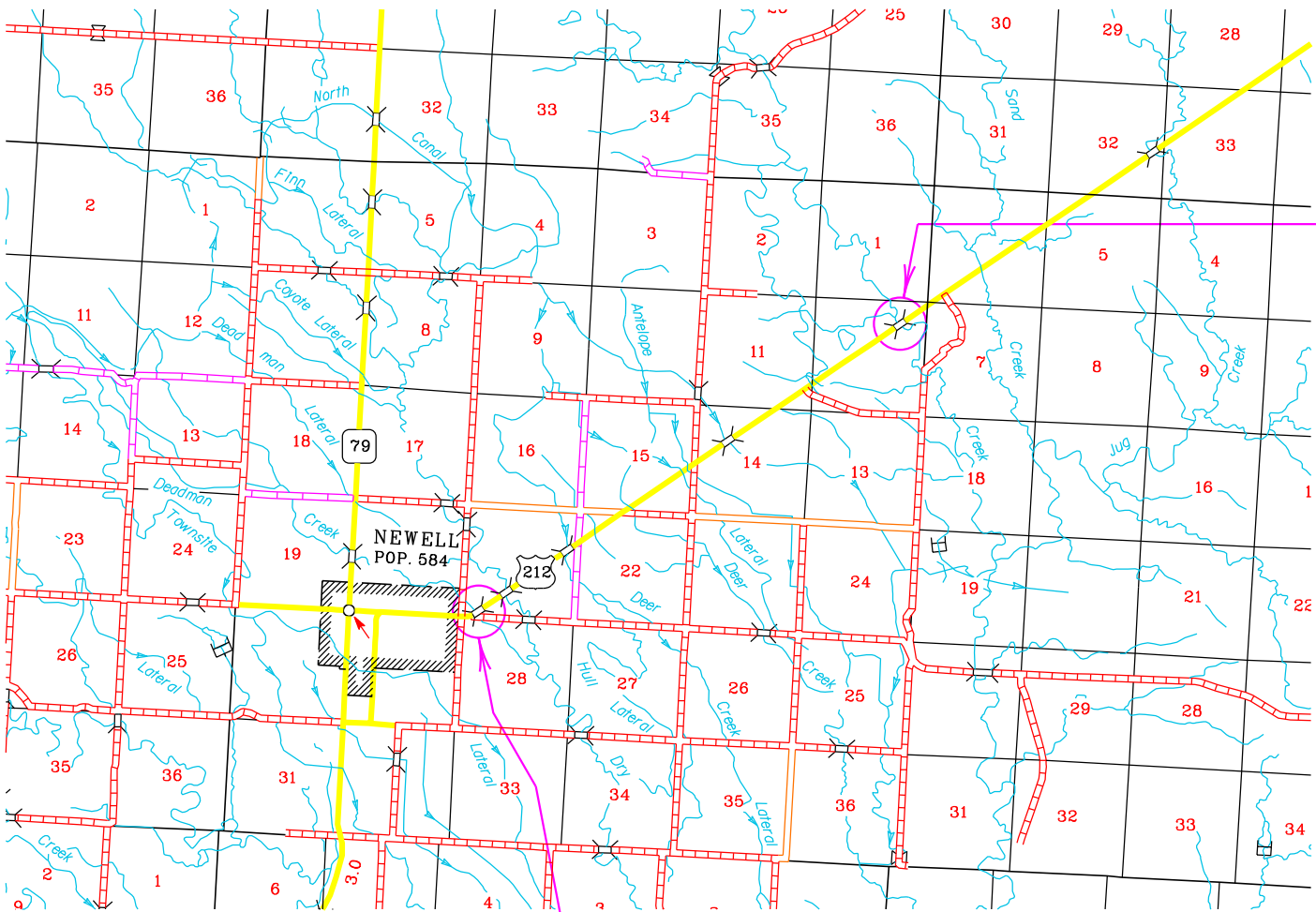


SECTION E: STRUCTURE PLANS

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E1	E69

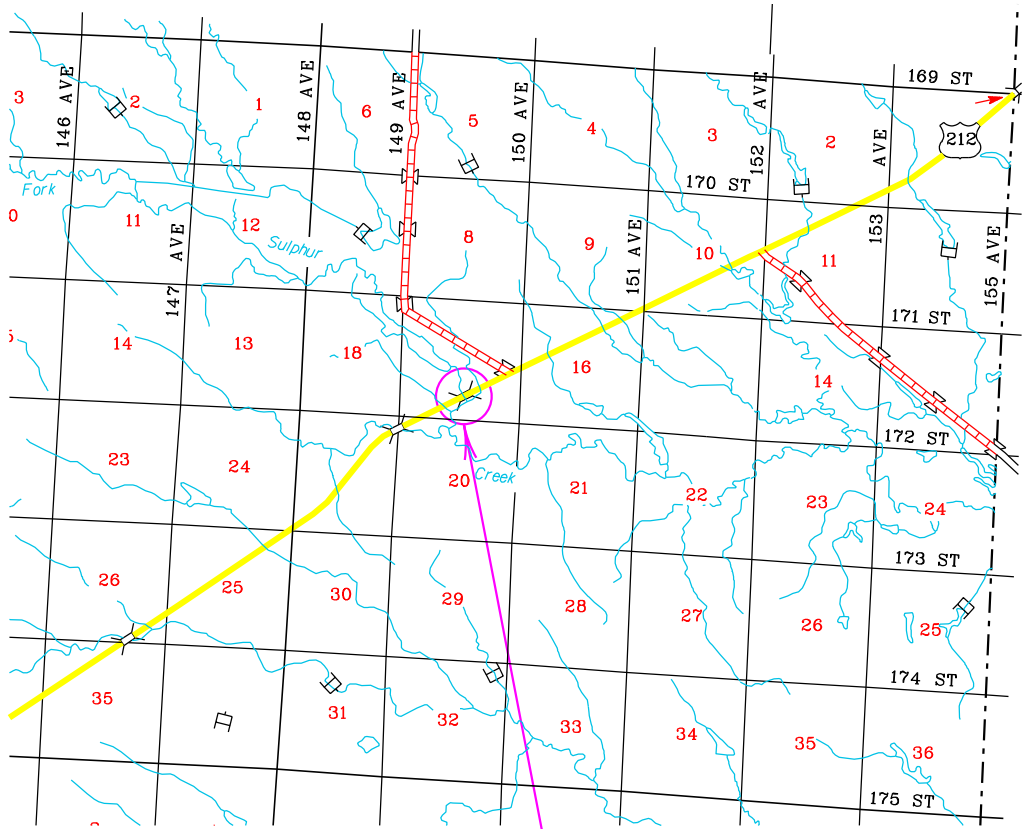


Str No 10-357-312
MRM 44.91+0.000

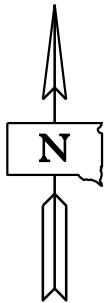
BEGIN NH 0212(207)40
Str No 10-324-337
MRM 40.63+0.000

INDEX OF SHEETS -

Sheet E1	Layout Map and Index
Sheet E2	Estimate of Structure Quantities
Sheet E3 to E12	Str. No. 10-324-337 154'-0" $\frac{7}{16}$ " 3 - 12' x 12' Box Culvert
Sheet E13 to E42	Str. No. 10-357-312 258' - 10" $\frac{7}{8}$ " Prestressed Girder Bridge
Sheet E43 to E69	Str. No. 10-496-208 177' - 0" Prestressed Girder Bridge



END NH 0212(207)40
Str No 10-496-208
MRM 62.15+0.000



STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E2	E69

SECTION E – ESTIMATE OF STRUCTURE QUANTITIES

Str. No. 10-324-337

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
250E0030	Incidental Work, Structure	Lump Sum	LS
420E0200	Structure Excavation, Box Culvert	219	CuYd
421E0200	Box Culvert Undercut	623	CuYd
460E0120	Class A45 Concrete, Box Culvert	532.8	CuYd
480E0100	Reinforcing Steel	108,514	Lb
700E0210	Class B Riprap	306.3	Ton
831E0110	Type B Drainage Fabric	314	SqYd
831E0300	Reinforcement Fabric (MSE)	909	SqYd

Str. No. 10-357-312

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E3310	Bridge Elevation Survey	Lump Sum	LS
120E7000	Select Granular Backfill	24.1	Ton
250E0030	Incidental Work, Structure	Lump Sum	LS
410E0030	Structural Steel, Miscellaneous	Lump Sum	LS
410E2600	Membrane Sealant Expansion Joint	75.8	Ft
420E0100	Structure Excavation, Bridge	2,200	CuYd
430E0200	Bridge End Embankment	1,500	CuYd
430E0300	Granular Bridge End Backfill	80.6	CuYd
430E0510	Approach Slab Underdrain Excavation	3.0	CuYd
430E0700	Precast Concrete Headwall for Drain	4	Each
460E0030	Class A45 Concrete, Bridge Deck	369.6	CuYd
460E0050	Class A45 Concrete, Bridge	182.1	CuYd
460E0150	Concrete Approach Slab for Bridge	189.4	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	37.9	SqYd
460E0230	Concrete Penetrating Sealer	1,031.4	SqYd
460E0500	Deck Drain, Girder Bridge	15	Each
465E0100	Class A45 Concrete, Drilled Shaft	145.7	CuYd
465E0200	Drilled Shaft Excavation	142.3	CuYd
465E0400	Crosshole Sonic Log (CSL) Test	2	Each
465E1074	74" Permanent Casing	50.0	Ft
480E0100	Reinforcing Steel	59,680	Lb
480E0200	Epoxy Coated Reinforcing Steel	3,173	Lb
480E0300	Stainless Reinforcing Steel	80,147	Lb
480E0514	No. 14 Rebar Splice	80	Each
510E0300	Preboring Pile	140	Ft
510E3401	HP 12x53 Steel Test Pile, Furnish and Drive	110	Ft
510E3405	HP 12x53 Steel Bearing Pile, Furnish and Drive	600	Ft
560E8045	45" Minnesota Shape Prestressed Concrete Beam	1,275	Ft
680E0040	4" Underdrain Pipe	117	Ft
680E2500	Porous Backfill	5.6	Ton
700E0210	Class B Riprap	2,234.0	Ton
700E1100	Overburden Excavation for Riprap	1,720	CuYd
734E0090	Perforated Geocell	688	SqFt
831E0110	Type B Drainage Fabric	2,736	SqYd

Str. No. 10-496-208

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E3310	Bridge Elevation Survey	Lump Sum	LS
120E7000	Select Granular Backfill	84.3	Ton
250E0030	Incidental Work, Structure	Lump Sum	LS
410E0030	Structural Steel, Miscellaneous	Lump Sum	LS
410E2600	Membrane Sealant Expansion Joint	75.8	Ft
420E0100	Structure Excavation, Bridge	550	CuYd
430E0200	Bridge End Embankment	840	CuYd
430E0300	Granular Bridge End Backfill	77.8	CuYd
430E0510	Approach Slab Underdrain Excavation	3.0	CuYd
430E0700	Precast Concrete Headwall for Drain	4	Each
460E0030	Class A45 Concrete, Bridge Deck	247.6	CuYd
460E0050	Class A45 Concrete, Bridge	101.5	CuYd
460E0150	Concrete Approach Slab for Bridge	172.4	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	37.9	SqYd
460E0230	Concrete Penetrating Sealer	704.0	SqYd
460E0500	Deck Drain, Girder Bridge	2	Each
465E0100	Class A45 Concrete, Drilled Shaft	77.5	CuYd
465E0200	Drilled Shaft Excavation	74.2	CuYd
465E1044	44" Permanent Casing	104.0	Ft
480E0100	Reinforcing Steel	53,746	Lb
480E0200	Epoxy Coated Reinforcing Steel	2,744	Lb
480E0300	Stainless Reinforcing Steel	46,107	Lb
480E0514	No. 14 Rebar Splice	72	Each
510E0300	Preboring Pile	120	Ft
510E3401	HP 12x53 Steel Test Pile, Furnish and Drive	120	Ft
510E3405	HP 12x53 Steel Bearing Pile, Furnish and Drive	550	Ft
560E8036	36" Minnesota Shape Prestressed Concrete Beam	869	Ft
680E0040	4" Underdrain Pipe	112	Ft
680E2500	Porous Backfill	5.6	Ton
700E0210	Class B Riprap	2,258.4	Ton
700E1100	Overburden Excavation for Riprap	2,550	CuYd
734E0090	Perforated Geocell	684	SqFt
831E0110	Type B Drainage Fabric	2,730	SqYd



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.	NH 0212(207)40	E3	E69

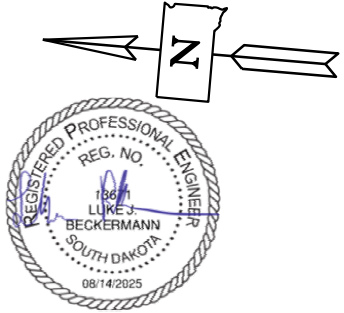


TABLE OF WORKING POINTS		
W. P.	STATION	OFFSET
"A"	76 + 85.51	66.58' Lt.
"B"	76 + 30.93	68.37' Lt.
"C"	76 + 74.59	45.17' Lt.
"D"	76 + 29.68	45.37' Lt.
"E"	76 + 22.22	45.54' Rt.
"F"	75 + 77.40	45.17' Rt.
"G"	76 + 09.14	65.70' Rt.
"H"	75 + 66.49	65.58' Rt.

**-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 - Outlet Details (A)
Sheet No. 6 - Outlet Details (B)
Sheet No. 7 - F8 Barrel Section Details (42' - 0")
Sheet No. 8 - F8 Barrel End Section Details (30' - 0")
Sheet No. 9 - Standard Plate No's 460.02 and 460.10
Sheet No. 10 - Standard Plate No. 620.16

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Incidental Work, Structure	Lump Sum	LS
Class A45 Concrete, Box Culvert	Cu. Yd.	532.8
Reinforcing Steel	Lb.	108,514
Structure Excavation, Box Culvert	Cu. Yd.	219
Box Culvert Undercut	Cu. Yd.	623
Reinforcement Fabric (MSE)	Sq. Yd.	909
Class B Riprap	Ton	306.3
Type B Drainage Fabric	Sq. Yd.	314

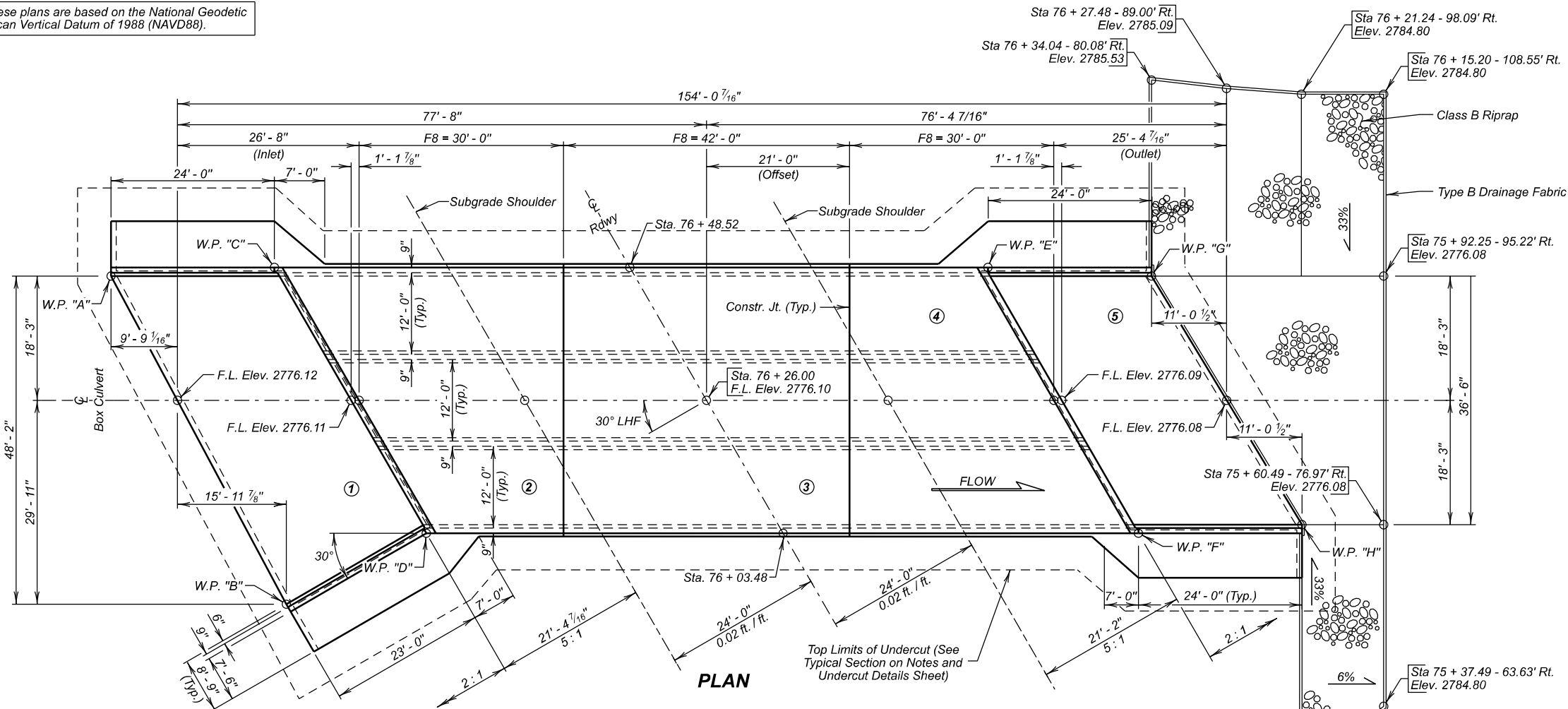
* For estimating purposes only, a factor of 1.4 tons/cu. yd. was used to convert Cu. Yd. to Tons.

**GENERAL DRAWING AND QUANTITIES
FOR**

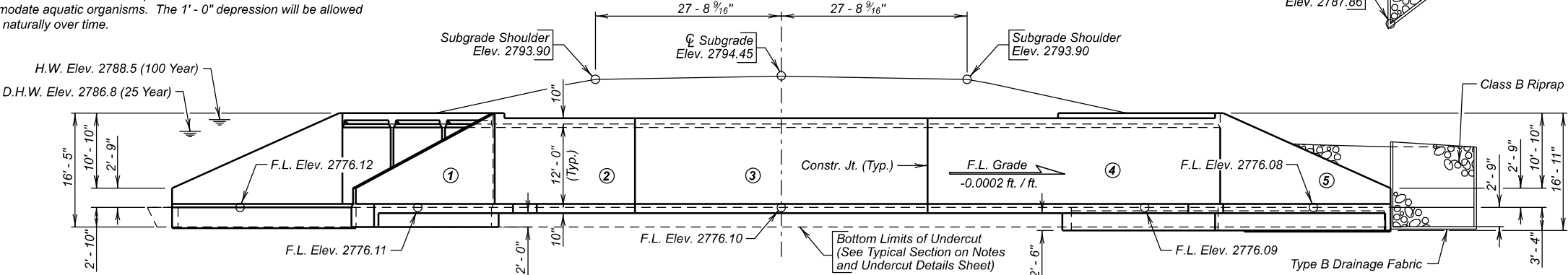
3 - 12' X 12' BOX CULVERT
OVER DRY CREEK
STA. 76 + 26.00
STR. NO. 10-324-337
PCN 06JD

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

DESIGNED BY LB BUTE06JD	CK. DES. BY JM 06JDGA01	DRAFTED BY AD	BRIDGE ENGINEER
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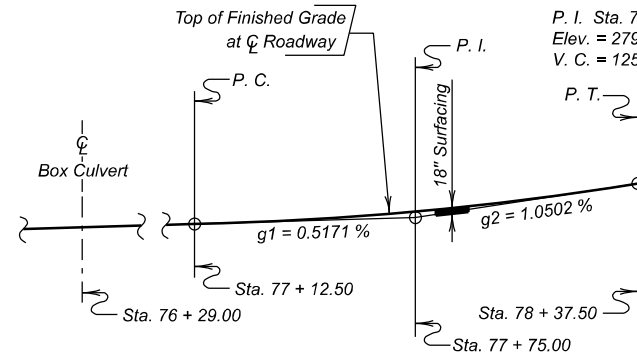
NOTE:
Box culvert flow line has been depressed 1' - 0" below channel flow line to accommodate aquatic organisms. The 1' - 0" depression will be allowed to fill in naturally over time.



HYDRAULIC DATA

Q_d	1669 cfs
A_d	348 sq ft
V_d	4.8 fps
Q_F	1669 cfs
Q_{100}	2979 cfs
Q_{OT}	$>Q_{500}$
V_{max}	8.1 fps

Q_d = Design discharge for the proposed culvert based on 25 year frequency. El. 2786.8.
 Q_{OT} = Overtopping discharge and frequency $> Q_{100}$ year recurrence interval. El. 2794.0 @ Sta. 70 + 68.00 ±.
 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. 2788.5.
 V_{max} = Maximum computed outlet velocity for the proposed culvert, based on 100 year frequency.



VERTICAL CURVE DATA

INCIDENTAL WORK, STRUCTURE

- In place centerline Sta. 75+41.25 to centerline Sta. 76+92.76 is a 151.5-foot, 5 span continuous concrete bridge with a 30'-0" clear roadway. The superstructure consists of a reinforced concrete slab with timber railing faced with steel thin-beam continuous across the bridge. The substructure consists of 2 column reinforced concrete bents and reinforced concrete vertical abutments, all of which are supported on timber piling.
- 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 Construction Specifications. All portions of the existing bridge will be removed and become the property of the Contractor.
- 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.
- 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 is 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.

PLANS BY:
HOUSTON ENGINEERING INC.

SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Specifications, 9th Edition.
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-7-26 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 and construction load consisting of two 7'-6" gage axles spaced 30-foot apart with gross axle weight (each axle) = 95,850 lbs. The construction load shall not be applied until a minimum of 4 feet of fill has been placed over the box culvert. Other construction loads in excess of legal load must be submitted thru proper channels to the Office of Bridge Design for analysis.
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 8 feet (F8)
3. Design Material Strengths: Concrete f'_c = 4,500 psi
Reinforcing Steel f_y = 60,000 psi
4. All concrete will be Class A45 Concrete, Box Culvert conforming to Section 460 of the Construction Specifications.
4. All reinforcing steel will conform to ASTM A615 Grade 60.
5. All lap splices shown are contact lap splices unless noted otherwise.
6. All exposed concrete corners and edges will be chamfered 3/4-inch unless noted otherwise in the plans.
7. Use 1-inch clear cover on all reinforcing steel EXCEPT as shown.
8. The Contractor will imprint on the structure the date of construction as specified and detailed on Standard Plate 460.02.
9. Care will be taken to establish Working Points (W.P.) as shown on the wings.
10. Circled numbers in PLAN and ELEVATION views on the General Drawing are section I.D. Numbers (see SDDOT Materials Manual).
11. Cost of Preformed Expansion Joint Filler used in apron construction will be incidental to the other contract items.
12. Soils below the bottom of the proposed RCBC consist of soft brown silt clay. Groundwater was encountered in the borings at an elevation of 2778.0 feet during the subsurface investigation conducted in May 2023.
13. Dewatering will be required to construct the box culvert. All cost incurred for dewatering will be incidental to other contract items.

REINFORCEMENT FABRIC (MSE)

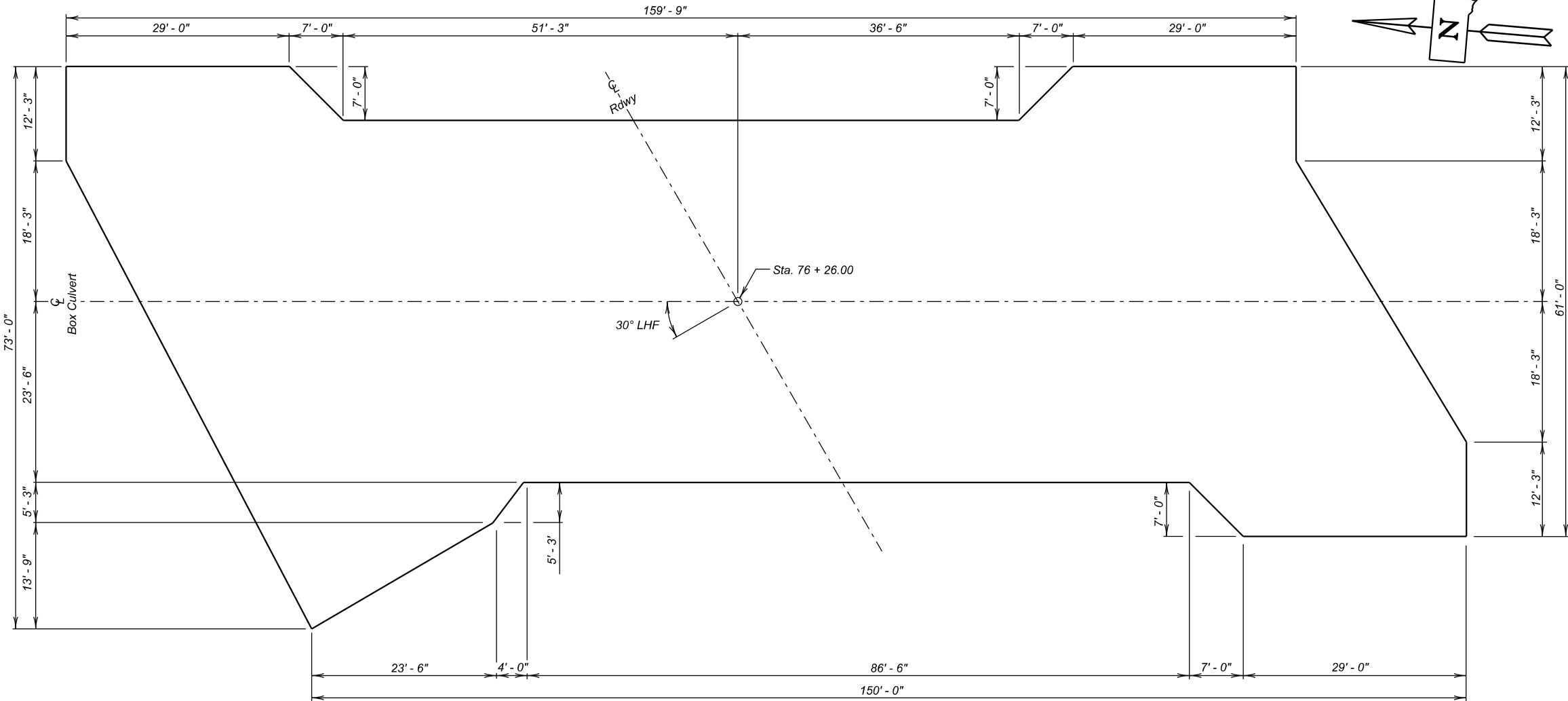
1. A layer of Reinforcement Fabric (MSE) will be placed at the bottom of the undercut prior to backfilling with granular material.
2. Reinforcement Fabric (MSE) will conform to Section 831. The Reinforcement Fabric (MSE) provided will be on the Approved Products List or will be certified by the supplier to meet this specification prior to installation.
3. Reinforcement Fabric (MSE) will be paid for at the contract unit price per sq. yd. for Reinforcement Fabric (MSE). Payment will be full compensation for furnishing and installing the Reinforcement Fabric (MSE) only. Granular backfill materials will be paid for as part of the Box Culvert Undercut bid item.

INSTALLATION PROCEDURE - GEOTEXTILE

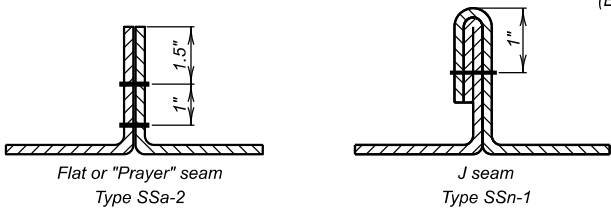
1. Place the Reinforcement Fabric (MSE) on as level and smooth of a surface as possible.
2. Any protrusions that might damage the geotextile will be removed prior to placing the geotextile.
3. The geotextile can be rolled out parallel to the centerline of the box culvert.
4. All seams in the geotextile will be stitched in accordance with the seaming procedure and as shown on the detail labeled "Seam Types."
5. No equipment will be allowed on the geotextile until the granular backfill material is in place.
6. The geotextile will be kept as taut as possible prior to backfilling.
7. Granular backfill material will be dumped behind the leading edge of the fill and pushed into place with a loader or dozer.

SEAMING PROCEDURE

1. The sewn seams will consist of two parallel rows of stitching ("prayer" seam, Type SSa-2), or a J-seam (Type SSn-1), using a single row of stitching. The stitching will be a lock type stitch.
2. If the Type SSa-2 seam is used, the two rows of stitching will be 1" apart with a tolerance of plus or minus 1/2" and will not cross, except for restitching. The minimum allowance, i.e., minimum distance from the geotextile edge to the stitch line nearest to that edge, will be 1 1/2".
3. If the J seam (Type SSn-1) is used, the minimum seam allowance will be 1".
4. The seam, stitch type, and the equipment used to perform the stitching will be as recommended by the manufacturer of the geotextile and approved by the Engineer.
5. The seams will be sewn in such a manner that the seam can be readily inspected by the Engineer.
6. The thread used will be high-strength polypropylene, polyester, or Kevlar thread. Nylon threads will not be allowed.



UNDERCUT LAYOUT
(Bottom Dimensions)



GEOTEXTILE SEAM TYPES



ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Box Culvert Undercut	Cu. Yd.	623
Reinforcement Fabric (MSE)	Sq. Yd.	909

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 - 12' x 12' BOX CULVERT

OVER DRY CREEK

STA. 76 + 26.00

STR. NO. 10-324-337

30° LHF SKEW

SEC. 21-T9N-R6E

NH 0212(207)40

HL-93

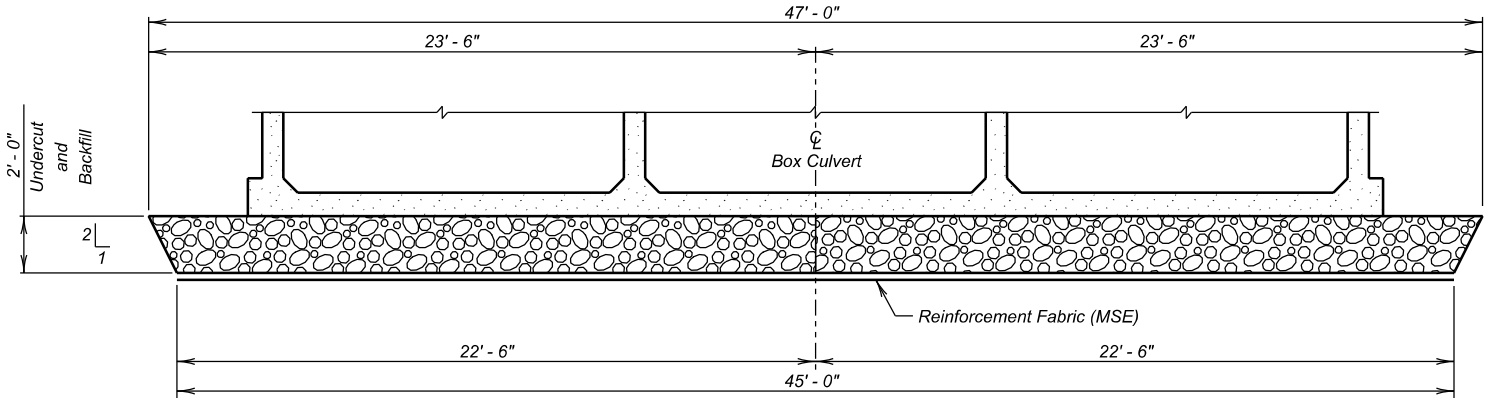
BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

AUGUST 2025

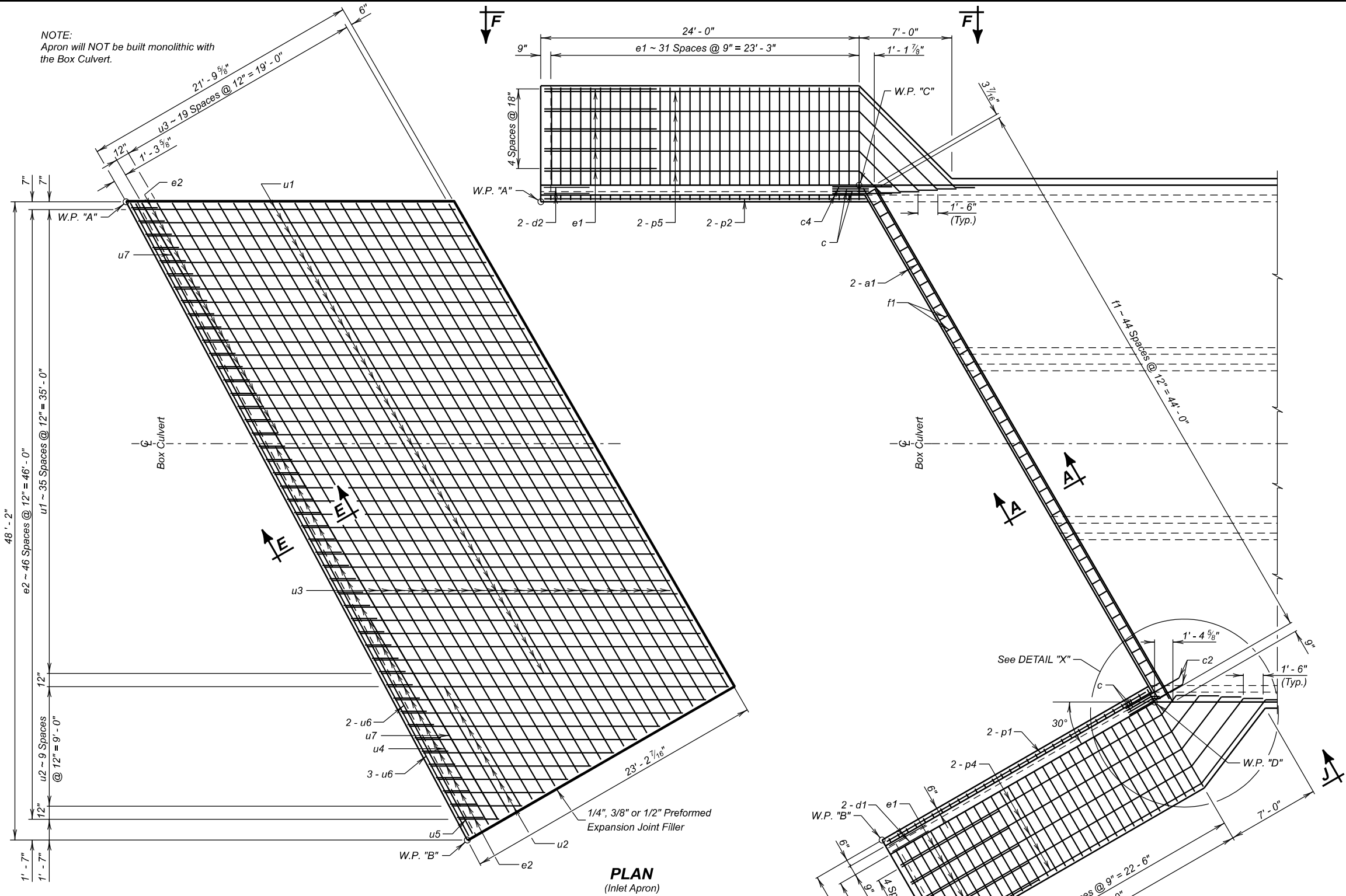
2 OF 10

DESIGNED BY LB BUTE06JD	CK. DES. BY JM 06JDGA02	DRAFTED BY AD	BRIDGE ENGINEER
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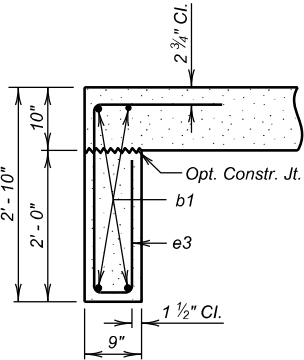


TYPICAL SECTION
(For Limits of Undercut)

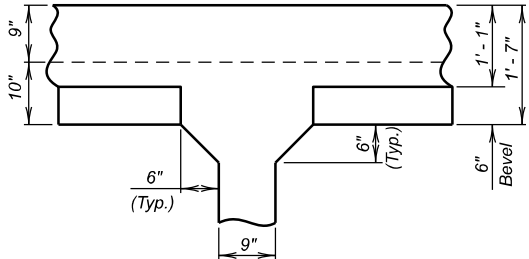
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E5	E69



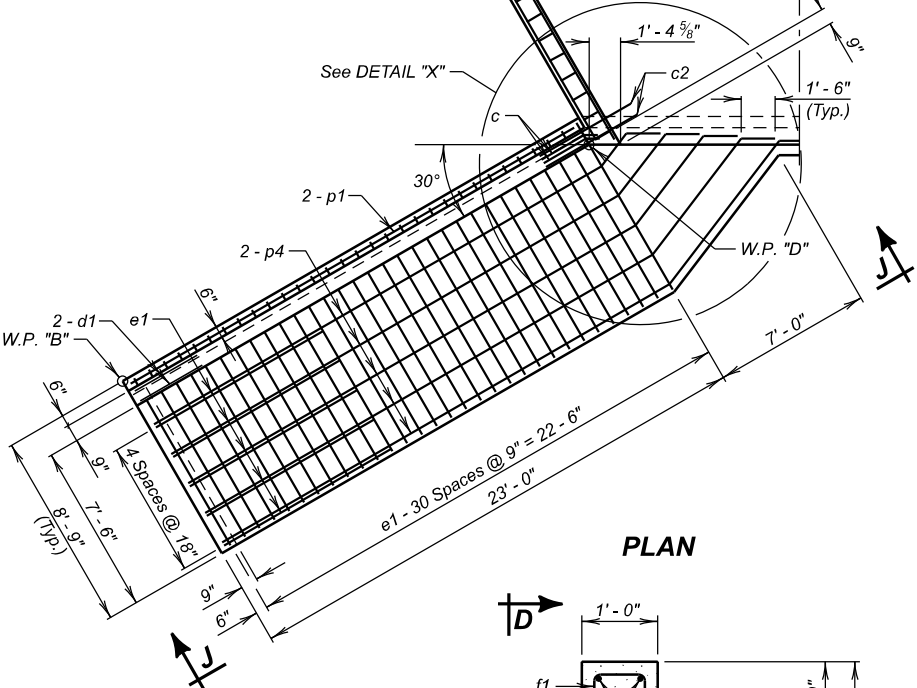
PLAN
(Inlet Apron)



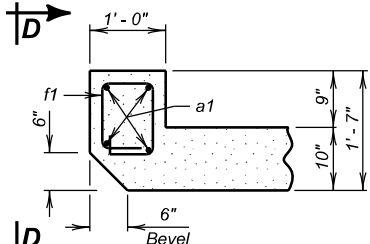
SECTION B-B



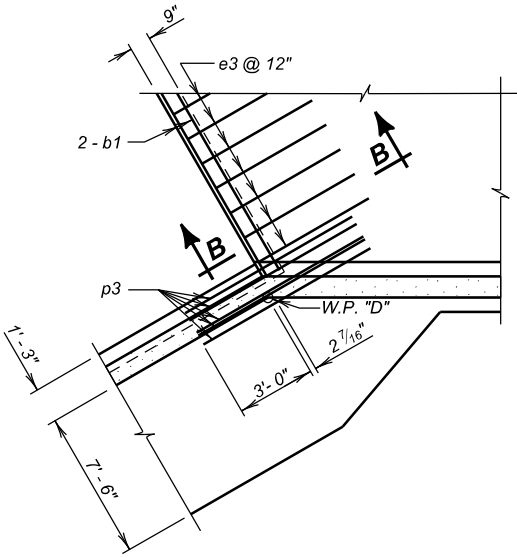
VIEW D-D
(At Interior Wall)



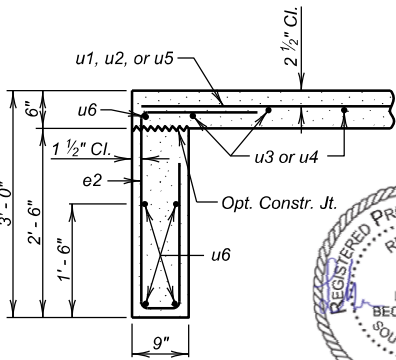
PLAN



SECTION A-A
(At Top Slab)



DETAIL "X"
(At Bottom Slab)



SECTION E-E

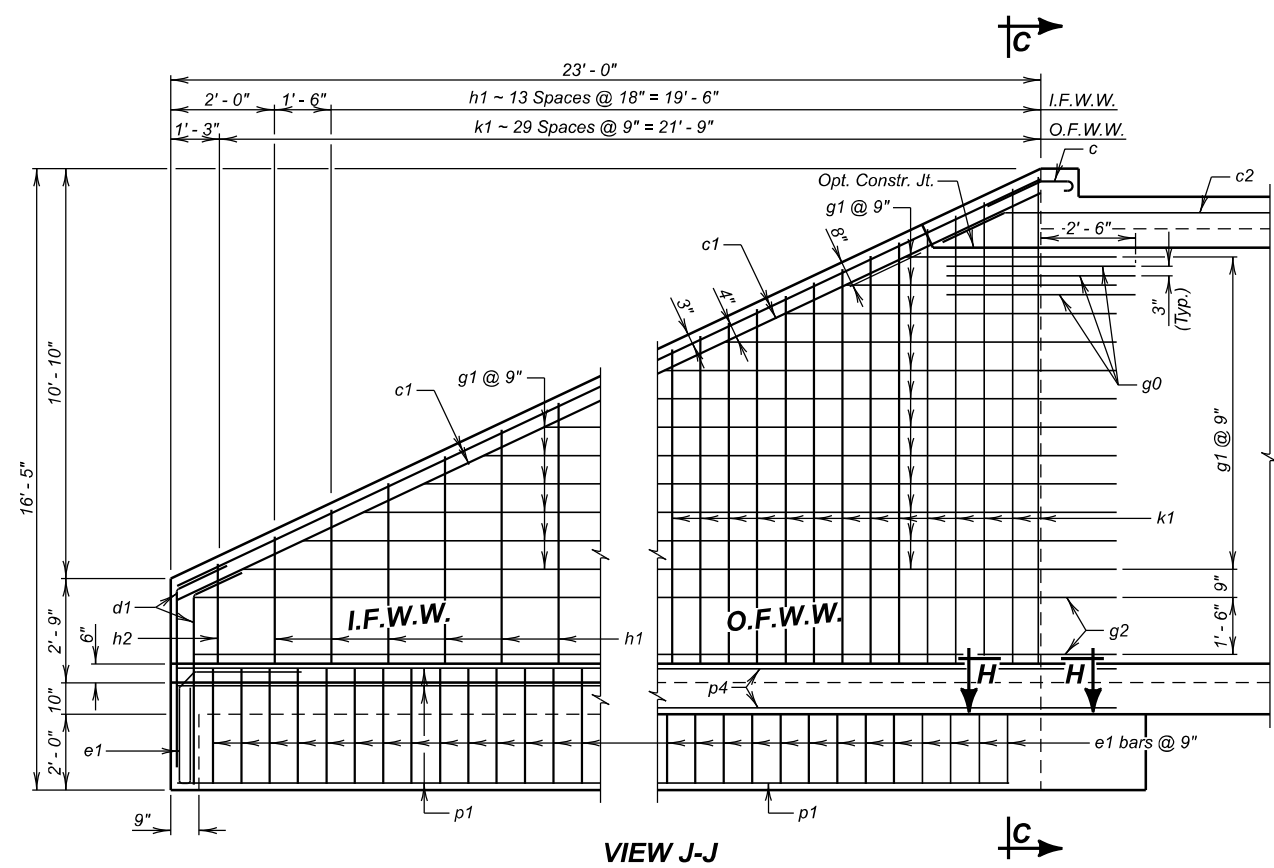
INLET DETAILS (A)
FOR

3 - 12' x 12' BOX CULVERT
OVER DRY CREEK
STA. 76 + 26.00
STR. NO. 10-324-337
30° LHF SKEW
SEC. 21-T9N-R6E
NH 0212(207)40
HL-93

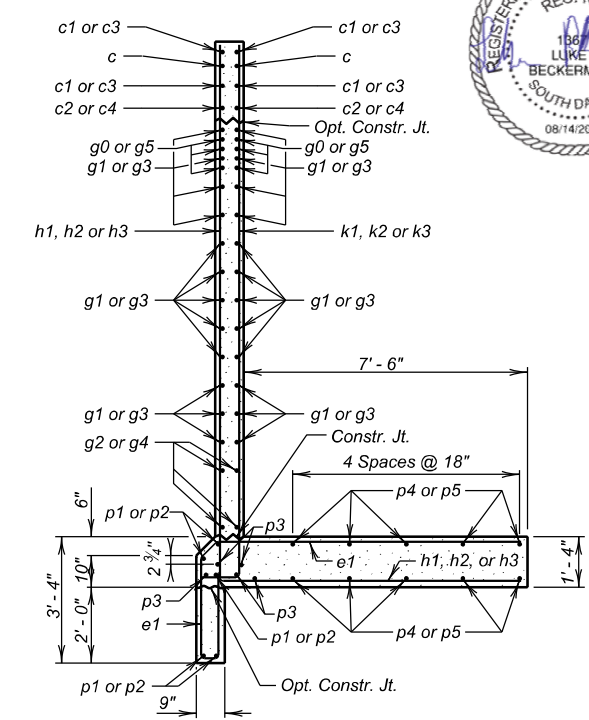
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

DESIGNED BY LB BUTE06JD	CK. DES. BY JM 06JDGA03	DRAFTED BY AD	BRIDGE ENGINEER
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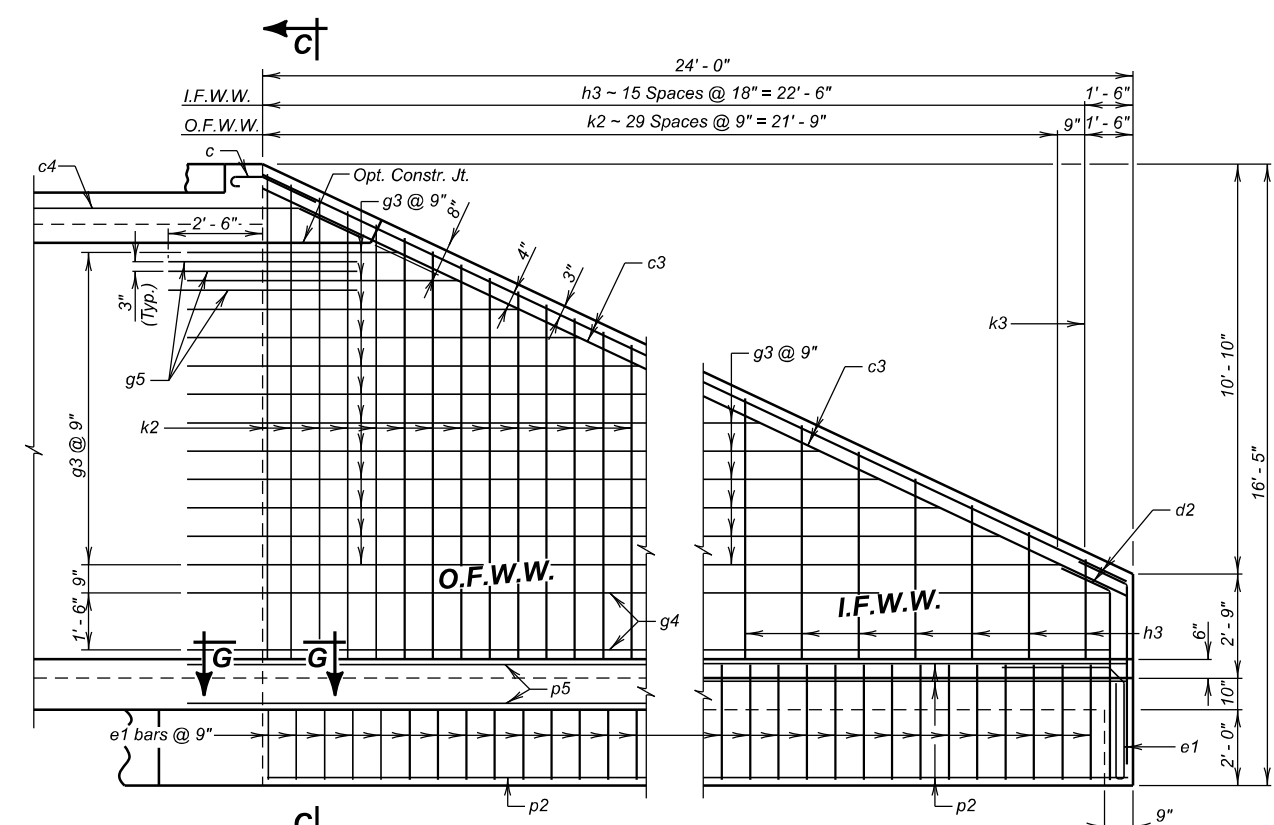




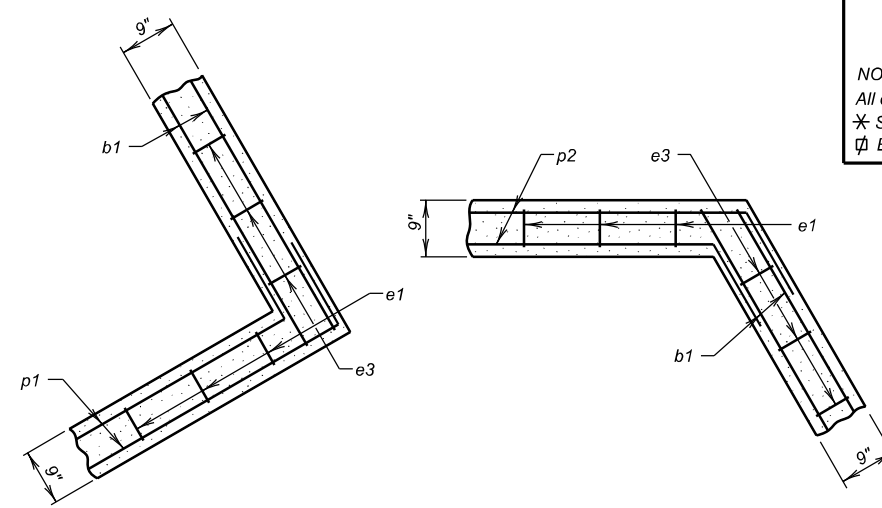
VIEW J-J



SECTION C-C



VIEW F-F



SECTION H-H

SECTION G-G

LEGEND FOR PLACING RE-STEEL

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



STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E6	E69

REINFORCING SCHEDULE (For One Inlet)

Mk.	No.	Size	Length	Type
a1	4	6	44'-5"	Str.
b1	4	6	41'-4"	Str.
c	4	5	4'-6"	1A
c1	4	5	25'-2"	Str.
c2	2	5	7'-0"	19B
c3	4	5	26'-1"	Str.
c4	2	5	7'-0"	19B
d1	4	5	6'-6"	19B
d2	4	5	6'-6"	19B
e1	73	6	14'-2"	S12A
e3	43	4	7'-3"	S12
f1	45	4	5'-6"	S6A
g0	6	5	5'-0"	19B
g1	12	4	28'-8"	19B
g2	4	4	24'-10"	19B
g3	12	4	29'-9"	Str.
g4	4	4	25'-10"	Str.
g5	6	5	5'-0"	Str.
h1	7	4	34'-8"	17A
h2	1	4	12'-1"	17A
h3	8	4	33'-8"	17A
k1	15	6	19'-10"	17A
k2	15	6	20'-4"	17A
k3	1	6	4'-11"	17A
p1	5	4	23'-10"	Str.
p2	5	4	25'-5"	Str.
p3	10	6	7'-0"	Str.
p4	5	4	58'-4"	Str.
p5	5	4	63'-2"	Str.
e2	47	4	7'-5"	S12
u1	18	4	50'-2"	Str.
u2	5	4	31'-0"	Str.
u3	10	4	95'-3"	Str.
u4	1	4	17'-10"	Str.
u5	1	4	3'-0"	Str.
u6	5	4	53'-11"	Str.
u7	1	4	53'-8"	Str.

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

INLET DETAILS (B)

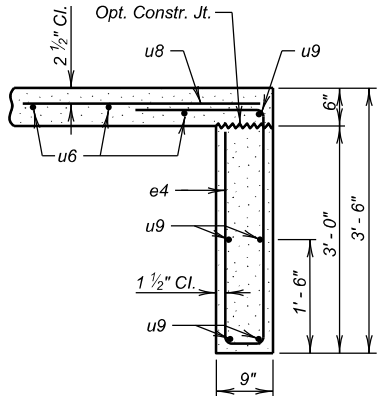
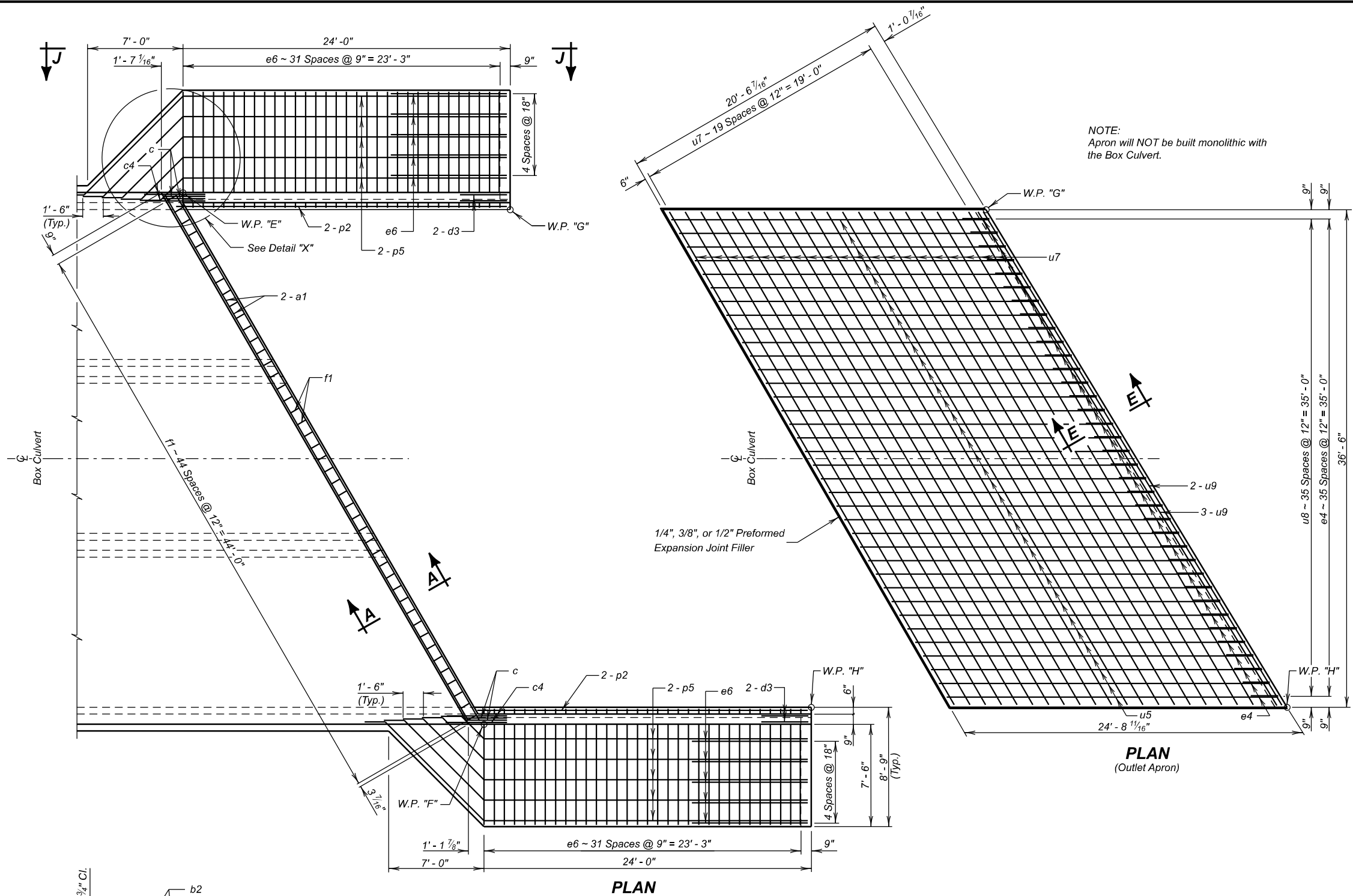
FOR
3 - 12' x 12' BOX CULVERT
OVER DRY CREEK
STA. 76 + 26.00
STR. NO. 10-324-337
30° LHF SKEW
SEC. 21-T9N-R6E
NH 0212(207)40
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION

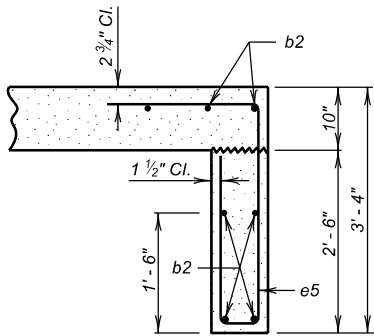
AUGUST 2025

DESIGNED BY LB BUTE06JD	CK. DES. BY JM 06JDGA04	DRAFTED BY AD	BRIDGE ENGINEER
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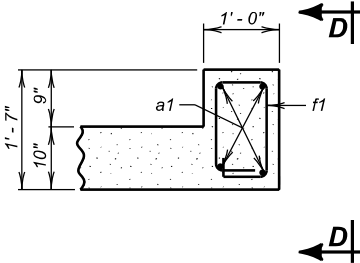
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E7	E69



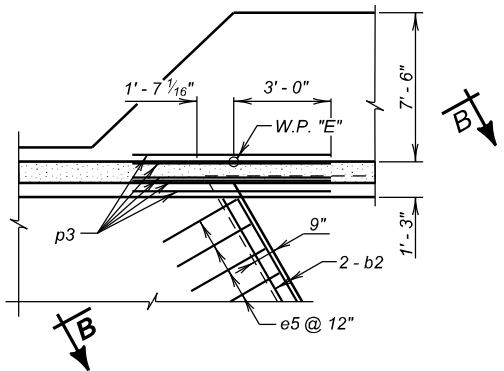
SECTION E-E



SECTION B-B



SECTION A-A
(At Top Slab)



DETAIL "X"
(At Bottom Slab)



OUTLET DETAILS (A)
FOR
3 - 12' x 12' BOX CULVERT
OVER DRY CREEK
STA. 76 + 26.00
STR. NO. 10-324-337
30° LHF SKEW
SEC. 21-T9N-R6E
NH 0212(207)40
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

DESIGNED BY LB BUTE06JD	CK. DES. BY JM 06JDGA05	DRAFTED BY AD	BRIDGE ENGINEER
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REINFORCING SCHEDULE (For One Outlet)

	Mk.	No.	Size	Length	Type	Bending Details
∅	a1	4	6	44' - 5"	Str.	
	b2	6	6	41' - 4"	Str.	
	c	4	5	4' - 6"	1A	
	c3	8	5	26' - 1"	Str.	
	c4	4	5	7' - 0"	19B	
	d3	8	5	7' - 0"	19B	
✱	e5	43	6	8' - 1"	S12	
	e6	74	4	15' - 2"	S12A	
	f1	45	4	5' - 6"	S6A	
	g3	24	4	29' - 9"	Str.	
	g4	8	4	25' - 10"	Str.	
	g5	12	5	5' - 0"	Str.	
✱	h3	16	4	33' - 8"	17A	
	k2	30	6	20' - 4"	17A	
	k3	2	6	4' - 11"	17A	
	p2	10	4	25' - 5"	Str.	
	p3	10	6	7' - 0"	Str.	
	p5	10	4	63' - 2"	Str.	
∅	OUTLET APRON					
	e4	36	4	8' - 5"	S12	
✱	u7	20	4	41' - 9"	Str.	
	u8	18	4	47' - 7"	Str.	
	u9	5	4	42' - 3"	Str.	

