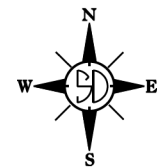


STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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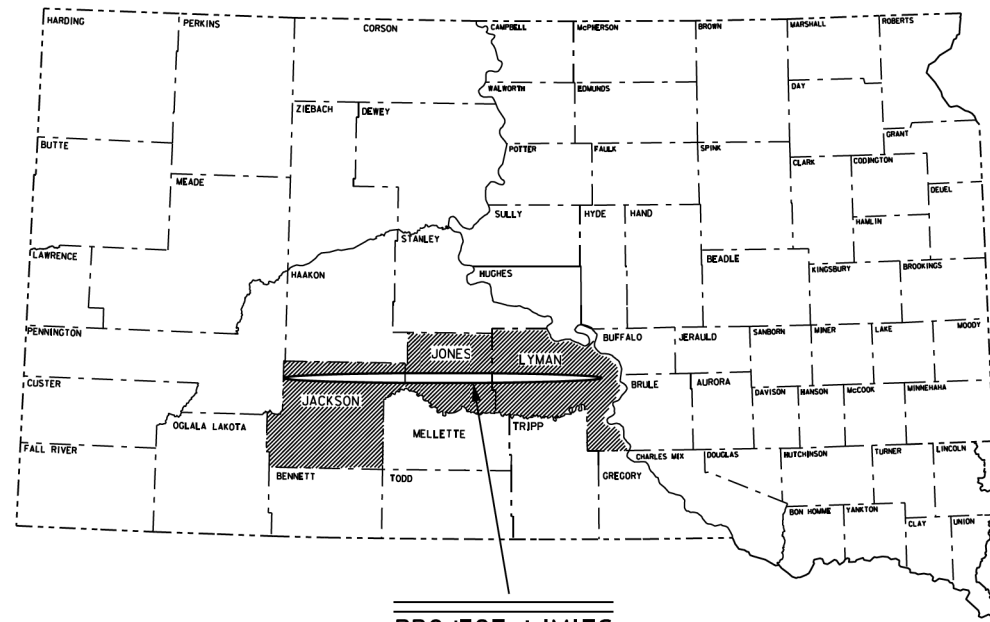
#### PLAN SHEET INDEX

Sheet 1	Title Sheet
Sheet 2	Estimate of Quantities
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Sheets 12-36	Standard Plates

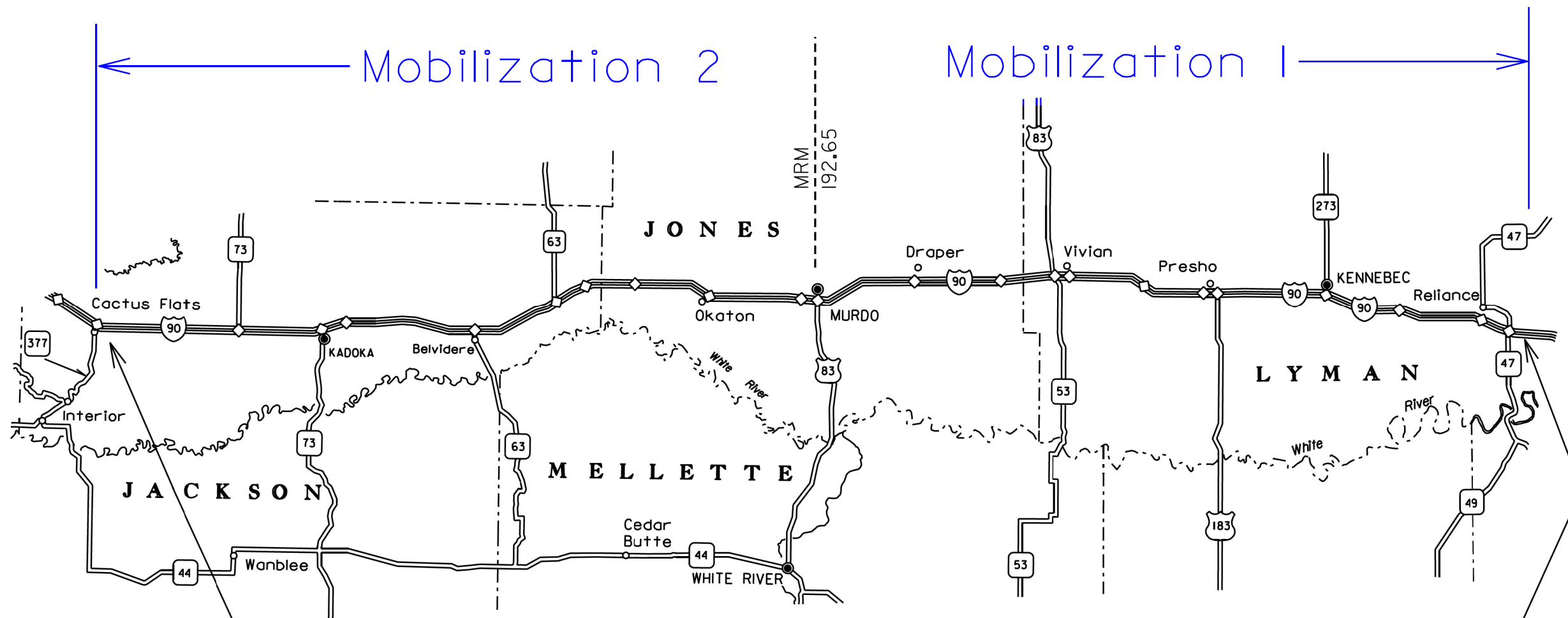
# STATE OF SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION PLANS FOR PROPOSED 000I-391 INTERSTATE 90 JACKSON, JONES, & LYMAN COUNTIES

GUARDRAIL REPAIR AND/OR REPLACEMENT DUE TO DAMAGE ON INTERSTATE 90

PCN i5rf



PROJECT LIMITS



STORM WATER PERMIT  
(None Required)

Start project at MRM 130.3

End project at MRM 251.6

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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 Excavation	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 Guardrail Post Strap	15	Each
* 629E1181	High Tension Cable Guardrail Cable Spacer	15	Each
* 629E2115	Cable	50	Ft

Non-Section Method

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
* 630E0200	Straight Class A Thrie Beam Rail	100.0	Ft
* 630E0210	Straight Class B Thrie Beam Rail	50.0	Ft
* 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
* 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
* 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
* 630E5120	Reset Thrie Beam Rail	25.0	Ft
* 630E5160	Reset W Beam Rail	25.0	Ft
* 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 shall 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 Section A Environmental Commitments as a communication tool for the Engineer and Contractor to ensure that attention is given to avoid, minimize, and/or mitigate an environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency with permitting authority can delay a project if identified environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office.

Additional guidance on SDDOT's Environmental Commitments can be accessed through the Environmental Procedures Manual found at: <http://www.sddot.com/resources/Manuals/EnvironProcManual.pdf>

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

**COMMITMENT B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES**

**COMMITMENT B2: WHOOPING CRANE**

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

**Action Taken/Required:**

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow 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 E: STORM WATER**

Construction activities constitute less than 1 acre of disturbance.

**Action Taken/Required:**

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

**COMMITMENT H: WASTE DISPOSAL SITE**

The Contractor shall furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

**Action Taken/Required:**

Construction and/or demolition debris may not be disposed of within the Public ROW.

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

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

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

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

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

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

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.

**COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES**

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

**Action Taken/Required:**

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

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

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

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



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

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

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

**COMPLETION DATE**

The contract will become effective on July 1, 2020 and will expire on June 15, 2021.

**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 shall 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 shall 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, shall 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 shall 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 shall be conducted during daylight hours only. Traffic shall be returned to the normal driving lanes during non-working hours. All construction operations shall 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 shall be equipped with an activated 360 degree, SAE J845, Class II or higher warning light to warn the traveling public.

Traffic control shall 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 shall be replaced immediately by the Contractor at the Contractor's expense.

Contractor shall 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 (W13-1P) shall be 30" x 30" and shall 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) shall be placed a minimum of 500 feet in front of the flagger station.

**GENERAL GUARDRAIL REPAIR**

The Contractor may be required to furnish some items that are not listed in the Contract Proposal. The Contractor shall 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 shall be incidental to the contract unit prices for the various items. Cost to remove and dispose of damaged guardrail items shall be incidental to the contract unit prices for the various items. The Contractor and Engineer shall negotiate installation costs for added items which vary significantly from contract items.

**HIGH TENSION GUARDRAIL**

The following bid items shall 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 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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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 shall 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**
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 shall 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 shall be incidental to the contract unit price per each for "W Beam Guardrail End Terminal". All W Beam guardrail end terminals that are replaced shall be selected from the South Dakota Department of Transportation Approved Product List.
  3. When the SDDOT instructs the Contractor to replace an MGS guardrail end terminal, the new MGS guardrail end terminal shall 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 shall be incidental to the contract unit price per each for "MGS End Terminal". All MGS guardrail end terminals that are replaced shall be selected from the South Dakota Department of Transportation Approved Product List.
  - 4.
  5. 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.

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GUARDRAIL-Continued

6. "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 additional payment for each post installed under these conditions.
7. "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 additional payment for each post installed under these conditions.
8. "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.
9. "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.
10. "3 Cable Guardrail Intermediate Post" includes the cost for both I Beam and Flanged type of posts. The post for this item shall be furnished and installed consistent with the type of posts presently in place at the proposed repair site.
11. "Beam Guardrail Post and Block" shall include the appropriate size wood block. The Engineer shall designate the proper post length of six, six and one-half, or seven feet as needed to fit the repair situation.
12. The Contractor shall 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 shall 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 shall 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 shall be incidental to the contract unit price per cubic yard for "Base Course, State Furnished".

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

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

CONTRACTOR FURNISHED BORROW EXCAVATION

The Contractor shall provide a suitable site for Contractor furnished borrow material. The borrow material shall 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 shall be incidental to the contract unit price per cubic yard for "Contractor Furnished Borrow Excavation". Compaction of borrow material shall 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 shall be the responsibility of the Contractor.

RESTORATION OF DISTURBED AREAS

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

Slopes and berms disturbed shall be leveled and excess material removed. Area shall 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 shall be noxious weed free. Cost for reshaping, leveling, removal of excess material, tilling, and seeding disturbed areas on the slopes and berms shall be incidental to the contract unit price for the various items.

STATE OF SOUTH DAKOTA	PROJECT	SHEET  6	TOTAL SHEETS  36
	000I-391		

Plotting Date: 02/20/2020

ITEMIZED LIST OF TRAFFIC CONTROL DEVICES

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

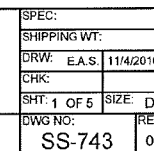
SIGN CODE	SIGN DESCRIPTION	000I-391 PCN i4jn			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W4-2	LEFT or RIGHT LANE ENDS (symbol)	2	48" x 48"	16.0	32.0
W7-3aP	NEXT ___ MILES (plaque)	2	36" x 30"	7.5	15.0
W13-1P	ADVISORY SPEED (plaque)	2	30" x 30"	6.3	12.6
W20-1	ROAD WORK AHEAD	3	48" x 48"	16.0	48.0
W20-5	LEFT 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
		EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT			259.6

ARROW BOARDS

ITEM DESCRIPTION	QUANTITY
Type C Advance Warning Arrow Board	1 Each

File - ...Working\ack151f.dgn







Plotting Date: 02/20/2020

PARTS LIST - CASS-S3 POST - IN CONCRETE - POST OPTION #3			
QTY	PART No	TITLE	Lbs / Each
2	3245G	5/16 HEX NUT (A563 Gr.A)	0.01
2	4225G	CABLE LOCK BOLT (A307)	0.09
1	5700B	CASS & TL3 CABLE SPACER	0.11
1	5836B	CONCRETE REINFORCING RING	0.88
1	5837B	SLEEVE CAP - CASS-TERMINAL POST	0.12
1	5839B	SLEEVE COVER - S3 POST	0.11
1	34039G	27" POST SLEEVE - IN CONCRETE	12.19
1	34045G	CASS-S3 POST - SHORT	28.06
1	105201B	CASS-S3 POST CAP	0.13
1	105202T	CASS-S3 - POST STRAP	0.19

PARTS LIST - CASS-S3 POST DRIVEN - OPTION #4			
QTY	PART No	TITLE	Lbs / Each
2	3245G	5/16 HEX NUT (A563 Gr.A)	0.01
2	4225G	CABLE LOCK BOLT (A307)	0.09
1	5700B	CASS & TL3 CABLE SPACER	0.11
1	34036G	CASS-S3 POST - LONG	38.51
1	105201B	CASS-S3 POST CAP	0.13
1	105202T	CASS-S3 - POST STRAP	0.19

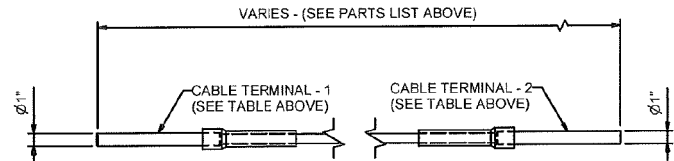
PARTS LIST - CASS-S3 POST BASE-PLATED - OPTION #5			
QTY	PART No	TITLE	Lbs / Each
2	3245G	5/16 HEX NUT (A563 Gr.A)	0.01
4	3300G	5/8" PLAIN WASHER - TYPE B - R - (F844)	0.06
4	3310G	5/8 LOCK WASHER	0.00
4	3361G	5/8" HEX NUT (A563 Gr.DH)	0.01
2	4225G	CABLE LOCK BOLT (A307)	0.09
4	5225G	5/8 x 7 1/2" HAS SUPER ROD CHSL PT (A193 B7)	0.62
0.6	5448B	HIT HY 150 MAX EPOXY (HILTI - 00283548)	
1	5700B	CASS & TL3 CABLE SPACER	0.11
1	34037A	CASS-TL3 POST BASE-PLATED	29.52
1	105201B	CASS-S3 POST CAP	0.13
1	105202T	CASS-S3 - POST STRAP	0.19

PARTS LIST - CASS-S3 POST - IN DRIVEN SLEEVE - POST OPTION			
QTY	PART No	TITLE	Lbs / Each
2	3245G	5/16 HEX NUT (A563 Gr.A)	0.01
2	4225G	CABLE LOCK BOLT (A307)	0.09
1	5700B	CASS & TL3 CABLE SPACER	0.11
1	5839B	SLEEVE COVER - S3 POST	0.11
1	34039G	27" POST SLEEVE - DRIVEN	13.87
1	34045G	CASS-S3 POST - SHORT	28.06
1	105201B	CASS-S3 POST CAP	0.13
1	105202T	CASS-S3 - POST STRAP	0.19

PARTS LIST - PRE-STRETCHED CABLE ASSEMBLIES					
QTY	PART No	TITLE	LENGTH	TERM-1	TERM-2
1	5817	CCT CABLE ASSEMBLY-TOP	54'-4"	R.H.T.	L.H.T.
1	5818	CCT CABLE ASSEMBLY-MID	48'-1"	R.H.T.	L.H.T.
1	5819	CCT CABLE ASSEMBLY-BOT	41'-10"	R.H.T.	L.H.T.
1	5867	CCA CABLE ASSEMBLY	25'-0"	R.H.T.	L.H.T.
1	5816	CABLE ASSEMBLY-INTERIOR	1000'	R.H.T.	L.H.T.
1	5753	CABLE FIELD SPICE SECTION	1025'	R.H.T.	NONE
1	5752	CABLE FIELD SPICE SECTION	1000'	R.H.T.	NONE
1	5788	CABLE FIELD SPICE SECTION	975'	R.H.T.	NONE
1	5797	CABLE FIELD SPICE SECTION	950'	R.H.T.	NONE
1	5796	CABLE FIELD SPICE SECTION	925'	R.H.T.	NONE
1	5795	CABLE FIELD SPICE SECTION	900'	R.H.T.	NONE
1	5794	CABLE FIELD SPICE SECTION	875'	R.H.T.	NONE
1	5793	CABLE FIELD SPICE SECTION	850'	R.H.T.	NONE
1	5792	CABLE FIELD SPICE SECTION	825'	R.H.T.	NONE
1	5791	CABLE FIELD SPICE SECTION	800'	R.H.T.	NONE
1	5790	CABLE FIELD SPICE SECTION	775'	R.H.T.	NONE
1	5789	CABLE FIELD SPICE SECTION	750'	R.H.T.	NONE
1	5788	CABLE FIELD SPICE SECTION	725'	R.H.T.	NONE
1	5787	CABLE FIELD SPICE SECTION	700'	R.H.T.	NONE
1	5786	CABLE FIELD SPICE SECTION	675'	R.H.T.	NONE
1	5785	CABLE FIELD SPICE SECTION	650'	R.H.T.	NONE
1	5784	CABLE FIELD SPICE SECTION	625'	R.H.T.	NONE
1	5783	CABLE FIELD SPICE SECTION	600'	R.H.T.	NONE
1	5782	CABLE FIELD SPICE SECTION	575'	R.H.T.	NONE
1	5781	CABLE FIELD SPICE SECTION	550'	R.H.T.	NONE
1	5780	CABLE FIELD SPICE SECTION	525'	R.H.T.	NONE
1	5779	CABLE FIELD SPICE SECTION	500'	R.H.T.	NONE
1	5778	CABLE FIELD SPICE SECTION	475'	R.H.T.	NONE
1	5776	CABLE FIELD SPICE SECTION	450'	R.H.T.	NONE
1	5775	CABLE FIELD SPICE SECTION	425'	R.H.T.	NONE
1	5769	CABLE FIELD SPICE SECTION	400'	R.H.T.	NONE
1	5768	CABLE FIELD SPICE SECTION	375'	R.H.T.	NONE
1	5767	CABLE FIELD SPICE SECTION	350'	R.H.T.	NONE
1	5766	CABLE FIELD SPICE SECTION	325'	R.H.T.	NONE
1	5765	CABLE FIELD SPICE SECTION	300'	R.H.T.	NONE
1	5764	CABLE FIELD SPICE SECTION	275'	R.H.T.	NONE
1	5763	CABLE FIELD SPICE SECTION	250'	R.H.T.	NONE
1	5762	CABLE FIELD SPICE SECTION	225'	R.H.T.	NONE
1	5761	CABLE FIELD SPICE SECTION	200'	R.H.T.	NONE
1	5760	CABLE FIELD SPICE SECTION	175'	R.H.T.	NONE
1	5759	CABLE FIELD SPICE SECTION	150'	R.H.T.	NONE
1	5758	CABLE FIELD SPICE SECTION	125'	R.H.T.	NONE
1	5757	CABLE FIELD SPICE SECTION	100'	R.H.T.	NONE
1	5756	CABLE FIELD SPICE SECTION	75'	R.H.T.	NONE
1	5755	CABLE FIELD SPICE SECTION	50'	R.H.T.	NONE
1	5754	CABLE FIELD SPICE SECTION	25'	R.H.T.	NONE
1	5840	CABLE FIELD REPAIR SECTION	5'	R.H.T.	L.H.T.

NOTE:

FOR THE STANDARD FIELD SPICE SECTIONS ABOVE, SUPPLY (1) RIGHT HAND THREADED STUD ASSEMBLY 5910G EACH.



PRE-STRETCHED CABLE ASSEMBLY

NOTES:

- IN LIEU OF BLACK SPACER 5700B SUPPLY YELLOW REFLECTIVE SPACER 5701B OR WHITE REFLECTIVE SPACER 5702. (AS REQUIRED PER PROJECT PLANS)
- IF INTERFERENCE OCCURS BETWEEN THE CABLE SPICE AND CASS-TL3 POST, SUPPLY A SPICE INTERFERENCE POST. LONG SPICE POST 34061G IN LIEU OF LONG CASS-S3 POST 34036G SHORT SPICE POST 34049G IN LIEU OF SHORT CASS-S3 POST 34045G
- IF REQUIRED PER PROJECT PLANS SUPPLY:  
CABLE PULLING TOOL 5850B  
CABLE TENSION METER 5878B  
CABLE THERMOMETER 5709B

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CASS-S3 (6:1 SLOPE)  
4-CABLE GUARDRAIL  
SAFETY SYSTEM

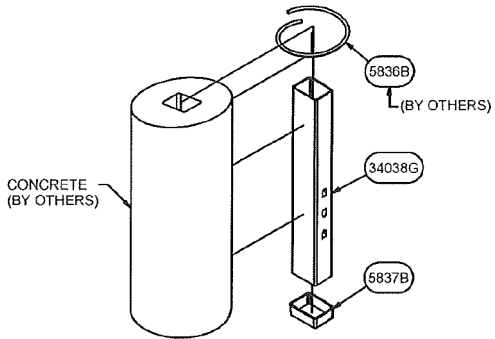
TRINITY HIGHWAY  
PRODUCTS, LLC

SPEC:  
SHIPPING WT:  
DRW: E.A.S. 11/4/2010  
CHK:  
SHT: 2 OF 5  
SIZE: D  
REV  
SS-743 0

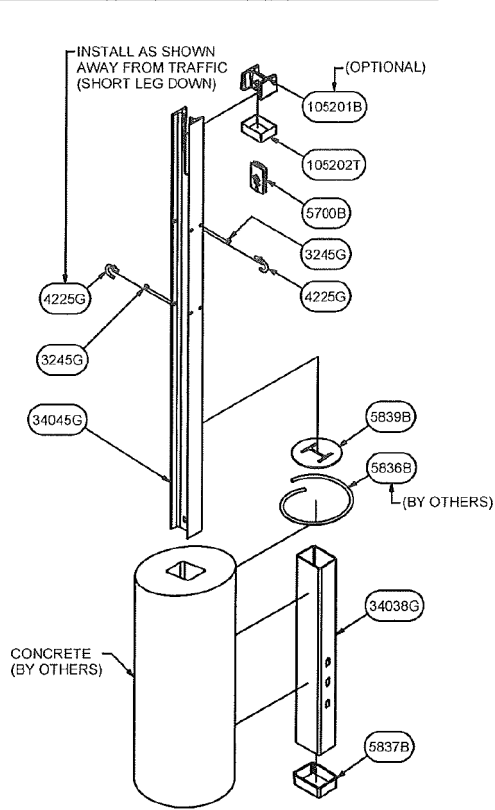
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PARTS LIST - PRE-CAST CONCRETE FOOTING - OPTION #3			
QTY	PART No	TITLE	Lbs / Each
1	5836B	CONCRETE REINFORCING RING	0.88
1	5837B	SLEEVE CAP - CASS-TERMINAL POST	0.12
1	34039G	27" POST SLEEVE - IN CONCRETE	12.19

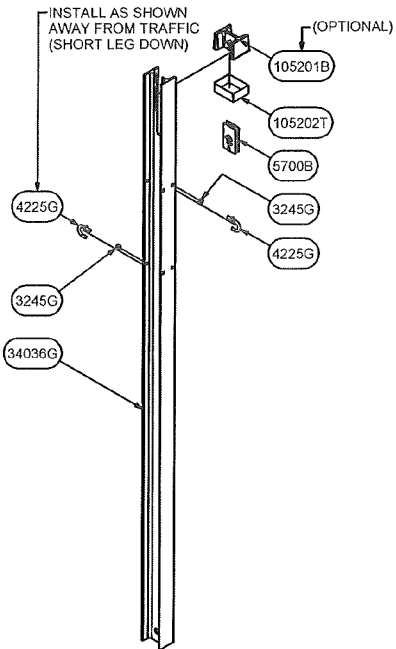
CONCRETE FOOTING ASSEMBLY  
(POST OPTION #3 - PRE-CAST OPTION)



