

STATE OF SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION PLANS FOR PROPOSED

PROJECT 089-491 SD HIGHWAY 89 CUSTER COUNTY

PIPE INSTALLATION PCN i62h



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DESIGN DESIGNATION

878
1067
175
51 %
1.2 %
2.6 %
45 mph

STORM WATER PERMIT

None Required

STATE OF	PROJECT	SHEET	TOTAL SHEETS
SOUTH DAKOTA	089-491	1	22
Plotting Date	04/30/2020		

INDEX OF SHEETS

1	General Layout with Index
2-7	Estimate with General Notes & Tables
8	Typical Sections
9	Horizontal Alignment Data
10	Control Data
11	Legend
12	Plan Sheets
13	Pipe Installation Detail
14	Pipe Section
15-23	Standard Plates



...\SD89 Pipe MRM 59.84\Title.dgi

ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E1010	Remove Asphalt Concrete Pavement	144.0	SqYd
120E0010	Unclassified Excavation	189	CuYd
230E0100	Remove and Replace Topsoil	Lump Sum	LS
260E1010	Base Course	139.0	Ton
320E1200	Asphalt Concrete Composite	49.0	Ton
421E0100	Pipe Culvert Undercut	11	CuYd
450E3012	24" RCP Arch Class 2, Furnish	38	Ft
450E3020	24" RCP Arch, Install	38	Ft
450E4600	24" RCP Arch Sloped End, Furnish	1	Each
450E4601	24" RCP Arch Sloped End, Install	1	Each
633E1220	High Build Waterborne Pavement Marking Paint, 4" White	100	Ft
633E1222	High Build Waterborne Pavement Marking Paint, 4" Yellow	100	Ft
634E0010	Flagging	40.0	Hour
634E0110	Traffic Control Signs	208.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0310	Temporary Flexible Vertical Markers (Tabs)	2,200	Ft
634E0600	4" Temporary Pavement Marking Tape Type I	144	Ft
670E4120	Type L Median Drain	1	Each
670E4122	Type L Frame and Grate Assembly	1	Each
734E0010	Erosion Control	Lump Sum	LS
734E0154	12" Diameter Erosion Control Wattle	70	Ft

SPECIFICATIONS

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

ENVIRONMENTAL COMMITMENTS

The SDDOT is committed to protecting the environment and uses Section A Environmental Commitments as a communication tool for the Engineer and Contractor to ensure that attention is given to avoid, minimize, and/or mitigate an environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency with permitting authority can delay a project if identified 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.

Additional guidance on SDDOT's Environmental Commitments can be accessed through the Environmental Procedures Manual found at: https://dot.sd.gov/media/documents/EnvironmentalProceduresManual.pdf

For questions regarding change orders in the field that may have an effect on an Environmental Commitment, the Project Engineer will contact the Environmental Office at 605-773-3098 or 605-773-4336 to determine whether an environmental analysis and/or resource agency coordination is necessary.

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 pits, or staging areas associated with the project, cease construction activities in the affected area until the Whooping Crane departs and immediately contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

COMMITMENT C: WATER SOURCE

The Contractor will not withdraw water with equipment previously used outside the State of South Dakota or previously used in aquatic invasive species waters within South Dakota without prior approval from the SDDOT Environmental Office. Thoroughly wash all construction equipment to prevent and control the introduction and spread of invasive species into the project vicinity.

Action Taken/Required:

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

Additional information and mapping of Aquatic Invasive Species in South Dakota can be accessed at: http://sdleastwanted.com/maps/default.aspx.

COMMITMENT E: STORM WATER

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.

STATE OF	PROJECT	SHEET	TOTAL
SOUTH DAKOTA	089-491	2	22

Construction activities constitute less than 1 acre of disturbance.

COMMITMENT H: WASTE DISPOSAL SITE

The Contractor will 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) will 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) will 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 Environmental Office and the Project Engineer.

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

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials will be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris will consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW will be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor will control the access to waste disposal sites not within the Public ROW with 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) will be incidental to the various contract items.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

State Historical Preservation Office (SHPO or THPO) concurrence has not been obtained for this project.

Action Taken/Required:

All earth disturbing activities require a cultural resource review prior to scheduling the pre-construction meeting. 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 will arrange and pay for a record search and when necessary, a cultural resource survey. 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 if the site was previously surveyed; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor will provide ARC with the following: a topographical map or aerial view of 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 will submit the cultural resources survey report to SDDOT Environmental Office, 700 East Broadway Avenue, Pierre, SD 57501-2586. 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.

In the event of an inadvertent discovery of human remains, funerary objects, or if evidence of cultural resources is identified during project construction activities, then such activities will immediately cease and the Project Engineer will be immediately notified. The Project Engineer will contact the SDDOT Environmental Office to determine an appropriate course of action.

