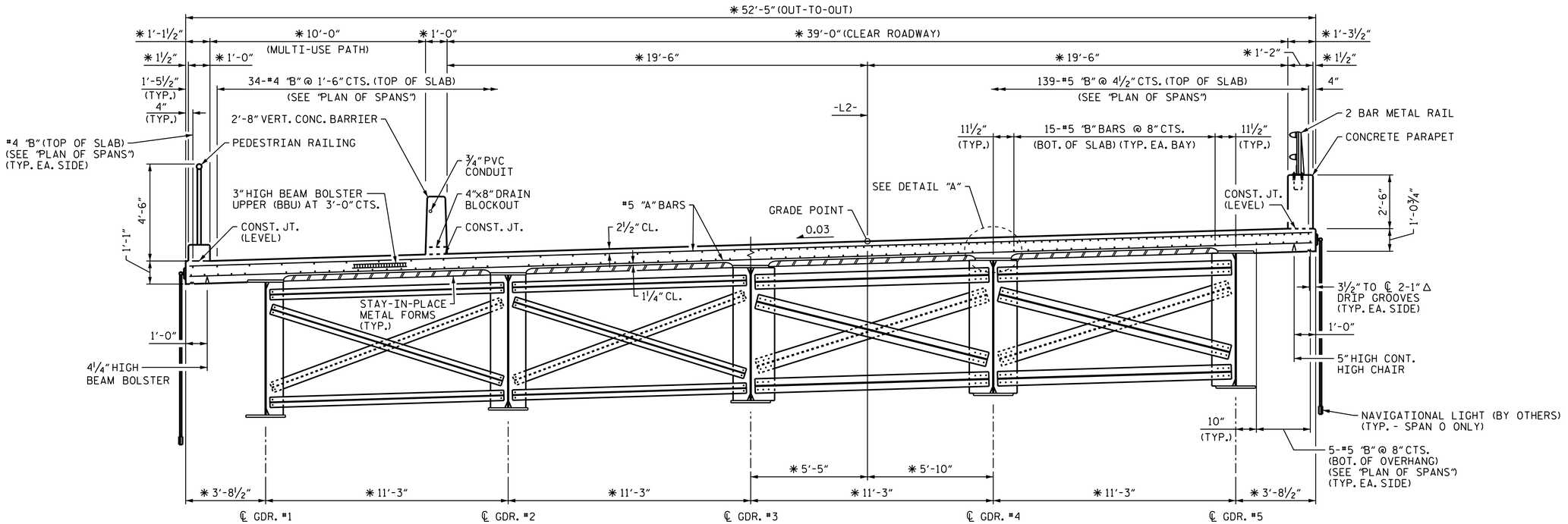
NOTES

FOR NOTES, SEE SHEET 1 OF 2.



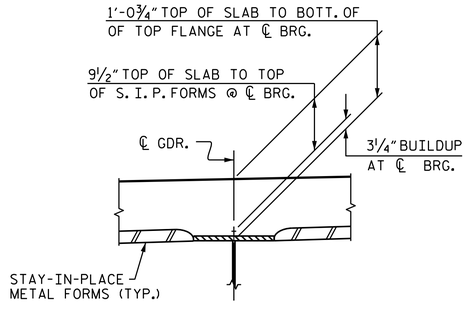
✳ RADIAL DIMENSION

AT INTERMEDIATE DIAPHRAGMS

AT BENT DIAPHRAGMS

SHOWING BENTS 14, 15, 17, 18, 20 AND 21

TYPICAL SECTION



DETAIL A

(TYP. EA. GIRDER)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 3 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III
C61628E0D9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION
SPANS N THROUGH V

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-229
1			3			TOTAL SHEETS
2			4			278

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DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

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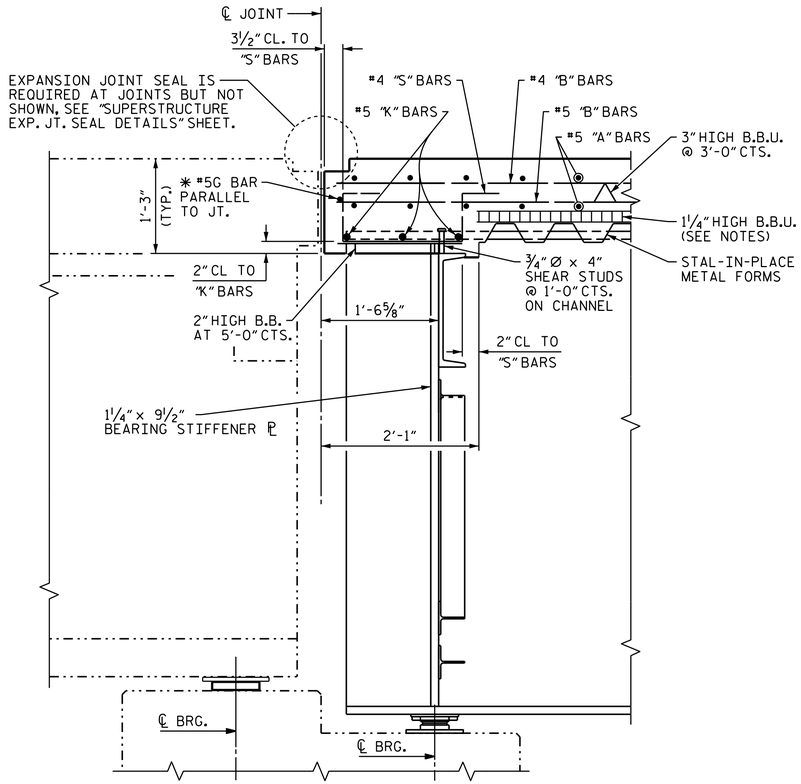
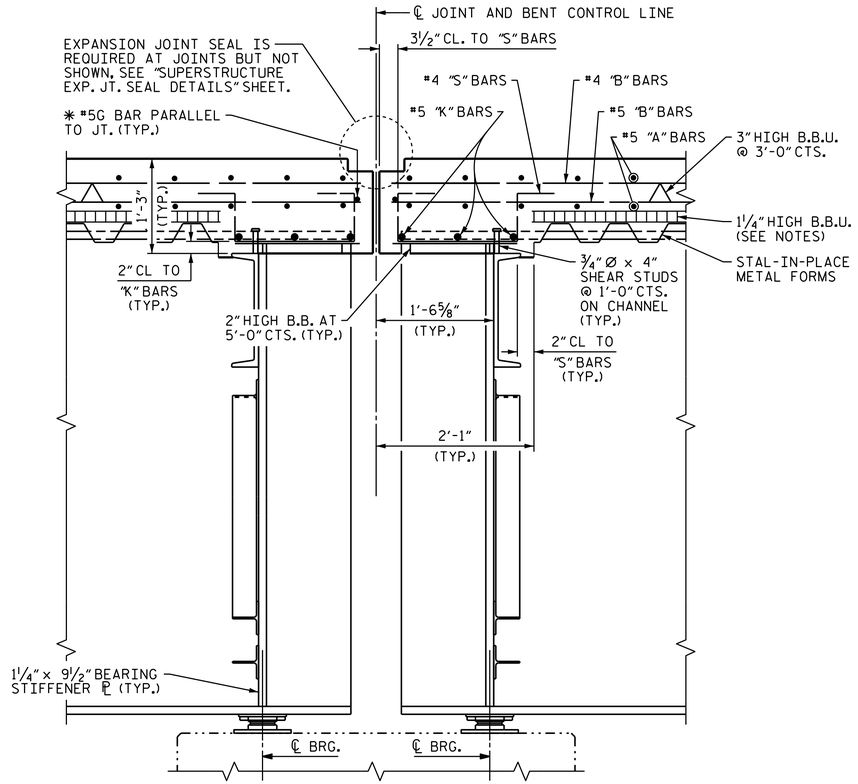


SECTION AT BENT 13

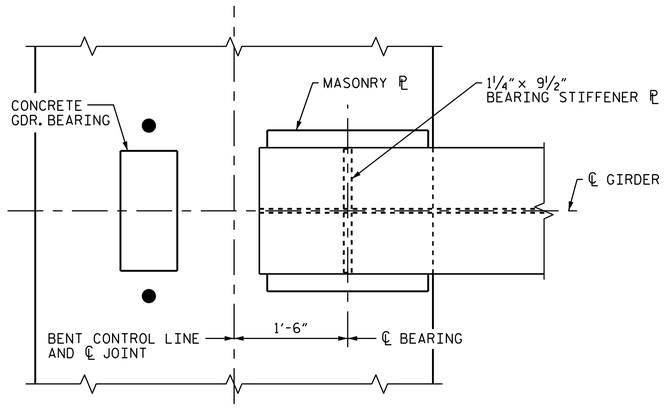
BENT 22 SIMILAR



SECTION AT BENT 16 AND BENT 19

NOTE:
FOR LOCATION OF SECTIONS, SEE "PLAN OF SPANS" SHEETS.

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



PLAN

BENT 13 SHOWN, BENT 22 SIMILAR

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 3 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III

C81628E0D9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

TYPICAL SECTION DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-230
1			3			TOTAL SHEETS
2			4			278

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DRAWN BY :	K. WHITE	DATE : FEB 2016
CHECKED BY :	T. H. CARROLL	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	T. H. CARROLL	DATE : MAY 2016

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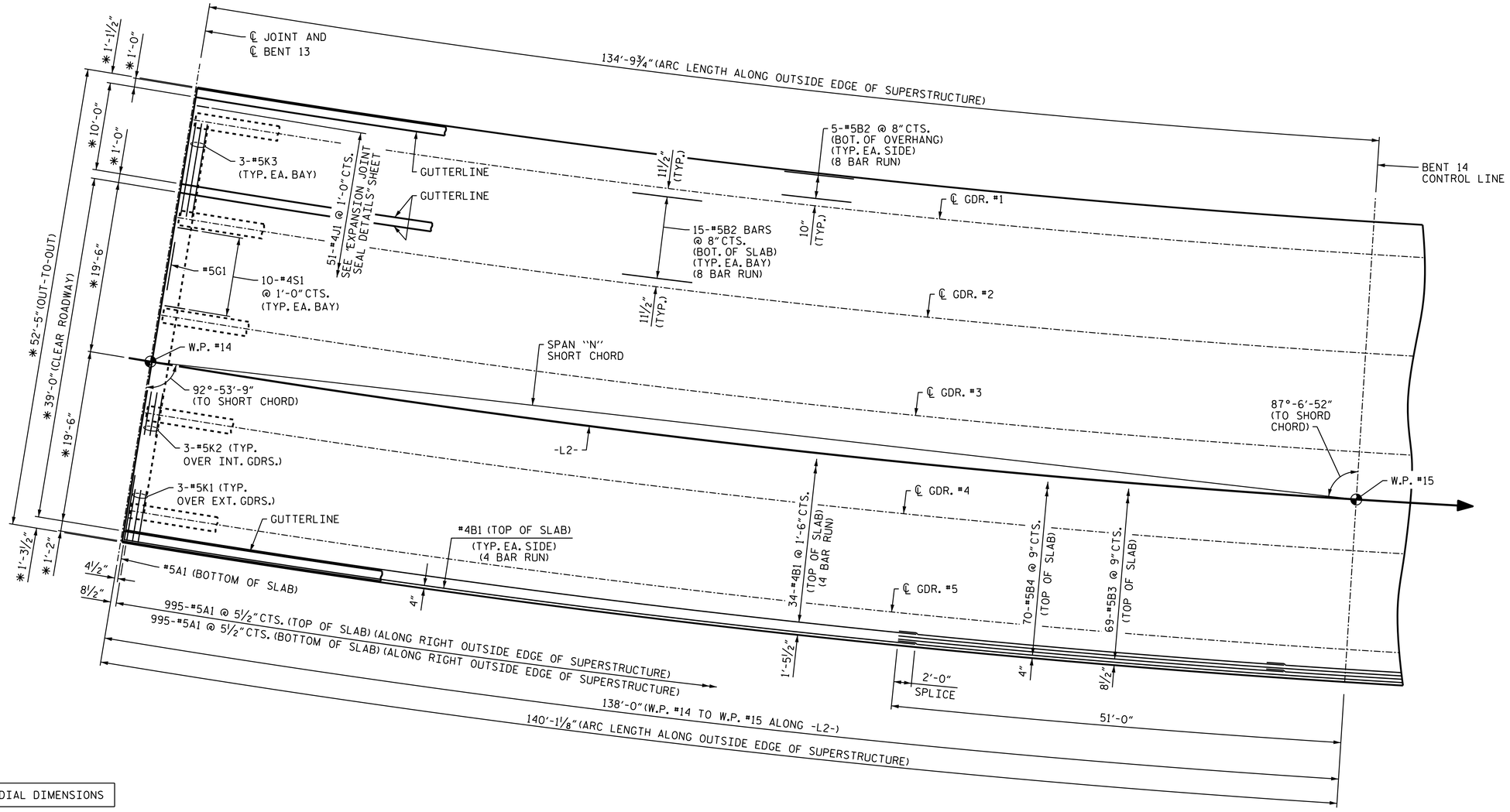
thgarrell



*RADIAL DIMENSIONS

PLAN OF SPAN "N"

SPAN "N" SHOWN, SPAN "Q" AND SPAN "T" SIMILAR

FOR REINFORCING LAYOUT IN PEDESTRIAN RAILING CURB, VERTICAL CONCRETE BARRIER RAIL AND CONCRETE PARAPET, SEE "VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT" SHEETS AND "PEDESTRIAN RAILING RAIL POST SPACING AND PLAN OF CONCRETE CURB" SHEETS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 3 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL, III

DocuSigned by: Trey H. Carroll, III
C61628E0D9C74BE...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

SPAN "N"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-231
1			3			TOTAL SHEETS
2			4			278

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : MAR 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

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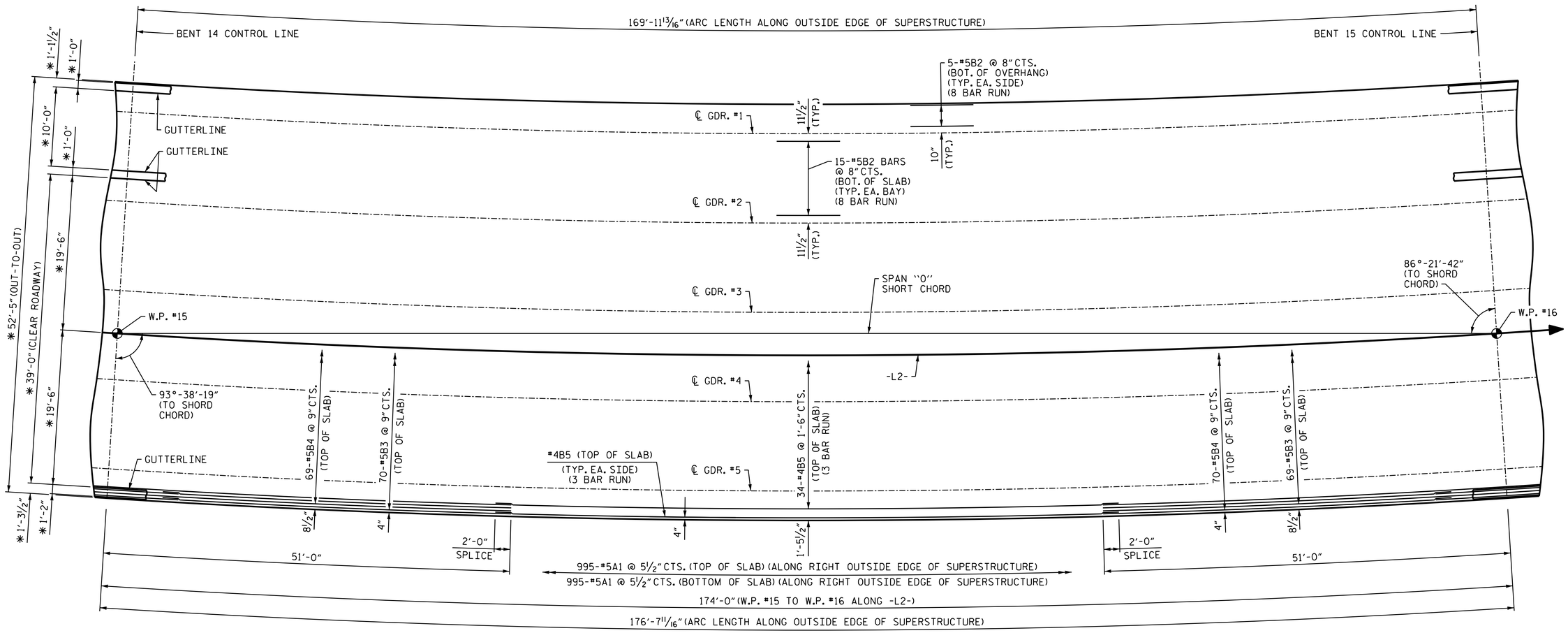

*RADIAL DIMENSIONS

PLAN OF SPAN "O"

SPAN "O" SHOWN, SPAN "R" AND SPAN "U" SIMILAR

FOR REINFORCING LAYOUT IN PEDESTRIAN RAILING CURB, VERTICAL CONCRETE BARRIER RAIL AND CONCRETE PARAPET, SEE "VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT" SHEETS AND "PEDESTRIAN RAILING RAIL POST SPACING AND PLAN OF CONCRETE CURB" SHEETS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 3 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

SPAN "O"

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : MAR 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

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REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-232
1			3			TOTAL SHEETS
2			4			278

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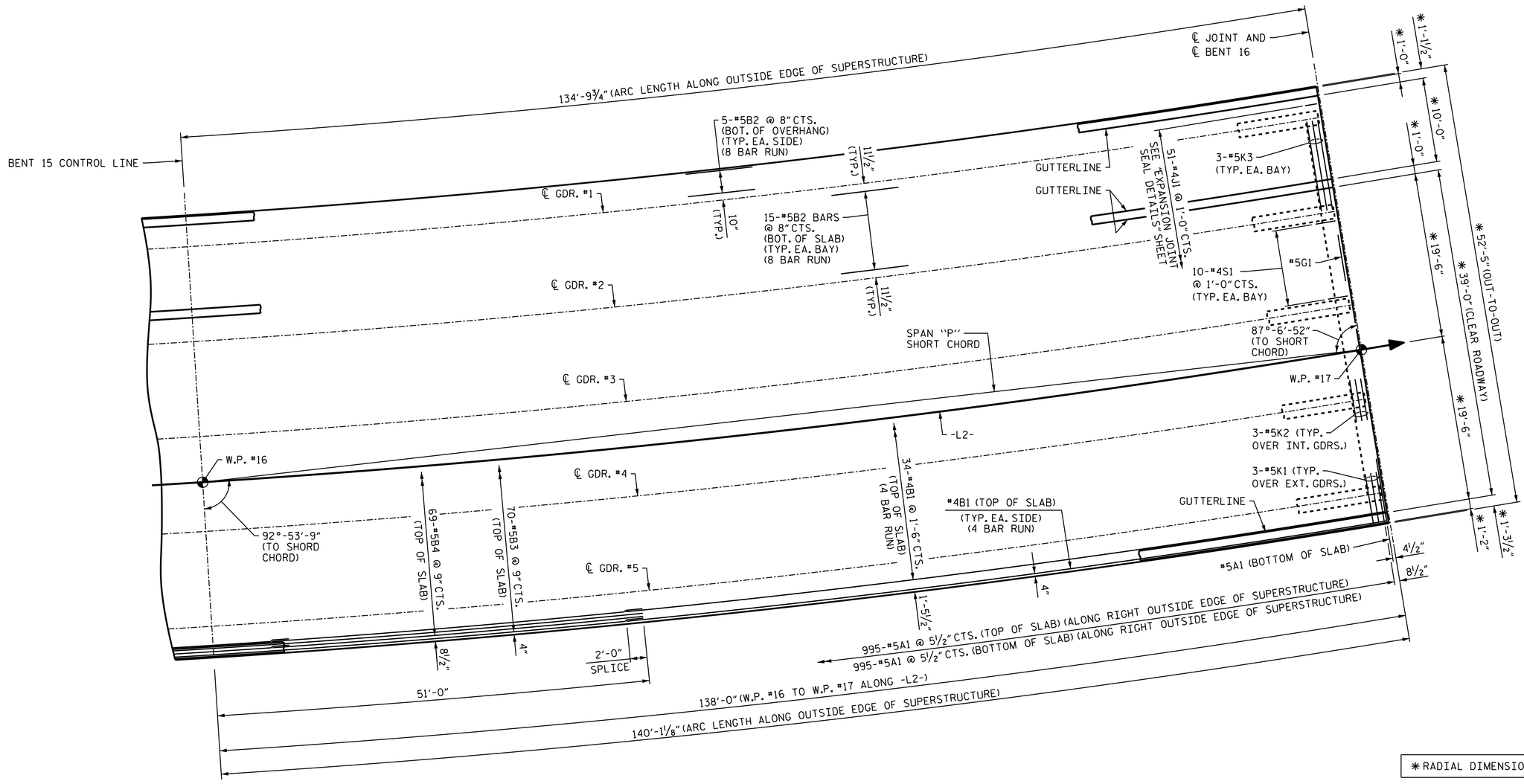

✳ RADIAL DIMENSIONS

PLAN OF SPAN "P"

SPAN "P" SHOWN, SPAN "S" AND SPAN "V" SIMILAR

FOR REINFORCING LAYOUT IN PEDESTRIAN RAILING CURB, VERTICAL CONCRETE BARRIER RAIL AND CONCRETE PARAPET, SEE "VERTICAL CONCRETE BARRIER RAIL, PARAPET AND RAIL POST LAYOUT" SHEETS AND "PEDESTRIAN RAILING RAIL POST SPACING AND PLAN OF CONCRETE CURB" SHEETS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 3 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III
C61628ED9C74BE...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

PLAN OF SPAN

SPAN "P"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-233
1			3			TOTAL SHEETS
2			4			278

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : MAR 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

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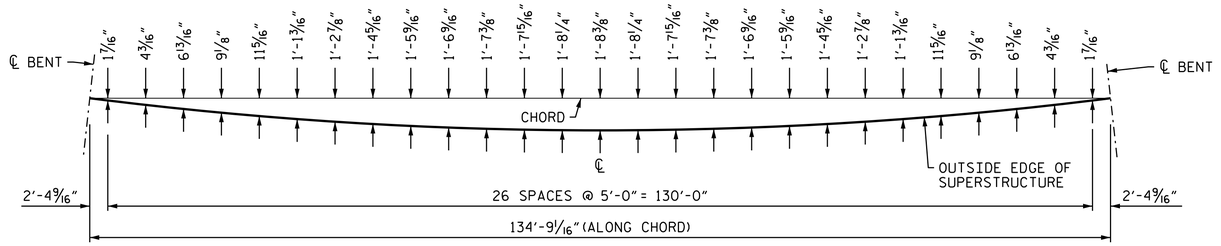
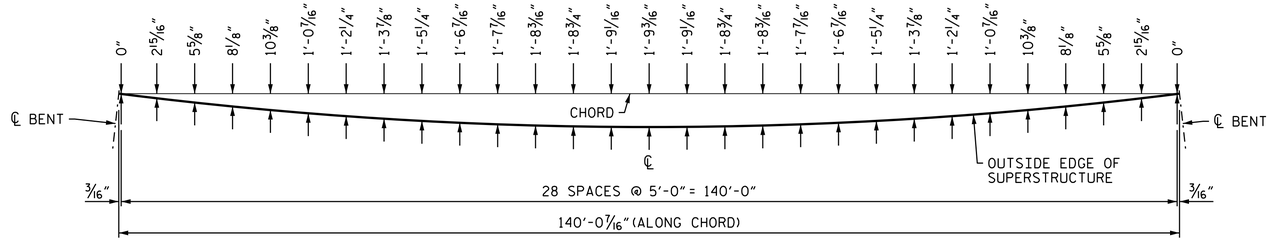


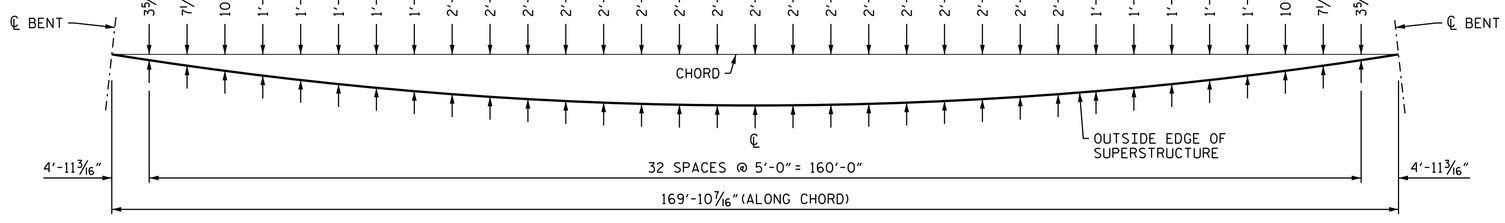
ARC OFFSETS (LEFT SIDE)

(SPANS "N", "P", "O", "S", "T" AND "V")



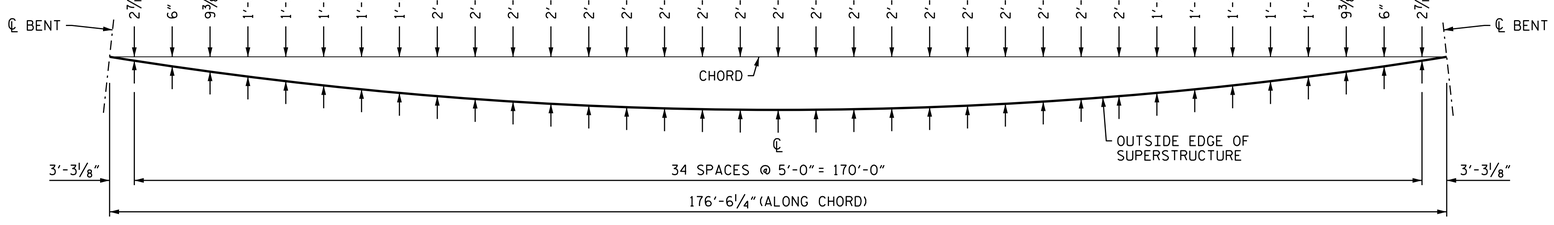
ARC OFFSETS (RIGHT SIDE)

(SPANS "N", "P", "O", "S", "T" AND "V")



ARC OFFSETS (LEFT SIDE)

(SPANS "O", "R" AND "U")



ARC OFFSETS (RIGHT SIDE)

(SPANS "O", "R" AND "U")

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III
C61628E0D9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

ARC OFFSETS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-234
1			3			TOTAL SHEETS
2			4			278

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

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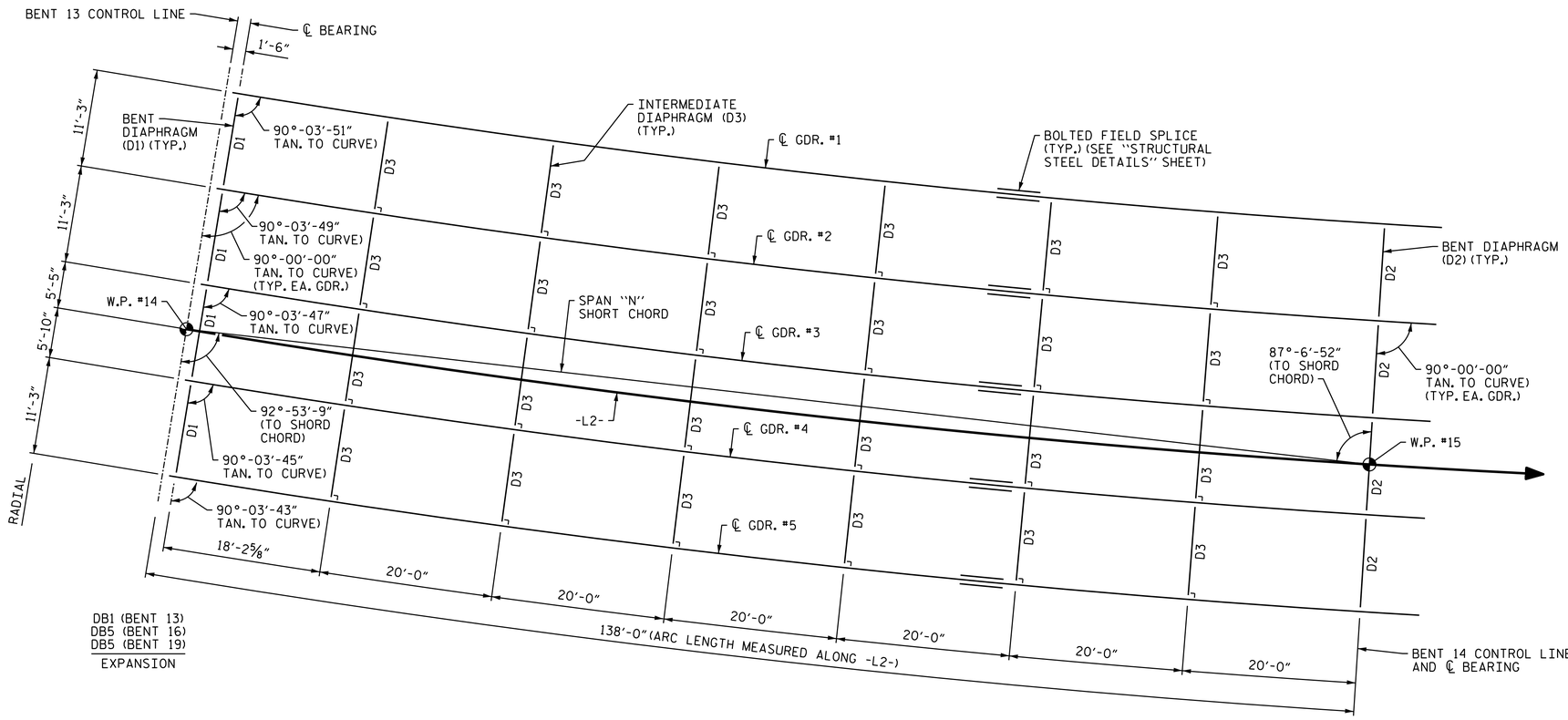

FRAMING PLAN - SPAN "N"

SPAN "N" SHOWN, SPAN "O" AND SPAN "T" SIMILAR

ALL DIAPHRAGM DIMENSIONS MEASURED RADIALLY ALONG OUTSIDE OF GIRDER #5

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 3 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III

C61628E0D9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

SPAN "N"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-235
1			3			TOTAL SHEETS
2			4			278

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. WHITE DATE : FEB 2016

CHECKED BY : T. H. CARROLL DATE : FEB 2016

DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

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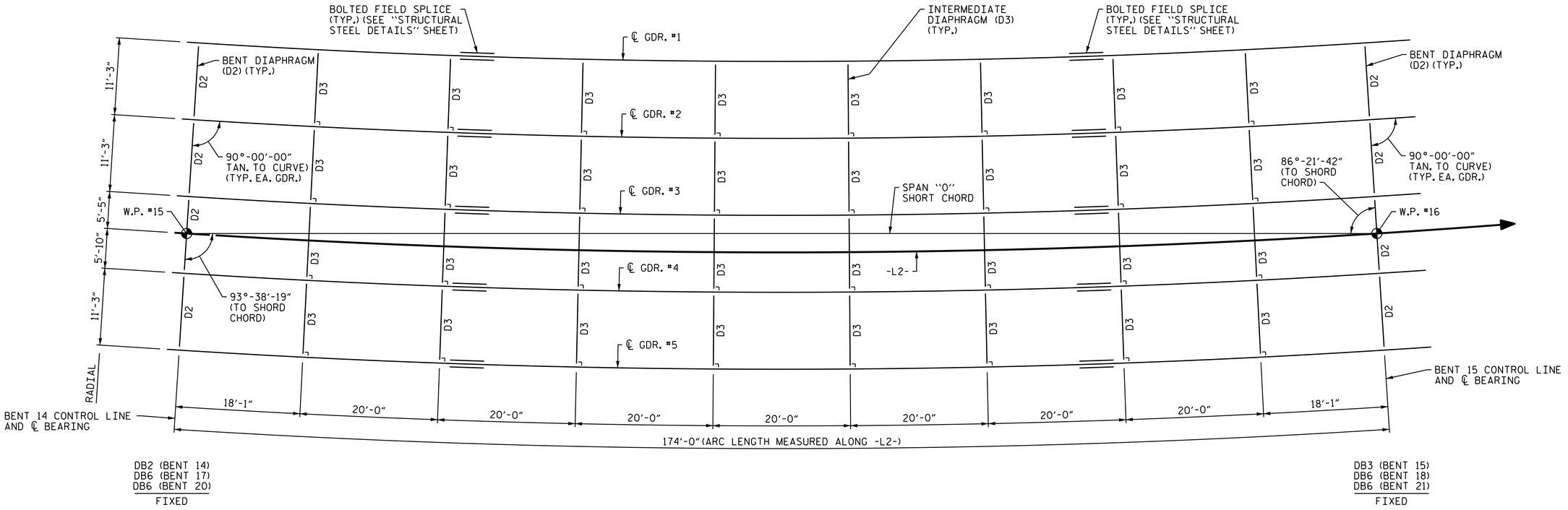

FRAMING PLAN - SPAN "O"

SPAN "O" SHOWN, SPAN "R" AND SPAN "U" SIMILAR

ALL DIAPHRAGM DIMENSIONS MEASURED RADIALLY ALONG OUTSIDE OF GIRDER #5

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 3 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III C61628E0D9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

SPAN "O"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-236
1			3			TOTAL SHEETS
2			4			278

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DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

01-JUN-2016 11:54
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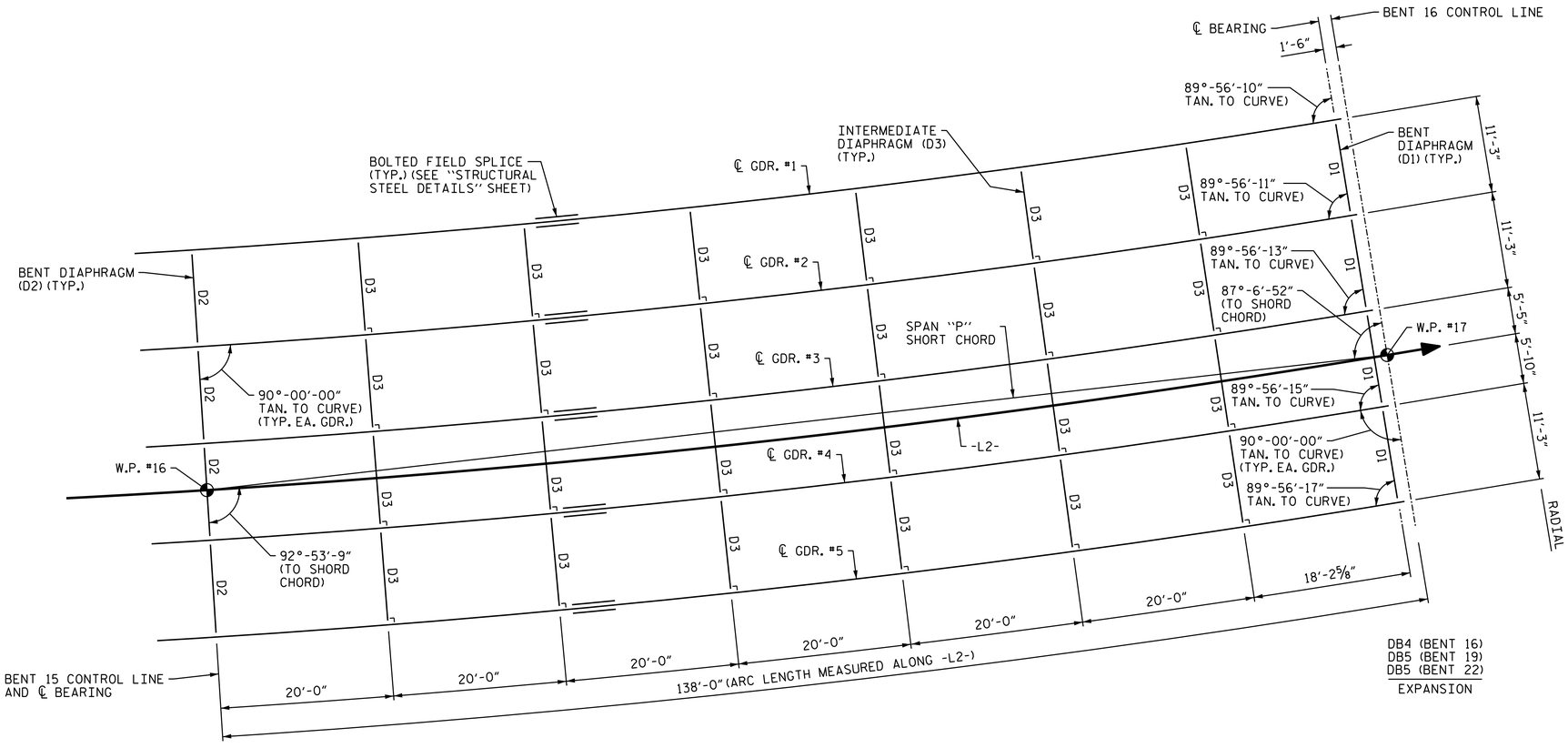
tbarrell



FRAMING PLAN - SPAN "P"

SPAN "P" SHOWN, SPAN "S" AND SPAN "V" SIMILAR

ALL DIAPHRAGM DIMENSIONS MEASURED RADIALLY ALONG OUTSIDE OF GIRDER #5

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 3 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL, III

DocuSigned by: Trey H. Carroll III

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

FRAMING PLAN

SPAN "P"

REVISIONS						SHEET NO.
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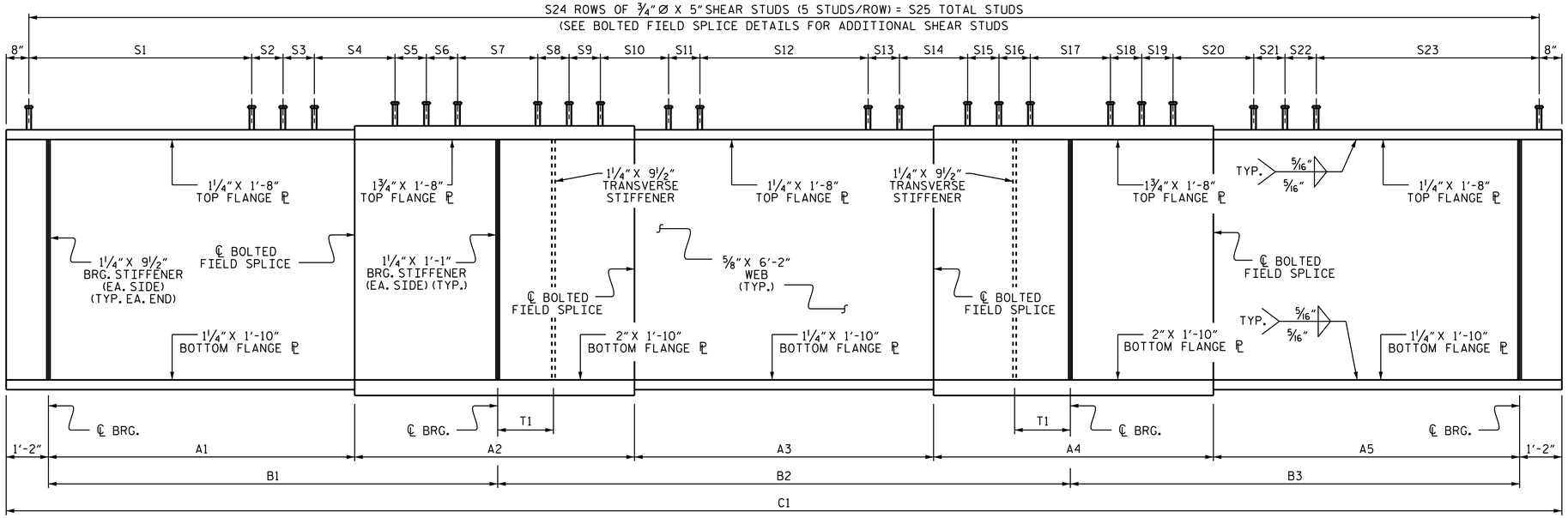
thorsell

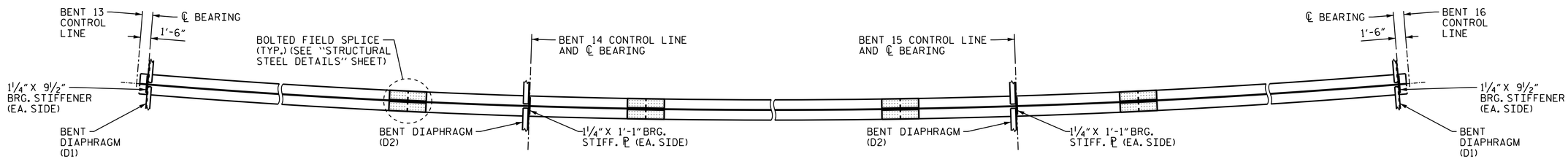
SHEAR STUD SPACINGS

GIRDER	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25
1	89 ROWS @ 1'-0"	10½"	10½"	3'-8⅛"	9"	9"	93 ROWS @ 10"	9"	9"	3'-7⅞"	8"	73 ROWS @ 1'-2"	8"	3'-7⅞"	9"	9"	93 ROWS @ 10"	9"	9"	3'-8⅛"	10½"	10½"	89 ROWS @ 1'-0"	451	2255
2	90 ROWS @ 1'-0"	9½"	9½"	3'-7¾"	9"	9"	94 ROWS @ 10"	8"	8"	3'-7⅜"	1'-1"	73 ROWS @ 1'-2"	1'-1"	3'-7⅜"	8"	8"	94 ROWS @ 10"	9"	9"	3'-7¾"	9½"	9½"	90 ROWS @ 1'-0"	455	2275
3	91 ROWS @ 1'-0"	8"	8"	3'-7¾"	9½"	9½"	95 ROWS @ 10"	7"	7"	3'-7 9⁄16"	10"	74 ROWS @ 1'-2"	10"	3'-7 9⁄16"	7"	7"	95 ROWS @ 10"	9½"	9½"	3'-7¾"	8"	8"	91 ROWS @ 1'-0"	460	2300
4	92 ROWS @ 1'-0"	6½"	6½"	3'-7⅝"	7½"	7½"	96 ROWS @ 10"	8"	8"	3'-8⅛"	1'-2"	74 ROWS @ 1'-2"	1'-2"	3'-8⅛"	8"	8"	96 ROWS @ 10"	7½"	7½"	3'-7⅝"	6½"	6½"	92 ROWS @ 1'-0"	464	2320
5	92 ROWS @ 1'-0"	11½"	11½"	3'-7⅛"	10"	10"	96 ROWS @ 10"	10"	10"	3'-7½"	1'-0"	75 ROWS @ 1'-2"	1'-0"	3'-7½"	10"	10"	96 ROWS @ 10"	10"	10"	3'-7⅛"	11½"	11½"	92 ROWS @ 1'-0"	465	2325



GIRDER ELEVATION

HORIZONTAL DIMENSIONS ARE MEASURED ALONG ARC



BOTTOM FLANGE DETAIL

GIRDER	RADIUS	GIRDER DIMENSIONS A1	A2	A3	A4	A5	B1	B2	B3	C1
1	1342'-1"	91'-1⅜"	83'-3½"	89'-0¼"	83'-3½"	91'-1⅜"	133'-8¼"	170'-5½"	133'-8¼"	440'-2"
2	1353'-4"	91'-10 11⁄16"	83'-11⅞"	89'-9⅛"	83'-11⅞"	91'-10 11⁄16"	134'-9 13⁄16"	171'-10⅝"	134'-9 13⁄16"	443'-10¼"
3	1364'-7"	92'-8"	84'-8¼"	90'-6⅛"	84'-8¼"	92'-8"	135'-11 11⁄16"	173'-3¾"	135'-11 11⁄16"	447'-6⅝"
4	1375'-10"	93'-5⅜"	85'-4⅝"	91'-3"	85'-4⅝"	93'-5⅜"	137'-1 11⁄16"	174'-8⅞"	137'-1 11⁄16"	451'-3"
5	1387'-1"	94'-2⅝"	86'-1"	92'-0"	86'-1"	94'-2⅝"	138'-2⅝"	176'-2"	138'-2⅝"	454'-11¼"

GIRDER	TRANSVERSE STIFFENER LOCATIONS T1
1	---
2	---
3	---
4	---
5	18'-1"

NOTES:

GIRDERS ARE NUMBERED FROM LEFT TO RIGHT (LOOKING UPSTATION).

THERE ARE 5 STUDS PER ROW.

PLACE TRANSVERSE STIFFENERS ON THE INSIDE OF WEB FOR EXTERIOR GIRDERS.

NO TRANSVERSE STIFFENER REQUIRED AT LOCATIONS MARKED AS "----".

