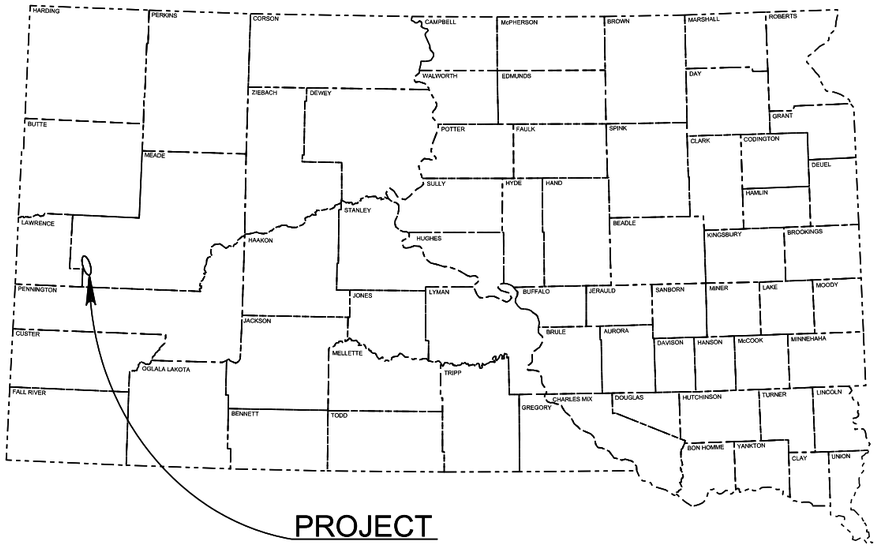
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-FP-PP 0901(195)35	1	8



STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

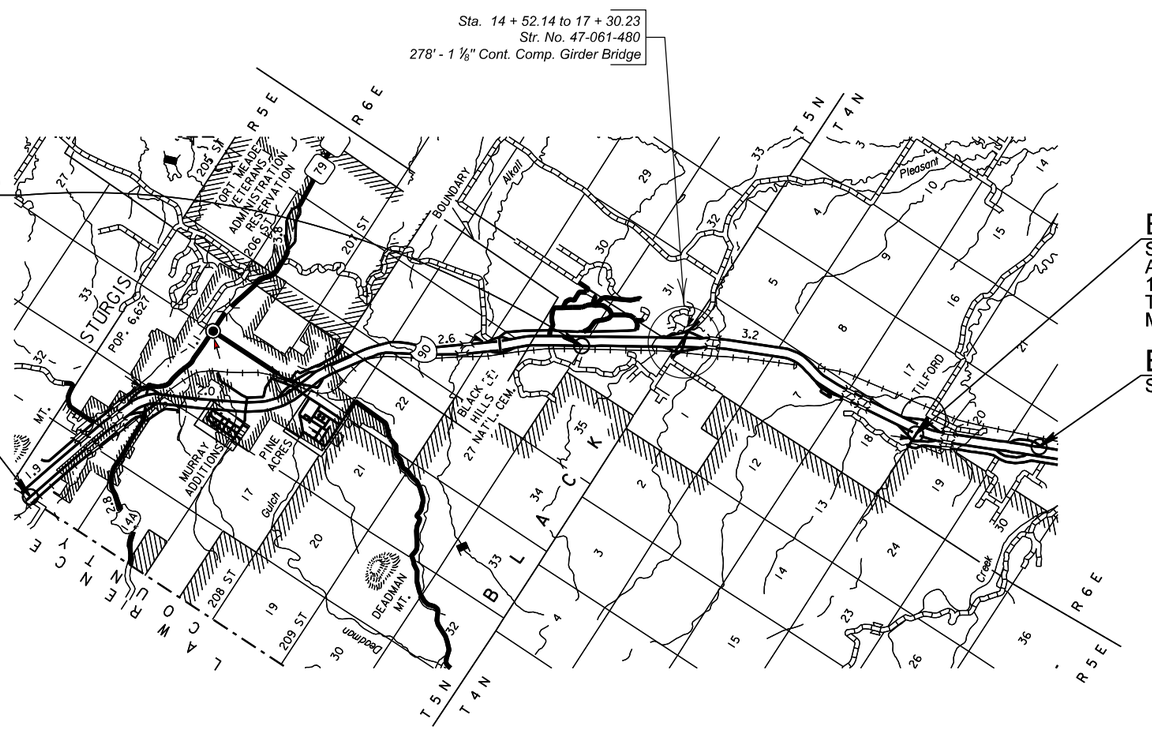
PLANS FOR PROPOSED

PROJECT IM-FP-PP 0901(195)35
INTERSTATE 90
MEADE COUNTY

STRUCTURAL STEEL
PCN 08UC

INDEX OF SHEETS -

Sta. 14 + 52.14 to 17 + 30.23
Str. No. 47-061-480
278' - 1 ⅛" Cont. Comp. Girder Bridge



BEGIN IM-FP-PP 0901(195)35

Station 159+28.37 I-90 Eastbound
Approximately 145.68' South and
251.71' West of SW Corner Section 25 -
Township 5 North - Range 5 East
MRM 35.06+0.79

BEGIN ITS

Station 128+50.00 EXEB

END IM-FP-PP 0901(195)35

Station 388+36.00 I-90 Eastbound
Approximately 6.30' North and
138.42' West of SE Corner Section 18
Township 4 North - Range 6 East
MRM 40.20+0.00

