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	DAKOTA	000 I -391	1	38
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Estimate of Quantities Trinity CASS-S3 Manufacturer Plates Standard Plates

# ESTIMATE OF QUANTITIES

Non-Section Method

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
* 009E0197	Mobilization 1	5	Each
* 009E0198	Mobilization 2	4	Each
* 110E0700	Remove 3 Cable Guardrail	200	Ft
* 110E0730	Remove Beam Guardrail	300.0	Ft
* 110E0770	Remove W Beam Guardrail Breakaway Cable Terminal	1	Each
* 110E0790	Remove W Beam Guardrail Deformed End	1	Each
* 110E0800	Remove W Beam Guardrail End Terminal	1	Each
* 110E6000	Remove 3 Cable Guardrail for Reset	25	Ft
* 110E6210	Remove Thrie Beam Guardrail for Reset	25.0	Ft
* 110E6230	Remove W Beam Guardrail for Reset	25.0	Ft
* 110E6300	Remove Rubrail for Reset	25.0	Ft
* 120E0600	Contractor Furnished Borrow	25	CuYd
* 260E1090	Base Course, State Furnished	25.0	Ton
* 629E0225	Reset High Tension Cable Guardrail Terminal Post	5	Each
* 629E0300	3 Cable Guardrail Slip Base Anchor Assembly	1	Each
* 629E0400	3 Cable Guardrail Anchor Assembly	1	Each
* 629E0454	Retension High Tension 4 Cable Guardrail	2,000	Ft
* 629E1000	Repair 3 Cable Guardrail	4,000	Ft
* 629E1100	3 Cable Guardrail End Post	10	Each
* 629E1102	3 Cable Guardrail Intermediate Post	130	Each
* 629E1103	3 Cable Guardrail Slip Base Anchor Post	2	Each
* 629E1104	3 Cable Guardrail Post, Winter	75	Each
* 629E1106	Drive Down 3 Cable Guardrail Post	20	Each
* 629E1108	Reset 3 Cable Guardrail Post	25	Each
* 629E1110	Cable Anchor Bracket	1	Each
* 629E1112	Cable Splice	5	Each
* 629E1114	3 Cable Guardrail J Hook Bolt	400	Each
* 629E1117	Turnbuckle Assembly	5	Each
* 629E1118	Spring Cable End Assembly with Turnbuckle	10	Each
* 629E1120	W Beam to 3 Cable Transition Bracket	4	Each
* 629E1122	3 Cable Guardrail End Post Cap	7	Each
* 629E1144	High Tension 4 Cable Guardrail Post	20	Each
* 629E1159	High Tension 4 Cable Guardrail Post and Sleeve	5	Each
* 629E1164	High Tension 4 Cable Guardrail Sleeve	5	Each
* 629E1170	High Tension Cable Guardrail Terminal Post	5	Each
* 629E1174	Hardware for High Tension Cable Attachment to Terminal Post	5	Each
* 629E1175	Hardware for High Tension Cable Attachment to Post	40	Each
* 629E1180	High Tension Cable Guardrall Post Strap	15	Each
* 629E1181	High Tension Cable Guardrail Cable Spacer	15	Each
* 629E2115	Cable	50	Ft
* 630E0200	Straight Class A Thrie Beam Rail	100.0	Ft
* 630E0210	Straight Class B Thrie Beam Rail	50.0	Ft

Non-Section Method

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
* 630E0500	Type 1 MGS	12.5	Ft
* 630E0520	Type 2 MGS	12.5	Ft
* 630E0530	Type 3 MGS	12.5	Ft
* 630E1200	Straight Class A W Beam Rail	175.0	Ft
* 630E1210	Straight Class B W Beam Rail	100.0	Ft
* 630E2000	W Beam to Thrie Beam Guardrail Transition	2	Each
* 630E2001	Asymmetrical W Beam to Thrie Beam Guardrail Transition	1	Each
* 630E2005	W Beam Guardrail to MGS Transition	1	Each
* 630E2010	W Beam Guardrail End Terminal	1	Each
* 630E2016	MGS Flared End Terminal	1	Each
* 630E2017	MGS MASH Flared End Terminal	1	Each
* 630E2018	MGS MASH Tangent End Terminal	1	Each
* 630E2019	MGS Tangent End Terminal	1	Each
* 630E2030	W Beam Guardrail Breakaway Cable Terminal	1	Each
* 630E2055	Thrie Beam Guardrail Trailing End Terminal	1	Each
* 630E2060	W Beam Guardrail Trailing End Terminal	1	Each
* 630E2065	MGS Trailing End Terminal	1	Each
* 630E2100	Beam Guardrail Post	0	Each
* 630E2105	Beam Guardrail Block	0	Each
* 630E2110	Beam Guardrail Post and Block	60	Each
* 630E2120	Beam Guardrail Post and Block, Winter	15	Each
* 630E2205	Breakaway Cable Terminal End Post	5	Each
* 630E2210	Breakaway Cable Terminal End Rail	3	Each
* 630E2215	W Beam Guardrail End Section Buffer	2	Each
* 630E5010	Reset Type 1 MGS	12.5	Ft
* 630E5020	Reset Type 2 MGS	12.5	Ft
* 630E5030	Reset Type 3 MGS	12.5	Ft
* 630E5160	Reset W Beam Rail	25.0	Ft
* 630E5203	Reset MGS MASH Flared End Terminal	1	Each
* 630E5204	Reset MGS MASH Tangent End Terminal	1	Each
* 630E5205	Reset MGS Flared End Terminal	1	Each
* 630E5206	Reset MGS Tangent End Terminal	1	Each
* 630E5220	Reset Rubrail	25.0	Ft
* 630E5520	Drive Down Beam Guardrail Post	10	Each
* 630E5530	Remove and Reset Beam Guardrail Post and Block	10	Each
* 632E2220	Guardrail Delineator	10	Each
* 634E0010	Flagging	10.0	Hour
* 634E0110	Traffic Control Signs	1,298.0	SqFt
* 634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
* 634E0275	Type 3 Barricade	8	Each
* 634E0420	Type C Advance Warning Arrow Board	1	Each
* 910E1070	Labor and Equipment	5	Hour

\* - Denotes Non-Participating

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# **ESTIMATE OF QUANTITIES**

The Contractor will furnish and install guardrail material as per the Contract Proposal. The quantities for each item are estimated to establish a pay unit. The actual amount of work required may vary greatly from the Estimate of Quantities. There will be no negotiation for overruns or underruns on this contract.

# SPECIFICATIONS

Standard Specifications for Roads & 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 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. During construction, the Project Engineer will verify that the Contractor has met Environmental Commitment requirements. 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.p df >

For questions regarding change orders in the field that may have an effect on an Environmental Commitment, the Project Engineer will contact the Environmental Engineer at 605-773-3180 or 605-773-4336 to determine whether an environmental analysis and/or resource agency coordination is necessary.

