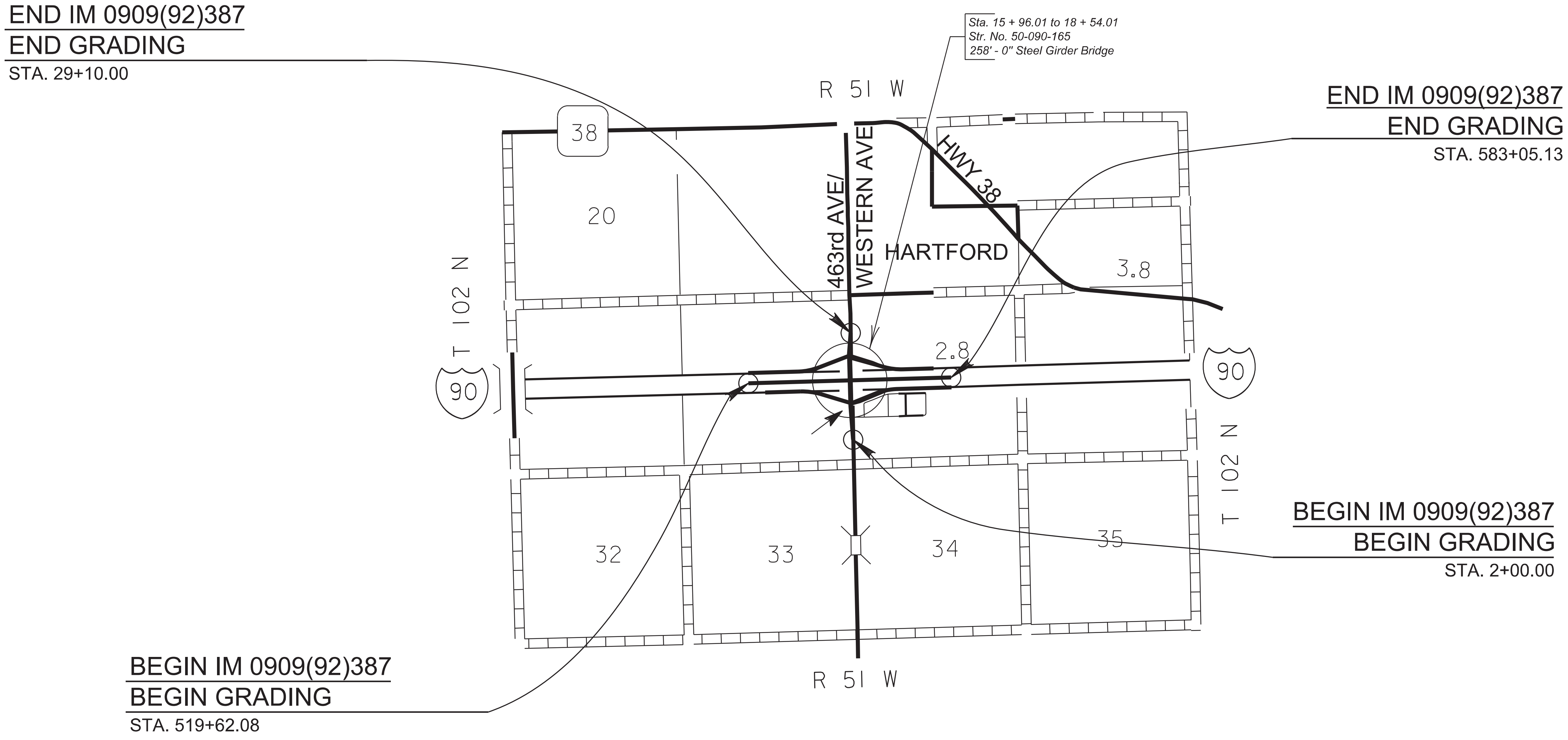
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E1	E45

Section E: Structure Plans

INDEX OF SHEETS -

Sheet E1	Layout Map and Index
Sheet E2	Estimate of Structure Quantities
Sheet E3 to E45	Str. No. 50-090-165 258' - 0" Steel Girder Bridge



Sta. 15 + 96.01 to 18 + 54.01
Str. No. 50-090-165
258' - 0" Steel Girder Bridge

END IM 0909(92)387
END GRADING
STA. 29+10.00

END IM 0909(92)387
END GRADING
STA. 583+05.13

BEGIN IM 0909(92)387
BEGIN GRADING
STA. 2+00.00

BEGIN IM 0909(92)387
BEGIN GRADING
STA. 519+62.08

SECTION E – ESTIMATE OF STRUCTURE QUANTITES

Str. No. 50-090-165

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E3310	Bridge Elevation Survey	Lump Sum	LS
009E5000	Concrete Penetrating Sealer	1,758.0	SqYd
120E7000	Select Granular Backfill	27.4	Ton
250E0030	Incidental Work, Structure	Lump Sum	LS
260E2010	Gravel Cushion	1,594.0	Ton
410E0026	Structural Steel, Install	Lump Sum	LS
410E2600	Membrane Sealant Expansion Joint	117.8	Ft
420E0100	Structure Excavation, Bridge	225	CuYd
430E0200	Bridge End Embankment	965	CuYd
430E0300	Granular Bridge End Backfill	89.8	CuYd
460E0030	Class A45 Concrete, Bridge Deck	502.3	CuYd
460E0050	Class A45 Concrete, Bridge	248.6	CuYd
460E0150	Concrete Approach Slab for Bridge	199.7	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	70.7	SqYd
460E0380	Install Dowel in Concrete	760	Each
460E0500	Deck Drain, Girder Bridge	30	Each
470E0120	Steel Pedestrian Railing on Sidewalk	547.5	Ft
470E0220	Steel Pedestrian Railing on Concrete Barrier	507.0	Ft
480E0100	Reinforcing Steel	56,988	Lb
480E0200	Epoxy Coated Reinforcing Steel	3,190	Lb
480E0300	Stainless Reinforcing Steel	120,670	Lb
480E0509	No. 9 Rebar Splice	4	Each
480E0511	No. 11 Rebar Splice	28	Each
480E0514	No. 14 Rebar Splice	84	Each
510E0100	Extract Pile	5	Each
510E0300	Preboring Pile	240	Ft
510E3401	HP 12x53 Steel Test Pile, Furnish and Drive	275	Ft
510E3405	HP 12x53 Steel Bearing Pile, Furnish and Drive	6,700	Ft
621E0300	Chain Link Fence for Bridge Sidewalk	548	Ft
651E0160	6" Reinforced Concrete Sidewalk	610	SqFt
734E2022	Bridge Berm Slope Protection, Quarried Aggregate	511.0	SqYd
831E1030	Perforated Geocell	783	SqFt

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

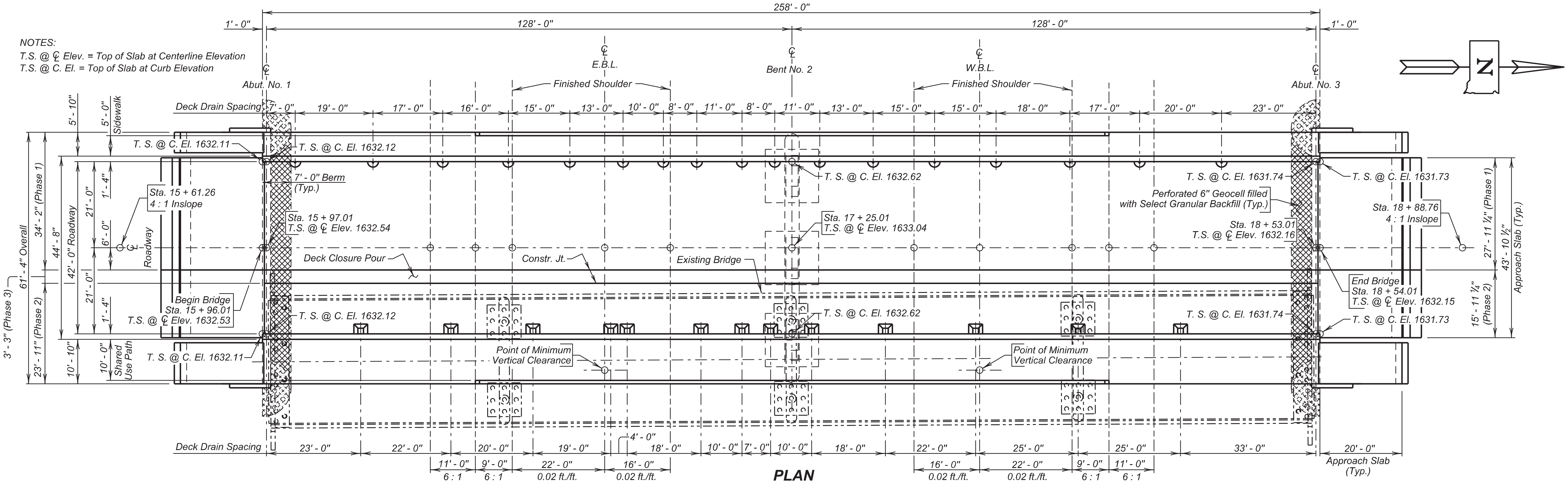
NOTE:
GIRDERS AND OTHER STRUCTURAL STEEL WILL BE FURNISHED BY THE STATE.

FOR BIDDING PURPOSES ONLY

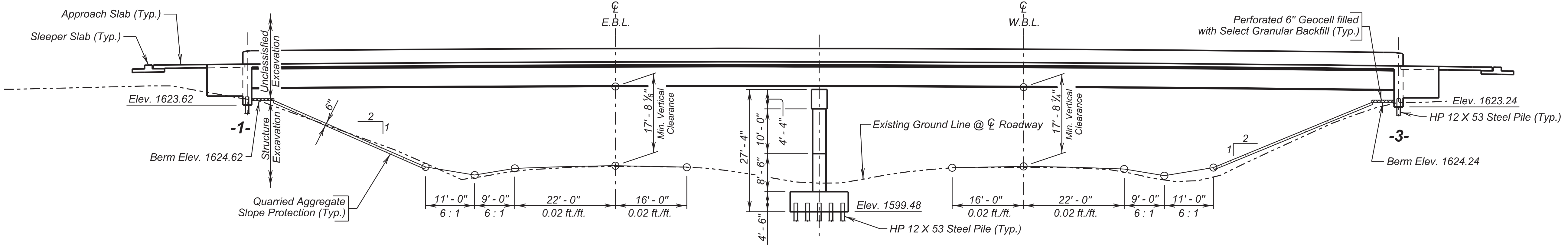
Revised October 10, 2024 BB/AG

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E3	E45

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



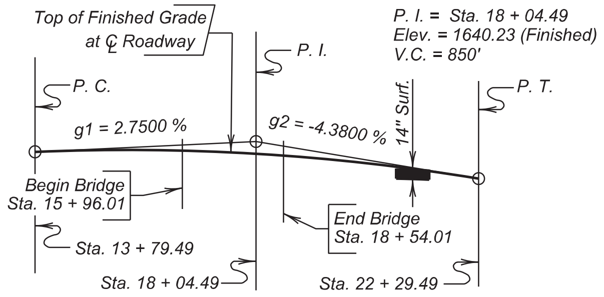
PLAN
(Sidewalk Railing not shown)



ELEVATION
(Sidewalk Railing not shown)

-X271-
INDEX OF BRIDGE SHEETS

-X271-
INDEX OF BRIDGE SHEETS (CONT.)



VERTICAL CURVE DATA

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

GENERAL DRAWING
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
PCN 06G8 HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
① OF (43)

-X271-

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AG	BB	BT	Steve A Johnson
MINN06G8	06G8TA01		BRIDGE ENGINEER

Revised August 12, 2024 AG
Revised October 24, 2024 BB

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Bridge Elevation Survey	Lump Sum	LS	
Concrete Penetrating Sealer	1758.0	SqYd	See Special Provision
Select Granular Backfill	27.4	Ton	
Incidental Work, Structure	Lump Sum	LS	
Gravel Cushion	1594	Ton	
Structural Steel, Install	Lump Sum	LS	See Special Provision
Membrane Sealant Expansion Joint	117.8	Ft	
Structure Excavation, Bridge	225	CuYd	
Bridge End Embankment	965	CuYd	
Granular Bridge End Backfill	89.8	CuYd	
Class A45 Concrete, Bridge Deck	502.3	CuYd	
Class A45 Concrete, Bridge	248.6	CuYd	
Concrete Approach Slab for Bridge	199.7	SqYd	
Concrete Approach Sleeper Slab for Bridge	70.7	SqYd	
Install Dowel in Concrete	760	Each	
Deck Drain, Girder Bridge	30	Each	
Steel Pedestrian Railing on Sidewalk	547.5	Ft	
Steel Pedestrian Railing on Concrete Barrier	507.0	Ft	
Reinforcing Steel	56,988	Lb	
Epoxy Coated Reinforcing Steel	3,190	Lb	
Stainless Reinforcing Steel	120,670	Lb	See Special Provision
No. 9 Rebar Splice	4	Each	
No. 11 Rebar Splice	28	Each	
No. 14 Rebar Splice	84	Each	
Extract Pile	5	Ft	
Preboring Pile	240	Ft	
HP 12x53 Steel Test Pile, Furnish and Drive	275	Ft	
HP 12x53 Steel Bearing Pile, Furnish and Drive	6,700	Ft	
Chain Link Fence for Bridge Sidewalk	548	Ft	
6” Reinforced Concrete Sidewalk	610	SqFt	
Bridge Berm Slope Protection, Quarried Aggregate	511.0	SqYd	
Perforated Geocell	783	SqFt	

BRIDGE SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.
3. All welding and welding inspections will be in conformance with the latest edition of AASHTO/AWS D1.5/D1.5M Bridge Welding Code unless noted otherwise in the plans.

BRIDGE DESIGN LOADING

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

DESIGN MATERIAL STRENGTHS

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

GENERAL CONSTRUCTION

1. All lap splices shown are contact lap splices unless noted otherwise.
2. All exposed concrete corners and edges will be chamfered 3/4-inch unless noted otherwise.
3. Use 2-inch clear cover on all reinforcing steel except as shown otherwise on plans.
4. The Contractor will imprint on the structure the date of new construction as specified and detailed on Standard Plate 460.02.
5. Barrier Curbs, and End blocks will be built perpendicular to the roadway grade line.
6. Requests for construction joints or reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.
7. Bridge berms will be constructed to the plans template prior to any pile driving or construction of abutment footings. See Standard Plate 120.10. Berm slopes will not be disturbed after construction. Any alterations to the berm or slopes after berm construction will be submitted to the Bridge Construction Engineer for approval. Allow 30 days for review of proposals.
8. The elevation of the bridge deck is 14 inches above subgrade elevation.

INCIDENTAL WORK, STRUCTURE

1. In place centerline Sta. 15+99.00 to centerline Sta. 18+53.00 is a 254.0-foot, 4 span continuous composite girder viaduct a 30’-0” clear roadway. The superstructure consists of a reinforced concrete slab with continuous concrete barrier continuous across the bridge. The deck has been overlaid with 0.25-inches of epoxy overlay. The substructure consists of 2 column reinforced concrete bents supported on timber piling and concrete sill abutments supported on timber pilling.
2. Break down and remove the existing bridge, and approach/sleeper slabs if applicable, to 1-foot below finished groundline, or as required to construct the new structure in accordance with Section 110 of the Construction Specifications. All portions of the existing bridge not salvaged for future highway related use will be removed and disposed of by the Contractor at an approved site. An appropriate site will be as described in the Environmental Commitments Notes in the plans.
3. 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.
4. It is anticipated that at least 5 treated timber piles will interfere with piling for this new structure. Any existing pile that interferes with piling for the new structure will be extracted. Payment for the extracting piling will be 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.

NOTICE - LEAD BASED PAINT

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

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
258' - 0" STEEL GIRDER BRIDGE
STR. NO. 50-090-165
DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AG	BB	BT	Steve A Johnson
MINN06G8	06G8TA02		BRIDGE ENGINEER

PERFORATED GEOCELL

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

   Agtec
   1-818-724-7657
   http://www.agtec.com

2. Perforated Geocell will be 6 inches tall and will be installed according to the manufacturer's recommendation.

3. Perforated Geocell will be filled with Select Granular Backfill in accordance with Section 850 of the Specifications.

4. Perforated Geocell will be paid for at the contract unit price per square foot. Payment will be full compensation for furnishing and installing the Perforated Geocell.

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

DESIGN MIX OF CONCRETE

1. All structural concrete will be Class A45 Concrete unless otherwise indicated.

2. Type II cement conforming to Section 750 of the Construction Specifications is required in all concrete on the structure except in the abutments. Abutment concrete will use a Type III cement or an approved modified A45 mix. The modified mix will meet the requirements for A45 concrete specified in Section 460 of the Construction Specification with the following modifications: a high range water reducer is required at the manufactures' recommended dosage, the maximum concrete slump is 6 inches, the maximum water/cementitious material ratio will be at least 0.02 less than the A45 mix used in the rest of the substructure, and the minimum concrete temperature at time of placement will be 65 degrees Fahrenheit. If used, type III cement will contain a maximum 8% Tricalcium Aluminate (C_3A) and a maximum 0.6% Alkalis (Na_2O + O.658K_2O).

3. Grout design mix will be as specified in Section 460.2 K of the Construction Specifications. A compressive strength of 2000 psi will be attained by the grout prior to erection of any beams. Chamfer edges of grout pads 3/4-inch. The quantity of grout is included in and will be paid for at the contract unit price per cubic yard for Class A45 Concrete, Bridge.

ABUTMENTS

1. Preboring piling at each abutment is required to whichever is greater, ten feet or to natural ground.

2. The HP 12x53 Piling were designed using a factored bearing resistance of 98 tons per pile. Piling will develop a field verified nominal bearing resistance of 245 tons per pile.

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

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

5. Piles will not be driven out of position by more than three inches in the direction parallel to the girder centerline. A pile-driving template will be used to ensure this accuracy.

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

CONNECTION OF GIRDER TO PILE

1. Cut off piling at the elevations shown in the plans and weld bearing plates to the piling. Adjust as necessary to make bearing plates level, and to permit proper position of the girders. If piles are driven out of position to the extent that bearing plates will not fit, the Contractor will submit the method of correction to the Engineer for approval. Piles will not be pulled into position.

2. All girder erection will be complete with the splices fully bolted and diaphragms in place, before welding girders to bearing plates. (Diaphragms need not be secured with more than temporary bolting, prior to the pile to girder connections.)

3. An alternate connection, capable of transmitting a direct load of 8000 lbs. to the pile and developing 30,000 lbs. horizontal force, may be submitted to the Office of Bridge Design for prior approval.

4. This connection will not be made when the temperature is greater than 70° F or less than 30° F.

5. Payment for installing the bearing plates will be incidental to the contract lump sum price for Structural Steel, Install.

POURING OF ABUTMENT CONCRETE

1. Abutment concrete will be placed, as directed by the Engineer, at a time when a relatively stable temperature can be expected. A relatively stable temperature is defined as an air temperature deviation of not more than 30° F within 12 hours of completing the abutment pour from the air temperature at the time when the abutment concrete is placed.

2. The forms will be secured to the girders in such a manner that they will be free to move longitudinally with the expansion or contraction of the girder.

3. The girders will be braced near the abutments in such a manner that their lateral movement or rotation will be prevented during the placing of concrete. The Contractor will include details for this bracing with the falsework plans.

BENT

1. The HP 12x53 Piling were designed using a factored bearing resistance of 98 tons per pile. Piling will develop a field verified nominal bearing resistance of 245 tons per pile.

2. One test pile will be driven at each bent and will become part of the pile group.

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

PILE DRIVING

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

   Pileco D25-32 Delmag D25-32 Delmag D30-32
   APE D30-32 APE D30-42 APE D30-52
   SPI D30

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

NOTES (CONTINUED)
FOR
258' - 0" STEEL GIRDER BRIDGE
STR. NO. 50-090-165
DECEMBER 2023

③ OF ㊸

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AG	BB	BT	Steve A Johnson
MINN06G8	06G8TA03		BRIDGE ENGINEER

SUPERSTRUCTURE

1. Shear connectors will be field welded to the girders in accordance with the Shear Connector Field Installation Special Provision.

2. The use of an approved deck finishing machine will be required during placement of bridge deck concrete. The deck finishing machine will be adjusted and operated in such a manner that the screed or screeds are parallel with the centerline of the bridge. The finish machine and concrete placement will be parallel to the skew of the bridge. If the deck finish machine cannot match the exact skew of the bridge, the difference will need be approved by the Engineer.

3. The concrete bridge deck will be placed and finished at a minimum rate of 44 feet of deck per hour measured along centerline roadway. If concrete cannot be placed and finished at this rate, the Engineer will order a header installed and operations stopped. If a header is required sometime during the pour operation, its location will be at or as near as possible to the three-quarter point of the span. Notify the Bridge Construction Engineer if deck pour operations are stopped. Operations may resume only when the Engineer is satisfied that a rate of 44 feet per hour can be maintained and the concrete has attained a minimum compressive strength of 2000 psi.

4. 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.

5. The Contractor is required to submit a detailed plan showing the proposed girder erection. The girder erection plan will be designed and stamped by a Professional Engineer registered with the State of South Dakota. The plan must be submitted 30 days prior to the start of work for approval by the Office of Bridge Design. The 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.

6. 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 traffic.

7. See Special Provision for Concrete Penetrating Sealer.

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

BEARINGS

Payment for 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, Install.

FIELD BOLTED GIRDER SPLICES

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

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

3. All bolts will be fully tightened prior to removing temporary supports.

WELDING AND WELD INSPECTION

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

CLASS B COMMERCIAL TEXTURE FINISH

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

   a) **Barrier:** All exposed surfaces (back*, top** and front**).
   b) **Abutments:** all exposed surfaces to an elevation 1-foot below finished ground line.
   c) ***Slab:** edge of slab
   d) ***Bent:** All exposed surfaces.

* 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 460.3 L.1.c and Section 460.3 M.1 of the Construction Specifications.

FALL PROTECTION

1. The Contractor will install a Fall Protection System conforming to OSHA Regulations. When working on the girders prior to decking installation, a Horizontal Lifeline – or other OSHA approved system will be installed. The Contractor will have one Personal Fall Arrest System (PFAS) available for use by a Department Inspector. The PFAS will be compatible with the installed Fall Protection System.

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.

APPROACH SLABS

1. Sleeper slab riser will be cast with or later than the approach slab. Care will be taken to ensure the correct grade is maintained across the top pf the sleeper slab riser.

2. The portion of the sleeper slab below the construction joint may be precast. If the bottom portion of the sleeper slab is precast, the Contractor will submit proposed lifting and setting plans to the Bridge Construction Engineer for approval. In addition, if reinforcing or other details differ from those shown in the plans, the Contractor will submit proposed alternate details for approval.

3. The use of an approved finishing machine will be required during placement of Class A45 Concrete for the approach slabs. Concrete placement in front of the machine will be kept parallel to the screed.

4. 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.

5. 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.

NOTES (CONTINUED)
FOR
258' - 0" STEEL GIRDER BRIDGE
STR. NO. 50-090-165
DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AG MINN06G8	BB 06G8TA04	BT	Steve A Johnson BRIDGE ENGINEER

DECK DRAINS

1. Deck Drains will be 4-inch diameter x 5'-9", 6-inch diameter x 4'-4", and 8-inch collector Fiberglass Pipe conforming to the requirements of ASTM - D2996. Deck Drains will also include Neenah R-3935 or an approved equivalent frame and grate.
2. The Fiberglass Pipe Sleeve can be made from a 4-inch diameter Fiberglass Pipe Fitting. It will be attached to the 4-inch diameter Fiberglass Pipe, as shown in the plans, per the manufacturer's recommendation.
3. All fiberglass pipe and pipe fittings will be handled and installed according to the guidelines and procedures recommended by the manufacturer. Pipe, pipe fittings, and adhesive must be from the same manufacturer.
4. Use fiberglass wear pads to protect against contact with supports or U-bolts.
5. The 1/2-inch diameter U-bolts, nuts and washers will conform to ASTM A307 and will be galvanized in accordance with ASTM F2329 then painted in accordance with Section 411 of the Construction Specifications. The top coat will be an approved brown (AMS STD 595 Color 30045).
6. Steel for the bent plates and washers will conform to ASTM A36 and will be painted in accordance with Section 411 of the Construction Specifications. The top coat will be an approved brown (AMS STD 595 Color 30045).
7. Washers will be plate washers or a continuous bar at least 5/16-inch thick with standard holes and completely cover the slot after installation.
8. The 1/2-inch diameter bolts and nuts will confirm to ASTM F3125, Gr. A325 and will be galvanized in accordance with ASTM F2329. The nut and bolts will be painted brown (AMS STD 595 Color 30045).
9. The deck drains to girder connection as shown in the plans allows the deck drain location to be adjusted slightly to clear transverse slab reinforcement.
10. All fiberglass pipes and pipe fittings will use pigmented resin throughout the wall. The color will be an approved brown (AMS STD 595 Color 30045).
11. Payment for deck drains will be at the contract unit price per each for Deck Drain, Girder Bridge, and will be full compensation for furnishing, fabricating, and installing the deck drains and all attaching hardware in accordance with the plans and Construction Specifications.

BOLT TESTING

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

SHOP PLANS

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

SHEAR STUD CONNECTOR

1. Prior to the welding of the studs to the girders, the top surface of the girders that are to have studs welded on will be clean of all dirt, rust, and any other foreign matter.
2. The shear connector will be installed in accordance with the Special Provision for Shear Connector Field Installation (Incidental).

FALSEWORK

Traffic control considerations require some construction activities to be performed over I-90 traffic. To protect traffic, 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.

QUARRIED AGGREGATE SLOPE PROTECTION

1. This work will consist of covering the bridge berm slopes with quarried aggregate slope protection for control and prevention of berm erosion.
2. The aggregate used in the quarried aggregate slope protection will be composed of durable fragments of quarried ledge rock or rhyolite or an approved alternative. The material will be well graded with 90 to 100% passing a 6-inch sieve and 0 to 10% passing a 2-inch sieve.
3. The surface upon which the slope protection is to be placed will be smooth, uniform, and free from foreign material. The top surface of the slope protection will conform to the dimensions, elevations, and slopes shown in the plans.
4. The quarried aggregate will be shaped and compacted to provide a stable, smooth, and uniform surface.
5. Payment for quarried aggregate slope protection will be at the contract unit price per square yard for Bridge Berm Slope Protection, Quarried Aggregate and will include furnishing all materials, labor, and equipment necessary or incidental to the satisfactory completion of this work. Payment will be for plans quantity.

AS - BUILT ELEVATION SURVEY

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

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 A496.
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 with 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.

NOTES (CONTINUED)
FOR
258' - 0" STEEL GIRDER BRIDGE
STR. NO. 50-090-165
DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	Steve A Johnson
AG	BB	BT	BRIDGE ENGINEER
MINN06G8	06G8TA05		

Revised October 24, 2024 BB
Revised November 6, 2024 BB

CHAIN LINK FENCE

1. The chain link fence fabric and supports will conform to Section 930 of the Construction Specifications as modified by the following notes.

2. The chain link fence fabric, wire ties, and miscellaneous hardware will be galvanized and conform to AASHTO M181. The fence fabric will be Type IV 9-gauge wire woven in a 2-inch diamond mesh. Knuckled selvage will be used on the top and bottom of the fence fabric.

3. A brown (AMS STD 595 Color 30045) thermally extruded polyvinyl coating will be applied to the fence fabric, wire ties, and all miscellaneous hardware.

4. The item Chain Link Fence for Bridge Sidewalk will be paid for at the contract unit price per linear foot. This payment will be full compensation for furnishing all material, labor, tools, and equipment necessary or incidental to the construction of the chain link fence including chain link fence fabric, posts, rails, wire ties, miscellaneous hardware, painting, and welding all to satisfactorily complete the 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.

STEEL RAILING – SIDEWALK

1. All rail and chain link fence posts will be built vertical.

2. All structural steel parts for railing will conform to ASTM A500, Grade B. Material less than 1/4-inch thick may be ASTM A1011, Grade 36. Rail post base plates will conform to ASTM A36.

3. Anchor bolts and nuts for railing will conform to ASTM A307. Washers will conform to ASTM F436 and all components will be galvanized in accordance with ASTM F2329. The bolts will be hex head "Structural" type with heavy hex nuts and round washers.

4. Anchor bolts will be tightened to a torque of 120 ft-lbs (approximated without the use of a calibrated torque wrench).

5. Non-shrink grout used to fill the recess beneath the rail post base plates will be a commercially available non-shrink grout containing no metallic particles and capable of attaining a 28-day compressive strength of 3000 psi. The non-shrink grout will be mixed according to the manufacturer's recommendations. 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.

6. All steel railing will be galvanized in accordance with ASTM F2329, then will be painted in accordance with Section 411 of the Construction Specifications and the color will be an approved brown (AMS STD 595 Color 30045). The galvanized steel railing will be cleaned in accordance with ASTM D6386 before painting.

7. Welding and Weld Inspection will be done in accordance with the current edition of AWS D1.5 Bridge Welding Code.

8. The costs of structural steel, welding, weld inspection, painting, and galvanization will be incidental to the contract unit price per foot for Steel Pedestrian Railing on Sidewalk and Steel Pedestrian Railing on Concrete Barrier.

GIRDER PREPURCHASE

1. The steel girders, diaphragms, bearings, shear studs, and associated hardware have been prepurchased by the Department of Transportation through a separate contract. All prepurchased materials for phase 1 are scheduled to be fabricated and available for delivery on or before June 20, 2025. All prepurchased materials for phase 2 are scheduled to be fabricated and available for delivery on or before October 10, 2025. The Contractor will be responsible for notifying both the Engineer and the Department's Structural Steel Fabricator (Egger Steel Company, Ph. 605-357-2209) of the date when the Contractor is ready to take delivery of the prepurchased materials. Upon this notice, the Department's Structural Steel Fabricator will have 7 calendar days to deliver the materials to the project site. The Contractor will be responsible for unloading the materials delivered.

2. If the pre-purchased materials need to be stored on the project site prior to erection, the Contractor will be responsible for storing the materials satisfactory to the Engineer in a safe location and in a manner that maintains the integrity and condition of the materials delivered. Any damage to the prepurchased items after delivery will be the Contractor's responsibility and will be replaced or repaired to the satisfaction of the Engineer.

3. If the Contractor is not ready to take delivery of the prepurchased materials on the project site by November 26th, 2025 the Contractor will need to coordinate with the fabricator to make extended storage arrangements or supply an alternate site to store the prepurchased materials. The Contractor will be responsible for unloading the materials delivered to the alternate site and will also be responsible for all work associated with transporting the materials to the project site at a later date. Any damage to the prepurchased items after delivery to the alternate site will be the Contractor's responsibility and will be replaced or repaired to the satisfaction of the Engineer.

4. The cost of the materials for tax purposes is $#,###,###.##. The Contractor is responsible for paying State use tax, applicable City use tax and excise tax on these materials.

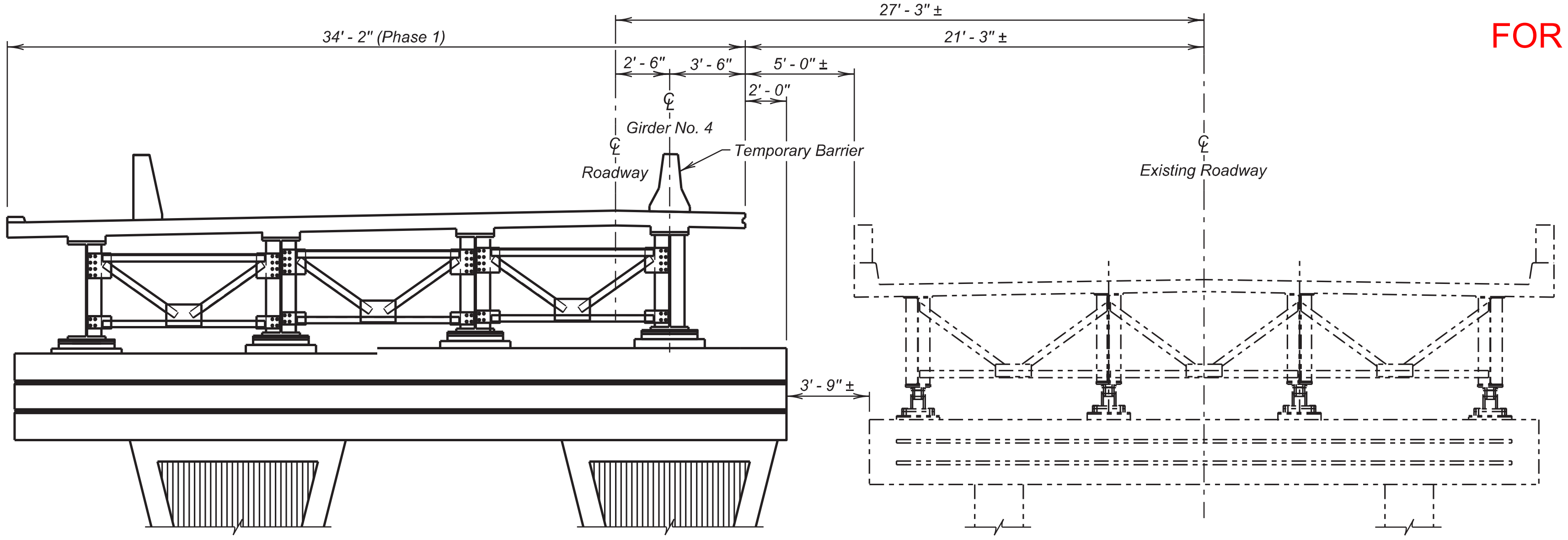
5. All costs associated with the aforementioned work will be incidental to the Lump Sum price bid for the Structural steel, Install contract item.

NOTES (CONTINUED)
FOR
258' - 0" STEEL GIRDER BRIDGE
STR. NO. 50-090-165
DECEMBER 2023

⑥ OF ㊸

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AG MINN06G8	BB 06G8TA06	BT	Steve A Johnson BRIDGE ENGINEER

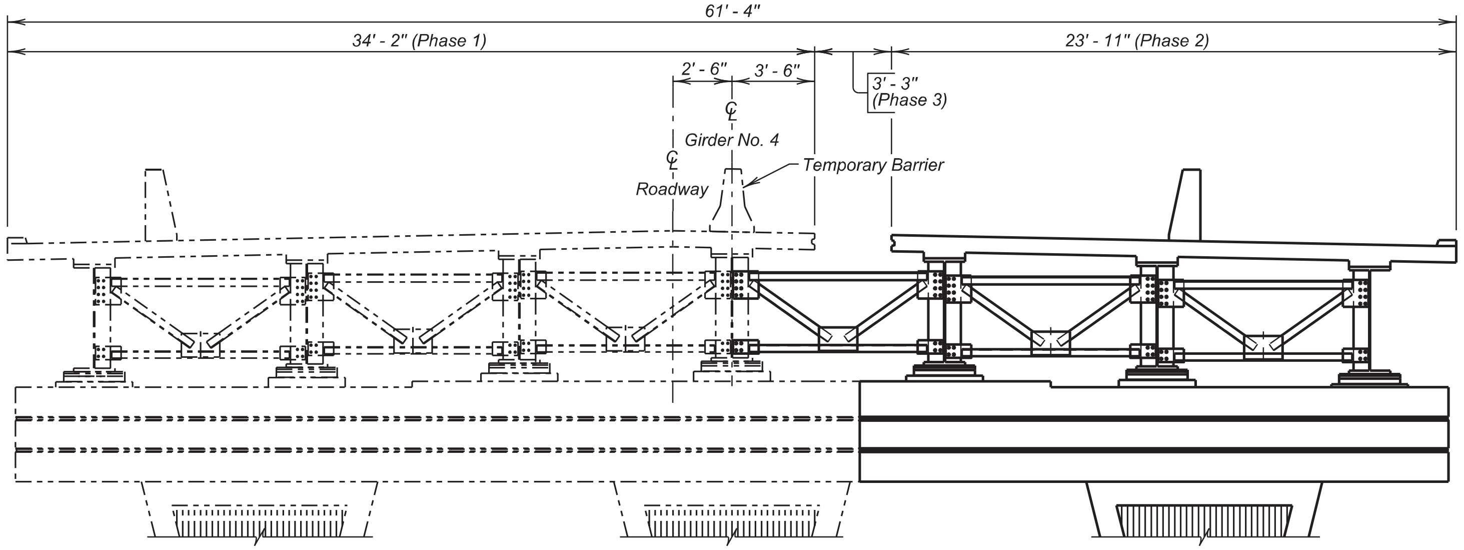
FOR BIDDING PURPOSES ONLY



PHASE 1 CONSTRUCTION (FACING NORTH)

(Railings not shown)

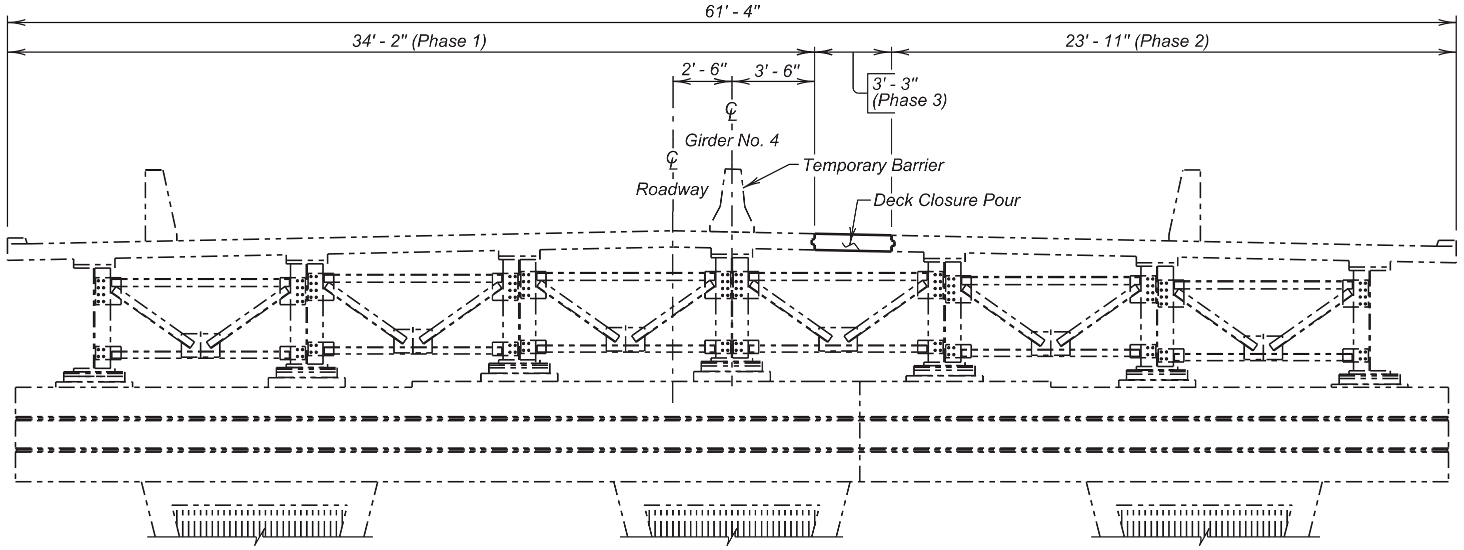
1. Construct Phase 1 portion of new bridge (Abutment, Bent, Superstructure, Bridge End Backfill, Approach and Sleeper Slabs).
2. Remove any remaining falsework from Phase 1.
3. Place Moveable Concrete Barriers as shown.
4. With traffic diverted to Phase 1, break down & remove existing structure (see Incidental Work, Structure Notes).



PHASE 2 CONSTRUCTION (FACING NORTH)

(Railings not shown)

5. Construct Phase 2 portion of the new bridge.
6. Diaphragms between girder no's. 4 & 5 will be placed with or before the Phase 2 portion of the bridge deck has been poured.



PHASE 3 CONSTRUCTION (FACING NORTH)

(Railings not shown)

7. Construct Phase 3 portion of the new bridge.

STRUCTURE PHASED CONSTRUCTION DETAILS

FOR

258' - 0" STEEL GIRDER BRIDGE

OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

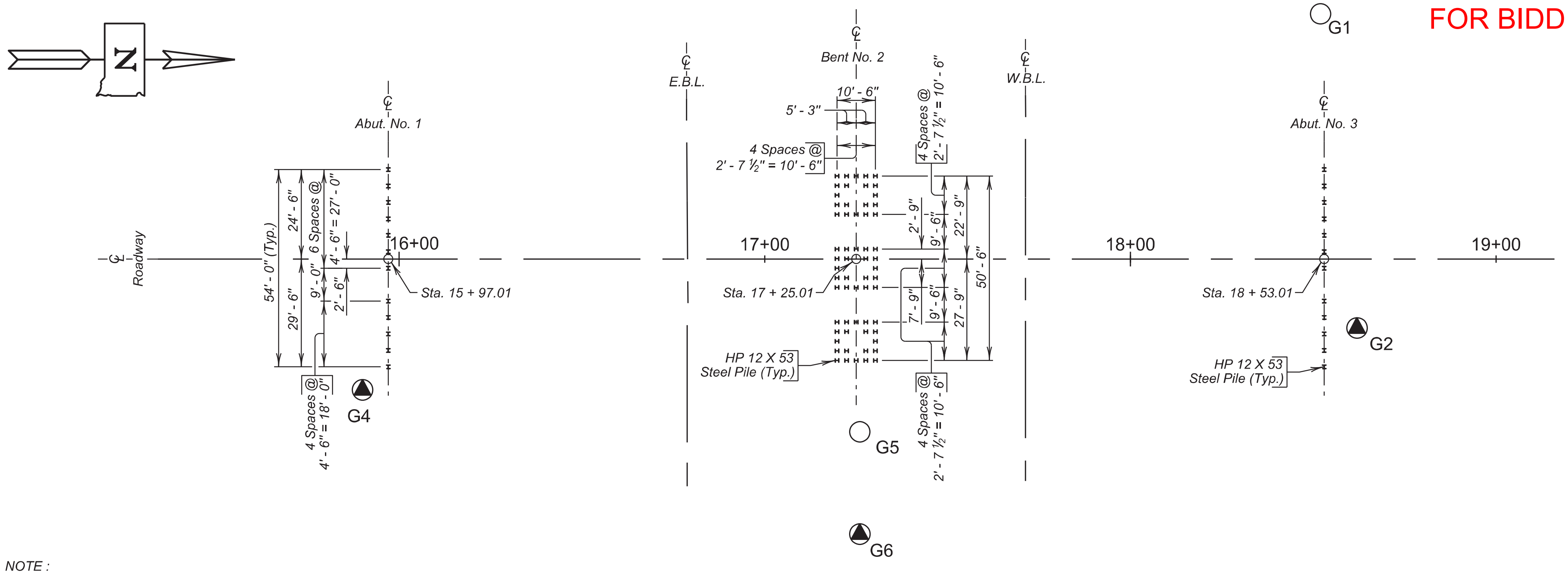
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

⑦ OF ㊸

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG/AU	BT	Steve A Johnson
MINN06G8	06G8TA07		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E10	E45

FOR BIDDING PURPOSES ONLY



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

PILING LAYOUT

G3

AVERAGE INPLACE
TIMBER PILING LENGTHS

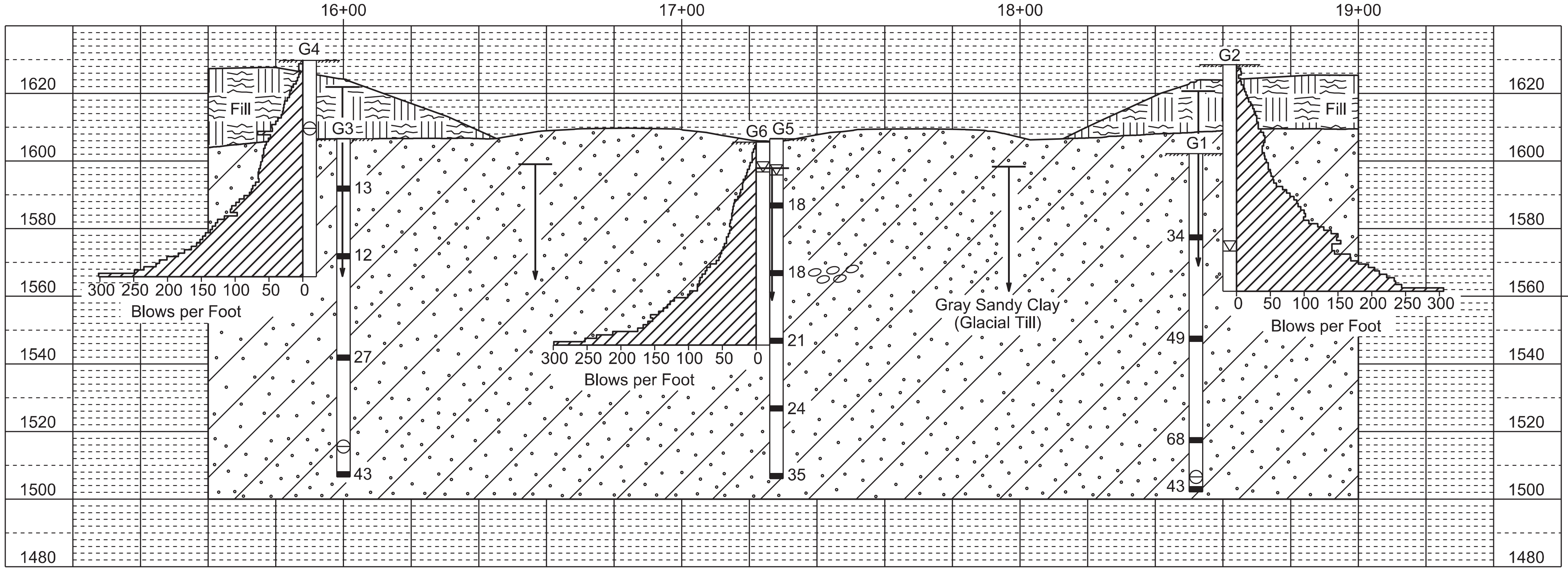
Hole Number	G3	
Station	16+00	
Depth	15.2	ft
Soil Color	Gray	
Classification	Sandy Clay	
Strength (Qu)	3,561	psf
Dry Density	108.2	pcf
Wet Density	129.9	pcf
Moisture	20.0	%
Pass No. 10	97.6	%
Pass No. 40	89.1	%
Pass No. 200	69.9	%
Sand Content	27.4	%
Silt Content	28.6	%
Clay Content	41.2	%

Hole Number	G3	
Station	16+00	
Depth	65.2	ft
Soil Color	Dark Brown	
Classification	Sandy Clay	
Strength (Qu)	6,582	psf
Dry Density	109.8	pcf
Wet Density	131.1	pcf
Moisture	19.4	%
Pass No. 10	97.3	%
Pass No. 40	88.8	%
Pass No. 200	68.9	%
Sand Content	28.3	%
Silt Content	29.6	%
Clay Content	39.3	%

Hole Number	G3	
Station	16+00	
Depth	100.5	ft
Soil Color	Gray	
Classification	Sandy Clay	
Strength (Qu)	7,403	psf
Dry Density	112.0	pcf
Wet Density	131.2	pcf
Moisture	17.1	%
Pass No. 10	97.1	%
Pass No. 40	86.5	%
Pass No. 200	66.8	%
Sand Content	30.4	%
Silt Content	33.3	%
Clay Content	33.4	%

Hole Number	G5	
Station	17+26	
Depth	40.5	ft
Soil Color	Dark Gray	
Classification	Silt Clay	
Strength (Qu)	5,613	psf
Dry Density	105.8	pcf
Wet Density	128.8	pcf
Moisture	21.8	%
Pass No. 10	96.7	%
Pass No. 40	88.9	%
Pass No. 200	70.0	%
Sand Content	26.7	%
Silt Content	25.2	%
Clay Content	44.9	%

Hole Number	G1	
Station	18+52	
Depth	25.5	ft
Soil Color	Brown	
Classification	Sandy Clay	
Strength (Qu)	12,240	psf
Dry Density	108.4	pcf
Wet Density	130.9	pcf
Moisture	20.3	%
Pass No. 10	95.6	%
Pass No. 40	88.2	%
Pass No. 200	67.5	%
Sand Content	28.1	%
Silt Content	25.1	%
Clay Content	42.5	%



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

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

LEGEND

○ Penetration Test	▽ Water	▮ Sample Zone
● Drive Test	⊖ Caved	

Drive tests are conducted by dropping a 490 pound hammer 30 inches to drive a 2 ⅞ inch drill stem to measure the resistance to penetration of the soil.