SPANS "N", "O", AND "P" SHOWN, SPANS "Q", "R", "S" AND "T", "U", "V" SIMILAR.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 4 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER T. H. CARROLL III

DocuSigned by: Trey H. Carroll III C61628E0D9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS NO.	BY:	DATE:	NO.	BY:	DATE:	SHEET NO.
1			3			S-238
2			4			TOTAL SHEETS 278

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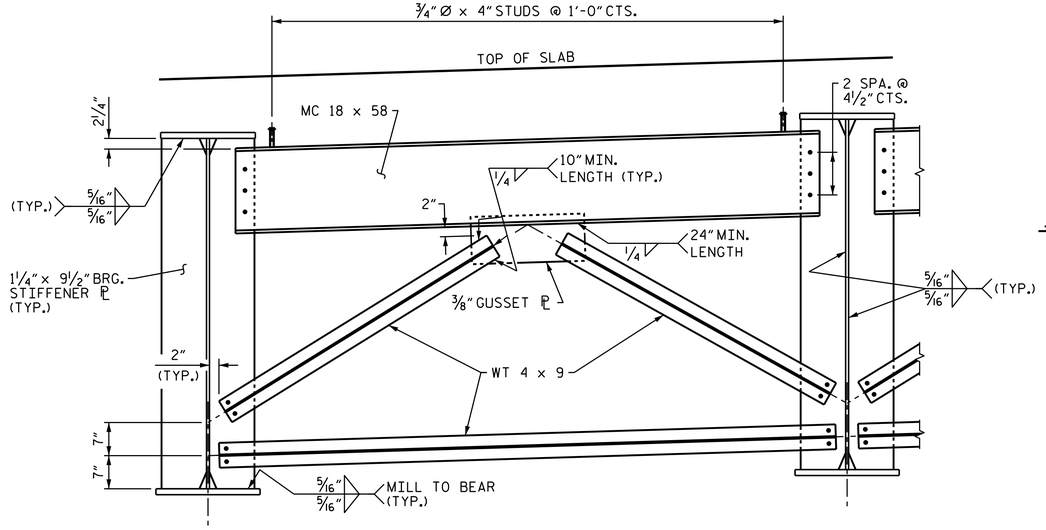
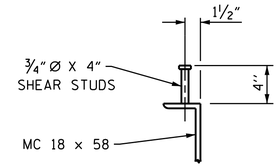
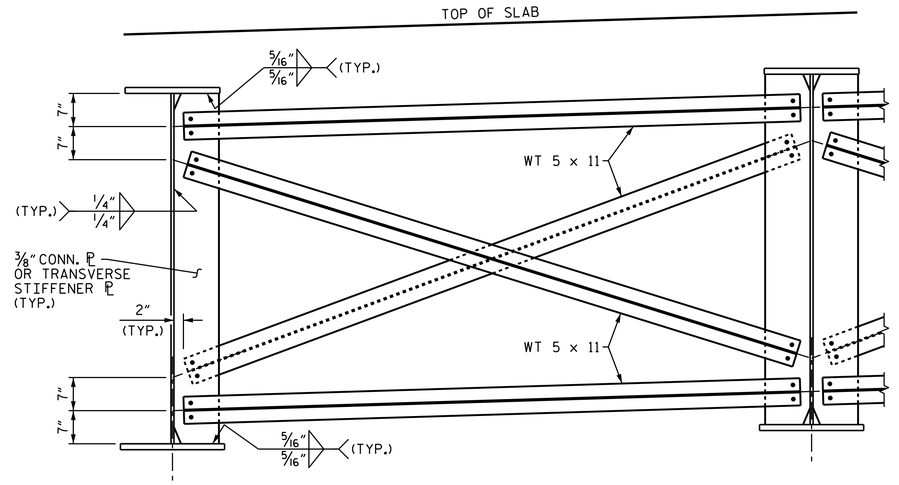
tbcarroll



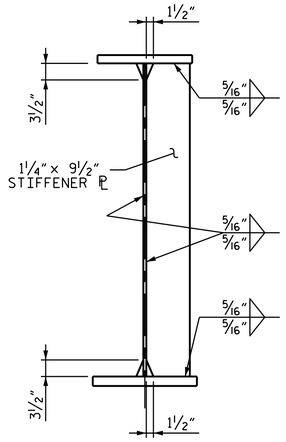
BENT DIAPHRAGM (D1)



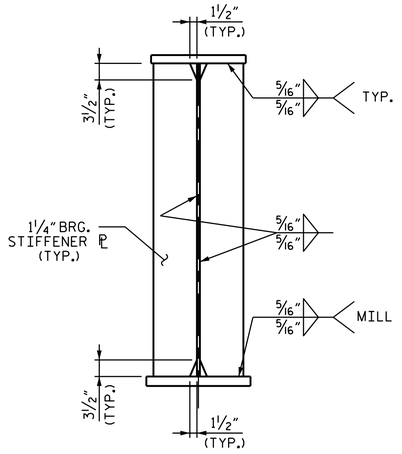
SHEAR STUD DETAIL



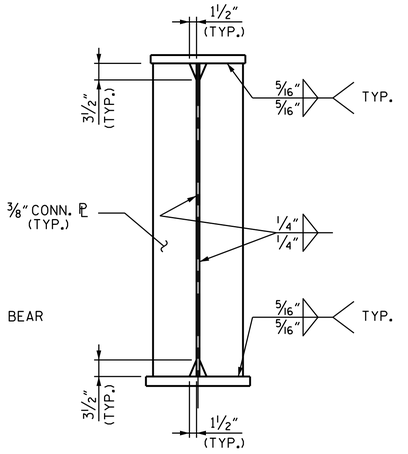
INTERMEDIATE DIAPHRAGM (D3)



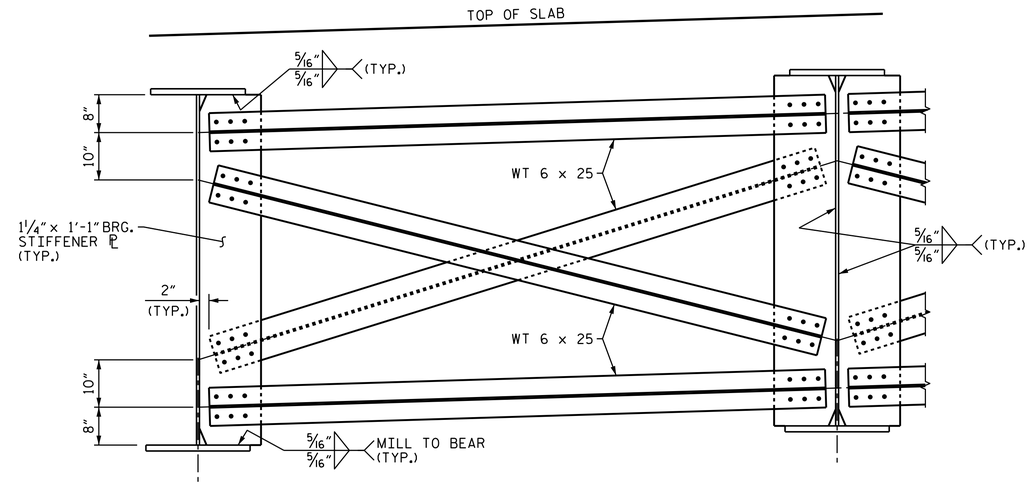
TRANSVERSE STIFFENER



BEARING STIFFENER



CONNECTOR PLATE



BENT DIAPHRAGM (D2)

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 4 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III
C61628E0D9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-239
1			3			TOTAL SHEETS
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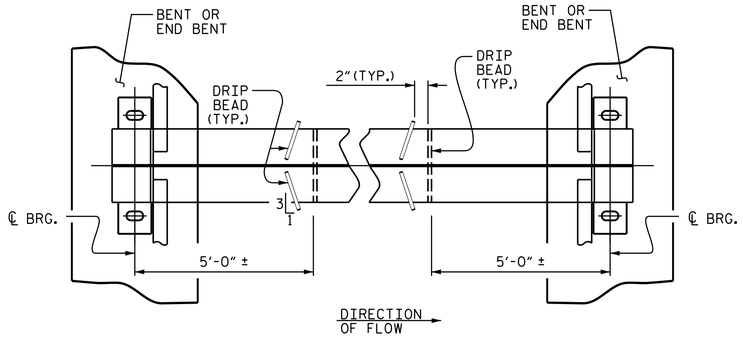
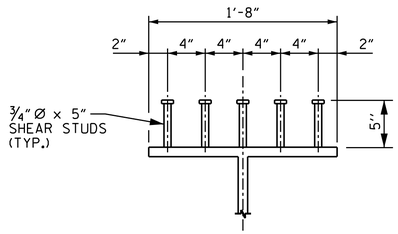
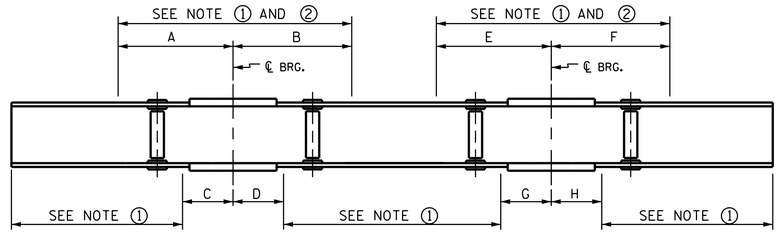
theorell



PART PLAN - BOTTOM FLANGE



SHEAR STUD DETAILS



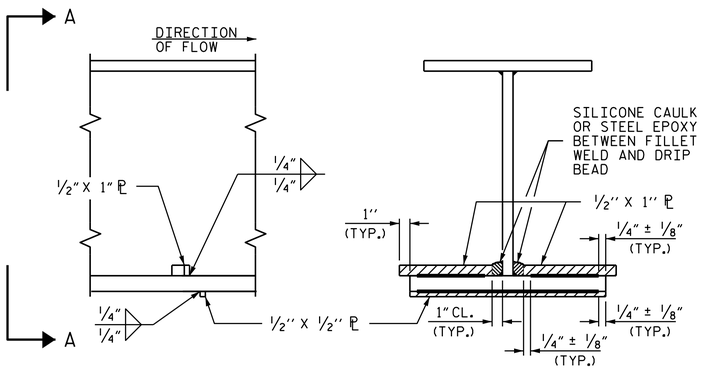
GIRDER	DIMENSIONS							
	A	B	C	D	E	F	G	H
1	40'-8"	38'-8"	32'-0"	31'-2"	38'-8"	40'-6"	31'-2"	32'-0"
2	40'-8"	38'-9"	33'-2"	32'-6"	38'-9"	40'-6"	32'-6"	33'-2"
3	41'-4"	39'-3"	33'-2"	32'-4"	39'-3"	41'-2"	32'-4"	33'-2"
4	46'-7"	39'-10"	33'-0"	31'-11"	39'-10"	41'-11"	31'-11"	33'-0"
5	50'-8"	43'-9"	33'-2"	31'-10"	43'-9"	49'-10"	31'-10"	33'-2"

*GIRDERS ARE NUMBERED FROM LEFT TO RIGHT (LOOKING UPSTATION)

NOTE 1 : CHARPY V-NOTCH TESTS ARE REQUIRED FOR ALL TOP OR BOTTOM FLANGE PLATES WHICH FALL WITHIN THESE LIMITS, ALL WEB PLATES, AND ALL SPLICE PLATES. IF A PERMITTED SHOP FLANGE SPLICE IS NOT USED, CHARPY V-NOTCH TESTS WILL BE REQUIRED FOR THE ENTIRE FLANGE PLATE. FOR CHARPY V-NOTCH TESTS, SEE ARTICLE 1072-7 OF THE STANDARD SPECIFICATIONS.

NOTE 2 : NO WELDING OF FORMS OR FALSEWORK TO THE TOP FLANGE WILL BE PERMITTED IN THIS REGION

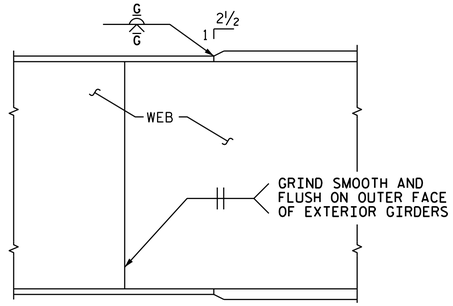
CHARPY V-NOTCH TESTS FOR CONTINUOUS PLATE GIRDERS



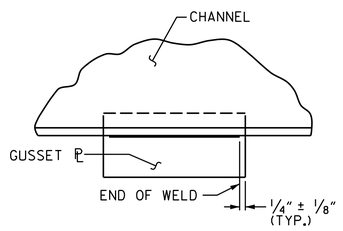
SECTION

VIEW A-A

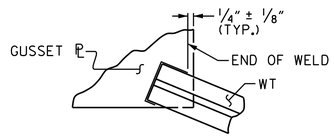
DRIP BEAD DETAILS



TYPICAL FLANGE AND WEB BUTT JOINT



TYPICAL GUSSET PLATE CONNECTION



TYPICAL "TEE" TO GUSSET PLATE CONNECTION

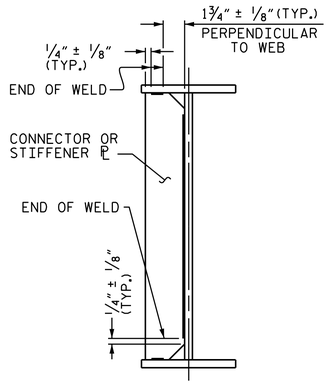


PLATE GIRDER

TYPICAL STIFFENER OR CONNECTOR PLATE CONNECTIONS

WELD TERMINATION DETAILS

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 4 STEEL ALTERNATE

6/2/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-240
1			3			TOTAL SHEETS
2			4			278

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DRAWN BY : K. WHITE DATE : FEB 2016
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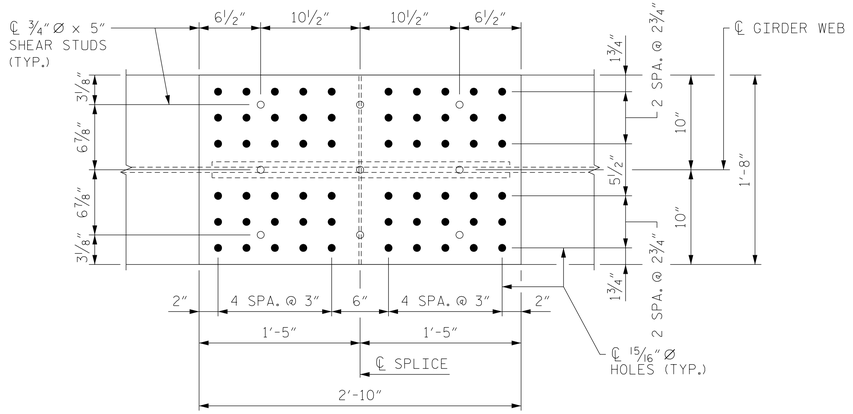
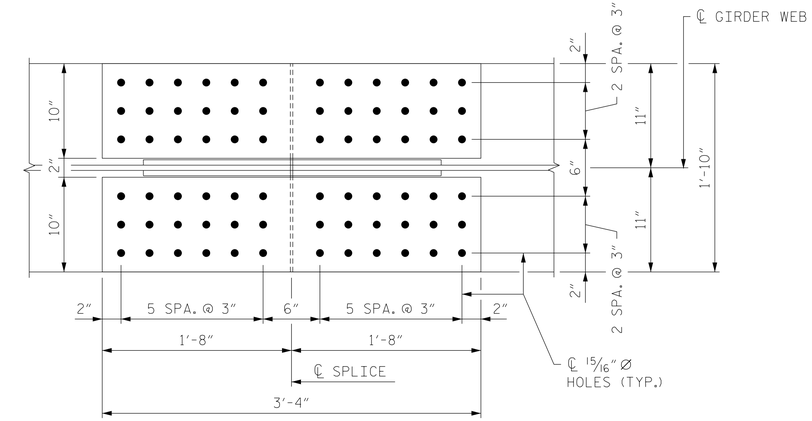
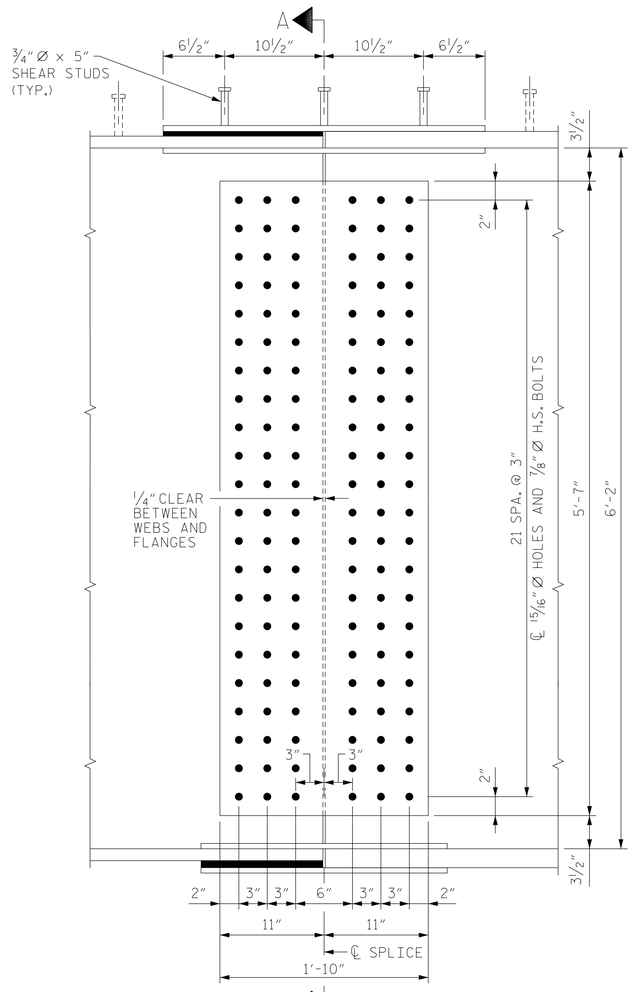
$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$



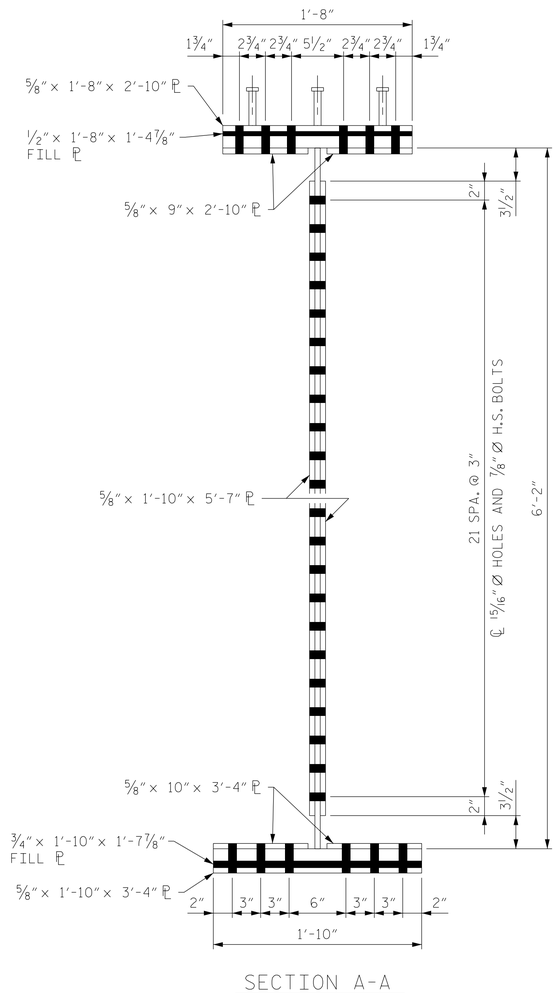
PLAN (TOP OF TOP FLANGE)



PLAN (TOP OF BOTTOM FLANGE)



ELEVATION



SECTION A-A

NOTES:

ALL STRUCTURAL STEEL, INCLUDING BEARINGS, SHALL BE ASTM A1010 GRADE 50 AND SHALL BE BID AS LUMP SUM COST. FOR INFORMATION PURPOSES, THE PROJECT ENTAILS ROUGHLY 906,832 LBS OF STRUCTURAL STEEL TO BE CONFIRMED BY THE FABRICATOR. ALL STRUCTURAL STEEL SHALL BE UNPAINTED.

FOR A1010 STRUCTURAL STEEL, SEE SPECIAL PROVISIONS.

ALL DIMENSIONS SHOWN ARE HORIZONTAL OR VERTICAL, UNLESS OTHERWISE NOTED.

ALL FIELD CONNECTIONS TO BE 7/8" DIA. HIGH STRENGTH BOLTS UNLESS OTHERWISE NOTED.

BEARING STIFFENERS ARE TO BE PLACED NORMAL TO THE WEB OF THE GIRDER AND SHALL BE PLUMB.

CAMBERED GIRDER LENGTHS SHALL BE ADJUSTED AND BEARINGS ARE TO BE PLACED ON THE CAMBERED GIRDER SO AS TO BE ALIGNED WITH THE ANCHORS AFTER THE DEAD LOAD DEFLECTION HAS OCCURRED. SHOP DRAWINGS SHALL BE PREPARED ACCORDINGLY.

SHOP SPLICES ARE PERMITTED TO LIMIT THE MAXIMUM REQUIRED FLANGE PIECE LENGTHS TO 60 FEET AND WEB PIECE LENGTHS TO 45 FEET. PERMITTED FLANGE AND WEB SHOP SPLICES SHALL NOT BE LOCATED WITHIN 15 FEET OF MAXIMUM DEAD LOAD DEFLECTION NOR WITHIN 15 FEET OF INTERMEDIATE BEARINGS OF CONTINUOUS UNITS. KEEP 2 FEET MINIMUM BETWEEN WEB AND FLANGE SHOP SPLICES.

STUDS ON GIRDERS MAY BE SHIFTED UP TO 1" IF NECESSARY TO CLEAR FLANGE SPLICE WELD.

END OF GIRDERS SHALL BE PLUMB.

✳ NOTE: SHEAR STUDS ARE TO BE SHOP WELDED ON TOP OF PLATE BEFORE FIELD ASSEMBLY.

SHEAR STUD DETAIL
FOR TOP FLANGE SPLICE PLATE

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 4 STEEL ALTERNATE

6/2/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

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C61628E0D9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUPERSTRUCTURE

STRUCTURAL STEEL DETAILS

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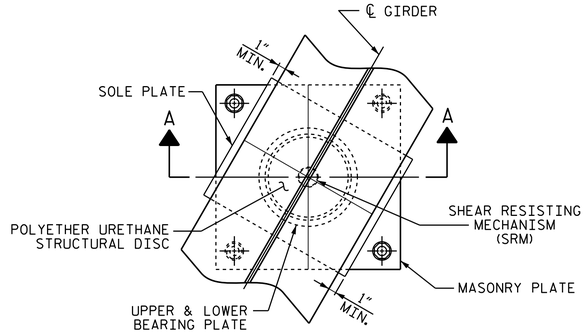
1			3			TOTAL SHEETS
2			4			278

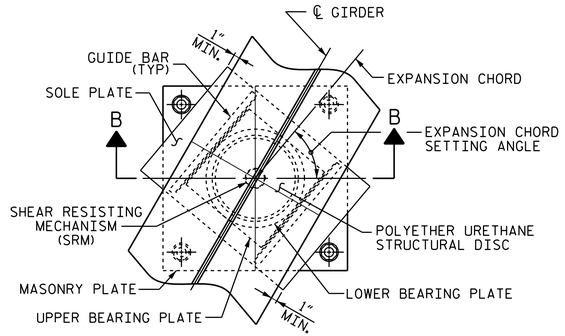
BOLTED FIELD SPLICE DETAILS

(TYPICAL EACH FIELD SPLICE)

$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$



PLAN



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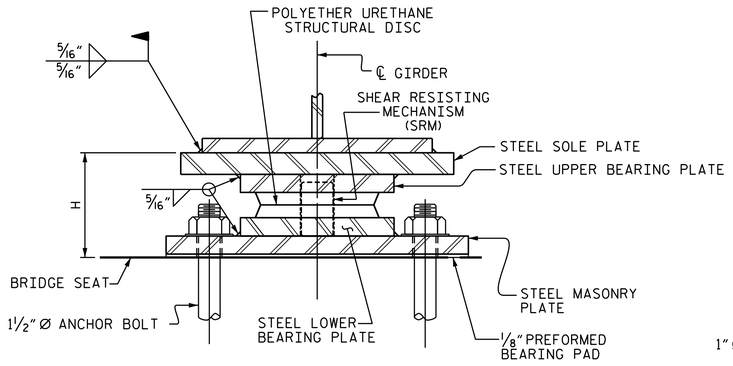
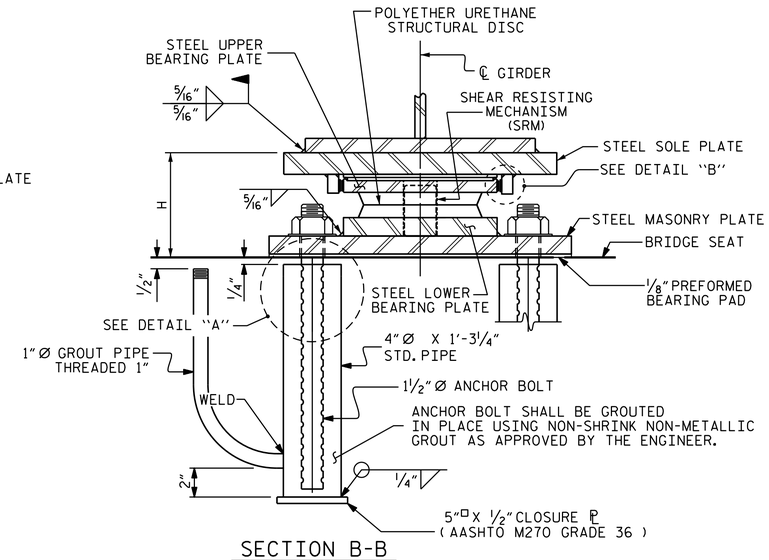


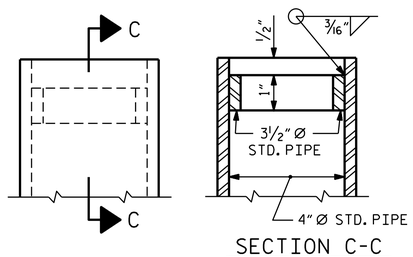
SECTION A-A

DB2, DB3, DB6 FIXED



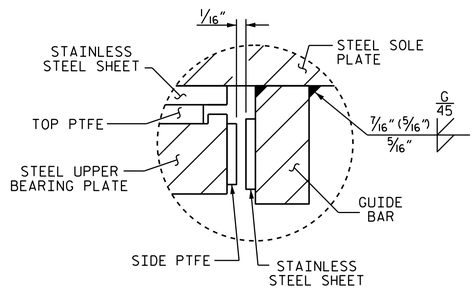
SECTION B-B

DB1, DB4, DB5 EXP.



SECTION C-C

DETAIL "A"



DETAIL "B"

NOTES

FOR DISC BEARINGS, SEE SPECIAL PROVISIONS.

ALL BEARING PLATES SHALL BE AASHTO M270 GRADE 50W OR GRADE 50.

AT ALL POINTS OF SUPPORT, NUTS FOR ANCHOR BOLTS SHALL BE FINGER-TIGHTENED PLUS AN ADDITIONAL ¼ TURN. THE THREAD OF THE NUT AND BOLT SHALL THEN BE BURRED WITH A SHARP POINTED TOOL.

WHEN WELDING THE SOLE PLATE TO THE GIRDER, USE TEMPERATURE INDICATING WAX PENS, OR OTHER SUITABLE MEANS, TO ENSURE THAT THE TEMPERATURE OF THE BEARING DOES NOT EXCEED 250°F. TEMPERATURES ABOVE THIS MAY DAMAGE THE TFE OR URETHANE DISC.

AFTER BEARING ASSEMBLY IS IN PLACE AND ANCHOR BOLTS HAVE BEEN FINALLY POSITIONED, THEY SHALL BE GROUTED IN PLACE AS SHOWN.

THE CLOSURE PLATE, GROUT PIPE, AND STANDARD PIPE FOR THIS ASSEMBLY NEED NOT BE GALVANIZED.

SOLE PLATES SHOULD BE WELDED TO GIRDER FLANGES AND ANCHOR BOLTS SHOULD BE GROUTED BEFORE FALSEWORK IS PLACED.

ALL SURFACES OF BEARING PLATES SHALL BE SMOOTH AND STRAIGHT.

FOR ATTACHMENT OF THE STAINLESS STEEL SHEETS TO THE STEEL SOLE PLATE AND GUIDE BARS, AS WELL AS THE TOP AND SIDE PTFE SHEETS TO THE STEEL UPPER BEARING PLATE, SEE SPECIAL PROVISIONS.

FOR THERMAL SPRAYED COATINGS (METALLIZATION), SEE SPECIAL PROVISIONS.

THE MINIMUM ROTATIONAL CAPACITY FOR ALL BEARINGS SHALL BE 0.02 RADIANS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 2 STEEL ALTERNATE

ASSEMBLED BY : T. H. CARROLL	DATE : 12/15/15
CHECKED BY : T. R. PETERSON	DATE : 12/17/15
DRAWN BY : TMG 08/13	REV.
CHECKED BY : EKP 10/13	REV.
	REV.

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III C61628E0D9C74BE...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

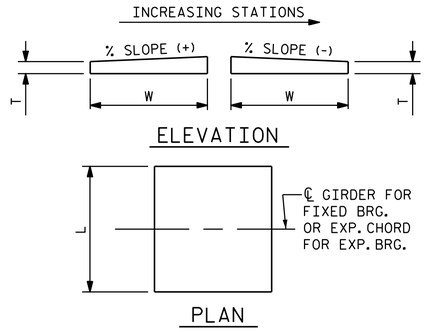
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

DISC BEARING DETAILS

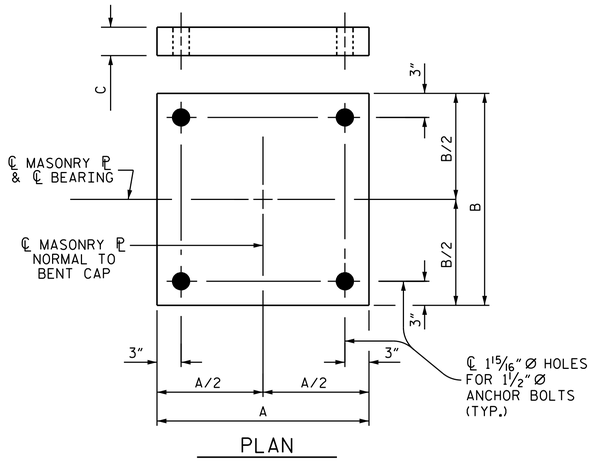
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-242
1			3			TOTAL SHEETS
2			4			278

STD. NO. DB1 (SHT 2)



NOTE:
DIMENSIONS "L", "W", AND "T" SHALL BE DETERMINED BY THE BEARING MANUFACTURER. SET DIMENSION "L" SUCH THAT THE MINIMUM EDGE DISTANCE TO THE GIRDER FLANGE IS 1".

SOLE PLATE DETAILS



MASONRY PLATE DETAILS

BEARINGS	LOCATION	NUMBER OF BEARINGS	DIMENSIONS					LOADS AND MOVEMENT				
			BEARING	MASONRY PLATE			SOLE PLATE	UNFACTORED VERTICAL LOAD (KIPS)			FACTORED HORIZONTAL LOAD (KIPS)	ONE-WAY MOVEMENT (IN.)
			H (IN.)	A (IN.)	B (IN.)	C (IN.)	TOP SLOPE (%)	DEAD DC	DEAD DW	LIVE LL+IM		
DB1 (EXP.)	BENT 13	5	8"	25½"	25½"	¾"	+3.40%	108	16	111	45	1¾"
DB2 (FIXED)	BENT 14	5	8 11/16"	26½"	26½"	1"	+2.42%	399	54	234	143	0
DB3 (FIXED)	BENT 15	5	8 7/16"	26½"	26½"	1"	-0.42%	399	54	234	143	0
DB4 (EXP.)	BENT 16	5	7 13/16"	25½"	25½"	¾"	-1.90%	108	16	111	45	1¾"
DB5 (EXP.)	BENT 16	5	8"	25½"	25½"	¾"	-3.40%	108	16	111	45	1¾"
DB6 (FIXED)	BENT 17	5	8 13/16"	26½"	26½"	1"	-3.42%	399	54	234	143	0
DB6 (FIXED)	BENT 18	5	8 13/16"	26½"	26½"	1"	-3.42%	399	54	234	143	0
DB5 (EXP.)	BENT 19	5	8"	25½"	25½"	¾"	-3.40%	108	16	111	45	1¾"
DB5 (EXP.)	BENT 19	5	8"	25½"	25½"	¾"	-3.40%	108	16	111	45	1¾"
DB6 (FIXED)	BENT 20	5	8 13/16"	26½"	26½"	1"	-3.42%	399	54	234	143	0
DB6 (FIXED)	BENT 21	5	8 13/16"	26½"	26½"	1"	-3.42%	399	54	234	143	0
DB5 (EXP.)	BENT 22	5	8"	25½"	25½"	¾"	-3.40%	108	16	111	45	1¾"

EXPANSION CHORD SETTING ANGLES

(EXPANSION DISC BEARINGS)

GIRDER	LOCATION					
	BENT 13	BENT 16		BENT 19		BENT 22
	FAR	NEAR	FAR	NEAR	FAR	NEAR
1	92°55'-04"	87°-04'-56"	92°55'-04"	87°-04'-56"	92°55'-04"	87°-04'-56"
2	92°55'-03"	87°-04'-57"	92°55'-03"	87°-04'-57"	92°55'-03"	87°-04'-57"
3	92°55'-02"	87°-04'-58"	92°55'-02"	87°-04'-58"	92°55'-02"	87°-04'-58"
4	92°55'-01"	87°-04'-59"	92°55'-01"	87°-04'-59"	92°55'-01"	87°-04'-59"
5	92°55'-00"	87°-05'-00"	92°55'-00"	87°-05'-00"	92°55'-00"	87°-05'-00"

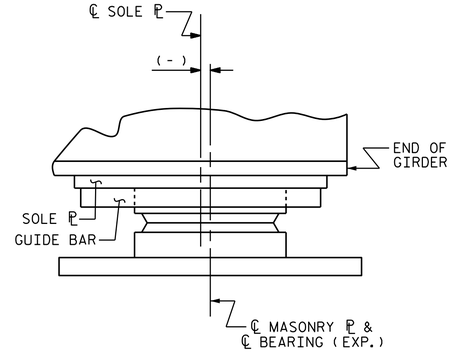
PLATE SETTING DATA

(EXPANSION DISC BEARINGS)

LOCATION	TEMPERATURE AT TIME OF SETTING			*
	45° F	60° F	90° F	
@ BENT 13	-¼"	0"	9/16"	-¼"
@ BENT 16	-¼"	0"	9/16"	-¼"
@ BENT 19	-¼"	0"	9/16"	-¼"
@ BENT 22	-¼"	0"	9/16"	-¼"

* CORRECTION FOR END ROTATION DUE TO WEIGHT OF SLAB AND COMPOSITE DEAD LOAD.

TEMPERATURE SETTING DETAIL



PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 2 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III
C61628E0D9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STANDARD

DISC BEARING DETAILS

ASSEMBLED BY : T. H. CARROLL	DATE : 12/15/15
CHECKED BY : T. R. PETERSON	DATE : 12/17/15
DRAWN BY : TMG 08/13	REV.
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-243
1			3			TOTAL SHEETS
2			4			278

STD. NO. DB1 (SHT 2)

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN "N" - GIRDER 1																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.006	0.010	0.015	0.019	0.022	0.025	0.026	0.027	0.027	0.026	0.024	0.021	0.018	0.015	0.011	0.008	0.004	0.002	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.022	0.041	0.059	0.075	0.088	0.097	0.103	0.106	0.105	0.100	0.093	0.082	0.070	0.056	0.042	0.029	0.017	0.008	0.003	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.004	0.005	0.007	0.008	0.009	0.010	0.010	0.010	0.010	0.009	0.008	0.007	0.006	0.004	0.003	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.030	0.055	0.079	0.101	0.118	0.131	0.139	0.143	0.142	0.136	0.126	0.111	0.095	0.077	0.057	0.040	0.023	0.011	0.004	0.000
VERTICAL CURVE ORDINATE	0.000	0.024	0.049	0.073	0.097	0.122	0.146	0.170	0.195	0.219	0.242	0.257	0.264	0.261	0.250	0.230	0.202	0.164	0.118	0.064	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	5/8	1 1/4	1 13/16	2 3/8	2 7/8	3 5/16	3 11/16	4 1/16	4 5/16	4 3/16	4 5/8	4 1/2	4 1/4	3 15/16	3 7/16	2 7/8	2 1/4	1 9/16	1 3/16	0
	SPAN "N" - GIRDER 2																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.006	0.011	0.016	0.021	0.024	0.027	0.028	0.029	0.029	0.028	0.026	0.023	0.019	0.016	0.012	0.008	0.005	0.002	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.024	0.046	0.066	0.084	0.099	0.109	0.116	0.119	0.117	0.113	0.104	0.092	0.079	0.063	0.048	0.033	0.019	0.010	0.003	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.004	0.006	0.007	0.009	0.010	0.010	0.011	0.011	0.010	0.009	0.009	0.007	0.006	0.005	0.003	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.032	0.061	0.088	0.112	0.132	0.146	0.154	0.159	0.157	0.151	0.139	0.124	0.105	0.085	0.065	0.044	0.026	0.013	0.004	0.000
VERTICAL CURVE ORDINATE	0.000	0.024	0.049	0.073	0.097	0.122	0.146	0.170	0.195	0.219	0.242	0.257	0.264	0.261	0.250	0.230	0.202	0.164	0.118	0.064	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/16	1 5/16	1 15/16	2 1/2	3 1/16	3 1/2	3 7/8	4 1/4	4 1/2	4 11/16	4 3/4	4 5/8	4 3/8	4	3 9/16	2 15/16	2 1/4	1 9/16	1 3/16	0
	SPAN "N" - GIRDER 3																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.006	0.012	0.017	0.022	0.026	0.028	0.030	0.031	0.031	0.029	0.027	0.024	0.021	0.017	0.013	0.009	0.005	0.003	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.026	0.050	0.071	0.091	0.106	0.117	0.124	0.127	0.126	0.121	0.112	0.099	0.085	0.068	0.051	0.036	0.021	0.011	0.004	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.004	0.006	0.008	0.009	0.010	0.011	0.011	0.011	0.011	0.010	0.009	0.008	0.006	0.005	0.003	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.034	0.066	0.094	0.121	0.141	0.155	0.165	0.169	0.168	0.161	0.149	0.132	0.114	0.091	0.069	0.048	0.028	0.015	0.005	0.000
VERTICAL CURVE ORDINATE	0.000	0.024	0.049	0.073	0.097	0.122	0.146	0.170	0.195	0.219	0.242	0.257	0.264	0.261	0.250	0.230	0.202	0.164	0.118	0.064	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/16	1 3/8	2	2 5/8	3 1/8	3 5/8	4	4 3/8	4 5/8	4 13/16	4 7/8	4 3/4	4 1/2	4 1/16	3 9/16	3	2 5/16	1 5/8	1 3/16	0
	SPAN "N" - GIRDER 4																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.007	0.013	0.018	0.023	0.027	0.030	0.032	0.033	0.032	0.031	0.029	0.026	0.022	0.018	0.013	0.009	0.005	0.003	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.027	0.052	0.075	0.095	0.111	0.123	0.130	0.133	0.132	0.127	0.117	0.104	0.089	0.071	0.054	0.037	0.022	0.011	0.004	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.005	0.007	0.008	0.010	0.011	0.012	0.012	0.012	0.011	0.011	0.010	0.008	0.007	0.005	0.003	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.036	0.070	0.100	0.126	0.148	0.164	0.174	0.178	0.176	0.169	0.157	0.140	0.119	0.096	0.072	0.049	0.029	0.015	0.005	0.000
VERTICAL CURVE ORDINATE	0.000	0.024	0.049	0.073	0.097	0.122	0.146	0.170	0.195	0.219	0.242	0.257	0.264	0.261	0.250	0.230	0.202	0.164	0.118	0.064	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	3/4	1 7/16	2 1/16	2 11/16	3 1/4	3 3/4	4 1/8	4 1/2	4 3/4	4 15/16	4 15/16	4 7/8	4 9/16	4 1/8	3 5/8	3	2 5/16	1 5/8	1 3/16	0
	SPAN "N" - GIRDER 5																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.007	0.014	0.020	0.025	0.029	0.032	0.034	0.035	0.035	0.033	0.031	0.027	0.023	0.019	0.014	0.010	0.006	0.003	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.028	0.054	0.077	0.098	0.115	0.127	0.135	0.138	0.137	0.131	0.120	0.107	0.091	0.073	0.055	0.038	0.022	0.011	0.004	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.003	0.005	0.007	0.009	0.011	0.012	0.013	0.013	0.013	0.012	0.011	0.010	0.009	0.007	0.005	0.004	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.038	0.073	0.104	0.132	0.155	0.171	0.182	0.186	0.185	0.176	0.162	0.144	0.123	0.099	0.074	0.052	0.030	0.015	0.005	0.000
VERTICAL CURVE ORDINATE	0.000	0.024	0.049	0.073	0.097	0.122	0.146	0.170	0.195	0.219	0.242	0.257	0.264	0.261	0.250	0.230	0.202	0.164	0.118	0.064	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	3/4	1 7/16	2 1/8	2 3/4	3 5/16	3 13/16	4 1/4	4 9/16	4 7/8	5	5	4 7/8	4 5/8	4 3/16	3 5/8	3 1/16	2 5/16	1 5/8	1 3/16	0

NOTES:

SLOPE FOR ZERO CAMBER BASE LINE VARIES.

TWENTIETH POINTS SHOWN ARE MEASURED ALONG ℄ GIRDER FOR EACH GIRDER.

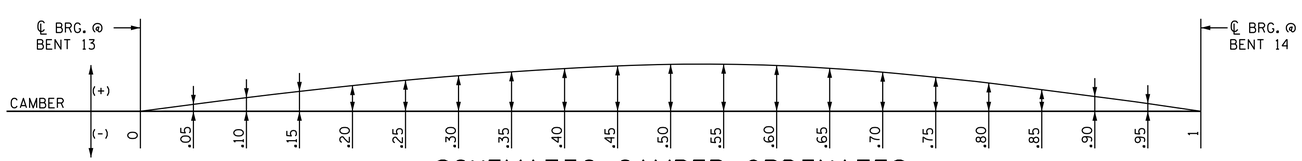
DOWNWARD DEFLECTIONS ARE SHOWN AS POSITIVE.

VERTICAL CURVE AND SUPERELEVATION ORDINATES THAT INCREASE CAMBER ARE SHOWN AS POSITIVE.

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

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.

** HEAT CURVING METHOD IS ALLOWED. CAMBER DISSIPATION RESULTING FROM HEAT CURVING IS ZERO FOR ALL GIRDERS.



SCHEMATIC CAMBER ORDINATES

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 9 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III C6162BED9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN "N"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-244
1			3			TOTAL SHEETS
2			4			278

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

01-JUN-2016 11:54
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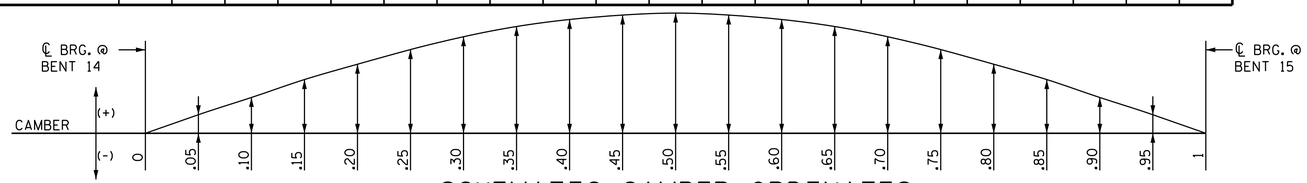
DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN "O" - GIRDER 1																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.005	0.010	0.016	0.021	0.027	0.031	0.035	0.037	0.038	0.037	0.035	0.031	0.027	0.021	0.016	0.010	0.005	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.008	0.020	0.039	0.060	0.082	0.102	0.120	0.134	0.142	0.145	0.142	0.134	0.120	0.102	0.082	0.060	0.039	0.020	0.008	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.005	0.007	0.010	0.012	0.014	0.015	0.016	0.017	0.016	0.015	0.014	0.012	0.010	0.007	0.005	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.011	0.028	0.054	0.083	0.113	0.141	0.165	0.184	0.195	0.200	0.195	0.184	0.165	0.141	0.113	0.083	0.054	0.028	0.011	0.000
VERTICAL CURVE ORDINATE	0.000	0.135	0.256	0.362	0.454	0.532	0.596	0.646	0.681	0.703	0.710	0.703	0.681	0.646	0.596	0.532	0.454	0.362	0.256	0.135	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1¾	3 7/16	5	6 7/16	7¾	8⅞	9¾	10⅜	10¾	10 15/16	10¾	10⅜	9¾	8⅞	7¾	6 7/16	5	3 7/16	1¾	0
	SPAN "O" - GIRDER 2																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.006	0.011	0.017	0.023	0.028	0.033	0.037	0.039	0.040	0.039	0.037	0.033	0.028	0.023	0.017	0.011	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.008	0.022	0.043	0.065	0.089	0.112	0.131	0.146	0.155	0.158	0.155	0.146	0.131	0.112	0.089	0.065	0.043	0.022	0.008	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.005	0.008	0.011	0.013	0.015	0.017	0.017	0.018	0.017	0.017	0.015	0.013	0.011	0.008	0.005	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.011	0.031	0.059	0.090	0.123	0.153	0.179	0.200	0.211	0.216	0.211	0.200	0.179	0.153	0.123	0.090	0.059	0.031	0.011	0.000
VERTICAL CURVE ORDINATE	0.000	0.135	0.256	0.362	0.454	0.532	0.596	0.646	0.681	0.703	0.710	0.703	0.681	0.646	0.596	0.532	0.454	0.362	0.256	0.135	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1¾	3 7/16	5 1/16	6½	7⅞	9	9⅞	10 9/16	10 15/16	11⅛	10 15/16	10 9/16	9⅞	9	7⅞	6½	5 1/16	3 7/16	1¾	0
	SPAN "O" - GIRDER 3																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.006	0.011	0.017	0.024	0.030	0.035	0.039	0.041	0.042	0.041	0.039	0.035	0.030	0.024	0.017	0.011	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.009	0.023	0.045	0.069	0.094	0.119	0.139	0.155	0.165	0.168	0.165	0.155	0.139	0.119	0.094	0.069	0.045	0.023	0.009	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.006	0.009	0.011	0.014	0.016	0.018	0.019	0.019	0.019	0.018	0.016	0.014	0.011	0.009	0.006	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.012	0.032	0.062	0.095	0.129	0.163	0.190	0.212	0.225	0.229	0.225	0.212	0.190	0.163	0.129	0.095	0.062	0.032	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.135	0.256	0.362	0.454	0.532	0.596	0.646	0.681	0.703	0.710	0.703	0.681	0.646	0.596	0.532	0.454	0.362	0.256	0.135	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1¾	3 7/16	5 1/16	6 9/16	7 15/16	9⅛	10 1/16	10 11/16	11⅛	11¼	11⅛	10 11/16	10 1/16	9⅛	7 15/16	6 9/16	5 1/16	3 7/16	1¾	0
	SPAN "O" - GIRDER 4																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.006	0.012	0.018	0.025	0.031	0.036	0.041	0.043	0.044	0.043	0.041	0.036	0.031	0.025	0.018	0.012	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.009	0.024	0.046	0.071	0.098	0.123	0.144	0.161	0.171	0.175	0.171	0.161	0.144	0.123	0.098	0.071	0.046	0.024	0.009	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.006	0.009	0.012	0.015	0.017	0.019	0.020	0.020	0.020	0.019	0.017	0.015	0.012	0.009	0.006	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.012	0.033	0.064	0.098	0.135	0.169	0.197	0.221	0.234	0.239	0.234	0.221	0.197	0.169	0.135	0.098	0.064	0.033	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.135	0.256	0.362	0.454	0.532	0.596	0.646	0.681	0.703	0.710	0.703	0.681	0.646	0.596	0.532	0.454	0.362	0.256	0.135	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1¾	3 7/16	5⅛	6⅝	8	9 3/16	10⅛	10 13/16	11¼	11⅜	11¼	10 13/16	10⅛	9 3/16	8	6⅝	5⅛	3 7/16	1¾	0
	SPAN "O" - GIRDER 5																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.006	0.012	0.019	0.026	0.033	0.038	0.043	0.046	0.046	0.046	0.043	0.038	0.033	0.026	0.019	0.012	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.009	0.024	0.047	0.072	0.100	0.126	0.148	0.165	0.176	0.179	0.176	0.165	0.148	0.126	0.100	0.072	0.047	0.024	0.009	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.004	0.007	0.010	0.013	0.016	0.018	0.020	0.021	0.022	0.021	0.020	0.018	0.016	0.013	0.010	0.007	0.004	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.012	0.034	0.066	0.101	0.139	0.175	0.204	0.228	0.243	0.247	0.243	0.228	0.204	0.175	0.139	0.101	0.066	0.034	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.135	0.256	0.362	0.454	0.532	0.596	0.646	0.681	0.703	0.710	0.703	0.681	0.646	0.596	0.532	0.454	0.362	0.256	0.135	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1¾	3½	5⅛	6 11/16	8 1/16	9¼	10 3/16	10 15/16	11⅜	11½	11⅜	10 15/16	10 3/16	9¼	8 1/16	6 11/16	5⅛	3½	1¾	0



SCHEMATIC CAMBER ORDINATES

NOTES:

SLOPE FOR ZERO CAMBER BASE LINE VARIES.

