

STATE OF	PROJECT	SHEET	TOTAL SHEETS
DAKOTA	087-491 & 016-491	1	21
Plotting Date:	09/27/2019		

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![](_page_0_Figure_5.jpeg)

# **ESTIMATE OF QUANTITIES**

#### PCN 15t0 - SD 87

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E1010	Remove Asphalt Concrete Pavement	355.6	SqYd
120E0010	Unclassified Excavation	1,635	CuYd
120E0300	Borrow Unclassified Excavation	760	CuYd
230E0100	Remove and Replace Topsoil	Lump Sum	LS
250E0010	Incidental Work	Lump Sum	LS
260E1010	Base Course	266.0	Ton
320E1200	Asphalt Concrete Composite	83.8	Ton
421E0100	Pipe Culvert Undercut	38	CuYd
450E0222	60" RCP Class 2, Furnish	90	Ft
450E0230	60" RCP, Install	90	Ft
450E2044	60" RCP Flared End, Furnish	2	Each
450E2045	60" RCP Flared End, Install	2	Each
633E1220	High Build Waterborne Pavement Marking Paint, 4" White	180	Ft
633E1222	High Build Waterborne Pavement Marking Paint, 4" Yellow	180	Ft
634E0010	Flagging	100.0	Hour
634E0110	Traffic Control Signs	105.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0275	Type 3 Barricade	16	Each
634E1002	Detour Signing	560.3	SqFt
700E0310	Class C Riprap	174.0	Ton
730E0210	Type F Permanent Seed Mixture	13	Lb
731E0100	Fertilizing	750	Lb
732E0250	Fiber Mulching	1,000	Lb
734E0900	Temporary Diversion Channel for Fish Passage	1	Each
831E0110	Type B Drainage Fabric	196	SqYd

# PCN 15t1 - US 16

BID ITEM	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
100E0020	Clear and Grub Tree	1	Each
250E0010	Incidental Work	Lump Sum	LS
634E0110	Traffic Control Signs	184.4	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0275	Type 3 Barricade	10	Each
700E0310	Class C Riprap	87.0	Ton
730E0210	Type F Permanent Seed Mixture	7	Lb
731E0100	Fertilizing	380	Lb
732E0250	Fiber Mulching	500	Lb
831E0110	Type B Drainage Fabric	98	SqYd

# **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: <a href="http://www.sddot.com/resources/Manuals/EnvironProcManual.pdf">http://www.sddot.com/resources/Manuals/EnvironProcManual.pdf</a>

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 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 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: <a href="http://sdleastwanted.com/maps/default.aspx">http://sdleastwanted.com/maps/default.aspx</a>.

# COMMITMENT D: WATER QUALITY STANDARDS

# COMMITMENT D1: SURFACE WATER QUALITY

The tributary of Spring Creek is classified as a cold water permanent fishery with a total suspended solids standard of less than 30 mg/L 30-day average, less than 53 mg/L daily maximum.

The tributary of Spring Creek is classified as fish and wildlife propagation, recreation, irrigation, and stock watering waters. Because of these beneficial uses, special construction measures may have to be taken to ensure that this water body is not impacted.

# Action Taken/Required:

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

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# **COMMITMENT D2: SURFACE WATER DISCHARGE**

The DENR General Permit for Temporary Discharge is required for temporary dewatering and discharges to waters of the state. The effluent limit for total suspended solids will be 90 mg/L 30-day average. The effluent limit applies to discharges to all waters of the state except discharges to waters classified as cold water permanent fish life propagation waters according to the ARSD 74:51:01:45. For discharges to waters of the state classified as cold water permanent fish life propagation waters, the effluent limit for total suspended solids will be 53 mg/L daily maximum.

The permittee has the option of completing effluent testing or implementing a pollution prevention plan for compliance with this permit. If the permittee develops a pollution prevention plan instead of total suspended solids sampling, the plan must be developed and implemented prior to discontinuing total suspended solids sampling. Refer to section 3.0 of the permit. If any pollutants are suspected of being discharged, a sample must be taken for those parameters listed in section 2.2 of the permit.