CASS-S3 POST - IN CONCRETE  
(POST OPTION #3 - CAST IN PLACE)

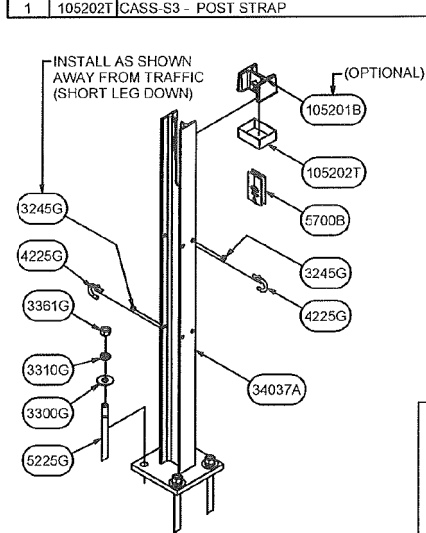


CASS-S3 POST - DRIVEN  
(POST OPTION #4 - DRIVEN)

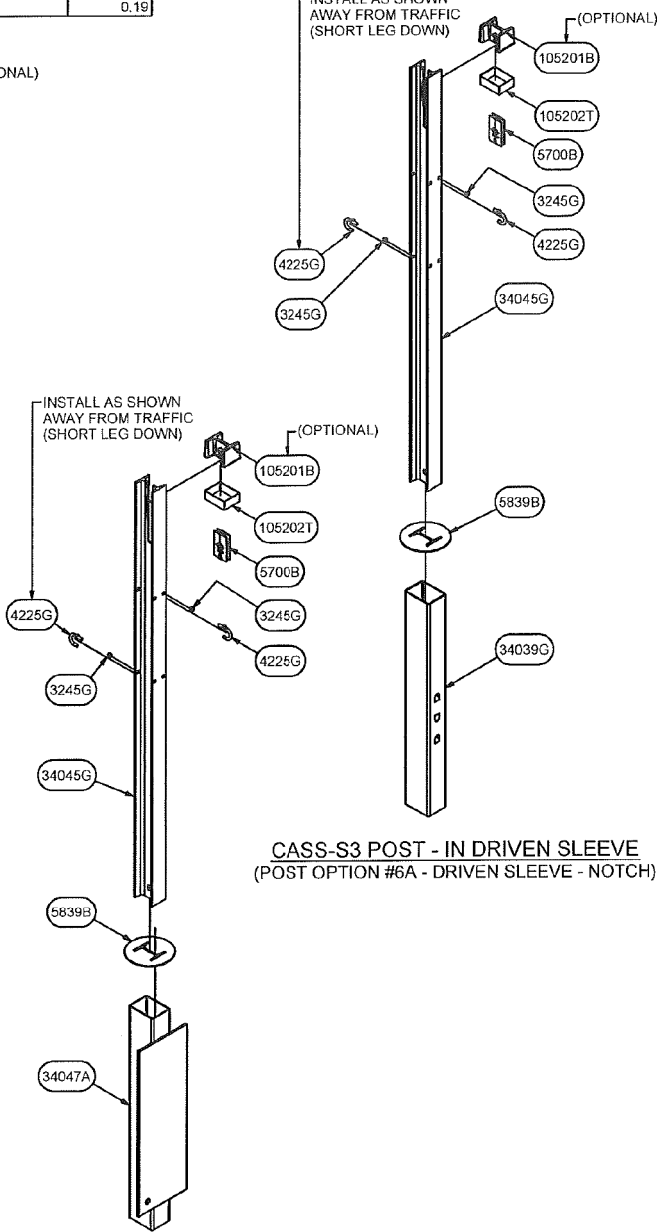


CASS-S3 POST - BASE-PLATED  
(POST OPTION #5 - BASE-PLATED)

- ANCHOR OPTIONS:  
MIN. EMBEDMENT IN 3,000 P.S.I. CONCRETE = 6".  
MIN. PULLOUT STRENGTH = 10,000 lbs.
- 5/8 ADHESIVE ANCHORING SYSTEM.  
(4 EACH 3300G, 3310G, 3361G & 5225G) & 0.6 EACH 5448B
  - 5/8 x 8" ALL THREADED ROD (A449) WITH EPOXY.  
(4 EACH 3300G, 3310G, 3361G & 6722G) & 0.6 EACH 5448B
  - 5/8 MECHANICAL ANCHOR. (BY OTHERS)



CASS-S3 POST - IN DRIVEN SLEEVE  
(POST OPTION #6A - DRIVEN SLEEVE - NOTCH)



CASS-S3 POST - IN DRIVEN SLEEVE  
(POST OPTION #6B - DRIVEN SLEEVE - SOIL PLATE)

PARTS LIST - CASS-S3 POST - IN DRIVEN SLEEVE - POST OPTION #6B			
QTY	PART No	TITLE	Lbs / Each
2	3245G	5/16 HEX NUT (A563 Gr.A)	0.01
2	4225G	CABLE LOCK BOLT (A307)	0.09
1	5700B	CASS & TL3 CABLE SPACER	0.11
1	5839B	SLEEVE COVER - S3 POST	0.11
1	34045G	CASS-S3 POST - SHORT	28.06
1	34047A	30.75" CASS-S3 POST SLEEVE w/ SOIL PLATE	27.47
1	105201B	CASS-S3 POST CAP	0.13
1	105202T	CASS-S3 - POST STRAP	0.19

Plot Scale - 1:200

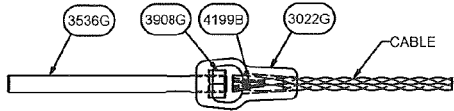
TRW11NT23

Plotted From -

File - ...Working\ack515r.dgn

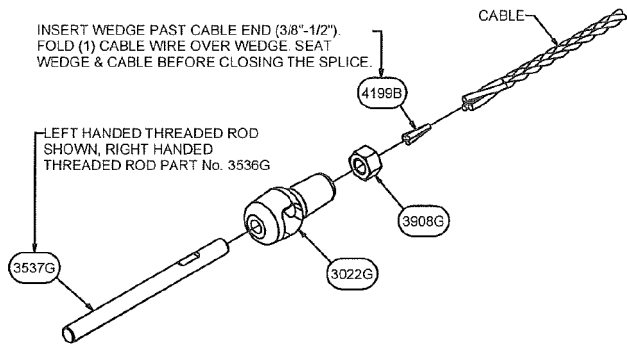
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	0001-391	9	36

Plotting Date: 02/20/2020



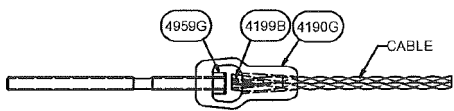
1" CABLE FIELD SPLICE - 5909G & 5910G  
(5910G SHOWN, 5909G SIMILAR)

PARTS LIST - 5910G			
QTY	PART No	TITLE	Lbs / Each
1	3022G	1" CABLE END CASTING	0.56
1	3536G	1" STUD FLATTENED - R.H.T.	2.88
1	3908G	1" Ø HEAVY HEX NUT (A563 DH)	0.47
1	4199B	3/4" CABLE WEDGE (3 x 7)	0.08



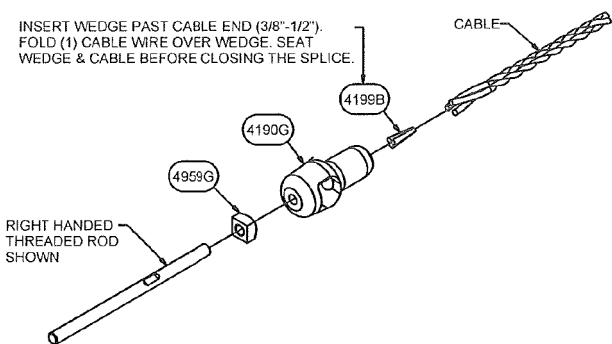
ASSEMBLY - 1" CABLE FIELD SPLICE - 5909G  
(5909G SHOWN, 5910G SIMILAR)

PARTS LIST - 5909G			
QTY	PART No	TITLE	Lbs / Each
1	3022G	1" CABLE END CASTING	0.56
1	3537G	1" STUD FLATTENED - L.H.T.	2.88
1	3908G	1" Ø HEAVY HEX NUT (A563 DH)	0.47
1	4199B	3/4" CABLE WEDGE (3 x 7)	0.08



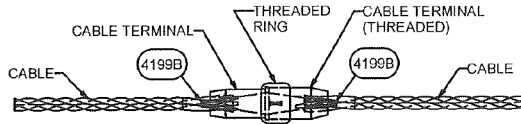
3/4" CABLE FIELD SPLICE - 5634G & 5635G  
(5634G SHOWN, 5635G SIMILAR)

PARTS LIST - 5634G			
QTY	PART No	TITLE	Lbs / Each
1	105204G	3/4" STUD FLATTENED - L.H.T.	1.62
1	4190G	3/4" CABLE END CASTING	3.78
1	4199B	3/4" CABLE WEDGE (3 x 7)	0.08
1	4959G	3/4" HEAVY SQUARE NUT (A563)	0.26



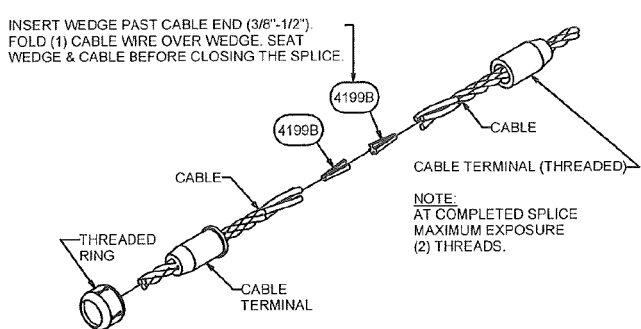
ASSEMBLY - 3/4" CABLE FIELD SPLICE - 5635G  
(5635G SHOWN, 5634G SIMILAR)

PARTS LIST - 5635G			
QTY	PART No	TITLE	Lbs / Each
1	105205G	3/4" STUD FLATTENED - R.H.T.	1.62
1	4190G	3/4" CABLE END CASTING	3.78
1	4199B	3/4" CABLE WEDGE (3 x 7)	0.08
1	4959G	3/4" HEAVY SQUARE NUT (A563)	0.26



TORPEDO CABLE SPLICE - 4099G

PARTS LIST - 4099G			
QTY	PART No	TITLE	Lbs / Each
1		CABLE TERMINAL - THREADED	1.78
1		CABLE TERMINAL	1.52
1		RING - THREADED	-0.06
2	4199B	3/4" CABLE WEDGE (3 x 7)	0.08



ASSEMBLY - TORPEDO CABLE SPLICE 4099G

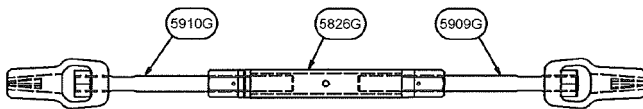
CASS TEMPERATURE & TENSION CHART (NEAREST 100 LB/F)		
FAHRENHEIT DEGREES	STD. CABLE LB/FORCE	PRE-STRETCHED LB/FORCE
< -15	8800	7500
-10	8600	7300
-5	8400	7100
0	8200	7000
5	8000	6800
10	7800	6600
15	7600	6500
20	7400	6300
25	7200	6100
30	7000	6000
35	6800	5800
40	6600	5600
45	6400	5500
50	6200	5300
55	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
200	1400	1300

ALLOWABLE DEVIATION FROM CHART IN TANGENT SECTIONS:  
+800, -200 POUNDS/FORCE.

CABLE TENSION READINGS ARE TYPICALLY HIGHER IN CURVED  
CABLE SECTIONS.

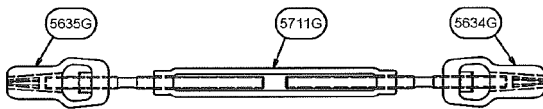
NOTE:

1. 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 SPECIFYING AGENCY TO DETERMINE IF APPROPRIATE FOR SPECIFIC APPLICATION.



1" CABLE SPLICE - 5633G  
(CLOSED BODY STYLE)

PARTS LIST - 5633G			
QTY	PART No	TITLE	Lbs / Each
1	5826G	1" CASS TURNBUCKLE CLOSED BODY STYLE	4.82
1	5909G	1" STUD ASSEMBLY L.H.T.	3.99
1	5910G	1" STUD ASSEMBLY R.H.T.	3.99

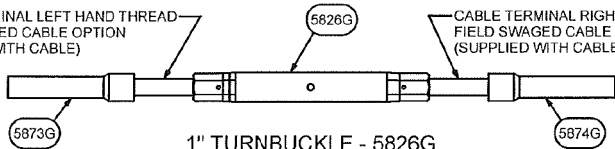


3/4" CABLE SPLICE - 5698G  
(OPEN BODY STYLE)

PARTS LIST - 5698G			
QTY	PART No	TITLE	Lbs / Each
1	5634G	3/4" STUD ASSEMBLY L.H.T.	5.74
1	5635G	3/4" STUD ASSEMBLY R.H.T.	5.74
1	5711G	3/4-12 TURNBUCKLE OPEN BODY	2.57

CABLE TERMINAL LEFT HAND THREAD  
FIELD SWAGED CABLE OPTION  
(SUPPLIED WITH CABLE)

CABLE TERMINAL RIGHT HAND THREAD  
FIELD SWAGED CABLE OPTION  
(SUPPLIED WITH CABLE)



1" TURNBUCKLE - 5826G  
(CLOSED BODY STYLE)

PARTS LIST - 5826G - SWAGED TERMINALS NOT SUPPLIED			
QTY	PART No	TITLE	Lbs / Each
1	5826G	1" CASS TURNBUCKLE CLOSED BODY STYLE	4.82
1	5873G	CASS STUD ASSEMBLY - SWAGED - LHT	3.97
1	5874G	CASS STUD ASSEMBLY - SWAGED - RHT	3.97

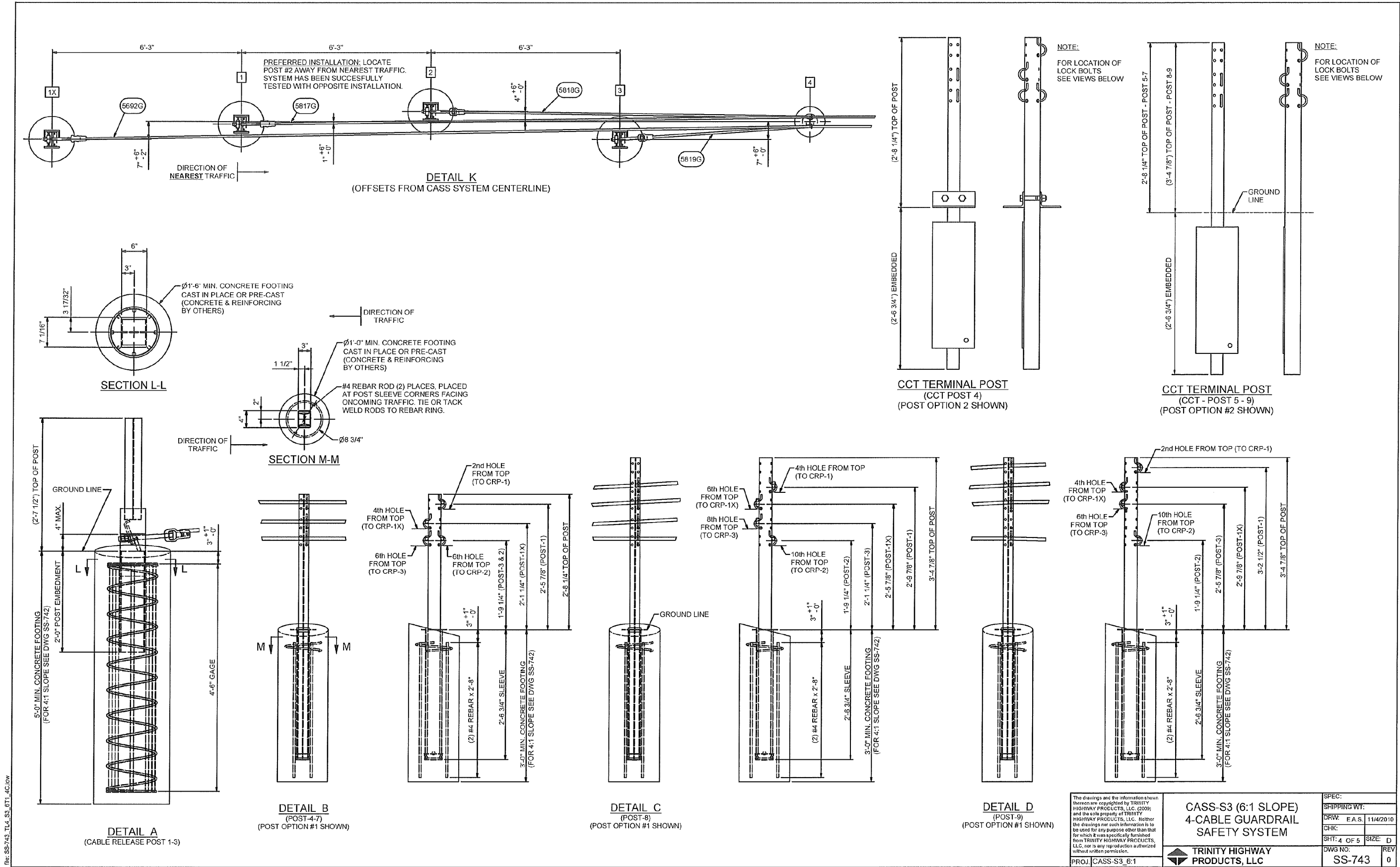
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PROJ: CASS-S3 6:1

CASS-S3 (6:1 SLOPE)  
4-CABLE GUARDRAIL  
SAFETY SYSTEM



SPEC:	
SHIPPING WT:	
DRW: E.A.S.	11/4/2010
CHK:	
SHT: 3 OF 5	SIZE: D
DWG NO:	REV
SS-743	0





STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	0001-391	11	36

Plotting Date: 02/20/2020

PARTS LIST - CCT CABLE RELEASE POST No. 1X-3 - IN CONCRETE			
QTY	PART No	TITLE	Lbs / Each
2	3240G	5/16 ROUND WASHER WIDE (F844)	0.02
2	3245G	5/16 HEX NUT (A563 Gr.A)	0.01
2	4211G	5/16 HEX BOLT x 1 3/4" - 1 1/8 RHT (A307)	0.05
1	5851B	REFLECTOR - MEDIAN - YELLOW	0.10
1	33909G	CASS CABLE BRACKET	1.92
1	33919B	REINFORCING CAGE - CRP POST	62.97
1	33934A	CRP - LOWER POST	51.80
1	33935A	CRP - UPPER POST	31.57

ALL HARDWARE FOR THE CCT CAN BE ORDERED AS ONE PACKAGE:

PART No. 33598G: (1) SET OF TERMINAL HARDWARE FOR 1" CABLE FITTINGS.  
PART No. 33599G: (1) SET OF TERMINAL HARDWARE FOR 3/4" CABLE FITTINGS.

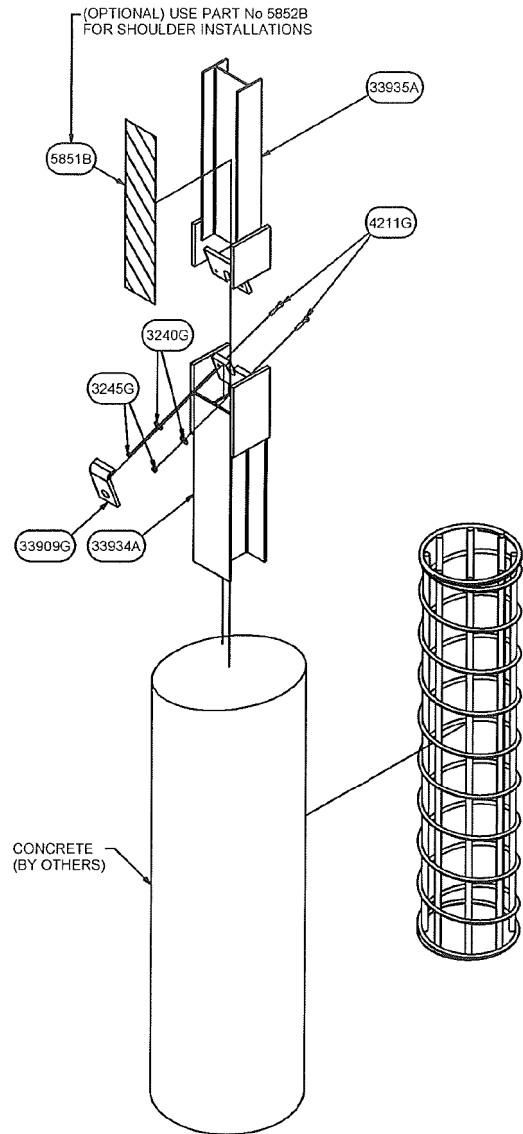
PARTS LIST - CCT TERMINAL POST No. 4-7 - IN CONCRETE			
QTY	PART No	TITLE	Lbs / Each
4	3245G	5/16 HEX NUT (A563 Gr.A)	0.01
4	5825G	CABLE LOCK BOLT (A307)	0.12
1	5836B	CONCRETE REINFORCING RING	0.88
1	5837B	SLEEVE CAP - CASS-TERMINAL POST	0.12
1	5839B	SLEEVE COVER - S3 POST	0.11
2	5919B	#4 REBAR - TERMINAL POST	1.78
1	33908B	SLEEVE - TERMINAL LINE POST	13.80
1	33910G	350-TL3 TERMINAL POST	28.63

PARTS LIST - CCT CABLE RELEASE POST No. 1X-3 - DRIVEN			
QTY	PART No	TITLE	Lbs / Each
2	3240G	5/16 ROUND WASHER WIDE (F844)	0.02
2	3245G	5/16 HEX NUT (A563 Gr.A)	0.01
2	4211G	5/16 HEX BOLT x 1 3/4" - 1 1/8 RHT (A307)	0.05
1	5851B	REFLECTOR - MEDIAN - YELLOW	0.10
1	33909G	CASS CABLE BRACKET	1.92
1	33935A	CRP - UPPER POST	31.57
1	33936A	CRP - LOWER POST	178.68

