

STATE OF	PROJECT	SHEET	TOTAL SHEETS
DAKOTA	085-471	1	18
Plotting Date:	03/09/2015		

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# **ESTIMATE OF QUANTITIES**

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
120E0010	Unclassified Excavation	406	CuYd
120E6200	Water for Granular Material	11.7	MGal
230E0100	Remove and Replace Topsoil	Lump Sum	LS
260E1010	Base Course	582.8	Ton
320E1200	Asphalt Concrete Composite	309.7	Ton
332E0010	Cold Milling Asphalt Concrete	1,556	SqYd
633E1400	Pavement Marking Paint, 4" White	800	Ft
633E1405	Pavement Marking Paint, 4" Yellow	100	Ft
634E0010	Flagging	100	Hour
634E0100	Traffic Control	996	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0640	Temporary Pavement Marking	400	Ft
680E0240	4" Corrugated Polyethylene Drainage Tubing	90	Ft
680E0440	4" Slotted Corrugated Polyethylene Drainage Tubing	111	Ft
680E2010	Precast Concrete Headwall for Drain	6	Each
680E2500	Porous Backfill	32.9	Ton
730E0210	Type F Permanent Seed Mixture	7	Lb
731E0100	Fertilizing	375	Lb
732E0250	Fiber Mulching	500	Lb
734E0154	12" Diameter Erosion Control Wattle	180	Ft
831E0110	Type B Drainage Fabric	114	SqYd

# **SPECIFICATIONS**

Standard Specifications for Roads and Bridges, 2004 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 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.

# 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 State ROW.

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

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

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

- 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.

1.31.

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

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

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

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

# 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 designated option borrow sites provided within the plans.

## Action Taken/Required:

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

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

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

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

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

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

# **SEQUENCE OF OPERATIONS**

Variations from this sequence shall be submitted to the Engineer for approval.

- 1. Set up traffic control for first half of roadway.
- 2. Excavate material.
- 3. Construct underdrains.
- 4. Place base course and surfacing.
- 5. Repeat steps 2 through 4 for other lane
- 6. Place flush seal..
- 7. Place erosion control.
- 8. Place permanent pavement marking.
- 9. Remove traffic control.

# **UTILITIES**

The Contractor shall be responsible for locating and protecting any utility that would conflict with any work. 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 project engineer to determine modifications that will be necessary to avoid utility impacts.

Any damage done to a utility will be the Contractor's responsibility to repair.

Utilities within the limits of the proposed construction shall be adjusted by the owner unless otherwise indicated in these plans.

# SAWING EXISTING ASPHALT CONCRETE

Where new asphalt concrete is placed adjacent to existing asphalt concrete the existing asphalt concrete or portland cement concrete shall be sawed full depth to a true line with a vertical face. Saw cutting will not be required at locations where cold milling is used to match existing surfacing elevations.

No separate payment shall be made for sawing and shall be incidental to the various asphalt concrete bid items on the project.

# UNCLASSIFIED EXCAVATION

Unclassified Excavation is provided on the project for removing surfacing material and to install the underdrains and repair the base. The excavation material shall be handled as waste and disposed of in accordance with the Waste Disposal note.

All excavation along the existing surfacing edge shall be performed, so that a shoulder drop off does not exist adjacent to lanes open to the traveling public. The Contractor shall provide a temporary 3:1 slope adjacent to the existing surfacing if the excavation and placement of material cannot be completed prior to nightfall. All costs associated with providing and removing this temporary slope shall be incidental to the various bid items on the project.

All costs for removing and disposing of the existing surfacing and waste material shall be incidental to the contract unit price per cubic yard for Unclassified Excavation.

Plans quantity shall be the basis of payment for the Unclassified Excavation quantity. If changes are made in the field during construction, measurements shall be taken and the quantity shall be adjusted accordingly.

# WATER FOR COMPACTION

Water for Granular Material shall be provided at a rate of 20 gallons per cubic yard of Base Course.

The cost of water for compaction of the Base Course shall be incidental to the contract unit price per Mgal for Water for Granular Material. Four percent, plus or minus, moisture will be required at the time of compaction unless otherwise directed by the Engineer.

# SUBGRADE REPAIR AND UNDERDRAINS

The Asphalt Concrete where the subgrade repair work is planned shall be sawcut.

Material shall be excavated to 2' below the original top of the pavement. Where underdrain installations are planned, trenches shall be excavated an additional 2' wide by 2' deep.

All costs for excavating and disposing of this material shall be incidental to the contract unit price per cubic yard for Unclassified Excavation.

