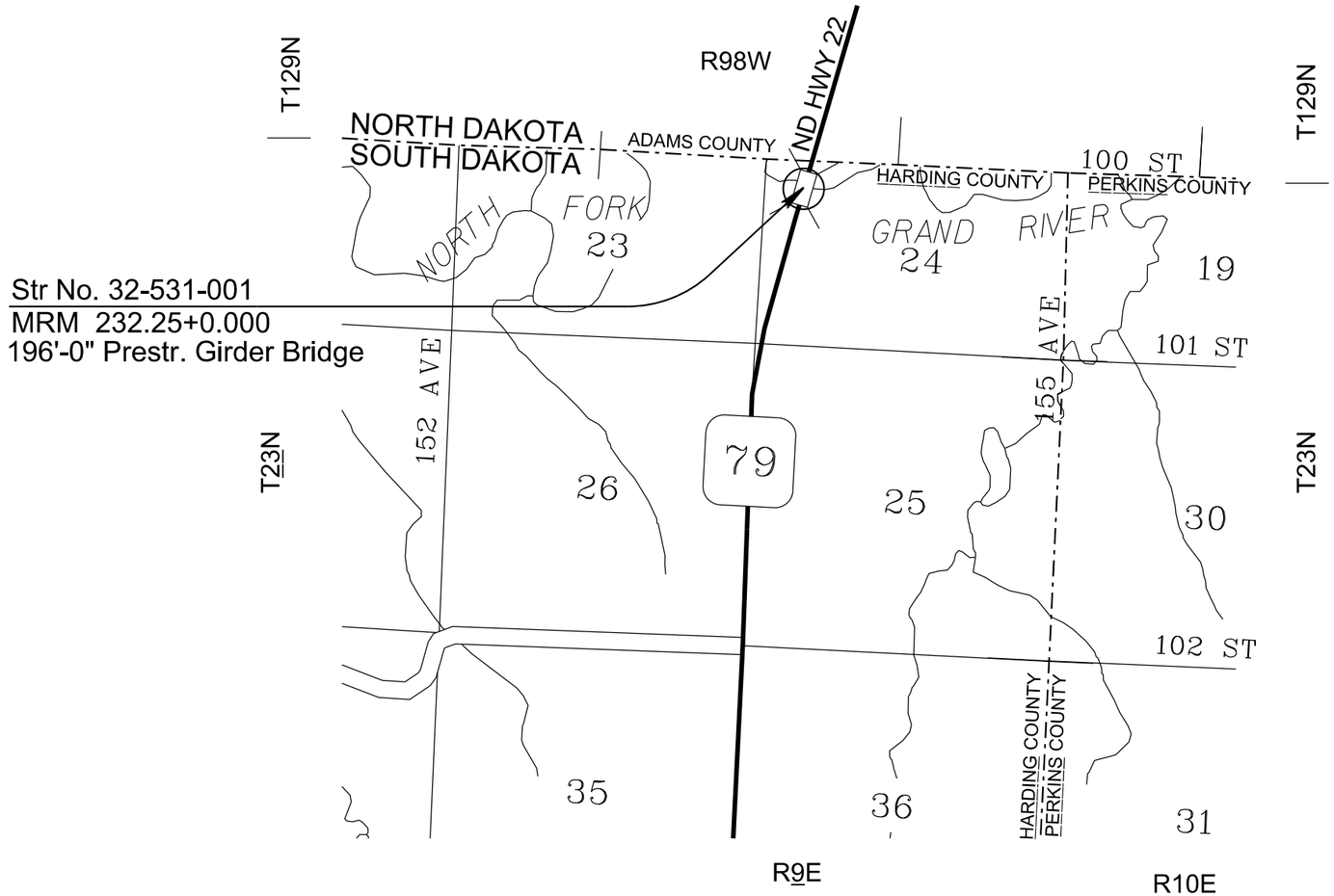
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E1	E27

Section E: Structure Plans

INDEX OF SHEETS



Str No. 32-531-001
MRM 232.25+0.000
196'-0" Prestr. Girder Bridge

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
08/12/2024

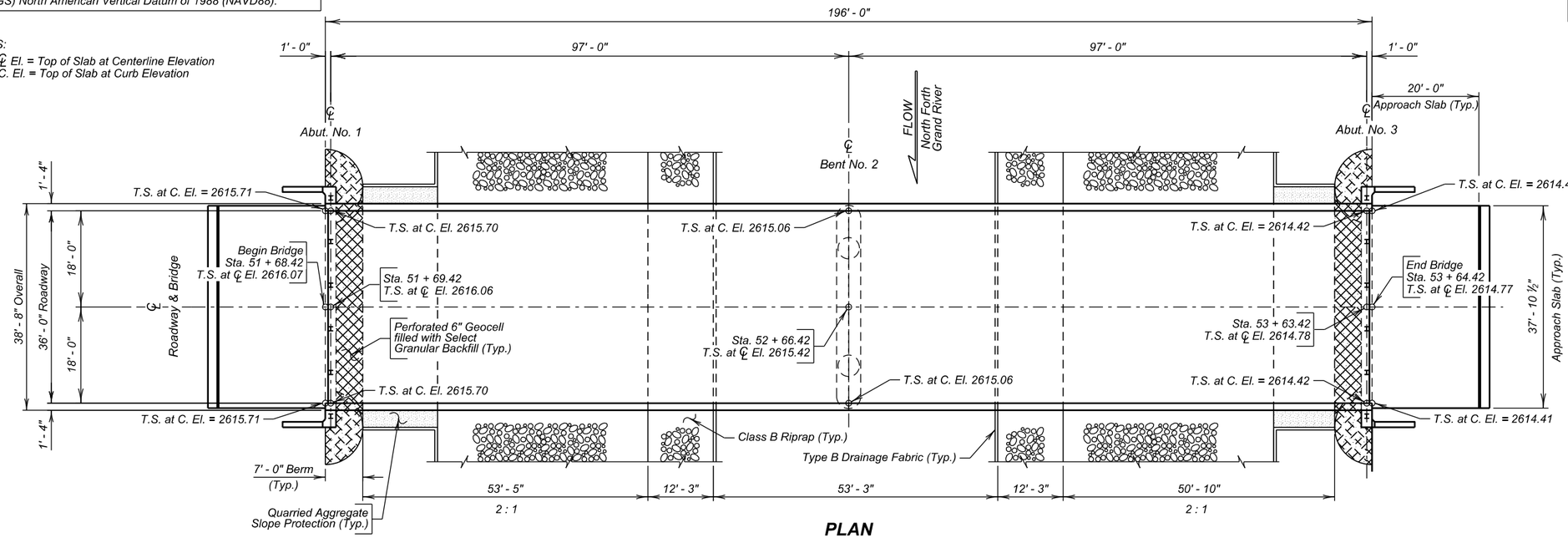
SECTION E - ESTIMATE OF STRUCTURE QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E5000	Concrete Penetrating Sealer	780.1	SqYd
120E7000	Select Granular Backfill	21.1	Ton
250E0030	Incidental Work, Structure	Lump Sum	LS
410E0030	Structural Steel, Miscellaneous	Lump Sum	LS
410E2600	Membrane Sealant Expansion Joint	75.8	Ft
420E0100	Structure Excavation, Bridge	18	CuYd
430E0200	Bridge End Embankment	1,360	CuYd
430E0300	Granular Bridge End Backfill	97.9	CuYd
430E0510	Approach Slab Underdrain Excavation	6.6	CuYd
430E0700	Precast Concrete Headwall for Drain	4	Each
460E0030	Class A45 Concrete, Bridge Deck	269.2	CuYd
460E0050	Class A45 Concrete, Bridge	99.9	CuYd
460E0150	Concrete Approach Slab for Bridge	172.3	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	37.9	SqYd
465E0100	Class A45 Concrete, Drilled Shaft	71.3	CuYd
465E0200	Drilled Shaft Excavation	65.7	CuYd
465E1062	62" Permanent Casing	20.0	Ft
480E0100	Reinforcing Steel	30,284	Lb
480E0200	Epoxy Coated Reinforcing Steel	2,083	Lb
480E0300	Stainless Reinforcing Steel	63,317	Lb
510E0300	Preboring Pile	120	Ft
510E3130	HP 12 Pile Tip Reinforcement	12	Each
510E3401	HP 12x53 Steel Test Pile, Furnish and Drive	100	Ft
510E3405	HP 12x53 Steel Bearing Pile, Furnish and Drive	450	Ft
560E8054	54" Minnesota Shape Prestressed Concrete Beam	774	Ft
680E0040	4" Underdrain Pipe	124	Ft
680E2500	Porous Backfill	5.4	Ton
700E0210	Class B Riprap	1,484.6	Ton
700E1100	Overburden Excavation for Riprap	777	CuYd
734E2022	Bridge Berm Slope Protection, Quarried Aggregate	142.2	SqYd
831E0110	Type B Drainage Fabric	1,911	SqYd
831E1030	Perforated Geocell	604	SqFt

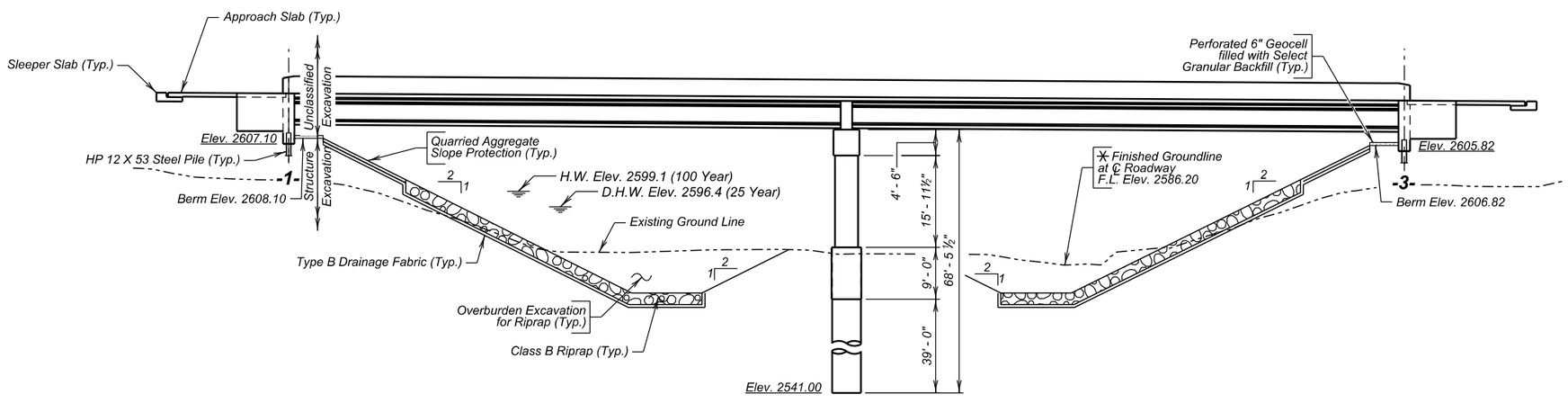
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E3	E27

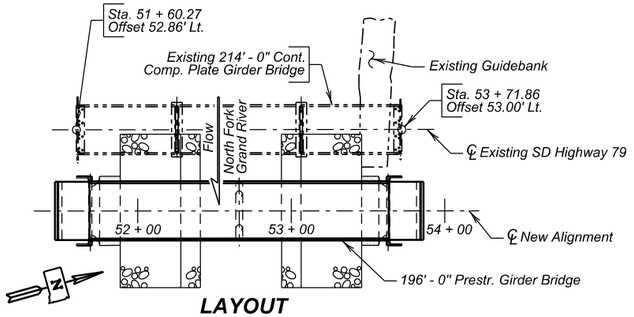
NOTES:
T.S. at ℄ El. = Top of Slab at Centerline Elevation
T.S. at C. El. = Top of Slab at Curb Elevation



PLAN

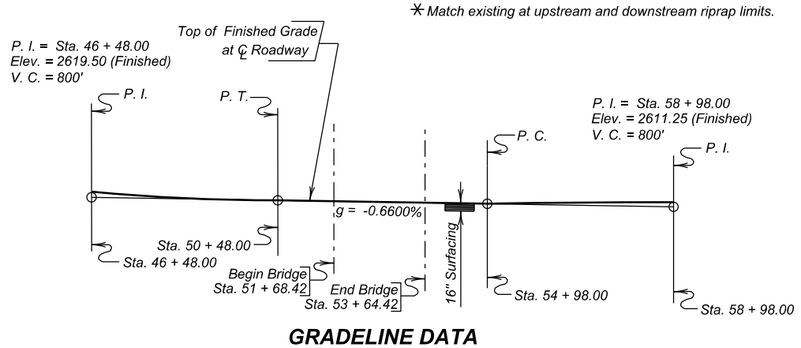


-2-
ELEVATION



LAYOUT

Match existing at upstream and downstream riprap limits.



GRADELINE DATA

-X081-
INDEX OF BRIDGE SHEETS -

HYDRAULIC DATA

Q_d	3330 cfs
A_d	951 sq. ft.
V_d	3.5 fps
Q_F	3330 cfs
Q_{100}	5908 cfs
Q_{OT}	>100 yr
V_{max}	4.5 fps

Q_d = Design discharge for the proposed bridge based on 25 year frequency. El. 2596.4.

Q_{OT} = Overtopping discharge and frequency >Q100 year recurrence interval. El. 2612.1 @ Sta. 62+38.

Q_F = Designated peak discharge for the basin approaching proposed project based on 25 year frequency.

Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 2599.1.

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

The hydraulic data contained in these plans is valid only if the overflow section is maintained. Alteration of the overflow section will require re-analysis of the hydraulics at this site to determine its effect on public safety.

GENERAL DRAWING
FOR
196' - 0" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93
PCN 06TD

HARDING COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

REGISTERED PROFESSIONAL ENGINEER — REG. NO. 13592 — CHRISTOPHER T. HERSINGER — SOUTH DAKOTA — 08/12/2024

PLANS BY: HRGreen

-X081-

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CTH	DVB	CTH	BRIDGE ENGINEER

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Concrete Penetrating Sealer	780.1	SqYd	See Special Provision
Select Granular Backfill	21.1	Ton	
Incidental Work, Structure	Lump Sum	LS	
Structural Steel, Miscellaneous	Lump Sum	LS	
Membrane Sealant Expansion Joint	75.8	Ft	
Structure Excavation, Bridge	18	CuYd	
Bridge End Embankment	1,360	CuYd	
Granular Bridge End Backfill	97.9	CuYd	
Approach Slab Underdrain Excavation	6.6	CuYd	
Precast Concrete Headwall for Drain	4	Each	
Class A45 Concrete, Bridge Deck	269.2	CuYd	
Class A45 Concrete, Bridge	99.9	CuYd	
Concrete Approach Slab for Bridge	172.3	SqYd	
Concrete Approach Sleeper Slab for Bridge	37.9	SqYd	
Class A45 Concrete, Drilled Shaft	71.3	CuYd	
Drilled Shaft Excavation	65.7	CuYd	
62” Permanent Casing	20	Ft	
Reinforcing Steel	30,284	Lb	
Epoxy Coated Reinforcing Steel	2,083	Lb	
Stainless Reinforcing Steel	63,317	Lb	See Special Provision
Preboring Pile	120	Ft	
HP 12x53 Pile Tip Reinforcement	12	Each	
HP 12x53 Steel Test Pile, Furnish and Drive	100	Ft	
HP 12x53 Steel Bearing Pile, Furnish and Drive	450	Ft	
54" Minnesota Shape Prestressed Concrete Beam	774	Ft	
4” Underdrain Pipe	124	Ft	
Porous Backfill	5.4	Ton	
Class B Riprap	1,484.6	Ton	
Overburden Excavation for Riprap	777	CuYd	
Bridge Berm Slope Protecting, Quarried Aggregate	142.2	SqYd	
Type B Drainage Fabric	1,911	SqYd	
Perforated Geocell	604	Sq Ft	

BRIDGE SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 9th Edition.
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and required provisions, supplemental specifications and special provisions as included in the proposal.

BRIDGE DESIGN LOADING

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

DESIGN MATERIAL STRENGTHS*

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

*For prestressed beams, see notes regarding Prestressed Girders.

GENERAL CONSTRUCTION

1. All lap splices shown are contact lap splices unless noted otherwise.
2. All exposed concrete corners and edges will be chamfered 3/4-inch unless noted otherwise.
3. Use 2-inch clear cover on all reinforcing steel except as shown otherwise on plans.
4. The Contractor will imprint on the structure the date of new construction as specified and detailed on Standard Plate 460.02.
5. Barrier Curbs and End blocks will be built perpendicular to the roadway grade line.
6. Requests for construction joints or reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.
7. Bridge berms will be constructed to the plans template prior to any pile driving or construction of abutment footings. See Standard Plate 120.11. Berm slopes will not be disturbed after construction. Any alterations to the berm or slopes after berm construction will be submitted to the Bridge Construction Engineer for approval. Allow 30 days for review of proposals.
8. The elevation of the bridge deck is 16 inches above subgrade elevation.

INCIDENTAL WORK, STRUCTURE

1. In place centerline Sta. 51+60.27, 52.86’ LT to centerline Sta. 53+71.86, 53.00’ LT is a 214 foot, 3-span continuous composite plate girder bridge with a 30’-0” clear roadway. The superstructure consists of 4 lines of steel girders with reinforced concrete deck with Standard Type RRA-1 steel railing faced with thrie beam continuous across the bridge. The substructure consists of pier wall reinforced concrete bents and reinforced concrete sill type abutments which are supported on pier walls on spread footings and timber piling.
2. Break down and remove the existing bridge, and approach/sleeper slabs if applicable, to 1-foot below finished groundline, or as required to construct the new structure in accordance with Section 110 of the Construction Specifications. All portions of the existing bridge will be removed and disposed of by the Contractor on a site obtained by the Contractor and approved by the Engineer in accordance with the Environmental Commitments found in Section A.
3. During demolition of the structure, efforts will be taken to prevent material from falling into the creek. Under no circumstances is asphalt allowed to fall into the creek.
4. The foregoing is a general description of the in-place bridge and should not be construed to be complete in all details. Before preparing the bid, it is the responsibility of the Contractor to make a visual inspection of the structure to verify the extent of the work and materials involved. If desired by the Contractor, a copy of the original construction plans may be obtained through the Office of Bridge Design.

NOTICE - LEAD BASED PAINT

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

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
08/12/2024

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES FOR

196’ – 0” PRESTR. GIRDER BRIDGE

Str. No. 32-531-001

APRIL 2024

DESIGNED BY:	CK. DES. BY:	DRAFTED BY:	
CTH	DVB	JKK	

DESIGN MIX OF CONCRETE

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

2. Type II cement conforming to Section 750 is required except Type III cement may be used for prestressed beams.

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

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. Abutment backwalls above the construction joint must be cast concurrently with the deck slab. The concrete used for the pile cap and wings will be Class A45 Concrete, Bridge. The concrete used for the backwall will be Class A45 Concrete, Bridge Deck. All abutment and bridge deck concrete will have attained design strength prior to backfilling. Abutment wing walls will not be cast until after the deck has been poured.

7. Each finished abutment shall include a Bridge Survey Marker. See Standard Plate 460.05.

8. Pile tip reinforcement will be required. See Standard Plate 510.30.

BENT

Spiral reinforcement may be fabricated from cold drawn wire conforming to ASTM A1064 or hot rolled plain or deformed bars conforming to the strength requirements of ASTM A615, Grade 60.

DRILLED SHAFT

1. The design of the drilled shafts is based upon encountering competent Ludlow Formation at elevation 2579.0. If competent Ludlow Formation is not encountered at or above this elevation, contact the Office of Bridge Design, through proper channels, before proceeding with the drilled shaft construction. Geotechnical Engineering Activity personnel will be present during the drilling operations to confirm these elevations and to observe placement of the drilled shafts. The Geotechnical Engineering Activity will be notified a minimum of two weeks prior to the start of excavation for the drilled shafts.

2. The drilled shafts will be constructed using the permanent casing method in conformance with the Special Provision for Drilled Shaft Construction. A construction joint will be placed at the top of the permanent casing and the permanent casing will extend a minimum of 1'-0" above the groundline, waterline, or construction platform elevation, whichever is higher.

3. Caving sand may be encountered during excavation of the drilled shafts requiring Wet Construction Methods. Removal of sandy material during drilling may require additional tooling and/or methods besides normal flight auger operations.

4. The construction joint locations and quantities provided on the plans are based upon the estimated existing groundline and waterline elevations. It is the responsibility of the Contractor to verify the existing elevations and have a drilled shaft installation plan submitted and approved prior to ordering the casing. If the Contractor intends to use construction platforms, etc. that would require any of the construction joints to be at a location other than the location shown in the plans, the Contractor will include these proposed changes in the drilled shaft installation plan for approval by the Office of Bridge Design.

5. The quantities for Drilled Shaft Excavation; 62-inch Permanent Casing; Class A45 Concrete, Drilled Shaft; and Class A45 Concrete, Bridge are based upon the construction joint locations as shown in the plans. Payment for these items will be at the contract unit price for the plans shown quantities regardless of any approved changes in the location of the construction joints as requested by the Contractor due to the construction of work platforms, etc. Measurement and payment will be made at the contract unit prices for any changes due to variations in the competent foundation soil or in the locations of the existing groundline and waterline elevations as ordered by the Engineer.