NOTES:
All dimensions are out to out of bars.
✕ 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	49.4	5066	24.9
Outlet Apron	19.9	1474	19.9

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)

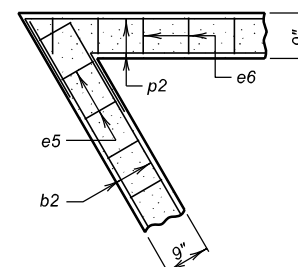
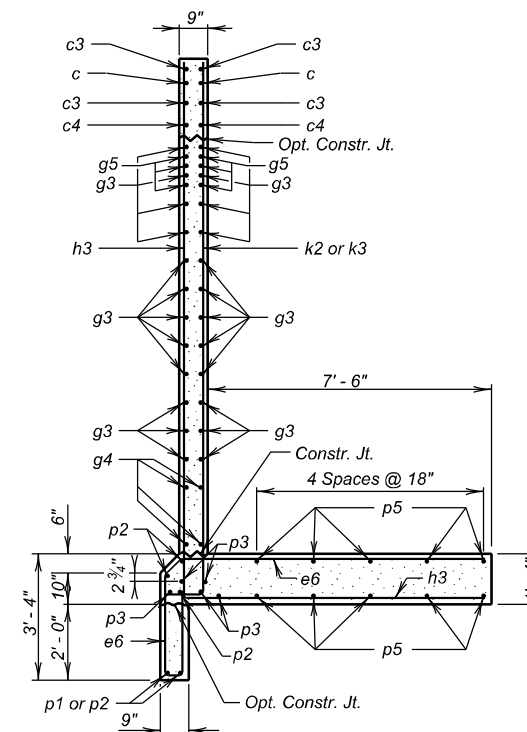
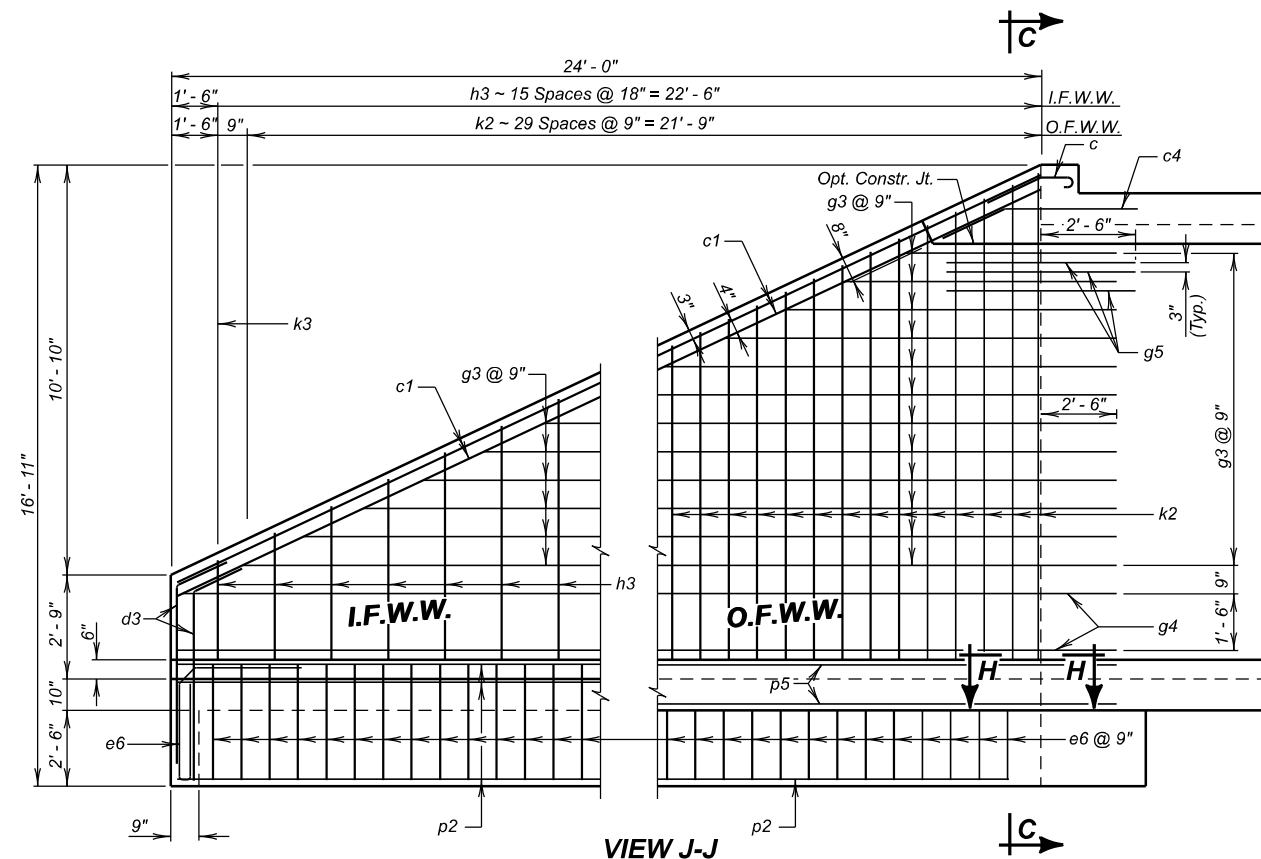
FOR

3 - 12' x 12' BOX CULVERT

OVER DRY CREEK	30° LHF SKEW
STA. 76 + 26.00	SEC. 21-T9N-R6E
STR. NO. 10-324-337	NH 0212(207)40
	HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

DESIGNED BY LB RLTF06JD	CK. DES. BY JM 06JDA06	DRAFTED BY AD	BRIDGE ENGINEER
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REINFORCING SCHEDULE
(For One F8 Barrel Section @ 42' - 0")

Mk.	No.	Size	Length	Type	Bending Details
h8	126	4	14' - 5"	17A	
j8	86	6	37' - 6"	Str.	
k8	82	5	23' - 0"	17	
m8	84	6	39' - 9"	Str.	
n8	84	6	38' - 9"	Str.	
p1	216	4	41' - 6"	Str.	
q8	168	5	9' - 8"	17A	
s8	84	6	24' - 5"	Str.	
w8	252	4	29' - 5"	S11A	

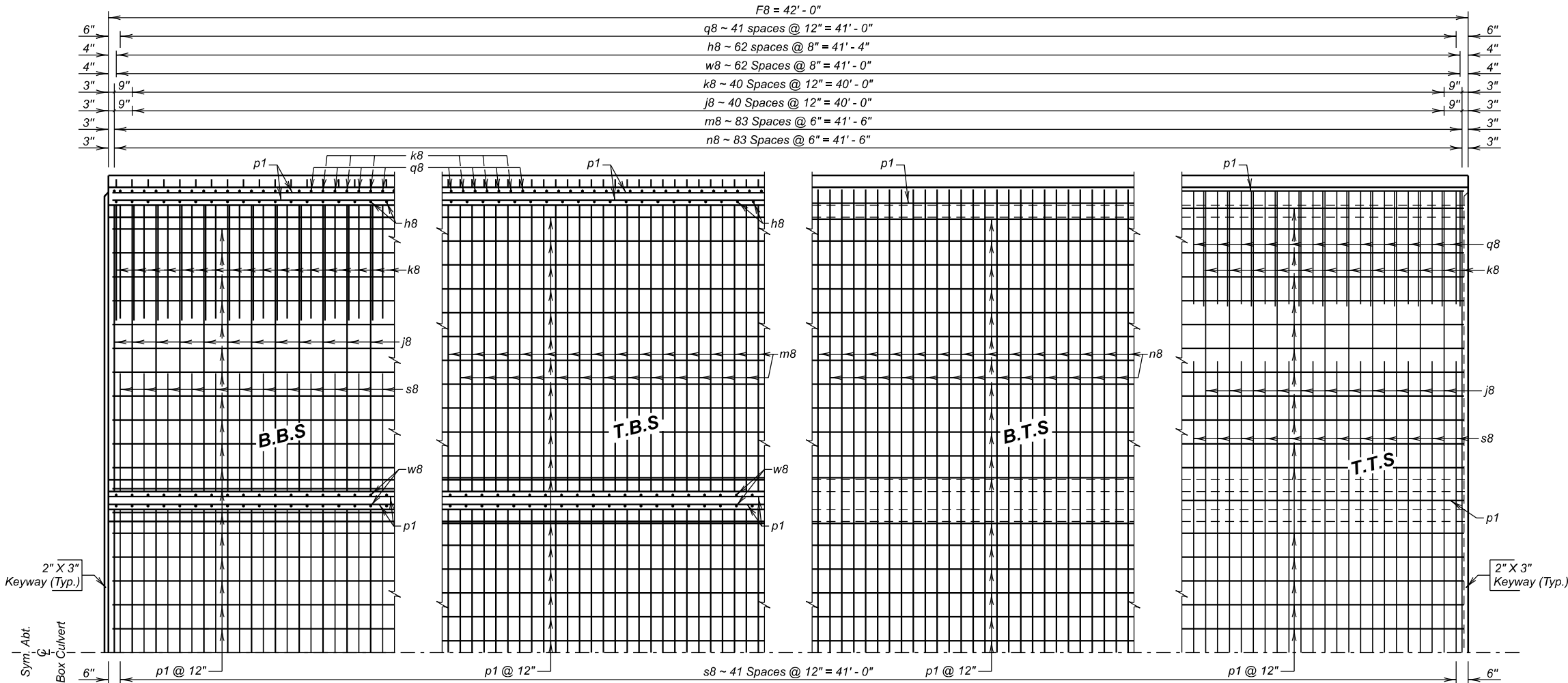
OPTIONAL k8 SPLICE DETAIL
Contractor may use optional reinforcing steel splice, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

NOTES:

All dimensions are out to out of bars.
Request for additional 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.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu. Yd.	Lb.	Cu. Yd.
1 - F8 Barrel Section @ 42' - 0"	161.5	33,643	51.9



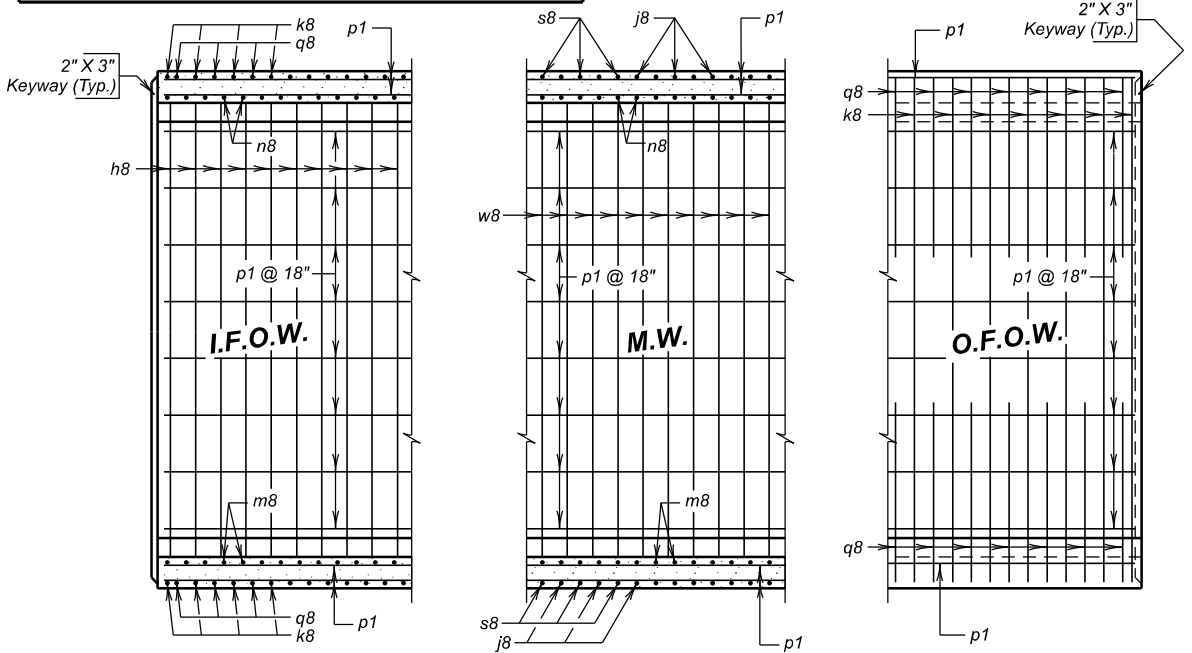
LEGEND FOR PLACING RE-STEEL

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

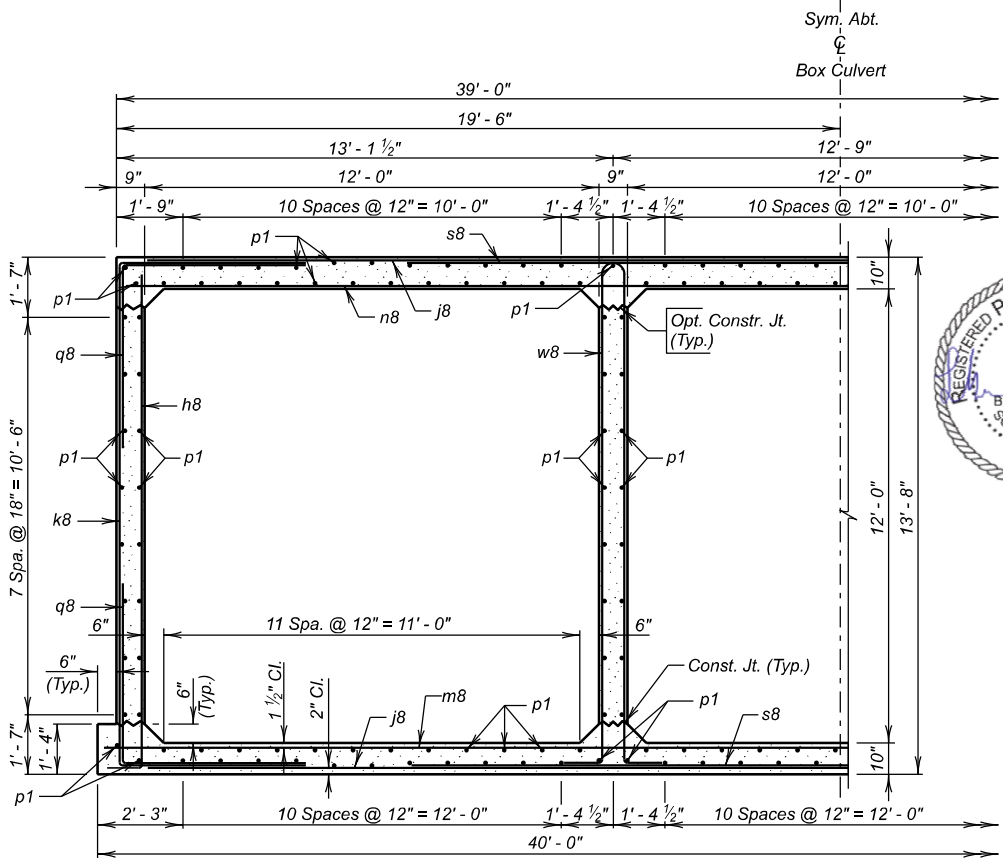
OPTIONAL POUR - BOTTOM SLAB

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.

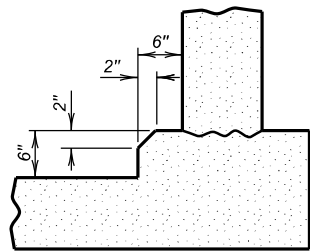
PLAN



ELEVATION



F8 BARREL HALF SECTION
(8' - 0" Maximum Fill)



OPTIONAL FILLET DETAIL
(At Bottom Slab)

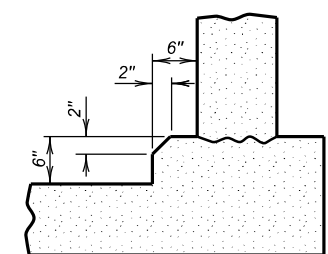
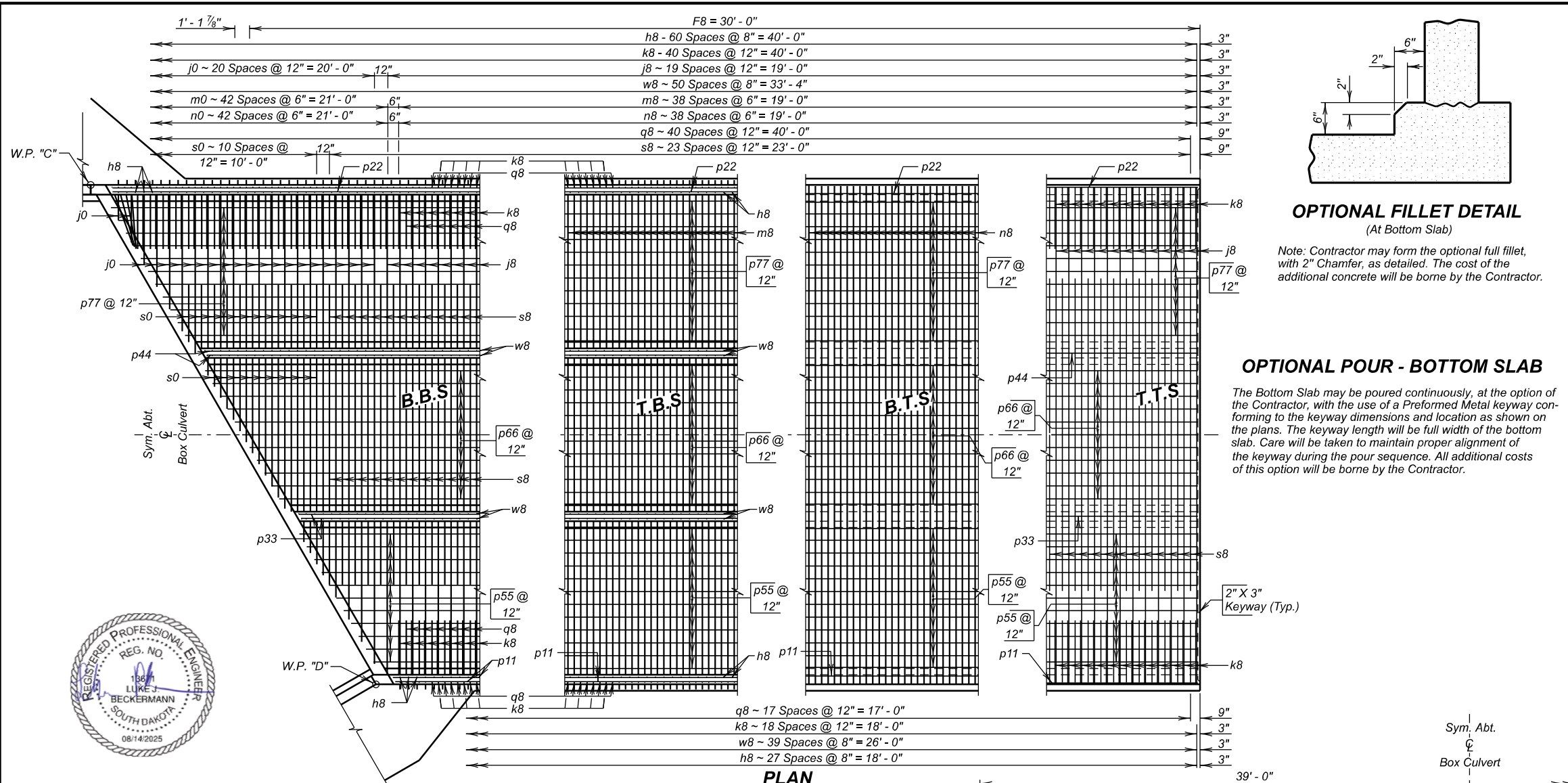
Note: Contractor may form the optional full fillet, with 2" Chamfer, as detailed. The cost of the additional concrete will be borne by the Contractor.



F8 BARREL SECTION DETAILS (42' - 0")
FOR
3 - 12' x 12' BOX CULVERT
OVER DRY CREEK
STA. 76 + 26.00
STR. NO. 10-324-337
30° LHF SKEW
SEC. 21-T9N-R6E
NH 0212(207)40
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

DESIGNED BY LB BUTE06JD	CK. DES. BY JM 06JDGA07	DRAFTED BY AD	BRIDGE ENGINEER
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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.

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E10	E69

REINFORCING SCHEDULE					Bending Details			
Mk.	No.	Size	Length	Type				
h8	178	4	14' - 5"	17A	p77	34' - 7"	40' - 11"	
j0	42	6	38' - 8"	Str.	p66	27' - 3"	33' - 7"	
j8	80	6	37' - 6"	Str.	p55	19' - 11"	26' - 3"	
k8	120	5	23' - 0"	17				p55
m0	86	6	40' - 10"	Str.				Cut 23
m8	78	6	39' - 9"	Str.				Cut 23
n0	86	6	39' - 10"	Str.				Cut 23
n8	78	6	38' - 9"	Str.	p55	26' - 3"	19' - 11"	
p11	40	4	19' - 7"	Str.	p66	33' - 7"	27' - 3"	
p22	40	4	41' - 8"	Str.	p77	40' - 11"	34' - 7"	
p33	38	4	26' - 6"	Str.				
p44	38	4	33' - 11"	Str.	n0	1' - 9"	38' - 1"	
p55	92	4	46' - 2"	Str.	s0	5' - 0"	22' - 4"	4' - 10" q8
p66	92	6	60' - 10"	Str.	m0	2' - 3"	38' - 7"	Type 17A
p77	92	4	75' - 6"	S11A	j0	2' - 0"	36' - 8"	j0
q8	236	5	9' - 8"	17A				Cut 21
s0	44	6	27' - 4"	Str.				Cut 43
s8	96	6	24' - 5"	Str.				Cut 43
w8	364	4	29' - 5"	S11A				Cut 11
z1	208	5	3' - 6"	Str.				

NOTES:
All dimensions are out to out of bars.
* See cutting diagram.
Ø 96 z1 bars required at each construction joint.
Request for additional 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.

OPTIONAL k8 SPLICE DETAIL
Contractor may use optional reinforcing steel splice, as shown. The cost of the additional reinforcing steel will be borne by the Contractor.

ESTIMATED QUANTITIES

ITEM	Class A45 Concrete, Box Culvert	Reinforcing Steel	Structure Excavation, Box Culvert
UNIT	Cu.Yd.	Lb.	Cu.Yd.
2 - F8 Barrel End Section @ 30' - 0"	230.7	61,159	74.1

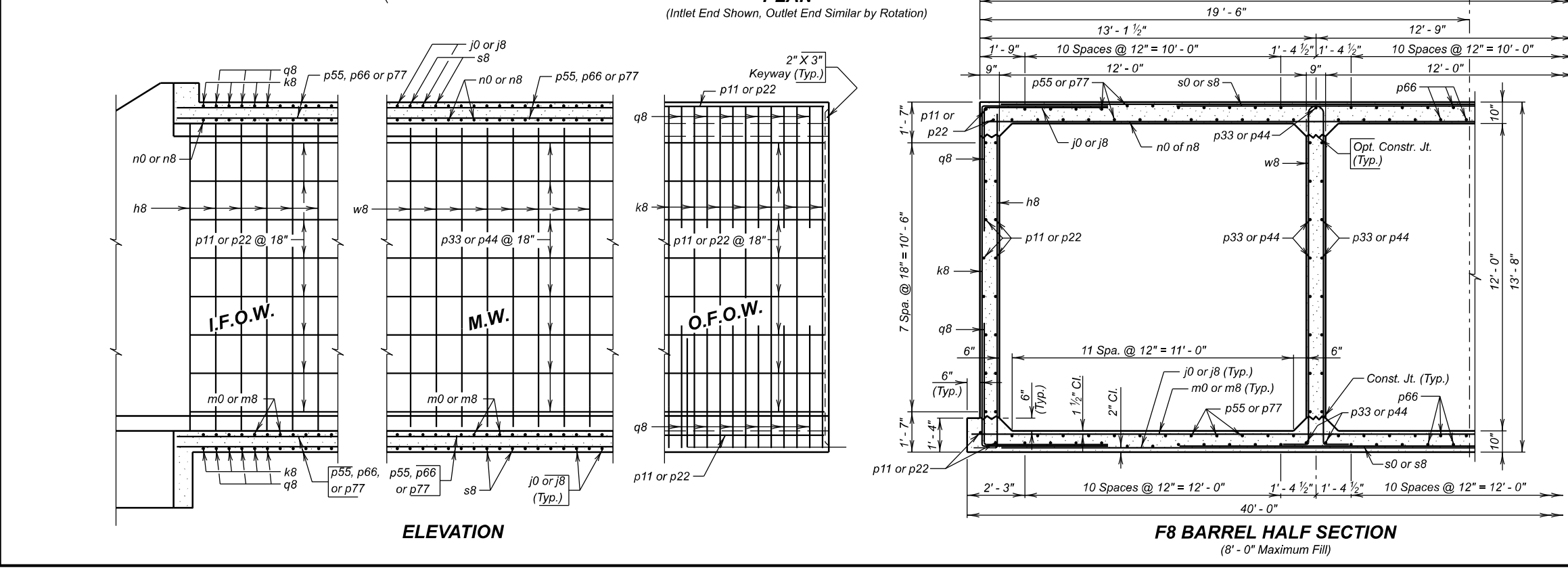
LEGEND FOR PLACING RE-STEEL

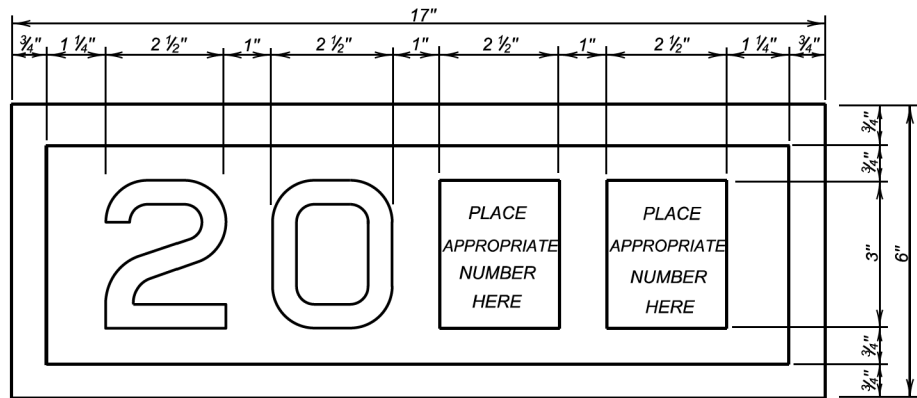
T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab
O.F.O.W. - Outside Face of Outside Wall
I.F.O.W. - Inside Face of Outside Wall
M.W. - Middle Wall

F8 BARREL END SECTION DETAILS (30' - 0")
FOR
3 - 12' x 12' BOX CULVERT
OVER DRY CREEK
STA. 76 + 26.00
STR. NO. 10-324-337
30° LHF SKEW
SEC. 21-T9N-R6E
NH 0212(207)40
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

DESIGNED BY LB BUTE06JD	CK. DES. BY JM 06JDGA08	DRAFTED BY AD	BRIDGE ENGINEER
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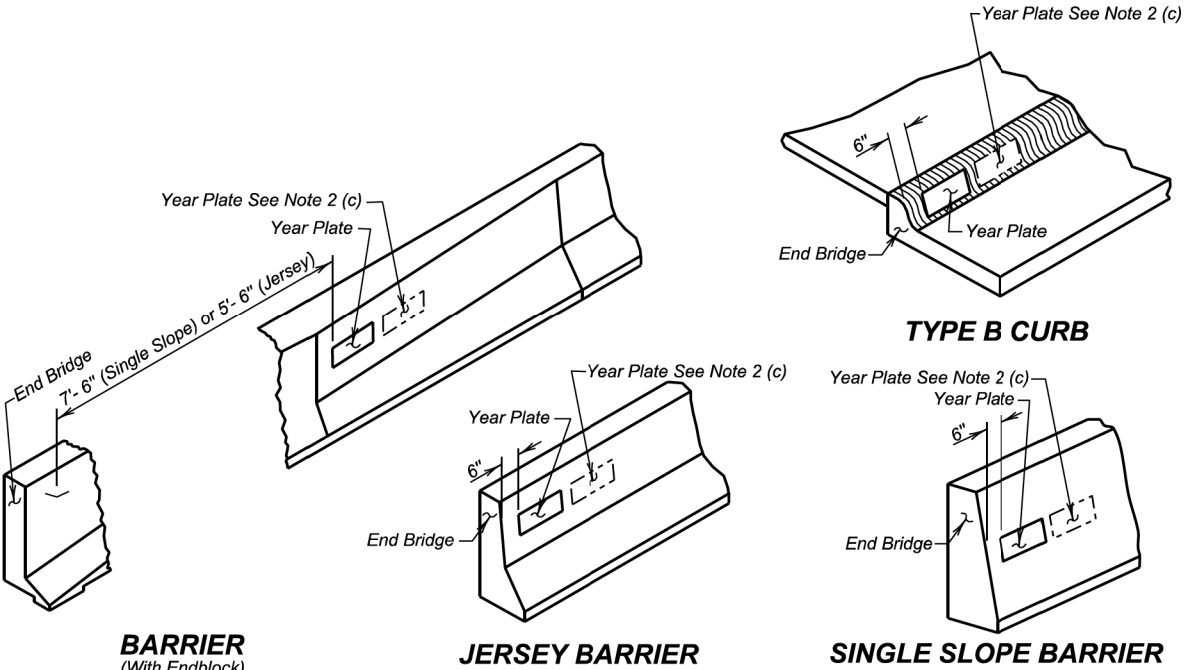




YEAR PLATE DETAILS

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.



TYPE B CURB

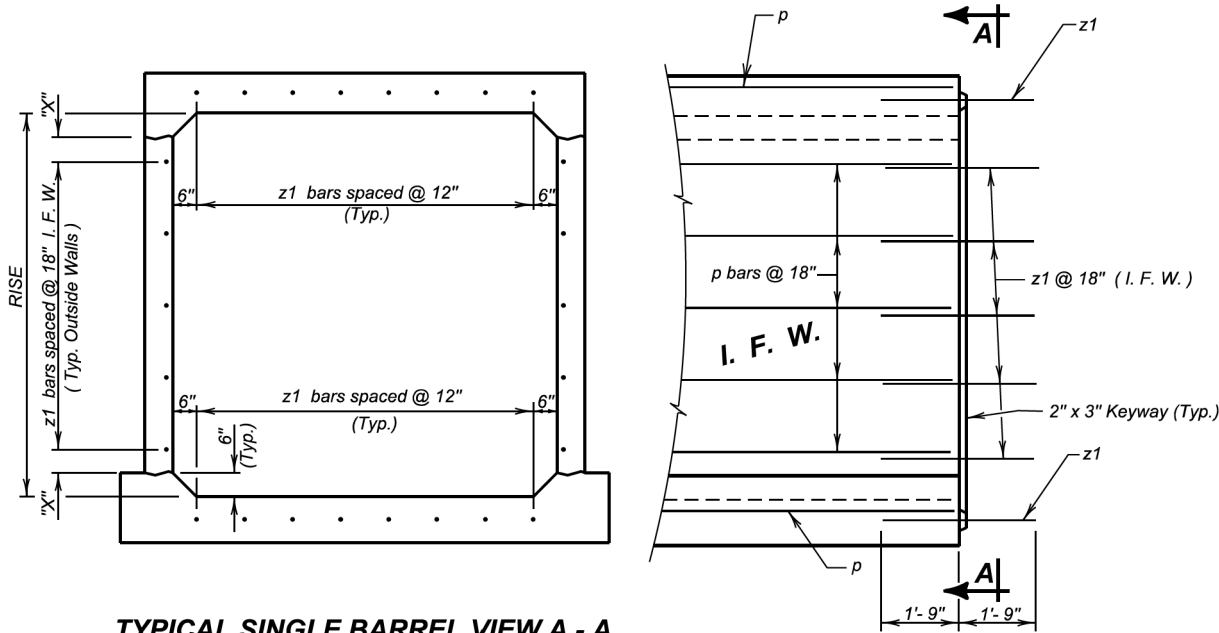
BARRIER
(With Endblock)

JERSEY BARRIER

SINGLE SLOPE BARRIER

January 22, 2021

Published Date: 2027	S D D O T	YEAR PLATE DETAILS	PLATE NUMBER
			460.02
			Sheet 1 Of 1



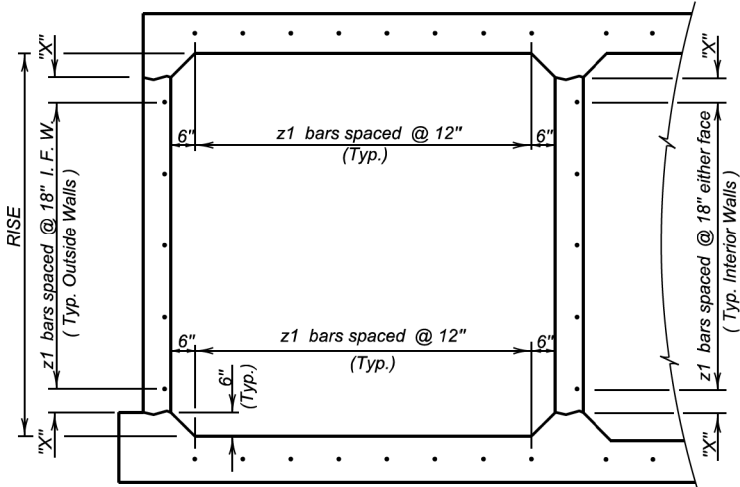
TYPICAL SINGLE BARREL VIEW A - A

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"



TYPICAL MULTIPLE BARREL VIEW A - A

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.

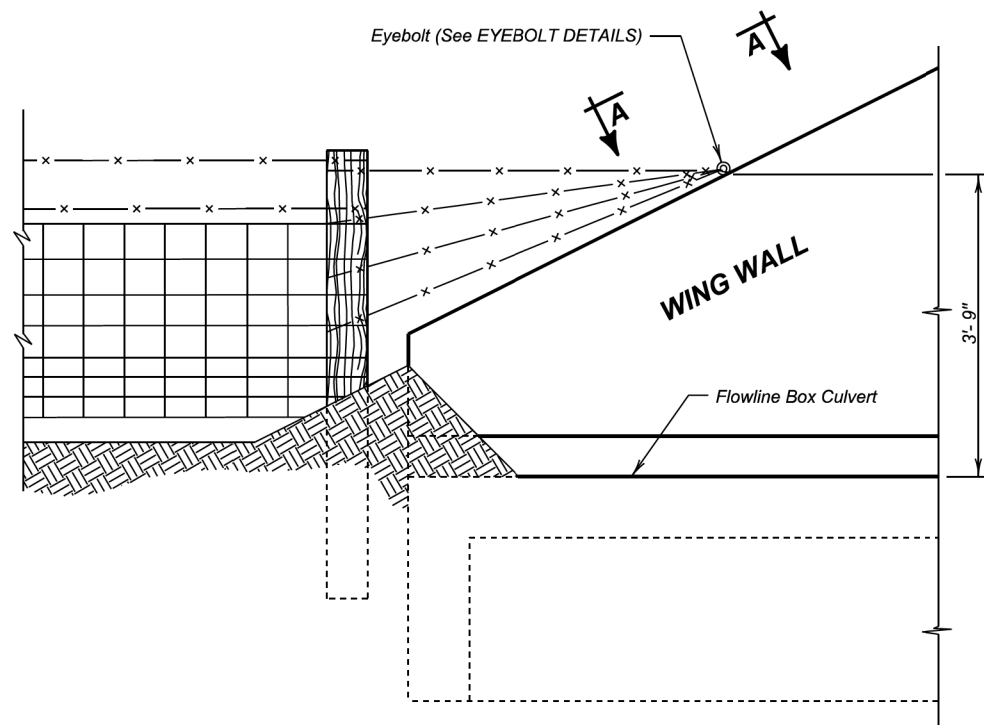
June 1, 2022

Published Date: 2027	S D D O T	BOX CULVERT BARREL TIE REINFORCEMENT	PLATE NUMBER
			460.10
			Sheet 1 of 1

3 - 12' X 12' BOX CULVERT

STR. NO. 10-324-337

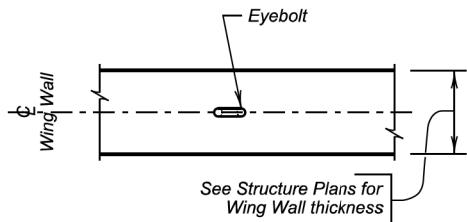
AUGUST 2025



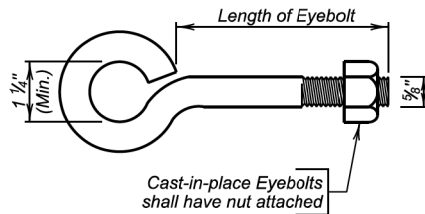
DETAIL FOR FENCE ANCHORS

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

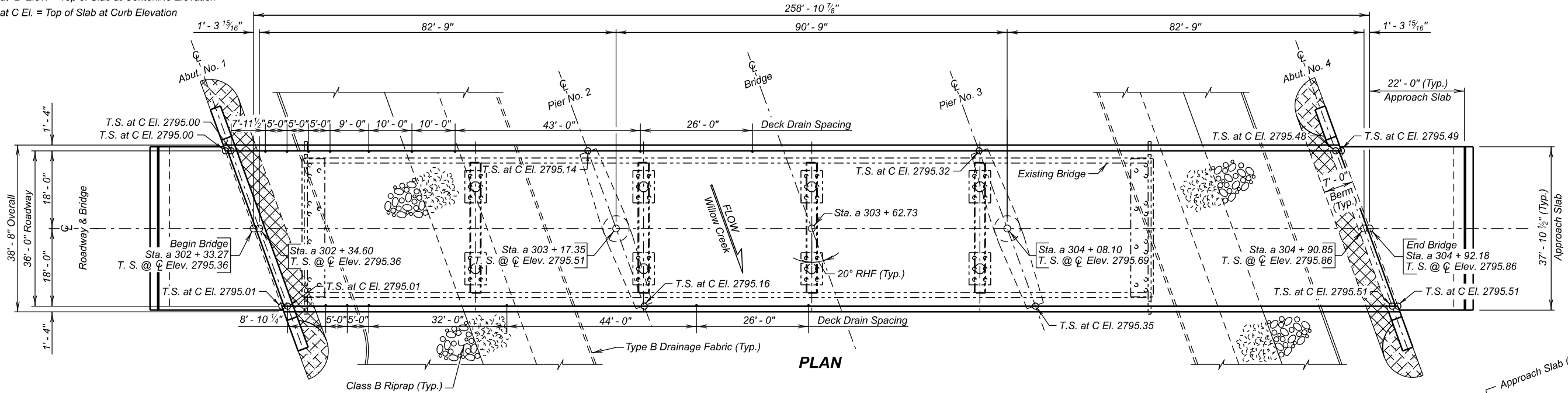
December 23, 2012

Published Date: 2027	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).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E13	E69

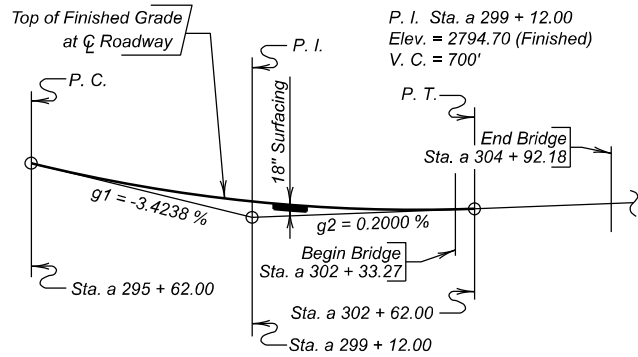
NOTE:
T. S. at $\bar{C}$ Elev. = Top of Slab at Centerline Elevation
T. S. at C El. = Top of Slab at Curb Elevation



PLAN

-X081- INDEX OF BRIDGE SHEETS -

- | | |
|---|--|
| Sheet No. 1 - General Drawing | Sheet No. 22 - Approach Slab Adjacent to Bridge Details (A) |
| Sheet No. 2 - Estimate of Structure Quantities and Notes | Sheet No. 23 - Approach Slab Adjacent to Bridge Details (B) |
| Sheet No. 3 - Notes (Continued) | Sheet No. 24 - Approach Slab Joint Details |
| Sheet No. 4 - Notes (Continued) | Sheet No. 25 - Riprap Details |
| Sheet No. 5 - (Notes Continued) | Sheet No. 26 - As-Built Elevation Survey (A) |
| Sheet No. 6 - Subsurface Investigation, Piling & Drilled Shaft Layout | Sheet No. 27 - As-Built Elevation Survey (B) |
| Sheet No. 7 - Abutment No. 1 Details | Sheet No. 28 - Details of Standard Plate No.'s 430.50 & 460.02 |
| Sheet No. 8 - Abutment No. 4 Details | Sheet No. 29 - Details of Standard Plate No.'s 460.05 & 510.40 |
| Sheet No. 9 - Abutment Details | Sheet No. 30 - Details of Standard Plate No.'s 620.17 & 630.92 |
| Sheet No. 10 - Pier Details (A) | |
| Sheet No. 11 - Pier Details (B) | |
| Sheet No. 12 - Superstructure Details (A) | |
| Sheet No. 13 - Superstructure Details (B) | |
| Sheet No. 14 - End Block, Barrier Curb, & Deck Drain Details | |
| Sheet No. 15 - 82' - 6" Girder Details | |
| Sheet No. 16 - 90' - 0" Girder Details | |
| Sheet No. 17 - Erection Data | |
| Sheet No. 18 - Slab Form Elevations | |
| Sheet No. 19 - Diaphragm Details | |
| Sheet No. 20 - Details of Bridge End Backfill (A) | |
| Sheet No. 21 - Details of Bridge End Backfill (B) | |

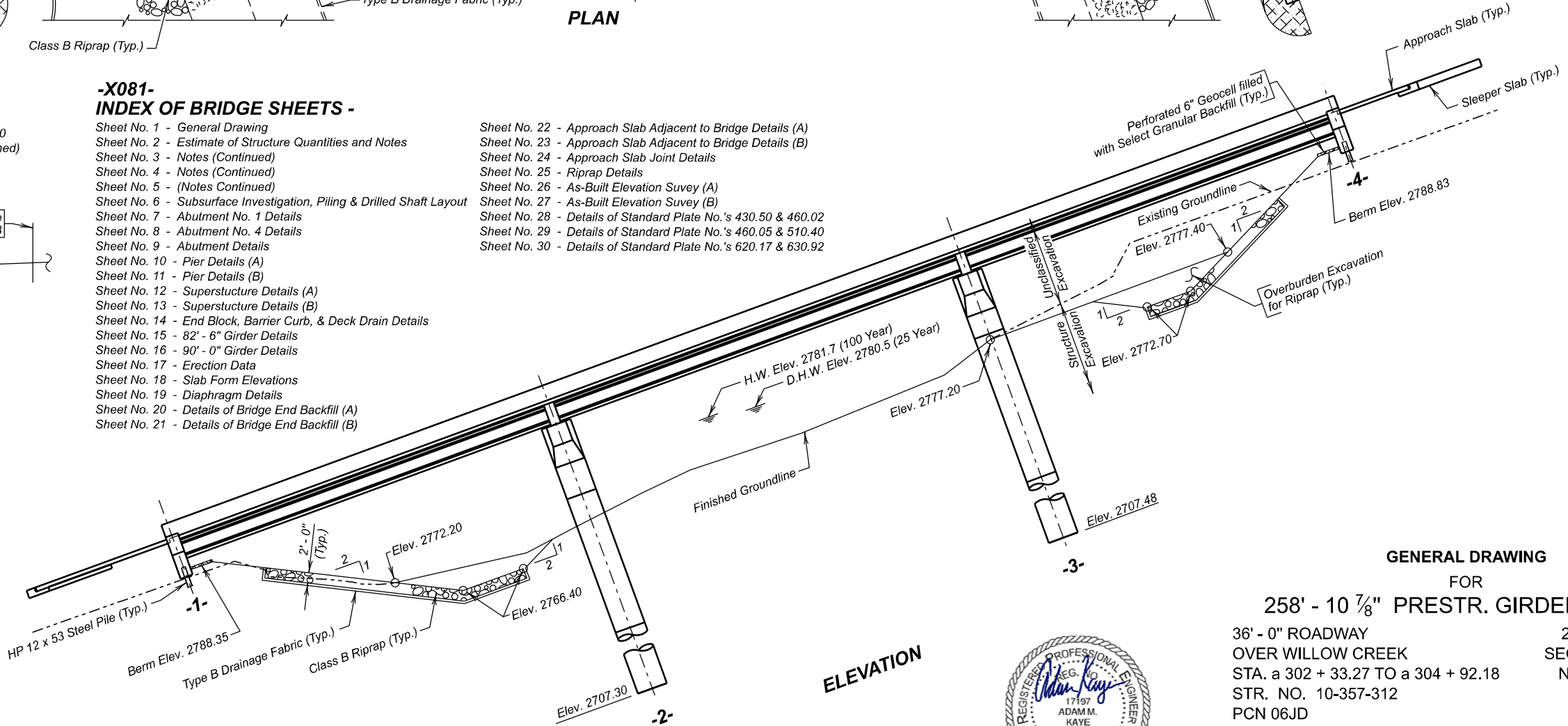


VERTICAL CURVE DATA

HYDRAULIC DATA

Q_d	2932 cfs
A_d	1047 sq ft
V_d	2.8 fps
Q_F	2932 cfs
Q_{100}	5197 cfs
Q_{OT}	$>Q_{500}$
V_{max}	3.9 fps

Q_d = Design discharge for the proposed bridge based on 25 year frequency. El. 2780.5.
 Q_{OT} = Overtopping discharge and frequency $>Q_{500}$ year recurrence interval. El. 2795.4 @ Sta. a 302 + 23.00 $\pm$.
 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. 2781.7.
 V_{max} = Maximum computed outlet velocity for the proposed bridge, based on 100 year frequency.



ELEVATION



GENERAL DRAWING FOR

258' - 10 7/8" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY
OVER WILLOW CREEK
STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312
PCN 06JD

20° RHF SKEW
SEC. 12-T9N-R6E
NH 0212(207)40
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

-X081-

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGB01	DRAFTED BY KC	BRIDGE ENGINEER
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PLANS BY:
HOUSTON ENGINEERING INC.

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E14	E69

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Bridge Elevation Survey	Lump Sum	LS	
Concrete Penetrating Sealer	1031.4	SqYd	See Special Provision
Select Granular Backfill	24.1	Ton	
Incidental Work, Structure	Lump Sum	LS	
Structural Steel, Miscellaneous	Lump Sum	LS	
Membrane Sealant Expansion Joint	75.8	Ft	
Structure Excavation, Bridge	2,200	CuYd	
Bridge End Embankment	1,500	CuYd	
Granular Bridge End Backfill	80.6	CuYd	
Approach Slab Underdrain Excavation	3	CuYd	
Precast Concrete Headwall for Drain	4	Each	
Class A45 Concrete, Bridge Deck	369.6	CuYd	
Class A45 Concrete, Bridge	182.1	CuYd	
Concrete Approach Slab for Bridge	189.4	SqYd	
Concrete Approach Sleeper Slab for Bridge	37.9	SqYd	
Deck Drain, Girder Bridge	15	Each	
Class A45 Concrete, Drilled Shaft	145.7	CuYd	
Drilled Shaft Excavation	142.3	CuYd	See Special Provision
Crosshole Sonic Log (CSL) Test	2	Each	See Special Provision
74" Permanent Casing	50	Ft	
Reinforcing Steel	59,680	Lb	
Epoxy Coated Reinforcing Steel	3,173	Lb	
Stainless Reinforcing Steel	80,147	Lb	See Special Provision
No. 14 Rebar Splice	80	Each	
Preboring Pile	140	Ft	
HP 12x53 Steel Test Pile, Furnish and Drive	110	Ft	
HP 12x53 Steel Bearing Pile, Furnish and Drive	600	Ft	
45" Minnesota Shape Prestressed Concrete Beam	1,275	Ft	
4" Underdrain Pipe	117	Ft	
Porous Backfill	5.6	Ton	
Class B Riprap	2,234.0	Ton	
Overburden Excavation for Riprap	1,720.0	CuYd	
Type B Drainage Fabric	2,736	SqYd	
Perforated Geocell	688	SqFt	

BRIDGE SPECIFICATIONS

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-7-26 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

- Girders are designed continuous for AASHTO HL-93 Live Load.
- Dead Load includes 22 psf for future wearing surface on the roadway.

DESIGN MATERIAL STRENGTHS*

Class A45 Concrete $f'_c = 4,500$ psi
Reinforcing Steel (ASTM A615, Gr. 60) $f_y = 60,000$ psi
Stainless Steel (ASTM A955, Gr. 60) $f_y = 60,000$ psi
Piling (ASTM A572 Grade 50) $f_y = 50,000$ psi

*For prestressed beams, see notes regarding Prestressed Girders.

GENERAL CONSTRUCTION

- All lap splices shown are contact lap splices unless noted otherwise.
- All exposed concrete corners and edges will be chamfered 3/4-inch unless noted otherwise.
- Use 2-inch clear cover on all reinforcing steel except as shown otherwise on plans.
- The Contractor will imprint on the structure the date of new construction as specified and detailed on Standard Plate 460.02.
- Barrier curbs and end blocks will be built perpendicular to the roadway grade line.
- 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.
- Bridge berms will be constructed to the plans template prior to any pile driving or construction of abutment footings. See Standard Plate 120.11. 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.
- The elevation of the bridge deck is 18 inches above subgrade elevation.

INCIDENTAL WORK, STRUCTURE

- In place centerline Sta. a 302+45.00 to centerline Sta. a 304+41.50 is a 196.5-foot, 5 span steel girder bridge with a 30'-0" clear roadway. The superstructure consists of a reinforced concrete slab with timber railing faced with steel thrie-beam continuous across the bridge. The substructure consists of 2 column reinforced concrete bents and reinforced concrete vertical abutments, all of which are supported on timber piling.
- 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 Construction Specifications. All portions of the existing bridge will be removed and become the property of the Contractor.

- 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.
- 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 is 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.

NOTICE - LEAD BASED PAINT

Be advised that the paint on the steel surfaces of the existing structure contains lead. The Contractor should plan operations accordingly and inform employees of the hazards of lead exposure.

DESIGN MIX OF CONCRETE

- All structural concrete will be Class A45 Concrete unless otherwise indicated.
- High sulfate levels are likely to be encountered on this project. All substructure concrete will be Class A45 conforming to Section 460, with the following modifications: the type of cement will be either a Type V or Type II with 20% to 25% Class F Modified Fly Ash substituted in accordance with Section 605.
- Type II cement conforming to Section 750 is required for the superstructure concrete, except Type III cement may be used for prestressed beams.
- Grout design mix will be as specified in Section 460.2 K of the Construction Specifications. A compressive strength of 2000 psi will be attained by the grout prior to erection of any beams. Chamfer edges of grout pads 3/4-inch. The quantity of grout is included in and will be paid for at the contract unit price per cubic yard for Class A45 Concrete, Bridge.



ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
258' – 10 7/8" PRESTR. GIRDER BRIDGE

STR. NO. 10-357-312

AUGUST 2025

2

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DESIGNED BY: AK BUTE06JD	CK. DES. BY: LB 06JDGB02	DRAFTED BY: KC	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E15	E69

ABUTMENTS

1. Preboring piling at each abutment is required to whichever is greater, ten feet or to natural ground.
2. The HP 12x53 Piling were designed using a factored bearing resistance of 98 tons per pile. Piling will develop a field verified nominal bearing resistance of 245 tons per pile.
3. One test pile will be driven at each abutment and will become part of the pile group. The test pile will be driven before any other pile and will be driven to the required field verified nominal resistance or as directed by the Engineer prior to driving any portion of the bearing piles.
4. The Contractor will have sufficient pile splice material on hand before pile driving is started. See Standard Plate 510.40.
5. Piles will not be driven out of position by more than three inches in the direction parallel to the girder centerline. A pile-driving template will be used to ensure this accuracy.
6. Abutment backwalls above the construction joint may be cast separately from the deck slab. The concrete used for the backwalls and wings will be Class A45 Concrete, Bridge. All abutment and bridge deck concrete will have attained design strength prior to backfilling.
7. Each finished abutment shall include a Bridge Survey Marker. See Standard Plate 460.05.
8. Pile can be driven to elevation 2755.00, but not below, prior to splicing. This will prevent the pile splice from being located in the bending zone of the integral abutment.

PILE DRIVING

1. A drivability analysis was performed using the wave equation analysis program (GRLWEAP). The following pile hammers were evaluated and found to produce acceptable driving stresses:

Delmag D30-32

SPI D30

APE D30-32

Based on initial analysis, the hammers listed will need to be operated no higher than the third 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 the fuel setting.
2. Pile hammers not listed will require evaluation and approval prior to use from the Geotechnical Engineering Activity. Requests for evaluation of hammers not listed will be submitted a minimum of 5 business days prior to installation of piles.

ABUTMENT BACKWALL COATING

The material for waterproofing the abutment backwall will be one of the products from the approved products list. The acceptable abutment backwall coating suppliers are listed on the approved products list at the following Internet address:

<http://apps.sd.gov/HC60ApprovedProducts/Main.aspx>

The cost of furnishing and applying the coating will be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge.

PIERS

1. The design of the drilled shafts is based upon encountering competent Pierre Shale at elevation 2750.00 ft. If competent Pierre Shale is not encountered at or above this elevation, contact the Office of Bridge Design, through proper channels, before proceeding with the drilled shaft construction. Geotechnical Engineering Activity personnel will be present during the drilling operations to confirm these elevations and to observe placement of the drilled shafts. The Geotechnical Engineering Activity will be notified a minimum of two weeks prior to the start of excavation for the drilled shafts.
2. The drilled shafts will be constructed using the permanent casing method in conformance with the Special Provision for Drilled Shaft Construction. A construction joint will be placed at the top of the permanent casing and the permanent casing will extend a minimum of 1'-0" above the groundline, waterline, or construction platform elevation, whichever is higher.
3. The construction joint locations and quantities provided on the plans are based upon the estimated existing groundline and waterline elevations. It is the responsibility of the Contractor to verify the existing elevations and have a drilled shaft installation plan submitted and approved prior to ordering the casing. If the Contractor intends to use construction platforms, etc. that would require any of the construction joints to be at a location other than the location shown in the plans, the Contractor will include these proposed changes in the drilled shaft installation plan for approval by the Office of Bridge Design.
4. The quantities for Drilled Shaft Excavation; 74-inch Permanent Casing; Class A45 Concrete, Drilled Shaft; and Class A45 Concrete, Bridge are based upon the construction joint locations as shown in the plans. Payment for these items will be at the contract unit price for the plans shown quantities regardless of any approved changes in the location of the construction joints as requested by the Contractor due to the construction of work platforms, etc. The use of a larger diameter temporary casing will be required to install permanent casing for the drilled shafts due to the length of the permanent casing. Diameter of temporary casing will be a minimum 6" larger than the permanent casing. All costs involved with temporary casing installation and removal will be incidental to the bid item, Drilled Shaft Excavation. Measurement and payment will be made at the contract unit prices for any changes due to variations in the competent foundation soil or in the locations of the existing groundline and waterline elevations as ordered by the Engineer.

5. The H1 bars are detailed full length of the Drilled Shaft and are provided in the reinforcing schedule. Once the construction joint elevations have been verified and established, mechanical splice details showing location will be submitted for approval to the Office of Bridge Design with the drilled shaft installation plan. Mechanical splices must be staggered and not placed side by side.

SUPERSTRUCTURE

1. Girder lifting hooks will be cut off before placement of concrete deck slab.
2. The diaphragms at the piers will be poured integrally with the deck slab. Placement of diaphragms at the piers shall not slow down the rate of deck concrete placement and finishing. The Contractor will place the concrete for the specified diaphragms ahead of the deck concrete in such a manner that advancement of the deck concrete reaches the diaphragm just as placement of concrete in the diaphragm is complete.
3. 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.
4. The concrete bridge deck will be placed and finished at a minimum rate of 45 feet of deck per hour measured along centerline roadway. If concrete cannot be placed and finished at this rate, the Engineer will order a header installed and operations stopped. If a header is required sometime during the pour operation, its location will be at or as near as possible to the three-quarter point of the span. Notify the Bridge Construction Engineer if deck pour operations are stopped. Operations may resume only when the Engineer is satisfied that a rate of 45 feet per hour can be maintained and the concrete has attained a minimum compressive strength of 2000 psi.
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.



NOTES (CONTINUED)
FOR
258' – 10 7/8" PRESTR. GIRDER BRIDGE

STR. NO. 10-357-312

AUGUST 2025

DESIGNED BY: AK	CK. DES. BY: LB	DRAFTED BY: KC	BRIDGE ENGINEER
BUTE06JD	06JDGB03		

PRESTRESSED GIRDERS

- Minimum concrete compressive strength f'_{ci} = 7,500 psi at 28 days for all girders, and f'_{ci} = 6,000 psi for all girders.
- All mild reinforcing steel will be deformed bars conforming to ASTM A615, Grade 60.
- Individual tendons in all pretensioned sections will consist of seven-wire uncoated Type 270K Strands having a nominal diameter of 0.6-inch and a minimum ultimate strength of 58600 lbs. per cable. An initial tensile force of 43500 lbs. will be applied to all 0.6-inch cables in all girders. All prestressing steel will conform to AASHTO M203. (low-relaxation strands).
- All prestressed girders within a span will be cast within an 8-day period. If not, the newest girder will be at least 6 weeks old before the deck slab is poured. The girders will be poured in all steel forms.
- Prestressed concrete girders will always be lifted by the devices provided in the top flanges near the ends of the girders. Types of lifting devices other than those shown on the plans may be used provided they are approved by the Office of Bridge Design. The design of the lifting devices will be the responsibility of the fabricator.
- Each beam will be marked showing structure number, casting date, and beam number. Marking will be on the face of the beam near the end and the location will be exposed after the diaphragms have been cast. Facia beams will be marked on an inside face. All markings will be stenciled and clearly legible. For beam designations and locations, see superstructure layout plan and Erection Data sheet.
- The physical properties of the elastomeric bearing pads will conform to the requirements of Section 18.2 of the AASHTO LFRD Bridge Construction Specification and the AASHTO Materials Specification M251. The elastomeric bearing pads will conform to Grade 70 (durometer). The cost of the pads will be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge. Certification that pads are 70 durometer and meet the requirements of AASHTO LFRD Bridge Construction Specification Section 18.2 and AASHTO Materials Specification M251 will be furnished to the Engineer with the shop drawings. No laminated bearing pads will be allowed.
- All exposed corners will be chamfered 3/4-inch or rounded to 3/4-inch radius.
- Dead Load of girder taken as effective at transfer. Cut strands flush with end of girder and coat end of strands with mortar, EXCEPT the strands that are to be extended and bent,
- The Contractor will be responsible for ensuring that transportation stresses, handling, and erection do not cause damage to the girders.
- Furnish and Install Inserts for T8 Rebars as shown in the plans. All costs involved will be incidental to the contract unit price per foot of 45" Minnesota Shape Prestressed Concrete Beam.