The Corrugated Polyethylene Drainage Tubing within the limits of the porous backfill shall be perforated and wrapped with Type B Drainage Fabric.

In areas of the trench where the perforated tubing is placed, the trench shall be lined with Type B Drainage Fabric. The wrapped perforated tubing shall then be placed in the bottom of the trench. The trench shall then be filled with porous Backfill and Type B Drainage Fabric shall be wrapped over the top of the Porous Backfill.

Base Course shall be placed to a depth 4" below the milled surface. Two of the three 2" lifts of Asphalt Concrete Composite shall be placed on top of the Base Course.

Density shall be to the satisfaction of the Engineer.

The final lift of 2" Asphalt Concrete Composite will be placed during the overlay of the milled area.

The Corrugated Polyethylene Drainage Tubing crossing the shoulder which outlets to the inslope shall be solid-walled (or non-perforated).

The Contactor shall saw cut the asphalt shoulder for installation of the drainage tubing. The non-perforated drainage tubing shall be backfilled with material that was removed from the trench.

All costs associated with installation of the drainage tubing through the shoulder shall be incidental to the contract unit price per foot 4" Corrugated Polyethylene Drainage Tubing.

All tubing shall be paid under the contract unit price per foot for 4" Corrugated Polyethylene Drainage Tubing or 4" Slotted Corrugated Polyethylene Drainage Tubing.

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# SURFACING THICKNESS DIMENSIONS

Plan tonnage will be applied even though the thickness may vary from that shown in the plans. At those locations where material must be placed to achieve a required elevation, plans tonnages may be varied to achieve the required elevation.

# **ASPHALT CONCRETE COMPOSITE**

Asphalt Concrete Composite shall be placed in three 2" lifts as shown on the subgrade repair and typical section.

Mineral aggregate for the Asphalt Concrete Composite shall conform to the requirements of the Standard Specifications for Class E, Type 1.

All other requirements in the Standard Specifications for Asphalt Concrete Composite shall apply.

The asphalt binder used in the mixture shall be PG 64-22, PG 64-28, PG 58-28 or PG 58-34 Asphalt Binder.

# FLUSH SEAL

SS-1h or CSS-1h Emulsified Asphalt for Flush Seal shall be applied 26 feet wide at the rate of 0.05 gallons per square yard.

Sand for Flush Seal applied 26 feet wide at a rate of 8 lbs/sq yd.

Sand for Flush Seal shall be furnished by the Contractor.

The Sand application shall be placed immediately behind the distributor.

The loose sand material left on the surface shall be lightly broomed off after a waiting period of twenty-four hours from the time of application or as otherwise ordered by the Engineer.

	Table of Materials Quantities									
								4" Slotted	Precast	
Cold					Water		4" Corrugated	Corrugated	Concrete	
Milling		Туре В			for	Asphalt	Polyethylene	Polyethylene	Headwall	
Asphalt	Unclassified	Drainage	Porous	Base	Granular	Concrete	Drainage	Drainage	for	
Concrete	Excavation	Fabric	Backfill	Course	Material	Composite	Tubing	Tubing	Drain	
(SqYd)	(CuYd)	(SqYd)	(Ton)	(Ton)	(Mgal)	(Ton)	(Ft)	(Ft)	(Each)	
1556	406	114.4	32.9	582.8	11.7	309.7	90	111	6	

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# TRAFFIC CONTROL – GENERAL NOTES

- 1. Requests to deviate from the sequence of operations shall 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 shall be submitted for review a minimum of one week prior to potential implementation.
- 2. Unless otherwise stated in these plans, no work will be allowed during hours of darkness. Hours of darkness are defined as ½ hour after sunset until ½ hour before sunrise.
- 3. Storage of vehicles and equipment shall be as near the right-of-way as possible. Contractor's employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work. Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage of the vegetation, surfacing, embankment, delineators, and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.
- 4. Existing guide, route, informational logo, regulatory, and warning signs shall be temporarily reset and maintained during construction. Removing, relocating, covering, salvaging and resetting of existing traffic control devices, including but not limited to, traffic signal heads, delineation, and signing shall be the responsibility of the Contractor. Non-applicable signing and all traffic control devices shall be covered or removed during periods of inactivity. Periods of inactivity shall be defined as no work taking place for a period of more than 48 hours. The cost of removing or covering non-applicable signs shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.
- 5. Construction signing mounted on portable supports shall not be used for a duration of more than 3 days, unless approved by the Engineer. Construction signing that remains in the same location for more than 3 days shall be mounted on fixed location, ground mounted, breakaway supports.
- 6. The quantity of traffic control units paid for will be for the greatest number of installations per sign in place at any one time regardless of the number of set-ups on the project.
- 7. Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.
- 8. All materials and equipment shall be stored a minimum distance of 30' from the traveled way during nonworking hours.
- 9. The Contractor shall provide documentation that all breakaway sign supports comply with FHWA NCHRP 350 or MASH crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.

