

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**

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**ESTIMATE OF QUANTITIES**

BID ITEM NUMBER	ITEM		000I-271 PCN I5TN QUANTITY	000I-272 PCN I5TP QUANTITY	000I-291 PCN I5TQ QUANTITY	000P-292 PCN I5TR QUANTITY	TOTAL QUANTITY	UNIT
009E0197	Mobilization 1	(Unit 271)	26	-	-	-	26	Each
009E0198	Mobilization 2	(Unit 272)	-	9	-	-	9	Each
009E0199	Mobilization 3	(Unit 291)	-	-	14	-	14	Each
009E0199	Mobilization 3	(Unit 292)	-	-	-	2	2	Each
628E1500	Concrete Barrier End Protection		<----- 1 ----->				1	Each
628E1500	Concrete Barrier End Protection	(Mash)	<----- 1 ----->				1	Each
628E1520	Refurbish Concrete Barrier End Protection		<----- 2 ----->				2	Each
629E0100	3 Cable Guardrail		<----- 100 ----->				100	Ft
629E0210	Reset High Tension 3 Cable Guardrail		<----- 50 ----->				50	Ft
629E0211	Reset High Tension 4 Cable Guardrail		<----- 500 ----->				500	Ft
629E0300	3 Cable Guardrail Slip Base Anchor Assembly		<----- 1 ----->				1	Each
629E0400	3 Cable Guardrail Anchor Assembly		<----- 1 ----->				1	Each
629E0450	Retension 3 Cable Guardrail		110	30	30	30	200	Each
629E0453	Retension High Tension 3 Cable Guardrail		<----- 250 ----->				250	Ft
629E0454	Retension High Tension 4 Cable Guardrail		500	200	200	100	1000	Ft
629E1000	Repair 3 Cable Guardrail		9000	5000	3000	3000	20000	Ft
629E1010	Repair 3 Cable Guardrail Slip Base Anchor Assembly		<----- 1 ----->				1	Each
629E1100	3 Cable Guardrail End Post	(I Beam)	25	15	10	10	60	Each
629E1102	3 Cable Guardrail Intermediate Post	(Flanged)	400	200	150	150	900	Each
629E1102	3 Cable Guardrail Intermediate Post	(I Beam)	25	10	15	10	60	Each
629E1103	3 Cable Guardrail Slip Base Anchor Post		4	2	3	1	10	Each
629E1104	3 Cable Guardrail Post, Winter		325	125	75	75	600	Each
629E1106	Drive Down 3 Cable Guardrail Post		7	3	3	2	15	Each
629E1108	Reset 3 Cable Guardrail Post		170	80	90	60	400	Each
629E1110	Cable Anchor Bracket		1	1	1	1	4	Each
629E1112	Cable Splice		6	3	3	3	15	Each
629E1114	3 Cable Guardrail J Hook Bolt		1400	700	700	700	3500	Each
629E1116	Steel Turnbuckle Cable End Assembly		12	6	6	6	30	Each
629E1118	Spring Cable End Assembly with Turnbuckle		10	4	4	4	22	Each
629E1120	W Beam to 3 Cable Transition Bracket		10	4	4	4	22	Each
629E1122	3 Cable Guardrail End Post Cap		2	1	1	1	5	Each
629E1143	High Tension 3 Cable Guardrail Post		<----- 2 ----->				2	Each
629E1144	High Tension 4 Cable Guardrail Post		<----- 40 ----->				40	Each
629E1158	High Tension 3 Cable Guardrail Post and Sleeve		<----- 2 ----->				2	Each
629E1159	High Tension 4 Cable Guardrail Post and Sleeve		<----- 30 ----->				30	Each
629E1163	High Tension 3 Cable Guardrail Sleeve		<----- 2 ----->				2	Each
629E1164	High Tension 4 Cable Guardrail Sleeve		<----- 2 ----->				2	Each
629E1170	High Tension Cable Guardrail Terminal Post		50	10	30	10	100	Each
630E0200	Straight Class A Thrie Beam Rail	(12 Gauge)	25	12.5	25	12.5	75	Ft
630E0210	Straight Class B Thrie Beam Rail	(10 Gauge)	<----- 12.5 ----->				12.5	Ft
630E0500	Type 1 MGS		<----- 50 ----->				50	Ft
630E0513	Type 1C MGS		<----- 12.5 ----->				12.5	Ft
630E0520	Type 2 MGS		<----- 12.5 ----->				12.5	Ft
630E0530	Type 3 MGS		<----- 12.5 ----->				12.5	Ft
630E0540	Type 4 MGS		<----- 12.5 ----->				12.5	Ft
630E1005	18'-9" Longspan MGS		<----- 1 ----->				1	Each
630E1006	25'-0" Longspan MGS		<----- 1 ----->				1	Each
630E1200	Straight Class A W Beam Rail	(12 Gauge)	500	200	300	200	1200	Ft
630E1210	Straight Class B W Beam Rail	(10 Gauge)	12.5	12.5	12.5	12.5	50	Ft
630E1500	Type 1 Guardrail Transition		<----- 1 ----->				1	Each
630E1501	Type 1 Retrofit Guardrail Transition		<----- 1 ----->				1	Each
630E1505	Type 2A Guardrail Transition		<----- 1 ----->				1	Each

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630E1510	Type 3 Guardrail Transition	<-----	1	----->		1	Each
630E2000	W Beam to Thrie Beam Guardrail Transition	<-----	2	----->		2	Each
630E2001	Assymetrical W Beam to Thrie Beam Guardrail Transition	<-----	1	----->		1	Each
630E2015	W Beam Guardrail Flared End Terminal	<-----	2	----->		2	Each
630E2016	MGS Flared End Terminal	<-----	1	----->		1	Each
630E2017	MGS Mash Flared End Terminal	<-----	1	----->		1	Each
630E2018	MGS Mash Tangent End Terminal	<-----	1	----->		1	Each
630E2019	MGS Tangent End Terminal	<-----	1	----->		1	Each
630E2020	W Beam Guardrail Tangent End Terminal	<-----	1	----->		1	Each
630E2030	W Beam Guardrail Breakaway Cable Terminal	2	1	1	1	5	Each
630E2050	Beam Guardrail Trailing End Terminal (W or Thrie)	<-----	1	----->		1	Each
630E2065	MGS Trailing End Terminal	<-----	1	----->		1	Each
630E2100	Beam Guardrail Post	3	1	1	1	6	Each
630E2105	Beam Guardrail Block	8	4	4	4	20	Each
630E2110	Beam Guardrail Post and Block	60	20	25	20	125	Each
630E2120	Beam Guardrail Post and Block, Winter	40	10	15	10	75	Each
630E2150	End Terminal Wood Breakaway Post	6	4	4	4	18	Each
630E2155	End Terminal Hinged Breakaway Post	1	1	1	1	4	Each
630E2210	Breakaway Cable Terminal End Rail	<-----	2	----->		2	Each
630E2215	W Beam Guardrail End Section Buffer	4	2	4	2	12	Each
630E2220	Tangent End Terminal Extruder Head	<-----	2	----->		2	Each
630E2235	Tangent End Terminal Rail	<-----	25	----->		25	Ft
630E2300	Rubrail	<-----	14	----->		14	Ft
630E5520	Drive Down Beam Guardrail Post	2	2	2	2	8	Each
630E5550	Reset Beam Guardrail Post and Block	50	10	20	10	90	Each
632E2220	Guardrail Delineator	100	50	50	50	250	Each
632E2510	Type 2 Object Marker Back to Back	2	2	2	2	8	Each
632E2520	Type 2 Object Marker	15	15	5	5	40	Each
634E0010	Flagging	4	2	2	2	10	Hour
634E0110	Traffic Control Signs	76	44	44	44	208	SqFt
634E0120	Traffic Control, Miscellaneous	<-----	Lump Sum	----->		Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	<-----	1	----->		1	Each

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**ENVIRONMENTAL COMMITMENTS**

The SDDOT is committed to protecting the environment and uses Section A Environmental Commitments as a communication tool for the Engineer and Contractor to ensure that attention is given to avoid, minimize, and/or mitigate an environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency with permitting authority can delay a project if identified environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office.

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

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

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

**COMMITMENT B2: WHOOPING CRANE**

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

**Action Taken/Required:**

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pits, or staging areas associated with the project, cease construction activities in the affected area until the Whooping Crane departs and immediately contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

**COMMITMENT B4: BALD EAGLE**

Bald eagles are known to occur in this area.

**Action Taken/Required:**

If a nest is observed within one mile of the project site, notify the Project Engineer immediately so that he/she can consult with the Environmental Office for an appropriate course of action.

**COMMITMENT 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.

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**COMMITMENT H: WASTE DISPOSAL SITE (CONTINUED)**

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

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

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

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10.06.

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

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

**COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES**

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

**Action Taken/Required:**

All earth disturbing activities require a cultural resource review prior to scheduling the pre-construction meeting. This work includes but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

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

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

The Contractor will submit the cultural resources survey report to SDDOT Environmental Office, 700 East Broadway Avenue, Pierre, SD 57501-2586. SDDOT will submit the information to the appropriate SHPO/THPO. Allow 30 Days from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

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

The Contractor is responsible for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor will not utilize a site known or suspected of having contaminated soil or water. The Contractor will provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

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**SPECIFICATIONS**

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

**LOCATION**

Guardrail repair will be limited to all Interstate and State Highways within the Sioux Falls and Yankton Areas.

**ESTIMATED QUANTITIES**

The Contractor shall furnish and install new guardrail material as per the Contract Proposal. The quantities for each item are estimated. 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.

**MOBILIZATION**

Mobilization 1 (Unit 271) - is the cost for mobilization per each time the Contractor is called in by the Area Engineer to perform guardrail repair within the Sioux Falls Area - Unit 271.

Mobilization 2 (Unit 272) - is the cost for mobilization per each time the Contractor is called in by the Area Engineer to perform guardrail repair within the Sioux Falls Area - Unit 272.

Mobilization 3 (Unit 291) - is the cost for mobilization per each time the Contractor is called in by the Area Engineer to perform guardrail repair within the Yankton Area - Unit 291.

Mobilization 3 (Unit 292) - is the cost for mobilization per each time the Contractor is called in by the Area Engineer to perform guardrail repair within the Yankton Area – Unit 292.

Mobilization 1 (Unit 271), Mobilization 2 (Unit 272), Mobilization 3 (Unit 291) or Mobilization 3 (Unit 292) will be paid for once each time the Contractor is called to the Unit, regardless of the number of sites requiring repair within that Unit.

**EMBANKMENT AND SURFACING FOR GUARDRAIL INSTALLATIONS**

It is not anticipated that embankment and surfacing will be required as a part of this contract. However, if embankment and/or surfacing material (base material and/or asphalt concrete) are/is required to perform a guardrail installation, it will be provided in accordance with the specifications, and either:

1. Furnished by the State and a placement price will be negotiated, or
2. Furnished and placed by the Contractor and a price will be negotiated, or
3. Accomplished by other means approved by the Engineer.

**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, excess material removed, area tilled to the minimum depth of three inches, seeded with Intermediate Wheatgrass at the rate of 18 Pounds P.L.S. per acre and fertilized with a commercial fertilizer with a minimum guaranteed analysis of 18-46-0 applied at the rate of 100 pounds per acre.

Cost for reshaping, leveling, removal of excess material, tilling, seeding and fertilizing disturbed areas on the slopes and berms shall be incidental to the contract unit prices for the various items.

**REMOVING GUARDRAIL**

Cost for removing and disposing of guardrail items shall be incidental to the contract unit prices for the various items. Removed guardrail items that are not reused shall become the property of the Contractor.

**SAFETY TREATMENT STANDARDS**

Repair shall be done in such a manner that the safety treatment in place after repair will meet or exceed the safety treatment in place prior to guardrail damage.

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**GUARDRAIL COMPLETION REQUIREMENTS**

At such time as repairs are required, the Contractor will be notified. The Contractor will have 21 days to complete the repairs. In the event that the Contractor has other guardrail work scheduled on another SD State contract, the Contractor may contact the Engineer to work out a reasonable schedule to accomplish the work. The Engineer will consider extending the completion time based on traffic volume, possible accident severity and probability.

Once the existing guardrail is removed from a bridge end, box culvert, bridge column, etc., the Contractor shall place drums or Type 2 Barricades at 25 foot intervals at each location where existing guardrail is removed. These devices shall extend 175 feet beyond the item of concern for each direction of traffic. Drums and Barricades shall remain in place until new guardrail has been installed.

Post end, beam, and end terminal sections shall be erected in a continuous operation within each individual run of guardrail. Incomplete guardrail installations shall be marked by delineation as noted in the previous paragraph.

If the Contractor does not complete the required work within the time allowed, the Contractor shall install an approved safety treatment that complies with crashworthy requirements for test level 3 of National Cooperative Highway Research Program (NCHRP) Report 350 or the AASHTO Manual for Assessing Safety Hardware (MASH) to protect the site. Safety treatment used must meet or exceed the in place safety treatment prior to guardrail damage.

Failure to comply with this requirement will necessitate liquidated damages being assessed at a rate of \$500 for each calendar day that the guardrail work remains incomplete. This provision applies up to the contract completion date. After the contract completion date, liquidated damages will be assessed in accordance with Section 8.8 or \$500, whichever is greater.

**GUARDRAIL GENERAL**

Cost for furnishing and installing hardware (including, but not limited to new bolts, nuts, washers, straps, cable spacers, nails, etc.) necessary for installing, resetting and repairing any of the various beam/cable/high tension cable guardrail types shall be incidental to the contract unit prices for the various items.

Should other items be required that are not in the Contract Proposal, the Contractor shall furnish the items and will be paid invoice cost plus shipping, taxes and ten percent for profit. Prior approval of the Engineer will be required. Installation cost for these items shall be incidental to the contract unit prices for the various items.

When a significant portion of any guardrail installation is damaged (say, more than half the installation) the Contractor shall request a new guardrail design from the Department.

Cable guardrail repair/replacement (where applicable) shall be placed at a flare rate no sharper than 34:1.

**OUTSIDE SHOULDER INSTALLATION**

Whenever an outside shoulder end terminal is significantly damaged, the entire end terminal shall be removed and replaced with an approved end terminal from the SDDOT Approved List of W Beam Guardrail Terminals. The Contractor must select an appropriate end terminal to match the standard for the existing installation. Installation of these terminals shall be as per Standard Plates 630.86, 630.87, 630.88 and/or 630.89.

The entire beam portion of the guardrail shall be installed within the allotted time as described in the Guardrail Completion Requirement notes. The cable portion (where applicable) may be installed in early spring after the ground has thawed, however, the Department, for safety, may order installation of the cable portion within the allotted time as described in the Guardrail Completion Requirements notes.

**MEDIAN SHOULDER INSTALLATION**

At existing Beam/Cable Installation - Whenever a median beam end terminal is significantly damaged, the entire length of beam guardrail (except for the 43.75' closest to the bridge, if this portion of the guardrail is not damaged) shall be replaced as per the detail for Typical Median Protection. This may involve cutting the existing guardrail. Whether the existing installation is W Beam or Thrie/W Beam, the total length of the newly completed installation shall be 81.25'.

At existing Beam Installation - Repair will be per the standard plates.

The entire beam portion of the guardrail shall be installed within the allotted time as described in the Guardrail Completion Requirement notes. The cable portion (where applicable) may be installed in early spring after the ground has thawed, however, the Department, for safety, may order installation of the cable portion within the allotted time as described in the Guardrail Completion Requirements notes.



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**3 CABLE GUARDRAIL**

Repair 3 Cable Guardrail - Includes the cost for putting existing 3 cable guardrail back into its original position and, if required, realigning posts within the displaced length of three cable guardrail. Payment for this item is applicable only when the existing cable rail requires being put back in place and posts require realigning.

Payment length shall be:

- From the first existing post that does not need replacing on each end of the repair area,
- From the first existing post that does not need replacing to the anchor if the anchor post, end posts or transition bracket are replaced or,
- From the first existing post that does not need replacing to the transition bracket if the transition bracket is not replaced.

If multiple areas require repair within a cable installation, the areas shall be measured separately.

Retension 3 Cable Guardrail – Includes the cost for retensioning of the entire run of cable guardrail. Payment will be made once per each installation retensioned, regardless of whether one, two or three cables require retensioning. Retensioning may include cutting and shortening of cables at the anchors to allow for proper tensioning.

Repair 3 Cable Guardrail Slip Base Anchor Assembly - This item will be considered full compensation for removal, repair and replacement of the damaged Slip Base Anchor Assembly. This work will be performed if it is determined that the Slip Base Anchor Assembly can be repaired without total footing removal. The work will consist of coring a 12" diameter section into the existing footing, centered over the existing slip base anchor stub post, to a depth of 22". The core will then be broken off and disposed of. The sides of the hole in the footing shall be roughened to the satisfaction of the Engineer. A rapid-setting, non-shrink, non-metallic grout shall be used (in accordance with the manufacturer's recommendations) to anchor the new slip base anchor stub post in the footing. The grout shall reach a compressive strength of over 5000 PSI.

3 Cable Guardrail Post, Winter - Includes the additional cost for removal and installation of 3 Cable Guardrail Posts (I Beam and Flanged Channel) 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.

Drive Down 3 Cable Guardrail Post - Includes the cost for adjusting the height of a cable guardrail post. Cost for disassembly/reassembly of the cable guardrail necessary to perform this adjustment shall be incidental to the contract unit price for this item.

Reset 3 Cable Guardrail Post - Includes removing and resetting cable guardrail post to the proper alignment with existing cable guardrail. Payment will be the same in frozen or unfrozen ground.

**HIGH TENSION CABLE GUARDRAIL**

High Tension Guardrail items shall be furnished and installed, reset, repaired and tensioned per the manufacturer's details and instructions.

Retension High Tension Cable Guardrail – Includes the cost for retensioning a length of high tension cable guardrail. Payment will be made once per foot length of installation retensioned, regardless of whether one, two three or four cables require retensioning. Retensioning shall include cutting and shortening of cables at the anchors to allow for proper tensioning.

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**BEAM GUARDRAIL**

Beam Guardrail Post, Beam Guardrail Block and Beam Guardrail Post and Block – Includes the cost for removal and installation of the various sizes and types of Post and Block being replaced. Posts and Blocks used will be of the appropriate size and type for the installation being repaired.

Beam Guardrail Post and Block, Winter - Includes the additional cost for removal and installation of posts and blocks 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 and block installed under these conditions.

Drive Down Beam Guardrail Post - Includes the cost for adjusting the height of a beam guardrail post. Cost for disassembly/reassembly of the beam guardrail necessary to perform this adjustment shall be incidental to the contract unit price for this item.

Reset Beam Guardrail Post and Block - Includes removing and resetting guardrail post and block to the proper alignment with existing beam guardrail. Payment will be the same in frozen or unfrozen ground.

W Beam Guardrail Breakaway Cable Terminal (BCT) – Includes the cost for removing damaged components of the existing terminal (including rail), furnishing and installing new Breakaway End Posts (2), W Beam End Section (Buffer) 11" +/- radius, the Modified W Beam Connector, related items and all hardware to attach. Any other BCT items that are required will be paid for at invoice cost plus shipping, taxes and ten percent profit (labor will be incidental to other items). The BCT will only be installed at locations where a W Beam to 3 Cable Transition is required.

Breakaway Cable Terminal End Rail – Includes the cost to remove existing and install a new end rail.

W Beam Guardrail End Section Buffer – Includes the cost to remove existing and install a new buffer assembly.

End Terminals (except BCTs) must be selected from the SDDOT Approved Products List at:  
<https://dot.sd.gov/doing-business/certification-accreditation/approved-products>

End Terminal Wood Breakaway Post – Includes the cost to remove the existing and install a new wood breakaway post on an end terminal.

End Terminal Hinged Breakaway Post – Includes the cost to remove the existing and install a new breakaway post on an end terminal.

Tangent End Terminal Extruder Head – Includes the cost to remove the existing and install a new Tangent End Terminal Extruder Head on a tangent end terminal.

Tangent End Terminal Rail – Includes the cost to remove existing and install new beam guardrail on a tangent end terminal.

**MIDWEST GUARDRAIL SYSTEM (MGS)**

If the Contractor is directed to perform repair on an MGS site, the repair shall be in accordance with the applicable standard plates for MGS.

Cost for repair at an MGS site will be included in the contract unit prices for the pertinent MGS and Beam Guardrail items.

**END PROTECTION**

Concrete Barrier End Protection - This item will be considered full compensation for removal and disposal of the existing system and replacement with a new Tracc Barrier Protection System.

Refurbish Concrete Barrier End Protection - This item will be considered full compensation for removal, repair and replacement of the damaged Tracc Barrier Protection System. The Contractor will load and transport the Tracc system stored at the Sioux Falls Area Office Complex to the accident site. The in place damaged Tracc system will be removed and replaced with the unit from the Sioux Falls Area Complex. The damaged unit will be rebuilt in accordance with the manufacturer's instructions at the Contractor's shop. After being rebuilt the Contractor will transport it to the Sioux Falls Area Complex for future use.

Concrete Barrier End Protection (MASH) - This item will be considered full compensation for removal and disposal of the existing system and replacement with an end protection system meeting MASH.

The Engineer will specify the replacement protection system to be installed.

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**

**GUARDRAIL DELINEATION**

Whenever the Contractor is directed to perform guardrail repair, all of the guardrail delineation at the location will be considered for upgrade. This will typically involve guardrail delineation at two to eight guardrail runs (For example: At twin structures, if one guardrail run is damaged, and the existing guardrail delineation at the site is not at the current standard, then all of the substandard guardrail delineation at each guardrail run (all traffic directions, over and under) will be upgraded).

Cost for this work shall be included in the contract unit prices per each for Guardrail Delineator, Type 2 Object Marker Back to Back, and Type 2 Object Marker.

**GENERAL MAINTENANCE OF TRAFFIC**

Portable sign supports may be used as long as the duration is 3 days or less. If the duration is more than 3 days the signs shall be on fixed location, ground mounted, breakaway supports.

Sufficient traffic control devices have been included in these plans to sign one workspace. If the Contractor elects to work on additional sites simultaneously, the cost for additional traffic control devices shall be incidental to the contract unit price per square foot for Traffic Control Signs.