Refer to Commitment D1: Surface Water Quality for stream classification.

# Action Taken/Required:

If construction dewatering is required, the Contractor will obtain the General Permit for Temporary Discharge Activities from the DENR Surface Water Program, 605-773-3351.

http://denr.sd.gov/des/sw/swqformsandpermits.aspx

The Contractor will provide a copy of the approved permit to the Project Engineer prior to proceeding with any dewatering activities. The approved permit must be kept on-site and as part of the project records.

Effluent monitoring, as a result of dewatering activities, will be summarized for each month and recorded on a separate Discharge Monitoring Report (DMR) and submitted to DENR monthly. Additional information can be found at http://denr.sd.gov/des/sw/WhatisaDMR.aspx

# 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 F: SEASONAL WORK RESTRICTION

The State of South Dakota Game, Fish, and Parks has designated a cold water fishery associated with this project.

# Action Taken/Required:

Construction or demolition activities should not take place during the Seasonal Work Restriction listed in the below table to avoid conflicts with spawning fish. If flows during this time are nonexistent or extremely low, the seasonal use restriction may not be applicable. The Contractor will not conduct in-stream work during the Seasonal Work Restriction without prior approval from the SDDOT Environmental Office.

Stream Name	Stream Classification	Seasonal Work Restriction
Trbutary of Spring Creek	Cold Water	October 1 to April 1

## COMMITMENT G: DEWATERING AND SEDIMENT COLLECTION

The purpose of a dewatering and sediment collection system is to collect turbid storm water on the project, treat it with flocculants as needed, and capture the sediment that falls out of suspension before the water is discharged into "Waters of the US" or "Waters of the State". Refer to Commitment D1: Surface Water Quality for stream classification.

## Action Taken/Required:

The Contractor will meet the terms of the Temporary Discharge Permit and the Storm Water Permit for Construction Activities.

The Contractor will create a Pollution Prevention Plan (PPP) for dewatering and sediment collection if the Contractor chooses to discharge the water into "Waters of the US" or "Waters of the State". Refer to the detail sheet OPTIONS FOR DEWATERING AND SEDIMENT COLLECTION in the plans. The PPP must be kept on-site and updated as site conditions change.

# 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:

- Dumping Allowed".
- 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.

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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

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

# **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 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 N: SECTION 404 PERMIT

The SDDOT has obtained a Section 404 Permit from the USACE for the permanent actions associated with this project.

#### Action Taken/Required:

The Contractor will comply with all requirements contained in the Section 404 Permit.

The Contractor will also be responsible for obtaining a Section 404 Permit for any dredge, excavation, or fill activities associated with material sources, storage areas, waste sites, and Contractor work sites outside the plan work limits that affect wetlands, floodplains, or waters of the United States.

# 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".

# **INCIDENTAL WORK**

All costs necessary to remove, haul and dispose of the concrete aprons around the pipe end sections will be incidental to the contract lump sum price for Incidental Work

All costs necessary to Remove 60" CMP and 2 end sections on SD 87, MRM 79+0.071 will be incidental to the contract lump sum price for Incidental Work.

# **GRADING OPERATIONS**

Water for Embankment is estimated at the rate of 10 gallons of water per cubic yard of Embankment minus Waste. The estimated quantity of Water for Embankment is 22.7 MGal. No separate payment will be made for the Water for Embankment and all costs associated will be incidental to the contract unit price per cubic yard of Unclassified Excavation.

The estimated cubic yards of excavation and/or embankment required to construct outlet ditches, ditch blocks, and approaches are included in the earthwork balance notes on the profile sheets.

Special ditch grades and other sections of the roadway different than the typical section will be constructed to the limits shown on the cross sections. If significant changes to the cross sections are necessary during construction. the Engineer will contact the Designer for the proposed change.

# 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.

# **TEMPORARY DIVERSION CHANNEL FOR FISH PASSAGE**

The Contractor will construct a temporary diversion channel in accordance with Standard Plate 734.30 at the location on SD Highway 87 shown in the plans.

