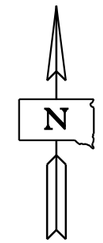
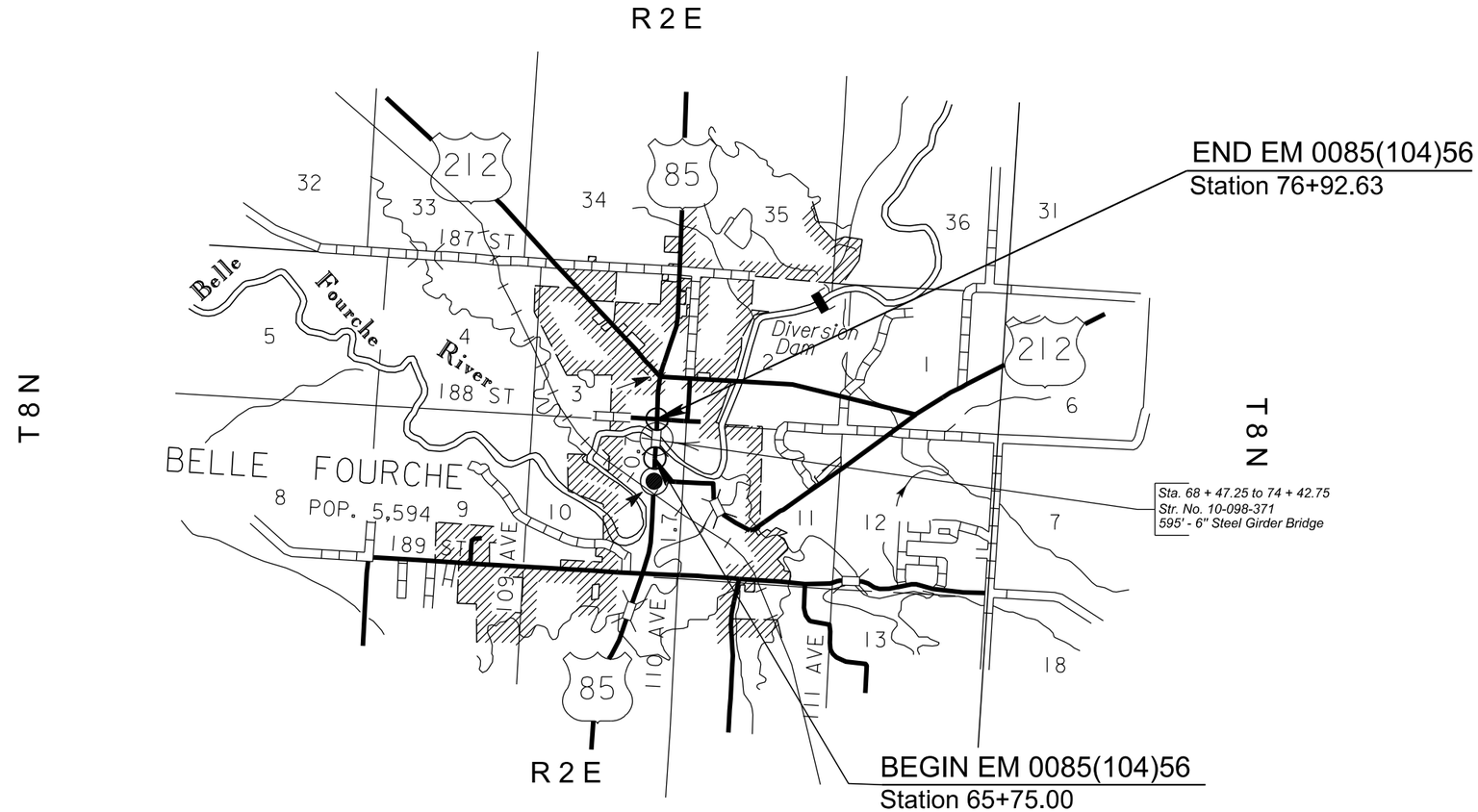
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E1 | E60 |

# Section E: Structure Plans

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| | |
|---|---|
| Sheet E1 | Layout Map and Index |
| Sheet E2 | Estimate of Structure Quantities |
| Sheet E3 to E60 | Str. No. 10-098-371 595' - 6" Steel Girder Bridge |

# SECTION E – ESTIMATE OF STRUCTURE QUANTITES

**Str. No. 10-098-371**

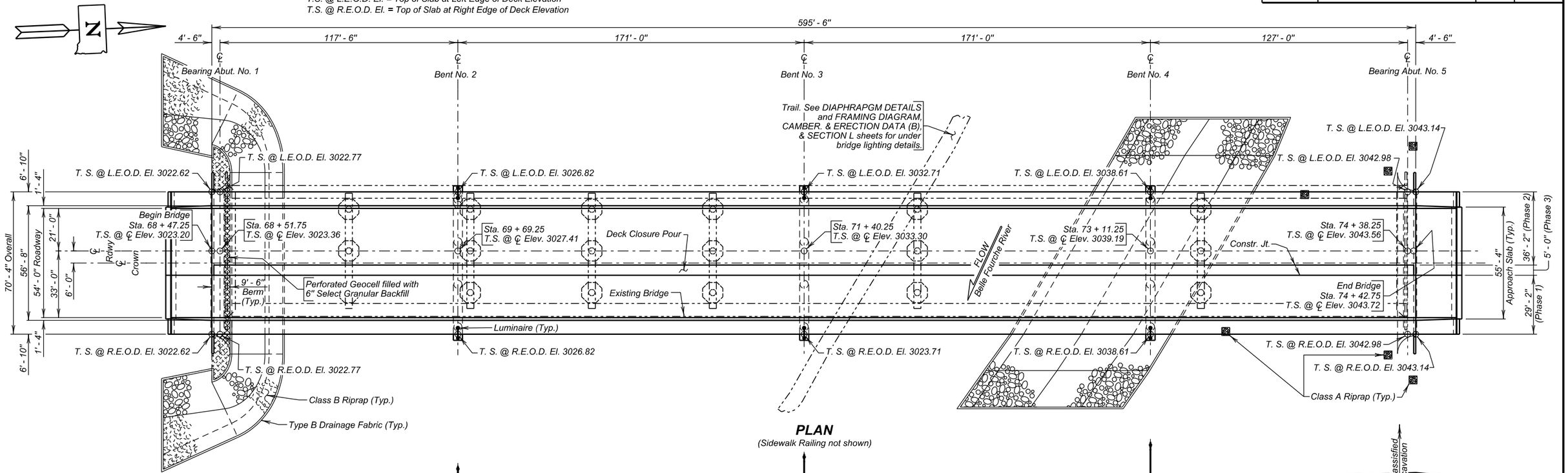
| BID ITEM NUMBER | ITEM | QUANTITY | UNIT |
|---|---|---|---|
| 009E3310 | Bridge Elevation Survey | Lump Sum | LS |
| 120E7000 | Select Granular Backfill | 18.8 | Ton |
| 250E0030 | Incidental Work, Structure | Lump Sum | LS |
| 260E1010 | Base Course | 34.5 | Ton |
| 410E0020 | Structural Steel | Lump Sum | LS |
| 410E0575 | Temporary Bridge Support | Lump Sum | LS |
| 410E0700 | Abutment Joint Drain | 2 | Each |
| 410E2100 | Finger Type Expansion Joint Assembly | 2 | Each |
| 410E2600 | Membrane Sealant Expansion Joint | 140.6 | Ft |
| 420E0100 | Structure Excavation, Bridge | 107 | CuYd |
| 421E1000 | Footing Undercut | 19 | CuYd |
| 430E0200 | Bridge End Embankment | 1,665 | CuYd |
| 430E0300 | Granular Bridge End Backfill | 167.6 | CuYd |
| 430E0510 | Approach Slab Underdrain Excavation | 2.8 | CuYd |
| 430E0700 | Precast Concrete Headwall for Drain | 2 | Each |
| 460E0030 | Class A45 Concrete, Bridge Deck | 1,304.4 | CuYd |
| 460E0050 | Class A45 Concrete, Bridge | 545.6 | CuYd |
| 460E0150 | Concrete Approach Slab for Bridge | 248.9 | SqYd |
| 460E0160 | Concrete Approach Sleeper Slab for Bridge | 61.5 | SqYd |
| 460E0230 | Concrete Penetrating Sealer | 4,628.0 | SqYd |
| 460E0380 | Install Dowel in Concrete | 2,540 | Each |
| 465E0100 | Class A45 Concrete, Drilled Shaft | 596.8 | CuYd |
| 465E0200 | Drilled Shaft Excavation | 584.8 | CuYd |
| 465E1062 | 62" Permanent Casing | 264.0 | Ft |
| 470E0120 | Steel Pedestrian Railing on Sidewalk | 1,269.0 | Ft |
| 470E0220 | Steel Pedestrian Railing on Concrete Barrier | 1,173.0 | Ft |
| 480E0100 | Reinforcing Steel | 338,155 | Lb |
| 480E0200 | Epoxy Coated Reinforcing Steel | 5,995 | Lb |
| 480E0300 | Stainless Reinforcing Steel | 303,321 | Lb |
| 480E0504 | No. 4 Rebar Splice | 28 | Each |
| 480E0511 | No. 11 Rebar Splice | 66 | Each |
| 480E0518 | No. 18 Rebar Splice | 216 | Each |
| 510E0100 | Extract Pile | 5 | Each |
| 510E0300 | Preboring Pile | 1,000 | Ft |
| 510E3521 | HP 14x73 Steel Test Pile, Furnish and Drive | 100 | Ft |
| 510E3525 | HP 14x73 Steel Bearing Pile, Furnish and Drive | 2,160 | Ft |
| 635E8020 | 2" Rigid Galvanized Steel Conduit | 1,350 | Ft |
| 651E0160 | 6" Reinforced Concrete Sidewalk | 664 | SqFt |
| 680E0304 | 4" Perforated Dual Wall HDPE Pipe | 324 | Ft |
| 680E0324 | 4" Dual Wall HDPE Pipe | 208 | Ft |
| 680E2500 | Porous Backfill | 61.3 | Ton |
| 700E0110 | Class A Riprap | 10.2 | Ton |
| 700E0210 | Class B Riprap | 1,992.0 | Ton |

| BID ITEM NUMBER | ITEM | QUANTITY | UNIT |
|---|---|---|---|
| 734E0090 | Perforated Geocell | 537 | SqFt |
| 831E0110 | Type B Drainage Fabric | 2,422 | SqYd |

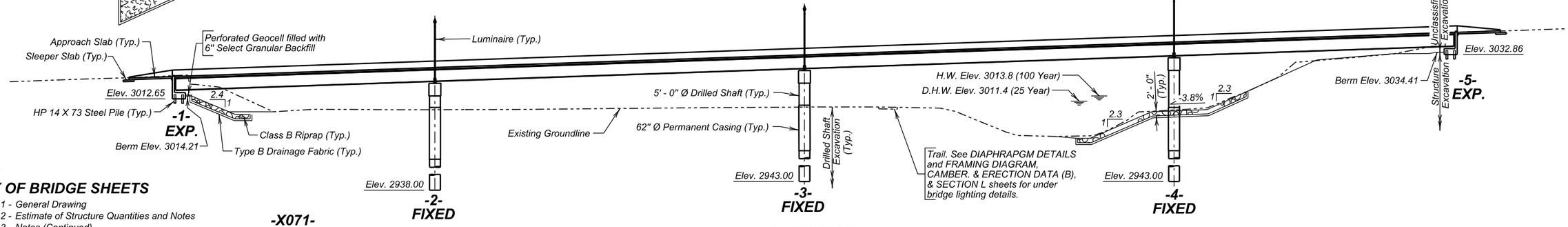
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

NOTES:
T.S. @ ℄ Elev. = Top of Slab at Centerline Elevation
T.S. @ L.E.O.D. El. = Top of Slab at Left Edge of Deck Elevation
T.S. @ R.E.O.D. El. = Top of Slab at Right Edge of Deck Elevation

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E3 | E60 |




## PLAN
(Sidewalk Railing not shown)



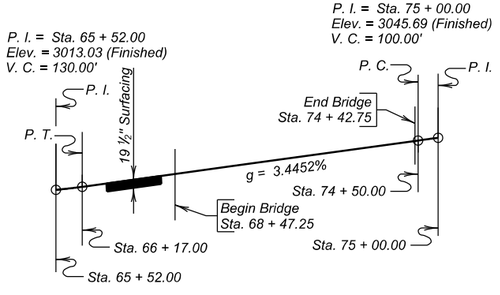

## ELEVATION
(Sidewalk Railing not shown)

## -X071-
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## -X071-
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Sheet No. 33 - Abutment Joint Drain Details
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Sheet No. 35 - Girder Layout Details (B)
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Sheet No. 37 - Diaphragm Details
Sheet No. 38 - Framing Diagram, Camber, & Erection Data (A)
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Sheet No. 57 - Details of Standard Plate No's. 460.05 and 510.40
Sheet No. 58 - Details of Standard Plate No. 620.17


## GRADELINE DATA

## HYDRAULIC DATA

| | |
|---|---|
| $Q_d$ | 4819 cfs |
| $A_d$ | 1906 sq. ft. |
| $V_d$ | 4.0 fps |
| $Q_F$ | 4819 cfs |
| $Q_{100}$ | 7281 cfs |
| $Q_{OT}$ | >$Q_{100}$ cfs |
| $V_{max}$ | 4.3 fps |

$Q_d$ = Design discharge for the proposed bridge based on 25 year frequency. El. 3011.4.

$Q_{OT}$ = Overtopping discharge and frequency > $Q_{100}$ yr. recurrence interval. El. 3012.2 @ Sta. 64 + 38.00 ±.

$Q_F$ = 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. 3013.8.

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

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

**GENERAL DRAWING**

FOR

# 595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93
PCN 04G4

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



-X071-

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU<br>BUTE04G4 | AG<br>04G4TA01 | BT | Steve A Johnson<br>BRIDGE ENGINEER |

# ESTIMATE OF STRUCTURE QUANTITIES

| DESCRIPTION | QUANTITY | UNIT | REMARKS |
|---|---|---|---|
| Bridge Elevation Survey | Lump Sum | LS | |
| Concrete Penetrating Sealer | 4,628.0 | SqYd | |
| Select Granular Backfill | 18.8 | Ton | |
| Incidental Work, Structure | Lump Sum | LS | |
| Base Course | 34.5 | Ton | |
| Structural Steel, Install | Lump Sum | LS | |
| Temporary Bridge Support | Lump Sum | LS | |
| Abutment Joint Drain | 2 | Each | |
| Finger Type Expansion Joint Assembly | 2 | Each | |
| Membrane Sealant Expansion Joint | 140.6 | Ft | |
| Structure Excavation, Bridge | 107 | CuYd | |
| Footing Undercut | 19 | CuYd | |
| Bridge End Embankment | 1,665 | CuYd | |
| Granular Bridge End Backfill | 167.6 | CuYd | |
| Approach Slab Underdrain Excavation | 2.8 | CuYd | |
| Precast Concrete Headwall for Drain | 2 | Each | |
| Class A45 Concrete, Bridge Deck | 1,304.4 | CuYd | |
| Class A45 Concrete, Bridge | 545.6 | CuYd | |
| Concrete Approach Slab for Bridge | 248.9 | SqYd | |
| Concrete Approach Sleeper Slab for Bridge | 61.5 | SqYd | |
| Install Dowel in Concrete | 2,540 | Each | |
| Class A45 Concrete, Drilled Shaft | 596.8 | CuYd | |
| Drilled Shaft Excavation | 584.8 | CuYd | |
| 62" Permanent Casing | 264.0 | Ft | |
| Steel Pedestrian Railing on Sidewalk | 1,269.0 | Ft | |
| Steel Pedestrian Railing on Concrete Barrier | 1,173.0 | Ft | |
| Reinforcing Steel | 338,155 | Lb | |
| Epoxy Coated Reinforcing Steel | 5995 | Lb | |
| Stainless Reinforcing Steel | 303,321 | Lb | |
| No. 4 Rebar Splice | 28 | Each | |
| No. 11 Rebar Splice | 66 | Each | |
| No. 18 Rebar Splice | 216 | Each | |
| Extract Pile | 5 | Each | |
| Preboring Pile | 1000 | Ft | |
| HP 14x73 Steel Test Pile, Furnish and Drive | 100 | Ft | |
| HP 14x73 Steel Bearing Pile, Furnish and Drive | 2,160 | Ft | |
| 2" Rigid Galvanized Steel Conduit | 1,350 | Ft | |
| 6” Reinforced Concrete Sidewalk | 664 | SqFt | |
| 4” Perforated Dual Wall HDPE Pipe | 324 | Ft | |
| 4” Dual Wall HDPE Pipe | 208 | Ft | |
| Porous Backfill | 61.3 | Ton | |
| Class A Riprap | 10.2 | Ton | |
| Class B Riprap | 1,992.0 | Ton | |
| Type B Drainage Fabric | 2,422 | SqYd | |
| Perforated Geocell | 537 | 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 for download and viewing at: https://dot.sd.gov/doing-business/contractors/standard-specifications

3. All welding and welding inspections will be in conformance with the latest edition of AASHTO/AWS D1.1/D1.5M Bridge Welding Code unless noted otherwise in the plans.

## BRIDGE DESIGN LOADING

1. AASHTO HL-93.

2. AASHTO HS-20-44 for Temporary Bridge Support only.

3. 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 |
| Structural Steel (ASTM A709 Gr. 50WT2) | fy = 50,000 psi |

## GENERAL CONSTRUCTION

1. Use 2-inch clear cover on all reinforcing steel except as shown otherwise on plans.

2. The Contractor will imprint on the structure the date of new construction as specified and detailed on Standard Plate 460.02.

3. Barrier Curbs and Tapered Barrier will be built perpendicular to the roadway grade line.

4. The elevation of the bridge deck is 19½ inches above subgrade elevation.

5. 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.

6. 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.

7. It is anticipated that at least 5 HP 8x36 steel piles will interfere with piling for the new structure. Any existing pile that interferes with the foundation for the new structure will be extracted. Payment for extracting piling will be at the contract unit price per each for Extract Pile and will be full compensation for extracting piling including materials, labor, and equipment necessary or incidental to the satisfactory completion of this work.

## DESIGN MIX OF CONCRETE

1. Concrete will conform to Section 460. All structural concrete will be Class A45 Concrete unless otherwise indicated.

2. Grout design mix will be as specified in Section 460. 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.

## TEMPORARY BRIDGE SUPPORT

1. Prior to removal of the superstructure on the existing bridge, the Temporary Support Walls must be installed. See STRUCTURE PHASED CONSTRUCTION DETAILS (A, B, & C). If alternate details for the Temporary Support Walls are requested, they will be submitted to the Bridge Office a minimum of 14 calendar days in advance for approval. All details are subject to Section 423.

2. Install one Temporary Support Wall at each existing bent location. Temporary Support Walls must achieve full design strength prior to removal of the superstructure. Six Temporary Support Walls are required.

3. Payment for furnishing and installing the Temporary Support Walls will be paid at the contract price for Temporary Bridge Support.

**ESTIMATE OF STRUCTURE QUANTITIES AND NOTES**

FOR

595' - 6" STEEL GIRDER BRIDGE

STR. NO. 10-098-371

MAY 2025



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA02 | | |

## INCIDENTAL WORK, STRUCTURE

1. In place centerline Sta. 68+54.38 to centerline Sta. 74+37.88 is a 583.5-foot, 7 span continuous composite steel girder viaduct with a 52'-0" clear roadway. The superstructure consists of a reinforced concrete deck on steel girders with concrete barrier continuous across the bridge. The deck has been overlaid with 0.25-inches of epoxy. The deck also has low slump, dense concrete overlay. The substructure consists of 3 column reinforced concrete bents supported on spread footings and concrete sill abutments. The existing abutment at begin bridge is supported by timber piling. The existing abutment at end bridge is supported by steel piling.

2. Prior to removal of the superstructure on the existing bridge for Phase 1 construction, the Support Frame must be installed and achieve full design strength.

3. Break down and remove the existing bridge in conformance with Section 110. See STRUCTURE PHASED CONSTRUCTION DETAILS (B) and (C).

4. 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.

5. 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.

6. If the existing spread footings interfere with the proposed drilled shafts at Bent No. 2, removal of the spread footings will be accomplished with as minimal disturbance to the in-place shale as possible.

## PILE GROUT

1. Grout will be a low shrink, neat cement grout or a sand-cement grout. The grout will have a max Water/Cementitious ratio of 0.45 capable of obtaining a compressive strength of at least 4,000 psi. The Contractor will submit a proposed grout mix design, along with compressive strength results, to the SDDOT Concrete Engineer, through the Area Engineer, a minimum of 30 working days prior to the first planned use. The proposed mix design will include brands and planned dosages of all admixtures and will explain the method and timing of introduction into the mix. The Concrete Engineer will review the proposed mix design prior to its use.

2. Grout equipment will produce a uniformly mixed grout free of lumps and undispersed cement and be capable of continuously agitating the mix. Use a positive displacement grout pump to place the grout. The grouting equipment will be sized to enable the prebore to be grouted in one continuous operation. The grout will be placed within 60 minutes after mixing or within the time recommended by the admixture manufacturer if admixtures are used. Grout not placed within the time limit will be rejected.

3. After all the piling has been seated, grout the piling prebore to an elevation of 3032.86 ft at Abutment No. 5. The piling will be grouted within 72 hours after drilling of the pile. Inject the grout at the lowest point of each prebore through a grout tube. The outlet end of the grout tube will deliver grout below the surface of the grout as the grout tube is withdrawn to prevent the creation of voids. Fill the prebore to the proper elevation in one continuous operation.

4. All costs for furnishing and installing the pile grout including labor materials, equipment, and incidentals necessary to complete the work will be incidental to the contract unit price per foot for the steel pile.

## ABUTMENTS

1. Drill prebore holes for Abutment No. 5 to elevation 2995. Once the prebore has been completed, the piling can be seated to bearing. After the pile has been seated, the bottom portion of the prebore will be backfilled with grout.

2. Water will likely be present in the holes so wet construction methods for placing the pile grout in the prebore holes will be required. It will be necessary to use a template to position the pile tops until the grout is set.

3. Piling may drive shorter than the lengths provided in the plans. Care will be taken not to overdrive or to damage the piling when seating them in the prebore.

4. A driveability analysis was performed using the wave equation analysis program (GRLWEAP). A list of acceptable hammers is provided below. At Abutment No. 5, the hammers listed will need to be operated no higher than the lowest fuel setting 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. 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.

   Delmag D30-32  SPI D30  APE D30-32

5. The HP 14x73 Piling were designed using a factored bearing resistance of 134 tons per pile. Piling will develop a field verified nominal bearing resistance of 335 tons per pile.

6. One test pile will be driven at each abutment and will become part of the pile group.

7. The Contractor will have sufficient pile splice material on hand before pile driving is started. See Standard Plate 510.40.

8. Each finished abutment will include a Bridge Survey Marker. See Standard Plate 460.05.

9. The z bars in the paving notch at the back of the abutment will be detailed full length but at the Contractor's discretion a mechanical splice may be used at no additional cost to the Department.

## 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.

2. The drilled shafts will be constructed according to Section 465.

3. The design of the drilled shafts is based upon encountering undisturbed Mowry Shale at elevation 2982 for Bent No. 2 and elevation 2987 for Bent Nos. 3 and 4. If competent and undisturbed Mowry 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.

4. The permanent casing method will be used. 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.

5. 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. The diameter of the temporary casing will be a minimum of 6 inches larger than the permanent casing.

6. 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 accepted prior to ordering the casing. If the Contractor requests a change 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 the proposed changes in the drilled shaft installation plan for acceptance by the Office of Bridge Design. The quantities for Drilled Shaft Excavation; 62-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.

7. 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.

**NOTES (CONTINUED)**

FOR

595' - 6" STEEL GIRDER BRIDGE

STR. NO. 10-098-371

MAY 2025



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA03 | | |

## CSL ACCESS TUBES

1. Access tubes will be furnished and installed in each of the drilled shafts in accordance with Section 465.

2. These access tubes are to be used for crosshole sonic log testing of the drilled shaft in the event that the Department deems that the quality of the drilled shaft is suspect. In order for the Department to determine if crosshole sonic log testing is necessary, no subsequent work above the construction joint will be allowed for 7 days or until authorized by the Engineer, whichever comes first. Upon authorization by the Engineer and prior to any subsequent concrete placement above the construction joint, the Contractor will remove the water from the access tubes, cut the access tubes off flush with the top of the drilled shaft and completely fill the access tubes with grout.

## BEARINGS

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

2. The pre-formed fabric pads will conform to Section 970.

3. The bearing plates will be shop primed with 3 mils of inorganic zinc primer in accordance with Section 411. No mid or top coat 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.

## SUPERSTRUCTURE, CONCRETE

1. Concrete will conform to Section 460 Class A45.

1. The concrete bridge deck will be placed and finished at a minimum rate of 87 feet of deck per hour measured along centerline roadway for each phase of construction. 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 87 feet per hour can be maintained and the concrete has attained a minimum compressive strength of 2000 psi.

3. 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.

4. Any concrete mortar that gets on any surfaces of the superstructure components will be washed off or removed before it is dry.

## SUPERSTRUCTURE, STRUCTURAL STEEL

1. Structural steel will conform to Section 410, except that all coats will be applied in the shop.

2. Structural steel will conform to ASTM A709 Gr. 50WT2. Steel for diaphragms and stiffeners will conform to ASTM A709 Gr. 50W.

3. Welded stud shear connectors will be automatic end welded type B studs 7/8-inch diameter by 5 inches long.

4. Ultrasonic testing of CJP groove welds will be used in lieu of radiography. See girder layout for locations of tension and stress reversal areas of the girder flanges.

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

6. Dead load camber will be cut into the girder webs. Heat cambering will not be allowed.

7. The top of the top flange and the shear studs will be shop painted following the shear connector attachment, with inorganic zinc primer in accordance with Section 411. No top or mid coat of polyurethane will be applied.

8. Structural steel under expansion joint will be painted in accordance with Section 411. The top coat will be an approved brown (AMS STD 595 Color 30045), see GIRDER LAYOUT DETAILS (A) for quantity.

9. The Contractor is required to submit a detailed girder erection plan in conformance with Section 5.2. The plan will be designed and stamped by a Professional Engineer registered in the State of South Dakota. The girder erection plan will include but not limited to, complete sequencing details, splice bolt up procedures, girder pick point locations, temporary shoring details, and temporary bracing details.

10. Bolts in flange splices will be placed with the heads down.

11. Bolts in web splices of exterior girders will be placed with the heads on the exterior face of girders.

12. If the substructure units are not protected from precipitation running off of the girders during construction, the concrete surfaces may become stained. If staining of the substructure units does occur, it will be removed at no additional cost to the Department, to the satisfaction of the Engineer.

13. All single girder segments will be adequately braced or held in position until the adjacent girder segment is placed and all diaphragms between the segments are fully installed and bolts fully tightened. Single girder segments will not be allowed to remain in place beyond the end of a work shift without connection to an adjacent girder segment with all diaphragms between the segments fully connected. At no time will a single girder segment be allowed over the trail.

## CLASS B COMMERCIAL TEXTURE FINISH

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

   a) **Barrier:** All exposed surfaces (outside*, top** and inside**).
   b) ***Abutments:** all exposed surfaces to an elevation 1-foot below finished ground line.
   c) ***Slab:** edge of slab
   d) ***Bent:** All exposed vertical surfaces, and top of cap as shown on BENT LAYOUT sheet.

   * Color will be AMS – STD - 595 33690 Tan
   ** Color will be AMS – STD - 595 37875 Pearl White

2. The Class B commercial texture finish will be applied in accordance with Section 460.

## WELDING AND WELD INSPECTION

Welding and weld inspection will conform to Section 410.

**NOTES (CONTINUED)**
FOR
595' - 6" STEEL GIRDER BRIDGE

STR. NO. 10-098-371
MAY 2025



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA04 | | |

## STEEL RAILING – SIDEWALK

1. All steel railing and hardware will conform to Section 470.

2. Non-shrink grout used to fill the recess beneath the rail post base plates will comply with Section 460. The cost of furnishing and placing the non-shrink grout will be incidental to the contract unit price per foot for Steel Pedestrian Railing on Sidewalk.

3. All steel railing and miscellaneous hardware will be galvanized in accordance with ASTM A123. All steel railing and miscellaneous hardware will have Natina Solution applied per manufacturer's recommendation. The galvanized steel railing will be cleaned in accordance with ASTM D6386 before application of the Natina Solution. Natina Solution will be applied at the Natina facility. All touchups will be done per manufacturer's recommendations with material supplied by the manufacturer.

   Natina
   1555 N VIP Blvd.
   Casa Grande, AZ 85122
   https://www.natina.com/

4. Galvanized bolts will be protected from touching stainless steel by gap, dielectric tape, or other method approved by the Engineer.

5. Steel Railing will be paid the contract unit price per foot for Steel Pedestrian Railing on Sidewalk and Steel Pedestrian Railing on Concrete Barrier.

## FALL PROTECTION

1. The Contractor will install a Fall Protection System conforming to OSHA Regulations. 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.

2. Modifications to any bridge components used to accommodate the Fall Protection System will be shown on the Falsework Plans and the appropriate Shop Plans. Field welding to bridge components will 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.

## FALSEWORK PLANS

1. Traffic control considerations require some construction activities to be performed over River Walk trail. To protect trail users, a roadway canopy containment system will be required. Include details for the roadway canopy with the falsework plans. All costs for furnishing, installing and removing the roadway canopy will be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge Deck.

2. Contractor will submit falsework plans in conformance with Section 5.2, and they will include the finish machine make, model, required length of truss, and manufacture's data for individual wheel loads. The design wheel loading will be the combined weight of the power unit, ½ of the truss weight, and the carriage.

3. All falsework plans that utilize exterior girder overhang brackets supporting the bridge deck cantilevers and finish machine screed rails (w/o needle beams) will include calculations for exterior girder lateral deflection due to torsion. The vertical deflection at the free end of the bridge deck overhang will be less than 0.25" for bracket deflection and girder rotation combined.

## SIDEWALK EXPANSION DEVICES

1. Material for the structural plates and bars will conform to ASTM A36. The end welded deformed bar anchors will conform to ASTM A1064.

2. All steel components will be galvanized after shop welding in accordance with ASTM A123.

3. The plain ferrule inserts in the expansion device will be 3/4-inch diameter commercially available regular steel inserts to be positioned by welding onto the plate of the expansion device as shown in the plans.

4. The bolts used to attach the sliding plates to the expansion device will conform to ASTM F593 and will be 3/4-inch diameter Group 2, Type 316 stainless steel socket countersunk head flat screws furnished with a thread type to be compatible to the thread type supplied with the plain ferrule inserts of the expansion device. All bolts are to be coated with liquid thread locking material that is intended to allow for future removal.

5. All costs involved in furnishing and installing the expansion devices at the sidewalks will be included in the contract unit price per square foot for 6" Reinforced Concrete Sidewalk. For informational purposes only, the estimated weight of structural steel in the expansion devices is 352 lbs.

## APPROACH SLABS

1. Approach slabs and sleeper slab will conform to Section 460.

2. Sleeper slab riser may be cast with or after the approach slab. Care will be taken to ensure the correct grade is maintained across the top of the sleeper slab riser.

3. 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.

4. 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.

## SIDEWALK APPROACH SLABS

1. The reinforced concrete sidewalks adjacent to the bridge will be paid for at the contract unit price per square foot for 6" Reinforced Concrete Sidewalk. This payment will be full compensation for all excavation, furnishing, hauling, and placing all materials including concrete, epoxy coated reinforcing steel, asphalt paint or 6 mil polyethylene sheeting, hot poured elastic joint sealer; for disposal of all excavated, and surplus materials; and for all labor, tools, equipment, and incidentals necessary to complete this item of work.

2. The top of the sidewalk will transition from the end of the bridge to the top of approach slab curb at the sidewalk expansion device.

3. All costs involved in furnishing and placing the sidewalk sleeper slabs will be included in the contract unit price per square foot for 6" Reinforced Concrete Sidewalk.

## APPROACH SLAB UNDERDRAIN SYSTEM

1. An underdrain system will be placed below the sleeper slab as shown in the plans in accordance with Section 435.

2. All labor, tools, equipment, and any incidentals necessary for the installation of 5-inch diameter schedule 40 steel pipe, will be incidental to the contract unit price per foot for 4" Perforated Dual Wall HDPE Pipe.

## USGS STREAM GAGE

A USGS gauging station is located off the NE side of the existing bridge, location approximately 72+39 – 33' R, and will be removed or relocated by the USGS. The Contractor will coordinate the removal or relocation of this station with the USGS. A minimum of two weeks notice will be given to the USGS prior to any work involving the stream gaging station. Contact the U.S. Geological Survey, Water Resource Division (605) 394-3200, 1608 Mountain View, Rapid City, SD 57702.

**NOTES (CONTINUED)**
FOR
595' - 6" STEEL GIRDER BRIDGE

STR. NO. 10-098-371
MAY 2025



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU<br>BUTE04G4 | AG<br>04G4TA05 | BT | Steve A Johnson<br>BRIDGE ENGINEER |

## 2" RIGID GALVANIZED STEEL CONDUIT

1. Conduit, with expansion fittings, junction boxes and pull tape will be provided at the location detailed in the plans.

2. Expansion devices are required at each Abutment. Fittings will be waterproof with insulating bushings and bonding jumper. Expansion devices will accommodate the full range of bridge joint movement shown in the plans.

3. Pull tape will be 1" tubular wave polyester pull tape with a minimum breaking strength of 6000 lbs.

4. Cast in place concrete inserts for conduit attachment will be Dayton Superior ¼" bolt diameter stainless steel F-42 Loop Ferrule Inserts with ¼" stainless steel bolts conforming to ASTM F593.

5. Conduit, fittings and attaching hardware will meet the requirements of NFPA 70 National Electrical Code (NEC). All steel components will be hot dip galvanized in accordance with ASTM A123 or A153 as applicable. Isolate the galvanized conduit brackets from the stainless steel insert and bolt with fiber washers.

6. All costs to provide the 2" diameter conduit, including concrete inserts, conduit, attaching hardware, junction boxes, expansion devices, pull tape, labor, equipment and any incidentals necessary to install the conduit will be included in the contract unit price per foot for 2" Rigid Galvanized Steel Conduit.

## BARRIER EXPANSION DEVICE

1. Material for the structural plates and bars will conform to ASTM A36. The 5/8-inch diameter end welded deformed bar anchors will be a commercially available Deformed Bar Anchor Stud, automatically end welded, with material conforming to ASTM A1064. The end welded concrete anchors will conform to Type A steel studs per latest edition of the AASHTO/AWS D1.5M/D1.5 Bridge Welding Code.

2. The bolts used to attach the sliding plates will be galvanized 3/4-inch diameter ASTM A307 counter sunk flat head bolts. Counter sunk bolts will be compatible to the thread type supplied with the plain ferrule inserts. All bolts are to be coated with liquid thread locking material that is intended to allow for future removal.

3. All steel components will be galvanized after shop welding in accordance with ASTM A123.

4. All galvanized steel for the barrier expansion device will not be in contact with any stainless reinforcing steel.

5. The cost of furnishing all material, labor, tools, and equipment required for the barrier expansion device including plates, bolts, insert, anchors, welding, galvanizing, and incidentals will be included in the lump sum price bid for Structural Steel, Miscellaneous.

## TRAFFIC CONTROL MOVABLE CONCRETE BARRIER

1. Traffic Control Movable Concrete Barriers will be anchored to the bridge deck on the side adjacent to traffic. Dependent on whether the anchorage system is located on the existing deck or the new deck, one of the following two methods will be employed:

    a. Existing Deck Anchors: The barriers will be attached to the deck using three 1" diameter F1554 bolt, two washers, and a nut snug tightened, per barrier segment. The holes will be core drilled using a diameter as minimal as possible to limit potential damage to existing reinforcing steel. The bolts will be removed with the barrier and holes can remain unfilled as they will be part of the deck to be removed.

    b. New Deck Anchors: The barriers will be attached to the deck using three 1" A316 stainless threaded anchors with washers per barrier segment. The location for the anchors will be blocked out in the deck, and a threaded insert will be grouted in to secure the threaded anchors. The anchors will be removed when the barrier is removed, and the threaded insert will be filled with grout. If the anchors cannot be removed, they will be cut flush with the deck and covered with epoxy.

2. Installation, removal, and potential repair areas of the anchor systems will be incidental to the contract unit price per each for Traffic Control Movable Concrete Barrier. See Section C.

## ABUTMENT JOINT DRAIN

1. The abutment joint drain will consist of bents plates bolted to the finger joint assembly, neoprene sheet, bar that runs along the edge of the neoprene sheeting, and associated bolt assemblies.

2. All new structural steel plates and bars will conform to ASTM A709, Grade 36.

3. All steel components including plates, bars, and structural shapes will be galvanized after shop welding in accordance with ASTM A123.

4. Each bolt assembly include two standard washers, and one standard nut. The bolts, nuts and washers will be either hot-dipped galvanized according to ASTM F2329 or made of corrosion resistant material.

5. The neoprene sheet will be EPDM Cloth Inserted Rubber. The material will have the following physical properties:

| | |
|---|---|
| Durometer: | 70 A Nominal |
| Tensile Strength: | 1500 psi |
| Temperature Range: | -40˚ F to 245˚ F |
| Elongation: | 100% |
| UV Rating: | Excellent |

6. Welding of the bent plates at construction joints will not be required if the Contractor fully seals the gap between the two plate ends with a silicon sealer approved by the Bridge Construction Engineer.

7. All costs associated with installation of the Abutment Joint Drain including fabrication, furnishing, installation, welding, galvanizing, equipment, labor, and other incidentals necessary to complete the work will be per the contract unit per each for Abutment Joint Drain.

## TEMPORARY RETAINING STRUCTURE

1. Temporary retaining structures will be necessary to maintain traffic on the existing alignment adjacent to the new abutments and berms during excavation, pile installation, abutment/wingwall construction, and placement of new embankment activities.

2. Sheet piling will not be an accepted method for soil retainment at the north embankment due to shale elevation. Contact the Geotechnical Engineering Activity if soil parameters necessary for design of the temporary soil retaining structures are desired.

3. The design of the temporary retaining structure is the responsibility of the Contractor. Contractor will submit plans and calculations, sealed by a Professional Engineer registered in South Dakota. Do not begin construction of the temporary retaining structure until the plans and calculations have been approved by the South Dakota DOT Bridge Construction Engineer. Allow a minimum of 15 days for review. The cost for this temporary soil retaining structure is included in the unit bid price for Structure Excavation Bridge.

**NOTES (CONTINUED)**

FOR

595' - 6" STEEL GIRDER BRIDGE

STR. NO. 10-098-371

MAY 2025



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| AU<br>BUTE04G4 | AG<br>04G4TA06 | BT | Steve A Johnson<br>BRIDGE ENGINEER |

## FINGER EXPANSION JOINT

1. Components of the finger expansion joint assembly will include all finger shaped plates, any plates and dowels attached to the finger plates, shims, and bolt assemblies required for the installation of the finger joint.

2. The top surfaces of the finger expansion joint will be placed parallel to each other, at correct grade, and crown. The gap between the fingers will be set using the Joint Installation Table. Strict adherence to these openings at the specified installation temperatures is required for the joint to function properly.

3. All new structural steel will conform to ASTM A709, Grade 50. Material less than 1/4-inch thick may be ASTM A1011, Grade 36. The 5/8-inch diameter end welded deformed bar anchors will be a commercially available Deformed Bar Anchor Stud, automatically end welded, with material conforming to ASTM A1064. All steel components, steel plates, bars and structural shapes will be galvanized after shop welding in accordance with ASTM A123.

4. The procedures for field welding the joint including weld process, joint preparation, and details for repairing the galvanizing after welding will be included in the shop plans. Repair of the galvanizing will be by the zinc-based solder method in conformance with ASTM A780.

5. The finger joint will be bolted to the girders using shims as necessary. Each finger joint bolt assembly will be mechanically galvanized and include four ASTM 449, Type 3 bolt, plate washer, standard washer, and heavy hex nut per girder.

6. Finger Type Expansion Joint Assembly will be measured by each assembly furnished and accepted complete in place. Payment will be full compensation for all material, welding, galvanizing, labor, equipment, tools and incidentals necessary to satisfactorily complete this work.

## 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 costs 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.

## ABUTMENT JOINT DRAIN

1. An Abutment Joint Drain is to be installed to drain water from the abutment joint drain away from the structure. The Abutment Joint Drain consists of the catch basin, gutter, Class A Riprap channel (Abutment 5 only); supports, and anchors assemblies needed for installation.

2. The Abutment Joint Drain shown in the plans is the best estimate of location for the drain system, actual conditions may vary. Following the installation of the joint, the Contractor will work with the Engineer to adjust location of the catch basin, length and slope of the gutter system, and placement of the riprap channel to ensure proper drainage. A sketch of the final configuration will be sent to the Office of Bridge Design and to the fabricator. The drain will outlet onto the embankment Class B Riprap at Abutment 1.

3. All new structural steel plates and bars will conform to ASTM A709, Grade 36. Material less than 1/4 inch thick may be ASTM A1011, Grade 36. All steel components will be galvanized after shop welding in accordance with ASTM A123.

4. The metal gutters will be 12-gage minimum and fabricated from hot-rolled carbon steel conforming to ASTM A653. A metal cap will be provided at the upper end of the metal gutter, attachment details will be shown on the shop drawings.

5. Material for the 3/8-inch diameter x 2¾-inch commercially available steel wedge-type anchor bolts, nuts and washers will be at the option of the Contractor. The bolts, nuts and washers will be either hot-dipped galvanized according to ASTM F2329 or made of corrosion resistant material. The wedge type anchors will be installed in accordance with the manufacturer's recommendations.

6. All costs associated with installing the new Abutment Joint Drain including fabrication, furnishing, and installing the new drainage system; Class A Riprap channel; equipment; labor; and incidentals necessary to complete the work will be per the contract unit per each for Abutment Joint Drain.

## RIPRAP

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

## PERFORATED GEOCELL

1. Perforated Geocell will conform to Section 734.

2. 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.

3. Select Granular Backfill will be paid for at the contract unit price per ton of material furnished. Payment will be full compensation for furnishing and placing the Select Granular Backfill.

**NOTES (CONTINUED)**

FOR

595' - 6" STEEL GIRDER BRIDGE

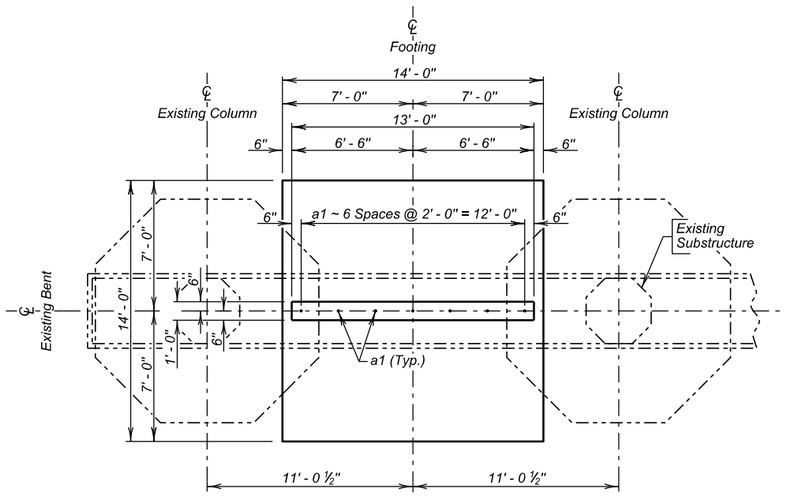
STR. NO. 10-098-371

MAY 2025

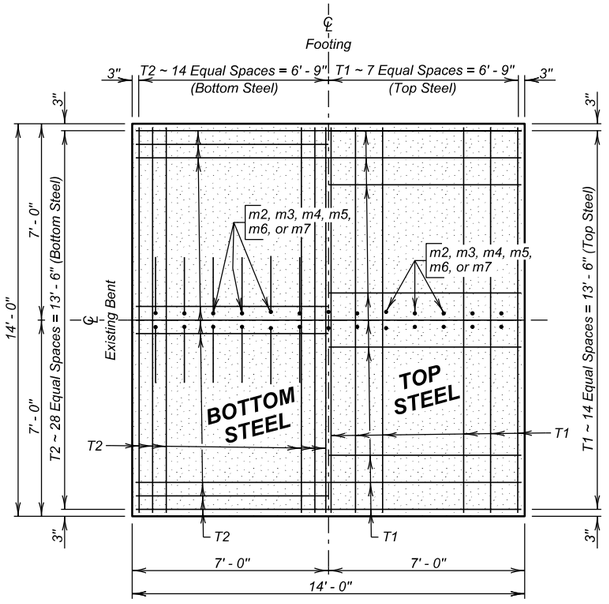


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU<br>BUTE04G4 | AG<br>04G4TA07 | BT | Steve A Johnson<br>BRIDGE ENGINEER |

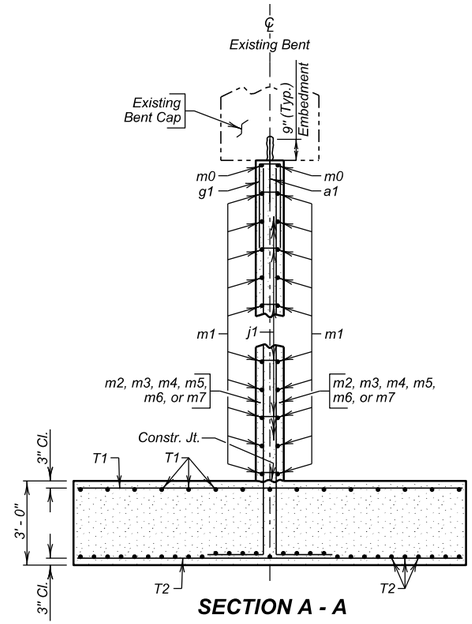
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|---|---|---|---|
| S.D. | EM 0085(104)56 | E10 | E60 |



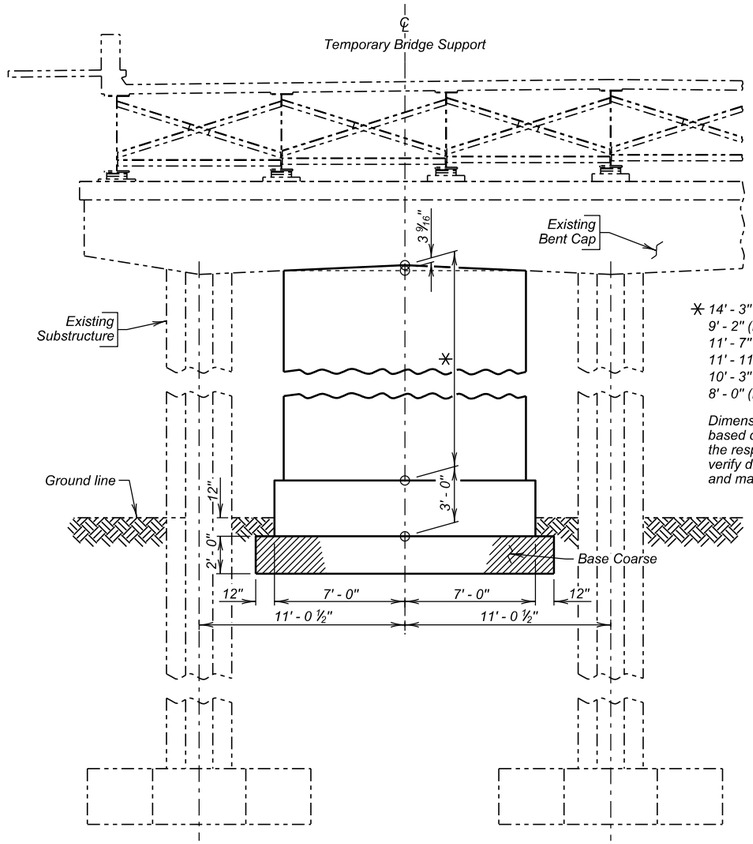

**PLAN (FACING NORTH)**




**SECTION B - B**



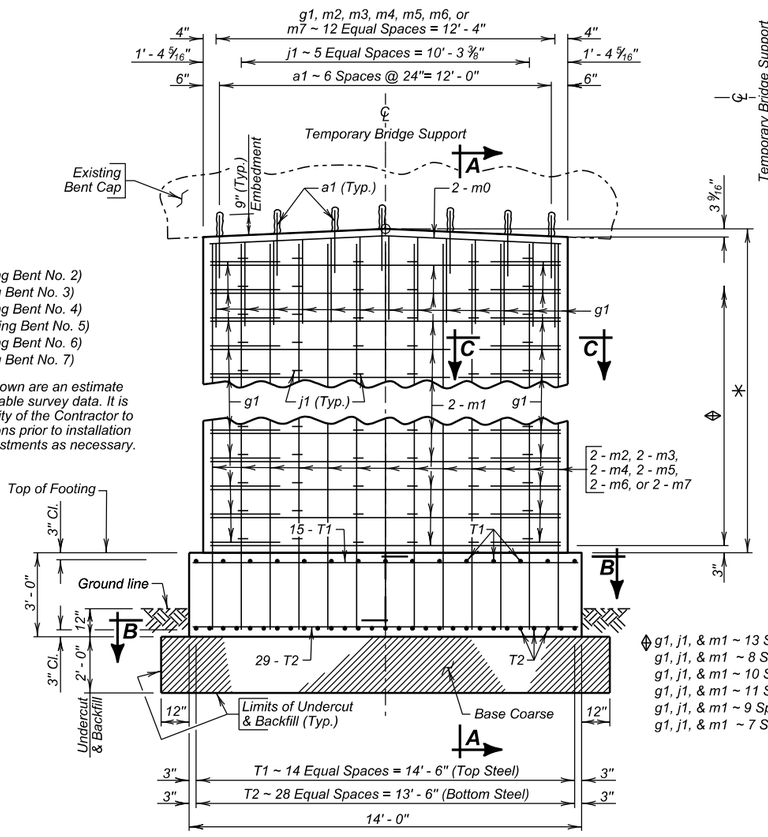

**SECTION A - A**




**ELEVATION (FACING NORTH)**
(Railing not shown)

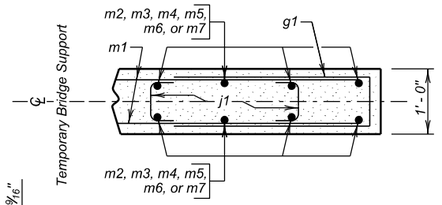
✳ 14' - 3" (Existing Bent No. 2)
9' - 2" (Existing Bent No. 3)
11' - 7" (Existing Bent No. 4)
11' - 11" (Existing Bent No. 5)
10' - 3" (Existing Bent No. 6)
8' - 0" (Existing Bent No. 7)

*Dimensions shown are an estimate based on available survey data. It is the responsibility of the Contractor to verify dimensions prior to installation and make adjustments as necessary.*




**ELEVATION (FACING NORTH)**

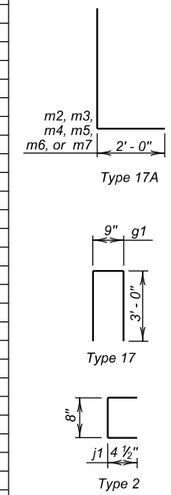
✳ g1, j1, & m1 ~ 13 Spaces @ 12" = 13' - 0" (Existing Bent No. 2)
g1, j1, & m1 ~ 8 Spaces @ 12" = 8' - 0" (Existing Bent No. 3)
g1, j1, & m1 ~ 10 Spaces @ 12" = 10' - 0" (Existing Bent No. 4)
g1, j1, & m1 ~ 11 Spaces @ 12" = 11' - 0" (Existing Bent No. 5)
g1, j1, & m1 ~ 9 Spaces @ 12" = 9' - 0" (Existing Bent No. 6)
g1, j1, & m1 ~ 7 Spaces @ 12" = 7' - 0" (Existing Bent No. 7)