END ITS

Station 464+00.00 EXEB

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-FP-PP 0901(195)35	2	8

ESTIMATE OF STRUCTURE QUANTITES

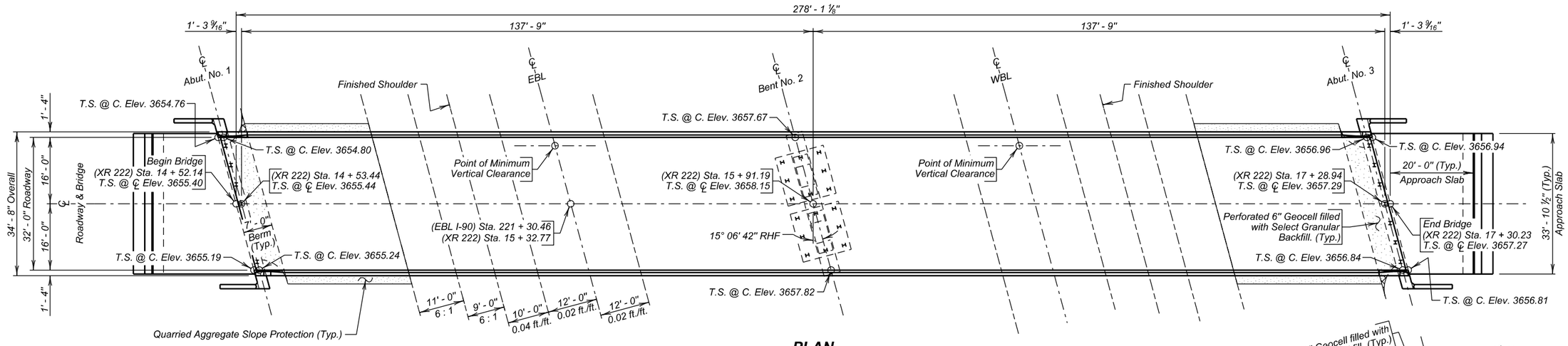
Str. No. 47-061-480

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

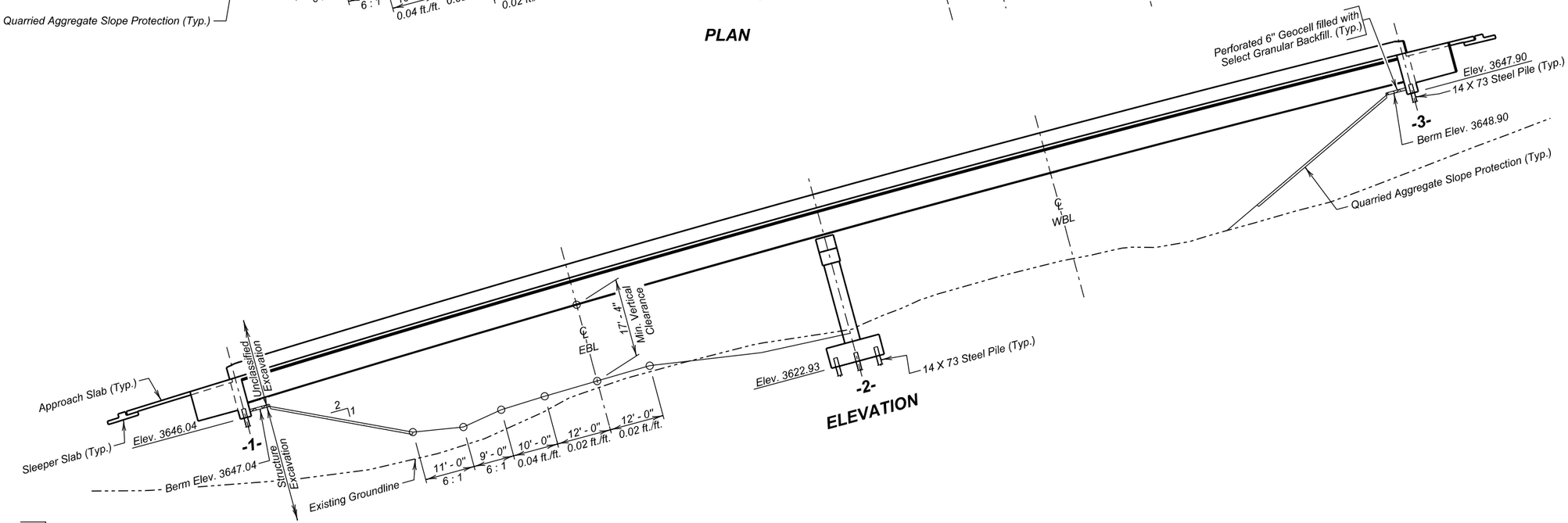
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

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

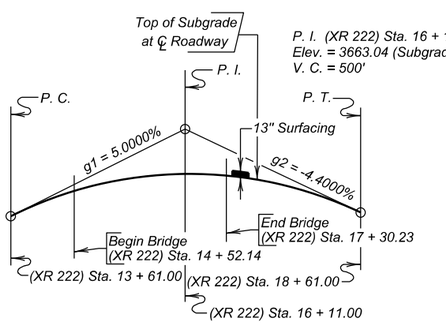
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-FP-PP 0901(195)35	3	8



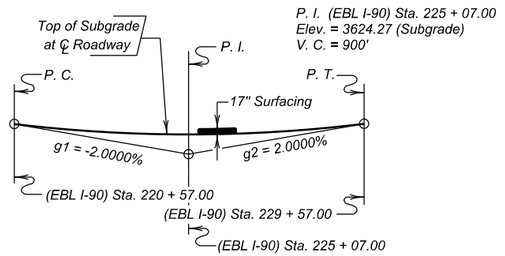
PLAN



ELEVATION



VERTICAL CURVE DATA
(XR 222)



VERTICAL CURVE DATA
(EBL I-90)

-X271-

INDEX OF BRIDGE SHEETS -

GENERAL DRAWING

FOR

278' - 1 ⅛" CONT. COMP. GIRDER BRIDGE

32' - 0" ROADWAY
OVER I-90
(XR 222) STA. 14 + 52.14 TO
(XR 222) STA. 17 + 30.23
STR. NO. 47-061-480
PCN 08UC

15° 06' 42" RHF SKEW
SEC. 6-T4N-R6E
IM-FP-PP 0901(195)35
HL-93

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

NOVEMBER 2021

1 OF 6

-X271-

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

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CHM	PW	MG	Steve A. Johnson BRIDGE ENGINEER
MEAD08UC	08UCGA01		

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Δ Structural Steel, Furnish	Lump Sum	LS	See Spec. Prov.
≠ Bridge Painting	Lump Sum	LS	

Δ For informational purposes only, the estimated weight of structural steel is 378,413 pounds.
≠ For informational purposes only, the estimated area to be painted is 22,976 sq. ft.

BRIDGE SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.

2. 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.

3. 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

1. AASHTO HL-93.

2. 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

1. Steel for the bearing plates will conform to ASTM A709 Gr. 50.

2. Payment for furnishing and installing the bearing plates will be incidental to the contract lump sum price for Structural Steel, Furnish.

