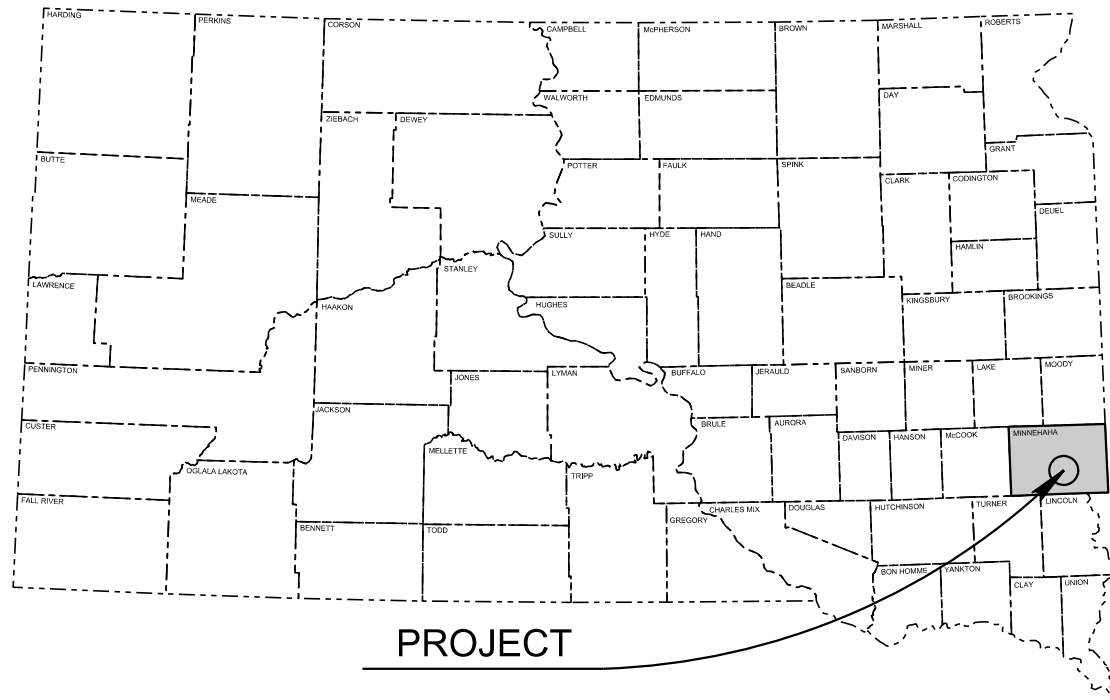
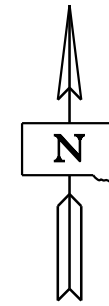


STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 2291(01)10	1	9



STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED
PROJECT IM 2291(01)10
60TH STREET N
MINNEHAHA COUNTY
STRUCTURAL STEEL
PCN 08U9



INDEX OF SHEETS -

Sheet E1	Layout Map and Index
Sheet E2	Estimate of Structure Quantities
Sheet E3 to E9	Str. No. 50-221-170 332' - 3" Steel Girder Bridge

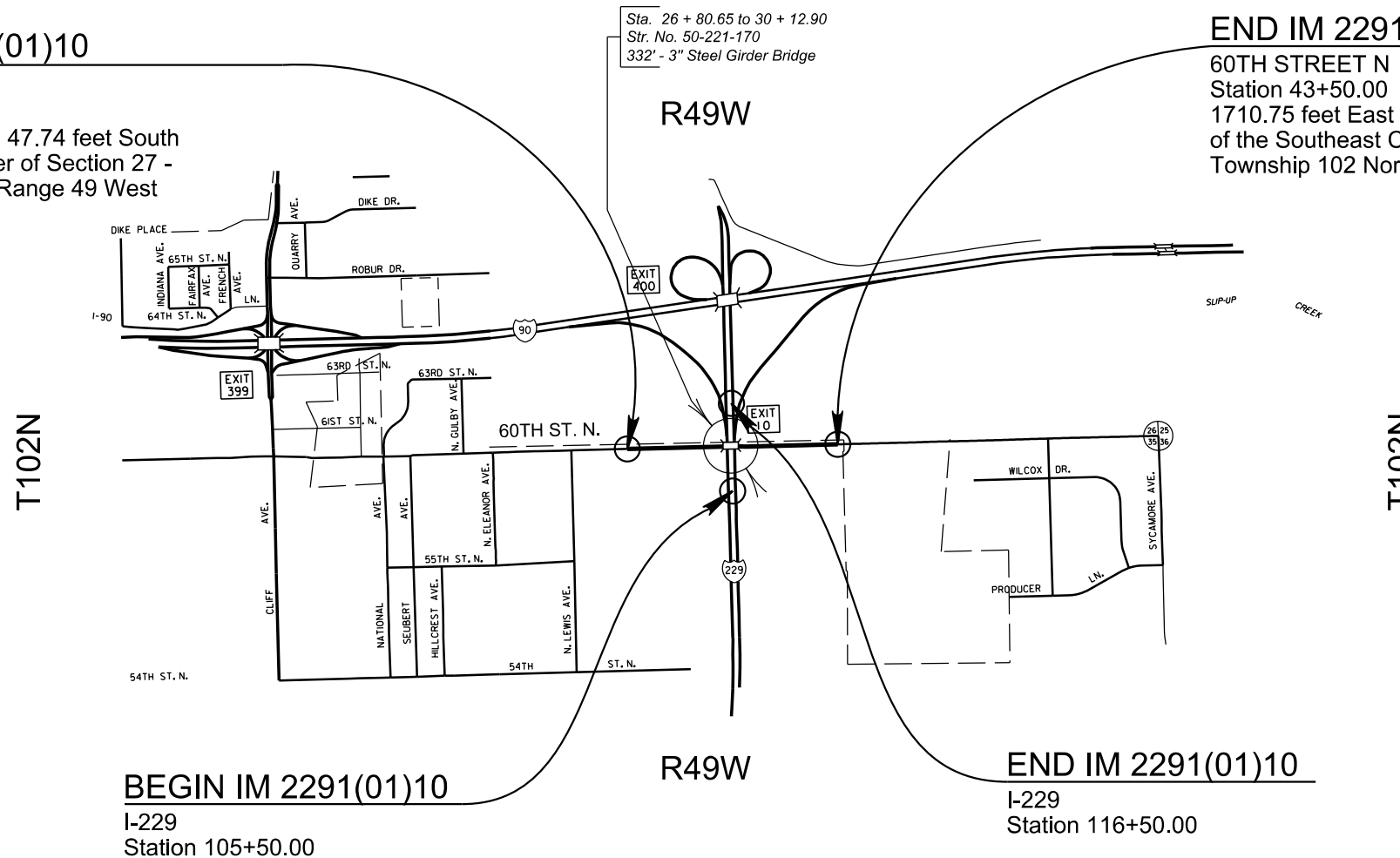
BEGIN IM 2291(01)10

60TH STREET N
Station 15+50.00
1086.61 feet West and 47.74 feet South
of the Southeast Corner of Section 27 -
Township 102 North - Range 49 West

Sta. 26 + 80.65 to 30 + 12.90
Str. No. 50-221-170
332' - 3" Steel Girder Bridge

END IM 2291(01)10

60TH STREET N
Station 43+50.00
1710.75 feet East and 73.74 feet North
of the Southeast Corner of Section 27 -
Township 102 North - Range 49 West



BEGIN IM 2291(01)10

I-229
Station 105+50.00

END IM 2291(01)10

I-229
Station 116+50.00

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 2291(01)10	2	9

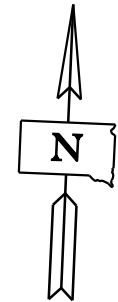
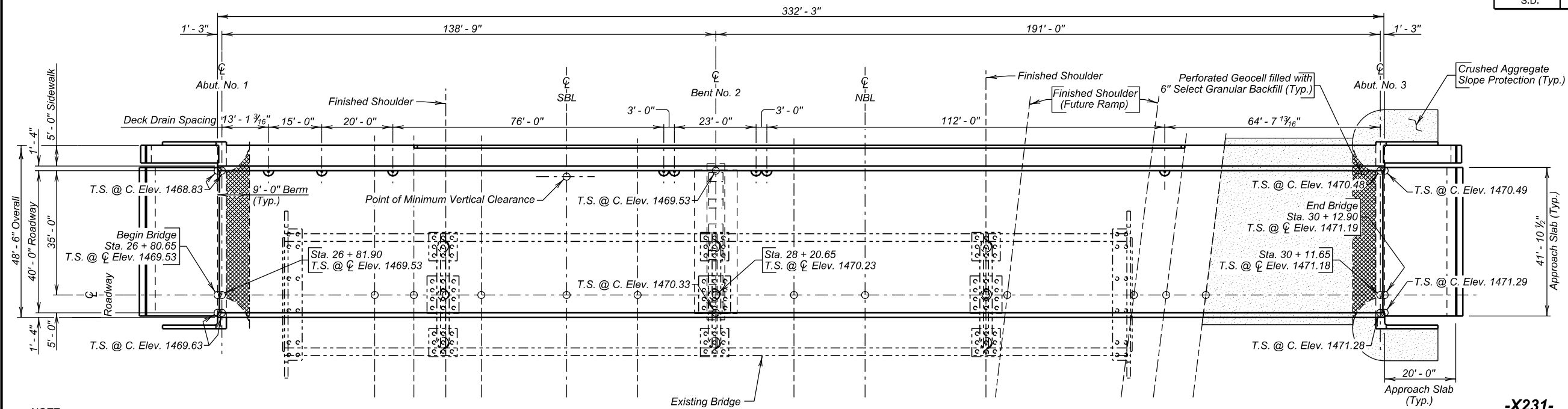
ESTIMATE OF STRUCTURE QUANTITIES

Str. No. 50-221-170

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
410E0025	Structural Steel, Furnish	Lump Sum	LS
411E0100	Bridge Painting	Lump Sum	LS

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.	IM 2291(01)10	3	9

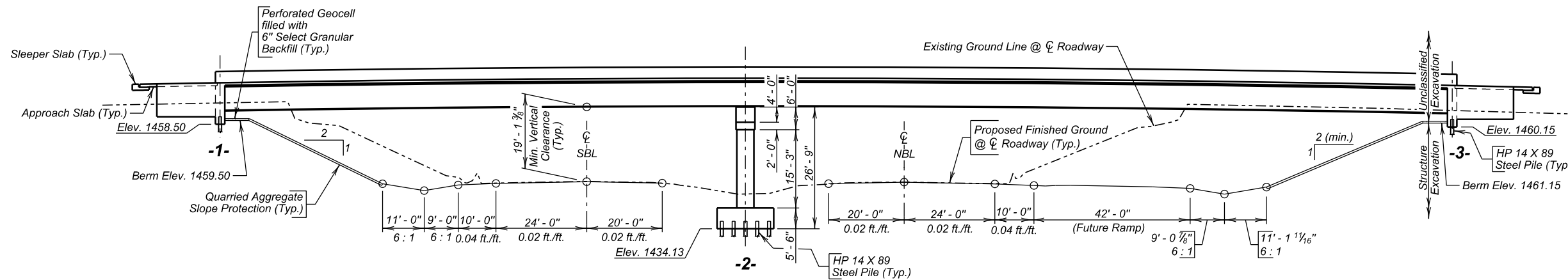


NOTE:
 T.S. @ C Elev. = Top of Slab at Centerline Elevation
 T.S. @ C. El. = Top of Slab at Curb Elevation

