

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-253, 090E-253, 050-253	1	9

Plotting Date: 05/20/2016

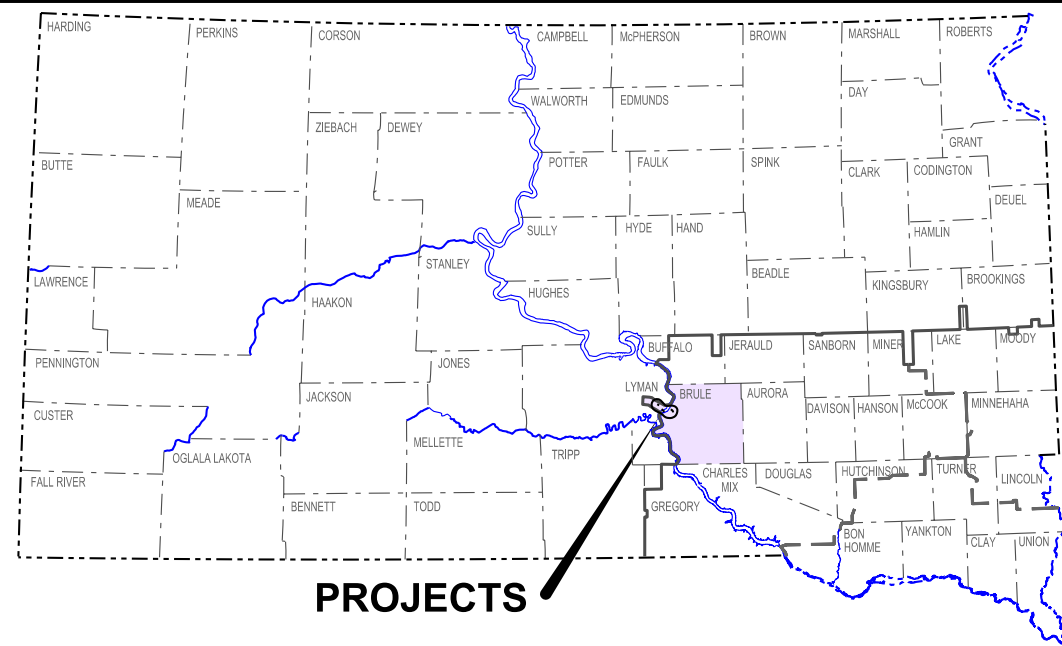
PLANS FOR PROPOSED
**PROJECTS 090W-253, 090E-253
& 050-253**

**INTERSTATE 90 &
SD HIGHWAY 50
LYMAN & BRULE COUNTIES
PIPE REPAIR & CURED IN PLACE PIPE LINING
PCN I4D0, I4CX & I4CY**

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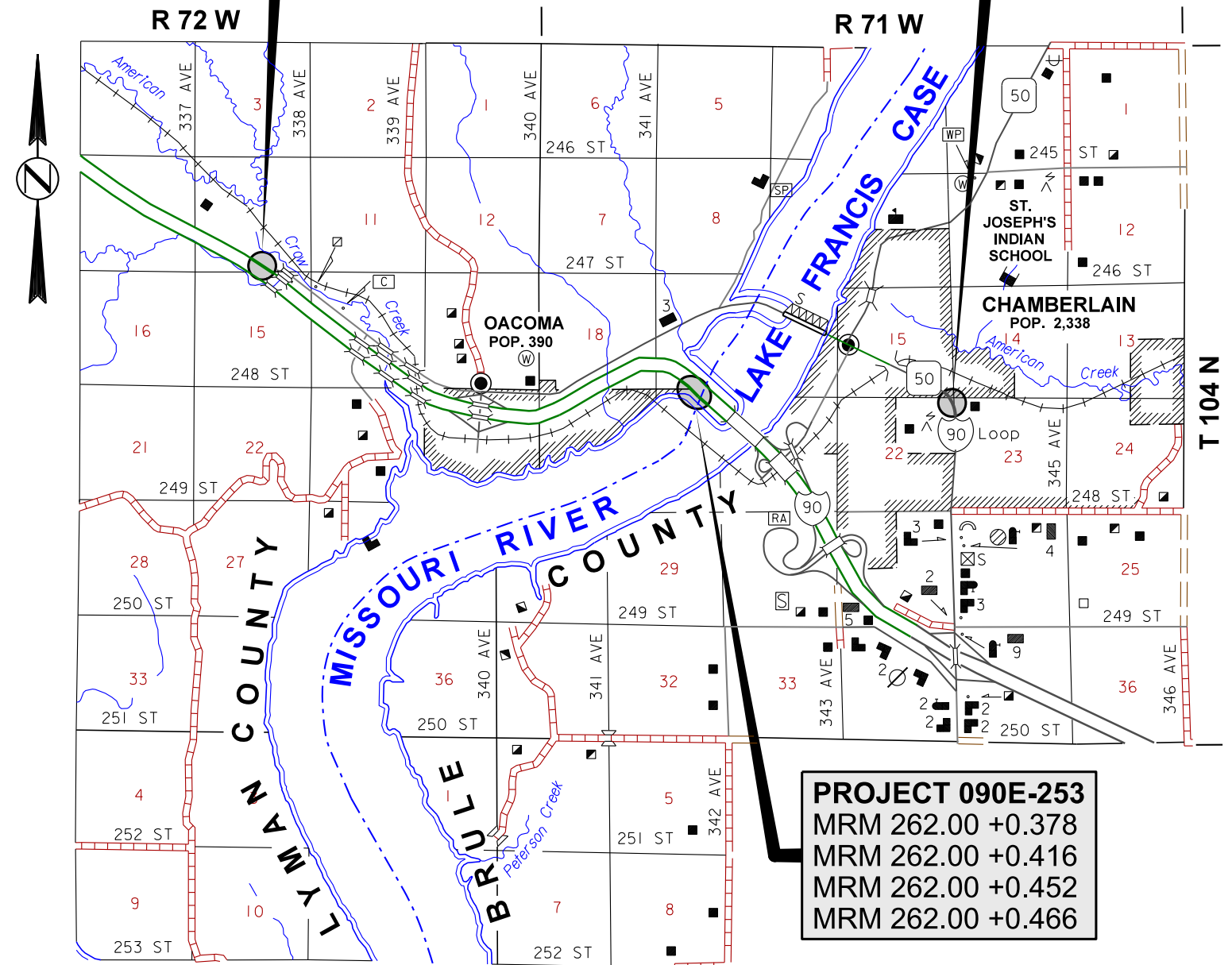
PLOT SCALE - 1" = 7000'