**SECTION C - C**

## REINFORCING SCHEDULE
(For One Temporary Bridge Support)

| | Mk. | No. | Size | Length | Type | Bending Details |
|---|---|---|---|---|---|---|
| △ | a1 | 7 | 5 | 3' - 0" | Str. | |
| ✳ | m0 | 2 | 4 | 12' - 6" | Str. | |
| | T1 | 30 | 8 | 13' - 9" | Str. | |
| | T2 | 58 | 11 | 13' - 9" | Str. | |
| Bent No. 2 | g1 | 41 | 4 | 6' - 9" | 17 | |
| | j1 | 84 | 4 | 1' - 5" | 2 | |
| | m1 | 28 | 4 | 12' - 6" | Str. | |
| | m2 | 26 | 8 | 18' - 5" | 17A | |
| Bent No. 3 | g1 | 31 | 4 | 6' - 9" | 17 | |
| | j1 | 54 | 4 | 1' - 5" | 2 | |
| | m1 | 18 | 4 | 12' - 6" | Str. | |
| | m3 | 26 | 8 | 13' - 4" | 17A | |
| Bent No. 4 | g1 | 35 | 4 | 6' - 9" | 17 | |
| | j1 | 66 | 4 | 1' - 5" | 2 | |
| | m1 | 22 | 4 | 12' - 6" | Str. | |
| | m4 | 26 | 8 | 15' - 9" | 17A | |
| Bent No. 5 | g1 | 37 | 4 | 6' - 9" | 17 | |
| | j1 | 72 | 4 | 1' - 5" | 2 | |
| | m1 | 24 | 4 | 12' - 6" | Str. | |
| | m5 | 26 | 8 | 16' - 1" | 17A | |
| Bent No. 6 | g1 | 33 | 4 | 6' - 9" | 17 | |
| | j1 | 60 | 4 | 1' - 5" | 2 | |
| | m1 | 20 | 4 | 12' - 6" | Str. | |
| | m6 | 26 | 8 | 14' - 4" | 17A | |
| Bent No. 7 | g1 | 29 | 4 | 6' - 9" | 17 | |
| | j1 | 48 | 4 | 1' - 5" | 2 | |
| | m1 | 16 | 4 | 12' - 6" | Str. | |
| | m7 | 26 | 8 | 12' - 2" | 17A | |




NOTES-
*All dimensions are out to out of bars.*
△ *Bars to be doweled into existing cap. Care will be taken to avoid damaging cap resteel.*
✳ *Bend in field as necessary to fit.*

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Temporary Bridge Support | L.S. | L.S. |

NOTE:
*Existing Bent No. 2 is the northmost location and exisitng Bent No. 7 is the southmost location.*

## INFORMATIONAL QUANTITIES

| | ITEM | UNIT | QUANTITY | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Existing Bent No. 2 | Existing Bent No. 3 | Existing Bent No. 4 | Existing Bent No. 5 | Existing Bent No. 6 | Existing Bent No. 7 |
| | Class A45 Concrete, Miscellaneous | Cu. Yd. | 28.6 | 26.1 | 27.3 | 27.4 | 26.6 | 25.5 |
| | Reinforcing Steel | Lb. | 7132 | 6622 | 6853 | 6907 | 6723 | 6510 |
| | Structure Excavation, Bridge | Cu. Yd. | 28.4 | 28.4 | 28.4 | 28.4 | 28.4 | 28.4 |
| ⏍ | Base Course | Tons | 35.8 | 35.8 | 35.8 | 35.8 | 35.8 | 35.8 |
| ⊛ | Install Dowel in Concrete | Each | 7 | 7 | 7 | 7 | 7 | 7 |

⏍ *For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to convert cu. yds. to tons.*
⊛ *22 Lbs. Reinforcing Steel (Dowel Bars)*

**STRUCTURE PHASED CONSTRUCTION DETAILS (A)**

FOR

# 595' - 6" STEEL GIRDER BRIDGE

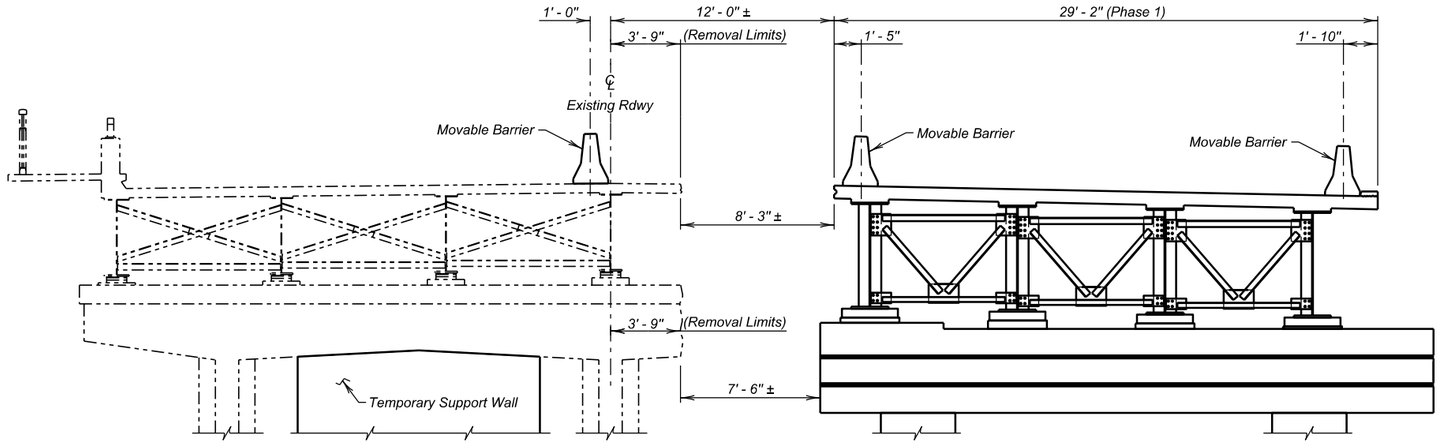
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

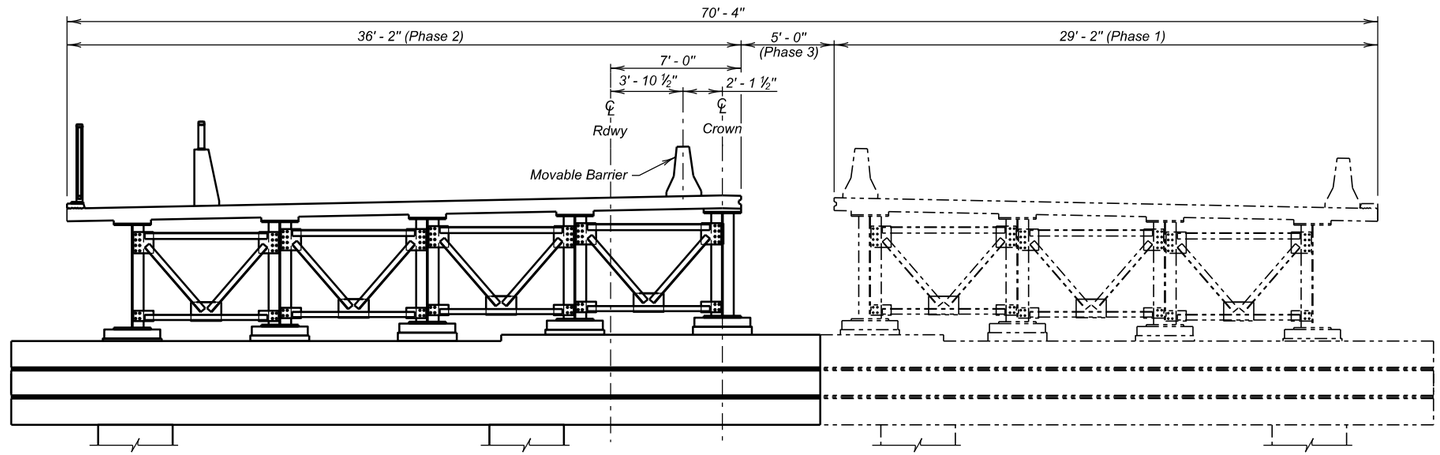


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | BB | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA08 | | |

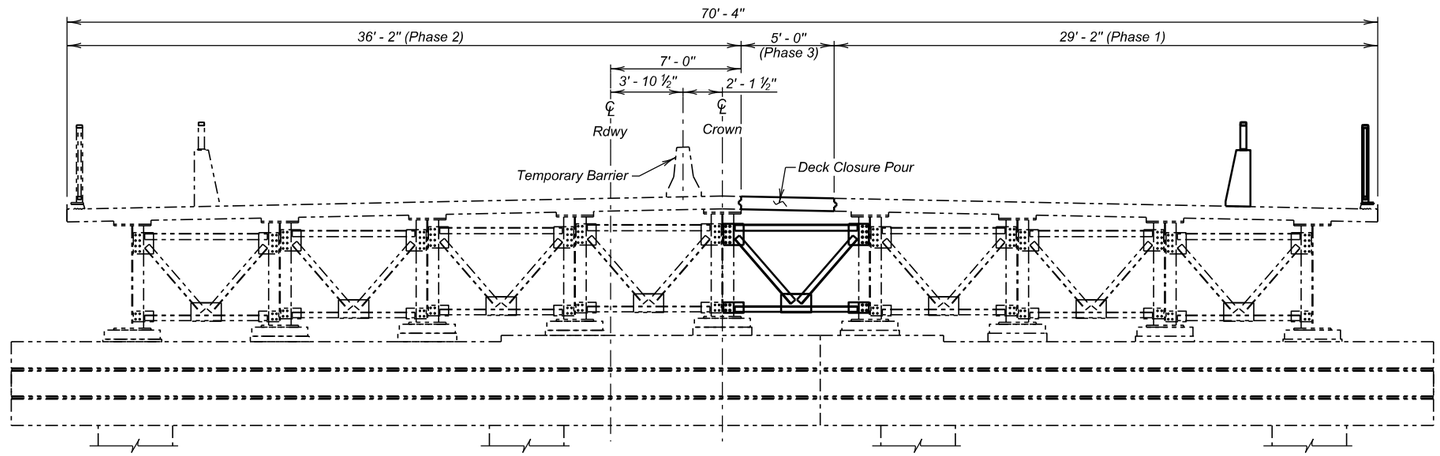
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E11 | E60 |




**PHASE 1 CONSTRUCTION (FACING NORTH)**



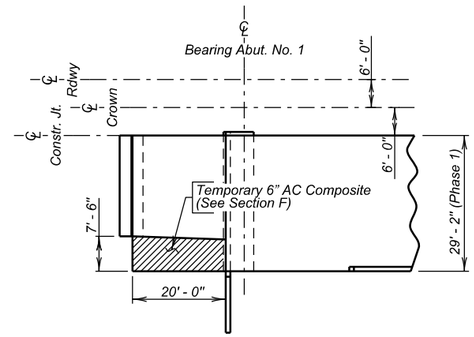

**PHASE 2 CONSTRUCTION (FACING NORTH)**




**PHASE 3 CONSTRUCTION (FACING NORTH)**

## PHASE 1 NOTES

1. Install Temporary Support Wall at each Bent location prior to removal of Superstructure.
2. Break down & remove a portion of the existing structure (see Incidental Work, Structure Notes).
3. Construct Phase 1 (East portion) of new bridge (Abutment, Bent, Superstructure, Finger Joint, Bridge End Backfill, Approach and Sleeper Slabs). Do not construct Barrier or Tapered Barrier.
4. Remove any remaining falsework from Phase 1.
5. Place Movable Concrete Barriers as shown, with anchorage.
6. Place Temporary AC surfacing in sidewalk approach slab limits. (See DETAIL "X")
7. With traffic diverted to Phase 1 of new bridge, break down & remove existing structure (see Incidental Work, Structure Notes).
8. Remove Temporary Support Walls.




**DETAIL "X"**

(Shown adjacent to Abut. No. 1
Abut. No. 5 similar opposite hand.)

## PHASE 2 NOTES

9. Construct Phase 2 (West portion) of the new bridge (Abutment, Bent, Superstructure, Barrier, Finger Joint, Bridge End Backfill, Approach and Sleeper Slabs, Sidewalk Approach Slabs, Pedestrian Railing, Barrier Curb Railing, and Tapered Barriers).
10. Place Movable Concrete Barrier as shown, with anchorage.
11. Divert traffic to Phase 2 of the new bridge and construct Barrier, Pedestrian Railing, Barrier Curb Railing, Tapered Barriers, and Sidewalk Approack Slabs in Phase 1 portion.

## PHASE 3 NOTES

12. Diaphragms between girder no's. 5 & 6 will be placed with or before the Phase 3 portion of the bridge deck has been poured.
13. Construct Phase 3 (closure pour) portion of the new bridge.
14. Remove Movable Concrete Barriers.

**STRUCTURE PHASED CONSTRUCTION DETAILS (B)**

FOR

595' - 6" STEEL GIRDER BRIDGE

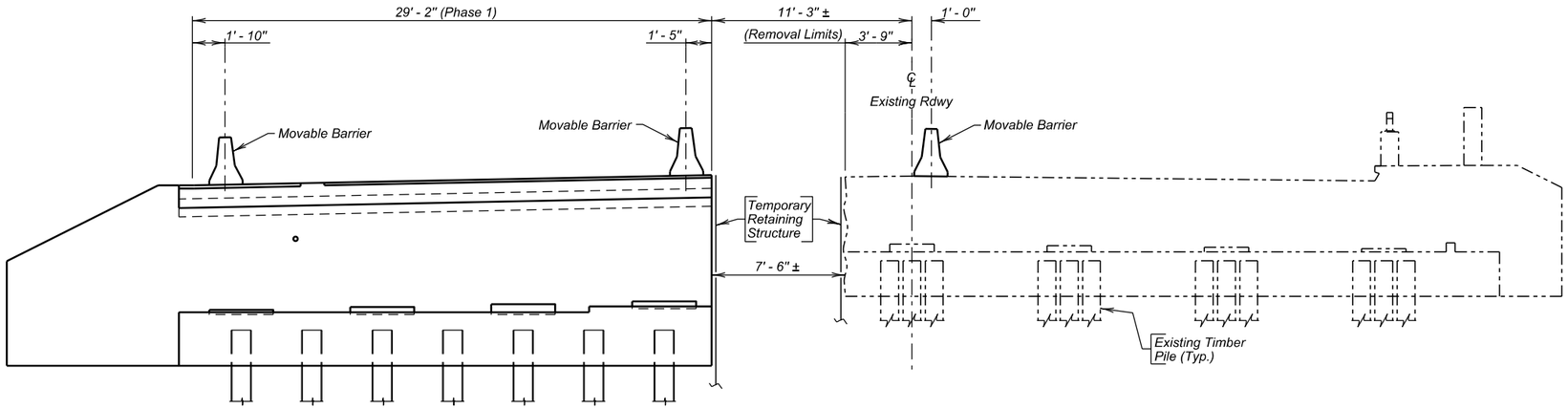
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

BUTTE COUNTY
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MAY 2025

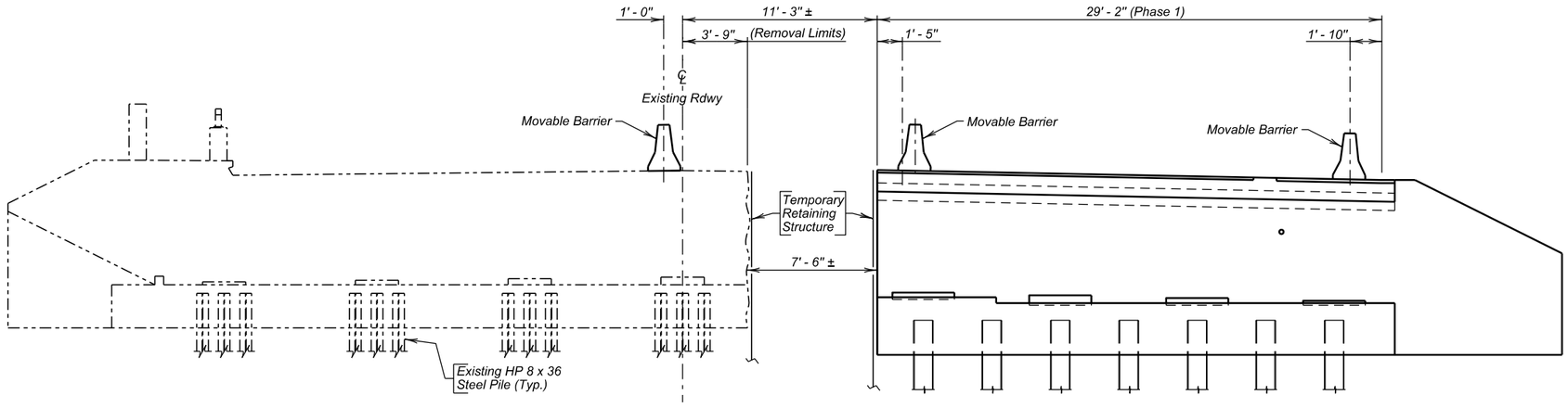


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA09 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E12 | E60 |




***PHASE 1 ABUTMENT CONSTRUCTION (FACING SOUTH)***
*(Abut. No. 1 shown)*




***PHASE 1 ABUTMENT CONSTRUCTION (FACING NORTH)***
*(Abut. No. 5 shown)*

**STRUCTURE PHASED CONSTRUCTION DETAILS (C)**

FOR

# 595' - 6" STEEL GIRDER BRIDGE

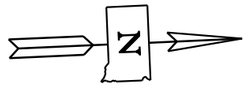
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

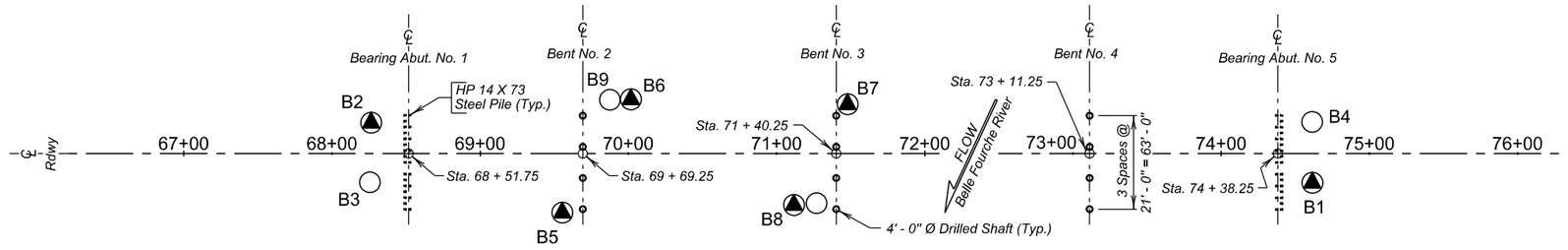
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2025



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU<br>BUTE04G4 | JH/AG<br>04G4TA10 | BT | Steve A Johnson<br>BRIDGE ENGINEER |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E13 | E60 |




## *PILING AND DRILLED SHAFT LAYOUT*

*NOTE :*
*This sheet is to be used in conjunction with the PILING INTERFERENCE DETAILS sheet.*

| Hole Number | B3 | |
|---|---|---|
| Station | 68+25.6 | |
| Depth | 35.5 | ft |
| Soil Color | Gray | |
| Classification | Clay | |
| Strength (Qu) | 4,749 | psf |
| Dry Density | 111.0 | pcf |
| Wet Density | 131.2 | pcf |
| Moisture | 18.2 | % |
| Pass No. 10 | 99.9 | % |
| Pass No. 40 | 99.7 | % |
| Pass No. 200 | 96.1 | % |
| Sand Content | 3.8 | % |
| Silt Content | 41.9 | % |
| Clay Content | 54.2 | % |

| Hole Number | B9 | |
|---|---|---|
| Station | 69+87.5 | |
| Depth | 10.5 | ft |
| Soil Color | Brown | |
| Classification | Sand | |
| Strength (Qu) | No Test | psf |
| Dry Density | 95.9 | pcf |
| Wet Density | 118.7 | pcf |
| Moisture | 23.8 | % |
| Pass No. 10 | 100.0 | % |
| Pass No. 40 | 100.0 | % |
| Pass No. 200 | 12.7 | % |
| Sand Content | 87.3 | % |
| Silt Content | 7.9 | % |
| Clay Content | 4.8 | % |

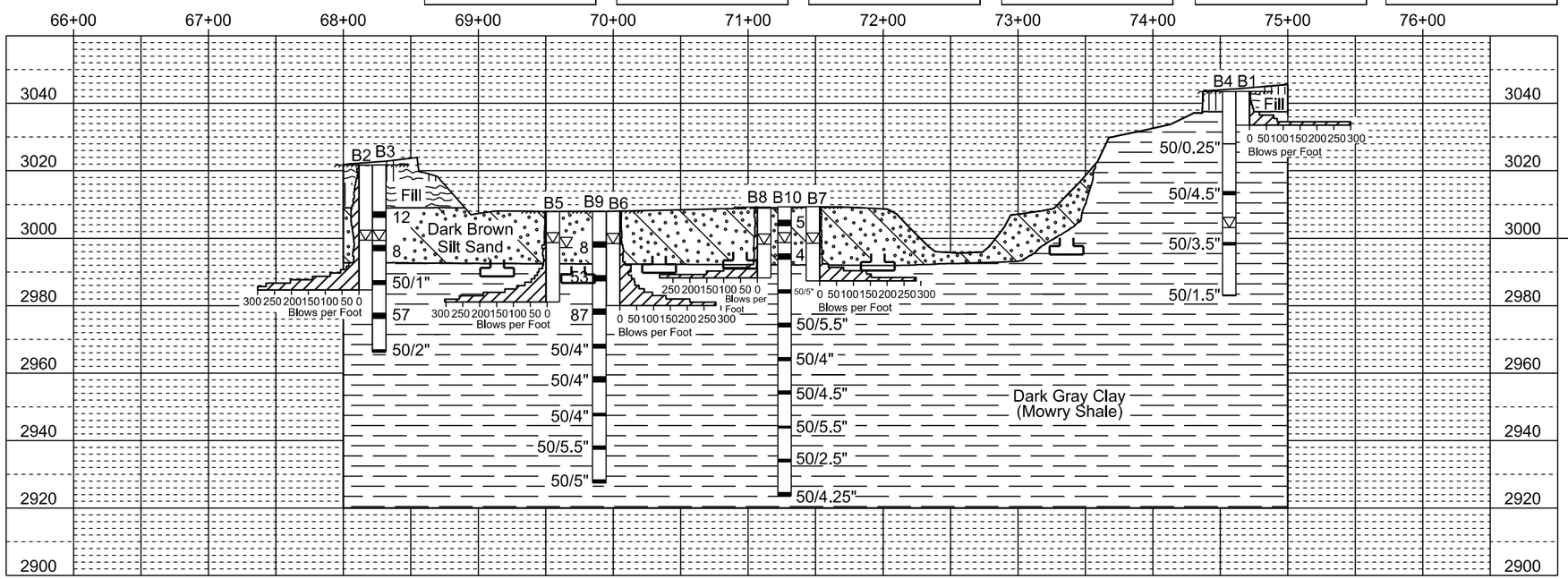
| Hole Number | B9 | |
|---|---|---|
| Station | 69+87.5 | |
| Depth | 40.5 | ft |
| Soil Color | Dark Gray | |
| Classification | Clay | |
| Strength (Qu) | 4,713 | psf |
| Dry Density | 99.5 | pcf |
| Wet Density | 123.0 | pcf |
| Moisture | 23.7 | % |
| Pass No. 10 | 100.0 | % |
| Pass No. 40 | 100.0 | % |
| Pass No. 200 | 97.2 | % |
| Sand Content | 2.8 | % |
| Silt Content | 29.4 | % |
| Clay Content | 67.8 | % |

| Hole Number | B10 | |
|---|---|---|
| Station | 71+27 | |
| Depth | 15.5 | ft |
| Soil Color | Gray | |
| Classification | Silty Sand | |
| Strength (Qu) | No Test | psf |
| Dry Density | 89.1 | pcf |
| Wet Density | 114.2 | pcf |
| Moisture | 28.1 | % |
| Pass No. 10 | 100.0 | % |
| Pass No. 40 | 99.7 | % |
| Pass No. 200 | 28.9 | % |
| Sand Content | 71.1 | % |
| Silt Content | 13.1 | % |
| Clay Content | 15.8 | % |

| Hole Number | B10 | |
|---|---|---|
| Station | 71+27 | |
| Depth | 25.5 | ft |
| Soil Color | Dark Gray | |
| Classification | Clay | |
| Strength (Qu) | 9,597 | psf |
| Dry Density | 105.3 | pcf |
| Wet Density | 126.4 | pcf |
| Moisture | 20.0 | % |
| Pass No. 10 | 100.0 | % |
| Pass No. 40 | 100.0 | % |
| Pass No. 200 | 96.8 | % |
| Sand Content | 3.2 | % |
| Silt Content | 23.6 | % |
| Clay Content | 73.2 | % |

| Hole Number | B4 | |
|---|---|---|
| Station | 74+61.4 | |
| Depth | 30.5 | ft |
| Soil Color | Gray | |
| Classification | Silt Clay | |
| Strength (Qu) | 2,593 | psf |
| Dry Density | 99.8 | pcf |
| Wet Density | 123.6 | pcf |
| Moisture | 23.8 | % |
| Pass No. 10 | 94.8 | % |
| Pass No. 40 | 93.8 | % |
| Pass No. 200 | 86.1 | % |
| Sand Content | 8.7 | % |
| Silt Content | 42.1 | % |
| Clay Content | 44.0 | % |

Existing Spread Footing
(Not to Scale)




Mowry Shale is a marine shale with a textural classification that varies from silt clay to clay silt. Color varies from gray to black. Bentonite zones may be encountered throughout. Nonweathered Mowry 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
Drive Test
Water
Sample Zone

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

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

### GROUNDWATER ELEVATIONS

MAY 2023

| | |
|---|---|
| B1 | DRY |
| B2 | 2999.4 |
| B3 | 3000.3 |
| B4 | 3003.2 |

SEPTEMBER 2023

| | |
|---|---|
| B5 | 2998.7 |
| B6 | 2998.4 |
| B7 | 2998.5 |
| B8 | 2998.4 |

### MEASURED SKIN FRICTION

| | ELEV. | PSF |
|---|---|---|
| B1 | 3033.5 | 6094 |
| B2 | 2984.7 | 1968 |
| B5 | 2981.1 | 2340 |
| B6 | 2980.0 | 2130 |
| B7 | 2987.2 | 1912 |
| B8 | 2988.4 | 1889 |

**SUBSURFACE INVESTIGATION, PILING & DRILLED SHAFT LAYOUT**
FOR
# 595' - 6" STEEL GIRDER BRIDGE

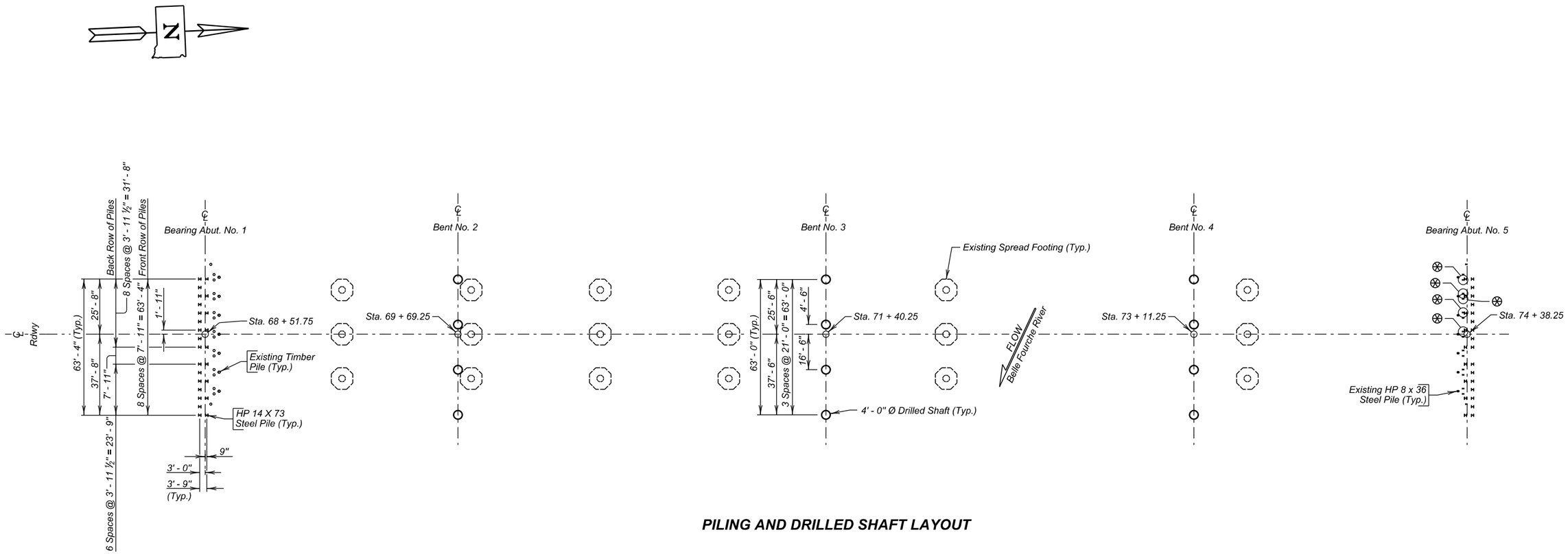
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | KG/AG | HK/BT | Steve A. Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA11 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E14 | E60 |




## *PILING AND DRILLED SHAFT LAYOUT*

*NOTE :*
*This sheet is to be used in conjunction with the SUBSURFACE INVESTIGATION, PILING, & DRILLED SHAFT LAYOUT sheet.*

*NOTE:*
*⊛ Existing HP 8 x 36 steel pile to be extracted.*

### *ESTIMATED QUANTITIES*

| *ITEM* | *UNIT* | *QUANTITY* |
|---|---|---|
| *Extract Pile* | *Each* | *5* |

**PILING INTERFERENCE DETAILS**

FOR

595' - 6" STEEL GIRDER BRIDGE

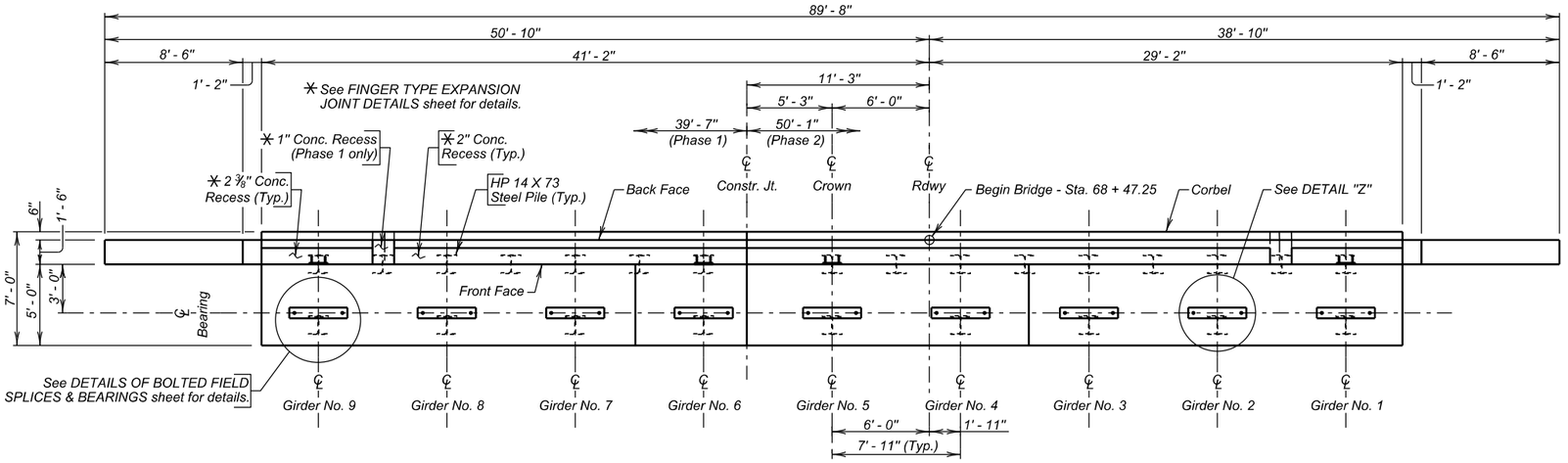
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

12 OF 58

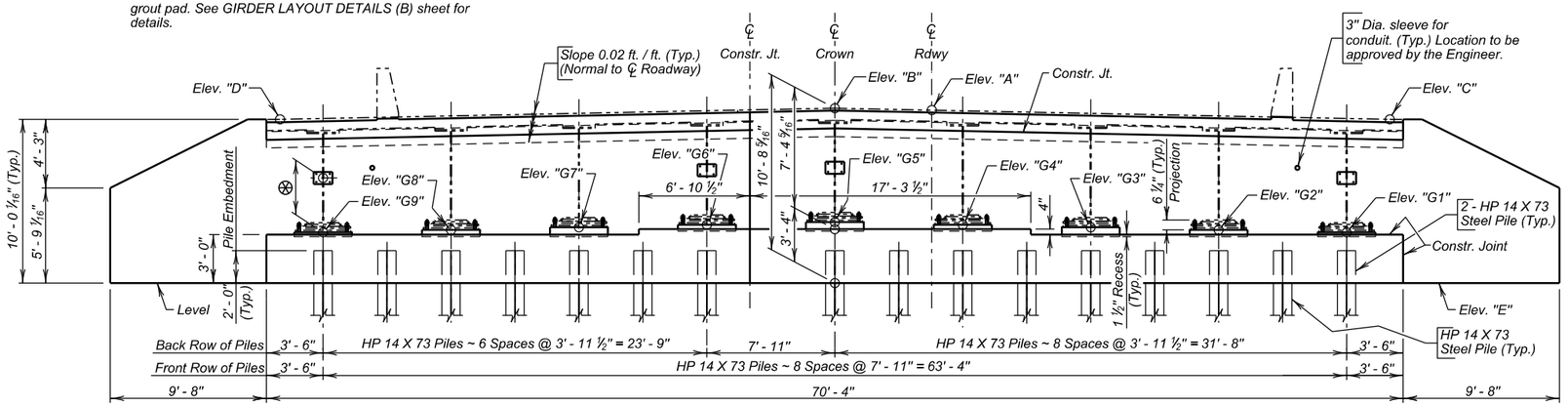
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|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA12 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E15 | E60 |



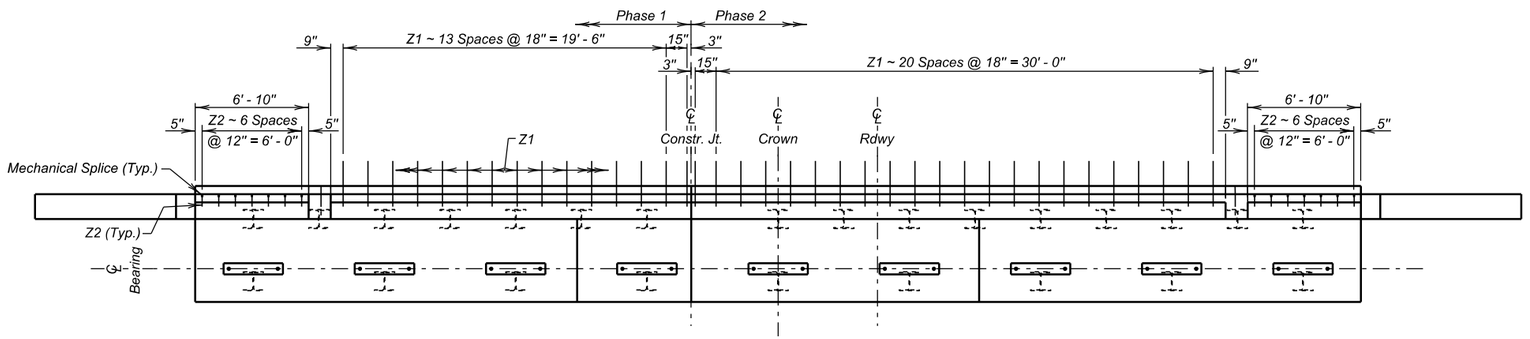

## PLAN

⊛ Place bumper plates at Girder No. 1, 5, 6, and 9 at each abutment. Bumper plate to be mounted 3' - 4 5/8" above top of grout pad. See GIRDER LAYOUT DETAILS (B) sheet for details.




## ELEVATION

(Along ℄ Abut. Backwall)




## PLAN

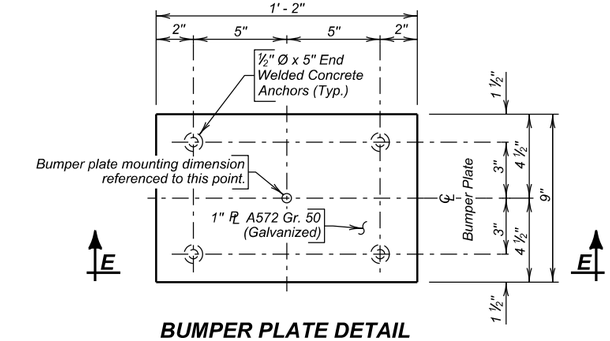
(Z bar Spacing)

### TABLE OF ELEVATIONS

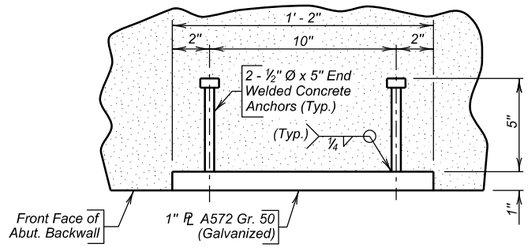
| Abut No. | ★Elev. "G1" | ★Elev. "G2" | ★Elev. "G3" | ★Elev. "G4" | ★Elev. "G5" | ★Elev. "G6" | ★Elev. "G7" | ★Elev. "G8" | ★Elev. "G9" | Elev. "A" | Elev. "B" | Elev. "C" | Elev. "D" | Elev. "E" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3015.78 | 3015.94 | 3016.10 | 3016.26 | 3016.41 | 3016.26 | 3016.10 | 3015.94 | 3015.78 | 3023.20 | 3023.29 | 3022.63 | 3022.63 | 3012.65 |

NOTE: Top of Grout Pad will be level and smooth.
★Elevations are Top of Grout Pad at centerline bearing.

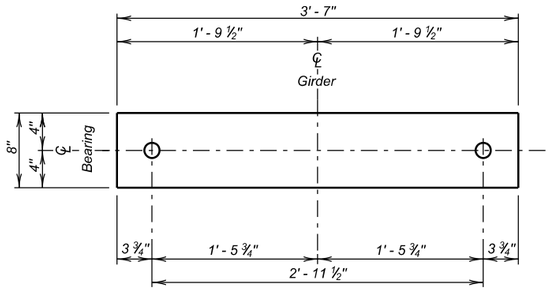
INCREASING STATIONS




## BUMPER PLATE DETAIL




## SECTION E - E




## DETAIL "Z"

(Grout Pad)

**ABUTMENT NO. 1 DETAILS (A)**

FOR

595' - 6" STEEL GIRDER BRIDGE

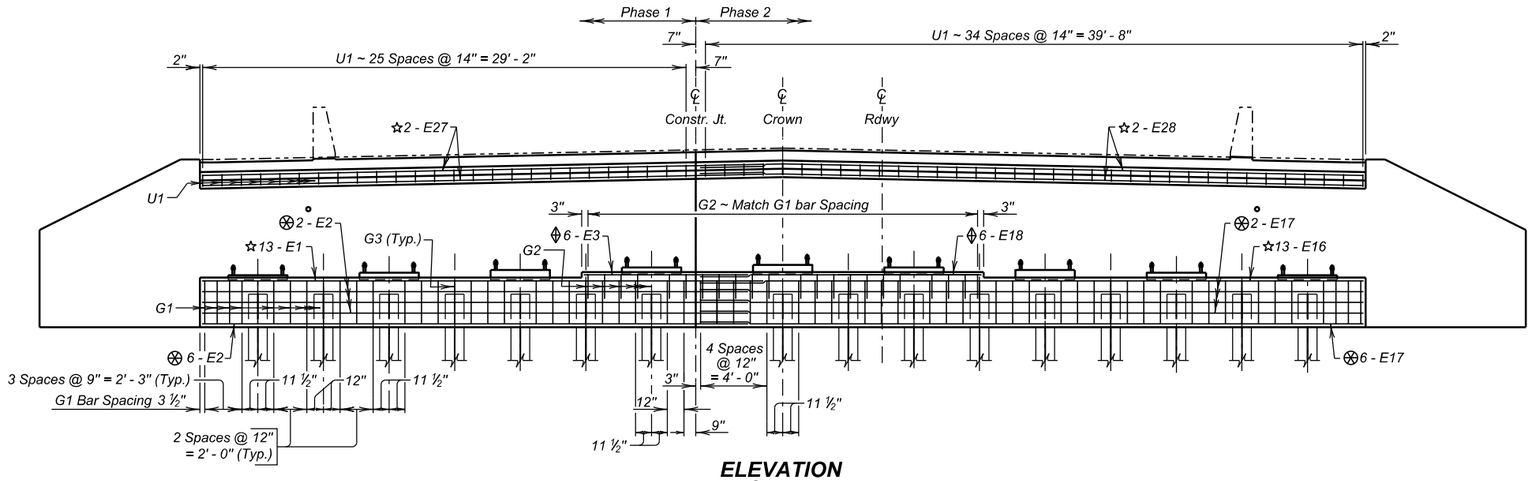
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
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BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2025

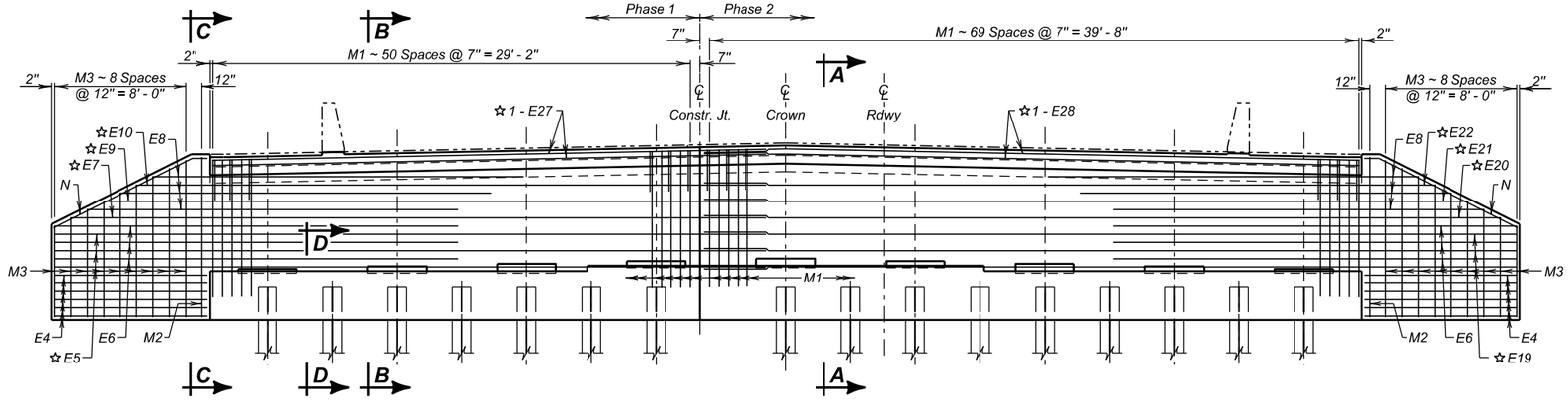
13 OF 58

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA13 | | |

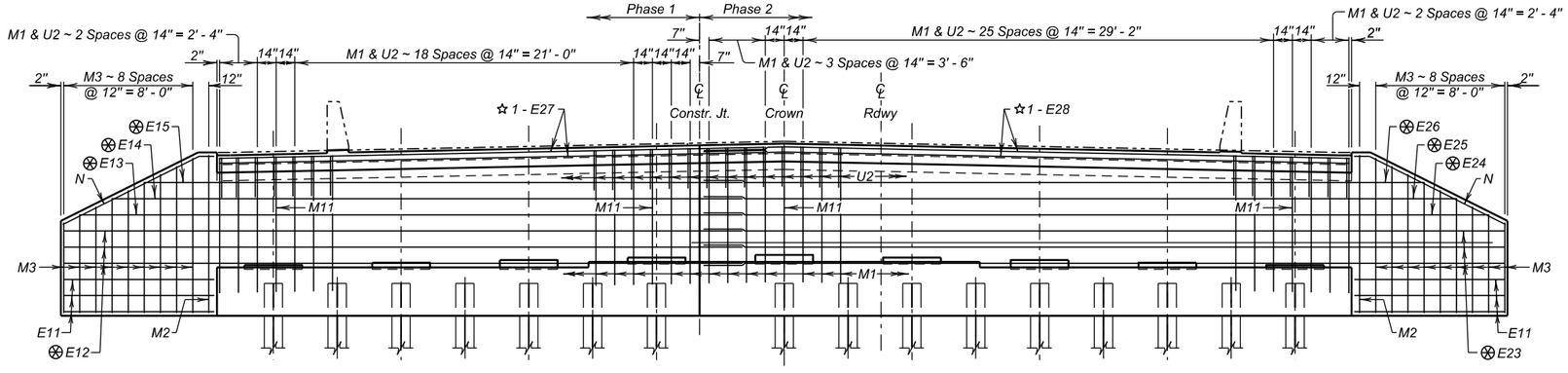
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E16 | E60 |




**ELEVATION**
(Along ℄ Abut. Backwall)

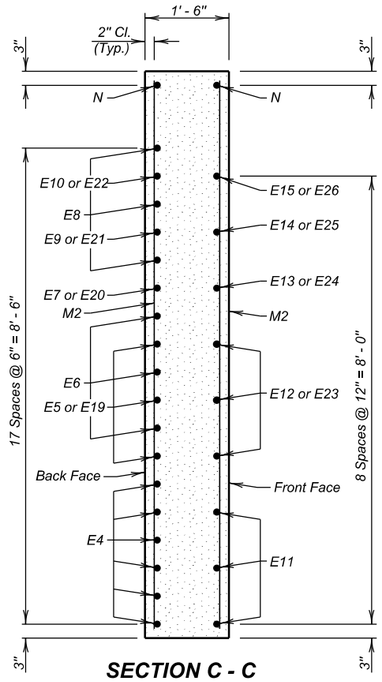



**ELEVATION**
(Back Face Along ℄ Abut. Backwall)




**ELEVATION**
(Front Face Along ℄ Abut. Backwall)

NOTES:
- ⟠ 2' - 5" min. lap
- ⊗ 2' - 11" min. lap
- ☆ 3' - 10" min. lap




**SECTION C - C**

**ABUTMENT NO. 1 DETAILS (B)**

FOR

## 595' - 6" STEEL GIRDER BRIDGE

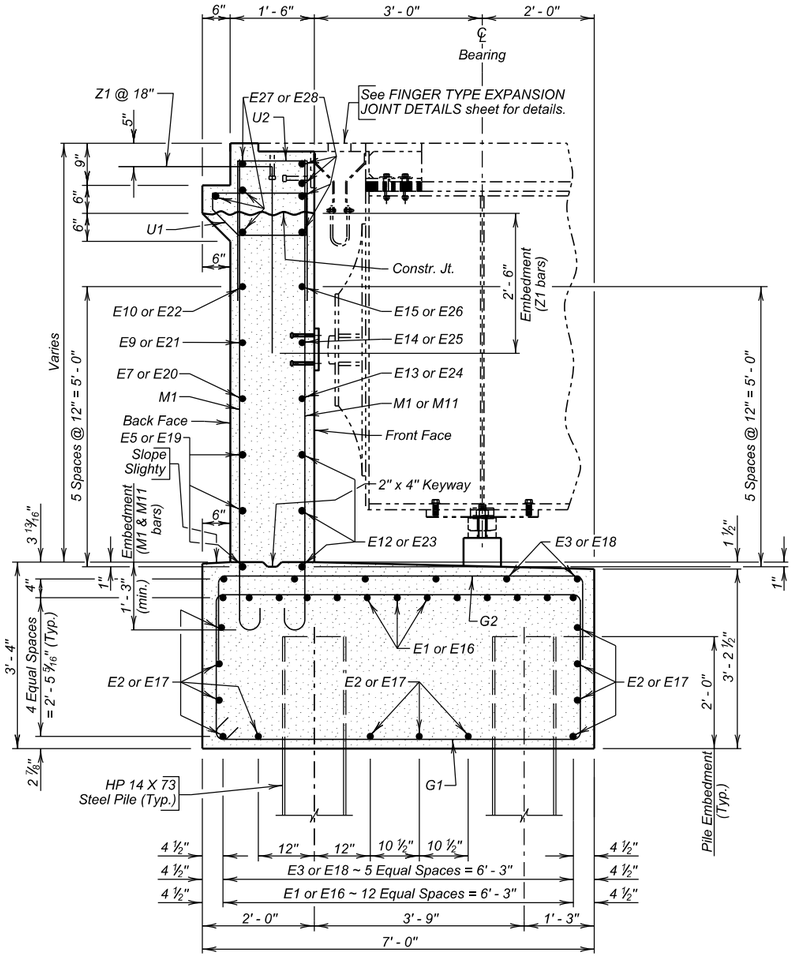
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
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BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2025

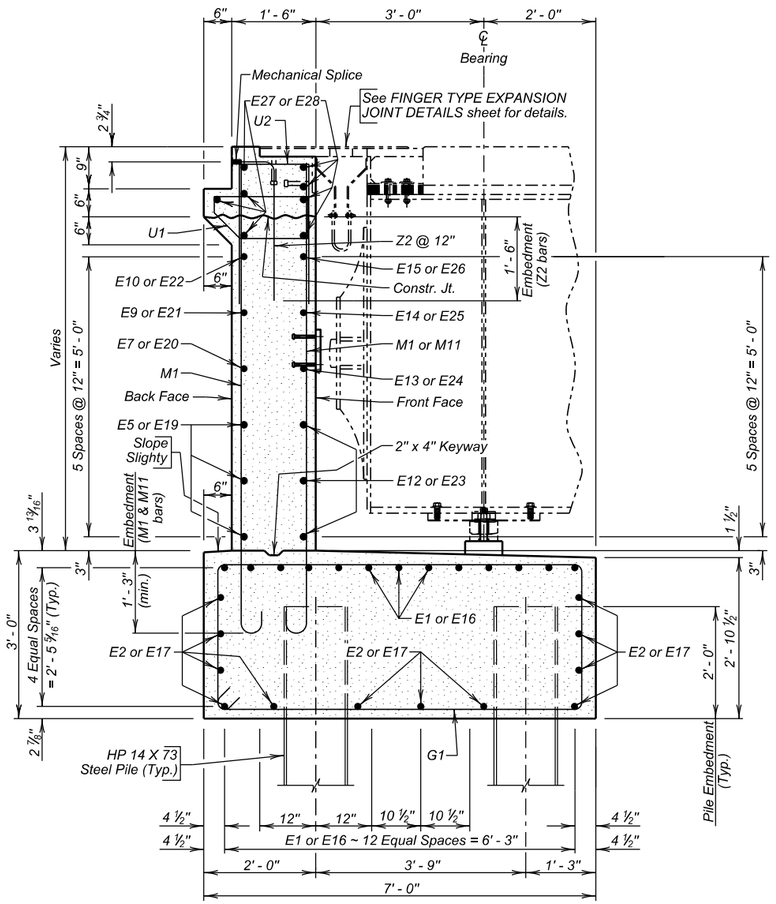


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA14 | | |

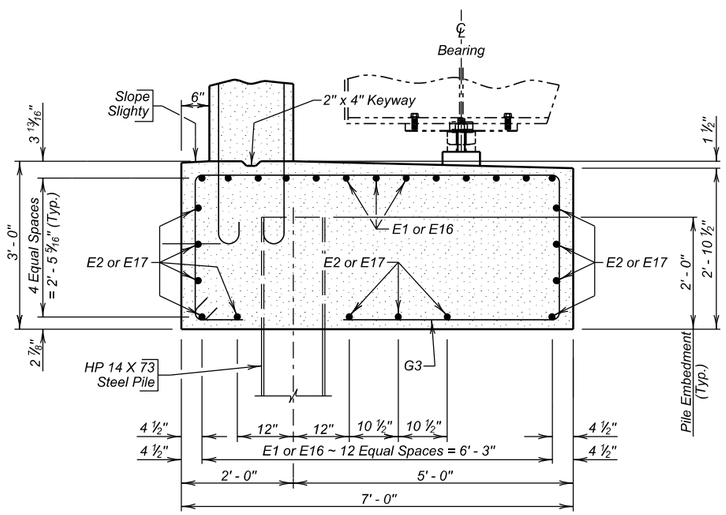
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E17 | E60 |