# **BORROW UNCLASSIFIED EXCAVATION SOURCE**

Borrow Unclassified Excavation shall be obtained from the stockpile at the SDDOT maintenance facility at the Keystone Wye.

The borrow material is royalty free to the Contractor.

# **EXCAVATION FOR DEEP PIPE REMOVAL**

All work necessary to excavate and backfill the deep pipes including labor, equipment, and incidentals will be incidental to the contract unit price per cubic yard for Unclassified Excavation. Payment for deep pipe excavation will be based only on plans quantity and measurement of these excavation quantities during construction will not be performed.

![](_page_3_Figure_38.jpeg)

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Deep pipes are existing mainline pipes at depths of 10 feet or greater (measured from the flow line to the lowest elevation of either the existing ground line, undercut line, or bottom of removed or salvaged surfacing).

The quantities computed for excavation of the deep pipes are based on the limits shown in the drawing below. The drawing shows a box culvert for illustration purposes only; the limits are similar for a pipe.

# PIPE CULVERT UNDERCUT

Pipe culvert undercut may be required for this project. The Engineer will determine which pipe will be undercut in accordance with Section 421 of the Specifications.

If pipe culvert undercut is required, the table below contains the rate for onefoot depth of pipe culvert undercut per foot of pipe length. When calculating pipe culvert undercut, the length of pipe ends should be included in the overall pipe length.

The pipe shown in the plans may or may not require undercutting. The Engineer will determine which pipe will be undercut in accordance with Section 421 of the Specifications.

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.

Storm sewer and approach pipes do not require undercutting unless specified otherwise in these plans.

Pipe Diameter	Round Pipe Undercut Rate for 1' Depth	Arch Pipe Undercut Rate for 1' Depth
(In)	(CuYd/Ft)	(CuYd/Ft)
24	0.2407	0.2577
30	0.2623	0.2847
36	0.2840	0.3110
42	0.3056	0.3337
48	0.3272	0.3596
54	0.3488	0.3827
60	0.3704	0.4105
66	0.3920	
72	0.4136	0.4630
78	0.4352	
84	0.4568	0.5123
90	0.4784	

![](_page_4_Figure_7.jpeg)

# **CLASS C RIPRAP**

Riprap shall conform to Section 830 of the Specifications. Riprap shall be placed in the approximate areas shown on the general drawing. (Conversion 1.4 Tons/CuYd).

All riprap shall be placed over Type B Drainage Fabric.

#### **SEQUENCE OF OPERATIONS**

The Contractor will submit a sequence of operations for approval two weeks prior to the preconstruction meeting.

Contractor requests to deviate from the sequence of operations will be submitted in writing to the Engineer for review. 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.

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.

# SHEETING FOR TRAFFIC CONTROL SIGNS

All fluorescent orange background material on traffic control signs, all temporary delineators, and all temporary STOP (R1-1), YIELD (R1-2), DO NOT ENTER (R5-1), and WRONG WAY (R5-1a) signs will conform to the requirements of ASTM D4956 Type IX or XI. All other traffic control signs and background colors will conform to the requirements of ASTM D4956 Type IV.

# INVENTORY OF TRAFFIC CONTROL DEVICES

#### PCN i5t0

		CONVENTIONAL ROAD			
SIGN CODE	SIGN DESCRIPTION	NUM BER	SIGN SIZE	SQFT PER SIGN	SQFT
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
	1	CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			105.0

