PLOT SCALE - 200.0000000:1.0000000

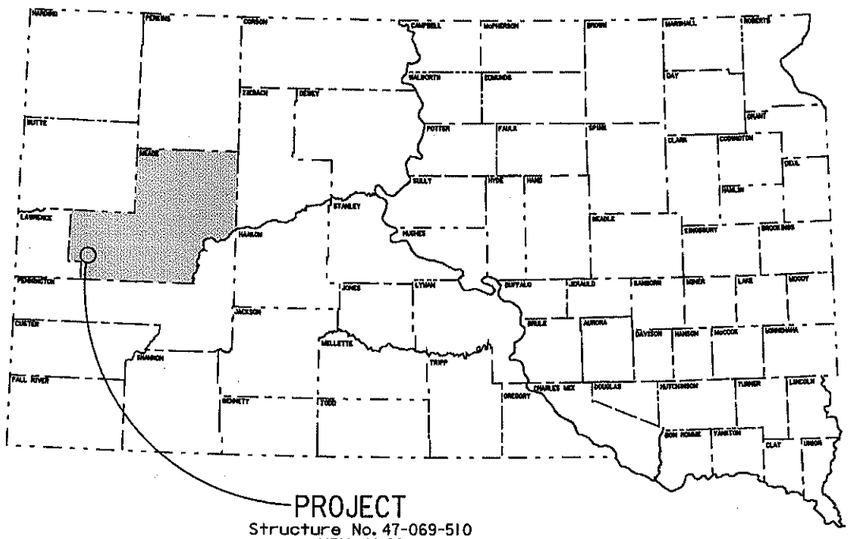
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-468	1	14

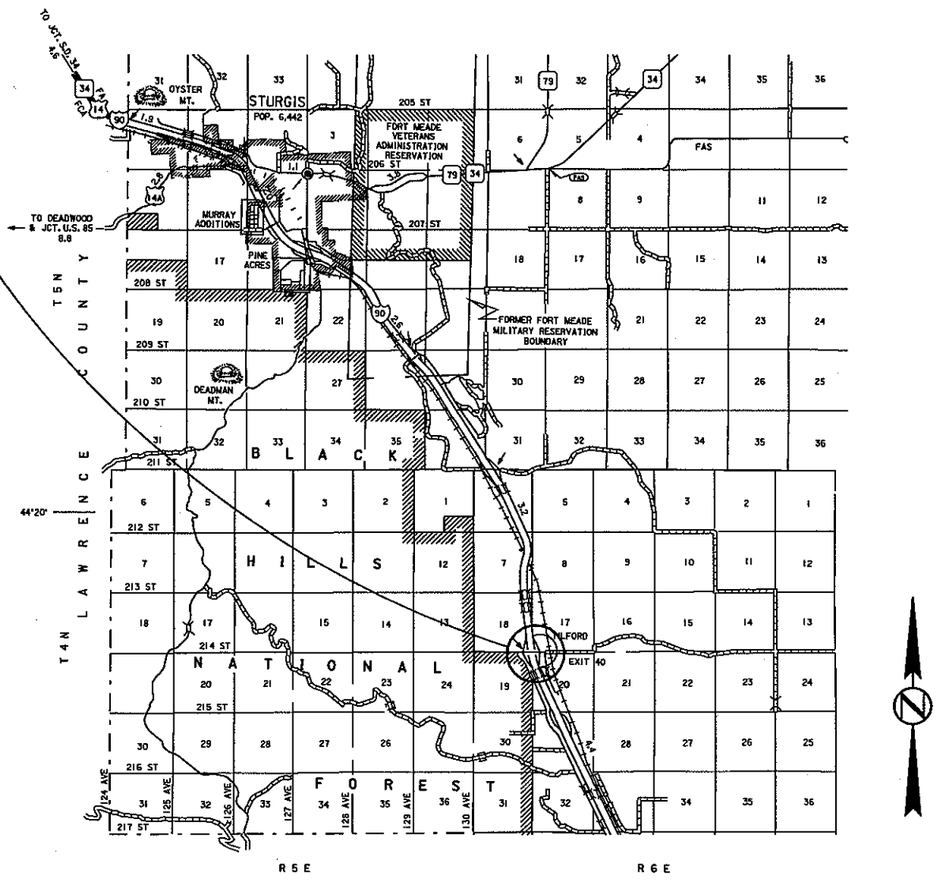
Plotting Date: 30-JUN-2009

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT 090 W-468
INTERSTATE 90
MEADE COUNTY

REPAIR BRIDGE COLUMN
PCN 11KE





INDEX OF SHEETS

STORM WATER PERMIT
(None Required)

DESIGN DESIGNATION

ADT (2008)	15270
ADT (2028)	24060
DHV	3275
D	50%
T DHV	6.8%
T ADT	14.9%
V	75 mph

PLOTTED FROM - TRRC12608

PLOT NAME - TITLE_11KE
FILE - U:\REGIONRC\PRJ\MEAD11KD & MEAD11KE\MEAD11KE\TITLE_11KE.DGN

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-468	2	14

ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E6210	Remove Thrie Beam Guardrail for Reset	12.5	Ft
460E0070	Class A45 Concrete, Bridge Repair	0.1	CuYd
460E0300	Breakout Structural Concrete	0.1	CuYd
460E8000	Column Fiber Wrap	1	Each
480E5000	Galvanic Anode	2	Each
630E5120	Reset Thrie Beam Rail	12.5	Ft
630E5550	Reset Beam Guardrail Post and Block	3	Each
634E0100	Traffic Control	320	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each

SPECIFICATIONS

Standard Specifications for Roads & Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal.

COMBINATION LETTING

This project is being let in combination with Project No. 090 W-468, PCN I1KD.

WORK DESCRIPTION

Work shall consist of bridge column repair.

GENERAL MAINTENANCE OF TRAFFIC

Removing, relocating, covering, salvaging and resetting of existing traffic control devices, including delineation, shall be the responsibility of the Contractor. Cost for this work shall be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.

The bottom of signs on portable or temporary supports shall not be less than seven feet above the pavement in urban areas and one foot above the pavement in rural areas. Portable sign supports may be used as long as the duration is less than 3 days. If the duration is more than 3 days the signs shall be on fixed supports.

Storage of vehicles and equipment shall be outside the clear zone and as near as possible to the right-of-way line. Contractor's employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work.

Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage to the vegetation, surfacing, embankment, delineators and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.

INVENTORY OF TRAFFIC CONTROL DEVICES

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	1	17	17
R2-1	30" x 36"	SPEED LIMIT ##	3	23	69
W3-5	48" x 48"	SPEED REDUCTION	1	34	34
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	1	34	34
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	1	34	34
W20-5	48" x 48"	LT. OR RT. LANE CLOSED #### FT. OR AHEAD	1	34	34
SPECIAL	30" x 24"	FINES DOUBLED	1	18	18
*****	*****	TYPE III BARRICADE - 8 FT. SINGLE SIDED	2	40	80
				TOTAL UNITS	320

WASTE DISPOSAL SITE

The Contractor will be required to furnish a site(s) for the disposal of construction/demolition debris generated by this project.

Construction/demolition debris may not be disposed of within the State ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Highway, Road, and Railway Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) shall not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements shall apply:

1. Construction/demolition debris consisting of concrete, asphalt concrete, or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction/demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the State ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the State ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating "No Dumping Allowed".

2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

HISTORICAL PRESERVATION OFFICE CLEARANCES

To obtain SHPO clearance, a cultural resources survey may need to be conducted by a qualified archaeologist. The Contractor shall arrange and pay for this survey. In lieu of a cultural resources survey, the Contractor could request a literature search on the site and provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that no artifacts have been found on the site. Jim Donohue, State Archaeological Research Center at 605-394-1937 shall be contacted for a literature search.

If borrow material is furnished from within the current geographical reservation boundaries or historic boundaries of the Lake Traverse, Yankton, or Flandreau-Santee reservations, the Contractor shall obtain THPO (Tribal Historical Preservation Office) clearance from the Tribal Cultural Resources Officer. This requirement is in addition to the SHPO clearance. If no Tribal contact exists, the required SHPO clearance shall suffice, with documentation of Tribal contact efforts provided to SHPO.

To facilitate SHPO and THPO responses, the Contractor should submit a cultural resources survey report or the results of the literature search along with a legal description of the site, a topographical map with the site clearly marked, and evidence of prior site disturbance to Terrence G. Keller, DOT Environmental Supervisor, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3721). Allow 30 days from the date this information is submitted to the Environmental Supervisor for SHPO approval. The Contractor is responsible for obtaining all required permits and clearances for the borrow and/or waste disposal site(s) prior to commencing construction activities at the borrow and/or waste disposal site(s). The Contractor shall provide the required permits and clearances to the Engineer at the preconstruction meeting.

UTILITIES

It is not anticipated that any utilities will be found within the boundaries of the project. The Contractor, however, will be responsible for locating and protecting any utility that would conflict with any work. Any damage done to a utility will be the Contractor's responsibility to repair at no cost to the State.

BEAM GUARDRAIL

If necessary, the 12.5 feet of thrie beam guardrail and associated wood posts and blocks adjacent to the damaged column may be removed for reset to facilitate bridge repairs.

All guardrail designated for reset shall be installed using reset wood posts, blocks, and hardware. Reset of the wood posts and blocks shall be paid for at the contract unit price per each for "Reset Beam Guardrail Post and Block".

When possible, all guardrail work shall be done when the adjacent lane is closed.

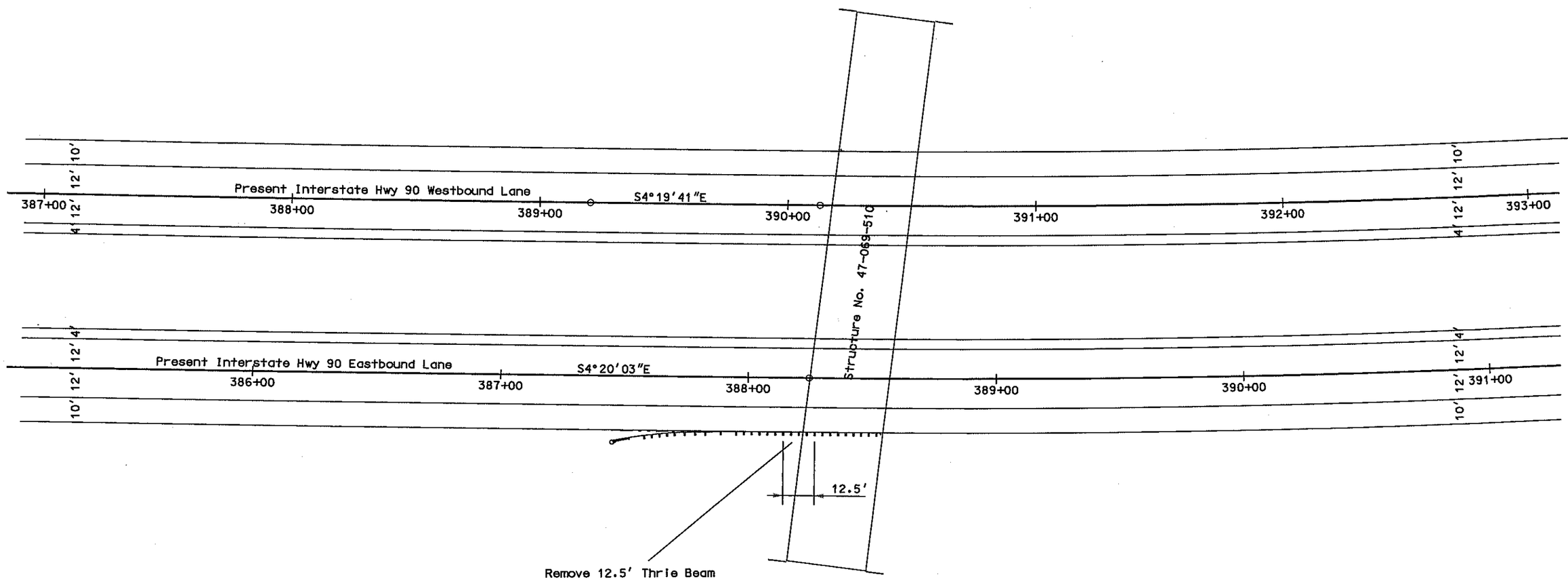
PLOT SCALE - 40.000000:1.000000

GUARDRAIL DETAILS

STRUCTURE NO. 47-069-510

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-468	3	14

Plotting Date: 30-JUN-2009



Remove 12.5' Thrie Beam Guardrail for Reset.

Reset 12.5' Thrie Beam Rail.

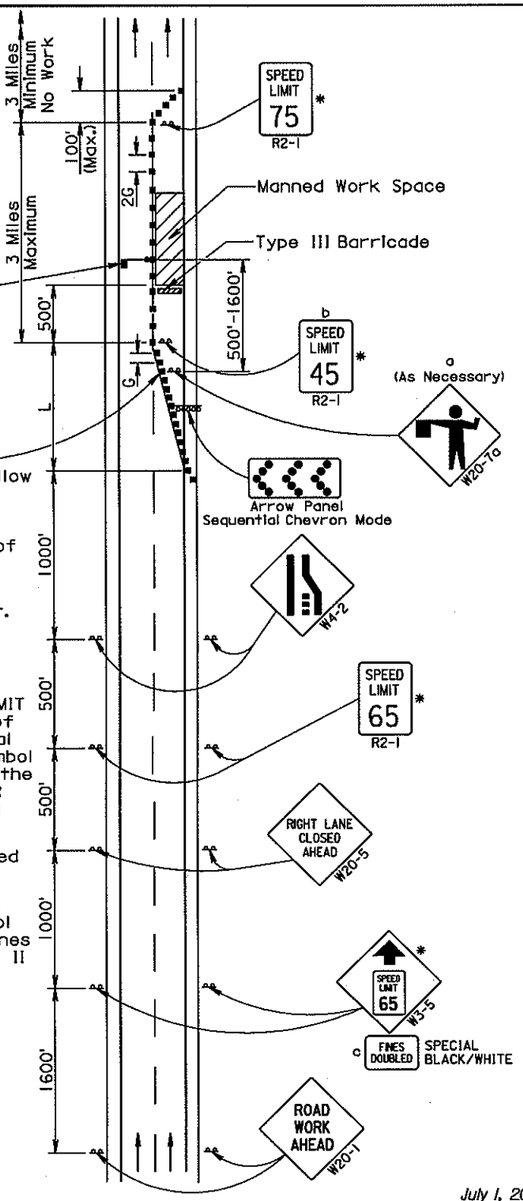
Reset 3 Beam Guardrail Post and Block.

PLOTTED FROM - TRBC12608

PLOT NAME - 387GR

FILE - U:\REGIONRC\PRJ\MEADIIKD & MEADIIKE\387GR.DGN

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)	Taper Length (Feet) (L)
0 - 30	25	180
35 - 40	25	320
45 - 50	50	600
55	50	660
60 - 65	50	780
70 - 75	50	900



■ Channelizing Device

* Speed appropriate for location.

4" white temporary pavement marking tape for right lane closures and 4" yellow temporary pavement marking tape for left lane closures or temporary road markers at 5' spacing shall be installed when the lane is closed for a period of 24 hours or more.

Signs a, b, and c shall be removed or covered when workers are not present.

ROAD WORK AHEAD sign is only required in advance of the first lane closure.

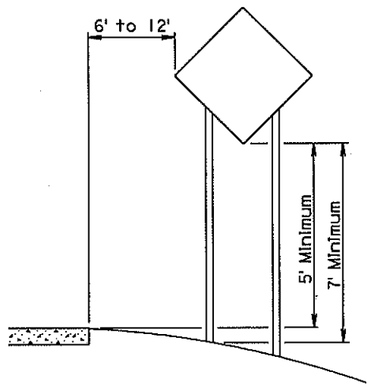
If the spacing between manned work spaces is 1 mile or greater, a SPEED LIMIT 65(*) sign shall be posted at the end of the first manned work space. Additional SPEED LIMIT 45(*) sign(s) and FLAGGER symbol sign(s) shall be installed in advance of the next manned work space(s). The FLAGGER sign shall be used whenever there is a Flagger present.

Left mounted advance signs on undivided highways are not required.

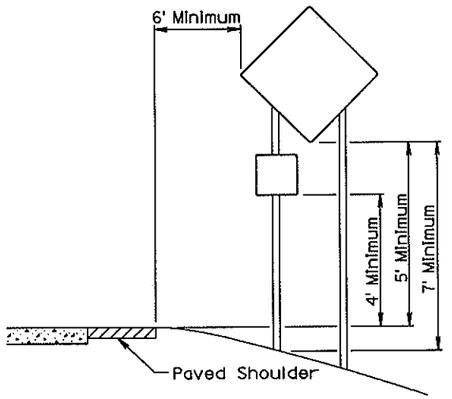
The channelizing devices shall be drums or type II barricades if traffic control must remain overnight or longer. 42" cones may be used in lieu of drums or type II barricades only along the centerline.