CSL ACCESS TUBES

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

SUPERSTRUCTURE

1. Girder lifting hooks will be cut off before placement of concrete deck slab.

2. The diaphragm at the bent will be poured integrally with the deck slab. Placement of diaphragm at the bent shall not slow down the rate of deck concrete placement and finishing. The Contractor will place the concrete for the specified diaphragms ahead of the deck concrete in such a manner that advancement of the deck concrete reaches the diaphragm just as placement of concrete in the diaphragm is complete.

3. The use of an approved deck finishing machine will be required during placement of bridge deck concrete. The deck finishing machine will be adjusted and operated in such a manner that the screed or screeds are parallel with the centerline of the bridge. The finish machine and concrete placement will be parallel to the skew of the bridge.

4. The concrete bridge deck will be placed and finished at a minimum rate of 78 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 78 feet per hour can be maintained and the concrete has attained a minimum compressive strength of 2000 psi.

5. Snap ties, if used in the barrier curb formwork, will be corrosion resistant. The corrosion resistant ties will be inert in concrete and compatible with the reinforcing steel.

6. See Special Provision for Concrete Penetrating Sealer.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
08/12/2024

NOTES (CONTINUED)
FOR
196' – 0" PRESTR. GIRDER BRIDGE

Str. No. 32-531-001

APRIL 2024

DESIGNED BY:	CK. DES. BY:	DRAFTED BY:	
CTH	DVB	JKK	BRIDGE ENGINEER

PRESTRESSED GIRDERS

1. Minimum concrete compressive strength f'_c = **7,600** psi at 28 days, and f'_{ci} = **6,000** psi for all Girders.

2. All mild reinforcing steel will be deformed bars conforming to ASTM A615, Grade 60.

3. Individual tendons in all pretensioned sections will consist of seven-wire uncoated Type 270K Strands having a nominal diameter of 0.6-inch and a minimum ultimate strength of 58600 lbs. per cable. An initial tensile force of 43500 lbs. will be applied to all 0.6-inch cables in all girders. All prestressing steel will conform to AASHTO M203. (low-relaxation strands).

4. All prestressed girders within a span will be cast within an 8-day period. If not, the newest girder will be at least 6 weeks old before the deck slab is poured. The girders will be poured in all steel forms.

5. Prestressed concrete girders will always be lifted by the devices provided in the top flanges near the ends of the girders. Types of lifting devices other than those shown on the plans may be used provided they are approved by the Office of Bridge Design. The design of the lifting devices will be the responsibility of the fabricator.

6. Each beam will be marked showing structure number, casting date, and beam number. Marking will be on the face of the beam near the end and the location will be exposed after the diaphragms have been cast. Facia beams will be marked on an inside face. All markings will be stenciled and clearly legible. For beam designations and locations, see superstructure layout plan and Erection Data sheet.

7. The physical properties of the elastomeric bearing pads will conform to the requirements of Section 18.2 of the AASHTO LFRD Bridge Construction Specification and the AASHTO Materials Specification M251. The elastomeric bearing pads will conform to Grade 70 (durometer). The cost of the pads will be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge. Certification that pads are 70 durometer and meet the requirements of AASHTO LFRD Bridge Construction Specification Section 18.2 and AASHTO Materials Specification M251 will be furnished to the Engineer with the shop drawings. No laminated bearing pads will be allowed.

8. All exposed corners will be chamfered 3/4-inch or rounded to 3/4-inch radius.

9. Dead Load of girder taken as effective at transfer. Cut strands flush with end of girder and coat end of strands with mortar, EXCEPT the strands that are to be extended and bent,

10. The Contractor will be responsible for ensuring that transportation stresses, handling, and erection do not cause damage to the girders.

11. Furnish and Install Inserts for T8 Rebars as shown in the plans. All costs involved will be incidental to the contract unit price per foot of 54” Minnesota Shape Prestressed Concrete Beam.

ABUTMENT BACKWALL COATING

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

http://apps.sd.gov/applications/HC60ApprovedProducts/ProductList.aspx

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

BOLT TESTING

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

SHOP PLANS

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

The fabricator will submit shop plans in accordance with the Specifications. Send shop plan submittals to HR Green, Inc., 431 N Phillips Ave., Suite 400, Sioux Falls, SD 57104 (kbrehm@hrgreen.com). After review, corrections (if necessary), and approval by HR Green, Inc., the Office of Bridge Design will review the submittals, authorize fabrication, arrange for fabrication inspection, and distribute the shop drawings.

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/or the appropriate Shop Plans. Field welding to bridge components shall not be allowed. Field placed concrete inserts or drilled-in anchor bolts will be allowed if approved by the Engineer. All costs associated with providing the Fall Protection System will be incidental to the other contract items.

CLASS B COMMERCIAL TEXTURE FINISH

1. A Class B commercial texture finish will be applied to the front face and top of the barriers. The color will be AMS-STD-595 36622 (Pearl gray).

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.

PILE DRIVING

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

   Delmag D30-32 SPI D-30 APE D30-32.

2. Based on initial analysis, the hammers listed will need to be operated no higher than the third fuel setting in order to prevent overstressing of the pile during driving operations. If during actual driving operations an adequate hammer drop to obtain design bearing is not achieved, contact the Geotechnical Engineering Activity prior to increasing the fuel setting.

3. 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.

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
08/12/2024

NOTES (CONTINUED)
FOR
196’ – 0” PRESTR. GIRDER BRIDGE

Str. No. 32-531-001

APRIL 2024

DESIGNED BY:	CK. DES. BY:	DRAFTED BY:
CTH	DVB	JKK

RIPRAP

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

QUARRIED AGGREGATE SLOPE PROTECTION

1. This work will consist of paving the bridge berm slopes with crushed aggregate slope protection for control and prevention of berm erosion.

2. The aggregate used in the crushed aggregate slope protection will be composed of durable fragments of quarried quartzite or an approved alternative. The material will be pink in color and well graded with 90 to 100% passing a 6-inch sieve and 0 to 10% passing a 2-inch sieve.

3. The Type B Drainage Fabric will be non-woven.

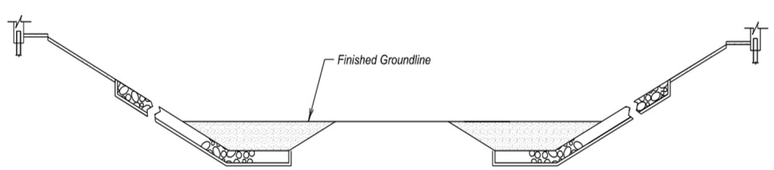
4. The surface upon which the slope protection is to be placed will be smooth, uniform, and free from foreign material. The top surface of the slope protection will conform to the dimensions, elevations, and slopes shown in the plans.

5. The crushed aggregate will be shaped and compacted to provide a stable, smooth, and uniform surface.

6. Payment for crushed aggregate slope protection will be at the contract unit price per square yard for Bridge Berm Slope Protection, Crushed 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.

OVERBURDEN EXCAVATION FOR RIPRAP

1. This work will consist of the removal and replacement of material between the limits of the finished groundline and the top of the riprap. See diagram below (overburden is in grey).



2. Excavation is to be completed after temporary diversion method is in place, if required, with minimal standing water to create the profile of slope protection specified in plans.

3. The removed material will be placed on top of the riprap to the natural ground, proposed groundline, or specified shape and elevations shown in plans. When overburden extends into the streambed it will form the channel bottom and profile as specified in plans. The finished ground at the upstream and downstream limits of proposed riprap will be shaped to match the upstream and downstream channel and flood plain.

4. The overburden material will be placed on top of the riprap and have a maximum lift depth of 1’ – 0” and compacted free of flowing water or standing water in excess or four inches above the riprap at the lowest elevation.

5. Compaction effort will produce a surface that does not pump, rut, or otherwise displace when traveled over with construction equipment to the satisfaction of the Engineer. Material may be added to excavated material to facilitate compaction and handling. Importing, stockpiling, blending, and/or wasting of materials will be incidental to the contract unit price for Overburden Excavation for Riprap.

6. Payment for Overburden Excavation for Riprap will be at the contract unit price and will be full compensation for labor, equipment, tools, and incidentals, including furnishing, installing, and removal of any temporary works necessary to complete the work. Payment will be for plans quantity unless measurement is ordered by the Engineer.

7. Before preparing the bid, it is the responsibility of the Contractor to verify existing conditions to determine if a temporary diversion method and/or dewatering will be required. If required, the Contractor must submit the temporary diversion method and/or dewatering for approval to the Construction Engineer 30 days prior to construction.

PERFORATED GEOCELL

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

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

2. Perforated Geocell will be 6 inches tall with Type B Drainage Fabric underlying the perforated Geocell. Installation will adhere to the manufacturer’s recommendation.

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

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.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
08/12/2024

NOTES (CONTINUED)
FOR
196’ – 0” PRESTR. GIRDER BRIDGE

Str. No. 32-531-001

APRIL 2024

DESIGNED BY:	CK. DES. BY:	DRAFTED BY:
CTH	DVB	JKK

APPROACH SLAB UNDERDRAIN SYSTEM

1. An underdrain system will be placed underneath the sleeper slabs and behind the abutments as shown in the plans in accordance with Section 435 of the Construction Specifications.

2. The 4-inch diameter Perforated PVC Drain Pipe will be PS 46 Solvent Weld PVC Pipe conforming to ASTM F758 or SDR 35 Solvent Weld PVC Pipe conforming to ASTM D3034 with perforations in accordance with ASTM F758. The 4-inch diameter PVC Outlet Pipe will be Schedule 40 PVC Pipe conforming to ASTM D1785 designated as PVC 1120, PVC 1220, or PVC 2120. Pipe sections will be connected using a PVC Solvent Cement conforming to ASTM D2564. The Drain Sleeve shall conform to ASTM D6707.

3. Care will be taken to ensure that the 4-inch diameter Perforated PVC Drain Pipe and the 4-inch diameter PVC Outlet Pipe are not damaged during construction. Sufficient cover material will be placed over the pipes before compaction equipment is allowed over the underdrain system. Any damaged pipes will be replaced by the Contractor at no additional cost to the Department.

4. All labor, tools, equipment, and any incidentals necessary for the Installation of 4-inch diameter Perforated PVC Drain Pipe, 4-inch diameter PVC Outlet Pipe, 5-inch diameter schedule 40 steel pipe, SDR Solvent Weld PVC Coupling, and PVC Cement will be incidental to the contract unit price per foot for 4” Underdrain Pipe.

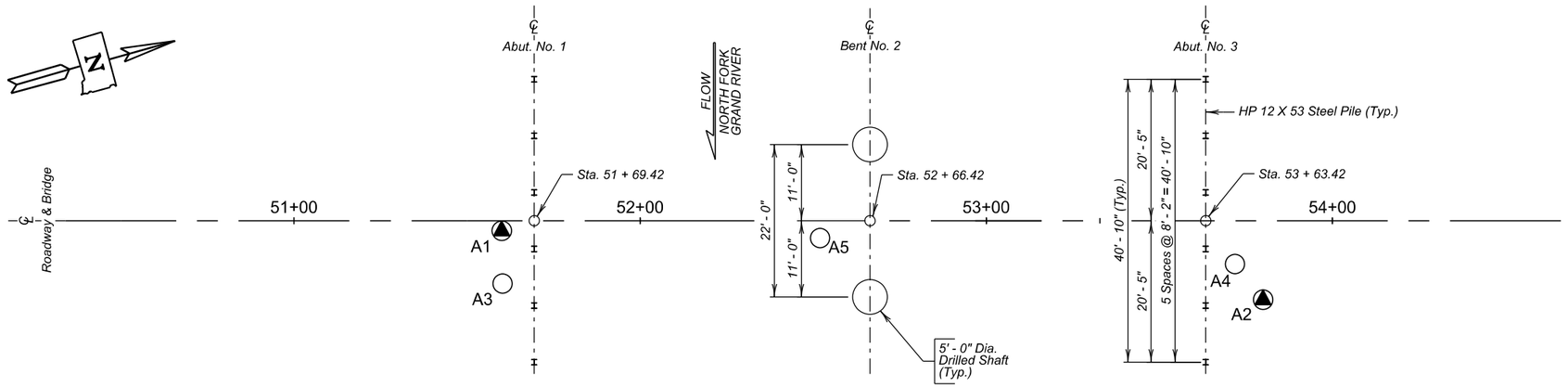
REGISTERED PROFESSIONAL ENGINEER
REG. NO. 13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
08/12/2024

NOTES (CONTINUED)
FOR
196’ – 0” PRESTR. GIRDER BRIDGE

Str. No. 32-531-001

APRIL 2024

DESIGNED BY:	CK. DES. BY:	DRAFTED BY:
CTH	DVB	JKK



PILING & DRILLED SHAFT LAYOUT

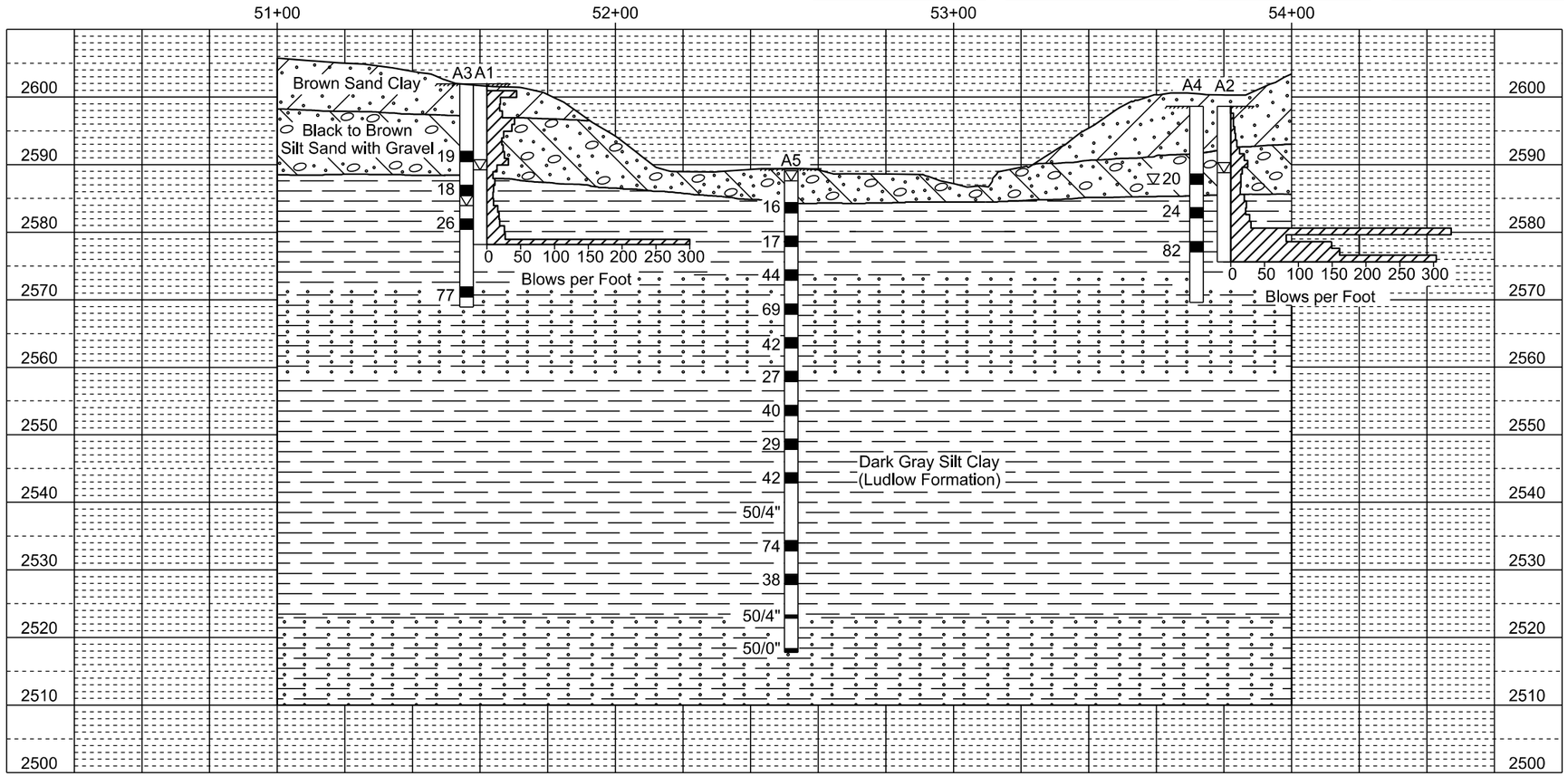
REGISTERED PROFESSIONAL ENGINEER
REG. NO. 13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
08/12/2024

Hole Number	A3	
Station	51+60.3	
Depth	31.5	ft
Soil Color	Dark Gray	
Classification	Silty Sand	
Strength (Qu)	1,191	psf
Dry Density	99.5	pcf
Wet Density	124.7	pcf
Moisture	25.3	%
Pass No. 10	100.0	%
Pass No. 40	99.9	%
Pass No. 200	24.2	%
Sand Content	75.8	%
Silt Content	11.8	%
Clay Content	12.4	%

Hole Number	A5	
Station	52+52	
Depth	11.2	ft
Soil Color	Dark Gray	
Classification	Clay	
Strength (Qu)	5,455	psf
Dry Density	91.9	pcf
Wet Density	117.1	pcf
Moisture	27.4	%
Pass No. 10	100.0	%
Pass No. 40	99.9	%
Pass No. 200	97.0	%
Sand Content	3.0	%
Silt Content	34.6	%
Clay Content	62.4	%

Hole Number	A5	
Station	52+52	
Depth	21.2	ft
Soil Color	Gray	
Classification	Silty Sand	
Strength (Qu)	1,086	psf
Dry Density	100.3	pcf
Wet Density	125.7	pcf
Moisture	25.3	%
Pass No. 10	100.0	%
Pass No. 40	100.0	%
Pass No. 200	44.0	%
Sand Content	56.0	%
Silt Content	31.6	%
Clay Content	12.4	%

Hole Number	A5	
Station	52+52	
Depth	31.5	ft
Soil Color	Dark Gray	
Classification	Silt Clay	
Strength (Qu)	5,871	psf
Dry Density	96.7	pcf
Wet Density	120.7	pcf
Moisture	24.8	%
Pass No. 10	100.0	%
Pass No. 40	99.9	%
Pass No. 200	93.2	%
Sand Content	6.8	%
Silt Content	43.2	%
Clay Content	50.0	%



The Ludlow Formation is a coastal deposit of loosely consolidated fine to meduim grained calcareous sandstone and shale with interbedded layers of siltstone and claystone. Textural classification varies from clay-silt to sand. Colors vary from white, tan, yellow and gray. Bands of lignite may be present.