## PCN i5t1

		CONVENTIONAL ROAD			
SIGN CODE	SIGN DESCRIPTION	NUM BER	SIGN SIZE	SQFT PER SIGN	SQFT
R3-1	RIGHT TURN PROHIBITION (symbol)	1	24" x 24"	4.0	4.0
R3-2	LEFT TURN PROHIBITION (symbol)	1	24" x 24"	4.0	4.0
W1-3	REVERSE TURN (L or R)	1	48" x 48"	16.0	16.0
W1-4	REVERSE CURVE (L or R)	2	48" x 48"	16.0	32.0
W9-3	CENTER LANE CLOSED A HEAD	1	48" x 48"	16.0	16.0
W13-1P	ADVISORY SPEED (plaque)	3	30" x 30"	6.3	18.9
W20-1	ROAD WORK AHEAD	3	48" x 48"	16.0	48.0
W21-5	SHOULDER WORK	2	48" x 48"	16.0	32.0
G20-2	END ROAD WORK	3	36" x 18"	4.5	13.5
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			184.4

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# **DETOUR SIGNING**

# PCN i5t0

			CONVENTIO	NAL ROAD	
SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R11-2	ROAD CLOSED	2	48" x 30"	10.0	20.0
R11-3a	ROAD CLOSED 5.5 MILES AHEAD LOCAL TRAFFIC ONLY	1	60" x 30"	12.5	12.5
W20-2	DETOUR AHEAD	4	48" x 48"	16.0	64.0
W20-3	ROAD CLOSED AHEAD	2	48" x 48"	16.0	32.0
M1-5	SD ROUTE MARKER (1 or 2 digits)	9	24" x 24"	4.0	36.0
M4-8	DETOUR	9	24" x 12"	2.0	18.0
M6-1	DIRECTION ARROW - Horizontal Single Head (L or R)	8	21" x 15"	2.2	17.6
M6-3	DIRECTION ARROW - Vertical Single Head	1	21" x 15"	2.2	2.2
SPECIAL	CLOSED AT JCT. 16/67	4	96" x 60"	40.0	160.0
SPECIAL	LOAD RESTRICTION	4	108" x 66"	49.5	198.0
		CON TRAFFIC	VENTIONAL CONTROL SI	road Igns Sqft	560.3

## PERMANENT PAVEMENT MARKING

The Contractor will be required to repaint all existing pavement markings including centerline, edge line, lane lines. The cost to duplicate the existing marking locations will be incidental to the contract unit price for the respective High Build Waterborne Pavement Marking Paint items.

# **RETROREFLECTIVITY FOR PAVEMENT MARKING PAINT**

The Department may take retroreflectivity readings on the pavement marking lines after 2 days and within 30 days of the line application using either a portable or mobile retroreflectometer that conforms to 30-meter geometry. If the Department chooses to take retroreflectivity readings, three retroreflectivity readings will be taken on each line at each test location. The three readings will be averaged and become the reading for that test location.

If the Department chooses to take retroreflectivity readings, three readings will be taken on the edge lines and lane lines in the direction of application. For combination solid yellow and skip yellow lines for turn lanes and for centerline markings on two-way roadways, three readings will be taken in one direction, the reflectometer will be turned 180 degrees and three more readings will be taken. The six readings for the centerline markings will be averaged and become the test reading for that test location.

If the Department chooses to take readings, the minimum retroreflectivity values will be 275 mc/m<sup>2</sup>/lux for white and 170 mc/m<sup>2</sup>/lux for yellow.

# 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.

#### **RATES OF MATERIALS FOR HIGH BUILD WATERBORNE PAVEMENT** MARKING PAINT

Solid 4" line = 27.8 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.

# PRESS RELEASE ANNOUNCEMENTS

The SDDOT will prepare a press release to be released 5 days prior to any phase change or any other major change that affects traffic flow. The SDDOT will be responsible to keep law enforcement, emergency services, and the traveling public notified of changes in project access. The Contractor will provide the Engineer with pertinent information 7 days prior to any phase change or any other major change that affects traffic flow.

# **REMOVE AND REPLACE TOPSOIL**

Prior to beginning operations, a 4" depth of topsoil will be salvaged and stockpiled. Following completion of operations, topsoil will be replaced on the inslope as directed by the Engineer.

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

#### **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
- 25% Glomus etunicatum

AM 120 Multi

All seed will 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 will be incidental to the contract unit price per pound for the corresponding permanent seed mixture.

