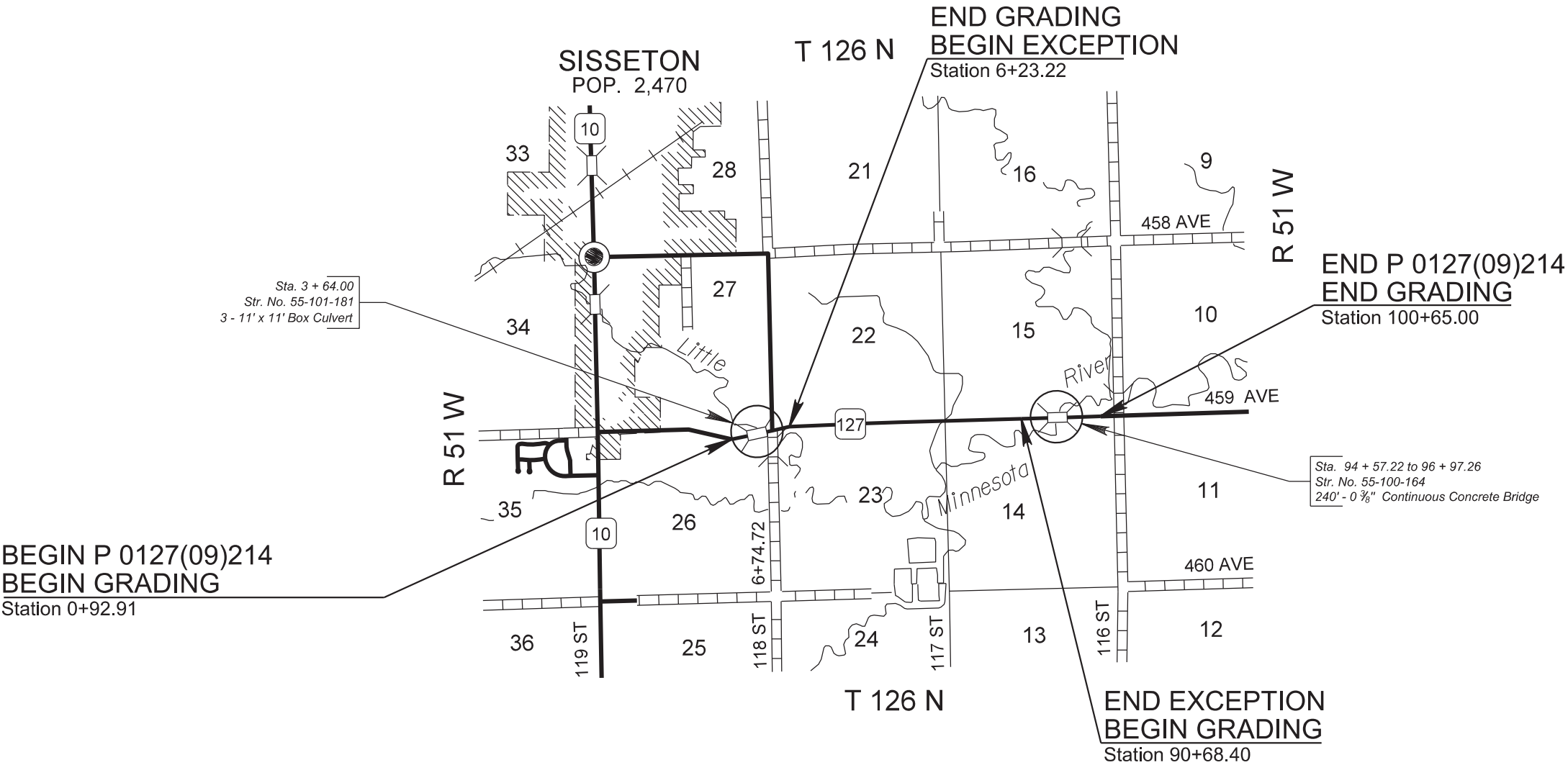
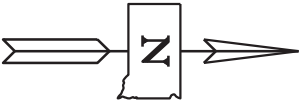


STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E1	E35

Section E: Structure Plans

INDEX OF SHEETS -

Sheet E1	Layout Map and Index
Sheet E2	Estimate of Structure Quantities & Notes
Sheet E3 to E13	Str. No. 55-101-181 3 - 11' x 11' Box Culvert
Sheet E14 to E35	Str. No. 55-100-164 240' - 0 3/8" Continuous Concrete Bridge



SECTION E – ESTIMATE OF STRUCTURE QUANTITES

Str. No. 55-101-181

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
250E0030	Incidental Work, Structure	Lump Sum	LS
420E0200	Structure Excavation, Box Culvert	177	CuYd
421E0200	Box Culvert Undercut	510	CuYd
460E0120	Class A45 Concrete, Box Culvert	424.6	CuYd
480E0100	Reinforcing Steel	63,188	Lb
700E0210	Class B Riprap	837.5	Ton
831E0110	Type B Drainage Fabric	919	SqYd

Str. No. 55-100-164

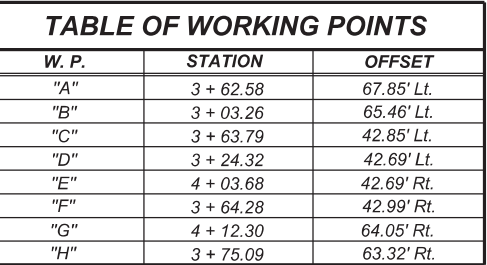
BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E3310	Bridge Elevation Survey	Lump Sum	LS
009E5000	Concrete Penetrating Sealer	1,044.0	SqYd
120E7000	Select Granular Backfill	22.4	Ton
250E0030	Incidental Work, Structure	Lump Sum	LS
410E2600	Membrane Sealant Expansion Joint	75.8	Ft
420E0100	Structure Excavation, Bridge	1,514	CuYd
430E0200	Bridge End Embankment	252	CuYd
430E0300	Granular Bridge End Backfill	68.5	CuYd
430E0510	Approach Slab Underdrain Excavation	7.5	CuYd
430E0700	Precast Concrete Headwall for Drain	4	Each
460E0030	Class A45 Concrete, Bridge Deck	475.2	CuYd
460E0050	Class A45 Concrete, Bridge	543.4	CuYd
460E0150	Concrete Approach Slab for Bridge	159.8	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	37.9	SqYd
480E0100	Reinforcing Steel	51,867	Lb
480E0200	Epoxy Coated Reinforcing Steel	9,124	Lb
480E0300	Stainless Reinforcing Steel	156,602	Lb
510E0100	Extract Pile	5	Each
510E0300	Preboring Pile	100	Ft
510E3361	HP 10x42 Steel Test Pile, Furnish and Drive	200	Ft
510E3365	HP 10x42 Steel Bearing Pile, Furnish and Drive	760	Ft
510E3521	HP 14x73 Steel Test Pile, Furnish and Drive	375	Ft
510E3525	HP 14x73 Steel Bearing Pile, Furnish and Drive	8,050	Ft
680E0040	4" Underdrain Pipe	147	Ft
680E2500	Porous Backfill	14.1	Ton
700E0210	Class B Riprap	1,978.0	Ton
700E1100	Overburden Excavation for Riprap	4,054	CuYd
831E0110	Type B Drainage Fabric	2,341	SqYd
831E1030	Perforated Geocell	640	SqFt

INCIDENTAL WORK, STRUCTURE

1. Incidental Work, Structure shall consist of the removal of the following structure:

Str. No. 55-101-181 In-place centerline Sta. 3+48.36 to centerline Sta. 4+31.36 is a 83'-0 " continuous concrete slab bridge with a 30'-0" clear roadway. The superstructure consists of a reinforced concrete slab with concrete rectangular block on curb rail continuous across the bridge. The deck has been overlaid with 2 inches of low slump concrete. The substructure consists of 2 column reinforced concrete bents and reinforced concrete abutments, all of which are supported on treated timber piles.
2. Break down and remove the existing structure 1 foot below finished ground or as required to construct the new structures in accordance with Section 110 of the Specifications. All portions of the existing structure shall be removed and disposed of by the Contractor on a site obtained by the Contractor and approved by the Engineer in accordance with COMMITMENT H: WASTE DISPOSAL SITE found in SECTION A.
3. During demolition of the structure, efforts shall be taken to prevent material from falling into the creek. Under no circumstances is asphalt allowed to fall into the creek.
4. The foregoing is a general description of the in-place structure and should not be construed to be complete in all details. Before preparing the bid it shall be the responsibility of the Contractor to make a visual inspection of the structure to verify the extent of the work and materials involved. If desired by the Contractor, a copy of the original construction plans may be obtained through the Office of Bridge Design.

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E3	E35

[illegible]

Q_d	813 cfs
A_d	254 sq ft
V_d	3.2 fps
Q_F	813 cfs
Q_{100}	1367 cfs
Q_{OT}	$>Q_{100}$
V_{max}	4.8 fps

Top of Finished Grade at C Roadway

P. I. Sta. 3 + 60.00
Elev. = 1160.0
V. C. = 400'

P. C. Sta. 1 + 60.00

Box Culvert

Sta. 3 + 64.00

Sta. 5 + 60.00

Sta. 3 + 60.00

$g_1 = -1.0081\%$

$g_2 = 0.0244\%$

18" Surfacing

**-X028-
INDEX OF CULVERT SHEETS-**

Sheet No. 1 - General Drawing and Quantities
Sheet No. 2 - Notes and Undercut Details
Sheet No. 3 - Inlet Details (A)
Sheet No. 4 - Inlet Details (B)
Sheet No. 5 - Inlet Details (C)
Sheet No. 6 - Outlet Details (A)
Sheet No. 7 - Outlet Details (B)
Sheet No. 8 - F5 Barrel End Section Details (46" - 0") (A)
Sheet No. 9 - F5 Barrel End Section Details (46" - 0") (B)
Sheet No. 10 - Details of Standard Plate No's 460.02 and 460.10
Sheet No. 11 - Details of Standard Plate No. 620.16

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
<i>Class A45 Concrete, Box Culvert</i>	<i>Cu. Yd.</i>	<i>424.6</i>
<i>Reinforcing Steel</i>	<i>Lb.</i>	<i>63188</i>
<i>Structure Excavation, Box Culvert</i>	<i>Cu. Yd.</i>	<i>177</i>
<i>Box Culvert Undercut</i>	<i>Cu. Yd.</i>	<i>510</i>
<i>Type B Drainage Fabric</i>	<i>Sq. Yd.</i>	<i>919</i>
<i>Class B Riprap</i>	<i>Ton</i>	<i>837.5</i>

GENERAL DRAWING AND QUANTITIES

FOR

3 - 11' X 11' BOX CULVERT

OVER TRIBUTARY TO LITTLE 25° RH F SKEW
MINNESOTA RIVER SEC. 26-T126N-R51W
STA. 3 + 64.00 P 0127(09)214
STR. NO. 55-101-181 HL-93
PCN 067D

ROBERTS COUNTY

S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2023

-X028-

DESIGNED BY AH ROBT067D	CK. DES. BY BM 067DGA01	DRAFTED BY MG	 BRIDGE ENGINEER
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1 OF 11

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E4	E35

SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
2. Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at <https://dot.sd.gov/doing-business/contractors/standard-specifications>.

GENERAL NOTES

1. Design Live Load: HL-93. No construction loading in excess of legal load was considered.
2. The design of the barrel section is based on a minimum fill height of 2 feet and includes all subsequent fill heights up to and including the maximum fill height of 5 ft. (F5).
3. Design Material Strengths: Concrete $f'c = 4500$ p.s.i.
Reinforcing Steel $f_y = 60000$ p.s.i.
4. All concrete will be Class A45, Box Culvert conforming to Section 460 of the Construction Specifications.
5. All reinforcing steel will conform to ASTM A615 Grade 60.
6. All lap splices shown are contact lap splices unless noted otherwise.
7. All exposed edges will be chamfered $\frac{3}{4}$ inch unless noted otherwise in the plans.
8. Use 1 inch clear cover on all reinforcing steel EXCEPT as shown.
9. The Contractor will imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02.
10. Care will be taken to establish Working Points (W.P.) as shown on the wings.
11. Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).
12. Cost of Preformed Expansion Joint Filler used in apron construction will be incidental to the other contract items.
13. Soils below the bottom of the proposed RCBC consist of gray clay. Groundwater was encountered at an elevation of 1146.68 feet during the subsurface investigation conducted in July 2022. Dewatering will be required for construction of the RCBC. All cost incurred for dewatering will be incidental to other contract items.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Box Culvert Undercut	Cu. Yd.	510

For payment, quantity is based on plan shown undercut dimensions and will not be measured unless the Engineer orders a change.

NOTES AND UNDERCUT DETAILS

FOR

3 - 11' X 11' BOX CULVERT

OVER TRIBUTARY TO LITTLE MINNESOTA RIVER
STA. 3 + 64.00
STR. NO. 55-101-181

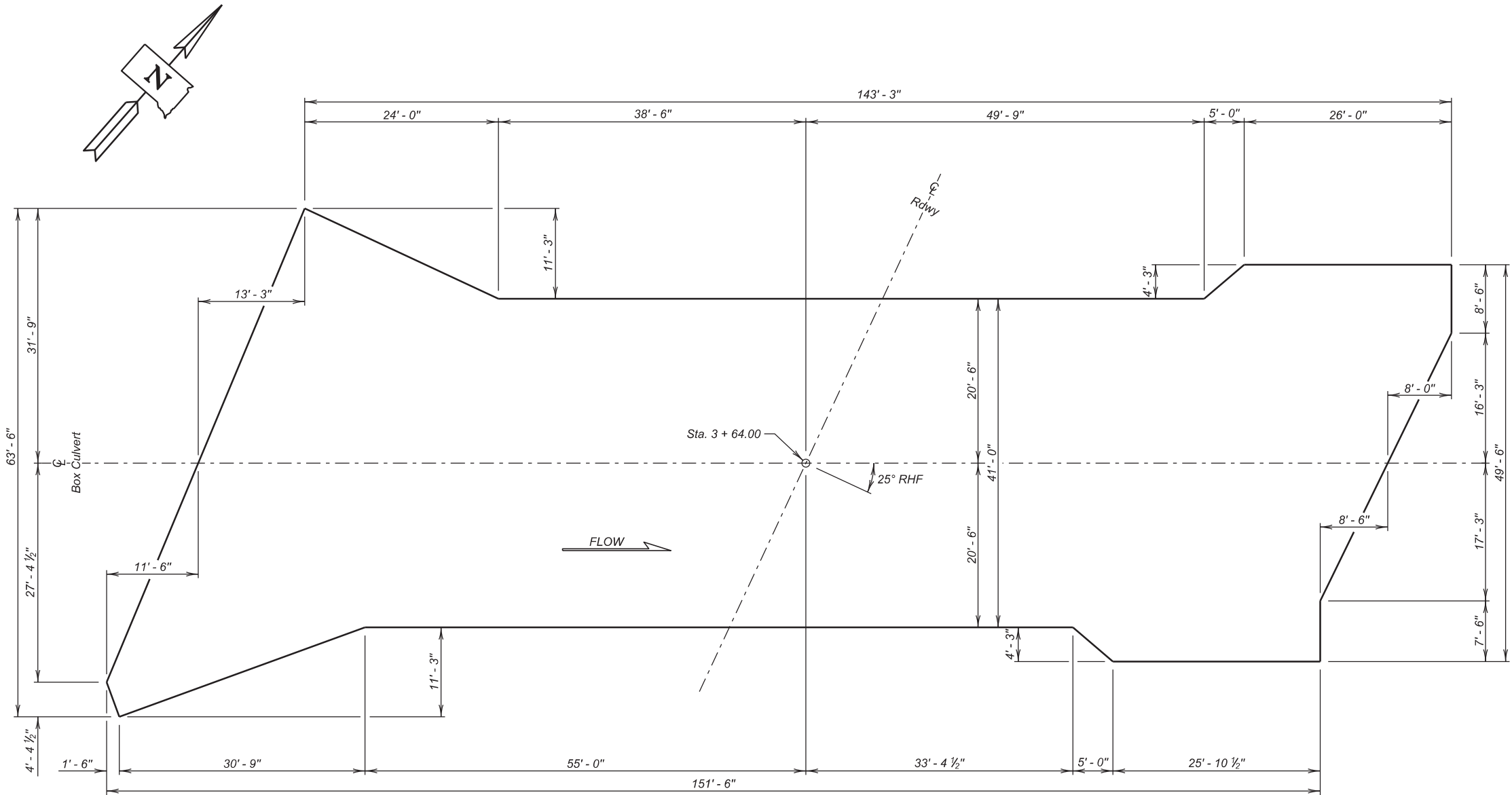
25° RHF SKEW
SEC. 26-T126N-R51W
P 0127(09)214
HL-93

ROBERTS COUNTY

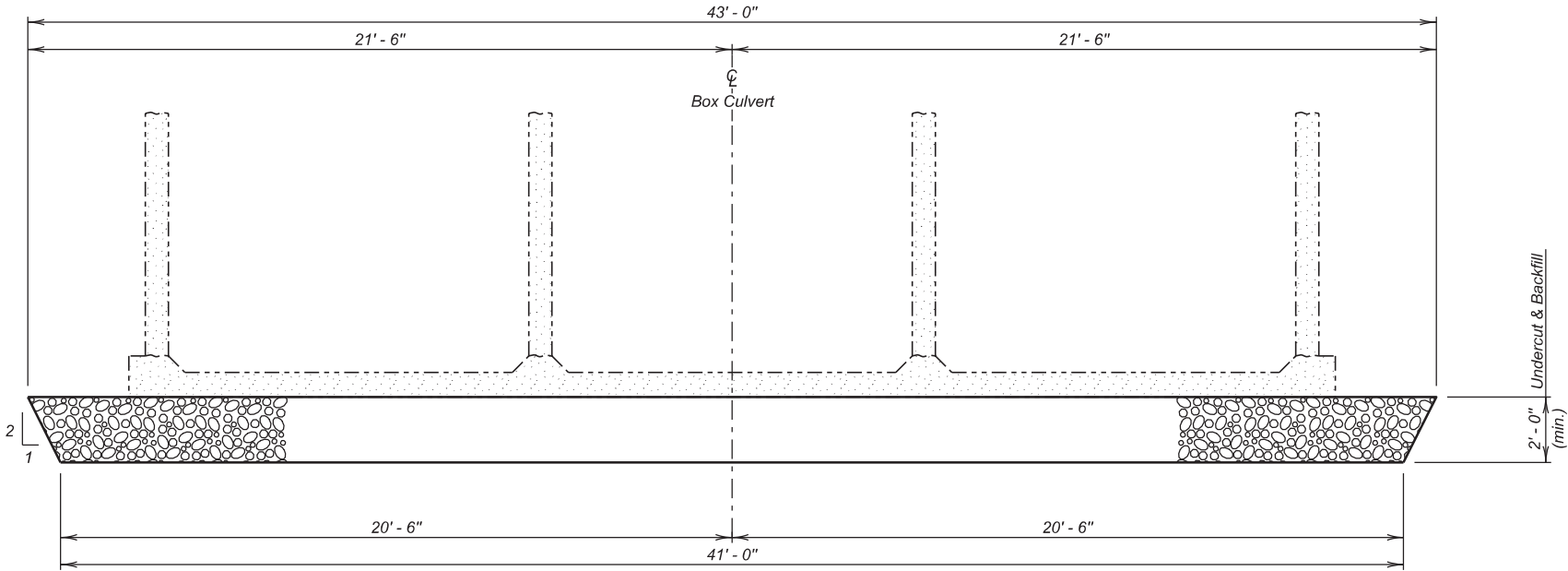
S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2023

DESIGNED BY AH ROBT067D	CK. DES. BY BM 067DGA02	DRAFTED BY MG	 BRIDGE ENGINEER
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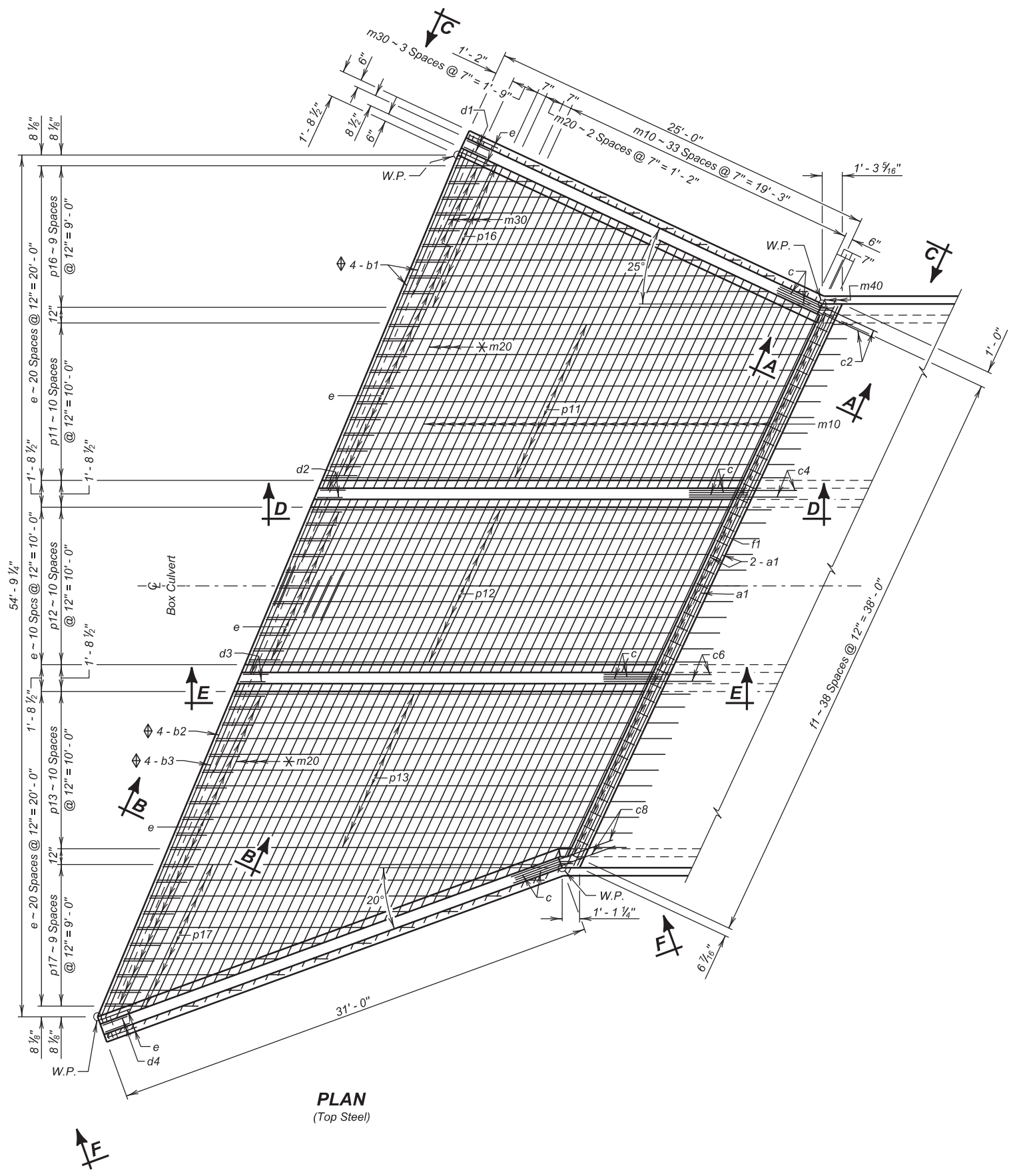


UNDERCUT LAYOUT
(Bottom Dimensions)



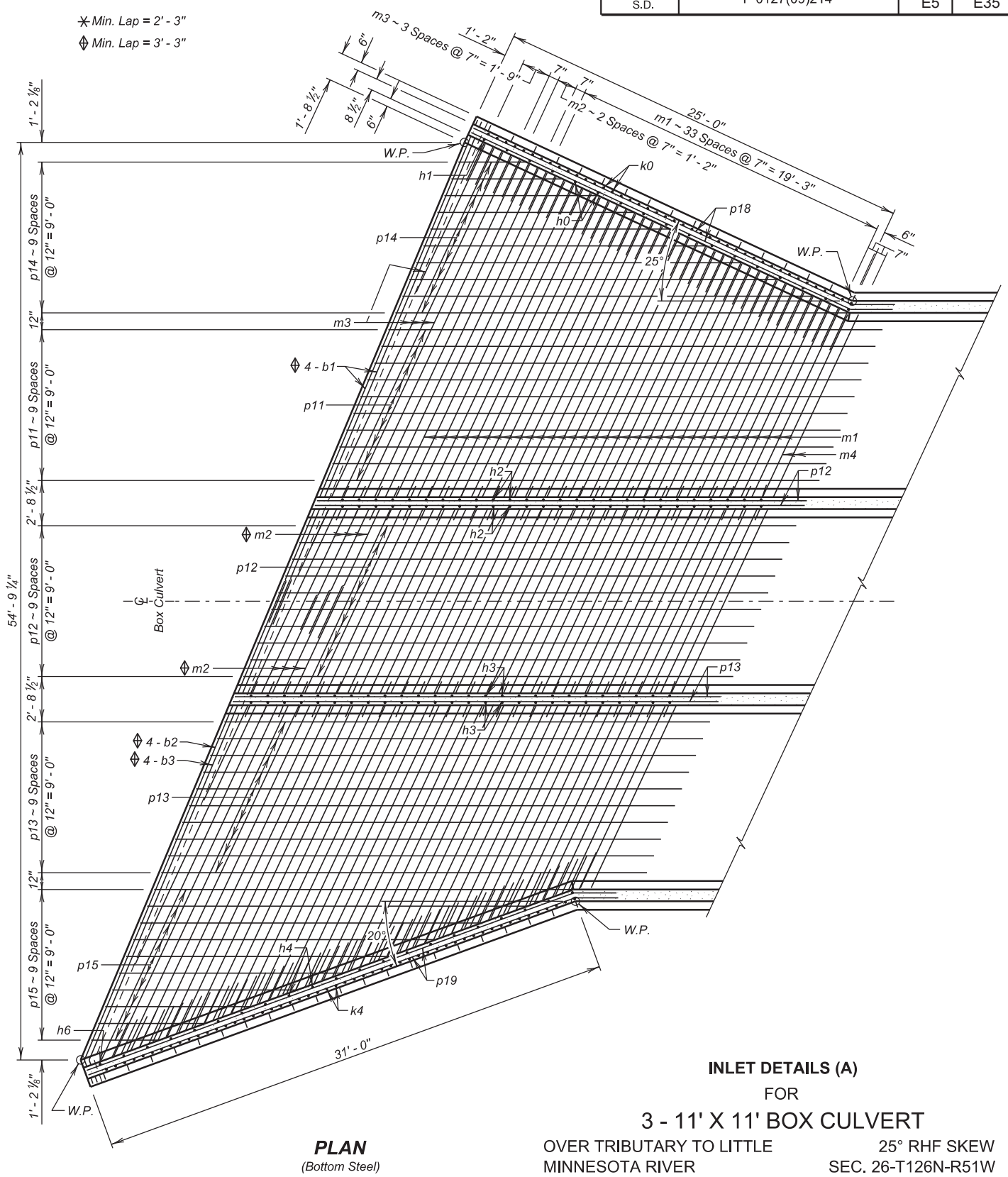
TYPICAL SECTION
(For Limits of Undercut)