**LANE CLOSURE RESTRICTION**

Lane closures will not be allowed on any day before 8am at the following locations:

- I29 NB from Exit 62 (Canton Interchange) north to Exit 71 (Harrisburg Interchange),
- I29 SB from Exit 94 (Baltic Interchange) south to Exit 86 (Renner/Crooks Interchange),

Lane closures will not be allowed on any day before 9am at the following locations:

- I29 NB from Exit 71 (Harrisburg Interchange) north to Exit 86 (Renner/Crooks Interchange),
- I29 SB from Exit 86 (Renner/Crooks Interchange) south to Exit 71 (Harrisburg Interchange),
- I90 EB & WB from 0.5 mile west of the Intersection with 471<sup>st</sup> St (Marion Road Interchange), east to 0.5 mile east of the Intersection with I229 and
- I229 NB & SB in their entirety.

Lane closures will not be allowed on any day from 4pm to 6pm at the following locations:

- I29 NB from Exit 86 (Renner/Crooks Interchange) north to Exit 94 (Baltic Interchange),
- I29 SB from Exit 71 (Harrisburg Interchange) south to Exit 62 (Canton Interchange),
- I90 EB & WB from 0.5 mile west of the Intersection with 471<sup>st</sup> St (Marion Road Interchange), east to 0.5 mile east of the Intersection with I229 and
- I229 NB & SB in their entirety.

**ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS**

SIGN CODE	SIGN DESCRIPTION	EXPRESSWAY / INTERSTATE			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W4-2	LEFT or RIGHT LANE ENDS (symbol)	2	48" x 48"	16.0	32.0
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0
W20-5	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
W21-5	SHOULDER WORK	2	48" x 48"	16.0	32.0
G20-2	END ROAD WORK (36" x 18" may be used on Conventional Roads)	2	48" x 24"	8.0	16.0
		EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT			
		208.0			

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	180	25
35 - 40	350	320	25
45	500	600	25
50	500	600	50
55	750	660	50
60 - 65	1000	780	50

■ Channelizing Device

**END ROAD WORK**  
G20-2

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

For short duration operations (1 hour or less) all channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

Worker signs (W21-1 or W21-1a) may be used instead of SHOULDER WORK signs.

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

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

WORK SPACE

*Published Date: 2nd Qtr. 2018*

**SDOT**

**GUIDES FOR TRAFFIC CONTROL DEVICES  
WORK ON SHOULDERS**

June 3, 2016

**PLATE NUMBER**  
**634.03**

*Sheet 1 of 1*

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	25
35 - 40	350	25
45	500	25
50	500	50
55	750	50
60 - 65	1000	50

- Flagger
- Channelizing Device

For low-volume traffic situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger may be used.

The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

For tack and/or flush seal operations, when flaggers are not being used, the FRESH OIL sign (W21-2) shall be displayed in advance of the liquid asphalt areas.

Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

The channelizing devices shall be drums or 42" cones.

Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

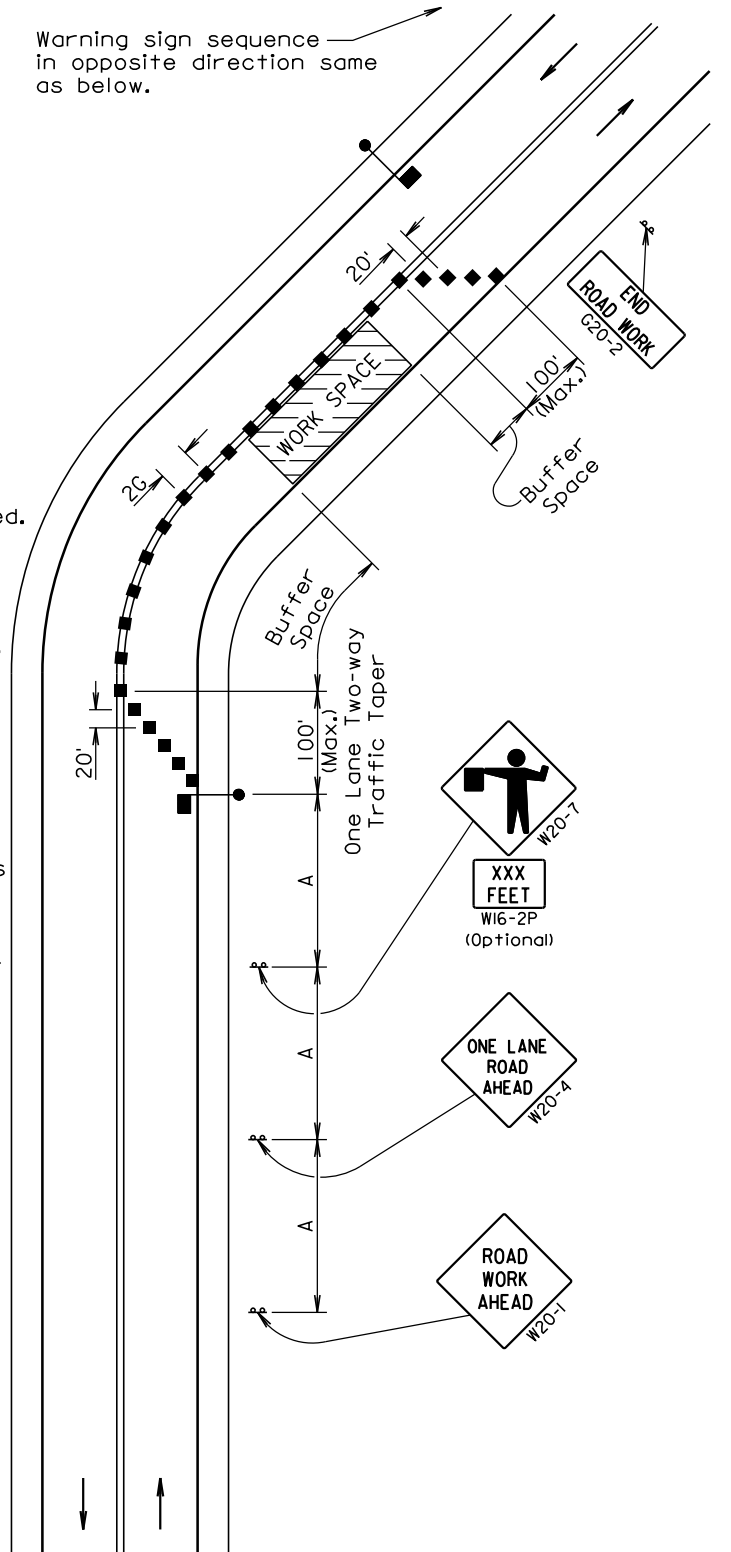
G20-2  
END  
ROAD WORK

Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.

The buffer space should be extended so that the two-way traffic taper is placed before a horizontal or vertical curve to provide adequate sight distance for the flagger and queue of stopped vehicles.

The length of A may be adjusted to fit field conditions.

Warning sign sequence in opposite direction same as below.



June 3, 2016

*Published Date: 2nd Qtr. 2018*

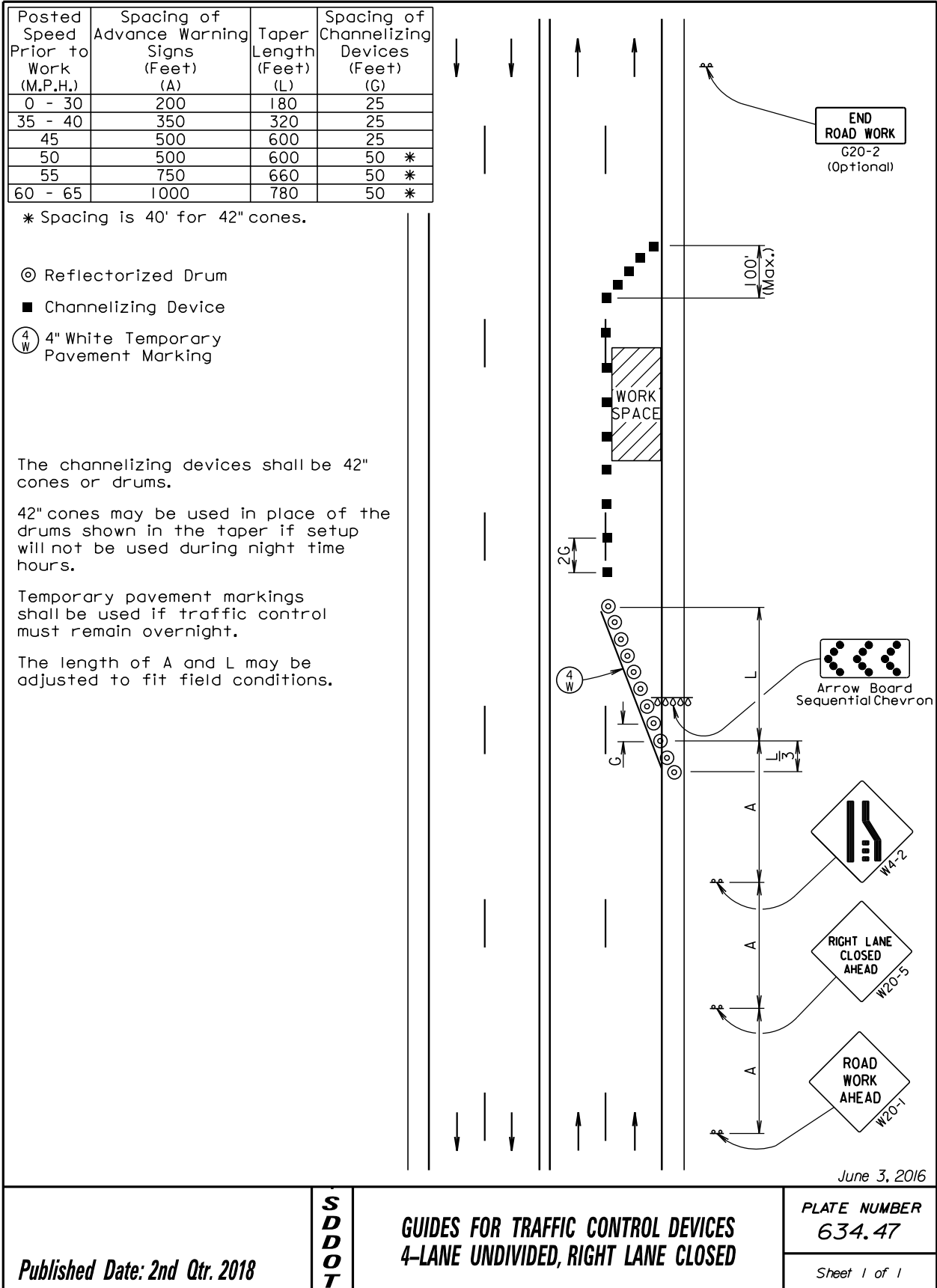
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**GUIDES FOR TRAFFIC CONTROL DEVICES  
LANE CLOSURE WITH FLAGGER PROVIDED**

**PLATE NUMBER  
634.23**

Sheet 1 of 1

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**

⊙ Reflectorized Drum

■ Channelizing Device

□ Movable Concrete Barrier

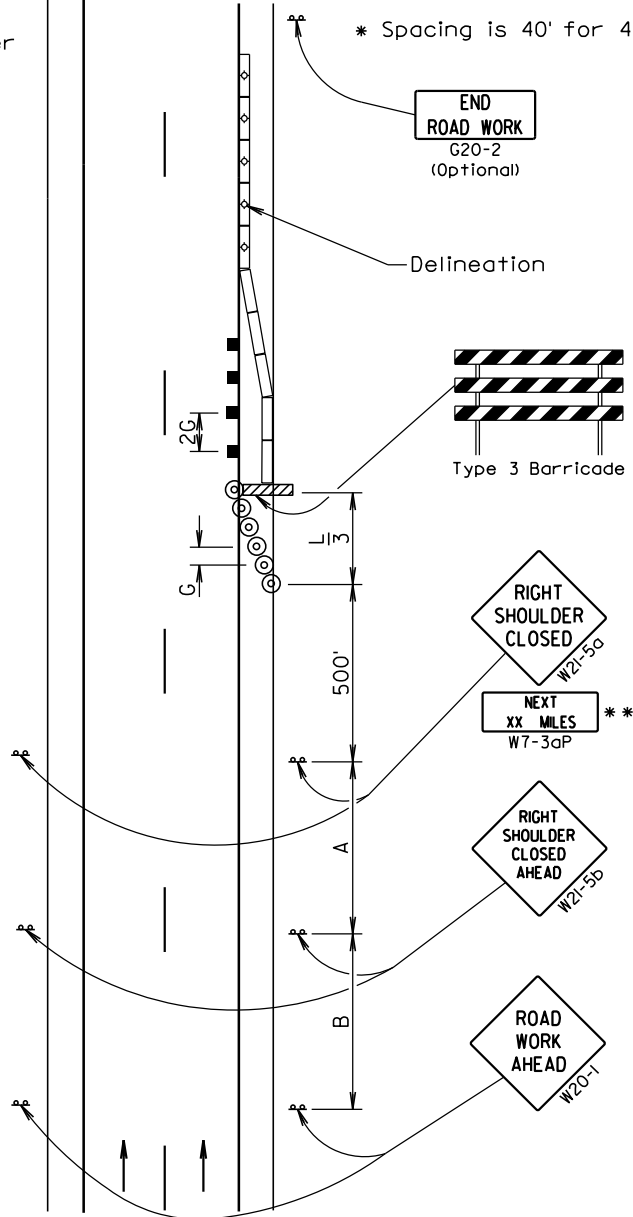
\*\* For distances 1/2 mile or greater.

42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

This standard plate shows one method which may be used to close a shoulder of a roadway for a long term project. The Highway Authority will determine if the use of barriers is required. If barriers are required, the layout details will be included elsewhere in the plans.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet)			Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
	(A)	(B)	(C)		
0 - 30	200			180	25
35 - 40	350			320	25
45	500			600	25
50	500			600	50 *
55	750			660	50 *
60 - 65	1000			780	50 *
	(A) (B)				
70 - 80	1000	1500		1125	50 *

\* Spacing is 40' for 42" cones.



June 3, 2016

Published Date: 2nd Qtr. 2018

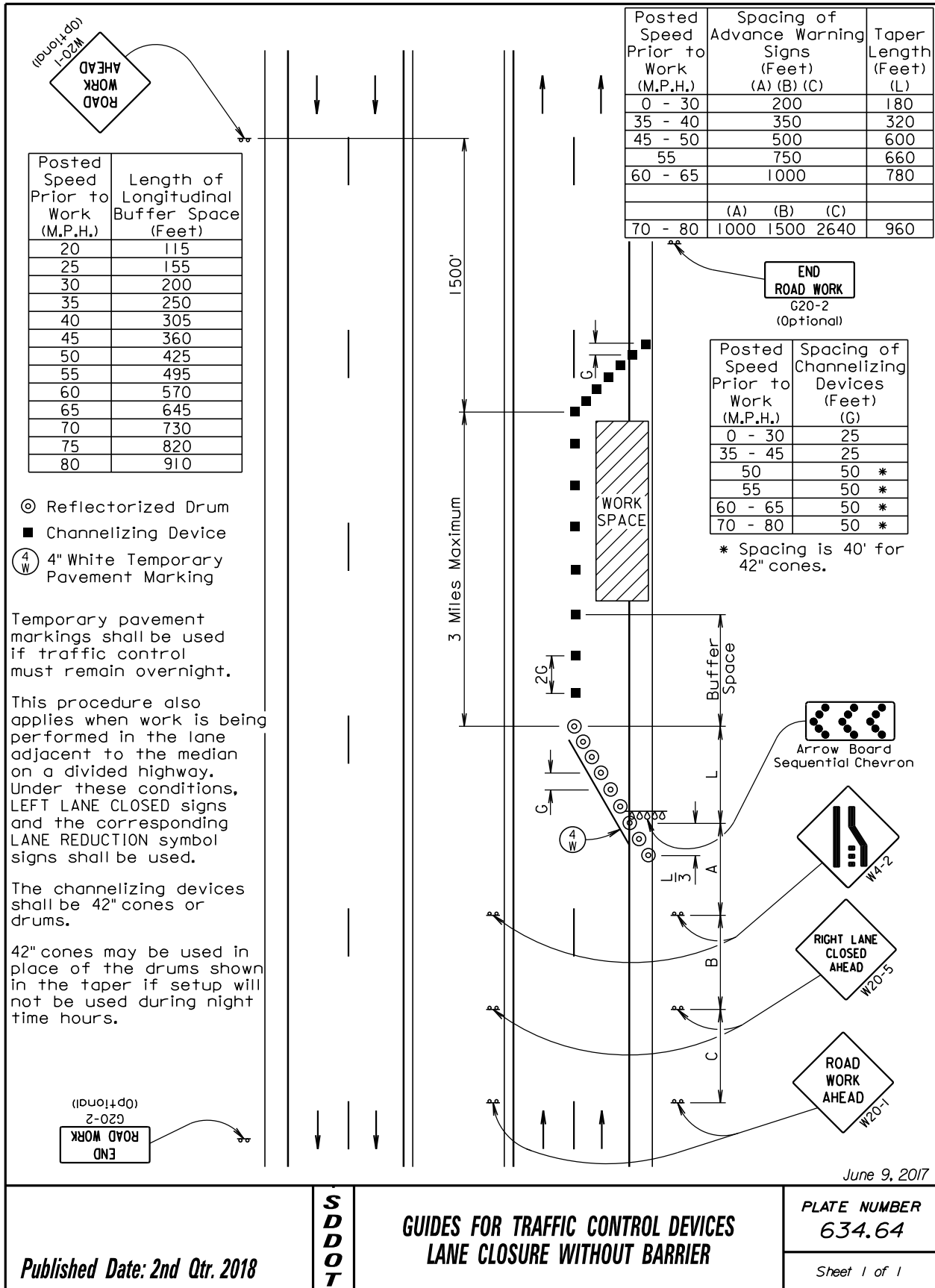
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**GUIDES FOR TRAFFIC CONTROL DEVICES  
SHOULDER CLOSED**

PLATE NUMBER  
**634.61**

Sheet 1 of 1

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**Published Date: 2nd Qtr. 2018**

**SDOT**

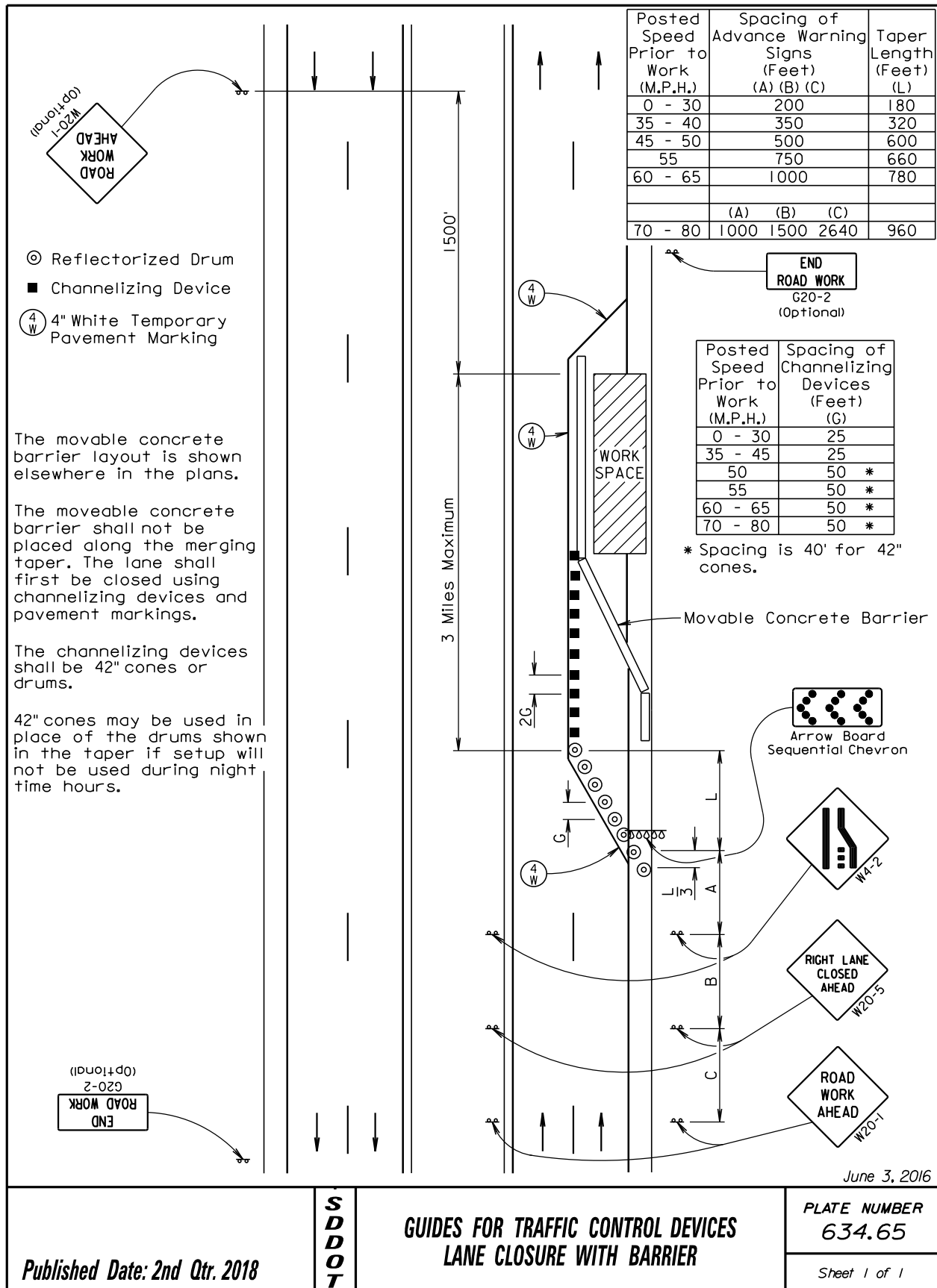
**GUIDES FOR TRAFFIC CONTROL DEVICES  
LANE CLOSURE WITHOUT BARRIER**

**PLATE NUMBER  
634.64**

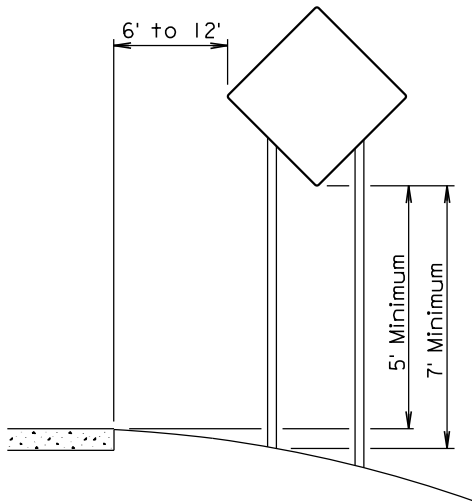
Sheet 1 of 1



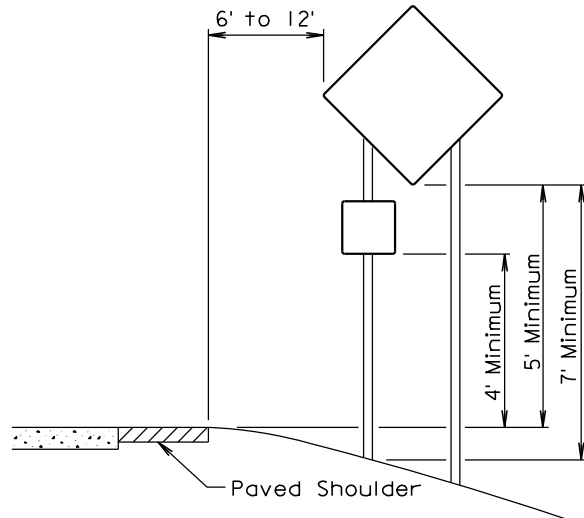
**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



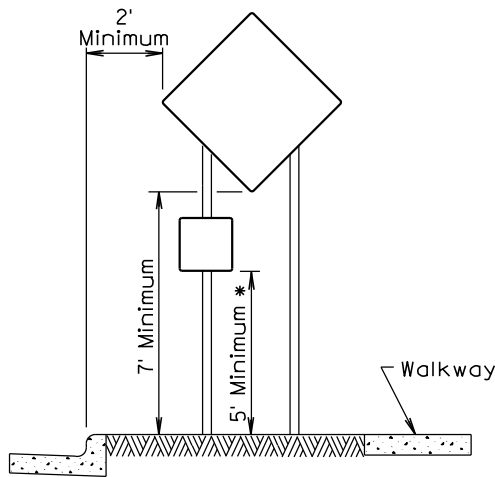
**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**RURAL DISTRICT**

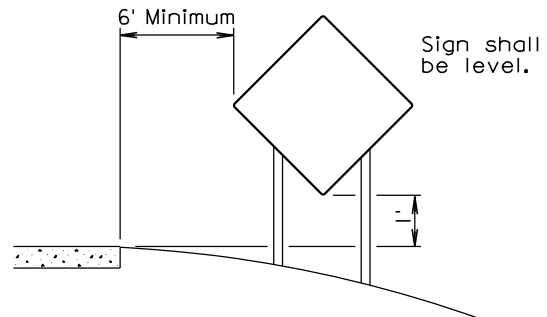


**RURAL DISTRICT WITH  
SUPPLEMENTAL PLATE**



**URBAN DISTRICT**

\* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.