PROJECTS

PROJECT 090W-253
MRM 258.00 +0.284

PROJECT 050-253
MRM 233.00 +0.035



STORM WATER PERMIT
(None required)

I90W ADT (2015) 3,295
I90E ADT (2015) 3,432
SD50 ADT (2015) 3,821

PROJECT 090E-253
MRM 262.00 +0.378
MRM 262.00 +0.416
MRM 262.00 +0.452
MRM 262.00 +0.466

PLOTTED FROM - TRMLINT15

FILE - ... \LYMAN\I4D0\TTL\I4D0.DGN

PLOT NAME - 1

ESTIMATE OF QUANTITIES & ENVIRONMENTAL COMMITMENTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-253, 090E-253, 050-253	2	9

ESTIMATE OF QUANTITIES

090W-253 PCN I4D0

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E7500	Remove Pipe for Reset	8	Ft
120E0600	Contractor Furnished Borrow Excavation	40	CuYd
230E0100	Remove and Replace Topsoil	Lump Sum	LS
450E4759	18" CMP 16 Gauge, Furnish	66	Ft
450E4760	18" CMP, Install	66	Ft
450E5010	18" CMP Elbow, Furnish	2	Each
450E5011	18" CMP Elbow, Install	2	Each
450E5211	18" CMP Flared End, Furnish	1	Each
450E5212	18" CMP Flared End, Install	1	Each
450E8009	18" RCP to CMP Transition, Furnish	1	Each
450E8010	18" Pipe Transition, Install	1	Each
450E9000	Reset Pipe	8	Ft
734E0010	Erosion Control	Lump Sum	LS

090E-253 PCN I4CX

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E5451	Salvage Riprap	19.6	Ton
450E4739	12" CMP 16 Gauge, Furnish	70	Ft
450E4740	12" CMP, Install	70	Ft
450E5000	12" CMP Elbow, Furnish	4	Each
450E5001	12" CMP Elbow, Install	4	Each
450E9500	Cured in Place Pipe	329	Ft
700E2010	Place Riprap	19.6	Ton

050-253 PCN I4CY

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E0500	Remove Pipe Culvert	62	Ft
120E0600	Contractor Furnished Borrow Excavation	550	CuYd
230E0020	Contractor Furnished Topsoil	15	CuYd
450E4759	18" CMP 16 Gauge, Furnish	54	Ft
450E4760	18" CMP, Install	54	Ft
734E0010	Erosion Control	Lump Sum	LS

SPECIFICATIONS

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

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 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.

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 Public ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for 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 Public 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 Public 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.

Cost 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.

ENVIRONMENTAL COMMITMENTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-253, 090E-253, 050-253	3	9

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: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

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 Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas 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.