TWENTIETH POINTS SHOWN ARE MEASURED ALONG ℄ GIRDER FOR EACH GIRDER.

DOWNWARD DEFLECTIONS ARE SHOWN AS POSITIVE.

VERTICAL CURVE AND SUPERELEVATION ORDINATES THAT INCREASE CAMBER ARE SHOWN AS POSITIVE.

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

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.

** HEAT CURVING METHOD IS ALLOWED. CAMBER DISSIPATION RESULTING FROM HEAT CURVING IS ZERO FOR ALL GIRDERS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 9 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III C6162BED9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN "O"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-245
1			3			TOTAL SHEETS
2			4			278

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

01-JUN-2016 11:54
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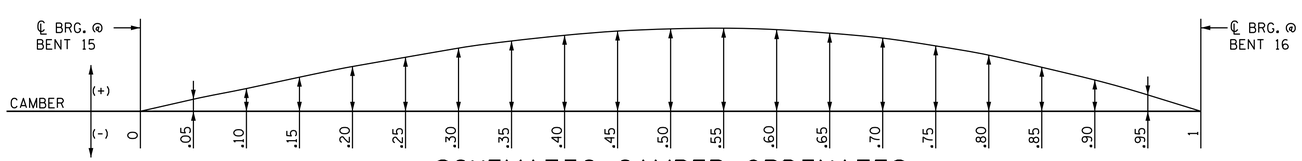
thogerall

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN "P" - GIRDER 1																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.002	0.004	0.008	0.011	0.015	0.018	0.021	0.024	0.026	0.027	0.027	0.026	0.025	0.022	0.019	0.015	0.010	0.006	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.003	0.008	0.017	0.029	0.042	0.056	0.070	0.082	0.092	0.099	0.104	0.106	0.103	0.097	0.088	0.075	0.059	0.041	0.022	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.010	0.010	0.010	0.010	0.009	0.008	0.007	0.005	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.004	0.011	0.023	0.040	0.057	0.077	0.095	0.111	0.125	0.135	0.141	0.143	0.139	0.131	0.118	0.101	0.079	0.055	0.030	0.000
VERTICAL CURVE ORDINATE	0.000	0.083	0.157	0.223	0.279	0.327	0.367	0.397	0.419	0.432	0.437	0.432	0.419	0.397	0.367	0.327	0.279	0.223	0.157	0.083	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1 1/16	2	2 15/16	3 13/16	4 5/8	5 5/16	5 7/8	6 3/8	6 11/16	6 7/8	6 7/8	6 3/4	6 7/16	6	5 5/16	4 9/16	3 5/8	2 9/16	1 3/8	0
	SPAN "P" - GIRDER 2																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.002	0.005	0.008	0.012	0.016	0.019	0.023	0.025	0.027	0.029	0.029	0.028	0.027	0.024	0.021	0.016	0.011	0.006	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.003	0.010	0.019	0.033	0.048	0.063	0.079	0.092	0.103	0.111	0.117	0.119	0.116	0.109	0.099	0.084	0.066	0.046	0.024	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.005	0.006	0.007	0.009	0.009	0.010	0.011	0.011	0.010	0.010	0.009	0.007	0.006	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.004	0.013	0.026	0.044	0.065	0.085	0.105	0.124	0.137	0.148	0.157	0.159	0.154	0.146	0.132	0.112	0.088	0.061	0.032	0.000
VERTICAL CURVE ORDINATE	0.000	0.083	0.157	0.223	0.279	0.327	0.367	0.397	0.419	0.432	0.437	0.432	0.419	0.397	0.367	0.327	0.279	0.223	0.157	0.083	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1 1/16	2 1/16	3	3 7/8	4 11/16	5 7/16	6	6 1/2	6 13/16	7	7 1/16	6 15/16	6 5/8	6 1/8	5 1/2	4 11/16	3 3/4	2 5/8	1 3/8	0
	SPAN "P" - GIRDER 3																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.003	0.005	0.009	0.013	0.017	0.021	0.024	0.027	0.029	0.030	0.031	0.030	0.028	0.026	0.022	0.017	0.012	0.006	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.004	0.011	0.021	0.036	0.051	0.068	0.085	0.099	0.111	0.120	0.126	0.127	0.124	0.117	0.106	0.091	0.071	0.050	0.026	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.005	0.006	0.008	0.009	0.010	0.011	0.011	0.011	0.011	0.010	0.009	0.008	0.006	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.005	0.015	0.028	0.048	0.069	0.091	0.114	0.132	0.148	0.160	0.167	0.169	0.165	0.155	0.141	0.121	0.094	0.066	0.034	0.000
VERTICAL CURVE ORDINATE	0.000	0.083	0.157	0.223	0.280	0.328	0.367	0.397	0.419	0.432	0.437	0.432	0.419	0.397	0.367	0.328	0.280	0.223	0.157	0.083	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1 1/16	2 1/16	3	3 15/16	4 3/4	5 1/2	6 1/8	6 5/8	6 15/16	7 3/16	7 3/16	7 1/16	6 3/4	6 1/4	5 5/8	4 13/16	3 13/16	2 11/16	1 3/8	0
	SPAN "P" - GIRDER 4																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.003	0.005	0.009	0.013	0.018	0.022	0.026	0.029	0.031	0.032	0.033	0.032	0.030	0.027	0.023	0.018	0.013	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.004	0.011	0.022	0.037	0.054	0.071	0.089	0.104	0.116	0.125	0.131	0.133	0.130	0.123	0.111	0.095	0.075	0.052	0.027	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.005	0.007	0.008	0.010	0.011	0.011	0.012	0.012	0.012	0.011	0.010	0.008	0.007	0.005	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.005	0.015	0.029	0.049	0.072	0.096	0.119	0.140	0.156	0.167	0.175	0.178	0.174	0.164	0.148	0.126	0.100	0.070	0.036	0.000
VERTICAL CURVE ORDINATE	0.000	0.083	0.157	0.223	0.280	0.328	0.367	0.397	0.419	0.432	0.437	0.432	0.419	0.397	0.367	0.328	0.280	0.223	0.157	0.083	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1 1/16	2 1/16	3	3 15/16	4 13/16	5 9/16	6 3/16	6 11/16	7 1/16	7 1/4	7 5/16	7 3/16	6 7/8	6 3/8	5 11/16	4 7/8	3 7/8	2 3/4	1 7/16	0
	SPAN "P" - GIRDER 5																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.003	0.006	0.010	0.014	0.019	0.023	0.027	0.031	0.033	0.035	0.035	0.034	0.032	0.029	0.025	0.020	0.014	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.004	0.011	0.022	0.038	0.055	0.073	0.091	0.107	0.120	0.129	0.136	0.138	0.135	0.127	0.115	0.098	0.077	0.054	0.028	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.004	0.005	0.007	0.009	0.010	0.011	0.012	0.013	0.013	0.013	0.012	0.011	0.009	0.007	0.005	0.003	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.005	0.015	0.030	0.052	0.074	0.099	0.123	0.144	0.162	0.174	0.184	0.186	0.182	0.171	0.155	0.132	0.104	0.073	0.038	0.000
VERTICAL CURVE ORDINATE	0.000	0.083	0.157	0.223	0.280	0.328	0.367	0.398	0.419	0.432	0.437	0.432	0.419	0.398	0.367	0.328	0.280	0.223	0.157	0.083	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1 1/16	2 1/16	3 1/16	4	4 13/16	5 9/16	6 1/4	6 3/4	7 1/8	7 5/16	7 3/8	7 1/4	6 15/16	6 7/16	5 13/16	4 15/16	3 15/16	2 3/4	1 7/16	0



SCHEMATIC CAMBER ORDINATES

NOTES:

SLOPE FOR ZERO CAMBER BASE LINE VARIES.

TWENTIETH POINTS SHOWN ARE MEASURED ALONG ℄ GIRDER FOR EACH GIRDER.

DOWNWARD DEFLECTIONS ARE SHOWN AS POSITIVE.

VERTICAL CURVE AND SUPERELEVATION ORDINATES THAT INCREASE CAMBER ARE SHOWN AS POSITIVE.

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

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.

** HEAT CURVING METHOD IS ALLOWED. CAMBER DISSIPATION RESULTING FROM HEAT CURVING IS ZERO FOR ALL GIRDERS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 9 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER T. H. CARROLL III

DocuSigned by: Trey H. Carroll III C6162BED9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN "P"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-246
1			3			TOTAL SHEETS
2			4			278

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

01-JUN-2016 11:54
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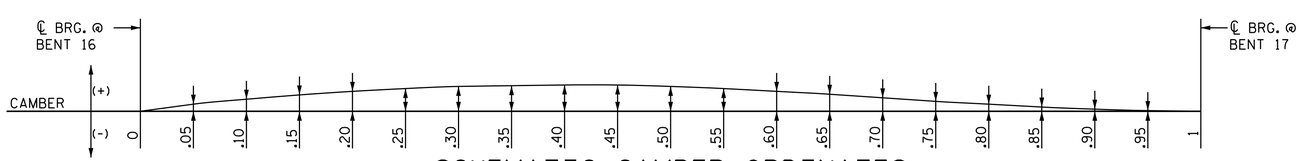
DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN "Q" - GIRDER 1																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.006	0.010	0.015	0.019	0.022	0.025	0.026	0.027	0.027	0.026	0.024	0.021	0.018	0.015	0.011	0.008	0.004	0.002	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.022	0.041	0.059	0.075	0.088	0.097	0.103	0.106	0.105	0.100	0.093	0.082	0.070	0.056	0.042	0.029	0.017	0.008	0.003	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.004	0.005	0.007	0.008	0.009	0.010	0.010	0.010	0.010	0.009	0.008	0.007	0.006	0.004	0.003	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.030	0.055	0.079	0.101	0.118	0.131	0.139	0.143	0.142	0.136	0.126	0.111	0.095	0.077	0.057	0.040	0.023	0.011	0.004	0.000
VERTICAL CURVE ORDINATE	0.000	0.013	0.018	0.017	0.016	0.015	0.014	0.013	0.012	0.011	0.010	0.009	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/2	7/8	1 1/8	1 3/8	1 5/8	1 3/4	1 13/16	1 7/8	1 13/16	1 3/4	1 5/8	1 7/16	1 1/4	1	3/4	1/2	5/16	1/8	1/16	0
	SPAN "Q" - GIRDER 2																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.006	0.011	0.016	0.021	0.024	0.027	0.028	0.029	0.029	0.028	0.026	0.023	0.019	0.016	0.012	0.008	0.005	0.002	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.024	0.046	0.066	0.084	0.099	0.109	0.116	0.119	0.117	0.113	0.104	0.092	0.079	0.063	0.048	0.033	0.019	0.010	0.003	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.004	0.006	0.007	0.009	0.010	0.010	0.011	0.011	0.010	0.009	0.009	0.007	0.006	0.005	0.003	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.032	0.061	0.088	0.112	0.132	0.146	0.154	0.159	0.157	0.151	0.139	0.124	0.105	0.085	0.065	0.044	0.026	0.013	0.004	0.000
VERTICAL CURVE ORDINATE	0.000	0.013	0.018	0.017	0.016	0.015	0.014	0.013	0.012	0.011	0.010	0.009	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	9/16	15/16	1 1/4	1 9/16	1 3/4	1 15/16	2	2 1/16	2	1 15/16	1 3/4	1 9/16	1 3/8	1 1/16	1 3/16	9/16	3/8	3/16	1/16	0
	SPAN "Q" - GIRDER 3																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.006	0.012	0.017	0.022	0.026	0.028	0.030	0.031	0.031	0.029	0.027	0.024	0.021	0.017	0.013	0.009	0.005	0.003	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.026	0.050	0.071	0.091	0.106	0.117	0.124	0.127	0.126	0.121	0.112	0.099	0.085	0.068	0.051	0.036	0.021	0.011	0.004	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.004	0.006	0.008	0.009	0.010	0.011	0.011	0.011	0.011	0.010	0.009	0.008	0.006	0.005	0.003	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.034	0.066	0.094	0.121	0.141	0.155	0.165	0.169	0.168	0.161	0.149	0.132	0.114	0.091	0.069	0.048	0.028	0.015	0.005	0.000
VERTICAL CURVE ORDINATE	0.000	0.013	0.018	0.017	0.016	0.015	0.014	0.013	0.012	0.011	0.010	0.009	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	9/16	1	1 5/16	1 5/8	1 7/8	2	2 1/8	2 3/16	2 1/8	2 1/16	1 7/8	1 11/16	1 7/16	1 3/16	7/8	5/8	3/8	3/16	1/16	0
	SPAN "Q" - GIRDER 4																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.007	0.013	0.018	0.023	0.027	0.030	0.032	0.033	0.032	0.031	0.029	0.026	0.022	0.018	0.013	0.009	0.005	0.003	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.027	0.052	0.075	0.095	0.111	0.123	0.130	0.133	0.132	0.127	0.117	0.104	0.089	0.071	0.054	0.037	0.022	0.011	0.004	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.005	0.007	0.008	0.010	0.011	0.012	0.012	0.012	0.011	0.011	0.010	0.008	0.007	0.005	0.003	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.036	0.070	0.100	0.126	0.148	0.164	0.174	0.178	0.176	0.169	0.157	0.140	0.119	0.096	0.072	0.049	0.029	0.015	0.005	0.000
VERTICAL CURVE ORDINATE	0.000	0.013	0.018	0.017	0.016	0.015	0.014	0.013	0.012	0.011	0.010	0.009	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	9/16	1 1/16	1 3/8	1 11/16	1 15/16	2 1/8	2 1/4	2 1/4	2 1/4	2 1/8	2	1 3/4	1 1/2	1 1/4	15/16	5/8	3/8	3/16	1/16	0
	SPAN "Q" - GIRDER 5																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.007	0.014	0.020	0.025	0.029	0.032	0.034	0.035	0.035	0.033	0.031	0.027	0.023	0.019	0.014	0.010	0.006	0.003	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.028	0.054	0.077	0.098	0.115	0.127	0.135	0.138	0.137	0.131	0.120	0.107	0.091	0.073	0.055	0.038	0.022	0.011	0.004	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.003	0.005	0.007	0.009	0.011	0.012	0.013	0.013	0.013	0.012	0.011	0.010	0.009	0.007	0.005	0.004	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.038	0.073	0.104	0.132	0.155	0.171	0.182	0.186	0.185	0.176	0.162	0.144	0.123	0.099	0.074	0.052	0.030	0.015	0.005	0.000
VERTICAL CURVE ORDINATE	0.000	0.013	0.018	0.017	0.016	0.015	0.014	0.013	0.012	0.011	0.010	0.009	0.008	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	5/8	1 1/16	1 7/16	1 3/4	2 1/16	2 1/4	2 5/16	2 3/8	2 3/8	2 1/4	2 1/16	1 13/16	1 9/16	1 1/4	15/16	11/16	3/8	3/16	1/16	0



SCHEMATIC CAMBER ORDINATES

NOTES:

SLOPE FOR ZERO CAMBER BASE LINE VARIES.

TWENTIETH POINTS SHOWN ARE MEASURED ALONG ℄ GIRDER FOR EACH GIRDER.

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** HEAT CURVING METHOD IS ALLOWED. CAMBER DISSIPATION RESULTING FROM HEAT CURVING IS ZERO FOR ALL GIRDERS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 9 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III C6162BED9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS

SPAN "Q"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-247
1			3			TOTAL SHEETS
2			4			278

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

01-JUN-2016 11:54
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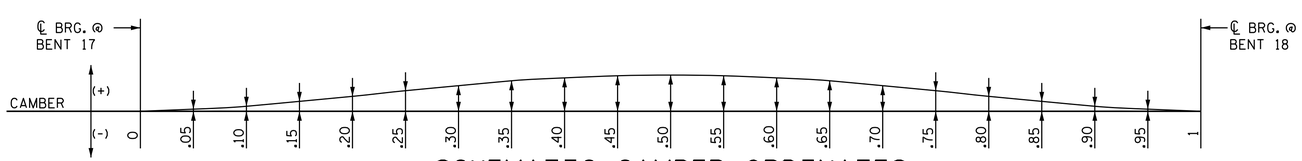
thogerall

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN "R" - GIRDER 1																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.005	0.010	0.016	0.021	0.027	0.031	0.035	0.037	0.038	0.037	0.035	0.031	0.027	0.021	0.016	0.010	0.005	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.008	0.020	0.039	0.060	0.082	0.102	0.120	0.134	0.142	0.145	0.142	0.134	0.120	0.102	0.082	0.060	0.039	0.020	0.008	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.005	0.007	0.010	0.012	0.014	0.015	0.016	0.017	0.016	0.015	0.014	0.012	0.010	0.007	0.005	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.011	0.028	0.054	0.083	0.113	0.141	0.165	0.184	0.195	0.200	0.195	0.184	0.165	0.141	0.113	0.083	0.054	0.028	0.011	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/8	5/16	5/8	1	1 3/8	1 11/16	2	2 3/16	2 5/16	2 3/8	2 5/16	2 3/16	2	1 11/16	1 3/8	1	5/8	5/16	1/8	0
	SPAN "R" - GIRDER 2																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.006	0.011	0.017	0.023	0.028	0.033	0.037	0.039	0.040	0.039	0.037	0.033	0.028	0.023	0.017	0.011	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.008	0.022	0.043	0.065	0.089	0.112	0.131	0.146	0.155	0.158	0.155	0.146	0.131	0.112	0.089	0.065	0.043	0.022	0.008	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.005	0.008	0.011	0.013	0.015	0.017	0.017	0.018	0.017	0.017	0.015	0.013	0.011	0.008	0.005	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.011	0.031	0.059	0.090	0.123	0.153	0.179	0.200	0.211	0.216	0.211	0.200	0.179	0.153	0.123	0.090	0.059	0.031	0.011	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/8	3/8	11/16	1 1/16	1 1/2	1 13/16	2 1/8	2 3/8	2 9/16	2 5/16	2 9/16	2 3/8	2 1/8	1 13/16	1 1/2	1 1/16	11/16	3/8	1/8	0
	SPAN "R" - GIRDER 3																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.006	0.011	0.017	0.024	0.030	0.035	0.039	0.041	0.042	0.041	0.039	0.035	0.030	0.024	0.017	0.011	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.009	0.023	0.045	0.069	0.094	0.119	0.139	0.155	0.165	0.168	0.165	0.155	0.139	0.119	0.094	0.069	0.045	0.023	0.009	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.006	0.009	0.011	0.014	0.016	0.018	0.019	0.019	0.019	0.018	0.016	0.014	0.011	0.009	0.006	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.012	0.032	0.062	0.095	0.129	0.163	0.190	0.212	0.225	0.229	0.225	0.212	0.190	0.163	0.129	0.095	0.062	0.032	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/8	3/8	3/4	1 1/8	1 5/16	1 15/16	2 1/4	2 5/16	2 11/16	2 3/4	2 11/16	2 5/16	2 1/4	1 15/16	1 5/16	1 1/8	3/4	3/8	1/8	0
	SPAN "R" - GIRDER 4																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.006	0.012	0.018	0.025	0.031	0.036	0.041	0.043	0.044	0.043	0.041	0.036	0.031	0.025	0.018	0.012	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.009	0.024	0.046	0.071	0.098	0.123	0.144	0.161	0.171	0.175	0.171	0.161	0.144	0.123	0.098	0.071	0.046	0.024	0.009	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.006	0.009	0.012	0.015	0.017	0.019	0.020	0.020	0.020	0.019	0.017	0.015	0.012	0.009	0.006	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.012	0.033	0.064	0.098	0.135	0.169	0.197	0.221	0.234	0.239	0.234	0.221	0.197	0.169	0.135	0.098	0.064	0.033	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/8	3/8	3/4	1 3/16	1 5/8	2	2 3/8	2 5/8	2 13/16	2 7/8	2 13/16	2 5/8	2 3/8	2	1 5/8	1 3/16	3/4	3/8	1/8	0
	SPAN "R" - GIRDER 5																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.006	0.012	0.019	0.026	0.033	0.038	0.043	0.046	0.046	0.046	0.043	0.038	0.033	0.026	0.019	0.012	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.009	0.024	0.047	0.072	0.100	0.126	0.148	0.165	0.176	0.179	0.176	0.165	0.148	0.126	0.100	0.072	0.047	0.024	0.009	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.004	0.007	0.010	0.013	0.016	0.018	0.020	0.021	0.022	0.021	0.020	0.018	0.016	0.013	0.010	0.007	0.004	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.012	0.034	0.066	0.101	0.139	0.175	0.204	0.228	0.243	0.247	0.243	0.228	0.204	0.175	0.139	0.101	0.066	0.034	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/8	7/16	13/16	1 3/16	1 11/16	2 1/8	2 7/16	2 3/4	2 15/16	2 15/16	2 15/16	2 3/4	2 7/16	2 1/8	1 11/16	1 3/16	13/16	7/16	1/8	0



SCHEMATIC CAMBER ORDINATES

NOTES:

SLOPE FOR ZERO CAMBER BASE LINE VARIES.

TWENTIETH POINTS SHOWN ARE MEASURED ALONG ℄ GIRDER FOR EACH GIRDER.

DOWNWARD DEFLECTIONS ARE SHOWN AS POSITIVE.

VERTICAL CURVE AND SUPERELEVATION ORDINATES THAT INCREASE CAMBER ARE SHOWN AS POSITIVE.

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

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.

** HEAT CURVING METHOD IS ALLOWED. CAMBER DISSIPATION RESULTING FROM HEAT CURVING IS ZERO FOR ALL GIRDERS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 9 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN "R"

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

SHEET NO. S-248

TOTAL SHEETS 278

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

01-JUN-2016 11:54
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thorcrall

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN "S" - GIRDER 1																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.002	0.004	0.008	0.011	0.015	0.018	0.021	0.024	0.026	0.027	0.027	0.026	0.025	0.022	0.019	0.015	0.010	0.006	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.003	0.008	0.017	0.029	0.042	0.056	0.070	0.082	0.092	0.099	0.104	0.106	0.103	0.097	0.088	0.075	0.059	0.041	0.022	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.010	0.010	0.010	0.010	0.009	0.008	0.007	0.005	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.004	0.011	0.023	0.040	0.057	0.077	0.095	0.111	0.125	0.135	0.141	0.143	0.139	0.131	0.118	0.101	0.079	0.055	0.030	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/16	1/8	1/4	1/2	11/16	15/16	1 1/8	1 5/16	1 1/2	1 5/8	1 11/16	1 11/16	1 11/16	1 9/16	1 7/16	1 3/16	15/16	11/16	3/8	0
	SPAN "S" - GIRDER 2																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.002	0.005	0.008	0.012	0.016	0.019	0.023	0.025	0.027	0.029	0.029	0.028	0.027	0.024	0.021	0.016	0.011	0.006	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.003	0.010	0.019	0.033	0.048	0.063	0.079	0.092	0.103	0.111	0.117	0.119	0.116	0.109	0.099	0.084	0.066	0.046	0.024	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.005	0.006	0.007	0.009	0.009	0.010	0.011	0.011	0.010	0.010	0.009	0.007	0.006	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.004	0.013	0.026	0.044	0.065	0.085	0.105	0.124	0.137	0.148	0.157	0.159	0.154	0.146	0.132	0.112	0.088	0.061	0.032	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/16	1/8	5/16	1/2	3/4	1	1 1/4	1 1/2	1 5/8	1 3/4	1 7/8	1 15/16	1 7/8	1 3/4	1 9/16	1 3/8	1 1/16	3/4	3/8	0
	SPAN "S" - GIRDER 3																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.003	0.005	0.009	0.013	0.017	0.021	0.024	0.027	0.029	0.030	0.031	0.030	0.028	0.026	0.022	0.017	0.012	0.006	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.004	0.011	0.021	0.036	0.051	0.068	0.085	0.099	0.111	0.120	0.126	0.127	0.124	0.117	0.106	0.091	0.071	0.050	0.026	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.005	0.006	0.008	0.009	0.010	0.011	0.011	0.011	0.011	0.010	0.009	0.008	0.006	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.005	0.015	0.028	0.048	0.069	0.091	0.114	0.132	0.148	0.160	0.167	0.169	0.165	0.155	0.141	0.121	0.094	0.066	0.034	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/16	3/16	5/16	9/16	13/16	1 1/16	1 3/8	1 9/16	1 3/4	1 15/16	2	2	2	1 7/8	1 11/16	1 7/16	1 1/8	13/16	7/16	0
	SPAN "S" - GIRDER 4																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.003	0.005	0.009	0.013	0.018	0.022	0.026	0.029	0.031	0.032	0.033	0.032	0.030	0.027	0.023	0.018	0.013	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.004	0.011	0.022	0.037	0.054	0.071	0.089	0.104	0.116	0.125	0.131	0.133	0.130	0.123	0.111	0.095	0.075	0.052	0.027	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.005	0.007	0.008	0.010	0.011	0.011	0.012	0.012	0.012	0.011	0.010	0.008	0.007	0.005	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.005	0.015	0.029	0.049	0.072	0.096	0.119	0.140	0.156	0.167	0.175	0.178	0.174	0.164	0.148	0.126	0.100	0.070	0.036	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/16	3/16	3/8	9/16	7/8	1 1/8	1 7/16	1 11/16	1 7/8	2	2 1/8	2 1/8	2 1/16	1 15/16	1 3/4	1 1/2	1 3/16	1 3/16	7/16	0
	SPAN "S" - GIRDER 5																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.003	0.006	0.010	0.014	0.019	0.023	0.027	0.031	0.033	0.035	0.035	0.034	0.032	0.029	0.025	0.020	0.014	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.004	0.011	0.022	0.038	0.055	0.073	0.091	0.107	0.120	0.129	0.136	0.138	0.135	0.127	0.115	0.098	0.077	0.054	0.028	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.004	0.005	0.007	0.009	0.010	0.011	0.012	0.013	0.013	0.013	0.012	0.011	0.009	0.007	0.005	0.003	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.005	0.015	0.030	0.052	0.074	0.099	0.123	0.144	0.162	0.174	0.184	0.186	0.182	0.171	0.155	0.132	0.104	0.073	0.038	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/16	3/16	3/8	5/8	7/8	1 3/16	1 1/2	1 3/4	1 15/16	2 1/16	2 3/16	2 1/4	2 3/16	2 1/16	1 7/8	1 9/16	1 1/4	7/8	7/16	0

SCHEMATIC CAMBER ORDINATES

NOTES:

SLOPE FOR ZERO CAMBER BASE LINE VARIES.

TWENTIETH POINTS SHOWN ARE MEASURED ALONG ℄ GIRDER FOR EACH GIRDER.

DOWNWARD DEFLECTIONS ARE SHOWN AS POSITIVE.

VERTICAL CURVE AND SUPERELEVATION ORDINATES THAT INCREASE CAMBER ARE SHOWN AS POSITIVE.

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

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.

** HEAT CURVING METHOD IS ALLOWED. CAMBER DISSIPATION RESULTING FROM HEAT CURVING IS ZERO FOR ALL GIRDERS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 6 OF 9 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III C6162BED9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN "S"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-249
1			3			TOTAL SHEETS
2			4			278

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

01-JUN-2016 11:54
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DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN "T" - GIRDER 1																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.006	0.010	0.015	0.019	0.022	0.025	0.026	0.027	0.027	0.026	0.024	0.021	0.018	0.015	0.011	0.008	0.004	0.002	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.022	0.041	0.059	0.075	0.088	0.097	0.103	0.106	0.105	0.100	0.093	0.082	0.070	0.056	0.042	0.029	0.017	0.008	0.003	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.004	0.005	0.007	0.008	0.009	0.010	0.010	0.010	0.010	0.009	0.008	0.007	0.006	0.004	0.003	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.030	0.055	0.079	0.101	0.118	0.131	0.139	0.143	0.142	0.136	0.126	0.111	0.095	0.077	0.057	0.040	0.023	0.011	0.004	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	3/8	11/16	15/16	1 3/16	1 7/16	1 9/16	1 11/16	1 11/16	1 11/16	1 5/8	1 1/2	1 5/16	1 1/8	1 5/16	1 1/16	1/2	1/4	1/8	1/16	0
	SPAN "T" - GIRDER 2																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.006	0.011	0.016	0.021	0.024	0.027	0.028	0.029	0.029	0.028	0.026	0.023	0.019	0.016	0.012	0.008	0.005	0.002	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.024	0.046	0.066	0.084	0.099	0.109	0.116	0.119	0.117	0.113	0.104	0.092	0.079	0.063	0.048	0.033	0.019	0.010	0.003	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.004	0.006	0.007	0.009	0.010	0.010	0.011	0.011	0.010	0.009	0.009	0.007	0.006	0.005	0.003	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.032	0.061	0.088	0.112	0.132	0.146	0.154	0.159	0.157	0.151	0.139	0.124	0.105	0.085	0.065	0.044	0.026	0.013	0.004	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	3/8	3/4	1 1/16	1 3/8	1 9/16	1 3/4	1 7/8	1 15/16	1 7/8	1 13/16	1 11/16	1 1/2	1 1/4	1	3/4	1/2	5/16	1/8	1/16	0
	SPAN "T" - GIRDER 3																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.006	0.012	0.017	0.022	0.026	0.028	0.030	0.031	0.031	0.029	0.027	0.024	0.021	0.017	0.013	0.009	0.005	0.003	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.026	0.050	0.071	0.091	0.106	0.117	0.124	0.127	0.126	0.121	0.112	0.099	0.085	0.068	0.051	0.036	0.021	0.011	0.004	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.004	0.006	0.008	0.009	0.010	0.011	0.011	0.011	0.011	0.010	0.009	0.008	0.006	0.005	0.003	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.034	0.066	0.094	0.121	0.141	0.155	0.165	0.169	0.168	0.161	0.149	0.132	0.114	0.091	0.069	0.048	0.028	0.015	0.005	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	7/16	13/16	1 1/8	1 7/16	1 11/16	1 7/8	2	2	2	1 15/16	1 13/16	1 9/16	1 3/8	1 1/16	13/16	9/16	5/16	3/16	1/16	0
	SPAN "T" - GIRDER 4																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.007	0.013	0.018	0.023	0.027	0.030	0.032	0.033	0.032	0.031	0.029	0.026	0.022	0.018	0.013	0.009	0.005	0.003	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.027	0.052	0.075	0.095	0.111	0.123	0.130	0.133	0.132	0.127	0.117	0.104	0.089	0.071	0.054	0.037	0.022	0.011	0.004	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.002	0.005	0.007	0.008	0.010	0.011	0.012	0.012	0.012	0.011	0.011	0.010	0.008	0.007	0.005	0.003	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.036	0.070	0.100	0.126	0.148	0.164	0.174	0.178	0.176	0.169	0.157	0.140	0.119	0.096	0.072	0.049	0.029	0.015	0.005	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	7/16	13/16	1 3/16	1 1/2	1 3/4	1 15/16	2 1/16	2 1/8	2 1/8	2	1 7/8	1 11/16	1 7/16	1 1/8	7/8	9/16	3/8	3/16	1/16	0
	SPAN "T" - GIRDER 5																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.007	0.014	0.020	0.025	0.029	0.032	0.034	0.035	0.035	0.033	0.031	0.027	0.023	0.019	0.014	0.010	0.006	0.003	0.001	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.028	0.054	0.077	0.098	0.115	0.127	0.135	0.138	0.137	0.131	0.120	0.107	0.091	0.073	0.055	0.038	0.022	0.011	0.004	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.003	0.005	0.007	0.009	0.011	0.012	0.013	0.013	0.013	0.012	0.011	0.010	0.009	0.007	0.005	0.004	0.002	0.001	0.000	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.038	0.073	0.104	0.132	0.155	0.171	0.182	0.186	0.185	0.176	0.162	0.144	0.123	0.099	0.074	0.052	0.030	0.015	0.005	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	7/16	7/8	1 1/4	1 3/16	1 7/8	2 1/16	2 3/16	2 1/4	2 1/4	2 1/8	1 15/16	1 3/4	1 1/2	1 3/16	7/8	5/8	3/8	3/16	1/16	0

SCHEMATIC CAMBER ORDINATES

NOTES:

SLOPE FOR ZERO CAMBER BASE LINE VARIES.

TWENTIETH POINTS SHOWN ARE MEASURED ALONG ℄ GIRDER FOR EACH GIRDER.

DOWNWARD DEFLECTIONS ARE SHOWN AS POSITIVE.

VERTICAL CURVE AND SUPERELEVATION ORDINATES THAT INCREASE CAMBER ARE SHOWN AS POSITIVE.

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

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.

** HEAT CURVING METHOD IS ALLOWED. CAMBER DISSIPATION RESULTING FROM HEAT CURVING IS ZERO FOR ALL GIRDERS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 7 OF 9 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III C6162BED9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN "T"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-250
1			3			TOTAL SHEETS
2			4			278

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

01-JUN-2016 11:54
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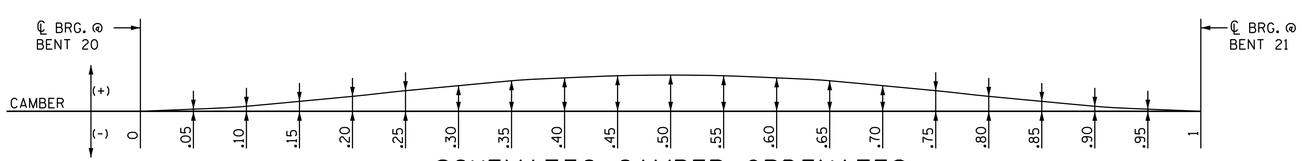
DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN "U" - GIRDER 1																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.005	0.010	0.016	0.021	0.027	0.031	0.035	0.037	0.038	0.037	0.035	0.031	0.027	0.021	0.016	0.010	0.005	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.008	0.020	0.039	0.060	0.082	0.102	0.120	0.134	0.142	0.145	0.142	0.134	0.120	0.102	0.082	0.060	0.039	0.020	0.008	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.005	0.007	0.010	0.012	0.014	0.015	0.016	0.017	0.016	0.015	0.014	0.012	0.010	0.007	0.005	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.011	0.028	0.054	0.083	0.113	0.141	0.165	0.184	0.195	0.200	0.195	0.184	0.165	0.141	0.113	0.083	0.054	0.028	0.011	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/8	5/16	5/8	1	1 3/8	1 11/16	2	2 3/16	2 5/16	2 3/8	2 5/16	2 3/16	2	1 11/16	1 3/8	1	5/8	5/16	1/8	0
	SPAN "U" - GIRDER 2																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.006	0.011	0.017	0.023	0.028	0.033	0.037	0.039	0.040	0.039	0.037	0.033	0.028	0.023	0.017	0.011	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.008	0.022	0.043	0.065	0.089	0.112	0.131	0.146	0.155	0.158	0.155	0.146	0.131	0.112	0.089	0.065	0.043	0.022	0.008	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.005	0.008	0.011	0.013	0.015	0.017	0.017	0.018	0.017	0.017	0.015	0.013	0.011	0.008	0.005	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.011	0.031	0.059	0.090	0.123	0.153	0.179	0.200	0.211	0.216	0.211	0.200	0.179	0.153	0.123	0.090	0.059	0.031	0.011	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/8	3/8	11/16	1 1/16	1 1/2	1 13/16	2 1/8	2 3/8	2 9/16	2 9/16	2 9/16	2 3/8	2 1/8	1 13/16	1 1/2	1 1/16	11/16	3/8	1/8	0
	SPAN "U" - GIRDER 3																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.006	0.011	0.017	0.024	0.030	0.035	0.039	0.041	0.042	0.041	0.039	0.035	0.030	0.024	0.017	0.011	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.009	0.023	0.045	0.069	0.094	0.119	0.139	0.155	0.165	0.168	0.165	0.155	0.139	0.119	0.094	0.069	0.045	0.023	0.009	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.006	0.009	0.011	0.014	0.016	0.018	0.019	0.019	0.019	0.018	0.016	0.014	0.011	0.009	0.006	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.012	0.032	0.062	0.095	0.129	0.163	0.190	0.212	0.225	0.229	0.225	0.212	0.190	0.163	0.129	0.095	0.062	0.032	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/8	3/8	3/4	1 1/8	1 3/16	1 15/16	2 1/4	2 3/16	2 11/16	2 3/4	2 11/16	2 3/16	2 1/4	1 15/16	1 3/16	1 1/8	3/4	3/8	1/8	0
	SPAN "U" - GIRDER 4																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.006	0.012	0.018	0.025	0.031	0.036	0.041	0.043	0.044	0.043	0.041	0.036	0.031	0.025	0.018	0.012	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.009	0.024	0.046	0.071	0.098	0.123	0.144	0.161	0.171	0.175	0.171	0.161	0.144	0.123	0.098	0.071	0.046	0.024	0.009	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.003	0.006	0.009	0.012	0.015	0.017	0.019	0.020	0.020	0.020	0.019	0.017	0.015	0.012	0.009	0.006	0.003	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.012	0.033	0.064	0.098	0.135	0.169	0.197	0.221	0.234	0.239	0.234	0.221	0.197	0.169	0.135	0.098	0.064	0.033	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/8	3/8	3/4	1 3/16	1 5/8	2	2 3/8	2 5/8	2 13/16	2 7/8	2 13/16	2 5/8	2 3/8	2	1 5/8	1 3/16	3/4	3/8	1/8	0
	SPAN "U" - GIRDER 5																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.002	0.006	0.012	0.019	0.026	0.033	0.038	0.043	0.046	0.046	0.046	0.043	0.038	0.033	0.026	0.019	0.012	0.006	0.002	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.009	0.024	0.047	0.072	0.100	0.126	0.148	0.165	0.176	0.179	0.176	0.165	0.148	0.126	0.100	0.072	0.047	0.024	0.009	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.001	0.004	0.007	0.010	0.013	0.016	0.018	0.020	0.021	0.022	0.021	0.020	0.018	0.016	0.013	0.010	0.007	0.004	0.001	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.012	0.034	0.066	0.101	0.139	0.175	0.204	0.228	0.243	0.247	0.243	0.228	0.204	0.175	0.139	0.101	0.066	0.034	0.012	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/8	7/16	13/16	1 3/16	1 11/16	2 1/8	2 7/16	2 3/4	2 15/16	2 15/16	2 15/16	2 3/4	2 7/16	2 1/8	1 11/16	1 3/16	13/16	7/16	1/8	0



SCHEMATIC CAMBER ORDINATES

NOTES:

SLOPE FOR ZERO CAMBER BASE LINE VARIES.

TWENTIETH POINTS SHOWN ARE MEASURED ALONG ℄ GIRDER FOR EACH GIRDER.

DOWNWARD DEFLECTIONS ARE SHOWN AS POSITIVE.

VERTICAL CURVE AND SUPERELEVATION ORDINATES THAT INCREASE CAMBER ARE SHOWN AS POSITIVE.

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

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.

** HEAT CURVING METHOD IS ALLOWED. CAMBER DISSIPATION RESULTING FROM HEAT CURVING IS ZERO FOR ALL GIRDERS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 8 OF 9 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III C6162BED9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN "U"

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-251
1			3			TOTAL SHEETS
2			4			278

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

01-JUN-2016 11:54
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thorcrall

DEAD LOAD DEFLECTION TABLE FOR GIRDERS

	SPAN "V" - GIRDER 1																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.002	0.004	0.008	0.011	0.015	0.018	0.021	0.024	0.026	0.027	0.027	0.026	0.025	0.022	0.019	0.015	0.010	0.006	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.003	0.008	0.017	0.029	0.042	0.056	0.070	0.082	0.092	0.099	0.104	0.106	0.103	0.097	0.088	0.075	0.059	0.041	0.022	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.004	0.006	0.007	0.008	0.009	0.010	0.010	0.010	0.010	0.009	0.008	0.007	0.005	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.004	0.011	0.023	0.040	0.057	0.077	0.095	0.111	0.125	0.135	0.141	0.143	0.139	0.131	0.118	0.101	0.079	0.055	0.030	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/16	1/8	1/4	1/2	11/16	15/16	1 1/8	1 5/16	1 1/2	1 5/8	1 11/16	1 11/16	1 11/16	1 9/16	1 7/16	1 3/16	15/16	11/16	3/8	0
	SPAN "V" - GIRDER 2																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.002	0.005	0.008	0.012	0.016	0.019	0.023	0.025	0.027	0.029	0.029	0.028	0.027	0.024	0.021	0.016	0.011	0.006	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.003	0.010	0.019	0.033	0.048	0.063	0.079	0.092	0.103	0.111	0.117	0.119	0.116	0.109	0.099	0.084	0.066	0.046	0.024	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.005	0.006	0.007	0.009	0.009	0.010	0.011	0.011	0.010	0.010	0.009	0.007	0.006	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.004	0.013	0.026	0.044	0.065	0.085	0.105	0.124	0.137	0.148	0.157	0.159	0.154	0.146	0.132	0.112	0.088	0.061	0.032	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/16	1/8	5/16	1/2	3/4	1	1 1/4	1 1/2	1 5/8	1 3/4	1 7/8	1 15/16	1 7/8	1 3/4	1 9/16	1 3/8	1 1/16	3/4	3/8	0
	SPAN "V" - GIRDER 3																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.003	0.005	0.009	0.013	0.017	0.021	0.024	0.027	0.029	0.030	0.031	0.030	0.028	0.026	0.022	0.017	0.012	0.006	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.004	0.011	0.021	0.036	0.051	0.068	0.085	0.099	0.111	0.120	0.126	0.127	0.124	0.117	0.106	0.091	0.071	0.050	0.026	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.005	0.006	0.008	0.009	0.010	0.011	0.011	0.011	0.011	0.010	0.009	0.008	0.006	0.004	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.005	0.015	0.028	0.048	0.069	0.091	0.114	0.132	0.148	0.160	0.167	0.169	0.165	0.155	0.141	0.121	0.094	0.066	0.034	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/16	3/16	5/16	9/16	13/16	1 1/16	1 3/8	1 9/16	1 3/4	1 15/16	2	2	2	1 7/8	1 11/16	1 7/16	1 1/8	13/16	7/16	0
	SPAN "V" - GIRDER 4																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.003	0.005	0.009	0.013	0.018	0.022	0.026	0.029	0.031	0.032	0.033	0.032	0.030	0.027	0.023	0.018	0.013	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.004	0.011	0.022	0.037	0.054	0.071	0.089	0.104	0.116	0.125	0.131	0.133	0.130	0.123	0.111	0.095	0.075	0.052	0.027	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.003	0.005	0.007	0.008	0.010	0.011	0.011	0.012	0.012	0.012	0.011	0.010	0.008	0.007	0.005	0.002	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.005	0.015	0.029	0.049	0.072	0.096	0.119	0.140	0.156	0.167	0.175	0.178	0.174	0.164	0.148	0.126	0.100	0.070	0.036	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/16	3/16	3/8	9/16	7/8	1 1/8	1 7/16	1 11/16	1 7/8	2	2 1/8	2 1/8	2 1/16	1 15/16	1 3/4	1 1/2	1 3/16	1 3/16	7/16	0
	SPAN "V" - GIRDER 5																				
TWENTIETH POINTS	0	.05	.10	.15	.20	.25	.30	.35	.40	.45	.50	.55	.60	.65	.70	.75	.80	.85	.90	.95	1
DEFLECTION DUE TO WEIGHT OF GIRDER	0.000	0.001	0.003	0.006	0.010	0.014	0.019	0.023	0.027	0.031	0.033	0.035	0.035	0.034	0.032	0.029	0.025	0.020	0.014	0.007	0.000
DEFLECTION DUE TO WEIGHT OF SLAB *	0.000	0.004	0.011	0.022	0.038	0.055	0.073	0.091	0.107	0.120	0.129	0.136	0.138	0.135	0.127	0.115	0.098	0.077	0.054	0.028	0.000
DEFLECTION DUE TO WEIGHT OF BARRIER RAIL	0.000	0.000	0.001	0.002	0.004	0.005	0.007	0.009	0.010	0.011	0.012	0.013	0.013	0.013	0.012	0.011	0.009	0.007	0.005	0.003	0.000
TOTAL DEAD LOAD DEFLECTION	0.000	0.005	0.015	0.030	0.052	0.074	0.099	0.123	0.144	0.162	0.174	0.184	0.186	0.182	0.171	0.155	0.132	0.104	0.073	0.038	0.000
VERTICAL CURVE ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
SUPERELEVATION ORDINATE	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CAMBER DUE TO DISSIPATION RESULTING FROM HEAT CURVING **	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
REQUIRED CAMBER	0	1/16	3/16	3/8	5/8	7/8	1 3/16	1 1/2	1 3/4	1 15/16	2 1/16	2 3/16	2 1/4	2 3/16	2 1/16	1 7/8	1 9/16	1 1/4	7/8	7/16	0

SCHEMATIC CAMBER ORDINATES

NOTES:

SLOPE FOR ZERO CAMBER BASE LINE VARIES.