BOLT TESTING

The certified mill test reports for all bolts used on the project will include the test results for all the testing specified in section 972.2 D of the Construction Specifications. Some of these tests are supplemental tests that must be requested at the time the bolts are ordered. It is the responsibility of the Contractor to notify the bolt supplier of these requirements.

SHOP PLANS

Shop plans will be required as specified by the Construction Specifications.

The fabricator will submit shop plans in accordance with the Specifications. If mailed, send shop plan submittals to Houston Engineering Inc., 1401 21st Avenue North, Fargo, ND 58102 or email directly to akaye@houstoneng.com. After review, corrections (if necessary), and approval by Houston Engineering Inc., the Office of Bridge Design will review the submittals, authorize fabrication, arrange for fabrication inspection, and distribute the shop drawings.

FALL PROTECTION

- The Contractor will install a Fall Protection System conforming to OSHA Regulations. When working on the girders prior to decking installation, a Horizontal Lifeline – or other OSHA approved system will be installed. The Contractor will have one Personal Fall Arrest System (PFAS) available for use by a Department Inspector. The PFAS will be compatible with the installed Fall Protection System.
- Modifications to any bridge components used to accommodate the Fall Protection System will be shown on the Falsework Plans and/or the appropriate Shop Plans. Field welding to bridge components shall not be allowed. Field placed concrete inserts or drilled-in anchor bolts will be allowed if approved by the Engineer. All costs associated with providing the Fall Protection System will be incidental to the other contract items.

CLASS B COMMERCIAL TEXTURE FINISH

A Class B commercial texture finish will be applied to the front and top faces of the barrier. Use pearl white finish color number 37875 meeting AMS – STD – 595. The Class B commercial texture finish will be applied in accordance with Section 460.3 L. 1.c and Section 460.3 M.1 of the Construction Specifications.

DECK DRAIN, GIRDER BRIDGE

- Deck Drains will be 4-inch diameter x 5'-6" Fiberglass Pipe conforming to the requirements of ASTM - D2996.
- The Fiberglass Pipe Sleeve can be made from a 4-inch diameter Fiberglass Pipe Fitting. It will be attached to the 4-inch diameter Fiberglass Pipe, as shown in the plans, per the manufacturer's recommendation.
- All fiberglass pipe and pipe fittings will be handled and installed according to the guidelines and procedures recommended by the manufacturer. Pipe, pipe fittings, and adhesive must be from the same manufacturer.
- Use fiberglass wear pads to protect against contact with supports or U-bolts.
- The 1/2-inch diameter U-bolts, nuts and washers will conform to ASTM A307 and will be galvanized in accordance with ASTM F2329.
- The deck drains to girder connection as shown in the plans allows the deck drain location to be adjusted slightly to clear transverse slab reinforcement.
- All fiberglass pipes and pipe fittings will use pigmented resin throughout the wall. The color will be an approved gray (AMS STD 595 Color 26622).
- Steel for the bent plates and washers will conform to ASTM A36 and will be galvanized in accordance with ASTM A123. Washers will be plate washers or a continuous bar at least 5/16" thick with standard holes and will have a size sufficient to completely cover the slot after installation.
- The 1/2- inch diameter bolts and nuts will conform to ASTM A307 and will be galvanized in accordance with ASTM F2329 or ASTM A153 as applicable.
- The 1/2-inch diameter concrete inserts will be capable of developing the strength of the A307 bolts and will be galvanized.
- Maintain 2-inch clear cover between the back of the inserts and the adjacent girder web.
- Payment for deck drains will be at the contract unit price per each for Deck Drain, Girder Bridge, and will be full compensation for furnishing, fabricating, and installing the deck drains and all attaching hardware in accordance with the plans and specifications.



NOTES (CONTINUED)
FOR
258' – 10 7/8" PRESTR. GIRDER BRIDGE

STR. NO. 10-357-312

AUGUST 2025

APPROACH SLABS

- Sleeper slab riser will be cast with or later than the approach slab. Care will be taken to ensure the correct grade is maintained across the top of the sleeper slab riser.
- 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.
- 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.
- The concrete in the approach slab will be tined perpendicular to the centerline of roadway.
- 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 surplus materials; and for labor, tools, equipment, and any incidentals necessary to complete this item of work.
- 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

- An underdrain system will be placed underneath the sleeper slabs and behind the abutments as shown in the plans in accordance with Section 435 of the Construction Specifications.
- 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 shall conform to ASTM D6707.
- 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.

- 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.

PERFORATED GEOCELL

- Perforated Geocell will be from the following company or equivalent:

Company: Agtec

Phone: 1-818-724-7657

Website: <http://www.agtec.com>
- Perforated Geocell will be 6 inches tall with Type B Drainage Fabric underlying the perforated Geocell. Installation will adhere to the manufacturer's recommendation.
- Perforated Geocell will be filled with the Select Granular Backfill in accordance with Section 850 of the Construction Specifications.
- 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.
- 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.

AS - BUILT ELEVATION SURVEY

The Contractor will be responsible for producing an as-built elevation survey soon after construction is completed but before the bridge is opened to traffic. The Contractor will be responsible for recording the as-built elevation shown in the plans. The completed table will be given to the Engineer and copies forwarded to the Office of Bridge Design and the Senior Region Bridge Engineer. The elevations will be based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88). The Engineer will provide the Contractor with a description, elevation, and location of the nearest benchmark that has a NAVD88 established elevation for the Contractor's use. The benchmark shown in the plans has not been tied to the NAVD88. The Contractor will be responsible for establishing a NAVD88 elevation for the benchmark provided in the plans. All cost associated with obtaining the NAVD88 elevations at the locations shown in the table and for the benchmark shown in the plans, including all equipment, labor, and any incidentals required will be incidental to the contract lump sum price for Bridge Elevation Survey.

RIPRAP

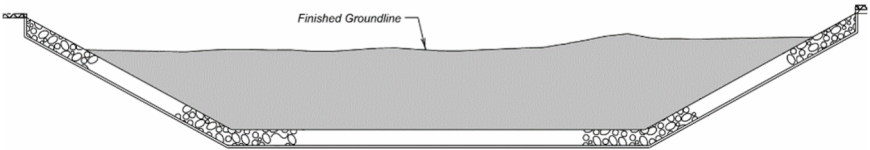
Berm slope and embankments will be compacted to the Specified Density Method in accordance with Section 120.3 B.3.a of the Construction Specifications. Riprap gradation and Drainage Fabric will comply with Section 700.2 of Construction Specifications. Placement of Riprap and Drainage Fabric will be in accordance with Section 700.3 of the Construction Specification and placed in the dry.

Revised 07/13/2026 AK

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E17	E69

OVERBURDEN EXCAVATION FOR RIPRAP

- 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).



- 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.
- 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.
- 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 or four inches above the riprap at the lowest elevation.
- 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.
- 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.
- 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.



NOTES (CONTINUED)
FOR
258' – 10 7/8" PRESTR. GIRDER BRIDGE

STR. NO. 10-357-312

AUGUST 2025

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DESIGNED BY: AK BUTE06JD	CK. DES. BY: LB 06JDGB05	DRAFTED BY: KC	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E18	E69

Pierre Shale is a marine shale with a textural classification that varies from silt clay to clay silt. Color varies from buff gray to black. The formation may contain concretion zones that are normally thin but occasionally are massive. These zones may be considered hard and dense. Thin zones may be present that are cemented resulting in claystone or siltstone seams. Bentonite zones may be encountered but are normally less than one half inch thick. Nonweathered Pierre Shale is considered to be "Soft Rock".

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 2 7/8 inch drill stem to measure the resistance to penetration of the soil.

Penetration test holes are drilled with a 6 5/8 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

L1 NO DATA
L2 2771.6

MARCH 2023

L3 2775.6
L4 2771.9

MEASURED SKIN FRICTION

	ELEV.	PSF
L1	2759.9	2110
L2	2747.4	1482

SUBSURFACE INVESTIGATION, PILING, & DRILLED SHAFT LAYOUT

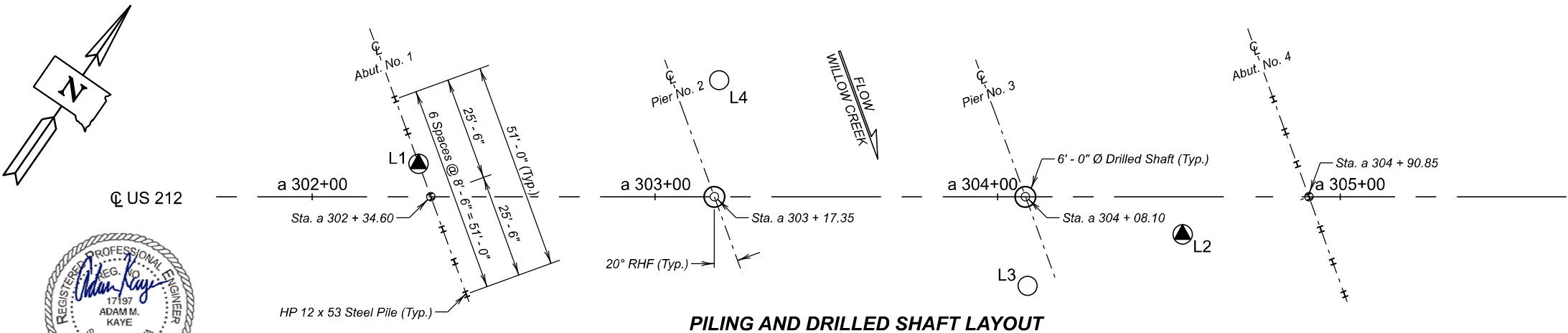
FOR

258' - 10 7/8" PRESTR. GIRDER BRIDGE
36' - 0" ROADWAY OVER WILLOW CREEK
20° RHF SKEW
SEC. 12-T9N-R6E
STA. a 302 + 33.27 TO a 304 + 92.18
NH 0212(207)40
STR. NO. 10-357-312
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

6 OF 30

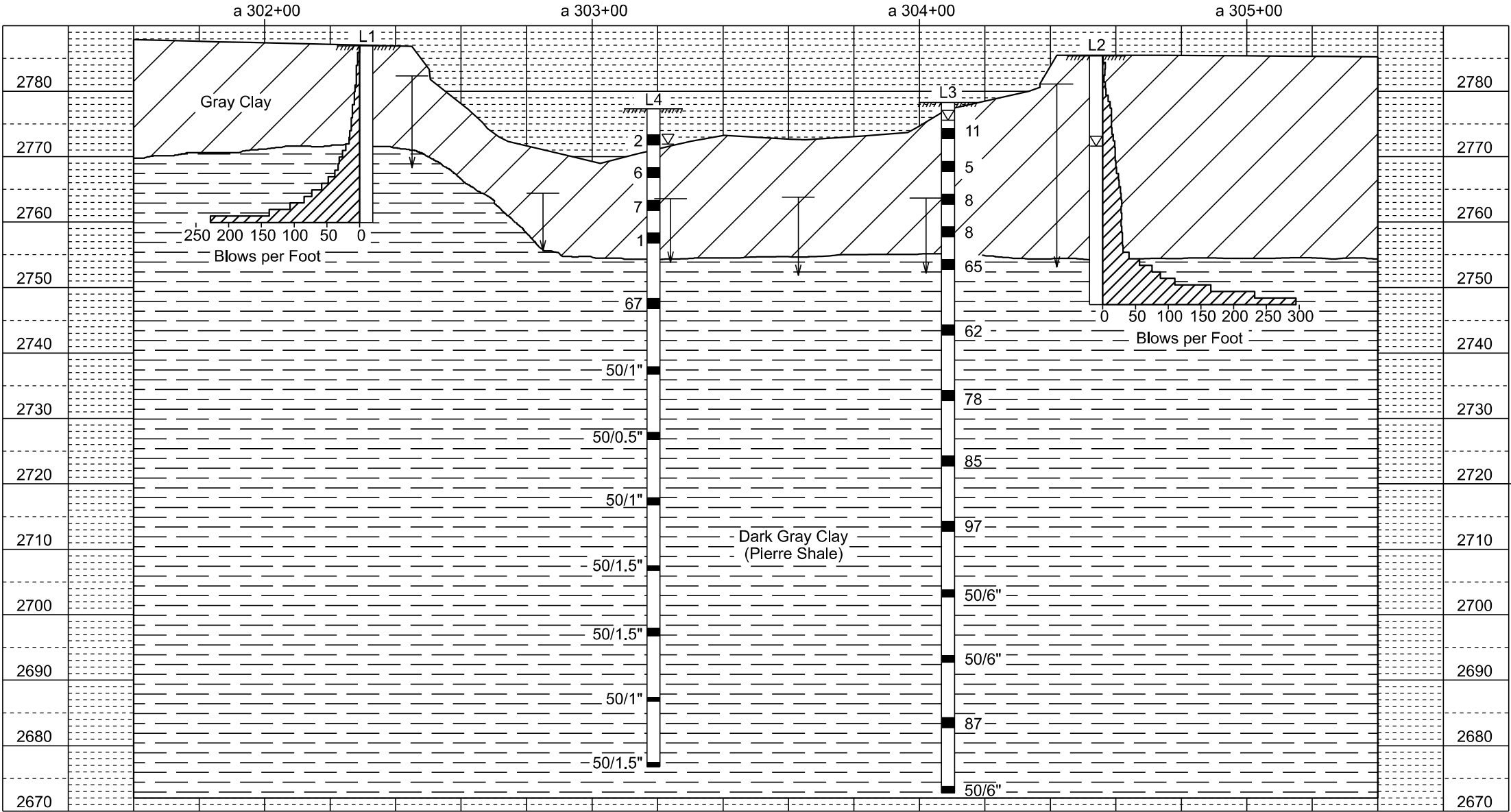
DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGB06	DRAFTED BY KC	BRIDGE ENGINEER
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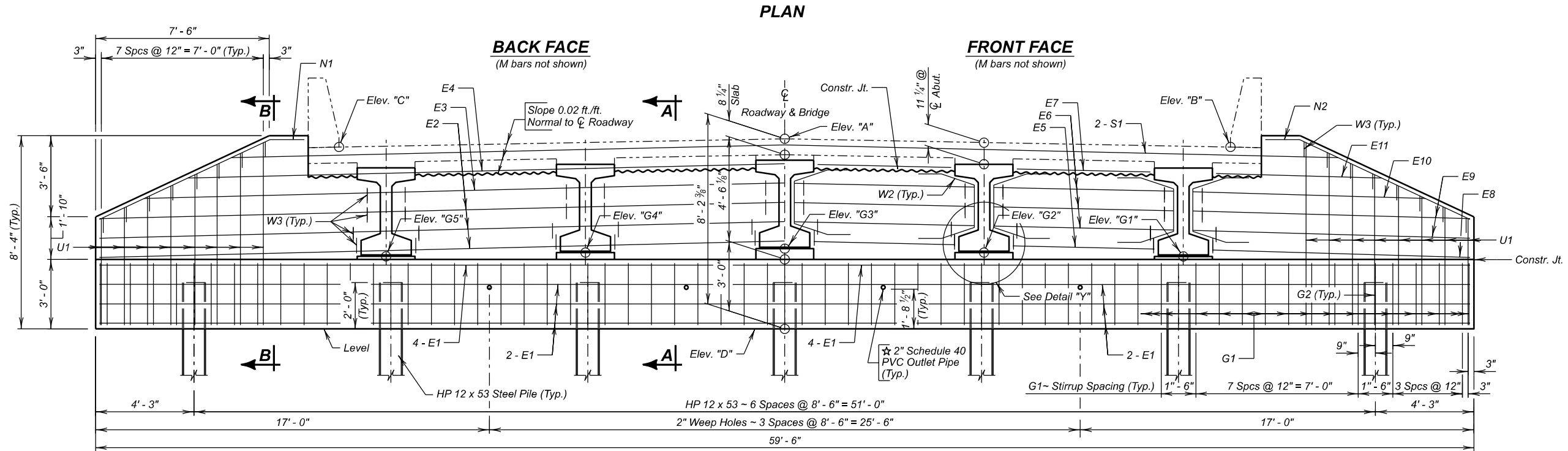
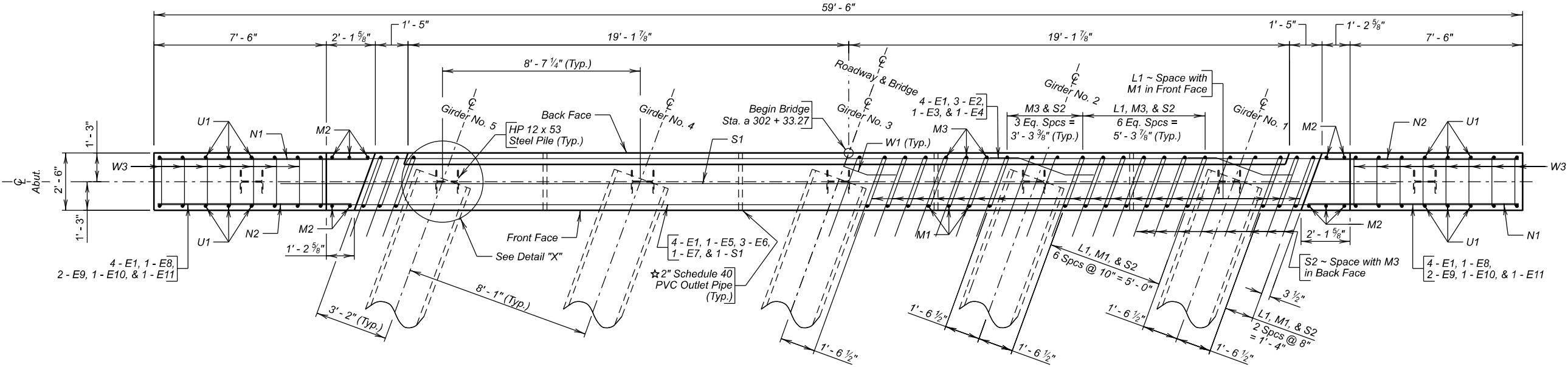


INPLACE TIMBER PILING

PILING AND DRILLED SHAFT LAYOUT

Hole Number	L4	Hole Number	L3	Hole Number	L3	Hole Number	L3
Station	303+18.75	Station	304+8.75	Station	304+8.75	Station	304+8.75
Depth	30.5 ft	Depth	15.5 ft	Depth	35.5 ft	Depth	45.2 ft
Soil Color	Dark Gray	Soil Color	Brown	Soil Color	Dark Gray	Soil Color	Dark Gray
Classification	Clay	Classification	Clay	Classification	Clay	Classification	Clay
Strength (Qu)	17,050 psf	Strength (Qu)	1,938 psf	Strength (Qu)	17,300 psf	Strength (Qu)	11,720 psf
Dry Density	104.3 pcf	Dry Density	80.6 pcf	Dry Density	107.7 pcf	Dry Density	101.7 pcf
Wet Density	127.8 pcf	Wet Density	118.1 pcf	Wet Density	130.6 pcf	Wet Density	125.8 pcf
Moisture	22.6 %	Moisture	46.5 %	Moisture	21.3 %	Moisture	23.7 %
Pass No. 10	100.0 %	Pass No. 10	99.9 %	Pass No. 10	100.0 %	Pass No. 10	99.7 %
Pass No. 40	100.0 %	Pass No. 40	98.6 %	Pass No. 40	100.0 %	Pass No. 40	99.7 %
Pass No. 200	99.3 %	Pass No. 200	93.3 %	Pass No. 200	99.8 %	Pass No. 200	99.5 %
Sand Content	0.7 %	Sand Content	6.7 %	Sand Content	0.2 %	Sand Content	0.2 %
Silt Content	29.1 %	Silt Content	27.1 %	Silt Content	28.6 %	Silt Content	26.6 %
Clay Content	70.2 %	Clay Content	66.2 %	Clay Content	71.2 %	Clay Content	73.0 %





☆ See DETAILS OF BRIDGE END BACKFILL (A) notes for payment and quantity

TABLE OF ELEVATIONS									
Abut. No.	Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"	Elev. G1	Elev. G2	Elev. G3	Elev. G4	Elev. G5
1	2795.36	2795.00	2795.01	2787.16	2790.29	2790.45	2790.61	2790.45	2790.30

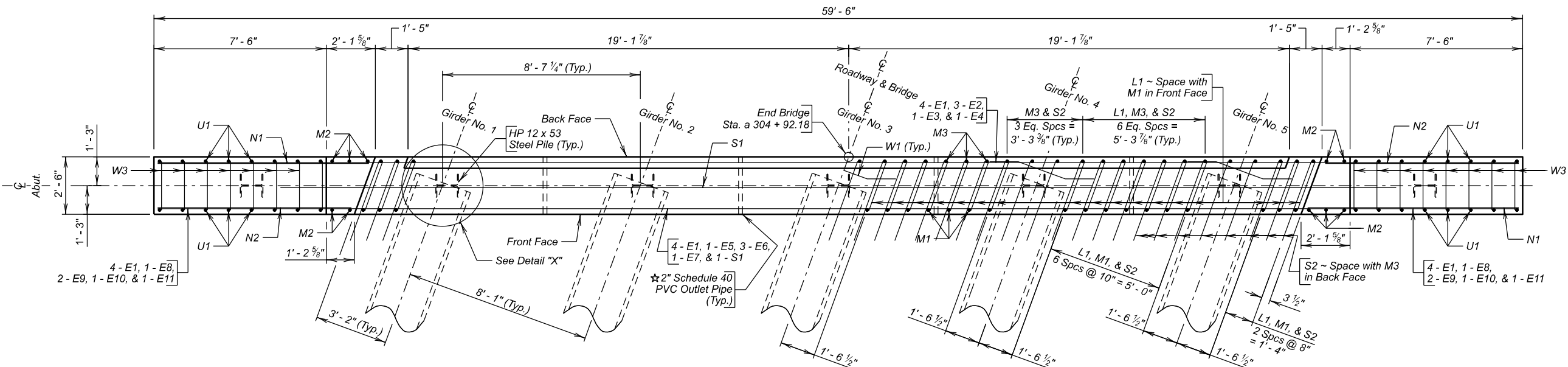
NOTE - Elev. "A", "B" and "C" are top of slab at C of Abutment. Elev. G1, G2, G3, G4 and G5 are top of grout pad elevations at C Abutment. Top of Grout Pads shall be Level and Smooth.



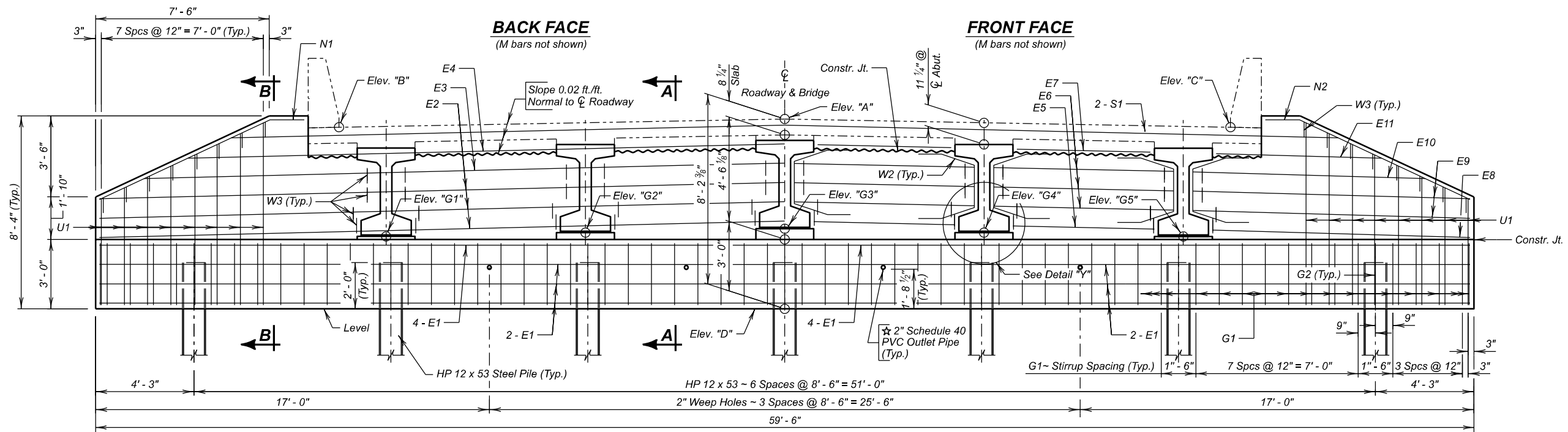
ABUTMENT NO. 1 DETAILS
FOR
258' - 10 7/8" PRESTR. GIRDER BRIDGE
36' - 0" ROADWAY
OVER WILLOW CREEK
STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312

20° RHF SKEW
SEC. 12-T9N-R6E
NH 0212(207)40
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PLAN



ELEVATION

(Along Centerline of Abutment)

★ See DETAILS OF BRIDGE END BACKFILL (A) notes for payment and quantity

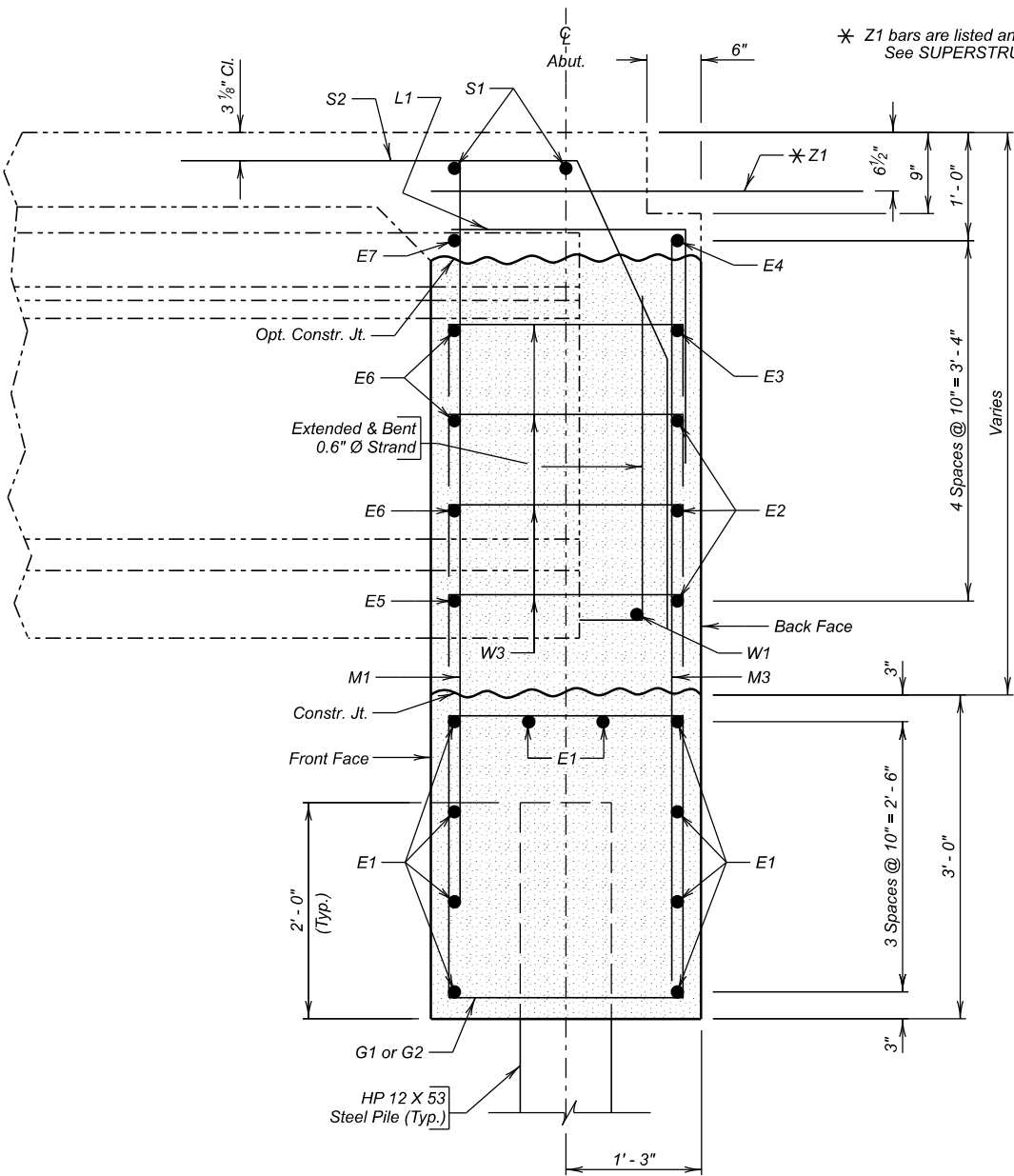
TABLE OF ELEVATIONS									
Abut. No.	Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"	Elev. G1	Elev. G2	Elev. G3	Elev. G4	Elev. G5
4	2795.86	2795.48	2795.51	2787.65	2790.77	2790.94	2791.11	2790.95	2790.80

NOTE - Elev. "A", "B" and "C" are top of slab at Centerline of Abutment. Elev. G1, G2, G3, G4 and G5 are top of grout pad elevations at Centerline of Abutment. Top of Grout Pads shall be Level and Smooth.

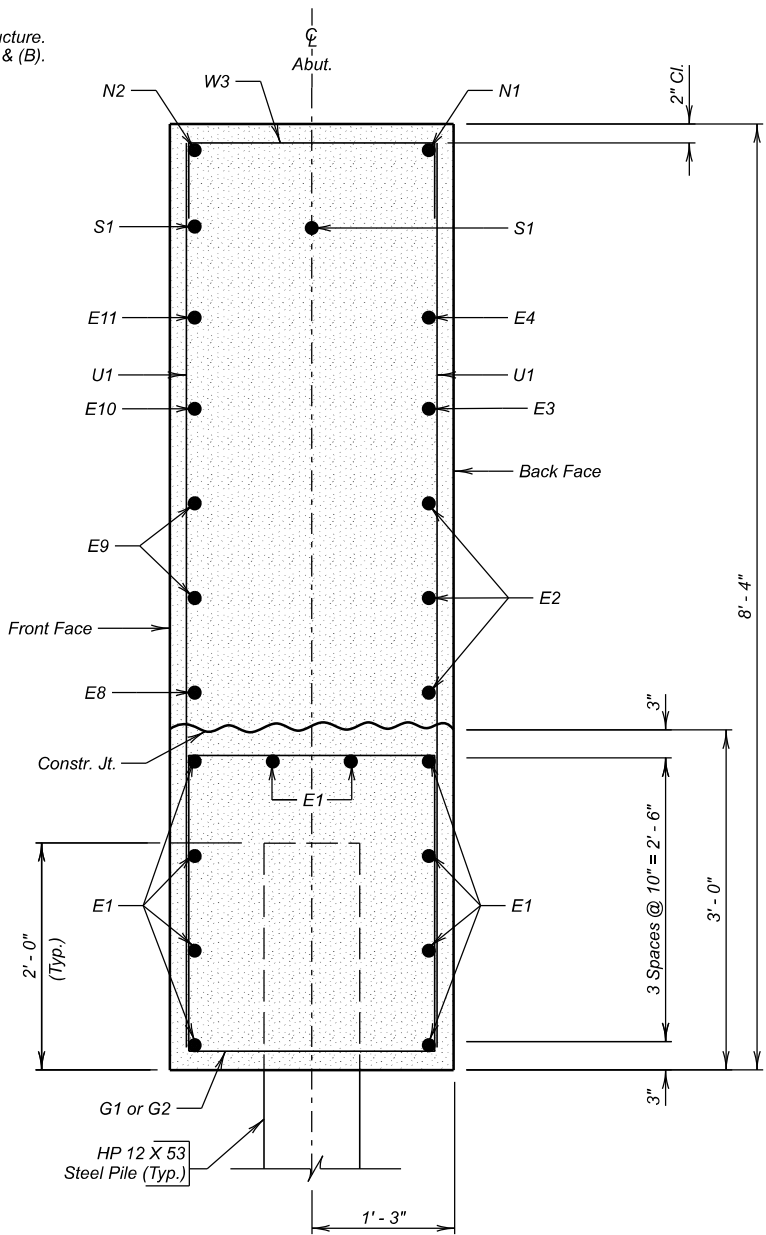


ABUTMENT NO. 4 DETAILS
FOR
258' - 10 7/8" PRESTR. GIRDER BRIDGE
36' - 0" ROADWAY OVER WILLOW CREEK
20° RHF SKEW
SEC. 12-T9N-R6E
STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312
NH 0212(207)40
HL-93

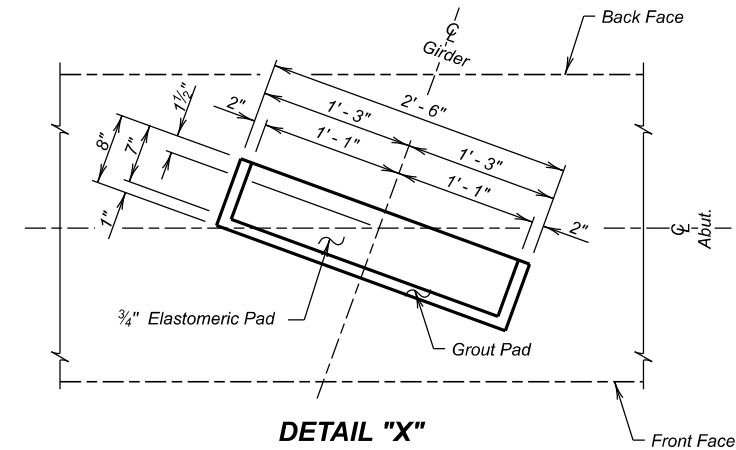
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025



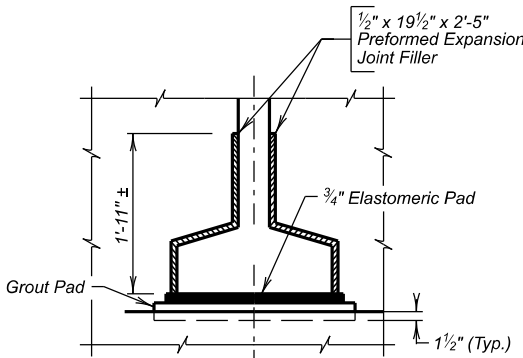
SEC. A - A



SEC. B - B

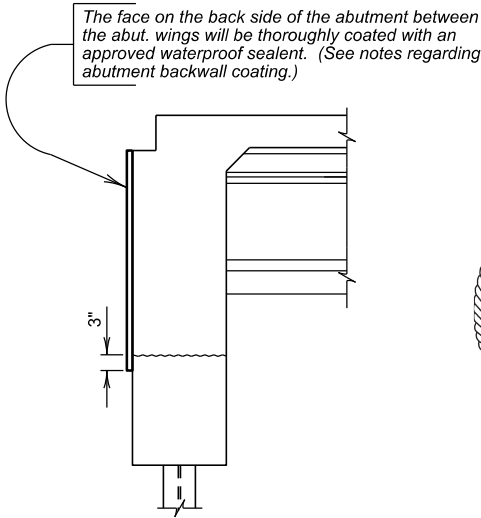


DETAIL "X"

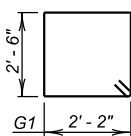
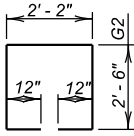
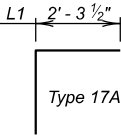
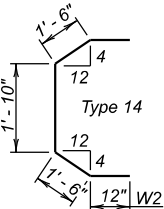
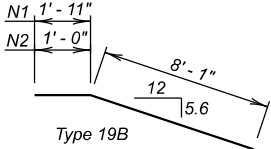
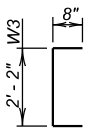
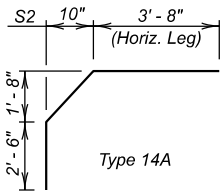
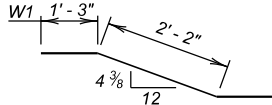
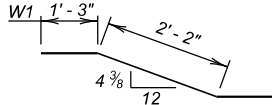
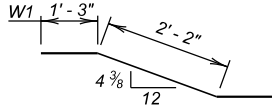
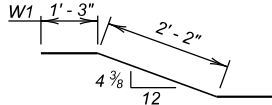
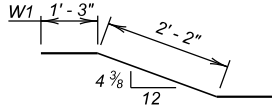
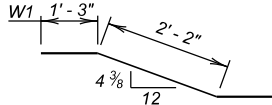
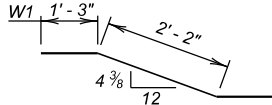


DETAIL "Y"

(Typical at girder ends; abutments only)



ABUT. BACKWALL COATING DETAILS

REINFORCING SCHEDULE					Bending Details	
(For One Abutment)						
Mk.	No.	Size	Length	Type		
E1	10	7	59'-2"	Str.		
E2	3	6	59'-2"	Str.		
E3	1	6	55'-4"	Str.		Type 17A
E4	1	6	51'-6"	Str.		
E5	4	6	5'-11"	Str.		Type 14
E6	12	6	7'-9"	Str.		
E7	4	6	5'-7"	Str.		Type 19B
E8	2	6	11'-1"	Str.		
E9	4	6	12'-0"	Str.		Type 17
E10	2	6	10'-0"	Str.		
E11	2	6	7'-2"	Str.		Type 14A
G1	58	5	10'-3"	T1		
G2	7	5	9'-2"	S6		Type 19C
L1	34	4	4'-7"	17A		
M1	34	5	6'-10"	Str.		Type 19C
M2	10	5	8'-0"	Str.		
M3	44	5	6'-10"	Str.		Type 19C
N1	2	6	10'-0"	19B		
N2	2	6	9'-1"	19B		Type 19C
S1	2	9	47'-9"	Str.		
S2	44	5	8'-2"	14A		Type 19C
U1	16	5	12'-5"	Str.		
W1	5	5	4'-8"	19C		Type 19C
W2	10	4	6'-10"	14		
W3	56	5	3'-6"	17		Type 19C

NOTES:

All dimensions are out to out of bars.

Ø See Cutting Diagram

Δ Bars to be Epoxy Coated.

ESTIMATED QUANTITIES			
ITEM	UNIT	QUANTITY	
		Abut. No. 1	Abut. No. 4
Class A45 Concrete, Bridge	Cu. Yd.	36.5	36.5
Reinforcing Steel	Lb.	3,625	3,625
Epoxy Coated Reinforcing Steel	Lb.	1,046	1,046
Structure Excavation, Bridge	Cu. Yd.	164	2,036
HP 12 X 53 Steel Test Pile, Furnish and Drive	Ft.	1 @ 50' = 50'	1 @ 60' = 60'
HP 12 X 53 Steel Bearing Pile, Furnish and Drive	Ft.	6 @ 45' = 270'	6 @ 55' = 330'
Preboring Pile	Ft.	7 @ 10' = 70'	7 @ 10' = 70'

Δ Includes 0.08 Cu. Yd. for grout pads.

NOTE:
Concrete will be placed in the space under the beams (within the backwall width) during the pour. Care will be taken to get the concrete vibrated into this area. If upon form removal the space is not completely filled and consolidated, the Contractor will grout in the remaining voids.

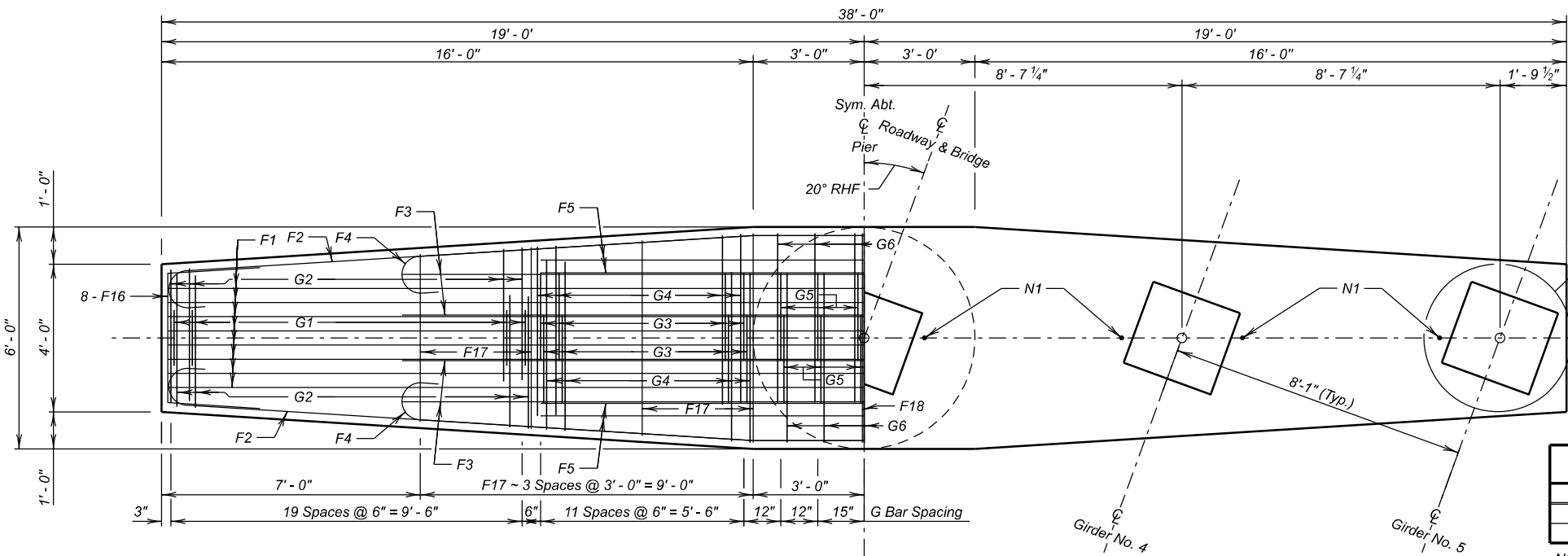


ABUTMENT DETAILS
FOR
258' - 10 7/8" PRESTR. GIRDER BRIDGE
36' - 0" ROADWAY
OVER WILLOW CREEK
STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312

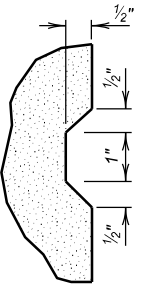
20° RHF SKEW
SEC. 12-T9N-R6E
NH 0212(207)40
HL-93

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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E22	E69



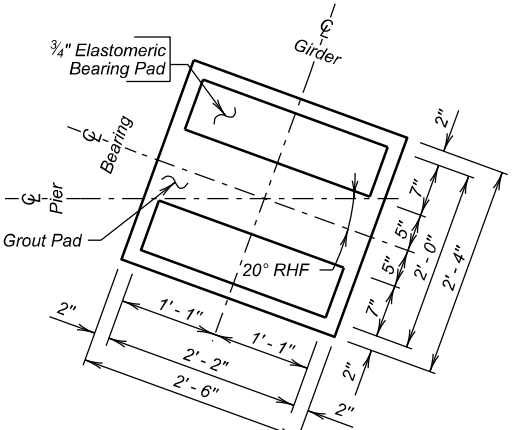
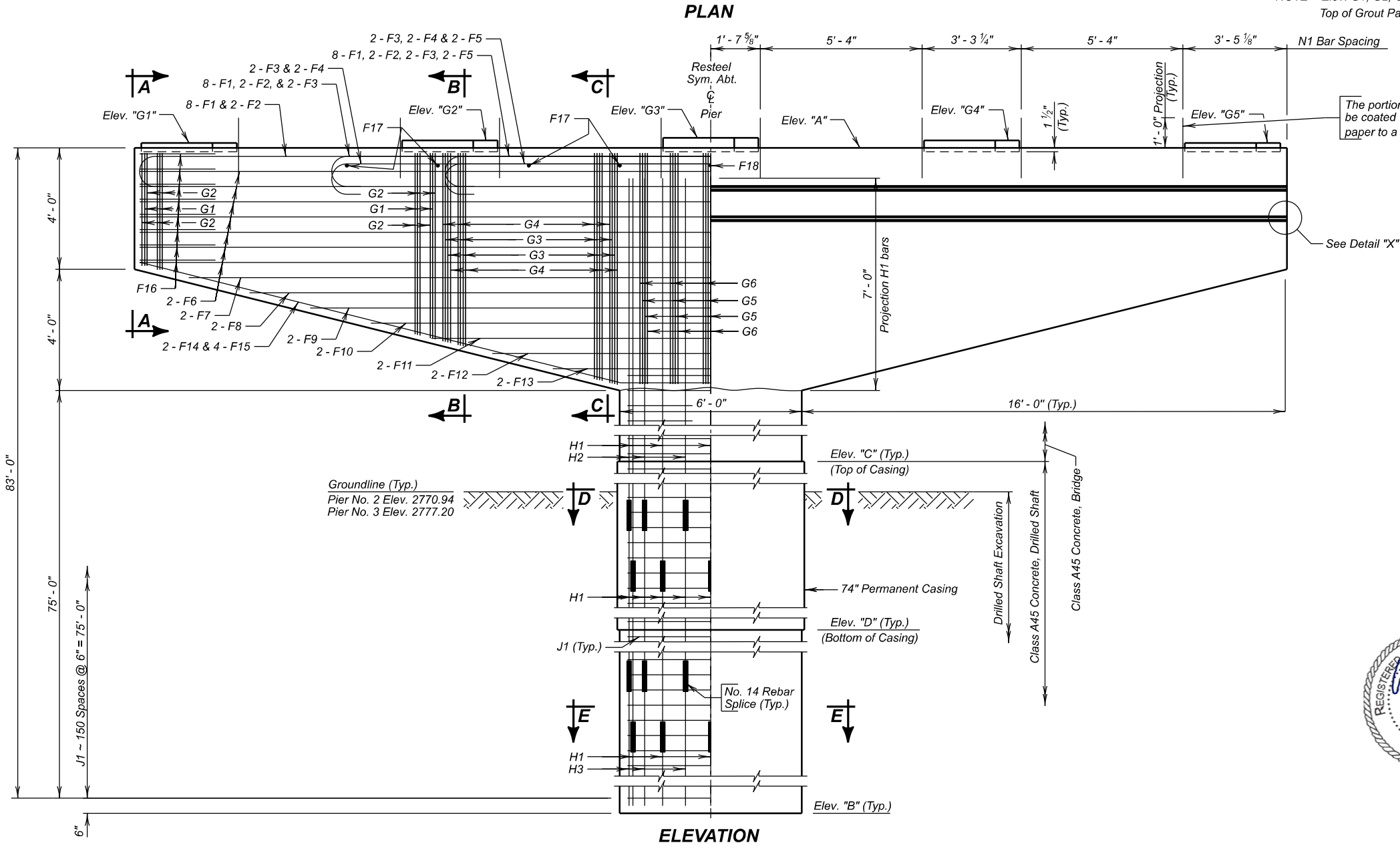
INCREASING STATIONS



DETAIL "X"

TABLE OF ELEVATIONS									
Pier No.	Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"	Elev. G1	Elev. G2	Elev. G3	Elev. G4	Elev. G5
2	2790.30	2707.30	2776.00	2752.00	2790.43	2790.59	2790.76	2790.61	2790.45
3	2790.48	2707.48	2778.00	2752.00	2790.61	2790.77	2790.94	2790.79	2790.63

NOTE - Elev. G1, G2, G3, G4 and G5 are top of grout pad elevations at Pier.
Top of Grout Pad shall be level and smooth.



DETAIL "Z"

PIER DETAILS (A)
FOR
258' - 10 7/8" PRESTR. GIRDER BRIDGE
36' - 0" ROADWAY
OVER WILLOW CREEK
STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312
20° RHF SKEW
SEC. 12-T9N-R6E
NH 0212(207)40
HL-93

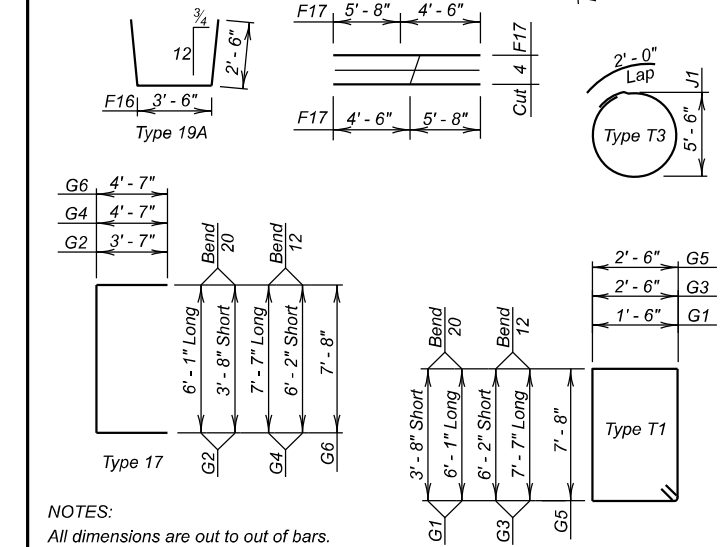


BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGB10	DRAFTED BY KC	BRIDGE ENGINEER
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REINFORCING SCHEDULE
(For One Pier - 2 Required)

Mk.	No.	Size	Length	Type	Bending Details
F1	8	11	40' - 10"	1	
F2	2	11	40' - 11"	7	
F3	4	11	28' - 2"	1	
F4	2	11	28' - 3"	7	
F5	4	11	20' - 8"	1	
F6	14	8	37' - 10"	19A	
F7	2	8	34' - 7"	19A	
F8	2	8	30' - 7"	19A	
F9	2	8	26' - 7"	19A	
F10	2	8	22' - 7"	19A	
F11	2	8	18' - 7"	19A	
F12	2	8	14' - 7"	19A	
F13	2	8	10' - 7"	19A	
F14	2	8	38' - 8"	19A	
F15	4	8	38' - 8"	19A	
F16	16	8	8' - 6"	19A	
F17	4	8	10' - 2"	Str.	
F18	1	8	5' - 8"	Str.	
G1	40	5	13' - 8"	T1	
G2	80	5	12' - 0 1/2"	17	
G3	48	5	19' - 8"	T1	
G4	48	5	16' - 0 1/2"	17	
G5	10	5	21' - 3"	T1	
G6	10	5	16' - 10"	17	
H1	40	14	27' - 3"	Str.	
H2	10	14	25' - 3"	Str.	
H3	10	14	29' - 3"	Str.	
J1	151	5	19' - 3"	T3	
N1	8	8	2' - 0"	Str.	



PIER DETAILS (B)

FOR

258' - 10 7/8" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY
OVER WILLOW CREEK
STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312

20° RHF SKEW
SEC. 12-T9N-R6E
NH 0212(207)40
HL-93

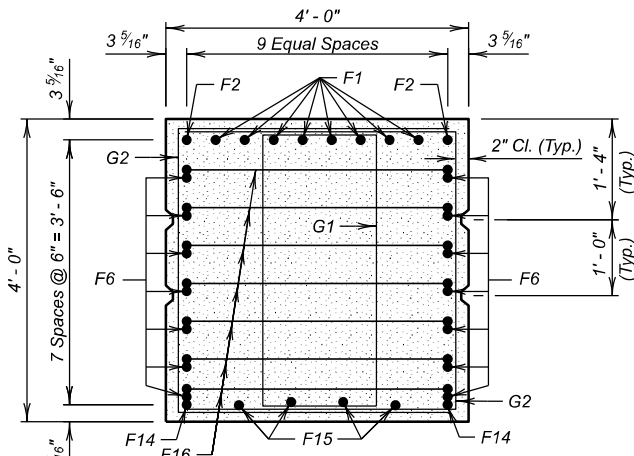
BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

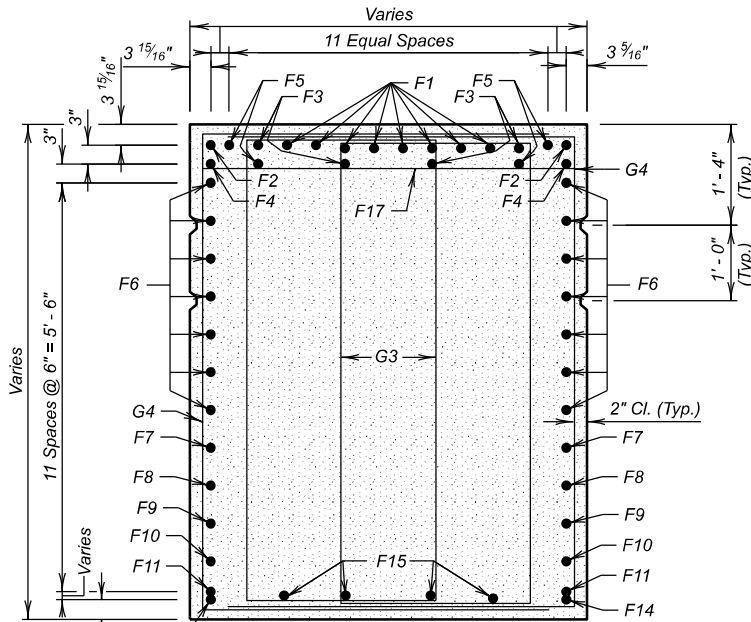
AUGUST 2025

11 OF 30

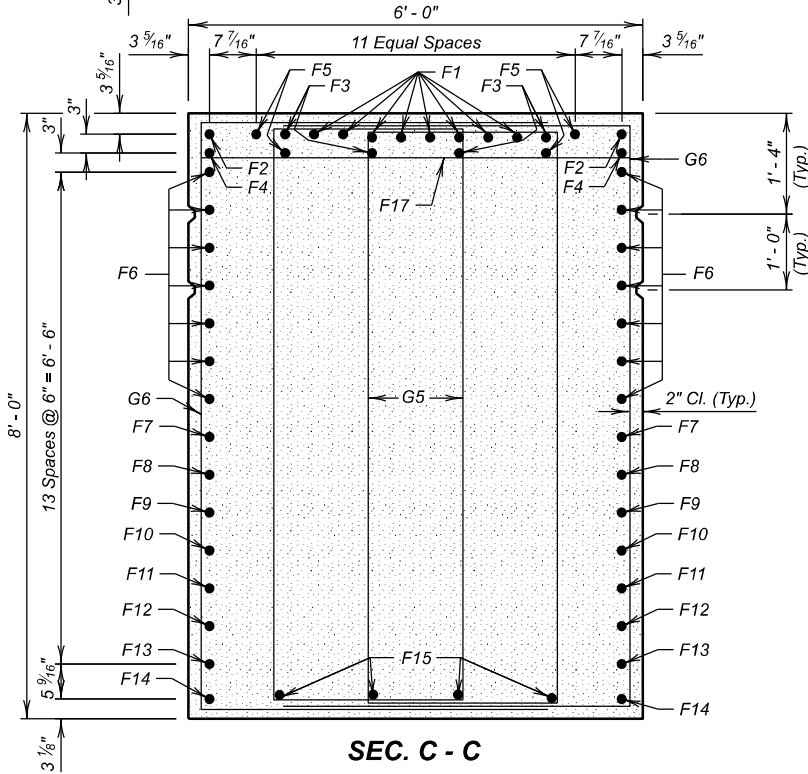
DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGB11	DRAFTED BY KC	BRIDGE ENGINEER
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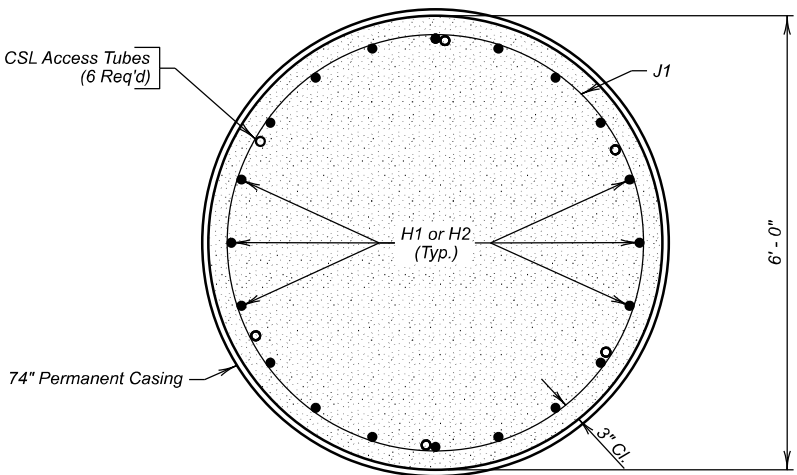
SEC. A - A



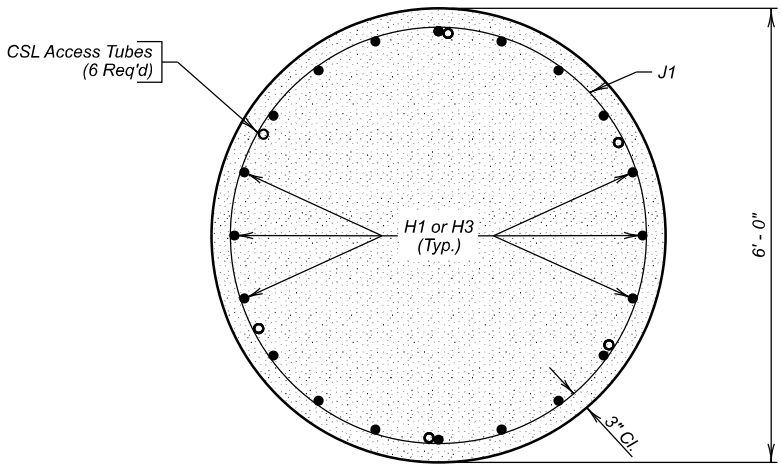
SEC. B - B



SEC. C - C



SEC. D - D



SEC. E - E

ESTIMATED QUANTITIES

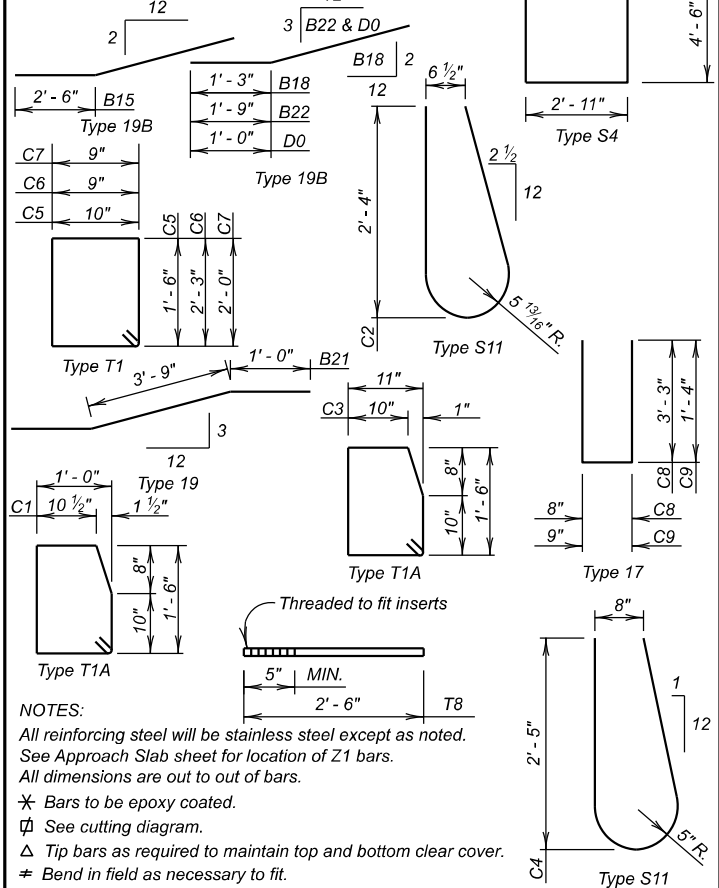
ITEM	UNIT	QUANTITY	
		Pier No. 2	Pier No. 3
Class A45 Concrete, Bridge	Cu. Yd.	55.5	53.6
Reinforcing Steel	Lb.	26,215	26,215
Drilled Shaft Excavation	Cu. Yd.	67.8	74.5
Class A45 Concrete, Drilled Shaft	Cu. Yd.	71.9	73.8
Crosshole Sonic Log (CSL) Test	Each	1	1
74" Permanent Casing	Ft.	24	26
No. 14 Rebar Splice	Each	40	40

* Includes 0.3 Cu. Yds. for Grout Pads at Piers 2 & 3.
6' - 0" Ø Equals 0.548 Cu. Yd/Ft. and 6' - 2" Ø Equals 0.564 Cu. Yd/Ft.