TABLE OF PIPE REPAIR

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-253, 090E-253, 050-253	4	9

PROJECT	MRM & DISPLACEMENT	SIZE & TYPE	REMOVE AND RESET PIPE CULVERT (FT)	REMOVE PIPE CULVERT (FT)	18" CMP FLARED END (EACH)	18" RCP TO CMP TRANSITION (EACH)	12" CMP 20° ELBOW (EACH)	18" CMP 10° ELBOW (EACH)	12" CMP (FT)	18" CMP (FT)	CONTRACTOR FURNISHED BORROW EXCAVATION (CUYD)	CURED IN PLACE PIPE (CIPP) (FT)	COMMENTS	SIDE OF ROAD
090W-253	258.00	+0.284	18" RCP TO 18" CMP	8	1	1		2		66	40			North
090W-253 Totals				8	1	1		2		66	40			
090E-253	262.00	+0.378	12" CMP				1		16			74		South
090E-253	262.00	+0.416	12" CMP				1		16			71		South
090E-253	262.00	+0.452	12" CMP				1		20			61		South
090E-253	262.00	+0.466	12" CMP				1		18			123	Included is 8' and 55' for Inlet to the east and west that tie into this Pipe Location	South
090E-253 Totals							4		70			329		
050-253	233.00	+0.051	24" RCP		62					54	550			East
050-253 Totals					62					54	550			

SCOPE OF WORK

The scope of work on this project shall include, but is not limited to the following:

1. Clean and install Cured in place pipe liners at 4 locations.
2. Install new elbows and pipe end sections.
3. Clean silt from ditches adjacent to pipe culvert.
4. Grade and shape ditch cleanout sections.
5. Seed and apply erosion control blanket to disturbed areas.

UTILITIES

The Contractor shall contact the involved utility companies through South Dakota One Call (1-800-781-7474) prior to starting work. It shall be the responsibility of the Contractor to coordinate work with the utility owners to avoid damage to existing facilities.

Utilities are not planned to be affected on this project. If utilities are identified near the improvement area through the SD One Call Process as required by South Dakota Codified Law 49-7A and Administrative Rule Article 20:25, the Contractor shall contact the Engineer to determine modifications that will be necessary to avoid utility impacts.

TIE BOLTS FOR RCP/RCP ARCH CULVERTS

Tie Bolts shall be installed at the inlet and outlet on all sections of new/reset culvert and on new/reset culvert ends (requires connection from existing culvert to new end section). Connection shall be made from the first section left in place to the first new/reset section and to all new/reset sections.

For informational purposes:

Field drilling will be required to install the tie bolts on reset culvert, on reset culvert ends and on existing culvert when installing a new/reset end section.

Cost for removing tie bolts for reuse, drilling tie bolt holes and providing, installing and reinstalling tie bolts shall be incidental to the contract unit prices for installing or resetting RCP Culverts and End Sections.

REMOVE AND RESET TYPE 2 OBJECT MARKERS

The Contractor will be required to remove prior to the work and reset after the work the Type 2 Object Markers at pipe ends. Cost for this work shall be incidental to the contract unit prices for the various items.

CULVERT REPAIR - MAINLINE CULVERT

The Contractor is encouraged to thoroughly investigate the culvert repair sites prior to bidding.

Hauling of embankment material on established traveled roadways shall be limited to trucks or small scrapers hauling legal loads and which do not cause damage to the roadway, as approved by the Engineer. Hauling of material in the roadway ditches will not be allowed.

The Contractor shall be responsible for restoration of any areas disturbed outside the limits of the work area.

Joints between concrete pipe culvert sections shall be protected against infiltration as indicated in Section 450.3 A of the Specifications. If an existing concrete pipe culvert section has a damaged joint or there is poor alignment of the joints, 2 layers of drainage fabric shall be placed over the joint.

REMOVE AND REPLACE TOPSOIL

Prior to starting construction operations, a sufficient volume of topsoil shall be removed from the construction limits to cover the disturbed areas to the required thickness as indicated in these plans.

Following completion of grading operations, topsoil shall be spread evenly over the disturbed areas. The thickness will be approximately 4 inches.

Removal and replacement of topsoil will not be measured for payment but shall be included in the contract lump sum price for Remove and Replace Topsoil.

CONTRACTOR FURNISHED TOPSOIL

No topsoil is existing to be salvaged at the location listed below. The Contractor will be required to furnish and place 4 inches of topsoil.

<u>SD50 MRM LOCATION</u>	<u>(CU YD)</u>
050-253 MRM 233 +0.051	15

Cost for furnishing and placing topsoil shall be incidental to the contract unit price per cubic yard for Contractor Furnished Topsoil.

PERMANENT SEEDING AND EROSION CONTROL BLANKET

The areas to be seeded comprise of all newly graded areas and disturbed areas within the project limits. All disturbed areas shall be covered by Type 2 Erosion Control Blanket. The limits of erosion control work will be determined by the Engineer on construction.