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E5	E35



PLAN
(Top Steel)

* Min. Lap = 2' - 3"
◇ Min. Lap = 3' - 3"

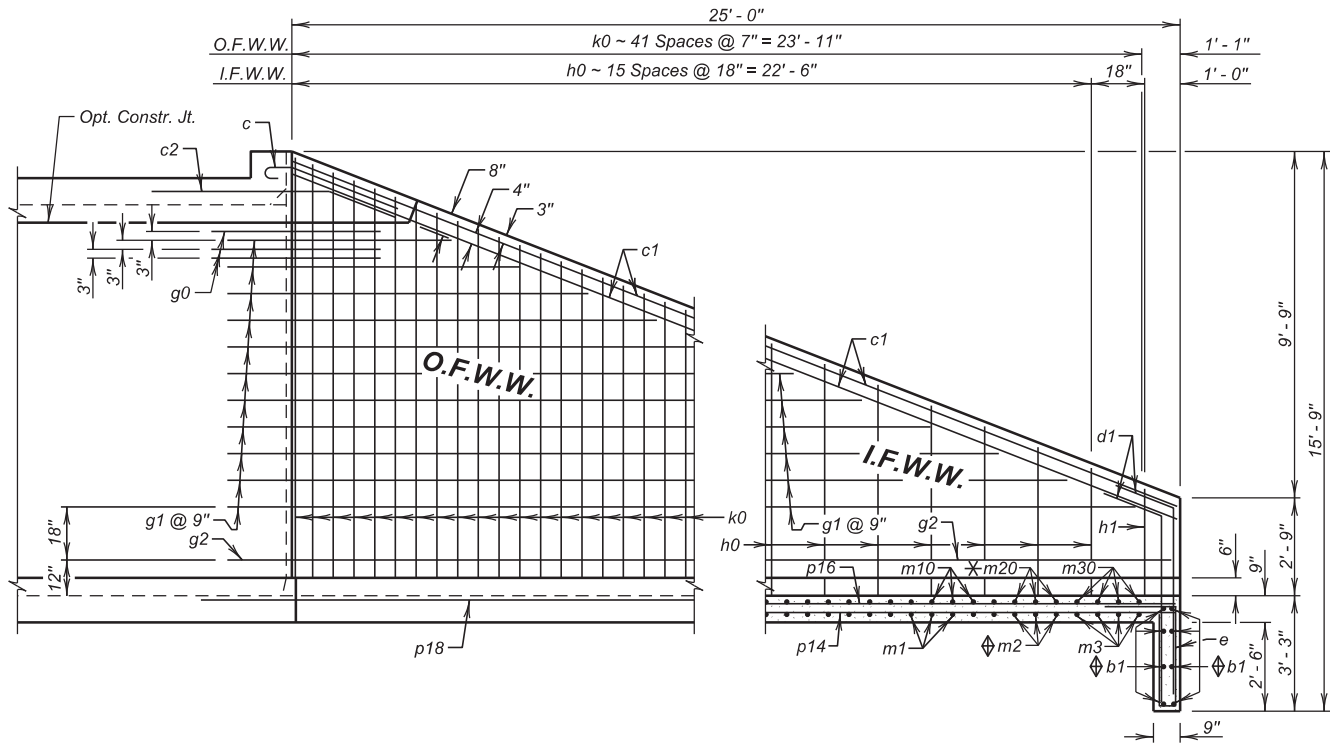


PLAN
(Bottom Steel)

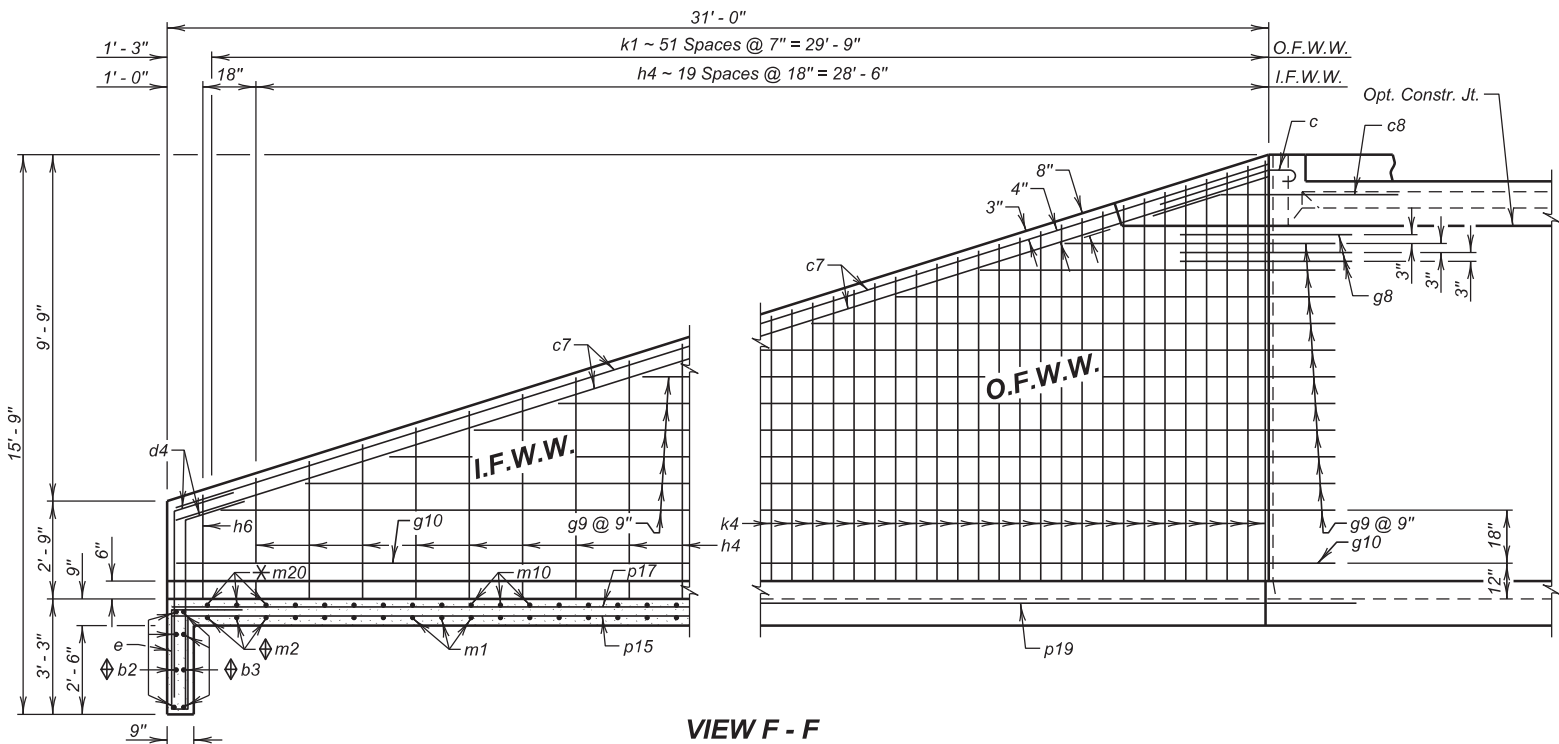
INLET DETAILS (A)
FOR
3 - 11' X 11' BOX CULVERT
OVER TRIBUTARY TO LITTLE MINNESOTA RIVER
STA. 3 + 64.00
STR. NO. 55-101-181
25° RHF SKEW
SEC. 26-T126N-R51W
P 0127(09)214
HL-93

ROBERTS COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2023

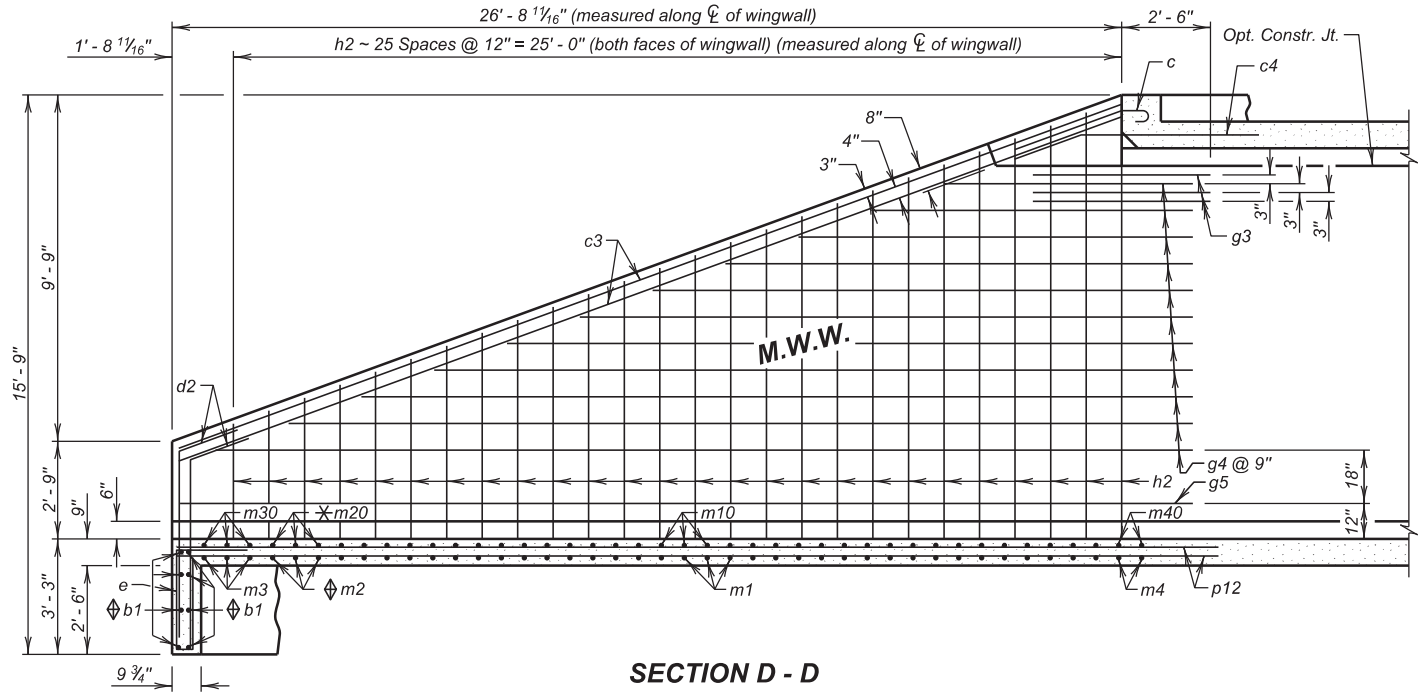
DESIGNED BY AH ROBT067D	CK. DES. BY BM 067DGA03	DRAFTED BY MG	Steve A. Johnson BRIDGE ENGINEER
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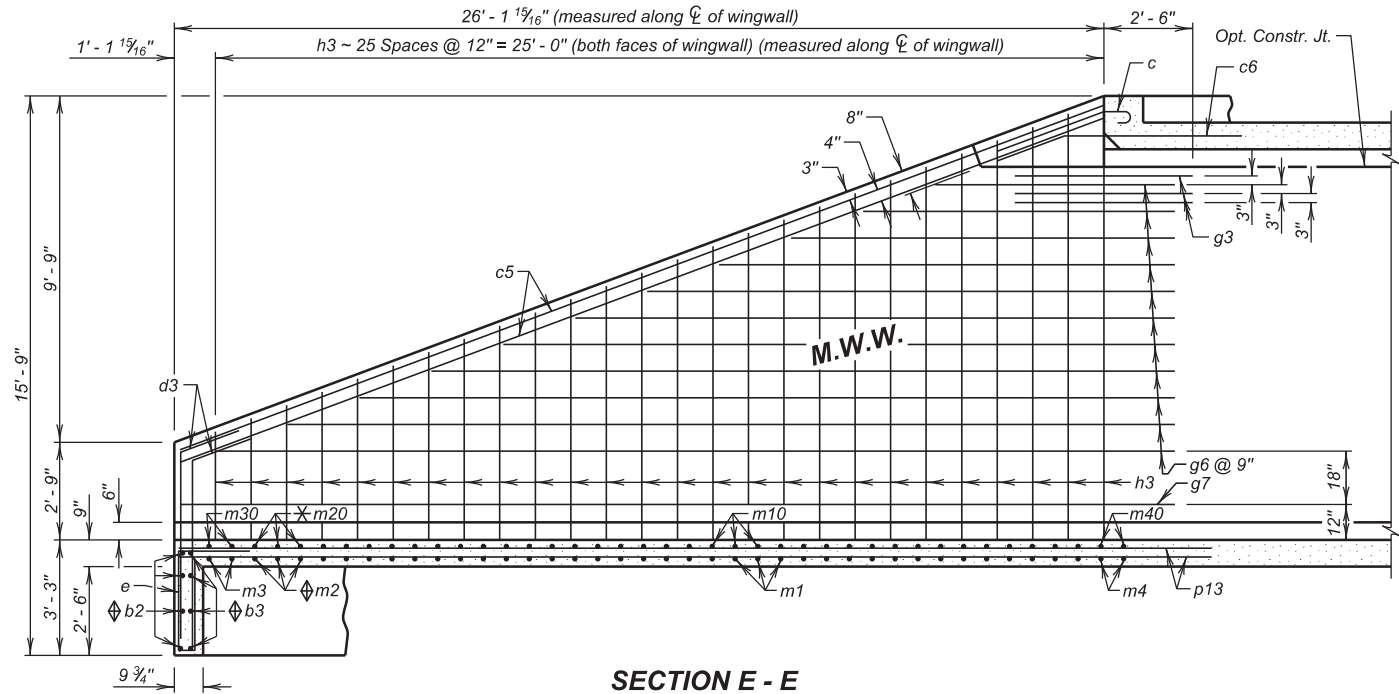
VIEW C - C



VIEW F - F



SECTION D - D



SECTION E - E

INLET DETAILS (B)

FOR

3 - 11' X 11' BOX CULVERT

OVER TRIBUTARY TO LITTLE
MINNESOTA RIVER
STA. 3 + 64.00
STR. NO. 55-101-181

25° RHF SKEW
SEC. 26-T126N-R51W
P 0127(09)214
HL-93

ROBERTS COUNTY

S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2023

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LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall
M. W. W. - Middle Wing Wall

* Min. Lap = 2' - 3"

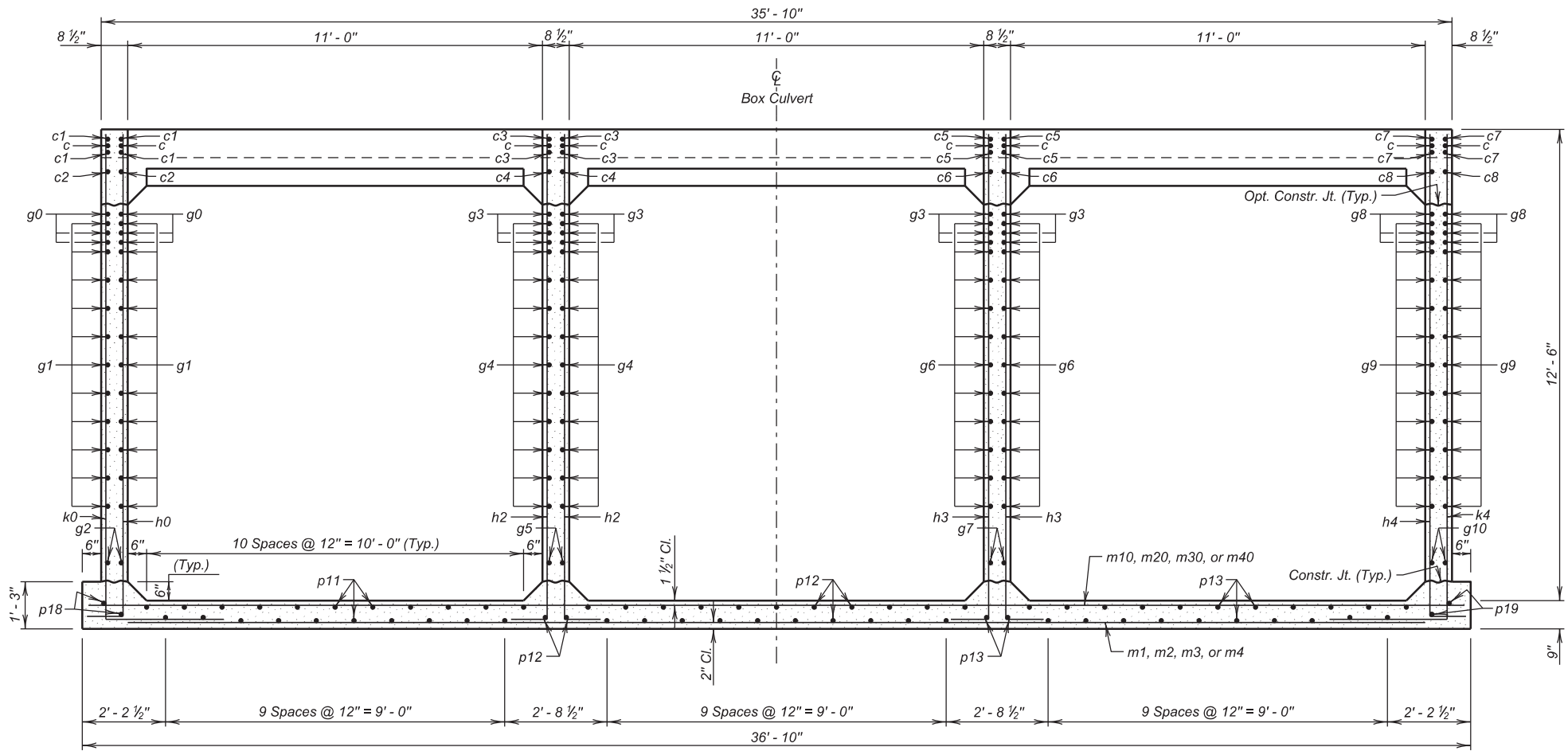
♦ Min. Lap = 3' - 3"

DESIGNED BY
AH
ROBT067D

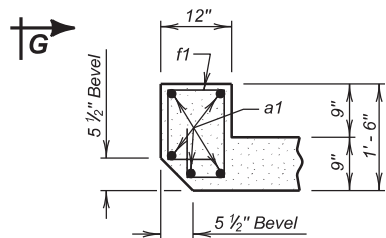
CK. DES. BY
BM
067DGA04

DRAFTED BY
MG

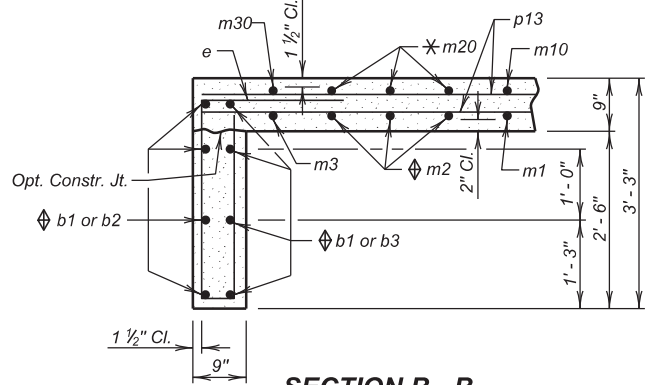
Steve A. Johnson
BRIDGE ENGINEER



TYPICAL INLET SECTION
(At parapet)

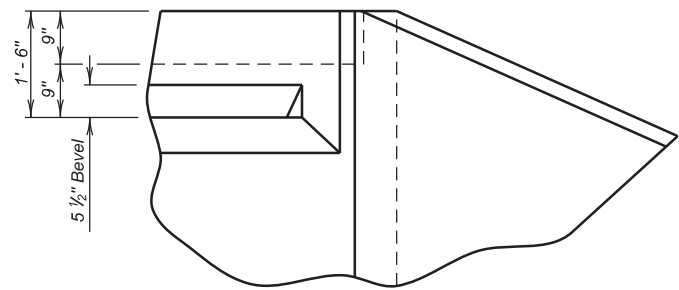


SECTION A - A
(At Top Slab)



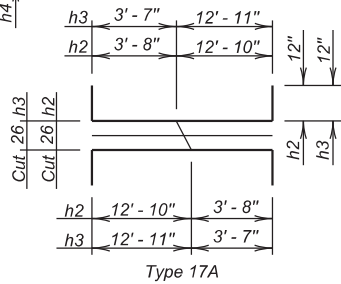
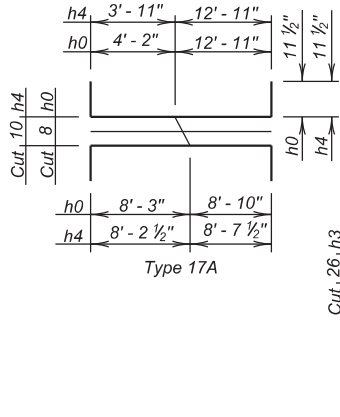
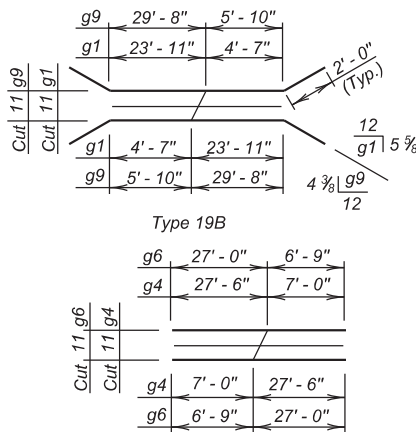
SECTION B - B

ESTIMATED QUANTITIES			
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Inlet	75.1	12501	48.7



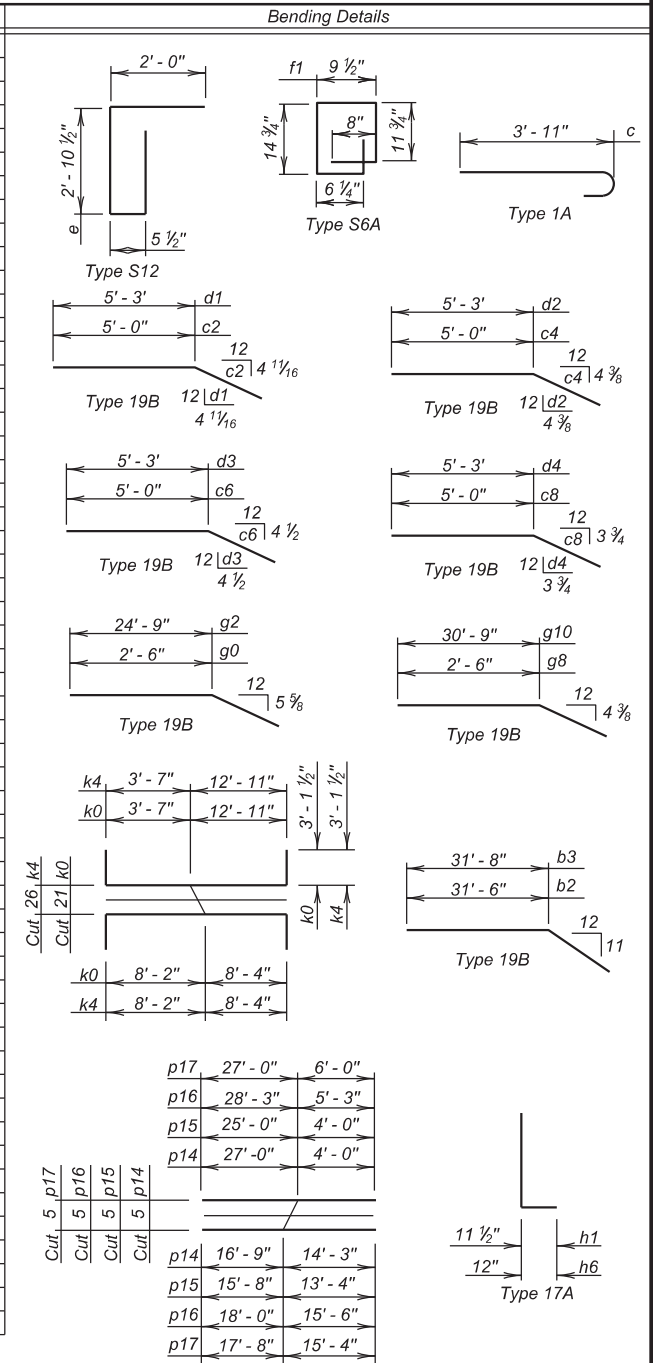
VIEW G - G
(At Exterior Wall)

NOTES:
All dimensions are out to out of bars.
See cutting diagram.
Bend in field as necessary to fit.



REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
a1	5	6	39'-3"	Str.
b1	8	6	33'-0"	Str.
b2	4	6	33'-0"	19B
b3	4	6	33'-0"	19B
c	8	5	4'-6"	1A
c1	4	5	26'-9"	Str.
c2	2	5	7'-0"	19B
c3	4	5	28'-3"	Str.
c4	2	5	7'-0"	19B
c5	4	5	27'-9"	Str.
c6	2	5	7'-0"	19B
c7	4	5	32'-3"	Str.
c8	2	5	7'-0"	19B
d1	4	5	7'-0"	19B
d2	4	5	7'-0"	19B
d3	4	5	7'-0"	19B
d4	4	5	7'-0"	19B
e	57	4	8'-0"	S12
f1	39	4	5'-0"	S6A
g0	6	5	5'-0"	19B
g1	11	4	32'-6"	19B
g2	2	4	26'-9"	19B
g3	12	5	5'-0"	Str.
g4	11	4	34'-6"	Str.
g5	2	4	28'-6"	Str.
g6	11	4	33'-9"	Str.
g7	2	4	28'-0"	Str.
g8	6	5	5'-0"	19B
g9	11	4	39'-6"	19B
g10	2	4	32'-9"	19B
h0	8	4	19'-0"	17A
h1	1	4	4'-6"	17A
h2	26	4	18'-6"	17A
h3	26	4	18'-6"	17A
h4	10	4	18'-9"	17A
h6	1	4	4'-6"	17A
k0	21	5	22'-9"	17A
k4	26	5	22'-9"	17A
m1	17	6	96'-0"	Str.
m2	6	6	31'-6"	Str.
m3	2	6	65'-3"	Str.
m4	2	6	37'-9"	Str.
m10	17	5	101'-0"	Str.
m20	6	5	32'-3"	Str.
m30	2	5	67'-3"	Str.
m40	2	5	37'-9"	Str.
p11	21	4	29'-9"	Str.
p12	21	4	29'-0"	Str.
p13	21	4	28'-6"	Str.
p14	5	4	31'-0"	Str.
p15	5	4	29'-0"	Str.
p16	5	4	33'-6"	Str.
p17	5	4	33'-0"	Str.
p18	2	4	27'-6"	Str.
p19	2	4	33'-6"	Str.