Mk.	No.	Size	Length	Type
B	485	5	39' - 6"	1
B1	26	5	41' - 6"	1A
B2	485	4	38' - 4"	Str.
B3	26	4	40' - 4"	Str.
B15	12	5	9' - 6"	19B
B16	10	4	50' - 2"	Str
B17	8	4	5' - 8"	Str
B18	12	8	3' - 0"	19B
B19	12	5	2' - 0"	Str
B20	12	6	3' - 6"	17A
B21	4	4	5' - 9"	19
B22	4	4	3' - 3"	19B
C1	496	5	5' - 10"	T1A
C2	500	5	5' - 3"	S11
C3	4	5	5' - 8"	T1A
C4	8	5	5' - 3"	T1A
C5	8	5	5' - 7"	S11
C6	12	6	7' - 4"	T1
C7	12	5	6' - 5"	T1
C8	4	6	7' - 3"	17
C9	4	5	3' - 5"	17
D	20	4	53' - 10"	Str.
D0	4	4	2' - 6"	19B
D1	60	4	50' - 10"	Str.
D2	86	5	60' - 0"	Str.
D3	86	7	59' - 0"	Str.
D4	43	5	33' - 10"	Str.
D5	84	7	32' - 6"	Str.
D6	190	5	53' - 11"	Str.
D7	20	5	54' - 3"	Str.
T1	16	6	5' - 11"	Str.
T2	48	5	7' - 9"	Str.
T3	16	5	5' - 7"	Str.
T4	12	5	5' - 0"	19C
T5	6	6	37' - 9"	Str.
T6	20	5	6' - 7"	19C
T7	20	5	5' - 0"	19C
T8	32	6	2' - 6"	Str.
U1	40	4	13' - 5"	S4
U2	20	6	13' - 11"	S4
U3	64	4	4' - 3"	17
Z1	48	7	4' - 0"	Str.

Mk.	No.	Size	Length	Type
B	485	5	39' - 6"	1
B1	26	5	41' - 6"	1A
B2	485	4	38' - 4"	Str.
B3	26	4	40' - 4"	Str.
B15	12	5	9' - 6"	19B
B16	10	4	50' - 2"	Str
B17	8	4	5' - 8"	Str
B18	12	8	3' - 0"	19B
B19	12	5	2' - 0"	Str
B20	12	6	3' - 6"	17A
B21	4	4	5' - 9"	19
B22	4	4	3' - 3"	19B
C1	496	5	5' - 10"	T1A
C2	500	5	5' - 3"	S11
C3	4	5	5' - 8"	T1A
C4	8	5	5' - 3"	T1A
C5	8	5	5' - 7"	S11
C6	12	6	7' - 4"	T1
C7	12	5	6' - 5"	T1
C8	4	6	7' - 3"	17
C9	4	5	3' - 5"	17
D	20	4	53' - 10"	Str.
D0	4	4	2' - 6"	19B
D1	60	4	50' - 10"	Str.
D2	86	5	60' - 0"	Str.
D3	86	7	59' - 0"	Str.
D4	43	5	33' - 10"	Str.
D5	84	7	32' - 6"	Str.
D6	190	5	53' - 11"	Str.
D7	20	5	54' - 3"	Str.
T1	16	6	5' - 11"	Str.
T2	48	5	7' - 9"	Str.
T3	16	5	5' - 7"	Str.
T4	12	5	5' - 0"	19C
T5	6	6	37' - 9"	Str.
T6	20	5	6' - 7"	19C
T7	20	5	5' - 0"	19C
T8	32	6	2' - 6"	Str.
U1	40	4	13' - 5"	S4
U2	20	6	13' - 11"	S4
U3	64	4	4' - 3"	17
Z1	48	7	4' - 0"	Str.



NOTES:

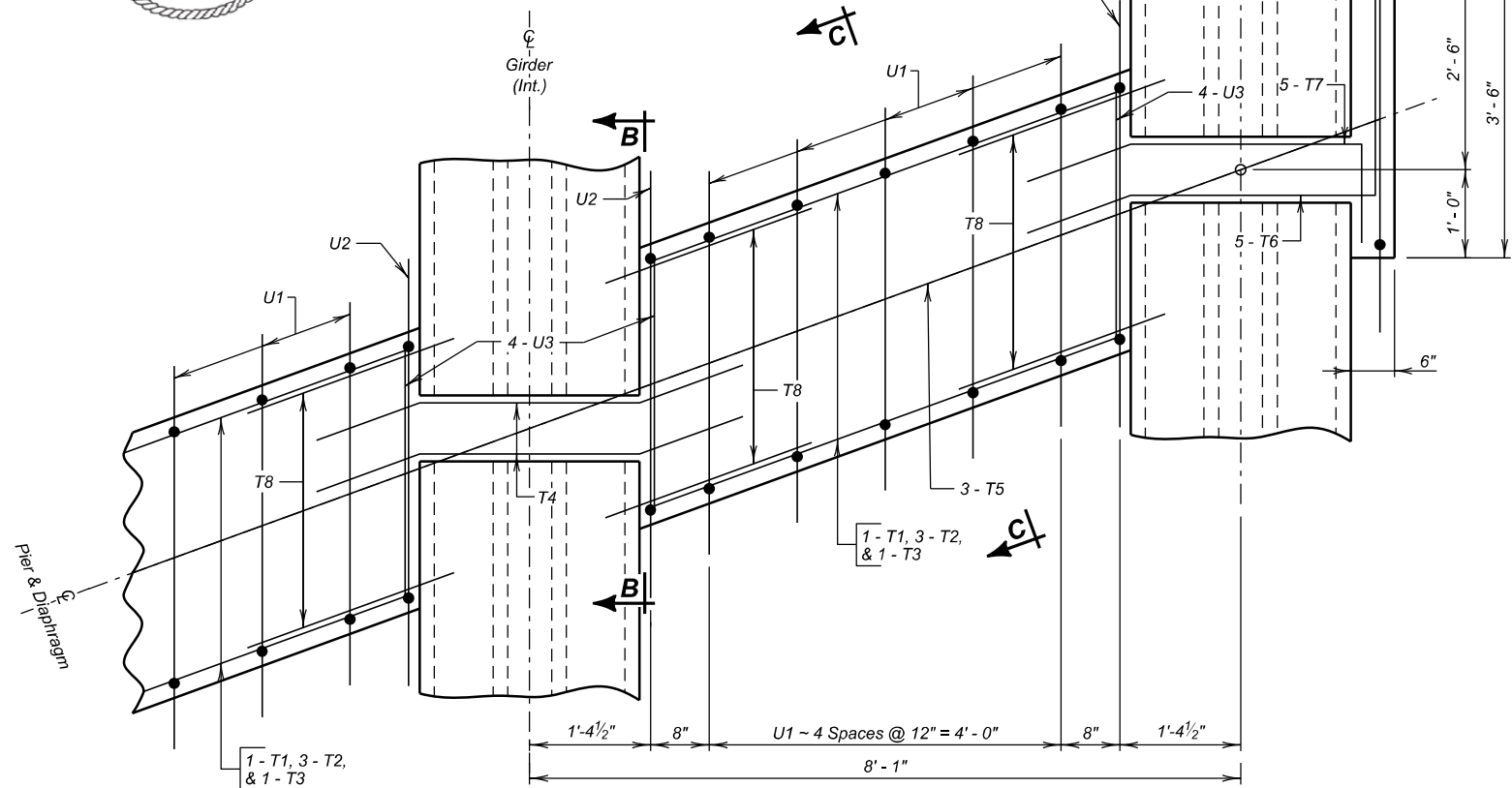


2'- 6"

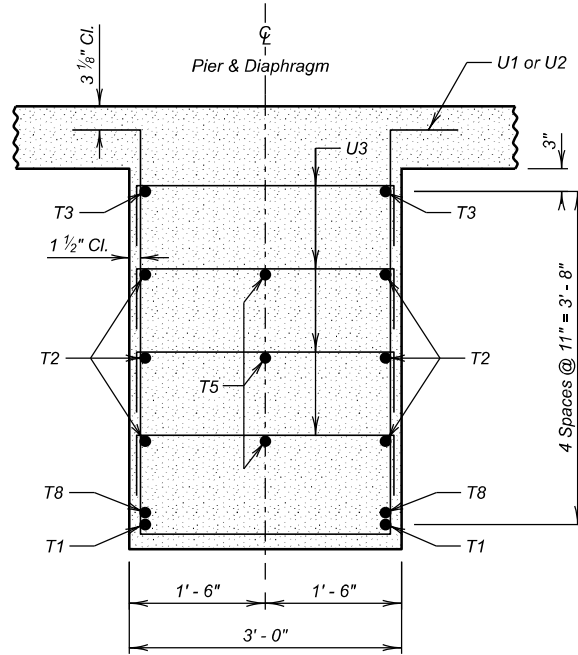
T8

All reinforcing steel will be stainless steel except as noted.
See Approach Slab sheet for location of Z1 bars.
All dimensions are out to out of bars.

- * Bars to be epoxy coated.
- Ø See cutting diagram.
- Δ Tip bars as required to maintain top and bottom clear cover.
- ≠ Bend in field as necessary to fit.



PIER DIAPHRAGMS
(Slab Not Shown)



SEC. C - C
(Girders Not Shown)

NOTE -

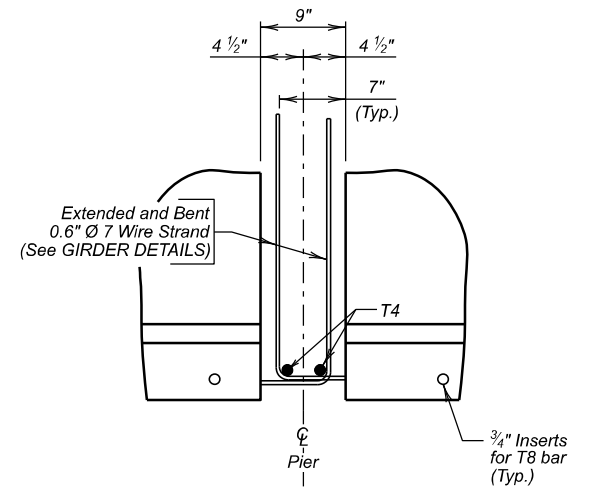
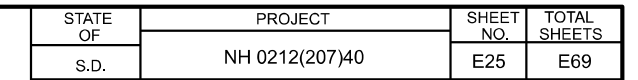
Concrete will be placed in the space under the beams at Piers 2 & 3 (within the diaphragm width) during the diaphragm pour. If upon form removal the space is not completely filled and consolidated, the Contractor will grout in the remaining voids.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
<i>Class A45 Concrete, Bridge Deck</i>	<i>Cu. Yd.</i>	<i>369.6</i>
<i>Stainless Reinforcing Steel</i>	<i>Lb.</i>	<i>80,147</i>
<i>Epoxy Coated Reinforcing Steel</i>	<i>Lb.</i>	<i>1,081</i>
<i>45" Minnesota Shape Prestressed Concrete Beam</i>	<i>Ft.</i>	<i>1,275</i>
<i>Concrete Penetrating Sealer</i>	<i>Sq. Yd.</i>	<i>1,031.4</i>
<i>Deck Drain Girder Bridge</i>	<i>Each</i>	<i>15</i>

☆ Includes quantities for Pier Diaphragms, Barrier Curbs, Slab, and Haunch.
(Average depth of 2" used for Haunch Quantity.) Concrete Quantity for
Barrier Curbs is 0.1184 Cu. Yd./Ft. and for End Blocks is 0.7184 Cu. Yd. each.

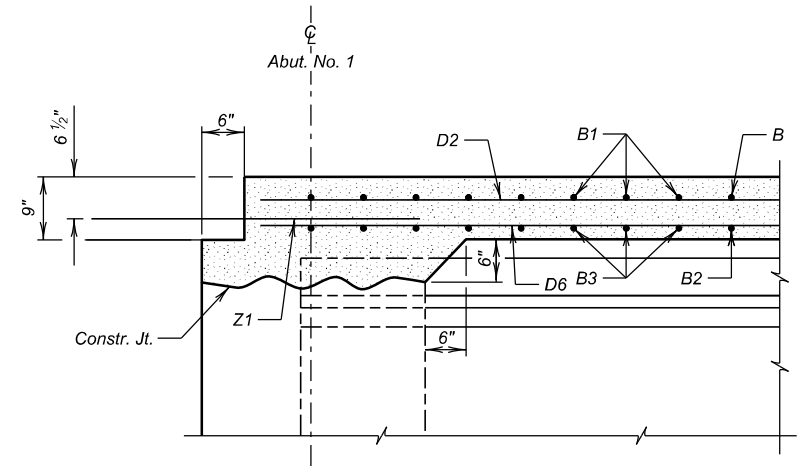
✧ Includes quantities for Barrier Curbs and Slab.

Ø Includes quantities for Pier Diaphragms.



SEC. B - B

(Showing extended and bent strand detail and T4 bar placement at Pier. T6 & T7 similar at exterior girder.)



SEC. D - D

SUPERSTRUCTURE DETAILS (B)

FOR

258' - 10 $\frac{7}{8}$ " PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY
OVER WILLOW CREEK

STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312

20° RHF SKEW
SEC. 12-T9N-R6E
NH 0212(207)40
HL-93

BUTTE COUNTY

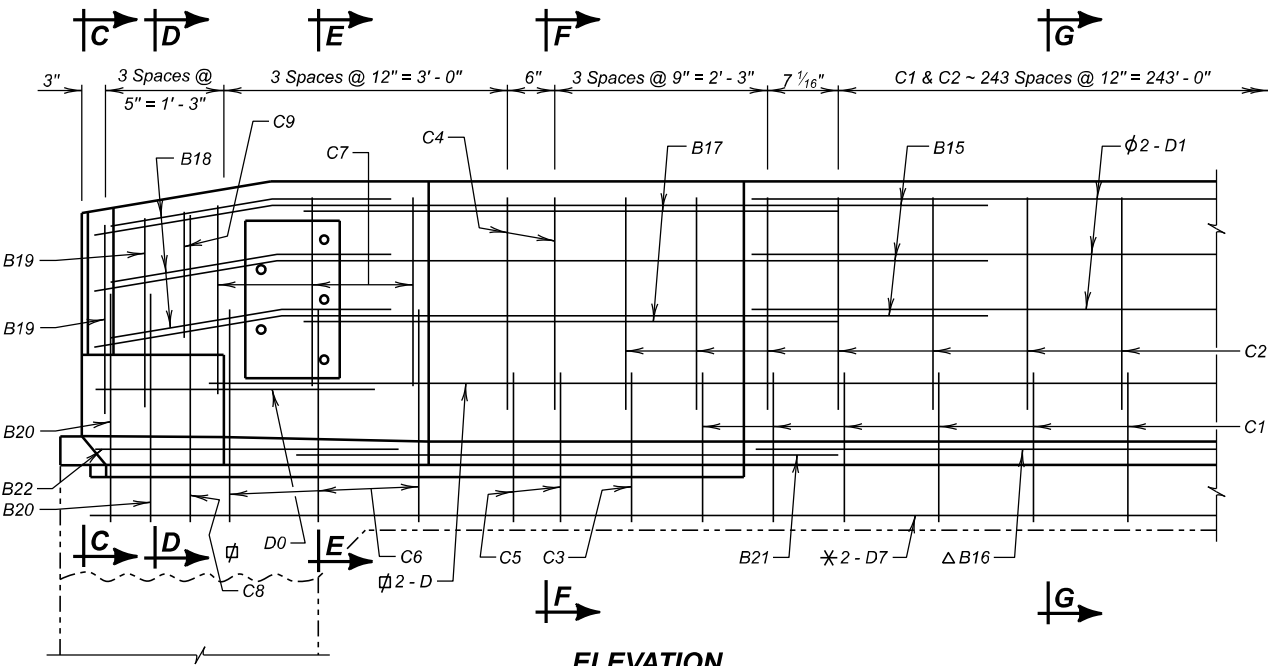
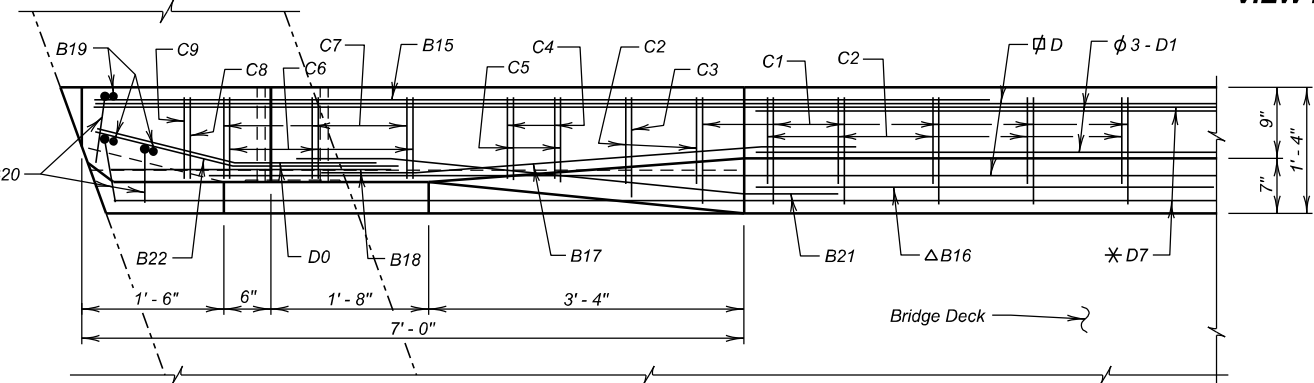
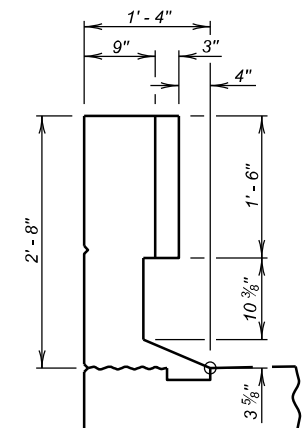
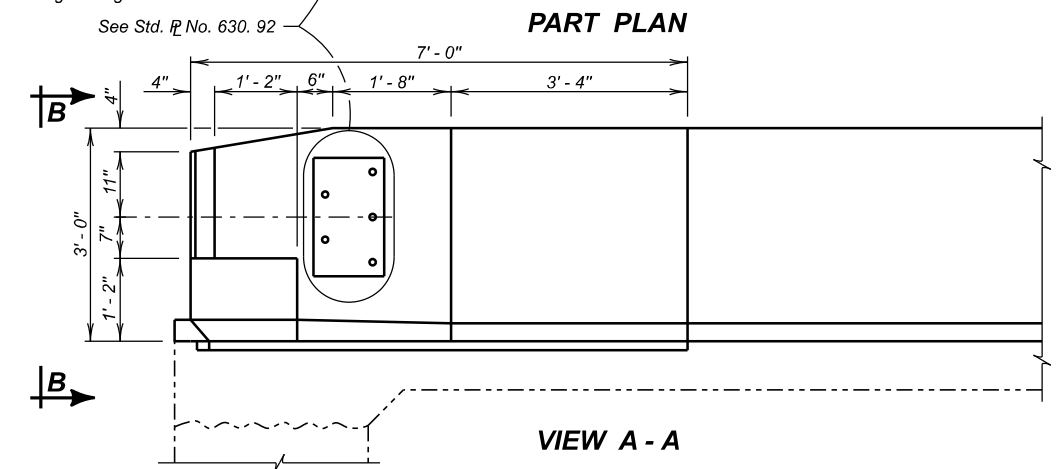
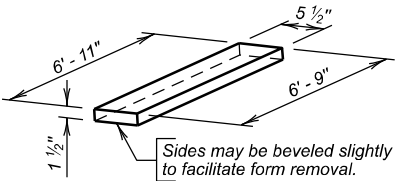
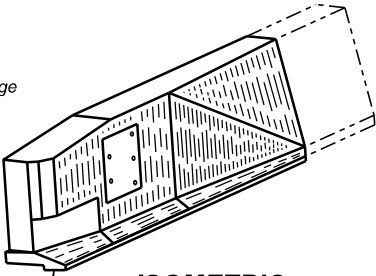
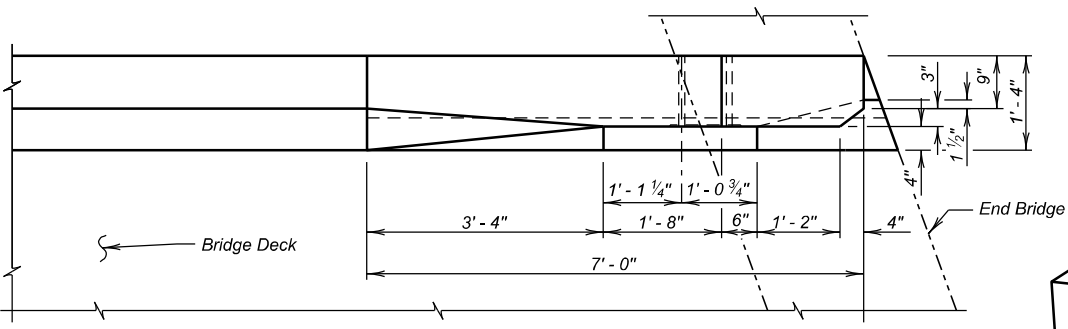
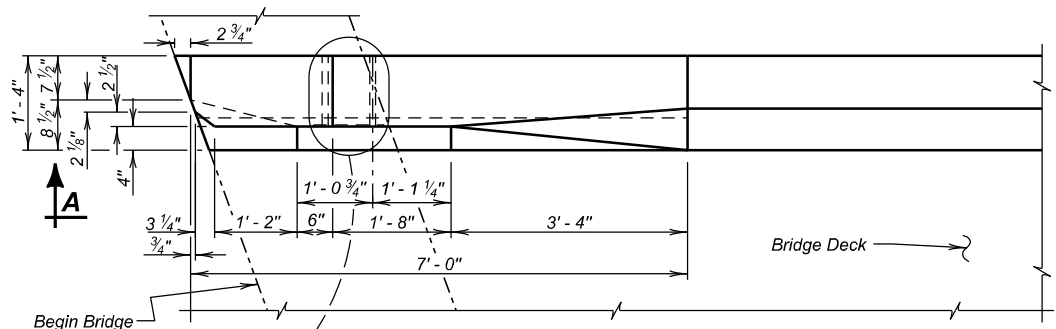
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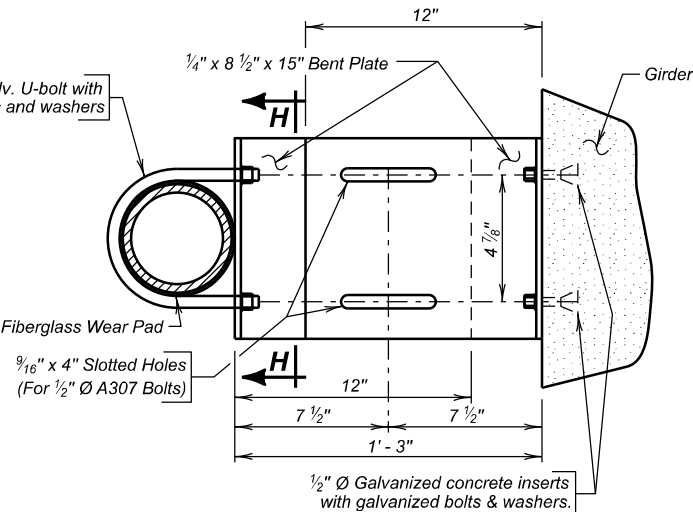
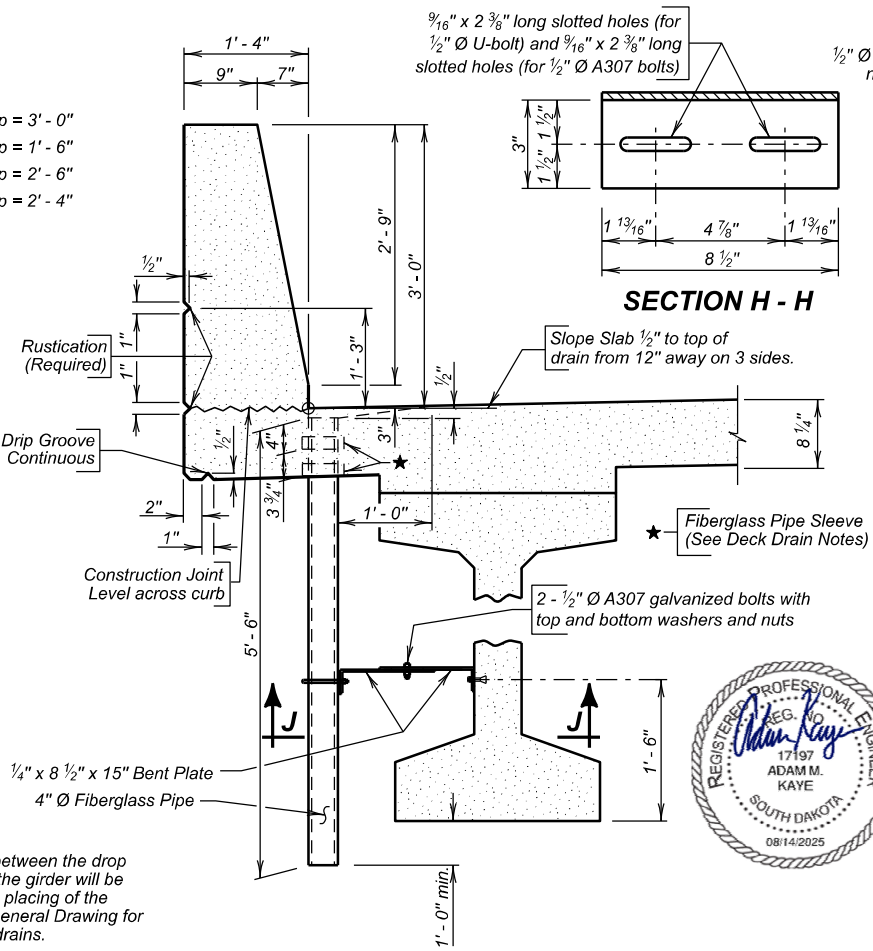
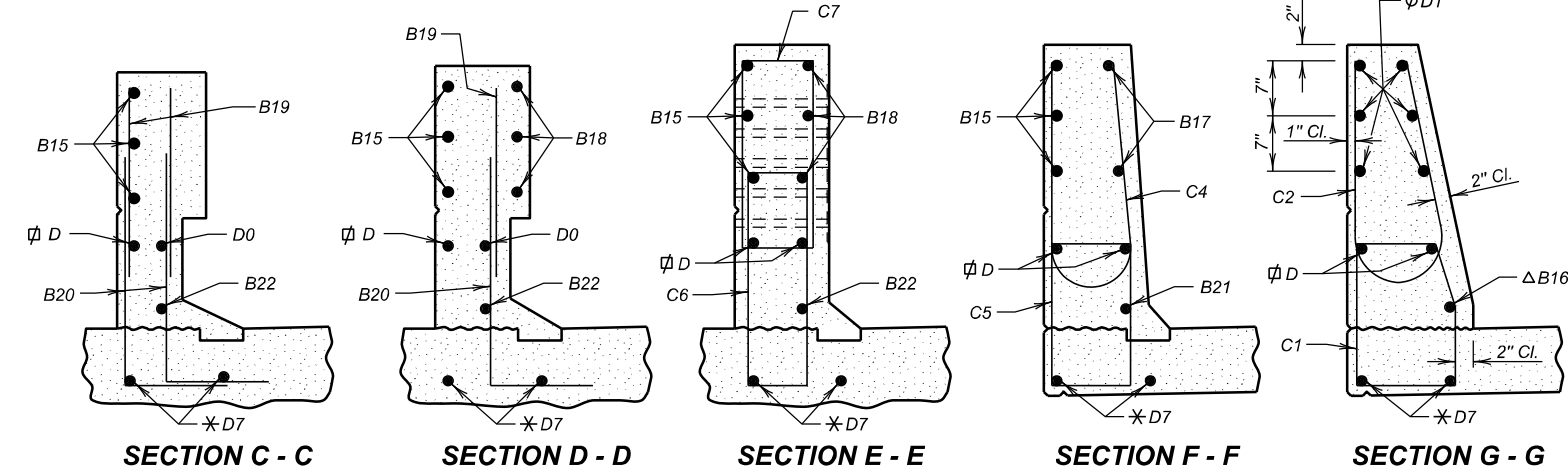
13 OF 30

DESIGNED BY AK	CK. DES. BY LB	DRAFTED BY KC	
BUTE06JD	06JDGB13		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E26	E69



NOTES:
 * Min. Lap = 3' - 0"
 Δ Min. Lap = 1' - 6"
 ∅ Min. Lap = 2' - 6"
 ϕ Min. Lap = 2' - 4"



END BLOCK, BARRIER CURB, & DECK DRAIN DETAILS
 FOR
258' - 10 7/8" PRESTR. GIRDER BRIDGE
 36' - 0" ROADWAY
 OVER WILLOW CREEK
 STA. a 302 + 33.27 TO a 304 + 92.18
 STR. NO. 10-357-312

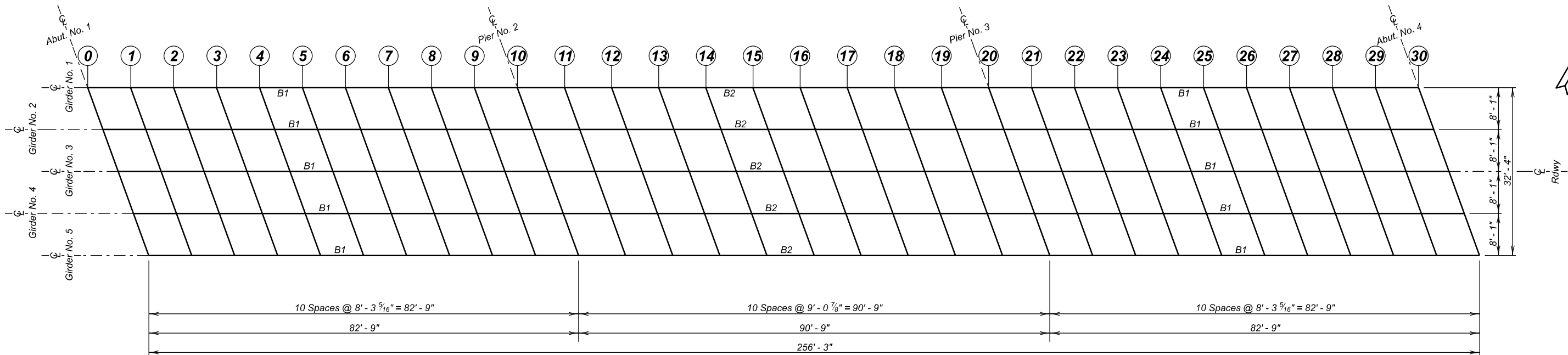
BUTTE COUNTY
 S. D. DEPT. OF TRANSPORTATION
 AUGUST 2025

DESIGNED BY	CK. DES. BY	DRAFTED BY	BRIDGE ENGINEER
AK BUTE06JD	LB 06JDBG14	KC	

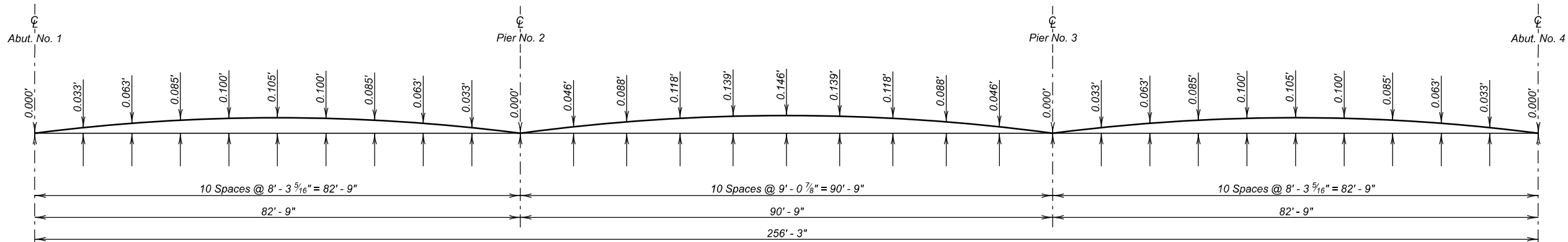


NOTE:
 The connection between the drop tube and web of the girder will be made prior to the placing of the deck slab. See General Drawing for spacing of deck drains.

BARRIER & DECK DRAIN DETAILS



GIRDER LAYOUT



CAMBER DIAGRAM

The Camber shown is the amount which has been added to the theoretical slab elevations to get slab elevations shown in the table of Slab Form Elevations and Calculations. Camber shown is for D.L. of slab, traffic barrier, and haunch, but does not include D.L. of beams.

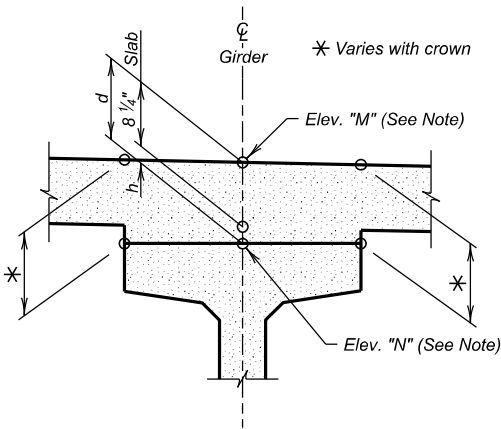


ERECTION DATA
FOR
258' - 10 7/8" PRESTR. GIRDER BRIDGE
36' - 0" ROADWAY
OVER WILLOW CREEK
STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312
20° RHF SKEW
SEC. 12-T9N-R6E
NH 0212(207)40
HL-93

BUTTE COUNTY
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		TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS															
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 Girder No.	Elev. "M"	2795.04	2795.07	2795.11	2795.14	2795.17	2795.19	2795.20	2795.20	2795.20	2795.19	2795.18	2795.24	2795.30	2795.35	2795.39	2795.42
	(-) Elev. "N"																
	(=) d																
	(-) 0.688'																
	(=) h																
2 Girder No.	Elev. "M"	2795.20	2795.24	2795.28	2795.31	2795.34	2795.36	2795.38	2795.38	2795.37	2795.36	2795.34	2795.41	2795.48	2795.53	2795.57	2795.60
	(-) Elev. "N"																
	(=) d																
	(-) 0.688'																
	(=) h																
3 Girder No.	Elev. "M"	2795.36	2795.40	2795.44	2795.48	2795.51	2795.53	2795.54	2795.54	2795.54	2795.53	2795.51	2795.58	2795.64	2795.70	2795.74	2795.77
	(-) Elev. "N"																
	(=) d																
	(-) 0.688'																
	(=) h																
4 Girder No.	Elev. "M"	2795.20	2795.24	2795.28	2795.32	2795.35	2795.38	2795.39	2795.39	2795.38	2795.37	2795.35	2795.42	2795.49	2795.54	2795.59	2795.61
	(-) Elev. "N"																
	(=) d																
	(-) 0.688'																
	(=) h																
5 Girder No.	Elev. "M"	2795.05	2795.08	2795.12	2795.16	2795.19	2795.21	2795.22	2795.23	2795.22	2795.21	2795.20	2795.26	2795.32	2795.38	2795.41	2795.44
	(-) Elev. "N"																
	(=) d																
	(-) 0.688'																
	(=) h																

TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS																
1 Girder No.		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	Elev. "M"	2795.43	2795.42	2795.41	2795.38	2795.36	2795.40	2795.45	2795.48	2795.51	2795.53	2795.55	2795.55	2795.55	2795.54	2795.52
	(-) Elev. "N"															
	(=) d															
	(-) 0.688'															
2 Girder No.																
	Elev. "M"	2795.61	2795.60	2795.59	2795.56	2795.52	2795.57	2795.62	2795.66	2795.69	2795.71	2795.72	2795.72	2795.72	2795.71	2795.69
	(-) Elev. "N"															
	(=) d															
	(-) 0.688'															
3 Girder No.																
	Elev. "M"	2795.78	2795.77	2795.75	2795.72	2795.69	2795.74	2795.79	2795.83	2795.86	2795.88	2795.89	2795.89	2795.89	2795.87	2795.86
	(-) Elev. "N"															
	(=) d															
	(-) 0.688'															
4 Girder No.																
	Elev. "M"	2795.62	2795.62	2795.60	2795.57	2795.54	2795.59	2795.63	2795.67	2795.70	2795.72	2795.73	2795.74	2795.73	2795.72	2795.70
	(-) Elev. "N"															
	(=) d															
	(-) 0.688'															
5 Girder No.																
	Elev. "M"	2795.45	2795.45	2795.43	2795.41	2795.38	2795.43	2795.47	2795.51	2795.54	2795.56	2795.57	2795.57	2795.57	2795.56	2795.55
	(-) Elev. "N"															
	(=) d															
	(-) 0.688'															



NOTE —

This table contains the information necessary to determine the depth of concrete over the girders at points shown. Calculations may be carried in the spaces provided. Elev. "M" is the design elevation of the top of slab before any concrete has been poured. This elevation includes correction for camber and dead load deflection. Elev. "N" is a field measured elevation taken on top of girders at the points shown with the girders in their positions. This elevation must be taken after erection is completed, but prior to placing any of the concrete. Girders shall not be supported between bearings when elevations are taken.

NOTE —

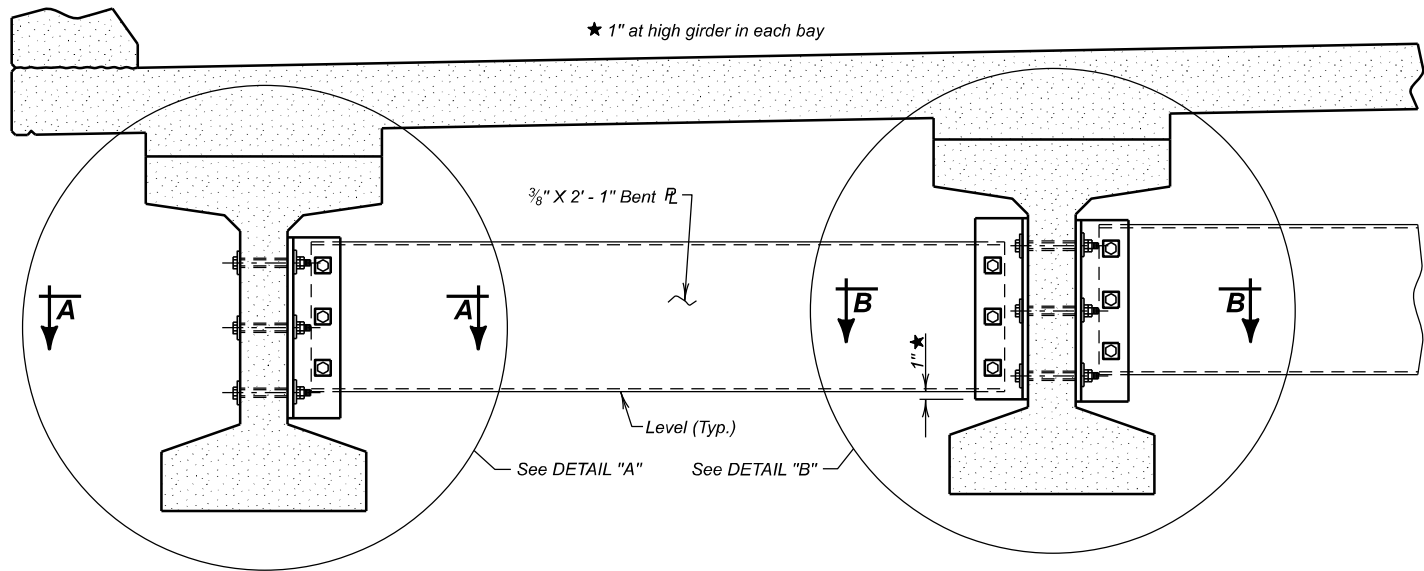
Based on a "d" of 11 1/4" at the C of each abutment and each pier (see SEC. A - A of SUPERSTRUCTURE DETAILS (A)), it is anticipated that the midspan haunch dimension "h" over the C of B1 will be 1 1/4", and B2 will be 1 1/2". If when computing the dimensions in the table, it is found that any dimension "h" is less than zero or greater than 4" the Office of Bridge Design of the South Dakota Dept. of Transportation shall be notified immediately. After the "Table of Slab Form Elevations and Calculations" has been filled out and approved for deck forming, a copy shall be forwarded to the Office of Bridge Design for review and analysis for the purpose of securing information relative to camber growth in the beams. This information is necessary for preparing plans for future structures of this type.



SLAB FORM ELEVATIONS
FOR
258' - 10 7/8" PRESTR. GIRDER BRIDGE
36' - 0" ROADWAY
OVER WILLOW CREEK
STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312

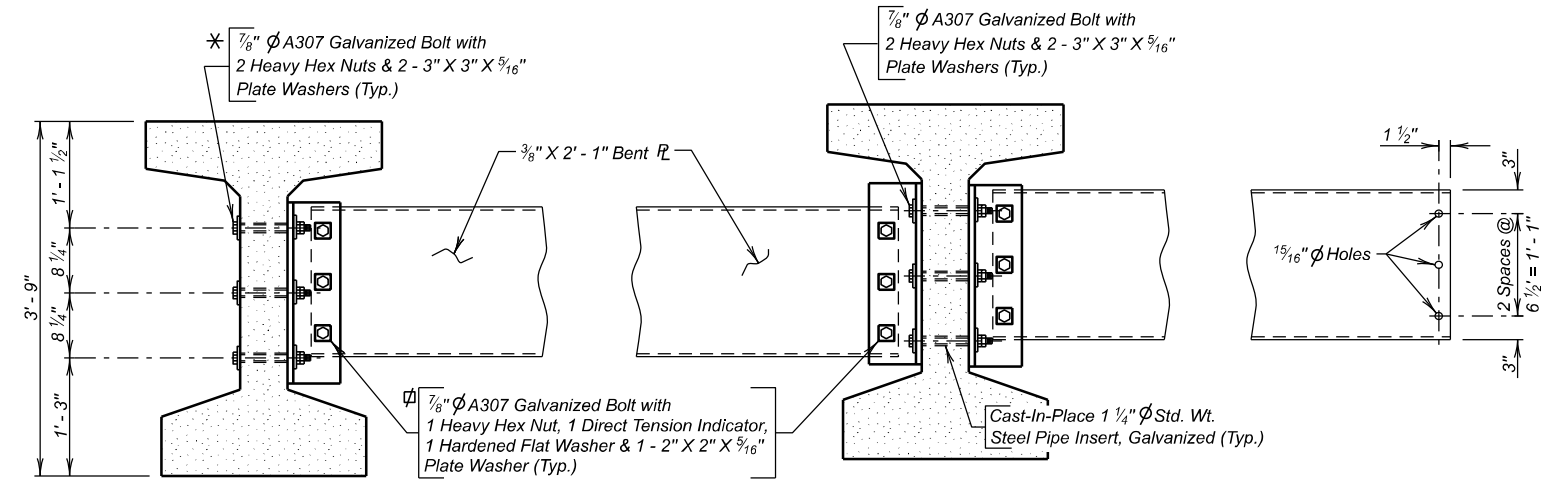
20° RHF SKEW
SEC. 12-T9N-R6E
NH 0212(207)40
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025



SECTION AT DIAPHRAGM

* Bolt head will be adjacent to the Exterior Face of the Exterior Girder.



DETAIL "A"
(Typ. Exterior Girder)

Ø Bolt Head and Direct Tension Indicator will be adjacent to 1 5/16" Ø holes in Bent Plate Diaphragm.

DETAIL "B"
(Typ. Interior Girder)

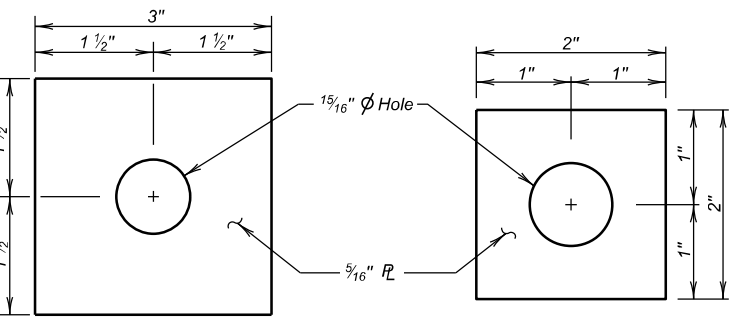
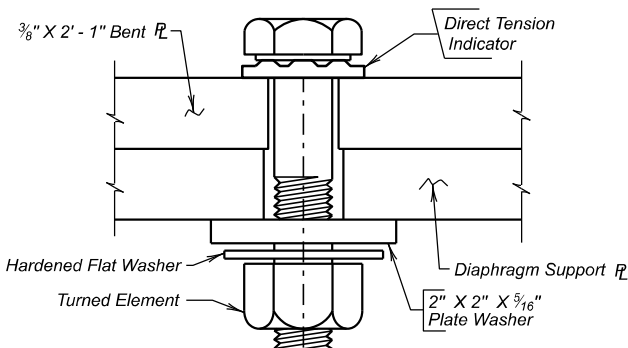
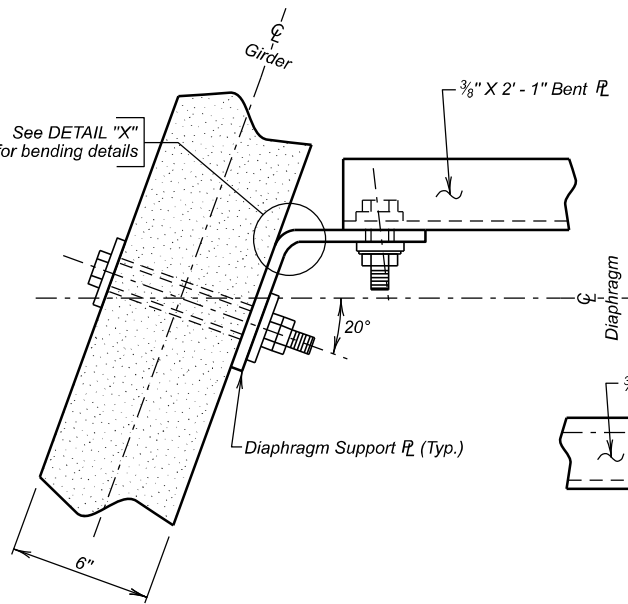


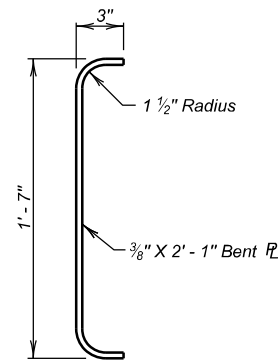
PLATE WASHER DETAILS



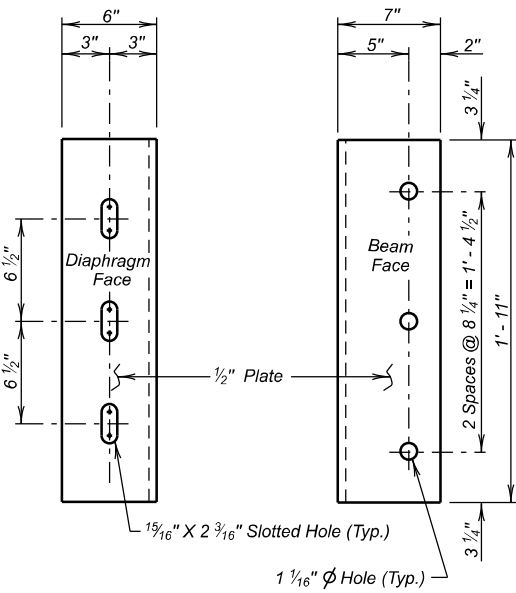
DIRECT TENSION INDICATOR
DETAIL



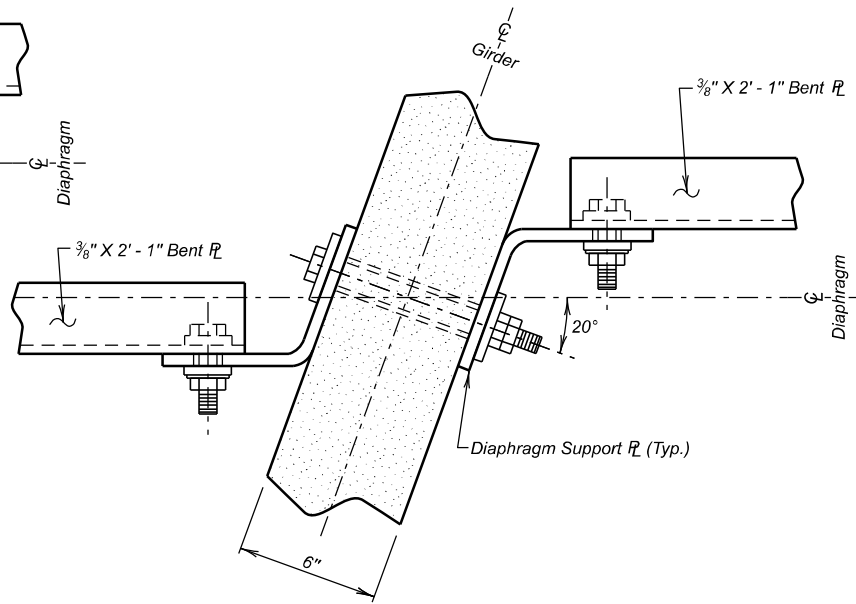
SEC. A - A



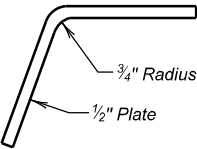
END VIEW BENT
PLATE DIAPHRAGM



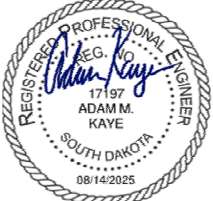
DIAPHRAGM SUPPORT PLATE



SEC. B - B



DETAIL "X"



NOTES:

1. All steel for the diaphragms including plate washers will conform to ASTM A36 and will be galvanized in accordance with ASTM A123 or A153. Bolts, nuts, and washers will be galvanized in accordance with ASTM F2329. Direct Tension Indicators will conform to Section 410 of the Specifications.
2. The steel diaphragms between adjacent girders will be installed as soon as possible and in conjunction with girder erection.
3. All costs associated with furnishing, fabricating, assembly and installation of diaphragms will be included in the lump sum price for Structural Steel, Miscellaneous.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Δ Structural Steel, Miscellaneous	L.S.	Lump Sum

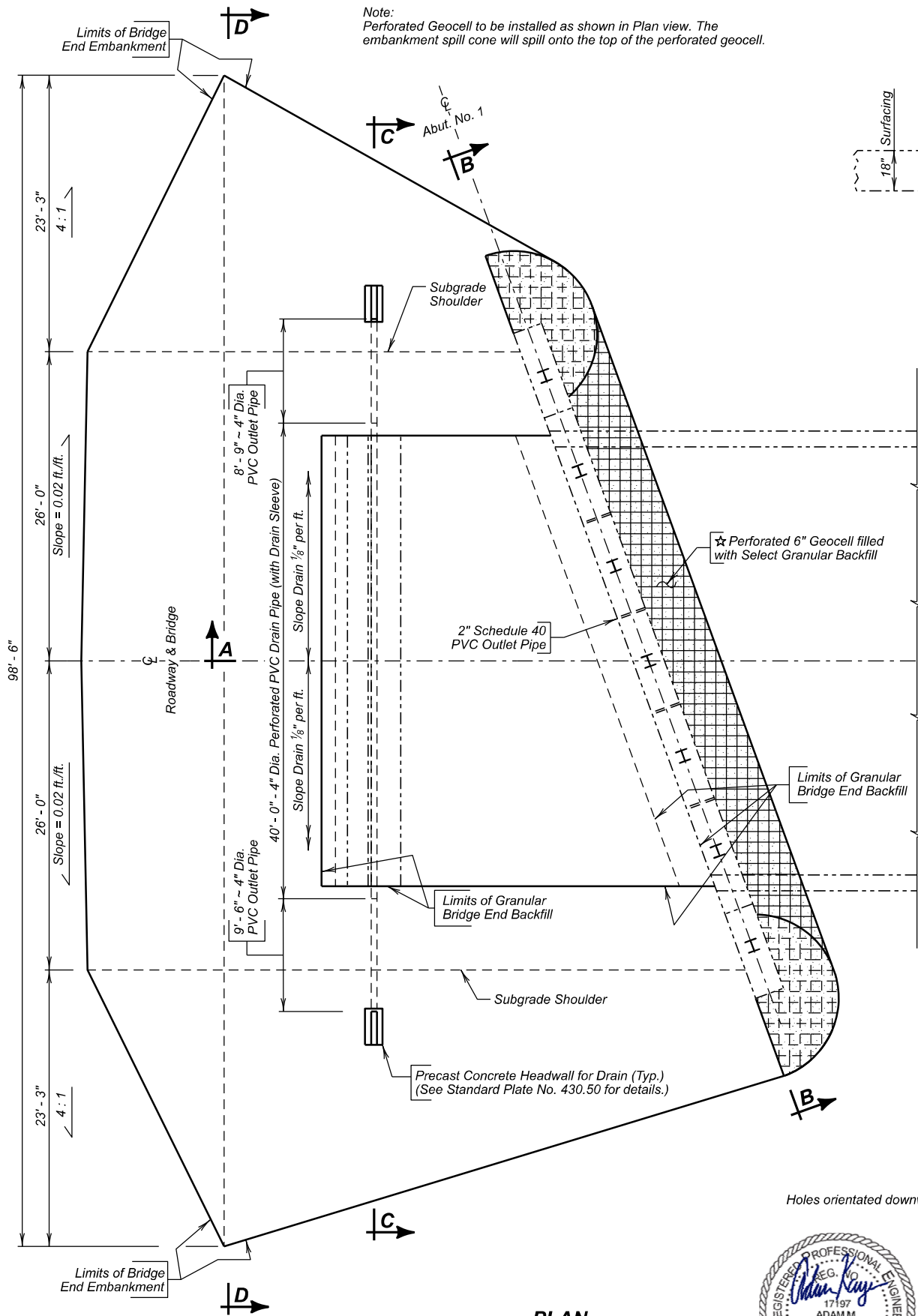
Δ For informational purposes only, the estimated weight of structural steel is 4005 Lbs. for 12 diaphragms.

DIAPHRAGM DETAILS
FOR

258' - 10 7/8" PRESTR. GIRDER BRIDGE
36' - 0" ROADWAY
OVER WILLOW CREEK
STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312

20° RHF SKEW
SEC. 12-T9N-R6E
NH 0212(207)40
HL-93

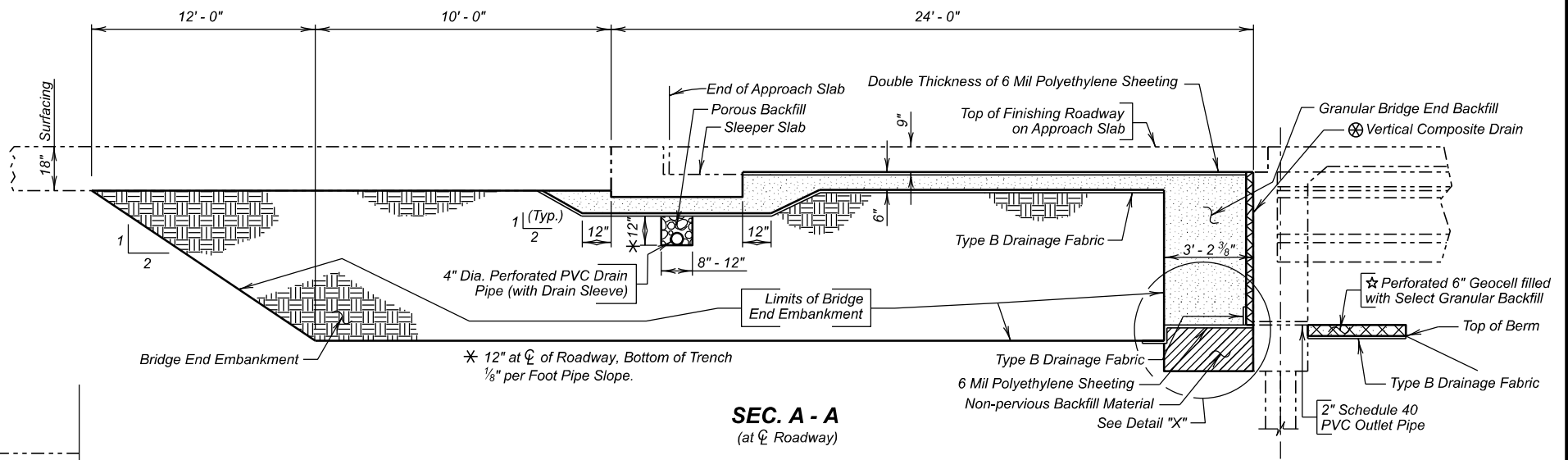
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025



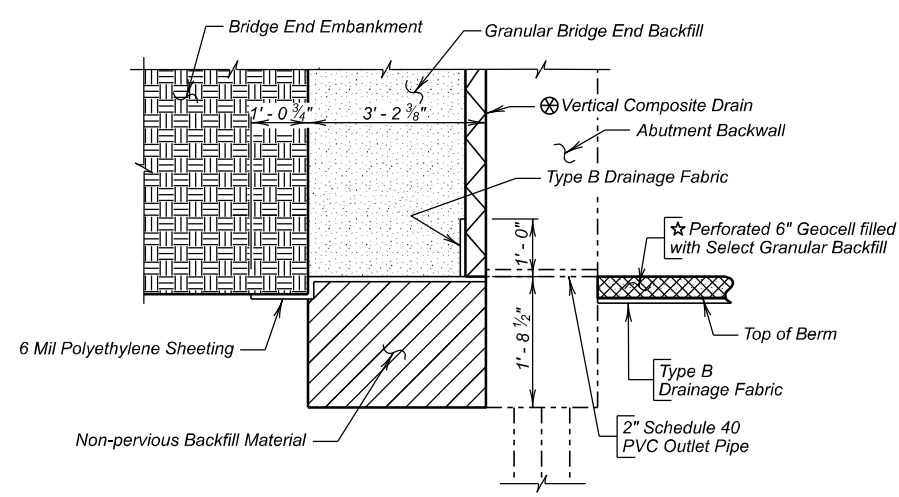
PLAN

(Bridge End Backfill shown adjacent to Abut. No. 1 Abut. No. 4 similar opposite hand except as shown.)