Penetration test holes are drilled with a 6 ⅝ inch diameter hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to obtain 2 inch nominal diameter samples and to measure the resistance to penetration of the soil. Penetration Test results are listed as uncorrected "N" values in blows per foot.

GROUNDWATER ELEVATIONS

SEPTEMBER 2021

G1	(DRY)	1506.6
G2		1573.4
G3	(DRY)	1515.6
G4	(DRY)	1603.7
G5		1595.9
G6		1596.8

MEASURED SKIN FRICTION

	ELEV.	PSF
G2	1561.5	722
G4	1565.8	592
G6	1545.6	767

SUBSURFACE INVESTIGATION AND PILING LAYOUT

FOR

258' - 0" STEEL GIRDER BRIDGE

OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

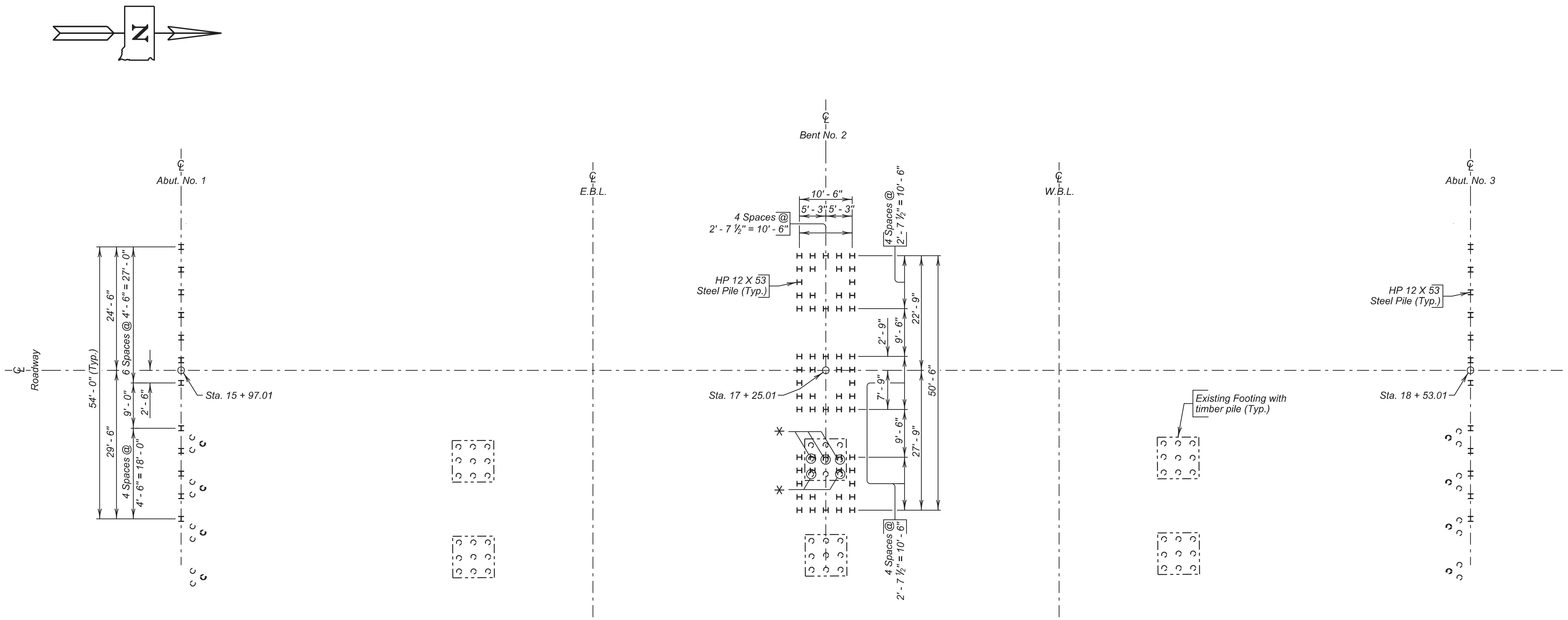
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

⑧ OF (43)

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG	HK/BT	Steve A Johnson
MINN06G8	06G8TA08		BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E11	E45



PILING LAYOUT

NOTE:
⚹ Existing timber pile to be extracted.

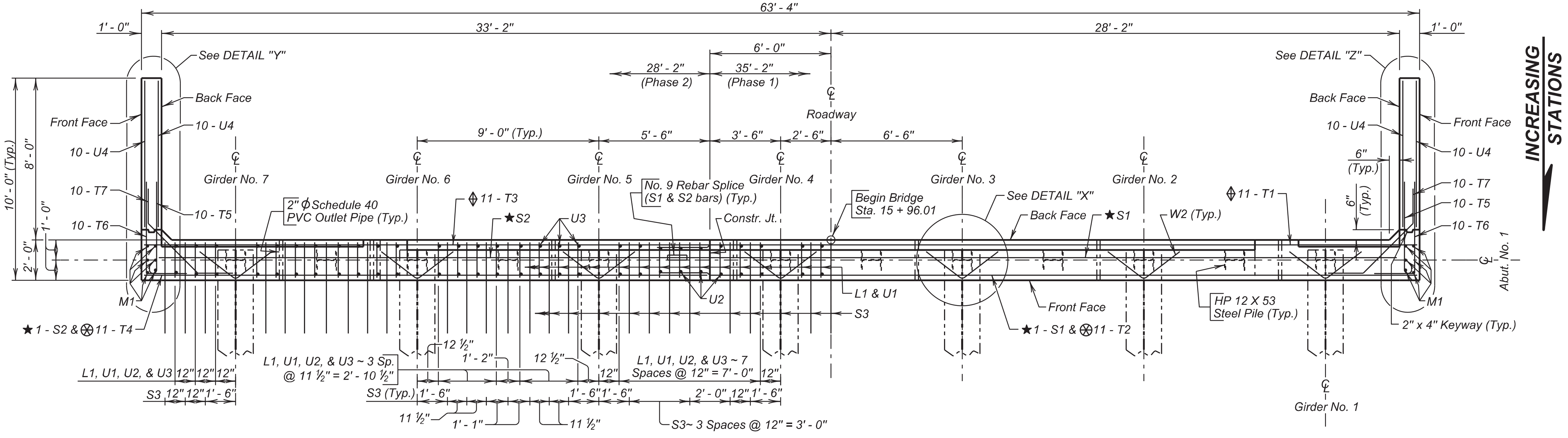
NOTE :
This sheet is to be used in conjunction with the SUBSURFACE INVESTIGATION AND PILING LAYOUT sheet.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Extract Pile	Each	5

PILING INTERFERENCE DETAILS
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
9 OF 43

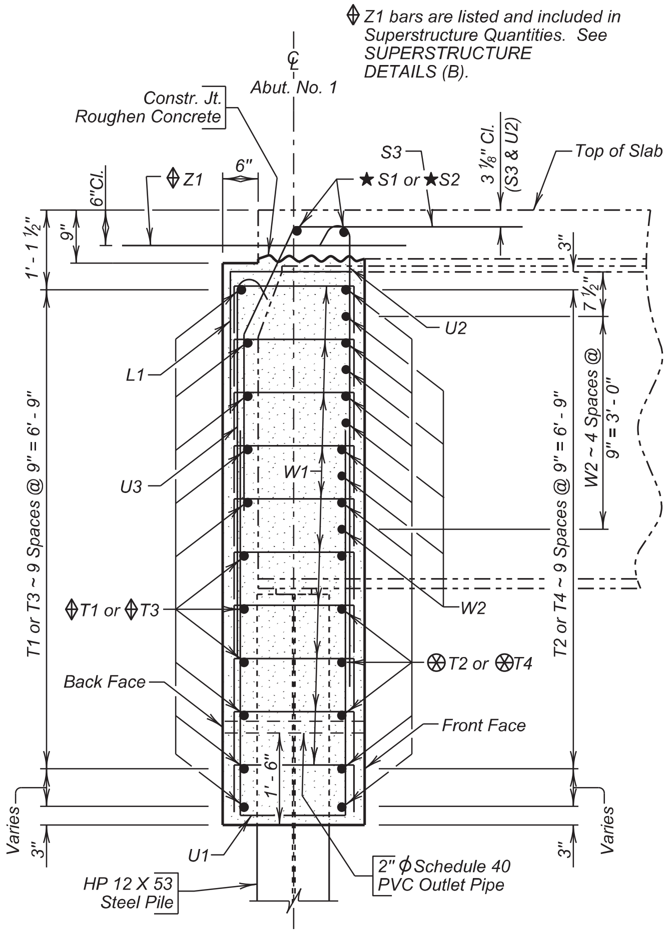
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG	BT	Steve A Johnson
MINN06G8	06G8TA09		BRIDGE ENGINEER



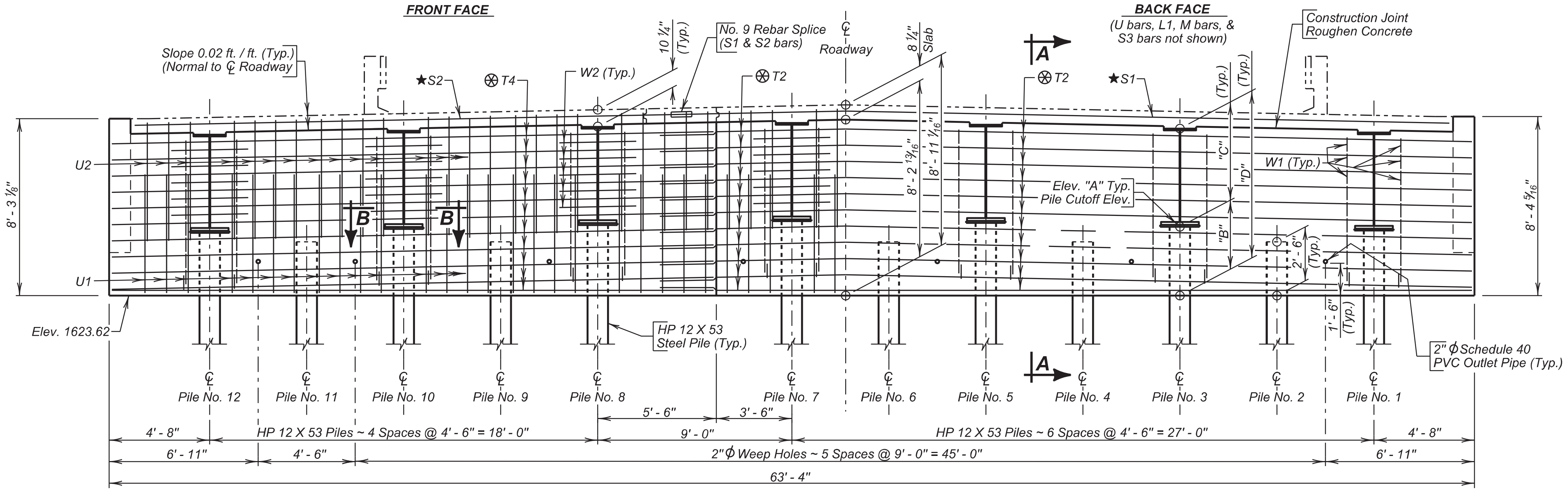
PLAN

NOTES:

- ⟠ 2' - 6" min. lap
- ⊛ 2' - 3" min. lap
- ★ No. 9 Rebar Splice



SECTION A - A



ELEVATION
(Along ℄ Abutment)

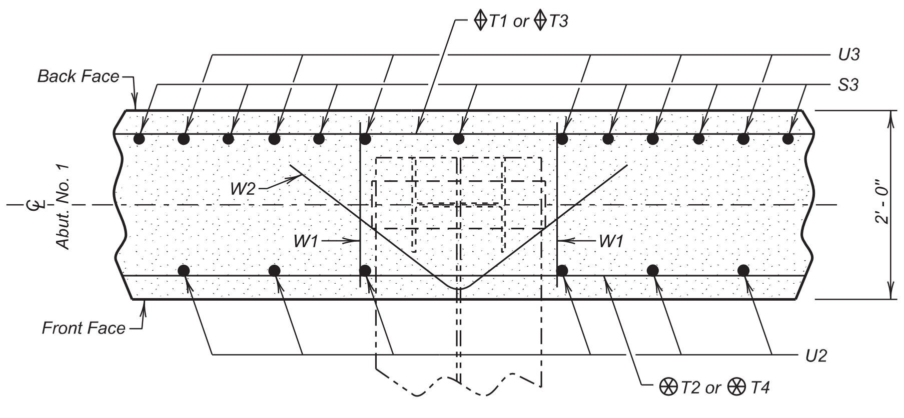
TABLE OF ELEV. & DIMENSIONS				
Pile No.	Elev. "A"	"B" (Ft.)	"C" (Ft.)	"D" (Ft.)
1	1626.63	3.02	4.56	7.58
2	1626.12	2.50	—	—
3	1626.81	3.20	4.56	7.76
4	1626.12	2.50	—	—
5	1626.99	3.38	4.56	7.94
6	1626.12	2.50	—	—
7	1627.07	3.46	4.56	8.02
8	1626.89	3.28	4.56	7.84
9	1626.12	2.50	—	—
10	1626.71	3.10	4.56	7.66
11	1626.12	2.50	—	—
12	1626.53	2.92	4.56	7.48

ABUTMENT NO. 1 DETAILS (A)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
⑩ OF ㊸

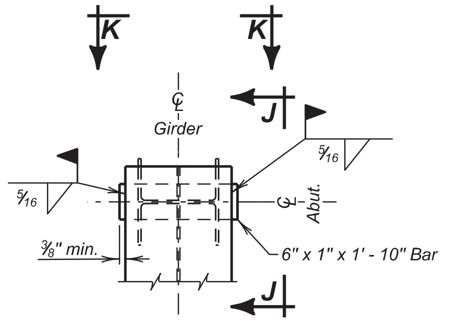
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG	BT	Steve A Johnson
MINN06G8	06G8TA10		BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

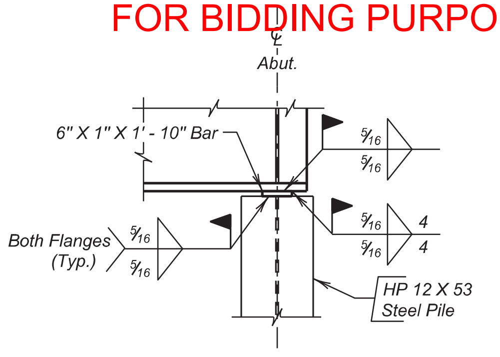
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E13	E45



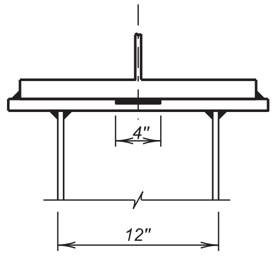
SECTION B - B



DETAIL "X"

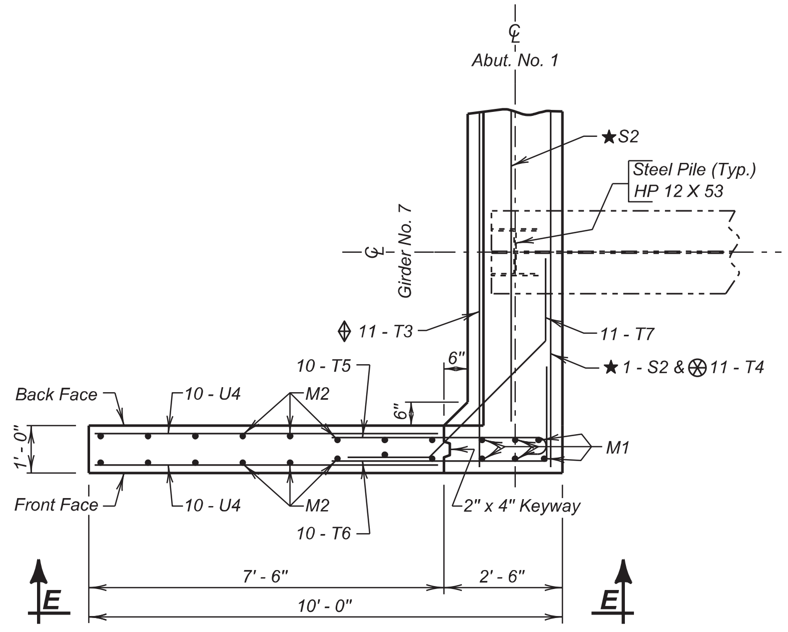


VIEW J - J

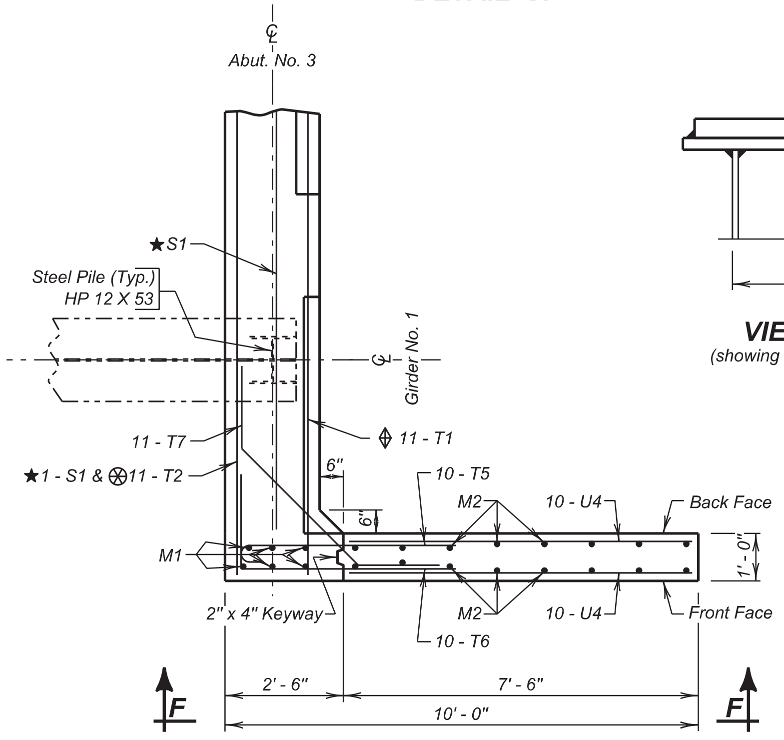


VIEW K - K

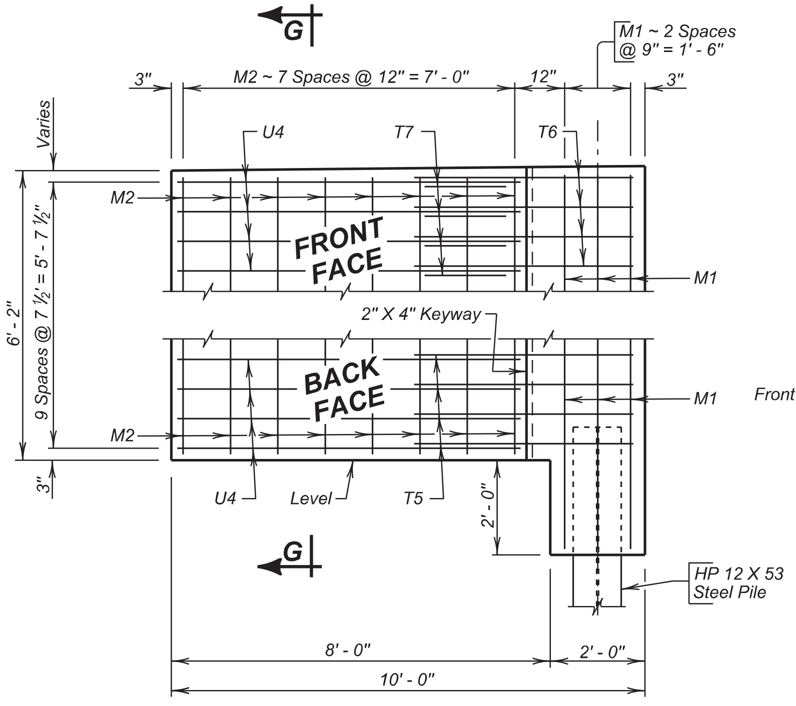
(showing weld locations)



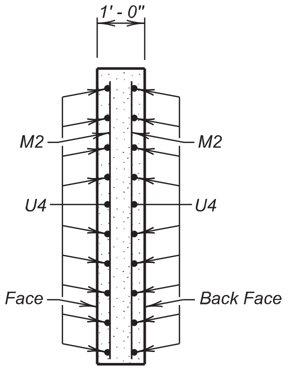
DETAIL "Y"



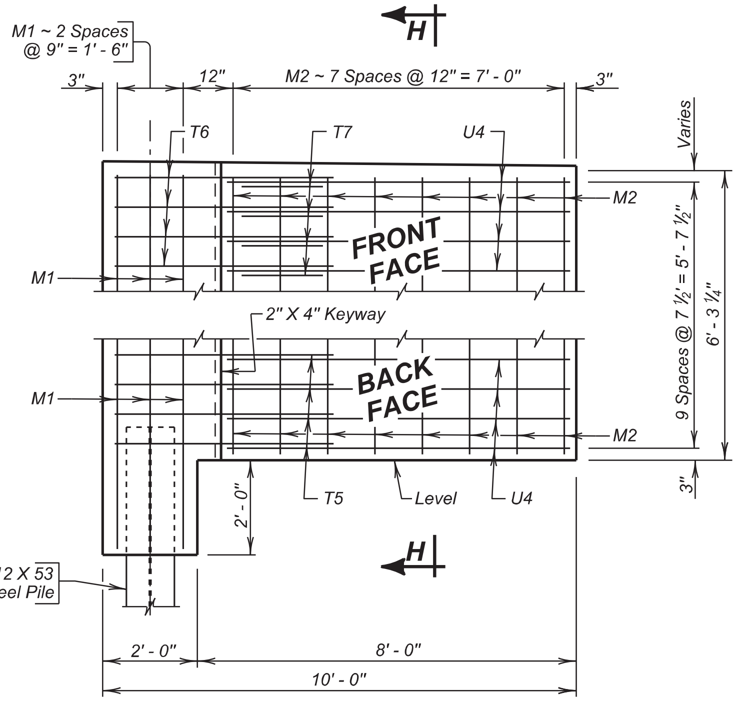
DETAIL "Z"



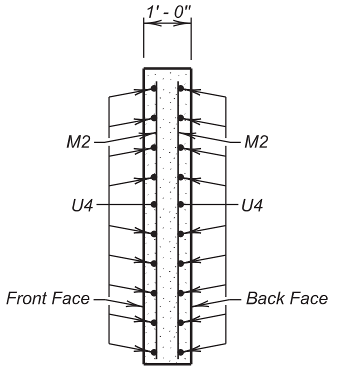
VIEW E - E



SECTION G - G



VIEW F - F

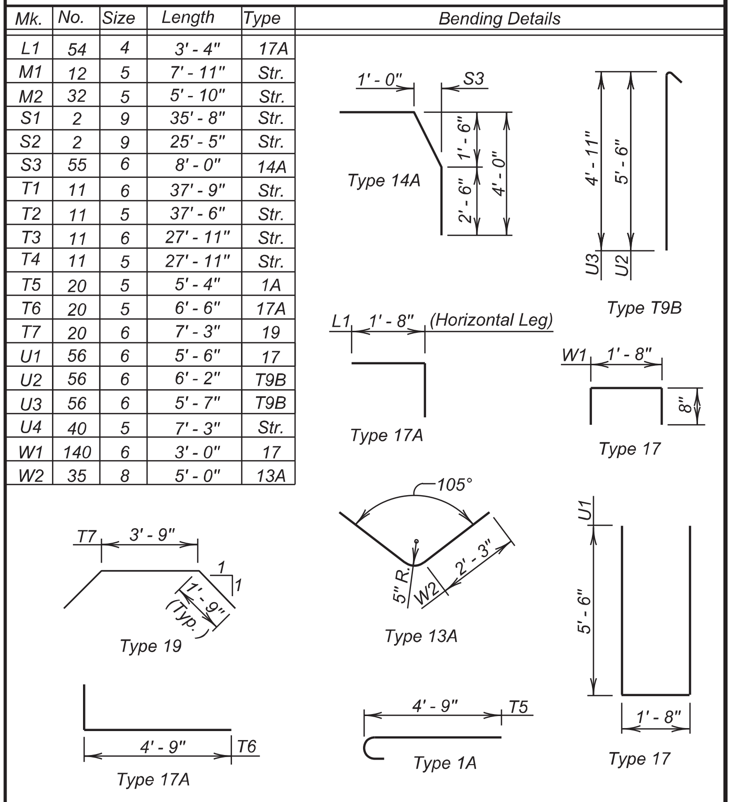


SECTION H - H

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
L1	54	4	3' - 4"	17A
M1	12	5	7' - 11"	Str.
M2	32	5	5' - 10"	Str.
ϕ S1	2	9	35' - 8"	Str.
ϕ S2	2	9	25' - 5"	Str.
ϕ S3	55	6	8' - 0"	14A
T1	11	6	37' - 9"	Str.
T2	11	5	37' - 6"	Str.
T3	11	6	27' - 11"	Str.
T4	11	5	27' - 11"	Str.
T5	20	5	5' - 4"	1A
T6	20	5	6' - 6"	17A
T7	20	6	7' - 3"	19
U1	56	6	5' - 6"	17
ϕ U2	56	6	6' - 2"	T9B
U3	56	6	5' - 7"	T9B
U4	40	5	7' - 3"	Str.
W1	140	6	3' - 0"	17
W2	35	8	5' - 0"	13A

Bending Details



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

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
ϕ Class A45 Concrete, Bridge	Cu. Yd.	40.6
Reinforcing Steel	Lb.	5047
Epoxy Coated Reinforcing Steel	Lb.	1595
Structure Excavation, Bridge	Cu. Yd.	12.3
HP 12 X 53 Steel Test Pile, Furnish & Drive	Ft.	1 @ 95' = 95'
HP 12 X 53 Steel Bearing Pile, Furnish & Drive	Ft.	11 @ 90' = 990'
Preboring Pile	Ft.	12 @ 10' = 120'
No. 9 Rebar Splice	Each	2

ϕ Includes 14 ft. of 2" dia. PVC Outlet Pipe as an approximate quantity contained in the Class A45 Concrete, Bridge.

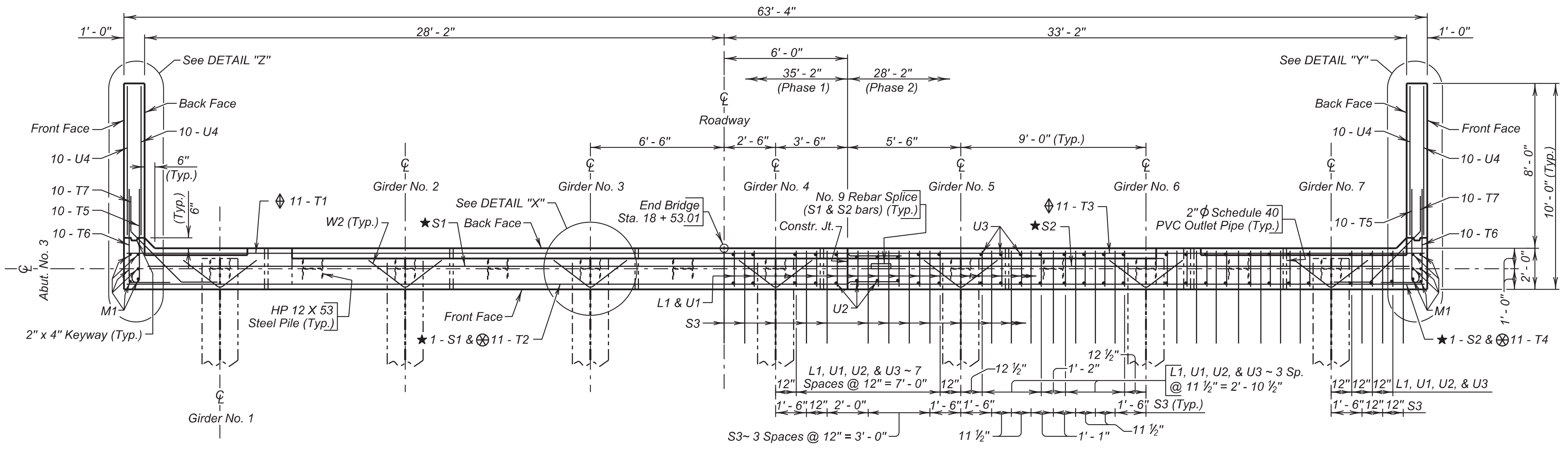
ABUTMENT NO. 1 DETAILS (B)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

⑪ OF ㊸

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG	BT	Steve A Johnson
MINN06G8	06G8TA11		BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

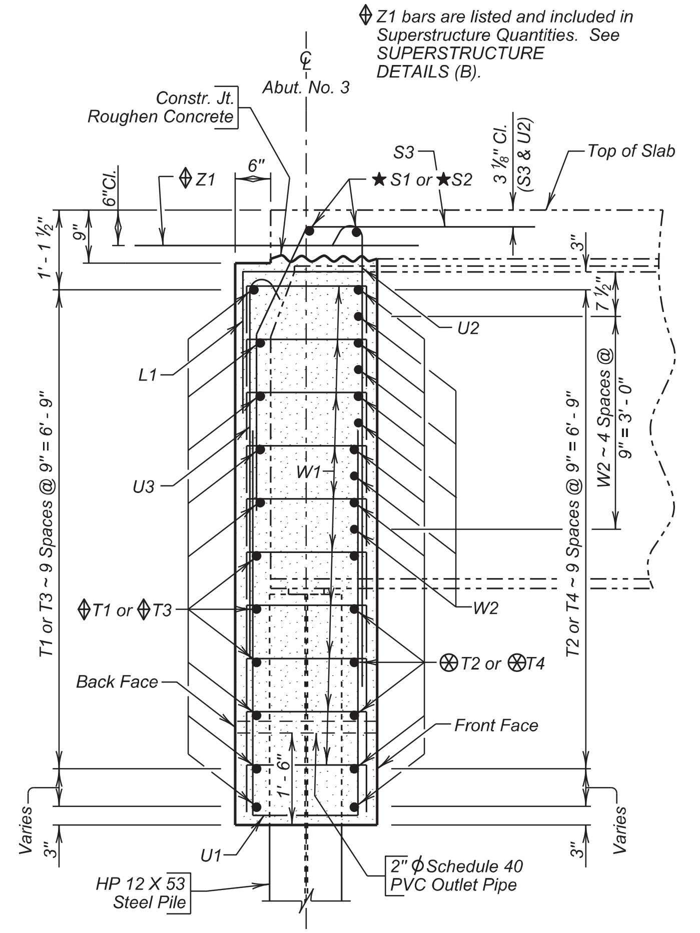
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E14	E45



PLAN

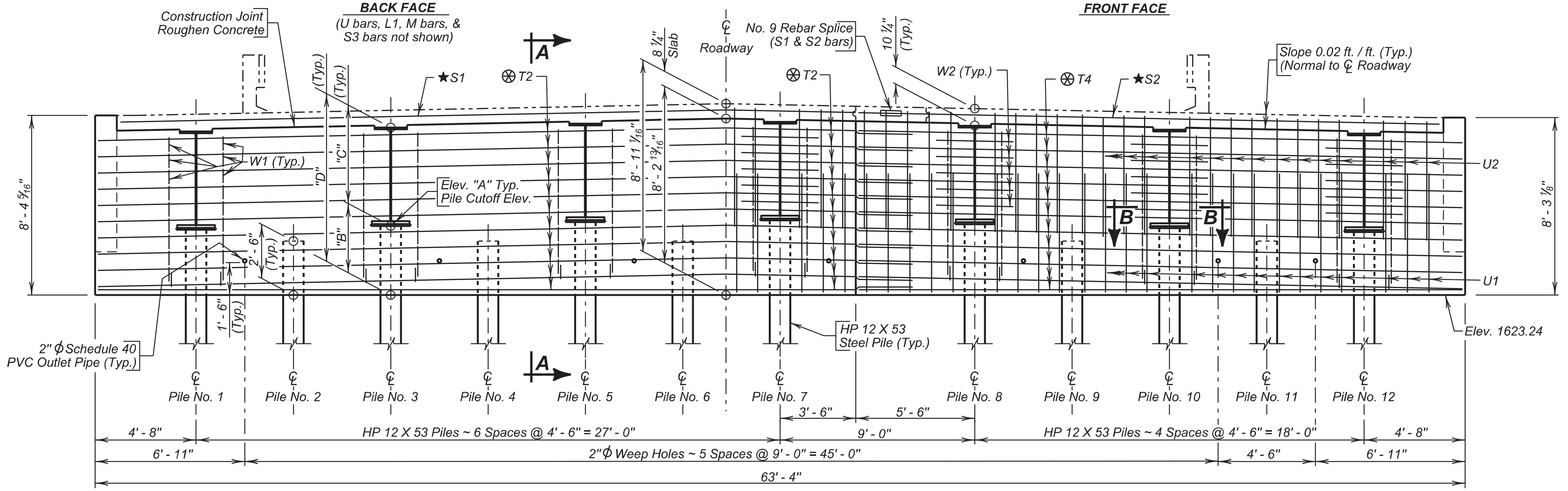
NOTES:

- ⯁ 2' - 6" min. lap
- ⊛ 2' - 3" min. lap
- ★ No. 9 Rebar Splice



⯁ Z1 bars are listed and included in Superstructure Quantities. See SUPERSTRUCTURE DETAILS (B).

SECTION A - A



ELEVATION

(Along ℄ Abutment)

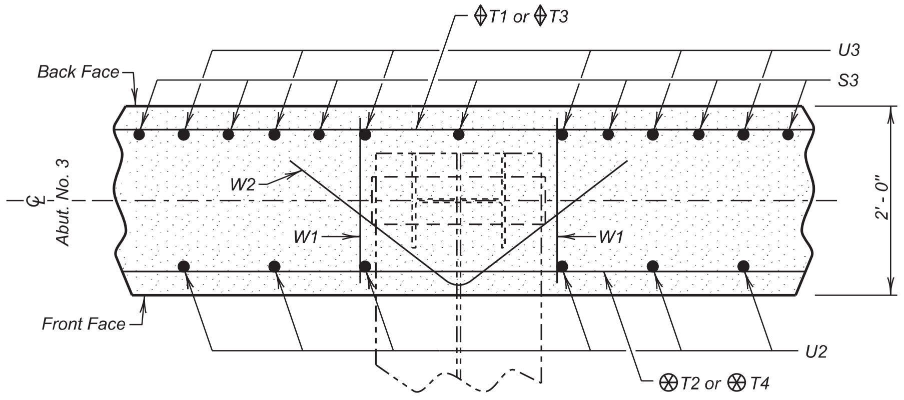
TABLE OF ELEV. & DIMENSIONS				
Pile No.	Elev. "A"	"B" (Ft.)	"C" (Ft.)	"D" (Ft.)
1	1626.25	3.02	4.56	7.58
2	1625.74	2.50	——	——
3	1626.43	3.20	4.56	7.76
4	1625.74	2.50	——	——
5	1626.61	3.38	4.56	7.94
6	1625.74	2.50	——	——
7	1626.69	3.46	4.56	8.02
8	1626.51	3.28	4.56	7.84
9	1625.74	2.50	——	——
10	1626.33	3.10	4.56	7.66
11	1625.74	2.50	——	——
12	1626.15	2.92	4.56	7.48

ABUTMENT NO. 3 DETAILS (A)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
⑫ OF ㊸

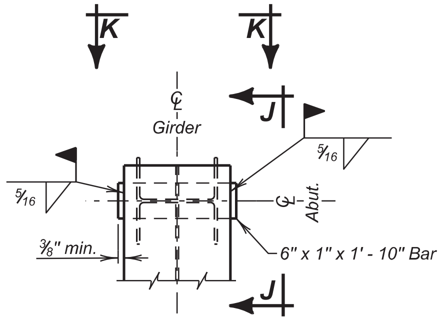
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB MINN06G8	AG 06G8TA12	BT	Steve A Johnson BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

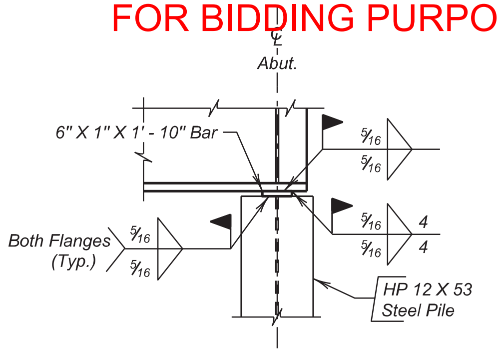
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E15	E45



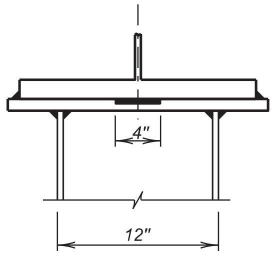
SECTION B - B



DETAIL "X"

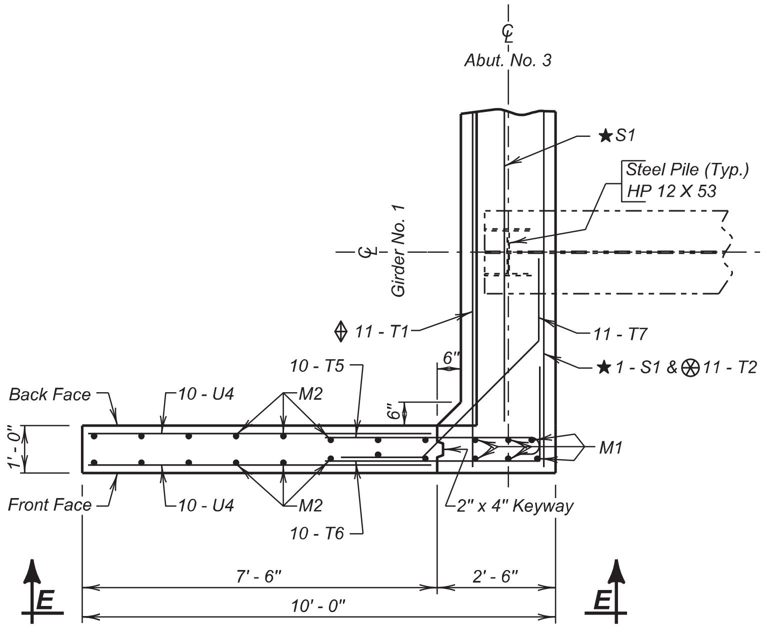


VIEW J - J

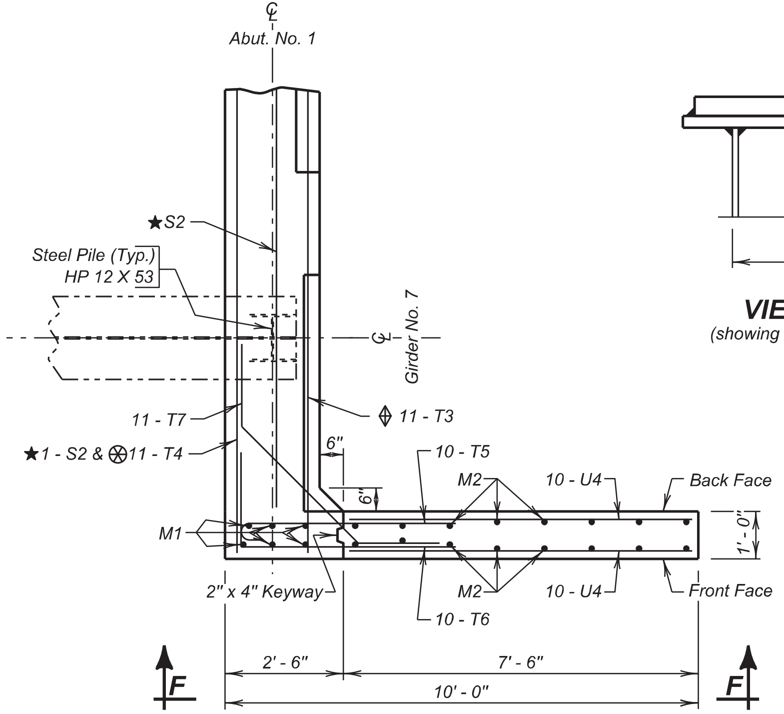


VIEW K - K

(showing weld locations)



DETAIL "Z"



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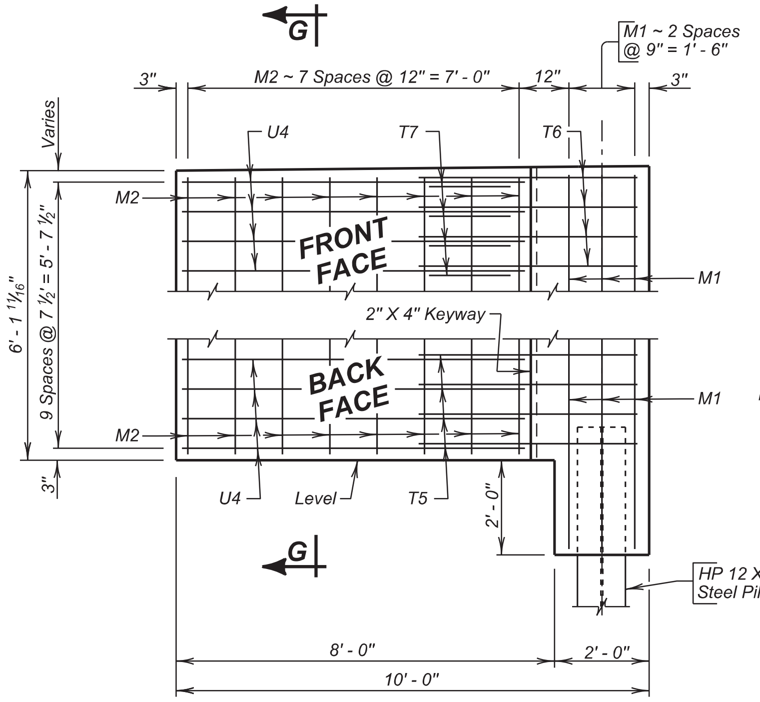
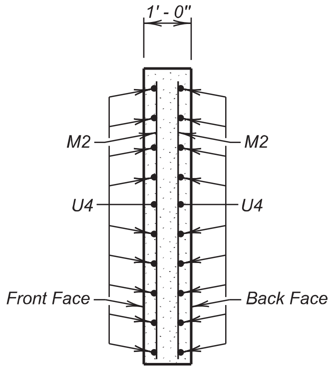
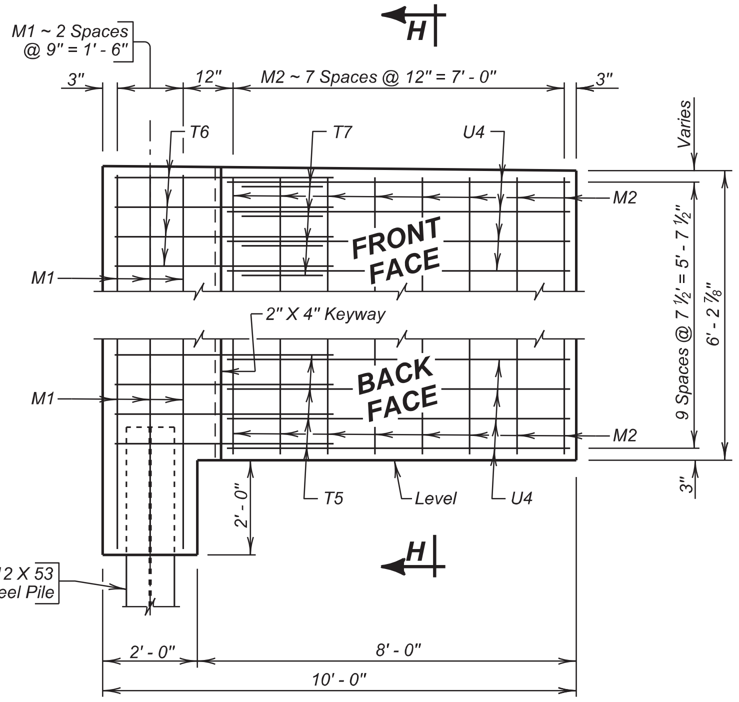


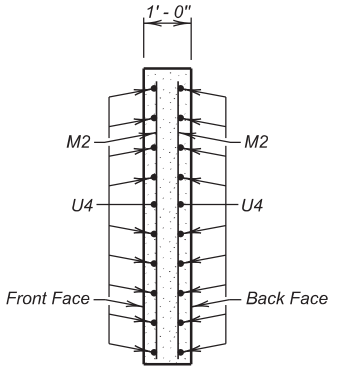
VIEW E - E



SECTION G - G



VIEW F - F

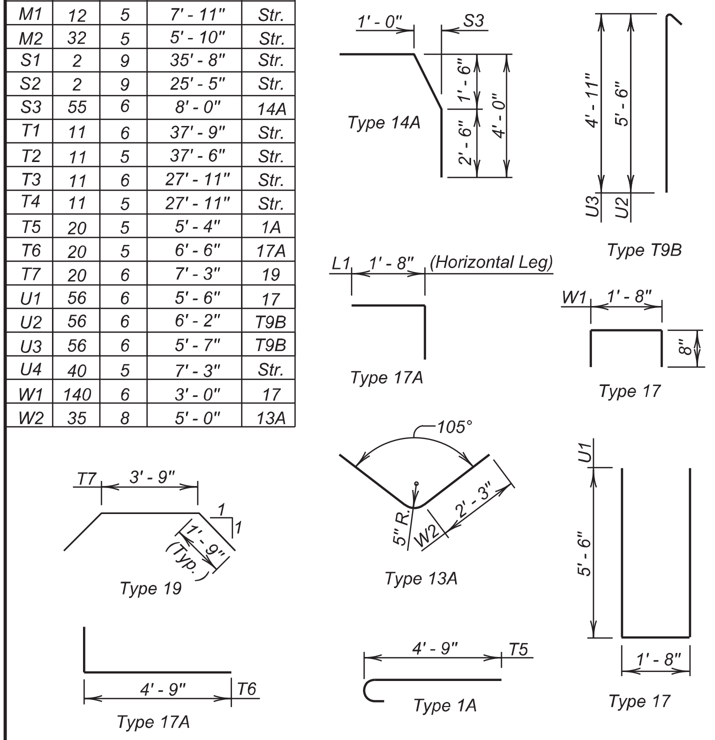


SECTION H - H

REINFORCING SCHEDULE

	Mk.	No.	Size	Length	Type
	L1	54	4	3' - 4"	17A
	M1	12	5	7' - 11"	Str.
	M2	32	5	5' - 10"	Str.
⌀	S1	2	9	35' - 8"	Str.
⌀	S2	2	9	25' - 5"	Str.
⌀	S3	55	6	8' - 0"	14A
	T1	11	6	37' - 9"	Str.
	T2	11	5	37' - 6"	Str.
	T3	11	6	27' - 11"	Str.
	T4	11	5	27' - 11"	Str.
	T5	20	5	5' - 4"	1A
	T6	20	5	6' - 6"	17A
	T7	20	6	7' - 3"	19
	U1	56	6	5' - 6"	17
⌀	U2	56	6	6' - 2"	T9B
	U3	56	6	5' - 7"	T9B
	U4	40	5	7' - 3"	Str.
	W1	140	6	3' - 0"	17
	W2	35	8	5' - 0"	13A

Bending Details



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

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
⌀	Class A45 Concrete, Bridge	Cu. Yd.	40.6
	Reinforcing Steel	Lb.	5047
	Epoxy Coated Reinforcing Steel	Lb.	1595
	Structure Excavation, Bridge	Cu. Yd.	12.3
	HP 12 X 53 Steel Test Pile, Furnish & Drive	Ft.	1 @ 95' = 95'
	HP 12 X 53 Steel Bearing Pile, Furnish & Drive	Ft.	11 @ 90' = 990'
	Preboring Pile	Ft.	12 @ 10' = 120'
	No. 9 Rebar Splice	Each	2

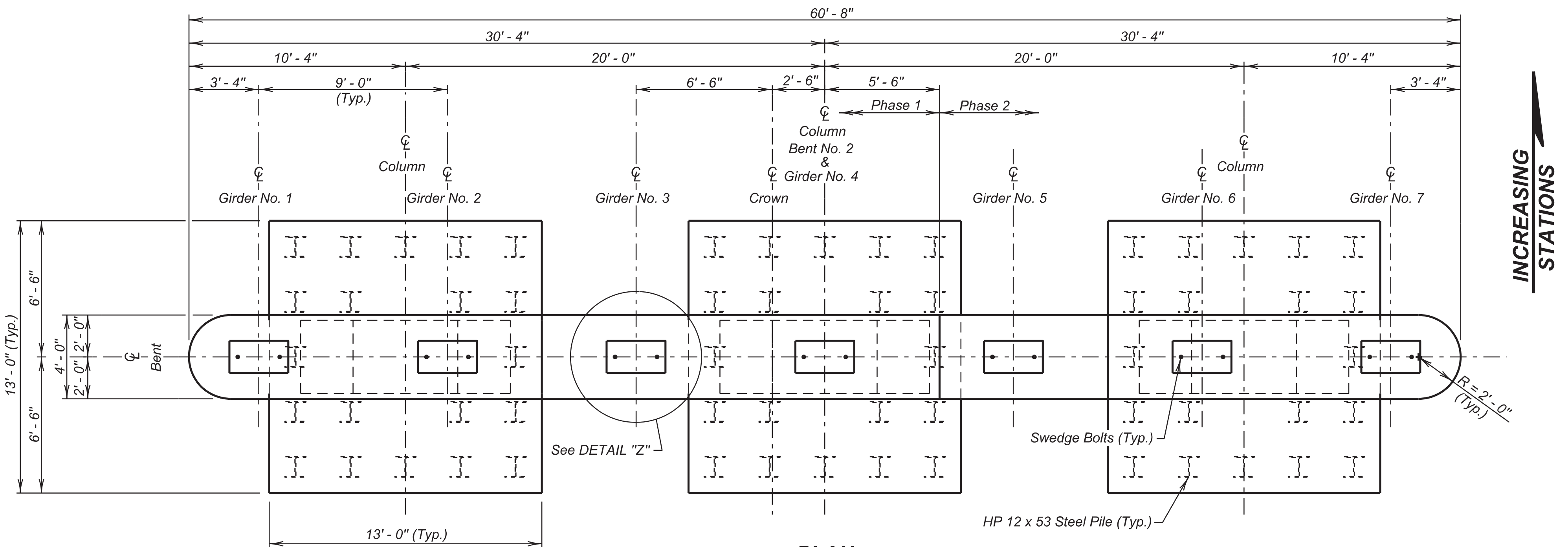
⌀ Includes 14 ft. of 2" dia. PVC Outlet Pipe as an approximate quantity contained in the Class A45 Concrete, Bridge.