July 1, 2005

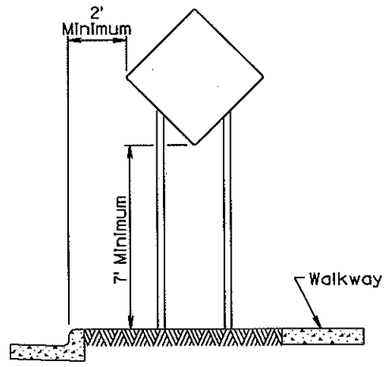
Published Date: 2nd Qtr. 2009	SDDOT	MANNED WORK SPACE SIGNING FOR DIVIDED AND UNDIVIDED HIGHWAYS	PLATE NUMBER 634.63
			Sheet 1 of 1



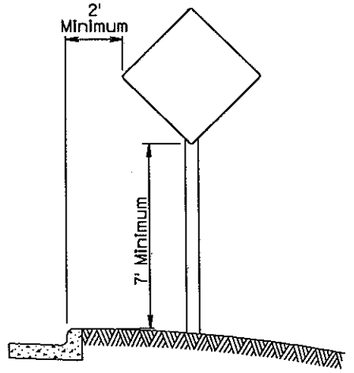
RURAL DISTRICT



RURAL DISTRICT WITH SUPPLEMENTAL PLATE



URBAN DISTRICT



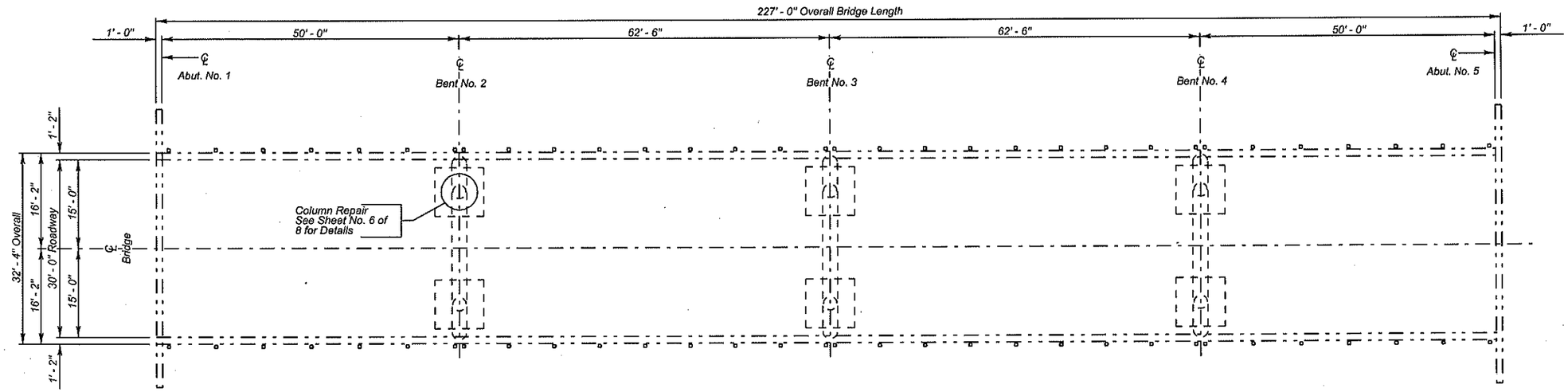
URBAN DISTRICT

December 23, 2003

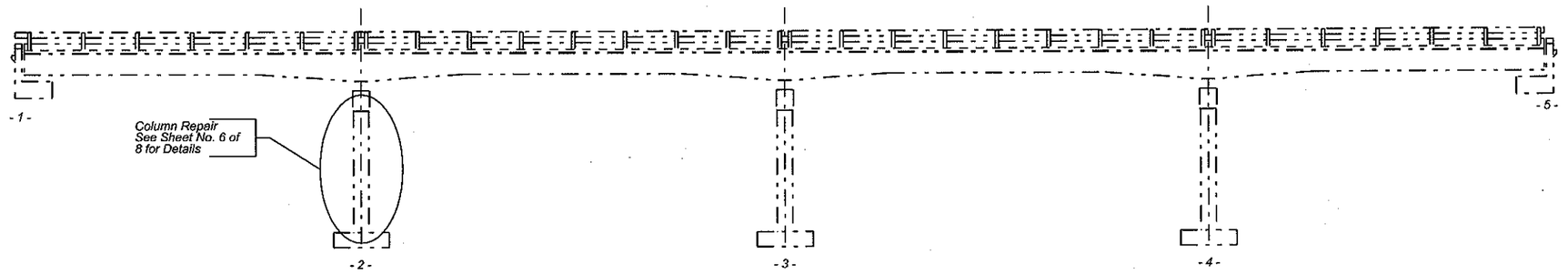
Published Date: 2nd Qtr. 2009	SDDOT	BREAKAWAY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1

Username - trrc12608

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 W-468	5	14



PLAN



ELEVATION

INDEX OF BRIDGE SHEETS -

LAYOUT OF REPAIRS
FOR
227' - 0" CONT. COMP. GIRDER BRIDGE

30'-0" ROADWAY — 0° SKEW
OVER I - 90 — SEC. 18/19-T4N-R6E
STR. NO. 47-069-510 — 090 W-468
PCN IIKE

MEADE COUNTY

S. D. DEPT. OF TRANSPORTATION

MAY 2009 — 1 OF 8

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

DESIGNED BY	DRAWN BY	CHECKED BY	
BB	JWL	EJA	Kevin N. Goeden
MEADIIKE	IIKELBOI		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 W-468	6	14

Estimate of Structure Quanties and Notes

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
460E0070	Class A45 Concrete, Bridge Repair	0.1	Cuyd
460E0300	Breakout Structural Concrete	0.1	CuYd
480E5000	Galvanic Anode	2	Each
460E8000	Column Fiber Wrap	1	Each

SPECIFICATIONS

1. Design Specifications: AASHTO Standard Specifications for Highway Bridges 2002 Edition with 2003 Interim Specifications using Working Stress Design.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal.

DETAILS AND DIMENSIONS OF EXISTING BRIDGE

All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure shall be accomplished with the traffic control shown in the plans. The following is a recommended sequence of operations for the planned work. Alternate sequence of operations may be submitted by the Contractor for approval by the Engineer at the pre-construction meeting.

1. Remove delaminated and loose concrete on the column indicated at Bent No. 2.

2. Place concrete in the removal areas and place the column fiber wrap at the location show on the plans for the column indicated at Bent No. 2.

COLUMN REPAIR

Concrete used in the column repair shall consist of one of the following products, or equal as approved by the Office of Bridge Design.

Vertical Patch
Nox-Crete Products Group
1444 S. 20th Street
Omaha, NE 68108
Phone: (402) 341-1976
http://www.nox-crete.com

COLUMN REPAIR (CONTINUED)

Akona Pre-Mixed Concrete Patch
Akona Manufacturing, LLC.
2025 Centre Pointe Boulevard
Suite 300
Mendota Heights, MN 55120
Phone: (651) 905-8137
http://www.akonallc.com/about/helpline.html

Thorite Rapid Vertical
BASF Construction Chemicals – Building Systems
889 Valley Park Drive
Shakopee, MN 55379
Phone: (952) 496-6000
http://www.buildingsystems.basf.com/index.asp

Speed Crete Red Line
Euclid Chemical
19218 Redwood
Cleveland, OH 44110
Phone: (800) 321-7628
http://www.tamms.com/default.asp

The concrete patch material shall be applied and cured as recommended by the Manufacturer and as approved by the Engineer. The Contractor shall furnish the Engineer a copy of the manufacturer's recommendations for mixing, installation and curing prior to use.

CONCRETE BREAKOUT

1. The column shall be broken out to the limits shown on the plans. Breakout limits shall be defined with a 3/4" deep sawcut (unless specified otherwise in these plans), where practical, as approved by the Engineer. Reinforcing steel that is exposed and is scheduled for use in the new construction shall be cleaned to the satisfaction of the Engineer. Care shall be taken not to damage the existing reinforcing steel that is to be reused in the new construction during concrete breakout. Any reinforcing steel that is damaged during concrete breakout shall be replaced or repaired, as approved by the Engineer, by the Contractor at no cost to the Department.

2. All broken out concrete shall be disposed of by the Contractor. Any disposal of discarded material shall be in accordance with the Construction Specifications.

3. The contract unit price per cubic yard for "Breakout Structural Concrete" shall include breaking out the column concrete, cleaning, straightening existing reinforcing steel and disposal of all broken out material.

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP

1. GENERAL

1.1 The Fiber Reinforced Epoxy Composite system shall be installed by a Contractor certified by the manufacturer in writing. Certified applicator shall have a minimum of two years experience in performing composite retrofits with wet lay-up systems.

1.2 Submittals required by the Contractor

1.2.1. The Contractor shall furnish the Manufacturer's product data, specifications and recommended application procedures showing compliance with the project requirements in writing to the Engineer at the preconstruction meeting. The material provided shall show testing information to demonstrate 10,000 hour system durability including 100% humidity, ozone, alkali soil, salt water, and 140° F testing on the actual composite to be used. Durability testing shall be demonstrated for the effects of ultraviolet light and freeze/thaw. The composite supplier will also make available large-scale test results from independent testing laboratories to demonstrate system performance.

1.2.2. Complete shop drawings shall be submitted for each installation of the composite system. The shop drawings shall contain details of the number and thickness of layers, joint and end details, number location and type of sheet anchors and structure locations where the material is to be applied.

1.2.5 A list of a minimum of one hundred (100) completed composite strengthening projects completed with the manufacturer's composite system. The list should include at a minimum, the dates of work, type, description and amount of work performed.

ESTIMATE OF QUANTITIES AND NOTES
FOR
227' – 0" CONT. COMP. GIRDER BRIDGE

30'-0" ROADWAY **0° SKEW**
STR. NO. 47-069-510 **SEC. 18/19 – T4N – R6E**
OVER I-90 **090 W-468**

MEADE COUNTY
S.D. DEPARTMENT OF TRANSPORTATION

MAY 2009 **2 OF 8**

DESIGNED BY:	DRAWN BY:	CHECKED BY:	
BB	BB	EJA	Kevin N. Boeder
MEADI1KE	I1KENOTB		BRIDGE ENGINEER

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP (CONT.)

1.2.6 A list of a minimum of five (5) completed composite strengthening projects performed by the certified applicator. The list should include at a minimum, the dates of work, type, description and amount of work performed, and the name and telephone number of a contact person at the agency or company for which the work was completed. In addition, provide the names of the applicator's key personnel (superintendent and assistant) who will perform the actual work. The superintendent and assistant shall have a minimum experience of 1year involvement in directing projects such as this.

1.2.7. The Department shall have the right to approve or reject the personnel qualifications as submitted. The Engineer may suspend the work if the Contractor substitutes an unauthorized composite system or unauthorized personnel for authorized personnel during construction.

2. MATERIALS

2.1 General Requirements:

2.1.1 Design the composite system to achieve the structural performance shown on the structural drawings.

2.1.2 Deliver epoxy materials in factory-sealed containers with the manufacturer's labels intact and legible with verification of date of manufacture and shelf life.

2.1.3 Store materials in a protected area at a temperature between 35°F and 100°F.

2.1.4. Products shall be stored according to the manufacturer's requirements and shall avoid contact with moisture.

2.2 Material Properties:

2.2.1 The system to be applied shall be the following or an approved equal as determined by the Office of Bridge Design. An approved equal shall need to satisfy all of the system requirements shown in 2.2.3.:

Tyfo Fibrwrap System supplied by the Fyfe Company
6044 Cornerstone Court West, Suite C
San Diego, California 92121-4730
Tel: (619) 642-0694
Fax: (619) 642-0947

2.2.2 The Tyfo Fibrwrap System shall have the following materials:

2.2.2.1 Composite fabric:
SCH 41 fabric – carbon and aramid hybrid fabric
SHE 51 fabric – glass and aramid hybrid fabric

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP (CONT.)

2.2.2.2 Epoxy saturant:
Tyfo S epoxy to be combined with the fabric to form the Tyfo Fiberwrap composite.

2.2.2.3 Primer/Filler:
Tyfo WS thickened epoxy for protective seal coat and filling voids.

2.2.2.4 Anchorage:
Tyfo Anchors to be used at termination points of bands which do not encase an element.

2.2.2.5 Finish Paint:
Tyfo A or Tyfo U paint.

2.2.3 The cured composite system shall conform to the following requirements:

Property	Glass Composite Requirement	Carbon Composite Requirement	ASTM Test Method
Ultimate Tensile Strength, minimum in primary fiber direction	60,000 psi	100,000 psi	D 3039
Ultimate Breaking Load, minimum in primary fiber direction	3,000 lb/in. width	4,000 lb/in. width	D 3039
% Tensile Strength Retained after:			
7 days exposure at 100% humidity	90	90	
3,000 hours exposure to ozone	90	90	
3,000 hours exposure to alkali	90	90	
3,000 hours exposure to salt water	90	90	
3,000 hours exposure at 140° F	90	90	
Elongation:			D 3039
Percent, Minimum	1.7	0.8	
Percent, Maximum	4	1.7	
Tensile Modulus, psi, minimum Based on cross sectional Area of primary fibers	3×10^6	8×10^6	D 3039
Ultimate Tensile Strength At 90 degrees to Primary fibers, psi, minimum	3,000	1,000	D 3039
Visual Defects	Acceptance Level III	Acceptance Level III	D 2563

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP (CONT.)

3. CONSTRUCTION REQUIREMENTS

3.1 Surface Preparation:

3.1.1 The surface to receive composite shall be free from fins, sharp edges and protrusions that will cause voids behind the installed composite or that, in the opinion of the Engineer, will damage the fibers. Existing uneven surfaces and voids to receive composite shall be filled with epoxy filler or other material approved by the Engineer (small pinholes or micro-bubbles in concrete surface or resin, do not require special detailing). The contact surfaces shall have no free moisture on them at the time of application. If moisture can not be avoided, use the manufacturer's suggested wet prime epoxy.

3.1.2 Round off sharp and chamfered corners to a radius of 1 inch (±0.25") by means of grinding or forming with the system's thickened epoxy. Variations in the radius along the edge shall not exceed 1/2" for every 12" of length.

3.1.3 The Contractor shall remove all unsound and loose concrete in the area of the composite column wrap prior to column wrap placement. The Contractor will not be allowed to use any impact type breakout equipment larger than a 15 pound jack hammer for concrete removal. Any damaged reinforcing steel caused by the removal operation shall be repaired by the Contractor as approved by the Engineer at the Contractor's expense. The removal areas shall be built up to the original section using an approved product listed under the Column Repair notes which meets the strength of existing section. Surfaces of the repaired areas shall be smooth and free of voids or undulations that would prevent full contact with the composite column wrap system.

3.1.4 Column surfaces shall have all surface foreign materials, such as bird nests, dirt, etc., removed as approved by the Engineer. Stripping off well-adhered paint or concrete from column surfaces is not required. One prime coat of the manufacturer's epoxy shall be applied prior to wrapping columns with the composite.

ESTIMATE OF QUANTITIES AND NOTES (CONTINUED)
FOR
227' – 0" CONT. COMP. GIRDER BRIDGE

30'-0" ROADWAY **0° SKEW**
STR. NO. 47-069-510 **SEC. 18/19 – T4N – R6E**
OVER I-90 **090W-468**

MEADE COUNTY
S.D. DEPARTMENT OF TRANSPORTATION

MAY 2009 3 OF 8

DESIGNED BY:	DRAWN BY:	CHECKED BY:	
BB	BB	EJA	Kevin N. Goeden
MEAI1KE	I1KENOTB		BRIDGE ENGINEER

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP (CONT.)

3.1.5 For surfaces which do not allow complete encasement with the composite system, surfaces shall be prepared for bonding by means of abrasive blasting or grinding to achieve a 1/16" minimum amplitude. All contact surfaces shall then be cleaned by hand or compressed air. One prime coat of the manufacturer's epoxy shall be applied and allowed to cure for a minimum of one hour. Prior to the application of the saturated fabric, fill any uneven surfaces with the manufacturer's thickened epoxy. Provide anchorage as detailed on the construction drawings.

3.2 Application Procedures

3.2.1 Fiber wrap material shall not be applied until all surface preparation work is complete and all patching materials have cured for a minimum of 10 days.

3.2.2 Verify ambient and concrete temperatures. No work shall proceed if the temperature of the concrete surface being repaired is less than 35 ° F or greater than 100 ° F. The temperature of the epoxy components shall be between 35° F and 100° F at the time of mixing or as specified on the component labels.

3.2.3 Prepare the epoxy matrix by combining components at a weight (or volume) ratio specified on the manufacturer's labeled units, with an allowable tolerance of + 10%. The components of epoxy resin shall be mixed with a mechanical mixer until uniformly mixed, typically 5 minutes at 400-600 rpm. Components which have exceeded their shelf life or pot life(as designated on the material label) shall not be used.

3.2.4 Saturation of the fabric shall be performed and monitored according to manufacturer's specified fiber-resin ratio. A previously calibrated saturator can be used to achieve the specified ratio. Fabric shall be completely saturated prior to application to contact surface in order to assure complete impregnation of fabric. Saturation shall be supervised and checked by the properly trained representative of the installer.

3.2.5 Both the epoxy resin and fabric shall be measured accurately, combined, and deposited uniformly at the rates shown on the approved working drawings and per manufacturer's recommendations. The composite system shall be comprised of fibers completely saturated with epoxy resin per proper ratio.

3.2.6 Quality control procedures: Record batch numbers for fabric and epoxy used each day, and note locations of installation. Measure square footage of fabric and volume of epoxy used each day. Complete report and submit to the Engineer.

3.2.8 Protect the areas adjacent to the application from splatter, drips and over runs.

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP (CONT.)

3.2.9 Apply saturated fabric to concrete surface using methods that produce a uniform, constant tensile force that is distributed across the entire width of fabric. Gaps between composite bands may not exceed 1/2 inch in width in the fabric's transverse joint unless otherwise noted on the project drawings. A lap length of at least 6 inches is required at all necessary over-laps in the longitudinal direction of the fabric.

3.2.10 Using a roller or hand pressure, insure proper orientation of fibers, release or roll out entrapped air, and ensure that each individual layer is firmly bedded and adhered to the preceding layer or substrate.

3.2.11 Apply a final coat of thickened epoxy. Detail all fabric edges, including butt splice, termination points, and jacket edges, with epoxy.

3.2.12 If the system incorporates structural fasteners, the limitations, detailing and location must be verified with the composite system manufacturer.

3.2.13 The completed installation shall be allowed to cure in ambient conditions. Epoxy curing temperatures shall be maintained in the temperature range designated for the formulation used. The temperature cure ranges and times will be supplied by the manufacturer. The composite system shall be protected from contact by moisture, damage and debris for a minimum of 24 hours after placement.