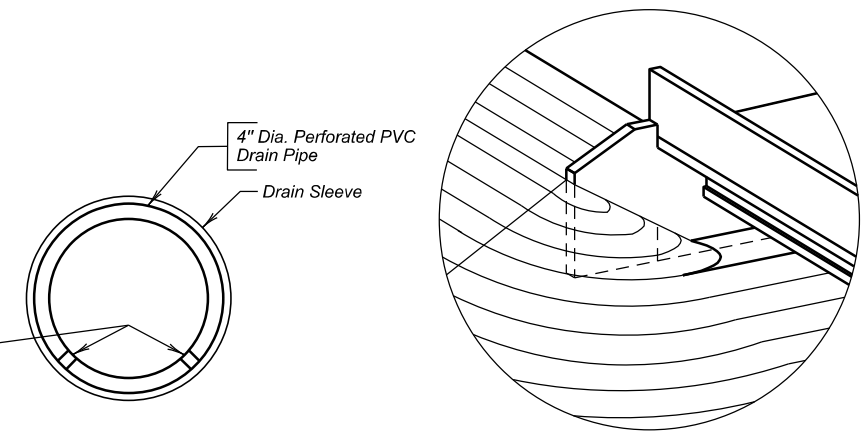
Note: The Contractor will ensure the underdrain pipes located at the sleeper slab are not damaged during the installation of the guardrail posts. Damaged underdrain pipes will be replaced at the Contractor's expense.



SEC. A - A
(at centerline of Roadway)



DETAIL "X"



DRAIN DETAIL

SPILL CONE DETAIL AT EMBANKMENT

⊗ Provide hole in vertical composite drain 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.	80.6
Bridge End Embankment	Cu. Yd.	1500
Porous Backfill	Ton	5.6
4" Underdrain Pipe	Ft.	117
Approach Slab Underdrain Excavation	Cu. Yd.	3
Select Granular Backfill	Ton	24.1
☆ Perforated Geocell	Sq. Ft.	688
Precast Concrete Headwall for Drain	Each	4

1. 80 ft. 4" dia. Perforated PVC Drain Pipe (with Drain Sleeve).
2. 37 ft. 4" dia. PVC Outlet Pipe.
3. 16 ft. 5" dia. Schedule 40 Steel Pipe.
4. 20 ft. 2" dia. PCV Outlet Pipe.
5. 452 sq. ft. Vertical Composite Drain.

Items 1 thru 5 are approximate quantities contained in the 4" Underdrain Pipe and are for information only.

6. 3,276 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
7. 204 sq. yd. Type B Drainage Fabric.

Items 6 and 7 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

258' - 10 7/8" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY
OVER WILLOW CREEK
STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312

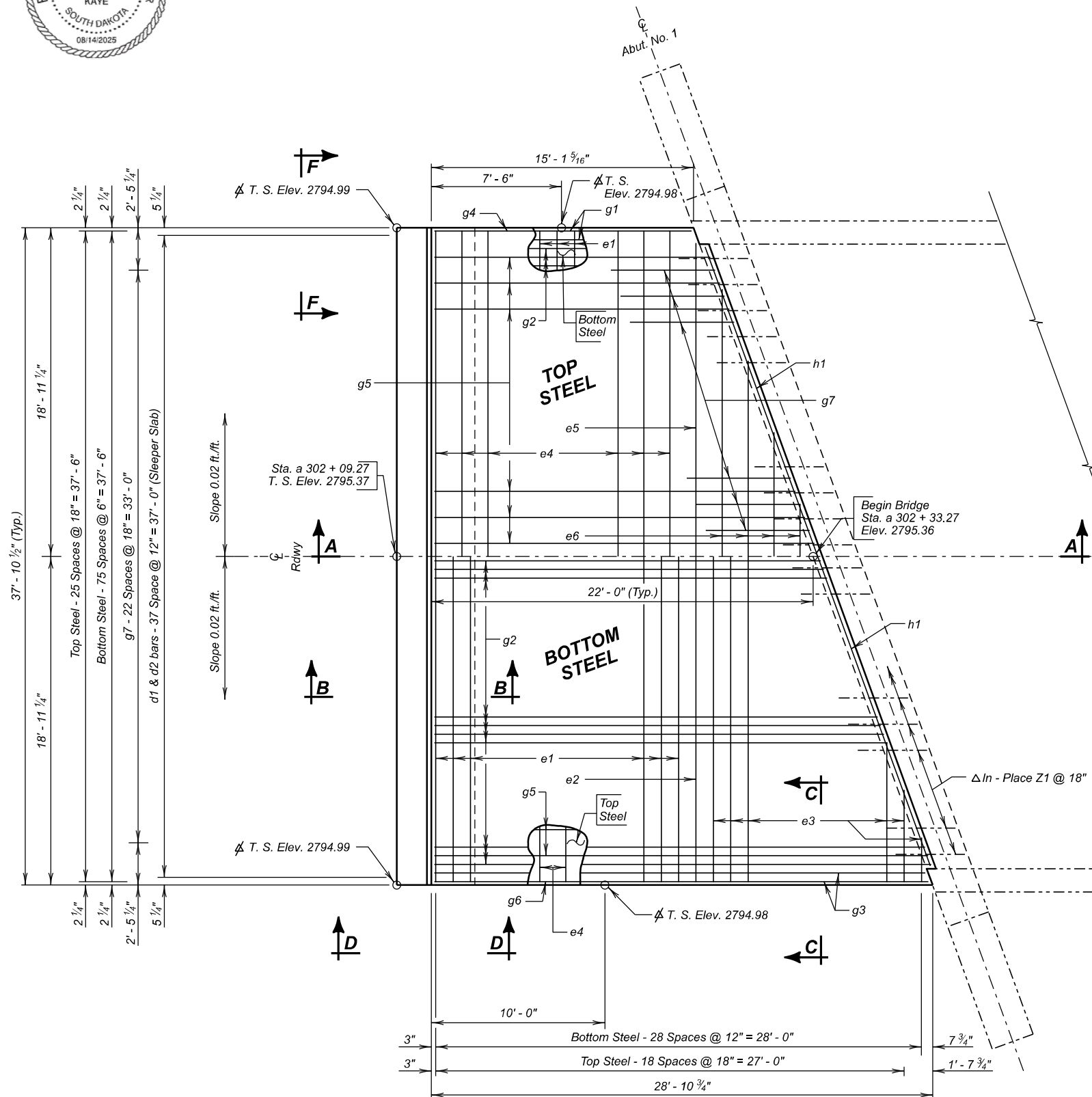
20° RHF SKEW
SEC. 12-T9N-R6E
NH 0212(207)40
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGB20	DRAFTED BY KC	BRIDGE ENGINEER
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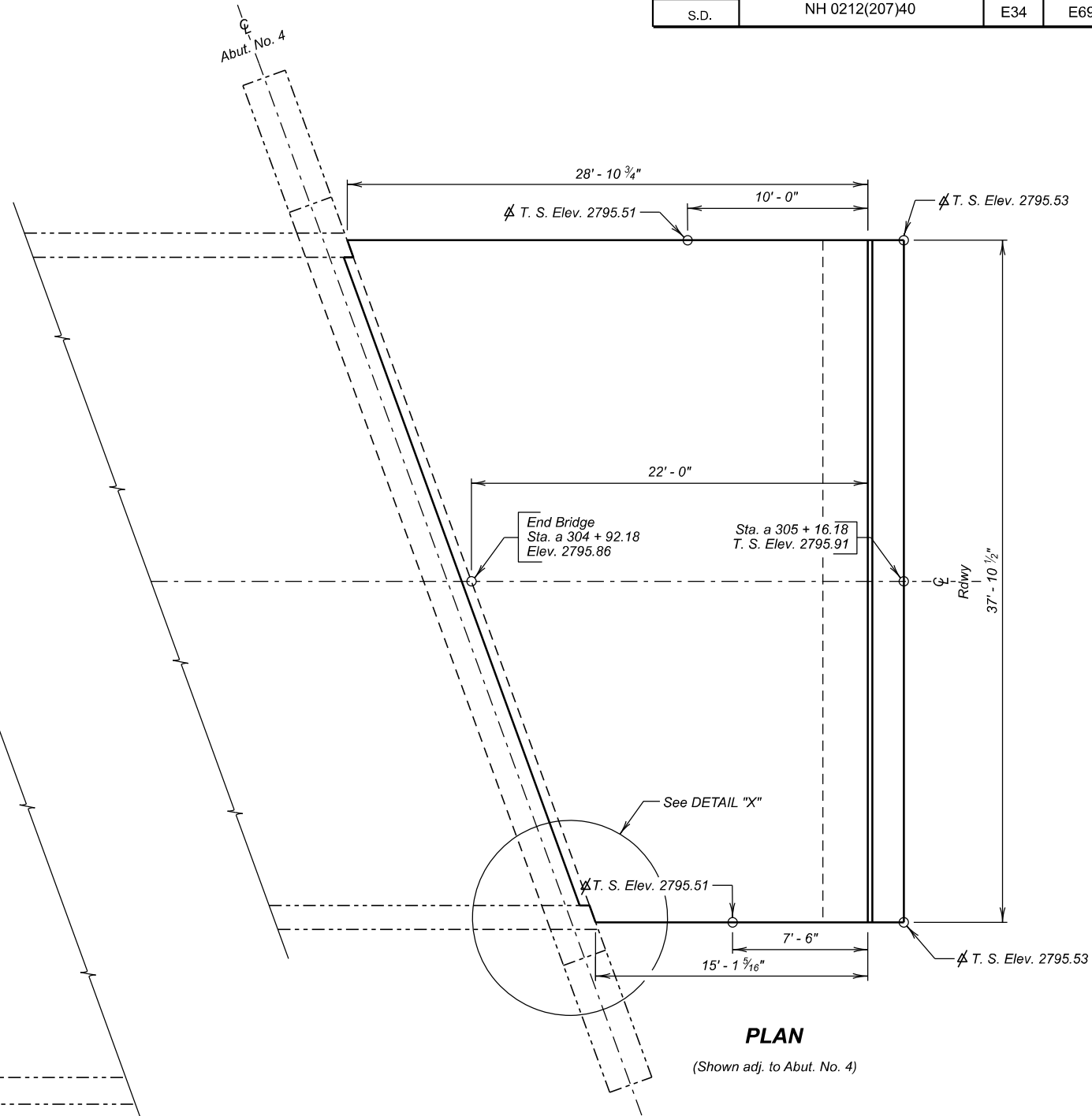
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E34	E69



PLAN

(Shown adj. to Abut. No. 1, Abut. No. 4 similar by rotation except as shown.)

NOTE:
For section views and approach slab details, see
APPROACH SLAB ADJACENT TO BRIDGE DETAILS (B)



PLAN

(Shown adj. to Abut. No. 4)

APPROACH SLAB ADJACENT TO BRIDGE DETAILS (A)

FOR

258' - 10 7/8" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY

OVER WILLOW CREEK

STA. a 302 + 33.27 TO a 304 + 92.18

STR. NO. 10-357-312

20° RHF SKEW

SEC. 12-T9N-R6E

NH 0212(207)40

HL-93

BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

AUGUST 2025

22 OF 30

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGB22	DRAFTED BY KC	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0212(207)40	E35	E69

REINFORCING SCHEDULE

(For Two Approach Slabs and Two Sleeper Slabs)

Mk.	No.	Size	Length	Type	Bending Details	
Sleeper Slabs						
c1	32	5	37' - 7"	Str.		
d1	152	4	5' - 0"	2		
d2	76	4	6' - 1"	T2		
Approach Slabs						
e1	30	6	37' - 7"	Str.		
e2	2	6	37' - 0"	Str.		
e3	13	6	38' - 5"	Str.		
e4	20	4	37' - 7"	Str.		
e5	2	4	37' - 0"	Str.		
e6	8	4	39' - 10"	Str.		
g1	4	8	14' - 11"	Str.		
g2	72	8	44' - 6"	Str.		
g3	4	8	28' - 4"	Str.		
g4	2	4	14' - 11"	Str.		
g5	24	4	44' - 6"	Str.		
g6	2	4	28' - 6"	Str.		
g7	46	4	6' - 0"	Str.		
h1	4	6	38' - 0"	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.	189.4
Concrete Approach Sleeper Slab for Bridge	Sq. Yd.	37.9

- 48.6 Cu. Yds. Concrete in Approach Slab.
- 13,520 Lbs. Epoxy Coated Re-Steel in Approach Slab.
- 13.6 Cu. Yds. Concrete in Sleeper Slab.
- 2,071 Lbs. Epoxy Coated Re-Steel in Sleeper Slab.
- 19.0 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.

APPROACH SLAB ADJACENT TO BRIDGE DETAILS (B)

FOR

258' - 10 7/8" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY
OVER WILLOW CREEK
STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312

20° RHF SKEW
SEC. 12-T9N-R6E
NH 0212(207)40
HL-93

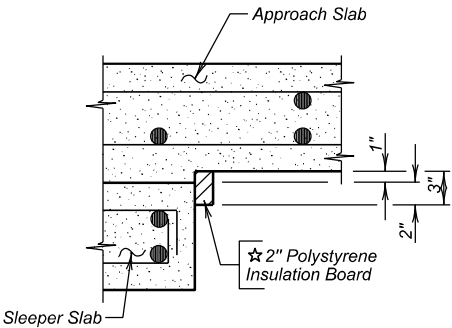
BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

AUGUST 2025

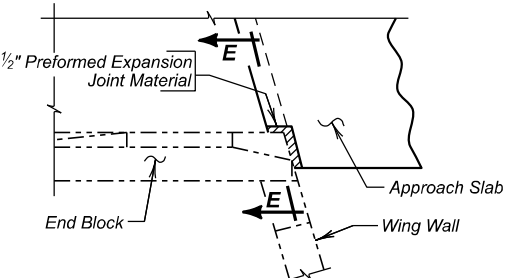
23 OF 30

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGB23	DRAFTED BY KC	BRIDGE ENGINEER
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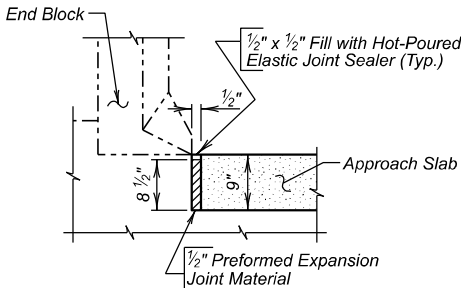


DETAIL "Q"

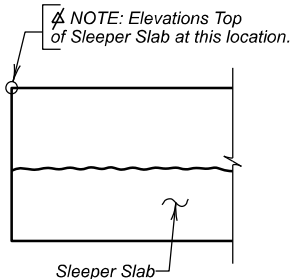
☆ Adhesive used to bond the 2" polystyrene insulation board to the concrete sleeper slab will be as recommended by the polystyrene insulation board manufacturer.



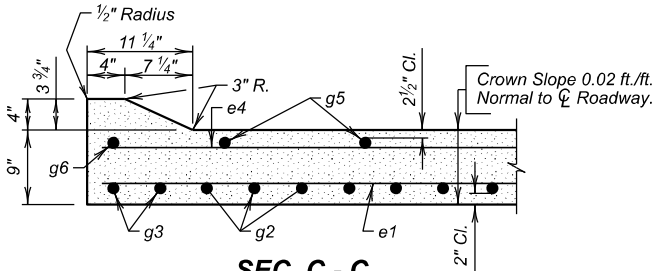
DETAIL "X"



SEC. E - E

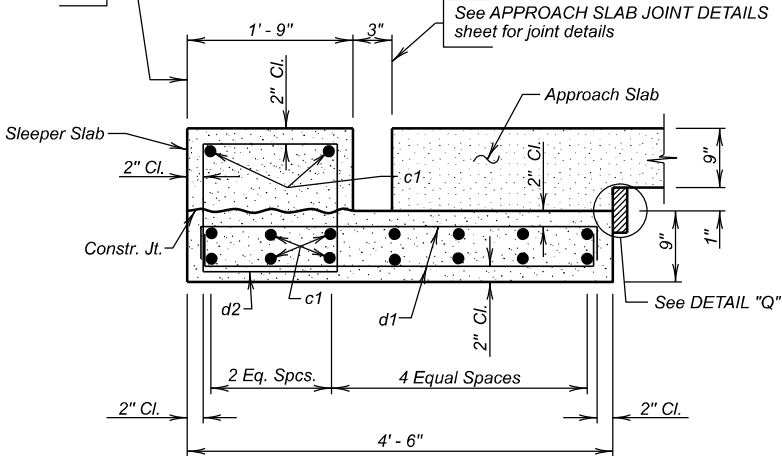


VIEW F - F



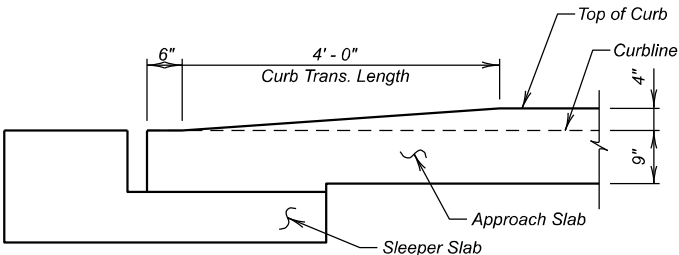
SEC. C - C

Sta. a 302 + 09.27 (Begin Bridge)
Sta. a 305 + 16.18 (End Bridge)

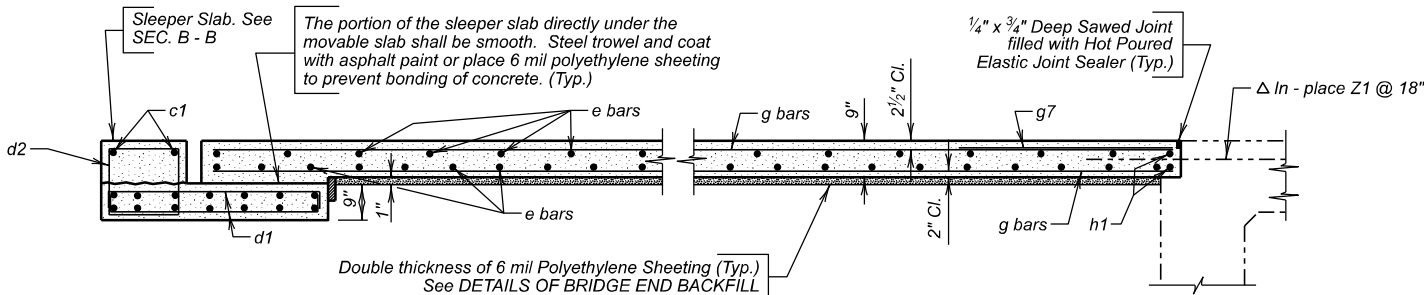


SEC. B - B

(Sleeper Slab)

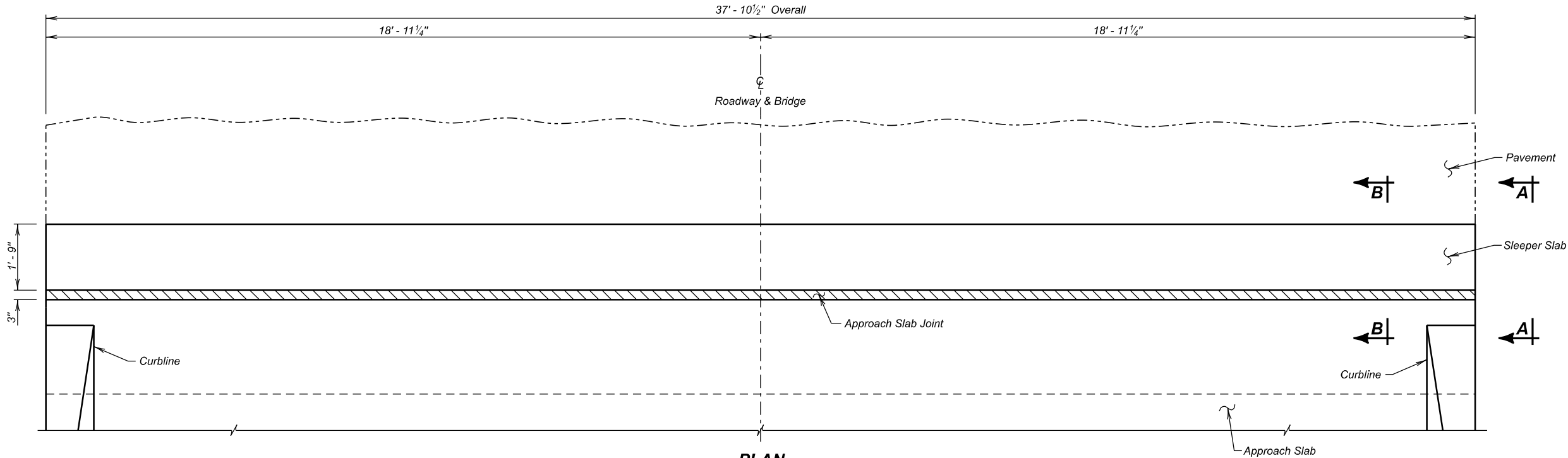


VIEW D - D



SEC. A - A

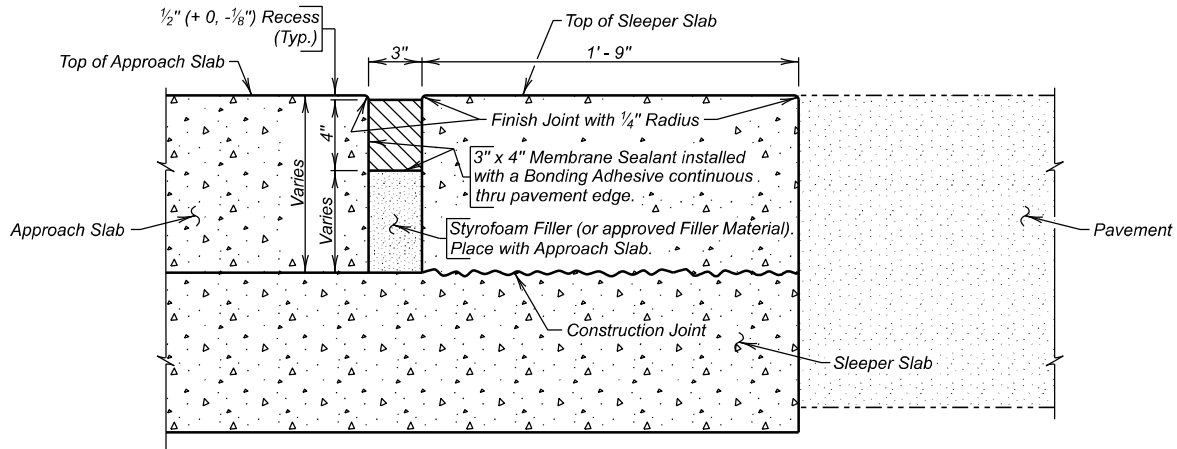




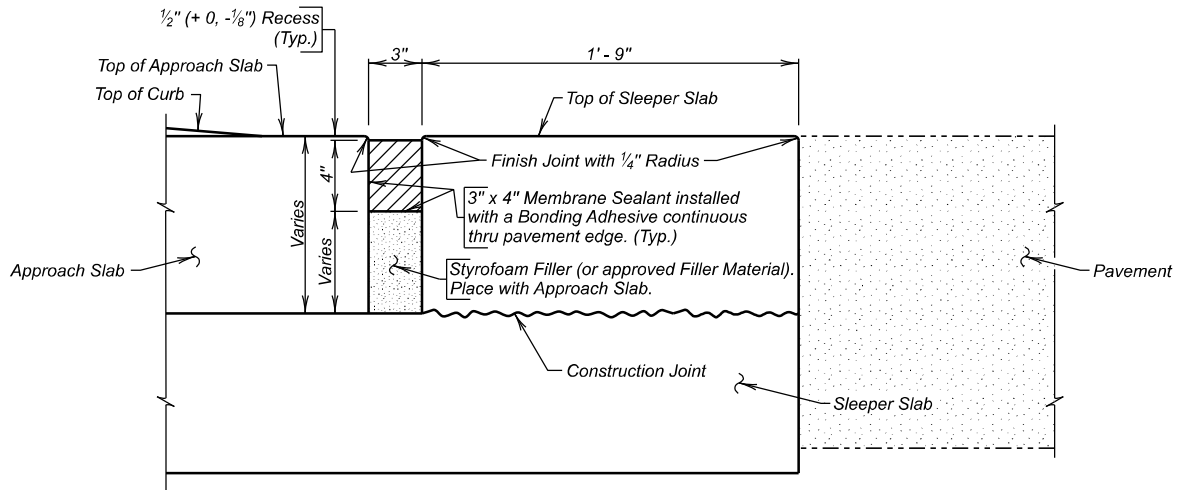
PLAN

GENERAL NOTES

- The Membrane Sealant will be on the approved product list for Membrane Sealant Expansion Joints.
- The manufacturer will supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension will be as recommended by the sealant manufacturer, however, in no case will the precompressed dimension exceed 75% of the joint opening width. The foam sealant will be slowly self expanding to permit workers ample time to install the membrane sealant before the membrane sealant exceeds the joint opening width.
- The membrane sealant will provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension.
- The membrane sealant will be supplied in pieces 5 feet in length or longer. The foam sealant will be ultra-violet and ozone resistant.
- The bonding adhesive used to attach the membrane sealant to the adjacent concrete will be approved by the membrane sealant manufacturer.
- Adhesive used to join adjacent pieces of the membrane sealant will be as recommended by the manufacturer.
- If styrofoam filler material is used in the construction, it will be closed cell and water-tight as approved by the Engineer.
- The minimum ambient air temperature at the time of joint installation and adhesive curing will be 40° F.
- A technical representative of the membrane sealant manufacturer will be present at the jobsite during installation. The technical representative will be knowledgeable in the correct procedures for the preparation and installation of the joint material to ensure the Contractor installs the joint to the manufacturer's recommendations.
- Concrete surfaces that will be in contact with the membrane sealant will be thoroughly cleaned by abrasive blasting to remove all laitance and contaminants (such as oil, curing compounds, etc.) from the concrete surface. At a minimum, two passes of abrasive blasting with the nozzle held at an angle to within 1 to 2 inches of the concrete surface will be required. Cleaning of the surfaces with solvents, wire brushing, or grinding will not be permitted.
- After abrasive blasting, but immediately prior to membrane joint installation, the entire joint contact surface will be air blasted. The air compressor used for joint cleaning will be equipped with trap devices capable of providing moisture-free and oil-free air at a recommended pressure of 90 psi. To obtain complete bonding with the adhesive, the adjacent concrete surfaces must be dry and clean. The contact surfaces for the joint will be visually inspected by the Engineer immediately prior to joint installation to verify the surface is dry and clean.
- Individual spliced sections will be installed as per the manufacturer's recommendations. The membrane joint sealant manufacturer will submit a detailed installation procedure to the Engineer at least 5 days prior to joint installation for his review.
- Traffic will not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.
- Use plywood or other material to protect concrete adjacent to the joint from spalling before any equipment is moved across the joint. Any spill areas will be repaired at the Contractor's expense by breaking out and replacing adjacent concrete, as approved by the Engineer.
- The Membrane Sealant Expansion Joint will be measured in feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The Membrane Sealant Expansion Joint will be paid for at the contract unit price per foot complete in place. Payment for this item will be full compensation for furnishing all the required materials in place, including labor, equipment and incidentals necessary to complete the work in accordance with the plans and the foregoing specifications.



SECTION B - B



VIEW A - A



ESTIMATED QUANTITIES (For Two Approach Slabs)		
ITEM	UNIT	QUANTITY
Membrane Sealant Expansion Joint	Ft.	75.8

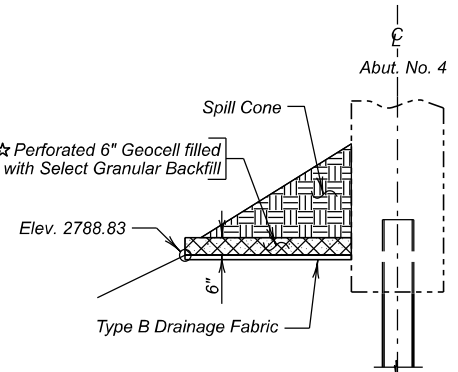
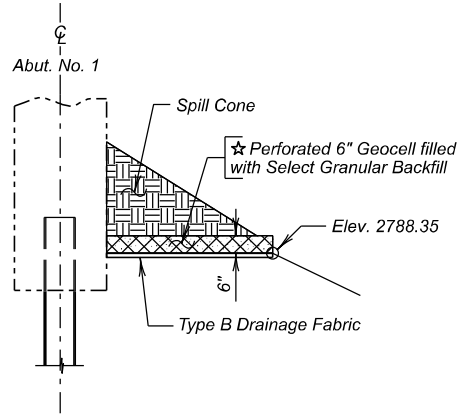
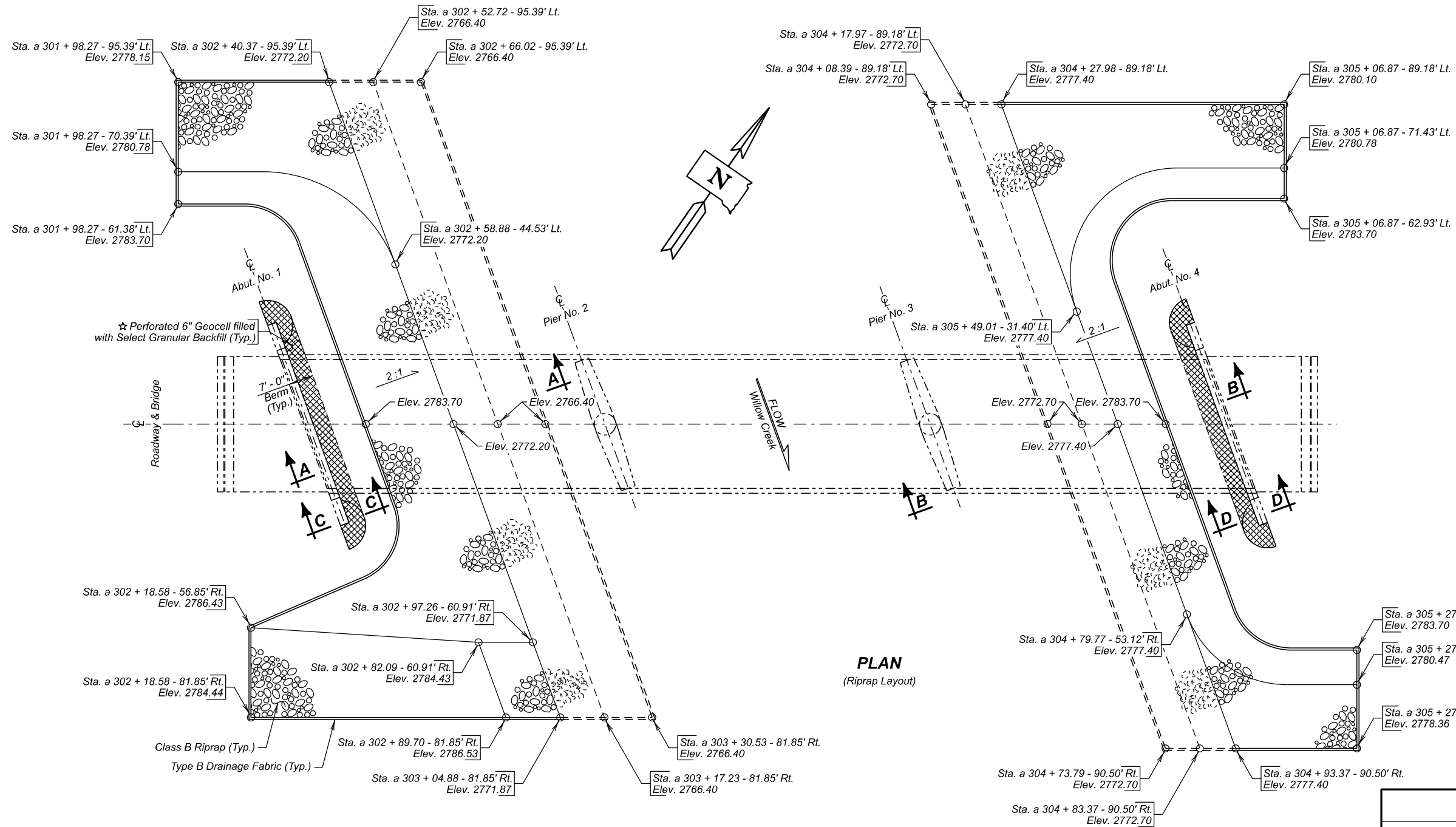
APPROACH SLAB JOINT DETAILS
FOR
258' - 10 7/8" PRESTR. GIRDER BRIDGE
36' - 0" ROADWAY
OVER WILLOW CREEK
STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312

20° RH F SKEW
SEC. 12-T9N-R6E
NH 0212(207)40
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGB24	DRAFTED BY KC	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E37	E69



ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class B Riprap	Ton	2,234.0
Overburden Excavation for Riprap	Cu. Yd.	1,720
Type B Drainage Fabric	Sq. Yd.	2,736

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

RIPRAP DETAILS

FOR

258' - 10 7/8" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY
OVER WILLOW CREEK

20° RHF SKEW
SEC. 12-T9N-R6E

STA. a 302 + 33.27 TO a 304 + 92.18
STR. NO. 10-357-312

NH 0212(207)40
HL-93

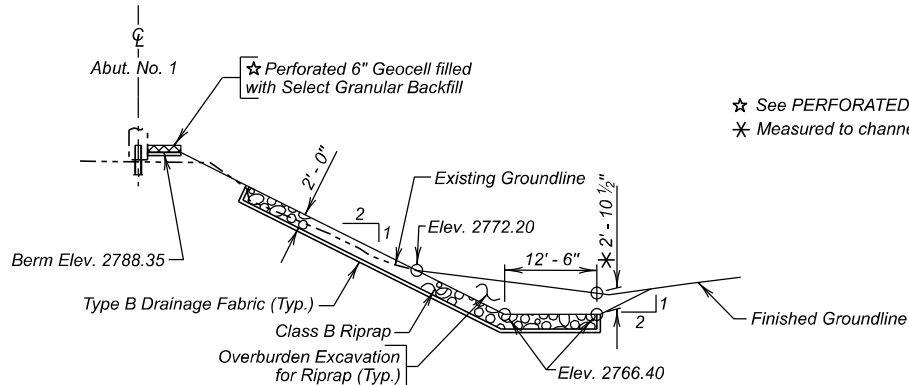
BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

AUGUST 2025

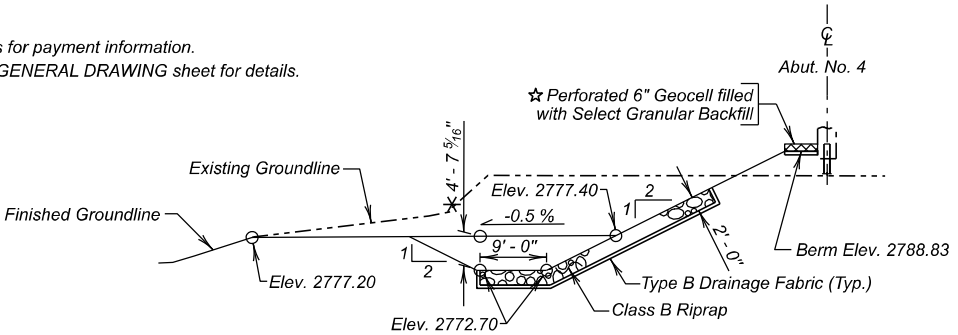
25 OF 30

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGB25	DRAFTED BY KC	BRIDGE ENGINEER
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SECTION A - A

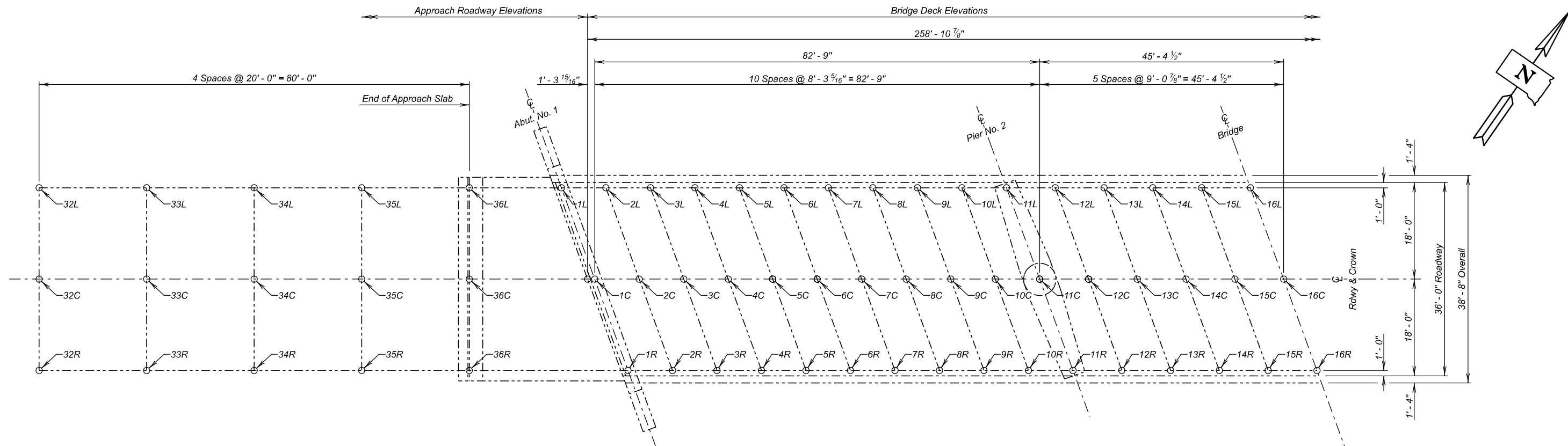
Note:
Restore the channel and channel banks to the existing conditions between the riprap intercepts. This will require a portion of the riprap to be buried.



SECTION B - B



STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E38	E69



PLAN

Table of As-Built Elevations - Bridge Deck

Location	Elevation	Location	Elevation	Location	Elevation
1L		1C		1R	
2L		2C		2R	
3L		3C		3R	
4L		4C		4R	
5L		5C		5R	
6L		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	

Table of As-Built Elevations - Approach Roadway

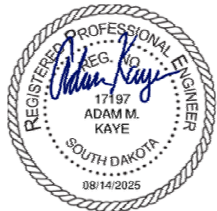
<i>Location</i>	<i>Elevation</i>	<i>Location</i>	<i>Elevation</i>	<i>Location</i>	<i>Elevation</i>
32L		32C		32R	
33L		33C		33R	
34L		34C		34R	
35L		35C		35R	
36L		36C		36R	

Elevations - Bridge Survey Markers

<i>Location</i>	<i>Station - Offset</i>	<i>Elevation</i>
<i>Begin Bridge</i>		

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.



AS - BUILT ELEVATION SURVEY (A)

FOR

258' - 10 $\frac{7}{8}$ " PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY

OVER WILLOW CREEK

STA. a 302 + 33.27 TO a 304 + 92.18

STR. NO. 10-357-312

20° RHF SKEW

SEC. 12-T9N-R6E

NH 0212(207)40

HL-93

BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

AUGUST 2025

(26) OF (30)

DESIGNED BY AK	CK. DES. BY LB	DRAFTED BY KC	
BUTE06JD	06JDGB26		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E39	E69



Location	Elevation	Location	Elevation	Location	Elevation
16L		16C		16R	
17L		17C		17R	
18L		18C		18R	
19L		19C		19R	
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	

Table of As-Built Elevations - Approach Roadway					
Location	Elevation	Location	Elevation	Location	Elevation
37L		37C		37R	
38L		38C		38R	
39L		39C		39R	
40L		40C		40R	
41L		41C		41R	



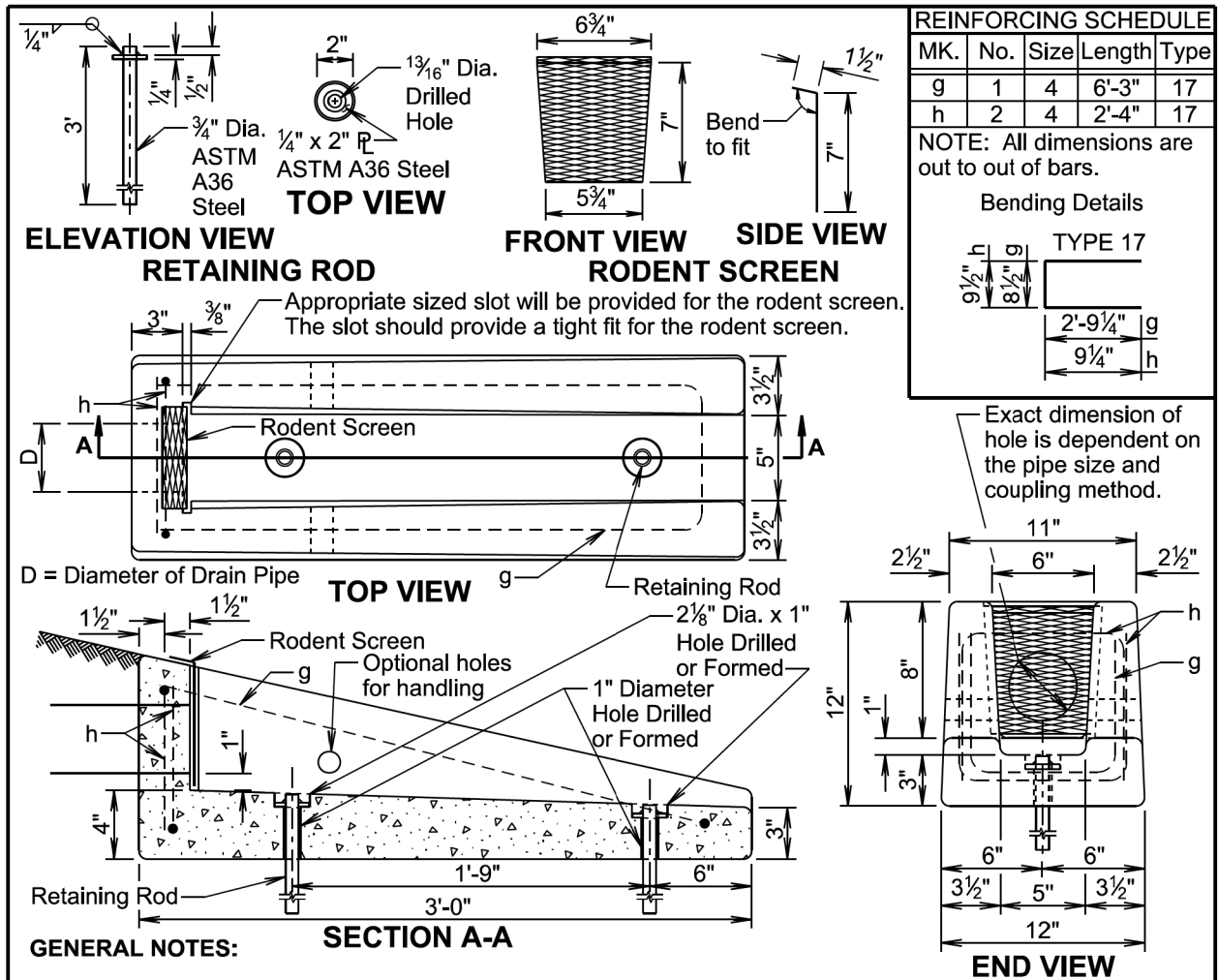
<i>Elevations - Bridge Survey Markers</i>		
<i>Location</i>	<i>Station - Offset</i>	<i>Elevation</i>
<i>End Bridge</i>		

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Bridge Elevation Survey	LS	Lump Sum

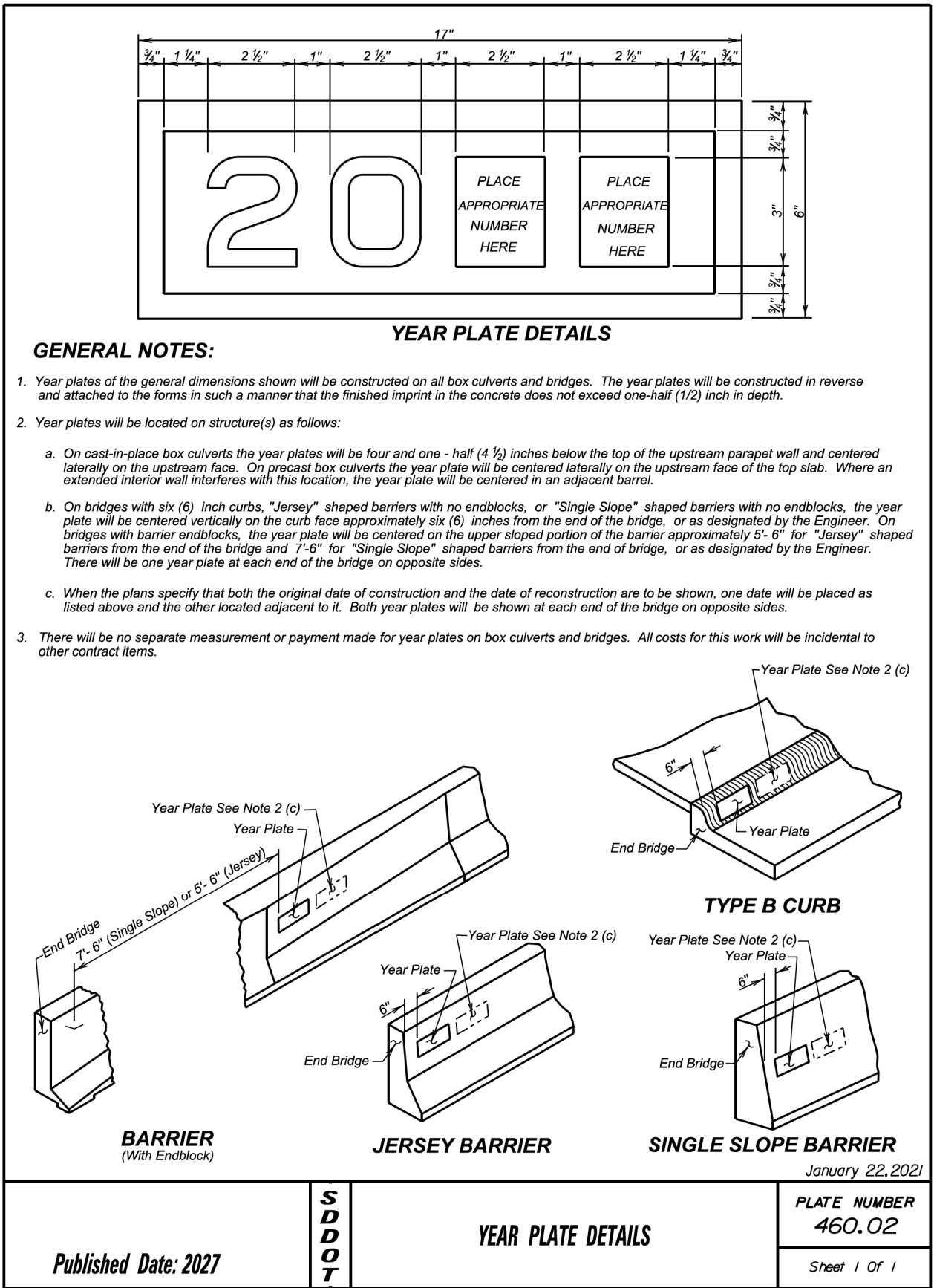
FOR

36' - 0" ROADWAY	20° RHF SKEW
OVER WILLOW CREEK	SEC. 12-T9N-R6E
STA. a 302 + 33.27 TO a 304 + 92.18	NH 0212(207)40
STR. NO. 10-357-312	HL-93

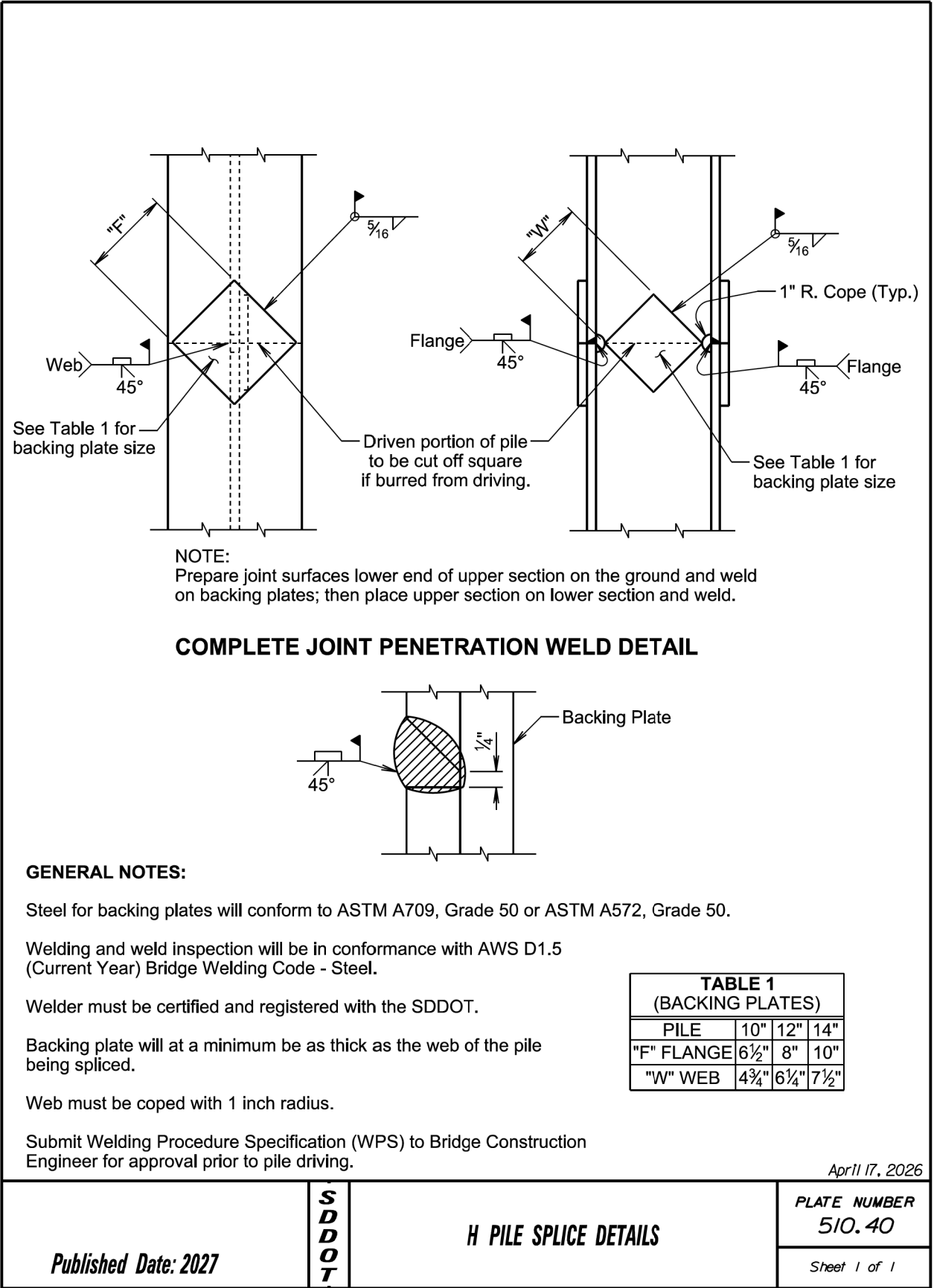
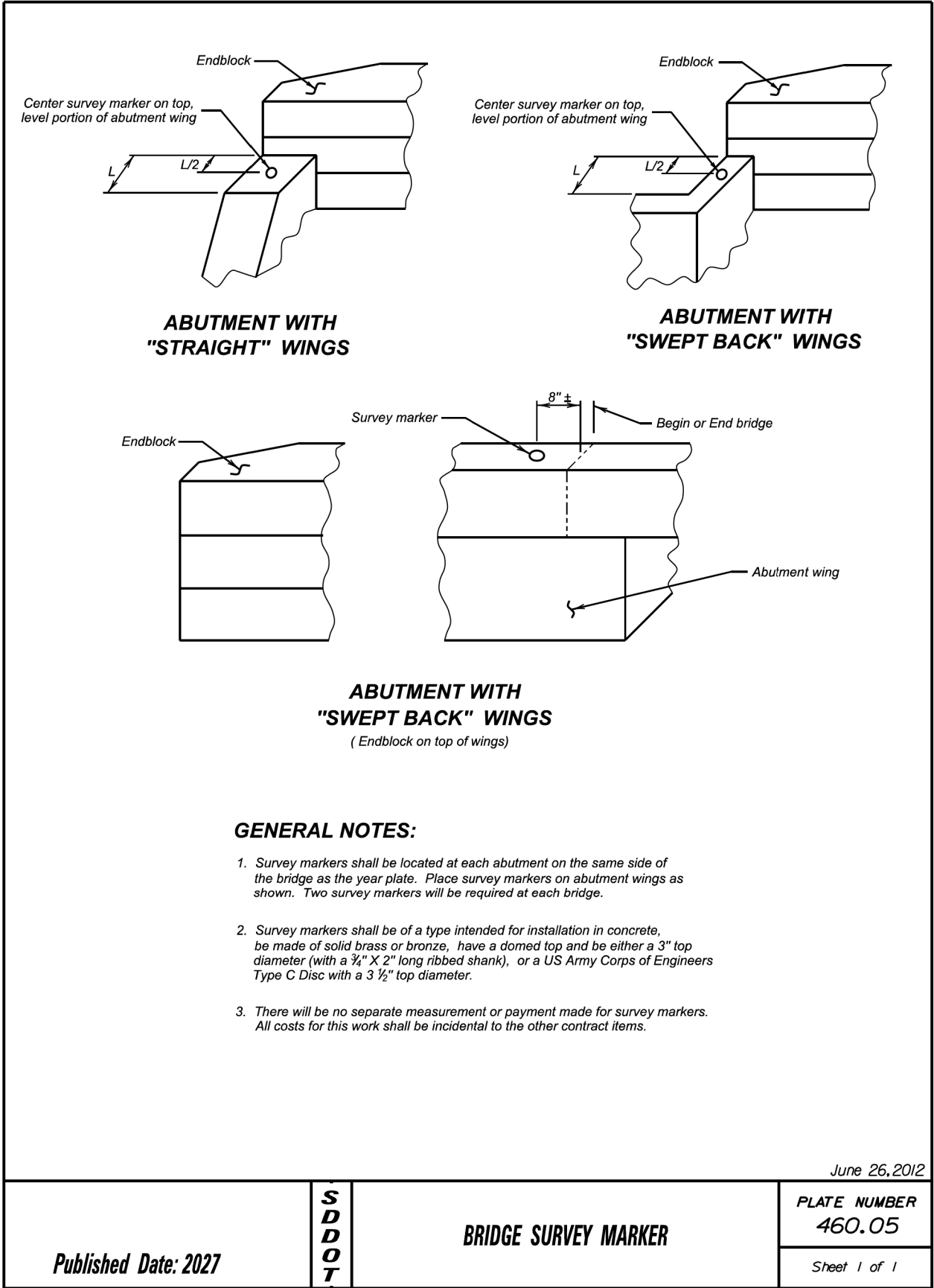
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

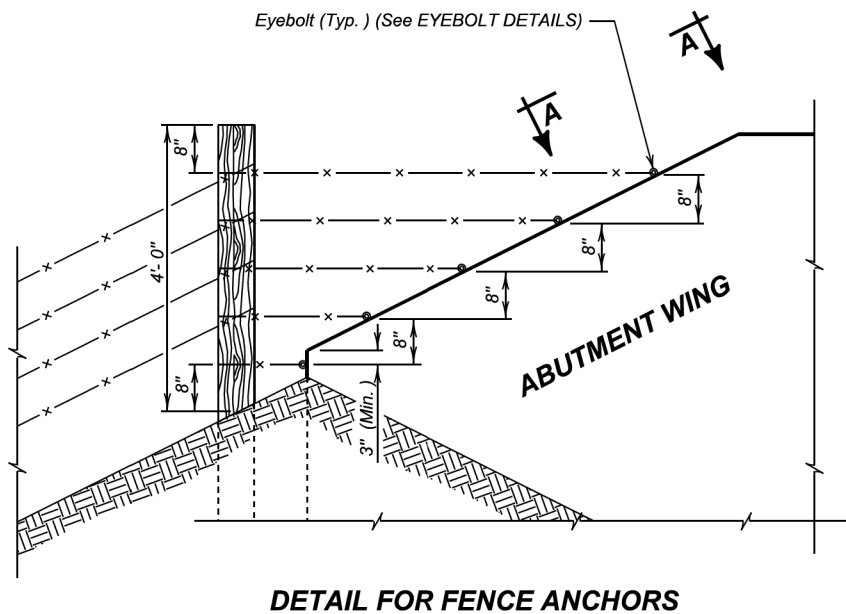


Published Date: 2027	S D D O T	PRECAST CONCRETE HEADWALL FOR DRAIN	PLATE NUMBER 430.50
			Sheet 1 of 1



Published Date: 2027	S D D O T	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 of 1

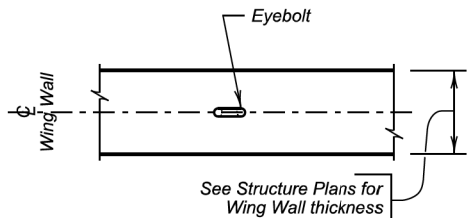




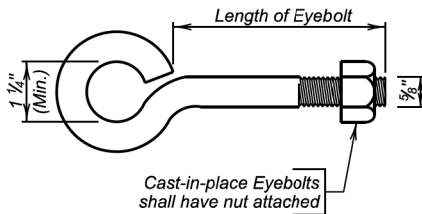
DETAIL FOR FENCE ANCHORS

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 bridge abutment wings.
3. Eyebolts shall be $\frac{7}{8}$ 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 $\frac{7}{8}$ 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.