Type G Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Arriba, Flintlock, Rodan, Rosana	7
Switchgrass	Dacotah, Forestburg, Nebraska 28, Pathfinder, Summer, Sunburst, Trailblazer	3
Indiangrass	Holt, Tomahawk	3
Big Bluestem	Bison, Bonilla, Champ, Pawnee, Sunnyview	3
Oats or Spring Wheat: April through May; Winter Wheat: August through November		10
Total:		26

There shall be no Seasonal Limitations per 730.3 B for the seeding on this project due to the sensitivity of the disturbed areas. Seed and Erosion Control Blanket shall be applied to each site not more than 14 calendar days after the completion of the work at the site.

The area to be seeded is estimated at 0.1 acre. The area to be covered with Type 2 Erosion Control Blanket is estimated at 0.1 acre (484 square yards).

Cost for erosion control work for furnishing, placing, and maintaining erosion control including equipment, labor, seeding, and placing erosion control blanket shall be incidental to the contract lump sum price for Erosion Control.

MYCORRHIZAL INOCULUM

Mycorrhizal inoculum shall consist of mycorrhizal fungi spores and mycorrhizal fungi-infected root fragments in a solid carrier. The carrier may include organic materials, calcinated clay, or other materials consistent with application and good plant growth. The supplier shall provide certification of the fungal species claimed and the live propagule count. The inoculum shall include the following fungal species:

- Glomus intraradices* 25%
- Glomus aggregatu* 25%
- Glomus mosseae* 25%
- Glomus etunicatum* 25%

All seed shall be inoculated by the seed supplier with a minimum of 100,000 live propagules of mycorrhizal fungi per acre. All costs of inoculating the seed shall be incidental to the contract lump sum price for Erosion Control.

The mycorrhizal inoculum shall be as shown below or an approved equal:

<u>Product</u>	<u>Manufacturer</u>
MycoApply	Mycorrhizal Applications, Inc. Grants Pass, OR Phone: 1-866-476-7800 www.mycorrhizae.com

EROSION CONTROL BLANKET

The erosion control blanket provided shall be from the approved product list. The approved product list for erosion control blanket may be viewed at the following internet site:

<http://sddot.com/business/certification/products/Default.aspx>

The Contractor shall install erosion control blanket according to the manufacturer's installation instructions.

DITCH CLEANOUT

Ditch cleanout is required at all locations as directed by the Engineer. There shall be no specific contract item for ditch cleanout. Ditch cleanout shall be incidental to the various contract items.

Ditch cleanout shall extend from the end of the culvert to within 1 foot of the Right-of-Way (ROW) Line. The bottom of the ditch cleanout shall be a minimum of 10 feet wide and the side slopes on the channel shall be 20:1 or flatter. For those locations where there is no channel from the inlet/outlet of the culvert to the ROW Line ditch cleanout shall be completed such that there is a flat area of 100 Square Feet created at the inlet/outlet and the sides slopes around the flat area shall be 20:1 or flatter.

Material from the ditch cleanout may be placed on the inslopes at the ditch cleanout locations, used as Contractor Furnished Borrow Excavation, or spread on the backslopes at some locations as directed by the Engineer.

Cleaning of existing ditches and disposal of soil shall be incidental to the contract unit prices for the various items.

CONTRACTOR FURNISHED BORROW EXCAVATION

The Contractor shall provide a suitable site for Contractor Furnished Borrow Excavation material. The Contractor Furnished Borrow Excavation may be obtained from ditch cleanout at the pipe end in some locations.

The borrow material shall be approved by the Engineer.

Compaction of the fill material shall be to the satisfaction of the Engineer.

It is not anticipated that water for compaction will be required; however, if in the opinion of the Engineer the fill material is extremely dry, water may be ordered and placed to the satisfaction of the Engineer. Cost for water shall be incidental to the contract unit price per cubic yard for Contractor Furnished Borrow Excavation.

The basis for payment for Contractor Furnished Borrow Excavation will be plans quantity. Additional quantities will be included for payment only in the event that work sites other than those shown on the plans are added to the contract.

Restoration of the Contractor Furnished Borrow Excavation site shall be the responsibility of the Contractor.

The Contractor is responsible for obtaining all required permits and clearances for the borrow site.

SALVAGE RIPRAP

The Contractor shall salvage existing riprap in the locations listed below. All Salvaged Riprap will be placed back on the project.

190

MRM LOCATION	(TONS)
262.00 + 0.378	4.9
262.00 + 0.416	4.9
262.00 + 0.452	4.9
262.00 + 0.466	4.9

Cost for salvaging riprap shall be included in the contract unit price per ton for Salvage Riprap. Cost for placing salvaged riprap will be included in the contract unit price per ton for Place Riprap. Items for salvaging and place riprap will be paid for at plans quantities.