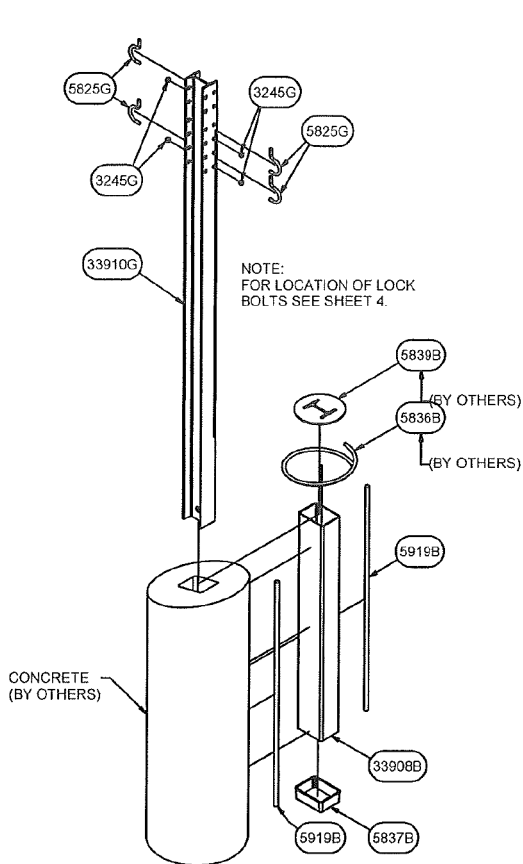
PARTS LIST - CCT TERMINAL POST No. 4-7 WITH SOIL PLATE			
QTY	PART No	TITLE	Lbs / Each
4	3245G	5/16 HEX NUT (A563 Gr.A)	0.01
2	3701G	3/4 FLAT WASHER (F436)	0.01
2	3711G	3/4 HEX NUT (A194 2H)	0.02
2	4779G	3/4 HEX BOLT x 4 1/2" (A325)	0.08
4	5825G	CABLE LOCK BOLT (A307)	0.12
2	9021G	BEARING ANGLE (A36)	3.81
1	33903A	350-TL3 TERMINAL POST w/ SOIL PLATE	42.25

PARTS LIST - CCT TERMINAL POST No. 8-9 - WITH SOIL PLATE			
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
1	33969A	350-TL4 TERMINAL POST w/ SOIL PLATE	46.02

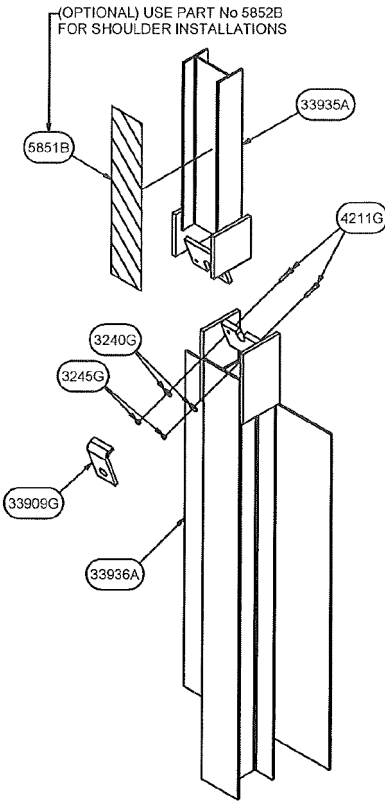
PARTS LIST - CCT TERMINAL POST No. 8-9 - IN CONCRETE			
QTY	PART No	TITLE	Lbs / Each
4	3245G	5/16 HEX NUT (A563 Gr.A)	0.01
4	5825G	CABLE LOCK BOLT (A307)	0.12
1	5836B	CONCRETE REINFORCING RING	0.88
1	5837B	SLEEVE CAP - CASS-TERMINAL POST	0.12
1	5839B	SLEEVE COVER - S3 POST	0.11
2	5919B	#4 REBAR - TERMINAL POST	1.78
1	33908B	SLEEVE - TERMINAL LINE POST	13.80
1	33955G	350-TL4 TERMINAL POST	32.42



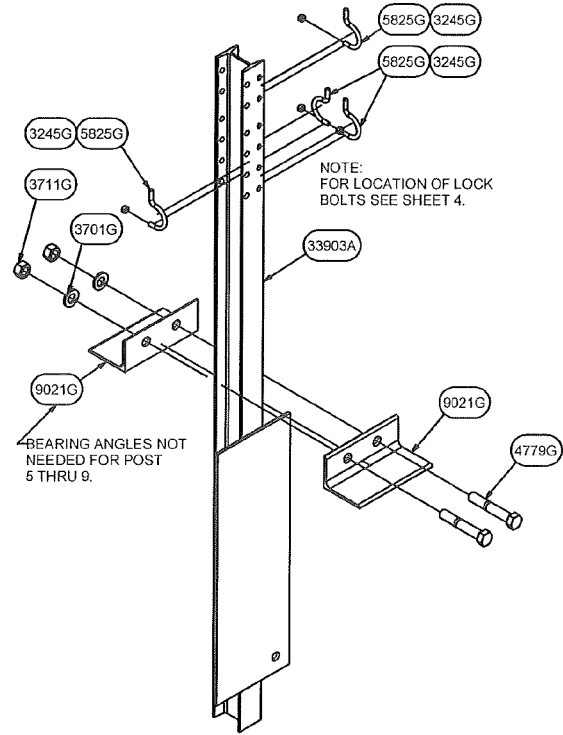
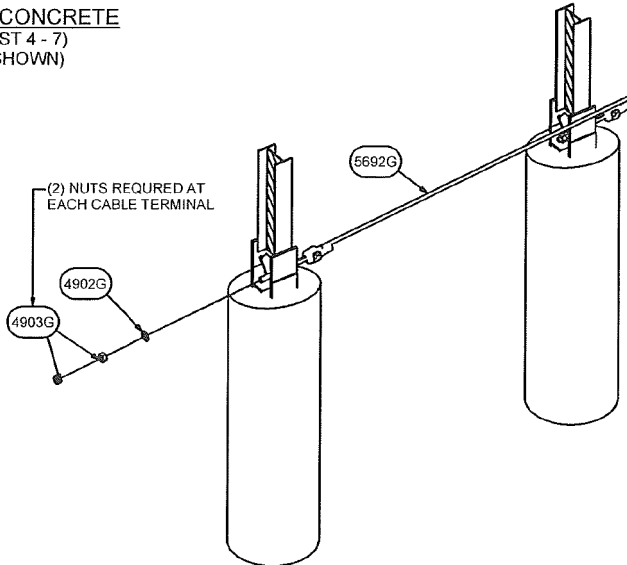
CRP TERMINAL POST - IN CONCRETE  
(CCT TERMINAL POST 1X - 3)  
(POST OPTION #1 SHOWN)



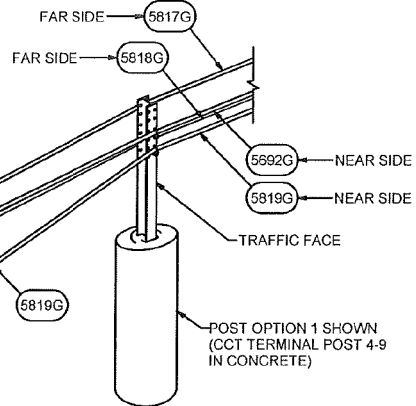
TERMINAL POST - IN CONCRETE  
(CCT TERMINAL POST 4 - 7)  
(POST OPTION #1 SHOWN)



CRP TERMINAL POST - DRIVEN  
(CCT TERMINAL POST 1X - 3)  
(POST OPTION #2 SHOWN)



TERMINAL LINE POST - WITH SOIL PLATE  
(CCT TERMINAL POST - 4)  
(POST OPTION #2 SHOWN)



HARDWARE CASS CABLE TERMINAL - CCT			
QTY	PART No	TITLE	Lbs / Each
4	4902G	1" Ø CIRCULAR WASHER (F436)	0.11
8	4903G	1" HEX NUT (A194 2H)	0.33
1	5692G	CRP - 4th CABLE ASSEMBLY [6'0"-6'6"]	116.91
1	5817G	CRP - TOP CABLE ASSEMBLY [5'4'-3']	107.59
1	5818G	CRP - MIDDLE CABLE ASSEMBLY [4'0'-0"]	98.09
1	5819G	CRP - BOTTOM CABLE ASSEMBLY [4'1'-9"]	88.85
4	33909G	CASS CABLE BRACKET	1.92

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PROJ: CASS-S3\_6:1

CASS-S3 (6:1 SLOPE)  
4-CABLE GUARDRAIL  
SAFETY SYSTEM

TRINITY HIGHWAY  
PRODUCTS, LLC

SPEC:

SHIPPING WT:

DRW: E.A.S. 11/4/2010

CHK:

SHT: 5 OF 5

SIZE: D

DWG NO: SS-743

REV 0

GENERAL NOTES:

Either flanged channel steel posts or S3x5.7 steel I beam posts will be used, but post type will be consistent throughout 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 ± 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 Range (Degree F)	-20 to -11	-10 to -1	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 79	80 to 89	90 to 99	100 to 120
Spring Compression (Inch)	4¼	4	3¾	3½	3¼	3	2¾	2½	2¼	2	1¾	1½	1¼

POST SPACING FOR HORIZONTAL CURVES	
Roadway $\varnothing$ 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

Published Date: 1st Qtr. 2020

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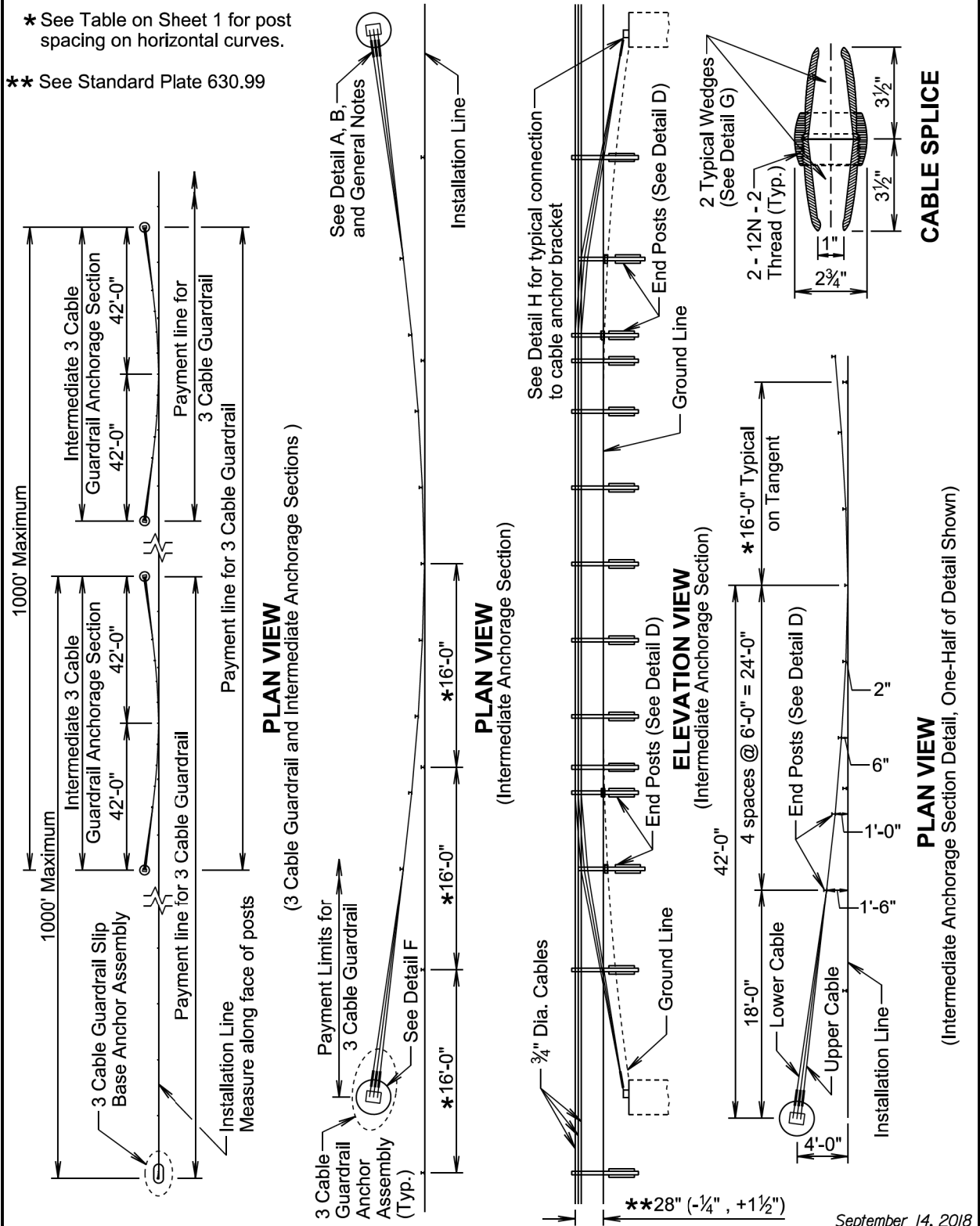
3 CABLE GUARDRAIL  
(LOW TENSION)

PLATE NUMBER  
629.01

Sheet 1 of 6

\* See Table on Sheet 1 for post spacing on horizontal curves.

\*\* See Standard Plate 630.99



September 14, 2018

Published Date: 1st Qtr. 2020

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3 CABLE GUARDRAIL  
(LOW TENSION)

PLATE NUMBER  
629.01

Sheet 2 of 6



**DETAIL**  
**(Concrete Anchor and Cable Anchor Bracket)**

Sheet 3 of 6

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### 3 CABLE GUARDRAIL (LOW TENSION)



**DETAIL 11**  
(Cable End Assembly Rod  
Connection to Cable Anchor Bracket)

## DETAIL

### DETAIL G

## DETAIL A

**DETAIL A**  
(Steel Turnbuckle Cable End Assembly)  
(Minimum Tensile Strength = 25,000 Lbs.)

Sheet 4 of 6

### 3 CABLE GUARDRAIL (LOW TENSION)

## DETAIL B

**DETAIL B**  
(Spring Cable End Assembly with Turnbuckle)  
(Compensating Device)



**3 CABLE GUARDRAIL (LOW TENSION)**

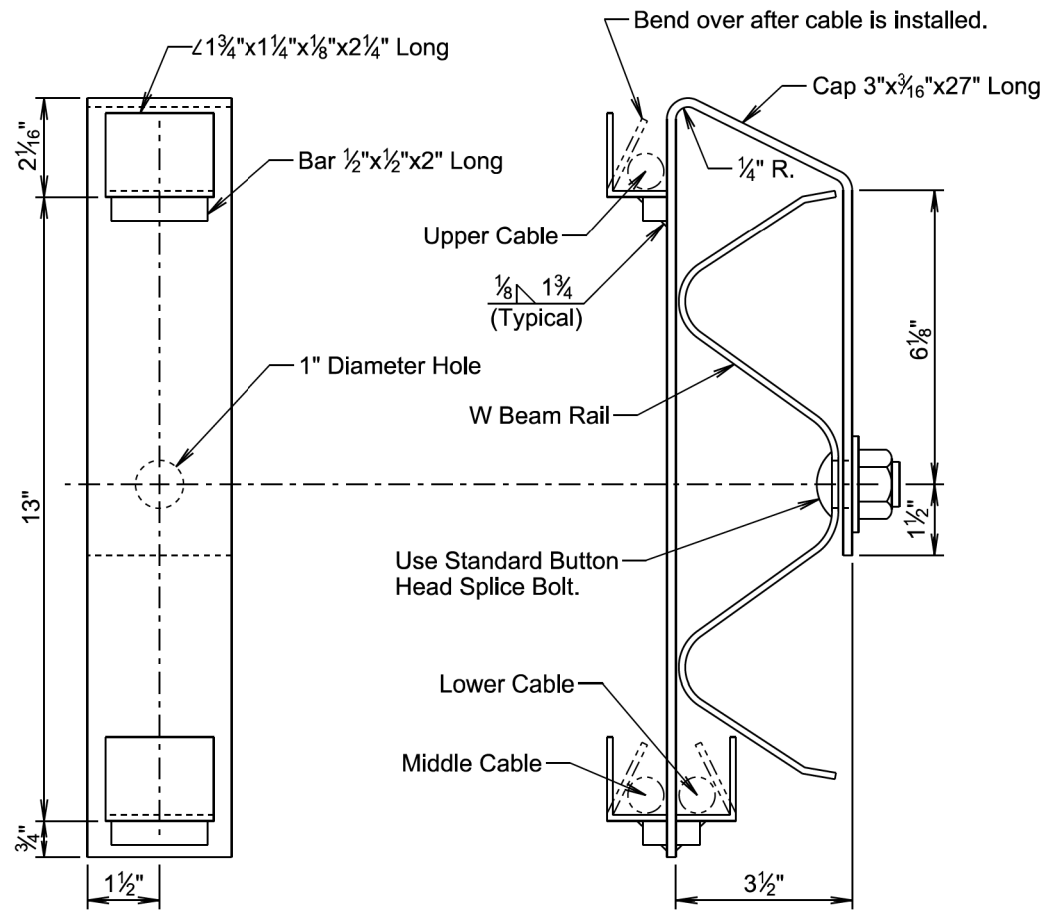
PLATE NUMBER
629.01

Sheet 6 of 6



Plotting Date: 02/20/2020





**ELEVATION VIEW**  
(Transition Bracket)

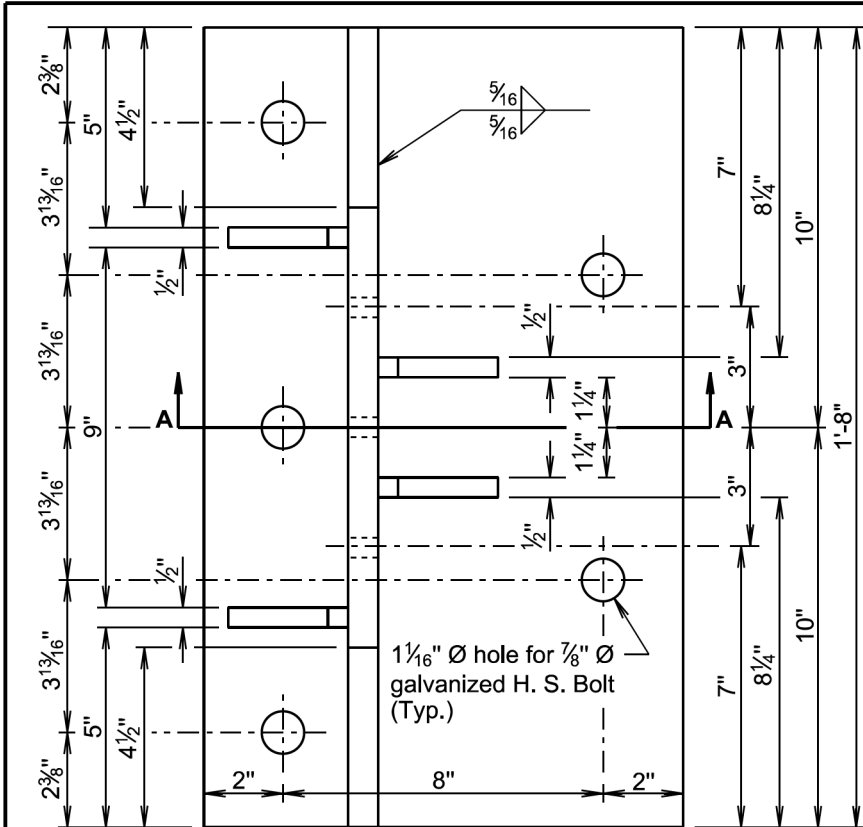
**END VIEW**  
(W Beam Rail and Transition Bracket)

**GENERAL NOTES:**

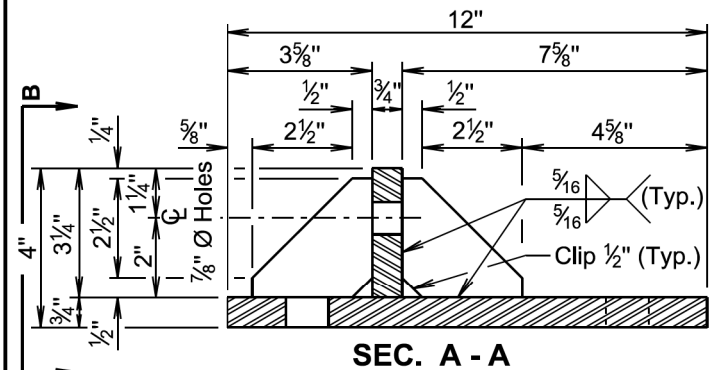
Steel used in the fabrication of the bracket will conform to ASTM A36 and the bracket will be galvanized after fabrication in accordance with ASTM A123.

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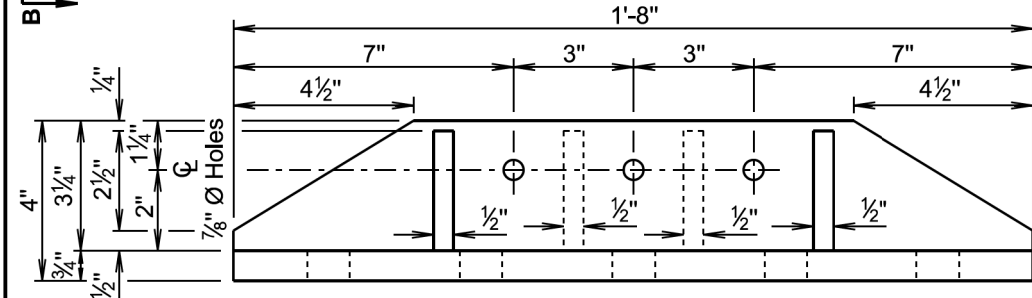
Published Date: 1st Qtr. 2020	S D D O T	W BEAM TO 3 CABLE TRANSITION BRACKET	PLATE NUMBER
			629.15
			Sheet 1 of 1



**PLAN VIEW**



**SEC. A - A**



**VIEW B - B**

**GENERAL NOTES:**

All steel will conform to ASTM A709, Grade 36.

Welding and weld inspection will be in conformance with AWS/ANSI D1.1 (Current Year) Structural Welding Code - Steel.

