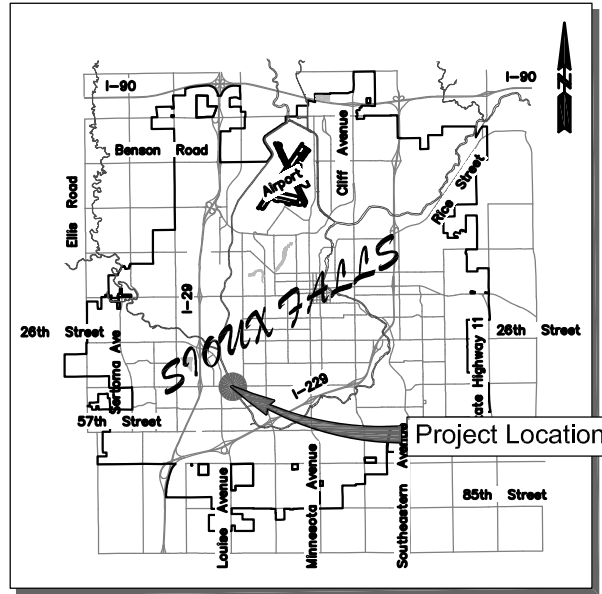


**City of Sioux Falls**  
**Minnehaha County**

**Plans for Proposed Grading, Curb and Gutter, Bridge, Roadway Lighting,  
Pavement Markings, PCC and Asphalt Concrete Pavement Surfacing,  
Retaining Wall, Watermain and Sanitary Sewer**

**BRIDGE REPLACEMENT  
OVER THE BIG SIOUX RIVER**

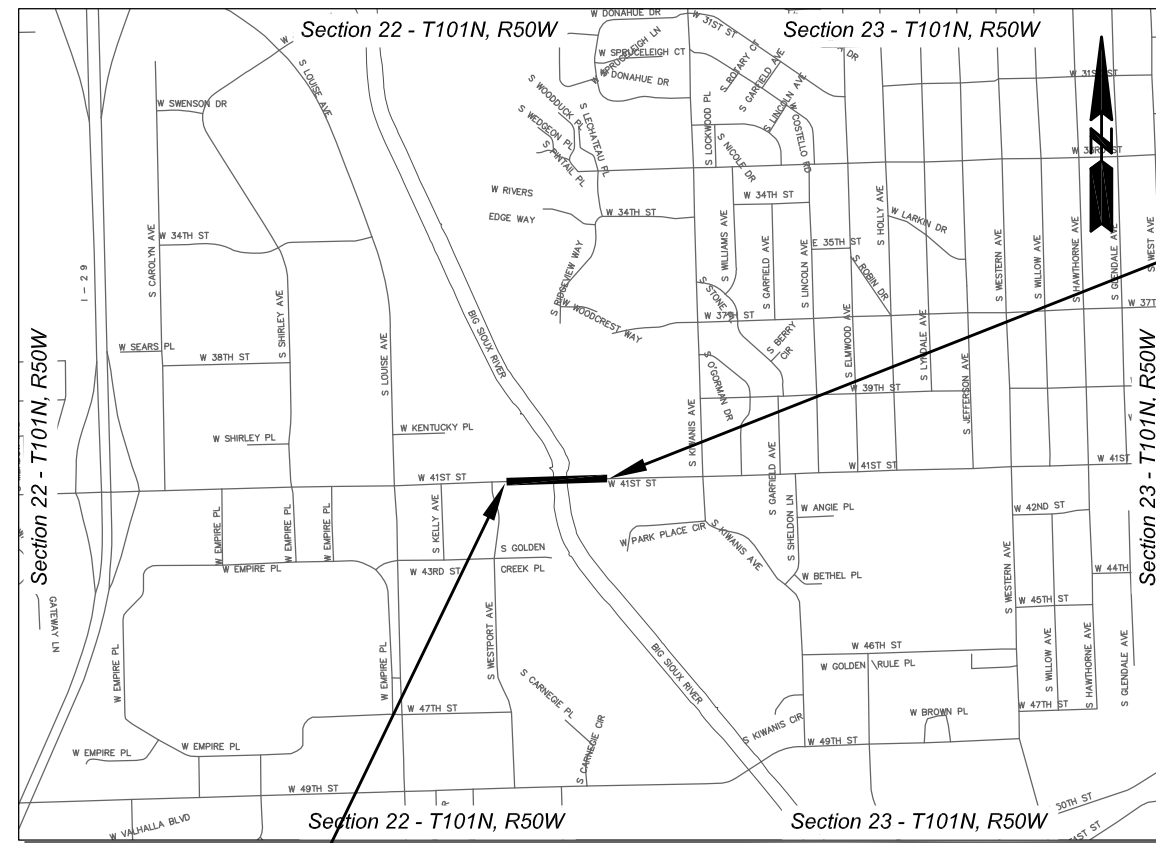
**CIP No. 422099  
Bid Request No. 09-1105**



**Vicinity Map**

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SHEET NO. C-1	TYPICAL SECTIONS
SHEET NO. D-1 THRU D-9	GENERAL NOTES
SHEET NO. E-1 THRU E-2	TABLE OF ROW AND EASEMENTS
SHEET NO. F-1 THRU F-11	TRAFFIC CONTROL
SHEET NO. G-1 THRU G-15	EROSION CONTROL AND RESTORATION
SHEET NO. H-1 THRU H-2	EXISTING CONDITIONS, REMOVALS AND INPLACE UTILITIES
SHEET NO. I-1 THRU I-7	PLAN AND PROFILE (STORM, WATER AND SANITARY)
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SHEET NO. N-1 THRU N-40	STANDARD DETAILS
SHEET NO. S-1 THRU S-44	STRUCTURES (BRIDGE)



**Location Map**

Drawing indicates general utility locations only. Neither the correctness or completeness of locations are guaranteed.

Prior to excavation contact:  
SOUTH DAKOTA ONE CALL (1-800-781-7474)

**Plans By:**



6300 SOUTH OLD VILLAGE PLACE  
SUITE 100  
SIOUX FALLS, SOUTH DAKOTA 57108  
(605) 977-7740  
FAX: (605) 977-7747



**End Project**  
Station 27+99.4  
41st Street

**City of Sioux Falls**

PUBLIC WORKS - DIVISION OF ENGINEERING  
224 WEST 9TH STREET  
SIOUX FALLS, SD 57104 (605) 367-8601

Approved

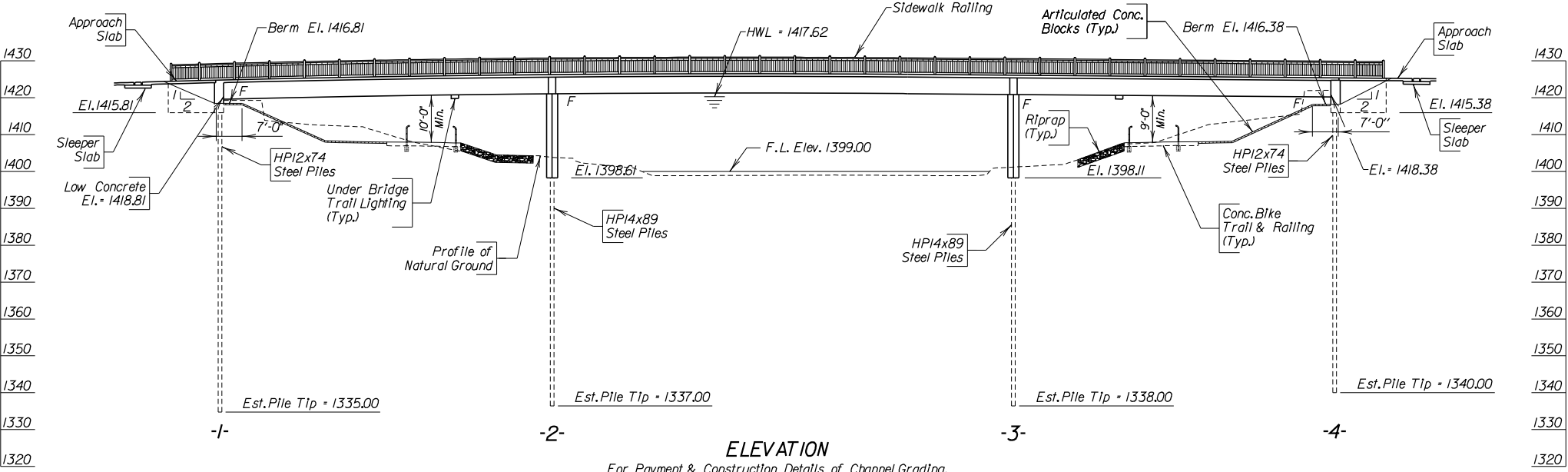
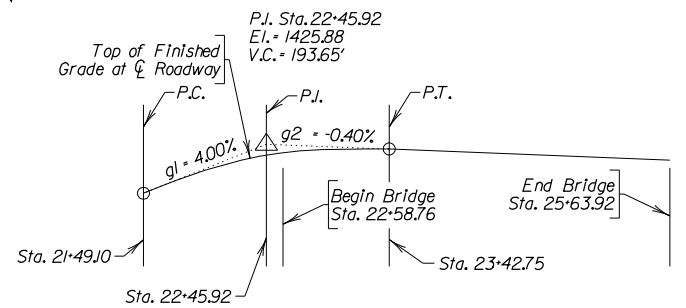
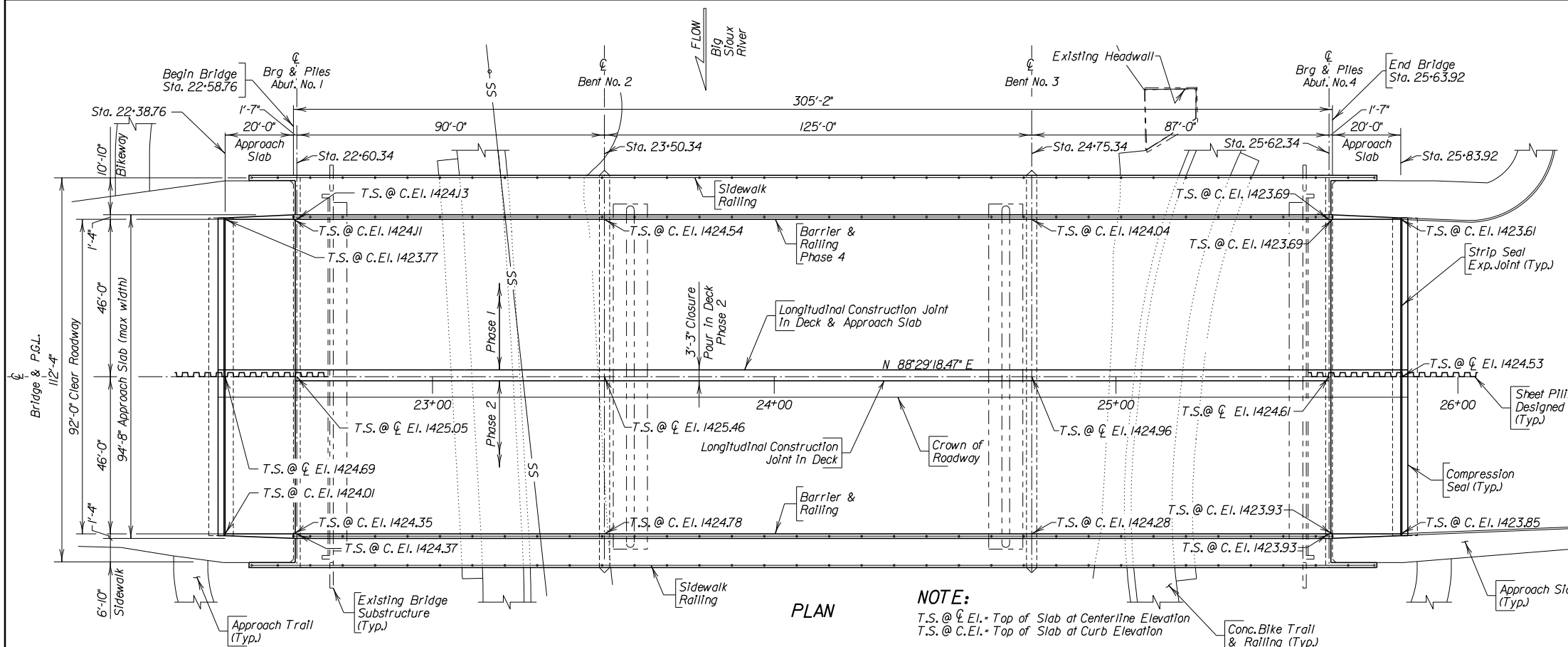
City Engineer

Date



**CITY OF SIOUX FALLS  
PUBLIC WORKS**  
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**INDEX OF BRIDGE SHEETS**

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S-2	Estimate of Structure Quantities & Notes
S-3	Notes (Continued)
S-4	Notes (Continued)
S-5	Notes (Continued)
S-6	Bridge Construction Staging Details
S-7	Subsurface Investigation & Piling Layout
S-8	Abutment Details
S-9	Abutment Details (Continued)
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S-35	Approach Slab Details (Continued)
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S-37	Strip Seal Details
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S-42	Temporary Barrier Details
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S-44	Standard Details (Continued)

**HYDRAULIC DATA**

$Q_d$	20900 c.f.s.
$A_d$	3986 sq. ft.
$V_d$	5.44 f.p.s.
$Q_F$	20900 c.f.s.
$Q_{100}$	20900 c.f.s.
$V_{max}$	5.44 f.p.s.

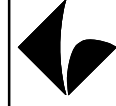
$Q_d$  = Design discharge for the proposed bridge based on 100 year frequency. El. 1417.66  
 $Q_F$  = Designated peak discharge for the basin approaching proposed project based on 100 year frequency.  
 $Q_{100}$  = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1417.66  
 $V_{max}$  = Maximum computed velocity for the proposed bridge, based on a 100 year frequency.

The hydraulic analysis is based on maximum discharge of a 2-yr flow passing through the Big Sioux River with the remainder of the flow diverted through the upstream diversion channel.

**41ST STREET BRIDGE REPLACEMENT OVER THE BIG SIOUX RIVER SIOUX FALLS, SOUTH DAKOTA**

**LAYOUT & GENERAL DRAWING**  
 DESIGNED BY: B. SCHULTZ  
 DRAWN BY: J. BERMAN  
 CHECKED BY: C. W. HOFF  
 DATE: 10/28/2009  
 REVISIONS:  
 BY: \_\_\_\_\_  
 DATE: \_\_\_\_\_

**CITY OF SIOUX FALLS PUBLIC WORKS**  
 Providing a Better Quality of Life for You!



SHEET NO.

**S-1**



**HDR** PLANS BY:  
 HDR, INC.  
 SIOUX FALLS, S.D.

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**ESTIMATE OF STRUCTURE QUANTITIES**

DESCRIPTION	QUANTITY	UNIT	REMARKS
Bridge Elevation Survey	Lump Sum	LS	
Incidental Work, Structure	Lump Sum	LS	
Strip Seal Expansion Joint	186.2	Ft	
Compression Seal	186.0	Ft	
Structure Excavation, Bridge	827	CuYd	
Granular Bridge End Backfill	235	CuYd	
Bridge End Backfill Underdrain Pipe	288	Ft	
Bridge End Backfill Excavation	1351	CuYd	
5'-0" Prestressed Concrete Box Girder	1804.0	Ft	
6'-0" Prestressed Concrete Box Girder	3908.6	Ft	
Class A45 Concrete, Bridge Deck	916.9	CuYd	Special Provision
Class A45 Concrete, Bridge	670.1	CuYd	
Concrete Approach Slab For Bridge	427.3	SqYd	
Concrete Approach Sleeper Slab For Bridge	149.9	SqYd	
Reinforcing Steel	41100	Lb	
Epoxy Coated Reinforcing Steel	123580	Lb	
Steel Bicycle Railing on Sidewalk	656.0	Ft	
Steel Bicycle Railing on Concrete Barrier	609.7	Ft	
No. 4 Rebar Splice	30	EACH	
No. 5 Rebar Splice	410	EACH	
No. 6 Rebar Splice	62	EACH	
No. 7 Rebar Splice	246	EACH	
Preboring Pile	440	Ft	
HP12 Pile Tip Reinforcement	44	EACH	
HP12x74 Steel Test Pile, Furnish & Drive	171	Ft	
HP12x74 Steel Bearing Pile, Furnish & Drive	3381	Ft	
HP14 Pile Tip Reinforcement	74	EACH	
HP14x89 Steel Test Pile, Furnish & Drive	170	Ft	
HP14x89 Steel Bearing Pile, Furnish & Drive	5766	Ft	

**SPECIFICATIONS FOR BRIDGE**

- Design Specifications: AASHTO LRFD Bridge Design Specification, 3rd Edition for Superstructure Design. The design of the substructure and remaining elements shall use the AASHTO Standard Specification, 17th Edition. Piling design shall use Service Load Design.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2004 Edition and Required Provisions and Supplemental Specifications as included in the Proposal.

**BRIDGE DESIGN LOADING**

- AASHTO HL-93 for Superstructure design.
- AASHTO HS25-44 & Alternate, for Substructure and Piling design.
- Dead Load includes 22 psf for future wearing surface (FWS) on the roadway.

**DESIGN MIX OF CONCRETE**

- All structural concrete shall be Class A45 unless otherwise indicated.
- Type II cement is required, except Type III may be used for the prestressed beams.
- Coarse Aggregate to be used in concrete shall consist of either crushed quartzite or other crushed ledge rock. If crushed ledge rock other than quartzite is to be used, it shall be from a source approved by the Engineer.
- For substructure, bridge deck, barrier and approach slabs adjacent to bridge (including sleeper slabs), the concrete mix shall produce a concrete having a minimum 28 day compressive strength of 4500 psi.

**GENERAL CONSTRUCTION - BRIDGE**

- All mild reinforcing steel shall conform to ASTM A615, Grade 60.
- All exposed concrete corners and edges shall be chamfered 3/4" unless noted otherwise.
- Use 2" clear cover on all reinforcing steel except as shown.
- The Contractor shall imprint on the structure the date of construction as specified and detailed on Standard Plate No. 460.02, which is on Sheet S-44.
- Barrier Curbs and Approach Barriers shall be built normal to the grade.
- Request for construction joints or reinforcement 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.

**UNIT DESIGN STRESSES**

- Design Material Strengths:
 

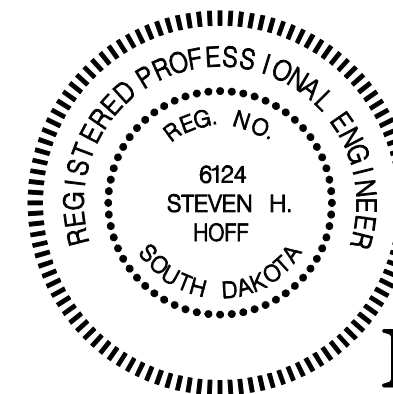
Concrete	$f'_c = 4500$ psi
Reinforcing Steel	$f_y = 60000$ psi
- For prestressed girders, set notes regarding Prestressed Girders.
- Design unit stresses shall be as set forth in the Design Specifications (See note regarding Specifications for Bridge).

**PHASED CONSTRUCTION**

- To accommodate traffic, this bridge must be built in Phases. For details of Phased construction see Bridge Construction Phasing Details Sheet No. S-8.

**INCIDENTAL WORK, STRUCTURE**

- In place centerline Sta. 22+71.84 to centerline Sta. 25+53.84 is a 282'-0", 3 span continuous Steel Plate Girder Bridge. There is 92'-0" clear roadway, two 1'-4" wide Jersey barriers, and two 6'-1" wide sidewalks. The superstructure slab and sidewalk are reinforced concrete. The barrier railing and pedestrian railing are steel. The deck has a 1 1/4" thick Latex Modified Concrete Overlay. The substructure consists of reinforced concrete sill type abutments and reinforced concrete wall piers, all supported on timber piling.
- Break down and remove, in conformance to the Phased construction, the existing superstructure, the existing abutments, the existing approach slabs, the existing sleeper slabs and the existing bents to a minimum of one foot below finished groundline or flowline, or as required to construct the new structure and removal of existing rip-rap in channel around limits of existing bridge in accordance with the South Dakota Standard Specifications. All portions of the demolished structure shall become the property of the Contractor and shall be removed and disposed of by the Contractor on a site obtained by the Contractor and approved by the Engineer. Existing conduit is present but not in service. The new conduit, except as noted, with service will be located outside the limits of this project.
- In order to proceed with Phase 1 of the construction sequence, the existing slab from the outermost left edge to 9" left of the roadway centerline must be removed, the existing abutment from the outermost left edge to 1'-9" left of the roadway centerline must be removed, the existing approach slabs and sleeper slabs from the outermost left edge to the roadway centerline and the existing bents and their footings from the outermost left edge to 1'-4 1/2" left of the roadway centerline must be removed. Prior to the breakout of concrete, a 12" deep sawcut will be made at the limits of the breakout. Care should be taken to ensure the operations taken to remove this portion of the existing bridge do not harm the portion of the existing bridge that will carry Phase 1 traffic. The cost of sawing, breaking out concrete, and disposal of all broken out material shall be included in the lump sum bid for Incidental Work.
- After Phase 1 construction is complete and traffic is switched off the existing bridge, removal of the remaining portion of the existing bridge may begin. Care should be taken to ensure the operations taken to remove this portion of the existing bridge do not harm the newly constructed portion of the bridge.
- The foregoing is a general description of the in-place structure and incidental work involved and should not be construed to be complete in all details. Before preparing the bid it shall be the responsibility of the Contractor to make a visual inspection of the structure to verify the extent of work and materials involved. If desired by the Contractor, a copy of the original construction plans may be obtained through the City of Sioux Falls, Public Works - Division of Engineering.
- During demolition of the existing structure, asphalt shall not be allowed to fall in the river.



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**NOTICE – LEAD BASED PAINT**

1. Be advised that the existing bridge plans indicate the paint on the steel surfaces may contain lead. The Contractor should plan his/her operations accordingly, and inform his/her employees of the hazards of lead exposure.

**ABUTMENTS**

1. One test pile shall be driven during Phase 1 construction at each abutment near the centerline of the bridge and will become part of the pile group.
2. Abutment backwalls above the construction joint shall be built monolithic with the deck slab.
3. Due to Phased construction there is insufficient room for a lap splice in the abutment. Therefore, the longitudinal abutment reinforcement shall be spliced with mechanical splice devices. The shop plans shall show the method of splicing to be used. The full mechanical connection shall develop 125 percent of the specified yield strength of the bar. The bar lengths shown in the plans are the lengths of the bars neglecting the mechanical devices. The receiver end of the device shall be placed in the Phase 1 portion of the abutment. The cost of the mechanical splice shall be paid for on a per each basis.
4. Abutment wingwalls shall not be cast until after the deck has been poured.
5. Estimated pile lengths are shown in the Table of Estimated Quantities on Sheet Nos. S-8 & S-10.
6. The Contractor shall have sufficient pile splice material on hand before pile driving is started. See Standard Plate No. 510.40 on Sheet No. S-4.
7. HP 12X74 A36 piling shall be driven to a minimum bearing value of 90 tons per pile.
8. Prebore piling at each abutment is required to whichever is greater, 10ft or to natural ground.
9. All exposed concrete surfaces of the abutments shall be finished in accordance with Section 460.3 M of the Construction Specifications. See CLASS B COMMERCIAL TEXTURE FINISH notes on Sheet No. S-4.
10. See PILE DRIVING notes on Sheet No. S-4.
11. Each Finished Abutment shall include a Bridge Survey Marker. See Standard Plate No. 460.05 on Sheet No. S-43.
12. Piles shall not be driven out of position by more than two inches in the direction parallel to the centerline of abutment bearing and piles. A pile-driving template shall be used to ensure this accuracy.
13. See PILE TIP REINFORCEMENT notes on Sheet No. S-5.

**BENTS**

1. One test pile shall be driven during Phase 1 construction at each bent near the centerline of the bridge and will become part of the pile group.
2. Submit details for vertical fractured fin finish to Engineer for approval. The costs associated with applying the vertical fractured fin finish shall be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge. See Sheet No. S-14 for details.
3. Estimated pile lengths are shown in the Table of Estimated Quantities on Sheet No. S-14.
4. The Contractor shall have sufficient pile splice material on hand before pile driving is started. See Standard Plate No. 510.40 on Sheet No. S-4.
5. HP 14X89 Gr. 50 piling shall be driven to a minimum bearing value of 100 tons per pile.
6. All exposed concrete surfaces of the bent shall be finished in accordance with Section 460.3 M of the Construction Specifications. See CLASS B COMMERCIAL TEXTURE FINISH notes on Sheet Nos. S-4.
7. See PILE DRIVING notes on Sheet No. S-4.
8. Piles shall not be driven out of position by more than two inches in the direction parallel to the centerline of bent. A pile-driving template shall be used to ensure this accuracy.
9. See PILE TIP REINFORCEMENT notes on Sheet No. S-5.

**PRESTRESSED BOX GIRDERS**

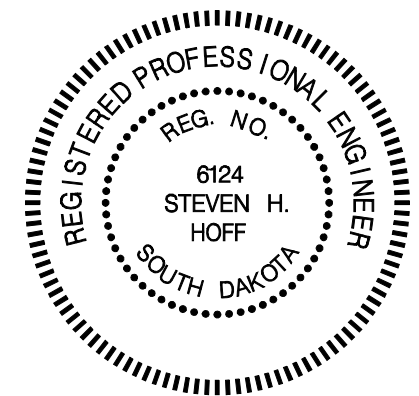
1. Minimum concrete compressive strength  $f'c = 8000$  psi at 28 days for all girders,  $f'ci = 6000$  psi for all Girders.
2. All mild reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 60.
3. Individual tendons in all pretensioned sections shall consist of seven wire uncoated Type 270K Strands having a nominal diameter of 0.6" and a minimum ultimate strength of 58600 lbs. per cable. An initial tensile force of 44000 lbs. shall be applied to all 0.6" cables in all girders. All prestressing steel shall conform to AASHTO M203 (low lax strands).
4. All prestressed girders within a span shall be cast within an 8 day period. If not, the newest girder shall be at least 6 weeks old before the deck slab is poured. The girders shall be poured in all steel forms.
5. Prestressed concrete girders shall 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 Engineer. The design of the lifting devices shall be the responsibility of the Fabricator.
6. Each girder shall be marked showing structure number, casting date, and beam number. Marking shall be on the face of the beam near the end and so located that they will be exposed after the diaphragms have been cast. Facia beams shall be marked on an inside face. All markings shall be stenciled and clearly legible. For beam designations and locations, see Girder Layout Sheet and Girder Erection Data Sheet.
7. The physical properties of the elastomeric bearing pads shall conform to the requirements of Section 18.2 of the AASHTO LRFD Bridge Construction Specification and the AASHTO Materials Specification M251. The elastomeric bearing pads shall conform to Grade 60 (durometer). The cost of the pads shall be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge. Certification that pads are 60 durometer and meet the requirements of AASHTO LRFD Bridge Construction Specification Section 18.2 and AASHTO Materials Specification M251 shall be furnished to the Engineer with the shop drawings.

**PRESTRESSED BOX GIRDERS – (continued)**

8. All exposed corners shall be chamfered 3/4" or rounded to 3/4" radius.
9. Dead Load of girder taken as effective at transfer. Cut strands, except those extended and bent, flush with end of girder and coat end of strands with mortar.
10. The Contractor shall be responsible for ensuring that transportation stresses, handling and erection do not cause damage to the girders.
11. Furnish and Install 3/4" Bent Rods (F1554, Gr. 55), Inserts of Bent Rods, Transverse Tie-Rod Ducts, Tie-Rods, Dowel Rods and Non-Shrink Grout as shown in the plans. All costs for these items shall be incidental to the contract unit price per foot of girder.
12. The Non-Shrink grout shall be a commercially available non-shrink grout containing no metallic particles and capable of attaining a 28-day compressive strength of 4000 psi. The non-shrink grout shall be mixed according to the manufacturer's recommendations.
13. The contract unit price for 5'-0" or 6'-0" Prestressed Concrete Box Girder shall include the cost of all materials and labor necessary to furnish the girder and erect it in place in accordance with the plans and specifications.

**SUPERSTRUCTURE**

1. Girder lifting hooks shall be cut off before placement of concrete deck slab.
2. The abutment backwall and diaphragms at the bents shall be poured integrally with the deck slab. Placement of the backwall and diaphragms shall not slow down the rate of deck concrete placement and finishing. The Contractor shall place the concrete for the specified backwall and diaphragms ahead of the deck concrete in such a manner that advancement of the deck concrete reaches the backwall and diaphragm just as placement of concrete in the backwall and diaphragm is complete.
3. The deck-finishing machine shall be adjusted and operated in such a manner that the roller screed or screeds are parallel with the centerline of the bridge. Concrete placement in front of the finish machine shall be kept parallel to the machine.
4. The bridge deck must be placed and finished continuously at a minimum rate of 37 ft. of deck per hour measured along Centerline Roadway. This rate is exclusive of concrete placed in the diaphragms. (See note 2 above.) If concrete cannot be placed and finished at this rate, the Engineer shall order a header installed and operations stopped. Notify the Bridge Construction Engineer if deck pour operations are stopped. Operations may resume only when the Engineer is satisfied that a rate of 37 ft. of deck per hour can be achieved and the concrete in the previous pour has attained a minimum compressive strength of 2000 psi.
5. Snap ties, if used in the barrier curb formwork, shall be epoxy coated. The epoxy coating shall be inert in concrete and compatible with the coating applied to the new epoxy coated reinforcing steel.



**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

**41ST STREET BRIDGE REPLACEMENT**  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

**NOTES (CONTINUED)**  
DESIGNED BY: D. BRULTER/REG  
DRAWN BY: J. SUPERS  
CHECKED BY: C. HALL  
REVISIONS:  
FILE: GENERAL\_NOTES.dwg  
DATE: 10/28/2009  
BY: DATE:

**CITY OF SIOUX FALLS**  
**PUBLIC WORKS**  
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SHEET NO.  
**S-3**

**CLASS A45 CONCRETE, BRIDGE DECK**

- Concrete used in the bridge deck slab, abutment backwalls, bent diaphragms and barrier curbs shall be in accordance with the requirements for bridge deck concrete as specified in the Special Provision for Optimized Aggregate Bridge Deck Concrete. The use of Class F Modified Fly Ash may be substituted for a portion of the cement in accordance with Section 605 of the Standard Specifications.
- The bridge deck concrete, excluding the barrier curbs, shall be placed and cured in accordance with the Special Provision for Bridge Deck Curing and Finishing.

**APPROACH SLABS**

- Sleeper slab riser shall be cast with the approach slab or cast after the approach slab is placed. Care shall be taken to ensure the correct grade is maintained across the joint.
- Due to phased construction there is insufficient room for a lap splice in the approach slab and sleeper slab. Therefore, the transverse approach slab and longitudinal sleeper slab reinforcement shall be spliced with mechanical splice devices. The shop plans shall show the method of splicing to be used. The full mechanical connection shall develop 125 percent of the specified yield strength of the bar. The bar lengths shown in the plans are the lengths of the bars neglecting the mechanical devices. The receiver end of the device shall be placed in the Phase 1 portion of the approach slab and sleeper slab. The cost of the mechanical splice shall be paid for on a per each basis.
- The concrete in the approach slab shall be tined normal to centerline roadway.
- 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 shall be kept parallel to the screed.
- The Concrete Approach Slabs Adjacent to Bridge shall be cured in accordance with Section 460.3 of the South Dakota Construction Specifications.
- Concrete Approach Sleeper Slab for Bridge will be paid for at the Contract unit price per square yard. This payment shall be full compensation for all excavation, furnishing, hauling, and placing all materials including concrete, structural steel, concrete anchors, 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.
- Concrete Approach Slab For Bridge will be paid for at the Contract unit price per square yard. This payment shall be full compensation for all excavation, furnishing, hauling and placing all materials including concrete, structural steel, asphalt paint or 4 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.

**ARMOR ANGLE ASSEMBLY FOR SLEEPER SLABS**

- Steel for the Armor Angle Assembly shall conform to ASTM A709, Grade 36. The Automatic End Welded Deformed Bar Anchor Studs shall conform to ASTM A496. The Armor Assembly complete in-place shall be a continuous unit, for each construction phase.
- Galvanize the Armor Angles and anything welded to them after all welding is completed. They shall be galvanized in accordance with AASHTO M111 (ASTM A123). All welding of Armor Angles and if welded splices are used subsequent to galvanizing, the weld details and the procedure for preparing the surface for welding and repainting the galvanizing after welding shall be included with the Shop Plans. Galvanizing shall be repaired in accordance with ASTM A780 using the zinc-based solder method.
- Welding for the Armor Angle Assembly shall be in accordance with ANS/AWS D1.1 Structural Welding Code – Steel.
- The cost of the Armor Angle Assembly complete in-place including fabrication, welding, and galvanizing shall be incidental to the contract unit price per square yard for Concrete Approach Sleeper Slab For Bridge.

**STRIP SEAL INSTALLATION**

The hot rolled steel extrusions that are to be cast into the sleeper slab riser and approach slabs shall be set at the correct grade and crown slope and securely supported during placement of the Class A45 Concrete. Care shall be taken to ensure that the correct grade is maintained across the joint.

**SHOP PLANS**

Shop plans shall be required as specified by Section 410.3.A. of the South Dakota Standard Specifications. This requirement shall apply for both the prestressed girders and fabricated steel items. The fabricator shall submit the Shop Plans for review to:

HDR Engineering, Inc.  
c/o Steven Hoff, P.E.  
6300 S. Old Village, Suite 100  
Sioux Falls, SD 57108-2102

One reviewed copy will be sent to the fabricator. The fabricator shall make any changes necessary, then send seven (7) final corrected copies to HDR Engineering, Inc. at the above address for final approval and fabrication authorization.

**CLASS B COMMERCIAL TEXTURE FINISH**

- A CLASS B COMMERCIAL TEXTURE FINISH shall be applied to the following areas: Barrier curbs – all exposed surfaces (front, top and back), including the edge of deck (vertical fascia). Concrete Girders – Outside face and bottom of fascia girders of the completed bridge. Abutments – all exposed surfaces to an elevation 1' below finished ground line. Bents – all exposed surfaces.
- This CLASS B COMMERCIAL TEXTURE FINISH shall be applied in accordance with Section 460.3.M.1.C of the South Dakota Construction Specifications.
- Where the CLASS B COMMERCIAL TEXTURE FINISH is to be applied, concrete curing shall be accomplished with cotton or burlap mats and polyethylene sheeting. Curing shall continue for not less than seven days after placing the concrete before the commercial texture finish is applied. Various commercial texture finish products require that the concrete be 28 days old before application. Therefore, the commercial texture finish shall be applied in accordance with the manufacturer's recommendations. The commercial texture finish itself does not require a specific cure except for drying.

**CLASS B COMMERCIAL TEXTURE FINISH (continued)**

- The cost of the Class B Commercial Texture Finish applied to the fascia girders shall be incidental to the contract unit price per cubic yard for class A45 Concrete, Bridge Deck.
- The color of the Class B Commercial Texture Finish shall be "Buff Tan".

**AS-BUILT ELEVATIONS SURVEY**

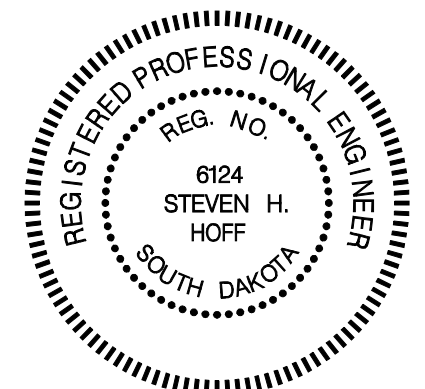
- The Contractor shall be responsible for recording the As-built deck elevations and bridge survey marker elevations at the locations shown in Table of As-Built Elevations shown in the plans. All costs associated with obtaining the elevations including all equipment, labor and any incidentals required shall be incidental to the contract lump sum price for Bridge Elevation Survey.

**PILE DRIVING**

- A gravity hammer shall not be used. An energy hammer will be required as follows:
  - Diesel Hammer– weight of striking parts not less than 3000 lbs. with a minimum equivalent energy rating of 62200 ft.-lbs.
  - Air or Steam Hammer– weight of striking parts not less than 6500 lbs. with a minimum equivalent energy rating of 33250 ft.-lbs.

**MECHANICAL REBAR SPLICES**

- Mechanical splice devices will be as required for reinforcing at the construction joints between Construction Phases as shown in the plans. Threaded flange-type mechanical splices with plugs shall be used. Submit Manufacturer's data (catalog cut acceptable) with details of mechanical splice used.
- The mechanical connection shall develop 125 percent of the specified yield strength of the bar. The Contractor shall obtain from the manufacturer and submit to the Engineer certification indicating the bar splice is capable of developing 125 percent of the yield strength of the bar.
- The mechanical splice devices shall be epoxy coated by the manufacturer or made of an approved corrosion resistant material. Coating the mechanical splice devices with epoxy touch-up paint is not an approved method for this coating.
- The bar lengths shown in the plans are the lengths of the bar neglecting the mechanical splice devices.
- All costs involved with supplying and installing the mechanical splice devices shall be incidental to the contract unit price per each for No. 4, No. 5, No. 6 or No. 7 Rebar Splice.



**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

**41ST STREET BRIDGE REPLACEMENT**  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

**NOTES (CONTINUED)**

DESIGNED BY: D. BRULTER	FILE: GENERAL NOTES.dwg
DRAWN BY: SUPERS	DATE: 10/28/2009
CHECKED BY: C. HALL	BY: DATE:
REVISIONS:	BY: DATE:

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SHEET NO.

**S-4**

**PILE TIP REINFORCEMENT**

1. Pile Tip Reinforcement is required on all piles.
2. The pile tips shall be reinforced with a one-piece cast steel point commercially available and produced by a manufacturer who regularly produces pile points as a production item available to the public. The cast steel pile points as a production item available to the public. The cast steel tip shall contain teeth on the point designed to dig into obstructions and bearing materials in order to develop the maximum carrying capacity of the materials encountered. Reinforcement tips shall be welded to the H-Piles as recommended by the manufacturer. The pile tip complete and in place shall be paid for at the contract unit price per each for HP12 or HP14 Pile Tip Reinforcement.
3. See Standard Plate No. 510.30 on Sheet No. S-44 for additional details.

**NOSE ARMOR ANGLE FOR BENTS**

1. Steel for the Nose Armor Angle shall conform to ASTM A709, Grade 36. The End Welded Studs shall conform Section 7.3 Type B of the ANSI/AASHTO/AWS D1.5-2002 Bridge Welding Code. See Sheet No. S-14 for details.
2. Galvanize the Nose Armor Angles and anything welded to them after all welding is completed. They shall be galvanized in accordance with AASHTO M111 (ASTM A123).
3. Welding for the Nose Armor Angle shall be in accordance with ANSI/AWS D1.1 Structural Welding Code - Steel.
4. The cost of the Nose Armor Angle complete in-place including fabrication, welding, and galvanizing shall be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge.

**STEEL RAILING**

1. All rail posts shall be built vertical.
2. All structural steel parts for railing shall conform to ASTM A500, Grade B. Material less than 1/4" thick may be ASTM A1011, Grade 36 and rail post base plates may be ASTM A709, Grade 36.
3. All anchor bolts and nuts for railing shall conform to ASTM A307. Washers shall conform to ASTM F436 and all components shall be galvanized in accordance with ASTM A153 or ASTM F2329. The bolts shall be hex head "structural" type with heavy hex nuts and round washers.
4. All anchor bolts shall be tightened to a torque of 120 ft-lbs (approximated without the use of a calibrated torque wrench).
5. The non-shrink grout used to fill the recess beneath the rail post base plates shall be a commercially available non-shrink grout containing no metallic particles and capable of attaining a 28-day compressive strength of 4000 psi. The non-shrink grout shall be mixed according to the manufacturer's recommendations. The cost of furnishing and placing the non-shrink grout shall be incidental to the contract unit price bid per foot of Steel Bicycle Railing on Sidewalk and Steel Bicycle Railing on Concrete Barrier.
6. All steel railing shall be painted in accordance with Section 411 of the South Dakota Standard Specifications and the color shall be an approved black.
7. Welding & Weld Inspection shall be done in accordance with the current edition of AWS D1.1 Structural Welding Code - Steel.
8. The costs of structural steel, welding, weld inspection, painting, and galvanizing shall be incidental to the contract price per foot for Steel Bicycle Railing on Sidewalk and Steel Bicycle Railing on Concrete Barrier.

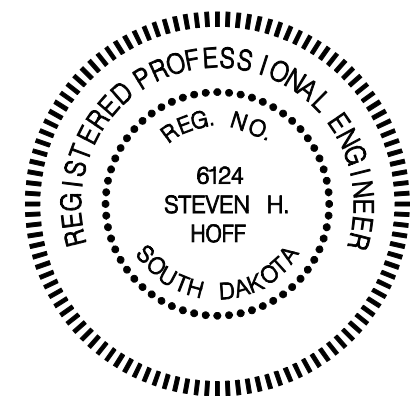
**INSTALLING DOWELS IN CONCRETE**

1. Holes drilled in the concrete shall be true and normal or as shown in the plans. Care shall be taken not to damage the reinforcing steel. Before drilling any holes in the concrete, an effort shall be made by the Contractor to mark on the concrete surface where practical any locations of the in-place reinforcing steel. In spite of this precaution, the contractor can still expect to encounter and have to drill through reinforcing steel or shift the dowel spacing as approved by the Engineer to miss the existing reinforcing steel.
2. The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV Grade 3 (Equivalent to ASTM C881, Type IV Grade 3).
3. The diameter of the drilled holes shall not be less than 1/8 inch greater, nor more than 3/8 inch greater than the diameter of the dowels or as per Manufacturer's recommendations. Use compressed air or other techniques to ensure that the hole is free of any loose material before epoxy resin is applied.
4. Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel bar. Rotate the steel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bar by the dipping method will not be allowed.
5. No loads shall be applied to the epoxy grouted dowel bars until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.
6. Embed dowels into concrete as detailed on Superstructure Detail and Approach Slab Detail Sheets.
7. Include the cost of Epoxy resin, installation and other incidental items in the unit bid for Class A45 Concrete, Bridge Deck.

**PEDESTRIAN UNDER BRIDGE LIGHTING**

1. Conduit for Under Bridge Lighting shall be Schedule 80 non-metallic heavy wall PVC (polyvinyl chloride plastic) and the color shall match the color of the Interconnect conduit detailed on the Roadway Sheets.
2. Conduit attachment details to the Concrete Box Girders shall be coordinated so the attachments are placed to miss the prestress strands. See allowable placement detail on sheet S-41.
3. Conduit for Under Bridge Lighting shall carry 3-#8CU THWN/THHN wires.
4. Refer to Sidewalk Handrail details on Sheet S-39.
5. See Roadway sheets for description of conduit and lighting wiring connections at each end of the bridge.
6. Refer to the Lighting Fixture Schedule for Light Information.
7. All costs involved with supplying, installing and connecting the Pedestrian Under Bridge Lighting and wiring conduit shall be included in the lump sum unit price for Pedestrian Under Bridge Lighting.
8. All costs involved with connecting the light wiring to the permanent electrical power source at each end of the bridge shall be included in the lump sum unit price for Pedestrian Under Bridge Lighting.

PEDESTRIAN UNDER BRIDGE LIGHTING FIXTURE SCHEDULE					
SERIES	QUANTITY	LAMP QTY	LAMPS	LAMP TYPE	LENS
RC6	4	2	100W/MH	96T8H F96T8/HO (8ft)	Q125 WHITE ACRYLIC (BASE)
MOUNTING	VOLTAGE	ORDERING INFORMATION			
SURFACE MOUNT	240V/60HZ	Surface Mounting Brackets, Tampered Resistant Hardware, 100 Watt Metal Halide Lamp, 240 Volts, 2 Lamps			



**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

**41ST STREET BRIDGE REPLACEMENT**  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

**NOTES (CONTINUED)**  
DESIGNED BY: D. BRULIN/EGE/BE  
DRAWN BY: J. SUPERS  
CHECKED BY: C. HALL  
REVISIONS:  
FILE: GENERAL NOTES4.dwg  
DATE: 10/30/2009  
BY: DATE:

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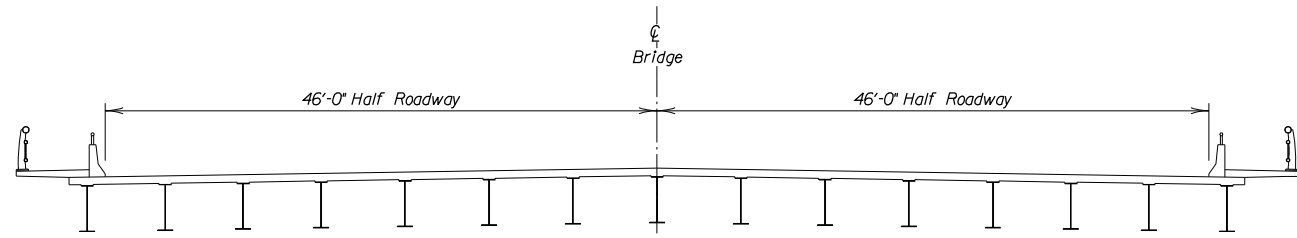


SHEET NO.

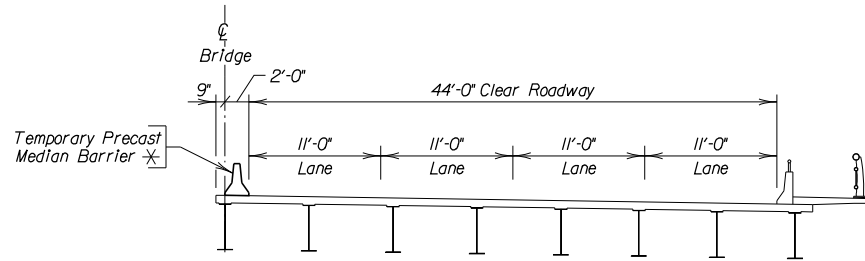
**S-5**

10/30/2009 owright C:\Pwworking\OMA\0412022\GENERAL\_NOTES4.dgn

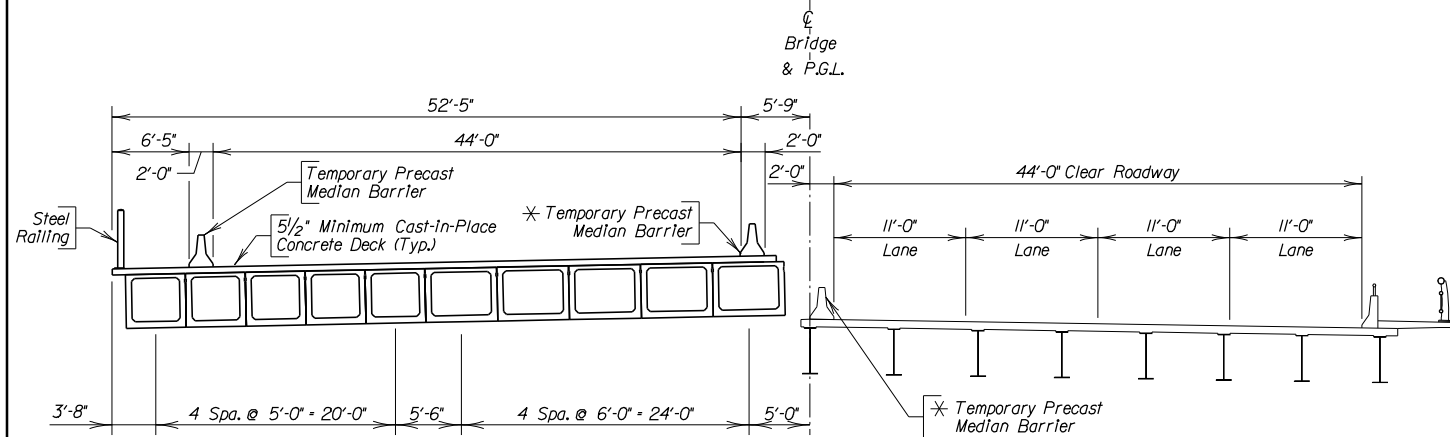
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10/28/2009 awright



EXISTING BRIDGE

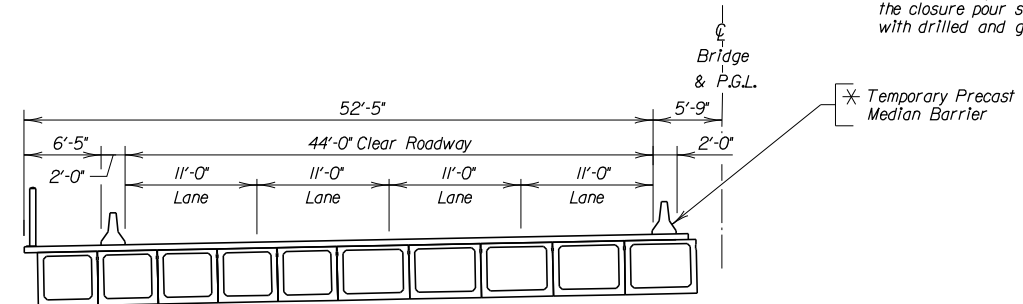


PHASE 1 REMOVAL



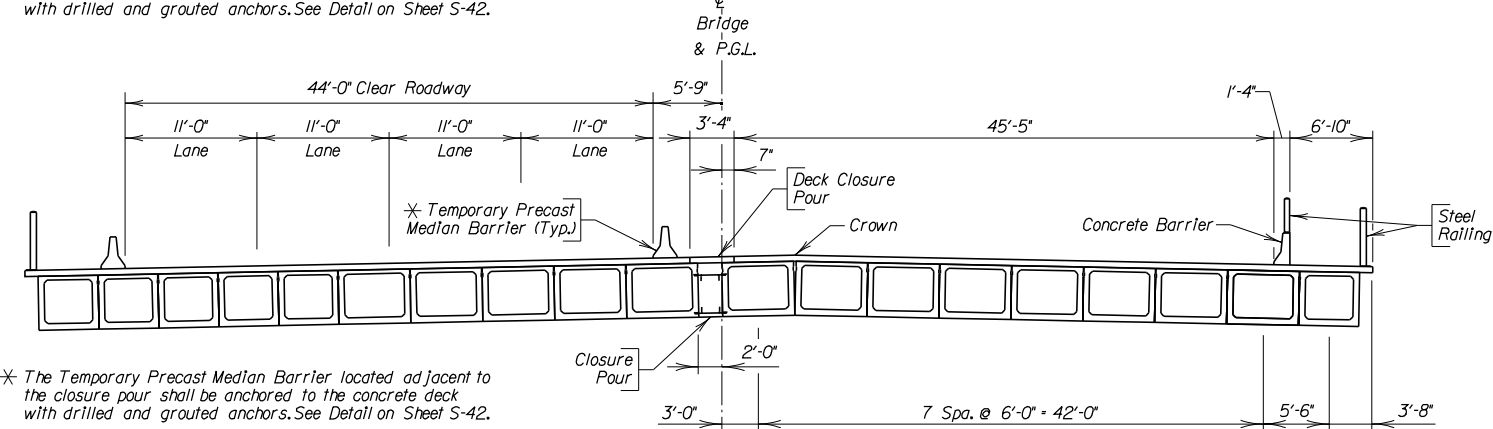
PHASE 1 CONSTRUCTION

\* The Temporary Precast Median Barrier located adjacent to the closure pour shall be anchored to the concrete deck with drilled and grouted anchors. See Detail on Sheet S-42.



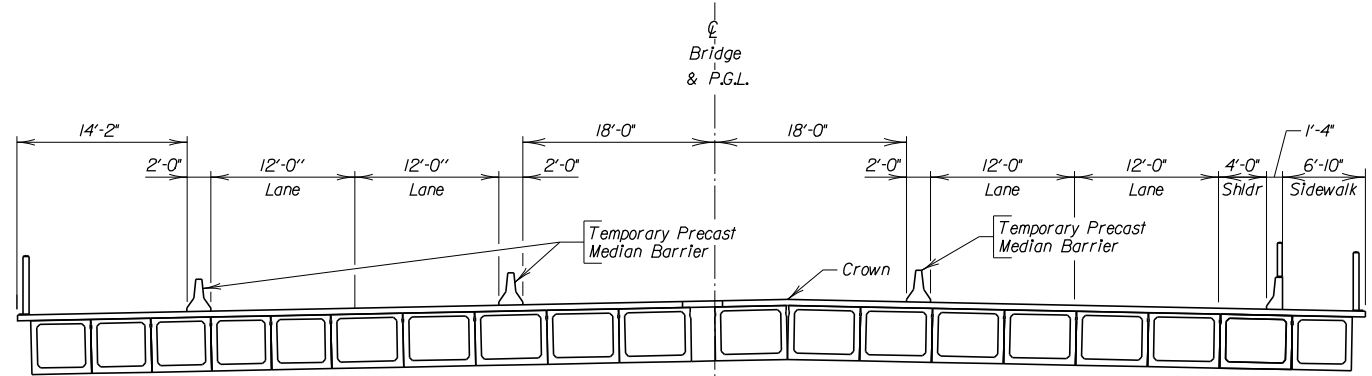
PHASE 2 REMOVAL

\* The Temporary Precast Median Barrier located adjacent to the closure pour shall be anchored to the concrete deck with drilled and grouted anchors. See Detail on Sheet S-42.