ABUTMENT NO. 3 DETAILS (B)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
⑬ OF ㊸

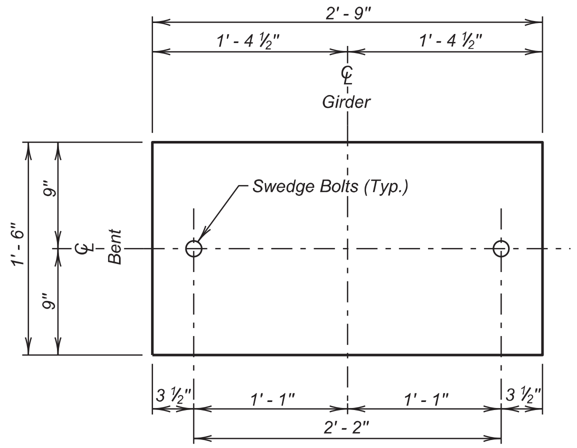
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB MINN06G8	AG 06G8TA13	BT	Steve A Johnson BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E16	E45

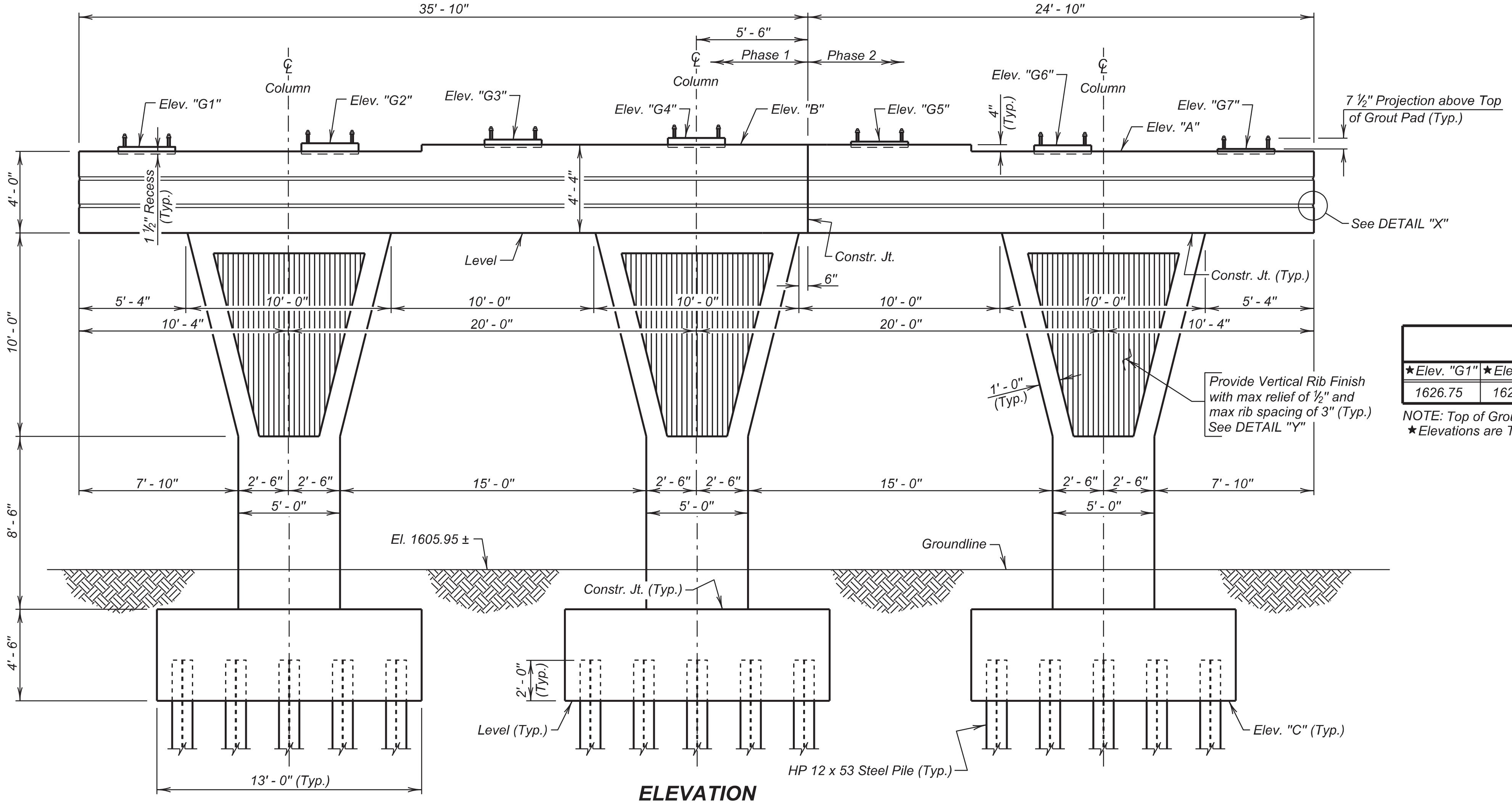


PLAN

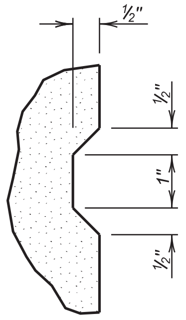


DETAIL "Z"

(Grout Pad)



ELEVATION



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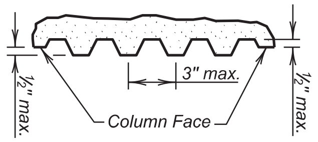


DETAIL "Y"

TABLE OF ELEVATIONS

★Elev. "G1"	★Elev. "G2"	★Elev. "G3"	★Elev. "G4"	★Elev. "G5"	★Elev. "G6"	★Elev. "G7"	Elev. "A"	Elev. "B"	Elev. "C"
1626.75	1626.93	1627.11	1627.19	1627.01	1626.83	1626.65	1626.52	1626.85	1599.48

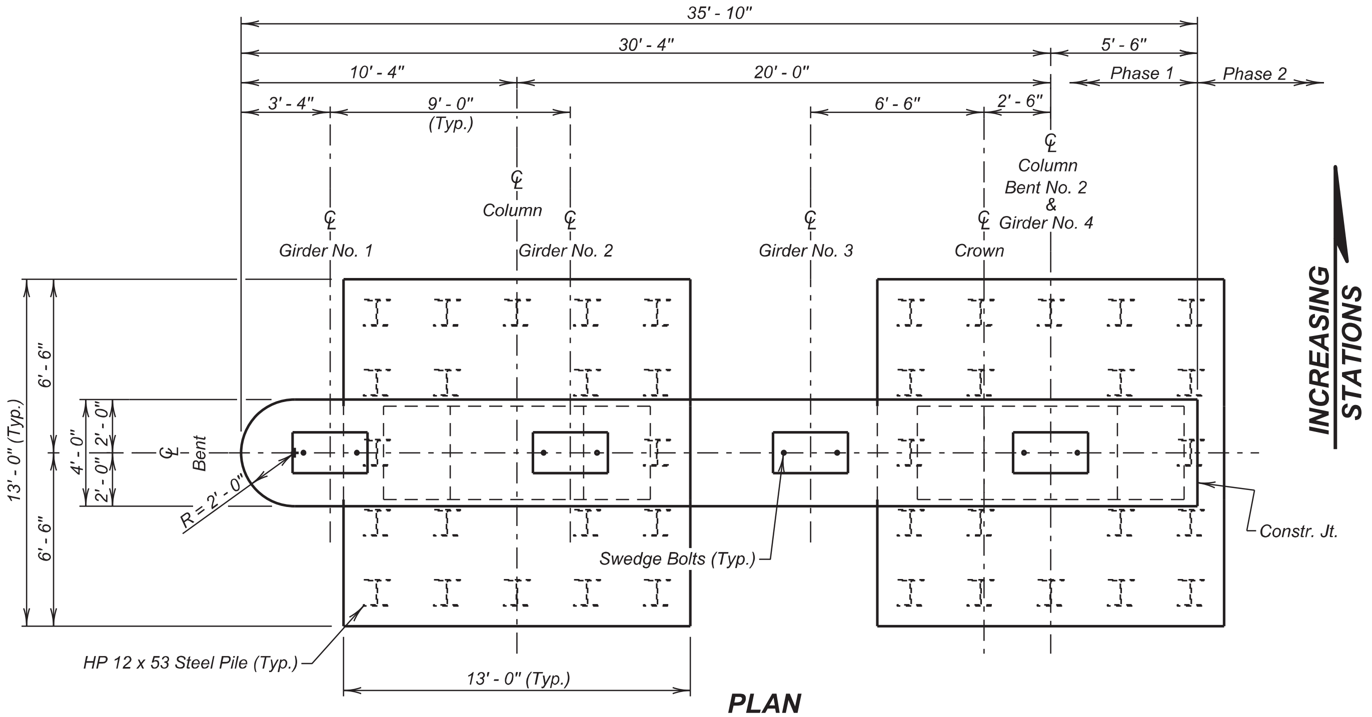
NOTE: Top of Grout Pad will be level and smooth.
★Elevations are Top of Grout Pad at centerline of bent.

BENT NO. 2 LAYOUT
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
⑭ OF ㊸

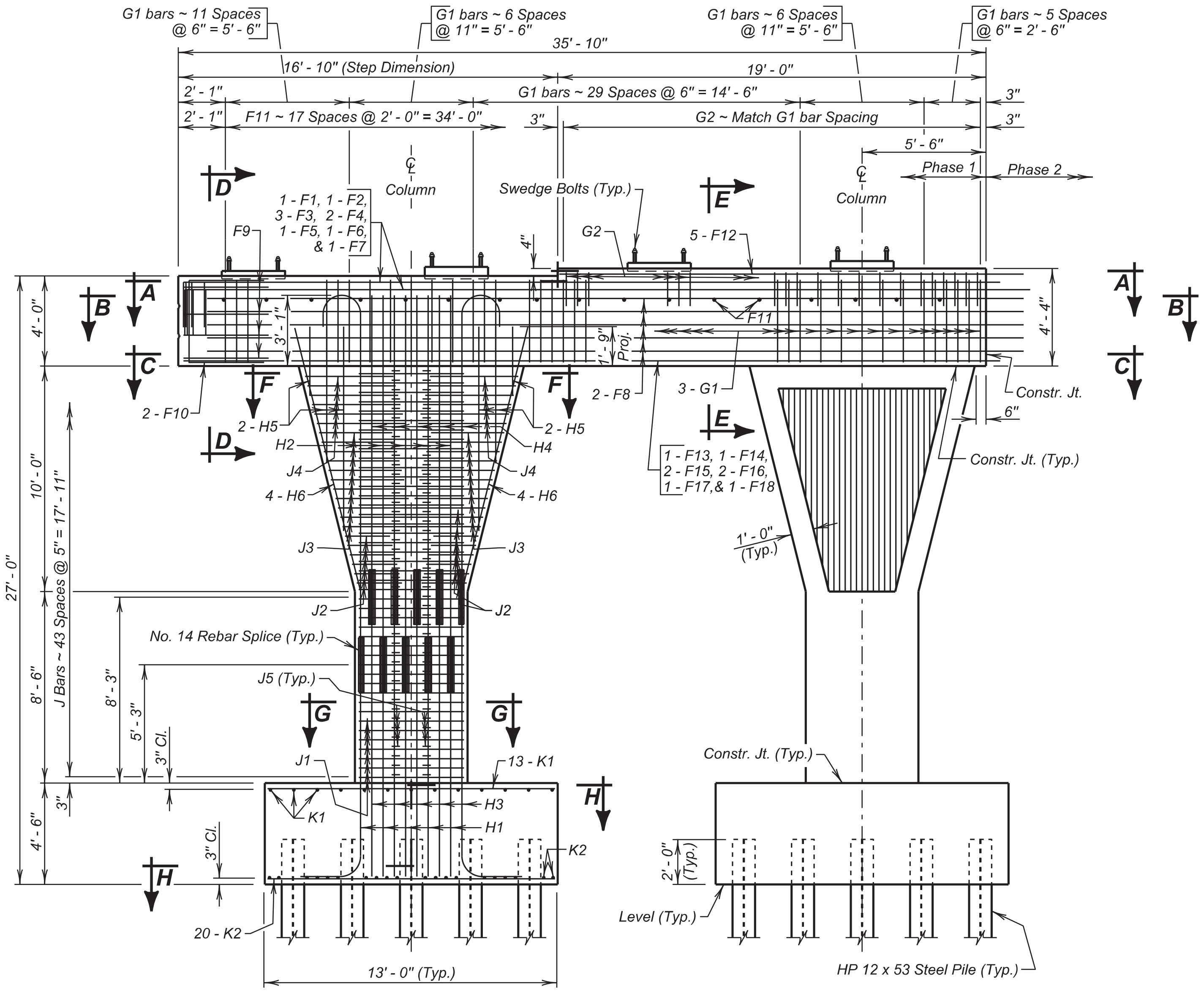
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AU	BT	Steve A Johnson
MINN06G8	06G8TA14		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E17	E45

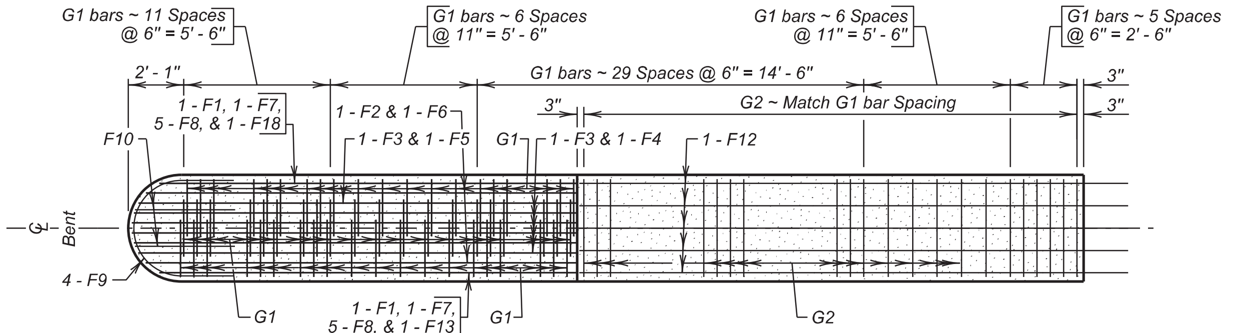
FOR BIDDING PURPOSES ONLY



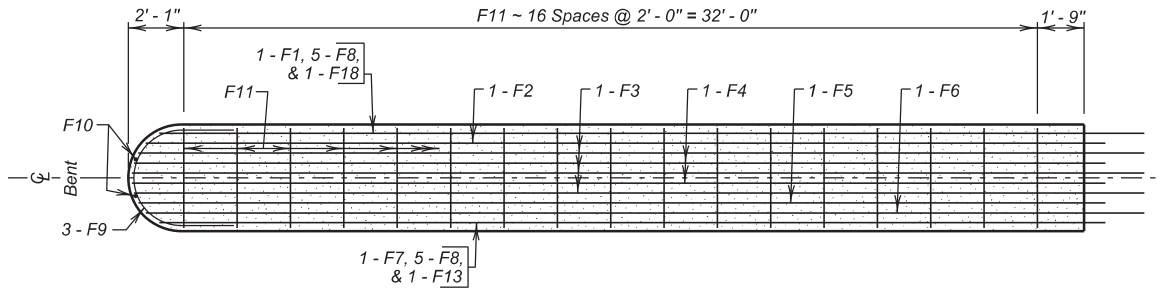
PLAN



ELEVATION



SECTON A - A



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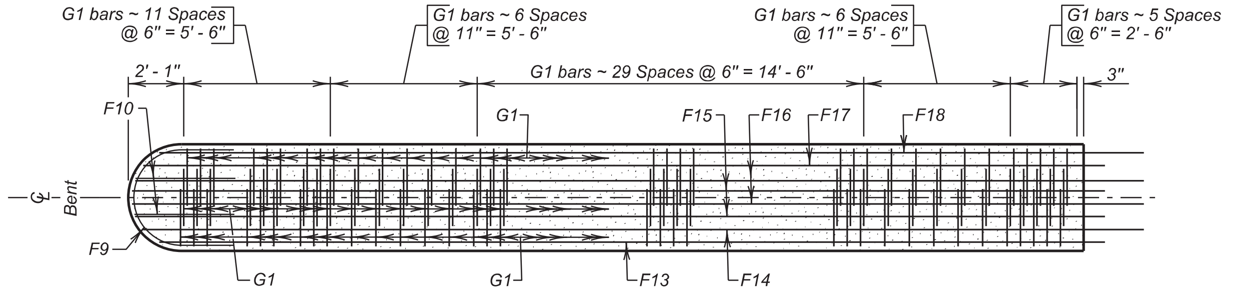
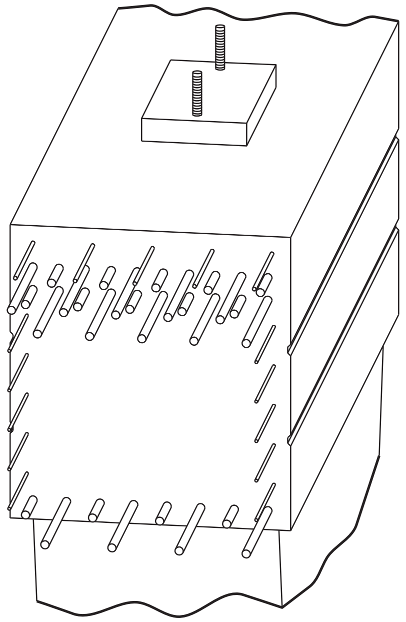


SECTON C - C



ISOMETRIC VIEW

(Showing Cap Resteel at Constr. Jt.)

BENT NO. 2 DETAILS (PHASE 1) (A)

FOR

258' - 0" STEEL GIRDER BRIDGE

OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

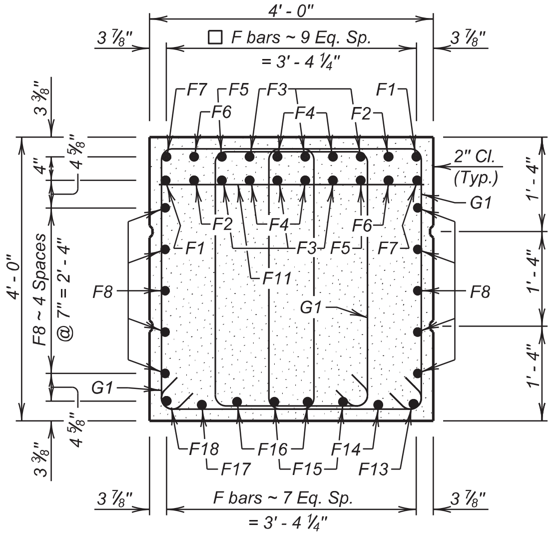
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

⑮ OF ㊸

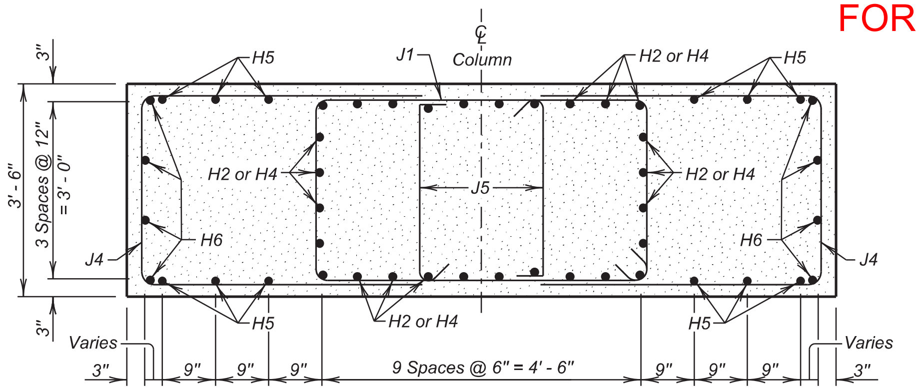
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AU	BT	Steve A Johnson
MINN06G8	06G8TA15		BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

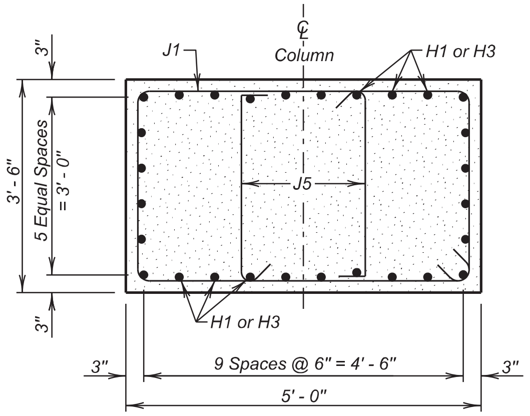
NOTE:
☐ Bars may be adjusted slightly to clear swedge bolts.



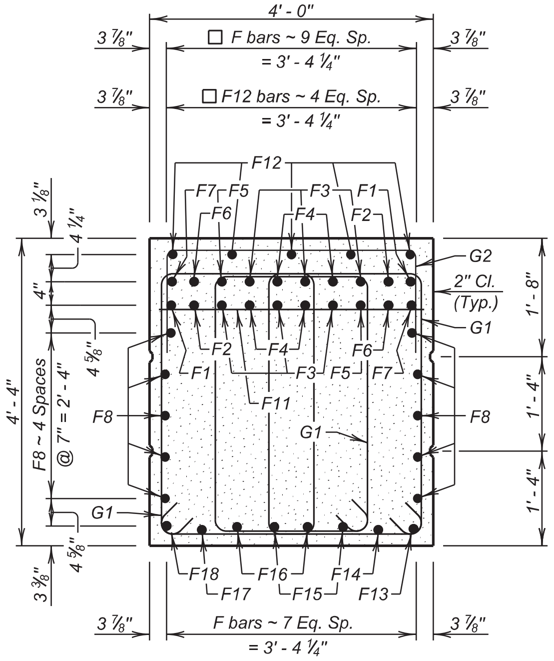
SECTON D - D



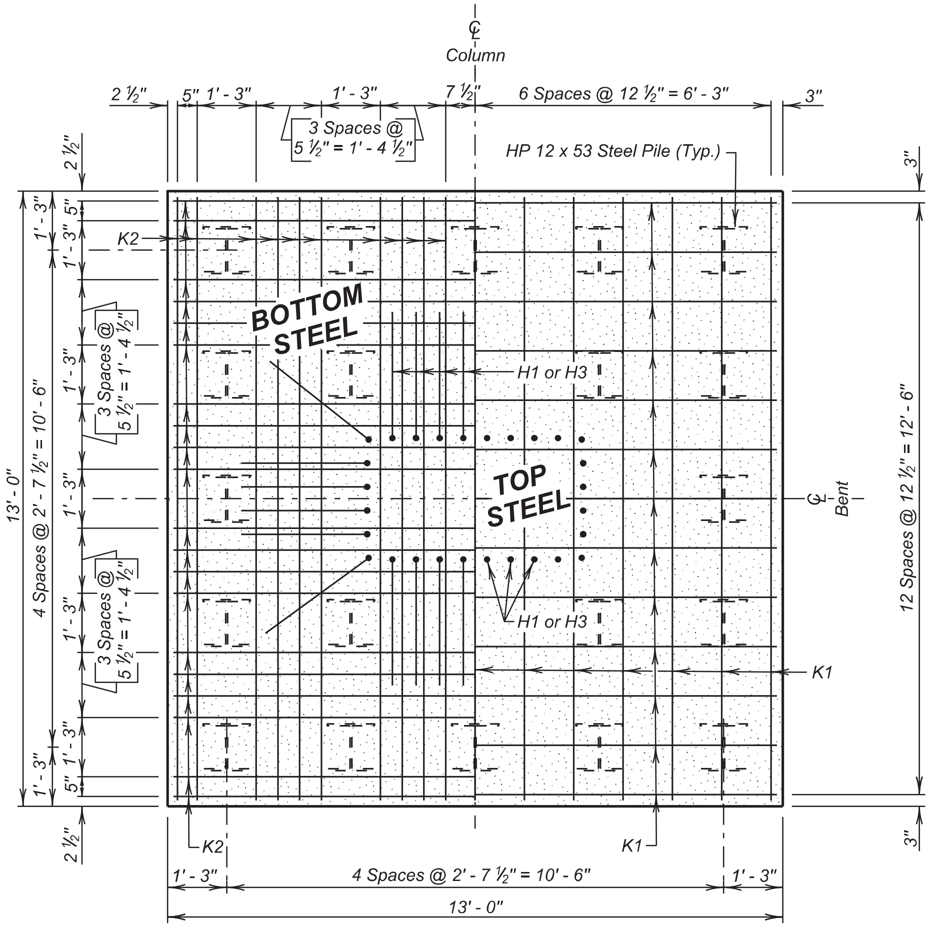
SECTON F - F



SECTON G - G



SECTON E - E

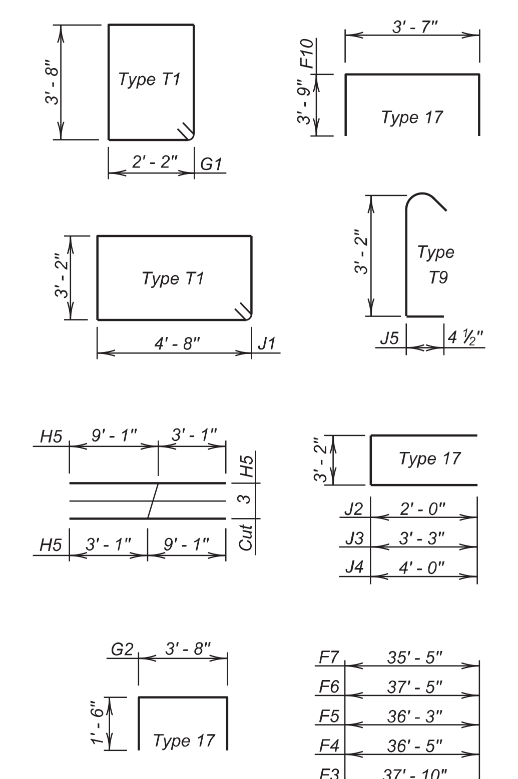


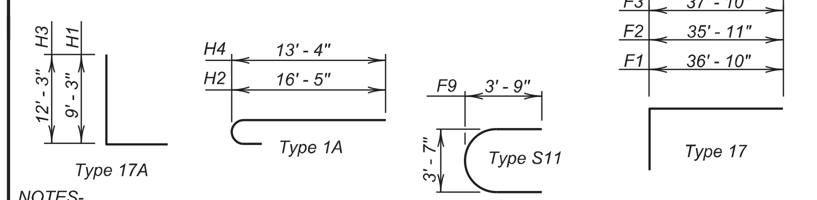
SECTION H - H

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
F1	2	11	38' - 10"	17A
F2	2	11	37' - 11"	17A
F3	6	11	39' - 10"	17A
F4	4	11	38' - 5"	17A
F5	2	11	38' - 3"	17A
F6	2	11	39' - 5"	17A
F7	2	11	37' - 5"	17A
F8	10	4	36' - 3"	Str.
F9	4	5	9' - 9"	S11
F10	2	5	11' - 1"	17
F11	17	5	3' - 9"	Str.
F12	5	4	20' - 10"	Str.
F13	1	11	35' - 5"	Str.
F14	1	11	37' - 6"	Str.
F15	2	11	36' - 5"	Str.
F16	2	11	37' - 11"	Str.
F17	1	11	36' - 0"	Str.
F18	1	11	36' - 10"	Str.
G1	174	5	12' - 8"	T1
G2	33	5	6' - 8"	17
H1	28	14	12' - 0"	17A
H2	28	14	18' - 8"	1A
H3	28	14	15' - 0"	17A
H4	28	14	15' - 7"	1A
⌀ H5	12	6	12' - 2"	Str.
H6	16	6	12' - 0"	Str.
J1	88	5	16' - 8"	T1
J2	24	6	7' - 2"	17
J3	44	6	9' - 8"	17
J4	24	6	11' - 2"	17
J5	176	4	3' - 11"	T9
K1	52	4	12' - 9"	Str.
K2	80	10	12' - 9"	Str.

Bending Details





NOTES-
All dimensions are out to out of bars.
⌀ See cutting diagram.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
✱ Class A45 Concrete, Bridge	Cu. Yd.	109.0
Reinforcing Steel	Lb.	30408
Structure Excavation, Bridge	Cu. Yd.	138.7
HP 12 X 53 Steel Test Pile, Furnish & Drive	Ft.	1 @ 85' = 85'
HP 12 X 53 Steel Bearing Pile, Furnish & Drive	Ft.	39 @ 80' = 3120'
No. 14 Rebar Splice	Each	56

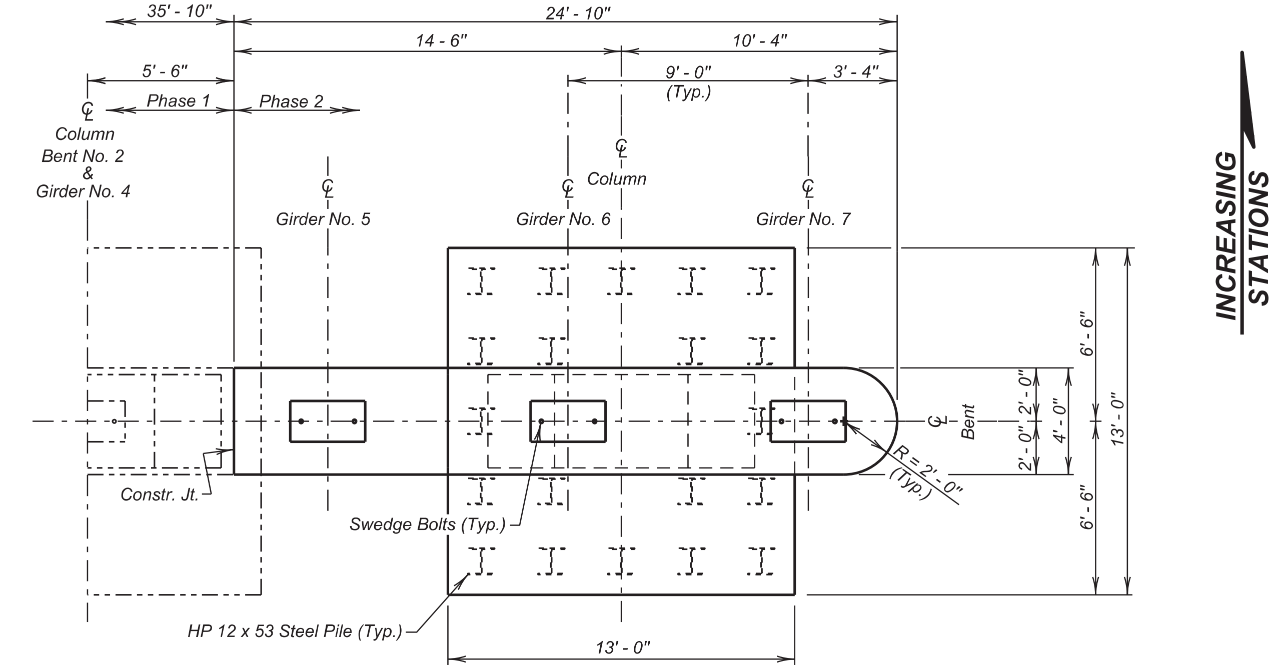
✱ Includes 0.3 Cu.Yds. for Grout Pads.

BENT NO. 2 DETAILS (PHASE 1) (B)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
⑯ OF ㊸

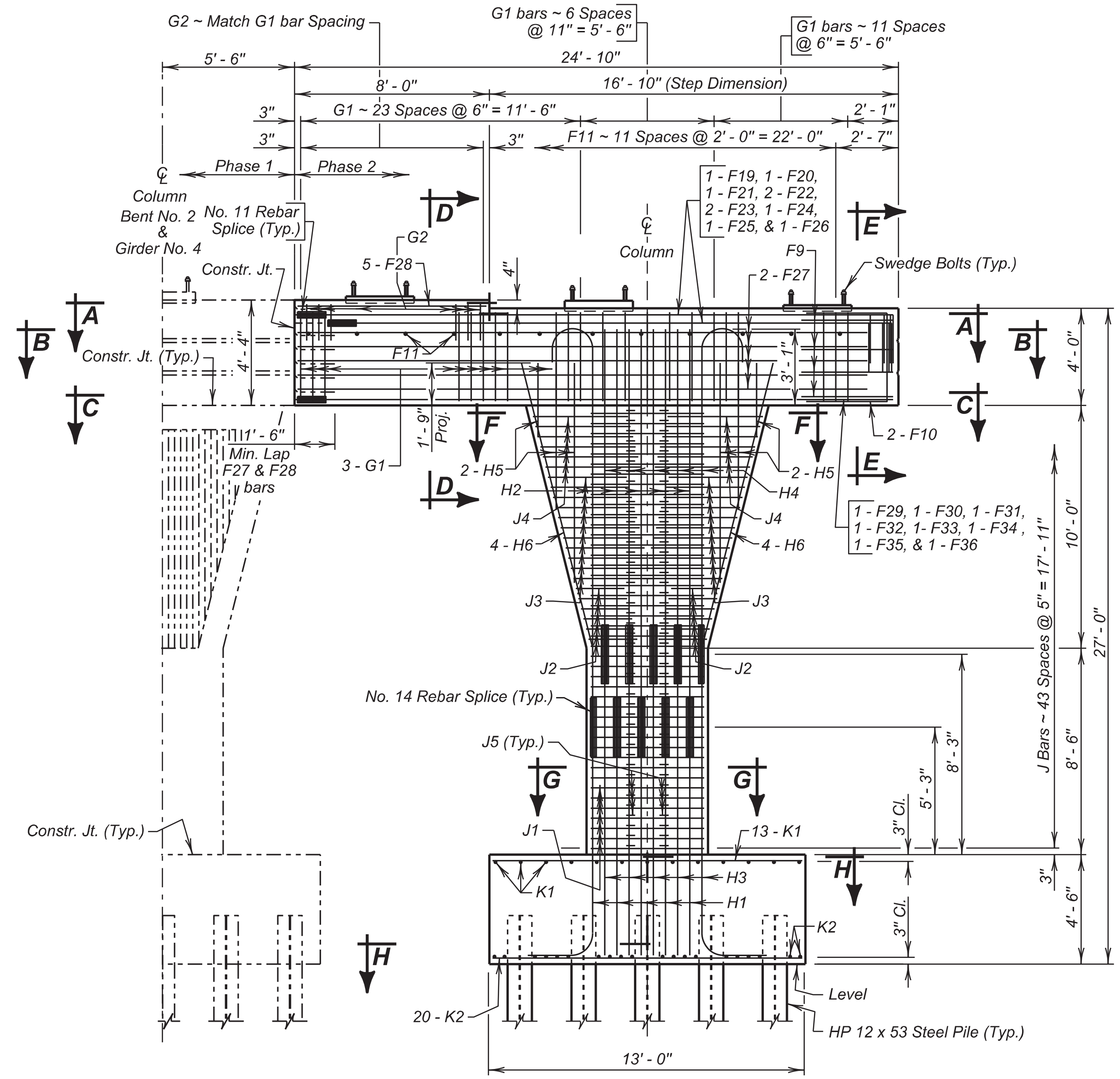
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AU	BT	Steve A Johnson BRIDGE ENGINEER
MINN06G8	06G8TA16		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E19	E45

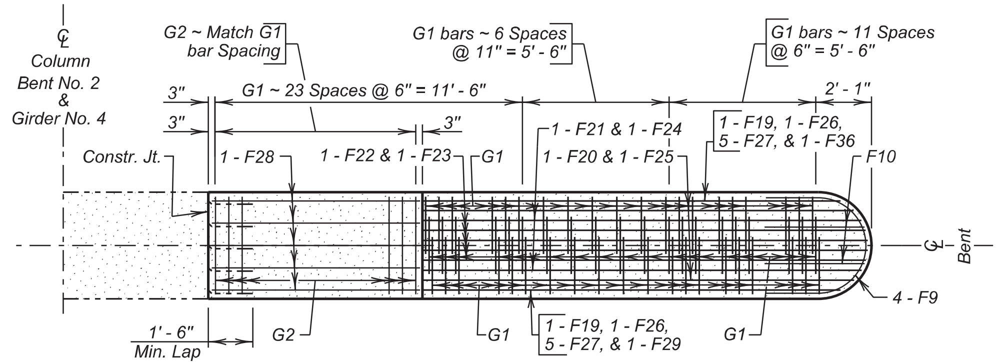
FOR BIDDING PURPOSES ONLY



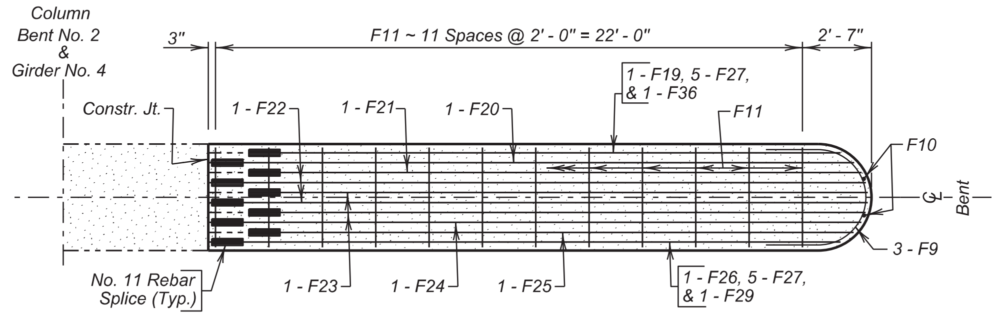
PLAN



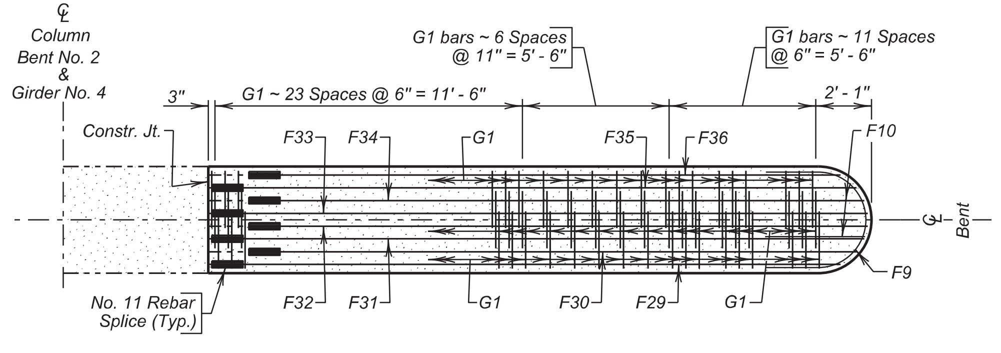
ELEVATION



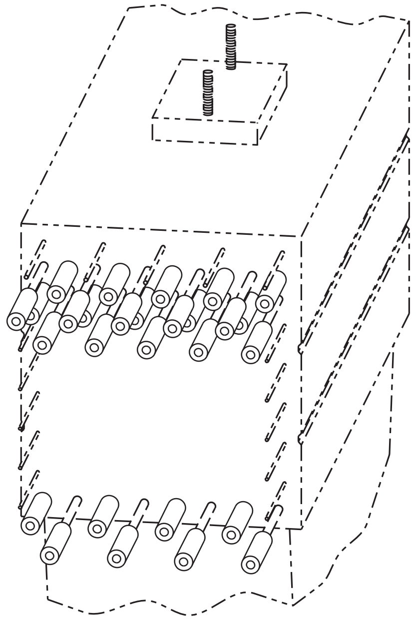
SECTON A - A



SECTON B - B



SECTON C - C



ISOMETRIC VIEW

(Showing Cap Resteel at Constr. Jt. with Mechanical Splices)

BENT NO. 2 DETAILS (PHASE 2) (A)

FOR

258' - 0" STEEL GIRDER BRIDGE

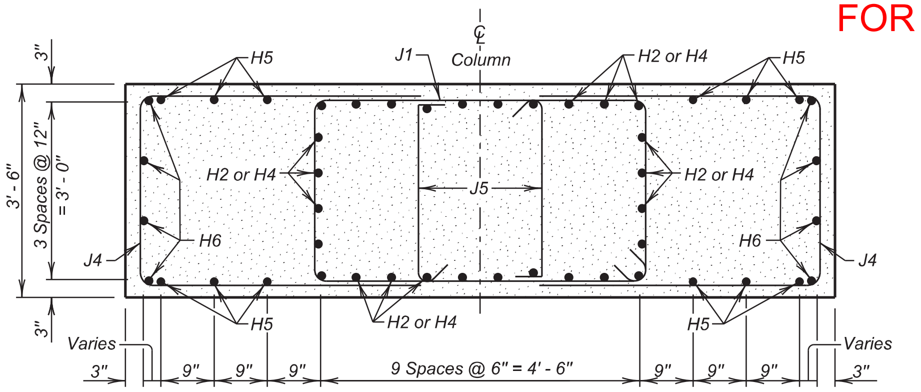
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

⑰ OF ㊸

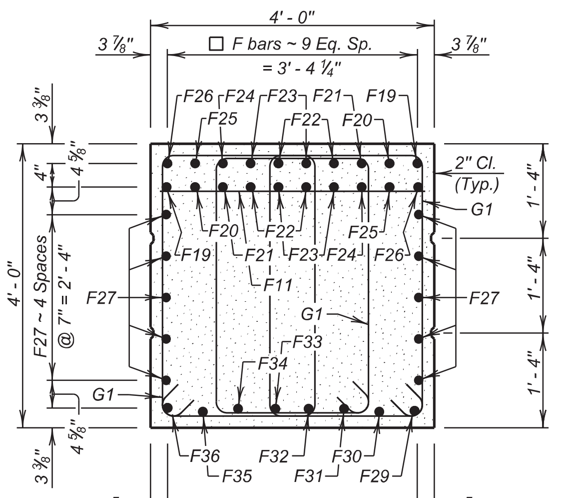
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AU	BT	Steve A Johnson
MINN06G8	06G8TA17		BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

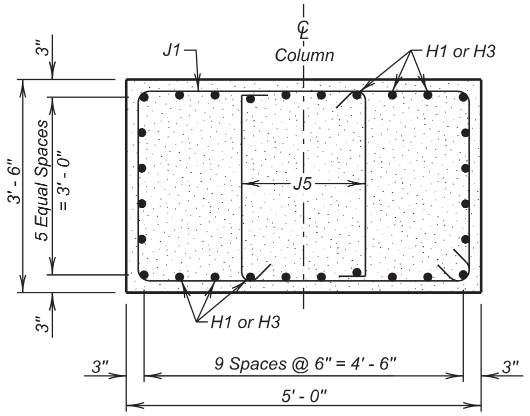


SECTON F - F

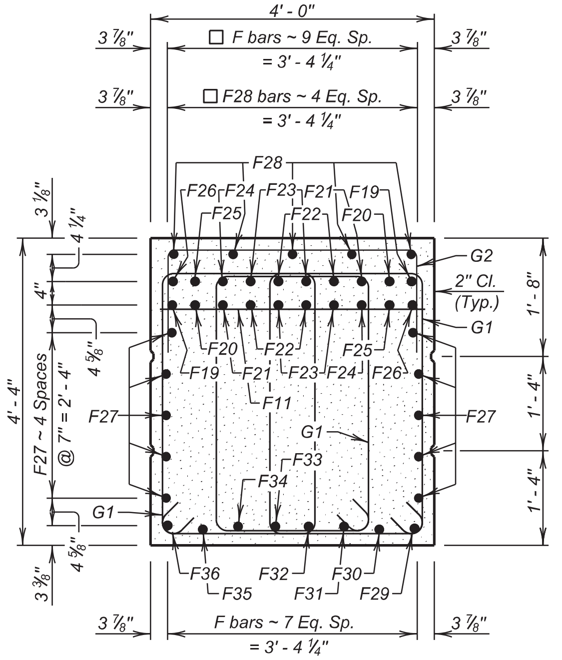
NOTE:
☐ Bars may be adjusted slightly to clear swedge bolts.