**RURAL DISTRICT  
3 DAY MAXIMUM**

(Not applicable to regulatory signs)

September 22, 2014

*Published Date: 2nd Qtr. 2018*

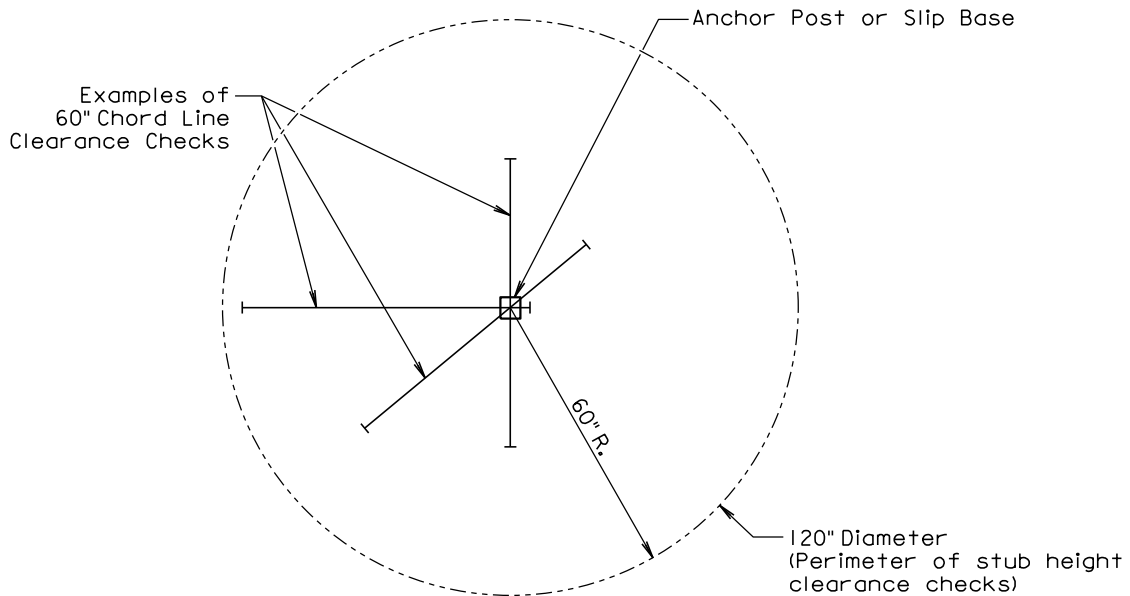
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**CRASHWORTHY SIGN SUPPORTS  
(Typical Construction Signing)**

**PLATE NUMBER  
634.85**

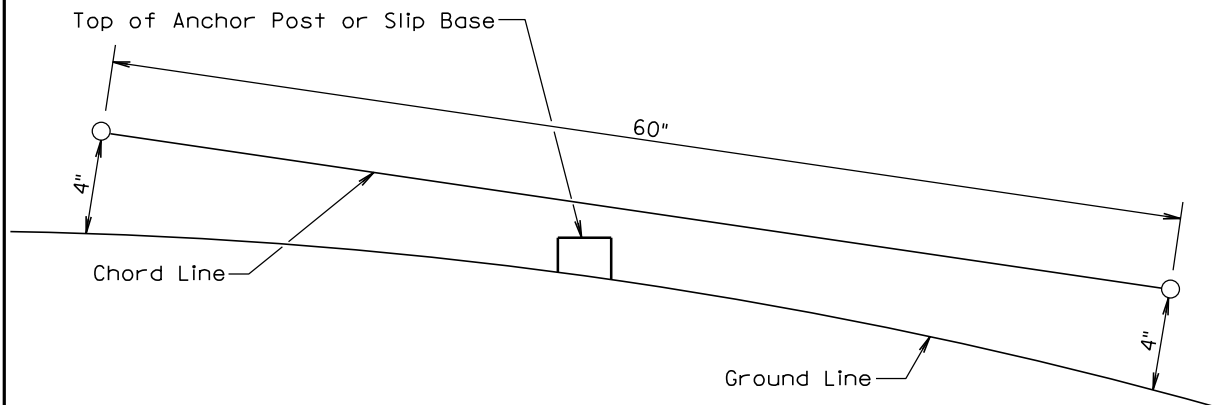
Sheet 1 of 1

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**PLAN VIEW**

(Examples of stub height clearance checks)



**ELEVATION VIEW**

**GENERAL NOTES:**

The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

*Published Date: 2nd Qtr. 2018*

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**BREAKAWAY SUPPORT STUB CLEARANCE**

**PLATE NUMBER  
634.99**

Sheet 1 of 1

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**

**GENERAL NOTES:**

Either flanged channel steel posts or S3x5.7 steel I beam posts shall be used, but post type shall be consistent throughout the project. The S3x5.7 Steel I Beam post shall 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 shall 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 shall be incidental to the contract unit price per foot for "3 Cable Guardrail".

The following table and criteria shall 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 shall 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 shall 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 shall have a total available travel of 6 inches minimum.

The cable shall 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 109	110 to 120
Spring Compression (Inch)	4 1/4	4	3 3/4	3 1/2	3 1/4	3	2 3/4	2 1/2	2 1/4	2	1 3/4	1 1/2	1 1/4	1

POST SPACING FOR HORIZONTAL CURVES	
Roadway $\angle$ 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

December 16, 2015

*Published Date: 2nd Qtr. 2018*

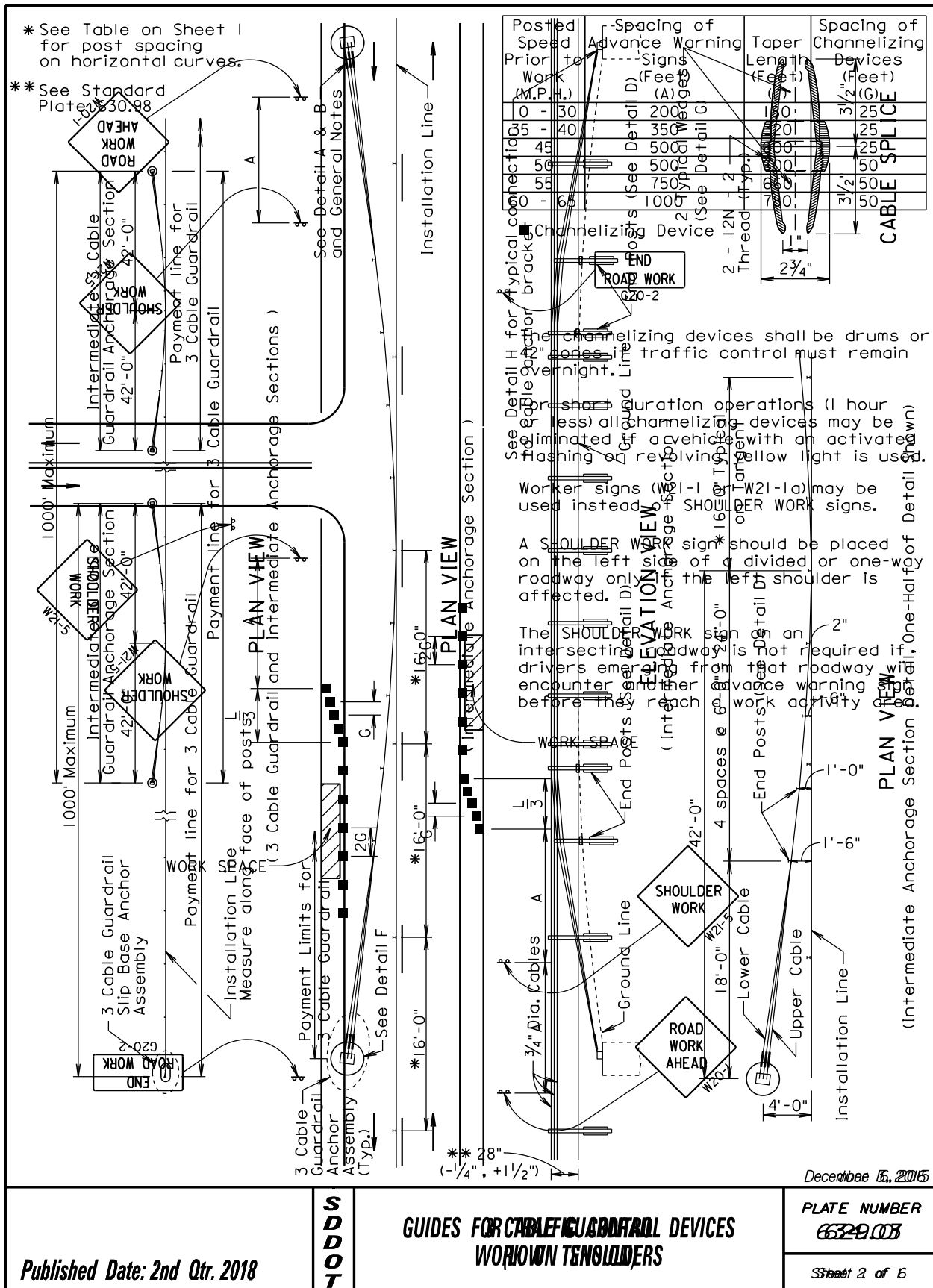
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**3 CABLE GUARDRAIL  
(LOW TENSION)**

**PLATE NUMBER  
629.01**

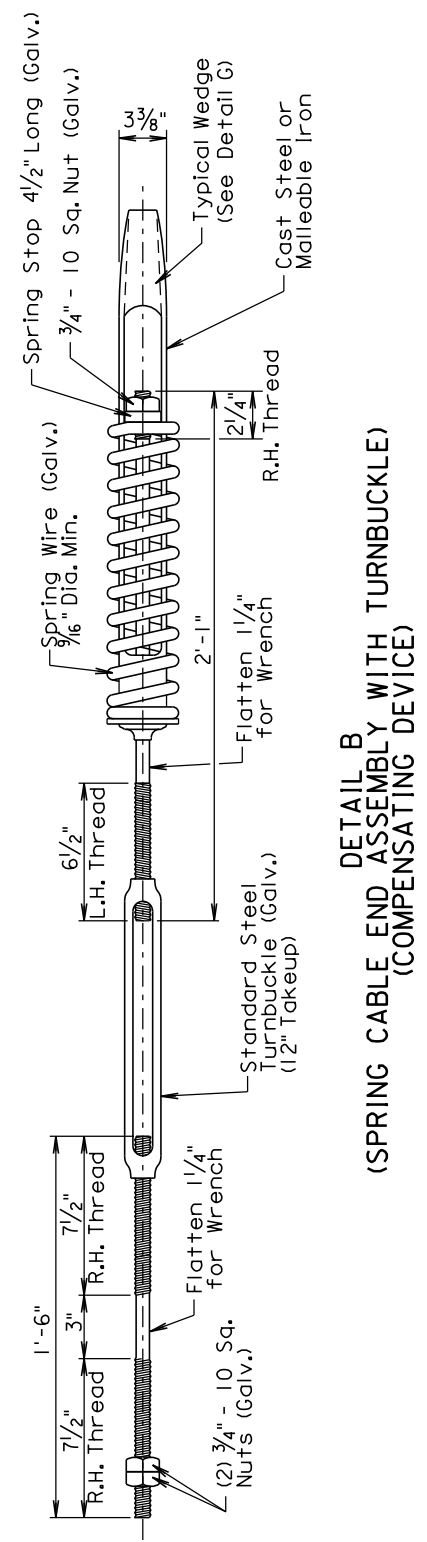
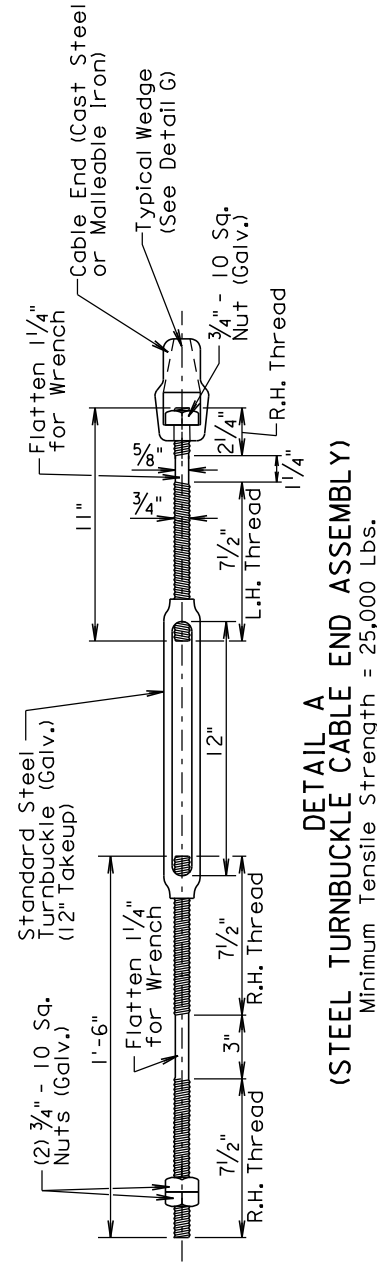
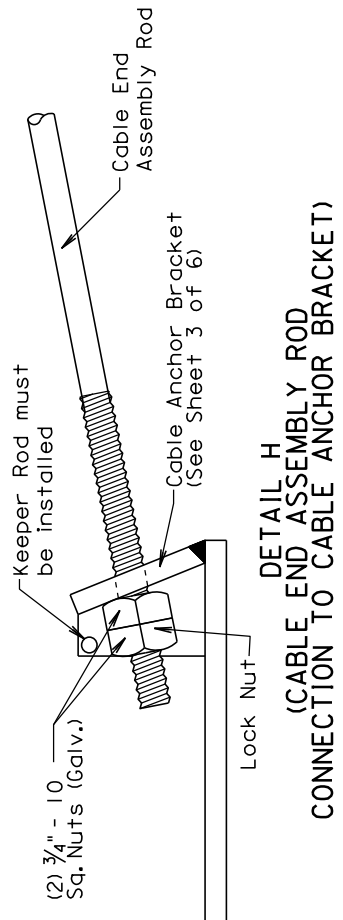
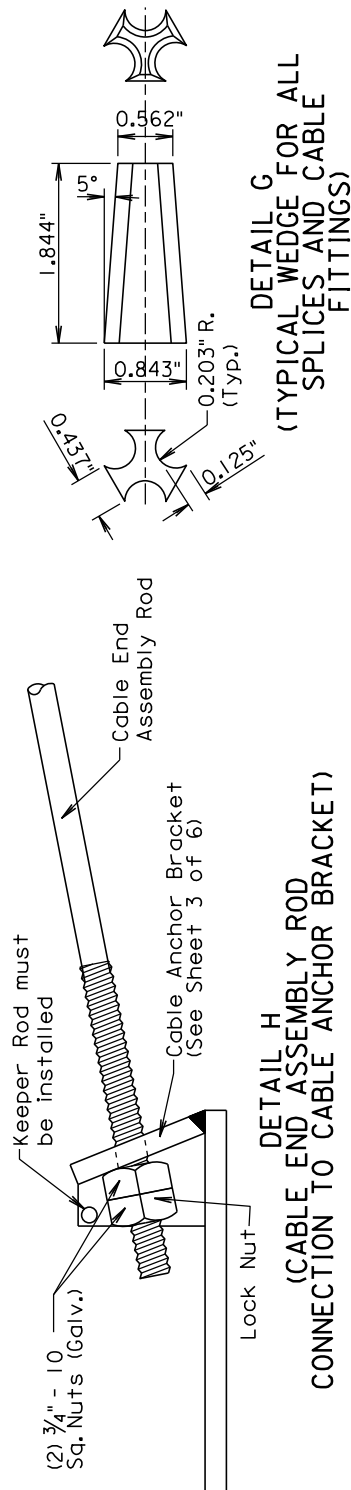
*Sheet 1 of 6*

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**





**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



December 16, 2015

Published Date: 2nd Qtr. 2018

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**3 CABLE GUARDRAIL  
(LOW TENSION)**