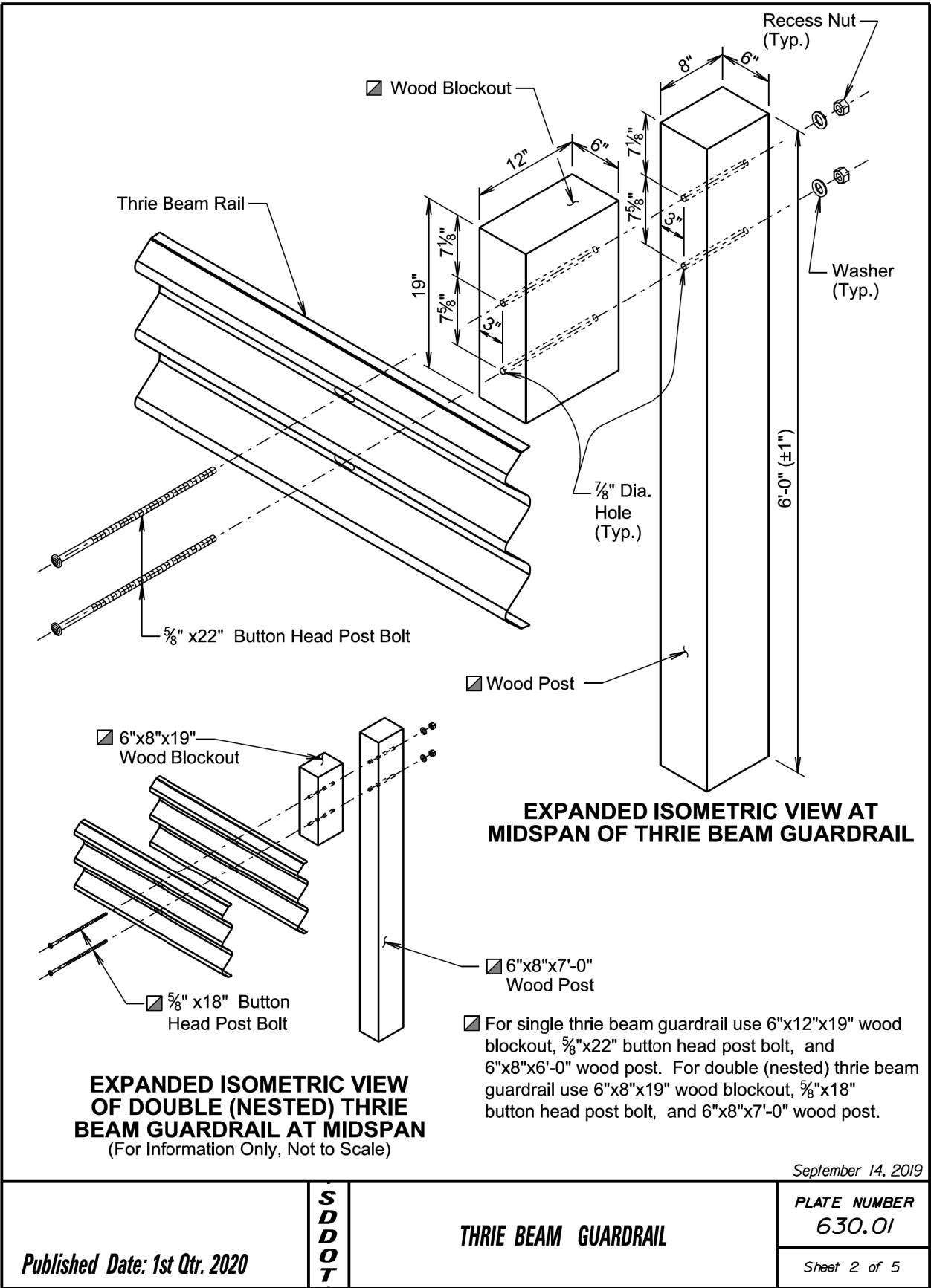
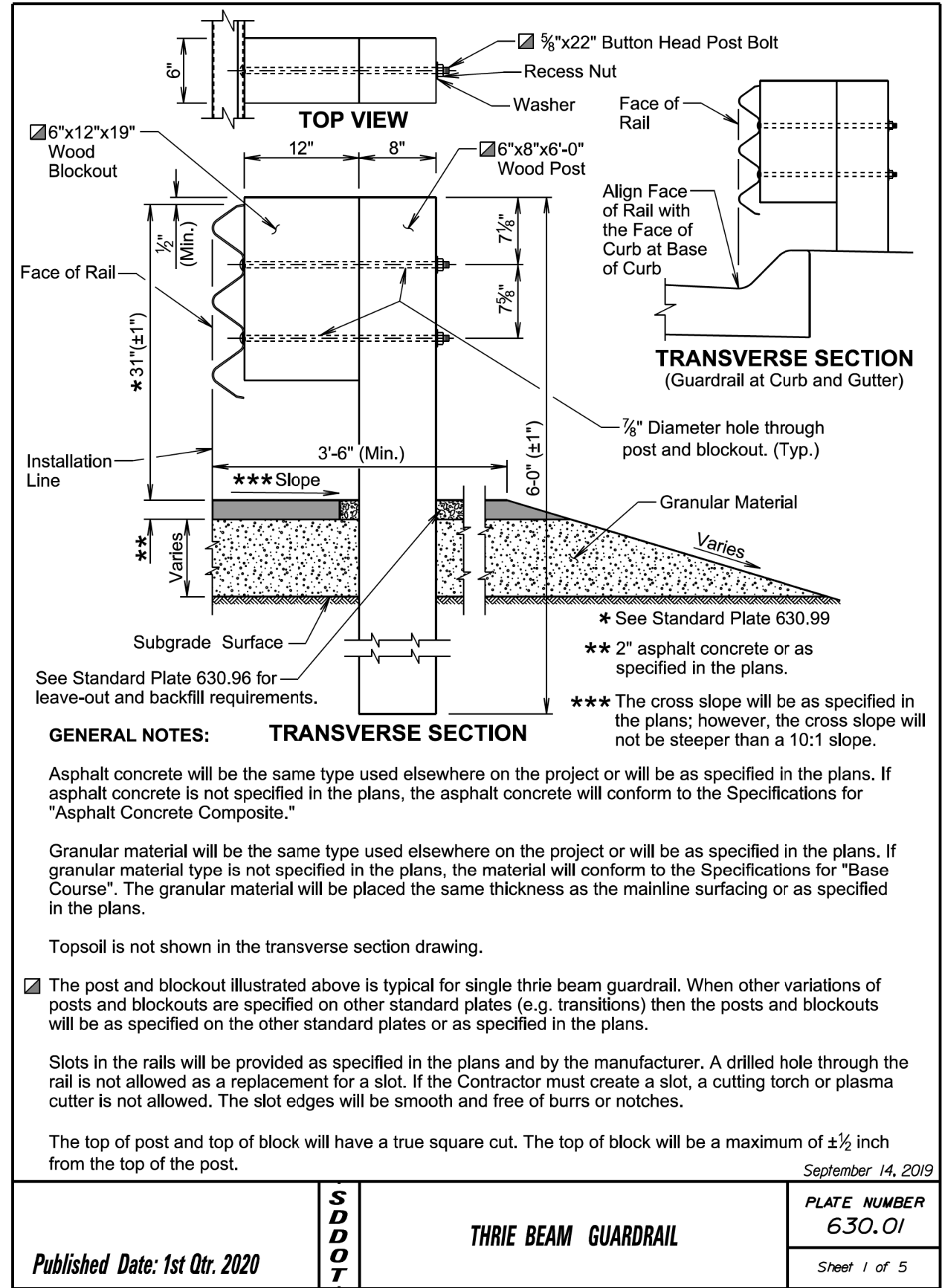
After fabrication, galvanize in accordance with AASHTO M111 (ASTM A123).

Bolts, nuts, and washers will be provided with each assembly. Bolts will be galvanized and conform to the requirements of ASTM A307 or A449. Plain washers will be galvanized and conform to ASTM F844.

All Costs associated with furnishing and installing the 3 cable guardrail connection assembly will be incidental to the contract unit price for the bid items "Class A45 Concrete, Bridge Deck", "Class A45 Concrete, Bridge Repair", or "3 Cable Guardrail", as applicable.

September 14, 2018

Published Date: 1st Qtr. 2020	S D D O T	3 CABLE GUARDRAIL CONNECTION ASSEMBLY	PLATE NUMBER
			629.30
			Sheet 1 of 1

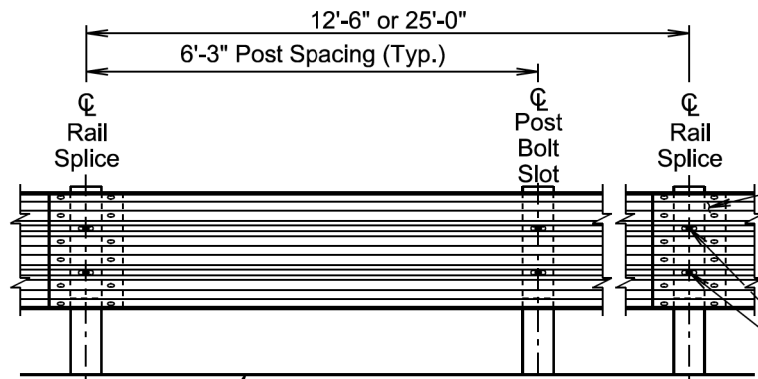


Plot Scale - 1:200

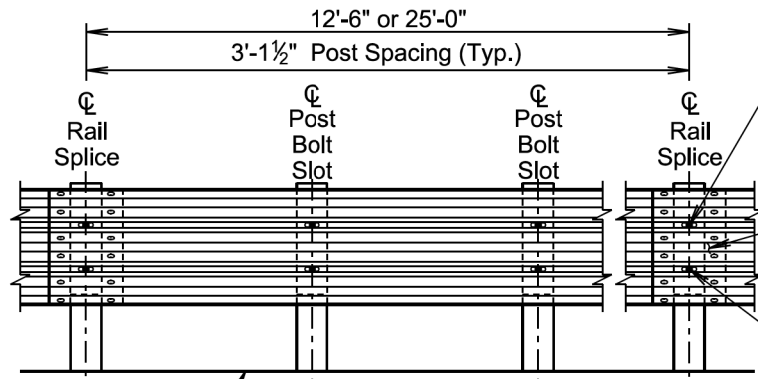
Plotted From - TRW11NT23

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	000I-391	19	36

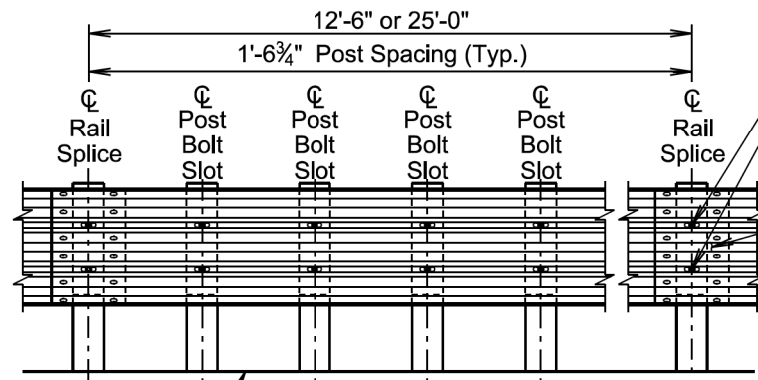
Plotting Date: 02/20/2020



**ELEVATION VIEW**  
(6'-3" Post Spacing)



**ELEVATION VIEW**  
(3'-1 1/2" Post Spacing)



**ELEVATION VIEW**  
(1'-6 3/4" Post Spacing)

Lap rail  
in direction  
of adjacent  
traffic.

The post bolt should  
be placed in the  
center (horizontally  
and vertically) of the  
slot. (Typ.)

Lap rail  
in direction  
of adjacent  
traffic.

The post bolt should  
be placed in the  
center (horizontally  
and vertically) of the  
slot. (Typ.)

Lap rail  
in direction  
of adjacent  
traffic.

September 14, 2019

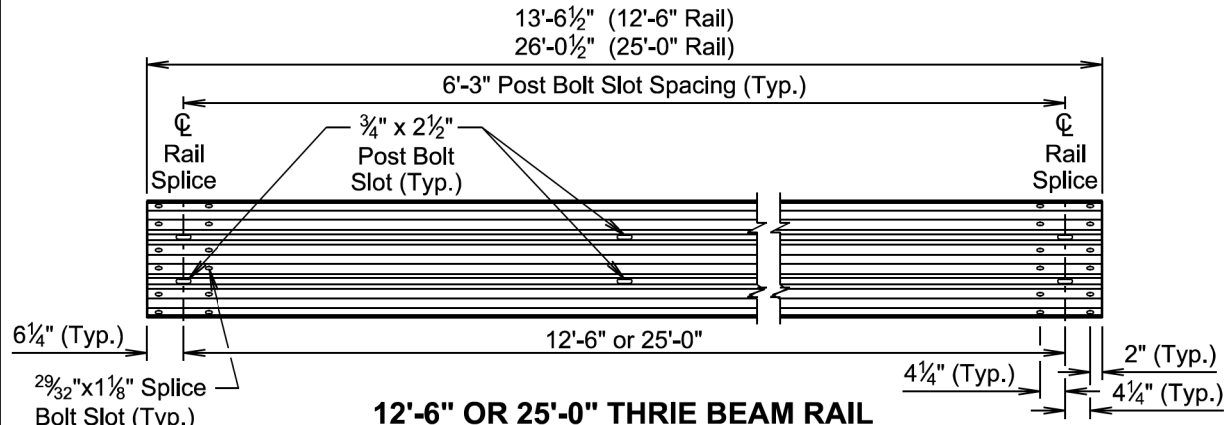
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**THRIE BEAM GUARDRAIL**

