

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0044(198)291	1	43

Plotting Date: 09/09/2015

PLANS FOR PROPOSED
PROJECT P 0044(198)291
SD HIGHWAY 44
CHARLES MIX &
GREGORY COUNTIES

INDEX OF SHEETS

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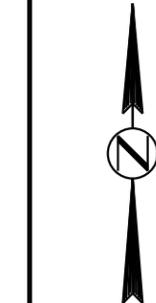
BRIDGE SUBSTRUCTURE REPAIR

PCN 05M4

PLOT SCALE - 1:7000

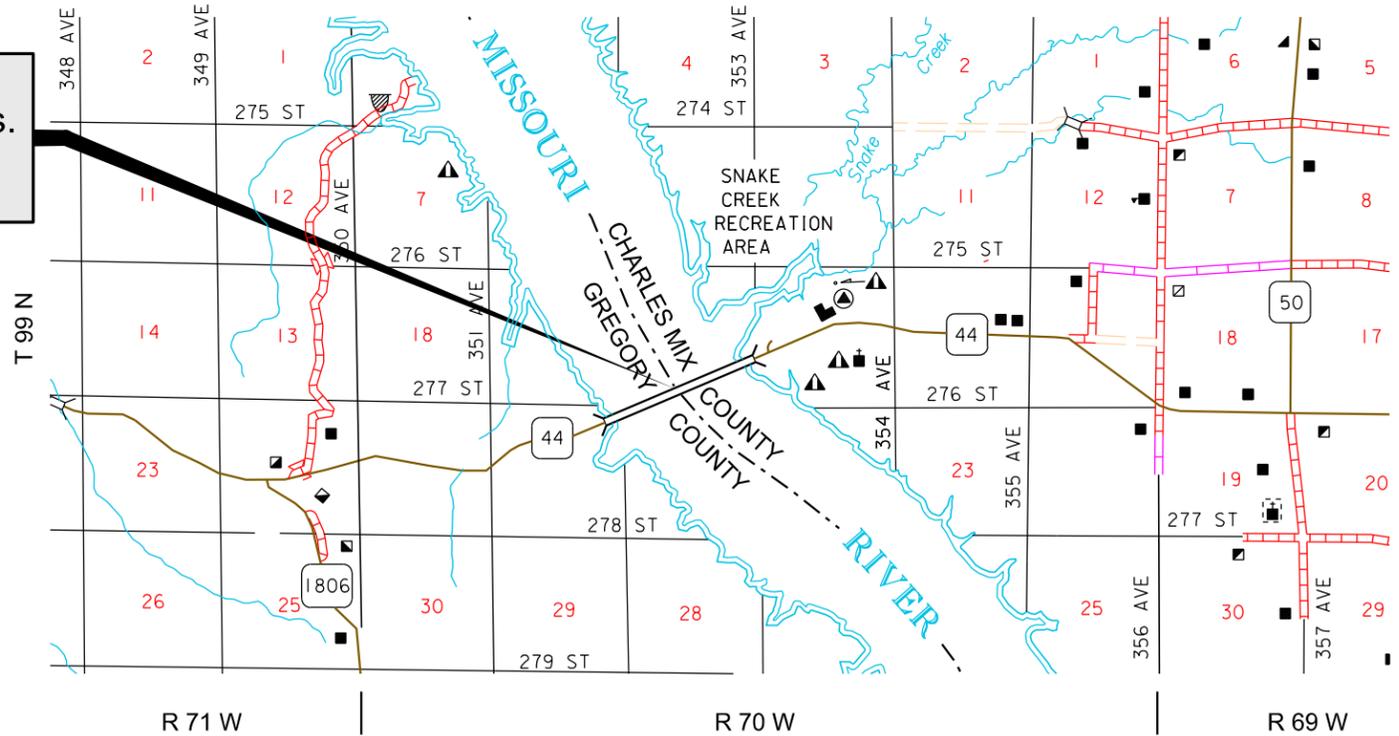
PLOT NAME - 1

FILE - ... \PRJ2015\GREG05M4\T1TL05M4.DGN



STR. NO. 12-085-080
Bridge Over Ft. Randall Res.
5655'-6"=1.071 Miles
MRM 291.59

DESIGN DESIGNATION	
ADT(2013)	855
ADT(2033)	973
DHV	117.7
D	51%
T DHV	9.1%
T ADT	20.0%
V	65 MPH



STORM WATER PERMIT
Not Required

ESTIMATE OF QUANTITIES

STRUCTURE 12-085-080

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
634E0010	Flagging	10.0	Hour
634E0110	Traffic Control Signs	96	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
420E0100	Structure Excavation, Bridge	2	CuYd
460E0174	Concrete Patching Material, Miscellaneous	33.9	CuFt
460E0300	Breakout Structural Concrete	1.5	CuYd
460E8050	Composite Fabric Wrap, Concrete Repair	3,292	SqFt
480E5000	Galvanic Anode	14	Each

SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

ENVIRONMENTAL COMMITMENTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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ENVIRONMENTAL COMMITMENTS

An Environmental Commitment is a measure that SDDOT commits to implement in order to avoid, minimize, and/or mitigate a real or potential environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency mentioned below with permitting authority can influence a project if perceived environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office. The environmental commitments associated with this project are as follows:

COMMITMENT B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES

COMMITMENT B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pit, or staging site associated with the project, cease construction activities in the affected area until the Whooping Crane departs and contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

COMMITMENT B4: BALD EAGLE

Bald eagles are known to occur in this area.

Action Taken/Required:

If a nest is observed within one mile of the project site, notify the Project Engineer immediately so that he/she can consult with the Environmental Office for an appropriate course of action.

COMMITMENT C: WATER SOURCE

The Contractor shall not withdraw water with equipment previously used outside the State of South Dakota without prior approval from the SDDOT Environmental Office. Thoroughly wash all construction equipment before entering South Dakota to reduce the risk of invasive species introduction into the project vicinity.

The Contractor shall not withdraw water directly from streams of the James, Big Sioux, and Vermillion watersheds without prior approval from the SDDOT Environmental Office.

Action Taken/Required:

The Contractor shall obtain the necessary permits from the regulatory agencies such as the Department of Environment and Natural Resources (DENR) and the United States Army Corps of Engineers (COE) prior to executing water extraction activities.

COMMITMENT D: WATER QUALITY STANDARDS

COMMITMENT D1: SURFACE WATER QUALITY

The Missouri River is classified as a warm water permanent fishery with a total suspended solids standard of 90 milligrams/liter.

Action Taken/Required:

The Contractor is advised the South Dakota Surface Water Quality Standards, administered by the Department of Environment and Natural Resources (DENR), apply to this project. Special construction measures shall be taken to ensure the above standard(s) of the surface waters are maintained and protected.

COMMITMENT D2: SURFACE WATER DISCHARGE

The Missouri River is classified as a warm water permanent fishery with a Surface Water Discharge standard of 90 milligrams/liter total suspended solids.

Action Taken/Required:

If construction dewatering is required, the Contractor shall obtain a Temporary Discharge Permit from the DENR and provide a copy to the Project Engineer. Contact the DENR Surface Water Program at 605-773-3351 to apply for a permit.

COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

ENVIRONMENTAL COMMITMENTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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COMMITMENT H: WASTE DISPOSAL SITE

The Contractor shall furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

Action Taken/Required:

Construction and/or 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 Project 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 and/or 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 and/or 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.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) shall be incidental to the various contract items.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

Action Taken/Required:

All earth disturbing activities not designated within the plans require review of cultural resources impacts. This work includes, but is not limited to: staging areas, borrow sites, waste disposal sites, and all material processing sites.

The Contractor shall arrange and pay for a cultural resource survey and/or records search. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor shall provide ARC with the following: a topographical map or aerial view on which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that artifacts have not been found on the site.

The Contractor shall submit the records search or cultural resources survey report and if the location of the site is within the current geographical or historic boundaries of any South Dakota reservation to SDDOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). SDDOT will submit the information to the appropriate SHPO/THPO. Allow **30 Days** from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

If evidence for cultural resources is uncovered during project construction activities, then such activities shall cease and the Project Engineer shall be immediately notified. The Project Engineer will contact the SDDOT Environmental Engineer in order to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for staging areas, borrow sites, waste disposal sites, or material processing sites that affect wetlands, threatened and endangered species, or waterways. The Contractor shall provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

COMMITMENT J: CONSTRUCTION PRACTICES FOR TEMPORARY WORKS IN WATERWAYS OF THE U.S.

The Contractor is advised that special construction measures have to be taken to ensure that the waterways of the U.S. are not impacted.

Action Taken/Required:

No excavation shall be made below the ordinary high water elevation in waterways outside of caissons, cribs, cofferdams, steel piling, or sheeting; and the natural streambed shall not be disturbed unless specified by the plans and under the observation of the Project Engineer. Refer to the Table of U.S. Waterways to Protect for ordinary high water elevations.

Action Taken/Required:(CONTINUED))

All dredged or excavated materials shall be placed at a site above the ordinary high water elevation in a confined area (not classified as a wetland) that is a minimum of 50 feet away from concentrated flows of storm water, drainage courses, and inlets to prevent return of such material to the waterway.

The construction of temporary work platforms, crossings, or berms below the ordinary high water elevation will be allowed provided that all material placed below the ordinary high water elevation consists of Class B or larger riprap.

All temporary caissons, cribs, cofferdams, steel piling, sheeting, work platforms, crossings, and berms shall be removed with minimal disturbance to the streambed. Proper construction practices shall be used to minimize increases in suspended solids and turbidity in the waterway.

Bridge berms, wing dams, traffic diversions, channel reconstruction, grading, etc. shall be constructed in close conformity with the plans to ensure that the hydraulic capacity of the waterway is not changed.

Temporary waterway crossings required for the Contractors construction operations shall be constructed with an adequate drainage structure size and minimum fill height to reduce the potential for upstream flooding. The Contractor will be responsible for sizing the temporary drainage structure for these crossings.

The Contractor shall give written notice, with a copy to the Area Engineer and the Department of Environment and Natural Resources (DENR), 30 days prior to the start of work. In addition, the Contractor shall give written notice to the Engineer 7 days prior to the commencement of the work so the Engineer may notify DENR of the day work will start.

Table of U.S. Waterways to Protect

Waterway	Ordinary High Water Elevation
Lake Francis Case	1365.0

COMMITMENT N: SECTION 404 PERMIT

The SDDOT has obtained a Section 404 Permit from the US Army Corps of Engineers for the permanent actions associated with this project.

Action Taken/Required:

The Contractor shall comply with all requirements contained in the Section 404 permit.

The Contractor shall also be responsible for obtaining a Section 404 permit for any dredge, excavation, or fill activities associated with staging areas, borrow sites, waste disposal sites, or material processing sites that affect wetlands or waters of the United States.

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R1-1	STOP		30" x 30"	6	
R1-2	YIELD		36" x 36"	9	
R2-1	SPEED LIMIT ___		24" x 30"	5	
R2-6aP	FINES DOUBLE (plaque)		24" x 18"	3	
R4-7	KEEP RIGHT (symbol)		24" x 30"	5	
R5-1	DO NOT ENTER		30" x 30"	6	
R5-1a	WRONG WAY		36" x 24"	6	
R10-6	STOP HERE ON RED		24" x 36"	6	
R11-2	ROAD CLOSED		48" x 30"	10	
R11-3a	ROAD CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY		60" x 30"	13	
R11-4	ROAD CLOSED TO THRU TRAFFIC		60" x 30"	13	
W1-1	LEFT or RIGHT TURN ARROW		48" x 48"	16	
W1-2	LEFT or RIGHT CURVE ARROW		48" x 48"	16	
W1-3	REVERSE TURN (L or R)		48" x 48"	16	
W1-4	REVERSE CURVE (L or R)		48" x 48"	16	
W3-1	STOP AHEAD (symbol)		48" x 48"	16	
W3-2	YIELD AHEAD (symbol)		48" x 48"	16	
W3-3	SIGNAL AHEAD (symbol)		48" x 48"	16	
W3-4	BE PREPARED TO STOP	2	48" x 48"	16	32
W3-5	SPEED REDUCTION AHEAD (___ MPH)		48" x 48"	16	
W4-1	MERGE (symbol)		48" x 48"	16	
W4-2	LEFT or RIGHT LANE ENDS (symbol)		48" x 48"	16	
W4-3	ADDED LANE (symbol)		48" x 48"	16	
W5-3	ONE LANE BRIDGE		48" x 48"	16	
W7-3aP	NEXT ___ MILES (plaque)		36" x 30"	8	
W8-1	BUMP		48" x 48"	16	
W8-6	TRUCK CROSSING		48" x 48"	16	
W8-7	LOOSE GRAVEL		48" x 48"	16	
W8-11	UNEVEN LANES		48" x 48"	16	
W8-17	SHOULDER DROP-OFF (symbol)		48" x 48"	16	
W13-1P	ADVISORY SPEED (plaque)		30" x 30"	6	
W16-3P	DISTANCE (plaque) 1/2 MILE Black on Orange		30" x 24"	5	
W16-3P	DISTANCE (plaque) 1 MILE Black on Orange		30" x 18"	4	
W20-1	ROAD WORK AHEAD	2	48" x 48"	16	32
W20-2	DETOUR AHEAD		48" x 48"	16	
W20-3	ROAD CLOSED AHEAD		48" x 48"	16	
W20-4	ONE LANE ROAD AHEAD		48" x 48"	16	
W20-5	LEFT or RIGHT LANE CLOSED AHEAD		48" x 48"	16	
W20-7	FLAGGER (symbol)	2	48" x 48"	16	32
W21-1	WORKERS (symbol)		48" x 48"	16	
W21-2	FRESH OIL		48" x 48"	16	
W21-3	ROAD MACHINERY AHEAD		48" x 48"	16	
W21-5	SHOULDER WORK		48" x 48"	16	
W21-5a	LEFT or RIGHT SHOULDER CLOSED		48" x 48"	16	
W21-5b	LEFT or RIGHT SHOULDER CLOSED AHEAD		48" x 48"	16	
G20-1	ROAD WORK NEXT ___ MILES		36" x 18"	5	
G20-2	END ROAD WORK		36" x 18"	5	
G20-5aP	WORK ZONE (plaque)		24" x 18"	3	
SPECIAL	TRUCKS ENTERING		48" x 48"	16	
-	TYPE 3 OBJECT MARKER		12" x 36"	3	
		CONVENTIONAL ROAD			
		TRAFFIC CONTROL SIGNS SQFT			96

Plotting Date: 09/09/2015

PLOT SCALE - 1:200

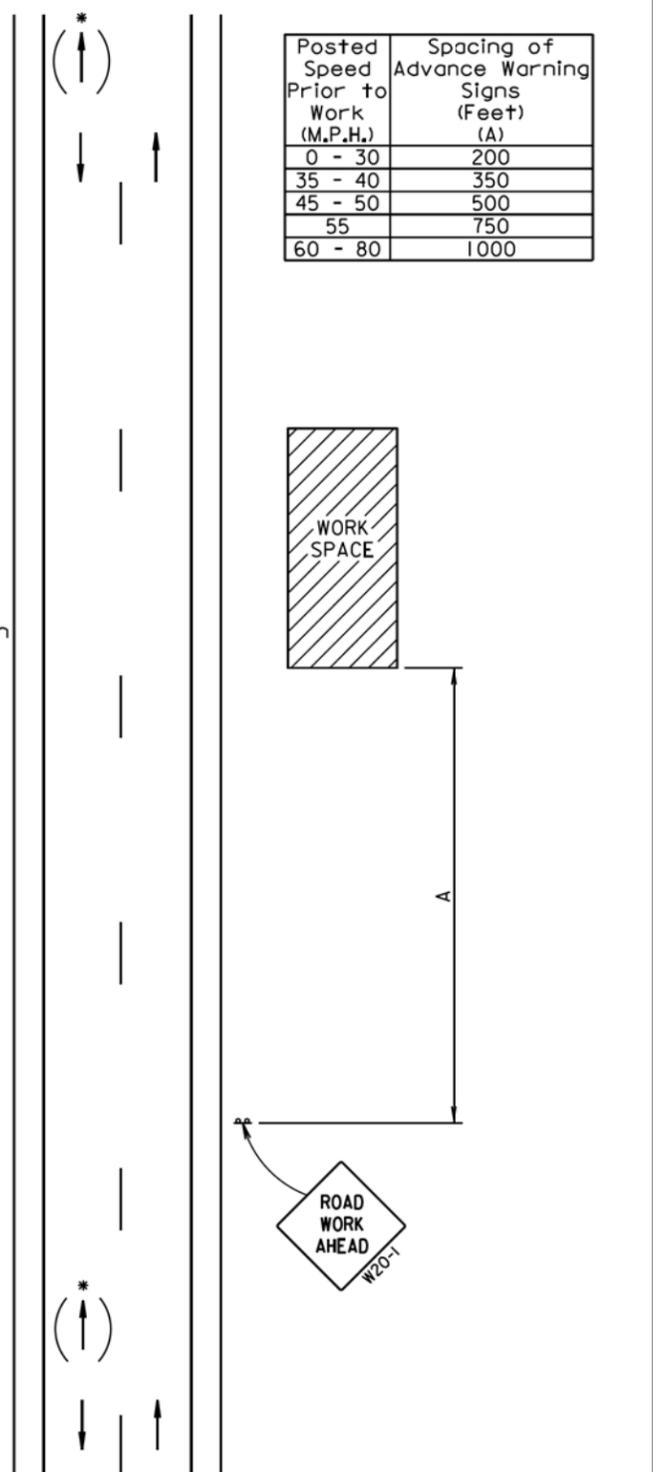
The signs illustrated are not required if the work space is behind a barrier, more than 2 feet behind the curb, or 15 feet or more from the edge of any roadway.

The signs illustrated shall be used where there are distracting situations; such as: vehicles parked on shoulder, vehicles accessing the work site via the highway, and equipment traveling on or crossing the roadway to perform work operations.

The ROAD WORK AHEAD sign may be replaced with other appropriate signs, such as the SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the shoulder.

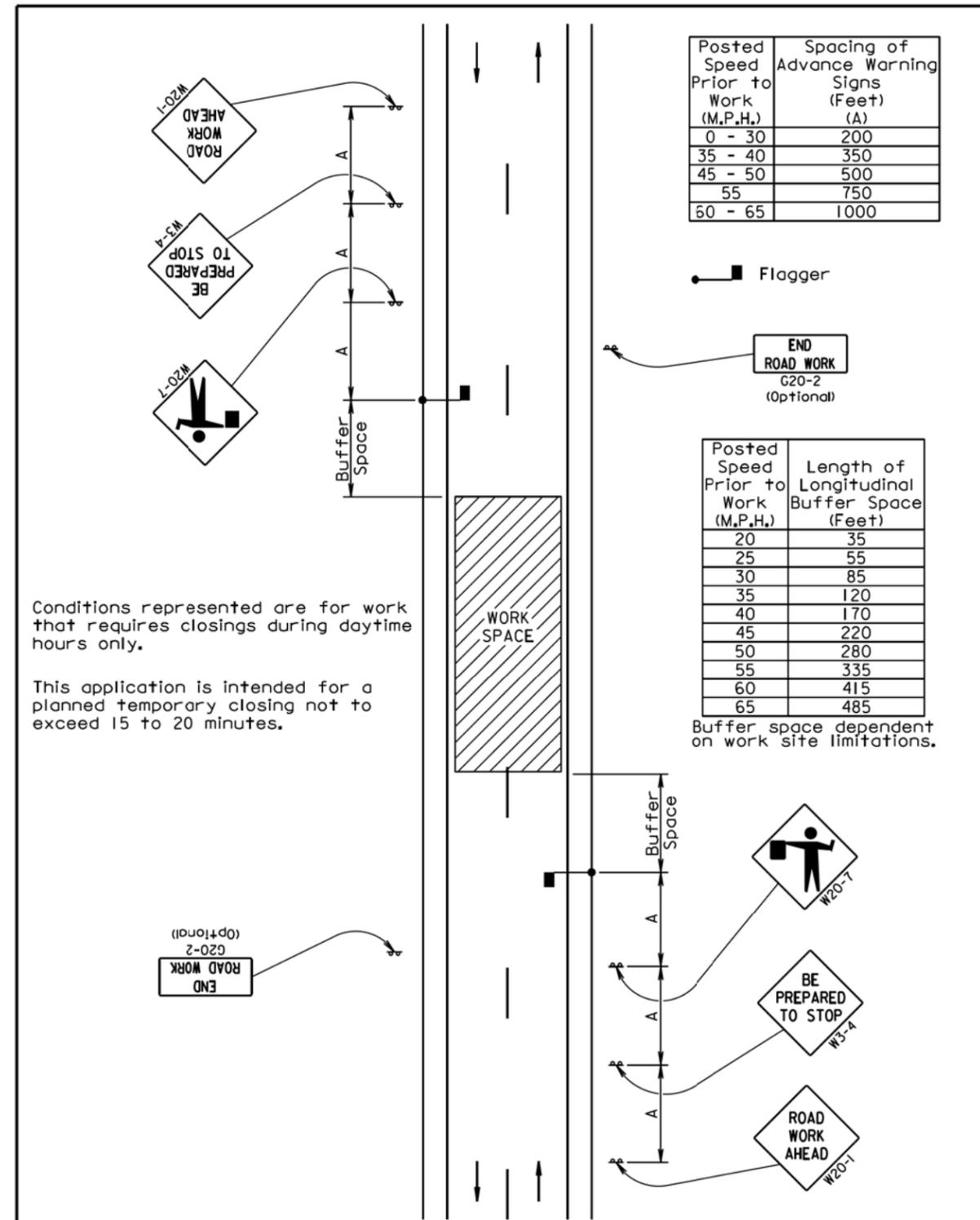
* If the work space is on a divided highway, an advance warning sign should also be placed on the left side of the directional roadway.

For short term, short duration, or mobile operations, all signs and channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.



April 15, 2015

PLOT NAME - 2



Conditions represented are for work that requires closings during daytime hours only.

This application is intended for a planned temporary closing not to exceed 15 to 20 minutes.

Buffer space dependent on work site limitations.

September 22, 2014

PLOTTED FROM - TRW\INT16

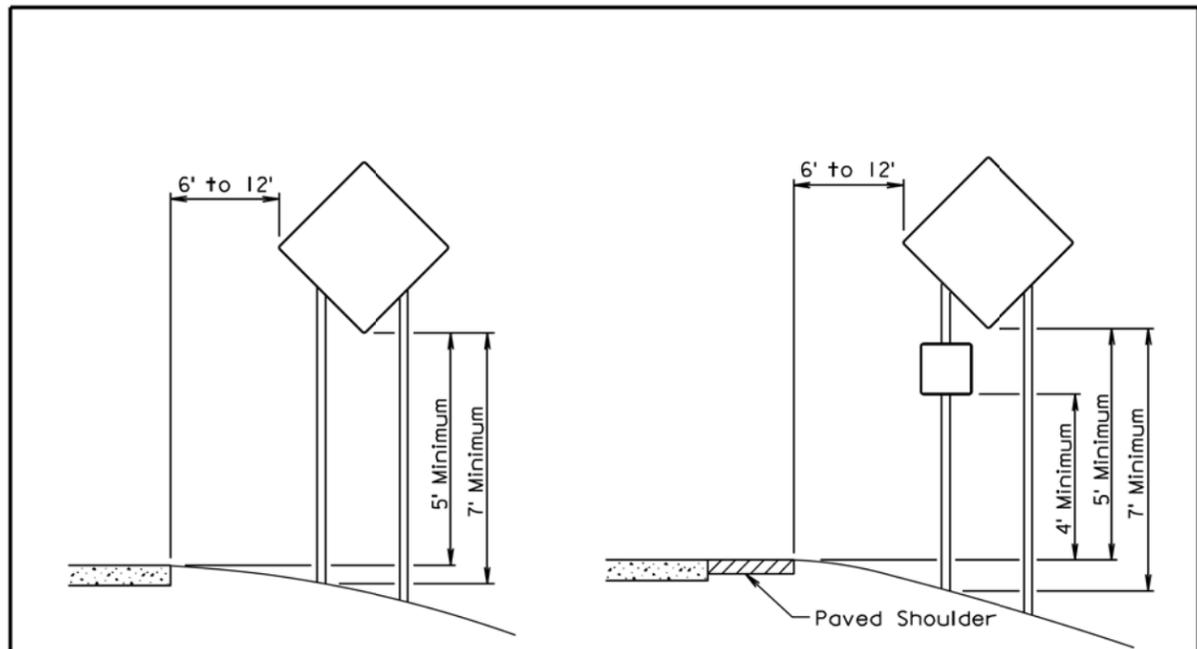
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Plotting Date: 09/09/2015

PLOT SCALE - 1:200

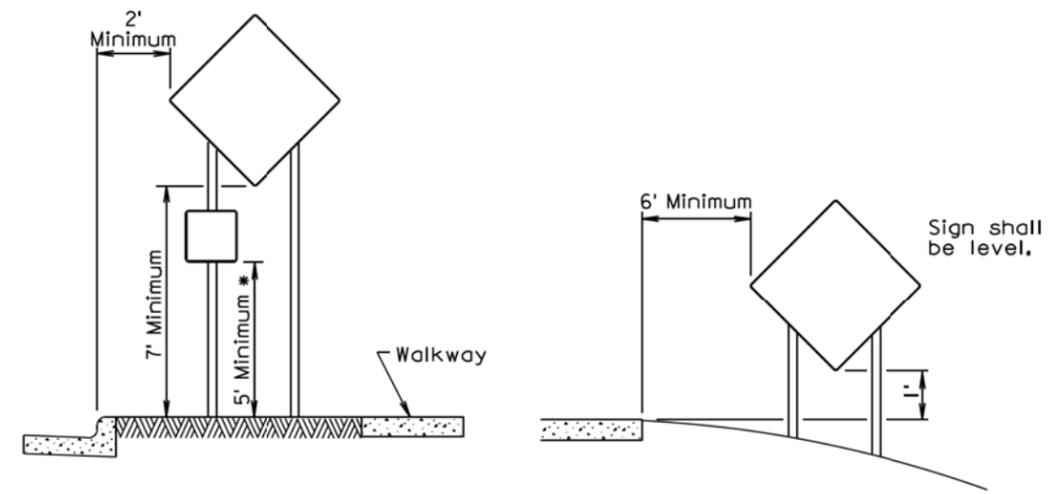
PLOT NAME - 3

FILE - ... \STANDARDPLATES_05M4.DGN



RURAL DISTRICT

RURAL DISTRICT WITH SUPPLEMENTAL PLATE



URBAN DISTRICT

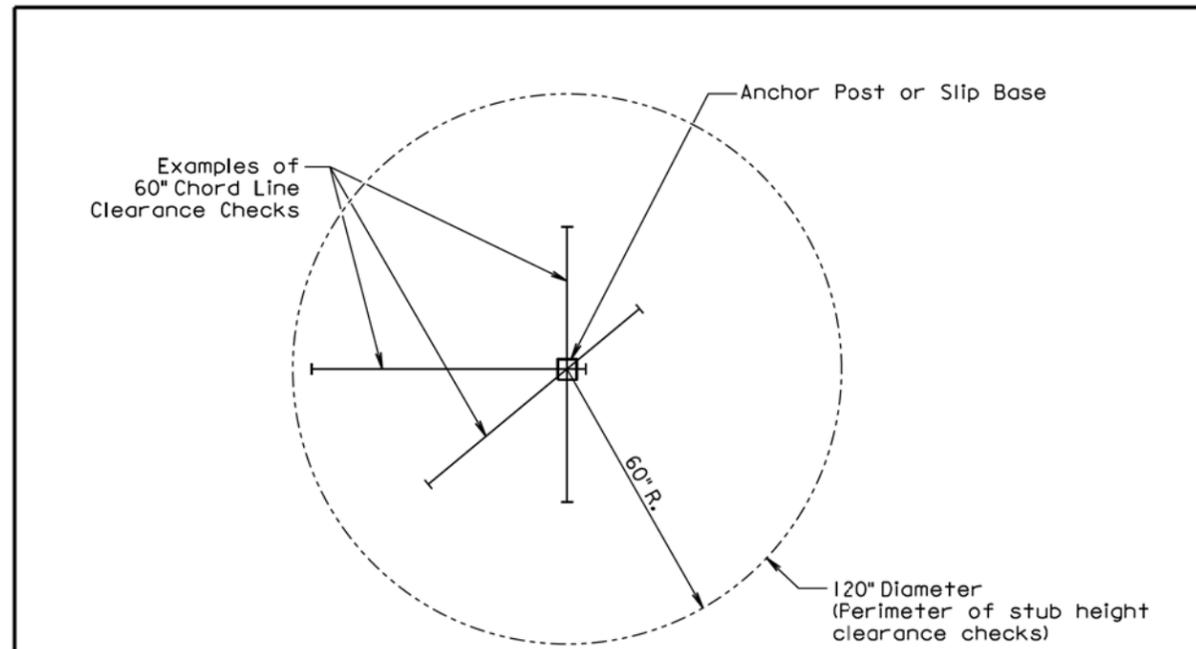
RURAL DISTRICT 3 DAY MAXIMUM

* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.