TWENTIETH POINTS SHOWN ARE MEASURED ALONG ℄ GIRDER FOR EACH GIRDER.

DOWNWARD DEFLECTIONS ARE SHOWN AS POSITIVE.

VERTICAL CURVE AND SUPERELEVATION ORDINATES THAT INCREASE CAMBER ARE SHOWN AS POSITIVE.

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

* INCLUDES SLAB, BUILDUPS & STAY-IN-PLACE FORMS.

** HEAT CURVING METHOD IS ALLOWED. CAMBER DISSIPATION RESULTING FROM HEAT CURVING IS ZERO FOR ALL GIRDERS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 9 OF 9 STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III C6162BED9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

DEAD LOAD DEFLECTIONS
SPAN "V"

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

SHEET NO. S-252

TOTAL SHEETS 278

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : FEB 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

01-JUN-2016 11:54
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thorcrall

SPAN W

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	182	5	1	7'-10"	1487
	S2	120	5	1	7'-2"	897
GDR. 1	S3	37	5	1	7'-9"	299
GDR. 2	S3	38	5	1	7'-9"	307
GDR. 3	S3	39	5	1	7'-9"	315
GDR. 4	S3	40	5	1	7'-9"	323
GDR. 5	S3	41	5	1	7'-9"	331
GDR. 1	S4	258	3	3	4'-4"	420
GDR. 2	S4	260	3	3	4'-4"	424
GDR. 3	S4	262	3	3	4'-4"	427
GDR. 4	S4	264	3	3	4'-4"	430
GDR. 5	S4	266	3	3	4'-4"	433
	S5	46	3	2	3'-3"	56
	S6	24	5	STR	6'-0"	150
	✳ S7	10	5	STR	4'-0"	42
GDR. 1	S8	163	4	STR	3'-8"	399
GDR. 2	S8	164	4	STR	3'-8"	402
GDR. 3	S8	165	4	STR	3'-8"	404
GDR. 4	S8	167	4	STR	3'-8"	409
GDR. 5	S8	168	4	STR	3'-8"	411
	S9	16	4	STR	8'-0"	86
	S10	16	4	4	6'-8"	71
	S11	8	6	STR	28'-0"	336
	S12	14	5	5	12'-8"	185

QUANTITIES FOR ONE GIRDER

GIRDER	REINFORCING STEEL	10,000 PSI CONCRETE	0.6"Ø L.R. STRANDS
	LB.	C.Y.	NO.
GDR. 1	4428	41.4	75
GDR. 2	4443	41.7	75
GDR. 3	4456	42.1	75
GDR. 4	4472	42.4	75
GDR. 5	4485	42.8	75

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	VARIES	743.55'

SPAN X

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	182	5	1	7'-10"	1487
	S2	120	5	1	7'-2"	897
GDR. 1	S3	38	5	1	7'-9"	307
GDR. 2	S3	39	5	1	7'-9"	315
GDR. 3	S3	39	5	1	7'-9"	315
GDR. 4	S3	40	5	1	7'-9"	323
GDR. 5	S3	40	5	1	7'-9"	323
GDR. 1	S4	260	3	3	4'-4"	424
GDR. 2	S4	262	3	3	4'-4"	427
GDR. 3	S4	262	3	3	4'-4"	427
GDR. 4	S4	264	3	3	4'-4"	430
GDR. 5	S4	264	3	3	4'-4"	430
	S5	46	3	2	3'-3"	56
	S6	24	5	STR	6'-0"	150
	✳ S7	20	5	STR	4'-0"	83
GDR. 1	S8	164	4	STR	3'-8"	402
GDR. 2	S8	165	4	STR	3'-8"	404
GDR. 3	S8	165	4	STR	3'-8"	404
GDR. 4	S8	166	4	STR	3'-8"	407
GDR. 5	S8	167	4	STR	3'-8"	409
	S9	16	4	STR	8'-0"	86
	S10	16	4	4	6'-8"	71
	S11	8	6	STR	28'-0"	336
	S12	14	5	5	12'-8"	185

QUANTITIES FOR ONE GIRDER

GIRDER	REINFORCING STEEL	10,000 PSI CONCRETE	0.6"Ø L.R. STRANDS
	LB.	C.Y.	NO.
GDR. 1	4484	41.7	75
GDR. 2	4497	41.9	75
GDR. 3	4497	42.1	75
GDR. 4	4511	42.4	75
GDR. 5	4513	42.6	75

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	VARIES	744.50'

SPAN Y

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	182	5	1	7'-10"	1487
S2	120	5	1	7'-2"	897
S3	34	5	1	7'-9"	275
S4	252	3	3	4'-4"	411
S5	46	3	2	3'-3"	56
S6	24	5	STR	6'-0"	150
✳ S7	10	5	STR	4'-0"	42
S8	157	4	STR	3'-8"	385
S9	16	4	STR	8'-0"	86
S10	16	4	4	6'-8"	71
S11	8	6	STR	28'-0"	336
S12	14	5	5	12'-8"	185

QUANTITIES FOR ONE GIRDER

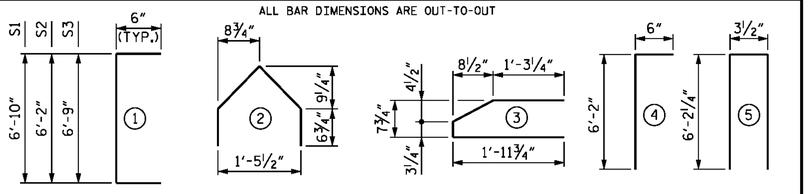
REINFORCING STEEL	10,000 PSI CONCRETE	0.6"Ø L.R. STRANDS
LB.	C.Y.	NO.
4381	39.8	75

GIRDERS REQUIRED

NUMBER	LENGTH	TOTAL LENGTH
5	140.76'	703.80'

BAR TYPES

ALL BAR DIMENSIONS ARE OUT-TO-OUT



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

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 6 OF 6 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

F.I.B. 78" PRESTRESSED CONCRETE GIRDER (SPANS Q THROUGH Y)

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

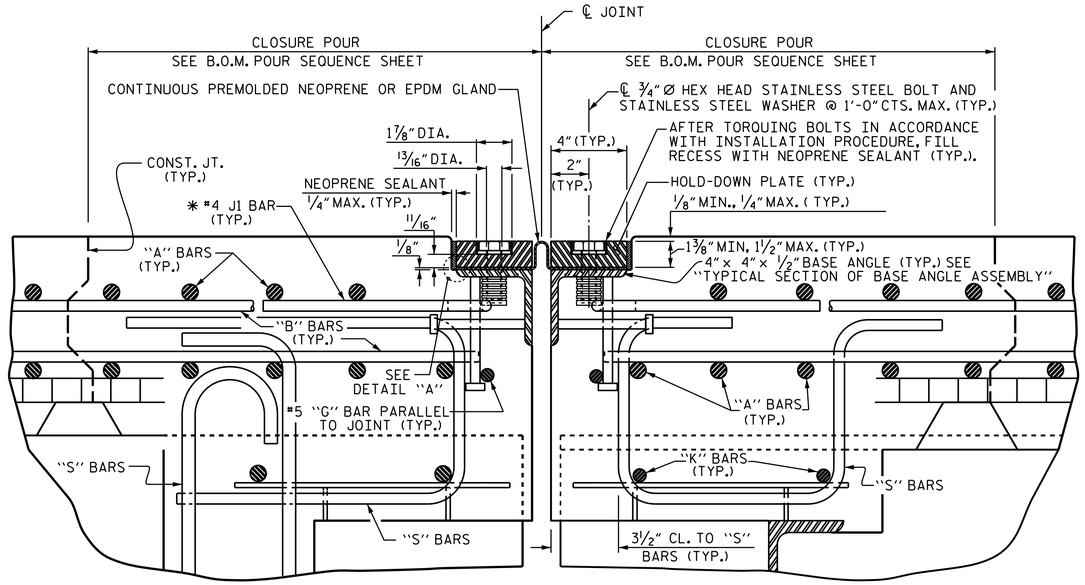
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-253
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	B. LOFLIN	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : FEB 2016
CHECKED BY:	J. SHERMAN	DATE : FEB 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

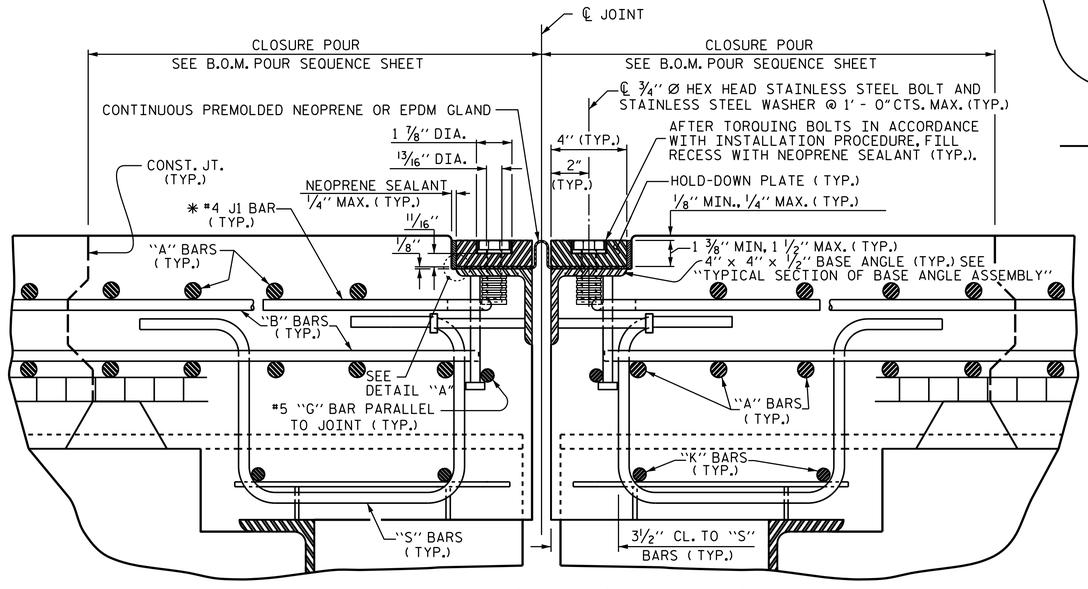
5/12/2016
401_083_B4929_SMU_FIB78_10s.dgn



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT PRESTRESSED CONCRETE GIRDER & STEEL SUPERSTRUCTURE
(BENT 13 SHOWN, BENT 22 SIMILAR BY ROTATION)

✳ 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.



EXPANSION JOINT DETAILS

SECTION NORMAL TO JOINT -- STEEL 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.

ASSEMBLED BY : T. H. CARROLL	DATE : 5/3/16
CHECKED BY : T. R. PETERSON	DATE : 5/3/16
DRAWN BY : REK 9/87	REV. 5/7/03R RWW/JTE
CHECKED BY : CRK 10/87	REV. 5/1/06R TLA/GM
	REV. 10/1/11 MAA/GM

01-JUN-2016 11:54
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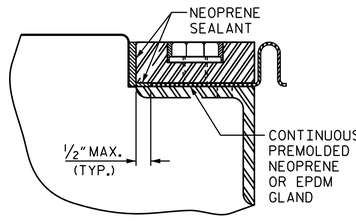
thcarroll

INSTALLATION PROCEDURE

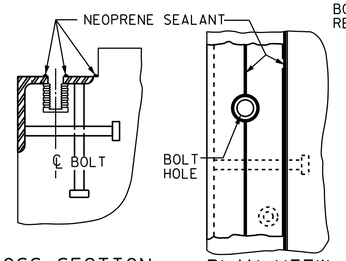
1. A TEMPLATE OR OTHER SUITABLE DEVICE SHALL BE USED TO FORM THE TOP OF THE EXPANSION JOINT SEAL BLOCKOUT TO THE PROPER DEPTH AND WIDTH. THE TEMPLATE SHALL BE 4⅛" TO 4¼" WIDE AND OF SUCH THICKNESS AS TO PROVIDE FOR CORRECT FINAL ELEVATION OF TOP OF HOLD-DOWN PLATES. THE TEMPLATE SHALL BE ATTACHED TO 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 COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
3. LAY THE GLAND ON THE BASE ANGLE AND FIELD MARK THE GLAND FOR THE BOLT HOLES. HOLES IN THE GLAND SHALL BE PUNCHED ⅛" IN DIAMETER WITH A HAND PUNCH.
4. IN ORDER TO CHECK FOR PROPER ALIGNMENT, PLACE THE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. DO NOT APPLY NEOPRENE SEALANT. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE BUT DO NOT TIGHTEN. THE ENGINEER SHALL INSPECT THE JOINT SEAL DEVICE FOR PROPER ALIGNMENT.
5. AFTER INSPECTION, REMOVE THE HOLD-DOWN PLATES AND GLAND. APPLY NEOPRENE SEALANT TO THE BASE ANGLE IN ACCORDANCE WITH THE "INSTALLATION SKETCH". PLACE GLAND AND HOLD-DOWN PLATES ON THE BASE ANGLE. BOLT THE HOLD-DOWN PLATES TO THE BASE ANGLE ASSEMBLY AND TORQUE THE BOLTS TO 88 FT-LBS WITH A TORQUE WRENCH. CHECK THE TORQUE AFTER THREE (3) HOURS AND, IF NECESSARY, RETIGHTEN TO 88 FT-LBS. A FINAL CHECK SHALL BE MADE AT SEVEN (7) DAYS. TORQUE SHALL NOT BE LESS THAN 80 FT-LBS AFTER SEVEN (7) DAYS.
6. AFTER PROPER TORQUING, CLEAN THE BOLT HOLE RECESSES AND THE RECESS BETWEEN THE JOINT SEAL DEVICE AND CONCRETE, COMPLETELY FILL THESE RECESSES WITH NEOPRENE SEALANT.

GENERAL NOTES

1. FOR EXPANSION JOINT SEALS, SEE SPECIAL PROVISIONS.
2. ALL PLATES AND ANGLES SHALL CONFORM TO AASHTO M270 GRADE 36 STEEL OR APPROVED EQUAL. ALL HOLD-DOWN BOLTS SHALL CONFORM TO ASTM F593 ALLOY 304 STAINLESS STEEL AND WASHERS SHALL CONFORM TO ASTM F844 EXCEPT THEY SHALL BE MADE FROM ALLOY 304 STAINLESS STEEL. ALL STUD ANCHORS SHALL CONFORM TO AASHTO M169, GRADES 1010 THRU 1020 OR APPROVED EQUAL. ALL CONCRETE INSERTS SHALL BE CLOSED END AND SHALL CONFORM TO AASHTO M169, GRADE 12L14. TENSILE CAPACITY SHALL BE 3,000 LBS. MIN.
3. A PREMOLDED CORRUGATED OR NON-CORRUGATED GLAND SHALL BE USED FOR JOINTS SKEWED BETWEEN 50° THRU 130°. FOR JOINTS SKEWED LESS THAN 50° OR MORE THAN 130°, ONLY A CORRUGATED GLAND SHALL BE USED.
4. CLOSED END FERRULES AND STUD ANCHORS SHALL BE SHOP WELDED AND ALL HOLES SHALL BE SHOP DRILLED AS SHOWN ON PLANS. STUD ANCHORS SHALL BE ELECTRIC ARC END WELDED WITH COMPLETE FUSION.
5. SURFACES COMING IN CONTACT WITH NEOPRENE SHALL BE GROUND SMOOTH PRIOR TO METALLIZING.
6. UPON COMPLETION OF SHOP FABRICATION, THE HOLD DOWN PLATE AND BASE ANGLE ASSEMBLY, AS SHOWN IN THE "TYPICAL SECTION OF BASE ANGLE ASSEMBLY", SHALL BE METALLIZED. SEE SPECIAL PROVISION FOR THERMAL SPRAYED COATINGS (METALLIZATION).
7. BASE ANGLE ASSEMBLY SHALL BE CONTINUOUS FOR THE LENGTH OF THE JOINT. AT CROWN BREAKS, THE ENDS OF THE BASE ANGLE ASSEMBLY SHALL BE CUT PARALLEL TO THE BRIDGE CENTERLINE FOR SKEWS LESS THAN 80° AND GREATER THAN 100°. FINISHED WELD SHALL BE GROUND SMOOTH AND COATED WITH A MINIMUM THICKNESS OF 4 DRY MILS OF ZINC-RICH PAINT IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
8. FIELD SPLICES OF HOLD-DOWN PLATES SHALL BE KEPT TO A MINIMUM. CONTRACTOR SHALL FURNISH DETAILED PLANS SHOWING PROPOSED SPLICE LOCATIONS FOR APPROVAL. HOLD-DOWN PLATES SHALL NOT EXCEED 20' LENGTHS UNLESS APPROVED BY THE ENGINEER.
9. NO ALTERNATE JOINT DETAILS SHALL BE PERMITTED IN LIEU OF THOSE SHOWN ON THESE PLANS.
10. THE CONTRACTOR MAY, AT HIS OPTION, USE ADHESIVELY ANCHORED ANCHOR BOLTS IN PLACE OF CONCRETE INSERTS FOR COVER PLATES. THE YIELD LOAD OF THE ¾"Ø BOLT IS 10 KIPS. FIELD TESTING OF THE ADHESIVE BONDING SYSTEM IS NOT REQUIRED.

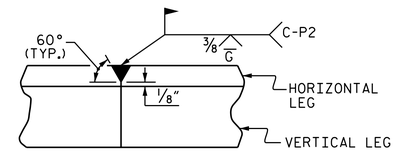


DETAIL "A"



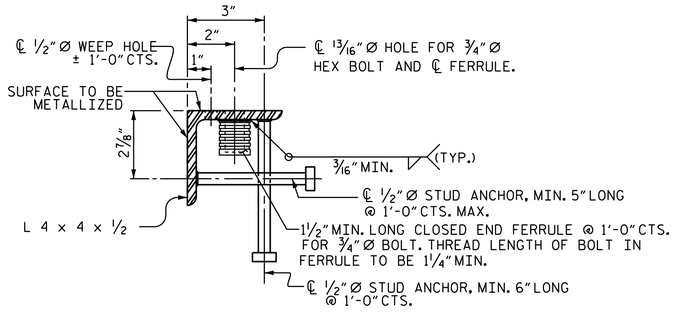
CROSS SECTION PLAN VIEW

INSTALLATION SKETCH



DETAIL- FIELD WELD
SPLICE OF BASE ANGLE

MOVEMENT AND SETTING AT JOINT					
LOCATION	SKEW ANGLE	TOTAL MOVEMENT (ALONG ℄ RDWY)	PERPENDICULAR JOINT OPENING AT 45° F	PERPENDICULAR JOINT OPENING AT 60° F	PERPENDICULAR JOINT OPENING AT 90° F
BENT 13	90°-00'-00"	2 13/16"	3"	2½"	1½"
BENT 16	90°-00'-00"	3"	3⅛"	2⅝"	1 9/16"
BENT 19	90°-00'-00"	3"	3⅛"	2⅝"	1 9/16"
BENT 22	90°-00'-00"	2⅞"	3 1/16"	2⅜"	1½"



TYPICAL SECTION OF BASE ANGLE ASSEMBLY

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER THEY H. CARROLL III

DocuSigned by: Trey H. Carroll III
C61628E0D9C74BE...

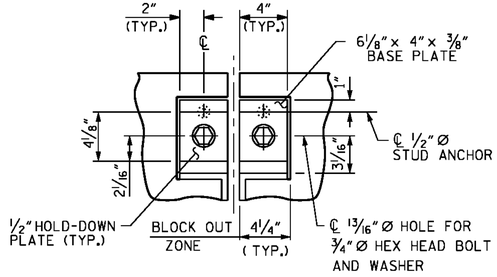
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

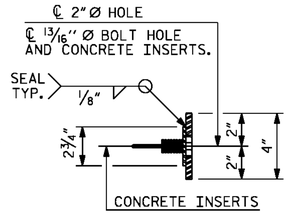
PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-
SHEET 1 OF 4 STEEL ALTERNATE

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

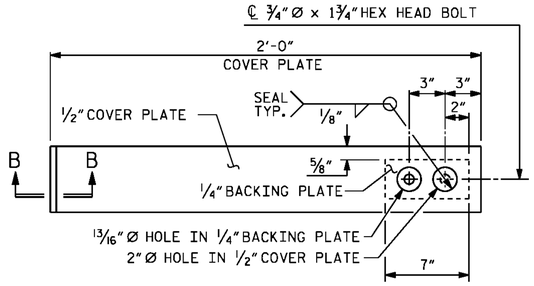
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-254
1			3			TOTAL SHEETS
2			4			278

STD. NO. EJS1





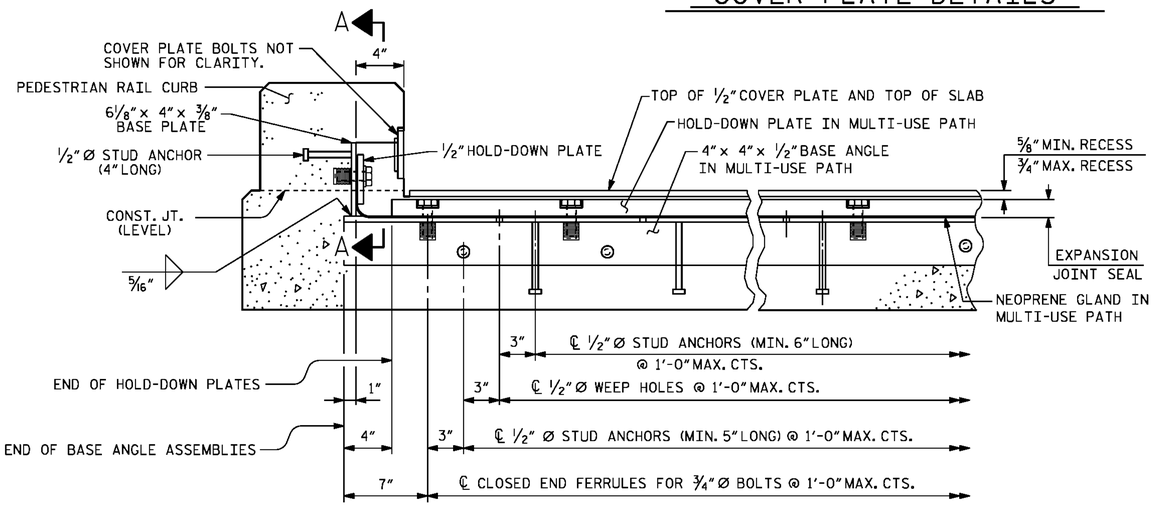
END VIEW



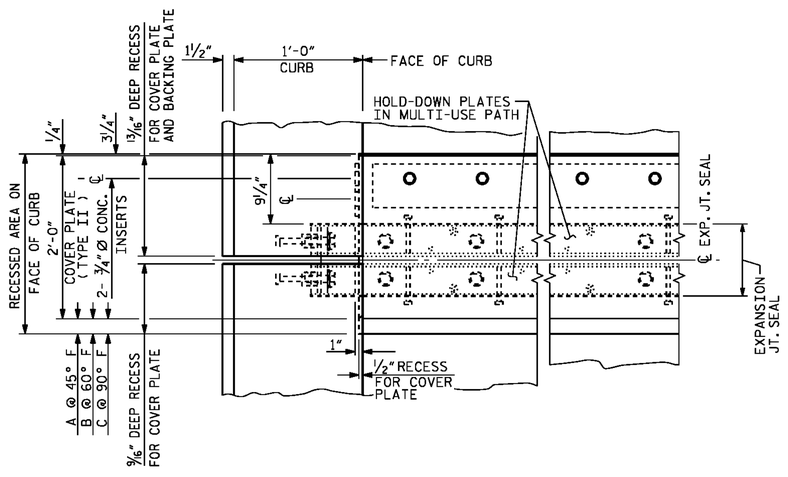
TYPE II - ELEVATION VIEW

COVER PLATE DETAILS

SECTION A - A

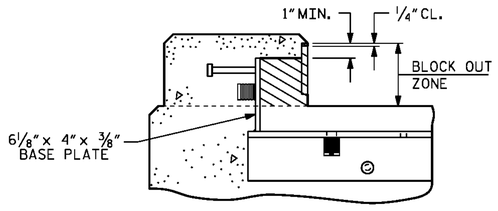


SECTION THRU RAIL NORMAL TO JOINT @ MULTI-USE PATH



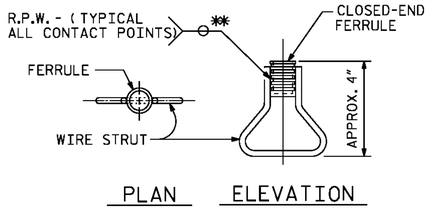
PLAN OF EXPANSION JOINT SEAL @ MULTI-USE PATH

COVER PLATE SHALL BE MOUNTED ON BRIDGE SIDE OF EXPANSION JOINT @ BOTH END BENTS



BLOCK OUT DETAIL

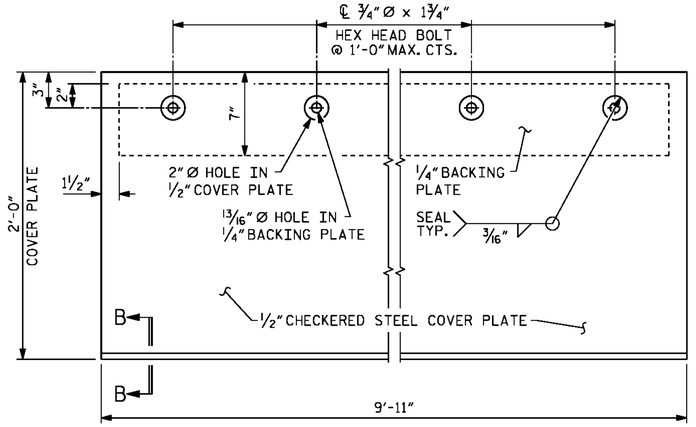
SEE " SECTION A - A " FOR OTHER DETAILS.



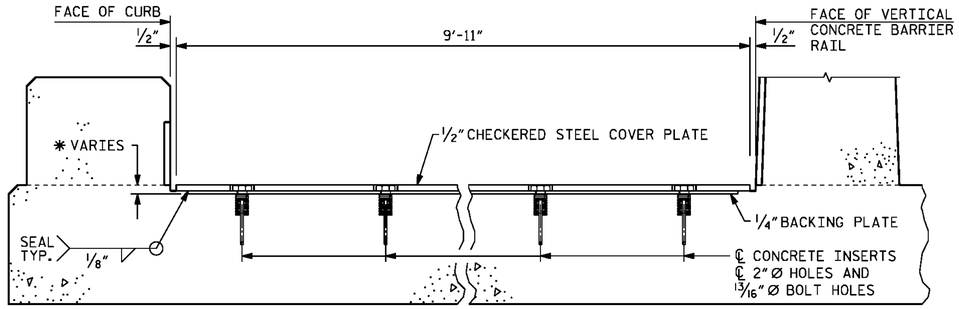
PLAN ELEVATION

CONCRETE INSERT

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



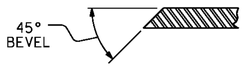
TYPE II - PLAN VIEW



SECTION VIEW

* 13⁄16" FOR THE SIDE OF THE JOINT HAVING THE ½" COVER PLATE WITH ¼" BACKING PLATE
9⁄16" FOR THE SIDE OF THE JOINT HAVING ONLY THE ½" COVER PLATE

COVER PLATE DETAILS



SECTION B - B

TABLE OF JOINT OPENINGS			
BENT NO.	Ⓐ	Ⓑ	Ⓒ
EB1	1⅝"	1½"	1³⁄16"
3	2⅛"	1¾"	1"
6	2⁷⁄16"	2"	1⁄16"
10	2⁷⁄16"	2"	1⁄16"
13	3"	2½"	1½"
16	3⅛"	2⅝"	1⁹⁄16"
19	3⅛"	2⅝"	1⁹⁄16"
22	3⁄16"	2⁹⁄16"	1½"
25	2³⁄16"	2"	1³⁄16"
26	1⅝"	1½"	1³⁄16"
EB2	1⅝"	1½"	1³⁄16"

NOTES

INSTALLATION PROCEDURE SHOWN ON SHEET 1 OF 4 SHALL BE COMPLETE PRIOR TO INSTALLATION OF CHECKERED STEEL COVER PLATE.

NO FIELD SPLICE IN HOLD-DOWN PLATES IN MULTI-USE PATH PERMITTED.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 4 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

EXPANSION JOINT SEAL DETAILS FOR PEDESTRIAN RAIL CURB

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-255
1			3			TOTAL SHEETS
2			4			278

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16

DocuSigned by: Jason R Doughty 00F1C8644B274F7...

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	J. SMITH	DATE : NOV 2015
DRAWN BY:	K. WHITE	DATE : NOV 2015
CHECKED BY:	J. DOUGHTY	DATE : MAY 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

DRAWN BY :	REK	9/	REV. 10/1/11 MAA/GM
CHECKED BY :	CRK	10/	REV. 7/12 MAA/GM
			REV. 6/13 MAA/GM

5/11/2016
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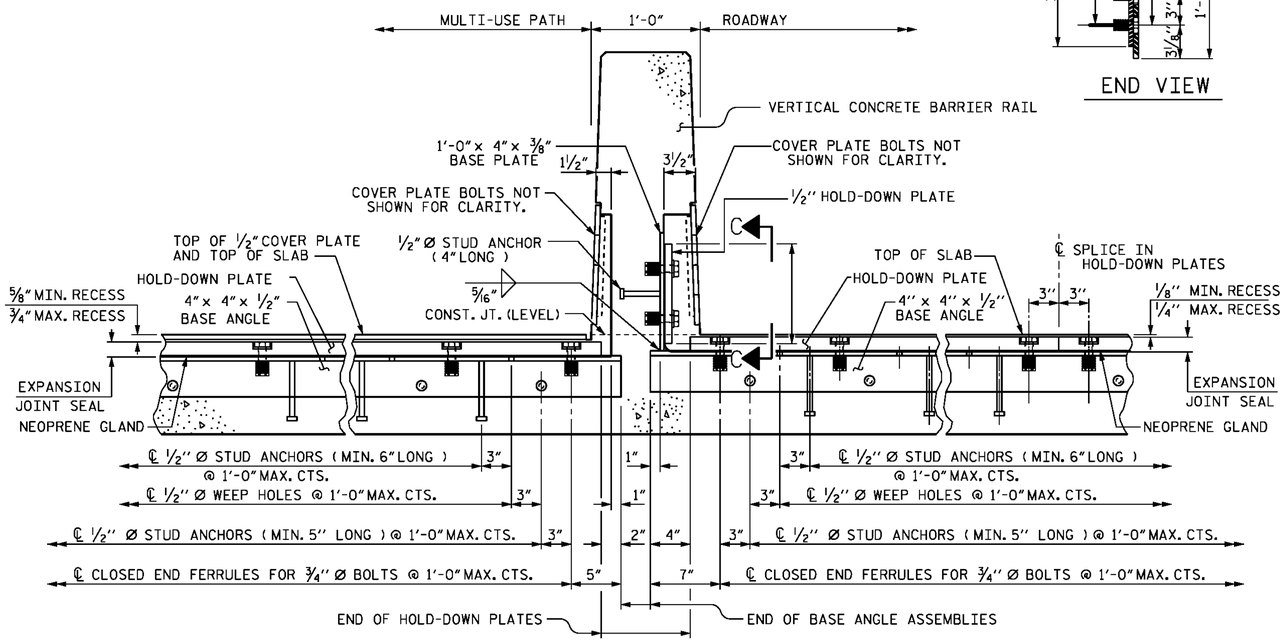
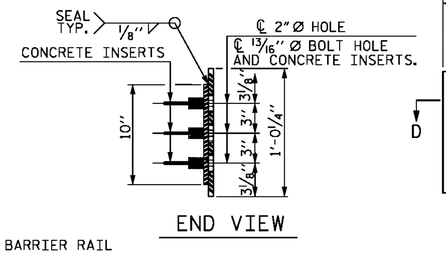
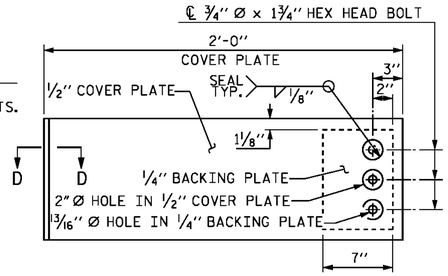


SECTION THRU RAIL NORMAL TO JOINT

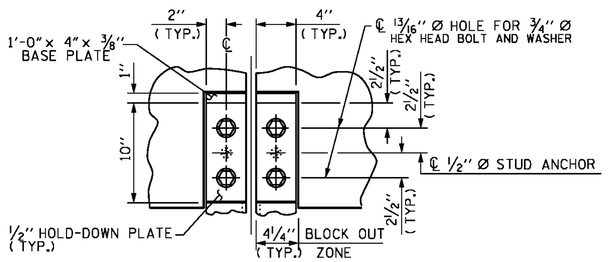


END VIEW



TYPE II - ELEVATION VIEW

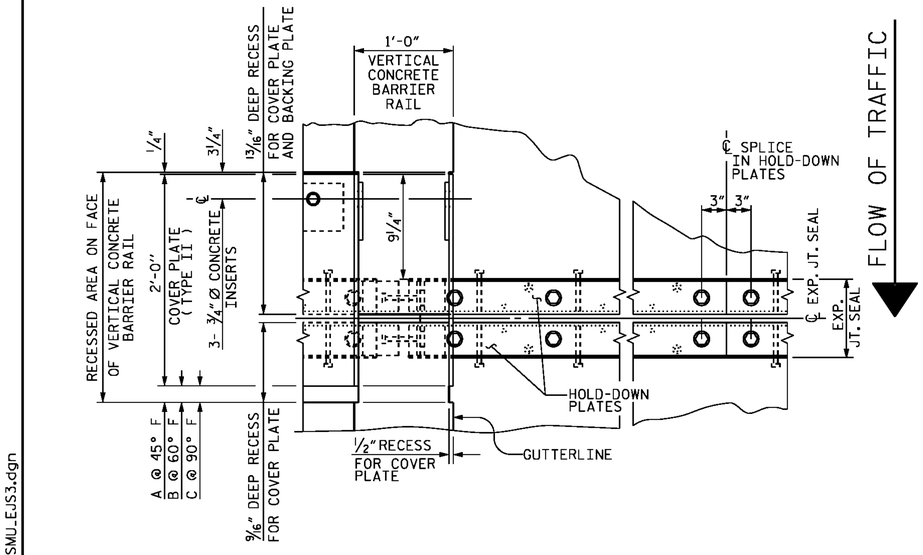
COVER PLATE DETAILS



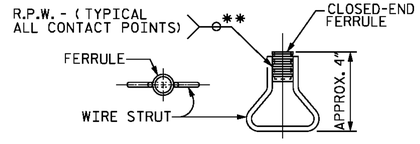
SECTION C - C

SECTION D - D

TABLE OF JOINT OPENINGS			
BENT NO.	Ⓐ	Ⓑ	Ⓒ
EB1	1 5/8"	1 1/2"	1 3/16"
3	2 1/8"	1 3/4"	1"
6	2 7/16"	2"	1 1/16"
10	2 7/16"	2"	1 1/16"
13	3"	2 1/2"	1 1/2"
16	3 1/8"	2 5/8"	1 3/16"
19	3 1/8"	2 5/8"	1 3/16"
22	3 1/16"	2 9/16"	1 1/2"
25	2 1/16"	1 3/4"	1 1/8"
26	1 5/8"	1 1/2"	1 3/16"
EB2	1 5/8"	1 1/2"	1 3/16"



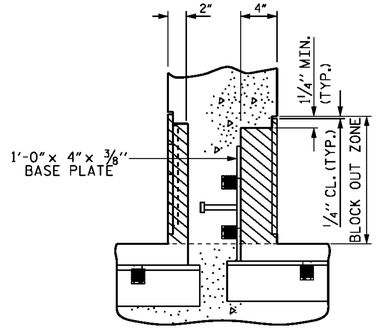
PLAN OF EXPANSION JOINT SEAL



PLAN ELEVATION

CONCRETE INSERT

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



BLOCK OUT DETAIL

SEE "SECTION C-C" FOR OTHER DETAILS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 4 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

EXPANSION JOINT SEAL DETAILS FOR VERTICAL CONCRETE BARRIER RAIL

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
C0F1C8648274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

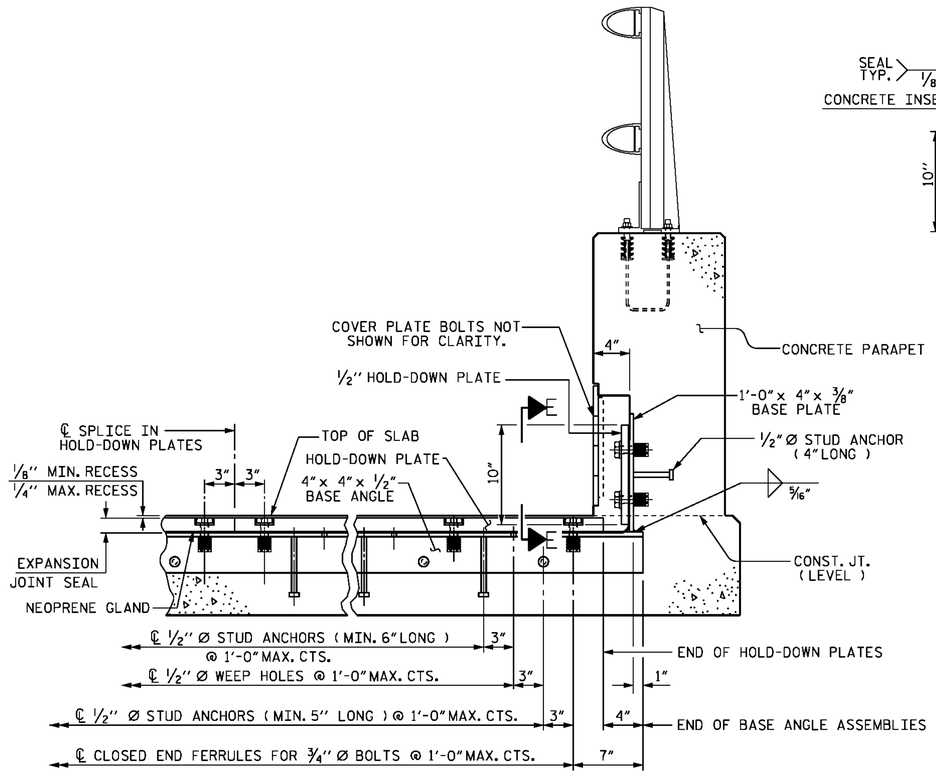
REVISIONS					
NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		

SHEET NO. S-256

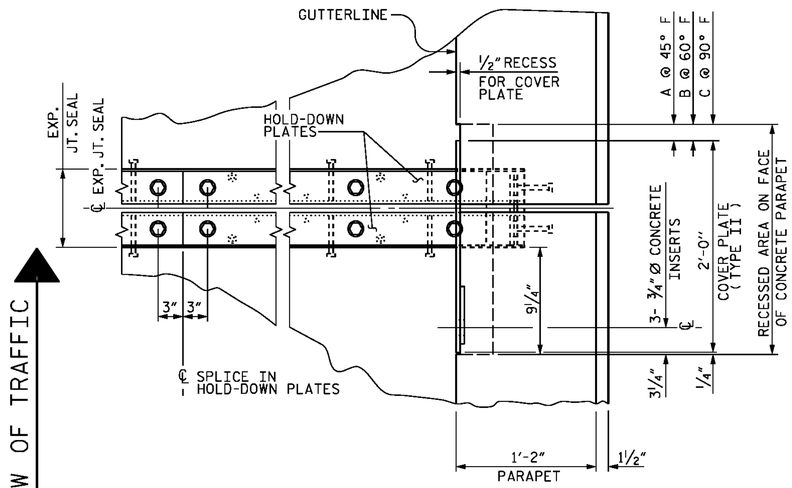
TOTAL SHEETS 278

DESIGNED BY:	J. SMITH	DATE : NOV 2015
DRAWN BY:	K. WHITE	DATE : NOV 2015
CHECKED BY:	J. DOUGHTY	DATE : MAY 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

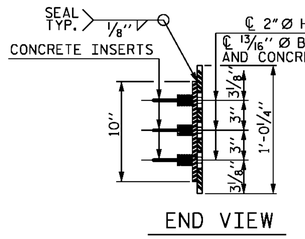
5/11/2016
401_089_B4929_SMU_EJS3.dgn



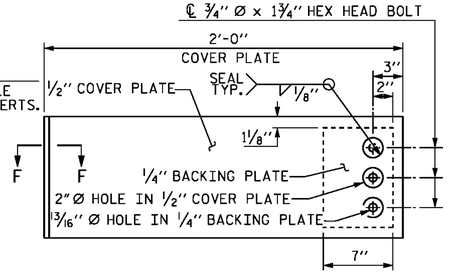
SECTION THRU PARAPET NORMAL TO JOINT



PLAN OF EXPANSION JOINT SEAL - RIGHT SIDE

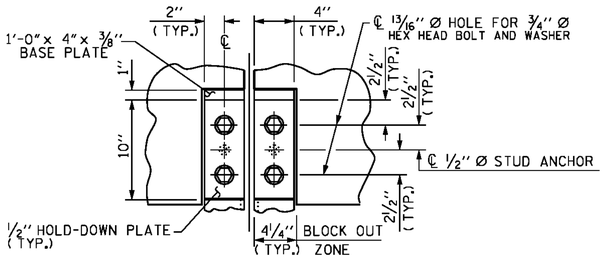


END VIEW

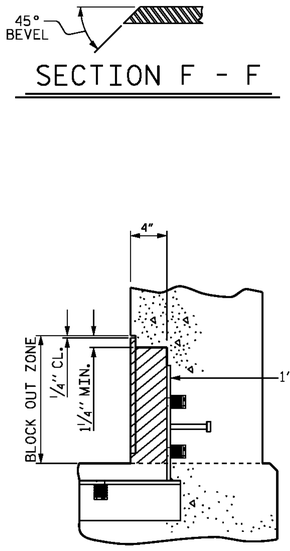


TYPE II - ELEVATION VIEW

COVER PLATE DETAILS



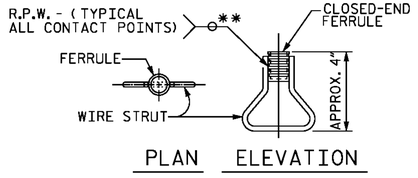
SECTION E - E



SECTION F - F

BLOCK OUT DETAIL

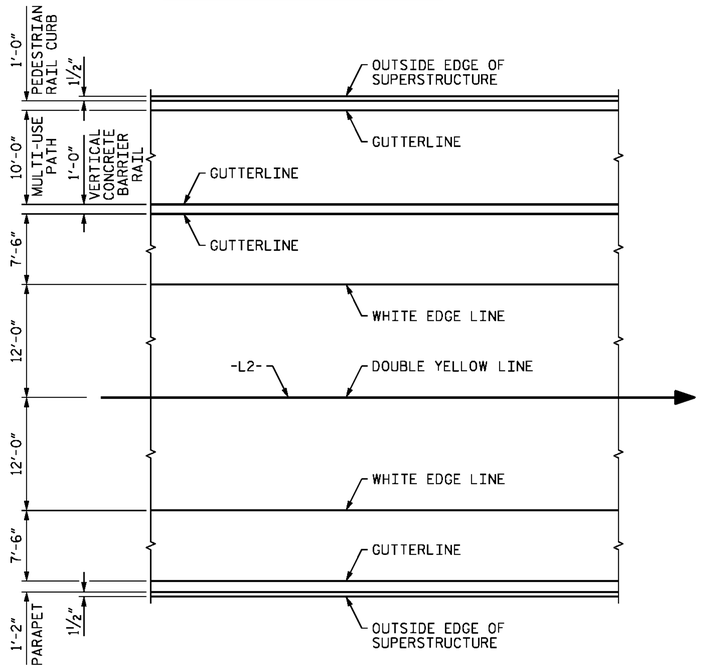
SEE "SECTION E-E" FOR OTHER DETAILS.