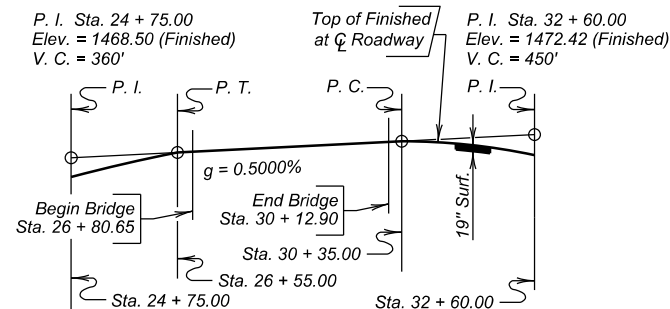
PLAN

**-X231-
 INDEX OF BRIDGE SHEETS**

- Sheet No. 1 - General Drawing
- Sheet No. 2 - Estimate of Structure Quantities and Notes
- Sheet No. 3 - End Block, Barrier Crub, and Deck Drain Details - Left Side
- Sheet No. 4 - Girder Layout Details
- Sheet No. 5 - Diaphragm Details
- Sheet No. 6 - Framing Diagram, Camber, & Erection Data
- Sheet No. 7 - Details of Bolted Field Splices & Bearings



ELEVATION



GRADELINE DATA

GENERAL DRAWING

FOR

332' - 3" STEEL GIRDER BRIDGE

40' - 0" ROADWAY & 5' - 0" SIDEWALK 0° SKEW
 OVER I - 229 SEC. 26/35-T102N-R49W
 STA. 26 + 80.65 TO 30 + 12.90 IM 2291(01)10
 STR. NO. 50-221-170 HL-93
 PCN 08U9

MINNEHAHA COUNTY

S. D. DEPT. OF TRANSPORTATION

OCTOBER 2021

1 OF 7

-X231-

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

DESIGNED BY PW MINN08U9	CK. DES. BY AG 08U9TA01	DRAFTED BY BT	<i>Steve A. Johnson</i> BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 2291(01)10	4	9

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Δ Structural Steel, Furnish	Lump Sum	LS	
≠ Bridge Painting	Lump Sum	LS	

Δ For informational purposes only, the estimated weight of the structural steel is 665,055 pounds.
≠ For informational purposes only, the estimated area to be painted is 36,976 sq. ft.

SPECIFICATIONS FOR BRIDGE

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and required provisions, supplemental specifications, and special provisions as included in the proposal.
- All welding and welding inspections will be in conformance with the latest edition of AASHTO/AWS D1.5/D1.5M Bridge Welding Code unless noted otherwise in the plans.

BRIDGE DESIGN LOADING

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

DESIGN MATERIAL STRENGTHS*

Structural Steel (ASTM A709 Gr. 36T2)	$f_y = 36,000$ psi
Structural Steel (ASTM A709 Gr. 50T2)	$f_y = 50,000$ psi

CONNECTION OF GIRDER TO PILE

- Steel for the bearing plates will conform to ASTM A709 Gr. 50.
- Payment for furnishing the bearing plates will be incidental to the contract lump sum price for Structural Steel, Furnish.

BENT

All Swedge Bolts will be 1 1/2-inch diameter x 2'-6" F1554, Grade 55 bolts with heavy hex nut and cut washer (listed with structural steel in Superstructure quantities). A minimum of 20% of the embedded bolt surface will be covered with deformations whose radial dimensions are 15 to 20% of the bolt diameter. Payment for furnishing the Swedge Bolts and associated hardware will be incidental to the contract lump sum price for Structural Steel, Furnish.

GIRDERS

- Structural steel will conform to ASTM A709 Gr. 50T2. Material less than 1/4-inch in thickness may be ASTM A1011 Grade 36. Steel for diaphragms and stiffeners may conform to ASTM A709 Gr. 36. Shear connectors will conform to Section 7.3 Type B of the Bridge Welding Code.
- Bolts, nuts, and washers will conform to ASTM F3125, Grade A325.
- Shear Connectors will be provided, but not installed. Shear Connectors shown are for information only and will be field welded to the girders under future contract.

- All butt-welded girder splices will be ultrasonically inspected.
- The cost of welding and weld inspection will be incidental to the contract lump sum price for Structural Steel, Furnish.
- Structural steel will be painted in accordance with Section 411 of the Construction Specifications. The top coat will be an approved brown (AMS STD 595 Color 30045).
- See Diaphragm Details for notes concerning diaphragms.
- Structural steel used in all girder web plates, girder flanges, and girder splice plates will comply with the Charpy-V-Notch toughness requirements set forth in Section 970 of the Construction Specifications. Material greater than 1 1/2 inches in thickness will require frequency (P) testing in lieu of heat lot (H) testing. See Girder Layout for location of tension and stress reversal areas of girder flanges.
- Dead Load camber will be cut into the girder webs. Do not induce or correct camber in plate girders by local heating without prior approval from the Engineer.
- The shear connectors that will be attached to the girder will be 7/8 inch diameter x 5 inches long and will conform to ASTM 108 Gr. 1015, 1018, or 1020. The connector will meet the following minimum requirements for Type B studs,

Tensile Strength	60ksi
Yield Strength	60 ksi
Elongation	20%
Reduction of Area	50%

BEARINGS

- All steel for the bearings will conform to ASTM A709, Gr. 50.
- The pre-formed fabric pads will be composed of multiple layers of 8-ounce cotton duck impregnated and bonded with high quality natural rubber or of equivalent and equally suitable materials compressed into resilient pads of uniform thickness, after compression and vulcanization. The finished pads will withstand compression loads perpendicular to the plane of the laminations of not less than 10,000 psi without detrimental reduction in thickness or extrusion.
- The bearing plates will be shop painted with 3 mils of inorganic zinc primer in accordance with Section 411 of the Construction Specifications. No top coat of polyurethane will be applied.
- Tolerances and surface finish for Rocker Plates will be as follows:

Convex Radius Dimension	+0.000-inch to -0.010-inch
Surface Finish, Machined Surfaces	125 RMS or Better
Surface Finish, Other Surfaces	230 RMS or Better
- Payment for furnishing the bearings, including the pre-formed fabric pads under the bearing plates and painting, will be incidental to the contract lump sum price for Structural Steel, Furnish.

FIELD BOLTED GIRDER SPLICES

- Steel for splice and filler plates will conform to ASTM A709 Gr. 50T2, except material less than 1/4-inch in thickness may be ASTM A1011 Gr. 36.
- Payment for furnishing splice plates and bolts for girder splices will be incidental to the contract lump sum bid price for Structural Steel, Furnish.

WELDING AND WELD INSPECTION

Main members referred to in Section 6.7 Nondestructive Testing of the Bridge Welding Code are identified as follows: girder webs, girder flanges, and bearing stiffeners. Ultrasonic testing of groove welds will be used in lieu of radiography. See girder layout for locations of tension and stress reversal areas of the girder flanges.

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.

DELIVERY OF STRUCTURAL STEEL

- All structural steel will be delivered to the job site. Refer to the Special Provision for Contract Time for storage and delivery timeframe requirements. The contact person regarding delivery arrangements is Sioux Falls Area Engineer, Harry Johnston at (605) 367-5680.
- All costs involved with the transportation of the structural steel to the job site will be included in the contract lump sum price for Structural Steel, Furnish.

TAX LIABILITY

The South Dakota Department of Transportation (SDDOT) is a South Dakota sales tax-exempt government entity. Therefore, a Certificate of Exemption will be provided to the successful bidding party which excuses the party from paying sales tax on the materials being furnished to the SDDOT. It is the responsibility of bidding parties to contact the SD Department of Revenue at 1-800-829-9188 to determine tax licensure requirements. A South Dakota Contractors Excise Tax License is not required for this pre-purchase contract as it is not considered a reality improvement.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES

FOR
332' - 3" STEEL GIRDER BRIDGE

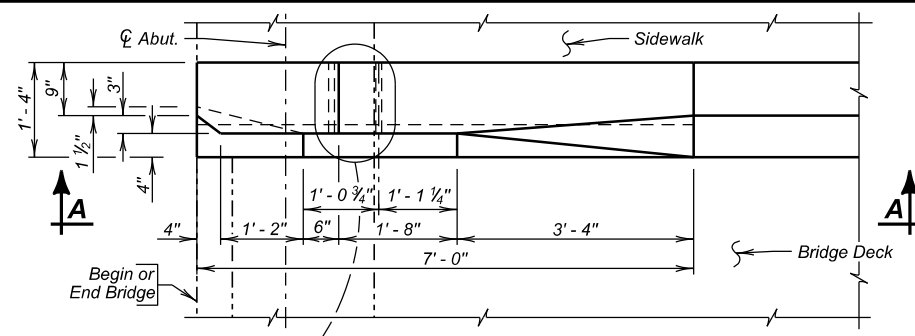
STR. NO. 50-221-170

OCTOBER 2021

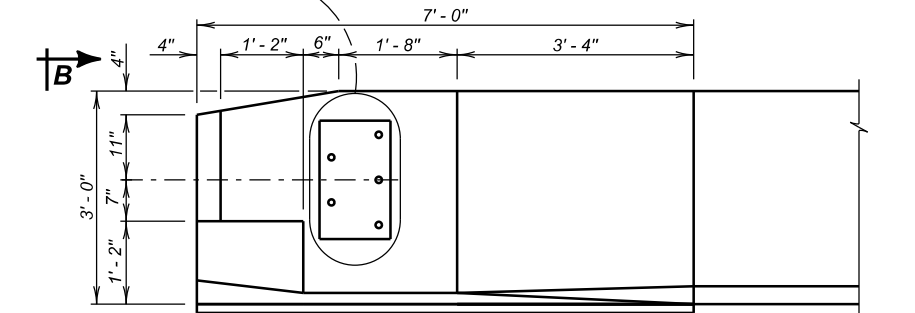
2 OF 7

DESIGNED BY PW MINN08U9	CK. DES. BY AG 08U9TA02	DRAFTED BY BT	<i>Steve A. Johnson</i> BRIDGE ENGINEER
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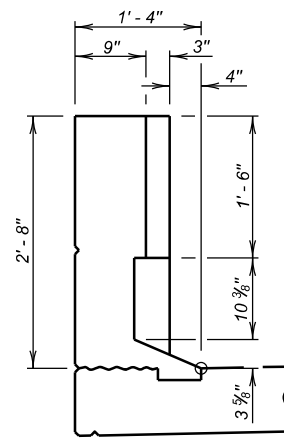
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0212(184)143	5	9