**SECTION A - A**




**SECTION B - B**




**SECTION D - D**

## ESTIMATED QUANTITIES

| | ITEM | UNIT | QUANTITY Phase 1 | QUANTITY Phase 2 |
|---|---|---|---|---|
| ϕ | Class A45 Concrete, Bridge | Cu. Yd. | 40.0 | 54.1 |
| | Reinforcing Steel | Lb. | 4646 | 5674 |
| | Epoxy Coated Reinforcing Steel | Lb. | 1325 | 1672 |
| | Structure Excavation, Bridge | Cu. Yd. | 23.7 | 29.6 |
| | No. 4 Rebar Splice | Each | 7 | 7 |
| | HP 14 x 73 Steel Test Pile, Furnish and Drive | Ft. | 1 @ 50' = 50' | ——— |
| | HP 14 x 73 Steel Bearing Pile, Furnish and Drive | Ft. | 10 @ 45' = 450' | 14 @ 45' = 630' |

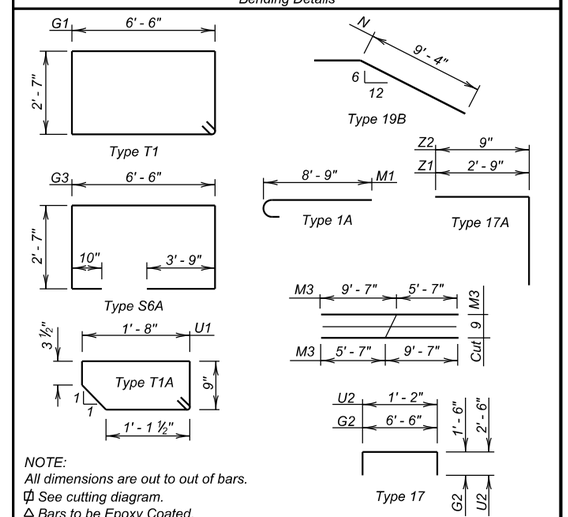
ϕ *Each abutment includes 0.2 cu. yds. for grout pads.*

## REINFORCING SCHEDULE

| | Mk. | No. | Size | Length | Type |
|---|---|---|---|---|---|
| Phase 1 | E1 | 13 | 8 | 33' - 9" | Str. |
| | E2 | 12 | 6 | 32' - 10" | Str. |
| | E3 | 6 | 8 | 10' - 9" | Str. |
| | E4 | 6 | 8 | 9' - 4" | Str. |
| | E5 | 3 | 8 | 43' - 5" | Str. |
| | E6 | 3 | 8 | 24' - 8" | Str. |
| | E7 | 1 | 8 | 42' - 6" | Str. |
| | E8 | 3 | 8 | 22' - 9" | Str. |
| | E9 | 1 | 8 | 40' - 6" | Str. |
| | E10 | 1 | 8 | 38' - 6" | Str. |
| | E11 | 3 | 5 | 9' - 4" | Str. |
| | E12 | 3 | 5 | 42' - 1" | Str. |
| △ | E13 | 1 | 5 | 41' - 2" | Str. |
| △ | E14 | 1 | 5 | 39' - 2" | Str. |
| | E15 | 1 | 5 | 37' - 2" | Str. |
| △ | E27 | 8 | 8 | 33' - 10" | Str. |
| | G1 | 24 | 4 | 18' - 11" | T1 |
| | G2 | 6 | 4 | 9' - 6" | 17 |
| | G3 | 3 | 4 | 16' - 3" | S6A |
| | M1 | 75 | 5 | 9' - 2" | 1A |
| | M2 | 2 | 5 | 9' - 9" | Str. |
| ϕ | M3 | 9 | 5 | 15' - 2" | Str. |
| △ | M11 | 2 | 5 | 9' - 2" | Str. |
| | N | 2 | 8 | 10 - 4" | 19B |
| △ | U1 | 26 | 5 | 5' - 0" | T1A |
| △ | U2 | 26 | 5 | 6' - 2" | 17 |
| △ | Z1 | 14 | 7 | 6' - 4" | 17A |
| △ | Z2 | 7 | 4 | 3' - 3" | 17A |

| | Mk. | No. | Size | Length | Type |
|---|---|---|---|---|---|
| Phase 2 | E4 | 6 | 8 | 9' - 4" | Str. |
| | E6 | 3 | 8 | 24' - 8" | Str. |
| | E8 | 3 | 8 | 22' - 9" | Str. |
| | E11 | 3 | 5 | 9' - 4" | Str. |
| | E16 | 13 | 8 | 39' - 11" | Str. |
| | E17 | 12 | 6 | 39' - 11" | Str. |
| | E18 | 6 | 8 | 16' - 10" | Str. |
| | E19 | 3 | 8 | 49' - 9" | Str. |
| | E20 | 1 | 8 | 48' - 10" | Str. |
| | E21 | 1 | 8 | 46' - 10" | Str. |
| | E22 | 1 | 8 | 44' - 10" | Str. |
| | E23 | 3 | 5 | 49' - 8" | Str. |
| △ | E24 | 1 | 5 | 48' - 8" | Str. |
| △ | E25 | 1 | 5 | 46' - 8" | Str. |
| | E26 | 1 | 5 | 44' - 8" | Str. |
| △ | E28 | 8 | 8 | 40' - 2" | Str. |
| | G1 | 33 | 4 | 18' - 11" | T1 |
| | G2 | 16 | 4 | 9' - 6" | 17 |
| | G3 | 4 | 4 | 16' - 3" | S6A |
| | M1 | 103 | 5 | 9' - 2" | 1A |
| | M2 | 2 | 5 | 9' - 9" | Str. |
| ϕ | M3 | 9 | 5 | 15' - 2" | Str. |
| △ | M11 | 2 | 5 | 9' - 2" | Str. |
| | N | 2 | 8 | 10 - 4" | 19B |
| △ | U1 | 35 | 5 | 5' - 0" | T1A |
| △ | U2 | 35 | 5 | 6' - 2" | 17 |
| △ | Z1 | 21 | 7 | 6' - 4" | 17A |
| △ | Z2 | 7 | 4 | 3' - 3" | 17A |

*Bending Details*




NOTE:
*All dimensions are out to out of bars.*
ϕ *See cutting diagram.*
△ *Bars to be Epoxy Coated.*

**ABUTMENT NO. 1 DETAILS (C)**

FOR

595' - 6" STEEL GIRDER BRIDGE

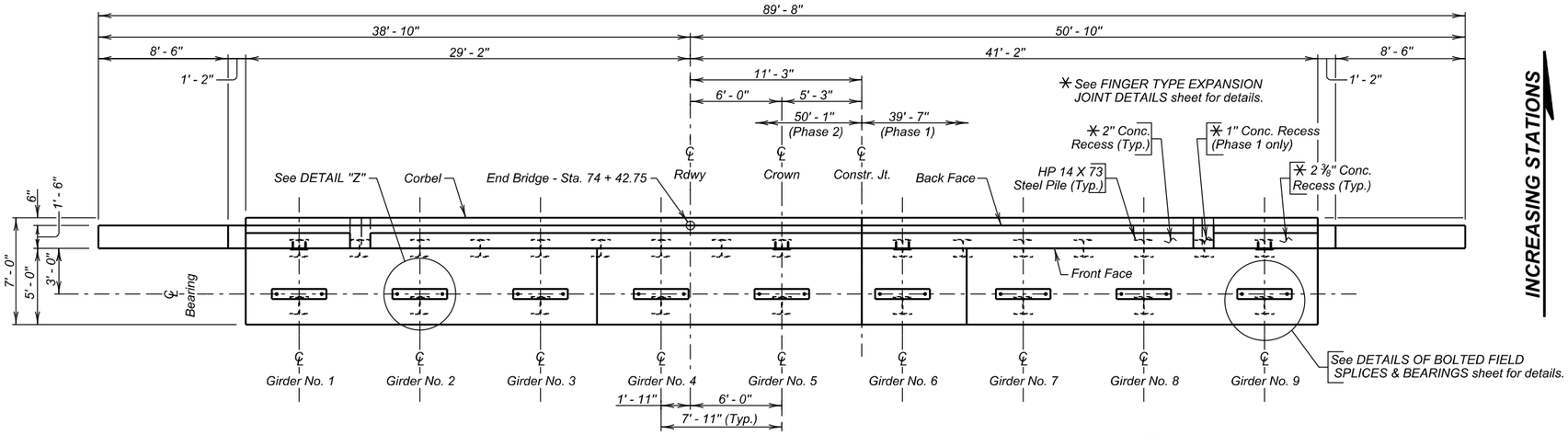
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

15 OF 58

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A. Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA15 | | |

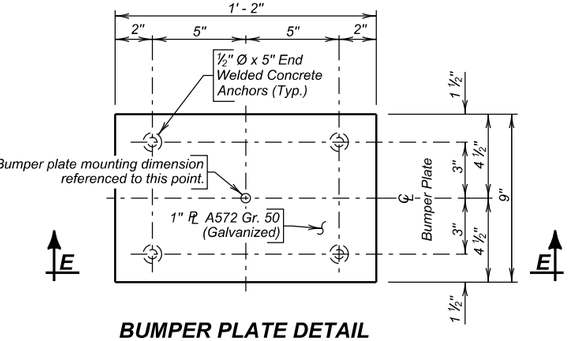
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E18 | E60 |



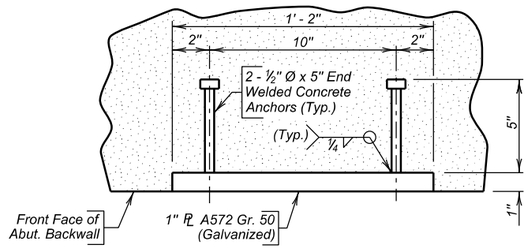

## PLAN

⊛ Place bumper plates at Girder No. 1, 5, 6, and 9 at each abutment. Bumper plate to be mounted 3' - 4 3/8" above top of grout pad. See GIRDER LAYOUT DETAILS (B) sheet for details.

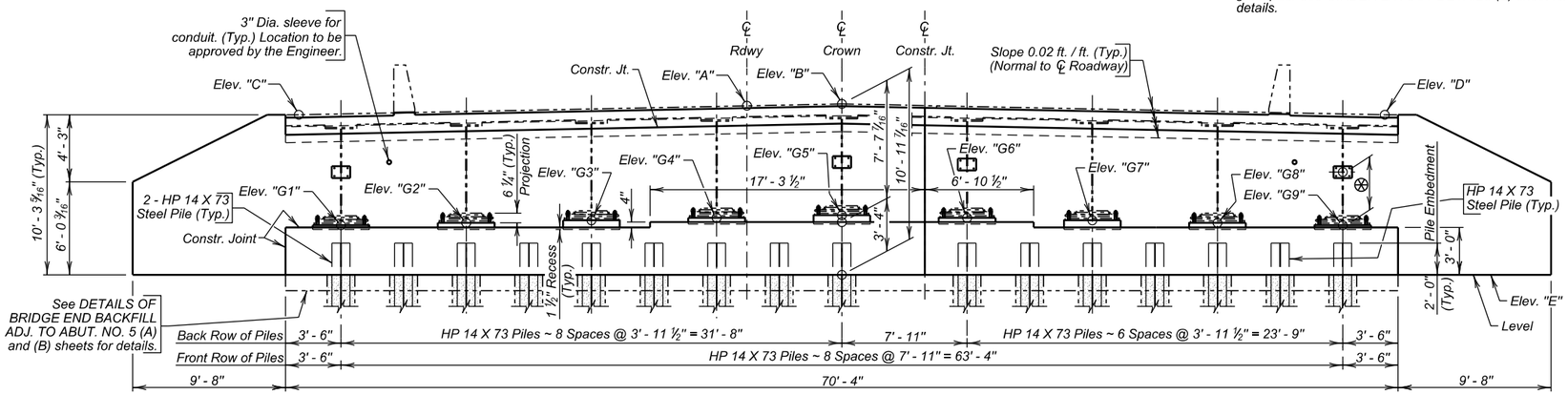
INCREASING STATIONS




## BUMPER PLATE DETAIL

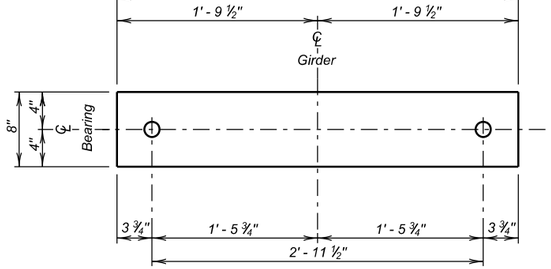



## SECTION E - E



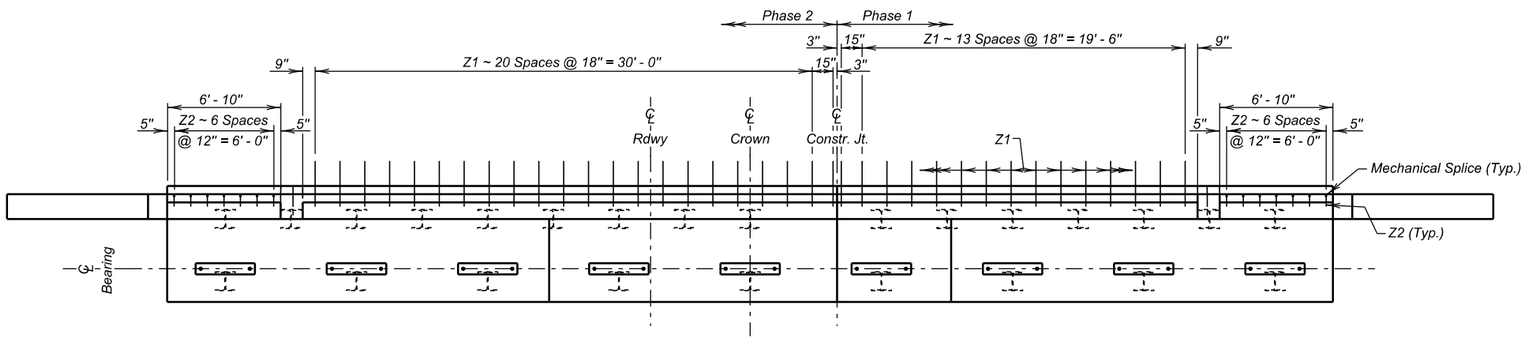

## ELEVATION

(Along ℄ Abut. Backwall)




## DETAIL "Z"

(Grout Pad)




## PLAN

(Z bar Spacing)

### TABLE OF ELEVATIONS

| Abut No. | ★Elev. "G1" | ★Elev. "G2" | ★Elev. "G3" | ★Elev. "G4" | ★Elev. "G5" | ★Elev. "G6" | ★Elev. "G7" | ★Elev. "G8" | ★Elev. "G9" | Elev. "A" | Elev. "B" | Elev. "C" | Elev. "D" | Elev. "E" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5 | 3035.98 | 3036.14 | 3036.30 | 3036.46 | 3036.61 | 3036.46 | 3036.30 | 3036.14 | 3035.98 | 3043.72 | 3043.81 | 3043.15 | 3043.15 | 3032.86 |

NOTE: Top of Grout Pad will be level and smooth.
★Elevations are Top of Grout Pad at centerline bearing.

**ABUTMENT NO. 5 DETAILS (A)**

FOR

595' - 6" STEEL GIRDER BRIDGE

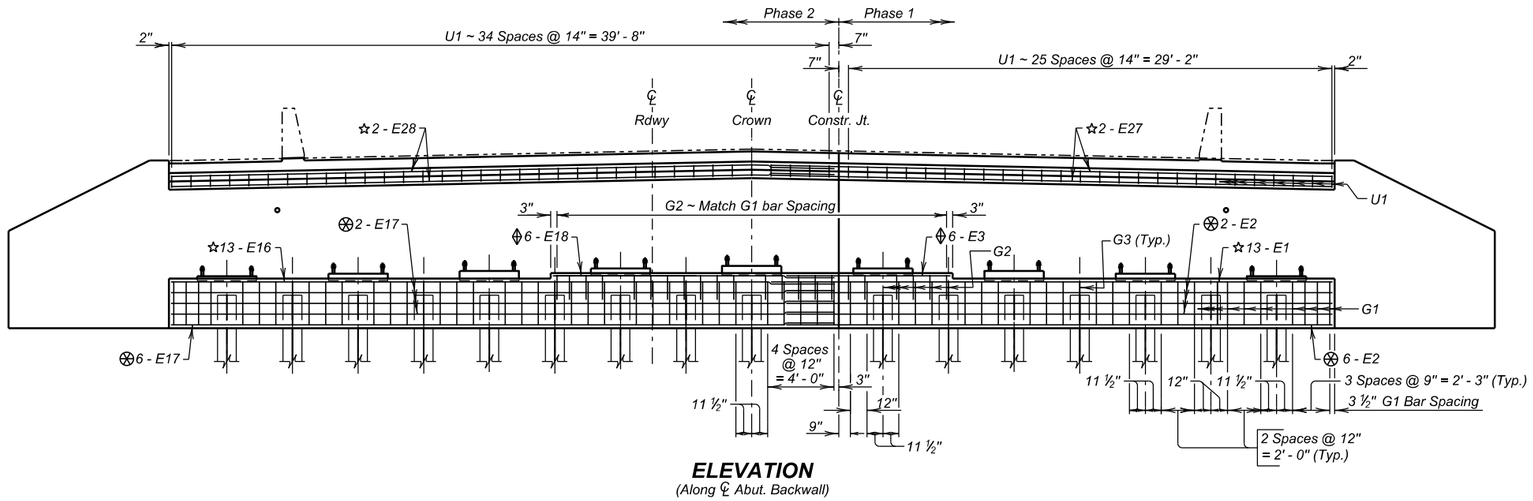
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

16 OF 58

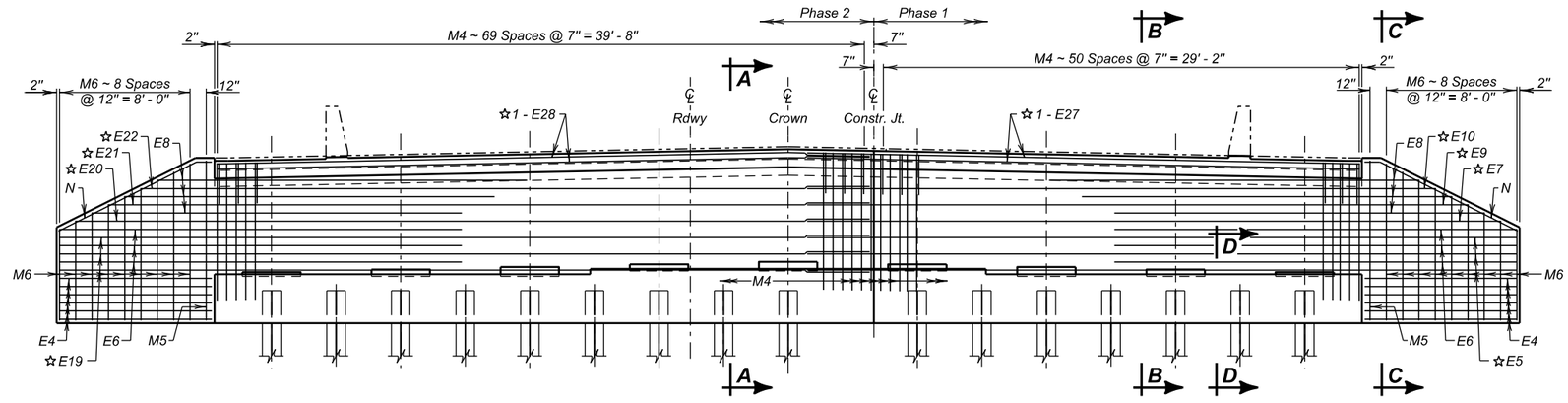
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA16 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E19 | E60 |

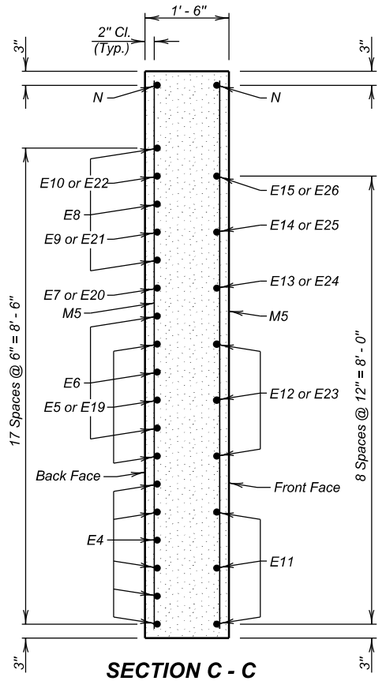



***ELEVATION***
*(Along ℄ Abut. Backwall)*

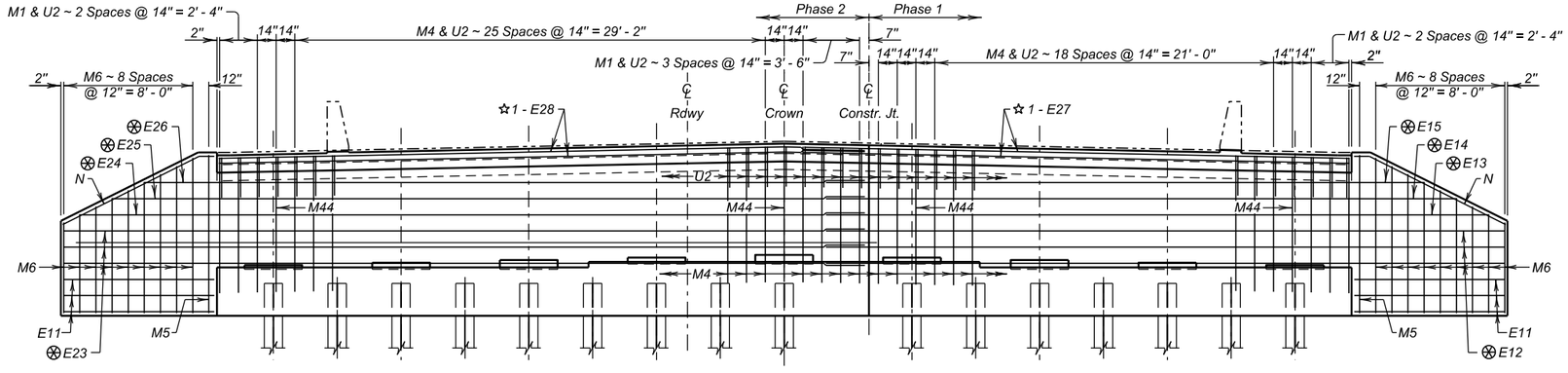
*NOTES:*
- ⧫ 2' - 5" min. lap
- ⊗ 2' - 11" min. lap
- ☆ 3' - 10" min. lap




***ELEVATION***
*(Back Face Along ℄ Abut. Backwall)*




***SECTION C - C***




***ELEVATION***
*(Front Face Along ℄ Abut. Backwall)*

**ABUTMENT NO. 5 DETAILS (B)**

FOR

## 595' - 6" STEEL GIRDER BRIDGE

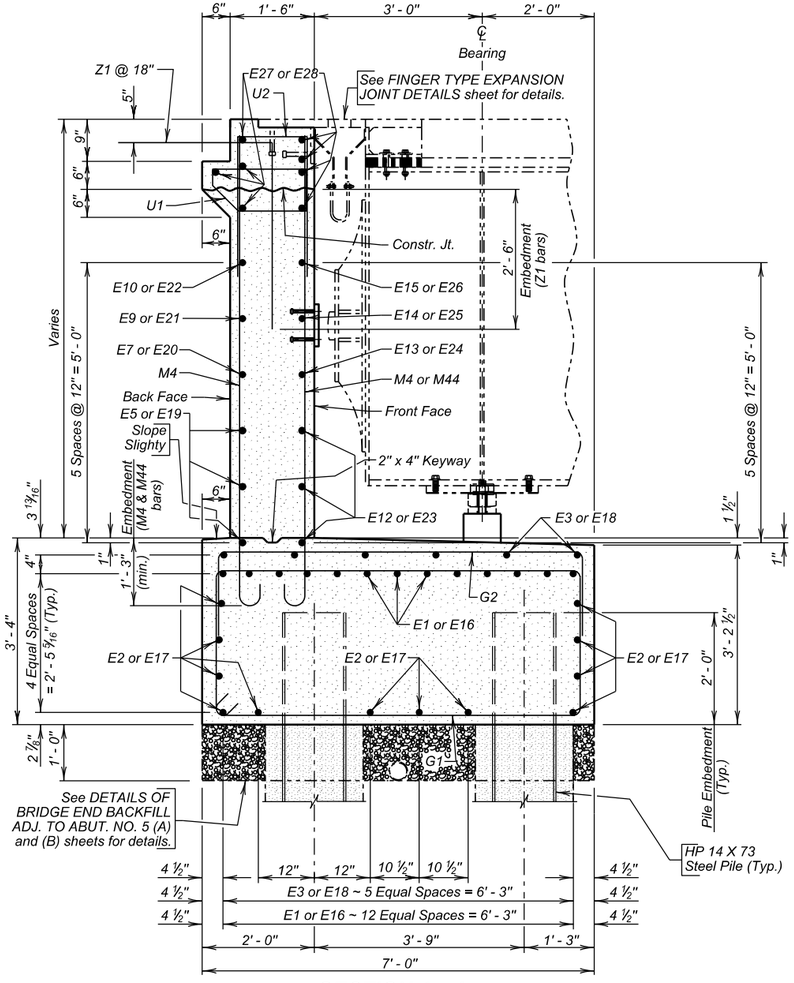
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

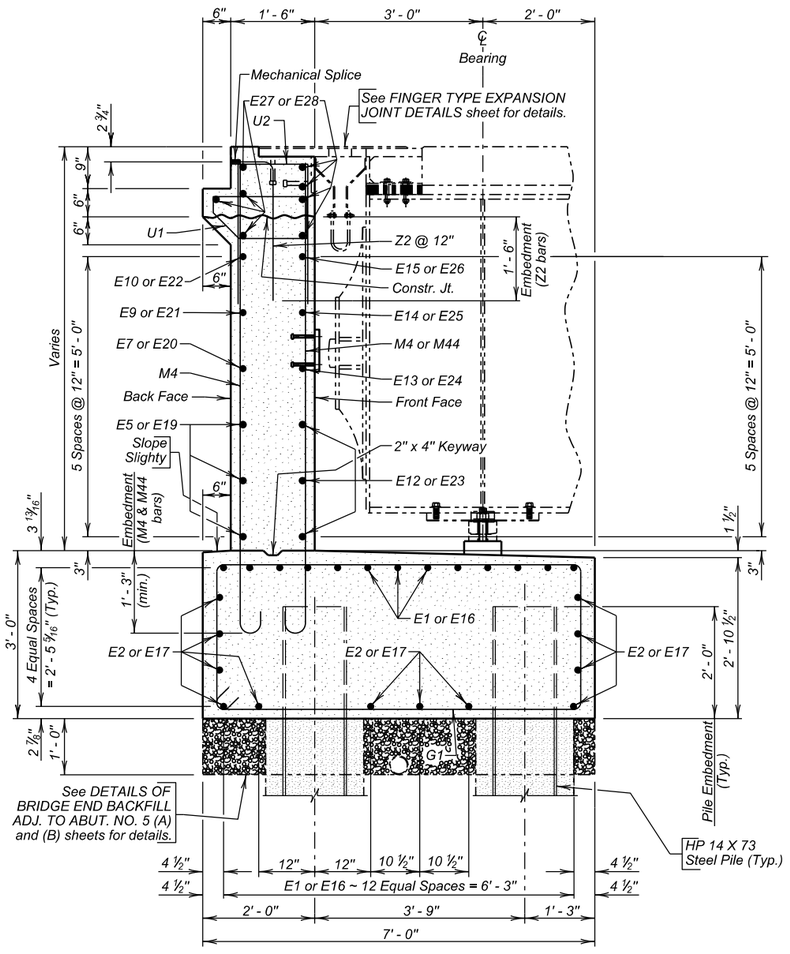


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA17 | | |

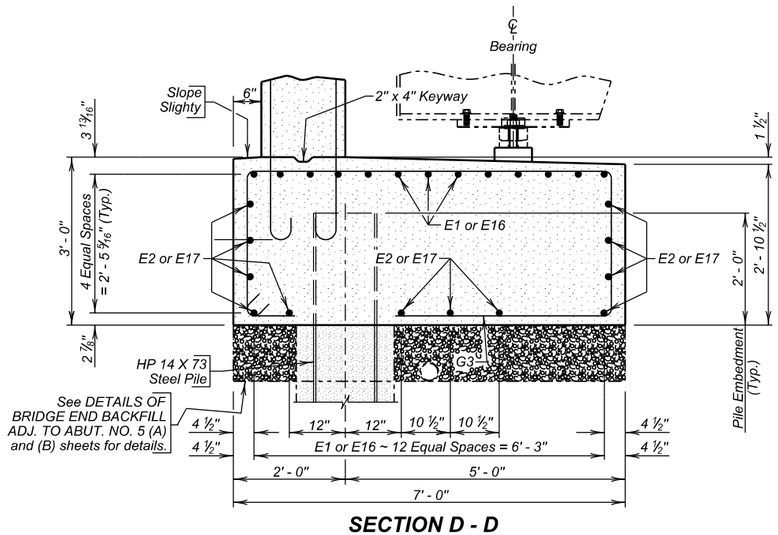
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E20 | E60 |




## SECTION A - A




## SECTION B - B




## SECTION D - D

## ESTIMATED QUANTITIES

| | ITEM | UNIT | QUANTITY | |
|---|---|---|---|---|
| | | | Phase 1 | Phase 2 |
| ϕ | Class A45 Concrete, Bridge | Cu. Yd. | 41.3 | 55.0 |
| | Reinforcing Steel | Lb. | 4671 | 5706 |
| | Epoxy Coated Reinforcing Steel | Lb. | 1326 | 1672 |
| | Structure Excavation, Bridge | Cu. Yd. | 23.7 | 29.6 |
| | No. 4 Rebar Splice | Each | 7 | 7 |
| | HP 14 x 73 Steel Test Pile, Furnish and Drive | Ft. | 1 @ 50' = 50' | ——— |
| | HP 14 x 73 Steel Bearing Pile, Furnish and Drive | Ft. | 10 @ 45' =450' | 14 @ 45' = 630' |
| | Preboring Pile | Ft. | 11 @ 40' = 440' | 14 @ 40' = 560' |

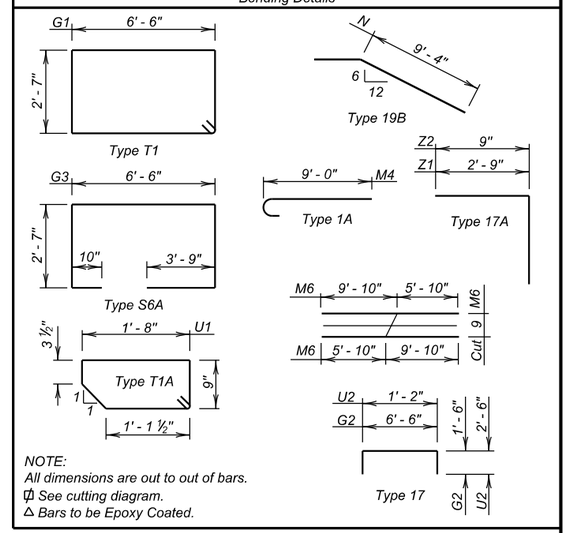
ϕ Each abutment includes 0.2 cu. yds. for grout pads.

## REINFORCING SCHEDULE

| | Mk. | No. | Size | Length | Type |
|---|---|---|---|---|---|
| Phase 1 | E1 | 13 | 8 | 33' - 9" | Str. |
| | E2 | 12 | 6 | 32' - 10" | Str. |
| | E3 | 6 | 8 | 10' - 9" | Str. |
| | E4 | 6 | 8 | 9' - 4" | Str. |
| | E5 | 3 | 8 | 43' - 5" | Str. |
| | E6 | 3 | 8 | 24' - 8" | Str. |
| | E7 | 1 | 8 | 42' - 6" | Str. |
| | E8 | 3 | 8 | 22' - 9" | Str. |
| | E9 | 1 | 8 | 40' - 6" | Str. |
| | E10 | 1 | 8 | 38' - 6" | Str. |
| | E11 | 3 | 5 | 9' - 4" | Str. |
| | E12 | 3 | 5 | 42' - 1" | Str. |
| △ | E13 | 1 | 5 | 41' - 2" | Str. |
| △ | E14 | 1 | 5 | 39' - 2" | Str. |
| | E15 | 1 | 5 | 37' - 2" | Str. |
| △ | E27 | 8 | 8 | 33' - 10" | Str. |
| | G1 | 24 | 4 | 19' - 1" | T1 |
| | G2 | 6 | 4 | 9' - 6" | 17 |
| | G3 | 3 | 4 | 16' - 3" | S6A |
| | M4 | 75 | 5 | 9' - 5" | 1A |
| | M5 | 2 | 5 | 10' - 0" | Str. |
| ℄ | M6 | 9 | 5 | 15' - 8" | Str. |
| △ | M44 | 2 | 5 | 9' - 5" | Str. |
| | N | 2 | 8 | 10 - 4" | 19B |
| △ | U1 | 26 | 5 | 5' - 0" | T1A |
| △ | U2 | 26 | 5 | 6' - 2" | 17 |
| △ | Z1 | 14 | 7 | 6' - 4" | 17A |
| △ | Z2 | 7 | 4 | 3' - 3" | 17A |

| | Mk. | No. | Size | Length | Type |
|---|---|---|---|---|---|
| Phase 2 | E4 | 6 | 8 | 9' - 4" | Str. |
| | E6 | 3 | 8 | 24' - 8" | Str. |
| | E8 | 3 | 8 | 22' - 9" | Str. |
| | E11 | 3 | 5 | 9' - 4" | Str. |
| | E16 | 13 | 8 | 39' - 11" | Str. |
| | E17 | 12 | 6 | 39' - 11" | Str. |
| | E18 | 6 | 8 | 16' - 10" | Str. |
| | E19 | 3 | 8 | 49' - 9" | Str. |
| | E20 | 1 | 8 | 48' - 10" | Str. |
| | E21 | 1 | 8 | 46' - 10" | Str. |
| | E22 | 1 | 8 | 44' - 10" | Str. |
| | E23 | 3 | 5 | 49' - 8" | Str. |
| △ | E24 | 1 | 5 | 48' - 8" | Str. |
| △ | E25 | 1 | 5 | 46' - 8" | Str. |
| | E26 | 1 | 5 | 44' - 8" | Str. |
| △ | E28 | 8 | 8 | 40' - 2" | Str. |
| | G1 | 33 | 4 | 19' - 1" | T1 |
| | G2 | 16 | 4 | 9' - 6" | 17 |
| | G3 | 3 | 4 | 16' - 3" | S6A |
| | M4 | 103 | 5 | 9' - 5" | 1A |
| | M5 | 2 | 5 | 10' - 0" | Str. |
| ℄ | M6 | 9 | 5 | 15' - 8" | Str. |
| △ | M44 | 2 | 5 | 9' - 5" | Str. |
| | N | 2 | 8 | 10 - 4" | 19B |
| △ | U1 | 35 | 5 | 5' - 0" | T1A |
| △ | U2 | 35 | 5 | 6' - 2" | 17 |
| △ | Z1 | 21 | 7 | 6' - 4" | 17A |
| △ | Z2 | 7 | 4 | 3' - 3" | 17A |

Bending Details




NOTE:
All dimensions are out to out of bars.
℄ See cutting diagram.
△ Bars to be Epoxy Coated.

**ABUTMENT NO. 5 DETAILS (C)**

FOR

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

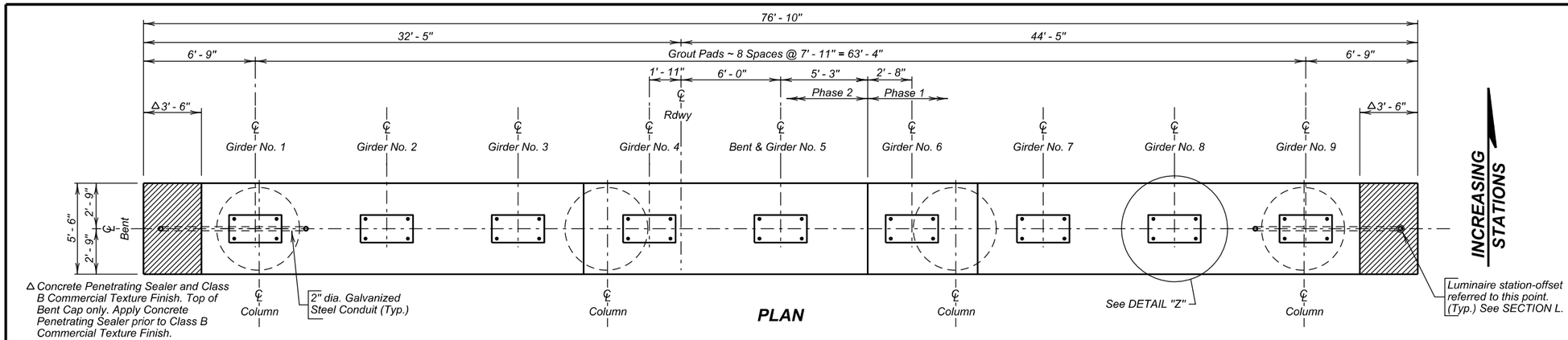
S. D. DEPT. OF TRANSPORTATION

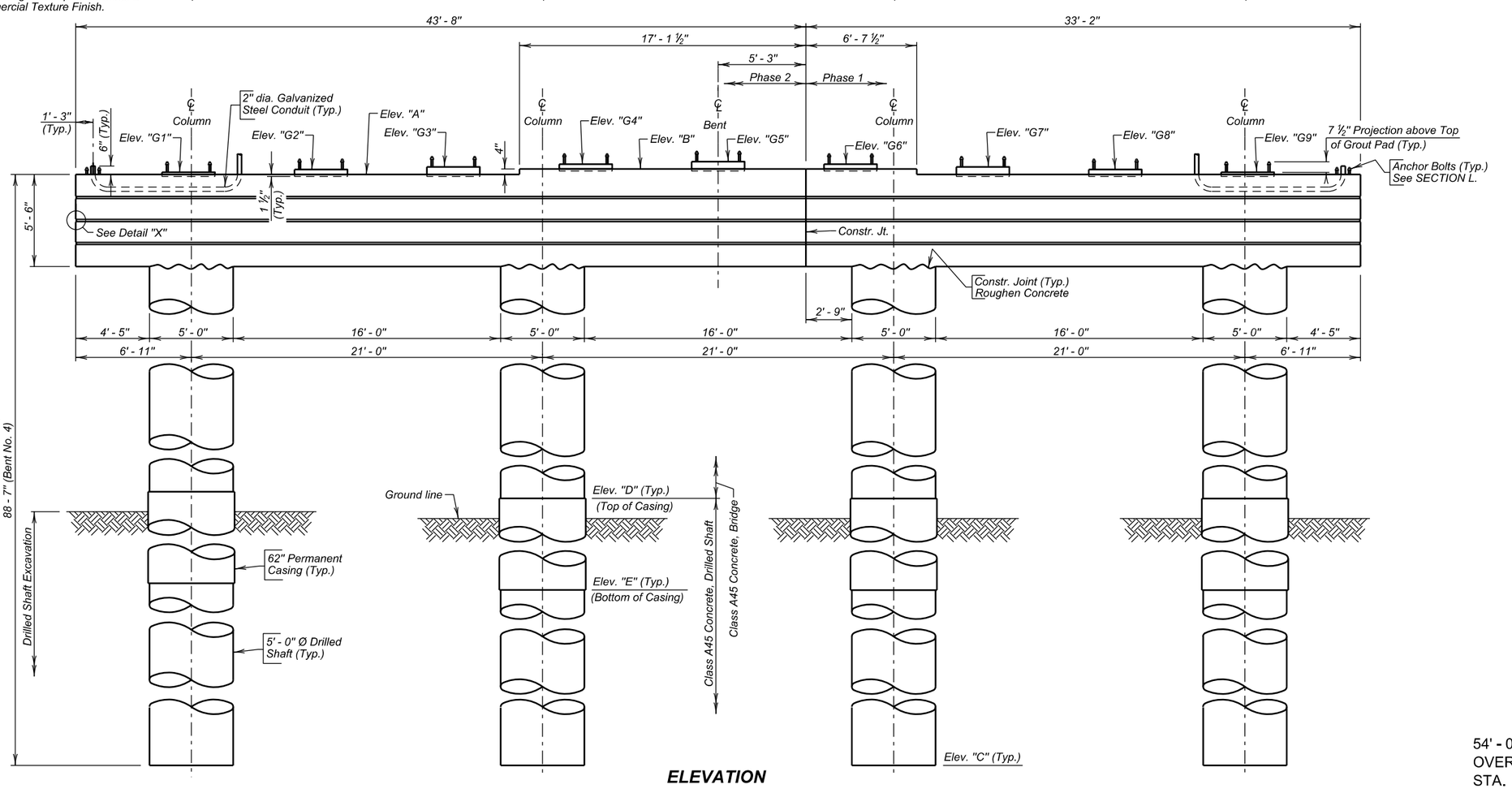
MAY 2025

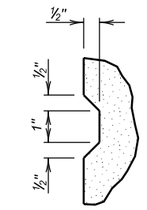
18 OF 58

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA18 | | |

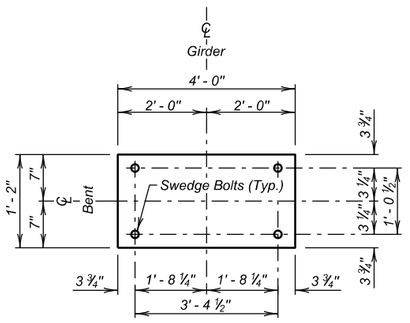
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E21 | E60 |




**DETAIL "X"**




**DETAIL "Z"**
(Grout Pad)

**TABLE OF ELEVATIONS**

| Bent No. | ★Elev. "G1" | ★Elev. "G2" | ★Elev. "G3" | ★Elev. "G4" | ★Elev. "G5" | ★Elev. "G6" | ★Elev. "G7" | ★Elev. "G8" | ★Elev. "G9" | Elev. "A" | Elev. "B" | Elev. "C" | Elev. "D" | Elev. "E" |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 3019.93 | 3020.09 | 3020.24 | 3020.40 | 3020.56 | 3020.40 | 3020.24 | 3020.09 | 3019.93 | 3019.80 | 3020.13 | 2938.00 | 3009.00 | 2985.00 |
| 3 | 3025.82 | 3025.98 | 3026.13 | 3026.29 | 3026.45 | 3026.29 | 3026.13 | 3025.98 | 3025.82 | 3025.69 | 3026.03 | 2943.00 | 3011.00 | 2989.00 |
| 4 | 3031.71 | 3031.87 | 3032.02 | 3032.18 | 3032.34 | 3032.18 | 3032.02 | 3031.87 | 3031.71 | 3031.58 | 3031.92 | 2943.00 | 3009.00 | 2989.00 |

NOTE: Top of Grout Pad will be level and smooth.
★Elevations are Top of Grout Pad at centerline of bent.

**BENT LAYOUT**

FOR

# 595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

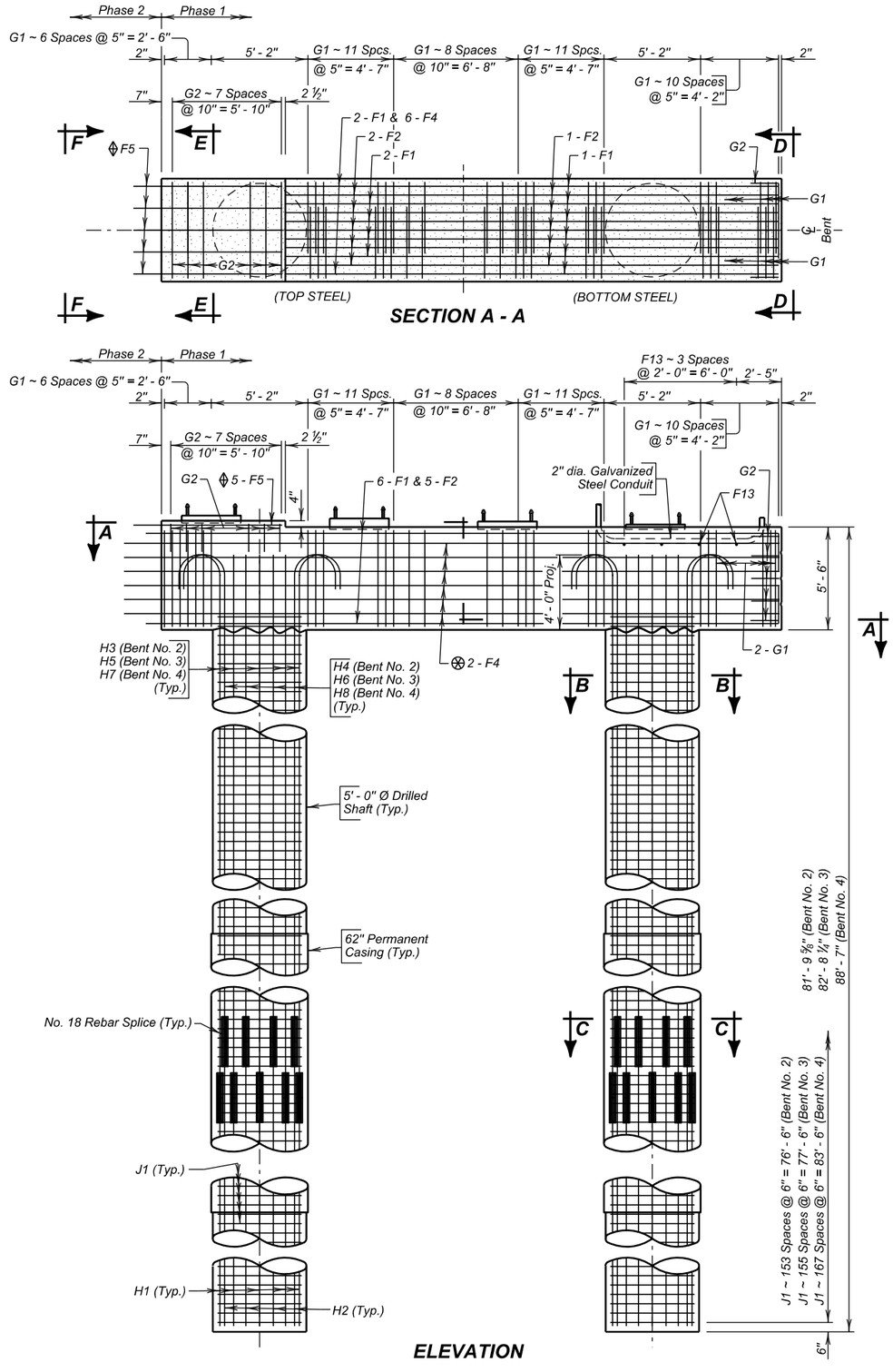
S. D. DEPT. OF TRANSPORTATION

MAY 2025



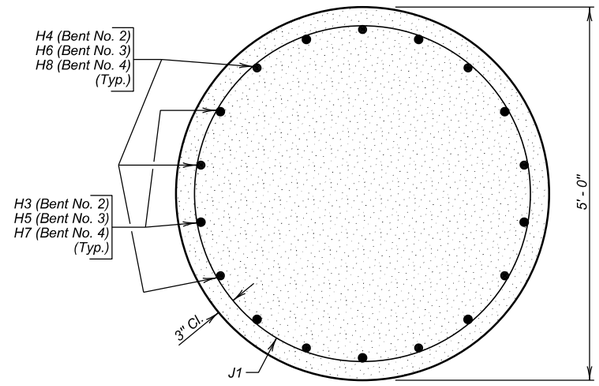
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | BB | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA19 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E22 | E60 |

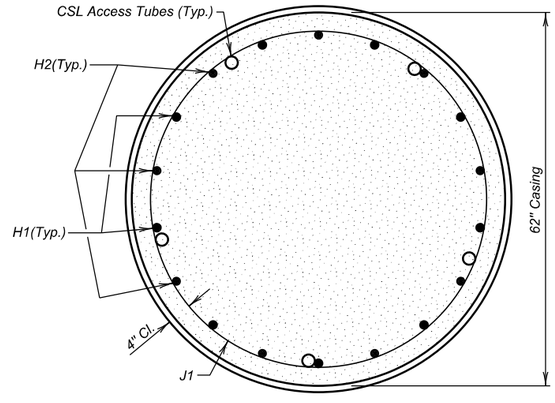



ELEVATION

NOTES:
◈ 1' - 6" min. lap
⊗ 2' - 0" min. lap




SECTION B - B




SECTION C - C

**BENT DETAILS (PHASE 1) (A)**

FOR

595' - 6" STEEL GIRDER BRIDGE

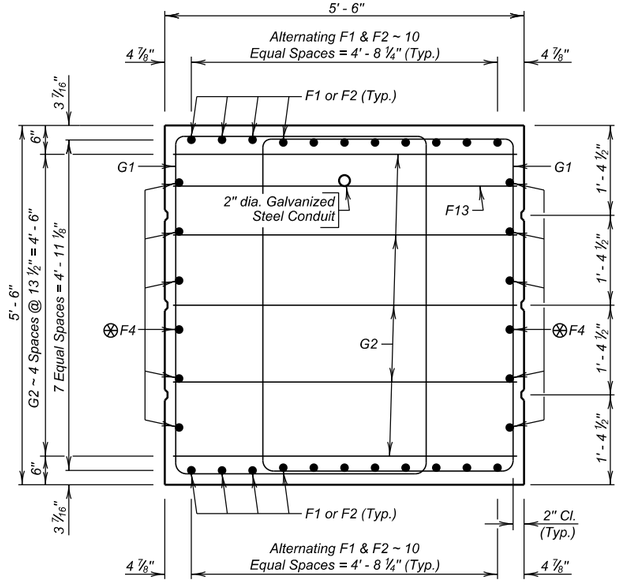
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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



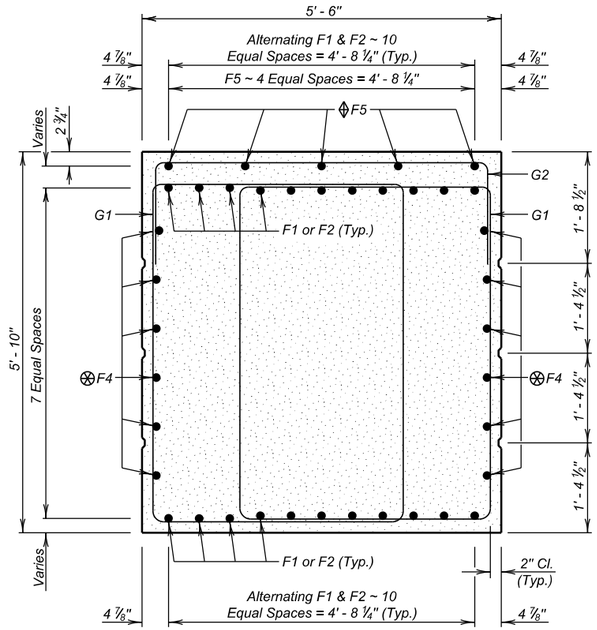
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | BB | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA20 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E23 | E60 |



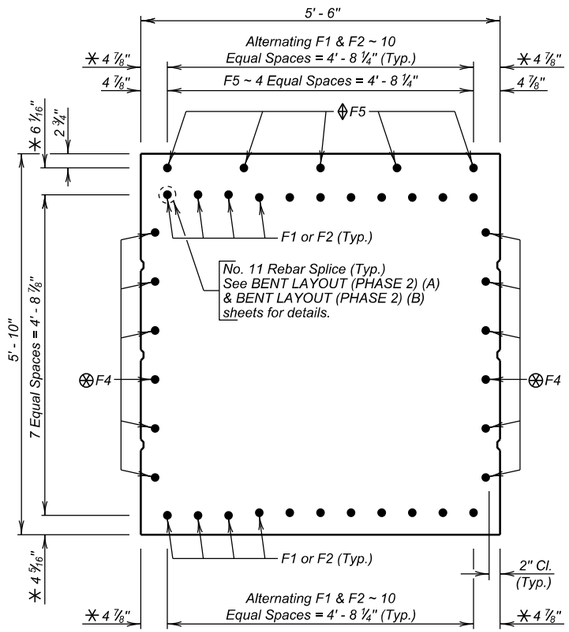

**VIEW D - D**

*(At Outside End of Bent Cap)*



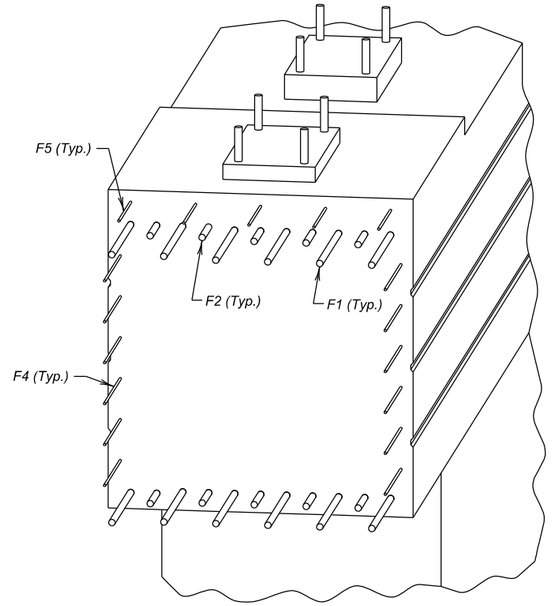

**SECTION E - E**

✳ NOTE:
Space F bars accordingly to ensure that the mechanical splices fit within the G1 bars.