PLAN ELEVATION

CONCRETE INSERT

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



PAVEMENT MARKING ALIGNMENT

TABLE OF JOINT OPENINGS			
BENT NO.	Ⓐ	Ⓑ	Ⓒ
EB1	1⅝"	1½"	1 3/16"
3	2⅛"	1¾"	1"
6	2 7/16"	2"	1 1/16"
10	2 7/16"	2"	1 1/16"
13	3"	2½"	1½"
16	3⅛"	2⅝"	1 9/16"
19	3⅛"	2⅝"	1 9/16"
22	3 1/16"	2 9/16"	1½"
25	2 1/16"	1¾"	1⅛"
26	1⅝"	1½"	1 3/16"
EB2	1⅝"	1½"	1 3/16"

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 4 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

EXPANSION JOINT SEAL DETAILS FOR CONCRETE PARAPET

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-257
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	J. SMITH	DATE : NOV 2015
DRAWN BY:	K. WHITE	DATE : NOV 2015
CHECKED BY:	J. DOUGHTY	DATE : MAY 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

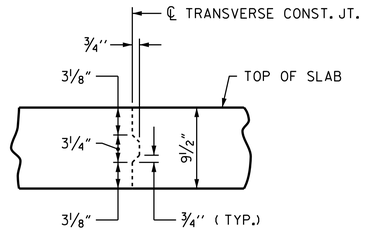
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032987 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

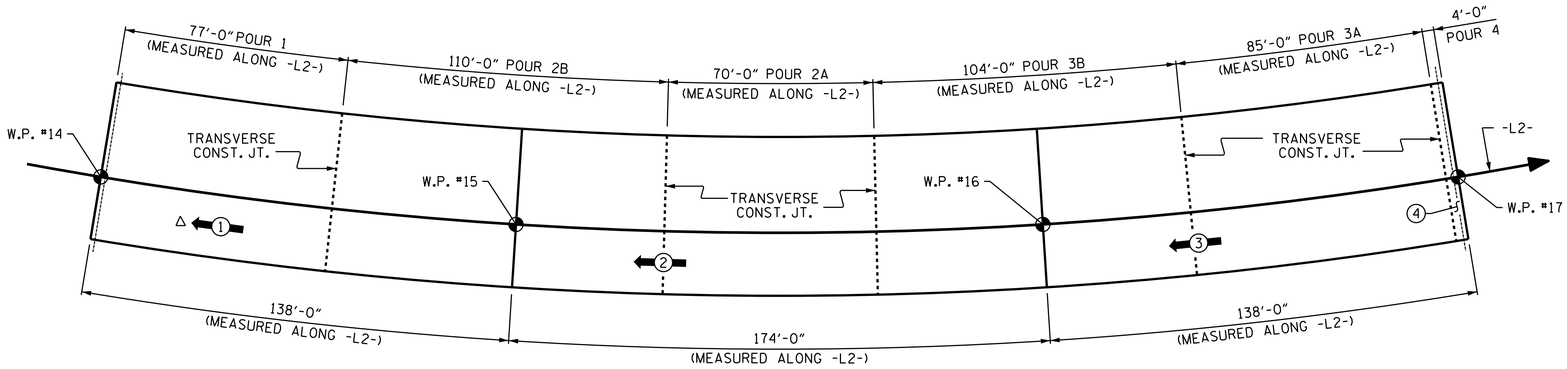
5/11/2016
401_091_B4929_SMU_EJS4.dgn

SUPERSTRUCTURE REINFORCING STEEL LENGTHS ARE BASED ON THE FOLLOWING MINIMUM SPLICE LENGTHS					
BAR SIZE	SUPERSTRUCTURE EXCEPT APPROACH SLABS, PARAPET, AND BARRIER RAIL		APPROACH SLABS		PARAPET AND BARRIER RAIL
	EPOXY COATED	UNCOATED	EPOXY COATED	UNCOATED	
#4	2'-0"	1'-9"	2'-0"	1'-9"	2'-9"
#5	2'-6"	2'-2"	2'-6"	2'-2"	3'-5"
#6	3'-0"	2'-7"	3'-10"	2'-7"	4'-4"
#7	5'-3"	3'-6"			
#8	6'-10"	4'-7"			



TRANSVERSE CONSTRUCTION JOINT DETAIL

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

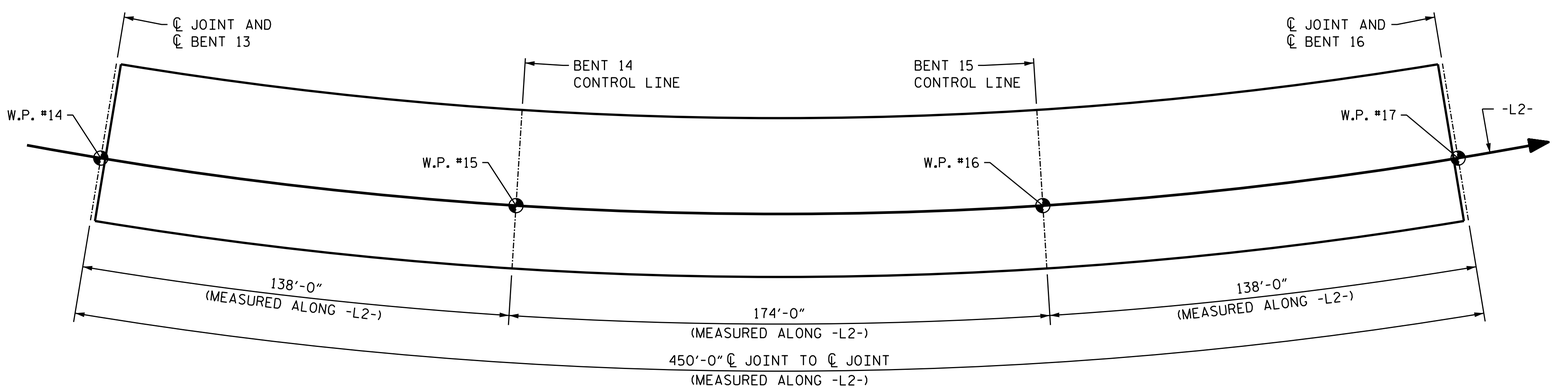


SPAN N SPAN O SPAN P

POURING SEQUENCE

(#) INDICATES THE NUMBER AND DIRECTION OF POUR

SPANS "N", "O" AND "P" SHOWN,
SPANS "O", "R", "S" AND "T", "U", "V" SIMILAR

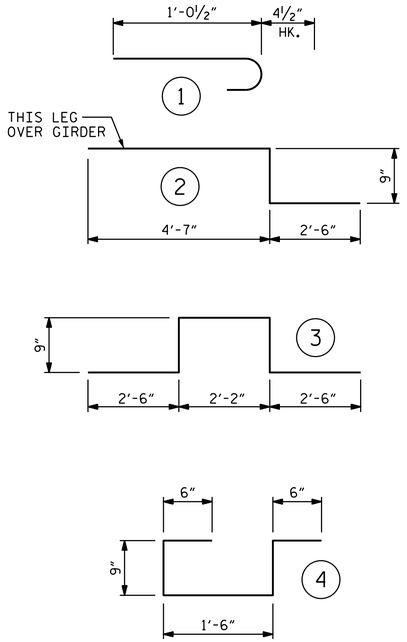


SPAN N SPAN O SPAN P

LAYOUT FOR COMPUTING AREA REINFORCED CONCRETE DECK SLAB (SQ. FT. = 23,495 SF)

SPANS "N", "O" AND "P" SHOWN,
SPANS "O", "R", "S" AND "T", "U", "V" SIMILAR

BAR TYPES



ALL BAR DIMENSIONS ARE OUT TO OUT

BILL OF MATERIAL

SPANS "N", "O" AND "P"

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
✱A1	1992	5	STR	52'-1"	108211
✱B1	288	4	STR	24'-3"	4665
✱B2	560	5	STR	59'-3"	34607
✱B3	278	5	STR	44'-6"	12903
✱B4	278	5	STR	60'-0"	17397
✱B5	108	4	STR	27'-7"	1990
✱G1	2	5	STR	52'-1"	109
✱J1	102	4	1	1'-5"	97
✱K1	12	5	2	7'-10"	98
✱K2	18	5	3	8'-8"	163
✱K3	24	5	STR	9'-3"	232
✱S1	80	4	4	4'-0"	214

✱ EPOXY COATED REINFORCING STEEL (LBS.) 180,472

CLASS AA CONCRETE

	(CU. YDS.)
POUR 1	140.5
POUR 2A	125.6
POUR 2B	197.3
POUR 3A	152.5
POUR 3B	186.6
POUR 4	8.5
TOTALS✱✱	811.0

✱✱ QUANTITIES FOR BARRIER RAIL AND PARAPET ARE NOT INCLUDED.

QUANTITIES FOR SPANS "N", "O" AND "P" SHOWN, SPANS "O", "R", "S" AND "T", "U", "V" SIMILAR

GROOVING BRIDGE FLOORS		
APPROACH SLABS	-	SQ.FT.
BRIDGE DECK	19,238	SQ.FT.
TOTAL	19,238	SQ.FT.

NOTES:

TRANSVERSE CONSTRUCTION JOINTS ARE TO BE PLACED RADIALLY ALONG -L2-.

△ IF THE CONTRACTOR CHOOSES TO REVERSE THE DIRECTION OF POUR #1, A CONSTRUCTION JOINT WILL BE REQUIRED 4'-0" FROM THE JOINT SEAL.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

STEEL ALTERNATE

6/1/2016

NORTH CAROLINA PROFESSIONAL SEAL 041992 ENGINEER TREY H. CARROLL III

DocuSigned by: Trey H. Carroll III C61628ED9C74BE...

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUPERSTRUCTURE

BILL OF MATERIAL

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-258
1			3			TOTAL SHEETS
2			4			278

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DRAWN BY : K. WHITE DATE : FEB 2016
CHECKED BY : T. H. CARROLL DATE : MAR 2016
DESIGN ENGINEER OF RECORD: T. H. CARROLL DATE : MAY 2016

01-JUN-2016 11:54
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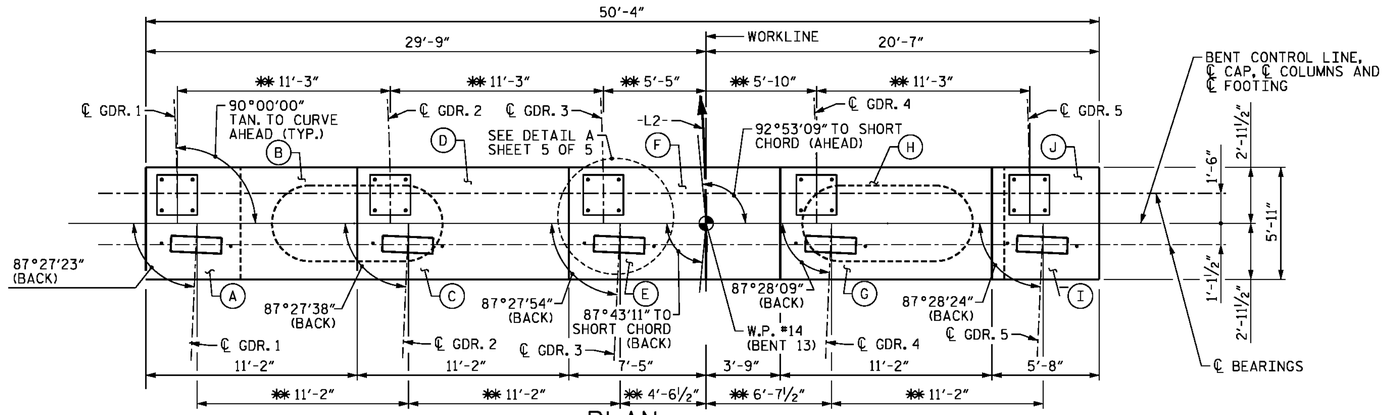
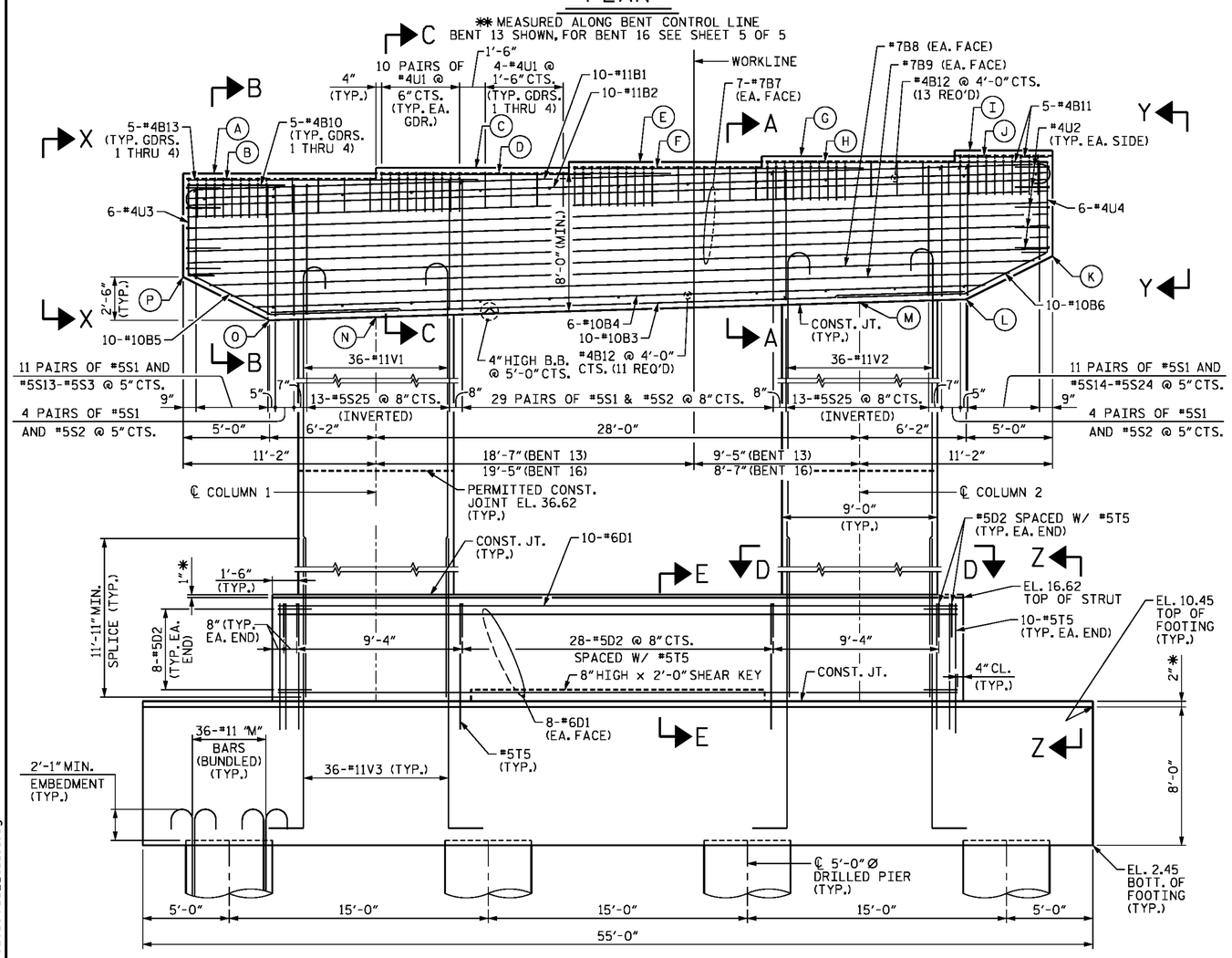


PLAN



NOTES

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

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

"T" BARS IN FOOTING MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN AND DRILLED PIER REINFORCEMENT.

FOR FOUNDATION NOTES, SEE "FOUNDATION NOTES" SHEET.

FOR SECTIONS AND VIEWS, SEE SHEET 2 OF 5 AND SHEET 3 OF 5.

FOR FOOTING AND DRILLED PIER REINFORCING DETAILS, SEE SHEET 3 OF 5 AND SHEET 4 OF 5.

✱ THE FOOTING AND STRUT ARE SLOPED TO DRAIN.

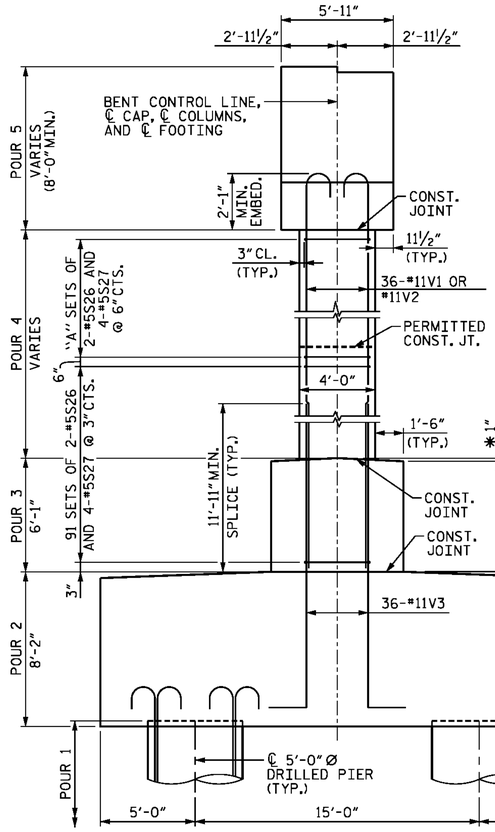
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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.

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.

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



END VIEW

BAR QUANTITY "A"	
BENT 13 COLUMN 1	41
BENT 13 COLUMN 2	42
BENT 16 COLUMN 1	48
BENT 16 COLUMN 2	50

ELEVATION

FOOTING REINFORCEMENT NOT SHOWN FOR CLARITY, SEE SHEET 3 OF 5.

ELEVATION TABLE																
BENT	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
13	62.51	62.15	62.85	62.49	63.18	62.83	63.51	63.16	63.85	63.50	57.68	55.18	54.99	54.15	53.97	56.47
16	65.88	65.76	66.22	66.10	66.55	66.44	66.89	66.78	67.23	67.11	61.29	58.79	58.60	57.76	57.57	60.07

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 5 STEEL ALTERNATE

DESIGNED BY:	E. ULLMER DATE : MAR 2016
DRAWN BY:	M. HOBBS DATE : MAR 2016
CHECKED BY:	B. LOFLIN DATE : APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

BENTS 13 AND 16 PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-259
1			3			TOTAL SHEETS
2			4			278

5/12/2016
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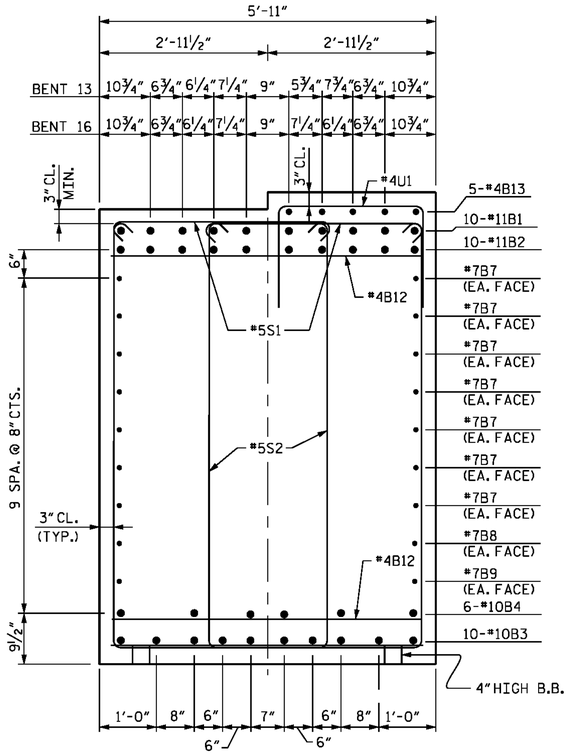
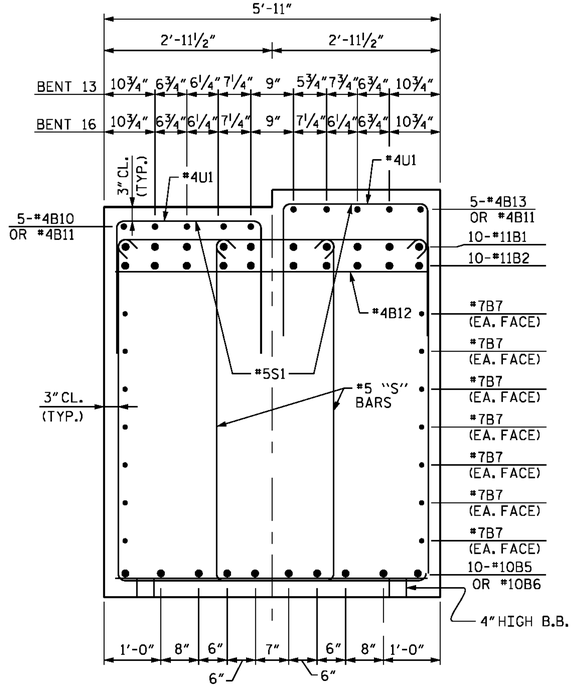
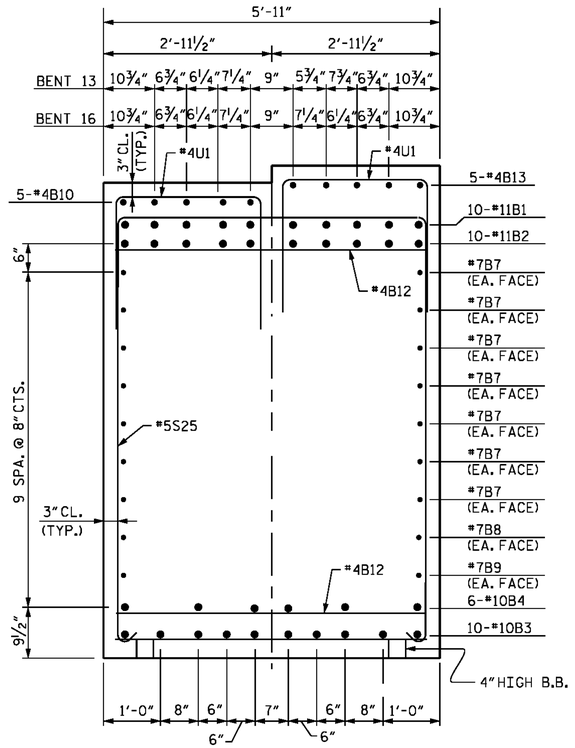


SECTION A-A



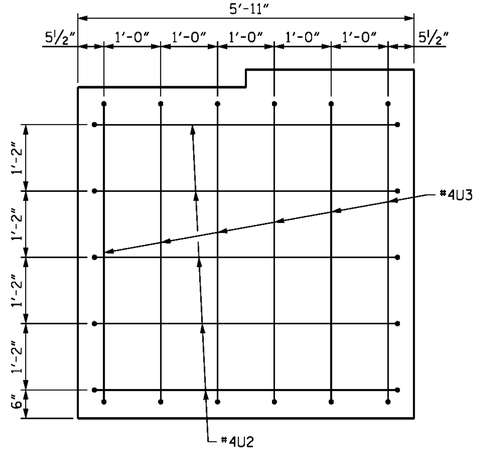
SECTION B-B



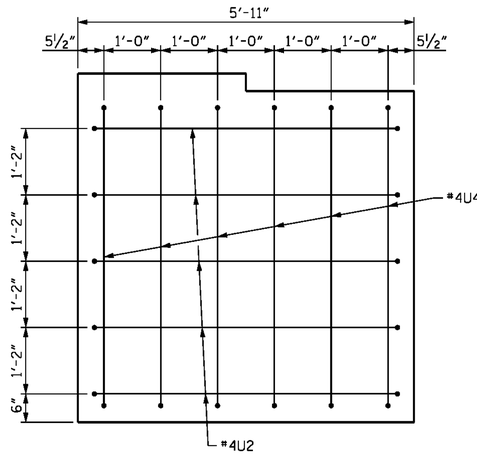
SECTION C-C

NOTES

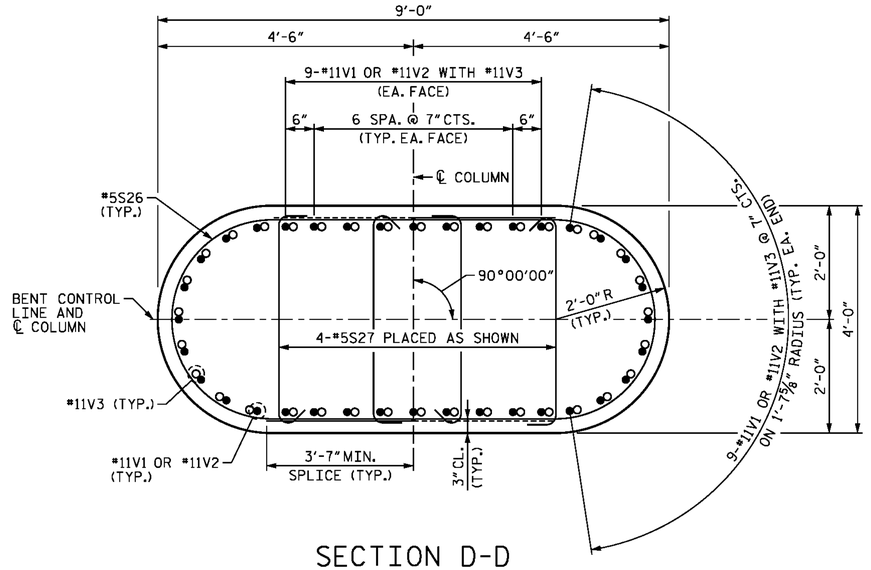
FOR NOTES, SEE SHEET 1 OF 5.



VIEW X-X



VIEW Y-Y



SECTION D-D

WHEN PLACING *5S27 BARS, ALTERNATE THE POSITION OF THE 135° HOOK HORIZONTALLY AND VERTICALLY.

ALTERNATE DIRECTION OF *5S26 TO STAGGER LAPS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 5 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 13 AND 16 SECTIONS AND DETAILS

DESIGNED BY:	E. ULLMER	DATE :	MAR 2016		
DRAWN BY:	M. HOBBS	DATE :	MAR 2016		
CHECKED BY:	B. LOFLIN	DATE :	APR 2016		
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016		

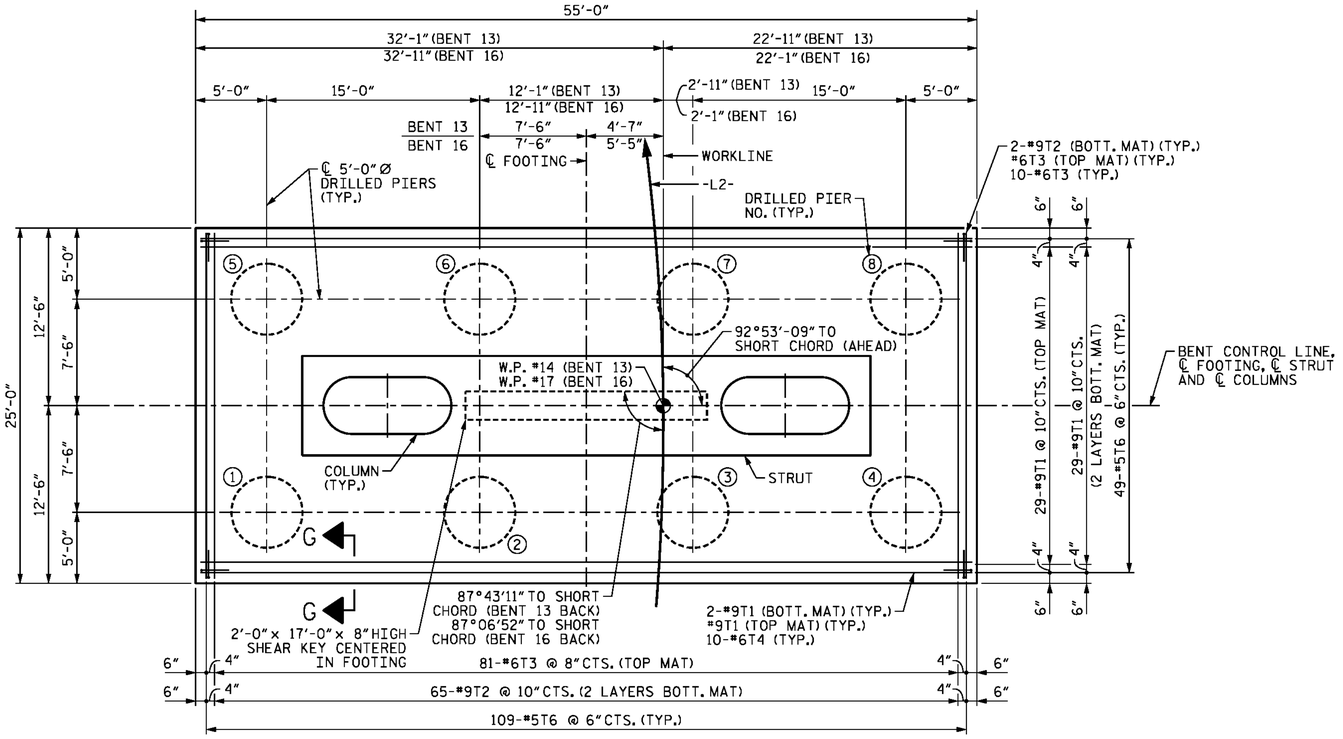
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

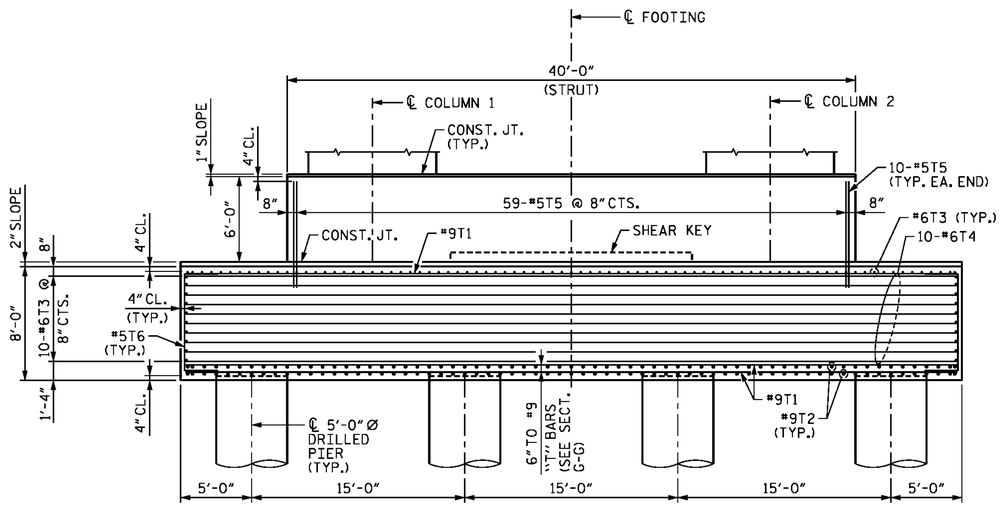
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-260
1			3			TOTAL SHEETS
2			4			278

5/12/2016
401_097_B4929_SMU_IB13_2s.dgn

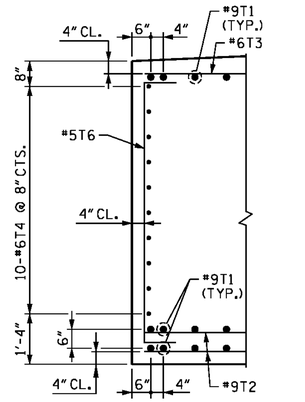


FOOTING PLAN

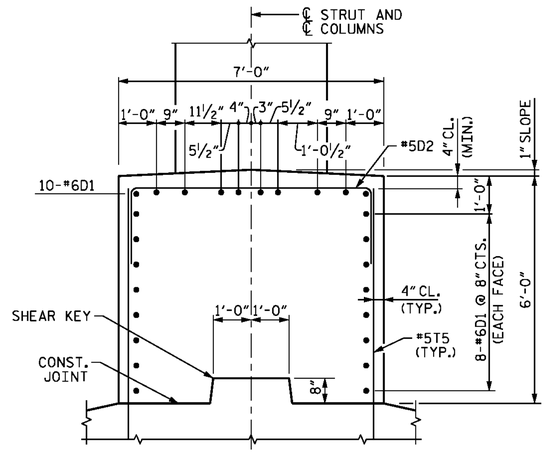


FOOTING AND STRUT ELEVATION

COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.

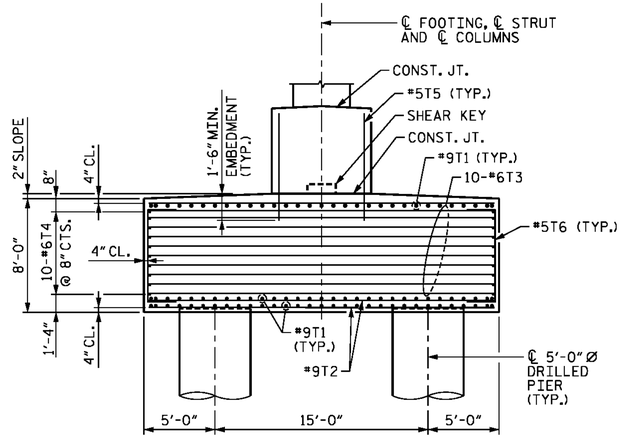


SECTION G-G



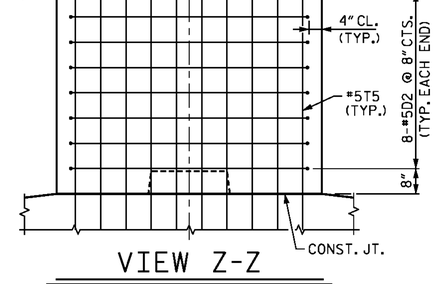
SECTION E-E

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.



SIDE ELEVATION

COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.



VIEW Z-Z

NOTES

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 5 STEEL ALTERNATE

DESIGNED BY:	E. ULLMER	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	FEB 2016
CHECKED BY:	B. LOFLIN	DATE :	MAY 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 13 AND 16 SECTIONS AND DETAILS

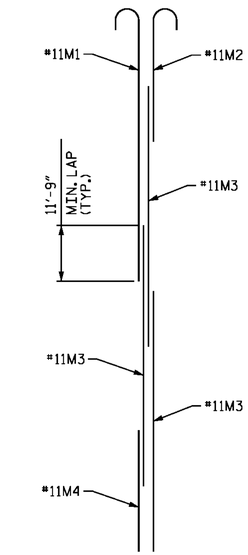
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-261
1			3			TOTAL SHEETS
2			4			278

5/12/2016
401099_B4929_SMU_IB13_3s.dgn

NOTES

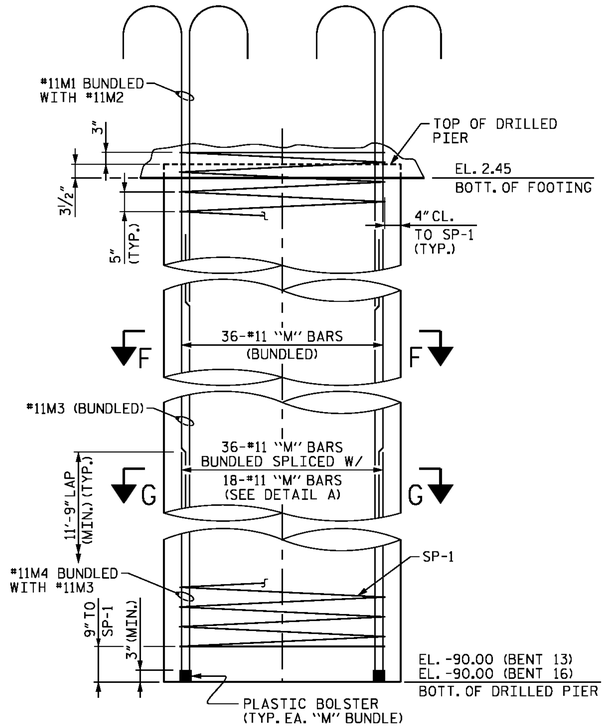
FOR NOTES, SEE SHEET 1 OF 5.

FOR BAR TYPES, SEE SHEET 5 OF 5.

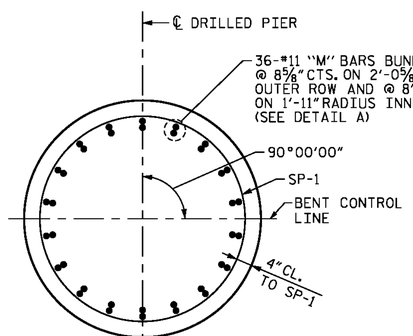


DETAIL A

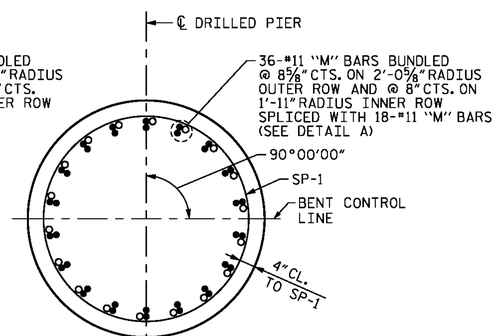
ONE BUNDLE SHOWN, REINFORCING STEEL IS TYPICAL FOR EACH BUNDLE.



DRILLED PIER ELEVATION



SECTION F-F



SECTION G-G

BILL OF MATERIAL

BENT 13

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816	T1	93	9	STR	54'-4"	17180
B2	10	#11	STR	49'-10"	2648	T2	134	9	STR	24'-4"	11086
B3	10	#10	STR	40'-4"	1736	T3	83	6	STR	24'-4"	3034
B4	6	#10	STR	42'-0"	1084	T4	20	6	STR	54'-4"	1632
B5	10	#10	2	10'-0"	430	T5	138	5	STR	7'-2"	1032
B6	10	#10	3	10'-0"	430	T6	316	5	9	8'-6"	2801
B7	14	#7	STR	49'-10"	1426						
B8	2	#7	STR	47'-4"	193	U1	116	4	9	6'-5"	497
B9	2	#7	STR	44'-8"	183	U2	10	4	9	8'-3"	55
B10	20	#4	STR	6'-3"	84	U3	6	4	9	8'-2"	33
B11	10	#4	STR	5'-2"	35	U4	6	4	9	8'-0"	32
B12	24	#4	STR	5'-5"	87						
B13	20	#4	STR	12'-2"	163	V1	36	11	4	47'-5"	9069
						V2	36	11	4	48'-3"	9229
D1	26	#6	STR	39'-4"	1536	V3	72	11	8	21'-2"	8097
D2	48	#5	9	10'-4"	517						
M1	144	#11	4	46'-2"	35321						
M2	144	#11	4	22'-10"	17469						
M3	432	#11	STR	50'-0"	114761						
M4	144	#11	STR	26'-8"	20402						
S1	118	#5	5	4'-9"	585						
S2	74	#5	6	19'-8"	1518						
S3	2	#5	6	19'-5"	41						
S4	2	#5	6	19'-0"	40						
S5	2	#5	6	18'-7"	39						
S6	2	#5	6	18'-1"	38	EPOXY COATED REINFORCING STEEL				LBS.	281,338
S7	2	#5	6	17'-8"	37						
S8	2	#5	6	17'-3"	36						
S9	2	#5	6	16'-10"	35	SP-1	8	*	10	3,019'-5"	25,194
S10	2	#5	6	16'-4"	34						
S11	2	#5	6	15'-11"	33						
S12	2	#5	6	15'-6"	32						
S13	2	#5	6	15'-1"	31	EPOXY COATED SPIRAL COLUMN REINFORCING STEEL				LBS.	25,194
S14	2	#5	6	19'-7"	41						
S15	2	#5	6	19'-3"	40	CLASS "AA" CONCRETE BREAKDOWN					
S16	2	#5	6	18'-11"	39	POUR #2 - FOOTING				C.Y.	412.4
S17	2	#5	6	18'-5"	38	POUR #3 - STRUT				C.Y.	61.5
S18	2	#5	6	18'-1"	38	POUR #4 - COLUMNS				C.Y.	91.5
S19	2	#5	6	17'-8"	37	POUR #5 - CAP				C.Y.	89.5
S20	2	#5	6	17'-3"	36	CLASS "AA" CONCRETE				C.Y.	654.9
S21	2	#5	6	16'-11"	35	5'-0"Ø DRILLED PIERS QUANTIES:					
S22	2	#5	6	16'-6"	34						
S23	2	#5	6	16'-1"	34	DRILLED PIER				LIN. FT.	741.9
S24	2	#5	6	15'-8"	33	POUR 1 - DRILLED PIER				C.Y.	539.6
S25	26	#5	6	21'-3"	576	PERMANENT STEEL CASING FOR 5'-0"Ø DRILLED PIERS				LIN. FT.	245.9
S26	530	#5	7	14'-1"	7785	CSL TUBES				LIN. FT.	3,770
S27	1060	#5	11	4'-6"	4975						

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

DESIGNED BY:	E. ULLMER	DATE : APR 2016
DRAWN BY:	M. HOBBS	DATE : APR 2016
CHECKED BY:	B. LOFLIN	DATE : APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/12/2016
401_101_B4929_SMU_IB13_4s.dgn

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 5 STEEL ALTERNATE

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

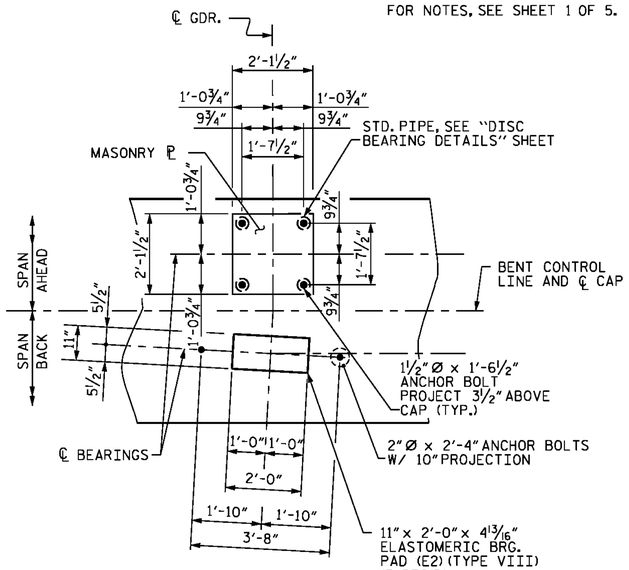
SUBSTRUCTURE

BENTS 13 AND 16 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-262
1			3			TOTAL SHEETS
2			4			278

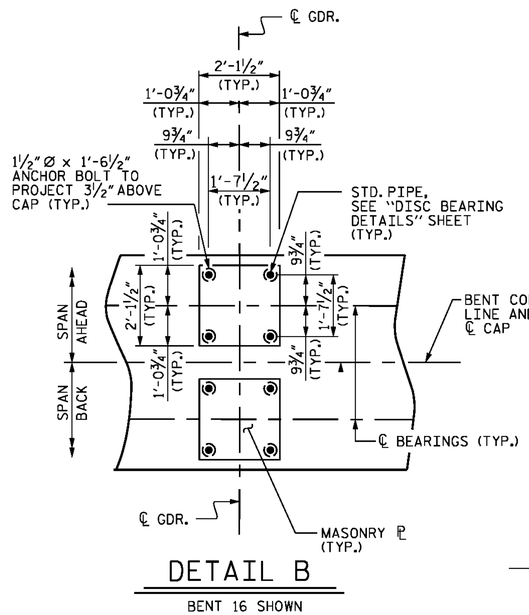
NOTES

FOR NOTES, SEE SHEET 1 OF 5.



DETAIL A

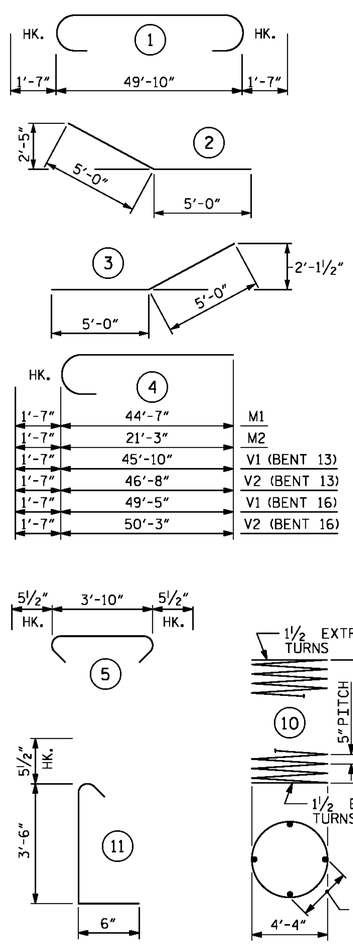
BENT 13 SHOWN



DETAIL B

BENT 16 SHOWN

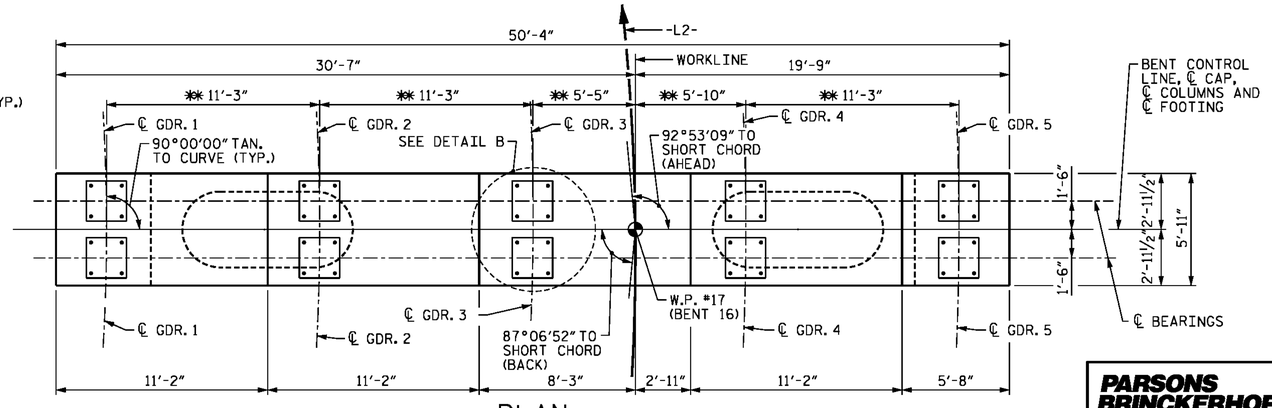
BAR TYPES



DIMENSION "A"	
BAR	"A"
S2	7'-5½"
S3	7'-4"
S4	7'-1½"
S5	6'-11"
S6	6'-8"
S7	6'-5½"
S8	6'-3"
S9	6'-0½"
S10	5'-9½"
S11	5'-7"
S12	5'-4½"
S13	5'-2"
S14	7'-5"
S15	7'-3"
S16	7'-1"
S17	6'-10"
S18	6'-8"
S19	6'-5½"
S20	6'-3"
S21	6'-1"
S22	5'-10½"
S23	5'-8"
S24	5'-5½"
S25	7'-5½"

ALL BAR DIMENSIONS ARE OUT TO OUT.

✱ THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.