BENTS

1. 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 will be incidental to the contract lump sum price for Structural Steel, Furnish.

GIRDERS

1. 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 A36.

2. Bolts, nuts and washers will conform to ASTM F3125, Grade A325.

3. Shear connectors will be provided, but not installed. Shear connectors shown are for information only and will be field welded to the girders under a future contract.

4. All butt-welded girder splices will be ultrasonically inspected.

5. The cost of welding and weld inspection will be incidental to the contract lump sum price for Structural Steel, Furnish.

6. 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).

7. See Diaphragm Details for notes concerning diaphragms.

8. 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.

9. 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.

10. Shear connectors will conform to Section 7.3 Type B of the Bridge Welding Code. 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 connectors will meet the following minimum mechanical property requirements for Type B studs,

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

BEARINGS

1. All steel for the bearings will conform to ASTM A709, Gr. 50.

2. 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.

3. 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.

4. 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

5. Payment for furnishing and installing 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

1. 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.

2. 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

1. 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 Rapid City Area Engineer, Mike Carlson at (605) 394-1635.

2. 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

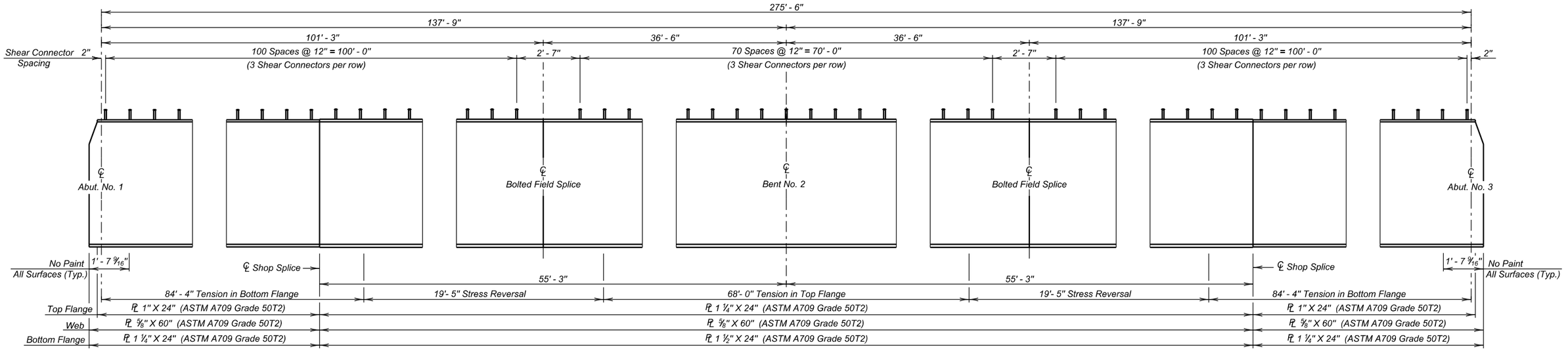
The South Dakota Department of Transportation (SDDOT) is a South Dakota sales tax-exempt government entity. Therefore, a Certificate of Exemption will be provided to the successful bidding party which excuses the party from paying sales tax on the materials being furnished to the SDDOT. It is the responsibility of the bidding parties to contact the South Dakota 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
278' - 1 ⅛" CONT. COMP. GIRDER BRIDGE

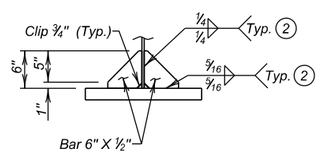
STR. NO. 47-061-480
NOVEMBER 2021

DESIGNED BY	CK. DES. BY	DRAFTED BY	
PW MEAD08UC	CHM 08UCGA02	PW	Steve A Johnson BRIDGE ENGINEER

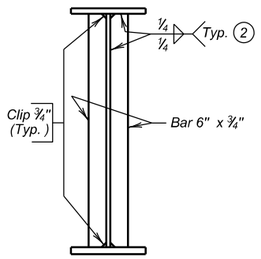
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-FP-PP 0901(195)35	5	8



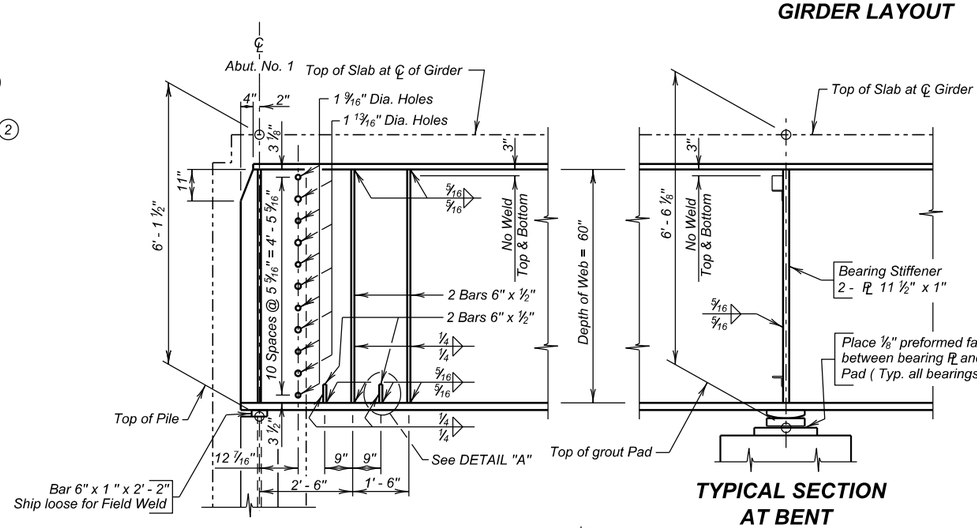
GIRDER LAYOUT



DETAIL "A"



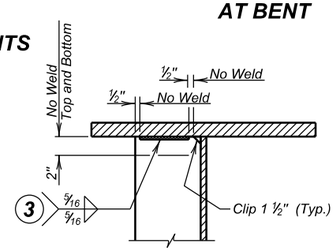
END VIEW



TYPICAL SECTION AT ABUTMENTS

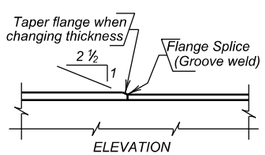
(Parallel to ℄ Girders)