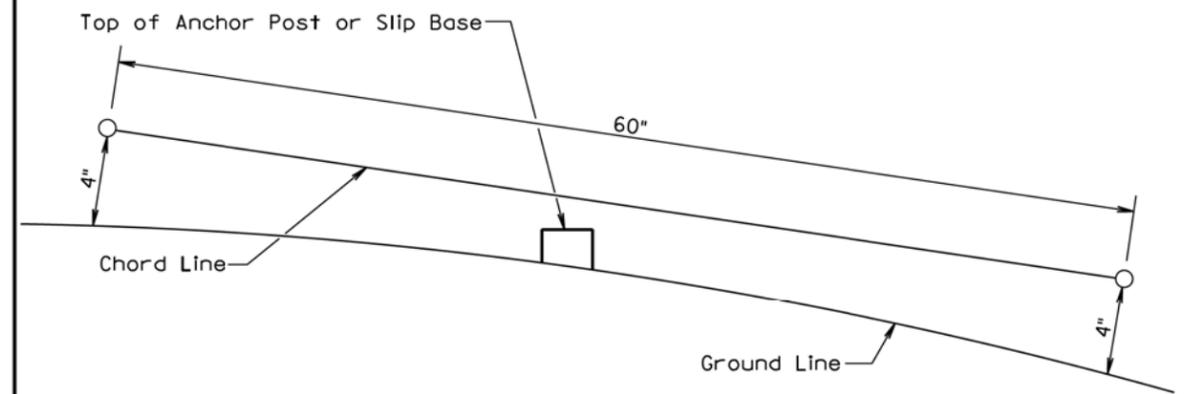
(Not applicable to regulatory signs)

September 22, 2014

Published Date: 3rd Qtr. 2015	S D D O T	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1



PLAN VIEW
(Examples of stub height clearance checks)



ELEVATION VIEW

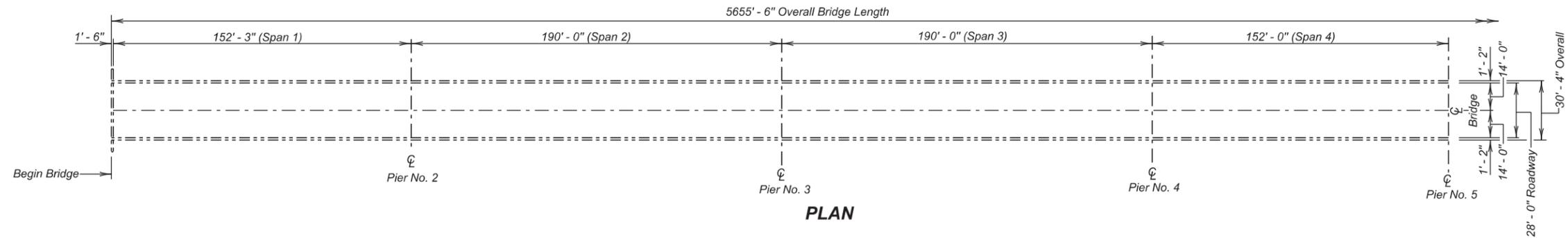
GENERAL NOTES:

The top of anchor posts and slip bases SHALL NOT extend above a 60° chord line within a 120" diameter circle around the post with ends 4" above the ground.
 At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.
 The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

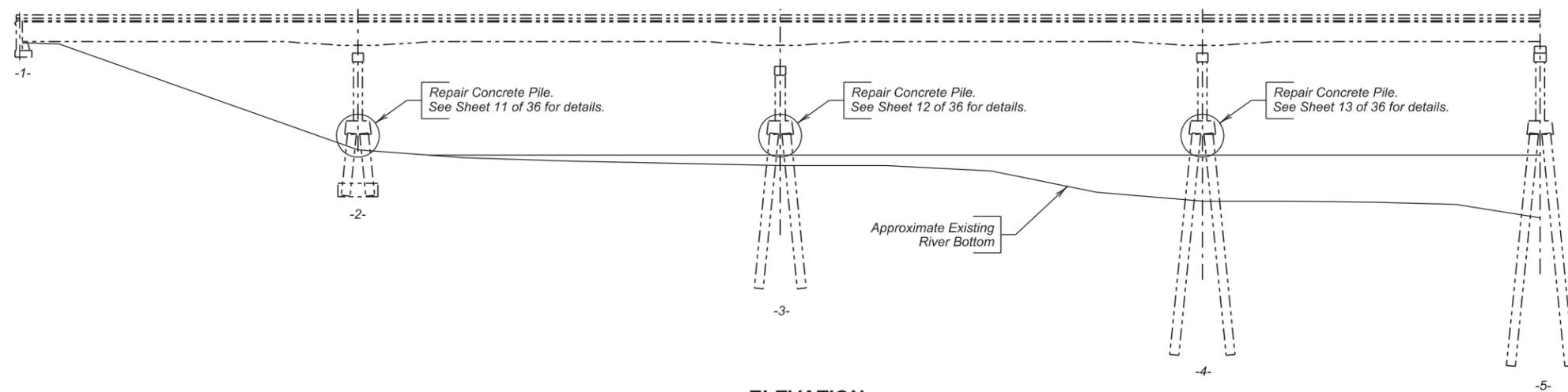
July 1, 2005

Published Date: 3rd Qtr. 2015	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
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PLAN



ELEVATION

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- Sheet Nos. 8 thru 10 - Estimate of Structure Quantities and Notes
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- Sheet No. 12 - Concrete Pile Repair at Pier No. 3
- Sheet No. 13 - Concrete Pile Repair at Pier No. 4
- Sheet No. 14 - Concrete Pile Repair at Pier No. 6
- Sheet No. 15 - Concrete Pile Repair at Pier No. 7
- Sheet No. 16 - Concrete Pile Repair at Pier No. 11
- Sheet No. 17 - Concrete Pile Repair at Pier No. 12
- Sheet No. 18 - Concrete Pile Repair at Pier No. 13
- Sheet No. 19 - Concrete Pile Repair at Pier No. 14
- Sheet No. 20 - Concrete Pile Repair at Pier No. 15
- Sheet No. 21 - Concrete Pile Repair at Pier No. 16
- Sheet No. 22 - Concrete Pile Repair at Pier No. 17
- Sheet No. 23 - Concrete Pile Repair at Pier No. 19
- Sheet No. 24 - Concrete Pile Repair at Pier No. 22
- Sheet No. 25 - Concrete Pile Repair at Pier No. 24
- Sheet Nos. 26 thru 36 - Original Construction plans

**LAYOUT FOR UPGRADING
FOR**

5655' - 6" BRIDGE OVER FT. RANDALL RES.
 28' - 0" ROADWAY 0° SKEW
 OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
 STR. NO. 12-085-080 P 0044(198)291
 PCN 02A9

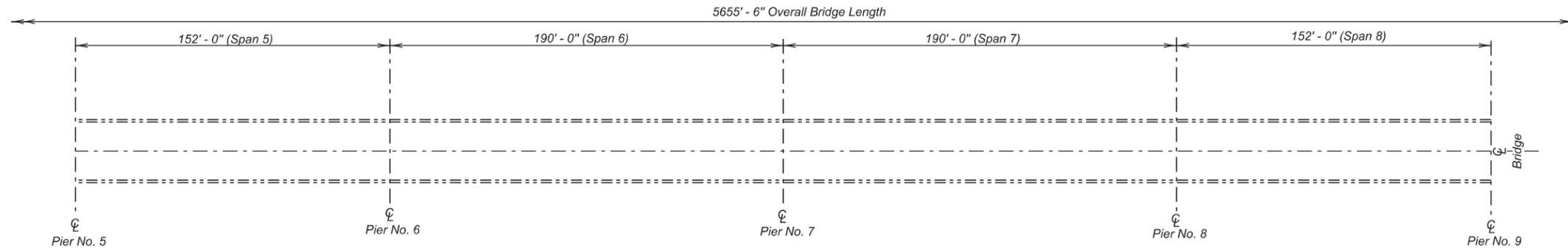
GREGORY - CHARLES MIX COUNTY
 S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014

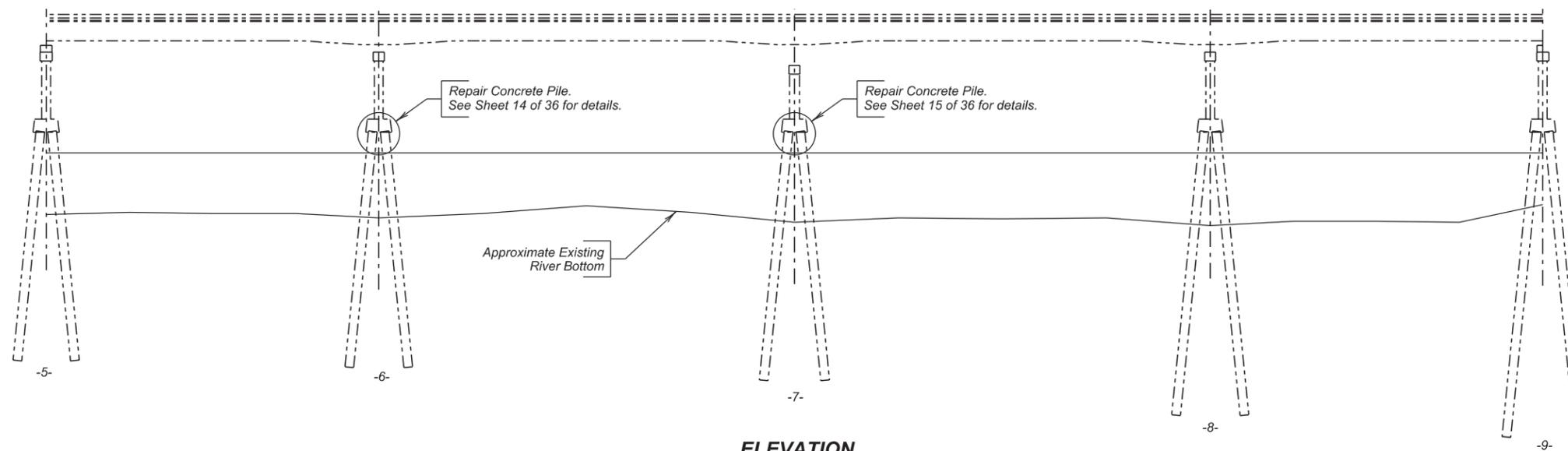
PLANS BY:
 OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA01	DRAFTED BY NP <i>Kevin N. Goeden</i> BRIDGE ENGINEER
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PLAN



ELEVATION

LAYOUT FOR UPGRADING (CONTINUED)

FOR

5655' - 6" BRIDGE OVER FT. RANDALL RES.

28' - 0" ROADWAY 0° SKEW

OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W

STR. NO. 12-085-080 P 0044(198)291

GREGORY - CHARLES MIX COUNTY

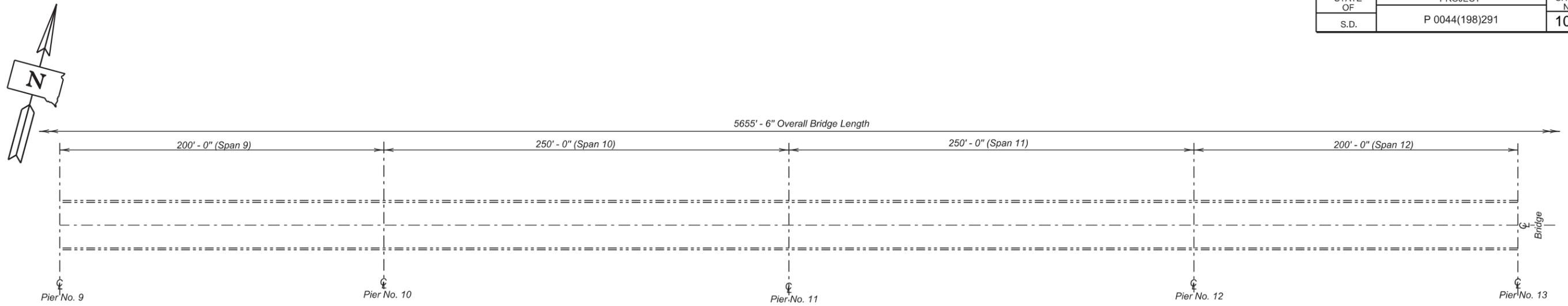
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014

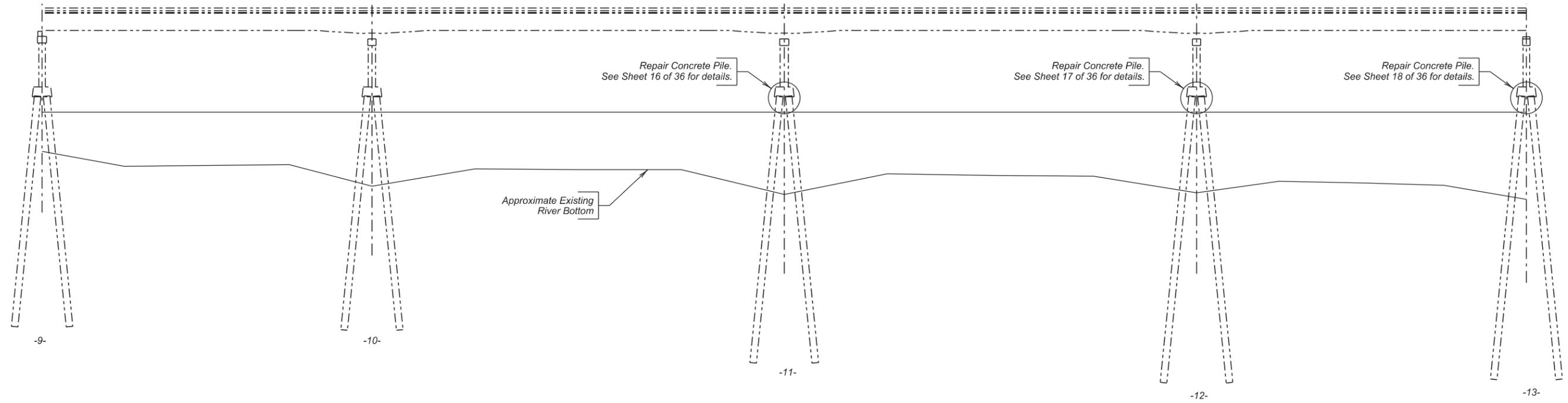
2 OF 36

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA02	DRAFTED BY NP <i>Kevin N. Goeden</i> BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	10	43



PLAN



ELEVATION

LAYOUT FOR UPGRADING (CONTINUED)

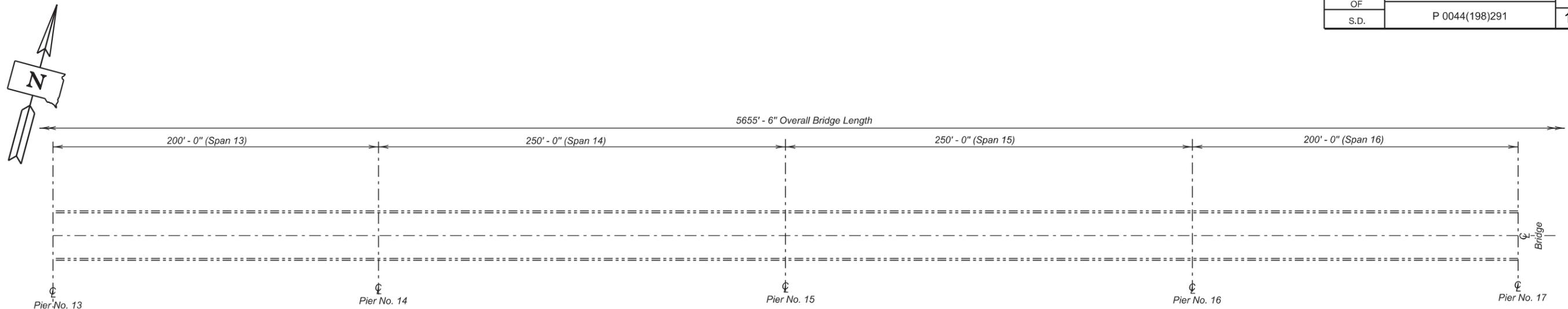
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
 28' - 0" ROADWAY 0° SKEW
 OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
 STR. NO. 12-085-080 P 0044(198)291

GREGORY - CHARLES MIX COUNTY
 S. D. DEPT. OF TRANSPORTATION

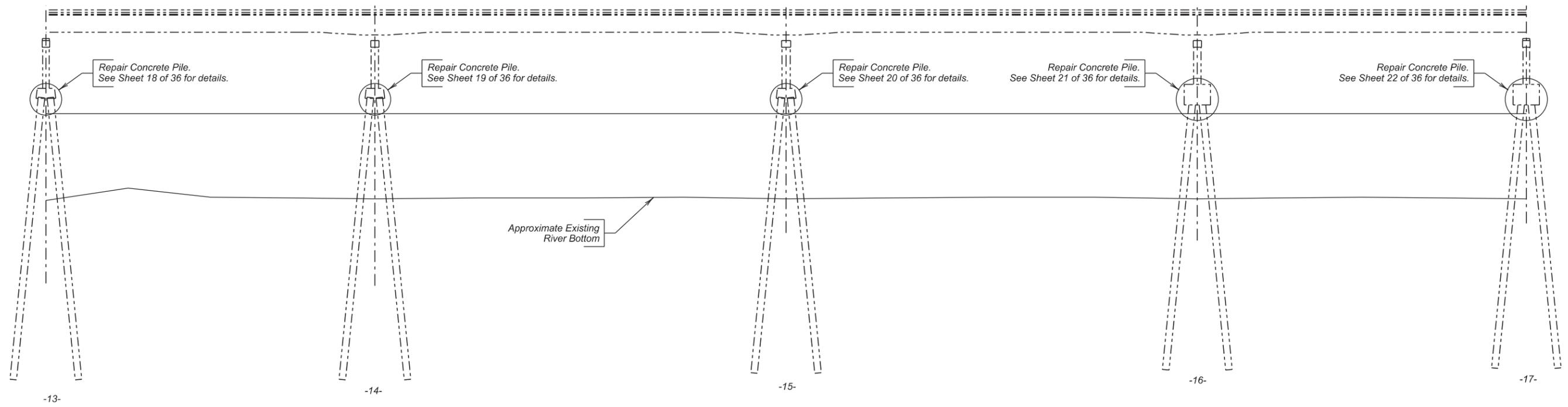
DECEMBER 2014 3 OF 36

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA03	DRAFTED BY NP <i>Kevin N. Goeden</i> BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	11	43



PLAN



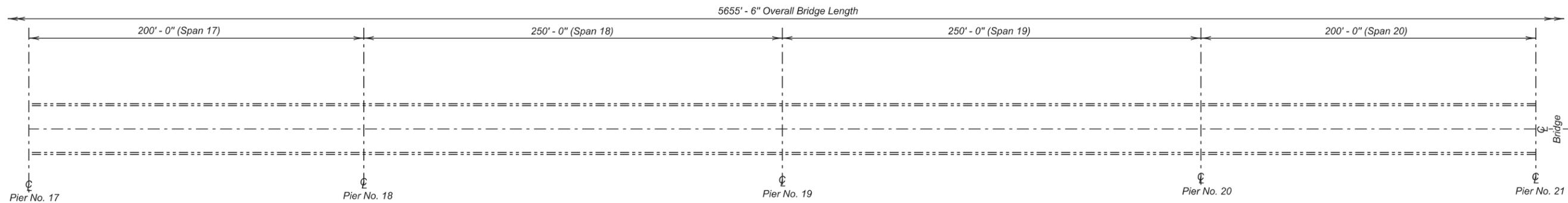
ELEVATION

LAYOUT FOR UPGRADING (CONTINUED)
 FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
 28' - 0" ROADWAY 0° SKEW
 OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
 STR. NO. 12-085-080 P 0044(198)291

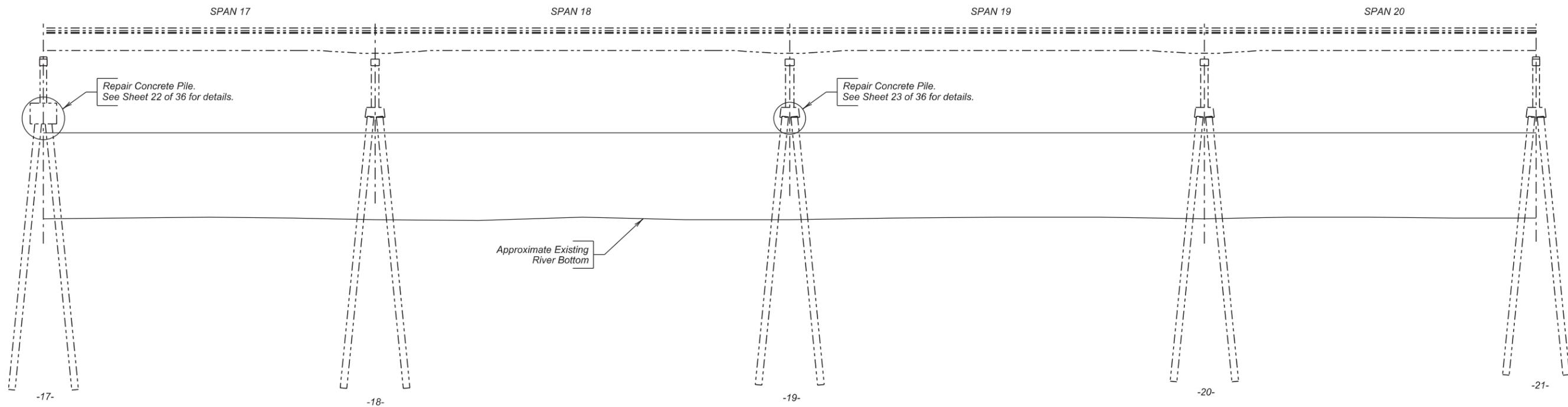
GREGORY - CHARLES MIX COUNTY
 S. D. DEPT. OF TRANSPORTATION
 DECEMBER 2014

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA04	DRAFTED BY NP <i>Kevin N. Goeden</i> BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	12	43



PLAN



ELEVATION

LAYOUT FOR UPGRADING (CONTINUED)

FOR

5655' - 6" BRIDGE OVER FT. RANDALL RES.
 28' - 0" ROADWAY 0° SKEW
 OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
 STR. NO. 12-085-080 P 0044(198)291

GREGORY - CHARLES MIX COUNTY

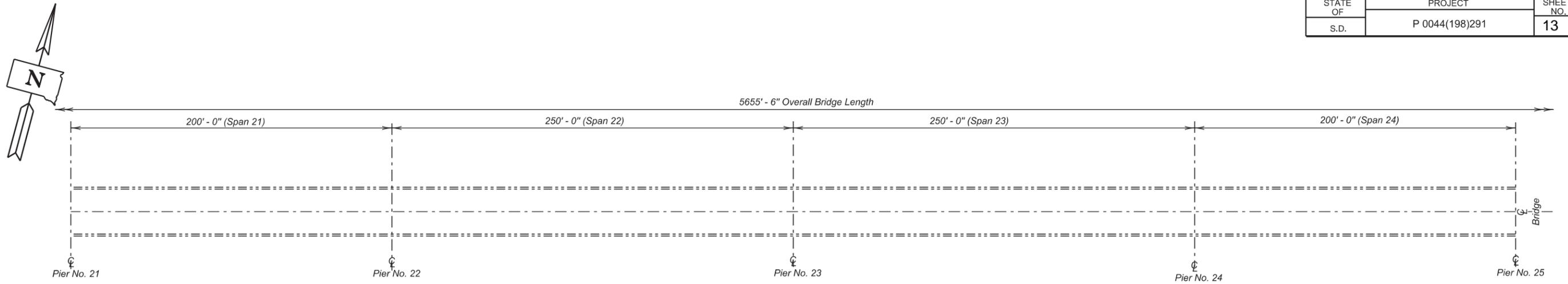
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014

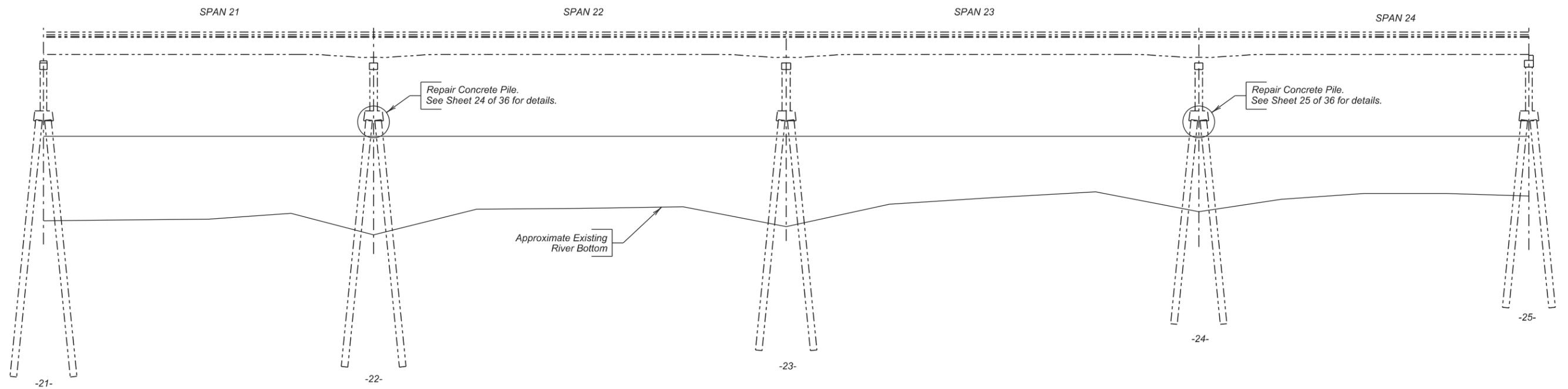
5 OF 36

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA05	DRAFTED BY NP <i>Kevin N. Goeden</i> BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	13	43



PLAN



ELEVATION

LAYOUT FOR UPGRADING (CONTINUED)

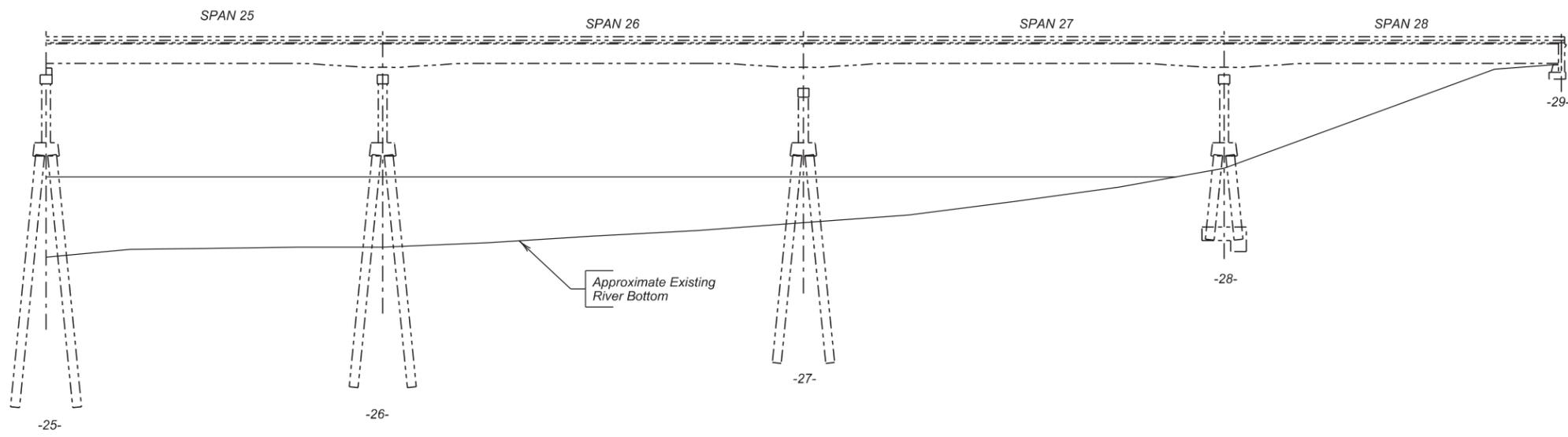
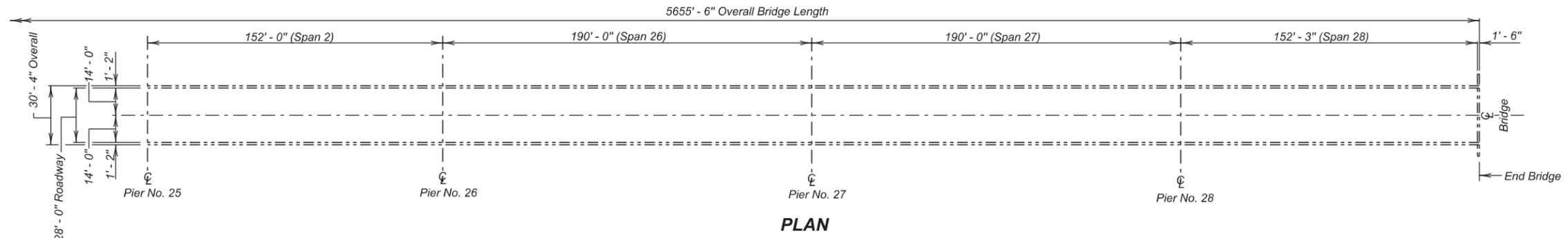
FOR
 5655' - 6" BRIDGE OVER FT. RANDALL RES.
 28' - 0" ROADWAY 0° SKEW
 OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
 STR. NO. 12-085-080 P 0044(198)291

GREGORY - CHARLES MIX COUNTY
 S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014 6 OF 36

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA06	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	14	43



ELEVATION

LAYOUT FOR UPGRADING (CONTINUED)
 FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
 28' - 0" ROADWAY 0° SKEW
 OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
 STR. NO. 12-085-080 P 0044(198)291

GREGORY - CHARLES MIX COUNTY
 S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014 (7) OF (36)

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA07	DRAFTED BY NP <i>Kevin N. Goeden</i> BRIDGE ENGINEER
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ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
420E0100	Structure Excavation, Bridge	2	CuYd
460E0174	Concrete Patching Material, Miscellaneous	33.9	CuFt
460E0300	Breakout Structural Concrete	1.5	CuYd
460E8050	Composite Fabric Wrap, Concrete Repair	3292	SqFt
480E5000	Galvanic Anode	14	Each

SPECIFICATIONS

- Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Working Stress Design.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

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 and are provided as information only. 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 under traffic. If traffic control is necessary, it shall be in accordance with the traffic control shown elsewhere in the plans. Alternate sequence of operations may be submitted by the Contractor for approval by the Engineer a minimum of two weeks prior to the pre-construction meeting.

- Breakout and repair deteriorated areas of the concrete piles and pile caps as shown by the plans.
- Place composite fabric wrap on the cracked concrete piles and at areas of concrete repair as shown by the plans.

GENERAL CONSTRUCTION NOTES

- All exposed concrete edges or corners shall be chamfered $\frac{3}{4}$ inch except where noted otherwise in the plans. Match the existing chamfer if chamfer differs.
- Maintain a minimum 2" clear cover on all reinforcing steel in concrete patching locations.
- Work on the repair areas of the pile caps shall be accomplished at a time when the plan designated repair areas are completely out of the water and shall remain out of the water for the length of cure period for the concrete patching material.

- Work on the repair areas of the piles can be accomplished above or below water. If the Contractor elects to perform the work above water work may not commence until the water surface is at 1345.0. There will be a limited amount of time when the piles are above water due to the changing water elevations for Lake Francis Case which this bridge crosses. The water level is controlled by the Corp of Engineers. The following link, which shows the historic water levels by the Corp of Engineers, is provided as a scheduling tool:

<http://www.nwd-mr.usace.army.mil/rcc/projdata/ftra.pdf>

CONCRETE BREAKOUT

- Portions of the existing concrete pile cap above the waterline shall be broken out to the limits shown on the plans. Breakout limits shall be defined with a $\frac{3}{4}$ " deep sawcut and shall be to a minimum depth of 3" (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 and straightened 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.
- All broken out concrete and discarded reinforcing bars shall be disposed of by the Contractor. Any disposal of discarded material shall be in accordance with the Environmental Commitments.
- During concrete removal operations, no broken out concrete shall be allowed to fall into the Missouri River.
- The contract unit price per cubic yard for "Breakout Structural Concrete" shall include breaking out concrete, cleaning, straightening existing reinforcing steel, and disposal of all broken out material.

GALVANIC ANODE

- The Contractor shall furnish and place galvanic anodes in the concrete repair areas of the pier cap as specified in this plan set.
- The galvanic anodes supplied shall be one of the following:
 - Galvashield XP+
Vector Corrosion Technologies
13312 N 56th St, Suite 102
Tampa, FL 33617
Phone: (813) 830-7566
Website: www.vector-corrosion.com
 - Sentinel Silver
Euclid Chemical Company
19218 Redwood Road
Cleveland, OH 44110
Phone: (800) 321-7628
Website: www.euclidchemical.com

- Sika Galvashield XP+
Sika Corporation US
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: (800) 933-7452
Website: <http://usa.sika.com>

- The anodes shall be placed in accordance with manufacturer's recommendations and as approved by the Engineer. 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 to the Office of Bridge Design.
- The anodes shall be placed with a minimum $\frac{3}{4}$ " cover and shall be set in 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.
- The electrical continuity of the electrical connections and reinforcing steel shall be confirmed per the manufacturer's recommendations.
- The Contractor shall provide manufacturer's product literature and installation instructions to the Engineer 10 days prior to installation.
- 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".

PILE CAP REPAIR

- After all delaminated concrete has been removed, the area shall be abrasive blasted and blown clean with clean, dry, oil-free compressed air at 90 psi.
- The concrete patching material used in the pile cap repair areas shall be supplied as the following or an equivalent as approved by the Office of Bridge Design:

Vertical Patch
Symons
2400 Arthur Avenue
Elk Grove Village, IL 60007
Phone: (847) 298-3200
Web site: www.symons.com

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES

FOR

5655' - 6" BRIDGE OVER FT. RANDALL RES.

STR. NO. 12-085-080

DECEMBER 2014

8 OF 36

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA08	DRAFTED BY NP <i>Kevin N. Boeden</i>	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	16	43

PILE CAP REPAIR(CONTINUED)

Meadow-Patch 20
 W. R. Meadows, Inc.
 P.O. Box 338
 Hampshire, IL 60140-0338
 Phone: (847) 214-2100
 Web site: www.wrmeadows.com

Speed Crete Red Line
 The Euclid Chemical Company
 19218 Redwood Rd.
 Cleveland, OH 44110
 Phone: (800) 321-7628
 Web site: www.euclidchemical.com

The concrete patching material shall be extended with aggregate of the quality, size and gradation specified in the manufacture's technical literature.

3. The bent caps shall be rebuilt to the dimensions of the original construction plans unless otherwise shown on the plans. When used, cap forms may be removed when the concrete attains a compressive strength of 2000 psi.
4. All costs associated with accessing, furnishing, placing and finishing the concrete patching material including all equipment, labor and incidentals shall be incidental to the unit price per cubic foot for "Concrete Patching Material, Miscellaneous". The total plan shown quantity for "Concrete Patching Material, Miscellaneous" is a combination of the patching material shown here for the cap and the patching material specified in the plans for the piling repair even though they are two separate products.

COMPOSITE FABRIC WRAP, CONCRETE REPAIR FOR PILING

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, 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 twenty (20) 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.
- 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 applicators shall have a minimum experience of 1 year 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 Deliver epoxy materials in factory-sealed containers with the manufacturer's labels intact and legible with verification of date of manufacture and shelf life.
- 2.1.2 Store materials in a protected area to avoid contact with moisture and at a temperature between 50°F and 90°F or in accordance to the manufacturer's requirements.

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
 8380 Miralani Drive
 San Diego, California 92126
 Tel: (858) 642-0694
 Fax: (858) 444-2982

- 2.2.2 The Tyfo Fibrwrap System shall have the following materials:

- 2.2.2.1 Composite fabric:
 SCH 41 fabric – carbon fabric
 SEH 51A fabric – glass fabric

- 2.2.2.2 Epoxy saturant:
 For above water installation Tyfo S epoxy to be combined with the fabric to form the Tyfo Fiberwrap composite.
 For underwater installation Tyfo SW-1S epoxy to be combined with the fabric to form the Tyfo Fiberwrap composite.

- 2.2.2.3 Primer/Filler:
 For above water installation Tyfo WS thickened epoxy for protective seal coat and filling voids.
 For underwater installation Tyfo SW-1 underwater epoxy for protective seal coat and filling voids.

- 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:			
Percent, Minimum	1.7	0.8	D 3039
Percent, Maximum	4	1.7	
Tensile Modulus, psi, minimum Based on cross sectional Area of primary fibers	3 x 10 ⁶	8 x 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

NOTES (CONTINUED)

FOR
 5655' - 6" BRIDGE OVER FT. RANDALL RES.

STR. NO. 12-085-080

DECEMBER 2014

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA09	DRAFTED BY NP	<i>Kevin N. Boeden</i> BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	17	43

COMPOSITE FABRIC WRAP, CONCRETE REPAIR FOR PILING (CONTINUED)

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). For above water installations, the contact surfaces shall have no free moisture on them at the time of application. If moisture cannot be avoided, use of the manufacturer's suggested wet prime epoxy will be required.
- 3.1.2 Round off sharp and chamfered corners to a radius of 1 inch ($\pm 0.25"$) 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 wrap prior to pile 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. Removal areas less than 1" in depth shall be built up to the original section using an epoxy grout supplied by the composite column wrap supplier which meets the strength of existing section. Removal areas greater than 1" in depth shall be built up using a concrete patching material specifically designed for patching vertical concrete surfaces as approved by the Engineer. The perimeter of the repair area shall be sawcut a minimum of 1/2". Featheredging is not allowed. 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 Concrete surfaces shall have all surface foreign materials, such as organics, aquatic organisms, dirt, etc., removed as approved by the Engineer. Cleaning shall be in accordance with the manufacturers recommendations as approved by the Engineer. Stripping off well-adhered paint or concrete from pier column surfaces is not required. For above water applications, one prime coat of the manufacturer's epoxy shall be applied prior to wrapping pier cap with the composite.

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 amount of time as recommended by the patching material manufacturer.