PLAN

✱✱ MEASURED ALONG BENT CONTROL LINE
BENT 16 SHOWN, FOR BENT 13 SEE SHEET 1 OF 5

BILL OF MATERIAL

BENT 16

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	10	#10	STR	40'-4"	1736
B4	6	#10	STR	42'-0"	1084
B5	10	#10	2	10'-0"	430
B6	10	#10	3	10'-0"	430
B7	14	#7	STR	49'-10"	1426
B8	2	#7	STR	47'-4"	193
B9	2	#7	STR	44'-8"	183
B10	20	#4	STR	6'-3"	84
B11	10	#4	STR	5'-2"	35
B12	24	#4	STR	5'-5"	87
B13	20	#4	STR	12'-2"	163
D1	26	#6	STR	39'-4"	1536
D2	48	#5	9	10'-4"	517
M1	144	#11	4	46'-2"	35321
M2	144	#11	4	22'-10"	17469
M3	432	#11	STR	50'-0"	114761
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S4	2	#5	6	19'-0"	40
S5	2	#5	6	18'-7"	39
S6	2	#5	6	18'-1"	38
S7	2	#5	6	17'-8"	37
S8	2	#5	6	17'-3"	36
S9	2	#5	6	16'-10"	35
S10	2	#5	6	16'-4"	34
S11	2	#5	6	15'-11"	33
S12	2	#5	6	15'-6"	32
S13	2	#5	6	15'-1"	31
S14	2	#5	6	19'-7"	41
S15	2	#5	6	19'-3"	40
S16	2	#5	6	18'-11"	39
S17	2	#5	6	18'-5"	38
S18	2	#5	6	18'-1"	38
S19	2	#5	6	17'-8"	37
S20	2	#5	6	17'-3"	36
S21	2	#5	6	16'-11"	35
S22	2	#5	6	16'-6"	34
S23	2	#5	6	16'-1"	34
S24	2	#5	6	15'-8"	33
S25	26	#5	6	21'-3"	576
S26	560	#5	7	14'-1"	8226
S27	1120	#5	11	4'-6"	5257

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
T1	93	#9	STR	54'-4"	17180
T2	134	#9	STR	24'-4"	11086
T3	83	#6	STR	24'-4"	3034
T4	20	#6	STR	54'-4"	1632
T5	138	#5	STR	7'-2"	1032
T6	316	#5	9	8'-6"	2801
U1	116	#4	9	6'-5"	497
U2	10	#4	9	8'-3"	55
U3	6	#4	9	8'-2"	33
U4	6	#4	9	8'-0"	32
V1	36	#11	4	51'-0"	9755
V2	36	#11	4	51'-10"	9914
V3	72	#11	8	21'-2"	8097

SP-1	8	✱	10	2,987'-1"	24,924

EPOXY COATED REINFORCING STEEL LBS. 283,432

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 24,924

CLASS "AA" CONCRETE BREAKDOWN
- POUR #2 - FOOTING C.Y. 412.4
- POUR #3 - STRUT C.Y. 61.5
- POUR #4 - COLUMNS C.Y. 100.3
- POUR #5 - CAP C.Y. 88.2

CLASS "AA" CONCRETE C.Y. 662.4

5'-0" Ø DRILLED PIERS QUANTITIES:
- DRILLED PIER LIN. FT. 741.9
- POUR 1 - DRILLED PIER C.Y. 539.6
- PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS LIN. FT. 245.9
- CSL TUBES LIN. FT. 3,770

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 5 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 13 AND 16 BILL OF MATERIALS

DESIGNED BY:	E. ULLMER	DATE :	MAR 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

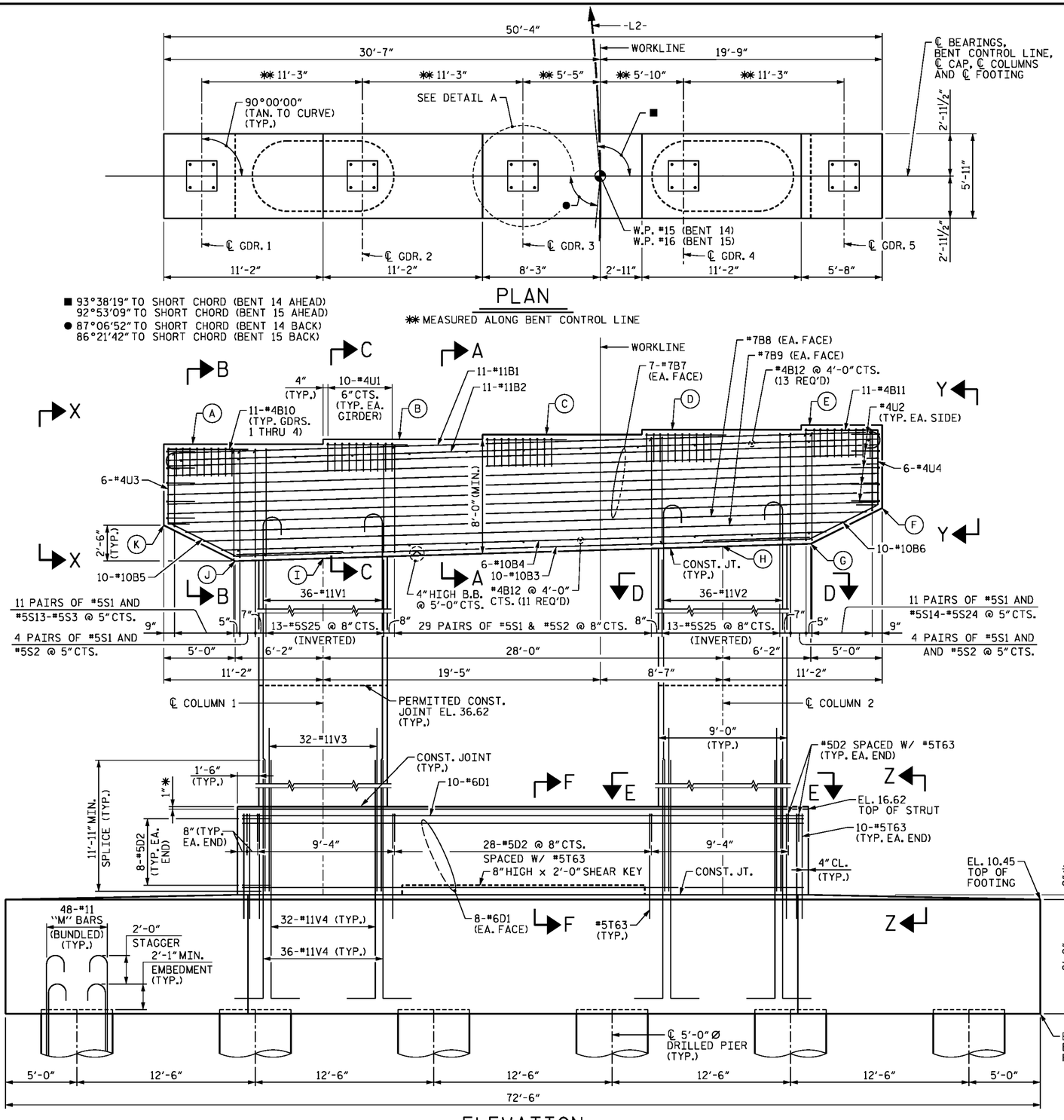
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
C0F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-263
1			3			TOTAL SHEETS
2			4			278

5/13/2016
401_103_B4929_SMU_IB13_5s.dgn



ELEVATION

FOOTING REINFORCEMENT NOT SHOWN FOR CLARITY, SEE SHEET 3 OF 5.

ELEVATION TABLE											
BENT	A	B	C	D	E	F	G	H	I	J	K
14	66.87	67.20	67.54	67.88	68.22	62.39	59.89	59.70	58.86	58.68	61.18
15	68.48	68.21	69.16	69.50	69.83	64.00	61.50	61.32	60.48	60.29	62.79

NOTES

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

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

"T" BARS IN FOOTING MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN AND DRILLED PIER REINFORCEMENT.

FOR FOUNDATION NOTES, SEE "FOUNDATION NOTES" SHEET.

FOR SECTIONS AND VIEWS, SEE SHEET 2 OF 5 AND SHEET 3 OF 5.

FOR FOOTING AND DRILLED PIER REINFORCING DETAILS, SEE SHEET 3 OF 5 AND SHEET 4 OF 5.

✱ THE FOOTING AND STRUT ARE SLOPED TO DRAIN.

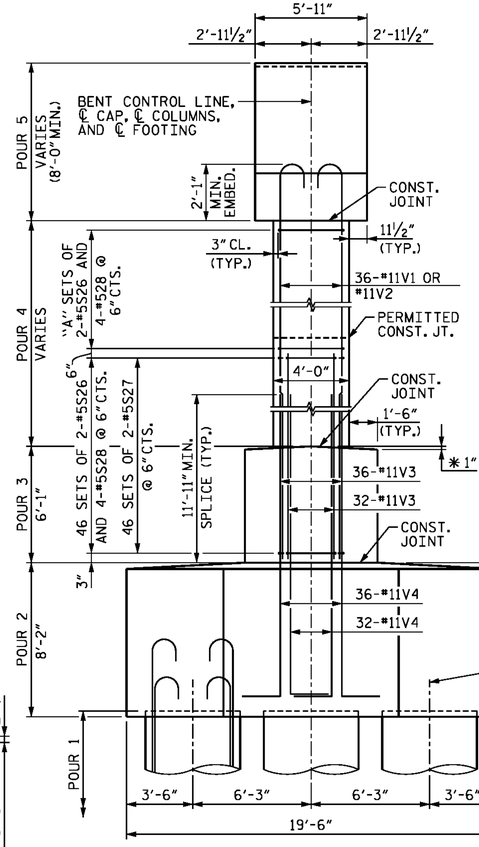
ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

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.

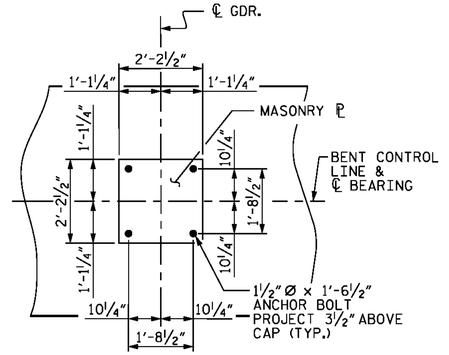
NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.

PLASTIC LUMBER FENDER SYSTEM IS REQUIRED AT BENTS 14 AND 15 BUT IS NOT SHOWN. SEE "PLASTIC LUMBER FENDERING SYSTEM" SHEET FOR DETAILS.



END VIEW



DETAIL A

BAR QUANTITY "A"	
BENT 14 COLUMN 1	50
BENT 14 COLUMN 2	52
BENT 15 COLUMN 1	53
BENT 15 COLUMN 2	55

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 5 STEEL ALTERNATE

DESIGNED BY:	E. ULLMER	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	FEB 2016
CHECKED BY:	B. LOFLIN	DATE :	APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

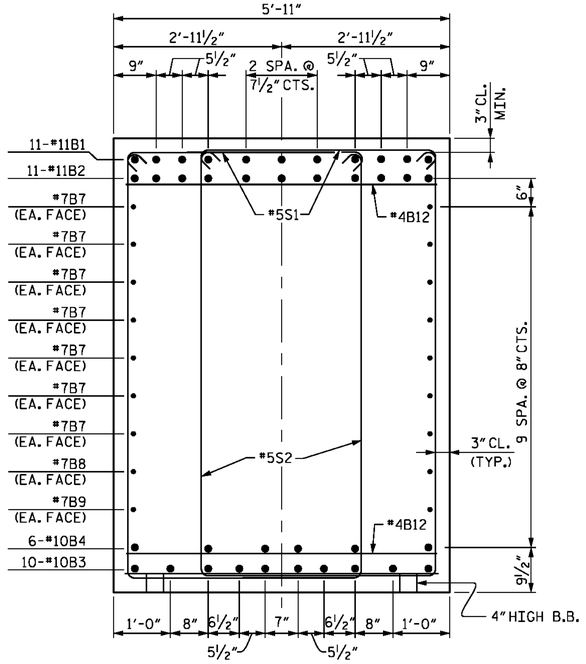
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

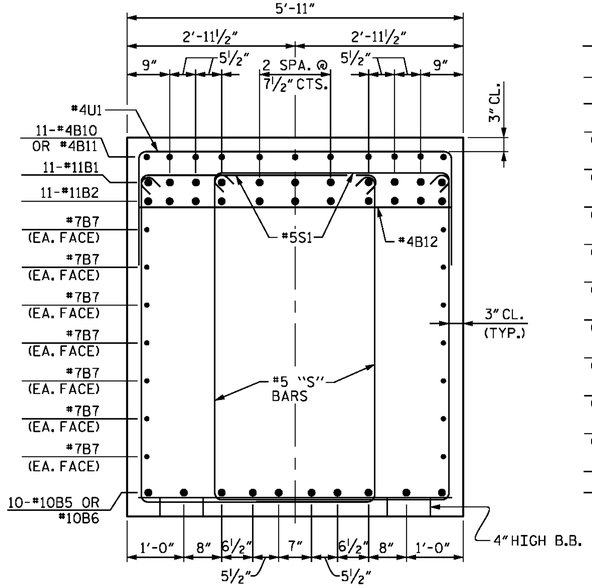
BENTS 14 AND 15 PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-264
1			3			TOTAL SHEETS
2			4			278

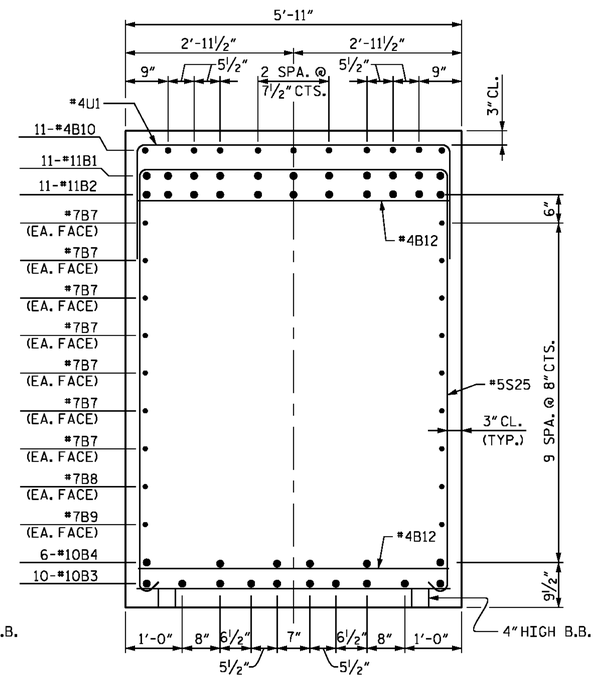
5/12/2016
401_105_B4929_SMU_IB14_1s.dgn



SECTION A-A



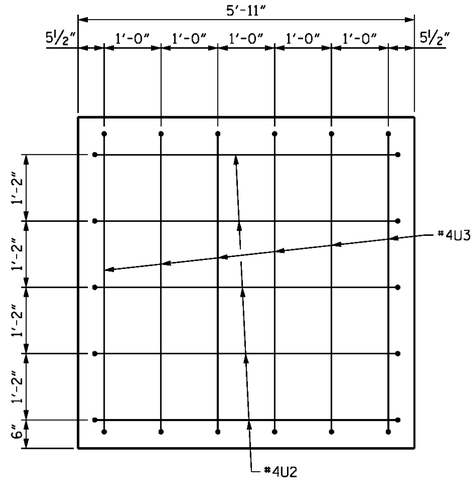
SECTION B-B



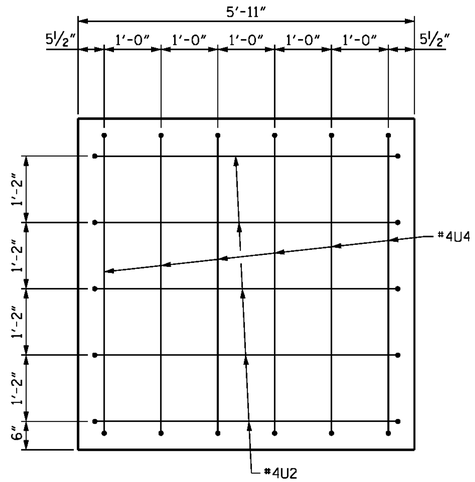
SECTION C-C

NOTES

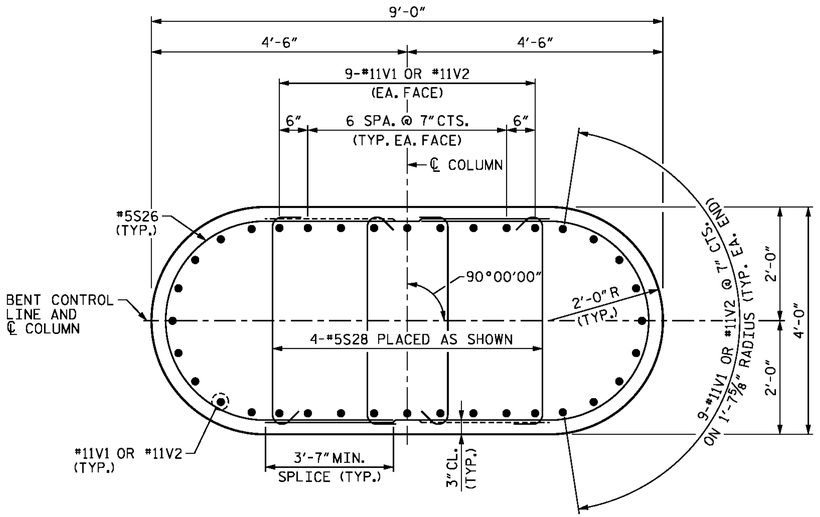
FOR NOTES, SEE SHEET 1 OF 5.



VIEW X-X



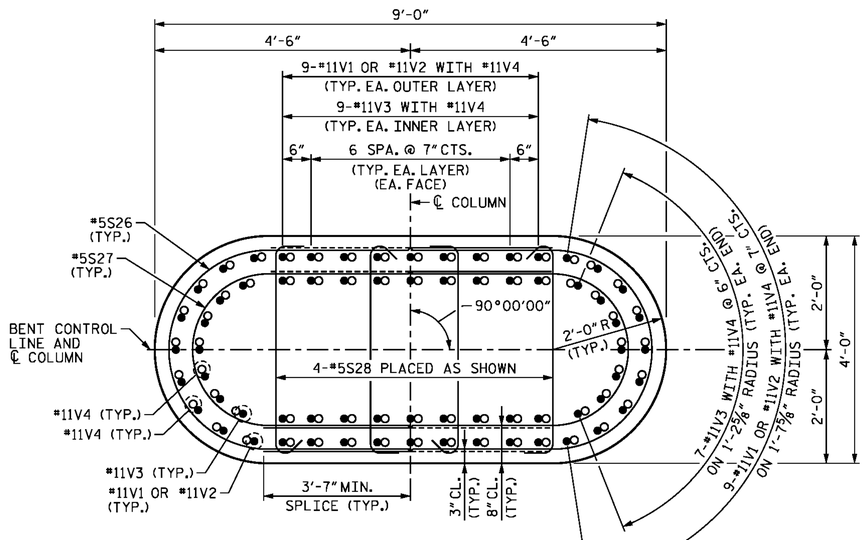
VIEW Y-Y



SECTION D-D

WHEN PLACING #5S28 BARS, ALTERNATE THE POSITION OF THE 135° HOOK HORIZONTALLY AND VERTICALLY.

ALTERNATE DIRECTION OF #5S26 TO STAGGER LAPS.



SECTION E-E

WHEN PLACING #5S28 BARS, ALTERNATE THE POSITION OF THE 135° HOOK HORIZONTALLY AND VERTICALLY.

ALTERNATE DIRECTION OF #5S26 AND #5S27 TO STAGGER LAPS.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 5 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 14 AND 15 SECTIONS AND DETAILS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

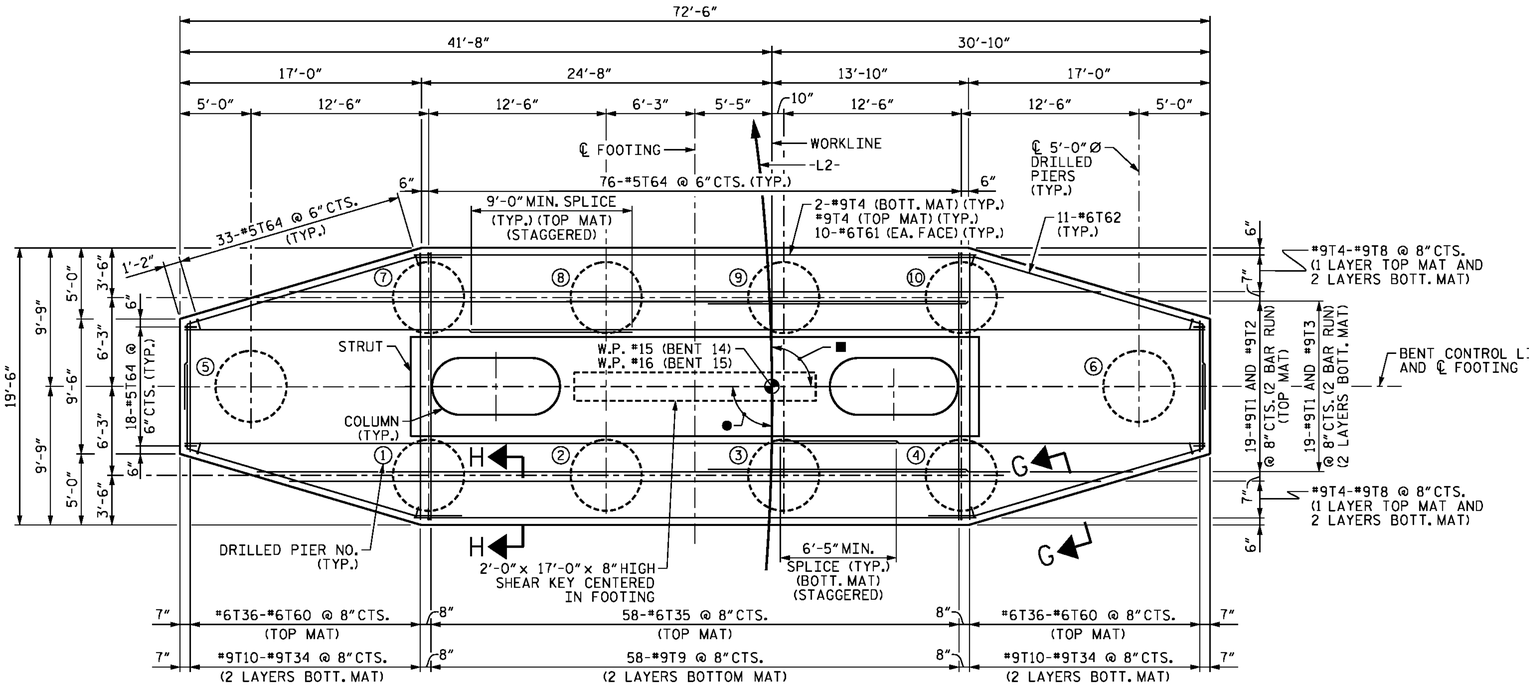
DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-265
1			3			TOTAL SHEETS
2			4			278

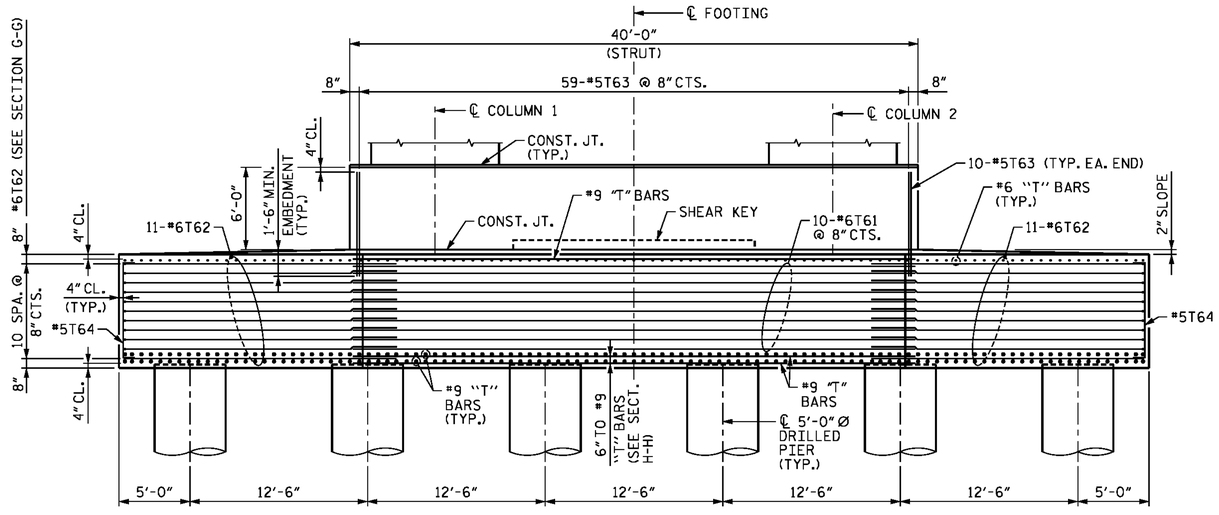
DESIGNED BY:	E. ULLMER	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	B. LOFLIN	DATE : APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/12/2016
401_107_B4929_SMU_IB14_2s.dgn



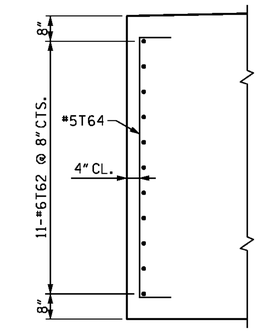
FOOTING PLAN

■ 93°38'19" TO SHORT CHORD (BENT 14 AHEAD)
92°53'09" TO SHORT CHORD (BENT 15 AHEAD)
● 87°06'52" TO SHORT CHORD (BENT 14 BACK)
86°21'42" TO SHORT CHORD (BENT 15 BACK)

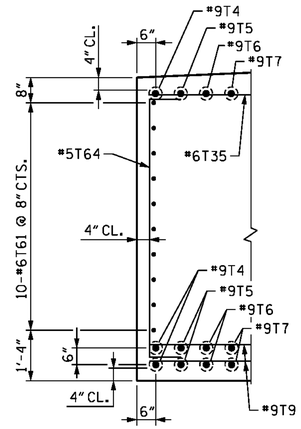


FOOTING AND STRUT ELEVATION

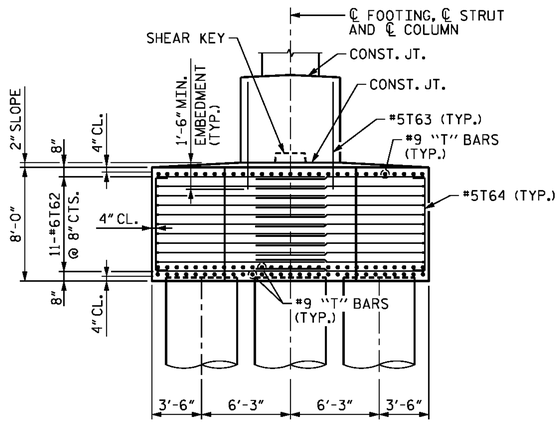
COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.



SECTION G-G



SECTION H-H

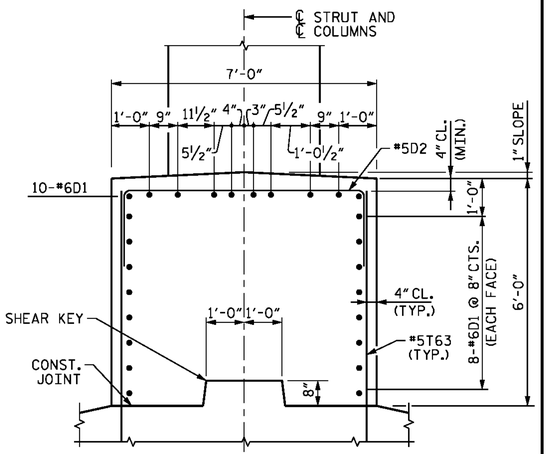


SIDE ELEVATION

COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.

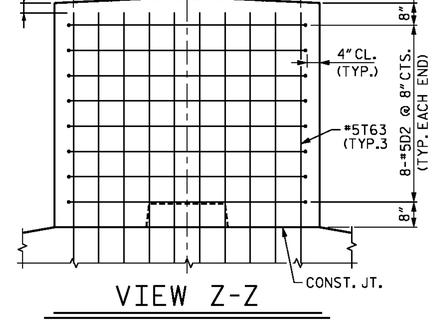
NOTES

FOR NOTES, SEE SHEET 1 OF 5.



SECTION F-F

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.



VIEW Z-Z

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 3 OF 5 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 14 AND 15 FOOTING DETAILS

DESIGNED BY:	E. ULLMER	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	B. LOFLIN	DATE : APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

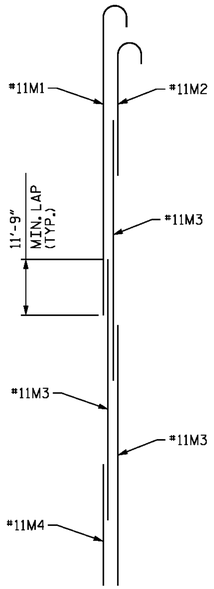
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-266
1			3			TOTAL SHEETS
2			4			278

5/12/2016
401_109_B4929_SMU_IB14_3s.dgn

NOTES

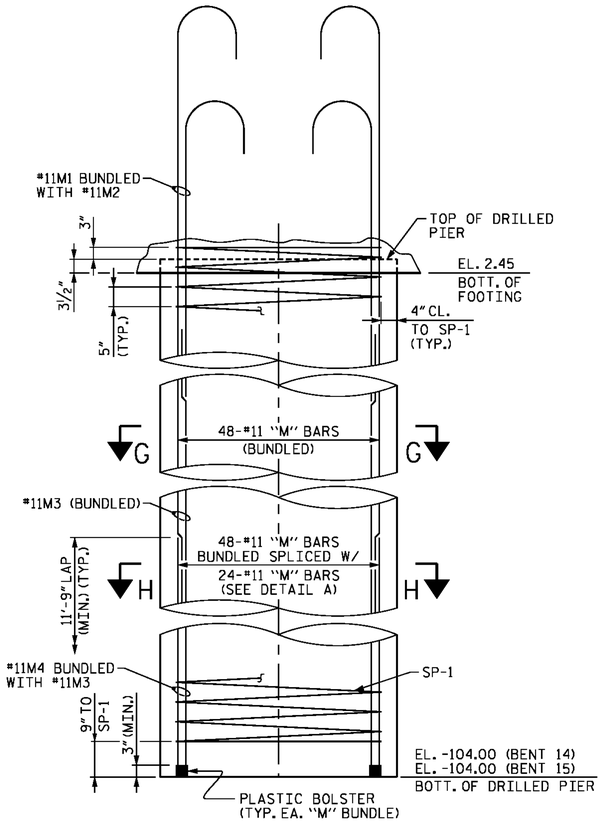
FOR NOTES, SEE SHEET 1 OF 5.

FOR BAR TYPES, SEE SHEET 5 OF 5.



DETAIL A

ONE BUNDLE SHOWN, REINFORCING STEEL IS TYPICAL FOR EACH BUNDLE.



DRILLED PIER ELEVATION

BILL OF MATERIAL

BENT 14

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	11	11	1	53'-0"	3097	T1	57	9	STR	50'-3"	9738	T51	2	#6	STR	15'-0"	45
B2	11	11	STR	49'-10"	2912	T2	38	9	STR	30'-7"	3951	T52	2	#6	STR	15'-5"	46
B3	10	10	STR	40'-4"	1736	T3	38	9	STR	28'-0"	3618	T53	2	#6	STR	15'-9"	47
B4	6	10	STR	42'-0"	1084	T4	6	9	STR	39'-6"	806	T54	2	#6	STR	16'-2"	49
B5	10	10	2	10'-0"	430	T5	6	9	STR	44'-0"	898	T55	2	#6	STR	16'-7"	50
B6	10	10	3	10'-0"	430	T6	6	9	STR	48'-7"	991	T56	2	#6	STR	17'-0"	51
B7	14	7	STR	49'-10"	1426	T7	6	9	STR	53'-1"	1083	T57	2	#6	STR	17'-4"	52
B8	2	7	STR	47'-4"	193	T8	6	9	STR	57'-8"	1176	T58	2	#6	STR	17'-9"	53
B9	2	7	STR	44'-8"	183	T9	116	9	STR	18'-10"	7428	T59	2	#6	STR	18'-2"	55
B10	44	4	STR	6'-3"	184	T10	4	9	STR	9'-1"	124	T60	2	#6	STR	18'-6"	56
B11	11	4	STR	5'-2"	38	T11	4	9	STR	9'-6"	129	T61	20	#6	STR	38'-6"	1157
B12	24	4	STR	5'-5"	87	T12	4	9	STR	9'-11"	135	T62	44	#6	8	28'-5"	1878
						T13	4	9	STR	10'-3"	139	T63	138	#5	STR	7'-2"	1032
D1	26	6	STR	39'-4"	1536	T14	4	9	STR	10'-8"	145	T64	320	#5	9	8'-6"	2837
D2	48	5	9	10'-4"	517	T15	4	9	STR	11'-1"	151						
						T16	4	9	STR	11'-6"	156	U1	50	#4	9	9'-5"	315
M1	240	11	4	55'-1"	70238	T17	4	9	STR	11'-10"	161	U2	10	#4	9	8'-3"	55
M2	240	11	4	26'-8"	34003	T18	4	9	STR	12'-3"	167	U3	6	#4	9	8'-2"	33
M3	720	11	STR	55'-0"	210395	T19	4	9	STR	12'-8"	172	U4	6	#4	9	8'-0"	32
M4	240	11	STR	28'-7"	36447	T20	4	9	STR	13'-0"	177						
						T21	4	9	STR	13'-5"	182	V1	36	#11	4	52'-8"	10073
S1	118	5	5	5'-1"	626	T22	4	9	STR	13'-10"	188	V2	36	#11	4	53'-7"	10249
S2	74	5	6	20'-0"	1544	T23	4	9	STR	14'-3"	194	V3	64	#11	STR	23'-0"	7821
S3	2	5	6	19'-9"	41	T24	4	9	STR	14'-7"	198	V4	136	#11	12	21'-2"	15294
S4	2	5	6	19'-4"	40	T25	4	9	STR	15'-0"	204						
S5	2	5	6	18'-11"	39	T26	4	9	STR	15'-5"	210						
S6	2	5	6	18'-5"	38	T27	4	9	STR	15'-9"	214						
S7	2	5	6	18'-0"	38	T28	4	9	STR	16'-2"	220						
S8	2	5	6	17'-7"	37	T29	4	9	STR	16'-7"	226						
S9	2	5	6	17'-2"	36	T30	4	9	STR	17'-0"	231						
S10	2	5	6	16'-8"	35	T31	4	9	STR	17'-4"	236						
S11	2	5	6	16'-3"	34	T32	4	9	STR	17'-9"	241						
S12	2	5	6	15'-10"	33	T33	4	9	STR	18'-2"	247						
S13	2	5	6	15'-5"	32	T34	4	9	STR	18'-6"	252						
S14	2	5	6	19'-11"	42	T35	58	6	STR	18'-10"	1641	SP-1	10	*	10	3,471'-6"	36,208
S15	2	5	6	19'-7"	41	T36	2	6	STR	9'-1"	27						
S16	2	5	6	19'-3"	40	T37	2	6	STR	9'-6"	29						
S17	2	5	6	18'-9"	39	T38	2	6	STR	9'-11"	30						
S18	2	5	6	18'-5"	38	T39	2	6	STR	10'-3"	31						
S19	2	5	6	18'-0"	38	T40	2	6	STR	10'-8"	32						
S20	2	5	6	17'-7"	37	T41	2	6	STR	11'-1"	33						
S21	2	5	6	17'-3"	36	T42	2	6	STR	11'-6"	35						
S22	2	5	6	16'-10"	35	T43	2	6	STR	11'-10"	36						
S23	2	5	6	16'-5"	34	T44	2	6	STR	12'-3"	37						
S24	2	5	6	16'-0"	33	T45	2	6	STR	12'-8"	38						
S25	26	5	6	21'-3"	576	T46	2	6	STR	13'-0"	39						
S26	388	5	7	14'-1"	5699	T47	2	6	STR	13'-5"	40						
S27	184	5	7	12'-10"	2463	T48	2	6	STR	13'-10"	42						
S28	776	5	11	4'-6"	3642	T49	2	6	STR	14'-3"	43						
						T50	2	6	STR	14'-7"	44						

EPOXY COATED REINFORCING STEEL LBS. 468,147

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 36,208

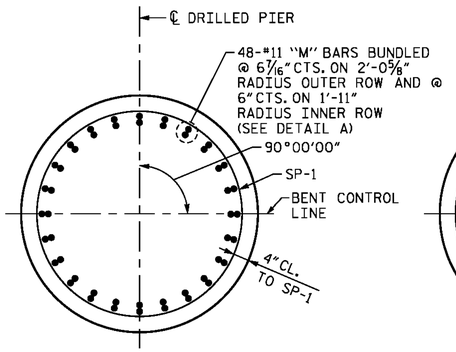
CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 373.2
POUR #3 - STRUT	C.Y. 61.5
POUR #4 - COLUMNS	C.Y. 103.0
POUR #5 - CAP	C.Y. 87.6
CLASS "AA" CONCRETE	C.Y. 625.3

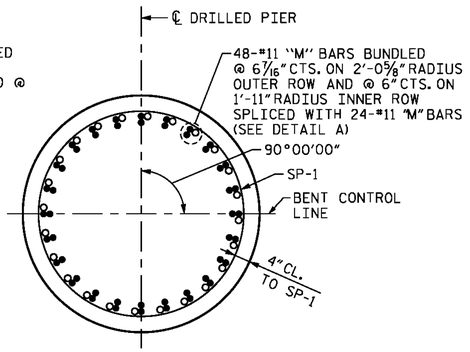
5'-0" Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN. FT.	1067.4
POUR 1 - DRILLED PIER	C.Y.	776.3
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	LIN. FT.	427.4
CSL TUBES	LIN. FT.	5,412
SPT TESTING	EA.	10

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.



SECTION G-G



SECTION H-H

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 5 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 14 AND 15 BILL OF MATERIALS

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

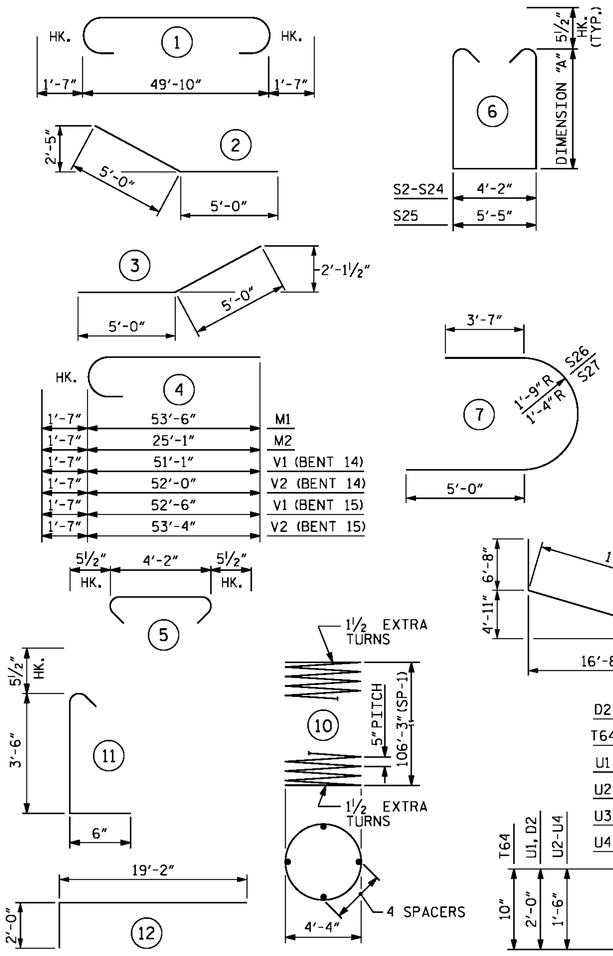
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-267
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	E. ULLMER	DATE : APR 2016
DRAWN BY:	M. HOBBS	DATE : APR 2016
CHECKED BY:	B. LOFLIN	DATE : APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/12/2016
401_111_B4929_SMU_TB14_4s.dgn

BAR TYPES



DIMENSION "A"	
BAR	"A"
S2	7'-5½"
S3	7'-4"
S4	7'-1½"
S5	6'-11"
S6	6'-8"
S7	6'-5½"
S8	6'-3"
S9	6'-0½"
S10	5'-9½"
S11	5'-7"
S12	5'-4½"
S13	5'-2"
S14	7'-5"
S15	7'-3"
S16	7'-1"
S17	6'-10"
S18	6'-8"
S19	6'-5½"
S20	6'-3"
S21	6'-1"
S22	5'-10½"
S23	5'-8"
S24	5'-5½"
S25	7'-5½"

ALL BAR DIMENSIONS ARE OUT TO OUT.

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

BILL OF MATERIAL

BENT 15

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	11	11	1	53'-0"	3097	T1	57	9	STR	50'-3"	9738	T51	2	6	STR	15'-0"	45
B2	11	11	STR	49'-10"	2912	T2	38	9	STR	30'-7"	3951	T52	2	6	STR	15'-5"	46
B3	10	10	STR	40'-4"	1736	T3	38	9	STR	28'-0"	3618	T53	2	6	STR	15'-9"	47
B4	6	10	STR	42'-0"	1084	T4	6	9	STR	39'-6"	806	T54	2	6	STR	16'-2"	49
B5	10	10	2	10'-0"	430	T5	6	9	STR	44'-0"	898	T55	2	6	STR	16'-7"	50
B6	10	10	3	10'-0"	430	T6	6	9	STR	48'-7"	991	T56	2	6	STR	17'-0"	51
B7	14	7	STR	49'-10"	1426	T7	6	9	STR	53'-1"	1083	T57	2	6	STR	17'-4"	52
B8	2	7	STR	47'-4"	193	T8	6	9	STR	57'-8"	1176	T58	2	6	STR	17'-9"	53
B9	2	7	STR	44'-8"	183	T9	116	9	STR	18'-10"	7428	T59	2	6	STR	18'-2"	55
B10	44	4	STR	6'-3"	184	T10	4	9	STR	9'-1"	124	T60	2	6	STR	18'-6"	56
B11	11	4	STR	5'-2"	38	T11	4	9	STR	9'-6"	129	T61	20	6	STR	38'-6"	1157
B12	24	4	STR	5'-5"	87	T12	4	9	STR	9'-11"	135	T62	44	6	8	28'-5"	1878
						T13	4	9	STR	10'-3"	139	T63	138	5	STR	7'-2"	1032
D1	26	6	STR	39'-4"	1536	T14	4	9	STR	10'-8"	145	T64	320	5	9	8'-6"	2837
D2	48	5	9	10'-4"	517	T15	4	9	STR	11'-1"	151						
						T16	4	9	STR	11'-6"	156	U1	50	4	9	9'-5"	315
M1	240	11	4	55'-1"	70238	T17	4	9	STR	11'-10"	161	U2	10	4	9	8'-3"	55
M2	240	11	4	26'-8"	34003	T18	4	9	STR	12'-3"	167	U3	6	4	9	8'-2"	33
M3	720	11	STR	55'-0"	210395	T19	4	9	STR	12'-8"	172	U4	6	4	9	8'-0"	32
M4	240	11	STR	28'-7"	36447	T20	4	9	STR	13'-0"	177						
						T21	4	9	STR	13'-5"	182	V1	36	11	4	54'-1"	10344
S1	118	5	5	5'-1"	626	T22	4	9	STR	13'-10"	188	V2	36	11	4	54'-11"	10504
S2	74	5	6	20'-0"	1544	T23	4	9	STR	14'-3"	194	V3	64	11	STR	23'-0"	7821
S3	2	5	6	19'-9"	41	T24	4	9	STR	14'-7"	198	V4	136	11	12	21'-2"	15294
S4	2	5	6	19'-4"	40	T25	4	9	STR	15'-0"	204						
S5	2	5	6	18'-11"	39	T26	4	9	STR	15'-5"	210						
S6	2	5	6	18'-5"	38	T27	4	9	STR	15'-9"	214						
S7	2	5	6	18'-0"	38	T28	4	9	STR	16'-2"	220						
S8	2	5	6	17'-7"	37	T29	4	9	STR	16'-7"	226						
S9	2	5	6	17'-2"	36	T30	4	9	STR	17'-0"	231						
S10	2	5	6	16'-8"	35	T31	4	9	STR	17'-4"	236						
S11	2	5	6	16'-3"	34	T32	4	9	STR	17'-9"	241	SP-1	10	*	10	3471'-6"	36,208
S12	2	5	6	15'-10"	33	T33	4	9	STR	18'-2"	247						
S13	2	5	6	15'-5"	32	T34	4	9	STR	18'-6"	252						
S14	2	5	6	19'-11"	42	T35	58	6	STR	18'-10"	1641						
S15	2	5	6	19'-7"	41	T36	2	6	STR	9'-1"	27						
S16	2	5	6	19'-3"	40	T37	2	6	STR	9'-6"	29						
S17	2	5	6	18'-9"	39	T38	2	6	STR	9'-11"	30						
S18	2	5	6	18'-5"	38	T39	2	6	STR	10'-3"	31						
S19	2	5	6	18'-0"	38	T40	2	6	STR	10'-8"	32						
S20	2	5	6	17'-7"	37	T41	2	6	STR	11'-1"	33						
S21	2	5	6	17'-3"	36	T42	2	6	STR	11'-6"	35						
S22	2	5	6	16'-10"	35	T43	2	6	STR	11'-10"	36						
S23	2	5	6	16'-5"	34	T44	2	6	STR	12'-3"	37						
S24	2	5	6	16'-0"	33	T45	2	6	STR	12'-8"	38						
S25	26	5	6	21'-3"	576	T46	2	6	STR	13'-0"	39						
S26	400	5	7	14'-1"	5876	T47	2	6	STR	13'-5"	40						
S27	184	5	7	12'-10"	2463	T48	2	6	STR	13'-10"	42						
S28	800	5	11	4'-6"	3755	T49	2	6	STR	14'-3"	43						
						T50	2	6	STR	14'-7"	44						

EPOXY COATED REINFORCING STEEL LBS. 468,963

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 36,208

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 373.2
POUR #3 - STRUT	C.Y. 61.5
POUR #4 - COLUMNS	C.Y. 107.0
POUR #5 - CAP	C.Y. 87.6
CLASS "AA" CONCRETE	C.Y. 629.3

5'-0" Ø DRILLED PIERS QUANTIES:

DRILLED PIER	LIN.FT. 1,067.4
POUR 1 - DRILLED PIER	C.Y. 776.3
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	LIN.FT. 427.4
CSL TUBES	LIN.FT. 5,412

NOTES

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 5 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 14 AND 15 BILL OF MATERIALS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

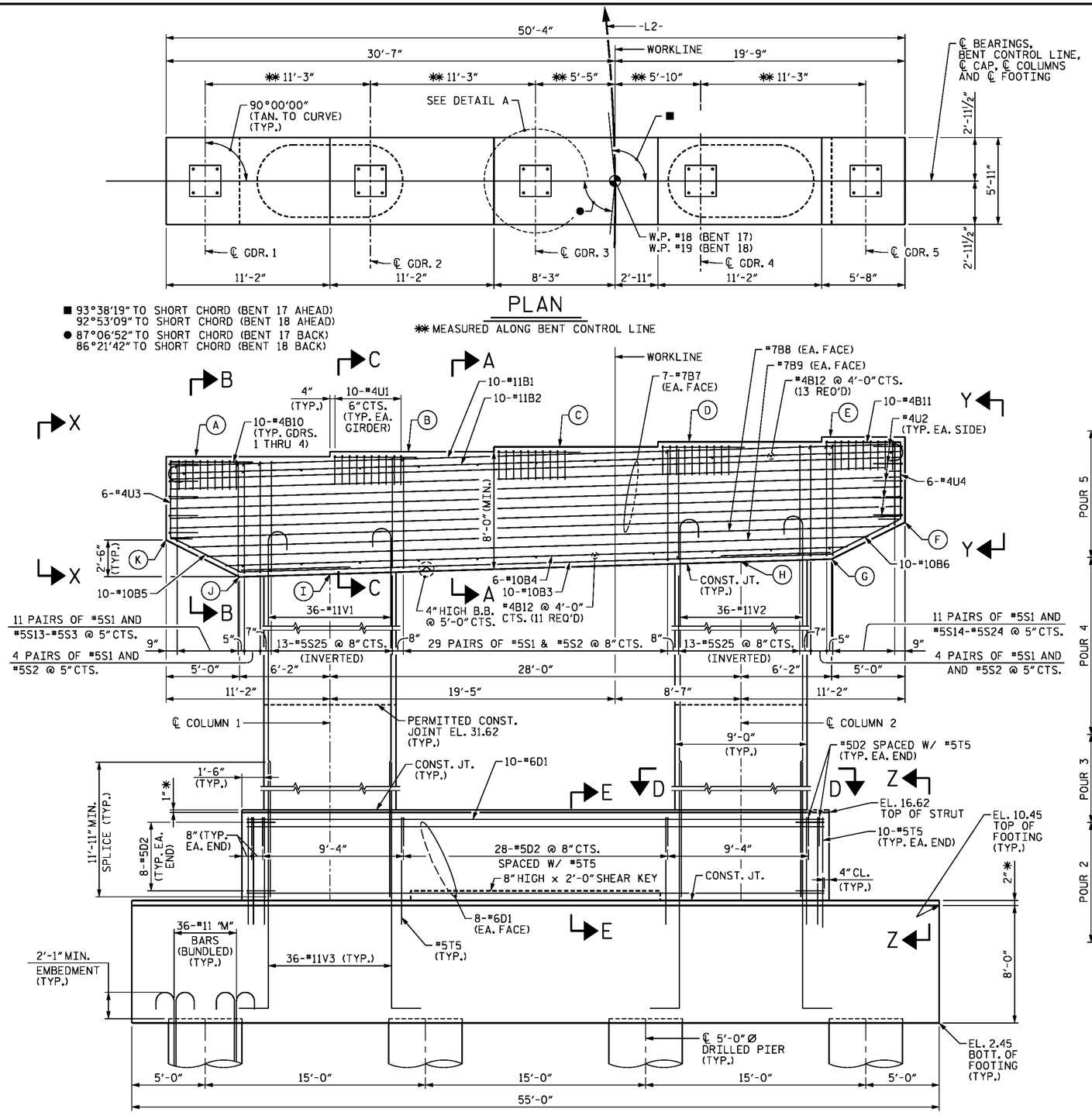
DocuSigned by: Jason R Doughty 00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-268
1			3			TOTAL SHEETS
2			4			278

DESIGNED BY:	E. ULLMER	DATE : APR 2016
DRAWN BY:	M. HOBBS	DATE : APR 2016
CHECKED BY:	B. LOFLIN	DATE : APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/12/2016
401_113_B4929_SMU_TB14_5s.dgn



PLAN

■ 93°38'19" TO SHORT CHORD (BENT 17 AHEAD)
92°53'09" TO SHORT CHORD (BENT 18 AHEAD)
● 87°06'52" TO SHORT CHORD (BENT 17 BACK)
86°21'42" TO SHORT CHORD (BENT 18 BACK)

✱✱ MEASURED ALONG BENT CONTROL LINE

ELEVATION

FOOTING REINFORCEMENT NOT SHOWN FOR CLARITY, SEE SHEET 3 OF 5.