The Contractor is responsible 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 will not utilize a site known or suspected of having contaminated soil or water. The Contractor will provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

COMMITMENT S: FIRE PREVENTION IN THE BLACK HILLS AREA

This project is located within the Black Hills Forest Fire Protection Boundary.

Action Taken/Required:

The Contractor shall adhere to the "Special Provision for Fire Plan".

STATE OF	PROJECT	SHEET	TOTAL
SOUTH DAKOTA	089-491	3	22

GRADING OPERATIONS

Generally, all shallow inlet and outlet ditches as noted on the plan sheets will be cut with a 10-foot wide bottom with 5:1 backslopes. However, the Engineer may direct the Contractor to adjust the ditch width for proper alignment with the drainage structure.

WATER FOR COMPACTION

The cost of water for compaction of the granular material will be incidental to the various other contract items. Six percent plus or minus moisture will be required at the time of compaction unless otherwise directed by the Engineer.

Water for compaction of earth embankments will be applied at the rate of 10 gallons per cubic yard of Unclassified Excavation. The cost of the water will be incidental to the contract unit price per cubic yard for UNCLASSIFIED EXCAVATION.

UTILITIES

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

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 will contact the Project Engineer to determine modifications that will be necessary to avoid utility impacts.

TABLE OF PIPE

	Reinforce	d Concrete	
	Arch	Arch	Pipe
	24"	Sloped	Culvert
	CI 2	End	Undercut
Station	(Ft)	(Each)	(CuYd)
70+26	38	1	11
Totals:	38	1	11

PIPE CULVERT UNDERCUT

The table below contains the rate for one-foot depth of pipe culvert undercut per foot of pipe length and should be used as an aid in determining the actual amount of undercut to be performed during construction. The table is derived from the drawing below and conforms to the Specifications. When calculating pipe culvert undercut, the length of pipe ends should be included in the overall pipe length.



PIPE COVER

The earthen subgrade cover for the pipe installation is less than one foot. Care shall be taken not to damage the structural properties of the pipes after installation and prior to the placement of final surfacing. Any additional costs for preventing damage to these pipes will be incidental to the contract unit price per foot for the corresponding pipe installation contract item.

MAINLINE CROSS PIPE INSTALLATION

Pipe culvert at Station 70+26 will be installed in accordance with the following notes and as shown on the Pipe Installation Detail.

After the existing pipe has been removed, the new pipe culvert will be undercut to a minimum depth of 1 foot. The depth of undercut is an estimate and the actual depth necessary will be determined during construction. The Engineer will determine how much undercut will be done in accordance with Section 421 of the Specifications, but will not reduce the undercut to less than 1 foot in depth.

Material for backfilling the undercut area will conform to the gradation requirements of Base Course in Section 882. If groundwater is encountered during construction, the select fill material for backfilling the undercut area and Class B Bedding will conform to the gradation requirements of Box Culvert Undercut Backfill. All other requirements of Section 421 will apply.

Pipe culverts will be bedded in accordance with Section 450.3 F.2, Class B Bedding with the following exceptions. The excavated area will extend 2 feet from the outermost diameter on both sides of the pipe with the back of the excavated area being sloped 2:1 upward to the top of the roadway surface. Select fill material for Class B Bedding will conform to the gradation requirements of Base Course in Section 882.

After the minimum testing requirements of M.S.T.R Section 4.1.F.3.a.1 (SDDOT Materials Manual) have been met, the minimum density testing requirements will be one test per zone. Each zone will be 2 feet in depth. Moisture testing will remain as per M.S.T.R.

The remainder of the pipe culvert excavation will be backfilled with soils taken from the pipe removal excavation or other suitable material as approved by the Engineer. The backfill will be benched into 2:1 excavation slope. Compaction of the backfill material will be governed by the Specified Density Method.

After the new pipe has been backfilled to the top of the subgrade, a 12" depth of Base Course and 6" (2-3" lifts) depth of asphalt concrete composite will be placed as a patch matching the existing asphalt concrete.

All costs to remove and dispose of asphalt concrete pavement, including full depth saw cutting of the asphalt concrete pavement, will be incidental to the contract unit price per square yard to "Remove Asphalt Concrete Pavement". Pipe Culvert Undercut will be paid for at the contract unit price per cubic yard for "Pipe Culvert Undercut". Material for pipe undercut backfill will be paid for at the contract unit price per ton for "Base Course". The bedding material and the excavation necessary for pipe installation will be incidental to the contract unit price per foot for the corresponding pipe installation contract items. The cost for asphalt concrete composite installed over the pipe replacement will be paid for at the contract unit price per ton for "Asphalt Concrete Composite".