3.2.14 Paint the finished surfaces of the composite system with a paint system approved by the manufacturer and the Office of Bridge Design. Paint shall not be applied within the first 24 hours of placement. After the 24 hour cure period paint can be applied when the composite system achieves a tacky surface where a light finger touch results in no transfer of epoxy to the finger but still exhibits a tacky feeling. From this time, until 72 hours later, two finish coats of the approved paint system shall be applied. If the paint system is applied after 72 hours, the surface must be roughened by sanding or brush blasting to break the gloss finish for the application of the paint system. Dust and residue shall be removed prior to application of paint coats. The color of the finished coat of paint shall match the color of the adjacent concrete as approved by the Engineer.

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP (CONT.)

3.2.15 All defects (including bubbles, delaminations, and fabric tears) spanning more than 5% of the surface area shall be repaired. Small defects (on the order of 6" diameter) shall be injected or back filled with epoxy. Bubbles less than 12" in diameter shall be repaired by injecting with epoxy. Two small holes shall be drilled into the bubble to allow injection of the epoxy and escape of entrapped air. Bubbles and delaminations greater than 12" in diameter shall be repaired by removing and re-applying the required number of layers of the composite and the required finish coatings. All repair procedures shall be subject to the approval of the Engineer.

4. METHOD OF MEASUREMENT

Measurement will not be made for Column Fiber Wrap. The plan quantity will be the basis of payment.

5. BASIS OF PAYMENT

Column Fiber Wrap will be paid for at the contract unit price per each. Payment will be full compensation for labor, equipment, materials, and all incidental work required.

ESTIMATE OF QUANTITIES AND NOTES (CONTINUED)
FOR
227' – 0" CONT. COMP. GIRDER BRIDGE

30'-0" ROADWAY **0° SKEW**
STR. NO. 47-069-510 **SEC. 18/19 – T4N – R6E**
OVER I-90 **090 W-468**

MEADE COUNTY
S.D. DEPARTMENT OF TRANSPORTATION

MAY 2009 **4 OF 8**

DESIGNED BY:	DRAWN BY:	CHECKED BY:	
BB MEAI1KE	BB I1KENOTB	EJA	Kevin N. Boeder BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 W-468	9	14

GALVANIC ANODES

1. The Contractor shall place galvanic anodes in the patched areas of the columns. Galvashield XP+, or an approved equivalent as approved by the Office of Bridge Design, shall be used. Galvashield XP+ is manufactured by:

   Vector Corrosion Technologies
   474 Dovercourt Drive
   Winnipeg, MB, Canada R3Y 1G4
   Phone: (204) 489-6300

2. The anodes shall be placed in accordance with manufacturer's recommendations and as approved by the Engineer. The anodes shall provide the corrosion prevention level of protection. The anodes have not been shown on the drawings. The Contractor shall provide shop drawings of the galvanic anode installation including locations of the individual anodes.

3. The anodes shall be placed with a minimum ¾" cover and shall be set in Galvashield Embedding Mortar per the manufacturer's recommendations. The anodes shall be fully encased in the concrete repair material. Where adequate cover does not exist, a concrete pocket shall be chipped out behind the anode to provide sufficient cover. The Contractor may need to chip around the reinforcing bar locally at the anode installation to make the electrical connection. The reinforcing steel at the connection location shall be cleaned per the manufacturer's recommendations to provide sufficient electrical connection and mechanical bond.

4. The electrical continuity of the electrical connections and reinforcing steel shall be confirmed per the manufacturer's recommendations.

5. The Contractor shall provide manufacturer's product literature, shop drawings and installation instructions.

6. All costs associated with placing anodes including labor, equipment, materials and incidentals shall be included in the contract unit price per each for "Galvanic Anode".

ESTIMATE OF QUANTITES AND NOTES (CONTINUED)
FOR
227' – 0" CONT. COMP. GIRDER BRIDGE

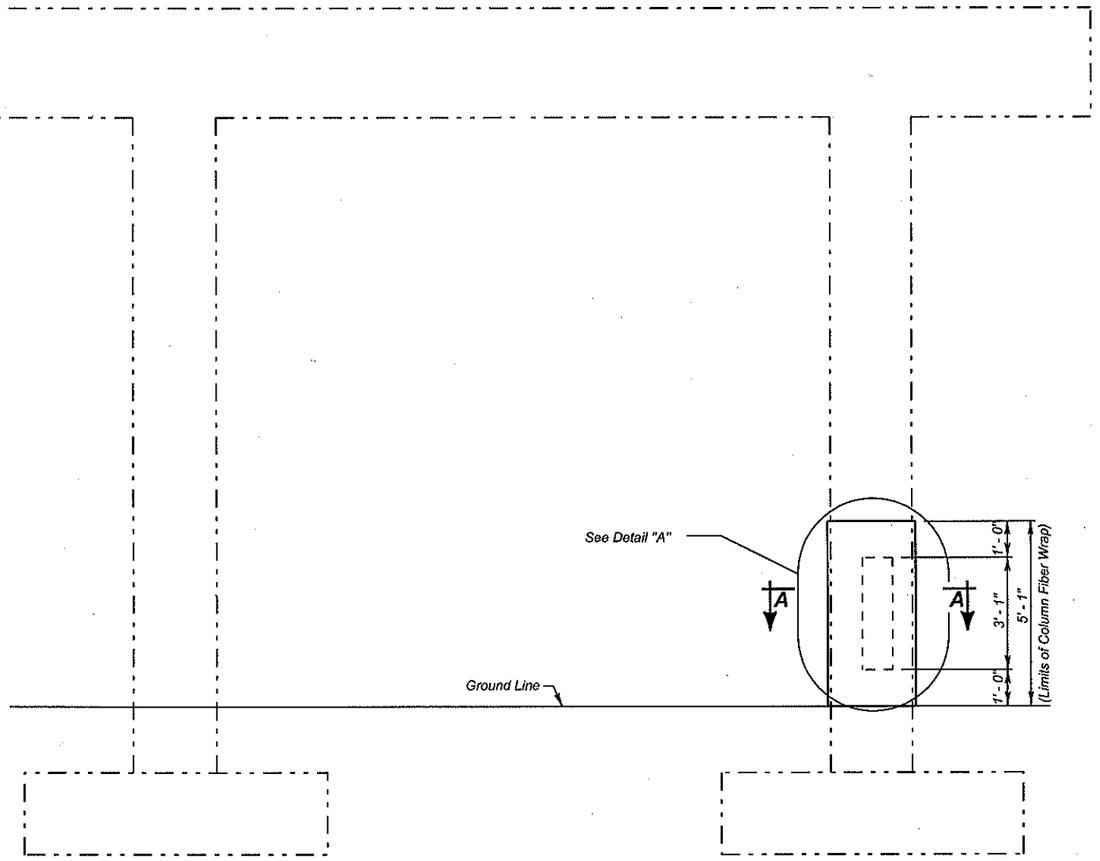
30'-0" ROADWAY **0° SKEW**
STR. NO. 47-069-510 **SEC. 18/19 – T4N – R6E**
OVER I-90 **090 W-468**

MEADE COUNTY
S.D. DEPARTMENT OF TRANSPORTATION

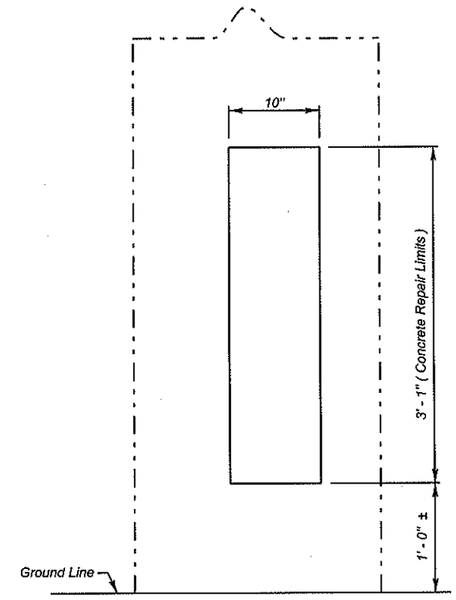
MAY 2009 **5 OF 8**

DESIGNED BY:	DRAWN BY:	CHECKED BY:	
BB MEAI1KE	BB I1KENOTB	EJA	Kevin N. Goeden BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 W-468	10	14



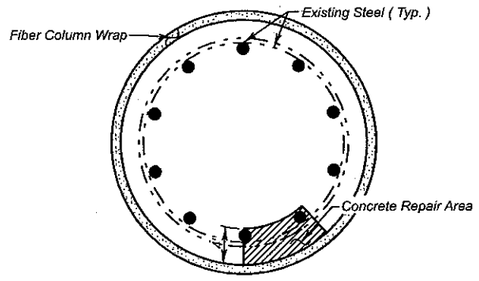
ELEVATION
(Bent No. 2)



DETAIL "A"

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Breakout Structural Concrete	CuYd	0.1
Class A45 Concrete, Bridge Repair	CuYd	0.1
Column Fiber Wrap	Each	1
Galvanic Anode	Each	2

NOTE :
This sheet is to be used in conjunction with the Notes.



SEC. A-A

COLUMN REPAIR DETAILS
FOR
227' - 0" CONT. COMP. GIRDER BRIDGE
30'-0" ROADWAY — 0° SKEW
OVER I- 90 — SEC. 18/19-T4N-R6E
STR. NO. 47-069-510 — 090 W-468
MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2009 — 6 OF 8

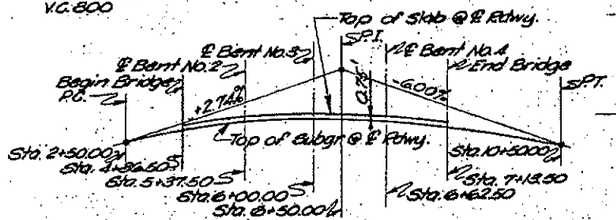
DESIGNED BY	DRAWN BY	CHECKED BY	
BB	BB	EJA	Kevin N Goeden
MEADIKE	IIKESBOG		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 W-468	11	14

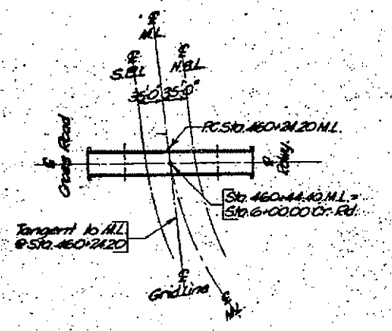
-X771-

INDEX OF BRIDGE SHEETS—

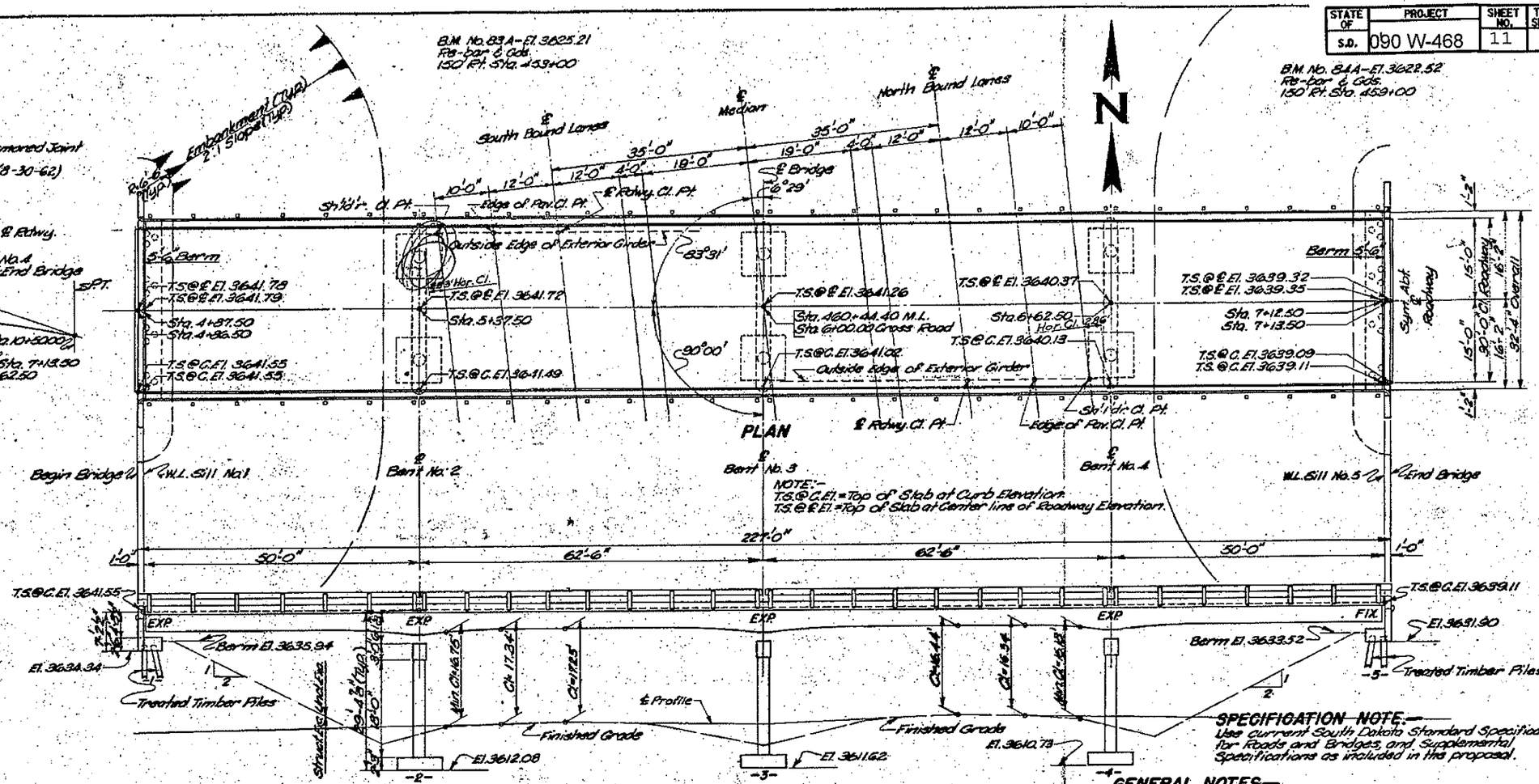
P.I. Sta. 6+50.00
El. 3648.57
V.C. 800



SUBGRADE CURVE DATA



LAYOUT



ELEVATION

ESTIMATED QUANTITIES

ITEM	Cl "A" Concrete Cu. Yds.	Steel-Lbs. Reinf.	Steel-Lbs. Struc.	Open Steel Railing-Lin. Ft.	Timber Piling-Lin. Ft. Treated Timber Piles	Timber Piling-Lin. Ft. *Test Pile	*Steel Pile shoes No.	Excavation-Cu. Yds. Struct.	Excavation-Cu. Yds. Unclass.
Superstructure	170.1	52,430	118,690	456.3					
Sill No. 1	23.2	2205			11@25=275	1@30=30	12	18	
Sill No. 5	23.2	2205			11@25=275	1@30=30	12	18	
Bent No. 2	26.2	6825						60	
Bent No. 3	25.2	6825						65	
Bent No. 4	25.2	6825						80	
Totals	292.1	77,335	118,690	456.3	550	#60	*24	241	△15879

@ One Treated Timber Test Pile shall be driven at Sills No. 1 and 5 before remaining piles are ordered.
△ See Grading Plans for Unclassified Excavation.
PILE NOTE:- Piles driven at Sills No. 1 and 5 including test piles, shall obtain their full bearing (24 tons) in the natural ground below the new embankments, elevations 3620.0± and 3617.8± respectively. Pre-bored holes thru the fill to natural ground are required, and shall have a minimum diameter 2" larger than the nominal diameter (3" from butt) of the pile.
*All Steel Pile Shoes as approved by the ENGINEER shall be used.

EXCAVATION NOTES.—

1. Footings for Bents No. 2, 3 & 4 shall be cast against red sandy gravel or reddish gray to white gypsum and carried into same approximately depth of footing. Limits of excavation for these footing shall be bound as nearly as practicable by the neat lines as shown in details of footings for Bents No. 2, 3 & 4 on Sheet No. 4.
2. Red sandy gravel or reddish gray to white gypsum shall develop a minimum bearing value of 3.75 tons per Sq. Ft. If the bearing value is less than 3.75 tons per Sq. Ft. communicate with the BRIDGE SECTION.
3. Final footing elevations for Bents No. 2, 3 & 4 shall be established before ordering column reinforcing steel for the respective bents.

GENERAL NOTES.—

1. Longitudinal elements of the slab shall conform to the vertical curve.
2. For elevations of Grout Pads G1, G2, G3, & G4, see table on Erection Data Sheet.
3. Surface Finish, Sec. 46.3×(3) of the current South Dakota Standard Specifications, shall include such portions of the structure which are visible from any traveled lane.
4. Rail Posts shall be built vertical.
5. Omit Floor Drains.

SPECIFICATION NOTE.—

Use current South Dakota Standard Specifications for Roads and Bridges, and Supplemental Specifications as included in the proposal.