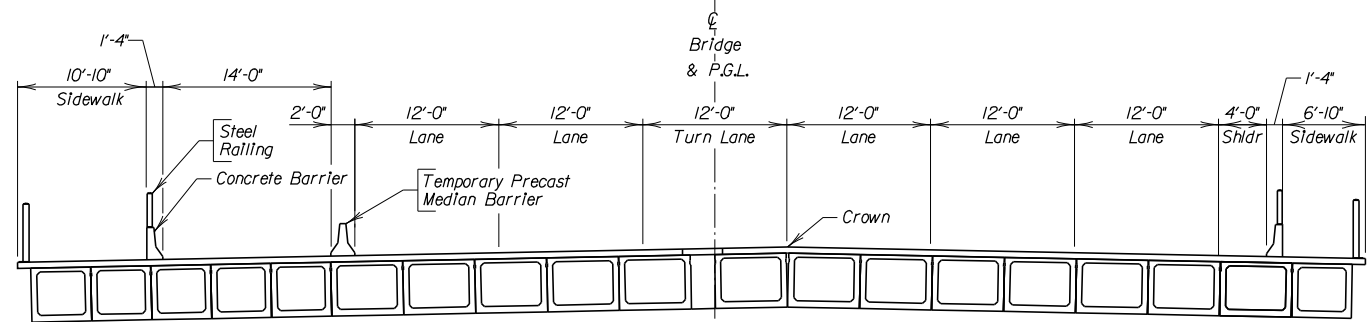


PHASE 2 CONSTRUCTION

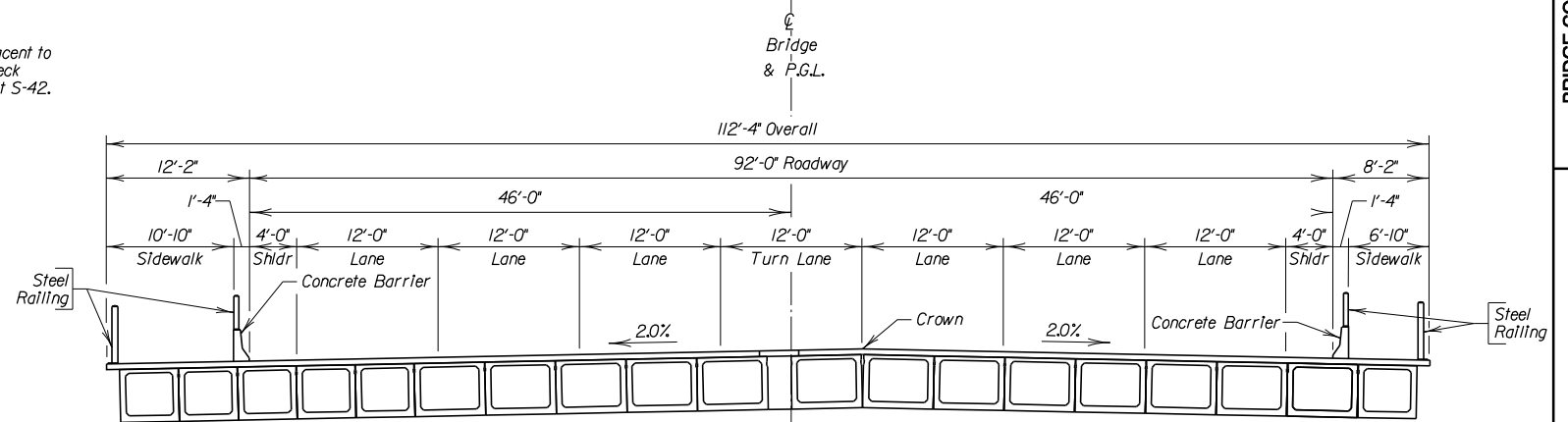
\* The Temporary Precast Median Barrier located adjacent to the closure pour shall be anchored to the concrete deck with drilled and grouted anchors. See Detail on Sheet S-42.



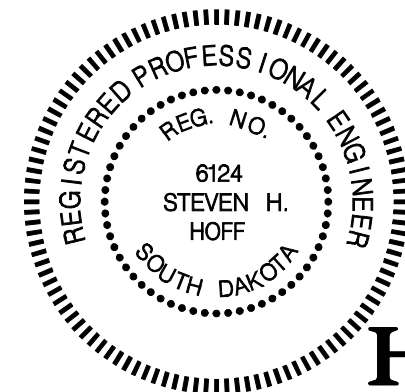
PHASE 3 TRAFFIC CONTROL



PHASE 4 CONSTRUCTION



COMPLETED BRIDGE

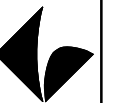


HDR  
PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

41ST STREET BRIDGE REPLACEMENT  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

BRIDGE CONSTRUCTION PHASING DETAILS  
DESIGNED BY: STEVEN HOFF  
DRAWN BY: C. WILHOFF  
CHECKED BY: C. WILHOFF  
DATE: 10/28/2009  
BY: DATE:  
BY: DATE:

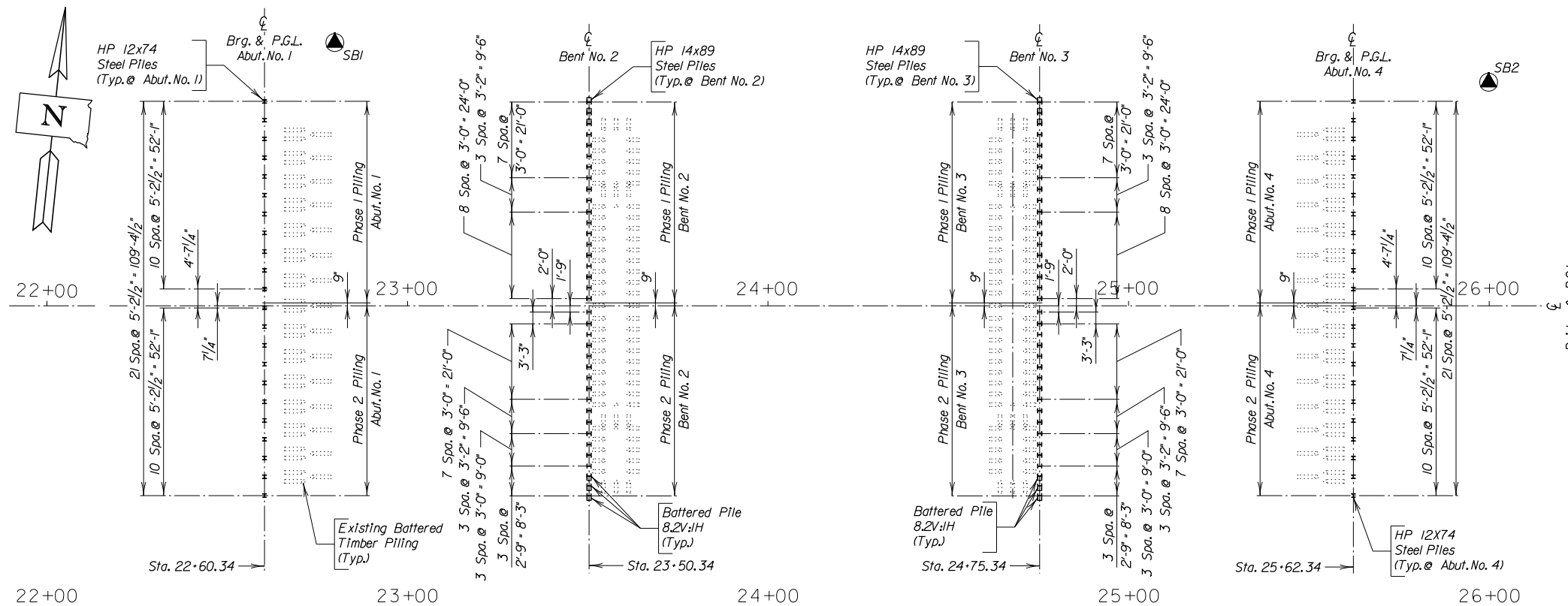
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SHEET NO.

S-6

10/28/2009 awright C:\Pwworking\OMA\0412022\GEOLOGY\_&\_PILE\_LAYOUT.dgn



GLACIATED TERRAIN CONTAINS ALL SIZES OF NATURAL MINERAL SEDIMENT RANGING FROM CLAY TO POSSIBLE BOULDERS. STREAMS ORIGINATING IN OR FLOWING THROUGH GLACIATED TOPOGRAPHY CONTAIN SEDIMENT LOADS DERIVED FROM GLACIATED SOURCES. STREAM AND RIVER CROSSINGS CONTAIN SEDIMENT NATURALLY SORTED AND RANDOMLY CONCENTRATED. ALLUVIAL SEDIMENT LOCATED AT THIS PROJECT LOCATION MAY HAVE CONCENTRATED COARSER GRAVEL SUCH AS PEBBLES, COBBLES AND BOULDERS. THE BORINGS SHOWN REPRESENT MATERIALS ONLY THAT WERE FOUND AT THE EXACT LOCATION OF THE SMALL DIAMETER DRILL HOLE. COARSE GRANULAR MATERIAL MAY BE PRESENT IN AREAS NOT PENETRATED BY THE DEPICTED BORINGS.

THE CITY OF SIOUX FALLS HAS ON FILE ALL OF THE BORING LOGS FOR THIS PROJECT. THESE LOGS AND ADDITIONAL RESULTS OF LABORATORY TESTS, IF ANY, ARE AVAILABLE FOR REVIEW,

LEGEND

▲ DRIVE TEST

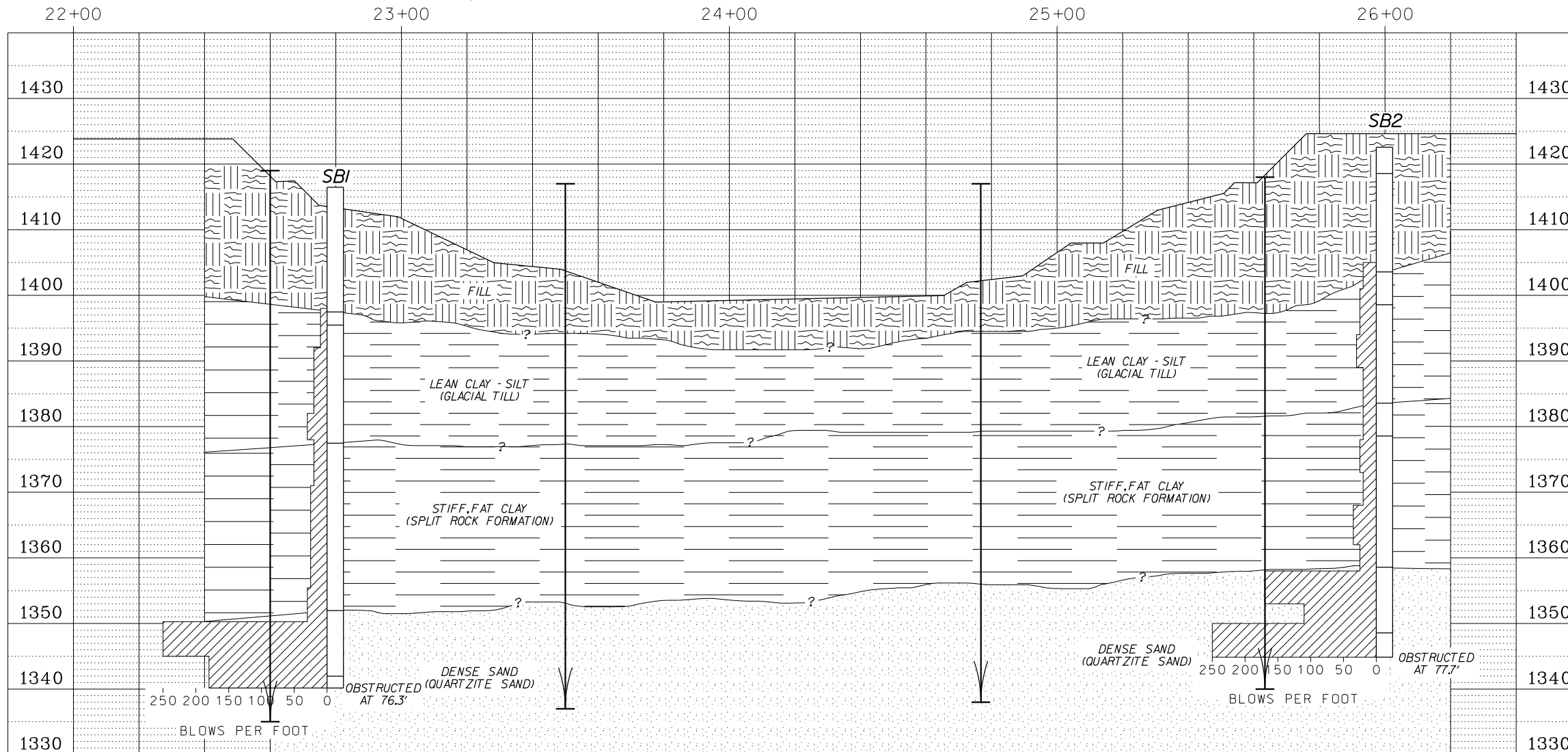
DRIVE TESTS CONDUCTED BY DROPPING A 490 POUND HAMMER 30 INCHES TO DRIVE A 2 7/8 INCH DRILL STEM WITH ATTACHED RETRACTABLE PLUG SAMPLER FOR TAKING UNDISTURBED SAMPLES AND TO MEASURE THE RESISTANCE TO PENETRATION OF THE SOIL.

GROUND WATER ELEVATIONS AS OF JUNE 2004

SB1 N/R

SB2 N/R

N/R = NOT RECORDED, DRILLING FLUIDS USED.



HDR PLANS BY: HDR, INC. SIOUX FALLS, S.D.

41ST STREET BRIDGE REPLACEMENT

OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

SUBSURFACE INVESTIGATION & PILING LAYOUT

DESIGNED BY: SP/TL/UB/BB/BE  
DRAWN BY: M/BB/BE  
CHECKED BY: C. HALL  
DATE: 10/28/2009  
REVISIONS:  
BY: DATE:

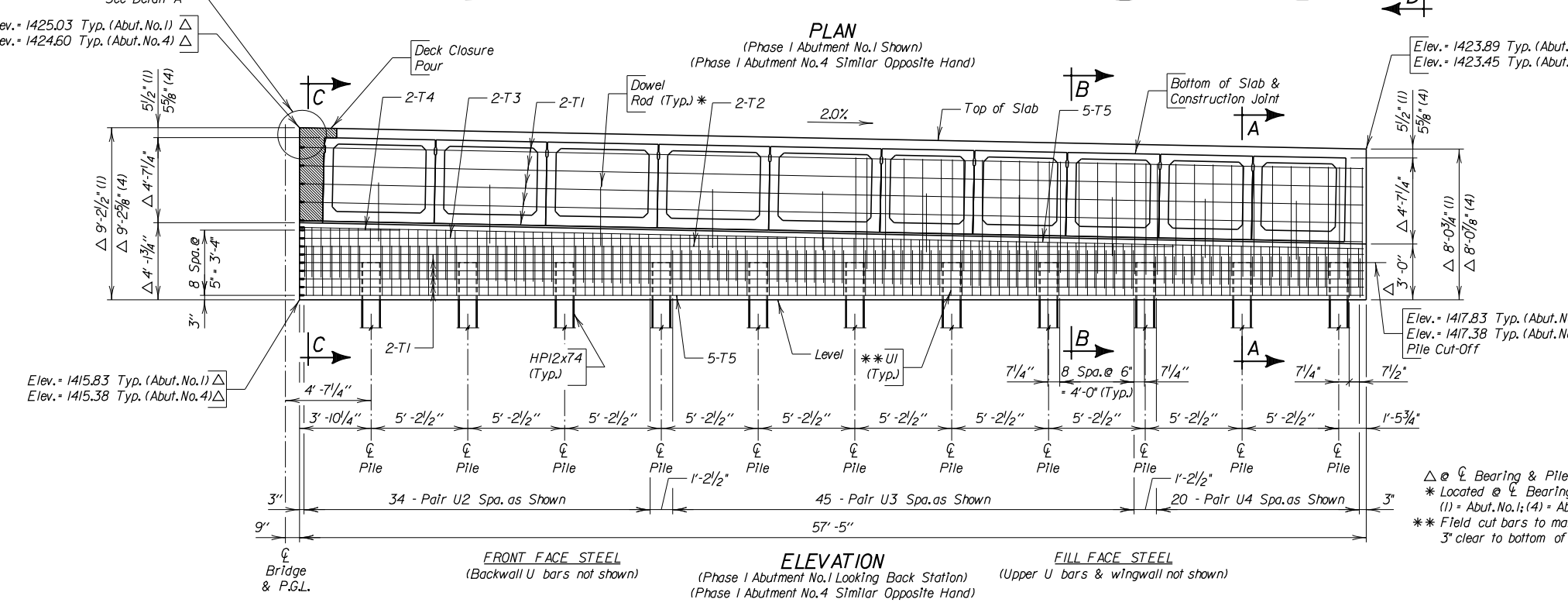
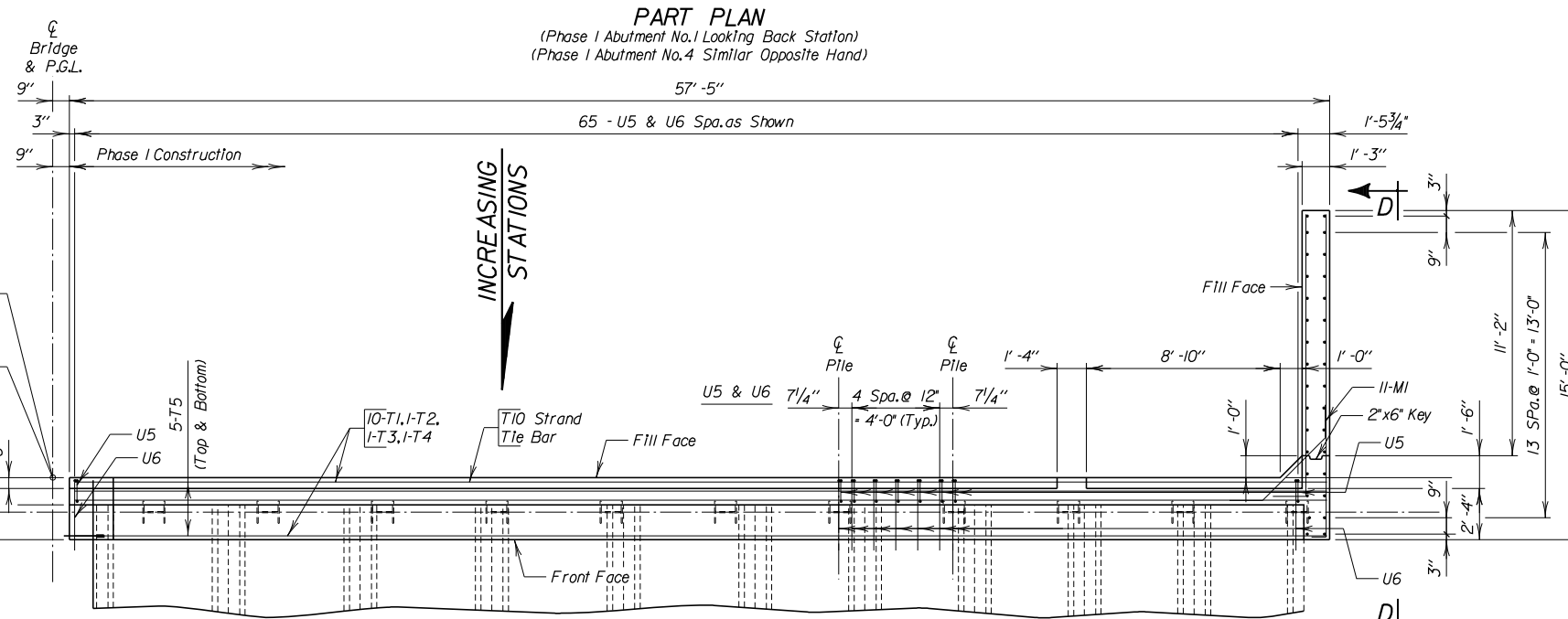
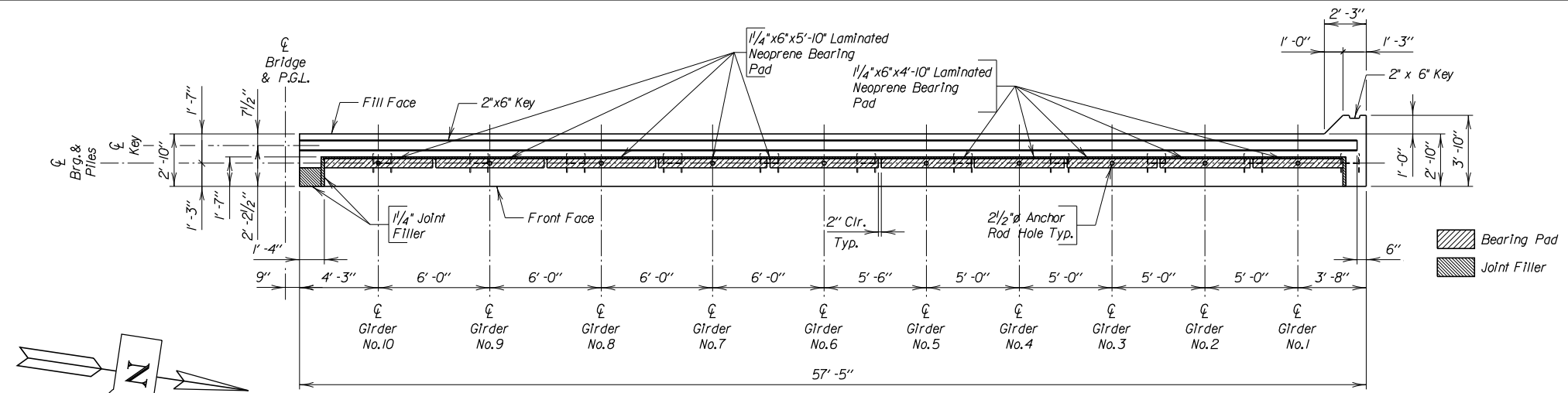
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SHEET NO.

S-7



10/28/2009 AMWRIGHT C:\PWORKING\DMA\0412022\PHASE I ABUTMENT DETAILS.DGN



### REINFORCING SCHEDULE

PHASE I ABUTMENT NO.1					Bending Details	
Mk.	No.	Size	Length	Type		
M1	11	7	7'-1"	17D	Type 14A	Type 17A
M2	11	7	15'-4"	17A		
M3	11	7	14'-3"	17A		
M4	2	7	12'-4"	Str.	Type S10	Type 17D
M5	26	6	7'-10"	Str.		
M6	6	6	6'-10"	Str.		
T1	20	5	57'-3"	Str.		
T2	2	5	47'-1"	Str.		
T3	2	5	26'-3"	Str.		
T4	2	5	5'-5"	Str.		
T5	10	6	57'-3"	Str.		
T10	1	5	57'-1"	Str.		
U1	11	4	10'-0"	S10		
U2	68	4	7'-10"	S10		
U3	90	4	7'-2"	S10		
U4	40	4	6'-8"	S10		
U5	65	5	13'-3"	S10		
U6	65	6	6'-1"	14A		

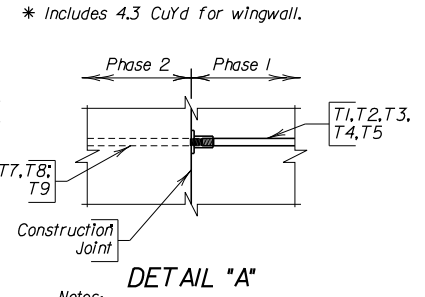
PHASE I ABUTMENT NO.4				
Mk.	No.	Size	Length	Type
M1	11	7	7'-1"	17D
M2	11	7	15'-4"	17A
M3	11	7	14'-3"	17A
M4	2	7	12'-4"	Str.
M5	26	6	7'-10"	Str.
M6	6	6	6'-10"	Str.
T1	20	5	57'-3"	Str.
T2	2	5	47'-1"	Str.
T3	2	5	26'-3"	Str.
T4	2	5	5'-5"	Str.
T5	10	6	57'-3"	Str.
T10	1	5	57'-1"	Str.
U1	11	4	10'-0"	S10
U2	68	4	7'-10"	S10
U3	90	4	7'-2"	S10
U4	40	4	6'-8"	S10
U5	65	5	13'-3"	S10
U6	65	6	6'-1"	14A

**Notes:**  
 ● Bars Include Mechanical Rebar Splicer. See Detail "A"  
 ▲ All Dimensions are Out to Out.  
 ▲ Bars to be Epoxy Coated.

### ESTIMATED ABUTMENT QUANTITIES

ITEM	UNIT	PHASE I QUANTITY	
		Abutment No. 1	Abutment No. 4
Class A45 Concrete, Bridge	CuYd	26.0 *	26.0 *
Reinforcing Steel	Lb	5407	5407
Epoxy Coated Reinforcing Steel	Lb	645	645
Structure Excavation, Bridge	Cu Yd	84	84
Preboring Pile	Ft	11 @ 10' - 110'	11 @ 10' - 110'
HPI2 Pile Tip Reinforcement	EACH	11	11
HPI2x74 Steel Test Pile, Furnish and Drive	Ft	1 @ 88' - 88'	1 @ 83' - 83'
HPI2x74 Steel Bearing Pile, Furnish and Drive	Ft	10 @ 83' - 830'	10 @ 78' - 780'
No.5 Rebar Splice	EACH	26	26
No.6 Rebar Splice	EACH	10	10

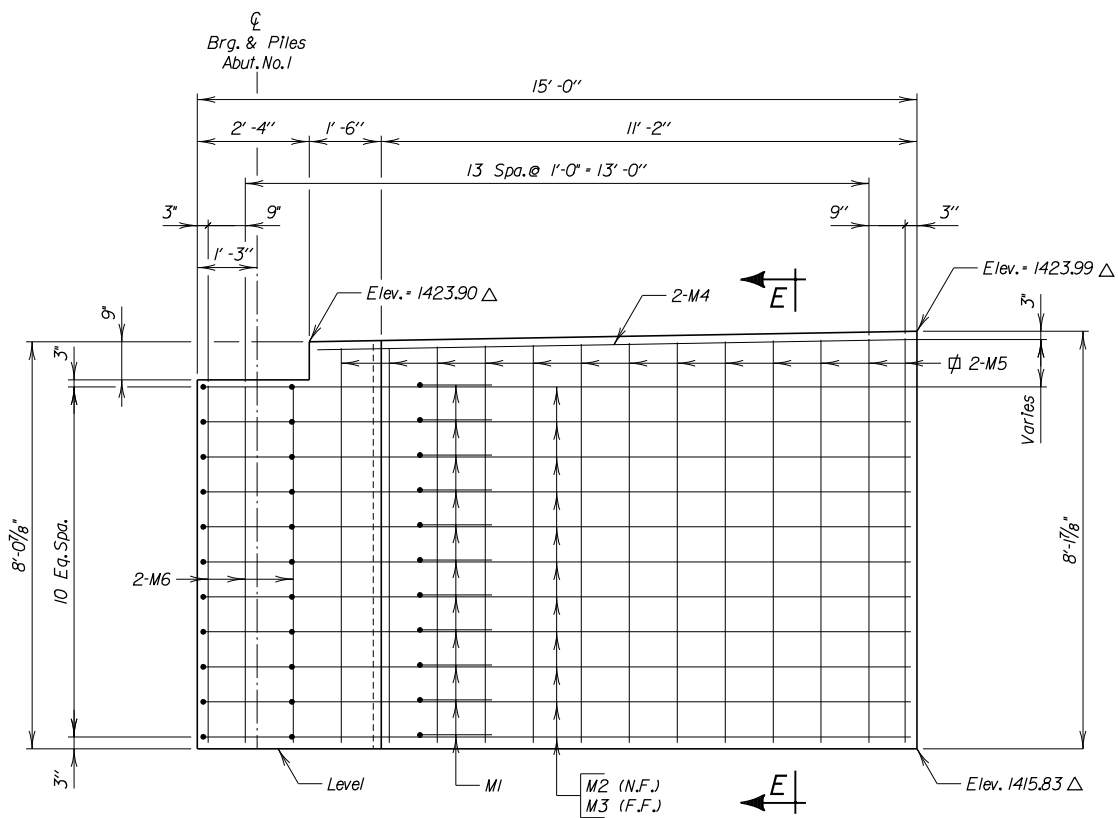
\* Includes 4.3 CuYd for wingwall.



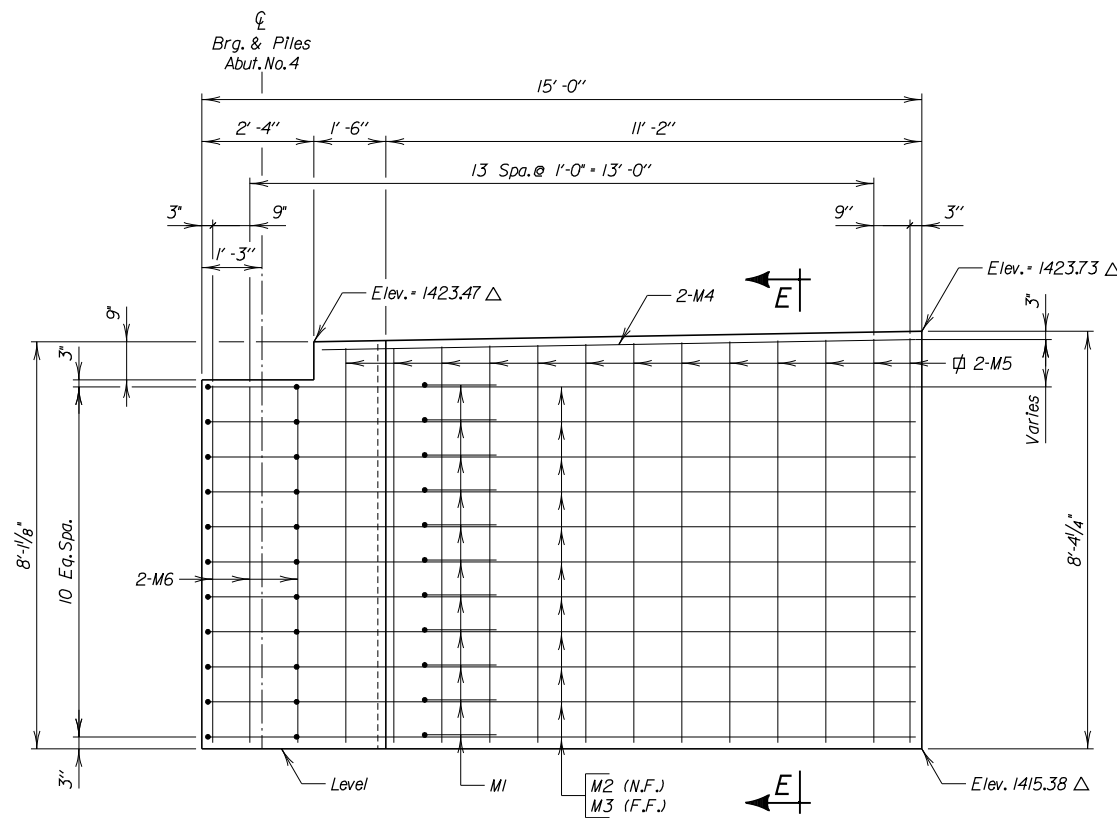
**REGISTERED PROFESSIONAL ENGINEER**  
 REG. NO. 6124  
 STEVEN H. HOFF  
 SOUTH DAKOTA

**HDR** PLANS BY:  
 HDR, INC.  
 SIOUX FALLS, S.D.

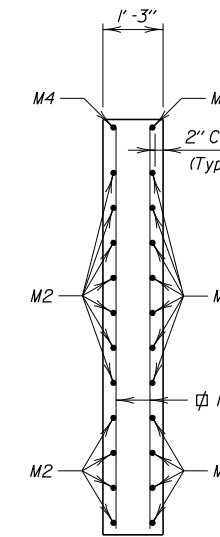
10/28/2009 AMWRIGHT C:\PWORKING\DMA\0412022\PHASE1\WING\_DETAILS.DGN



VIEW D-D  
(Phase 1 Abutment No.1)

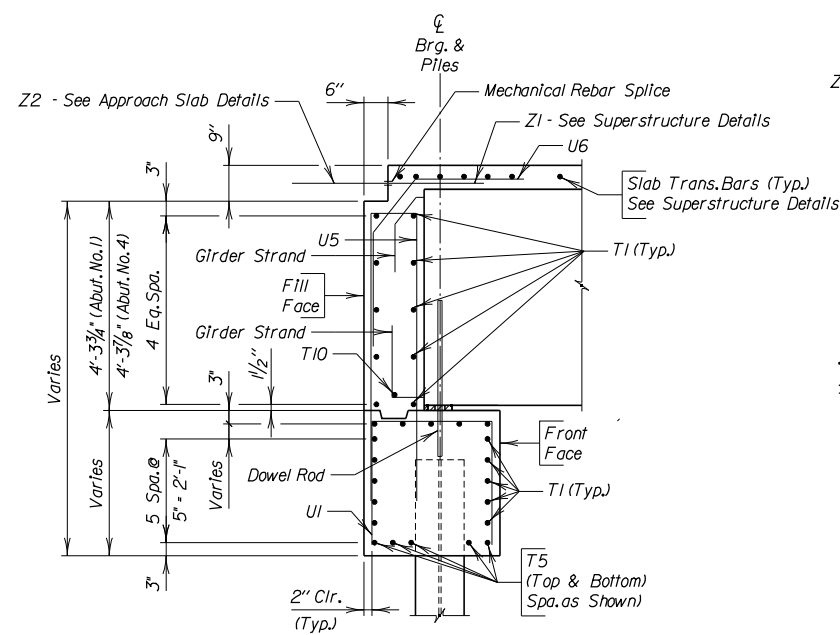


VIEW D-D  
(Phase 1 Abutment No.4)

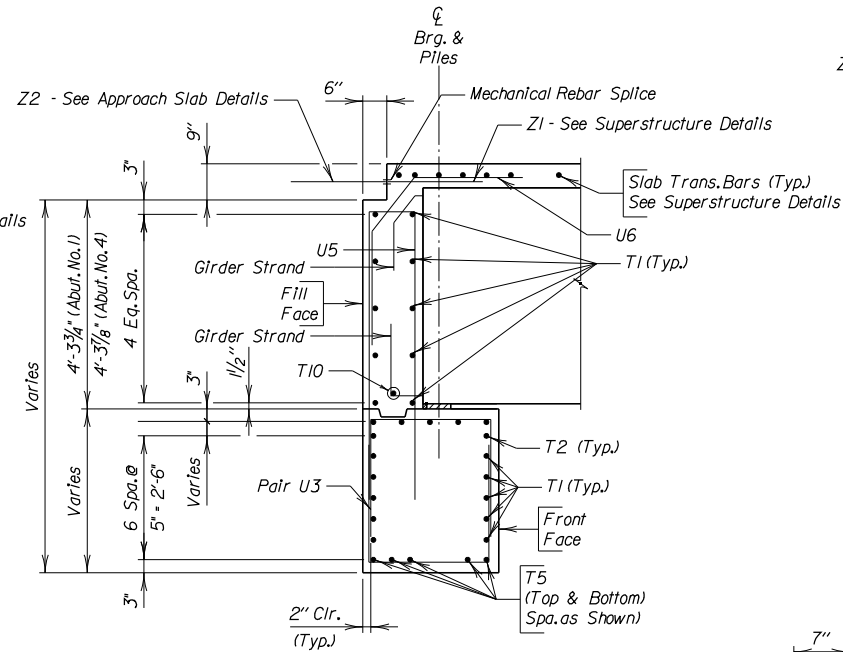


SEC. E-E

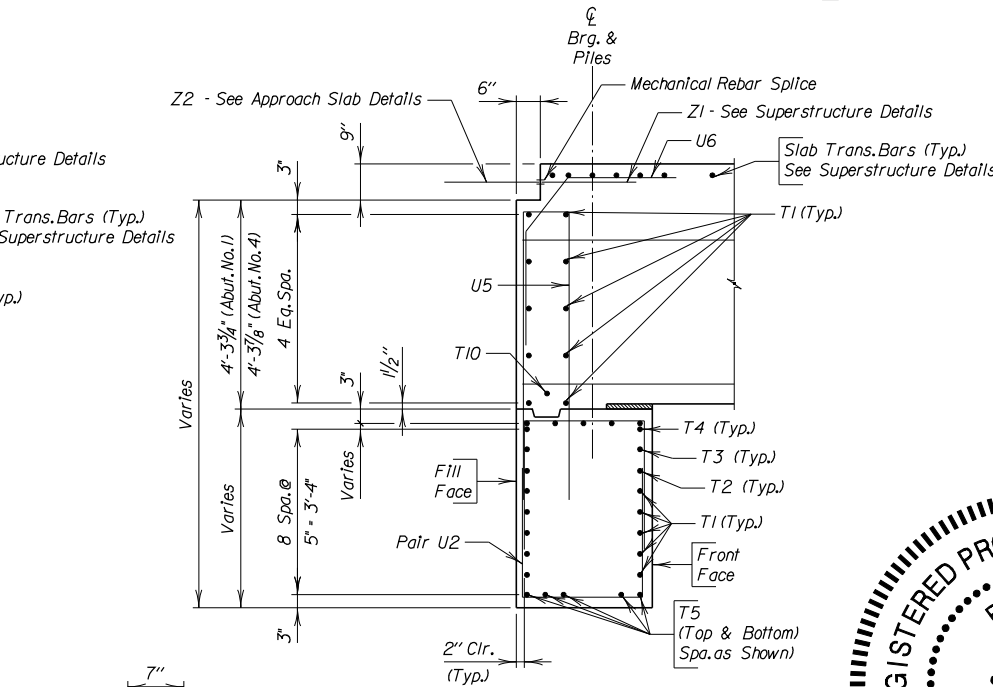
∅ Field cut bars to maintain 3" clear to top of wingwall.  
△ @ Ffill Face



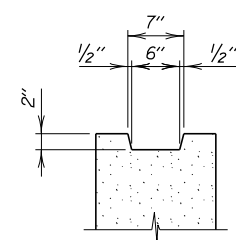
SECTION A-A



SECTION B-B



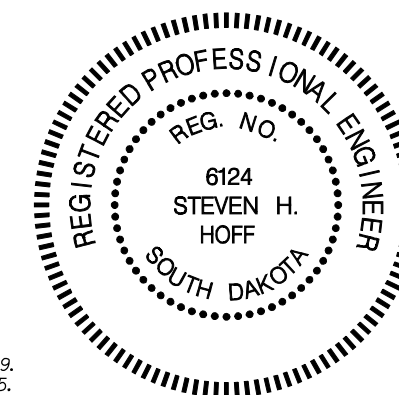
SECTION C-C



KEYWAY DETAIL

Notes:

1. For Girder Details, see Sheet Nos. S-16 to S-23.
2. For Superstructure Details, see Sheet Nos. S-24 to S-29.
3. For Approach Slab Details, see Sheet Nos. S-33 to S-35.



HDR PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

ABUTMENT DETAILS (CONTINUED)

DESIGNED BY: HOFFERBILL  
DRAWN BY: J. BERGNER  
CHECKED BY: C. HALL  
DATE: 10/28/2009

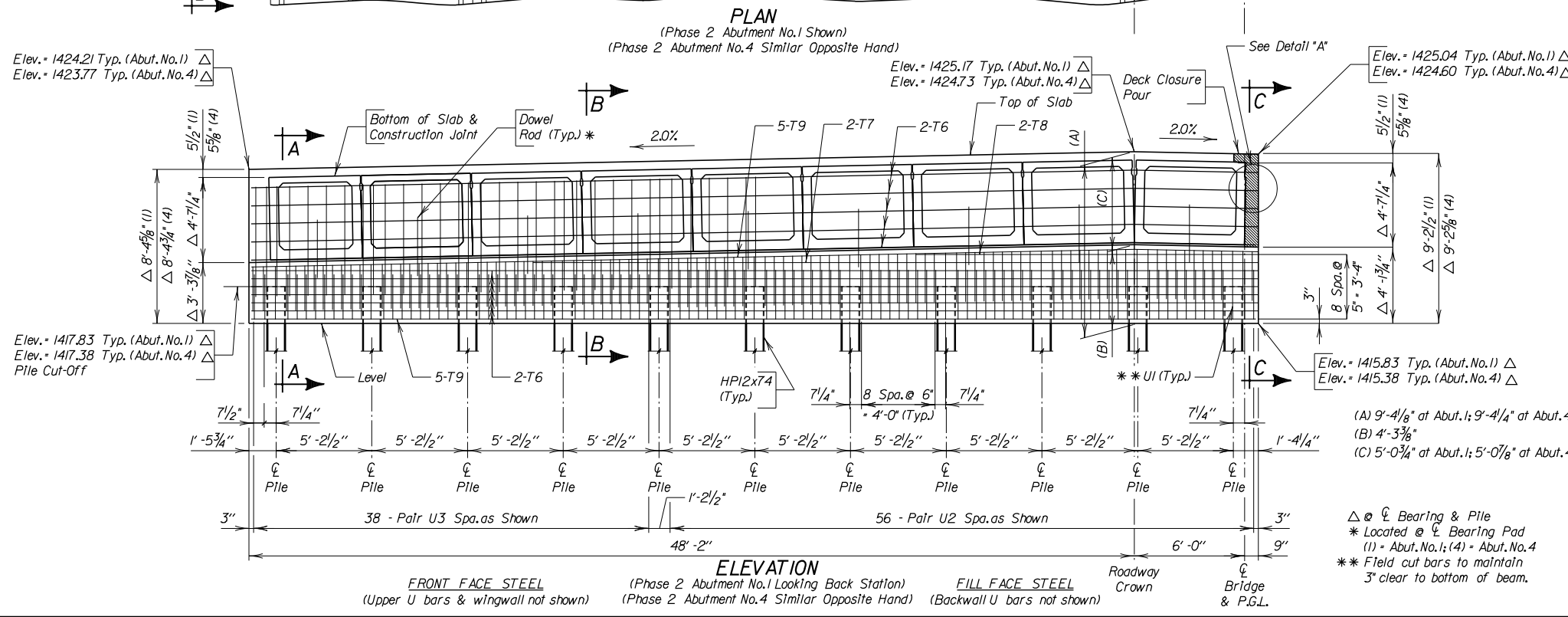
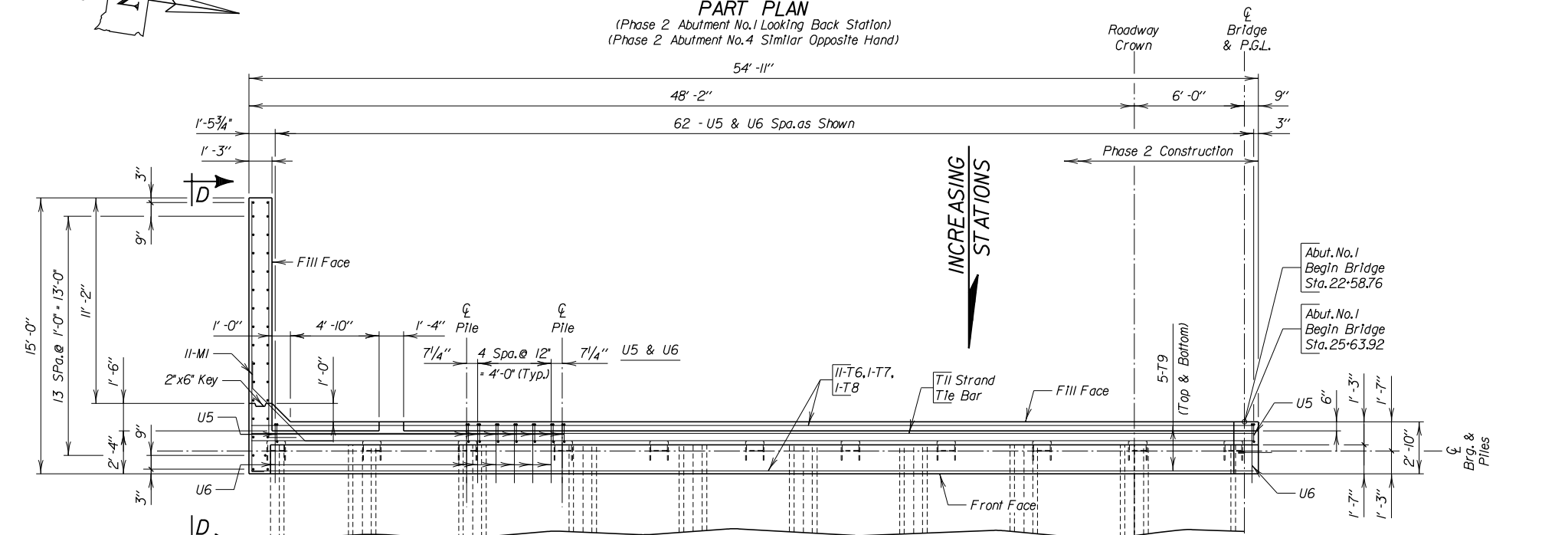
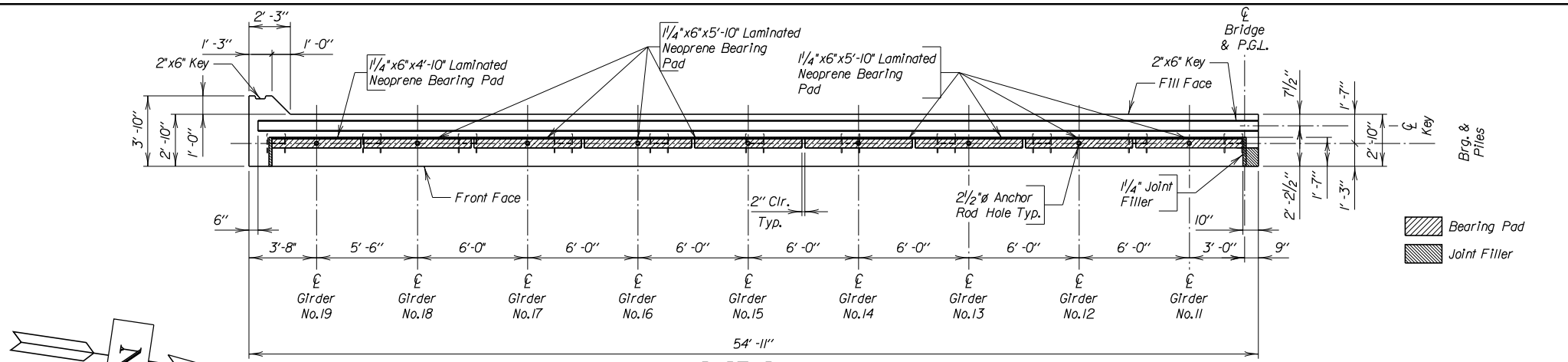
REVISIONS:  
BY: DATE:

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SHEET NO.

S-9

41ST STREET BRIDGE REPLACEMENT  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA



### REINFORCING SCHEDULE

PHASE 2 ABUTMENT NO.1					Bending Details	
Mk.	No.	Size	Length	Type		
M1	11	7	7'-1"	17D		
M2	11	7	15'-4"	17A		
M3	11	7	14'-3"	17A		
M4	2	7	12'-4"	Str.		
M7	26	6	8'-2"	Str.		
M8	6	6	7'-2"	Str.		
T6	22	5	54'-9"	Str.		
T7	2	5	39'-5"	Str.		
T8	2	5	18'-7"	Str.		
T9	10	6	54'-9"	Str.		
T11	1	5	54'-7"	Str.		
U1	11	4	10'-0"	S10		
U2	112	4	7'-10"	S10		
U3	76	4	7'-2"	S10		
U5	62	5	13'-3"	S10		
U6	62	6	6'-1"	14A		

PHASE 2 ABUTMENT NO.4				
Mk.	No.	Size	Length	Type
M1	11	7	7'-1"	17D
M2	11	7	15'-4"	17A
M3	11	7	14'-3"	17A
M4	2	7	12'-4"	Str.
M7	26	6	8'-2"	Str.
M8	6	6	7'-2"	Str.
T6	22	5	54'-9"	Str.
T7	2	5	39'-5"	Str.
T8	2	5	18'-7"	Str.
T9	10	6	54'-9"	Str.
T11	1	5	54'-7"	Str.
U1	11	4	10'-0"	S10
U2	112	4	7'-10"	S10
U3	76	4	7'-2"	S10
U5	62	5	13'-3"	S10
U6	62	6	6'-1"	14A

**Notes:**  
 ● Bars Include Mechanical Rebar Splicer. See Detail "A"  
 ▲ All Dimensions are Out to Out.  
 ▲ Bars to be Epoxy Coated.

### ESTIMATED ABUTMENT QUANTITIES

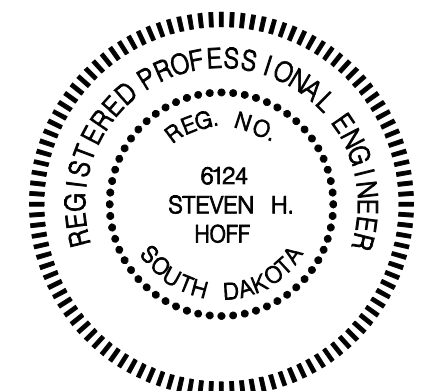
ITEM	UNIT	Phase 2 QUANTITY	
		Abutment No. 1	Abutment No. 4
Class A45 Concrete, Bridge	CuYd	26.8 *	26.9 *
Reinforcing Steel	Lb	5345	5345
Epoxy Coated Reinforcing Steel	Lb	617	617
Structure Excavation, Bridge	CuYd	78	78
Preboring Pile	Ft	11 @ 10' - 110'	11 @ 10' - 110'
HPI2 Pile Tip Reinforcement	EACH	11	11
HPI2x74 Steel Bearing Pile, Furnish and Drive	Ft	11 @ 83' - 913'	11 @ 78' - 858'

\* Includes 4.4 CuYd for wingwall.

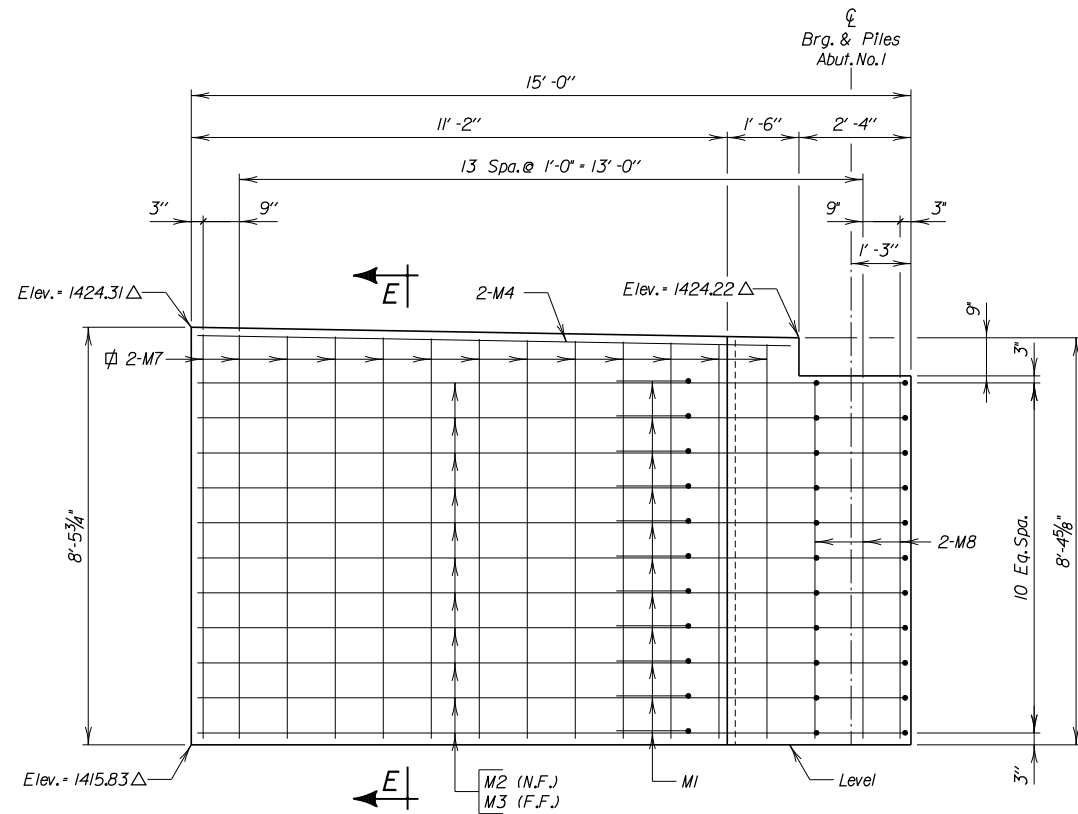
**DETAIL "A"**

**Notes:**

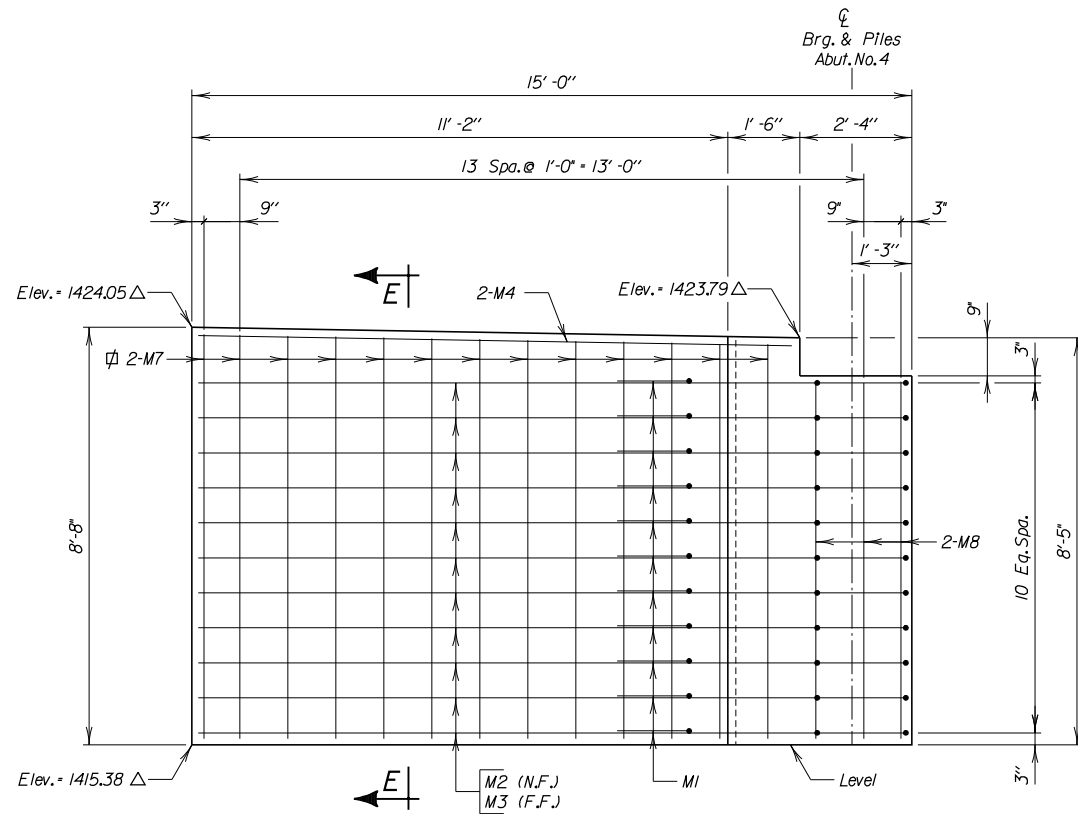
1. For Wingwall Details, see Sheet No. S-11.
2. For Girder Details, see Sheet Nos. S-16 to S-23.
3. For Superstructure Details, see Sheet Nos. S-24 to S-29.