TYPICAL SECTION AT BENT

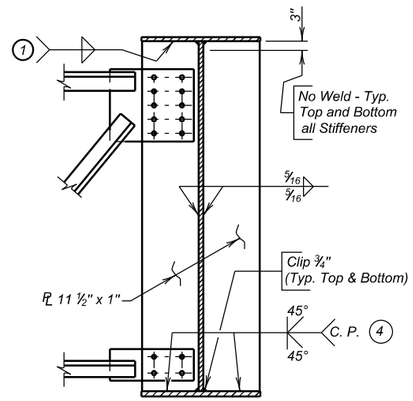


DETAIL "Y"

FLANGE TO WEB WELDS	
FLANGE THICKNESS	FILLET WELDS
1"	5/16"
1 1/4"	5/16"
1 1/2"	5/16"

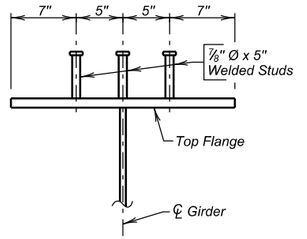


TYPICAL SECTION AT SHOP SPLICE



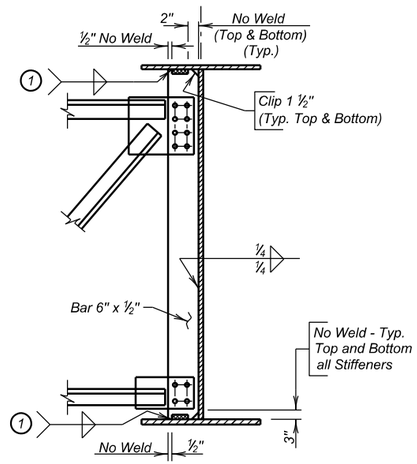
DETAILS OF DIAPHRAGM STIFFENERS AT ℄ BENT

(Shown at Exterior Girder)



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.
819 Shear Connectors per Girder.



DETAILS OF STIFFENERS AT INTERMEDIATE DIAPHRAGMS

(Shown at Exterior Girder)

NOTES:

1. *See DIAPHRAGM DETAILS Sheet for Diaphragm Details.*
2. *See FRAMING DIAGRAM, CAMBER, AND ERECTION DATA Sheet for spacing of Diaphragms, Stiffeners, and Girder Camber.*
3. *All dimensions shown are horizontal or vertical.*
4. *All Stiffeners and Girder Ends shall be made normal to flanges, except bearing stiffeners at abutments shall be vertical.*
5. *Stiffeners to have tight fit top and bottom.*
6. *Dimensions shown are for steel temperature of 45° F.*
7. *Stiffeners that are 5/8" thick may be substitiuted for the 1/2" thick stiffeners shown.*

(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 Fillet weld, same as at Top Flange.*

GIRDER LAYOUT AND DETAILS

FOR

278' - 1 1/8" CONT. COMP. GIRDER BRIDGE

32' - 0" ROADWAY
OVER I-90
(XR 222) STA. 14 + 52.14 TO
(XR 222) STA. 17 + 30.23
STR. NO. 47-061-480

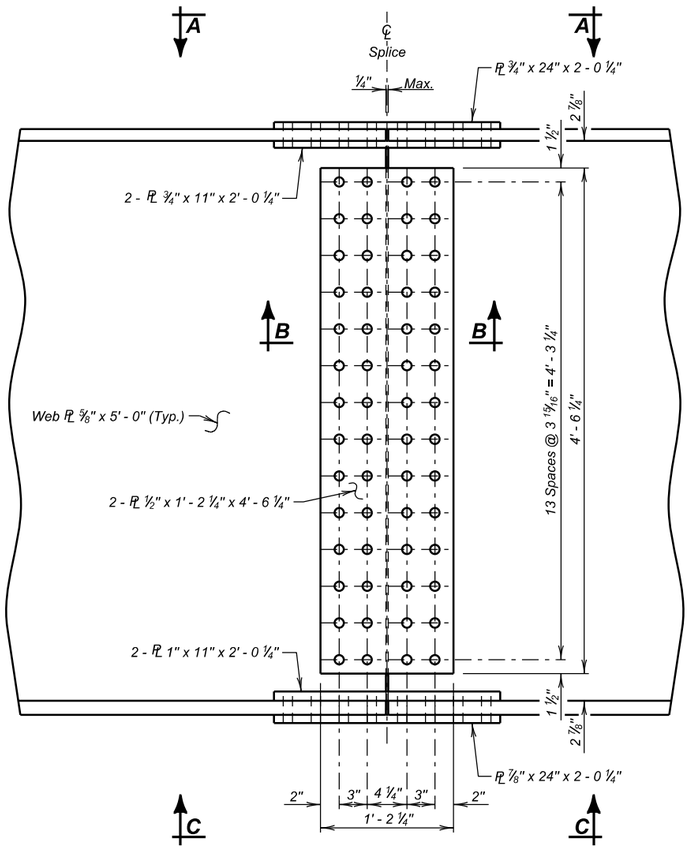
15° 06' 42" RHF SKEW
SEC. 6-T4N-R6E
IM-FP-PP 0901(195)35
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 2021

3 OF 6

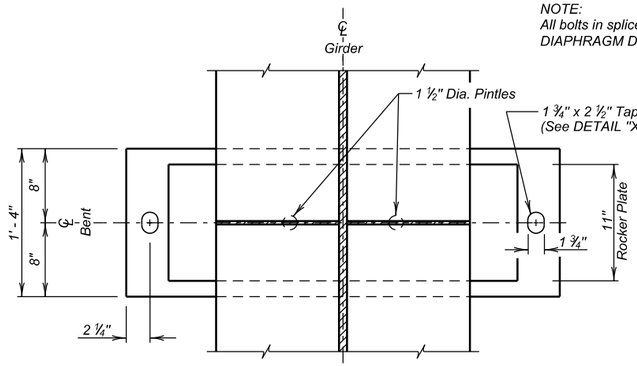
DESIGNED BY	CK. DES. BY	DRAFTED BY	
CHM	PW	MG	Steve A Johnson BRIDGE ENGINEER
MEAD08UC	08UCGA03		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-FP-PP 0901(195)35	6	8