Once construction is complete, the Project Engineer will review all environmental commitments for the project and document their completion.

# 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 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 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 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 through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating "No Dumping Allowed".

2. 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.

# **CLEARANCES**

provided within the plans.

# **Action Taken/Required:**

All earth disturbing activities not designated within the plans require review of cultural resources impacts. This work includes, but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

The Contractor will 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 will 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 will 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.

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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 will be removed from view of the ROW or buried and the waste disposal site reclaimed as noted

# COMMITMENT I: HISTORICAL PRESERVATION OFFICE

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

#### HISTORICAL PRESERVATION OFFICE COMMITMENT I: **CLEARANCES – Continued**

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 within 100 feet of the inadvertent discovery will immediately cease and the Project Engineer will be immediately notified. The Project Engineer will contact the SDDOT Environmental Office, who will contact the appropriate SHPO/THPO within 48 hours of the discovery to determine an appropriate course of action.

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

# **COMPLETION DATE**

The contract will become effective on July 1, 2024 and will expire on June 15, 2025.

## SCOPE OF WORK

This project consists of guardrail repair within the section of Interstate 90 located in the South Dakota Department of Transportation Winner Area. as ordered by the Engineer. This stretch of Interstate is located in Jackson, Jones, and Lyman Counties from MRM 130.3 to MRM 251.6. The Winner Area Engineer will inform the Contractor of any areas that are to be exempted from guardrail repair due to active construction projects. This information will detail the exemption limits from Mile Reference Marker to Mile Reference Marker and date to date that guardrail repair will not be conducted.

# MOBILIZATION

Mobilization 1 is the cost of mobilization per each time the Contractor mobilizes to the project at the request of the Winner Area Engineer, or his designated representative, to perform guardrail repair within the Winner Area east of the bridge structure located on Highway 83 over Interstate 90 (Winner Area East of Murdo). This structure is located at MRM 192.65.

Mobilization 2 is the cost of mobilization per each time the Contractor mobilizes to the project at the request of the Winner Area Engineer, or his designated representative, to perform guardrail repair within the Winner Area, at or west of the bridge structure located on Highway 83 over Interstate 90 (Winner Area West of Murdo). This structure is located at MRM 192.65.

Mobilization will be paid once each time the Contractor is required to mobilize to repair guardrail, regardless of the number of sites requiring repair within the project limits. Mobilization will be paid at the higher of the two Mobilization bid items if the Contractor is required to repair guardrail at sites both east and west of the dividing line located at MRM 192.65.

# **PROGRESS PAYMENTS**

At the preconstruction meeting the Contractor will be given a Billing Sheet to record the work done at the repair areas. This sheet will be used by the Contractor to record the location of each repair site and the materials required to make repairs.

Progress payments will be prepared upon receipt of the Billing Sheet from the Contractor for repairs completed.

# UTILITIES

The Contractor is required to comply with South Dakota Codified Law and Administrative Rule addressing excavation activities. Notification of Utility companies will be in accordance with Section 5.6 of the Specifications. South Dakota One Call phone number is 1-800-781-7474.

# **GENERAL MAINTENANCE OF TRAFFIC**

The plan quantity for Traffic Control Signs is based on the Contractor mobilizing five times to repair guardrail and the required number of traffic control devices to construct one work zone for each mobilization. Additional traffic control devices will be measured and paid if the Contractor has a large enough crew to work at two work sites simultaneously. Signs that are reused at different sites during the same mobilization will be paid for only once. Signs that have tabs or are hinged to expedite changing the message will be considered as one sign for payment. Traffic control signs and Type 3 barricades will be measured and paid each time the Contractor is mobilized to repair guardrail. The Type C Advance Warning Arrow Board, if used, will be paid for only once for the time duration of this project.

Equipment will be confined to the shoulder, a driving lane closed to traffic, or a passing lane closed to traffic. Closure of both driving and passing lanes simultaneously will not be permitted. The Contractor will not cross interstate medians to travel between work sites in opposite interstate lanes. Contractor employees will not be allowed to use the SDDOT maintenance crossovers.

Work activities will be conducted during daylight hours only. Traffic will be returned to the normal driving lanes during non-working hours. All construction operations will be conducted in the general direction of traffic movement

All equipment and vehicles entering or exiting the roadway, traveling on the shoulders, traveling at speeds less than 40 MPH between work sites, or working within the right-of-way will be equipped with an activated 360 degree, SAE J845, Class II or higher warning light to warn the traveling public.

Traffic control will be in accordance with Section 634 of the specifications and the plan notes. All traffic control devices are to be in like new condition. Any traffic control device that warrants replacement due to its poor condition or absence will be replaced immediately by the Contractor at the Contractor's expense.

The Contractor will use flaggers and 45 MPH Advisory Speed Plates as needed to regulate traffic to provide a safe working environment for Contractor workers and inspection personnel. The advisory speed plates of the flagger station.

# **GENERAL GUARDRAIL REPAIR**

# **HIGH TENSION GUARDRAIL**

of each bid item.

Trinity Highway Products CASS-S3 4-Cable Guardrail Safety System will be repaired and reinstalled in accordance with manufacturer details and instructions shown in these plans.

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(W13-1P) will be 30" x 30" and will be installed in conjunction with the "Right Lane Closed Ahead" (W20-5) signs as shown on Standard Plate 634.64. The flagger symbol sign (W20-7) will be placed a minimum of 500 feet in front

The Contractor may be required to furnish some items that are not listed in the Contract Proposal. The Contractor will furnish the invoice and will be paid invoice cost plus shipping, handling, taxes and 10 percent for profit. The Contractor is required to receive prior approval from the Engineer before making these purchases. Installation cost for these additional items will be incidental to the contract unit prices for the various items. Cost to remove and dispose of damaged guardrail items will be incidental to the contract unit prices for the various items. The Contractor and Engineer will negotiate installation costs for added items which vary significantly from contract items.

The following bid items will be used when the Engineer directs the Contractor to repair High Tension 4 Cable Guardrail Systems. The primary expected repairs are listed in the table, followed by an explanation

### **HIGH TENSION GUARDRAIL - Continued**

# High Tension Guardrail Bid Items

BID ITEM NUMBER	ITEM	PAYMENT INFO.	UNIT
629E0225	Reset High Tension Cable Guardrail Terminal Post	1	Each
629E0454	Retension High Tension 4 Cable Guardrail	2	Ft
629E1112	Cable Splice	3	Each
629E1117	Turnbuckle Assembly	4	Each
629E1144	High Tension 4 Cable Guardrail Post	5	Each
629E1159	High Tension 4 Cable Guardrail Post and Sleeve	6	Each
629E1164	High Tension 4 Cable Guardrail Sleeve	7	Each
629E1170	High Tension Cable Guardrail Terminal Post	8	Each
629E1174	Hardware For High Tension Cable Attachment To Terminal Post	9	Each
629E1175	Hardware For High Tension Cable Attachment To Post	10	Each
629E1180	High Tension Cable Guardrail Post Strap	11	Each
629E1181	High Tension Cable Guardrail Cable Spacer	12	Each
629E2115	Cable	13	Ft

# High Tension Guardrail Bid Items **Payment Information Explanation**

1. This item to be used when a terminal post needs to be reset if the cable was released after post was struck. Post needs to be in good working condition. Payment includes cost for resetting the terminal post including, hardware, labor, equipment, and incidentals.