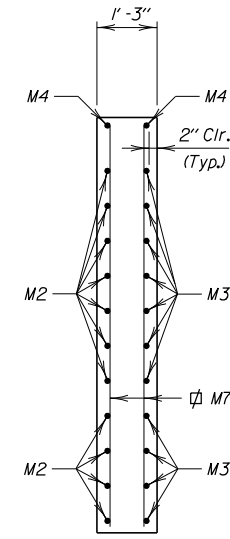
10/28/2009 AMWRIGHT C:\PWORKING\DMA\0412022\PHASE2\_WING\_DETAILS.DGN



VIEW D-D  
(Phase 2 Abutment No.1)

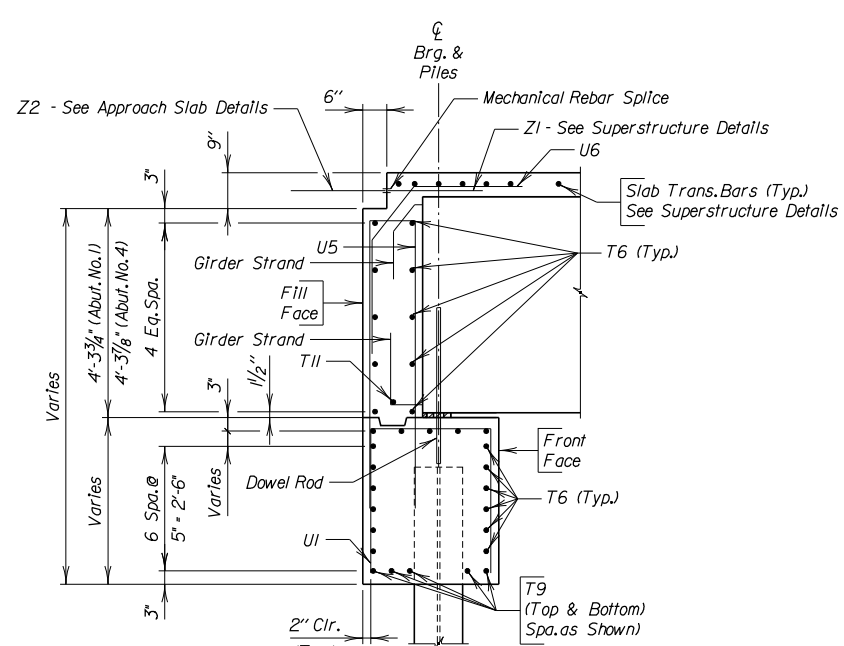


VIEW D-D  
(Phase 2 Abutment No.4)

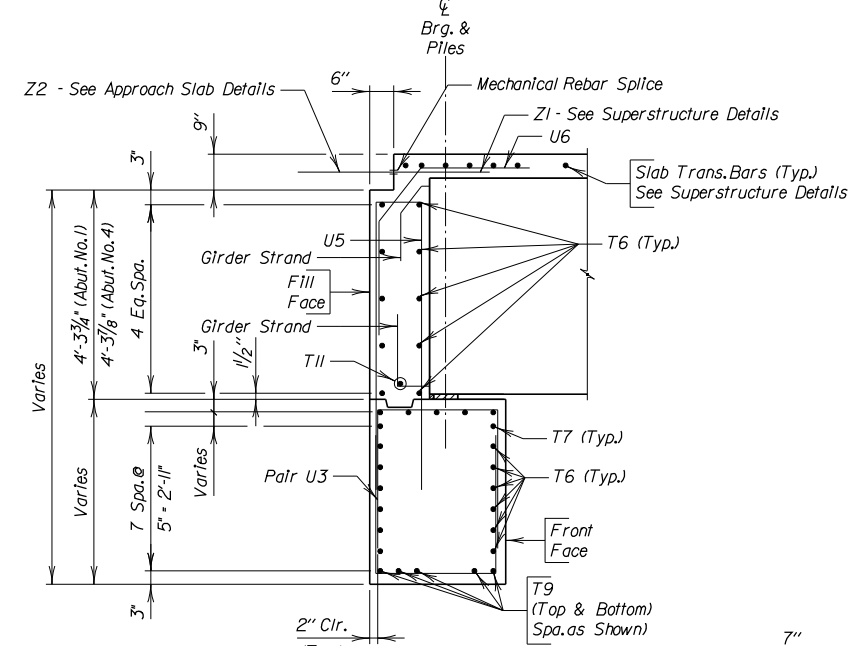


SEC. E-E

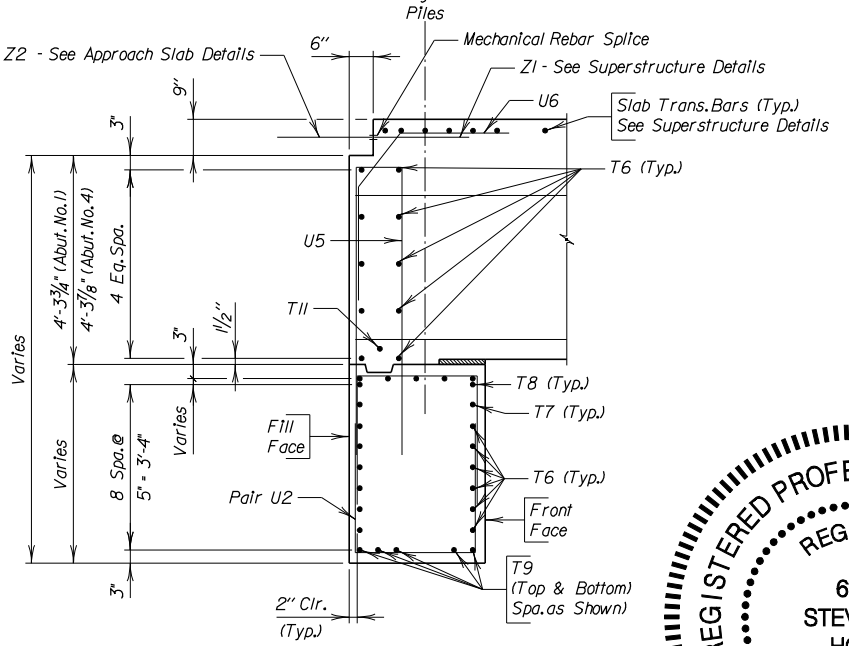
Field cut bars to maintain 3" clear to top of wingwall.  
 Filled Face



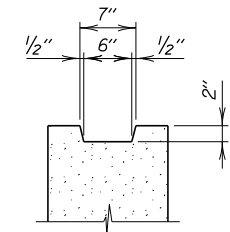
SECTION A-A



SECTION B-B

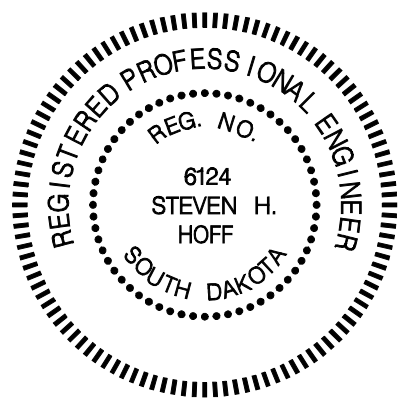


SECTION C-C



KEYWAY DETAIL

- Notes:
1. For Girder Details, see Sheet Nos. S-16 to S-23.
  2. For Superstructure Details, see Sheet Nos. S-24 to S-29.
  3. For Approach Slab Details, see Sheet Nos. S-33 to S-35.



41ST STREET BRIDGE REPLACEMENT  
 OVER THE BIG SIOUX RIVER  
 SIOUX FALLS, SOUTH DAKOTA

ABUTMENT DETAILS (CONTINUED)

DESIGNED BY: J. BERGQUIST	DATE: 10/28/2009
CHECKED BY: C. HALL	DATE: 10/28/2009
REVISIONS:	BY: DATE:

CITY OF SIOUX FALLS  
**PUBLIC WORKS**  
 Providing a Better Quality of Life for You!



SHEET NO.

S-11

**HDR** PLANS BY:  
 HDR, INC.  
 SIOUX FALLS, S.D.

10/28/2009 AMRIGHT C:\PWORKING\DM\0412022\BENT\_DETAILS1.DGN

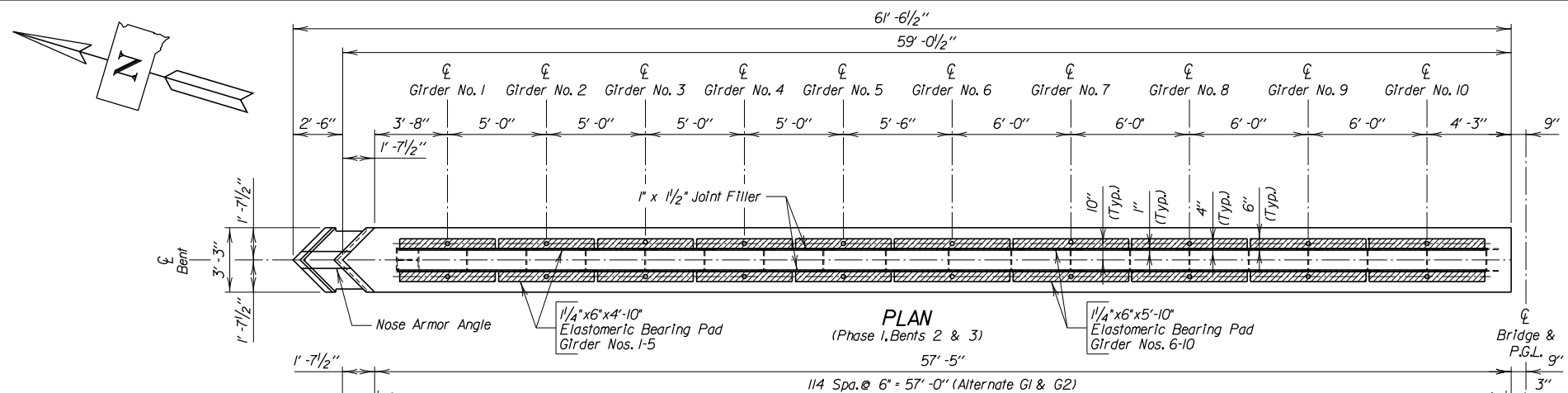
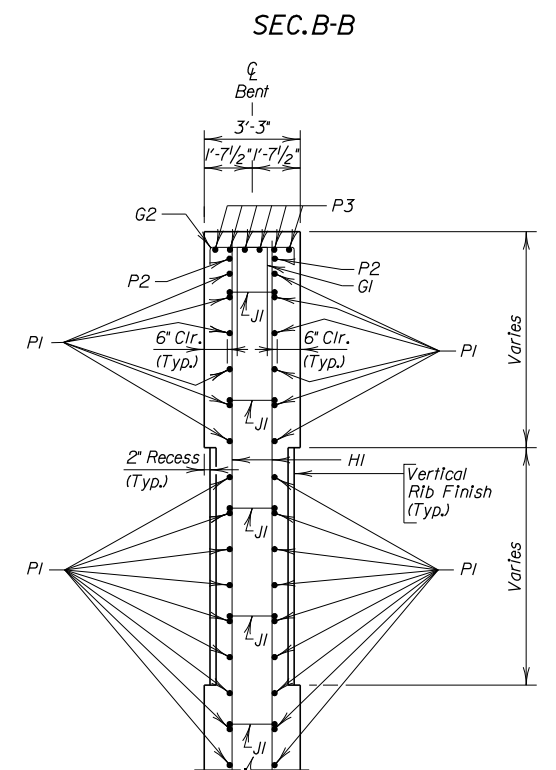
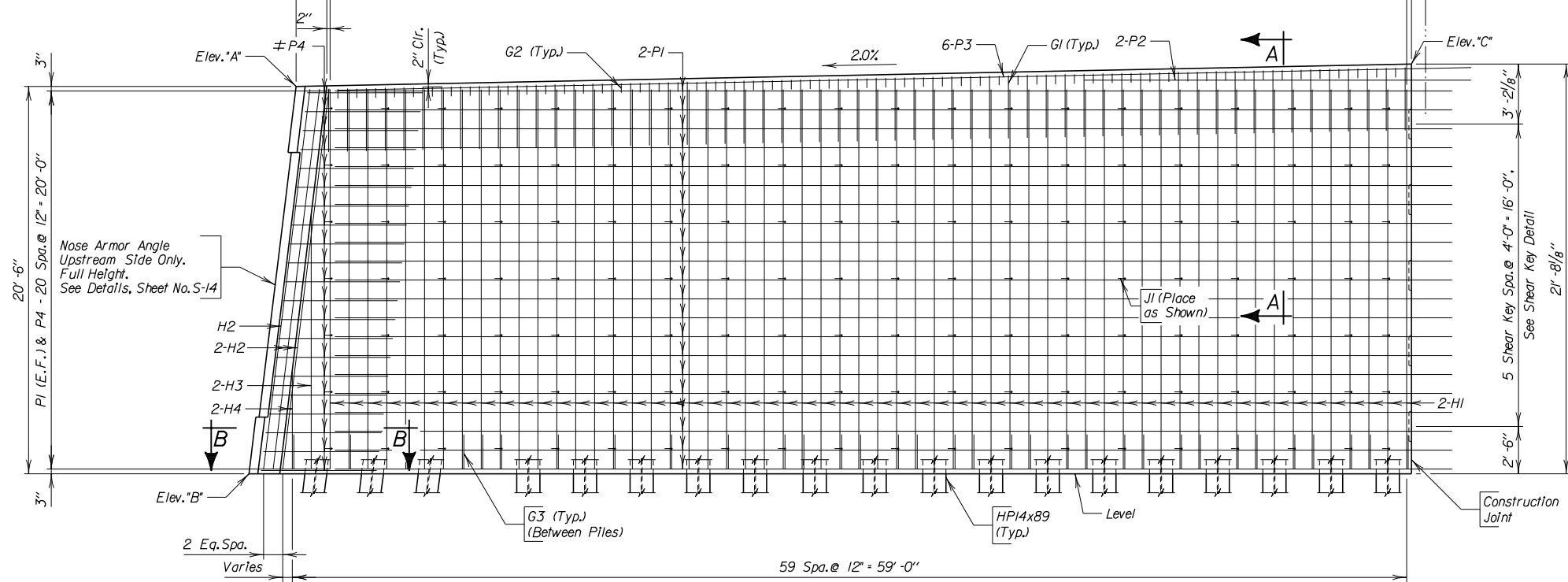
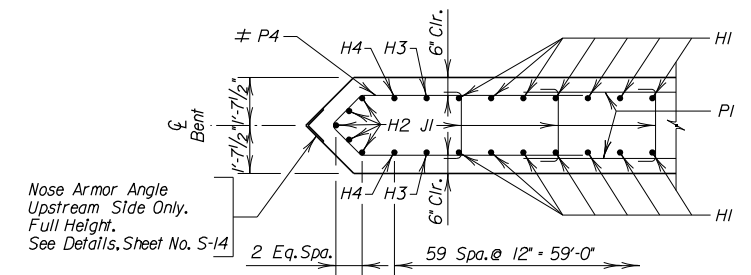
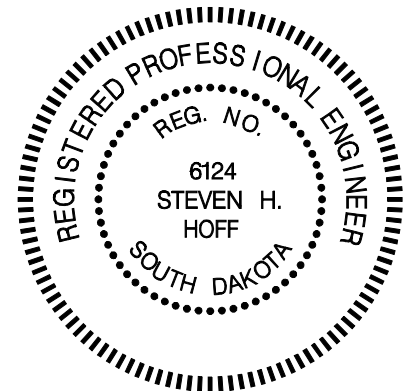
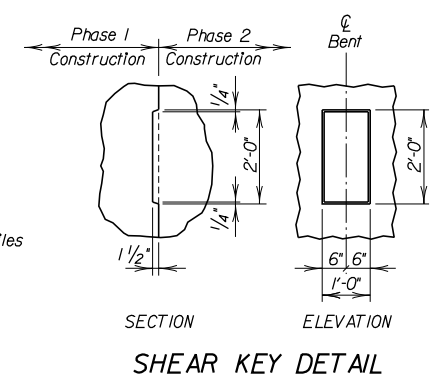


TABLE OF ELEVATIONS				
Bent No.	Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"
2	1419.11	1398.61	1420.29	1417.11
3	1418.61	1398.11	1419.79	1416.61

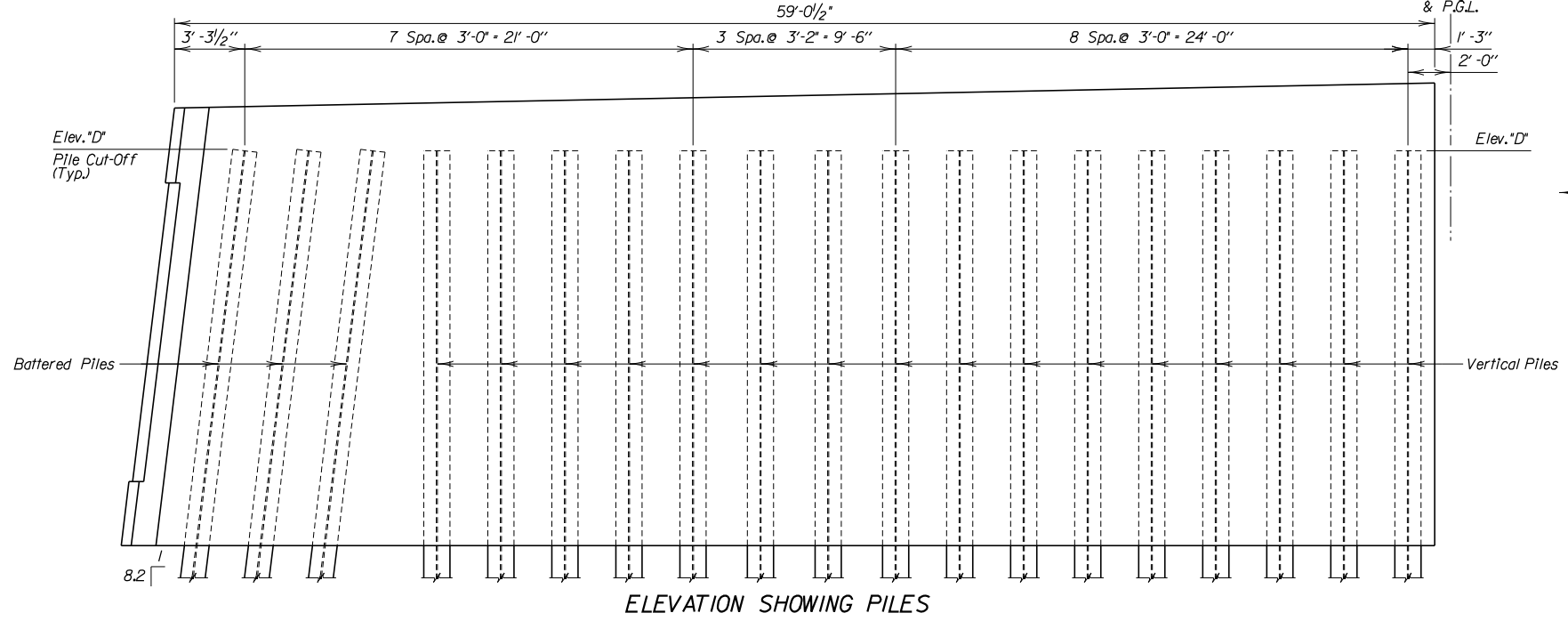
INCREASING STATIONS



Notes:  
1. For additional Bent Details, see Sheet Nos. S-13 and S-14.  
2. For Girder Details, see Sheet Nos. S-16 to S-23.



**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.



10/28/2009 AMWRIGHT C:\PWORKING\DMA\0412022\BENT\_DETAILS2.DGN

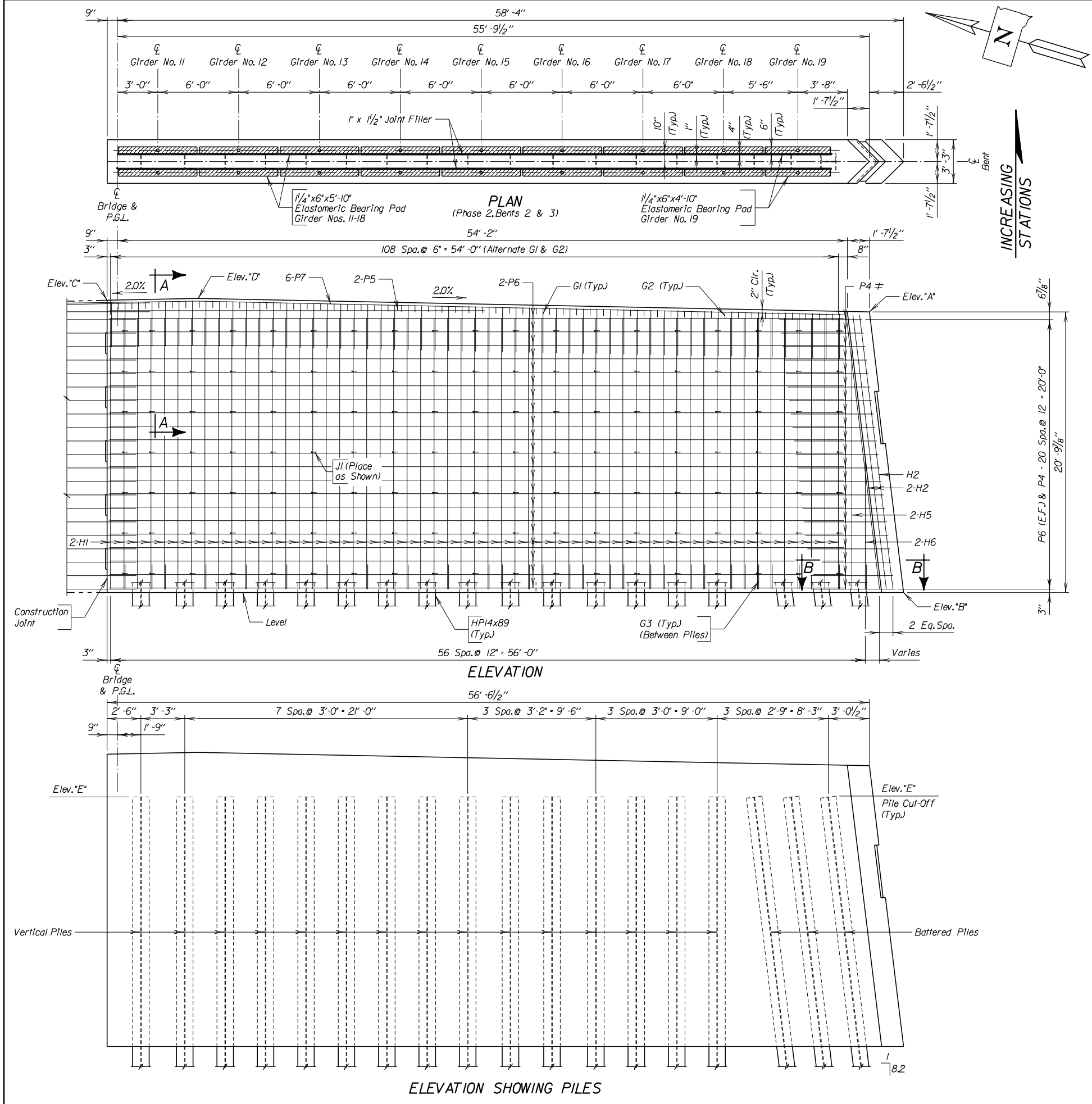
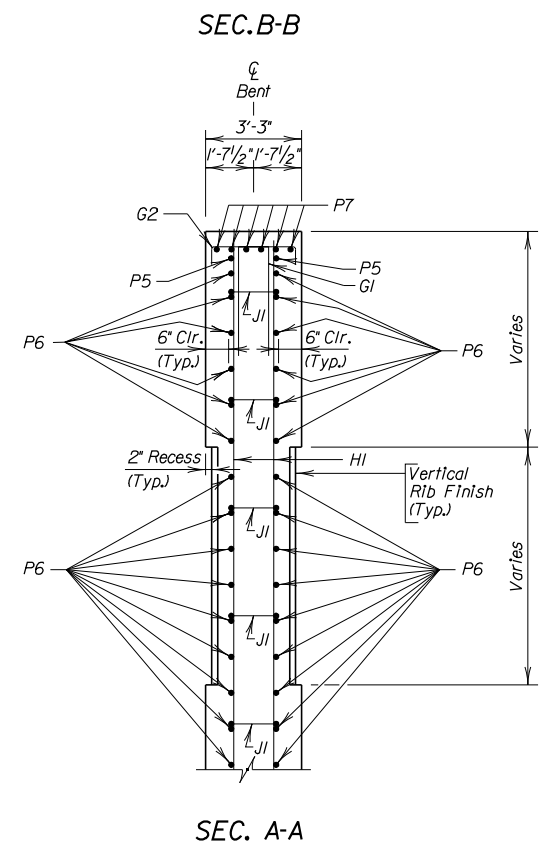
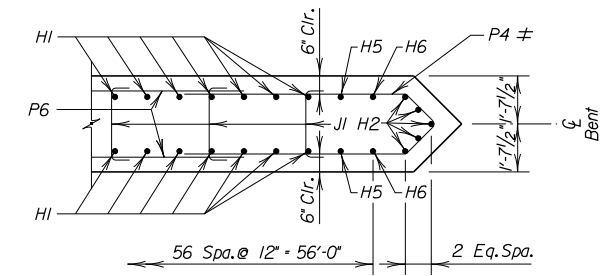


TABLE OF ELEVATIONS					
Bent No.	Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"	Elev. "E"
2	1419.43	1398.61	1420.29	1420.42	1417.11
3	1418.93	1398.11	1419.79	1419.92	1416.61

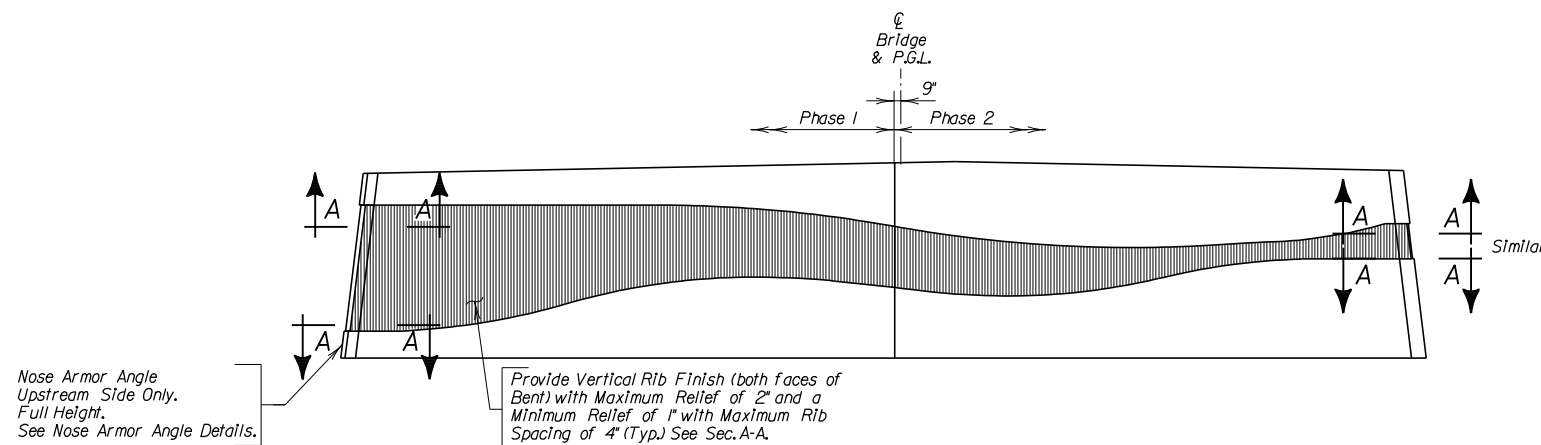


- Notes:
- For additional Bent Details, see Sheet Nos. S-13 and S-15.
  - For Girder Details, see Sheet Nos. S-16 to S-23.

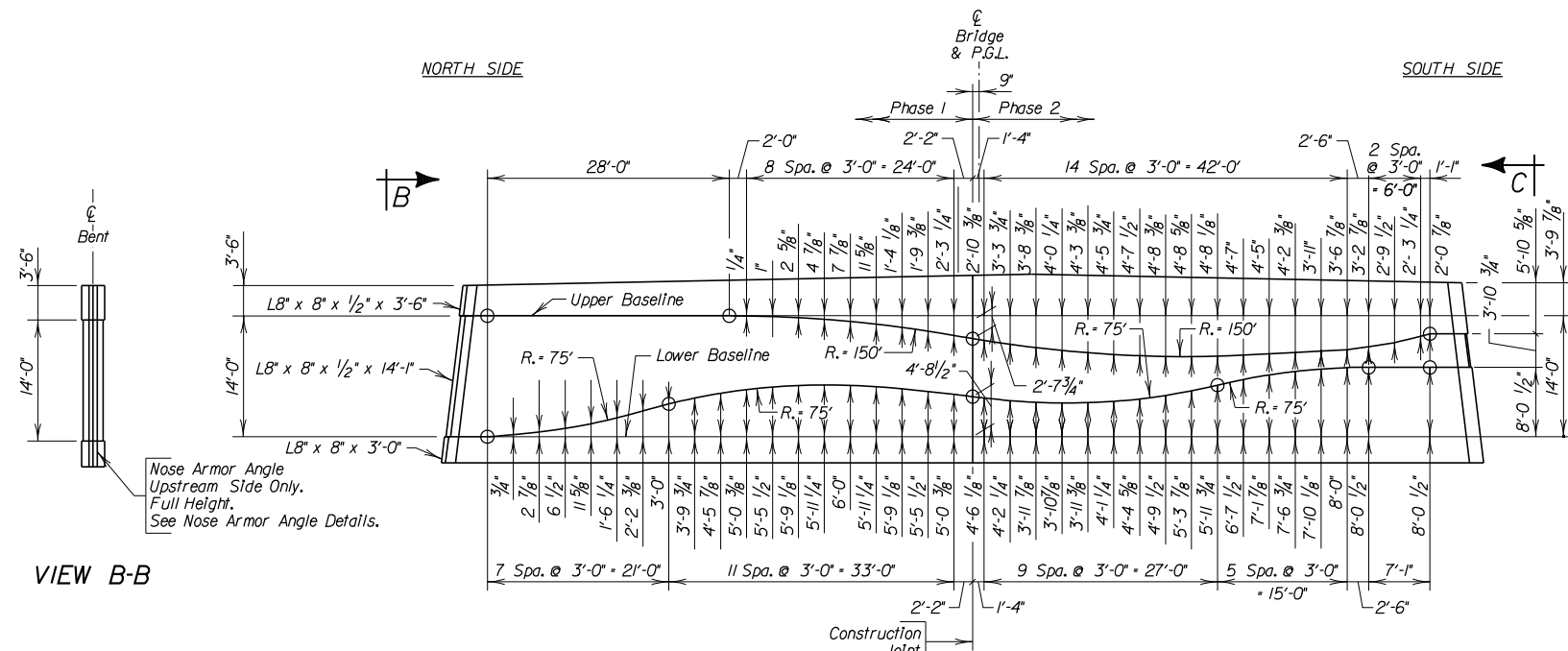


**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

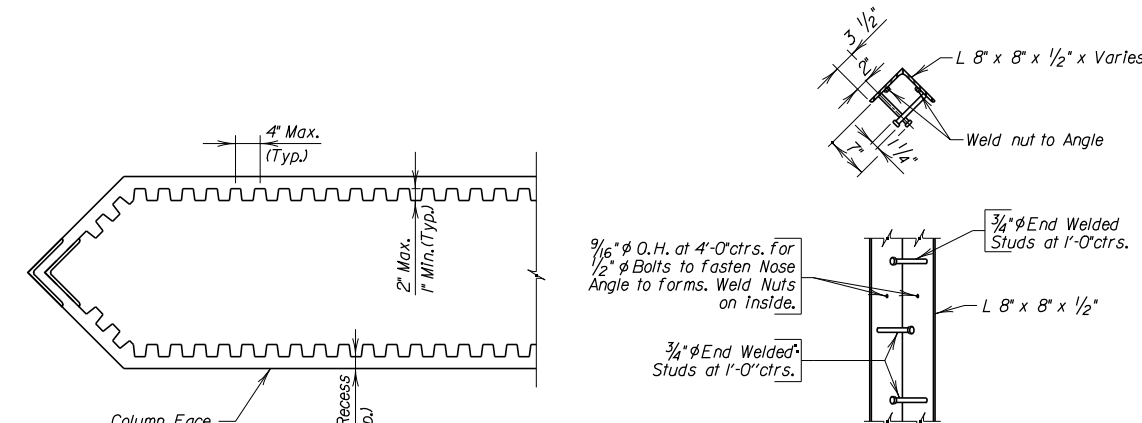
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**ELEVATION**  
(Looking Upstation)

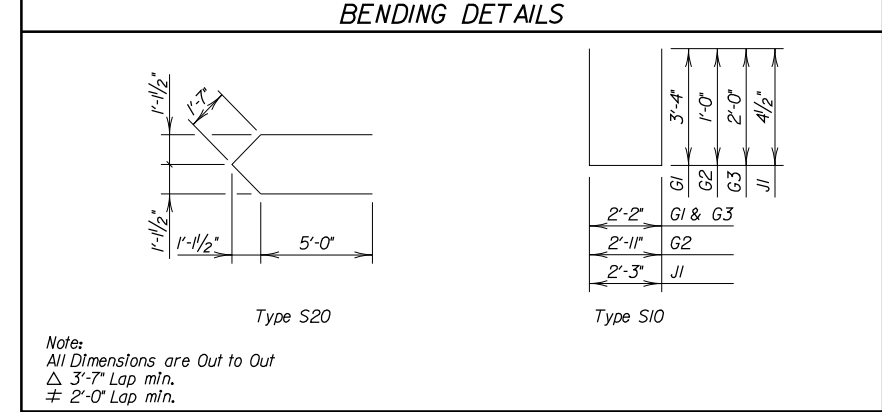


**VERTICAL RIB FINISH DETAIL**



**NOSE ARMOR ANGLE DETAILS**  
(See Notes Regarding Nose Armor Angle Sheet No. S-5)

REINFORCING SCHEDULE (For One Bent)									
PHASE 1					PHASE 2				
Mk.	No.	Size	Length	Type	Mk.	No.	Size	Length	Type
G1	58	4	8'-10"	S10	G1	55	4	8'-10"	S10
G2	57	4	4'-11"	S10	G2	54	4	4'-11"	S10
G3	33	4	6'-2"	S10	G3	29	4	8'-2"	S10
H1	116	4	20'-1"	Str.	H1	110	4	20'-1"	Str.
H2	5	4	20'-3"	Str.	H2	5	4	20'-3"	Str.
H3	2	4	13'-6"	Str.	H5	2	4	17'-9"	Str.
H4	2	4	5'-3"	Str.	H6	2	4	9'-6"	Str.
J1	140	4	3'-0"	S10	J1	133	4	3'-0"	S10
P1	42	4	59'-2"	Str.	P4	21	4	13'-2"	S20
P2	2	6	20'-6"	Str.	P5	2	6	27'-10"	Str.
P3	6	6	60'-0"	Str.	P6	42	4	54'-6"	Str.
P4	21	4	13'-2"	S20	P7	6	6	54'-7"	Str.

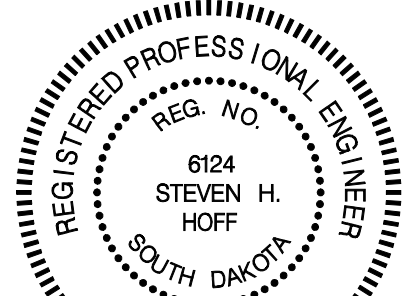


**BENDING DETAILS**

**VIEW C-C**

ITEM	UNIT	PHASE 1 QUANTITY		PHASE 2 QUANTITY	
		Bent No. 2	Bent No. 3	Bent No. 2	Bent No. 3
Class A45 Concrete, Bridge	CuYd	140.0	140.0	142.2	142.2
Reinforcing Steel	Lb	5042	5042	4757	4757
Structure Excavation, Bridge	CuYd	161	101	148	93
HPI4x89 Steel Test Pile, Furnish and Drive	Ft	1 @ 86' - 86'	1 @ 84' - 84'	N/A	N/A
HPI4x89 Steel Bearing Pile, Furnish and Drive	Ft	18 @ 81' - 1458'	15 @ 79' & 3 @ 80' - 1425'	18 @ 81' - 1458'	15 @ 79' & 3 @ 80' - 1425'
HPI4 Pile Tip Reinforcement	EACH	19	19	18	18

\* For information only, the estimated weight of Structural Steel in the Nose Armor Angle is 560 lbs. for one Bent.

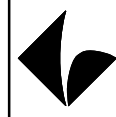


**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

**41ST STREET BRIDGE REPLACEMENT**  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

**BENT DETAILS (CONTINUED)**  
DESIGNED BY: C. HANCOCK  
DRAWN BY: D. BERNARD  
CHECKED BY: D. SPILLITGERBER  
DATE: 10/28/2009  
REVISIONS:  
BY: DATE:

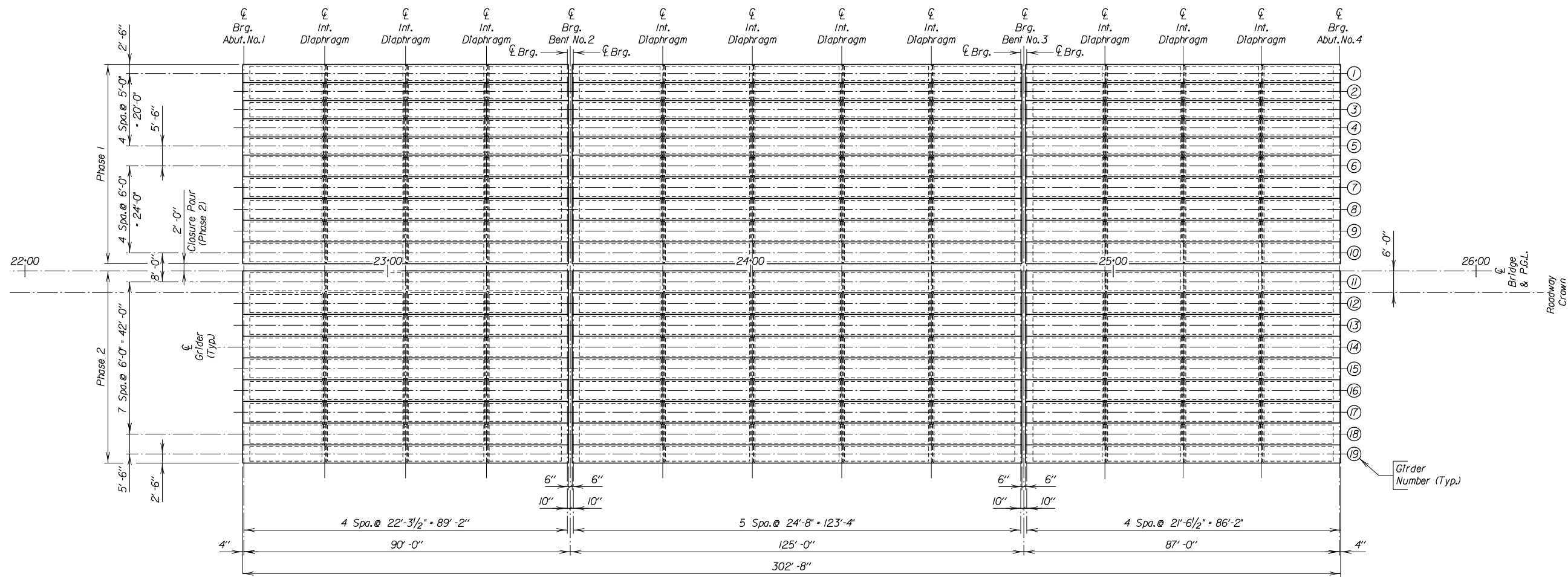
**CITY OF SIOUX FALLS**  
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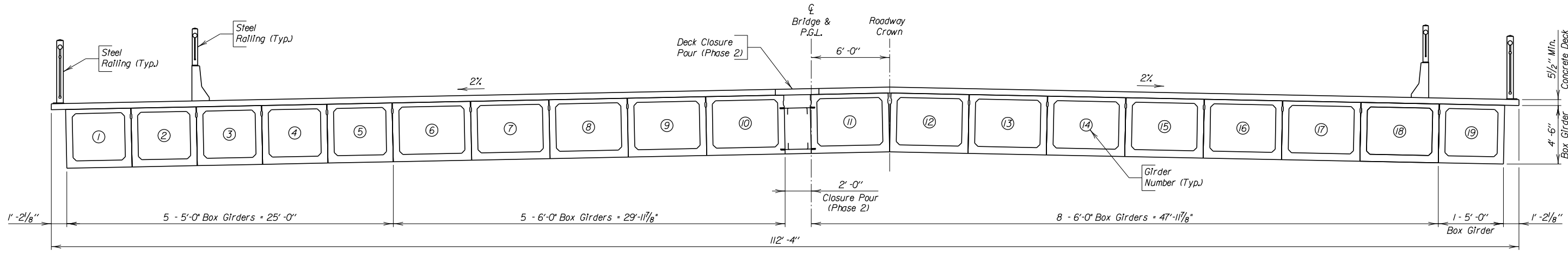
SHEET NO.

**S-14**

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GIRDER LAYOUT



TYPICAL SECTION

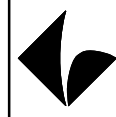
NOTES:  
 The Girders shall be erected in the following sequence of construction:  
 Phase 1) Girders 10 to 1  
 Phase 2) Girders 11 to 19  
 Closure Pour



**41ST STREET BRIDGE REPLACEMENT**  
 OVER THE BIG SIOUX RIVER  
 SIOUX FALLS, SOUTH DAKOTA

**GIRDER LAYOUT & TYPICAL SECTION**  
 DESIGNED BY: J. SUPERSOFT  
 DRAWN BY: J. SUPERSOFT  
 CHECKED BY: D. SPULTZGERBER  
 REVISIONS:  
 DATE: 10/28/2009  
 BY: DATE:

**CITY OF SIOUX FALLS**  
**PUBLIC WORKS**  
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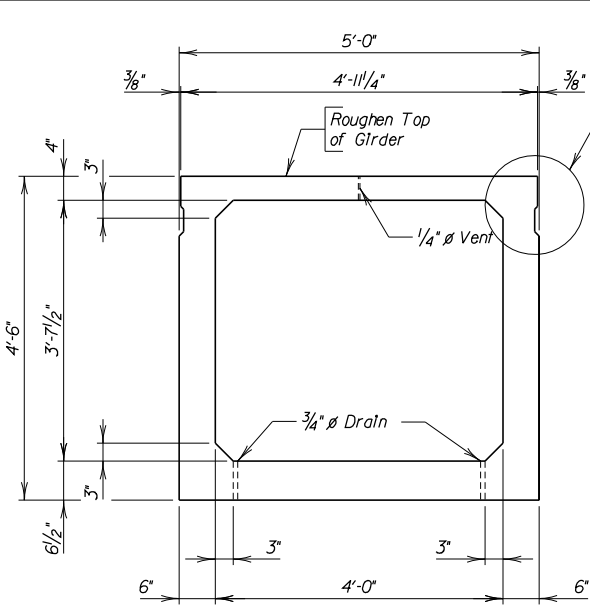
SHEET NO.

**S-15**

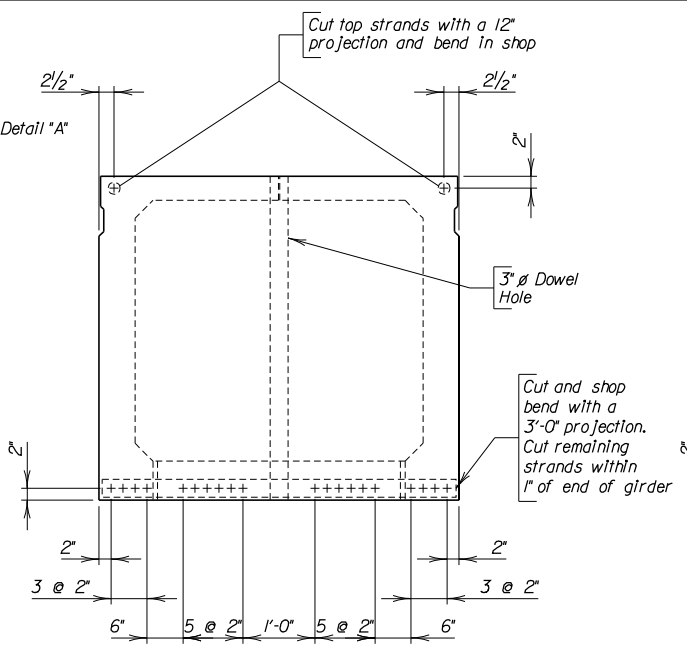
**HDR** PLANS BY:  
 HDR, INC.  
 SIOUX FALLS, S.D.



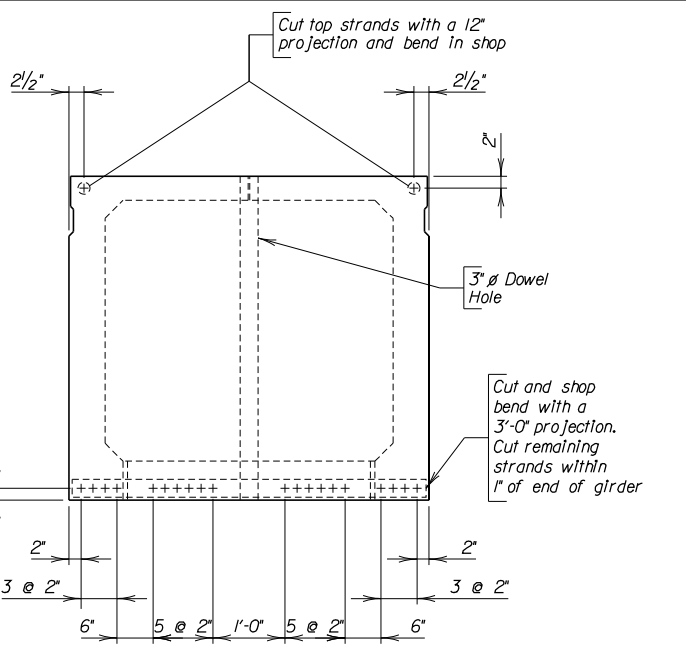
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**GIRDER DIMENSIONS**

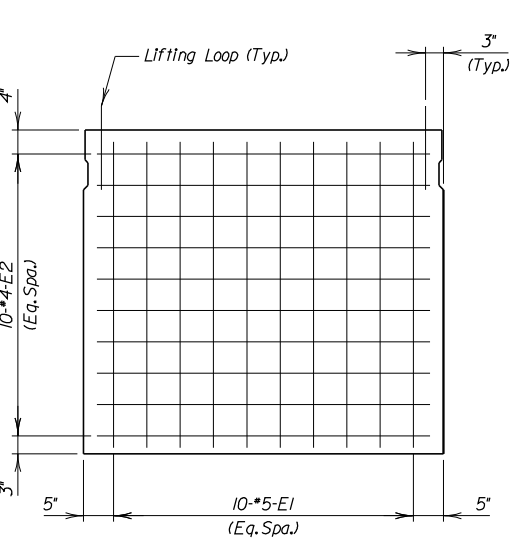


**END OF GIRDER @ ABUTMENT NO. 1**

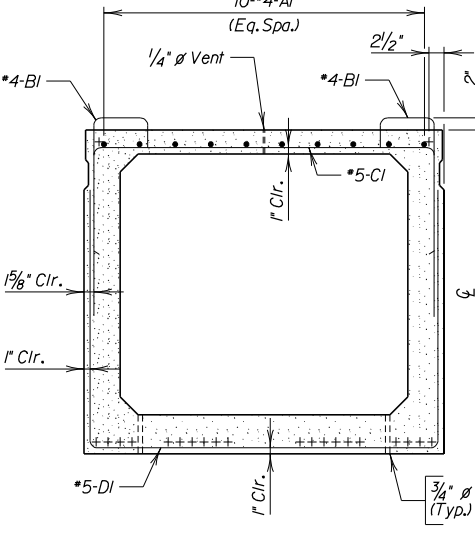


**END OF GIRDER @ BENT NO. 2**

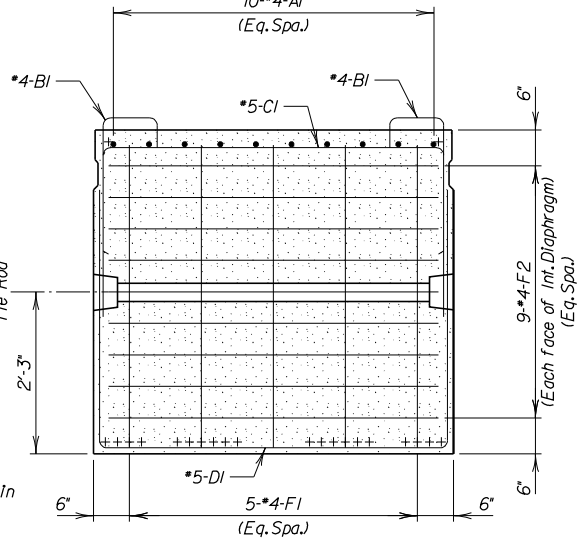
**STRAND ARRANGEMENTS**  
(Girder 2 to 5 Shown, Girders 1 & 19 Similar)



**ELEVATION A-A**  
(Shift E1 and E2 to clear strands by 1/2" min.)

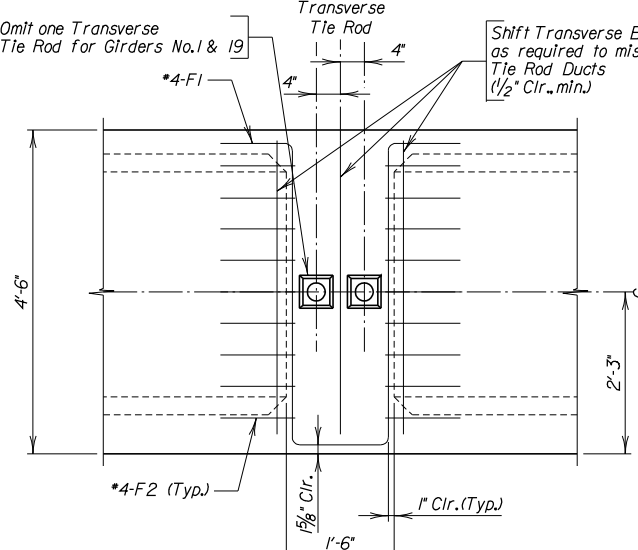


**ELEVATION B-B**



**SECTION C-C**  
(Shift F1 and F2 to clear strands by 1/2" min.)

105-Pair-4-B1, 105-5-C1, and 105-5-D1 (Spaced as shown)



**ELEVATION D-D**  
(A1, B1, C1 and D1 bars, shear keys and chamfers not shown for clarity)

**5'-0" GIRDER - SPAN 1**

REINFORCING SCHEDULE (Per Girder)			
MK.	No.	Size	Length
AI	20	4	45'-11"
BI	210	4	3'-2"
CI	105	5	9'-11"
DI	105	5	12'-6"
E1	20	5	9'-9"
E2	20	4	7'-8"
F1	15	4	11'-9"
F2	54	4	6'-8"

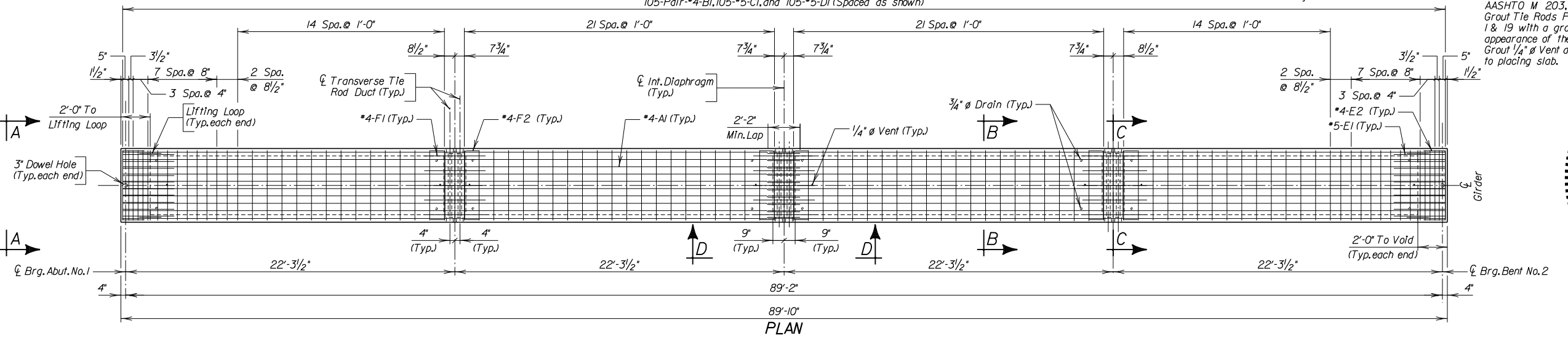
  

Bending Details	
AI BARS	45'-11" (Total length)
BI BARS	3'-6" (Total length)
CI BARS	4'-8 3/4" (Total length)
DI BARS	4'-10" (Total length)
E1 BARS	9'-9" (Total length)
E2 BARS	7'-8" (Total length)
F1 BARS	11'-9" (Total length)
F2 BARS	6'-8" (Total length)

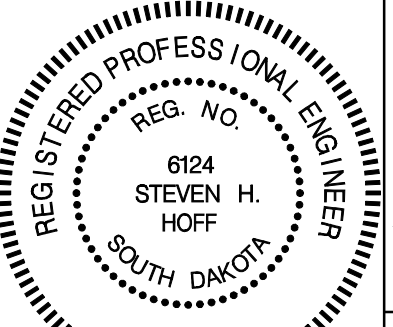
**NOTE:**  
All dimensions are out to out of bars.  
All BI bars are to be Epoxy Coated.  
Minimum clearance to reinforcing shall be 1" unless noted otherwise.  
All reinforcing shall be Grade 60.