STATE OF	PROJECT	SHEET	TOTAL SHEETS
SOUTH DAKOTA	089-491	4	22

TABLE OF TYPE L MEDIAN DRAINS(Quantities Shown for Information Only)

				Type L Frame and
		Class M6	Reinforcing	Grate
		Concrete	Steel	Assembly
Station	L/R	(CuYd)	(Lb)	(Each)
70+26	L	.62	106	1
	Totals:	.62	106	1

TABLE OF SURFACING & UNCLASSIFIED EXCAVATION

		Remove				
		Asphalt				Asphalt
		Concrete	Unclassified	Pipe	Base	Concrete
Station	Length	Pavement	Excavation	Undercut	Course	Composite
	Ft	SqYd	CY	CY	Ton	Ton
70+27	50	144	189	11	139	49
	Total:	144	189	11	139	49

SURFACING THICKNESS DIMENSIONS

Plans quantity will be applied even though the thickness may vary from that shown on the plans.

At those locations where material must be placed to achieve a required elevation, plans quantity may be varied to achieve the required elevation.

UNCLASSIFIED EXCAVATION

Payment will be based on plans quantity. Further measurements will not be made unless there is a change made in the limits of work.

STATE OF	PROJECT	SHEET	TOTAL
SOUTH DAKOTA	089-491	5	22

REMOVE AND REPLACE TOPSOIL

4" Topsoil will be salvaged and stockpiled prior to constructing the culvert installation. Limits of this work, depth of salvage, and stockpile location will be directed by the Engineer. Following completion of construction, topsoil will be spread evenly over the disturbed areas.

The estimated amount of topsoil to be removed and replaced is 14 CuYd.

All costs associated with removing and replacing the topsoil along areas to be resurfaced will be incidental to the contract lump sum price for "Remove and Replace Topsoil".

Payment will be based on plans quantity. Further measurements will not be made unless there is a change made in the limits of work.

EROSION CONTROL

The estimated area requiring erosion control is 1,148 square feet. All costs for the erosion control work for furnishing, placing, and maintaining erosion control including equipment, labor, seeding, mycorrhizal inoculum, fertilizing, and fiber mulching will be incidental to the contract lump sum price for "Erosion Control".

The limits of erosion control work will be determined by the Engineer during construction.

Mycorrhizal Inoculum

Mycorrhizal inoculum will 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 will provide certification of the fungal species claimed and the live propagule count. The inoculum will include the following fungal species:

- 25% Glomus intraradices
- 25% Glomus aggregatum or deserticola
- 25% Glomus mosseae

AM

25% Glomus etunicatum

All seed will be inoculated by the seed supplier with a minimum of 100,000 live propagules of mycorrhizal fungi per acre.

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

Product	<u>Manufacturer</u>
MycoApply	Mycorrhizal Applications, Inc. Grants Pass, OR Phone: 1-866-476-7800 www.mycorrhizae.com
120 Multi Species Blend	Reforestation Technologies Int. Gilroy, CA Phone: 1-800-784-4769 www.reforest.com

Fertilizing

The Contractor will apply an all-natural slow release fertilizer prior to seeding or placing sod. The all-natural fertilizer will have a minimum guaranteed analysis of 4-4-4 and be USDA Certified BioBased. It should provide a minimum of 4% (N) nitrogen with a minimum water insoluble nitrogen (WIN) fraction of 2.07%, a minimum of 4% (P2O5) available phosphate, a minimum of 4% (K2O) soluble potash, and a maximum carbon to nitrogen ratio (C:N ratio) of 5:1. The all-natural fertilizer will be free of weed-seed and pathogens accomplished through thermophilic composting, and not mechanical or chemical sterilization, to assure presence of beneficial soil microbiology. The fertilizer will have a near neutral pH, a low salt index, a low biological oxygen demand, contain organic humic and fulvic acids, and have high aerobic organism counts. The fertilizer will also be stable, free of bad odors, and be unattractive as a food source for animals. It should also be in a granular form that is easily spread.

The fertilizer will be applied at a rate of 1,500 pounds per acre in accordance with the manufacturer's recommended method of application.

The all-natural slow release fertilizer will be as shown below or an approved equal:

<u>Manufacturer</u>
Sustane Corporate Headquarters Cannon Falls, Minnesota Phone: 1-800-352-9245 www.sustane.com
[⊃] erfect Blend, LLC 3ellevue, WA Phone: 1-866-456-8890 www.perfect-blend.com

Permanent Seeding

Product Sustane

Perfect Blend

The areas to be seeded consist of all newly graded areas within the project limits except for the top of roadways.