ORIGINAL CONSTRUCTION PLANS

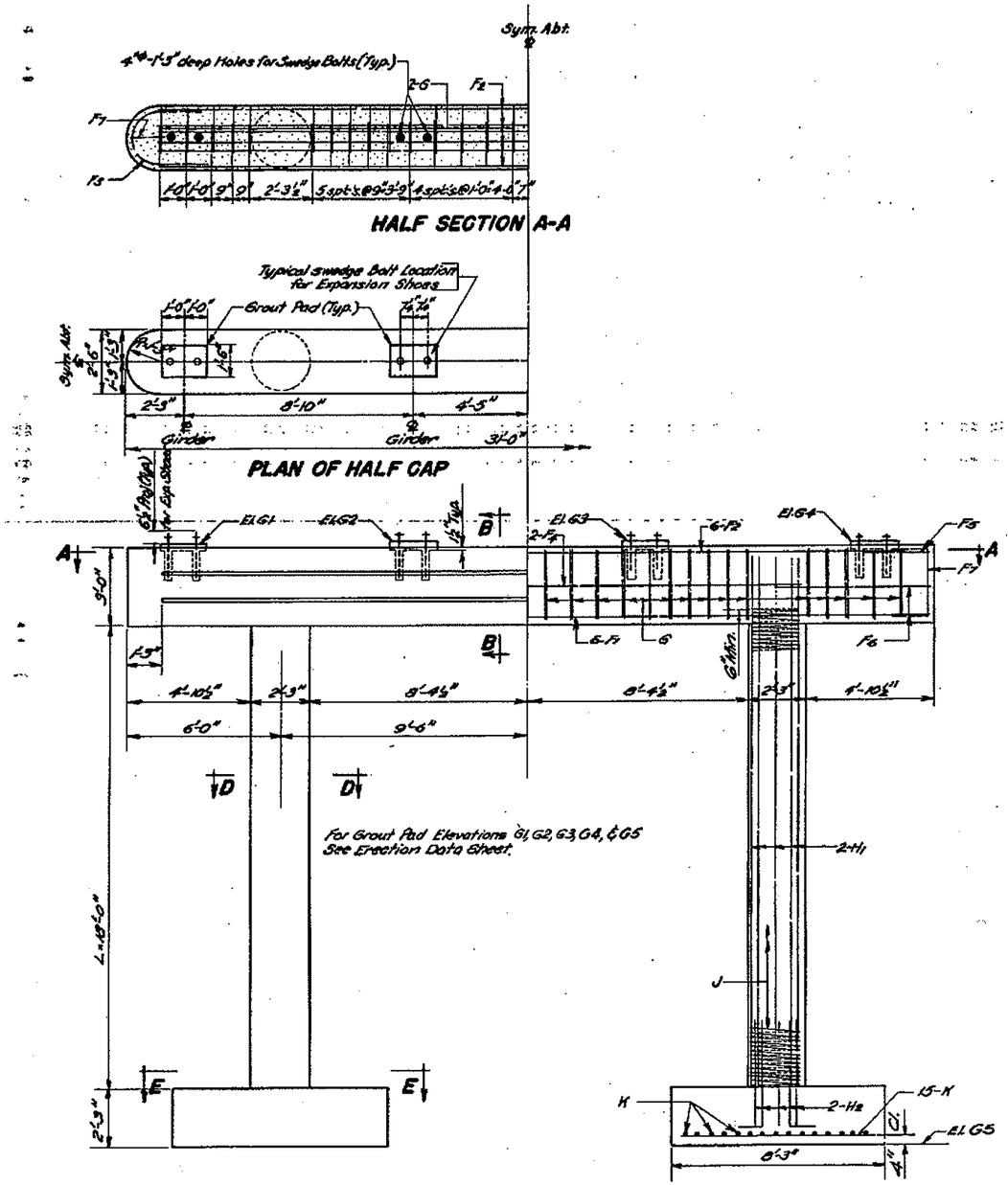
GENERAL DRAWING AND QUANTITIES
FOR
227'-0" CONT. COMP. GIRDER VIADUCT
30'-0" ROADWAY
OVER I.S. NO. 90 STA. 460+44.4 SEC. 18/19-T4N-R6E
STA. 4+86.50 TO STA. 7+13.50 I 90-1(9)38
MEADE COUNTY
SOUTH DAKOTA H20-S16-44
DEPARTMENT OF HIGHWAYS
JULY 1962 (7) OF (8)

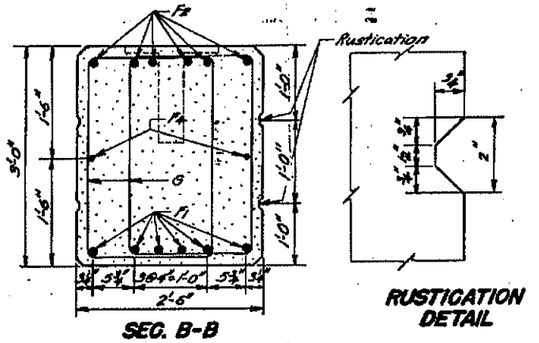
-X771-

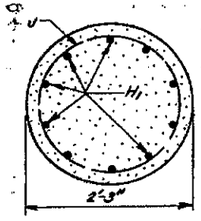
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	G.A.	R.d.E.R.K.	BRIDGE ENGINEER

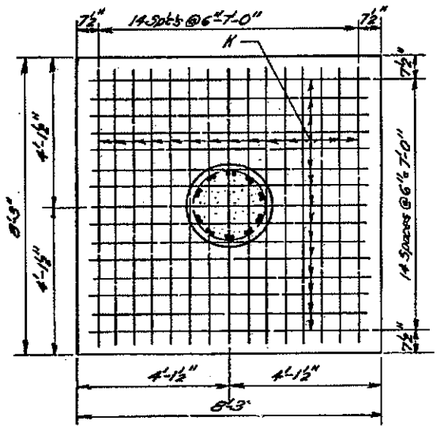
47-036

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 W-468	12	14





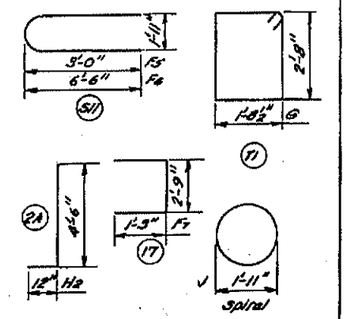




REINFORCING SCHEDULE (For one bent)

Mark	No.	Size	Length	Type
F1	6	11	20'-9"	Str.
F3	6	11	22'-6"	Str.
F4	2	6	20'-9"	Str.
F5	2	8	7'-0"	S11
F6	4	6	14'-0"	S11
F7	2	5	5'-3"	17
G	60	5	9'-9"	71
H1	20	11	20'-6"	Str.
H2	20	11	5'-3"	2A
J	2	4	698'-0"	Spiral
K	60	6	7'-9"	Str.

Bending Details



Spirals - 2" pitch - 1½ extra turns at each end. Splice as required using a lap of 1½ turns or weld as approved by the Bridge Department. Use 3 spacer bars per column for spirals. The weight of spacers are included in the total weight of Re-Steel

All dimensions are out to out of bars.

ESTIMATED QUANTITIES

℄ For one bent.

ITEM	UNIT	Bent No. 2, 3, or 4
*Class 'A' Concrete	Cu. Yds.	252
#Reinforcing Steel	Lbs.	6825
Struct. Excavation per ft. of depth	Cu. Yds.	9.4

*Includes 0.1 Cu. Yds. for Grout Pads.
#Includes 83 lbs. for Spacers.

GENERAL NOTES -

1. All exposed edges shall be chamfered 1".
2. Use 2" clear cover on all reinforcing steel except as shown.
3. All Re. Steel shall conform to A.S.T.M. A 305 (current) and A-15 (current) Intermediate Grade.
4. Specifications for grout shall be the same as those for Class 'A' Conc. except that the maximum size of aggregate shall be reduced to ¼".
5. Design Loading: H20-S16-44 (T-Current) A.A.S.H.O.
6. Unit Stresses:
   Concrete f_c = 1600 p.s.i.
   Concrete f'_c = 4000 p.s.i. (28 days)
   Re-Steel f_s = 20,000 p.s.i. (Intermediate Grade)
7. All sheet swedge bolts shall be 1¼"ø x 1'-9" with heavy hex. nut and cut washer. (Listed as structural steel in superstructure)

ORIGINAL CONSTRUCTION PLANS

DETAILS OF BENTS NO. 2, 3, AND 4
FOR
227'-0" CONT. COMP. GIRDER VIADUCT
30'-0" ROADWAY
OVER I.S. NO. 90 STA. 460+44.4 SEC. 18/19-T4N-R6E

STA. 4+86.50 TO STA. 7+13.50 I 90-1(9)38
MEADE COUNTY H20-S16-44
SOUTH DAKOTA
DEPARTMENT OF HIGHWAYS
JUNE 1962

8 OF 8

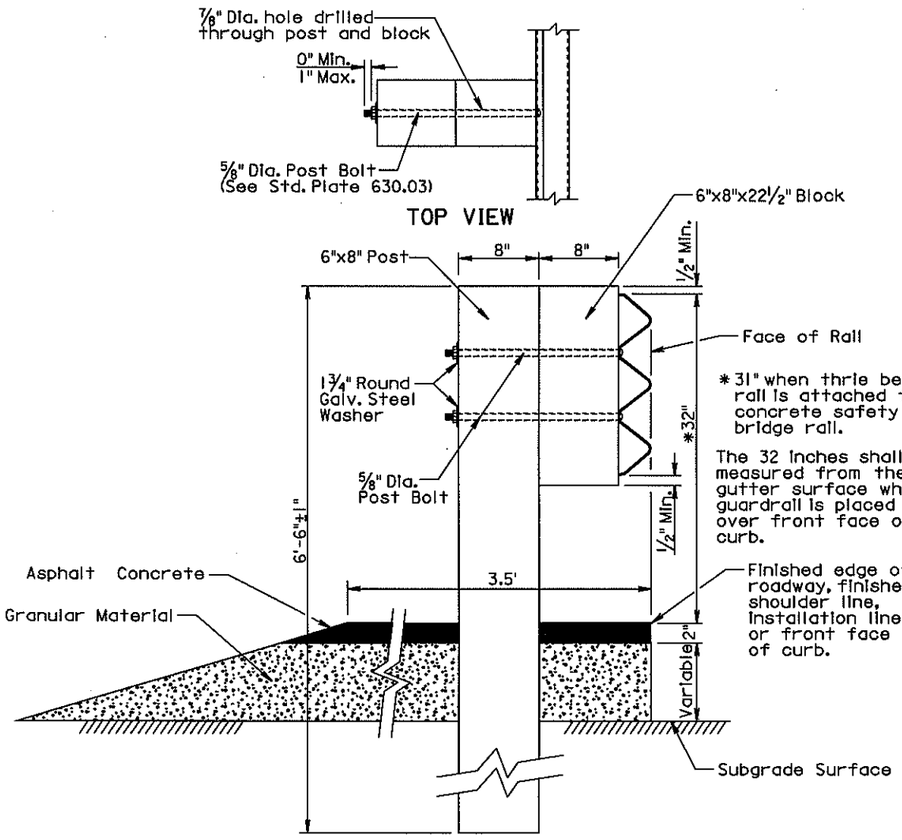
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	K. E. H.	R. d. E. R. K.	

BRIDGE ENGINEER

47-069-518

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-468	13	14

Plotting Date: 30-JUN-2009



* 31" when thrie beam rail is attached to a concrete safety bridge rail.

The 32 inches shall be measured from the gutter surface when guardrail is placed over front face of curb.

TRANSVERSE SECTION

GENERAL NOTES:

Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the SD Standard Specifications for "Asphalt Concrete Composite." For informational purposes, the Rate of Materials for the 3.5' wide section of asphalt concrete as shown above shall be 4.80 Tons per Station.

Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the SD Standard Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

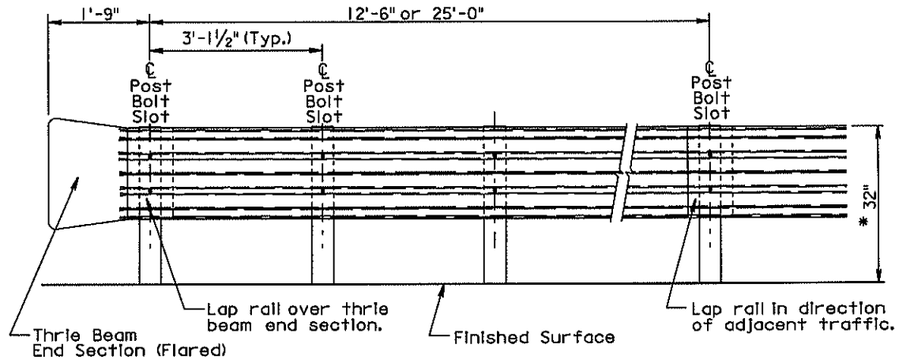
Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "Thrie Beam Guardrail" bid item.

The cross slope for the surfacing and subgrade surface shall be as specified in the plans (See Typical Sections and/or Cross Sections).

The top of posts and top of block shall have a true square cut. The top of post and top of block shall be flush.

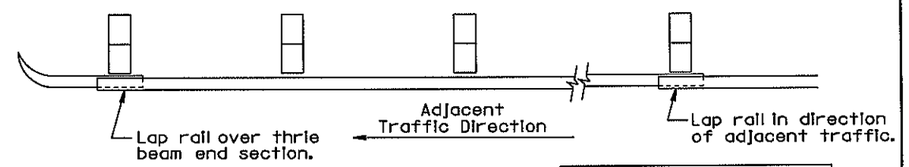
March 31, 2000

Published Date: 2nd Qtr. 2009	SDDOT	THRIE BEAM GUARDRAIL POST INSTALLATION	PLATE NUMBER 630.01 Sheet 1 of 1



* 31" when thrie beam is attached to a concrete safety bridge rail.

ELEVATION



PLAN

THRIE BEAM GUARDRAIL DEFLECTION CRITERIA	
POST SPACING	MAXIMUM DEFLECTION
6'-3"	2'-6"
3'-1 1/2"	1'-9"

For Informational Purposes Only

GENERAL NOTES:

All thrie beam rail shall be Type 1.

There will be no separate payment for furnishing and installing Thrie Beam End Sections (Flared) and Thrie Beam Terminal Connectors. All costs for the Thrie Beam End Sections (Flared) and Thrie Beam Terminal Connectors shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

Thrie beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used shall be compatible with the total length of rail per site as shown in the plans.

Thrie Beam End Sections (Flared) shall only be used in a one way traffic situation. See Standard Plate 630.80 for Thrie Beam End Section (Flared) in the Beam Guardrail Trailing End Terminal.

All costs for constructing thrie beam guardrail including labor, equipment, and materials including all posts, blocks, steel beam rail, and hardware shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "Thrie Beam Guardrail" bid item.

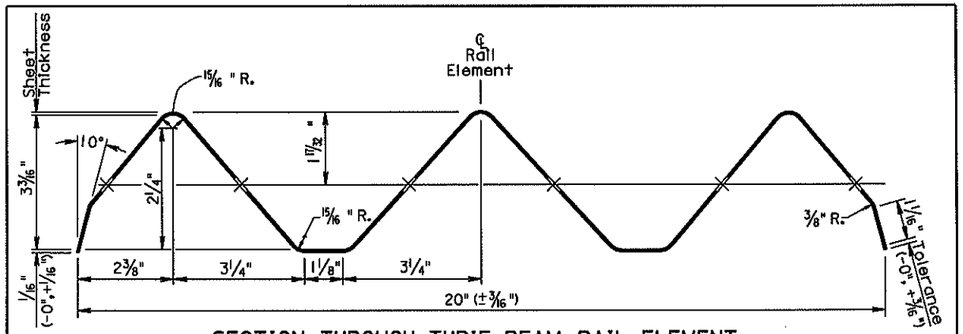
March 28, 2001

Published Date: 2nd Qtr. 2009	SDDOT	THRIE BEAM GUARDRAIL INSTALLATION	PLATE NUMBER 630.02 Sheet 1 of 1

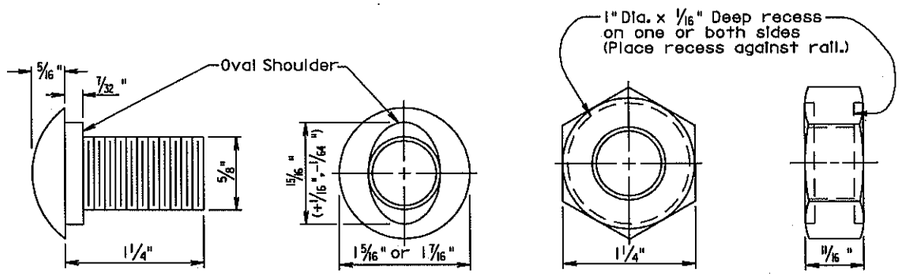
Username - trrol2608

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-468	14	14

Plotting Date: 30-JUN-2009

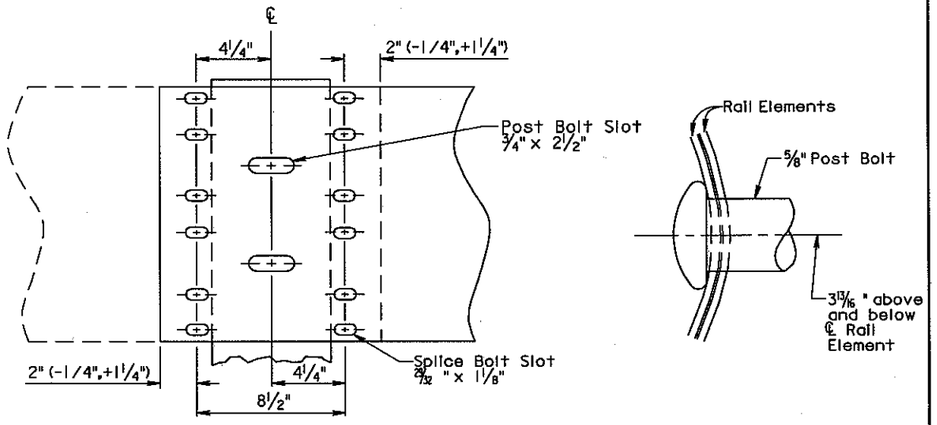


SECTION THROUGH THRIE BEAM RAIL ELEMENT



The Post Bolt is similar except the post bolt is 18" long.

SPLICE BOLT
(5/8" BUTTON HEAD BOLT AND RECESS NUT)



Lap in direction of traffic.