INLET DETAILS (C)

FOR

3 - 11' X 11' BOX CULVERT

OVER TRIBUTARY TO LITTLE MINNESOTA RIVER
STA. 3 + 64.00
STR. NO. 55-101-181

25° RHF SKEW
SEC. 26-T126N-R51W
P 0127(09)214
HL-93

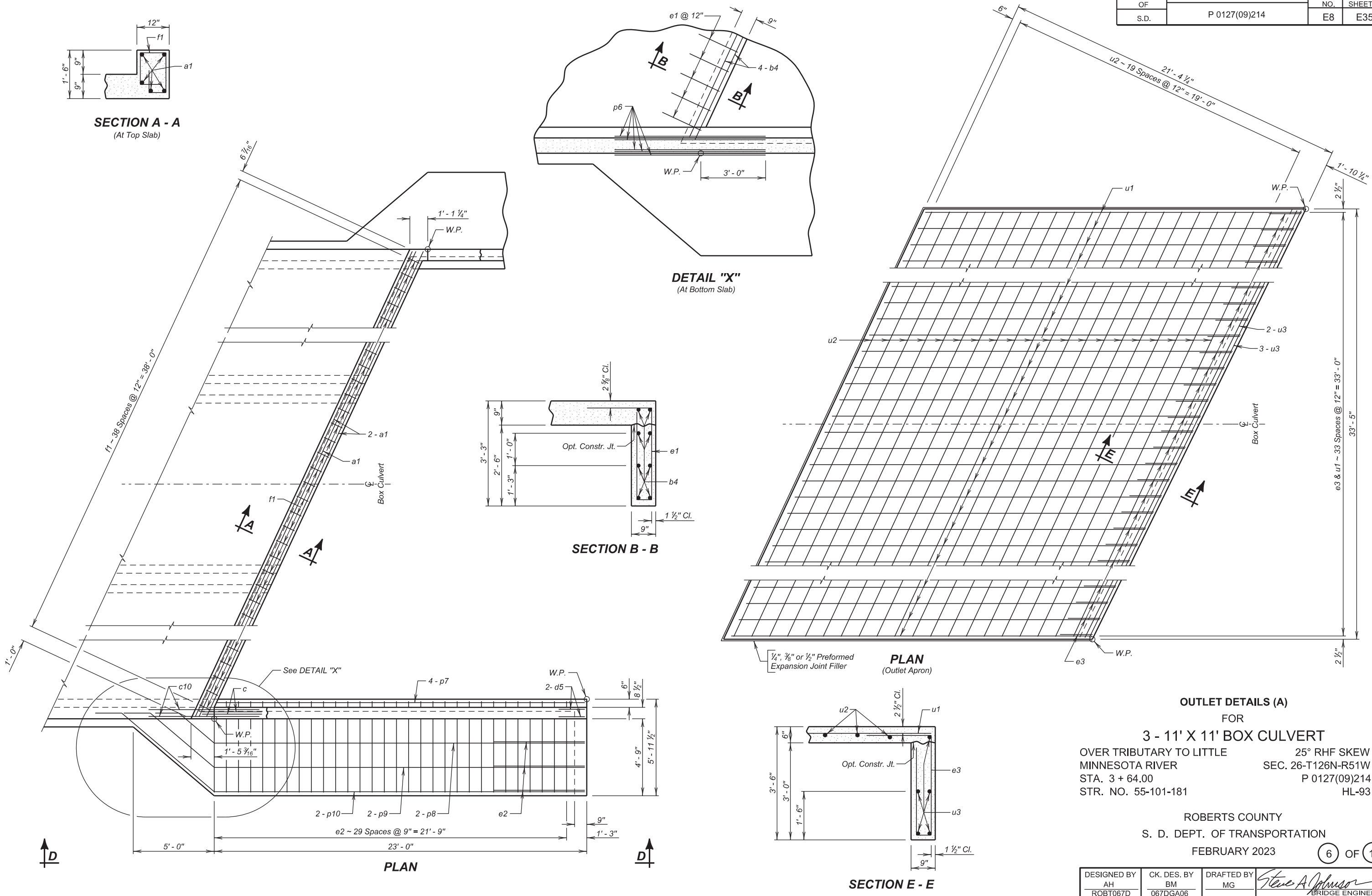
ROBERTS COUNTY

S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2023

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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E8	E35

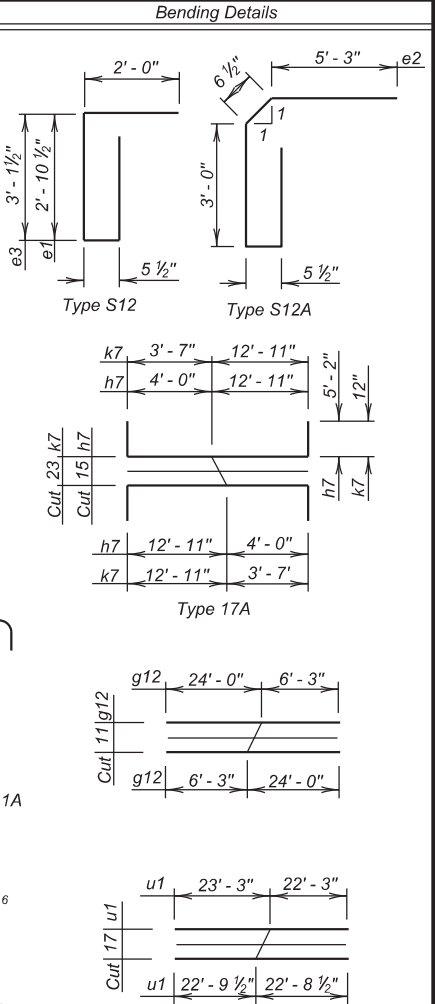


REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
a1	5	6	39' - 3"	Str.
b4	8	6	38' - 3"	Str.
c	4	5	4' - 6"	1A
c9	8	5	24' - 9"	Str.
c10	4	5	7' - 0"	19B
d5	8	5	7' - 0"	19B
e1	38	4	8' - 0"	S12
e2	66	4	12' - 0"	S12A
f1	39	4	5' - 0"	S6A
g11	12	5	5' - 0"	Str.
g12	22	4	30' - 3"	Str.
g13	4	4	24' - 9"	Str.
h7	15	4	27' - 3"	17A
k7	23	5	18' - 6"	17A
p6	10	6	7' - 0"	Str.
p7	18	4	25' - 6"	Str.
p8	4	4	27' - 3"	Str.
p9	4	4	29' - 6"	Str.
p10	4	4	31' - 9"	Str.

OUTLET APRON

e3	34	4	8' - 6"	S12
u1	17	4	45' - 6"	Str.
u2	25	4	36' - 6"	Str.



NOTES:
All dimensions are out to out of bars.
Ø See cutting diagram.
* Bend in field as necessary to fit.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
Outlet	33.4	3868	16.0
Outlet Apron	17.4	1320	17.4

LEGEND FOR PLACING RE-STEEL

O. F. W. W. - Outside Face of Wing Wall
I. F. W. W. - Inside Face of Wing Wall

OUTLET DETAILS (B)

FOR

3 - 11' X 11' BOX CULVERT

OVER TRIBUTARY TO LITTLE MINNESOTA RIVER
STA. 3 + 64.00
STR. NO. 55-101-181
25° RHF SKEW
SEC. 26-T126N-R51W
P 0127(09)214
HL-93

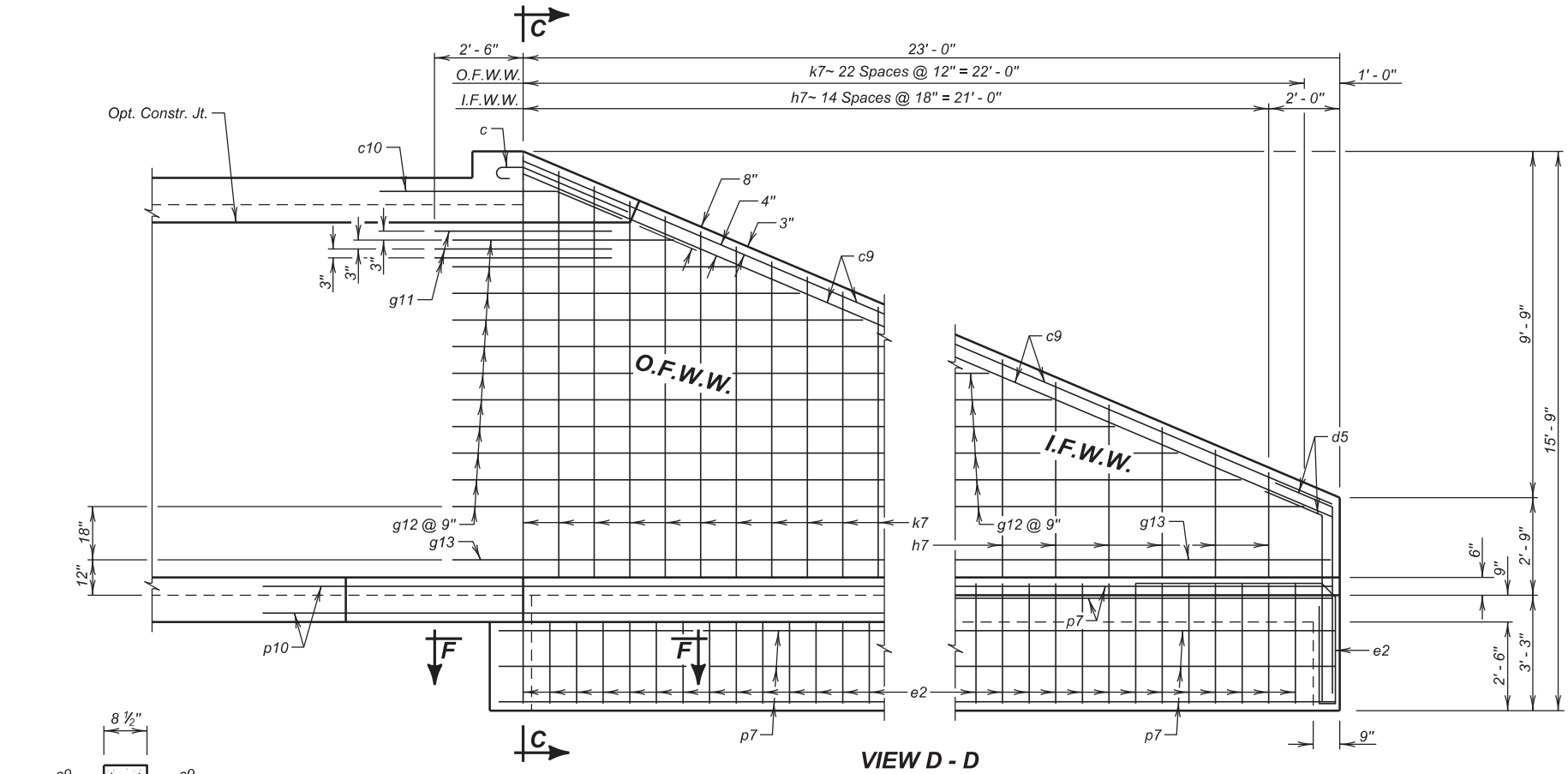
ROBERTS COUNTY

S. D. DEPT. OF TRANSPORTATION

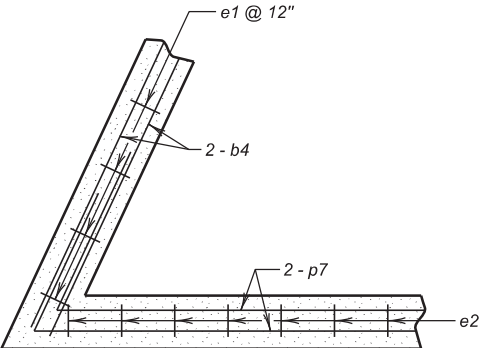
FEBRUARY 2023

7 OF 11

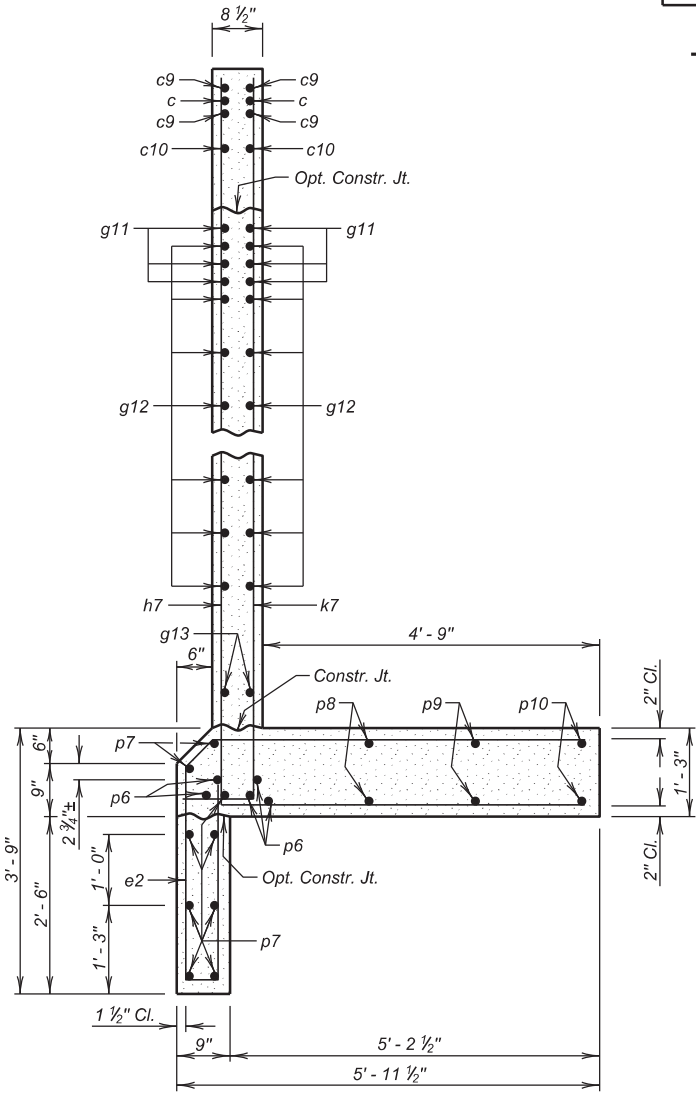
DESIGNED BY AH ROBT067D	CK. DES. BY BM 067DGA07	DRAFTED BY MG Steve A. Johnson BRIDGE ENGINEER
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VIEW D - D

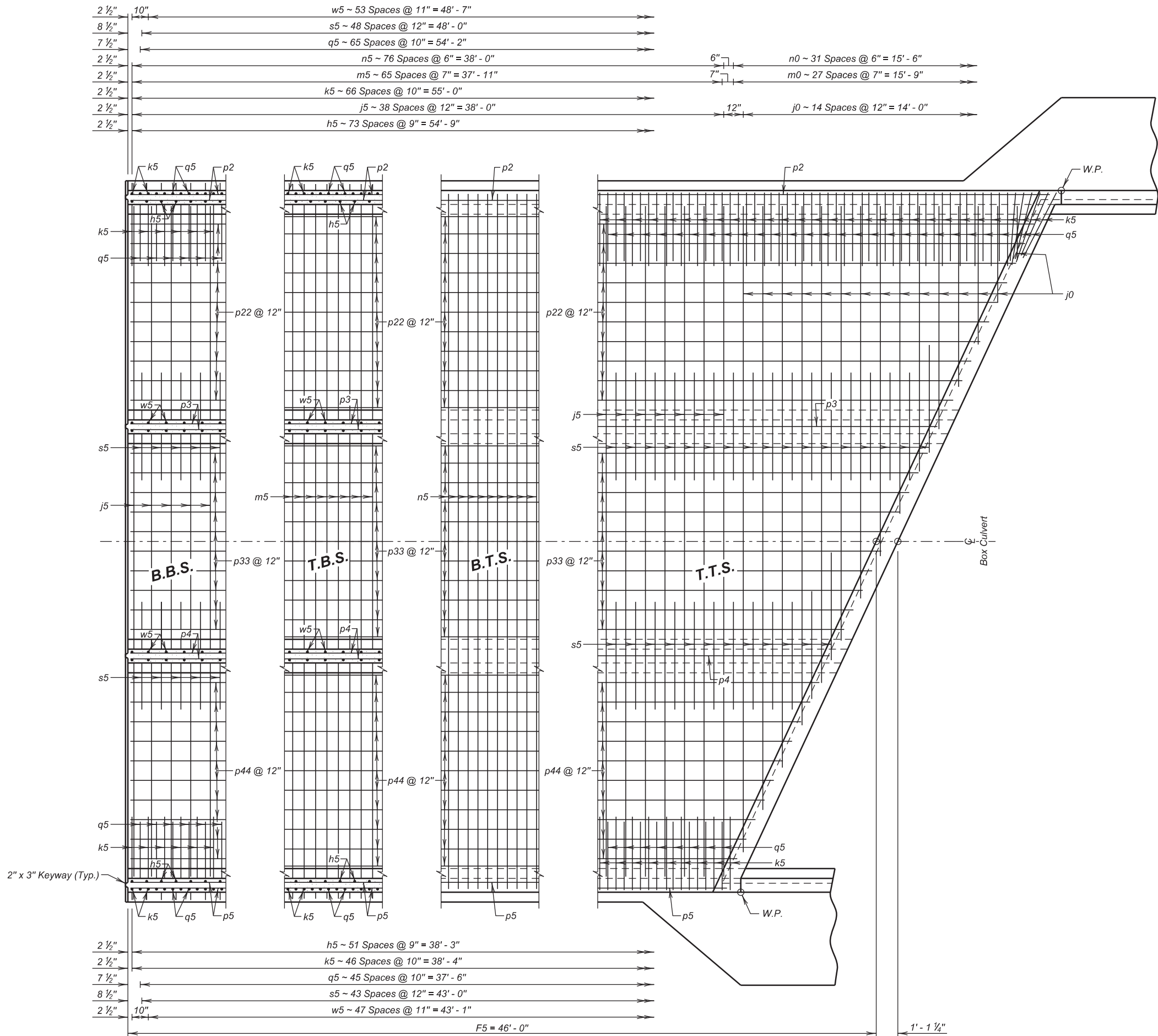


SECTION F - F



SECTION C - C

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E10	E35



PLAN
(Outlet end shown, Inlet end similar by rotation)

LEGEND FOR PLACING RE - STEEL
T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab

F5 BARREL END SECTION DETAILS (46' - 0") (A)
FOR
3 - 11' X 11' BOX CULVERT
OVER TRIBUTARY TO LITTLE MINNESOTA RIVER
STA. 3 + 64.00
STR. NO. 55-101-181
25° RHF SKEW
SEC. 26-T126N-R51W
P 0127(09)214
HL-93

ROBERTS COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2023

DESIGNED BY AH ROBT067D	CK. DES. BY BM 067DGA08	DRAFTED BY MG	<i>Steve A. Johnson</i> BRIDGE ENGINEER
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REINFORCING SCHEDULE
(For Two F5 Barrel End Sections)

Mk.	No.	Size	Length	Type	Bending Details	
h5	252	4	13' - 0"	17A		
j0	30	5	35' - 6"	Str.		
j5	156	5	34' - 3"	Str.		
k5	228	4	19' - 9"	17		
m0	28	5	36' - 3"	Str.		
m5	132	5	36' - 6"	Str.		
n0	32	5	35' - 9"	Str.		
n5	154	5	35' - 6"	Str.		
p2	36	4	54' - 9"	Str.		
p3	34	4	49' - 0"	Str.		
p4	34	4	43' - 6"	Str.		
p5	36	4	38' - 3"	Str.		
p22	42	4	103' - 9"	Str.		
p33	42	4	92' - 9"	Str.		
p44	42	4	81' - 9"	Str.		
q5	448	4	7' - 6"	17A		
s5	372	5	5' - 6"	Str.		
w5	208	4	26' - 6"	S11A		
z1	94	5	3' - 6"	Str.		

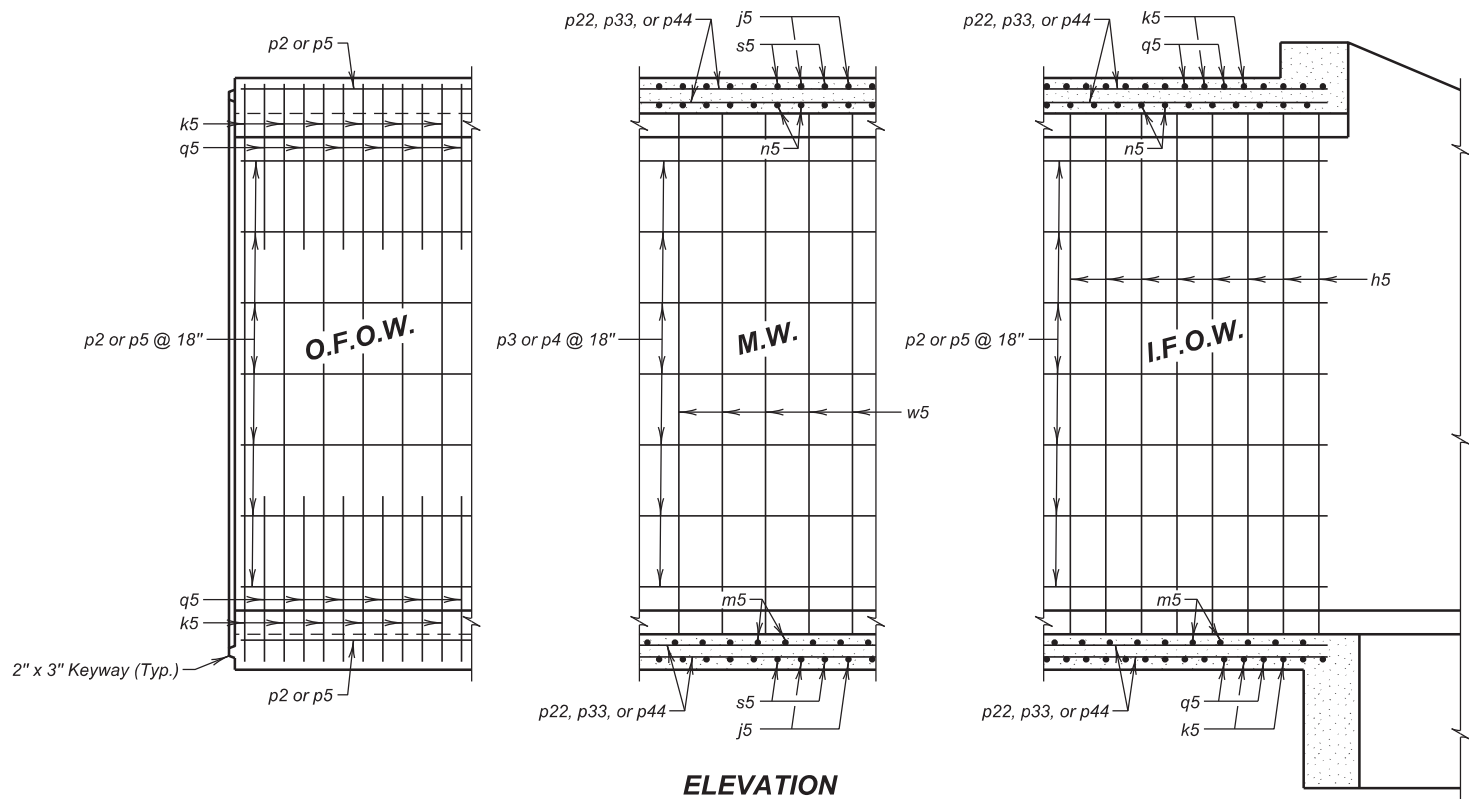
OPTIONAL w5 SPLICE DETAIL				OPTIONAL k5 SPLICE DETAIL			
n0	1' - 3"	34' - 6"					
m0	1' - 3"	35' - 0"					
j0	2' - 9"	32' - 9"					
j0	32' - 9"	2' - 9"					
m0	35' - 0"	1' - 3"					
n0	34' - 6"	1' - 3"					

ESTIMATED QUANTITIES			
ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
2 - F5 Barrel End Sections @ 46' - 0"	298.7	45499	94.1

LEGEND FOR PLACING RE - STEEL	
O.F.O.W.	- Outside Face of Outside Wall
I.F.O.W.	- Inside Face of Outside Wall
M.W.	- Middle Wall

F5 BARREL END SECTION DETAILS (46' - 0") (B)
FOR
3 - 11' X 11' BOX CULVERT
OVER TRIBUTARY TO LITTLE MINNESOTA RIVER
STA. 3 + 64.00
STR. NO. 55-101-181
25° RHF SKEW
SEC. 26-T126N-R51W
P 0127(09)214
HL-93

ROBERTS COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2023



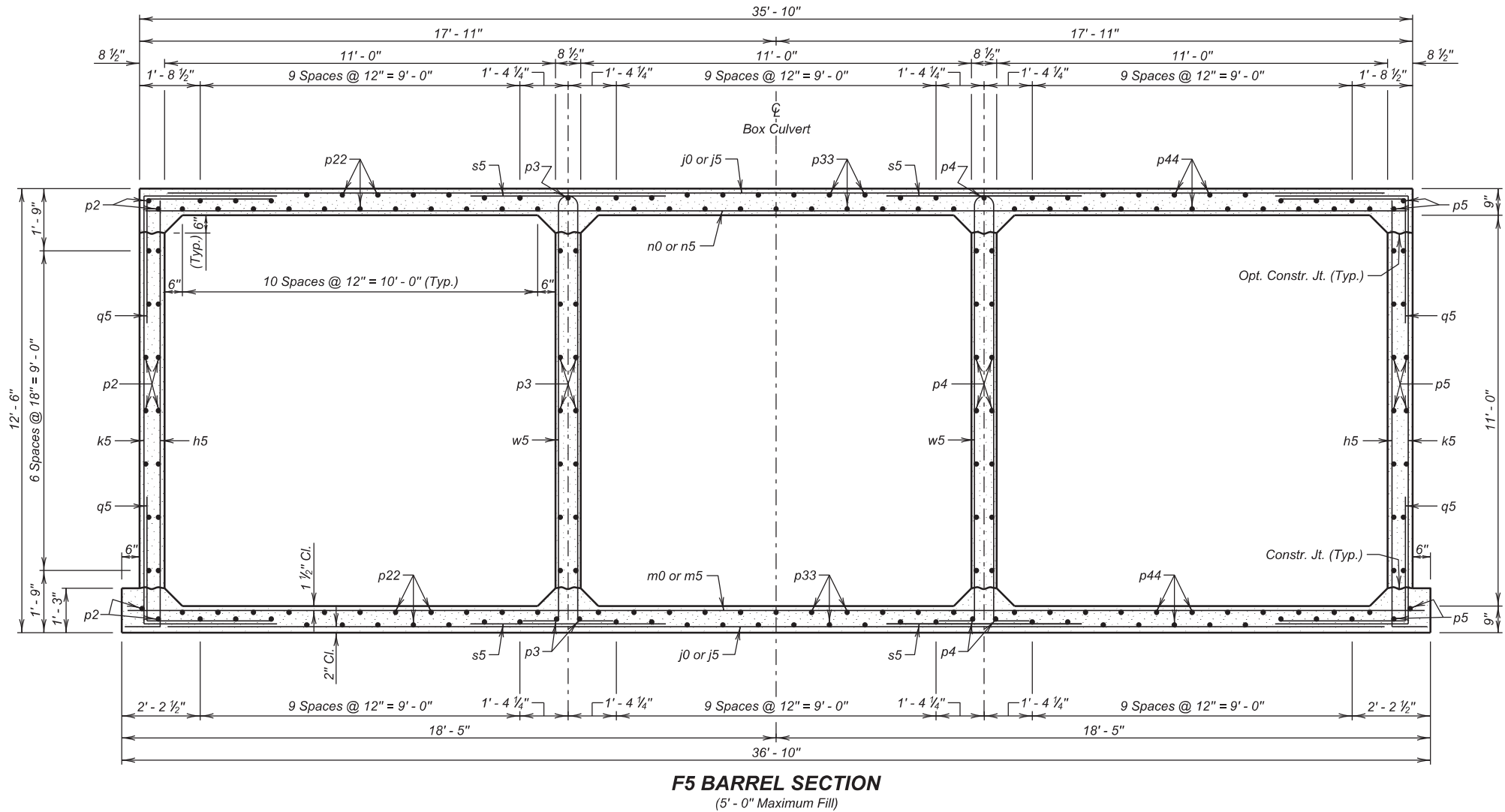
OPTIONAL FILLET DETAIL
(At Bottom Slab)

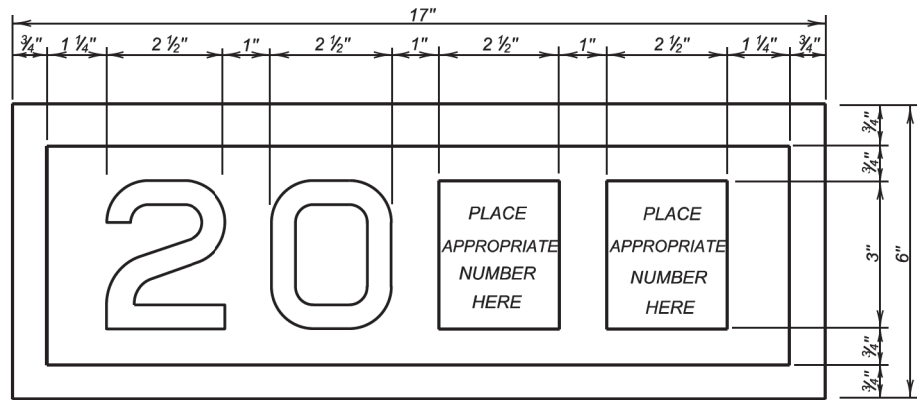
Note: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.