- 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 certified applicator.
- 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.
- 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. 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 (in above water applications only), damage and debris for a minimum of 24 hours after placement.
- 3.2.14 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. All repair procedures shall be subject to the approval of the Engineer.
- 3.3 Underwater Inspection Procedures and Documentation
- 3.3.1 The Contractor will provide one Chief Diver in the water at all times that the underwater operations are being performed. The Chief Diver shall have real time video feed and radio contact with an inspector provided by the Department. The Chief Diver shall be available to check the work of other divers, do a final check upon completion of that dive/day's work, or address any other concerns at the request of the inspector while divers are in the water.
- 3.3.2 Acceptance of the Composite Fiber Wrap, Concrete Repair payment item shall be based on visual inspection of the surface preparation of the concrete, application of patching material when present, application of the composite fiber wrap, and the final installed product at each location.
- 3.3.3 The Contractor will be responsible for providing unedited video logs for each diver and for each composite fiber wrap location. Video logs shall be submitted to the Project Engineer in a digital format the following working day from when the work was performed.
- 3.3.4 Submitted video logs shall be in a format that is readily viewable on most computers and shall be labeled with the diver's name, location of work, type of work, and the date on which the work was performed.

NOTES (CONTINUED)

FOR

5655' - 6" BRIDGE OVER FT. RANDALL RES.

STR. NO. 12-085-080

DECEMBER 2014

10 OF 36

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA10	DRAFTED BY NP <i>Kevin N. Boeden</i> BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	17A	43

COMPOSITE FABRIC WRAP, CONCRETE REPAIR FOR PILING (CONTINUED)

4. METHOD OF MEASUREMENT

Measurement will not be made for Composite Fabric Wrap, Concrete Repair. The plan quantity which is based on a water elevation of 1344.5 will be the basis of payment.

5. BASIS OF PAYMENT

“Composite Fabric Wrap, Concrete Repair” will be paid for at the contract unit price per square foot. Payment will be full compensation for labor, equipment, materials, and all incidental work required. Additionally, if the Contractor selects to complete work under water, all costs associated with providing real time video and communication between the Chief Diver and Department inspector, unedited daily video logs and any incidental items related to the underwater inspection requirements shall be incidental to the contract unit price per square foot for “Composite Fabric Wrap, Concrete Repair”.

NOTES (CONTINUED)

FOR

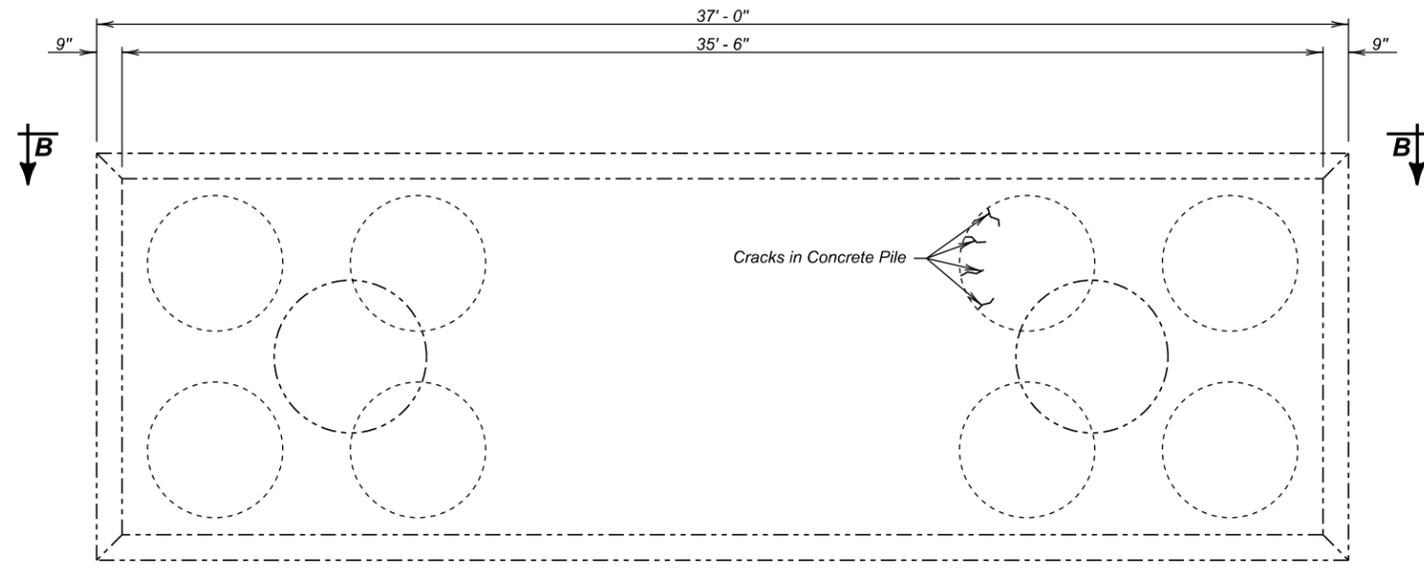
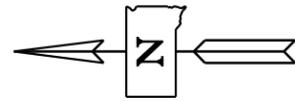
5655' - 6" BRIDGE OVER FT. RANDALL RES.

STR. NO. 12-085-080

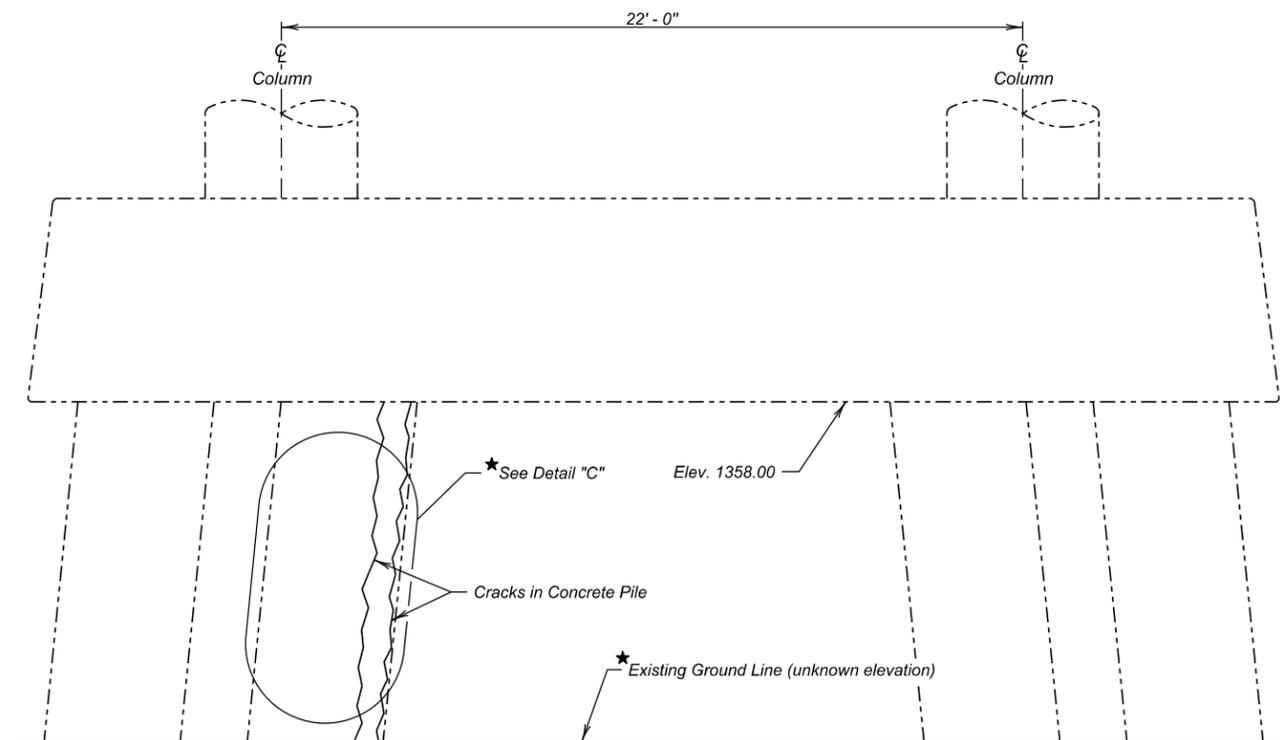
DECEMBER 2014

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DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA10A	DRAFTED BY NP <i>Kevin N. Goeden</i> BRIDGE ENGINEER
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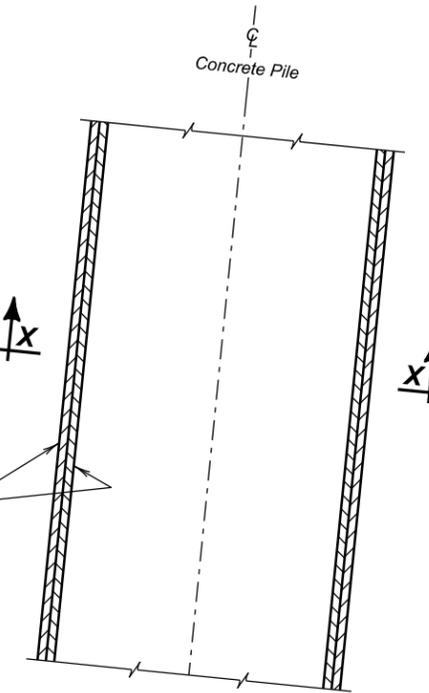


PLAN

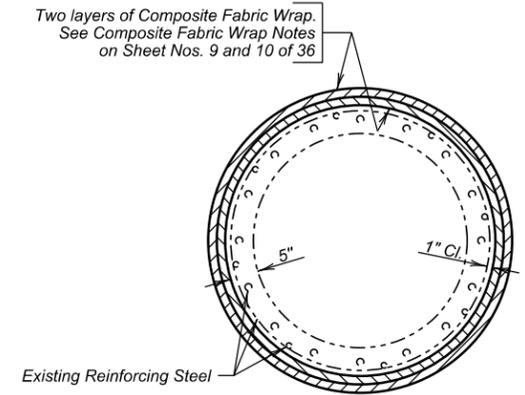


VIEW B - B

* To place the column wrap material down to an elevation of 1344.5 it may be necessary to excavate material adjacent to the piles.



DETAIL "C"
(Showing Composite Fabric Wrap)



SECTION X - X

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
∅ Composite Fabric Wrap, Concrete Repair	Sq. Ft.	151
△ Structure Excavation, Bridge	Cu. Yd.	2

∅ Quantity based on wrapping 12 feet of the concrete pile.
△ Quantity based on 2' - 0" deep excavation around concrete pile.

CONCRETE PILE REPAIR AT PIER NO. 2
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

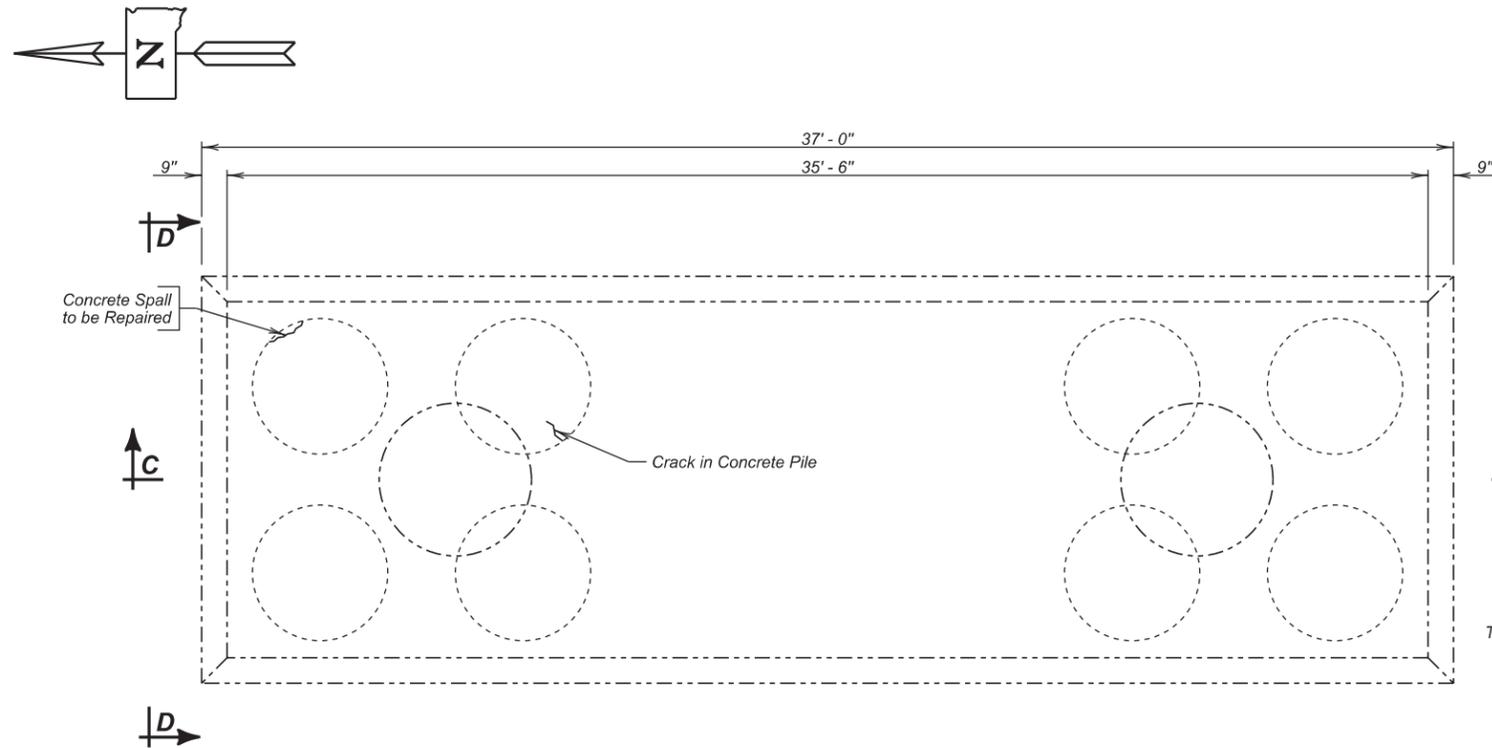
GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

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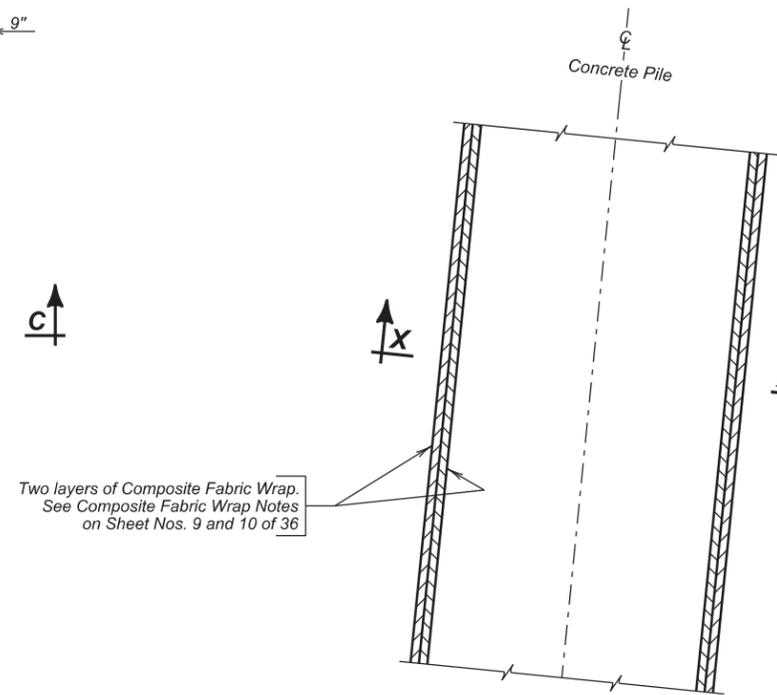
DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA11	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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Revised April 15, 2015 NP

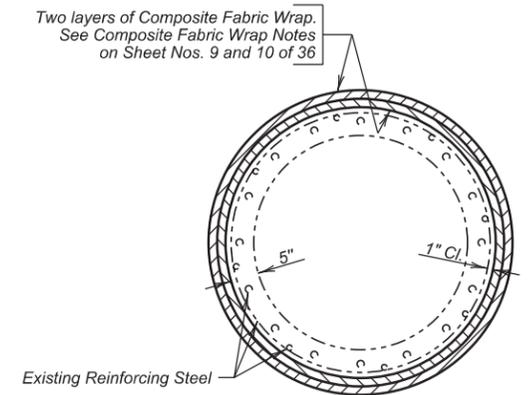
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	19	43



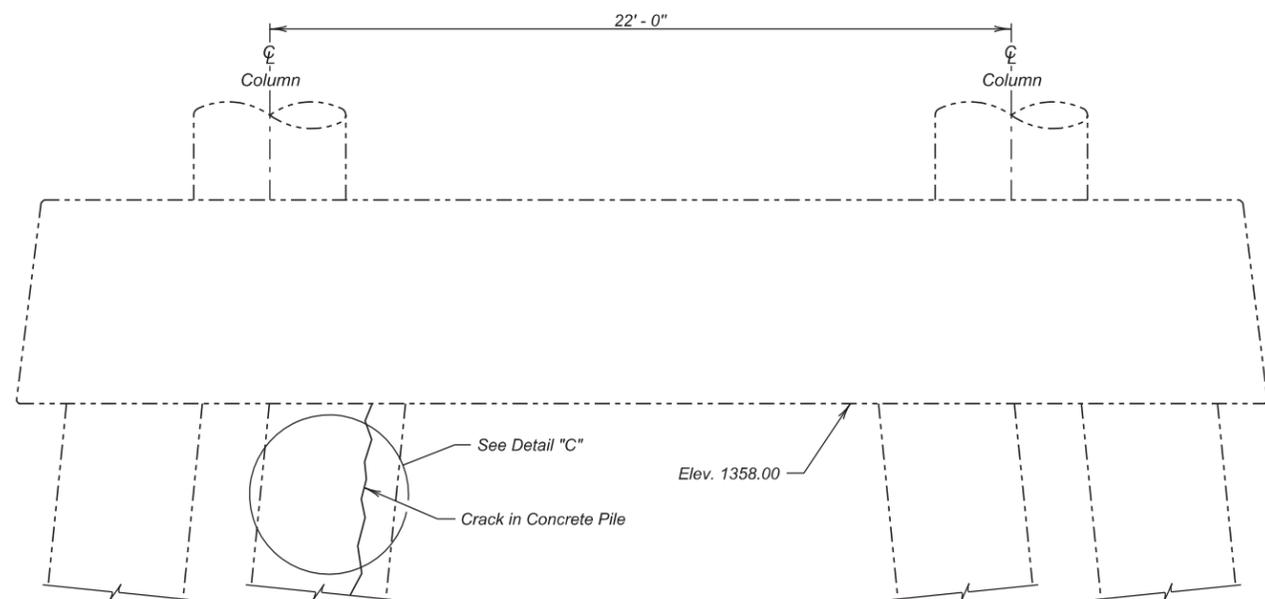
PLAN



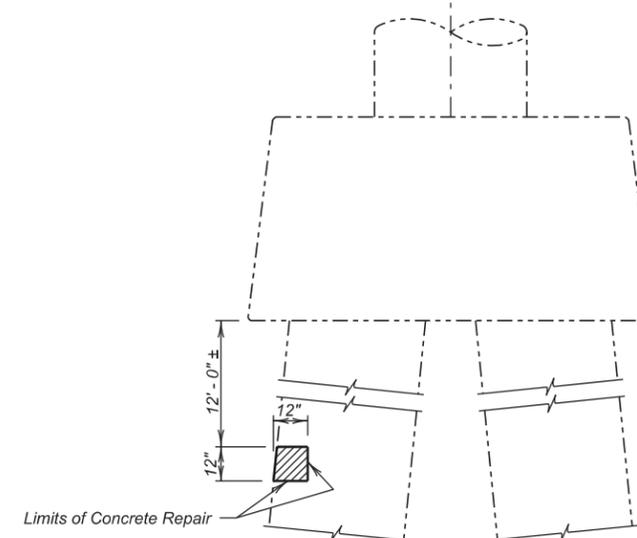
DETAIL "C"
(Showing Composite Fabric Wrap)



SECTION X - X



SECTION C - C



VIEW D - D

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Breakout Structural Concrete	Cu. Yd.	0.1
Concrete Patching Material, Miscellaneous	Cu. Ft.	0.3
Composite Fabric Wrap, Concrete Repair	Sq. Ft.	195

Quantity based on wrapping concrete pile lengths of 2.0 and 13.5 feet.

CONCRETE PILE REPAIR AT PIER NO. 3

FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

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LEGEND -

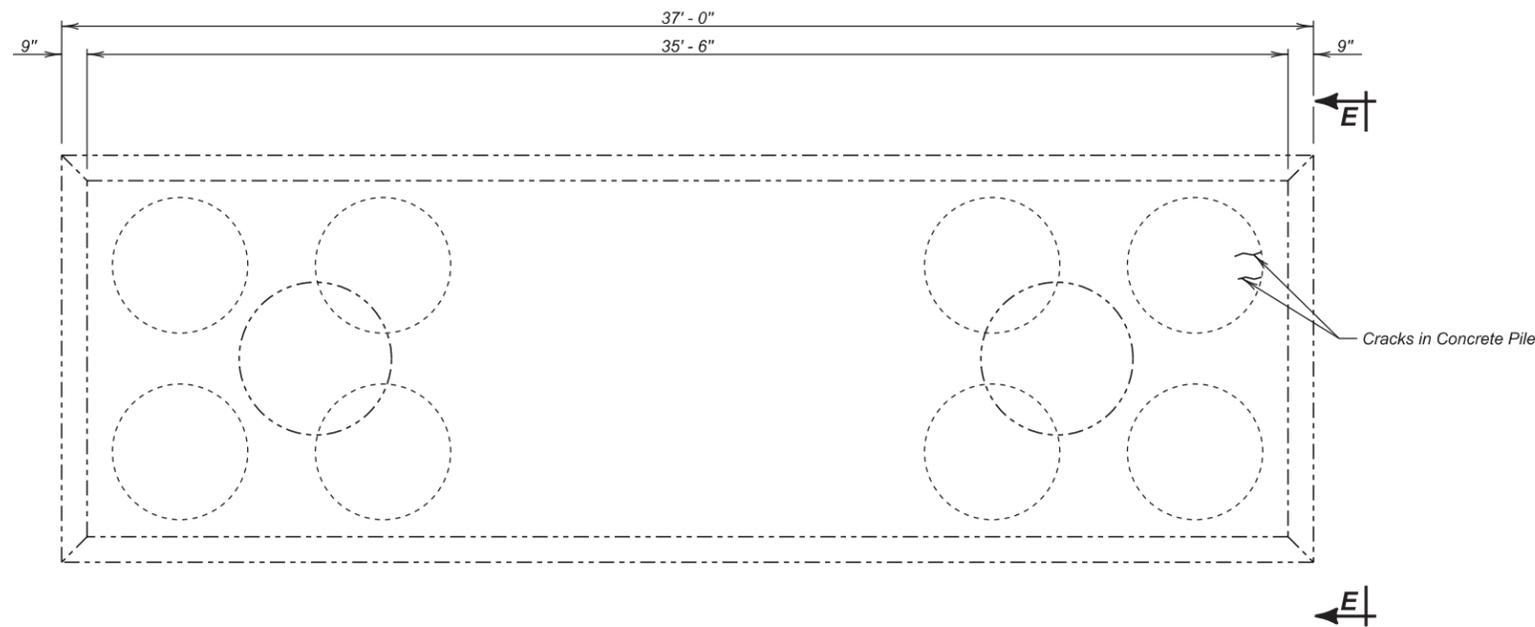
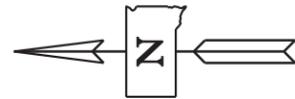


Shaded areas indicate locations of concrete removal and patching. Shaded areas shall be fiber wrapped a minimum of 6" outside the limits of repair in accordance with Detail "C".

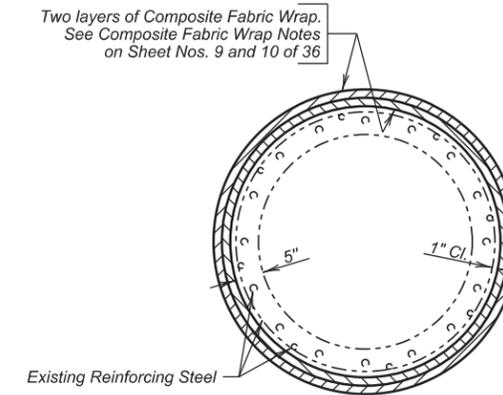
DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA12	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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Revised April 15, 2015 NP

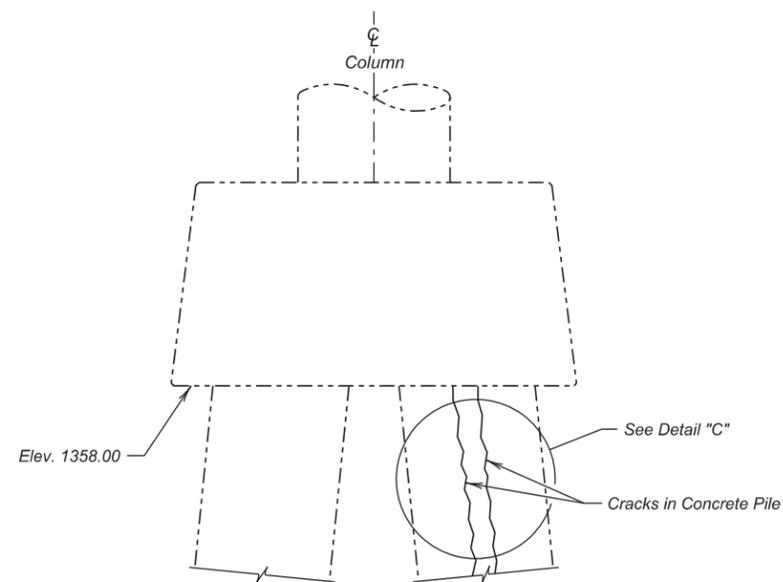
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	20	43



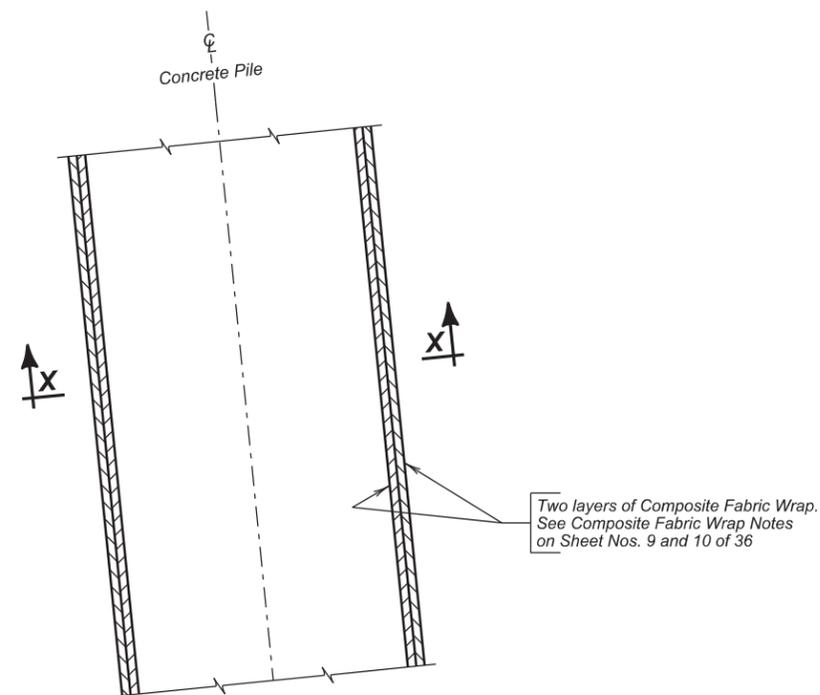
PLAN



SECTION X - X



VIEW E - E



DETAIL "C"
(Showing Composite Fabric Wrap)

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
∅ Composite Fabric Wrap, Concrete Repair	Sq. Ft.	170

∅ Quantity based on wrapping 13.5 feet of the concrete pile.

CONCRETE PILE REPAIR AT PIER NO. 4
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

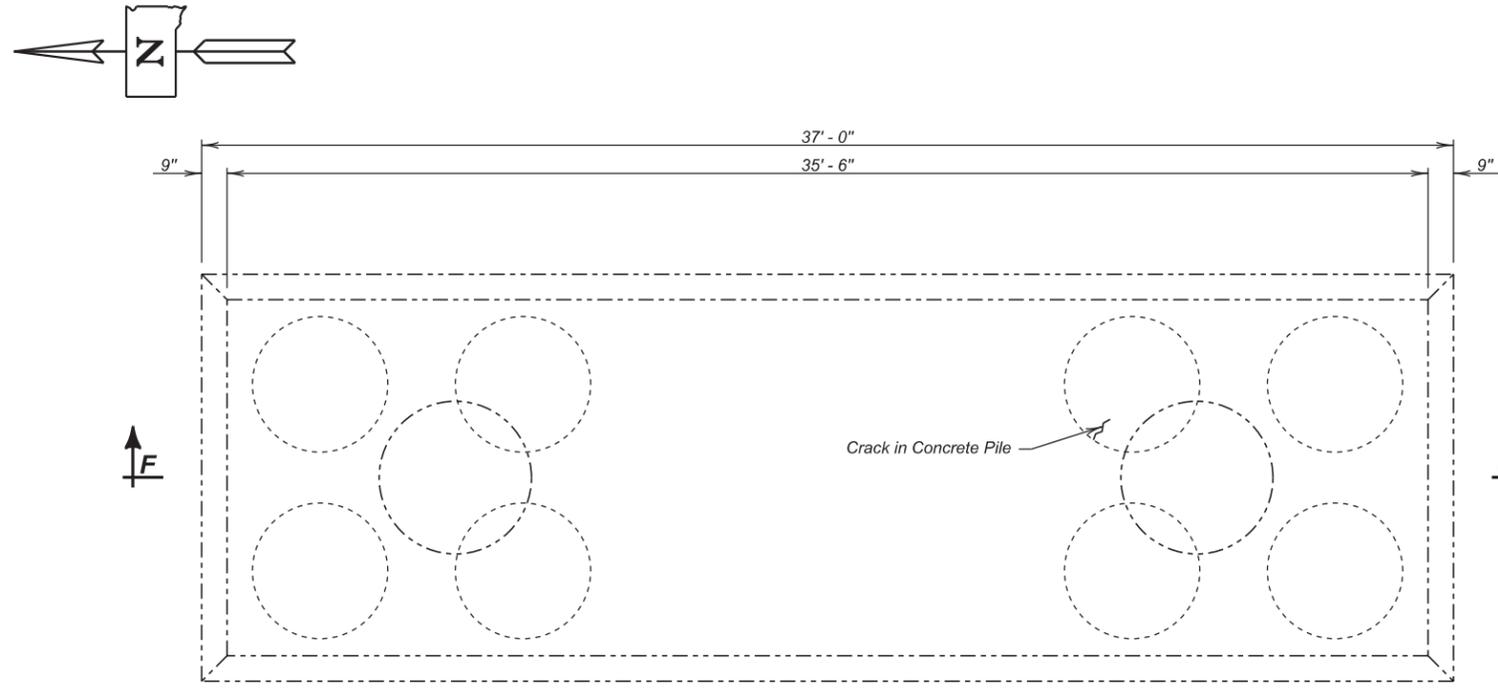
GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014 13 OF 36

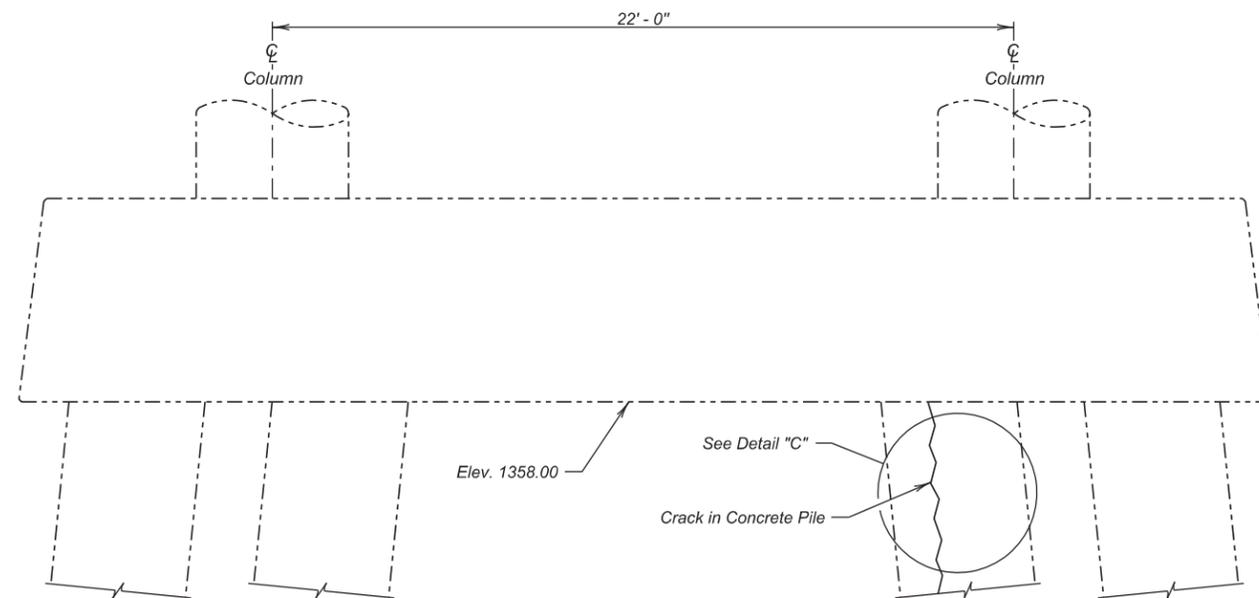
DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA13	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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Revised April 15, 2015 NP

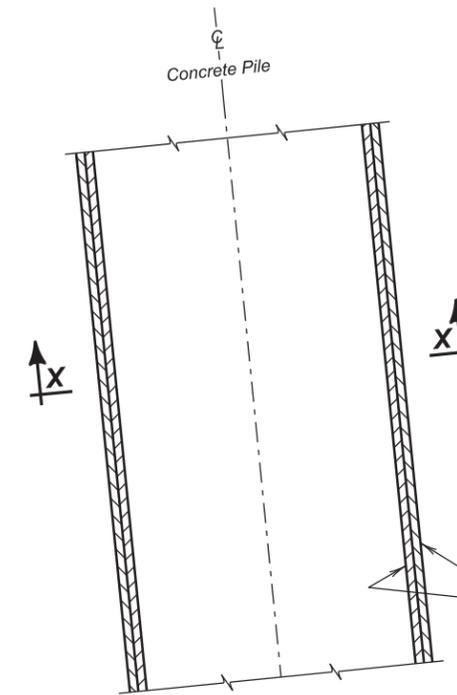
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	21	43



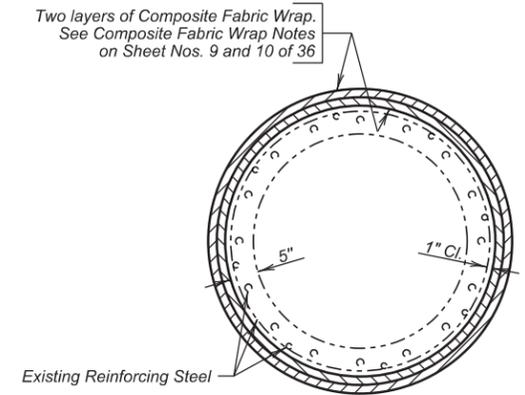
PLAN



SECTION F - F



DETAIL "C"
(Showing Composite Fabric Wrap)



SECTION X - X

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Composite Fabric Wrap, Concrete Repair	Sq. Ft.	170

Quantity based on wrapping 13.5 feet of the concrete pile.