**ABUTMENT NO. 1 INT. BENT NO. 2 STRAND DETAILS AT GIRDER ENDS**  
(Shear keys and chamfers not shown for clarity)

**Notes:**  
For Detail "A" & additional Girder Details, see Sheet Nos. S-22 & S-23.  
Concrete for prestressed girders shall have a minimum compressive strength  $f'c = 8,000$  psi at 28 days and  $f'ci = 6,000$  psi at release.  
(-) Indicates prestressing strand.  
Use 22 strands with an initial prestress force of 968 kips.  
Prestressing tendons shall be uncoated, seven-wire, low-relaxation strands, 0.6" diameter in accordance with AASHTO M 203, Grade 270.  
Grout Tie Rods Pockets at outside of Girders 1 & 19 with a grout proportioned to match the appearance of the girder concrete.  
Grout 1/4"  $\phi$  Vent at top of girder closed prior to placing slab.



**PLAN**



**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

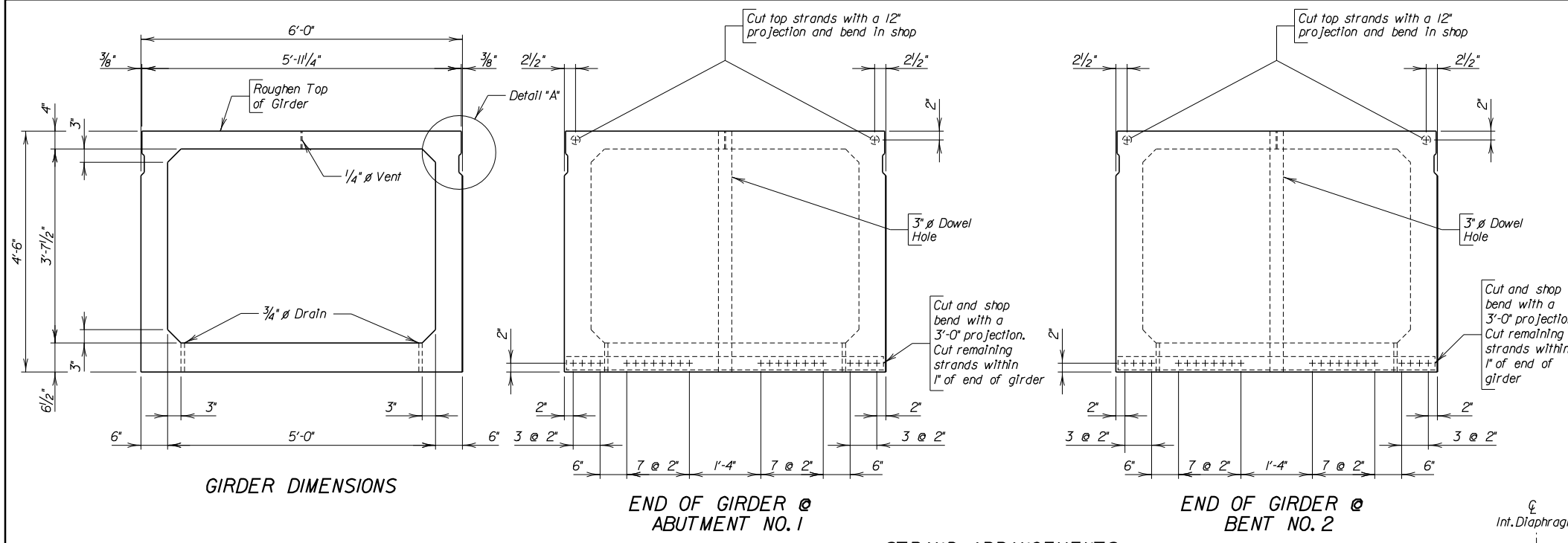
**41ST STREET BRIDGE REPLACEMENT**  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

**GIRDER DETAILS**  
DESIGNED BY: C. HANOFF  
DRAWN BY: SUPREMS  
CHECKED BY: D. SPULTZGERBER  
DATE: 10/28/2009

**CITY OF SIOUX FALLS PUBLIC WORKS**  
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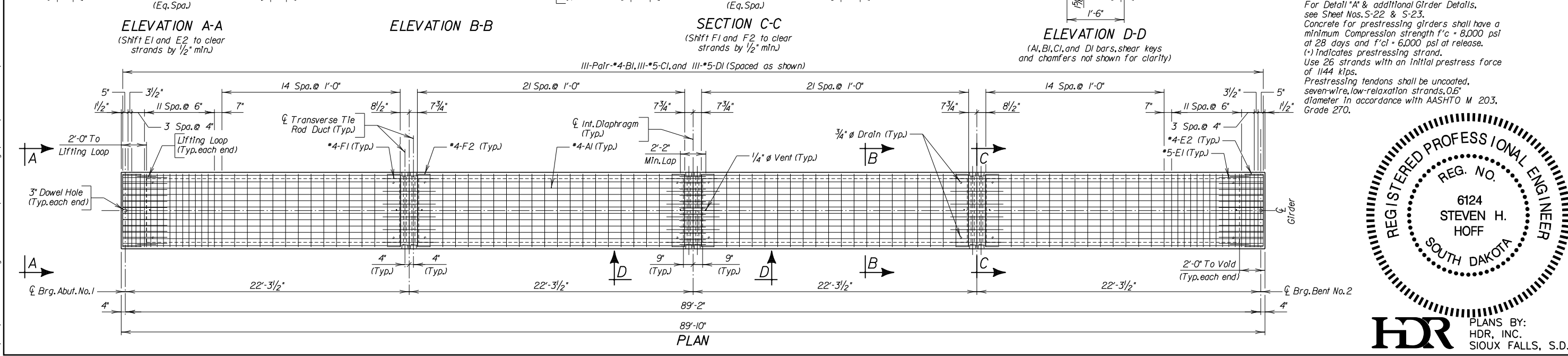
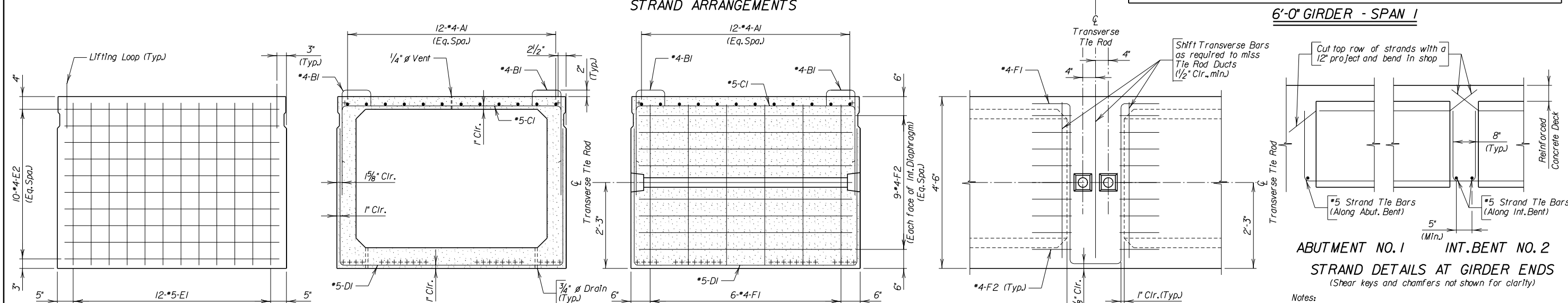
SHEET NO. **S-16**

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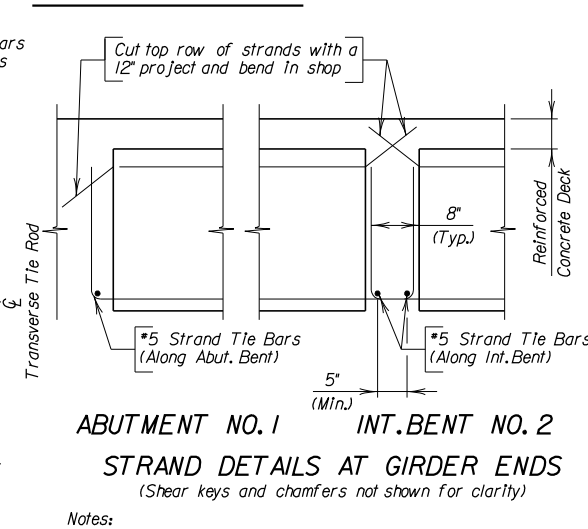


REINFORCING SCHEDULE				Bending Details	
MK.	No.	Size	Length		
AI	24	4	45'-11"	AI BARS	[Diagram: AI Bars bending detail]
BI	222	4	3'-2"		
CI	III	5	10'-11"	CI BARS	[Diagram: CI Bars bending detail]
DI	III	5	13'-6"		
E1	24	5	9'-9"	E1 BARS	[Diagram: E1 Bars bending detail]
E2	20	4	8'-8"		
F1	18	4	11'-9"	F1 BARS	[Diagram: F1 Bars bending detail]
F2	54	4	7'-8"		

NOTE:  
 All dimensions are out to out of bars.  
 All BI bars are to be Epoxy Coated.  
 Minimum clearance to reinforcing shall be 1" unless noted otherwise.  
 All reinforcing shall be Grade 60.



6'-0" GIRDER - SPAN 1

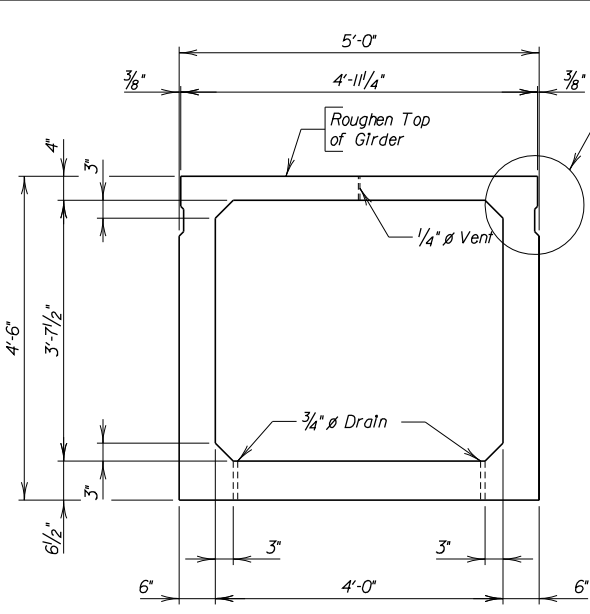


Notes:  
 For Detail 'A' & additional Girder Details, see Sheet Nos. S-22 & S-23.  
 Concrete for prestressing girders shall have a minimum Compression strength  $f'c = 8,000$  psi at 28 days and  $f'ci = 6,000$  psi at release.  
 (-) indicates prestressing strand.  
 Use 26 strands with an initial prestress force of 1144 kips.  
 Prestressing tendons shall be uncoated, seven-wire, low-relaxation strands, 0.6" diameter in accordance with AASHTO M 203, Grade 270.

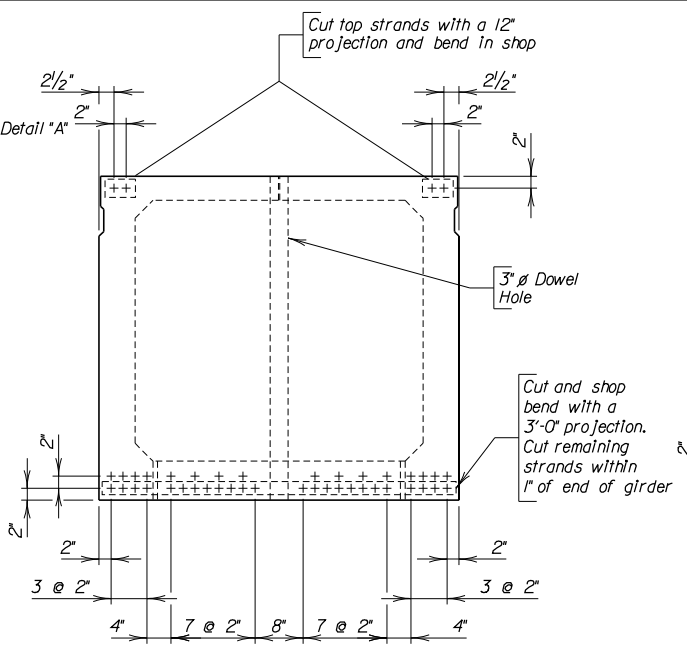
REGISTERED PROFESSIONAL ENGINEER  
 REG. NO. 6124  
 STEVEN H. HOFF  
 SOUTH DAKOTA

HDR PLANS BY:  
 HDR, INC.  
 SIOUX FALLS, S.D.

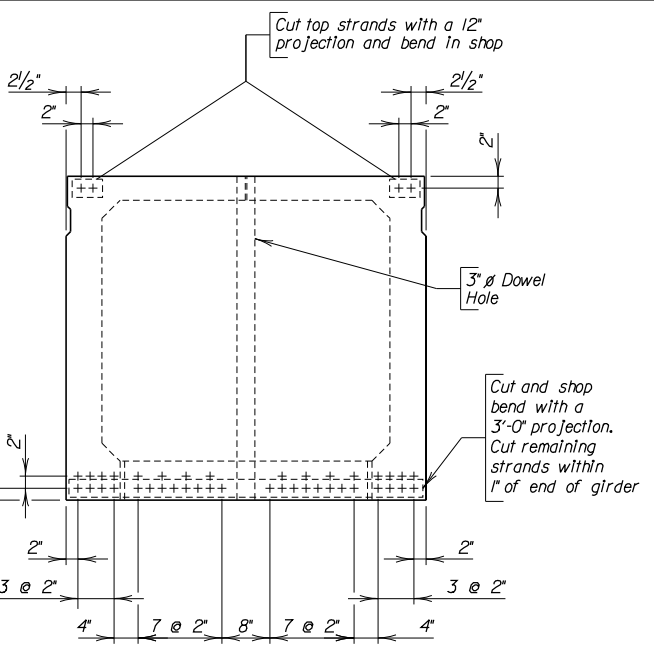
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GIRDER DIMENSIONS

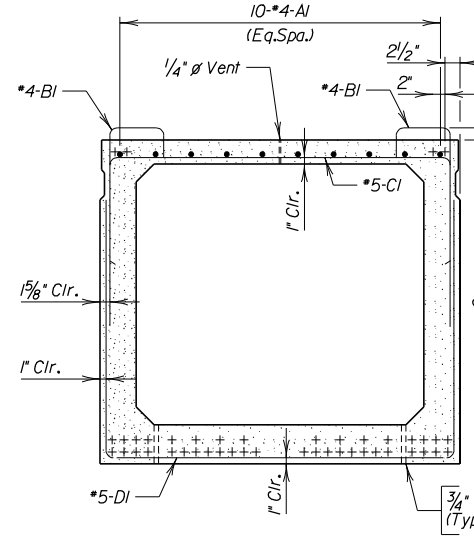


END OF GIRDER @ BENT NO. 2

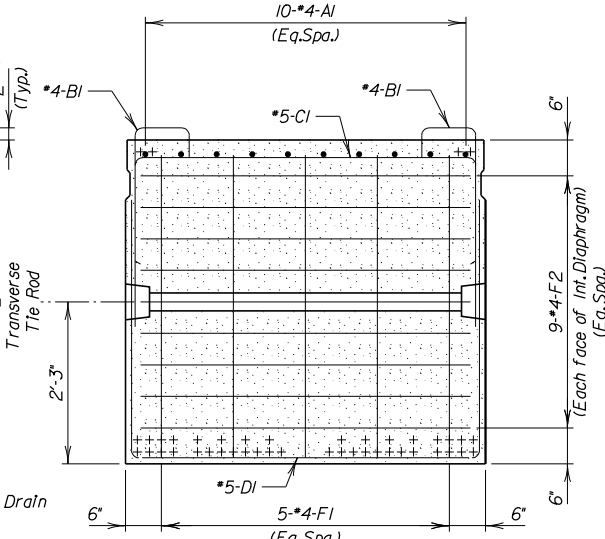


END OF GIRDER @ BENT NO. 3

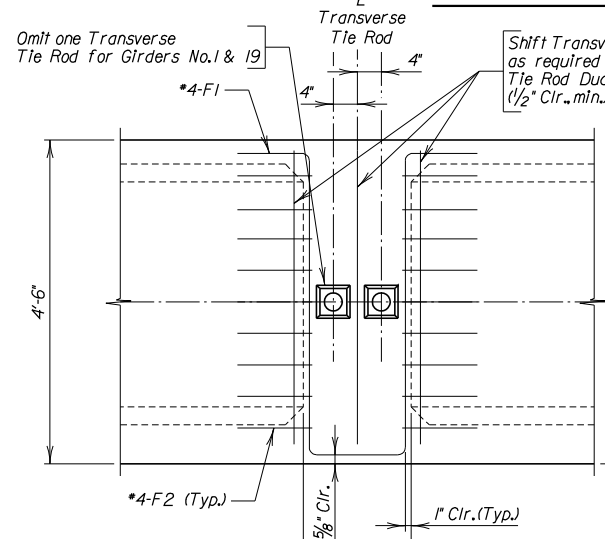
STRAND ARRANGEMENTS  
(Girder 2 to 5 Shown, Girders 1 & 19 Similar)



ELEVATION A-A  
(Shift E1 and E2 to clear strands by 1/2" min.)

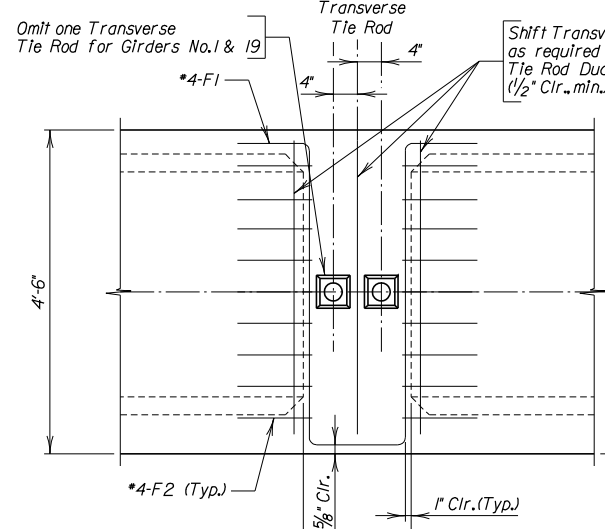


ELEVATION B-B



SECTION C-C  
(Shift F1 and F2 to clear strands by 1/2" min.)

5'-0" GIRDER - SPAN 2



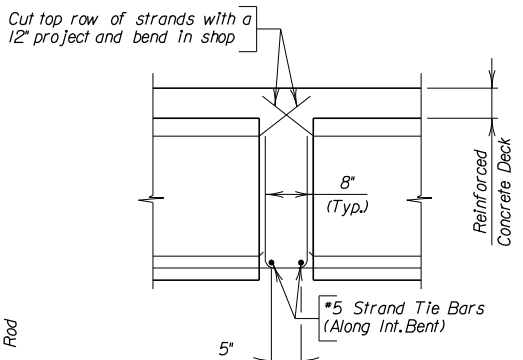
ELEVATION D-D  
(AI, BI, CI, and DI bars, shear keys and chamfers not shown for clarity)

REINFORCING SCHEDULE (Per Girder)			
MK.	No.	Size	Length
AI	30	4	42'-9"
BI	276	4	3'-2"
CI	138	5	9'-11"
DI	138	5	12'-6"
E1	20	5	9'-9"
E2	20	4	7'-8"
F1	20	4	11'-9"
F2	72	4	6'-8"

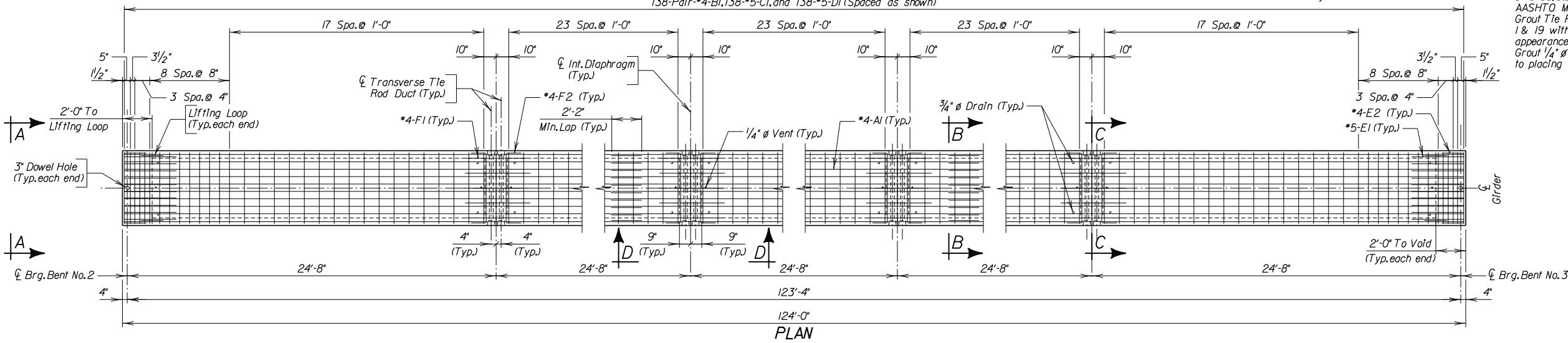
Bending Details	
AI BARS	42'-9"
BI BARS	3'-6"
CI BARS	4'-8 3/4"
DI BARS	4'-10"
E1 BARS	9'-9"
E2 BARS	7'-8"
F1 BARS	11'-9"
F2 BARS	6'-8"

NOTE:  
All dimensions are out to out of bars.  
All BI bars are to be Epoxy Coated.  
Minimum clearance to reinforcing shall be 1" unless noted otherwise.  
All reinforcing shall be Grade 60.

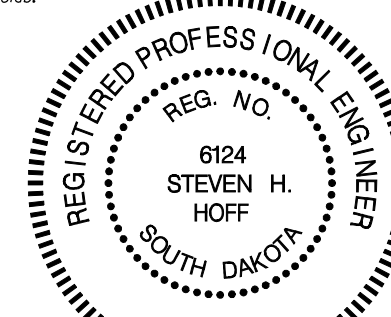


INT. BENT NO. 2 & 3  
STRAND DETAILS AT GIRDER ENDS  
(Shear keys and chamfers not shown for clarity)

Notes:  
For Detail 'A' & additional Girder Details, see Sheet Nos. S-22 & S-23.  
Concrete for prestressed girders shall have a minimum compression strength  $f'c = 8,000$  psi at 28 days and  $f'ci = 6,000$  psi at release.  
(\*) Indicates prestressing strand.  
Use 44 strands with an initial prestress force of 1936 kips.  
Prestressing tendons shall be uncoated, seven-wire, low-relaxation strands, 0.6" diameter in accordance with AASHTO M 203, Grade 270.  
Grout Tie Rods Pockets at outside of Girders 1 & 19 with a grout proportioned to match the appearance of the girder concrete.  
Grout 1/4" diameter Vent at top of girder closed prior to placing slab.



PLAN



HDR  
PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

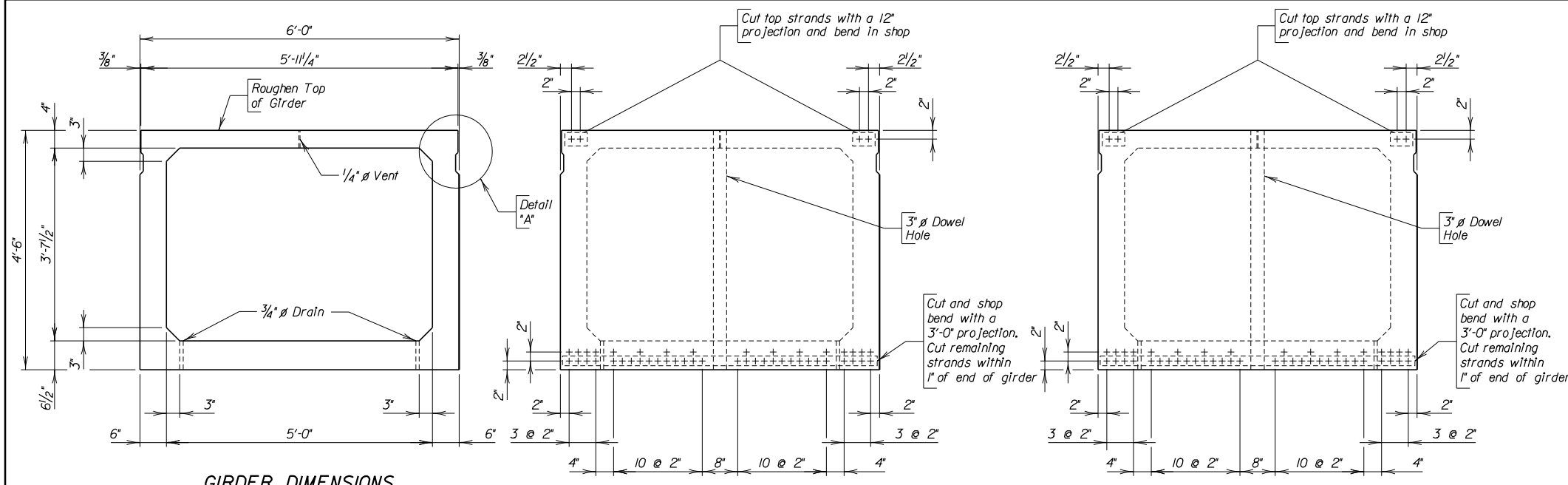
41ST STREET BRIDGE REPLACEMENT  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

GIRDER DETAILS (CONTINUED)  
DESIGNED BY: C. A. HOFF  
DRAWN BY: SUPREMA, S. SPAN 2 DGN  
CHECKED BY: D. SPULTZGERBER  
DATE: 10/28/2009  
REVISIONS:  
BY: DATE:

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SHEET NO.  
S-18

10/28/2009 awright C:\P\working\OMA\0412022\GIRDER\_DETAILS\_6\_SPAN2.DGN



**REINFORCING SCHEDULE**

MK.	No.	Size	Length
AI	36	4	42'-9"
BI	296	4	3'-2"
CI	148	5	10'-11"
DI	148	5	13'-6"
E1	24	5	9'-9"
E2	20	4	8'-8"
F1	24	4	11'-9"
F2	72	4	7'-8"

**Bending Details**

AI BARS: 42'-9" length, 9" width

BI BARS: 3'-6" length, 2'-0" height

CI BARS: 5'-8 3/4" length, 2'-7" height

DI BARS: 5'-10" length, 3'-10" height

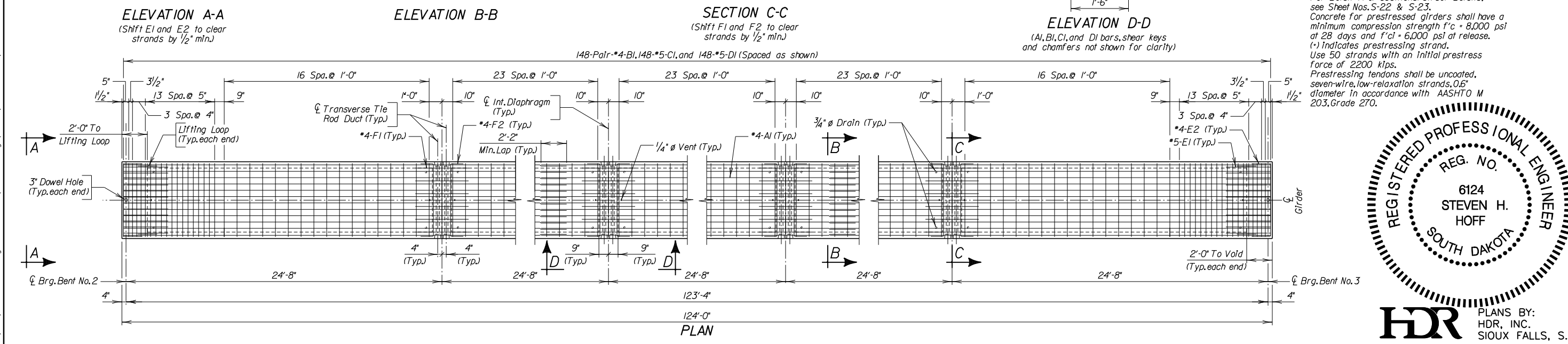
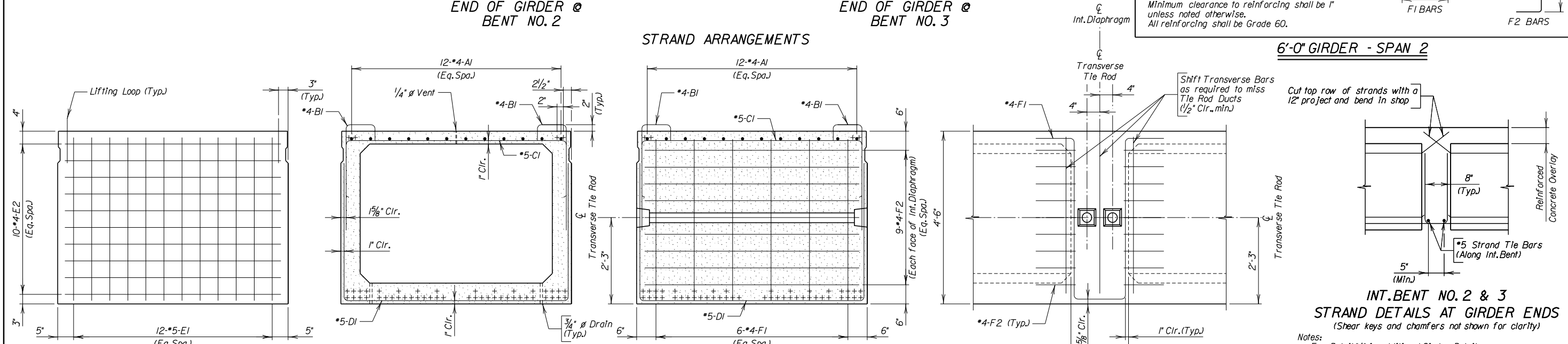
E1 BARS: 9'-9" length, 1'-6" height

E2 BARS: 8'-8" length, 4'-2 1/2" height

F1 BARS: 11'-9" length, 1'-4" width

F2 BARS: 7'-8" length, 5'-7 1/2" height

**NOTE:**  
All dimensions are out to out.  
All BI bars shall be epoxy coated.  
Minimum clearance to reinforcing shall be 1" unless noted otherwise.  
All reinforcing shall be Grade 60.



**REGISTERED PROFESSIONAL ENGINEER**

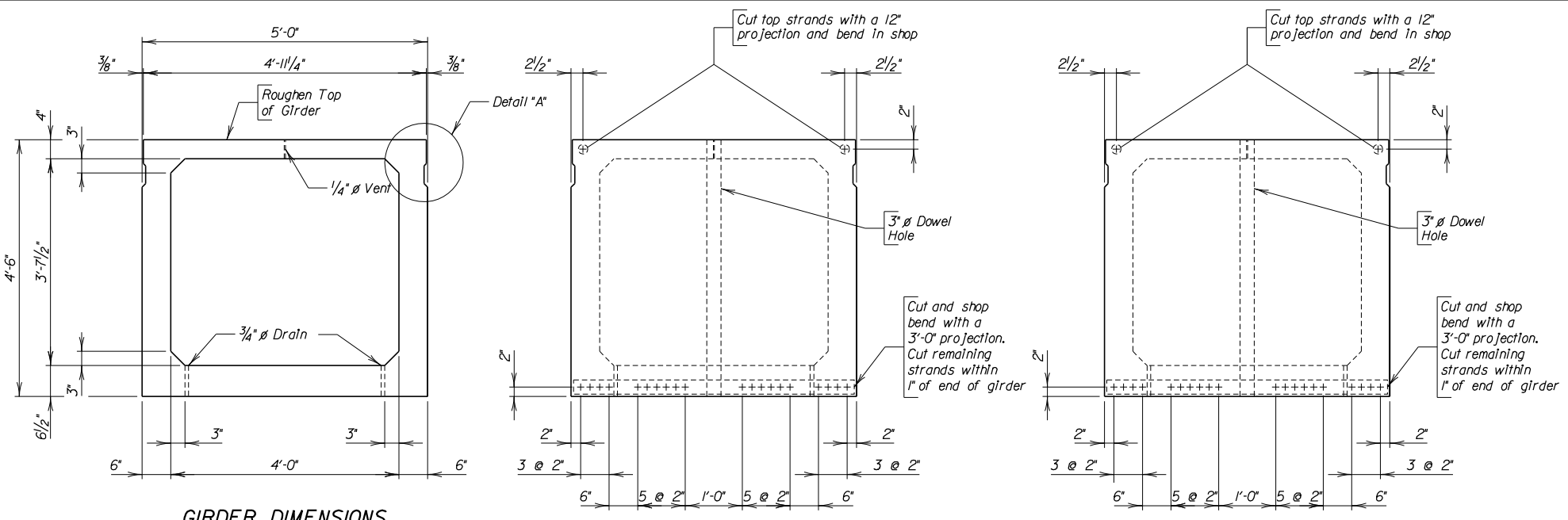
REG. NO. 6124

STEVEN H. HOFF

SOUTH DAKOTA

**HDR** PLANS BY: HDR, INC. SIOUX FALLS, S.D.

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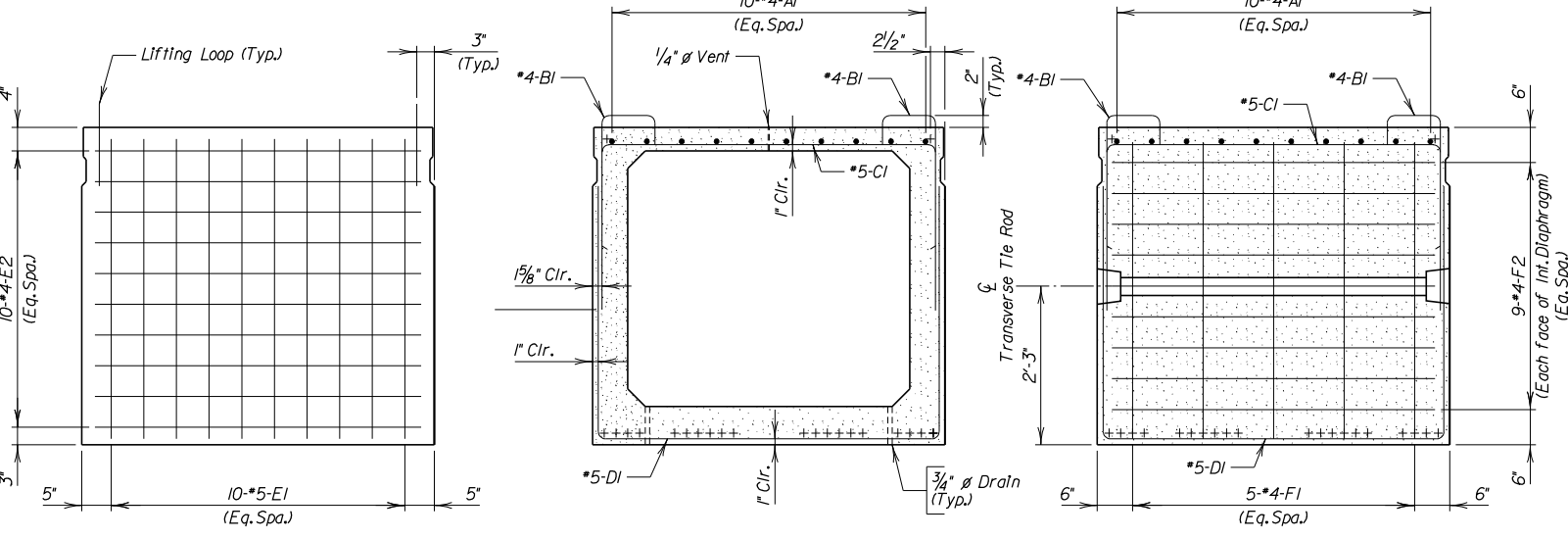


GIRDER DIMENSIONS

END OF GIRDER @ BENT NO. 3

END OF GIRDER @ ABUTMENT NO. 4

STRAND ARRANGEMENTS  
(Girder 2 to 5 Shown, Girders 1 & 19 Similar)



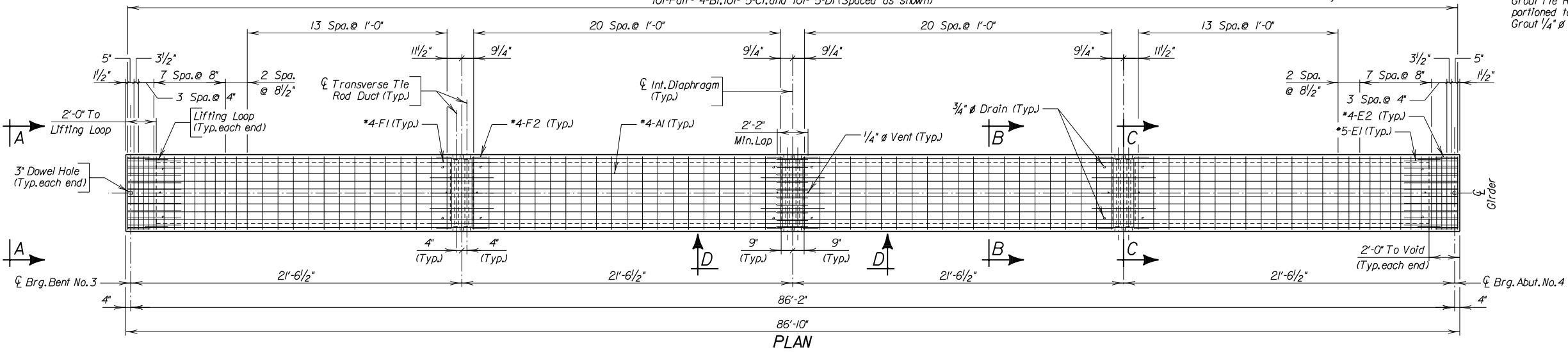
ELEVATION A-A  
(Shift E1 and E2 to clear strands by 1/2" min.)

ELEVATION B-B

SECTION C-C  
(Shift F1 and F2 to clear strands by 1/2" min.)

ELEVATION D-D  
(A1, B1, C1, and D1 bars, shear keys and chamfers not shown for clarity)

101-Pair \*4-B1, 101 \*5-C1, and 101 \*5-D1 (Spaced as shown)



PLAN

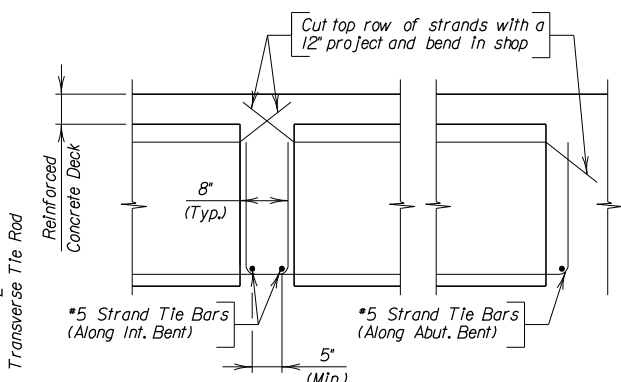
REINFORCING SCHEDULE (Per Girder)			
MK.	No.	Size	Length
AI	20	4	44'-5"
BI	202	4	3'-2"
CI	101	5	9'-11"
DI	101	5	12'-6"
E1	20	5	9'-9"
E2	20	4	7'-8"
F1	15	4	11'-9"
F2	54	4	6'-8"

Bending Details	
AI BARS	44'-5" (Total length)
BI BARS	3'-6" (Total length)
CI BARS	9'-11" (Total length)
DI BARS	12'-6" (Total length)
E1 BARS	9'-9" (Total length)
E2 BARS	7'-8" (Total length)
F1 BARS	11'-9" (Total length)
F2 BARS	6'-8" (Total length)

NOTE:  
All dimensions are out to out of bars.  
All BI bars are to be Epoxy Coated.  
Minimum clearance to reinforcing shall be 1" unless noted otherwise.  
All reinforcing shall be Grade 60.

5'-0" GIRDER - SPAN 3



INT. BENT NO. 3 ABUTMENT NO. 4  
STRAND DETAILS AT GIRDER ENDS  
(Shear keys and chamfers not shown for clarity)

Notes:  
For Detail "A" & additional Girder Details, see Sheet Nos. S-22 & S23.  
Concrete for prestressed girders shall have a minimum compressive strength  $f'c = 8,000$  psi at 28 days and  $f'ci = 6,000$  psi at release.  
(-) indicates prestressing strand.  
Use 22 strands with an initial prestress force of 968 kips.  
Prestressing tendons shall be uncoated, seven-wire, low-relaxation strands, 0.6" diameter in accordance with AASHTO M 203, Grade 270.  
Grout Tie Rods Pockets at outside of Girders 1 & 19 with a grout portioned to match the appearance of the girder concrete.  
Grout 1/4" vent at top of girder closed prior to placing slab.

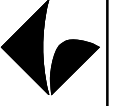


HDR PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

41ST STREET BRIDGE REPLACEMENT  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

GIRDER DETAILS (CONTINUED)  
DESIGNED BY: C. HOFF  
DRAWN BY: SUPREMA  
CHECKED BY: D. SPULTZGERBER  
DATE: 10/28/2009

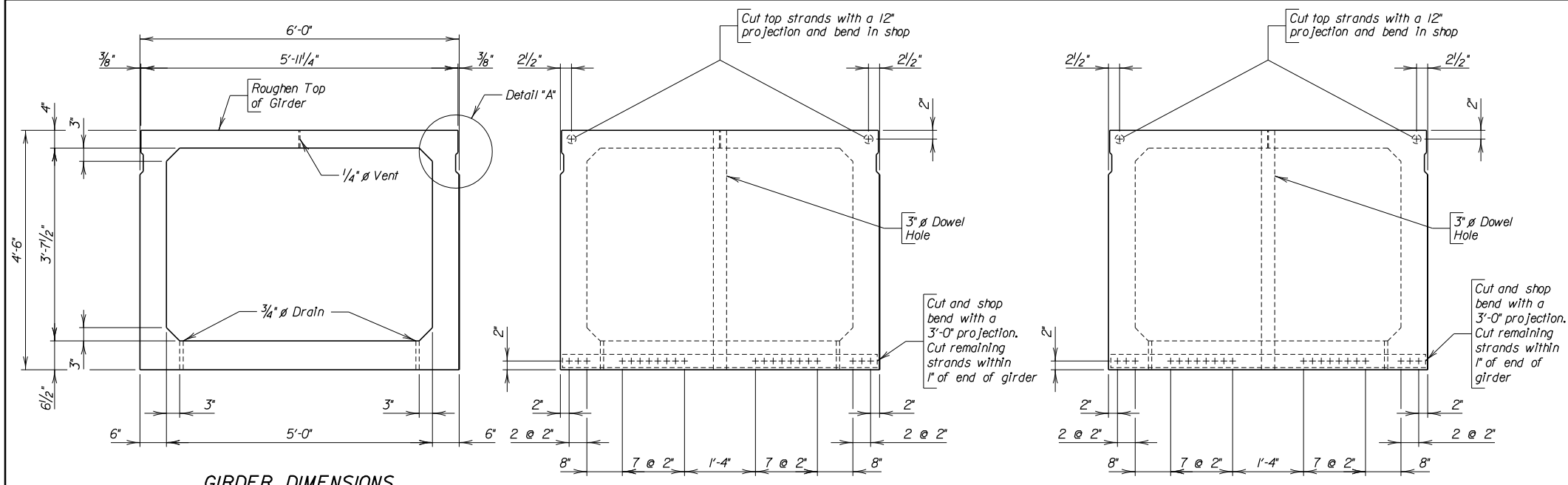
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SHEET NO.

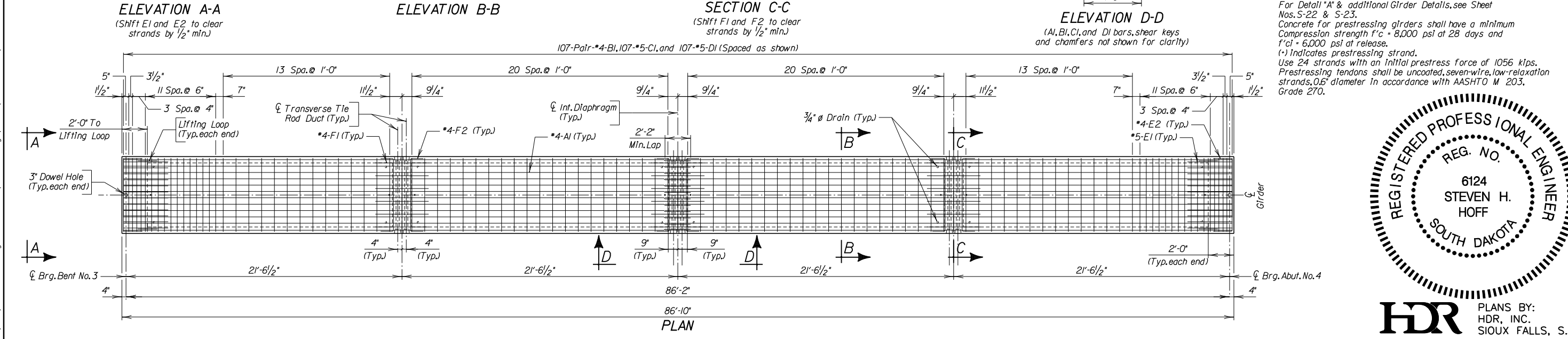
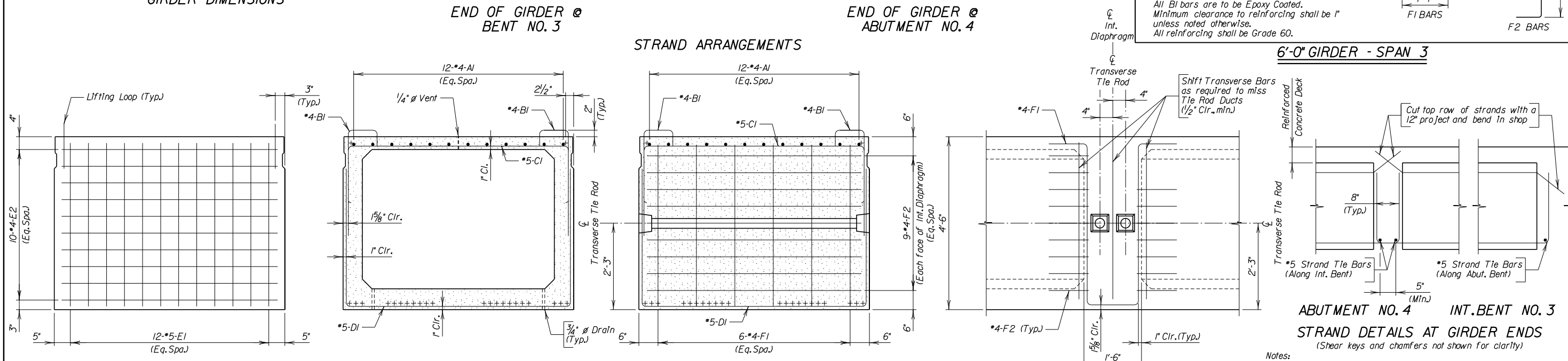
S-20

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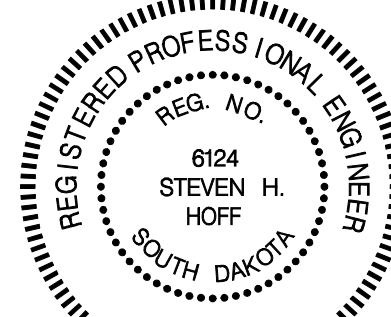


REINFORCING SCHEDULE				Bending Details	
MK.	No.	Size	Length		
AI	24	4	44'-5"	AI BARS	
BI	214	4	3'-2"	BI BARS	
CI	107	5	10'-11"	CI BARS	
DI	107	5	13'-6"	DI BARS	
E1	24	5	9'-9"	E1 BARS	
E2	20	4	8'-8"	E2 BARS	
F1	18	4	11'-9"	F1 BARS	
F2	54	4	7'-8"	F2 BARS	

NOTE:  
 All dimensions are out to out of bars.  
 All BI bars are to be Epoxy Coated.  
 Minimum clearance to reinforcing shall be 1" unless noted otherwise.  
 All reinforcing shall be Grade 60.



Notes:  
 For Detail "A" & additional Girder Details, see Sheet Nos. S-22 & S-23.  
 Concrete for prestressing girders shall have a minimum Compression strength  $f'_c = 8,000$  psi at 28 days and  $f'_ci = 6,000$  psi at release.  
 (-) Indicates prestressing strand.  
 Use 24 strands with an initial prestress force of 1056 kips.  
 Prestressing tendons shall be uncoated, seven-wire, low-relaxation strands, 0.6" diameter in accordance with AASHTO M 203, Grade 270.