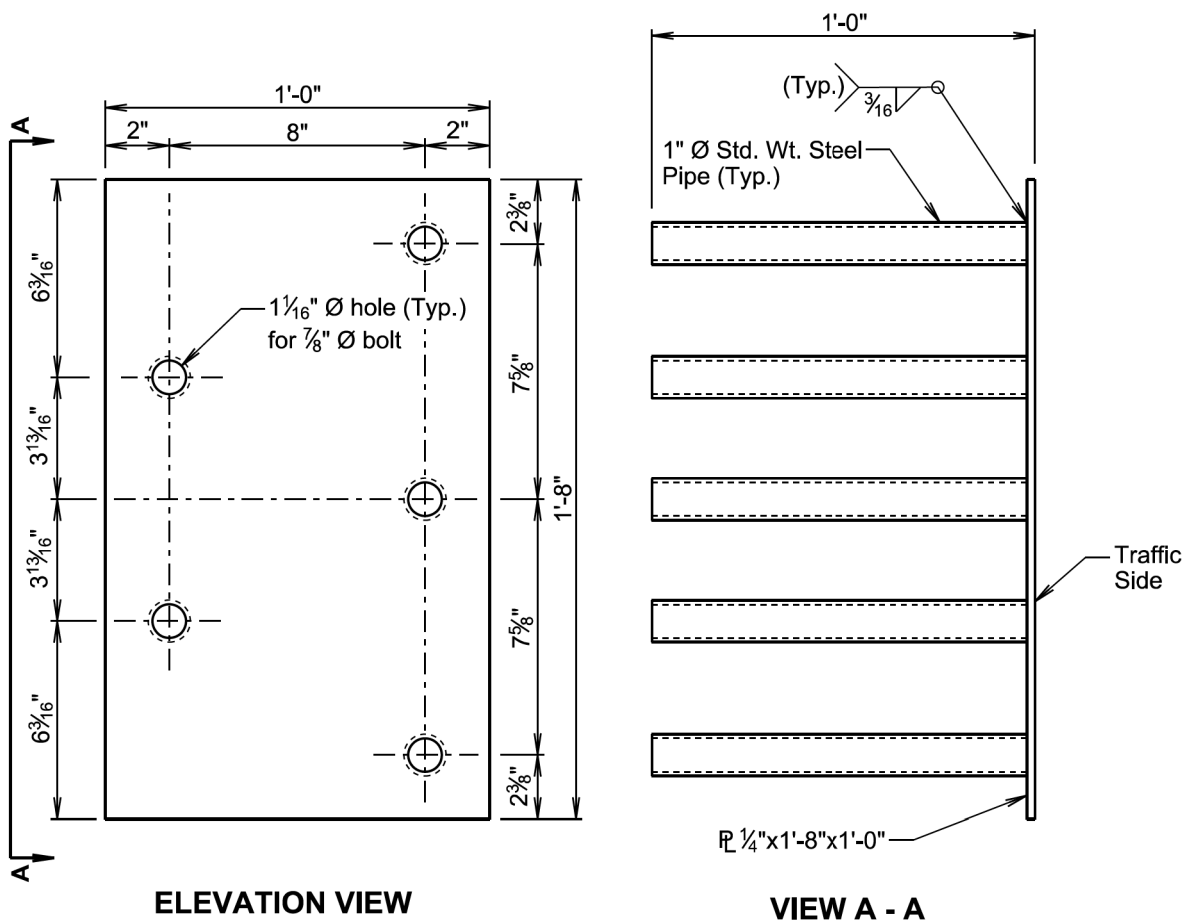
VIEW A - A



EYEBOLT DETAILS

December 23, 2012

Published Date: 2027	S D D O T	FENCE ANCHORS FOR BRIDGE ABUTMENT WINGS (WINGS LONGER THAN 6')	PLATE NUMBER 620.17
			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, Grade B or ASTM A500, Grade B or C.

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, F3125 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", "Class A45 Concrete, Bridge Barrier", or "Class A45 Concrete, Bridge Repair", as applicable.

April 17, 2026

Published Date: 2027	S D D O T	5 BOLT INSERT PLATE ASSEMBLY	PLATE NUMBER 630.92
			Sheet 1 of 1

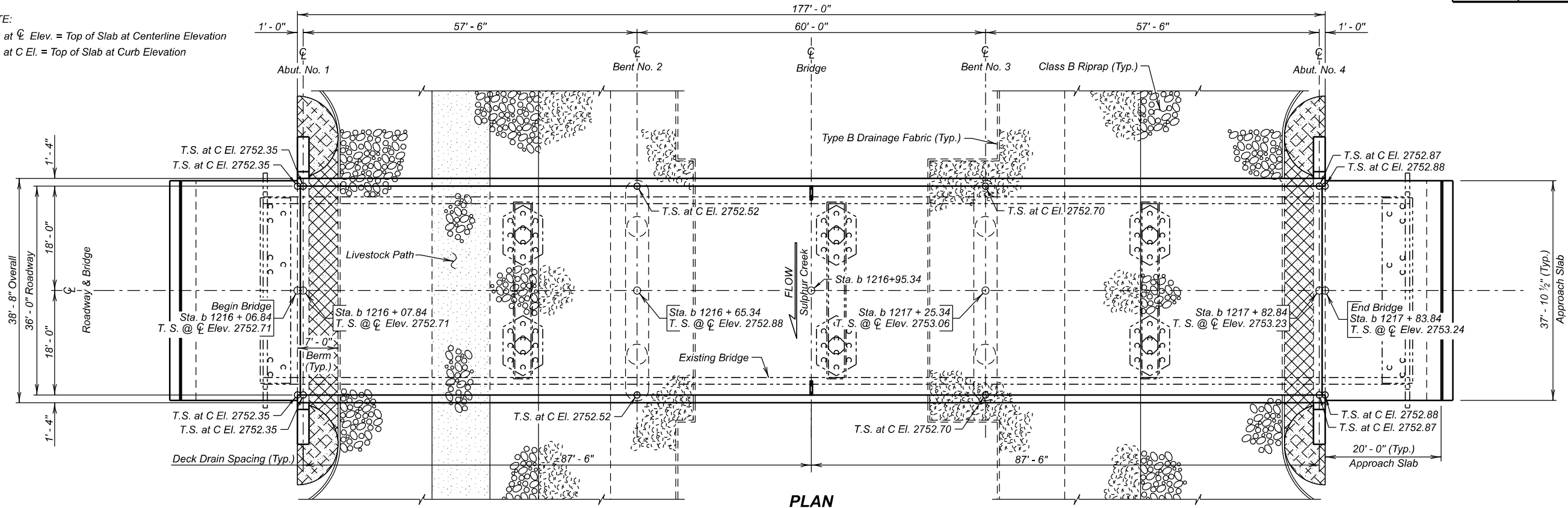
258' - 10 $\frac{7}{8}$ " PRESTR. GIRDER BRIDGE

STR. NO. 10-357-312
AUGUST 2025

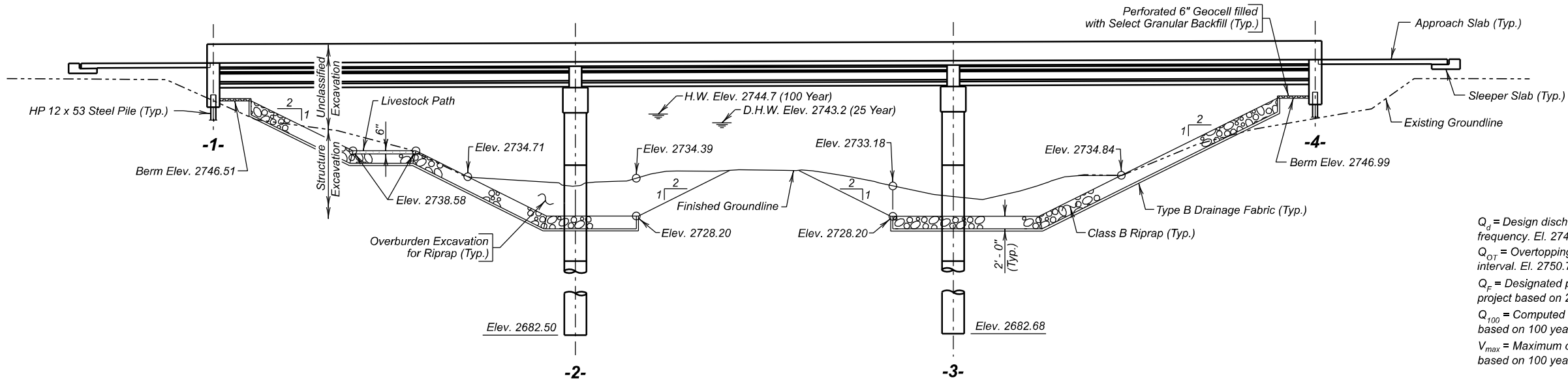
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E43	E69

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



PLAN



ELEVATION

HYDRAULIC DATA

Q_d	3005 cfs
A_d	835 sq ft
V_d	3.6 fps
Q_F	3005 cfs
Q_{100}	5444 cfs
Q_{OT}	$> Q_{500}$
V_{max}	5.4 fps

Q_d = Design discharge for the proposed bridge based on 25 year frequency. El. 2743.2.

Q_{OT} = Overtopping discharge and frequency $> Q_{500}$ year recurrence interval. El. 2750.7 @ Sta. b 1208 + 75.00 ±.

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. 2744.7.

V_{max} = Maximum computed outlet velocity for the proposed bridge, based on 100 year frequency.

GENERAL DRAWING

FOR

177' - 0" PRESTRESSED GIRDER BRIDGE
36' - 0" ROADWAY
OVER SULPHUR CREEK
STA. b 1216 + 06.84 TO b 1217 + 83.84
STR. NO. 10-496-208
PCN 06JD

BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

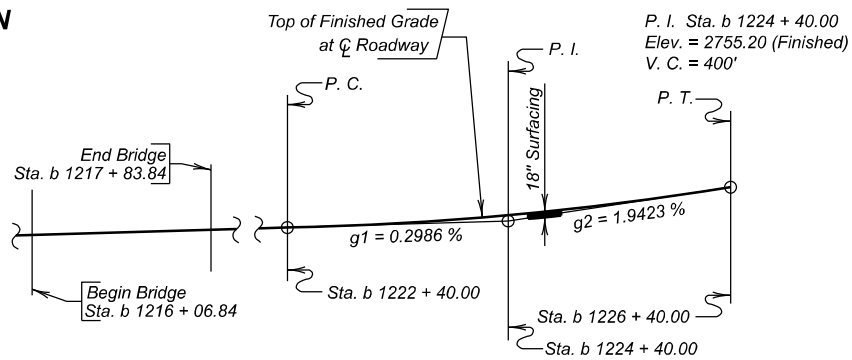
AUGUST 2025

1 OF 27

-X081-
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 - Notes (Continued)
Sheet No. 6 - Subsurface Investigation, Piling & Drilled Shaft Layout
Sheet No. 7 - Abutment Details (A)
Sheet No. 8 - Abutment Details (B)
Sheet No. 9 - Bent Details
Sheet No. 10 - Superstructure Details (A)
Sheet No. 11 - Superstructure Details (B)
Sheet No. 12 - End Block, Barrier Curb, & Deck Drain Details
Sheet No. 13 - 57' - 3" Girder Details
Sheet No. 14 - 59' - 3" Girder Details

Sheet No. 15 - Erection Data
Sheet No. 16 - Slab Form Elevations
Sheet No. 17 - Diaphragm Details
Sheet No. 18 - Details of Bridge End Backfill (A)
Sheet No. 19 - Details of Bridge End Backfill (B)
Sheet No. 20 - Approach Slab Adjacent to Bridge Details
Sheet No. 21 - Approach Slab Joint Details
Sheet No. 22 - Riprap Details
Sheet No. 23 - As-Built Elevation Survey (A)
Sheet No. 24 - As-Built Elevation Survey (B)
Sheet No. 25 - Details of Standard Plate No.'s 430.50 & 460.02
Sheet No. 26 - Details of Standard Plate No.'s 460.05 & 510.40
Sheet No. 27 - Details of Standard Plate No.'s 620.18 & 630.92



VERTICAL CURVE DATA

PLANS BY:
HOUSTON ENGINEERING INC.

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGC01	DRAFTED BY KC	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E44	E69

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Bridge Elevation Survey	Lump Sum	LS	
Concrete Penetrating Sealer	704	SqYd	See Special Provision
Select Granular Backfill	84.3	Ton	
Incidental Work, Structure	Lump Sum	LS	
Structural Steel, Miscellaneous	Lump Sum	LS	
Membrane Sealant Expansion Joint	75.8	Ft	
Structure Excavation, Bridge	550	CuYd	
Bridge End Embankment	840	CuYd	
Granular Bridge End Backfill	77.8	CuYd	
Approach Slab Underdrain Excavation	3	CuYd	
Precast Concrete Headwall for Drain	4	Each	
Class A45 Concrete, Bridge Deck	247.6	CuYd	
Class A45 Concrete, Bridge	101.5	CuYd	
Concrete Approach Slab for Bridge	172.4	SqYd	
Concrete Approach Sleeper Slab for Bridge	37.9	SqYd	
Deck Drain, Girder Bridge	2	Each	
Class A45 Concrete, Drilled Shaft	77.5	CuYd	See Special Provision
Drilled Shaft Excavation	74.2	CuYd	
44" Permanent Casing	104	Ft	
Reinforcing Steel	53,746	Lb	
Epoxy Coated Reinforcing Steel	2,744	Lb	
Stainless Reinforcing Steel	46,107	Lb	See Special Provision
No. 14 Rebar Splice	72	Each	
Preboring Pile	120	Ft	
HP 12x53 Steel Test Pile, Furnish and Drive	120	Ft	
HP 12x53 Steel Bearing Pile, Furnish and Drive	550	Ft	
36" Minnesota Shape Prestressed Concrete Beam	869	Ft	
4" Underdrain Pipe	112	Ft	
Porous Backfill	5.6	Ton	
Class B Riprap	2,258.4	Ton	
Overburden Excavation for Riprap	2,550.0	CuYd	
Type B Drainage Fabric	2,730	SqYd	
Perforated Geocell	684	SqFt	

BRIDGE SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 10-7-26 Version, Required Provisions, and Special Provisions as included in the Proposal. The Standard Specifications for Roads and Bridges are available to download and viewing at: <https://dot.sd.gov/doing-business/contractors/standard-specifications>

BRIDGE DESIGN LOADING

1. Girders are designed simple for AASHTO HL-93 Live Load.
2. Dead Load includes 22 psf for future wearing surface on the roadway.

DESIGN MATERIAL STRENGTHS*

Class A45 Concrete	$f'_c = 4,500$ psi
Reinforcing Steel (ASTM A615, Gr. 60)	$f_y = 60,000$ psi
Stainless Steel (ASTM A955, Gr. 60)	$f_y = 60,000$ psi
Piling (ASTM A572 Grade 50)	$f_y = 50,000$ psi

*For prestressed beams, see notes regarding Prestressed Girders.

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 otherwise on plans.
4. The 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 footings. See Standard Plate 120.10. 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. b 1216+00.42 to centerline Sta. b 1217+98.91 is a 197.5-foot, 4 span steel girder bridge with a 30'-0" clear roadway. The superstructure consists of a reinforced concrete slab with timber railing faced with steel thrie-beam continuous across the bridge. 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 Construction Specifications. All portions of the existing bridge will be removed and become the property of the Contractor.

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 is 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.

NOTICE - LEAD BASED PAINT

Be advised that the paint on the steel surfaces of the existing structure contains lead. The Contractor should plan operations accordingly and inform employees of the hazards of lead exposure.

DESIGN MIX OF CONCRETE

1. All structural concrete will be Class A45 Concrete unless otherwise indicated.
2. Type II cement conforming to Section 750 is required except Type III cement may be used for prestressed beams.
3. Grout design mix will be as specified in Section 460.2 K of the Construction Specifications. A compressive strength of 2000 psi will be attained by the grout prior to erection of any beams. Chamfer edges of grout pads 3/4-inch. The quantity of grout is included in and will be paid for at the contract unit price per cubic yard for Class A45 Concrete, Bridge.



ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
177'-0" PRESTRESSED GIRDER BRIDGE

STR. NO. 10-496-208

AUGUST 2025

DESIGNED BY: AK	CK DES. BY: LB	DRAFTED BY: KC	BRIDGE ENGINEER
BUTE06JD	06JDGC02		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E45	E69

ABUTMENTS

1. Preboring piling at each abutment is required to whichever is greater, ten feet or to natural ground.
2. The HP 12x53 Piling were designed using a factored bearing resistance of 98 tons per pile. Piling will develop a field verified nominal bearing resistance of 245 tons per pile.
3. One test pile will be driven at each abutment and will become part of the pile group. The test pile will be driven before any other pile and will be driven to the required field verified nominal resistance or as directed by the Engineer prior to driving any portion of the bearing piles.
4. The Contractor will have sufficient pile splice material on hand before pile driving is started. See Standard Plate 510.40.
5. Piles will not be driven out of position by more than three inches in the direction parallel to the girder centerline. A pile-driving template will be used to ensure this accuracy.
6. Abutment backwalls above the construction joint may be cast separately from the deck slab. The concrete used for the backwalls and wings will be Class A45 Concrete, Bridge. All abutment and bridge deck concrete will have attained design strength prior to backfilling.
7. Each finished abutment shall include a Bridge Survey Marker. See Standard Plate 460.05.
8. Pile can be driven to elevation 2715, but not below, prior to splicing. This will prevent the pile splice from being located in the bending zone of the integral abutment.

PILE DRIVING

1. A drivability analysis was performed using the wave equation analysis program (GRLWEAP). The following pile hammers were evaluated and found to produce acceptable driving stresses:

Delmag D30-32 SPI D30 APE D30-32

Based on initial analysis, the hammers listed will need to be operated no higher than the third 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 the fuel setting.

2. Pile hammers not listed will require evaluation and approval prior to use from the Geotechnical Engineering Activity. Requests for evaluation of hammers not listed will be submitted a minimum of 5 business days prior to installation of piles.

ABUTMENT BACKWALL COATING

The material for waterproofing the abutment backwall will be one of the products from the approved products list. The acceptable abutment backwall coating suppliers are listed on the approved products list at the following Internet address:

<http://apps.sd.gov/HC60ApprovedProducts/Main.aspx>

The cost of furnishing and applying the coating will be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge.

BENTS

1. The design of the drilled shafts is based upon encountering competent Pierre Shale at elevation 2709. If competent Pierre Shale is not encountered at or above this elevation, contact the Office of Bridge Design, through proper channels, before proceeding with the drilled shaft construction. Geotechnical Engineering Activity personnel will be present during the drilling operations to confirm these elevations and to observe placement of the drilled shafts. The Geotechnical Engineering Activity will be notified a minimum of two weeks prior to the start of excavation for the drilled shafts.
2. The drilled shafts will be constructed using the permanent casing method in conformance with the Special Provision for Drilled Shaft Construction. A construction joint will be placed at the top of the permanent casing and the permanent casing will extend a minimum of 1'-0" above the groundline, waterline, or construction platform elevation, whichever is higher.
3. The construction joint locations and quantities provided on the plans are based upon the estimated existing groundline and waterline elevations. It is the responsibility of the Contractor to verify the existing elevations and have a drilled shaft installation plan submitted and approved prior to ordering the casing. If the Contractor intends to use construction platforms, etc. that would require any of the construction joints to be at a location other than the location shown in the plans, the Contractor will include these proposed changes in the drilled shaft installation plan for approval by the Office of Bridge Design.
4. The quantities for Drilled Shaft Excavation; 44-inch Permanent Casing; Class A45 Concrete, Drilled Shaft; and Class A45 Concrete, Bridge are based upon the construction joint locations as shown in the plans. Payment for these items will be at the contract unit price for the plans shown quantities regardless of any approved changes in the location of the construction joints as requested by the Contractor due to the construction of work platforms, etc. The use of a larger diameter temporary casing will be required to install permanent casing for the drilled shafts due to the length of the permanent casing. Diameter of temporary casing will be a minimum 6" larger than the permanent casing. All costs involved with temporary casing installation and removal will be incidental to the bid item, Drilled Shaft Excavation. Measurement and payment will be made at the contract unit prices for any changes due to variations in the competent foundation soil or in the locations of the existing groundline and waterline elevations as ordered by the Engineer.

5. The H1 bars are detailed full length of the Drilled Shafts and Columns and are provided in the reinforcing schedule. Once the construction joint elevations have been verified and established, mechanical splice details showing location will be submitted for approval to the Office of Bridge Design with the drilled shaft installation plan. Mechanical splices must be staggered and not placed side by side.
6. Spiral reinforcement may be fabricated from cold drawn wire conforming to ASTM A1064 or hot rolled plain or deformed bars conforming to the strength requirements of ASTM A615, Grade 60.

CSL ACCESS TUBES

1. Access tubes will be furnished and installed in each of the drilled shafts in accordance with the Special Provision for Drilled Shaft Construction.



NOTES (CONTINUED)
FOR
177'-0" PRESTRESSED GIRDER BRIDGE

STR. NO. 10-496-208

AUGUST 2025

DESIGNED BY: AK	CK DES. BY: LB	DRAFTED BY: KC	BRIDGE ENGINEER
BUTE06JD	06JDGC03		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E46	E69

SUPERSTRUCTURE

- Girder lifting hooks will be cut off before placement of concrete deck slab.
- The diaphragms at the bents will be poured integrally with the deck slab. Placement of diaphragms at the bents shall not slow down the rate of deck concrete placement and finishing. The Contractor will place the concrete for the specified diaphragms ahead of the deck concrete in such a manner that advancement of the deck concrete reaches the diaphragm just as placement of concrete in the diaphragm is complete.
- 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.
- The concrete bridge deck will be placed and finished at a minimum rate of 40 feet of deck per hour measured along centerline roadway. If concrete cannot be placed and finished at this rate, the Engineer will order a header installed and operations stopped. If a header is required sometime during the pour operation, its location will be at or as near as possible to the three-quarter point of the span. Notify the Bridge Construction Engineer if deck pour operations are stopped. Operations may resume only when the Engineer is satisfied that a rate of 40 feet per hour can be maintained and the concrete has attained a minimum compressive strength of 2000 psi.
- 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.
- See Special Provision for Concrete Penetrating Sealer.

PRESTRESSED GIRDERS

- Minimum concrete compressive strength f'_{ci} = **5,000** psi at 28 days for all girders, f'_{cs} = **4,500** psi for all girders.
- All mild reinforcing steel will be deformed bars conforming to ASTM A615, Grade 60.
- Individual tendons in all pretensioned sections will consist of seven-wire uncoated Type 270K Strands having a nominal diameter of 0.6-inch and a minimum ultimate strength of 58600 lbs. per cable. An initial tensile force of 43500 lbs. will be applied to all 0.6-inch cables in all girders. All prestressing steel will conform to AASHTO M203. (low-relaxation strands).
- All prestressed girders within a span will be cast within an 8-day period. If not, the newest girder will be at least 6 weeks old before the deck slab is poured. The girders will be poured in all steel forms.
- Prestressed concrete girders will always be lifted by the devices provided in the top flanges near the ends of the girders. Types of lifting devices other than those shown on the plans may be used provided they are approved by the Office of Bridge Design. The design of the lifting devices will be the responsibility of the fabricator.

- Each beam will be marked showing structure number, casting date, and beam number. Marking will be on the face of the beam near the end and the location will be exposed after the diaphragms have been cast. Facia beams will be marked on an inside face. All markings will be stenciled and clearly legible. For beam designations and locations, see superstructure layout plan and Erection Data sheet.
- The physical properties of the elastomeric bearing pads will conform to the requirements of Section 18.2 of the AASHTO LFRD Bridge Construction Specification and the AASHTO Materials Specification M251. The elastomeric bearing pads will conform to Grade 70 (durometer). The cost of the pads will be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge. Certification that pads are 70 durometer and meet the requirements of AASHTO LFRD Bridge Construction Specification Section 18.2 and AASHTO Materials Specification M251 will be furnished to the Engineer with the shop drawings. No laminated bearing pads will be allowed.
- All exposed corners will be chamfered 3/4-inch or rounded to 3/4-inch radius.
- Dead Load of girder taken as effective at transfer. Cut strands flush with end of girder and coat end of strands with mortar, EXCEPT the strands that are to be extended and bent,
- The Contractor will be responsible for ensuring that transportation stresses, handling, and erection do not cause damage to the girders.
- Furnish and Install Inserts for T8 Rebars as shown in the plans. All costs involved will be incidental to the contract unit price per foot of 36" Minnesota Shape Prestressed Concrete Beam.

BOLT TESTING

The certified mill test reports for all bolts used on the project will include the test results for all the testing specified in section 972.2 D of the Construction Specifications. Some of these tests are supplemental tests that must be requested at the time the bolts are ordered. It is the responsibility of the Contractor to notify the bolt supplier of these requirements.

SHOP PLANS

Shop plans will be required as specified by the Construction Specifications.

The fabricator will submit shop plans in accordance with the Specifications. If mailed, send shop plan submittals to Houston Engineering Inc., 1401 21st Avenue North, Fargo, ND 58102 or email directly to akaye@houstoneng.com. After review, corrections (if necessary), and approval by Houston Engineering Inc., the Office of Bridge Design will review the submittals, authorize fabrication, arrange for fabrication inspection, and distribute the shop drawings.

FALL PROTECTION

- The Contractor will install a Fall Protection System conforming to OSHA Regulations. When working on the girders prior to decking installation, a Horizontal Lifeline – or other OSHA approved system will be installed. The Contractor will have one Personal Fall Arrest System (PFAS) available for use by a Department Inspector. The PFAS will be compatible with the installed Fall Protection System.
- Modifications to any bridge components used to accommodate the Fall Protection System will be shown on the Falsework Plans and/or the appropriate Shop Plans. Field welding to bridge components shall not be allowed. Field placed concrete inserts or drilled-in anchor bolts will be allowed if approved by the Engineer. All costs associated with providing the Fall Protection System will be incidental to the other contract items.

CLASS B COMMERCIAL TEXTURE FINISH

A Class B commercial texture finish will be applied to the front and top faces of the barrier. Use pearl white finish color number 37875 meeting AMS – STD – 595. The Class B commercial texture finish will be applied in accordance with Section 460.3 L. 1.c and Section 460.3 M.1 of the Construction Specifications.

DECK DRAIN, GIRDER BRIDGE

- Deck Drains will be HSS 6" x 4" x 1/4" structural tube steel conforming to the requirements of ASTM A36. The deck drains will be galvanized in accordance with ASTM A123.
- Steel for the bent plates, and washers will conform to ASTM A36 and will be galvanized in accordance with ASTM A123. Washers will be plate washers or a continuous bar at least 5/16" thick with standard holes and will have a size sufficient to completely cover the slot after installation.
- The 1/2-inch diameter square U-bolts, nuts, and washers will conform to ASTM A307 and will be galvanized in accordance with ASTM F2329 or ASTM A153 as applicable.
- Payment for deck drains will be at the contract unit price per each for Deck Drains, Girder Bridge, and will be full compensation for furnishing, fabricating, and installing the deck drains including all hardware necessary to attach the deck drains to the structure in accordance with the plans and specifications.



NOTES (CONTINUED)
FOR
177'-0" PRESTRESSED GIRDER BRIDGE

STR. NO. 10-496-208

AUGUST 2025

4 27

DESIGNED BY: AK	CK DES. BY: LB	DRAFTED BY: KC	BRIDGE ENGINEER
BUTE06JD	06JDGC04		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E47	E69

APPROACH SLABS

- Sleeper slab riser will be cast with or later than the approach slab. Care will be taken to ensure the correct grade is maintained across the top pf the sleeper slab riser.
- 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.
- 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.
- The concrete in the approach slab will be tined perpendicular to the centerline of roadway.
- 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 surplus materials; and for labor, tools, equipment, and any incidentals necessary to complete this item of work.
- 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

- An underdrain system will be placed underneath the sleeper slabs and behind the abutments as shown in the plans in accordance with Section 435 of the Construction Specifications.
- 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 shall conform to ASTM D6707.
- 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.

- 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.

PERFORATED GEOCELL

- Perforated Geocell will be from the following company or equivalent:

Company: Agtec

Phone: 1-818-724-7657

Website: <http://www.agtec.com>
- Perforated Geocell will be 6 inches tall with Type B Drainage Fabric underlying the perforated Geocell. Installation will adhere to the manufacturer's recommendation.
- Perforated Geocell will be filled with the Select Granular Backfill in accordance with Section 850 of the Construction Specifications.
- 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.
- 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.

AS - BUILT ELEVATION SURVEY

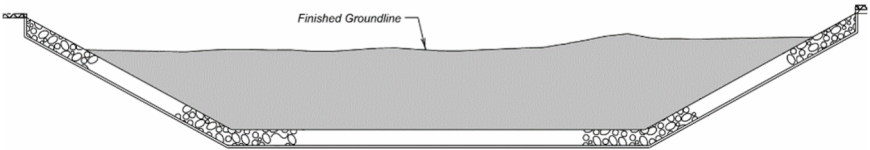
The Contractor will be responsible for producing an as-built elevation survey soon after construction is completed but before the bridge is opened to traffic. The Contractor will be responsible for recording the as-built elevation shown in the plans. The completed table will be given to the Engineer and copies forwarded to the Office of Bridge Design and the Senior Region Bridge Engineer. The elevations will be based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88). The Engineer will provide the Contractor with a description, elevation, and location of the nearest benchmark that has a NAVD88 established elevation for the Contractor's use. The benchmark shown in the plans has not been tied to the NAVD88. The Contractor will be responsible for establishing a NAVD88 elevation for the benchmark provided in the plans. All cost associated with obtaining the NAVD88 elevations at the locations shown in the table and for the benchmark shown in the plans, including all equipment, labor, and any incidentals required will be incidental to the contract lump sum price for Bridge Elevation Survey.

RIPRAP

Berm slope and embankments will be compacted to the Specified Density Method in accordance with Section 120.3 B.3.a of the Construction Specifications. 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 placed in the dry.

OVERBURDEN EXCAVATION FOR RIPRAP

- 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).



- 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.
- 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.
- 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 or four inches above the riprap at the lowest elevation.
- 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.
- 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.
- 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.



NOTES (CONTINUED)
FOR
177'-0" PRESTRESSED GIRDER BRIDGE

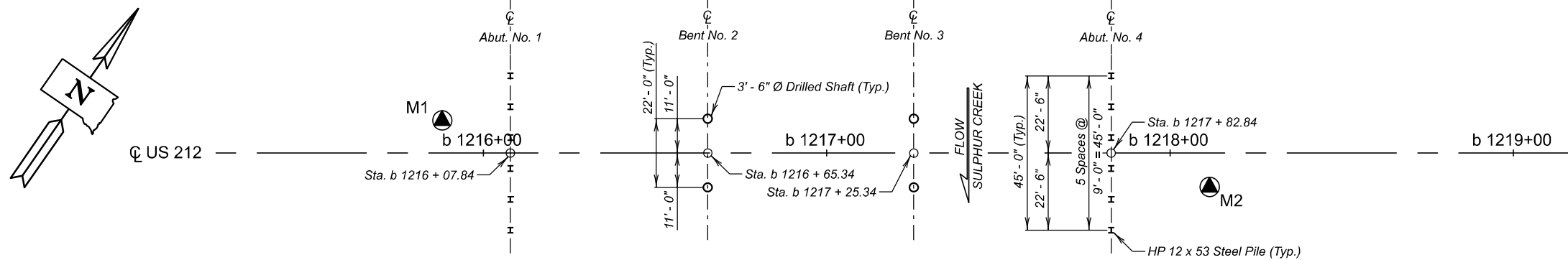
STR. NO. 10-496-208

AUGUST 2025

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DESIGNED BY: AK	CK DES. BY: LB	DRAFTED BY: KC	BRIDGE ENGINEER
BUTE06JD	06JDGC05		



Hole Number	M3
Station	1216+87.38
Depth	15.2 ft
Soil Color	Brown
Classification	Clay Sand
Strength (Qu)	413 psf
Dry Density	96.2 pcf
Wet Density	121.3 pcf
Moisture	26.2 %
Pass No. 10	100.0 %
Pass No. 40	99.6 %
Pass No. 200	40.1 %
Sand Content	59.9 %
Silt Content	18.9 %
Clay Content	21.2 %

Hole Number	M3
Station	1216+87.38
Depth	25.2 ft
Soil Color	Dark Gray
Classification	Clay
Strength (Qu)	6,750 psf
Dry Density	100.2 pcf
Wet Density	124.5 pcf
Moisture	24.2 %
Pass No. 10	99.6 %
Pass No. 40	99.6 %
Pass No. 200	99.0 %
Sand Content	0.6 %
Silt Content	31.1 %
Clay Content	67.9 %



PILING AND DRILLED SHAFT LAYOUT

Hole Number	M3
Station	1216+87.38
Depth	30.2 ft
Soil Color	Dark Gray
Classification	Clay
Strength (Qu)	19,270 psf
Dry Density	108.6 pcf
Wet Density	131.0 pcf
Moisture	20.6 %
Pass No. 10	100.0 %
Pass No. 40	100.0 %
Pass No. 200	99.6 %
Sand Content	0.4 %
Silt Content	29.8 %
Clay Content	69.8 %

Hole Number	M3
Station	1216+87.38
Depth	34.8 ft
Soil Color	Dark Gray
Classification	Clay
Strength (Qu)	26,040 psf
Dry Density	108.2 pcf
Wet Density	130.0 pcf
Moisture	20.1 %
Pass No. 10	99.9 %
Pass No. 40	99.9 %
Pass No. 200	99.7 %
Sand Content	0.3 %
Silt Content	30.5 %
Clay Content	69.2 %

Hole Number	M4
Station	1217+13.92
Depth	40.2 ft
Soil Color	Dark Gray
Classification	Clay
Strength (Qu)	17,220 psf
Dry Density	102.5 pcf
Wet Density	126.0 pcf
Moisture	22.9 %
Pass No. 10	100.0 %
Pass No. 40	100.0 %
Pass No. 200	99.9 %
Sand Content	0.1 %
Silt Content	25.7 %
Clay Content	74.2 %

LEGEND

- Penetration Test
● Drive Test
▽ Water
⊖ Caved
■ Sample Zone

Drive tests are conducted by dropping a 490 pound hammer 30 inches to drive a 2 7/8 inch drill stem to measure the resistance to penetration of the soil.

Penetration test holes are drilled with a 6 5/8 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

M1	2734.8
M2	2734.7

MARCH 2023

M3	2735.9
M4	2735.7

MEASURED SKIN FRICTION

	ELEV.	PSF
M1	2705.0	1065
M2	2706.1	1183

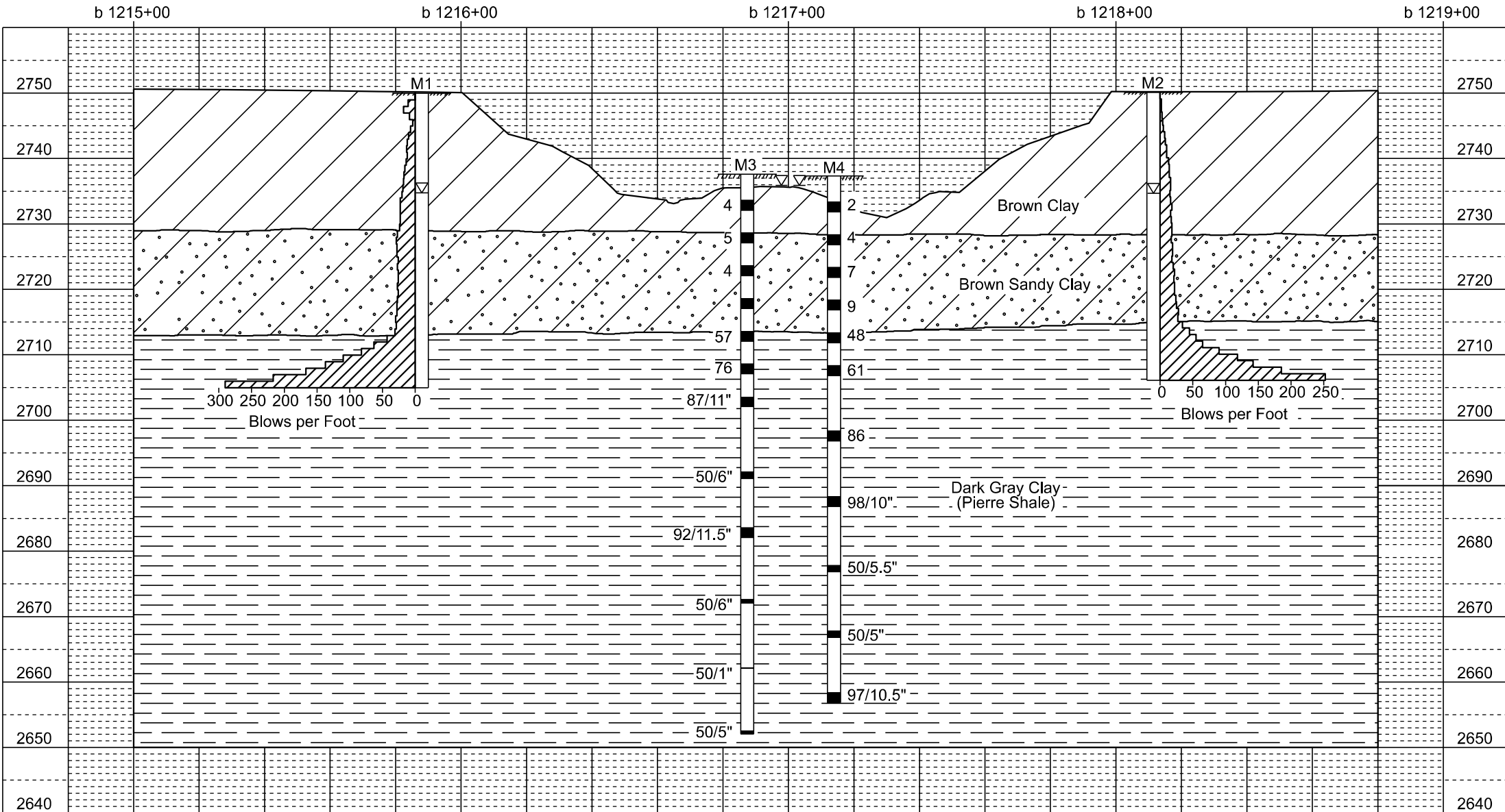
SUBSURFACE INVESTIGATION, PILING, & DRILLED SHAFT LAYOUT

FOR

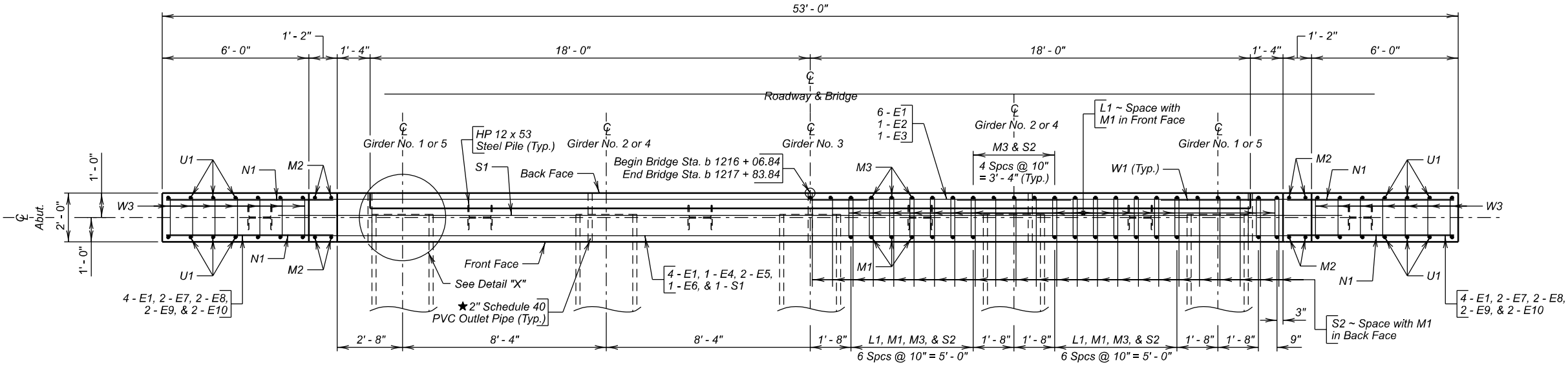
177' - 0" PRESTRESSED GIRDER BRIDGE

36' - 0" ROADWAY 0° SKEW
OVER SULPHUR CREEK SEC. 17-T11N-R9E
STA. b 1216 + 06.84 TO b 1217 + 83.84 NH 0212(207)40
STR. NO. 10-496-208 HL-93

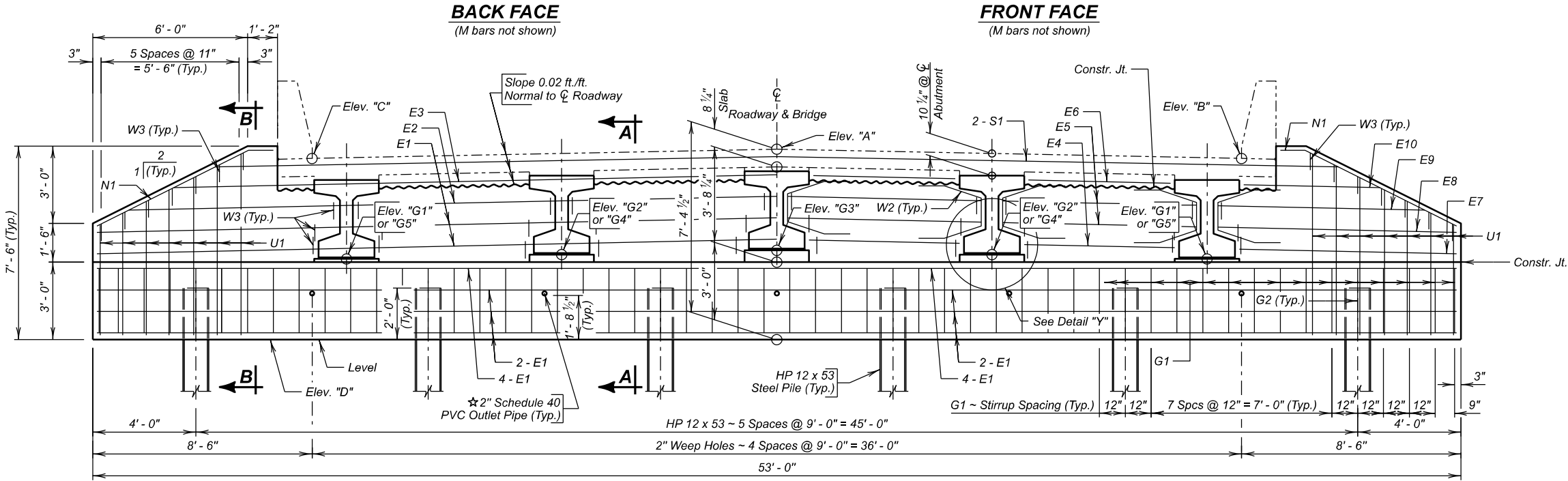
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025



STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E49	E69



PLAN
(Abut. No. 1 shown, Abut. No. 4 similar by opposite hand.)



ELEVATION
(Along $\bar{C}$ Abutment)

★ See DETAILS OF BRIDGE END BACKFILL (A)
notes for payment and quantity.

TABLE OF ELEVATIONS									
Abut. No.	Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"	Elev. G1	Elev. G2	Elev. G3	Elev. G4	Elev. G5
1	2752.71	2752.35	2752.35	2745.33	2748.46	2748.63	2748.80	2748.63	2748.46
4	2753.23	2752.87	2752.87	2745.85	2748.99	2749.15	2749.32	2749.15	2748.99

NOTE - Elev. "A", "B" and "C" are top of slab at $\bar{C}$ of Abutment. Elev. G1, G2, G3, G4 and G5 are top of grout pad elevations at $\bar{C}$ Abutment. Top of Grout Pads shall be Level and Smooth.



ABUTMENT DETAILS (A)
FOR
177' - 0" PRESTRESSED GIRDER BRIDGE
36' - 0" ROADWAY
OVER SULPHUR CREEK
STA. b 1216 + 06.84 TO b 1217 + 83.84
STR. NO. 10-496-208
0° SKEW
SEC. 17-T11N-R9E
NH 0212(207)40
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGC07	DRAFTED BY KC	BRIDGE ENGINEER
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REINFORCING SCHEDULE

(For One Abutment)

Mk.				No.	Size	Length	Type
E1	12	6	52'-8"	Str.			
E2	1	6	50'-2"	Str.			
E3	1	6	46'-9"	Str.			
E4	4	6	5'-10"	Str.			
E5	8	6	7'-6"	Str.			
E6	4	6	5'-6"	Str.			
E7	2	6	8'-5"	Str.			
E8	2	6	9'-3"	Str.			
E9	2	6	8'-0"	Str.			
E10	2	6	5'-3"	Str.			
G1	48	5	9'-3"	T1			
G2	6	5	8'-2"	S6			
L1	32	4	3'-4"	17A			
M1	32	5	5'-11"	Str.			
M2	8	5	7'-2"	Str.			
M3	47	5	5'-11"	Str.			
N1	4	6	7'-7"	19B			
S1	2	9	43'-6"	Str.			
S2	47	5	7'-6"	14A			
U1	14	5	11'-3"	Str.			
W1	5	5	4'-8"	Str.			
W2	10	4	6'-1"	14			
W3	44	5	3'-0"	17			

2'-6"

1'-8"

G1

G2

2'-6"

1'-8"

Type T1

1'-8"

9"

9"

2'-6"

Type S6

8 1/2"

3'-8"

(Horiz. Leg)

2'-3"

1'-5"

1'-1"

1'-6"

12

4

12

4

12

6

Type 14A

Type 14

Type 19B

1'-0"

6'-7"

12

6

4'-3"

7'-0"

7'-0"

4'-3"

7

Out

Type 17A

1'-8"

L1

Type 17

8"

W3

1'-6"

NOTES:
All dimensions are out to out of bars.
Ø See Cutting Diagram
Δ Bars to be Epoxy Coated.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY	
		Abut. No. 1	Abut. No. 4
Class A45 Concrete, Bridge	Cu. Yd.	23	23
Reinforcing Steel	Lb.	2,623	2,623
Epoxy Coated Reinforcing Steel	Lb.	933	933
Structure Excavation, Bridge	Cu. Yd.	440	110
HP 12 X 53 Steel Test Pile, Furnish and Drive	Ft.	1 @ 60' = 60'	1 @ 60' = 60'
HP 12 X 53 Steel Bearing Pile, Furnish and Drive	Ft.	5 @ 55' = 275'	5 @ 55' = 275'
Preboring Pile	Ft.	6 @ 10' = 60'	6 @ 10' = 60'

Includes 0.08 Cu. Yd. for grout pads.

NOTE:
Concrete will be placed in the space under the beams (within the backwall width) during the pour. Care will be taken to get the concrete vibrated into this area. If upon form removal the space is not completely filled and consolidated, the contractor will grout in the remaining voids.

ABUTMENT DETAILS (B)

FOR

177' - 0" PRESTRESSED GIRDER BRIDGE

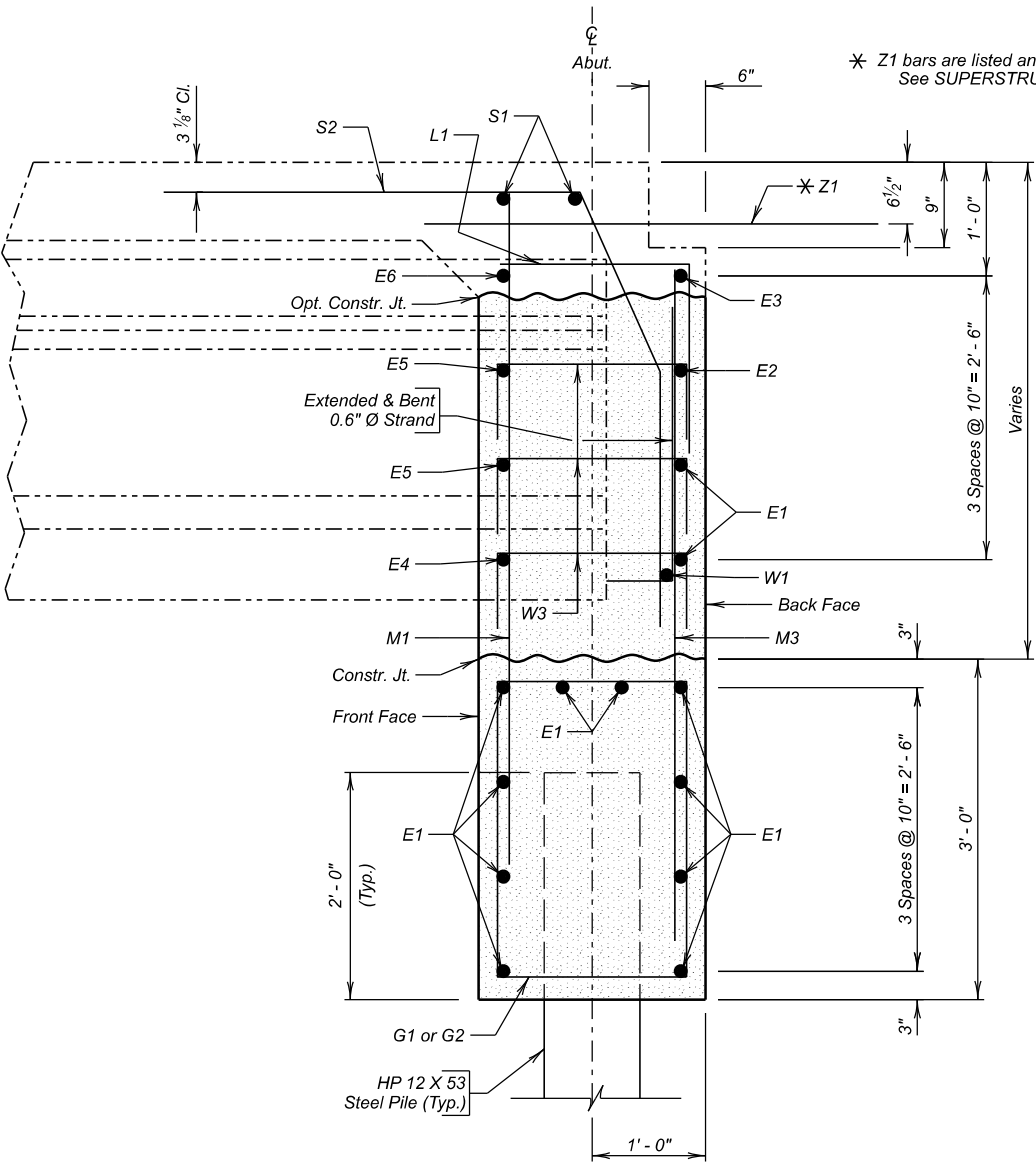
36' - 0" ROADWAY
OVER SULPHUR CREEK
STA. b 1216 + 06.84 TO b 1217 + 83.84
STR. NO. 10-496-208

0° SKEW
SEC. 17-T11N-R9E
NH 0212(207)40
HL-93

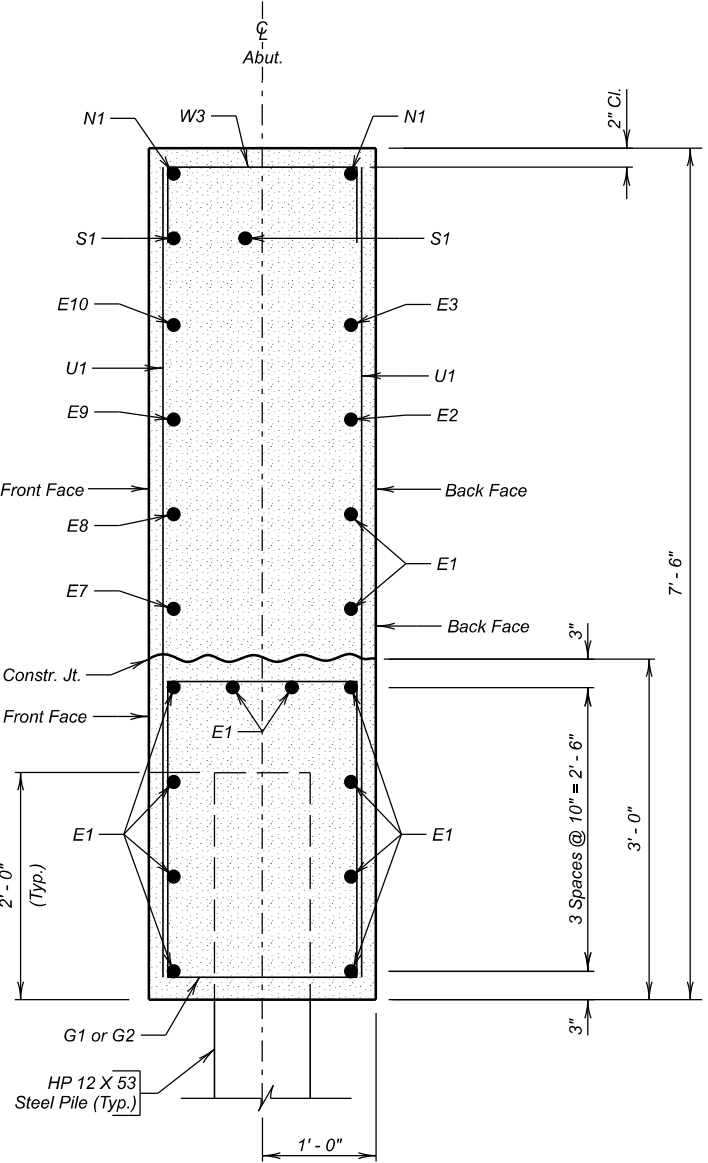
BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

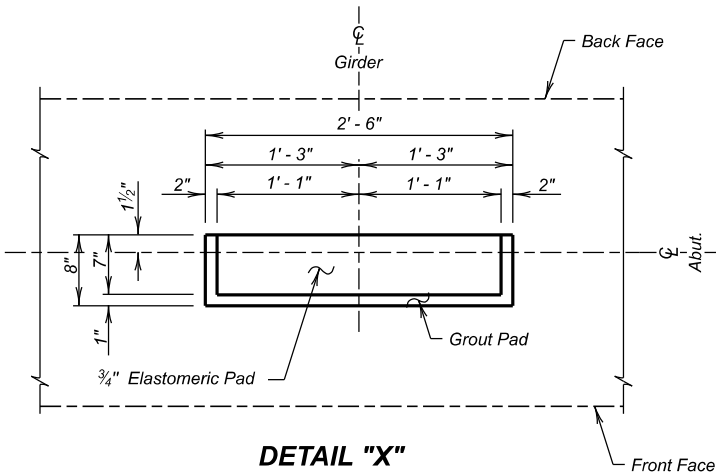
AUGUST 2025



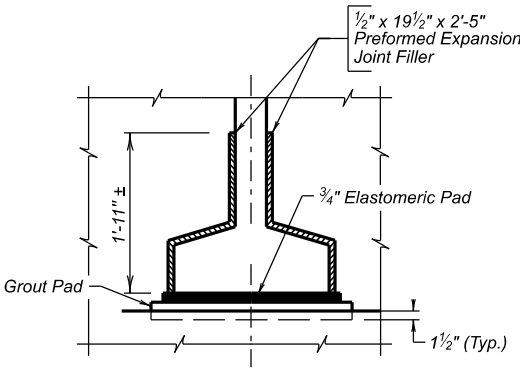
SEC. A - A



SEC. B - B



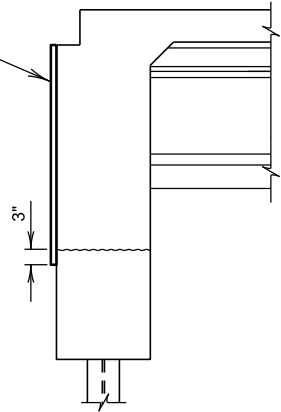
DETAIL "X"



DETAIL "Y"

(Typical at girder ends; abutments only)

The face on the back side of the abutment between the abut. wings will be thoroughly coated with an approved waterproof sealant. (See Notes regarding abutment backwall coating.)



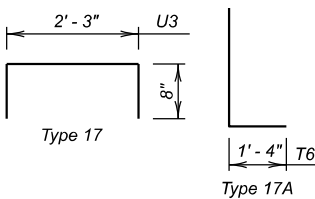
ABUT. BACKWALL COATING DETAILS



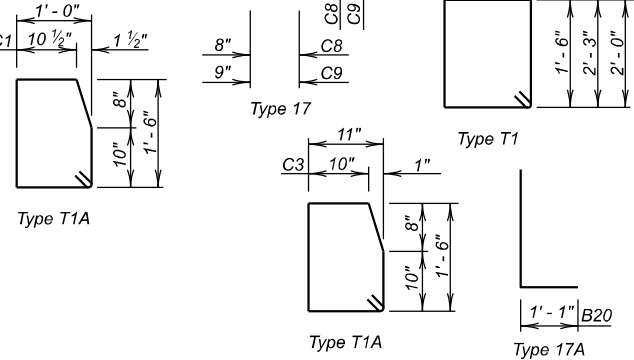
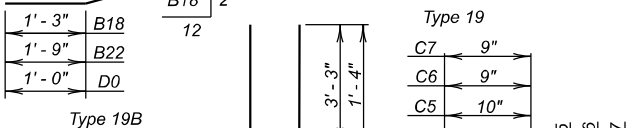
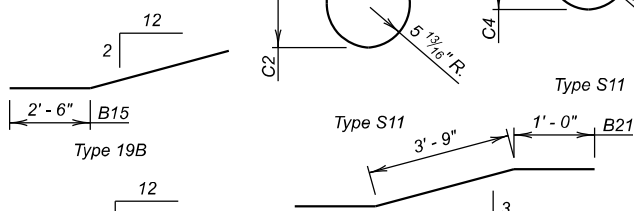
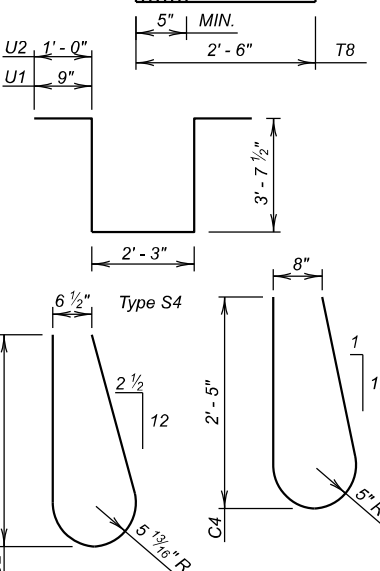
Mk.	No.	Size	Length	Type
B	259	5	39' - 6"	1
B1	130	5	38' - 4"	Str.
B2	129	5	35' - 10"	Str.
B15	12	5	9' - 6"	19B
B16	6	4	55' - 6"	Str.
B17	8	4	5' - 8"	Str.
B18	12	8	3' - 0"	19B
B19	12	5	2' - 0"	Str.
B20	12	6	3' - 6"	17A
B21	4	4	5' - 9"	19
B22	4	4	3' - 3"	19B
C1	332	5	5' - 10"	T1A
C2	336	5	5' - 3"	S11
C3	4	5	5' - 8"	T1A
C4	8	5	5' - 3"	S11
C5	8	5	5' - 7"	T1
C6	12	6	7' - 4"	T1
C7	12	5	6' - 5"	T1
C8	4	6	7' - 3"	17
C9	4	5	3' - 5"	17
D	16	4	46' - 2"	Str.
D0	4	4	2' - 6"	19B
D1	36	4	56' - 0'	Str.
D2	148	5	45' - 8"	Str.
D3	72	6	22' - 3"	Str.
D4	180	5	37' - 7"	Str.
D5	16	5	46' - 8"	Str.
T1	16	6	5' - 8"	Str.
T2	32	5	7' - 6"	Str.
T3	16	5	5' - 6"	Str.
T4	12	5	5' - 0"	Str.
T5	6	6	36' - 6"	Str.
T6	32	5	5' - 3"	17A
T7	8	5	2' - 11"	Str.
T8	32	6	2' - 6"	Str.
U1	40	4	11' - 0"	S4
U2	20	6	11' - 6"	S4
U3	48	4	3' - 7"	17
Z1	48	7	4' - 0"	Str.