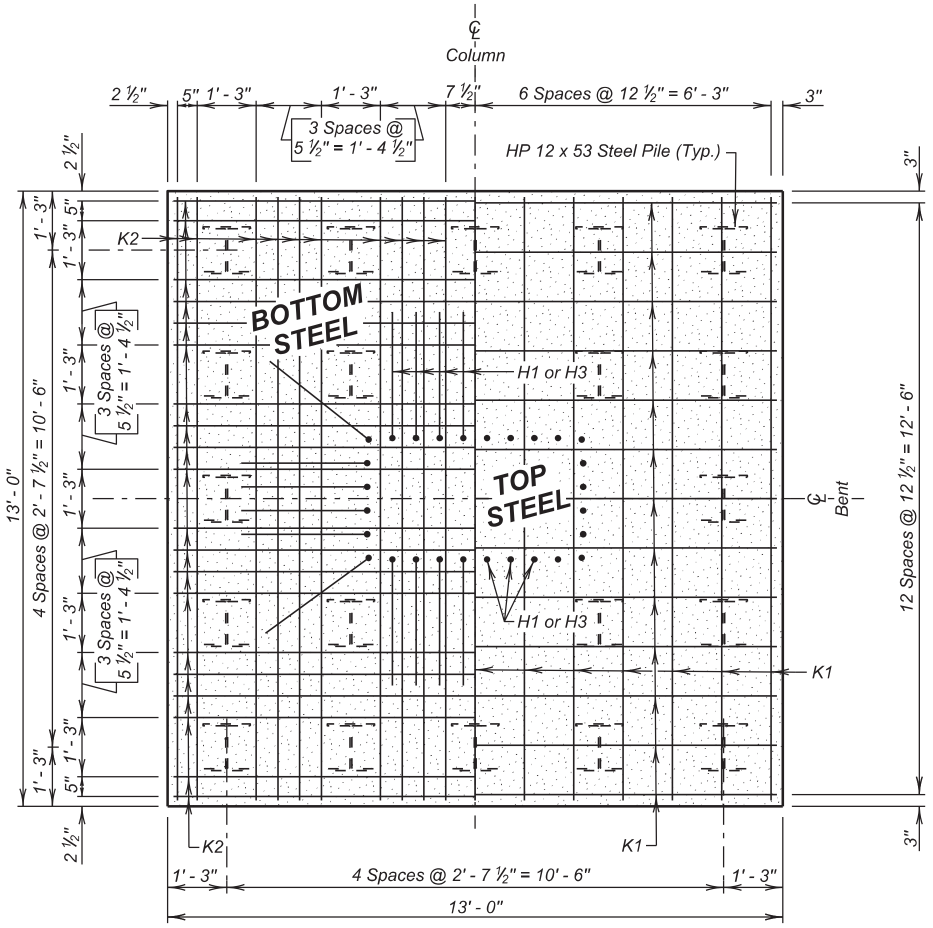
SECTON D - D



SECTON G - G



SECTON E - E

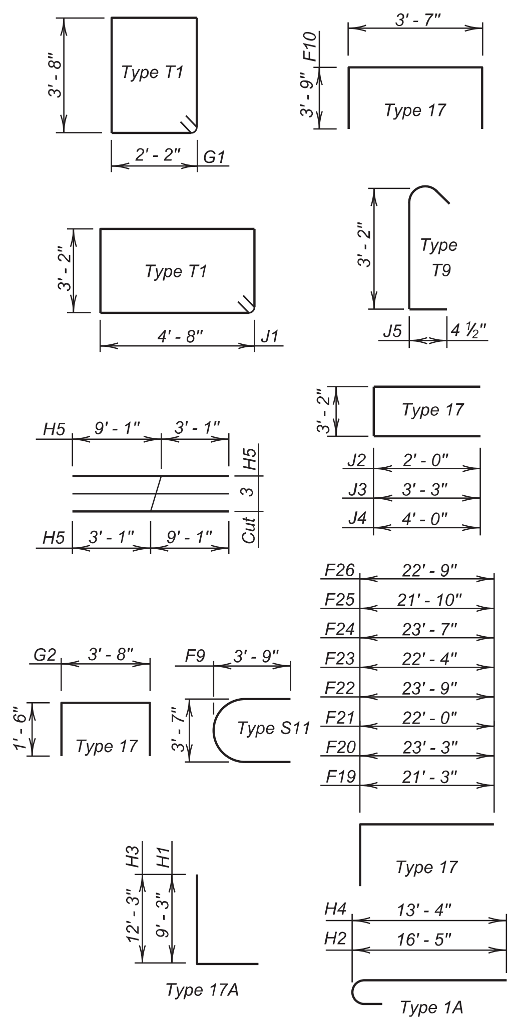


SECTION H - H

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
F9	4	5	9' - 9"	S11
F10	2	5	11' - 1"	17
F11	12	5	3' - 9"	Str.
F19	2	11	23' - 3"	17A
F20	2	11	25' - 3"	17A
F21	2	11	24' - 0"	17A
F22	4	11	25' - 9"	17A
F23	4	11	24' - 4"	17A
F24	2	11	25' - 7"	17A
F25	2	11	23' - 10"	17A
F26	2	11	24' - 9"	17A
F27	10	4	23' - 0"	Str.
F28	5	4	7' - 9"	Str.
F29	1	11	22' - 8"	Str.
F30	1	11	21' - 11"	Str.
F31	1	11	23' - 7"	Str.
F32	1	11	22' - 4"	Str.
F33	1	11	23' - 10"	Str.
F34	1	11	22' - 1"	Str.
F35	1	11	23' - 5"	Str.
F36	1	11	21' - 3"	Str.
G1	123	5	12' - 8"	T1
G2	16	5	6' - 8"	17
H1	14	14	12' - 0"	17A
H2	14	14	18' - 8"	1A
H3	14	14	15' - 0"	17A
H4	14	14	15' - 7"	1A
⌀ H5	6	6	12' - 2"	Str.
H6	8	6	12' - 0"	Str.
J1	44	5	16' - 8"	T1
J2	12	6	7' - 2"	17
J3	22	6	9' - 8"	17
J4	12	6	11' - 2"	17
J5	88	4	3' - 11"	T9
K1	26	4	12' - 9"	Str.
K2	40	10	12' - 9"	Str.

Bending Details



NOTES-
All dimensions are out to out of bars.
⌀ See cutting diagram.

ESTIMATED QUANTITIES

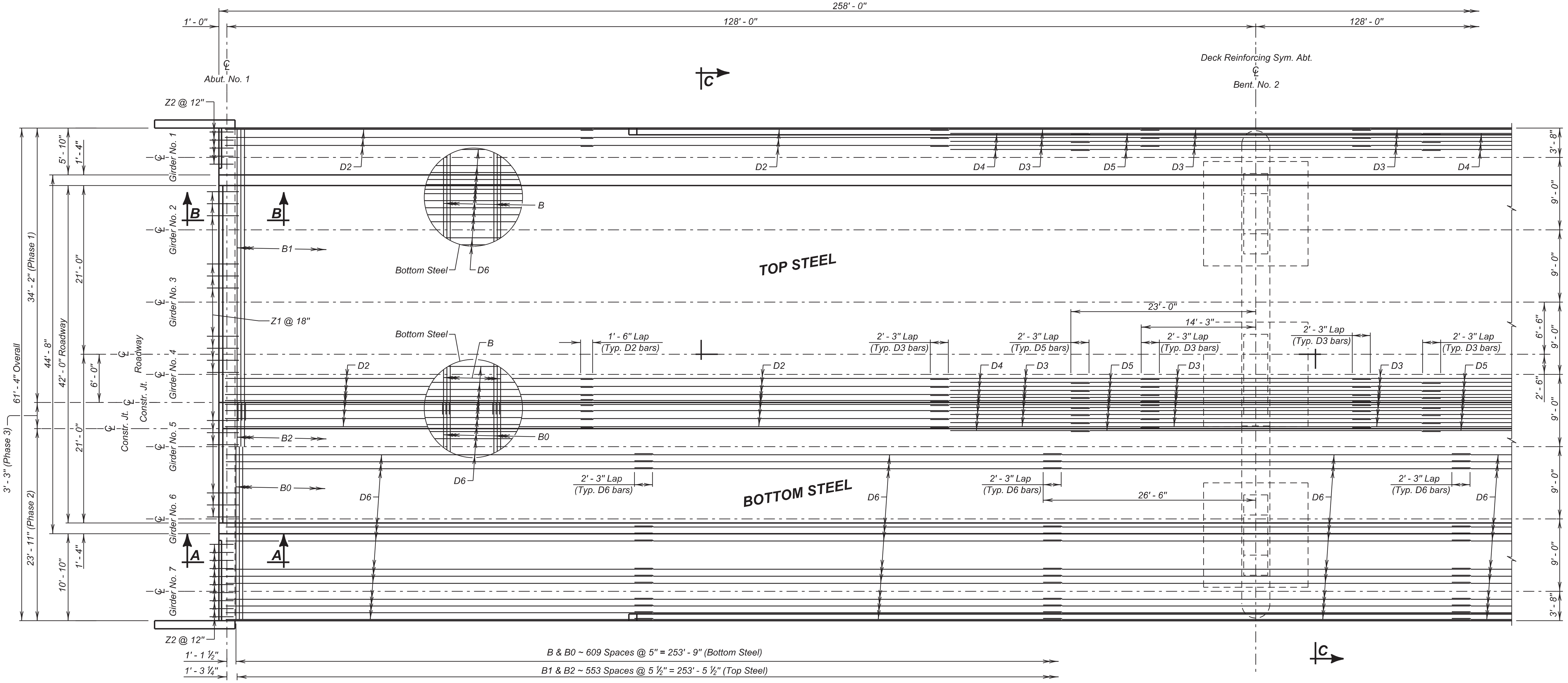
ITEM	UNIT	QUANTITY
⚹ Class A45 Concrete, Bridge	Cu. Yd.	58.4
Reinforcing Steel	Lb.	16486
Structure Excavation, Bridge	Cu. Yd.	61.6
HP 12 X 53 Steel Bearing Pile, Furnish & Drive	Ft.	20 @ 80' = 1600'
No. 11 Rebar Splice	Each	28
No. 14 Rebar Splice	Each	28

⚹ Includes 0.1 Cu.Yds. for Grout Pads.

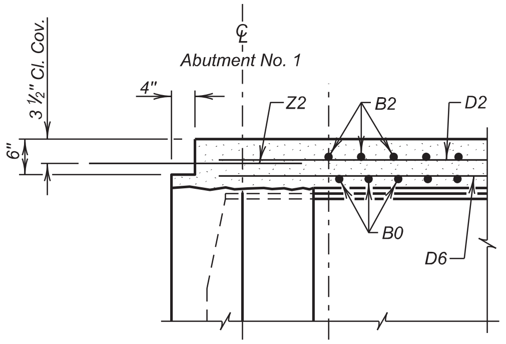
BENT NO. 2 DETAILS (PHASE 2) (B)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023 ⑱ OF 43

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AU	BT	Steve A Johnson
MINN06G8	06G8TA18		BRIDGE ENGINEER

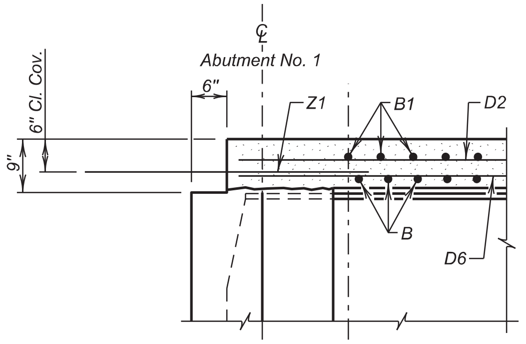
FOR BIDDING PURPOSES ONLY



HALF PLAN



SECTION A - A



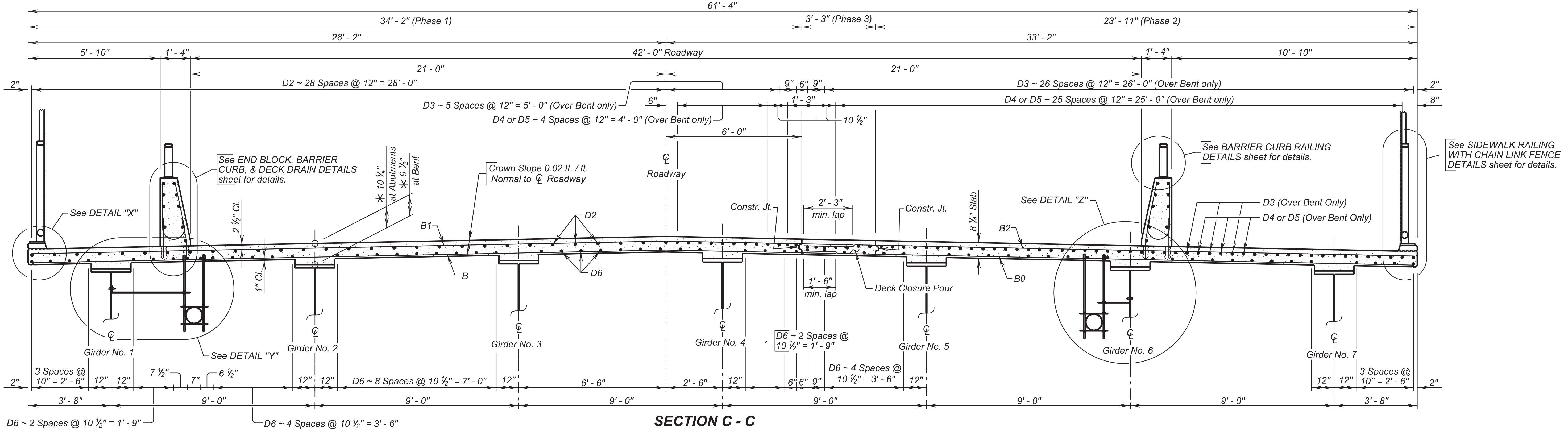
SECTION B - B

SUPERSTRUCTURE DETAILS (A)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

19 OF 43

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AG MINN06G8	BB 06G8TA19	BT	Steve A Johnson BRIDGE ENGINEER

Revised October 24, 2024 BB
Revised November 25, 2024 BB



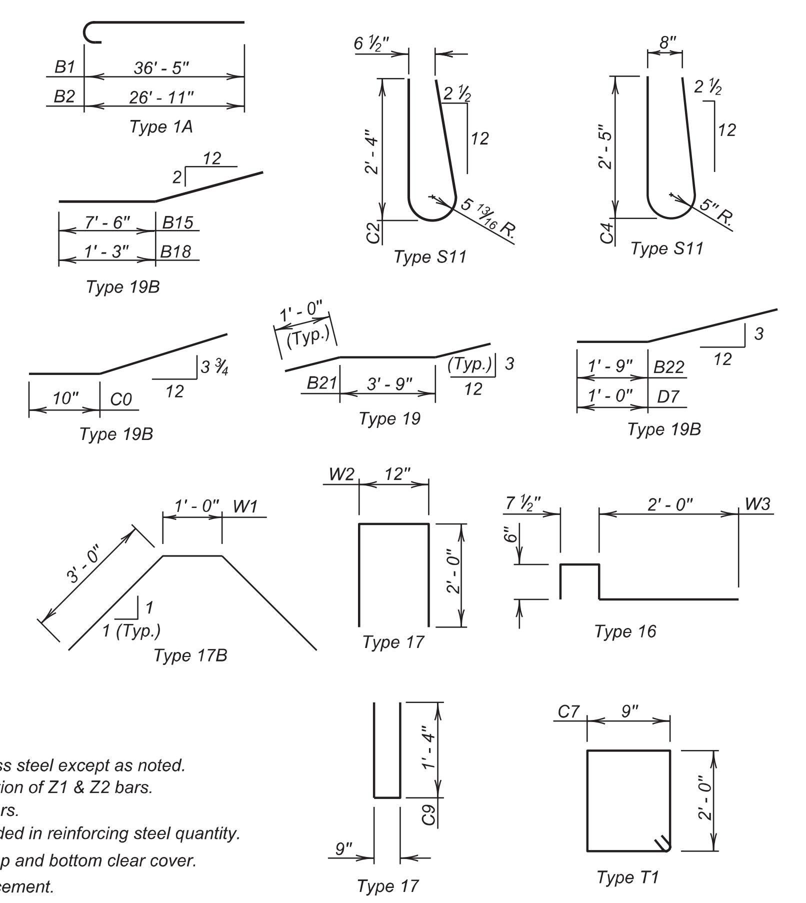
SECTION C - C

✳ 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

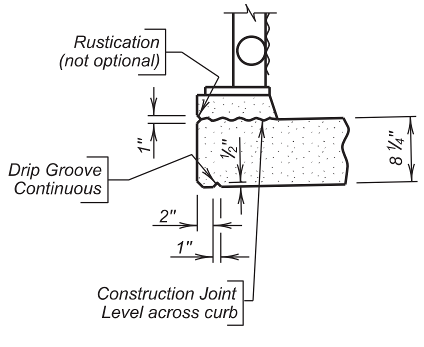
Mk.	No.	Size	Length	Type
B	610	4	35' - 9"	Str.
B0	610	4	26' - 11"	Str.
⍋ B1	554	5	37' - 0"	1A
⍋ B2	554	5	27' - 6"	1A
B15	12	5	9' - 6"	19B
B16	10	4	50' - 0"	Str.
B17	8	4	5' - 8"	Str.
B18	12	8	3' - 0"	19B
B19	12	5	2' - 0"	Str.
B21	4	4	5' - 9"	19
B22	4	4	3' - 3"	19B
◈ C	274	5	1' - 6"	Str.
◈ C0	486	5	1' - 6"	19B
C2	498	5	5' - 3"	S11
C4	8	5	5' - 3"	S11
C7	12	5	6' - 5"	T1
C9	4	5	3' - 5"	17
D	20	4	52' - 6"	Str.
D1	60	4	50' - 0"	Str.
D2	252	4	45' - 9"	Str.
D3	189	6	28' - 6"	Str.
D4	122	6	17' - 3"	Str.
D5	61	6	46' - 0"	Str.
D6	315	6	53' - 3"	Str.
D7	4	4	2' - 6"	19B
D8	4	4	2' - 6"	Str.
⧖ M5	104	4	4' - 3"	Str.
⊛ W1	66	4	7' - 0"	17B
⊛ W2	66	4	5' - 0"	17
⊛ W3	310	4	3' - 8"	16
Z1	56	7	4' - 0"	Str.
⊛ Z2	30	4	3' - 0"	Str.

Bending Details



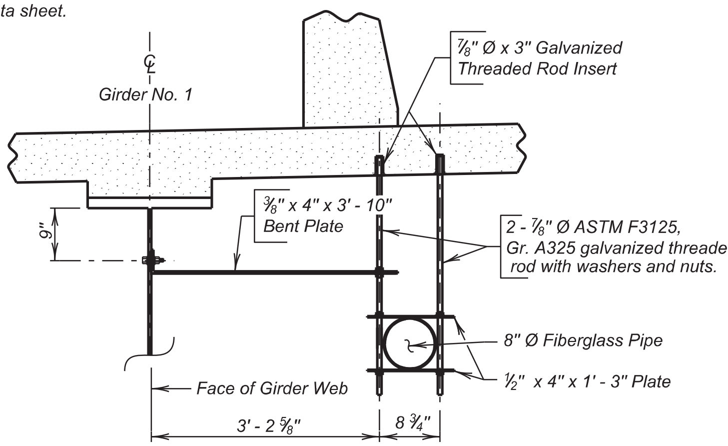
NOTES -

All reinforcing steel will be stainless steel except as noted.
See Approach Slab sheet 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.
⧖ See DECK DRAIN DETAILS (RIGHT SIDE) for placement.



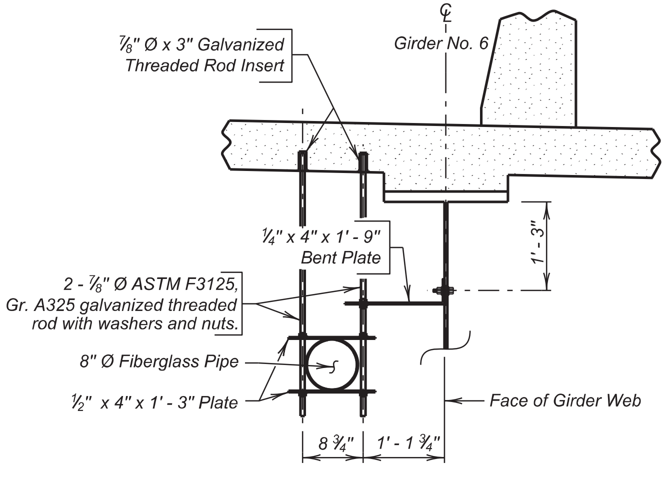
DETAIL "X"

(Resteel not shown.)



DETAIL "Y"

(Resteel not shown.)



DETAIL "Z"

(Resteel not shown.)

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
★ Class A45 Concrete, Bridge Deck	Cu. Yd.	502.3
Stainless Reinforcing Steel	Lb.	120670
△ Structural Steel, Install	Lump Sum	Lump Sum
Concrete Penetrating Sealer	Sq. Yd.	1758
Install Dowel in Concrete	Each	760
Deck Drain, Girder Bridge	Each	30

★ Concrete quantity for Barrier Curb is 0.1184 Cu. Yd. per foot and for End Block is 0.7184 Cu. Yd. per 12' End Block.

△ For informational purposes only, the estimated weight of the structural steel is 640000 pounds. It includes all costs for installing shear connectors. For informational purposes only, the number of shear connectors is 7203 and the estimated weight of the shear connectors is 6663 pounds.

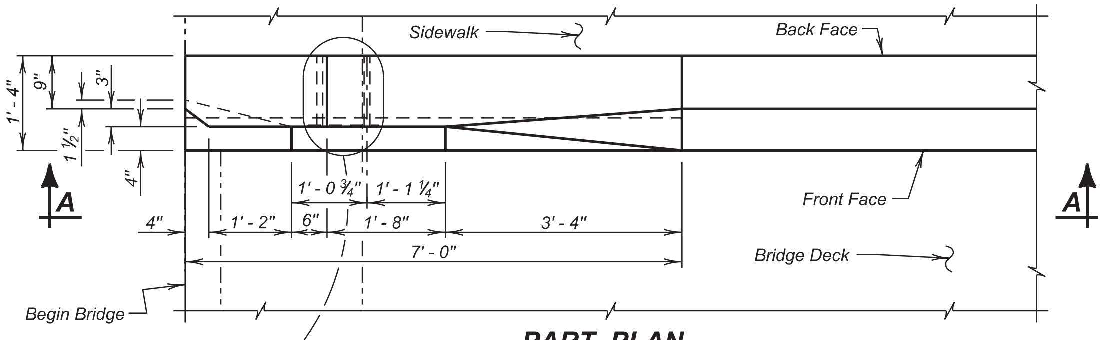
SUPERSTRUCTURE DETAILS (B)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
⑳ OF (43)

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AG	BB	BT	Steve A Johnson
MINN06G8	06G8TA20		BRIDGE ENGINEER

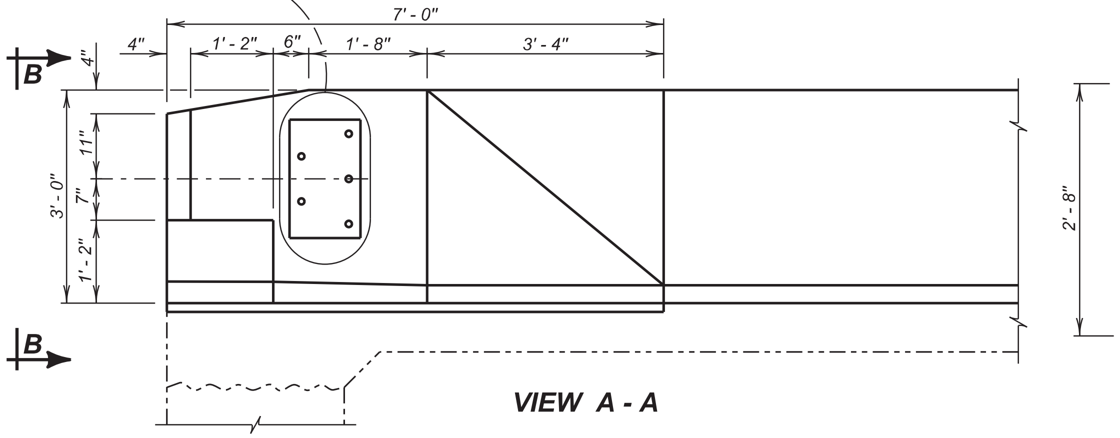
FOR BIDDING PURPOSES ONLY

Revised October 24, 2024 BB

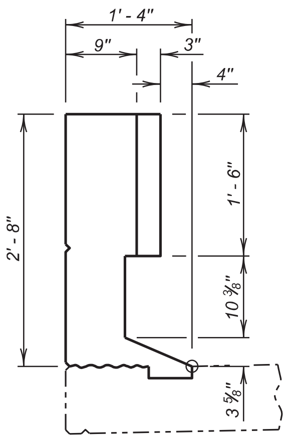
NOTE:
THE DECK DRAINS AND ASSOCIATED HARDWARE ARE NOT INCLUDED WITH THE ITEMS FURNISHED BY THE STATE.



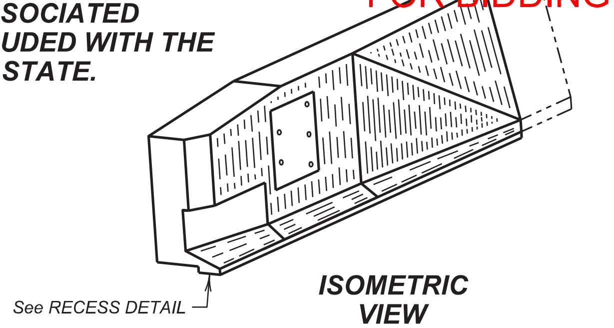
PART PLAN



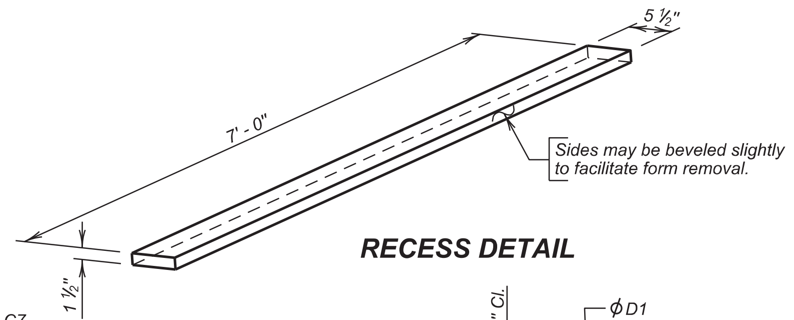
VIEW A - A



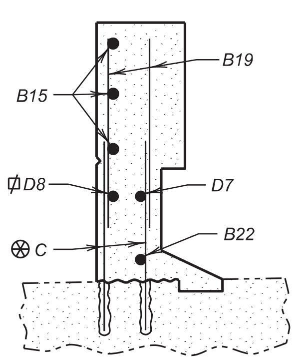
VIEW B - B



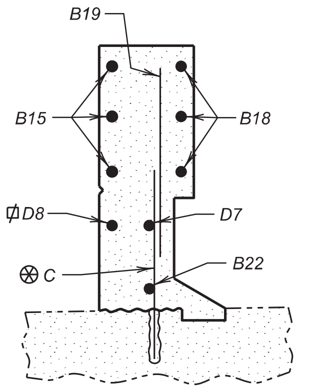
ISOMETRIC VIEW



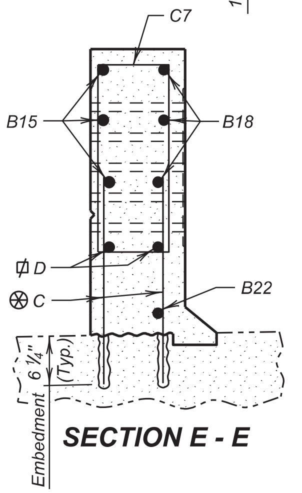
RECESS DETAIL



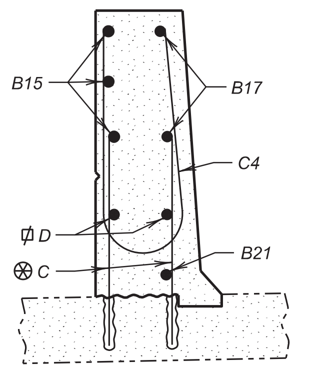
SECTION C - C



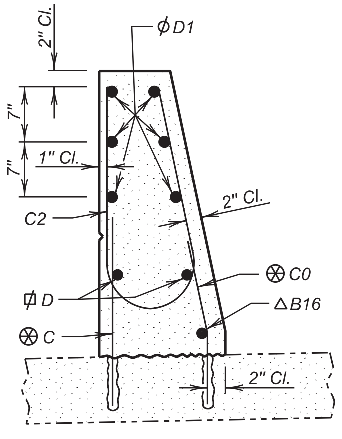
SECTION D - D



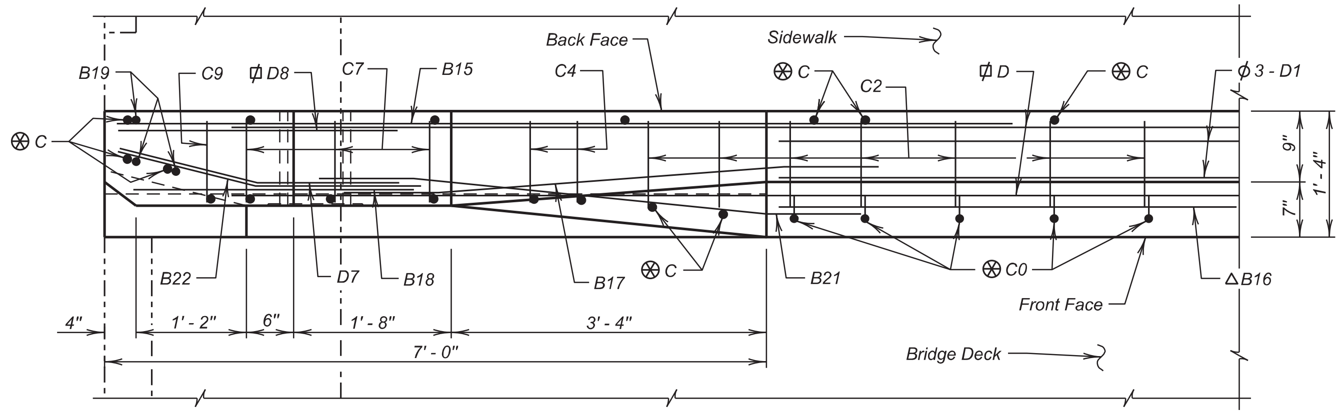
SECTION E - E



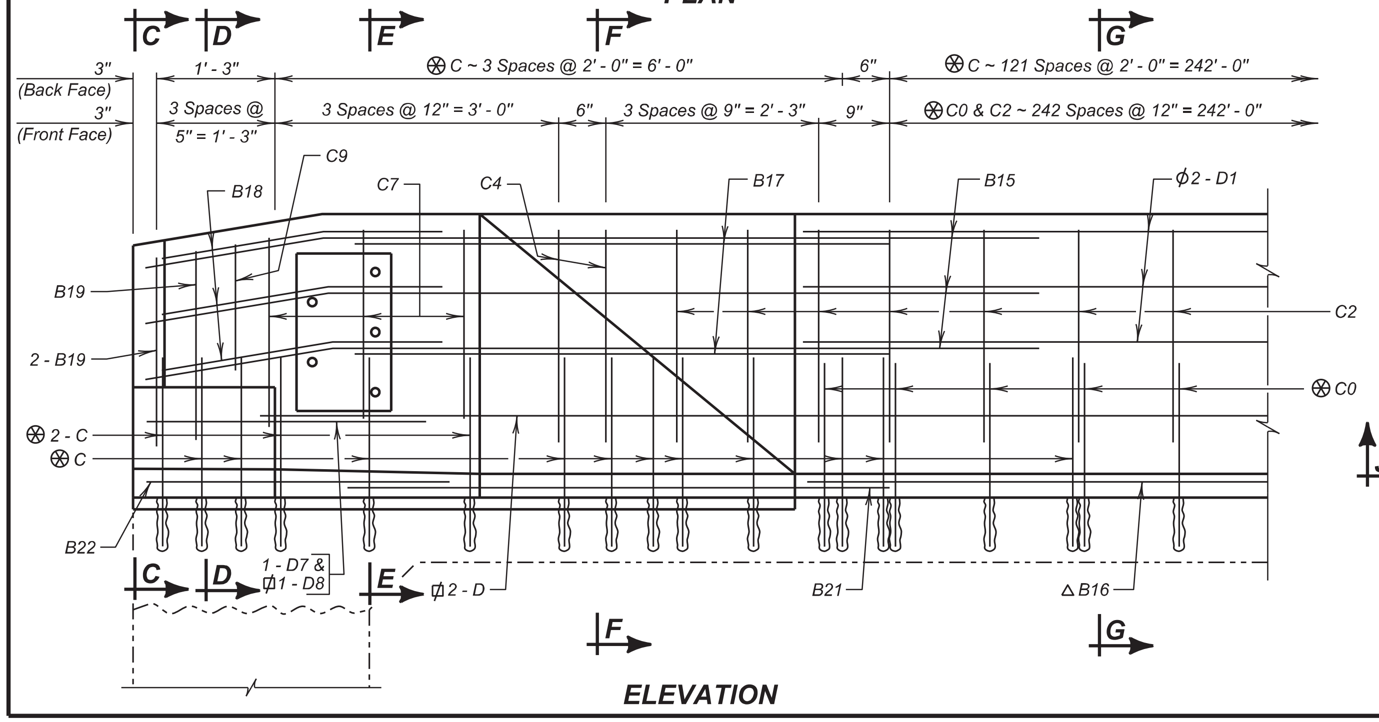
SECTION F - F



SECTION G - G

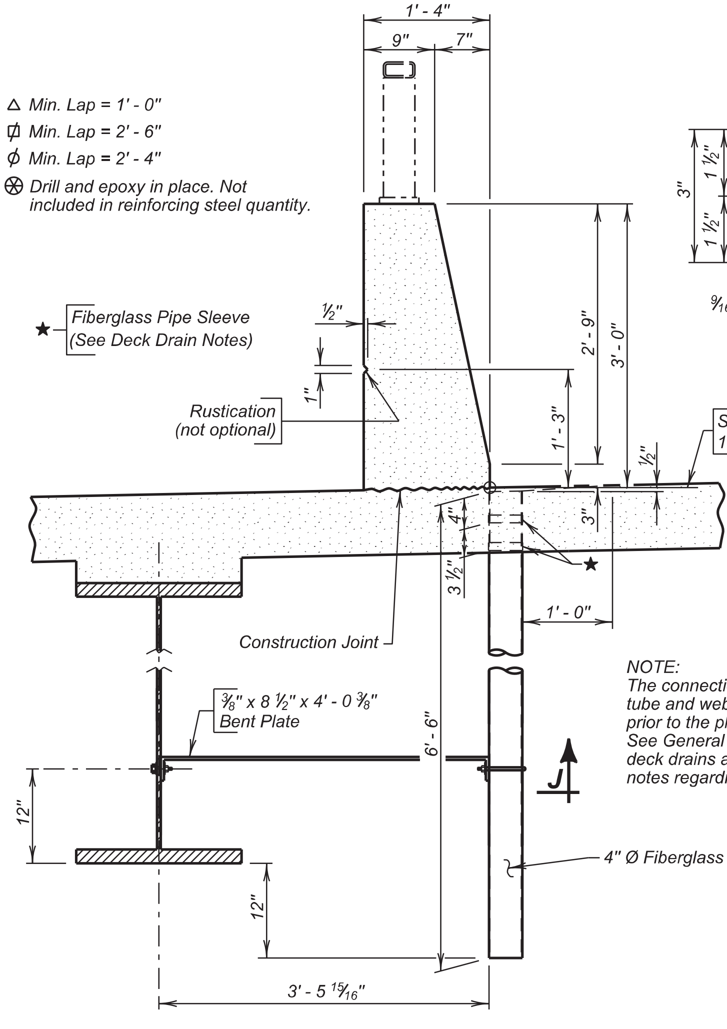


PLAN



ELEVATION

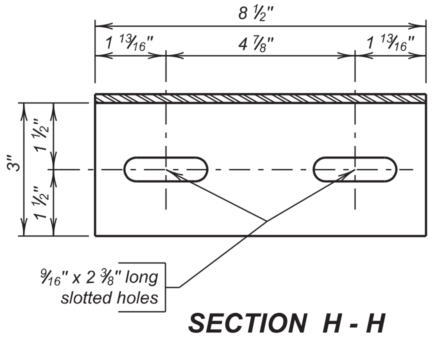
△ Min. Lap = 1' - 0"
∅ Min. Lap = 2' - 6"
ϕ Min. Lap = 2' - 4"
⊛ Drill and epoxy in place. Not included in reinforcing steel quantity.



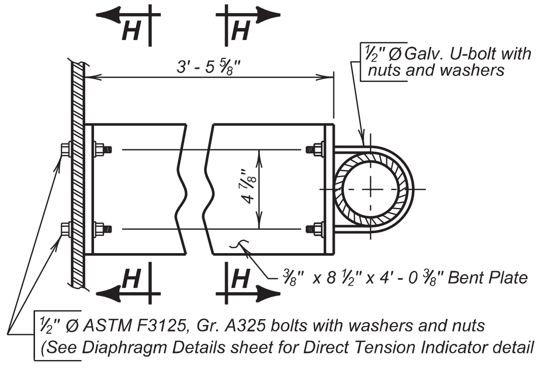
DRAIN AND BARRIER DETAILS

(Sta. 16 + 04.00, Sta. 16 + 23.00, and Sta. 18 + 30.00 - Left Side Only)

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



SECTION H - H



SECTION J - J

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

END BLOCK, BARRIER CURB & DECK DRAIN DETAILS
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
㉑ OF ㊸

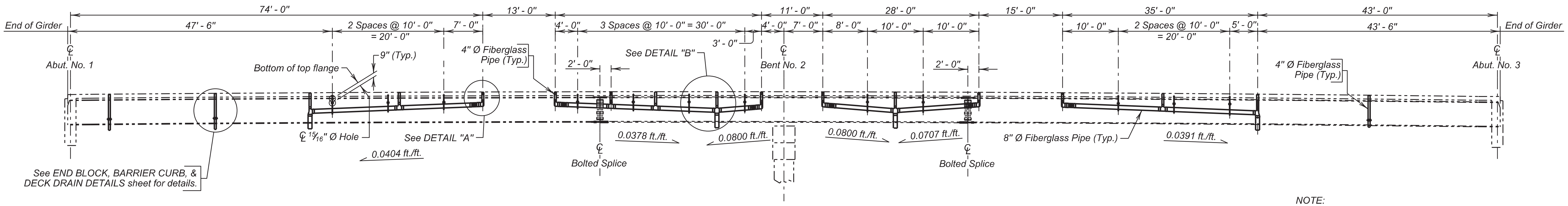
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AG	BB	BT	Steve A Johnson BRIDGE ENGINEER
MINN06G8	06G8TA21		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E24	E45

FOR BIDDING PURPOSES ONLY

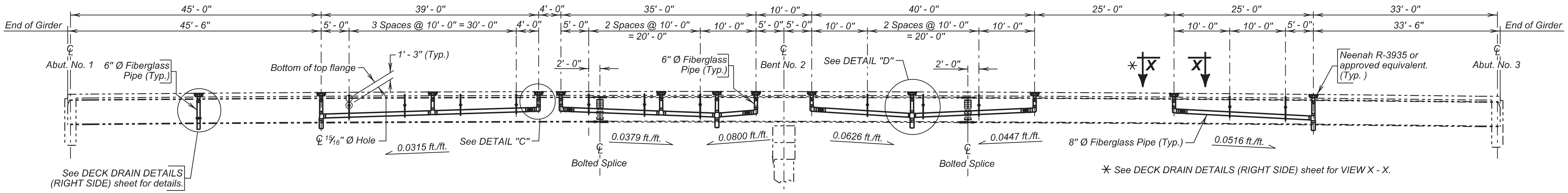
Revised October 24, 2024 BB

NOTE:
THE DECK DRAINS AND ASSOCIATED HARDWARE ARE NOT INCLUDED WITH THE ITEMS FURNISHED BY THE STATE.



ELEVATION
(Shown along ℄ Girder No. 1)

NOTE:
This sheet is to be used in conjunction with the DECK DRAIN DETAILS (RIGHT SIDE) sheet.

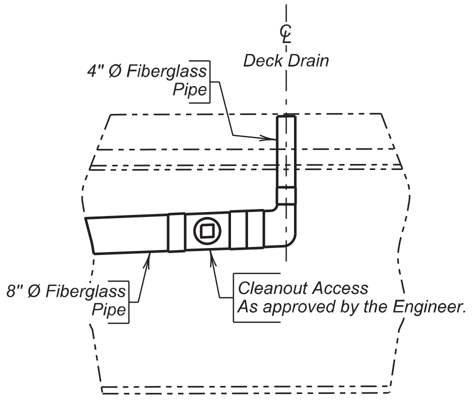


✳ See DECK DRAIN DETAILS (RIGHT SIDE) sheet for VIEW X - X.

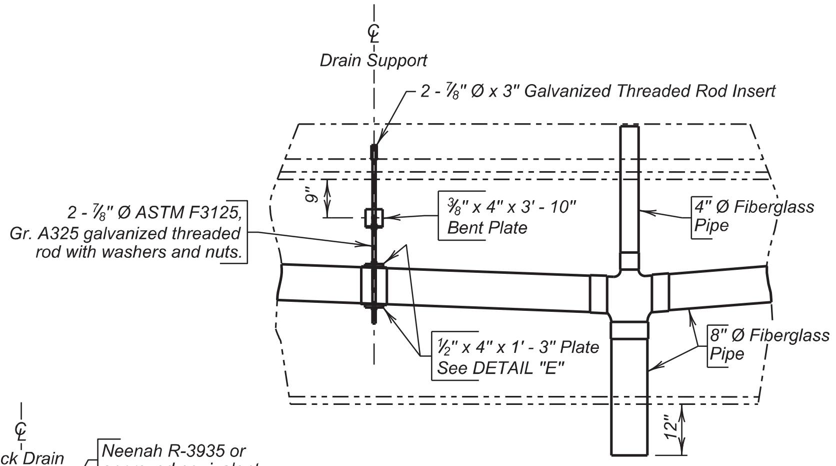
ELEVATION
(Shown along ℄ Girder No. 6)

NOTES

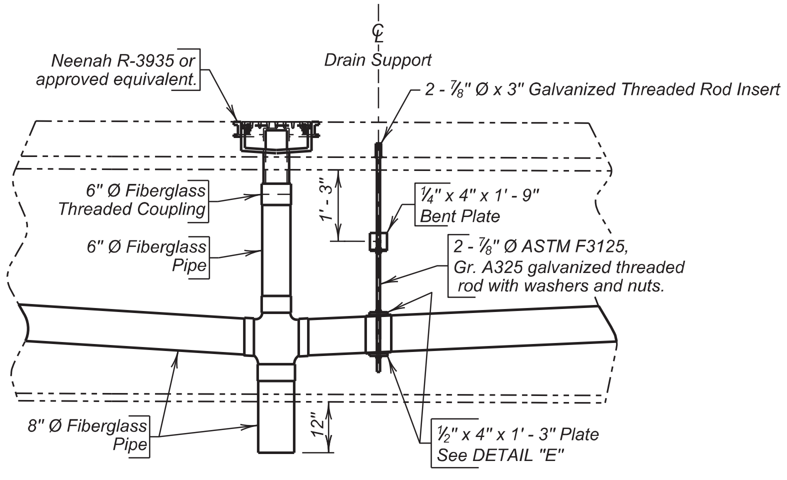
1. Deck drain will be Neenah R-3935 bridge drain scupper with bolted grate or an approved equivalent.
2. Fiberglass pipe and fittings will be reinforced thermosetting resin pipe (RTRP) systems meeting the requirements of ASTM D2996.
3. Fiberglass pipe and fittings will be handled and installed in accordance with the guidelines and procedures recommended by the manufacturer. Pipe, fittings, and adhesive must be from the same manufacturer.
4. The RTRP system will be pigmented to match the girder. The RTRP system will not be coated paint, gel-coat, or any other exterior coating.
5. All grates will be securely bolted to the scupper drain frame and in addition will be attached to scupper frames with a 3/16" proof coil chain of sufficient length to allow removal of clean out. Provide detail and length of chain in Shop Drawings.
6. The 3/8" Ø High Strength bolts, nuts, and washers will conform to ASTM F3125 Grade A325 Type 3. The bolts will be heavy hexagon head structural type with heavy semi-finished hexagon nut and hardened washer. See Section 410 of the Specifications for tightening procedure.
7. All steel will be ASTM A588.
8. Cut top transverse bars and longitudinal deck bars as required to provide 3" clear around the drain.
9. Adjust or field bend bottom transverse and longitudinal deck bars and Barrier steel as required to avoid contact with drain.
10. M5 bars to be placed with top mat of deck bars.