CURED IN PLACE PIPE (CIPP)

Installer performing the CIPP work shall comply with qualifications herein. For an installer of the cured-in place pipe to be considered as acceptable the Installer must satisfy all insurance, financial, and bonding requirements of the Owner, and must have had at least three (3) years of active consecutive experience in the commercial installation of the cured-in-place pipe product. In addition, the installer must have successfully installed at least 400,000 feet of the cured-in-place pipe product bid in wastewater collection systems. Documentation of compliance with this paragraph shall be submitted to the Engineer.

The sewn tube shall meet the requirements of ASTM F1216 or ASTM F2019, or a seamless version of F2019. The fabric tube shall be free from tears, holes, cuts, foreign materials and other surface defects. The tube should be fabricated to a size that, when installed will tightly fit the internal circumference and length of the original sewer pipe. Allowance should be made for circumferential stretching during the installation and shrinkage of resin. If any part of the material becomes damaged prior to installation it shall be repaired or replaced in accordance with the manufacturer's recommendations at no additional cost to the owner.

The Contractor shall verify the lengths in the field before the liner tube is cut and impregnated.

The resin used shall be compatible with the CIPP system used, and designed for use in gravity sewers. The resin shall be filled polyester or unsaturated vinyl ester. Catalyst system compatible with the CIPP system shall be used that provides the cured physical strengths and properties specified herein.

The CIPP shall be designed as per ASTM F1216, Appendix X.1. The CIPP shall be designed to assume no bonding to the original pipe wall. The original pipe shall be considered as fully deteriorated pipe for design concerns.

The layers of the cured CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves freely between the layers. If the layers separate during field sample testing, new samples will be required to be obtained from the installed pipe. Any reoccurrence may cause rejection of the work.

The cured pipe material shall conform to the structural properties, as listed below:

Flexural stress: 4,500psi per ASTM D790
 Modulus of Elasticity: 250,000 psi per ASTM D790
 The contractor shall furnish and install hydrophilic end seals to provide a full diameter compression seal at all upstream and downstream ends of the CIPP liners. All overlapped liners or ends shall form a watertight seal. The contractor shall secure the connections between the CIPP and host pipe in accordance to with the manufacturer's installation instructions.

Prior to the installation of the CIPP the contractor shall clean and perform an inspection of the condition of pipe. The contractor shall clear existing pipe of obstruction such as solids or collapsed pipe that will prevent CIPP installations.

CIPP installation shall be in accordance with ASTM F1216, Section 7 or ASTM F1743, Section 6, with the following additional requirements.

CURED IN PLACE PIPE (CIPP) (CONTINUED)

The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall.

Tube insertion shall be performed in accordance with the manufacturer's recommendations and in such a way as to fully extend the tube to its termination point and hold the tube tight against the pipe wall.

The curing process shall follow a step cure or similar approach recommended by the manufacturer and shall be held at the top step for an adequate length of time to ensure that the design physical properties are attained. Circulation water shall cool down to at least 100 degrees F for 1 before hour releasing the hydrostatic head.

The installation and curing method shall be per manufacturer's specification.

Cost for furnishing, placing, cleaning and inspecting the pipe including equipment and labor shall be incidental to the contract unit price per foot for Cured in Place Pipe.

CONCRETE PIPE CONNECTION

A 24" RCP is located at MRM 233.00 +0.051 on SD50. Included in the quantities are 54' of 18" CMP that is to be inserted in the outlet end of the pipe. A length of 3' of CMP shall be inserted into the existing RCP. A connection to the existing pipe shall be made by placing a 2' wide by 6" thick M6 concrete collar.

Cost for constructing the concrete collar including material and labor shall be incidental to the contract unit price per foot for the corresponding pipe item.

TRAFFIC CONTROL

All Traffic Control and Flagging will be provided by the SDDOT Maintenance Forces. The Engineer must be given a 48 hour notice before work is to begin to coordinate the traffic control with the maintenance forces.

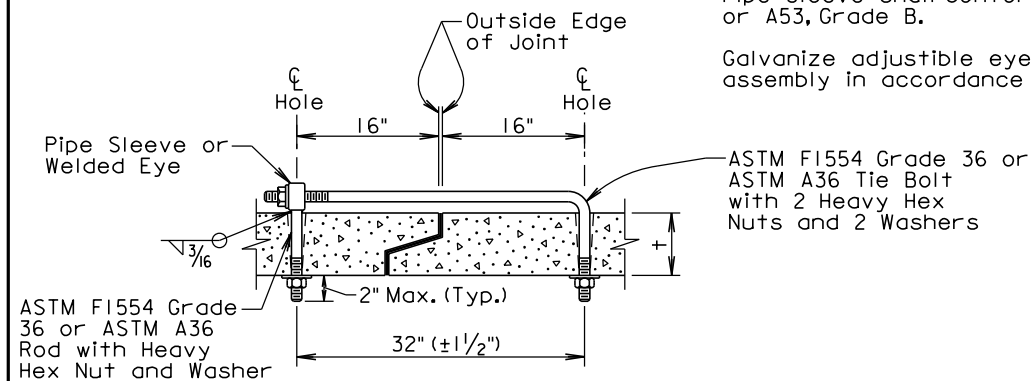
Wall "t" (in.)	Rod Dia. (in.)	Pipe Sleeve Dia. (nominal)
≤ 3/4	5/8	3/4
3/2-6/2	3/4	1
≥ 7	1	1 1/4

GENERAL NOTES:

Tie bolts shall conform to ASTM F1554 Grade 36 or ASTM A36. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.