**VIEW F - F**

*(At Mechnical Splice Locations)*



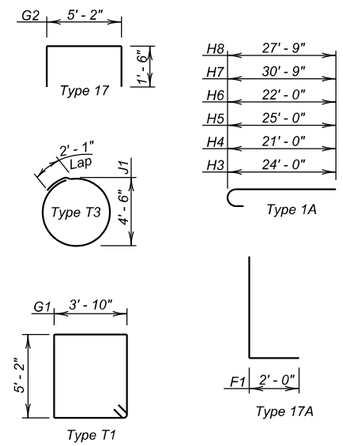

***ISOMETRIC VIEW***

*(Showing Phase 1 Cap Resteel at Constr. Jt.)*

## REINFORCING SCHEDULE

| | Mk. | No. | Size | Length | Type |
|---|---|---|---|---|---|
| | F1 | 12 | 11 | 37' - 5" | 17A |
| | F2 | 10 | 11 | 33' - 10" | Str. |
| | F4 | 12 | 5 | 35' - 2" | Str. |
| | F5 | 5 | 4 | 9' - 10" | Str. |
| | F13 | 4 | 5 | 5' - 3" | Str. |
| | G1 | 98 | 5 | 18' - 11" | T1 |
| | G2 | 14 | 4 | 8' - 2" | 17 |
| | H1 | 18 | 18 | 56' - 0" | Str. |
| | H2 | 18 | 18 | 59' - 0" | Str. |
| Bent No. 2 | H3 | 18 | 18 | 27' - 0" | 1A |
| Bent No. 2 | H4 | 18 | 18 | 24' - 0" | 1A |
| Bent No. 2 | J1 | 308 | 4 | 16' - 4" | T3 |
| Bent No. 3 | H5 | 18 | 18 | 28' - 0" | 1A |
| Bent No. 3 | H6 | 18 | 18 | 25' - 0" | 1A |
| Bent No. 3 | J1 | 312 | 4 | 16' - 4" | T3 |
| Bent No. 4 | H7 | 18 | 18 | 33' - 9" | 1A |
| Bent No. 4 | H8 | 18 | 18 | 30' - 9" | 1A |
| Bent No. 4 | J1 | 336 | 4 | 16' - 4" | T3 |

Bending Details




NOTES:
All dimensions are out to out of bars.

## ESTIMATED QUANTITIES

| | ITEM | UNIT | QUANTITY | | |
|---|---|---|---|---|---|
| | | | Bent No. 2 | Bent No. 3 | Bent No. 4 |
| ϕ | Class A45 Concrete, Bridge | Cu. Yd. | 45.2 | 50.9 | 62.3 |
| | Reinforcing Steel | Lb. | 50685 | 51218 | 54296 |
| | Drilled Shaft Excavation | Cu. Yd. | 101.8 | 96.2 | 94.2 |
| | Class A45 Concrete, Drilled Shaft | Cu. Yd. | 103.2 | 99.0 | 96.0 |
| | 62" Permanent Casing | Ft. | 2 @ 24' = 48' | 2 @ 22' = 44' | 2 @ 20' = 40' |
| | No. 18 Rebar Splice | Each | 36 | 36 | 36 |
| | Concrete Penetrating Sealer | Sq. Yd. | 2 | 2 | 2 |

ϕ Each bent includes 0.2 cu. yds. for grout pads.

**BENT DETAILS (PHASE 1) (B)**

FOR

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

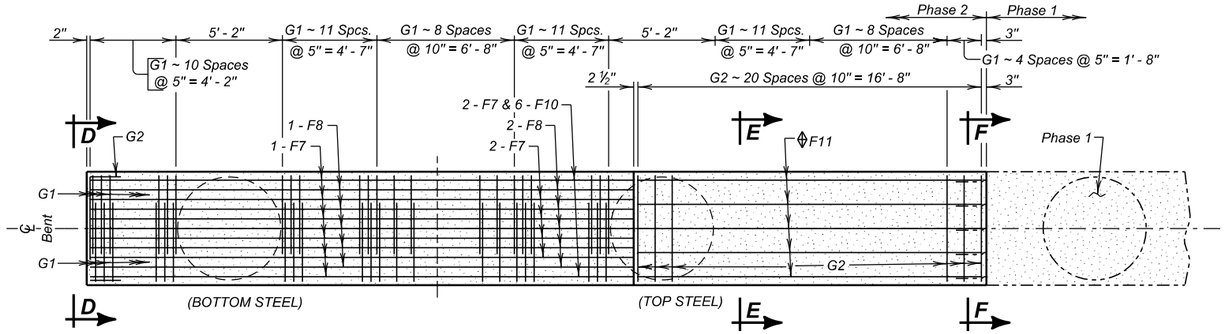
S. D. DEPT. OF TRANSPORTATION

MAY 2025

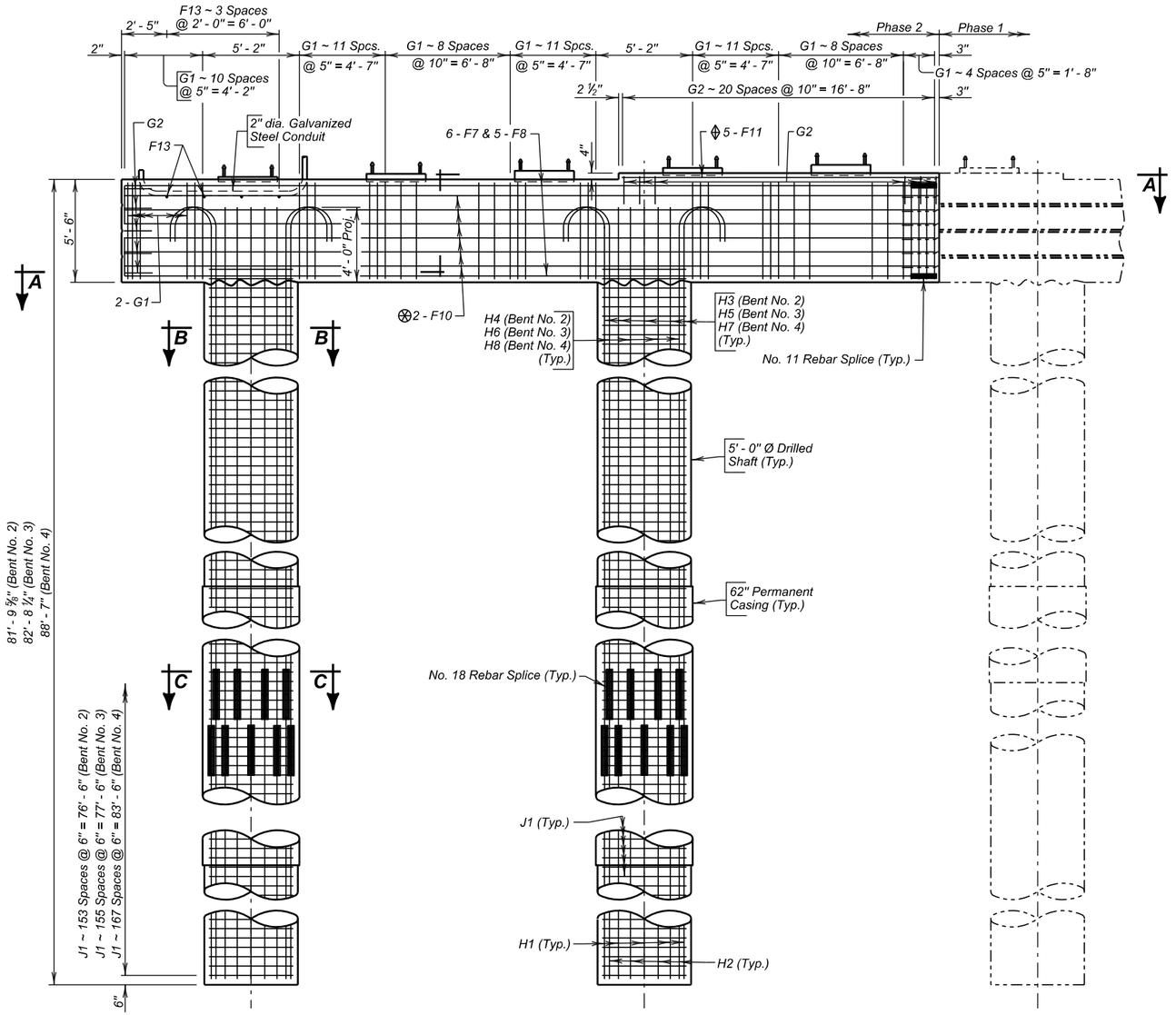


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | BB | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA21 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E24 | E60 |

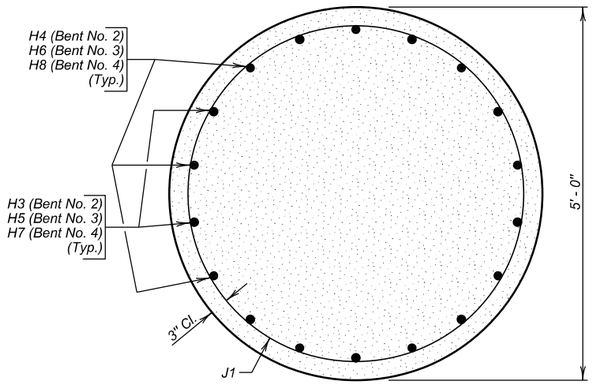



**SECTION A - A**




**ELEVATION**

NOTES:
- ⧫ 1' - 6" min. lap
- ⊗ 2' - 0" min. lap




**SECTION B - B**




**SECTION C - C**

**BENT DETAILS (PHASE 2) (A)**

FOR

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

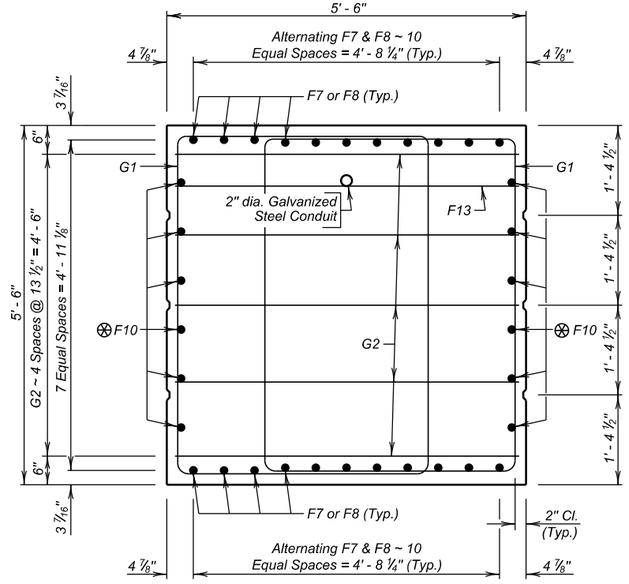
S. D. DEPT. OF TRANSPORTATION

MAY 2025

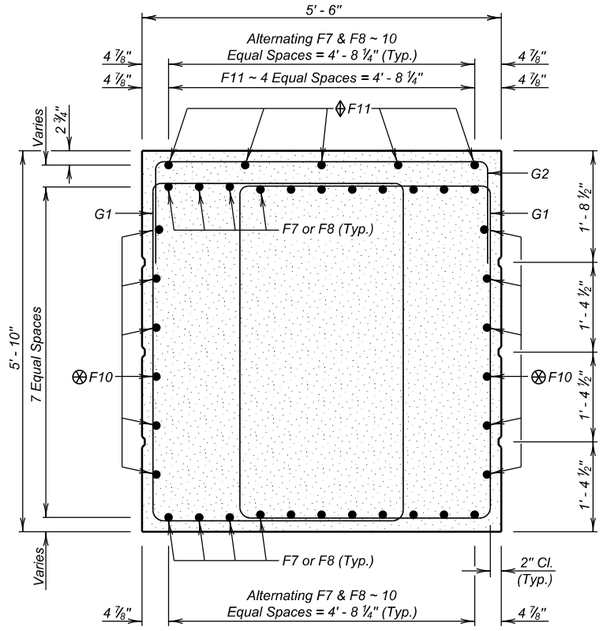


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | BB | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA22 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E25 | E60 |

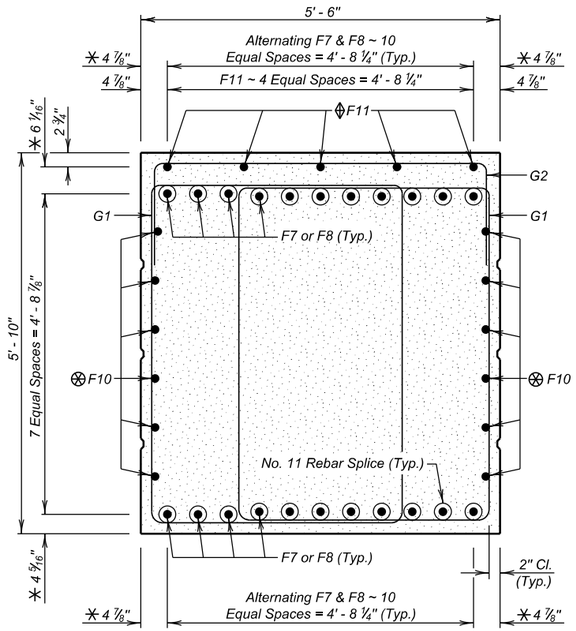



### VIEW D - D
(At Outside End of Bent Cap)

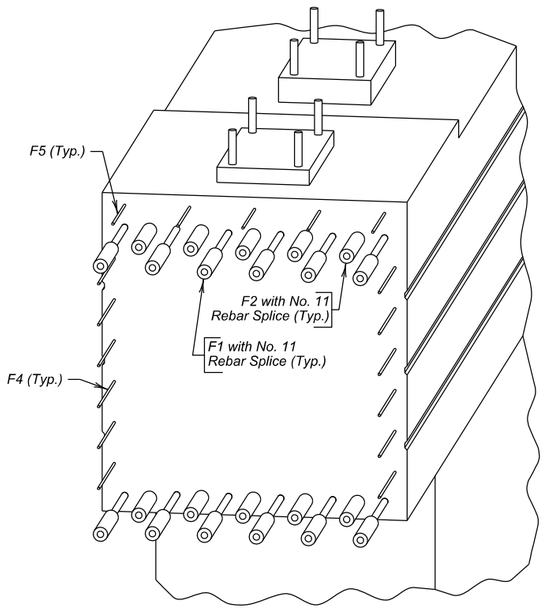



### SECTION E - E

✳ NOTE:
Space F bars accordingly to ensure that the mechanical splices fit within the G1 bars.




### SECTION F - F
(At Mechnical Splice Locations)

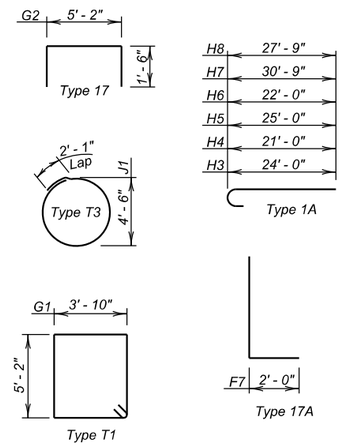



### ISOMETRIC VIEW
(Showing Phase 1 Cap Resteel at Constr. Jt.)

## REINFORCING SCHEDULE

| | Mk. | No. | Size | Length | Type |
|---|---|---|---|---|---|
| | F7 | 12 | 11 | 43' - 1" | 17A |
| | F8 | 10 | 11 | 42' - 8" | Str. |
| | F10 | 12 | 5 | 43' - 4" | Str. |
| | F11 | 5 | 4 | 15' - 1" | Str. |
| | F13 | 4 | 5 | 5' - 3" | Str. |
| | G1 | 132 | 5 | 18' - 11" | T1 |
| | G2 | 26 | 4 | 8' - 2" | 17 |
| | H1 | 18 | 18 | 56' - 0" | Str. |
| | H2 | 18 | 18 | 59' - 0" | Str. |
| Bent No. 2 | H3 | 18 | 18 | 27' - 0" | 1A |
| Bent No. 2 | H4 | 18 | 18 | 24' - 0" | 1A |
| Bent No. 2 | J1 | 308 | 4 | 16' - 4" | T3 |
| Bent No. 3 | H5 | 18 | 18 | 28' - 0" | 1A |
| Bent No. 3 | H6 | 18 | 18 | 25' - 0" | 1A |
| Bent No. 3 | J1 | 312 | 4 | 16' - 4" | T3 |
| Bent No. 4 | H7 | 18 | 18 | 33' - 9" | 1A |
| Bent No. 4 | H8 | 18 | 18 | 30' - 9" | 1A |
| Bent No. 4 | J1 | 336 | 4 | 16' - 4" | T3 |

Bending Details




NOTES:
All dimensions are out to out of bars.

## ESTIMATED QUANTITIES

| | ITEM | UNIT | QUANTITY | | |
|---|---|---|---|---|---|
| | | | Bent No. 2 | Bent No. 3 | Bent No. 4 |
| ϕ | Class A45 Concrete, Bridge | Cu. Yd. | 58.1 | 63.8 | 74.9 |
| | Reinforcing Steel | Lb. | 52372 | 52905 | 55982 |
| | Drilled Shaft Excavation | Cu. Yd. | 101.8 | 96.2 | 94.2 |
| | Class A45 Concrete, Drilled Shaft | Cu. Yd. | 103.2 | 99.0 | 96.0 |
| | 62" Permanent Casing | Ft. | 2 @ 24' = 48' | 2 @ 22' = 44' | 2 @ 20' = 40' |
| | No. 18 Rebar Splice | Each | 36 | 36 | 36 |
| | No. 11 Rebar Splice | Each | 22 | 22 | 22 |
| | Concrete Penetrating Sealer | Sq. Yd. | 2 | 2 | 2 |

ϕ Each bent includes 0.3 cu. yds. for grout pads.

**BENT DETAILS (PHASE 2) (B)**

FOR

# 595' - 6" STEEL GIRDER BRIDGE

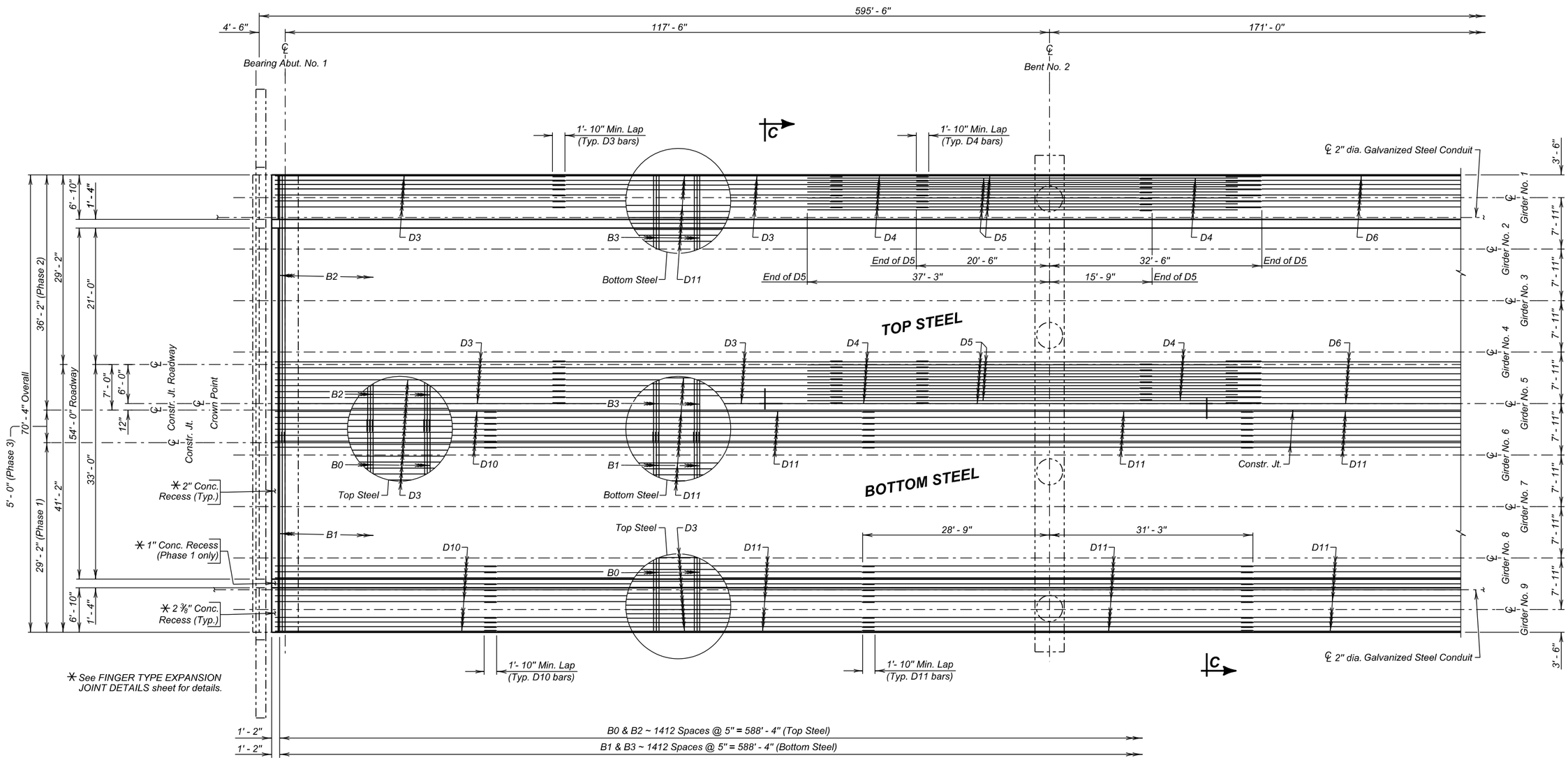
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | BB | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA23 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E26 | E60 |




***PARTIAL PLAN***

**SUPERSTRUCTURE DETAILS (A)**

FOR

## 595' - 6" STEEL GIRDER BRIDGE

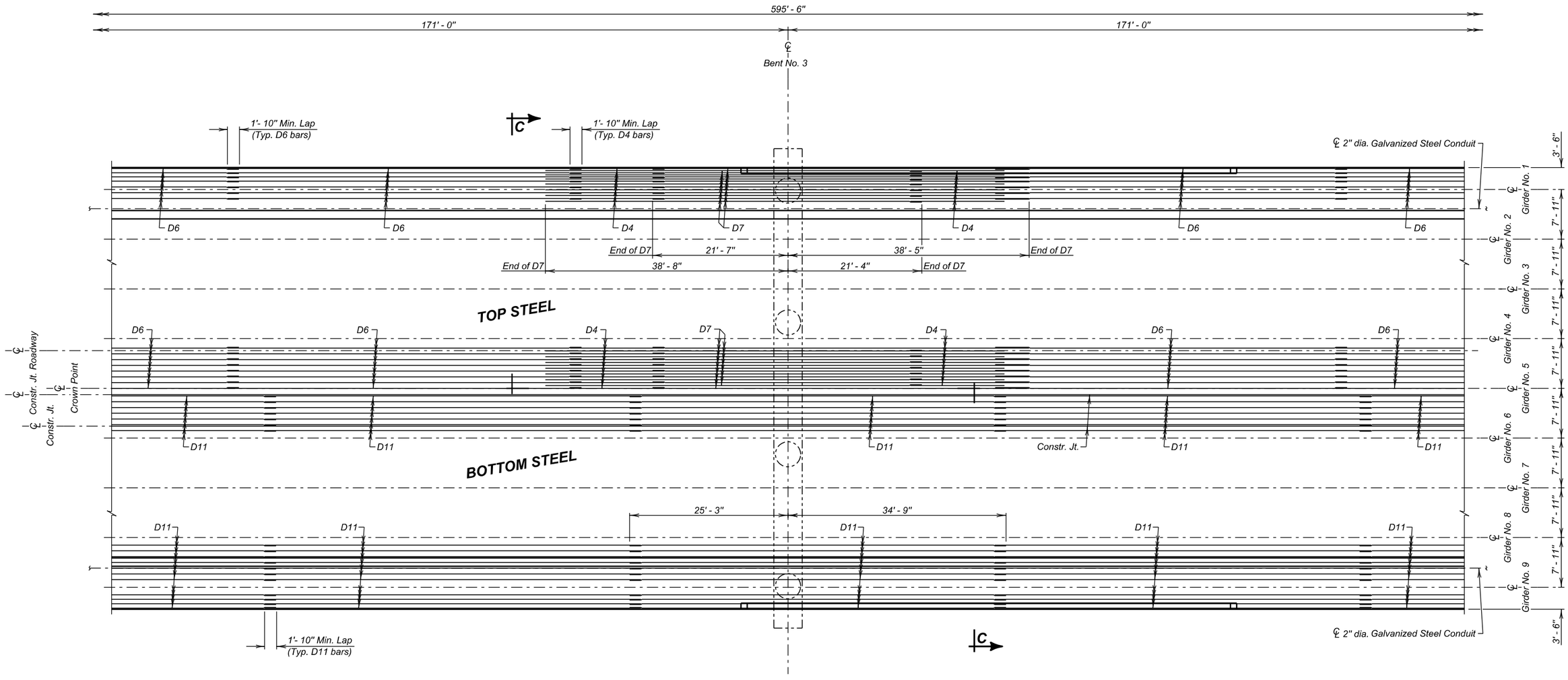
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA24 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E27 | E60 |




***PARTIAL PLAN***

**SUPERSTRUCTURE DETAILS (B)**

FOR

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW

OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E

STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56

STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

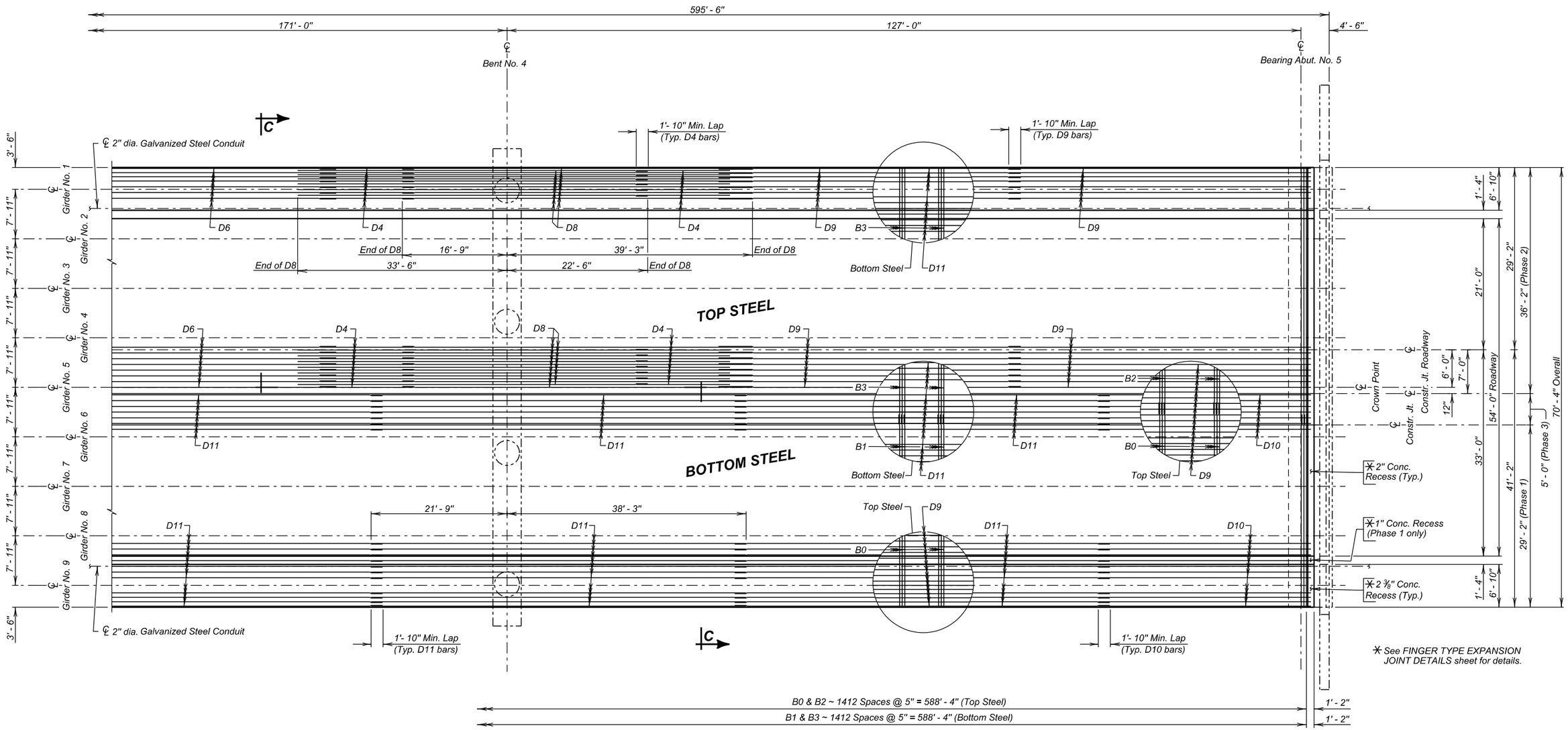
S. D. DEPT. OF TRANSPORTATION

MAY 2025

25 OF 58

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA25 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E28 | E60 |




***PARTIAL PLAN***

**SUPERSTRUCTURE DETAILS (C)**

FOR

# 595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW

OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E

STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56

STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

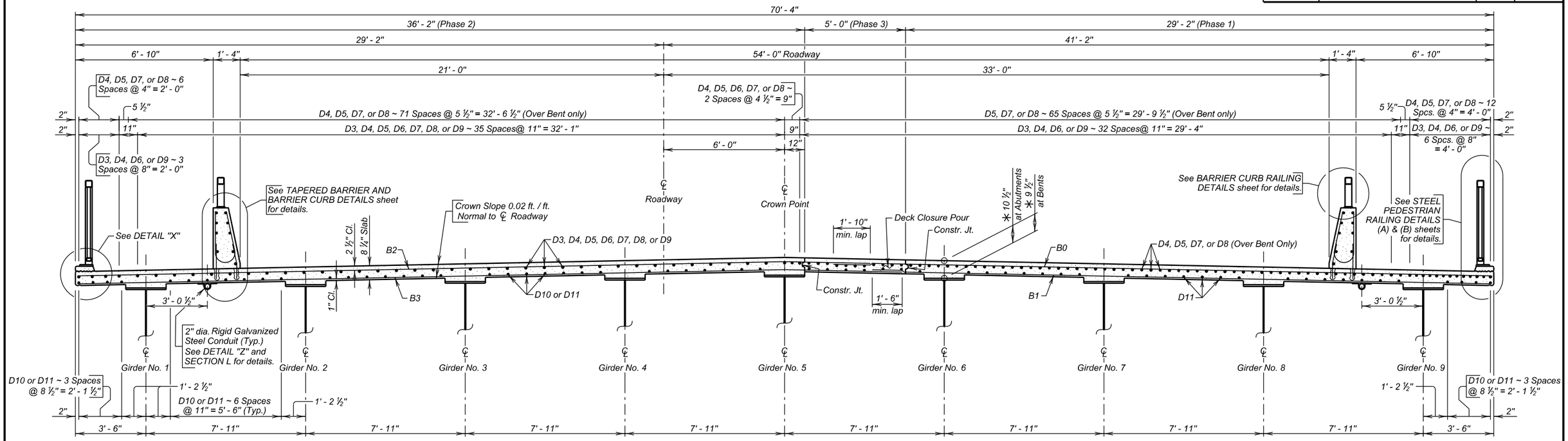
S. D. DEPT. OF TRANSPORTATION

MAY 2025

26 OF 58

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA26 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E29 | E60 |



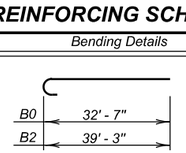

## SECTION C - C

✳ *Dimensions are at ℄ bearing: at other points along the girders this dimension will be computed as shown on the Slab Form Elevations & Erection Data sheet.*

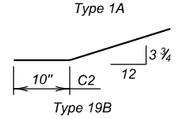
## REINFORCING SCHEDULE

| | Mk. | No. | Size | Length | Type | Bending Details |
|---|---|---|---|---|---|---|
| Phase 1 | B0 | 1413 | 5 | 33' - 2" | 1A | |
| | B1 | 1413 | 4 | 30' - 8" | Str. | |
| | C | 591 | 5 | 5' - 3" | S11 | |
| ⧫ | C1 | 591 | 5 | 1' - 6" | Str. | |
| ⧫ | C2 | 591 | 5 | 1' - 6" | 19B | |
| | D | 110 | 4 | 59' - 9" | Str. | |
| | D3 | 68 | 5 | 44' - 7" | Str. | |
| | D4 | 201 | 5 | 15' - 0" | Str. | |
| | D5 | 67 | 5 | 53' - 0" | Str. | |
| | D6 | 136 | 5 | 56' - 5" | Str. | |
| | D7 | 67 | 5 | 60' - 0" | Str. | |
| | D8 | 67 | 5 | 56' - 0" | Str. | |
| | D9 | 68 | 5 | 48' - 4" | Str. | |
| | D10 | 52 | 5 | 34' - 0" | Str. | |
| | D11 | 234 | 5 | 60' - 0" | Str. | |
| ⊛ | W1 | 75 | 4 | 7' - 0" | 17B | |
| ⊛ | W2 | 75 | 4 | 5' - 0" | 17 | |
| ⊛ | W3 | 78 | 4 | 3' - 8" | 16 | |

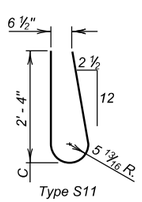
| | Mk. | No. | Size | Length | Type |
|---|---|---|---|---|---|
| Phase 2 & 3 | B2 | 1413 | 5 | 39' - 10" | 1A |
| | B3 | 1413 | 4 | 40' - 10" | Str. |
| | C | 591 | 5 | 5' - 3" | S11 |
| ⧫ | C1 | 591 | 5 | 1' - 6" | Str. |
| ⧫ | C2 | 591 | 5 | 1' - 6" | 19B |
| | D | 110 | 4 | 59' - 9" | Str. |
| | D3 | 92 | 5 | 44' - 7" | Str. |
| | D4 | 276 | 5 | 15' - 0" | Str. |
| | D5 | 92 | 5 | 53' - 0" | Str. |
| | D6 | 184 | 5 | 56' - 5" | Str. |
| | D7 | 92 | 5 | 60' - 0" | Str. |
| | D8 | 92 | 5 | 56' - 0" | Str. |
| | D9 | 92 | 5 | 48' - 4" | Str. |
| | D10 | 76 | 5 | 34' - 0" | Str. |
| | D11 | 342 | 5 | 60' - 0" | Str. |
| ⊛ | W1 | 75 | 4 | 7' - 0" | 17B |
| ⊛ | W2 | 75 | 4 | 5' - 0" | 17 |
| ⊛ | W3 | 78 | 4 | 3' - 8" | 16 |



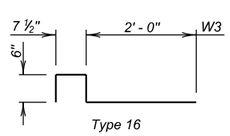
Type 1A



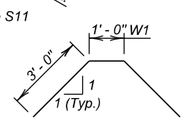
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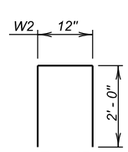
Type S11



Type 16

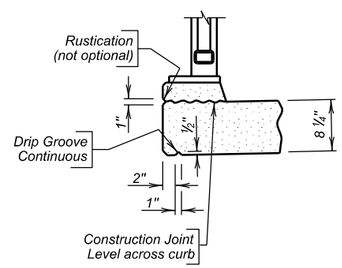


Type 17B



Type 17

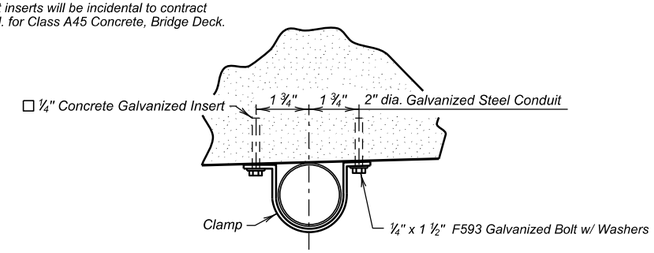
NOTES -
- All reinforcing steel will be stainless steel.
- See ABUTMENT DETAILS sheets for location of Z1 & Z2 bars.
- All dimensions are out to out of bars.
- ⧫ Drill and epoxy in place. Not included in reinforcing steel quantity.
- ⧓ Tip bars as required to maintain top and bottom clear cover.
- ⊛ See SIDEWALK DETAILS for placement.




## DETAIL "X"

☐ *Maximum Spacing for Concrete Galvanized Inserts is 5' - 0".*

*(All hardware except inserts will be incidental to contract unit price per Cu. Yd. for Class A45 Concrete, Bridge Deck. See SECTION L.*




## DETAIL "Z"

## ESTIMATED QUANTITIES

| | ITEM | UNIT | QUANTITY Phase 1 | Phase 2 | Phase 3 |
|---|---|---|---|---|---|
| ★ | Class A45 Concrete, Bridge Deck | Cu. Yd. | 486.6 | 672.7 | 145.1 |
| | Stainless Reinforcing Steel | Lb. | 133280 | 170041 | —— |
| △ | Structural Steel | Lump Sum | Lump Sum | Lump Sum | —— |
| | Concrete Penetrating Sealer | Sq. Yd. | 1914 | 2374 | 328 |
| ☆ | Install Dowel in Concrete | Each | 1182 | —— | 1182 |
| | 2" Rigid Galvanized Steel Conduit | Ft. | 675 | 675 | —— |

★ *Concrete quantity for Barrier Curb is 0.1184 Cu. Yd. per foot.*

△ *Item is an approximate quantity contained in the above bid item and is for information only. It includes all costs for installing shear connectors.*

| Phase 1 | Phase 2 | |
|---|---|---|
| 1015212 | 1285032 | Lbs. Structural Steel. |

☆ *Item included in quantity for dowel bars.*

| Phase 1 | Phase 2 | |
|---|---|---|
| 1849 | 1849 | Lbs. Stainless Re-Steel. |

**SUPERSTRUCTURE DETAILS (D)**

FOR

# 595' - 6" STEEL GIRDER BRIDGE

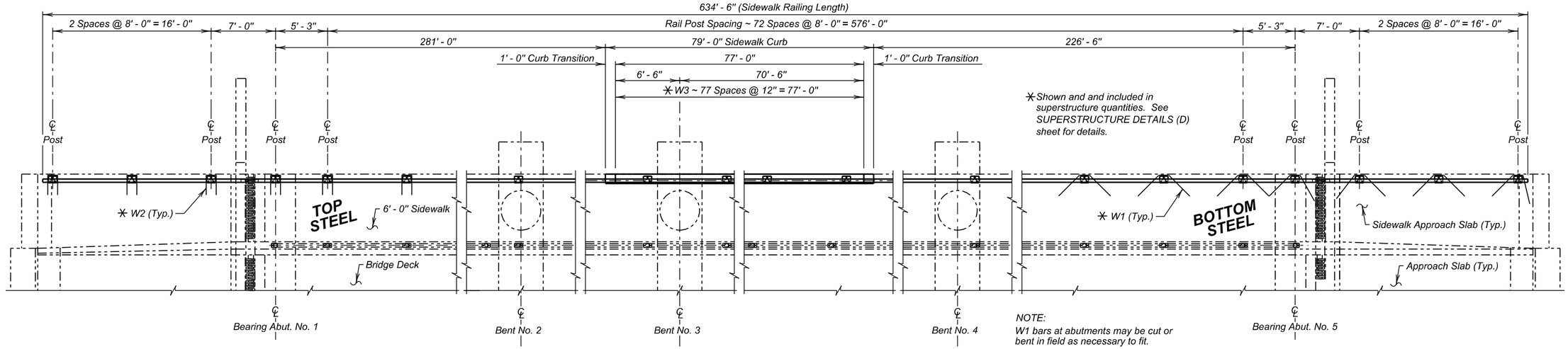
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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



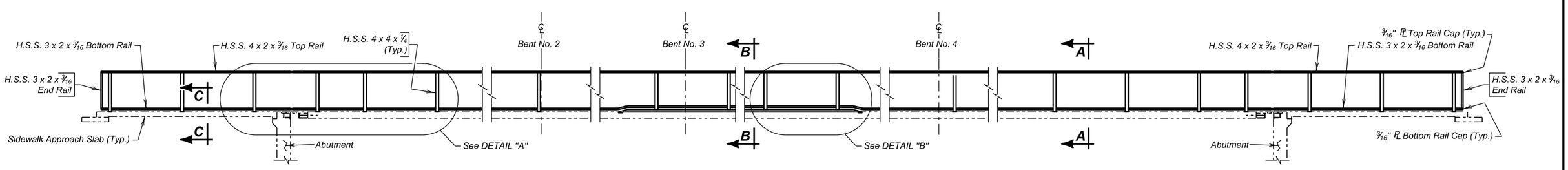
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA27 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E30 | E60 |



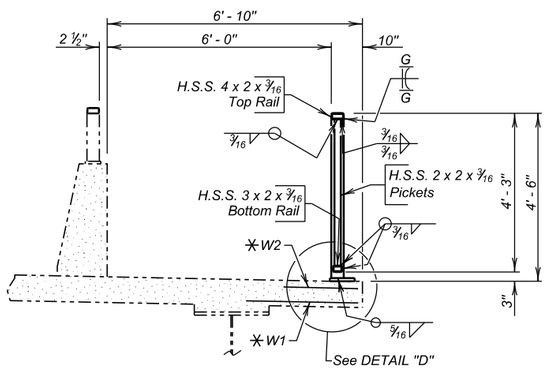

## PLAN

(Pickets NOT shown)

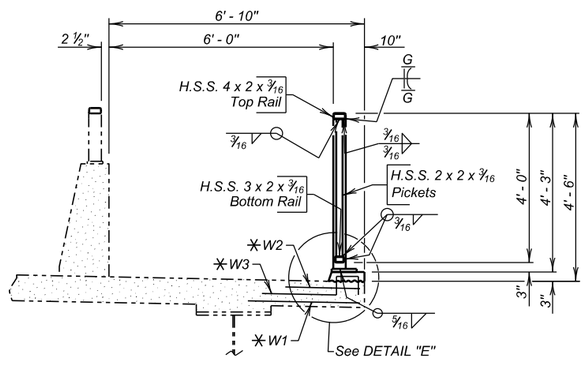



## ELEVATION

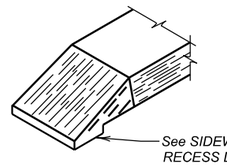
(Pickets and Anchors Bolts NOT shown)



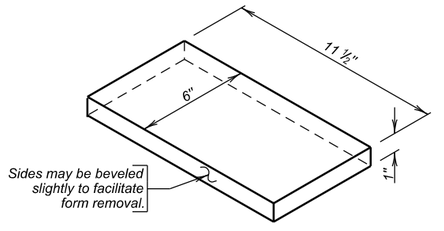

## SECTION A - A




## SECTION B - B




## CURB TRANSITION ISOMETRIC VIEW




## SIDEWALK CURB RECESS DETAIL

### ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Steel Pedestrian Railing on Sidewalk | Ft. | 1269.0 |

**STEEL PEDESTRIAN RAILING DETAILS (A)**

FOR

595' - 6" STEEL GIRDER BRIDGE

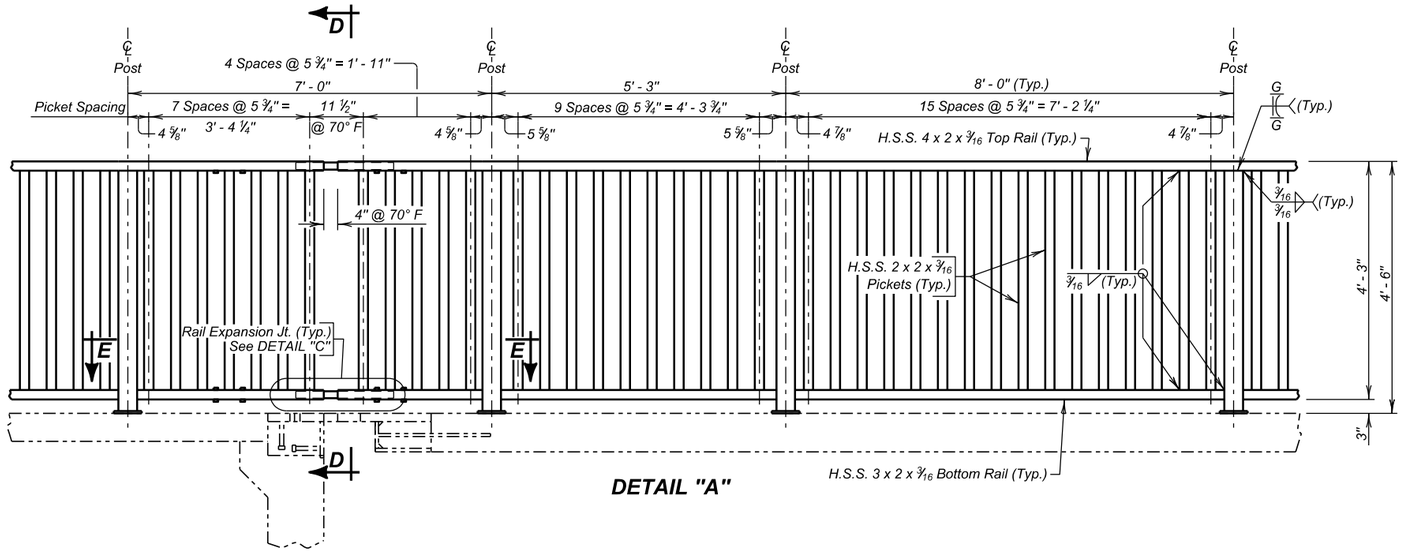
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

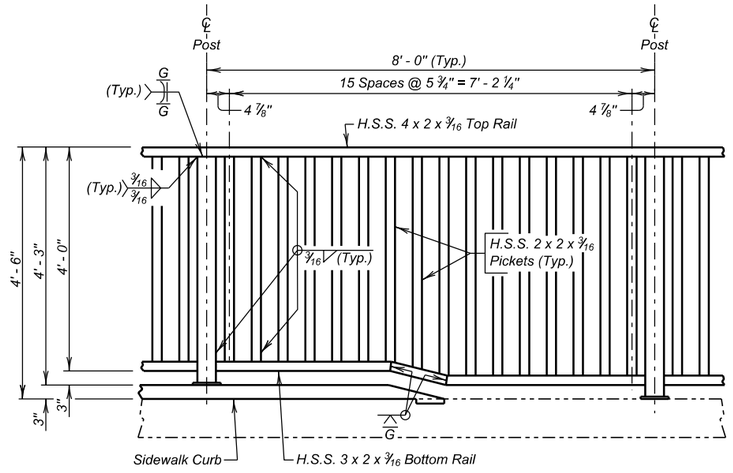


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steven A. Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA28 | | |

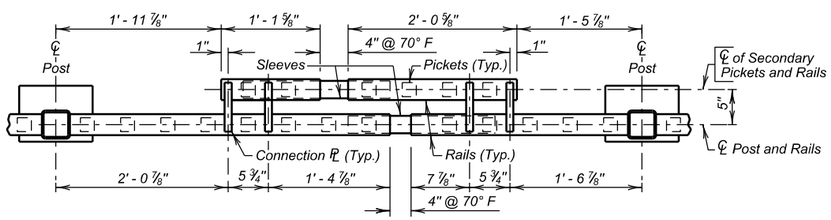
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E31 | E60 |



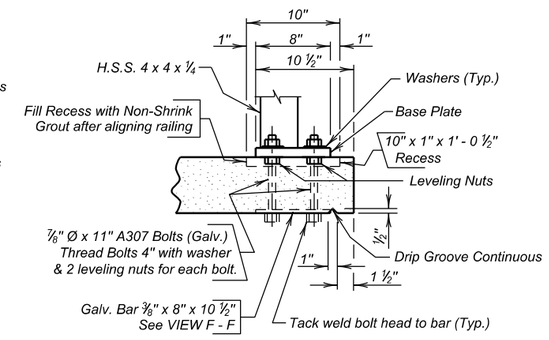

**DETAIL "A"**




**DETAIL "B"**

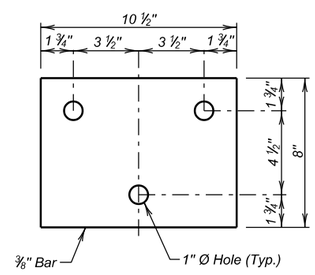



**SECTION E - E**

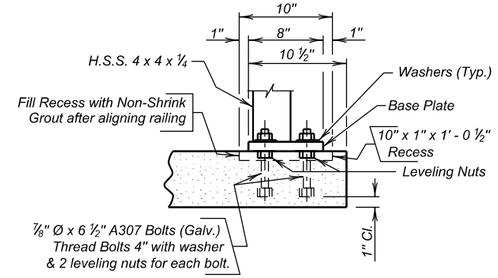



**DETAIL "D"**
(Sidewalk)

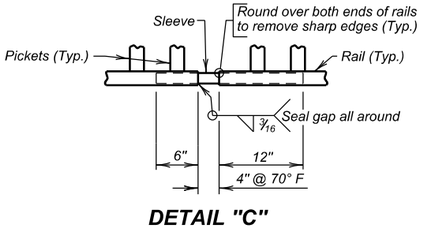
NOTE:
Vent holes will be required at each end of all hollow steel members to be galvanized.