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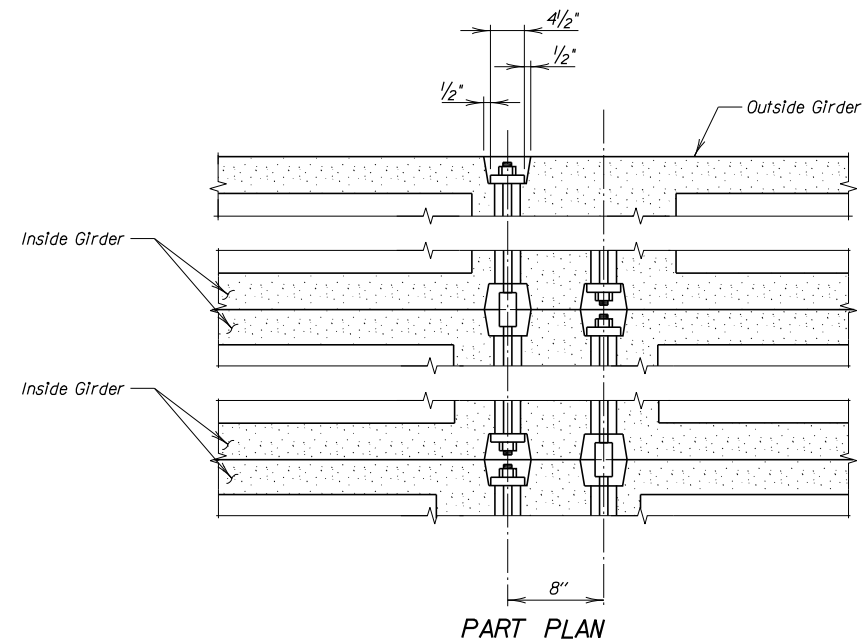
41ST STREET BRIDGE REPLACEMENT  
 OVER THE BIG SIOUX RIVER  
 SIOUX FALLS, SOUTH DAKOTA

GIRDER DETAILS (CONTINUED)  
 REGISTERED BY: C. HOFF  
 DRAWN BY: SUPREMA  
 CHECKED BY: D. SPULTZGERBER  
 REVISIONS:  
 DATE: 10/28/2009  
 BY: DATE:

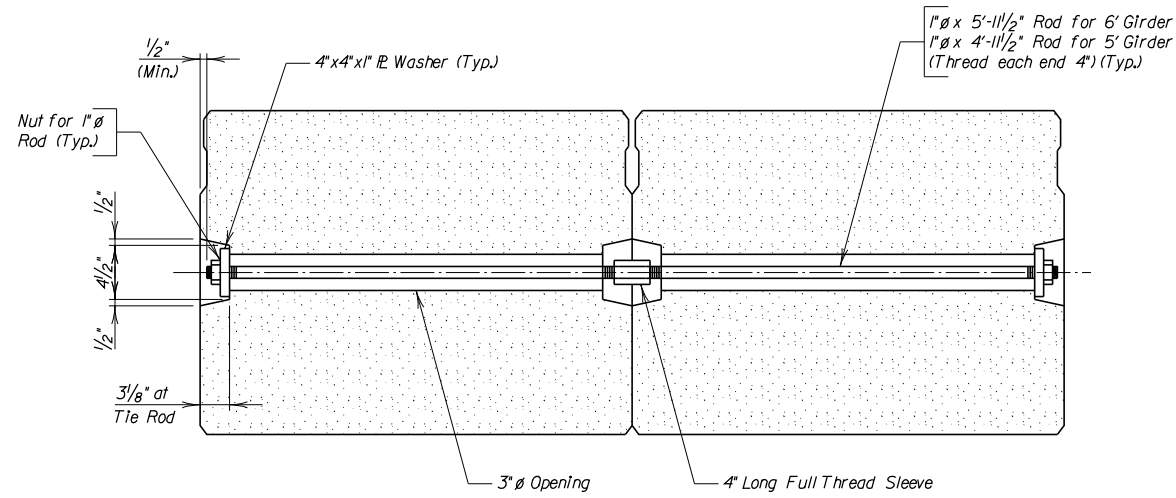
CITY OF SIOUX FALLS  
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SHEET NO.  
**S-21**

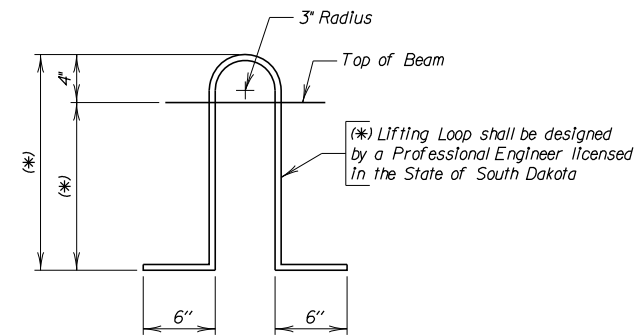
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PART PLAN



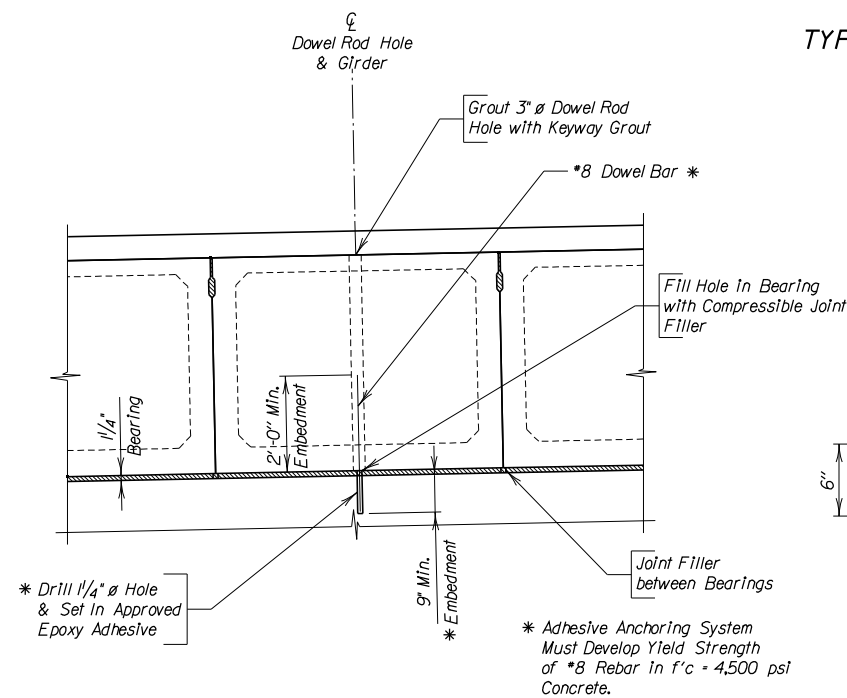
PART SECTION



LIFTING LOOP DETAIL

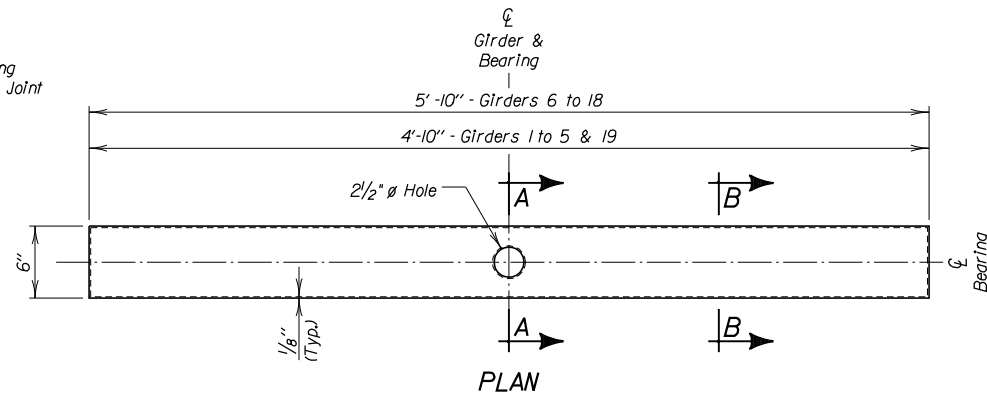
Note:  
Cut lifting loop within 1" of top of girder prior to placing slab concrete.

TYPICAL TRANSVERSE TIE ASSEMBLY  
(Reinforcement & Strands not shown for clarity)



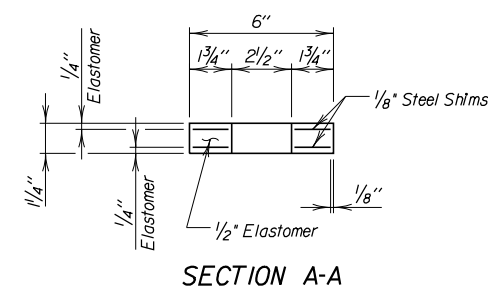
GIRDER DOWEL DETAIL

\* Adhesive Anchoring System Must Develop Yield Strength of \*8 Rebar in f'c = 4500 psi Concrete.

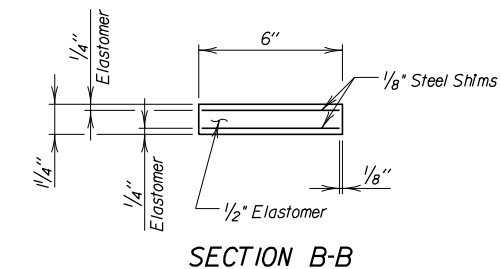


PLAN

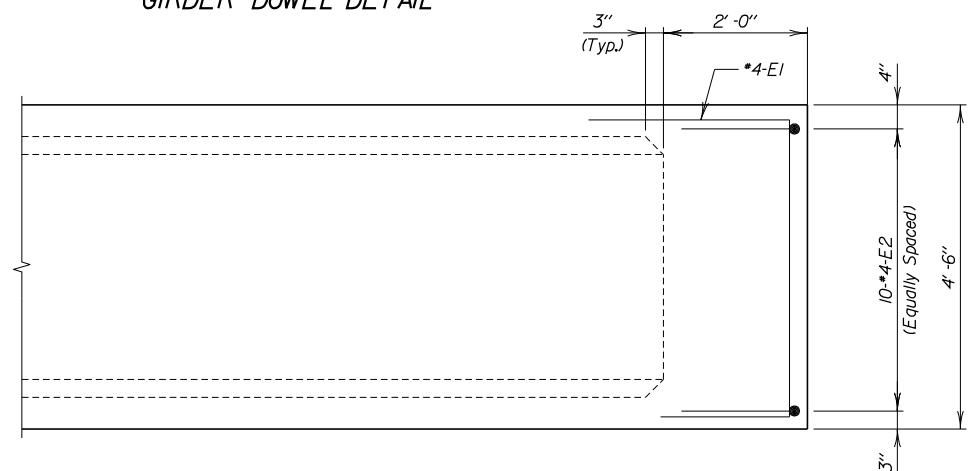
BEARING DETAILS



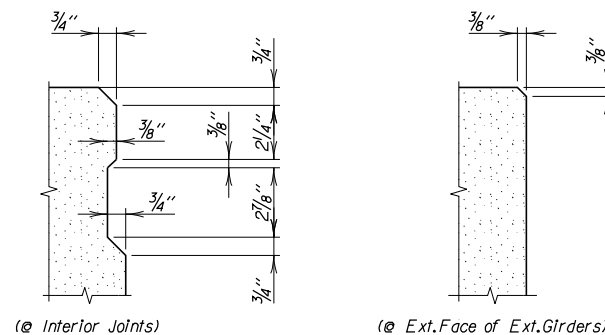
SECTION A-A



SECTION B-B

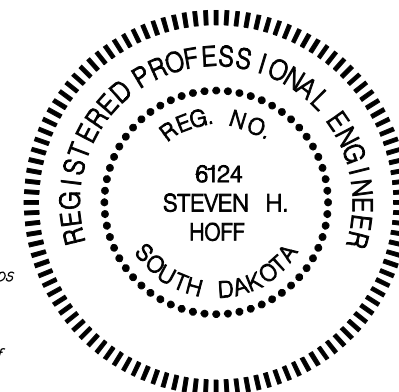


TYPICAL END ELEVATION  
(Stirrups, long reinforcement, strands, chamfers & shear keys not shown for clarity)



DETAIL "A"  
(See Girder Detail Sheets for Location of Detail "A")

NOTES:  
The 1" rods in the transverse tie assembly shall be tightened to a snug fit and the threads set. Pockets that receive transverse tie bar on outside shall be filled with grout after transverse tie assembly is in place.  
Keyway surface shall be cleaned to remove form oil or other bond breaking material prior to shipment of the beams. Cleaning shall be done by sandblasting the keyway areas between top of the beam and the bottom edge of the key.  
Use high strength tie rods that conform to ASTM F1554 Grade 105. Use heavy hexagon nuts that conform to ASTM A563. Hot-dip galvanize tie rods, plates, nuts and washers after fabrication. Tighten tie rods to a minimum tension of 30 kips using turn of the nut method.  
Use mechanically galvanized load indicating washers conforming to ASTM F959 when tensioning the tie rods on the first pair of girders to calibrate the turn of the nut method. The load indicating washers shall be placed on the anchor end, not the tensioning end.  
Tighten all tie rods (per girder) to about one half of the specified tension before proceeding with the final tensioning.

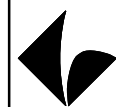


HDR PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

41ST STREET BRIDGE REPLACEMENT  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

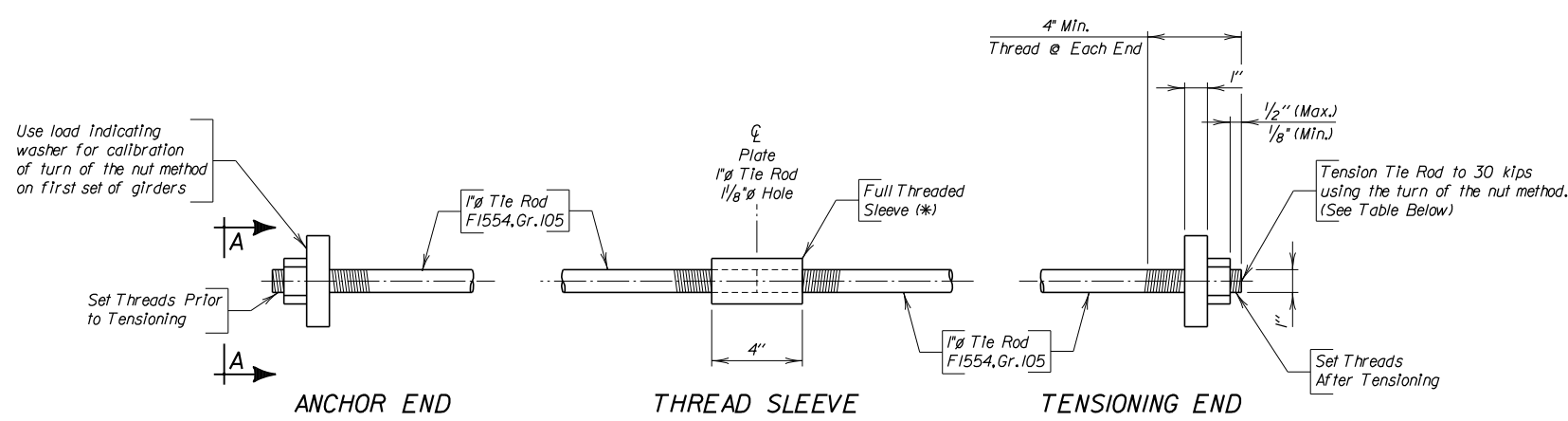
MISCELLANEOUS GIRDER DETAILS  
DESIGNED BY: L. SUPERSOFT  
DRAWN BY: D. SPILLIGER  
CHECKED BY: D. SPILLIGER  
DATE: 10/28/2009  
REVISIONS:  
BY: DATE:

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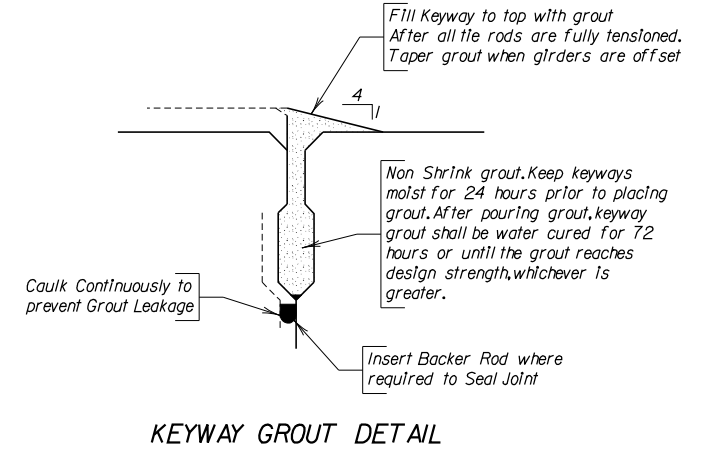
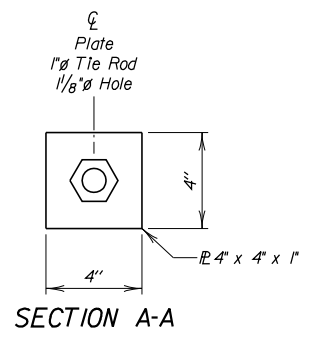
SHEET NO.  
S-22

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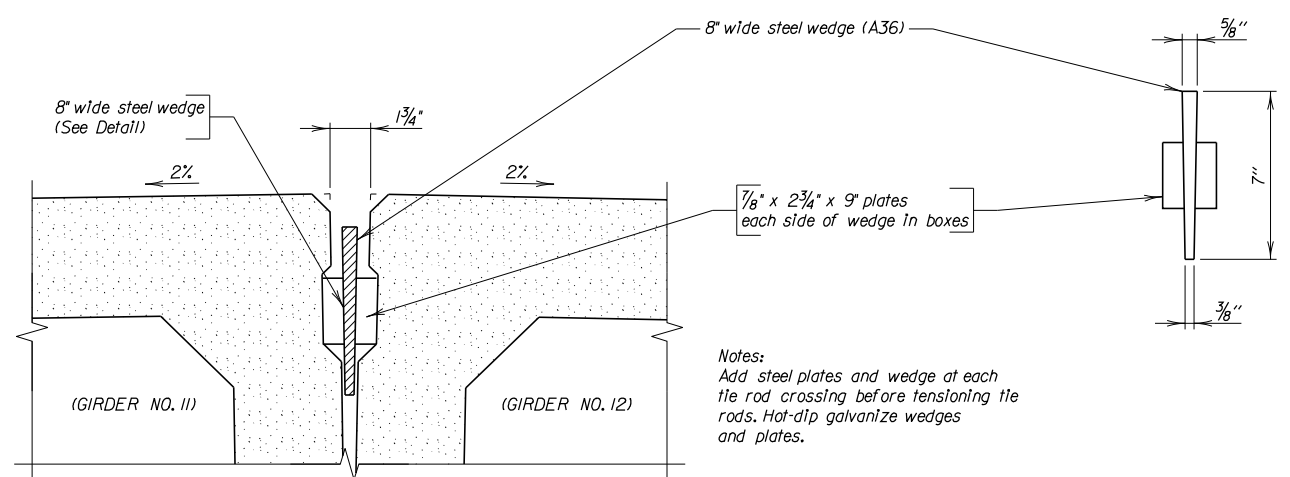


**TIE ROD & BEARING PLATE DETAILS**

(\*) Certification of Thread Sleeve Capacity in excess of tie rod capacity shall be provided.

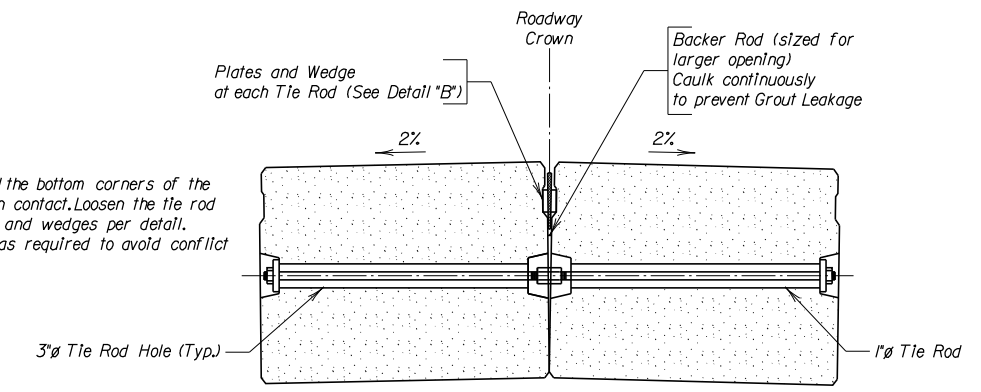


TURN OF THE NUT REQUIREMENTS	
(6' to 6') Girder No. 6 to No. 18	- 1/2" Turns
(6' to 5') Girder No. 5 to No. 6 & Girder No. 18 to Girder No. 19	- 3/8" Turns
(5' to 5') Girder No. 1 to No. 5	- 1/4" Turns

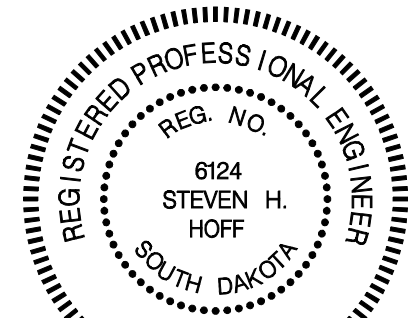


**DETAIL "B"**  
PLATE AND WEDGE DETAIL AT CROWN

Notes:  
Tighten tie rods until the bottom corners of the boxes or slabs are in contact. Loosen the tie rod and install the plates and wedges per detail. Shift wedge location as required to avoid conflict with the tie rod.

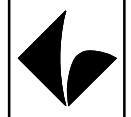


**TYPICAL SLAB DETAIL FOR**  
INSTALLING BOXES ON CROWN



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SIOUX FALLS, S.D.

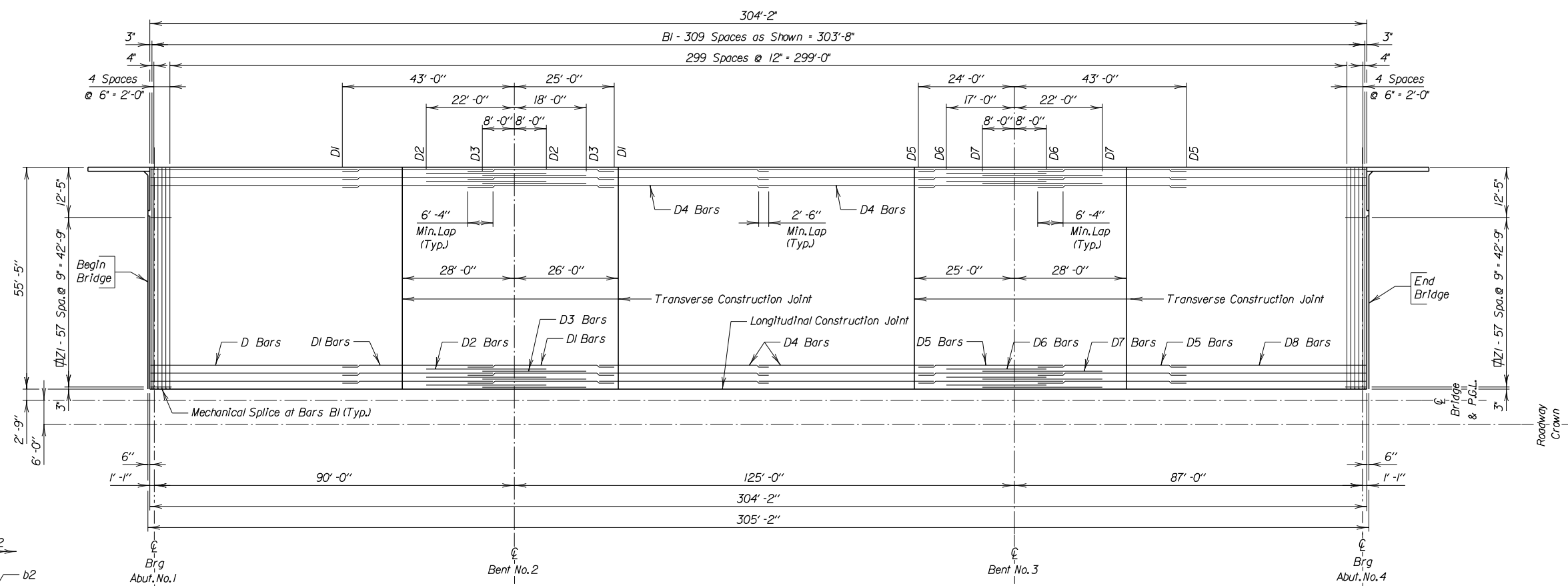
MISCELLANEOUS GIRDER DETAILS (CONTINUED)  
DESIGNED BY: SUPERSOFT  
DRAWN BY: D. SPULTZGERBER  
CHECKED BY: D. SPULTZGERBER  
DATE: 10/28/2009  
REVISIONS:  
BY: DATE:



SHEET NO.

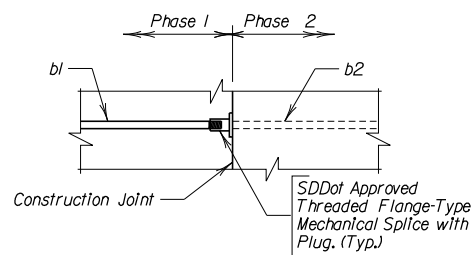


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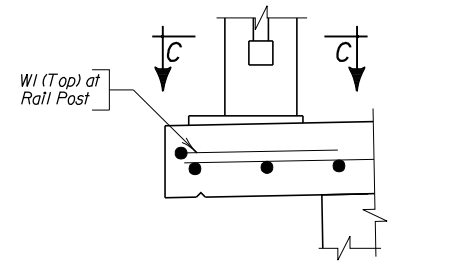


PLAN VIEW - PHASE I

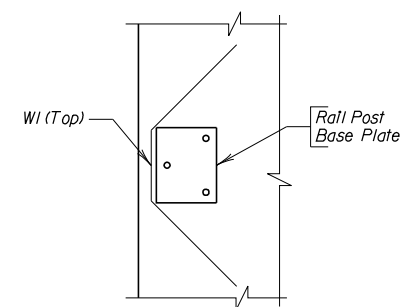
φZ1 bars have mechanical splices and connect to Z2 bars in Approach Slab.



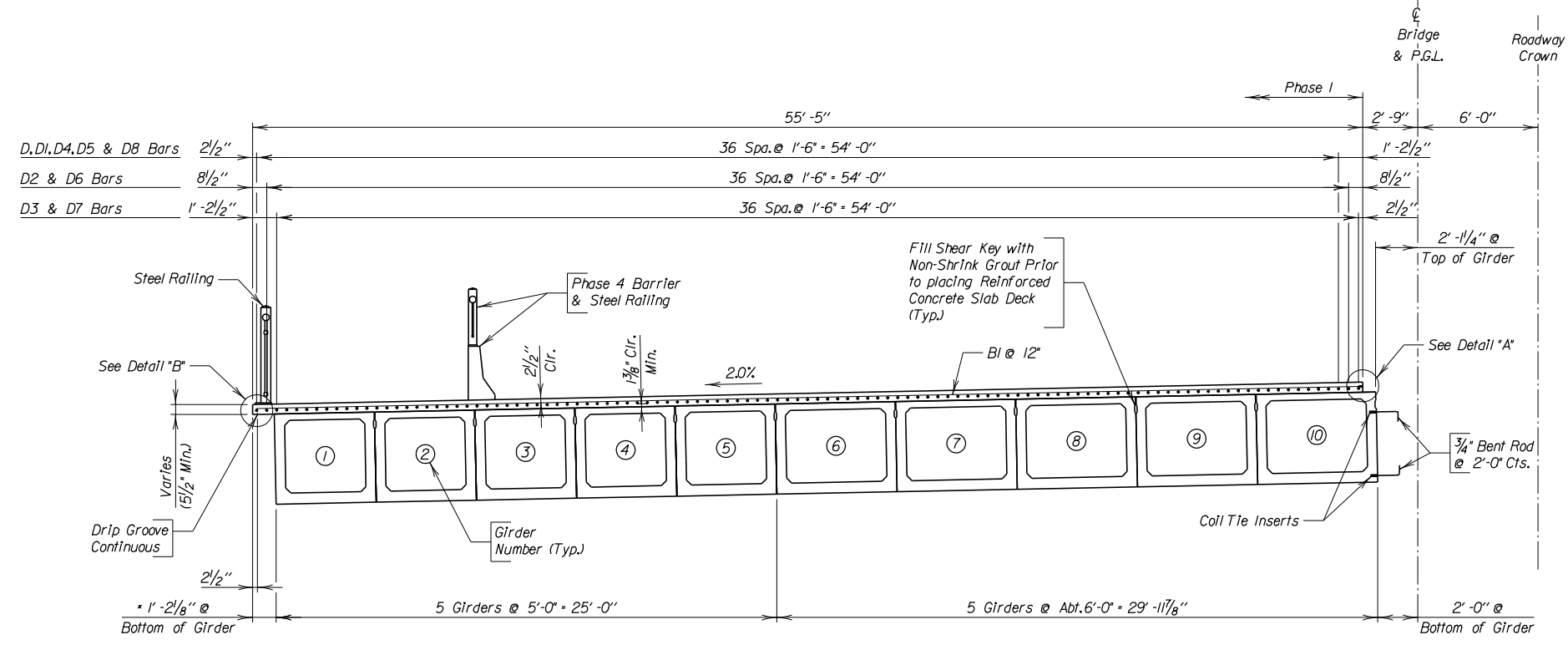
DETAIL "A"



DETAIL "B"



SECTION C-C



TYPICAL SECTION - PHASE I

\* Actual Dimension may vary based on Fabrication & Erection Tolerance & overall Structure width growth.

- Notes:
1. For Girder Details, see Sheet Nos. S-16 to S-23.
  2. For Handrail Details, see Sheet Nos. S-39 and S-40.



41ST STREET BRIDGE REPLACEMENT  
 OVER THE BIG SIOUX RIVER  
 SIOUX FALLS, SOUTH DAKOTA

SUPERSTRUCTURE DETAILS  
 DESIGNED BY: C. HANCOCK  
 DRAWN BY: J. SUPERS  
 CHECKED BY: D. SPULTZGERBER  
 REVISIONS:  
 DATE: 10/28/2009  
 BY: DATE:

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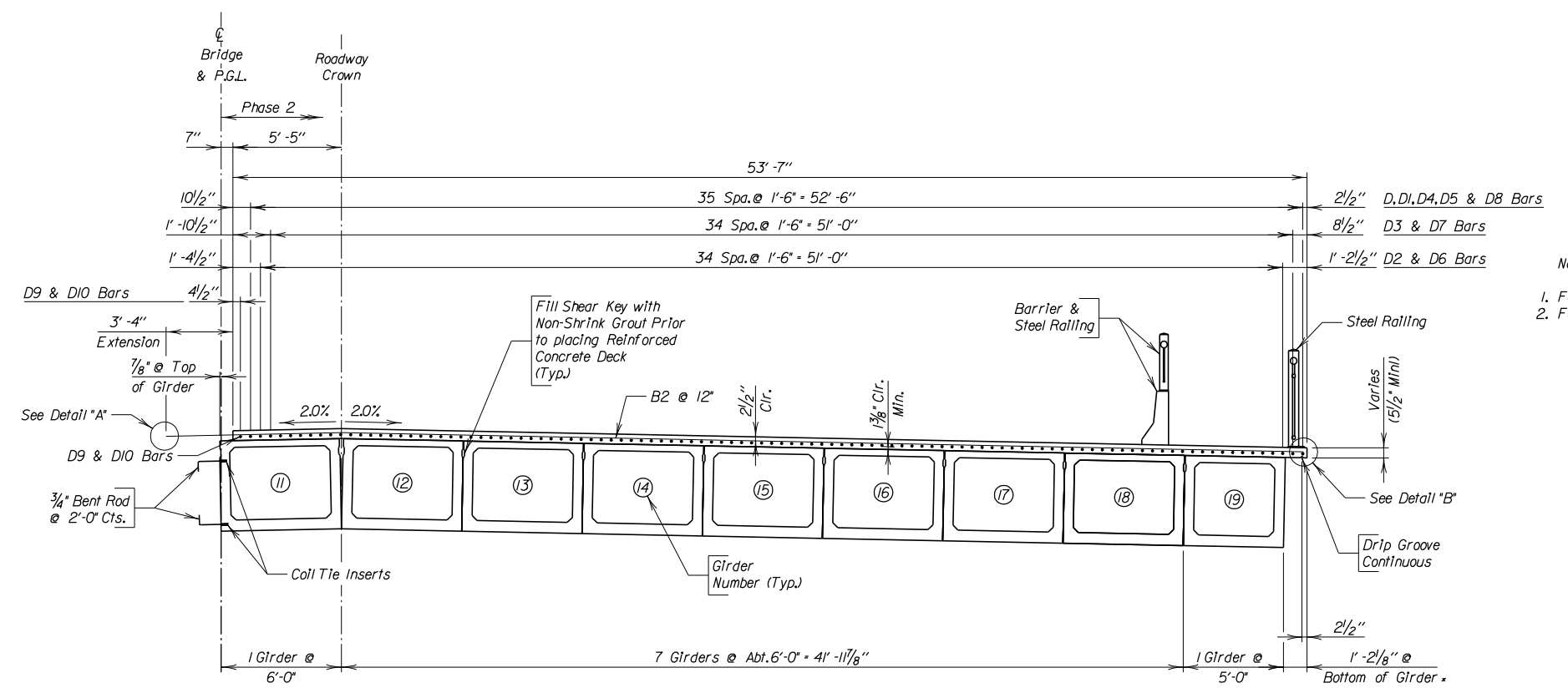
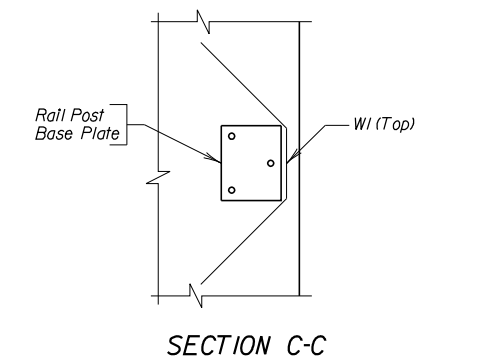
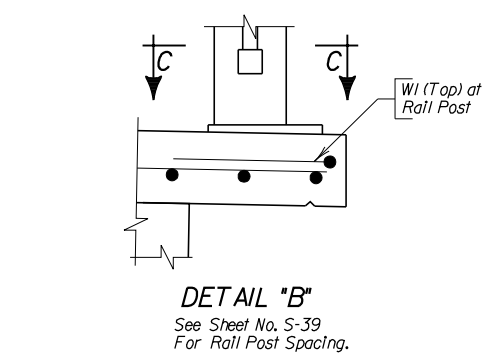
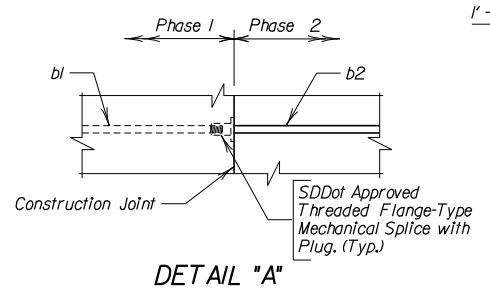
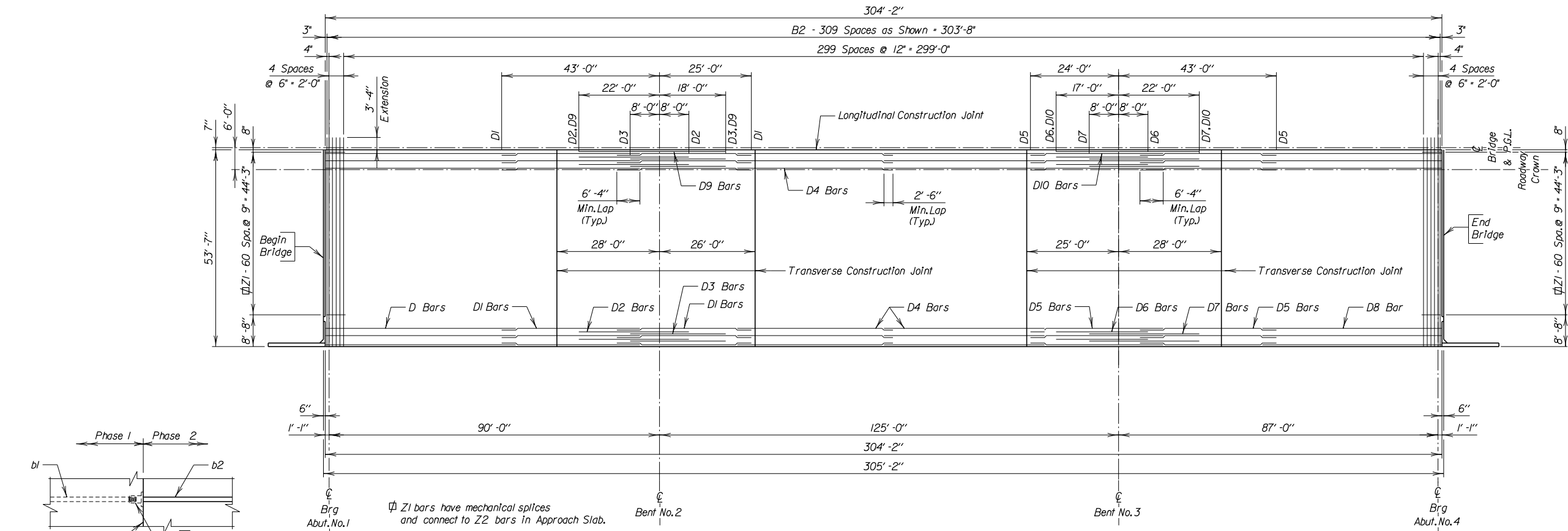


SHEET NO.

S-24

HDR PLANS BY:  
 HDR, INC.  
 SIOUX FALLS, S.D.

10/28/2009 awright C:\Pwworking\OMA\0412022\STAGE2A\_SUPERSTRUCTURE.DGN



- Notes:
1. For Girder Details, see Sheet Nos. S-16 to S-23.
  2. For Handrail Details, see Sheet Nos. S-39 and S-40.



\* Actual Dimension may vary based on Fabrication & Erection Tolerance & overall Structure width growth.

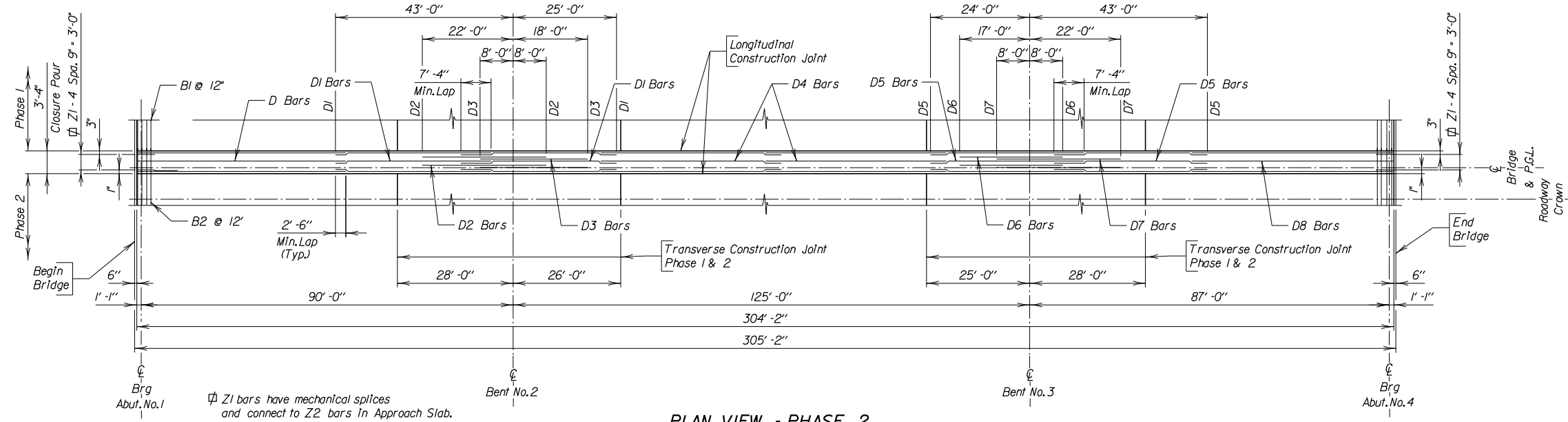
**41ST STREET BRIDGE REPLACEMENT**  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

**SUPERSTRUCTURE DETAILS (CONTINUED)**

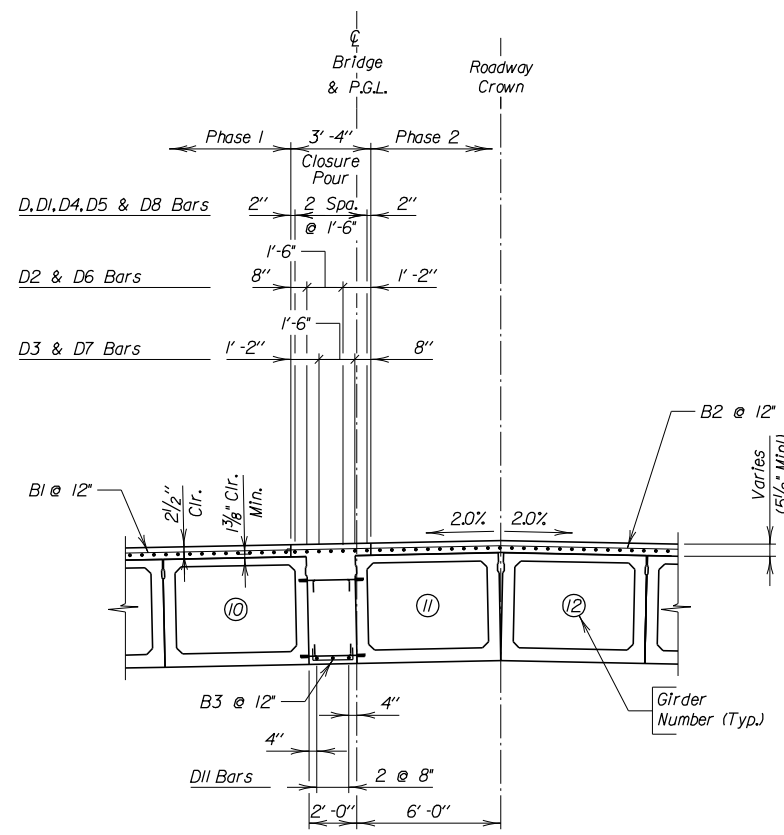
DESIGNED BY: T. SUPERSCHNITZ	FILE: STAGE2A_SUPERSTRUCTURE.DGN
DRAWN BY: D. SPULTZGERBER	DATE: 10/28/2009
CHECKED BY: D. SPULTZGERBER	DATE:
REVISIONS:	BY: DATE:

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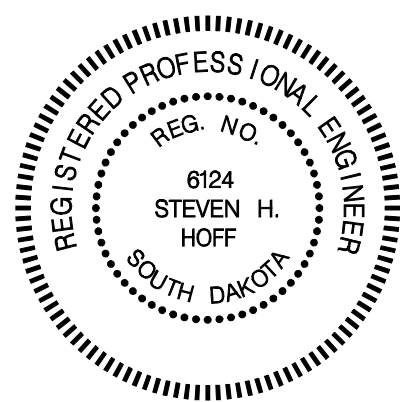
10/28/2009 09:11:00 AM C:\P\working\OMA\0412022\STAGE2B\_SUPERSTRUCTURE.DGN



Ø Z1 bars have mechanical splices and connect to Z2 bars in Approach Slab.



Notes:  
1. For Girder Details, see Sheet Nos. S-16 to S-23.

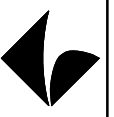


HDR PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

41ST STREET BRIDGE REPLACEMENT  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

SUPERSTRUCTURE DETAILS (CONTINUED)  
DESIGNED BY: [REDACTED] FILE: STAGE2B\_SUPERSTRUCTURE.DGN  
CHECKED BY: D. SPILLIGERBERG DATE: 10/28/2009  
REVISIONS: BY: DATE:

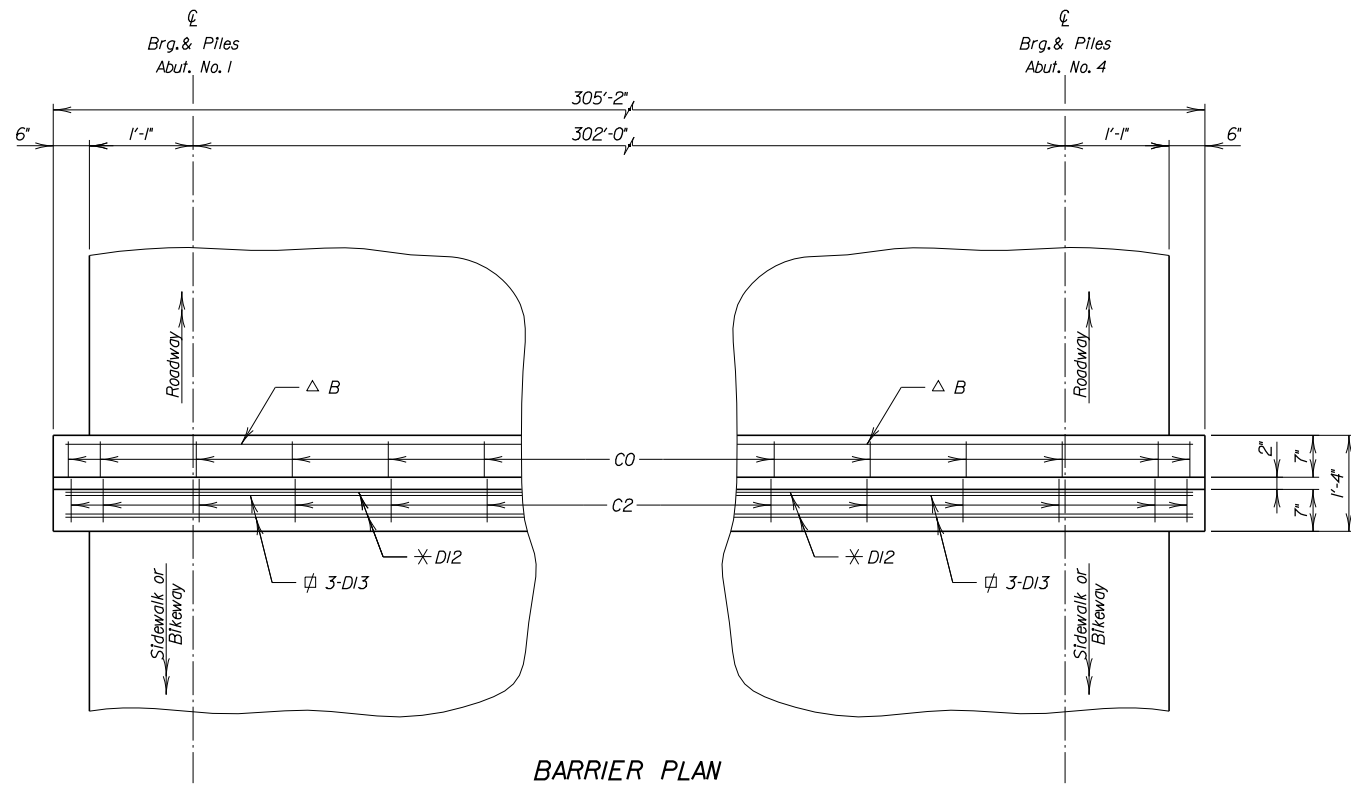
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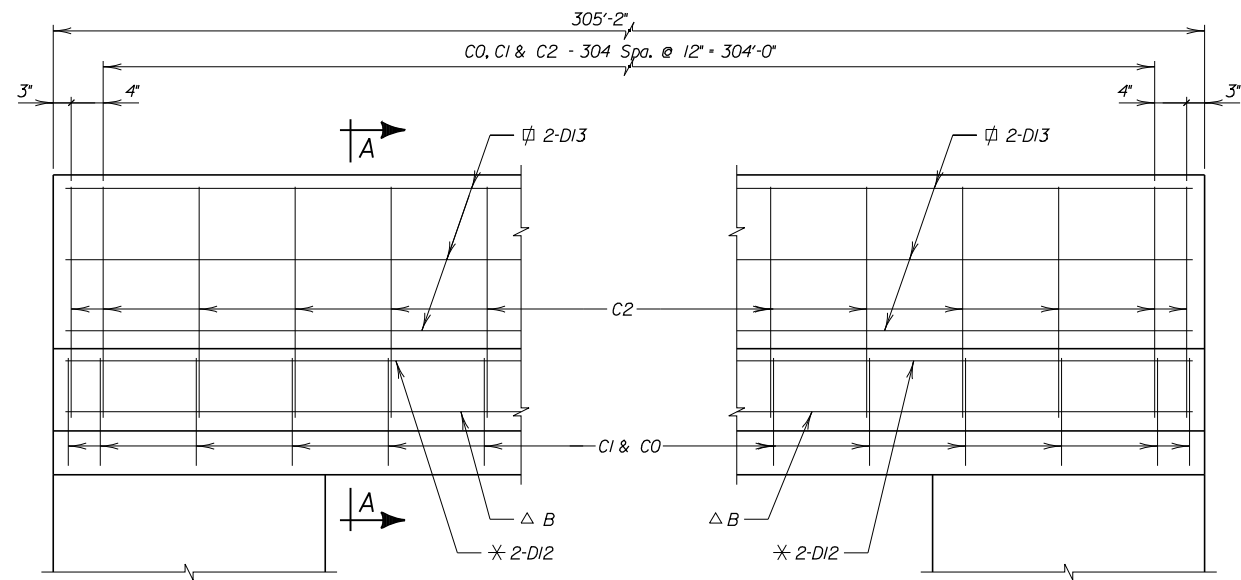
SHEET NO.

S-26

10/28/2009 owright C:\PWworking\OMA\0412022\BARRIER\_DETAIL.S.dgn

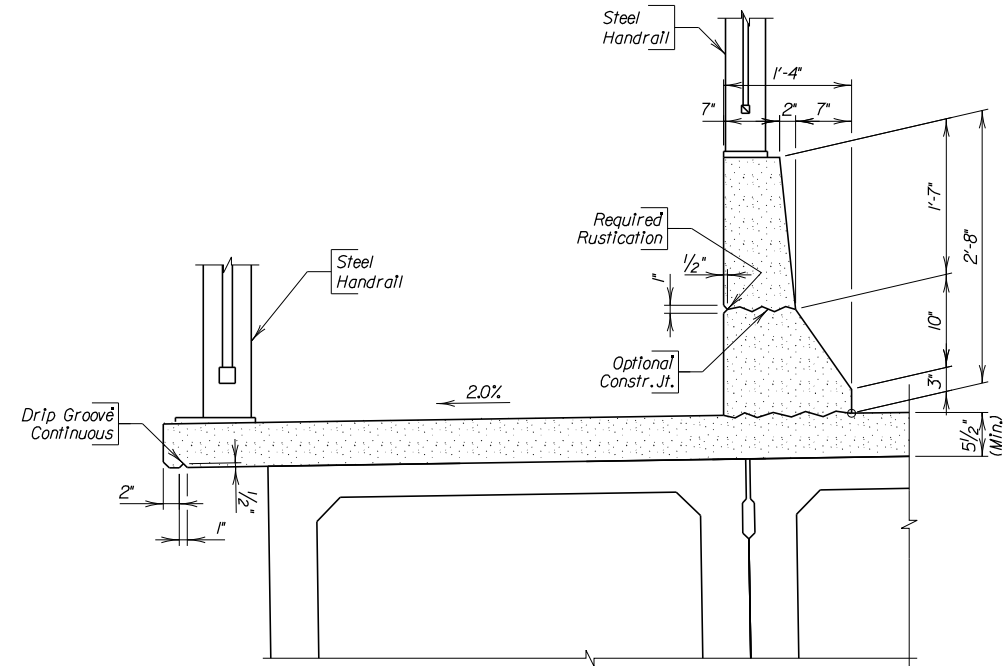


BARRIER PLAN

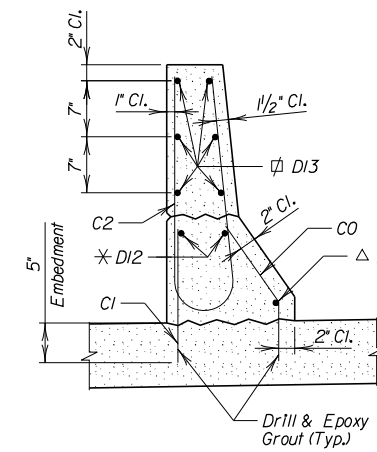


BARRIER ELEVATION

- \* Min. Lap = 2'-9"
- Δ Min. Lap = 1'-0"
- φ Min. Lap = 2'-0"



BARRIER DETAIL



SEC. A-A

Note:  
1. Barriers & Steel Handrails shall be built plumb.



**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

SUPERSTRUCTURE DETAILS (CONTINUED)

DESIGNED BY: SUPERSOFT  
DRAWN BY: SUPERSOFT  
CHECKED BY: D. SPULTZGERBER  
REVISIONS:

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SHEET NO.