ELEVATION TABLE											
BENT	A	B	C	D	E	F	G	H	I	J	K
17	60.74	61.08	61.41	61.75	62.09	56.26	53.76	53.57	52.74	52.55	55.05
18	54.47	54.81	55.15	55.49	55.82	50.00	47.50	47.31	46.47	46.29	48.79

NOTES

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

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

"T" BARS IN FOOTING MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN AND DRILLED PIER REINFORCEMENT.

FOR FOUNDATION NOTES, SEE "FOUNDATION NOTES" SHEET.

FOR SECTIONS AND VIEWS, SEE SHEET 2 OF 5 AND SHEET 3 OF 5.

FOR FOOTING AND DRILLED PIER REINFORCING DETAILS, SEE SHEET 3 OF 5 AND SHEET 4 OF 5.

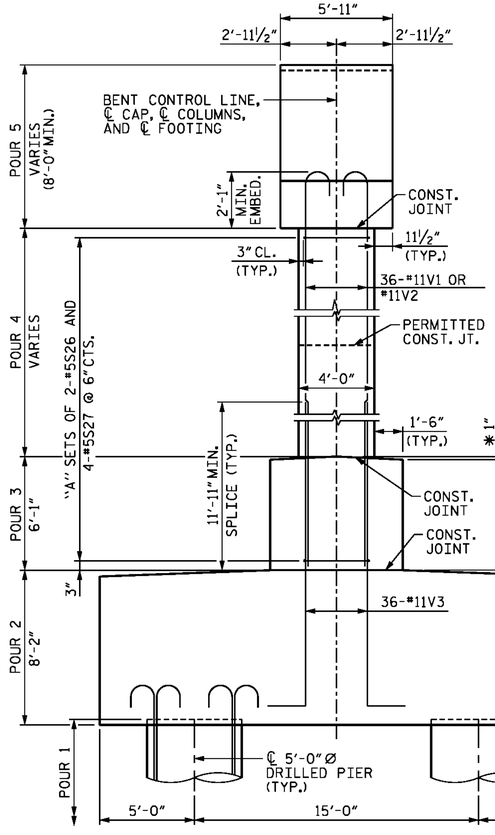
✱ THE FOOTING AND STRUT ARE SLOPED TO DRAIN.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

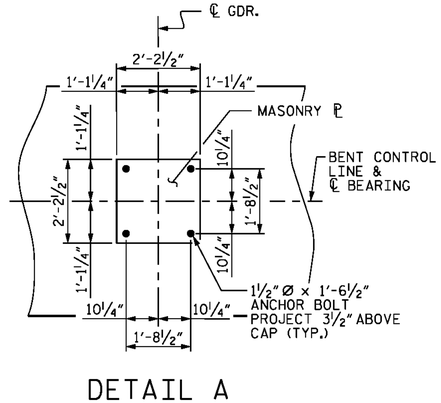
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS IS DETAILED WITH 3 FEET OF EXTRA LENGTH.

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.



END VIEW



DETAIL A

BAR QUANTITY "A"	
BENT 17 COLUMN 1	84
BENT 17 COLUMN 2	85
BENT 18 COLUMN 1	71
BENT 18 COLUMN 2	73

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 5 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 17 AND 18 PLAN AND ELEVATION

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-269
1			3			TOTAL SHEETS
2			4			278

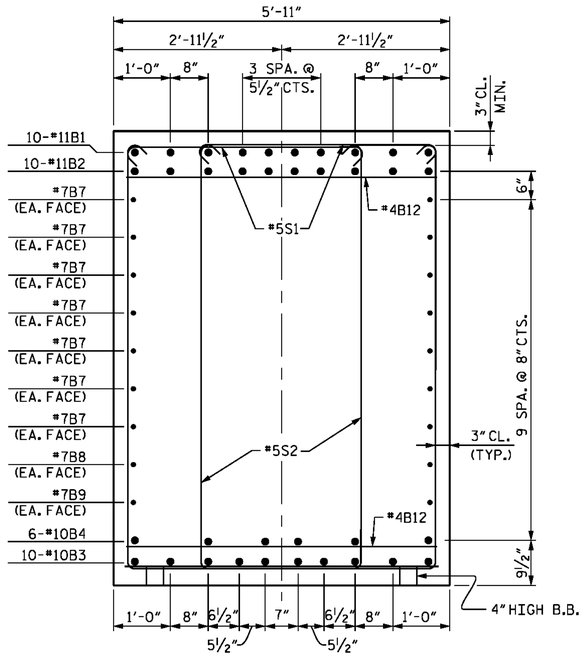
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

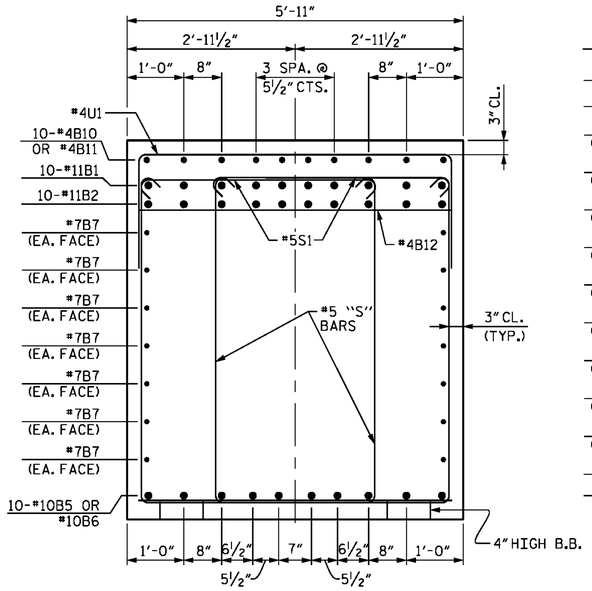
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DESIGNED BY:	E. ULLMER	DATE : FEB 2016
DRAWN BY:	M. HOBBS	DATE : MAR 2016
CHECKED BY:	B. LOFLIN	DATE : MAY 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

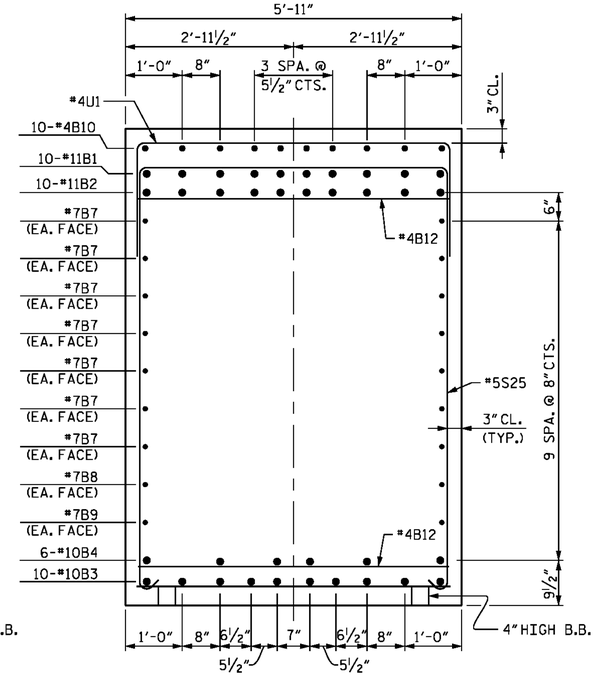
5/12/2016
401_115_B4929_SMU_IB17_ls.dgn



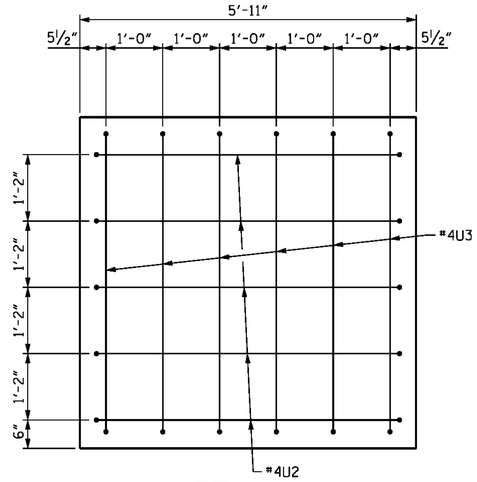
SECTION A-A



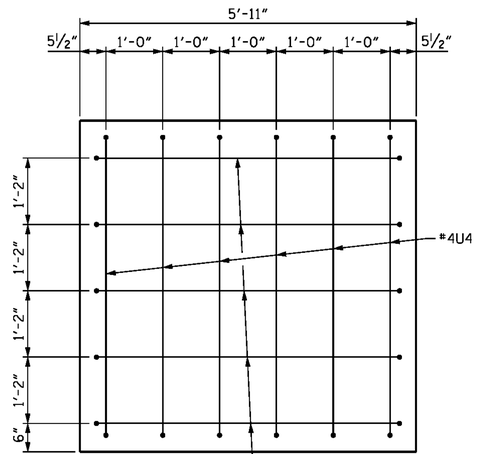
SECTION B-B



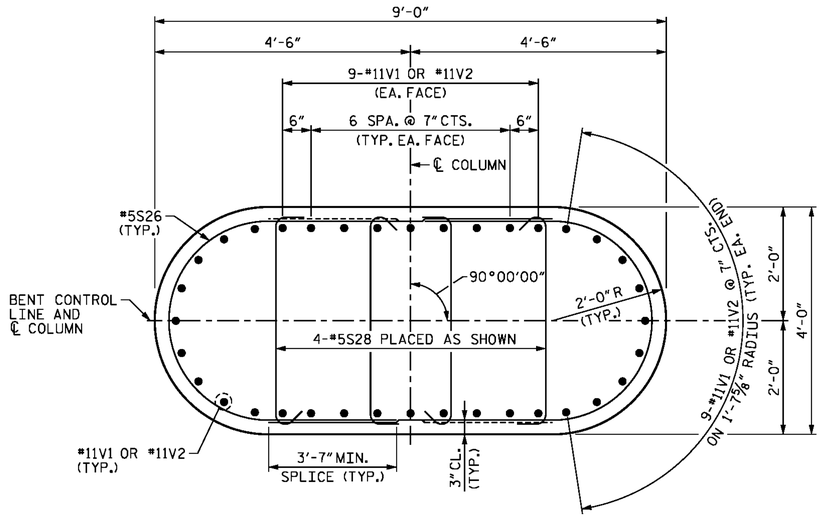
SECTION C-C



VIEW X-X



VIEW Y-Y



SECTION D-D

WHEN PLACING #5S28 BARS, ALTERNATE THE POSITION OF THE 135° HOOK HORIZONTALLY AND VERTICALLY.

ALTERNATE DIRECTION OF #5S26 TO STAGGER LAPS.

NOTES

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

DESIGNED BY:	E. ULLMER	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/12/2016
401_117_B4929_SMU_IB17_2s.dgn

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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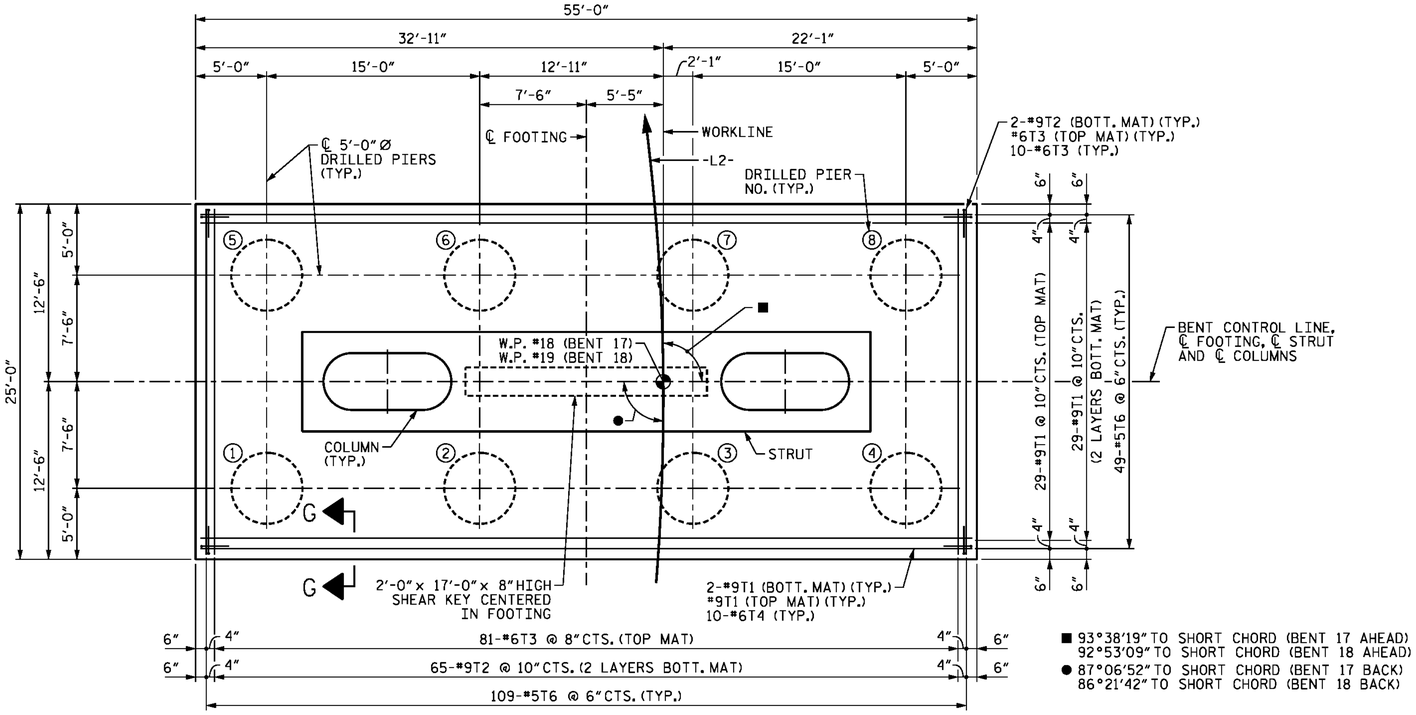
STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

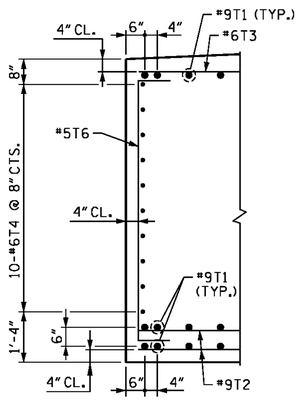
BENTS 17 AND 18 SECTIONS AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-270
1			3			TOTAL SHEETS
2			4			278

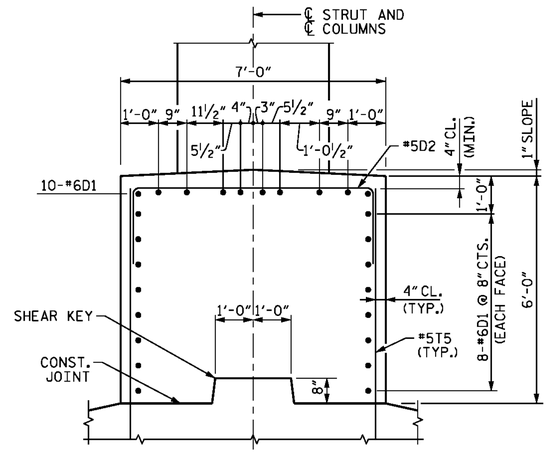


■ 93°38'19" TO SHORT CHORD (BENT 17 AHEAD)
92°53'09" TO SHORT CHORD (BENT 18 AHEAD)
● 87°06'52" TO SHORT CHORD (BENT 17 BACK)
86°21'42" TO SHORT CHORD (BENT 18 BACK)

FOOTING PLAN

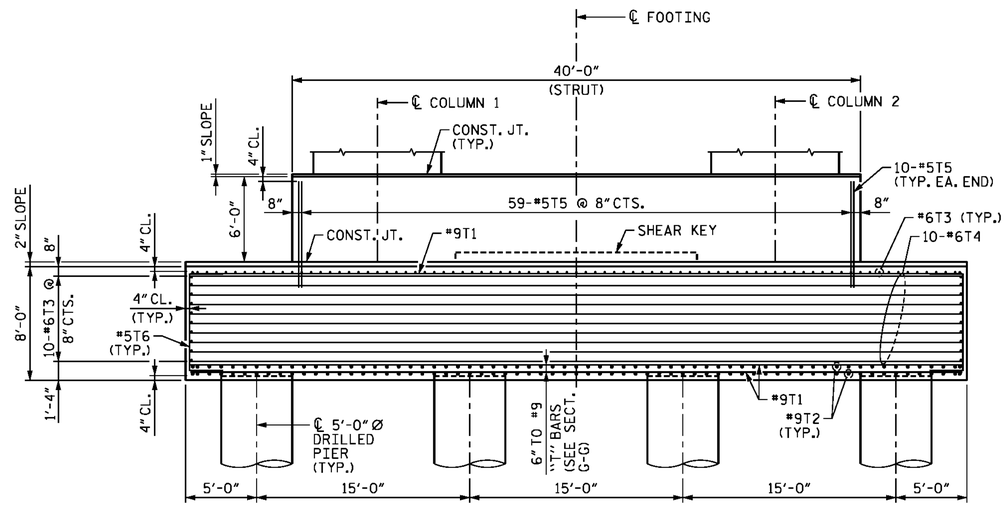


SECTION G-G



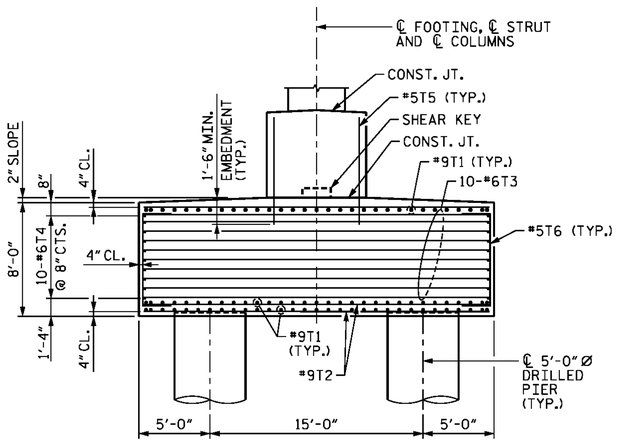
SECTION E-E

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.



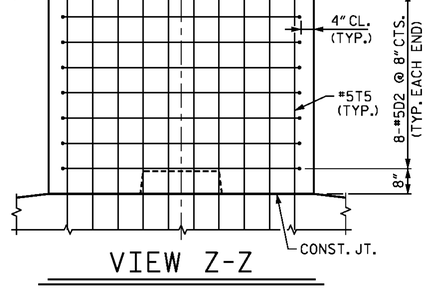
FOOTING AND STRUT ELEVATION

COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.



SIDE ELEVATION

COLUMN AND STRUT REINFORCEMENT NOT SHOWN
FOR CLARITY, SEE SHEETS 1 OF 5 AND 2 OF 5.



VIEW Z-Z

PROJECT NO. B-4929
PENDER COUNTY
STATION: 38+13.81 -L2-

SHEET 3 OF 5 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 17 AND 18 SECTIONS AND DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-271
1			3			TOTAL SHEETS
2			4			278

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C86448274F7...

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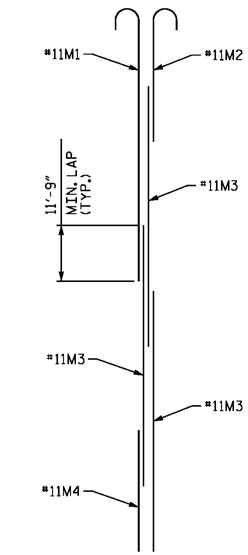
DESIGNED BY:	E. ULLMER	DATE :	FEB 2016
DRAWN BY:	M. HOBBS	DATE :	MAR 2016
CHECKED BY:	B. LOFLIN	DATE :	APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/12/2016
401.119_B4929_SMU_IB17_3s.dgn

NOTES

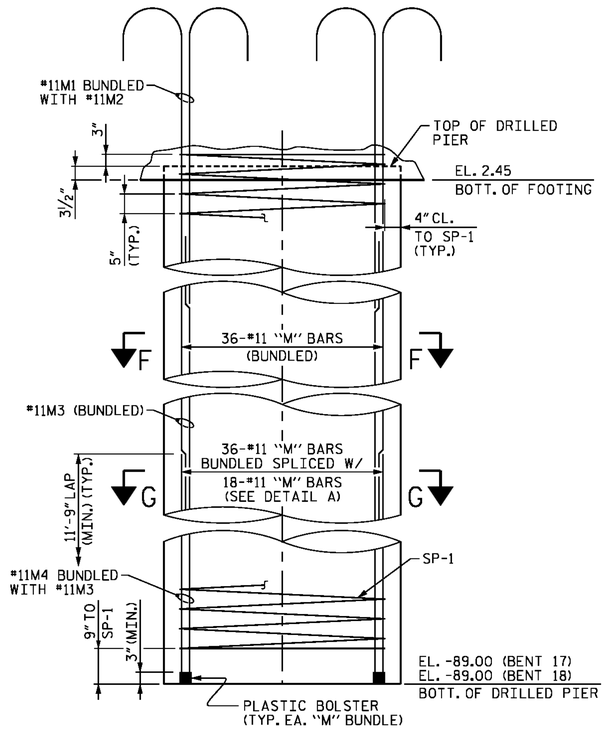
FOR NOTES, SEE SHEET 1 OF 5.

FOR BAR TYPES, SEE SHEET 5 OF 5.

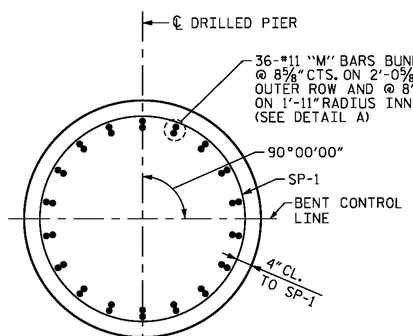


DETAIL A

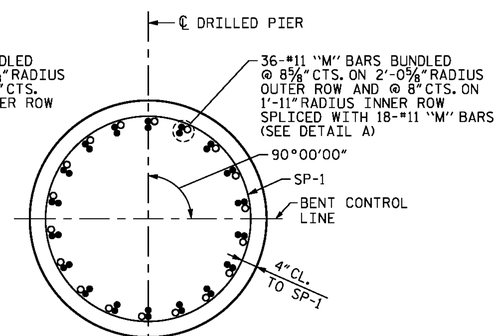
ONE BUNDLE SHOWN, REINFORCING STEEL IS TYPICAL FOR EACH BUNDLE.



DRILLED PIER ELEVATION



SECTION F-F



SECTION G-G

BILL OF MATERIAL

BENT 17

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816	T1	93	#9	STR	54'-4"	17180
B2	10	#11	STR	49'-10"	2648	T2	134	#9	STR	24'-4"	11086
B3	10	#10	STR	40'-4"	1736	T3	83	#6	STR	24'-4"	3034
B4	6	#10	STR	42'-0"	1084	T4	20	#6	STR	54'-4"	1632
B5	10	#10	2	10'-0"	430	T5	138	#5	STR	7'-2"	1032
B6	10	#10	3	10'-0"	430	T6	316	#5	9	8'-6"	2801
B7	14	#7	STR	49'-10"	1426						
B8	2	#7	STR	47'-4"	193	U1	50	#4	9	9'-5"	315
B9	2	#7	STR	44'-8"	183	U2	10	#4	9	8'-3"	55
B10	40	#4	STR	6'-3"	167	U3	6	#4	9	8'-2"	33
B11	10	#4	STR	5'-2"	35	U4	6	#4	9	8'-0"	32
B12	24	#4	STR	5'-5"	87						
						V1	36	#11	4	45'-11"	8782
D1	26	#6	STR	39'-4"	1536	V2	36	#11	4	46'-9"	8942
D2	48	#5	9	10'-4"	517	V3	72	#11	8	21'-2"	8097
M1	144	#11	4	46'-2"	35321						
M2	144	#11	4	21'-10"	16704						
M3	432	#11	STR	50'-0"	114761						
M4	144	#11	STR	25'-8"	19637						
S1	118	#5	5	5'-1"	626						
S2	74	#5	6	20'-0"	1544						
S3	2	#5	6	19'-9"	41						
S4	2	#5	6	19'-4"	40						
S5	2	#5	6	18'-11"	39						
S6	2	#5	6	18'-5"	38						
S7	2	#5	6	18'-0"	38	EPOXY COATED REINFORCING STEEL				LBS.	274,432
S8	2	#5	6	17'-7"	37						
S9	2	#5	6	17'-2"	36						
S10	2	#5	6	16'-8"	35	SP-1	8	*	10	2,987'-1"	24,924
S11	2	#5	6	16'-3"	34						
S12	2	#5	6	15'-10"	33						
S13	2	#5	6	15'-5"	32						
S14	2	#5	6	19'-11"	42	EPOXY COATED SPIRAL COLUMN REINFORCING STEEL				LBS.	24,924
S15	2	#5	6	19'-7"	41						
S16	2	#5	6	19'-3"	40	CLASS "AA" CONCRETE BREAKDOWN					
S17	2	#5	6	18'-9"	39	POUR #2 - FOOTING				C.Y.	412.4
S18	2	#5	6	18'-5"	38	POUR #3 - STRUT				C.Y.	61.5
S19	2	#5	6	18'-0"	38	POUR #4 - COLUMNS				C.Y.	88.2
S20	2	#5	6	17'-7"	37	POUR #5 - CAP				C.Y.	87.6
S21	2	#5	6	17'-3"	36	CLASS "AA" CONCRETE				C.Y.	649.7
S22	2	#5	6	16'-10"	35	5'-0"Ø DRILLED PIERS QUANTITIES:					
S23	2	#5	6	16'-5"	34						
S24	2	#5	6	16'-0"	33	DRILLED PIER				LIN. FT.	733.9
S25	26	#5	6	21'-3"	576	POUR 1 - DRILLED PIER				C.Y.	533.8
S26	338	#5	7	14'-1"	4965	PERMANENT STEEL CASING FOR 5'-0"Ø DRILLED PIERS				LIN. FT.	197.9
S27	676	#5	11	4'-6"	3173	CSL TUBES				LIN. FT.	3,730

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

DESIGNED BY:	E. ULLMER	DATE :	APR 2016
DRAWN BY:	M. HOBBS	DATE :	APR 2016
CHECKED BY:	B. LOFLIN	DATE :	APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/12/2016
401_121_B4929_SMU_IB17_4s.dgn

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 5 STEEL ALTERNATE

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C864482274F7...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

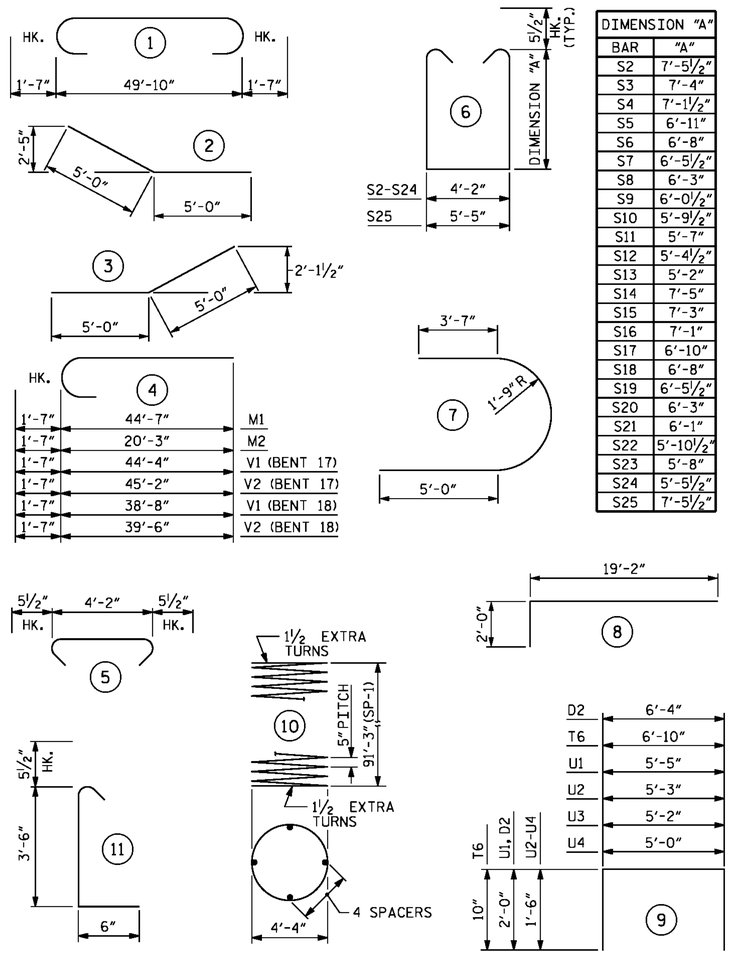
BENTS 17 AND 18 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-272
1			3			TOTAL SHEETS
2			4			278

NOTES

FOR NOTES, SEE SHEET 1 OF 5.

BAR TYPES



DIMENSION "A"	
BAR	"A"
S2	7'-5½"
S3	7'-4"
S4	7'-1½"
S5	6'-11"
S6	6'-8"
S7	6'-5½"
S8	6'-3"
S9	6'-0½"
S10	5'-9½"
S11	5'-7"
S12	5'-4½"
S13	5'-2"
S14	7'-5"
S15	7'-3"
S16	7'-1"
S17	6'-10"
S18	6'-8"
S19	6'-5½"
S20	6'-3"
S21	6'-1"
S22	5'-10½"
S23	5'-8"
S24	5'-5½"
S25	7'-5½"

ALL BAR DIMENSIONS ARE OUT TO OUT.

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.

BILL OF MATERIAL

BENT 18

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	10	#10	STR	40'-4"	1736
B4	6	#10	STR	42'-0"	1084
B5	10	#10	2	10'-0"	430
B6	10	#10	3	10'-0"	430
B7	14	#7	STR	49'-10"	1426
B8	2	#7	STR	47'-4"	193
B9	2	#7	STR	44'-8"	183
B10	40	#4	STR	6'-3"	167
B11	10	#4	STR	5'-2"	35
B12	24	#4	STR	5'-5"	87
D1	26	#6	STR	39'-4"	1536
D2	48	#5	9	10'-4"	517
M1	144	#11	4	46'-2"	35321
M2	144	#11	4	21'-10"	16704
M3	432	#11	STR	50'-0"	114761
M4	144	#11	STR	25'-8"	19637
S1	118	#5	5	5'-1"	626
S2	74	#5	6	20'-0"	1544
S3	2	#5	6	19'-9"	41
S4	2	#5	6	19'-4"	40
S5	2	#5	6	18'-11"	39
S6	2	#5	6	18'-5"	38
S7	2	#5	6	18'-0"	38
S8	2	#5	6	17'-7"	37
S9	2	#5	6	17'-2"	36
S10	2	#5	6	16'-8"	35
S11	2	#5	6	16'-3"	34
S12	2	#5	6	15'-10"	33
S13	2	#5	6	15'-5"	32
S14	2	#5	6	19'-11"	42
S15	2	#5	6	19'-7"	41
S16	2	#5	6	19'-3"	40
S17	2	#5	6	18'-9"	39
S18	2	#5	6	18'-5"	38
S19	2	#5	6	18'-0"	38
S20	2	#5	6	17'-7"	37
S21	2	#5	6	17'-3"	36
S22	2	#5	6	16'-10"	35
S23	2	#5	6	16'-5"	34
S24	2	#5	6	16'-0"	33
S25	26	#5	6	21'-3"	576
S26	288	#5	7	14'-1"	4230
S27	576	#5	11	4'-6"	2703

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
T1	93	#9	STR	54'-4"	17180
T2	134	#9	STR	24'-4"	11086
T3	83	#6	STR	24'-4"	3034
T4	20	#6	STR	54'-4"	1632
T5	138	#5	STR	7'-2"	1032
T6	316	#5	9	8'-6"	2801
U1	50	#4	9	9'-5"	315
U2	10	#4	9	8'-3"	55
U3	6	#4	9	8'-2"	33
U4	6	#4	9	8'-0"	32
V1	36	#11	4	40'-3"	7699
V2	36	#11	4	41'-1"	7858
V3	72	#11	8	21'-2"	8097

EPOXY COATED REINFORCING STEEL LBS. 271,060

SP-1	8	*	10	2,987'-1"	24,924

EPOXY COATED SPIRAL COLUMN REINFORCING STEEL LBS. 24,924

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 412.4
POUR #3 - STRUT	C.Y. 61.5
POUR #4 - COLUMNS	C.Y. 73.2
POUR #5 - CAP	C.Y. 87.6

CLASS "AA" CONCRETE C.Y. 634.7

5'-0" Ø DRILLED PIERS QUANTITIES:

DRILLED PIER	LIN. FT. 733.9
POUR 1 - DRILLED PIER	C.Y. 533.8
PERMANENT STEEL CASING FOR 5'-0" Ø DRILLED PIERS	LIN. FT. 253.9
CSL TUBES	LIN. FT. 3,730

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 5 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 17 AND 18
BILL OF MATERIALS

DESIGNED BY:	E. ULLMER	DATE :	APR 2016
DRAWN BY:	M. HOBBS	DATE :	APR 2016
CHECKED BY:	B. LOFLIN	DATE :	APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

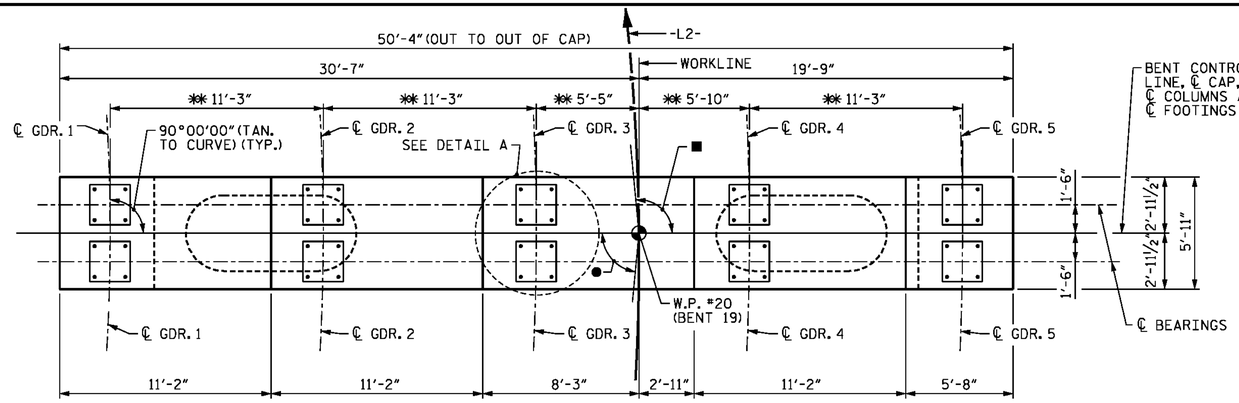
PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1CB644B274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-273
1			3			TOTAL SHEETS
2			4			278

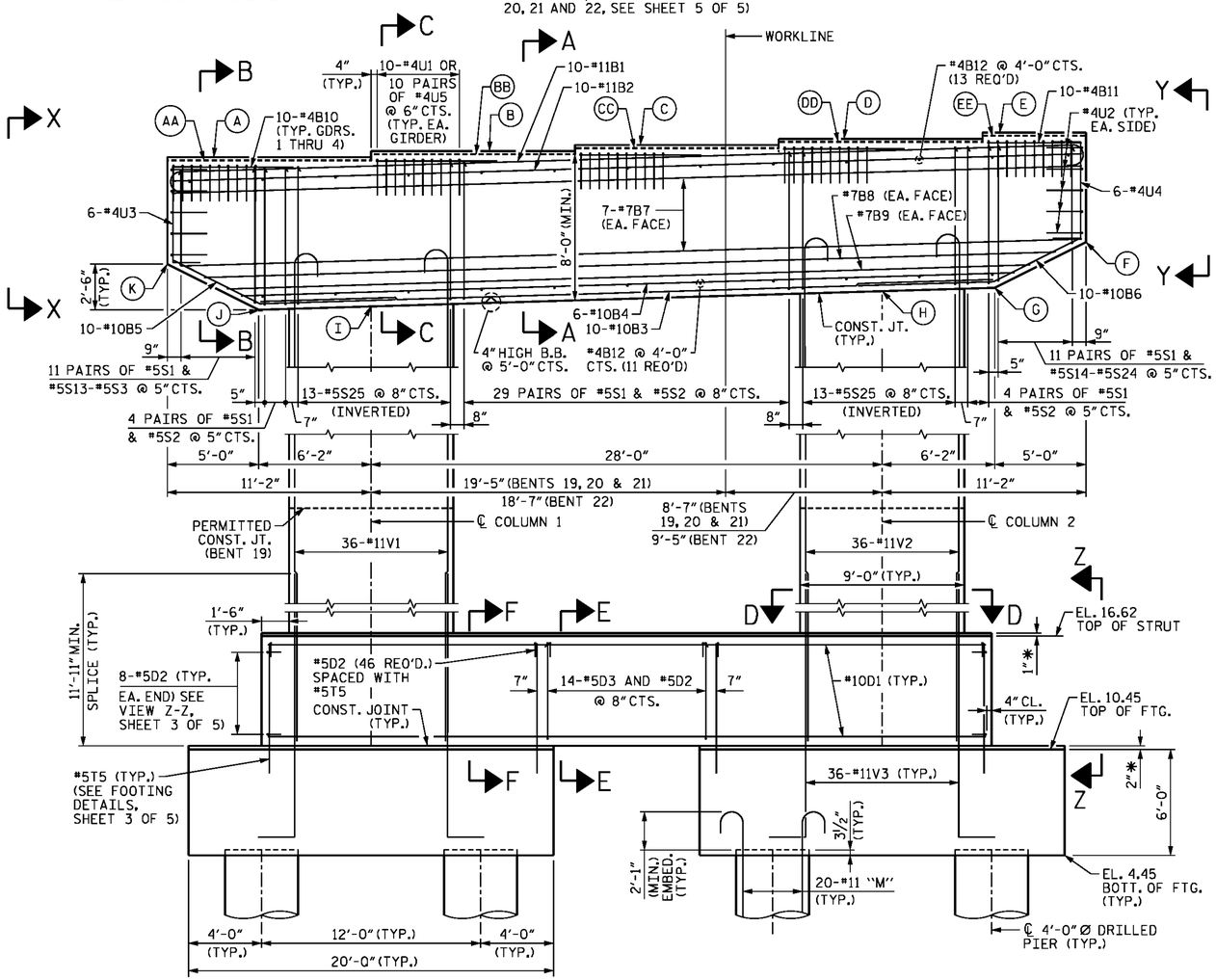
5/12/2016
401_123_B4929_SMU_IB17_5s.dgn



PLAN

■ 92°53'09" TO SHORT CHORD (AHEAD)
● 87°06'52" TO SHORT CHORD (BACK)

✱✱ MEASURED ALONG BENT CONTROL LINE (BENT 19 SHOWN, FOR CAP PLANS OF BENTS 20, 21 AND 22, SEE SHEET 5 OF 5)



ELEVATION

FOOTING REINFORCEMENT NOT SHOWN FOR CLARITY, SEE SHEET 3 OF 5.

FOR CAP SECTION AT BENT 22, SEE PARTIAL SECTION ON SHEET 2 OF 5.

ELEVATION TABLE																
BENT	A	B	C	D	E	F	G	H	I	J	K	AA	BB	CC	DD	EE
19	49.69	50.03	50.37	50.70	51.04	45.11	42.61	42.42	41.58	41.39	43.89	49.58	49.92	50.26	50.60	50.93
20	44.54	44.88	45.21	45.55	45.89	40.07	37.58	37.39	36.54	36.35	38.85	--	--	--	--	--
21	38.27	38.61	38.95	39.29	39.62	33.80	31.30	31.11	30.27	30.08	32.58	--	--	--	--	--
22	33.49	33.83	34.17	34.50	34.84	28.83	26.33	26.14	25.30	25.12	27.62	33.30	33.63	33.97	34.31	34.64

BAR QUANTITY		
LOCATION	QUANTITY "A"	QUANTITY "B"
BENT 19 COLUMN 1	38	25
BENT 19 COLUMN 2	38	26
BENT 20 COLUMN 1	52	--
BENT 20 COLUMN 2	54	--
BENT 21 COLUMN 1	40	--
BENT 21 COLUMN 2	41	--
BENT 22 COLUMN 1	30	--
BENT 22 COLUMN 2	31	--

NOTES:

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

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

"T" BARS IN FOOTING MAY BE SHIFTED AS NECESSARY TO CLEAR COLUMN AND DRILLED PIER REINFORCEMENT.

FOR FOUNDATION NOTES, SEE "FOUNDATION NOTES" SHEET.

FOR SECTIONS AND VIEWS, SEE SHEET 2 OF 5 AND SHEET 3 OF 5.

FOR FOOTING AND DRILLED PIER REINFORCING DETAILS, SEE SHEET 3 OF 5 AND SHEET 4 OF 5.