CONCRETE PILE REPAIR AT PIER NO. 6

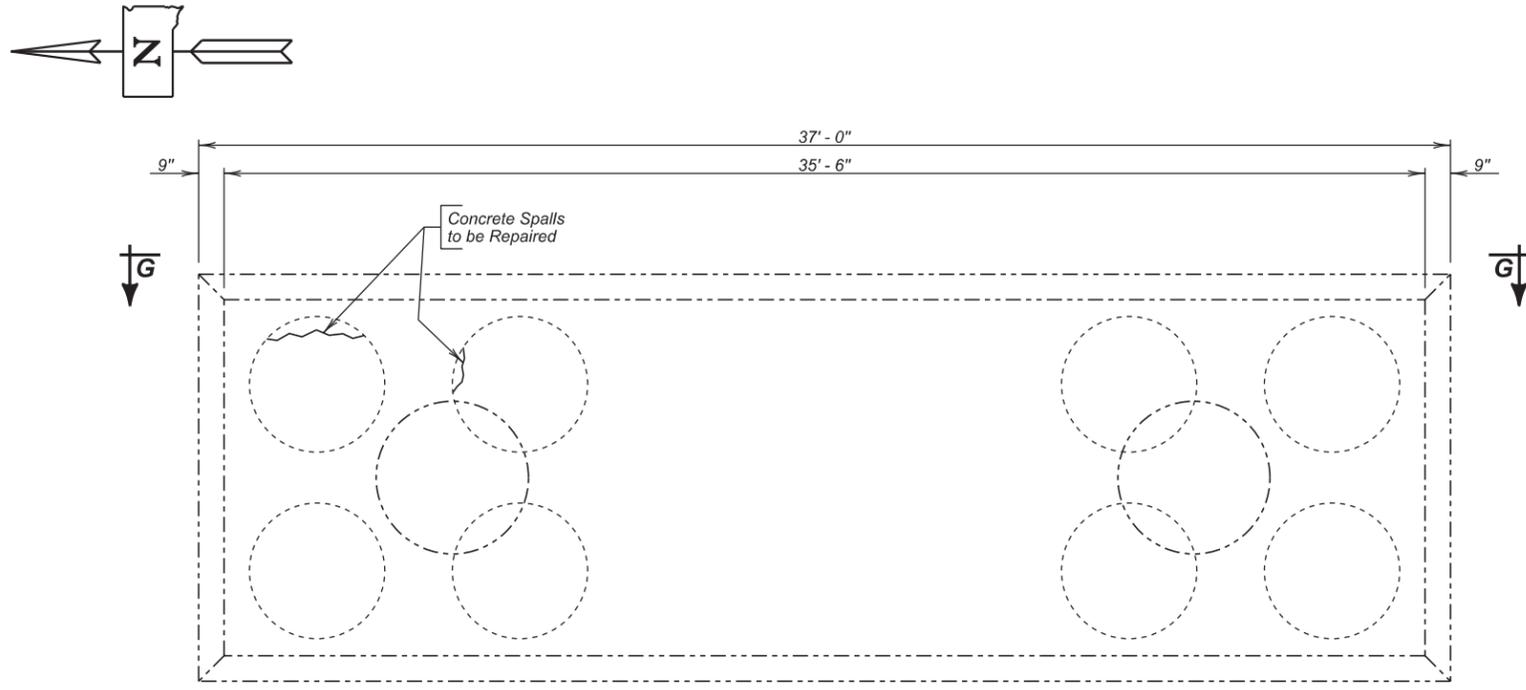
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

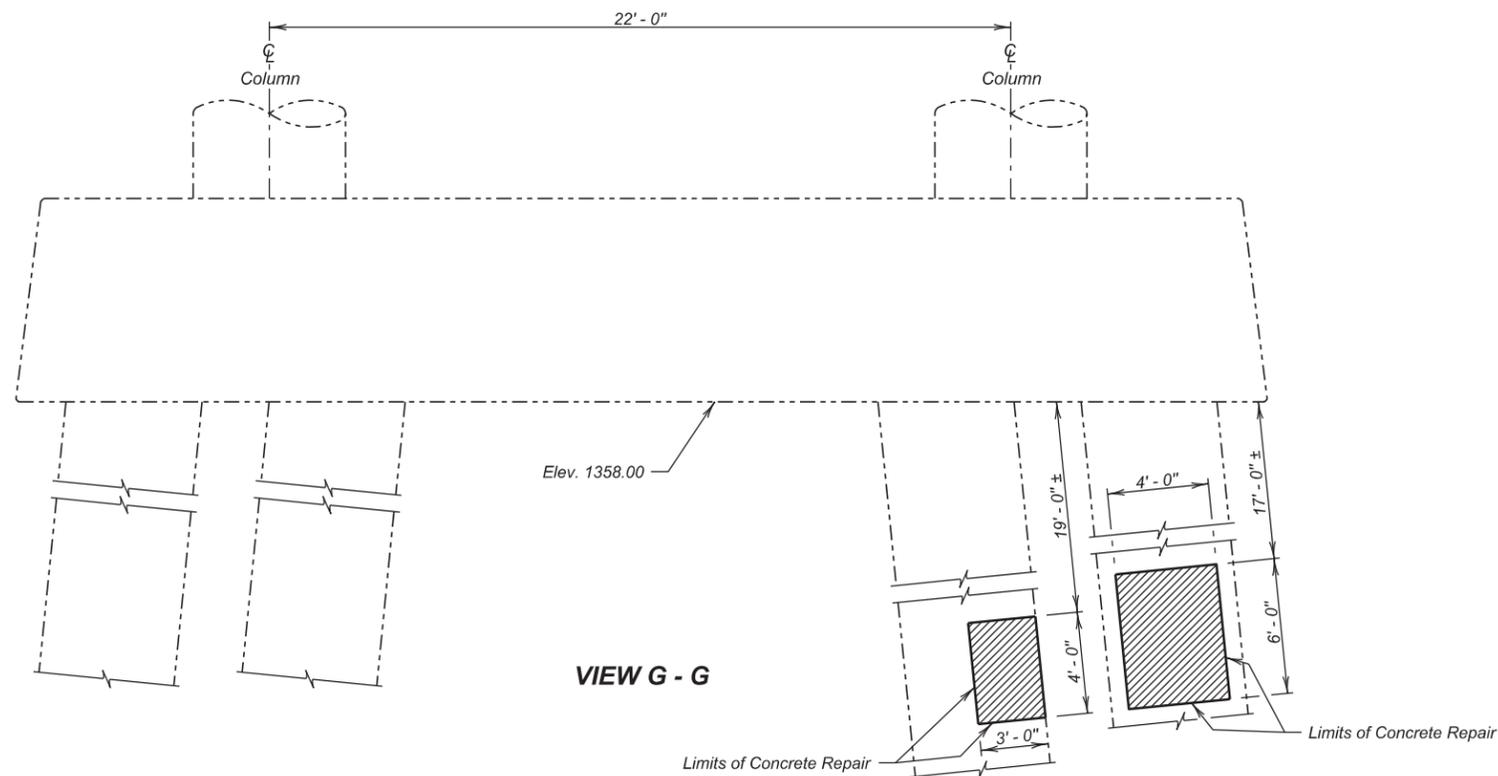
DECEMBER 2014 14 OF 36

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA14	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	22	43



PLAN

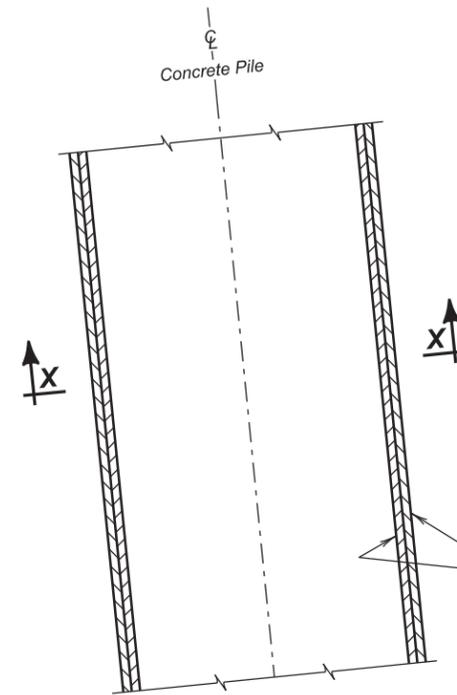


VIEW G - G

LEGEND -

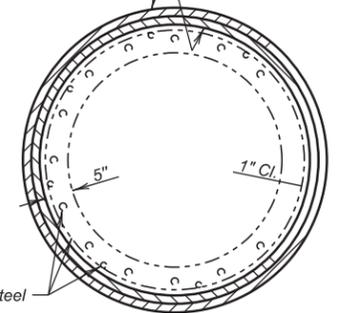


Shaded areas indicate locations of concrete removal and patching. Shaded areas shall be fiber wrapped a minimum of 6" outside the limits of repair in accordance with Detail "C".



DETAIL "C"
(Showing Composite Fabric Wrap)

Two layers of Composite Fabric Wrap. See Composite Fabric Wrap Notes on Sheet Nos. 9 and 10 of 36



SECTION X - X

Two layers of Composite Fabric Wrap. See Composite Fabric Wrap Notes on Sheet Nos. 9 and 10 of 36

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Breakout Structural Concrete	Cu. Yd.	0.3
Concrete Patching Material, Miscellaneous	Cu. Ft.	9.0
Composite Fabric Wrap, Concrete Repair	Sq. Ft.	151

Quantity based on wrapping concrete pile lengths of 5 and 7 feet.

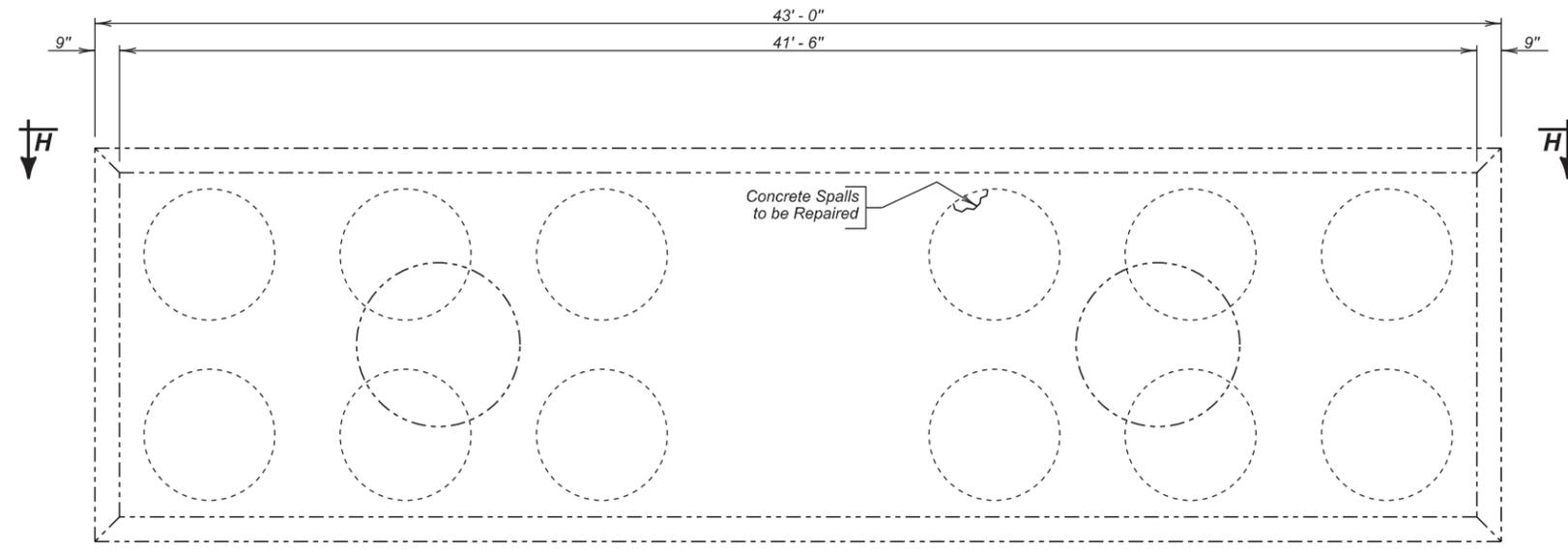
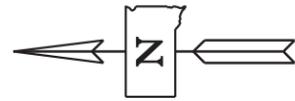
CONCRETE PILE REPAIR AT PIER NO. 7

FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

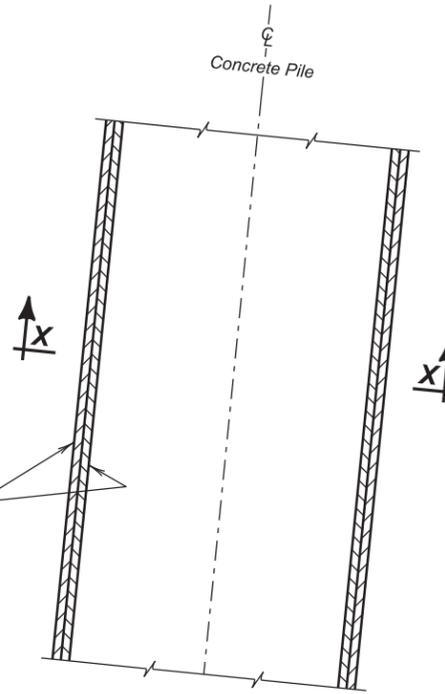
GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014

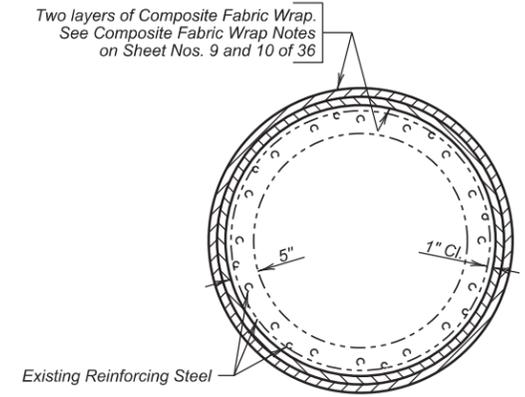
DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA15	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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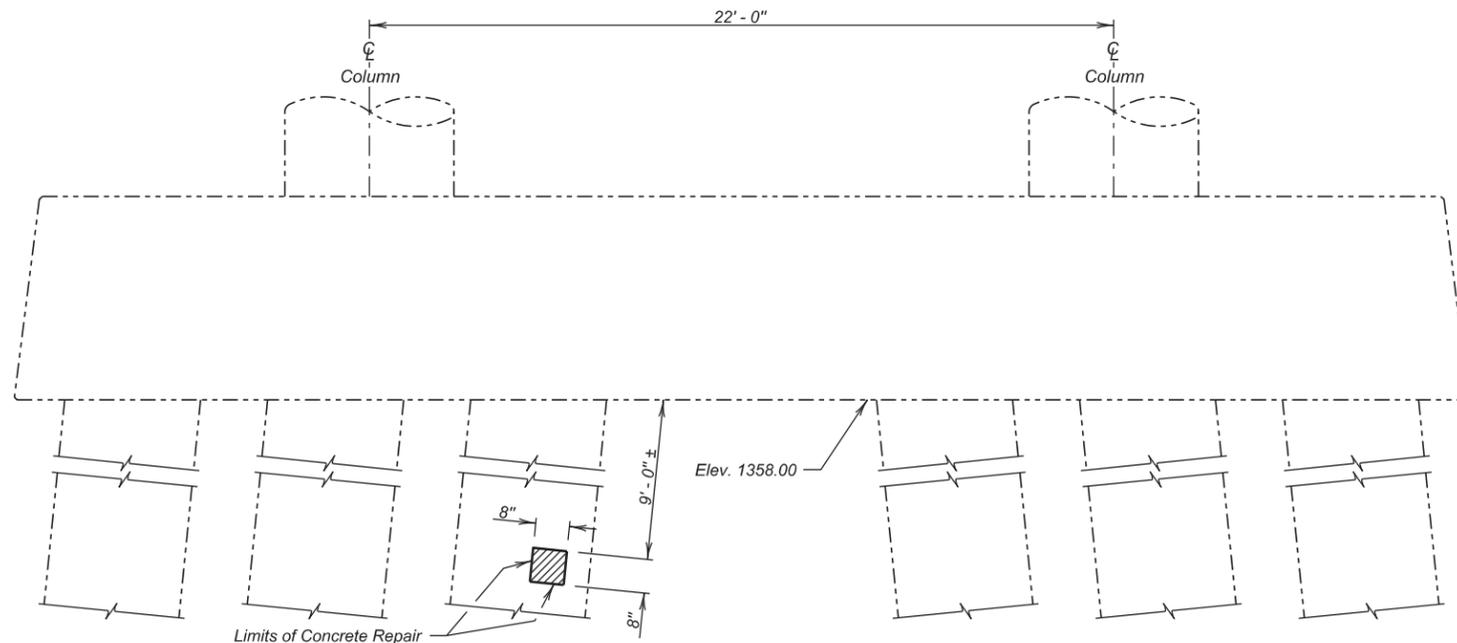
PLAN



DETAIL "C"
(Showing Composite Fabric Wrap)



SECTION X - X



VIEW H - H

LEGEND -



Shaded areas indicate locations of concrete removal and patching. Shaded areas shall be fiber wrapped a minimum of 6" outside the limits of repair in accordance with Detail "C".

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Breakout Structural Concrete	Cu. Yd.	0.1
Concrete Patching Material, Miscellaneous	Cu. Ft.	0.1
Composite Fabric Wrap, Concrete Repair	Sq. Ft.	25

Quantity based on wrapping 2 feet of the concrete pile.

CONCRETE PILE REPAIR AT PIER NO. 11

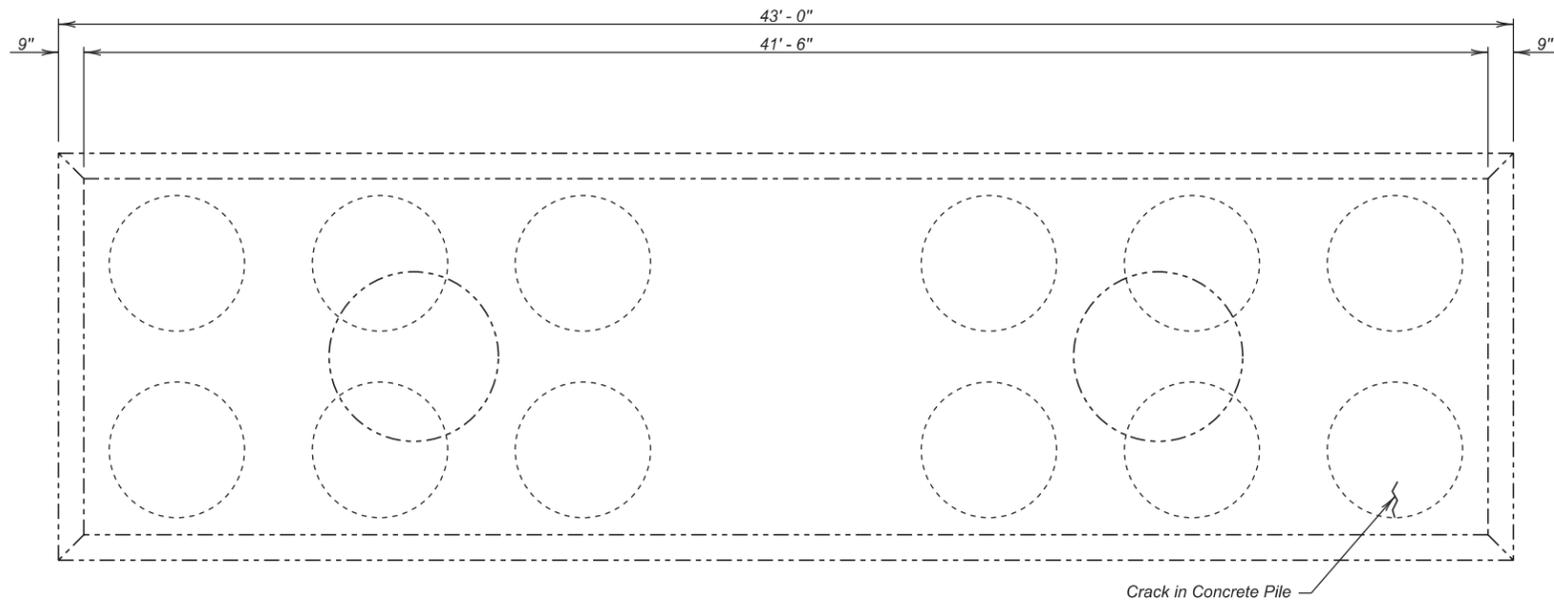
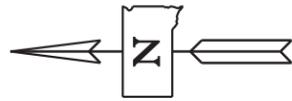
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

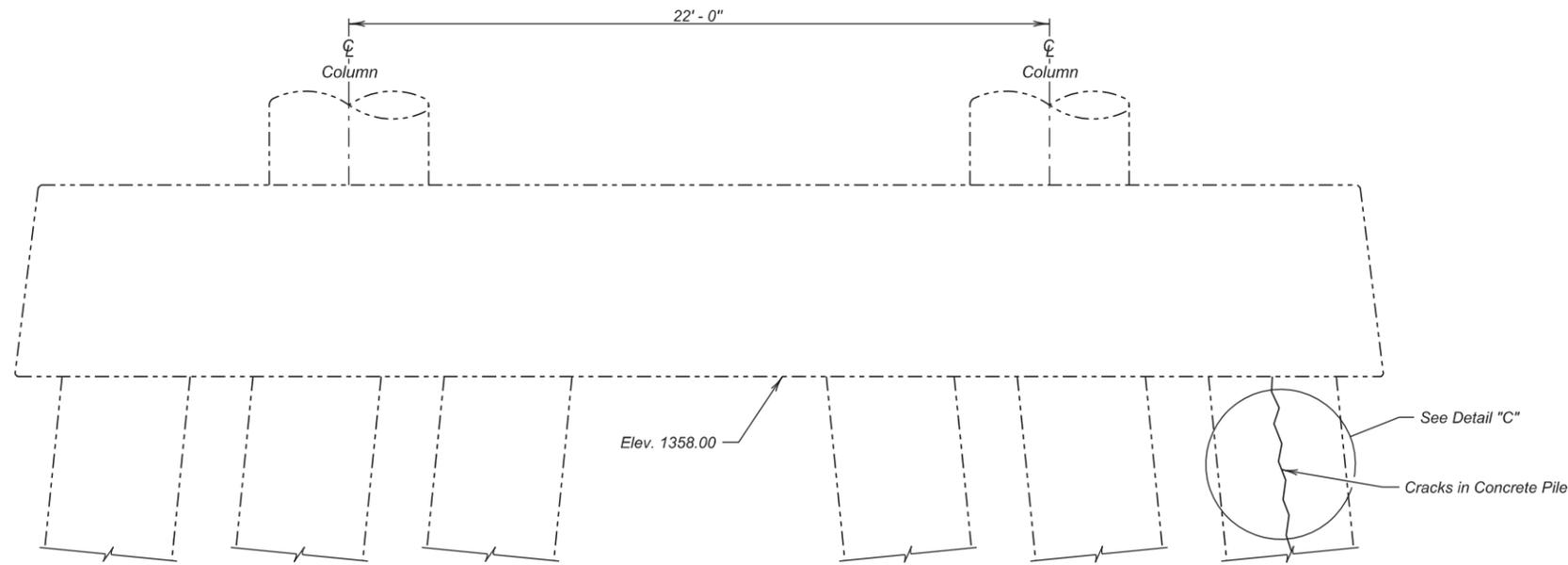
DECEMBER 2014

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA16	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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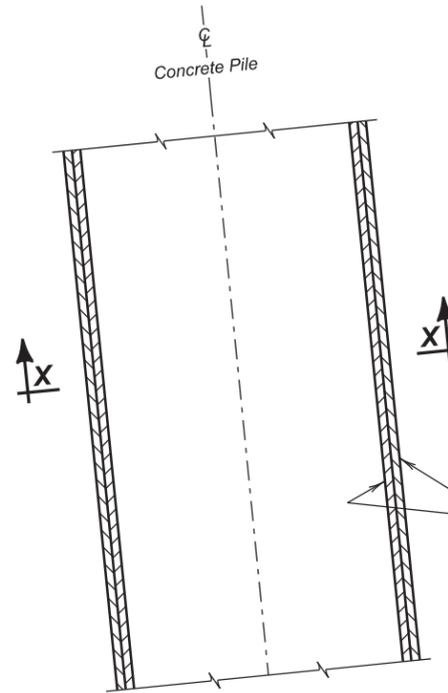
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	24	43



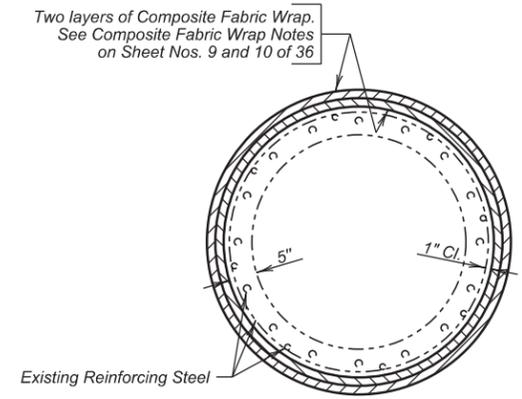
PLAN



ELEVATION



DETAIL "C"
(Showing Composite Fabric Wrap)



SECTION X - X

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Composite Fabric Wrap, Concrete Repair	Sq. Ft.	170

Quantity based on wrapping 13.5 feet of the concrete pile.

CONCRETE PILE REPAIR AT PIER NO. 12
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

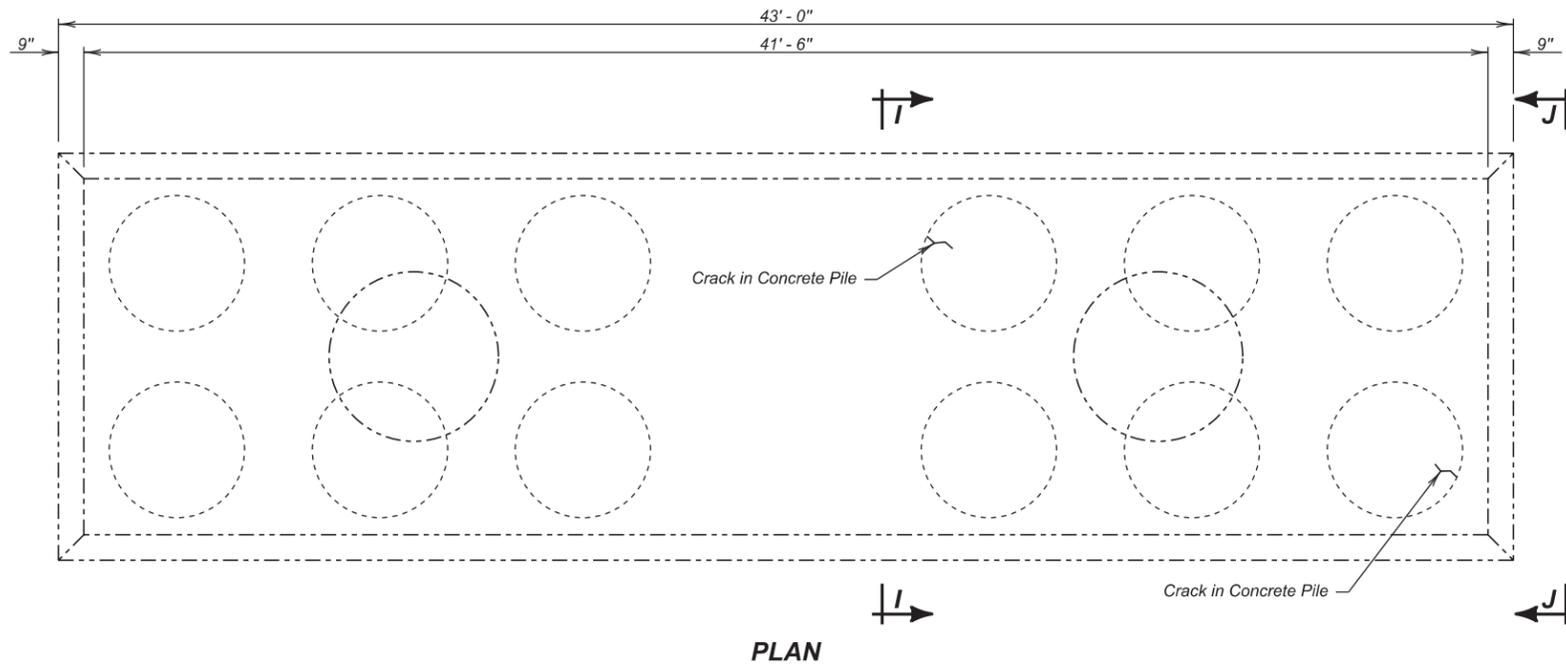
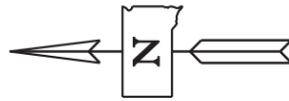
GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014 17 OF 36

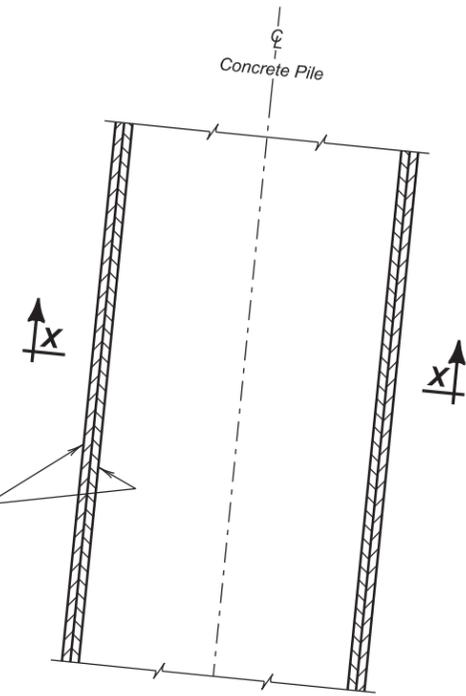
DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA17	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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Revised April 15, 2015 NP

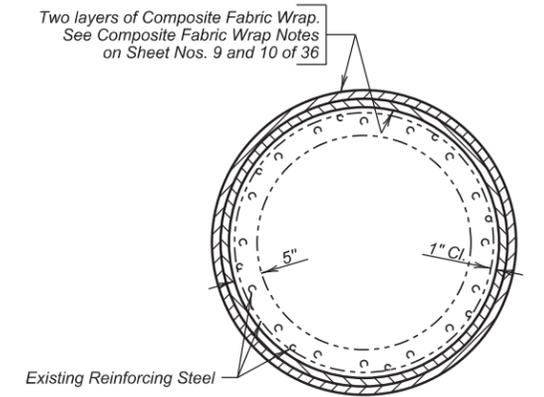
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	25	43



PLAN

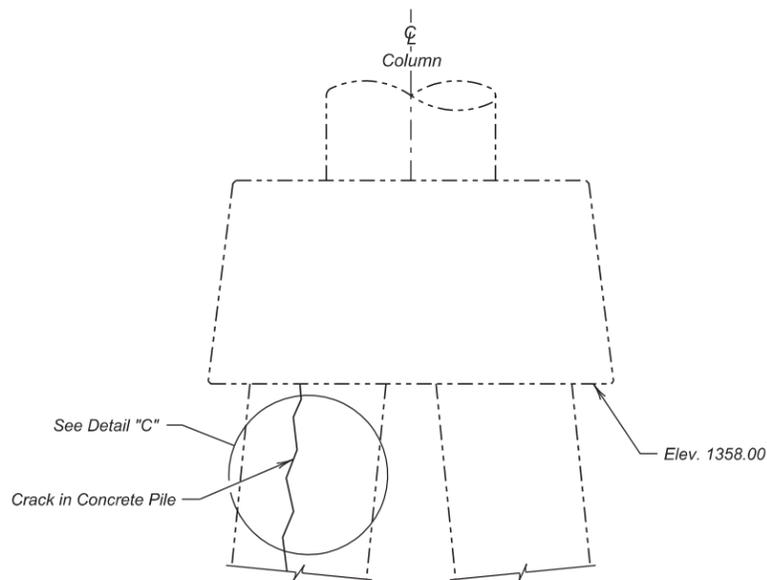


DETAIL "C"
(Showing Composite Fabric Wrap)

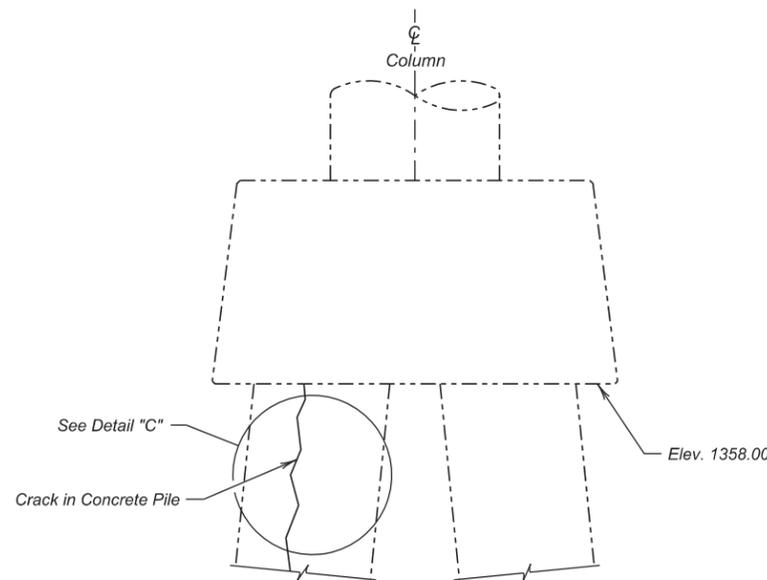


SECTION X - X

Two layers of Composite Fabric Wrap.
See Composite Fabric Wrap Notes
on Sheet Nos. 9 and 10 of 36



SECTION I - I



VIEW J - J

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Composite Fabric Wrap, Concrete Repair	Sq. Ft.	340

Quantity based on wrapping concrete pile lengths of 13.5 and 13.5 feet.