- 10. The Contractor shall be required to have a person available 24 hour/day, 7 days/week to maintain traffic control devices. The name and cellular telephone number of this individual shall be given to the Engineer at the preconstruction meeting.
- 11. The Contractor or designated traffic control subcontractor shall make night inspections at the initial set up of traffic control and every week thereafter to ensure the adequacy, legibility and reflectivity of each sign and device. A written summary of each inspection shall be given to the Engineer within 24 hours after completion of the inspection. The cost for the nighttime inspection work shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.
- 12. Vehicles working in traffic or alongside traffic shall be equipped with a flashing amber light visible from all directions. The amber light shall be mounted on the uppermost part of the Contractor's vehicle. Lights must have peak intensity within the range of 40 to 400 candelas and must flash at  $75 \pm 15$  flashes per minute. Vehicle flasher/hazard lights are not acceptable. All haul trucks shall be equipped with a second flashing amber light that is visible from the backside of the haul truck. The costs for the flashing amber lights shall be incidental to the various related contract bid items.
- 13. All construction operations shall be conducted in the general direction of traffic movement.
- 14. If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD whichever is more stringent shall be used, as determined by the Engineer.
- 15. Temporary Road Markers (Tabs) shall be used for lane closure tapers or lane shift tapers and shall be installed at 5' spacing. Tabs used for tapers and shifts will not be measured for payment. All costs associated to furnish, install, maintain (including replacement as required by the Engineer at no added cost to the Department), and remove all markers will be incidental to the contract lump sum price for Traffic Control, Miscellaneous.
- 16. Drums are required in all lane closure tapers.
- 17. The Contractor shall install flags or supplemental beacon to the stop signs as per section 2A.15 of the MUTCD. Cost for this shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous
- 18. The traffic control setup shown on Standard Plate 634.25 shall be left in place until all paving activities are completed.

#### **BUMP MARKERS**

Bump markers shall be placed adjacent to the bump location.

After placing the bump markers, "Bump" warning signs with the appropriate speed advisory plates shall be placed 500 feet to 750 feet in advance of the bump location in rural areas, or 250 feet to 500 feet in advance of the bump location in urban areas. These distances may be adjusted by the Engineer if local conditions do not allow the placement of warning signs within the specified areas.

The steel delineator post shall be 1.12 lb/ft flanged channel post for ground mounted installation. If the duration is less than 3 days, the Type 1 Object Marker can be installed on temporary supports.

Payment for bump markers shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.



# **INVENTORY OF TRAFFIC CONTROL DEVICES**

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	2	17	34
R1-1	30" x 30"	STOP	2	21	42
W1-3	48" x 48"	REVERSE TURN SIGN (RIGHT)	2	34	68
W3-1	48" x 48"	STOP AHEAD (SYMBOL)	2	34	68
W8-1	48" x 48"	BUMP	2	34	68
W13-1P	30" x 30"	ADVISORY SPEED PLATE - 20 MPH	4	21	84
W20-1	48" x 48"	ROAD WORK AHEAD	4	34	136
W20-4	48" x 48"	ONE LANE ROAD AHEAD	4	34	136
W20-7	48" x 48"	FLAGGER	2	34	68
W21-5	48" x 48"	SHOULDER WORK	2	34	68
****		TYPE 3 BARRICADE - 8 FT. DOUBLE SIDED	4	56	224
		-	FOTAL U	NITS	996

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# **TEMPORARY PAVEMENT MARKING**

The Contractor shall place temporary pavement marking. Temporary pavement marking paint shall be used on the milled surface. Temporary road markers shall be used on the finished asphalt surface. Temporary pavement markings for the centerline of the roadway throughout the full length of the project shall meet the requirements of Section 634 of the Specifications. Covers on tabs shall be removed prior to opening the roadway to normal traffic flow.

The Contractor shall use protective marker covers

The Contractor shall be responsible for maintaining a visible and reflective centerline throughout the project. Any marking covered or damaged shall be replaced prior to the end of the day. All costs associated with this work shall be incidental to the contract unit price per mile for Temporary Pavement Marking.