Pipe Sleeve shall conform to ASTM A500 or A53, Grade B.

Galvanize adjustable eye bolt tie assembly in accordance with ASTM A153.



ADJUSTABLE EYE BOLT TIE

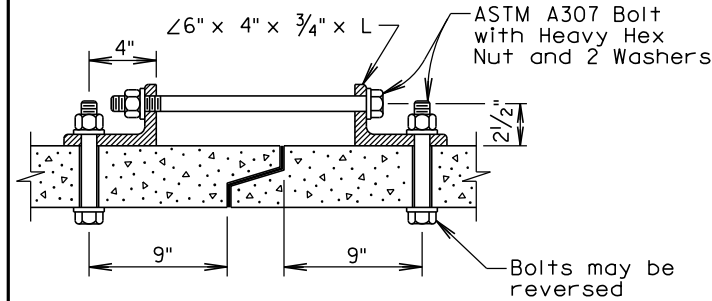
Pipe Dia. (in.)	"L" (in.)	Bolt Dia. (in.)
≤ 48	4	3/4
> 48	6	1

GENERAL NOTES:

Angles shall conform to ASTM A36.

Bolts shall conform to ASTM A307. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.

Galvanize angles, bolts, nuts, and washers in accordance with ASTM A153.



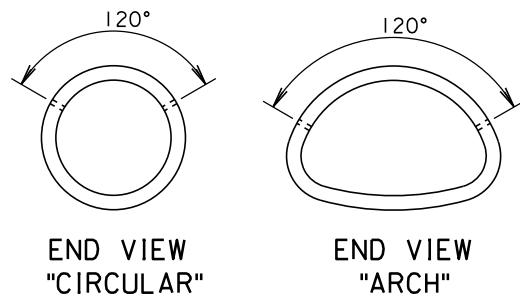
ANGLE AND BOLT TIE

GENERAL NOTES:

In lieu of the tie bolts detailed above other types of tie bolt connections may be installed as approved by the Office of Bridge Design.

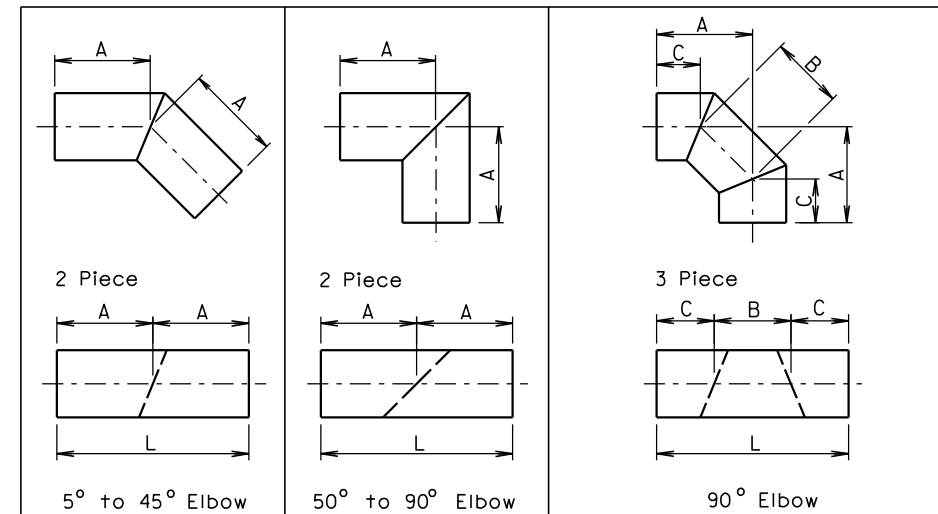
All pipe sections of R.C.P. and R.C.P. Arch shall be tied with tie bolts except for pipe located between drop inlets, manholes, and junction boxes. All pipe sections of pipes that only enter or exit drop inlets, manhole, and junction boxes shall be tied with tie bolts.

There will be no separate measurement or payment for the tie bolts. The cost for furnishing and installing the tie bolts shall be incidental to the contract unit price per foot for the corresponding bid item for R.C.P. or R.C.P. Arch.