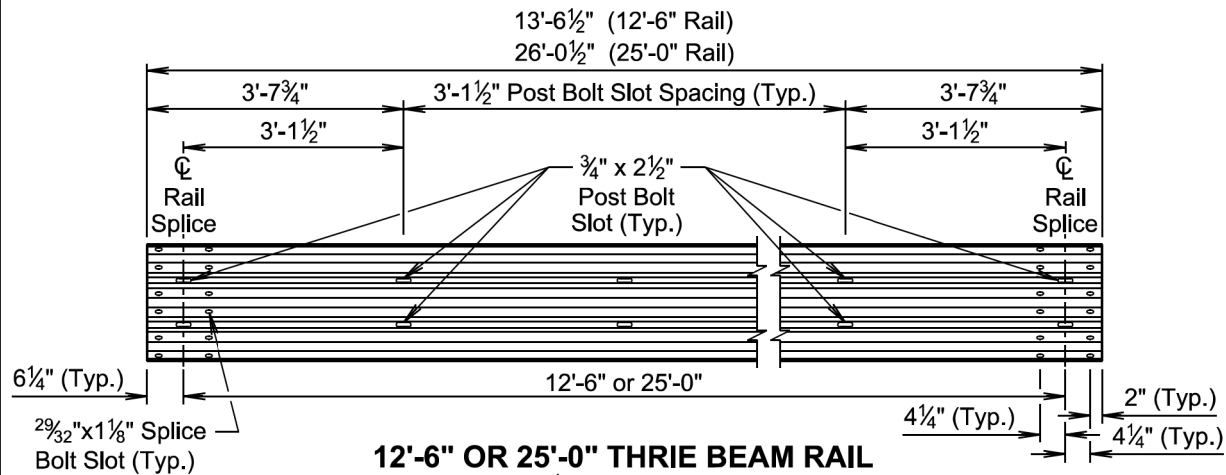
**PLATE NUMBER**  
**630.01**

Sheet 3 of 5

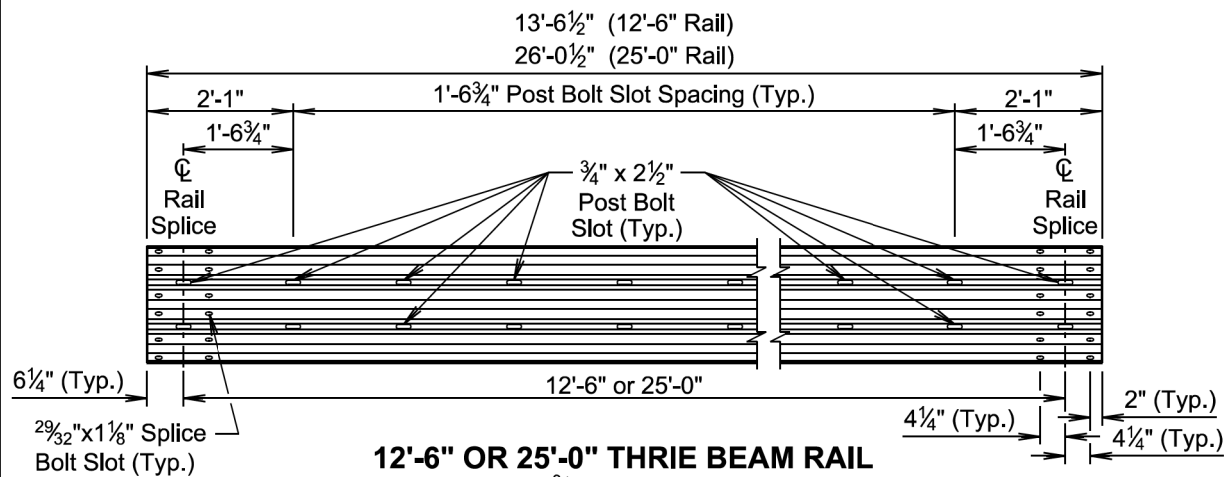
**Published Date: 1st Qtr. 2020**



**12'-6" OR 25'-0" THRIE BEAM RAIL**  
(6'-3" Post Spacing)



**12'-6" OR 25'-0" THRIE BEAM RAIL**  
(3'-1 1/2" Post Spacing)



**12'-6" OR 25'-0" THRIE BEAM RAIL**  
(1'-6 3/4" Post Spacing)

September 14, 2019

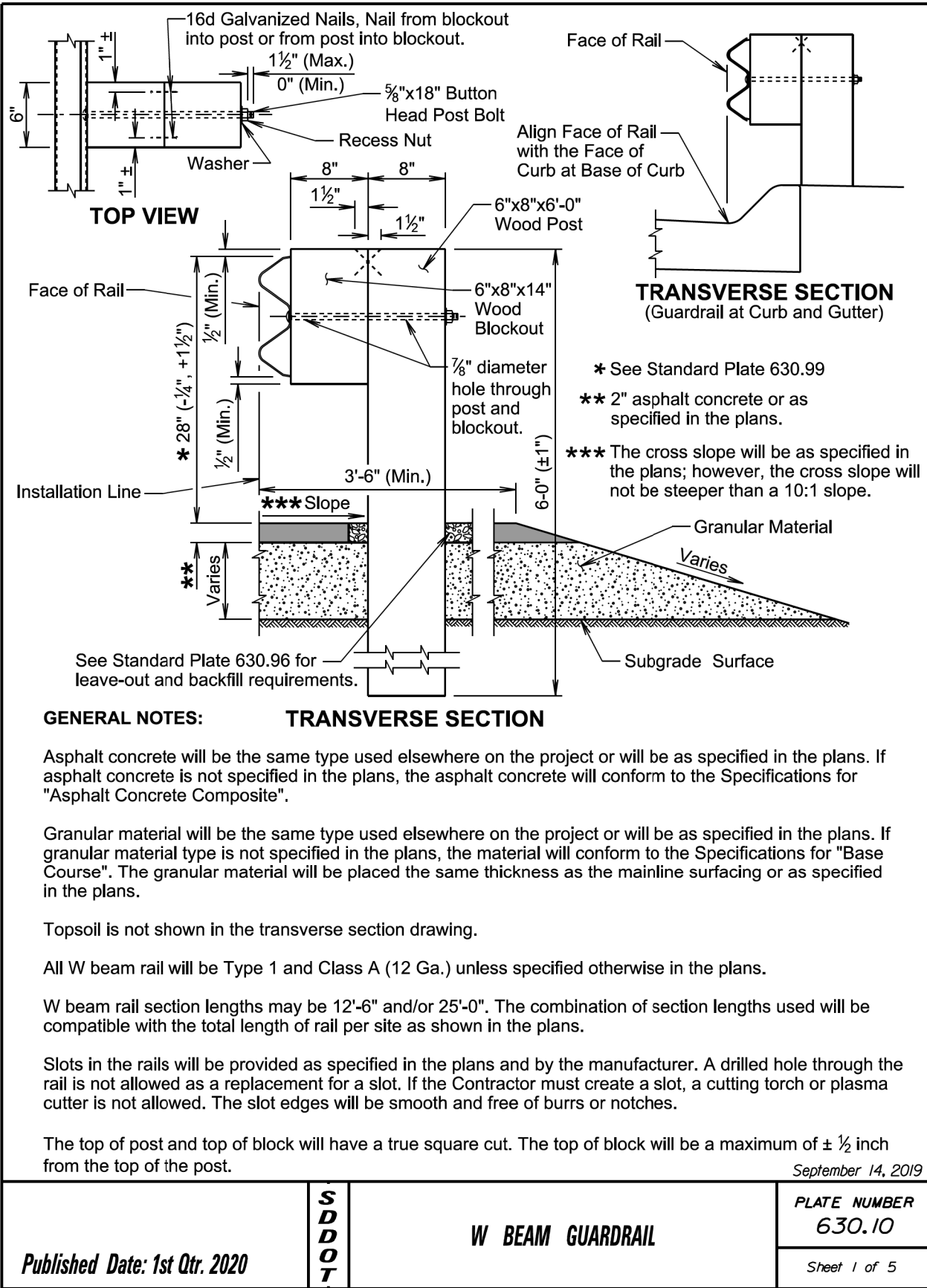
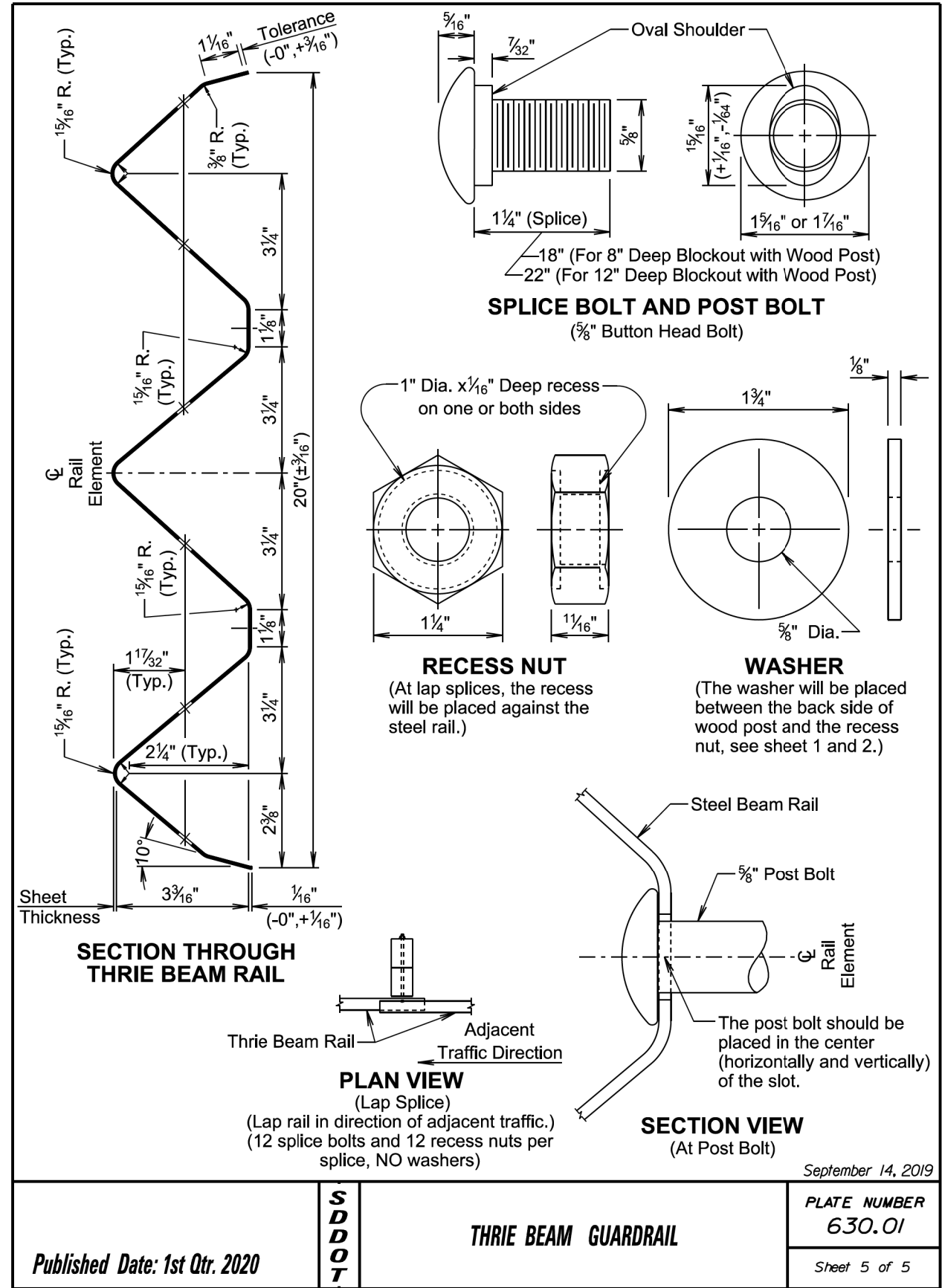
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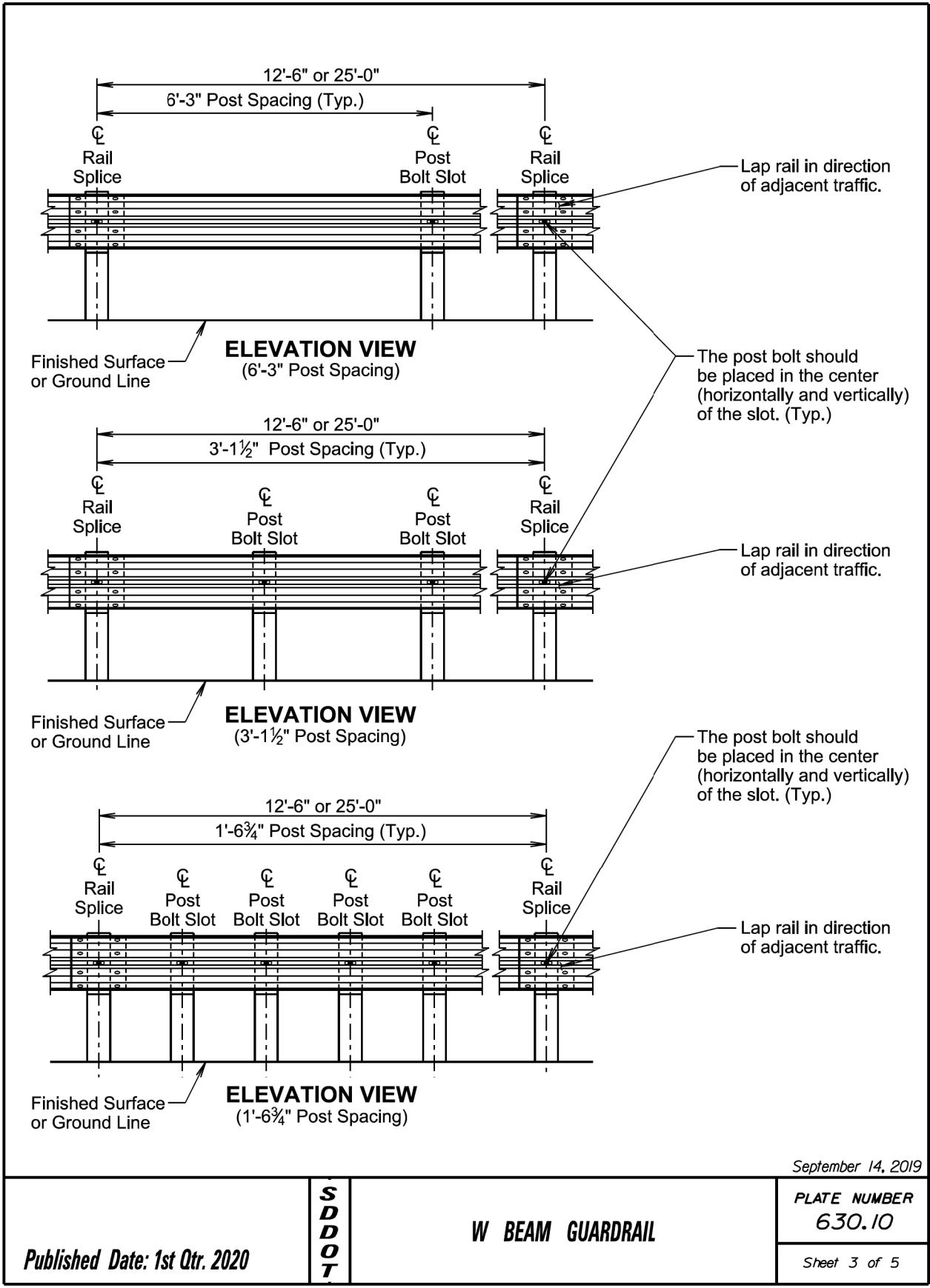
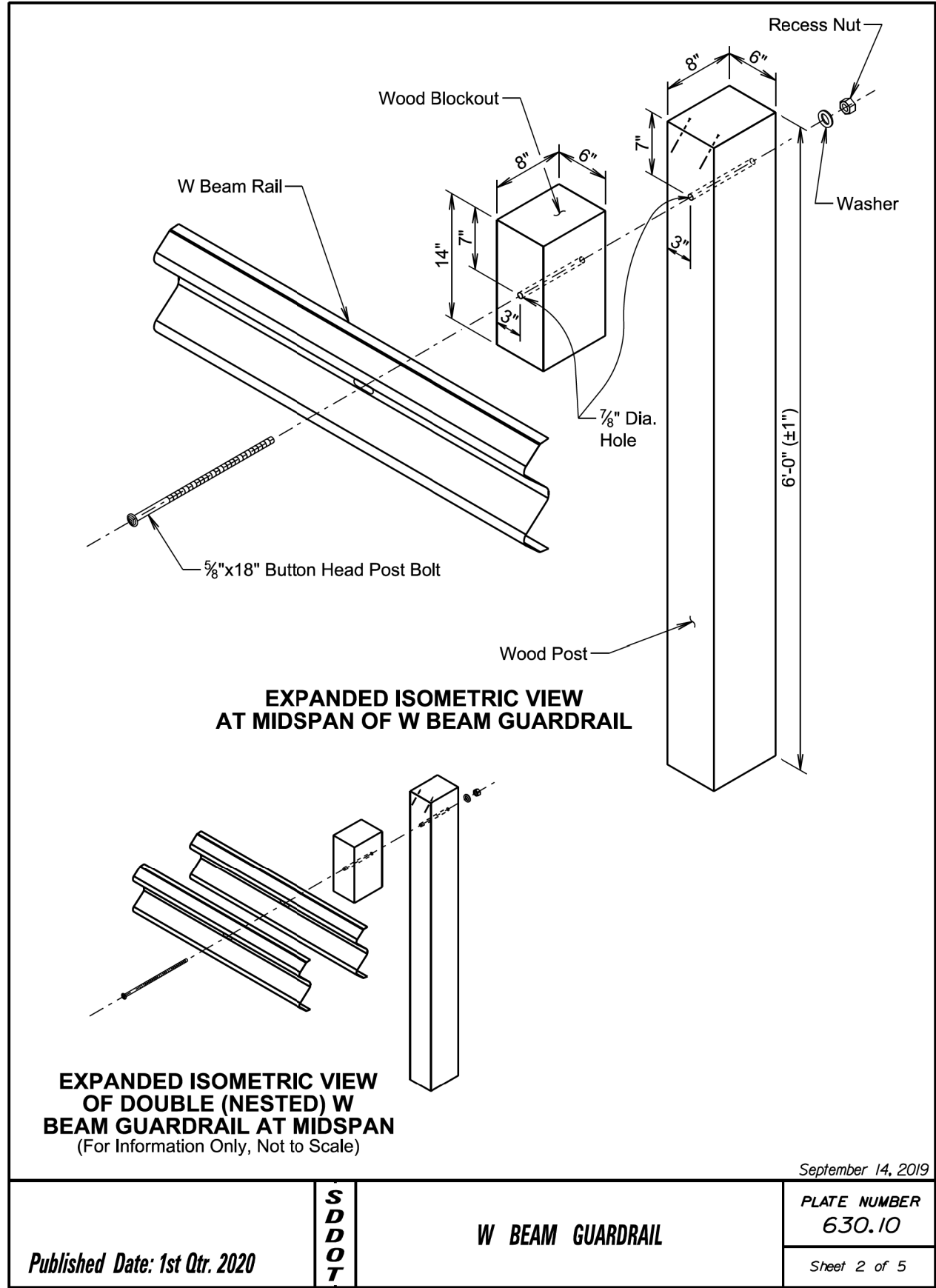
**THRIE BEAM GUARDRAIL**

**PLATE NUMBER**  
**630.01**

Sheet 4 of 5

**Published Date: 1st Qtr. 2020**

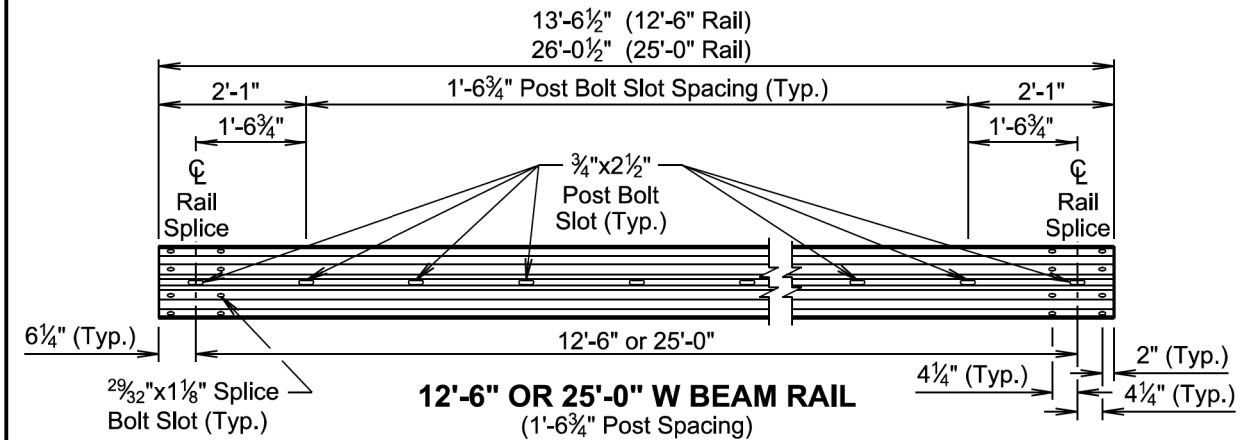
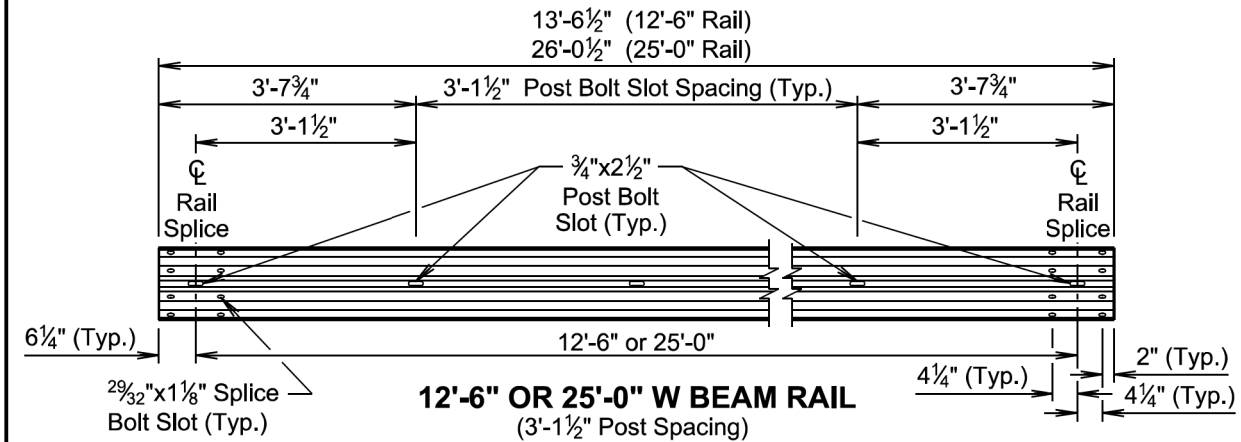
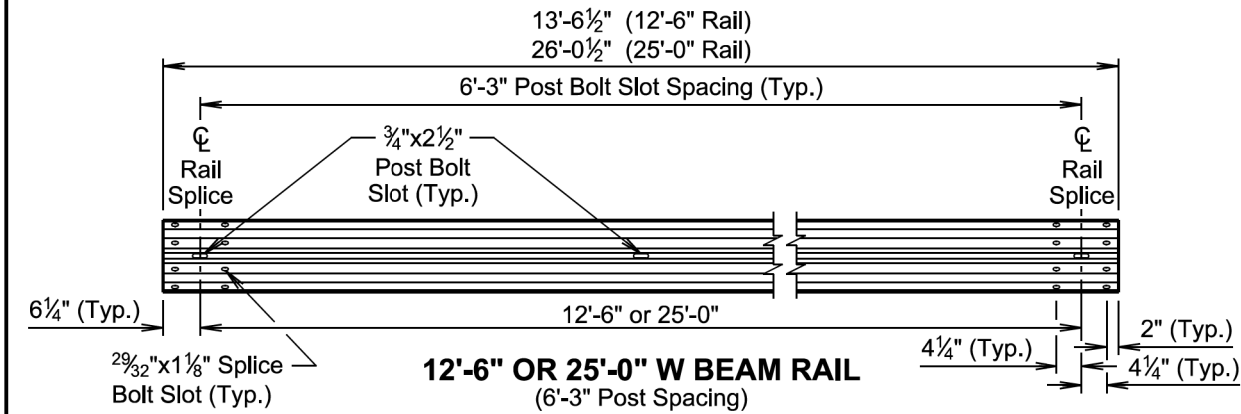






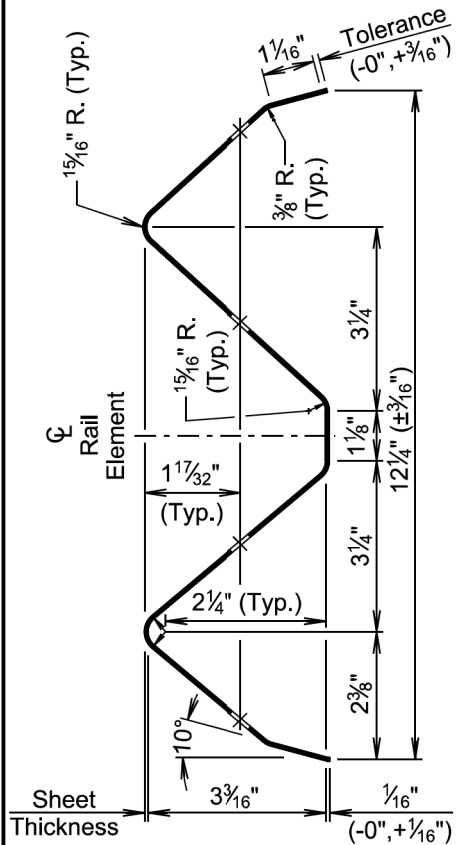
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	000I-391	22	36

Plotting Date: 02/20/2020

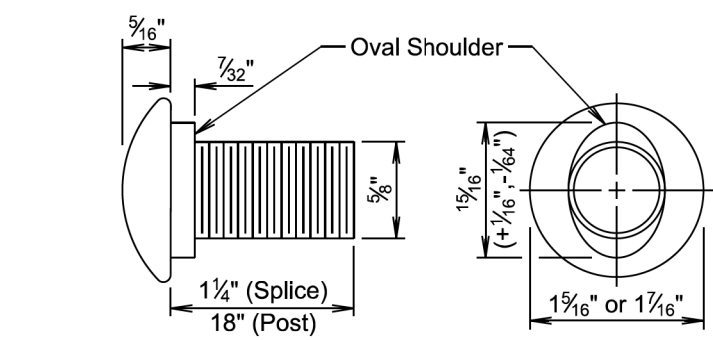


September 14, 2019

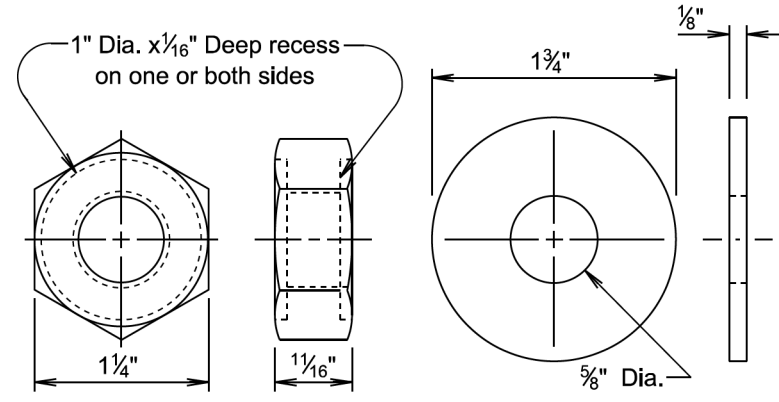
Published Date: 1st Qtr. 2020	S D D O T	W BEAM GUARDRAIL	PLATE NUMBER 630.10
			Sheet 4 of 5



SECTION THROUGH  
W BEAM RAIL

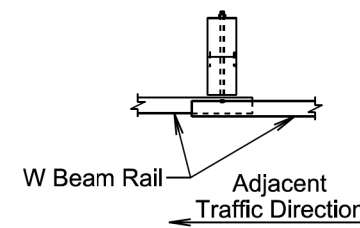


SPLICE BOLT AND POST BOLT  
(3/8" Button Head Bolt)

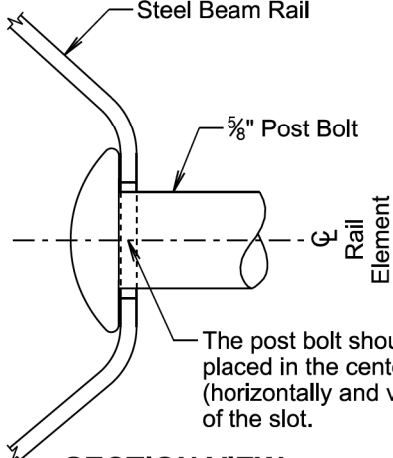


RECESS NUT  
(At lap splices, the recess will be placed against the steel rail.)

WASHER  
(The washer will be placed between the back side of wood post and the recess nut, see sheet 1 and 2.)



PLAN VIEW  
(Lap Splice)  
(Lap rail in direction of adjacent traffic.)  
(8 splice bolts and 8 recess nuts per splice, NO washers)



SECTION VIEW  
(At Post Bolt)

September 14, 2019

Published Date: 1st Qtr. 2020	S D D O T	W BEAM GUARDRAIL	PLATE NUMBER 630.10
			Sheet 5 of 5

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	000I-391	23	36

Plotting Date: 02/20/2020

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"

STANDARD 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.

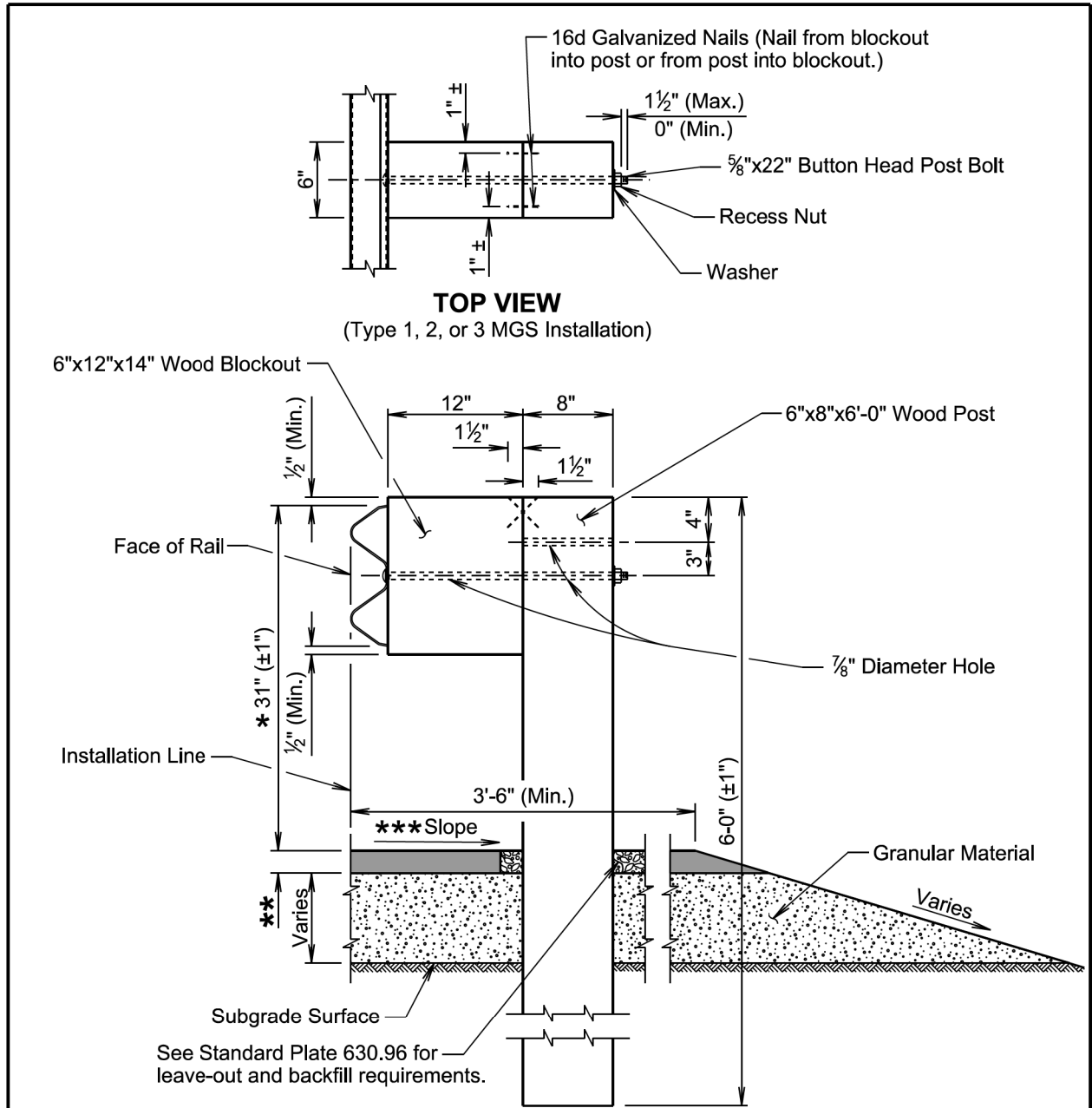
W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used will be compatible with the total length of rail per site as shown in the plans.