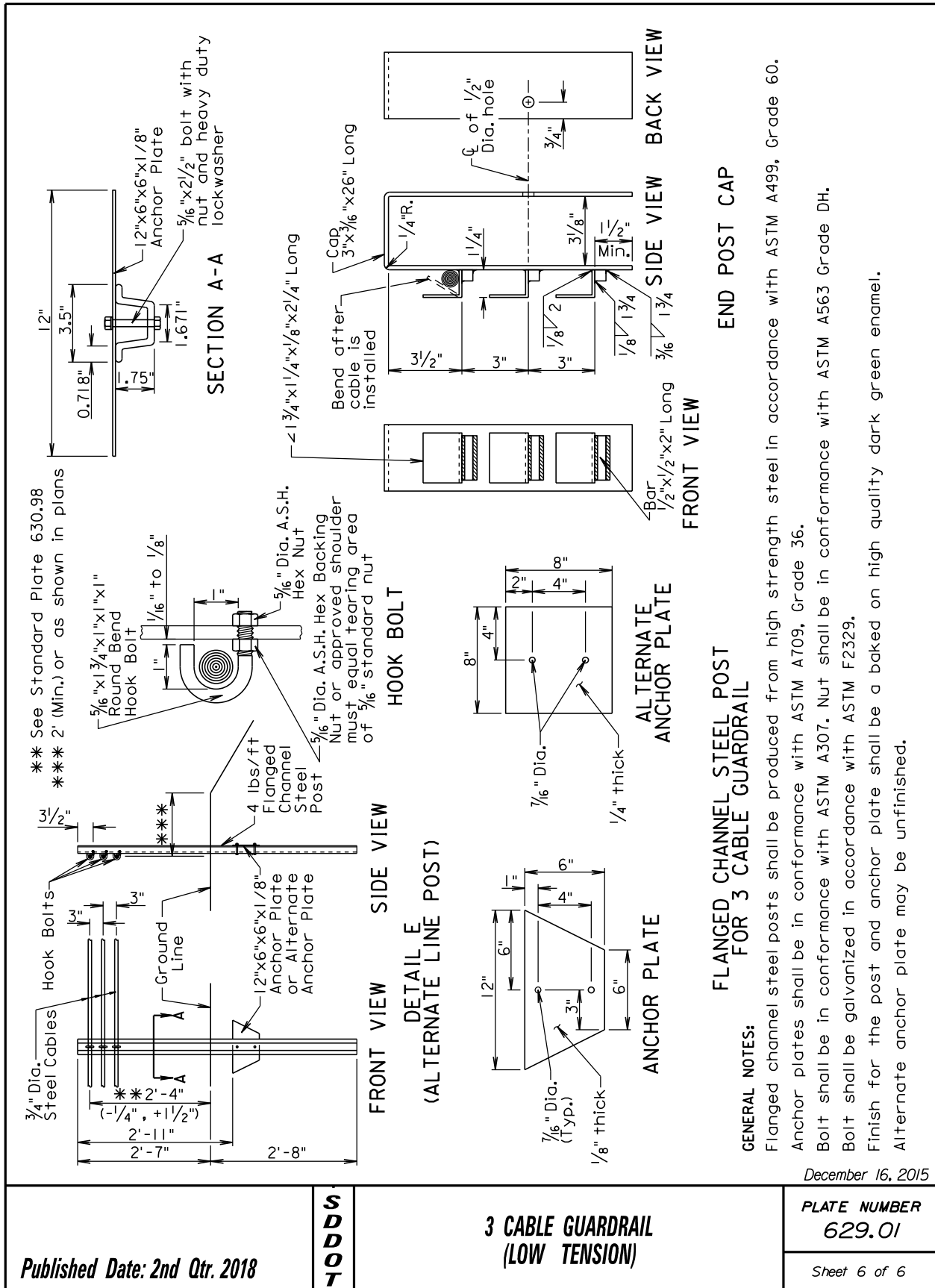
**PLATE NUMBER  
629.01**

Sheet 4 of 6

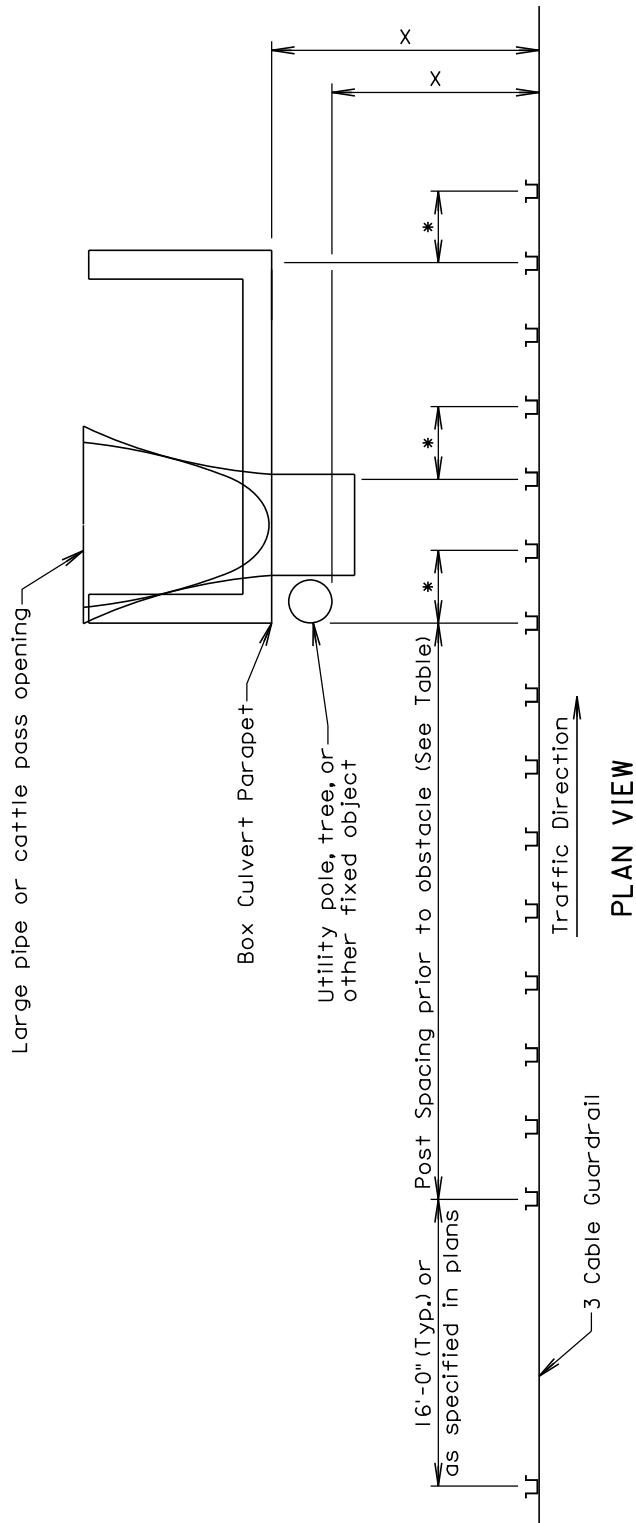




**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



POST SPACING PRIOR TO OBSTACLE		
X Deflection Distance (Ft)	Number of Post Spaces	Post Spacing (Ft)
10.5 to 11.4	8	4
11.5 to 12.9	6	8
13.0 to 14.9	4	12
15 and Greater	3	16

**GENERAL NOTES:**

- \* Post spacing for deflection control shall continue to one post past the obstacle for one-way traffic.
- Post spacing for deflection control shall be provided on both sides of the obstacle for two-way traffic.
- For illustrational purposes, the 3 cable guardrail posts and post spacings shown on this standard plate depict the situation when there is a box culvert 10.5' to 11.49' away from the 3 cable guardrail and the traffic is one-way.
- This standard plate shall not be used for high tension cable guardrail installations.

December 16, 2014

Published Date: 2nd Qtr. 2018

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**3 CABLE GUARDRAIL (LOW TENSION)  
POST SPACING FOR DEFLECTION CONTROL**

**PLATE NUMBER  
629.02**

Sheet 1 of 1



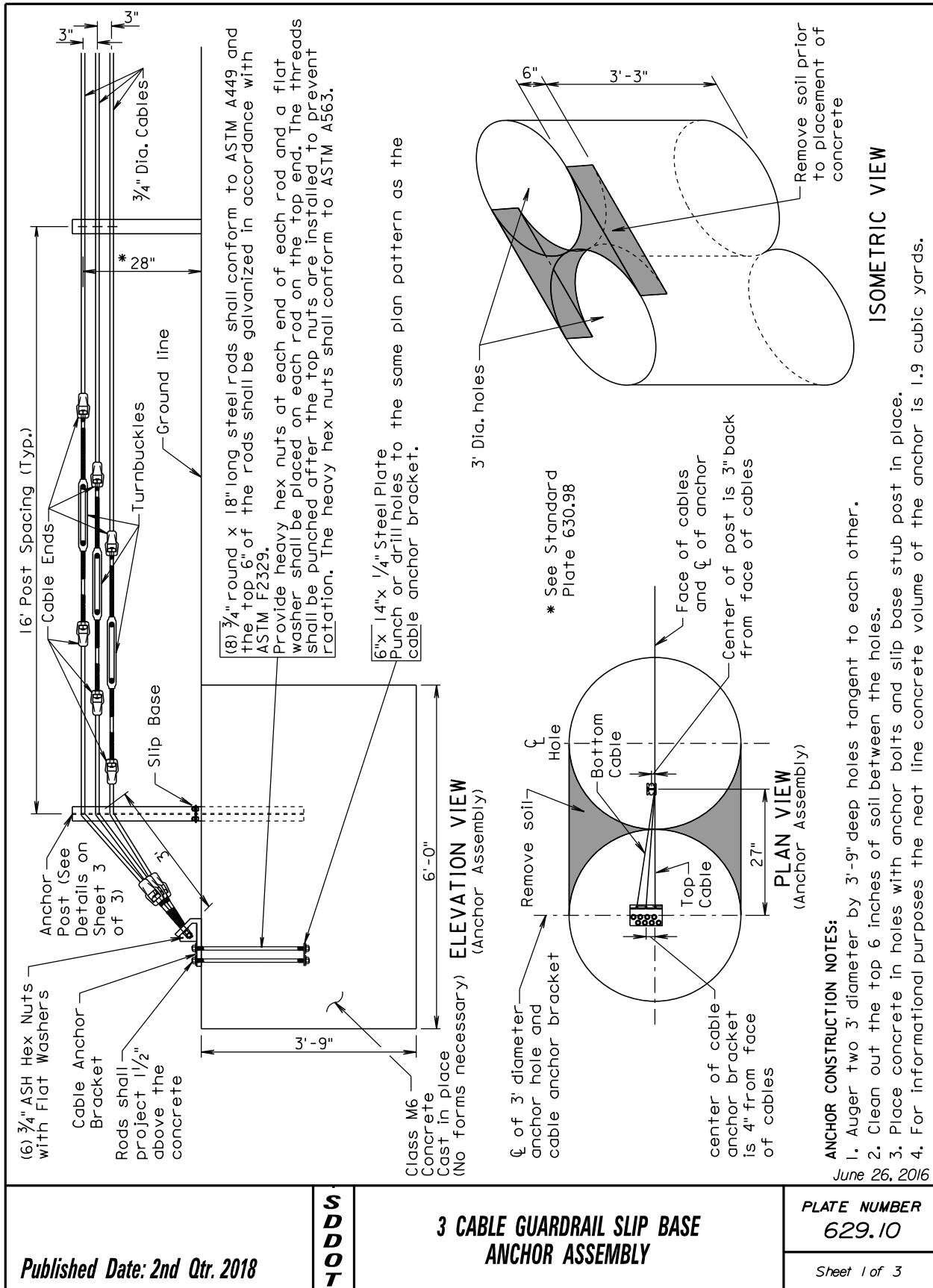
***Published Date: 2nd Qtr. 2018***

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### 3 CABLE GUARDRAIL SLIP BASE ANCHOR ASSEMBLY

PLATE NUMBER  
629.10

Sheet 1 of 3



**ANCHOR CONSTRUCTION NOTES:**

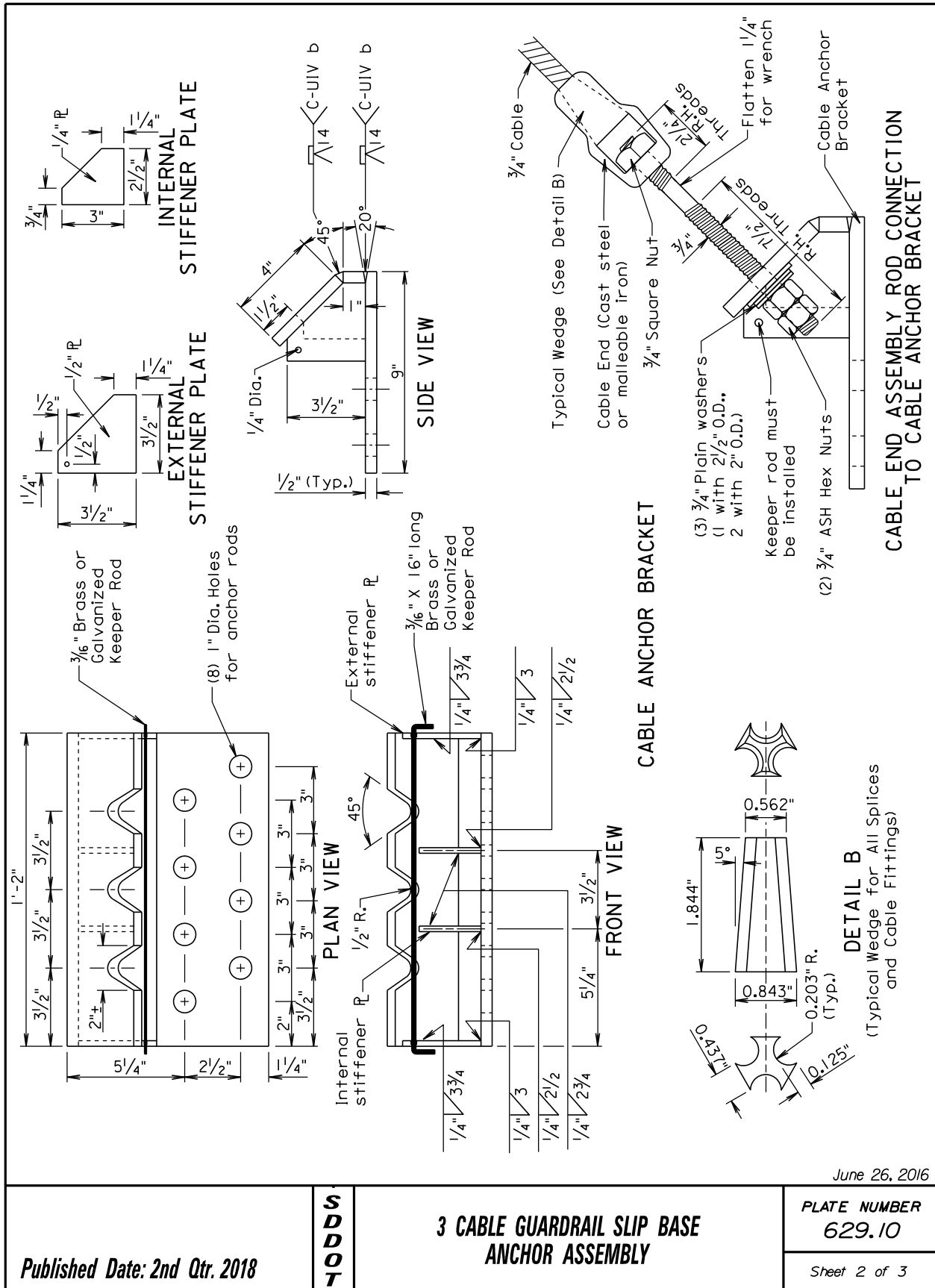
1. Auger two 3' diameter by 3'-9" deep holes tangent to each other.
2. Clean out the top 6 inches of soil between the holes.
3. Place concrete in holes with anchor bolts and slip base stub post.

June 26, 2016

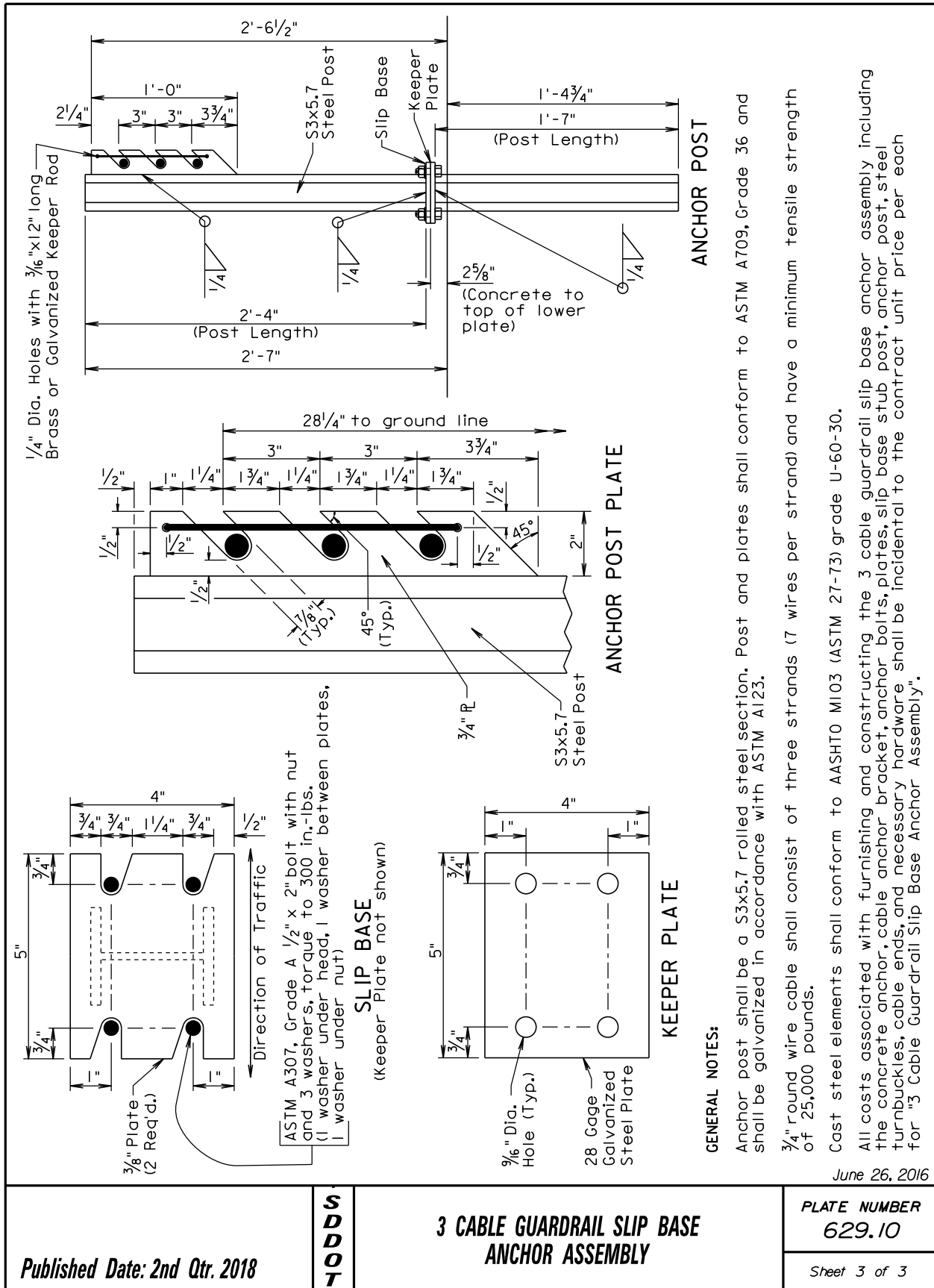
## ISOMETRIC VIEW

bic yards.

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



Published Date: 2nd Qtr. 2018

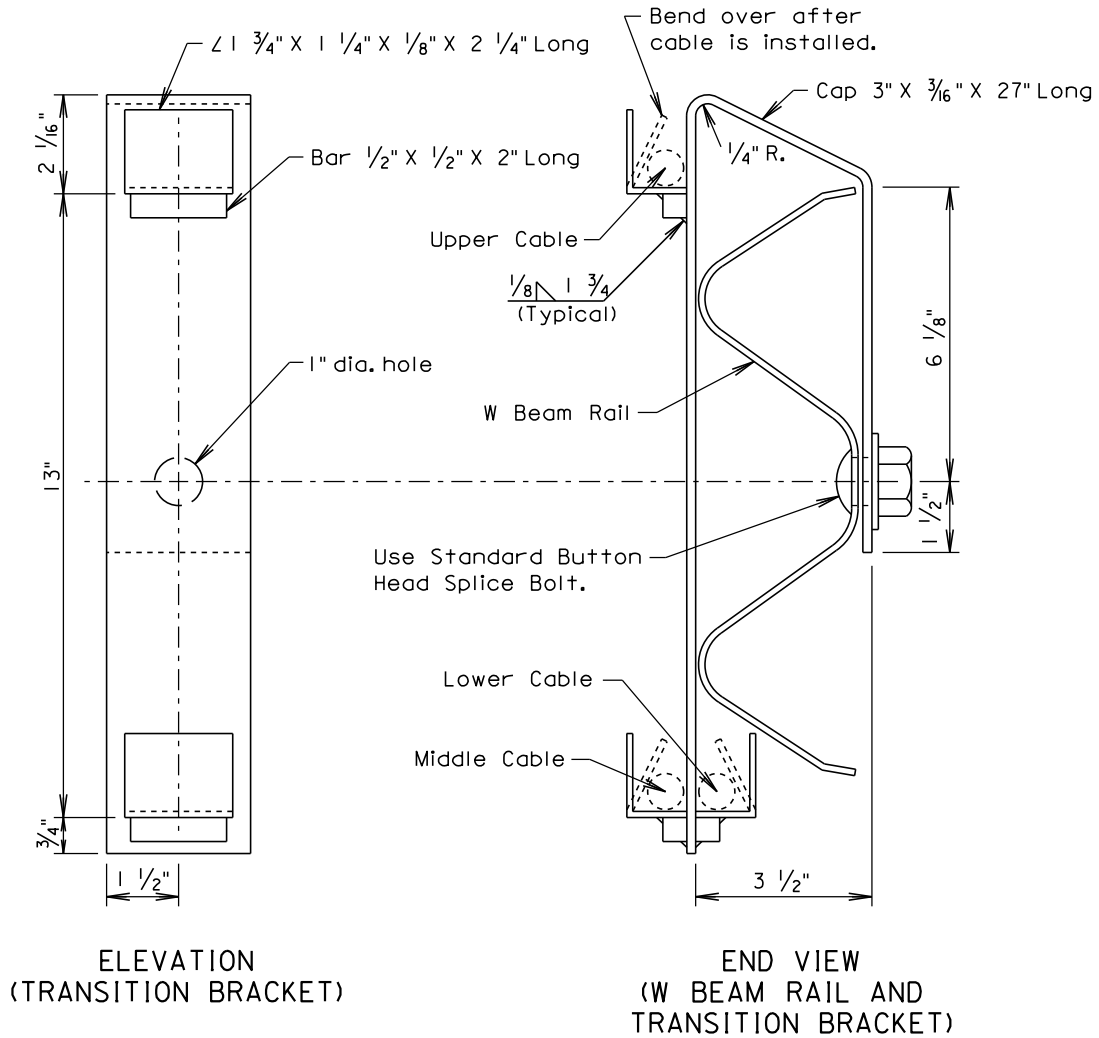
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**3 CABLE GUARDRAIL SLIP BASE  
ANCHOR ASSEMBLY**

**PLATE NUMBER  
629.10**

Sheet 3 of 3

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**GENERAL NOTES:**

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

March 31, 2000

*Published Date: 2nd Qtr. 2018*

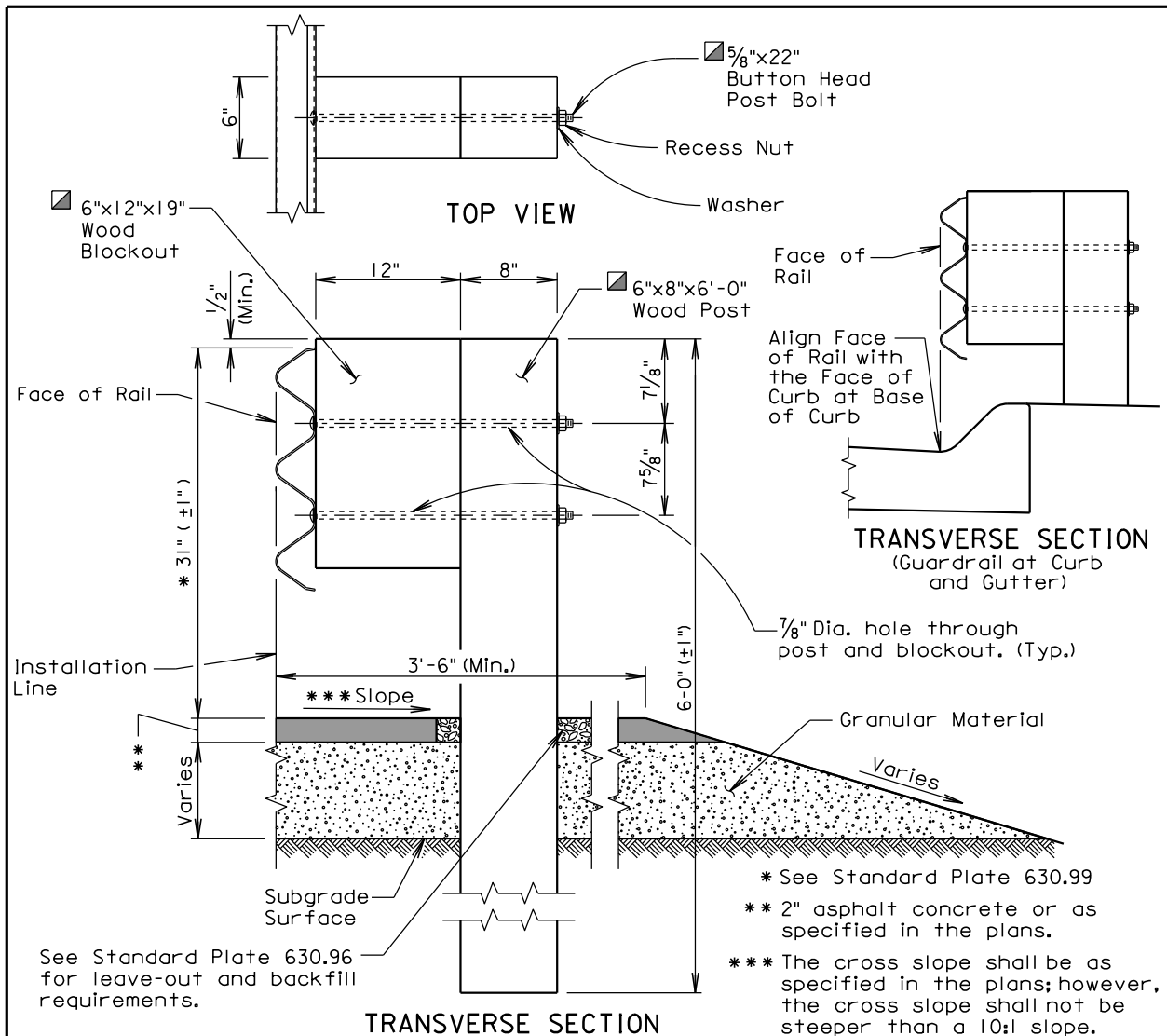
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**W BEAM TO 3 CABLE TRANSITION BRACKET**