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

LEGEND

Penetration Test
Drive Test
Water
Caved
Sample Zone

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

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

GROUNDWATER ELEVATIONS

MARCH 2022

A1	2589.2
A2	2588.8

JULY 2022

A3	2583.9
A4	2587.1

JANUARY 2023

A5	2587.6

MEASURED SKIN FRICTION

	ELEV.	PSF
A1	2578.2	830
A2	2575.6	967

SUBSURFACE INVESTIGATION & PILING/DRILLED SHAFT LAYOUT
FOR

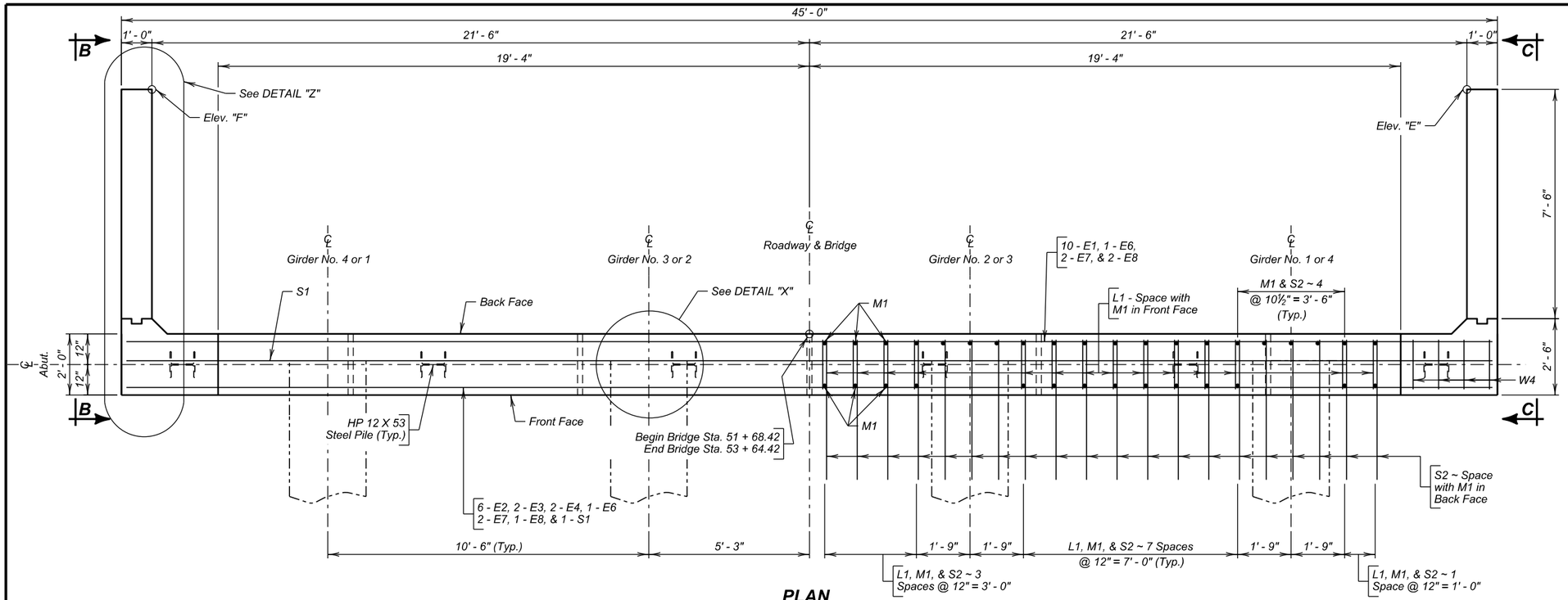
196' - 0" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

HARDING COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CTH	DVB	JKK	BRIDGE ENGINEER

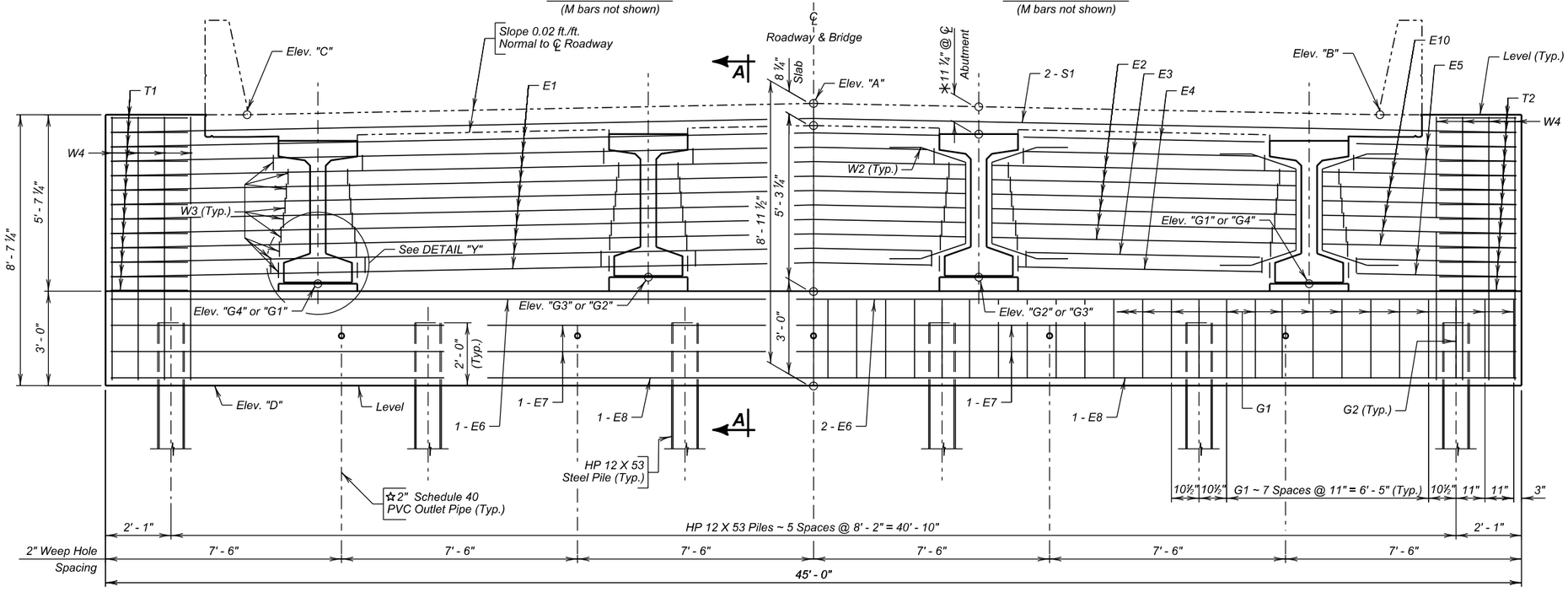
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E10	E27



PLAN

(Abut. No. 1 shown, Abut. No. 3 similar by opposite hand.)

⚹ *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.*



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

ELEVATION

(Along ℄ Abutment)

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
08/12/2024

ABUTMENT DETAILS (A)

FOR

196' - 0" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

HARDING COUNTY

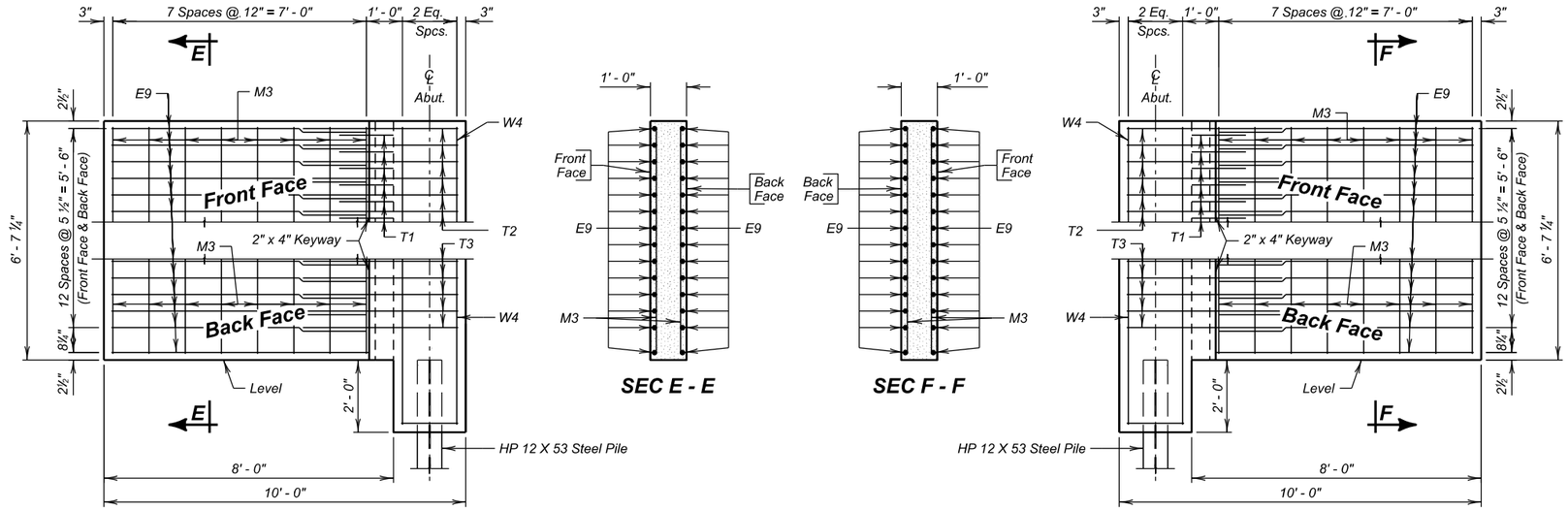
S. D. DEPT. OF TRANSPORTATION

APRIL 2024

8 OF 25

DESIGNED BY	CK. DES. BY	DRAFTED BY	
			BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E11	E27

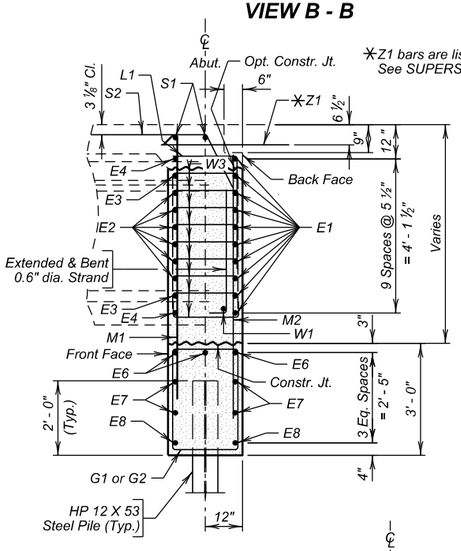


VIEW B - B

SEC E - E

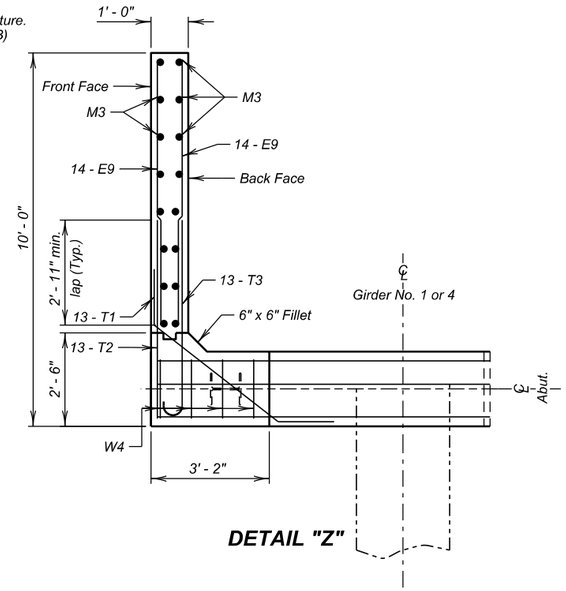
SEC F - F

VIEW C - C

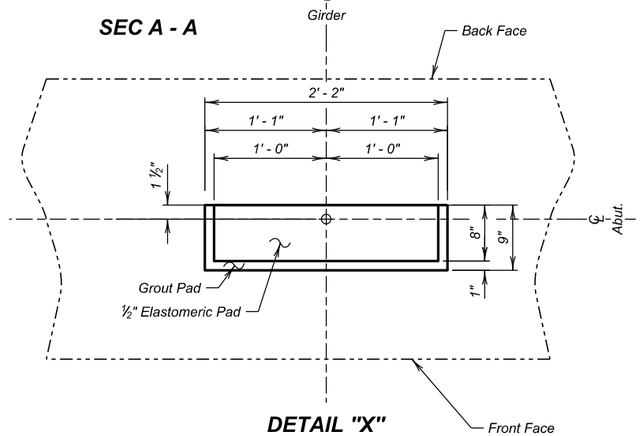


SEC A - A

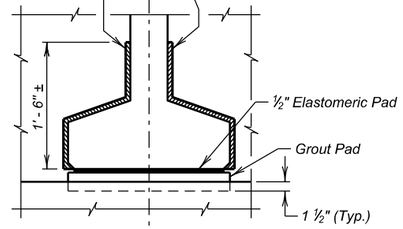
Z1 bars are listed and included in superstructure. See SUPERSTRUCTURE DETAILS (A) & (B)



DETAIL "Z"



DETAIL "X"



DETAIL "Y"

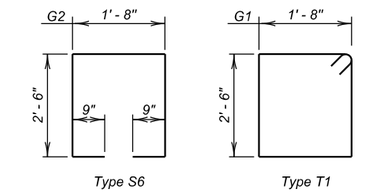
(Typical at girder ends; abutments only)

REINFORCING SCHEDULE

(For One Abutment)

Mk.	No.	Size	Length	Type
E1	10	6	44' - 8"	Str.
E2	18	6	9' - 8"	Str.
E3	6	6	7' - 5"	Str.
E4	6	6	7' - 9"	Str.
E5	8	6	5' - 2"	Str.
E6	3	7	44' - 8"	Str.
E7	4	4	44' - 8"	Str.
E8	2	9	44' - 8"	Str.
E9	56	6	7' - 2"	Str.
E10	12	6	6' - 2"	Str.
G1	44	4	8' - 4"	T1
G2	6	5	8' - 2"	S6
△ L1	28	4	3' - 4"	17A
△ M1	34	5	7' - 6"	T9B
M2	34	5	7' - 1"	Str.
M3	32	5	6' - 3"	Str.
△ S1	2	9	44' - 8"	Str.
△ S2	40	5	8' - 3"	17A
T1	26	6	7' - 3"	19
T2	26	6	6' - 5"	17A
T3	26	6	6' - 1"	1A
W1	4	5	4' - 8"	Str.
W2	8	4	7' - 7"	14
W3	72	5	2' - 8"	17
W4	8	6	18' - 2"	17

Bending Details



NOTES:
All dimensions are out to out of bars.
△ Bars to be epoxy coated.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY	
		Abut. No. 1	Abut. No. 3
∉ Class A45 Concrete, Bridge	Cu. Yd.	29.0	29.0
Reinforcing Steel	Lb.	4,548	4,548
Epoxy Coated Reinforcing Steel	Lb.	976	976
Structure Excavation, Bridge	Cu. Yd.	8.9	8.9
HP 12 Pile Tip Reinforcement	Each	6	6
HP 12 x 53 Steel Test Pile, Furnish & Drive	Ft.	1@ 50' = 50'	1@ 50' = 50'
HP 12 x 53 Steel Bearing Pile, Furnish & Drive	Ft.	5 @ 45' = 225'	5 @ 45' = 225'
Preboring Pile	Ft.	6 @ 10' = 60'	6 @ 10' = 60'

∉ Includes 0.04 cu. yds. for grout pads.

TABLE OF ELEVATIONS

Abut. No.	Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"	Elev. "E"	Elev. "F"
1	2616.06	2615.70	2615.70	2607.10	2615.76	2615.76
3	2614.78	2614.42	2614.42	2605.82	2614.36	2614.36

TABLE OF ELEVATIONS

Abut No.	Elev. "G1"	Elev. "G2"	Elev. "G3"	Elev. "G4"
1	2610.22	2610.48	2610.48	2610.22
3	2608.94	2609.20	2609.20	2608.94

NOTE -
Elev. "A", "B" and "C" are top of slab at ℄ of Abutment.
Elev. "E" & "F" are top of wingwall at the end of wingwall
Elev. "G1", "G2", "G3", and "G4" are top of grout pad elevations at ℄ Abutment. Top of Grout Pads will be Level and Smooth.

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
08/12/2024

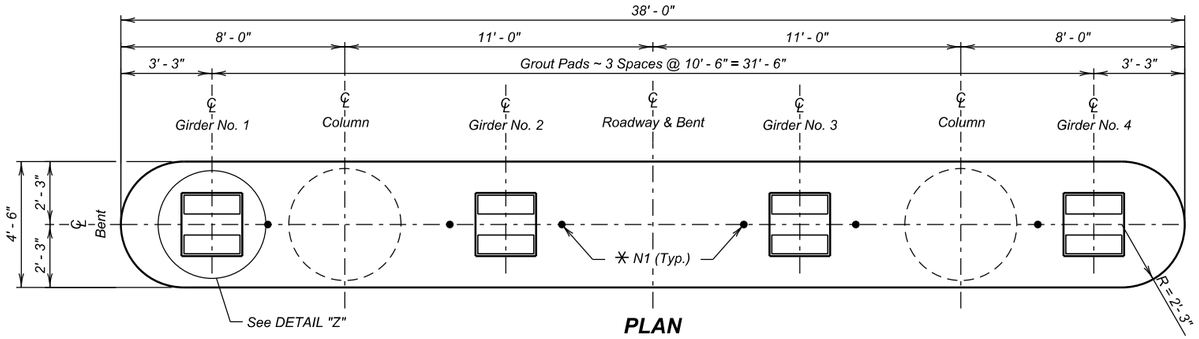
ABUTMENT DETAILS (B)
FOR
196' - 0" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

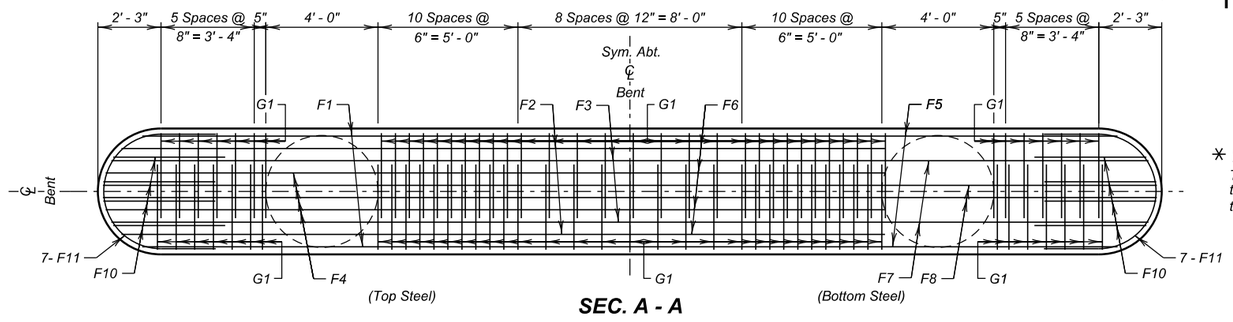
HARDING COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

DESIGNED BY	CK. DES. BY	DRAFTED BY	
			BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E12	E27

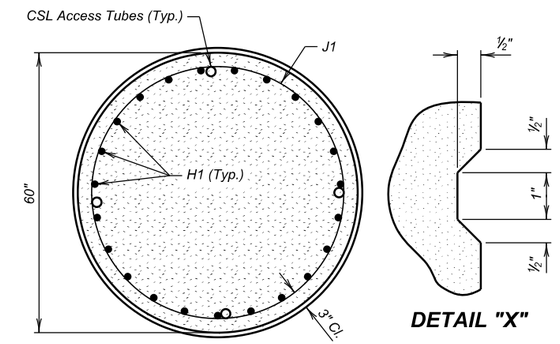


PLAN



SEC. A - A

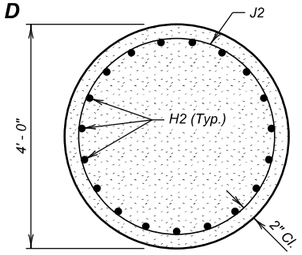
INCREASING STATIONS



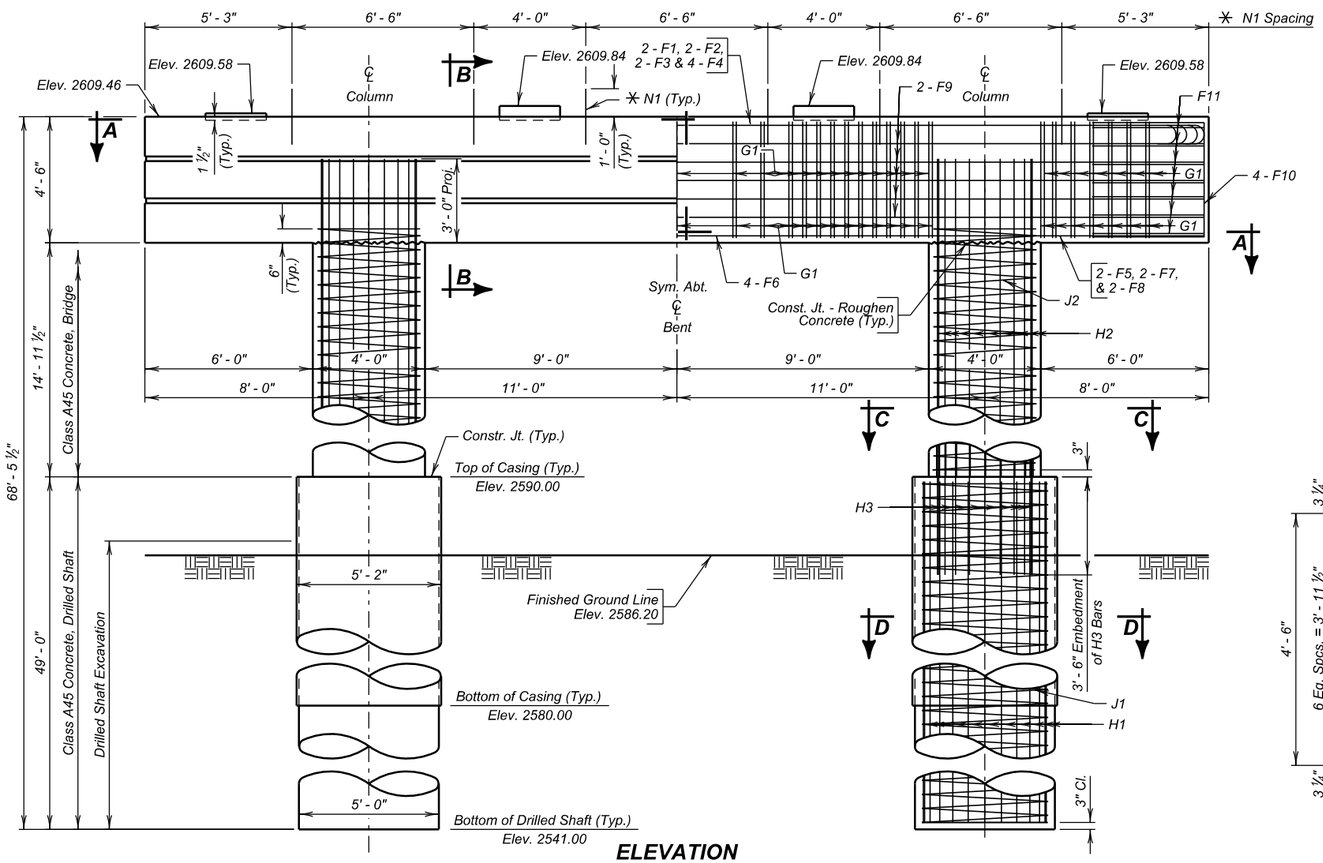
SEC. D - D

DETAIL "X"

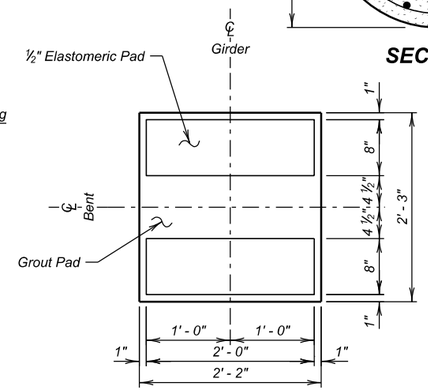
✳ **NOTE:**
The portion of the N1 bar above the bent cap is to be coated with asphalt paint or wrapped with tar paper to a minimum thickness of 1/16".