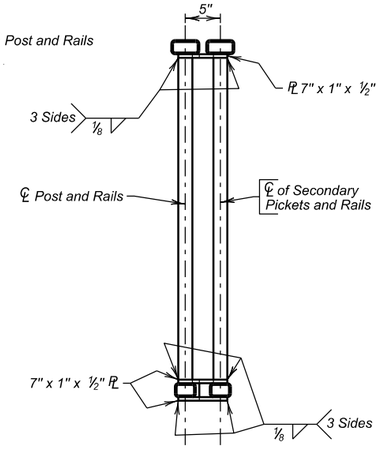

**VIEW F - F**



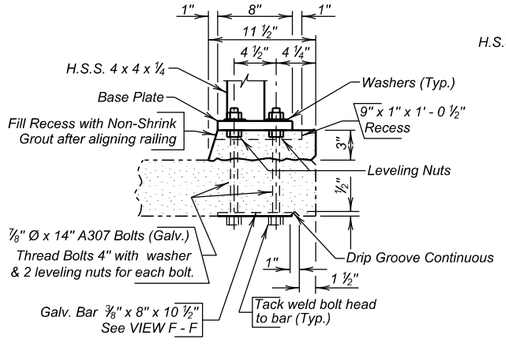

**SECTION C - C**
(Sidewalk Approach Slab)



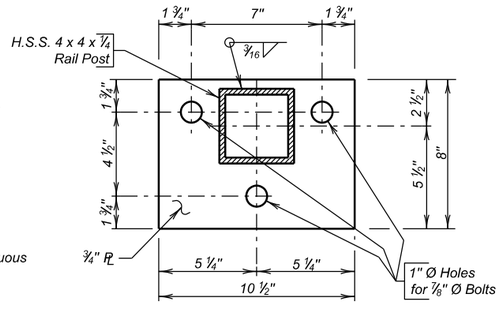

**DETAIL "C"**



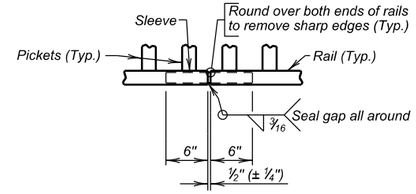

**SECTION D - D**




**DETAIL "E"**
(Sidewalk Curb)




**BASE PLATE DETAIL**
(For Steel Pedestrian Railing)




**RAIL FIELD SPLICE**

**STEEL PEDESTRIAN RAILING DETAILS (B)**

FOR

595' - 6" STEEL GIRDER BRIDGE

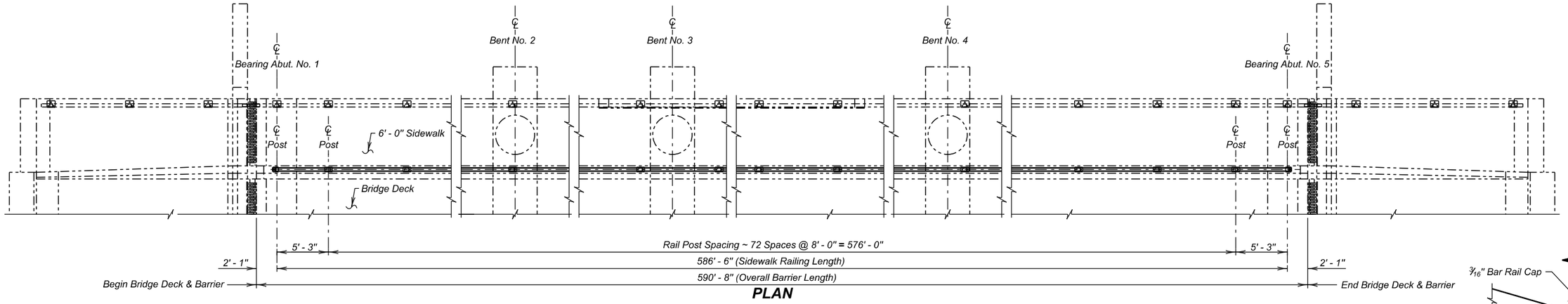
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

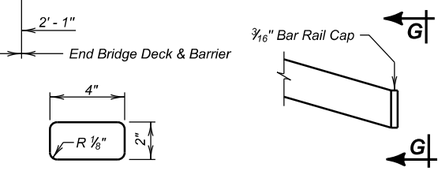


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA29 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E32 | E60 |

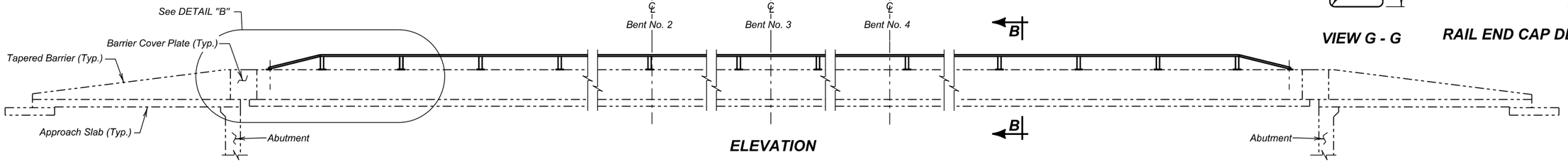



## PLAN

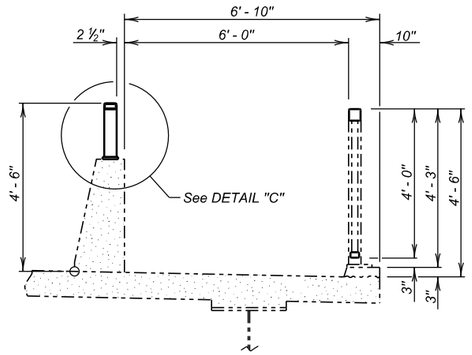



## VIEW G - G

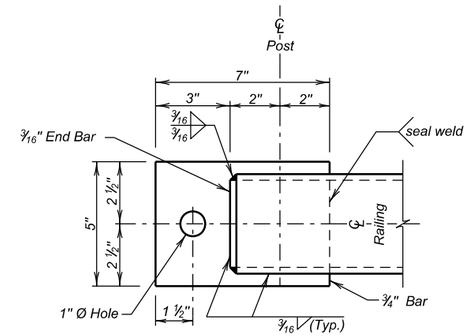
## RAIL END CAP DETAIL



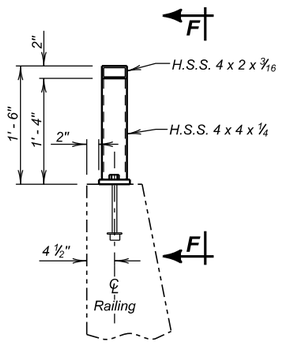

## ELEVATION



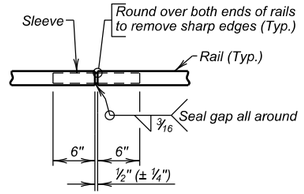

## SECTION B - B




## VIEW E - E



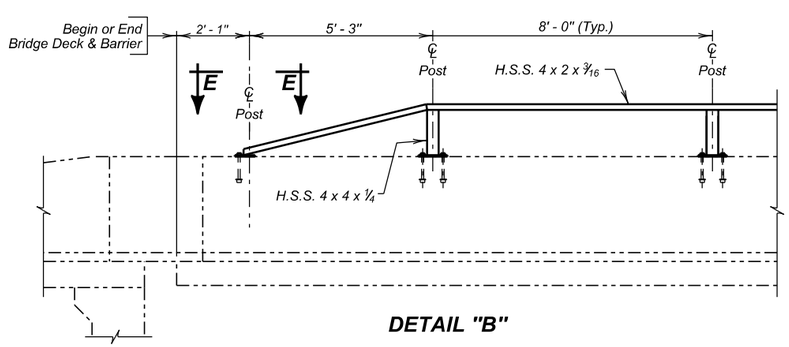

## DETAIL "C"



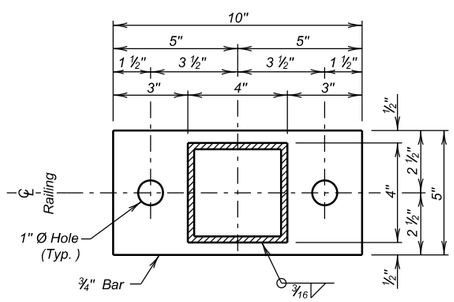

## RAIL FIELD SPLICE

### ESTIMATED QUANTITIES

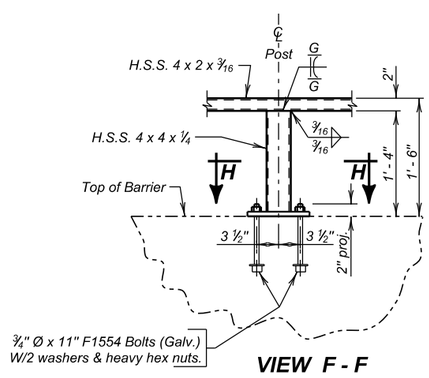
| ITEM | UNIT | QUANTITY |
|---|---|---|
| Steel Pedestrian Railing on Concrete Barrier | Ft. | 1173.0 |




## DETAIL "B"




## VIEW H - H




## VIEW F - F

**BARRIER CURB RAILING DETAILS**

FOR

## 595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

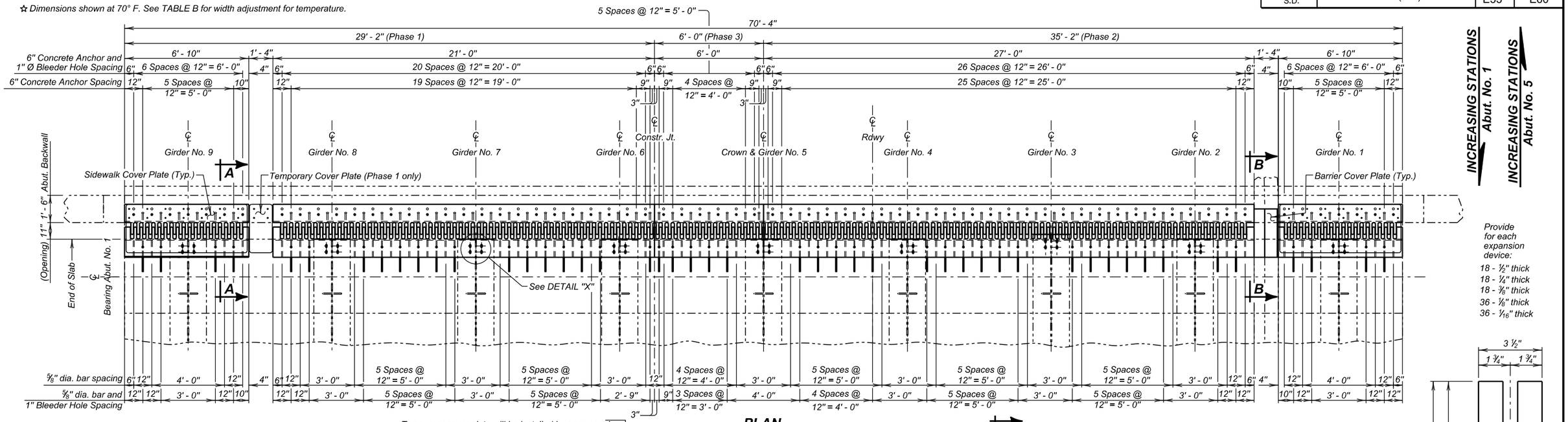
MAY 2025

30 OF 58

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson |
| BUTE04G4 | 04G4TA30 | | BRIDGE ENGINEER |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E33 | E60 |

☆ *Dimensions shown at 70° F. See TABLE B for width adjustment for temperature.*



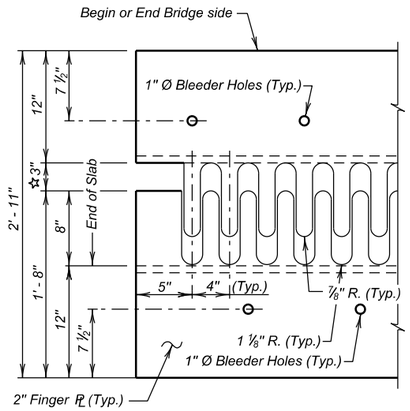

## PLAN
(Abut. No 1 shown Abut. No. 5 similar by rotation)

*Temporary cover plate will be installed by epoxy anchor, ferrule insert, or other method approved by the Engineer. This plate will be placed during Phase 1 and removed for the barrier placement in Phase 3.*

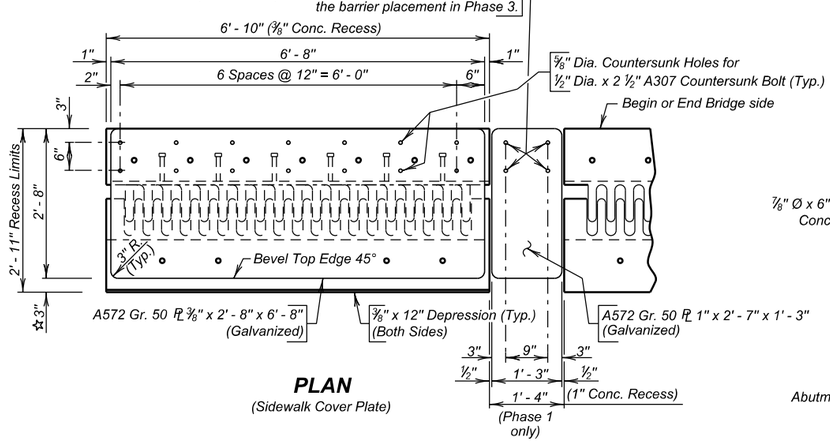
**INCREASING STATIONS** Abut. No. 1

**INCREASING STATIONS** Abut. No. 5

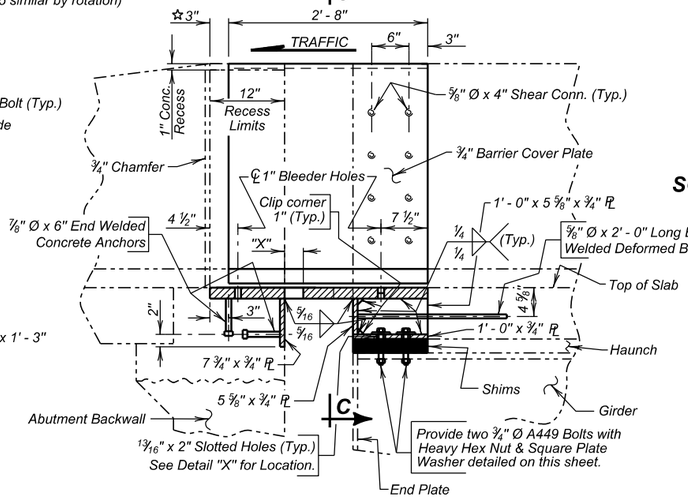
*Provide for each expansion device:*
- *18 - ½" thick*
- *18 - ¼" thick*
- *18 - ⅜" thick*
- *36 - ⅛" thick*
- *36 - 1/16" thick*



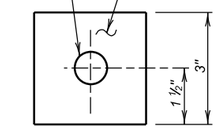

## FINGER DETAILS



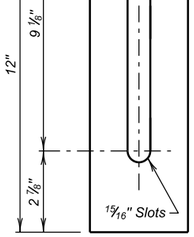

## PLAN
(Sidewalk Cover Plate)



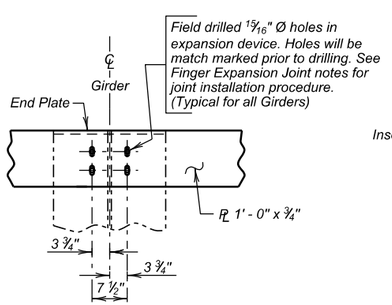

## SECTION B - B



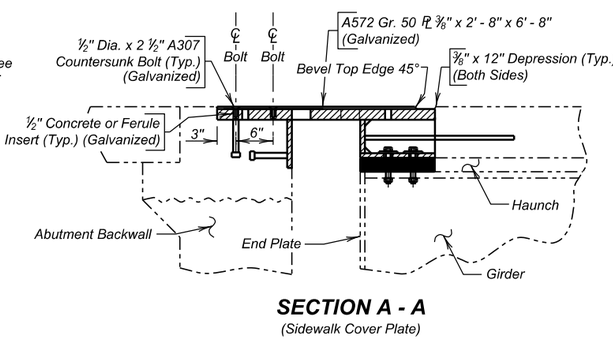

## SQUARE PLATE WASHER




## SHIM DETAIL




## DETAIL "X"

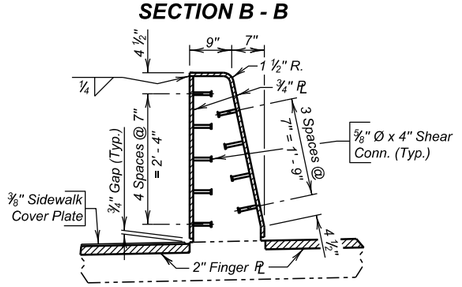



## SECTION A - A
(Sidewalk Cover Plate)

### ☆TABLE B

| Temp. | Dimension "X" | |
|---|---|---|
| | Abut. No. 1 | Abut. No. 5 |
| 30° | 3 15/16" | 3 15/16" |
| 40° | 3 11/16" | 3 11/16" |
| 50° | 3 7/16" | 3 ½" |
| 60° | 3 ¼" | 3 ¼" |
| 70° | 3" | 3" |
| 80° | 2 ¾" | 2 ¾" |
| 90° | 2 9/16" | 2 ½" |
| 100° | 2 5/16" | 2 5/16" |

*Note:*
*Temperature in above Table Corresponds to Girder Temperature.*




## SECTION C - C

### ESTIMATED QUANTITIES

| | ITEM | UNIT | QUANTITY |
|---|---|---|---|
| ≠ | Finger Type Expansion Joint Assembly | Each | 2 |

1. 21209 lbs. Structural Steel per each Finger Type Expansion Joint Assembly.

≠ *Item 1 is an approximate quantity contained in the above bid item and is for information only.*

**FINGER TYPE EXPANSION JOINT DETAILS**

FOR

# 595' - 6" STEEL GIRDER BRIDGE

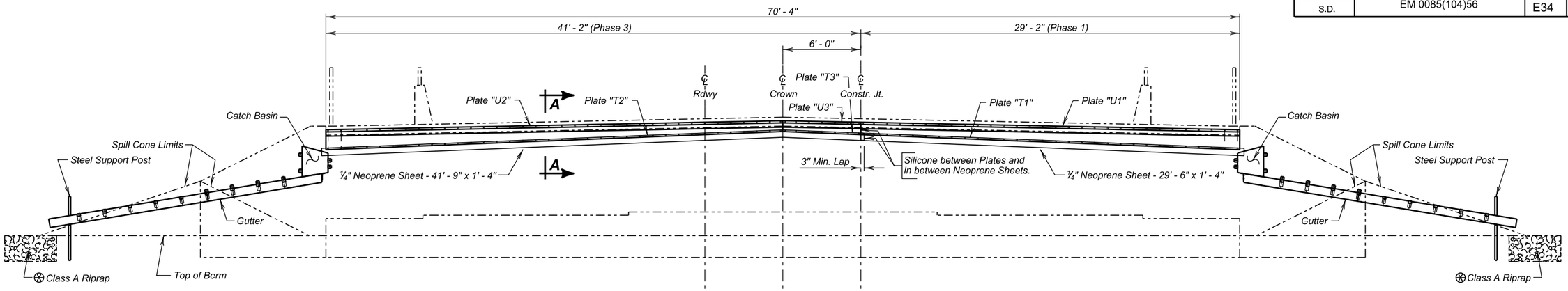
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA31 | | |

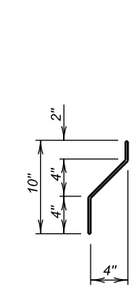
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E34 | E60 |




⊛ Class A Riprap at Abut. No. 5 only.
See RIPRAP DETAILS sheet for quantites.

## ABUTMENT JOINT DRAIN LAYOUT

(Shown adjacent to Abut. No. 5, Abut. No. 1 Similar opposite hand)




**SECTION Z - Z**

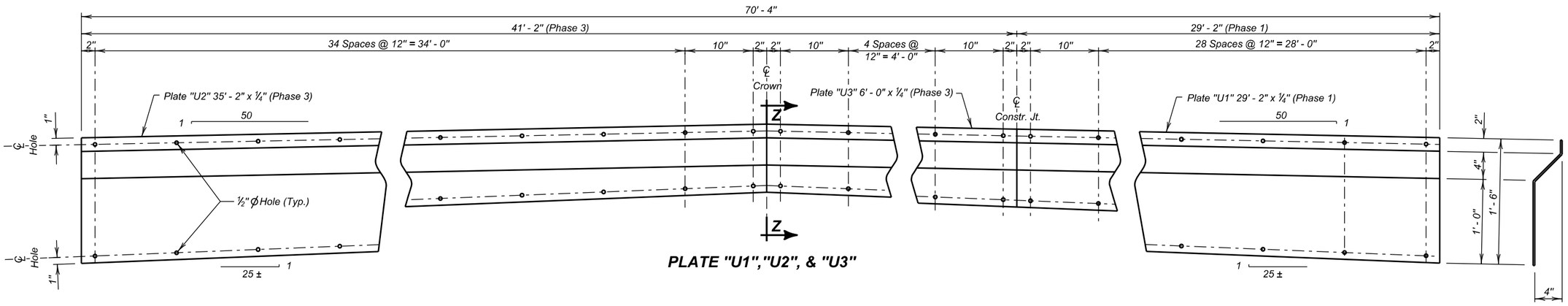
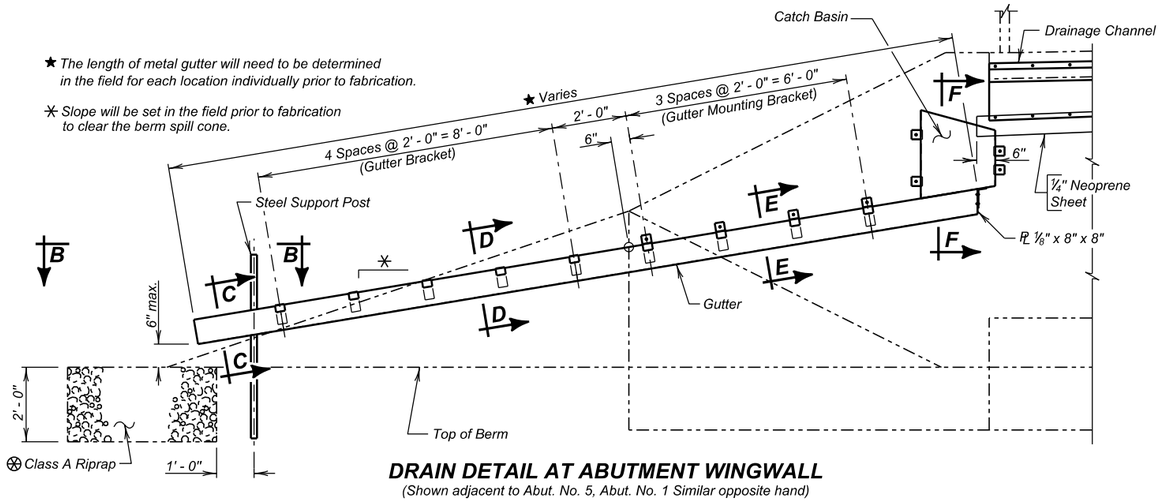
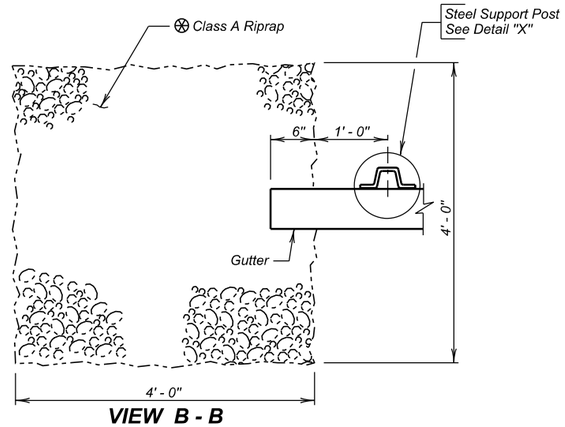



**PLATE "U1","U2", & "U3"**




**DRAIN DETAIL AT ABUTMENT WINGWALL**

(Shown adjacent to Abut. No. 5, Abut. No. 1 Similar opposite hand)




**VIEW B - B**

(Detail of Rockpile at Abut. No. 5 only)

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Abutment Joint Drain | Each | 2 |

*Items 1 thru 3 are approximate quantities contained in the above bid item and are for information only.*

1. Structural Steel — 5128 lbs.
2. Neoprene Sheet (not including laps) — 190 sq. ft.

**ABUTMENT JOINT DRAIN LAYOUT**

FOR

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

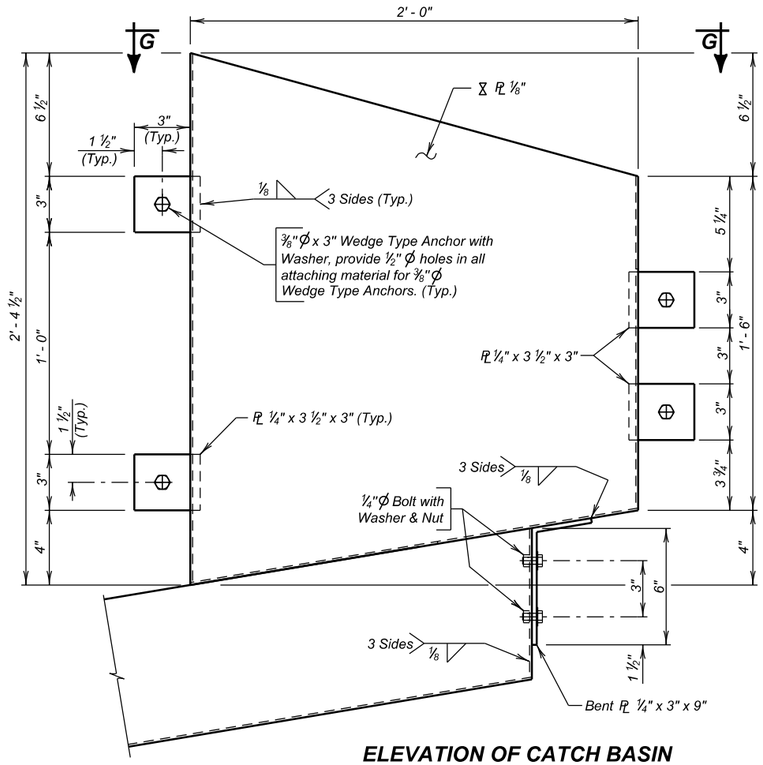
S. D. DEPT. OF TRANSPORTATION

MAY 2025



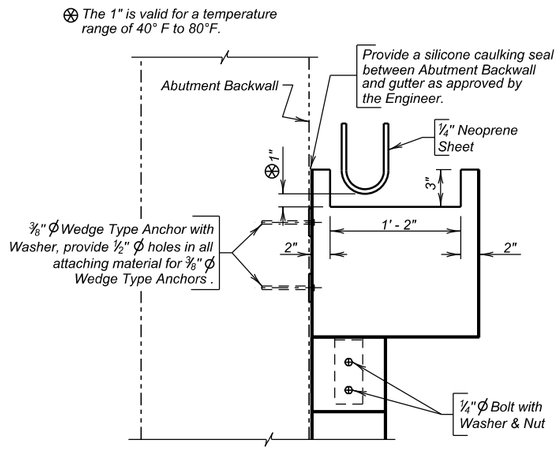
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA32 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E35 | E60 |

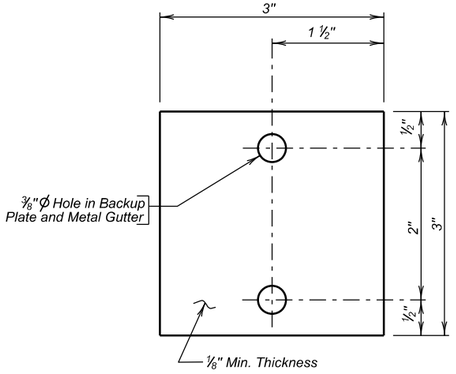



**ELEVATION OF CATCH BASIN**

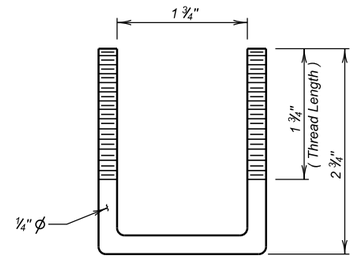
⊛ The 1" is valid for a temperature range of 40° F to 80°F.



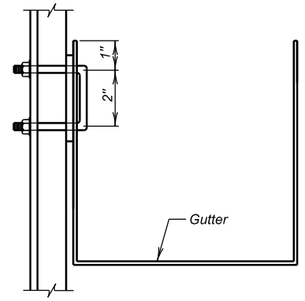

**SECTION F - F**



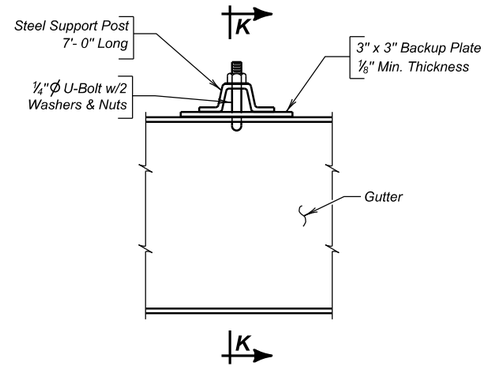

**BACKUP PLATE**



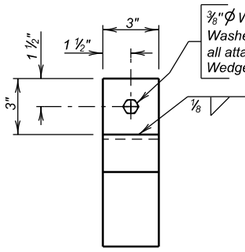

**U - BOLT**



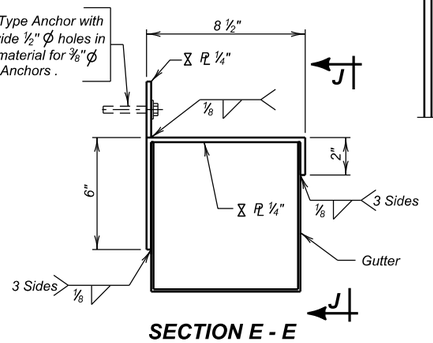

**SECTION K - K**




**DETAIL "X"**



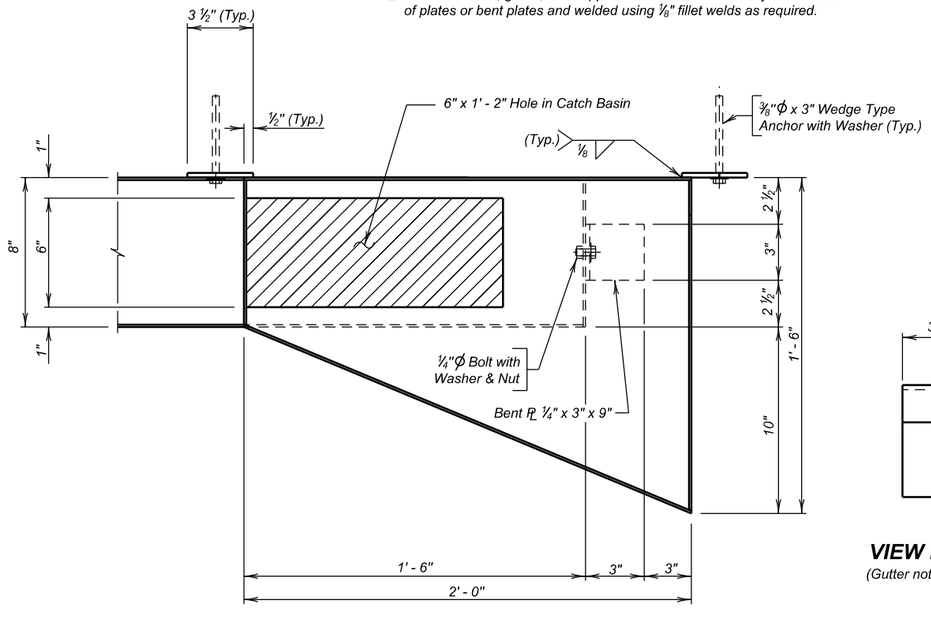

**VIEW J - J**
(Gutter not shown)




**SECTION E - E**

**GUTTER MOUNTING BRACKET DETAIL**

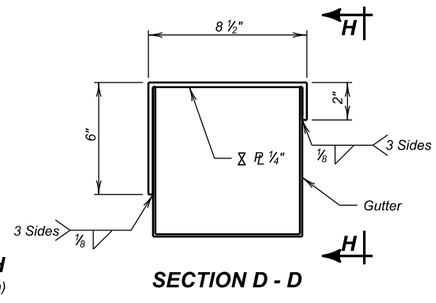
⧖ The catch basin, gutter, and supports can be made from any combination of plates or bent plates and welded using ⅛" fillet welds as required.




**VIEW G - G**

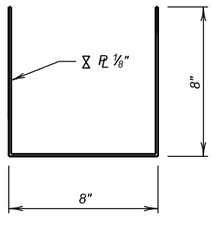



**VIEW H - H**
(Gutter not shown)



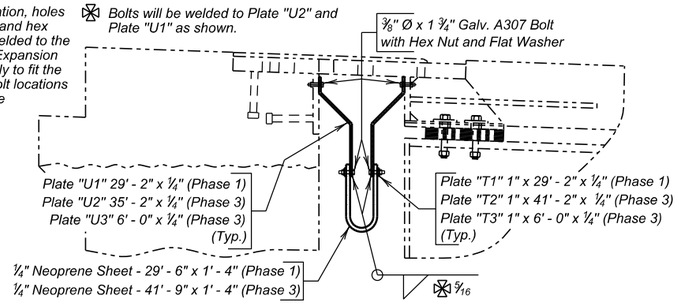

**SECTION D - D**

**GUTTER BRACKET DETAIL**




**SECTION C - C**
(Typical Gutter Section)

NOTE:
During fabrication, holes will be drilled and hex nuts will be welded to the Finger Type Expansion Joint Assembly to fit the designated bolt locations for the U-Plate Connections.




**SECTION A - A**
(Under Finger Expansion Joint)

**ABUTMENT JOINT DRAIN DETAILS**

FOR

## 595' - 6" STEEL GIRDER BRIDGE

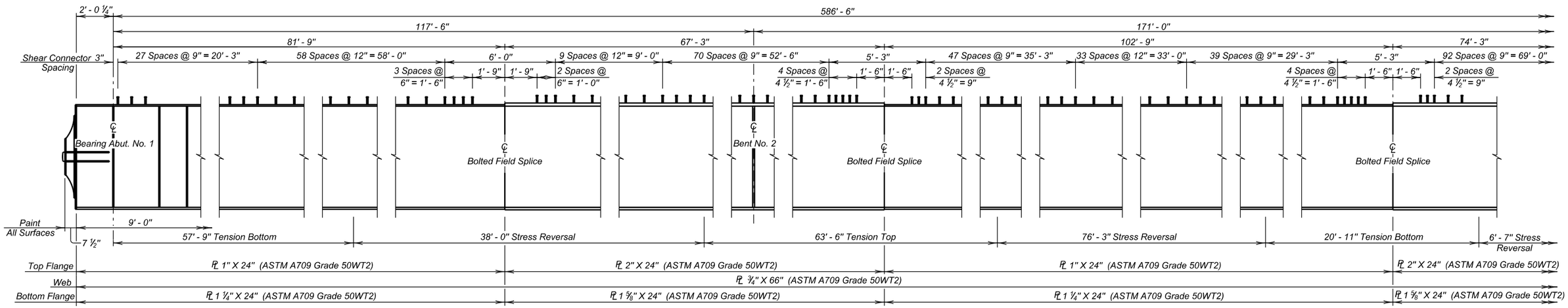
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

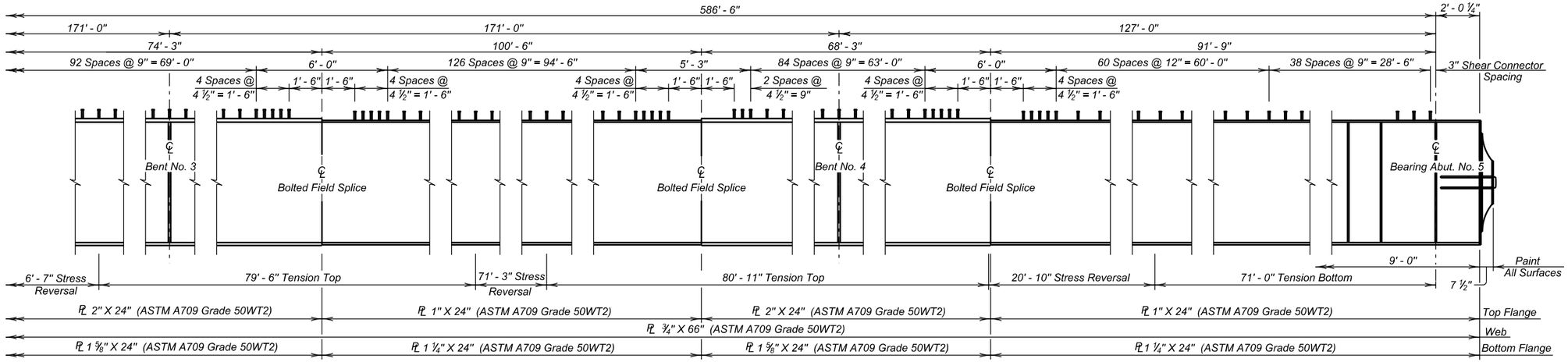


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA33 | | |

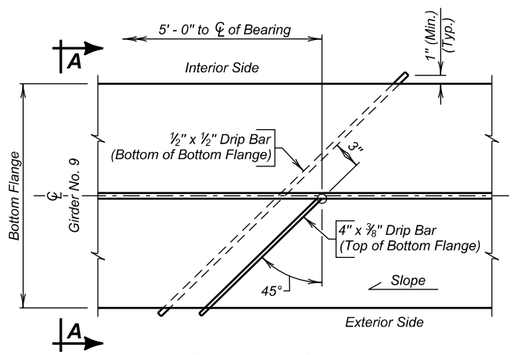
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E36 | E60 |




## GIRDER LAYOUT

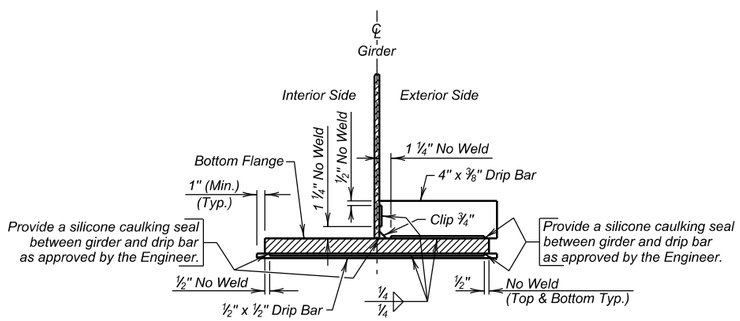



## GIRDER LAYOUT CONT.




## DRIP BAR DETAIL

(Girder No. 9 shown, Girder No. 1 similar by opposite hand used on all Bents and Abutment No. 1 only)




## SECTION A - A

**GIRDER LAYOUT DETAILS (A)**

FOR

# 595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

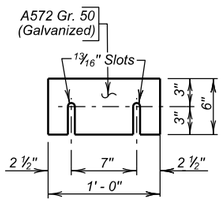
MAY 2025



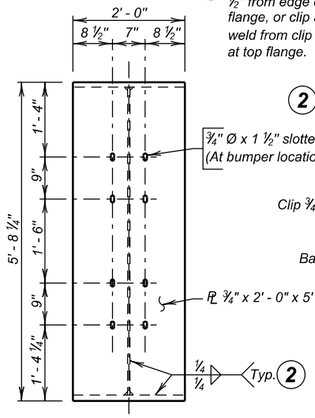
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA34 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E37 | E60 |

Provide the following shims for each bumper :
- 2 - ½" thick
- 2 - ¼" thick
- 4 - ⅛" thick
- 4 - 1/16" thick

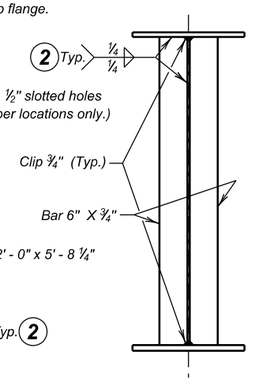



**SHIM DETAIL**

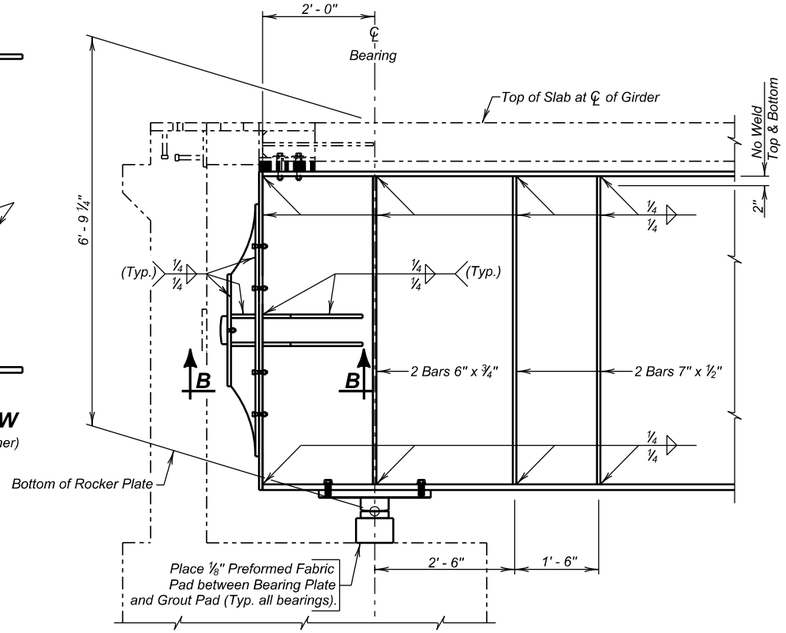



**END VIEW**
(End Plate)

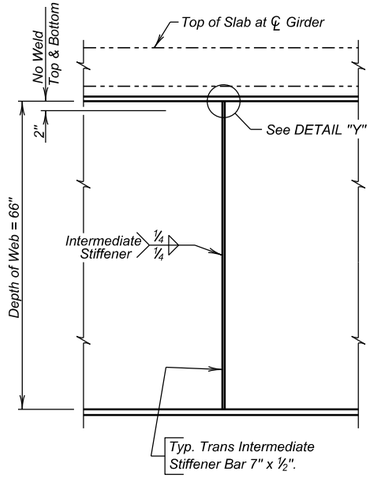
(2) NOTE: All fillet welds will terminate ½" from edge of stiffener, edge of flange, or clip as appropriate, except weld from clip to edge of stiffener at top flange.



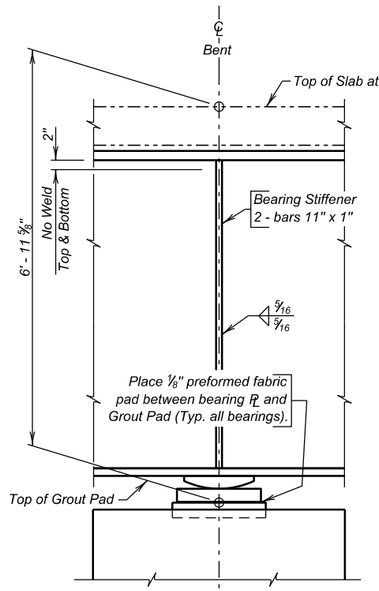

**END VIEW**
(Bearing Stiffener)



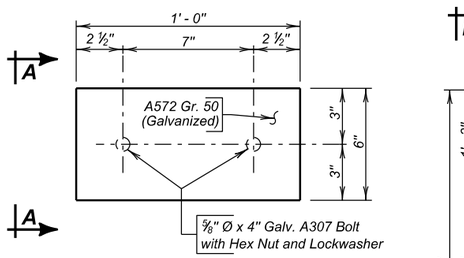

**TYPICAL SECTION AT ABUTMENTS**



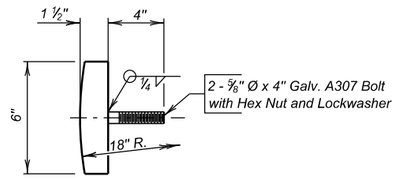

**TYPICAL SECTION AT INTERMEDIATE STIFFENER**
(Diaphragm not shown)



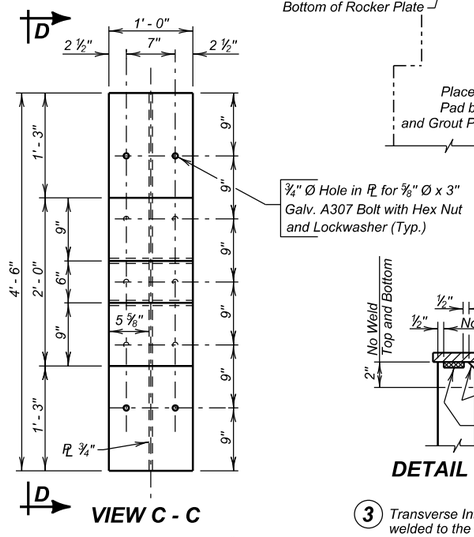

**TYPICAL SECTION AT BENTS**
(Diaphragm not shown)




**BUMPER**




**VIEW A - A**

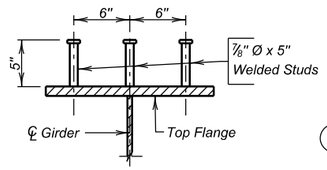



**VIEW C - C**




**DETAIL "Y"**

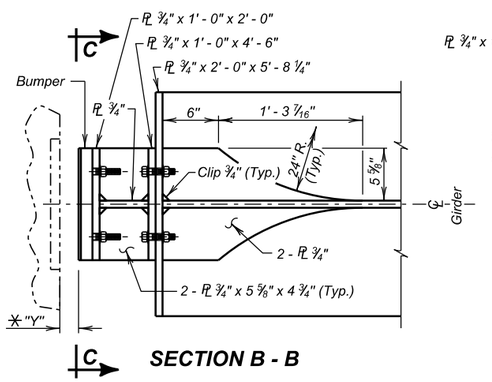
(3) Transverse Intermediate Stiffeners will be welded to the compression flange as shown in DETAIL "Y". In zones of stress reversal the Transverse Intermediate Stiffener will not be attached to either flange. Ends of Stiffeners not welded will fit tight. See Girder Layout above for location of tension flange and zones of stress reversal.



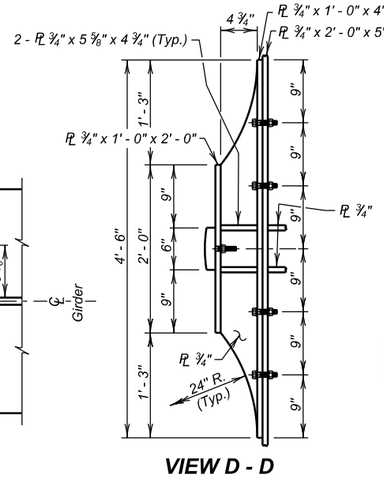

**SHEAR CONNECTOR DETAILS**

Welded Stud Shear Connectors are spaced as shown on Girder Layout. Payment for Shear Connectors will be included in the Lump Sum bid for Structural Steel. 2187 Shear Connectors per Girder.

✳ Place bumpers at Girder No. 1, 5, 6, and 9 at each abutment. Make final setting of bumpers after all slab concrete has been poured. Adjust shims plates so the the dimension "Y" is one inch shorter than dimension "X" as found on the FINGER TYPE EXPANSION JOINT DETAILS sheet.

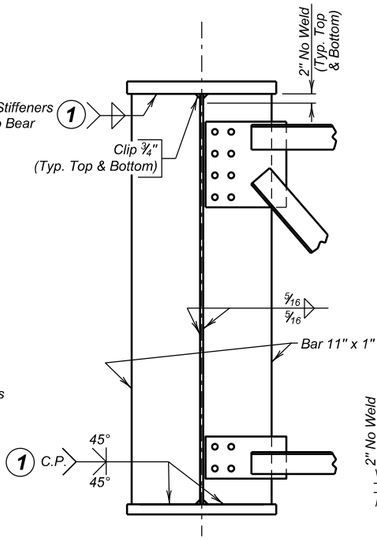



**SECTION B - B**

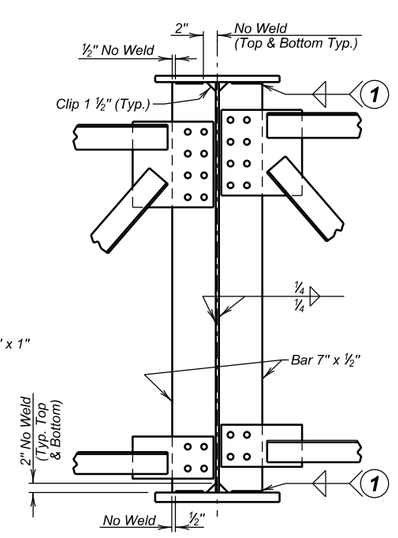



**VIEW D - D**

(1) NOTE: All fillet welds attaching diaphragm or bearing stiffeners to girder flanges, will terminate ½" 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.




**DETAILS OF STIFFENERS AT ℄ BENTS**
(Exterior Girder shown)




**DETAILS OF STIFFENERS AT INTERMEDIATE DIAPHRAGMS**
(Interior Girder shown)

## FLANGE TO WEB WELDS

| Flange Thickness | Fillet Welds |
|---|---|
| 1" | 5/16" |
| 1 ¼" | 5/16" |
| 1 ⅝" | 5/16" |
| 2" | 5/16" |

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 will be made normal to flanges, except bearing stiffeners at bent & abutments will be vertical.
5. Stiffeners to have tight fit top and bottom.
6. Dimensions shown are for steel temperature of 45° F.