2. Payment includes cost for all labor and equipment to tension the high tension 4 cable guardrail to current specifications. Measurement will be measured to the nearest foot from the center of anchor assembly to center of anchor assembly. For example: If the system utilizes four anchor footings in the anchor assembly, then the center of the anchor assembly would be centered between the second and third footing.

3. Bid item may be used for splicing high tension cable guardrail or low tension standard 3 cable guardrail. Payment for cable splice includes cost for cutting cable as necessary, furnishing and installing the cable splice, labor, equipment, and incidentals.

4. Bid item may be used for furnishing and installing turnbuckle assembly for high tension or low tension cable guardrail. This item is used for a typical repair if a turnbuckle is damaged and a new one needs to be installed. Payment for turnbuckle assembly includes cost for cutting the cable as necessary, furnishing and installing the turnbuckle assembly, labor, equipment, and incidentals.

5. Bid item may be used for furnishing and installing a high tension 4 cable guardrail post. This item is used for a typical repair if a high tension 4 cable guardrail post is damaged and a new one needs to be installed. Payment includes cost for furnishing and installing a high tension 4 cable guardrail post, new hardware, labor, equipment, and incidentals.

6. Bid item may be used for furnishing and installing a high tension 4 cable guardrail post and sleeve. This item is used for a typical repair if a high tension 4 cable guardrail post and sleeve is damaged and a new one needs to be installed. Payment includes cost for furnishing and installing a high tension 4 cable guardrail post and sleeve, new hardware, labor, equipment, and incidentals.

7. Bid item may be used for furnishing and installing a high tension 4 cable guardrail sleeve. This item is used for a typical repair if a high tension 4 cable guardrail sleeve is damaged and a new one needs to be installed. Payment includes cost for furnishing and installing a high tension 4 cable guardrail sleeve, new hardware, resetting post, labor, equipment, and incidentals.

8. Bid item may be used for furnishing and installing a high tension cable guardrail terminal post. This item is used for a typical repair if a high tension cable guardrail terminal post is damaged and a new one needs to be installed. Use this item even if there is only one terminal post for the anchorage system as some systems have a terminal post for every cable and have multiple footings and terminal posts depending on the number of cables. Payment includes cost for furnishing and installing a high tension cable guardrail terminal post, new hardware, labor, equipment, and incidentals.

9. Bid item may be used for furnishing and installing the hardware for a high tension cable guardrail terminal post. This item is used for a typical repair if a high tension cable guardrail terminal post is struck and releases the cable(s). Use this item when the terminal post is in good condition and only new hardware and resetting the terminal post is necessary. Payment includes cost for furnishing and installing hardware for the high tension cable attachment to terminal post, resetting terminal post, labor, equipment, and incidentals.

10. Bid item may be used for furnishing and installing the hardware for a high tension cable attachment to post. This item is used for a typical repair if the hardware was damaged by a snow plow or other crash. Use this item when the post is in good condition and only new hardware is necessary. The quantity and unit for the bid item is one "Each" for one attachment, i.e. if all attachments are damaged on a high tension 4 cable guardrail post then the quantity would be 4. Payment includes cost for furnishing and installing hardware for the high tension cable attachment to post, labor, equipment, and incidentals.

11. This bid item is specific to products from Trinity known as the CASS high tension cable barrier. Use this item when only the post strap needs to be replaced. This part would be included in the price of the post if a new post is needed. Payment includes cost for furnishing and installing the high tension cable guardrail post strap, labor, equipment, and incidentals.

12. This bid item is specific to products from Trinity known as the CASS high tension cable barrier. This part typically has white or yellow reflectorized delineation on it. Use this item when only the cable spacer needs to be replaced. This part would be included in the price of the post if a new post is needed. Payment includes cost for furnishing and installing the high tension cable guardrail cable spacer, labor, equipment, and incidentals.

13. This bid item will be used for furnishing and installing cable for high tension (prestretched) or low tension (prestretched or non-pre-stretched) cable guardrail for a typical repair if a cable is damaged and a new piece needs to be installed. Payment for each cable includes cost for cutting the cable as necessary, furnishing and installing the cable, labor, equipment, and incidentals.

#### **GUARDRAIL**

- Approved Product List.

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1. When guardrail adjoining bridge ends is ordered to be repaired, the contractor will replace with the same size and type as existing type of guardrail. Post spacing will be in accordance with current specifications. See the Department's 630 Standard Plate Series for

post spacing and post length requirements included in these plans or at the Department's website @:

http://www.sddot.com/business/design/plates/index/Default.aspx.

2. When the SDDOT instructs the Contractor to replace a W Beam guardrail end terminal, the new W Beam guardrail end terminal will be of the same type (flared or tangent) that was originally installed. The costs for furnishing and installing the tangent and flared W Beam guardrail end terminals will be incidental to the contract unit price per each for "W Beam Guardrail End Terminal". If W Beam posts and blocks are needing to be replaced, they be paid under their respective bid items "Beam Guardrail Post" and "Beam Guardrail Block" these prices include all costs for furnishing and installation. All W Beam guardrail end terminals, posts and blocks that are replaced will be selected from the South Dakota Department of Transportation

3. When the SDDOT instructs the Contractor to replace an MGS guardrail end terminal, the new MGS guardrail end terminal will be of the same type (flared or tangent) that was originally installed. The costs for furnishing and installing the tangent and flared MGS guardrail end terminals will be incidental to the contract unit price per each for "MGS End Terminal". If posts and blocks are needing to be replaced, they will be paid under their respective bid items "Beam Guardrail Post" and "Beam Guardrail Block" these prices include all costs for furnishing and installation. All MGS guardrail end terminals, posts and blocks that are replaced will be selected from the South Dakota Department of Transportation Approved Product List.

4. If the ground condition at the site is frozen or has large snow amounts, the portion of embankment and surfacing modification that does not affect guardrail installation or performance will be completed as soon as conditions permit, prior to contract completion date.