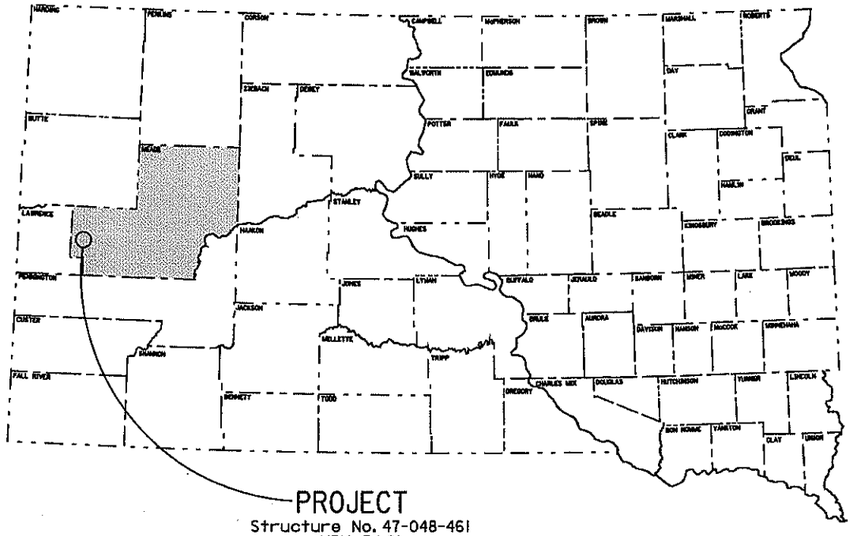
RAIL SPLICE

March 31, 2000

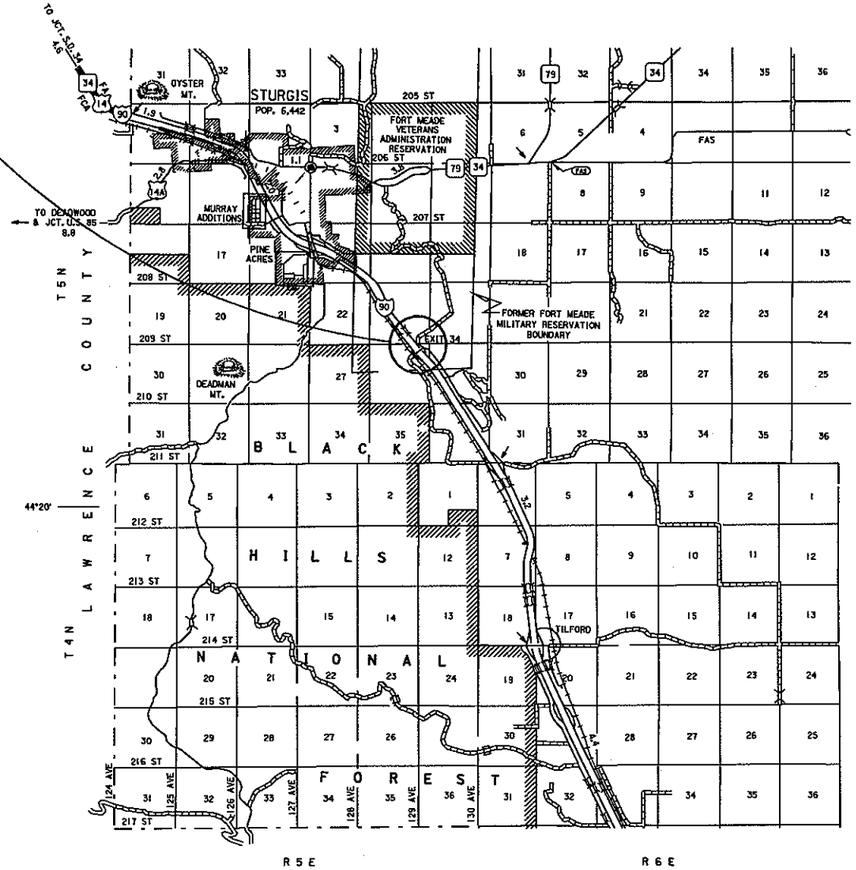
Published Date: 2nd Qtr. 2009	SDDOT	THRIE BEAM RAIL, RAIL SPLICE, AND HARDWARE	PLATE NUMBER 630.03 Sheet 1 of 1

Username - trrcl2608

PLOT SCALE - 200.000000:1.000000



PROJECT
Structure No. 47-048-461
MRM 34.81



STORM WATER PERMIT
(None Required)

DESIGN DESIGNATION

ADT (2008)	16320
ADT (2028)	28075
DHV	3820
D	50%
T DHV	6.6%
T ADT	14.6%
V	75 mph

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT 090 W-468
INTERSTATE 90
MEADE COUNTY

REPAIR BRIDGE COLUMN
PCN 11KD

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-468	1	13

Plotting Date: 30-JUN-2009

INDEX OF SHEETS

PLOTTED FROM - TRRC12608

PLOT NAME - TITLE_11KD
FILE - U:\REGIONRC\PRJ\MEAD11KD & MEAD11KE\MEAD11KD\TITLE_11KD.DGN

ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
460E0070	Class A45 Concrete, Bridge Repair	0.5	CuYd
460E0300	Breakout Structural Concrete	0.5	CuYd
460E8000	Column Fiber Wrap	1	Each
460E5000	Galvanic Anode	18	Each
634E0010	Flagging	40	Hour
634E0100	Traffic Control	510	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
900E7020	Bridge Cleaning	Lump Sum	LS

SPECIFICATIONS

Standard Specifications for Roads & Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal.

COMBINATION LETTING

This project is being let in combination with Project No. 090 W-468, PCN I1KE.

WORK DESCRIPTION

Work shall consist of bridge column repair.

GENERAL MAINTENANCE OF TRAFFIC

Removing, relocating, covering, salvaging and resetting of existing traffic control devices, including delineation, shall be the responsibility of the Contractor. Cost for this work shall be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.

The bottom of signs on portable or temporary supports shall not be less than seven feet above the pavement in urban areas and one foot above the pavement in rural areas. Portable sign supports may be used as long as the duration is less than 3 days. If the duration is more than 3 days the signs shall be on fixed supports.

Storage of vehicles and equipment shall be outside the clear zone and as near as possible to the right-of-way line. Contractor's employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work.

Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage to the vegetation, surfacing, embankment, delineators and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.

INVENTORY OF TRAFFIC CONTROL DEVICES

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	4	17	68
R1-1	48" x 48"	STOP	2	34	68
W1-3	48" x 48"	REVERSE TURN SIGN (LEFT OR RIGHT	1	34	34
W3-1	48" x 48"	STOP AHEAD (SYMBOL)	2	34	68
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	4	34	136
W20-4	48" x 48"	ONE LANE ROAD #### FT. OR AHEAD	2	34	68
W20-7a	48" x 48"	FLAGGER	2	34	68
				TOTAL UNITS	510

WASTE DISPOSAL SITE

The Contractor will be required to furnish a site(s) for the disposal of construction/demolition debris generated by this project.

Construction/demolition debris may not be disposed of within the State ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Highway, Road, and Railway Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) shall not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements shall apply:

1. Construction/demolition debris consisting of concrete, asphalt concrete, or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction/demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the State ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the State ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating "No Dumping Allowed".

2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

HISTORICAL PRESERVATION OFFICE CLEARANCES

To obtain SHPO clearance, a cultural resources survey may need to be conducted by a qualified archaeologist. The Contractor shall arrange and pay for this survey. In lieu of a cultural resources survey, the Contractor could request a literature search on the site and provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that no artifacts have been found on the site. Jim Donohue, State Archaeological Research Center at 605-394-1937 shall be contacted for a literature search.

If borrow material is furnished from within the current geographical reservation boundaries or historic boundaries of the Lake Traverse, Yankton, or Flandreau-Santee reservations, the Contractor shall obtain THPO (Tribal Historical Preservation Office) clearance from the Tribal Cultural Resources Officer. This requirement is in addition to the SHPO clearance. If no Tribal contact exists, the required SHPO clearance shall suffice, with documentation of Tribal contact efforts provided to SHPO.

To facilitate SHPO and THPO responses, the Contractor should submit a cultural resources survey report or the results of the literature search along with a legal description of the site, a topographical map with the site clearly marked, and evidence of prior site disturbance to Terrence G. Keller, DOT Environmental Supervisor, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3721). Allow 30 days from the date this information is submitted to the Environmental Supervisor for SHPO approval. The Contractor is responsible for obtaining all required permits and clearances for the borrow and/or waste disposal site(s) prior to commencing construction activities at the borrow and/or waste disposal site(s). The Contractor shall provide the required permits and clearances to the Engineer at the preconstruction meeting.

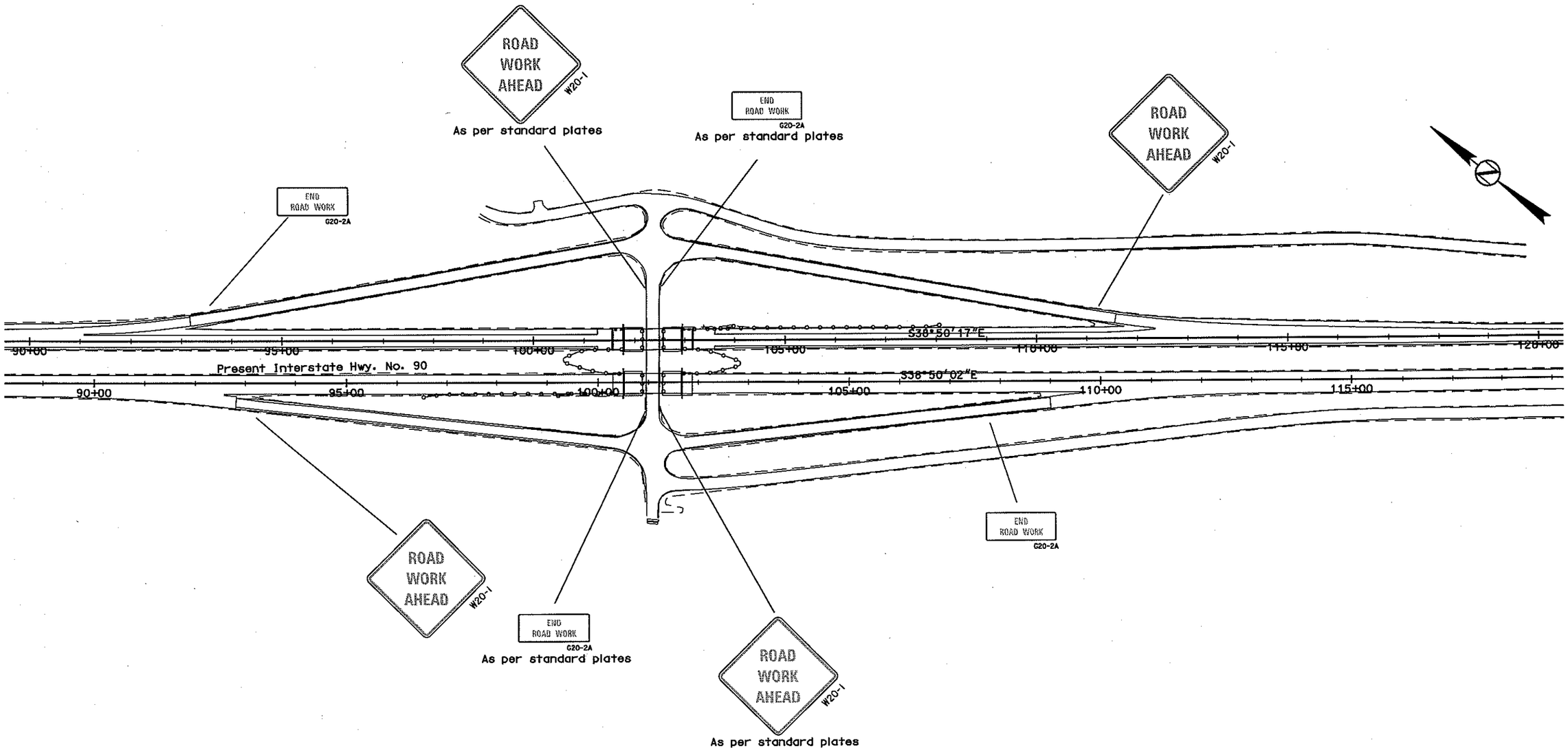
UTILITIES

It is not anticipated that any utilities will be found within the boundaries of the project. The Contractor, however, will be responsible for locating and protecting any utility that would conflict with any work. Any damage done to a utility will be the Contractor's responsibility to repair at no cost to the State.

FIXED LOCATION SIGNS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-468	3	13

Plotting Date: 30-JUN-2009



PLOT SCALE - 200.0000000:1.0000000
PLOTTED FROM - TRRC12608
FILE - U:\REGIONRCVPRJ\MEAD11KD\090WB.DGN
PLOT NAME - 090WB

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-468	4	13

Plotting Date: 30-JUN-2009

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	25
35 - 40	350	25
45 - 50	500	50
55	750	50
60 - 65	1000	50

Flagger

Channelizing Device

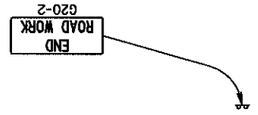
For low-volume traffic situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger may be used.

The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

For tack and/or flush seal operations, when flaggers are not being used, the FRESH OIL sign (W21-2) shall be displayed in advance of the liquid asphalt areas.

Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

The channelizing devices shall be drums or type II barricades if traffic control must remain overnight or longer. During daylight hours, 42" cones may be used in lieu of drums or type II barricades along the centerline.

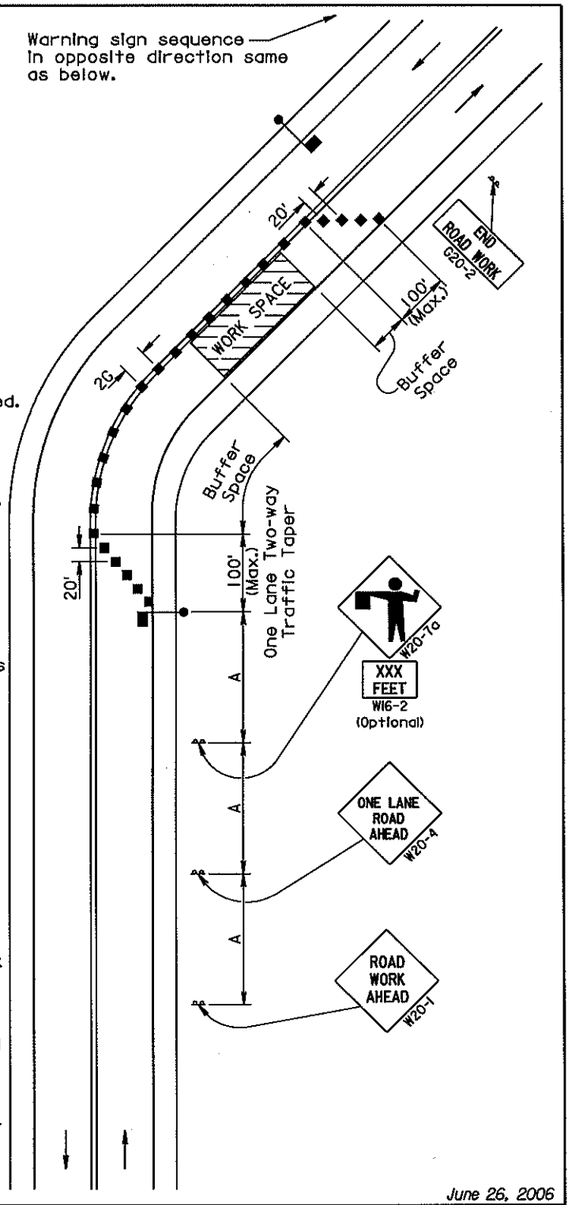


Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.

The buffer space shall be a sufficient length so that the channelizing devices are visible to approaching traffic.

Warning sign sequence in opposite direction same as below.

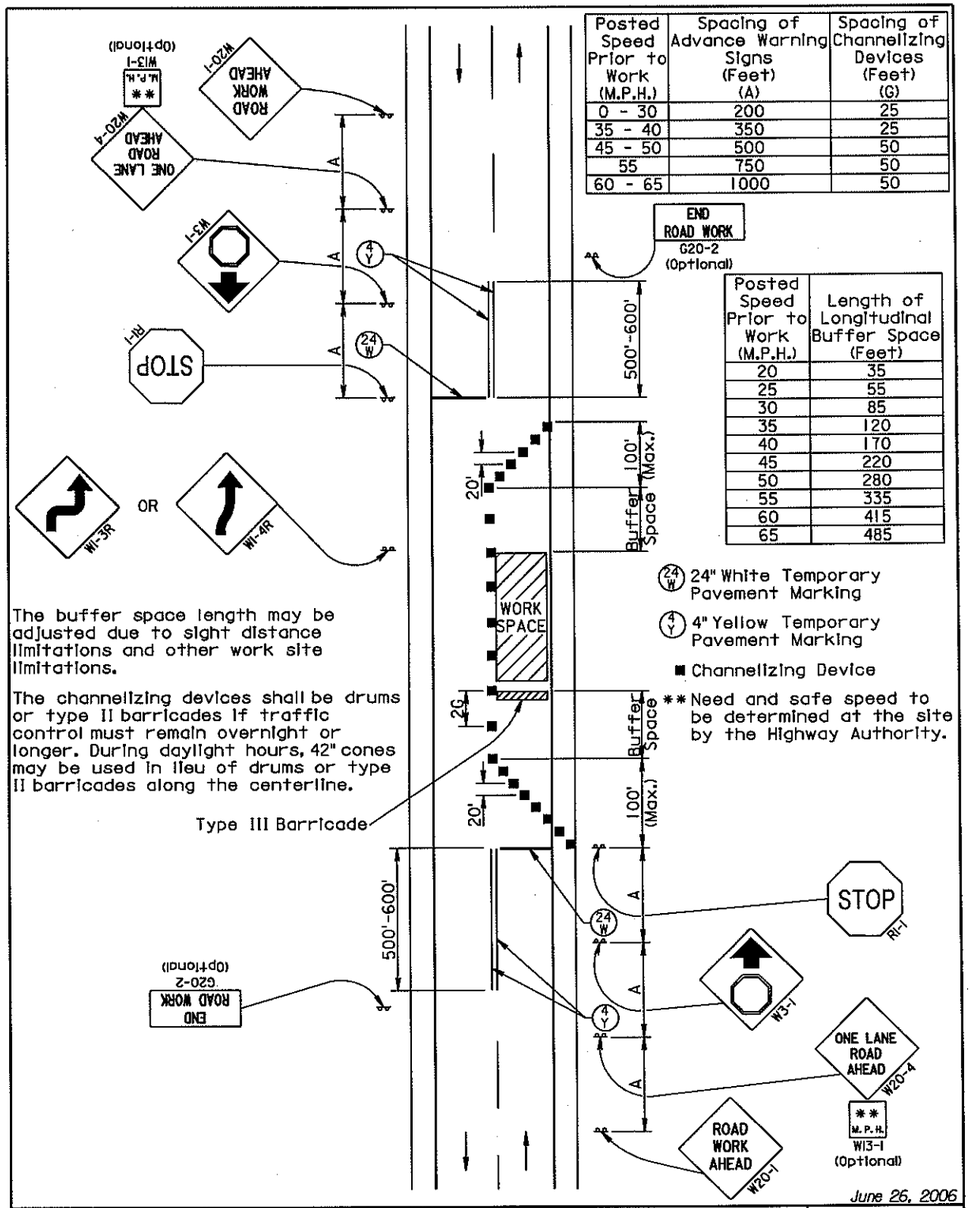


June 26, 2006

Published Date: 2nd Qtr. 2009	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
			Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	25
35 - 40	350	25
45 - 50	500	50
55	750	50
60 - 65	1000	50

Posted Speed Prior to Work (M.P.H.)	Length of Longitudinal Buffer Space (Feet)
20	35
25	55
30	85
35	120
40	170
45	220
50	280
55	335
60	415
65	485



24" White Temporary Pavement Marking

4" Yellow Temporary Pavement Marking

Channelizing Device

** Need and safe speed to be determined at the site by the Highway Authority.

The buffer space length may be adjusted due to sight distance limitations and other work site limitations.