Type F Permanent Seed Mixture will consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Arriba, Flintlock, Rodan, Rosana, Walsh	7
Green Needlegrass	Lodorm, AC Mallard Ecovar	4
Sideoats Grama	Butte, Pierre	3
Blue Grama	Bad River	2
Oats or Spring Wheat: April through May;		10
Winter Wheat: August through November		
	Total:	26

Fiber Mulching

seeding.

The Contractor will allow the fiber mulch to cure a minimum of 18 hours prior to watering or any storm event to ensure proper cohesion between the soil and fiber particles.

The fiber mulch provided will be from the approved product list. The approved product list for fiber mulch may be viewed at the following internet site:

http://apps.sd.gov/HC60ApprovedProducts/main.aspx

EROSION CONTROL WATTLE

Erosion control wattles for restraining the flow of runoff and sediment will be installed at locations noted in the table and at locations determined by the Engineer during construction. Refer to Standard Plate 734.06 for details.

The Contractor will provide certification that the erosion control wattles do not contain noxious weed seeds.

Erosion control wattles will remain on the project to decompose.

internet site:

http://apps.sd.gov/HC60ApprovedProducts/main.aspx

TABLE OF EROSION CONTROL WATTLE

Station 70+26 70+26

STATE OF	PROJECT	SHEET	TOTAL
SOUTH DAKOTA	089-491	6	22

Fiber mulch will be applied in a separate operation following permanent

The erosion control wattle provided will be from the approved product list. The approved product list for erosion control wattle may be viewed at the following

	Diameter		Quantity
L/R	(Inch)	Location	(Ft)
R	12	Pipe outlet	50
L	12	Median Drain	20
		Total:	70

SEQUENCE OF OPERATIONS

The pipe will be installed half width at a time.

The Contractor will submit a sequence of operations for approval two weeks prior to the preconstruction meeting. Approval of an alternate sequence of operations will only be allowed when the proposed changes meet with the Department's intent for traffic control and sequencing of the work. An alternate sequence will be submitted for review a minimum of one week prior to potential implementation.

GENERAL TRAFFIC CONTROL

Existing guide, route, informational logo, regulatory, and warning signs will be temporarily reset and maintained during construction. Removing, relocating, covering, salvaging, and resetting of existing traffic control devices, including delineation, will be the responsibility of the Contractor. Cost for this work will be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost will be replaced by the Contractor at no cost to the State.

All temporary traffic control sign locations will be set in the field by the Contractor and verified by the Engineer prior to installation.

All construction operations will be conducted in the general direction of traffic movement.

If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD, whichever is more stringent will be used, as determined by the Engineer.

Unless otherwise stated in these plans, work will not be allowed during hours of darkness.

Traffic Control Signs, as shown in the Estimate of Quantities, are estimates. Contractor's operation may require adjustments in quantities, either more or less. Payment will be for those signs actually ordered by the Engineer and used.

Fixed location signing placed more than 4 calendar days prior to the start of construction will be covered or laid down until the time of construction. The covers must be approved by the Engineer prior to installation. The cost of materials, labor, and equipment necessary to complete this work will be incidental to other contract items. No separate payment will be made.

All fixed location signs, sign posts, and breakaway bases will be removed within 7 calendar days following pavement marking.

All haul trucks will be equipped with an additional flashing amber light that is visible from the backside of the haul truck. The costs for the flashing amber lights will be incidental to the various related contract items.

At no time will a vertical drop-off of greater than 3 inches be left overnight adjacent to the traveled way. The Contractor will utilize embankment material to ensure a 3-inch vertical drop-off is not exceeded. The slope of the embankment material will not be steeper than a 4:1 within 30 feet of the traveled way.

The Contractor will notify businesses/homeowners a minimum of two weeks prior to construction to inform them of upcoming construction and again a minimum of 48 hours prior to any blocked access to make appropriate arrangements.

TEMPORARY PAVEMENT MARKING

Prior to nightfall, tabs will be required to mark centerline on segments of roadway where existing centerline markings have been removed and new markings have not been installed.

Temporary pavement marking for stop bars will consist of 4" temporary pavement marking tape type I. Placement of each 24" white stop bar will be accomplished by placing six pieces of 4" x 12' tape adjacent to one another. Each workspace requires two stop bars which is an equivalent of approximately 144' of 4" tape (1 workspaces at 144' = 144'). Temporary pavement marking on centerline will consist of temporary flexible vertical markers (tabs) or temporary raised pavement markers and will be used as depicted on standard plate 634.25 when the stop condition must remain in place during nighttime hours, 9:00 pm to 6:00 am (Estimate 1 workspaces remaining during nighttime hours x 2,200' per workspace = 2,200').