February 28, 2013

Published Date: 2nd Qtr. 2016	S D D O T	TIE BOLTS FOR R.C.P. AND R.C.P. ARCH	PLATE NUMBER 450.18
			Sheet 1 of 1



Diameter	A		L		Diameter	A		L		Diameter	A	B	C	L
	Inches	Feet	Feet	Feet		Inches	Feet	Feet	Inches		Feet	Inches	Inches	Inches
12	1	2	12	2	4	12	25 1/2	11	18 1/2	4				
15	1	2	15	2	4	15	26 1/2	12	18	4				
18	1	2	18	2	4	18	27	14	17	4				
21	2	4	21	2	4	21	27	15	16 1/2	4				
24	2	4	24	2	4	24	27 1/2	16	16	4				
27	2	4	27	2	4	27	27 1/2	17	15 1/2	4				
30	2	4	30	3	6	30	40	19	26 1/2	6				
33	2	4	33	3	6	33	40	20	26	6				
36	2	4	36	3	6	36	40 1/2	21	25 1/2	6				
42	2	4	42	3	6	42	41	23	24 1/2	6				
48	2	4	48	4	8	48	53 1/2	26	35	8				
54	3	6	54	4	8	54	54	28	34	8				
60	3	6	60	4	8	60	54 1/2	31	32 1/2	8				
66	3	6	66	4	8	66	54	33	31 1/2	8				
72	3	6	72	5	10	72	67 1/2	36	42	10				
78	3	6	78	5	10	78	68	39	40 1/2	10				
84	3	6	84	5	10	84	68 1/2	41	39 1/2	10				
90	3	6	90	6	12	90	70	46	37	10				
96	3	6	96	6	12	96	82	46	49	12				

FABRICATED ELBOW LENGTHS FOR ALL CORRUGATIONS

GENERAL NOTES:

All dimensions shown are nominal.

L = Linear Feet of C.M.P. required to fabricate fitting.

June 26, 2001

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Alternate Type Connector Sections may be used with approval of the Engineer.

Dia. D (in.)	Ga.	DIMENSIONS (in.)					Approx. Slope	Body
		A	B	H	L	W		
12	16	6	6	6	21	24	2 1/2:1	1 Pc.
15	16	7	8	6	26	30	2 1/2:1	1 Pc.
18	16	8	10	6	31	36	2 1/2:1	1 Pc.
21	16	9	12	6	36	42	2 1/2:1	1 Pc.
24	16	10	13	6	41	48	2 1/2:1	1 Pc.
30	14	12	16	8	46	60	2 1/2:1	1 Pc.
36	14	14	19	9	51	72	2 1/2:1	2 Pc.
42	12	16	22	11	60	84	2 1/2:1	2 Pc.
48	12	18	27	12	69	90	2 1/4:1	2 Pc.
54	12	18	30	12	78	102	2:1	3 Pc.
60	12	18	33	12	84	114	1 3/4:1	3 Pc.
66	12	18	36	12	87	120	1 1/2:1	3 Pc.
72	12	18	39	12	87	126	1 1/3:1	3 Pc.
78	12	18	42	12	87	132	1 1/4:1	3 Pc.
84	12	18	45	12	87	138	1 1/6:1	3 Pc.

STANDARD CONNECTIONS

Threaded 5/8" Dia. Rod over Top of culvert Pipe Bolted on Side Lug For 30" through 84"

Dimple Band Collar bolted to end section with 3/8" bolts Alternate for all sizes

Strap Bolt Connector For 12" through 24" only

TUBING ATTACHMENT DETAILS SECTION A-A

1" O.D. 14 Ga. Galv. Tubing

Sheet

3/8" x 1/2" Gal. Buttonhead Rivets spaced 6" C. to C. Overall length of rivets=0.78"

NOTE: Tubing is slipped over the sheet and rivets or lugs prior to forming operations of the apron.

SECTION A-A (alternate)

1/2" I.D. (Metal Edge)

Half Punches (Lugs)

Flow Line

TYPICAL CROSS-SECTION

Finish Earth Slope as Required

Approx. 2 1/2:1 Slope

Standard Coupling Band

GENERAL NOTES:

All 3 pc. bodies shall have 12 Ga. sides and 10 Ga. center panels. Width of center panels shall be greater than 20% of the pipe periphery. Multiple panel bodies to have lap seams tightly joined by 3/8" Dia. galvanized rivets or bolts.

For 60" through 84" sizes, reinforced edges shall be supplemented with galvanized stiffener angles. The angles will be 2" x 2" x 1/4" for 60" through 72" diameters and 2 1/2" x 2 1/2" x 1/4" for 78" and 84" diameters. The angles shall be attached by 3/8" diameter galvanized nuts and bolts.

Rivets and Bolts shall be 3/8" Dia. Min. for 10 Ga. and 12 Ga. sheet, and 5/16" Dia. Min. for 14 Ga. and 16 Ga. sheets. Tighten nuts with torque wrench to 25 lbs. torque.