CONCRETE PILE REPAIR AT PIER NO. 13
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

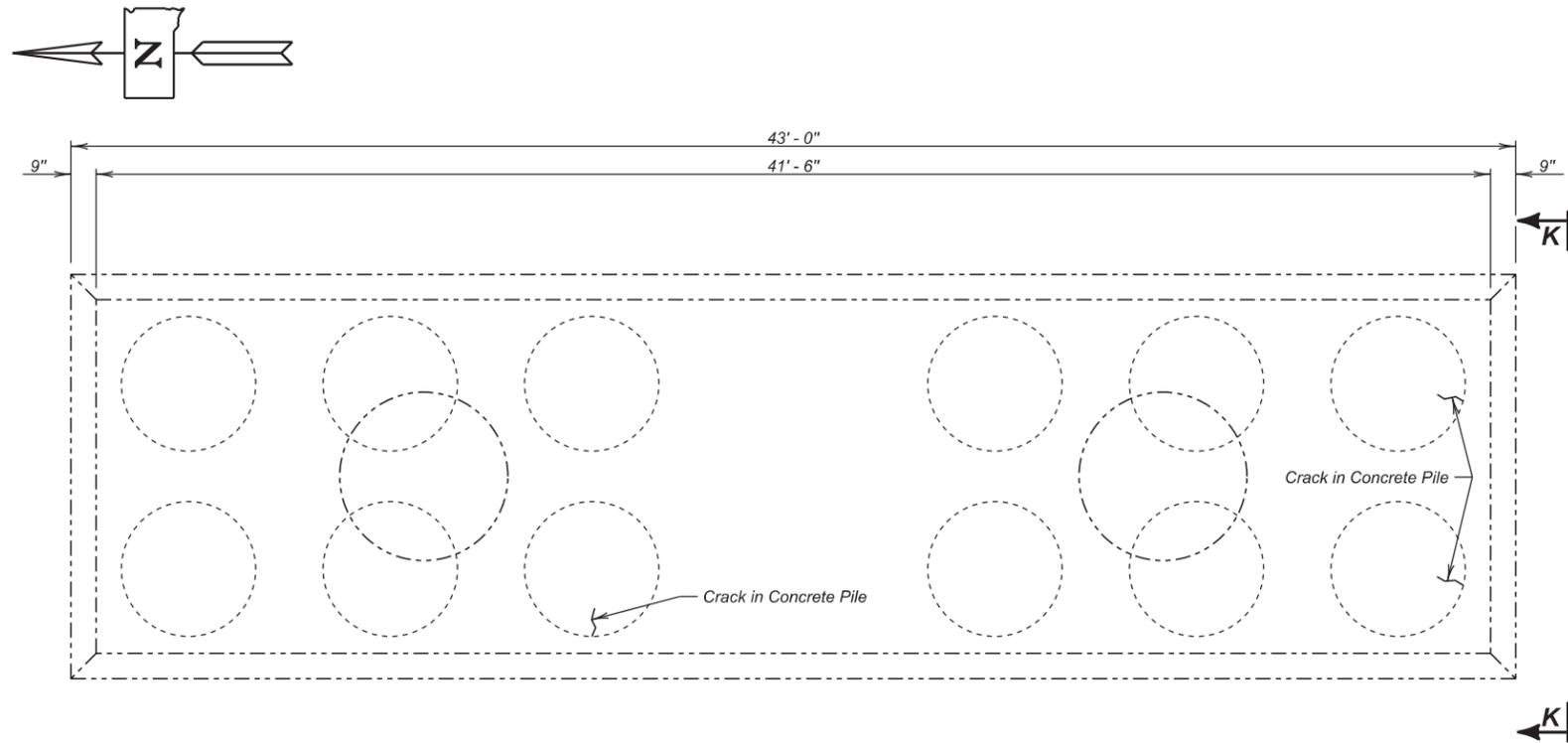
GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014 18 OF 36

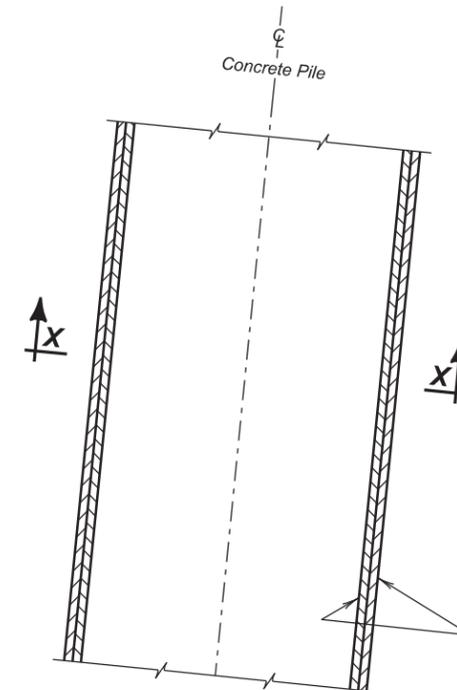
DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA18	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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Revised April 15, 2015 NP

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	26	43

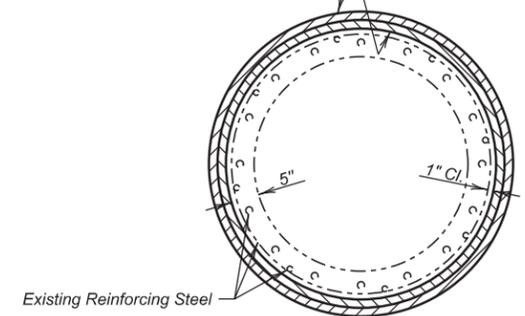


PLAN



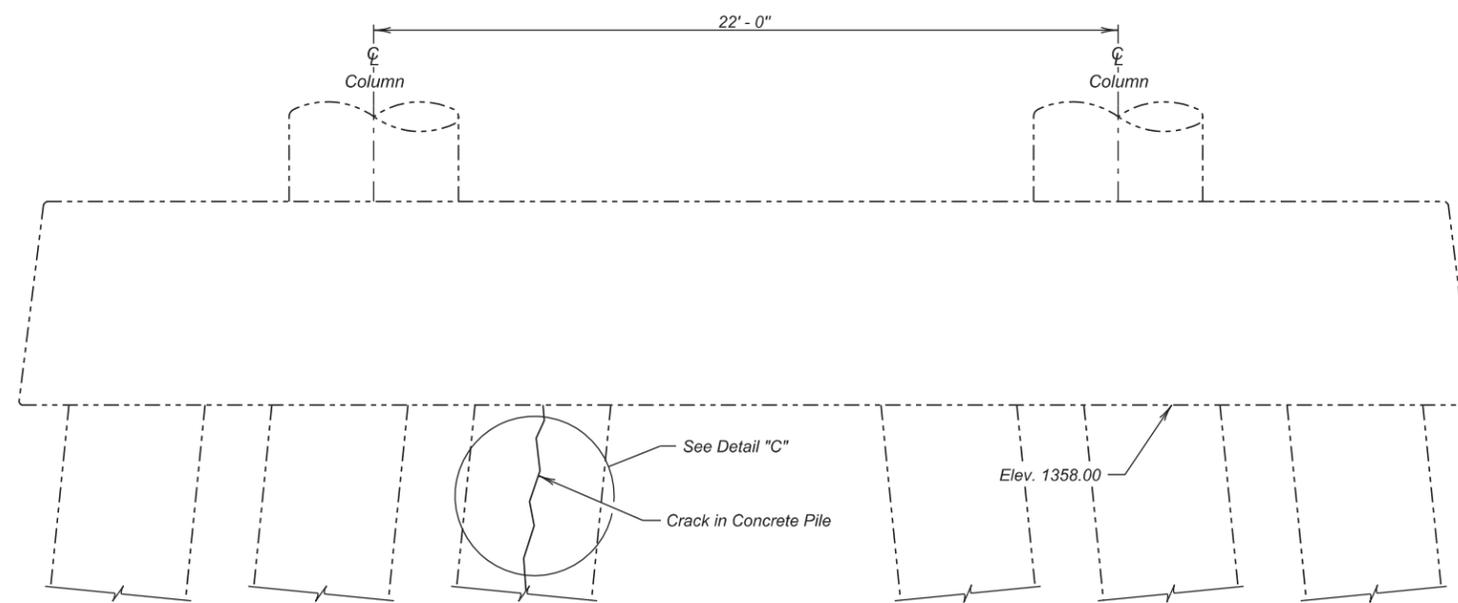
DETAIL "C"
(Showing Composite Fabric Wrap)

Two layers of Composite Fabric Wrap.
See Composite Fabric Wrap Notes
on Sheet Nos. 9 and 10 of 36

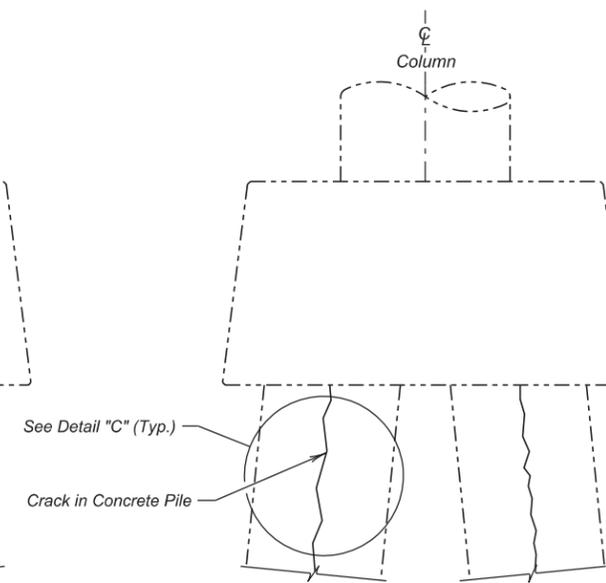


SECTION X - X

Two layers of Composite Fabric Wrap.
See Composite Fabric Wrap Notes
on Sheet Nos. 9 and 10 of 36



ELEVATION



VIEW K - K

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Composite Fabric Wrap, Concrete Repair	Sq. Ft.	509

Quantity based on wrapping concrete pile lengths of 13.5, 13.5, and 13.5 feet.

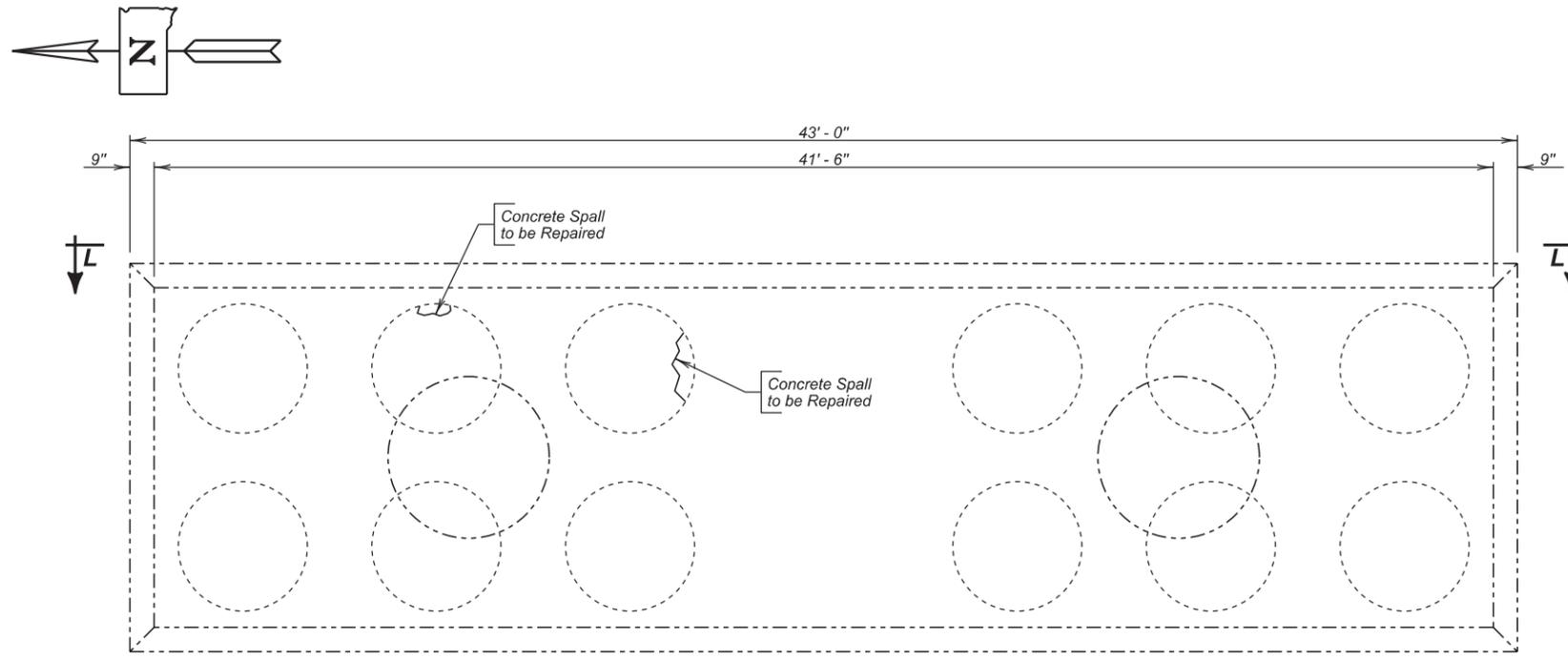
CONCRETE PILE REPAIR AT PIER NO. 14
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

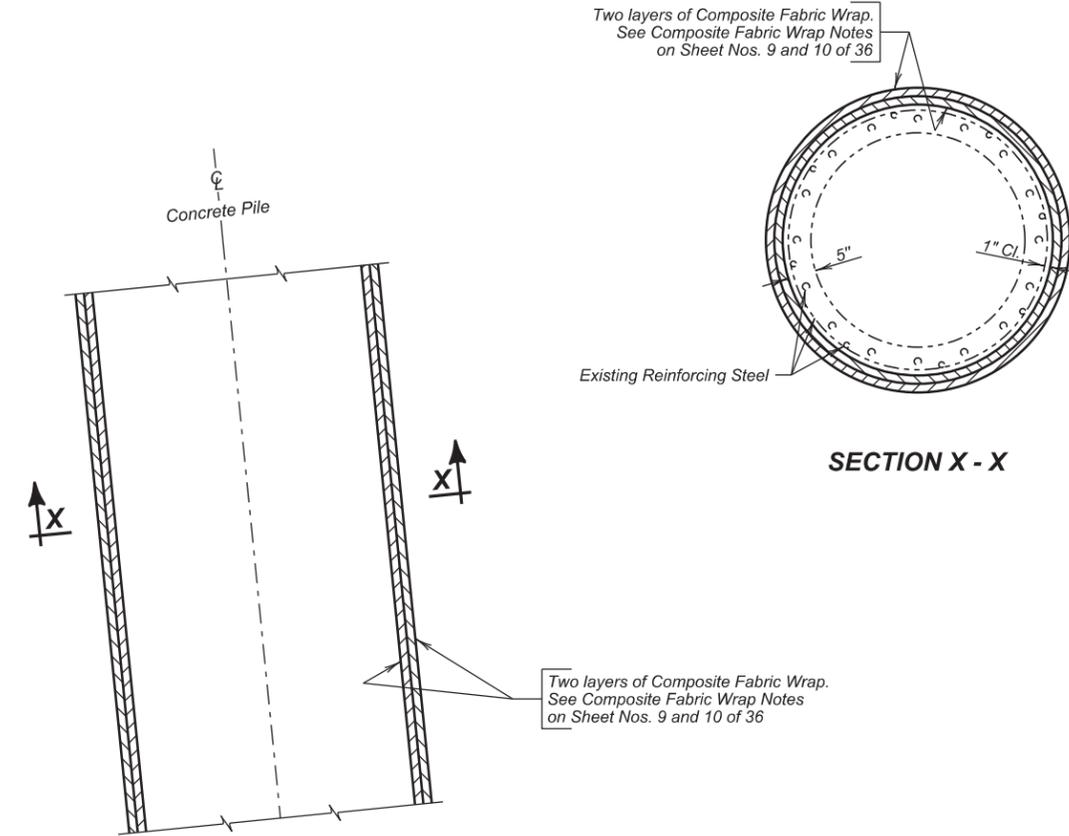
DECEMBER 2014 19 OF 36

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA19	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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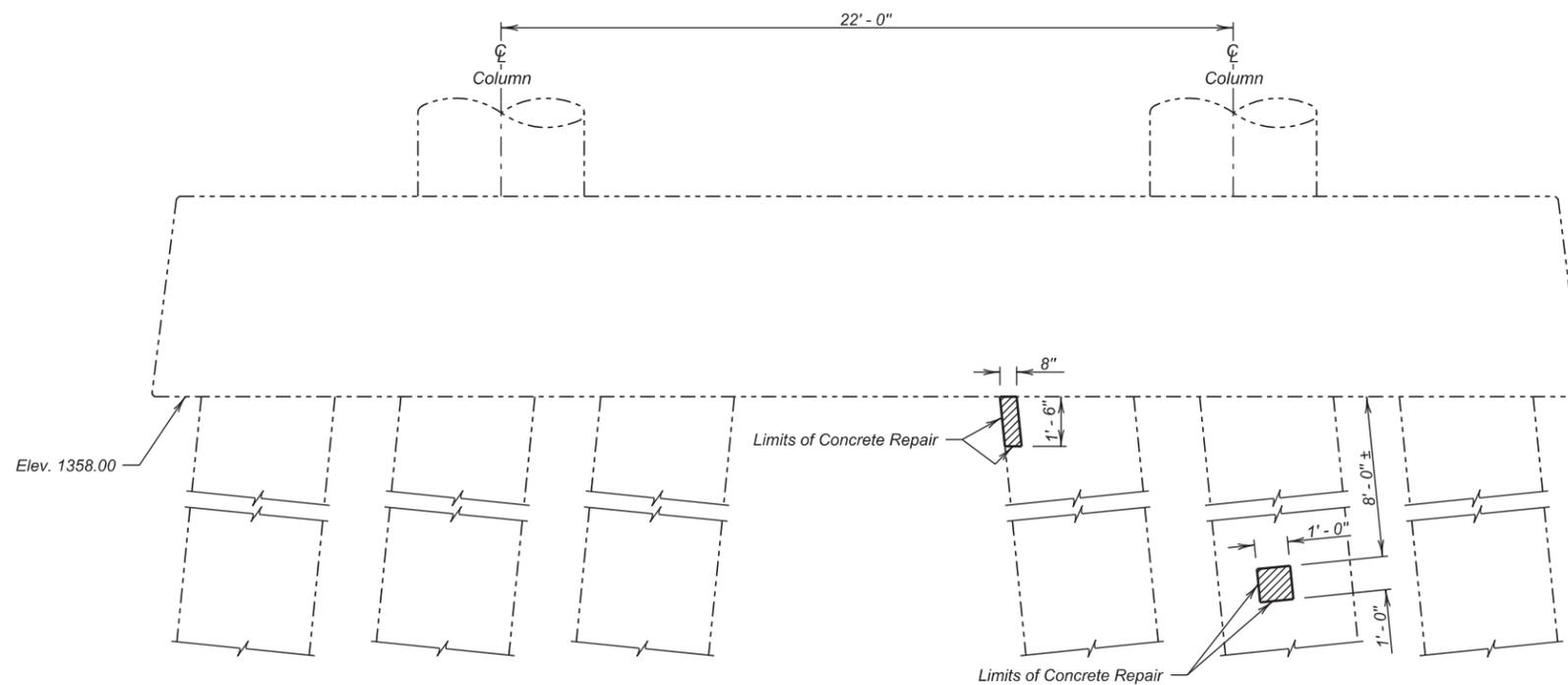
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	27	43



PLAN



DETAIL "C"
(Showing Composite Fabric Wrap)



VIEW L - L

LEGEND -



Shaded areas indicate locations of concrete removal and patching. Shaded areas shall be fiber wrapped a minimum of 6" outside the limits of repair in accordance with Detail "C".

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Breakout Structural Concrete	Cu. Yd.	0.1
Concrete Patching Material, Miscellaneous	Cu. Ft.	0.5
Composite Fabric Wrap, Concrete Repair	Sq. Ft.	51

Quantity based on wrapping concrete pile lengths of 2.0 and 2.0 feet.

CONCRETE PILE REPAIR AT PIER NO. 15
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

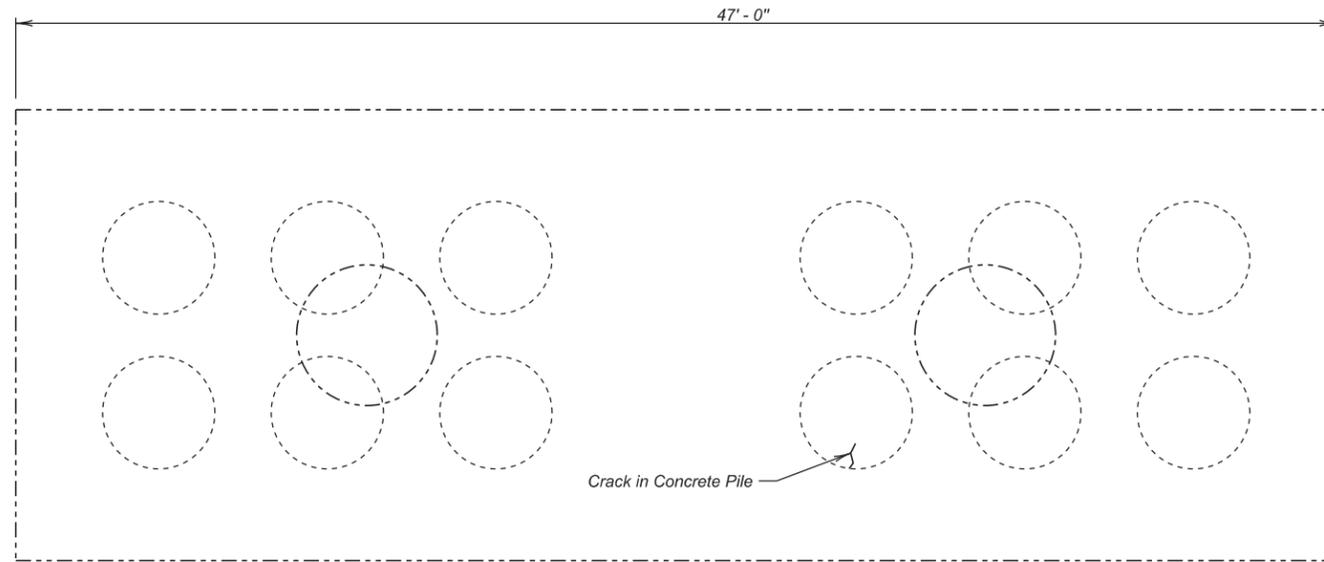
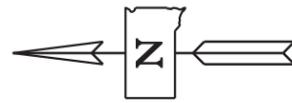
GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014

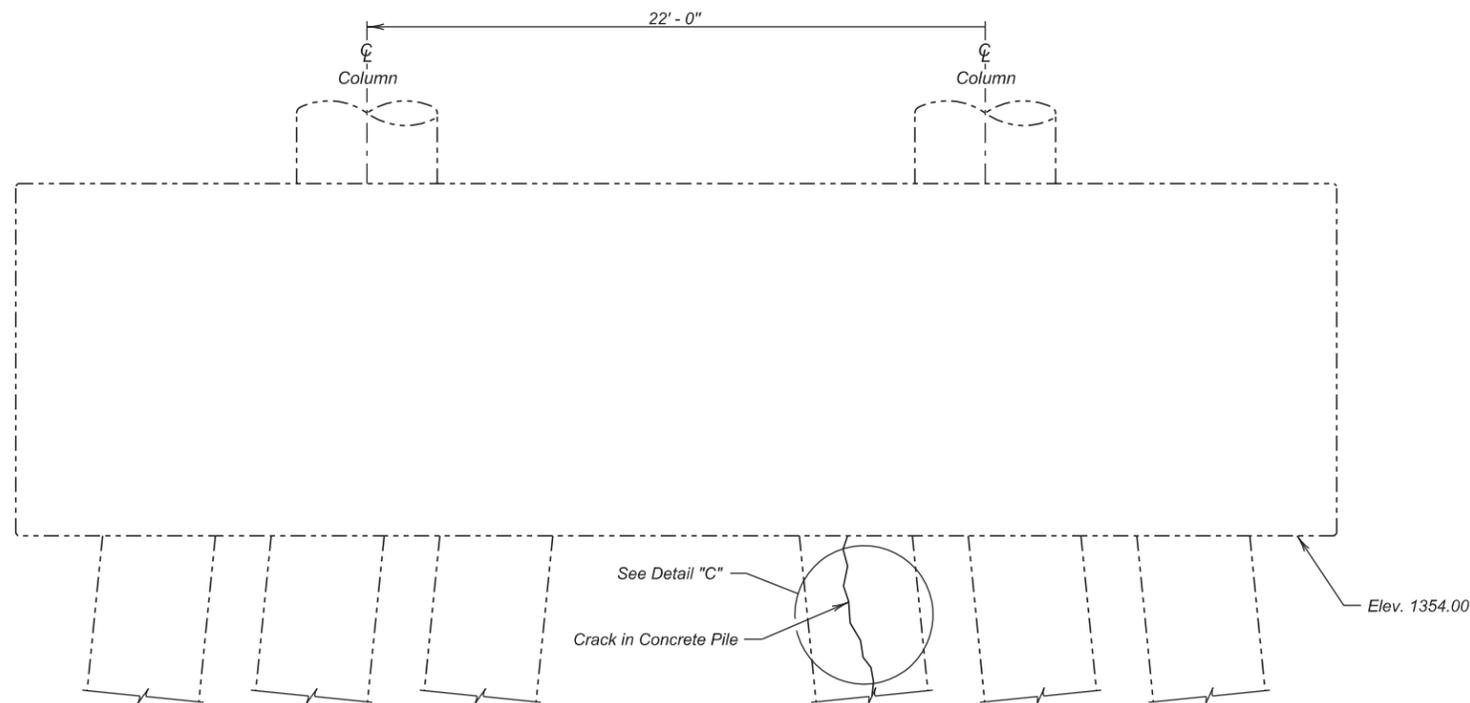
DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA20	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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Revised April 15, 2015 NP

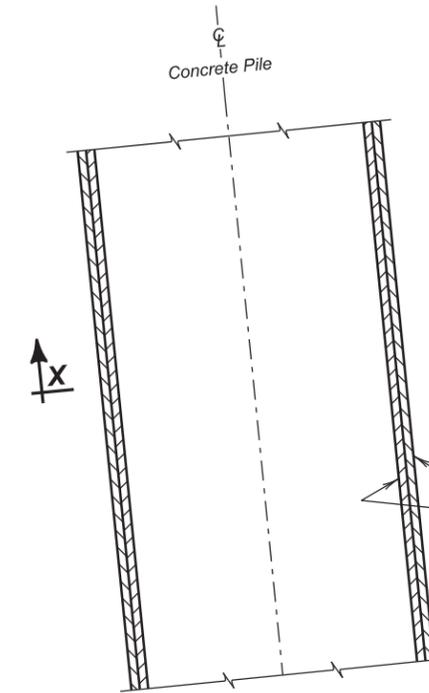
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	28	43



PLAN

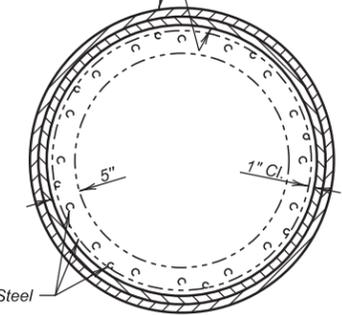


ELEVATION



DETAIL "C"
(Showing Composite Fabric Wrap)

Two layers of Composite Fabric Wrap.
See Composite Fabric Wrap Notes
on Sheet Nos. 9 and 10 of 36



SECTION X - X

Two layers of Composite Fabric Wrap.
See Composite Fabric Wrap Notes
on Sheet Nos. 9 and 10 of 36

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
∅ Composite Fabric Wrap, Concrete Repair	Sq. Ft.	170

∅ Quantity based on wrapping 13.5 feet of the concrete pile.