PERMANENT PAVEMENT MARKING

The Contractor will be required to repaint all existing pavement markings including centerline, edge line.

HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

All materials will be applied as per manufacturer's recommendations.

This material will consist of a durable high build, low VOC, fast drying, waterborne traffic paint with a 100% acrylic polymer (Arkema DT-400, Dow HD-21A, or equivalent). The Contractor will provide certification that the material is one of the following products or an equivalent as approved by the Operations Traffic Engineer:

> Diamond Vogel's Waterborne High Build Polymer Marking Paint Ennis-Flint's High Build Polymer Marking Paint

No further testing of this material will be required. Reflective media will consist of glass beads.

High Build Waterborne Pavement Marking Paint applied after October 15 must be formulated as cold-weather waterborne paint. Cold weather waterborne paint will meet the requirements of Section 980.1 B.

RATES OF MATERIALS FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

Solid 4" line = 22.5 Gals/Mile Glass Beads = 8 Lbs/Gal.

All cost for materials, labor and equipment necessary to furnish and install the pavement markings will be incidental to the contract unit price for the respective High Build Waterborne Pavement Marking Paint items.

TABLE OF TRAFFIC CONTROL DEVICES ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

		CONVENTIONAL ROAD			
SIGN CODE	SIGN DESCRIPTION	NUM BER	SIGN SIZE	SQFT PER SIGN	SQFT
R1-1	STOP	2	30"	5.2	10.4
W1-4	REVERSE CURVE (L or R)	1	48" x 48"	16.0	16.0
W3-1	STOP AHEAD (symbol)	2	48" x 48"	16.0	32.0
W3-4	BE PREPARED TO STOP	2	48" x 48"	16.0	32.0
W13-1P	ADVISORY SPEED (plaque)	2	30" x 30"	6.3	12.6
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)	2	48" x 48"	16.0	32.0
G20-2	END ROAD WORK	2	36" x 18"	4.5	9.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT 2		208.0	

STATE OF	PROJECT	SHEET	TOTAL
SOUTH DAKOTA	089-491	7	22



HORIZONTAL ALIGNMENT DATA

MAINLINE

Туре	Station			Northing	Easting
POB	59+67.76			545735.090	1109425.023
		TL= 475.75	N 20°01'24" W		
PC	64+43.51			546182.078	1109262.125
PI	67+21.28	R = 7000.00	Delta = 4°32'41" R	546443.060	1109167.014
PT	69+98.76			546710.757	1109092.883
		TL= 149.01	N 15°28'43" W		
PC	71+47.77			546854.364	1109053.115
PI	73+08.57	R = 6500.00	Delta = 2°50'04" L	547009.336	1109010.200
PT	74+69.31			547161.996	1108959.674
		TL= 310.85	N 18°18'47" W		
POE	77+80.16			547457.099	1108862.004

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. South Zone (NAD 83/CONUS); epoch 20 02.00; Geoid 03; SF = 0.9996518061

	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL
		089-491	9	22

CONTROL DATA

HORIZONTAL AND VERTICAL CONTROL POINTS							
Point	Station	Offset		Description	Northing	Easting	Elevation
SPIKE1	66+18.78	21.85 R	Reference Mark		546354.456	1109224.891	5476.82
SPIKE2	70+99.75	17.70 L	Reference Mark		546803.360	1109048.877	5456.63
CP7			Reference Mark		545514.525	1109507.216	5482.27
CP8	65+93.01	18.75 R	Reference Mark		546329.120	1109230.189	5476.87
CP9			Reference Mark		547557.838	1108821.325	5441.24
6418	68+73.99	32.98 R	Barcap		546600.183	1109158.874	5470.43
6442	71+05.77	32.05 R	Barcap		546822.436	1109095.209	5452.07
7039	73+90.47	32.45 L	Rebar		547077.174	1108953.065	5457.63

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. South Zone (NAD 83/conus); epoch 2002.00 Geoid 03; SF = 0.9996518061 The elevations shown on this sheet are based on NAVD 88.