# **GUARDRAIL-Continued**

- 5. "Beam Guardrail Post and Block, Winter" is the additional cost for removal and installation of guardrail posts when there is in excess of one foot of solid frozen ground at the work site. This contract unit price will be an <u>additional payment</u> for each post installed under these conditions.
- 6. "3 Cable Guardrail Post, Winter" is the additional cost for removal and installation of a 3 Cable Guardrail Post (I Beam or Flanged Channel) when there is in excess of one foot solid frozen ground at the work site. This contract unit price will be an <u>additional payment</u> for each post installed under these conditions.
- 7. "Remove and Reset Beam Guardrail Post & Block" includes removal of wood guardrail post and block and resetting it to proper alignment with the Beam Guardrail. Payment for this work will be the same in frozen or unfrozen ground.
- 8. "Repair 3 Cable Guardrail" includes the cost for replacing and repairing damaged cable, realigning posts, and the tensioning of the entire run of three cable guardrail. Payment for this item is applicable only when broken cable is repaired or the existing cable rail requires realigning and tensioning.
- 9. "3 Cable Guardrail Intermediate Post" includes the cost for both I Beam and Flanged type of posts. The post for this item will be furnished and installed consistent with the type of posts presently in place at the proposed repair site.
- 10. "Beam Guardrail Post and Block" will include the appropriate size wood block. The Engineer will designate the proper post length of six, six and one-half, or seven feet as needed to fit the repair situation.
- 11. The Contractor will replace any damaged guardrail delineation which cannot be repaired by bolting/riveting to new posts or guardrail installed by Contractor. See Standard Plate 632.40 for guardrail delineation requirements. The "Guardrail Delineator" bid item will be used to compensate the contractor for this work.

# LABOR AND EQUIPMENT

The Contractor may be required to clean out snow from around the guardrail and posts during the winter period. All costs to remove snow away from the work area necessary to complete the requested guardrail repair work, including labor, equipment, and incidentals will be incidental to the contract unit price per hour for Labor and Equipment.

# **BASE COURSE, STATE FURNISHED**

The Contractor may be required to install Base Course, State Furnished on this project. This base course will be compacted to the satisfaction of the Engineer. Base Course State Furnished will be available from the SDDOT Maintenance Yards located at Kadoka, legal description of NW1/4, Section 32, T2S, R22E; (Exit 150) and Reliance, legal description of SW1/4, Section 35, T105N, R73W; (Exit 250). This material can be used without testing.

The Base Course, State Furnished is royalty free to the Contractor.

The final quantity to be paid will be based on loose volume of cubic yards hauled in each truckload. All costs for hauling and placing base course material will be incidental to the contract unit price per cubic yard for "Base Course, State Furnished".

All other requirements of the specifications for Base Course will apply.

This project will use a conversion factor of 1.5 ton per cubic yard for this material.

#### **CONTRACTOR FURNISHED BORROW EXCAVATION**

The Contractor will provide a suitable site for Contractor furnished borrow material. The borrow material will be approved by the Engineer. The final quantity to be paid will be based on loose volume of cubic yards hauled in each truckload. All costs for placements of borrow material will be incidental to the contract unit price per cubic yard for "Contractor Furnished Borrow Excavation". Compaction of borrow material will be to the satisfaction of the Engineer. The Contractor is responsible for obtaining all required permits and clearances for the borrow site.

Restoration of the Contractor furnished borrow site will be the responsibility of the Contractor.

# **RESTORATION OF DISTURBED AREAS**

Areas disturbed as a result of work necessary under this Contract will be reshaped and/or restored to the satisfaction of the Engineer.

Slopes and berms disturbed will be leveled and excess material removed. Area will be tilled to the minimum depth of three inches and seeded with Intermediate Wheatgrass (Oahe) at the rate of one-half (1/2) pound "Pure Live Seed" per 1000 square feet. The seed will be noxious weed free. Cost for reshaping, leveling, removal of excess material, tilling, and seeding disturbed areas on the slopes and berms will be incidental to the contract unit price for the various items.

# **ITEMIZED LIST OF TRAFFIC CONTROL DEVICES**

SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W4-2	LEFT or RIGHT LANE ENDS (symbol)	2	48" x 48"	16.0	32.0
W7-3aP	NEXT MILES (plaque)	2	36" x 30"	7.5	15.0
W13-1P	ADVISORY SPEED (plaque)	2	30" x 30"	6.3	12.6
W20-1	ROAD WORK AHEAD	3	48" x 48"	16.0	48.0
W20-5	LEFT or RIGHT LANE CLOSED AHEAD	2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)	2	48" x 48"	16.0	32.0
W21-5a	LEFT or RIGHT SHOULDER CLOSED	2	48" x 48"	16.0	32.0
W21-5b	LEFT or RIGHT SHOULDER CLOSED AHEAD	2	48" x 48"	16.0	32.0
G20-2	END ROAD WORK	3	48" x 24"	8.0	24.0
		EXPRES TRAFF	SWAY / INTE IC CONTRO SQFT	ERSTATE L SIGNS	259.6

ITEM DESCRIPTION Type C Advance Warnin

STATE OF	PROJECT	SHEET	TOTAL SHEETS
SOUTH DAKOTA	0001-391	6	38

Plotting Date:

02/20/2024

# ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

#### ARROW BOARDS

	QUANTITY	
g Arrow Board	1	Each



	STATE OF SOUTH	PROJECT	SHEET	TOTAL SHEET
	DAKOTA	000 I -391	7	38
	Plotting Date:	02/20/2024		
NOTES:				
1. CASS-S3 4-C/ NATIONAL COO LEVEL 3 (NCHR 4:1 OR FLATTE! TESTED AND A( PROGRAM REP SPACING WHEN INFORMATION (	ABLE (4:1) HAS BE PERATIVE HIGHV IP 350 TL3) FOR V R SLOPE. CASS-S CCEPTED TO NAT ORT 350 TEST LE NINSTALLED ON CAN BE FOUND IN	EIN SUCCESSFULLY TESTED AND ACCEP WAY RESEARCH PROGRAM REPORT 350 T ARIOUS POST SPACING WHEN INSTALLE S3 4-CABLE (4:1) HAS BEEN SUCCESSFULL 10NAL COOPERATIVE HIGHWAY RESEAR NUEL 4 (NCHRP 350 TL4) FOR VARIOUS PO A 5:1 OR FLATTER SLOPE. ADDITIONAL 4 FHWA ACCEPTANCE LETTER B-141F.	TED TO EST D ON A .Y CH ST	
2. CASS CABLE ACCEPTED TO I CASS-S3 4-CAB AND DEPARTUF THE NATIONAL (CCA) IS USED ' ANCHOR MUST IMPACTING THE	TERMINAL (CCT) NCHRP TL3. AN N LE (4:1) TRANSITI RE TERMINATION HIGHWAY SYSTE TO TERMINATE TI BE EITHER SHIEL E CABLE <u>CAN NO</u>	HAS BEEN SUCCESSFULLY TESTED AND NCHRP 350 TL3 APPROVED TERMINAL (CC ION (VARIOUS) SHALL BE USED ON APPRO S WHEN CASS-S3 4-CABLE (4:1) IS INSTAL M (NHS), IF A NON-CRASHWORTHY ANCH HE CABLE SYSTEM, THE NON-CRASHWOR DED OR LOCATED SO THAT A VEHICLE I IMPACT THE NON-CRASHWORTHY ANCH	et) or Dach Led on Or Rthy Hor.	
3. CASS-S3 4-C/ WITH SLOPES C ETC. THAT MAY CASS-S3 4-CAB FROM THE BRE MATERIALS MA' "ROUND" VARIO INTERFERE WI THE DESIGN HE CONSULT THE (C	ABLE (4:1) SHALL SIGNIFICANTLY , SIGNIFICANTLY , ILE (4:1) MUST BE AK POINT. GRAE Y BE REQUIRED. JUS TOPOGRAPH IFI THE ABILITY O SIGHT (IN RELATIC CASS MANUAL(S)	BE INSTALLED ON SHOULDERS OR MEDIA R WITHOUT OBSTRUCTIONS, DEPRESSIC AFFECT THE STABLITY OF AN ERRANT VI SINSTALLED A MAXIMUM OF FOUR (4) FE SINS OC SITE AND/OR APPROPRIATE FILL THE DESIGNER/INSTALLER SHALL 'FLAT ICAL INCONSISTENCIES THAT COULD F THE INSTALLER TO CONSISTENTLY MAI DO TTO THE TERRAIN) OF THE CABLES. PL FOR INSTALLATIONS IN 'DITCH SECTION'	ANS INS, EHICLE. ET TEN" OR NTAIN EASE S".	
4. CASS-S3 4-C/ OBSTACLES TH LINE POSTS. NI OF 21'-0", OR M/ WHICHEVER IS DEFLECTION. C RATE NOT TO E	ABLE (4:1) POST S AT CONFLICT WI O POST SPACE C AXIMUM POST SP LESS. REDUCING CASS-S3 4-CABLE XCEED 30:1.	SPACING MAY BE MODIFIED TO AVOID TH THE INSTALLATION OF CASS-S3 4-CAB AN EXCEED THE MAXIMUM POST SPACE ACING ALLOWED BY PROJECT ENGINEEF 3 OR INCREASING POST SPACING AFFEC (4:1) MAY BE LATERALLY TRANSFERRED	LE (4:1) LIMIT ?- TS AT A	
5. POST FOUND TRINITY MAY AL IS INSTALLED W CONTACT TRINI	ATIONS MAY BE I LOW THE USE OI MTH AN ACCEPTA ITY.	DRILLED THROUGH EXISTING PAVEMENT F ALTERNATE LINE POST FOOTINGS IF SY ABLE MOWSTRIP APPLICATION - PLEASE	STEM	
6. FOR AESTHE POSTS, AND LO PLUMB (APPRO	TIC PURPOSES T WER CABLE RELI XIMATELY 1/8" PI	RINITY RECOMMENDS ALL SLEEVES, DRI EASE POSTS TO BE INSTALLED REASONA ER FOOT).	VEN MBLY	
7. ALL CONCRE P.S.I. PRIOR TO CONCRETE TO AGENCY SPECIE	TE SHALL HAVE A D TENSIONING TH BE VIBRATED IN A FICATION.	A MINIMUM COMPRESSIVE STRENGTH OF E SYSTEM. TRINITY RECOMMENDS THE ACCORDANCE WITH THE LATEST APPLIC/	3,000 \BLE	
8. CASS-S3 4-C/ NCHRP REPORT CLASSIFICATIO OR IF SOIL IS SI CONTACT TRINI THE USE OF "MI MAINTENANCE.	ABLE (4:1) SHALL T 350 STANDARD N, IF SOLID ROCK JSCEPTABLE TO ITY ABOUT ALTEF OW STRIPS" FOR / INSTALLATION.	BE INSTALLED IN WELL-DRAINED, COMPA SOILS. IF SOIL DOESN'T MEET THIS VCONCRETE IS ENCOUNTERED BELOW G SEVERE FREEZE/THAW CYCLES, PLEASE NATE FOOTING DESIGN(S). TRINITY SUG EROSION PREVENTION AND EASE OF	CTED, RADE GESTS	
9. WHEN THE S' FLATTER SLOP INCREASED BY SPECIFICATION FOLLOWED.	YSTEM & TERMIN E, THE DEPTH OF 6". (SEE DRAWIN IS AND SOIL QUA	AL IS INSTALLED <u>ENTIRELY</u> ON A 4:1 OR F THE CONCRETE FOOTINGS <u>SHALL</u> BE IG SS-742) ALL OTHER DIMENSIONS, VAR LIFICATIONS REMAIN IN PLACE AND MUS	ious St be	
10. PLEASE SEE DELINEATION.	SPECIFYING AG	ENCY (OR MUTCD) FOR PROPER "BARRIE	R"	
11. PLEASE CON REPAIR MANUA	NTACT TRINITY O	R CONSULT THE DESIGN, INSTALLATION, DNAL INFORMATION.	OR	
TRINITY HIGI 2525 STEMM DALLAS, TX 7	HWAY PRODU ONS FREEWA 75207 PHON	ICTS, LLC. EMAIL: Y PRODUCT.INFO@TRIN.NET IE: (800) 644-7976		
OPTION 1 CCT 2 CCT	- TERMINAL POS -TERMINAL POS	CASS-TL3-S3 POST OPTIONS T 1 - 9 - IN CONCRETE T 1 - 9 - WITH SOIL PLATE		
3 CAS	S-S3 POST - IN CO S-S3 POST - DRIV	ONCRETE		
5 CAS	S-S3 POST - BASI	E-PLATED RIVEN SLEEVE		
6 ICAS				

The drawings and the information shown thereon are courselined by TRINITY HIGHWAY PRODUCTS, LLC. (2009) and the sole property of TRINITY HIGHWAY PRODUCTS, LLC. Naihar the drawings nor such information is to be used for any purpose duffer than that for which it was specifically furrished from TRINITY HIGHWAY PRODUCTS.	CASS-S3 (6:1 SLOPE) 4-CABLE GUARDRAIL SAFETY SYSTEM	SPEC: SHIPPING WT: DRW: E.A.S. 11/4/20 CHK: SHT: 1 OF 5 SIZE:	)10 D
without written permission.	TRINITY HIGHWAY	DWG NO:	0
PROJ. CASS-S3_6:1	PRODUCTS, LLC	SS-743	