The channelizing devices shall be drums or type II barricades if traffic control must remain overnight or longer. During daylight hours, 42" cones may be used in lieu of drums or type II barricades along the centerline.

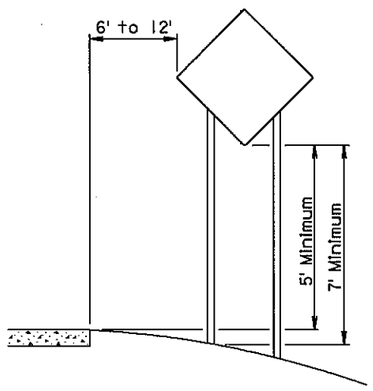
June 26, 2006

Published Date: 2nd Qtr. 2009	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE USING STOP SIGNS	PLATE NUMBER 634.25
			Sheet 1 of 1

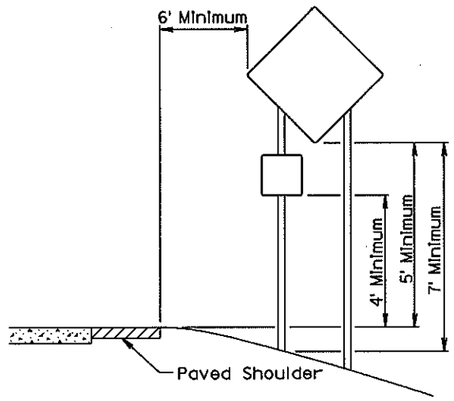
Username - trrcl2608

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090 W-468	5	13

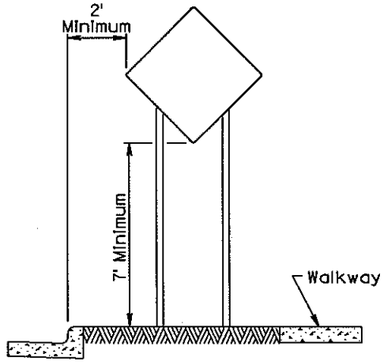
Plotting Date: 30-JUN-2009



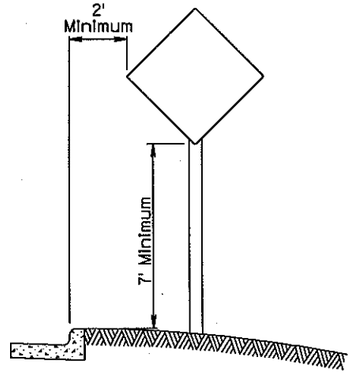
RURAL DISTRICT



RURAL DISTRICT WITH SUPPLEMENTAL PLATE



URBAN DISTRICT



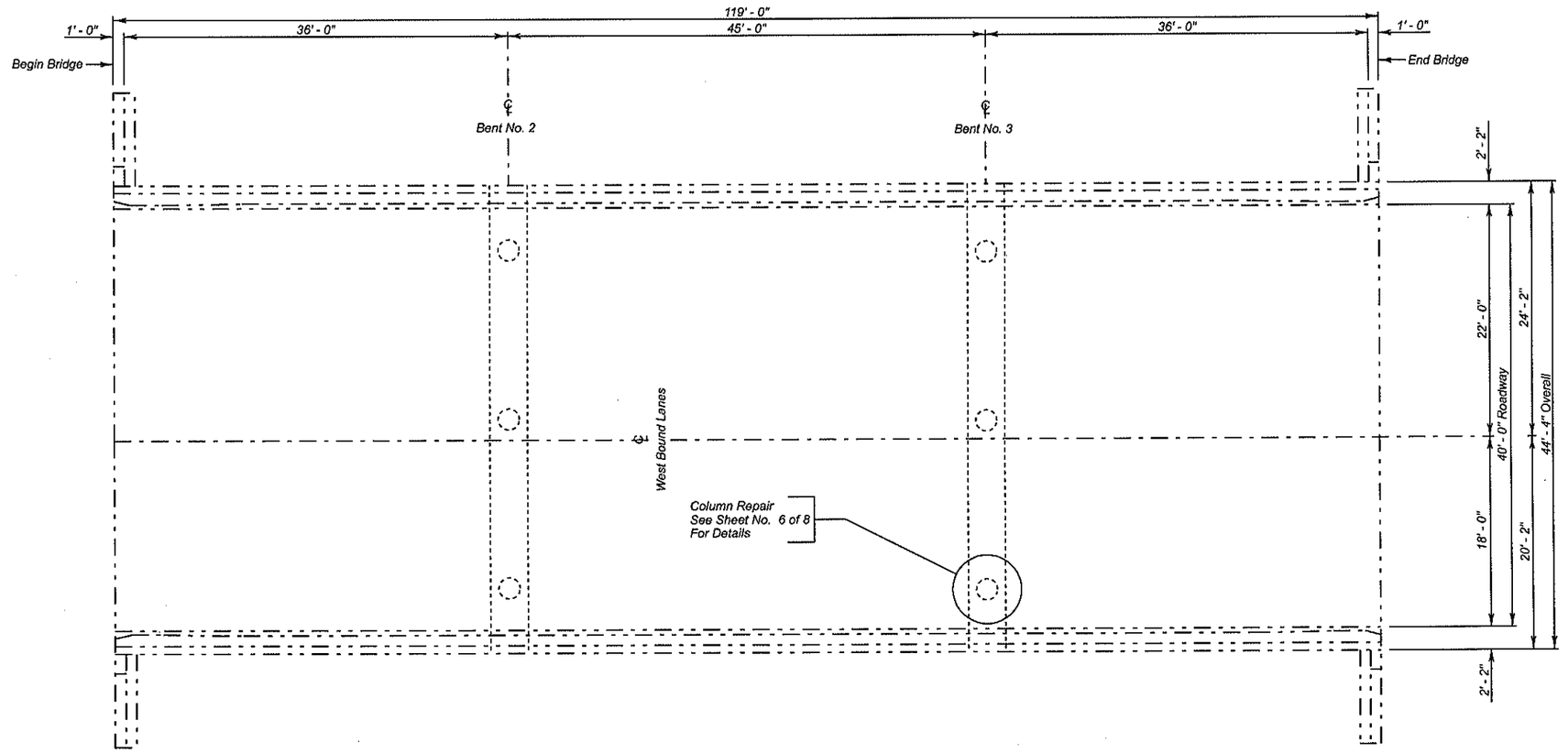
URBAN DISTRICT

December 23, 2003

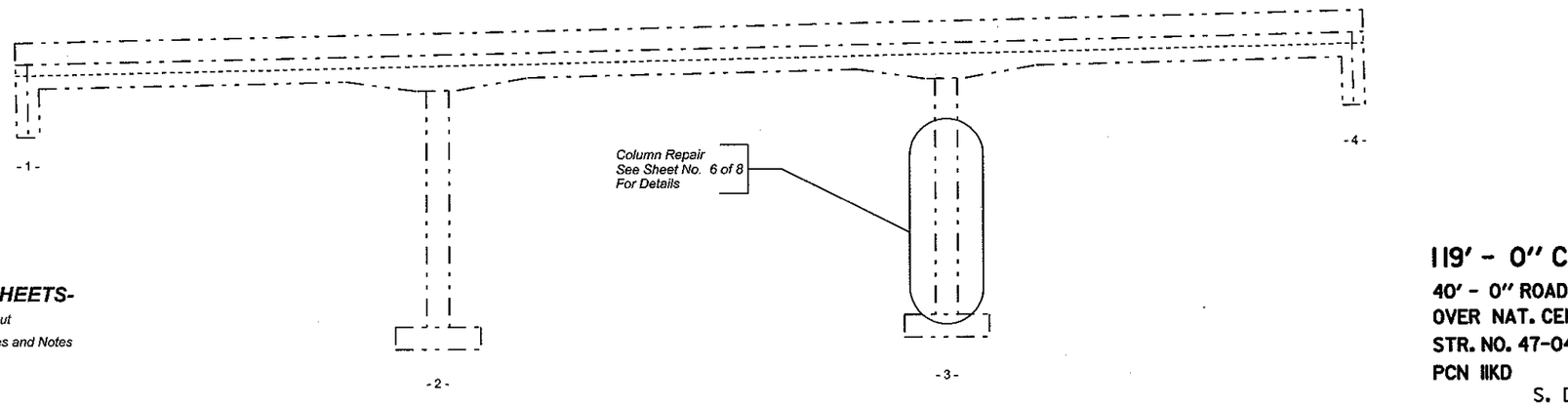
Published Date: 2nd Qtr. 2009	SDDOT	BREAKAWAY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1

Username - trrcl2608

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 W-468	6	13



PLAN



ELEVATION

INDEX OF BRIDGE SHEETS-

WEST BOUND LANES
COLUMN REPAIR LAYOUT
FOR

119' - 0" CONTINUOUS CONCRETE BRIDGE

40' - 0" ROADWAY — **SEC. 26-T5N-R5E**
OVER NAT. CEMETERY ROAD — **0° SKEW**
STR. NO. 47-048-461 — **090 W-468**
PCN 11KD — **MEADE COUNTY**

S. D. DEPT. OF TRANSPORTATION
JUNE 2009

(1) OF (8)

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

DESIGNED BY	DRAWN BY	CHECKED BY	
EJA	SMS	BB	Kevin N Boeder
MEAD11KD	11KDSA01		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090W-468	7	13

Estimate of Structure Quanties and Notes

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
460E0070	Class A45 Concrete, Bridge Repair	0.5	Cuyd
460E0300	Breakout Structural Concrete	0.5	CuYd
460E8000	Column Fiber Wrap	1	Each
480E5000	Galvanic Anode	18	Each
900E7020	Bridge Cleaning	Lump Sum	LS

SPECIFICATIONS

1. Design Specifications: AASHTO Standard Specifications for Highway Bridges 2002 Edition with 2003 Interim Specifications using Working StressDesign.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal.

DETAILS AND DIMENSIONS OF EXISTING BRIDGE

All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure shall be accomplished with the traffic control shown in the plans. The following is a summary of the work required with this project:

1. Remove delaminated and loose concrete on the column indicated at Bent No. 3.

2. Clean the accident affected area with power washing and abrasive blasting as approved by the Engineer.

3. Place concrete in the removal areas and place the column fiber wrap at the location show on the plans for the column indicated at Bent No. 3.

COLUMN REPAIR

Concrete used in the column repair shall consist of one of the following products, or equal as approved by the Office of Bridge Design.

Vertical Patch
Nox-Crete Products Group
1444 S. 20th Street
Omaha, NE 68108
Phone: (402) 341-1976
http://www.nox-crete.com

COLUMN REPAIR (CONTINUED)

Akona Pre-Mixed Concrete Patch
Akona Manufacturing, LLC.
2025 Centre Pointe Boulevard
Suite 300
Mendota Heights, MN 55120
Phone: (651) 905-8137
http://www.akonallc.com/about/helpline.html

Thorite Rapid Vertical
BASF Construction Chemicals – Building Systems
889 Valley Park Drive
Shakopee, MN 55379
Phone: (952) 496-6000
http://www.buildingsystems.basf.com/index.asp

Speed Crete Red Line
Euclid Chemical
19218 Redwood
Cleveland, OH 44110
Phone: (800) 321-7628
http://www.tamms.com/default.asp

The concrete patch material shall be applied and cured as recommended by the Manufacturer and as approved by the Engineer. The Contractor shall furnish the Engineer a copy of the manufacturer's recommendations for mixing, installation and curing prior to use.

CONCRETE BREAKOUT

1. The column shall be broken out to the limits shown on the plans. Breakout limits shall be defined with a 3/4" deep sawcut (unless specified otherwise in these plans), where practical, as approved by the Engineer. Reinforcing steel that is exposed and is scheduled for use in the new construction shall be cleaned to the satisfaction of the Engineer. Care shall be taken not to damage the existing reinforcing steel that is to be reused in the new construction during concrete breakout. Any reinforcing steel that is damaged during concrete breakout shall be replaced or repaired, as approved by the Engineer, by the Contractor at no cost to the Department.

2. All broken out concrete shall be disposed of by the Contractor. Any disposal of discarded material shall be in accordance with the Construction Specifications.

3. The contract unit price per cubic yard for "Breakout Structural Concrete" shall include breaking out column indicated, cleaning existing reinforcing steel and disposal of all broken out material.

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP

1. GENERAL

1.1 The Fiber Reinforced Epoxy Composite system shall be installed by a Contractor certified by the manufacturer in writing. Certified applicator shall have a minimum of two years experience in performing composite retrofits with wet lay-up systems.

1.2 Submittals required by the Contractor

1.2.1. The Contractor shall furnish the Manufacturer's product data, specifications and recommended application procedures showing compliance with the project requirements in writing to the Engineer at the preconstruction meeting. The material provided shall show testing information to demonstrate 10,000 hour system durability including 100% humidity, ozone, alkali soil, salt water, and 140° F testing on the actual composite to be used. Durability testing shall be demonstrated for the effects of ultraviolet light and freeze/thaw. The composite supplier will also make available large-scale test results from independent testing laboratories to demonstrate system performance.

1.2.2. Complete shop drawings shall be submitted for each installation of the composite system. The shop drawings shall contain details of the number and thickness of layers, joint and end details, number location and type of sheet anchors and structure locations where the material is to be applied.

1.2.5 A list of a minimum of one hundred (100) completed composite strengthening projects completed with the manufacturer's composite system. The list should include at a minimum, the dates of work, type, description and amount of work performed.

ESTIMATE OF QUANTITES AND NOTES
FOR
119' – 0" CONT. COMP. GIRDER BRIDGE

40'-0" ROADWAY **0° SKEW**
STR. NO. 47-048-461 **SEC. 26 – T5N – R5E**
OVER NAT CEMETERY ROAD **090W-468**

MEADE COUNTY
S.D. DEPARTMENT OF TRANSPORTATION

MAY 2009 **2 OF 8**

DESIGNED BY:	DRAWN BY:	CHECKED BY:	
BB	BB	EJA	Kevin N. Boeder
MEADI1KD	I1KDNOTA		BRIDGE ENGINEER

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP (CONT.)

1.2.6 A list of a minimum of five (5) completed composite strengthening projects performed by the certified applicator. The list should include at a minimum, the dates of work, type, description and amount of work performed, and the name and telephone number of a contact person at the agency or company for which the work was completed. In addition, provide the names of the applicator's key personnel (superintendent and assistant) who will perform the actual work. The superintendent and assistant shall have a minimum experience of 1year involvement in directing projects such as this.

1.2.7. The Department shall have the right to approve or reject the personnel qualifications as submitted. The Engineer may suspend the work if the Contractor substitutes an unauthorized composite system or unauthorized personnel for authorized personnel during construction.

2. MATERIALS

2.1 General Requirements:

2.1.1 Design the composite system to achieve the structural performance shown on the structural drawings.

2.1.2 Deliver epoxy materials in factory-sealed containers with the manufacturer's labels intact and legible with verification of date of manufacture and shelf life.

2.1.3 Store materials in a protected area at a temperature between 35°F and 100°F.

2.1.4. Products shall be stored according to the manufacturer's requirements and shall avoid contact with moisture.

2.2 Material Properties:

2.2.1 The system to be applied shall be the following or an approved equal as determined by the Office of Bridge Design. An approved equal shall need to satisfy all of the system requirements shown in 2.2.3.:

Tyfo Fibrwrap System supplied by the Fyfe Company
6044 Cornerstone Court West, Suite C
San Diego, California 92121-4730
Tel: (619) 642-0694
Fax: (619) 642-0947

2.2.2 The Tyfo Fibrwrap System shall have the following materials:

2.2.2.1 Composite fabric:
SCH 41 fabric – carbon and aramid hybrid fabric
SHE 51 fabric – glass and aramid hybrid fabric

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP (CONT.)