CONCRETE PILE REPAIR AT PIER NO. 16
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

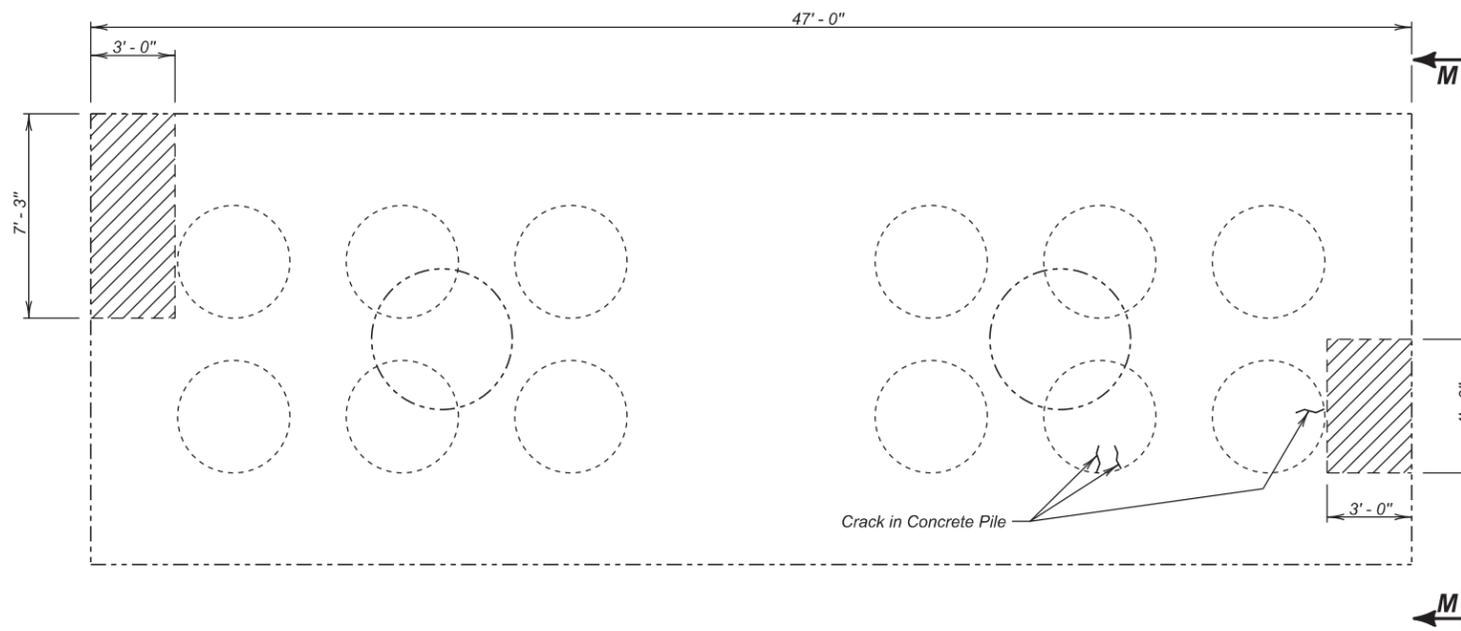
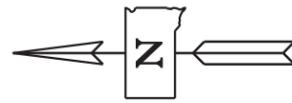
GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014 (21) OF (36)

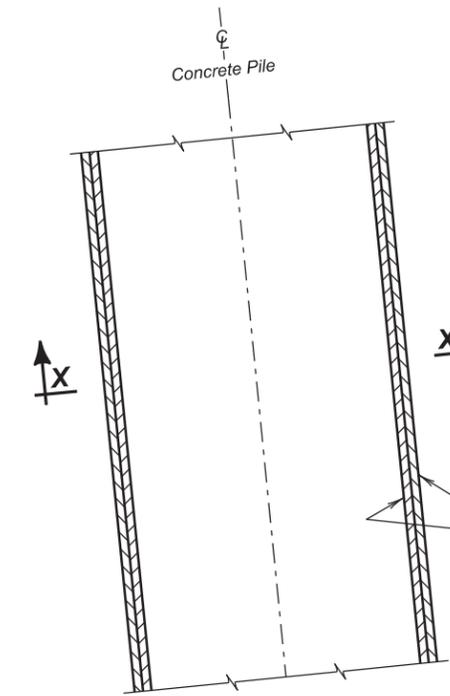
DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA21	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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Revised April 15, 2015 NP

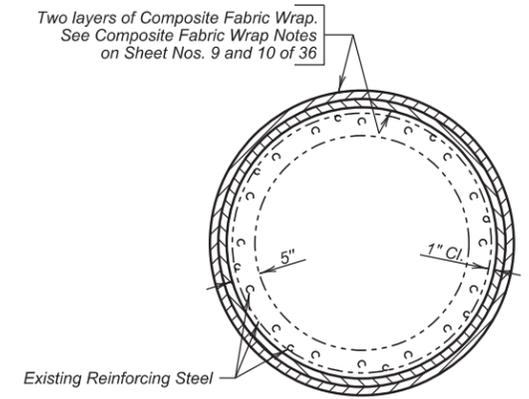
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	29	43



PLAN



DETAIL "C"
(Showing Composite Fabric Wrap)

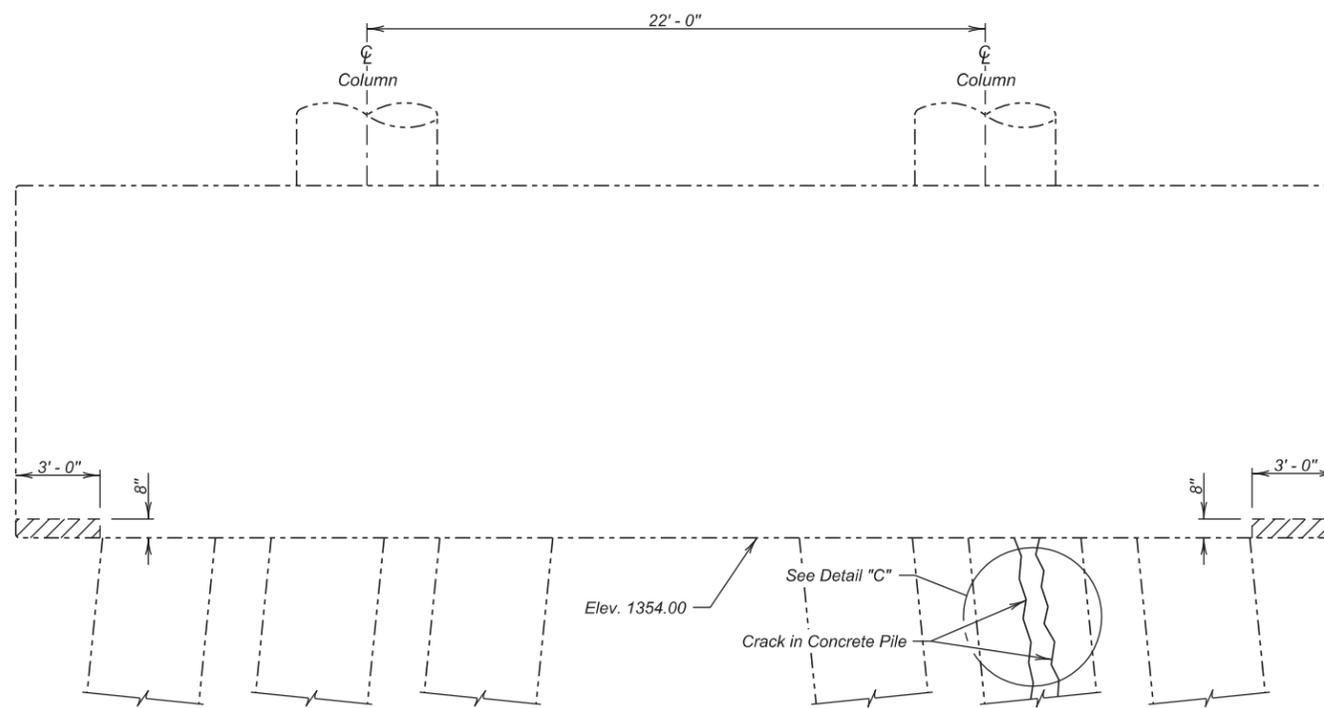


SECTION X - X

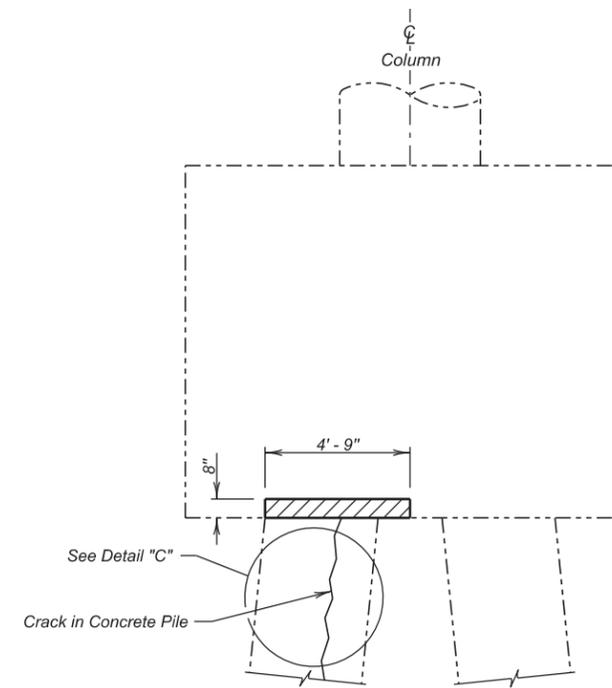
Two layers of Composite Fabric Wrap.
See Composite Fabric Wrap Notes
on Sheet Nos. 9 and 10 of 36

LEGEND -

Shaded areas indicate locations of concrete removal and patching.



ELEVATION



VIEW M - M

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Breakout Structural Concrete	Cu. Yd.	0.9
Concrete Patching Material, Miscellaneous	Cu. Ft.	24.0
Galvanic Anode	Each	14
Composite Fabric Wrap, Concrete Repair	Sq. Ft.	340

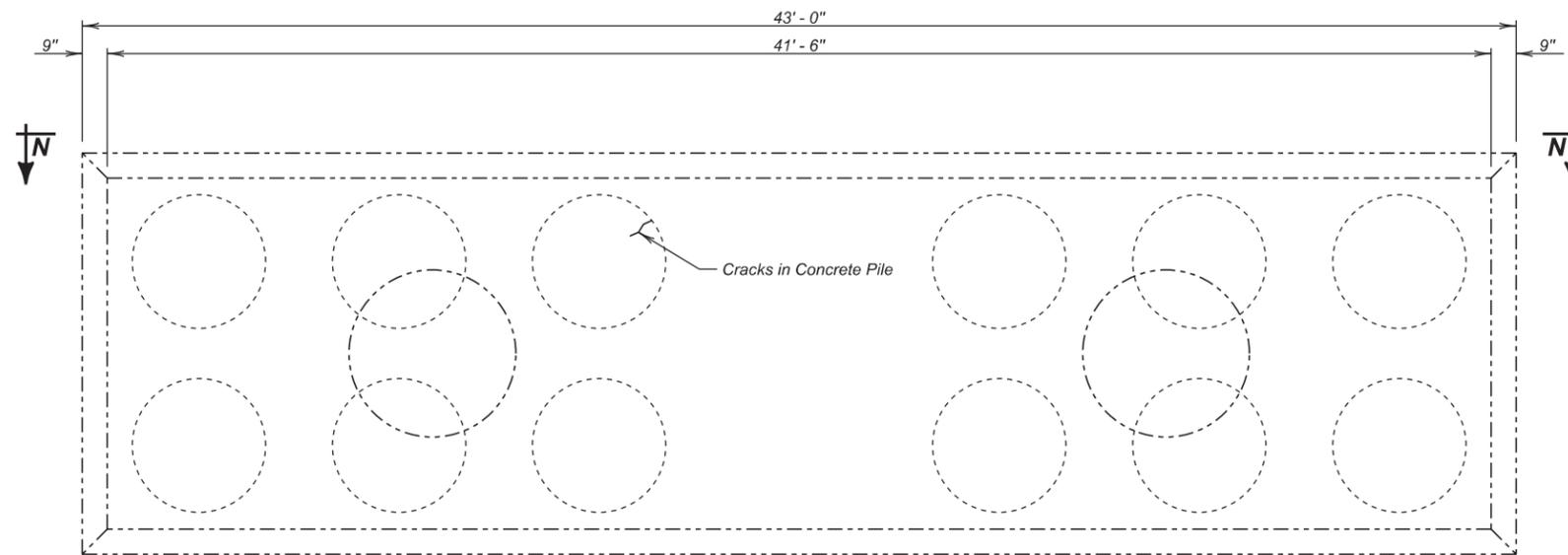
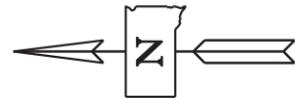
Quantity based on wrapping concrete pile lengths of 13.5 and 13.5 feet.

CONCRETE PILE REPAIR AT PIER NO. 17
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

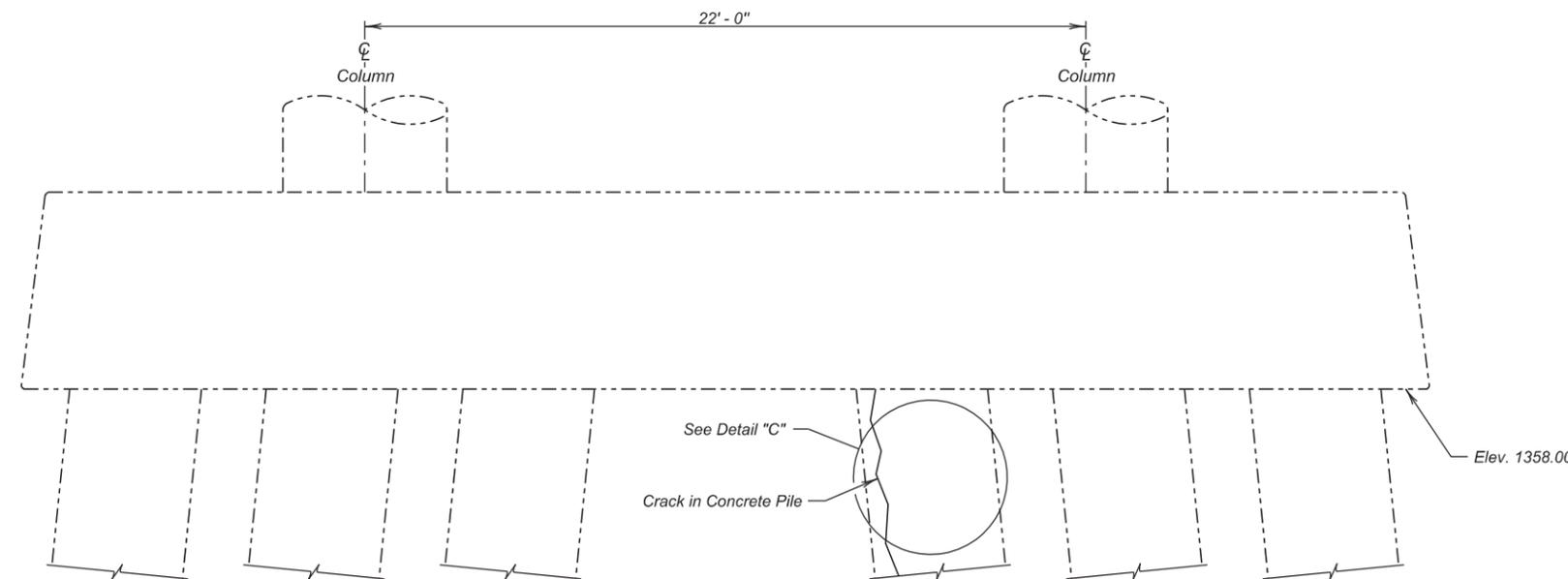
GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014 22 OF 36

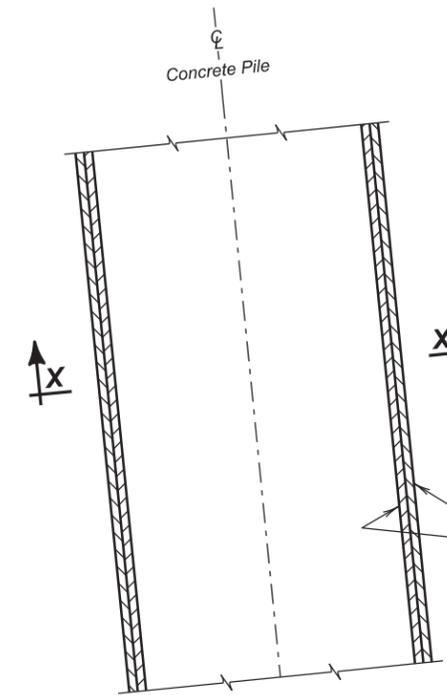
DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA22	DRAFTED BY NP <i>Kevin N. Goeden</i> BRIDGE ENGINEER
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PLAN

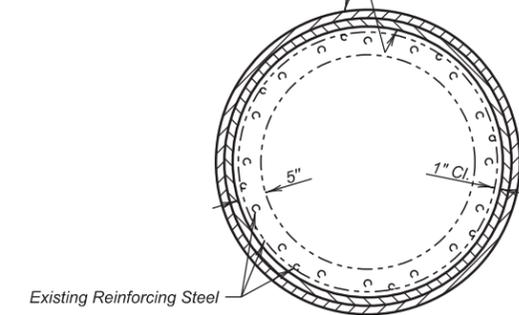


VIEW N - N



DETAIL "C"
(Showing Composite Fabric Wrap)

Two layers of Composite Fabric Wrap.
See Composite Fabric Wrap Notes
on Sheet Nos. 9 and 10 of 36



SECTION X - X

Two layers of Composite Fabric Wrap.
See Composite Fabric Wrap Notes
on Sheet Nos. 9 and 10 of 36

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Composite Fabric Wrap, Concrete Repair	Sq. Ft.	170

Quantity based on wrapping 13.5 feet of the concrete pile.

CONCRETE PILE REPAIR AT PIER NO. 19
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

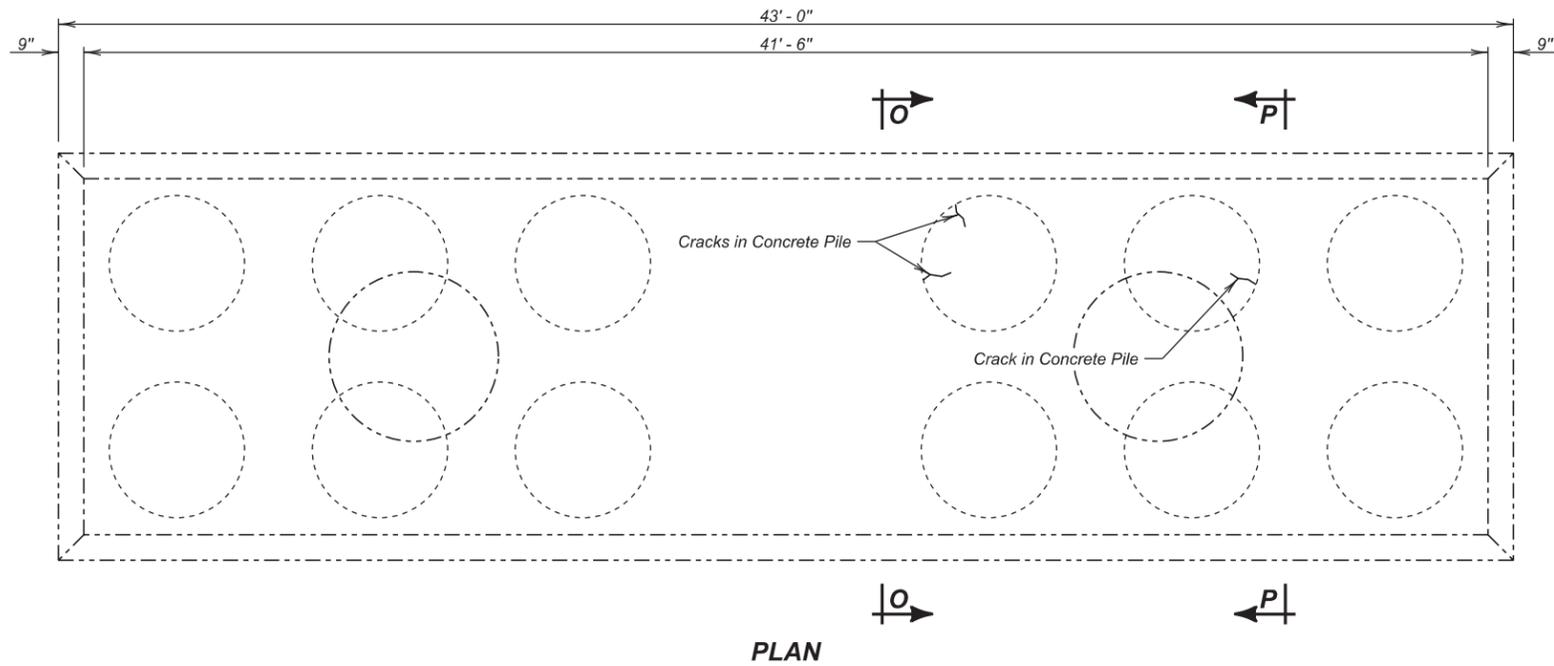
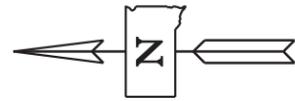
GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014 23 OF 36

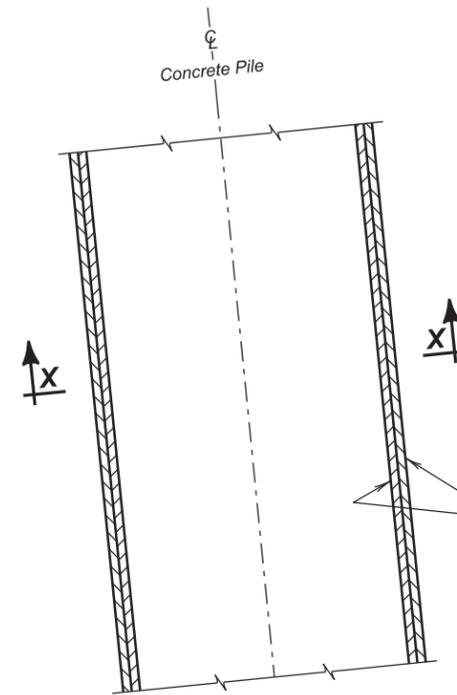
DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA23	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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Revised April 15, 2015 NP

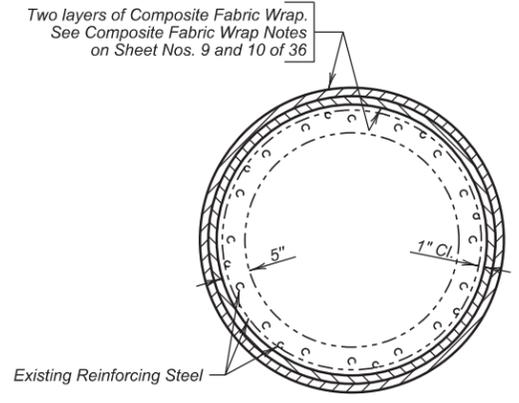
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	31	43



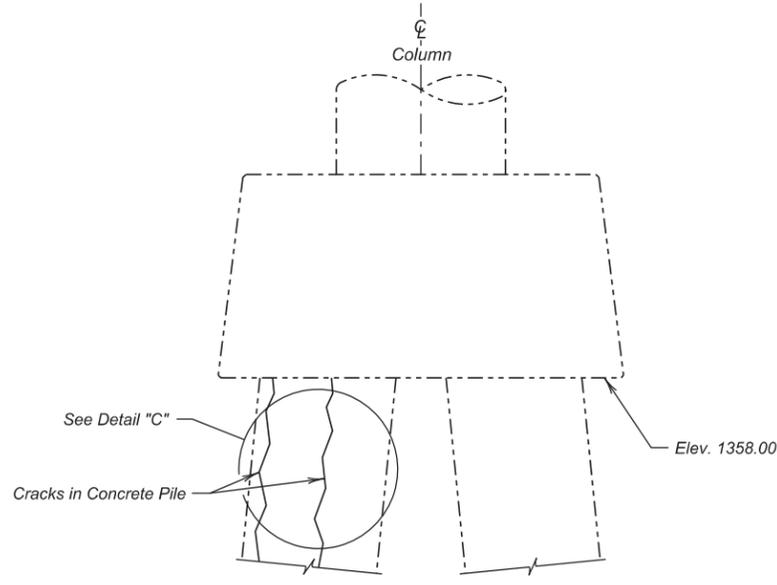
PLAN



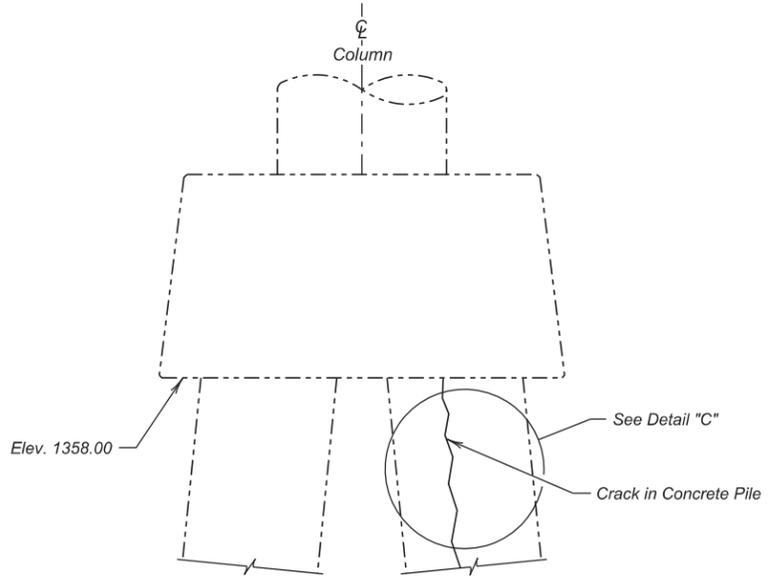
DETAIL "C"
(Showing Composite Fabric Wrap)



SECTION X - X



SECTION O - O



VIEW P - P

Two layers of Composite Fabric Wrap.
See Composite Fabric Wrap Notes
on Sheet Nos. 9 and 10 of 36

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Composite Fabric Wrap, Concrete Repair	Sq. Ft.	340

Quantity based on wrapping concrete pile lengths of 13.5 and 13.5 feet.

CONCRETE PILE REPAIR AT PIER NO. 22
FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

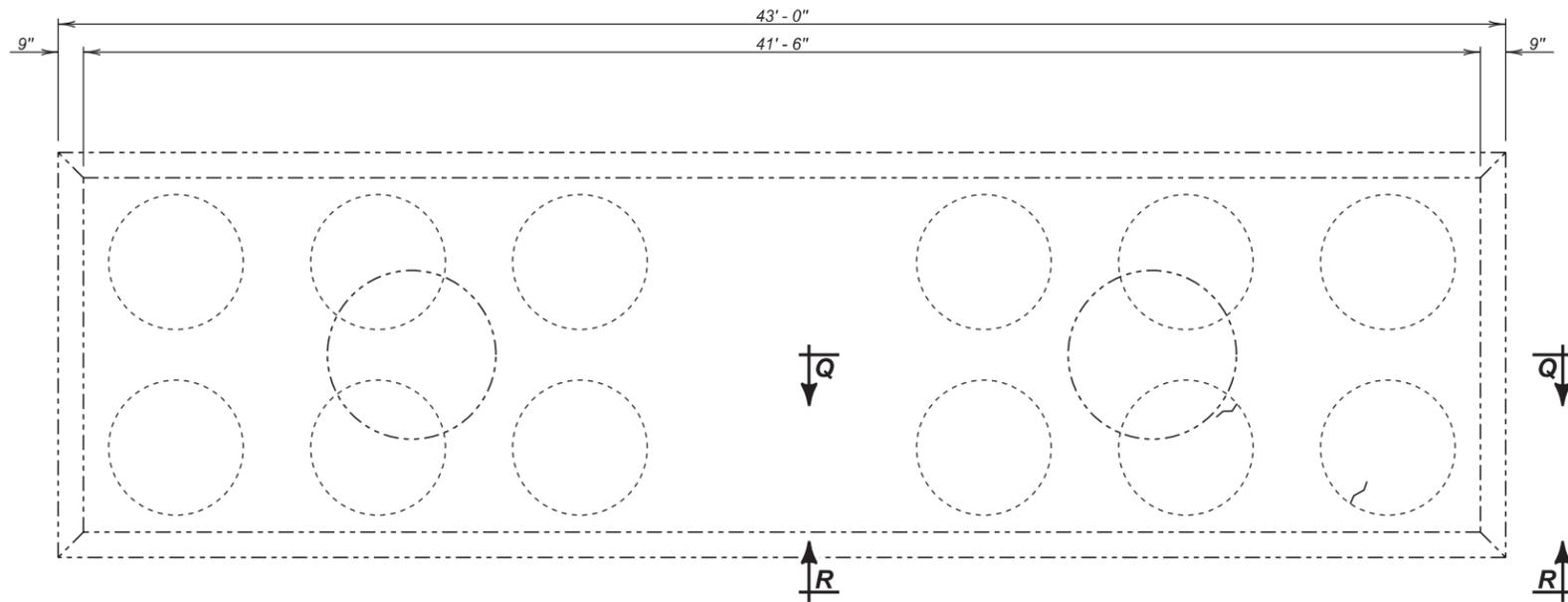
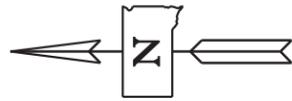
GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014 24 OF 36

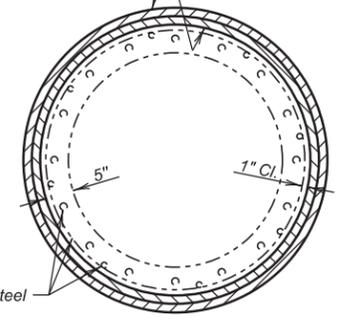
DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA24	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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Revised April 15, 2015 NP

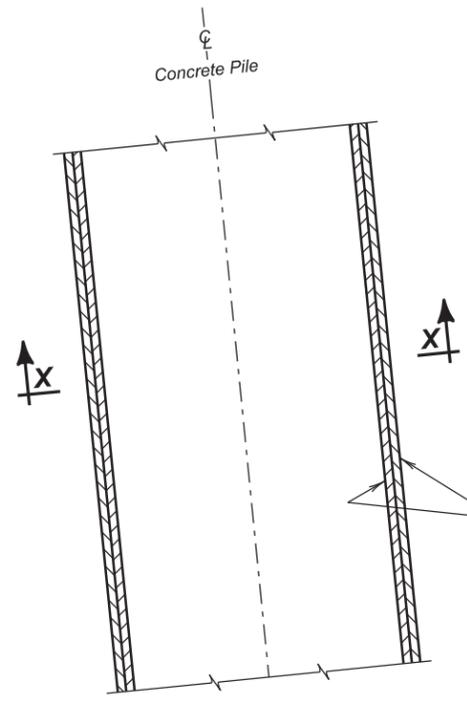
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	32	43



Two layers of Composite Fabric Wrap.
See Composite Fabric Wrap Notes
on Sheet Nos. 9 and 10 of 36

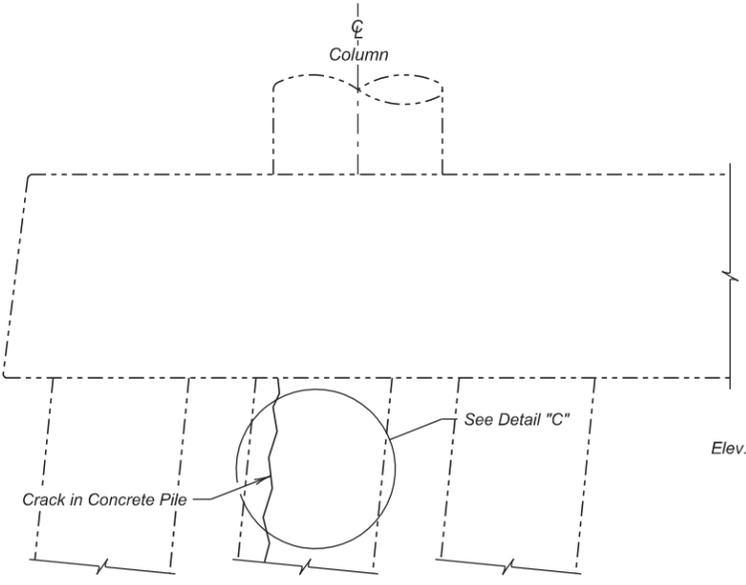


SECTION X - X

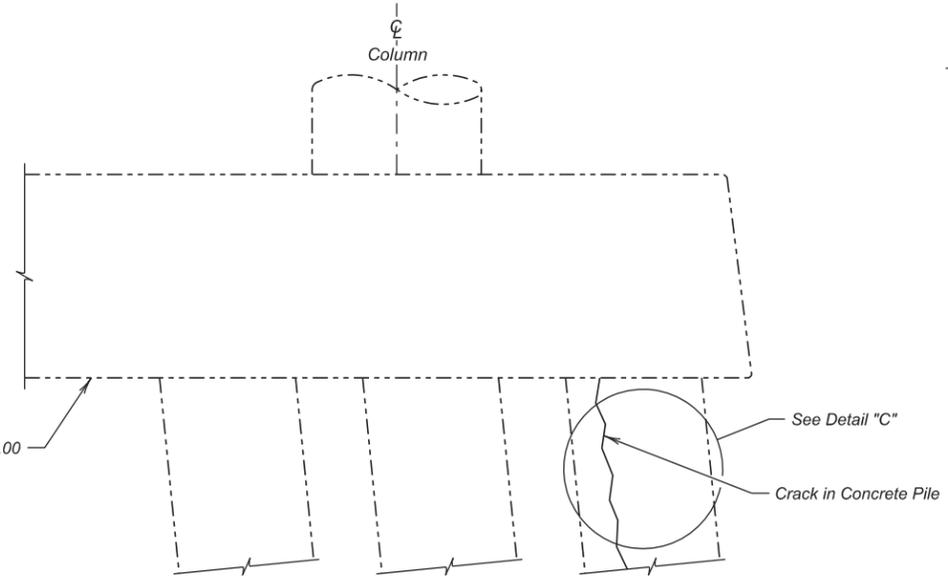


Two layers of Composite Fabric Wrap.
See Composite Fabric Wrap Notes
on Sheet Nos. 9 and 10 of 36

DETAIL "C"
(Showing Composite Fabric Wrap)



SECTION Q - Q



SECTION R - R

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Composite Fabric Wrap, Concrete Repair	Sq. Ft.	340

Quantity based on wrapping concrete pile lengths of 13.5 and 13.5 feet.