**PLATE NUMBER  
629.15**

*Sheet 1 of 1*

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



*Published Date: 3rd Qtr. 2019*

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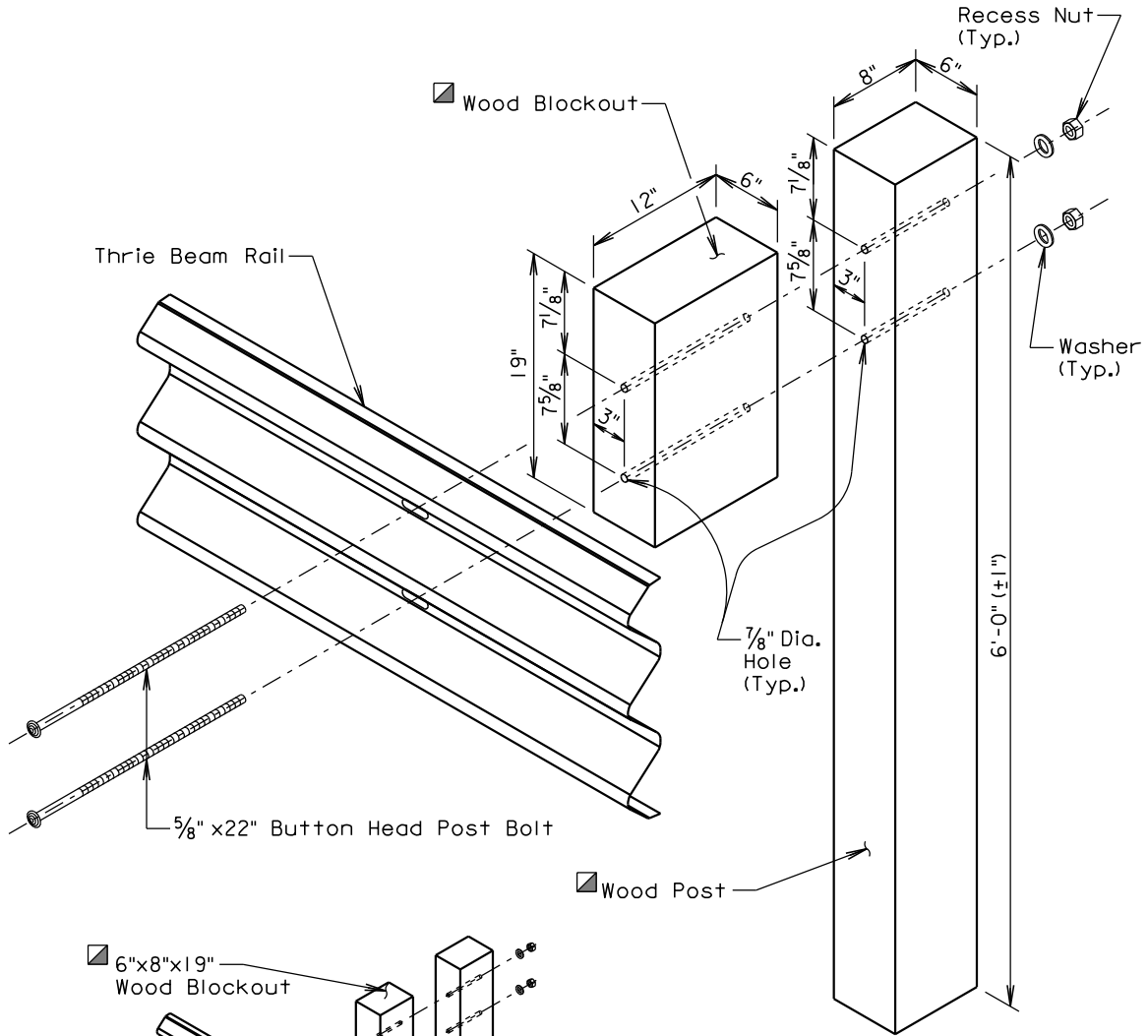
**THRIE BEAM GUARDRAIL**

**PLATE NUMBER  
630.01**

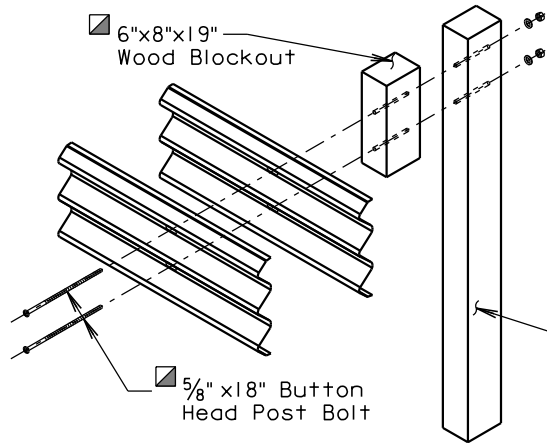
*Sheet 1 of 5*



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**EXPANDED ISOMETRIC VIEW AT  
MIDSPAN OF THRIE BEAM GUARDRAIL**



**EXPANDED ISOMETRIC VIEW  
OF DOUBLE (NESTED) THRIE  
BEAM GUARDRAIL AT MIDSPAN  
(For Information Only, Not to Scale)**

For single thrie beam guardrail use 6"x12"x19" wood blockout, 5/8" x 22" button head post bolt, and 6"x8"x6'-0" wood post. For double (nested) thrie beam guardrail use 6"x8"x19" wood blockout, 5/8" x 18" button head post bolt, and 6"x8"x7'-0" wood post.

May 1, 2018

*Published Date: 3rd Qtr. 2019*

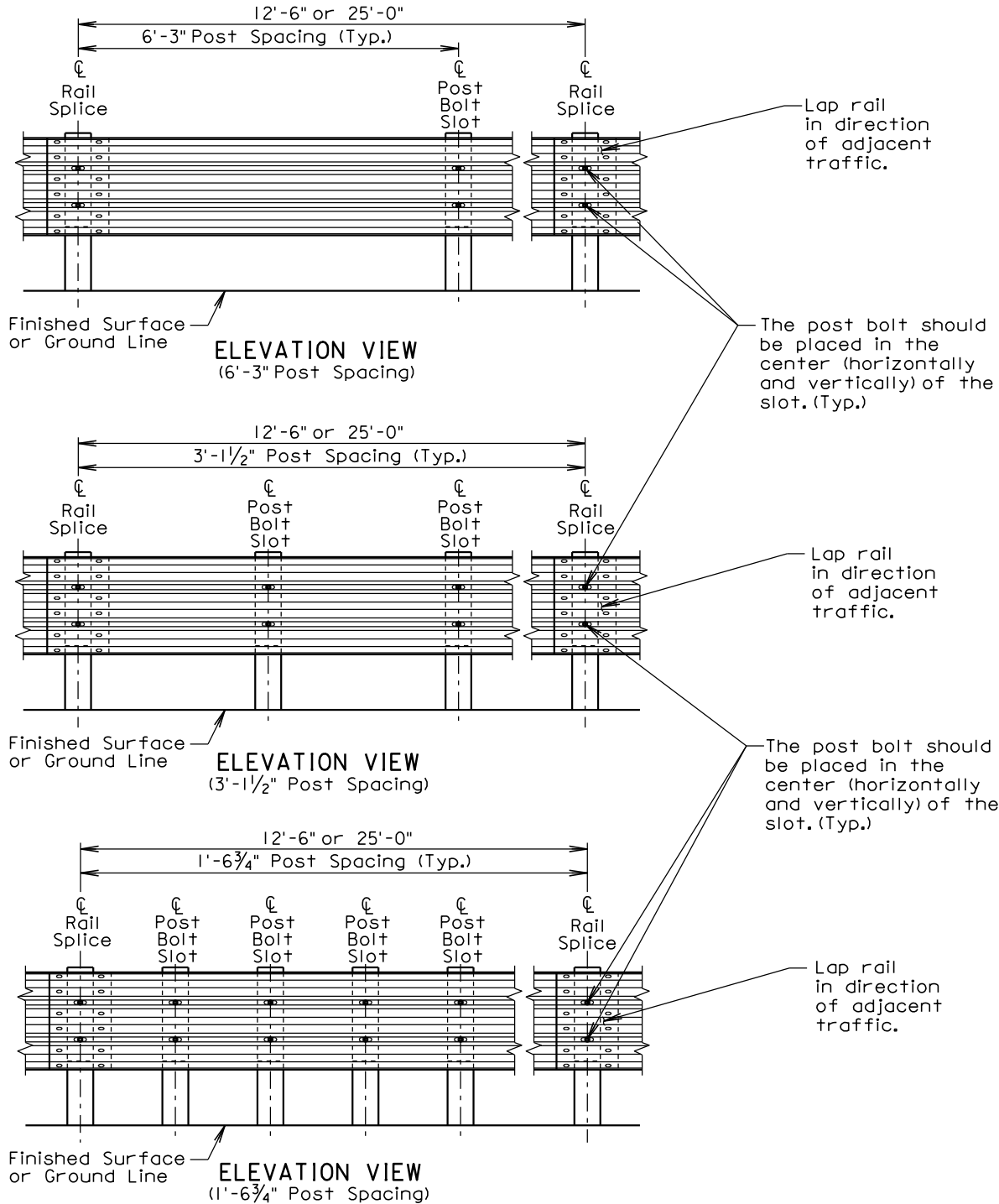
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**THRIE BEAM GUARDRAIL**

**PLATE NUMBER  
630.01**

Sheet 2 of 5

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



May 1, 2018

Published Date: 3rd Qtr. 2019

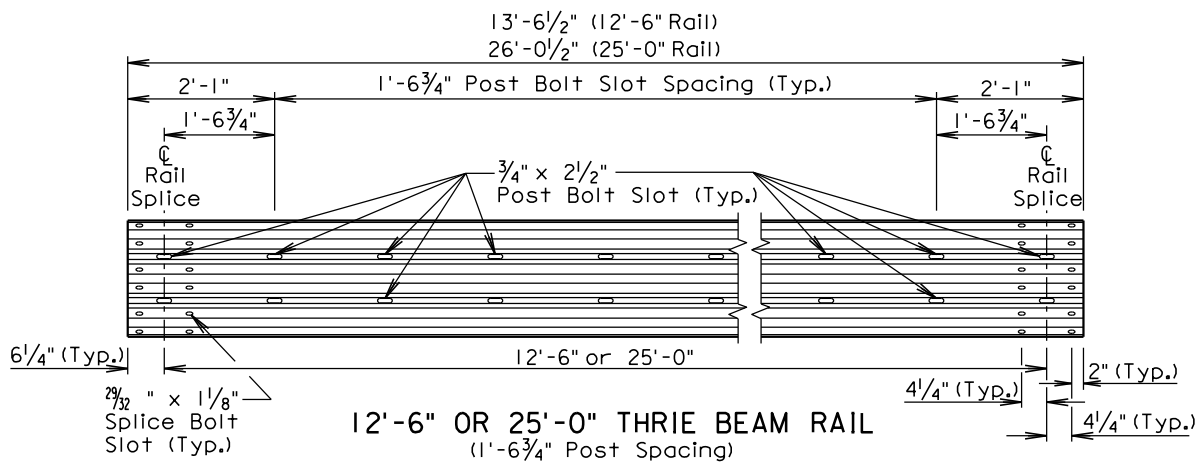
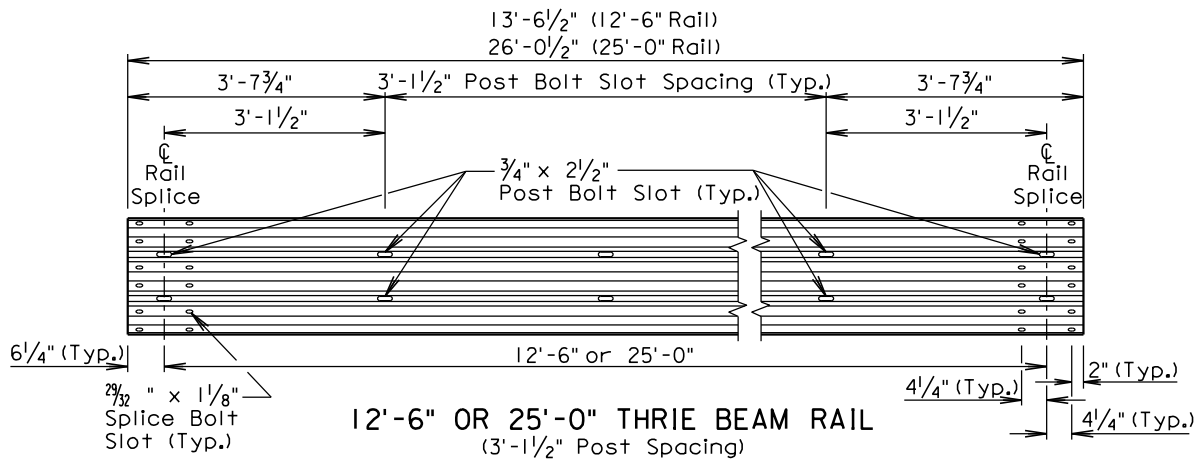
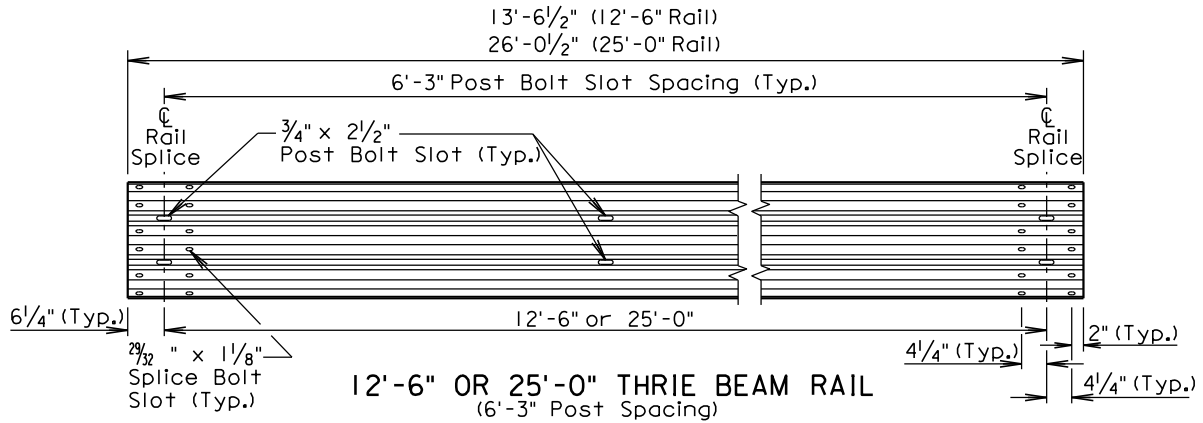
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**THRE BEAM GUARDRAIL**

**PLATE NUMBER  
630.01**

Sheet 3 of 5

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



May 1, 2018

Published Date: 3rd Qtr. 2019

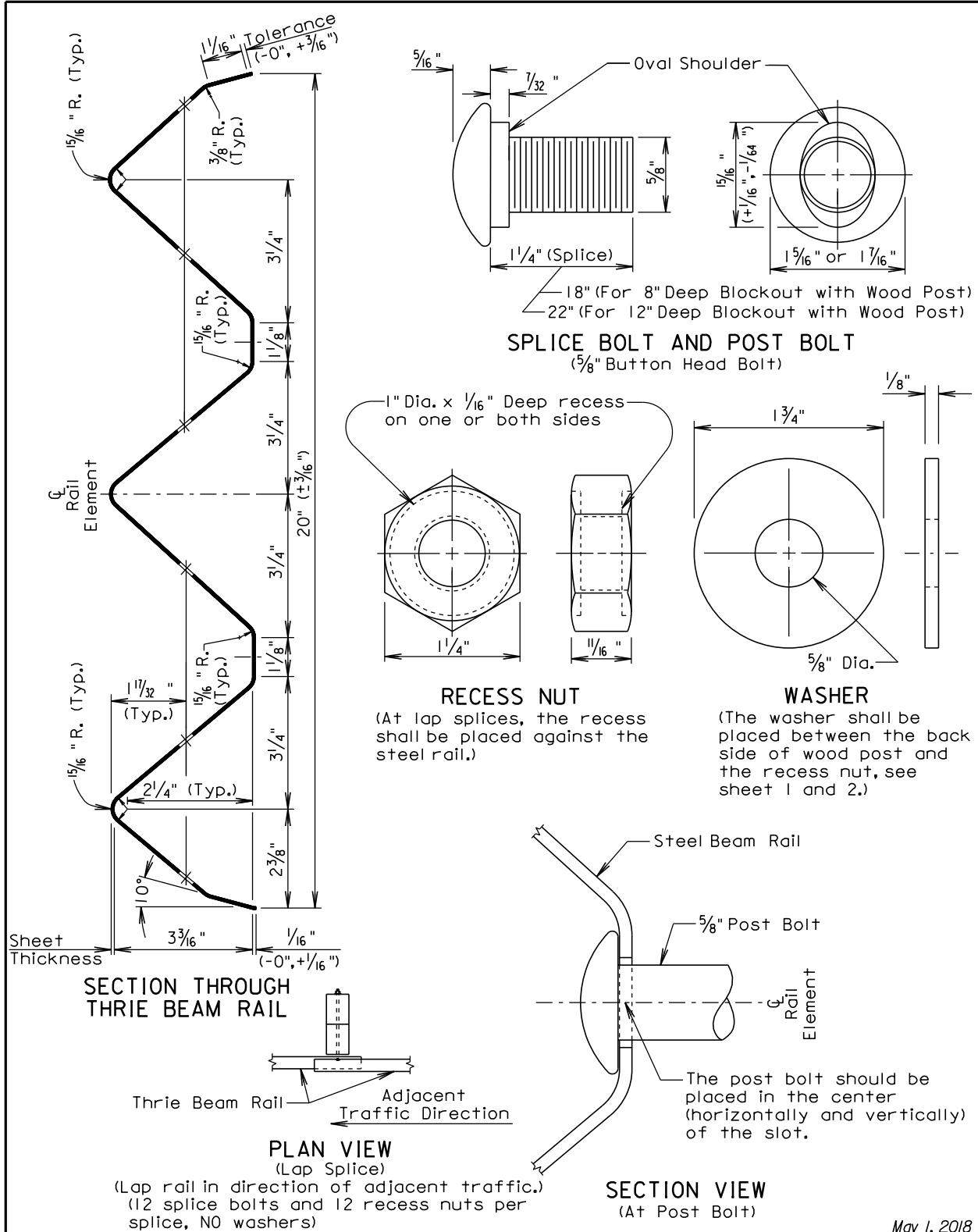
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**THRIE BEAM GUARDRAIL**