**S-27**

**41ST STREET BRIDGE REPLACEMENT**  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

10/28/2009 awright C:\P\working\OMA\0412022\SUPERSTRUCTURE\_REINF.DGN

REINFORCING SCHEDULE														
PHASE 1					PHASE 2					PHASE 4				
Mk.	No.	Size	Length	Type	Mk.	No.	Size	Length	Type	Mk.	No.	Size	Length	Type
B1	310	5	55'-3"	Str.	B	6	4	51'-8"	Str.	B	6	4	51'-8"	Str.
D	37	6	50'-5"	Str.	B2	310	5	56'-9"	Str.	C0	307	5	1'-8"	19B
D1	74	8	37'-2"	Str.	B3	301	5	3'-4"	S10	C1	307	5	1'-4"	Str.
D2	37	8	30'-0"	Str.	C0	307	5	1'-8"	19B	C2	307	5	5'-1"	S11
D3	37	8	26'-0"	Str.	C1	307	5	1'-4"	Str.	D12	12	5	53'-2"	Str.
D4	74	6	41'-9"	Str.	C2	307	5	5'-1"	S11	D13	36	4	52'-6"	Str.
D5	74	8	36'-8"	Str.	D	39	6	50'-5"	Str.					
D6	37	8	25'-0"	Str.	D1	78	8	37'-2"	Str.					
D7	37	8	30'-0"	Str.	D2	37	8	30'-0"	Str.					
D8	37	6	47'-5"	Str.	D3	37	8	26'-0"	Str.					
H1	4	5	4'-3"	Str.	D4	78	6	41'-9"	Str.					
P1	2	5	57'-6"	Str.	D5	78	8	36'-8"	Str.					
P3	10	5	5'-2"	17A	D6	37	8	25'-0"	Str.					
W1	36	5	6'-0"	17B	D7	37	8	30'-0"	Str.					
Z1	116	7	2'-0"	Str.	D8	39	6	47'-5"	Str.					
					D9	1	8	40'-0"	Str.					
					D10	1	8	39'-0"	Str.					
					D11	18	6	52'-9"	Str.					
					D12	12	5	53'-2"	Str.					
					D13	36	4	52'-6"	Str.					
					H1	4	5	4'-3"	Str.					
					P2	2	5	55'-0"	Str.					
					P3	10	5	5'-2"	17A					
					W1	36	5	6'-0"	17B					
					Z1	130	7	2'-0"	Str.					

●, Δ

●, Δ

**BENDING DETAILS**

**NOTES:**

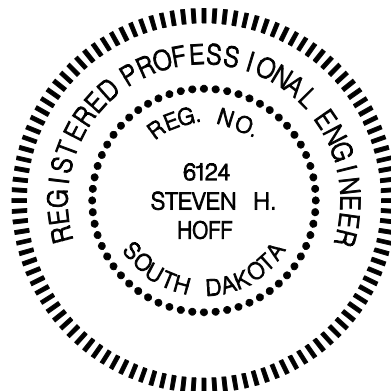
- Bars include Mechanical Rebar Splice, see Sheet No. S-35.
- Δ See Sheet No. S-33 & S-34 for placement of Z1 bars.
- ☆ Drill and epoxy in place. Not included in Epoxy Coated Reinforcing Steel quantity.

All reinforcing shall be epoxy coated.  
All dimensions are out to out.

ESTIMATED SUPERSTRUCTURE QUANTITIES				
ITEM	UNIT	QUANTITY		
		Phase 1	Phase 2	Phase 4
Class A45 Concrete, Bridge Deck	Cu Yd	378.3	512.9	25.7
Epoxy Coated Reinforcing Steel	Lb	54486	62802	3763
No. 5 Rebar Splice	EACH	310	N/A	N/A
No. 7 Rebar Splice	EACH	116	130	N/A
Install Dowel in Concrete *	EACH	N/A	614	614

1. Barrier Curb concrete quantity is 0.0841 Cu.Yds./ft.

\* For information only.



**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

**41ST STREET BRIDGE REPLACEMENT**  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

---

**REVISIONS**

NO.	DATE	BY	REVISIONS

---

**REGISTERED PROFESSIONAL ENGINEER**  
REG. NO. 6124  
STEVEN H. HOFF  
SOUTH DAKOTA

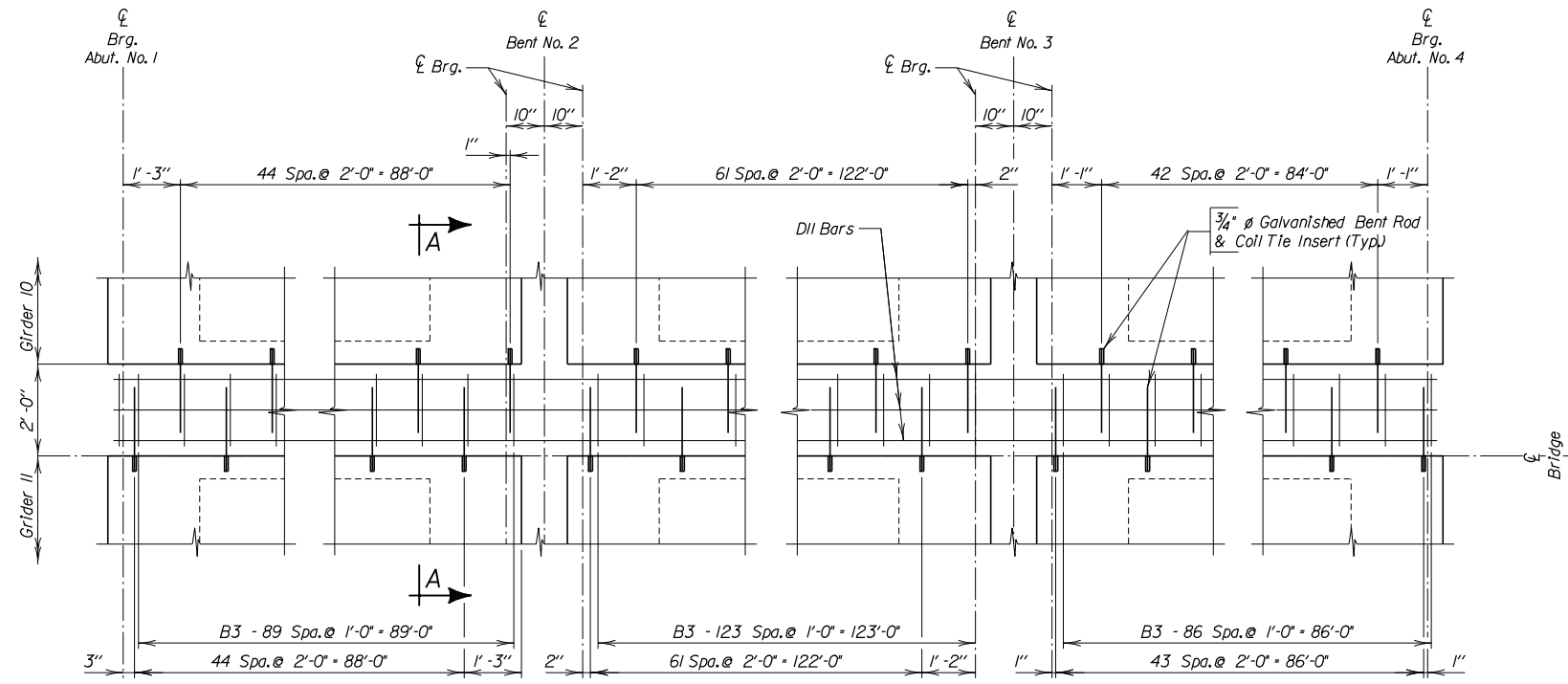
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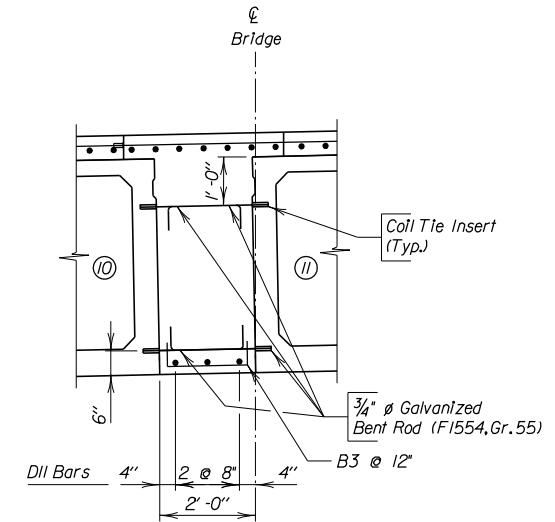
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SHEET NO. **S-28**

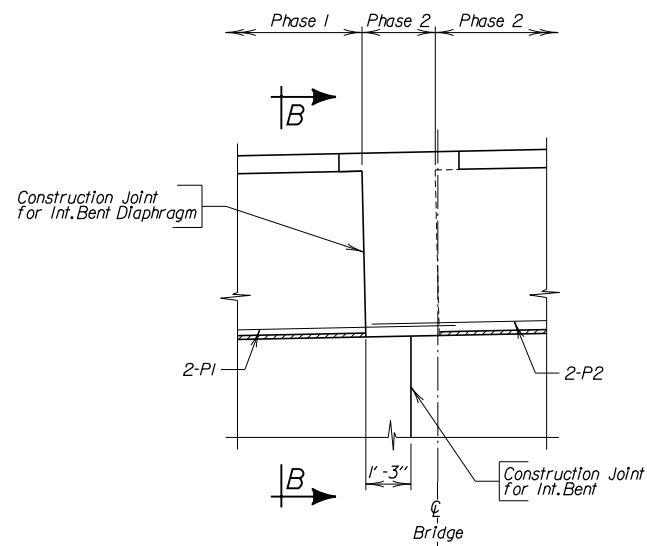
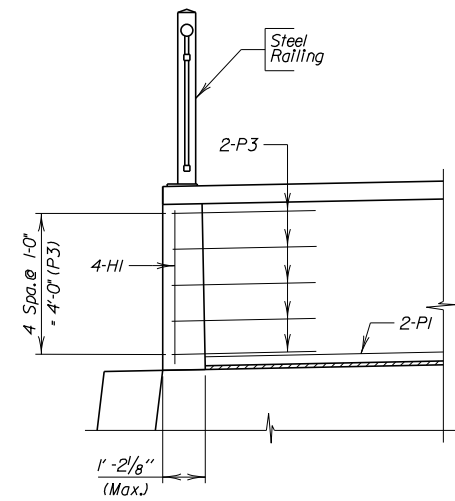
10/28/2009 09:17:00 AM C:\P\working\OMA\0412022\SUPER\_DIAPHR&CLOSUREPOUR.DGN



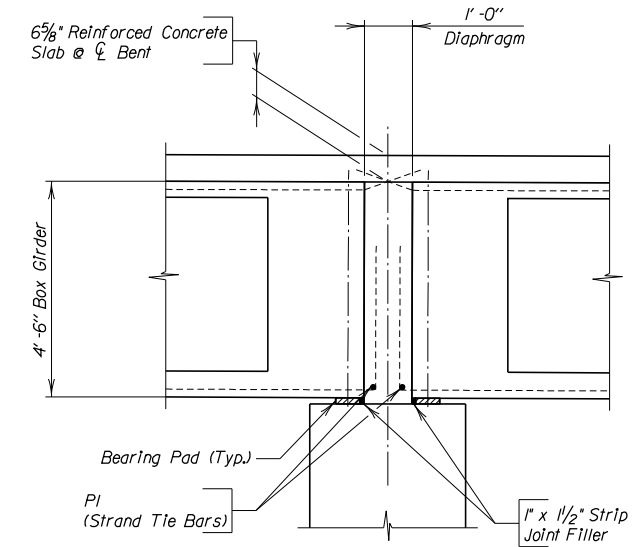
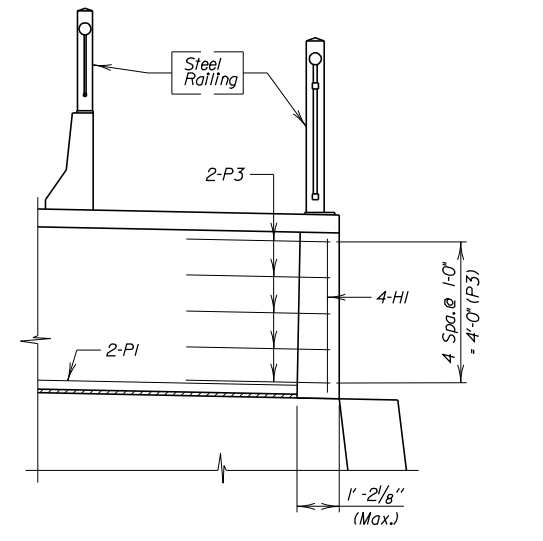
**PART PLAN SHOWING COIL TIE SPACING AT CLOSURE POUR**  
(Deck & Deck Steel not shown for clarity)



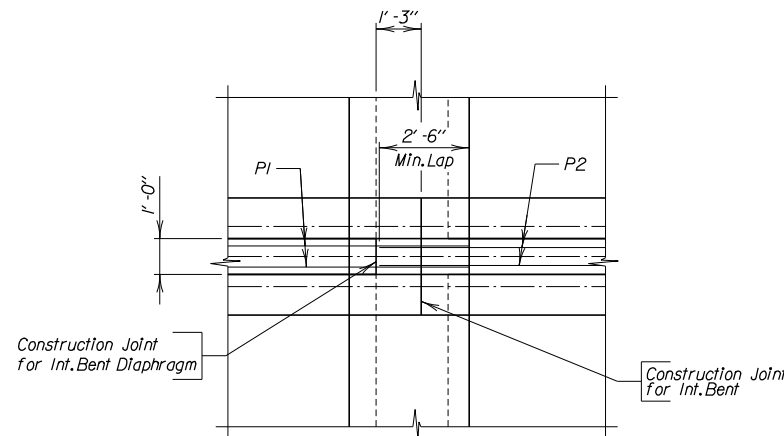
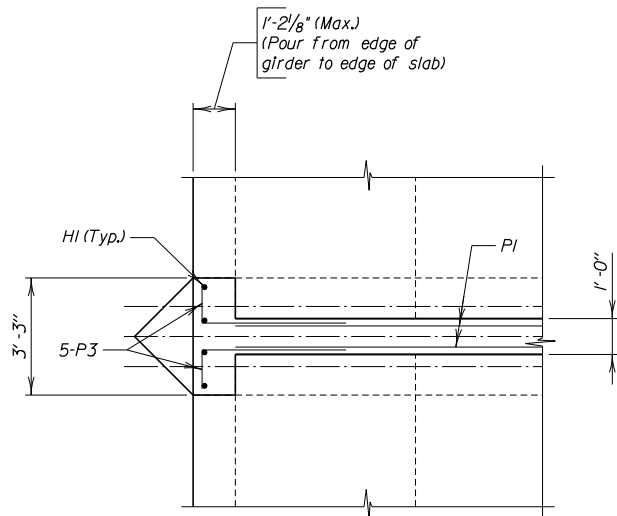
**SECTION A-A**  
(Shift coil ties as required to miss girder reinforcing)



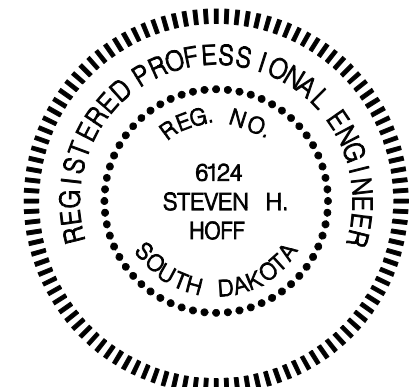
**SECTION THRU INT. DIAPHRAGM**



**SECTION B-B**



**PLAN AT INT. DIAPHRAGM**



**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

**SUPERSTRUCTURE DETAILS (CONTINUED)**

DESIGNED BY: SUPER  
DRAWN BY: SUPER  
CHECKED BY: C. HALL  
DATE: 10/28/2009

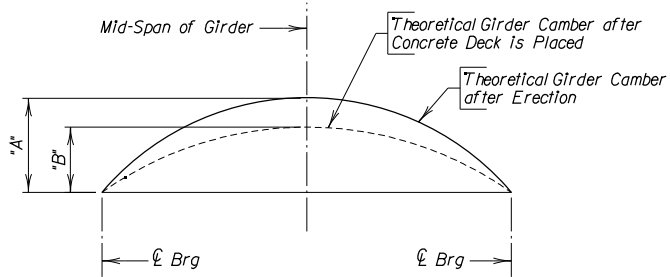
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SHEET NO.

**S-29**

**41ST STREET BRIDGE REPLACEMENT**  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA



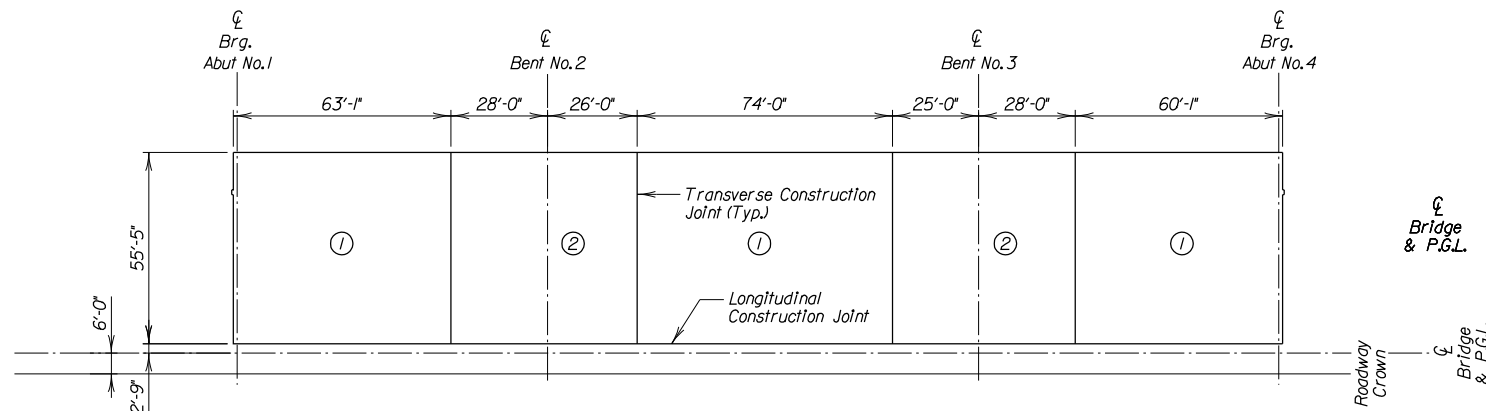
GIRDER CAMBER DIAGRAM

Note:  
Positive Camber indicates upward deflection.  
Calculation of Camber at the following locations -  
0.1 pt. = 0.314 x 0.5 pt.  
0.2 pt. = 0.593 x 0.5 pt.  
0.3 pt. = 0.813 x 0.5 pt.  
0.4 pt. = 0.952 x 0.5 pt.

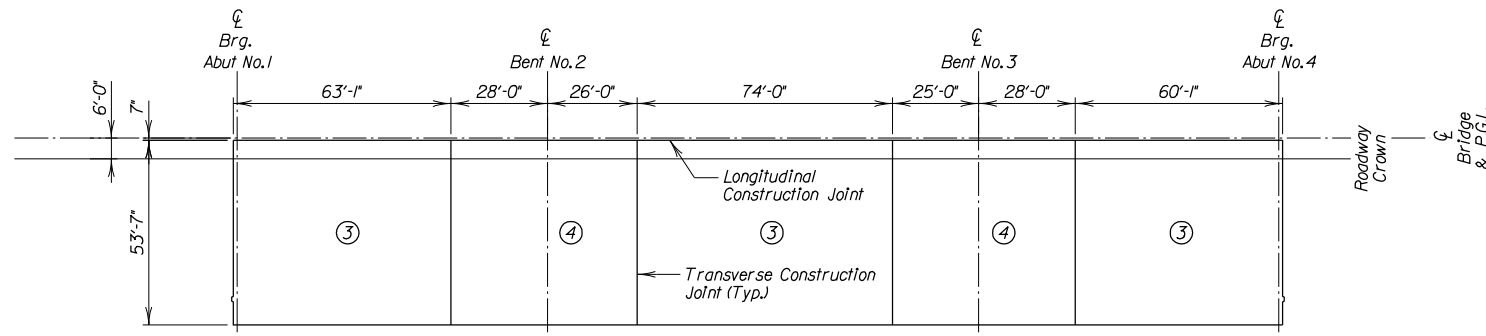
	Span No. 1		Span No. 2		Span No. 3	
	*A*	*B*	*A*	*B*	*A*	*B*
PHASE 1						
Girder No. 1	1/2"	1/4"	1 3/4"	7/8"	5/8"	3/8"
Girder Nos. 2, 3, 4 & 5	1/2"	1/4"	1 3/4"	1"	5/8"	3/8"
Girder Nos. 6 & 7	5/8"	3/8"	2"	1 1/8"	1/2"	3/8"
Girder No. 8 *	5/8"	3/8"	2"	1"	1/2"	1/4"
Girder No. 9 *	5/8"	1/4"	2"	3/4"	1/2"	1/4"
Girder No. 10 *	5/8"	1/8"	2"	3/8"	1/2"	1/8"
PHASE 2						
Girder No. 11 *	5/8"	1/8"	2"	3/8"	1/2"	1/8"
Girder No. 12 *	5/8"	1/4"	2"	3/4"	1/2"	1/4"
Girder No. 13 *	5/8"	3/8"	2"	1"	1/2"	1/4"
Girder No. 14, 15, 16, 17 & 18	5/8"	3/8"	2"	1 1/8"	1/2"	3/8"
Girder No. 19	1/2"	1/4"	1 3/4"	7/8"	5/8"	3/8"

\* - Includes Closure Pour Deflections in "B".

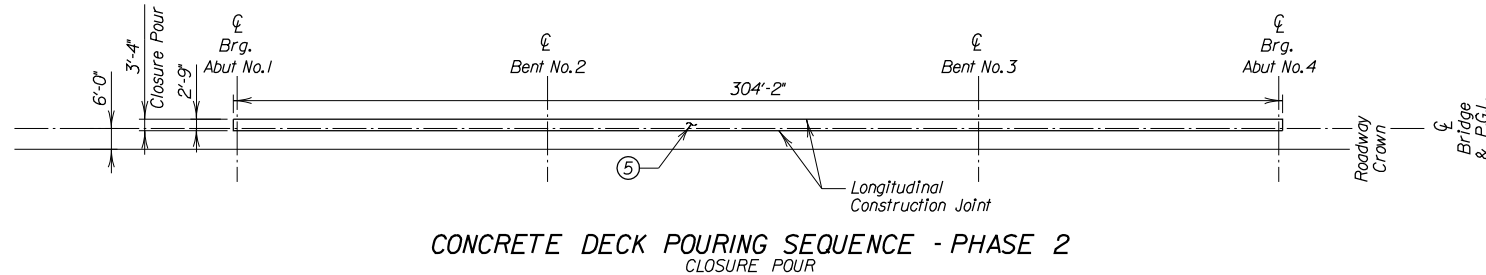
	Span No. 1		Span No. 2		Span No. 3	
	*A*	*B*	*A*	*B*	*A*	*B*
PHASE 1						
Girder No. 1	5/2"	6/2"	7 1/4"	7 1/8"	8 1/4"	8 1/8"
Girder Nos. 2, 3, 4 & 5	5/2"	6 1/2"	7 1/4"	7 1/8"	8 1/4"	8 1/8"
Girder Nos. 6 & 7	5/2"	6 1/2"	7 1/4"	7 1/8"	8 1/4"	8 1/8"
Girder No. 8 **	5/2"	6 1/2"	7 1/4"	7 1/8"	8 1/4"	8 1/8"
Girder No. 9 **	5/2"	6 1/2"	7 1/4"	7 1/8"	8 1/4"	8 1/8"
Girder No. 10 **	5/2"	6 1/2"	7 1/4"	7 1/8"	8 1/4"	8 1/8"
PHASE 2						
Girder No. 11 **	5/2"	6 1/2"	7 1/4"	7 1/8"	8 1/4"	8 1/8"
Girder No. 12 **	5/2"	6 1/2"	7 1/4"	7 1/8"	8 1/4"	8 1/8"
Girder No. 13 **	5/2"	6 1/2"	7 1/4"	7 1/8"	8 1/4"	8 1/8"
Girder No. 14, 15, 16, 17 & 18	5/2"	6 1/2"	7 1/4"	7 1/8"	8 1/4"	8 1/8"
Girder No. 19	5/2"	6 1/2"	7 1/4"	7 1/8"	8 1/4"	8 1/8"



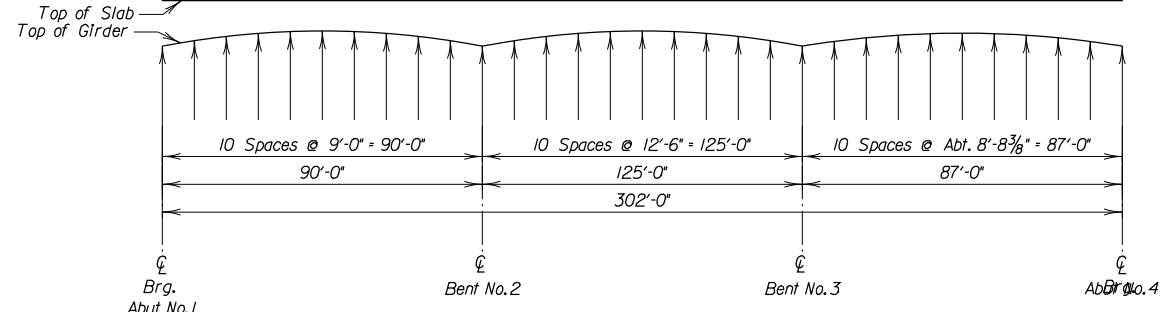
CONCRETE DECK POURING SEQUENCE - PHASE 1



CONCRETE DECK POURING SEQUENCE - PHASE 2



CONCRETE DECK POURING SEQUENCE - PHASE 2 CLOSURE POUR



THEORETICAL CONCRETE DECK DIAGRAM

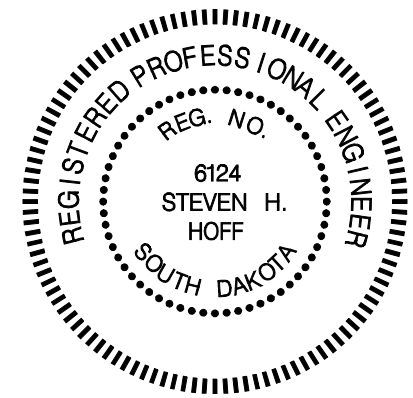
\*\* - Includes Estimated Deck Thickness Variation Due to Closure Pour.

Note:  
Phase 1: All ① sections shall be poured first.  
Then any ② sections may be poured.

Note:  
Phase 2: All ③ sections shall be poured first.  
Then any ④ sections may be poured.

Note:  
Phase 2: Section ⑤ shall be poured continuously from end to end.

Note:  
1. For Girder Layout and Typical Section, see Sheet No. S-15.



HDR PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

GIRDER ERECTION DATA

DESIGNED BY: C. HANOFF  
DRAWN BY: J. SUPERS  
CHECKED BY: C. HALL  
REVISIONS:

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SHEET NO.

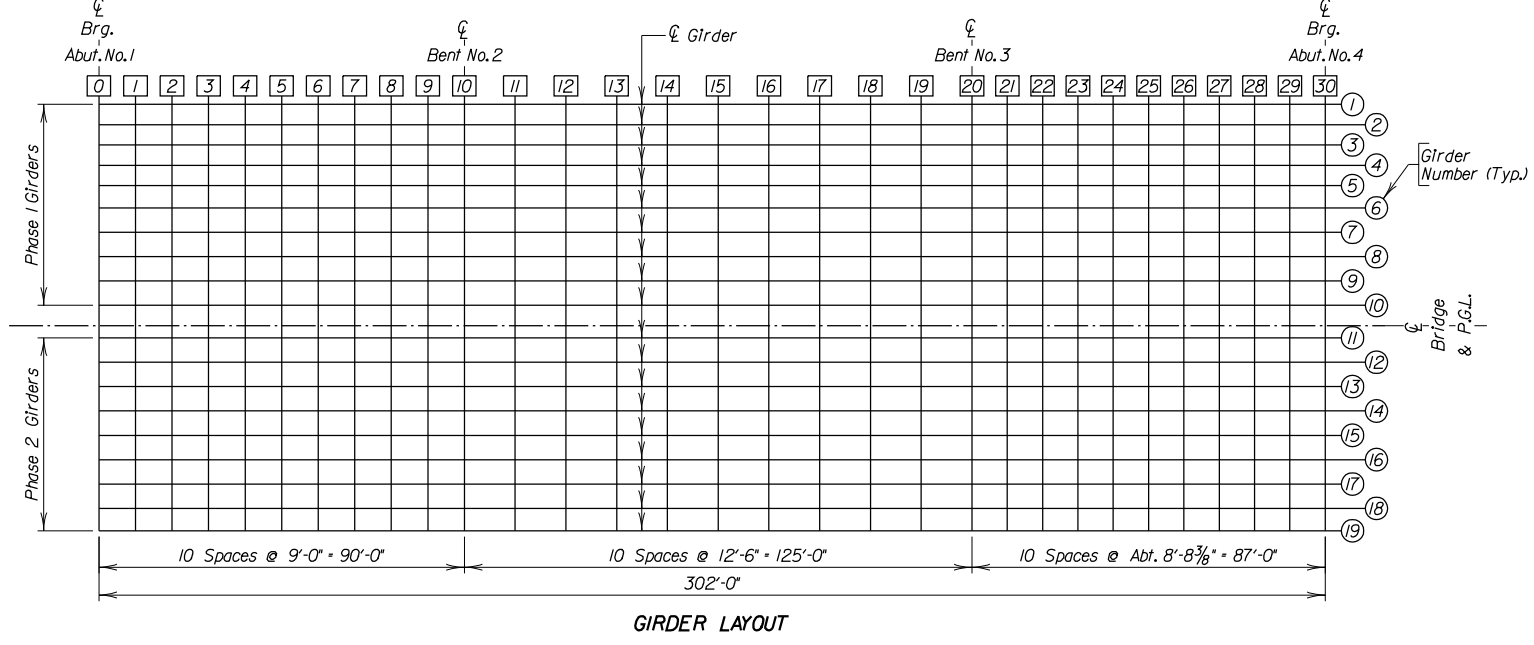
S-30

41ST STREET BRIDGE REPLACEMENT  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

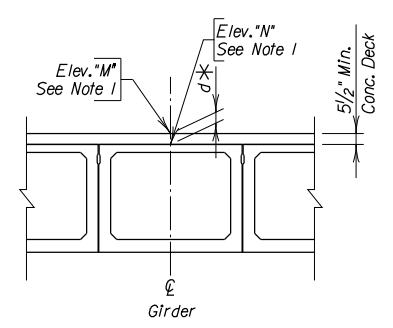
10/28/2009 awright C:\P\working\OMA\0412022\SLAB\_FORM\_ELEVATIONS.dgn

TABLE OF SLAB FORM ELEVATIONS & CALCULATIONS

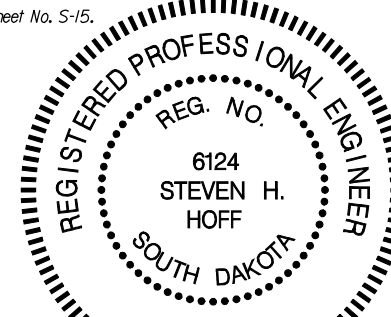
Table with 30 columns (0-30) and multiple rows for Phase 1 and Phase 2 girders, listing elevations in feet and inches (Elev. "M") and elevations at the top of the slab (Elev. "N").



\* If during construction, it is found that this dimension is less than 5/2", corrective measures must be taken as approved by the Engineer.



- Notes:
1. The TABLE OF SLAB FORM ELEVATIONS & COMPUTATIONS contains the necessary information to determine the depth of concrete, in feet, over the girders at the points shown. All calculations can be carried out in the space provided. Elev. "M" is theoretical top of slab elevation before any concrete has been poured. Elev. "N" is a field measured elevation taken on top of girders at points shown. This elevation must be taken after erection is complete, but prior to placing any of the slab concrete.
2. For Girder Layout and Typical Section, see Sheet No. S-15.
3. For Erection Data see Sheet No. S-30.

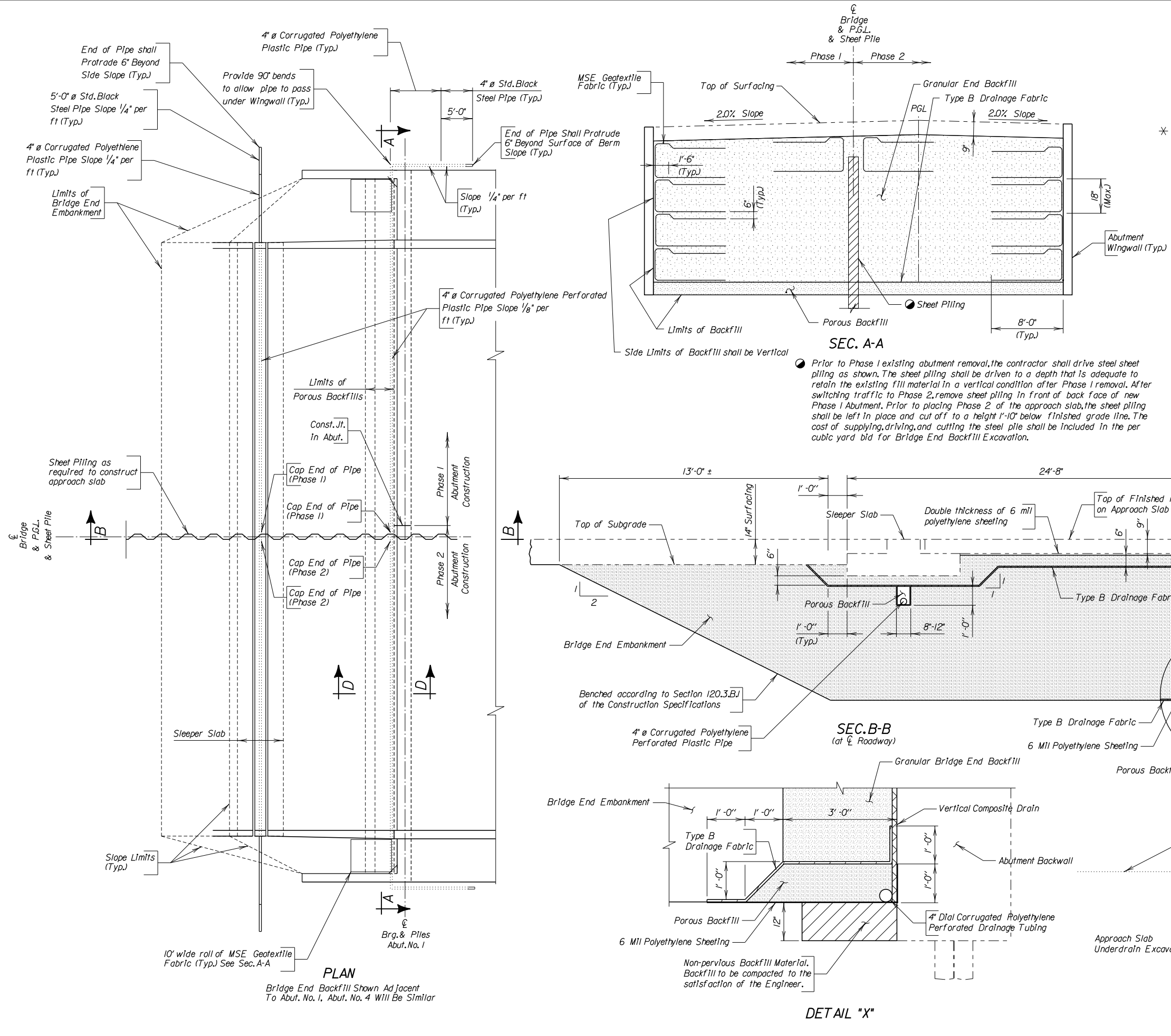


HDR PLANS BY: HDR, INC. SIOUX FALLS, S.D.

41ST STREET BRIDGE REPLACEMENT OVER THE BIG SIOUX RIVER SIOUX FALLS, SOUTH DAKOTA
SLAB FORM ELEVATIONS
REGISTERED BY: C. HANOFF DATE: 10/28/2009
CHECKED BY: C. HALL
CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!
SHEET NO. S-31



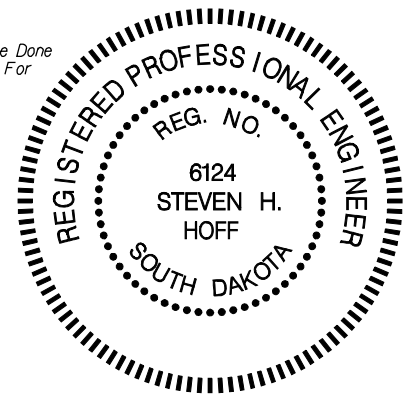
10/28/2009 AWRIGHT C:\PWORKING\QMA\0412022\BRIDGE\_BACKFILL.DGN



ESTIMATED QUANTITIES (For 2 Abutments)			
ITEM	UNIT	QUANTITY	
		PHASE 1	PHASE 2
Bridge End Backfill Excavation	CuYd	692	659
Granular Bridge End Backfill	CuYd	120	115
Bridge End Embankment	CuYd	740	700
Bridge End Underdrain Pipe	Ft	146	142
Porous Backfill	Ton	34	32
Approach Slab Underdrain Excavation	CuYd	6	6
Precast Concrete Headwall for Drain	Each	4	4

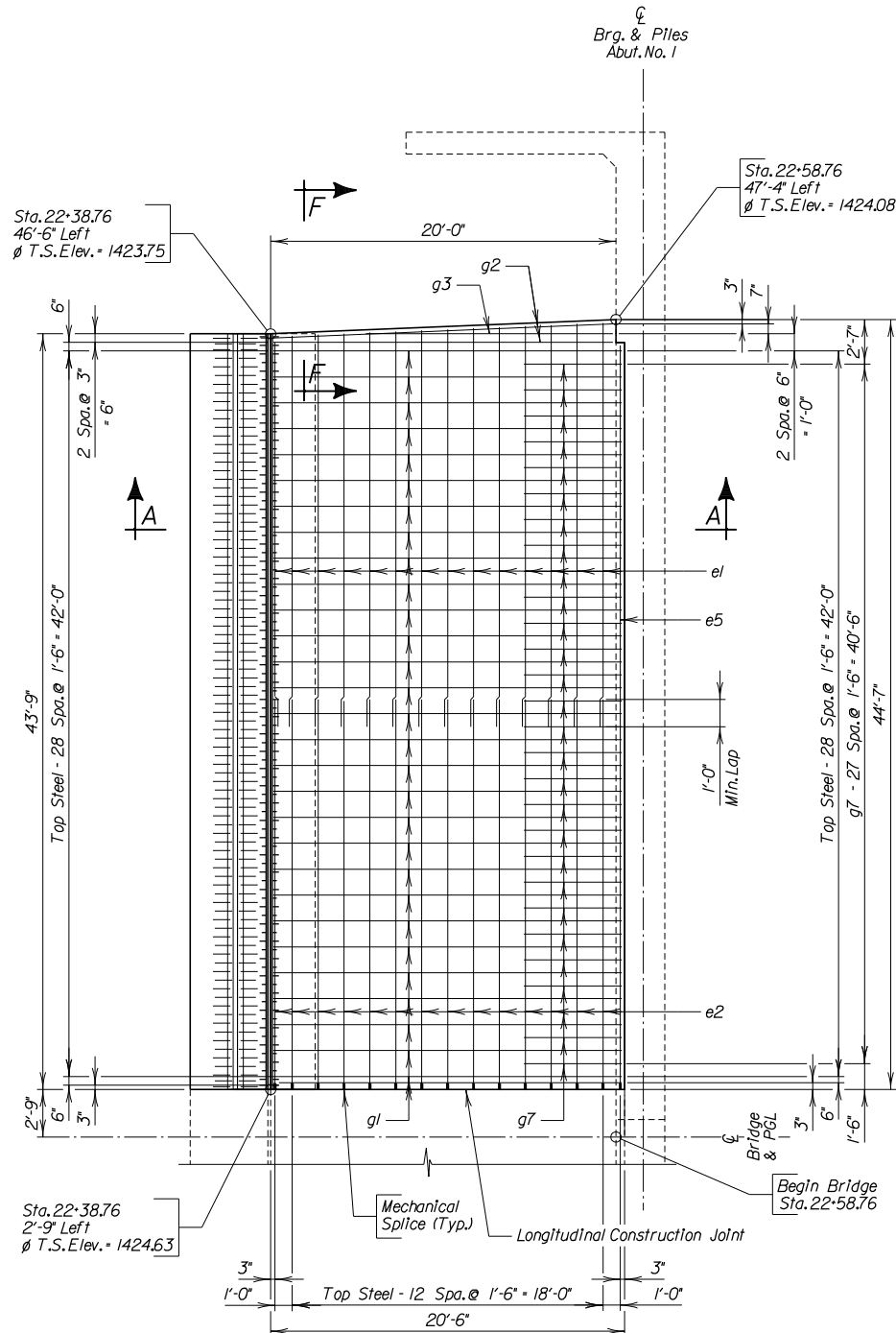
ITEM	UNIT	QUANTITY	
		PHASE 1	PHASE 2
6 mil Polyethylene Sheeting (not including laps)	SqFt	285	265
Type B Drainage Fabric	SqYd	375	355
MSE Geotextile Fabric	SqYd	195	195
Vertical Composite Drain	SqFt	785	750
4" Corrugated Polyethylene Perforated Drainage Tubing	Ft	106	102
4" Corrugated Polyethylene Drainage Tubing	Ft	30	30
4" Std. Black Steel Pipe	Ft	10	10

☆ Quantity based on 1'-0" deep x 1'-0" wide trench.  
 For estimating purposes only, a factor of 1.90 tons/cu.yd. was used to convert Cu. Yds. to Tons.  
 △ Porous backfill shall conform to Section 680.2A of the Construction Specifications.  
 ✱ The Cost of providing and installing this item is considered subsidiary to Granular Bridge End Backfill. Bridge End Backfill Excavation will not be measured. Plans quantity payment will be full compensation for this item.  
 † Items are subsidiary to Granular Bridge End Backfill.  
 ‡ Items are subsidiary to Bridge End Backfill Excavation.

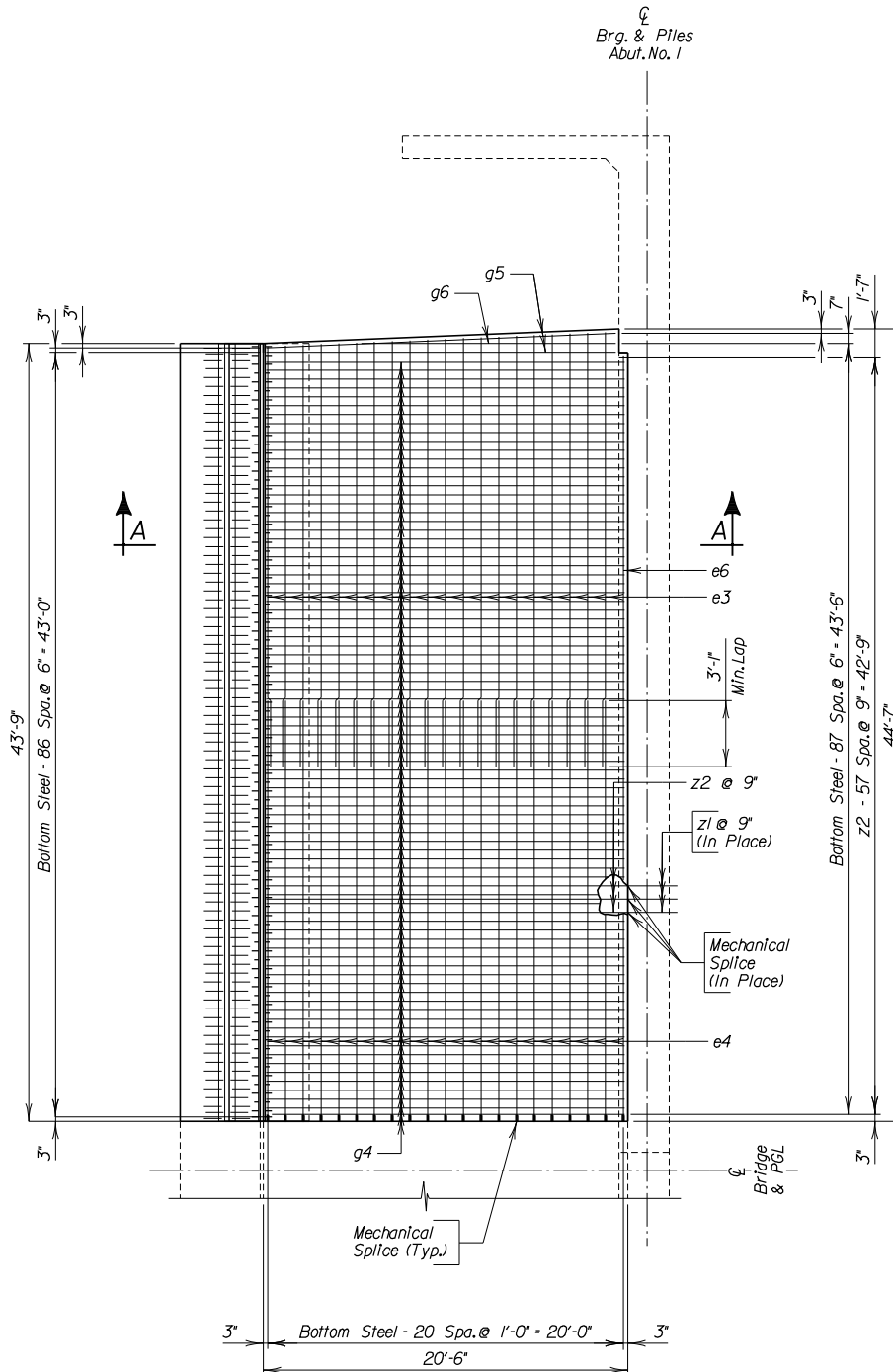


**HDR** PLANS BY:  
 HDR, INC.  
 SIOUX FALLS, S.D.

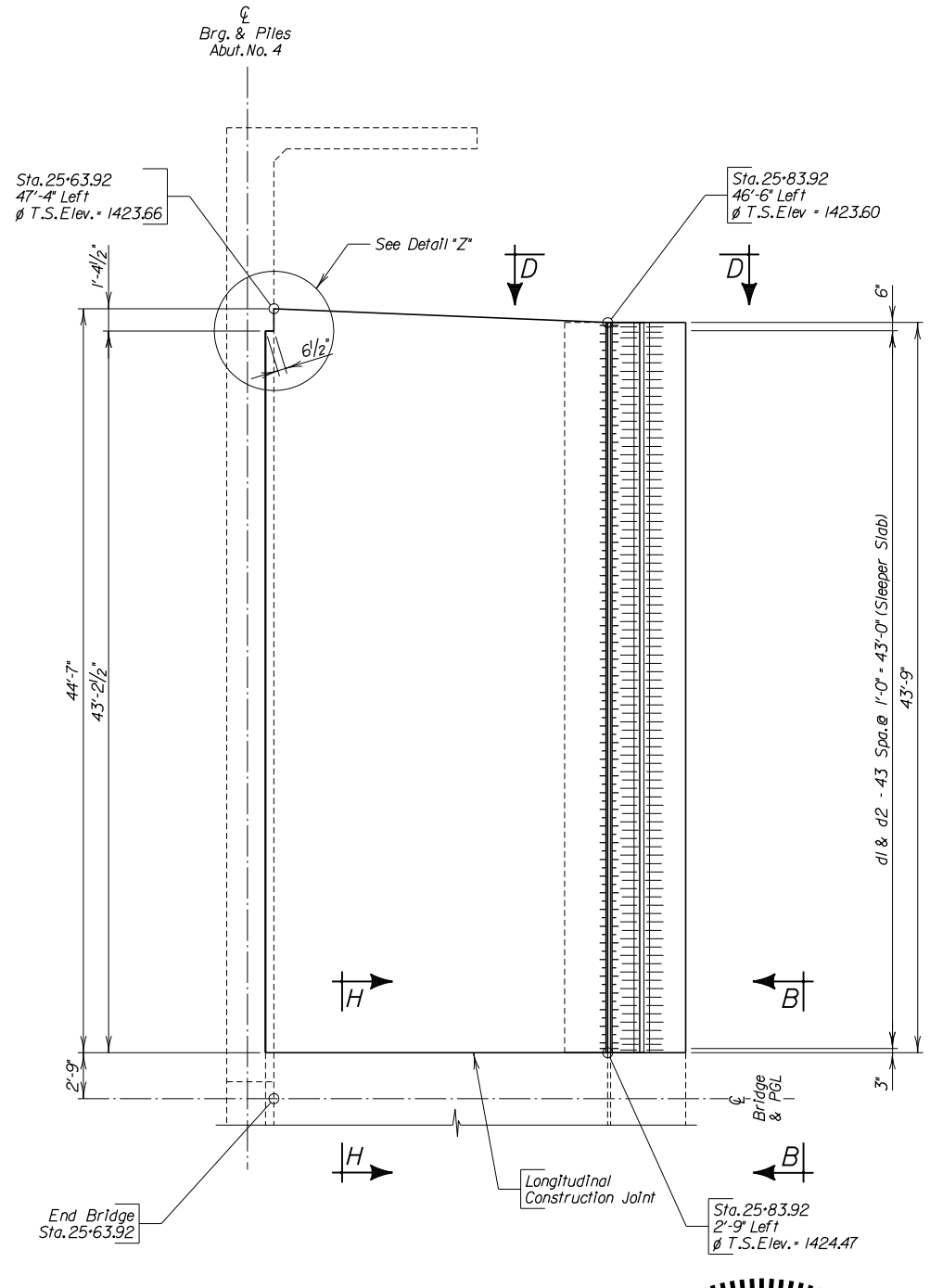
10/28/2009 awright C:\PWworking\OMA\0412022\PHASE1\_APPROACH\_DETAILS.DGN



PHASE I - TOP STEEL  
PLAN ABUTMENT NO.1



PHASE I - BOTTOM STEEL  
PLAN ABUTMENT NO.1



PHASE I  
PLAN ABUTMENT NO.4

Notes:

1. For Abutment Details, see Sheet Nos. S-8 to S-11.
2. For Superstructure Details, see Sheet Nos. S-24 to S-29.
3. For Approach Slab Barrier Details, see Sheet No. S-36.
4. For Strip Seal Details, see Sheet No. S-37.
5. For Compression Seal Details, see Sheet No. S-38.