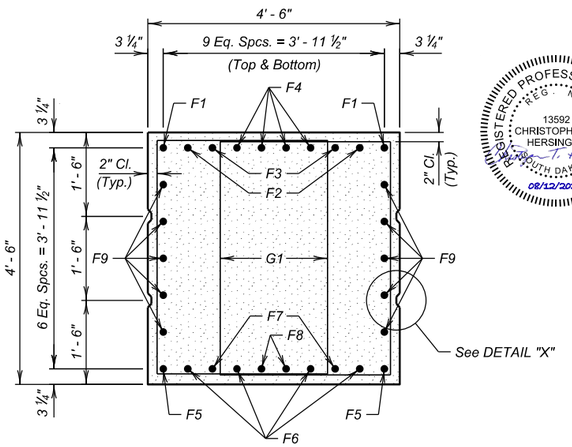
SEC. C - C



ELEVATION



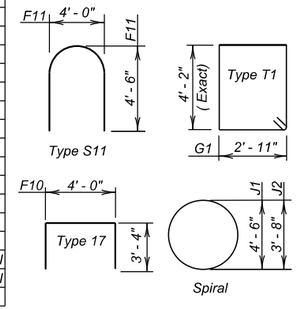
DETAIL "Z"

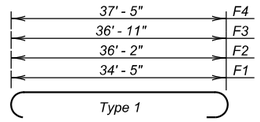


SEC. B - B

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
F1	2	9	37' - 0"	1	
F2	2	9	38' - 9"	1	
F3	2	9	39' - 6"	1	
F4	4	9	40' - 0"	1	
F5	2	9	34' - 5"	Str.	
F6	4	9	18' - 0"	Str.	
F7	2	9	36' - 11"	Str.	
F8	2	9	37' - 5"	Str.	
F9	10	5	34' - 5"	Str.	
F10	8	5	10' - 8"	17	
F11	14	5	11' - 3"	S11	
G1	86	5	15' - 2"	T1	
H1	46	10	48' - 6"	Str.	
H2	38	9	17' - 11"	Str.	
H3	38	9	7' - 3"	Str.	
J1	2	5	1382' - 10"	Spiral	
J2	2	4	415' - 8"	Spiral	
N1	6	8	2' - 0"	Str.	





NOTES -
All dimensions are out to out of bars.

Spirals - Use 6" pitch and 1 ½ extra turns at each end. Use 1 ½ turns for lap at splice as required, or weld as approved by the Office of Bridge Design. Use 3 vertical spacer bars per column. Spirals may be smooth bars. Bar length shown does not include splices.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
℄ Class A45 Concrete, Bridge	Cu. Yd.	41.9
Class A45 Concrete, Drilled Shaft	Cu. Yd.	71.3
Drilled Shaft Excavation	Cu. Yd.	65.7
62" Permanent Casing	Ft.	20
Reinforcing Steel	Lb.	20,609

℄ *Includes 0.2 Cu. Yds. for Grout Pads*

NOTES:

1. *Top of Grout Pad shall be level and smooth.*
2. *Lap splice length between H2 and H3 bars shall be 3' -6" min.*
3. *Include details for installation of reinforcing steel at drilled shaft/column interface in Drilled Shaft Installation Plan.*

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
08/12/2024

BENT DETAILS
FOR
196' - 0" PRESTR. GIRDER BRIDGE

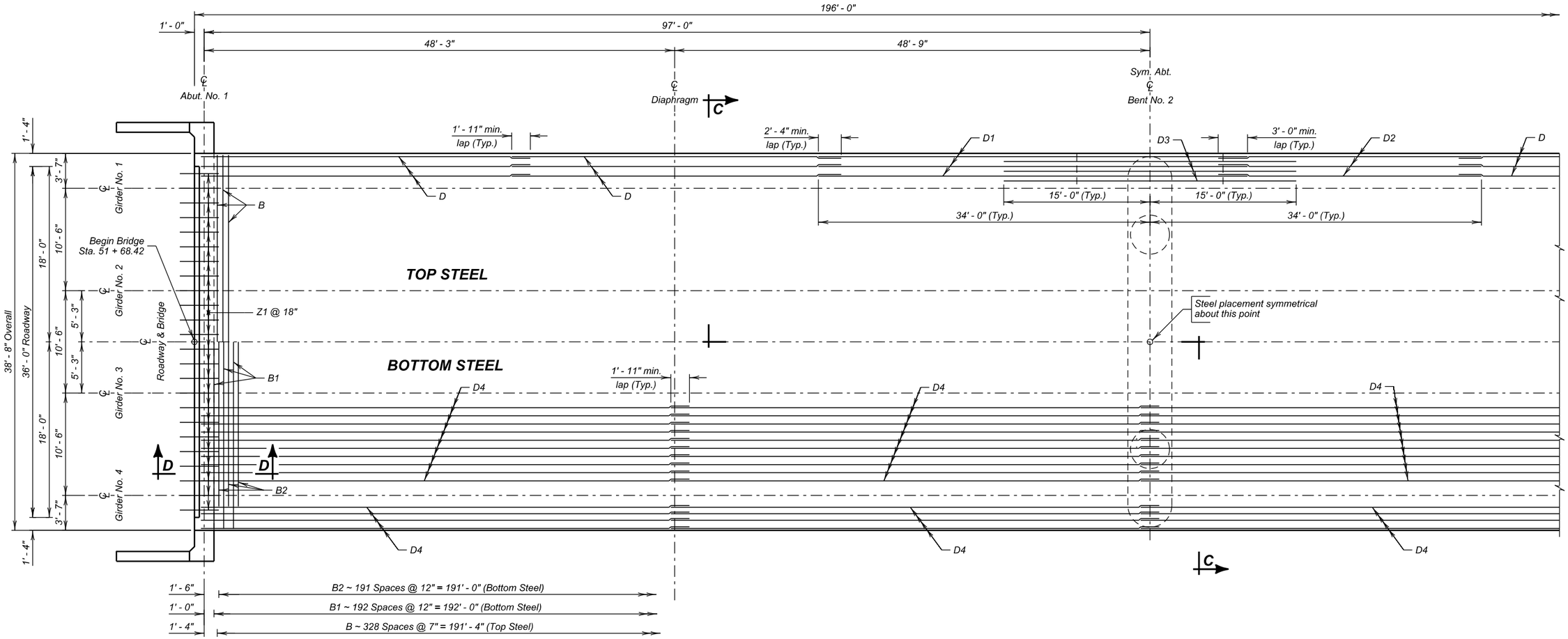
36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

HARDING COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

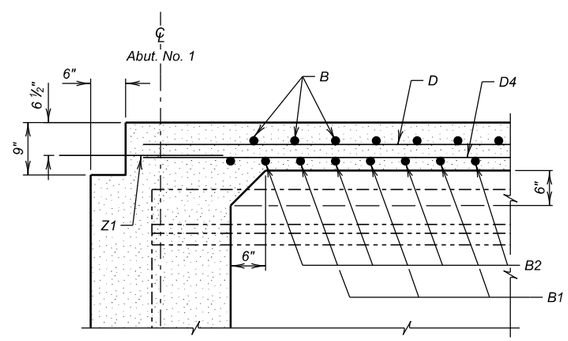
10 OF 25

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CTH	DVB	JKK	BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E13	E27



HALF PLAN



SEC. D - D

SUPERSTRUCTURE DETAILS (A)

FOR

196' - 0" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

HARDING COUNTY

S. D. DEPT. OF TRANSPORTATION

APRIL 2024

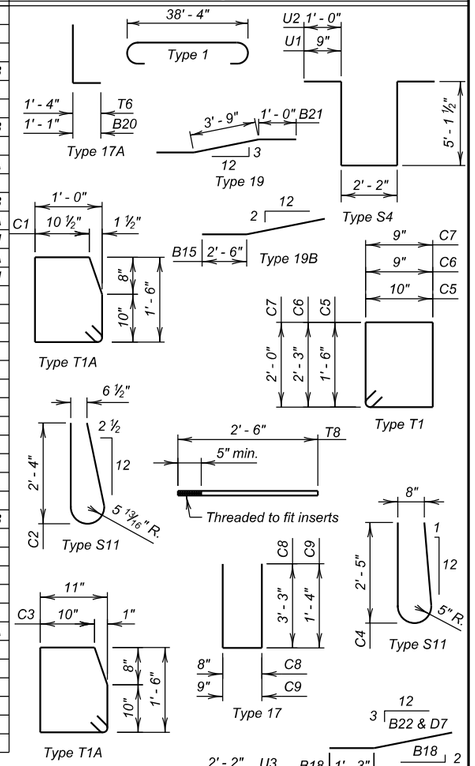
DESIGNED BY	CK. DES. BY	DRAFTED BY	
CTH	DVB	JKK	BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E14	E27

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
B	329	6	39' - 8"	1
B1	193	4	38' - 4"	Str.
B2	192	5	34' - 0"	Str.
B15	12	5	9' - 6"	19B
B16	8	4	46' - 8"	Str.
B17	8	4	5' - 8"	Str.
B18	12	8	3' - 0"	19B
B19	12	5	2' - 0"	Str.
B20	12	6	3' - 6"	17A
B21	4	4	5' - 9"	19
B22	4	4	3' - 3"	19B
C1	370	5	5' - 10"	T1A
C2	374	5	5' - 3"	S11
C3	4	5	5' - 8"	T1A
C4	8	5	5' - 3"	S11
C5	8	5	5' - 7"	T1
C6	12	6	7' - 4"	T1
C7	12	5	6' - 5"	T1
C8	4	6	7' - 3"	17
C9	4	5	3' - 5"	17
D	156	5	33' - 10"	Str.
D1	39	8	44' - 0"	Str.
D2	39	8	27' - 0"	Str.
D3	38	8	30' - 0"	Str.
D4	152	5	50' - 2"	Str.
D5	48	4	47' - 0"	Str.
D6	16	4	49' - 9"	Str.
D7	4	4	2' - 6"	19B
◈ T1	6	6	8' - 0"	Str.
◈ T2	18	5	9' - 8"	Str.
◈ T3	6	5	7' - 8"	Str.
✳ T4	4	5	5' - 0"	Str.
◈ T5	3	6	34' - 8"	Str.
✳ T6	20	5	5' - 3"	17A
◈ T7	4	5	5' - 0"	Str.
◈ T8	12	6	2' - 6"	Str.
U1	18	4	13' - 11"	S4
U2	8	6	14' - 5"	S4
◈ U3	24	4	3' - 6"	17
Z1	48	7	4' - 0"	Str.

Bending Details



NOTES:
All reinforcing steel will be stainless steel except as noted.
All dimensions are out to out of bars.
✳ Bars to be epoxy coated.
◈ Bars to be plain reinforcing steel.

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY
☆	Class A45 Concrete, Bridge Deck	Cu. Yd.	269.2
◊	Reinforcing Steel	Lb.	579
◊	Epoxy Coated Reinforcing Steel	Lb.	131
◫	Stainless Reinforcing Steel	Lb.	63,317
	54" Minnesota Shape Prestressed Concrete Beam	Ft.	774
	Concrete Penetrating Sealer	Sq. Yd.	780.1

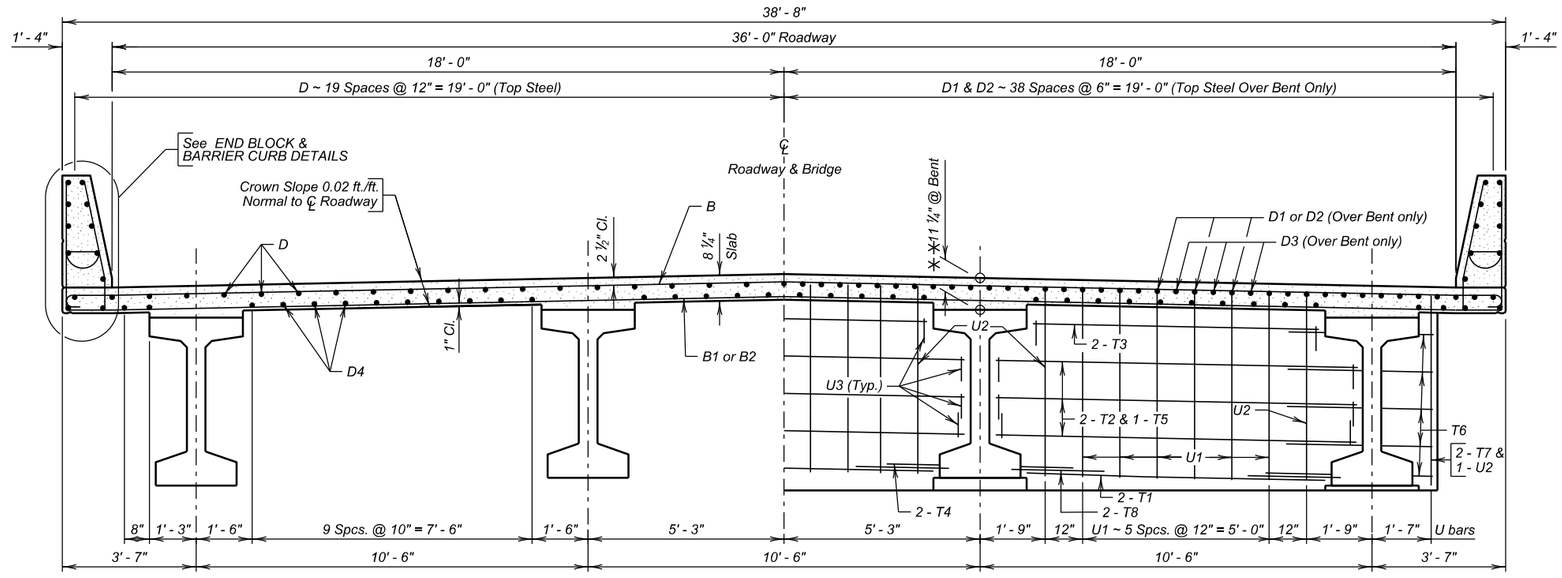
◫ Includes quantities for Barrier Curbs and Slab.

◊ Includes quantities for Bent Diaphragm

☆ Includes quantities for Bent Diaphragm, Barrier Curbs, Slab, and Haunch. (Average depth of 2 ¼" used for Haunch Quantity.) Concrete quantity for Barrier Curb is 0.1184 Cu. Yd. per foot and for End Block is 0.7184 Cu. Yd. each.

NOTE -

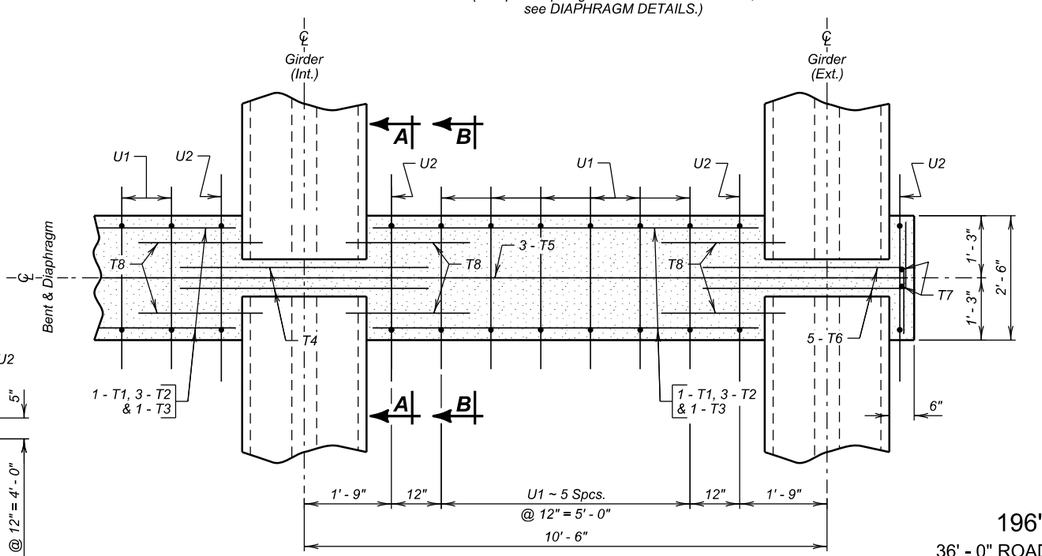
Concrete will be placed in the space under the beams at Bent No. 2 (within the diaphragm width) during the diaphragm pour. If upon form removal the space is not completely filled and consolidated, the contractor will grout in the remaining voids.



✳✳ 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.

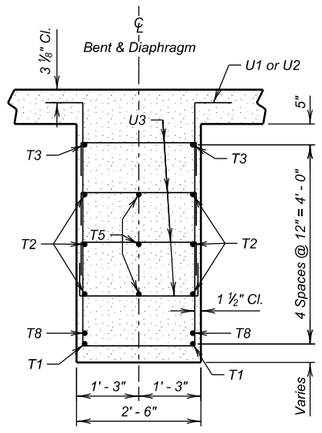
SEC. C - C

(Midspan diaphragm not shown in this section, see DIAPHRAGM DETAILS.)



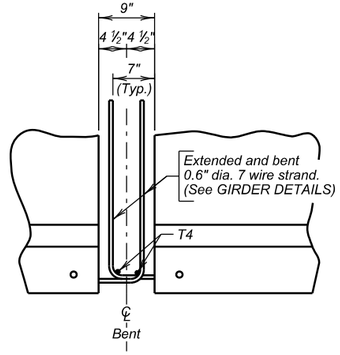
BENT DIAPHRAGM

(Slab Not Shown)



SEC B - B

(Girders Not Shown)



SEC A - A

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

SUPERSTRUCTURE DETAILS (B)

FOR

196' - 0" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

HARDING COUNTY

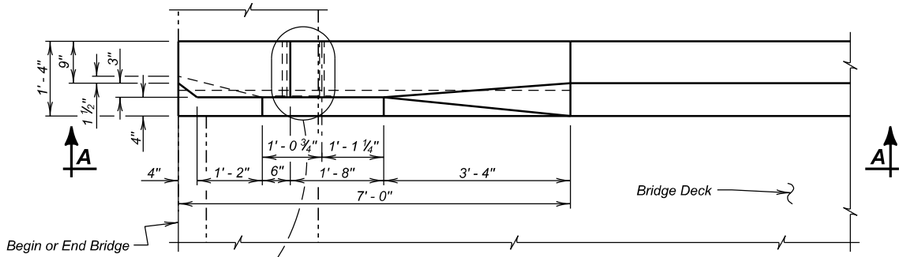
S. D. DEPT. OF TRANSPORTATION

APRIL 2024

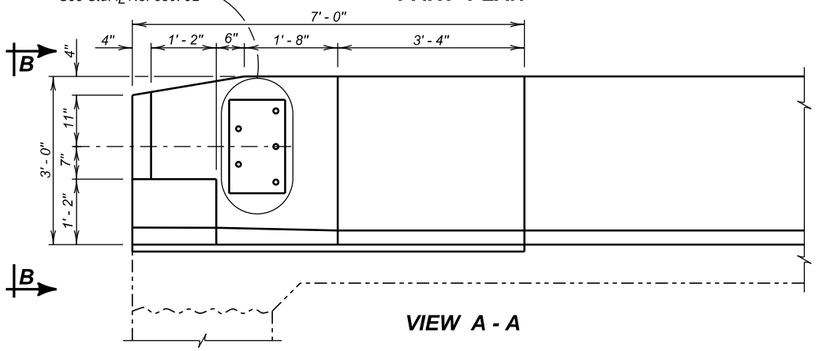
12 OF 25

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CTH	DVB	JKK	BRIDGE ENGINEER

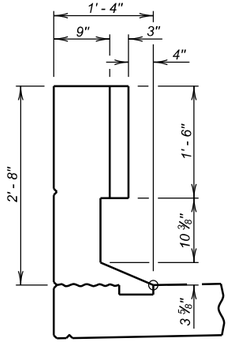
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E15	E27