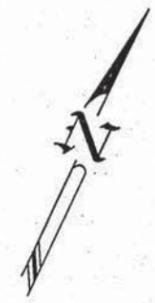
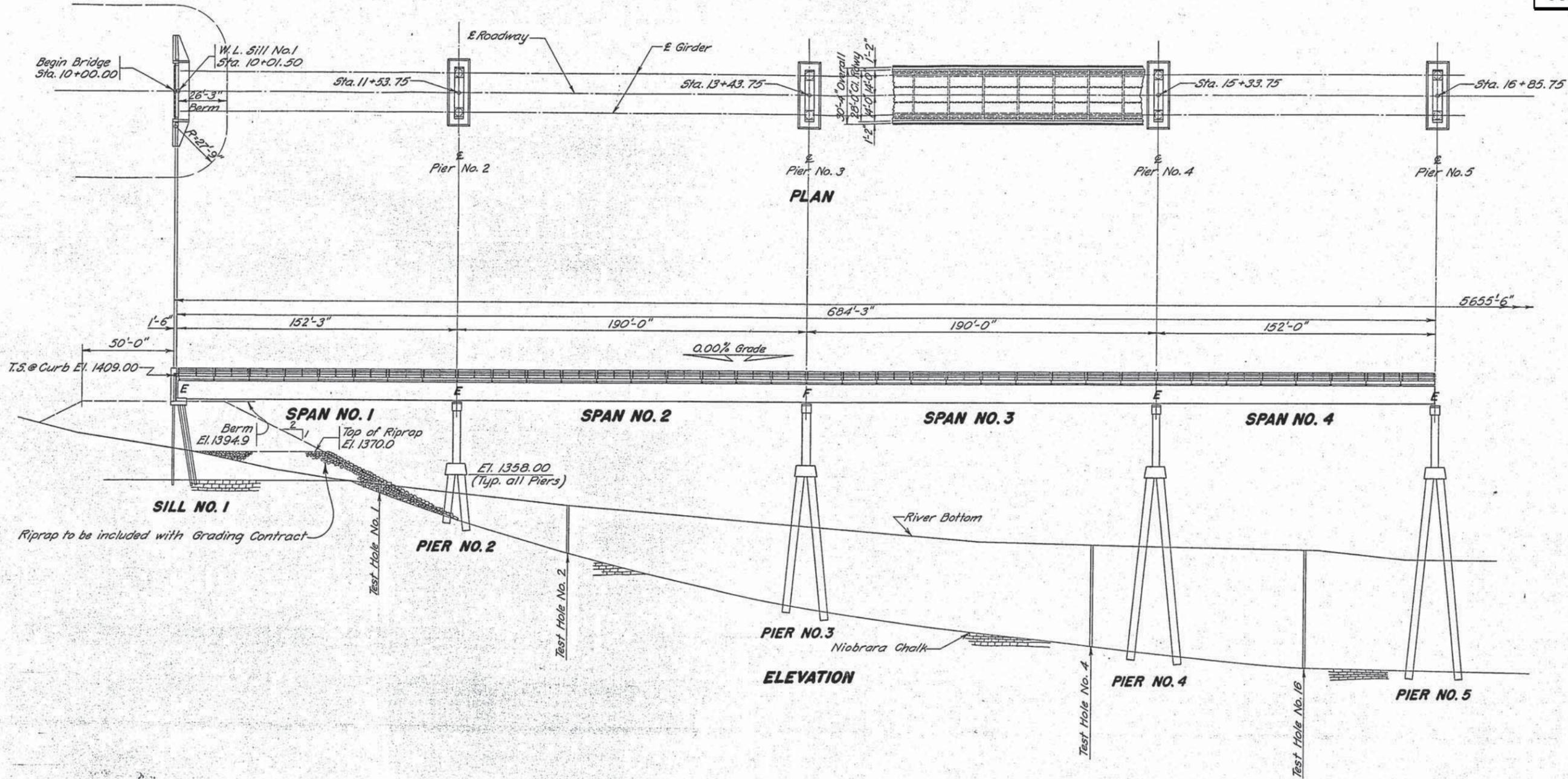
CONCRETE PILE REPAIR AT PIER NO. 24

FOR
5655' - 6" BRIDGE OVER FT. RANDALL RES.
28' - 0" ROADWAY 0° SKEW
OVER MISSOURI RIVER SEC. 16/20/21-T99N-R70W
STR. NO. 12-085-080 P 0044(198)291

GREGORY - CHARLES MIX COUNTY
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014 (25) OF (36)

DESIGNED BY NP CMIX05M4	CK. DES. BY BWS 05M4RA25	DRAFTED BY NP Kevin N. Goeden BRIDGE ENGINEER
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SPECIFICATION NOTE—
 Standard Specifications for Roads and Bridges issued April 1957 and Revisions and Supplements to Standard Specifications for Roads and Bridges dated March 1961 and Supplemental Specifications as included in the proposal.

PORTLAND CEMENT: Portland Cement, other than Type I, may be used at the option of the Contractor with the approval of ENGINEER.

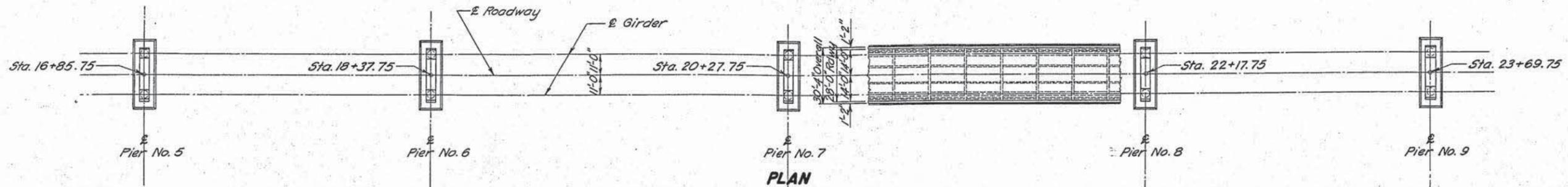
NOTE—
 For Horizontal and Vertical controls see Special Provisions.

ORIGINAL CONSTRUCTION PLANS

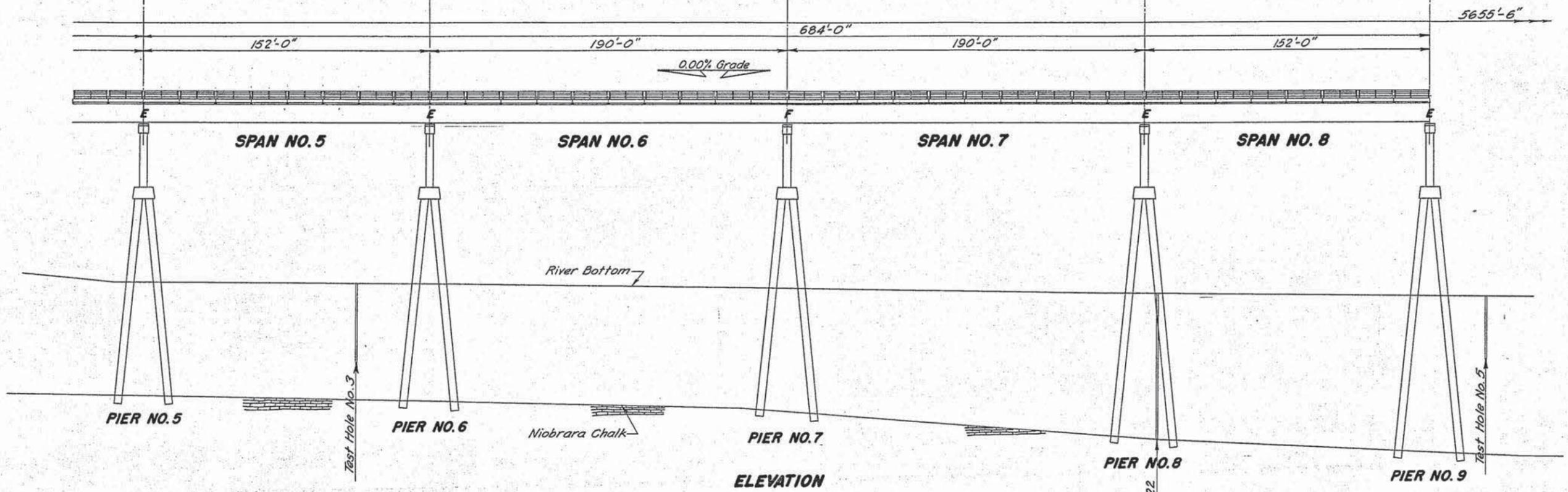
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 FOR
5,655'-6" BRIDGE OVER FT. RANDALL RES.
 28'-0" ROADWAY
 STA. 10+00.00 TO STA. 66+55.50 WAR 008-3 SEC. 1
 ON STATE HWY. 44 GREGORY-CHARLES MIX CO.
 STR. NO. 12-085-080 SOUTH DAKOTA H20-S16-44
 DEPARTMENT OF HIGHWAYS
 NOV. 1961 (26) OF (36)

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
R.W.J.	DB	E.L.	<i>[Signature]</i>
			CONSULT'G. BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	34	43



PLAN



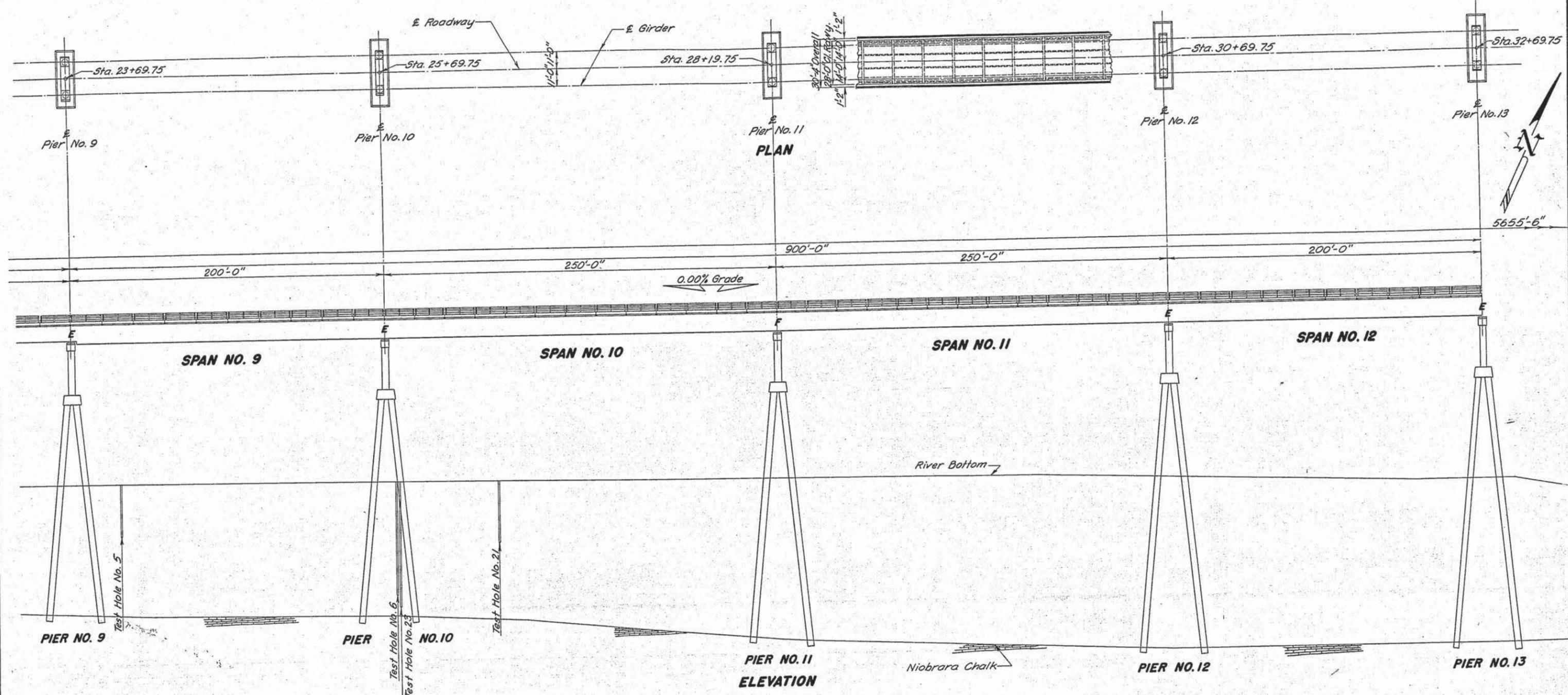
ELEVATION

ORIGINAL CONSTRUCTION PLANS

GENERAL DRAWING
 FOR
5,655'-6" BRIDGE OVER FT. RANDALL RES.
 28'-0" ROADWAY
 STA. 10+00.00 TO STA. 66+55.50 WAR 008-3 SEC. 1
 ON STATE HWY. 44 GREGORY-CHARLES MIX CO.
 STR. NO. 12-085-080 SOUTH DAKOTA H20-S16-44
 DEPARTMENT OF HIGHWAYS
 NOV. 1961 (27) OF (36)

DESIGNED BY <i>R.W.J.</i>	DRAWN BY <i>DJS</i>	CHECKED BY <i>E.K.</i>	APPROVED <i>[Signature]</i> CONSULT'G. BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	35	43

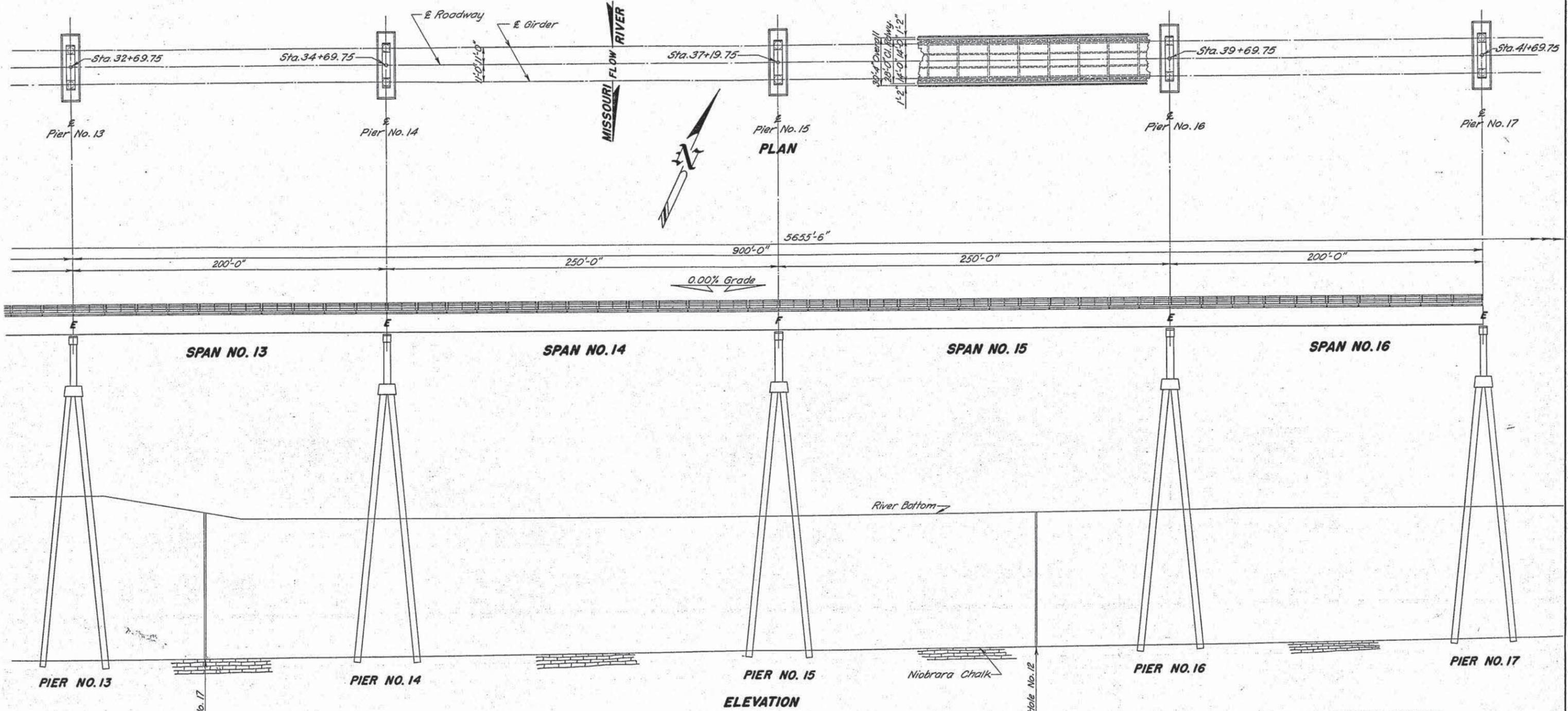


GENERAL DRAWING
FOR
5,655'-6" BRIDGE OVER FT. RANDALL RES.
28'-0" ROADWAY
STA. 10+00.00 TO STA. 66+55.50 WAR 008-3 SEC. 1
ON STATE HWY. 44 GREGORY-CHARLES MIX CO.
STR. NO. 12-085-080 SOUTH DAKOTA H20-S16-44
DEPARTMENT OF HIGHWAYS
NOV. 1961 **28** OF **36**

ORIGINAL CONSTRUCTION PLANS

DESIGNED BY R.W.J.	DRAWN BY D.B.	CHECKED BY E.V.	APPROVED <i>[Signature]</i> CONSULT'G. BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	36	43



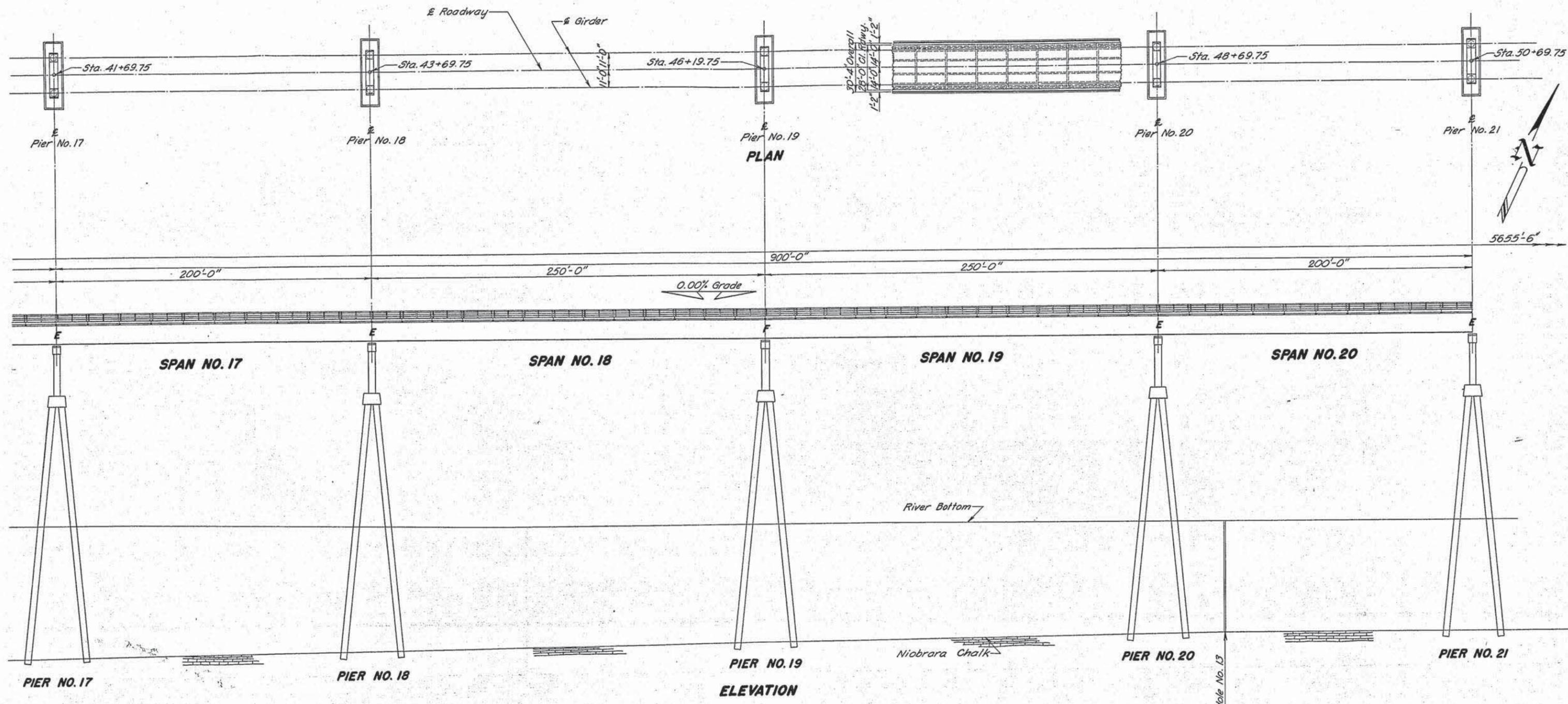
ELEVATION

GENERAL DRAWING
 FOR
5,655'-6" BRIDGE OVER FT. RANDALL RES.
 28'-0" ROADWAY
 STA. 10+00.00 TO STA. 66+55.50 WAR 008-3 SEC. 1
 ON STATE HWY. 44 GREGORY-CHARLES MIX CO.
 STR. NO. 12-085-080 SOUTH DAKOTA H20-S16-44
 DEPARTMENT OF HIGHWAYS
 NOV. 1961

ORIGINAL CONSTRUCTION PLANS

DESIGNED BY R.W.J.	DRAWN BY D.B.	CHECKED BY K.C.W.	APPROVED K.P. [Signature] CONSULT'G. BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	37	43

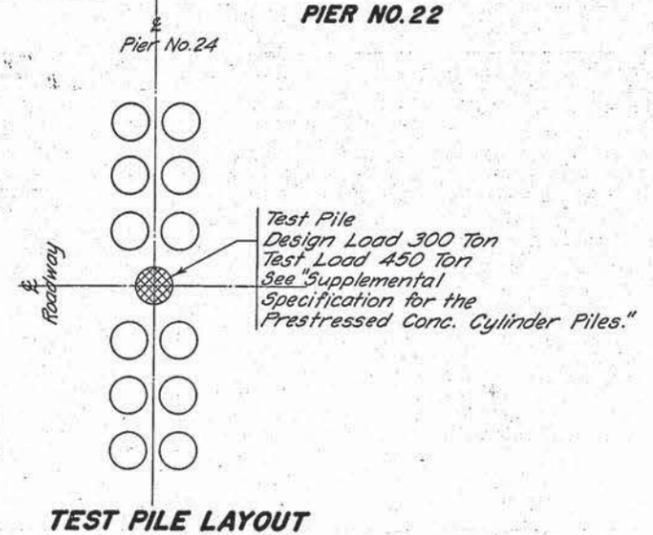
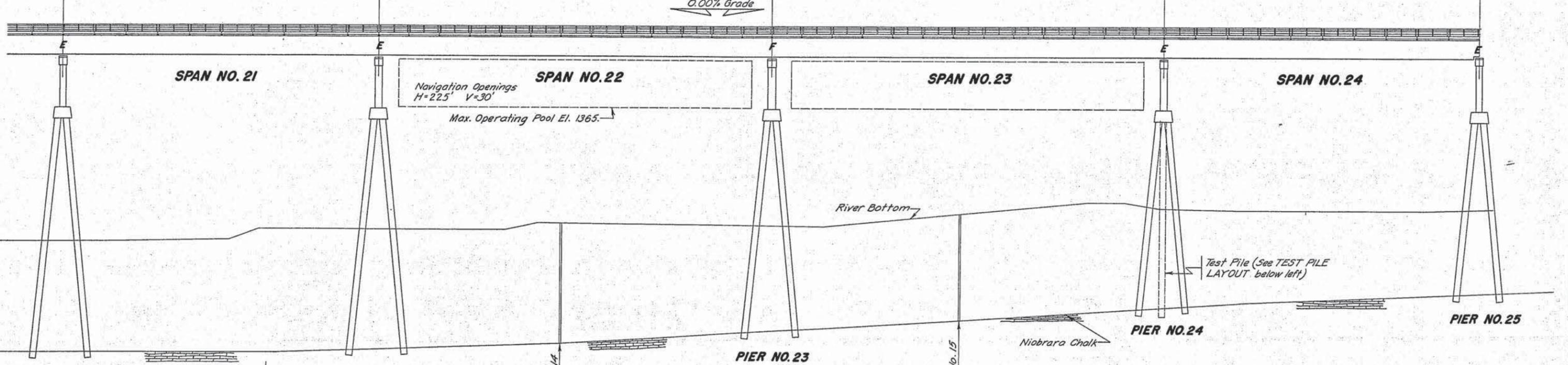
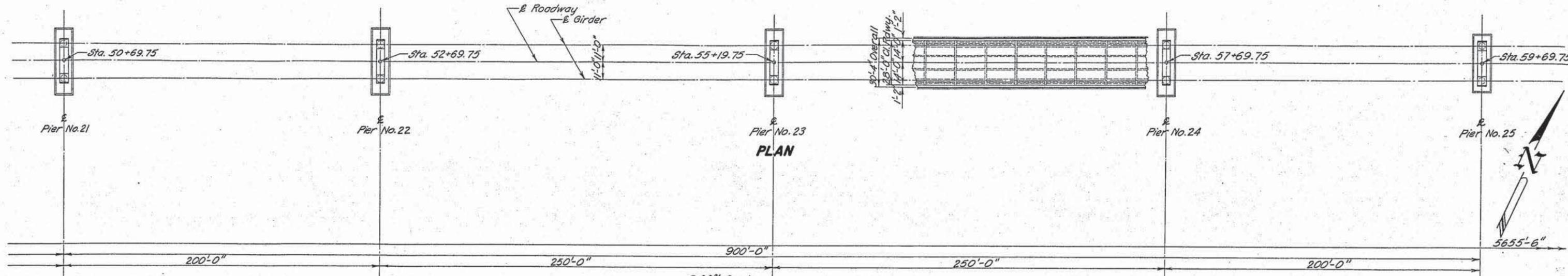


GENERAL DRAWING
FOR
5,655'-6" BRIDGE OVER FT. RANDALL RES.
28'-0" ROADWAY
STA. 10+00.00 TO STA. 66+55.50 WAR 008-3 SEC. 1
ON STATE HWY. 44 GREGORY-CHARLES MIX CO.
STR. NO. 12-085-080 SOUTH DAKOTA H20-S16-44
DEPARTMENT OF HIGHWAYS
NOV. 1961 **30** OF **36**

ORIGINAL CONSTRUCTION PLANS

DESIGNED BY <i>R.W.J.</i>	DRAWN BY <i>D.B.</i>	CHECKED BY <i>K.C.W.</i>	APPROVED <i>H.P. Seuss</i> CONSULT'G. BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	38	43

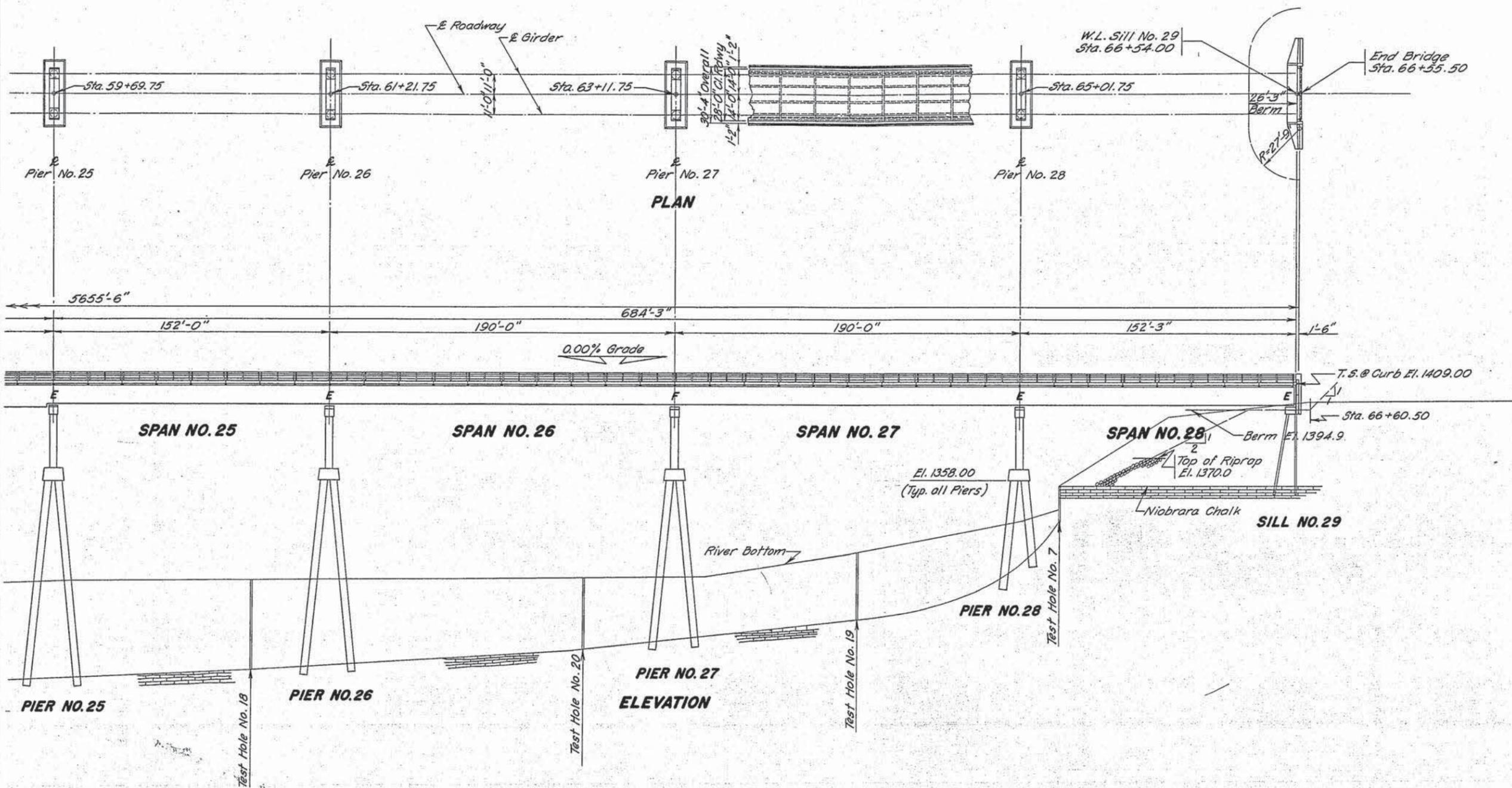


ORIGINAL CONSTRUCTION PLANS

GENERAL DRAWING
 FOR
5,655'-6" BRIDGE OVER FT. RANDALL RES.
 28'-0" ROADWAY
 STA. 10+00.00 TO STA. 66+55.50 WAR 008-3 SEC. I
 ON STATE HWY. 44 GREGORY-CHARLES MIX CO.
 STR. NO. 12-085-080 SOUTH DAKOTA H20-S16-44
 DEPARTMENT OF HIGHWAYS
 NOV. 1961

DESIGNED BY <i>R.W.J.</i>	DRAWN BY <i>D.B.</i>	CHECKED BY <i>K.C.W.</i>	APPROVED <i>K.H. Deuss</i> CONSULT'G. BRIDGE ENGINEER
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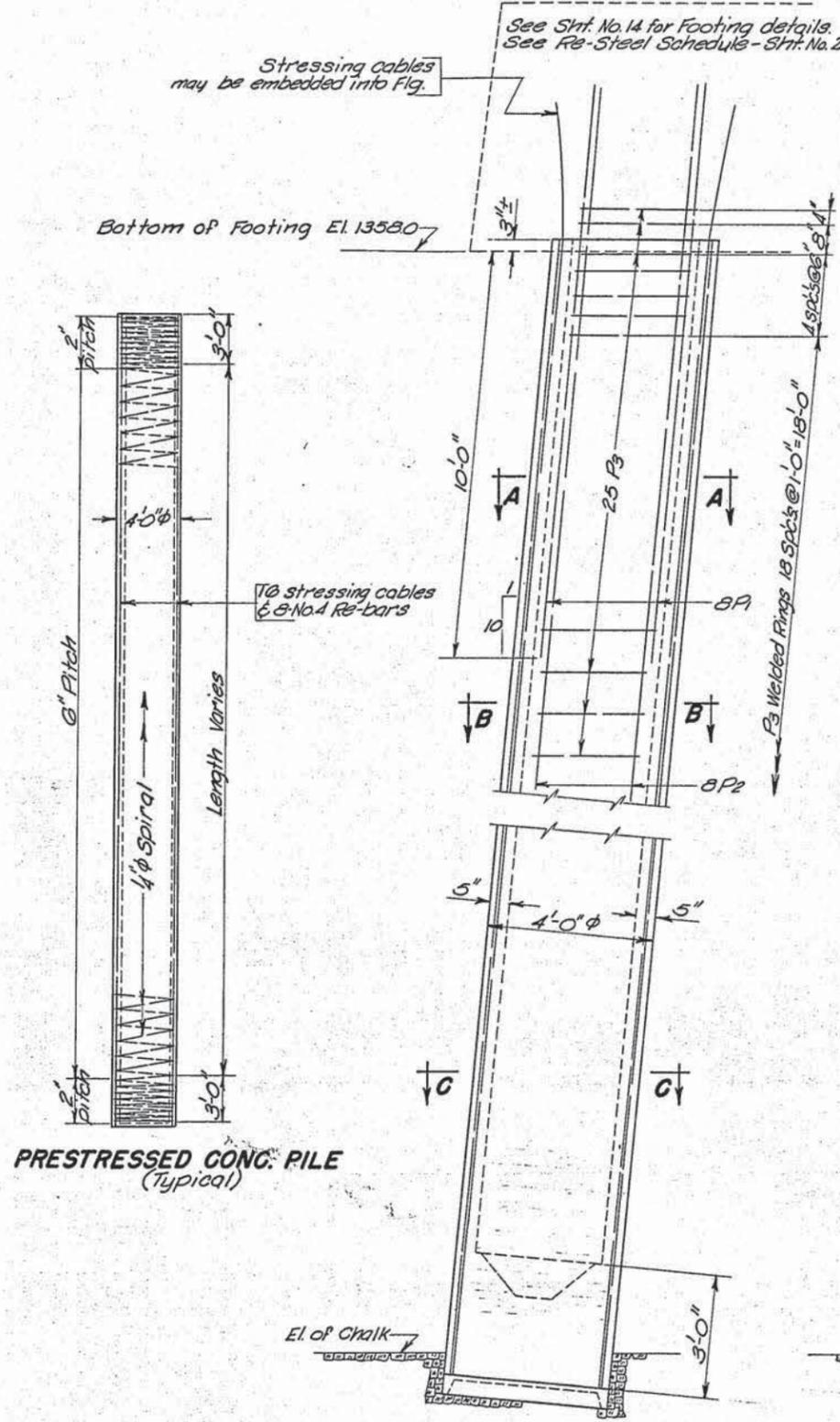
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	39	43