		STATE OF	PRO	JECT		SHEET	TOTAL SHEETS
		DAKOTA	0001-	-391		8	38
		Plotting Date:	02/20/2024				
	P/	ARTS LIST - PRE-STR	ETCHED CABLE AS	SEMBLIES			
<u>1 1</u>	ART No 5817 CCT CA	TITLE BLE ASSEMBLY-TOP	LENGTH 54'-4''	R.H.T.	L.H.T.	Lbs / Each 58.3	
1	5818 CCT CA 5819 CCT CA	BLE ASSEMBLY-MID BLE ASSEMBLY-BOT	<u>48'-1"</u> 41'-10"	R.H.T. R.H.T.	L.H.T.	52.3 46.3	
1	5867 CCA CA	BLE ASSEMBLY	25'-0''	R.H.T.	L.H.T.	30.9 967.0	
1	5753 CABLE	IELD SPLICE SECTIO	N 1025'	R.H.T.	NONE	989.0	
1	5798 CABLE	IELD SPLICE SECTIO	N 975'	R.H.T.	NONE	940.9	
1	5797 CABLE 5796 CABLE	FIELD SPLICE SECTIO	N 950' N 925'	R.H.T. R.H.T.	NONE	916.9 892.8	
1	5795 CABLE	IELD SPLICE SECTIO	N 900' N 875'	R.H.T.	NONE	868.8 844.7	
1	5793 CABLE	IELD SPLICE SECTIO	N 850'	R.H.T.	NONE	820.7	
1	5791 CABLE	IELD SPLICE SECTIO	N 800'	R.H.T.	NONE	772.6	
1	5789 CABLE	HELD SPLICE SECTIO	N 775' N 750'	R.H.T. R.H.T.	NONE	748.5	
1	5788 CABLE 5787 CABLE	IELD SPLICE SECTIO	N 725' N 700'	R.H.T.	NONE	700.4 676.4	
1	5786 CABLE	IELD SPLICE SECTIO	N 675'	R.H.T.	NONE	652.3 628.3	
1	5784 CABLE	IELD SPLICE SECTIO	N 625'	R.H.T.	NONE	604.2	
	5783 CABLE	FIELD SPLICE SECTIO	N 575'	R.H.T.	NONE	556.1	
1	5781 CABLE	IELD SPLICE SECTIO	N 550' N 525'	<u>R.H.T.</u> <u>R.H</u> .T.	NONE	532.1 508.0	
1	5779 CABLE	FIELD SPLICE SECTIO	N 500' N 475'	R.H.T. RHT	NONE	484.0 459.9	
	5776 CABLE	TELD SPLICE SECTIO	N 450'	R.H.T.	NONE	435.9 411 B	
	5769 CABLE	IELD SPLICE SECTIO	N 425 N 400'	R.H.T.	NONE	387.8	
	5768 CABLE 5767 CABLE	FIELD SPLICE SECTIO	N 375' N 350'	R.H.T. R.H.T.	NONE	363.7	
1	5766 CABLE	IELD SPLICE SECTIO	N 325'	R.H.T.	NONE	<u>315.7</u> 291.6	
1	5764 CABLE	IELD SPLICE SECTIO	N 275'	R.H.T.	NONE	267.6	
	5763 CABLE	FIELD SPLICE SECTIO	N 225'	R.H.T.	NONE	219.5	
	5761 CABLE 5760 CABLE	FIELD SPLICE SECTIO	N 200' N 175'	R.H.T.	NONE	195.4 171.4	
	5759 CABLE	IELD SPLICE SECTIO	N 150'	R.H.T.	NONE	147.3	
_	5757 CABLE	IELD SPLICE SECTIO	N 100'	R.H.T.	NONE	99.2	
	5755 CABLE	IELD SPLICE SECTIO	N 50'	R.H.T.	NONE	51.1	
1	5754 CABLE	IELD SPLICE SECTIO	N 25'	R.H.T.	NONE	27.1	
PPLY 10G EA	(1) <u>right hand</u> Ach.	THREADED STUD AS	SEMBLY				
h		VARIES - (SEE PAR	RTS LIST ABOVE)		^P		
	-CAE	LE TERMINAL - 1	CABLE TERMIN	JAL - 2-		-1	
	(SEI	E TABLE ABOVE)	(SEE TABLE A			Ø	
			Ş <u> </u>				
	DDE	STRETCHED					
	<u>rne</u>	UNCIONED	CADLE AGGE				
NOT	ES:						
1		ACK SPACER 57009	SUPPLY YELLOW F	REFLECTIV	E SPACER	5701B	
	OR WHITE RE	FLECTIVE SPACER 5	702. (AS REQUIRE	PER PRO	JECT PLAN	IS)	
2.	IF INTERFER	ENCE OCCURS BETW	EEN THE CABLE S	PLICE AND	CASS-TL3	POST,	
	LONG SPLICE	POST 34061G IN LIE	U OF LONG CASS-S	S3 POST 34	1036G		
	SHORT SPLIC	E POST 34049G IN L	EU OF SHORT CAS	ə-ə3 POST	34045G		
3.	IF REQUIRED	NG TOOL 5850B	S SUPPLY:				
	CABLE TENS CABLE THER	ION METER 5878B MOMETER 5709B					
The drawi	ngs and the information st	www.			SPEC:		
thereon an HIGHWAY	PRODUCTS, LLC. (2009)	CASS-	S3 (6:1 SLOF	PE)	SHIPPING W	л:	
HIGHWAY	PRODUCTS, LLC. Neithings nor such information is	to 4-CABI	E GUARDR	AIL	DRW: E.A.	S. 11/4/2010	
se used fo or which i for TRIN	or any purpose other than It was specifically furnishe ITTY HIGHWAY PRODUC	SAFE	I'Y SYSTEM	1	SHT: 2 OF	5 SIZE: D	
LLC, nor is without wr	s any reproduction authori itten permission.	TRINIT	Y HIGHWAY		DWG NO:	REV	
ROUR	CASS-S3 61	PROD	ICTS LLC		1 55-1	43 10	



STATE OF	PROJECT	SHEET	TOTAL SHEETS
SOUTH DAKOTA	0001-391	9	38
Plotting Date:	02/20/2024		

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8	
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3	
2	
5	
21	

FAHRENHEIT	STD CABLE	I PRE-STRETC
DEGREES	1 B/FORCE	LB/FORCE
<=-15	8800	7500
-10	8600	7300
-5	8400	7100
0	8200	7000
5	8000	6800
10	7800	6600
15	7600	6500
20	7400	6300
25	7200	6100
30	7000	6000
35	6800	5800
40	6600	5600
45	6400	5500
50	6200	5300
55	6000	5100
60	5800	5000
65	5600	4800
70	5400	4600
75	5200	4500
80	5000	4300
85	4800	4100
90	4600	4000
95	4400	3800
100	4200	3600
105	4000	3500
110	3800	3300
115	3600	3100
120	3400	3000
125	3200	2800
130	3000	2700
135	2900	2600
140	2700	2500
145	2500	2400
150	2400	2300
160	2200	2100
170	2000	1900
180	1800	1700
190	1600	1500
000	4400	

ALLOWABLE DEVIATION FROM CHART IN TANGENT SECTIONS: +800, -203 POUNDS/FORCE.

CABLE TENSION READINGS ARE TYPICALLY HIGHER IN CURVED CABLE SECTIONS.