Flagger symbol signs (W20-7) and flaggers, or a shadow vehicle equipped with high-intensity rotating, flashing, oscillating or strobe lights shall be positioned on the roadway shoulder in advance of the workers for the installation of temporary road markers. The traffic control device used shall be moved to provide proper warning of the work operation. A ROAD WORK AHEAD (W20-1) sign, a worker symbol sign (W21-1) or a BE PREPARED TO STOP (W3-4) sign shall be mounted on the rear of the shadow vehicle. The method of traffic control used by the Contractor for this work shall be approved by the Engineer.

All costs for temporary pavement marking including furnishing, applying, uncovering, maintenance and removal of tabs shall be incidental to the contract unit price per mile for Temporary Pavement Marking.

#### PERMANENT PAVEMENT MARKING

The Contractor shall survey and mark the location of no passing zones prior to covering pavement marking.

The Contractor shall repaint all of the existing pavement marking paint including centerline, edge line, lane lines, etc. The Contractor shall provide a copy of the pavement marking inventory to the Engineer. The cost of tabs shall be incidental to the temporary pavement making bid item. All costs associated with this work shall be incidental to the pavement marking bid items.

Application of permanent pavement marking may begin 7 calendar days following completion of the fog seal and shall be completed within 14 calendar days following completion of the fog seal.

Striper and advance and trailing warning vehicles shall be equipped with flashing amber or arrow panel warning lights.

# RATES OF APPLICATION

Centerline striping (yellow) - 25.0 gallons per mile. \* 4" Edgeline striping (white) - 33.8 gallons per mile. \*\* Glass Beads – 8 lbs. per gallon of paint

\* Rate is a Region average. The actual gallons used will vary depending upon the number of No Passing Zones.

\*\* Rate is for both edge lines.

Table of Pavement Marking				
	Pavement	Pavement		
Temporary	Marking	Marking		
Pavement	Paint,	Paint,		
Marking	4" White	4" Yellow		
(Ft)	(Ft)	(Ft)		
400	800	100		

#### **REMOVE AND REPLACE TOPSOIL**

Prior to beginning underdrain construction, a 4" depth of topsoil shall be bladed to the side on the respective inslopes and left in a windrow at the edge of the work limits. Following completion of underdrain construction, topsoil shall be bladed back over the inslopes to the point indicated on the typical section.

All cost associated with removing and replacing the topsoil along areas to be resurfaced shall be incidental to the lump sum price for Remove and Replace Topsoil.

# **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 unit price per pound for the corresponding permanent seed mixture.

Product

### MycoApply

# Manufacturer

Mycorrhizal Applications, Inc. Grants Pass, OR Phone: 1-866-476-7800 http://www.mycorrhizae.com/

# FERTILIZING

The Contractor shall apply an all-natural slow release fertilizer prior to seeding or placing sod. The all-natural fertilizer shall have a minimum guaranteed analysis of 4-6-4 and be USDA Certified BioBased. It should provide a minimum of 4% (N) nitrogen with a minimum water insoluble nitrogen (WIN) fraction of 3.2%, a minimum of 6% (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 shall 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 shall 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 shall 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 all-natural slow release fertilizer shall be applied according to the manufacturer's application recommendations.

approved equal:

Product

Sustane

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The application rate is 1,500 pounds per acre.

The all-natural slow release fertilizer shall be from the list below or an

Manufacturer

Sustane Corporate Headquarters Cannon Falls. Minnesota Phone: 1-800-352-9245 http://www.sustane.com/

# 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.

All permanent seed shall be planted in the topsoil at a depth of  $\frac{1}{4}$ " to  $\frac{1}{2}$ ".

All seed broadcast must be raked or dragged in (incorporated) within the top  $\frac{1}{2}$ " to  $\frac{1}{2}$ " of topsoil when possible. This requirement may be waived by the Engineer during construction when raking or dragging is deemed not feasible by conventional methods.

The varieties listed for seed mixtures are preferred varieties.

Native harvest seed will be allowed.

Type F Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Flintlock, Rodan, Rosana	7
Green Needlegrass	Lodorm	4
Sideoats Grama	Butte, Killdeer, Pierre, Trailway	3
Blue Grama	Bad River, Willis	2
Oats or Spring Wheat: April through May;		10
Winter Wheat: August through November		
	Total <sup>.</sup>	26

#### FIBER MULCHING

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

An additional 2% by weight of tackifier shall 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 shall be guar gum. If the product selected has synthetic tackifier included, then the additional 2% of tackifier shall be synthetic.

Fiber mulch shall be applied at the rate of 2000 pounds per acre.

The Contractor shall 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 shall be incidental to the contract unit price per pound or ton for Fiber Mulching.