Mk.	No.	Size	Length	Type
B	259	5	39' - 6"	1
B1	130	5	38' - 4"	Str.
B2	129	5	35' - 10"	Str.
B15	12	5	9' - 6"	19B
B16	6	4	55' - 6"	Str.
B17	8	4	5' - 8"	Str.
B18	12	8	3' - 0"	19B
B19	12	5	2' - 0"	Str.
B20	12	6	3' - 6"	17A
B21	4	4	5' - 9"	19
B22	4	4	3' - 3"	19B
C1	332	5	5' - 10"	T1A
C2	336	5	5' - 3"	S11
C3	4	5	5' - 8"	T1A
C4	8	5	5' - 3"	S11
C5	8	5	5' - 7"	T1
C6	12	6	7' - 4"	T1
C7	12	5	6' - 5"	T1
C8	4	6	7' - 3"	17
C9	4	5	3' - 5"	17
D	16	4	46' - 2"	Str.
D0	4	4	2' - 6"	19B
D1	36	4	56' - 0'	Str.
D2	148	5	45' - 8"	Str.
D3	72	6	22' - 3"	Str.
D4	180	5	37' - 7"	Str.
D5	16	5	46' - 8"	Str.
T1	16	6	5' - 8"	Str.
T2	32	5	7' - 6"	Str.
T3	16	5	5' - 6"	Str.
T4	12	5	5' - 0"	Str.
T5	6	6	36' - 6"	Str.
T6	32	5	5' - 3"	17A
T7	8	5	2' - 11"	Str.
T8	32	6	2' - 6"	Str.
U1	40	4	11' - 0"	S4
U2	20	6	11' - 6"	S4
U3	48	4	3' - 7"	17
Z1	48	7	4' - 0"	Str.

Diagram of a Type 1 pipe section. A horizontal line represents the pipe axis. A vertical line segment labeled B is at the left end. A dimension line above the axis indicates a length of $38' - 4''$. Below the axis, a rounded rectangular shape is labeled *Type 1*.



- Threaded to fit inserts



NOTES:

All reinforcing steel will be stainless steel except as noted.

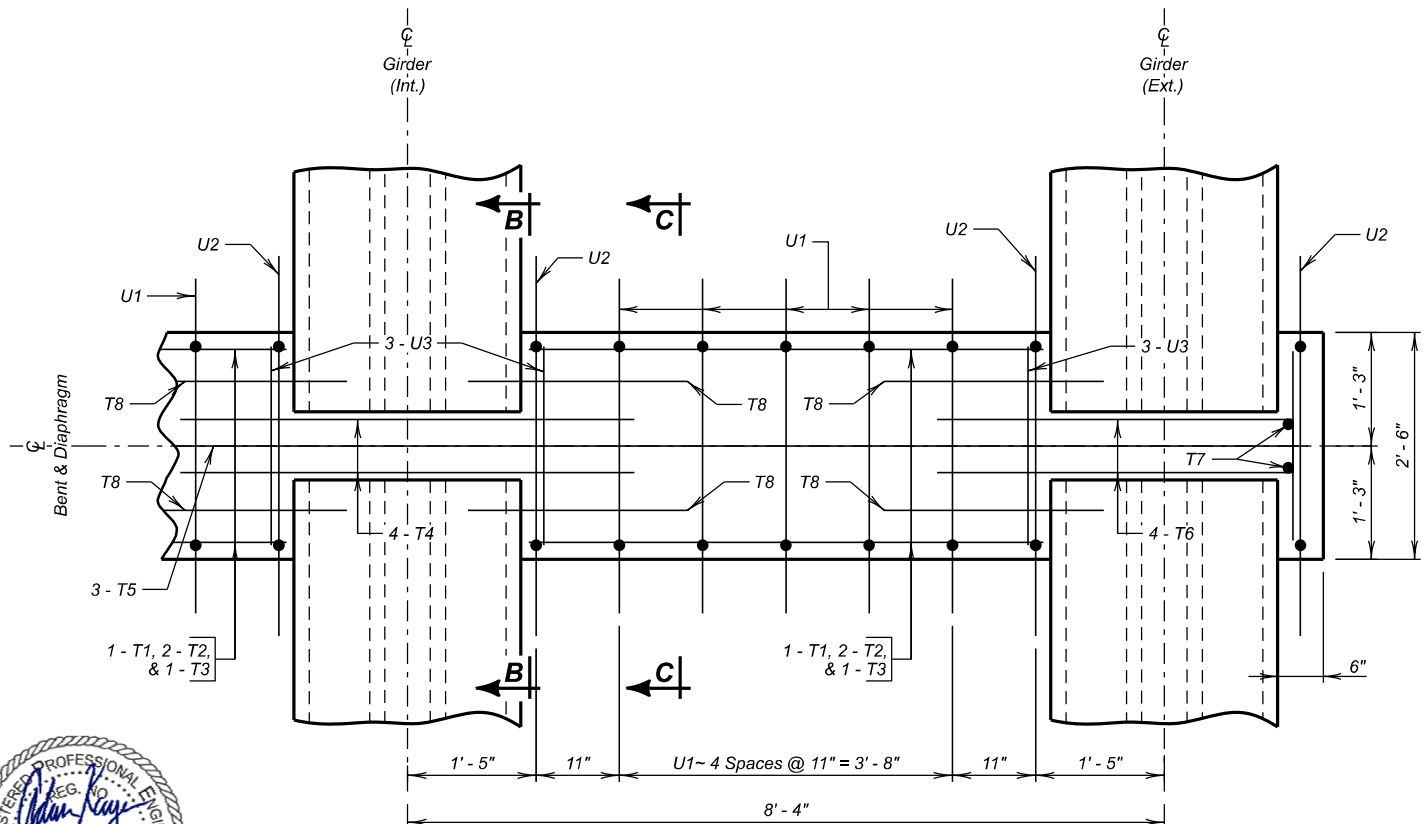
See Approach Slab sheet for location of Z1 bars

All dimensions are out to out of bars.

✕ Bars to be epoxy coated

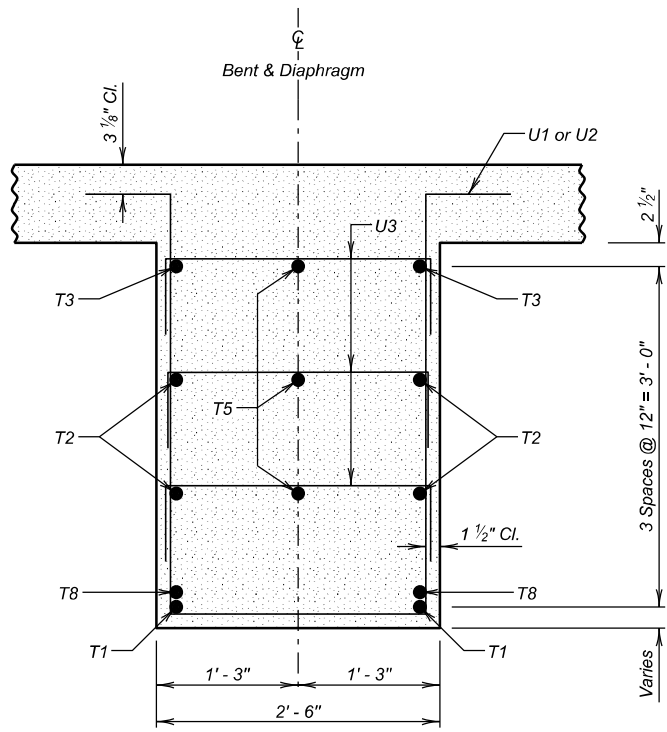
A. Tip bars as required to maintain top and bottom clear cover.

- △ Tip bars as required to maintain
- ✦ Bend in field as necessary to fit



BENT DIAPHRAGMS

(Slab Not Shown)



SEC. C - C

(Girders Not Shown)

NOTE -

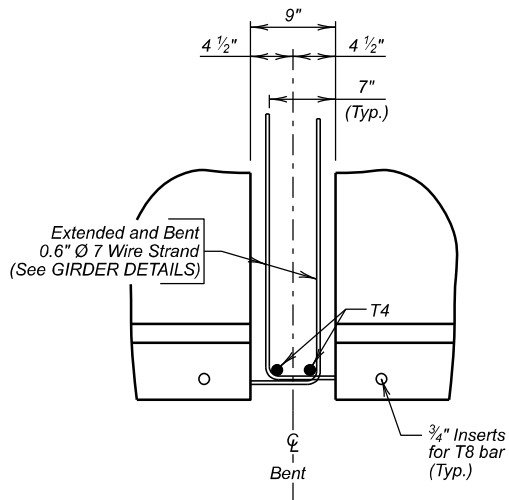
Concrete will be placed in the space under the beams at Bents 2 & 3 (within the diaphragm width) during the diaphragm pour. If upon form removal the space is not completely filled and consolidated, the Contractor will grout in the remaining voids.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
<i>Class A45 Concrete, Bridge Deck</i>	<i>Cu. Yd.</i>	<i>247.6</i>
<i>Stainless Reinforcing Steel</i>	<i>Lb.</i>	<i>46,107</i>
<i>Epoxy Coated Reinforcing Steel</i>	<i>Lb.</i>	<i>878</i>
<i>36" Minnesota Shape Prestressed Concrete Beam</i>	<i>Ft.</i>	<i>869</i>
<i>Concrete Penetrating Sealer</i>	<i>Sq. Yd.</i>	<i>704</i>
<i>Deck Drain Girder Bridge</i>	<i>Each</i>	<i>2</i>

★ Includes quantities for Bent Diaphragms, Barrier Curbs, Slab, and Haunch.
(Average depth of 1 1/2" used for Haunch Quantity.) Concrete Quantity for
Barrier Curbs is 0.1184 Cu. Yd./Ft. and for End Blocks is 0.7184 Cu. Yd. each

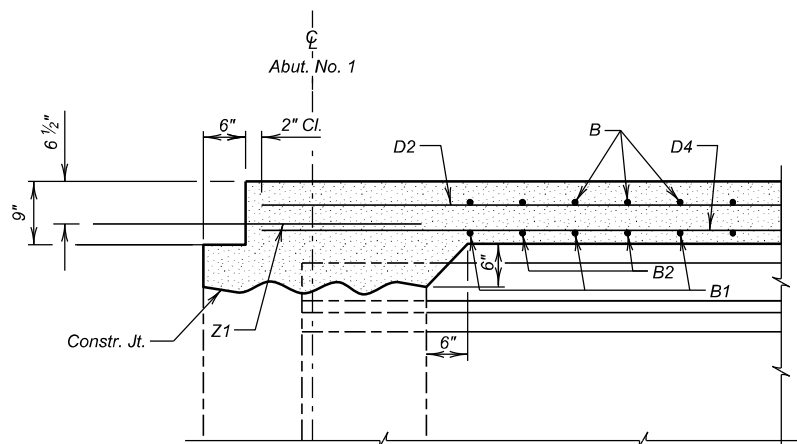
~~4~~ Includes quantities for Barrier Curbs and Slab.

ϕ Includes quantities for Bent Diaphragms.



SEC. B - B

(Showing extended and bent strand detail and T4 bar placement at Bent. T6 similar at exterior girder.)



SEC. D - D

SUPERSTRUCTURE DETAILS (B)

FOR

177' - 0" PRESTRESSED GIRDER BRIDGE

36' - 0" ROADWAY

OVER SULPHUR CREEK

STA. b 1216 + 06.84 TO b 1217 + 83.84

STR. NO. 10-496-208

0° SKEW

SEC. 17-T11N-R9E

NH 0212(207)40

HL-93

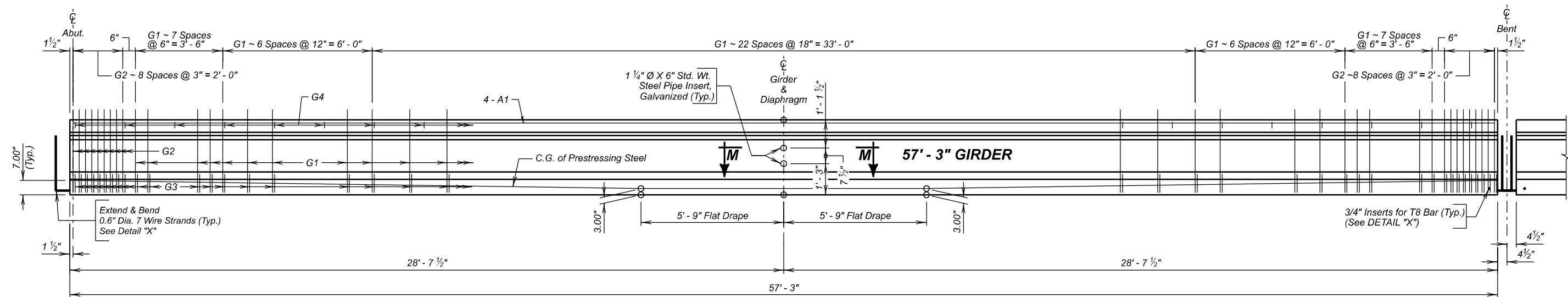
BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

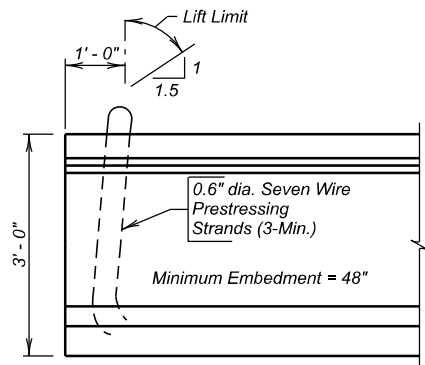
AUGUST 2025

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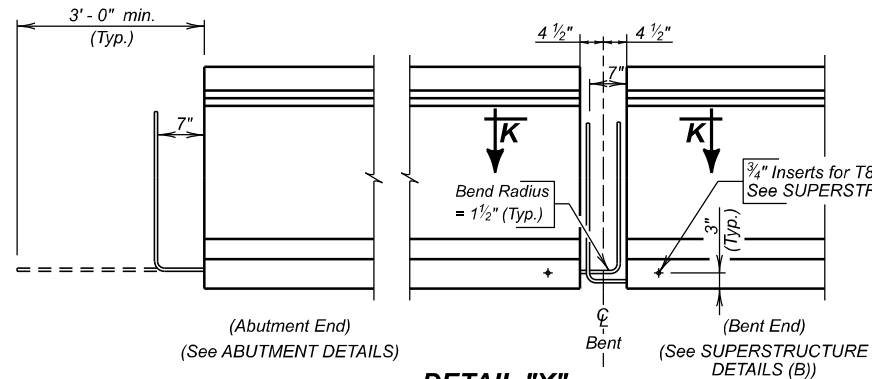
DESIGNED BY AK	CK. DES. BY LB	DRAFTED BY KC	
ROUTE06.ID	06.IDGC11		BRIDGE ENGINEER



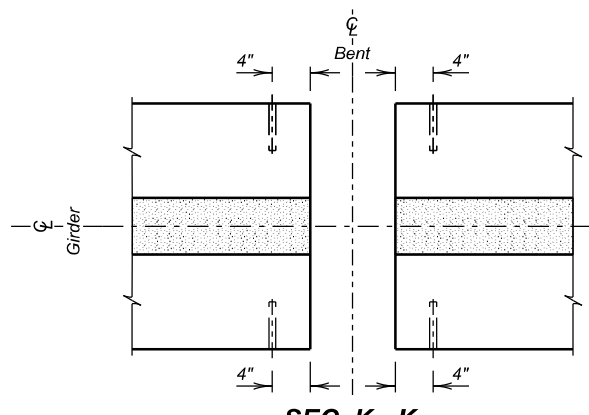
ELEVATION



TYPICAL LIFTING DEVICE



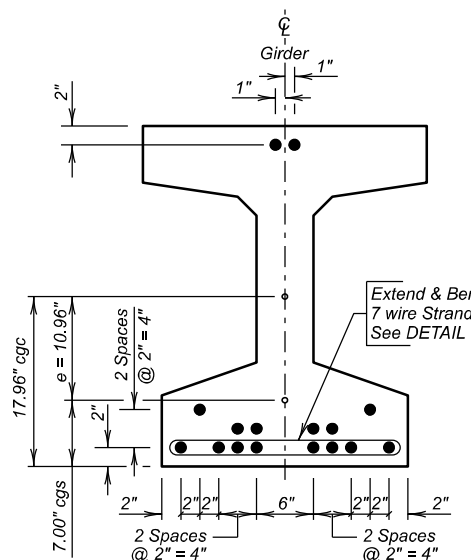
DETAIL "X"



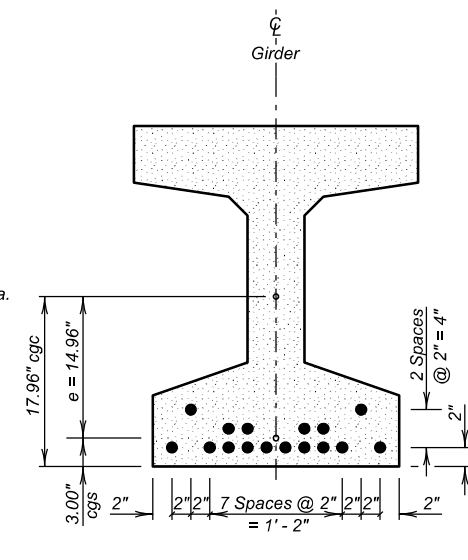
SEC. K - K
Layout for inserts at beam ends
(Bent only)

REINFORCING SCHEDULE					
(For One Girder)					
Mk.	No.	Size	Length	Type	Bending Details
A1	4	7	57' - 0"	Str.	
G1	49	4	7' - 0"	S11	
G2	18	5	7' - 0"	S11	
G3	67	4	4' - 10"	S3A	
G4	30	4	2' - 8"	17	

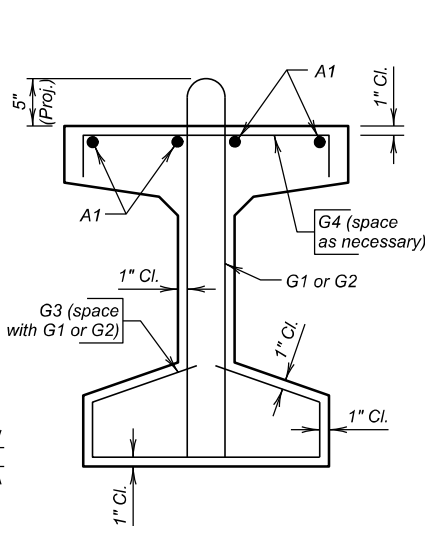
All Dimensions are out to out of bars.
* Bars to be epoxy coated.



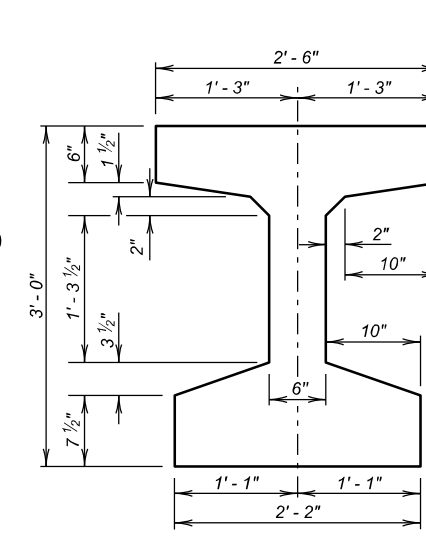
END VIEW



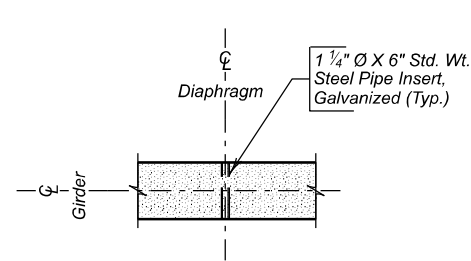
SECTION



STIRRUP DETAILS



TYPE 36 GIRDER

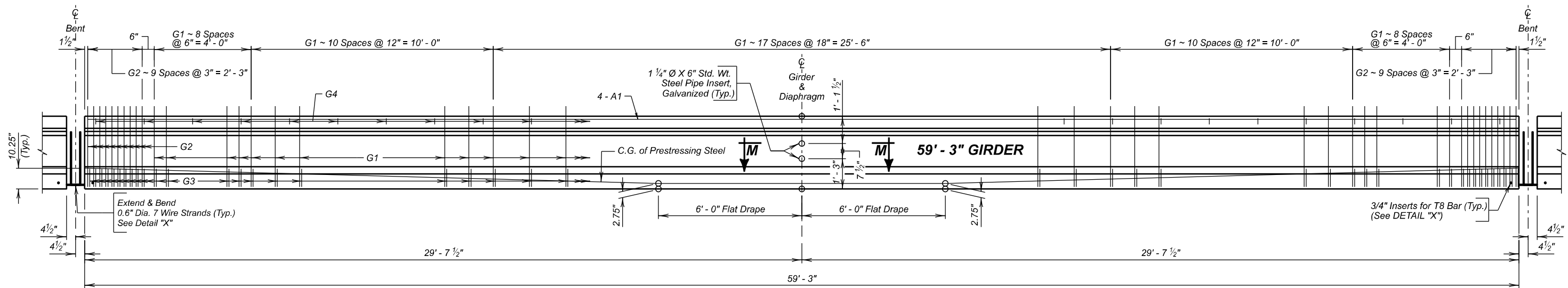


SEC. M - M

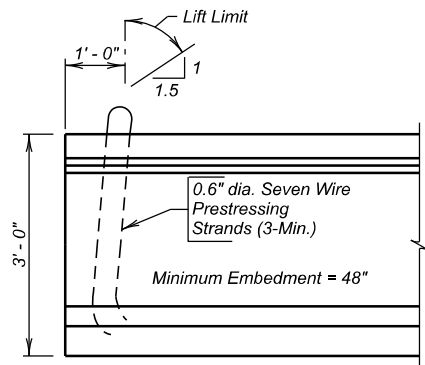


57' - 3" GIRDER DETAILS
FOR
177' - 0" PRESTRESSED GIRDER BRIDGE
36' - 0" ROADWAY 0° SKEW
OVER SULPHUR CREEK SEC. 17-T11N-R9E
STA. b 1216 + 06.84 TO b 1217 + 83.84 NH 0212(207)40
STR. NO. 10-496-208 HL-93

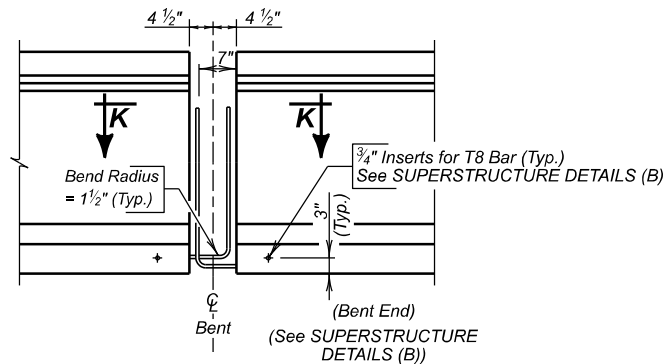
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
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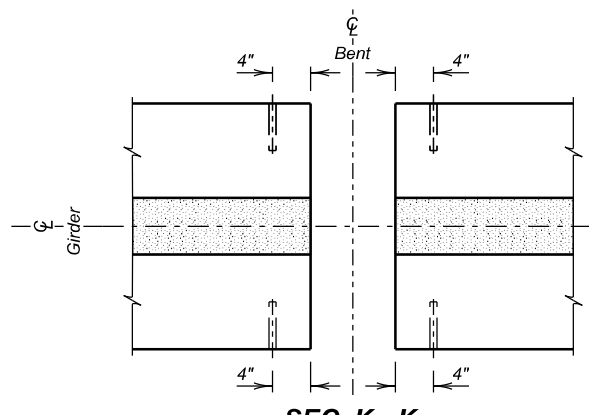
ELEVATION



TYPICAL LIFTING DEVICE



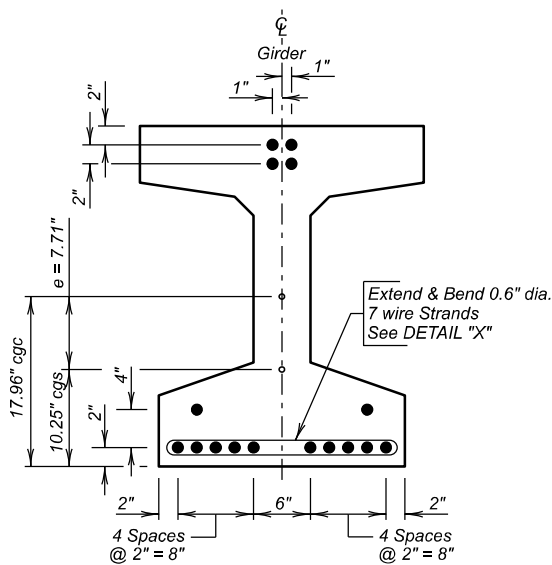
DETAIL "X"



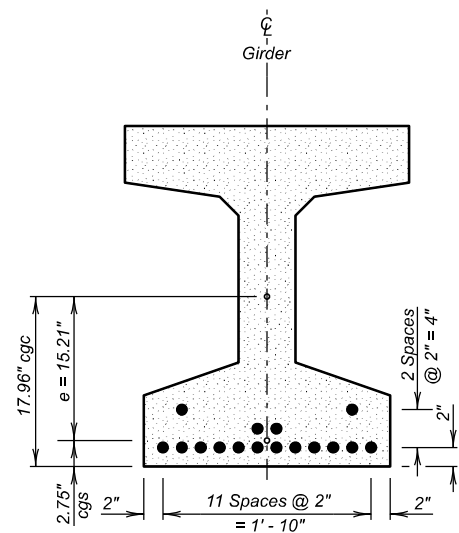
SEC. K - K
Layout for inserts at beam ends
(Bent only)

REINFORCING SCHEDULE					
(For One Girder)					
Mk.	No.	Size	Length	Type	Bending Details
A1	4	7	59' - 0"	Str.	
G1	54	4	7' - 0"	S11	
G2	20	5	7' - 0"	S11	
G3	74	4	4' - 10"	S3A	
G4	30	4	2' - 8"	17	

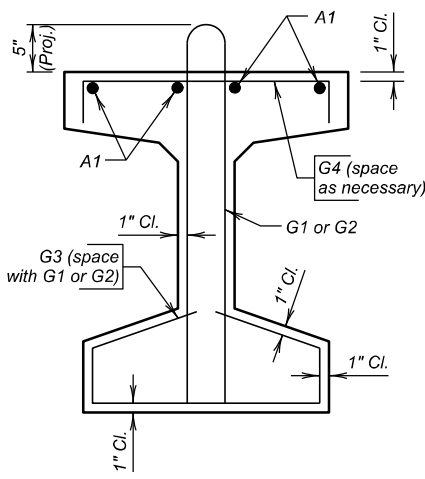
All Dimensions are out to out of bars.
* Bars to be epoxy coated.



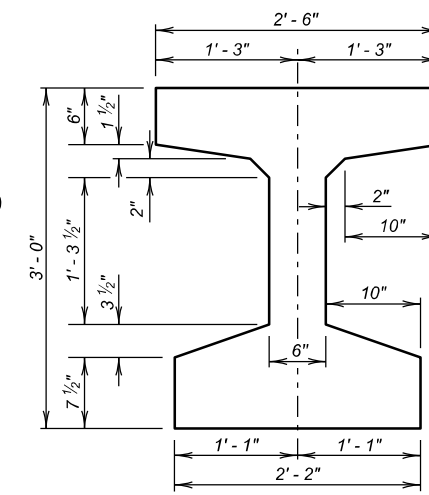
END VIEW



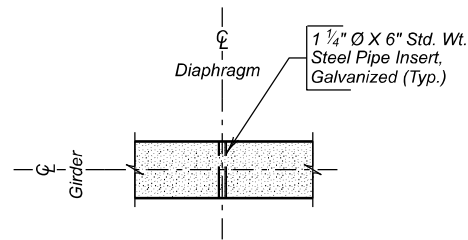
SECTION



STIRRUP DETAILS



TYPE 36 GIRDER



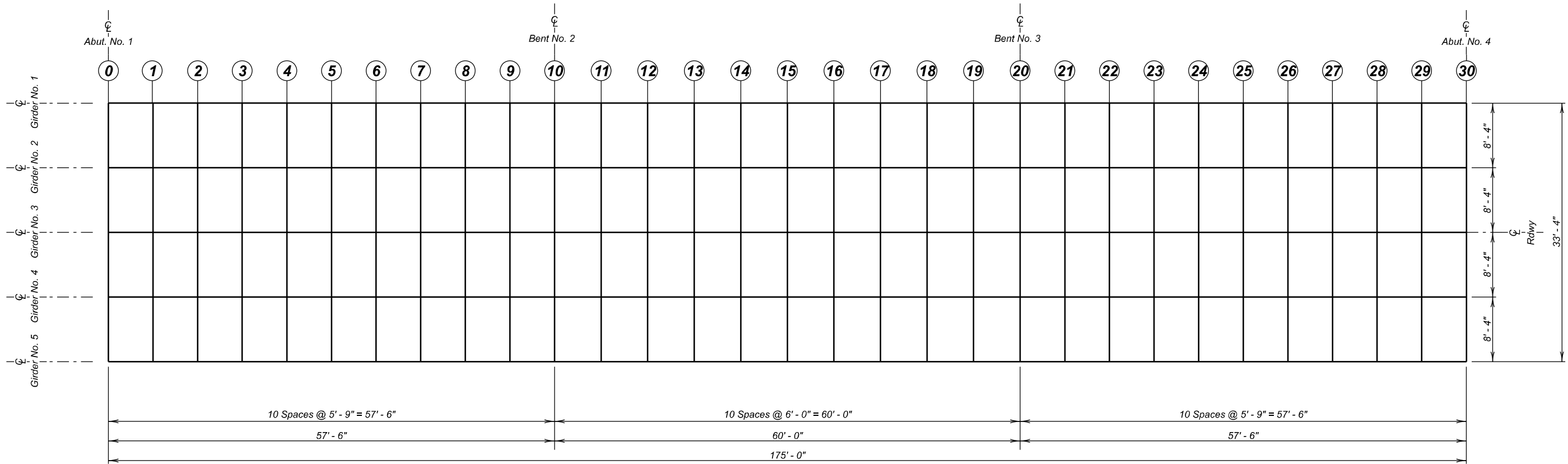
SEC. M - M



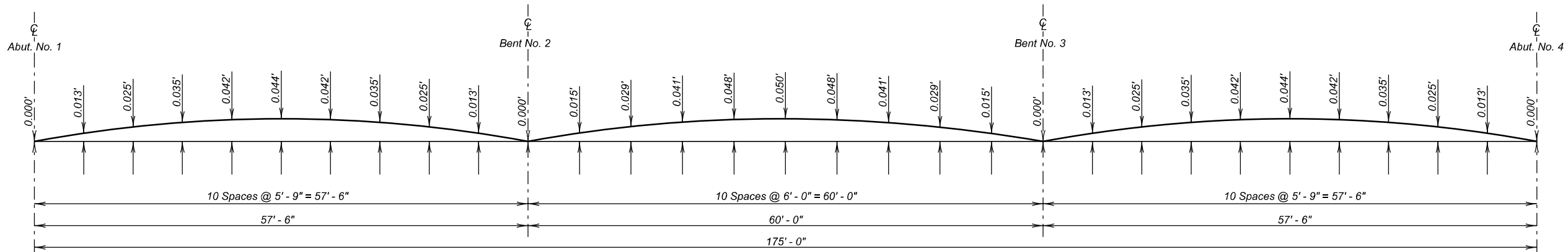
59' - 3" GIRDER DETAILS
FOR
177' - 0" PRESTRESSED GIRDER BRIDGE
36' - 0" ROADWAY
OVER SULPHUR CREEK
STA. b 1216 + 06.84 TO b 1217 + 83.84
STR. NO. 10-496-208

0° SKEW
SEC. 17-T11N-R9E
NH 0212(207)40
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025



GIRDER LAYOUT



CAMBER DIAGRAM

The Camber shown is the amount which has been added to the theoretical slab elevations to get slab elevations shown in the table of Slab Form Elevations and Calculations. Camber shown is for D.L. of slab, traffic barrier, and haunch, but does not include D.L. of beams.

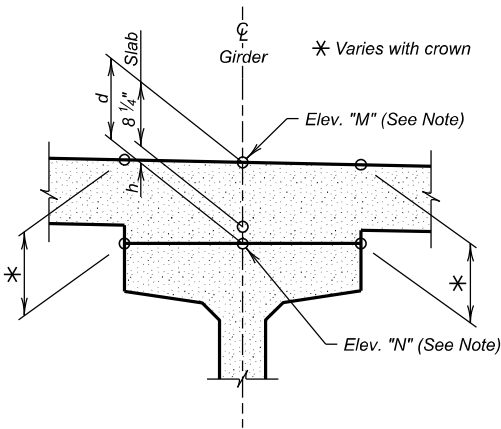
ERECTION DATA
FOR

177' - 0" PRESTRESSED GIRDER BRIDGE
36' - 0" ROADWAY 0° SKEW
OVER SULPHUR CREEK SEC. 17-T11N-R9E
STA. b 1216 + 06.84 TO b 1217 + 83.84 NH 0212(207)40
STR. NO. 10-496-208 HL-93



BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

		TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS															
		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Girder No. 1	Elev. "M"	2752.38	2752.41	2752.43	2752.46	2752.48	2752.50	2752.52	2752.53	2752.54	2752.54	2752.55	2752.58	2752.61	2752.64	2752.66	2752.68
	(-) Elev. "N"																
	(=) d																
	(-) 0.688'																
	(=) h																
Girder No. 2	Elev. "M"	2752.55	2752.58	2752.61	2752.63	2752.66	2752.67	2752.69	2752.70	2752.71	2752.71	2752.72	2752.75	2752.78	2752.81	2752.84	2752.86
	(-) Elev. "N"																
	(=) d																
	(-) 0.688'																
	(=) h																
Girder No. 3	Elev. "M"	2752.71	2752.74	2752.77	2752.80	2752.82	2752.84	2752.86	2752.87	2752.87	2752.88	2752.88	2752.92	2752.95	2752.98	2753.00	2753.02
	(-) Elev. "N"																
	(=) d																
	(-) 0.688'																
	(=) h																
Girder No. 4	Elev. "M"	2752.55	2752.58	2752.61	2752.63	2752.66	2752.67	2752.69	2752.70	2752.71	2752.71	2752.72	2752.75	2752.78	2752.81	2752.84	2752.86
	(-) Elev. "N"																
	(=) d																
	(-) 0.688'																
	(=) h																
Girder No. 5	Elev. "M"	2752.38	2752.41	2752.43	2752.46	2752.48	2752.50	2752.52	2752.53	2752.54	2752.54	2752.55	2752.58	2752.61	2752.64	2752.66	2752.68
	(-) Elev. "N"																
	(=) d																
	(-) 0.688'																
	(=) h																



NOTE —

This table contains the information necessary to determine the depth of concrete over the girders at points shown. Calculations may be carried in the spaces provided. Elev. "M" is the design elevation of the top of slab before any concrete has been poured. This elevation includes correction for camber and dead load deflection. Elev. "N" is a field measured elevation taken on top of girders at the points shown with the girders in their positions. This elevation must be taken after erection is completed, but prior to placing any of the concrete. Girders shall not be supported between bearings when elevations are taken.

NOTE —

Based on a "d" of 10 1/4" at the C of each abutment and each bent (see SEC. A - A of SUPERSTRUCTURE DETAILS (A)), it is anticipated that the midspan haunch dimension "h" over the C of each girder will be 1 1/8". If when computing the dimensions in the table, it is found that any dimension "h" is less than zero or greater than 4" the Office of Bridge Design of the South Dakota Dept. of Transportation shall be notified immediately. After the "Table of Slab Form Elevations and Calculations" has been filled out and approved for deck forming, a copy shall be forwarded to the Office of Bridge Design for review and analysis for the purpose of securing information relative to camber growth in the beams. This information in necessary for preparing plans for future structures of this type.

TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS																
Girder No. 1		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	Elev. "M"	2752.70	2752.71	2752.72	2752.72	2752.73	2752.76	2752.79	2752.81	2752.83	2752.85	2752.87	2752.88	2752.89	2752.90	2752.90
	(-) Elev. "N"															
	(=) d															
	(-) 0.688'															
Girder No. 2																
	Elev. "M"	2752.87	2752.88	2752.89	2752.89	2752.90	2752.93	2752.96	2752.98	2753.01	2753.03	2753.04	2753.05	2753.06	2753.06	2753.07
	(-) Elev. "N"															
	(=) d															
	(-) 0.688'															
Girder No. 3																
	Elev. "M"	2753.04	2753.05	2753.06	2753.06	2753.06	2753.09	2753.12	2753.15	2753.17	2753.19	2753.21	2753.22	2753.23	2753.23	2753.24
	(-) Elev. "N"															
	(=) d															
	(-) 0.688'															
Girder No. 4																
	Elev. "M"	2752.87	2752.88	2752.89	2752.89	2752.90	2752.93	2752.96	2752.98	2753.01	2753.03	2753.04	2753.05	2753.06	2753.06	2753.07
	(-) Elev. "N"															
	(=) d															
	(-) 0.688'															
Girder No. 5																
	Elev. "M"	2752.70	2752.71	2752.72	2752.72	2752.73	2752.76	2752.79	2752.81	2752.83	2752.85	2752.87	2752.88	2752.89	2752.90	2752.90
	(-) Elev. "N"															
	(=) d															
	(-) 0.688'															

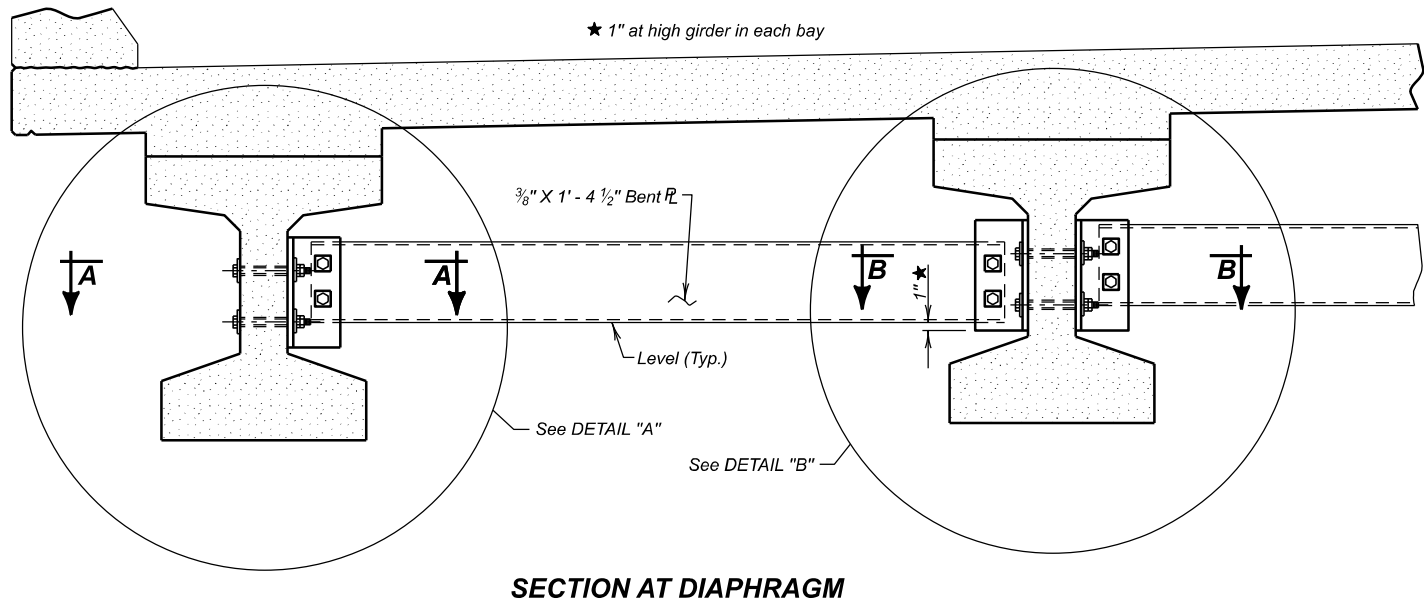


SLAB FORM ELEVATIONS
FOR
177' - 0" PRESTRESSED GIRDER BRIDGE
36' - 0" ROADWAY
OVER SULPHUR CREEK
STA. b 1216 + 06.84 TO b 1217 + 83.84
STR. NO. 10-496-208

0° SKEW
SEC. 17-T11N-R9E
NH 0212(207)40
HL-93

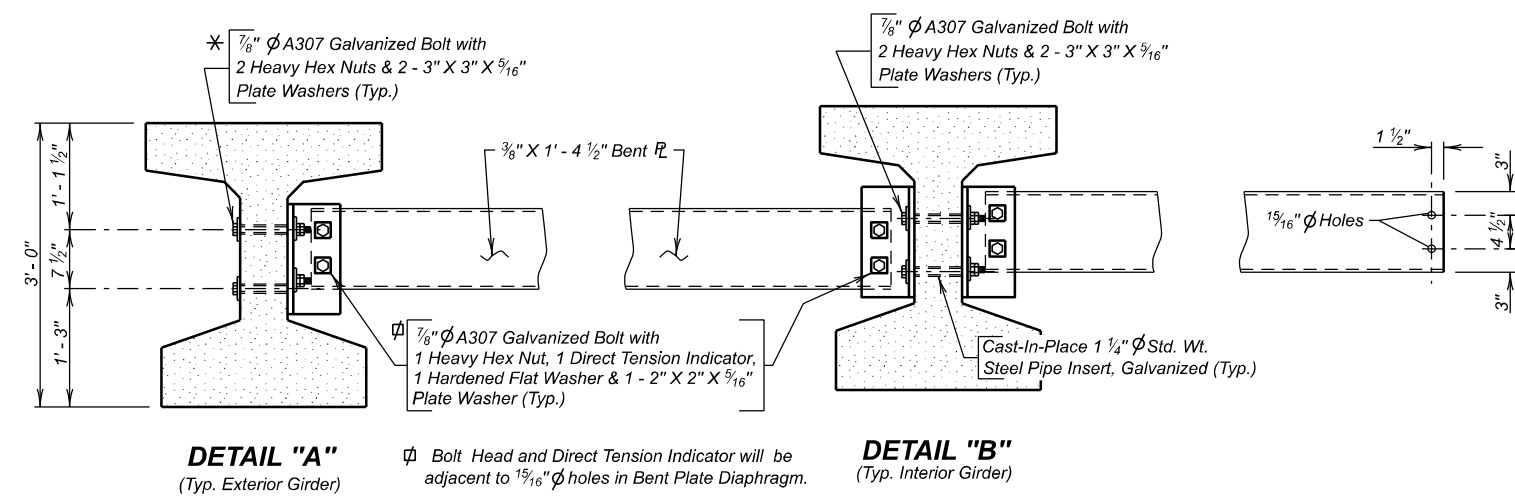
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E59	E69



SECTION AT DIAPHRAGM

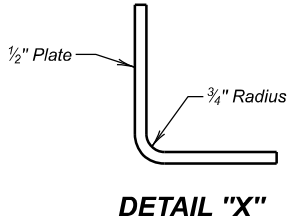
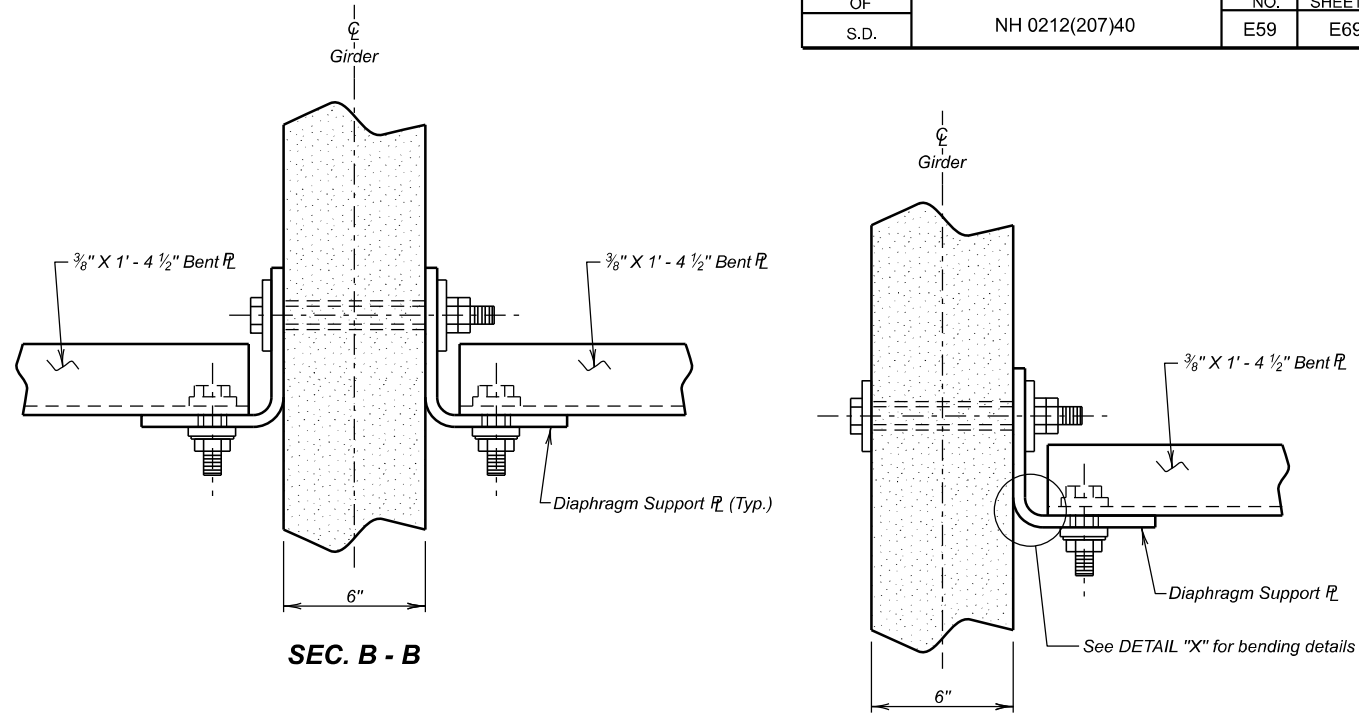
* Bolt head will be adjacent to the Exterior Face of the Exterior Girder.



DETAIL "A"

Ø Bolt Head and Direct Tension Indicator will be adjacent to 15/16" Ø holes in Bent Plate Diaphragm.

DETAIL "B"



END VIEW BENT
PLATE DIAPHRAGM

- NOTES:**
- All steel for the diaphragms including plate washers will conform to ASTM A36 and will be galvanized in accordance with ASTM A123 or A153. Bolts, nuts, and washers will be galvanized in accordance with ASTM F2329. Direct Tension Indicators will conform to Section 410 of the Specifications.
 - The steel diaphragms between adjacent girders will be installed as soon as possible and in conjunction with girder erection.
 - See End Block, Barrier Curb, & Deck Drain Details for deck drain connection details. See General Drawing for spacing of deck drains where 5/16" x 2" slotted holes will be required in the steel diaphragms.
 - All costs associated with furnishing, fabricating, assembly and installation of diaphragms will be included in the lump sum price for Structural Steel, Miscellaneous.



ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Δ Structural Steel, Miscellaneous	L.S.	Lump Sum

Δ For informational purposes only, the estimated weight of structural steel is 2540 Lbs. for 12 diaphragms.

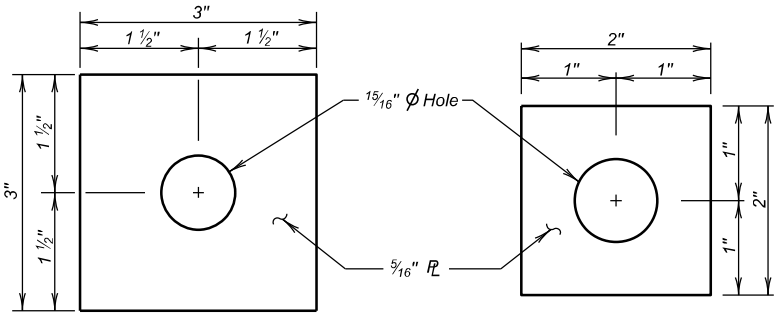
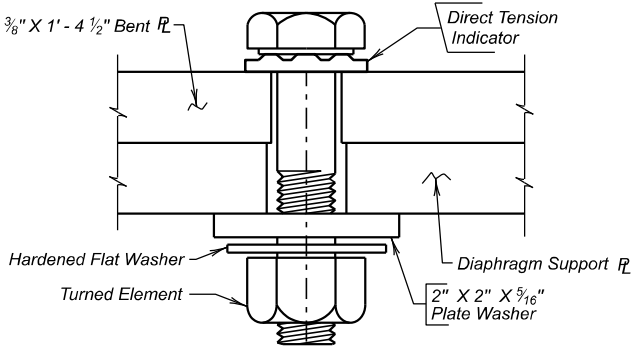
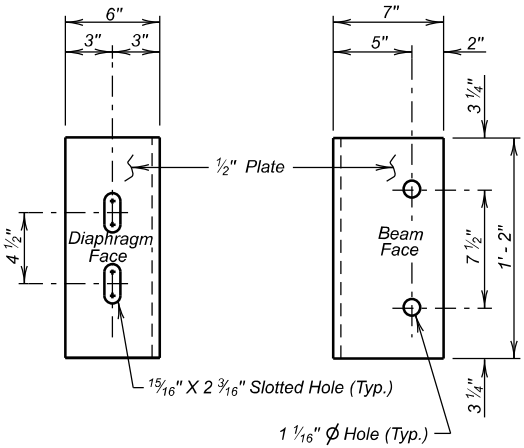


PLATE WASHER DETAILS



DIRECT TENSION INDICATOR
DETAIL



DIAPHRAGM SUPPORT PLATE

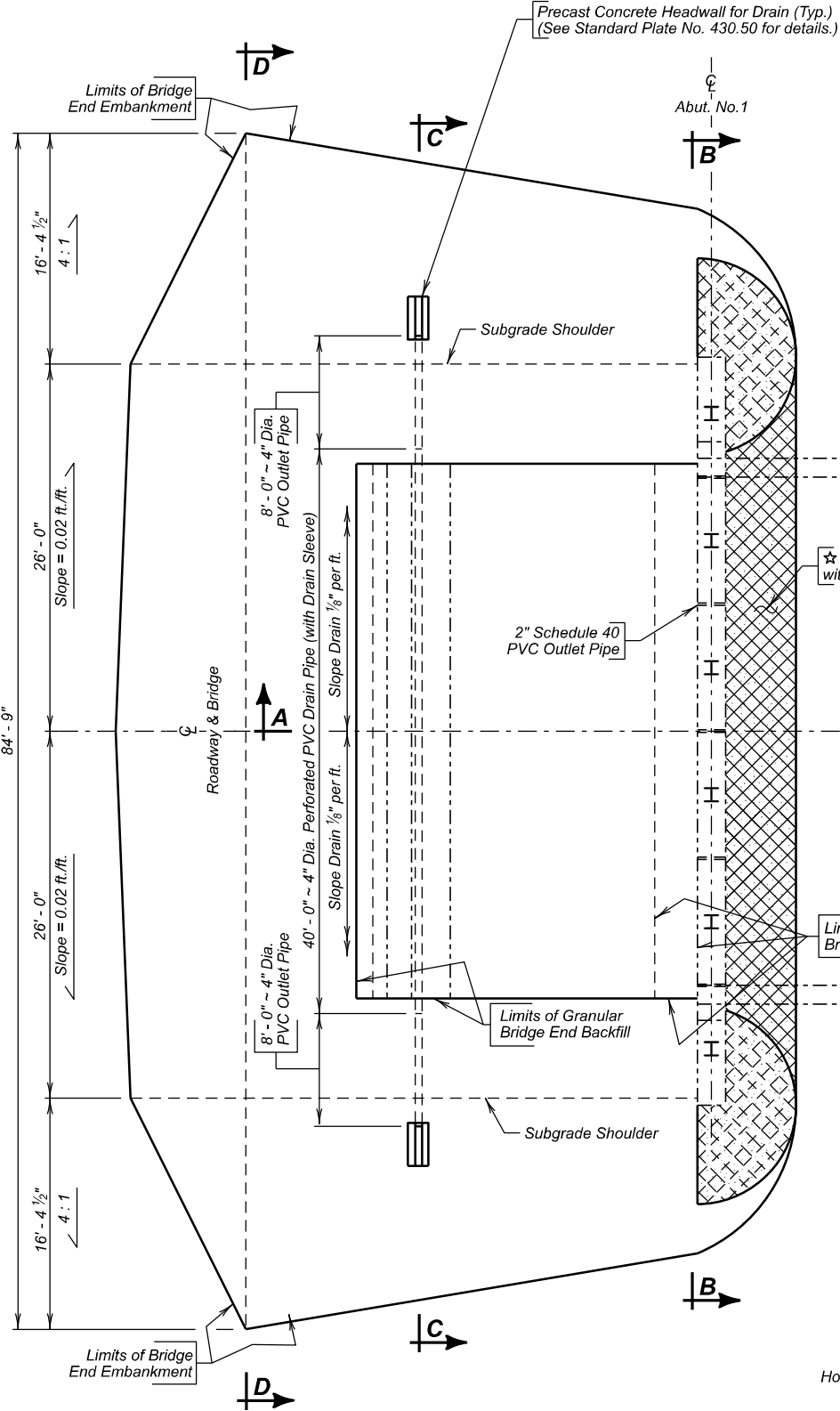
DIAPHRAGM DETAILS
FOR

177' - 0" PRESTRESSED GIRDER BRIDGE
36' - 0" ROADWAY
OVER SULPHUR CREEK
STA. b 1216 + 06.84 TO b 1217 + 83.84
STR. NO. 10-496-208

0° SKEW
SEC. 17-T11N-R9E
NH 0212(207)40
HL-93

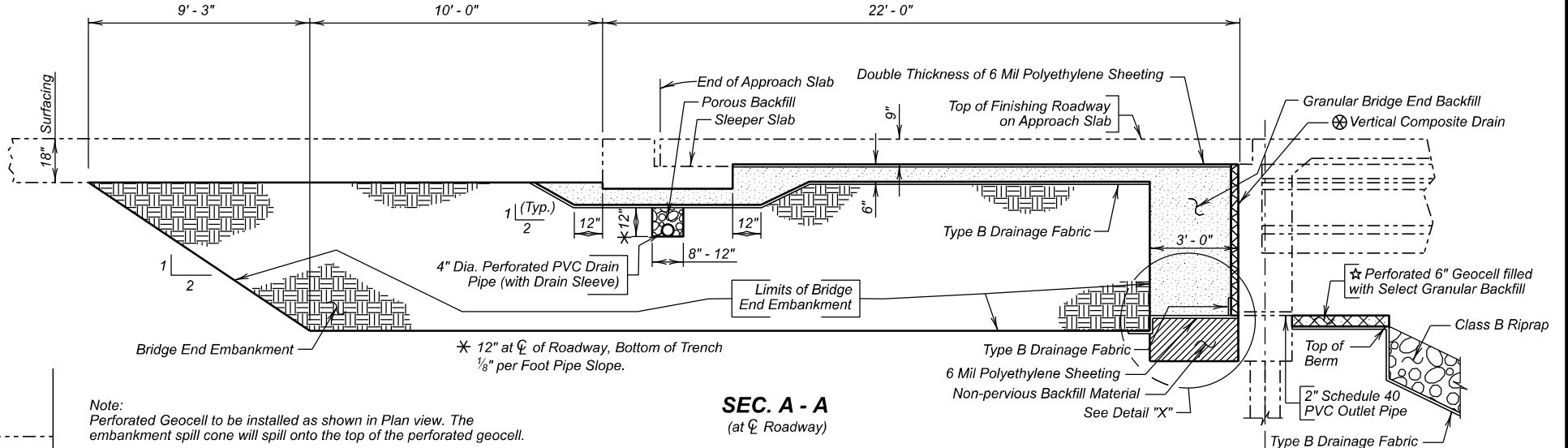
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGC17	DRAFTED BY KC	BRIDGE ENGINEER
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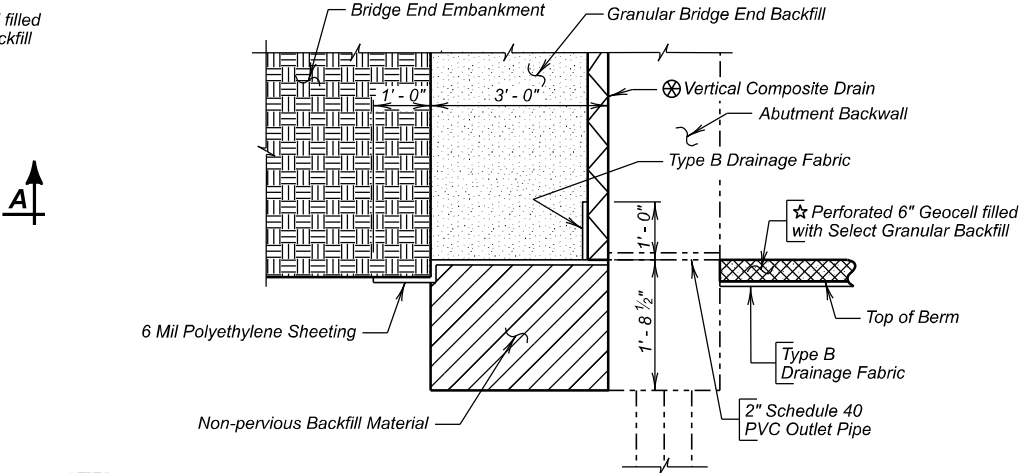
PLAN

(Bridge End Backfill shown adjacent to Abut. No. 1
Abut. No. 4 similar opposite hand except as shown.)

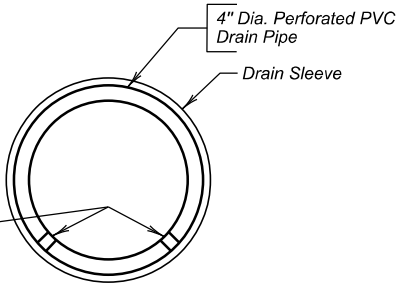


SEC. A - A
(at centerline of Roadway)

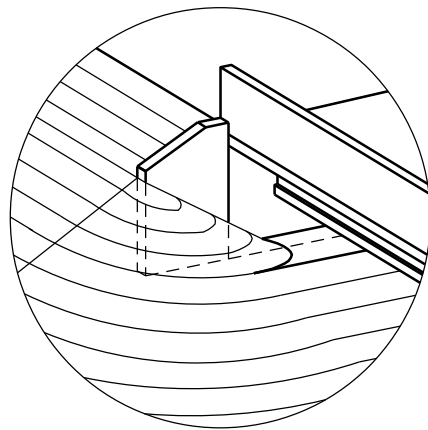
Note:
Perforated Geocell to be installed as shown in Plan view. The
embankment spill cone will spill onto the top of the perforated geocell.