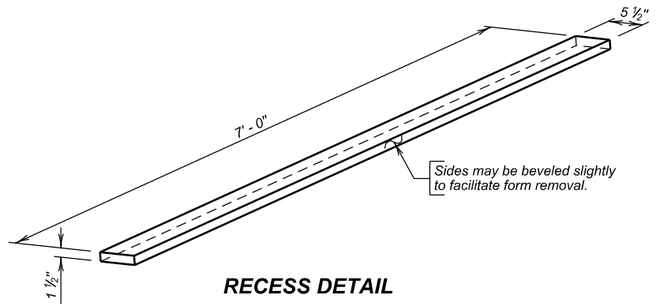
PART PLAN



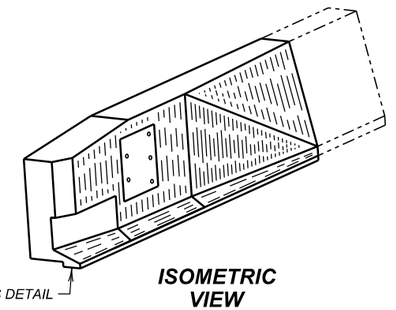
VIEW A - A



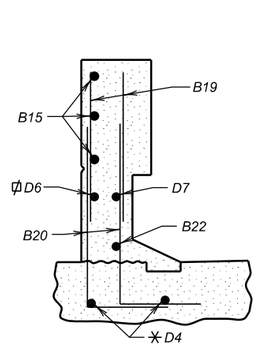
VIEW B - B



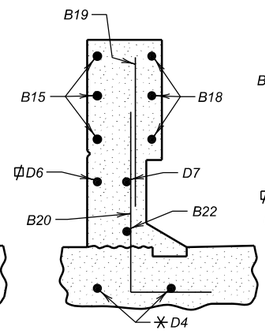
RECESS DETAIL



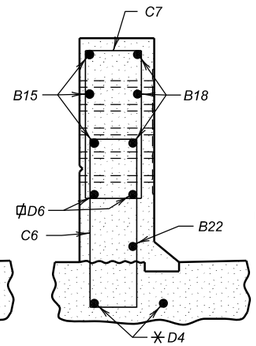
ISOMETRIC VIEW



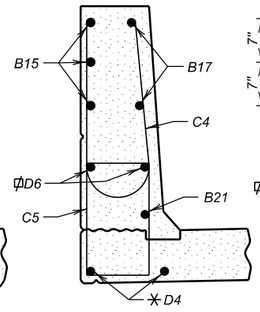
SECTION C - C



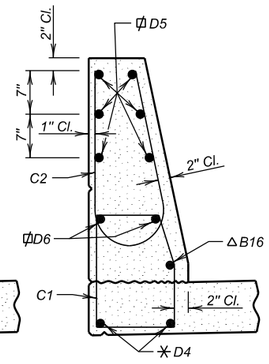
SECTION D - D



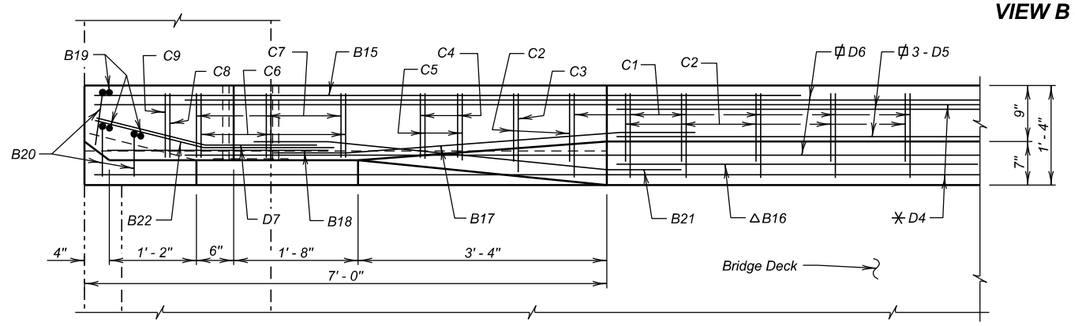
SECTION E - E



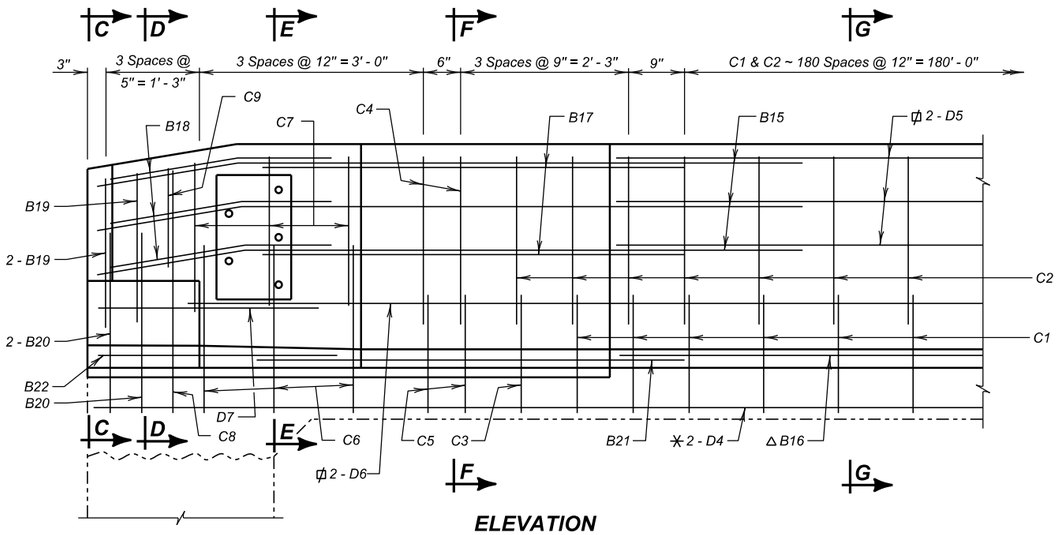
SECTION F - F



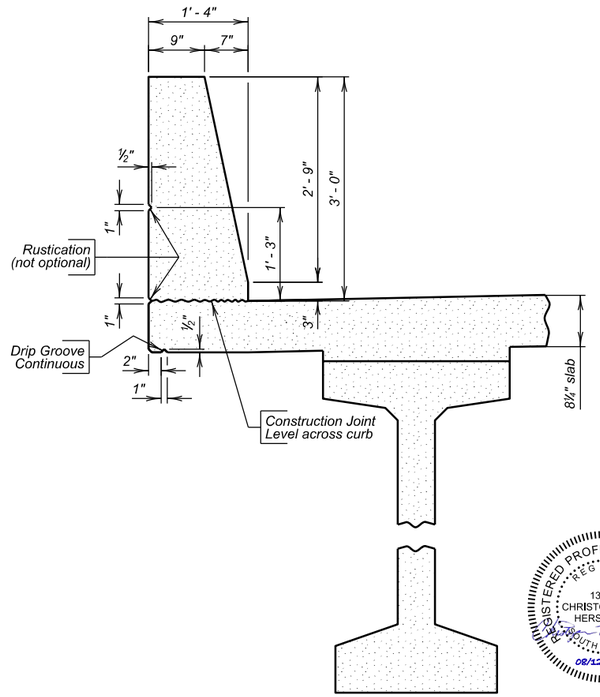
SECTION G - G



PLAN



ELEVATION



BARRIER DETAILS

D4 Min. Lap = 1' - 11"
△ Min. Lap = 1' - 6"
℄ Min. Lap = 1' - 11"

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

END BLOCK AND BARRIER CURB DETAILS
FOR
196' - 0" PRESTR. GIRDER BRIDGE

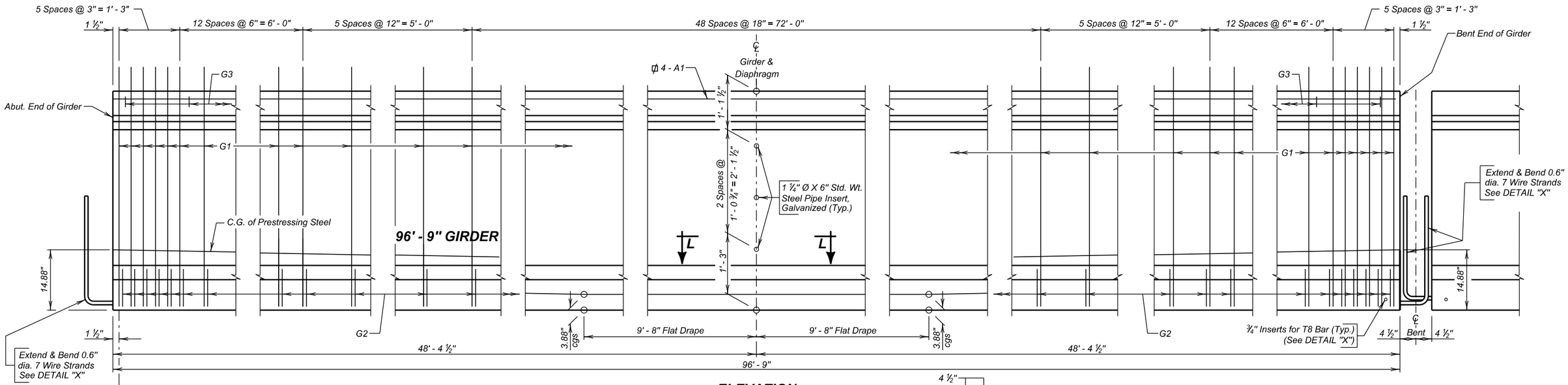
36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

HARDING COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

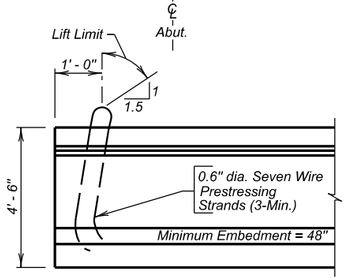
REGISTERED PROFESSIONAL ENGINEER — REG. NO. 13592 — CHRISTOPHER T. HERSINGER — SOUTH DAKOTA — 08/12/2024

DESIGNED BY	CK. DES. BY	DRAFTED BY	BRIDGE ENGINEER

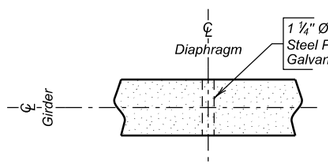
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E16	E27



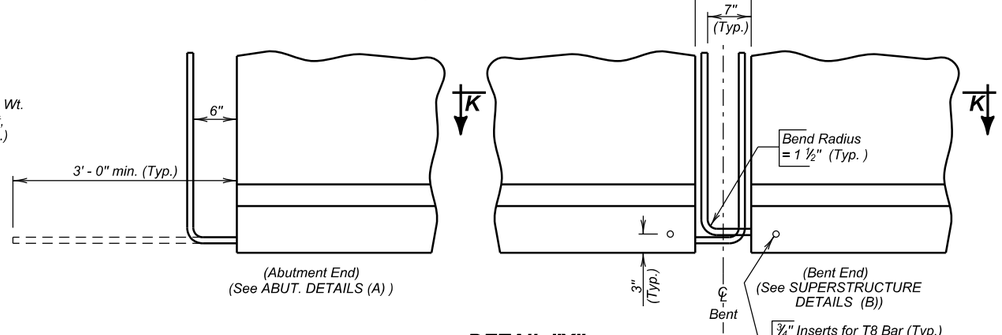
ELEVATION



TYPICAL LIFTING DEVICE



SEC. L - L

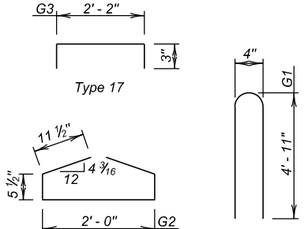


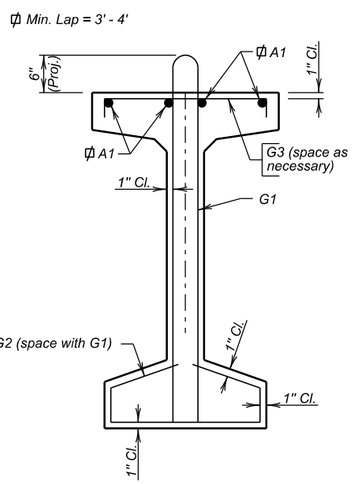
DETAIL "X"

△ Bars to be epoxy coated.
All dimensions are out to out of bars.

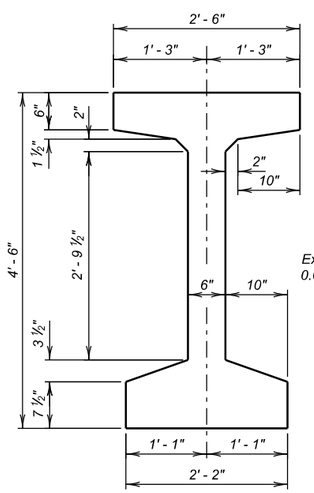
REINFORCING SCHEDULE
(For One Girder)

Mk.	No.	Size	Length	Type	Bending Details
A1	8	7	50' - 0"	Str.	
G1	93	5	10' - 0"	S11	
G2	93	4	4' - 10"	S3A	
G3	49	4	2' - 8"	17	

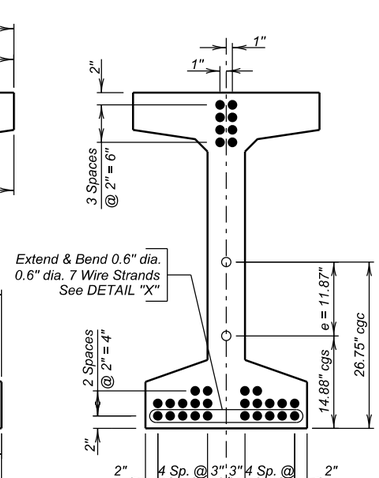




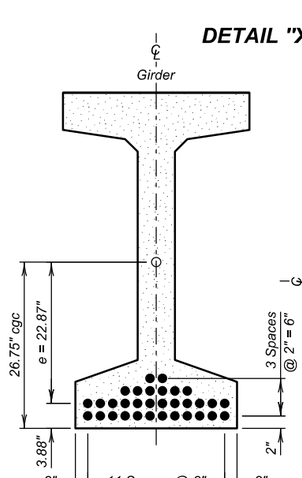
STIRRUP DETAILS



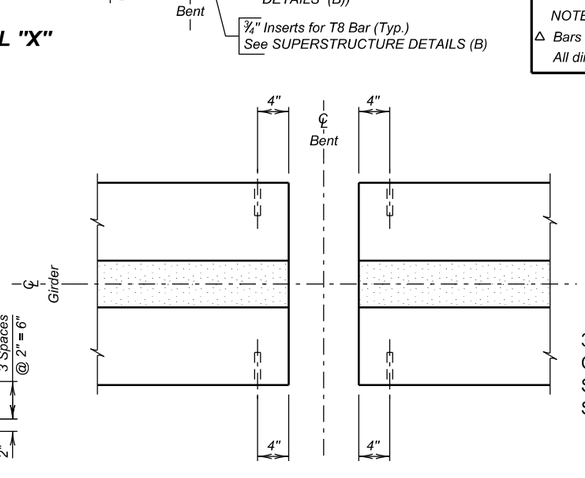
TYPE 54 GIRDER



END VIEW



℄ SECTION



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

96' - 9" GIRDERS
(32 ~ 0.6 Dia. Type 270 Low Lax. Strands)

96' - 9" GIRDER DETAILS
FOR
196' - 0" PRESTR. GIRDER BRIDGE

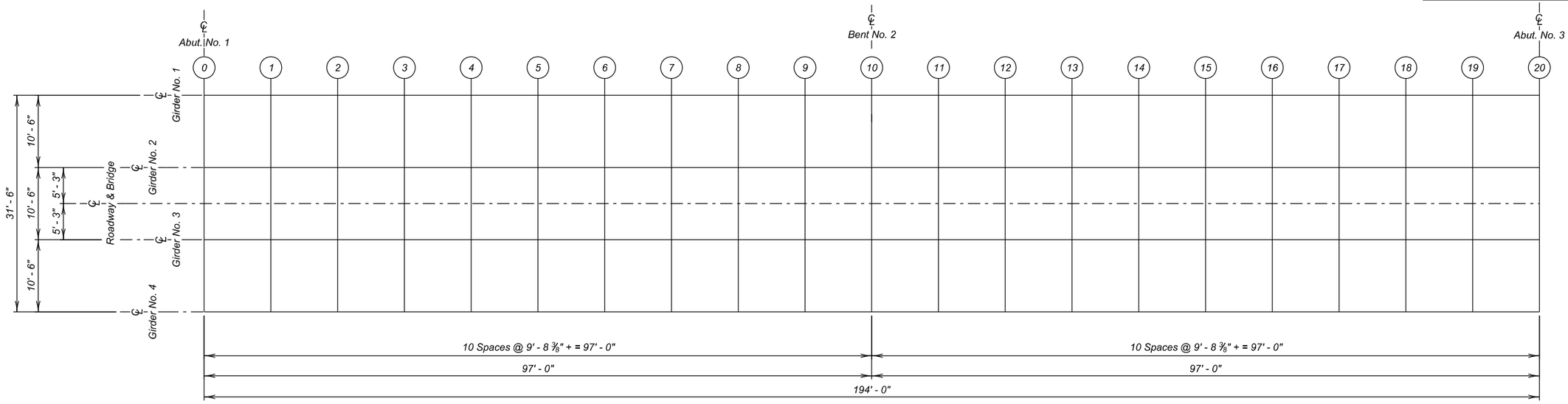
36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

HARDING COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

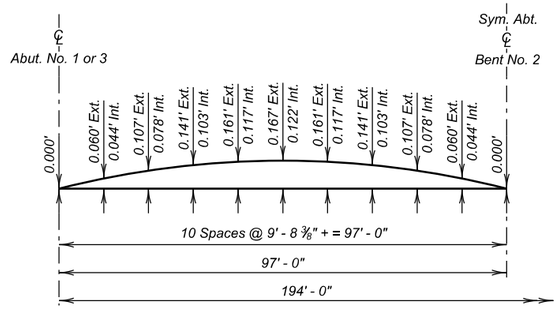
14 OF 25

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CTH	DVB	JKK	BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E17	E27

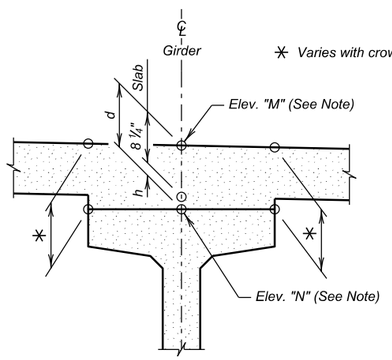


GIRDER LAYOUT



CAMBER DIAGRAM

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



NOTE -

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

NOTE -

Based on a "d" of 11 ¼" at the ℄ of each abutment and 11 ¼" at the ℄ of the Bent (see SEC. C - C on SUPERSTRUCTURE DETAILS (B), it is anticipated that the midspan haunch dimension "h" over the ℄ of each girder will be 1 ½". If when computing the dimensions in the table, it is found that any dimension "h" is less than ¼" or greater than 4" the Office of Bridge Design of the South Dakota Dept. of Transportation will be notified immediately. After the "Table of Slab Form Elevations and Calculations" has been completely filled out and approved for deck forming, a copy will be forwarded to the Office of Bridge Design for review and analysis for the purpose of securing information relative to camber growth in the beams. This information is necessary for preparing plans for future structures of this type.