**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

**41ST STREET BRIDGE REPLACEMENT  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA**

**APPROACH SLAB DETAILS**

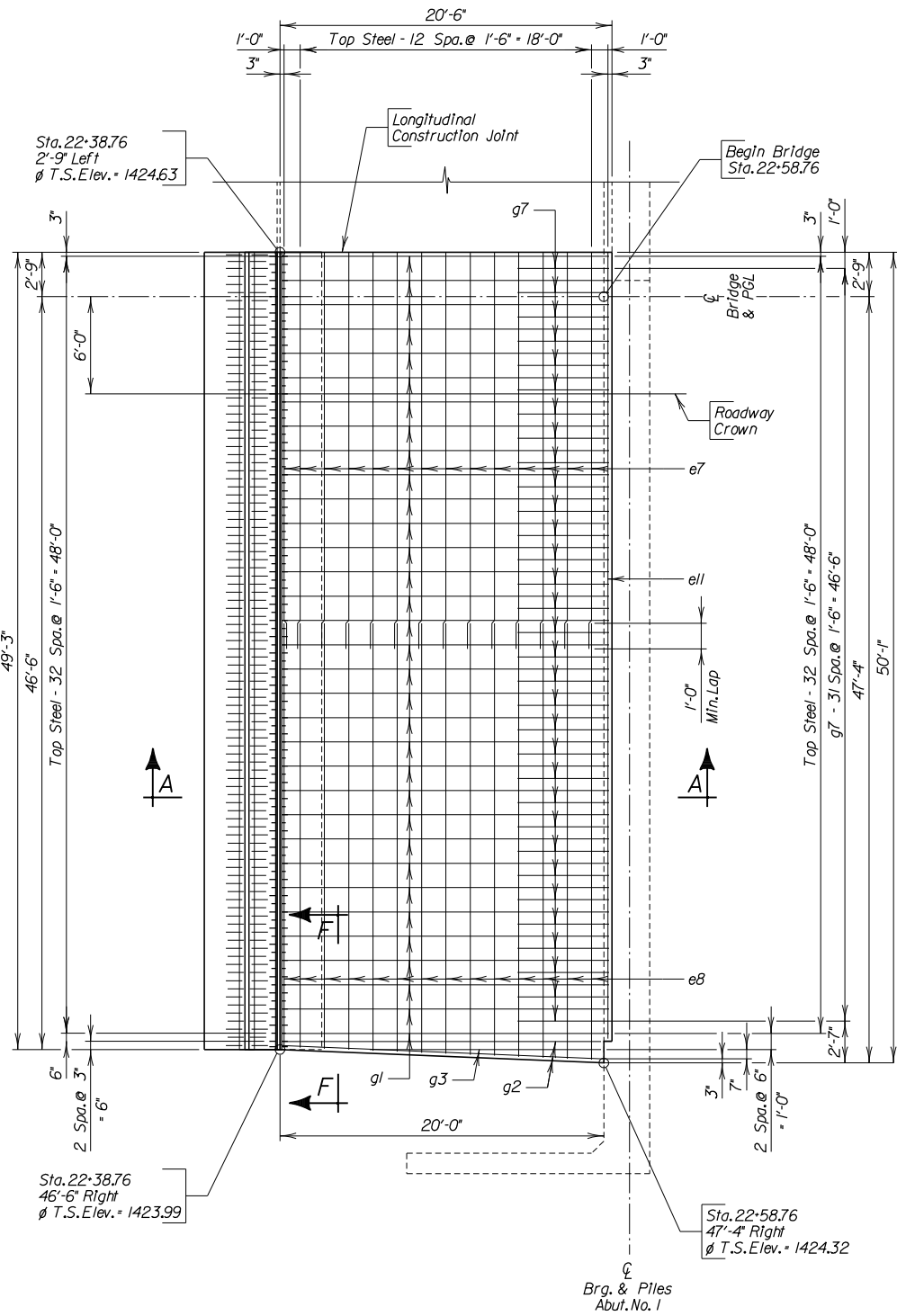
DESIGNED BY: D. SCHEITLER  
DRAWN BY: T. SUPERS  
CHECKED BY: C. HALL  
REVISIONS:  
DATE: 10/28/2009  
BY: DATE:

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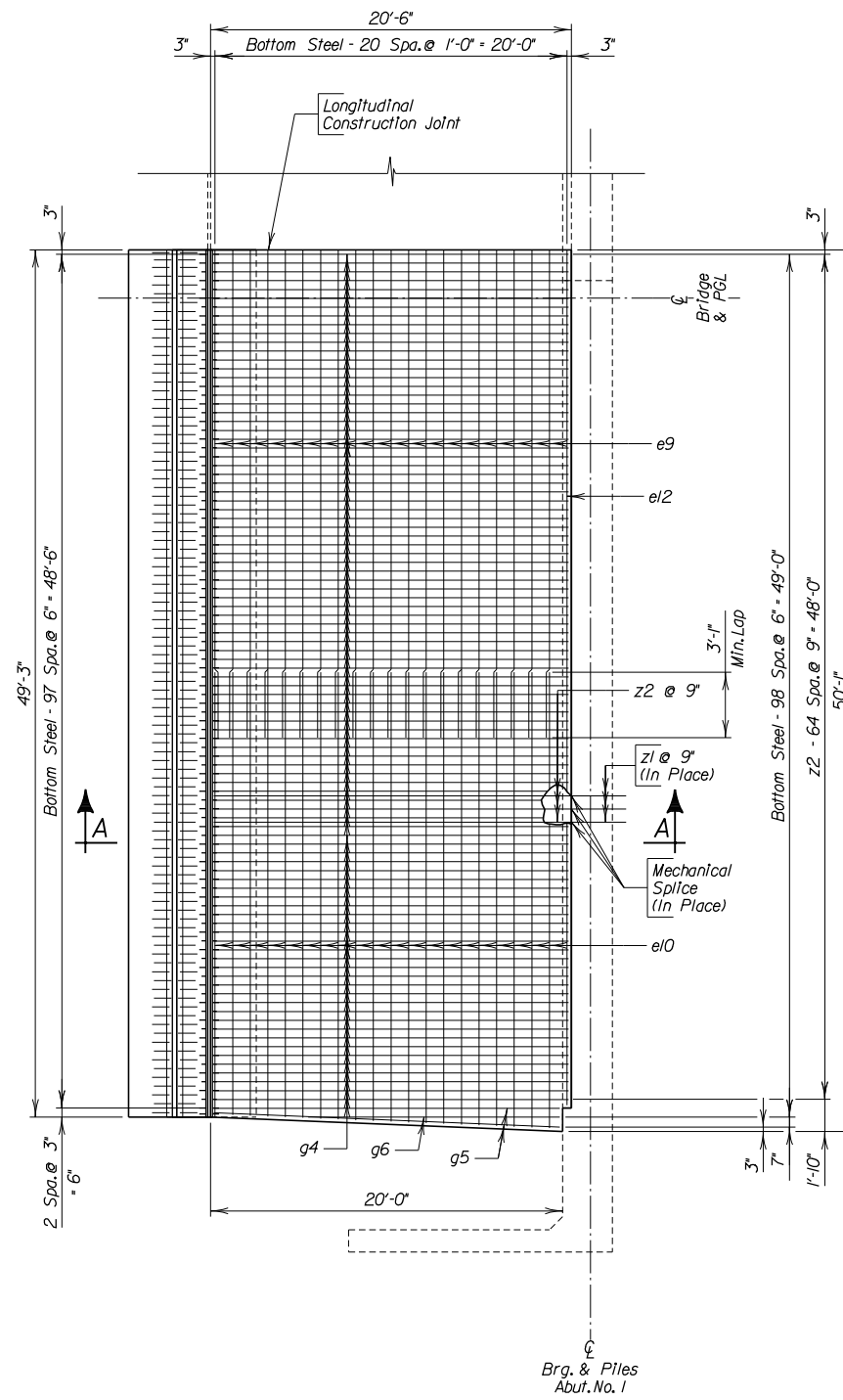
SHEET NO.

**S-33**

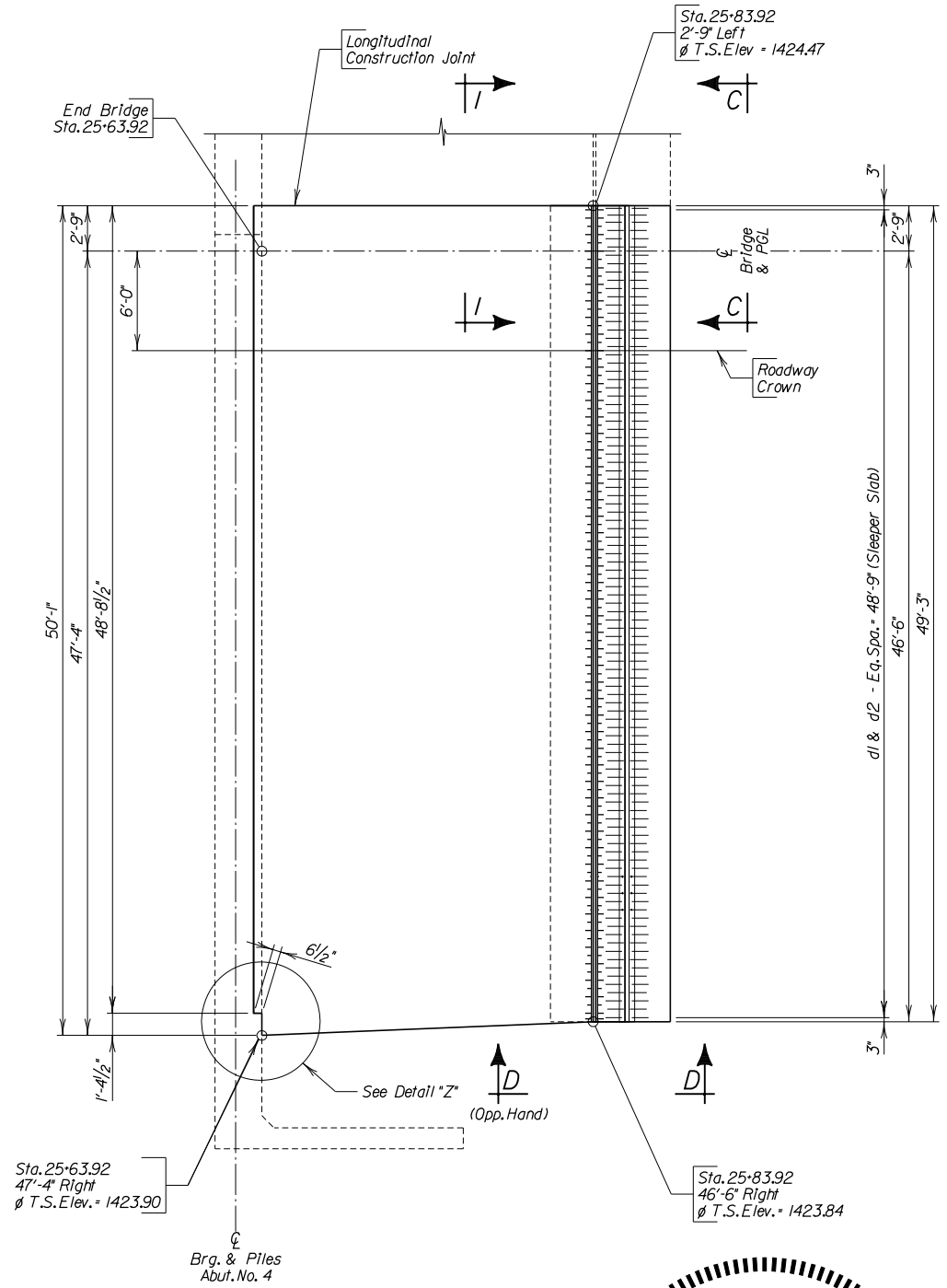
10/28/2009 awright C:\Pwworking\OMA\0412022\PHASE2\_APPROACH\_DETAILS.DGN



PHASE 2 - TOP STEEL  
PLAN ABUTMENT NO.1



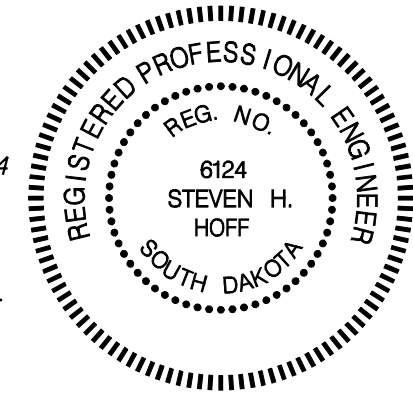
PHASE 2 - BOTTOM STEEL  
PLAN ABUTMENT NO.1



PHASE 2  
PLAN ABUTMENT NO.4

Notes:

1. For Abutment Details, see Sheet Nos. S-8 to S-11.
2. For Superstructure Details, see Sheet Nos. S-24 to S-29.
3. For Approach Slab Barrier Details, see Sheet No. S-36.
4. For Strip Seal Details, see Sheet No. S-37.
5. For Compression Seal Details, see Sheet No. S-38.



**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

APPROACH SLAB DETAILS (CONTINUED)

DESIGNED BY: C. HALL  
DRAWN BY: SUPERS  
CHECKED BY: C. HALL  
DATE: 10/28/2009

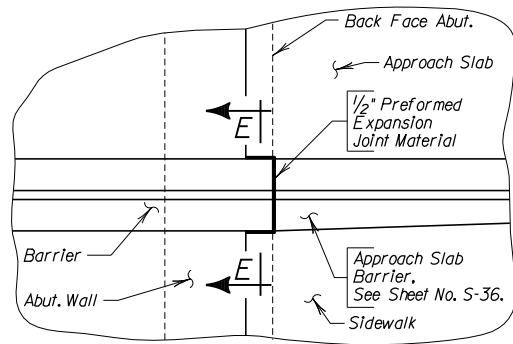
**CITY OF SIOUX FALLS  
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SHEET NO.

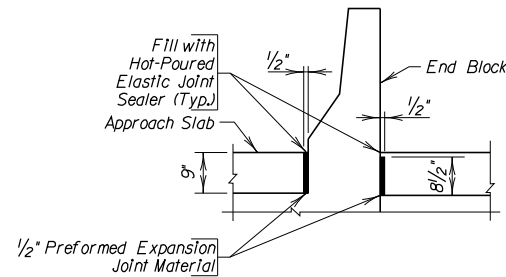
**S-34**

**41ST STREET BRIDGE REPLACEMENT  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA**

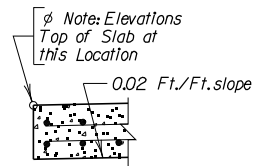
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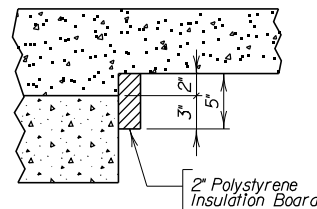
PLAN DETAIL "Z"



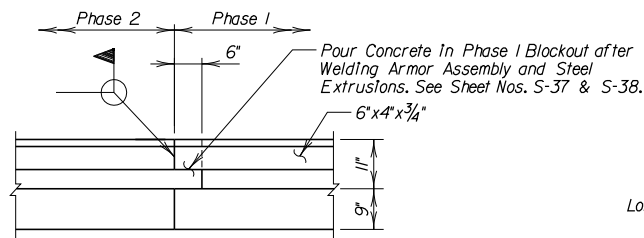
SEC. E-E



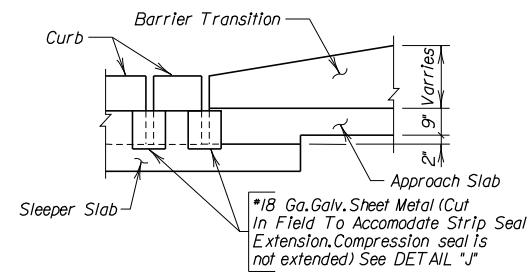
SEC. F-F



DETAIL "Z"



VIEW C-C



VIEW D-D  
(Phase 2 - Opposite Hand)

(Phase 2 - Opposite Hand)

(Phase 2 - Opposite Hand)

(Phase 2 - Opposite Hand)

(Phase 2 - Opposite Hand)

(Phase 2 - Opposite Hand)

(Phase 2 - Opposite Hand)

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(Phase 2 - Opposite Hand)

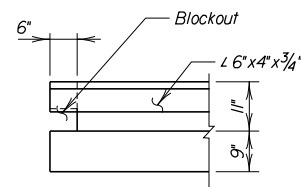
(Phase 2 - Opposite Hand)

(Phase 2 - Opposite Hand)

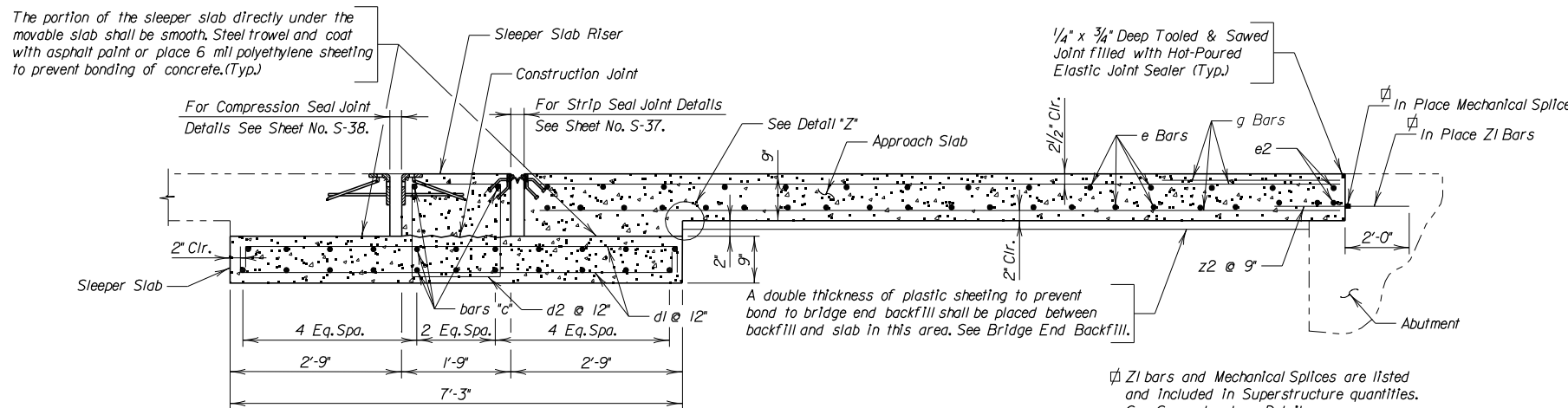
(Phase 2 - Opposite Hand)

(Phase 2 - Opposite Hand)

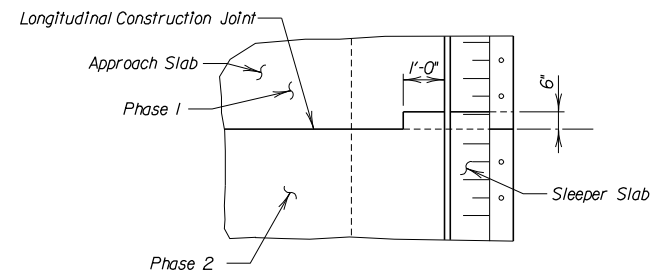
(Phase 2 - Opposite Hand)



VIEW B-B

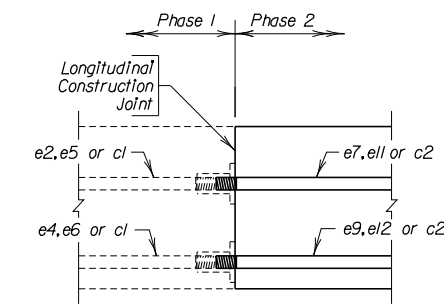


SECTION A-A

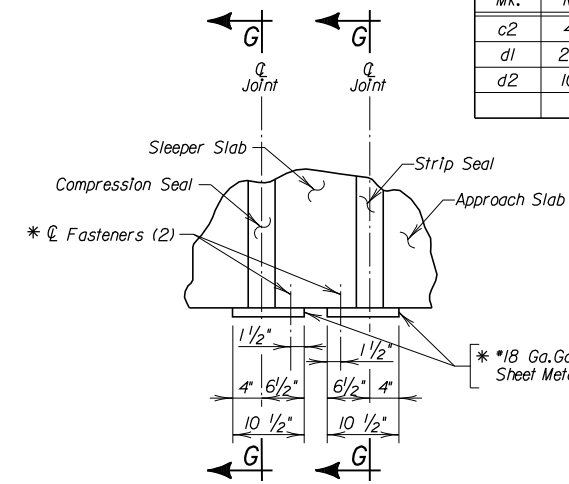


BLOCK OUT DETAIL

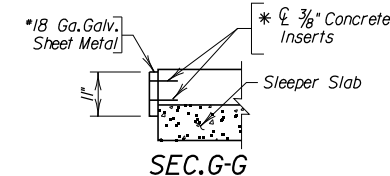
(see notes on Sheet Nos. S-37 & S-38)



SEC. I-I



PLAN - DETAIL "J"



SEC. G-G

\* Attach \*18 gage galvanized sheet metal to Sleeper Slab only after slab has been poured. Install prior to sidewalk construction. Use fasteners that will not spall concrete as approved by the Engineer.

REINFORCING SCHEDULE- STAGE 1

PHASE 1					Bending Details
Mk.	No.	Size	Length	Type	
TWO APPROACH SLABS					
e1	28	4	23'-1"	Str.	
e2	28	4	22'-5"	Str.	
e3	40	6	24'-1"	Str.	
e4	40	6	23'-5"	Str.	
e5	2	4	43'-1"	Str.	
e6	2	6	43'-1"	Str.	
g1	60	4	20'-2"	Str.	
g2	4	4	19'-7"	Str.	
g3	2	4	13'-9"	Str.	
g4	172	8	20'-2"	Str.	
g5	4	8	19'-7"	Str.	
g6	2	8	13'-9"	Str.	
g7	56	4	6'-0"	Str.	
z2	116	7	2'-0"	Str.	
TWO SLEEPER SLABS					
c1	48	5	43'-7"	Str.	
d1	176	4	7'-9"	T2	
d2	88	4	6'-3"	T2	
PHASE 2					
TWO APPROACH SLABS					
Mk.	No.	Size	Length	Type	
e7	28	4	25'-2"	Str.	
e8	28	4	25'-10"	Str.	
e9	40	6	26'-2"	Str.	
e10	40	6	26'-10"	Str.	
e11	2	4	48'-7"	Str.	
e12	2	6	48'-7"	Str.	
g1	66	4	20'-2"	Str.	
g2	4	4	19'-7"	Str.	
g3	2	4	13'-9"	Str.	
g4	194	8	20'-2"	Str.	
g5	4	8	19'-7"	Str.	
g6	2	8	13'-9"	Str.	
g7	64	4	6'-0"	Str.	
z2	130	7	2'-0"	Str.	
TWO SLEEPER SLABS					
Mk.	No.	Size	Length	Type	
c2	48	5	49'-1"	Str.	
d1	200	4	7'-9"	T2	
d2	100	4	6'-3"	T2	

NOTES:  
 • Bars Include Mechanical Rebar Splicer, see Section H-H and I-I, this sheet.  
 All Dimensions are Out to Out of Bar.  
 All Bars to be Epoxy Coated.



HDR PLANS BY:  
 HDR, INC.  
 SIOUX FALLS, S.D.

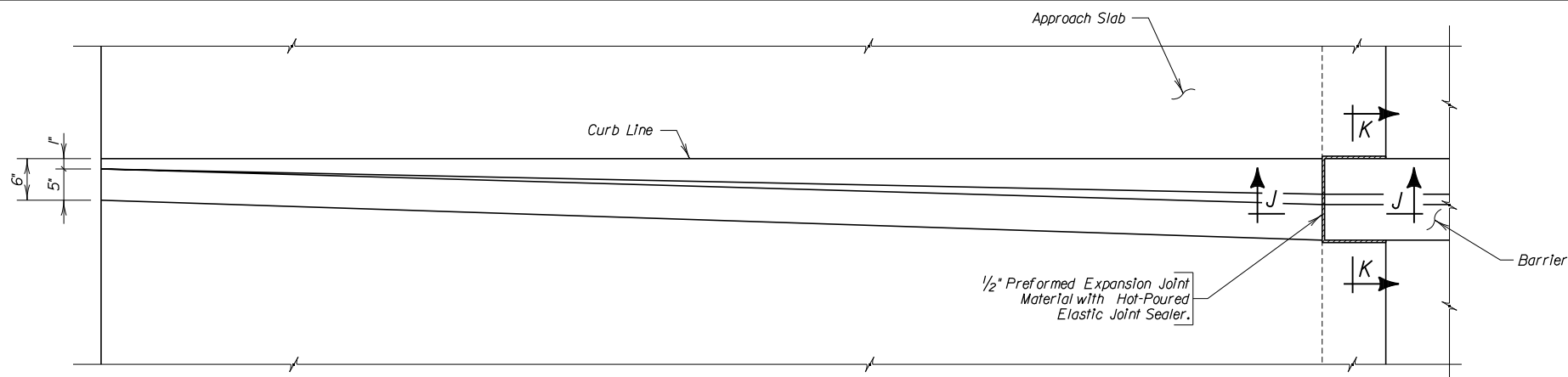
41ST STREET BRIDGE REPLACEMENT  
 OVER THE BIG SIOUX RIVER  
 SIOUX FALLS, SOUTH DAKOTA

APPROACH SLAB DETAILS (CONTINUED)  
 DESIGNED BY: DR. R. L. LUTHEGGER  
 DRAWN BY: SUPREMACY  
 CHECKED BY: C. HALL  
 REVISIONS:  
 DATE: 10/28/2009  
 BY: DATE:

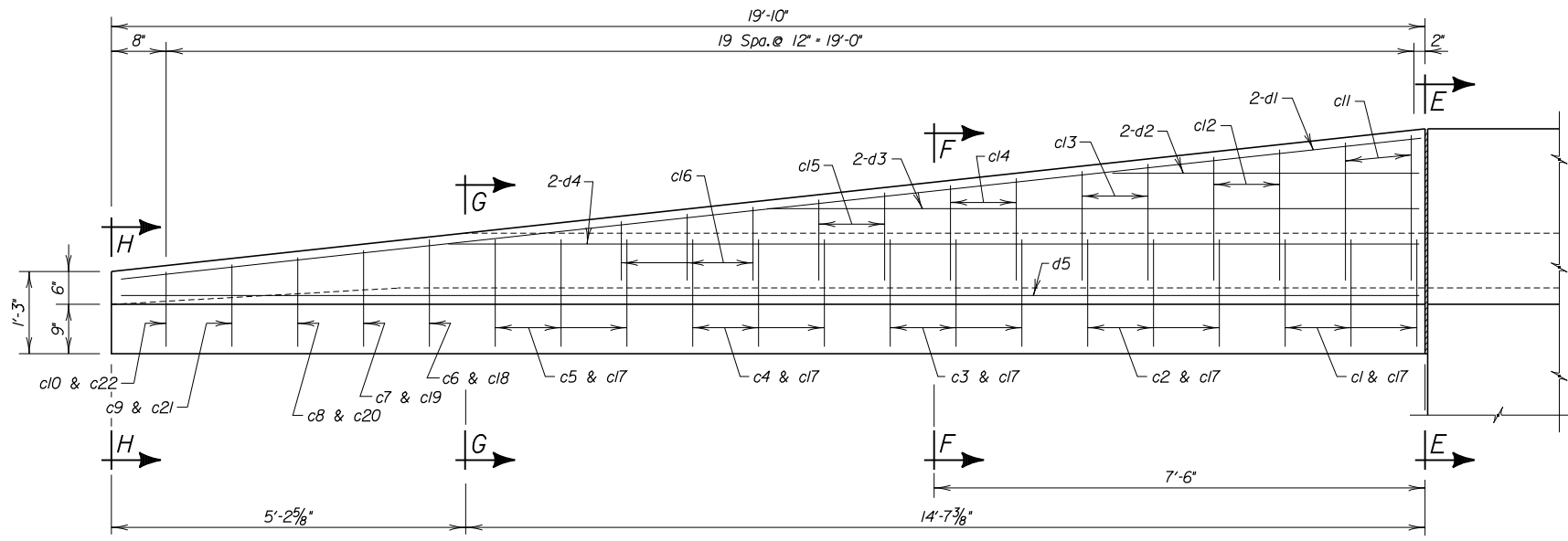
CITY OF SIOUX FALLS  
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SHEET NO.  
**S-35**

10/28/2009 awright C:\Pwworking\OMA\0412022\APPROACH\_BARRIER.dgn

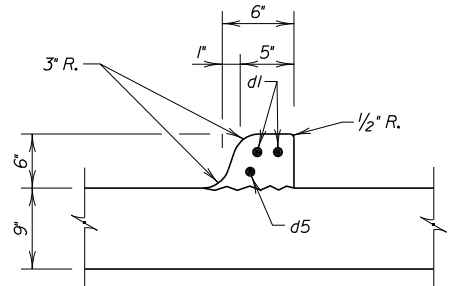


PLAN  
(Typ. Barrier Taper)

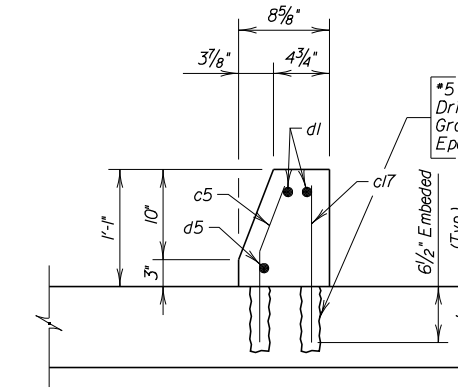


ELEVATION

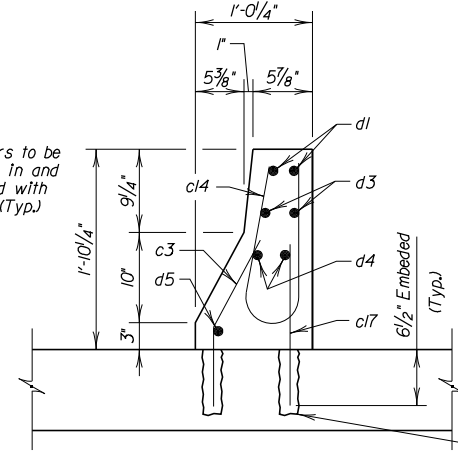
NOTE:  
This sheet is to be used in conjunction with Sheet Nos. S-33, S-34 & S-35.



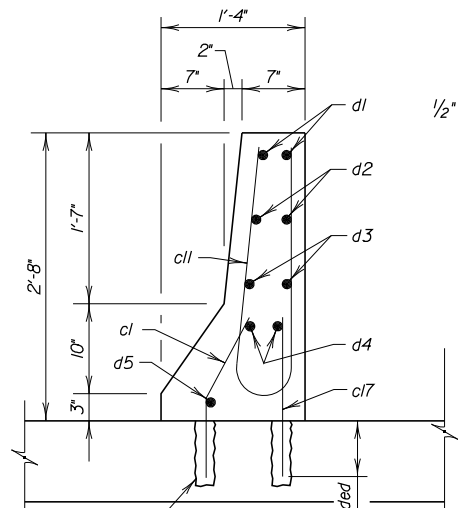
SEC. H-H



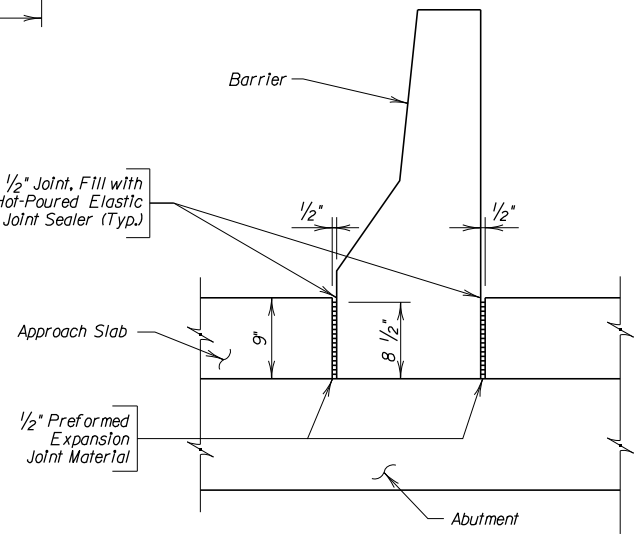
SEC. G-G



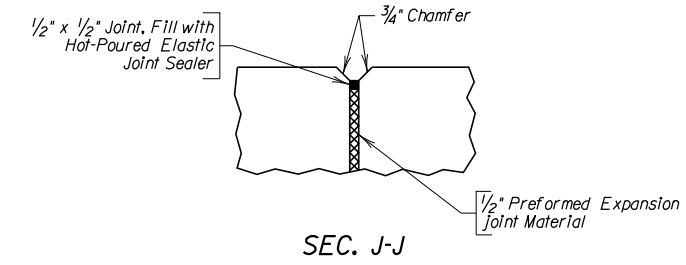
SEC. F-F



SEC. E-E



SEC. K-K



SEC. J-J

REINFORCING SCHEDULE				
4 Tapered Barrier Curbs				
Mk.	No.	Size	Length	Type
c1	12	5	1'-8"	19B
c2	12	5	1'-8"	19B
c3	12	5	1'-7"	19B
c4	12	5	1'-7"	19B
c5	12	5	1'-7"	19B
c6	4	5	1'-5"	19B
c7	4	5	1'-3"	19B
c8	4	5	1'-2"	19B
c9	4	5	1'-1"	19B
c10	4	5	11"	19B
c11	8	5	4'-10"	SII
c12	8	5	4'-5"	SII
c13	8	5	4'-0"	SII
c14	8	5	3'-6"	SII
c15	8	5	3'-1"	SII
c16	12	5	2'-7"	SII
c17	60	5	1'-6"	Str.
c18	4	5	1'-4"	Str.
c19	4	5	1'-3"	Str.
c20	4	5	1'-2"	Str.
c21	4	5	1'-0"	Str.
c22	4	5	11"	Str.
d1	8	5	19'-9"	Str.
d2	8	5	5'-3"	Str.
d3	8	5	11'-0"	Str.
d4	8	5	14'-6"	Str.
d5	4	4	19'-8"	Str.

NOTE:  
All Dimensions are Out to Out of Bar.  
All Bars to be Epoxy Coated.  
\* Drill and Epoxy in place, Not Included in Epoxy Coated Re-Steel in Tapered Barries.

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

ITEM	UNIT	QUANTITY		
		Phase 1	Phase 2	Phase 4
Concrete Approach Slab for Bridge	SqYd	201J	226.2	N/A
Concrete Approach Sleeper Slab for Bridge	SqYd	70.5	79.4	N/A
No. 4 Mechanical Rebar Splice	EACH	30	N/A	N/A
No. 5 Mechanical Rebar Splice	EACH	48	N/A	N/A
No. 6 Mechanical Rebar Splice	EACH	42	N/A	N/A

	Phase 1	Phase 2	Phase 4	
1.	517	58J	N/A	Cu.Yds.Concrete In Approach Slab.
2.	15011	16824	N/A	Lbs.Epoxy Coated Re-Steel In Approach Slab.
3.	22.8	25.7	N/A	Cu.Yds.Concrete In Sleeper Slab.
4.	3460	3910	N/A	Lbs.Epoxy Coated Re-Steel In Sleeper Slab.
5.	4858	5464	N/A	Lbs.Structural Steel In Armor Assembly.
6.	N/A	1.7	1.7	Cu.Yds.Concrete In Tapered Barries.
7.	N/A	456	456	Lbs.Epoxy Coated Re-Steel In Tapered Barries.
8.	N/A	80	80	Each Install Dowel In Concrete.

Items 1 thru 8 are approximate quantities contained in the above bid items and are for information only.

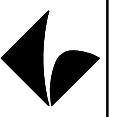


HDR  
PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

41ST STREET BRIDGE REPLACEMENT  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

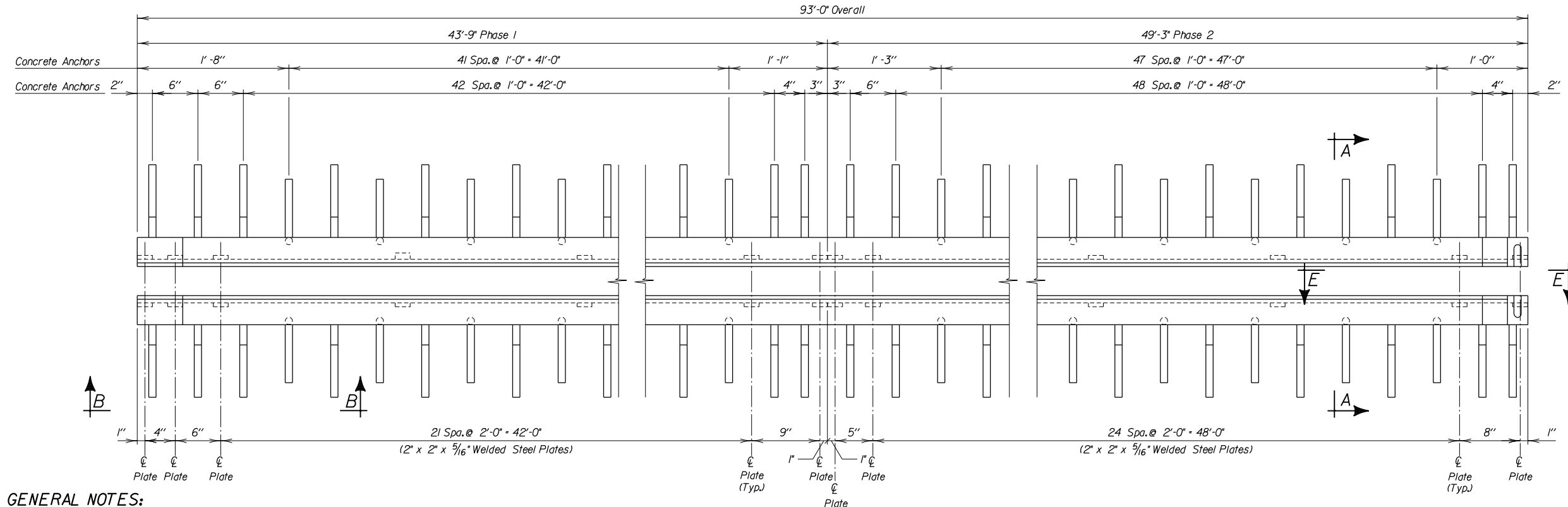
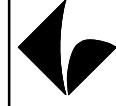
APPROACH SLAB BARRIER DETAILS  
DESIGNED BY: J. HOFF  
DRAWN BY: J. HOFF  
CHECKED BY: C. HALL  
DATE: 10/28/2009  
BY: J. HOFF  
DATE: 10/28/2009

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SHEET NO.

S-36

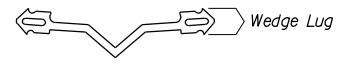


TEMPERATURE	DIMENSION "X"
30°	2 3/4"
40°	2 5/8"
50°	2 1/2"
60°	2 3/8"
70°	2 1/4"
80°	2 1/8"

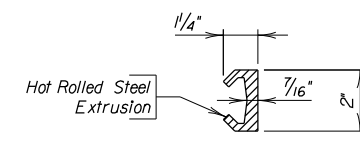
**GENERAL NOTES:**

- Materials for the steel extrusion shall conform to ASTM-A36, A242, or A588. Materials for the 2"x2"x5/16" welded steel plates shall conform to ASTM-A36. Material for the 1/2" x 6" concrete anchors shall conform to Type A steel studs of Section 7 of the latest edition of the ANSI/AWS D11 Structural Welding Code-Steel.
- Material for the neoprene seal shall conform to ASTM D2628 modified to omit the recovery test. No splices will be permitted in the neoprene seal.
- The lubricant-adhesive used to install the neoprene seal shall conform to the requirements of ASTM D4070. The neoprene seal and the lubricant adhesive should be supplied of recommended by the same source as they must be compatible.
- The installation of the neoprene seal shall be as recommended by its manufacturer and approved by the Engineer, but in general shall be as follows: the neoprene seal shall be installed and bonded to the steel extrusion with a high-solids lubricant adhesive. The neoprene surfaces shall be roughened with a wire brush prior to application of the lubricant adhesive. The neoprene seal may be installed either prior to or after the time the steel extrusions are concreted into the approach and sleeper slab. The steel extrusions shall be dry, clean, free from dirt, grease and contaminants at the time the neoprene seal is installed.
- Due to the length of the steel extrusions, splices are permitted. No welds shall be permitted in the internal section of the extrusion where the neoprene seal is located. Weld details shall be shown on the shop plans for approval by the engineer. Welding shall be in accordance with latest edition of the ANSI/AWS D11 Structural Welding Code-Steel. Galvanize the steel extrusions and anything welded to them after all welding is completed. They shall be galvanized in accordance with AASHTO M111 (ASTM A123). If welded splices are used subsequent to galvanizing, the weld details and the procedures for preparing the surface for welding and repairing the galvanizing after welding shall be included in the shop plans. Repair of galvanizing shall be by the zinc-based solder method in conformance with ASTM A780.
- The thickness and shape of the neoprene seal may vary from the sketch shown (DETAIL "C" on this sheet) according to the manufacturer's design; however, the wedge lugs must properly fit the groove in the steel extrusion. Before installation, the shop plans of the proposed neoprene seal showing the fixed dimensions, thickness of neoprene seal, and dimensions pertinent to the fit of the neoprene seal in the steel extrusion shall be submitted to and approved by the Engineer.
- Since the configuration and dimensions of the steel extrusion may vary according to each manufacturer's design, they need not conform exactly to that shown in DETAIL "D"; however, any deviations from the plan shown configuration or dimensions must be approved by the Engineer.
- The Strip Seal Expansion Joint supplier shall submit a detailed gland installation procedure with the shop plans.
- The cost of welding shall be included in the unit cost for Strip Seal Expansion Joint.
- The Neoprene seal shall be installed and bonded to the joint with a high solids lubricant adhesive. At the time of the Neoprene Seal installation, the steel surfaces of the joint to be in contact with the Neoprene Seal shall be dry, clean and free from dirt, grease and contaminants. The Contractor shall be required to clean those areas by abrasive blasting.
- The Strip Seal Expansion Joint will be measured in linear feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The Strip Seal Expansion Joint will be paid for at the contract unit price per linear foot complete in place. Payment for this item shall be full compensation for furnishing all the required materials in place, inclusive of labor, equipment and incidentals necessary to complete the work in accordance with plans and the foregoing specifications.
- Due to staged construction, the steel extrusion shall be spliced in the field at the location shown above. Use the block out detail shown on Sheet No. S-35. The weld details and the procedures for preparing the surface for welding and repairing the galvanizing after welding shall be included with the shop plans.

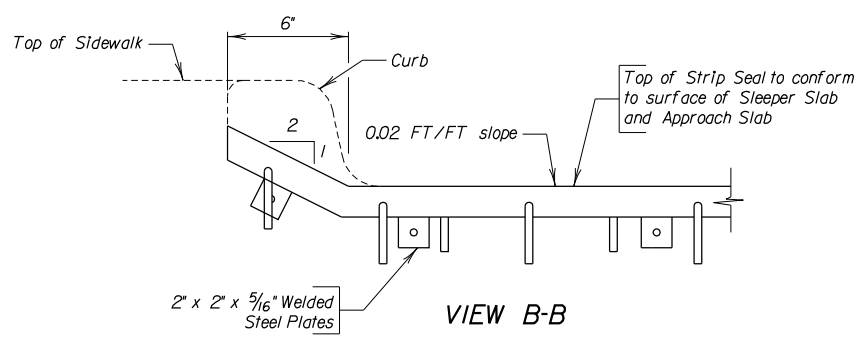
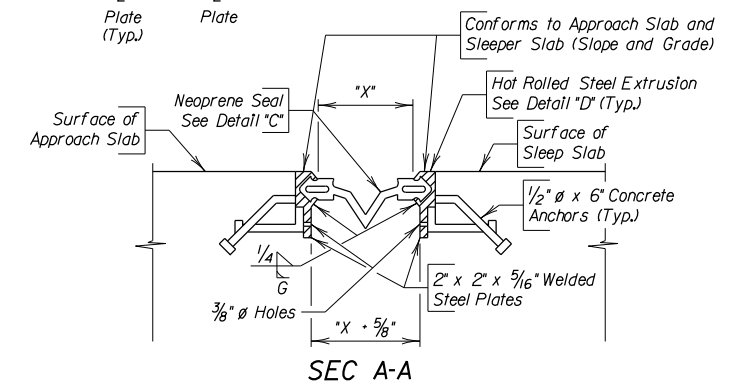
PLAN OF STRIP SEAL  
(Neoprene Seal not shown)



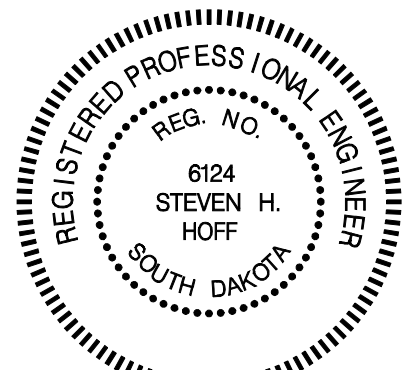
DETAIL "C"  
Neoprene Seal shall have a 4" movement capability



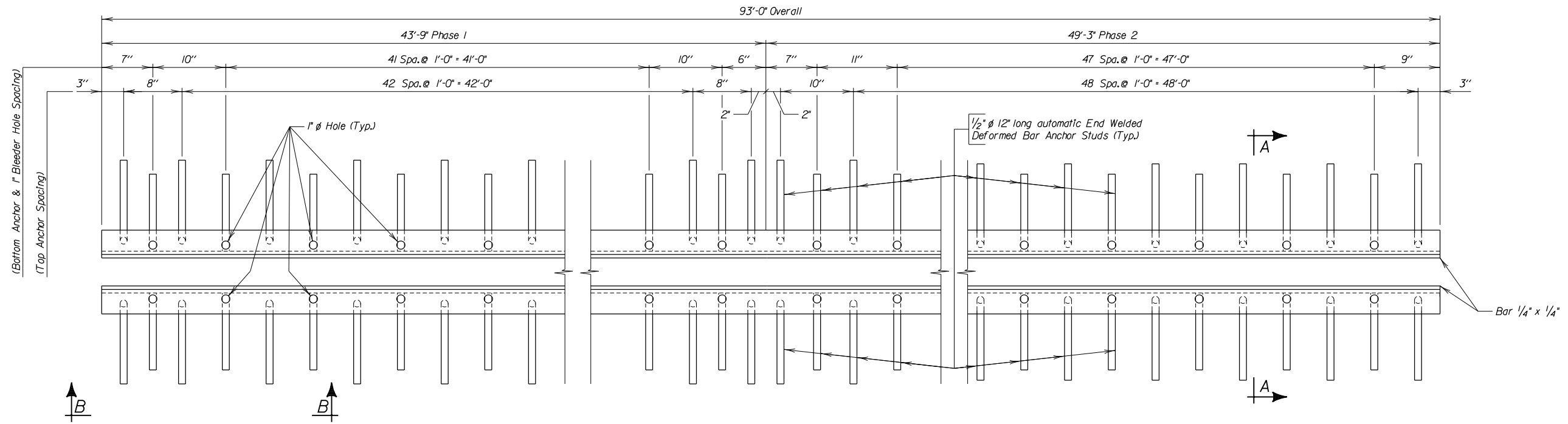
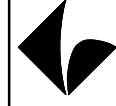
DETAIL "D"



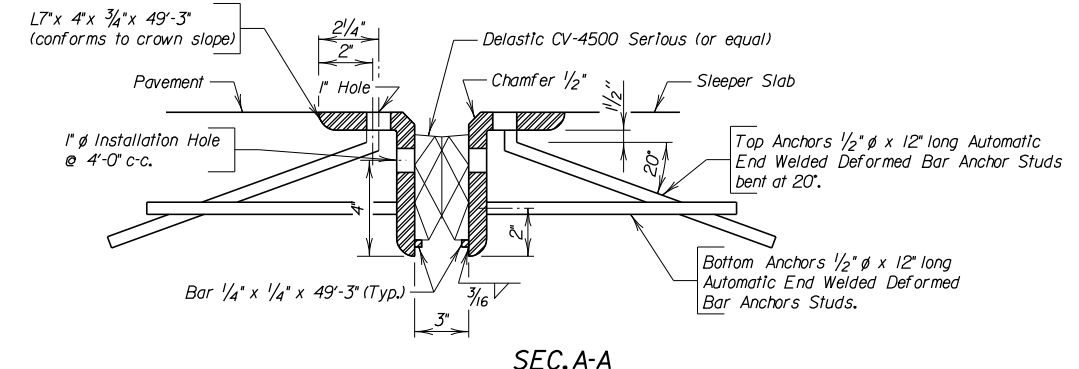
ITEM	UNIT	QUANTITY	
		PHASE 1	PHASE 2
Strip Seal Expansion	Ft.	87.6	98.6



10/28/2009 awright C:\PWworking\OMA\0412022\STRIP\_SEAL.dgn

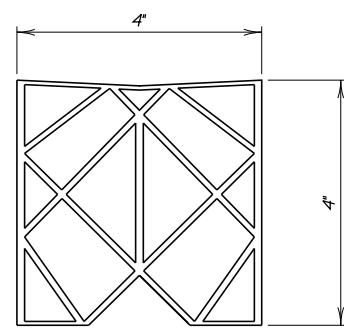


**PLAN OF COMPRESSION SEAL**  
(Neoprene Seal not shown)



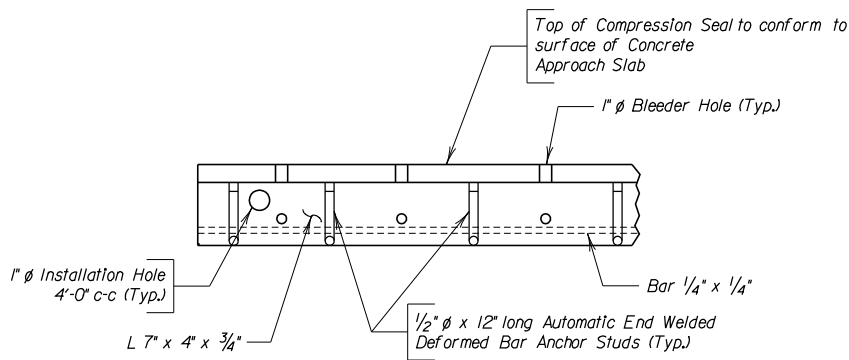
**SEC. A-A**

(See Note Regarding Armor Angle Assembly on Sheet No. S-4.)



**DETAIL "C"**

Neoprene Seal shall have a 1 5/8" movement capability



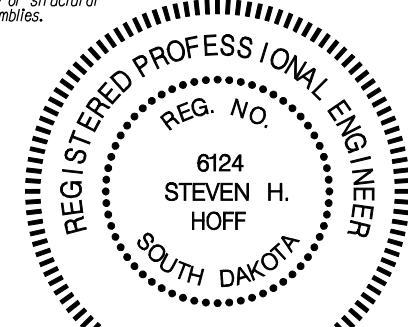
**VIEW B-B**

**GENERAL NOTES:**

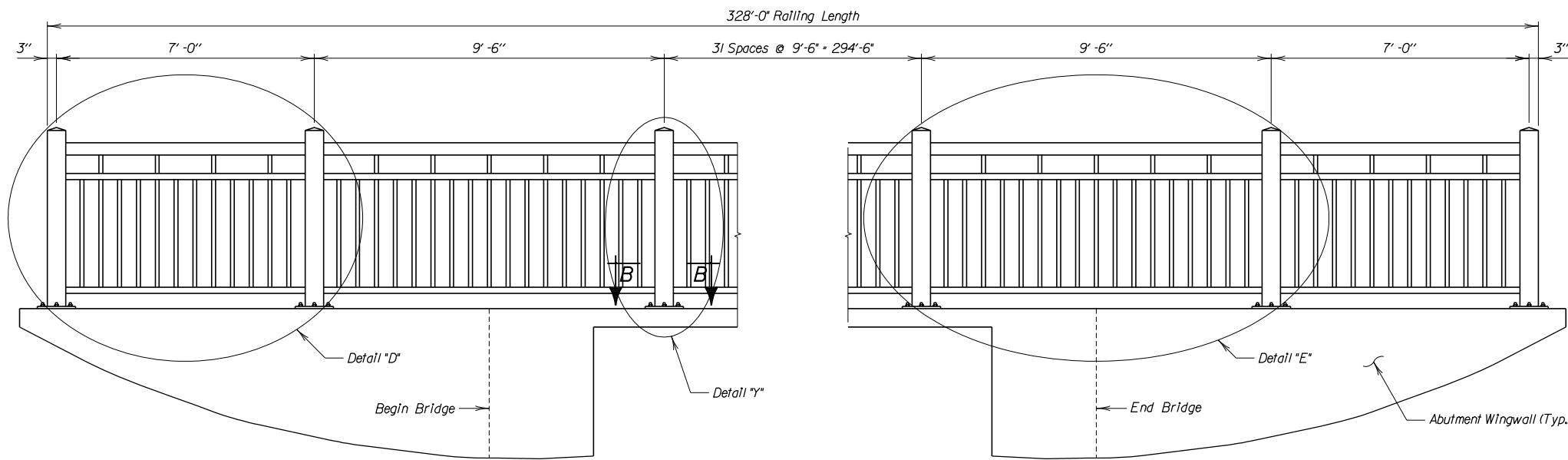
- Steel for the Angles shall conform to ASTM A709, Grade 36. The Automatic End Welded Deformed Bar Anchor Studs shall conform to ASTM A496. The Armor Assembly complete in-place shall be a continuous unit within each stage.
- The shape of the compression seal may vary from that shown in DETAIL "C" on this sheet however the overall dimensions and the movement capability shall be met.
- Material for the Neoprene Compression Seal shall conform to that specified in ASTM D2628. No splice will be permitted in the Neoprene Seal.
- The lubricant adhesive used to install the neoprene seal shall conform to the requirements of ASTM D4070-91 (1996). The Neoprene Seal and the lubricant adhesive should be supplied or recommended by the same source as they must be compatible.
- The Neoprene Seal shall be installed and bonded to the joint with a high solids lubricant adhesive. At the time of the Neoprene Seal installation, the steel surfaces of the joint to be in contact with the Neoprene Seal shall be dry, clean and free from dirt, grease and contaminants. The Contractor shall be required to clean those areas by abrasive blasting.
- The installation of the compression seal shall be as specified by the manufacturer and shall be subject to the approval of the Engineer. The ends of the Neoprene Seal shall be sealed as recommended by the manufacturer.
- Galvanize the Angles and anything welded to them after all welding is completed. They shall be galvanized in accordance with AASHTO M111 (ASTM A123). If welded splices are used subsequent to galvanizing, the weld details and the procedures for preparing the surface for welding and repairing the galvanizing after welding shall be included with the shop plans. Repair of galvanizing shall be by the zinc-based solder method conforming with ASTM A780.
- Welding for the Angle Assembly shall be in accordance with ANSI/AWS D1J Structural Welding Code - Steel.
- The Compression Seal Joint supplier shall submit a detailed compression seal installation procedure with the shop plans.
- The cost of welding shall be included in the contract unit price per foot for Compression Seal Joint.
- The Compression Seal Joint will be measured in feet to the nearest one-tenth foot, complete in place. Measure will be made of the overall horizontal length. The Compression Seal 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, inclusive of labor, equipment and incidentals necessary to complete the work in accordance with plans and the foregoing specifications.
- Due to staged construction, the armor assembly shall be spliced in the field at the location shown above. Use the block out detail shown on Sheet No. S-35. The weld details and the procedures for preparing the surface for welding and repairing the galvanizing after welding shall be included with the shop plans.

<b>ESTIMATE QUANTITIES</b> (For Two Approach Slabs)			
ITEM	UNIT	QUANTITY	
		PHASE 1	PHASE 2
Compression Seal Joint	Ft.	87.5	98.5

For informational purposes only the estimated quantity of structural steel is 10,330 lb for two complete Armor Angle Assemblies.