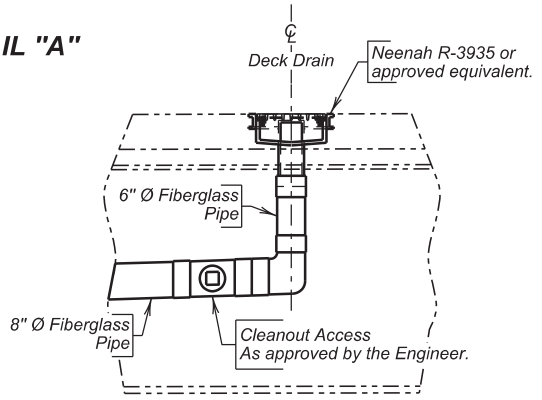
DETAIL "A"



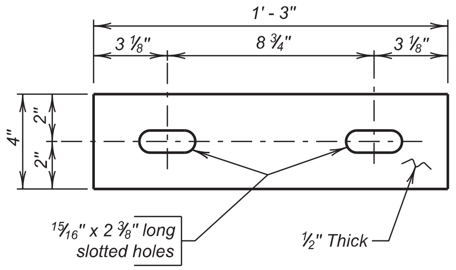
DETAIL "B"



DETAIL "D"



DETAIL "C"



DETAIL "E"

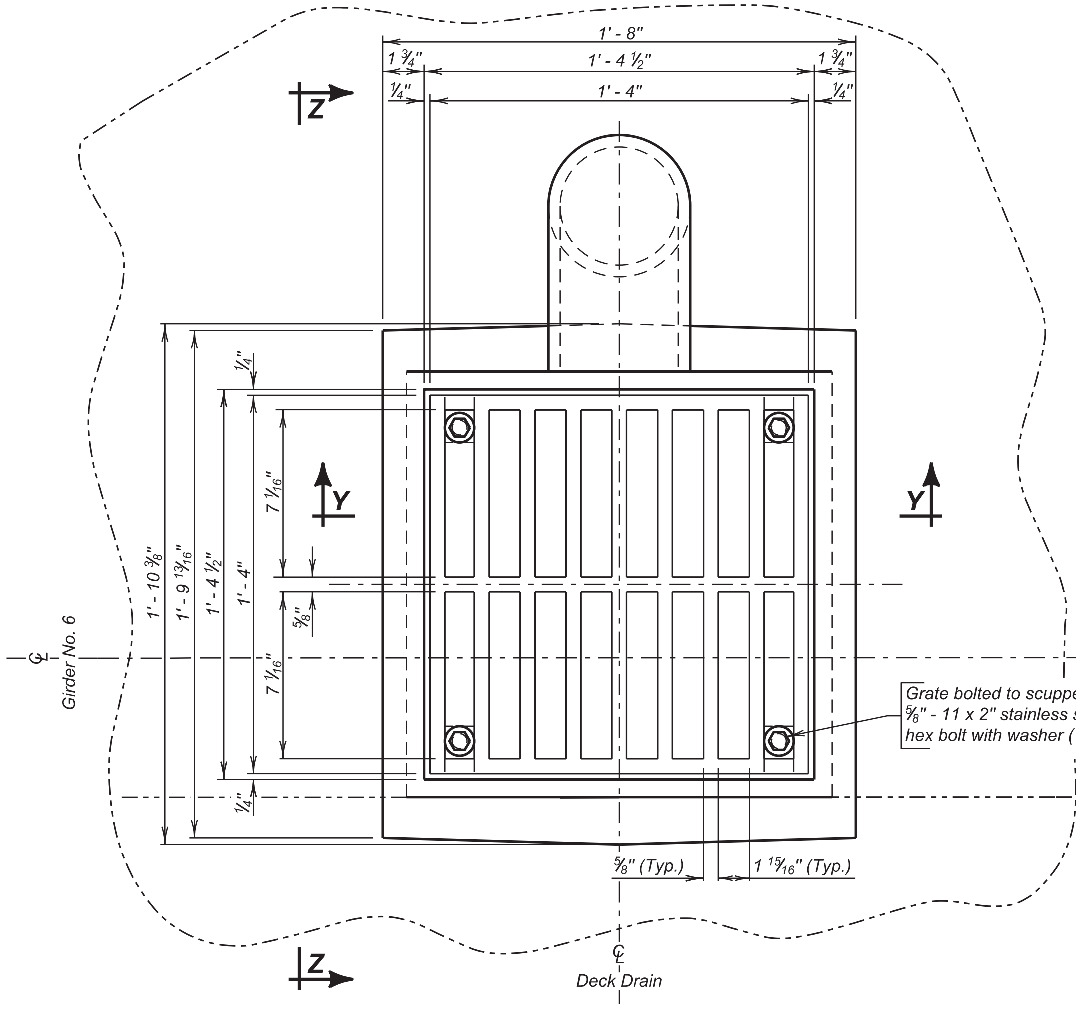
COLLECTION PIPE DETAILS
FOR
258' - 0" STEEL GIRDER BRIDGE

OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

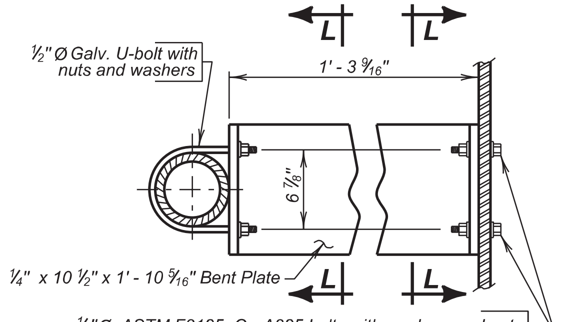
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
㉒ OF ㊸

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG	BT	Steve A Johnson
MINN06G8	06G8TA22		BRIDGE ENGINEER

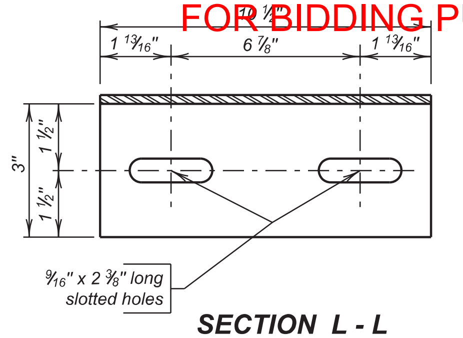
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E25	E45



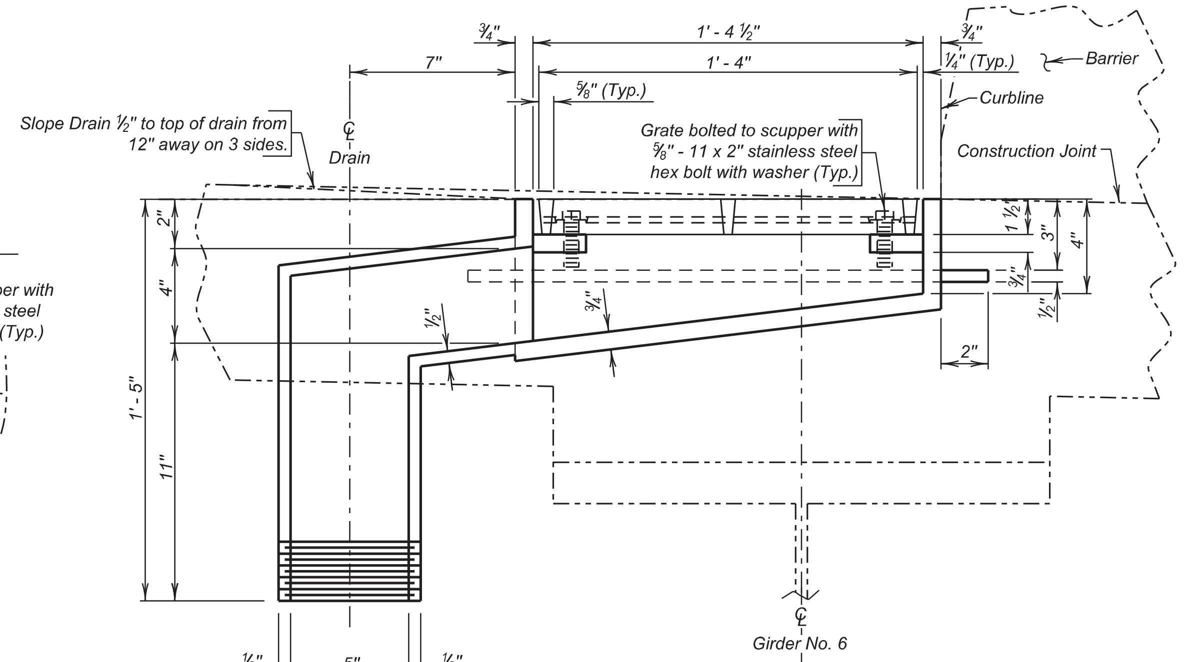
VIEW X - X
(Deck Drain Plan)



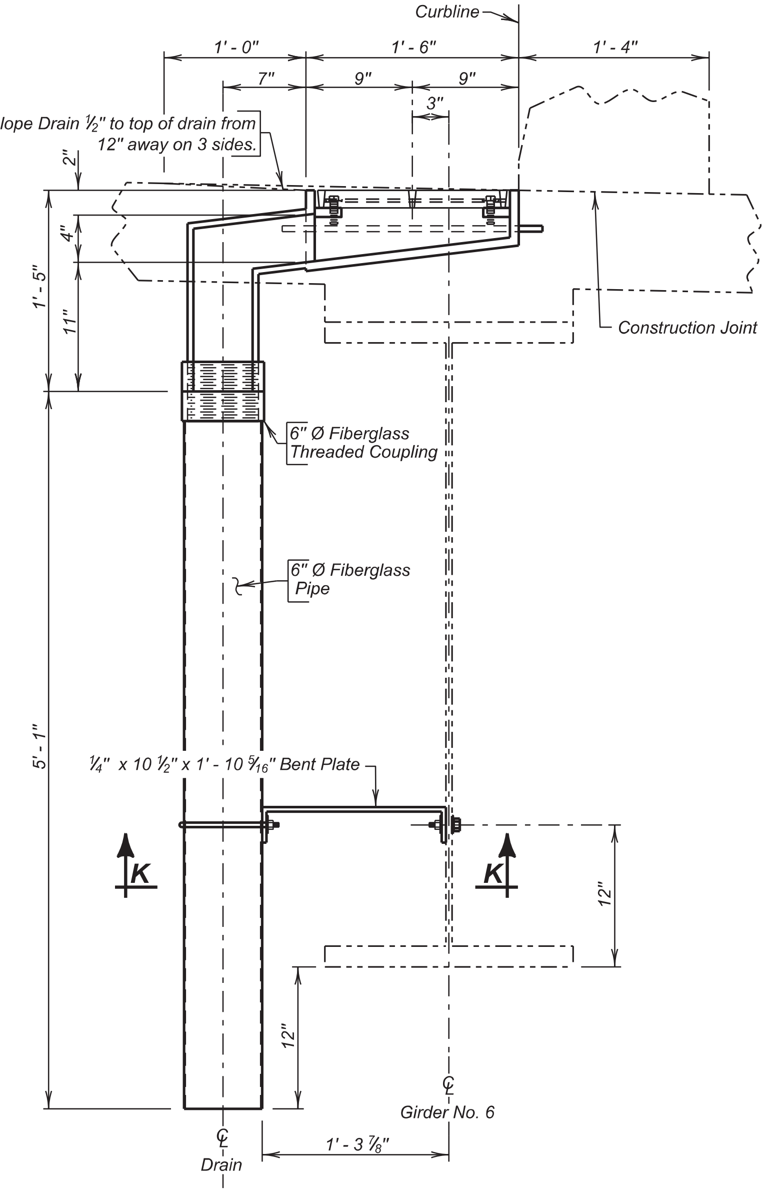
SECTION K - K



SECTION L - L

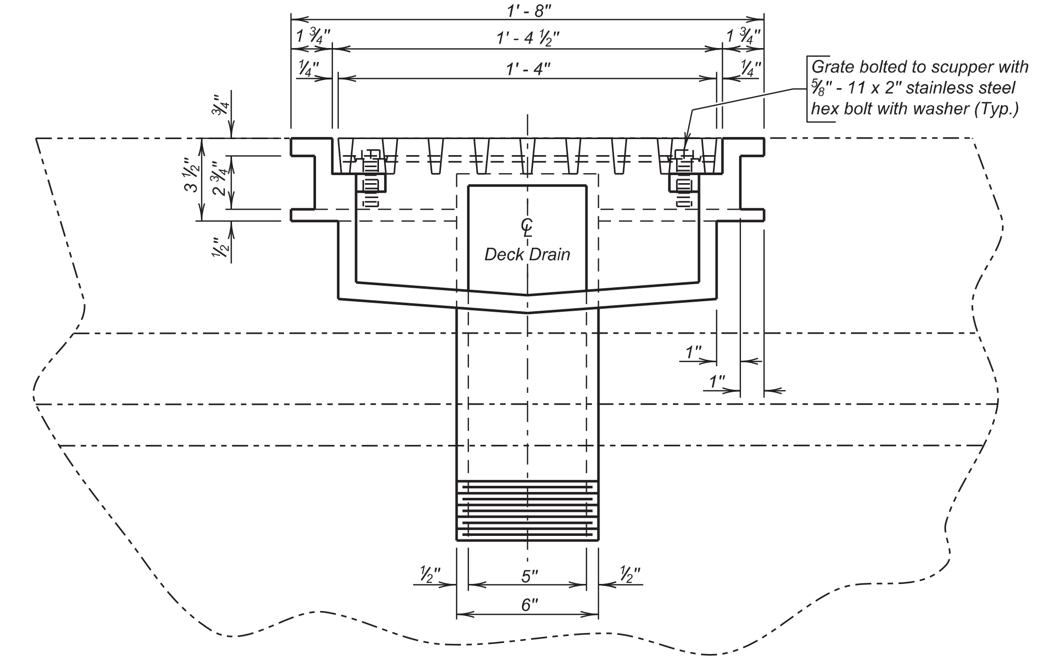


SECTION Z - Z

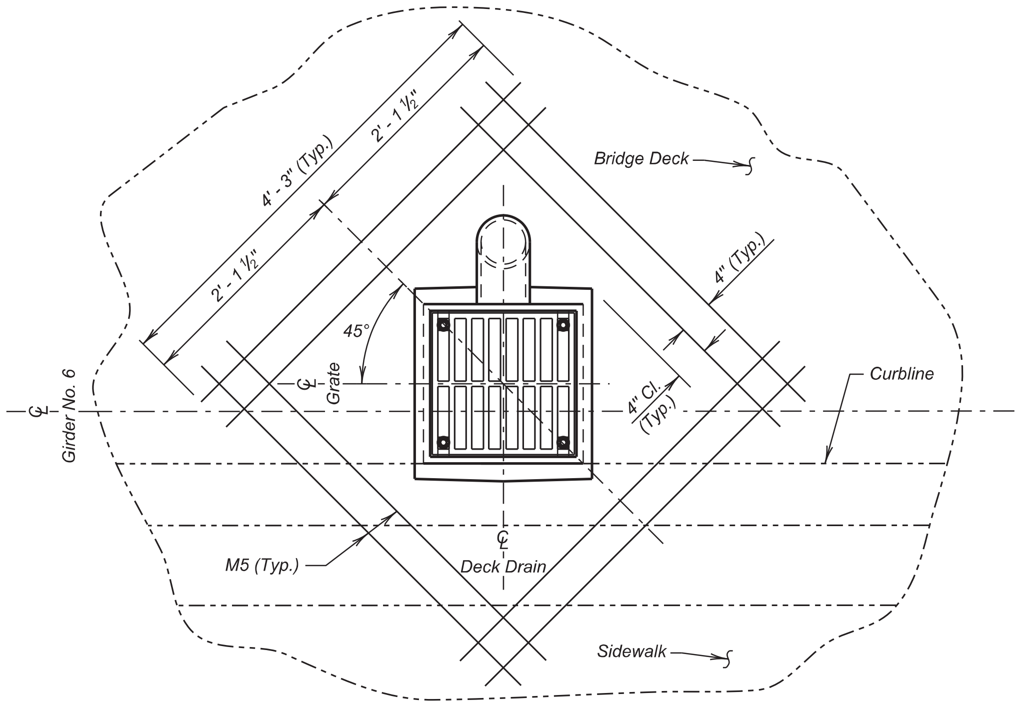


DRAIN AND BARRIER DETAILS
(Sta. 16 + 20.00 - Right Side Only)

NOTE:
THE DECK DRAINS AND ASSOCIATED HARDWARE ARE NOT INCLUDED WITH THE ITEMS FURNISHED BY THE STATE.



SECTION Y - Y
(Deck Drain Elevation)



DECK DRAIN REINFORCING DETAILS
(Place in Top Steel)

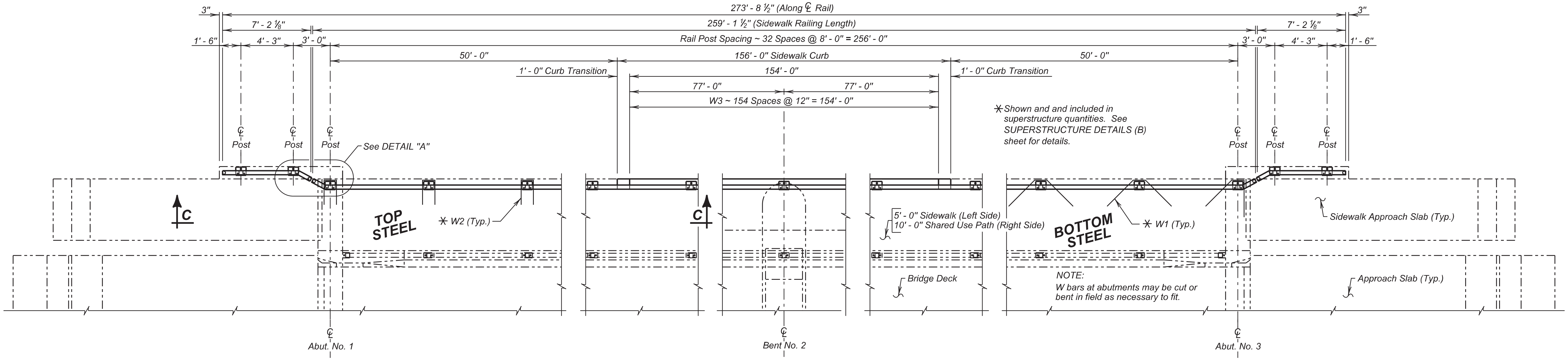
NOTE:
This sheet is to be used in conjunction with the COLLECTION PIPE DETAILS sheet.

DECK DRAIN DETAILS (RIGHT SIDE)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG	BT	Steve A Johnson
MINN06G8	06G8TA23		BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E26	E45

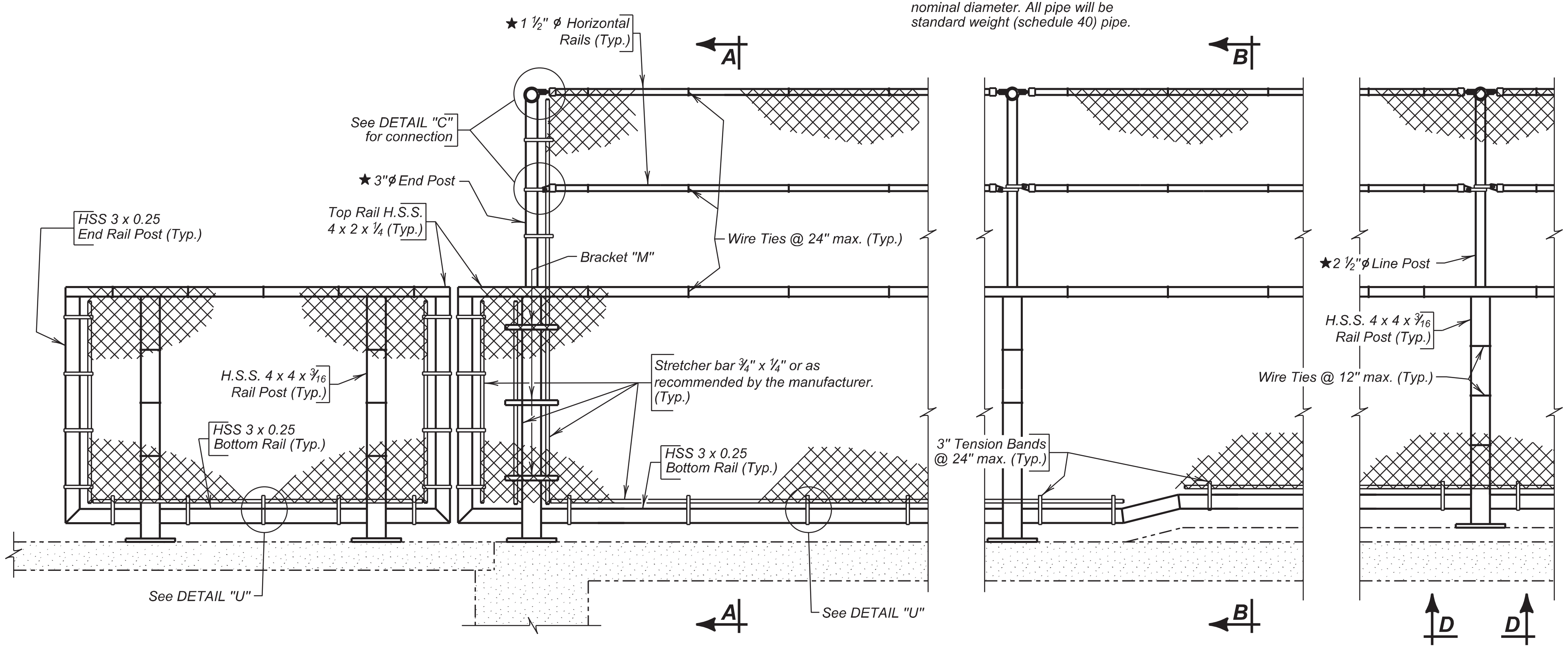


✱Shown and and included in superstructure quantities. See SUPERSTRUCTURE DETAILS (B) sheet for details.

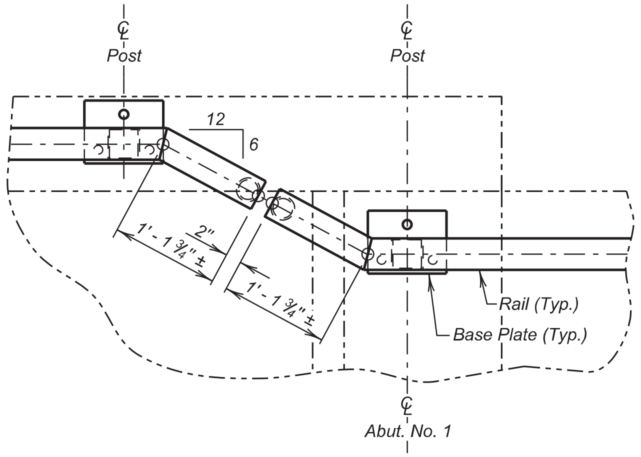
NOTE:
W bars at abutments may be cut or bent in field as necessary to fit.

PLAN

★NOTE:
Diameter of pipe shown is the nominal diameter. All pipe will be standard weight (schedule 40) pipe.



SECTION C - C



DETAIL "A"

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Steel Pedestrian Railing on Sidewalk	Ft.	547.5
Chain Link Fence for Bridge Sidewalk	Ft.	548

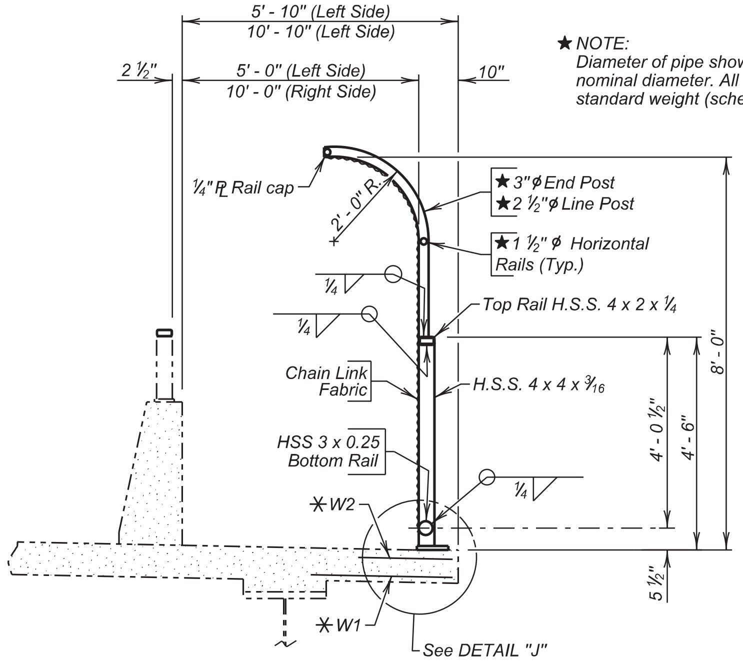
SIDEWALK RAILING WITH CHAINLINK FENCE DETAILS (A)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
㉔ OF ㊸

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG	BT	Steve A Johnson
MINN06G8	06G8TA24		BRIDGE ENGINEER

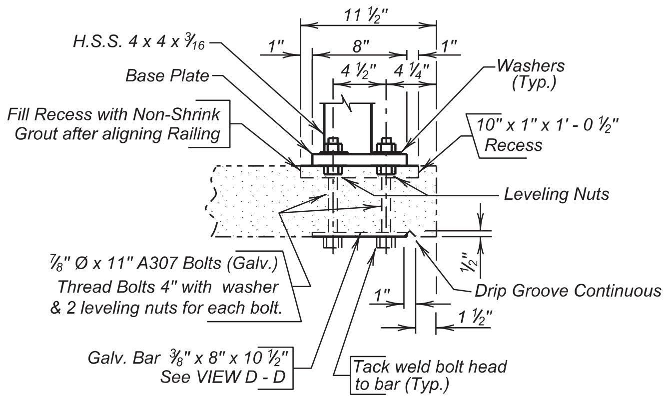
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E27	E45

FOR BIDDING PURPOSES ONLY

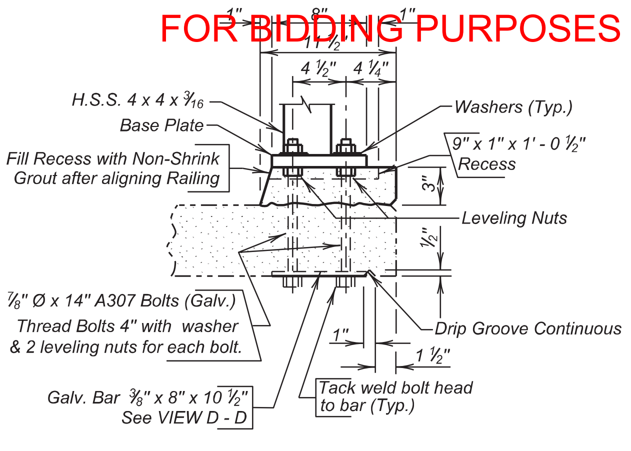
★ NOTE:
Diameter of pipe shown is the nominal diameter. All pipe shall be standard weight (schedule 40) pipe.



SECTION A - A



DETAIL "J"



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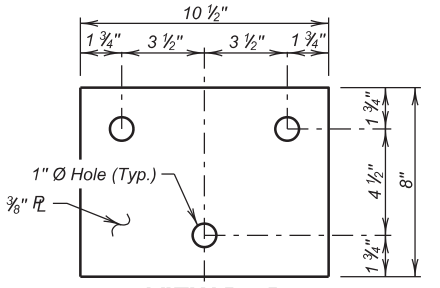
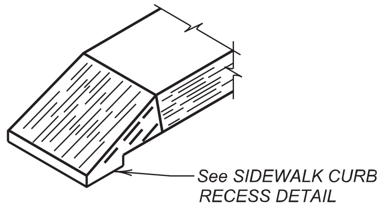
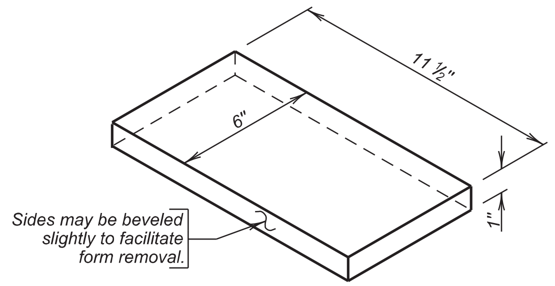


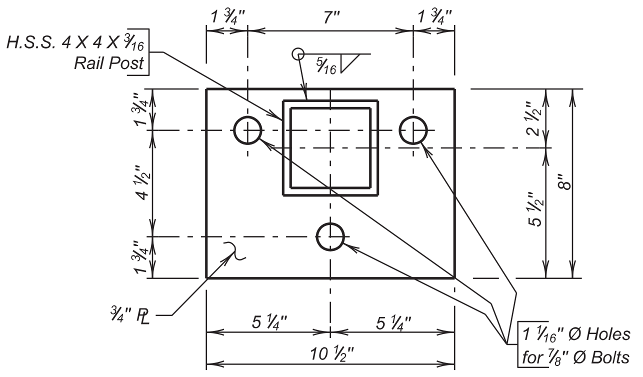
VIEW D - D



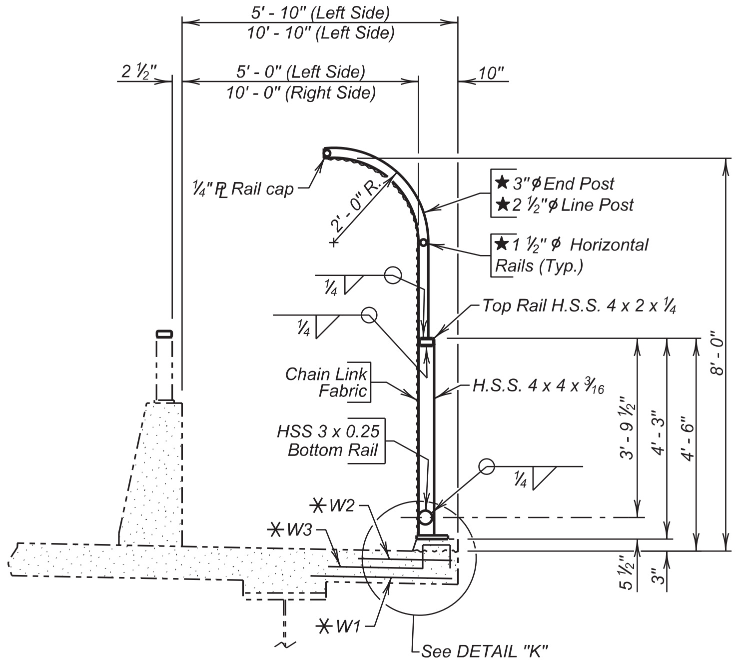
CURB TRANSITION ISOMETRIC VIEW



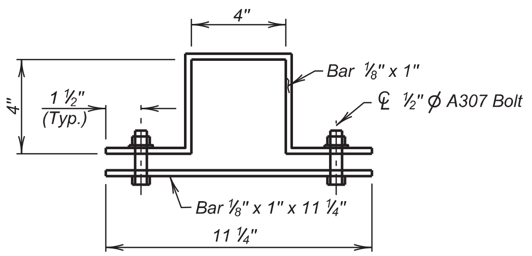
SIDEWALK CURB RECESS DETAIL



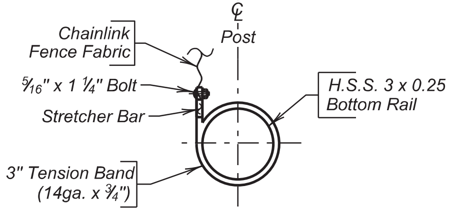
BASE PLATE DETAIL



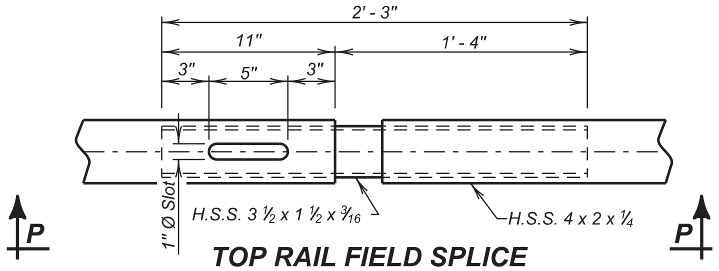
SECTION B - B



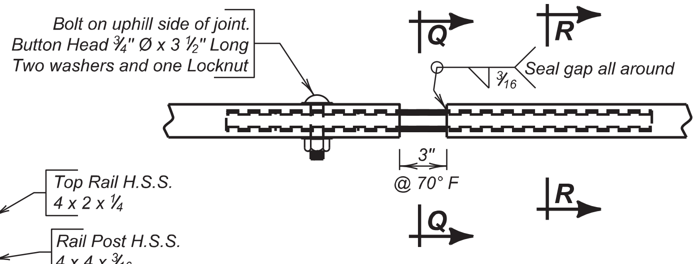
BRACKET "M"



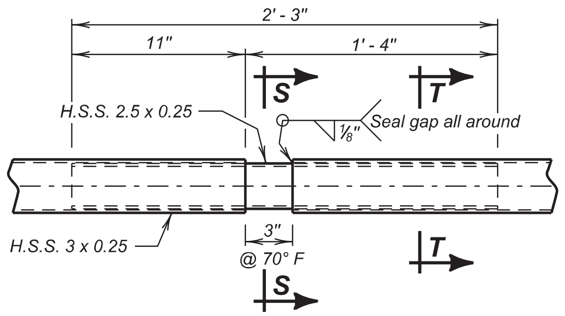
DETAIL "U"



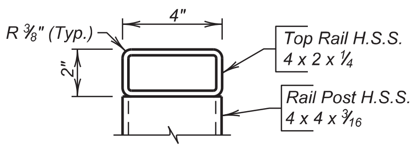
TOP RAIL FIELD SPLICE



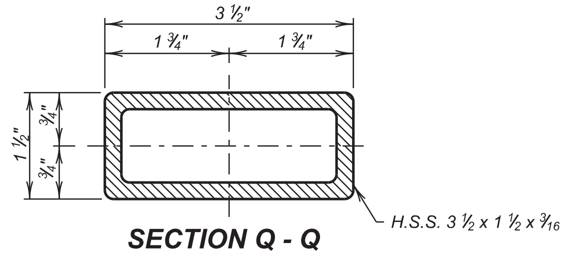
VIEW P - P



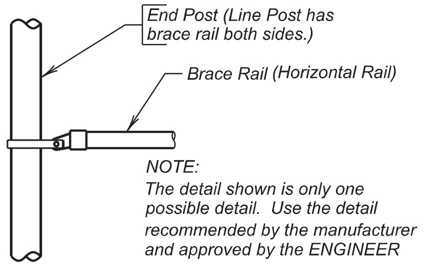
BOTTOM RAIL FIELD SPLICE



VIEW G - G

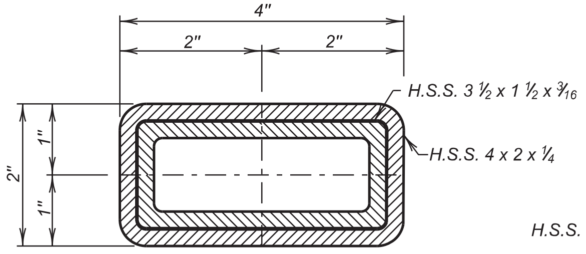


SECTION Q - Q

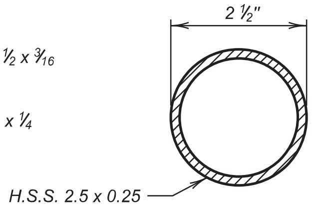


NOTE:
The detail shown is only one possible detail. Use the detail recommended by the manufacturer and approved by the ENGINEER

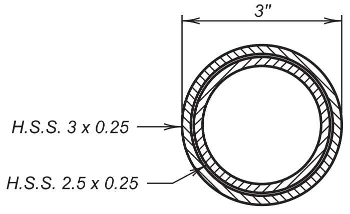
DETAIL "C"



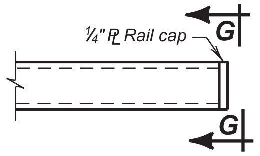
SECTION R - R



SECTION S - S



SECTION T - T



RAIL END CAP DETAIL

SIDEWALK RAILING WITH CHAINLINK FENCE DETAILS (B)

FOR

258' - 0" STEEL GIRDER BRIDGE

OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

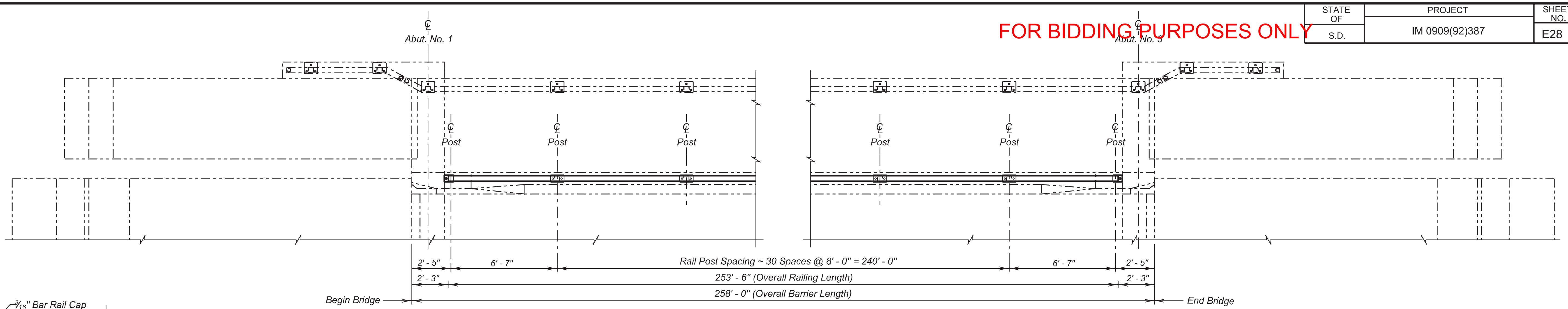
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

(25) OF (43)

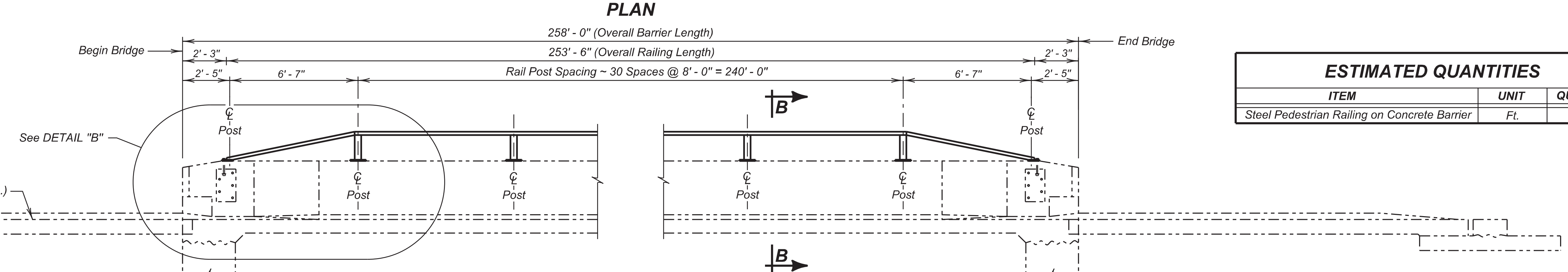
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG	BT	Steve A Johnson
MINN06G8	06G8TA25		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E28	E45

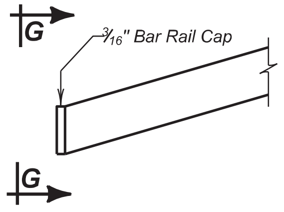
FOR BIDDING PURPOSES ONLY



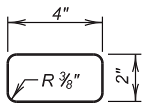
PLAN



ELEVATION

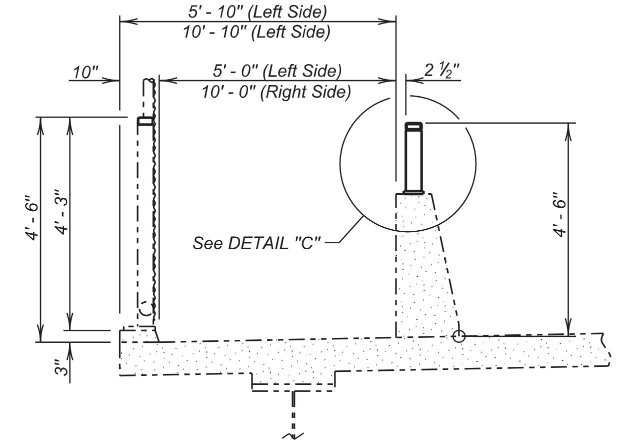


RAIL END CAP DETAIL

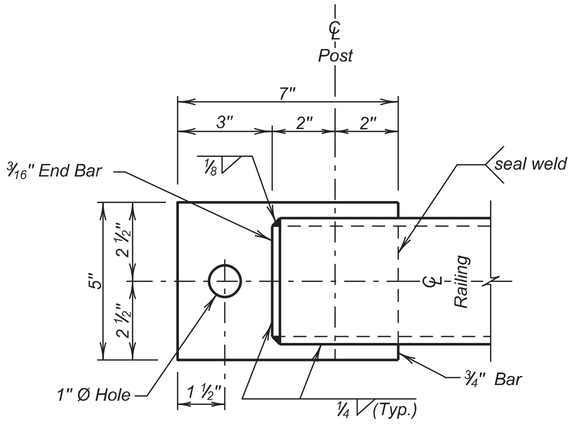


VIEW G - G

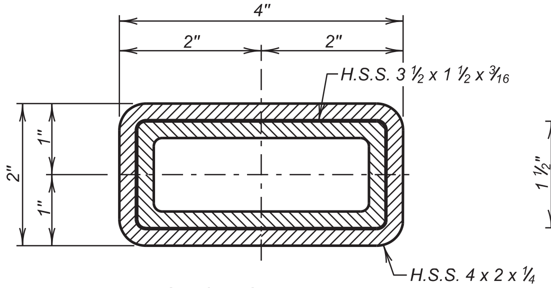
ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Steel Pedestrian Railing on Concrete Barrier	Ft.	507.0



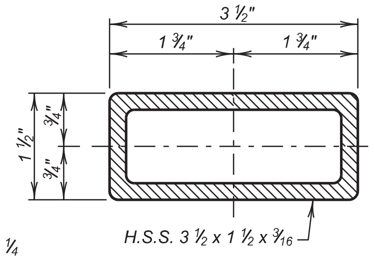
SECTION B - B



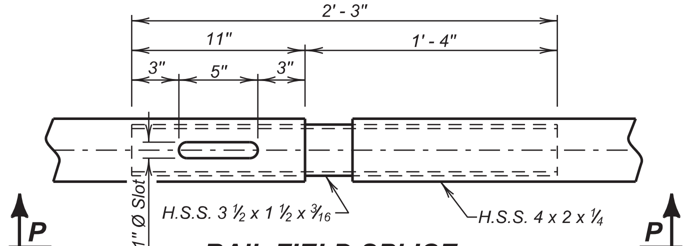
VIEW E - E



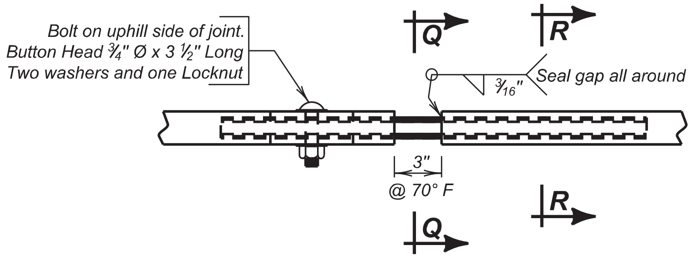
SECTION R - R



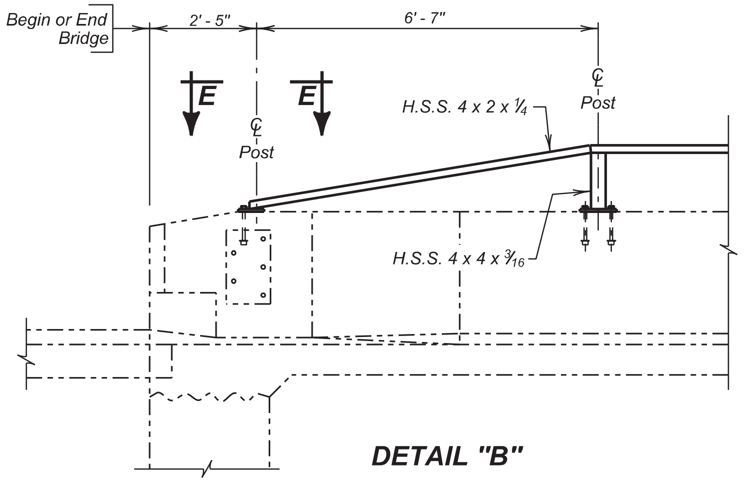
SECTION Q - Q



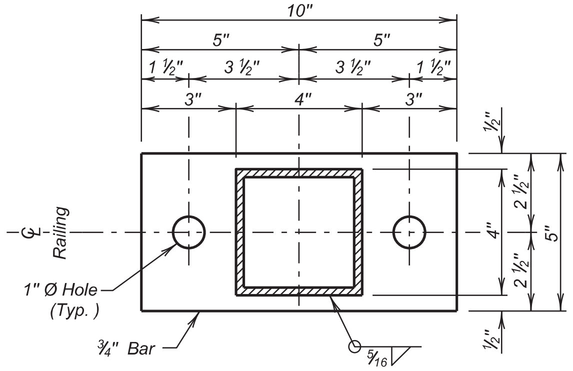
RAIL FIELD SPLICE



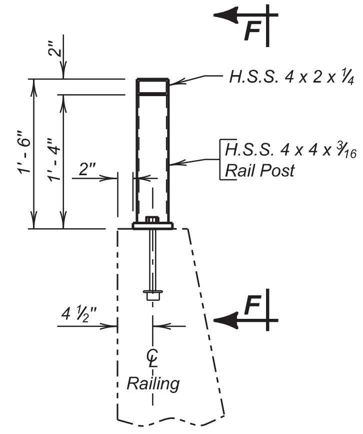
VIEW P - P



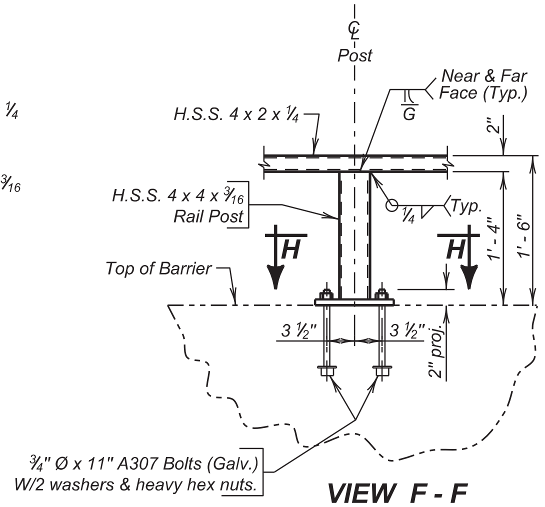
DETAIL "B"



VIEW H - H



DETAIL "C"



VIEW F - F

BARRIER CURB RAILING DETAILS

FOR

258' - 0" STEEL GIRDER BRIDGE

OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

㉖ OF ㊸

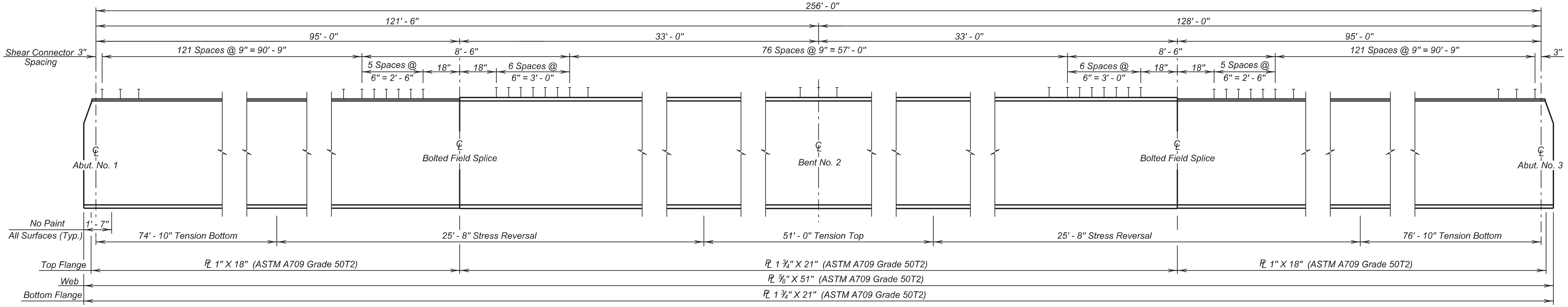
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG	BT	Steve A Johnson
MINN06G8	06G8TA26		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E29	E45

FOR BIDDING PURPOSES ONLY

Revised October 24, 2024 BB

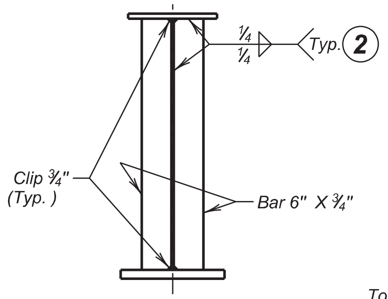
NOTE:
GIRDERS WILL BE FURNISHED BY THE STATE. USE THIS SHEET FOR SHEAR STUD CONNECTOR LOCATIONS.



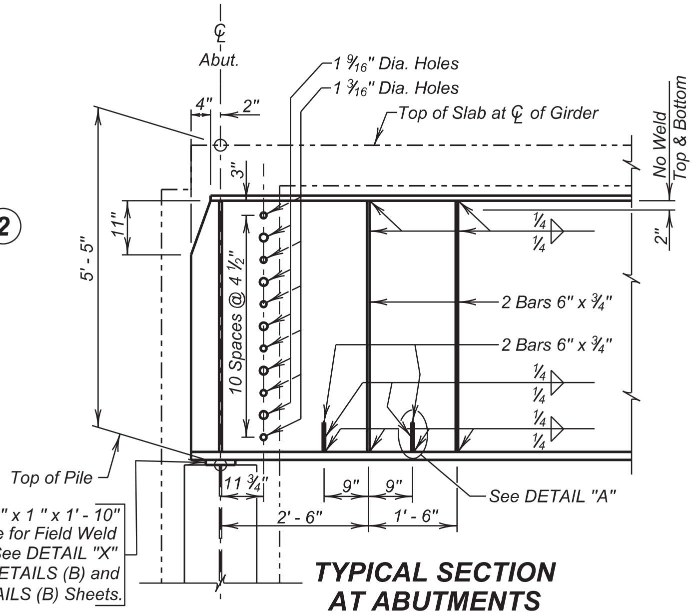
GIRDER LAYOUT

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.

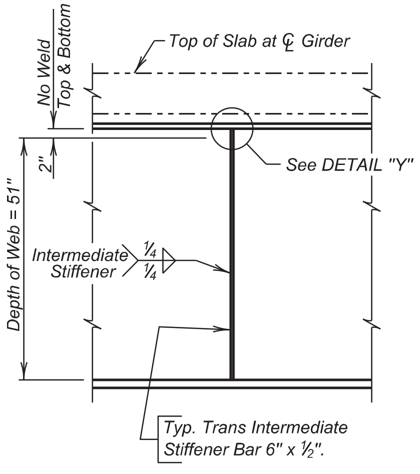
① NOTE: All fillet welds attaching diaphragm or bearing stiffeners to girder flanges, will terminate ½" from edge of stiffener, edge of flange, or clip as appropriate. Weld size to be as indicated in the table of Flange to Web Welds.



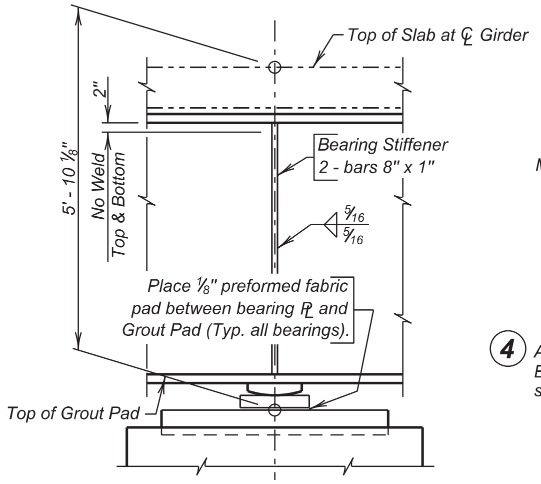
END VIEW



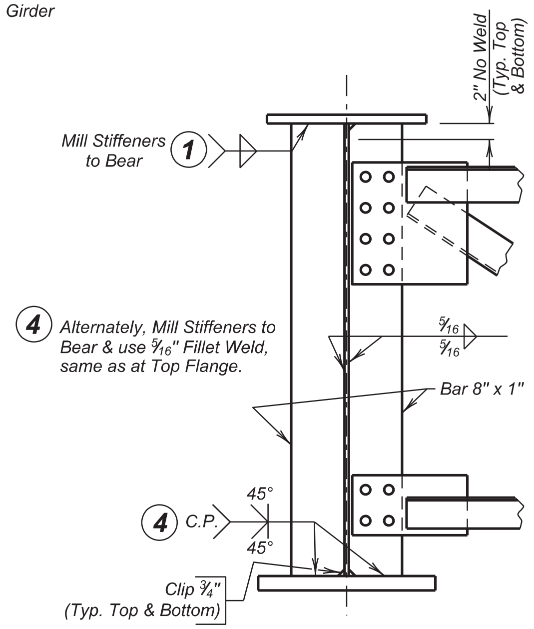
TYPICAL SECTION AT ABUTMENTS



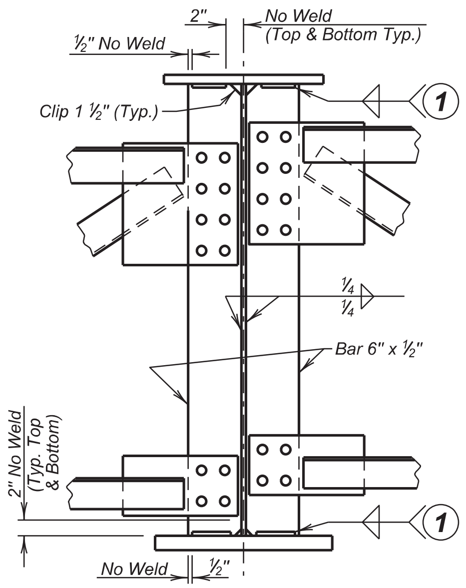
TYPICAL SECTION AT INTERMEDIATE STIFFENER



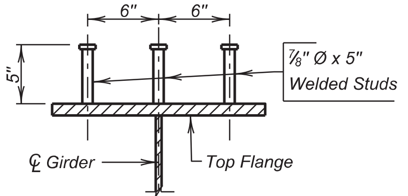
TYPICAL SECTION AT BENT
(Diaphragm not shown)



DETAILS OF STIFFENERS AT ℄ BENT
(Exterior Girder shown)



DETAILS OF STIFFENERS AT INTERMEDIATE DIAPHRAGMS
(Interior Girder shown)

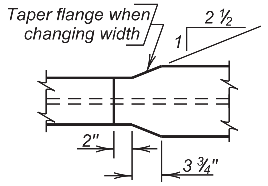


SHEAR CONNECTOR DETAILS

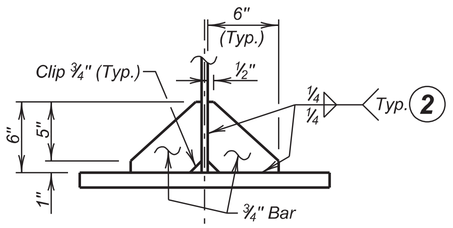
Welded Stud Shear Connectors are spaced as shown on Girder Layout. Payment for Shear Connectors will be included in the Lump Sum bid for Structural Steel, Install. 1029 Shear Connectors per Girder.