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"	2615.744	2615.717	2615.682	2615.639	2615.588	2615.528	2615.460	2615.383	2615.298	2615.205	2615.103	2615.077	2615.042	2614.999	2614.948	2614.888	2614.819	2614.743	2614.658	2614.565	2614.463
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 2	Elev. "M"	2615.954	2615.943	2615.921	2615.887	2615.841	2615.783	2615.713	2615.631	2615.537	2615.431	2615.313	2615.303	2615.281	2615.247	2615.201	2615.143	2615.073	2614.991	2614.897	2614.791	2614.673
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 3	Elev. "M"	2615.954	2615.943	2615.921	2615.887	2615.841	2615.783	2615.713	2615.631	2615.537	2615.431	2615.313	2615.303	2615.281	2615.247	2615.201	2615.143	2615.073	2614.991	2614.897	2614.791	2614.673
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 4	Elev. "M"	2615.744	2615.717	2615.682	2615.639	2615.588	2615.528	2615.460	2615.383	2615.298	2615.205	2615.103	2615.077	2615.042	2614.999	2614.948	2614.888	2614.819	2614.743	2614.658	2614.565	2614.463
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					

ERECTION DATA AND SLAB FORM ELEVATIONS

FOR

196' - 0" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY — 0° SKEW

OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E

STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232

STR. NO. 32-531-001 — HL-93

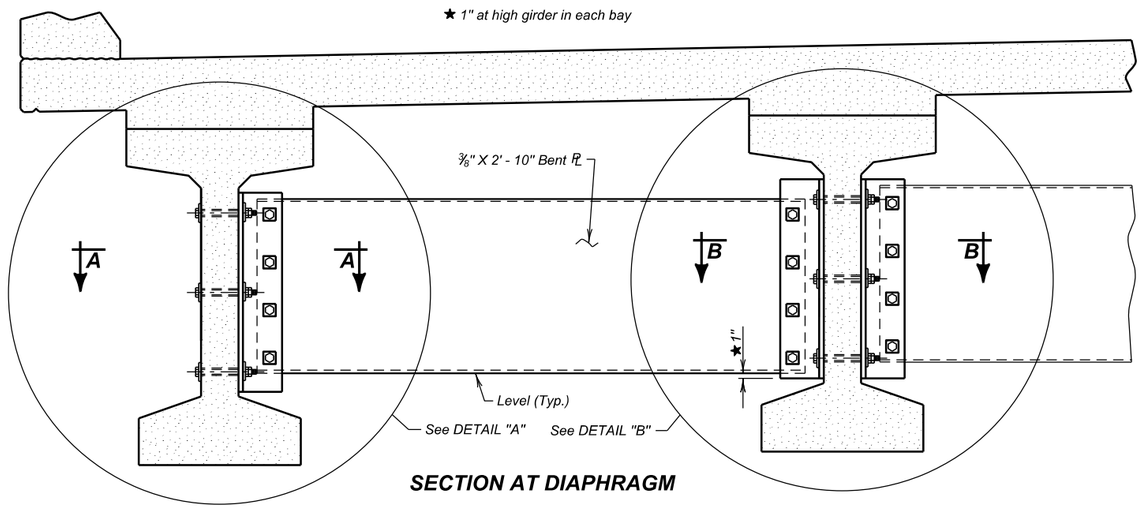
HARDING COUNTY

S. D. DEPT. OF TRANSPORTATION

APRIL 2024

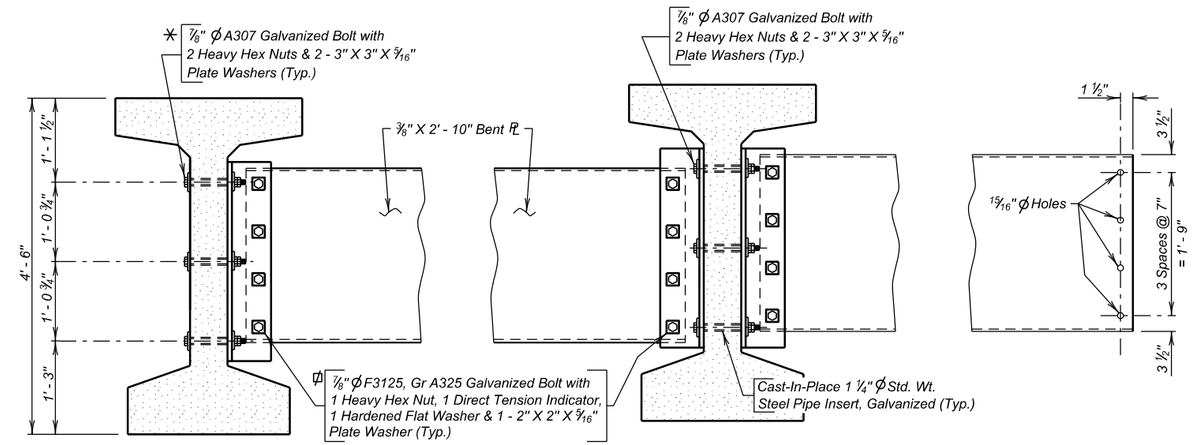
DESIGNED BY	CK. DES. BY	DRAFTED BY	BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E18	E27



SECTION AT DIAPHRAGM

✳ Bolt head shall be adjacent to the Exterior Face of the Exterior Girder.



DETAIL "A"
(Typ. Exterior Girder)

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

DETAIL "B"
(Typ. Interior Girder)

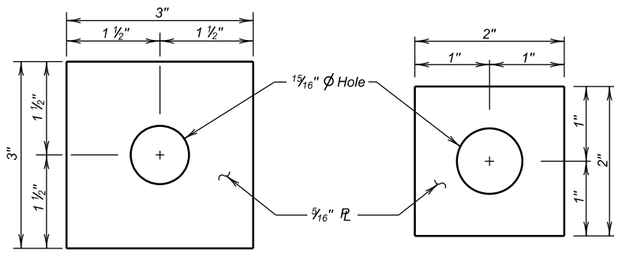
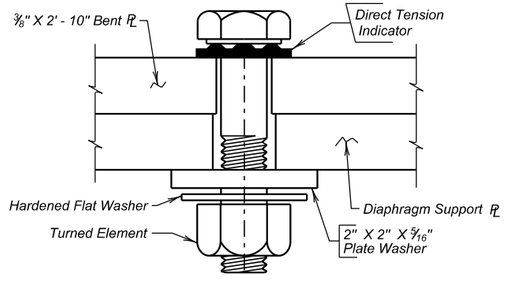
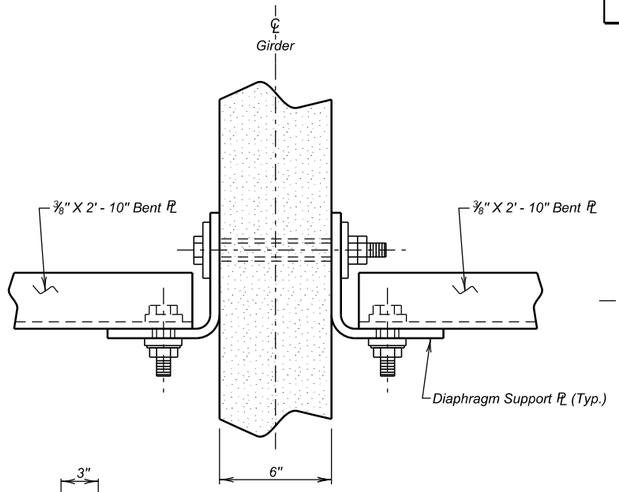


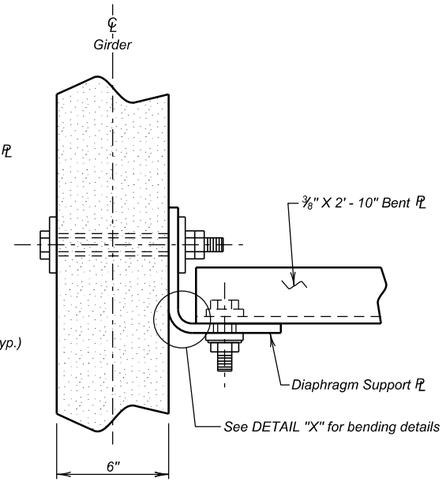
PLATE WASHER DETAILS



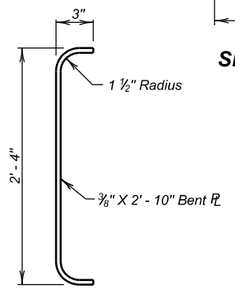
DIRECT TENSION INDICATOR DETAIL



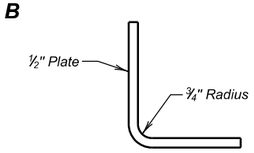
SEC. B - B



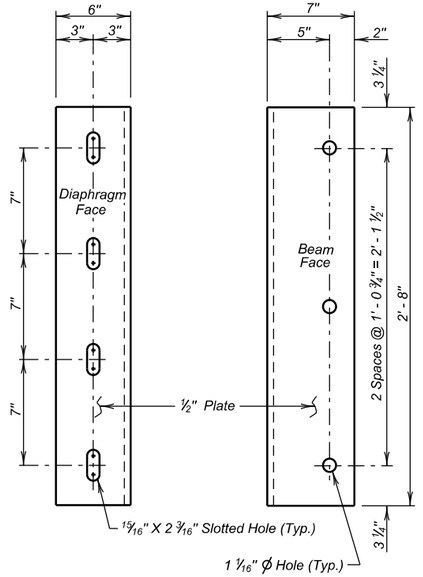
SEC. A - A



END VIEW BENT PLATE DIAPHRAGM



DETAIL "X"



DIAPHRAGM SUPPORT PLATE

NOTES:

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

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
△ Structural Steel, Miscellaneous	L.S.	Lump Sum

△ For informational purposes only, the estimated weight of structural steel is 1818 Lbs. for 6 diaphragms.

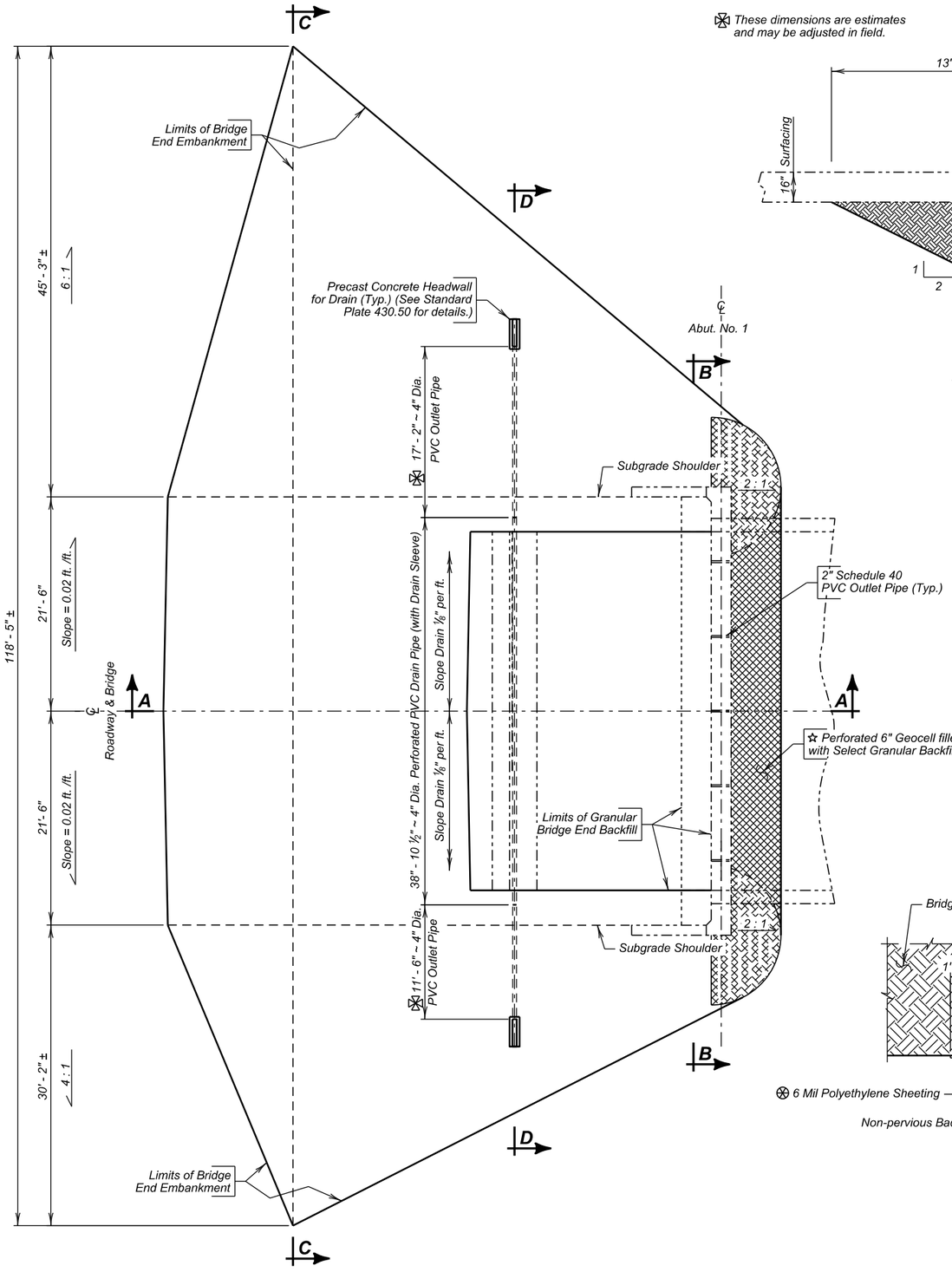
DIAPHRAGM DETAILS
FOR
196' - 0" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

HARDING COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

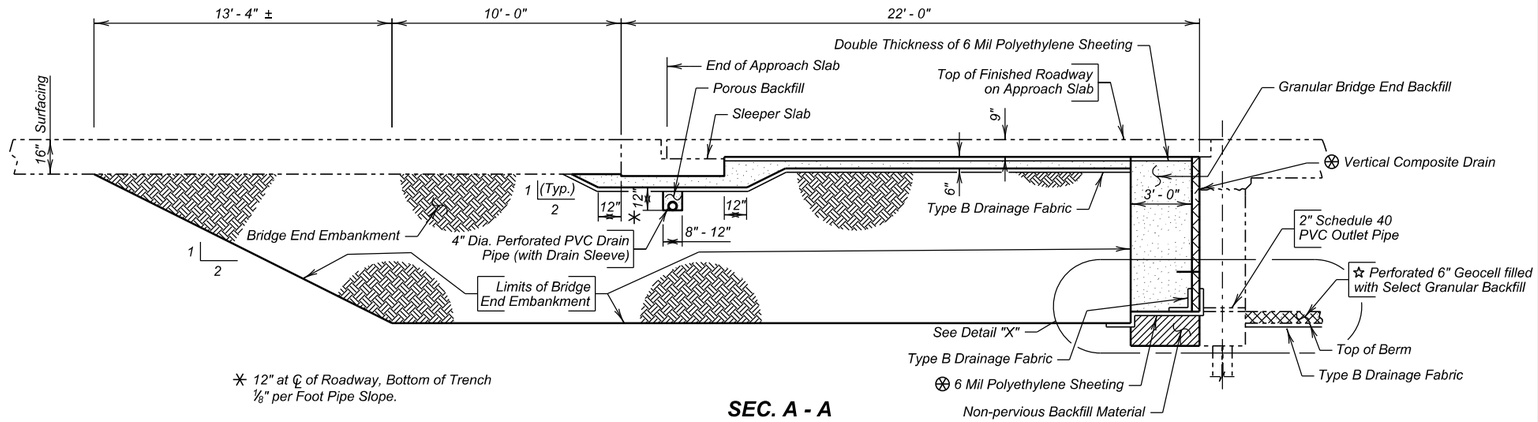
DESIGNED BY	CK. DES. BY	DRAFTED BY	
CTH	DVB	JKK	BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E19	E27



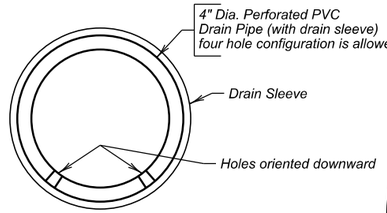
PLAN
(Bridge End Backfill shown adjacent to Abut. No. 1, Abut. No. 3 similar by opposite hand except as shown.)

These dimensions are estimates and may be adjusted in field.

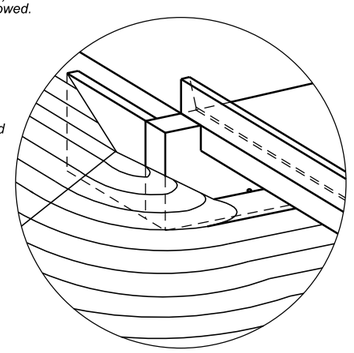


✳ 12" at ℄ of Roadway, Bottom of Trench
⅛" per Foot Pipe Slope.

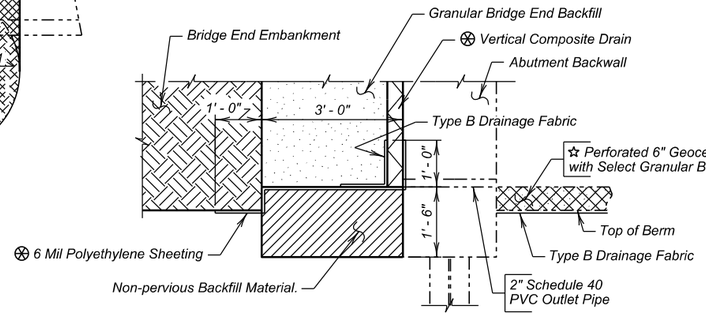
SEC. A - A
(at ℄ Roadway)



DRAIN DETAIL



SPILL CONE DETAIL AT EMBANKMENT



DETAIL "X"

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

ESTIMATED QUANTITIES
(For Two Abutments)

	ITEM	UNIT	QUANTITY
⧈	Select Granular Backfill	Ton	21.1
⧓	Bridge End Embankment	Cu. Yd.	1,360
	Granular Bridge End Backfill	Cu. Yd.	97.9
⧫	Approach Slab Underdrain Excavation	Cu. Yd.	6.6
	Precast Concrete Headwall for Drain	Each	4
	4" Underdrain Pipe	Ft.	124
⧫⧈	Porous Backfill	Ton	5.4
☆	Perforated Geocell	Sq. Ft.	604

1. 78 ft. 4" dia. Perforated PVC Drain Pipe (with Drain Sleeve).
2. 16 ft. 5" dia. Schedule 40 Steel Pipe.
3. 20 ft. 2" dia. Schedule 40 PVC Outlet Pipe.
4. 57 ft. 4" dia. Schedule 40 PVC Outlet Pipe.
5. 562 sq. ft. Vertical Composite Drain.

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

6. 3236 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
7. 280 sq. yd. Type B Drainage Fabric.

Items 6 thru 7 are approximate quantities contained in the Granular Bridge End Backfill and are for information only.

⧈ For estimating purpose only, a factor of 1.89 tons/cu. yd. was used to convert cu. yds. to tons.
⧓ Shrinkage Factor of 1.25 Used.
⧫ Quantity based on a 12" wide trench.
☆ See PERFORATED GEOCELL notes for payment information.

NOTE:

1. Perforated Geocell to be installed as shown in PLAN view. The embankment spill cone will spill onto the top of the perforated geocell.
2. The Contractor will ensure the underdrain pipes located at the sleeper slab are not damaged during installation of the guardrail posts. Damaged underdrain pipes will be replaced at the Contractor's expense.

REGISTERED PROFESSIONAL ENGINEER — REG. NO. 13592 — CHRISTOPHER T. HERSINGER — SOUTH DAKOTA — 08/12/2024

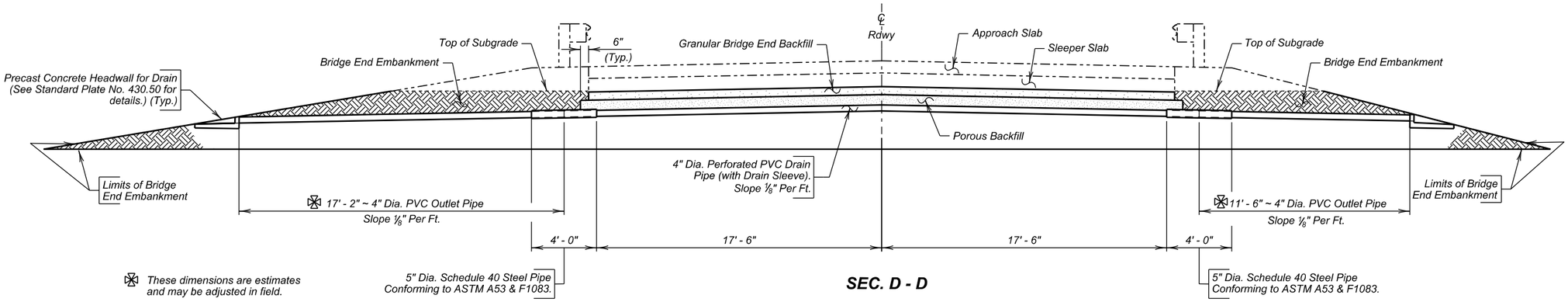
DETAILS OF BRIDGE END BACKFILL (A)
FOR
196' - 0" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY	0° SKEW
OVER NORTH FORK GRAND RIVER	SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42	P 0079(84)232
STR. NO. 32-531-001	HL-93

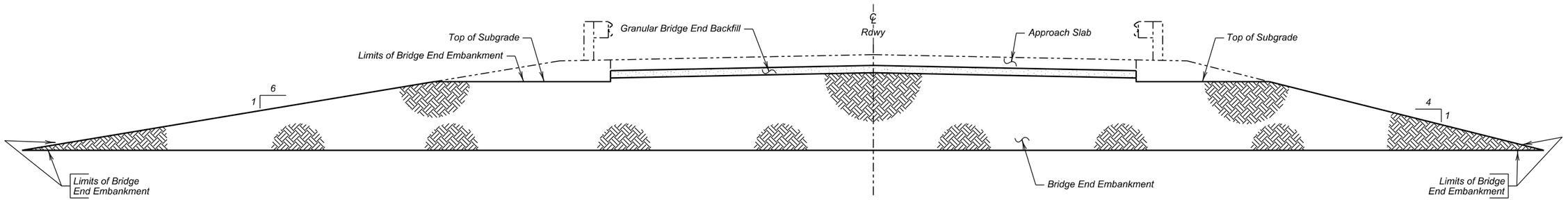
HARDING COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CTH	DVB	JKK	BRIDGE ENGINEER