The mycorrhizal inoculum will 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			
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.

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Perfect

## **PERMANENT SEEDING**

The areas to be seeded consist of all newly graded areas within the project limits except for the top of roadways and temporary easements under cultivation.

Type F Permanent Seed Mixture will consist of the following:

STATE OF	PROJECT	SHEET	TOTAL SHEETS
DAKOTA	087-491 & 016-491	6	21

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

duct	Manufacturer
ane	Sustane Corporate Headquarters Cannon Falls, Minnesota Phone: 1-800-352-9245 www.sustane.com
Blend	Perfect Blend, LLC Bellevue, WA Phone: 1-866-456-8890 www.perfect-blend.com

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**

Fiber mulch will be applied in a separate operation following permanent seeding.

An additional 2% by weight of tackifier will be added to the fiber mulch product selected from the approved product list. If the product selected has guar gum tackifier included, then the additional 2% of tackifier will be guar gum. If the product selected has synthetic tackifier included, then the additional 2% of tackifier will be synthetic.

Fiber mulch will be applied at the rate of 2,000 pounds per acre.

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.

All costs for the additional tackifier added to the fiber mulch including labor, equipment, and materials will be incidental to the contract unit price per pound for Fiber Mulching.

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://sddot.com/business/certification/products/Default.aspx

# WATER FOR GRANULAR MATERIAL

At the time of compaction, the material will have approximately 4% moisture uniformly blended throughout the depth of material. The Engineer may adjust the percent moisture. All cost for Water for Granular Material shall be incidental to the contract unit price per cubic yard for Base Course.

# ASPHALT CONCRETE COMPOSITE

Asphalt Concrete Composite will include MC-70 Asphalt for Prime placed at the rate of 0.30 gallons per square yard. The Asphalt for Prime will be applied to the Base Course for the full width of the bottom layer of Asphalt Concrete Composite plus one foot additional on the outside shoulder.

Asphalt for tack SS-1h or CSS-1h will be applied prior to each lift of Asphalt Concrete Composite. Asphalt for tack will be applied at a rate of 0.06 gallons per square yard on primed base course or new asphalt concrete pavement. The Asphalt for tack will be applied for the full width of the bottom layer of Asphalt Concrete Composite plus one-half foot additional on the outside shoulder.

	Table of Material Quantities																	
		Temporary Diversion Channel for Fish	Clear and			Remove Asphalt	Unclassified	Borrow		Pipe	60" RCP	60" RCP	60" RCP Flared End	60" RCP Flared End	Class C	Type B	Type F Permanent Seed	
		Passage	Tree	L	w	Pavement	Excavation	Excavation	*Embankment	Undercut	Furnish	Install	Furnish	Furnish	Riprap	Fabric	Mixture	Fertili
		(Each)	(Each)	(Ft)	(Ft)	(SqYd)	(CuYd)	(CuYd)	(CuYd)	(CuYd)	(Ft)	(Ft)	(Each)	(Each)	(Ton)	(SqYd)	(Lb)	(Lb
PCN i5t0	SD 87	1		100	32	355.6	1635	760.4	2395.4	37.8	90	90	2	2	174	196	13	75
PCN i5t1	US 16		1												87	98	7	38
*Not a bid	item																	

		STATE OF	PF	ROJECT	SHEET	TOTAL
		SOUTH	087-49	1 & 016-491	7	SHEETS 21
	l					
				High Build	High B	uild
				Waterborne	Waterb	orne
				Pavement	Pavem	ent
			Asphalt	Marking	Marki	ng
	Fiber	Base	Concrete	Paint, 4"	Paint,	4"
zing	Mulching	g Course	Composite	White	Yello	w
)	(Lb)	(Ton)	(Ton)	(Ft)	(Ft)	
0	1000	266	83.8	180	180	)
0	500					

# US 16 MRM 37.49+0.083

MRM 37.49+0.083 R Remove Concrete Apron (Incidental Work)

MRM 37.49+0.083 R Install Class C Riprap - 3' Depth (87 Ton) Type B Drainage Fabric (98 SqYd)