OPTIONAL POUR - BOTTOM SLAB

The Bottom Slab may be poured continuously, at the option of the Contractor, with the use of a Preformed Metal keyway conforming to the keyway dimensions and location as shown on the plans. The keyway length will be full width of the bottom slab. Care will be taken to maintain proper alignment of the keyway during the pour sequence. All additional costs of this option will be borne by the Contractor.

Δ Place z1 bars thru construction joint between barrel sections as shown on Standard Plate No. 460.10. Number of z1 bars shown is for one construction joint.

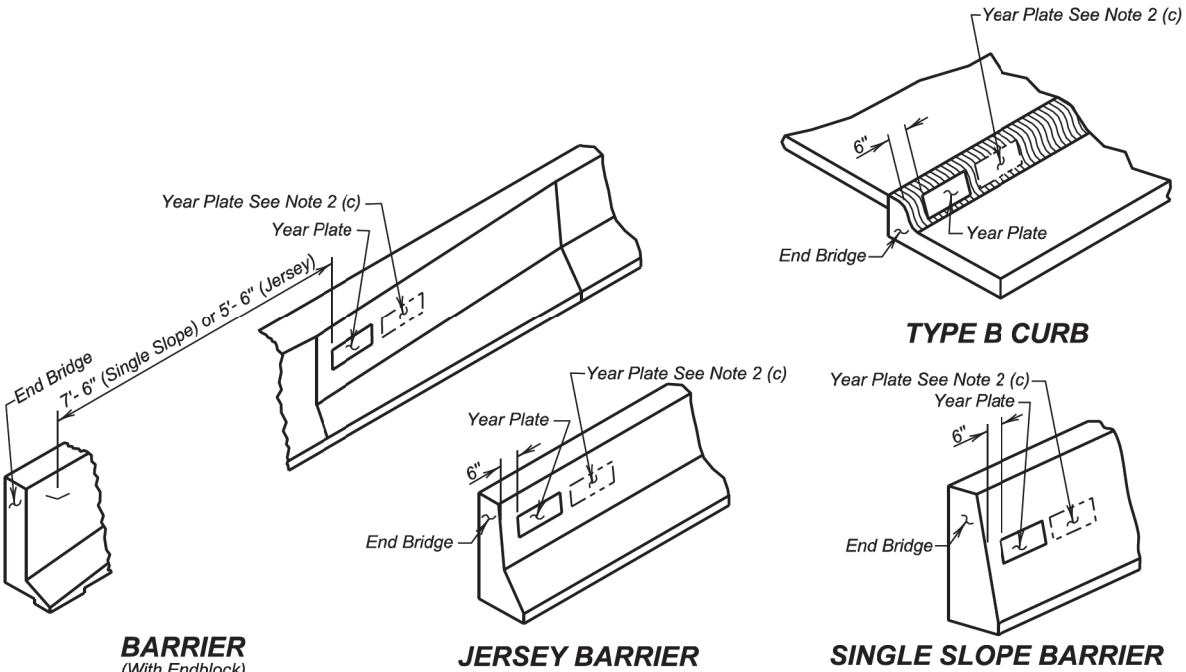




YEAR PLATE DETAILS

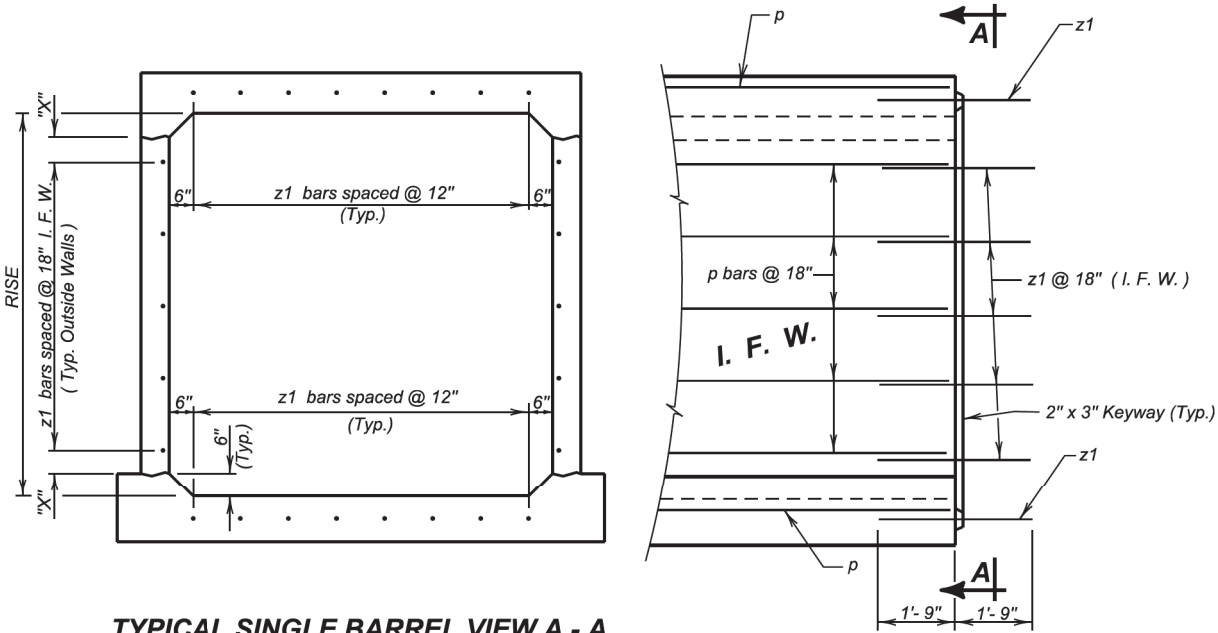
GENERAL NOTES:

- Year plates of the general dimensions shown will be constructed on all box culverts and bridges. The year plates will be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.
- Year plates will be located on structure(s) as follows:
 - On cast-in-place box culverts the year plates will be four and one - half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate will be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate will be centered in an adjacent barrel.
 - On bridges with six (6) inch curbs, "Jersey" shaped barriers with no endblocks, or "Single Slope" shaped barriers with no endblocks, the year plate will be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with barrier endblocks, the year plate will be centered on the upper sloped portion of the barrier approximately 5'-6" for "Jersey" shaped barriers from the end of the bridge and 7'-6" for "Single Slope" shaped barriers from the end of bridge, or as designated by the Engineer. There will be one year plate at each end of the bridge on opposite sides.
 - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.



January 22, 2021

Published Date: 2025	S D D O T	YEAR PLATE DETAILS	PLATE NUMBER
			460.02
			Sheet 1 Of 1



TYPICAL SINGLE BARREL VIEW A - A

ELEVATION

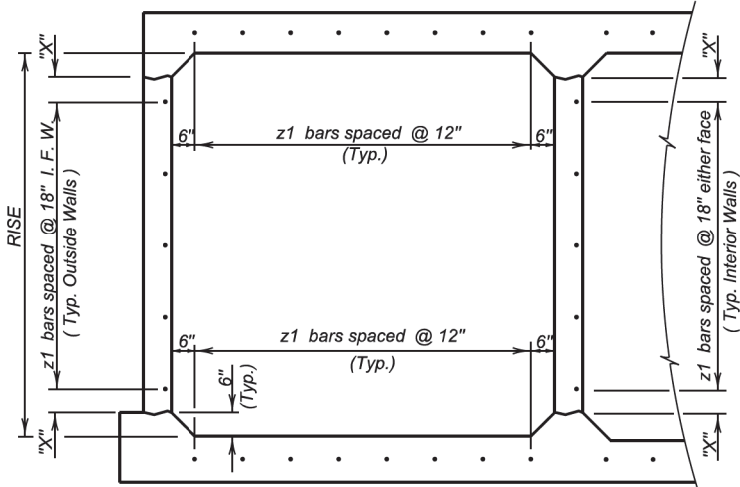
LEGEND FOR PLACING RE-STEEL

I. F. W. - Inside Face Wall

RISE	"X"
3'- 0"	3"
4'- 0"	9"
5'- 0"	6"
6'- 0"	3"
7'- 0"	9"
8'- 0"	6"
9'- 0"	3"
10'- 0"	9"
11'- 0"	6"
12'- 0"	3"
13'- 0"	9"
14'- 0"	6"

GENERAL NOTES:

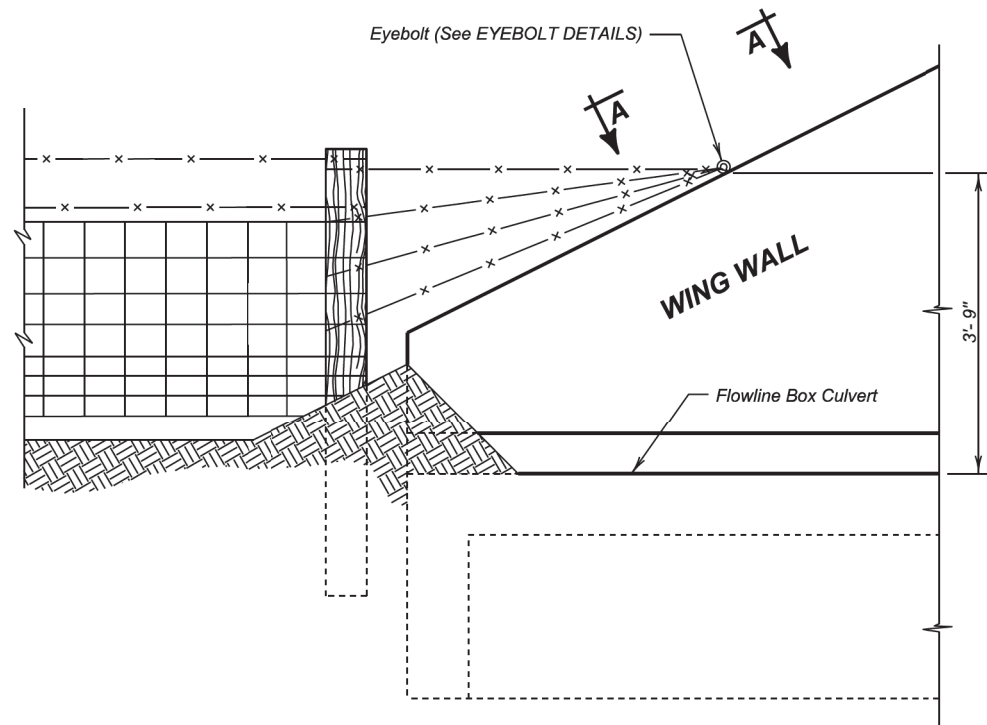
- z1 bars will be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars will be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.
- Drainage Fabric Protection will be placed in accordance with Section 422, or Section 560, whichever is applicable.



TYPICAL MULTIPLE BARREL VIEW A - A

June 1, 2022

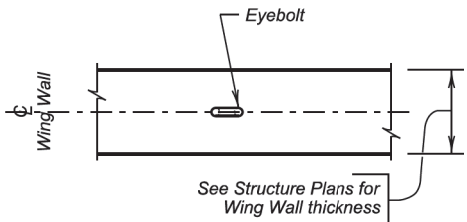
Published Date: 2025	S D D O T	BOX CULVERT BARREL TIE REINFORCEMENT	PLATE NUMBER
			460.10
			Sheet 1 of 1



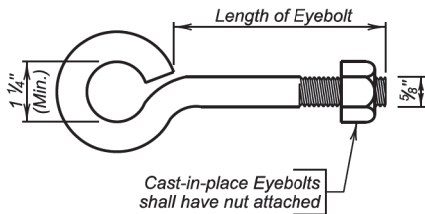
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be $\frac{5}{8}$ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be $4\frac{1}{2}$ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the $\frac{5}{8}$ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

December 23, 2012

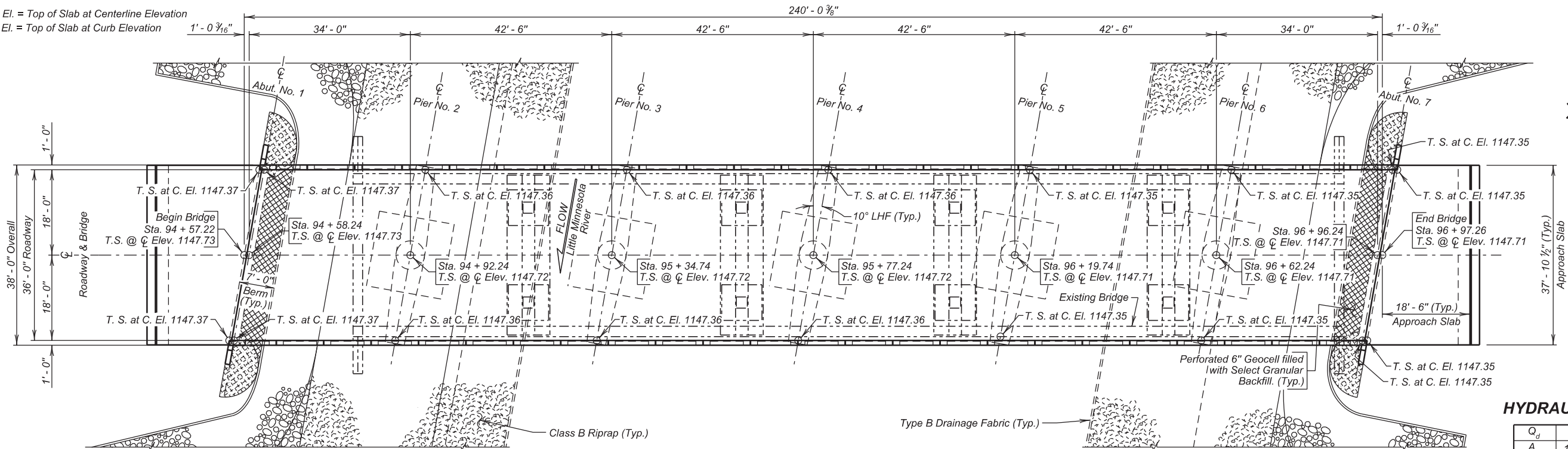
Published Date: 2025	S D D O T	FENCE ANCHORS FOR BOX CULVERT WING WALLS	PLATE NUMBER 620.16
			Sheet 1 of 1

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

NOTES:

T. S. at ∇ El. = Top of Slab at Centerline Elevation
T. S. at C. El. = Top of Slab at Curb Elevation

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E14	E35



PLAN

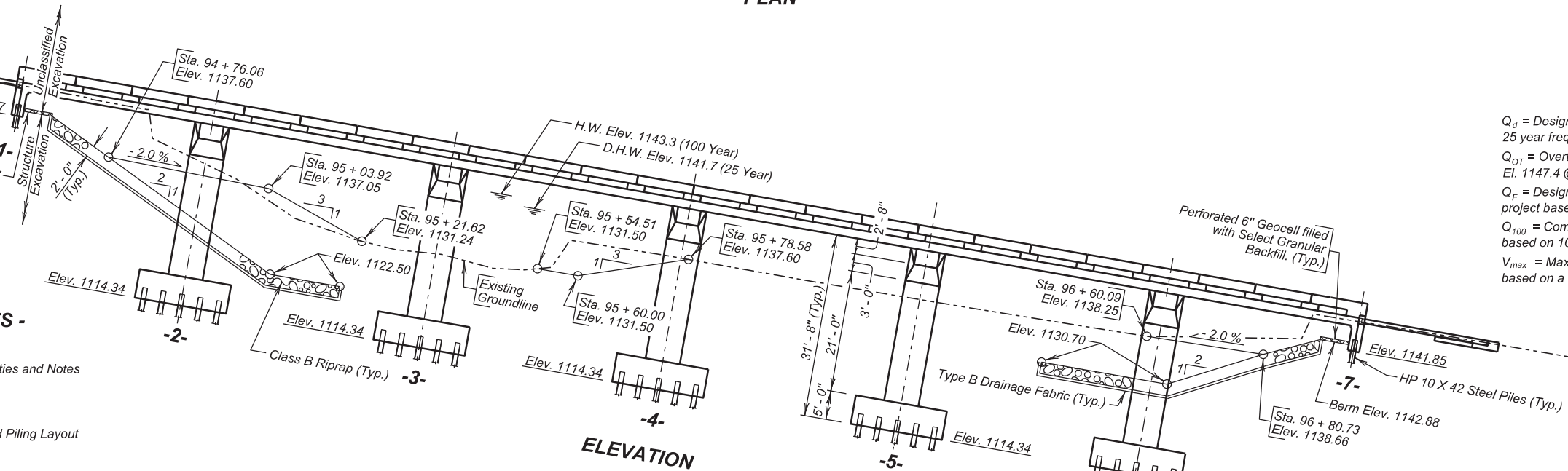
HYDRAULIC DATA

Q_d	3915 cfs
A_d	1212 sq. ft.
V_d	3.8 fps
Q_F	3915 cfs
Q_{100}	6996 cfs
Q_{OT}	$>Q_{100}$ cfs
V_{max}	5.5 fps

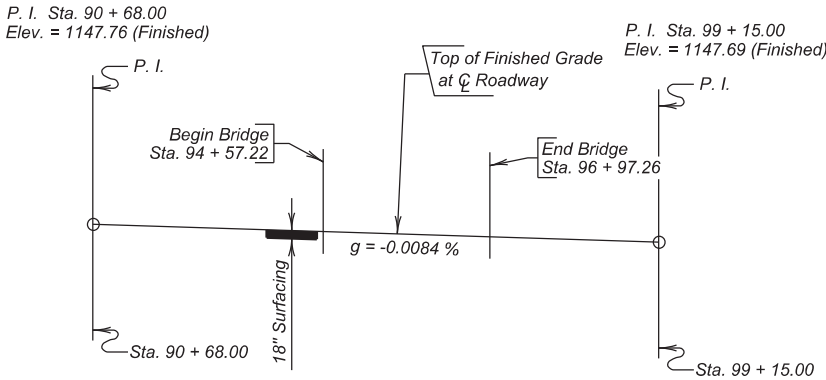
Q_d = Design discharge for the proposed bridge based on 25 year frequency. El. 1141.7.
 Q_{OT} = Overtopping discharge and frequency $> Q_{100}$ yr. recurrence interval. El. 1147.4 @ Sta. 101 + 20.00.
 Q_F = Designated peak discharge for the basin approaching proposed project based on 25 year frequency.
 Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1143.3.
 V_{max} = Maximum computed outlet velocity for the proposed bridge based on a 100 year frequency.

-X020-
INDEX OF BRIDGE SHEETS -

- Sheet No. 1 - General Drawing
- Sheet No. 2 - Estimate of Structure Quantities and Notes
- Sheet No. 3 - Notes (Continued)
- Sheet No. 4 - Notes (Continued)
- Sheet No. 5 - Subsurface Investigation and Piling Layout
- Sheet No. 6 - Piling Interference Details
- Sheet No. 7 - Abutment Details
- Sheet No. 8 - Pier Details (A)
- Sheet No. 9 - Pier Details (B)
- Sheet No. 10 - Superstructure Details (A)
- Sheet No. 11 - Superstructure Details (B)
- Sheet No. 12 - Kansas Corral Rail Details
- Sheet No. 13 - Details of Bridge End Backfill (A)
- Sheet No. 14 - Details of Bridge End Backfill (B)
- Sheet No. 15 - Details of Approach Slab Adjacent to Bridge
- Sheet No. 16 - Approach Slab Joint Details
- Sheet No. 17 - Riprap Details
- Sheet No. 18 - As - Built Elevation Survey (A)
- Sheet No. 19 - As - Built Elevation Survey (B)
- Sheet No. 20 - Details of Standard Plate No's. 430.50 and 460.02
- Sheet No. 21 - Details of Standard Plate No's. 460.05 and 510.40
- Sheet No. 22 - Details of Standard Plate No's. 620.18 and 630.92



ELEVATION



GRADELINE DATA

GENERAL DRAWING

FOR

240' - 0 3/8" CONT. CONCRETE BRIDGE

36' - 0" ROADWAY
OVER LITTLE MINNESOTA RIVER
STA. 94 + 57.22 TO 96 + 97.26
STR. NO. 55-100-164
PCN 067D

ROBERTS COUNTY

S. D. DEPT. OF TRANSPORTATION

AUGUST 2024

1 OF 22

-X020-

PLANS BY:
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY ER ROBT067D	CK. DES. BY JH 067DGB01	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E15	E35

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Bridge Elevation Survey	Lump Sum	LS	
Concrete Penetrating Sealer	1044	SqYd	See Special Provision
Select Granular Backfill	22.4	Ton	
Incidental Work, Structure	Lump Sum	LS	
Membrane Sealant Expansion Joint	75.8	Ft	
Structure Excavation, Bridge	1514	CuYd	
Bridge End Embankment	252	CuYd	
Granular Bridge End Backfill	68.5	CuYd	
Approach Slab Underdrain Excavation	7.5	CuYd	
Precast Concrete Headwall for Drain	4	Each	
Class A45 Concrete, Bridge Deck	475.2	CuYd	
Class A45 Concrete, Bridge	543.4	CuYd	
Concrete Approach Slab for Bridge	159.8	SqYd	
Concrete Approach Sleeper Slab for Bridge	37.9	SqYd	
Reinforcing Steel	51867	Lb	
Epoxy Coated Reinforcing Steel	9124	Lb	
Stainless Reinforcing Steel	156602	Lb	See Special Provision
Extract Pile	5	Each	
Preboring Pile	100	Ft	
HP 10x42 Steel Test Pile, Furnish and Drive	200	Ft	
HP 10x42 Steel Bearing Pile, Furnish and Drive	760	Ft	
HP 14x73 Steel Test Pile, Furnish and Drive	375	Ft	
HP 14x73 Steel Bearing Pile, Furnish and Drive	8050	Ft	
4" Underdrain Pipe	147	Ft	
Porous Backfill	14.1	Ton	
Class B Riprap	1978.0	Ton	
Overburden Excavation of Riprap	4054	CuYd	
Type B Drainage Fabric	2341	SqYd	
Perforated Geocell	640	SqFt	

SPECIFICATIONS FOR BRIDGE

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
2. Standard Specifications for Roads and Bridges, 10-1-25 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available for download and viewing at <https://dot.sd.gov/doing-business/contractors/standard-specifications>.

BRIDGE DESIGN LOADING

1. AASHTO HL-93.
2. Dead Load includes 22 psf for future wearing surface on the roadway.

DESIGN MATERIAL STRENGTHS

Concrete
Reinforcing Steel (ASTM A615, Gr. 60)
Stainless Steel (ASTM A955, Gr. 60)
Piling (ASTM A572 Grade 50)

f'c = 4,500 psi
fy = 60,000 psi
fy = 60,000psi
fy = 50,000 psi

GENERAL CONSTRUCTION

1. All lap splices shown are contact lap splices unless noted otherwise.
2. All exposed concrete corners and edges will be chamfered 3/4-inch unless noted otherwise.
3. Use 2-inch clear cover on all reinforcing steel except as shown.
4. Contractor will imprint on the structure the date of new construction as specified and detailed on Standard Plate 460.02.
5. Barrier curbs and end blocks will be built perpendicular to the roadway grade line.
6. Requests for construction joints or reinforcing steel splices at points other than those shown must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.
7. Bridge berms will be constructed to the plans template prior to any pile driving or construction of abutment. See Standard Plate 120.10 as appropriate. Berm slopes will not be disturbed after construction. Any alterations to the berm or slopes after berm construction will be submitted to the Bridge Construction Engineer for approval. Allow 30 days for review of proposals.
8. The elevation of the bridge deck is 18 inches above subgrade elevation.

INCIDENTAL WORK, STRUCTURE

1. In place centerline Sta. 94+80.17 to centerline Sta. 96+89.17 is a 209.0' 5 span continuous concrete bridge with a 30'-0" clear roadway. The superstructure consists of a reinforced concrete slab with a discontinuous concrete railing faced with continuous w-beam rail, concrete posts, and plywood spacers. The deck has been overlaid with 2 inches of low slump dense concrete (LSDC) and an epoxy chip seal overlay. The substructure consists of 2 column reinforced concrete bents and reinforced concrete vertical abutments, all of which are supported on timber piling.
2. Break down and remove the existing bridge, and approach/sleeper slabs if applicable, to 1 foot below finished groundline, or as required to construct the new structure in accordance with Section 110 of the Specifications. All portions of the existing bridge will be removed and disposed of by the Contractor on a site obtained by the Contractor and approved by the Engineer in accordance with the Environmental Commitments found in Section A.