NOTE:

TURNBUCKLES SHALL BE INSTALLED WITH A MINIMUM OF 1-1/2" THREAD ENGAGEMENT. TO ALLOW FOR MAINTENANCE/REPAIR ADJUSTMENTS AT A LATER DATE, TRINITY SUGGESTS INSTALLER UTILIZE NO MORE THAN 4" THREAD ENGAGEMENT.

2. WHEN CUTTING CABLE LENGTHS IN THE FIELD FROM CABLE REELS, IT MAY BE PERMISSIBLE TO UTILIZE A CABLE TORPEDO SPLICE (4099G) BETWEEN TURNBUCKLES. DO NOT USE FOR CABLE LENGTH SHORTER THAN 100'. PLEASE CONTACT TRINITY, CONSULT TRINITY'S MANUAL OR SPECIFIC AGENCY TO DETERMINE IF APPROPRIATE FOR SPECIFIC APPLICATION.

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wthout writen permission.	TRINITY HIGHWAY	DWG NO: REV
PROJ. CASS-S3_6:1	PRODUCTS, LLC	SS-743 0



Plot Scale -

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	STATE OF	PROJECT	SHEET	TOTAL SHEETS
	SOUTH DAKOTA	0001-391	11	38
	Plotting Date:	02/20/2024		
	Tiotung Date.	02/20/2024		
	PARTS LIS	T - CCT TERMINAL POST No. 4-7 WITH SOIL I	PLATE Lbs / Each	
	4 3245G	5/16 HEX NUT (A563 Gr.A)	0.01	
G) 3245G)	2 3701G	3/4 FLAT WASHER (F436)	0.01	
22450	2 3711G 2 4779G	3/4 HEX BOLT x 4 1/2" (A325)	0.02	
3,32436	4 5825G	CABLE LOCK BOLT (A307)	0.12	
	2 9021G	BEARING ANGLE (A36)	3.81	
i	1 000007		42.20	
	DARTELIST	COT TERMINAL DOST No 8.0 MATH SOIL	DIATE	
N OF LOCK	QTY PART No	TITLE	Lbs / Each	
HEET 4.	4 3245G	5/16 HEX NUT (A563 Gr.A)	0.01	
	4 5825G 1 33989A	CABLE LOCK BOLT (A307) 350-TL4 TERMINAL POST w/ SOIL PLATE	0.12 46.02	
l l	1 000001		-10.02	
	DADTO 1	T COT TERMINAL DOST NO 8 0 IN CONCE	DETE	
	QTY PART No	TITLE	Lbs / Each	
	4 3245G	5/16 HEX NUT (A563 Gr.A)	0.01	
	4 5825G	CABLE LOCK BOLT (A307)	0.12	
90216	1 5837B	SLEEVE CAP - CASS-TERMINAL POST	0.03	
	1 5839B	SLEEVE COVER - S3 POST	0.11	
(4779G)	2 5919B	#4 REBAR - TERMINAL LINE POST	1.78	
$\times$ $\sim$	1 33955G	350-TL4 TERMINAL POST	32.42	
A A				
V				
	FAR SIDE	-5817G)		
	6	$\sim$		
FA	R SIDE	18G		
PLATE				
		5692G NEAR SIDE		
	////	(5819G)-NEAR SIDE		
	β	TRAFFIC FACE		
6	819G)			
		POST OPTION 1 SHOWN		
rk –		IN CONCRETE)		
$\neg$				
_				
				1949 S. A.
	PART No I	DWARE CASS CABLE TERMINAL - CCT TITLE	bs/Each	
4	4902G 1"Ø	CIRCULAR WASHER (F436)	0.11	
8	4903G 1" H	EX NUT (A194 2H)	0.33	
	5817G CRF	- TOP CABLE ASSEMBLY [54'-3'']	107.59	
1	5818G CRF	- MIDDLE CABLE ASSEMBLY [48'-0"]	98.09	
	5819G CRP	S CABLE BRACKET	88.85	
	00000000000		1.02	
			l	Provide and a second
				N. S.
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and the sole property of TRINITY HIGHWAY PRODUCTS, LLC, Neither	4-CA		11/4/2010	
the drawings nor such information is to be used for any purpose other than that	α ΛΟ <sup>-</sup> Γ	FETY SYSTEM	1.1.1.1.2010	
for which it was specifically furnished from TRINITY HIGHWAY PRODUCTS, LLC, por is any reproduction authorized		SHT: 5 OF 5	SIZE: D	
without written permission.			REV	
PROJ. 10422-23_6:1	I NF PRO	00013, LLC 03-72	<u>, 1</u>	

#### **GENERAL NOTES:**

Either flanged channel steel posts or S3x5.7 steel I beam posts will be used, but post type will be consistent thoughout the project. The S3x5.7 steel I beam post will be used for the end posts.

All costs associated with furnishing and constructing the 3 cable guardrail anchor assembly including the concrete anchor, cable anchor bracket, compensating device, steel turnbuckle cable assembly, and necessary hardware will be incidental to the contract unit price per each for "3 Cable Guardrail Anchor Assembly".

All costs associated with furnishing and constructing the 3 cable guardrail including posts, cable, cable splices, and hardware will be incidental to the contract unit price per foot for "3 Cable Guardrail".

The following table and criteria will apply to the arrangement of the Spring Cable End Assemblies (Compensation Devices) and Turnbuckle Cable End Assemblies:

LENGTH OF CABLE RUN	CRITERIA FOR ARRANGEMENT OF THE SPRING CABLE END ASSEMBLIES (COMPENSATION DEVICES) AND TURNBUCKLE CABLE END ASSEMBLIES
Less than 500'	Use turnbuckle on the approaching traffic end and compensating device on the other end of each individual cable, except in the W Beam to 3 Cable Transition where all compensating devices will be provided at the bridge ends.
Greater than 500' to 1000'	Use compensating device on each end of each individual cable.
Greater than 1000'	Start new run by interlacing at last parallel post as shown on sheet 2 of 6.

All Compensating Devices will be attached to the cable anchor bracket when one end of the run is attached to a bridge.

Compensating Devices must have a spring rate of  $450 \pm 50$  pounds per inch and will have a total available travel of 6 inches minimum.