March 31, 2000

2 2/3 x 1/2 CMP of same nominal diameter as RCP

Tie Bolt Holes

9" (Min.) 12" (Min.) 25 1/2"

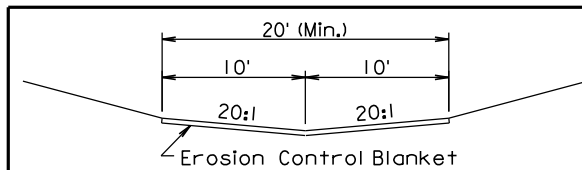
INLET
(CMP to RCP Transition)

12" (Min.) 9" (Min.) 25 1/2"

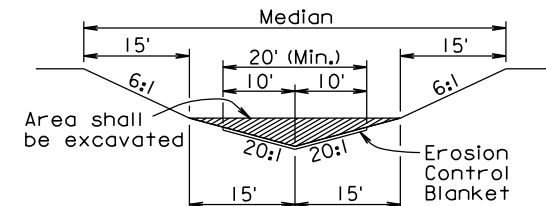
OUTLET
(RCP to CMP Transition)

GENERAL NOTE:
Arch pipe transitions shall be fabricated similar to the round transition shown above.

March 31, 2000

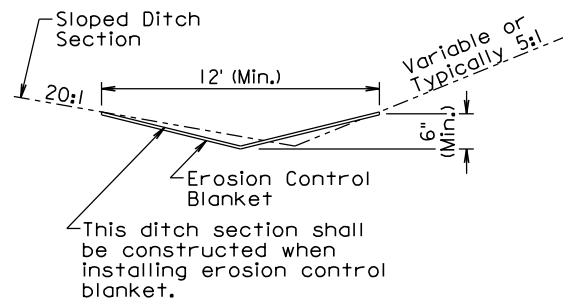


STANDARD DITCH SECTION

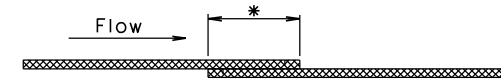


The median shall be shaped to the limits shown in this detail where the erosion control blanket will be placed.

MEDIAN SECTION



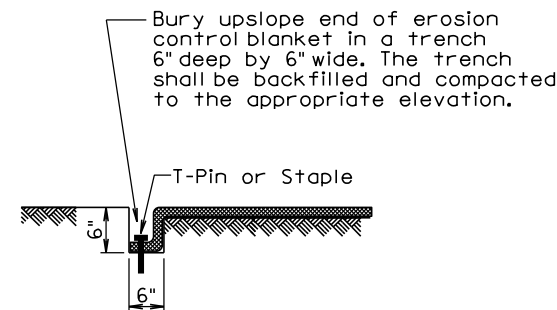
SLOPED DITCH SECTION



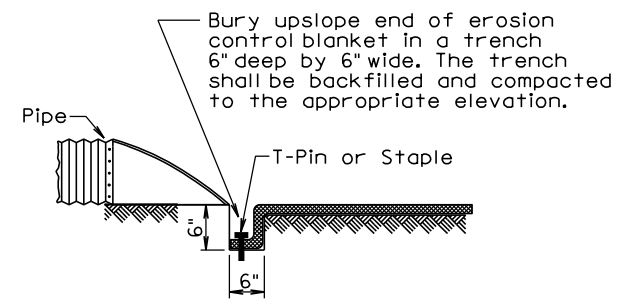
* Use a 4" (Min.) overlap wherever two widths of erosion control blanket are applied side by side.

* Use a 6" (Min.) overlap wherever one roll of erosion control blanket ends and another begins.

OVERLAP DETAIL



TRENCH DETAIL



PIPE END DETAIL

GENERAL NOTES:

Prior to placement of the erosion control blanket, the areas shall be properly prepared, shaped, seeded, and fertilized.

Erosion control blanket shall be unrolled in the direction of the flow of water when placed in ditches and on slopes. The upslope end of the erosion control blanket shall be buried in a trench 6" wide by 6" deep. There shall be at least a 6" overlap wherever one roll of erosion control blanket ends and another begins, with the upslope erosion control blanket placed on top of the downslope erosion control blanket.

The erosion control blanket shall be pinned to the ground according to the manufacturer's installation recommendations.

After the placement of the erosion control blanket, the Contractor shall fine grade along all edges of the blanket to maintain a uniform slope adjacent to the blanket and level any low spots which might prevent uniform and unrestricted flow of side drainage directly onto the erosion control blanket.

All ditch sections shall be shaped when installing the erosion control blanket. All costs for shaping the ditches shall be incidental to the contract unit price per foot for "Shaping for Erosion Control Blanket".

December 23, 2004

Published Date: 2nd Qtr. 2016	S D D O T	EROSION CONTROL BLANKET	PLATE NUMBER 734.01
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