3. During demolition of the structure, efforts will be taken to prevent material from falling into the creek. Under no circumstances is asphalt allowed to fall into the creek.
4. The foregoing is a general description of the in-place bridge and should not be construed to be complete in all details. Before preparing the bid it will be the responsibility of the Contractor to make a visual inspection of the structure to verify the extent of the work and materials involved. If desired by the Contractor, a copy of the original construction plans may be obtained through the Office of Bridge Design.
5. It is anticipated that at least five (5) existing timber piles will interfere with piling for this new structure. Any existing timber pile that interferes with piling for the new structure will be extracted. Payment for the extracting piling will be at the contract unit price per each for Extract Pile and will be full compensation for extracting piling including materials, labor, and equipment necessary or incidental to the satisfactory completion of this work.

DESIGN MIX OF CONCRETE

1. All structural concrete will be Class A45 unless otherwise indicated.
2. Type II cement is required.

ABUTMENTS

1. Pre-boring piling at each abutment is required to whichever is greater, ten feet or to natural ground
2. The HP 10x42 Piling were designed using a factored bearing resistance of 77 tons per pile. Piling will develop a field verified nominal bearing resistance of 192 tons per pile.
3. The Contractor will have sufficient pile splice material on hand before pile driving is started. See Standard Plate No. 510.40.
4. Piles will not be driven out of position by more than two inches in the direction normal to the abutment centerline. A pile-driving template will be used to ensure this accuracy.
5. One test pile will be driven at each abutment and will become part of the pile group.
6. Each finished abutment will include a Bridge Survey Marker. See Standard Plate No. 460.05.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
240' - 0 3⁄8" CONT. CONCRETE BRIDGE

STR. NO. 55-100-164
AUGUST 2024

DESIGNED BY ER ROBT067D	CK. DES. BY JH 067DGB02	DRAFTED BY BT	 BRIDGE ENGINEER
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PILE DRIVING

1. A driveability analysis was performed using the wave equation analysis program (GRLWEAP). A list of acceptable hammers is provided below. The hammers listed were found to produce acceptable driving stresses. Pile hammers not listed will require evaluation and approval prior to use from the Geotechnical Engineering Activity.

HP 10x42:

Delmag D36-23 APE D36-26 SPI D36-26

Based on initial analysis, the hammers listed above will need to be operated no higher than the lowest fuel setting in order to prevent overstressing of the pile during driving operations. If during actual driving operations an adequate hammer drop to obtain design bearing is not achieved, contact the Geotechnical Engineering Activity prior to increasing fuel setting.

HP 14x73:

Delmag D36-23 APE D36-26 SPI D36-26

2. Pile hammers not listed will require evaluation and approval prior to use from the Geotechnical Engineering Activity.

PIERS

1. The HP 14x73 Piling were designed using a factored bearing resistance of 134 tons per pile. Piling will develop a field verified nominal bearing resistance of 335 tons per pile.
2. One test pile will be driven at each pier and will become part of the pile group.
3. The Contractor will have sufficient pile splice material on hand before pile driving is started. See Plate No. 510.40
4. It is anticipated that cofferdams will be necessary. Cofferdams will be designed and constructed in accordance with Section 423 of the Specifications.

SUPERSTRUCTURE

1. Preplanned construction joints may be used in accordance with Section 460.3 of the Construction Specifications. Contact the Office of Bridge Design for joint configuration and allowable location. Emergency slab construction joints will be as shown with the superstructure details. If an emergency slab joint is used, contact the Office of Bridge Design before proceeding with deck pour.
2. The use of an approved deck finishing machine will be required during placement of bridge deck concrete. The deck finishing machine will be adjusted and operated in such a manner that the screed or screeds are parallel with the centerline of the bridge. The finish machine and concrete placement will be parallel to the skew of the bridge. If the deck finish machine cannot match the exact skew of the bridge, the difference will need be approved by the Engineer.

3. Barrier curbs will be poured after all the slab has been poured. Superstructure falsework will not be removed until bridge deck concrete, including barrier curbs, has attained a strength of 2400 psi.
4. The minimum pour rate will be in accordance with Section 460.3.J.2 of the Construction Specifications.
5. Snap ties, if used in the barrier curb formwork, will be corrosion resistant. The corrosion resistant ties will be inert in concrete and compatible with the reinforcing steel.
6. See Special Provision for Concrete Penetrating Sealer.

FALSEWORK

1. The Contractor will be required to include with the Falsework Plans, details for the construction of an adequate "Walk-Way" including railing.
2. The maximum falsework deflection allowed is ¼ inch.

CLASS B COMMERCIAL TEXTURE FINISH

1. A Class B commercial texture finish will be applied to the following areas:

Barrier Rail: all exposed surfaces (front and top).

2. The Class B commercial texture finish will be applied in accordance with Section 460.3 L.1.c of the Specifications.
3. Where the Class B commercial texture finish is to be applied, concrete curing will be accomplished with cotton or burlap mats and polyethylene sheeting. Curing will continue for not less than seven days after placing concrete before the commercial texture finish is applied. The commercial texture finish will be applied in accordance with the manufacturer's recommendations. The commercial texture finish itself does not require a specific cure except for drying.

AS - BUILT ELEVATION SURVEY

The Contractor will be responsible for recording the As-built deck elevations and bridge survey marker elevations at the locations shown in the Table of As-Built Elevations shown in the plans. All costs associated with obtaining the elevations including all equipment, labor and any incidentals required will be incidental to the contract lump sum price for Bridge Elevation Survey.

APPROACH SLABS

1. Sleeper slab riser will be cast with the approach slab or cast after the approach slab is placed. Care will be taken to ensure the correct grade is maintained across the joint.
2. The portion of the sleeper slab below the construction joint may be precast. If the bottom portion of the sleeper slab is precast, the Contractor will submit proposed lifting and setting plans to the Bridge Construction Engineer for approval. In addition, if reinforcing or other details differ from those shown in the plans, the Contractor will submit proposed alternate details for approval.

3. The use of an approved finishing machine will be required during placement of Class A45 Concrete for the approach slabs. Concrete placement in front of the machine will be kept parallel to the screed.
4. The concrete in the approach slab will be tined normal to centerline roadway.
5. Concrete Approach Sleeper Slab for Bridge, whether cast-in-place or precast, will be paid for at the contract unit price per square yard. This payment will be full compensation for all excavation, furnishing, hauling, and placing all materials including concrete and reinforcing steel; for disposal of all excavated material and surplus materials; and for labor, tools, equipment and any incidentals necessary to complete this item of work.
6. Concrete Approach Slab for Bridge will be paid for at the contract unit price per square yard. This payment will be full compensation for all excavation, furnishing, hauling and placing all materials including concrete, asphalt paint or 6 mil polyethylene sheeting, elastic joint sealer and reinforcing steel; for disposal of all excavated material and surplus materials and for labor, tools, equipment and any incidentals necessary to complete this item of work.

APPROACH SLAB UNDERDRAIN SYSTEM

1. An underdrain system will be placed underneath the sleeper slabs as shown in the plans in accordance with Section 435 of the Construction Specifications.
2. The 4-inch diameter Perforated PVC Drain Pipe will be PS 46 Solvent Weld PVC Pipe conforming to ASTM F758 or SDR 35 Solvent Weld PVC Pipe conforming to ASTM D3034 with perforations in accordance with ASTM F758. The 4-inch diameter PVC Outlet Pipe will be Schedule 40 PVC Pipe conforming to ASTM D1785 designated as PVC 1120, PVC 1220, or PVC 2120. Pipe sections will be connected using a PVC Solvent Cement conforming to ASTM D2564. The Drain Sleeve will conform to ASTM D6707.
3. Care will be taken to ensure that the 4-inch diameter Perforated PVC Drain Pipe and the 4-inch diameter PVC Outlet Pipe are not damaged during construction. Sufficient cover material will be placed over the pipes before compaction equipment is allowed over the underdrain system. Any damaged pipes will be replaced by the Contractor at no additional cost to the Department.
4. All labor, tools, equipment, and any incidentals necessary for the Installation of 4-inch diameter Perforated PVC Drain Pipe, 4-inch diameter PVC Outlet Pipe, 5-inch diameter schedule 40 steel pipe, SDR Solvent Weld PVC Coupling, and PVC Cement will be incidental to the contract unit price per foot for 4" Underdrain Pipe.

NOTES (CONTINUED)

FOR

240' - 0 3/8" CONT. CONCRETE BRIDGE

STR. NO. 55-100-164

AUGUST 2024

3 OF 22

DESIGNED BY ER ROBT067D	CK. DES. BY JH 067DGB03	DRAFTED BY BT	 BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E17	E35

PERFORATED GEOCELL

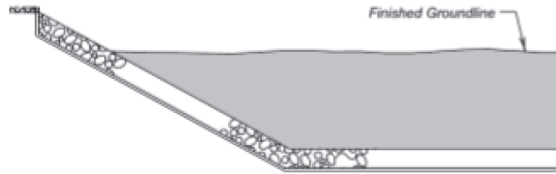
1. Perforated Geocell will be from the following company or equivalent:

Company: Agtec
Phone: 1-818-724-7657
Website: <http://www.agtec.com>

2. Perforated Geocell will be 6 inches tall with Type B Drainage Fabric underlying the perforated Geocell. Installation will adhere to the manufacturer's recommendation.
3. Perforated Geocell will be filled with the Select Granular Backfill in accordance with Section 850 of the Construction Specifications.
4. Perforated Geocell will be paid for at the contract unit price per square foot. Payment will be full compensation for furnishing and installing the Perforated Geocell.
5. Select Granular Backfill will be paid for at the contract unit price per ton of material furnished. Payment will be full compensation for furnishing, loading, hauling, and placing the Select Granular Backfill.

OVERBURDEN EXCAVATION FOR RIPRAP

1. This work will consist of the removal and replacement of material between the limits of the finished groundline and the top of the riprap. See diagram below (overburden is in grey).



2. Excavation is to be completed after temporary diversion method is in place, if required, with minimal standing water to create the profile of slope protection specified in plans.
3. The removed material will be placed on top of the riprap to the natural ground, proposed groundline, or specified shape and elevations shown in plans. When overburden extends into the streambed it will form the channel bottom and profile as specified in plans. The finished ground under the bridge will be shaped to match the upstream and downstream channel and flood plain.
4. The overburden material will be placed on top of the riprap and have a maximum lift depth of 1' – 0" and compacted free of flowing water or standing water in excess of four inches above the riprap at the lowest elevation.
5. Compaction effort will produce a surface that does not pump, rut, or otherwise displace when traveled over with construction equipment to the satisfaction of the Engineer. Material may be added to excavated material to facilitate compaction and handling. Importing, stockpiling, blending, and/or wasting of materials will be incidental to the contract unit price for Overburden Excavation for Riprap.

6. Payment for Overburden Excavation for Riprap will be at the contract unit price and will be full compensation for labor, equipment, tools, and incidentals, including furnishing, installing, and removal of any temporary works necessary to complete the work. Payment will be for plans quantity unless measurement is ordered by the Engineer.
7. Before preparing the bid, it is the responsibility of the Contractor to verify existing conditions to determine if a temporary diversion method and/or dewatering will be required. If required, the Contractor must submit the temporary diversion method and/or dewatering for approval to the Construction Engineer 30 days prior to construction.

RIPRAP

Riprap gradation and Drainage Fabric will comply with Section 700.2 of Construction Specifications. Placement of Riprap and Drainage Fabric will be in accordance with Section 700.3 of the Construction Specification and conditions must be free of standing water.

NOTES (CONTINUED)

FOR

240' - 0 ³/₈" CONT. CONCRETE BRIDGE

STR. NO. 55-100-164

AUGUST 2024

4 OF 22

DESIGNED BY ER ROBT067D	CK. DES. BY JH 067DGB04	DRAFTED BY BT	 BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E18	E35

Glaciated Terrain contains all sizes of natural mineral sediment ranging from clay to boulders. Streams originating in or flowing through glaciated topography contain sediment loads derived from glaciated sources. Stream and river crossings contain sediment naturally sorted and randomly concentrated. Alluvial sediment located at this project location may have concentrated coarser gravel such as pebbles, cobbles and boulders. The borings shown only represent material that was found at the exact location of the small diameter drill hole. Coarse granular material may be present in areas not penetrated by the depicted borings.

The Geotechnical Engineering Activity has all of the boring logs and laboratory test results available for review at the Central Office in Pierre.

LEGEND

- Penetration Test
- ▽

Water
- ◻

Sample Zone
- Drive Test
- ⊖

Caved

Drive tests are conducted by dropping a 490 pound hammer 30 inches to drive a 2⅞ inch drill stem to measure the resistance to penetration of the soil.

Penetration test holes are drilled with a 6⅝ inch diameter hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to collect samples and measure the resistance to penetration of the soil. Samples are collected using a lined Modified California Sampler. Penetration test results are listed as uncorrected "N" values in blows per foot. Blows over inches are listed if refusal is achieved, which is 50 blows within one 6 inch set.

GROUNDWATER ELEVATIONS

MAY 2022

I1	1137.7
I2	1138.2

MEASURED SKIN FRICTION

	ELEV.	PSF
I1	1072.1	817
I2	1071.1	753

SUBSURFACE INVESTIGATION AND PILING LAYOUT

FOR

240' - 0 ⅜" CONT. CONCRETE BRIDGE

36' - 0" ROADWAY
OVER LITTLE MINNESOTA RIVER
STA. 94 + 57.22 TO 96 + 97.26
STR. NO. 55-100-164

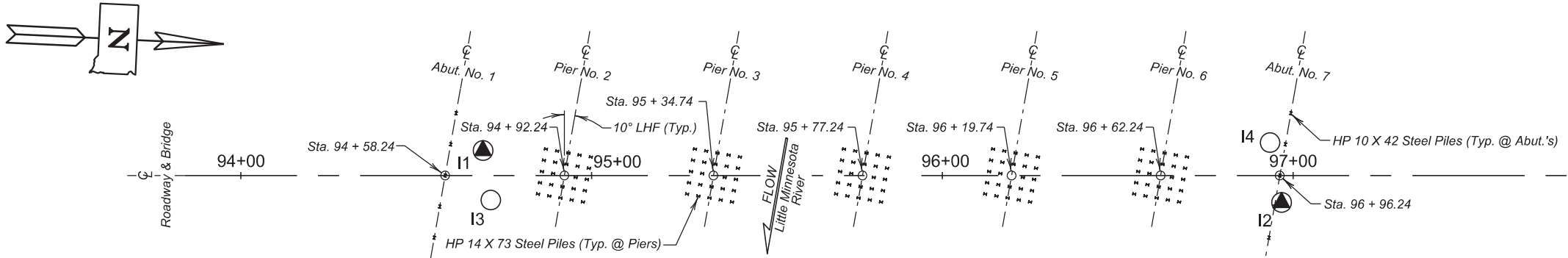
10° LHF SKEW
SEC. 14/15-T126N-R51W
P 0127(09)214
HL-93

ROBERTS COUNTY

S. D. DEPT. OF TRANSPORTATION

AUGUST 2024 5 OF 22

DESIGNED BY ER ROBT067D	CK. DES. BY SH/JH 067DGB05	DRAFTED BY HK/BT	Steve A. Johnson BRIDGE ENGINEER
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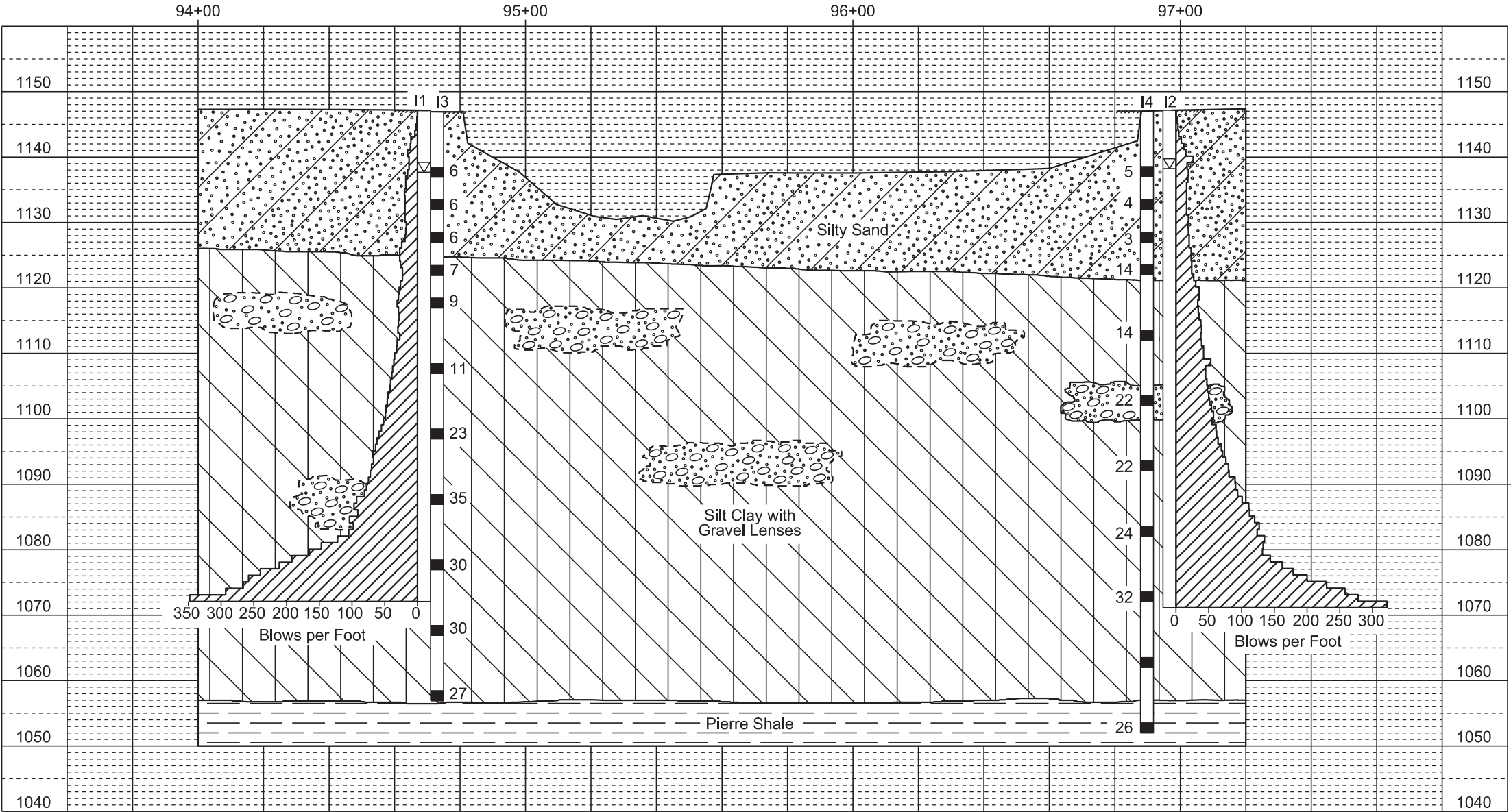
NOTE :
This sheet is to be used in conjunction with the
PILING INTERFERENCE DETAILS sheet.

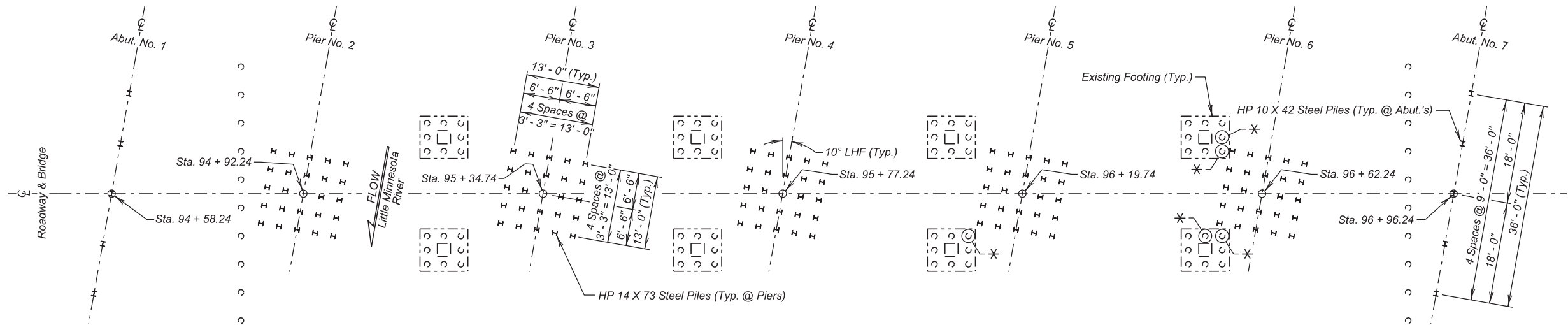
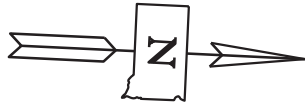
PILING LAYOUT

COFFERDAM SOIL PARAMETERS

	Friction Angle (Φ)	Cohesion (c)	Wet Unit Weight (γw)
Silty Sand	26°	100 psf	120 pcf
Silt Clay	24°	150 psf	124 pcf

Hole Number Station Depth Soil Color Classification Strength (Qu) Dry Density Wet Density Moisture Pass No. 10 Pass No. 40 Pass No. 200 Sand Content Silt Content Clay Content	I3 94+71 20.0 ft Brown Sandy Silt No Test NA pcf NA pcf NA % 94.6 % 76.3 % 56.6 % 38.1 % 39.2 % 17.4 %	I3 94+71 30.0 ft Brown Clay Silt No Test NA pcf NA pcf NA % 97.5 % 89.5 % 70.1 % 27.4 % 49.2 % 20.9 %	Hole Number Station Depth Soil Color Classification Strength (Qu) Dry Density Wet Density Moisture Pass No. 10 Pass No. 40 Pass No. 200 Sand Content Silt Content Clay Content	I4 96+95 25.0 ft Brown Silty Sand No Test NA pcf NA pcf NA % 100.0 % 98.2 % 43.6 % 56.4 % 25.2 % 18.4 %	Hole Number Station Depth Soil Color Classification Strength (Qu) Dry Density Wet Density Moisture Pass No. 10 Pass No. 40 Pass No. 200 Sand Content Silt Content Clay Content	I4 96+95 36.5 ft Brown Silt Clay No Test NA pcf NA pcf NA % 99.2 % 96.0 % 80.6 % 18.6 % 43.5 % 37.1 %	Hole Number Station Depth Soil Color Classification Strength (Qu) Dry Density Wet Density Moisture Pass No. 10 Pass No. 40 Pass No. 200 Sand Content Silt Content Clay Content	I4 96+95 45.0 ft Brown Gravelly Sand No Test NA pcf NA pcf NA % 52.7 % 31.0 % 11.5 % 41.2 % 7.1 % 4.4 %
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PILING LAYOUT

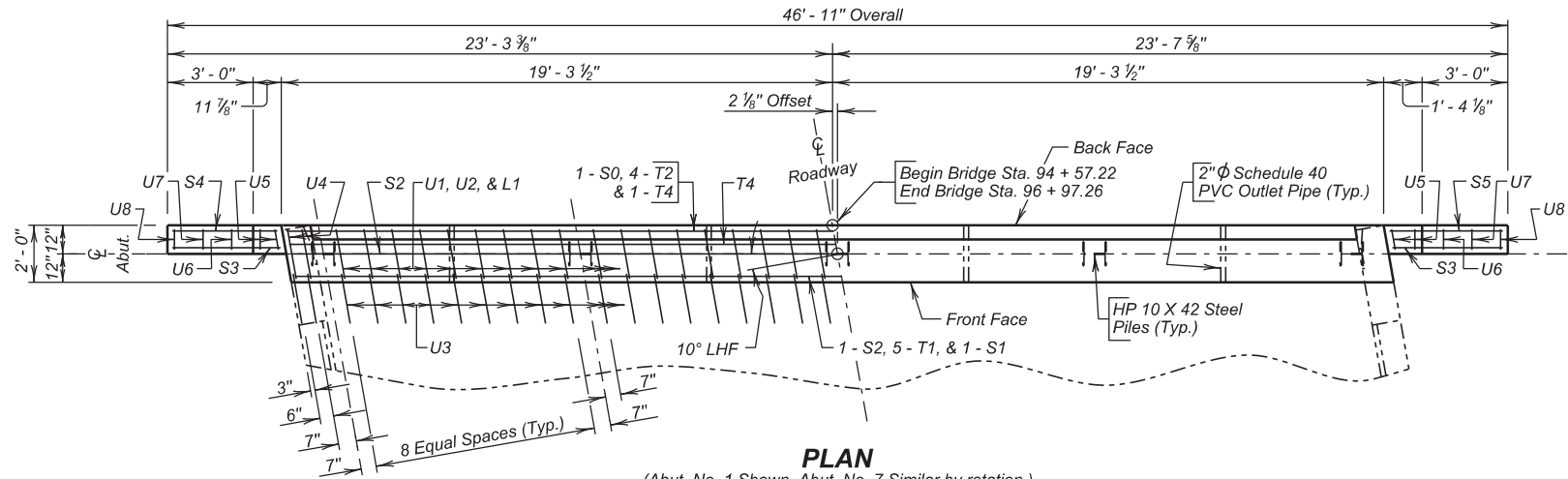
NOTE:
✱ Existing timber pile to be extracted.

NOTE :
This sheet is to be used in conjunction with the SUBSURFACE INVESTIGATION AND PILING LAYOUT sheet.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Extract Pile	Each	5

PILING INTERFERENCE DETAILS
FOR
240' - 0 3/8" CONT. CONCRETE BRIDGE
36' - 0" ROADWAY
OVER LITTLE MINNESOTA RIVER
STA. 94 + 57.22 TO 96 + 97.26
STR. NO. 55-100-164
10° LHF SKEW
SEC. 14/15-T126N-R51W
P 0127(09)214
HL-93

ROBERTS COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2024



INCREASING STATIONS
Abut. No. 1
INCREASING STATIONS
Abut. No. 7

REINFORCING SCHEDULE

(For One Abutment)

Mk.	No.	Size	Length	Type	Bending Details	
Δ	B12	10	7	16'-4"	S11	
Δ	B13	2	7	9'-0"	17A	
Δ	L1	36	4	3'-6"	17A	
	S0	1	9	46'-7"	Str.	
	S1	1	9	38'-3"	Str.	
≠ Δ	S2	2	9	38'-3"	Str.	
	S3	2	9	4'-2"	19B	
	S4	1	9	4'-0"	19B	
	S5	1	9	4'-4"	19B	
≠	T1	5	5	41'-3"	2	
	T2	4	5	46'-7"	Str.	
	T3	18	5	5'-5"	Str.	
≠ Δ	T4	2	5	38'-3"	Str.	
Δ	T5	4	5	4'-0"	Str.	
Δ	U1	36	6	9'-6"	14B	
Δ	U2	40	4	6'-2"	17	
Δ	U3	40	4	2'-10"	S12A	
Δ	U4	4	6	10'-2"	17	
	U5	4	4	13'-4"	T1	
	U6	2	4	12'-4"	T1	
	U7	2	4	11'-6"	T1	
	U8	2	4	10'-6"	T1	

NOTES:
All dimensions are out to out of bars.
Δ Bars to be epoxy coated.
≠ Bend in field as necessary to fit.