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

<i>Published Date: 1st Qtr. 2020</i>	<b>S D D O T</b>	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b>	PLATE NUMBER 630.20
			Sheet 1 of 6



\* See Standard Plate 630.99

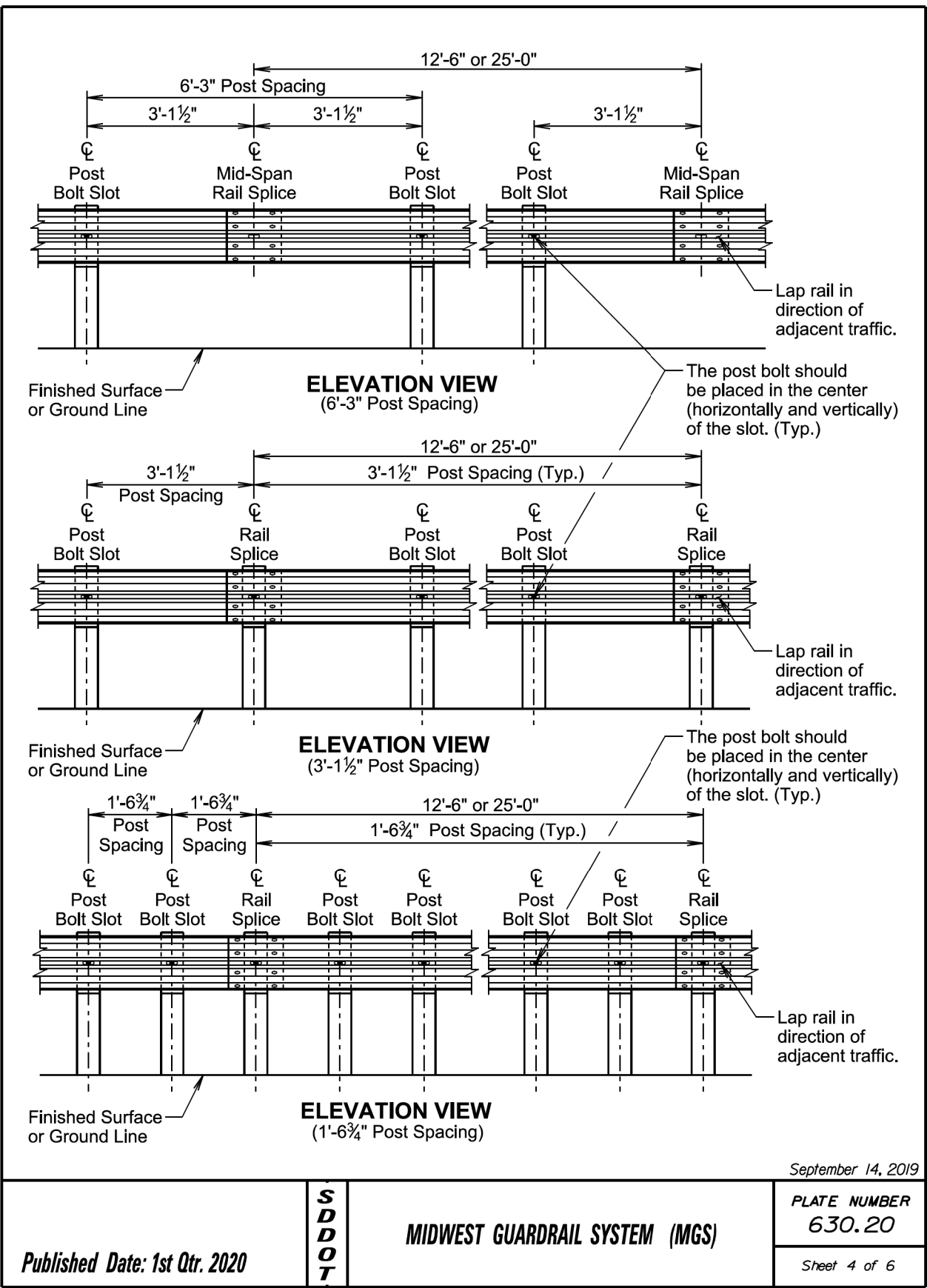
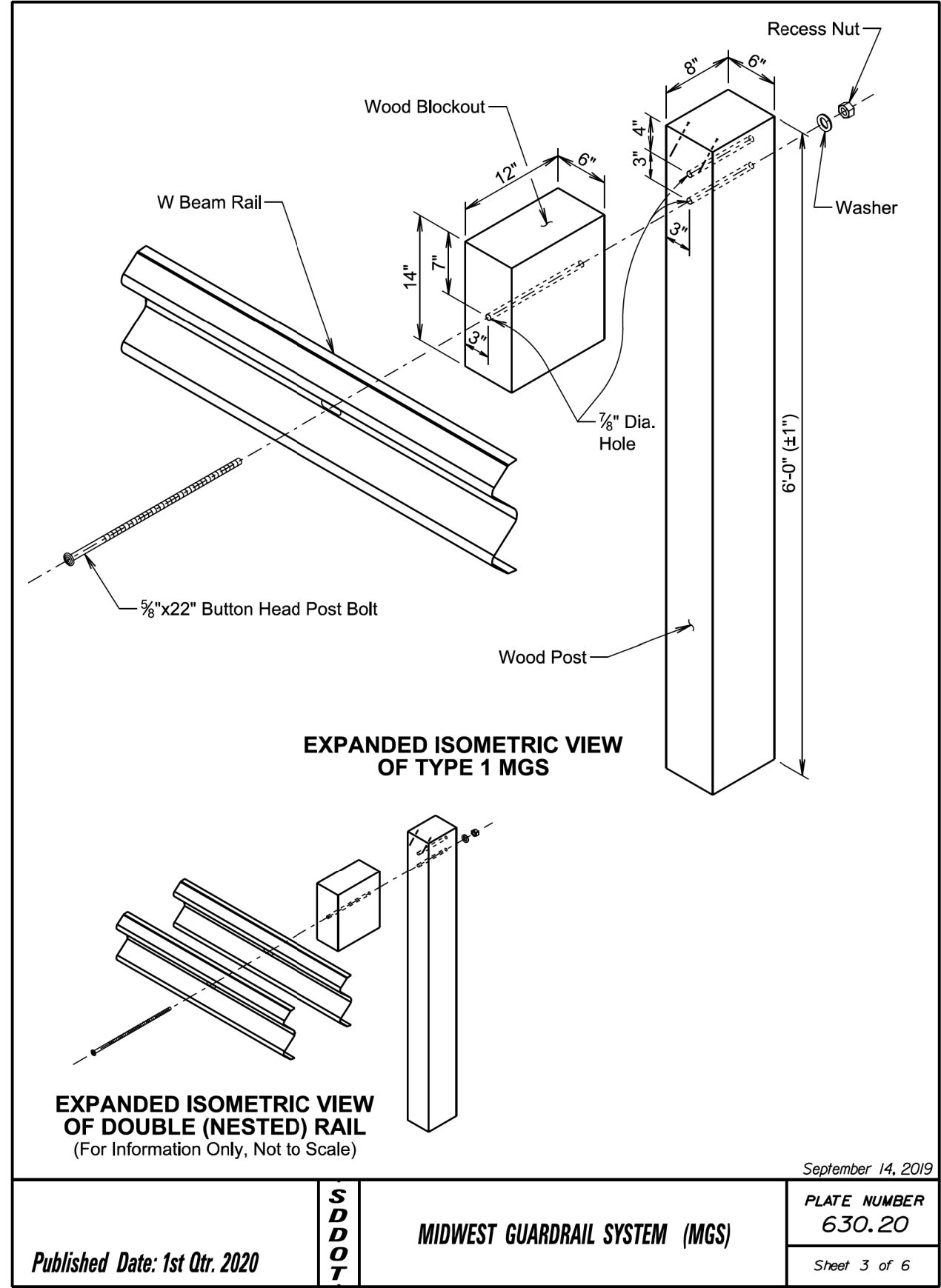
\*\* 2" asphalt concrete or as specified in the plans.

\*\*\* The cross slope will be as specified in the plans; however, the cross slope will not be steeper than a 10:1 slope.

TRANSVERSE SECTION  
(Type 1, 2, or 3 MGS Installation)

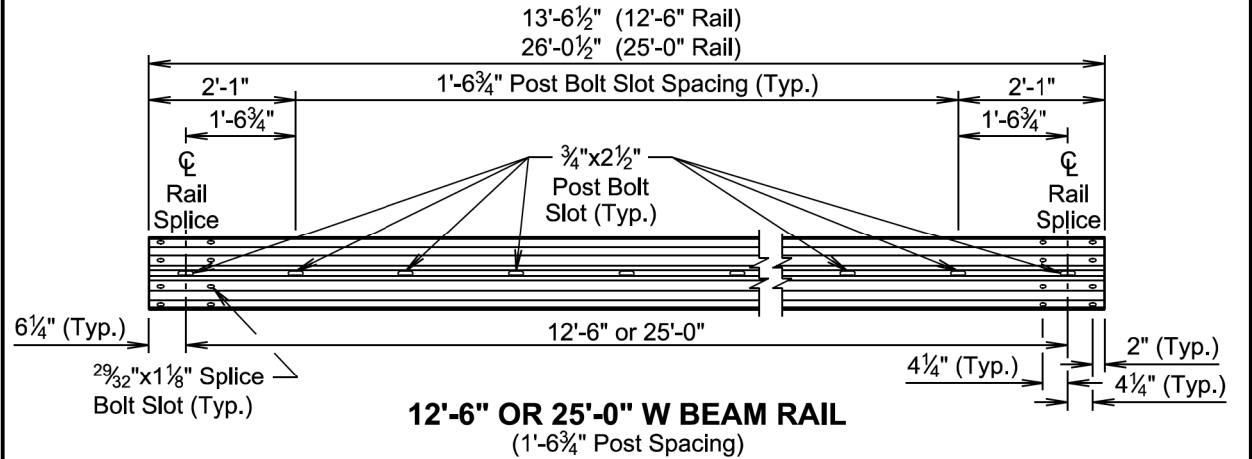
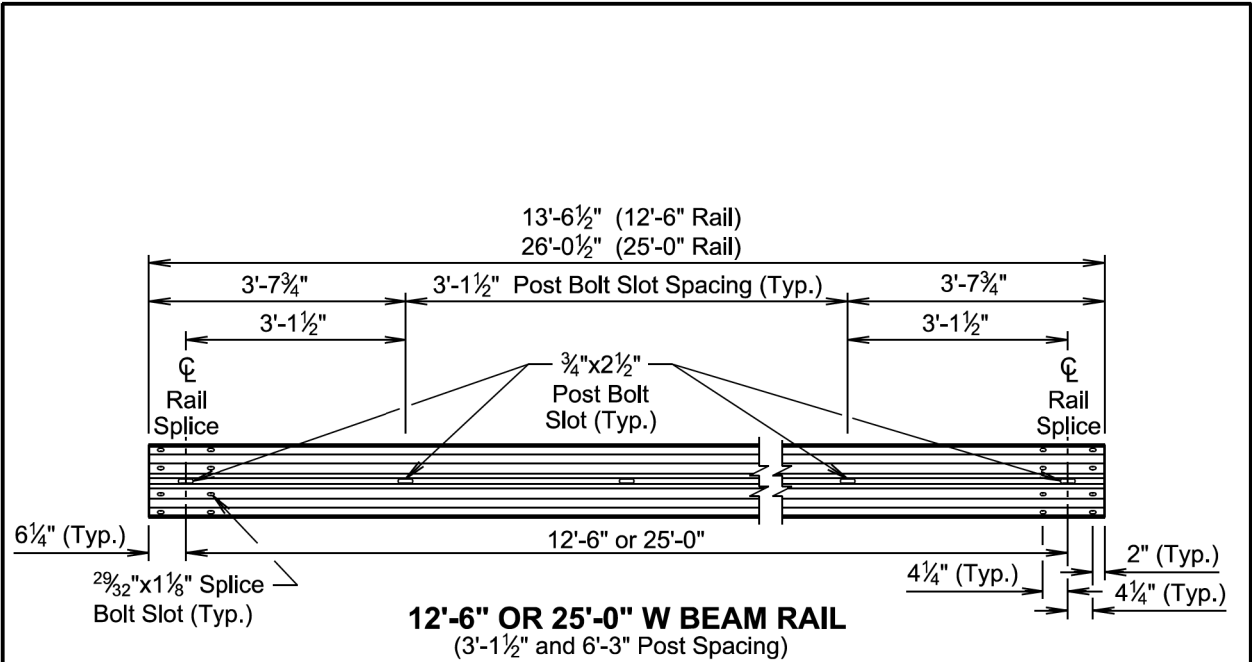
September 14, 2019

<i>Published Date: 1st Qtr. 2020</i>	<b>S D D O T</b>	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b>	PLATE NUMBER 630.20
			Sheet 2 of 6



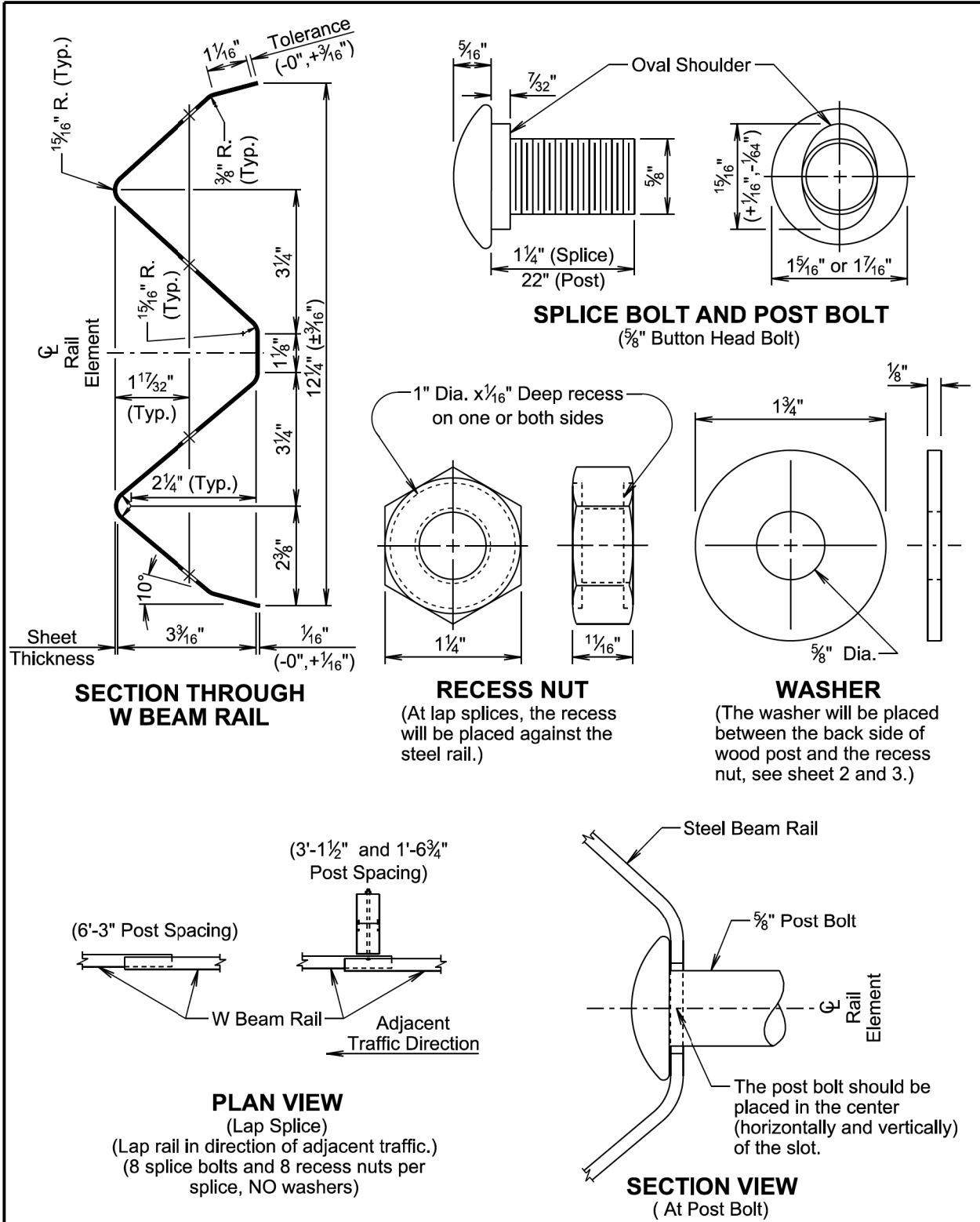
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	000I-391	25	36

Plotting Date: 02/20/2020



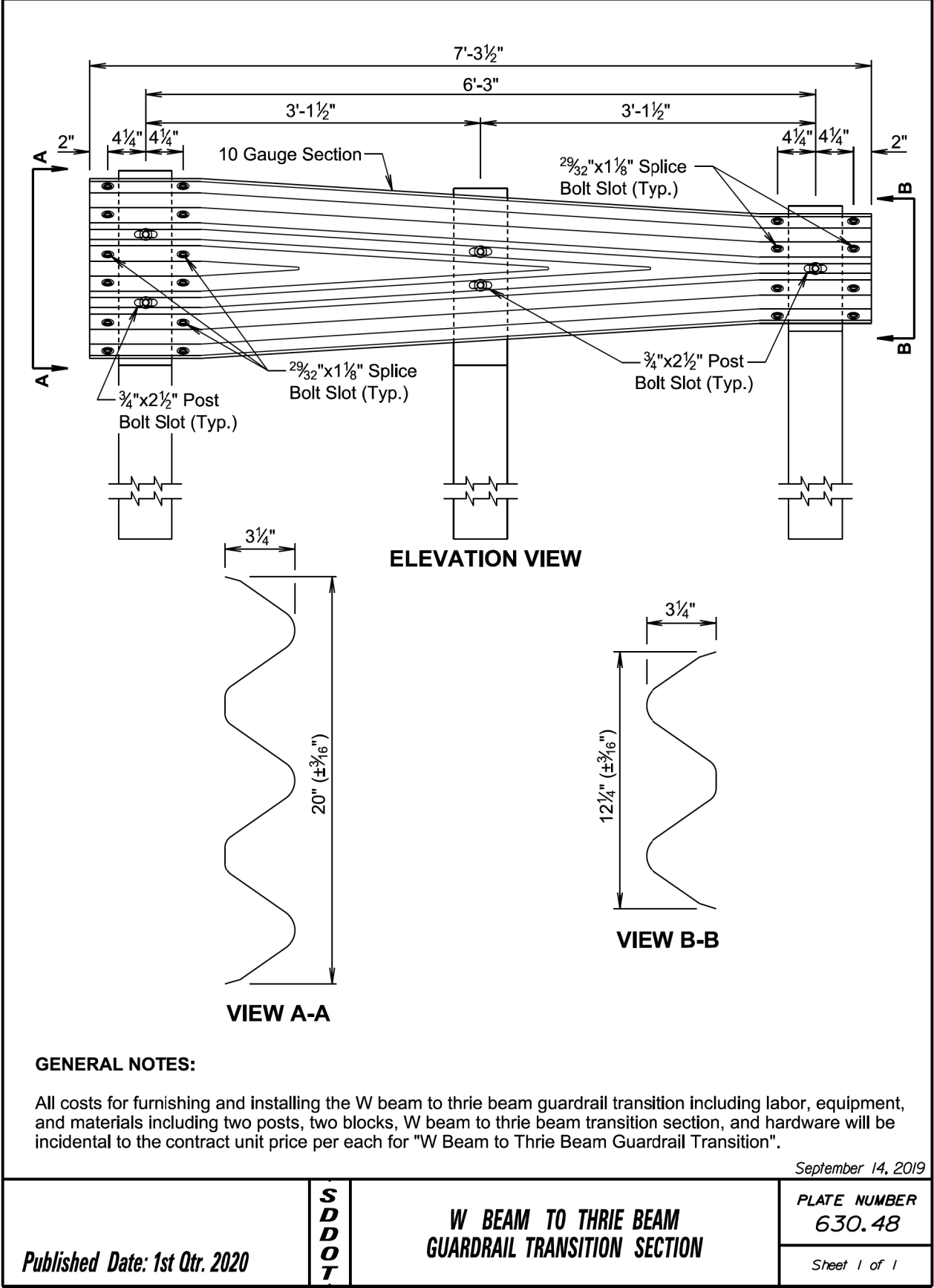
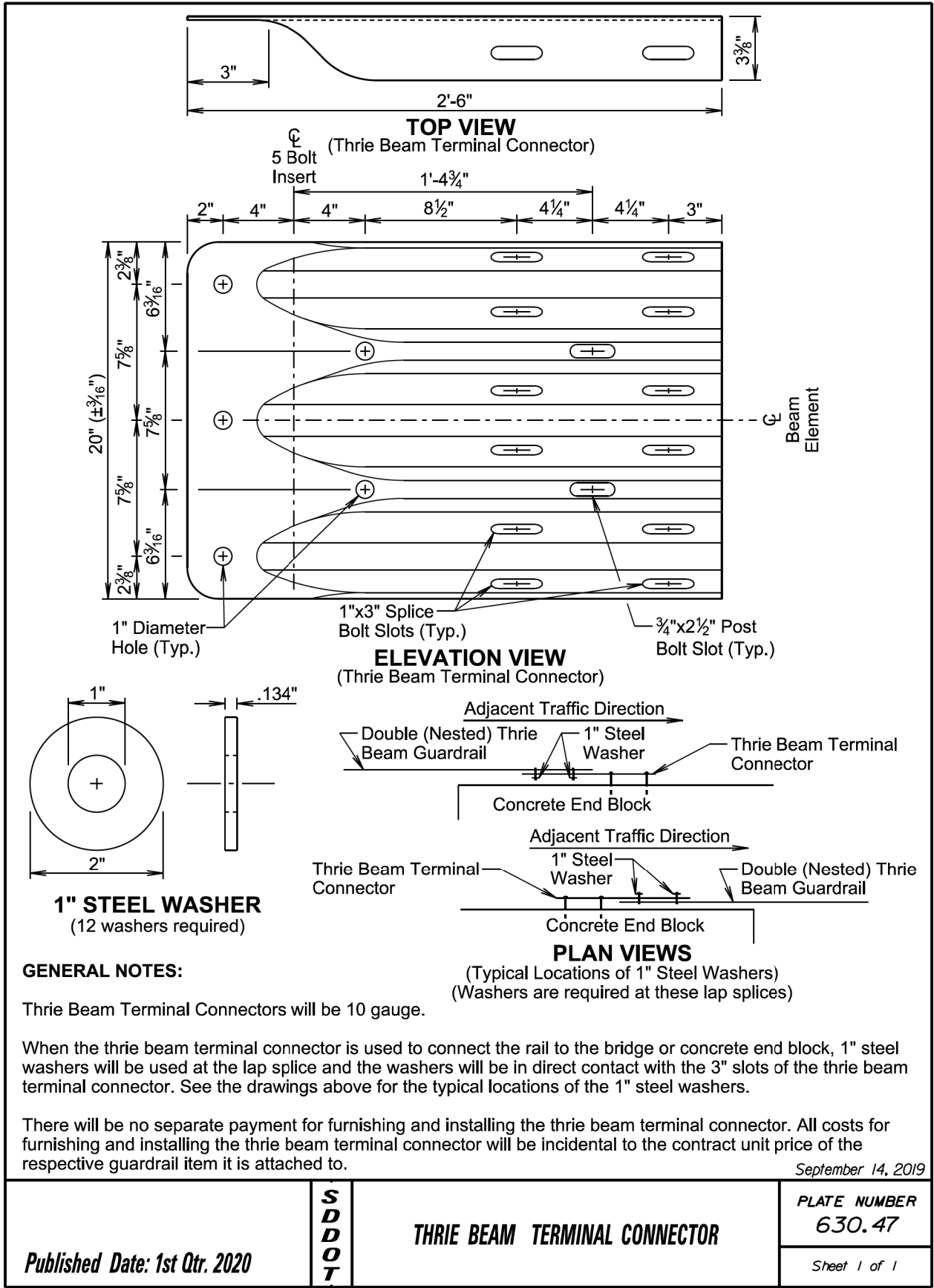
September 14, 2019

<b>Published Date: 1st Qtr. 2020</b>	<b>S D D O T</b>	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b>	PLATE NUMBER 630.20
			Sheet 5 of 6