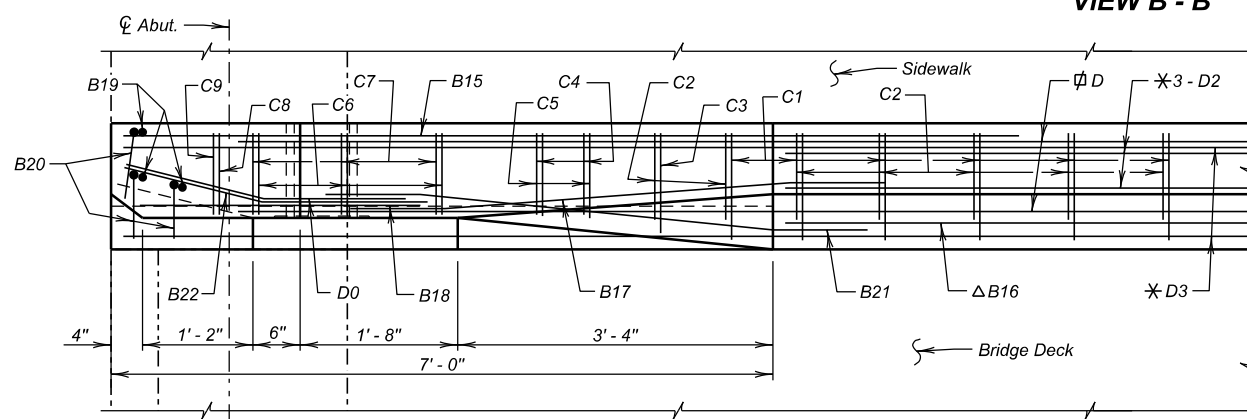
PART PLAN



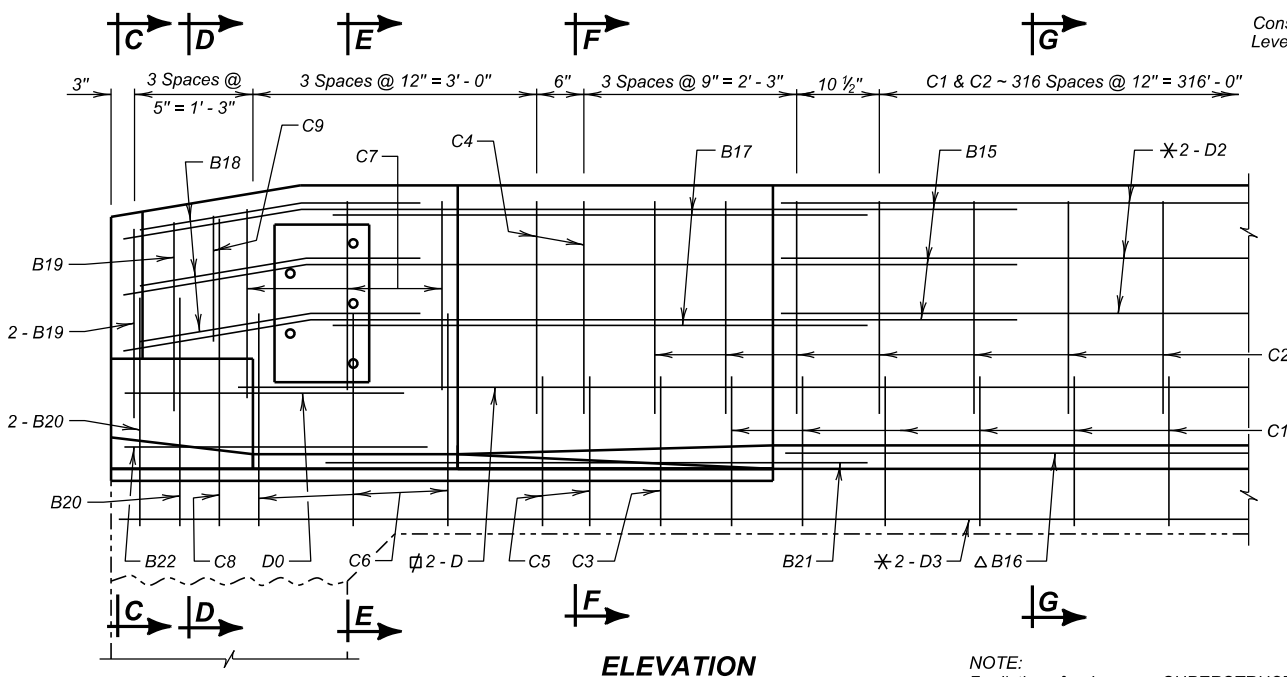
VIEW A - A



VIEW B - B

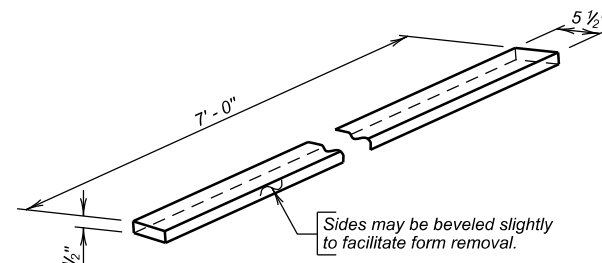


PLAN

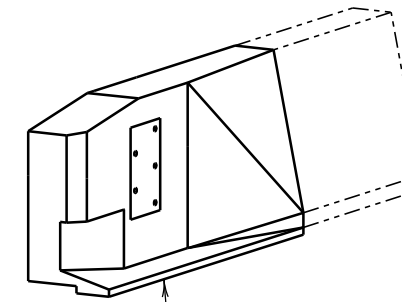


ELEVATION

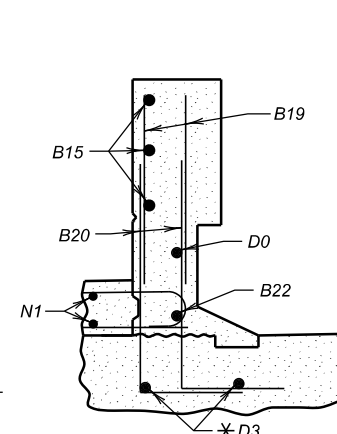
NOTE:
For listing of re-bars see SUPERSTRUCTURE DETAILS (B).



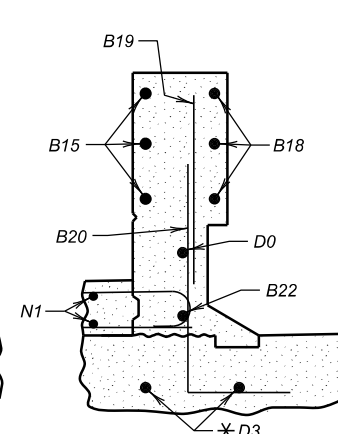
RECESS DETAIL



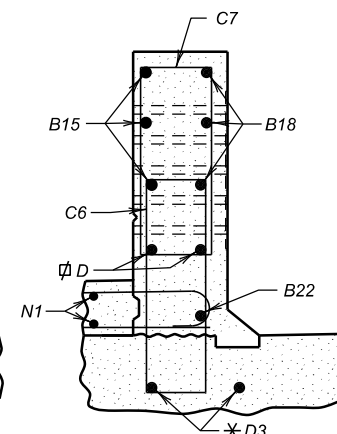
ISOMETRIC VIEW



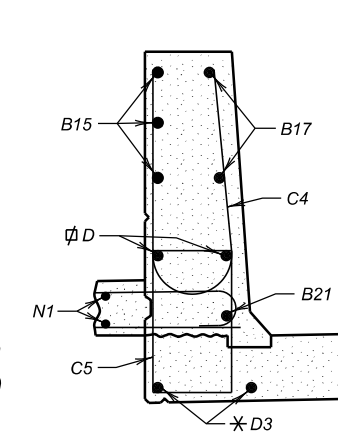
SECTION C - C



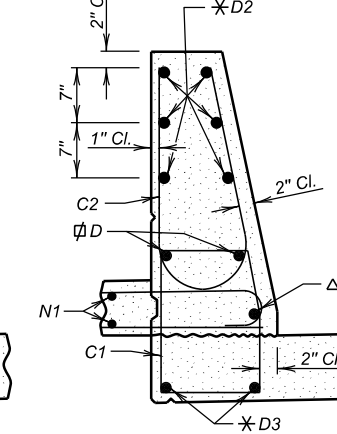
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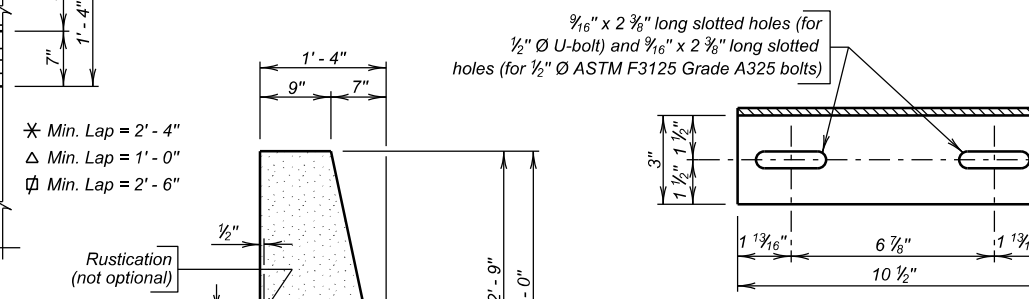
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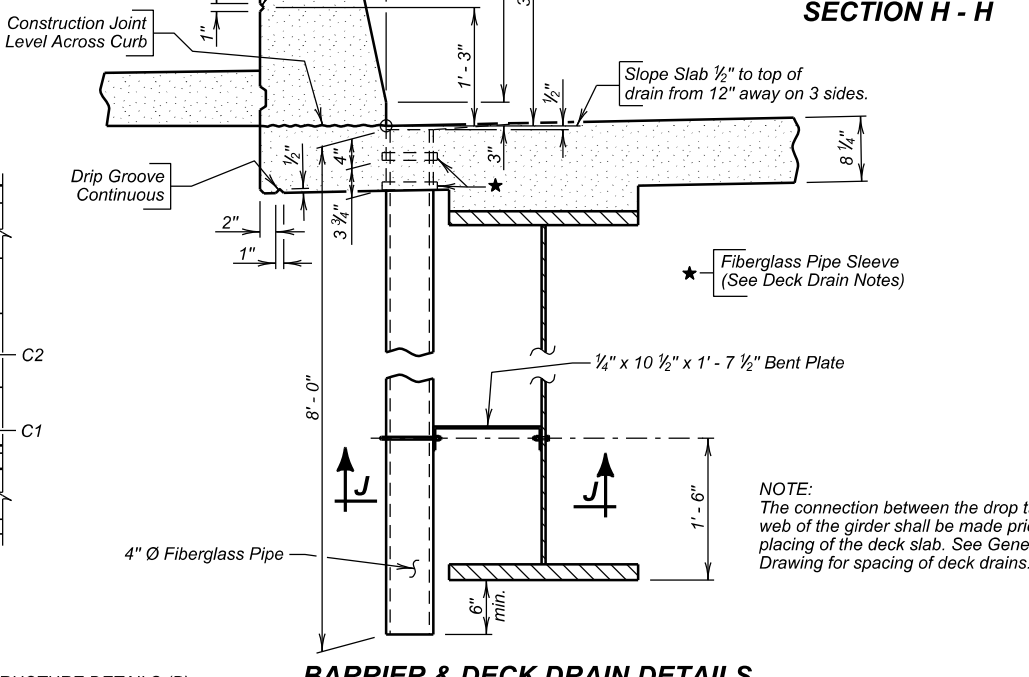
SECTION F - F