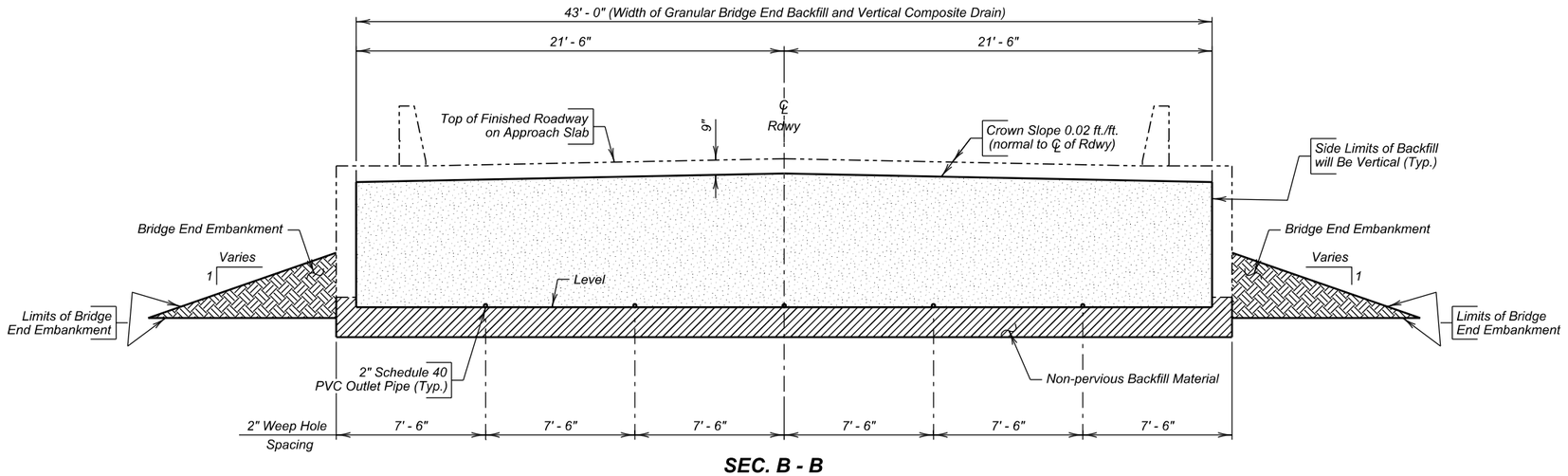
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E20	E27



SEC. D - D



SEC. C - C



SEC. B - B

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
08/12/2024

DETAILS OF BRIDGE END BACKFILL (B)

FOR

196' - 0" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

HARDING COUNTY

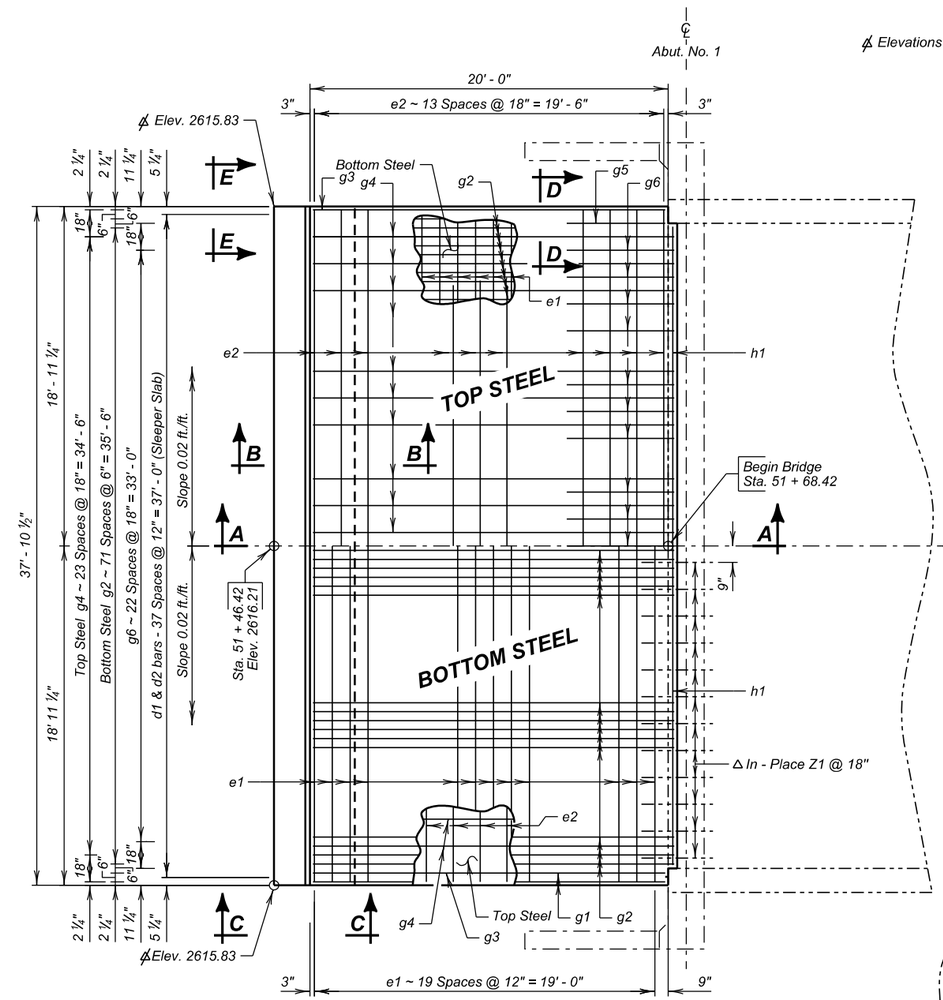
S. D. DEPT. OF TRANSPORTATION

APRIL 2024

18 OF 25

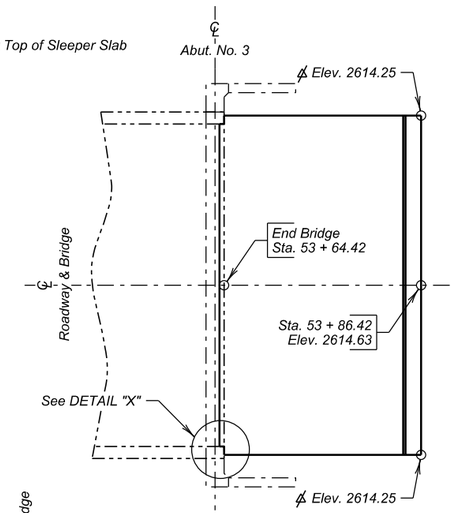
DESIGNED BY	CK. DES. BY	DRAFTED BY	
			BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E21	E27



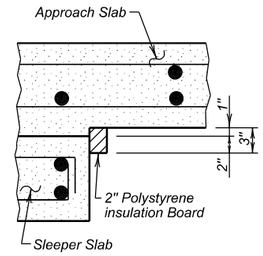
PLAN

(Shown adj. to Abut. No. 1, Abut. No. 3 similar by opposite hand except as shown.)



PLAN

(Shown adj. to Abut. No. 3)



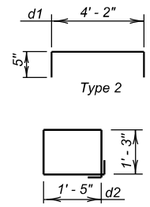
DETAIL "Q"

REINFORCING SCHEDULE

(For Two Approach Slabs and Two Sleeper Slabs)

Mk.	No.	Size	Length	Type
Sleeper Slabs				
c1	32	5	37' - 6"	Str.
d1	152	4	5' - 0"	2
d2	76	4	6' - 1"	T2
Approach Slabs				
e1	40	6	37' - 6"	Str.
e2	28	4	37' - 6"	Str.
g1	8	8	19' - 8"	Str.
g2	144	8	20' - 2"	Str.
g3	4	4	19' - 8"	Str.
g4	48	4	20' - 2"	Str.
g5	4	4	5' - 6"	Str.
g6	46	4	6' - 0"	Str.
h1	4	6	35' - 8"	Str.

Bending Details



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

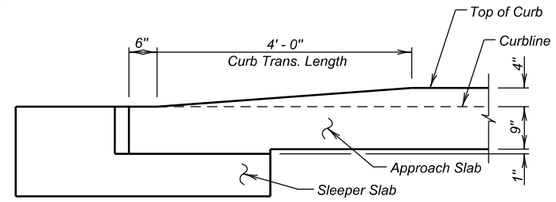
ESTIMATED QUANTITIES

(For Two Approach Slabs and Two Sleeper Slabs)

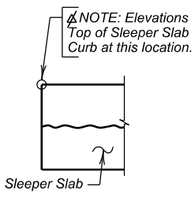
ITEM	UNIT	QUANTITY
Concrete Approach Slab for Bridge	Sq. Yd.	172.3
Concrete Approach Sleeper Slab for Bridge	Sq. Yd.	37.9

1. 44.2 Cu. Yds. Concrete in Approach Slab.
2. 12241 Lbs. Epoxy Coated Re-Steel in Approach Slab.
3. 13.6 Cu. Yds. Concrete in Sleeper Slab.
4. 2069 Lbs. Epoxy Coated Re-Steel in Sleeper Slab.

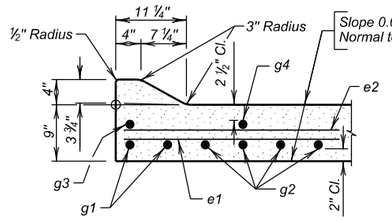
Items 1 thru 4 are approximate quantities contained in the above bid items and are for information only.



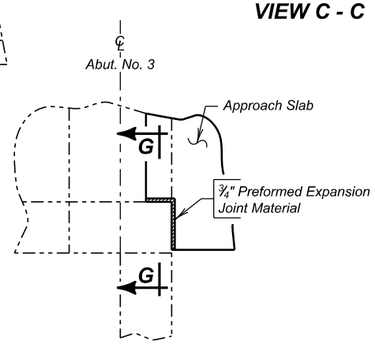
VIEW C - C



VIEW E - E



SEC. D - D



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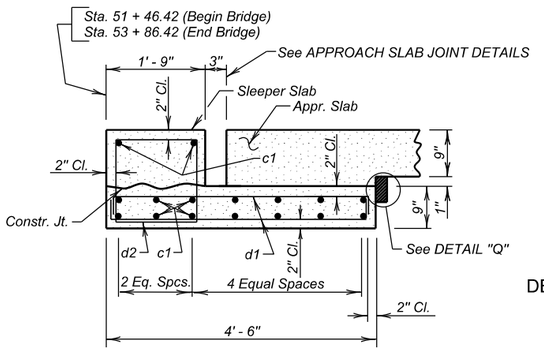
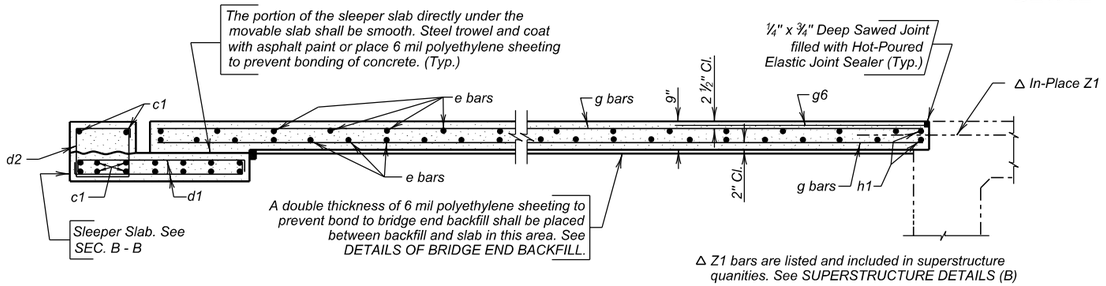


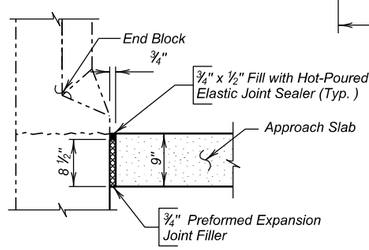
SEC. B - B

(Sleeper Slab)



Δ Z1 bars are listed and included in superstructure quanities. See SUPERSTRUCTURE DETAILS (B)

SEC. A - A



SEC. G - G

DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE
FOR

196' - 0" PRESTR. GIRDER BRIDGE

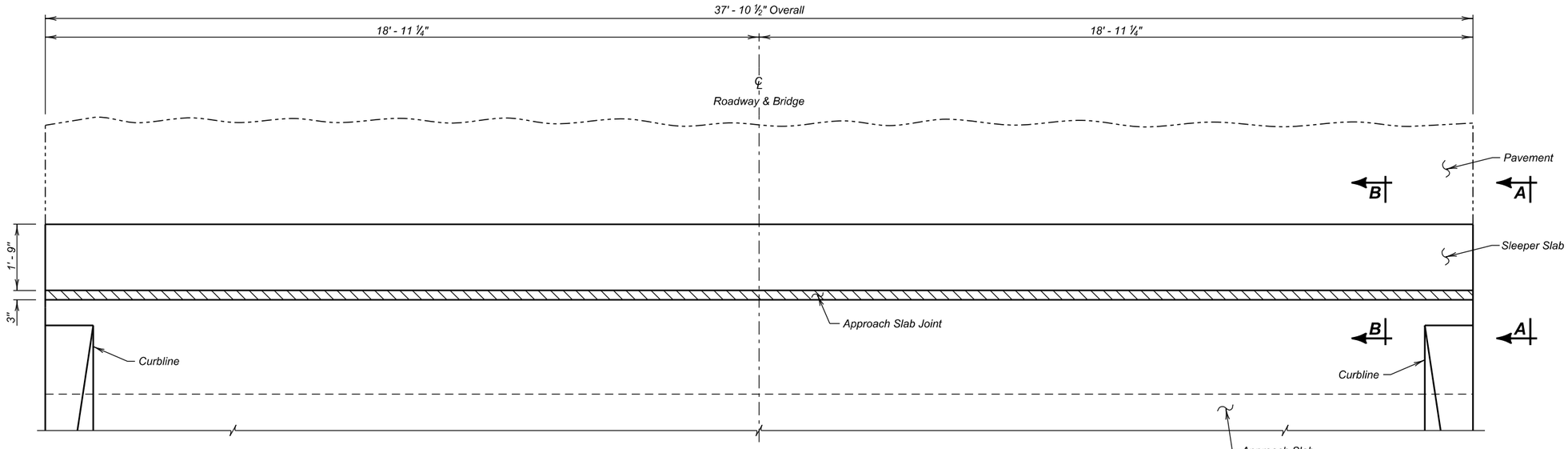
36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

HARDING COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

19 OF 25

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CTH	DVB	JKK	BRIDGE ENGINEER

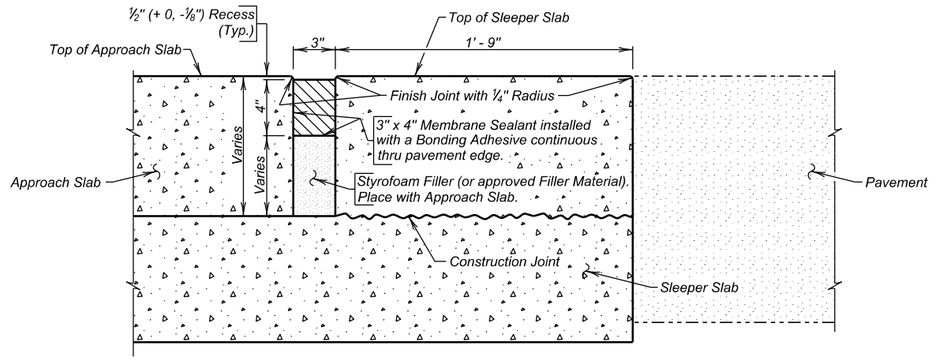
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E22	E27



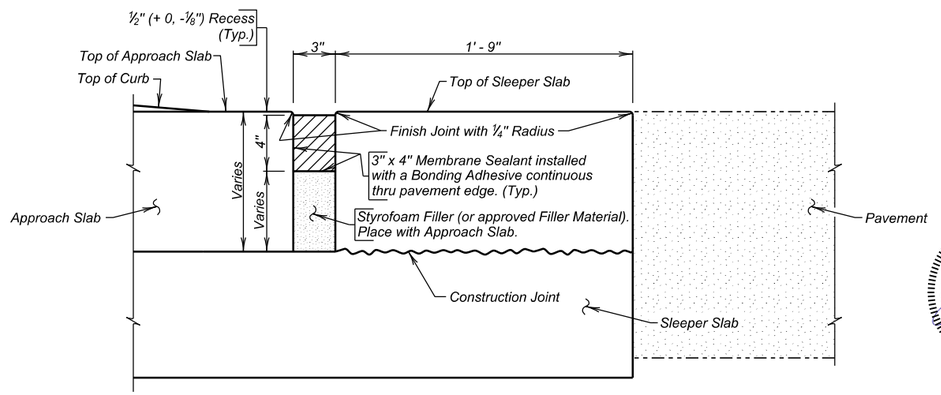
PLAN

GENERAL NOTES

1. The Membrane Sealant shall be on the approved product list for Membrane Sealant Expansion Joints.
2. The manufacturer shall supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension shall be as recommended by the sealant manufacturer, however, in no case shall the precompressed dimension exceed 75% of the joint opening width. The foam sealant shall 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 shall provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension.
4. The membrane sealant shall be supplied in pieces a minimum of 5 feet in length. The foam sealant shall be ultra-violet and ozone resistant.
5. The bonding adhesive used to attach the membrane sealant to the adjacent concrete shall be approved by the membrane sealant manufacturer.
6. Adhesive used to join adjacent pieces of the membrane sealant shall be as recommended by the manufacturer.
7. If styrofoam filler material is used in the construction, it shall be closed cell and water-tight as approved by the Engineer.
8. The minimum ambient air temperature at the time of joint installation and adhesive curing shall be 40° F.
9. A technical representative of the membrane sealant manufacturer shall be present at the jobsite during installation. The technical representative shall be knowledgeable in the correct procedures for the preparation and installation of the joint material to ensure the Contractor installs the joint to the manufacturer's recommendations.
10. Surfaces that will be in contact with the membrane sealant shall be thoroughly cleaned by abrasive blasting to remove all laitance and contaminants (such as oil, curing compounds, etc.) from the surface. At a minimum, two passes of abrasive blasting with the nozzle held at an angle to within 1 to 2 inches of the surface will be required. Cleaning of the surfaces with solvents, wire brushing, or grinding shall not be permitted.
11. After abrasive blasting, but immediately prior to membrane joint installation, the entire joint contact surface shall be air blasted. The air compressor used for joint cleaning shall 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 surfaces must be dry and clean. The contact surfaces for the joint shall be visually inspected by the Engineer immediately prior to joint installation to verify the surface is dry and clean.
12. Individual spliced sections shall be installed as per the manufacturer's recommendations. The membrane joint sealant manufacturer shall submit a detailed installation procedure to the Engineer at least 5 days prior to joint installation for his review.
13. Traffic shall not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.
14. 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.
15. 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 shall be full compensation for furnishing all the required materials in place, including labor, equipment and incidentals necessary to complete the work in accordance with the plans and the foregoing specifications.