**PLATE NUMBER**  
**630.01**

Sheet 4 of 5

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



May 1, 2018

Published Date: 3rd Qtr. 2019

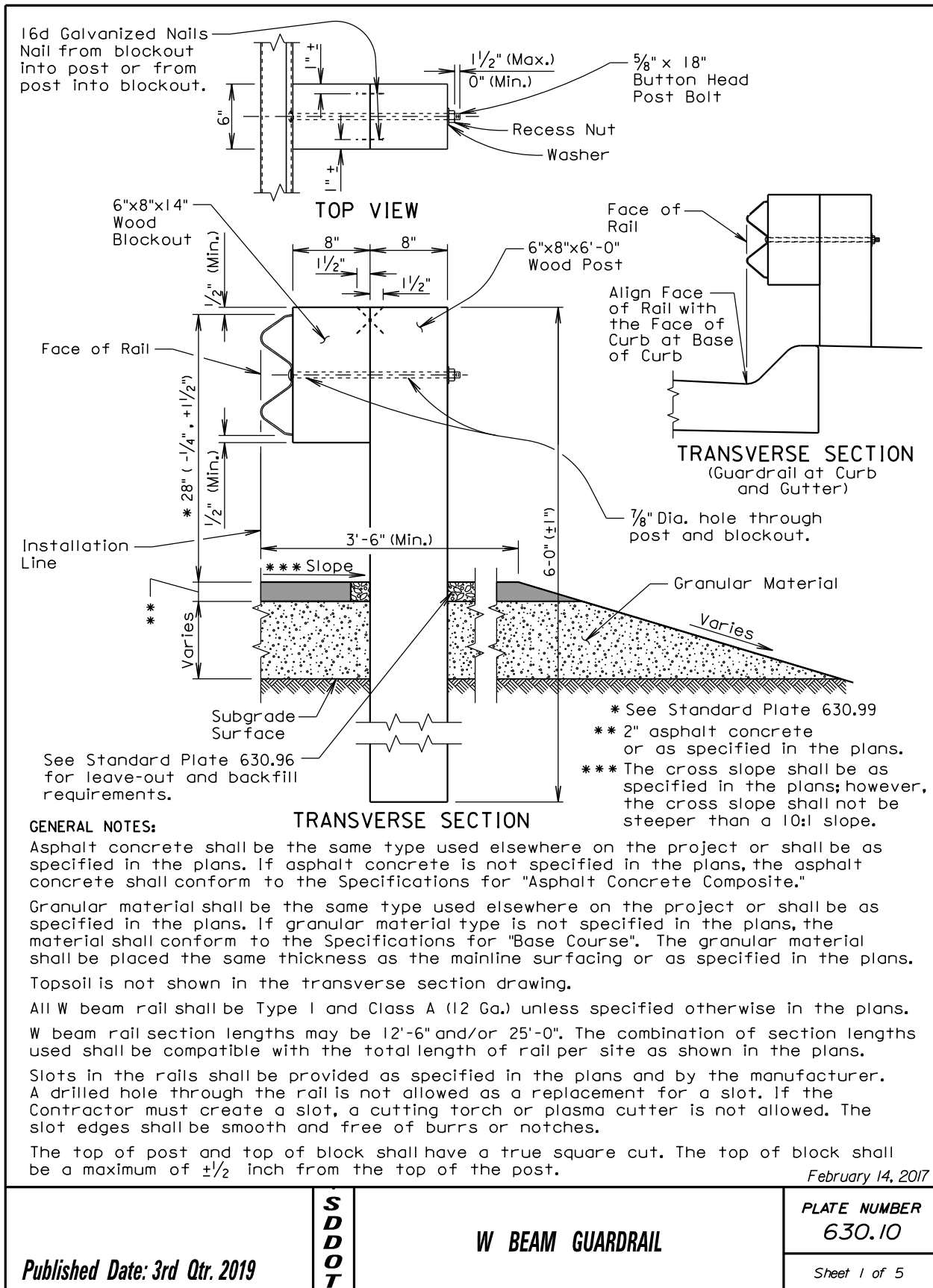
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**THRIE BEAM GUARDRAIL**

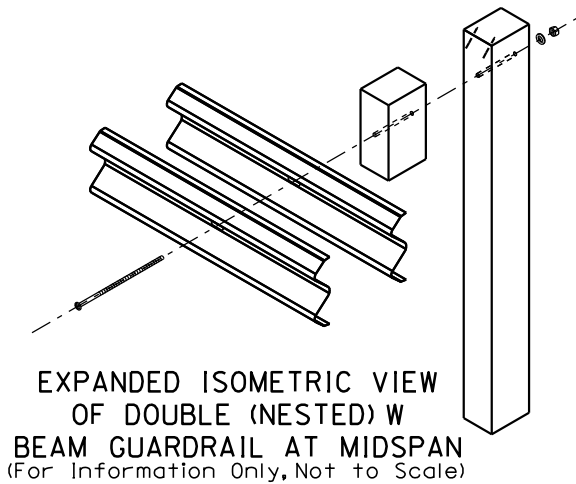
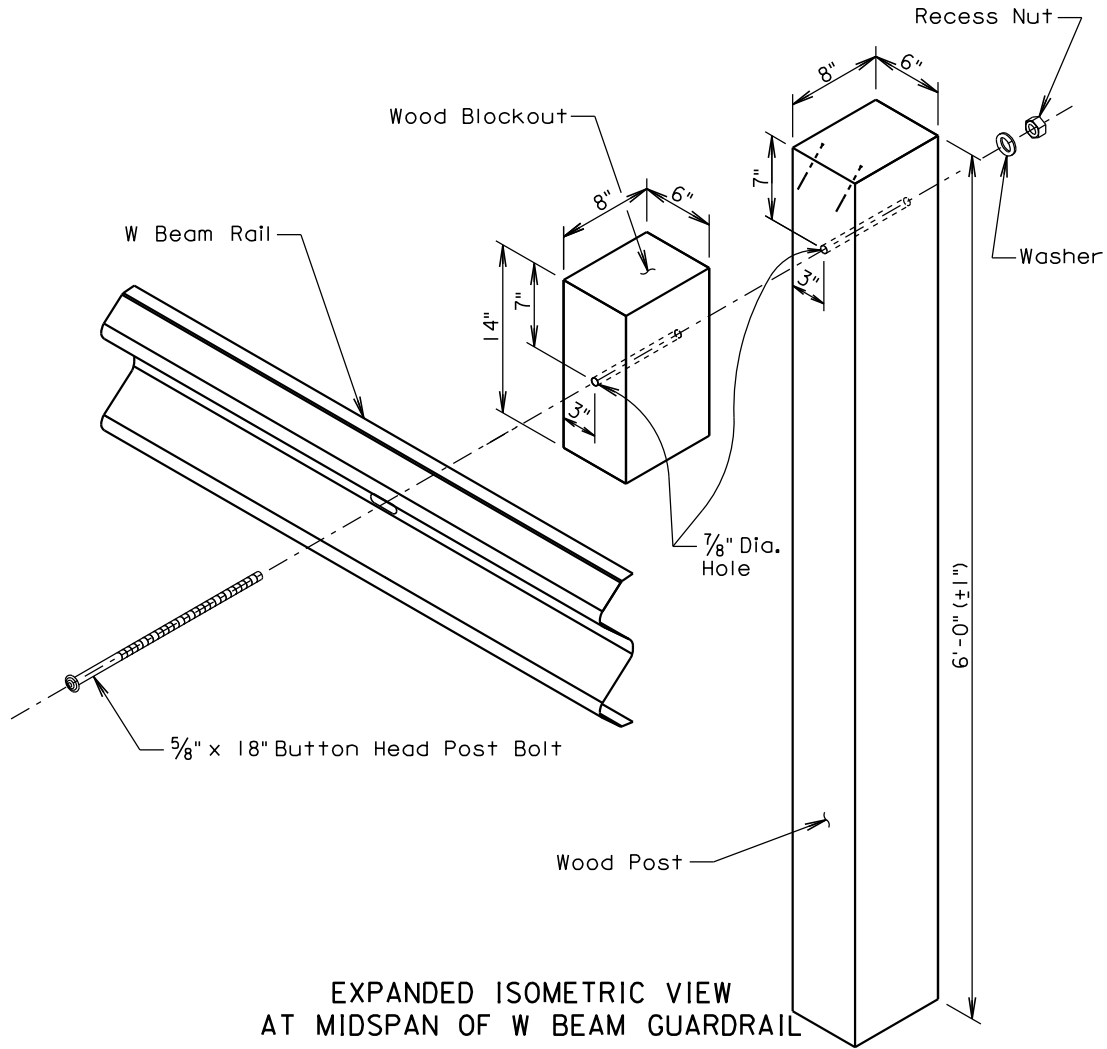
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Sheet 5 of 5

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



February 14, 2017

*Published Date: 3rd Qtr. 2019*

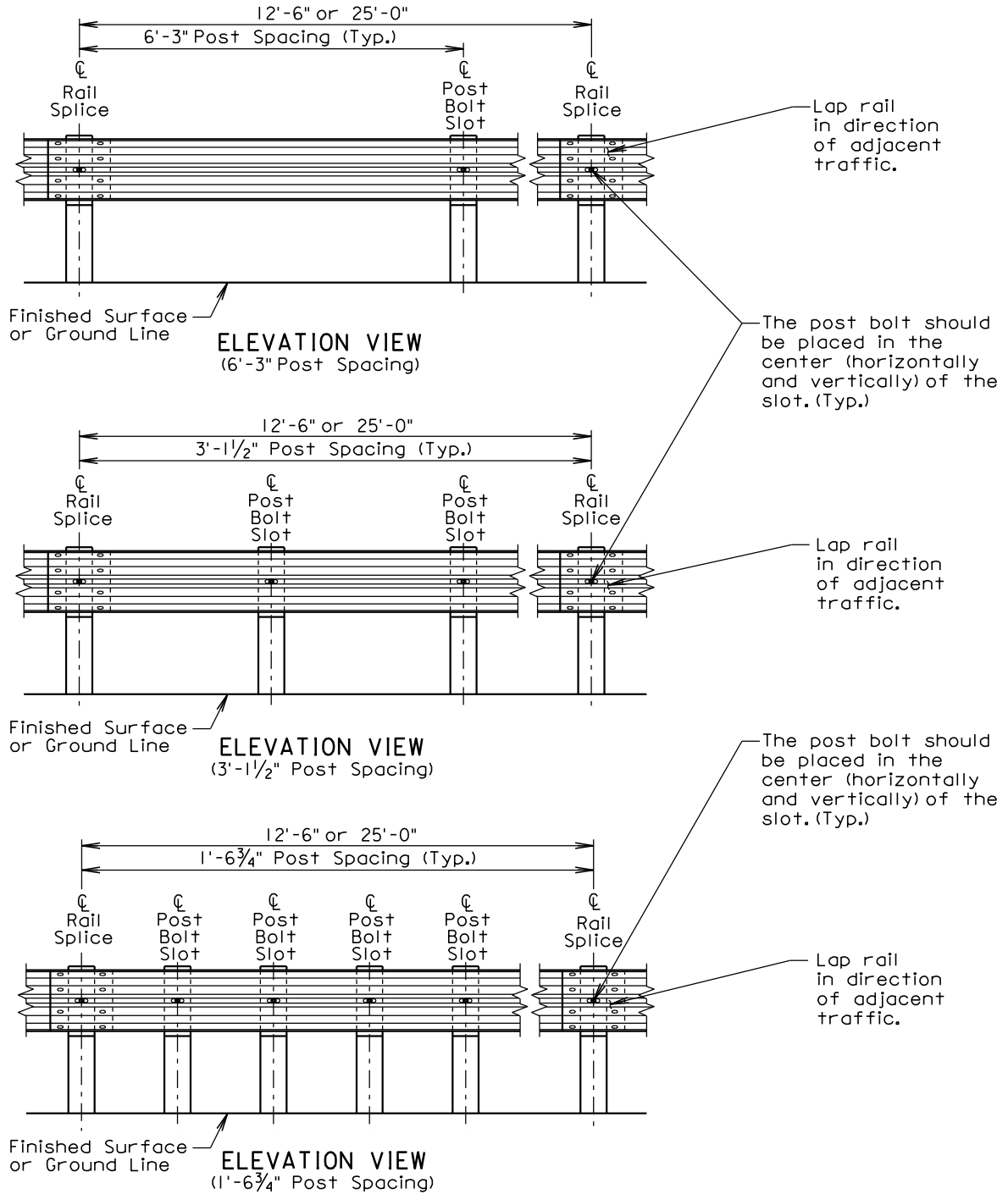
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**W BEAM GUARDRAIL**

**PLATE NUMBER  
630.10**

*Sheet 2 of 5*

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



February 14, 2017

Published Date: 3rd Qtr. 2019

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**W BEAM GUARDRAIL**

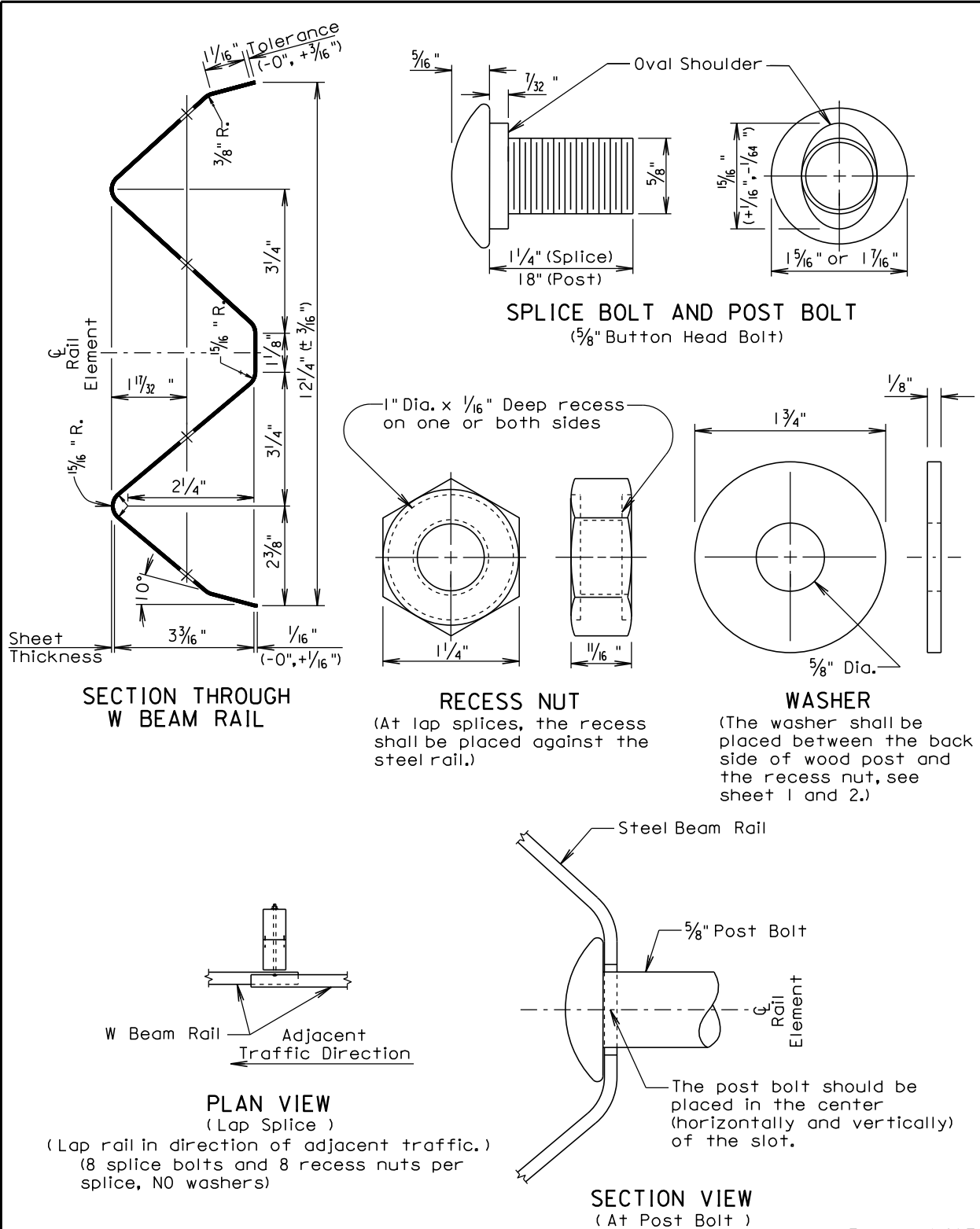
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Sheet 3 of 5





**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



February 14, 2017

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**W BEAM GUARDRAIL**

**PLATE NUMBER  
630.10**

Sheet 5 of 5

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**

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'-1 1/2"
3	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	1'-6 3/4"
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 shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the Specifications for "Asphalt Concrete Composite."

Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the Specifications for "Base Course". The granular material shall 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 shall 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 shall be compatible with the total length of rail per site as shown in the plans.

Slots in the rails shall 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 shall 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 shall be incidental to the contract unit price per foot for the respective MGS bid item.

*September 14, 2017*

<i>Published Date: 3rd Qtr. 2019</i>	<b>S D D O T</b>	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b>	<b>PLATE NUMBER</b> <b>630.20</b>
			<i>Sheet 1 of 6</i>

**TOP VIEW**  
(Type 1, 2, or 3 MGS Installation)

6" x 12" x 14" Wood Blockout

16d Galvanized Nails  
Nail from blockout into post  
or from post into blockout.

1 1/2" (Max.)  
0" (Min.)

5/8" x 22"  
Button Head  
Post Bolt

Recess Nut

Washer

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

6" x 8" x 6'-0" Wood Post

12"

8"

1 1/2"

1 1/2"

4"

3"

7/8" Dia. hole

3'-6" (Min.)

6'-0" (±1")

Granular Material

Varies

Subgrade Surface

See Standard Plate 630.96  
for leave-out and backfill  
requirements.

\*\*\* Slope

Varies

Installation Line

\* 31" (±1")

1/2" (Min.)

Face of Rail

1/2"

Varies

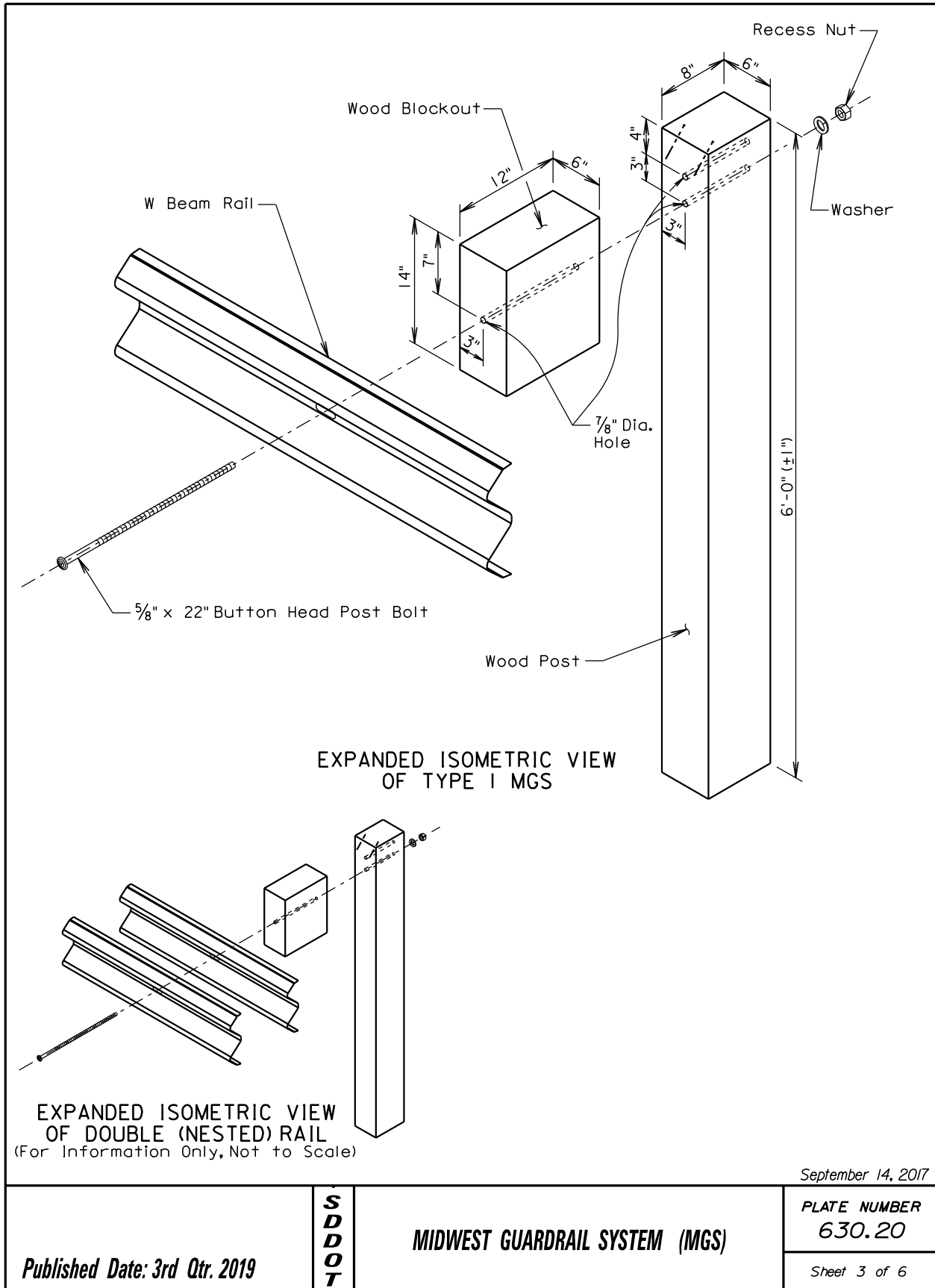
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\* See Standard Plate 630.99

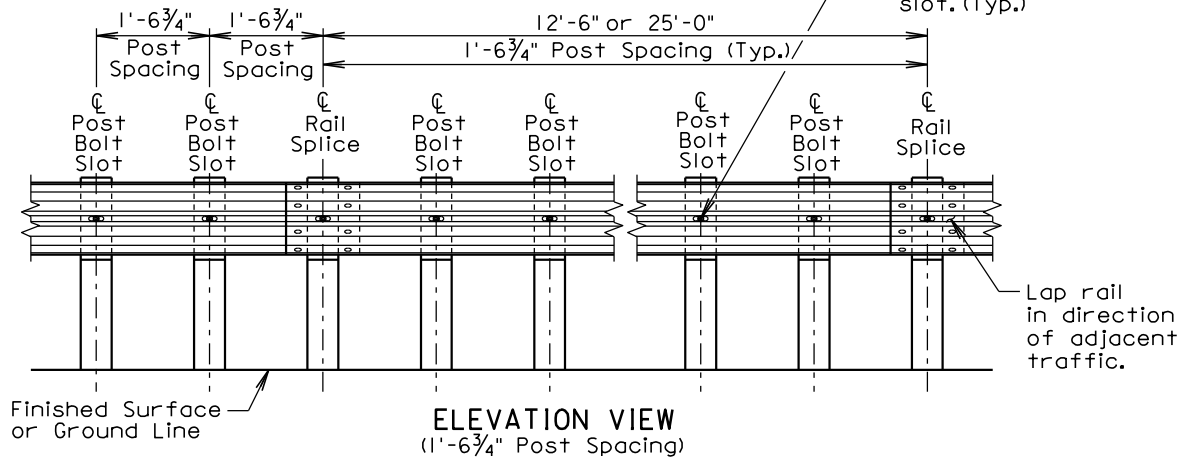
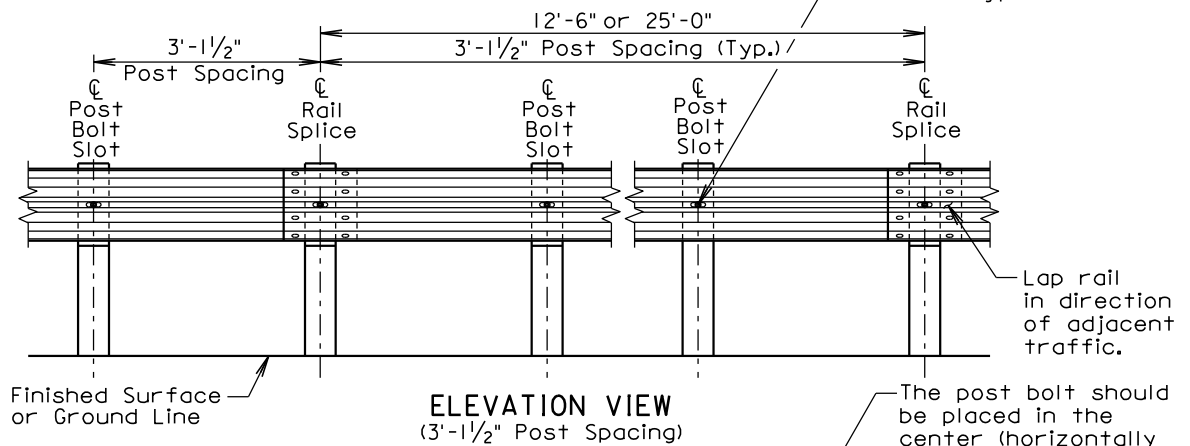
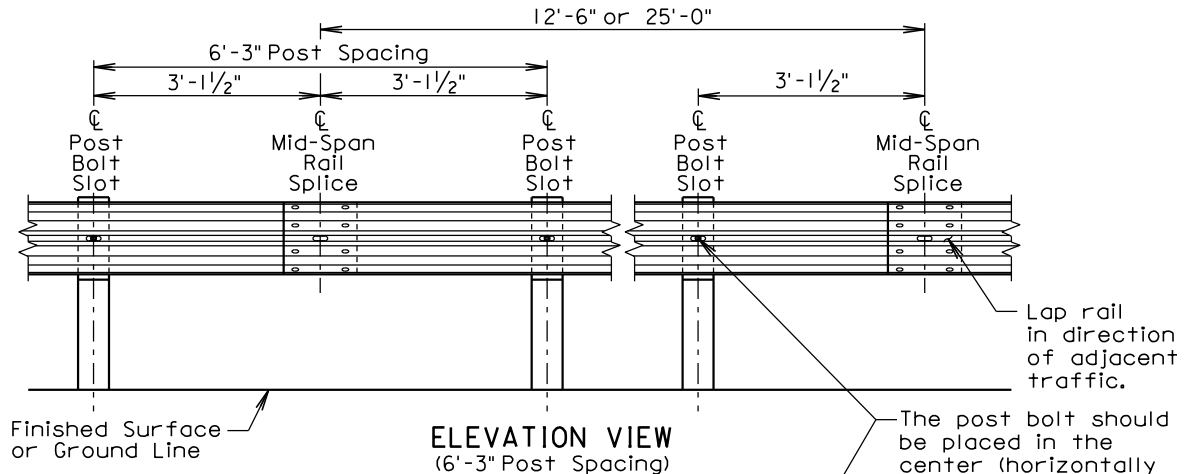
\*\* 2" asphalt concrete or  
as specified in the plans.