ESTIMATED QUANTITIES

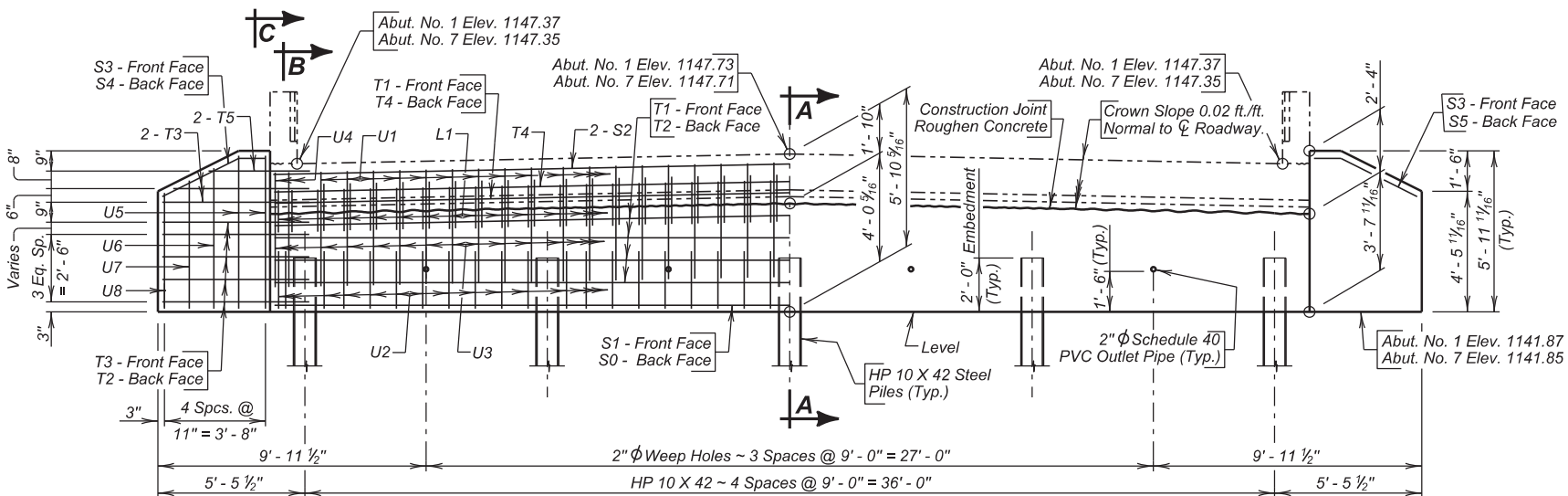
ITEM	UNIT	QUANTITY	
		Abutment No. 1	Abutment No. 7
* Class A45 Concrete, Bridge	Cu. Yd.	12.7	12.7
Reinforcing Steel	Lb.	1136	1136
Epoxy Coated Reinforcing Steel	Lb.	1462	1462
Structure Excavation, Bridge	Cu. Yd.	9.5	9.5
HP 10 X 42 Steel Test Pile, Furnish and Drive	Ft.	1 @ 100' = 100'	1 @ 100' = 100'
HP 10 X 42 Steel Bearing Pile, Furnish and Drive	Ft.	4 @ 95' = 380'	4 @ 95' = 380'
Preboring Pile	Ft.	5 @ 10' = 50'	5 @ 10' = 50'

* Includes 8 ft. of 2" dia. PVC Pipe for weep holes.

ABUTMENT DETAILS

FOR
240' - 0 3/8" CONT. CONCRETE BRIDGE
36' - 0" ROADWAY
OVER LITTLE MINNESOTA RIVER
STA. 94 + 57.22 TO 96 + 97.26
STR. NO. 55-100-164
10° LHF SKEW
SEC. 14/15-T126N-R51W
P 0127(09)214
HL-93

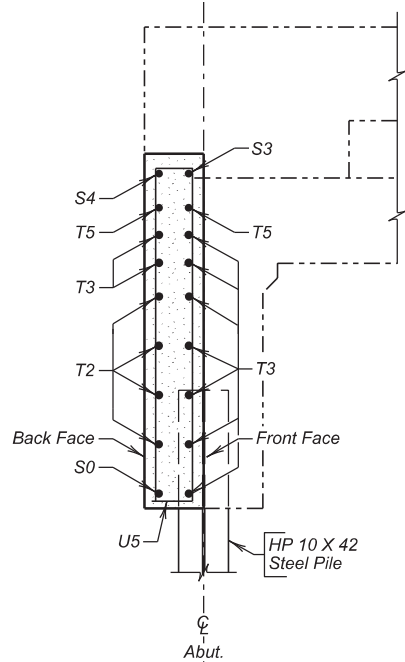
ROBERTS COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2024



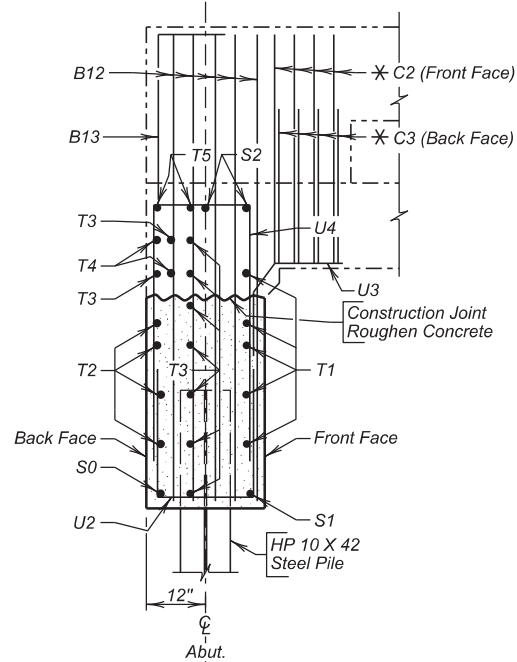
ELEVATION

(Along C Abutment)

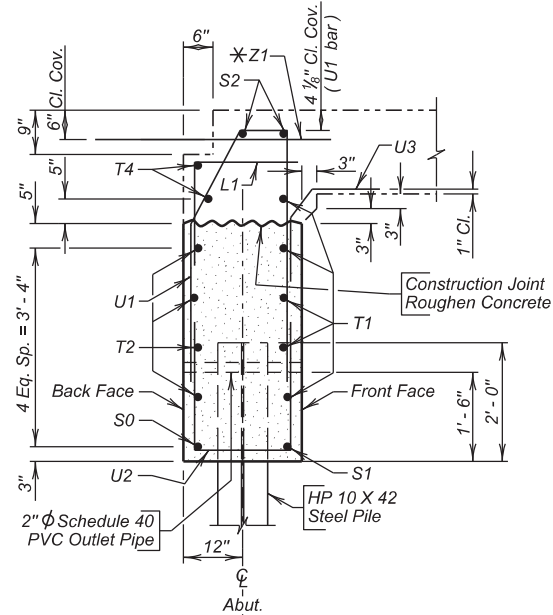
* NOTE:
Quantity for C2, C3, & Z1 bars are included on the
SUPERSTRUCTURE DETAILS Sheet.



SECTION C - C

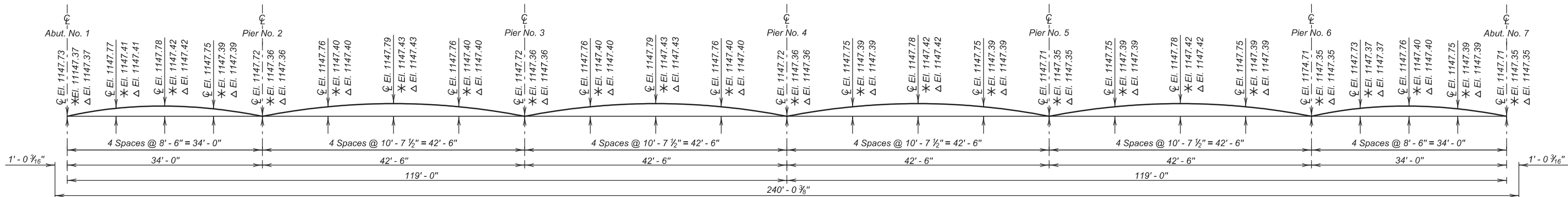
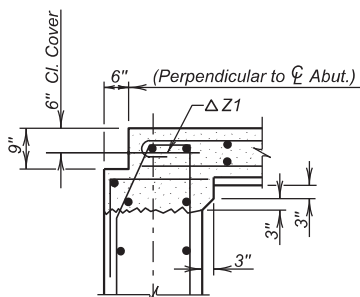
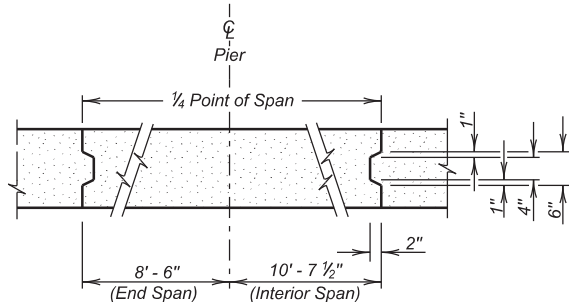
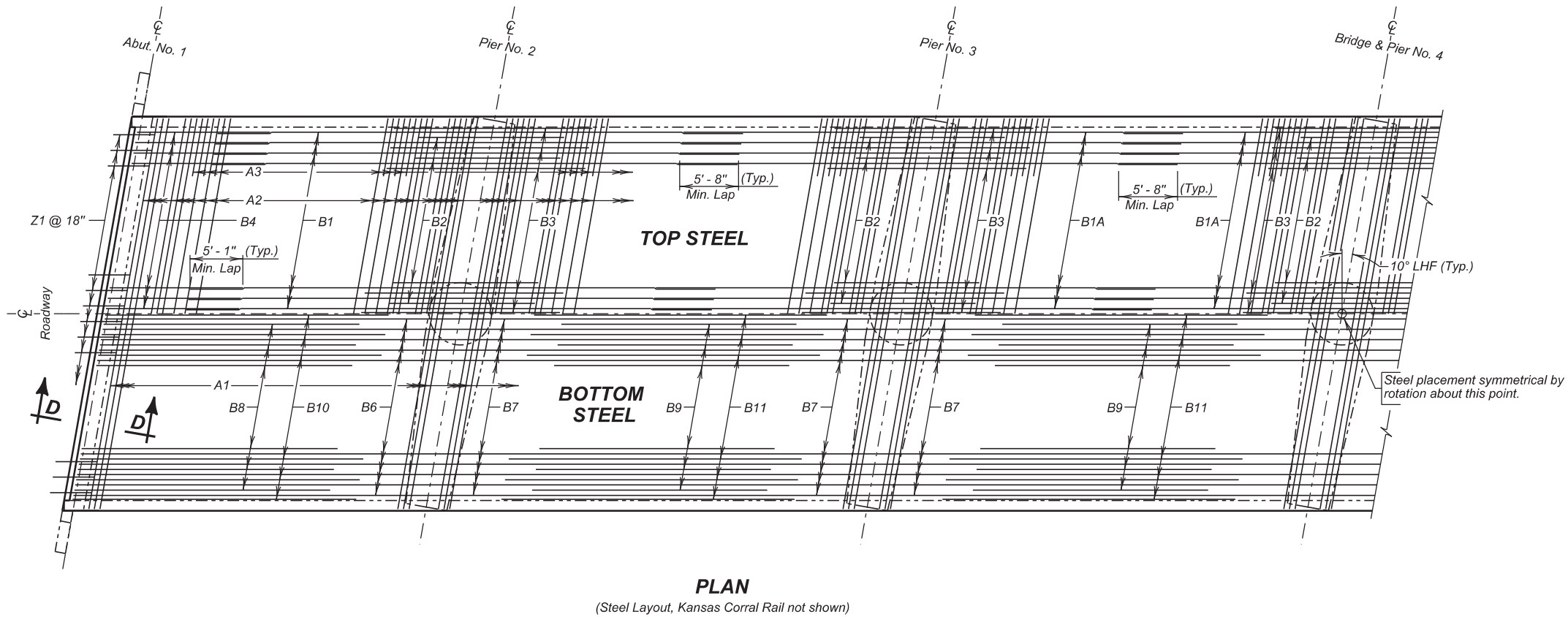


SECTION B - B

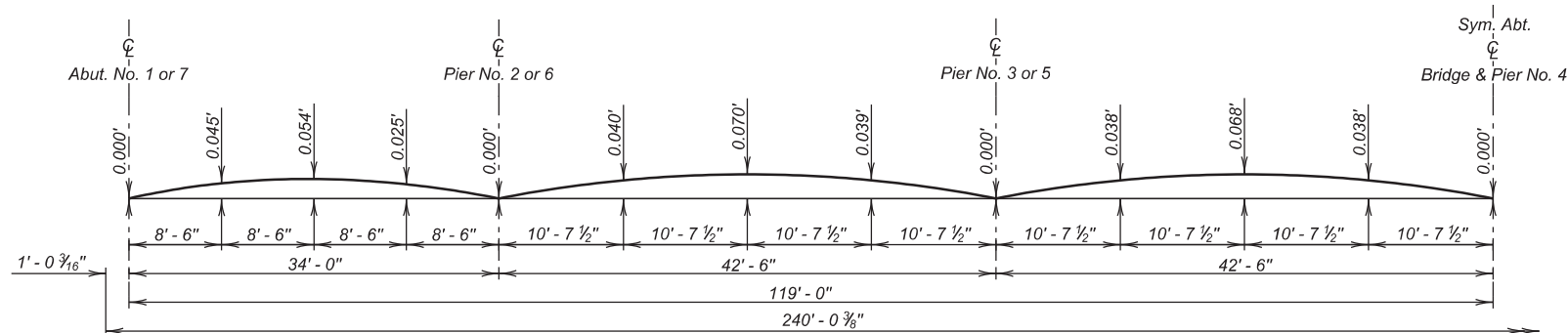


SECTION A - A

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E24	E35



Elevations indicated with * are Top of Finished Slab at Left Curb line, with C/L are Top of Finished Slab at Centerline Roadway and with Δ are Top of Finished at Right Curb Line. Camber for Dead Load Deflection Plus Plastic Flow have been included in the elevations shown above.



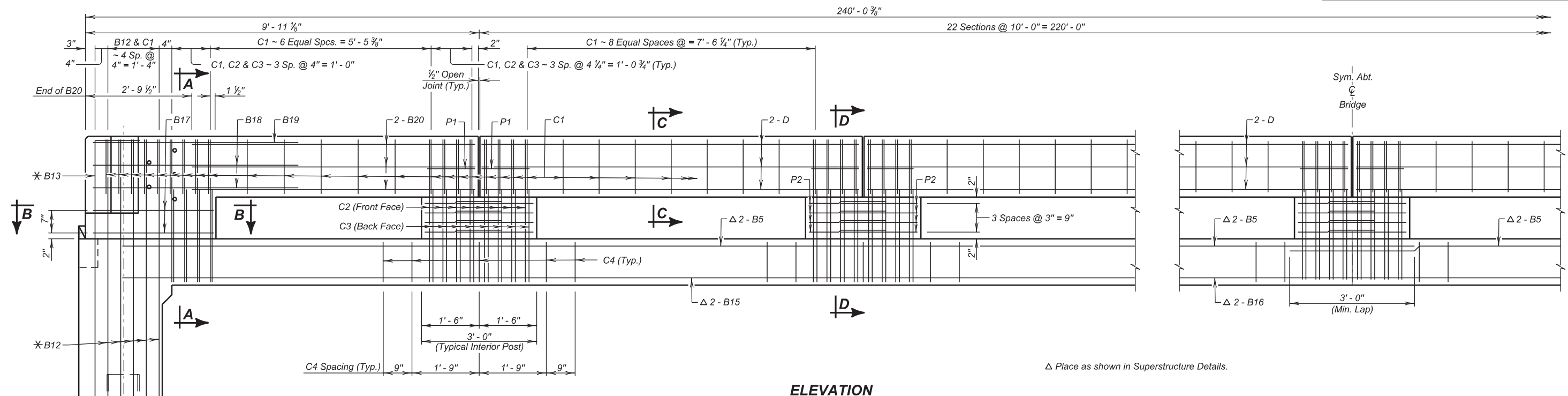
Camber is calculated for dead load deflection plus plastic flow and will be added to the proposed grade elevations at the respective stations to establish the elevations of the top of the finished roadway slab.

SUPERSTRUCTURE DETAILS (B)
FOR
240' - 0 3/8" CONT. CONCRETE BRIDGE
36' - 0" ROADWAY
OVER LITTLE MINNESOTA RIVER
STA. 94 + 57.22 TO 96 + 97.26
STR. NO. 55-100-164
10° LHF SKEW
SEC. 14/15-T126N-R51W
P 0127(09)214
HL-93

ROBERTS COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2024

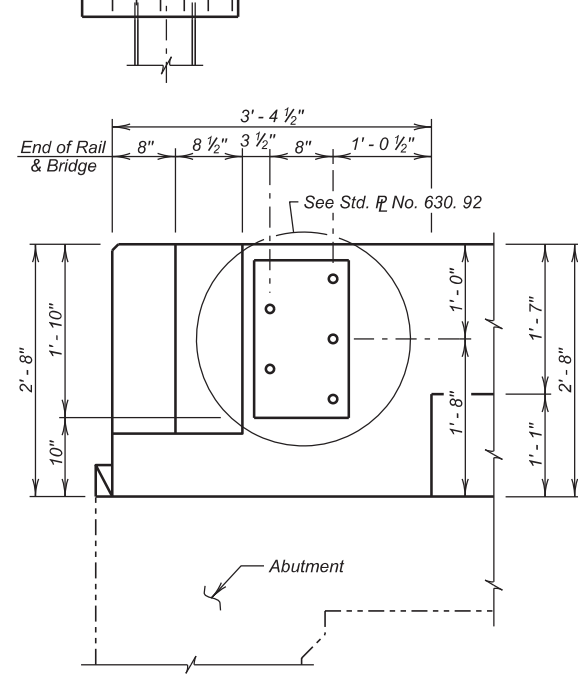
DESIGNED BY ER ROBT067D	CK. DES. BY JH 067DGB11	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E25	E35

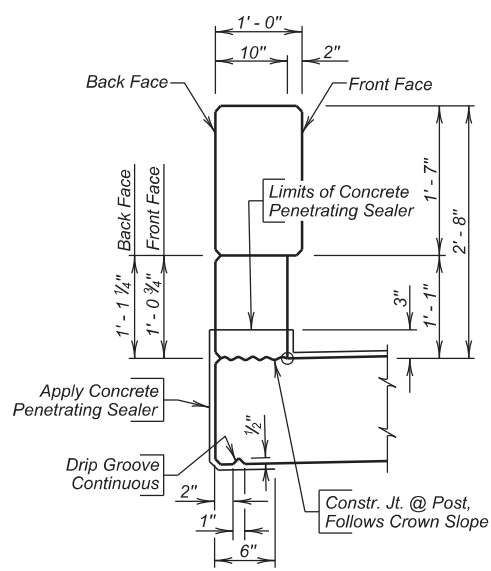


△ Place as shown in Superstructure Details.

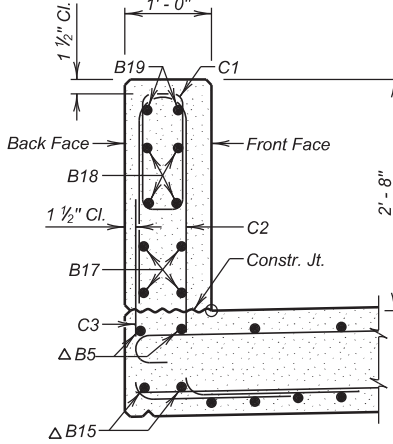
ELEVATION



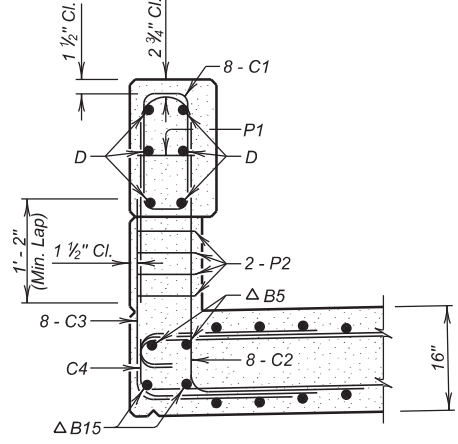
ELEVATION



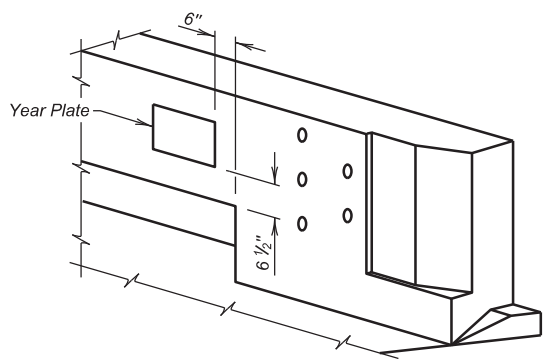
TYPICAL RAIL SECTION



SECTION A - A

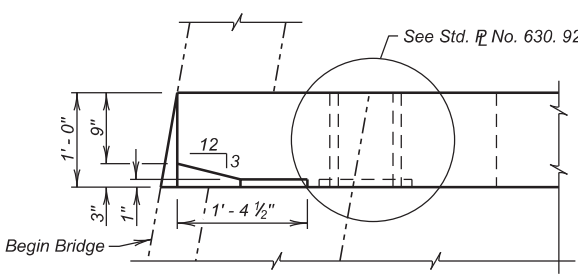


SECTION D - D
(Typ. @ Interior Posts)

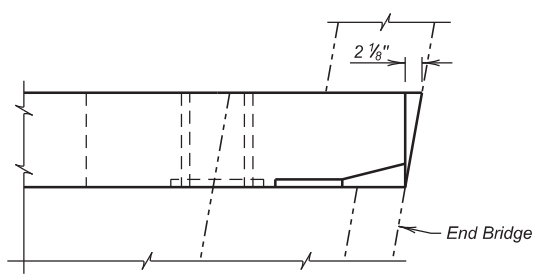


ISOMETRIC VIEW

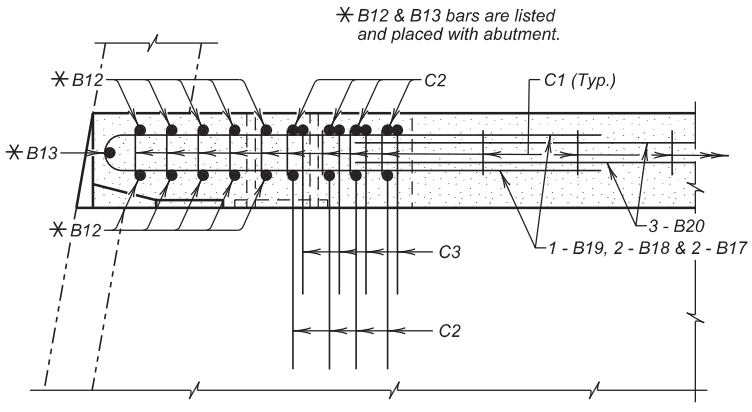
NOTE:
For listing of re-bars see Superstructure Details.