**GIRDER LAYOUT DETAILS (B)**

FOR

## 595' - 6" STEEL GIRDER BRIDGE

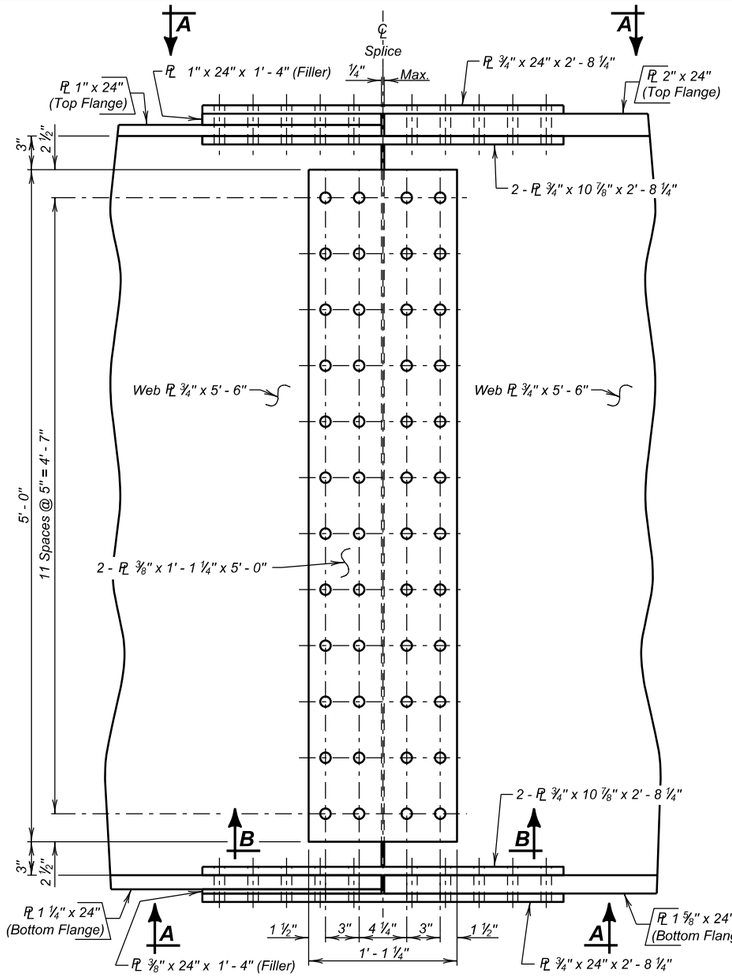
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

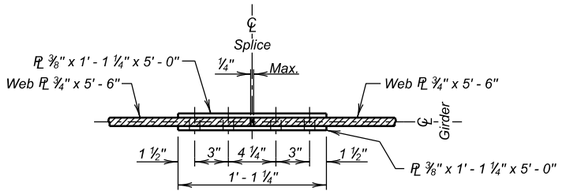


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG/JH | BT | Steven A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA35 | | |

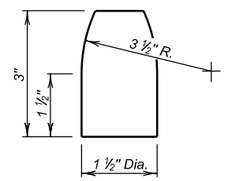
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
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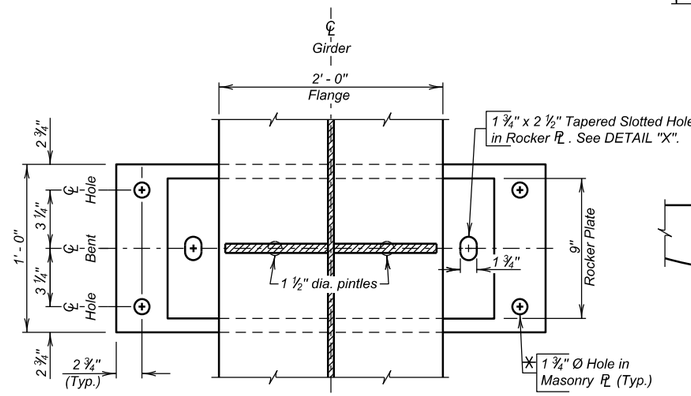

**FIELD BOLTED SPLICE DETAIL (Typ.)**



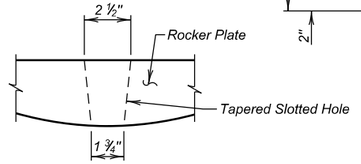

**SECTION B - B**



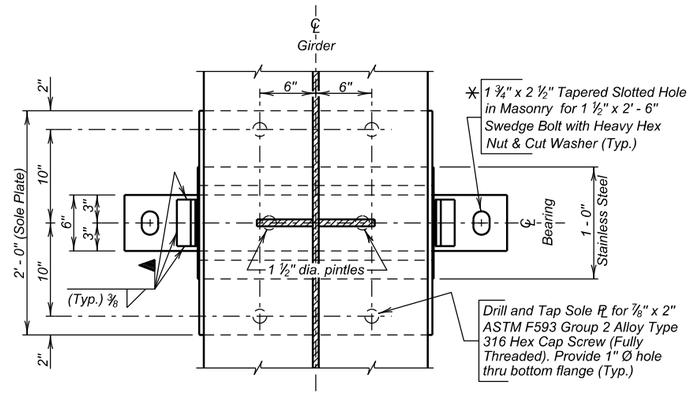

**PINTLE DETAIL**




**PLAN**
(Bolts & Washers Not Shown)



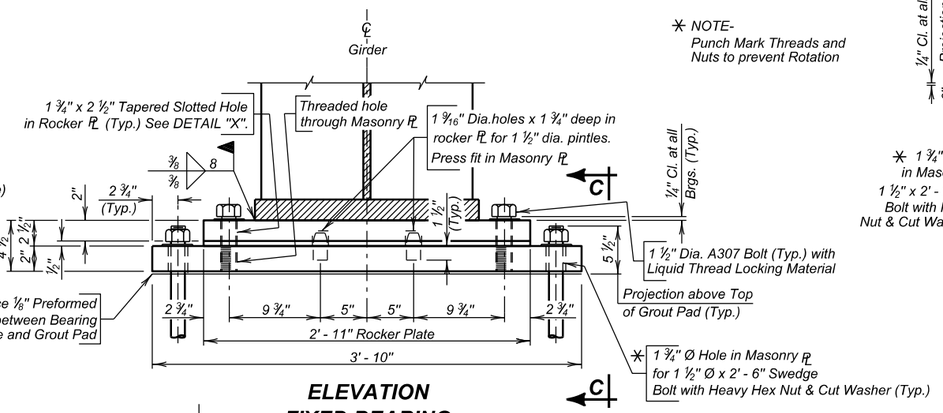

**DETAIL "X"**



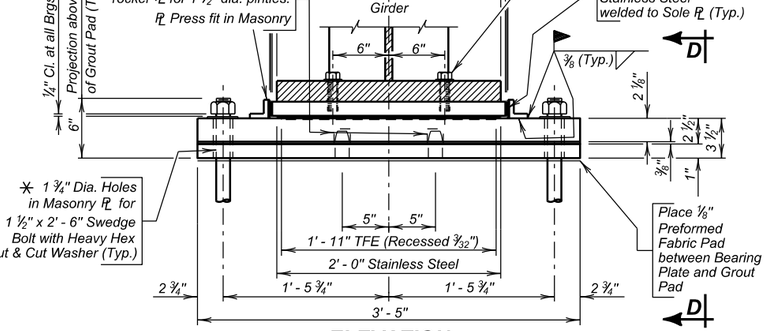

**PLAN**
(Bolts & washers not shown this view)



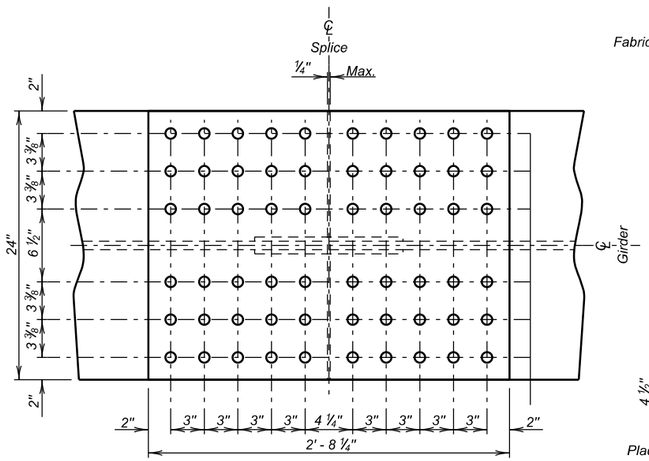

**FIELD BOLTED SPLICE DETAIL (Typ.)**



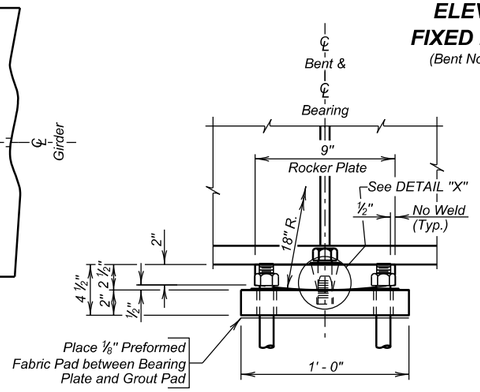

**ELEVATION**
**FIXED BEARING**
(Bent No.'s 2, 3, & 4)



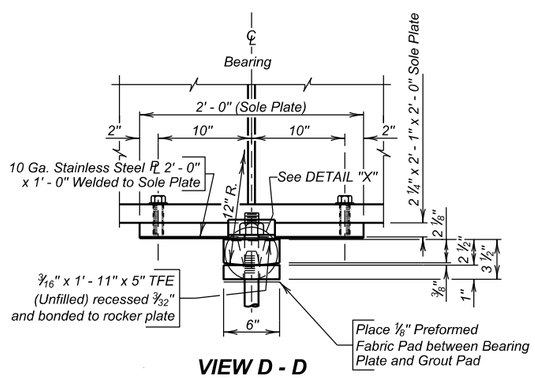

**ELEVATION**
**ABUTMENT EXPANSION BEARING**




**TOP FLANGE OR BOTTOM FLANGE**
**(VIEW A - A)**




**VIEW C - C**




**VIEW D - D**

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

**DETAILS OF BOLTED FIELD SPLICES & BEARINGS**
FOR
595' - 6" STEEL GIRDER BRIDGE

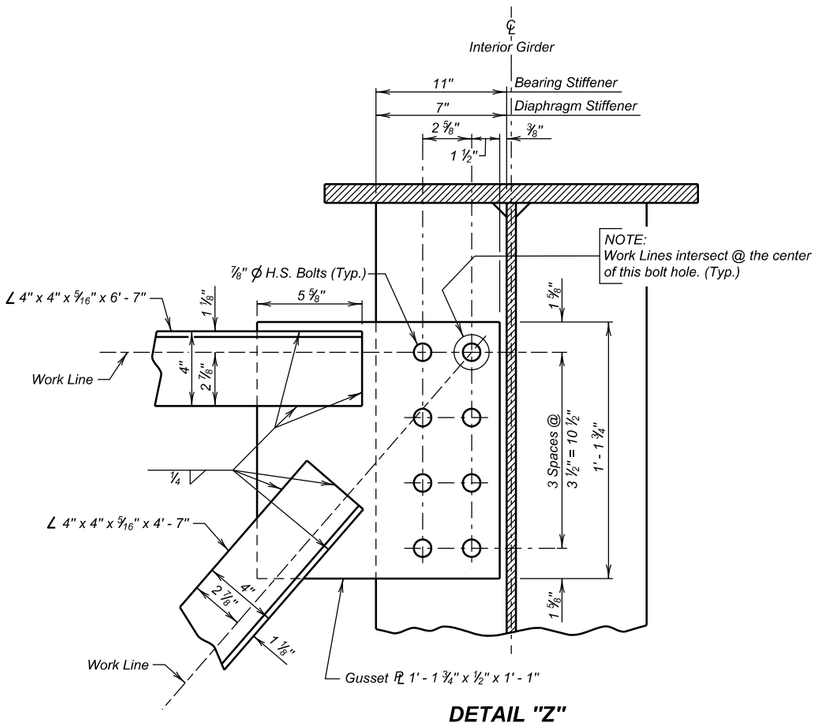
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

BUTTE COUNTY
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MAY 2025

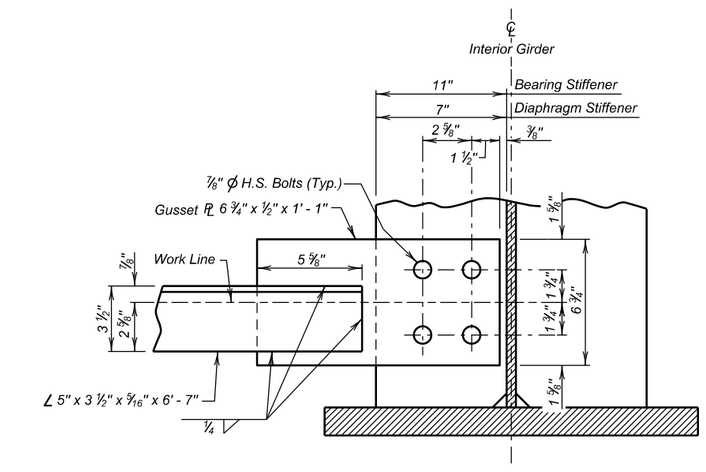


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG/JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA36 | | |

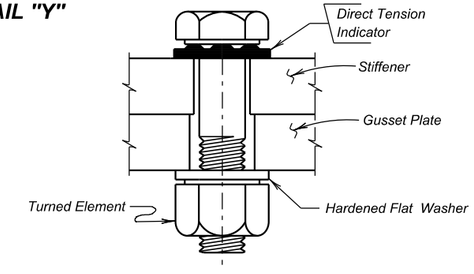
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E39 | E60 |



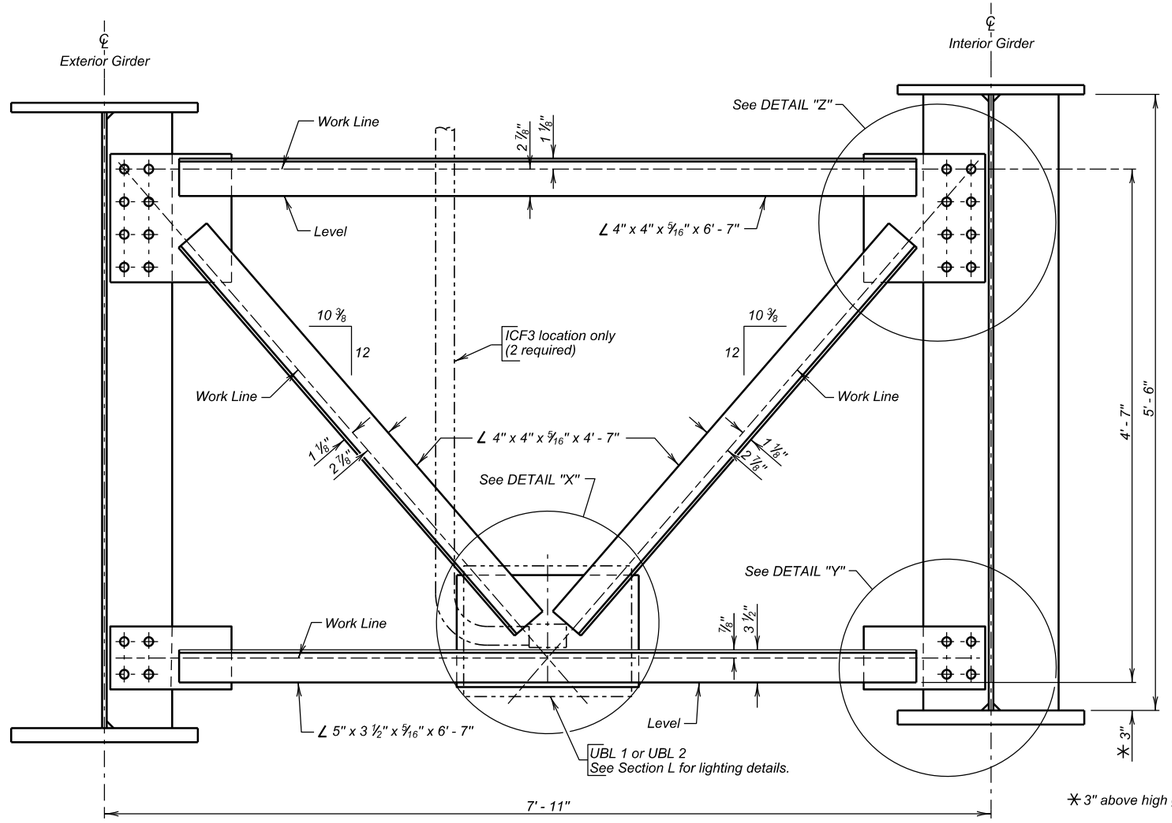

## DETAIL "Z"




## DETAIL "Y"



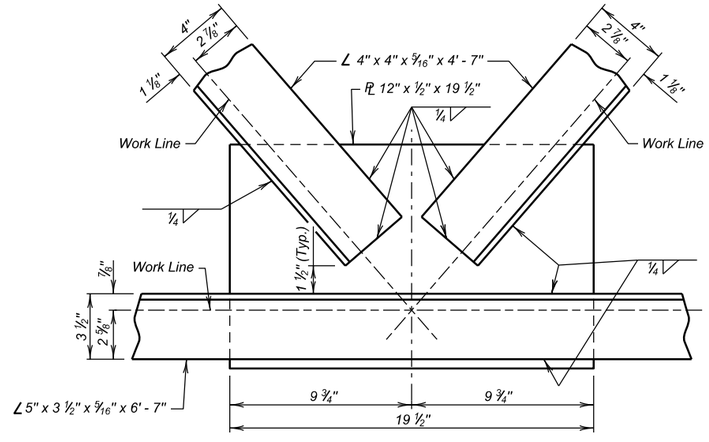

## DIRECT TENSION INDICATOR DETAIL




✳ 3" above high girder in each bay.

## DIAPHRAGM DETAIL

*(ECF1 to be PAINTED -16 required)*
*(Weight of One Unit = 353 lbs.)*




## DETAIL "X"

## GENERAL NOTES

1. The Steel Diaphragms are included in the quantity for Structural Steel.
2. Use 1 1/16"∅ bolt holes in the ½" gusset plates. Use 15/16" ∅ bolt holes in the stiffener plates. Diaphragms between girder no's. 5 & 6 to be installed with the closure pour will have 1 1/16" ∅ x 2" slotted holes in the gusset plate.
3. Install bolt heads on the side of the connection with the 15/16" ∅ bolt holes. Install direct tension indicators under the bolt heads.
4. The ⅞" High Strength bolts, nuts, and washers will conform to ASTM A3125 Grade A325 Type 3. 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 bars and plates.

NOTE :
This sheet is to be used in conjunction with STRUCTURE PHASED CONSTRUCTION DETAILS and FRAMING DIAGRAM, CAMBER, & ERECTION DATA (A) & (B) sheets.

**DIAPHRAGM DETAILS**

FOR

595' - 6" STEEL GIRDER BRIDGE

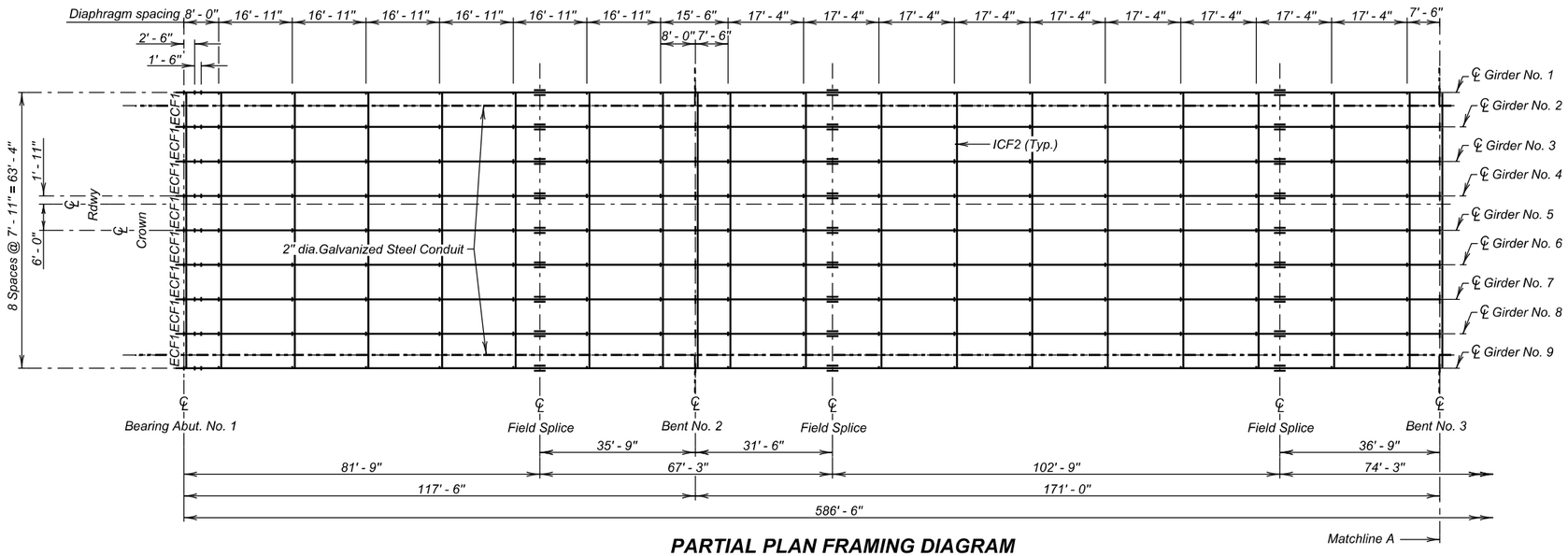
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA37 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E40 | E60 |

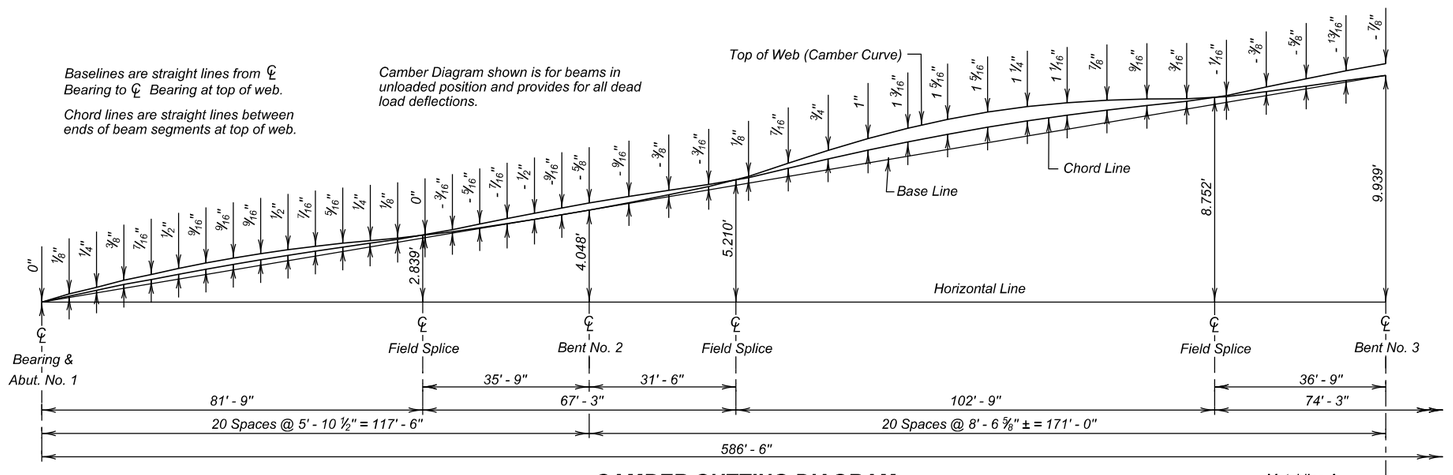



## PARTIAL PLAN FRAMING DIAGRAM

*Baselines are straight lines from ℄ Bearing to ℄ Bearing at top of web.*

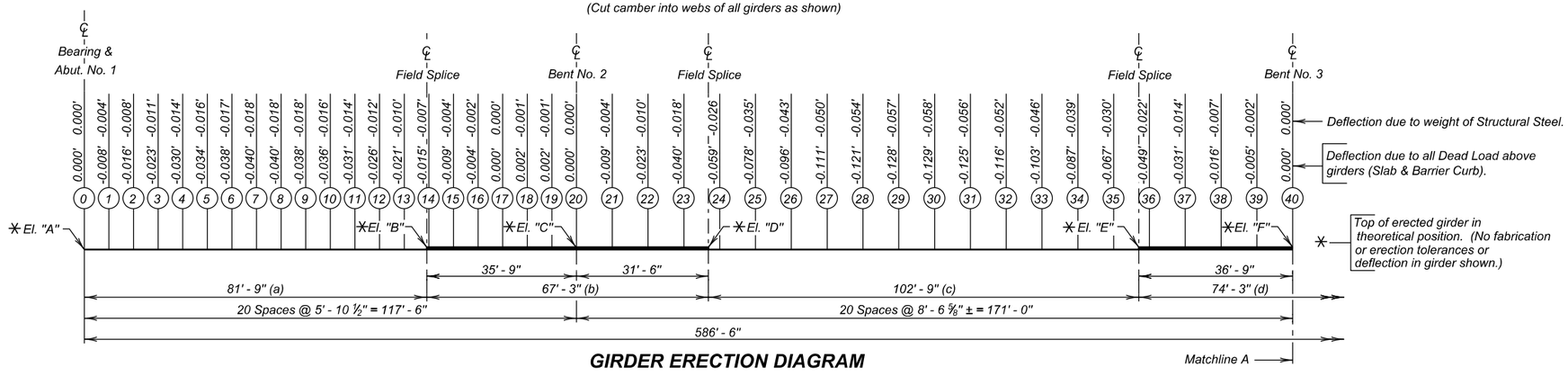
*Chord lines are straight lines between ends of beam segments at top of web.*

*Camber Diagram shown is for beams in unloaded position and provides for all dead load deflections.*




## CAMBER CUTTING DIAGRAM

(Cut camber into webs of all girders as shown)




## GIRDER ERECTION DIAGRAM

*ϕ 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.*

### ϕ GIRDER ERECTION ELEVATIONS AND SLOPES

| Girder No. | ELEVATIONS (Top of Girder) | | | | | | SLOPES (%) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | "A" | "B" | "C" | "D" | "E" | "F" | a | b | c | d |
| 1 | 3021.990 | 3024.791 | 3026.101 | 3027.070 | 3030.609 | 3031.930 | 3.426 | 3.389 | 3.444 | 4.283 |
| 2 | 3022.148 | 3024.950 | 3026.259 | 3027.229 | 3030.767 | 3032.088 | 3.426 | 3.389 | 3.444 | 4.283 |
| 3 | 3022.307 | 3025.108 | 3026.417 | 3027.387 | 3030.926 | 3032.246 | 3.426 | 3.389 | 3.444 | 4.283 |
| 4 | 3022.465 | 3025.266 | 3026.576 | 3027.545 | 3031.084 | 3032.405 | 3.426 | 3.389 | 3.444 | 4.283 |
| 5 | 3022.383 | 2025.185 | 3026.494 | 3027.464 | 3031.002 | 3032.323 | 3.426 | 3.389 | 3.444 | 4.283 |
| 6 | 3022.225 | 3025.026 | 3026.336 | 3027.305 | 3030.844 | 3032.165 | 3.426 | 3.389 | 3.444 | 4.283 |
| 7 | 3022.067 | 3024.868 | 3026.177 | 3027.147 | 3030.686 | 3032.006 | 3.426 | 3.389 | 3.444 | 4.283 |
| 8 | 3021.098 | 3024.710 | 3026.019 | 3026.989 | 3030.527 | 3031.848 | 3.426 | 3.389 | 3.444 | 4.283 |
| 9 | 3021.750 | 3024.551 | 3025.861 | 3026.830 | 3030.369 | 3031.069 | 3.426 | 3.389 | 3.444 | 4.283 |

*NOTE :*
*This sheet is to be used in conjunction with SLAB FORM ELEVATIONS (A) & (B) sheets.*

**FRAMING DIAGRAM, CAMBER, & ERECTION DATA (A)**

FOR

# 595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

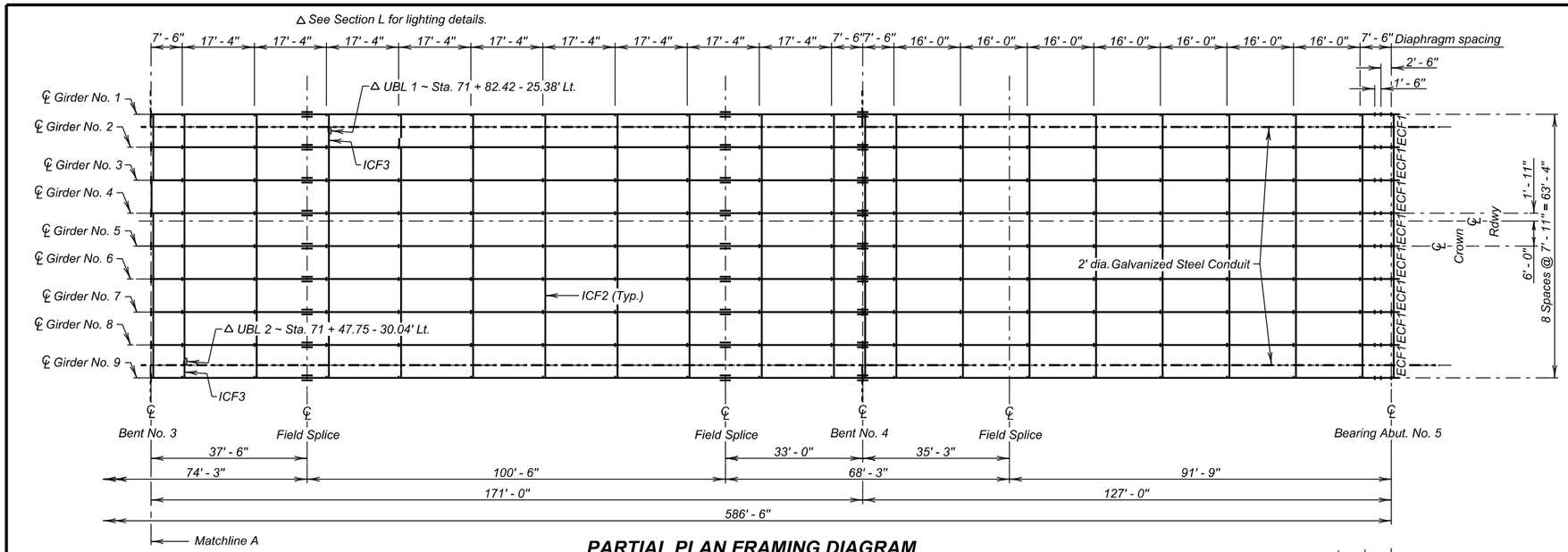
S. D. DEPT. OF TRANSPORTATION

MAY 2025

38 OF 58

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA38 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E41 | E60 |

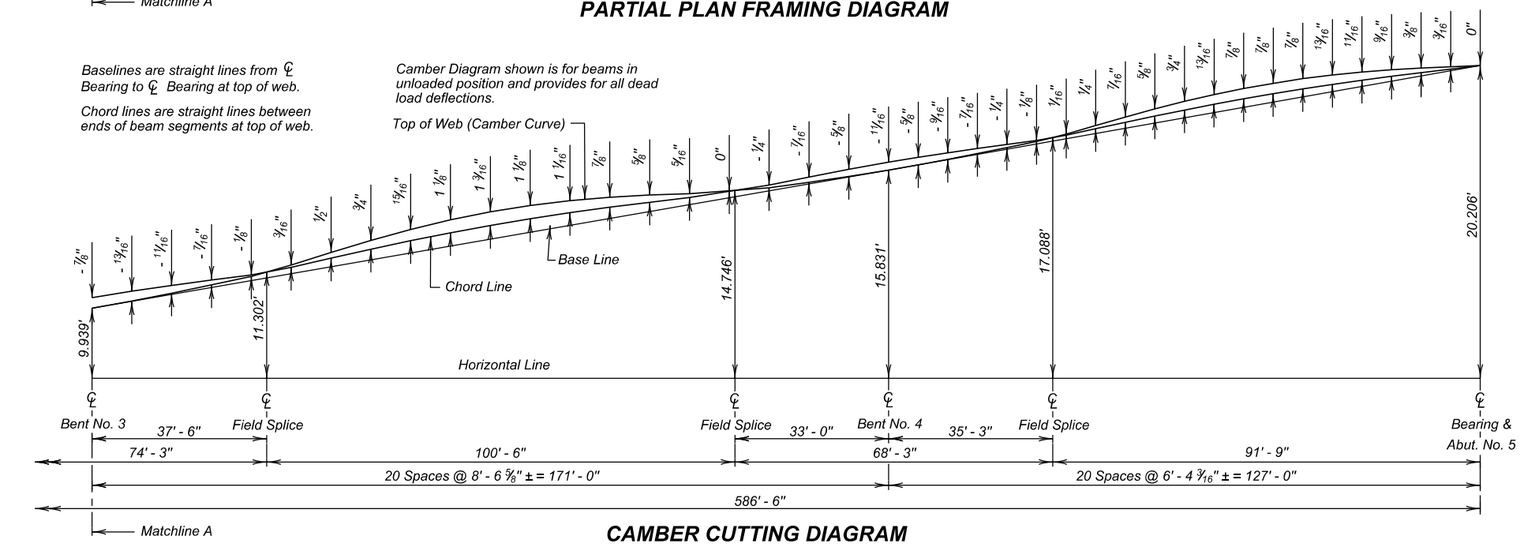



## PARTIAL PLAN FRAMING DIAGRAM

Baselines are straight lines from ℄ Bearing to ℄ Bearing at top of web.

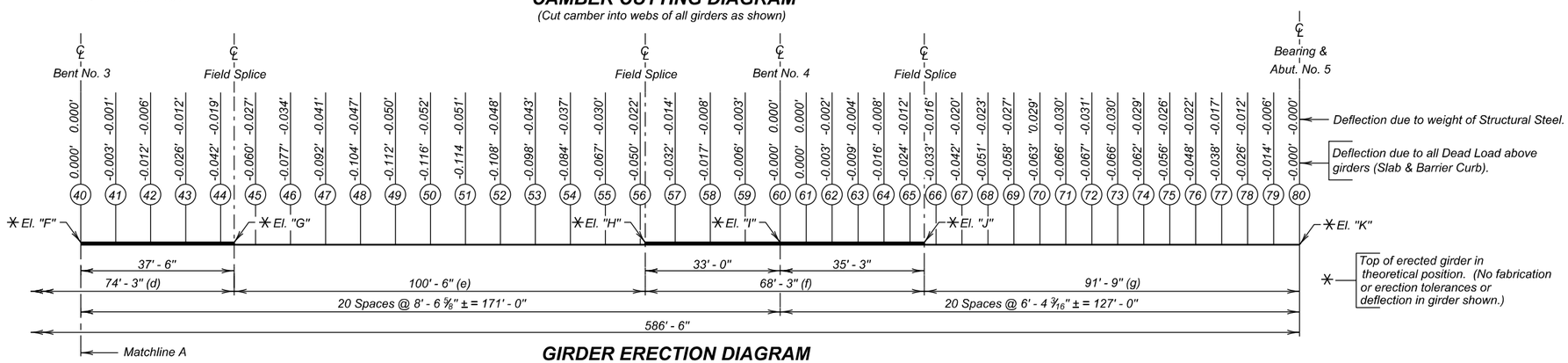
Chord lines are straight lines between ends of beam segments at top of web.

Camber Diagram shown is for beams in unloaded position and provides for all dead load deflections.




## CAMBER CUTTING DIAGRAM

(Cut camber into webs of all girders as shown)




## GIRDER ERECTION DIAGRAM

ϕ 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.*

### ϕ GIRDER ERECTION ELEVATIONS AND SLOPES

| Girder No. | ELEVATIONS (Top of Girder) | | | | | | SLOPES (%) | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | "F" | "G" | "H" | "I" | "J" | "K" | d | e | f | g |
| 1 | 3031.930 | 3033.536 | 3036.619 | 3037.821 | 3039.006 | 3042.196 | 4.283 | 3.083 | 3.362 | 3.477 |
| 2 | 3032.088 | 3033.694 | 3036.777 | 3037.979 | 3039.164 | 3042.355 | 4.283 | 3.083 | 3.362 | 3.477 |
| 3 | 3032.246 | 3033.852 | 3036.935 | 3038.137 | 3039.322 | 3042.513 | 4.283 | 3.083 | 3.362 | 3.477 |
| 4 | 3032.405 | 3034.011 | 3037.094 | 3038.296 | 3039.481 | 3042.671 | 4.283 | 3.083 | 3.362 | 3.477 |
| 5 | 3032.323 | 3033.929 | 3037.012 | 3038.214 | 3039.399 | 3042.590 | 4.283 | 3.083 | 3.362 | 3.477 |
| 6 | 3032.165 | 3033.771 | 3036.854 | 3038.056 | 3039.241 | 3042.431 | 4.283 | 3.083 | 3.362 | 3.477 |
| 7 | 3032.006 | 3033.612 | 3036.695 | 3037.897 | 3039.082 | 3042.273 | 4.283 | 3.083 | 3.362 | 3.477 |
| 8 | 3031.848 | 3033.454 | 3036.537 | 3037.739 | 3038.924 | 3042.115 | 4.283 | 3.083 | 3.362 | 3.477 |
| 9 | 3031.069 | 3033.296 | 3036.379 | 3037.581 | 3038.766 | 3041.956 | 4.283 | 3.083 | 3.362 | 3.477 |

*NOTE :*
*This sheet is to be used in conjunction with SLAB FORM ELEVATIONS (C) & (D) sheets.*

**FRAMING DIAGRAM, CAMBER, & ERECTION DATA (B)**

FOR

# 595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

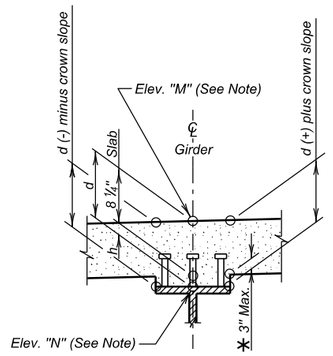


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A. Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA39 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E42 | E60 |

## TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS

| | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Girder No. 1 | Elev. "M" | 3022.844 | 3023.055 | 3023.265 | 3023.475 | 3023.683 | 3023.891 | 3024.096 | 3024.301 | 3024.503 | 3024.704 | 3024.904 | 3025.102 | 3025.300 | 3025.496 | 3025.693 | 3025.890 | 3026.087 | 3026.286 | 3026.486 | 3026.688 | 3026.892 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | | |
| Girder No. 2 | Elev. "M" | 3023.003 | 3023.213 | 3023.424 | 3023.633 | 3023.842 | 3024.049 | 3024.255 | 3024.459 | 3024.662 | 3024.863 | 3025.062 | 3025.261 | 3025.458 | 3025.655 | 3025.851 | 3026.048 | 3026.245 | 3026.444 | 3026.644 | 3026.846 | 3027.051 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | | |
| Girder No. 3 | Elev. "M" | 3023.161 | 3023.371 | 3023.582 | 3023.792 | 3024.000 | 3024.207 | 3024.413 | 3024.617 | 3024.820 | 3025.021 | 3025.221 | 3025.419 | 3025.616 | 3025.813 | 3026.009 | 3026.206 | 3026.404 | 3026.602 | 3026.802 | 3027.004 | 3027.209 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | | |
| Girder No. 4 | Elev. "M" | 3023.319 | 3023.530 | 3023.740 | 3023.950 | 3024.158 | 3024.366 | 3024.571 | 3024.776 | 3024.978 | 3025.179 | 3025.379 | 3025.577 | 3025.775 | 3025.971 | 3026.168 | 3026.365 | 3026.562 | 3026.761 | 3026.961 | 3027.163 | 3027.367 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | | |
| Girder No. 5 | Elev. "M" | 3023.238 | 3023.448 | 3023.659 | 3023.868 | 3024.077 | 3024.284 | 3024.490 | 3024.694 | 3024.897 | 3025.098 | 3025.297 | 3025.496 | 3025.693 | 3025.890 | 3026.086 | 3026.283 | 3026.480 | 3026.679 | 3026.879 | 3027.081 | 3027.286 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | | |
| Girder No. 6 | Elev. "M" | 3023.079 | 3023.290 | 3023.500 | 3023.710 | 3023.918 | 3024.126 | 3024.331 | 3024.536 | 3024.738 | 3024.939 | 3025.139 | 3025.337 | 3025.535 | 3025.731 | 3025.928 | 3026.125 | 3026.322 | 3026.521 | 3026.721 | 3026.923 | 3027.127 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | | |
| Girder No. 7 | Elev. "M" | 3022.921 | 3023.131 | 3023.342 | 3023.552 | 3023.760 | 3023.967 | 3024.173 | 3024.377 | 3024.580 | 3024.781 | 3024.981 | 3025.179 | 3025.376 | 3025.573 | 3025.769 | 3025.966 | 3026.164 | 3026.362 | 3026.562 | 3026.764 | 3026.969 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | | |
| Girder No. 8 | Elev. "M" | 3022.763 | 3022.973 | 3023.184 | 3023.393 | 3023.602 | 3023.809 | 3024.015 | 3024.219 | 3024.422 | 3024.623 | 3024.822 | 3025.021 | 3025.218 | 3025.415 | 3025.611 | 3025.808 | 3026.005 | 3026.204 | 3026.404 | 3026.606 | 3026.811 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | | |
| Girder No. 9 | Elev. "M" | 3022.604 | 3022.815 | 3023.025 | 3023.235 | 3023.443 | 3023.651 | 3023.856 | 3024.061 | 3024.263 | 3024.464 | 3024.664 | 3024.862 | 3025.060 | 3025.256 | 3025.453 | 3025.650 | 3025.847 | 3026.046 | 3026.246 | 3026.448 | 3026.652 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | | |




* If during construction, it is found that this dimension will be exceeded or is less than zero, corrective measures must be taken as approved by the Engineer.

### NOTES:

This Table contains the necessary information to determine the depth of concrete, in feet, over the girders at the points shown. All calculations can be carried out in the space provided.
Elevation "M" is theoretical top of slab elevation before any concrete has been poured.
This elevation includes correction for deflection due to Dead Load above girders.
Elevation "N" is a field measured elevation taken on top of girders at points shown. This elevation must be taken after girder erection is complete, but prior to placing any of the slab concrete. Girders will not be supported by construction shoring while elevations are taken.

### NOTES:

This sheet is to be used in conjunction with FRAMING DIAGRAM, CAMBER, & ERECTION DATA (A) Sheet.

**SLAB FORM ELEVATIONS (A)**

FOR

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA40 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E43 | E60 |

## TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS

| | | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Girder No. 1 | Elev. "M" | 3027.196 | 3027.504 | 3027.816 | 3028.130 | 3028.444 | 3028.756 | 3029.065 | 3029.370 | 3029.671 | 3029.967 | 3030.257 | 3030.543 | 3030.825 | 3031.103 | 3031.378 | 3031.654 | 3031.931 | 3032.210 | 3032.494 | 3032.784 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 2 | Elev. "M" | 3027.354 | 3027.663 | 3027.975 | 3028.288 | 3028.602 | 3028.914 | 3029.223 | 3029.529 | 3029.829 | 3030.125 | 3030.416 | 3030.701 | 3030.983 | 3031.261 | 3031.536 | 3031.813 | 3032.090 | 3032.369 | 3032.652 | 3032.942 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 3 | Elev. "M" | 3027.513 | 3027.821 | 3028.133 | 3028.447 | 3028.760 | 3029.073 | 3029.382 | 3029.687 | 3029.988 | 3030.283 | 3030.574 | 3030.860 | 3031.141 | 3031.419 | 3031.694 | 3031.971 | 3032.248 | 3032.527 | 3032.811 | 3033.100 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 4 | Elev. "M" | 3027.671 | 3027.979 | 3028.291 | 3028.605 | 3028.919 | 3029.231 | 3029.540 | 3029.845 | 3030.146 | 3030.442 | 3030.732 | 3031.018 | 3031.300 | 3031.578 | 3031.853 | 3032.129 | 3032.406 | 3032.685 | 3032.969 | 3033.259 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 5 | Elev. "M" | 3027.589 | 3027.898 | 3028.210 | 3028.523 | 3028.837 | 3029.149 | 3029.458 | 3029.764 | 3030.064 | 3030.360 | 3030.651 | 3030.936 | 3031.218 | 3031.496 | 3031.771 | 3032.048 | 3032.325 | 3032.604 | 3032.887 | 3033.177 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 6 | Elev. "M" | 3027.431 | 3027.739 | 3028.051 | 3028.365 | 3028.679 | 3028.991 | 3029.300 | 3029.605 | 3029.906 | 3030.202 | 3030.492 | 3030.778 | 3031.060 | 3031.338 | 3031.613 | 3031.889 | 3032.166 | 3032.445 | 3032.729 | 3033.019 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 7 | Elev. "M" | 3027.273 | 3027.581 | 3027.893 | 3028.207 | 3028.520 | 3028.833 | 3029.142 | 3029.447 | 3029.748 | 3030.043 | 3030.334 | 3030.620 | 3030.901 | 3031.179 | 3031.454 | 3031.731 | 3032.008 | 3032.287 | 3032.571 | 3032.860 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 8 | Elev. "M" | 3027.114 | 3027.423 | 3027.735 | 3028.048 | 3028.362 | 3028.674 | 3028.983 | 3029.289 | 3029.589 | 3029.885 | 3030.176 | 3030.461 | 3030.743 | 3031.021 | 3031.296 | 3031.573 | 3031.850 | 3032.129 | 3032.412 | 3032.702 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 9 | Elev. "M" | 3026.956 | 3027.264 | 3027.576 | 3027.890 | 3028.204 | 3028.516 | 3028.825 | 3029.130 | 3029.431 | 3029.727 | 3030.017 | 3030.303 | 3030.585 | 3030.863 | 3031.138 | 3031.414 | 3031.691 | 3031.970 | 3032.254 | 3032.544 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |

***NOTE:***

*This sheet is to be used in conjunction with FRAMING DIAGRAM, CAMBER, & ERECTION DATA (A) Sheet.*

**SLAB FORM ELEVATIONS (B)**

FOR

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW

OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E

STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56

STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

MAY 2025

41 OF 58

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA41 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E44 | E60 |

## TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS

| | | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Girder No. 1 | Elev. "M" | 3033.081 | 3033.385 | 3033.693 | 3034.004 | 3034.316 | 3034.628 | 3034.938 | 3035.244 | 3035.547 | 3035.845 | 3036.138 | 3036.427 | 3036.711 | 3036.991 | 3037.269 | 3037.570 | 3037.824 | 3038.103 | 3038.386 | 3038.675 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 2 | Elev. "M" | 3033.240 | 3033.543 | 3033.852 | 3034.163 | 3034.475 | 3034.786 | 3035.096 | 3035.403 | 3035.705 | 3036.003 | 3036.296 | 3036.585 | 3036.869 | 3037.150 | 3037.428 | 3037.729 | 3037.982 | 3038.262 | 3038.545 | 3038.833 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 3 | Elev. "M" | 3033.398 | 3033.702 | 3034.010 | 3034.321 | 3034.633 | 3034.945 | 3035.254 | 3035.561 | 3035.864 | 3036.162 | 3036.455 | 3036.743 | 3037.027 | 3037.308 | 3037.586 | 3037.887 | 3038.140 | 3038.420 | 3038.703 | 3038.992 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 4 | Elev. "M" | 3033.556 | 3033.860 | 3034.168 | 3034.479 | 3034.791 | 3035.103 | 3035.413 | 3035.719 | 3036.022 | 3036.320 | 3036.613 | 3036.902 | 3037.186 | 3037.466 | 3037.744 | 3038.045 | 3038.299 | 3038.578 | 3038.861 | 3039.150 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 5 | Elev. "M" | 3033.475 | 3033.778 | 3034.087 | 3034.398 | 3034.710 | 3035.021 | 3035.331 | 3035.638 | 3035.940 | 3036.238 | 3036.531 | 3036.820 | 3037.104 | 3037.385 | 3037.663 | 3037.964 | 3038.217 | 3038.497 | 3038.780 | 3039.068 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 6 | Elev. "M" | 3033.316 | 3033.620 | 3033.928 | 3034.239 | 3034.551 | 3034.863 | 3035.173 | 3035.479 | 3035.782 | 3036.080 | 3036.373 | 3036.662 | 3036.946 | 3037.226 | 3037.504 | 3037.805 | 3038.059 | 3038.338 | 3038.621 | 3038.910 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 7 | Elev. "M" | 3033.158 | 3033.462 | 3033.770 | 3034.081 | 3034.393 | 3034.705 | 3035.014 | 3035.321 | 3035.624 | 3035.922 | 3036.215 | 3036.503 | 3036.787 | 3037.068 | 3037.346 | 3037.647 | 3037.900 | 3038.180 | 3038.463 | 3038.752 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 8 | Elev. "M" | 3033.000 | 3033.303 | 3033.612 | 3033.923 | 3034.235 | 3034.546 | 3034.856 | 3035.163 | 3035.465 | 3035.763 | 3036.056 | 3036.345 | 3036.629 | 3036.910 | 3037.188 | 3037.489 | 3037.742 | 3038.022 | 3038.305 | 3038.593 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 9 | Elev. "M" | 3032.841 | 3033.145 | 3033.453 | 3033.764 | 3034.076 | 3034.388 | 3034.698 | 3035.004 | 3035.307 | 3035.605 | 3035.898 | 3036.187 | 3036.471 | 3036.751 | 3037.029 | 3037.330 | 3037.584 | 3037.863 | 3038.146 | 3038.435 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |

***NOTE:***

*This sheet is to be used in conjunction with FRAMING DIAGRAM, CAMBER, & ERECTION DATA (B) Sheet.*

**SLAB FORM ELEVATIONS (C)**

FOR

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW

OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E

STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56

STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

MAY 2025



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steven A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA42 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E45 | E60 |

## TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS

| | | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Girder No. 1 | Elev. "M" | 3038.894 | 3039.116 | 3039.340 | 3039.566 | 3039.793 | 3040.021 | 3040.249 | 3040.476 | 3040.701 | 3040.926 | 3041.148 | 3041.368 | 3041.585 | 3041.800 | 3042.013 | 3042.224 | 3042.432 | 3042.639 | 3042.845 | 3043.050 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 2 | Elev. "M" | 3039.052 | 3039.274 | 3039.498 | 3039.724 | 3039.952 | 3040.179 | 3040.407 | 3040.634 | 3040.860 | 3041.084 | 3041.306 | 3041.526 | 3041.743 | 3041.959 | 3042.171 | 3042.382 | 3042.591 | 3042.798 | 3043.003 | 3043.209 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 3 | Elev. "M" | 3039.210 | 3039.432 | 3039.657 | 3039.883 | 3040.110 | 3040.338 | 3040.565 | 3040.792 | 3041.018 | 3041.242 | 3041.464 | 3041.684 | 3041.902 | 3042.117 | 3042.330 | 3042.540 | 3042.749 | 3042.956 | 3043.162 | 3043.367 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 4 | Elev. "M" | 3039.369 | 3039.591 | 3039.815 | 3040.041 | 3040.268 | 3040.496 | 3040.724 | 3040.951 | 3041.176 | 3041.401 | 3041.623 | 3041.843 | 3042.060 | 3042.275 | 3042.488 | 3042.699 | 3042.907 | 3043.114 | 3043.320 | 3043.525 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 5 | Elev. "M" | 3039.287 | 3039.509 | 3039.733 | 3039.959 | 3040.187 | 3040.414 | 3040.642 | 3040.869 | 3041.095 | 3041.319 | 3041.541 | 3041.761 | 3041.978 | 3042.194 | 3042.406 | 3042.617 | 3042.826 | 3043.033 | 3043.238 | 3043.444 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 6 | Elev. "M" | 3039.129 | 3039.351 | 3039.575 | 3039.801 | 3040.028 | 3040.256 | 3040.484 | 3040.711 | 3040.936 | 3041.161 | 3041.383 | 3041.603 | 3041.820 | 3042.035 | 3042.248 | 3042.459 | 3042.667 | 3042.874 | 3043.080 | 3043.285 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 7 | Elev. "M" | 3038.970 | 3039.192 | 3039.417 | 3039.643 | 3039.870 | 3040.098 | 3040.325 | 3040.552 | 3040.778 | 3041.002 | 3041.224 | 3041.444 | 3041.662 | 3041.877 | 3042.090 | 3042.300 | 3042.509 | 3042.716 | 3042.922 | 3043.127 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 8 | Elev. "M" | 3038.812 | 3039.034 | 3039.258 | 3039.484 | 3039.712 | 3039.939 | 3040.167 | 3040.394 | 3040.620 | 3040.844 | 3041.066 | 3041.286 | 3041.503 | 3041.719 | 3041.931 | 3042.142 | 3042.351 | 3042.558 | 3042.763 | 3042.969 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |
| Girder No. 9 | Elev. "M" | 3038.654 | 3038.876 | 3039.100 | 3039.326 | 3039.553 | 3039.781 | 3040.009 | 3040.236 | 3040.461 | 3040.686 | 3040.908 | 3041.128 | 3041.345 | 3041.560 | 3041.773 | 3041.984 | 3042.192 | 3042.399 | 3042.605 | 3042.810 |
| | (-) Elev. "N" | | | | | | | | | | | | | | | | | | | | |
| | (=) d | | | | | | | | | | | | | | | | | | | | |
| | (-) 0.688 | | | | | | | | | | | | | | | | | | | | |
| | (=) h | | | | | | | | | | | | | | | | | | | | |

***NOTE:***

*This sheet is to be used in conjunction with FRAMING DIAGRAM, CAMBER, & ERECTION DATA (B) Sheet.*

**SLAB FORM ELEVATIONS (D)**

FOR

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW

OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E

STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56

STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

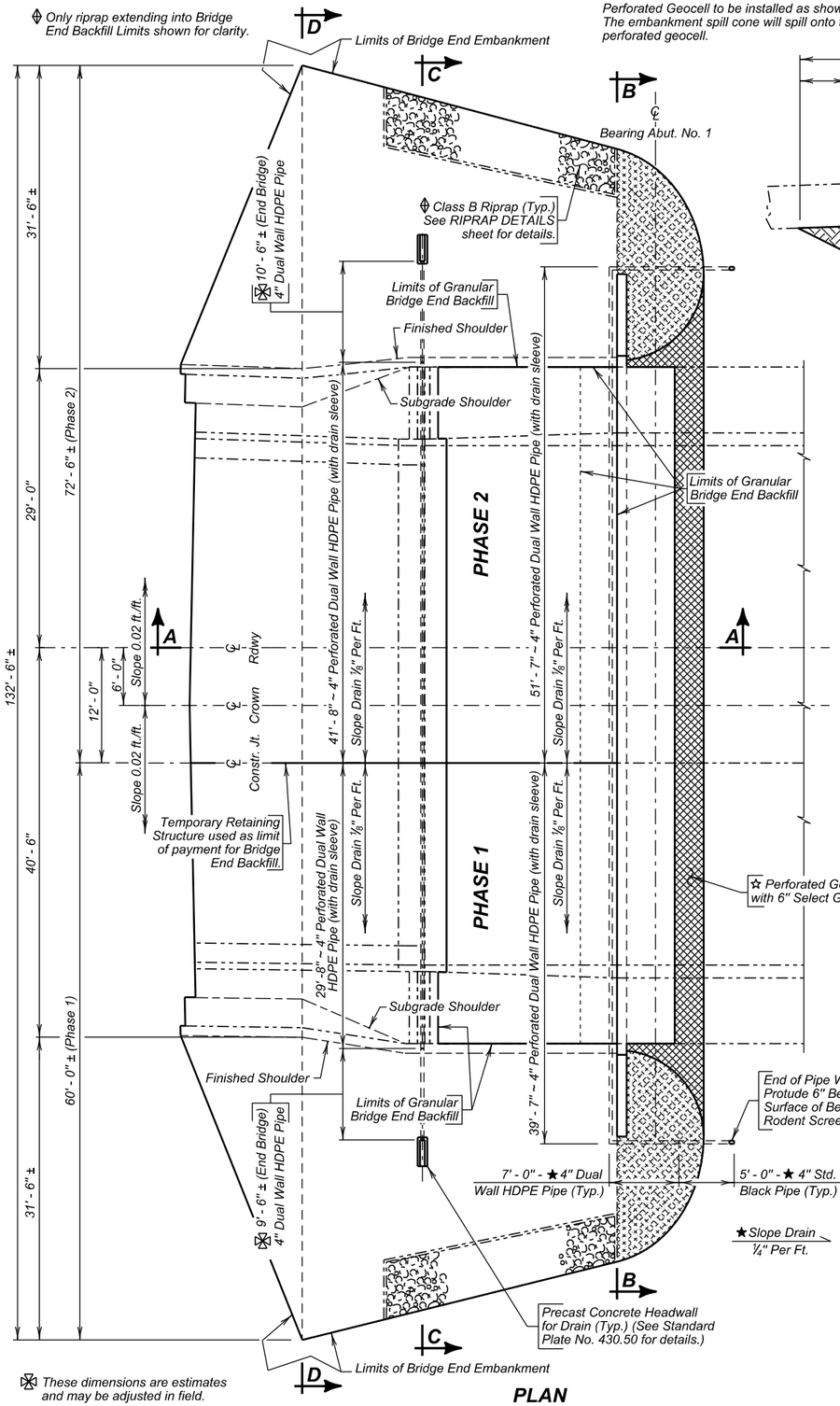
MAY 2025



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | AG | BT | Steven A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA43 | | |

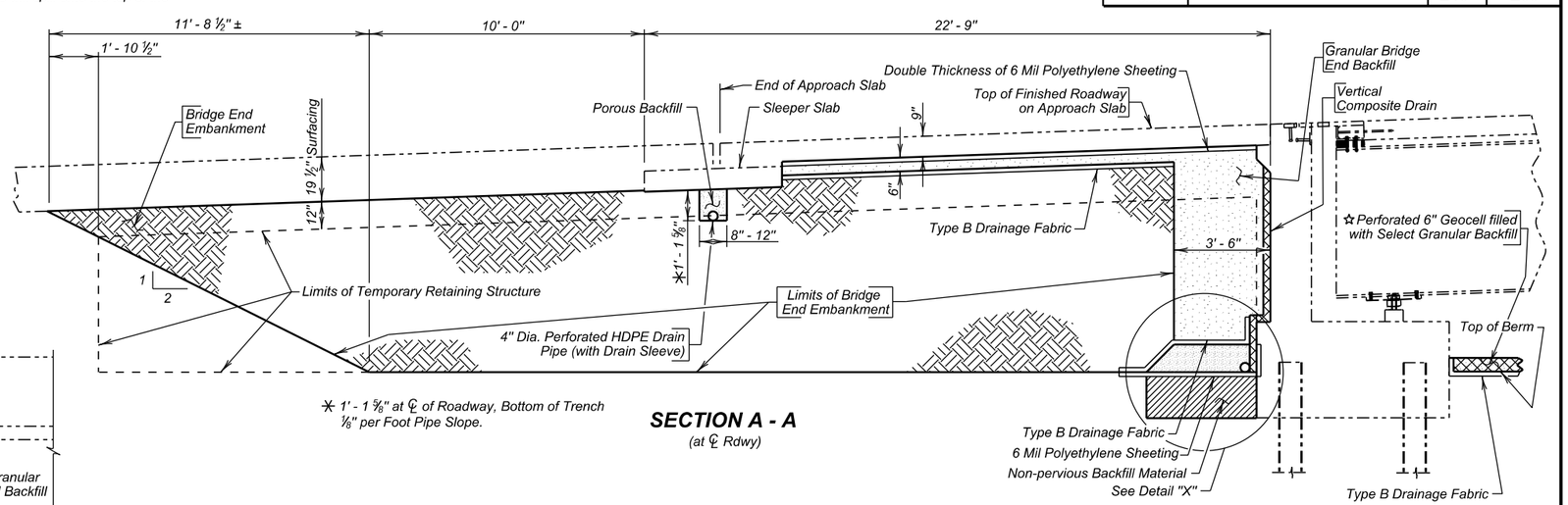
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E46 | E60 |

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



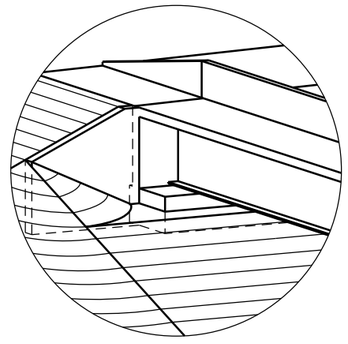

✠ These dimensions are estimates and may be adjusted in field.

**PLAN**
(Bridge End Backfill shown adjacent to Abut. No. 1)

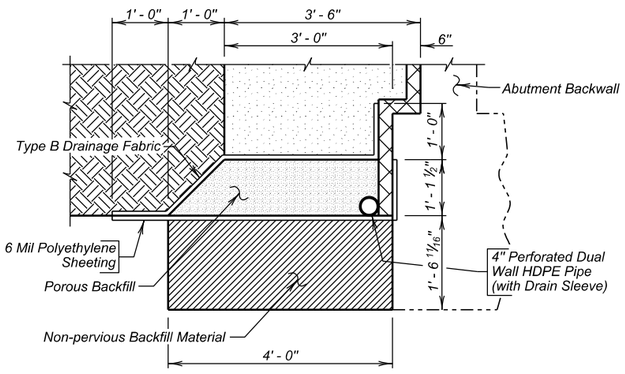



✠ 1' - 1 ⅝" at ℄ of Roadway, Bottom of Trench ⅛" per Foot Pipe Slope.

**SECTION A - A**
(at ℄ Rdwy)



**SPILL CONE DETAIL AT EMBANKMENT**
(Bridge and Sidewalk Railing not shown)




**DETAIL "X"**

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY Phase 1 | QUANTITY Phase 2 |
|---|---|---|---|
| Granular Bridge End Backfill | Cu. Yd. | 34.1 | 48.1 |
| ⌀ Bridge End Embankment | Cu. Yd. | 504 | 643 |
| ⌀ Porous Backfill | Ton | 14.0 | 19.6 |
| 4" Perforated Dual Wall HDPE Pipe | Ft. | 70 | 94 |
| 4" Dual Wall HDPE Pipe | Ft. | 22 | 23 |
| ⊛ Approach Slab Underdrain Excavation | Cu. Yd. | 1.2 | 1.6 |
| Precast Concrete Headwall for Drain | Each | 1 | 1 |

| | Phase 1 | Phase 2 | |
|---|---|---|---|
| 1. | 226 | 319 | sq. ft. Vertical Composite Drain. |
| 2. | 1251 | 1739 | sq. ft. 6 mil Polyethylene Sheeting, not including laps. |
| 3. | 77 | 105 | sq. yd. Type B Drainage Fabric. |

Items 1 thru 3 are approximate quantities contained in the Granular Bridge End Backfill and are for information only.

| | Phase 1 | Phase 2 | |
|---|---|---|---|
| 4. | 5 | 5 | ft. 4" Std. Black Pipe |

Item 4 is an approximate quantity contained in the 4" Dual Wall HDPE Pipe and is 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 ADJ. TO ABUT. NO. 1 (A)**
FOR
# 595' - 6" STEEL GIRDER BRIDGE

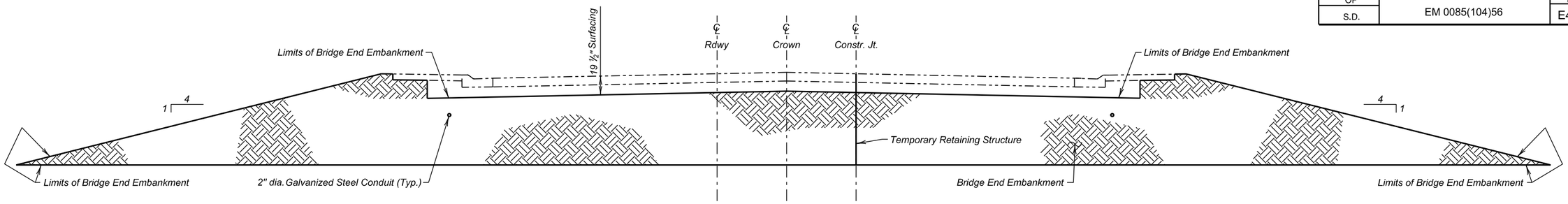
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

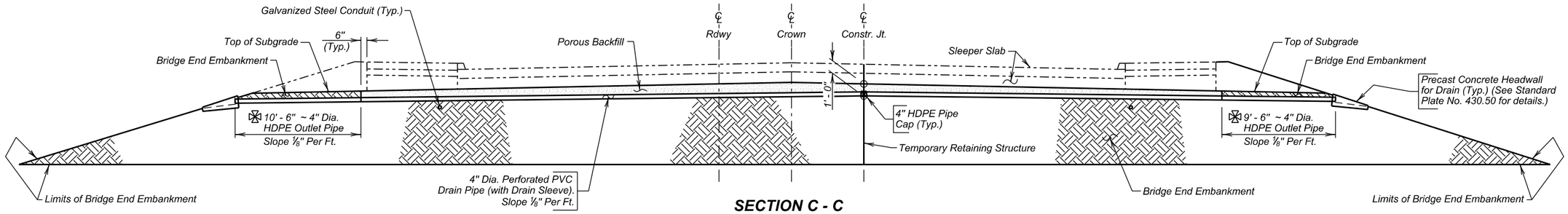


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA43 | | |

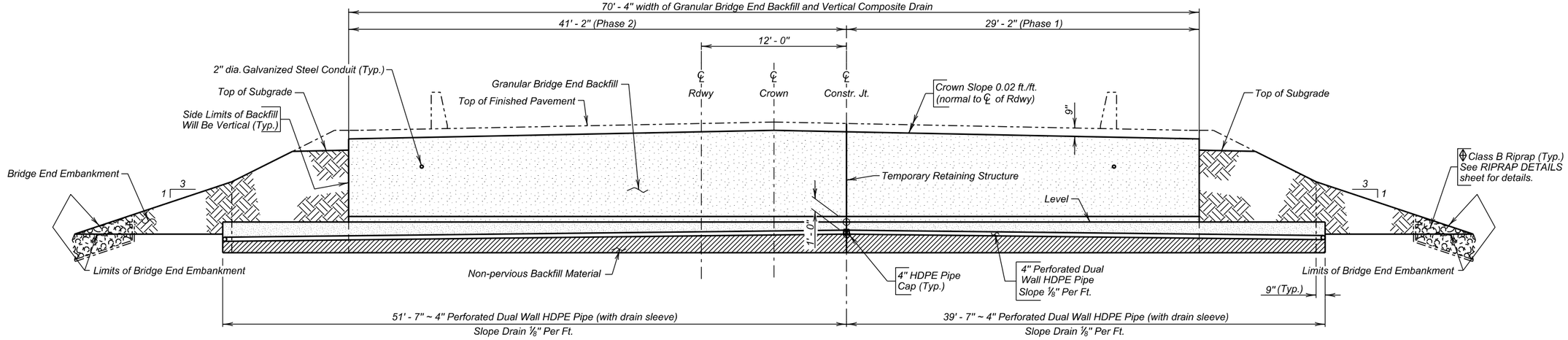
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E47 | E60 |




**SECTION D - D**




**SECTION C - C**




**SECTION B - B**

**DETAILS OF BRIDGE END BACKFILL**
**ADJ. TO ABUT. NO. 1 (B)**

FOR

## 595' - 6" STEEL GIRDER BRIDGE

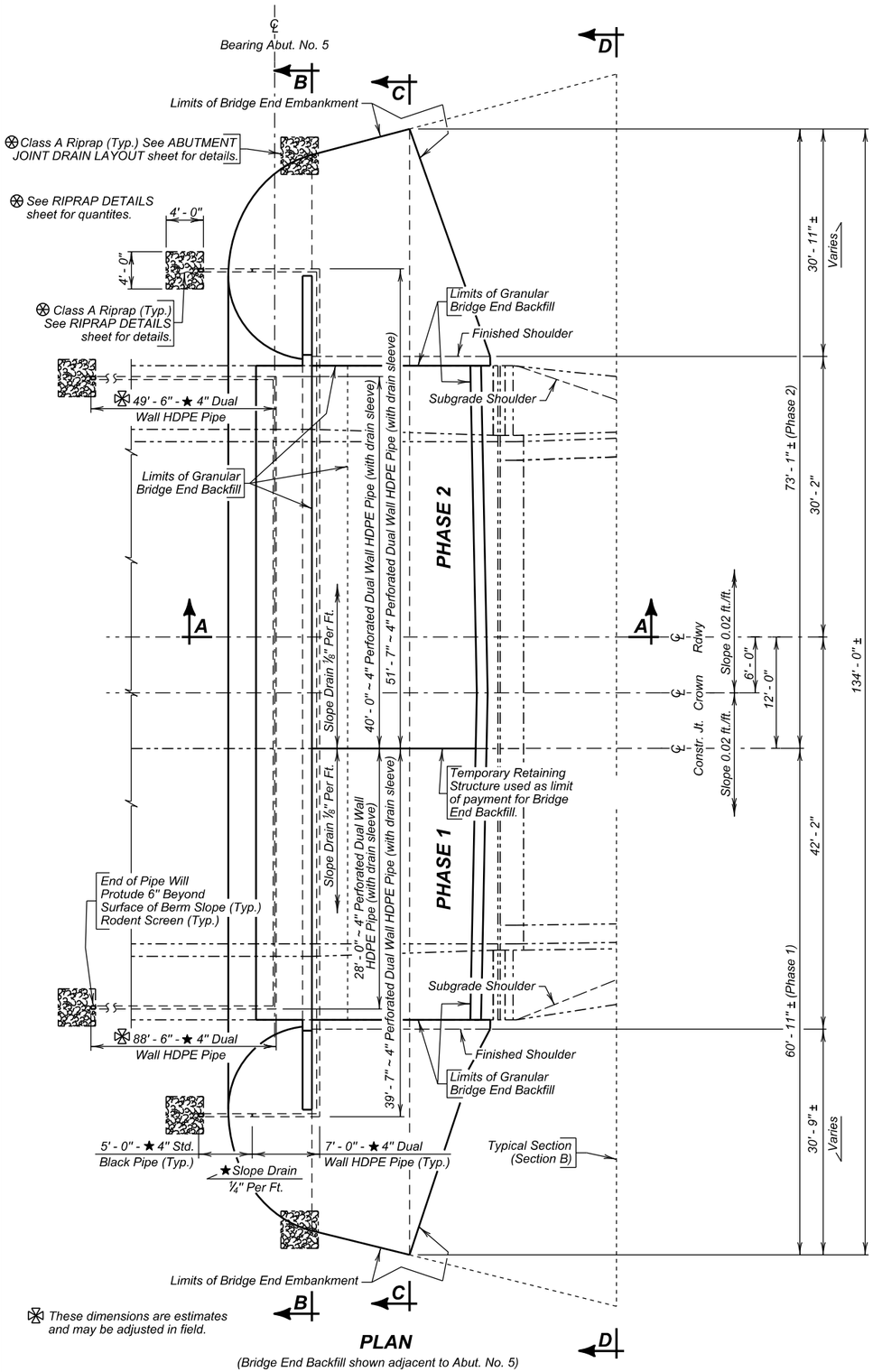
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A. Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA45 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E48 | E60 |

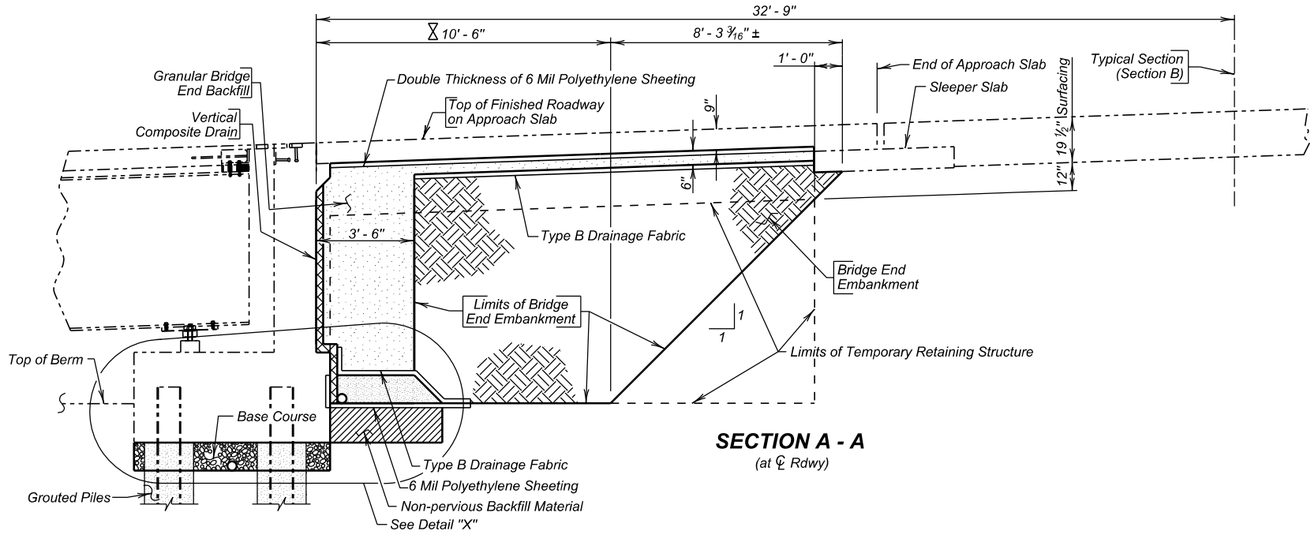



These dimensions are estimates and may be adjusted in field.

**PLAN**

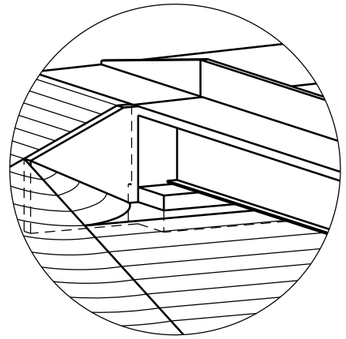
(Bridge End Backfill shown adjacent to Abut. No. 5)

NOTE:
⧖ Dimension differs from Std. Plate No. 120.10



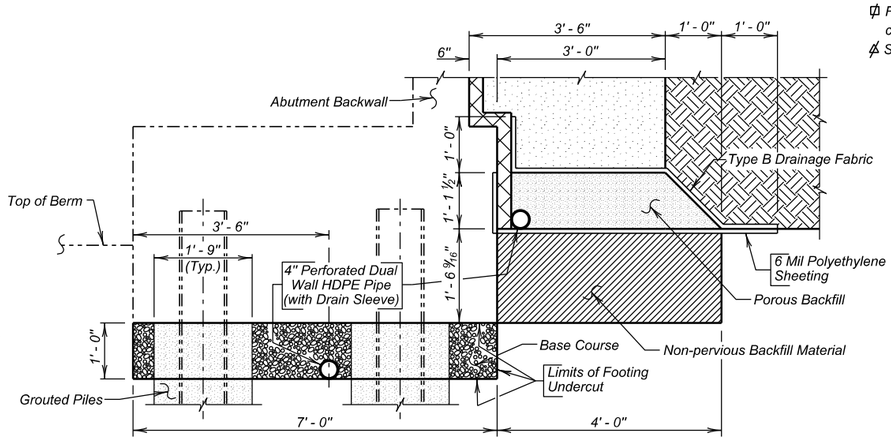

**SECTION A - A**

(at ℄ Rdwy)



**SPILL CONE DETAIL AT EMBANKMENT**

(Bridge and Sidewalk Railing not shown)




**DETAIL "X"**

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY | |
|---|---|---|---|
| | | Phase 1 | Phase 2 |
| Granular Bridge End Backfill | Cu. Yd. | 35.4 | 50.0 |
| ⁂ Bridge End Embankment | Cu. Yd. | 235 | 283 |
| ⏢ Porous Backfill | Ton | 11.7 | 16.0 |
| 4" Perforated Dual Wall HDPE Pipe | Ft. | 68 | 92 |
| 4" Dual Wall HDPE Pipe | Ft. | 101 | 62 |
| ⏢ Base Course | Ton | 14.3 | 20.2 |
| Footing Undercut | Cu. Yd. | 8 | 11 |

Phase 1 Phase 2

1. 226 319 sq. ft. Vertical Composite Drain.
2. 1251 1739 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
3. 77 105 sq. yd. Type B Drainage Fabric.

*Items 1 thru 3 are approximate quantities contained in the Granular Bridge End Backfill and are for information only.*

Phase 1 Phase 2

4. 5 5 ft. 4" Std. Black Pipe

*Item 4 is an approximate quantity contained in the 4" Dual Wall HDPE Pipe and is 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.

**DETAILS OF BRIDGE END BACKFILL ADJ. TO ABUT. NO. 5 (A)**
FOR
# 595' - 6" STEEL GIRDER BRIDGE

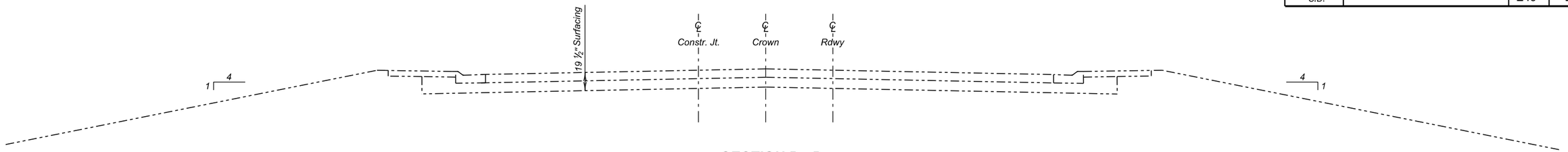
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS 0° SKEW
OVER BELLE FOURCHE RIVER SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 EM 0085(104)56
STR. NO. 10-098-371 HL-93

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

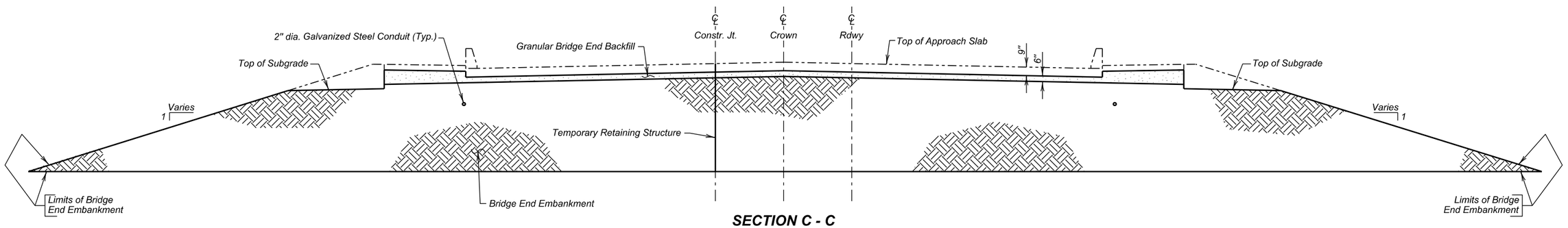


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A. Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA46 | | |

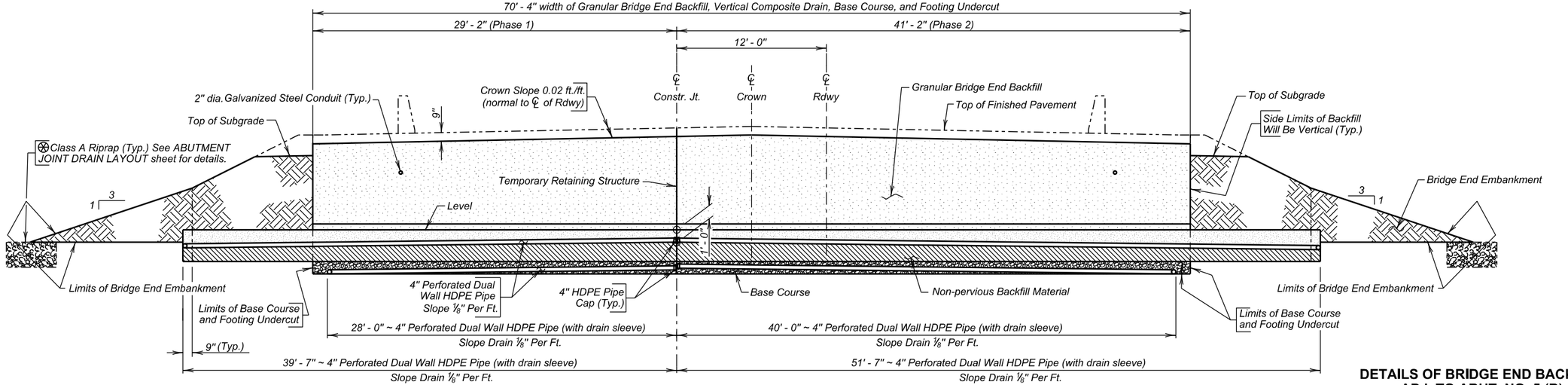
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E49 | E60 |




**SECTION D - D**




**SECTION C - C**




**SECTION B - B**

**DETAILS OF BRIDGE END BACKFILL**
**ADJ. TO ABUT. NO. 5 (B)**

FOR

## 595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

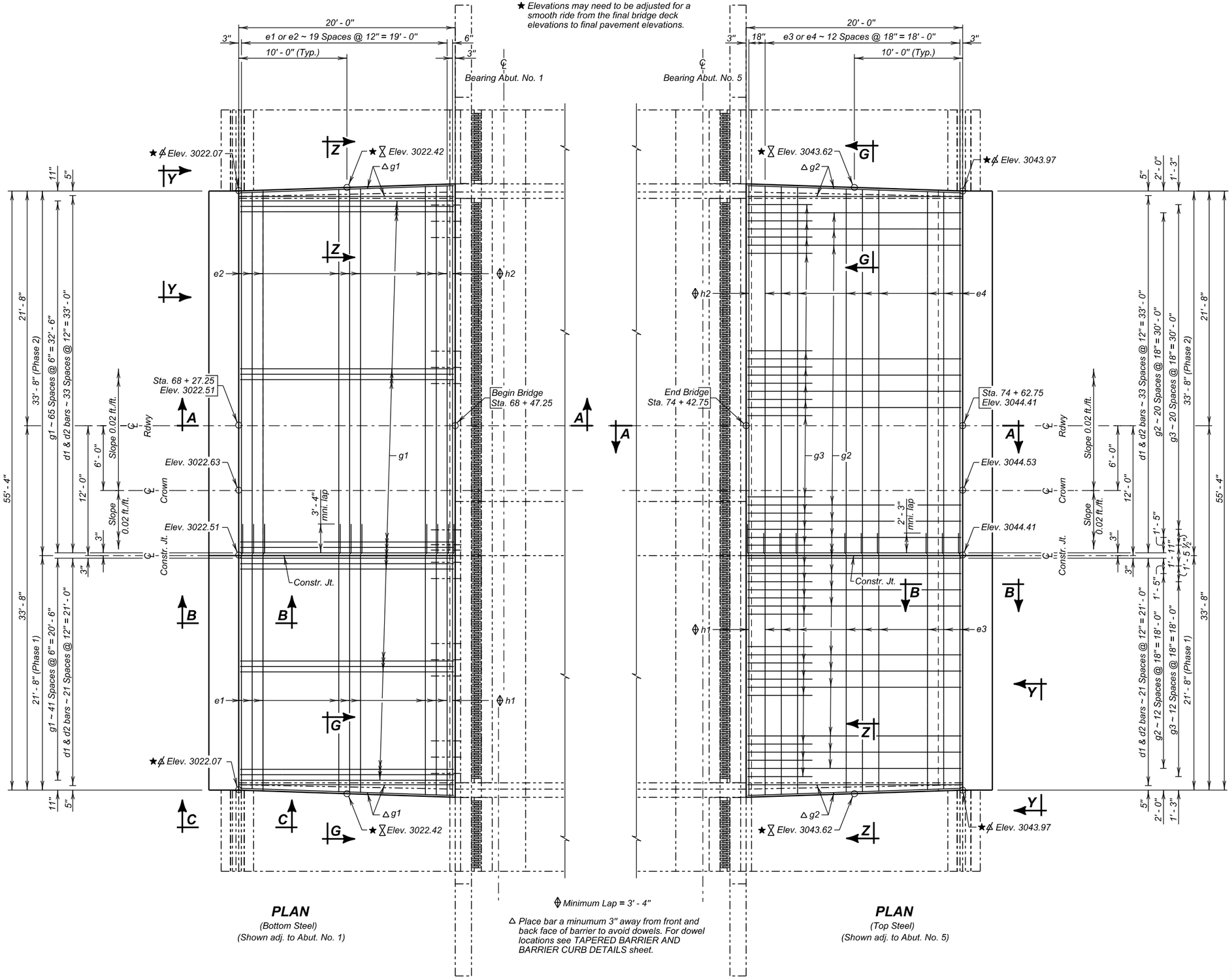
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2025

47 OF 58

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA47 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E50 | E60 |

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




**PLAN**
*(Bottom Steel)*
*(Shown adj. to Abut. No. 1)*

◊ *Minimum Lap = 3' - 4"*

△ *Place bar a minumum 3" away from front and back face of barrier to avoid dowels. For dowel locations see TAPERED BARRIER AND BARRIER CURB DETAILS sheet.*

**PLAN**
*(Top Steel)*
*(Shown adj. to Abut. No. 5)*

**APPROACH SLAB ADJACENT TO BRIDGE DETAILS (A)**

FOR

## 595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

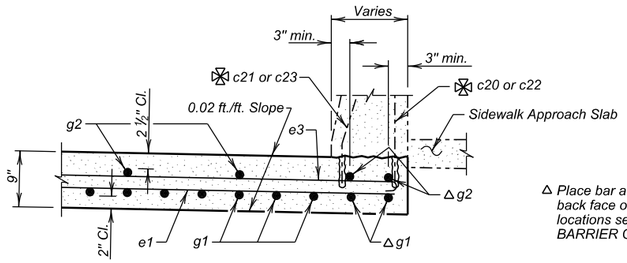
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2025



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steven A. Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA48 | | |

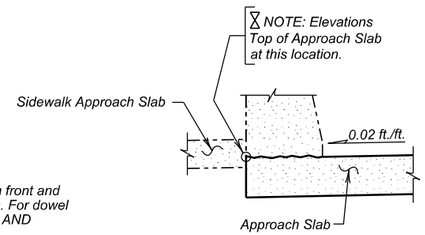
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E51 | E60 |

✠ *Shown and included in reinforcing schedule for approach slab barriers. See TAPERED BARRIER AND BARRIER CURB DETAILS sheet for details.*



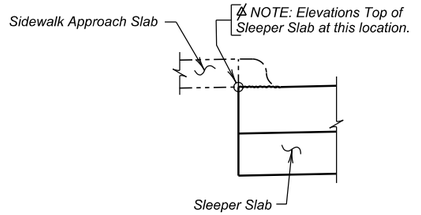

**SECTION G - G**

△ *Place bar a minumum 3" away from front and back face of barrier to avoid dowels. For dowel locations see TAPERED BARRIER AND BARRIER CURB DETAILS sheet.*




**SECTION Z - Z**

(Resteel not shown)




**VIEW Y - Y**

## REINFORCING SCHEDULE

(For Two Approach Slabs & Two Sleeper Slabs)

| | Mk. | No. | Size | Length | Type |
|---|---|---|---|---|---|
| Phase 1 | *Sleeper Slabs* | | | | |
| | c1 | 32 | 5 | 24' - 6" | Str. |
| | d1 | 88 | 4 | 5' - 6" | 2 |
| | d2 | 44 | 4 | 7' - 3" | T2 |
| | *Approach Slabs* | | | | |
| | e1 | 40 | 6 | 25' - 9" | Str. |
| | e3 | 26 | 4 | 24' - 8" | Str. |
| | g1 | 88 | 8 | 19' - 9" | Str. |
| | g2 | 32 | 4 | 19' - 9" | Str. |
| | g3 | 28 | 4 | 6' - 0" | Str. |
| | h1 | 4 | 6 | 25' - 9" | Str. |

| | Mk. | No. | Size | Length | Type |
|---|---|---|---|---|---|
| Phase 2 | *Sleeper Slabs* | | | | |
| | c2 | 32 | 5 | 33' - 4" | Str. |
| | d1 | 136 | 4 | 5' - 6" | 2 |
| | d2 | 68 | 4 | 7' - 3" | T2 |
| | *Approach Slabs* | | | | |
| | e2 | 40 | 6 | 34' - 0' | Str. |
| | e4 | 26 | 4 | 34' - 0" | Str. |
| | g1 | 136 | 8 | 19' - 9" | Str. |
| | g2 | 48 | 4 | 19' - 9" | Str. |
| | g3 | 44 | 4 | 6' - 0" | Str. |
| | h2 | 4 | 6 | 34' - 0" | Str. |

*Bending Details*




*NOTE:*
*All bars to be epoxy coated.*
*All dimensions are out to out of bars.*

## ESTIMATED QUANTITIES

(For Two Approach Slabs and Two Sleeper Slabs)

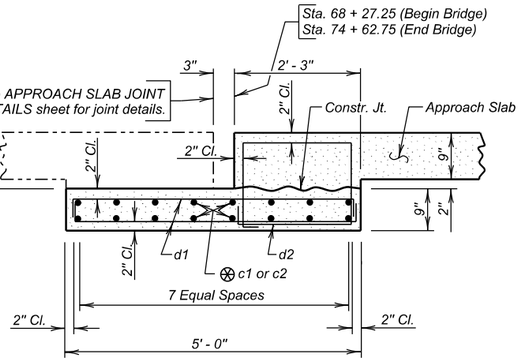
| ITEM | UNIT | QUANTITY Phase 1 | QUANTITY Phase 2 |
|---|---|---|---|
| Concrete Approach Slab for Bridge | Sq. Yd. | 97.8 | 151.1 |
| Concrete Approach Sleeper Slab for Bridge | Sq. Yd. | 24.1 | 37.4 |
| ☆ Install Dowel in Concrete | Each | 88 | 88 |

*Items 1 thru 6 are approximate quantities contained in the above bid items and are for information only.*

| | Phase 1 | Phase 2 | |
|---|---|---|---|
| 1. | 25.1 | 38.7 | Cu. Yds. Concrete in Approach Slabs. |
| 2. | 7311 | 10819 | Lbs. Epoxy Coated Re-Steel in Approach Slabs. |
| 3. | 6.0 | 9.4 | Cu. Yds. Concrete in Sleeper Slabs. |
| 4. | 1360 | 1964 | Lbs. Epoxy Coated Re-Steel in Sleeper Slabs. |
| 5. | 2.7 | 2.7 | Cu. Yds. Concrete in Tapered Barriers. |
| 6. | 262 | 262 | Lbs. Stainless Re-Steel in Tapered Barriers. |

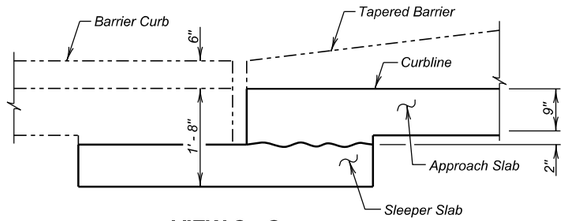
☆ *Included in quantity for dowel bars.*

| Phase 1 | Phase 2 | |
|---|---|---|
| 211 | 211 | Lbs. Stainless Re-Steel. |

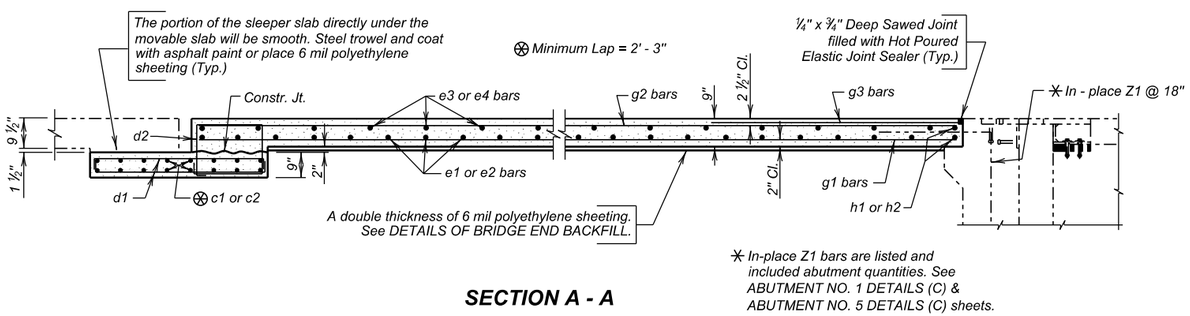



**SECTION B - B**

(Sleeper Slab)
(Approach Slab Steel not shown for clarity.)




**VIEW C - C**




**SECTION A - A**

✳ *In-place Z1 bars are listed and included abutment quantities. See ABUTMENT NO. 1 DETAILS (C) & ABUTMENT NO. 5 DETAILS (C) sheets.*

**APPROACH SLAB ADJACENT TO BRIDGE DETAILS (B)**

FOR

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

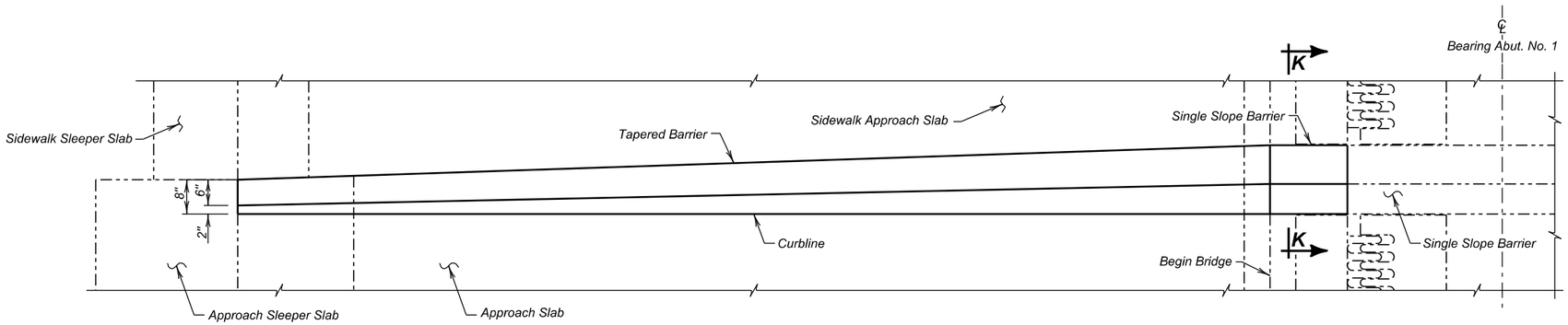
S. D. DEPT. OF TRANSPORTATION

MAY 2025



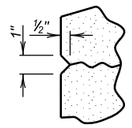
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA49 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E52 | E60 |




**PLAN**

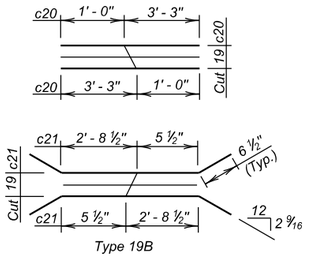
*(Shown Adj. to Abut. No. 1*
*Abut. No. 5 similar by opposite hand.)*



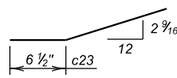

**RUSTICATION DETAIL**

## REINFORCING SCHEDULE

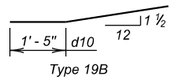
| Mk. | No. | Size | Length | Type | Bending Details |
|---|---|---|---|---|---|
| 4 Tapered Barrier Curbs | | | | | |
| c20 | 38 | 5 | 4' - 3" | Str. | |
| c21 | 38 | 5 | 4' - 3" | 19B | |
| c22 | 12 | 5 | 3' - 4" | Str. | |
| c23 | 12 | 5 | 3' - 5" | 19B | |
| d10 | 8 | 5 | 21' - 3" | 19B | |
| d11 | 8 | 5 | 6' - 5" | Str. | |
| d12 | 8 | 5 | 11' - 1" | Str. | |
| d13 | 8 | 5 | 17' - 3" | Str. | |
| d14 | 4 | 4 | 21' - 1" | Str. | |




Type 19B




Type 19B

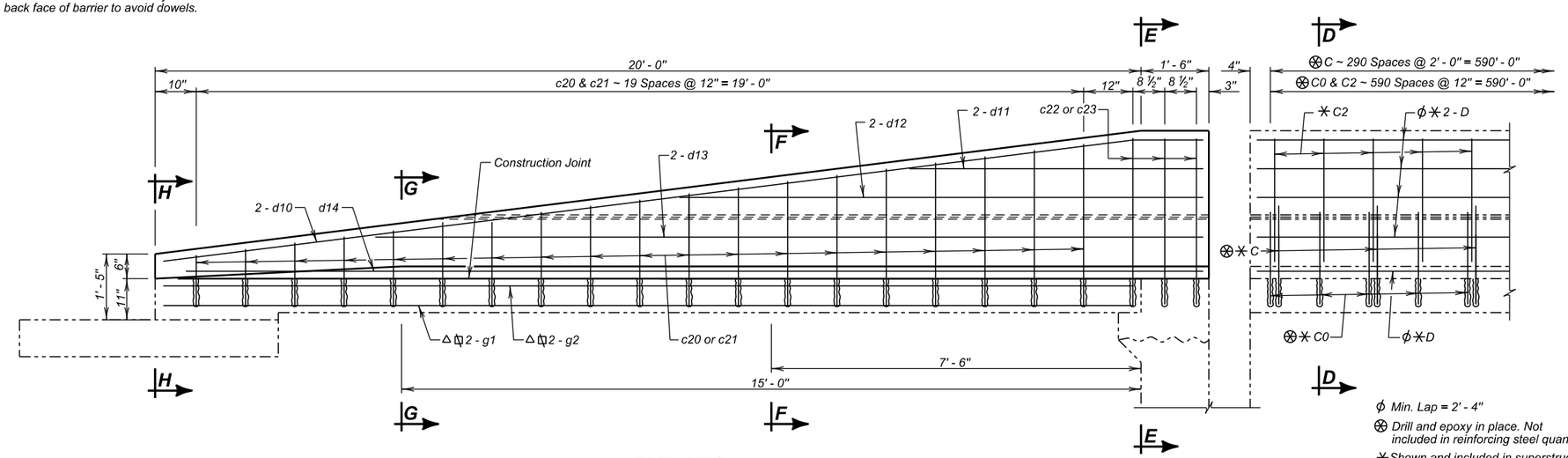



Type 19B

*NOTES:*
*All dimensions are out to out of bars.*
*All reinforcing steel will be stainless steel.*
△ *See cutting diagram.*
⌖ *Drill and epoxy in place. Not included in reinforcing steel quantity.*

*NOTES:*
*For listing re-bar and concrete quantities see APPROACH SLAB ADJACENT TO BRIDGE DETAILS (B) sheet for details.*

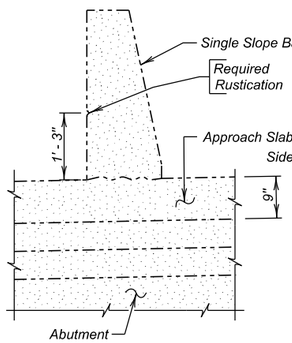
△ *Place bar a minumum 3" away from front and back face of barrier to avoid dowels.*




**ELEVATION**

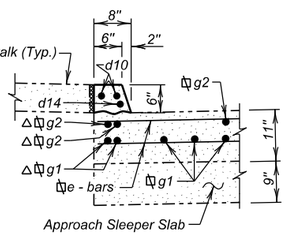
*(Shown Adj. to Abut. No. 1*
*Abut. No. 5 similar by opposite hand.)*

⌖ *Min. Lap = 2' - 4"*
⌖ *Drill and epoxy in place. Not included in reinforcing steel quantity.*
✳ *Shown and included in superstructure quantities. See SUPERSTRUCTURE DETAILS (D) sheet for details.*

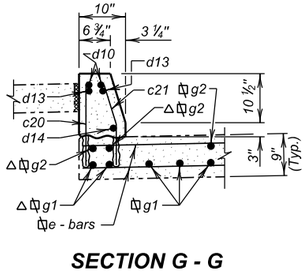



**SECTION K - K**

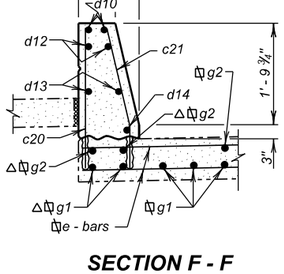
△ *Shown and and included in approach slab quantities. See APPROACH SLAB ADJACENT TO BRIDGE DETAILS (C) sheet for details.*