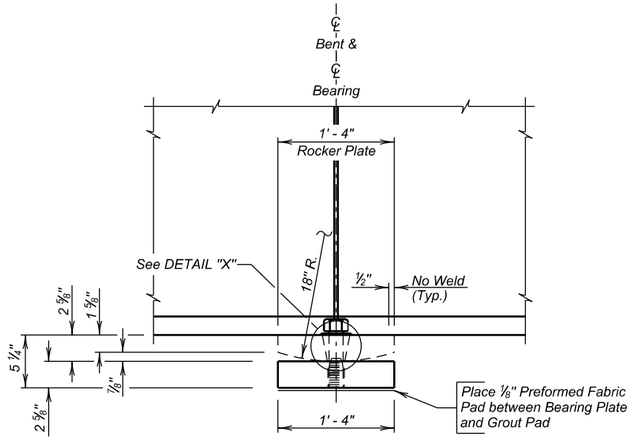


BOLTED FIELD SPLICE DETAIL

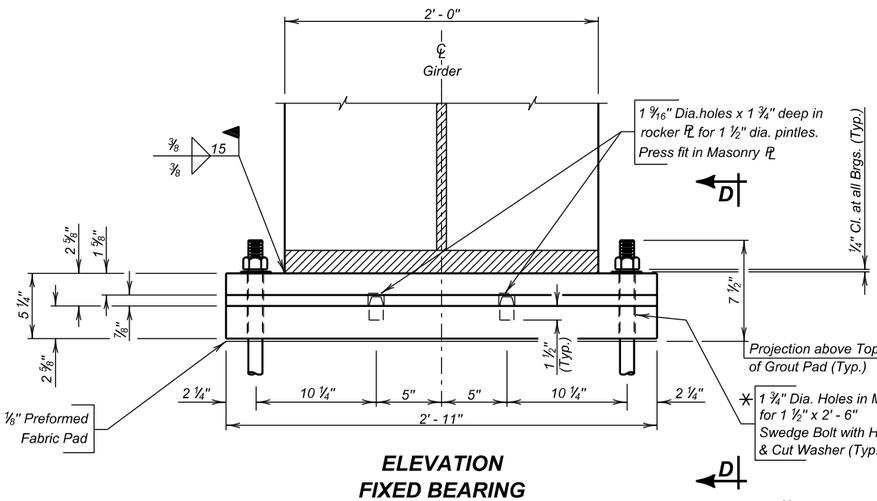
NOTE:
All bolts in splices shall be ⅞" A325 High Strength Bolts. (See DIAPHRAGM DETAILS sheet for Direct Tension Indicator Detail.)



PLAN
(Bolts & Washers Not Shown)

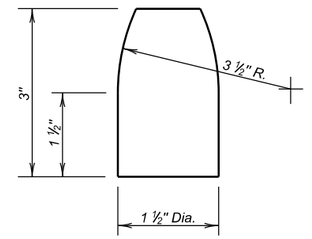


VIEW D - D

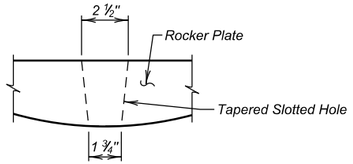


ELEVATION
FIXED BEARING
BENT NO. 2

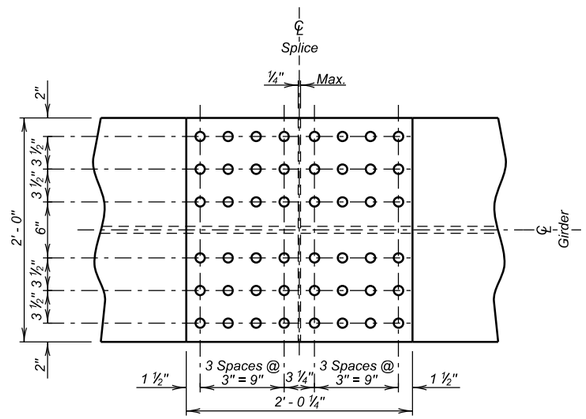
✳ NOTE-
Punch Mark Threads and Nuts to prevent Rotation



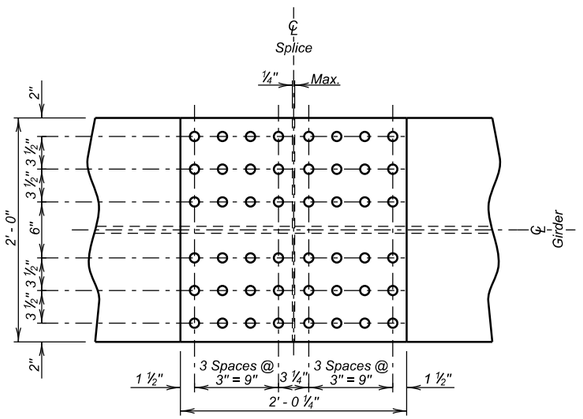
PINTLE DETAIL



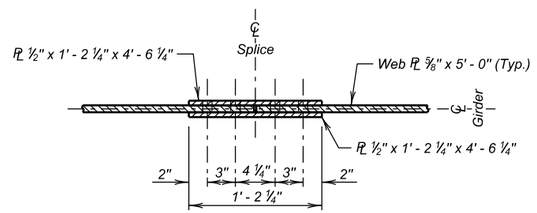
DETAIL "X"



VIEW A - A
(Top Flange)



VIEW C - C
(Bottom Flange)