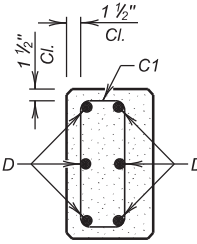
PART PLAN



PART PLAN



SECTION B - B



SECTION C - C

KANSAS CORRAL RAIL DETAILS

FOR

240' - 0 3/8" CONT. CONCRETE BRIDGE

36' - 0" ROADWAY
OVER LITTLE MINNESOTA RIVER
STA. 94 + 57.22 TO 96 + 97.26
STR. NO. 55-100-164

10° LHF SKEW
SEC. 14/15-T126N-R51W
P 0127(09)214
HL-93

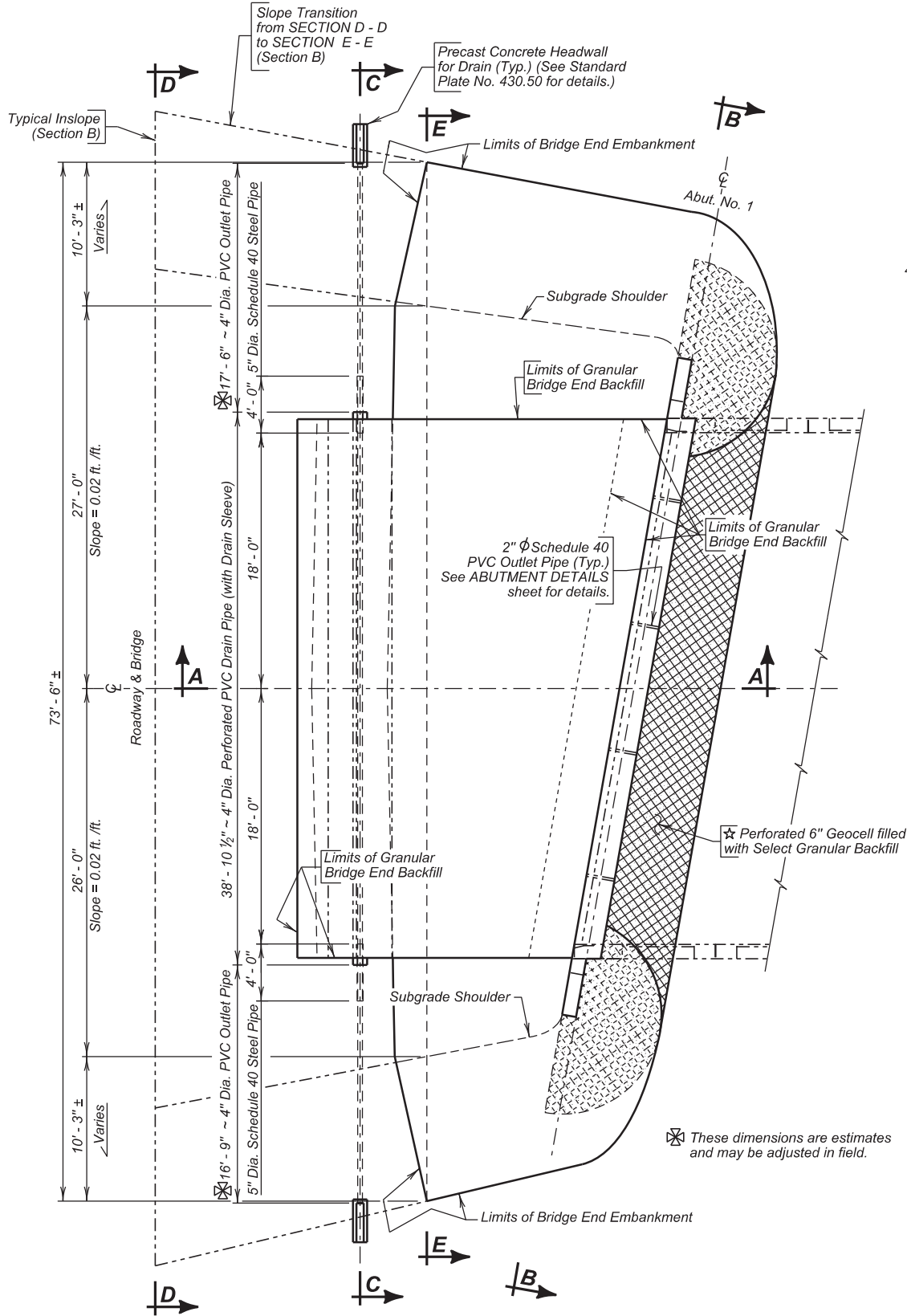
ROBERTS COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2024

DESIGNED BY ER ROBT067D	CK. DES. BY JH 067DGB12	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
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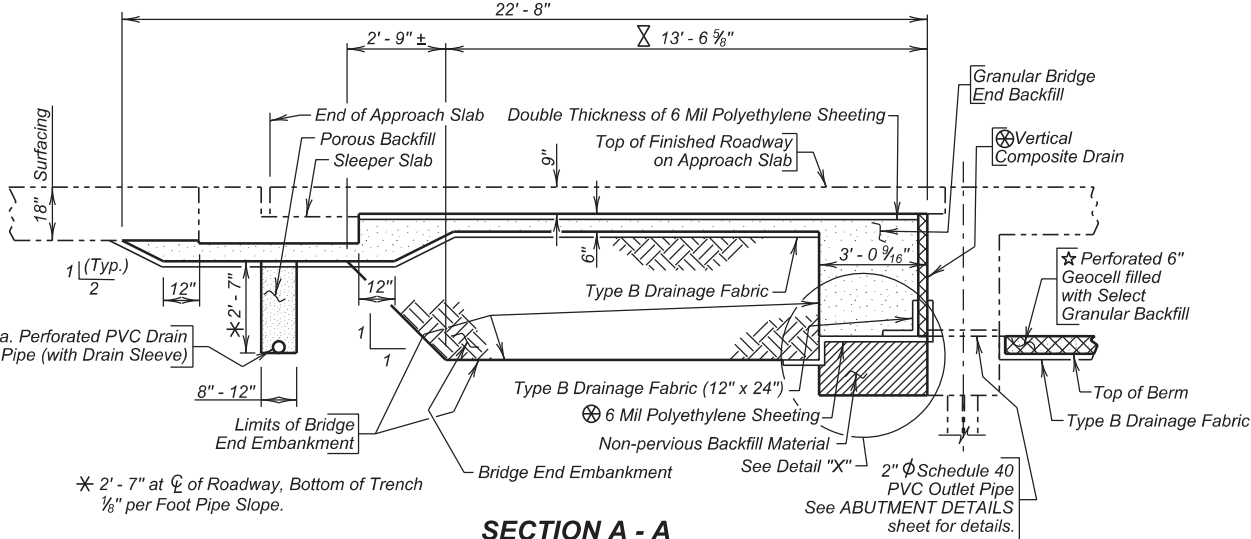
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E26	E35

NOTE:
Perforated Geocell to be installed as shown in
PLAN view. The embankment spill cone will spill
onto the top of the perforated geocell.

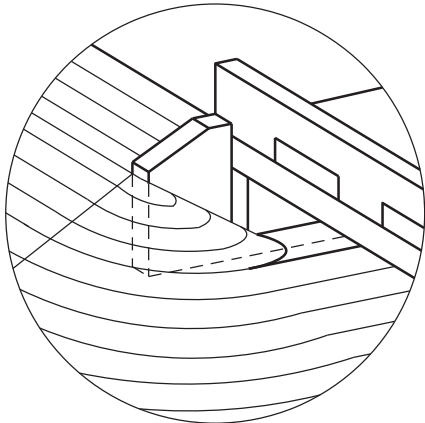
NOTE:
Dimension differs from Std. Plate No. 120.10



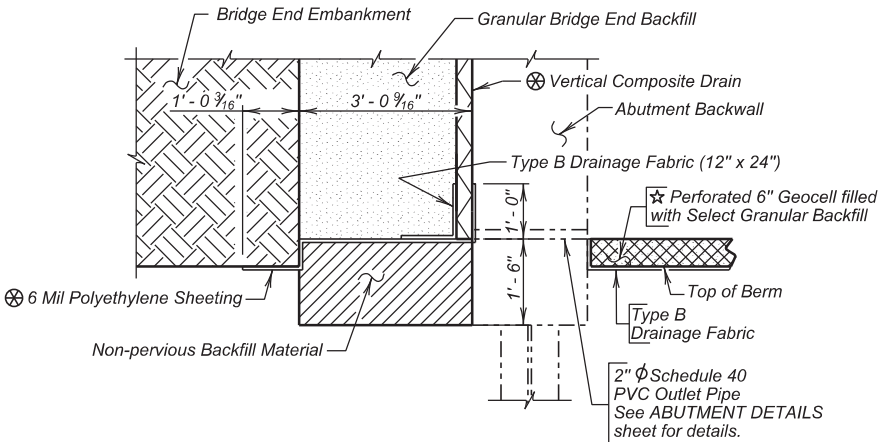
PLAN
(Bridge End Backfill shown adjacent to Abut. No. 1
Abut. No. 7 similar opposite hand except as shown.)



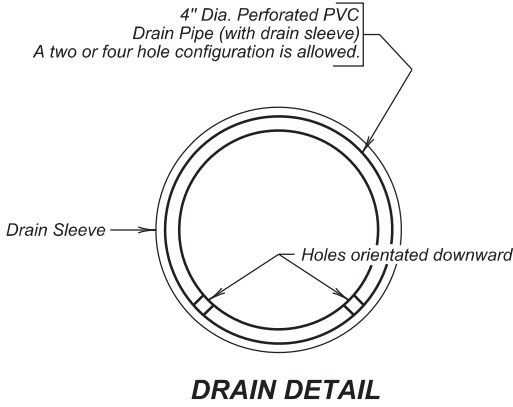
SECTION A - A
(at Roadway)



NOTE:
The Contractor will ensure the underdrain pipes
located at the sleeper slab are not damaged during
the installation of the guardrail posts. Damaged
underdrain pipes will be replaced at the Contractor's
expense.



DETAIL "X"



Provide hole in vertical composite drain and 6 mil polyethylene
sheeting to provide drainage through weep holes.

See PERFORATED GEOCELL notes for payment information.

ESTIMATED QUANTITIES

(For Two Abutments)

ITEM	UNIT	QUANTITY
Granular Bridge End Backfill	Cu. Yd.	68.5
Bridge End Embankment	Cu. Yd.	252
Porous Backfill	Ton	14.1
4" Underdrain Pipe	Ft.	147
Approach Slab Underdrain Excavation	Cu. Yd.	7.5
Precast Concrete Headwall for Drain	Each	4

- 78 ft. 4" dia. Perforated PVC Drain Pipe (with Drain Sleeve).
- 69 ft. 4" dia. PVC Outlet Pipe.
- 16 ft. 5" dia. Schedule 40 Steel Pipe.
- 302 sq. ft. Vertical Composite Drain.

Items 1 thru 4 are approximate quantities contained in the 4" Underdrain
Pipe and are for information only.

- 2867 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
- 174 sq. yd. Type B Drainage Fabric.

Items 5 and 6 are approximate quantities contained in the Granular Bridge
End Backfill and are for information only.

For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to
convert cu. yds. to tons.

Shrinkage Factor of 1.25 used.

Quantity based on a 12" wide trench.

DETAILS OF BRIDGE END BACKFILL (A)

FOR

240' - 0 3/8" CONT. CONCRETE BRIDGE

36' - 0" ROADWAY

OVER LITTLE

MINNESOTA RIVER

STA. 94 + 57.22 TO 96 + 97.26

STR. NO. 55-100-164

10° LHF SKEW

SEC. 14/15-T126N-R51W

P 0127(09)214

HL-93

ROBERTS COUNTY

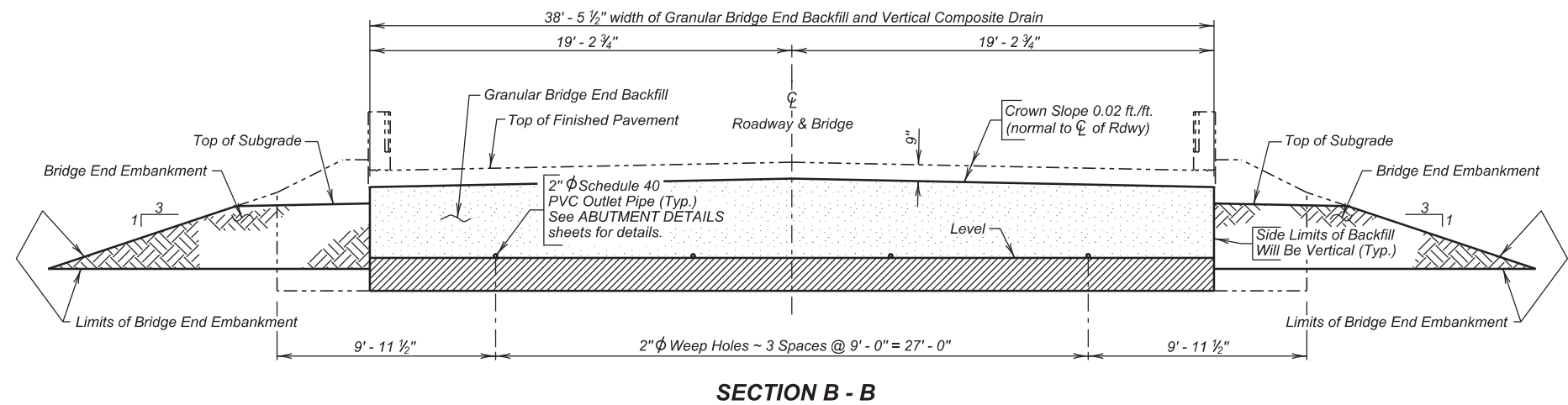
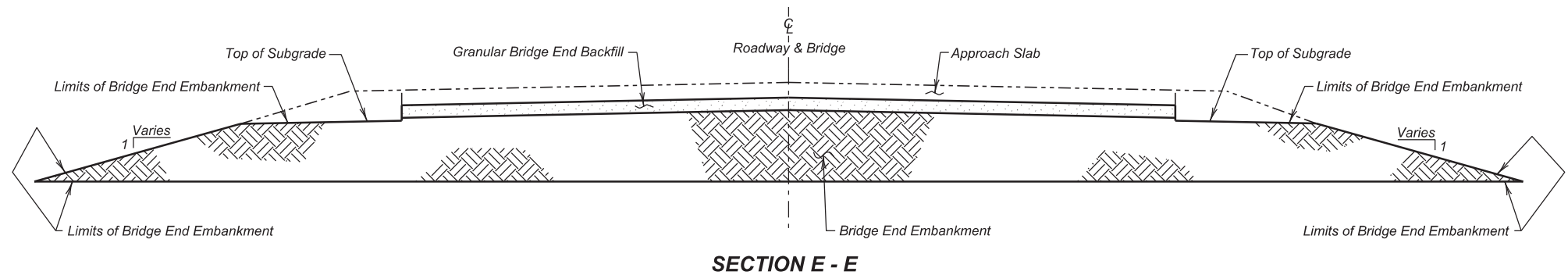
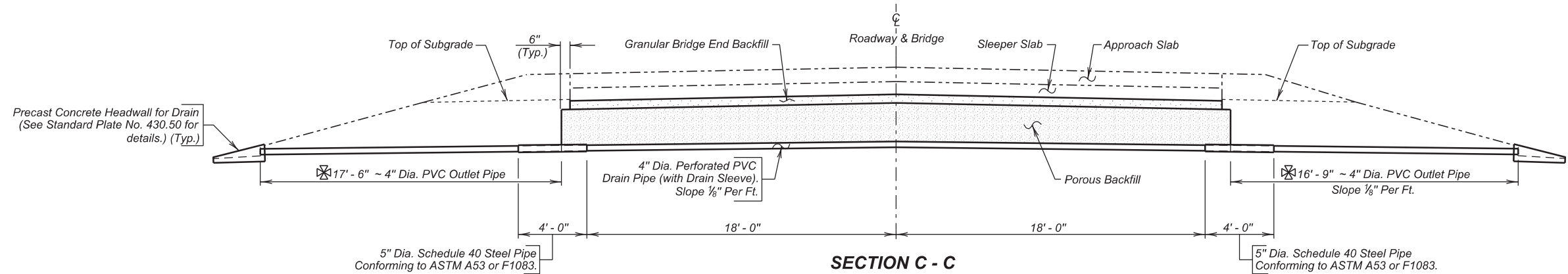
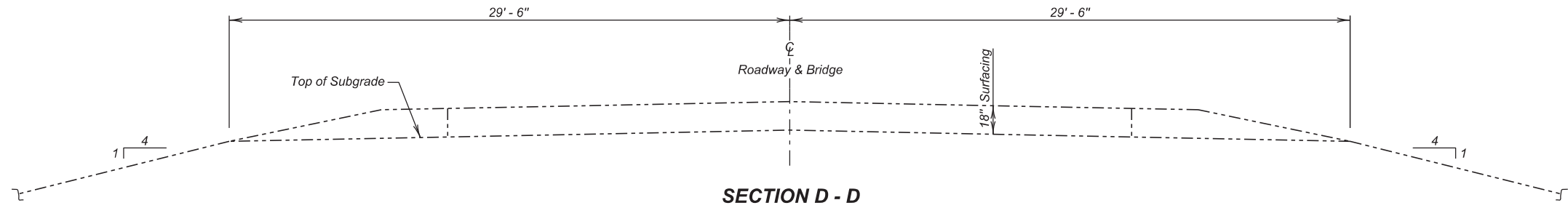
S. D. DEPT. OF TRANSPORTATION

AUGUST 2024

13 OF 22

DESIGNED BY ER ROBT067D	CK. DES. BY JH 067DGB13	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E27	E35



DETAILS OF BRIDGE END BACKFILL (B)

FOR
240' - 0 3/8" CONT. CONCRETE BRIDGE
36' - 0" ROADWAY
OVER LITTLE MINNESOTA RIVER
STA. 94 + 57.22 TO 96 + 97.26
STR. NO. 55-100-164

10° LHF SKEW
SEC. 14/15-T126N-R51W
P 0127(09)214
HL-93

ROBERTS COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2024

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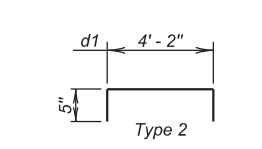
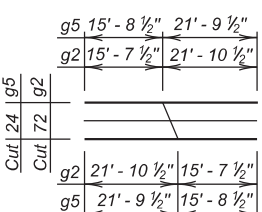
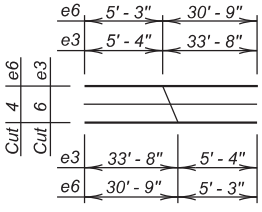
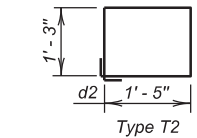
DESIGNED BY ER ROBT067D	CK. DES. BY JH 067DGB14	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
		E28	E35
S.D.	P 0127(09)214		

REINFORCING SCHEDULE

(For Two Approach Slabs and Two Sleeper Slabs)

Bending Details				
Mk.	No.	Size	Length	Type
Sleeper Slab				
c1	32	5	37'-6"	Str.
d1	152	4	5'-0"	2
d2	76	4	6'-1"	T2
Approach Slab				
a3	6	4	11'-6"	14
e1	30	6	37'-6"	Str.
e2	2	6	36'-6"	Str.
e3	6	6	39'-0"	Str.
e4	20	4	37'-6"	Str.
e5	2	4	36'-6"	Str.
e6	4	4	36'-0"	Str.
g1	4	8	14'-11"	Str.
g2	72	8	37'-6"	Str.
g3	4	8	21'-6"	Str.
g4	2	4	14'-11"	Str.
g5	24	4	37'-6"	Str.
g6	2	4	21'-6"	Str.
g7	46	4	6'-0"	Str.
h1	4	6	36'-3"	Str.



NOTES:
All bars to be epoxy coated.
All dimensions are out to out of bars.
See cutting diagram.

ESTIMATED QUANTITIES

(For Two Approach Slabs and Two Sleeper Slabs)

ITEM	UNIT	QUANTITY
Concrete Approach Slab for Bridge	Sq. Yd.	159.8
Concrete Approach Sleeper Slab for Bridge	Sq. Yd.	37.9

- 40.5 cu. yds. Concrete in Approach Slab.
 - 11447 lbs. Epoxy Coated Re-Steel in Approach Slab.
 - 13.6 cu. yds. Concrete in Sleeper Slab.
 - 2069 lbs. Epoxy Coated Re-Steel in Sleeper Slab.
 - 19 sq. ft. of 2" Polystyrene Insulation Board.
- Items 1 thru 5 are approximate quantities contained in the above bid items and are for information only.

* Add a3 bar to bottom layer of steel as shown in DETAIL "Y" and top layer of steel as shown in DETAIL "Z".

* Cut all bars in area of drop inlet as shown in DETAIL "Y" and DETAIL "Z".

DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE

FOR

240' - 0 3/8" CONT. CONCRETE BRIDGE

36' - 0" ROADWAY
OVER LITTLE MINNESOTA RIVER
STA. 94 + 57.22 TO 96 + 97.26
STR. NO. 55-100-164

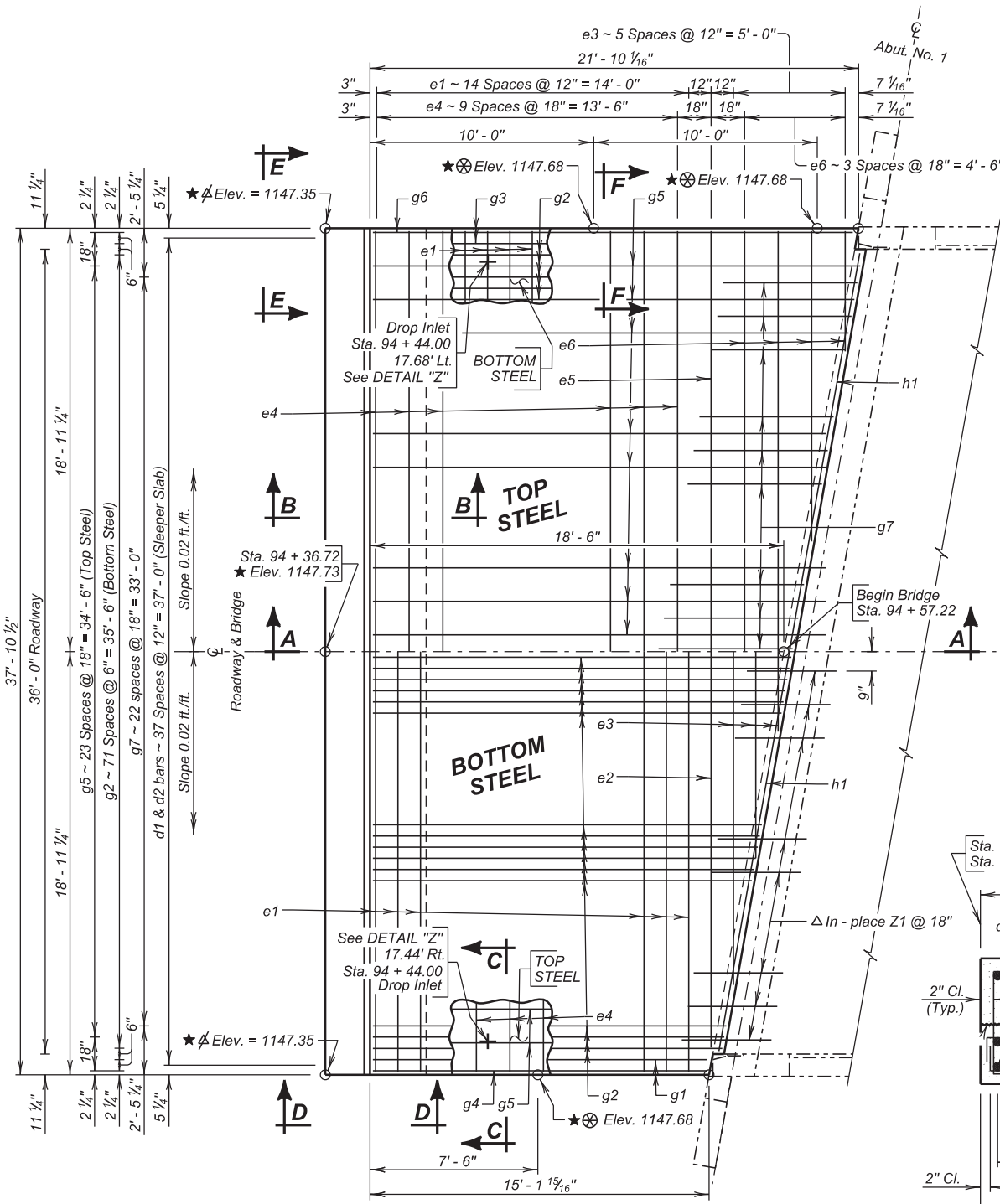
10° LHF SKEW
SEC. 14/15-T126N-R51W
P 0127(09)214
HL-93

ROBERTS COUNTY

S. D. DEPT. OF TRANSPORTATION

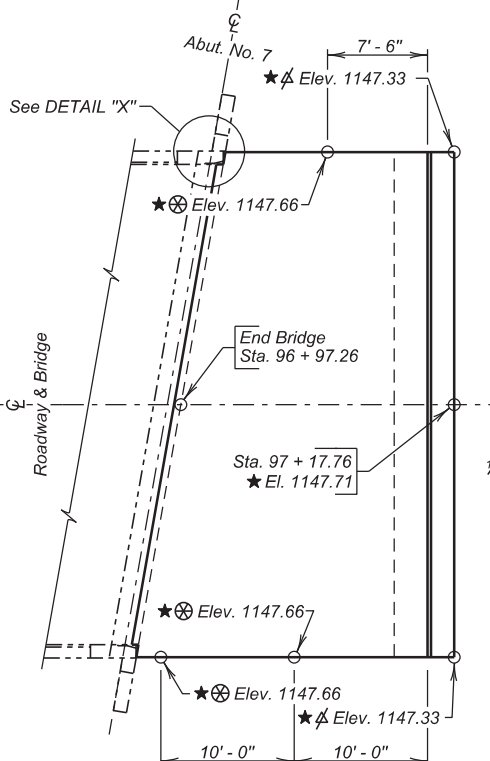
AUGUST 2024

DESIGNED BY ER ROBT067D	CK. DES. BY JH 067DGB15	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
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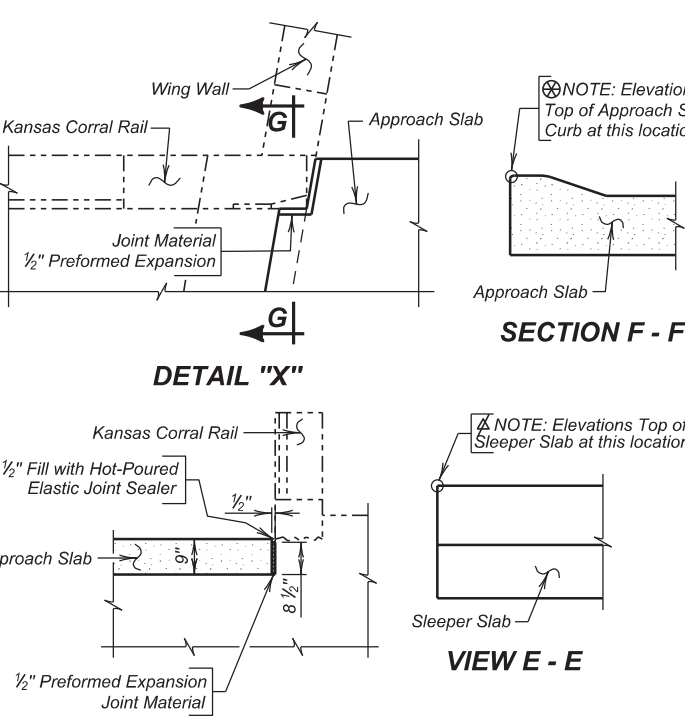
PLAN

(Shown adjacent to Abut. No. 1, Abut. No. 7 similar by rotation except as shown.)

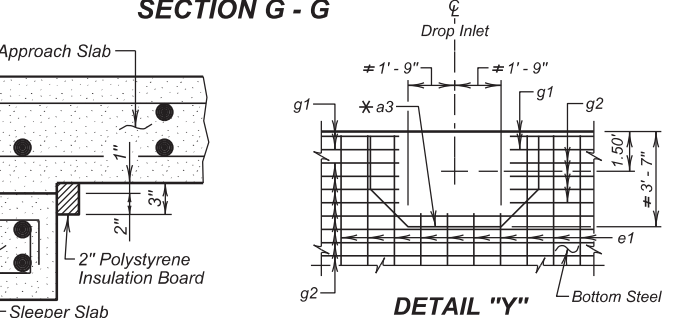


PLAN

(Shown adj. to Abut. No. 7)



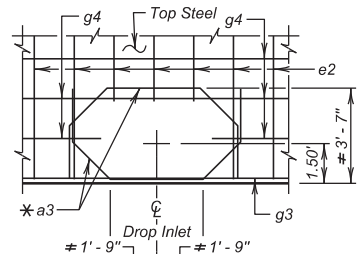
SECTION F - F



SECTION G - G

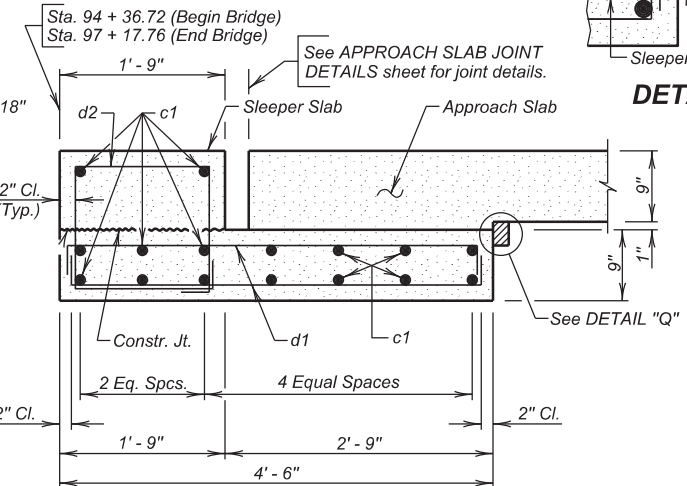
DETAIL "Q"

(Plan for Bottom Steel when drop inlet is used.)