2.2.2.2 Epoxy saturant:
Tyfo S epoxy to be combined with the fabric to form the Tyfo Fiberwrap composite.

2.2.2.3 Primer/Filler:
Tyfo WS thickened epoxy for protective seal coat and filling voids.

2.2.2.4 Anchorage:
Tyfo Anchors to be used at termination points of bands which do not encase an element.

2.2.2.5 Finish Paint:
Tyfo A or Tyfo U paint.

2.2.3 The cured composite system shall conform to the following requirements:

Property	Glass Composite Requirement	Carbon Composite Requirement	ASTM Test Method
Ultimate Tensile Strength, minimum in primary fiber direction	60,000 psi	100,000 psi	D 3039
Ultimate Breaking Load, minimum in primary fiber direction	3,000 lb/in. width	4,000 lb/in. width	D 3039
% Tensile Strength Retained after:			
7 days exposure at 100% humidity	90	90	
3,000 hours exposure to ozone	90	90	
3,000 hours exposure to alkali	90	90	
3,000 hours exposure to salt water	90	90	
3,000 hours exposure at 140° F	90	90	
Elongation:			D 3039
Percent, Minimum	1.7	0.8	
Percent, Maximum	4	1.7	
Tensile Modulus, psi, minimum Based on cross sectional Area of primary fibers	3×10^6	8×10^6	D 3039
Ultimate Tensile Strength At 90 degrees to Primary fibers, psi, minimum	3,000	1,000	D 3039
Visual Defects	Acceptance Level III	Acceptance Level III	D 2563

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP (CONT.)

3. CONSTRUCTION REQUIREMENTS

3.1 Surface Preparation:

3.1.1 The surface to receive composite shall be free from fins, sharp edges and protrusions that will cause voids behind the installed composite or that, in the opinion of the Engineer, will damage the fibers. Existing uneven surfaces and voids to receive composite shall be filled with epoxy filler or other material approved by the Engineer (small pinholes or micro-bubbles in concrete surface or resin, do not require special detailing). The contact surfaces shall have no free moisture on them at the time of application. If moisture can not be avoided, use the manufacturer's suggested wet prime epoxy.

3.1.2 Round off sharp and chamfered corners to a radius of 1 inch (±0.25") by means of grinding or forming with the system's thickened epoxy. Variations in the radius along the edge shall not exceed 1/2" for every 12" of length.

3.1.3 The Contractor shall remove all unsound and loose concrete in the area of the composite column wrap prior to column wrap placement. The Contractor will not be allowed to use any impact type breakout equipment larger than a 15 pound jack hammer for concrete removal. Any damaged reinforcing steel caused by the removal operation shall be repaired by the Contractor as approved by the Engineer at the Contractor's expense. The removal areas shall be built up to the original section using an approved product listed under the Column Repair Notes which meets the strength of existing section. Surfaces of the repaired areas shall be smooth and free of voids or undulations that would prevent full contact with the composite column wrap system.

3.1.4 Column surfaces shall have all surface foreign materials, such as bird nests, dirt, etc., removed as approved by the Engineer. Stripping off well-adhered paint or concrete from column surfaces is not required. One prime coat of the manufacturer's epoxy shall be applied prior to wrapping columns with the composite.

ESTIMATE OF QUANTITIES AND NOTES (CONTINUED)
FOR
119' – 0" CONT. COMP. GIRDER BRIDGE

40'-0" ROADWAY **0° SKEW**
STR. NO. 47-048-461 **SEC. 26 – T5N – R5E**
OVER NAT CEMETERY ROAD **090W-468**

MEADE COUNTY
S.D. DEPARTMENT OF TRANSPORTATION

MAY 2009 3 OF 8

DESIGNED BY:	DRAWN BY:	CHECKED BY:	
BB	BB	EJA	Kevin N. Goeden
MEADI1KD	I1KDNOTA		BRIDGE ENGINEER

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP (CONT.)

3.1.5 For surfaces which do not allow complete encasement with the composite system, surfaces shall be prepared for bonding by means of abrasive blasting or grinding to achieve a 1/16" minimum amplitude. All contact surfaces shall then be cleaned by hand or compressed air. One prime coat of the manufacturer's epoxy shall be applied and allowed to cure for a minimum of one hour. Prior to the application of the saturated fabric, fill any uneven surfaces with the manufacturer's thickened epoxy. Provide anchorage as detailed on the construction drawings.

3.2 Application Procedures

3.2.1 Fiber wrap material shall not be applied until all surface preparation work is complete and all patching materials have cured for a minimum of 10 days.

3.2.2 Verify ambient and concrete temperatures. No work shall proceed if the temperature of the concrete surface being repaired is less than 35 ° F or greater than 100 ° F. The temperature of the epoxy components shall be between 35° F and 100° F at the time of mixing or as specified on the component labels.

3.2.3 Prepare the epoxy matrix by combining components at a weight (or volume) ratio specified on the manufacturer's labeled units, with an allowable tolerance of + 10%. The components of epoxy resin shall be mixed with a mechanical mixer until uniformly mixed, typically 5 minutes at 400-600 rpm. Components which have exceeded their shelf life or pot life(as designated on the material label) shall not be used.

3.2.4 Saturation of the fabric shall be performed and monitored according to manufacturer's specified fiber-resin ratio. A previously calibrated saturator can be used to achieve the specified ratio. Fabric shall be completely saturated prior to application to contact surface in order to assure complete impregnation of fabric. Saturation shall be supervised and checked by the properly trained representative of the installer.

3.2.5 Both the epoxy resin and fabric shall be measured accurately, combined, and deposited uniformly at the rates shown on the approved working drawings and per manufacturer's recommendations. The composite system shall be comprised of fibers completely saturated with epoxy resin per proper ratio.

3.2.6 Quality control procedures: Record batch numbers for fabric and epoxy used each day, and note locations of installation. Measure square footage of fabric and volume of epoxy used each day. Complete report and submit to the Engineer.

3.2.8 Protect the areas adjacent to the application from splatter, drips and over runs.

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP (CONT.)

3.2.9 Apply saturated fabric to concrete surface using methods that produce a uniform, constant tensile force that is distributed across the entire width of fabric. Gaps between composite bands may not exceed 1/2 inch in width in the fabric's transverse joint unless otherwise noted on the project drawings. A lap length of at least 6 inches is required at all necessary over-laps in the longitudinal direction of the fabric.

3.2.10 Using a roller or hand pressure, insure proper orientation of fibers, release or roll out entrapped air, and ensure that each individual layer is firmly bedded and adhered to the preceding layer or substrate.

3.2.11 Apply a final coat of thickened epoxy. Detail all fabric edges, including butt splice, termination points, and jacket edges, with epoxy.

3.2.12 If the system incorporates structural fasteners, the limitations, detailing and location must be verified with the composite system manufacturer.

3.2.13 The completed installation shall be allowed to cure in ambient conditions. Epoxy curing temperatures shall be maintained in the temperature range designated for the formulation used. The temperature cure ranges and times will be supplied by the manufacturer. The composite system shall be protected from contact by moisture, damage and debris for a minimum of 24 hours after placement.

3.2.14 Paint the finished surfaces of the composite system with a paint system approved by the manufacturer and the Office of Bridge Design. Paint shall not be applied within the first 24 hours of placement. After the 24 hour cure period paint can be applied when the composite system achieves a tacky surface where a light finger touch results in no transfer of epoxy to the finger but still exhibits a tacky feeling. From this time, until 72 hours later, two finish coats of the approved paint system shall be applied. If the paint system is applied after 72 hours, the surface must be roughened by sanding or brush blasting to break the gloss finish for the application of the paint system. Dust and residue shall be removed prior to application of paint coats. The color of the finished coat of paint shall match the color of the adjacent concrete as approved by the Engineer.

FIBER REINFORCED EPOXY COMPOSITE COLUMN WRAP (CONT.)

3.2.15 All defects (including bubbles, delaminations, and fabric tears) spanning more than 5% of the surface area shall be repaired. Small defects (on the order of 6" diameter) shall be injected or back filled with epoxy. Bubbles less than 12" in diameter shall be repaired by injecting with epoxy. Two small holes shall be drilled into the bubble to allow injection of the epoxy and escape of entrapped air. Bubbles and delaminations greater than 12" in diameter shall be repaired by removing and re-applying the required number of layers of the composite and the required finish coatings. All repair procedures shall be subject to the approval of the Engineer.

4. METHOD OF MEASUREMENT

Measurement will not be made for Column Fiber Wrap. The plan quantity will be the basis of payment.

5. BASIS OF PAYMENT

Column Fiber Wrap will be paid for at the contract unit price per each. Payment will be full compensation for labor, equipment, materials, and all incidental work required.

BRIDGE CLEANING

The portions of the bridge deck and columns affected by the fire shall be power washed to remove all discoloration and staining as approved by the Engineer. After power washing, any discoloration and staining remaining on the concrete surface shall be removed with abrasive blasting as approved by the Engineer. All costs associated with the power washing and abrasive blasting including equipment, labor, materials and any incidentals shall be paid for under the contract Lump Sum price for "Bridge Cleaning."

ESTIMATE OF QUANTITIES AND NOTES (CONTINUED)
FOR
119' – 0" CONT. COMP. GIRDER BRIDGE

40'-0" ROADWAY **0° SKEW**
STR. NO. 47-048-461 **SEC. 26 – T5N – R5E**
OVER NAT CEMETERY ROAD **090W-468**

MEADE COUNTY
S.D. DEPARTMENT OF TRANSPORTATION

MAY 2009 **4 OF 8**

DESIGNED BY:	DRAWN BY:	CHECKED BY:	
BB	BB	EJA	Kevin N. Goeden
MEADI1KD	I1KDNOTA		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 W-468	10	13

GALVANIC ANODES

1. The Contractor shall place galvanic anodes in the patched areas of the columns. Galvashield XP+, or an approved equivalent as approved by the Office of Bridge Design, shall be used. Galvashield XP+ is manufactured by:

   Vector Corrosion Technologies
   474 Dovercourt Drive
   Winnipeg, MB, Canada R3Y 1G4
   Phone: (204) 489-6300

2. The anodes shall be placed in accordance with manufacturer's recommendations and as approved by the Engineer. The anodes shall provide the corrosion prevention level of protection. The anodes have not been shown on the drawings. The Contractor shall provide shop drawings of the galvanic anode installation including locations of the individual anodes.

3. The anodes shall be placed with a minimum ¾" cover and shall be set in Galvashield Embedding Mortar per the manufacturer's recommendations. The anodes shall be fully encased in the concrete repair material. Where adequate cover does not exist, a concrete pocket shall be chipped out behind the anode to provide sufficient cover. The Contractor may need to chip around the reinforcing bar locally at the anode installation to make the electrical connection. The reinforcing steel at the connection location shall be cleaned per the manufacturer's recommendations to provide sufficient electrical connection and mechanical bond.

4. The electrical continuity of the electrical connections and reinforcing steel shall be confirmed per the manufacturer's recommendations.

5. The Contractor shall provide manufacturer's product literature, shop drawings and installation instructions.

6. All costs associated with placing anodes including labor, equipment, materials and incidentals shall be included in the contract unit price per each for "Galvanic Anode".

ESTIMATE OF QUANTITIES AND NOTES (CONTINUED)
FOR
119' – 0" CONT. COMP. GIRDER BRIDGE

40'-0" ROADWAY
STR. NO. 47-048-461
OVER NAT CEMETERY ROAD

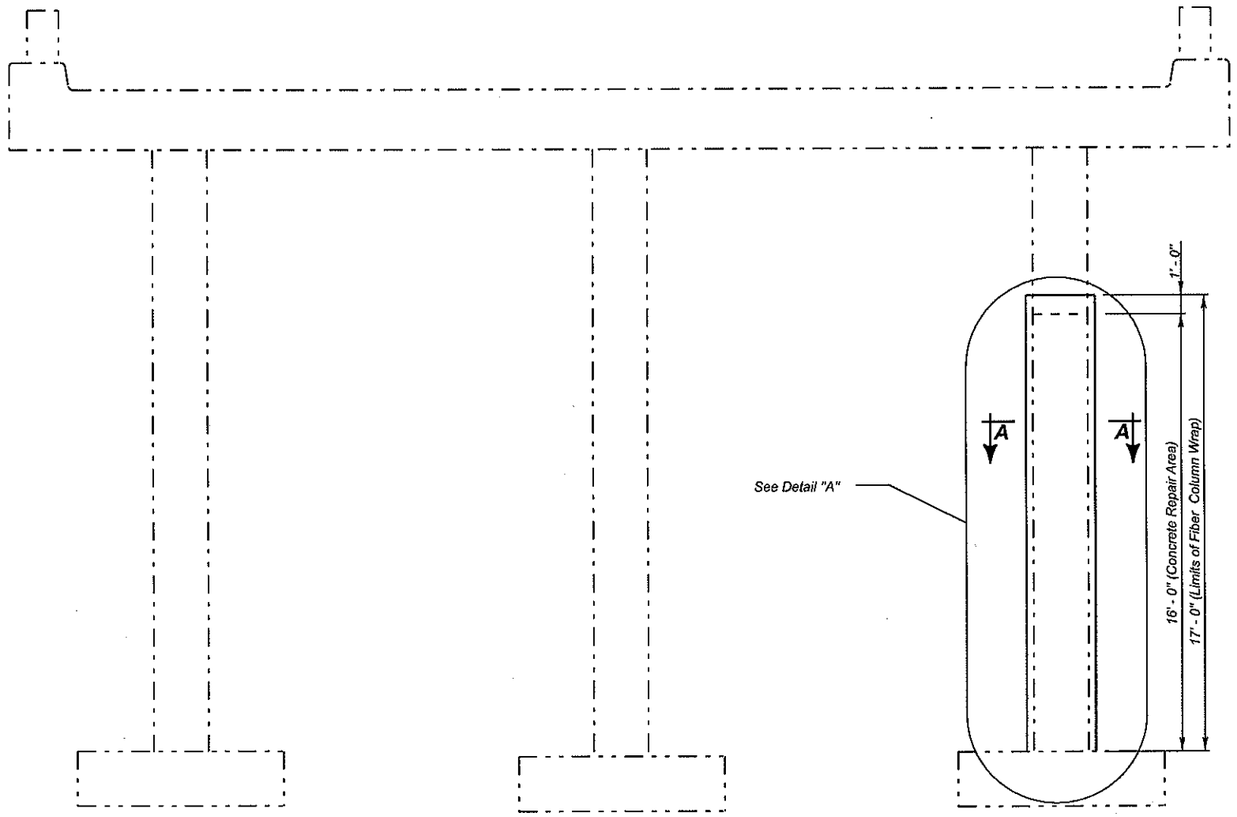
0° SKEW
SEC. 26 – T5N – R5E
090W-468

MEADE COUNTY
S.D. DEPARTMENT OF TRANSPORTATION

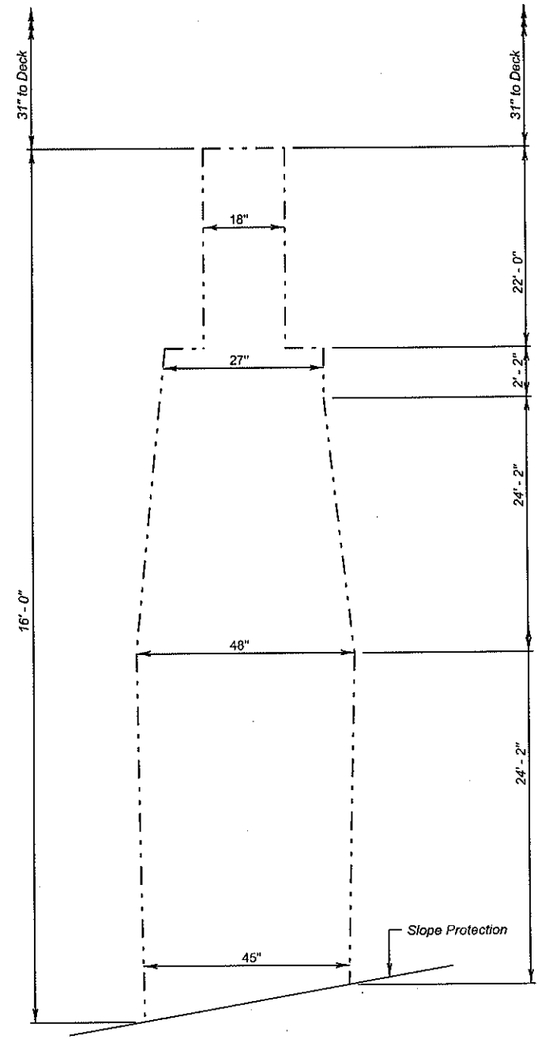
MAY 2009

DESIGNED BY:	DRAWN BY:	CHECKED BY:	
BB	BB	EJA	Kevin N. Boeder
MEADI1KD	I1KDNOTA		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 W-468	11	13



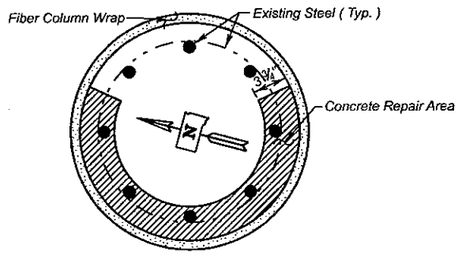
ELEVATION
(Bent No. 3)



DETAIL "A"
(Concrete Repair Details)

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Breakout Structural Concrete	CuYd	0.5
Class A45 Concrete, Bridge Repair	CuYd	0.5
Column Fiber Wrap	Each	1
Galvanic Anode	Each	18

NOTE :
This sheet is to be used in conjunction with the Notes.