ORIGINAL CONSTRUCTION PLANS

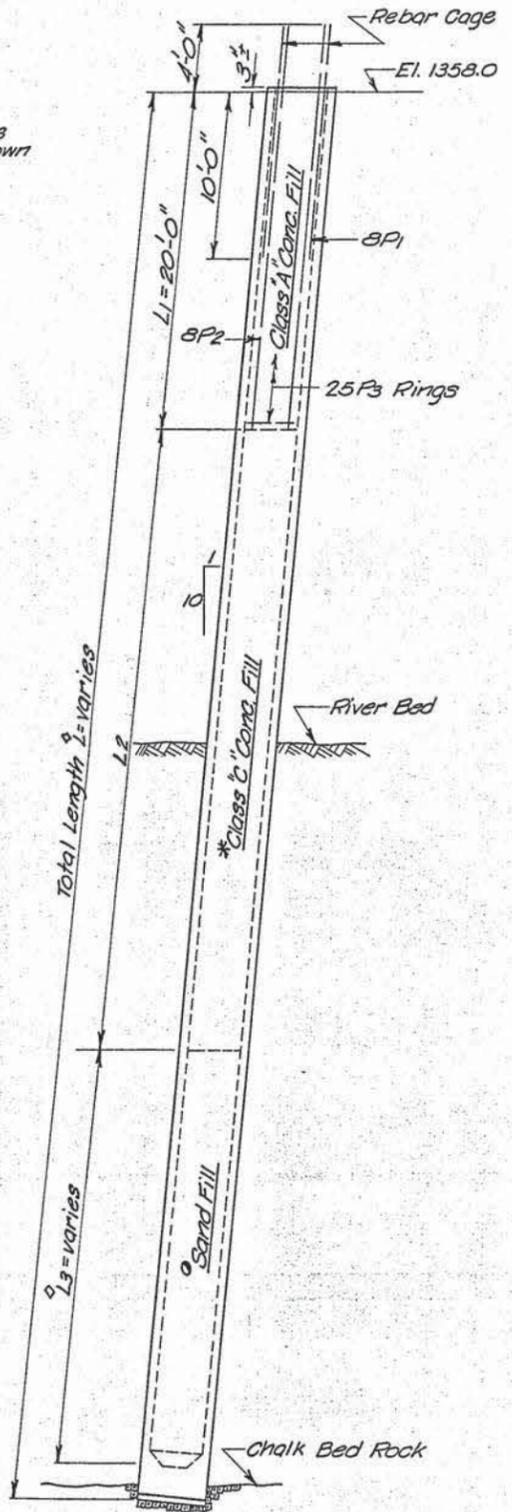
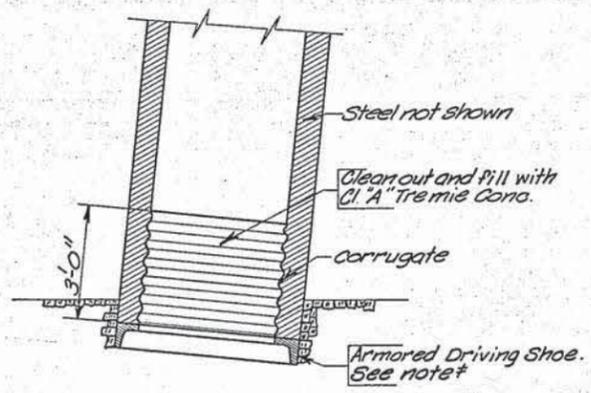
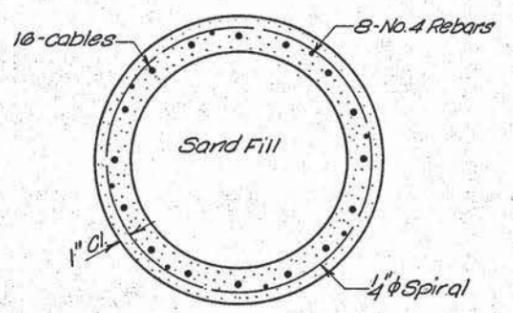
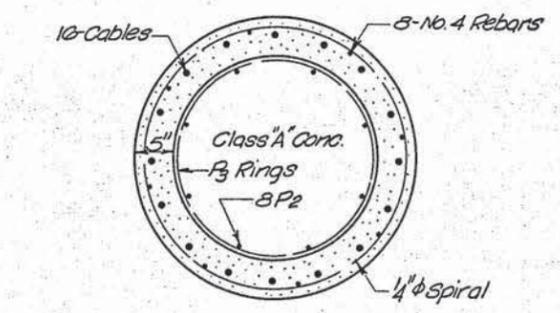
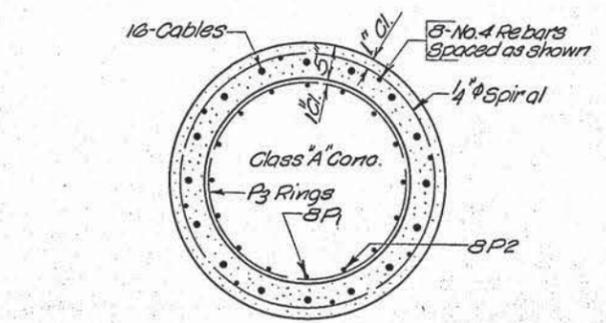
GENERAL DRAWING
 FOR
5,655'-6" BRIDGE OVER FT. RANDALL RES.
 28'-0" ROADWAY
 STA. 10+00.00 TO STA. 66+55.50 WAR 008-3 SEC. 1
 ON STATE HWY. 44 GREGORY-CHARLES MIX CO.
 STR. NO. 12-085-080 SOUTH DAKOTA H20-S16-44
 DEPARTMENT OF HIGHWAYS
 NOV. 1961 32 OF 36

DESIGNED BY R.W.T.	DRAWN BY DVB	CHECKED BY K.C.W.	APPROVED K.P. [Signature] CONSULT'G. BRIDGE ENGINEER
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PRESTRESSED CONG. PILE (Typical)

DETAILS OF PRESTRESSED CONCRETE PILES IN PLACE (Typical)



Piers	No. of Piles	Diag. in.	Wall thickness in.	∅L Lin. Ft.	L ₁ Ft.	L ₂ Ft.	∅L ₃ Ft.	Class A ¹ Conc. Cu. Yds.	Class C ² Conc. Cu. Yds.	∅ Sand Cu. Yds.
No. 2	8	48	5	25	20	5	0	5.83	1.46	0
3				70		30	20		8.75	5
4				100		40	40		11.67	11
5				105		45	40		13.13	11
6				108		50	38		14.59	10
7				114		50	44		14.59	12
8				130		55	55		16.04	15
9	8			140		60	60		17.50	17
10	12			142		70	52		20.42	14
11				162		75	67		21.88	19
12				174		75	79		21.88	22
13				172		80	72		23.34	20
14				172		85	67		24.79	19
15				168		90	58		26.25	16
16				166			56			15
17				165			55			15
18				164			54			15
19				162			52			14
20				180			50			14
21				156		90	46		26.25	13
22				150		80	50		23.34	14
23				140		75	45		21.88	12
24	12			124		65	39		18.96	11
25	8			114		65	29		18.96	8
26				105		55	30		16.04	8
27				94		55	19		16.04	5
28	8	48	5	50	20	20	10	5.83	5.83	2

*Class C Concrete shall conform to the Specifications for Class A Concrete except that cement content may be reduced provided the crushing strength (F_c) at 28 days is not less than 3000 p.s.i.

†Material for Sand Fill shall be Pit Run sand or gravel with maximum aggregate size of 3". Quantities here given are for contractors information only and is not a bid item. See Supplemental Specifications for Prestressed Concrete Cylinder Piles.

‡These lengths are based on existing and available log boring data, and may vary from actual driving conditions.

§Details of Armored Shoe shall be submitted by Contractor to Bridge Division for approval. Shoes shall be detailed to facilitate driving and shall be fixed to pile so that under no condition will Armored Shoe loosen from pile or crush under any load.

ORIGINAL CONSTRUCTION PLANS

DETAILS OF PRESTRESSED CONCRETE PILES
FOR
5,655'-6" BRIDGE OVER FT. RANDALL RES.
28'-0" ROADWAY

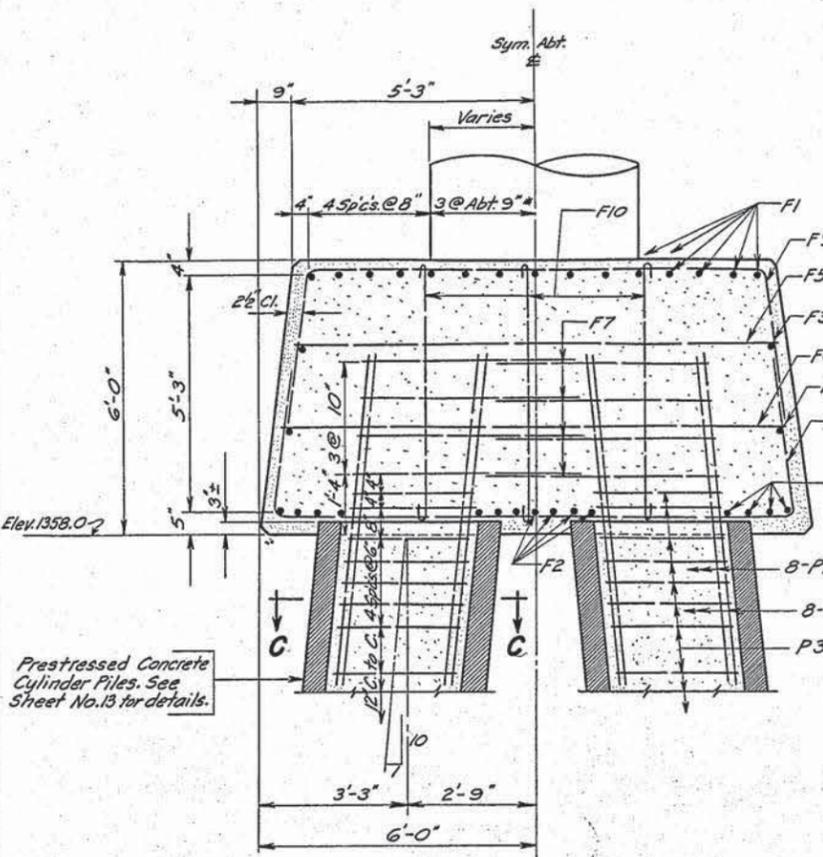
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ON STATE HWY 44 GREGORY-CHARLES MIX CO.
STR. NO. 12-085-080 SOUTH DAKOTA H20-S16-44
DEPARTMENT OF HIGHWAYS

GENERAL NOTES:-
For fabrication and driving of Piles See Supplemental Specifications for the Prestressed Concrete Cylinder Piles.
Details shown on this Drawg. are typical for post tension methods. For alternate reinforcement plans see par. 6 and par. 18, Sec. II of Supplemental Specifications for the Concrete Cylinder Piles.

NOV. 1961 33 OF 36

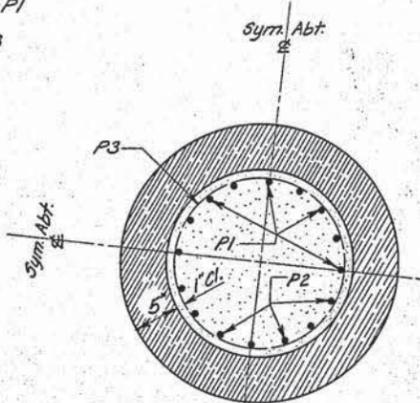
DESIGNED BY E.K. #K.C.W.	DRAWN BY E.K.	CHECKED BY K.C.W.	APPROVED K.P. Buss CONSULT'G. BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	41	43

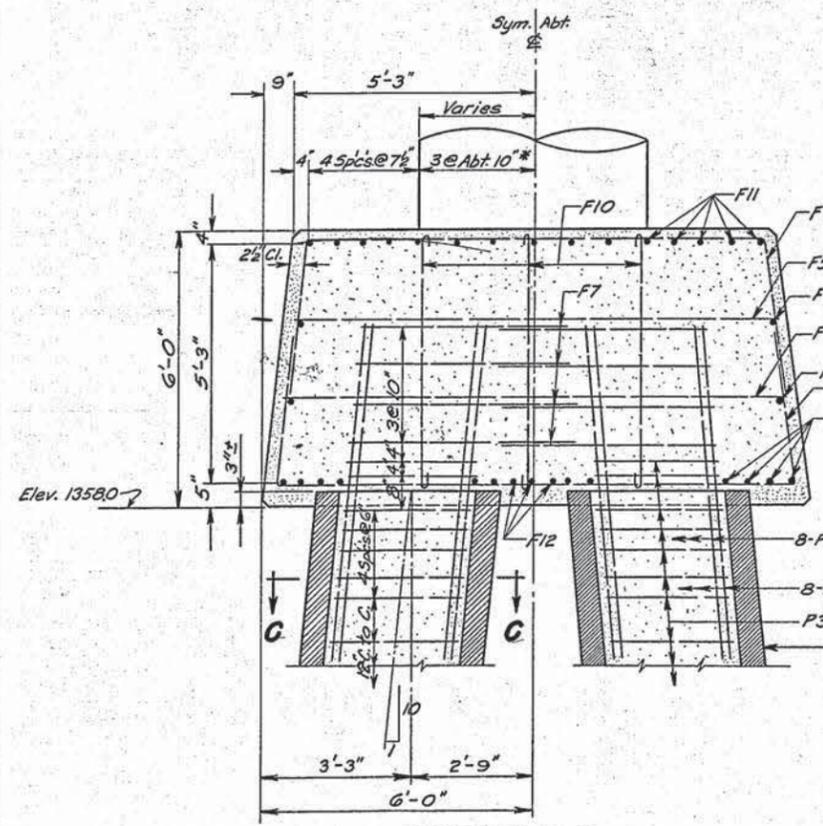


SECTION A-A

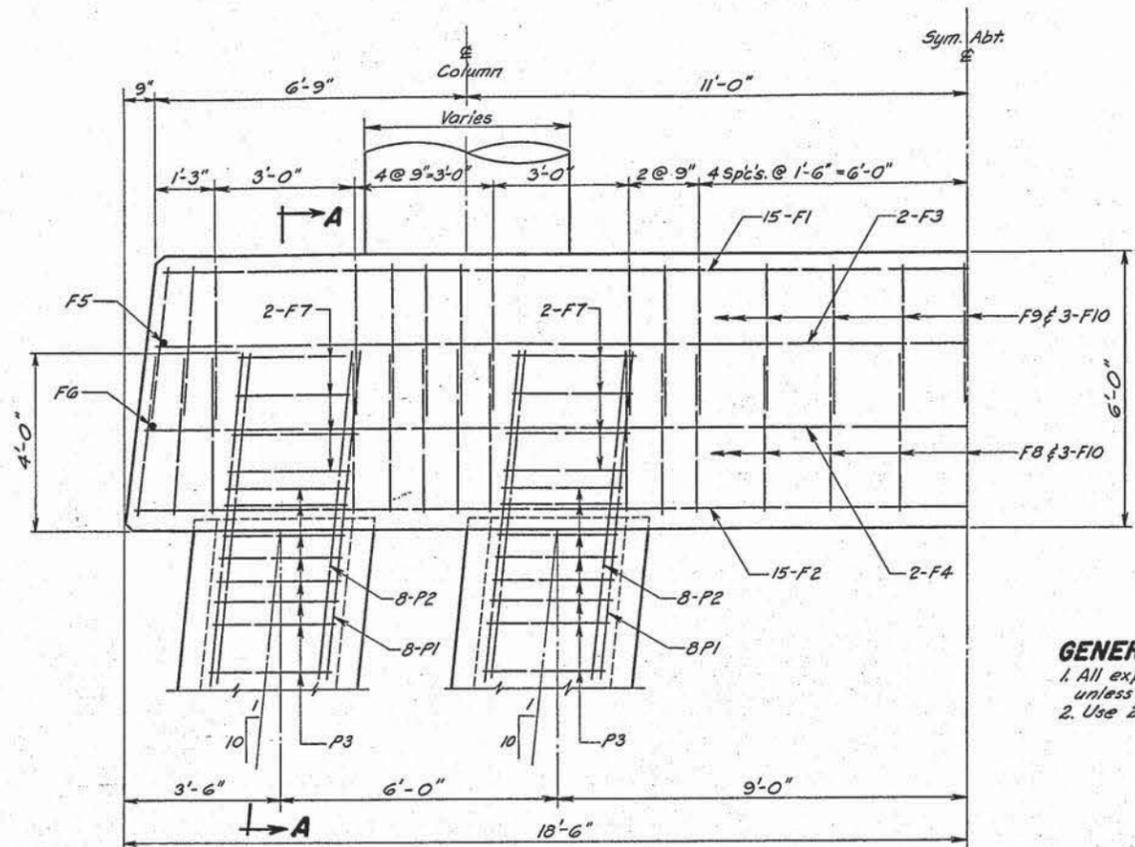
NOTE: Column Re-steel not shown. See Sheet No's. 15 thru 20.
* Space bars as necessary to clear column Re-steel.



SECTION C-C

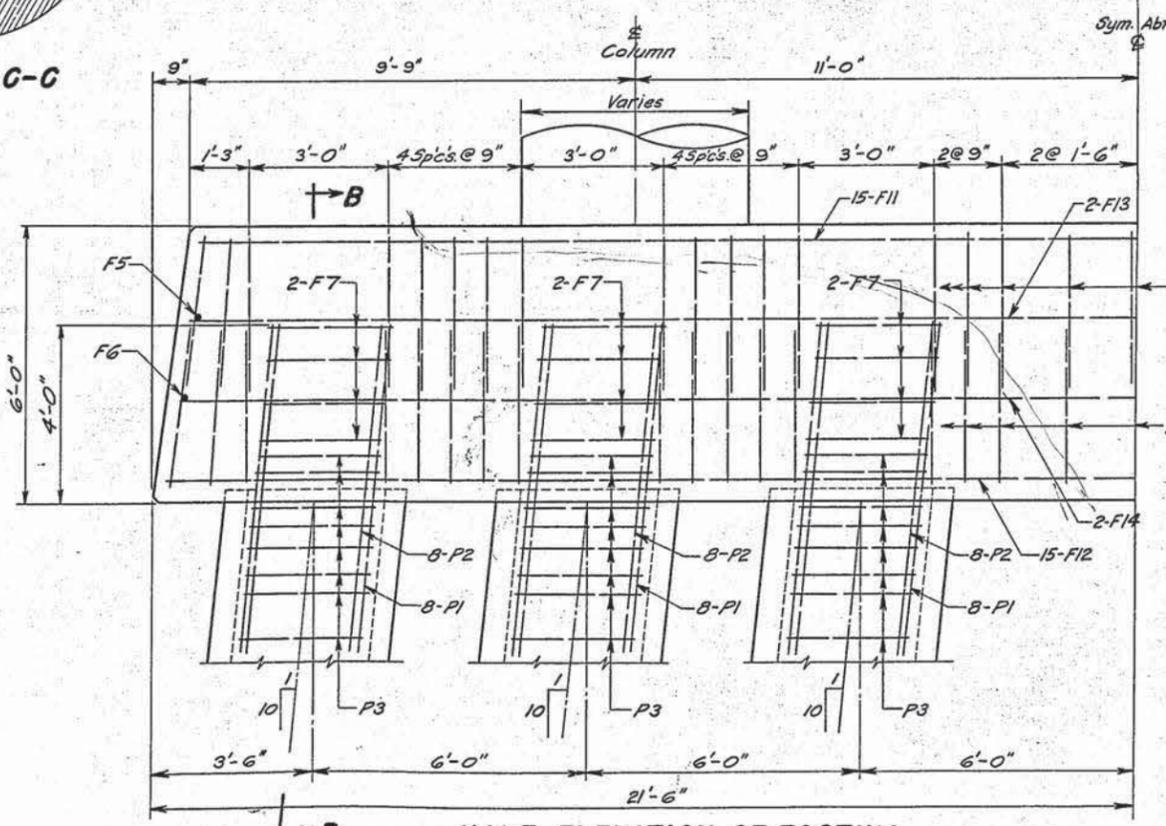


SECTION B-B



HALF ELEVATION OF FOOTING
(Typical for Piers 2 thru 9 and 25 thru 28)

GENERAL NOTES— (For all Piers)
1. All exposed corners and edges shall be chamfered 1" unless otherwise noted.
2. Use 2" clear cover on all reinforcing steel except as shown.



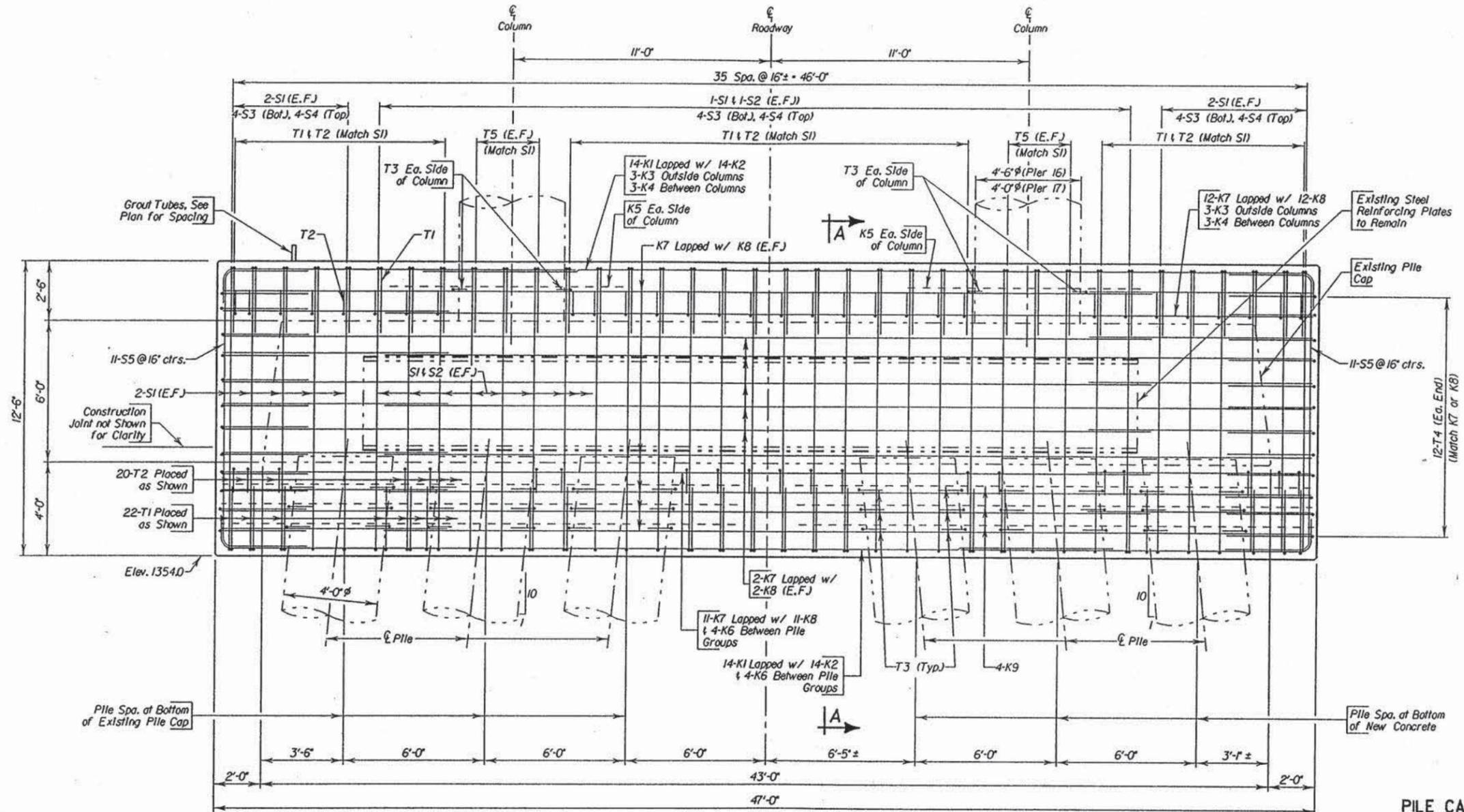
HALF ELEVATION OF FOOTING
(Typical for Piers 10 thru 24)

ORIGINAL CONSTRUCTION PLANS

FOOTING DETAILS OF PIERS NO. 2 THRU 28
FOR
5,655'-6" BRIDGE OVER FT. RANDALL RES.
28'-0" ROADWAY
STA. 10+00.00 TO STA. 66+55.50 WAR 008-3 SEC. 1
ON STATE HWY. 44 GREGORY-CHARLES MIX CO.
STR. NO. 12-085-080 SOUTH DAKOTA H20-S16-44
DEPARTMENT OF HIGHWAYS
NOV. 1961 34 OF 36

DESIGNED BY E.K. & K.C.W.	DRAWN BY E.K. Traced by: KMM	CHECKED BY K.C.W.	APPROVED CONSULT'G. BRIDGE ENGINEER
------------------------------	------------------------------------	----------------------	--

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0044(198)291	42	43



ELEVATION OF PILE CAP ENCASEMENT

PILE CAP REPAIRS FOR
 5,655'-6" BRIDGE OVER FT. RANDALL
 RESERVOIR ON STATE HWY. 44
 FOOTING RETROFIT, PIERS 16 & 17

NOTE -
 See Sheet 5 of 25 for
 Section A-A.

28' ROADWAY 0° SKEW
 OVER THE MISSOURI RIVER
 STA. 10+00.00 TO 66+55.50 ER 0044(103)291
 STR. NO. 12-085-080 HS20-44
 PCEMS 479P

ORIGINAL CONSTRUCTION PLANS

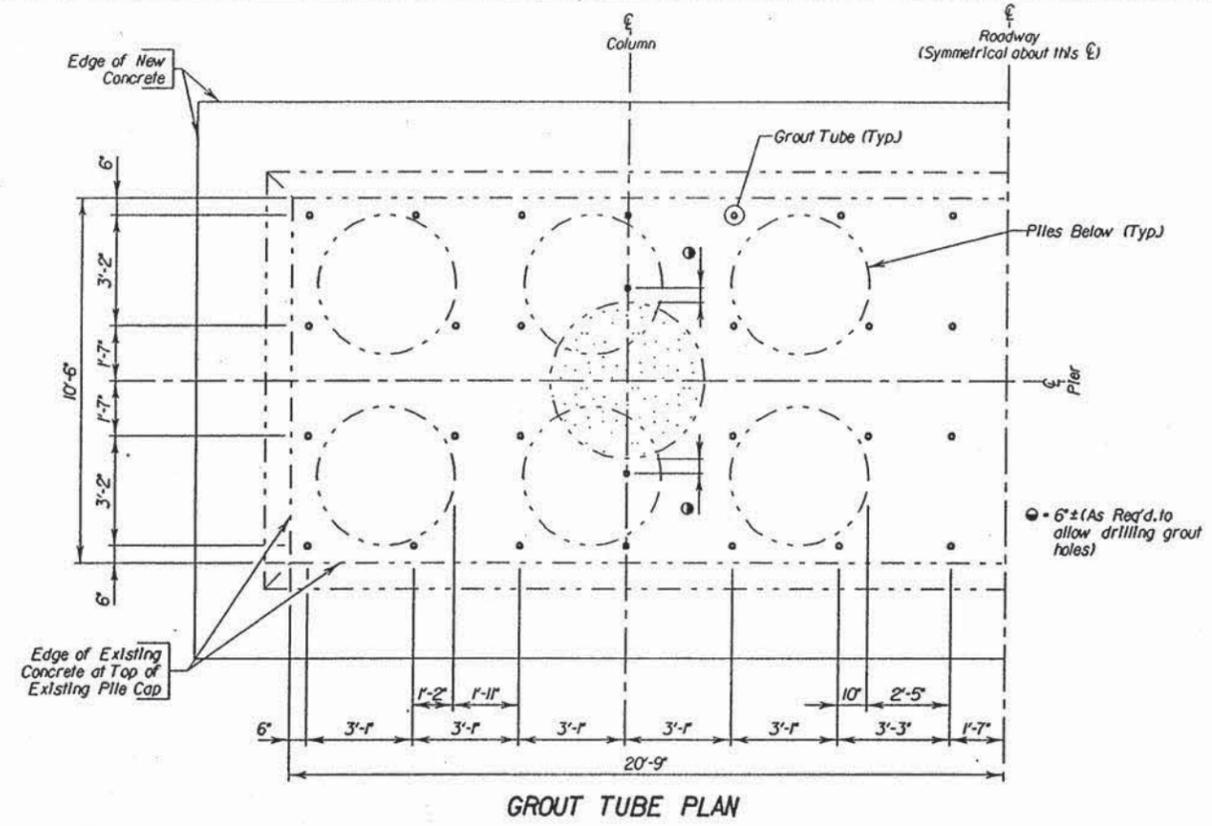
GREGORY-CHARLES MIX COUNTY
 S.D. DEPT. OF TRANSPORTATION

MAY 1997 35 OF 36



DESIGNED BY LJC	DRAWN BY RMA	CHECKED BY JLC	APPROVED BRIDGE ENGINEER
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User: RALD M. ALVORD
 Project Number: 02303-002-103
 Date Plotted: 05/27/97 10:3 am

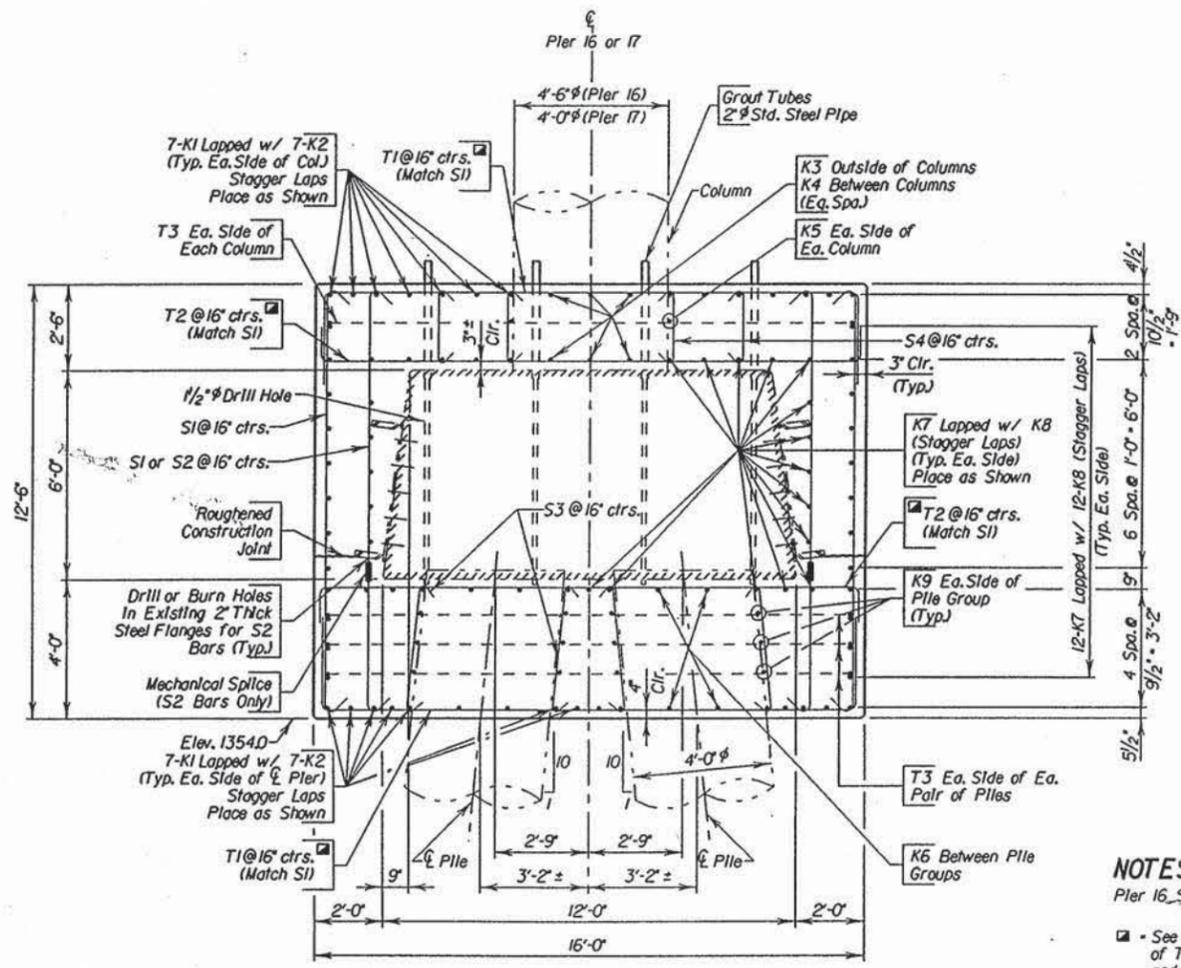


GROUT TUBE PLAN

REINFORCING SCHEDULE (ONE PIER)

Mk.	No.	Size	Length	Type	Bending Details
K1	28	10	40'-0"	17A	
K2	28	10	17'-0"	17A	
K3	12	6	9'-9"	Str.	
K4	6	6	17'-0"	Str.	
K5	4	6	10'-0"	Str.	
K6	8	6	7'-6"	Str.	
K7	53	6	40'-0"	Str.	
K8	53	6	10'-2"	Str.	
K9	24	6	22'-0"	Str.	
S1	94	6	13'-3"	T9A	
S2	50	6	13'-3"	T9B	
S3	144	5	4'-5"	T9A	
S4	144	5	3'-0"	T9A	
S5	22	6	19'-1"	17	
T1	52	6	20'-10"	17	
T2	50	6	17'-6"	17	
T3	40	6	17'-4"	17	
T4	24	6	22'-8"	17	
T5	12	6	7'-11"	17A	

NOTE -
Reinforcing Schedule Shown Is for one Pier only. The Reinforcement Is Identical at Piers 16 and 17.



SECTION A - A

NOTES -
Pier 16 Shown, Pier 17 Similar.
See Elevation View for Placement of Transverse Reinforcement at Columns and Piles.

ORIGINAL CONSTRUCTION PLANS

PILE CAP REPAIRS FOR
5,655'-6" BRIDGE OVER FT. RANDALL RESERVOIR ON STATE HWY. 44
FOOTING RETROFIT, PIERS 16 & 17

28' ROADWAY 0° SKEW
OVER THE MISSOURI RIVER
STA. 10+00.00 TO 66+55.50 ER 0044(103)291
STR. NO. 12-085-080 HS20-44
PCEMS 479P

GREGORY-CHARLES MIX COUNTY
S.D. DEPT. OF TRANSPORTATION

MAY 1997 36 OF 36



DESIGNED BY LJC	DRAWN BY RMA	CHECKED BY JLC	APPROVED BRIDGE ENGINEER
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User: RICHARD M. ALVORD
 Project: 0044(198)291
 Date: 05/12/97 10:30 am