The fiber mulch provided shall 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

# **EROSION CONTROL WATTLE**

Erosion control wattles for restraining the flow of runoff and sediment shall be installed on the outer perimeter of the drain headwalls and at locations determined by the Engineer during construction. Refer to Standard Plate 734.06 for details.

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

Erosion control wattles shall remain on the project to decompose.

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

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

Tab	ole of Erosi	on Control	
Type F			12"
Permanent			Erosion
Seed		Fiber	Control
Mixture	Fertlizing	Mulching	Wattles
(Lb)	(Lb)	(Lb)	(Ft)
7	375	500	180

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# TYPICAL SECTIONS



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OTTED EBOM - IBBC1360

# **Base Repair and Underdrain Installation Detail**

LONGITUDINAL SECTION ALONG CENTERLINE Length of Poor Subgrade





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Concrete	Pavement
lace	
lace	

1.5' Base Course

# GENERAL PAVEMENT Marking layout



	67.75 05		PR		CUEET	TOTAL
	STATE OF				SHEET	SHEETS
	DAKOTA		085-4	471	12	18
	Plotting	Date:	03/09/20	015		
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STATE OF	PROJECT	SHEET	TOTAL SHEETS
DAKOTA	085-471	13	18
Plotting Date:	03/09/2015		

...\Title Sheet Highway 85 MRM 145 dgn



<ul> <li>Channelizing Device</li> <li>For low-volume traffic situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger may be use</li> <li>The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (I hour or less).</li> <li>For tack and/or flush seal operations, when flaggers are not being used, the FRESH OLL sign (W21-2) shall be displayed in advance of the liquid asphalt areas.</li> <li>Flashing warning lights and/or flags may be used to call attention to the advance warning signs.</li> <li>The channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.</li> <li>Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.</li> <li>The buffer space should be extended so that the two-way traffic taper is placed before a horizontal or vertical curve to provide adequate sight distance for the flagger and queue of stopped vehicles.</li> <li>The length of A may be adjusted to fit field conditions.</li> </ul>
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Channelizing Device
-
Flagger
45 - 50         500         50           55         750         50           60 - 65         1000         50
(M,P.H.)         (A)         (G)           0 - 30         200         25           35 - 40         350         25
Speed Advance WarningLhannelizing Prior to Signs Devices Work (Feet) (Feet) (M.P.H.) (A)









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	SOUTH DAKOTA	085-471	16	18



STATE OF	PROJECT	SHEET	TOTAL
SOUTH DAKOTA	085-471	17	18



The Contractor and Engineer shall in week and within 24 hours after ever Contractor shall remove, dispose, or r necessary as determined by the Eng Sediment removal, disposal, or necessar All costs for removing accumulated s shaping shall be incidental to the cor Sediment". All costs for furnishing and installing equipment, and materials shall be incide for the corresponding erosion contr	<ul> <li>The stakes shall be 17.2° or 2°.2° woor rebar may be used only if approved 6° from the ends of the wattles and shall be 3' to 4'.</li> <li>Where installing running lengths of a wattle tightly against the first and The Contractor and Engineer shall in week and within 24 hours after ever Contractor shall remove, dispose, or a necessary as determined by the Eng Sediment removal, disposal, or necessar All costs for removing accumulated s shaping shall be incidental to the consediment".</li> <li>All costs for furnishing and installine equipment, and materials shall be incidental to the contractor be corresponding erosion contractor for the corresponding erosion contractor.</li> </ul>
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	STATE OF SOUTH			SHEET	SHEETS
	DAKOTA	085-471		18	18
shall be insta	alled alor	ng the contour	and		
igher than poi he ends.	nt B to	ensure that w	vater		
n, install the w e wattle, and	attle tig then com	phtly in the tipact the soil	rench so excavated		
the uphill side	e.See De <sup>-</sup>	tail B.			
akes, however, the Engineer.	other ty The stak	ypes of stake .es shall be pla	s such as aced		
e spacing of ·	the stak	es along the v	wattles		
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t the erosion	control	wattles once	every		
ape the accur	nulated s	sediment when			
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shaping shall t nent, disposal c	be as dir of sedime	ected by the ent, and necess	Engineer. Sary		
ct unit price	per cubi	c yard for "R	emove		
ne erosion cor	ntrol wat <sup>.</sup>	tles including	labor.		
al to the contract unit price per foot attle bid item.					
olwattle fro	m the pr	oiect includin	a labor.		
al to the contract unit price per foot for					
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			Sheet 2 d	of 2	