SECTION B - B

DETAILS OF BOLTED FIELD SPLICES AND BEARINGS
FOR
278' - 1 ⅛" CONT. COMP. GIRDER BRIDGE

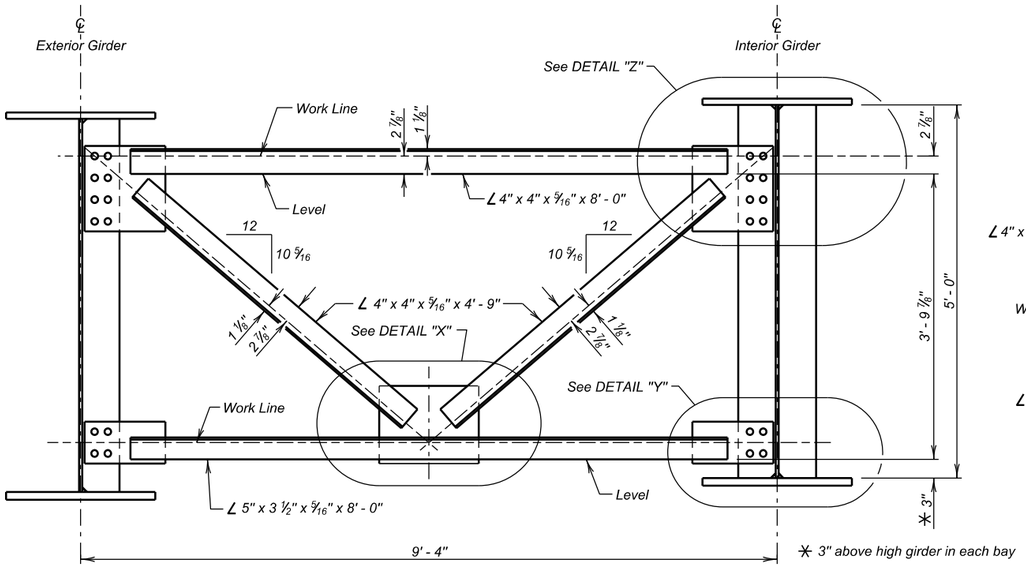
32' - 0" ROADWAY
OVER I-90
(XR 222) STA. 14 + 52.14 TO
(XR 222) STA. 17 + 30.23
STR. NO. 47-061-480

15° 06' 42" RHF SKEW
SEC. 6-T4N-R6E
IM-FP-PP 0901(195)35
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 2021

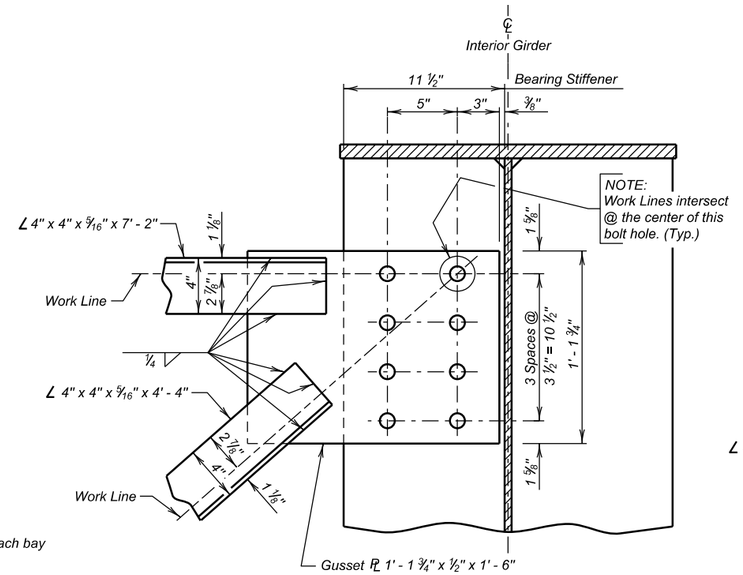
DESIGNED BY	CK. DES. BY	DRAFTED BY	
CHM	PW	MG	Steven A. Johnson BRIDGE ENGINEER
MEAD08UC	08UCGA04		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-FP-PP 0901(195)35	7	8

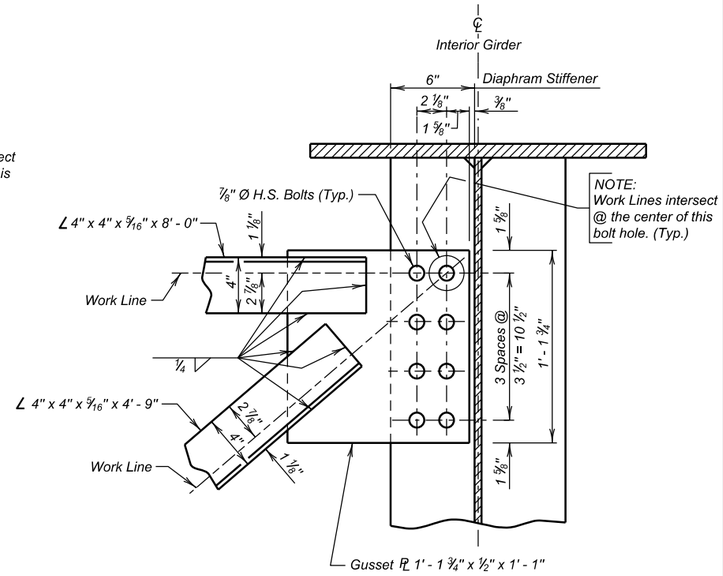


INTERMEDIATE DIAPHRAGM DETAIL

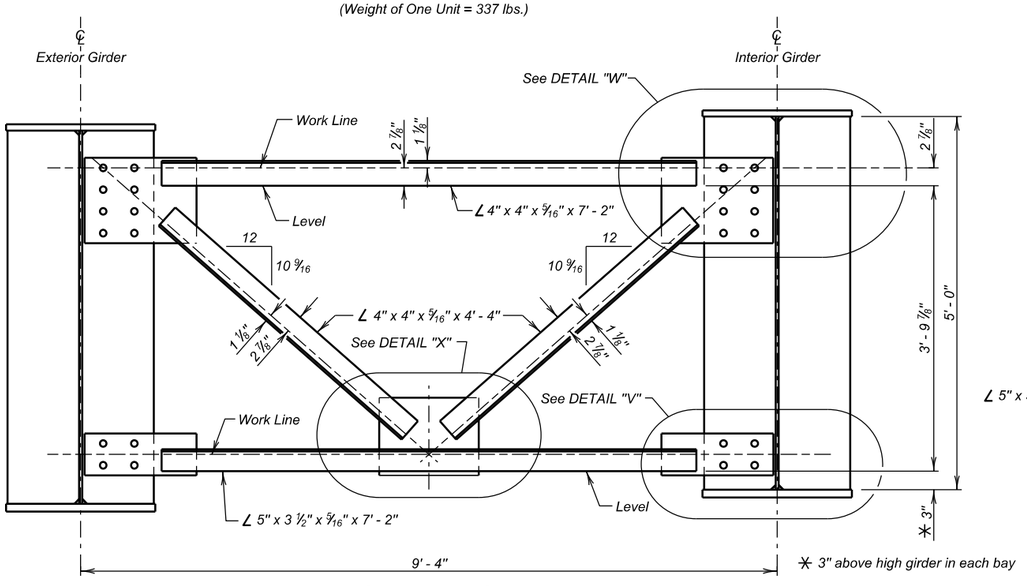
(Weight of One Unit = 337 lbs.)