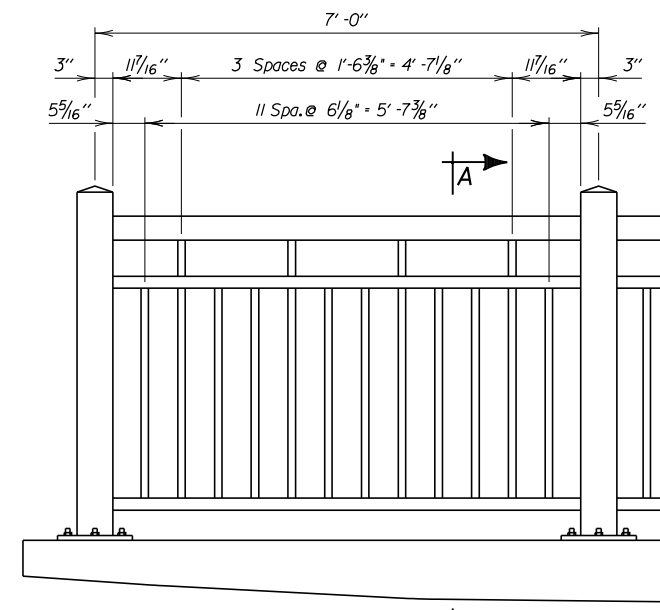
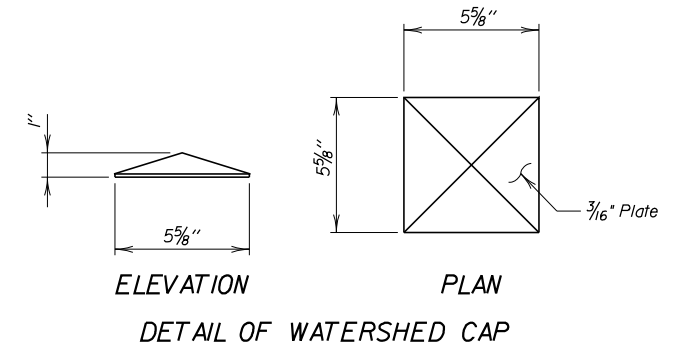


10/28/2009 AMWRIGHT C:\PWORKING\DMA\0412022\RAILING-AT-SIDEWALK.DGN

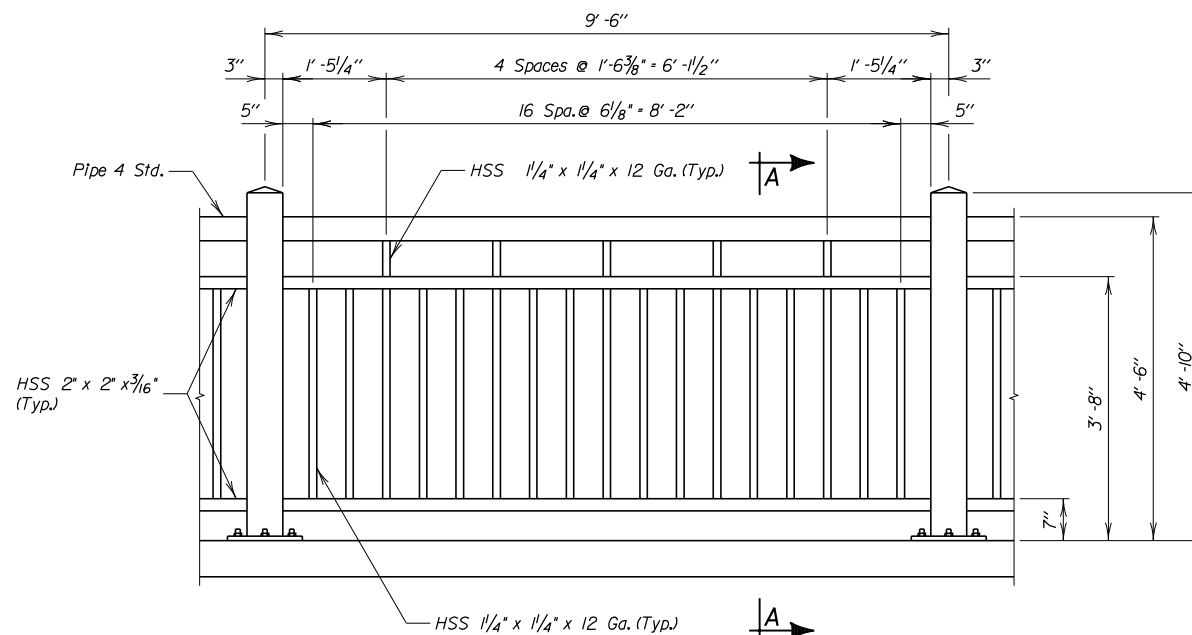


ELEVATION OF STEEL RAILING ON SIDEWALK ON STRUCTURE

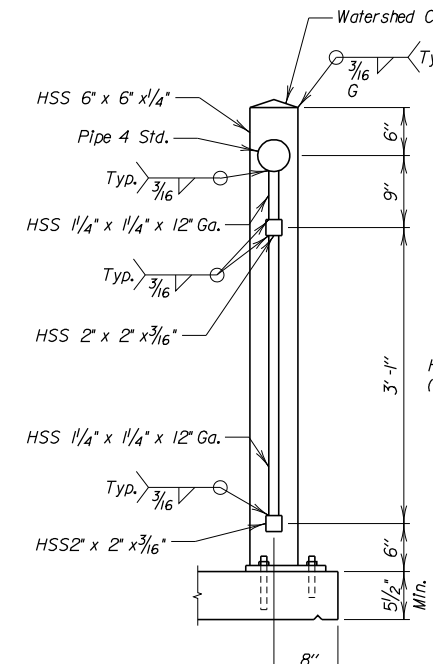
ESTIMATED QUANTITIES				
ITEM	UNIT	QUANTITY		
		Phase 1	Phase 2	Phase 4
Steel Railing on Sidewalk	Ft	328'-0"	328'-0"	N/A



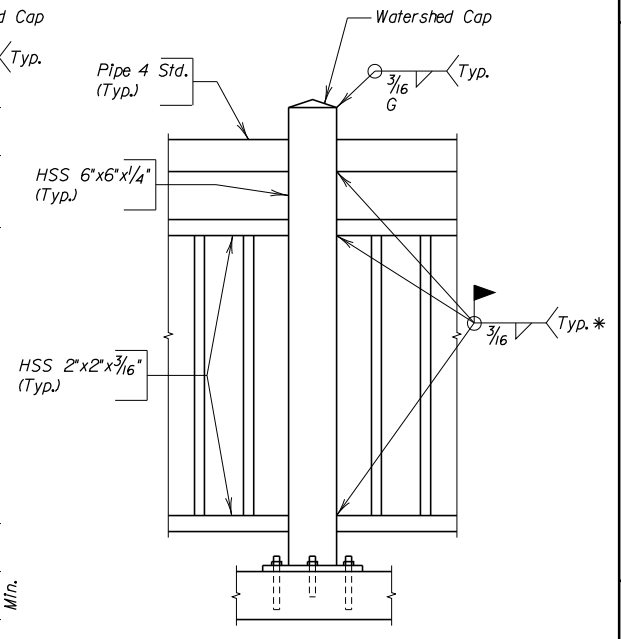
DETAIL "D"  
(Typical End Panel)



DETAIL "E"  
(Typical all Interior Panels)

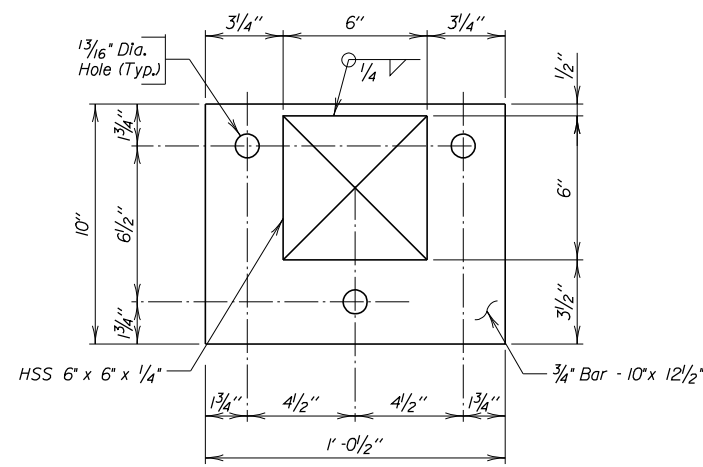


SECTION A-A  
(Typical)

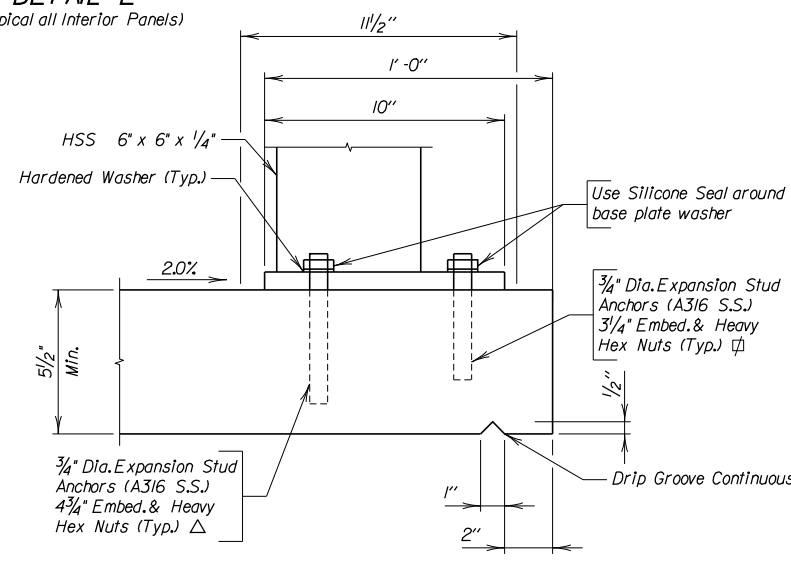


DETAIL "Y"

\*The contractor may wish to fabricate the railing in sections with one or more posts attached in the shop. Shop plans submitted for approval shall indicate the location of shop and field connections.



SEC. B-B



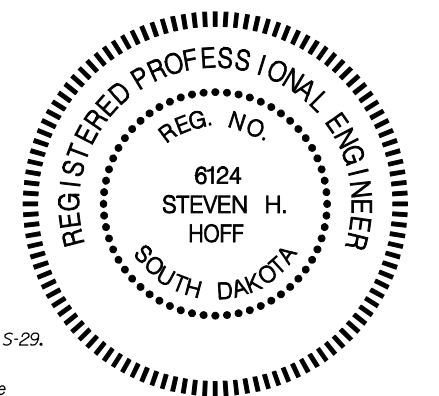
DETAIL AT SIDEWALK OVERHANG

Note:

1. For Superstructure Details, see Sheet Nos. S-24 to S-29.

⊕ Design based on a min. ultimate pullout resistance of 5.8 kips.

△ Design based on a min. ultimate pullout resistance of 12.2 kips.

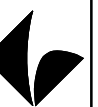


HDR PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

41ST STREET BRIDGE REPLACEMENT  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

SIDEWALK RAILING DETAILS  
DESIGNED BY: B. SCHULTZBERGER  
DRAWN BY: J. BERLAND  
CHECKED BY: C. HALL  
DATE: 10/28/2009  
REVISIONS:  
BY: DATE:

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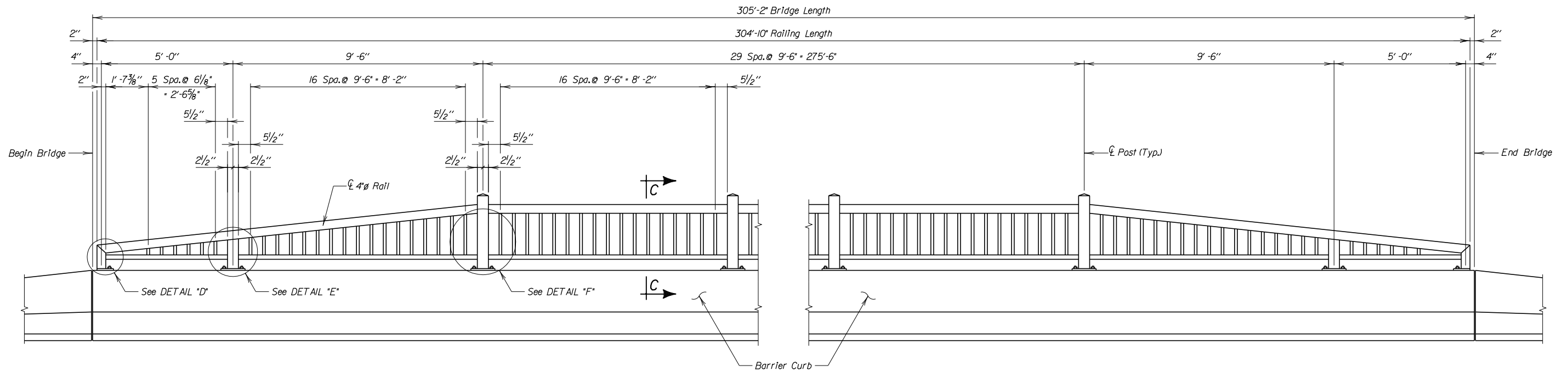


SHEET NO.

S-39

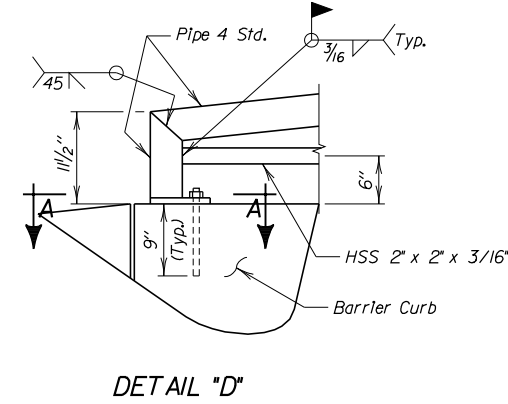


10/28/2009 awright c:\pwworking\oma\d0412022\RAILING\_ON\_BARRIER\_CURRB.dgn

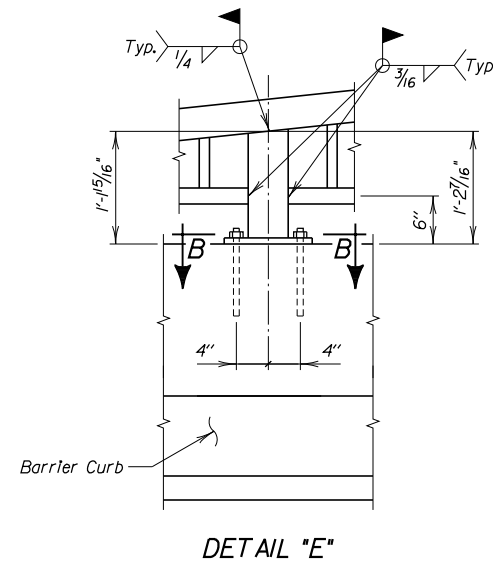


**ELEVATION OF SPECIAL STEEL RAILING ATOP BARRIER**  
(Phase 4 shown, Phase 2 similar)

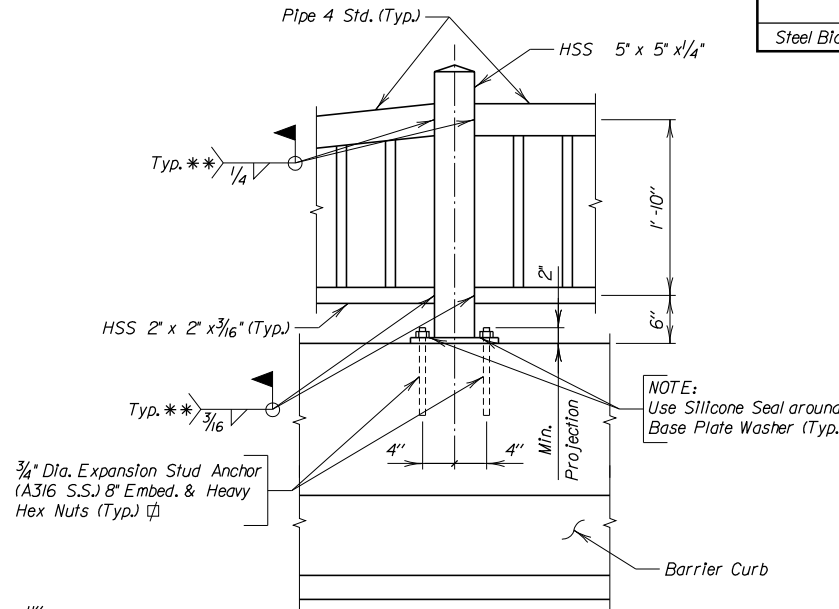
ITEM	UNIT	ESTIMATED QUANTITIES		
		Phase 1	Phase 2	Phase 4
Steel Bicycle Railing on Concrete Barrier	Ft	N/A	304'-10"	304'-10"



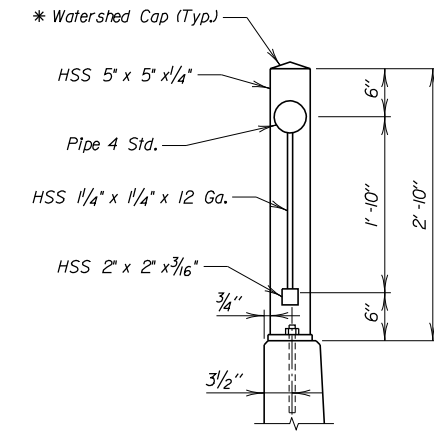
**DETAIL "D"**



**DETAIL "E"**

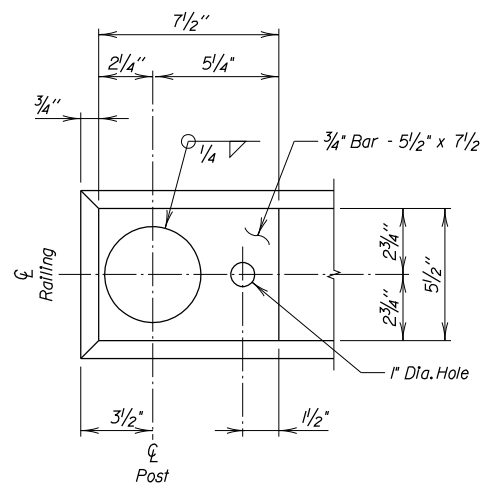


**DETAIL "F"**

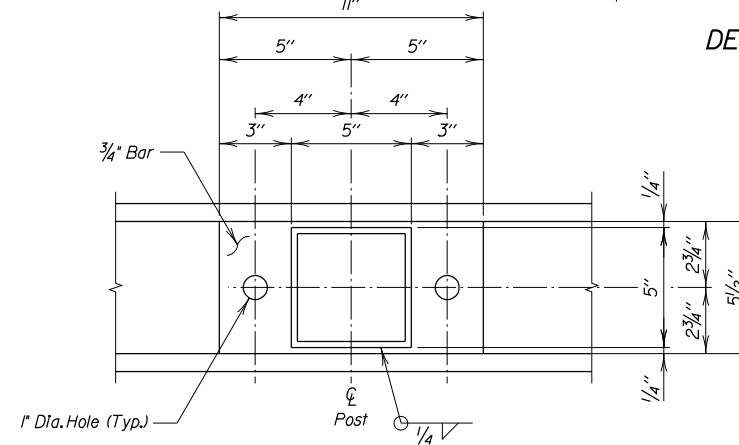


**SEC. C-C**

\* For detail of watershed cap, see Sheet No. S-39.



**VIEW A-A**



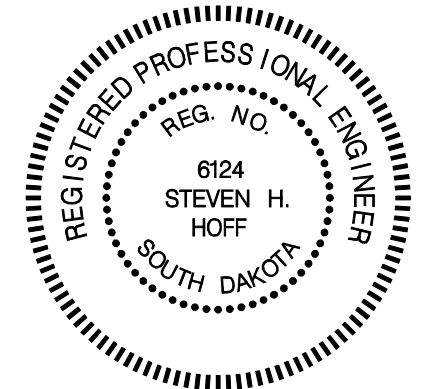
**VIEW B-B**

Note:

1. For Superstructure Details, see Sheet Nos. S-24 to S-29.

\*\* The contractor may wish to fabricate the railing in sections with one or more posts attached in the shop. Shop plans submitted for approval shall indicate the location of shop and field connections.

⊞ Design based on a min. ultimate pullout resistance of 17 kips.

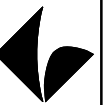


**HDR** PLANS BY:  
HDR, INC.  
SIOUX FALLS, S.D.

**41ST STREET BRIDGE REPLACEMENT**  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

**BARRIER CURB RAILING DETAILS**  
DESIGNED BY: B. SPALTEBERGER - RAILING ON BARRIER CURB.dgn  
DRAWN BY: J. BERGER  
CHECKED BY: C. HALL  
DATE: 10/28/2009  
REVISIONS:  
BY: DATE:

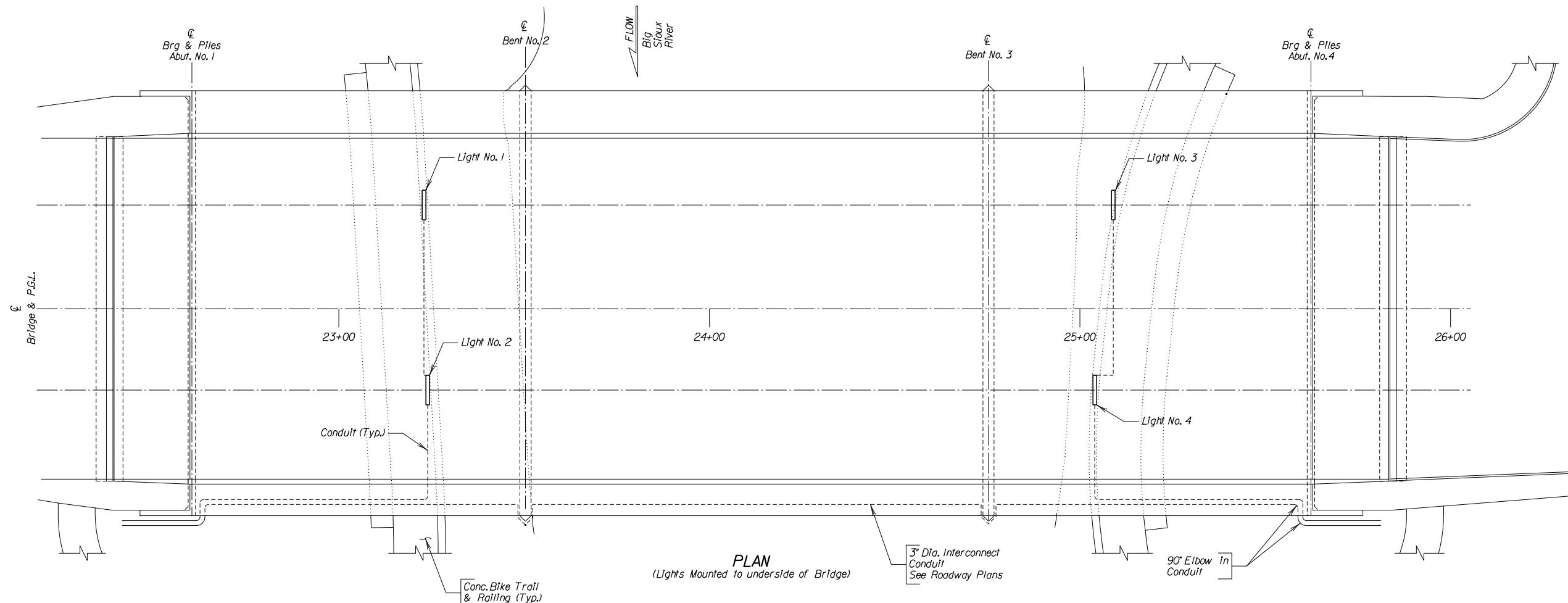
**CITY OF SIOUX FALLS**  
**PUBLIC WORKS**  
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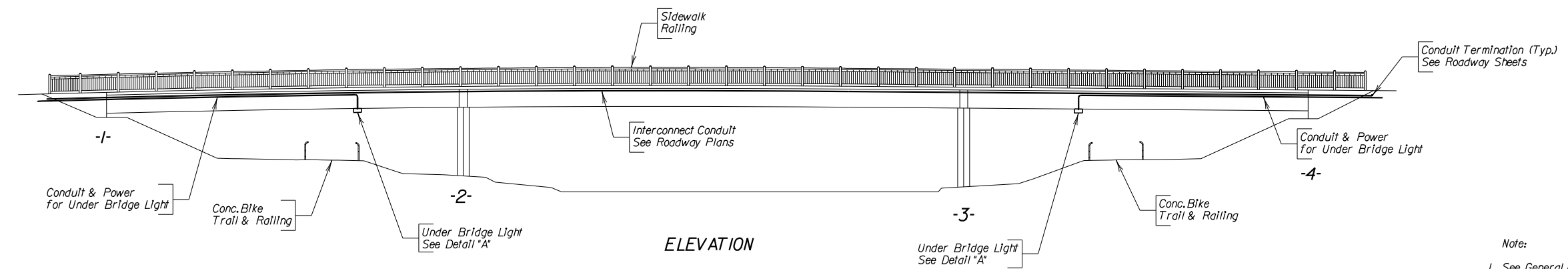
SHEET NO.

**S-40**

C:\Pwworking\OMA\0412022\UNDER\_BRIDGE\_LIGHTING.DGN  
10/28/2009 awright

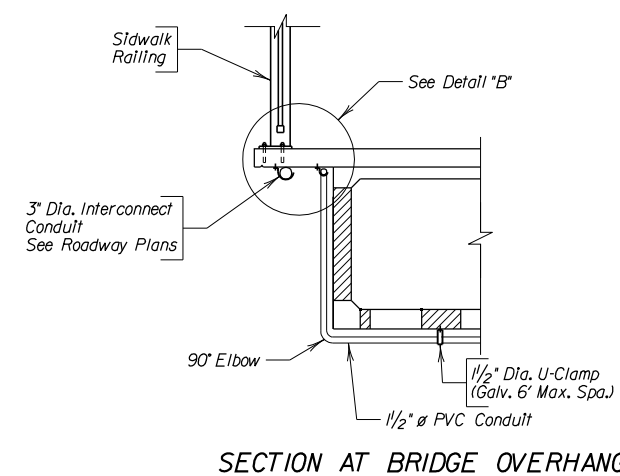


**PLAN**  
(Lights Mounted to underside of Bridge)

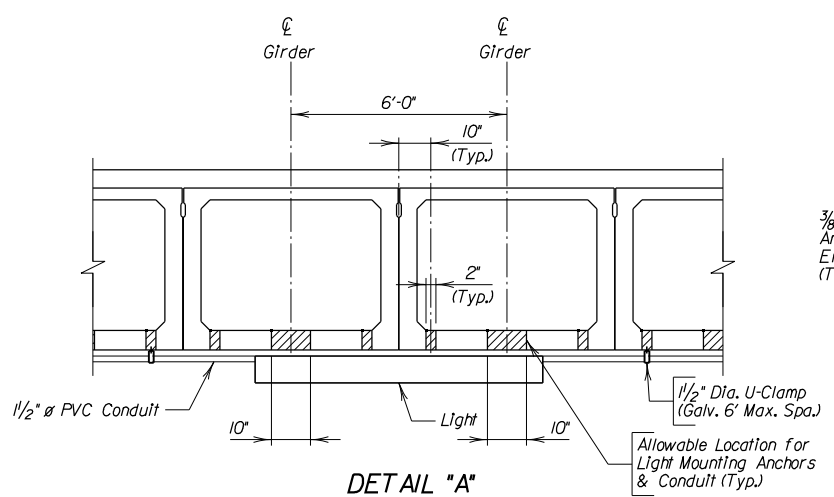


**ELEVATION**

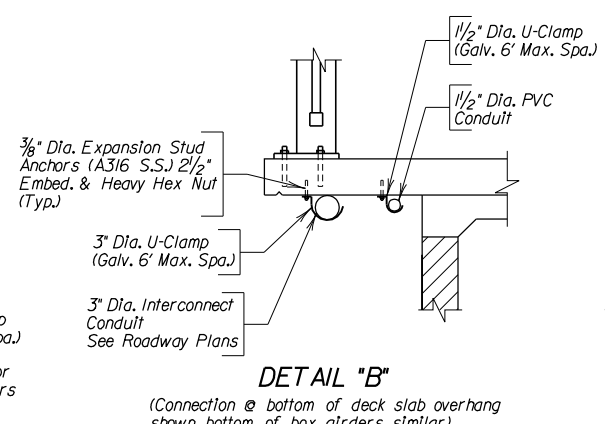
- Note:
1. See General Notes on Sheet S-5.
  2. Refer to Girder Details on Sheet Nos. S-17 & S-21.



**SECTION AT BRIDGE OVERHANG**



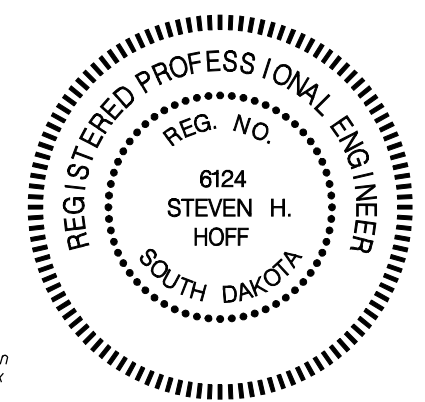
**DETAIL "A"**



**DETAIL "B"**

LIGHT LOCATION TABLE		
LIGHT NO.	STATION	OFFSET
NO. 1	23+23*	28'-0" Lt *
NO. 2	23+24*	22'-0" Rt *
NO. 3	25+09*	28'-0" Lt *
NO. 4	25+04*	22'-0" Rt *

\* Light Locations are approximate. Location of light mounting bridge hardware must be located as shown in Detail "A" to the underside of 6'-0" wide concrete box girders. Concrete expansion anchors must be placed in the allowable locations in the 6'-0" wide girders as shown in Detail "A".

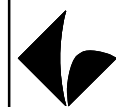


**HDR** PLANS BY:  
HDR, INC.  
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**41ST STREET BRIDGE REPLACEMENT**  
OVER THE BIG SIOUX RIVER  
SIOUX FALLS, SOUTH DAKOTA

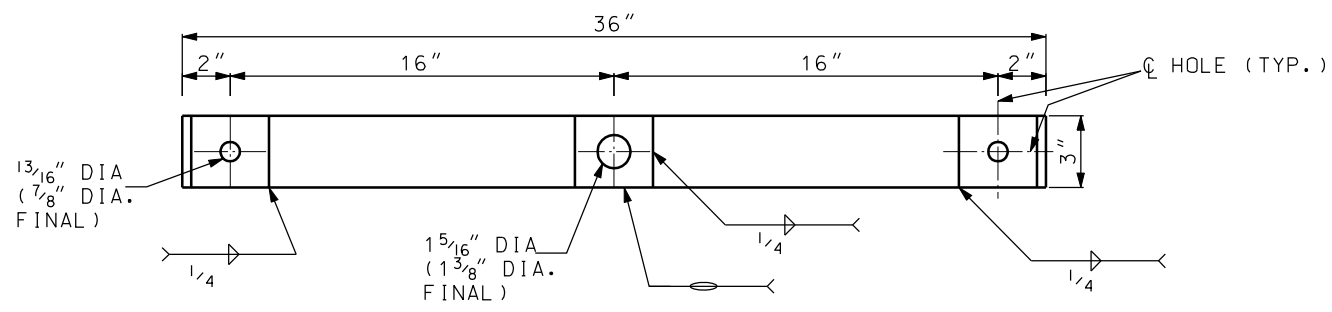
**UNDER BRIDGE LIGHTING LAYOUT & DETAILS**  
DESIGNED BY: C. BERNDT  
DRAWN BY: C. BERNDT  
CHECKED BY: C. WILGOT  
DATE: 10/28/2009  
REVISIONS:  
BY: \_\_\_\_\_  
DATE: \_\_\_\_\_

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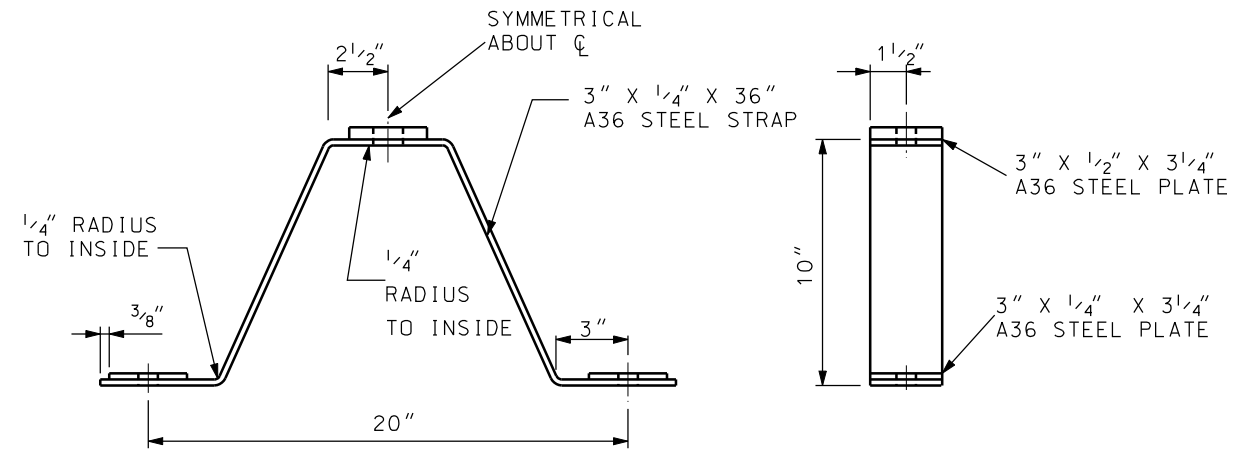


SHEET NO.

**S-41**

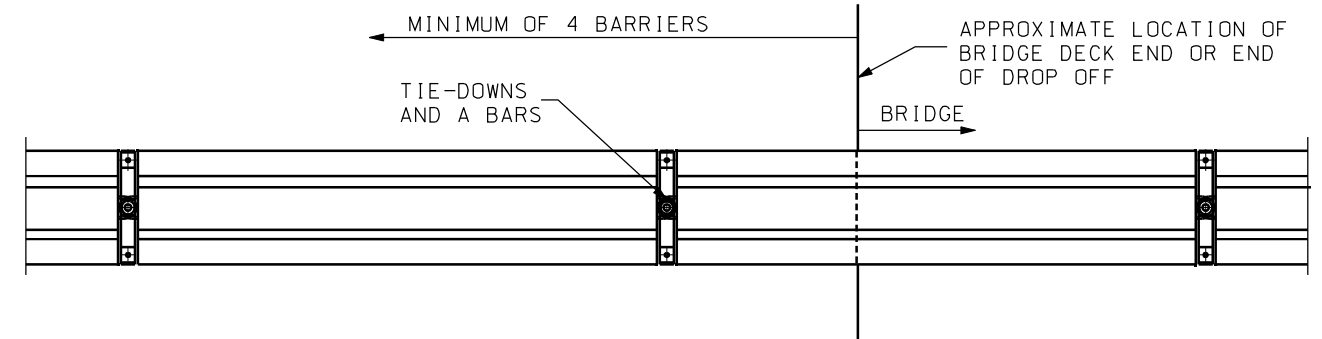


PLAN OF TIE-DOWN STRAP

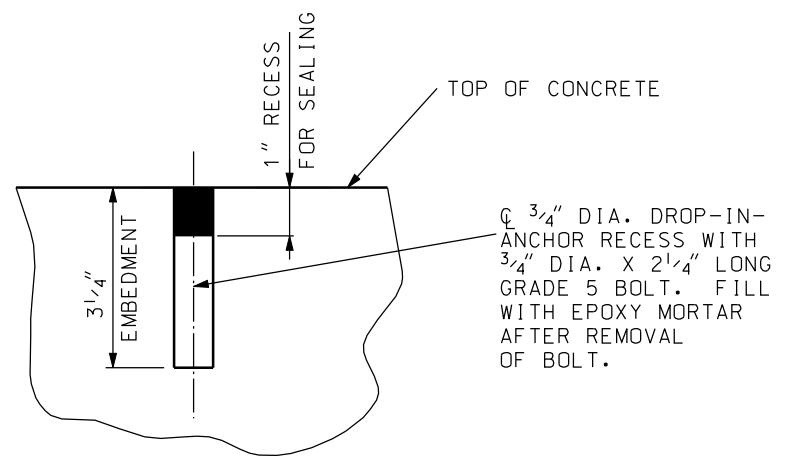


SIDE VIEW

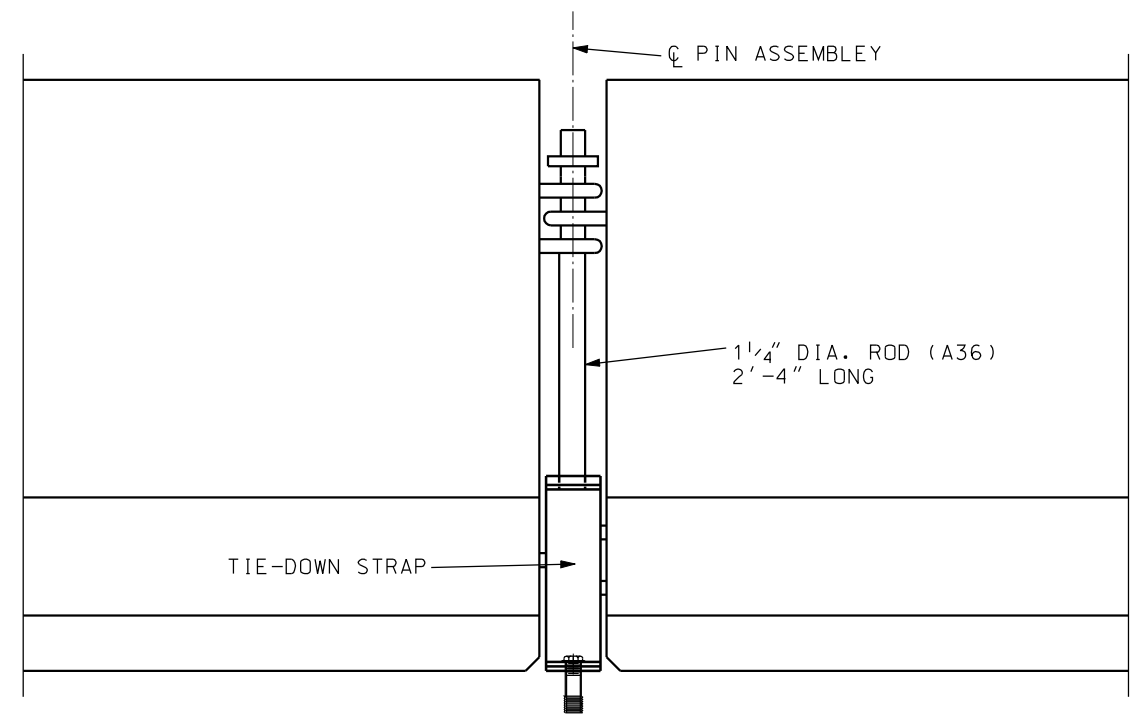
DETAILS OF TYPE F TEMPORARY BARRIER TIE-DOWN STRAP



PLAN OF TRANSITION FOR FREE-STANDING BARRIER TO TIE-DOWN BARRIER

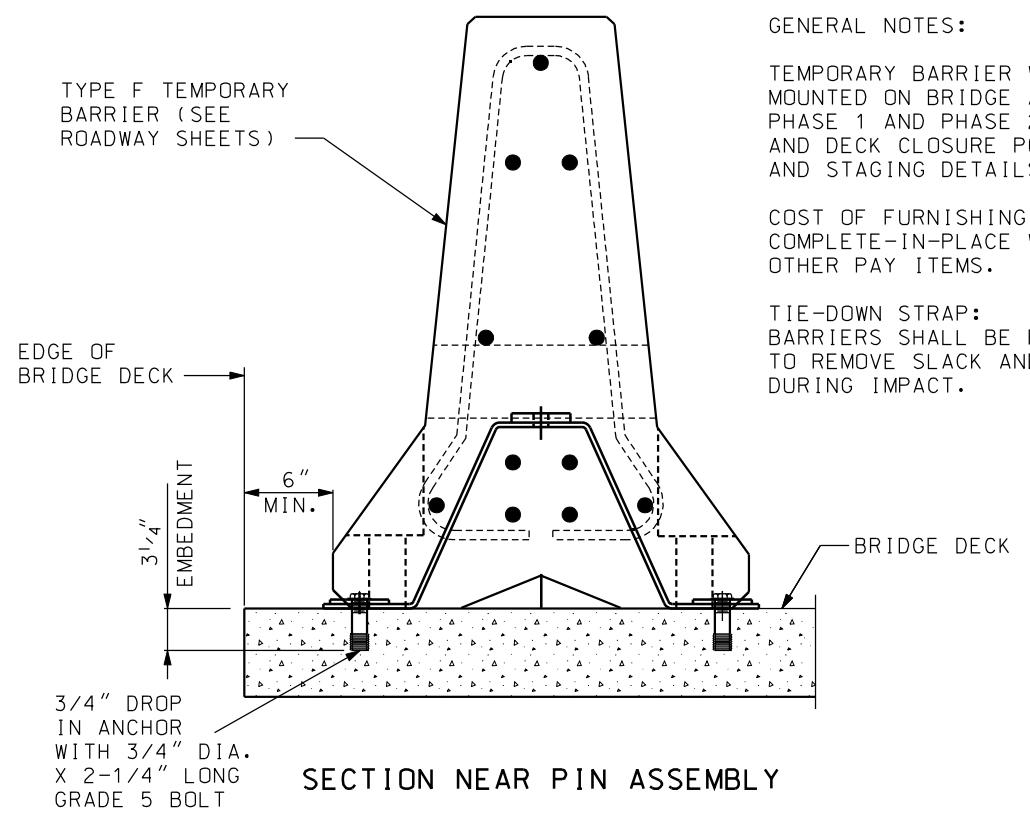


DETAIL SHOWING SEALING OF HOLES AFTER REMOVAL OF TIE-DOWN BOLTS



PART ELEVATION OF TEMPORARY BARRIER

TIE-DOWN STRAP



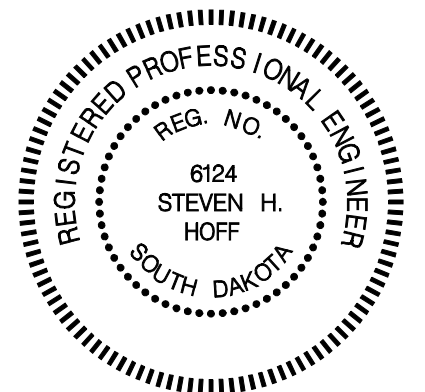
SECTION NEAR PIN ASSEMBLY

GENERAL NOTES:

TEMPORARY BARRIER WITH TIE-DOWN STRAP SHALL BE MOUNTED ON BRIDGE AND EXISTING BRIDGE DURING PHASE 1 AND PHASE 2 AND LOCATED ADJACENT TO GIRDER AND DECK CLOSURE POUR. SEE BRIDGE CONSTRUCTION AND STAGING DETAILS ON SHEET S-6.

COST OF FURNISHING AND INSTALLING THE TIE-DOWN SYSTEM COMPLETE-IN-PLACE WILL BE CONSIDERED INCIDENTAL TO OTHER PAY ITEMS.

TIE-DOWN STRAP: BARRIERS SHALL BE PULLED TIGHT DURING INSTALLATION TO REMOVE SLACK AND PROVIDE LONGITUDINAL TENSION DURING IMPACT.

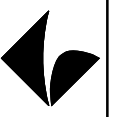


HDR PLANS BY: HDR, INC. SIOUX FALLS, S.D.

41ST STREET BRIDGE REPLACEMENT OVER THE BIG SIOUX RIVER SIOUX FALLS, SOUTH DAKOTA

DESIGNED BY: D. SPILLITZBERGER	FILE: TEMPORARY_BARRIER_TIE_DOWN.DGN
DRAWN BY: J. WIGG	DATE: 10/28/2009
CHECKED BY: C. HALL	BY: DATE:
REVISIONS:	BY: DATE:

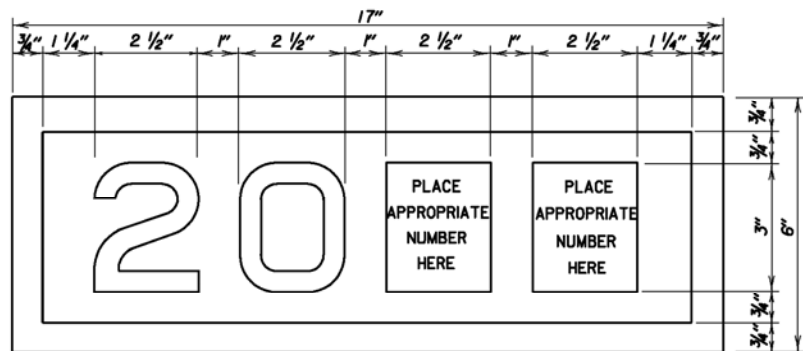
CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!



SHEET NO.

S-42

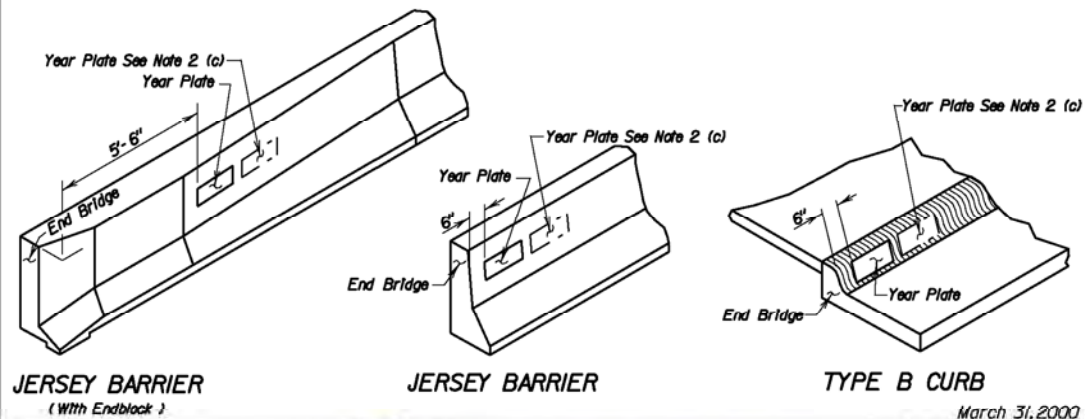
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YEAR PLATE DETAILS

NOTES:

- Year plates of the general dimensions shown shall be constructed on all box culverts and bridges. The year plates shall 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.
- Year plates shall be located on structure (s) as follows:
  - On cast-in-place box culverts the year plates shall be four and one-half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate shall be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate shall be centered in an adjacent barrel.
  - On bridges with six (6) inch curbs or "Jersey" shaped barriers with no endblocks, the year plate shall 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 "Jersey" shaped barrier endblocks, the year plate shall be centered on the upper sloped portion of the barrier approximately 5'-6" from the end of the bridge, or as designated by the Engineer. There shall be one year plate at each end of the bridge on opposite sides.
  - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date shall be placed as listed above and the other located adjacent to it. Both year plates shall be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work shall be incidental to the other contract items.



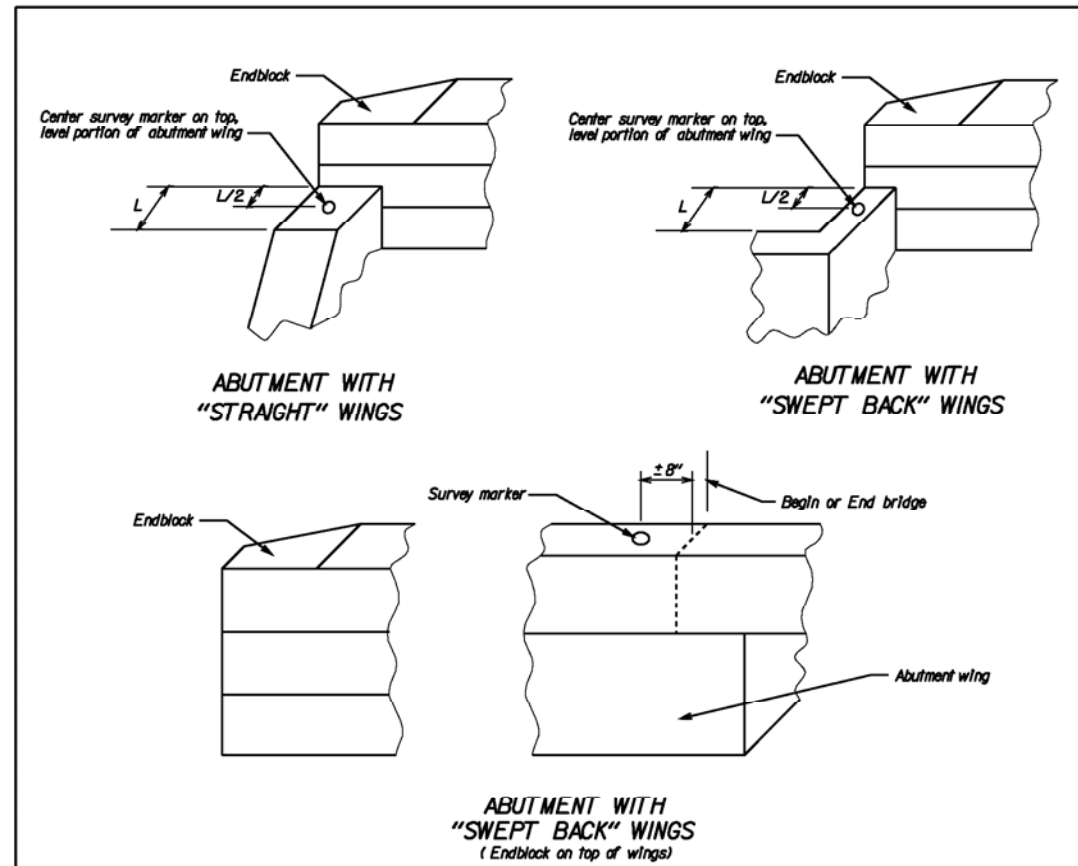
JERSEY BARRIER  
(With Endblock)

JERSEY BARRIER

TYPE B CURB

March 31, 2000

Published Date: 3rd Qtr. 2009	SDDOT	YEAR PLATE DETAILS	PLATE NUMBER
			460.02
			Sheet 1 of 1



ABUTMENT WITH  
"STRAIGHT" WINGS

ABUTMENT WITH  
"SWEEP BACK" WINGS

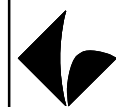
ABUTMENT WITH  
"SWEEP BACK" WINGS  
(Endblock on top of wings)

NOTES:

- 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.
- 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 3/4" X 2" long ribbed shank), or a US Army Corps of Engineers Type C Disc with a 3 1/2" top diameter.
- 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.

Published Date: 3rd Qtr. 2009	SDDOT	BRIDGE SURVEY MARKER	February 15, 2001
			PLATE NUMBER
			460.05
			Sheet 1 of 1

10/28/2009 09:11:00 AM C:\P\working\OMA\0412022\STANDARD\_DETAIL.S1.DGN



10/28/2009 09:41:2022 \STANDARD\_DETAIL52.DGN

**\*VIEW C-C**

**VIEW A-A**

**\*VIEW B-B**

**ELEVATION**

**ALTERNATE WELD ATTACHMENT**

① See Table 1  
② Typical Both Flanges

December 23, 2004

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

**NOTES:**

- 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.
- Material for pile points shall conform to ASTM A27, Grade 65-35, Class 2.
- 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.
- Welding and weld inspection shall be in conformance with AWS D1.1 (Current Year) Structural Welding Code - Steel.

Published Date: 3rd Qtr. 2009

**SDDOT**

**H PILE TIP REINFORCEMENT**

PLATE NUMBER 510.30

Sheet 1 of 1

**TABLE 1**

WELD	PILE	TYPICAL APPLICATION
1/2" + 5/16" @ 45°	HP 14 X 102 HP 14 X 89 HP 12 X 74	
3/8" + 5/16" @ 45°	HP 14 X 73 HP 12 X 63 HP 10 X 57	
5/16" + 5/16" @ 45°	HP 12 X 53 HP 10 X 42 HP 8 X 36	

**TABLE 2**  
(7/16" SQUARE PLATES)

PILE	8"	10"	12"	14"
"F" FLANGE	5"	6 1/2"	8"	10"
"W" WEB	4"	5 1/2"	6 1/2"	8"

**NOTES:**

- Steel for splice plates shall conform to ASTM A36.
- Welding and weld inspection shall be in conformance with AWS D1.1 (Current Year) Structural Welding Code - Steel.

December 23, 2004

Published Date: 3rd Qtr. 2009

**SDDOT**

**STEEL PILE SPLICE DETAILS**

PLATE NUMBER 510.40

Sheet 1 of 1