DETAIL "Z"

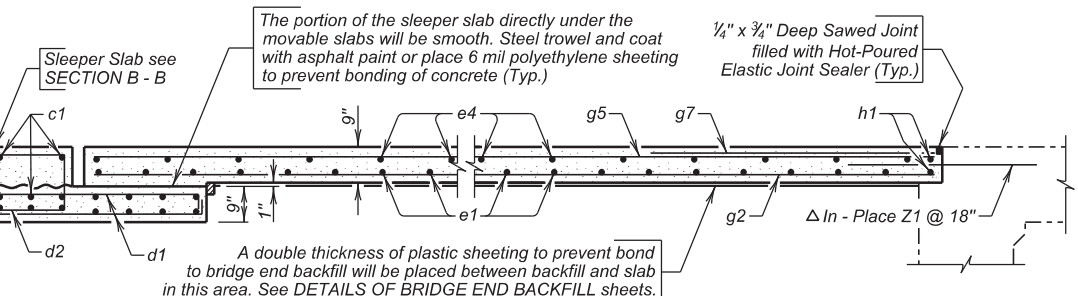
(Plan for Top Steel when drop inlet is used.)



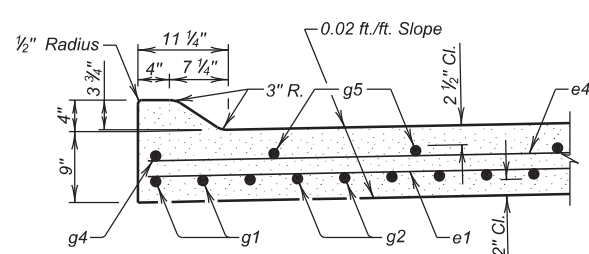
SECTION B - B

(Sleeper Slab)

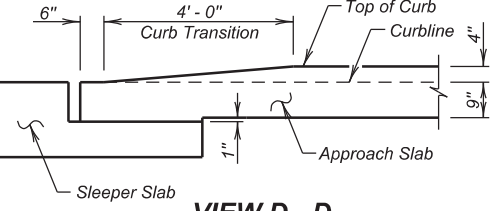
Δ In-place Z1 bars and are listed and included in superstructure quantities. See SUPERSTRUCTURE DETAILS sheet.



SECTION A - A



SECTION C - C

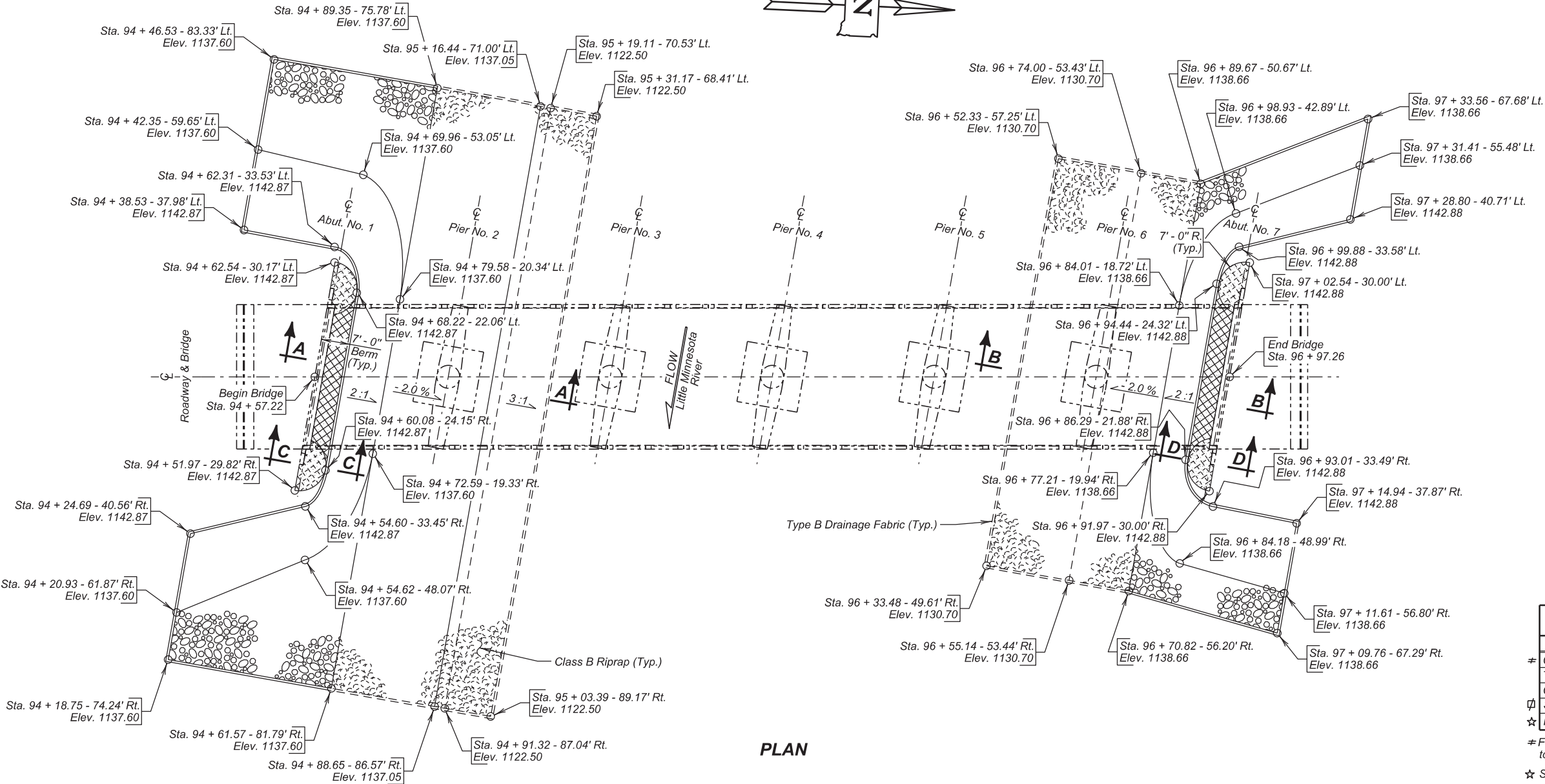
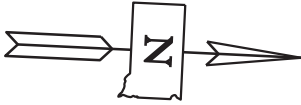


VIEW D - D

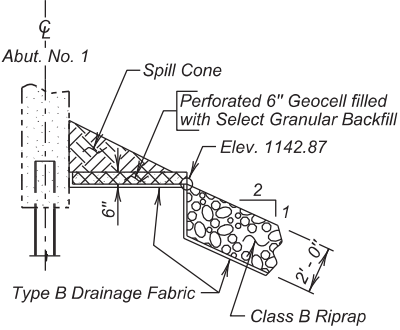
★ Elevations may need to be adjusted for a smooth ride from the final bridge deck elevations to final pavement elevations.

The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

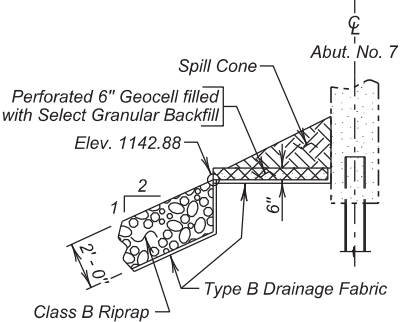
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E30	E35



PLAN



SECTION C - C



SECTION D - D

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class B Riprap	Ton	1978.0
Type B Drainage Fabric	Sq. Yd.	2341
Overburden Excavation for Riprap	Cu. Yd.	4054
Select Granular Backfill	Ton	22.4
Perforated Geocell	Sq. Ft.	640

For estimating purposes only, a factor of 1.4 tons/cu.yd. was used to convert Cu. Yds. to Tons.

See PERFORATED GEOCELL notes for payment information.

For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to convert cu. yds. to tons.

RIPRAP DETAILS

FOR

240' - 0 3/8" CONT. CONCRETE BRIDGE

36' - 0" ROADWAY
OVER LITTLE MINNESOTA RIVER
STA. 94 + 57.22 TO 96 + 97.26
STR. NO. 55-100-164

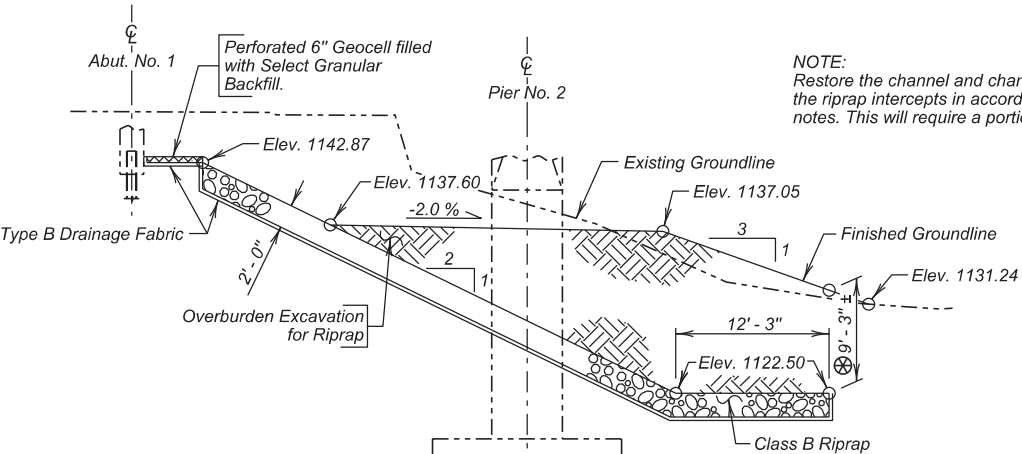
10° LHF SKEW
SEC. 14/15-T126N-R51W
P 0127(09)214
HL-93

ROBERTS COUNTY

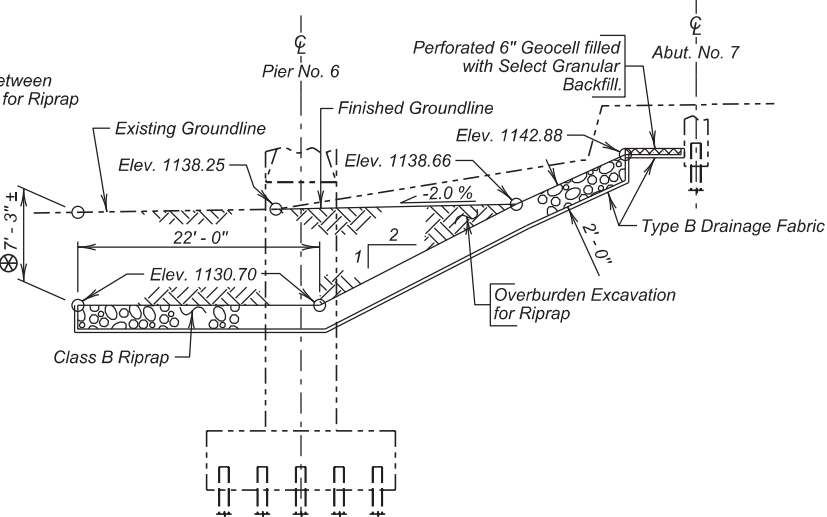
S. D. DEPT. OF TRANSPORTATION

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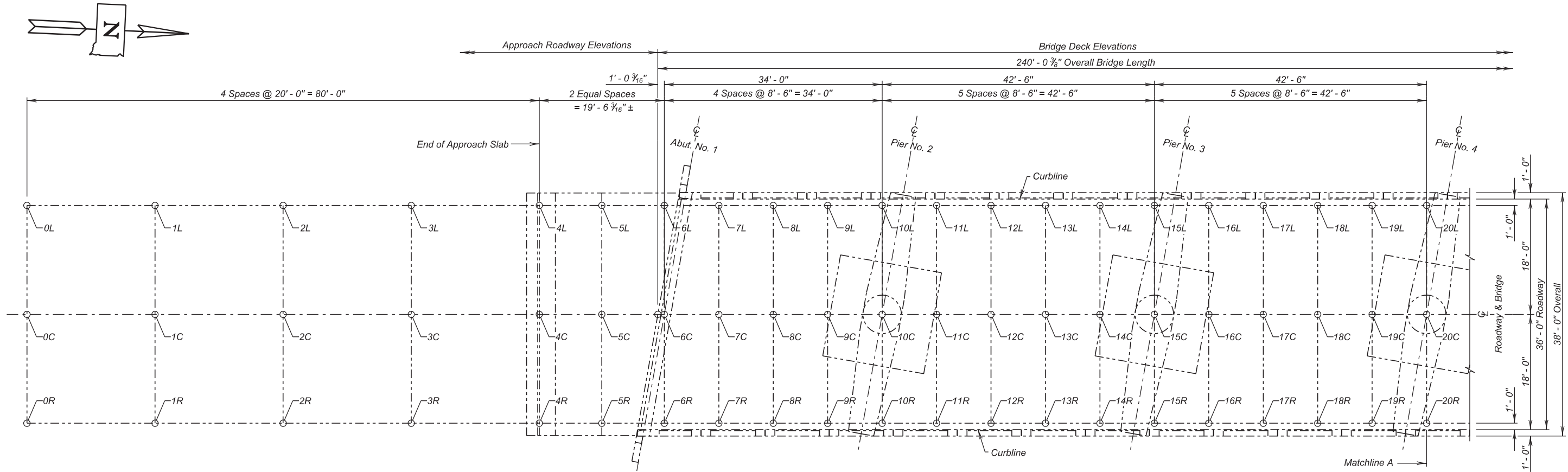
SECTION A - A



SECTION B - B

Measured to channel intercept. See GENERAL DRAWING Sheet for details.

DESIGNED BY ER ROBT067D	CK. DES. BY JH 067DGB17	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
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PLAN

Table of As-Built Elevations - Approach Roadway					
Location	Elevation	Location	Elevation	Location	Elevation
0L		0C		0R	
1L		1C		1R	
2L		2C		2R	
3L		3C		3R	
4L		4C		4R	
5L		5C		5R	
6L					

NOTE -
The Contractor will be responsible for producing the As - Built Elevation Survey soon after construction is complete and before the bridge is opened to traffic. The As - Built Elevations of the Bridge will be taken and recorded at the locations shown by the table on this sheet. The completed table will be given to the Engineer who will forward a copy to the Office of Bridge Design and the Region Office.

Table of As-Built Elevations - Bridge Deck					
Location	Elevation	Location	Elevation	Location	Elevation
		6C		6R	
7L		7C		7R	
8L		8C		8R	
9L		9C		9R	
10L		10C		10R	
11L		11C		11R	
12L		12C		12R	
13L		13C		13R	
14L		14C		14R	
15L		15C		15R	
16L		16C		16R	
17L		17C		17R	
18L		18C		18R	
19L		19C		19R	
20L		20C		20R	

Elevations - Bridge Survey Markers		
Location	Station - Offset	Elevation
Begin Bridge		

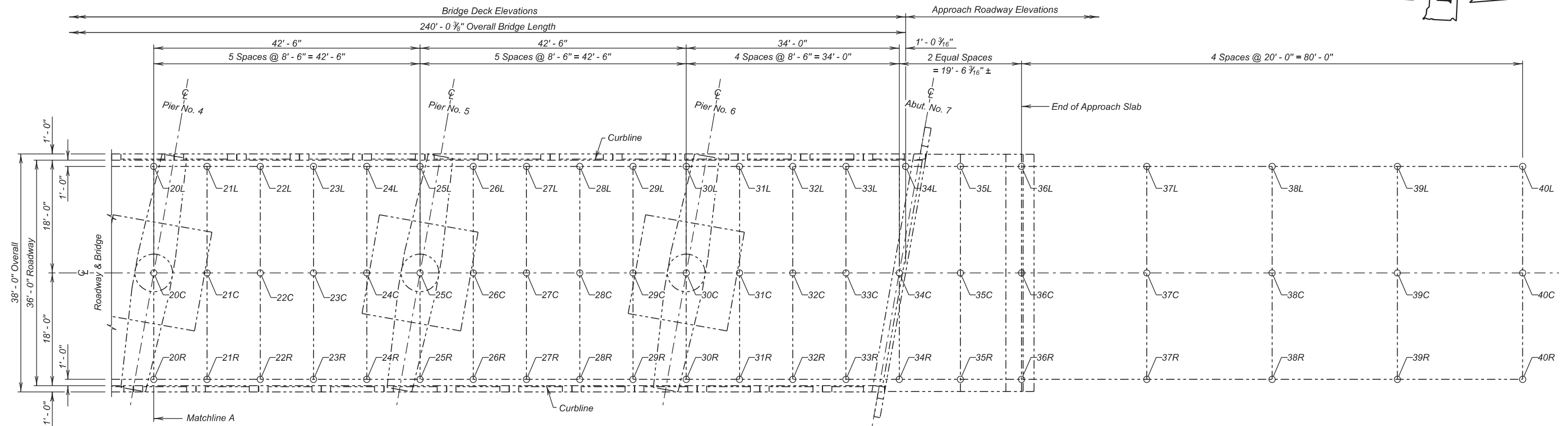
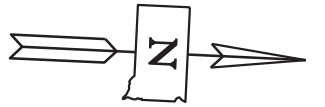
ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Bridge Elevation Survey	L. S.	Lump Sum

AS - BUILT ELEVATION SURVEY (A)
FOR
240' - 0 3/8" CONT. CONCRETE BRIDGE
36' - 0" ROADWAY
OVER LITTLE MINNESOTA RIVER
STA. 94 + 57.22 TO 96 + 97.26
STR. NO. 55-100-164
10° LHF SKEW
SEC. 14/15-T126N-R51W
P 0127(09)214
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0127(09)214	E32	E35



PLAN

Location	Elevation	Location	Elevation	Location	Elevation
20L		20C		20R	
21L		21C		21R	
22L		22C		22R	
23L		23C		23R	
24L		24C		24R	
25L		25C		25R	
26L		26C		26R	
27L		27C		27R	
28L		28C		28R	
29L		29C		29R	
30L		30C		30R	
31L		31C		31R	
32L		32C		32R	
33L		33C		33R	
34L		34C		—	

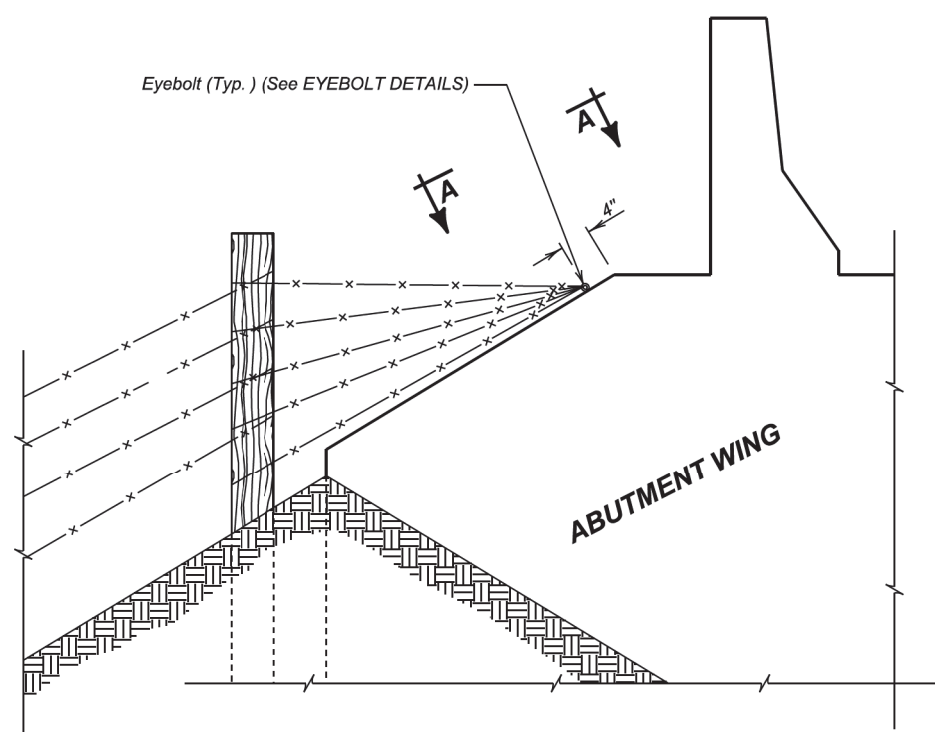
Table of As-Built Elevations - Approach Roadway					
Location	Elevation	Location	Elevation	Location	Elevation
—		—		34R	
35L		35C		35R	
36L		36C		36R	
37L		37C		37R	
38L		38C		38R	
39L		39C		39R	
40L		40C		40R	

<i>Elevations - Bridge Survey Markers</i>		
<i>Location</i>	<i>Station - Offset</i>	<i>Elevation</i>
<i>End Bridge</i>		

AS - BUILT ELEVATION SURVEY (B)
FOR
240' - 0 $\frac{3}{8}$ " CONT. CONCRETE BRIDGE
36' - 0" ROADWAY
OVER LITTLE
MINNESOTA RIVER
STA. 94 + 57.22 TO 96 + 97.26
STR. NO. 55-100-164
10° LHF SKEW
SEC. 14/15-T126N-R51W
P 0127(09)214
HL-93

ROBERTS COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2024

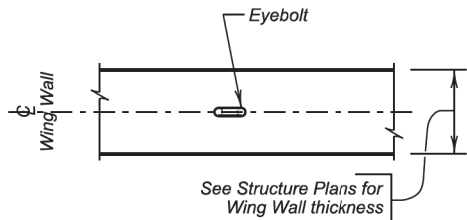
DESIGNED BY ER ROBT067D	CK. DES. BY JH 067DGB19	DRAFTED BY BT	 BRIDGE ENGINEER
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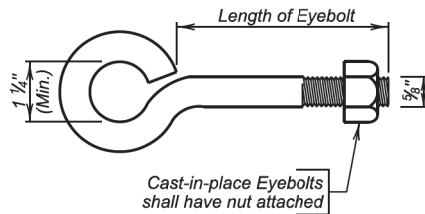
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the bridge abutment wings.
3. Eyebolts shall be $\frac{5}{8}$ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 $\frac{1}{2}$ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the $\frac{5}{8}$ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



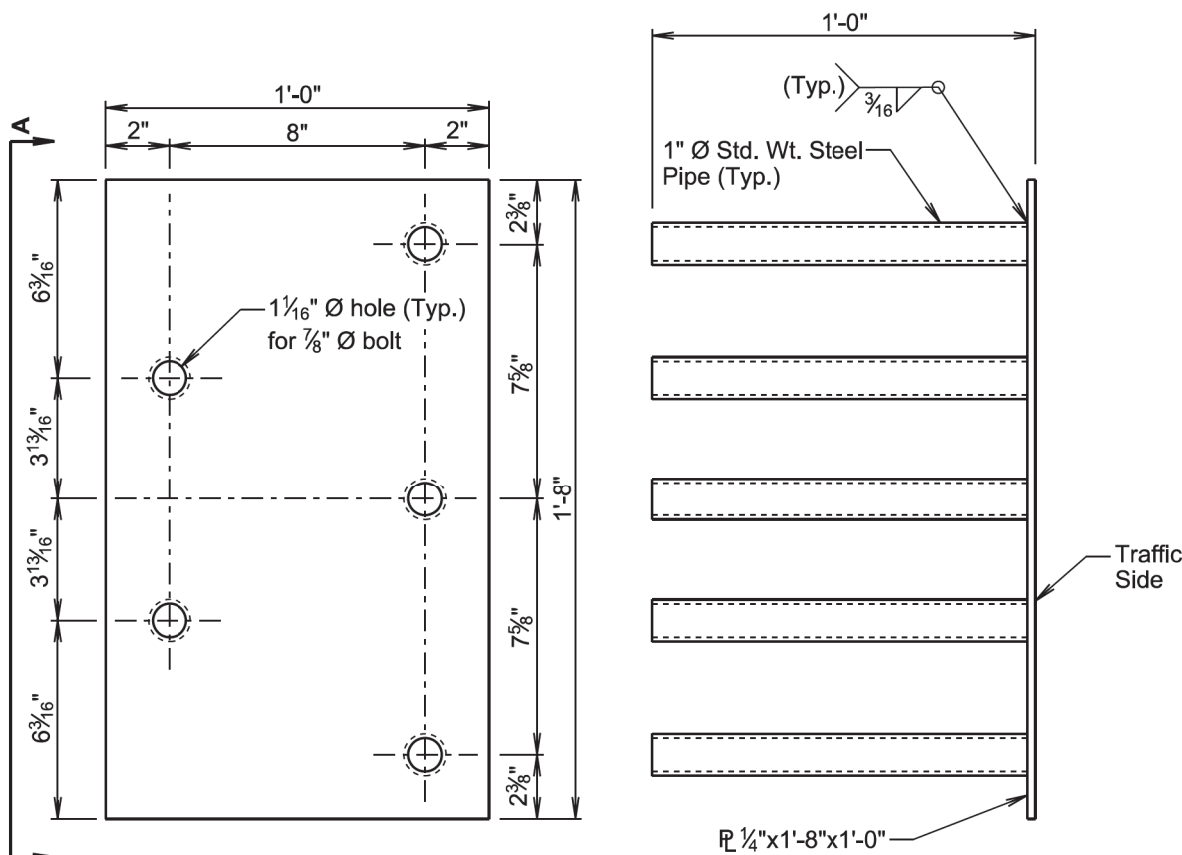
VIEW A - A



EYEBOLT DETAILS

December 23, 2012

Published Date: 2025	S D D O T	FENCE ANCHORS FOR BRIDGE ABUTMENT WINGS (WINGS 6' AND SHORTER)	PLATE NUMBER 620.18
			Sheet 1 of 1



ELEVATION VIEW

VIEW A - A

GENERAL NOTES:

- Steel plate for the insert assembly will conform to ASTM A709, Grade 36. The steel pipes will conform to ASTM A53 or ASTM A500, Grade B.
- Welding and weld inspection will be in conformance with AWS D1.1 - (Current Year) Structural Welding Code - Steel.
- After fabrication, galvanize in accordance with AASHTO M111 (ASTM A123).
- Bolts, nuts, and washers will be provided with each assembly. Bolts will be galvanized and conform to the requirements of ASTM A307, F-1554 Grade A325, or A449. Plain washers will be galvanized and conform to ASTM F844.
- Bolt heads will be placed on the traffic side of the endblock. Bolt projection at the back side of the insert will not exceed 1 inch beyond the nut.
- The cost of the 5 bolt insert plate assembly complete in place including welding and galvanizing will be incidental to the contract unit price per cubic yard for "Class A45 Concrete, Miscellaneous", "Class A45 Concrete, Bridge Deck", or "Class A45 Concrete, Bridge Repair", as applicable.

August 27, 2020

Published Date: 2025	S D D O T	5 BOLT INSERT PLATE ASSEMBLY	PLATE NUMBER 630.92
			Sheet 1 of 1

240' - 0 $\frac{3}{8}$ " CONT. CONCRETE BRIDGE

STR. NO. 55-100-164
AUGUST 2024