MRM 37.49+0.083 R Clear and Grub 1 tree MRM 37.49+0.083 R Clearing (Lump Sum) As directed by the Engineer

Do Not Disturb Pipe Culvert or Pipe Culvert End Section

![](_page_7_Picture_6.jpeg)

STATE OF	PROJECT	SHEET	TOTAL SHEETS
DAKOTA	087-491 & 016-491	8	21
Plotting [	Date: 09/27/2019		

![](_page_7_Picture_11.jpeg)

![](_page_8_Figure_0.jpeg)

	07175.05	PROJECT	OUFFT	TOTAL	1
	STATE OF SOUTH DAKOTA	087-491 & 016-491	9	SHEETS 21	
	Plotting	Date: 10/02/2019			
ı					PLOT NAME - 3
0+01					FILE NDESIGN/EI5TØ. DGN

# SD 87 MRM 79+0.071

Station 171+05 Remove 84' - 60" CMP & 2 - 60" CMP Flared End Sections (Incidental Work)

Station 171+05 Install 90' - 60" RCP & 2 - 60" RCP Flared End Sections

![](_page_9_Figure_4.jpeg)

ng Date:	10/02/2019	STATE OF	PROJECT				SHEET NO.	TOTAL SHEETS
		DAKOTA		087-491	& 016-491		10	21
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							5	215
1								1
							5	210
1							5	205
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   				   			5	200
1								
							5	195
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Iowline levation								
188.5							5	190
1 1 1						- - - -	_	105
¦							5	100
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; ; ,							5	180
1 1 1						- - -		
				L		171+0	5 5	175
								100

# TYPICAL SURFACING SECTIONS

![](_page_10_Figure_1.jpeg)

![](_page_10_Figure_3.jpeg)

![](_page_10_Figure_4.jpeg)

![](_page_11_Figure_0.jpeg)

ile - ...\Design\detour signing

Sign Detail

![](_page_12_Figure_1.jpeg)

STATE OF		PROJE	СТ	SHEET	TOTAL SHEETS
		087-491 &	016-491	13	21
Plotting	Date:	09/27/201	9		

# TRAFFIC CONTROL LAYOUT INTERSECTION OF SD87 & US16

![](_page_13_Picture_1.jpeg)

![](_page_13_Picture_2.jpeg)

Note:

This layout to be used in conjunction with Standard Plate 634.53 for closure of SD Hwy. 87 at US Hwy. 16.

TYPE III BARRICADE

CHANNELIZING DEVICE

![](_page_14_Figure_0.jpeg)

						550 IS05		TOTAL			
				STATE OF SOUTH		PROJECT	SHEET	SHEETS			
				DAKOTA	087-	491 & 016-491	15	21			
			-	Plotting Date:	09/27	/2019					
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12	431/2	30	731/	2 48	3 11/	2					
<u> </u> /2	49 <sup>1</sup> / <sub>2</sub>	24	73 <sup>i</sup> /	2 54	31/4 11/	2					
2	54	193/4	733/	4 60	31/2 17	2					
5	63	34% 35	97%	4 72	$\frac{4}{4/2}$ 1/	2					
4	72	26	98	84	5 1/	2					
7	65	33 <sup>1</sup> /4	98 <sup>1</sup> /	4 90	51/2 1/	2					
5	60	39	99	96	5 1/	2					
0	72	27	99	102	$\frac{51}{2}$ 1/	2					
о 6	90	21	33	114	6 <sup>1</sup> /2 1 <sup>1</sup> /	2					
6	901/2	21	1117	2 120	61/2 11/	2					
Ι	87 <sup>1</sup> /2	24	1117	2 132	6 <sup>1</sup> / <sub>2</sub> 6						
						June 26. 2015					
						LAIL NUMBER					
	R. C. P.	FLARE	D EN	IDS		-30.10					
						Sheet I of I					
							l				

![](_page_15_Figure_0.jpeg)