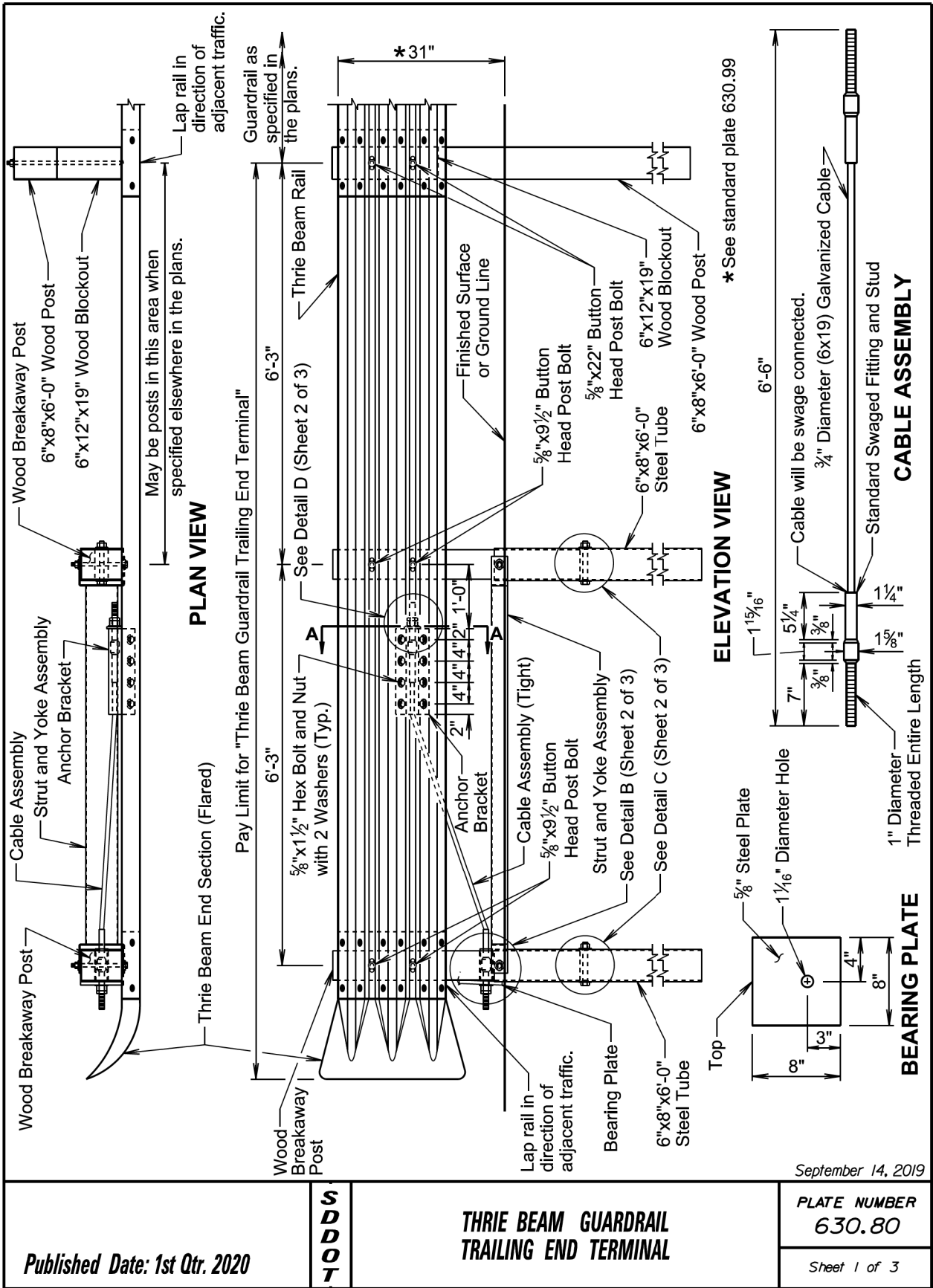
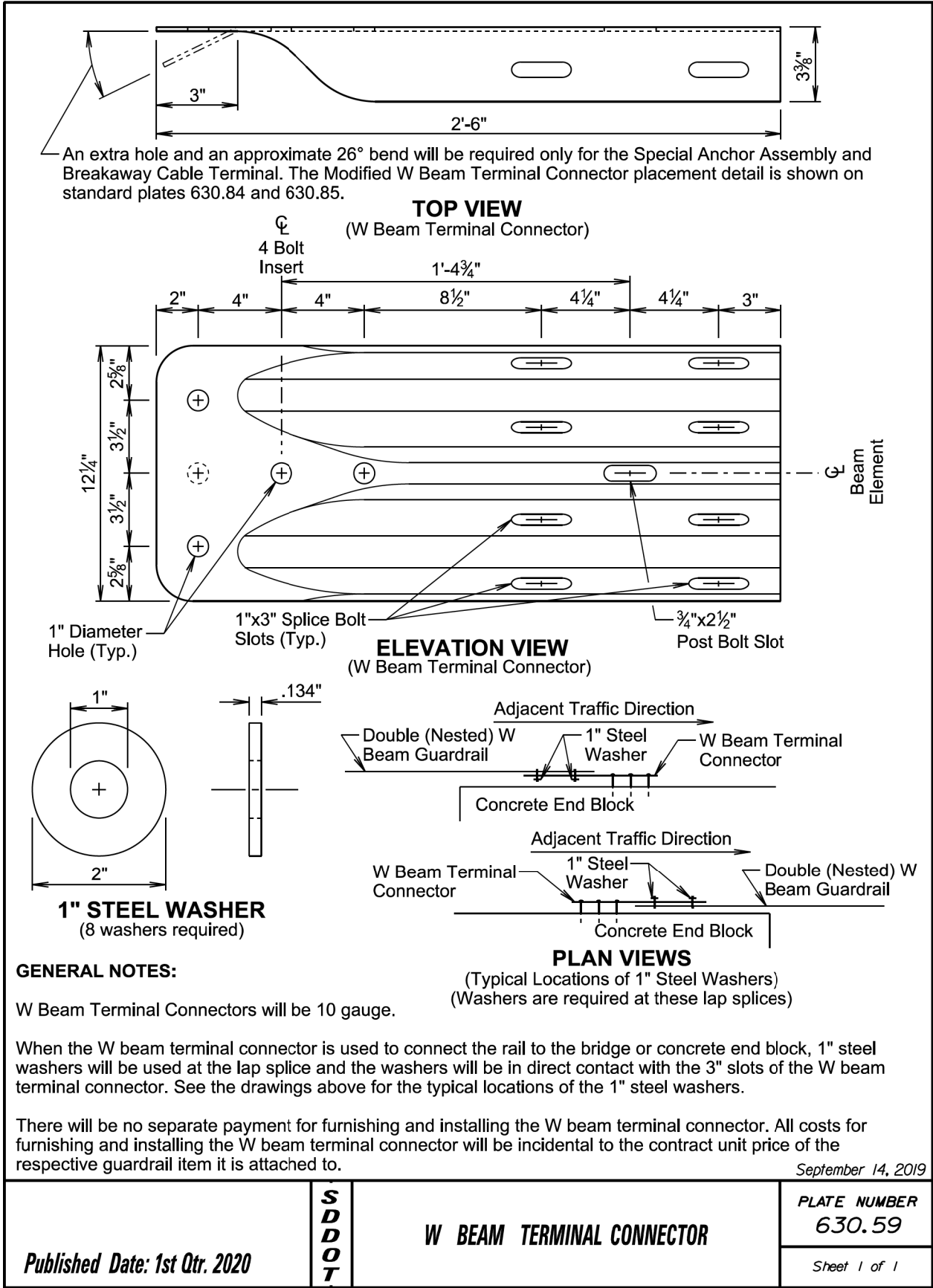


September 14, 2019

<b>Published Date: 1st Qtr. 2020</b>	<b>S D D O T</b>	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b>	PLATE NUMBER 630.20
			Sheet 6 of 6









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SDOT

PLATE NUMBER  
630.80

Sheet 2 of 3



Thrie beam end sections (flared) will be 12 gauge.

The cable will be  $\frac{3}{4}$ " Type II, with Class A coating in conformance with AASHTO M30.

The steel tube will meet the requirements of ASTM A500, Grade B, and will be galvanized after fabrication in accordance with the requirements of AASHTO M111.

All hardware will be galvanized in accordance with ASTM A153.

The anchor bracket, soil plate, and bearing plate will be fabricated from steel that meets ASTM A36 Specifications. They will be galvanized after fabrication in accordance with ASTM A123.

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 furnishing and constructing the thrie beam guardrail trailing end terminal including labor, equipment, materials which includes thrie beam rail section, all posts and blockouts, wood breakaway posts, steel tubes, cable assembly, bearing plate, anchor bracket, strut and yoke assembly, thrie beam end section (flared), hardware, and incidentals will be included in the contract unit price per each for "Thrie Beam Guardrail Trailing End Terminal".

September 14, 2019

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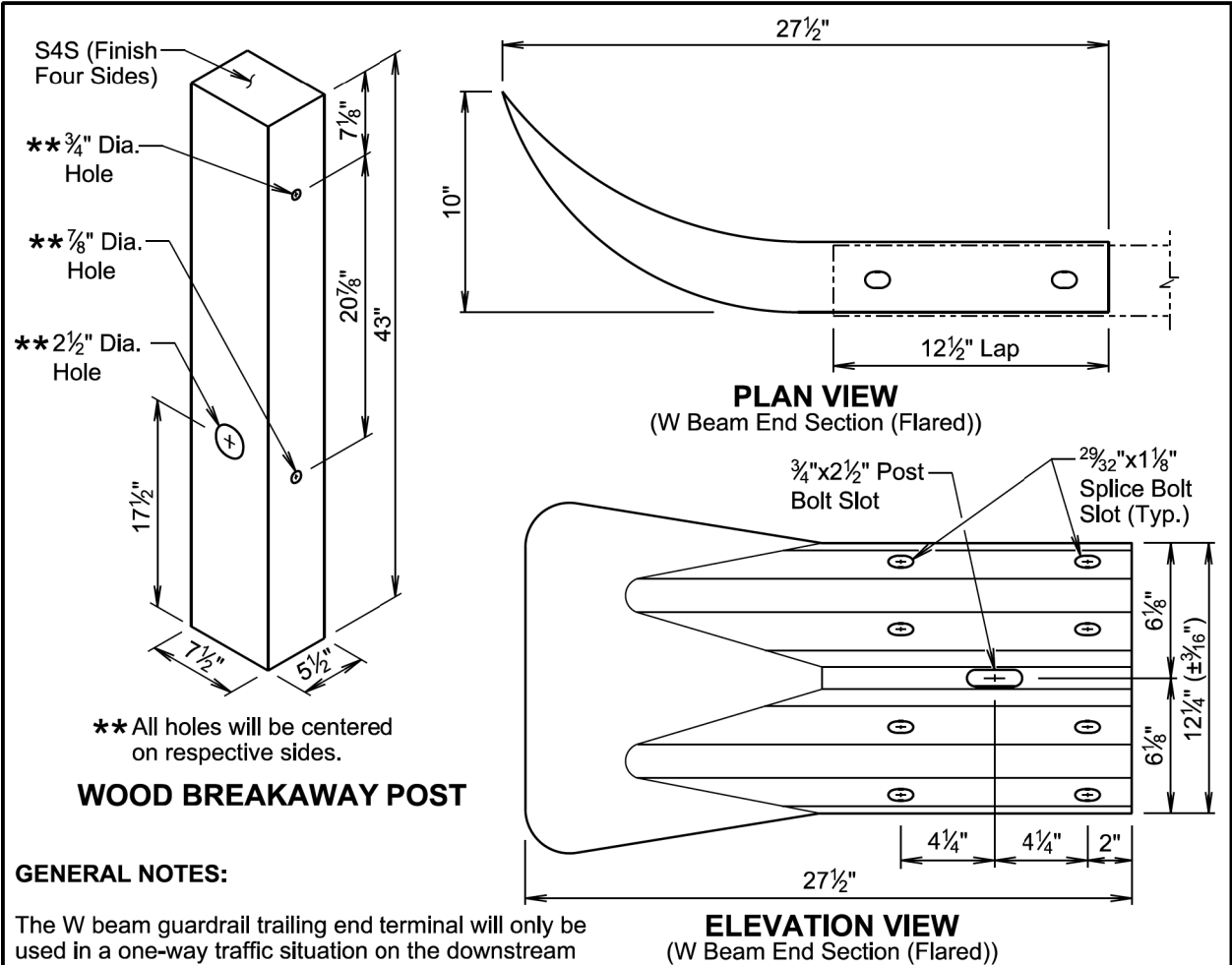
PLATE NUMBER  
630.80

Sheet 3 of 3



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	000I-391	30	36

Plotting Date: 02/20/2020



GENERAL NOTES:

The W beam guardrail trailing end terminal will only be used in a one-way traffic situation on the downstream traffic flow end.

W beam end section (flared) will be 12 gauge.

The cable will be 3/4", Type II, with Class A coating in conformance with AASHTO M30.

The steel tube will meet the requirements of ASTM A500, Grade B, and will be galvanized after fabrication in accordance with the requirements of AASHTO M111.

All hardware will be galvanized in accordance with ASTM A153.

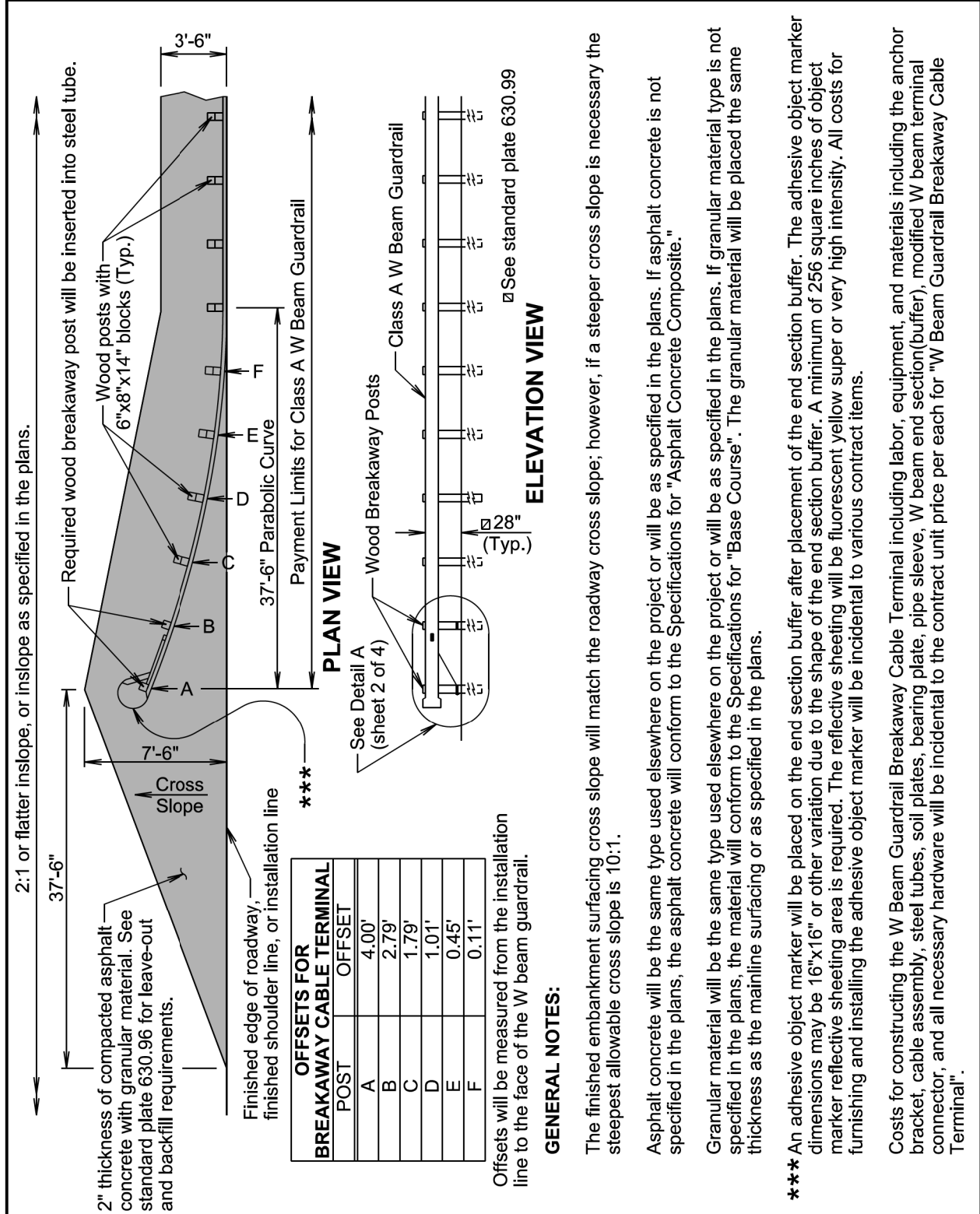
The anchor bracket, strut and yoke assembly, and bearing plate will be fabricated from steel that meets ASTM A36 Specifications. They will be galvanized after fabrication in accordance with ASTM A123.

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 furnishing and constructing the W beam guardrail trailing end terminal including labor, equipment, materials which includes W beam rail section, two wood breakaway posts, steel tubes, strut and yoke assembly, cable assembly, bearing plate, anchor bracket, W beam end section (flared), one wood post and blockout, hardware, and incidentals will be included in the contract unit price per each for "W Beam Guardrail Trailing End Terminal".

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Published Date: 1st Qtr. 2020	S D D O T	W BEAM GUARDRAIL TRAILING END TERMINAL	PLATE NUMBER 630.81
			Sheet 3 of 3



OFFSETS FOR BREAKAWAY CABLE TERMINAL	
POST	OFFSET
A	4.00'
B	2.79'
C	1.79'
D	1.01'
E	0.45'
F	0.11'

GENERAL NOTES:

The finished embankment surfacing cross slope will match the roadway cross slope; however, if a steeper cross slope is necessary the steepest allowable cross slope is 10:1.

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.

\*\*\* An adhesive object marker will be placed on the end section buffer after placement of the end section buffer. The adhesive object marker dimensions may be 16"x16" or other variation due to the shape of the end section buffer. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting will be fluorescent yellow super or very high intensity. All costs for furnishing and installing the adhesive object marker will be incidental to various contract items.

Costs for constructing the W Beam Guardrail Breakaway Cable Terminal including labor, equipment, and materials including the anchor bracket, cable assembly, steel tubes, soil plates, bearing plate, pipe sleeve, W beam end section(buffer), modified W beam terminal connector, and all necessary hardware will be incidental to the contract unit price per each for "W Beam Guardrail Breakaway Cable Terminal".

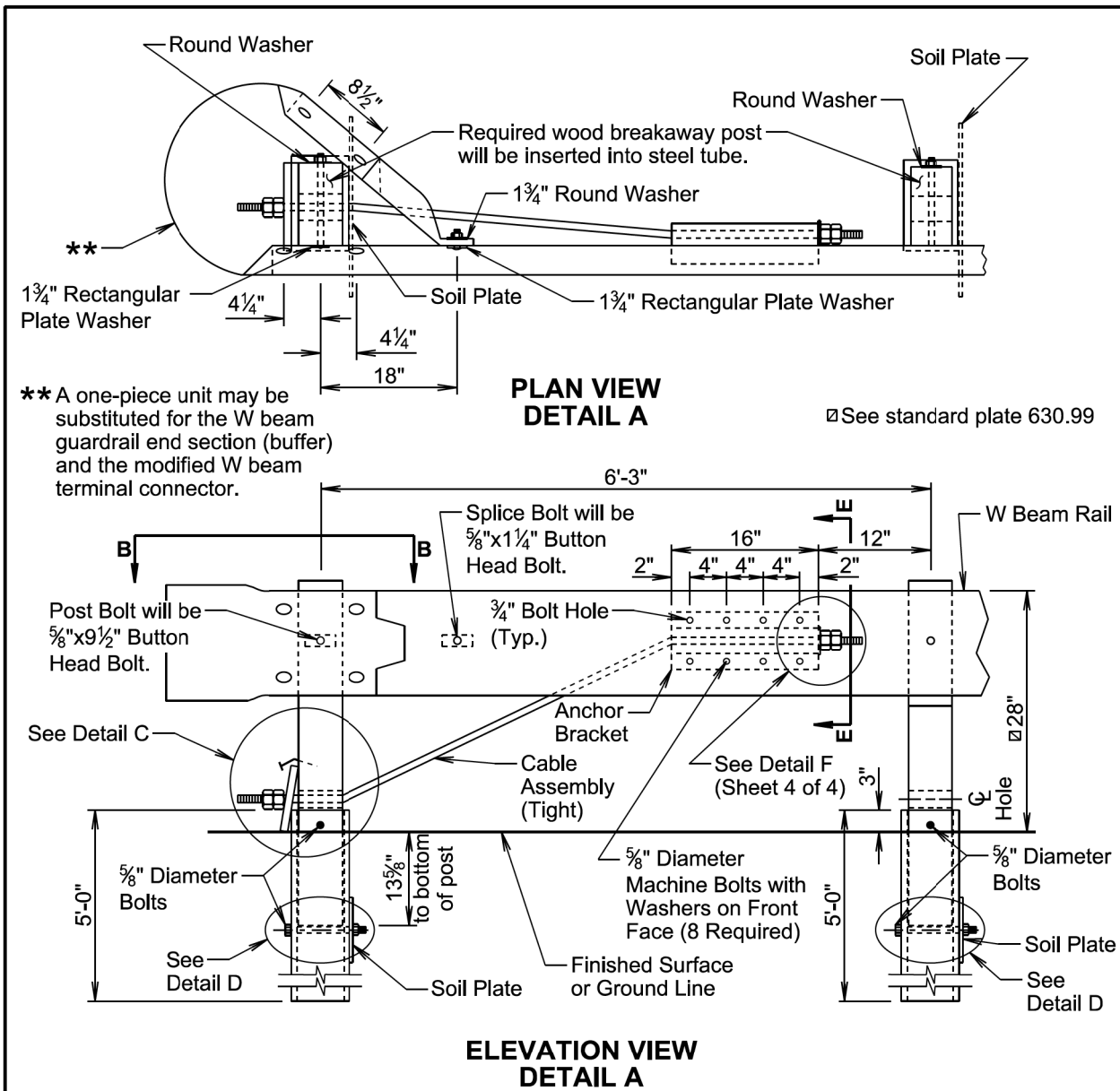
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Published Date: 1st Qtr. 2020	S D D O T	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.85
			Sheet 1 of 4



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	0001-391	31	36

Plotting Date: 02/20/2020



**GENERAL NOTES:**

All hardware will be galvanized in accordance with ASTM A153.

The steel tubes will meet the requirements of ASTM A500, Grade B, and will be galvanized after fabrication in accordance with the requirements of AASHTO M111.