DETAIL "W"

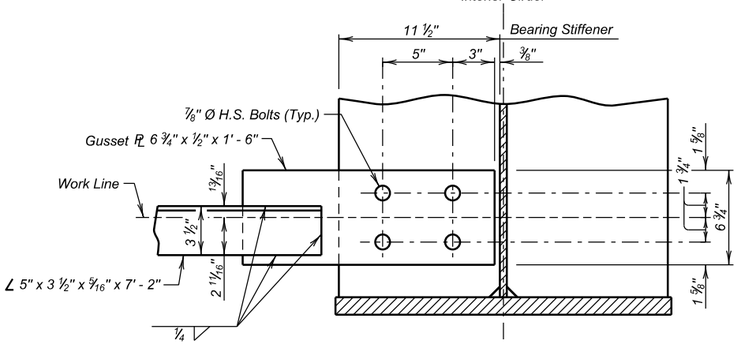


DETAIL "Z"



BEARING DIAPHRAGM DETAIL

(Weight of One Unit = 343 lbs.)



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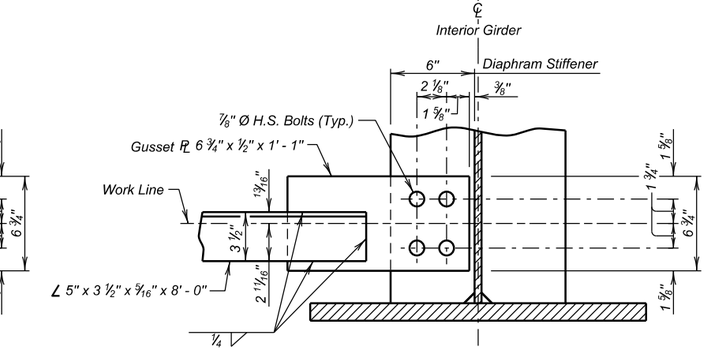
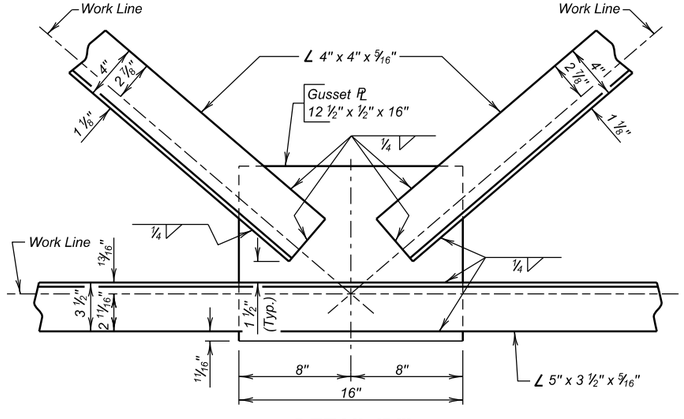
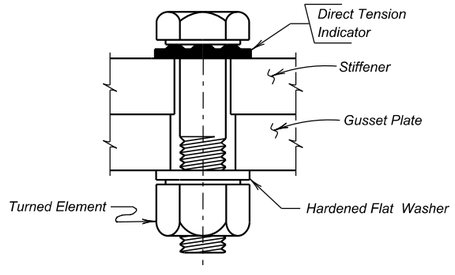


DETAIL "Y"



DETAIL "X"



DIRECT TENSION INDICATOR DETAIL

GENERAL NOTES

1. The Steel Diaphragms are included in the quantity for Structural Steel, Furnish.
2. Use 1 1/16" Ø bolt holes in the ½" gusset plates. Use 15/16" Ø bolt holes in the stiffener plates.
3. Install bolt heads on the side of the connection with the 15/16" Ø bolt holes. Install direct tension indicators under the bolt heads.
4. The ⅞" High Strength bolts, nuts, and washers will conform to ASTM F3125 Grade A325. The bolts will be the heavy hexagon head structural type with heavy semi-finished hexagon nut and hardened washer.
5. Terminate all welds ½" from the edges of the gusset plates.

DIAPHRAGM DETAILS

FOR

278' - 1 ⅛" CONT. COMP. GIRDER BRIDGE

32' - 0" ROADWAY
OVER I-90
(XR 222) STA. 14 + 52.14 TO
(XR 222) STA. 17 + 30.23
STR. NO. 47-061-480

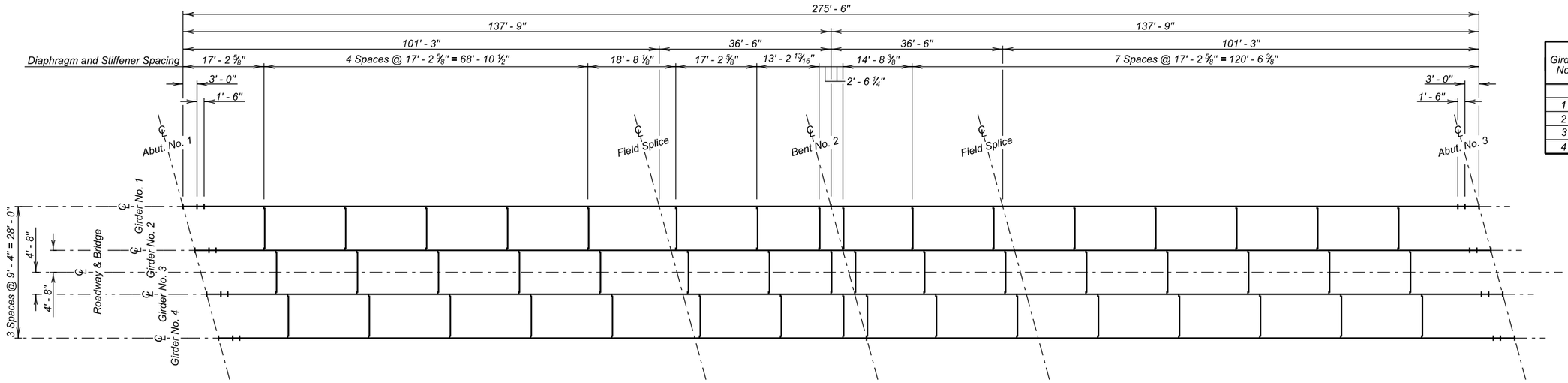
15° 06' 42" RHF SKEW
SEC. 6-T4N-R6E
IM-FP-PP 0901(195)35
HL-93