STATE OF	PROJECT	SHEET	TOTAL
SOUTH DAKOTA	089-491	10	22

- 6.82 6.63 2.27
- .24
- .43

LEGEND

Anchor <u></u> Antenna Approach Assumed Corner Azimuth Marker BBQ Grill/ Fireplace Bearing Tree Bench Mark Box Culvert Bridge Brush 62533 Buildings _____ Bulk Tank \blacksquare Cattle Guard Cemetery Centerline Cistern Clothes Line Commercial Sign Double Face Commercial Sign One Post Commercial Sign Overhead المحصا Commercial Sign Two Post Concrete Symbol Control Point Creek Edge _ _ _ _ Curb/Gutter Curb ----Dam Grade/Dike/Levee _____ Deck Edge Ditch Block Doorway Threshold ____ _ - _ -Drainage Profile Drop Inlet Edge Of Asphalt Edge Of Concrete Edge Of Gravel Edge Of Other Edge Of Shoulder Electric Transformer/Power Junction Box Fence Barbwire Fence Chainlink Fence Electric Fence Miscellaneous Fence Rock Fence Snow Fence Wood Fence Woven Fire Hydrant Flag Pole Flower Bed 7777 Gas Valve Or Meter Gas Pump Island Grain Bin Guardrail **~~~** Guide Sign One Post Guide Sign Two Post Gutter Guy Pole Haystack

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Hedge	62633
Highway ROW Marker	
Interatate Close Cate	7-9
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Irrigation Ditch	
Lake Edge	
Lawn Sprinkler	\$
Mailbox	۵
Manhole Electric	0
Manhole Gas	_ @
Manhole Cas Manhole Missellaneous	
Manhole Miscellaneous	
Mannole Sanitary Sewer	0
Manhole Storm Sewer	0
Manhole Telephone	0
Manhole Water	0
Merry-Go-Round	₩
Microwave Radio Tower	Ϋ́
Miscellaneous Line	
Miscellancous Broparty Corpor	
Miscellaneous Property Comer	هــــ
Miscellaneous Post	0
Overhang Or Encroachment	
Overhead Utility Line	— OH —
Parking Meter	Ŷ
Pedestrian Push Button Pole	0
Pipe With End Section	
Dipe With Headwell	
Pipe Without End Section	
Playground Slide	
Playground Swing	жк
Power And Light Pole	-
Power And Telephone Pole	, je stali i s
Power Meter	, W
Power Pole	И
Power Pole And Transformer	Ā
	Ŷ
Power Tower Structure	
Propane Tank	
Property Pipe	\odot
Property Pipe With Cap	۲
Property Stone	PS
Public Telephone	2
Railroad Crossing Signal	-04
Pailroad Milepost Marker	¥*
Railload Milepost Marker	
Railroad ROW Marker	
Railroad Signs	þ
Railroad Switch	
Railroad Track	
Railroad Trestle	
Rehar	Æ
Rebar With Can	
Rebai Will Cap	<u> </u>
Reference Mark	<u>~</u>
Regulatory Sign One Post	þ
Regulatory Sign Two Post	B
Retaining Wall	
Riprap	ααααα
River Edge	
Rock And Wire Baskets	— – –
Rocknilles	AB-
Rotallita Diah	1
Satellite Dist	4

Septic Tank	Ψ
Shrub Tree	\$
Sidewalk	
Sign Face	
Sign Post	0
Slough Or Marsh	<u></u>
Spring	A
Stream Gauge	ø
Street Marker	<u> </u>
Subsurface Utility Exploration Test Hole	•
Telephone Fiber Optics	— T/F —
Telephone Junction Box	
Telephone Pole	Ø
Television Cable Jct Box	0
Television Tower	夲
Test Wells/Bore Holes	
Traffic Signal	‡
Trash Barrel	Ō
Tree Belt	~~~~
Tree Coniferous	*
Tree Deciduous	0
Tree Stumps	٨
Triangulation Station	۸
Underground Electric Line	— P —
Underground Gas Line	— G —
Underground High Pressure Gas Line	— HG —
Underground Sanitary Sewer	— s —
Underground Storm Sewer	= s =
Underground Tank	
Underground Telephone Line	— T —
Underground Television Cable	— TV —
Underground Water Line	— w —
Warning Sign One Post	þ
Warning Sign Two Post	P P
Water Fountain	l
Water Hydrant	CP
Water Meter	۷
Water Tower	
Water Valve	0
Water Well	\odot
Weir Rock	
Windmill	8
Wingwall	
Witness Corner	(KO)

	STATE OF	PROJE	ст	SHEET	TOTAL SHEETS
	SOUTH DAKOTA	089-4	91	11	22
	Plotting Date:	04/30/2020			
State and Nati County Line Section Line Quarter Line Sixteenth Line Property Line Construction L ROW Line New ROW Lin Cut and Fill Lir Control of Acco New Control of Proposed ROV (After Property	ine nits ess f Access V Disposal)	•			
Drainage Arrov	N				
Remove Conc	rete Paven	nent			
Remove Conci	rete Drivev	vay Pavement			
Remove Aspha	alt Concret	e Pavement			
Remove Conc	rete Sidew	alk			
Remove Conc	rete Media	n Pavement			
Remove Conc	rete Curb a	and/or Gutter			
Detectable Wa Pedestrian Pu and 30" x 48" with 1.5% slop	arning sh Button Clear Spac e	Pole ce			

STATE OF PROJECT SHEET TO TAL SOUTH SOUTH
DAKOTA 089-491 12 22
70+26 - L Plotting Date: 04/30/2020
Install Type L Median Drain
α rype ∟ Frame α Grate Assembly
70+26
Install 38' - 24" RC Pipe Arch & 1 - 24: RC Sloped Arch End Section
tot otro
Fa -
70+00
70+26
at the Pipe Outlet.
Install 20 Ft of 12" Diameter Erosion Control Wattle aroung median drain.
Placement shall be determined by the engineer during construction.