FLANGE TO WEB WELDS

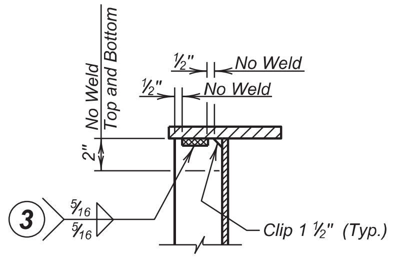
Flange Thickness	Fillet Welds
1"	5⁄16"
1 ¾"	5⁄16"



PLAN
(Typical Section at Bolted Splice)



DETAIL "A"



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.

NOTES:

1. See DIAPHRAGM DETAILS Sheet for Diaphragm Details.
2. See FRAMING DIAGRAM, CAMBER, AND ERECTION DATA Sheet for spacing of Diaphragms, Stiffeners, and Girder Camber.
3. All dimensions shown are horizontal or vertical.
4. All Stiffeners and Girder Ends shall be made normal to flanges, except bearing stiffeners at 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
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023 ㉗ OF ㊸

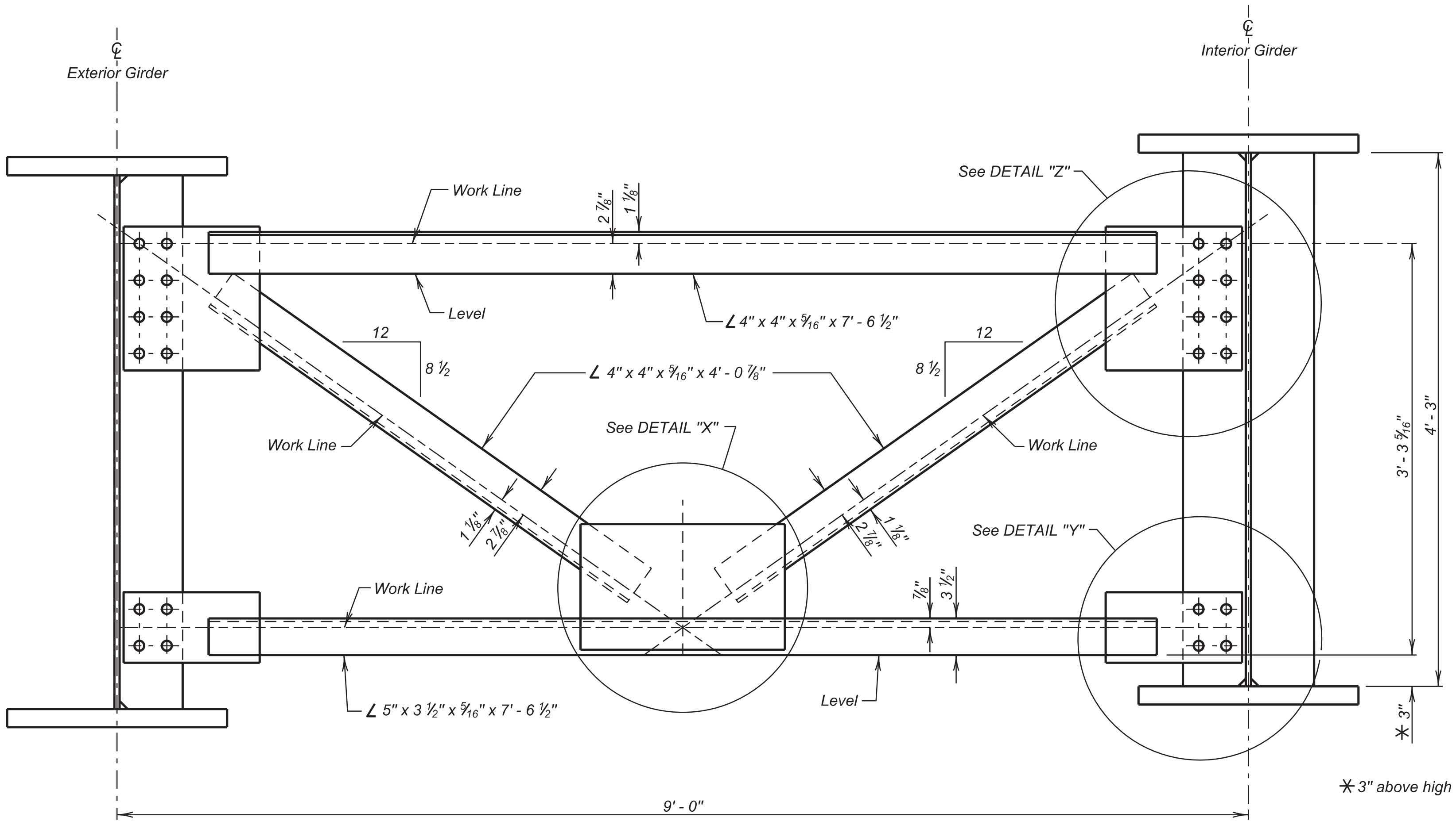
DESIGNED BY	CK. DES. BY	DRAFTED BY	
AG MINN06G8	BB 06G8TA27	BT	Steve A Johnson BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

Revised October 24, 2024 BB

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E30	E45

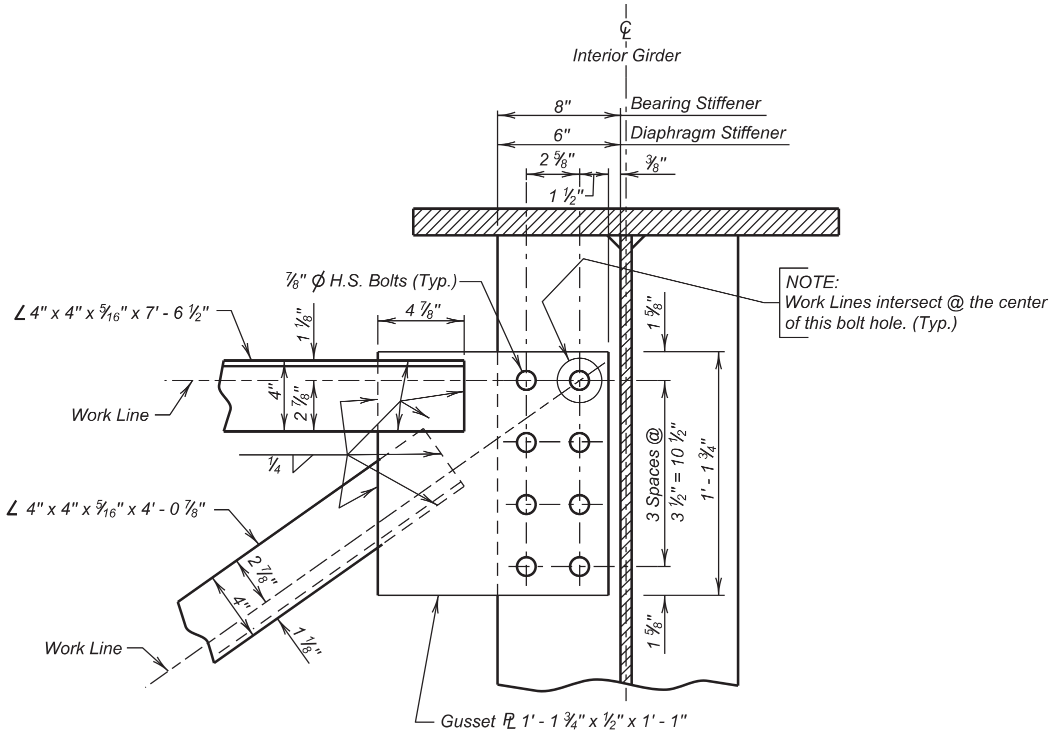
NOTE:
DIAPHRAGMS AND ASSOCIATED HARDWARE WILL BE FURNISHED BY THE STATE.



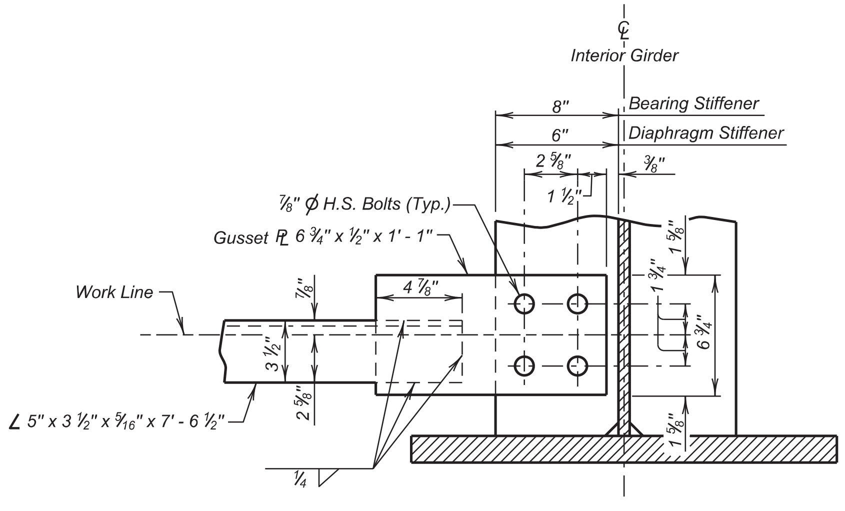
✱ 3" above high girder in each bay.

DIAPHRAGM DETAIL

(Weight of One Unit = 353 lbs.)



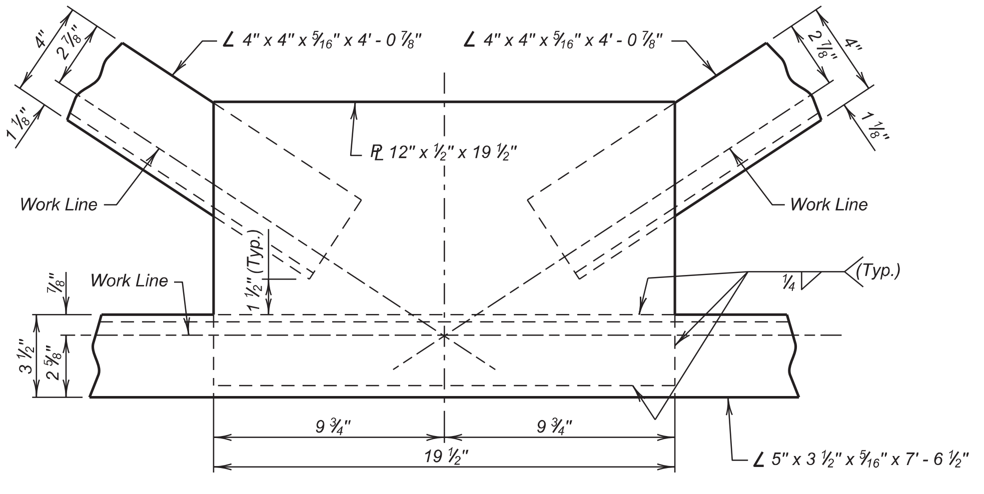
DETAIL "Z"



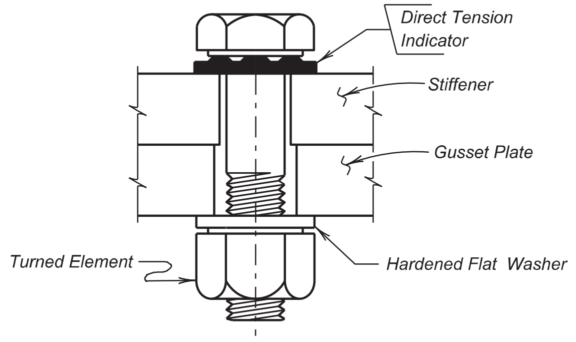
DETAIL "Y"

GENERAL NOTES

1. The Steel Diaphragms are included in the quantity for Structural Steel, Install.
2. Use 1 1/16"⌀ bolt holes in the ½" gusset plates. Use 15/16" ⌀ bolt holes in the stiffener plates.
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.



DETAIL "X"



DIRECT TENSION INDICATOR DETAIL

DIAPHRAGM DETAILS

FOR

258' - 0" STEEL GIRDER BRIDGE

OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

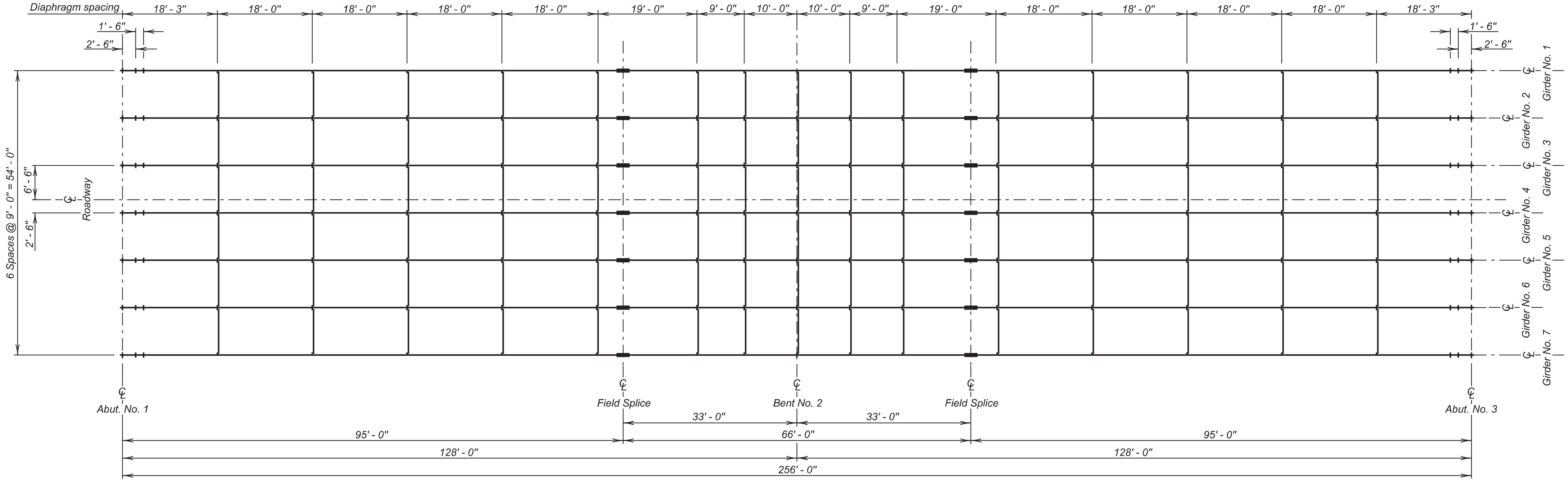
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB MINN06G8	AG 06G8TA28	BT	Steve A Johnson BRIDGE ENGINEER

NOTE:
GIRDERS AND ASSOCIATED HARDWARE
WILL BE FURNISHED BY THE STATE.

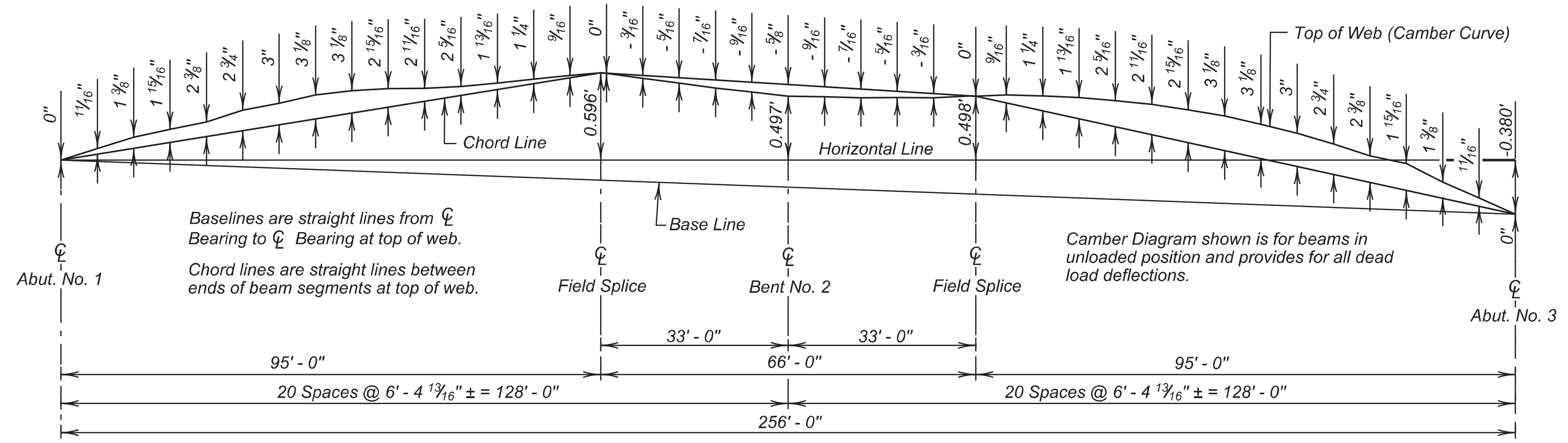
FOR BIDDING PURPOSES ONLY

Revised October 24, 2024 BB

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E31	E45



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

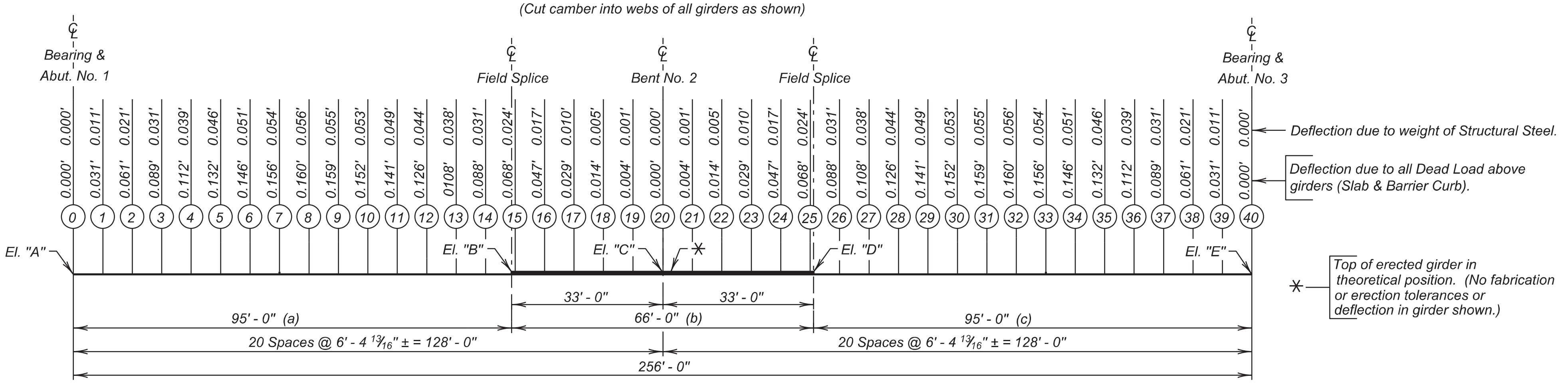
(Cut camber into webs of all girders as shown)

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"	a	b	c
1	1631.196	1631.493	1631.756	1631.395	1630.816	0.313	-0.148	-0.610
2	1631.376	1631.673	1631.936	1631.575	1630.996	0.313	-0.148	-0.610
3	1631.556	1631.853	1632.116	1631.755	1631.176	0.313	-0.148	-0.610
4	1631.636	1631.993	1632.196	1632.835	1631.256	0.313	-0.148	-0.610
5	1631.445	1631.743	1632.016	1631.686	1631.066	0.313	-0.148	-0.610
6	1631.276	1631.573	1631.836	1631.475	1630.896	0.313	-0.148	-0.610
7	1631.096	1631.393	1631.656	1631.295	1630.716	0.313	-0.148	-0.610

NOTE :
This sheet is to be used in conjunction with SLAB FORM ELEVATIONS sheet.



✳ Top of erected girder in theoretical position. (No fabrication or erection tolerances or deflection in girder shown.)

GIRDER ERECTION DIAGRAM

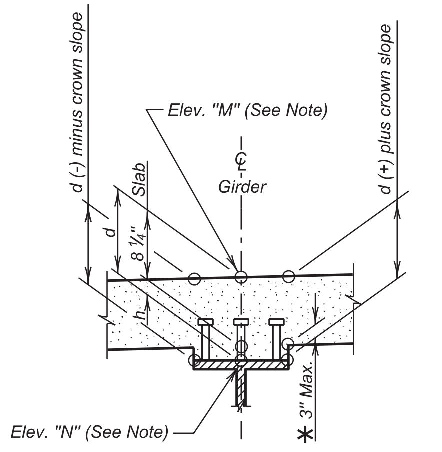
FRAMING DIAGRAM, CAMBER, & ERECTION DATA
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023 ㉙ OF (43)

DESIGNED BY	CK. DES. BY	DRAFTED BY	Steve A Johnson
AG	BB	BT	BRIDGE ENGINEER
MINN06G8	06G8TA29		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E32	E45

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"	1632.050	1632.139	1632.223	1632.301	1632.372	1632.435	1632.490	1632.536	1632.574	1632.602	1632.622	1632.635	1632.639	1632.638	1632.631	1632.619	1632.605	1632.589	1632.573	1632.559	1632.547
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 2	Elev. "M"	1632.230	1632.319	1632.403	1632.481	1632.552	1632.615	1632.670	1632.716	1632.754	1632.782	1632.802	1632.815	1632.819	1632.818	1632.811	1632.799	1632.785	1632.769	1632.753	1632.739	1632.727
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 3	Elev. "M"	1632.410	1632.499	1632.583	1632.661	1632.732	1632.795	1632.850	1632.896	1632.934	1632.962	1632.982	1632.995	1632.999	1632.998	1632.991	1632.979	1632.965	1632.949	1632.933	1632.919	1632.907
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 4	Elev. "M"	1632.490	1632.579	1632.663	1632.741	1632.812	1632.875	1632.930	1632.976	1633.014	1633.042	1633.062	1633.075	1633.079	1633.078	1633.071	1633.059	1633.045	1633.029	1633.013	1632.999	1632.987
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 5	Elev. "M"	1632.310	1632.399	1632.483	1632.561	1632.632	1632.695	1632.750	1632.796	1632.834	1632.862	1632.882	1632.895	1632.899	1632.898	1632.891	1632.879	1632.865	1632.849	1632.833	1632.819	1632.807
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 6	Elev. "M"	1632.130	1632.219	1632.303	1632.381	1632.452	1632.515	1632.570	1632.616	1632.654	1632.682	1632.702	1632.715	1632.719	1632.718	1632.711	1632.699	1632.685	1632.669	1632.653	1632.639	1632.627
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688																					
	(=) h																					
Girder No. 7	Elev. "M"	1631.950	1632.039	1632.123	1632.201	1632.272	1632.335	1632.390	1632.436	1632.474	1632.502	1632.522	1632.535	1632.539	1632.538	1632.531	1632.519	1632.505	1632.489	1632.473	1632.459	1632.447
	(-) 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.

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"	1632.540	1632.535	1632.532	1632.529	1632.524	1632.517	1632.505	1632.488	1632.464	1632.433	1632.393	1632.346	1632.289	1632.224	1632.150	1632.068	1631.978	1631.881	1631.778	1631.670
	(-) Elev. "N"																				
	(=) d																				
	(-) 0.688																				
	(=) h																				
Girder No. 2	Elev. "M"	1632.720	1632.715	1632.712	1632.709	1632.704	1632.697	1632.685	1632.668	1632.644	1632.613	1632.573	1632.526	1632.469	1632.404	1632.330	1632.248	1632.158	1632.061	1631.958	1631.850
	(-) Elev. "N"																				
	(=) d																				
	(-) 0.688																				
	(=) h																				
Girder No. 3	Elev. "M"	1632.900	1632.895	1632.892	1632.889	1632.884	1632.877	1632.865	1632.848	1632.824	1632.793	1632.753	1632.706	1632.649	1632.584	1632.510	1632.428	1632.338	1632.241	1632.138	1632.030
	(-) Elev. "N"																				
	(=) d																				
	(-) 0.688																				
	(=) h																				
Girder No. 4	Elev. "M"	1632.980	1632.975	1632.972	1632.969	1632.964	1632.957	1632.945	1632.928	1632.904	1632.873	1632.833	1632.786	1632.729	1632.664	1632.590	1632.508	1632.418	1632.321	1632.218	1632.110
	(-) Elev. "N"																				
	(=) d																				
	(-) 0.688																				
	(=) h																				
Girder No. 5	Elev. "M"	1632.800	1632.795	1632.792	1632.789	1632.784	1632.777	1632.765	1632.748	1632.724	1632.693	1632.653	1632.606	1632.549	1632.484	1632.410	1632.328	1632.238	1632.141	1632.038	1631.930
	(-) Elev. "N"																				
	(=) d																				
	(-) 0.688																				
	(=) h																				
Girder No. 6	Elev. "M"	1632.620	1632.615	1632.612	1632.609	1632.604	1632.597	1632.585	1632.568	1632.544	1632.513	1632.473	1632.426	1632.369	1632.304	1632.230	1632.148	1632.058	1631.961	1631.858	1631.750
	(-) Elev. "N"																				
	(=) d																				
	(-) 0.688																				
	(=) h																				
Girder No. 7	Elev. "M"	1632.440	1632.435	1632.432	1632.429	1632.424	1632.417	1632.405	1632.388	1632.364	1632.333	1632.293	1632.246	1632.189	1632.124	1632.050	1631.968	1631.878	1631.781	1631.678	1631.570
	(-) Elev. "N"																				
	(=) d																				
	(-) 0.688																				
	(=) h																				

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.

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

SLAB FORM ELEVATIONS
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

(30) OF (43)

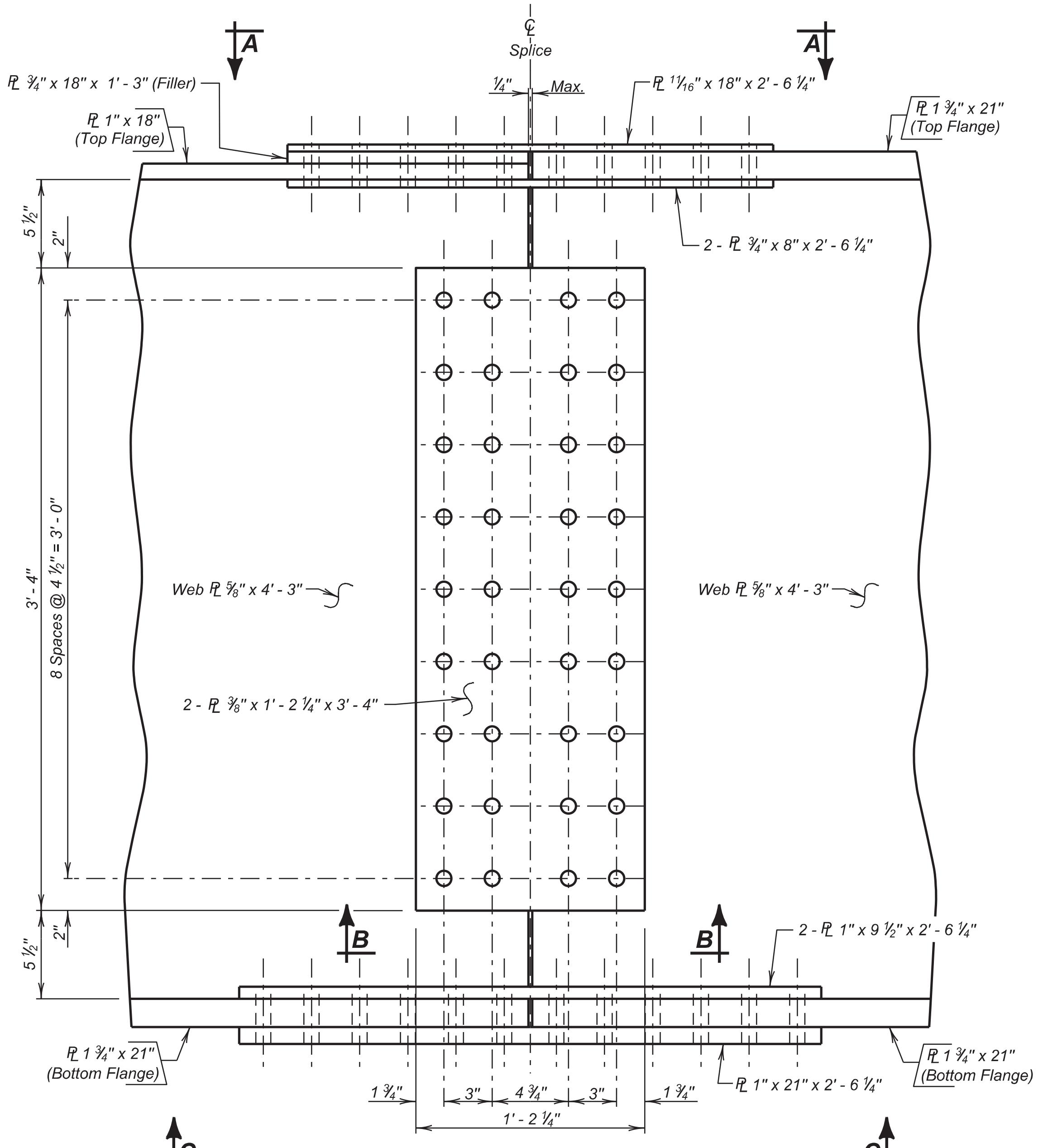
DESIGNED BY	CK. DES. BY	DRAFTED BY	Steve A Johnson
AG	BB	BT	BRIDGE ENGINEER
MINN06G8	06G8TA30		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E33	E45

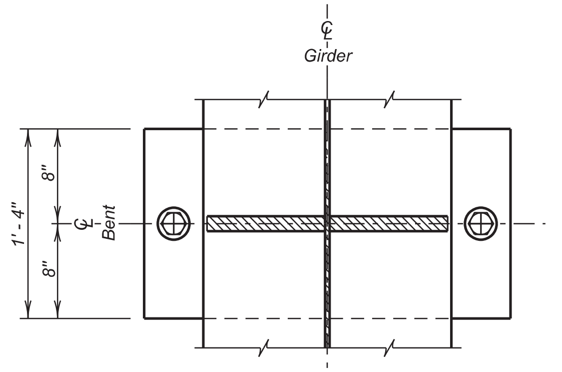
FOR BIDDING PURPOSES ONLY

Revised October 24, 2024 BB

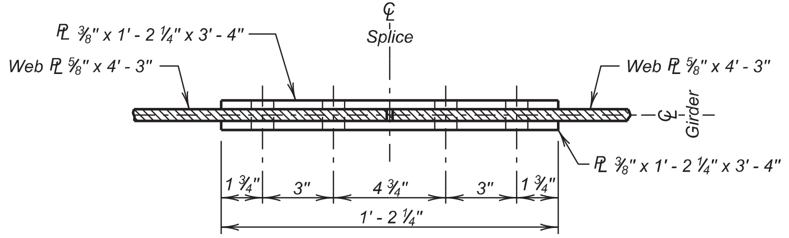
NOTE:
BOLTED SPLICES, BEARINGS, AND ASSOCIATED HARDWARE WILL BE FURNISHED BY THE STATE.



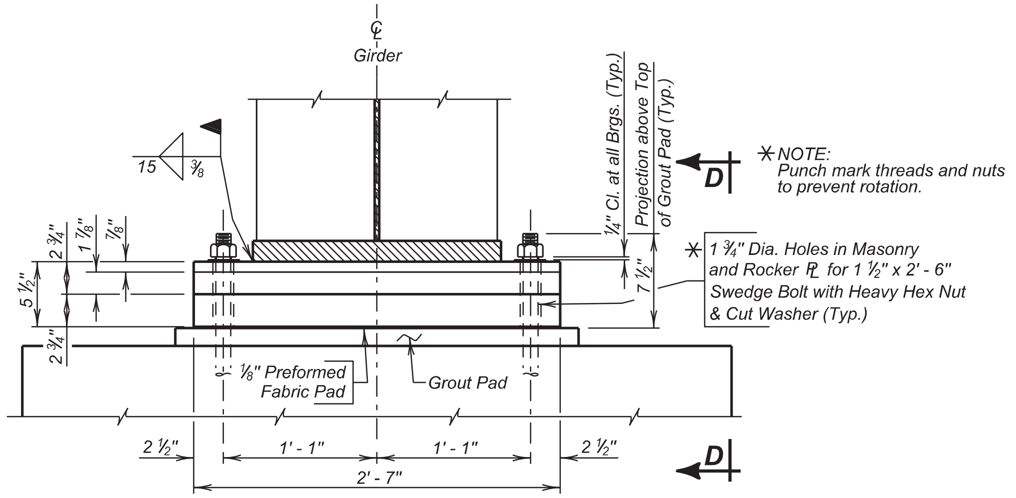
FIELD BOLTED SPLICE DETAIL (Typ.)



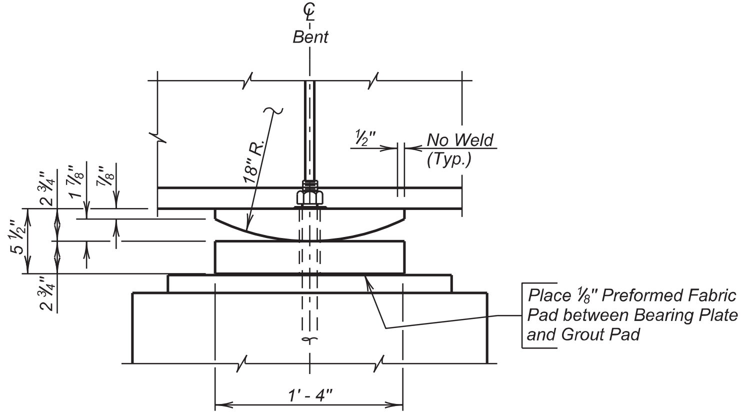
PLAN



SECTION B - B

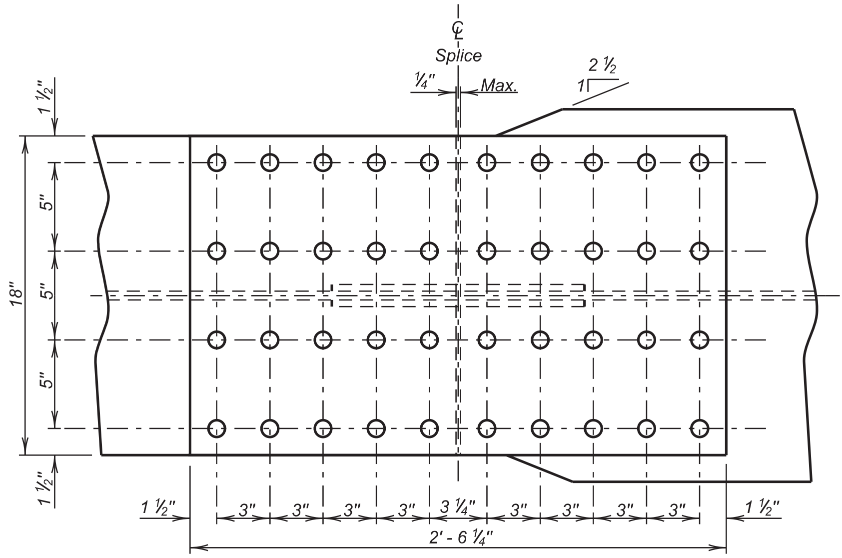


ELEVATION
FIXED BEARING
BENT NO. 2

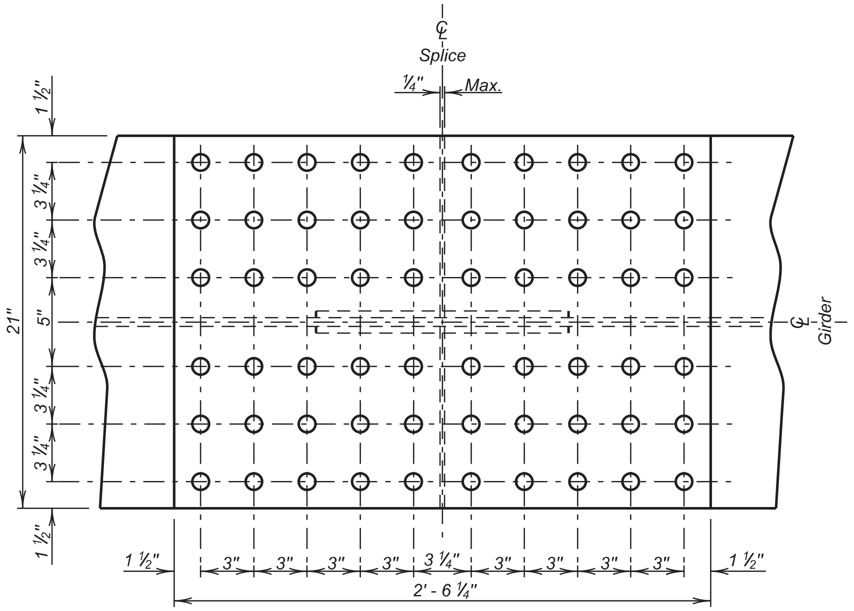


VIEW D - D

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



TOP FLANGE
(VIEW A - A)



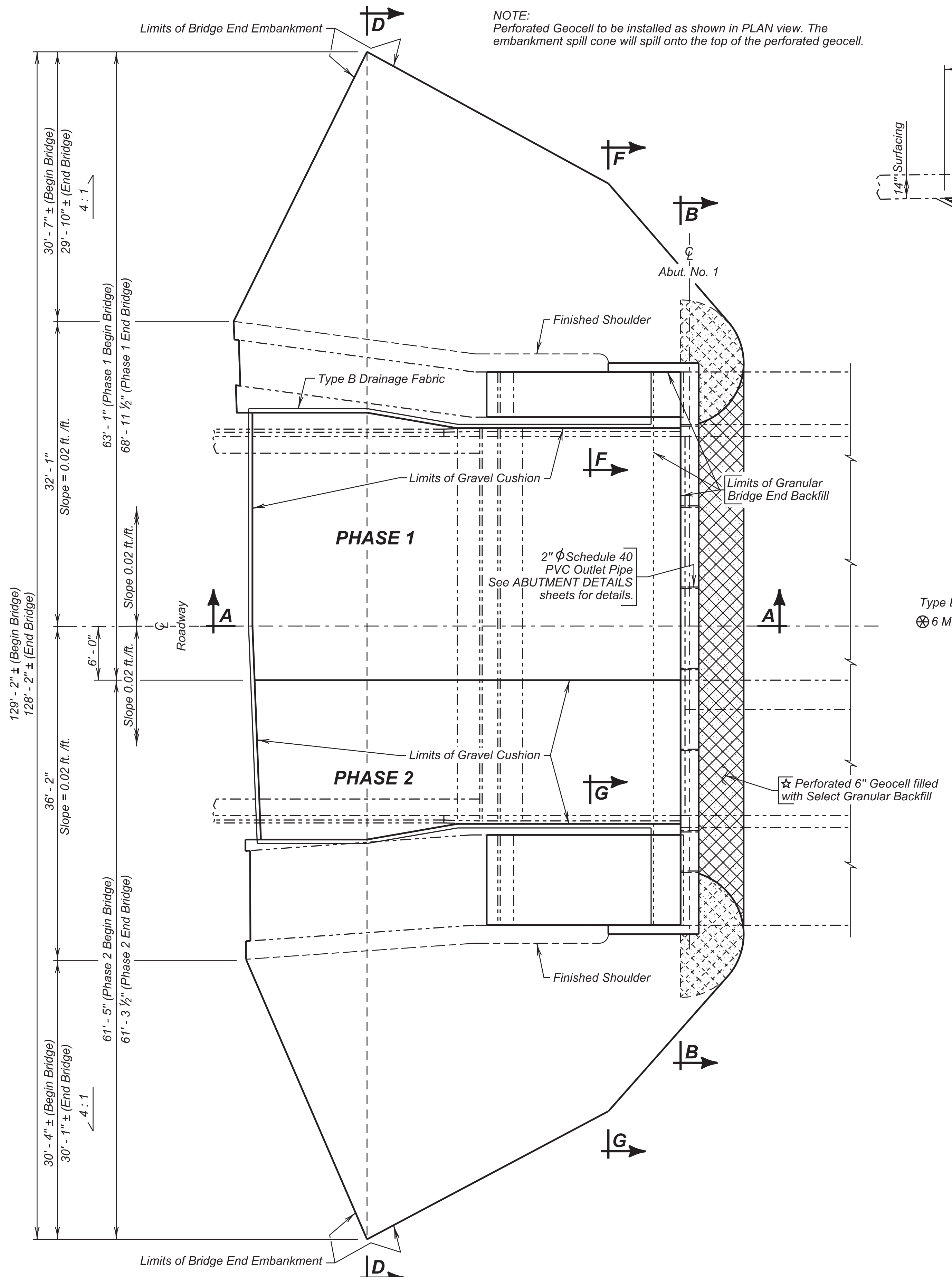
BOTTOM FLANGE
(VIEW C - C)

DETAILS OF BOLTED FIELD SPLICES & BEARINGS
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
(31) OF (43)

DESIGNED BY	CK. DES. BY	DRAFTED BY	
AG	BB	BT	Steve A Johnson
MINN06G8	06G8TA31		BRIDGE ENGINEER

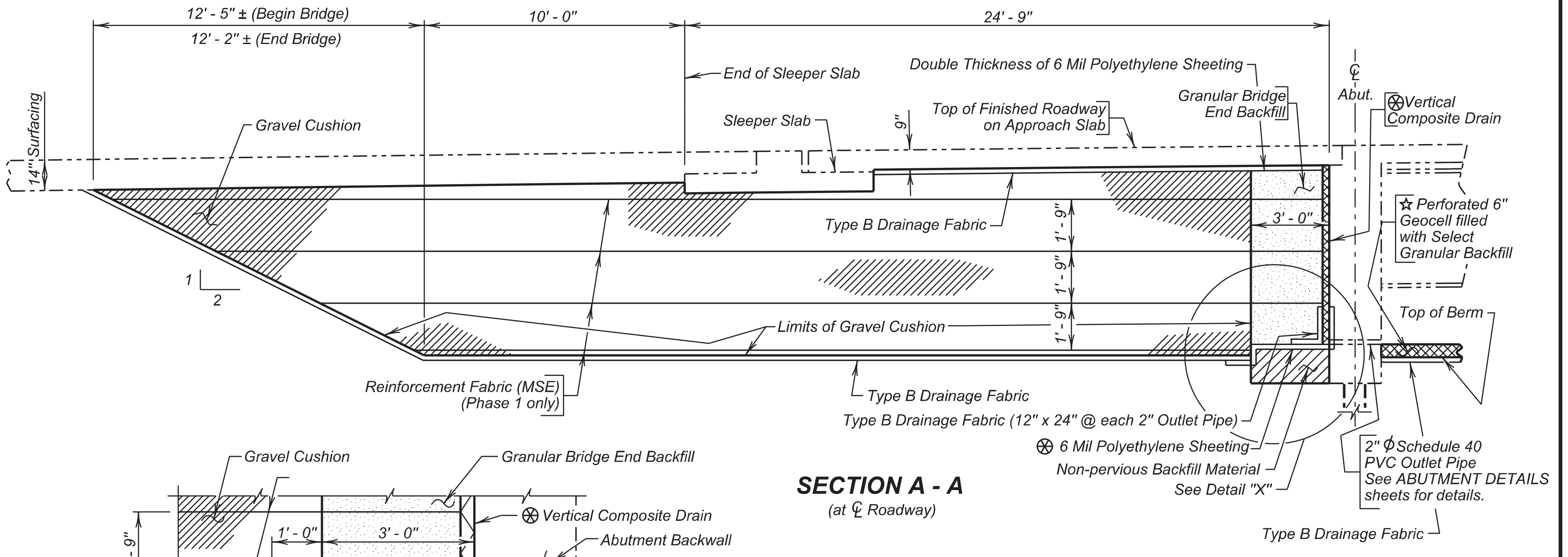
FOR BIDDING PURPOSES ONLY

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



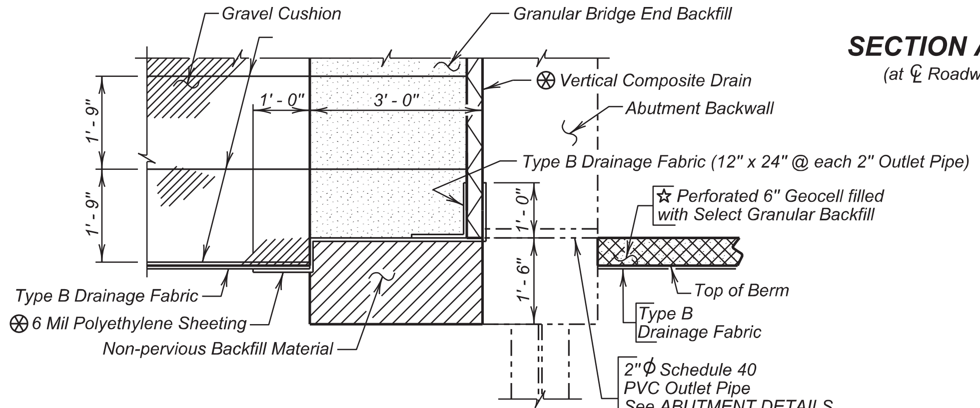
PLAN

(Bridge End Backfill shown adjacent to Abut. No. 1
Abut. No. 3 similar opposite hand except as shown.)



SECTION A - A

(at ℄ Roadway)



DETAIL "X"

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

☆ See PERFORATED GEOCELL notes for payment information.

ESTIMATED QUANTITIES

(For Two Abutments - Phase 1)

	ITEM	UNIT	QUANTITY
⍋	Bridge End Embankment	Cu. Yd.	438.3
	Granular Bridge End Backfill	Cu. Yd.	50.3
Ф	Gravel Cushion	Ton	1007

1. 488 sq. ft. Vertical Composite Drain.
2. 1956 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
3. 314 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.

4. 491 sq. yd. Reinforcement Fabric (MSE).

Item 4 is an approximate quantity contained in the Gravel Cushion and is for information only.

Ф 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.

ESTIMATED QUANTITIES

(For Two Abutments - Phase 2)

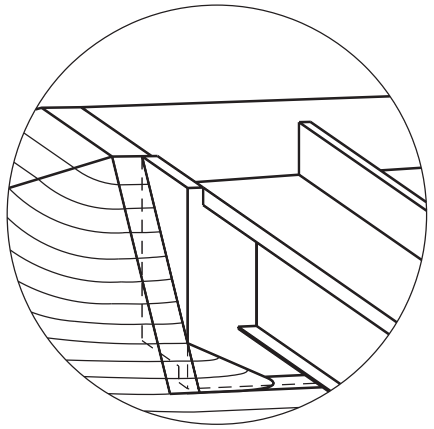
	ITEM	UNIT	QUANTITY
⍋	Bridge End Embankment	Cu. Yd.	526.9
	Granular Bridge End Backfill	Cu. Yd.	39.5
Ф	Gravel Cushion	Ton	587

1. 383 sq. ft. Vertical Composite Drain.
2. 1116 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
3. 183 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.