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

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



September 14, 2017

Published Date: 3rd Qtr. 2019

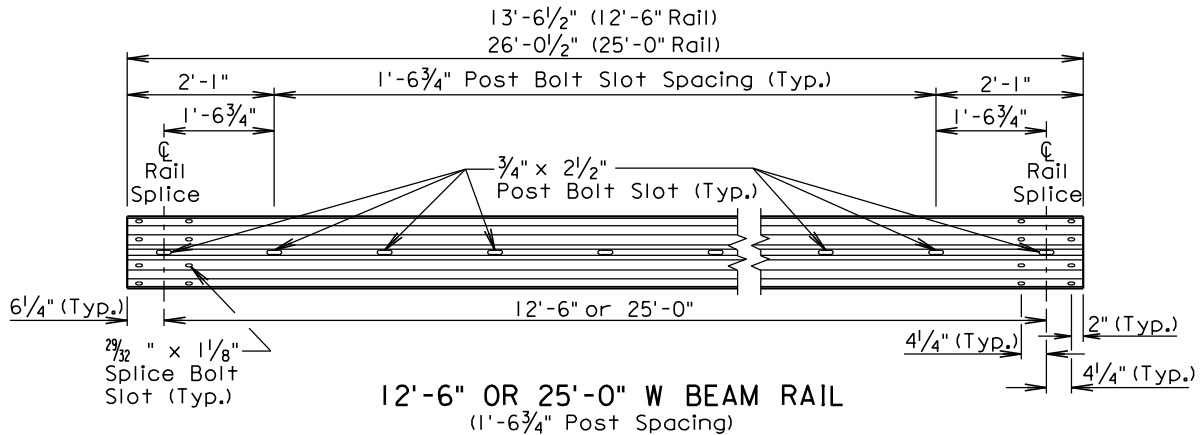
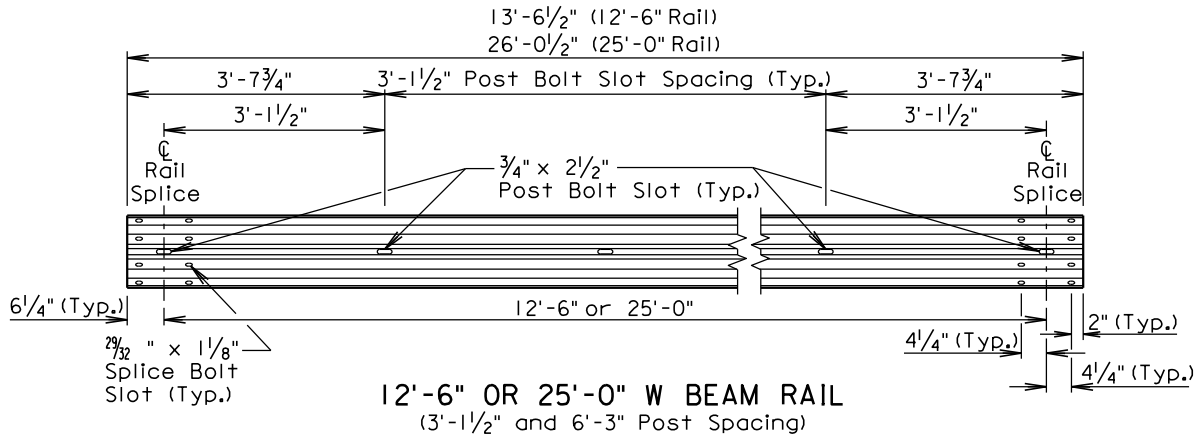
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**MIDWEST GUARDRAIL SYSTEM (MGS)**

**PLATE NUMBER**  
**630.20**

Sheet 4 of 6

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



September 14, 2017

*Published Date: 3rd Qtr. 2019*

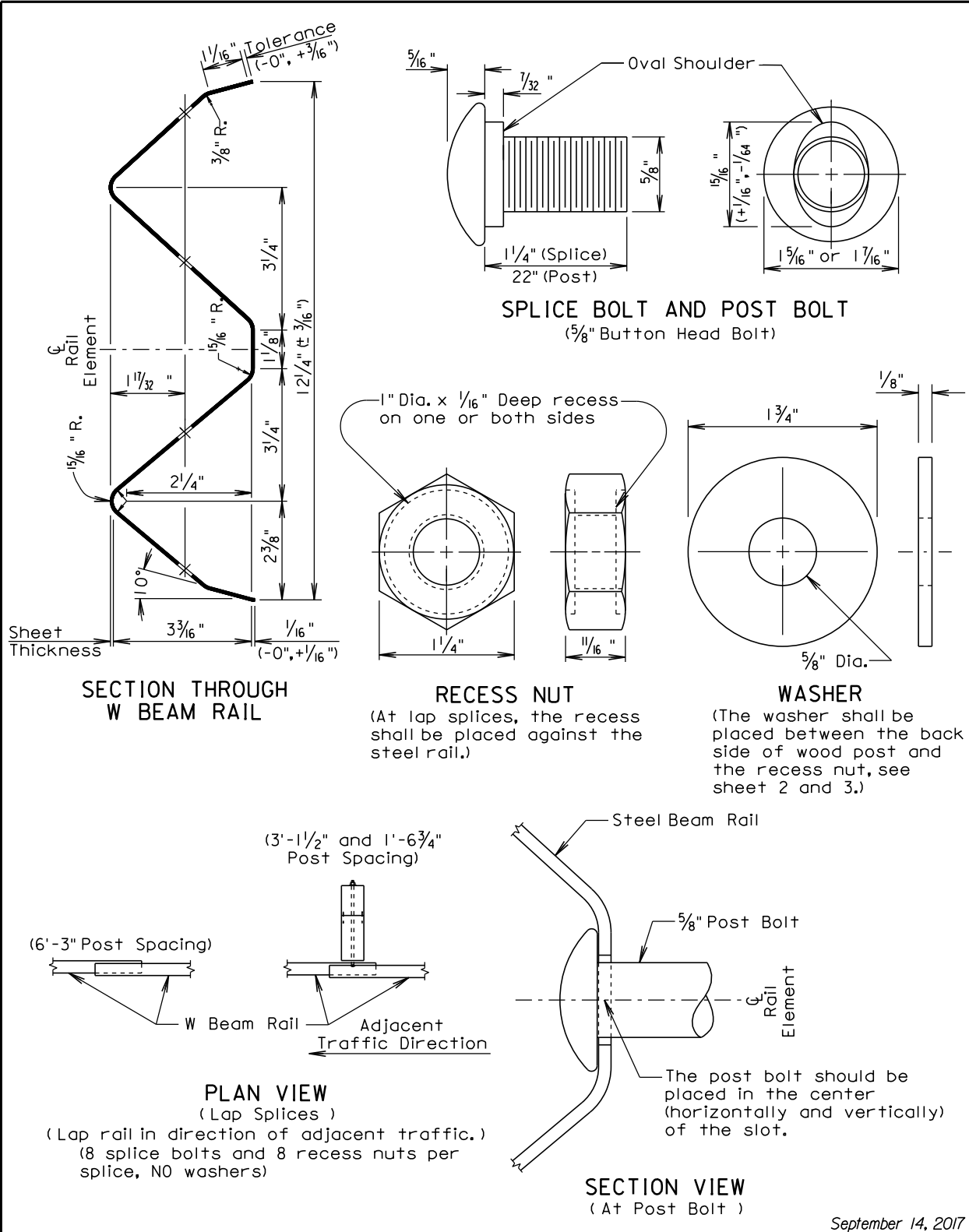
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**MIDWEST GUARDRAIL SYSTEM (MGS)**

**PLATE NUMBER  
630.20**

*Sheet 5 of 6*

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



September 14, 2017

Published Date: 3rd Qtr. 2019

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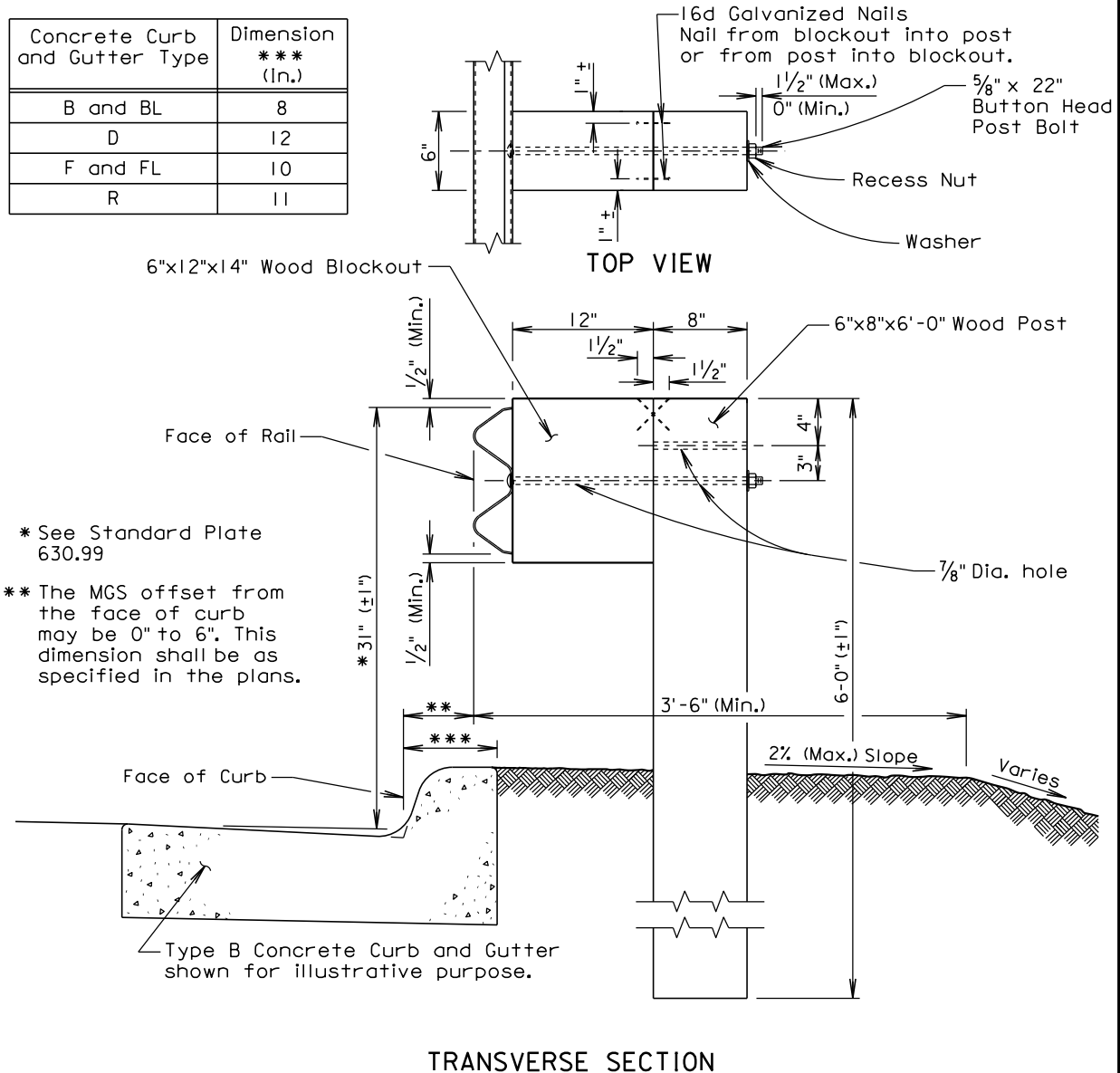
**MIDWEST GUARDRAIL SYSTEM (MGS)**

**PLATE NUMBER  
630.20**

Sheet 6 of 6

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**

Concrete Curb and Gutter Type	Dimension *** (In.)
B and BL	8
D	12
F and FL	10
R	11



**GENERAL NOTES:**

The guardrail on this standard plate is Type I MGS. See standard plate 630.20 for specifications regarding Type I MGS.

When PCC pavement or asphalt concrete pavement is adjacent to the post, see standard plate 630.96 for leave-out and backfill requirements.

February 14, 2017

*Published Date: 3rd Qtr. 2019*

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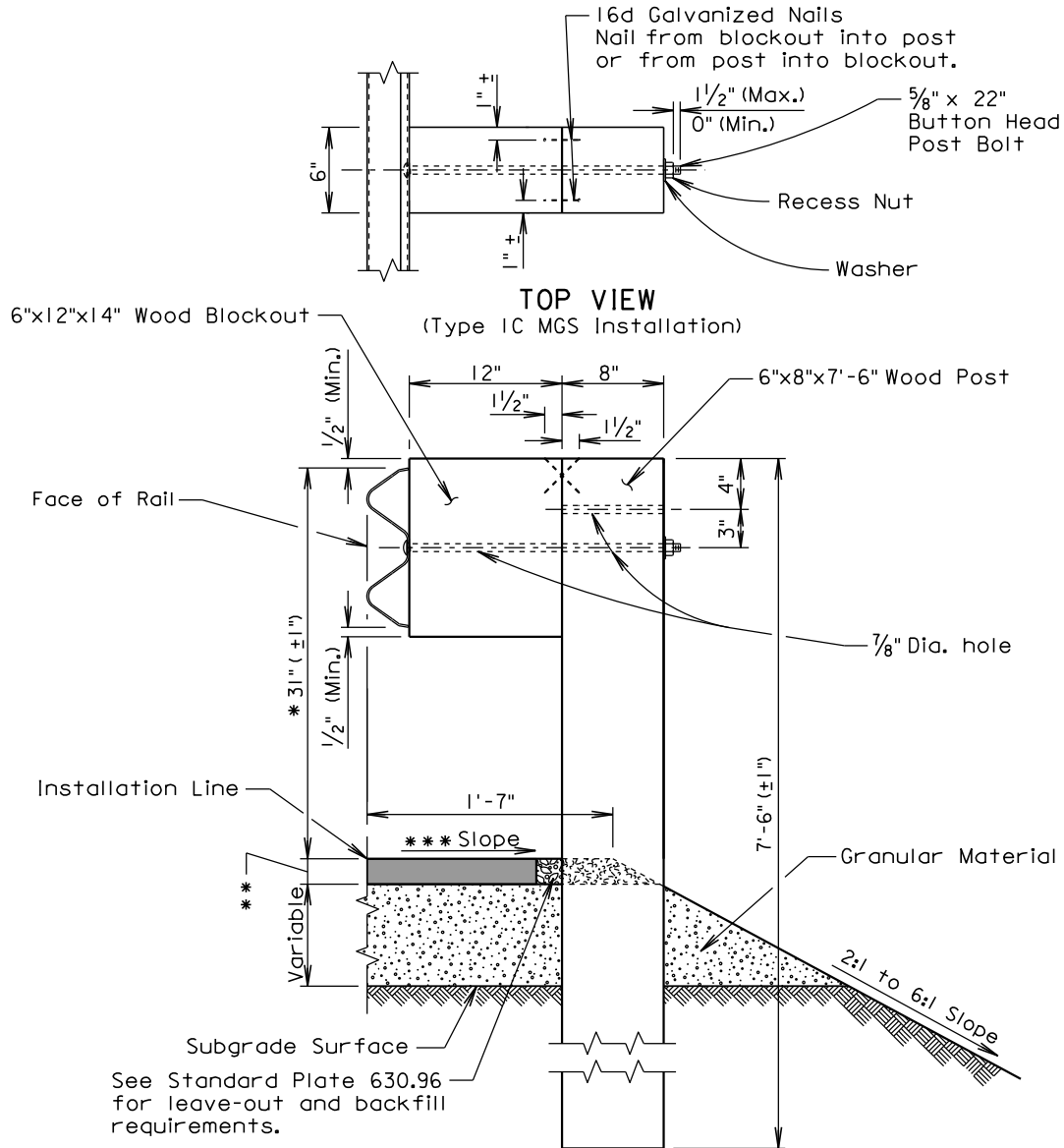
**MIDWEST GUARDRAIL SYSTEM (MGS)  
AT CURB AND GUTTER**

**PLATE NUMBER  
630.22**

*Sheet 1 of 1*



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



\*See Standard Plate 630.99

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

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

**GENERAL NOTES:**

The guardrail on this standard plate is Type IC MGS. See standard plate 630.20 for  
specifications regarding Type IC MGS.

Topsoil is not shown in the transverse section drawing.