...\SD89 Pipe MRM 59.84\70.dgn



	70+26 - 21, L Install Typė L Median Drain and Type L Erame & Grate Top Wall El 5455.75 Floor El 5454.25	2' 5' 12' 12' 5'	-	
	 <u>20:99</u> 5455.75	5458 19 6" Asphalt Concrete	Composite <u>36.32</u> 5454.127	
	 <u>20.99</u> 5454.25 <u>/1</u> 5	Install 24" - 38' RCP Arch 7.99 & 1 Sloped End 454.25	<u>25.19</u> 5454.18	
100				

04/30/2020	STATE OF	PROJECT		SHEET	TOTAL SHEETS	1
	SOUTH DAKOTA	089-491		14	22	
						-













Radial dimensions at joints: $\pm \frac{1}{8}$ for 65" span or less and $\pm \frac{1}{4}$ for longer spans. Rise and Span: +2% of tabular values. Length of Joint (J): $\pm \frac{1}{4}$ ". Wall thickness (T): not less than design T by more

∠Gravel Bedding Material shall be supplied for 102" to 169" spans. It shall be placed to a thickness of 6" (Min.) x 85% of the Span x Length of culvert and shall conform to the gradation requirements than 5% or $\frac{3}{6}$ ", whichever is greater. Laying length: shall not underrun by more than $\frac{1}{2}$ ". be screened or may be plan provided material.

* Siz (in.	Approx. Wt./Ft. (Ib.)	Rise (in.)	Span (in .)	T (in.)	a (in .)	b (in .)	c (in.)	j (in .)	e (in .)	f (in .)	g (in.)	RI (in.)	R2 (in .)	R3 (in.)
18	170	131/2	22	21/2	13/8	3⁄8	3⁄4	2	11/8	3⁄8	I	271/2	133⁄4	51/4
24	320	18	28 ¹ /2	31/2	15/8	1/2	13/8	3	13/8	1/2	15/8	40 ¹¹ /16	143⁄4	45/8
30	450	221/2	361⁄4	4	1 ¹³ / ₁₆	5⁄8	1%	31/2	1%	5⁄8	1 13/16	51	18¾	61⁄8
36	600	265/8	43¾	41/2	2	3⁄4	13⁄4	4	13⁄4	3⁄4	2	62	22 ¹ /2	61/2
42	740	315/6	511/8	41/2	2	3⁄4	13⁄4	4	13⁄4	3⁄4	2	73	26 ¹ /4	7 ¾
48	890	36	58 ¹ /2	5	2 ¹ /4	3⁄4	2	5	2	3⁄4	2 ¹ /4	84	30	81⁄8
54	1100	40	65	51/2	2 ¹ /2	3⁄4	2 ¹ /4	5	21/4	3⁄4	2 ¹ /2	92 ¹ /2	333/8	10
60	1400	45	731/2	6	35/6	3⁄4	I ¹⁵ /16	5	2¾	3⁄4	21/2	105	371/2	
72	1900	54	88	7	313/16		23/16	6	31/4	-	23⁄4	126	45	135/16
84	2500	62	102	8	4 ¹ /8		21⁄8	6	31/2		31/2	162 ¹ /2	52	14 ¹ /2
96	3300	78	1223/8	9	41/2	I	31/2	7	4	Ι	4	218	62	20
108	4200	88	1381/2	10	5		4	7	41/2	I	41/2	269	70	22
120	5100	96 7/8	154	11	51/2		41/2	7	5	I	5	3013/8	78	24
132	5100	1061/2	1683⁄4	10			4	7	41/2	I	4 ¹ /2	329	855/8	26 7/8

* Equivalent Diameter of Circular R.C.P.

GENERAL NOTES:

Construction of R.C.P. Arch shall conform to the requirements of Section 990 of the Specifications. Not more than 2 four-foot sections shall be permitted near the ends of any culvert. Four-foot lengths shall be used only to secure the required length of culvert.