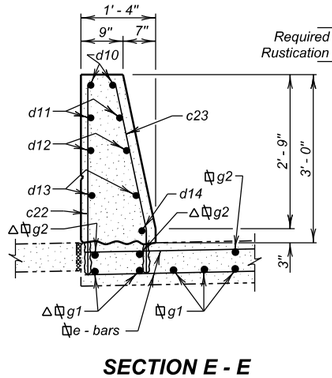

**SECTION H - H**



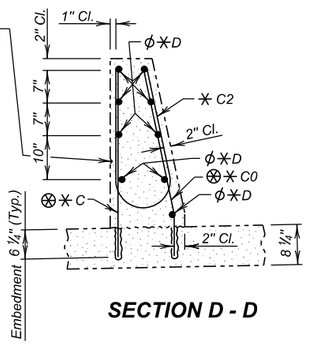

**SECTION G - G**




**SECTION F - F**




**SECTION E - E**




**SECTION D - D**

**TAPERED BARRIER AND BARRIER CURB DETAILS**

FOR

## 595' - 6" STEEL GIRDER BRIDGE

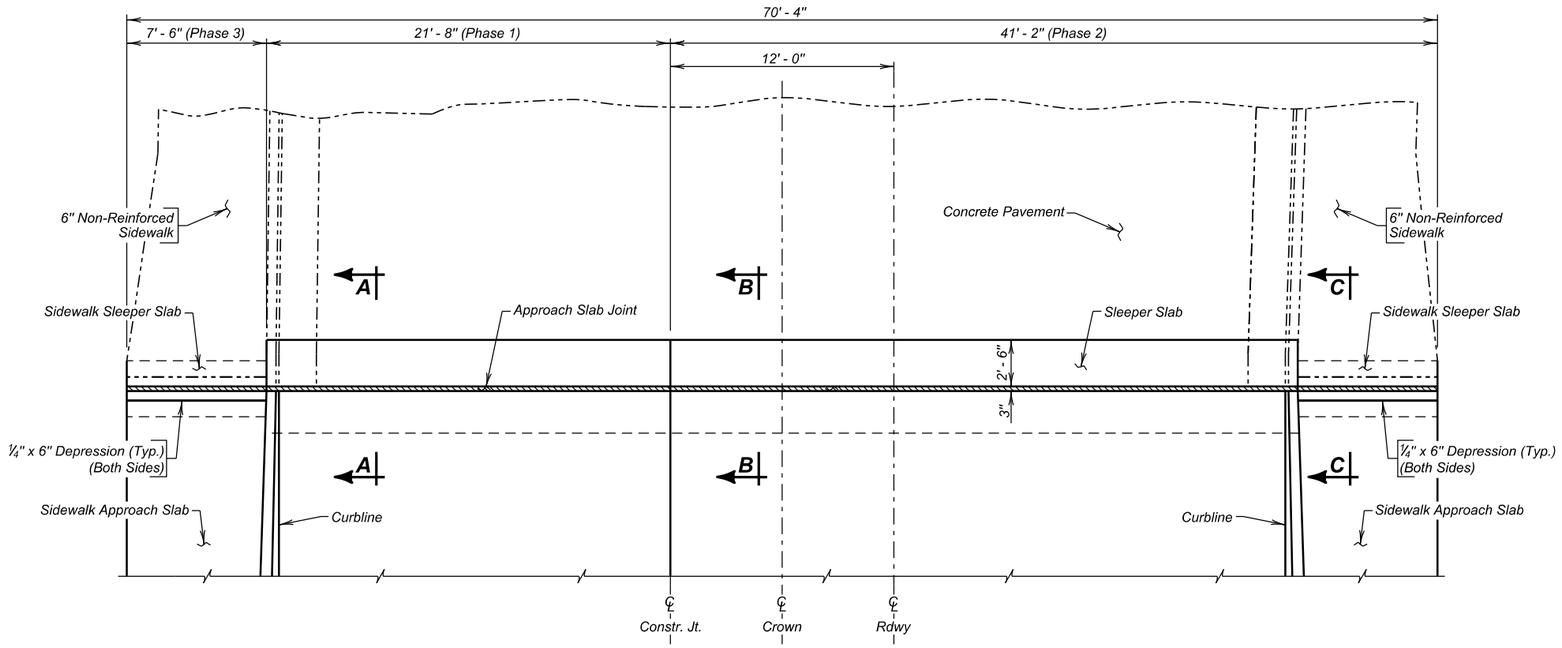
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

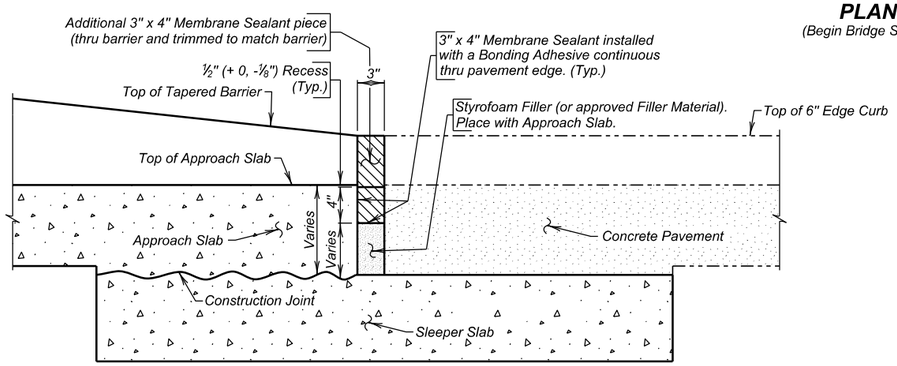


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA50 | | |

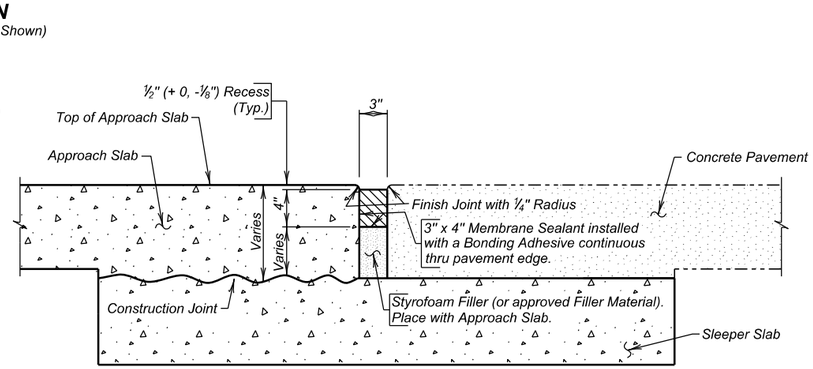
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| | EM 0085(104)56 | E53 | E60 |



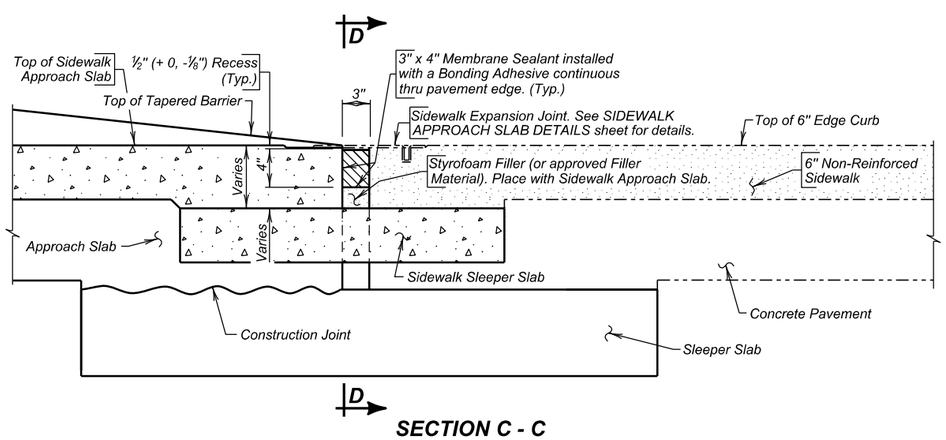

**PLAN**
(Begin Bridge Shown)



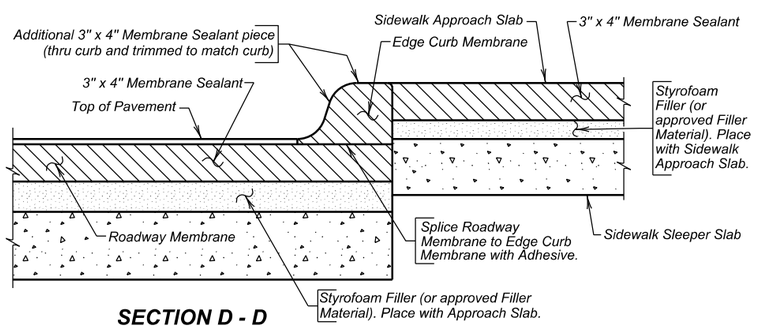

**SECTION A - A**




**SECTION B - B**




**SECTION C - C**




**SECTION D - D**

## GENERAL NOTES

1. The membrane sealant will be on the approved product list for membrane sealant expansion joints.
2. 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 to provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension. 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.
3. The membrane sealant will be supplied in pieces 5 feet in length or longer. The foam sealant will be ultra-violet and ozone resistant.
4. The bonding adhesive used to attach the membrane sealant to the adjacent concrete will be approved by the membrane sealant manufacturer.
5. Adhesive used to join adjacent pieces of the membrane sealant will be as recommended by the manufacturer.
6. If styrofoam filler material is used in the construction, it will be closed cell and water-tight as approved by the Engineer.
7. The minimum ambient air temperature at the time of joint installation and adhesive curing will be 40° F.
8. 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 concrete surfaces with solvents, wire brushing, or grinding will not be permitted.
9. 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.
10. Individual spliced sections will be installed as per the manufacturers' 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.
11. Traffic will not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.
12. Use plywood or other material to protect concrete adjacent to the joint from spalling before any equipment is moved across the joint. Any spall areas will be repaired at the Contractor's expense by breaking out and replacing adjacent concrete, as approved by the Engineer.
13. 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.

## ESTIMATED QUANTITIES
(For Two Approach Slabs)

| ITEM | UNIT | QUANTITY | | |
|---|---|---|---|---|
| | | Phase 1 | Phase 2 | Phase 3 |
| Membrane Sealant Expansion Joint | Ft. | 43.3 | 82.3 | 15.0 |

**APPROACH SLAB JOINT DETAILS**

FOR

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

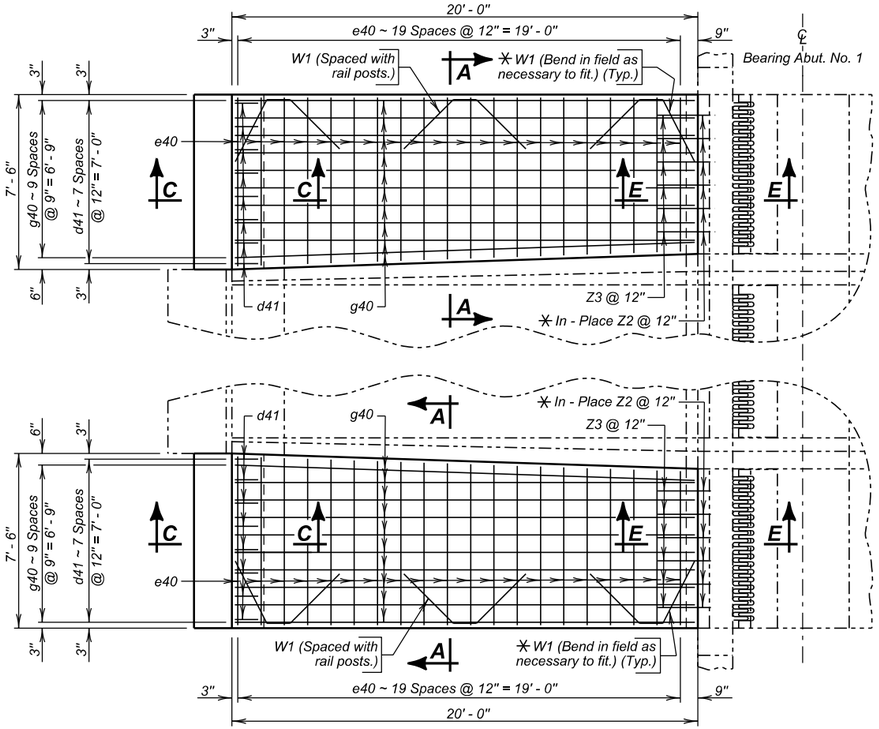
S. D. DEPT. OF TRANSPORTATION

MAY 2025



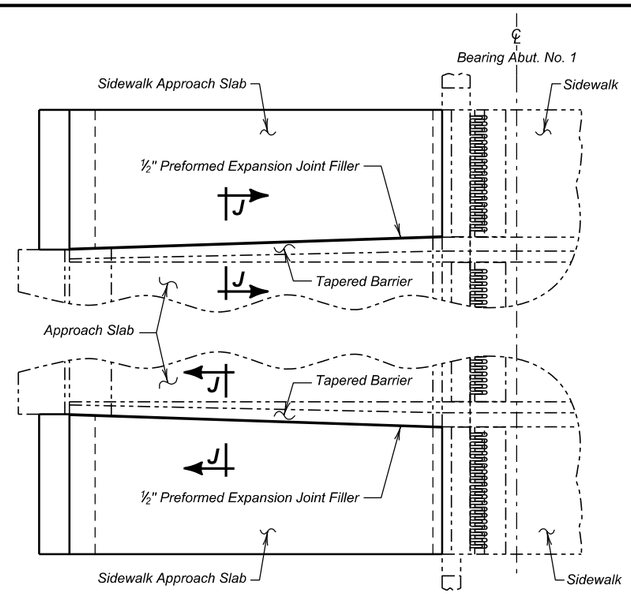
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA51 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E54 | E60 |



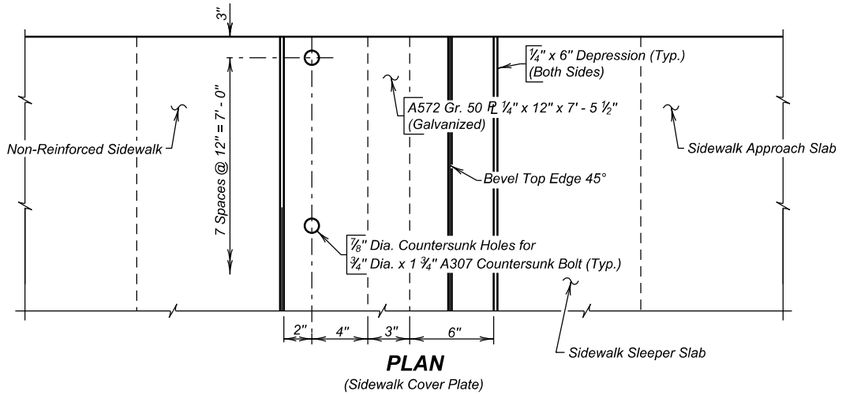

**PLAN**

(Sidewalk Approach Slab shown adjacent to Abut. No. 1. Abut. No. 5 similar opposite hand.)



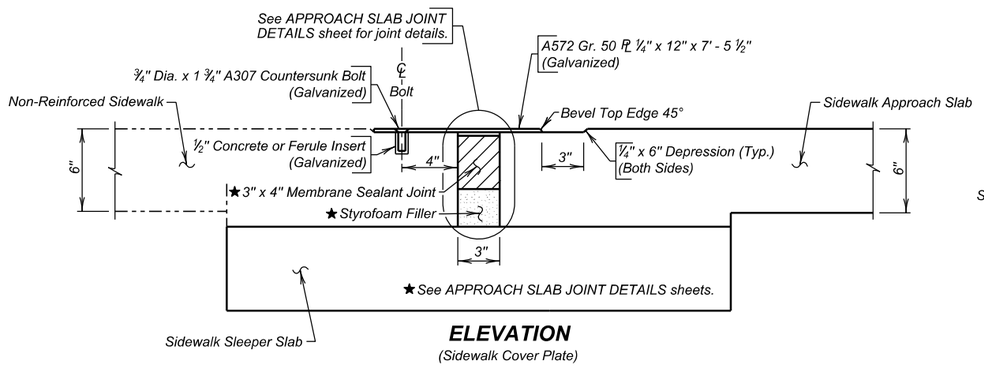

**PLAN**

(Sidewalk Approach Slab shown adjacent to Abut. No. 1. Abut. No. 5 similar opposite hand.)



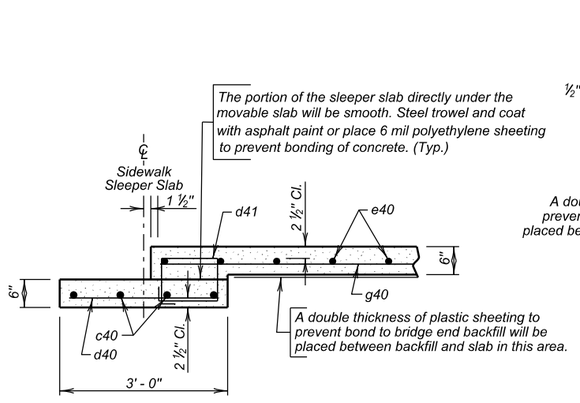

**PLAN**

(Sidewalk Cover Plate)

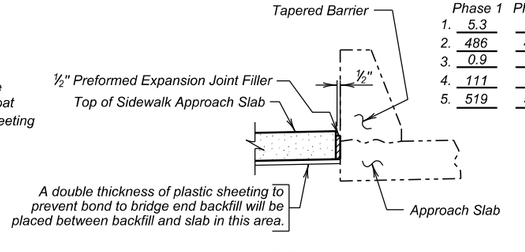



**ELEVATION**

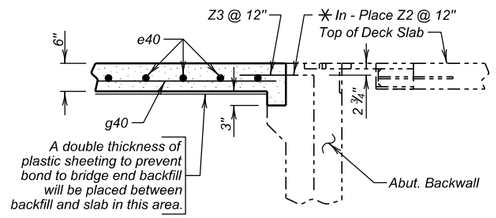
(Sidewalk Cover Plate)



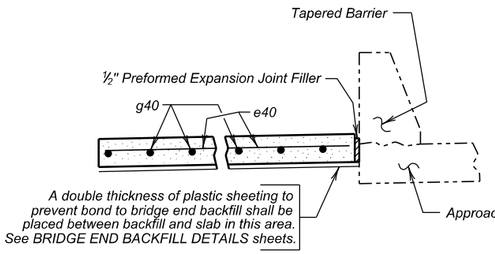

**SECTION C - C**



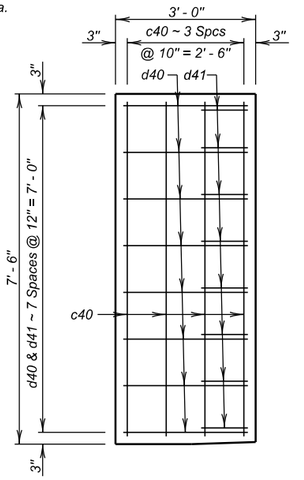

**SECTION J - J**




**SECTION E - E**




**SECTION A - A**



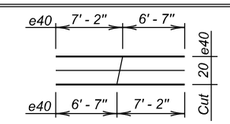

**PLAN**

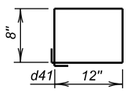
(Sidewalk Sleeper Slab shown adjacent to Abut. No. 1 left side, right side similar opposite hand.)

## REINFORCING SCHEDULE

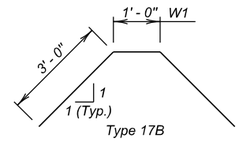
(For Four Sidewalk Approach Slabs and Four Sidewalk Sleeper Slabs)

| Mk. | No. | Size | Length | Type |
|---|---|---|---|---|
| c40 | 16 | 4 | 7' - 3" | Str. |
| d40 | 32 | 4 | 2' - 8" | Str. |
| d41 | 32 | 4 | 4' - 1" | T2 |
| ∢ e40 | 40 | 4 | 13' - 9" | Str. |
| g40 | 40 | 4 | 19' - 9" | Str. |
| ✳ W1 | 12 | 4 | 7' - 0" | 17B |
| Z3 | 24 | 4 | 1' - 4" | Str. |



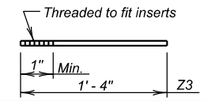




Type T2




Type 17B

NOTE:
All bars to be Epoxy Coated.
All dimensions are out to out of bars.
∢ See cutting diagram.
✳ Bend in field as necessary to fit.




## ESTIMATED QUANTITIES

(For Two Sidewalk Approach Slabs)

| ITEM | UNIT | QUANTITY | |
|---|---|---|---|
| | | Phase 2 | Phase 3 |
| 6" Reinforced Concrete Sidewalk | Sq. Ft. | 332 | 332 |

Items 1 thru 5 are approximate quantities contained in the above bid item and are for information only.

| Phase 1 | Phase 2 | |
|---|---|---|
| 1. 5.3 | 5.3 | Cu. Yds. Concrete in Sidewalk Approach Slabs. |
| 2. 486 | 486 | Lbs. Epoxy Coated Re-Steel in Sidewalk Approach Slabs. |
| 3. 0.9 | 0.9 | Cu. Yds. Concrete in Sidewalk Sleeper Slabs. |
| 4. 111 | 111 | Lbs. Epoxy Coated Re-Steel in Sidewalk Sleeper Slabs. |
| 5. 519 | 519 | Sq. Ft. 6 mil Polyethylene Sheeting under the reinforced concrete sidewalk. |

✳ In-place Z2 bars are listed and included abutment quantities. See ABUTMENT NO. 1 DETAILS (C) and ABUTMENT NO. 5 DETAILS (C) sheet.

**SIDEWALK APPROACH SLAB DETAILS**

FOR

# 595' - 6" STEEL GIRDER BRIDGE

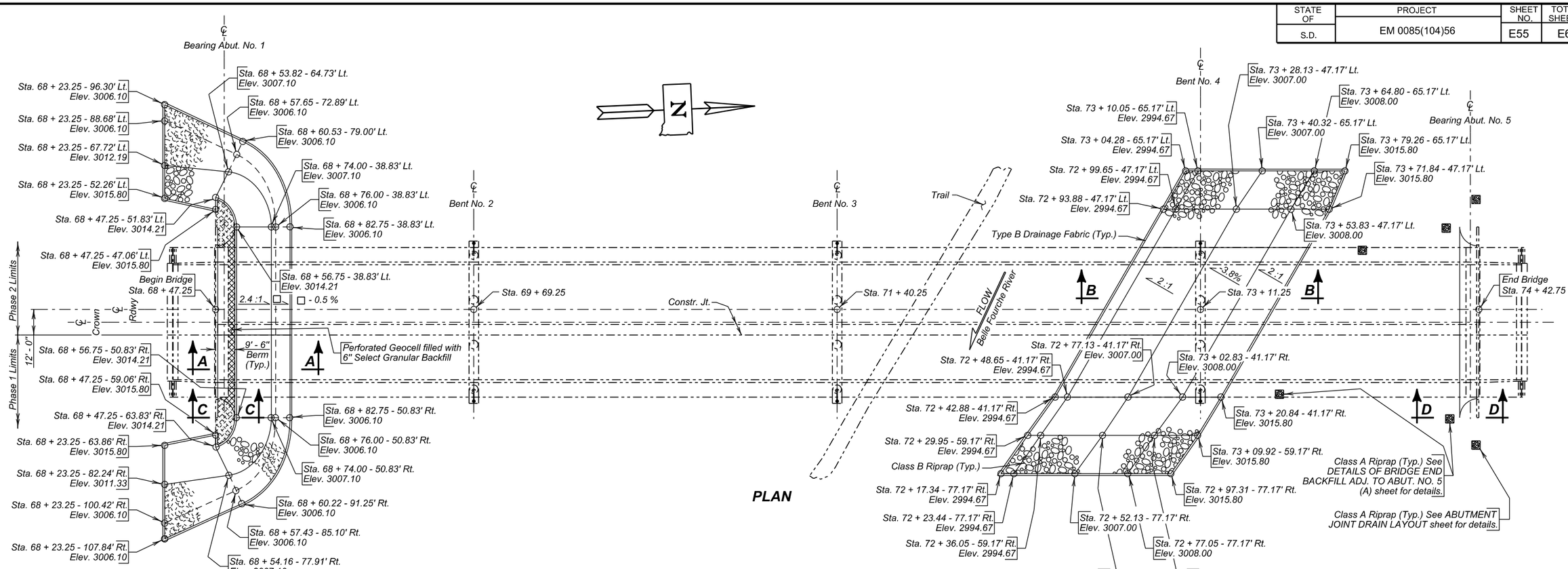
54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW
OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56
STR. NO. 10-098-371 — HL-93

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

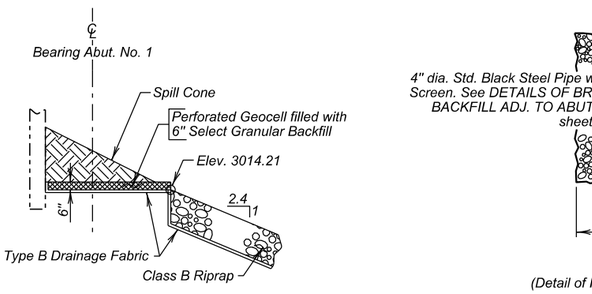
52 OF 58

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA52 | | |

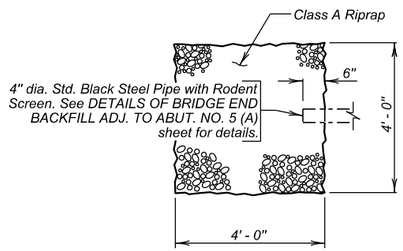
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | EM 0085(104)56 | E55 | E60 |




**PLAN**

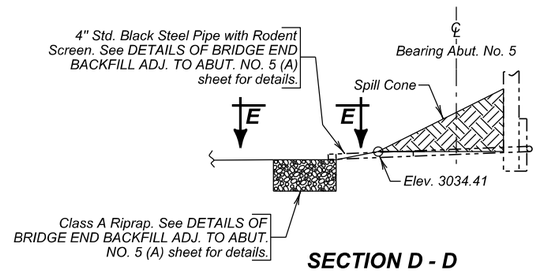



**SECTION C - C**

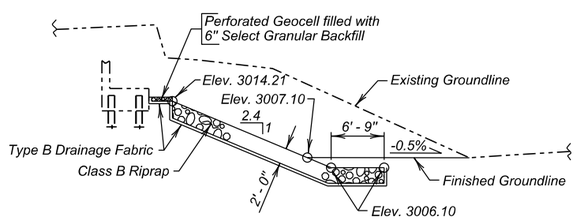



**VIEW E - E**

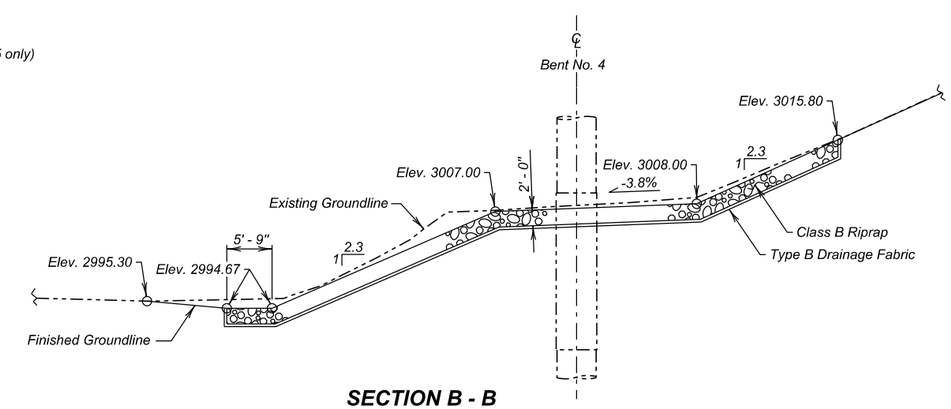
(Detail of Rockpile at Abut. No. 5 only)




**SECTION D - D**




**SECTION A - A**




**SECTION B - B**

## ESTIMATED QUANTITIES

| | ITEM | UNIT | QUANTITY Phase 1 | QUANTITY Phase 2 |
|---|---|---|---|---|
| ≠ | Class A Riprap | Ton | 5.1 | 5.1 |
| ≠ | Class B Riprap | Ton | 917.0 | 1075.0 |
| | Type B Drainage Fabric | Sq. Yd. | 1119 | 1303 |
| ⌀ | Select Granular Backfill | Ton | 8.8 | 10.0 |
| ☆ | Perforated Geocell | Sq. Ft. | 251.7 | 285.0 |

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

☆ See PERFORATED GEOCELL notes for payment information.

⌀ For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to convert Cu. Yds. to Tons.

| | Phase 1 | Phase 2 | |
|---|---|---|---|
| 1. | 28 | 32 | Sq. Yd. Type B Drainage Fabric |

*Item 1 is an approximate quantity contained in the Perforated Geocell and is for information only.*

## RIPRAP DETAILS

FOR

# 595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW

OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E

STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56

STR. NO. 10-098-371 — HL-93

BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

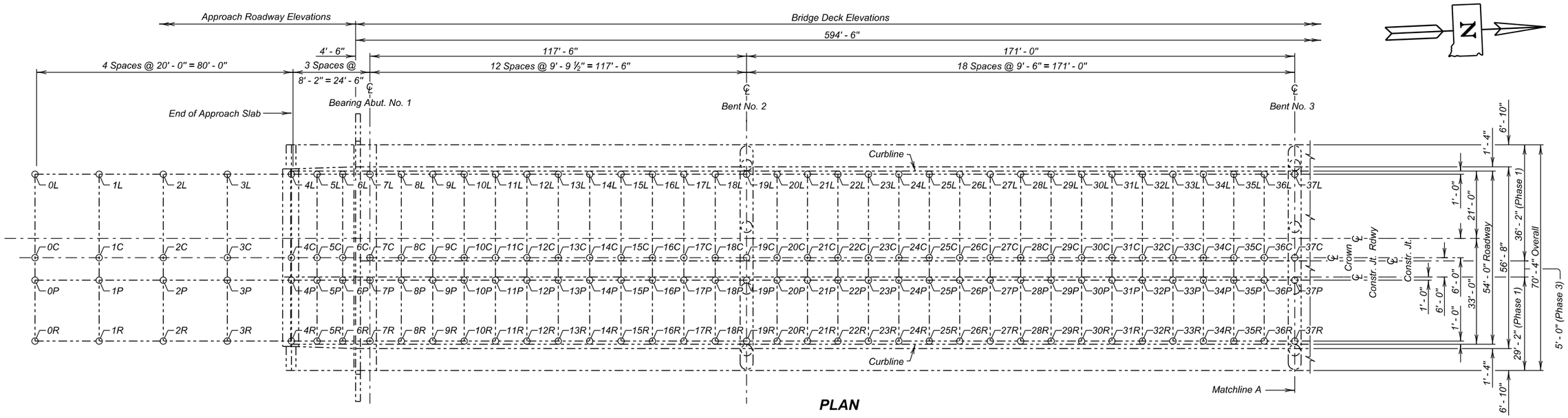
MAY 2025



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steven A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA53 | | |

*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. | EM 0085(104)56 | E56 | E60 |




**PLAN**

### Table of As-Built Elevations - Approach Roadway

| Location | Elevation | Location | Elevation | Location | Elevation | Location | Elevation |
|---|---|---|---|---|---|---|---|
| 0L | | 0C | | 0P | | 0R | |
| 1L | | 1C | | 1P | | 1R | |
| 2L | | 2C | | 2P | | 2R | |
| 3L | | 3C | | 3P | | 3R | |
| 4L | | 4C | | 4P | | 4R | |
| 5L | | 5C | | 5P | | 5R | |
| 6L | | 6C | | 6P | | 6R | |

### Table of As-Built Elevations - Bridge Deck

| Location | Elevation | Location | Elevation | Location | Elevation | Location | Elevation |
|---|---|---|---|---|---|---|---|
| 7L | | 7C | | 7P | | 7R | |
| 8L | | 8C | | 8P | | 8R | |
| 9L | | 9C | | 9P | | 9R | |
| 10L | | 10C | | 10P | | 10R | |
| 11L | | 11C | | 11P | | 11R | |
| 12L | | 12C | | 12P | | 12R | |
| 13L | | 13C | | 13P | | 13R | |
| 14L | | 14C | | 14P | | 14R | |
| 15L | | 15C | | 15P | | 15R | |
| 16L | | 16C | | 16P | | 16R | |
| 17L | | 17C | | 17P | | 17R | |

### Table of As-Built Elevations - Bridge Deck (Cont.)

| Location | Elevation | Location | Elevation | Location | Elevation | Location | Elevation |
|---|---|---|---|---|---|---|---|
| 18L | | 18C | | 18P | | 18R | |
| 19L | | 19C | | 19P | | 19R | |
| 20L | | 20C | | 20P | | 20R | |
| 21L | | 21C | | 21P | | 21R | |
| 22L | | 22C | | 22P | | 22R | |
| 23L | | 23C | | 23P | | 23R | |
| 24L | | 24C | | 24P | | 24R | |
| 25L | | 25C | | 25P | | 25R | |
| 26L | | 26C | | 26P | | 26R | |
| 27L | | 27C | | 27P | | 27R | |
| 28L | | 28C | | 28P | | 28R | |
| 29L | | 29C | | 29P | | 29R | |
| 30L | | 30C | | 30P | | 30R | |
| 31L | | 31C | | 31P | | 31R | |
| 32L | | 32C | | 32P | | 32R | |
| 33L | | 33C | | 33P | | 33R | |
| 34L | | 34C | | 34P | | 34R | |
| 35L | | 35C | | 35P | | 35R | |
| 36L | | 36C | | 36P | | 36R | |
| 37L | | 37C | | 37P | | 37R | |

### Elevations - Bridge Survey Markers

| Location | Station - Offset | Elevation |
|---|---|---|
| Begin Bridge | | |

### ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Bridge Elevation Survey | L. S. | Lump Sum |

*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

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS 0° SKEW
OVER BELLE FOURCHE RIVER SEC. 10-T8N-R2E
STA. 68 + 47.25 TO 74 + 42.75 EM 0085(104)56
STR. NO. 10-098-371 HL-93

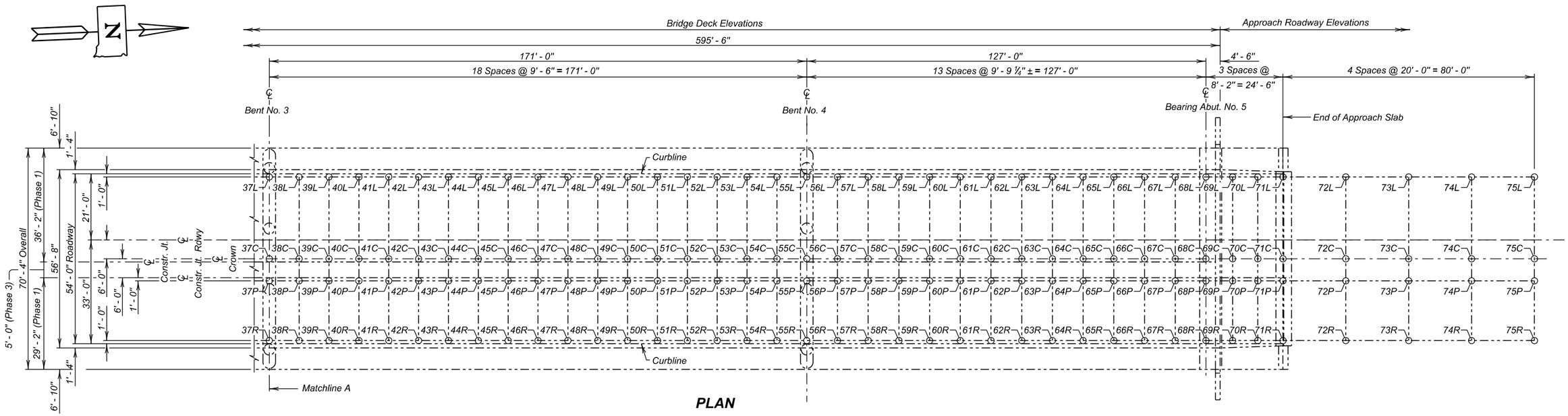
BUTTE COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2025



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | Steve A Johnson BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA57 | | |

*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. | EM 0085(104)56 | E57 | E60 |




**PLAN**

### Table of As-Built Elevations - Bridge Deck (Cont.)

| Location | Elevation | Location | Elevation | Location | Elevation | Location | Elevation |
|---|---|---|---|---|---|---|---|
| 37L | | 37C | | 37P | | 37R | |
| 38L | | 38C | | 38P | | 38R | |
| 39L | | 39C | | 39P | | 39R | |
| 40L | | 40C | | 40P | | 40R | |
| 41L | | 41C | | 41P | | 41R | |
| 42L | | 42C | | 42P | | 42R | |
| 43L | | 43C | | 43P | | 43R | |
| 44L | | 44C | | 44P | | 44R | |
| 45L | | 45C | | 45P | | 45R | |
| 46L | | 46C | | 46P | | 46R | |
| 47L | | 47C | | 47P | | 47R | |
| 48L | | 48C | | 48P | | 48R | |
| 49L | | 49C | | 49P | | 49R | |
| 50L | | 50C | | 50P | | 50R | |
| 51L | | 51C | | 51P | | 51R | |
| 52L | | 52C | | 52P | | 52R | |
| 53L | | 53C | | 53P | | 53R | |
| 54L | | 54C | | 54P | | 54R | |
| 55L | | 55C | | 55P | | 55R | |
| 56L | | 56C | | 56P | | 56R | |
| 57L | | 57C | | 57P | | 57R | |

### Table of As-Built Elevations - Bridge Deck

| Location | Elevation | Location | Elevation | Location | Elevation | Location | Elevation |
|---|---|---|---|---|---|---|---|
| 58L | | 58C | | 58P | | 58R | |
| 59L | | 59C | | 59P | | 59R | |
| 60L | | 60C | | 60P | | 60R | |
| 61L | | 61C | | 61P | | 61R | |
| 62L | | 62C | | 62P | | 62R | |
| 63L | | 63C | | 63P | | 63R | |
| 64L | | 64C | | 64P | | 64R | |
| 65L | | 65C | | 65P | | 65R | |
| 66L | | 66C | | 66P | | 66R | |
| 67L | | 67C | | 67P | | 67R | |
| 68L | | 68C | | 68P | | 68R | |

### Table of As-Built Elevations - Approach Roadway

| Location | Elevation | Location | Elevation | Location | Elevation | Location | Elevation |
|---|---|---|---|---|---|---|---|
| 69L | | 69C | | 69P | | 69R | |
| 70L | | 70C | | 70P | | 70R | |
| 71L | | 71C | | 71P | | 71R | |
| 72L | | 72C | | 72P | | 72R | |
| 73L | | 73C | | 73P | | 73R | |
| 74L | | 74C | | 74P | | 74R | |
| 75L | | 75C | | 75P | | 75R | |

### Elevations - Bridge Survey Markers

| Location | Station - Offset | Elevation |
|---|---|---|
| End Bridge | | |

**AS - BUILT ELEVATION SURVEY (B)**

FOR

595' - 6" STEEL GIRDER BRIDGE

54' - 0" ROADWAY & 2 - 6' - 0" SIDEWALKS — 0° SKEW

OVER BELLE FOURCHE RIVER — SEC. 10-T8N-R2E

STA. 68 + 47.25 TO 74 + 42.75 — EM 0085(104)56

STR. NO. 10-098-371 — HL-93

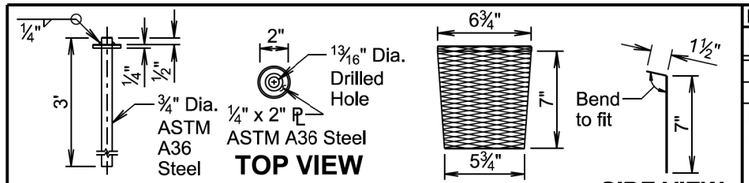
BUTTE COUNTY

S. D. DEPT. OF TRANSPORTATION

MAY 2025



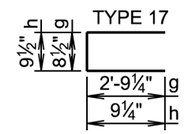
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| AU | JH | BT | BRIDGE ENGINEER |
| BUTE04G4 | 04G4TA55 | | |

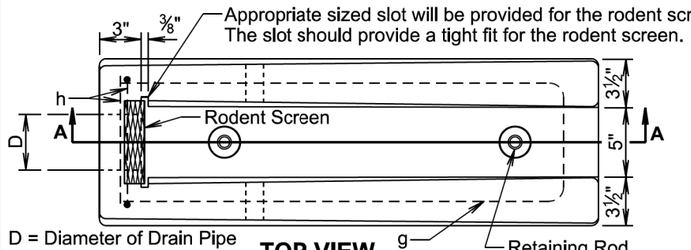


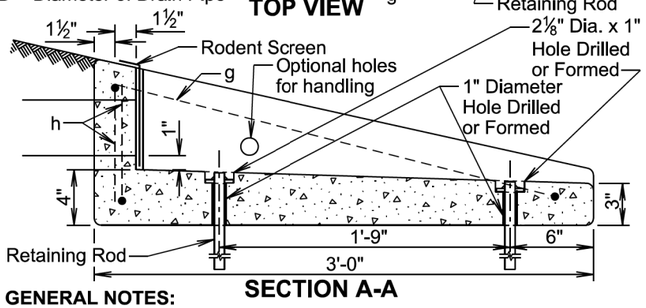

| REINFORCING SCHEDULE | | | | |
|---|---|---|---|---|
| MK. | No. | Size | Length | Type |
| g | 1 | 4 | 6'-3" | 17 |
| h | 2 | 4 | 2'-4" | 17 |

NOTE: All dimensions are out to out of bars.

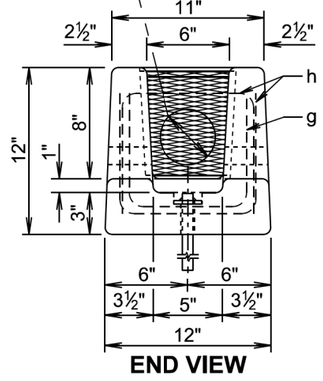
Bending Details




Exact dimension of hole is dependent on the pipe size and coupling method.




**GENERAL NOTES:**

The concrete will be Class M6. The concrete will conform to the requirements of Section 462 of the Specifications. It is estimated that each unit weighs approximately 210 pounds.

All reinforcing steel will conform to ASTM A615, Grade 60 and will be epoxy coated. The reinforcing steel will be securely retained to prevent displacement during placement of concrete. It is estimated that 7.3 pounds of reinforcing steel is required for each unit.

The pipe will be placed in the concrete headwall with the pipe end flush with the concrete surface adjacent to the rodent screen.

The rodent screen will be galvanized 13 Ga. steel with a diamond shaped flattened mesh pattern. The size will be ½". The size refers to the measurement across the smallest diamond shaped opening measured from the centers of the wires.

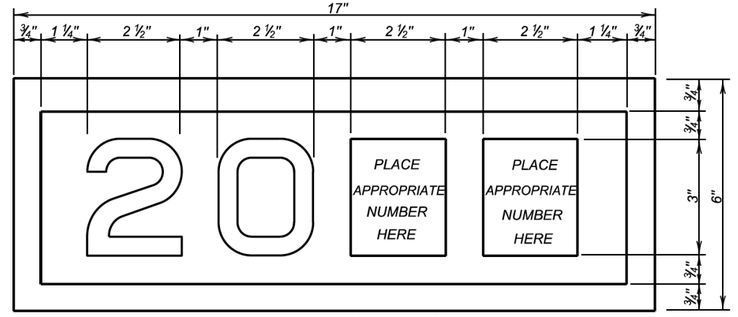
The retaining rod will be galvanized in accordance with ASTM A123 after all shop welding has been completed.

The drawing indicates using ½" fillets; however, ¾" chamfers may be substituted for the ½" fillets.

All costs for furnishing and installing the concrete headwall including equipment, labor, and materials including concrete, reinforcing steel, retaining rods, and rodent screen will be incidental to the contract unit price per each for "Precast Concrete Headwall for Drain".

November 19, 2021

| | | | |
|---|---|---|---|
| Published Date: 2027 | SDDOT | PRECAST CONCRETE HEADWALL FOR DRAIN | PLATE NUMBER 430.50<br>Sheet 1 of 1 |




YEAR PLATE DETAILS

**GENERAL NOTES:**

1. *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.*

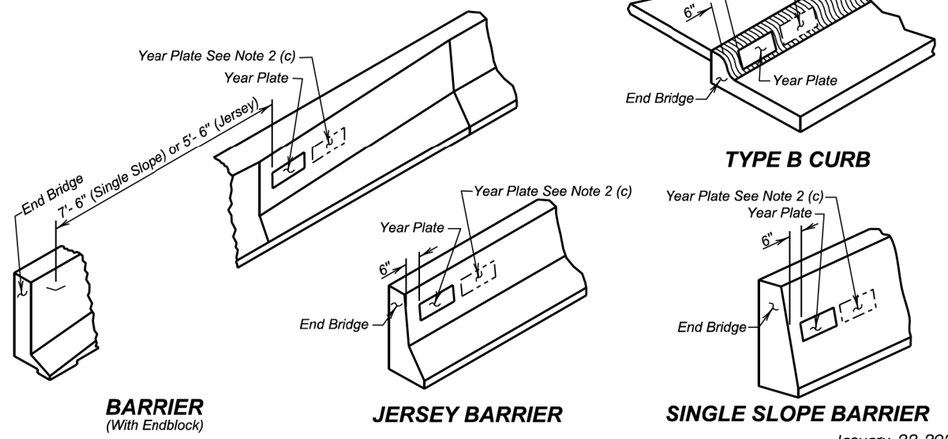
2. *Year plates will be located on structure(s) as follows:*

   a. *On cast-in-place box culverts the year plates will be four and one - half (4 ½) 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.*

   b. *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.*

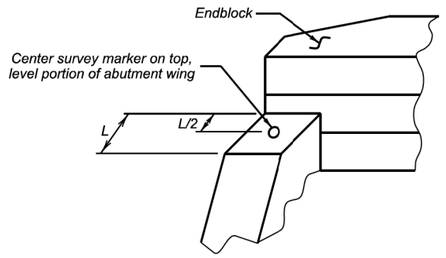
   c. *When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date will be placed as listed above and the other located adjacent to it. Both year plates will be shown at each end of the bridge on opposite sides.*

3. *There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work will be incidental to other contract items.*

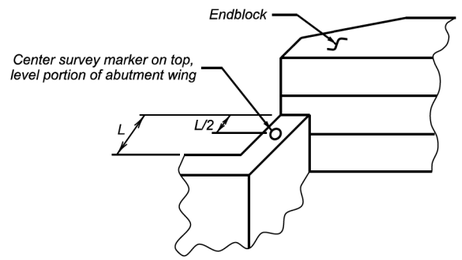



January 22, 2021

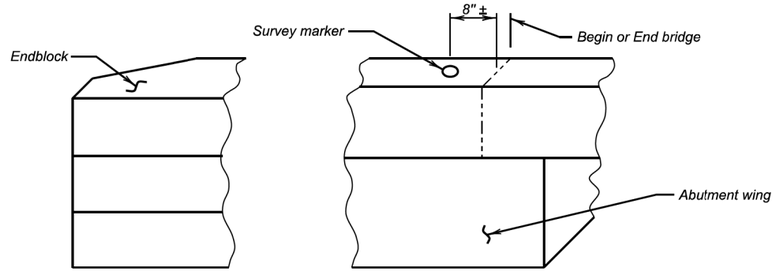
| | | | |
|---|---|---|---|
| Published Date: 2027 | SDDOT | YEAR PLATE DETAILS | PLATE NUMBER 460.02<br>Sheet 1 Of 1 |




**ABUTMENT WITH "STRAIGHT" WINGS**




**ABUTMENT WITH "SWEPT BACK" WINGS**




**ABUTMENT WITH "SWEPT BACK" WINGS**

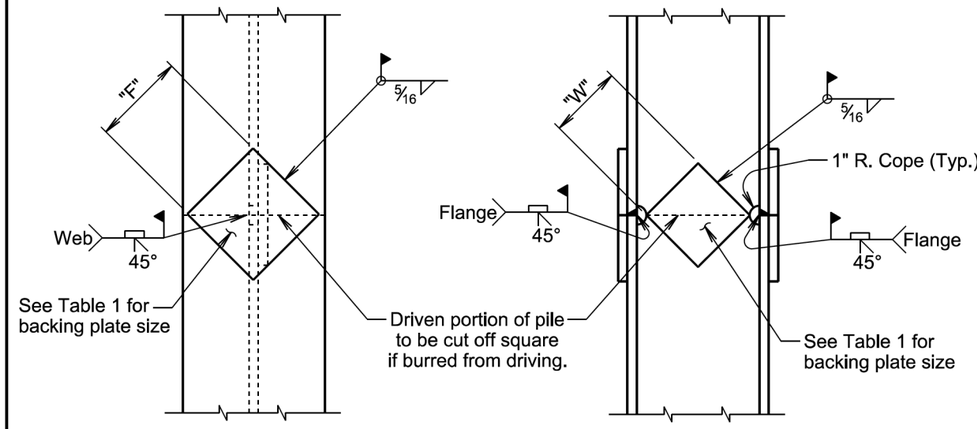
*( Endblock on top of wings)*

**GENERAL NOTES:**

1. Survey markers shall be located at each abutment on the same side of the bridge as the year plate. Place survey markers on abutment wings as shown. Two survey markers will be required at each bridge.
2. Survey markers shall be of a type intended for installation in concrete, be made of solid brass or bronze, have a domed top and be either a 3" top diameter (with a ¾" X 2" long ribbed shank), or a US Army Corps of Engineers Type C Disc with a 3 ½" top diameter.
3. There will be no separate measurement or payment made for survey markers. All costs for this work shall be incidental to the other contract items.

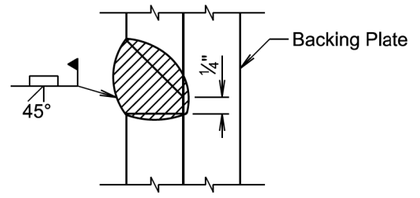
June 26, 2012

| Published Date: 2027 | SDDOT | BRIDGE SURVEY MARKER | PLATE NUMBER 460.05 |
|---|---|---|---|
| | | | Sheet 1 of 1 |




NOTE:
Prepare joint surfaces lower end of upper section on the ground and weld on backing plates; then place upper section on lower section and weld.

**COMPLETE JOINT PENETRATION WELD DETAIL**




**GENERAL NOTES:**

Steel for backing plates will conform to ASTM A709, Grade 50 or ASTM A572, Grade 50.

Welding and weld inspection will be in conformance with AWS D1.5 (Current Year) Bridge Welding Code - Steel.

Welder must be certified and registered with the SDDOT.

Backing plate will at a minimum be as thick as the web of the pile being spliced.

Web must be coped with 1 inch radius.

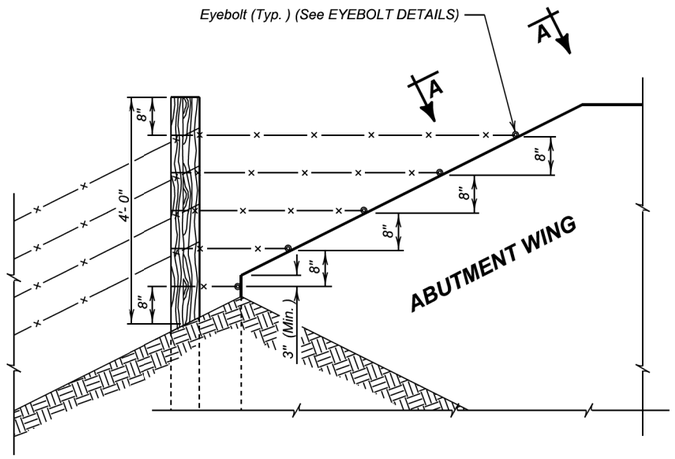
Submit Welding Procedure Specification (WPS) to Bridge Construction Engineer for approval prior to pile driving.

**TABLE 1**
(BACKING PLATES)

| PILE | 10" | 12" | 14" |
|---|---|---|---|
| "F" FLANGE | 6½" | 8" | 10" |
| "W" WEB | 4¾" | 6¼" | 7½" |

April 17, 2026

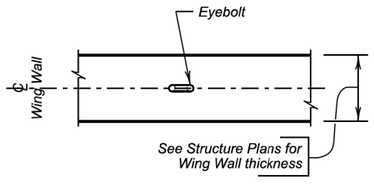
| Published Date: 2027 | SDDOT | H PILE SPLICE DETAILS | PLATE NUMBER 510.40 |
|---|---|---|---|
| | | | Sheet 1 of 1 |



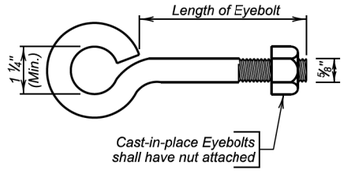

**DETAIL FOR FENCE ANCHORS**

## 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 ⅝ 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 ½ 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 ⅝ 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 | SDDOT | FENCE ANCHORS FOR BRIDGE ABUTMENT WINGS (WINGS LONGER THAN 6') | PLATE NUMBER 620.17<br>Sheet 1 of 1 |

595' - 6" STEEL GIRDER BRIDGE
STR. NO. 10-098-371
MAY 2025