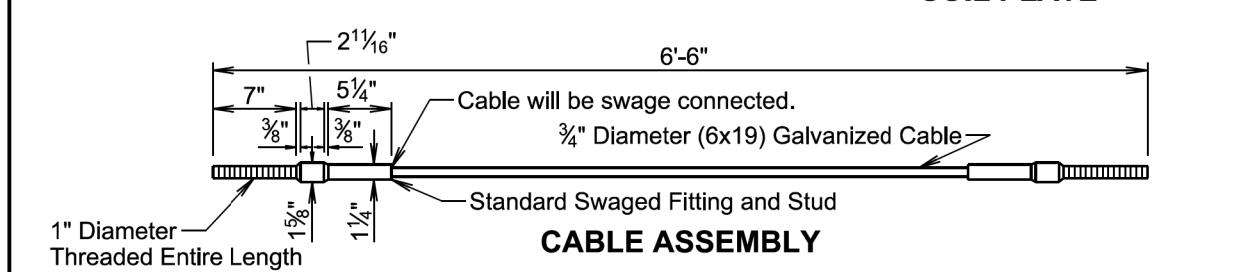
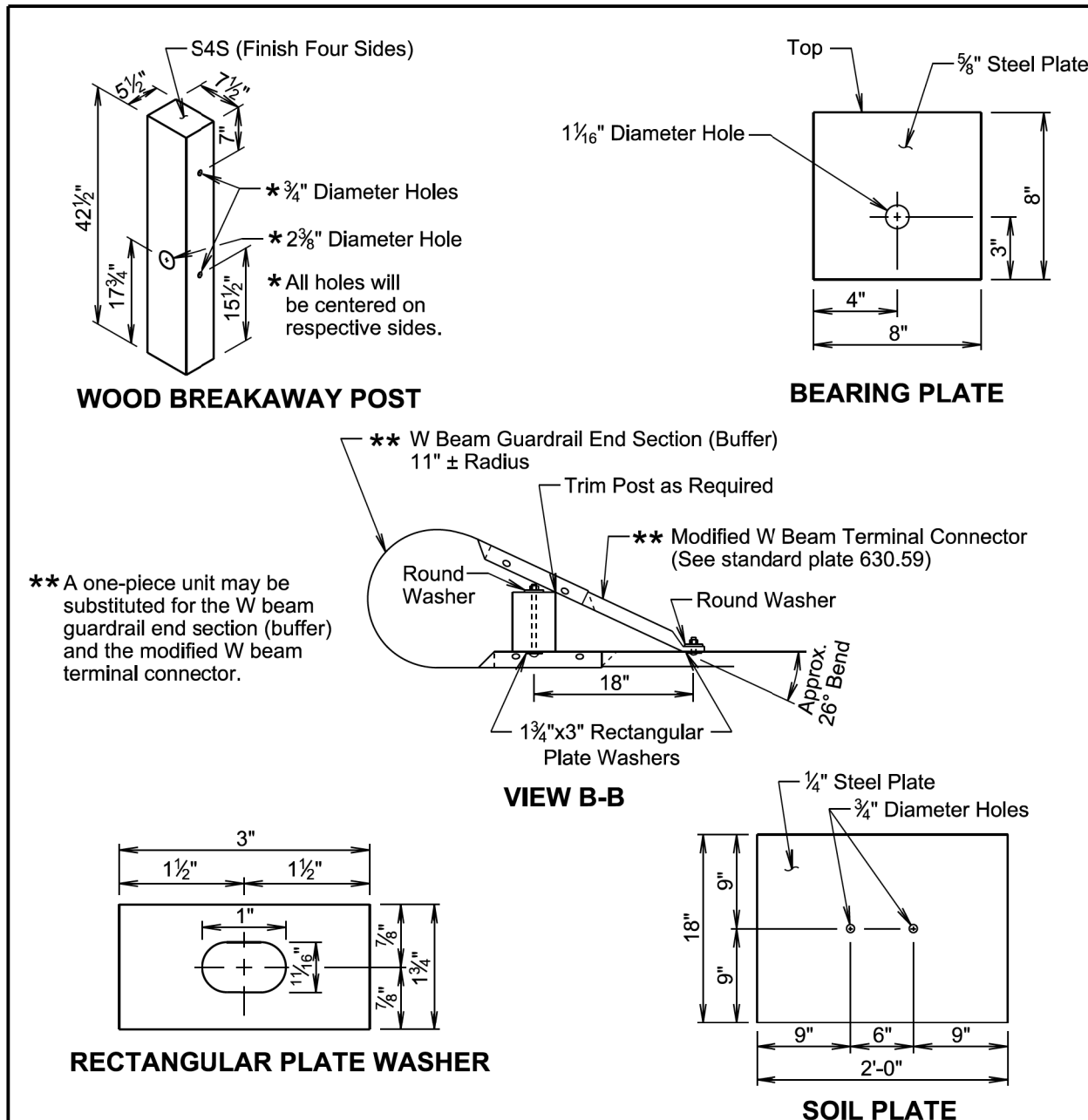
The anchor bracket, soil plate, and bearing plate will be fabricated from steel that meets ASTM A36 Specifications. They will be galvanized after fabrication in accordance with ASTM A123.

The W Beam End Section (Buffer) will be 12 gage galvanized steel.

The cable will be 3/4", Type II, with Class A coating in conformance with AASHTO M30.

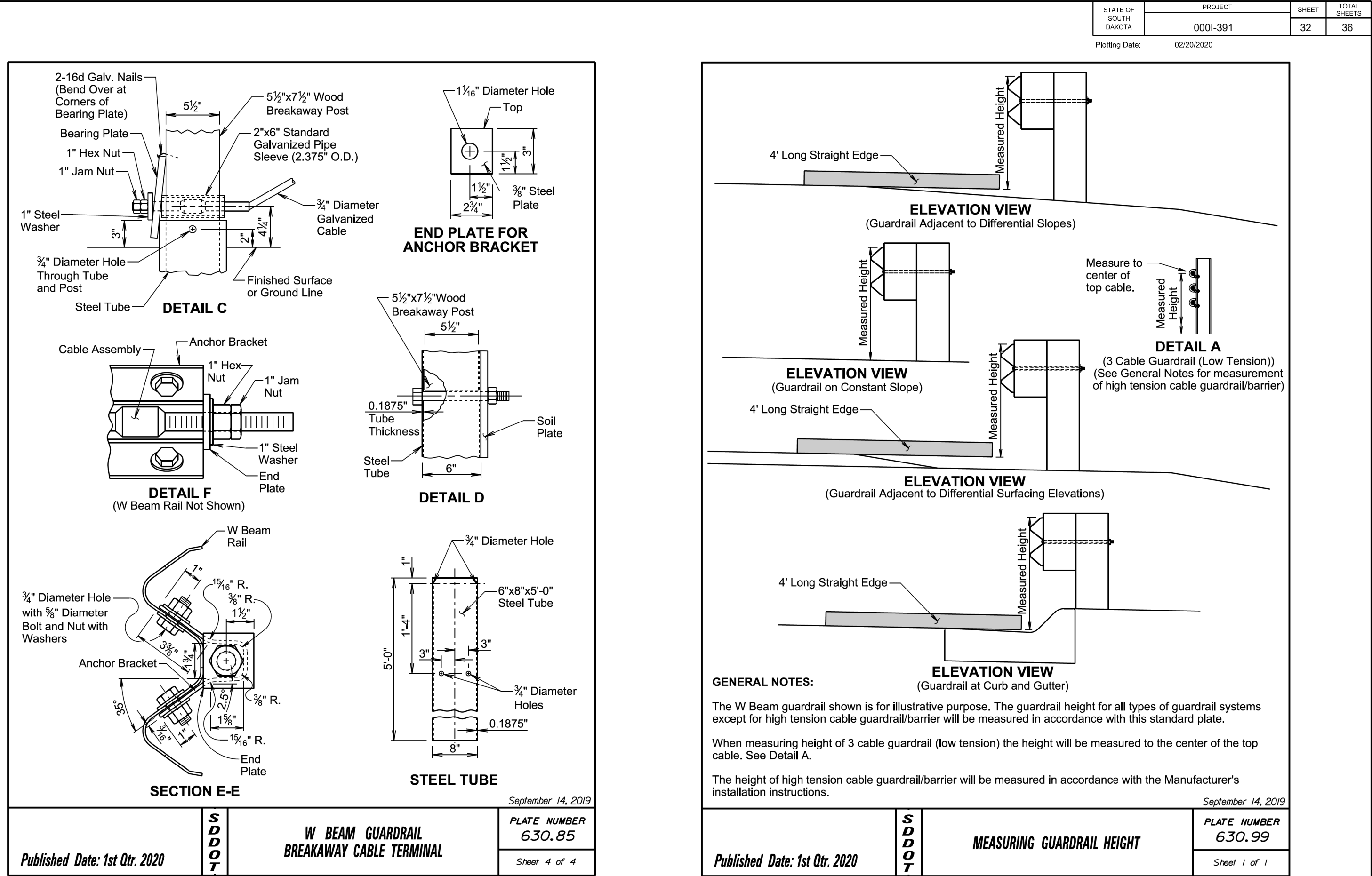
September 14, 2019

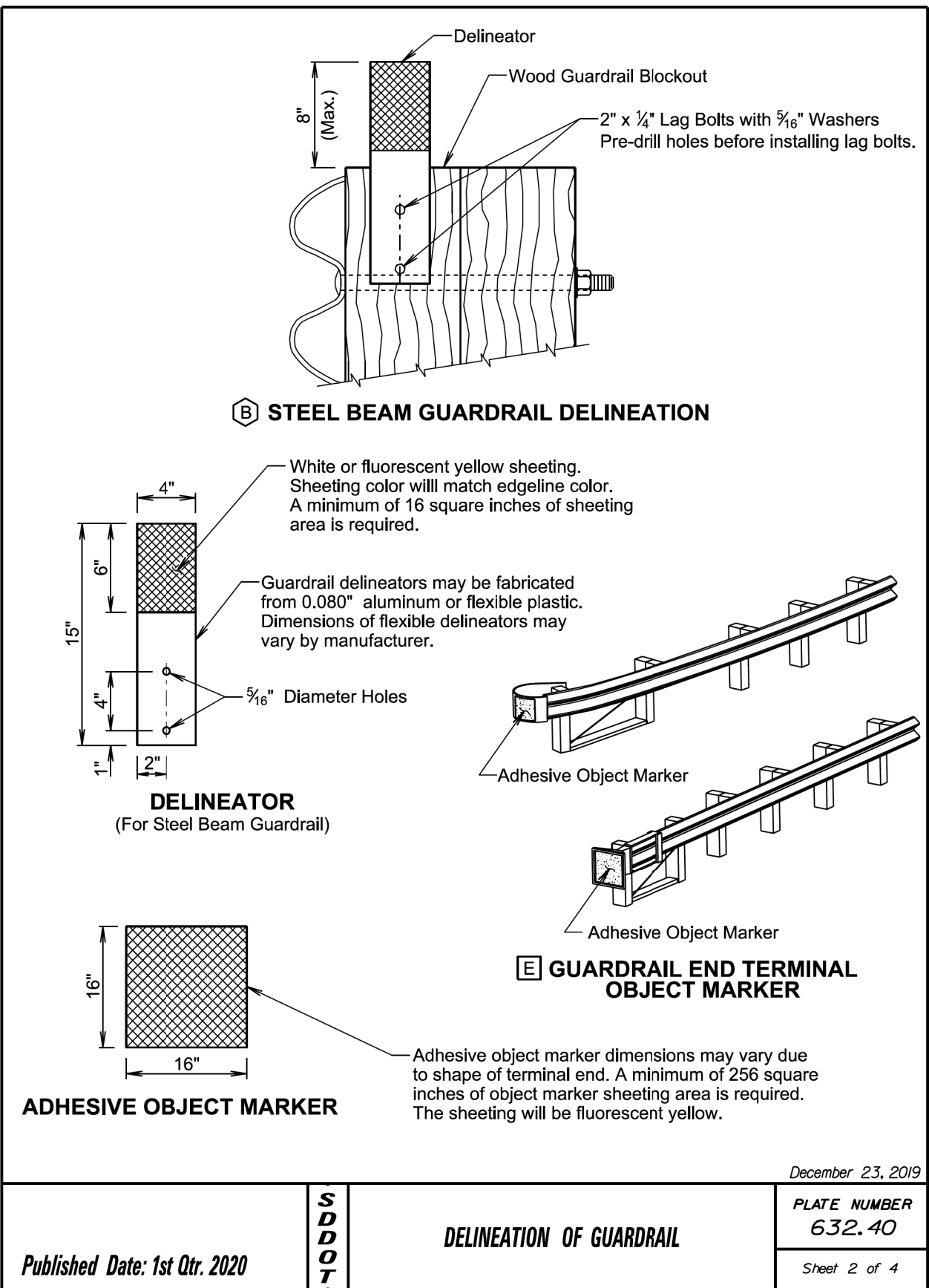
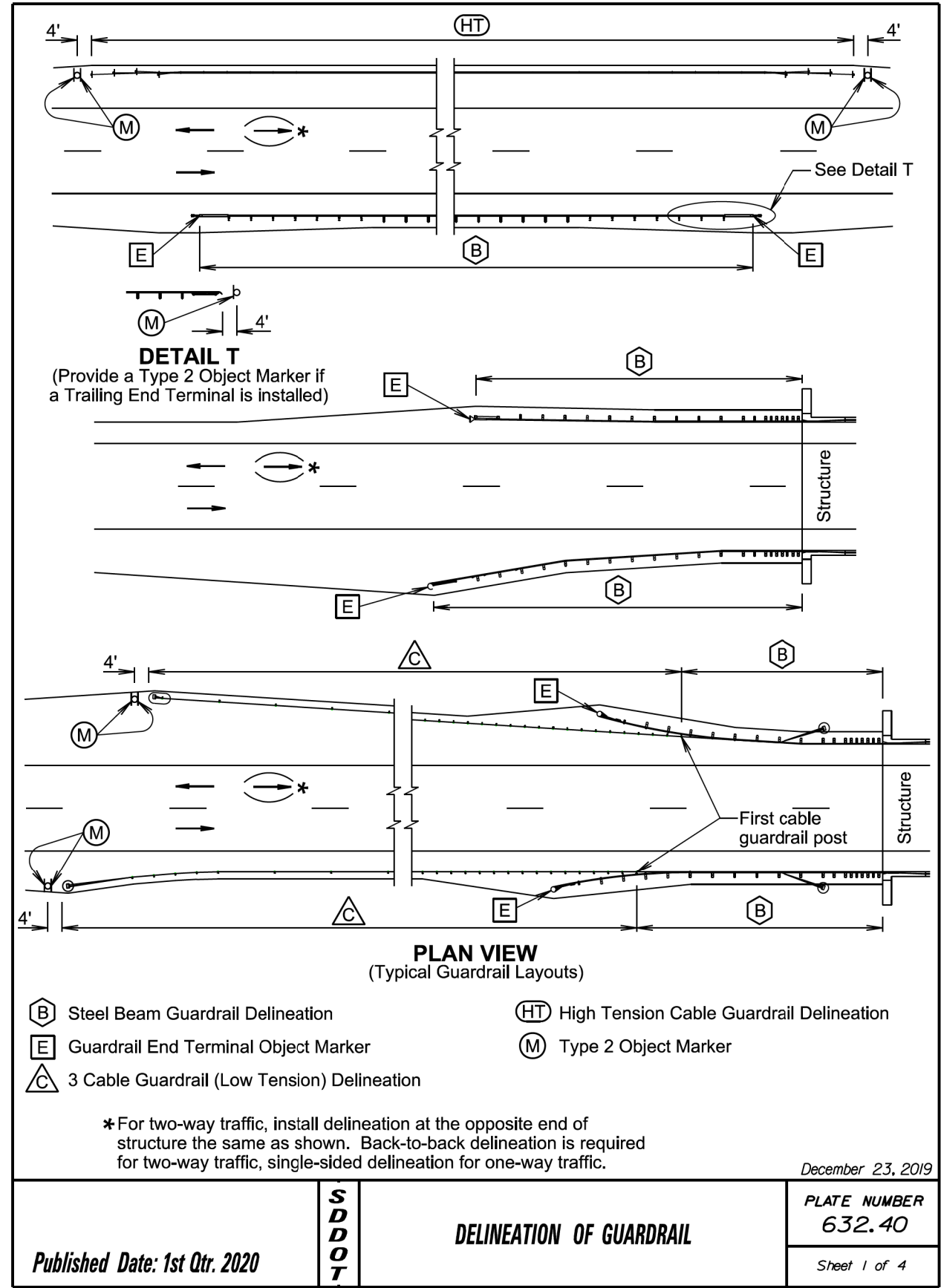
Published Date: 1st Qtr. 2020	S D D O T	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.85
			Sheet 2 of 4



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Published Date: 1st Qtr. 2020	S D D O T	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.85
			Sheet 3 of 4



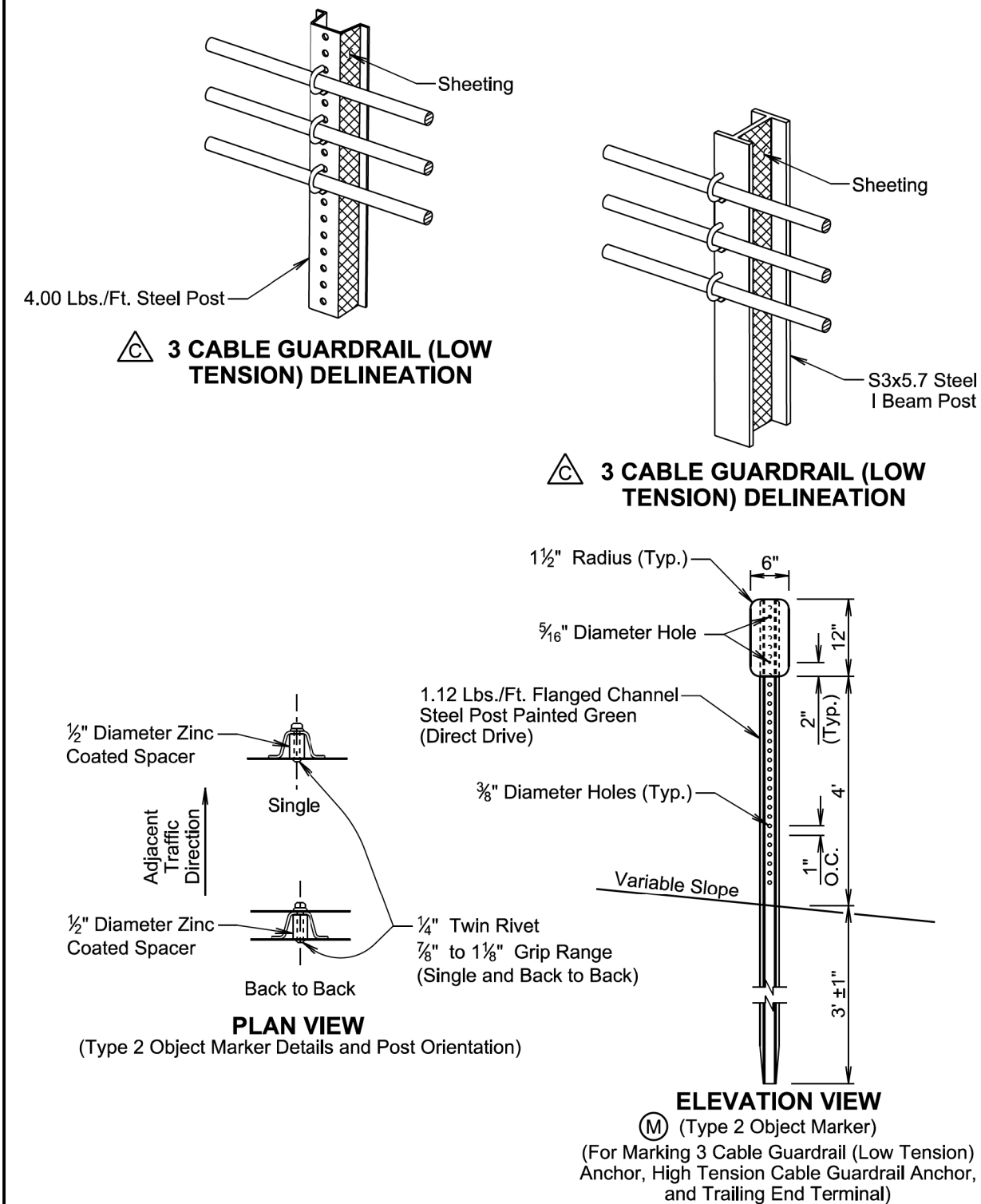


Plot Scale - 1:200

Plotted From - TRW11NT23

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	000I-391	34	36

Plotting Date: 02/20/2020



December 23, 2019

<i>Published Date: 1st Qtr. 2020</i>	<b>S D D O T</b>	<b>DELINEATION OF GUARDRAIL</b>	PLATE NUMBER 632.40
			Sheet 3 of 4

**GENERAL NOTES:**

The delineation of high tension cable guardrail will be reflective sheeting placed back to back on every other post cap or cable spacer. The sheeting will be type XI in conformance with ASTM D4956. The color of the reflective sheeting shall be the same as the nearest pavement marking.

The delineators for steel beam guardrail and sheeting on 3 cable guardrail (low tension) posts will be covered with a minimum of 16 square inches of reflective sheeting. The reflective sheeting will be type XI in conformance with ASTM D4956. Along two-way roadways the sheeting will be on both sides of the delineators and guardrail posts and will be white in color. For one-way roadways the sheeting will only be required on the side facing traffic and the color will be the same as the nearest pavement marking, yellow on the left side of the roadway and white on the right side.

When steel beam guardrail is attached to a bridge the first delineator will be attached to the post nearest the bridge.

At bridges with guardrail less than 200 feet in length, a minimum of 4 delineators will be placed in addition to the end terminal yellow object marker. The spacing between the delineators will be approximately one third of the length of the guardrail.

At bridges with guardrail 200 feet and greater in length, including bridges that have steel beam guardrail transitioning to 3 cable guardrail (low tension), the delineators will be placed at a spacing of approximately 50 feet. Delineation will extend throughout the length of the guardrail system.

Steel beam guardrail that is not attached to a bridge and is less than 200 feet in length, a minimum of 4 delineators will be placed in addition to the end terminal yellow object markers. The spacing between the delineators will be approximately one third of the length of the guardrail.

Steel beam guardrail that is not attached to a bridge and is 200 feet and greater in length, including steel beam guardrail transitioning to 3 cable guardrail (low tension), the delineators will be placed at a spacing of approximately 50 feet. Delineation will extend throughout the length of the guardrail system.

All costs for furnishing and installing single or back to back guardrail delineation on 3 cable guardrail and steel beam guardrail will be included in the contract unit price per each for "Guardrail Delineator".

All costs for furnishing and installing the reflective sheeting on the cable spacers or post caps for the high tension cable guardrail will be incidental to the respective high tension cable guardrail contract item.

An adhesive object marker will be placed on the end of the W beam guardrail or MGS end terminal. The adhesive object marker dimensions may vary due to the shape of the terminal end. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting will be fluorescent yellow type XI sheeting in conformance with ASTM D4956. All costs for furnishing and installing the adhesive object marker will be incidental to various contract items.

A type 2 object marker will be placed adjacent to the 3 cable guardrail (low tension) anchor, high tension cable guardrail anchor, and trailing end terminal at the location noted on sheet 1 of this standard plate. The type 2 object marker (6" x 12") will have fluorescent yellow type XI sheeting in conformance with ASTM D4956. All costs for furnishing and installing the type 2 object marker including the steel post, 6" x 12" reflective panel, and hardware will be included in the contract unit price per each for "Type 2 Object Marker" for single-sided and "Type 2 Object Marker Back to Back" for back to back type 2 object markers.

December 23, 2019

<i>Published Date: 1st Qtr. 2020</i>	<b>S D D O T</b>	<b>DELINEATION OF GUARDRAIL</b>	PLATE NUMBER 632.40
			Sheet 4 of 4

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