Ф 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.



SPILL CONE DETAIL AT EMBANKMENT

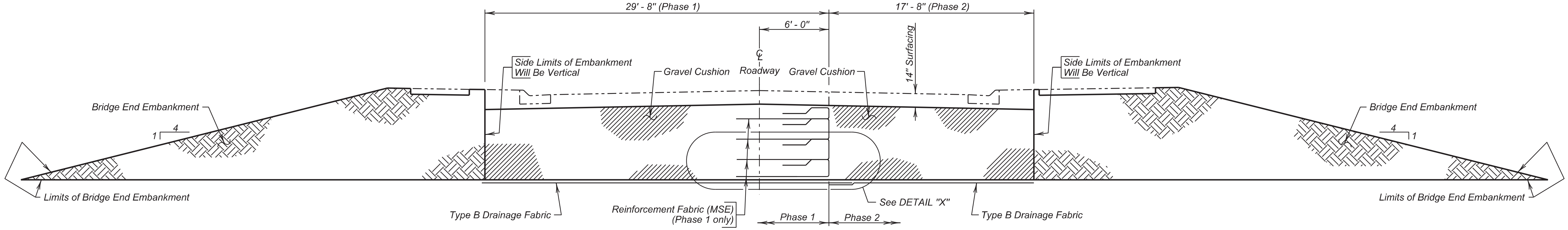
(Barrier Curb and Sidewalk Railing not shown)

DETAILS OF BRIDGE END BACKFILL (A)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023 ㉜ OF ㊸

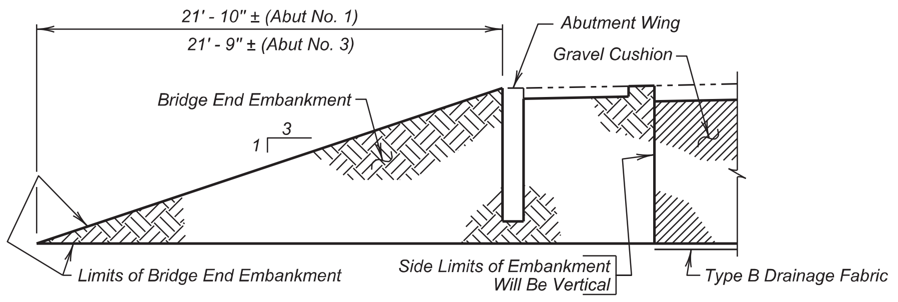
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB MINN06G8	AG 06G8TA32	BT	Steve A Johnson BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

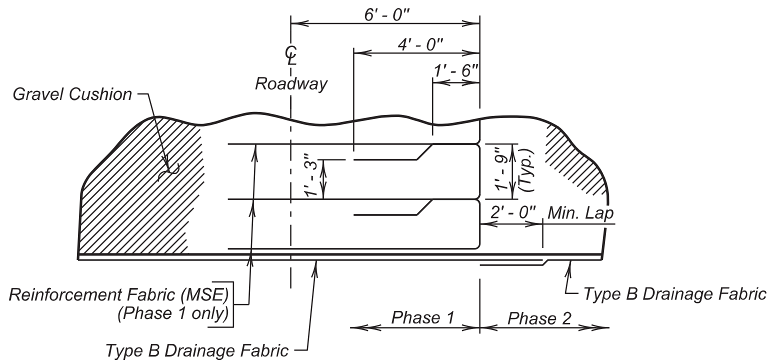
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E35	E45



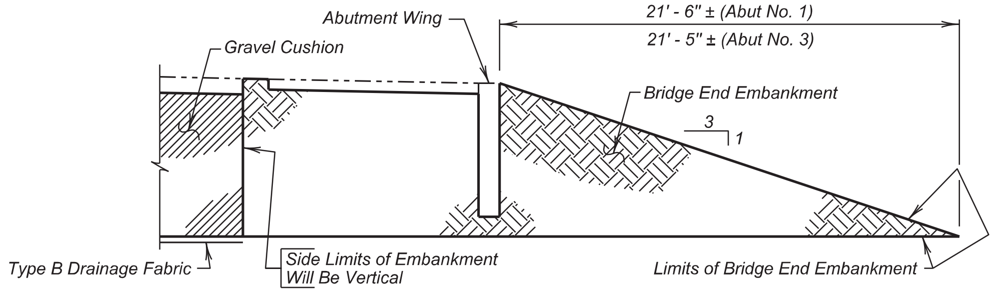
SECTION D - D



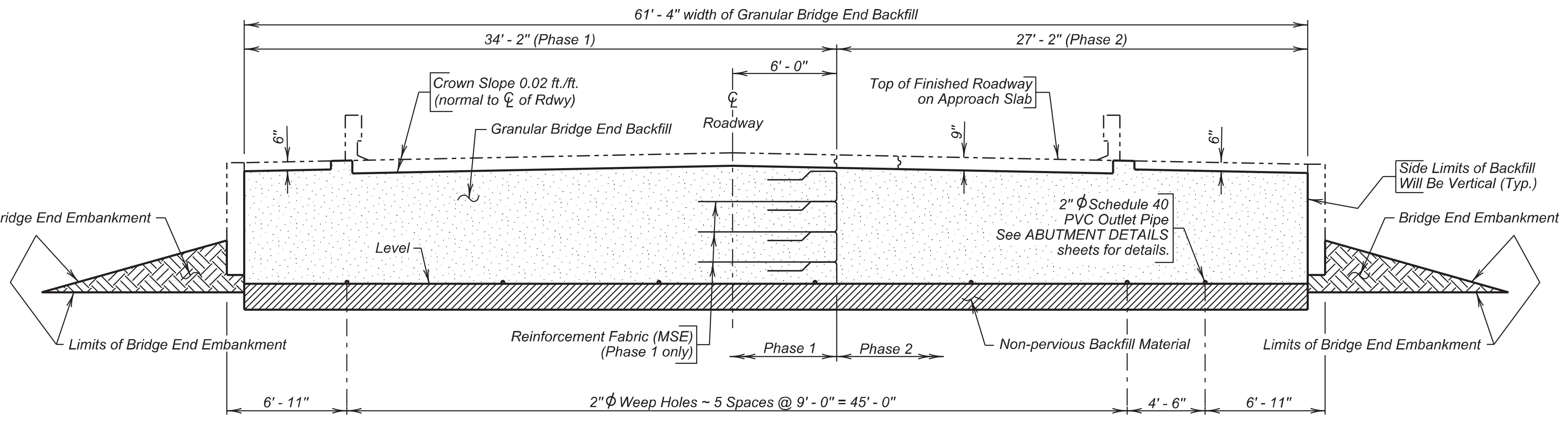
SECTION F - F



DETAIL "X"



SECTION G - G



SECTION B - B

DETAILS OF BRIDGE END BACKFILL (B)

FOR

258' - 0" STEEL GIRDER BRIDGE

OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

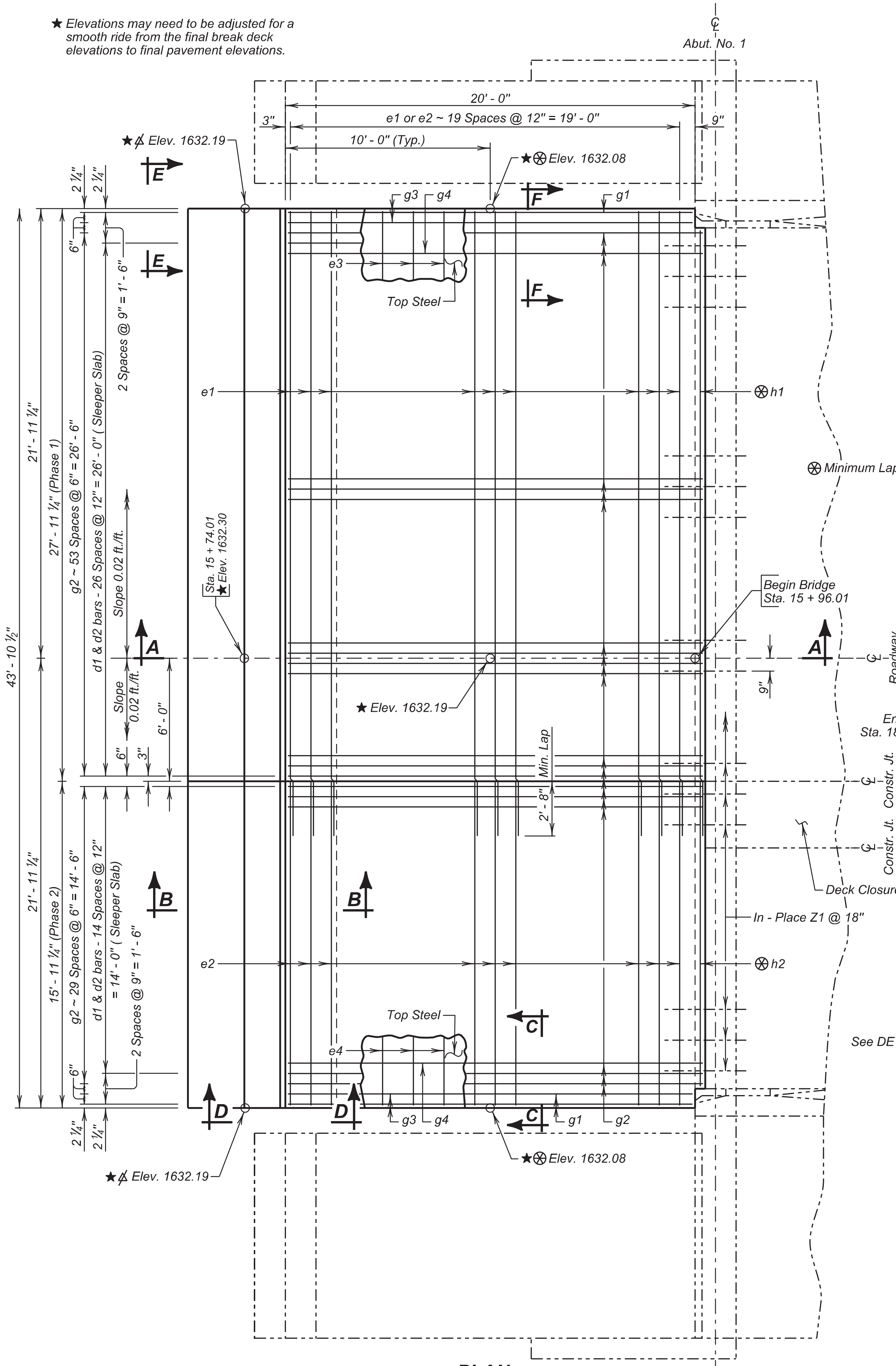
33 OF 43

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG	BT	Steve A Johnson
MINN06G8	06G8TA33		BRIDGE ENGINEER

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

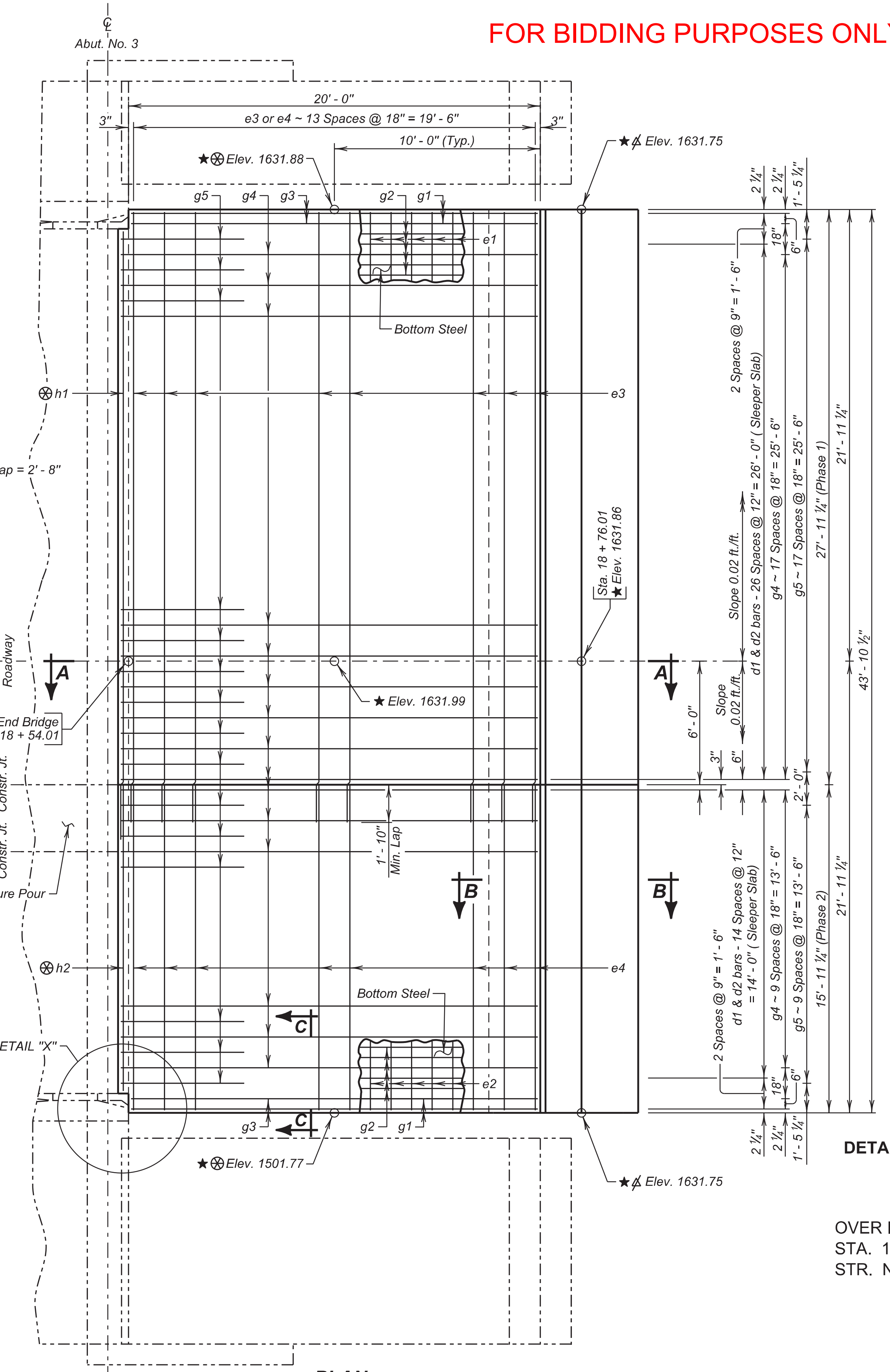
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E36	E45



PLAN

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



PLAN

(Top Steel)
(Shown adj. to Abut. No. 3)

DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE (A)

FOR

258' - 0" STEEL GIRDER BRIDGE

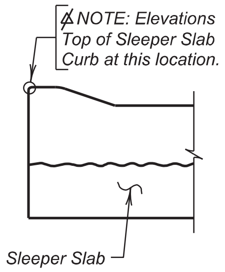
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023 ㉞ OF ㊸

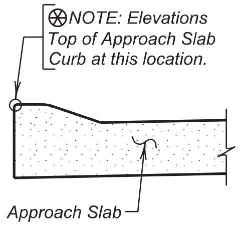
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB MINN06G8	AG 06G8TA34	BT	Steve A Johnson BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

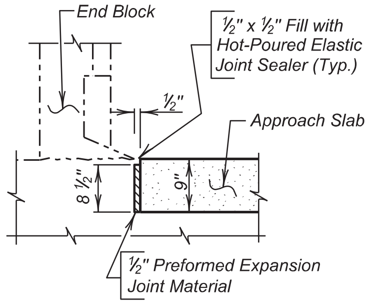
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E37	E45



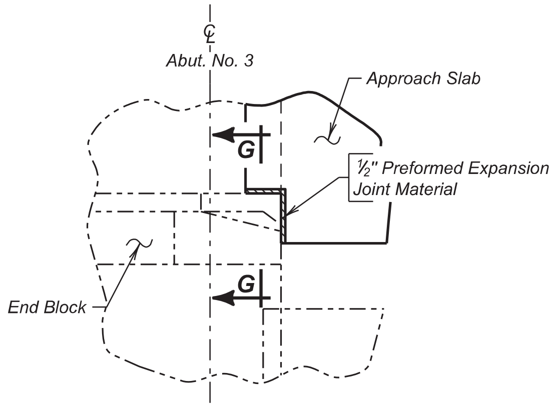
VIEW E - E



SECTION F - F
(Resteel not shown)



SECTION G - G

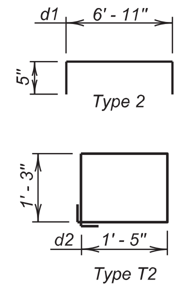


DETAIL "X"

REINFORCING SCHEDULE
(For Two Approach Slabs & Two Sleeper Slabs)

Mk.	No.	Size	Length	Type
Sleeper Slabs				
c1	48	5	30' - 6"	Str.
c2	48	5	15' - 8"	Str.
d1	184	4	7' - 9"	2
d2	92	4	6' - 1"	T2
Approach Slabs				
e1	40	6	30' - 6"	Str.
e2	40	6	15' - 8"	Str.
e3	28	4	29' - 8"	Str.
e4	28	4	15' - 8"	Str.
g1	8	8	19' - 9"	Str.
g2	168	8	20' - 3"	Str.
g3	8	4	19' - 9"	Str.
g4	56	4	20' - 3"	Str.
g5	56	4	6' - 0"	Str.
h1	4	6	29' - 7"	Str.
h2	4	6	14' - 9"	Str.

Bending Details



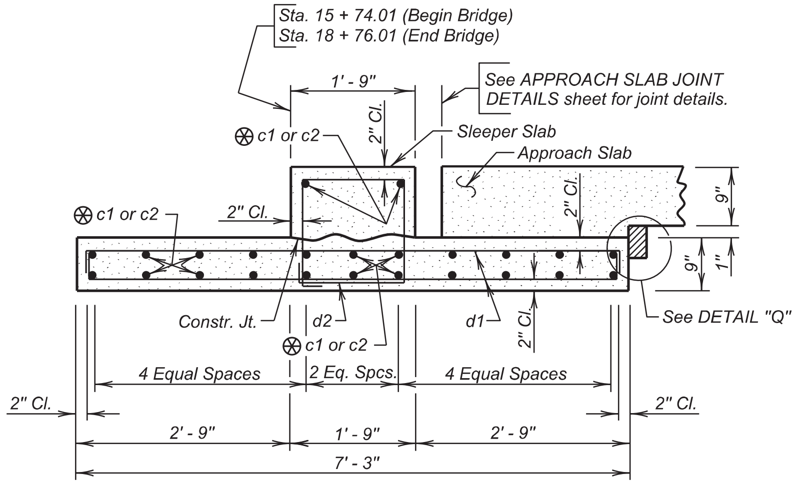
NOTE:
All bars to be epoxy coated.
All dimensions are out to out of bars.

ESTIMATED QUANTITIES
(For Two Approach Slabs and Two Sleeper Slabs)

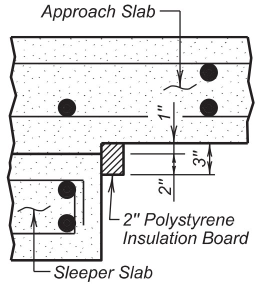
ITEM	UNIT	QUANTITY
Concrete Approach Slab for Bridge	Sq. Yd.	199.7
Concrete Approach Sleeper Slab for Bridge	Sq. Yd.	70.7

1. 50.6 Cu. Yds. Concrete in Approach Slabs.
2. 15397 Lbs. Epoxy Coated Re-Steel in Approach Slabs.
3. 22.4 Cu. Yds. Concrete in Sleeper Slabs.
4. 3638 Lbs. Epoxy Coated Re-Steel in Sleeper Slabs.
5. 22 Sq. Ft. of 2" Polystyrene Insulation Board

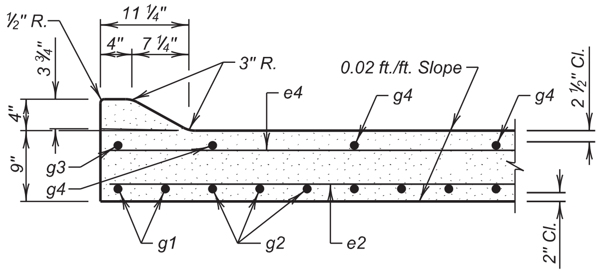
Items 1 thru 5 are approximate quantities contained in the above bid items and are for information only.



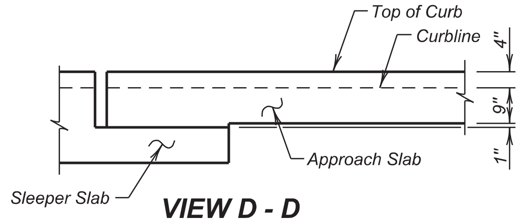
SECTION B - B
(Sleeper Slab)



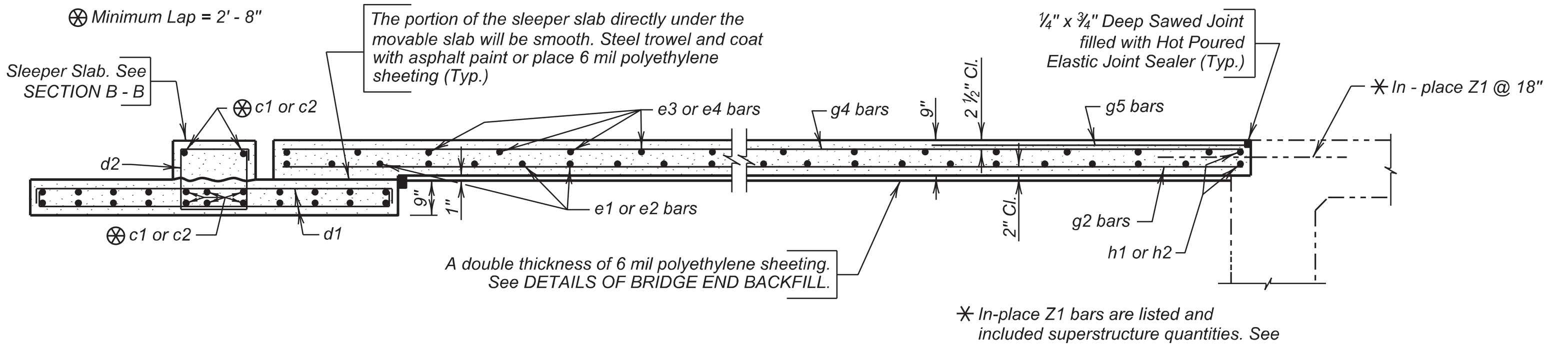
DETAIL "Q"



SECTION C - C



VIEW D - D



The portion of the sleeper slab directly under the movable slab will be smooth. Steel trowel and coat with asphalt paint or place 6 mil polyethylene sheeting (Typ.)

A double thickness of 6 mil polyethylene sheeting. See DETAILS OF BRIDGE END BACKFILL.

✳ In-place Z1 bars are listed and included superstructure quantities. See SUPERSTRUCTURE DETAILS (B) sheet.

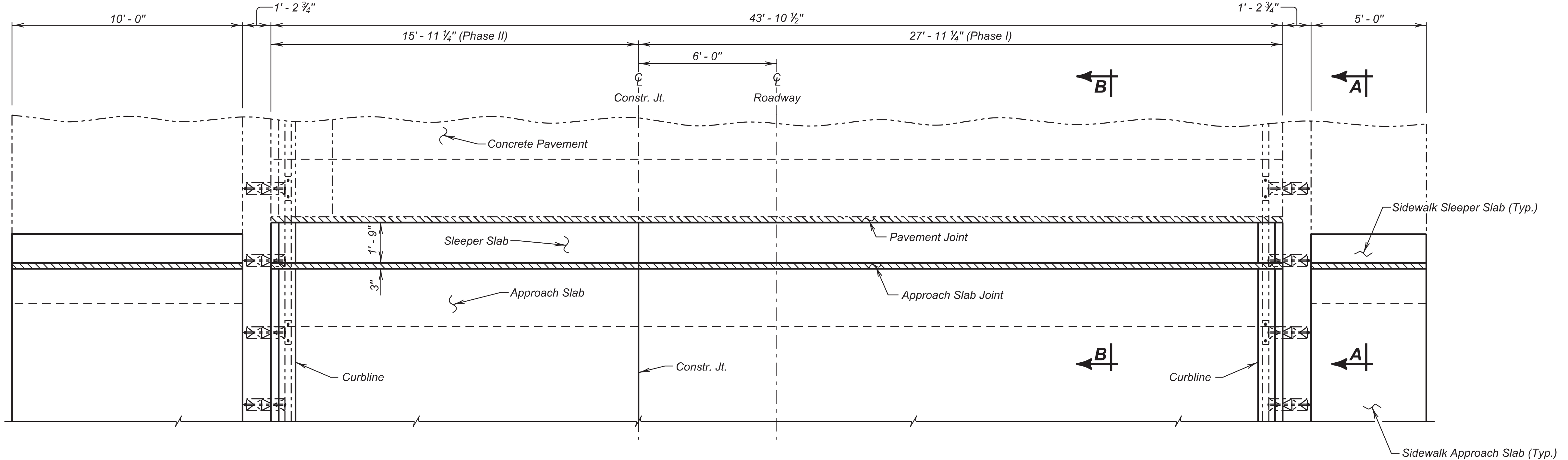
SECTION A - A

DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE (B)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
㉟ OF ㊸

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB MINN06G8	AG 06G8TA35	BT	Steve A Johnson BRIDGE ENGINEER

FOR BIDDING PURPOSES ONLY

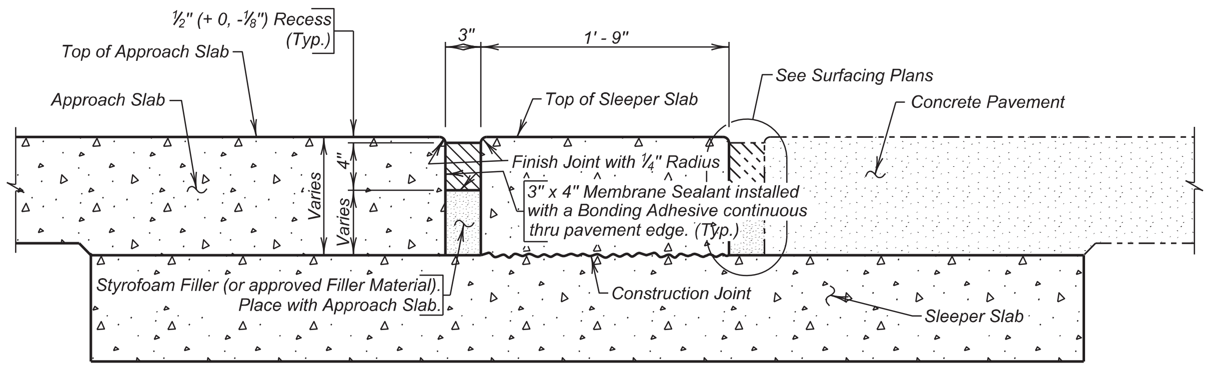
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E38	E45



PLAN
(Begin Bridge Shown)

GENERAL NOTES

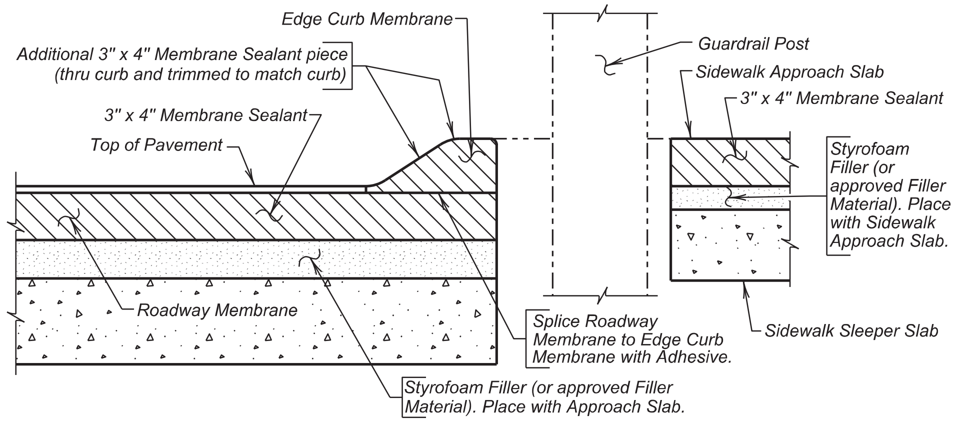
1. The membrane sealant will be on the approved product list for membrane sealant expansion joints.
2. The manufacturer will supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension will be as recommended by the sealant manufacturer to provide a water 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. A technical representative of the membrane sealant manufacturer will be present at the jobsite during installation. The technical representative will be knowledgeable in the correct procedures for the preparation and installation of the joint material to insure the Contractor installs the joint to the Manufacturers recommendations.
9. 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.
10. 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.
11. 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.
12. Traffic will not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.
13. 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.
14. The membrane sealant expansion joint will be measured in feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The membrane sealant expansion joint will be paid for at the contract unit price per foot complete in place. Payment for this item will be full compensation for furnishing all the required materials in place, including labor, equipment and incidentals necessary to complete the work in accordance with the plans and the foregoing specifications.



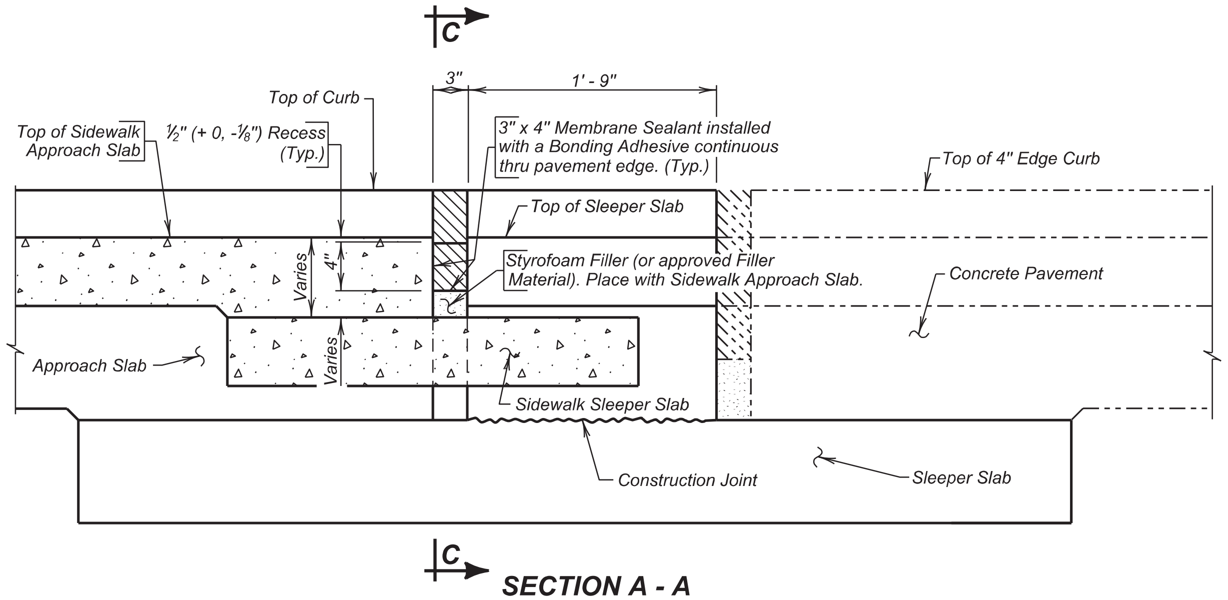
SECTION B - B

ESTIMATED QUANTITIES
(For Two Approach Slabs)

ITEM	UNIT	QUANTITY
Membrane Sealant Expansion Joint	Ft.	117.8



SECTION C - C



SECTION A - A

APPROACH SLAB JOINT DETAILS
FOR
258' - 0" STEEL GIRDER BRIDGE

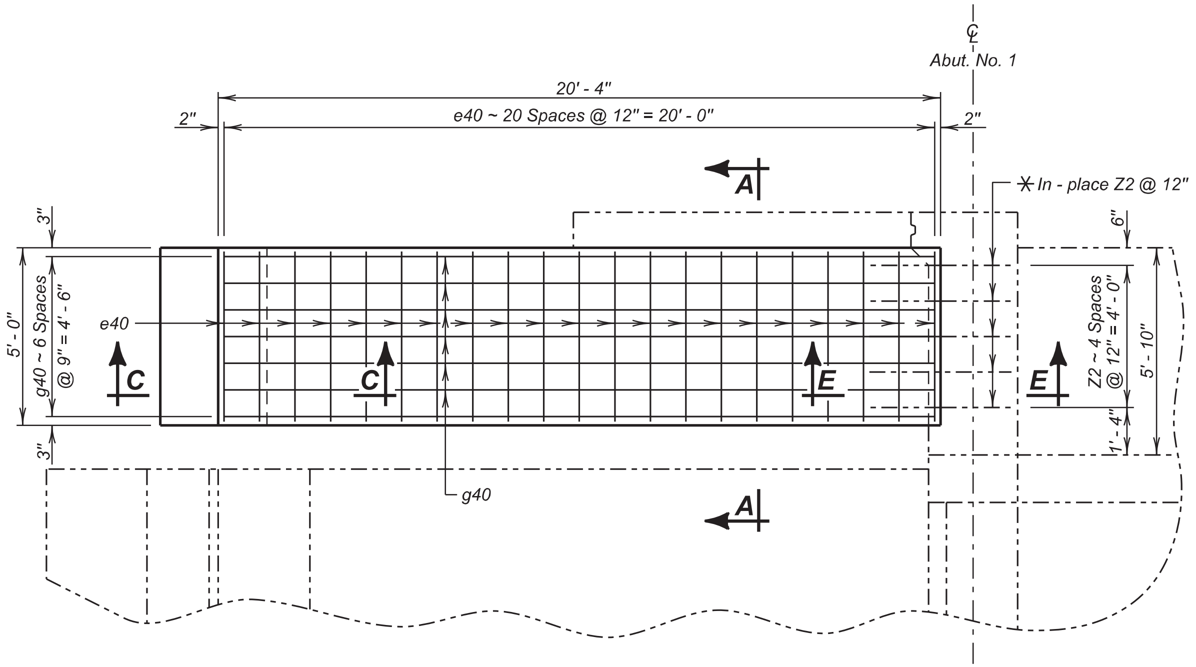
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

DESIGNED BY	CK. DES. BY	DRAFTED BY	Steve A Johnson
BB	AG	BT	
MINN06G8	06G8TA36		BRIDGE ENGINEER

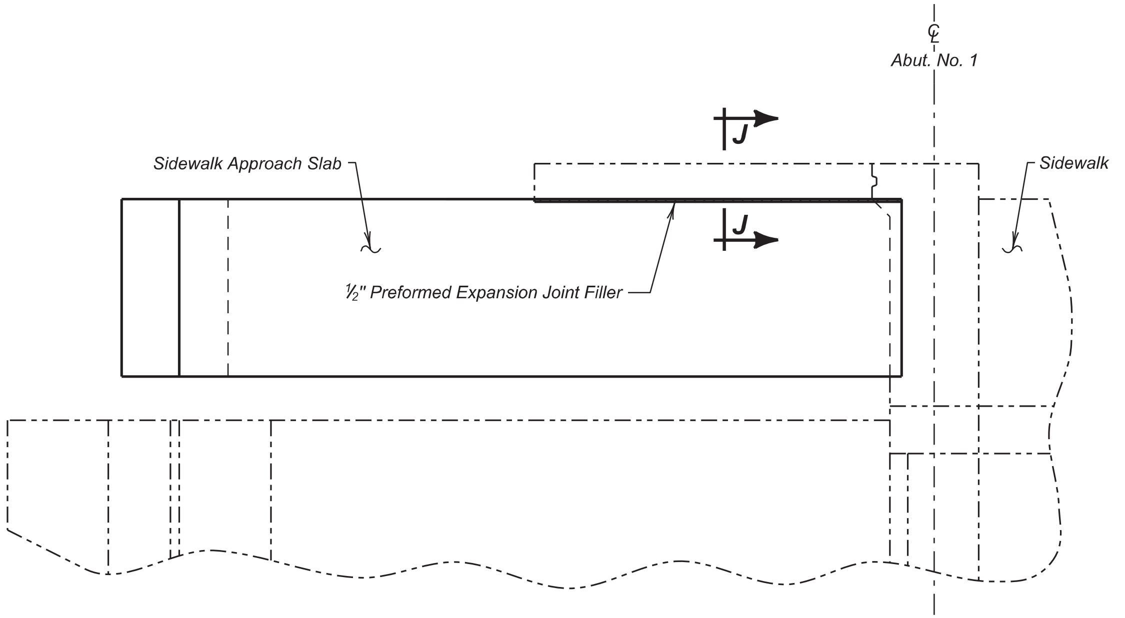
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E39	E45



PLAN

(Sidewalk Approach Slab shown adjacent to Abut. No. 1. Abut. No. 3 similar opposite hand.)



PLAN

(Expanion Joint Filler shown adjacent to Abut. No. 1, Abut. No. 3 similar opposite hand)

REINFORCING SCHEDULE

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

Mk.	No.	Size	Length	Type
d40	10	4	2' - 8"	Str.
e40	50	4	4' - 9"	Str.
g40	14	4	20' - 2"	Str.

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

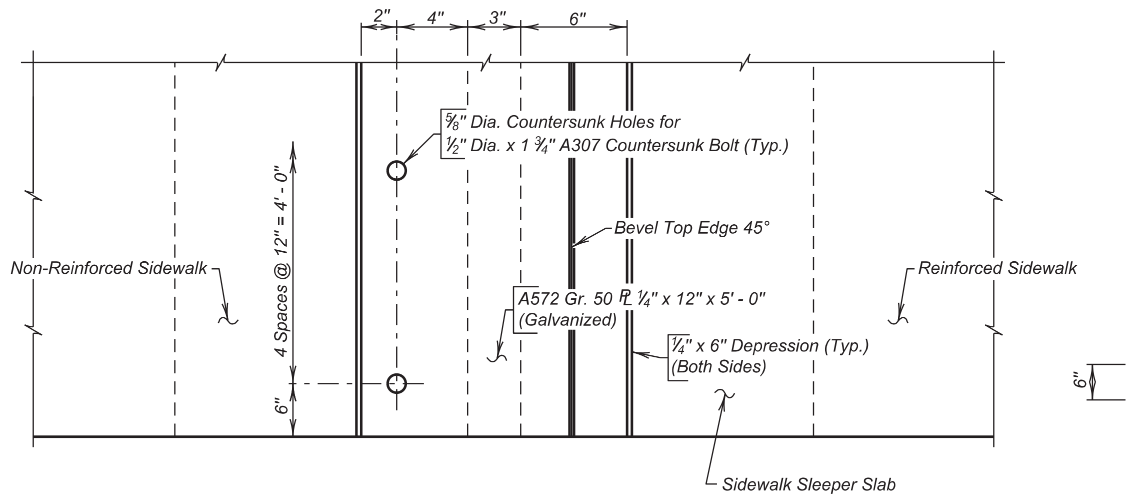
ESTIMATED QUANTITIES

(For Two Sidewalk Approach Slabs)

ITEM	UNIT	QUANTITY
6" Reinforced Concrete Sidewalk	Sq. Ft.	203

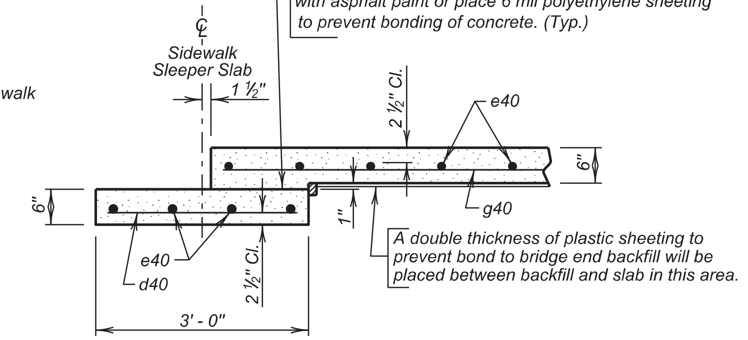
1. 3.8 Cu. Yds. Concrete in Sidewalk Approach Slabs.
2. 322 Lbs. Epoxy Coated Re-Steel in Sidewalk Approach Slabs.
3. 0.6 Cu. Yds. Concrete in Sidewalk Sleeper Slabs.
4. 43 Lbs. Epoxy Coated Re-Steel in Sidewalk Sleeper Slabs.
5. 376 Sq. Ft. 6 mil Polyethylene Sheeting under reinforced concrete sidewalk.
6. 17 Ft. of Expansion Joint filler adjacent to wing.
7. 2.5 sq. ft. of 2" Polystyrene Insulation Board.

Items 1 thru 7 are approximate quantities contained in the above bid item and are for information only.

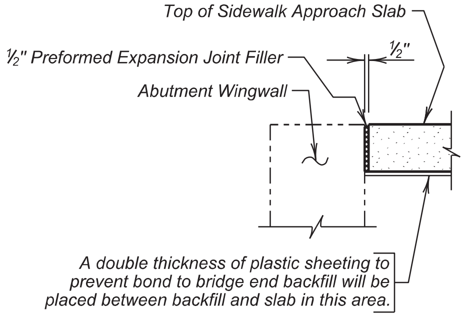


PLAN

(Sidewalk Cover Plate)

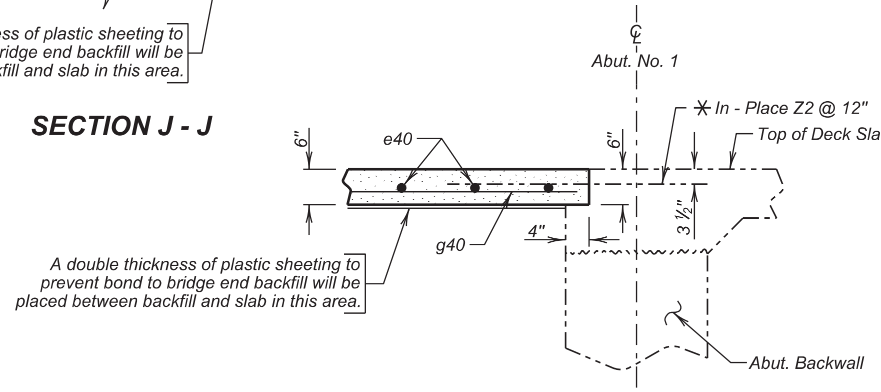


SECTION C - C

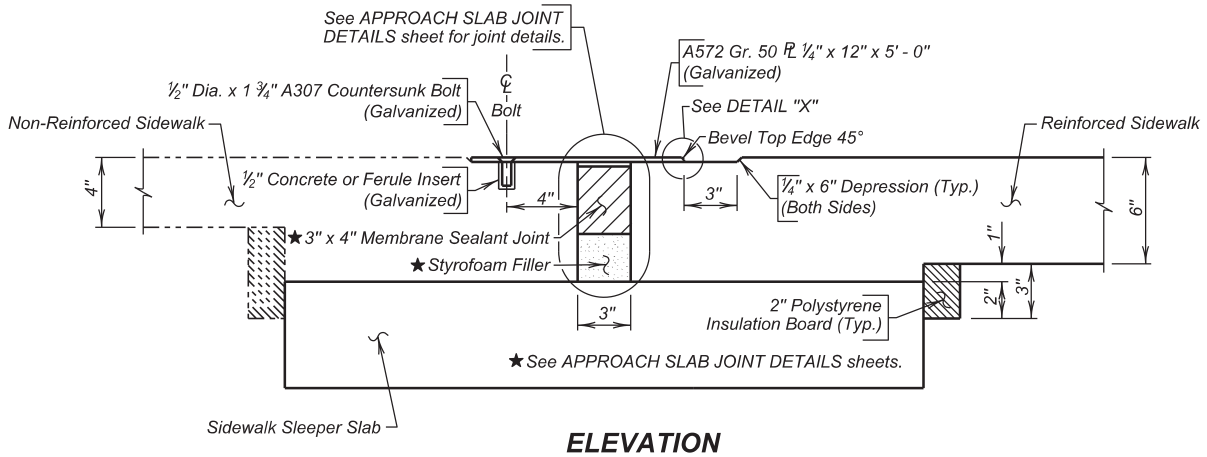


SECTION J - J

✳ In-place Z2 bars are listed and included superstructure quantities. See SUPERSTRUCTURE DETAILS (B) sheet.

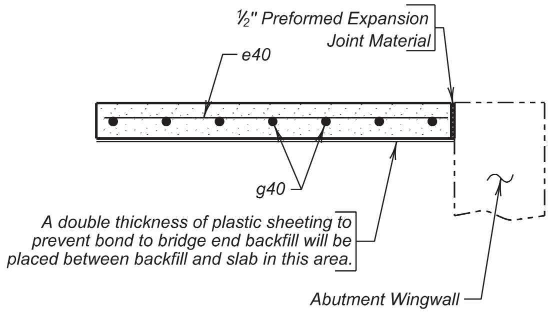


SECTION E - E

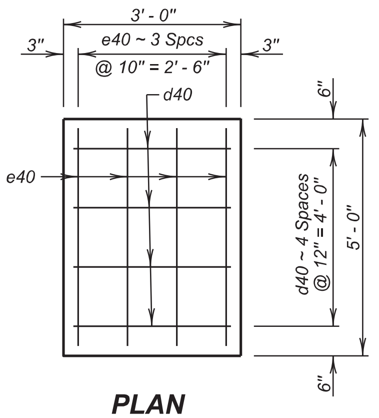


ELEVATION

(Sidewalk Cover Plate)



SECTION A - A



PLAN

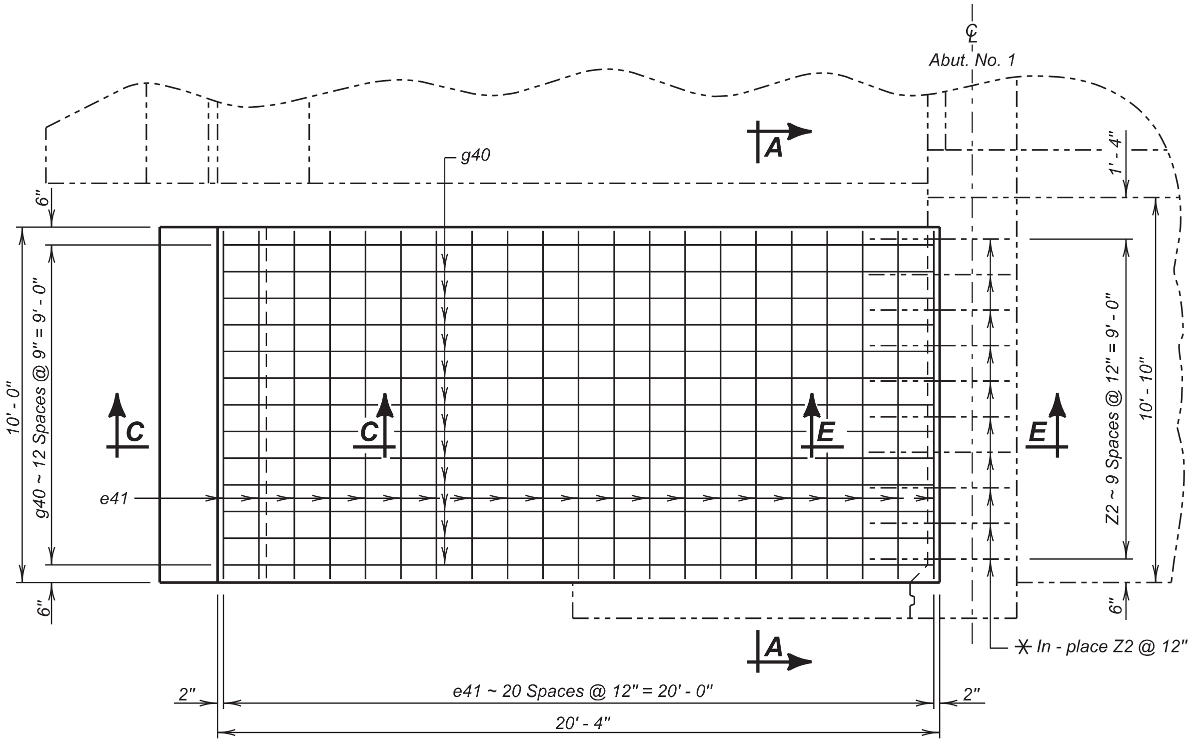
(Sidewalk Sleeper Slab)

SIDEWALK APPROACH SLAB DETAILS (LEFT SIDE)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
(37) OF (43)

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB MINN06G8	AG 06G8TA37	BT	Steve A Johnson BRIDGE ENGINEER

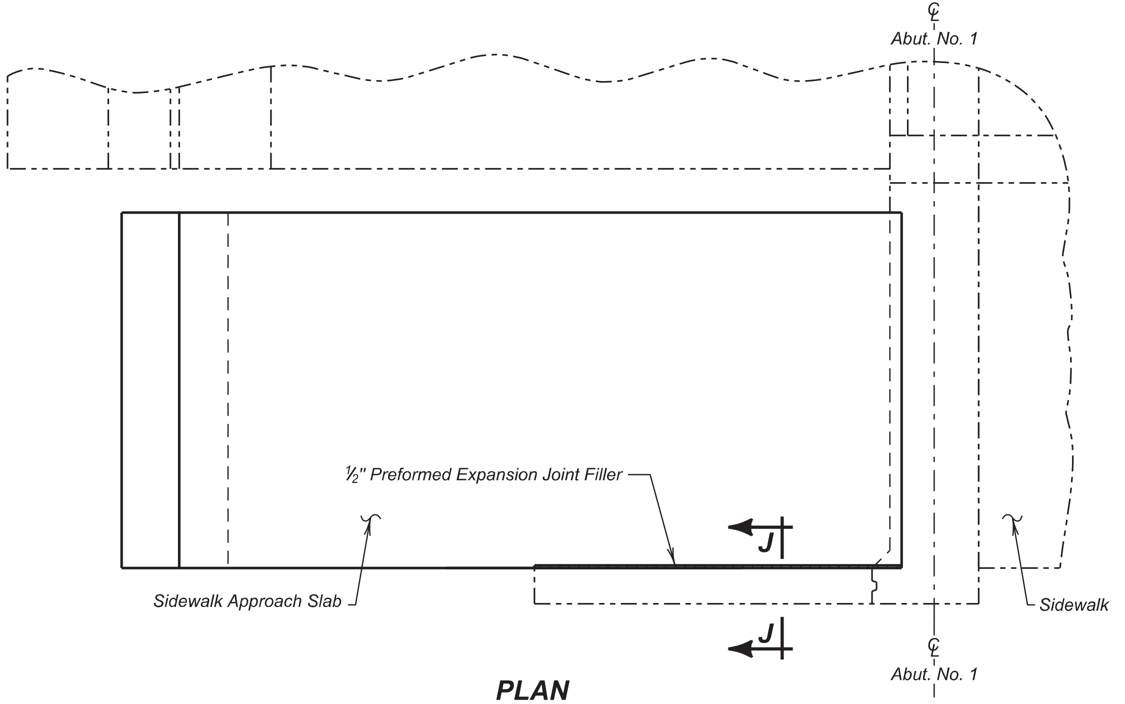
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E40	E45



PLAN

(Sidewalk Approach Slab shown adjacent to Abut. No. 1. Abut. No. 3 similar opposite hand.)