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 2021

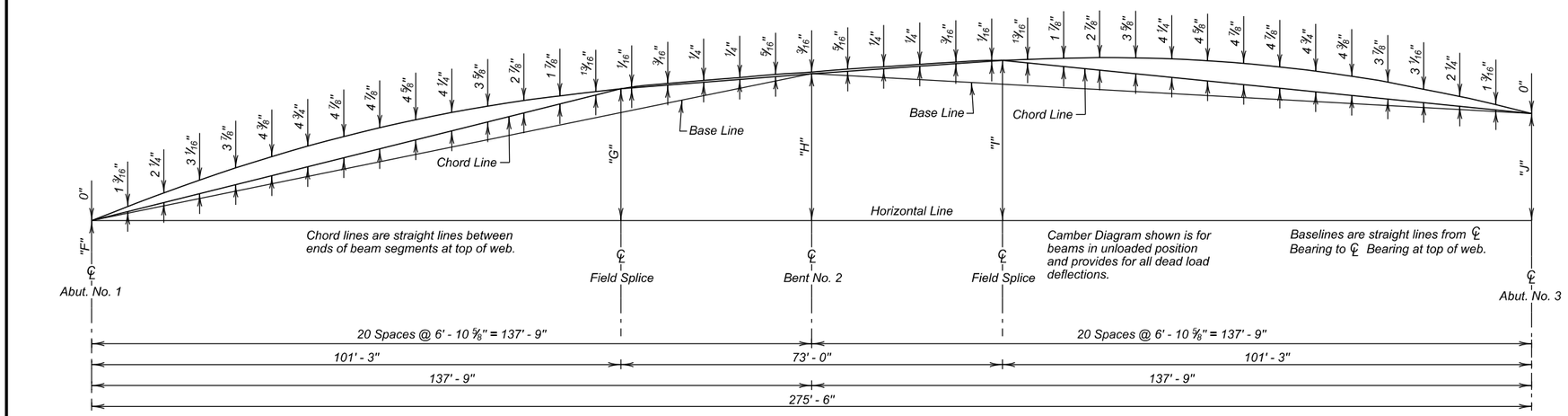
5 OF 6

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CHM MEAD08UC	PW 08UCGA05	MG	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM-FP-PP 0901(195)35	8	8

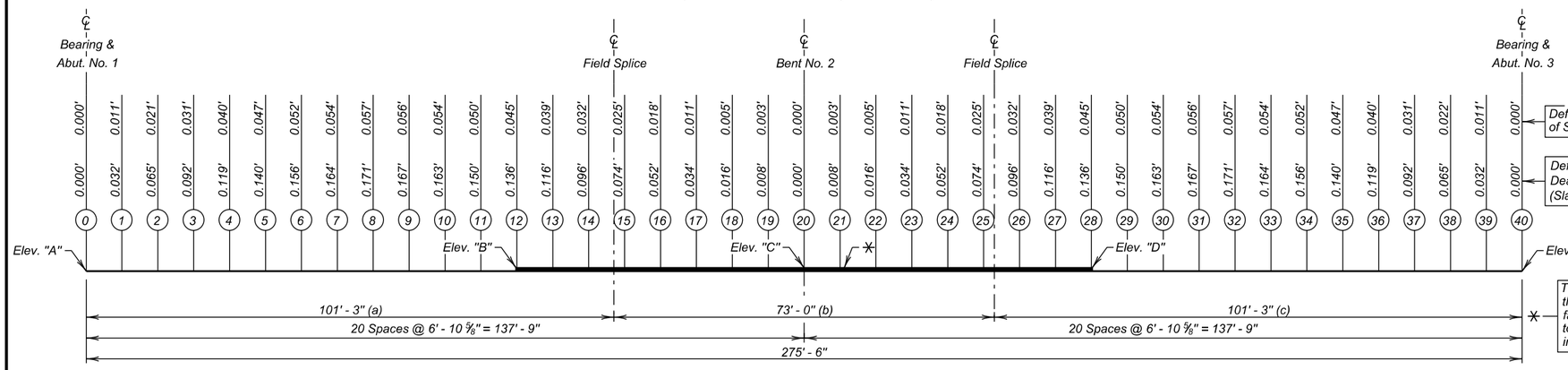


FRAMING DIAGRAM



CAMBER CUTTING DIAGRAM

(Cut camber into webs of all girders as shown)



GIRDER ERECTION DIAGRAM

Girder No.	CAMBER DIMENSIONS				
	"F"	"G"	"H"	"I"	"J"
1	0.000'	2.519	2.808	3.062	2.049
2	0.000'	2.471	2.743	2.979	1.918
3	0.000'	2.423	2.678	2.897	1.788
4	0.000'	2.375	2.612	2.814	1.657

℄ NOTE-

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.

℄ GIRDER ERECTION ELEVATIONS AND SLOPES

Girder No.	ELEVATIONS (Top of Girder)					SLOPES (%)		
	"A"	"B"	"C"	"D"	"E"	a	b	c
1	3654.183	3656.187	3657.012	3656.730	3656.232	1.959	0.744	-0.472
2	3654.453	3656.409	3657.217	3656.918	3656.371	1.912	0.696	-0.519
3	3654.535	3656.444	3657.234	3656.917	3656.323	1.864	0.649	-0.566
4	3654.430	3656.290	3657.063	3656.729	3656.087	1.817	0.601	-0.614

FRAMING DIAGRAM, CAMBER, & ERECTION DATA

FOR

278' - 1 1/8" CONT. COMP. GIRDER BRIDGE

32' - 0" ROADWAY
OVER I-90
(XR 222) STA. 14 + 52.14 TO
(XR 222) STA. 17 + 30.23
STR. NO. 47-061-480

15° 06' 42" RHF SKEW
SEC. 6-T4N-R6E
IM-FP-PP 0901(195)35
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MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 2021

6 OF 6

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CHM	PW	MG	Steve A Johnson BRIDGE ENGINEER
MEAD08UC	08UCGA06		