SEC. A-A

COLUMN REPAIR DETAILS
FOR
119' - 0" CONTINUOUS CONCRETE BRIDGE

40' - 0" ROADWAY
OVER NAT. CEMETERY ROAD
STR. NO. 47-048-461

SEC. 26-T5N-R5E
0° SKEW
090 W-468

MEADE COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2009

6 OF 8

DESIGNED BY	DRAWN BY	CHECKED BY	
EJA	SMS	BB	Kevin N. Goeden
MEAD\IKD	\IKDSA04		BRIDGE ENGINEER

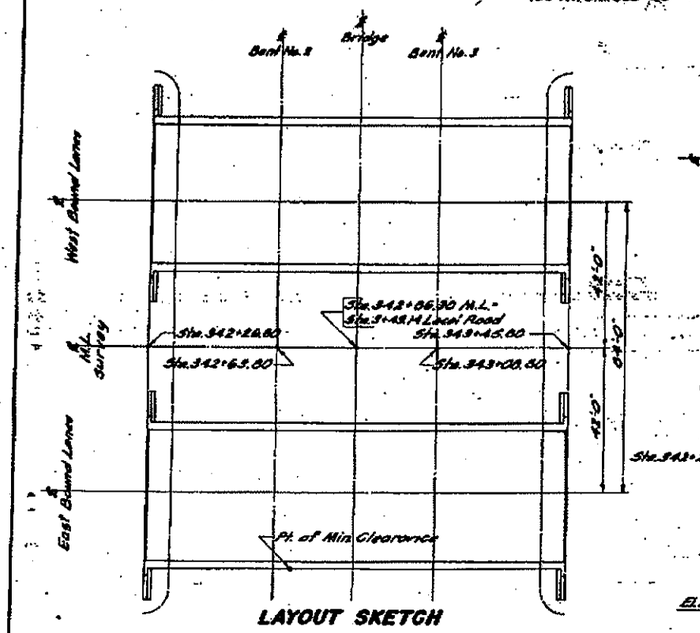
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 W-468	12	13

-X220-

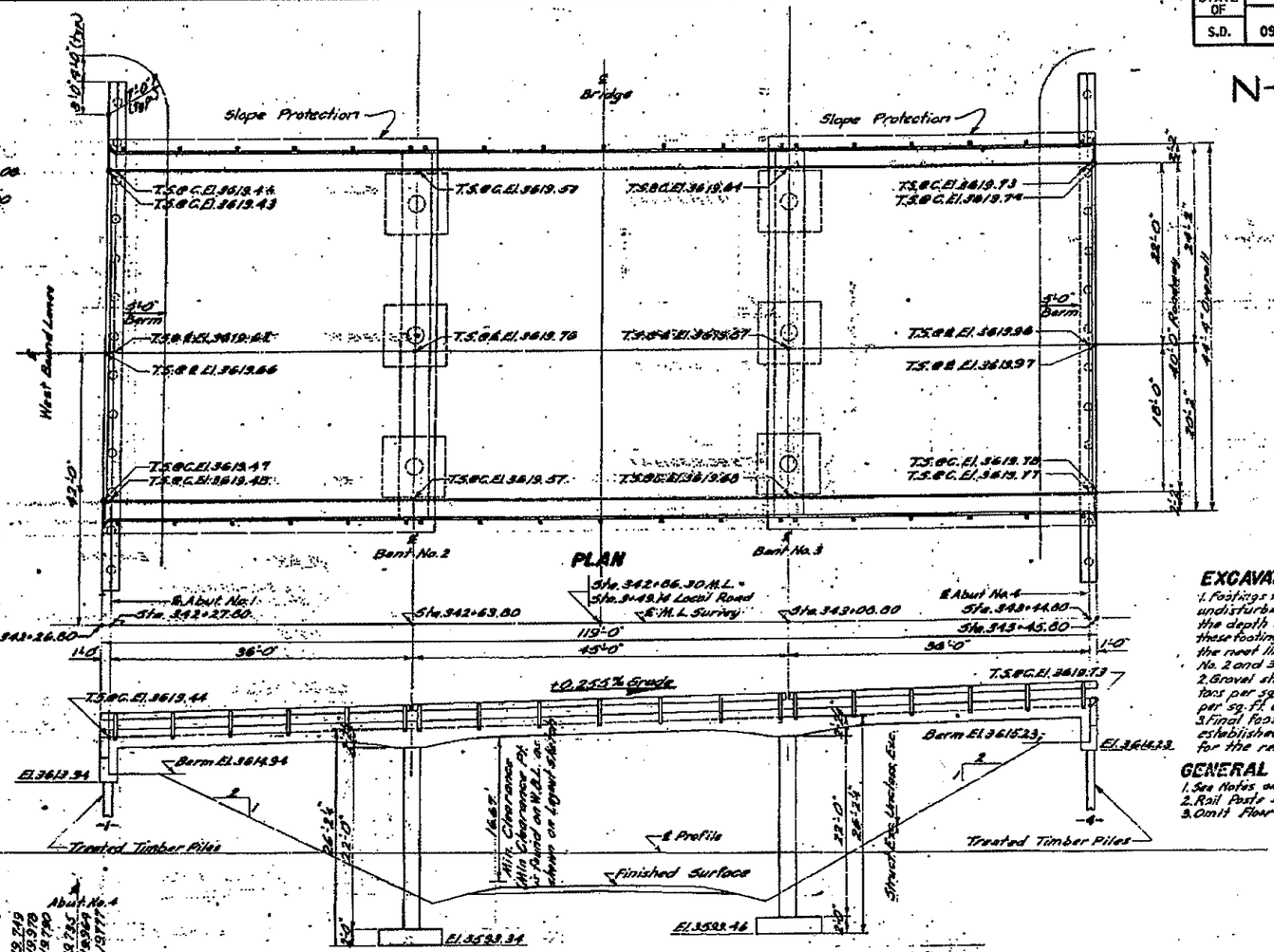
INDEX OF BRIDGE SHEETS—

Sheet No.1—General Drawing, Layout and Quantities.
Sheet No.2—Subsurface Investigations.
Sheet No.3—Details of Superstructure.
Sheet No.4—Details of Substructure.
Sheet No.5—Standard Type RA-1M Steel Railing. CS-RA-1M (8-30-62)

B.M. #42-El.3918.08
Re-Bar ℄ Obs.
150' Rt. Sta. 339+00



LAYOUT SKETCH



ELEVATION

N

B.M. #43-El. 3601.68
Re-Bar ℄ Obs.
150' Rt. Sta. 346+00

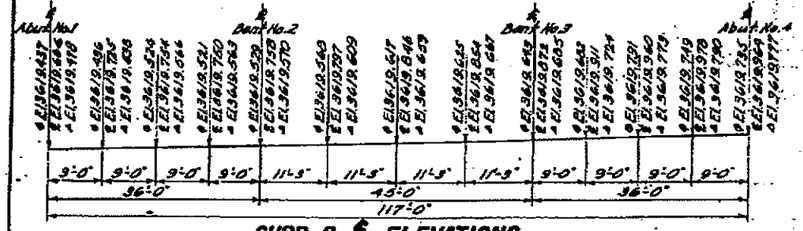
NOTE: T.S.@C. = Top of Slab at ℄
T.S.@℄ = Top of Slab at ℄

EXCAVATION NOTES—

1. Footings for Bents No. 2 and 3 shall be c... undisturbed Gravel, and carried into s... the depth of footings. Limits of Gravel ... these footings shall be bounded as nearly ... the neat lines as shown in detail of foo... No. 2 and 3 on Sheet No. (4) of (5).
2. Gravel shall develop a minimum bear... tons per sq. ft. If the bearing value is l... per sq. ft. communicate with the BRIDG...
3. Final footing elevations for Bents No. ... established before ordering co...umn re... for the respective Bents.

GENERAL NOTES—

1. See Notes on Sheets No. 3 and 4.
2. Rail Posts shall be built vertica...
3. Omit Floor Drains.



CURB & ℄ ELEVATIONS

NOTE: ◆= Top of Slab at Left Curb, ℄= Top of Slab at Centerline Roadway, ▲= Top of Slab at Right Curb. Elevations shown are Top of Finished Slab at Curb and ℄ Roadway PLUS camber for Dead Load and Plastic Flow. Do not use Camber Dimensions, shown on Sheet No. 3 of Bridge Plans.

SPECIFICATION NOTE—

Use Current South Dakota Standard Specifications for Roads and Bridges; and the Supplemental Specifications as included in the proposal.

ESTIMATED QUANTITIES (ONE STRUCTURE)

ITEM	Cl. A Conc. Cu. Yds.	Steel—Lbs. Reinf.	Steel—Lbs. Struct.	Type A Steel Railing Lin. Ft.	Timber Piles—Lin. Ft. Test*	Timber Piles—Lin. Ft. Treated Timber	Excavation—Cu. Yds.* Struct.	Excavation—Cu. Yds.* Unclass.‡	Pile Shoes # No.	Slope Protection—Sq. Yds.
Superstructure	217.0	71,950.	80	240.3						
Abutments No.1 & No.4	45.5	4,385.	1435		1940.80	28935*	980'	20	30	458
Bents No.2 & No.3	40.5	10,495.						120		
Totals	303.0	87,830	1495	240.3	#80	980'	140	≠30	≠458	

*One Treated Timber Test Pile shall be driven at Abut. No.1 and Abut. No.4 before remaining piles are ordered.
*See Grading Plans for Unclassified Excavation.
#All-Steel Pile Shoes as approved by the ENGINEER shall be used.

PILE NOTE: Piles driven at Abutments No.1 & No.4, including Test Piles, shall obtain their full bearing (24 Tons) in the natural ground below the new embankment elevations 3603.0± and 3604.2± respectively. Pre-Bored holes through the fill are required and shall have a minimum diameter 2" larger than the nominal diameter (3' from the butt) of the pile.
* See Grading Plans for Slope Protection.

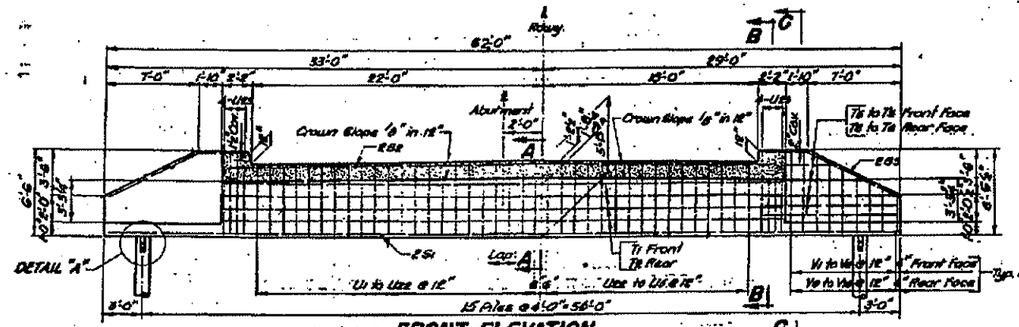
ORIGINAL CONSTRUCTION PLANS

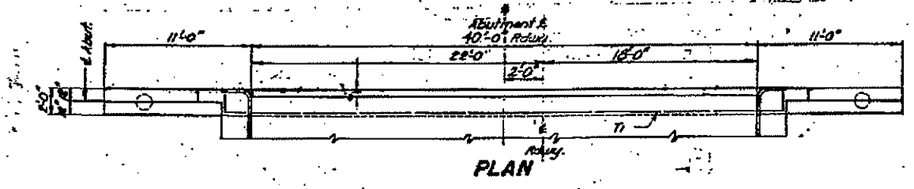
WEST BOUND LANES
GENERAL DRAWING, LAYOUT AND
FOR
110'-0" CONT. CONC. B...
40'-0" ROADWAY
OVER NAT CEMETERY ROAD
STA. 342+26.80 TO 345+45.80 M.L.
...E CO...TY
SOUTH DA...OTA
DEPARTMENT OF ...HWY

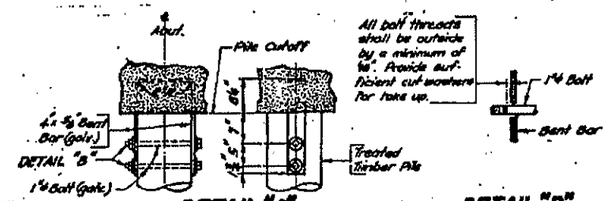
-X220-

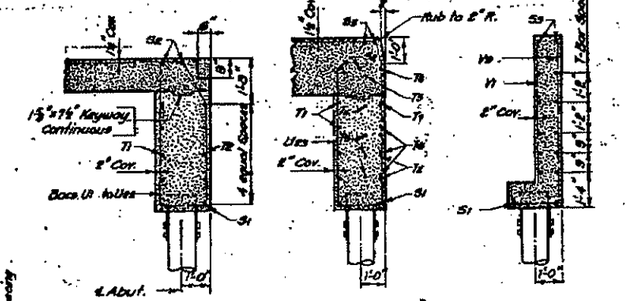
(7) OF (8)

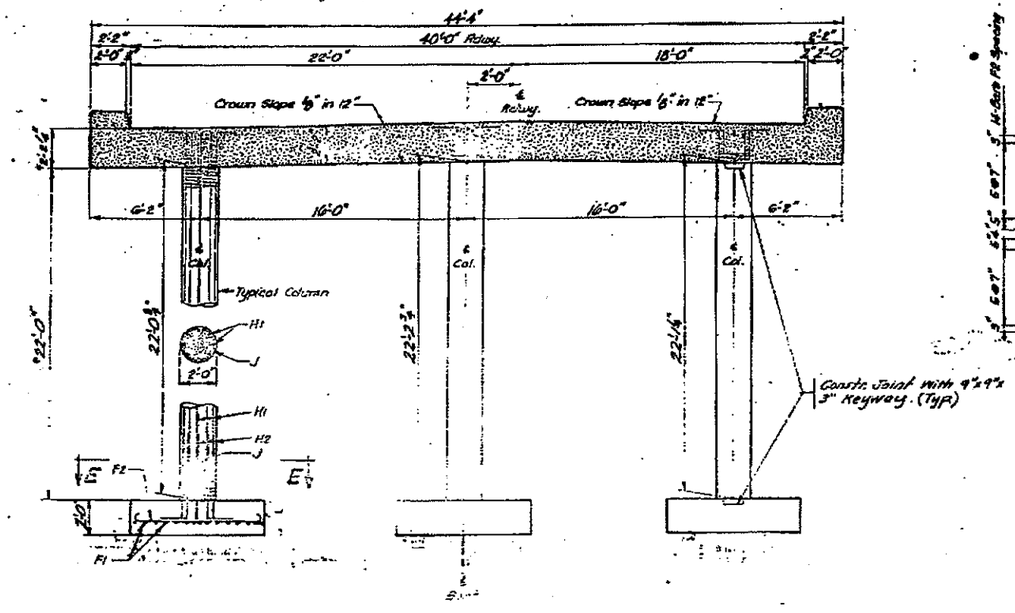
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	090 W-468	13	13

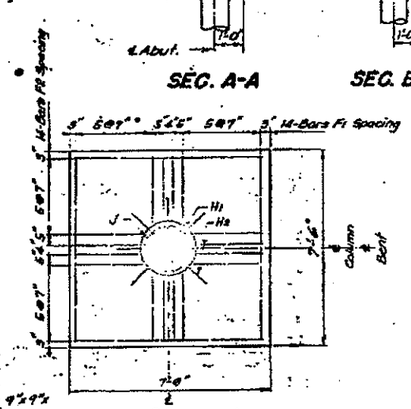










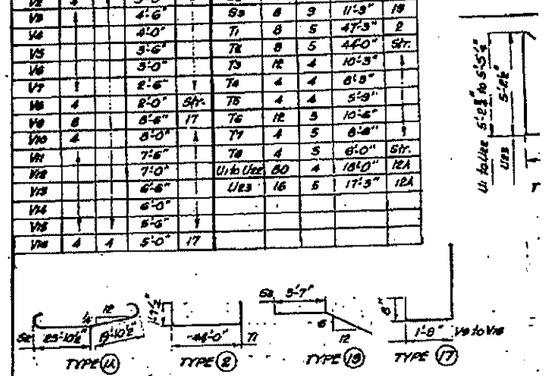


NOTE: For Notes and Quantities see General Drawing.

REINFORCING SCHEDULE
(For Two Abutments)

Mark	No.	Size	Length	Type	Mark	No.	Size	Length	Type
V1	8	4	5'-6"	Str.	S1	8	9	31'-9"	Str.
V2	4	4	5'-0"	1A	S2	4	9	40'-9"	1A
V3	1	4	4'-6"	1	S3	8	9	11'-9"	19
V4	1	4	4'-0"	1	T1	8	5	47'-3"	2
V5	1	4	3'-6"	1	T2	8	5	44'-0"	Str.
V6	1	4	3'-0"	1	T3	12	4	10'-3"	1
V7	1	4	2'-6"	1	T4	4	4	6'-9"	1
V8	4	4	2'-0"	Str.	T5	4	4	5'-9"	1
V9	8	4	8'-6"	17	T6	12	5	10'-6"	1
V10	4	4	8'-0"	1	T7	4	5	8'-6"	1
V11	1	4	7'-6"	1	T8	4	5	8'-0"	Str.
V12	1	4	7'-0"	1	U1 to U12	80	4	18'-0"	12A
V13	1	4	6'-6"	1	U13	16	5	17'-3"	12A
V14	1	4	6'-0"	1					
V15	1	4	5'-6"	1					
V16	4	4	5'-0"	17					

Bending Details

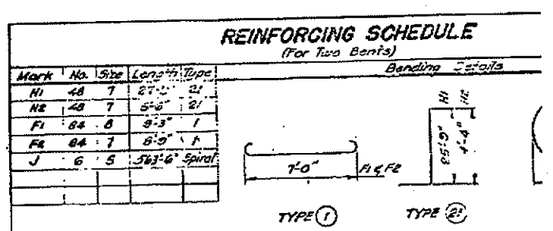


NOTE: All detail dimensions are out to out of bars.

REINFORCING SCHEDULE
(For Two Bents)

Mark	No.	Size	Length	Type
N1	48	7	27'-0"	21
N2	48	7	5'-6"	21
F1	84	8	9'-3"	1
F2	84	7	8'-9"	1
J	6	5	5ft 3'-6"	Spiral

Bending Details



NOTE: All detail dimensions of bars are out to out.

ORIGINAL CONSTRUCTION PLANS

WEST

40'-

NAT. CEMETERY

342+26.80 343+45.80

MEADE COUNTY