			June 26, 2015
	S D D	REINFORCED CONCRETE PIPE ARCH	plate number 450.02
Published Date: 2nd Qtr. 2020			Sheet I of I

STATE OF PROJECT	SHEET	TOTAL				
SOUTH DAKOTA 089-491	17	22				
Plotting Date: 04/30/2020						
Tongue (Inlet) Groove (Outlet) United to the second seco	17	22				
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $						
* Equivalent Diameter of Circular R.C.P. ** Acceptable Flat Bottom Alternate. Tie Bolt (Typ.) See Standard Plate 450.18						
SECTION (Along Centerline of Pipe) GENERAL NOTE: The length of concrete pipe shown in the construction plans is between sloped ends.						
S D D D Published Date: 2nd Otr. 2020S P P TPLATE 450Sheet	NUMBER O.13 Hof I					

Dia. (in.)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	R (in.)		
FOR CIRCULAR PIPE								
24	3	6	72	12	84	3		
30	3½	71/2	90	12	102	31/2		
		FOR	ARCH	PIPE				
* 24	3	6	48	12	60	3		
* 30	3 ¹ /2	71/2	60	12	72	31/2		
* 36	4 ¹ /2	85⁄8	66	30	96	0		
* 42	4 ¹ /2	10	77 ¹ /4	18¾	96	0		









Scale - 1

d From - TRRC11610





TDDC11610

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Plotted From - TRRC11610



ESTIMATED QUANTITIES							
ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY				
★ Class M6 Concrete	Cu.Yd.	0.35	0.24 H				
Reinforcing Steel	Lb.	87.51	12.02 H				
Type L Frame and Grate Assembly	Each	1					

		PIPE DISPLACEMENT REDUCTIONS								
		DIAMETER (Inches)	Wall T (Inches)	CLASS M6 CONCRETE (Cu. Yd.)						
1	σ.	15	2 1/4	0.04						
	U.	18	2 1/2	0.05						
	R	24	3	0.09						
	CH CH	18	2 1/2	0.05						
	RR	24	3	0.09						

SPECIFICATIONS:

- 1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 2012 Edition.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES:

- 1. The dimension H is in feet.
- 2. Design Live Load: HL-93.
- ★ 3. Reduce total quantities of concrete by the amount of concrete displaced by the pipe. The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.
- Cut and bend reinforcing steel during construction as necessary to accomodate pipe outlet. All reinforcing steel shall conform to ASTM A615 Grade 60.
- 5. All Concrete shall be Class M6.
- 6. All angles shall conform to ASTM A36. Tubes shall conform to ASTM A500 Grade B.
- 7. All exposed edges shall be chamfered $\frac{3}{4}$ inch.
- 8. Use 1 $\frac{1}{2}$ inch clear cover on all reinforcing steel except as shown.
- 9. After welding is complete, galvanize the frame and grate assembly in accordance with AASHTO M111 (ASTM A123). For information only, the estimated weight of the frame and grate assembly is 198 pounds.
- 10. Type L Median Drain shall be paid for at the contract unit price per each or by the individual bid items as shown in the plans, which shall be full compensation for furnishing all materials and labor including necessary excavation and backfill required to construct one complete drain.
- 11. The location and size of pipe outlet from the drain shall be as noted on cross section sheets.

 S
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 TYPE L MEDIAN DRAIN
 PLATE NUMBER

 Published Date: 2nd Qtr. 2020
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 For 4:1 INSLOPE
 Sheet 1 of 2







GENERAL NOTES:

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Published Date: 2nd Qtr. 2020

	STATE OF		PROJECT	SHEET	TOTAL SHEETS	
	DAKOTA		089-491	22	22	
	Plotting Date:	04/30)/2020			
]		
ong the contour a	nd nernenc	licular to	the water flow			
to ensure that wa	ater flows o	ver the w	attle and not			
tightly in the tren	ch so that (tavlight o	an not be seen			
m the trench aga	inst the wa	attle on th	e uphill side.			
other types of sta	kes such a	s rebar m	hay be used			
	us or the w	atties and	the spacing			
r will butt the sec	ond wattle	tightly ag	ainst the first			
		agnay ag				
trol wattles in acc	ordance w	ith the sto	orm water			
he accumulated s	sediment w	hen nece	essary as			
			ha fan			s.dgn
e as directed by tr nd necessary sha	aping will b	r. All cost e inciden	tal to the			IP late:
						2h sto
attles including la	abor, equip	ment, an	d materials will			16
esponding erosic	on control v	vattle con	tract item.			- e
project including	labor, equi	pment, ar	nd materials will			Ē
	n watte.					
			February 14, 2020	l		
			PLATE NUMBER			
SION CONTROL V	NATTLE	/34.06				
			Sheet 2 of 2			