SECTION G - G

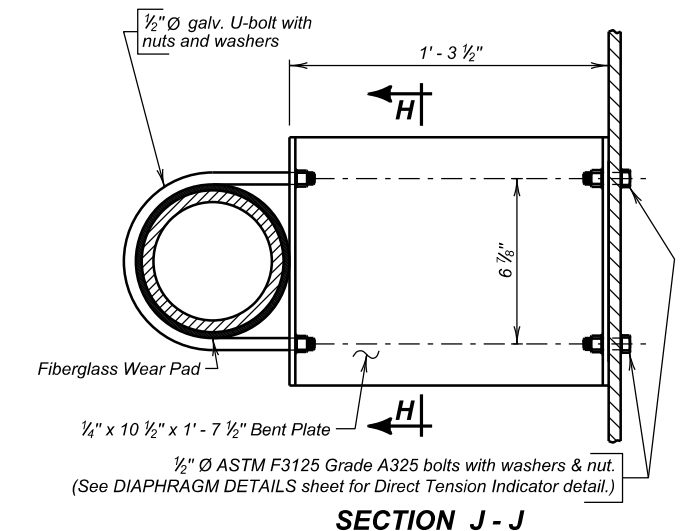


SECTION H - H



BARRIER & DECK DRAIN DETAILS

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

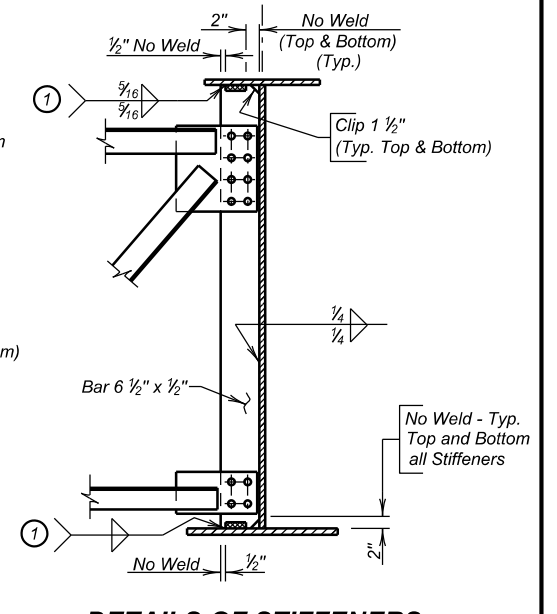
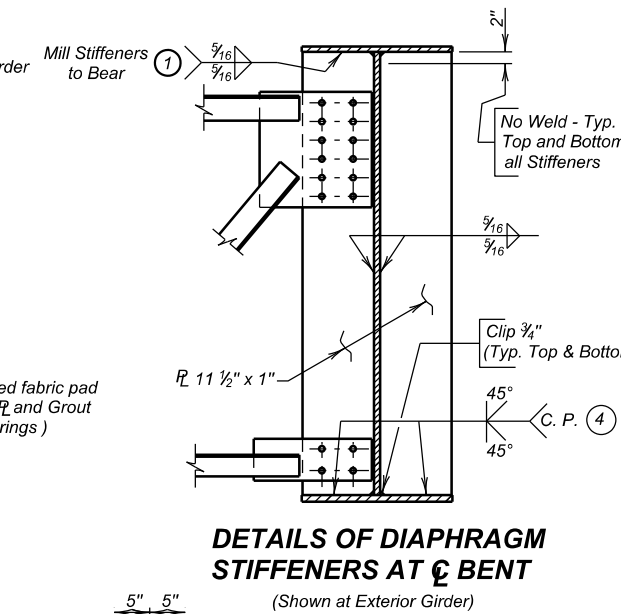
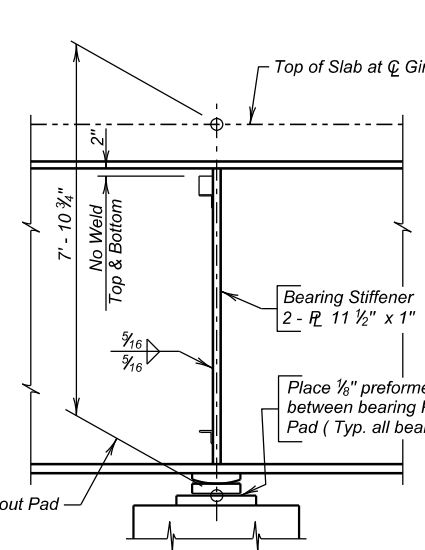
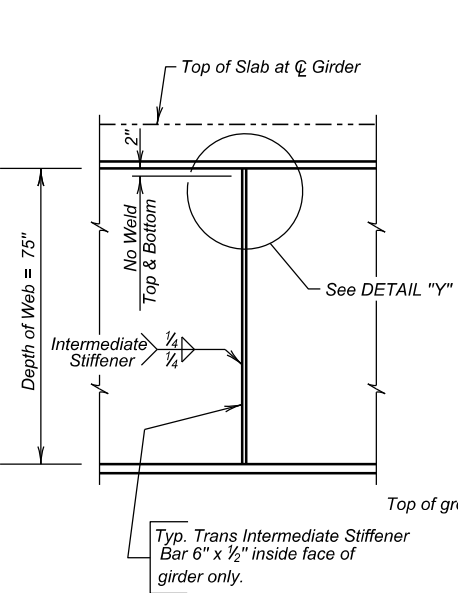
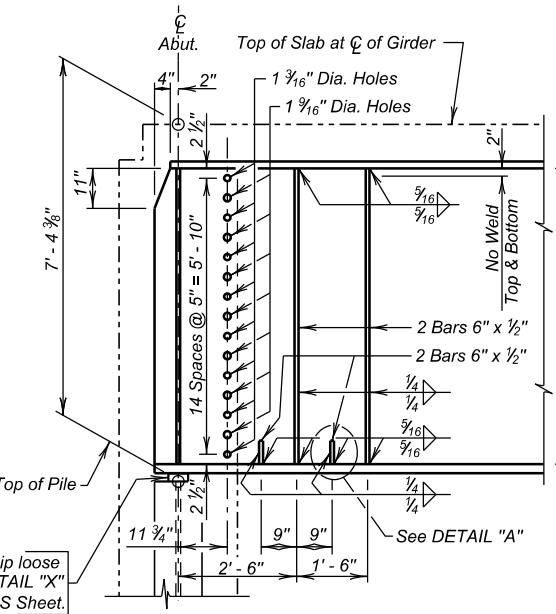
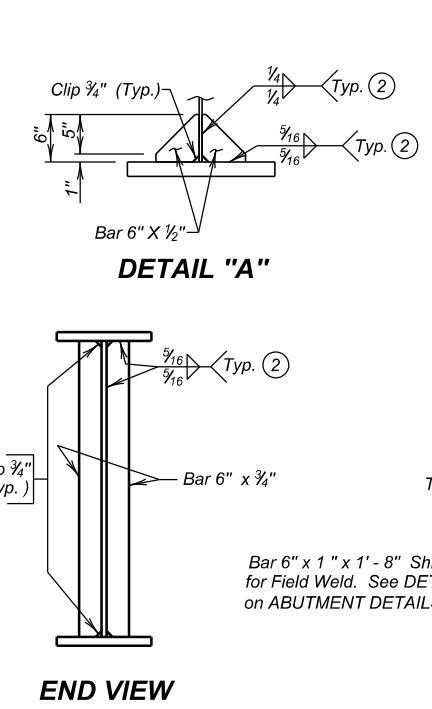
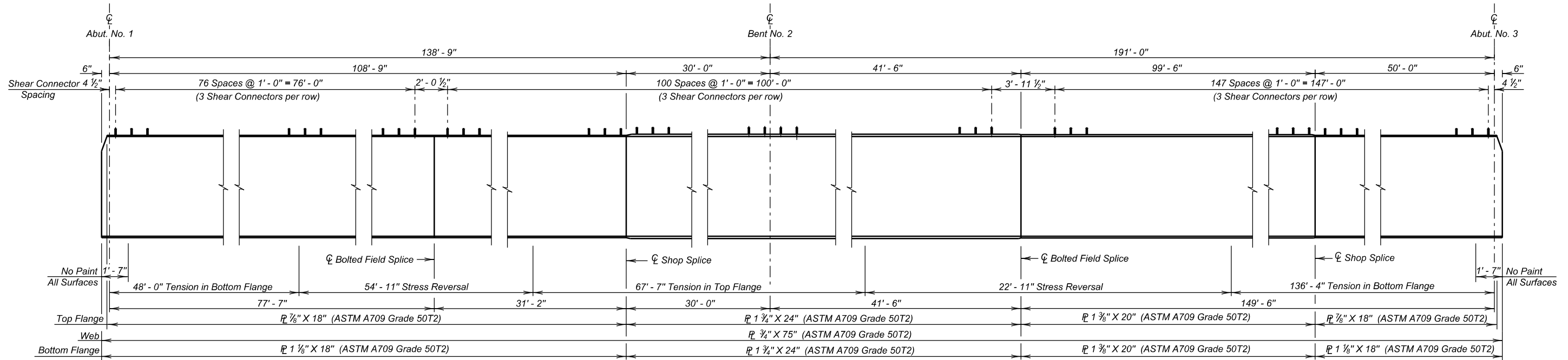