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STATE OF	PROJECT	SHEET	TOTAL
SOUTH DAKOTA	087-491 & 016-491	16	21
Plotting Date:	09/27/2019		

![](_page_16_Figure_0.jpeg)

![](_page_16_Figure_1.jpeg)

		STATE OF SOUTH DAKOTA		PROJECT			
				087-491 & 016-491			
		Plotting D	ate:	09/27/201	9		
				-			
osted	S	pacing	of		Spacing of		
Speed	Advo	nce W	arning	Taper	Channelizing		
ior to		Signs	5	Length	Devices		
Work		(Feet	•)	(Feet)	(Feet)		
M.P.H.)		(A)		(L)	(G)		
D - 30		200		180	25		
5 - 40		350		320	25		
15		EOO		1 0 0 0	25		

The channelizing devices shall be drums or 42" cones if traffic control must remain

For short duration operations (I hour or less) all channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

A SHOULDER WORK sign should be placed on the left side of a divided or one-way roadway only if the left shoulder is

intersecting roadway is not required if drivers emerging from that roadway will encounter another advance warning sign before they reach a work activity area.

June 3. 2016 PLATE NUMBER 634.03 Sheet I of I

TOTAL SHEETS

21

SHEET 17

50

50

50

For low-volume traffic situation with short work zones on stru- roadways where the flagger is to road users approaching from directions, a single flagger ma The ROAD WORK AHEAD and the F WORK signs may be omitted for duration operations (I hour or For tack and/or flush seal op- when flaggers are not being u FRESH OIL sign (W21-2) shall be of in advance of the liquid aspho areas. Flashing warning lights and/or may be used to call attention advance warning signs. The channelizing devices shall or 42" cones. Channelizing devices are not r along the centerline adjacent	ons aight s visible om both y be used END ROAD short less). erations, used, the displayed off flags to the be drums required to work	5. 		A 100' Survey Burner Two-way Traffic Taper	ABU SPOCE BU SPOCE ABU SPOCE A
Channelizing devices and flagge be used at intersecting roads control intersecting road traf required. The buffer space should be end so that the two-way traffic placed before a horizontal or curve to provide adequate sig distance for the flagger and of stopped vehicles.	ers shall to ific as xtended taper is vertical ht queue		•	AHE AND AND AND AND AND AND AND AND AND AND	AD AD RK AD XCO
The length of A may be adjust	ted to		1		

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Tyr (Full I Signing shov	pe 3 Barric Roadway Clo vn for or	ade osure) ne				
* Use approp and number	oriate rou 	ute marker				
Flashing war should be u the advance	rning ligh Ised to c ed warnin	ts and/or all attentions ag signs.	flags on to			
Regulatory should be m the duratio	traffic ( nodified c n of the	control dev is needed detour.	vices for			
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If the road distance bey and/or there destination p intersection, and DETOUR s Type 3 barri	is opener ond the e are sig points be place th signs on o cades loc	d for some intersection inficant of yond the e ROAD CLC double side cated at t	e on rigin/ DSED ed he			
edge of the lf the road distance bey and there a points beyon ROAD CLOSED placed on a barricade pl the roadway	travelectis closed frond the re few o and DETO double s aced in t	d way. d a short intersection rigin/desti residence UR sign ma ided Type the center	on ination is), the iy be 3 of			
A route mar may be place corner of th augment or	• ker direc ed on the he inters replace t	ctional asse e far left section to the one sh	embly Iown		1	t
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![](_page_17_Figure_3.jpeg)

![](_page_18_Figure_0.jpeg)

![](_page_18_Figure_1.jpeg)

![](_page_19_Figure_0.jpeg)

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STATE OF	PROJECT	SHEET	TOTAL
SOUTH DAKOTA	087-491 & 016-491	20	21
Plotting Date:	09/27/2019		

![](_page_20_Figure_0.jpeg)

STATE OF	PROJECT	SHEET	TOTAL SHEETS
SOUTH DAKOTA	087-491 & 016-491	21	21
Plotting Date:	09/27/2019		