SECTION B - B



VIEW A - A

ESTIMATED QUANTITIES
(For Two Approach Slabs)

ITEM	UNIT	QUANTITY
Membrane Sealant Expansion Joint	Ft.	75.8

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
08/13/2024

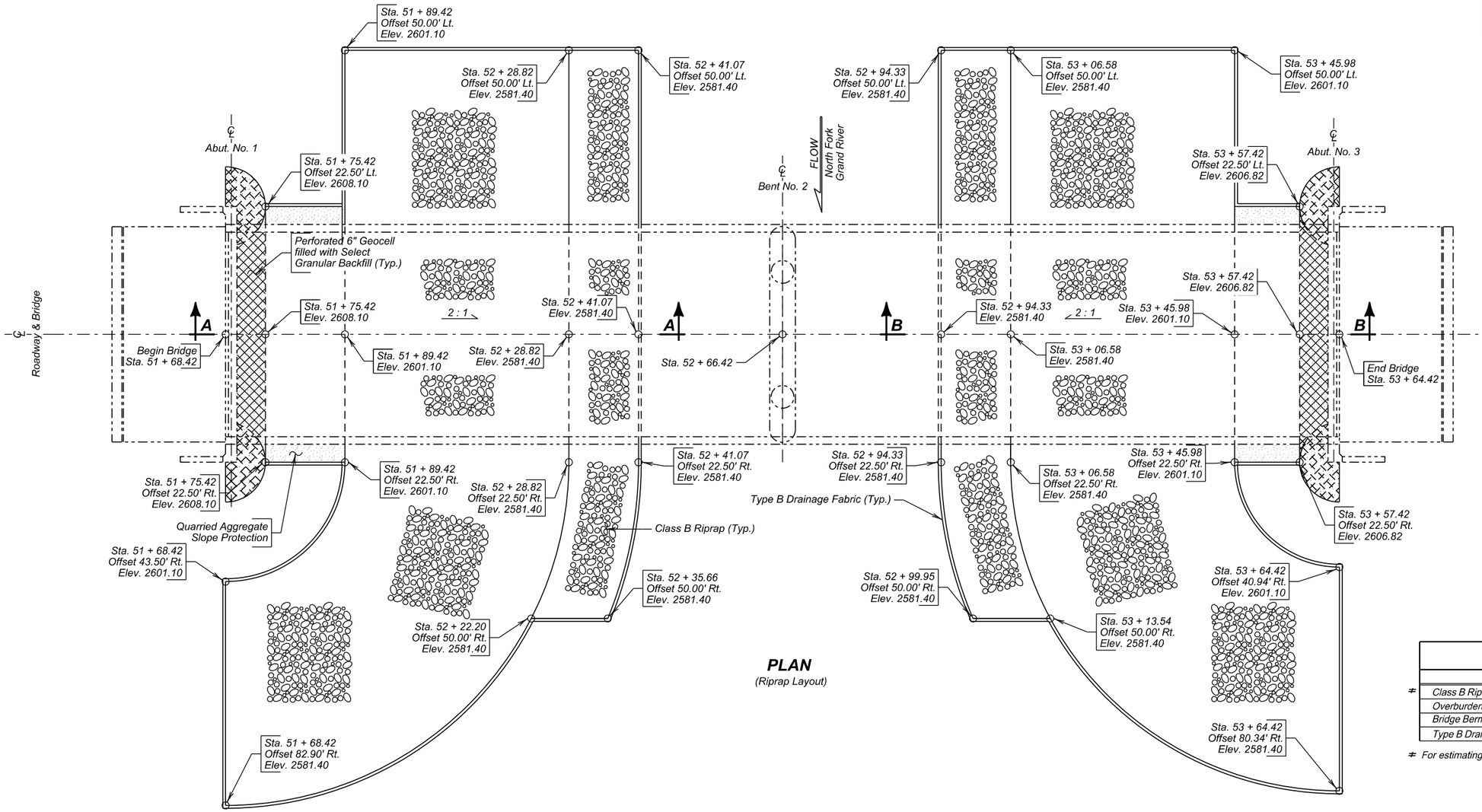
APPROACH SLAB JOINT DETAILS
FOR
196' - 0" PRESTR. GIRDER BRIDGE

36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

HARDING COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

DESIGNED BY	CK. DES. BY	DRAFTED BY	
CTH	DVB	JKK	BRIDGE ENGINEER

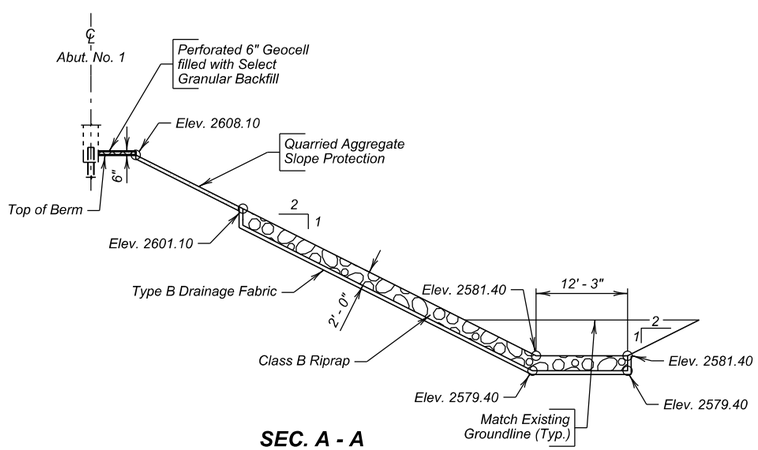
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E23	E27



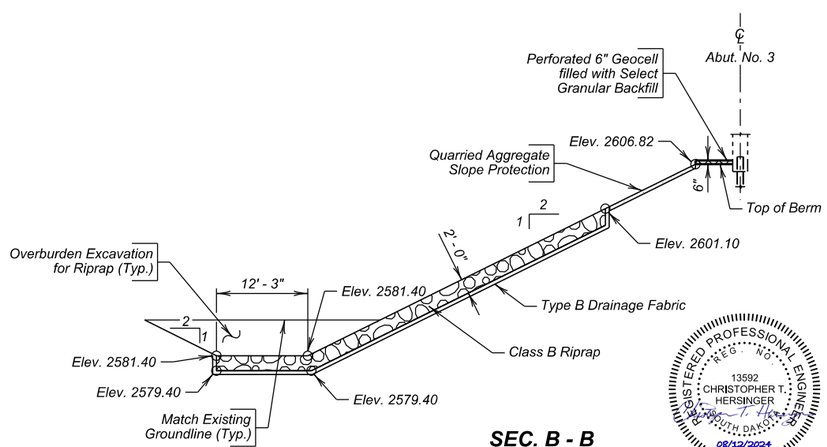
PLAN
(Riprap Layout)

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class B Riprap	Ton	1,484.6
Overburden Excavation for Riprap	Cu. Yd.	777
Bridge Berm Slope Protection, Quarried	Sq. Yd.	142.2
Type B Drainage Fabric	Sq. Yd.	1,911

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



SEC. A - A



SEC. B - B

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
13592
CHRISTOPHER T. HERSINGER
SOUTH DAKOTA
06/13/2024

RIPRAP DETAILS
FOR
196' - 0" PRESTR. GIRDER BRIDGE

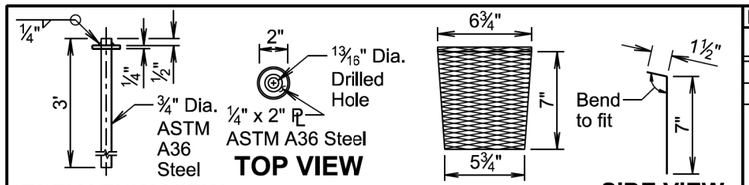
36' - 0" ROADWAY — 0° SKEW
OVER NORTH FORK GRAND RIVER — SEC. 24-T23N-R9E
STA. 51 + 68.42 TO 53 + 64.42 — P 0079(84)232
STR. NO. 32-531-001 — HL-93

HARDING COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2024

DESIGNED BY	CK. DES. BY	DRAFTED BY	
			BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0079(84)232	E24	E27

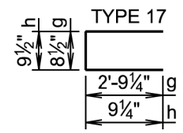
Rev 9/25/2024 JKK

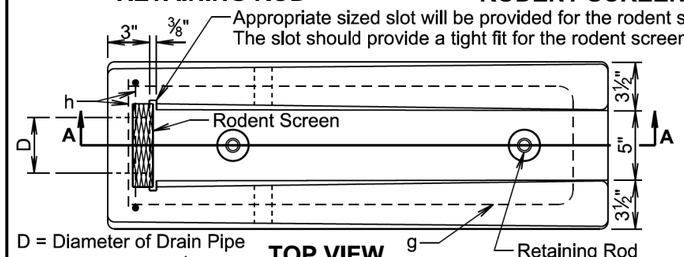


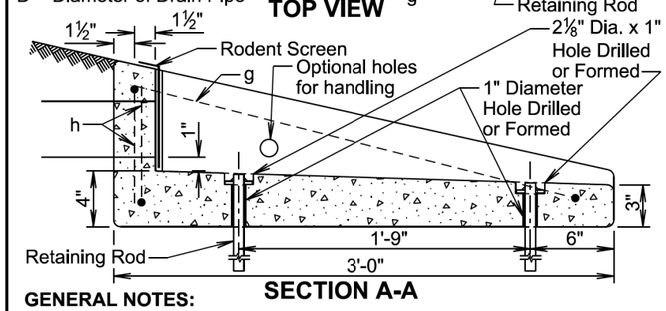
REINFORCING SCHEDULE				
MK.	No.	Size	Length	Type
g	1	4	6'-3"	17
h	2	4	2'-4"	17

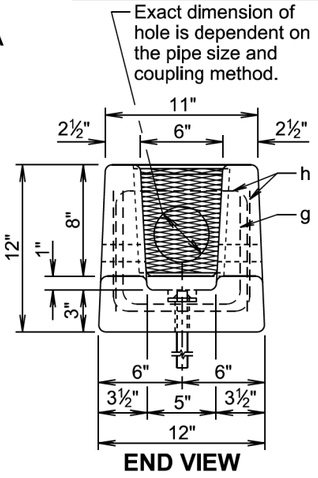
NOTE: All dimensions are out to out of bars.

Bending Details









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.

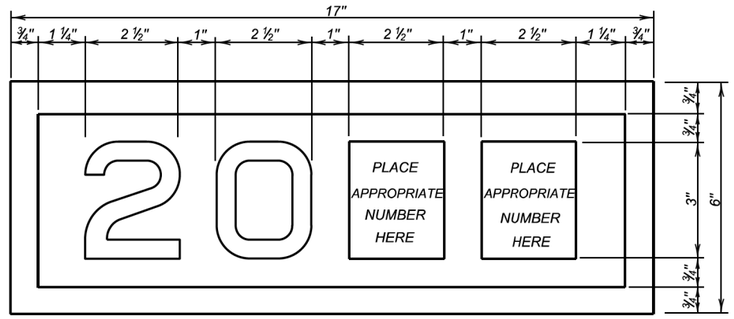
The retaining rod will be galvanized in accordance with ASTM A123 after all shop welding has been completed.

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

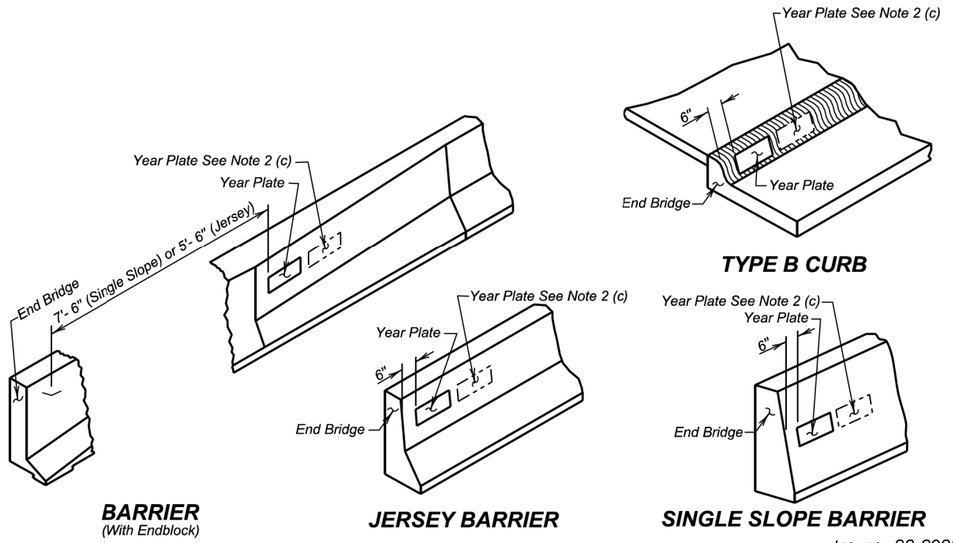
Published Date: 2025	SDDOT	PRECAST CONCRETE HEADWALL FOR DRAIN	PLATE NUMBER 430.50
			Sheet 1 of 1



YEAR PLATE DETAILS

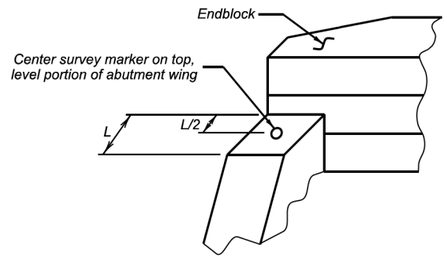
GENERAL NOTES:

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.

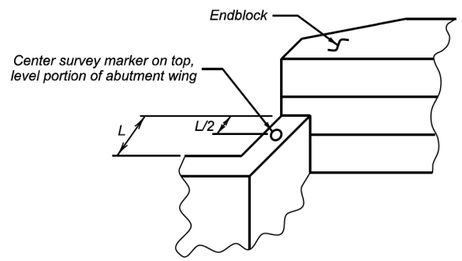


January 22, 2021

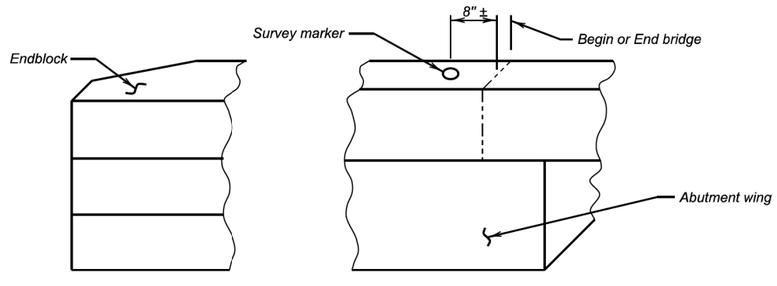
Published Date: 2025	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER 460.02
			Sheet 1 Of 1



ABUTMENT WITH "STRAIGHT" WINGS



ABUTMENT WITH "SWEPT BACK" WINGS



ABUTMENT WITH "SWEPT BACK" WINGS

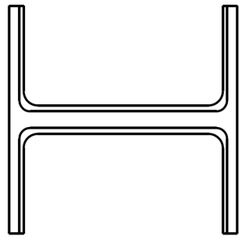
(Endblock on top of wings)

GENERAL NOTES:

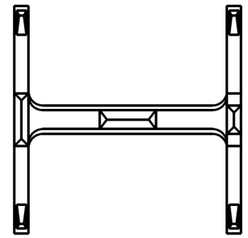
1. Survey markers shall be located at each abutment on the same side of the bridge as the year plate. Place survey markers on abutment wings as shown. Two survey markers will be required at each bridge.
2. Survey markers shall be of a type intended for installation in concrete, be made of solid brass 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

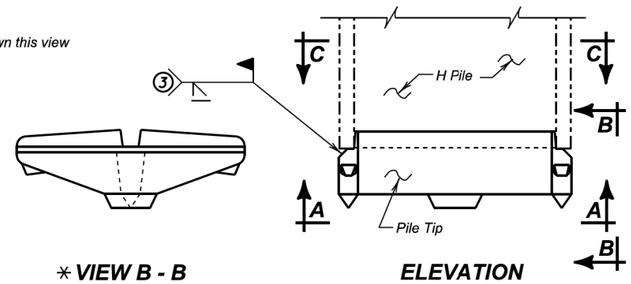


⁎ VIEW C - C



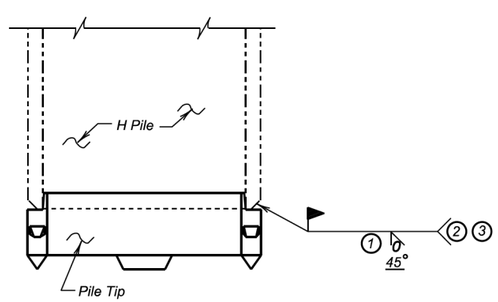
VIEW A - A

⁎ H Pile not shown this view



⁎ VIEW B - B

ELEVATION



2 See Table 1
3 Typical Both Flanges

ALTERNATE WELD ATTACHMENT

TABLE 1

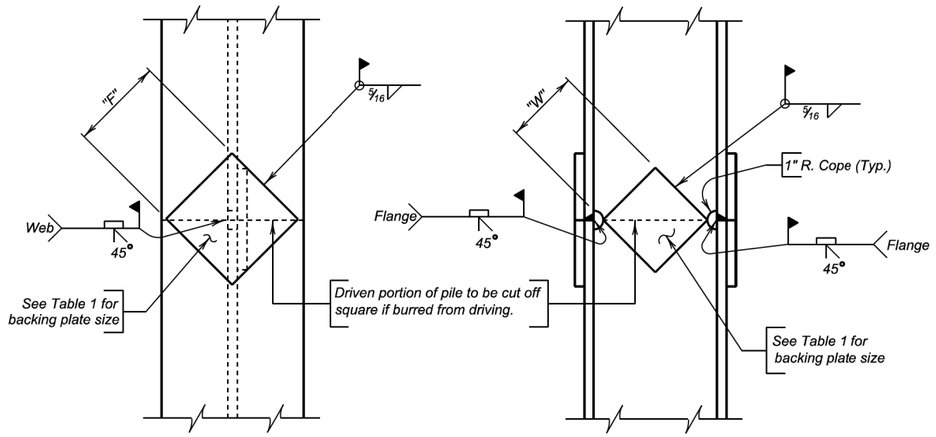
(1) DEPTH OF PREPARATION	PILE
3/8	HP 14 X 102 HP 14 X 89 HP 12 X 74
5/16	HP 14 X 73 HP 12 X 63 HP 10 X 57
1/4	HP 12 X 53 HP 10 X 42 HP 8 X 36

GENERAL NOTES:

1. Pile tip reinforcement shall be one-piece cast steel points commercially available and produced by a manufacturer who regularly produces pile points as a production item available to the public.
2. Material for pile points shall conform to ASTM A27, Grade 65-35, Class 2.
3. Pile points shall contain teeth designed to dig into obstructions and bearing materials in order to develop the maximum carrying capacity of the materials encountered.
4. Welding and weld inspection shall be in conformance with AWS D1.5 - (Current Year) Bridge Welding Code - Steel.

December 23, 2012

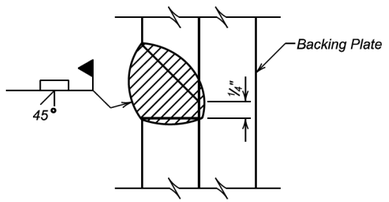
Published Date: 2025	SDDOT	H PILE TIP REINFORCEMENT	PLATE NUMBER 510.30
			Sheet 1 Of 1



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:

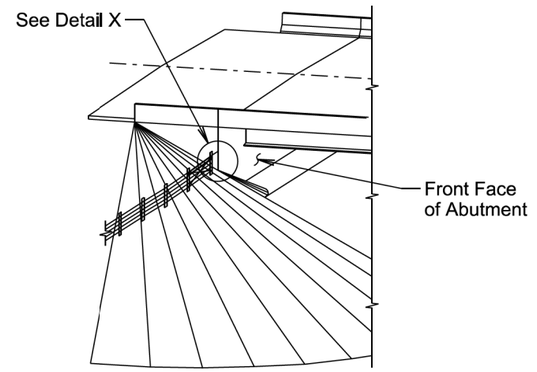
1. *Steel for backing plates shall conform to ASTM A709 Grade 50.*
2. *Welding and weld inspection shall be in conformance with AWS D1.5 (Current Year) Bridge Welding Code - Steel.*
3. *Welder must be certified and registered with the SDDOT.*
4. *Backing plate shall at a minimum be as thick as the web 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)

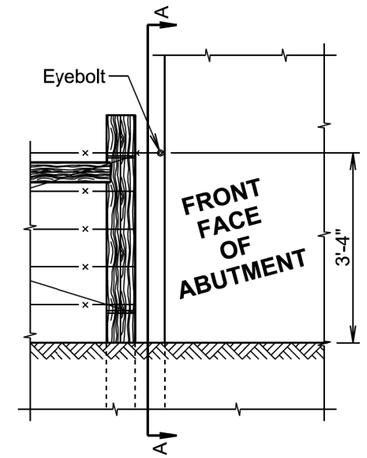
PILE	10"	12"	14"
"F" FLANGE	6 ½"	8"	10"
"W" WEB	4 ¾"	6 ¼"	7 ½"

December 23, 2012

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



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.

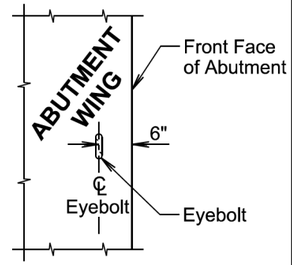
The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).

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.

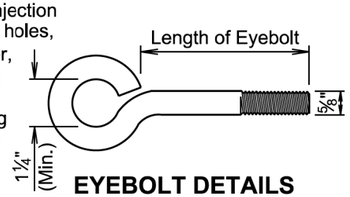
Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes ⅓ to ½ full of epoxy, or as recommended by the Manufacturer, prior to insertion of the eyebolts. Care will be taken to prevent epoxy 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.



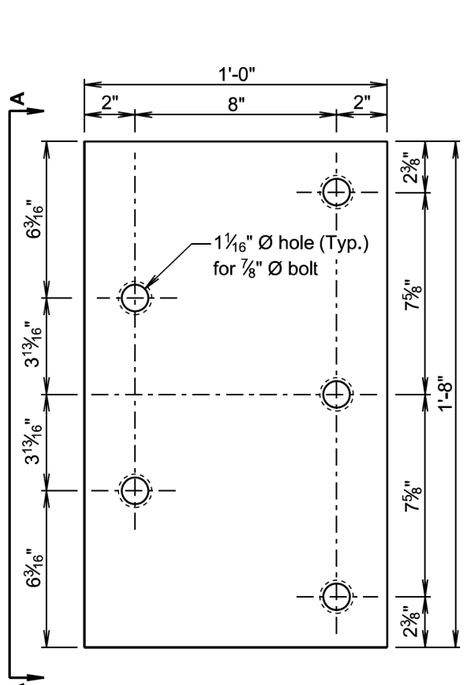
VIEW A-A



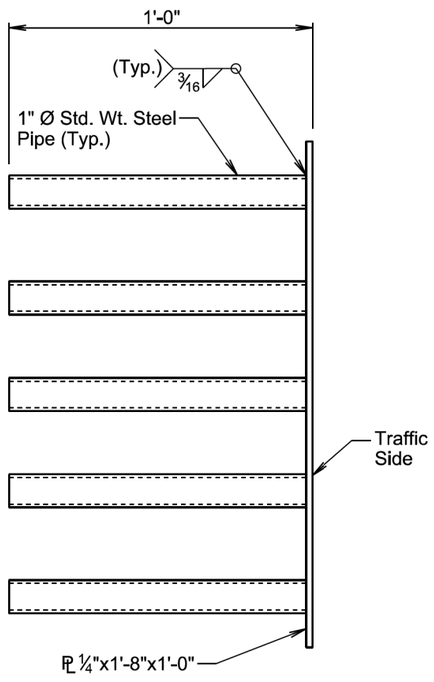
EYEBOLT DETAILS

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