SECTION J - J

ENDBLOCK, BARRIER CURB, AND DECK DRAIN DETAILS - LEFT SIDE
FOR
332' - 3" STEEL GIRDER BRIDGE
40' - 0" ROADWAY & 5' - 0" SIDEWALK
OVER I - 229
STA. 26 + 80.65 TO 30 + 12.90
STR. NO. 50-221-170

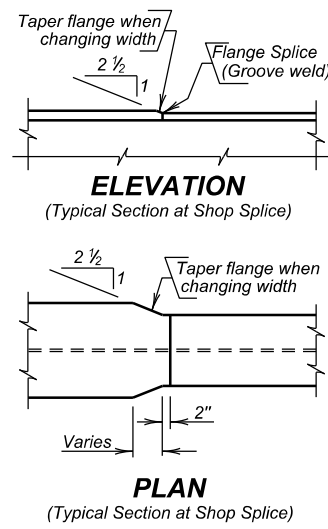
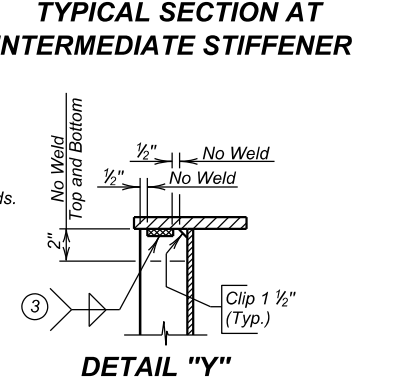
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2021

DESIGNED BY PW MINN08U9	CK. DES. BY AG 08U9TA03	DRAFTED BY BT	Steve A. Johnson BRIDGE ENGINEER
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- NOTES -**
- See DIAPHRAGM DETAILS sheet for Diaphragm Details.
 - See FRAMING DIAGRAM, CAMBER, AND ERECTION DATA Sheet for spacing of Diaphragms, Stiffeners, and Girder Camber.
 - All dimensions shown are horizontal or vertical.
 - All Stiffeners and Girder Ends shall be made normal to flanges, except bearing stiffeners at bent & abutments shall be vertical.
 - Stiffeners to have tight fit top and bottom.
 - Dimensions shown are for steel temperature of 45° F.
 - It is permissible to substitute 3/4" bars for the 1/2" bars shown. No additional payment will be made.

- 1** NOTE: All fillet welds attaching diaphragm or bearing stiffeners to girder flanges, shall terminate 1/2" from edge of stiffener, edge of flange, or clip as appropriate. Weld size to be as indicated in the table of Flange to Web Welds.
- 2** NOTE: All fillet welds shall terminate 1/2" from edge of stiffener, edge of flange, or clip as appropriate, except weld from clip to edge of stiffener at top flange.
- 3** Transverse Intermediate Stiffeners shall be welded to the compression flange as shown in DETAIL "Y". In zones of stress reversal the Transverse Intermediate Stiffener shall not be attached to either flange. Ends of Stiffeners not welded shall fit tight. See Girder Layout above for location of tension flange and zones of stress reversal.
- 4** Alternately, Mill Stiffeners to Bear & use 5/16" Fillet Weld, same as at Top Flange.



SHEAR CONNECTOR DETAILS

Welded Stud Shear Connectors are spaced as shown on Girder Layout. Shear Connectors will be field install and are shown here for informational purposes only. Payment for providing Shear Connectors will be included in the Lump Sum bid for Structural Steel, Furnish 978 Shear Connectors per Girder.

FLANGE TO WEB WELDS

FLANGE THICKNESS	FILLET WELDS
7/8"	5/16"
1 1/8"	5/16"
1 3/8"	5/16"
1 7/8"	5/16"

GIRDER LAYOUT DETAILS FOR

332' - 3" STEEL GIRDER BRIDGE

40' - 0" ROADWAY & 5' - 0" SIDEWALK

OVER I - 229

STA. 26 + 80.65 TO 30 + 12.90

STR. NO. 50-221-170

0° SKEW

SEC. 26/35-T102N-R49W

IM 2291(01)10

HL-93

MINNEHAHA COUNTY

S. D. DEPT. OF TRANSPORTATION

OCTOBER 2021

DESIGNED BY PW

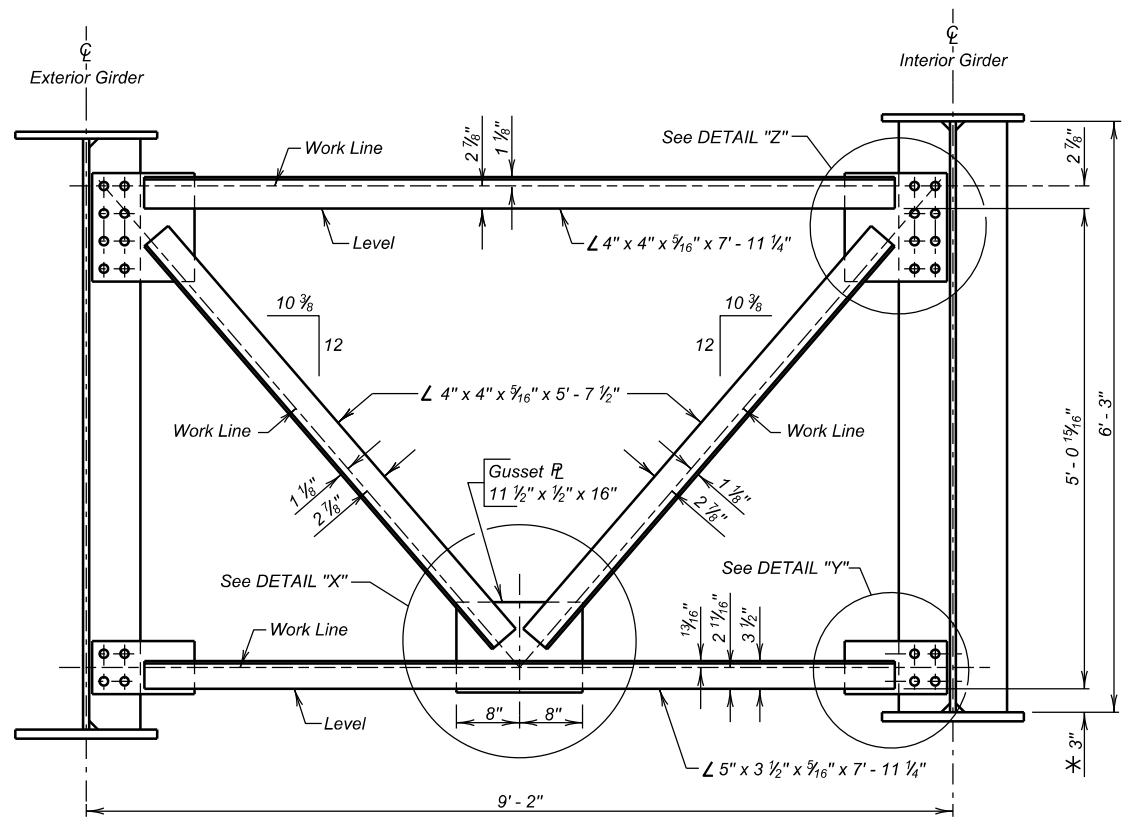
CK. DES. BY AG

DRAFTED BY BT

Steve A. Johnson

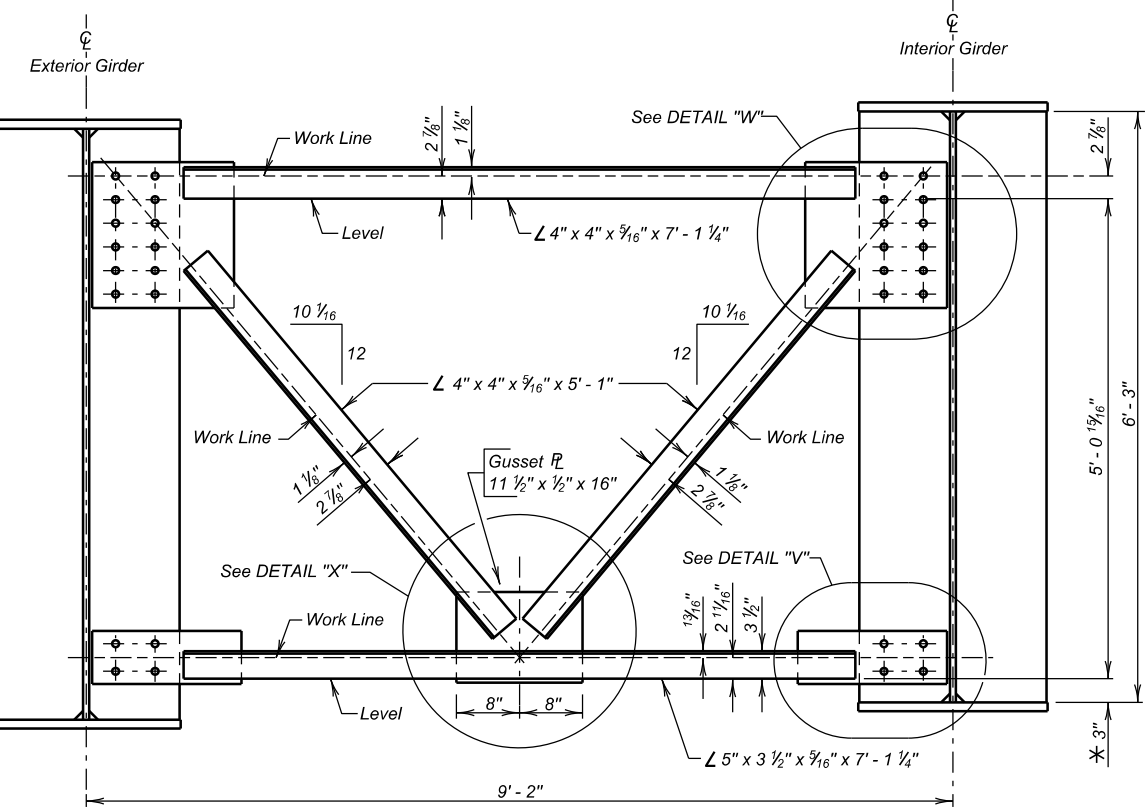
BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 2291(01)10	7	9



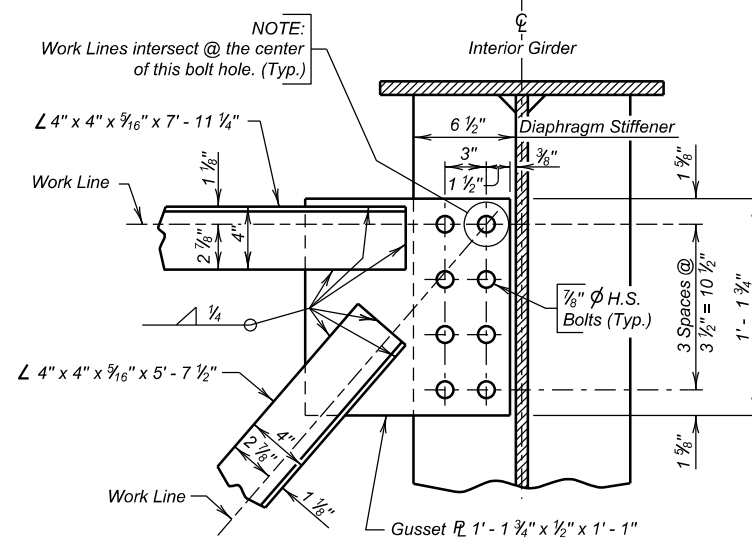
INTERMEDIATE DIAPHRAGM DETAIL
(Weight of One Unit = 349 lbs.)