DETAIL "X"



DRAIN DETAIL



SPILL CONE DETAIL AT EMBANKMENT

Provide hole in vertical composite drain
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.	77.8
Bridge End Embankment	Cu. Yd.	840
Porous Backfill	Ton	5.6
4" Underdrain Pipe	Ft.	112
Approach Slab Underdrain Excavation	Cu. Yd.	3
Select Granular Backfill	Ton	24.0
Perforated Geocell	Sq. Ft.	684
Precast Concrete Headwall for Drain	Each	4

- 80 ft. 4" dia. Perforated PVC Drain Pipe (with Drain Sleeve).
- 32 ft. 4" dia. PVC Outlet Pipe.
- 16 ft. 5" dia. Schedule 40 Steel Pipe.
- 20 ft. 2" dia. PVC Outlet Pipe.
- 362 sq. ft. Vertical Composite Drain.

Items 1 thru 5 are approximate quantities contained in the 4" Underdrain
Pipe and are for information only.

- 2,954 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
- 190 sq. yd. Type B Drainage Fabric.

Items 6 and 7 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

177' - 0" PRESTRESSED GIRDER BRIDGE

36' - 0" ROADWAY

0° SKEW

OVER SULPHUR CREEK

SEC. 17-T11N-R9E

STA. b 1216 + 06.84 TO b 1217 + 83.84

NH 0212(207)40

STR. NO. 10-496-208

HL-93

BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

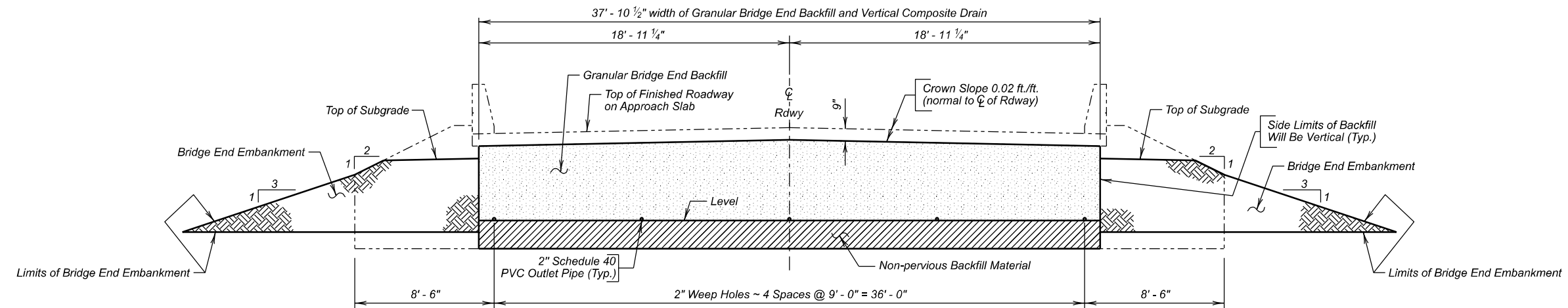
AUGUST 2025

18 OF 27

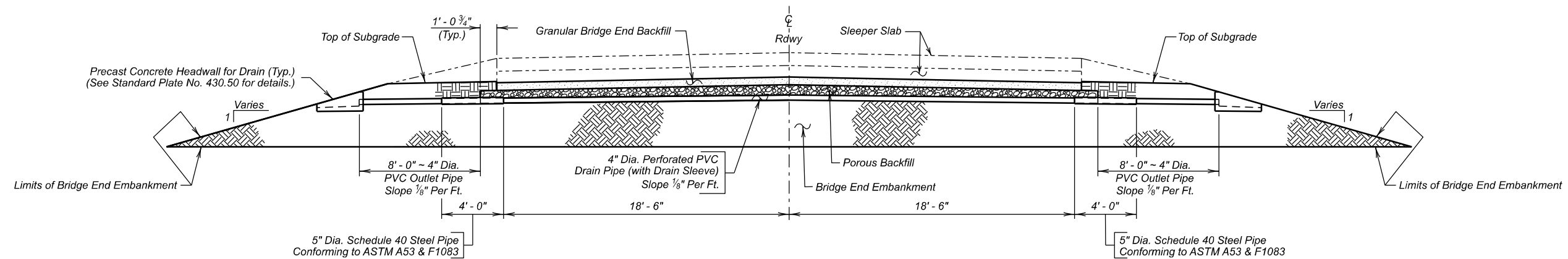
Note:
The Contractor will ensure the underdrain pipes located at the sleeper slab
are not damaged during the installation of the guardrail posts. Damaged
underdrain pipes will be replaced at the Contractor's expense.

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGC18	DRAFTED BY KC	BRIDGE ENGINEER
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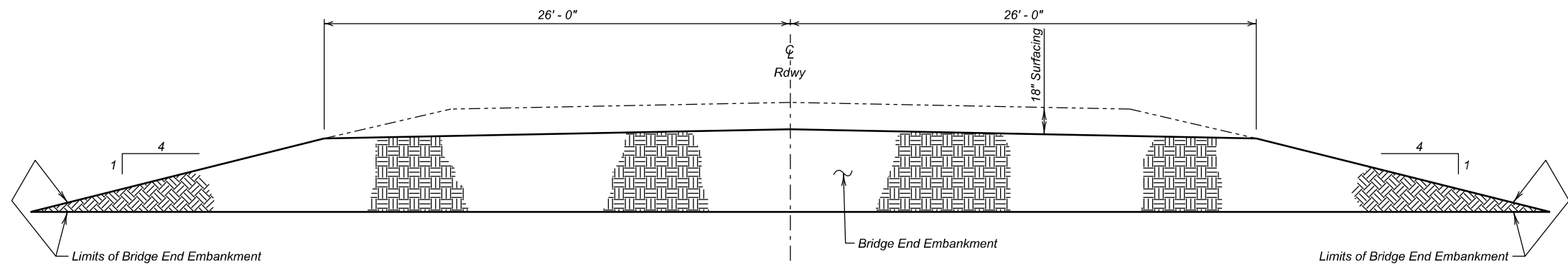
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E61	E69



SEC. B - B



SEC. C - C



SEC. D - D

DETAILS OF BRIDGE END BACKFILL (B)

FOR

177' - 0" PRESTRESSED GIRDER BRIDGE

36' - 0" ROADWAY 0° SKEW
OVER SULPHUR CREEK SEC. 17-T11N-R9E
STA. b 1216 + 06.84 TO b 1217 + 83.84 NH 0212(207)40
STR. NO. 10-496-208 HL-93

BUTTE COUNTY

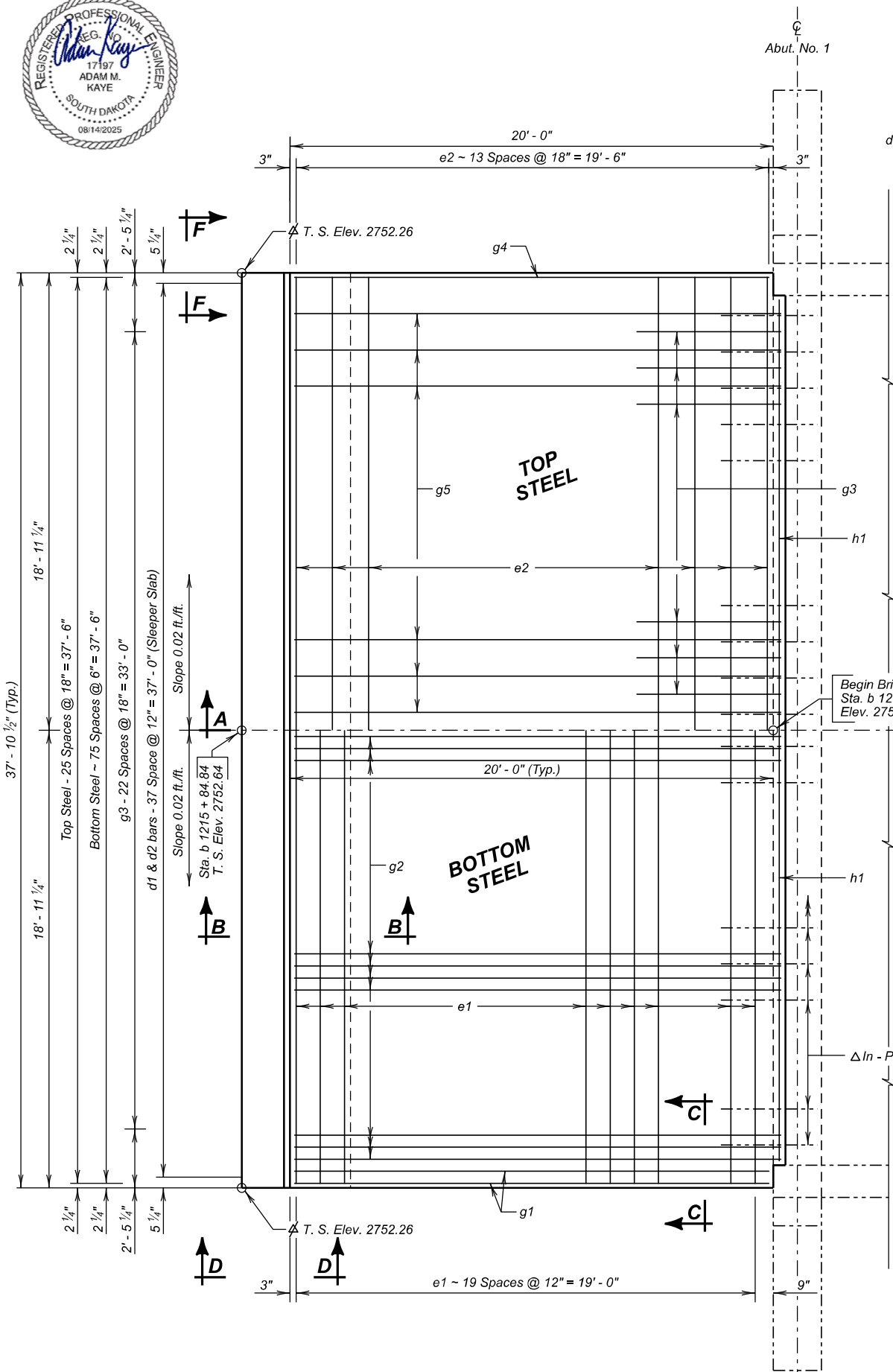
S. D. DEPT. OF TRANSPORTATION

AUGUST 2025

19 OF 27

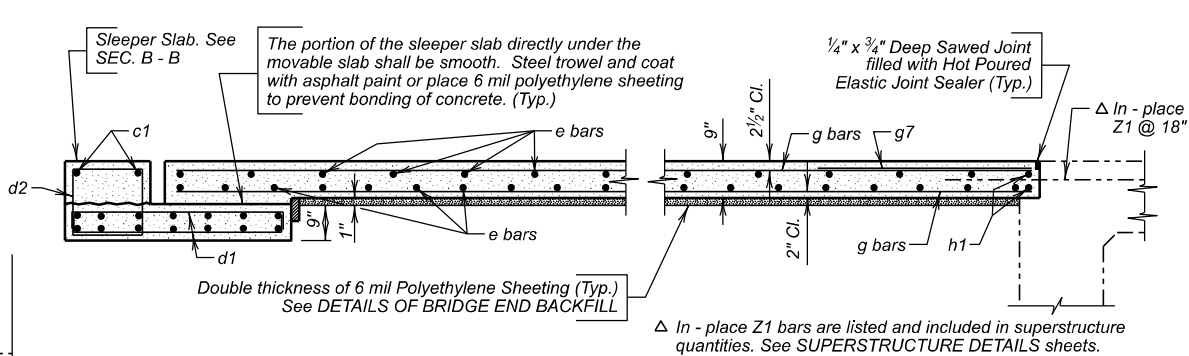


DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGC19	DRAFTED BY KC	BRIDGE ENGINEER
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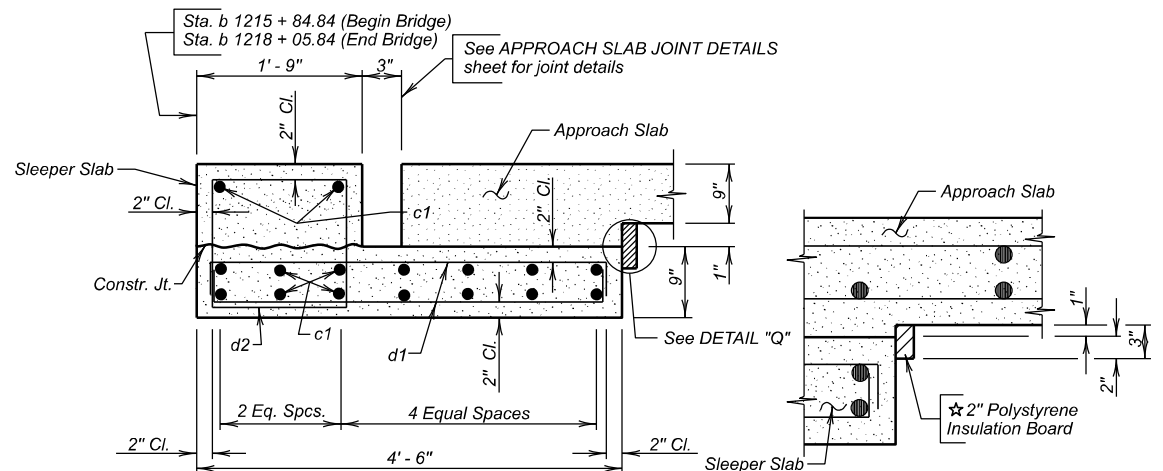


PLAN

(Shown adj. to Abut. No. 1, Abut. No. 4 similar by rotation except as shown.)

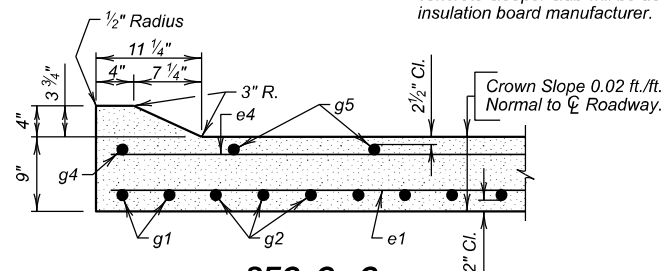


SEC. A - A

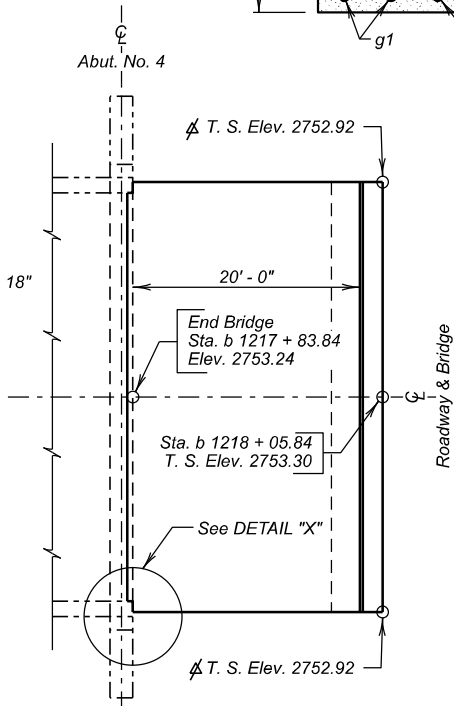


SEC. B - B

(Sleeper Slab)

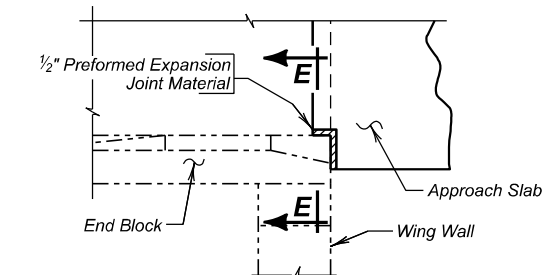


SEC. C - C

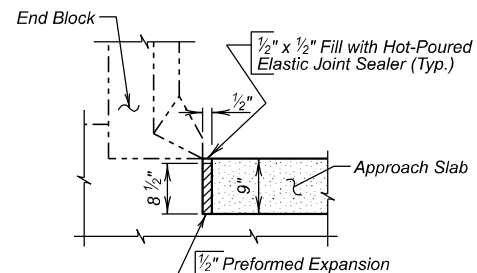


PLAN

(Shown adj. to Abut. No. 4)



DETAIL "X"



SEC. E - E

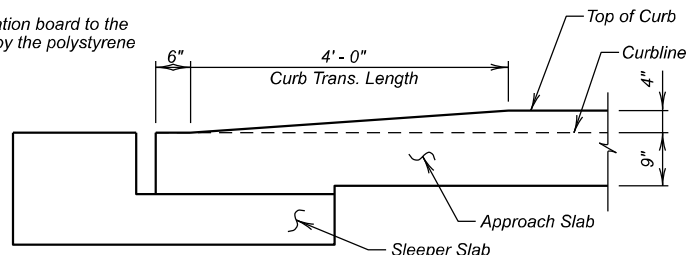
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(207)40	E62	E69

REINFORCING SCHEDULE					Bending Details	
(For Two Approach Slabs and Two Sleeper Slabs)						
Mk.	No.	Size	Length	Type		
Sleeper Slabs						
c1	32	5	37' - 7"	Str.		
d1	152	4	5' - 0"	2		
d2	76	4	6' - 1"	T2		
Approach Slabs						
e1	40	6	37' - 7"	Str.		
e2	28	6	37' - 7"	Str.		
g1	8	8	19' - 9"	Str.		
g2	144	8	20' - 3"	Str.		
g3	46	4	6' - 0"	Str.		
g4	4	4	19' - 9"	Str.		
g5	52	4	20' - 3"	Str.		
h1	4	6	35' - 9"	Str.		

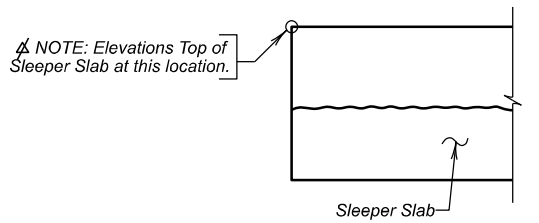
NOTES:
All Bars to be Epoxy Coated.
All dimensions are out to out of bars.

ESTIMATED QUANTITIES		
(For Two Approach Slabs and Two Sleeper Slabs)		
ITEM	UNIT	QUANTITY
Concrete Approach Slab for Bridge	Sq. Yd.	172.4
Concrete Approach Sleeper Slab for Bridge	Sq. Yd.	37.9

- 44.2 Cu. Yds. Concrete in Approach Slab.
 - 13,202 Lbs. Epoxy Coated Re-Steel in Approach Slab.
 - 13.6 Cu. Yds. Concrete in Sleeper Slab.
 - 2,071 Lbs. Epoxy Coated Re-Steel in Sleeper Slab.
 - 19.0 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.



VIEW D - D



VIEW F - F

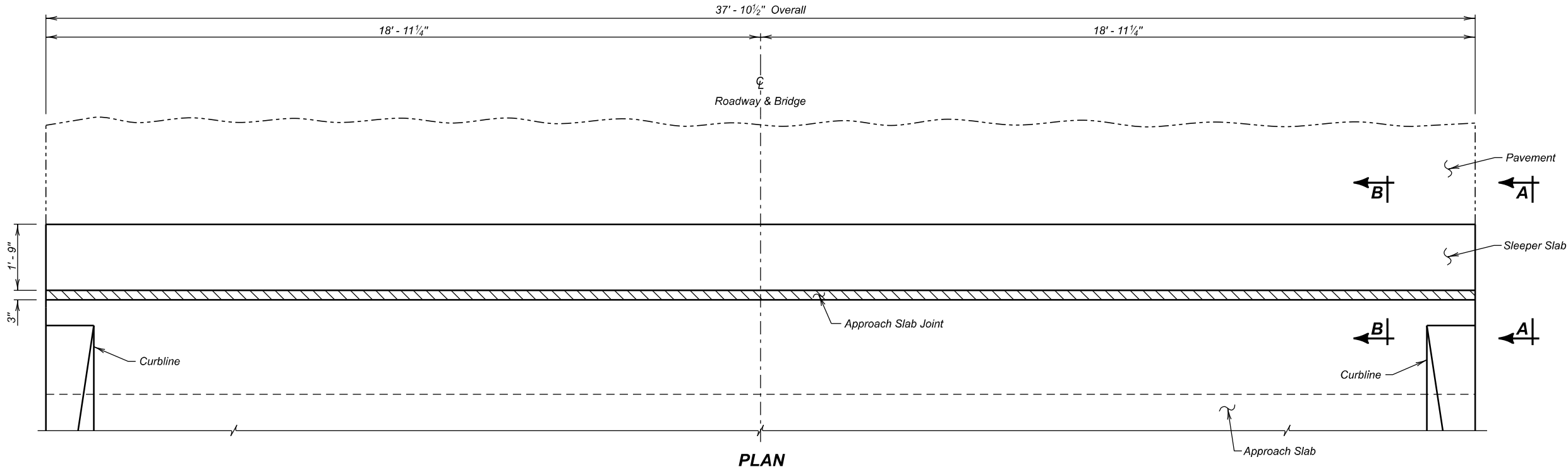
APPROACH SLAB ADJACENT TO BRIDGE DETAILS
FOR

177' - 0" PRESTRESSED GIRDER BRIDGE
36' - 0" ROADWAY
OVER SULPHUR CREEK
STA. b 1216 + 06.84 TO b 1217 + 83.84
STR. NO. 10-496-208

0° SKEW
SEC. 17-T11N-R9E
NH 0212(207)40
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

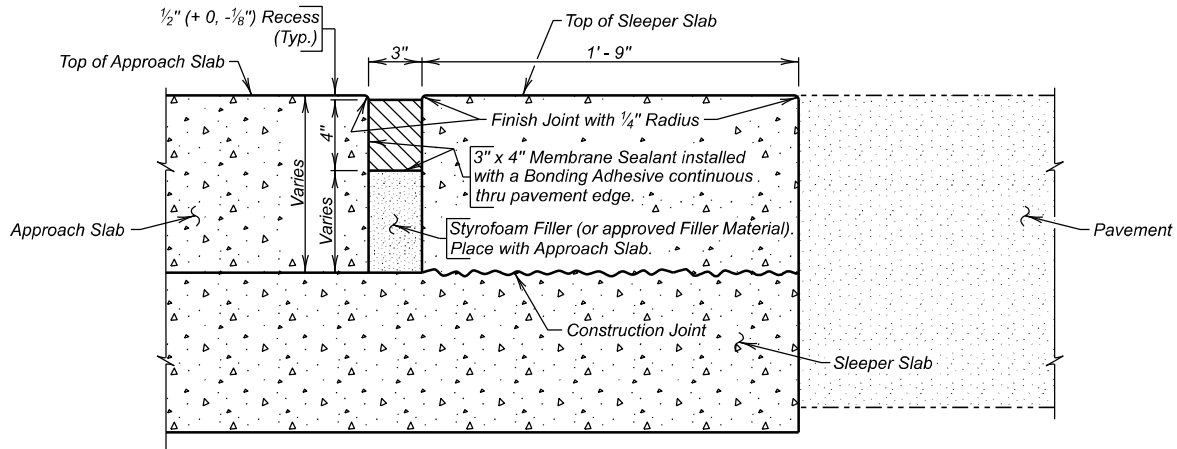
DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGC20	DRAFTED BY KC	BRIDGE ENGINEER
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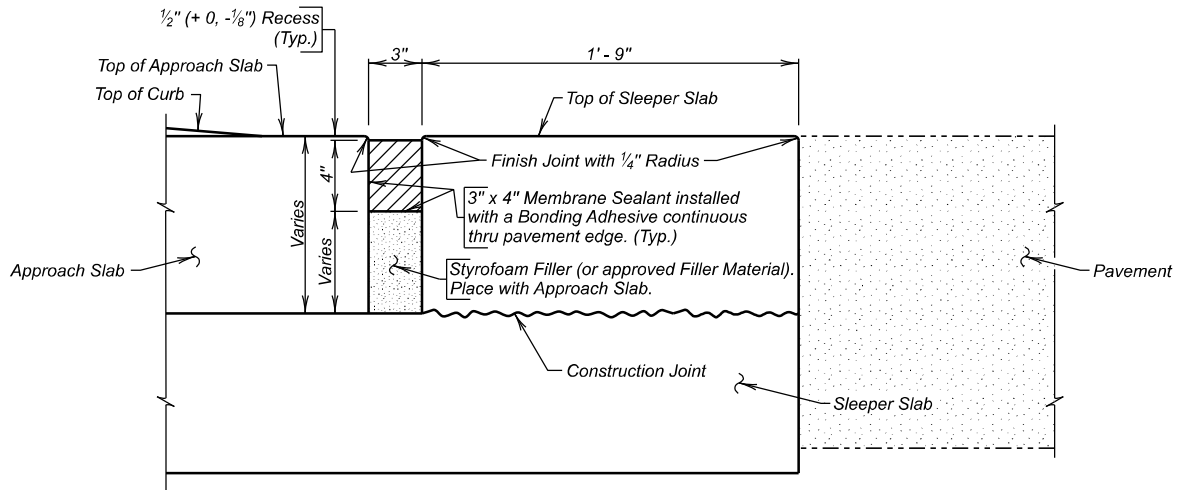
PLAN

GENERAL NOTES

- The Membrane Sealant will be on the approved product list for Membrane Sealant Expansion Joints.
- The manufacturer will supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension will be as recommended by the sealant manufacturer, however, in no case will the precompressed dimension exceed 75% of the joint opening width. The foam sealant will be slowly self expanding to permit workers ample time to install the membrane sealant before the membrane sealant exceeds the joint opening width.
- The membrane sealant will provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension.
- The membrane sealant will be supplied in pieces 5 feet in length or longer. The foam sealant will be ultra-violet and ozone resistant.
- The bonding adhesive used to attach the membrane sealant to the adjacent concrete will be approved by the membrane sealant manufacturer.
- Adhesive used to join adjacent pieces of the membrane sealant will be as recommended by the manufacturer.
- If styrofoam filler material is used in the construction, it will be closed cell and water-tight as approved by the Engineer.
- The minimum ambient air temperature at the time of joint installation and adhesive curing will be 40° F.
- A technical representative of the membrane sealant manufacturer will be present at the jobsite during installation. The technical representative will be knowledgeable in the correct procedures for the preparation and installation of the joint material to ensure the Contractor installs the joint to the manufacturer's recommendations.
- Concrete surfaces that will be in contact with the membrane sealant will be thoroughly cleaned by abrasive blasting to remove all laitance and contaminants (such as oil, curing compounds, etc.) from the concrete surface. At a minimum, two passes of abrasive blasting with the nozzle held at an angle to within 1 to 2 inches of the concrete surface will be required. Cleaning of the surfaces with solvents, wire brushing, or grinding will not be permitted.
- After abrasive blasting, but immediately prior to membrane joint installation, the entire joint contact surface will be air blasted. The air compressor used for joint cleaning will be equipped with trap devices capable of providing moisture-free and oil-free air at a recommended pressure of 90 psi. To obtain complete bonding with the adhesive, the adjacent concrete surfaces must be dry and clean. The contact surfaces for the joint will be visually inspected by the Engineer immediately prior to joint installation to verify the surface is dry and clean.
- Individual spliced sections will be installed as per the manufacturer's recommendations. The membrane joint sealant manufacturer will submit a detailed installation procedure to the Engineer at least 5 days prior to joint installation for his review.
- Traffic will not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.
- Use plywood or other material to protect concrete adjacent to the joint from spalling before any equipment is moved across the joint. Any spill areas will be repaired at the Contractor's expense by breaking out and replacing adjacent concrete, as approved by the Engineer.
- The Membrane Sealant Expansion Joint will be measured in feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The Membrane Sealant Expansion Joint will be paid for at the contract unit price per foot complete in place. Payment for this item will be full compensation for furnishing all the required materials in place, including labor, equipment and incidentals necessary to complete the work in accordance with the plans and the foregoing specifications.



SECTION B - B



VIEW A - A

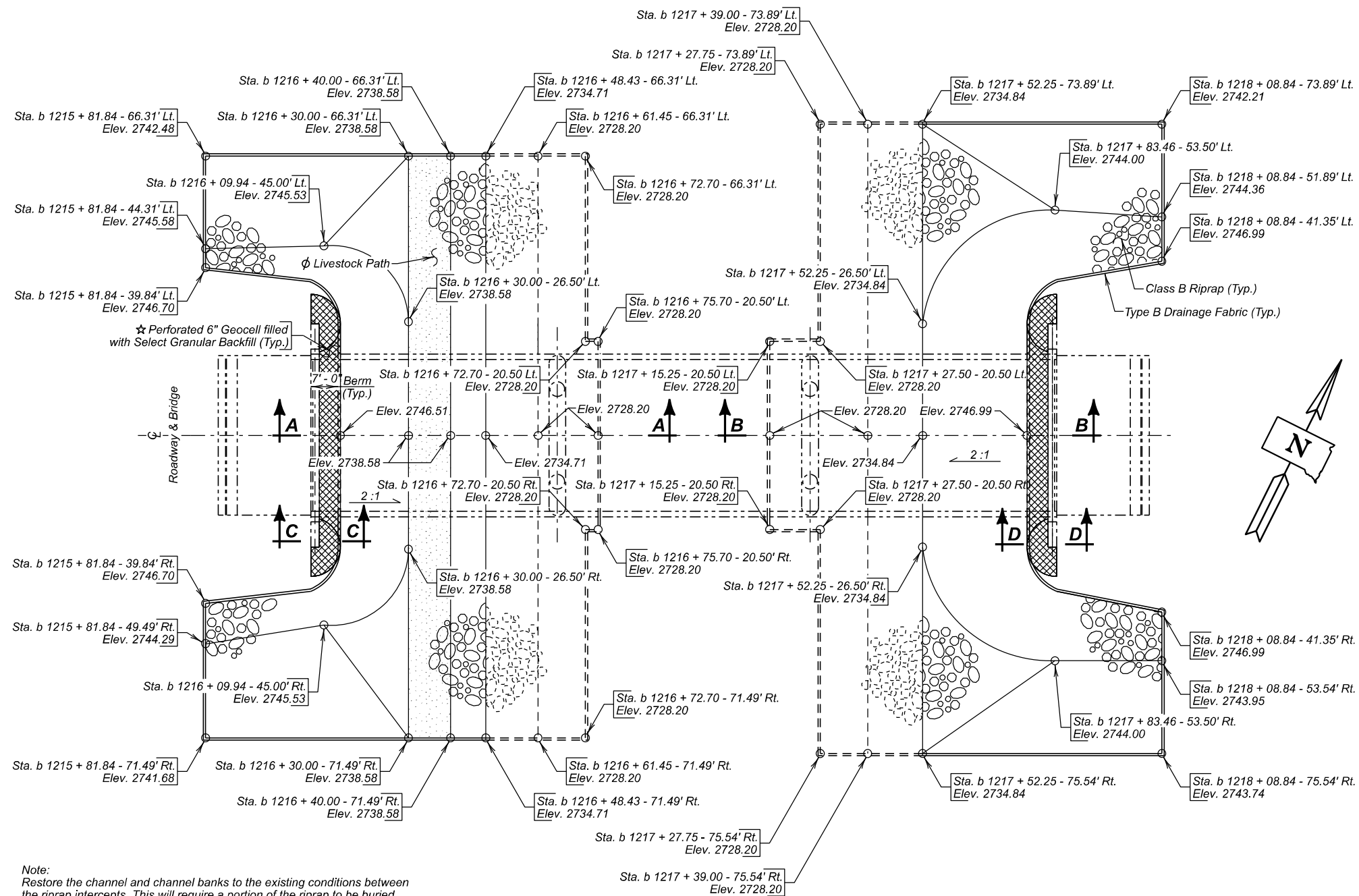


ESTIMATED QUANTITIES (For Two Approach Slabs)		
ITEM	UNIT	QUANTITY
Membrane Sealant Expansion Joint	Ft.	75.8

APPROACH SLAB JOINT DETAILS
FOR
177' - 0" PRESTRESSED GIRDER BRIDGE
36' - 0" ROADWAY
OVER SULPHUR CREEK
STA. b 1216 + 06.84 TO b 1217 + 83.84
STR. NO. 10-496-208
0° SKEW
SEC. 17-T11N-R9E
NH 0212(207)40
HL-93

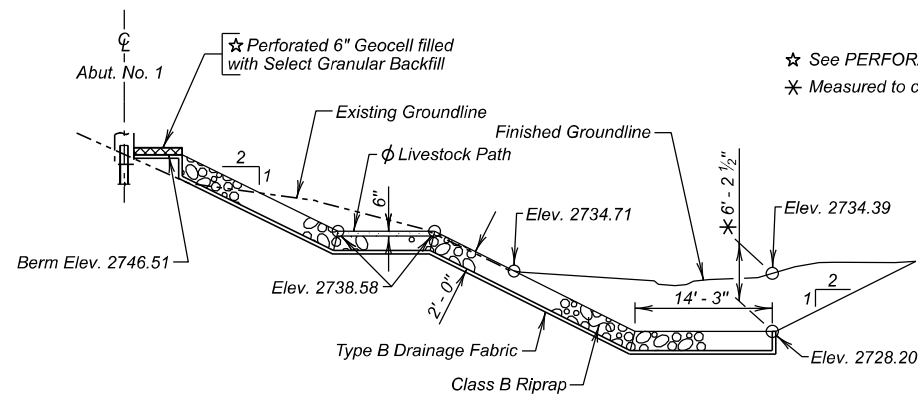
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGC21	DRAFTED BY KC	BRIDGE ENGINEER
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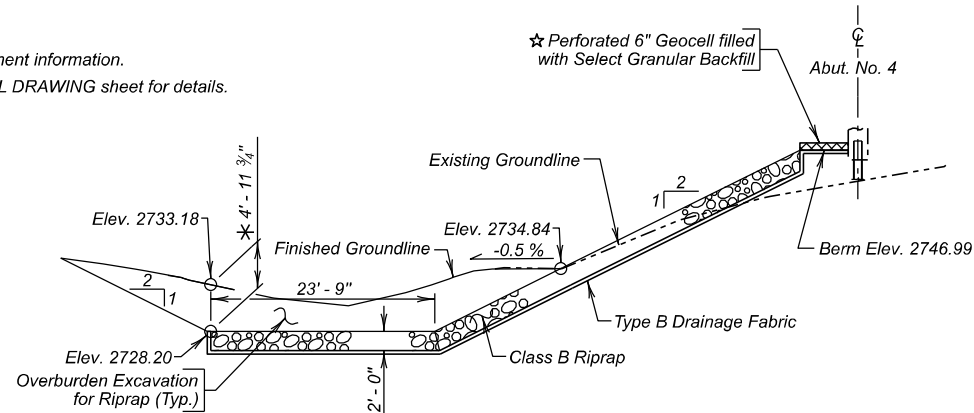


PLAN
(Riprap Layout)

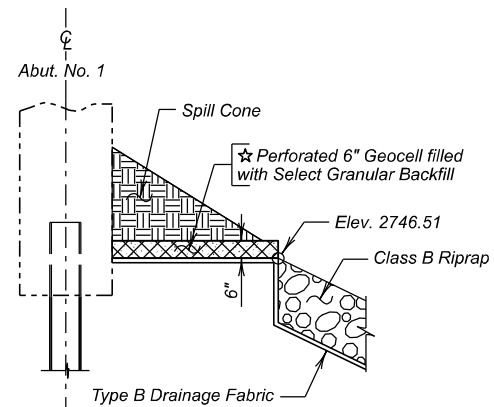
Note:
Restore the channel and channel banks to the existing conditions between the riprap intercepts. This will require a portion of the riprap to be buried.



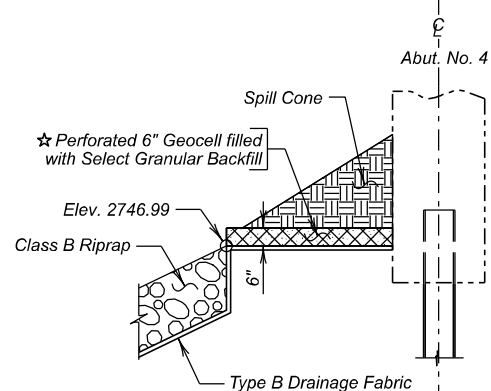
SECTION A - A



SECTION B - B



SECTION C - C



SECTION D - D



ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class B Riprap	Ton	2,258.4
Overburden Excavation for Riprap	Cu. Yd.	2,550
Type B Drainage Fabric	Sq. Yd.	2,730
Select Granular Backfill	Ton	60.3

For estimating purposes only, a factor of 1.4 tons/cu.yd. was used to convert Cu. Yds. to Tons.
For estimating purposes only, a factor of 1.89 tons/cu.yd. was used to convert Cu. Yds. to Tons. Quantity was increased 25% to account for voids in the riprap. The quantity in the table is for the livestock path only.

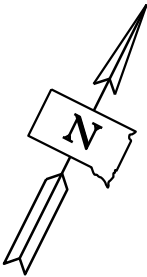
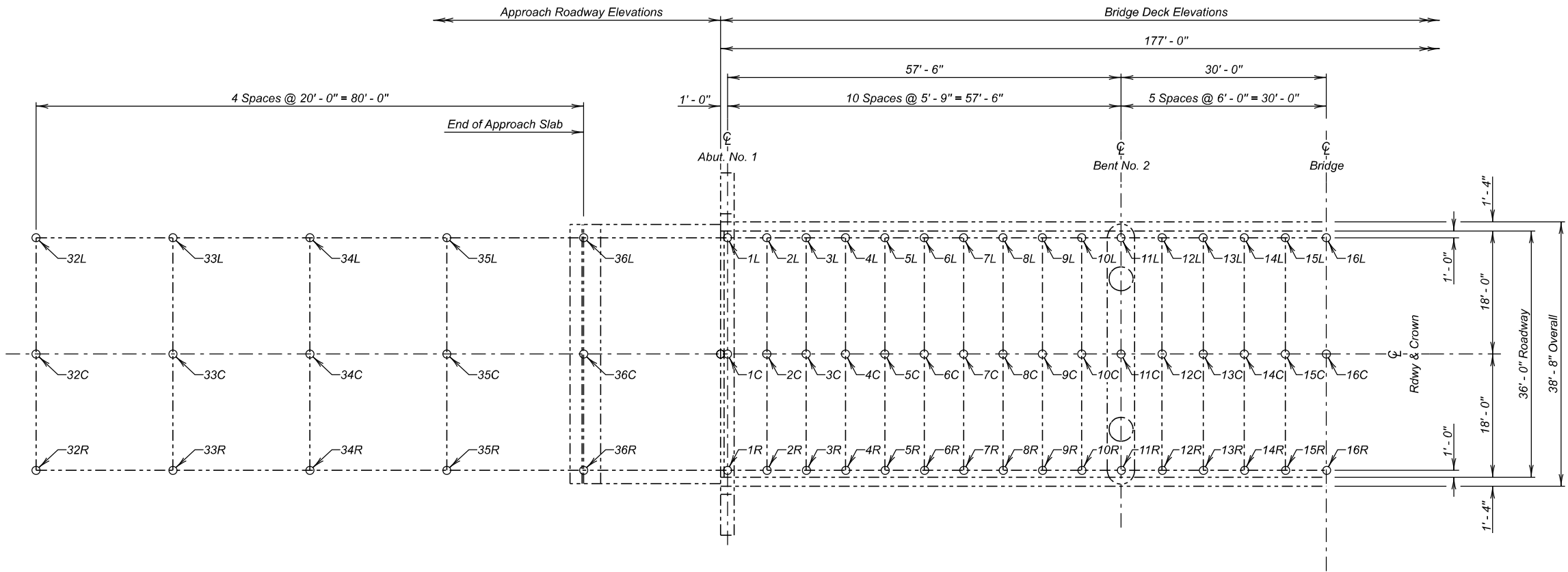
RIPRAP DETAILS
FOR

177' - 0" PRESTRESSED GIRDER BRIDGE
36' - 0" ROADWAY
OVER SULPHUR CREEK
STA. b 1216 + 06.84 TO b 1217 + 83.84
STR. NO. 10-496-208
0° SKEW
SEC. 17-T11N-R9E
NH 0212(207)40
HL-93

BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
AUGUST 2025

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.	NH 0212(207)40	E65	E69



PLAN

Table of As-Built Elevations - Bridge Deck

Location	Elevation	Location	Elevation	Location	Elevation
1L		1C		1R	
2L		2C		2R	
3L		3C		3R	
4L		4C		4R	
5L		5C		5R	
6L		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	

Table of As-Built Elevations - Approach Roadway

Location	Elevation	Location	Elevation	Location	Elevation
32L		32C		32R	
33L		33C		33R	
34L		34C		34R	
35L		35C		35R	
36L		36C		36R	

Elevations - Bridge Survey Markers

Location	Station - Offset	Elevation
Begin Bridge		

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.

AS - BUILT ELEVATION SURVEY (A)

FOR

177' - 0" PRESTRESSED GIRDER BRIDGE

36' - 0" ROADWAY

0° SKEW

OVER SULPHUR CREEK

SEC. 17-T11N-R9E

STA. b 1216 + 06.84 TO b 1217 + 83.84

NH 0212(207)40

STR. NO. 10-496-208

HL-93

BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

AUGUST 2025

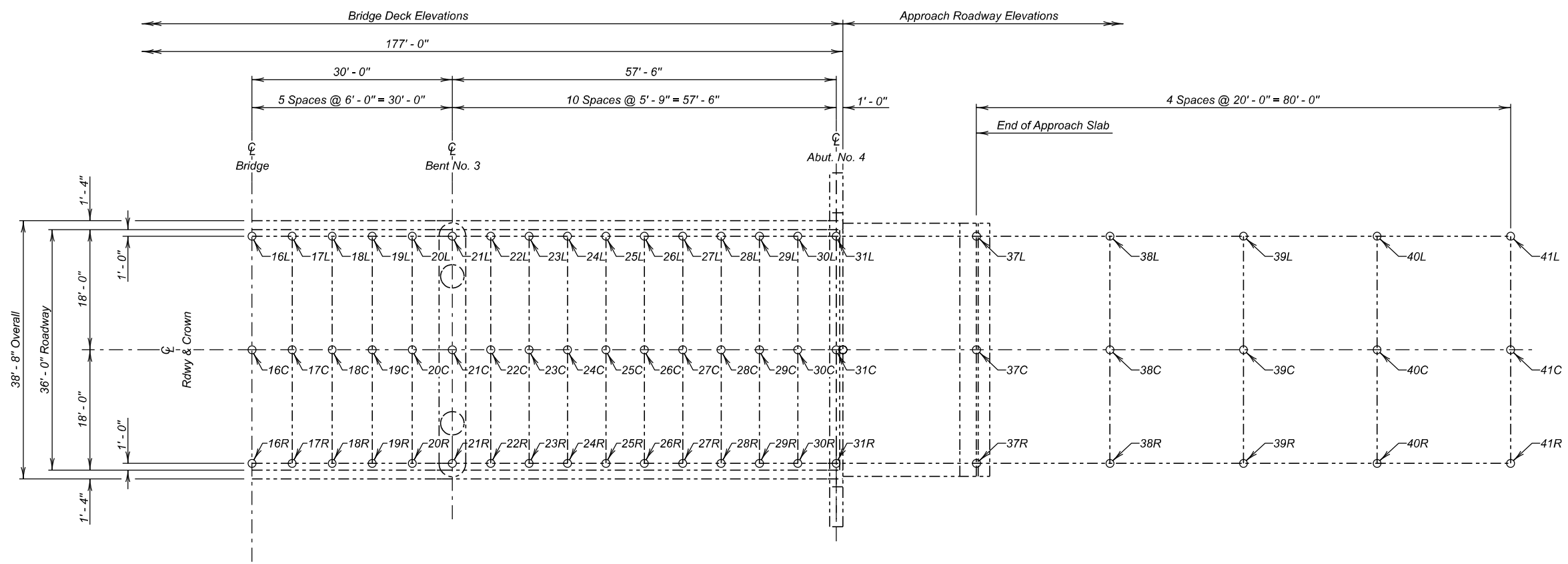
23 OF 27

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGC23	DRAFTED BY KC	BRIDGE ENGINEER
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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.	NH 0212(207)40	E66	E69



PLAN

Table of As-Built Elevations - Bridge Deck

Location	Elevation	Location	Elevation	Location	Elevation
16L		16C		16R	
17L		17C		17R	
18L		18C		18R	
19L		19C		19R	
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	

Table of As-Built Elevations - Approach Roadway

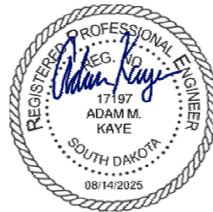
Location	Elevation	Location	Elevation	Location	Elevation
37L		37C		37R	
38L		38C		38R	
39L		39C		39R	
40L		40C		40R	
41L		41C		41R	

Elevations - Bridge Survey Markers

Location	Station - Offset	Elevation
End Bridge		

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Bridge Elevation Survey	LS	Lump Sum



AS - BUILT ELEVATION SURVEY (B)

FOR

177' - 0" PRESTRESSED GIRDER BRIDGE

36' - 0" ROADWAY

0° SKEW

OVER SULPHUR CREEK

SEC. 17-T11N-R9E

STA. b 1216 + 06.84 TO b 1217 + 83.84

NH 0212(207)40

STR. NO. 10-496-208

HL-93

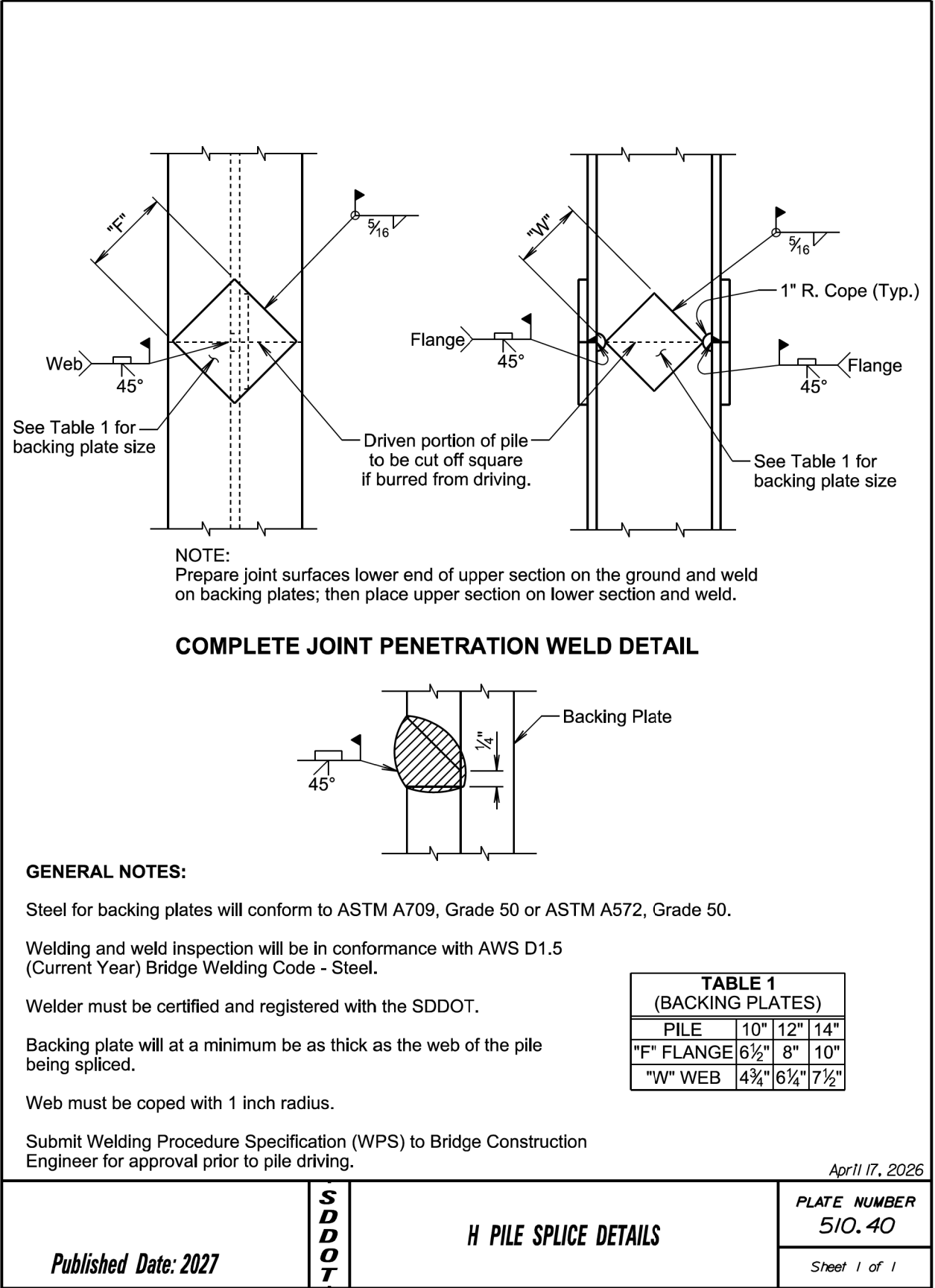
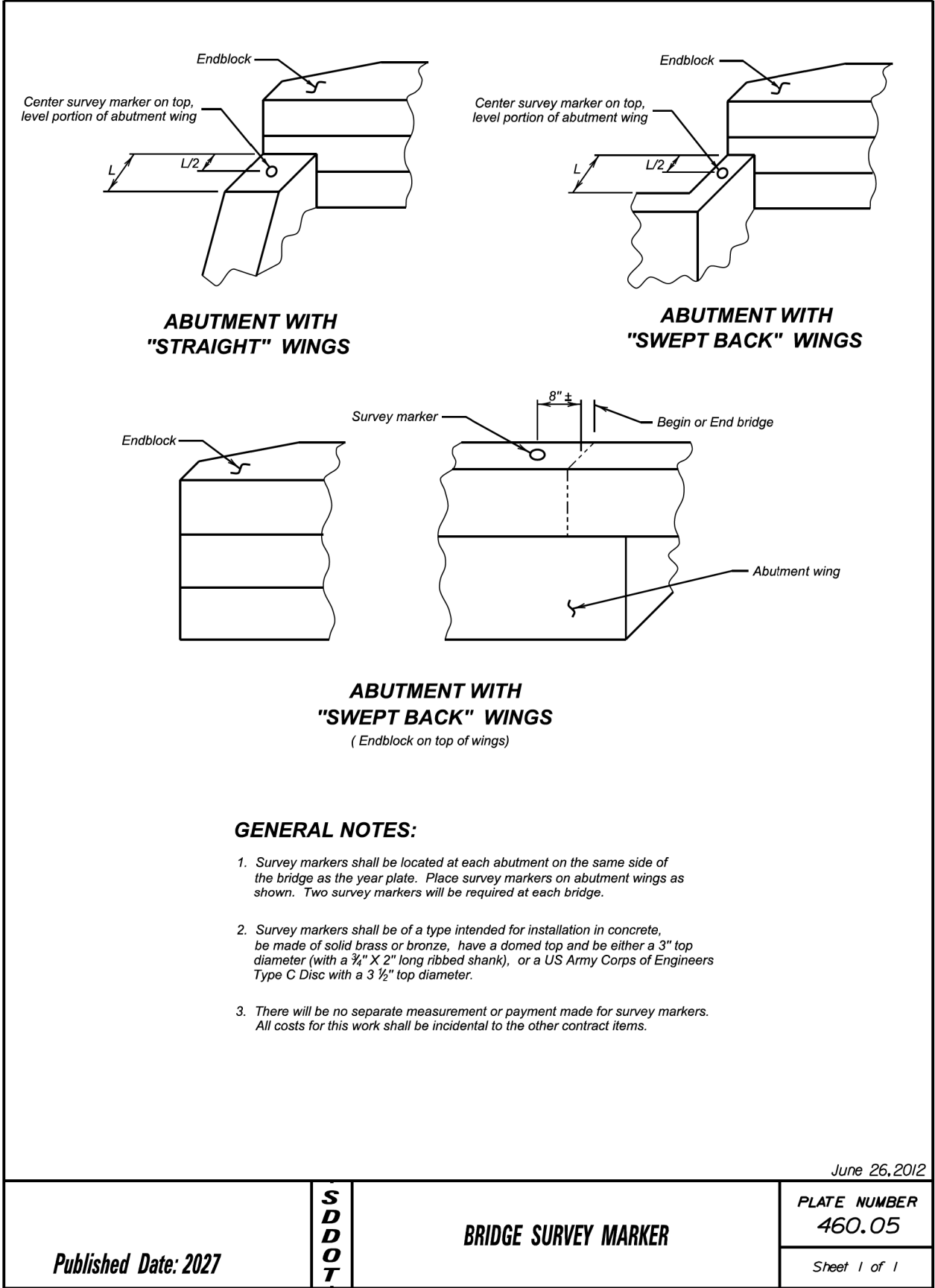
BUTTE COUNTY

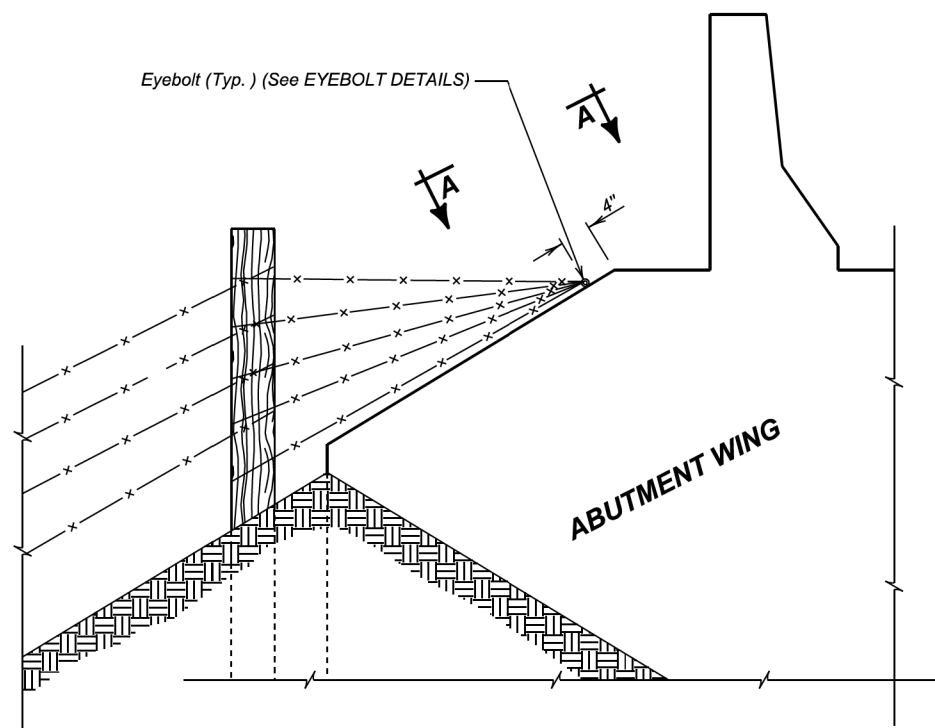
S. D. DEPT. OF TRANSPORTATION

AUGUST 2025

24 OF 27

DESIGNED BY AK BUTE06JD	CK. DES. BY LB 06JDGC24	DRAFTED BY KC	BRIDGE ENGINEER
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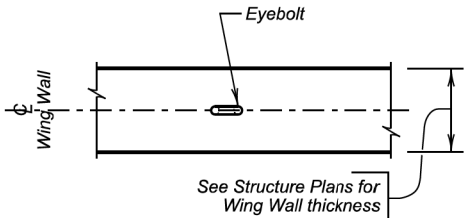




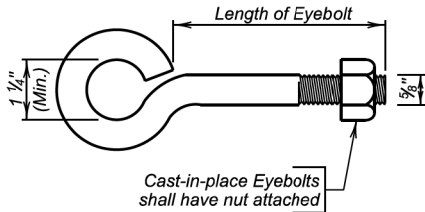
DETAIL FOR FENCE ANCHORS

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.



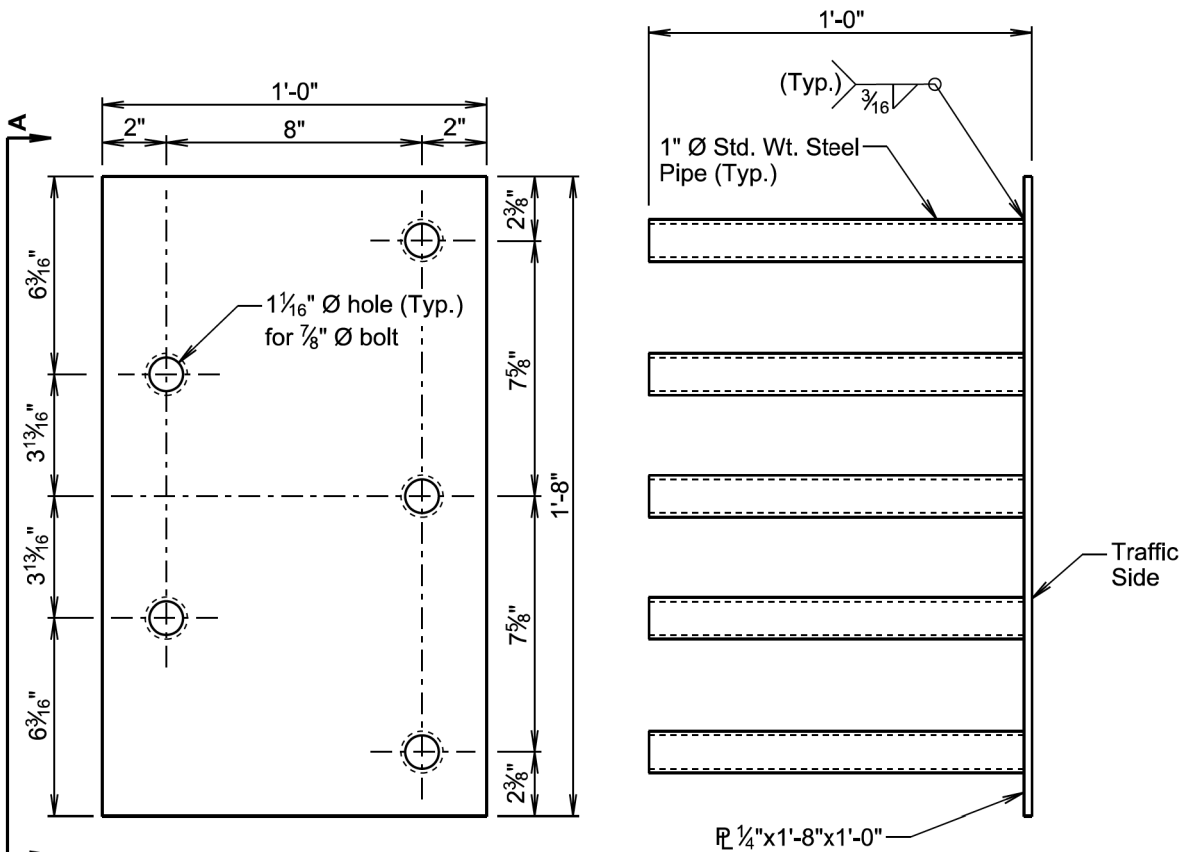
VIEW A - A



EYEBOLT DETAILS

December 23, 2012

Published Date: 2027	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, Grade B or ASTM A500, Grade B or C.

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, F3125 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", "Class A45 Concrete, Bridge Barrier", or "Class A45 Concrete, Bridge Repair", as applicable.

April 17, 2026

Published Date: 2027	S D D O T	5 BOLT INSERT PLATE ASSEMBLY	PLATE NUMBER 630.92
			Sheet 1 of 1