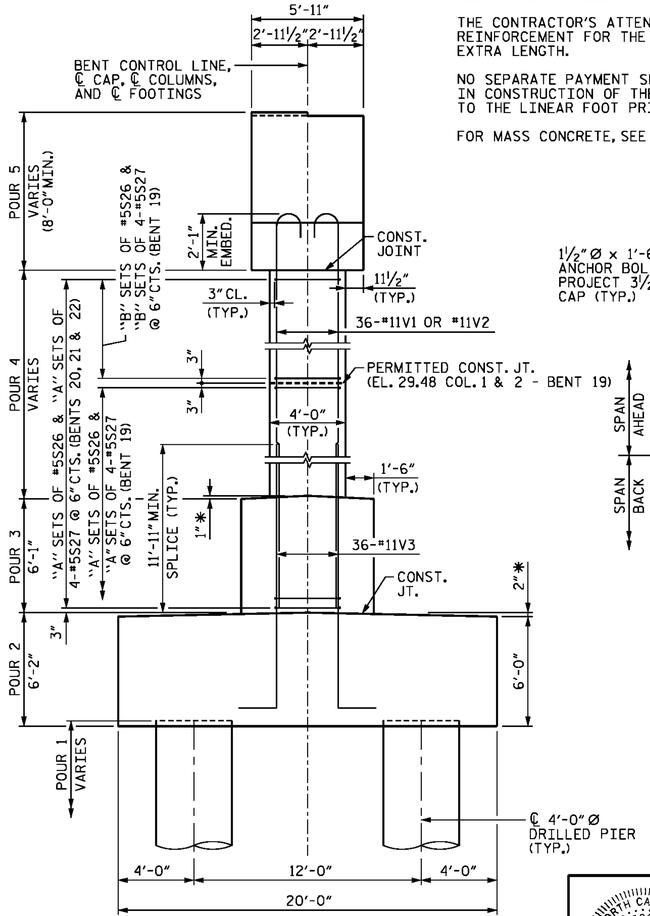
✱ FOOTING AND STRUT ARE SLOPED TO DRAIN.

ALL STEEL IN THE DRILLED PIERS IS INCLUDED IN THE PAY ITEMS FOR "EPOXY COATED REINFORCING STEEL" AND "EPOXY COATED SPIRAL COLUMN REINFORCING STEEL".

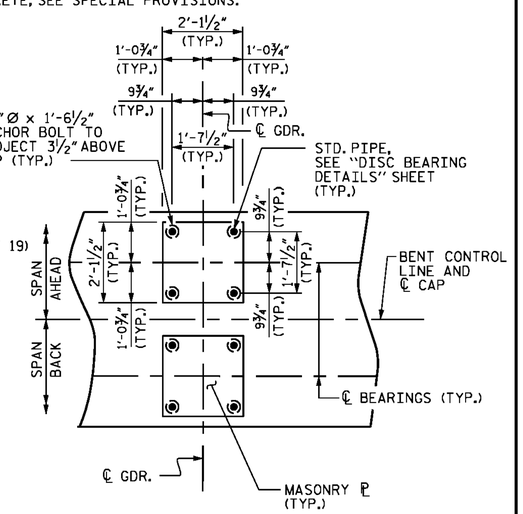
THE CONTRACTOR'S ATTENTION IS CALLED TO THE FACT THAT THE LONGITUDINAL REINFORCEMENT FOR THE DRILLED PIERS ARE DETAILED WITH 3 FEET OF EXTRA LENGTH.

NO SEPARATE PAYMENT SHALL BE MADE FOR ANY ADDITIONAL STEEL REQUIRED IN CONSTRUCTION OF THE DRILLED PIER AS THIS IS CONSIDERED INCIDENTAL TO THE LINEAR FOOT PRICE FOR DRILLED PIER.

FOR MASS CONCRETE, SEE SPECIAL PROVISIONS.



END VIEW



DETAIL A

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 1 OF 5 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 19 THROUGH 22 PLAN AND ELEVATION

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

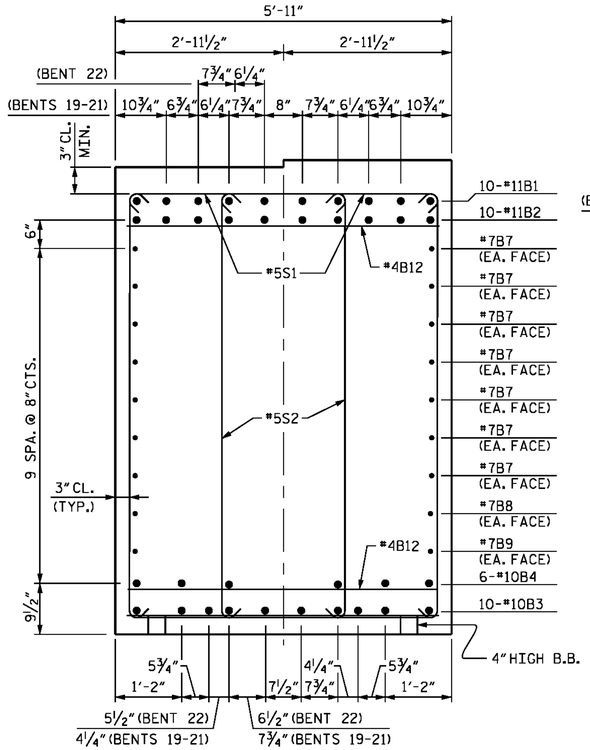
NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
03F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-274
1			3			TOTAL SHEETS
2			4			278

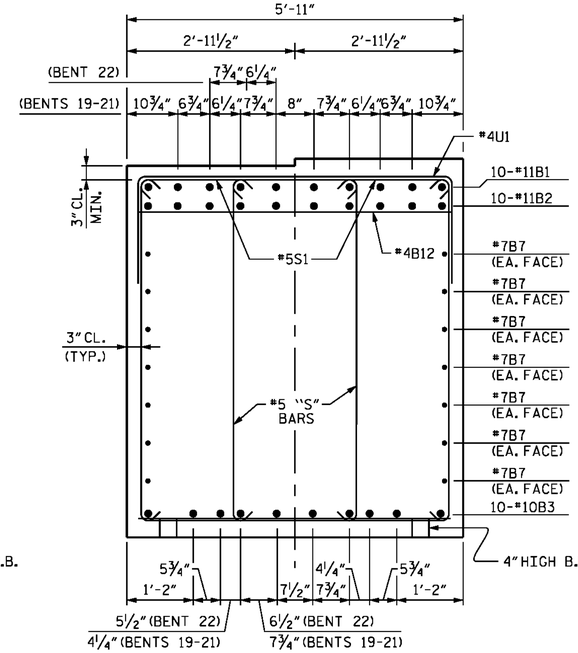
DESIGNED BY:	J. BORUTA	DATE : MAR 2016
DRAWN BY:	K. WHITE	DATE : MAR 2016
CHECKED BY:	J. DOUGHTY	DATE : APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE : MAY 2016

5/12/2016
401_125_B4929_SMU_TB19_1s.dgn



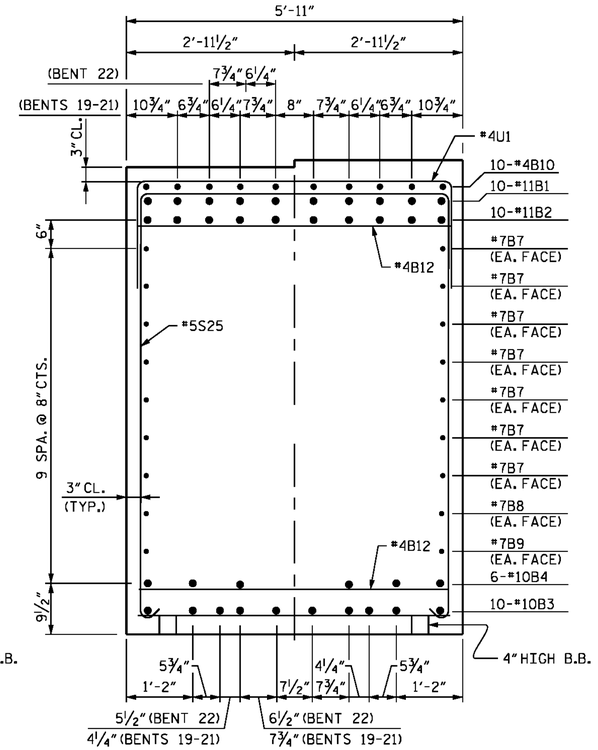
SECTION A-A

(BENT 19 SHOWN, BENTS 20, 21 & 22 SIMILAR)
(NO STEP IN BENTS 20 & 21)



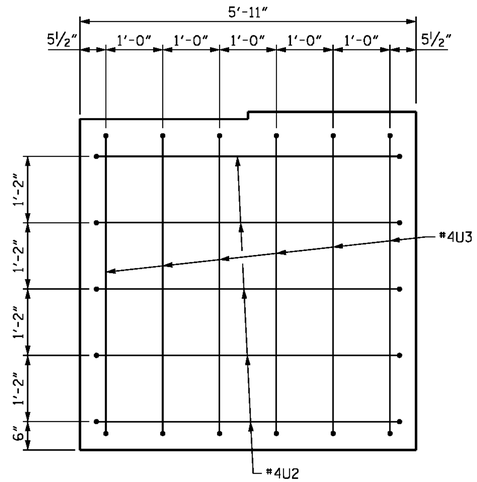
SECTION B-B

(BENT 19 SHOWN, BENTS 20, 21 & 22 SIMILAR)
(NO STEP IN BENTS 20 & 21)



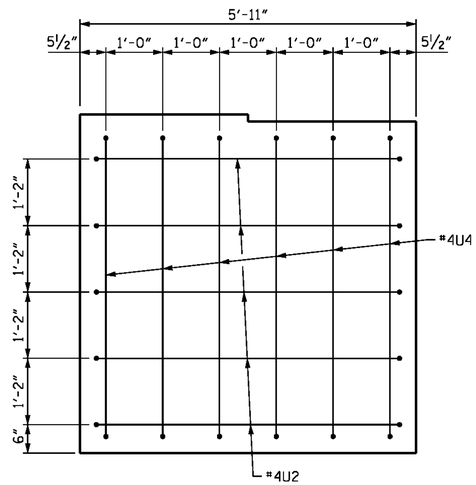
SECTION C-C

(BENT 19 SHOWN, BENTS 20, 21 & 22 SIMILAR)
(NO STEP IN BENTS 20 & 21)



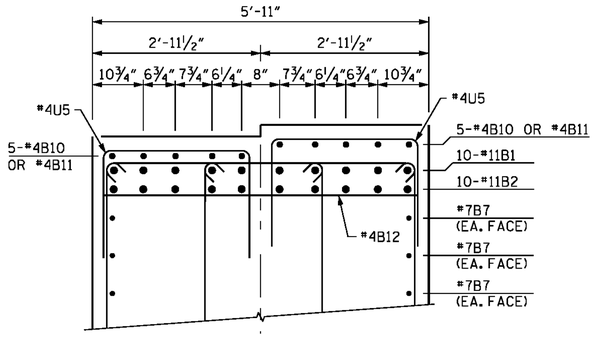
VIEW X-X

(NO STEP IN BENTS 20 & 21)



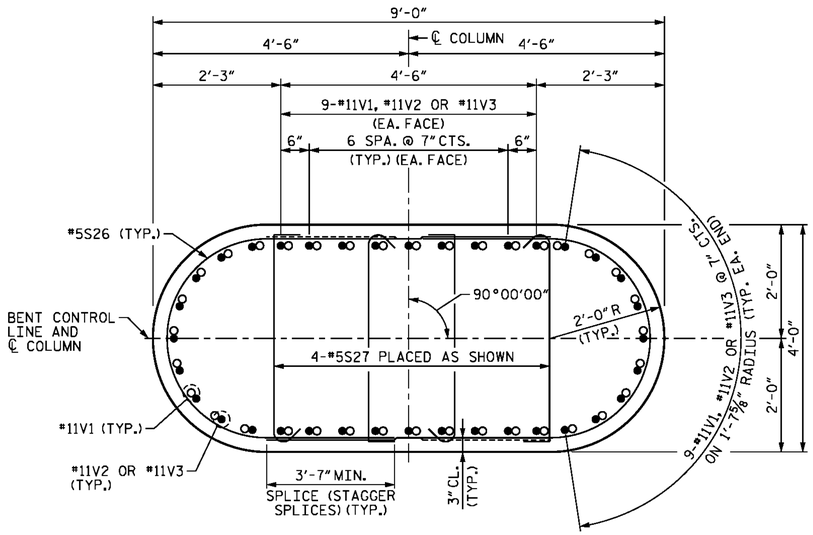
VIEW Y-Y

(NO STEP IN BENTS 20 & 21)



PARTIAL SECTION

(BENT 22)



SECTION D-D

WHEN PLACING *5S27 BARS, ALTERNATE THE POSITION OF THE 135° HOOK HORIZONTALLY AND VERTICALLY.

ALTERNATE DIRECTION OF *5S26 TO STAGGER LAPS.

NOTES:

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 2 OF 5 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 19 AND 22 SECTIONS AND DETAILS

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty

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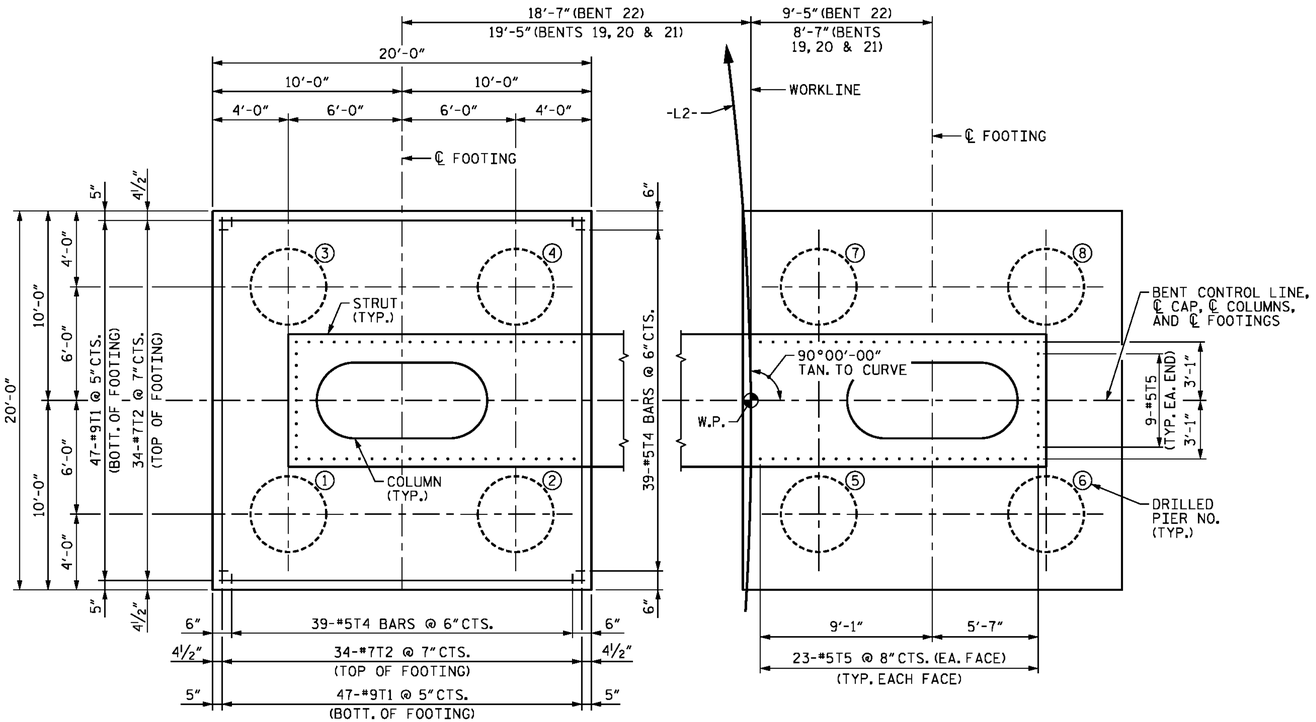
REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-275
1			3			TOTAL SHEETS
2			4			278

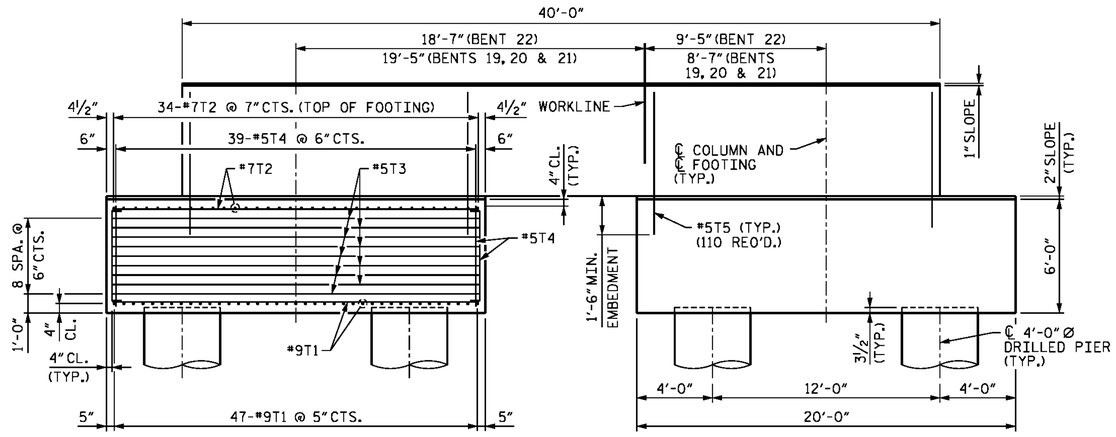
DESIGNED BY:	J. BORUTA	DATE :	FEB 2016
DRAWN BY:	MAH/KEW	DATE :	MAR 2016
CHECKED BY:	J. DOUGHTY	DATE :	APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

5/12/2016
401_127_B4929_SMU_IB19_2s.dgn



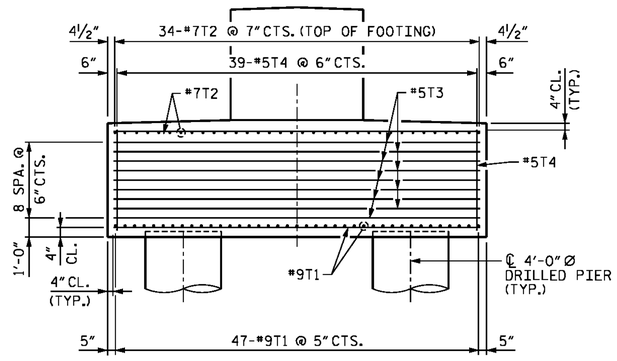
FOOTING PLAN

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

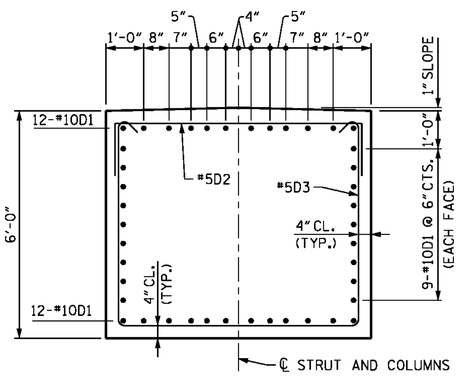


ELEVATION

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

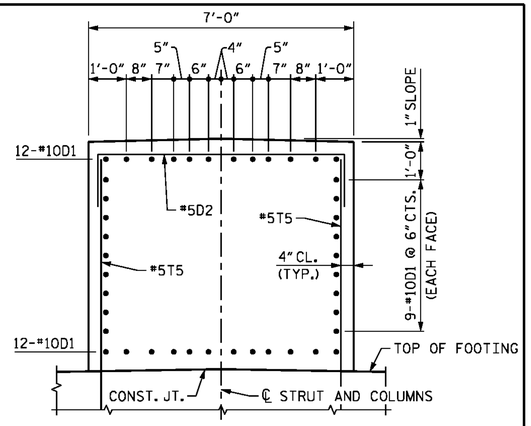


SIDE ELEVATION



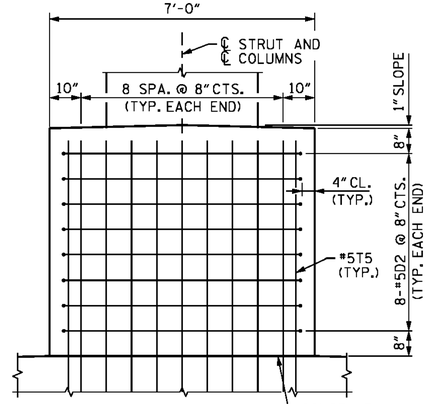
SECTION E-E

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.



SECTION F-F

BARS MAY BE SHIFTED SLIGHTLY, AS NECESSARY, TO CLEAR COLUMN REINFORCING.



VIEW Z-Z

NOTES:

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 3 OF 5 STEEL ALTERNATE

DESIGNED BY:	J. BORUTA	DATE :	MAR 2016
DRAWN BY:	MAH/KEW	DATE :	MAR 2016
CHECKED BY:	J. DOUGHTY	DATE :	APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty 00F1C88448274F7...

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

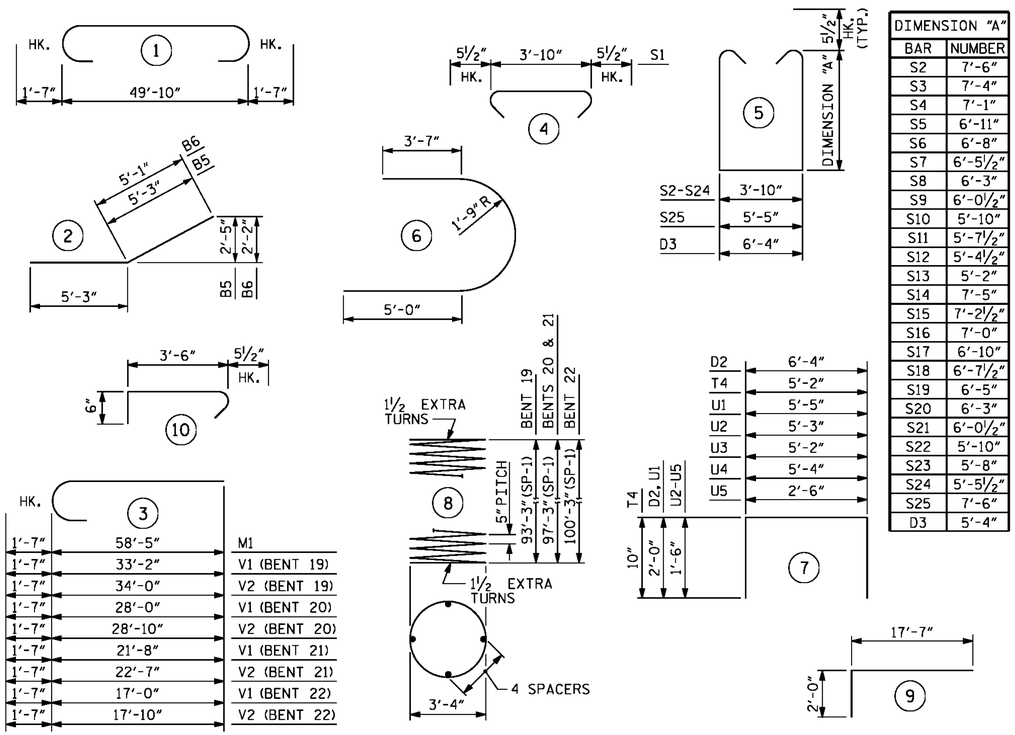
SUBSTRUCTURE

BENTS 19 AND 22 FOOTING DETAILS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-276
1			3			TOTAL SHEETS
2			4			278

5/12/2016
401129_B4929_SMU_IB19_3s.dgn

BAR TYPES



DIMENSION "A"	
BAR	NUMBER
S2	7'-6"
S3	7'-4"
S4	7'-1"
S5	6'-11"
S6	6'-8"
S7	6'-5½"
S8	6'-3"
S9	6'-0½"
S10	5'-10"
S11	5'-7½"
S12	5'-4½"
S13	5'-2"
S14	7'-5"
S15	7'-2½"
S16	7'-0"
S17	6'-10"
S18	6'-7½"
S19	6'-5"
S20	6'-3"
S21	6'-0½"
S22	5'-10"
S23	5'-8"
S24	5'-5½"
S25	7'-6"
D3	5'-4"

ALL BAR DIMENSIONS ARE OUT TO OUT.

BILL OF MATERIAL

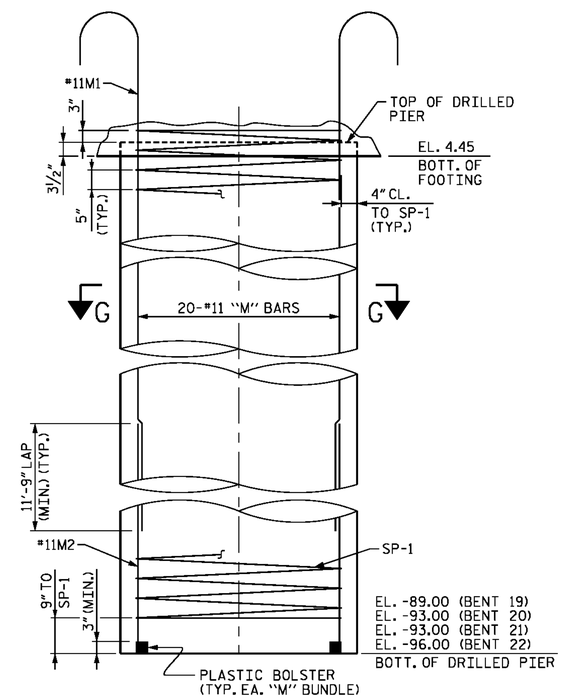
BENT 19

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816	S25	26	#5	5	21'-4"	579
B2	10	#11	STR	49'-10"	2648	S26	252	#5	6	14'-1"	3702
B3	10	#10	STR	40'-4"	1736	S27	504	#5	10	4'-6"	2366
B4	6	#10	STR	42'-4"	1093						
B5	10	#10	2	10'-6"	452	T1	188	#9	STR	19'-4"	12358
B6	10	#10	2	10'-4"	445	T2	136	#7	STR	19'-4"	5374
B7	14	#7	STR	49'-10"	1426	T3	72	#5	STR	19'-4"	1452
B8	2	#7	STR	47'-8"	195	T4	312	#5	7	6'-10"	2224
B9	2	#7	STR	45'-0"	184	T5	110	#5	STR	7'-2"	822
B10	40	#4	STR	6'-3"	167						
B11	10	#4	STR	5'-2"	35	U1	50	#4	7	9'-5"	315
B12	24	#4	STR	5'-5"	87	U2	10	#4	7	8'-3"	55
						U3	6	#4	7	8'-2"	33
D1	42	#10	STR	39'-4"	7109	U4	6	#4	7	8'-4"	33
D2	76	#5	7	10'-4"	819						
D3	14	#5	5	17'-11"	262	V1	36	#11	3	34'-9"	6647
						V2	36	#11	3	35'-7"	6806
M1	160	#11	3	60'-0"	51005	V3	72	#11	9	19'-7"	7491
M2	160	#11	STR	52'-2"	44346						
S1	118	#5	4	4'-9"	585	EPOXY COATED REINFORCING STEEL LBS. 167,991					
S2	74	#5	5	19'-9"	1524						
S3	2	#5	5	19'-5"	41						
S4	2	#5	5	18'-11"	39	SP-1	8	*	8	2339'-9"	19523
S5	2	#5	5	18'-7"	39						
S6	2	#5	5	18'-1"	38						
S7	2	#5	5	17'-8"	37	EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 19,523					
S8	2	#5	5	17'-3"	36						
S9	2	#5	5	16'-10"	35	CLASS "AA" CONCRETE BREAKDOWN					
S10	2	#5	5	16'-5"	34	POUR #2 - FOOTING C.Y. 179.8					
S11	2	#5	5	16'-0"	33	POUR #3 - STRUT C.Y. 62.7					
S12	2	#5	5	15'-6"	32	POUR #4 - COLUMNS C.Y. 61.7					
S13	2	#5	5	15'-1"	31	POUR #5 - CAP C.Y. 88.1					
S14	2	#5	5	19'-7"	41						
S15	2	#5	5	19'-2"	40	CLASS "AA" CONCRETE C.Y. 392.3					
S16	2	#5	5	18'-9"	39						
S17	2	#5	5	18'-5"	38	4'-0" Ø DRILLED PIERS QUANTIES:					
S18	2	#5	5	18'-0"	38	DRILLED PIER LIN. FT. 749.9					
S19	2	#5	5	17'-7"	37						
S20	2	#5	5	17'-3"	36	POUR 1 - DRILLED PIER C.Y. 349.0					
S21	2	#5	5	16'-10"	35						
S22	2	#5	5	16'-5"	34	PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS LIN. FT. 269.9					
S23	2	#5	5	16'-1"	34						
S24	2	#5	5	15'-8"	33	CSL TUBES LIN. FT. 3047.7					

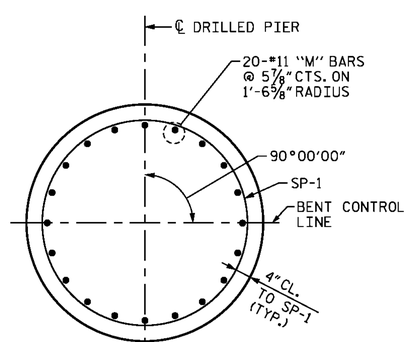
BENT 20

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT	BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816	S25	26	#5	5	21'-4"	579
B2	10	#11	STR	49'-10"	2648	S26	208	#5	6	14'-1"	3055
B3	10	#10	STR	40'-4"	1736	S27	416	#5	10	4'-6"	1952
B4	6	#10	STR	42'-4"	1093						
B5	10	#10	2	10'-6"	452	T1	188	#9	STR	19'-4"	12358
B6	10	#10	2	10'-4"	445	T2	136	#7	STR	19'-4"	5374
B7	14	#7	STR	49'-10"	1426	T3	72	#5	STR	19'-4"	1452
B8	2	#7	STR	47'-8"	195	T4	312	#5	7	6'-10"	2224
B9	2	#7	STR	45'-0"	184	T5	110	#5	STR	7'-2"	822
B10	40	#4	STR	6'-3"	167						
B11	10	#4	STR	5'-2"	35	U1	50	#4	7	9'-5"	315
B12	24	#4	STR	5'-5"	87	U2	10	#4	7	8'-3"	55
						U3	6	#4	7	8'-2"	33
D1	42	#10	STR	39'-4"	7109	U4	6	#4	7	8'-4"	33
D2	76	#5	7	10'-4"	819						
D3	14	#5	5	17'-11"	262	V1	36	#11	3	29'-7"	5658
						V2	36	#11	3	30'-5"	5818
M1	160	#11	3	60'-0"	51005	V3	72	#11	9	19'-7"	7491
M2	160	#11	STR	56'-2"	47746						
S1	118	#5	4	4'-9"	585	EPOXY COATED REINFORCING STEEL LBS. 168,353					
S2	74	#5	5	19'-9"	1524						
S3	2	#5	5	19'-5"	41						
S4	2	#5	5	18'-11"	39	SP-1	8	*	8	2438'-9"	20349
S5	2	#5	5	18'-7"	39						
S6	2	#5	5	18'-1"	38						
S7	2	#5	5	17'-8"	37	EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 20,349					
S8	2	#5	5	17'-3"	36						
S9	2	#5	5	16'-10"	35	CLASS "AA" CONCRETE BREAKDOWN					
S10	2	#5	5	16'-5"	34	POUR #2 - FOOTING C.Y. 179.8					
S11	2	#5	5	16'-0"	33	POUR #3 - STRUT C.Y. 62.7					
S12	2	#5	5	15'-6"	32	POUR #4 - COLUMNS C.Y. 49.1					
S13	2	#5	5	15'-1"	31	POUR #5 - CAP C.Y. 87.5					
S14	2	#5	5	19'-7"	41						
S15	2	#5	5	19'-2"	40	CLASS "AA" CONCRETE C.Y. 379.1					
S16	2	#5	5	18'-9"	39						
S17	2	#5	5	18'-5"	38	4'-0" Ø DRILLED PIERS QUANTIES:					
S18	2	#5	5	18'-0"	38	DRILLED PIER LIN. FT. 781.9					
S19	2	#5	5	17'-7"	37						
S20	2	#5	5	17'-3"	36	POUR 1 - DRILLED PIER C.Y. 363.9					
S21	2	#5	5	16'-10"	35						
S22	2	#5	5	16'-5"	34	PERMANENT STEEL CASING FOR 4'-0" Ø DRILLED PIERS LIN. FT. 269.9					
S23	2	#5	5	16'-1"	34						
S24	2	#5	5	15'-8"	33	CSL TUBES LIN. FT. 3175.7					

* THE SP-1 SPIRAL REINFORCING STEEL SHALL BE W31 OR D-20 OR D-31 COLD DRAWN WIRE OR #5 PLAIN DEFORMED BAR.



DRILLED PIER ELEVATION



SECTION G-G

NOTES:

FOR NOTES, SEE SHEET 1 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 4 OF 5 STEEL ALTERNATE

DESIGNED BY:	J. BORUTA	DATE :	MAR 2016
DRAWN BY:	K. WHITE	DATE :	MAR 2016
CHECKED BY:	J. DOUGHTY	DATE :	APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY
5/12/16
DocuSigned by: Jason R Doughty
00F1C88448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
SUBSTRUCTURE

BENTS 19 THROUGH 22 BILL OF MATERIALS

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-277
1			3			TOTAL SHEETS
2			4			278

5/12/2016
401_131_B4929_SMU_IB19_4s.dgn

BILL OF MATERIAL

BENT 21

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	10	#10	STR	40'-4"	1736
B4	6	#10	STR	42'-4"	1093
B5	10	#10	2	10'-6"	452
B6	10	#10	2	10'-4"	445
B7	14	#7	STR	49'-10"	1426
B8	2	#7	STR	47'-8"	195
B9	2	#7	STR	45'-0"	184
B10	40	#4	STR	6'-3"	167
B11	10	#4	STR	5'-2"	35
B12	24	#4	STR	5'-5"	87
D1	42	#10	STR	39'-4"	7109
D2	76	#5	7	10'-4"	819
D3	14	#5	5	17'-11"	262
M1	160	#11	3	60'-0"	51005
M2	160	#11	STR	56'-2"	47746
S1	118	#5	4	4'-9"	585
S2	74	#5	5	19'-9"	1524
S3	2	#5	5	19'-5"	41
S4	2	#5	5	18'-11"	39
S5	2	#5	5	18'-7"	39
S6	2	#5	5	18'-1"	38
S7	2	#5	5	17'-8"	37
S8	2	#5	5	17'-3"	36
S9	2	#5	5	16'-10"	35
S10	2	#5	5	16'-5"	34
S11	2	#5	5	16'-0"	33
S12	2	#5	5	15'-6"	32
S13	2	#5	5	15'-1"	31
S14	2	#5	5	19'-7"	41
S15	2	#5	5	19'-2"	40
S16	2	#5	5	18'-9"	39
S17	2	#5	5	18'-5"	38
S18	2	#5	5	18'-0"	38
S19	2	#5	5	17'-7"	37
S20	2	#5	5	17'-3"	36
S21	2	#5	5	16'-10"	35
S22	2	#5	5	16'-5"	34
S23	2	#5	5	16'-1"	34
S24	2	#5	5	15'-8"	33
S25	26	#5	5	21'-4"	579
S26	168	#5	6	14'-1"	2468
S27	336	#5	10	4'-6"	1577
T1	188	#9	STR	19'-4"	12358
T2	136	#7	STR	19'-4"	5374
T3	72	#5	STR	19'-4"	1452
T4	312	#5	7	6'-10"	2224
T5	110	#5	STR	7'-2"	822
U1	50	#4	7	9'-5"	315
U2	10	#4	7	8'-3"	55
U3	6	#4	7	8'-2"	33
U4	6	#4	7	8'-4"	33
V1	36	#11	3	23'-3"	4447
V2	36	#11	3	24'-2"	4622
V3	72	#11	9	19'-7"	7491
SP-1	8	*	8	2438'-9"	20349

EPOXY COATED REINFORCING STEEL LBS. 164,984

EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 20,349

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 179.8
POUR #3 - STRUT	C.Y. 62.7
POUR #4 - COLUMNS	C.Y. 33.5
POUR #5 - CAP	C.Y. 87.5
CLASS "AA" CONCRETE	C.Y. 363.5

4'-0" "DRILLED PIERS QUANTITIES:

DRILLED PIER	LIN. FT. 781.9
POUR 1 - DRILLED PIER	C.Y. 363.9
PERMANENT STEEL CASING FOR 4'-0" "DRILLED PIERS	LIN. FT. 269.9
CSL TUBES	LIN. FT. 3175.7

BENT 22

BAR	NUMBER	SIZE	TYPE	LENGTH	WEIGHT
B1	10	#11	1	53'-0"	2816
B2	10	#11	STR	49'-10"	2648
B3	10	#10	STR	40'-4"	1736
B4	6	#10	STR	42'-4"	1093
B5	10	#10	2	10'-6"	452
B6	10	#10	2	10'-4"	445
B7	14	#7	STR	49'-10"	1426
B8	2	#7	STR	47'-8"	195
B9	2	#7	STR	45'-0"	184
B10	40	#4	STR	6'-3"	167
B11	10	#4	STR	5'-2"	35
B12	24	#4	STR	5'-5"	87
D1	42	#10	STR	39'-4"	7109
D2	76	#5	7	10'-4"	819
D3	14	#5	5	17'-11"	262
M1	160	#11	3	60'-0"	51005
M2	160	#11	STR	59'-2"	50296
S1	118	#5	4	4'-9"	585
S2	74	#5	5	19'-9"	1524
S3	2	#5	5	19'-5"	41
S4	2	#5	5	18'-11"	39
S5	2	#5	5	18'-7"	39
S6	2	#5	5	18'-1"	38
S7	2	#5	5	17'-8"	37
S8	2	#5	5	17'-3"	36
S9	2	#5	5	16'-10"	35
S10	2	#5	5	16'-5"	34
S11	2	#5	5	16'-0"	33
S12	2	#5	5	15'-6"	32
S13	2	#5	5	15'-1"	31
S14	2	#5	5	19'-7"	41
S15	2	#5	5	19'-2"	40
S16	2	#5	5	18'-9"	39
S17	2	#5	5	18'-5"	38
S18	2	#5	5	18'-0"	38
S19	2	#5	5	17'-7"	37
S20	2	#5	5	17'-3"	36
S21	2	#5	5	16'-10"	35
S22	2	#5	5	16'-5"	34
S23	2	#5	5	16'-1"	34
S24	2	#5	5	15'-8"	33
S25	26	#5	5	21'-4"	579
S26	120	#5	6	14'-1"	1763
S27	240	#5	10	4'-6"	1126
T1	188	#9	STR	19'-4"	12358
T2	136	#7	STR	19'-4"	5374
T3	72	#5	STR	19'-4"	1452
T4	312	#5	7	6'-10"	2224
T5	110	#5	STR	7'-2"	822
U2	10	#4	7	8'-3"	55
U3	6	#4	7	8'-2"	33
U4	6	#4	7	8'-4"	33
U5	100	#4	7	5'-6"	367
V1	36	#11	3	18'-7"	3554
V2	36	#11	3	19'-5"	3714
V3	72	#11	9	19'-7"	7491
SP-1	8	*	8	2513'-1"	20969

EPOXY COATED REINFORCING STEEL LBS. 164,629

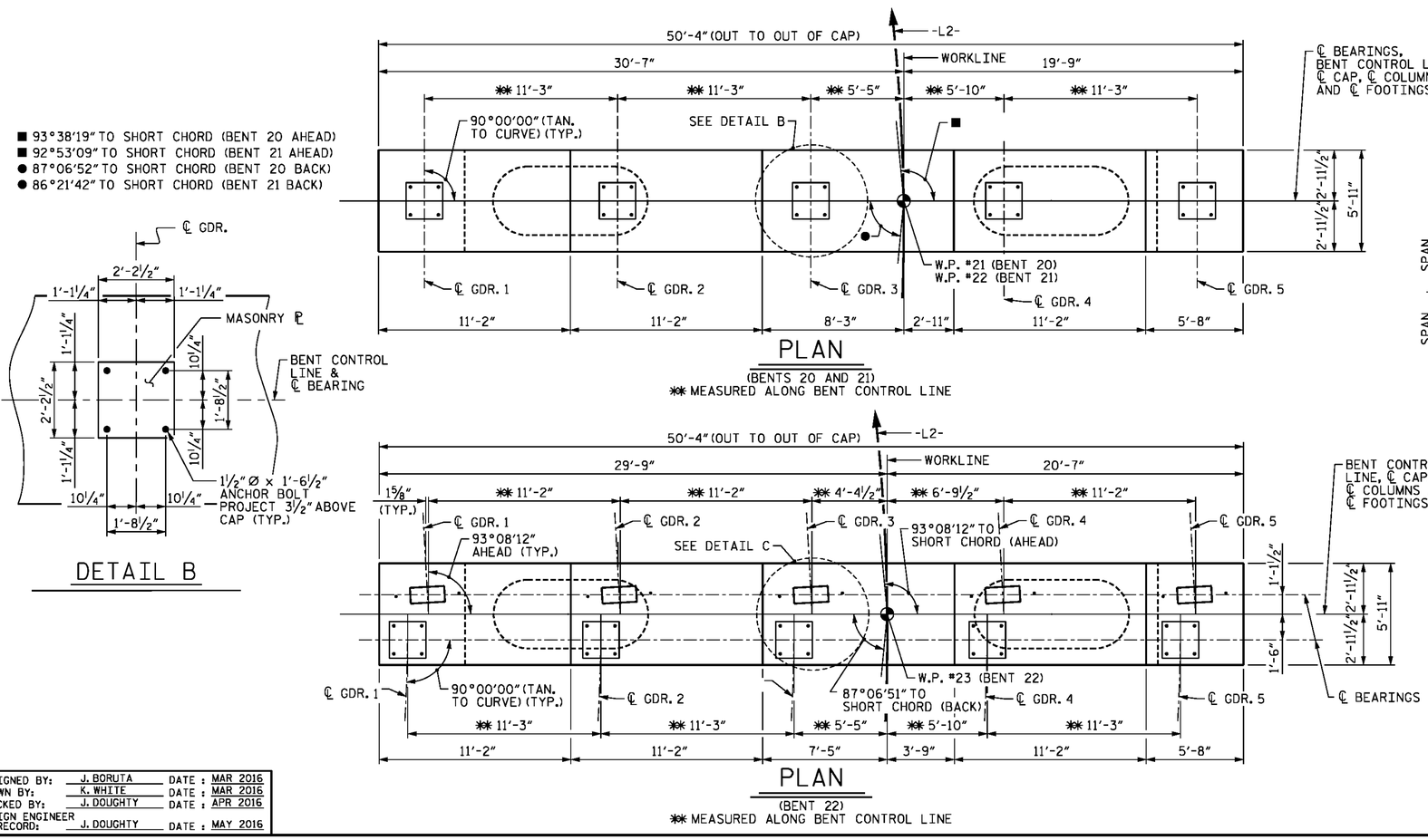
EPOXY COATED SPIRAL DRILLED PIER REINFORCING STEEL LBS. 20,969

CLASS "AA" CONCRETE BREAKDOWN

POUR #2 - FOOTING	C.Y. 179.8
POUR #3 - STRUT	C.Y. 62.7
POUR #4 - COLUMNS	C.Y. 22.0
POUR #5 - CAP	C.Y. 88.5
CLASS "AA" CONCRETE	C.Y. 353.0

4'-0" "DRILLED PIERS QUANTITIES:

DRILLED PIER	LIN. FT. 805.9
POUR 1 - DRILLED PIER	C.Y. 375.1
PERMANENT STEEL CASING FOR 4'-0" "DRILLED PIERS	LIN. FT. 157.9
CSL TUBES	LIN. FT. 3271.7



PLAN

(BENTS 20 AND 21)

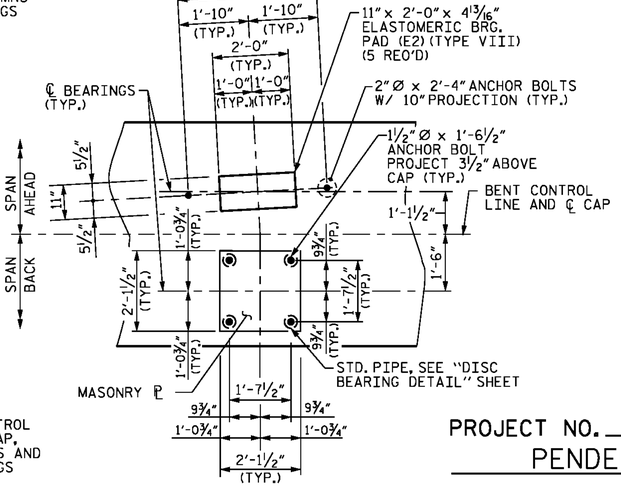
* MEASURED ALONG BENT CONTROL LINE

DETAIL B

PLAN

(BENT 22)

* MEASURED ALONG BENT CONTROL LINE



DETAIL C

NOTES:

FOR NOTES, SEE SHEET 1 OF 5.

FOR BAR TYPES, SEE SHEET 4 OF 5.

PROJECT NO. B-4929

PENDER COUNTY

STATION: 38+13.81 -L2-

SHEET 5 OF 5 STEEL ALTERNATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

SUBSTRUCTURE

BENTS 19 THROUGH 22 BILL OF MATERIALS

DESIGNED BY:	J. BORUTA	DATE :	MAR 2016
DRAWN BY:	K. WHITE	DATE :	MAR 2016
CHECKED BY:	J. DOUGHTY	DATE :	APR 2016
DESIGN ENGINEER OF RECORD:	J. DOUGHTY	DATE :	MAY 2016

PARSONS BRINCKERHOFF
434 FAYETTEVILLE STREET
SUITE 1500
RALEIGH, NC 27601
LICENSE NO. F-0165

NORTH CAROLINA PROFESSIONAL SEAL 032967 ENGINEER JASON R. DOUGHTY

5/12/16

DocuSigned by: Jason R Doughty
00F1C86448274F7...

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-278
1			3			TOTAL SHEETS
2			4			278

5/13/2016
401_133_B4929_SMU_IB19_5s.dgn