✱ 3" above high girder in each bay.

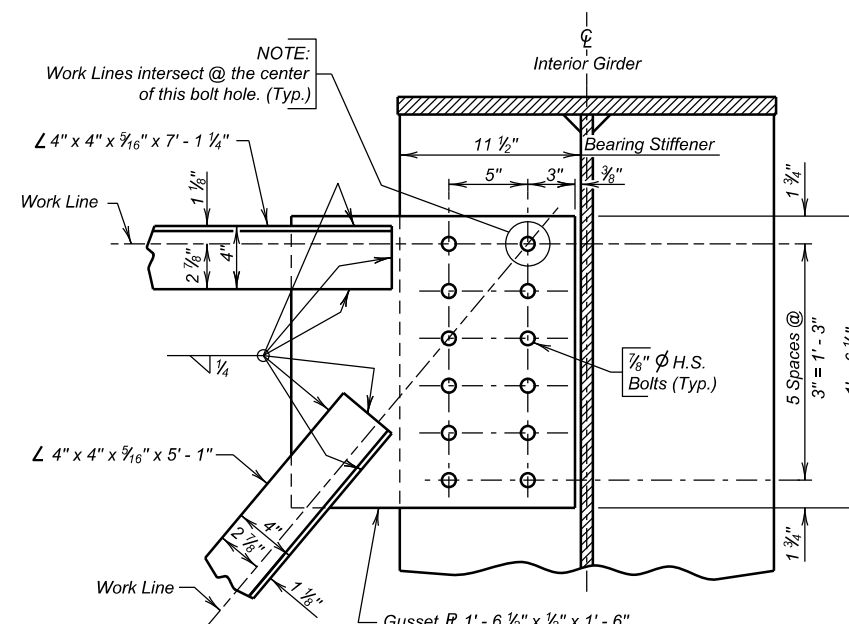


BEARING DIAPHRAGM DETAIL
(Weight of One Unit = 391 lbs.)

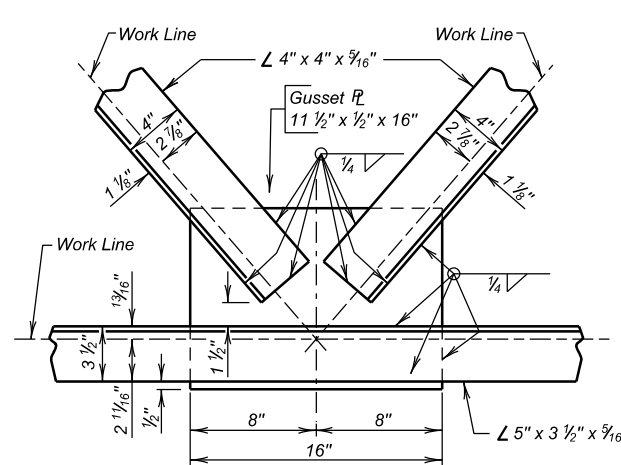
✱ 3" above high girder in each bay.



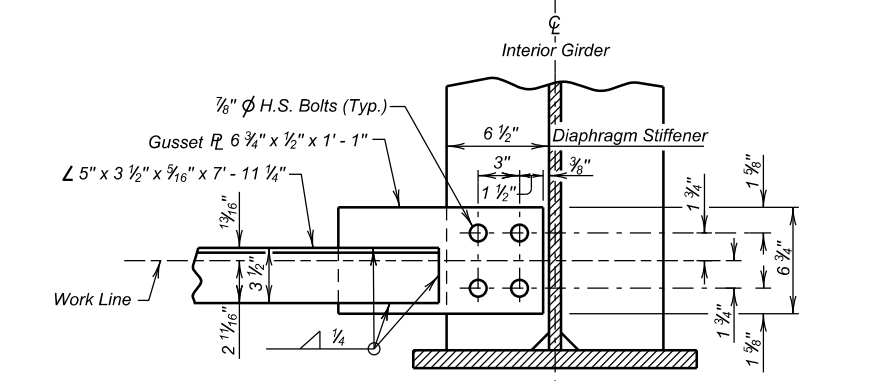
DETAIL "Z"



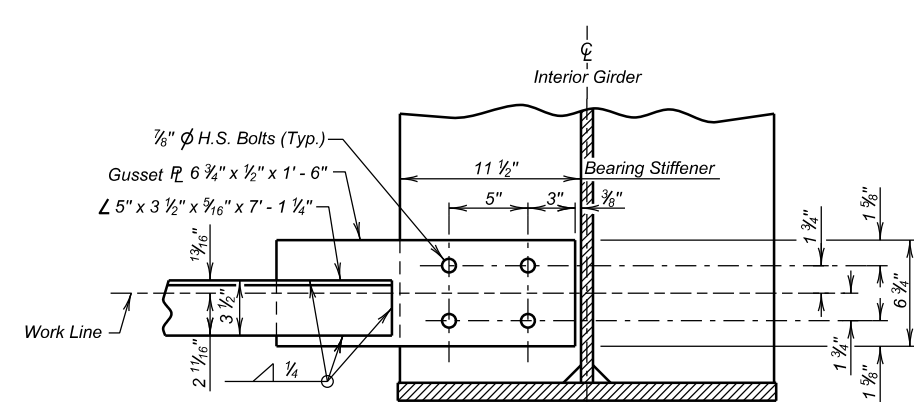
DETAIL "W"



DETAIL "X"



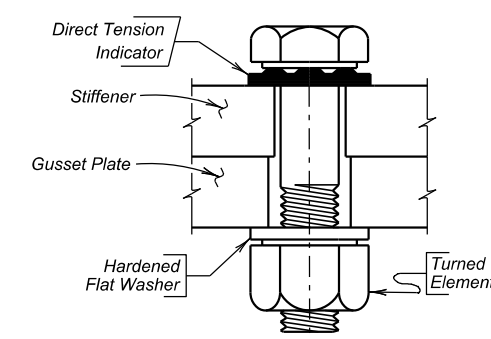
DETAIL "Y"



DETAIL "V"

GENERAL NOTES

1. The Steel Diaphragms are included in the quantity for Structural Steel, Furnish.
2. Use 1/16" diameter bolt holes in the 1/2" gusset plates. Use 1/8" diameter bolt holes in the stiffener plates.
3. The 3/8" High Strength bolts, nuts, and washers shall conform to ASTM A3125 Grade A325. The bolts shall be the heavy hexagon head structural type with heavy semi-finished hexagon nut and hardened washer.
4. Terminate all welds 1/2" from the edges of the bars and plates.

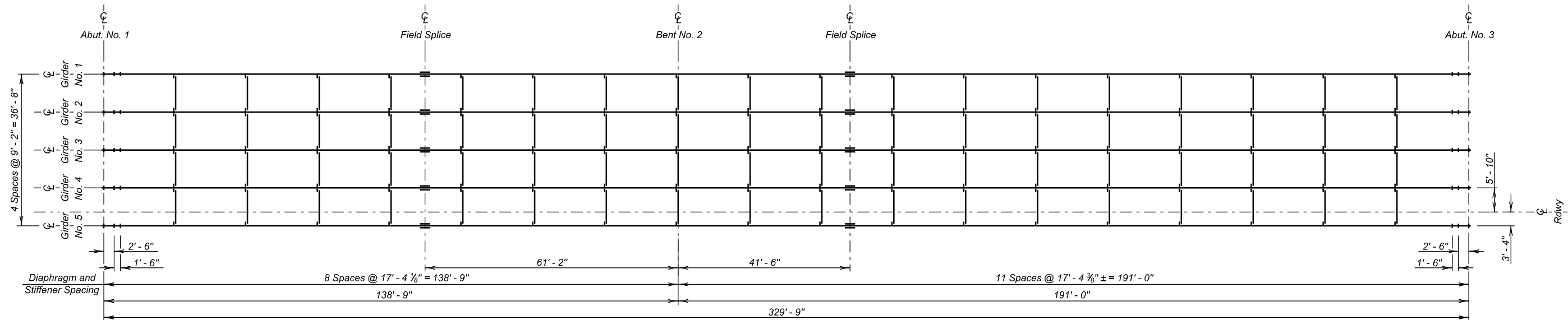


DIRECT TENSION INDICATOR DETAIL

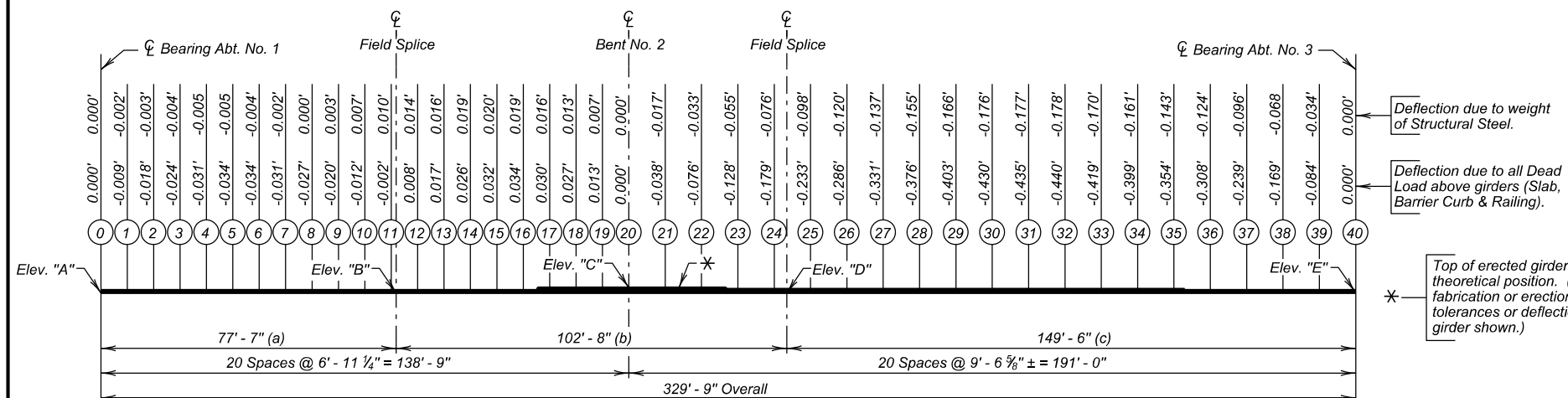
DIAPHRAGM DETAILS FOR
332' - 3" STEEL GIRDER BRIDGE
 40' - 0" ROADWAY & 5' - 0" SIDEWALK 0° SKEW
 OVER I - 229 SEC. 26/35-T102N-R49W
 STA. 26 + 80.65 TO 30 + 12.90 IM 2291(01)10
 STR. NO. 50-221-170 HL-93

MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 OCTOBER 2021

DESIGNED BY PW MINN08U9	CK. DES. BY AG 08U9TA05	DRAFTED BY BT	<i>Steve A. Johnson</i> BRIDGE ENGINEER
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FRAMING DIAGRAM

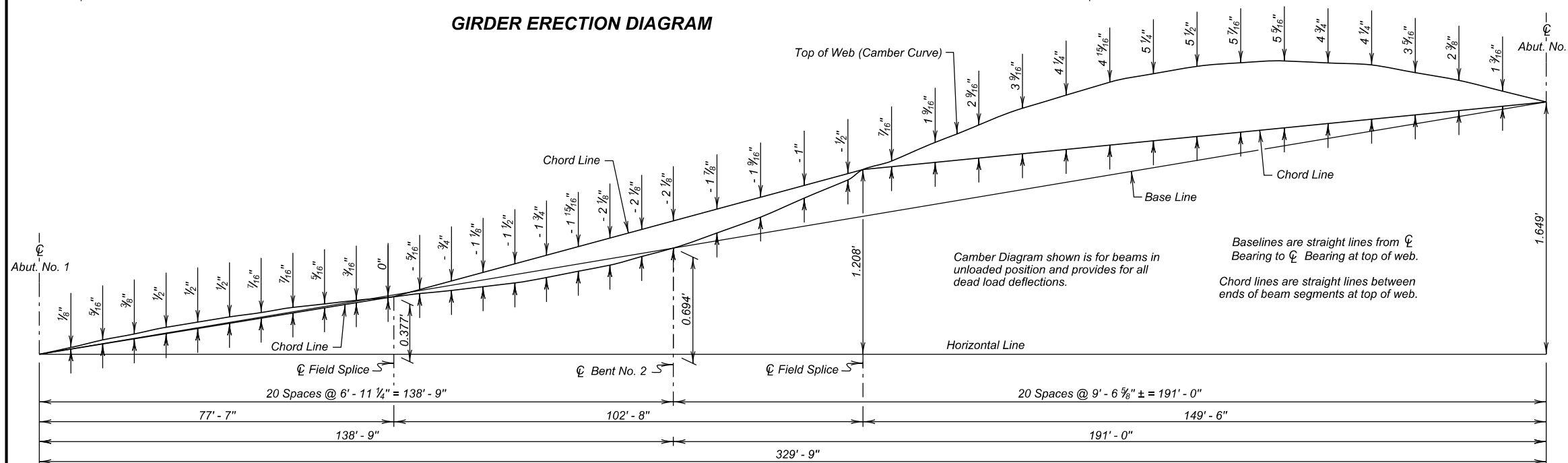


GIRDER ERECTION DIAGRAM

φ GIRDER ERECTION ELEVATIONS AND SLOPES

Girder No.	ELEVATIONS (Top of Girder)					SLOPES (%)		
	"A"	"B"	"C"	"D"	"E"	a	b	c
1	1468.003	1468.391	1468.770	1468.746	1469.652	0.500	0.305	0.634
2	1468.187	1468.575	1468.953	1468.929	1469.885	0.500	0.305	0.634
3	1468.370	1468.758	1469.137	1469.112	1470.019	0.500	0.305	0.634
4	1468.553	1468.941	1469.320	1469.296	1470.202	0.500	0.305	0.634
5	1468.737	1469.125	1469.503	1469.479	1470.385	0.500	0.305	0.634

NOTE:
 φ These elevations and slopes occur at a time after girder erection is completed but prior to any placement of concrete. Slopes shown are an imaginary straight line between points at beam ends and are (+) towards increasing stations.



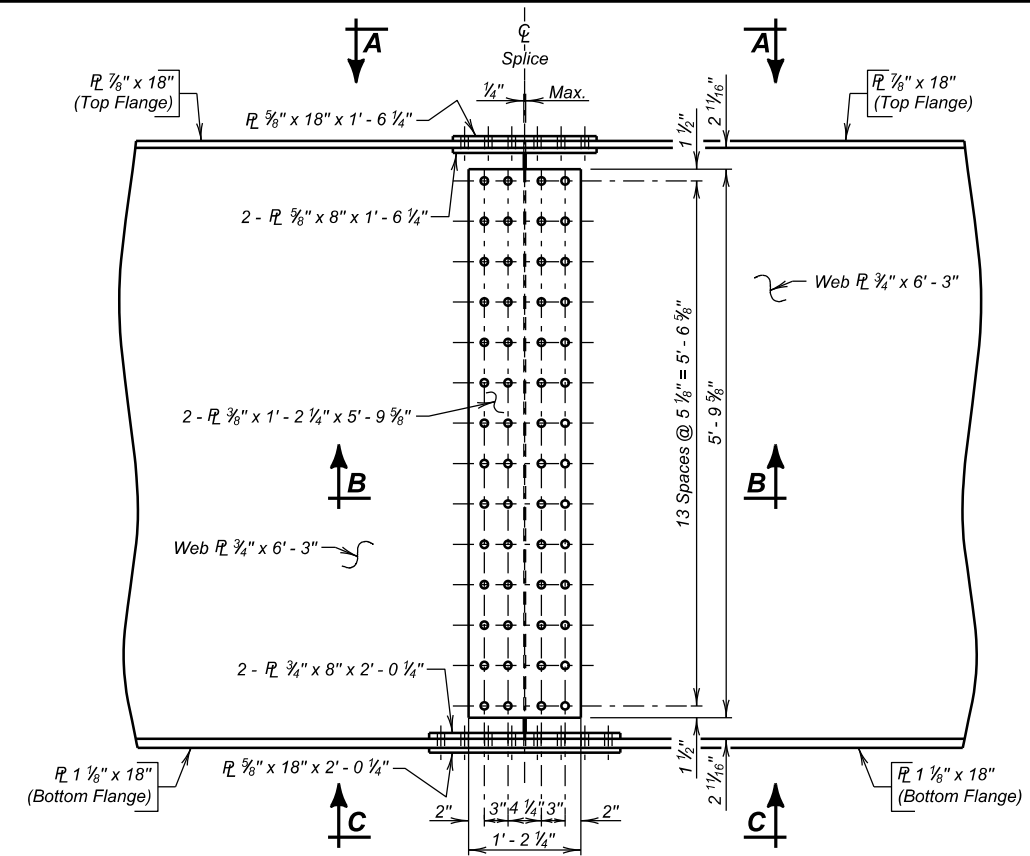
CAMBER CUTTING DIAGRAM
 (Cut camber into webs of all girders as shown)

FRAMING DIAGRAM, CAMBER & ERECTION DATA

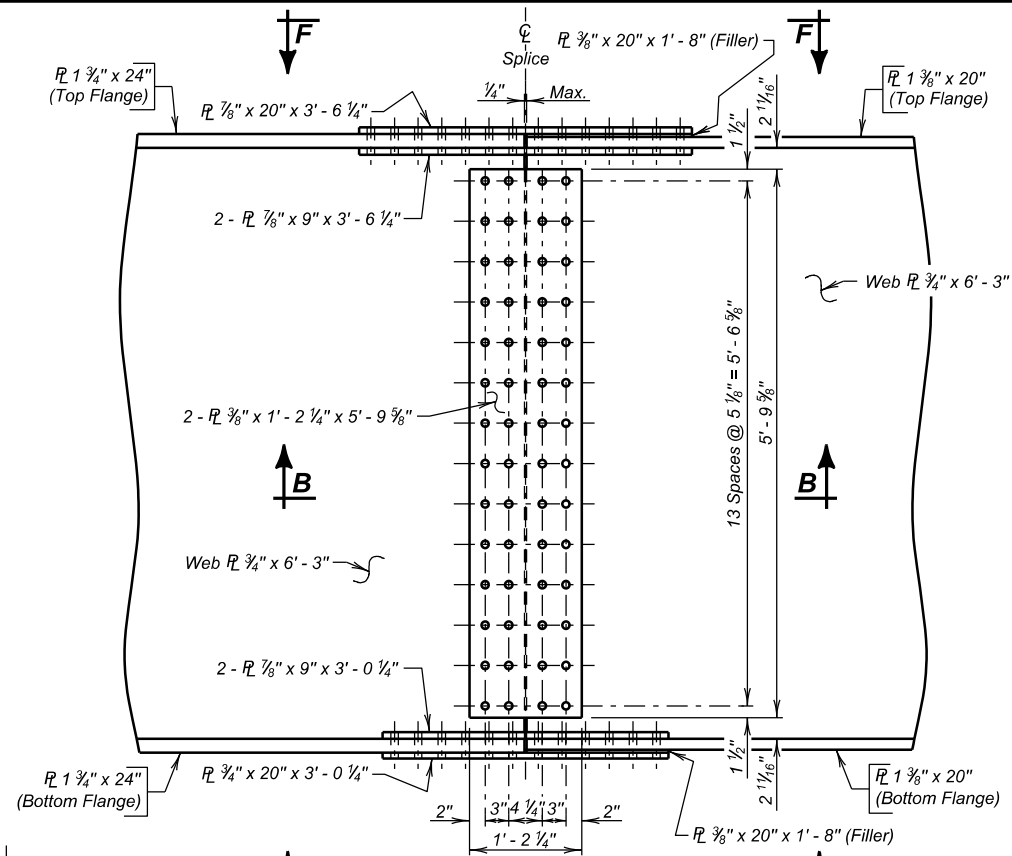
FOR
332' - 3" STEEL GIRDER BRIDGE
 40' - 0" ROADWAY & 5' - 0" SIDEWALK 0° SKEW
 OVER I - 229 SEC. 26/35-T102N-R49W
 STA. 26 + 80.65 TO 30 + 12.90 IM 2291(01)10
 STR. NO. 50-221-170 HL-93

MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 OCTOBER 2021

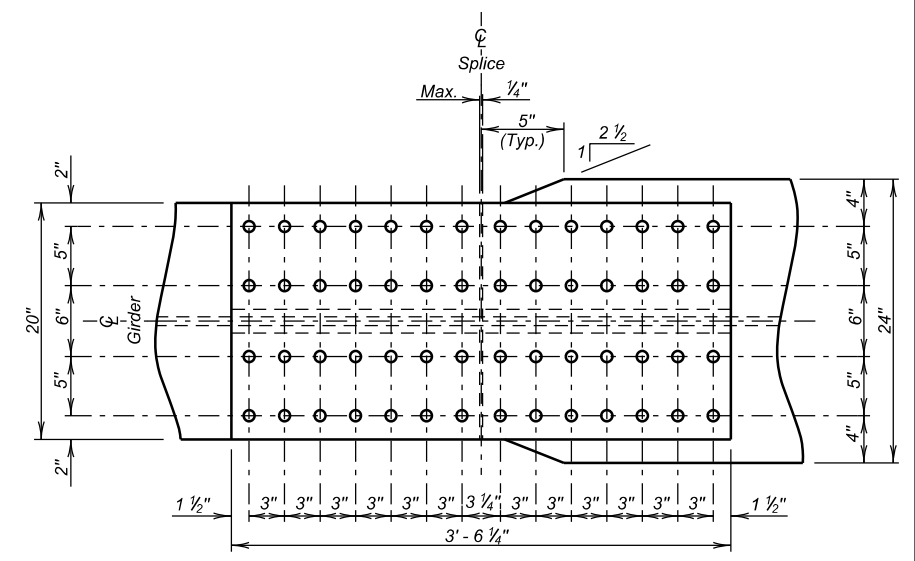
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 2291(01)10	9	9



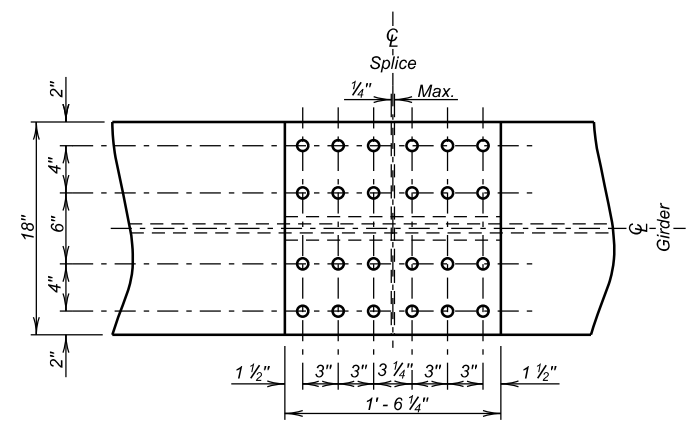
BOLTED FIELD SPLICE DETAIL
(Span 1)



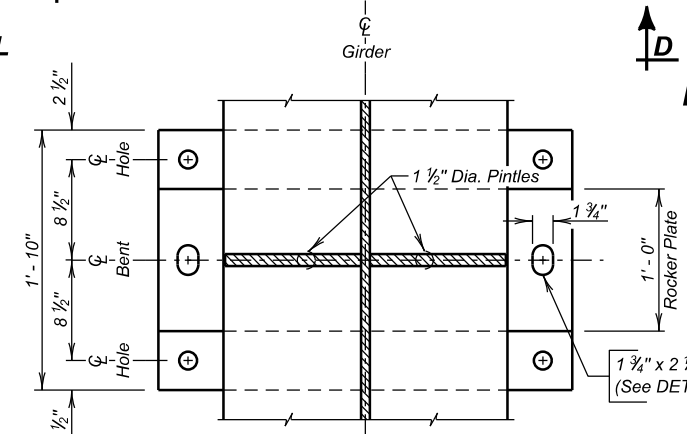
BOLTED FIELD SPLICE DETAIL
(Span 2)



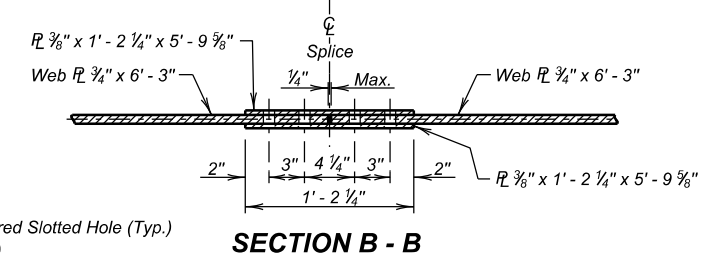
VIEW F - F



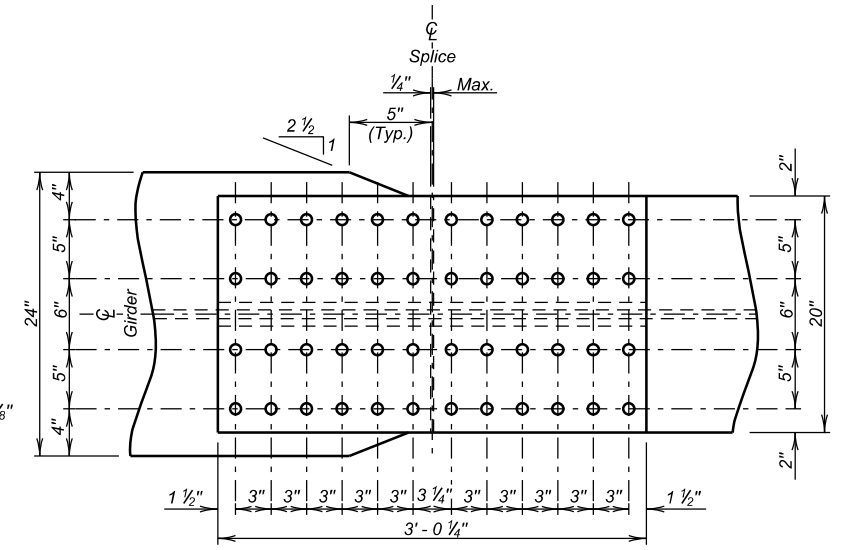
VIEW A - A



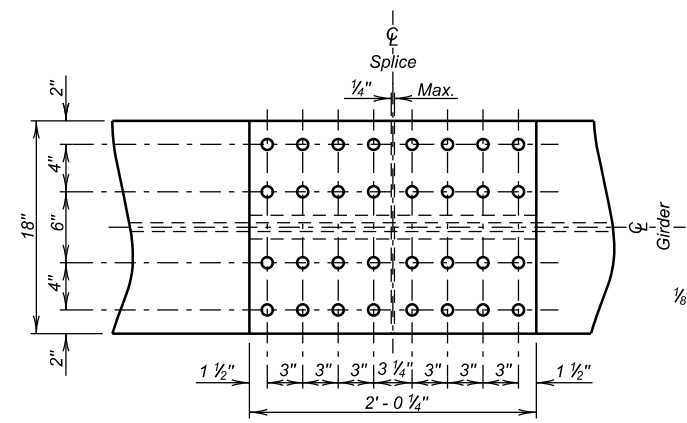
PLAN
(Bolts & Washers Not Shown)



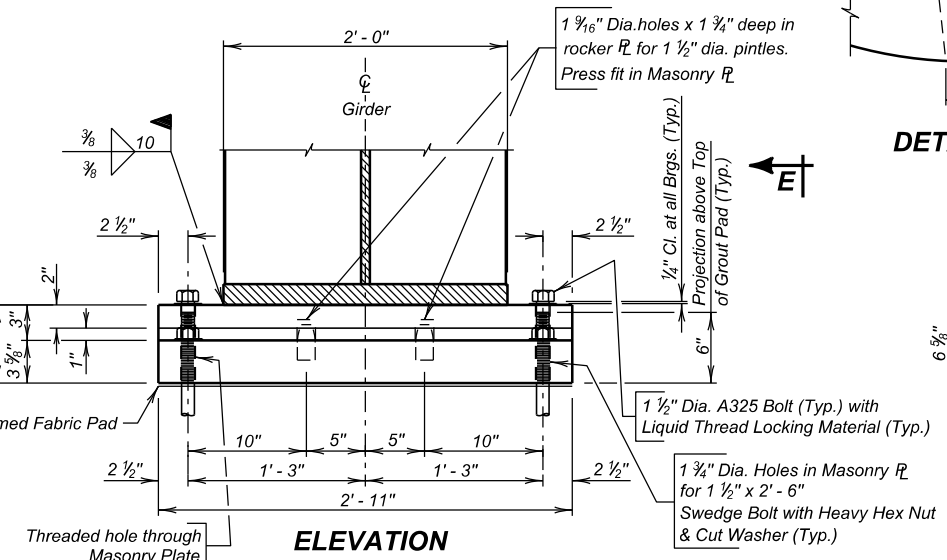
SECTION B - B



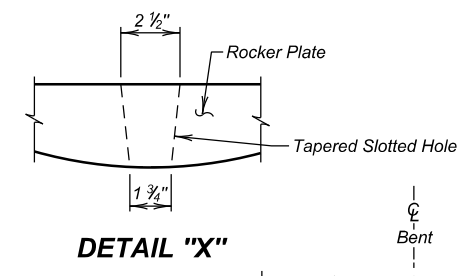
VIEW D - D



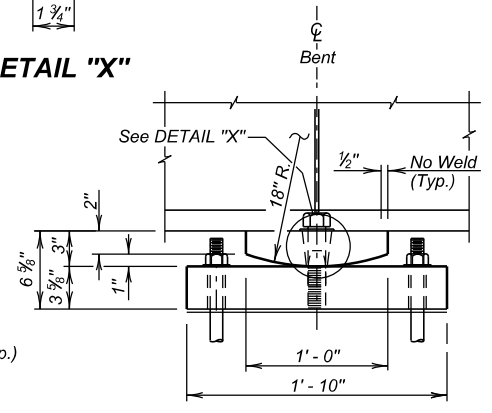
VIEW C - C



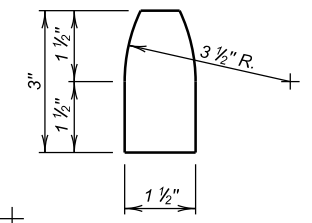
ELEVATION
FIXED BEARING
BENT NO. 2



DETAIL 'X'



VIEW E - E



PINTLE DETAIL

NOTE:
All bolts in splices shall be 7/8" A325 High Strength Bolts. (See DIAPHRAGM DETAILS sheet for Direct Tension Indicator Detail.)

DETAILS OF BOLTED FIELD SPLICES
FOR
332' - 3" STEEL GIRDER BRIDGE

40' - 0" ROADWAY & 5' - 0" SIDEWALK
OVER I - 229
STA. 26 + 80.65 TO 30 + 12.90
STR. NO. 50-221-170

0° SKEW
SEC. 26/35-T102N-R49W
IM 2291(01)10
HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2021

DESIGNED BY PW MINN08U9	CK. DES. BY AG 08U9TA07	DRAFTED BY BT	<i>Steve A. Johnson</i> BRIDGE ENGINEER
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