PLAN

(Sidewalk Approach Slab shown adjacent to Abut. No. 1. Abut. No. 3 similar opposite hand.)

REINFORCING SCHEDULE

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

Mk.	No.	Size	Length	Type
d40	20	4	2' - 8"	Str.
e41	50	4	9' - 9"	Str.
g40	26	4	20' - 2"	Str.

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

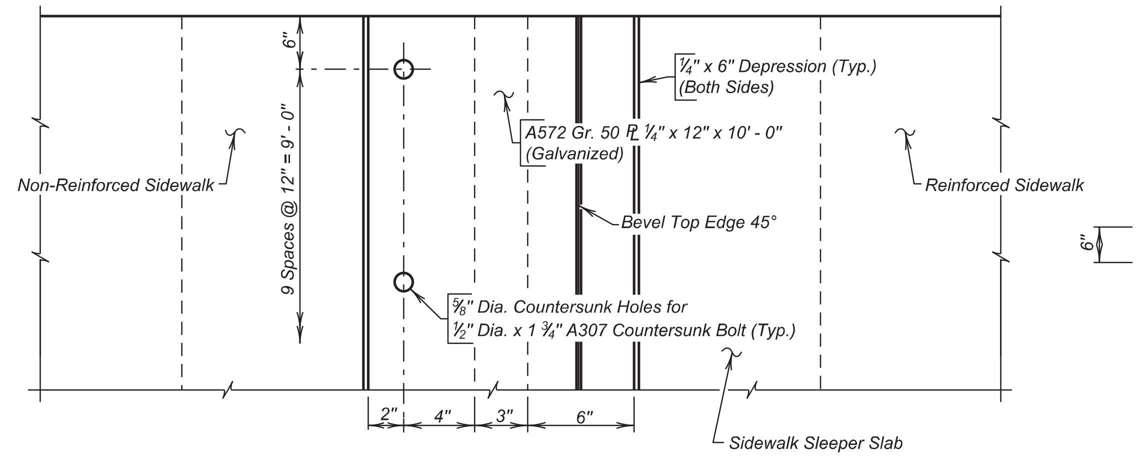
ESTIMATED QUANTITIES

(For Two Sidewalk Approach Slabs)

ITEM	UNIT	QUANTITY
6" Reinforced Concrete Sidewalk	Sq. Ft.	407

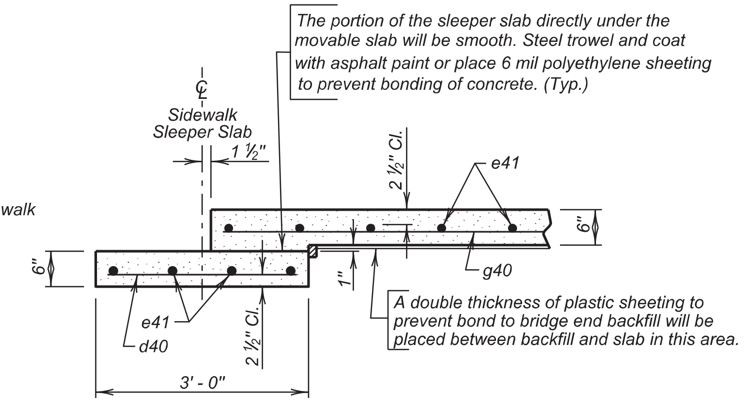
1. 7.6 Cu. Yds. Concrete in Sidewalk Approach Slabs.
2. 572 Lbs. Epoxy Coated Re-Steel in Sidewalk Approach Slabs.
3. 1.2 Cu. Yds. Concrete in Sidewalk Sleeper Slabs.
4. 140 Lbs. Epoxy Coated Re-Steel in Sidewalk Sleeper Slabs.
5. 753 Sq. Ft. 6 mil Polyethylene Sheeting under reinforced concrete sidewalk.
6. 17 Ft. of Expansion Joint adjacent to wing.
7. 5 sq. ft. of 2" Polystyrene Insulation Board.

Items 1 thru 7 are approximate quantities contained in the above bid item and are for information only.

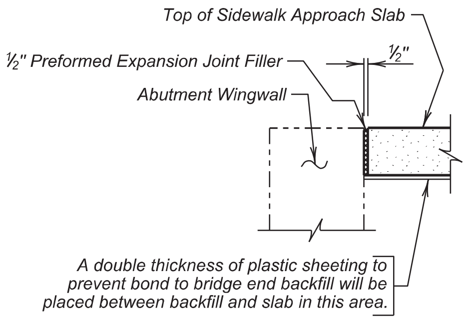


PLAN

(Sidewalk Cover Plate)

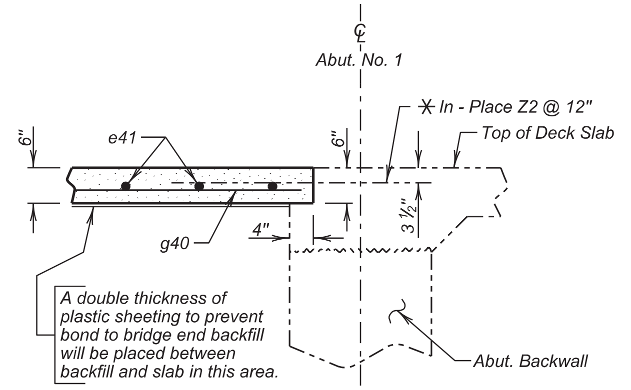


SECTION C - C

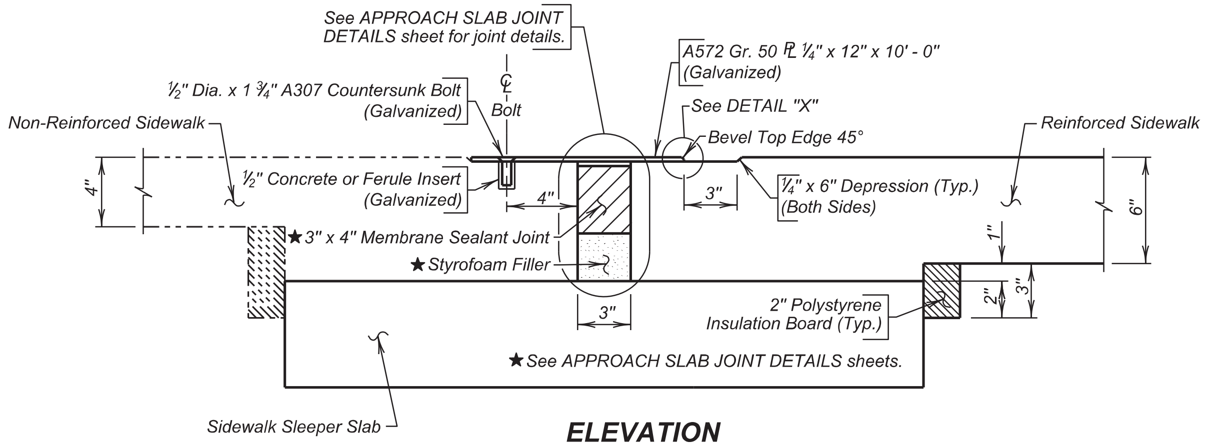


SECTION J - J

✳ In-place Z2 bars are listed and included superstructure quantities. See SUPERSTRUCTURE DETAILS (B) sheet.

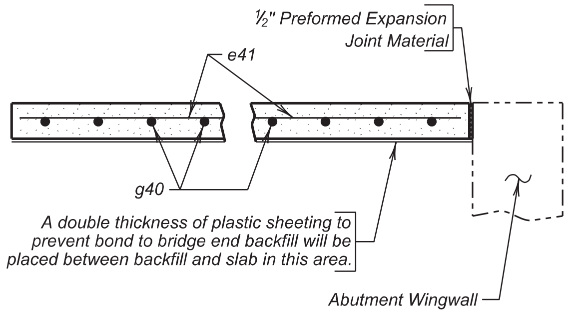


SECTION E - E

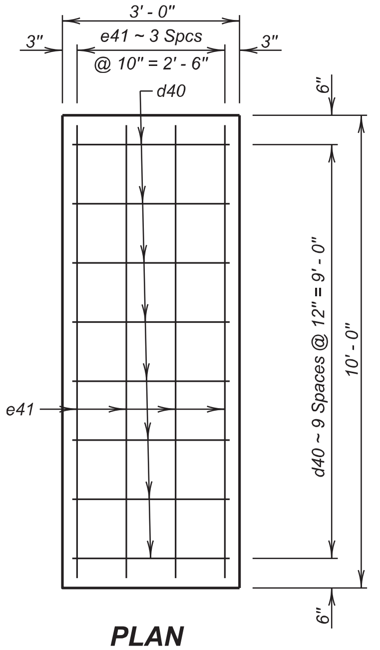


ELEVATION

(Sidewalk Cover Plate)



SECTION A - A



PLAN

(Sidewalk Sleeper Slab)

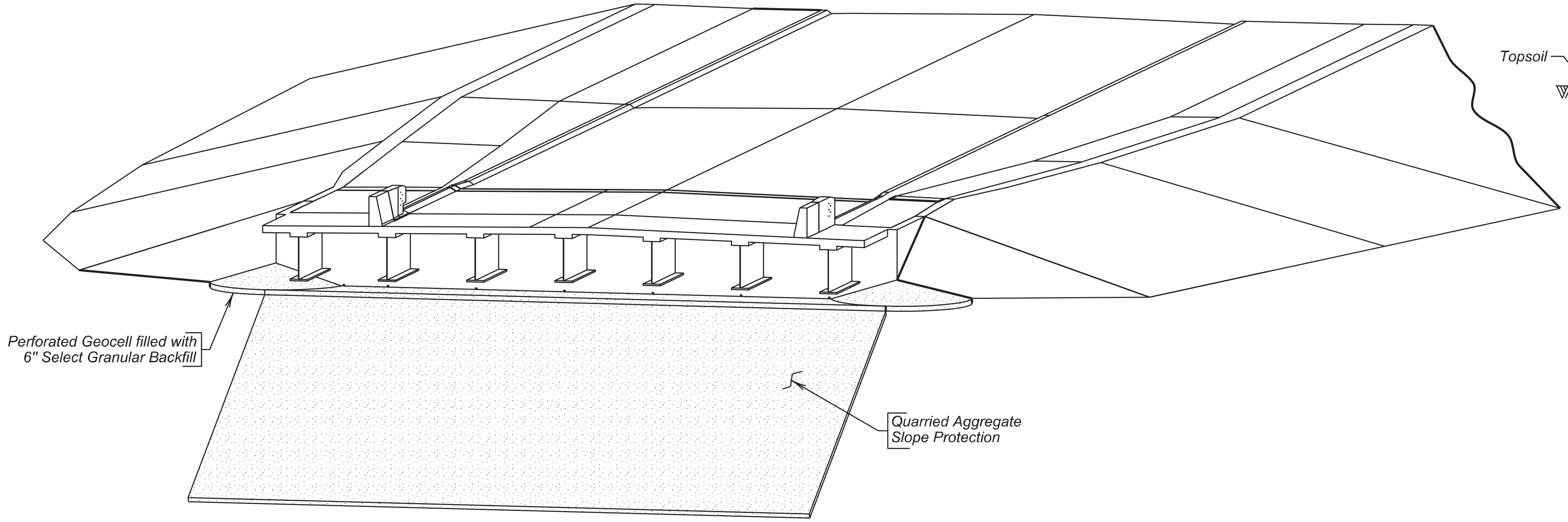
SIDEWALK APPROACH SLAB DETAILS (RIGHT SIDE)
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

38 OF 43

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG	BT	Steve A Johnson
MINN06G8	06G8TA38		BRIDGE ENGINEER

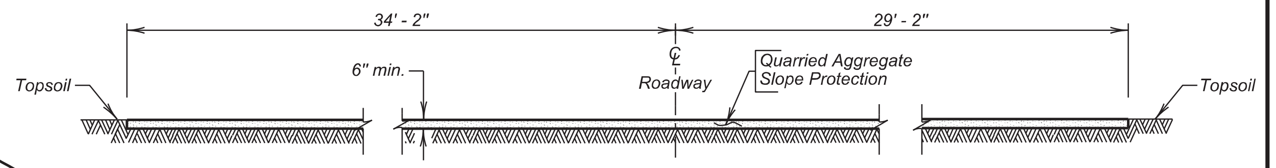
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E41	E45

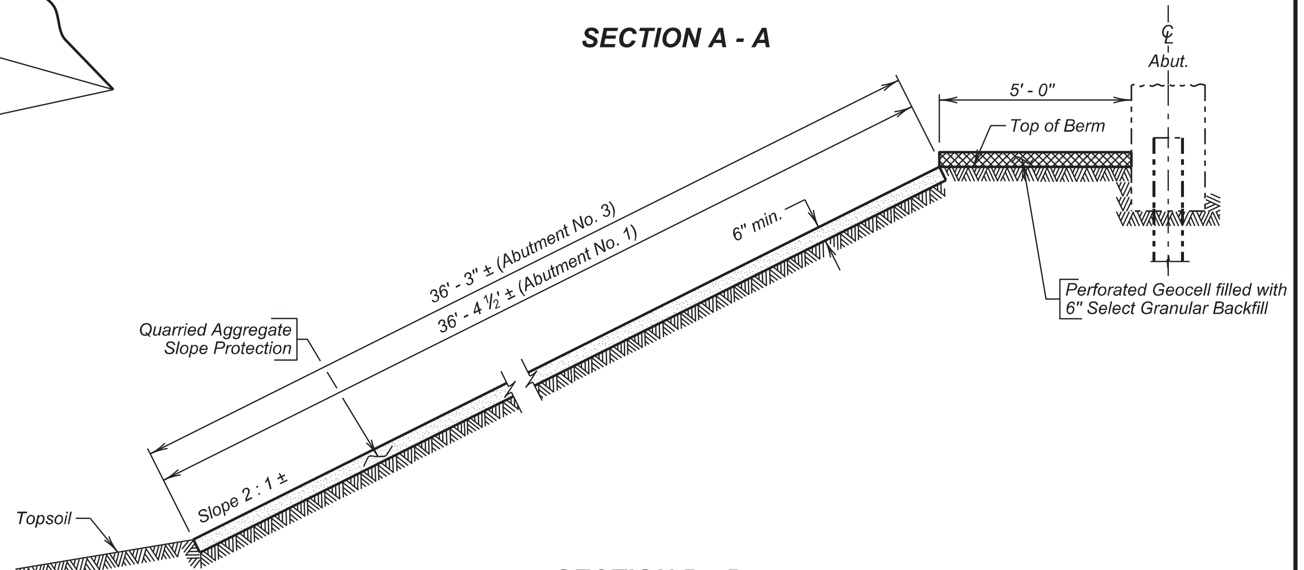


ISOMETRIC VIEW

(Abutment No. 1 shown)

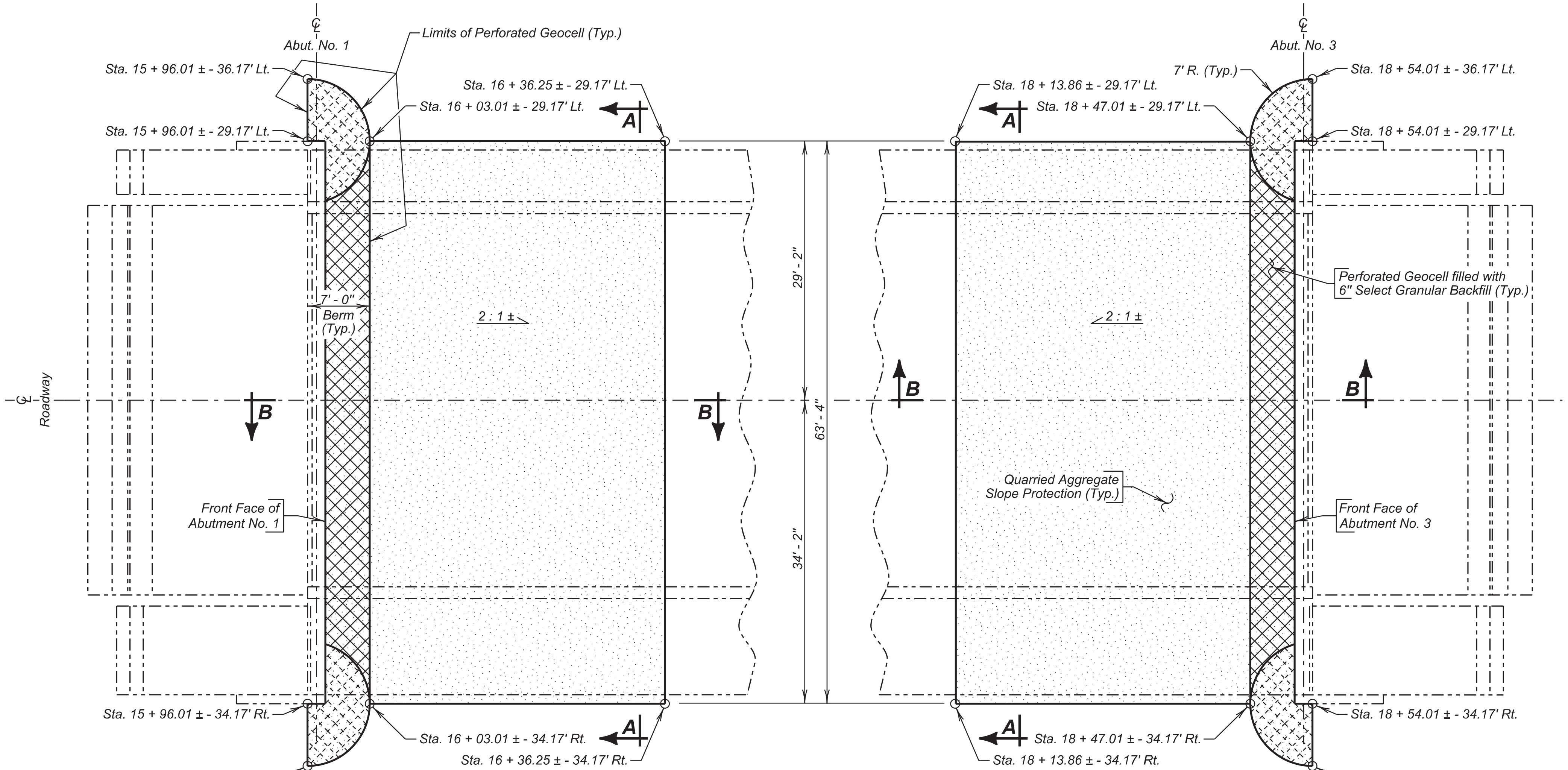


SECTION A - A



SECTION B - B

(Along ℄ Rdwy)



PLAN

ESTIMATED QUANTITIES

(For Two Abutments)

	ITEM	UNIT	QUANTITY
	Bridge Berm Slope Protection, Quarried Aggregate	Sq. Yd.	511.0
⌀	Select Granular Backfill	Ton	27.4
☆	Perforated Geocell	Sq. Ft.	783

☆ 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.

SLOPE PROTECTION DETAILS

FOR

258' - 0" STEEL GIRDER BRIDGE

OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023

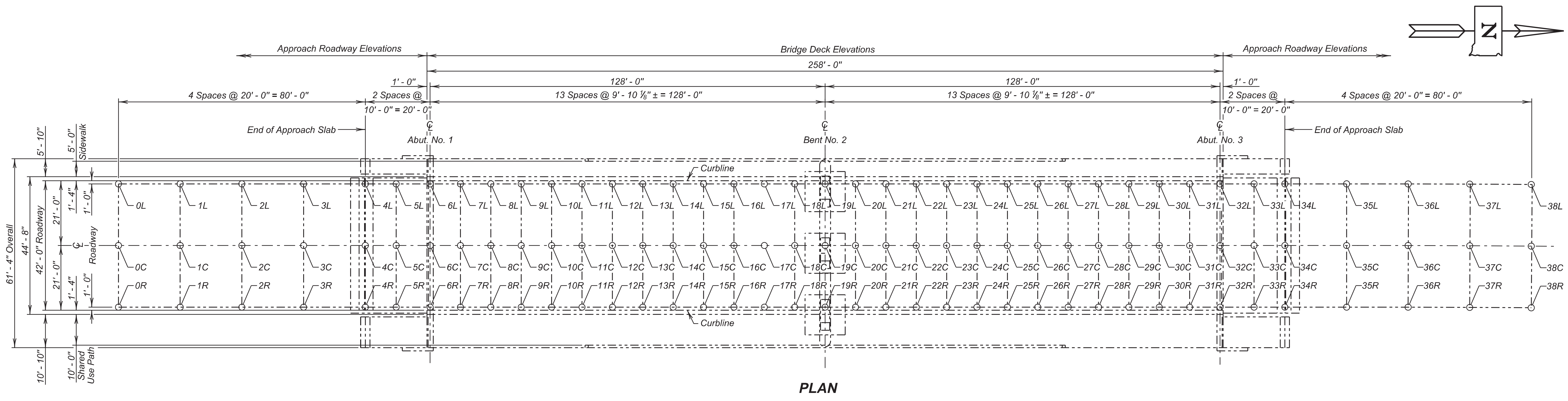
39 OF 43

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB	AG	BT	Steve A Johnson
MINN06G8	06G8TA39		BRIDGE ENGINEER

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

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E42	E45



PLAN

Table of As-Built Elevations - Approach Roadway

Location	Elevation	Location	Elevation	Location	Elevation
0L		0C		0R	
1L		1C		1R	
2L		2C		2R	
3L		3C		3R	
4L		4C		4R	
5L		5C		5R	
33L		33C		33R	
34L		34C		34R	
35L		35C		35R	
36L		36C		36R	
37L		37C		37R	
38L		38C		38R	

Table of As-Built Elevations - Bridge Deck

Location	Elevation	Location	Elevation	Location	Elevation
6L		6C		6R	
7L		7C		7R	
8L		8C		8R	
9L		9C		9R	
10L		10C		10R	
11L		11C		11R	
12L		12C		12R	
13L		13C		13R	
14L		14C		14R	
15L		15C		15R	
16L		16C		16R	
17L		17C		17R	
18L		18C		18R	
19L		19C		19R	
20L		20C		20R	
21L		21C		21R	
22L		22C		22R	
23L		23C		23R	
24L		24C		24R	
25L		25C		25R	
26L		26C		26R	
27L		27C		27R	
28L		28C		28R	
29L		29C		29R	
30L		30C		30R	
31L		31C		31R	
32L		32C		32R	

Elevations - Bridge Survey Markers

Location	Station - Offset	Elevation
Begin Bridge		
End Bridge		

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

ESTIMATED QUANTITIES

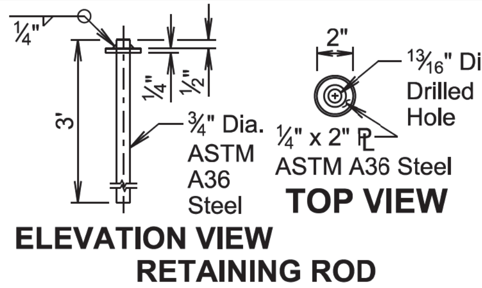
ITEM	UNIT	QUANTITY
Bridge Elevation Survey	L. S.	Lump Sum

AS - BUILT ELEVATION SURVEY
FOR
258' - 0" STEEL GIRDER BRIDGE
OVER I-90 0° SKEW
STA. 15 + 96.01 TO 18 + 54.01 SEC. 28/27-T102N-R51W
STR. NO. 50-090-165 IM 0909(92)387
HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2023
㊵ OF ㊸

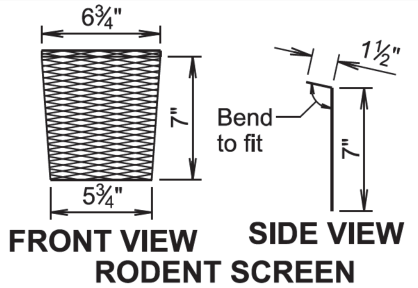
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BB MINN06G8	AG 06G8TA43	BT	Steve A Johnson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E43	E45

FOR BIDDING PURPOSES ONLY



RETAINING ROD

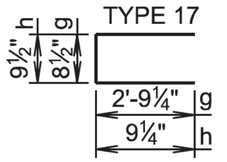


RODENT SCREEN

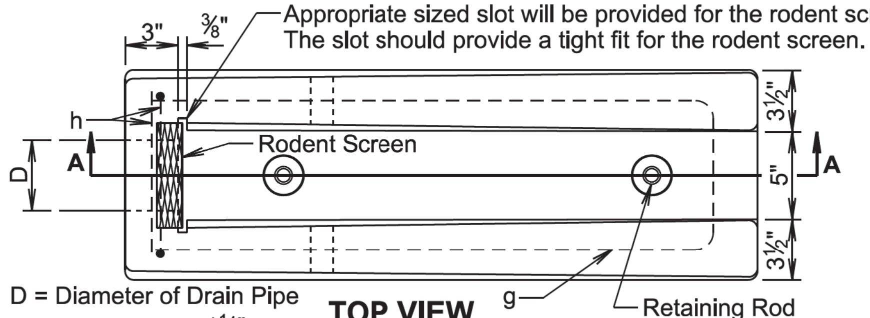
REINFORCING SCHEDULE				
MK.	No.	Size	Length	Type
g	1	4	6'-3"	17
h	2	4	2'-4"	17

NOTE: All dimensions are out to out of bars.

Bending Details

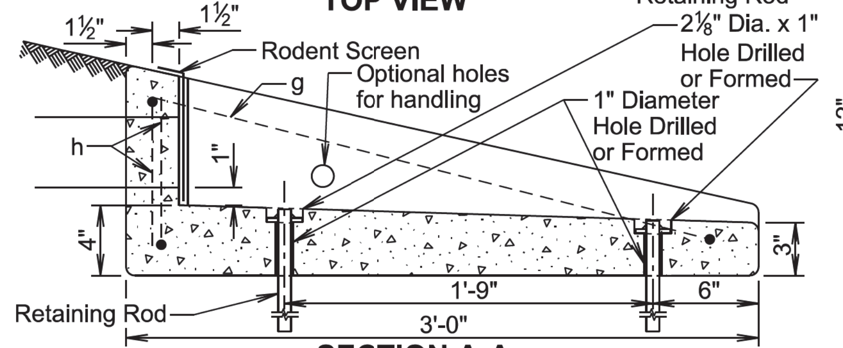


Appropriate sized slot will be provided for the rodent screen. The slot should provide a tight fit for the rodent screen.



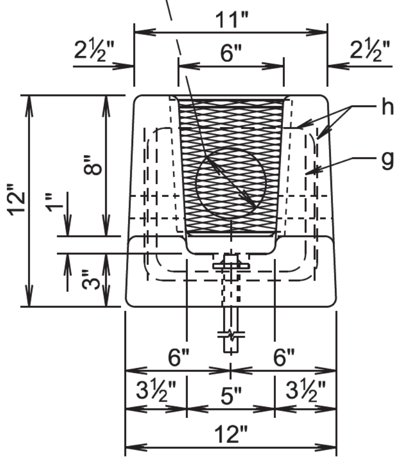
D = Diameter of Drain Pipe

TOP VIEW



SECTION A-A

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



END VIEW

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.

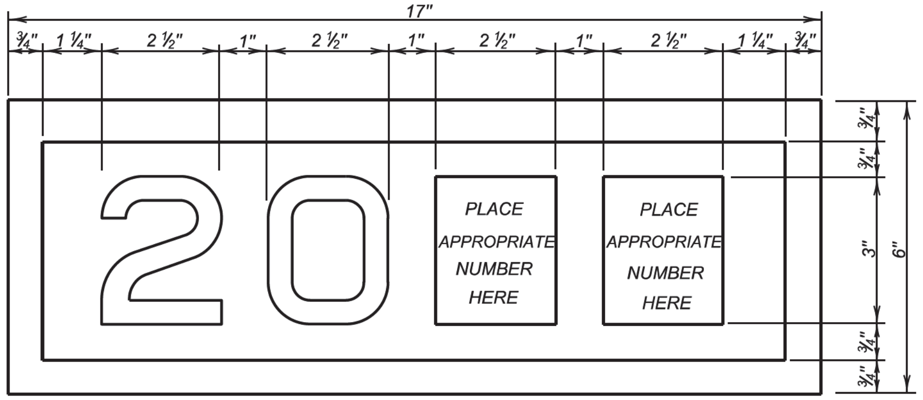
The retaining rod will be galvanized in accordance with ASTM A123 after all shop welding has been completed.

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: 2025	SDDOT	PRECAST CONCRETE HEADWALL FOR DRAIN	PLATE NUMBER 430.50 Sheet 1 of 1



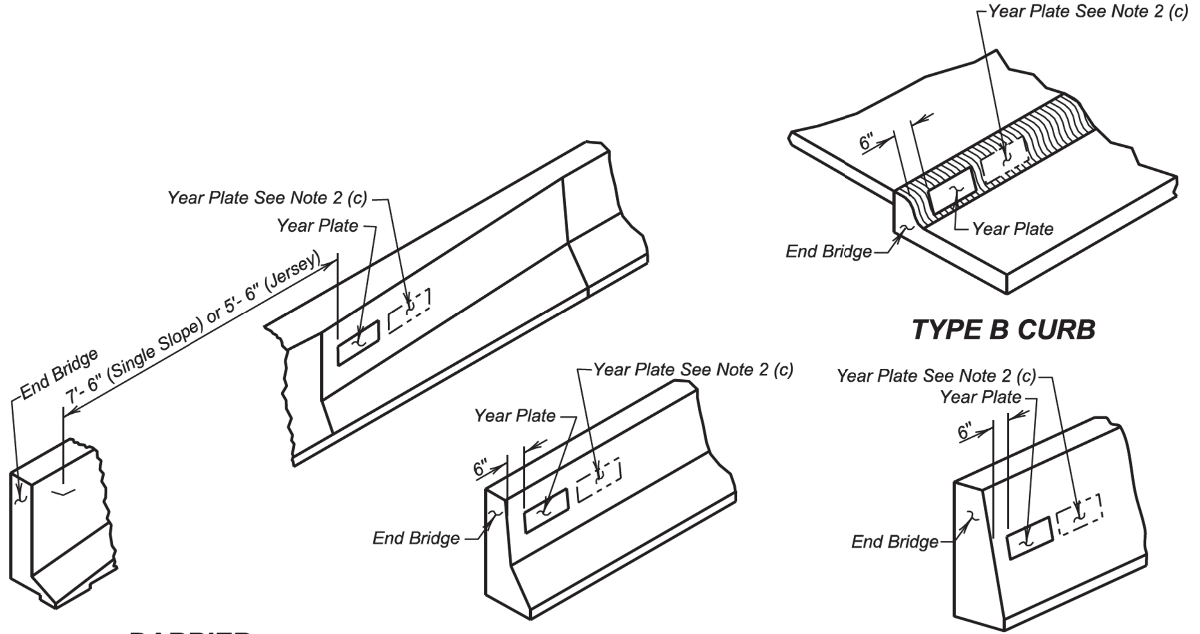
YEAR PLATE DETAILS

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.*



TYPE B CURB

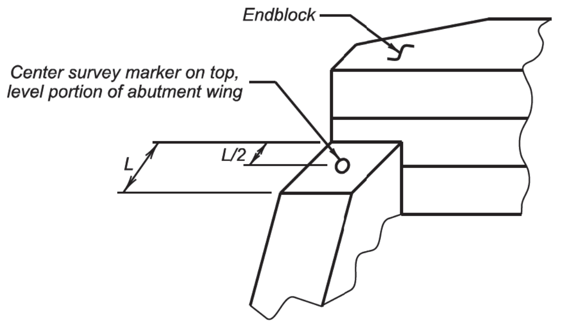
BARRIER
(With Endblock)

JERSEY BARRIER

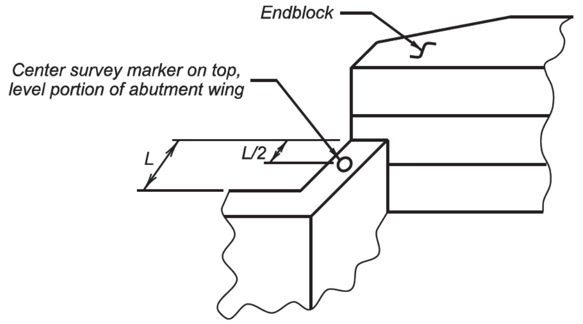
SINGLE SLOPE BARRIER

January 22, 2021

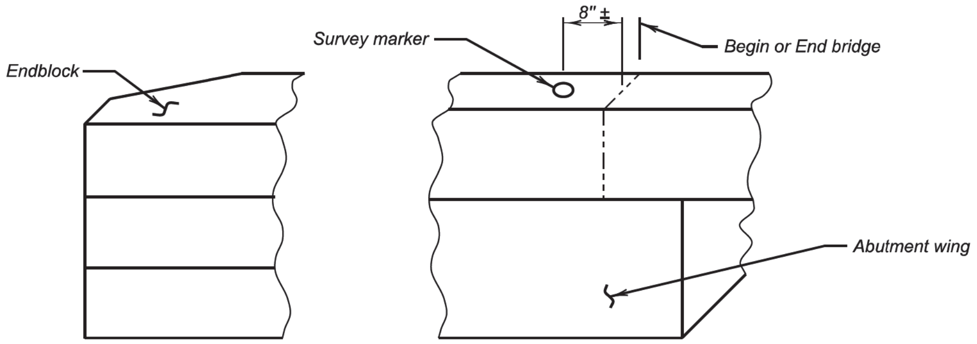
Published Date: 2025	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02 Sheet 1 of 1



ABUTMENT WITH "STRAIGHT" WINGS



ABUTMENT WITH "SWEPT BACK" WINGS



ABUTMENT WITH "SWEPT BACK" WINGS

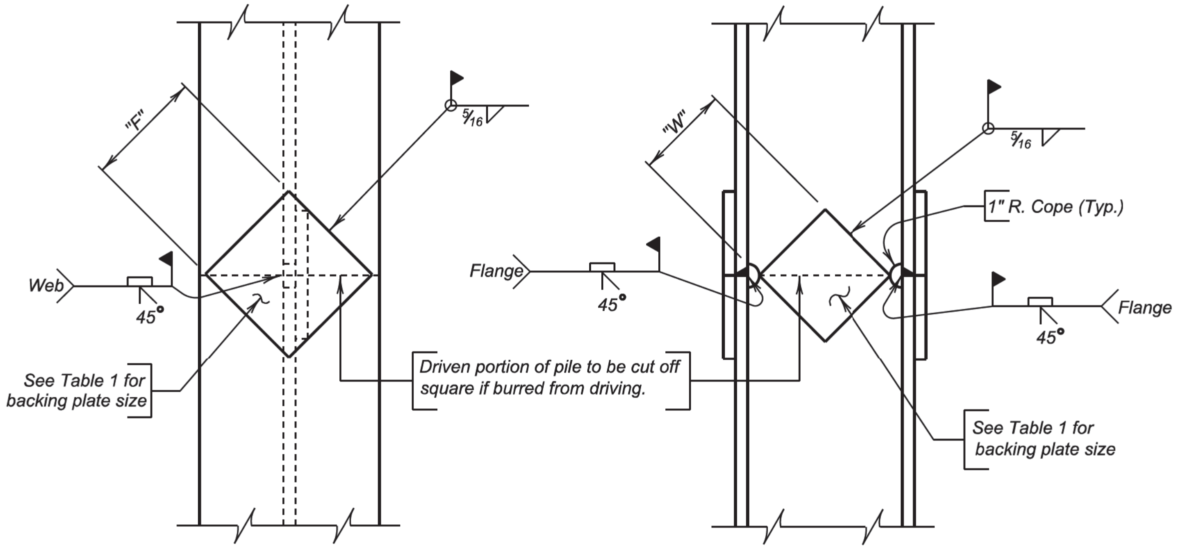
(Endblock on top of wings)

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

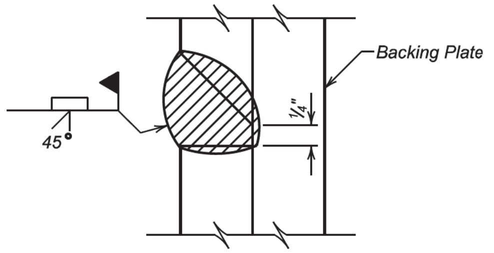
Published Date: 2025	SDDOT	BRIDGE SURVEY MARKER	PLATE NUMBER 460.05 Sheet 1 of 1



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:

1. Steel for backing plates shall conform to ASTM A709 Grade 50.
2. Welding and weld inspection shall be in conformance with AWS D1.5 (Current Year) Bridge Welding Code - Steel.
3. Welder must be certified and registered with the SDDOT.
4. Backing plate shall at a minimum be as thick as the web of the pile being spliced.
5. Web must be coped with 1 inch radius.
6. Submit Welding Procedure Specification (WPS) to Bridge Construction Engineer for approval prior to pile driving.

TABLE 1
(BACKING PLATES)

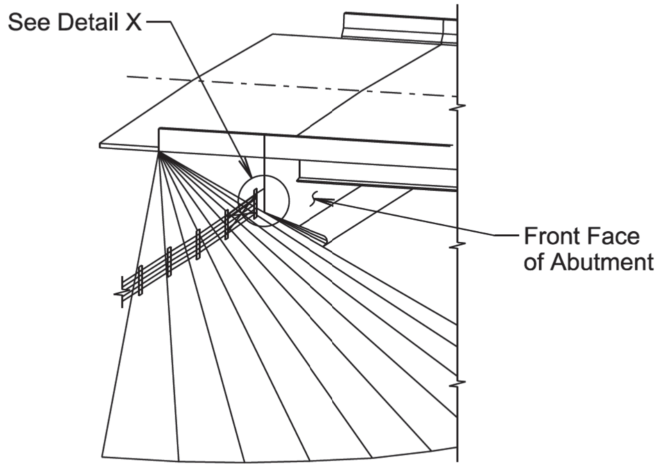
PILE	10"	12"	14"
"F" FLANGE	6 ½"	8"	10"
"W" WEB	4 ¾"	6 ¼"	7 ½"

December 23, 2012

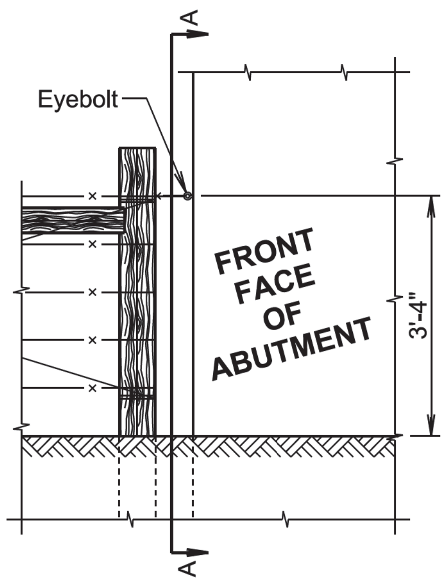
Published Date: 2025	SDDOT	STEEL PILE SPLICE DETAILS	PLATE NUMBER 510.40 Sheet 1 of 1

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(92)387	E45	E45



DETAILS FOR FENCE ANCHORS



DETAIL X

GENERAL NOTES:

The fence and post details shown are for illustrative purpose only. The fence will be as specified elsewhere in the plans.

Eyebolts will be placed on all of the bridge abutment wings.

Eyebolts will be ⅝ inch diameter with 6 inches minimum length and will conform to ASTM A307.

Eyebolts will be galvanized in accordance with AASHTO M232 (ASTM A153).

Eyebolts will be installed after abutment wings are backfilled and berm construction is complete. Drill-in and epoxy eyebolts into abutment such that the eye of the bolt is flush with the concrete surface.

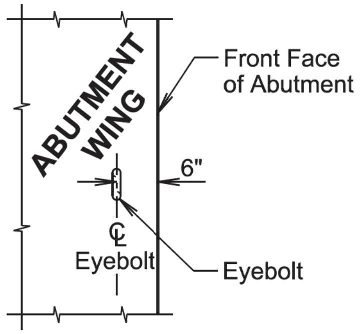
The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).

The diameter of the drilled holes will not be less than ⅛ inch greater, nor more than ⅜ inch greater than the diameter of the eyebolts or as per Manufacturer's recommendations. The drilled holes will be blown out with compressed air using a device that will reach the back of the hole to be sure that all debris or loose material has been removed prior to epoxy injection.

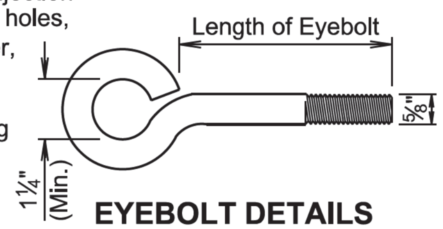
Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes ⅓ to ½ full of epoxy, or as recommended by the Manufacturer, prior to insertion of the eyebolts. Care will be taken to prevent epoxy from flowing out of the horizontal holes prior to eyebolt insertion. Rotate the eyebolt during installation to eliminate voids and ensure complete bonding of the bolt. Insertion of the eyebolts by the dipping or painting method will not be allowed.

Loads will not be applied to the epoxy grouted eyebolts until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.

The cost for furnishing and installing the eyebolts will be incidental to various contract items.



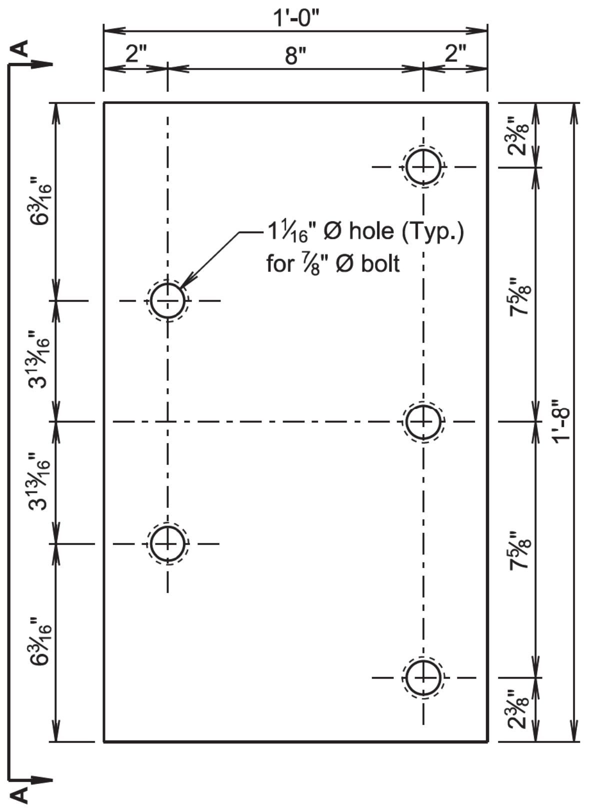
VIEW A-A



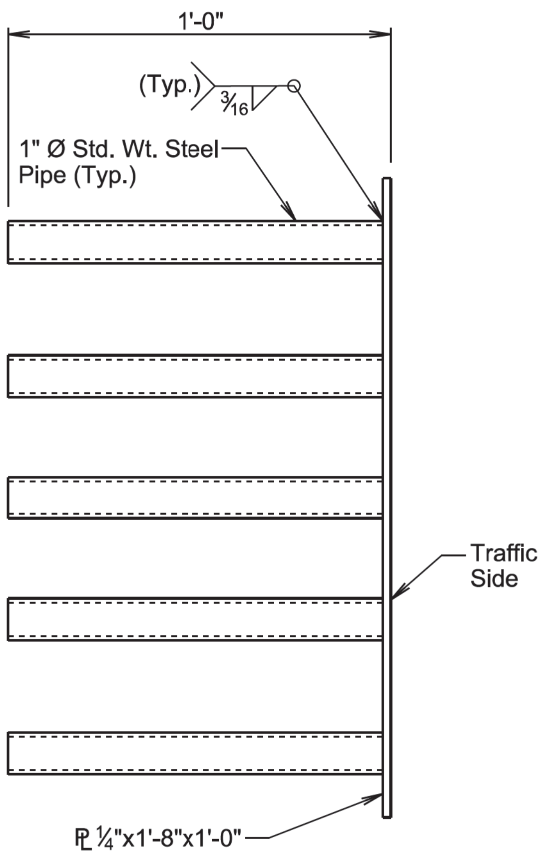
EYEBOLT DETAILS

November 19, 2020

Published Date: 2025	SDDOT	FENCE ANCHORS FOR BRIDGE ABUTMENTS (SWEPT BACK WINGS)	PLATE NUMBER 620.19 Sheet 1 of 1



ELEVATION VIEW



VIEW A - A

GENERAL NOTES:

Steel plate for the insert assembly will conform to ASTM A709, Grade 36. The steel pipes will conform to ASTM A53 or ASTM A500, Grade B.

Welding and weld inspection will be in conformance with AWS D1.1 - (Current Year) Structural Welding Code - Steel.

After fabrication, galvanize in accordance with AASHTO M111 (ASTM A123).

Bolts, nuts, and washers will be provided with each assembly. Bolts will be galvanized and conform to the requirements of ASTM A307, F-1554 Grade A325, or A449. Plain washers will be galvanized and conform to ASTM F844.

Bolt heads will be placed on the traffic side of the endblock. Bolt projection at the back side of the insert will not exceed 1 inch beyond the nut.

The cost of the 5 bolt insert plate assembly complete in place including welding and galvanizing will be incidental to the contract unit price per cubic yard for "Class A45 Concrete, Miscellaneous", "Class A45 Concrete, Bridge Deck", or "Class A45 Concrete, Bridge Repair", as applicable.

August 27, 2020

Published Date: 2025	SDDOT	5 BOLT INSERT PLATE ASSEMBLY	PLATE NUMBER 630.92 Sheet 1 of 1

258' - 0" STEEL GIRDER BRIDGE
STR. NO. 50-090-165
DECEMBER 2023