The cable will be retensioned after the initial 2 week pretension period in accordance with the following table:

CABLE TENSIONING SPECIFICATIONS														
Temperature	-20	-10	0	10	20	30	40	50	60	70	80	90	100	110
Range (Degree F)	to -11	to -1	to 9	to 19	to 29	to 39	to 49	to 59	to 69	to 79	to 89	to 99	to 109	to 120
Spring Compression (Inch)	4¼	4	3¾	3½	3¼	3	2¾	2½	2¼	2	1¾	1½	1¼	1

POST SPACING FOR	HORIZONTAL CURVES
Roadway ଦୁ Curvature	Maximum Post Spacing (Ft)
1° and Less	16
Greater than 1° to 8°	12
Greater than 8° to 13°	8
Greater than 13°	NOT ALLOWED

			September 14, 2018
	S D D	3 CABLE GUARDRAIL	plate number 629.01
Published Date: 2024		(LUW TENSIUN)	Sheet I of 6



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	TYPE AND DETAILS OF MGS										
Type of MGS	W Beam Rail Single or Double (Nested)	Blockout Size	Blockout Material	Post Size	Post Material	Post Spacing					
1	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	6'-3"					
1C	Single	6"x12"x14"	Wood	6"x8"x7'-6"	Wood	6'-3"					
2	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	3'-1½"					
3	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	1'-6¾"					
4	Double	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	6'-3"					

S	TANDARD PLATE REFERENCE			
Type of MGS	See Standard Plate(s)			
1	630.20, 630.22			
1C	630.20, 630.25			
2	630.20			
3	630.20			
4	630.20			

# **GENERAL NOTES:**

Asphalt concrete will be the same type used elsewhere on the project or will be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete will conform to the Specifications for "Asphalt Concrete Composite".

Granular material will be the same type used elsewhere on the project or will be as specified in the plans. If granular material type is not specified in the plans, the material will conform to the Specifications for "Base Course". The granular material will be placed the same thickness as the mainline surfacing or as specified in the plans.

Topsoil is not shown in the transverse section drawing on sheet 2 of 6.

All W beam rail will be Type 1 and Class A (12 Ga.) unless specified otherwise in the plans.

W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used will be compatible with the total length of rail per site as shown in the plans.

Slots in the rails will be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges will be smooth and free of burrs or notches.

All costs for constructing the MGS including labor, equipment, and materials including all posts, blockouts, steel beam rail, and hardware will be incidental to the contract unit price per foot for the respective MGS contract item.

			September 14, 2019
	S D D	MIDWEST GUARDRAIL SYSTEM (MGS)	plate number 630.20
Published Date: 2024	0 T		Sheet I of 6











Plotted From - TRWI1NT35









- Plotted From - TRWI1NT35





















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	STATE OF		PROJECT	SHEET	TOTAL	
	SOUTH DAKOTA	0	001-391	35	SHEETS 38	
	Plotting Date:	02/20	)/2024			
neator						
-Wood Guardra	ail Blockou	ıt				
-2" Pr	x $ m \%$ " Lag I e-drill hole	Bolts with s before i	$\frac{5}{16}$ " Washers nstalling lag bolts.			
DRAIL DELIN	NEATIO	N				
ow sheeting. n edgeline color. inches of sheetir	ng					
e fabricated						
ators may						
Adhesive Object	ct Marker					DN_NonSectionMethod.dgn
			J			File\i7
	esive Obje	ect Markei				
	BJECT	MARKE				
object marker di of terminal end. / object marker sh ting will be fluore	mensions A minimum neeting are escent yello	may vary 1 of 256 so a is requi bw.	due quare red.			
			December 23, 2019			
			PLATE NUMBER			
IEATION OF GUA	ARDRAIL		632 <b>.</b> 40			
			Sheet 2 of 4			
						i i



## **GENERAL NOTES:**

The delineation of high tension cable guardrail will be reflect post cap or cable spacer. The sheeting will be type XI in conreflective sheeting shall be the same as the nearest pavement

The delineators for steel beam guardrail and sheeting on 3 with a minimum of 16 square inches of reflective sheeting. The with ASTM D4956. Along two-way roadways the sheeting we posts and will be white in color. For one-way roadways the straffic and the color will be the same as the nearest pavement and white on the right side.

When steel beam guardrail is attached to a bridge the first bridge.

At bridges with guardrail less than 200 feet in length, a mini the end terminal yellow object marker. The spacing between of the length of the guardrail.

At bridges with guardrail 200 feet and greater in length, inclutransitioning to 3 cable guardrail (low tension), the delineated 50 feet. Delineation will extend throughout the length of the

Steel beam guardrail that is not attached to a bridge and is delineators will be placed in addition to the end terminal yell delineators will be approximately one third of the length of the

Steel beam guardrail that is not attached to a bridge and is guardrail transitioning to 3 cable guardrail (low tension), the approximately 50 feet. Delineation will extend throughout th

All costs for furnishing and installing single or back to back beam guardrail will be included in the contract unit price per

All costs for furnishing and installing the reflective sheeting tension cable guardrail will be incidental to the respective h

An adhesive object marker will be placed on the end of the adhesive object marker dimensions may vary due to the sha inches of object marker reflective sheeting area is required. type XI sheeting in conformance with ASTM D4956. All cost marker will be incidental to various contract items.

A type 2 object marker will be placed adjacent to the 3 cable guardrail anchor, and trailing end terminal at the location no object marker (6" x 12") will have fluorescent yellow type X costs for furnishing and installing the type 2 object marker in and hardware will be included in the contract unit price per and "Type 2 Object Marker Back to Back" for back to back

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	STATE OF		PROJECT	SHEET	TOTAL SHEETS
	DAKOTA	0	0001-391	36	38
	Plotting Date:	02/20	0/2024		
				1	
ctive sheeting pla nformance with <i>l</i> ent marking.	ced back ASTM D49	to back or 956. The c	n every other color of the		
cable guardrail ( The reflective sho vill be on both sic sheeting will only ent marking, yello	low tensio eeting will des of the y be requir ow on the	n) posts v be type X delineator ed on the left side o	vill be covered (I in conformance rs and guardrail e side facing f the roadway		
delineator will be	attached	to the pos	st nearest the		
imum of 4 delinea n the delineators	ators will b will be ap	e placed proximate	in addition to ely one third		
luding bridges that ors will be placed guardrail system	at have ste l at a spac า.	eel beam ing of app	guardrail proximately		
less than 200 feo llow object marke he guardrail.	et in lengtl ers. The sp	n, a minim bacing bet	num of 4 tween the		
200 feet and gre e delineators will ne length of the g	ater in len be placed uardrail sy	gth, inclue at a spac /stem.	ding steel beam ing of		nMethod.dan
guardrail delinea r each for "Guarc	tion on 3 d drail Deline	cable gua eator".	rdrail and steel		NonSectio
on the cable spa igh tension cable	icers or po guardrail	ost caps fo contract i	or the high item.		NQ2I/
W beam guardra ape of the termir . The reflective sl ts for furnishing a	ail or MGS nal end. A heeting wi and install	end term minimum II be fluore ing the ac	inal. The of 256 square escent yellow lhesive object		File -
le guardrail (low t oted on sheet 1 c (I sheeting in con ncluding the stee each for "Type 2 type 2 object ma	tension) ar formance of post, 6" Object Ma arkers.	nchor, hig dard plate with AST x 12" refle arker" for	h tension cable e. The type 2 M D4956. All ective panel, single-sided		
			December 23, 2019		
IFATION OF CUADDAN			plate number 632 <b>.</b> 40		
LATION OF OUR	in viinit		Sheet 4 of 4		
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Plot Scale -

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