February 14, 2017

*Published Date: 3rd Qtr. 2019*

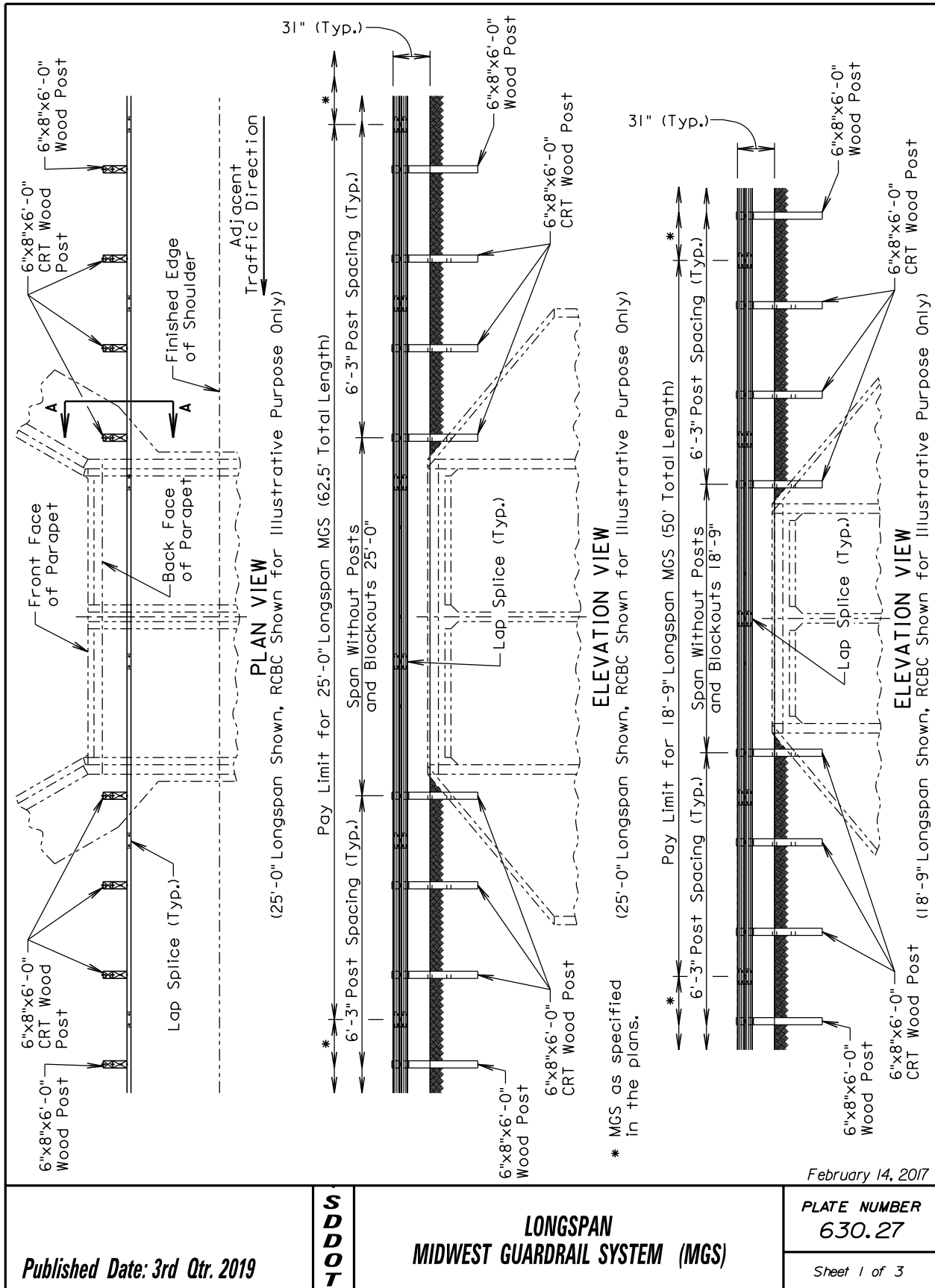
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**TYPE 1C MIDWEST GUARDRAIL SYSTEM (MGS)  
INSTALLATION AT BREAK POINT OF SLOPE**

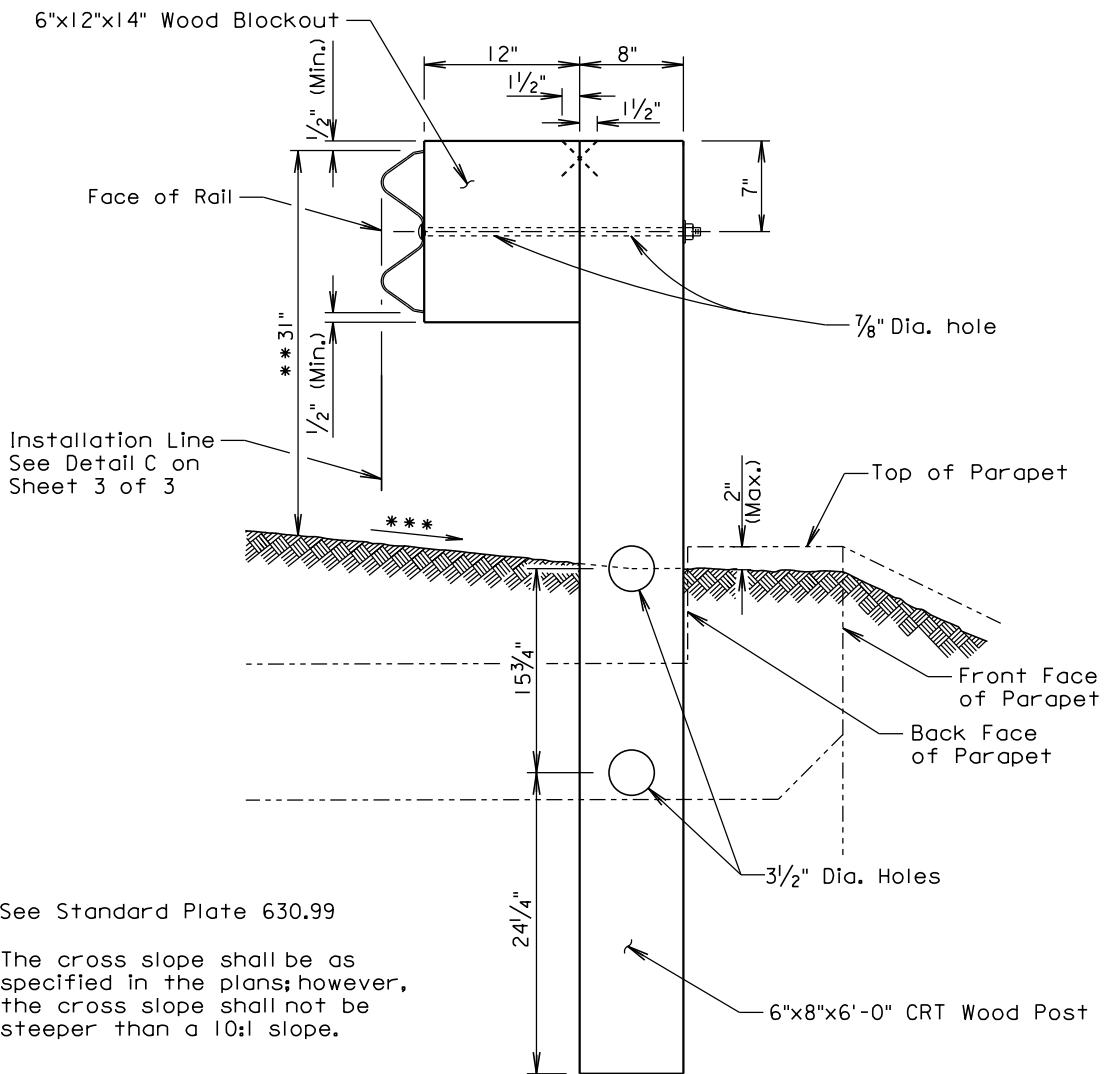
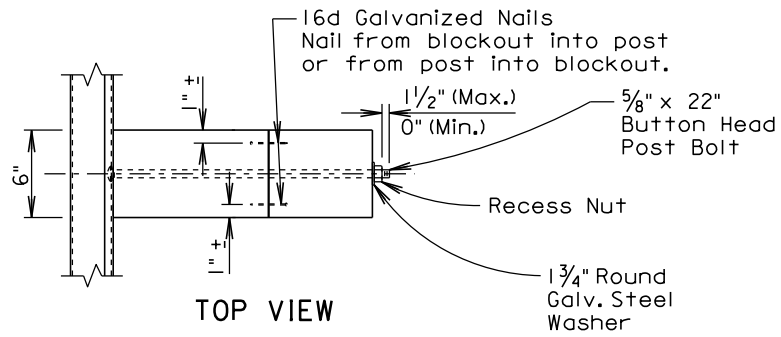
**PLATE NUMBER  
630.25**

*Sheet 1 of 1*

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**VIEW A-A**

(Longspan alignment is shown with the back of post aligned with the back face of parapet.)

February 14, 2017

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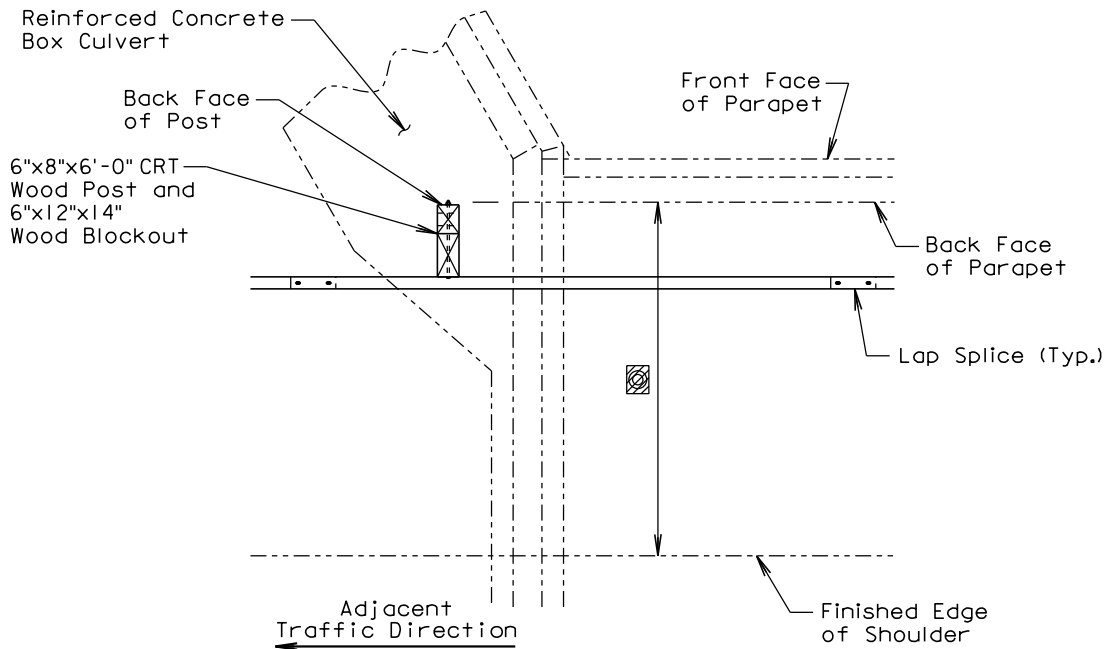
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**LONGSPAN  
MIDWEST GUARDRAIL SYSTEM (MGS)**

**PLATE NUMBER  
630.27**

Sheet 2 of 3

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**DETAIL C**

(Longspan alignment is shown with the back of post aligned with the back face of parapet)

- ☒ The MGS Longspan alignment shall be as specified in the plans; however, the allowable limits of lateral alignment shall be such that the back of post shall not encroach beyond the back face of the parapet and the front face of the guardrail shall not encroach onto the finished shoulder. For other types of culverts that do not have a parapet, the back of post lateral alignment shall be a minimum of 1 foot from the opening.

**GENERAL NOTES:**

See Standard Plate 630.20 for hardware details and specifications.

The span without posts shall be 25' or 18'-9" only, as shown on sheet 1 of 3.

All W beam rail shall be Type I 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 shall be compatible with the total length of rail per site as shown in the plans.

When PCC pavement or asphalt concrete pavement is adjacent to the post, see standard plate 630.96 for leave-out and backfill requirements.

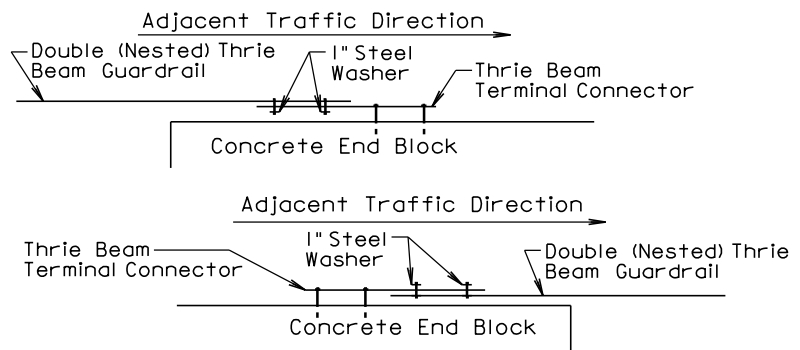
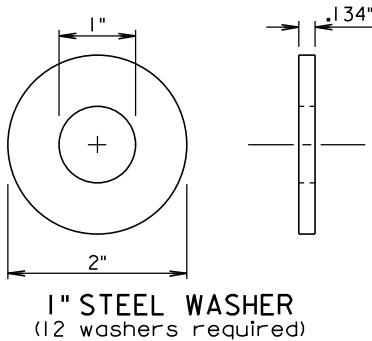
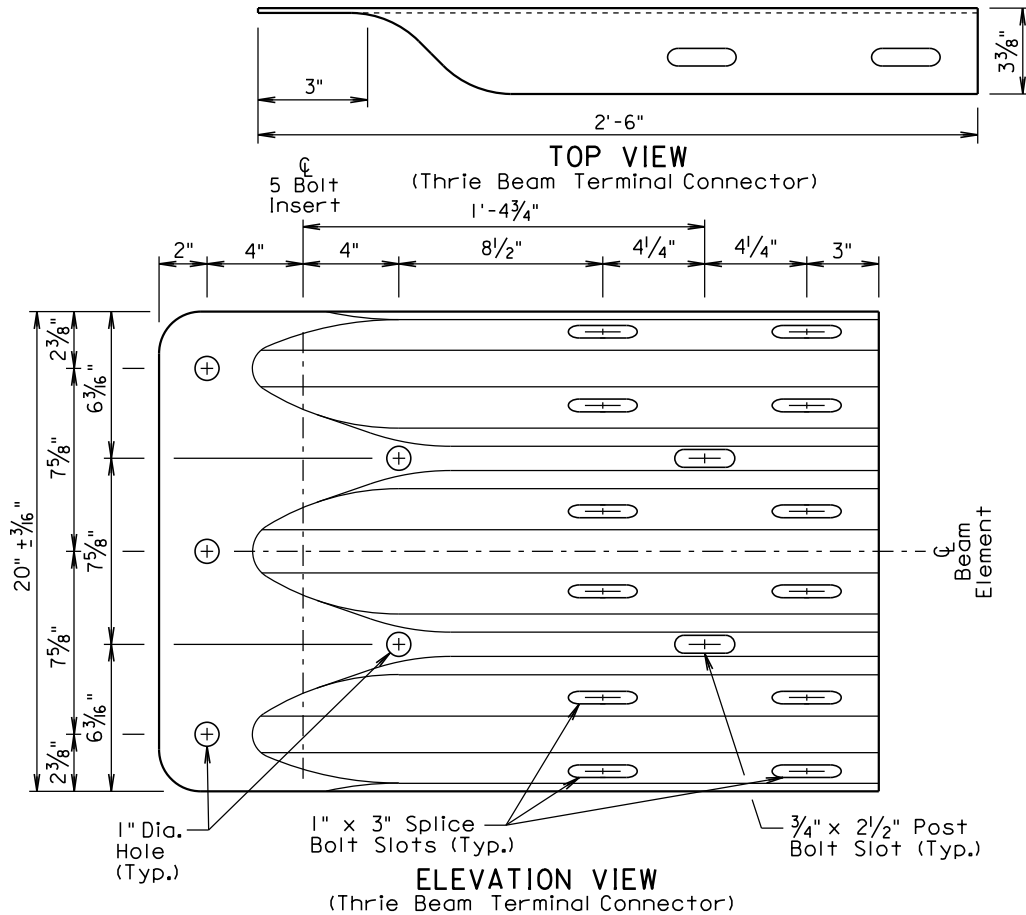
Slots in the rails shall be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges shall be smooth and free of burrs or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

All costs for constructing the Longspan MGS including labor, equipment, and materials including all posts, blockouts, steel beam rail, and hardware shall be incidental to the contract unit price per each for the corresponding Longspan MGS bid item.

February 14, 2017

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			Sheet 3 of 3

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**GENERAL NOTES:**

Thrie Beam Terminal Connectors shall be 10 gauge.

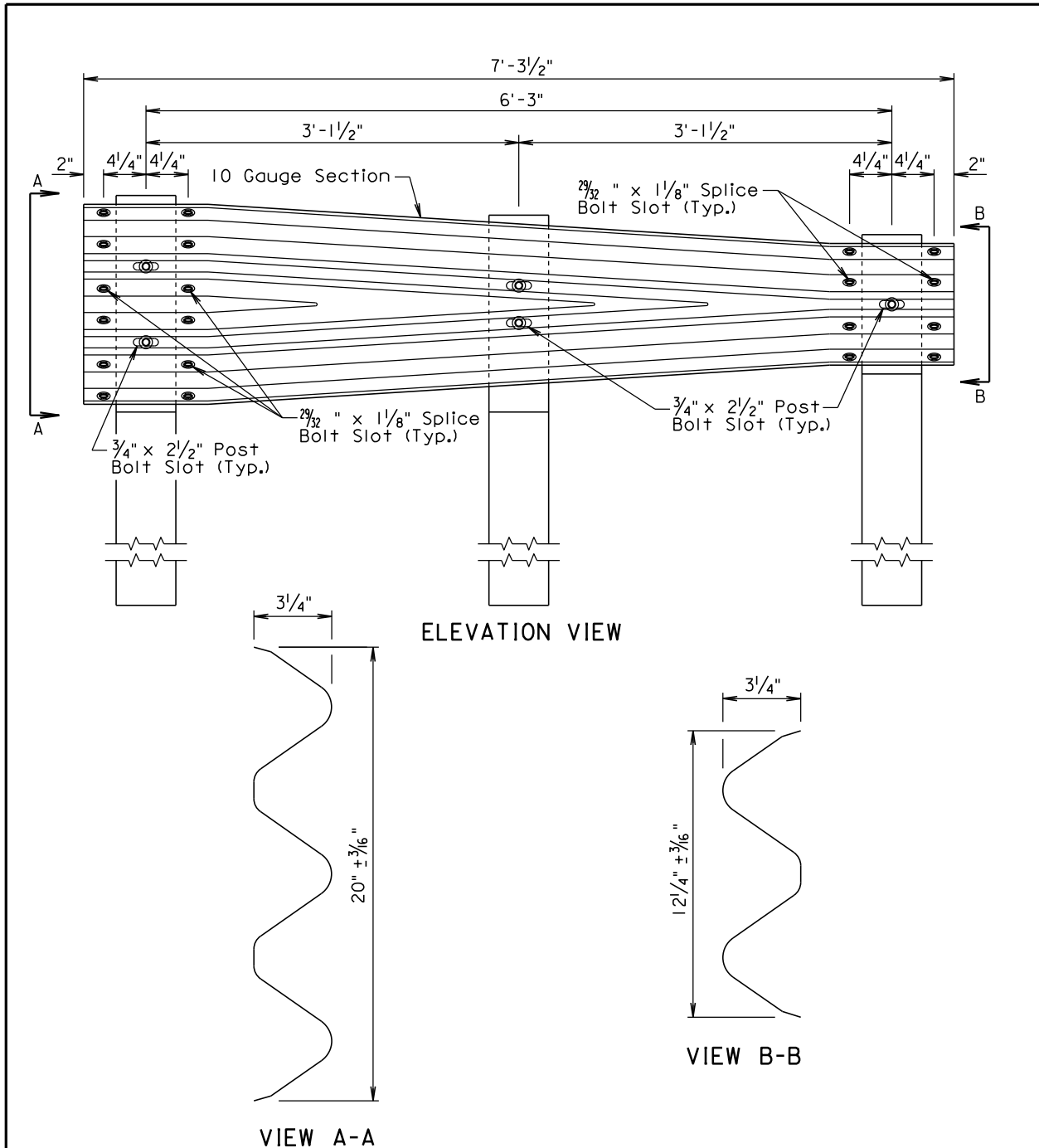
When the thrie beam terminal connector is used to connect the rail to the bridge or concrete end block, 1" steel washers shall be used at the lap splice and the washers shall be in direct contact with the 3" slots of the thrie beam terminal connector. See the drawings above for the typical locations of the 1" steel washers.

There will be no separate payment for furnishing and installing the thrie beam terminal connector. All costs for furnishing and installing the thrie beam terminal connector shall be incidental to the contract unit price of the respective guardrail item it is attached to.

February 14, 2017

Published Date: 3rd Qtr. 2019	S D D O T	THRIE BEAM TERMINAL CONNECTOR	PLATE NUMBER 630.47
			Sheet 1 of 1

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**GENERAL NOTES:**

All costs for furnishing and installing the W beam to thrie beam guardrail transition including labor, equipment, and materials including two posts, two blocks, W beam to thrie beam transition section, and hardware shall be incidental to the contract unit price per each for "W Beam to Thrie Beam Guardrail Transition".

February 14, 2017

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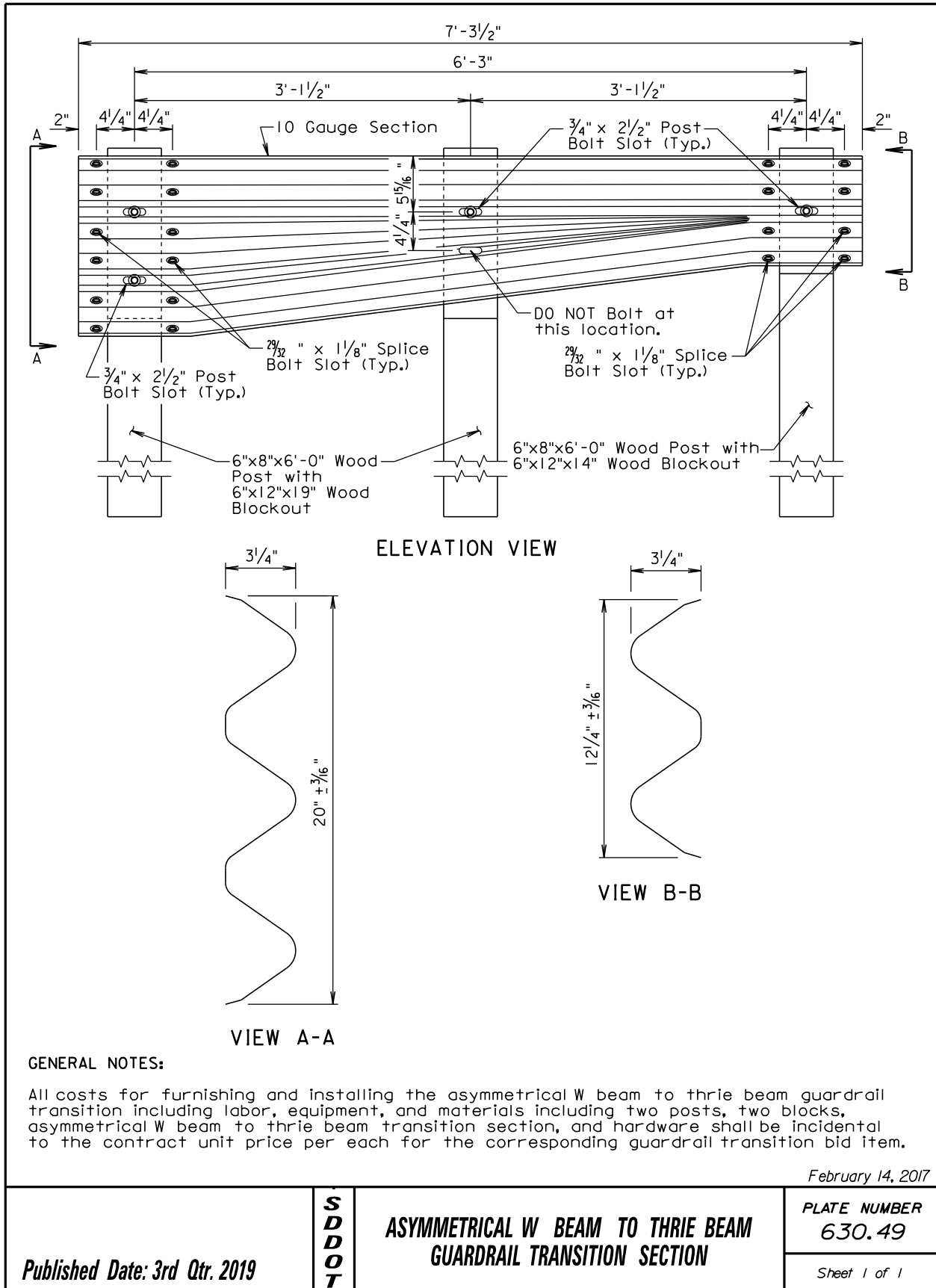
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**W BEAM TO THRIE BEAM  
GUARDRAIL TRANSITION SECTION**

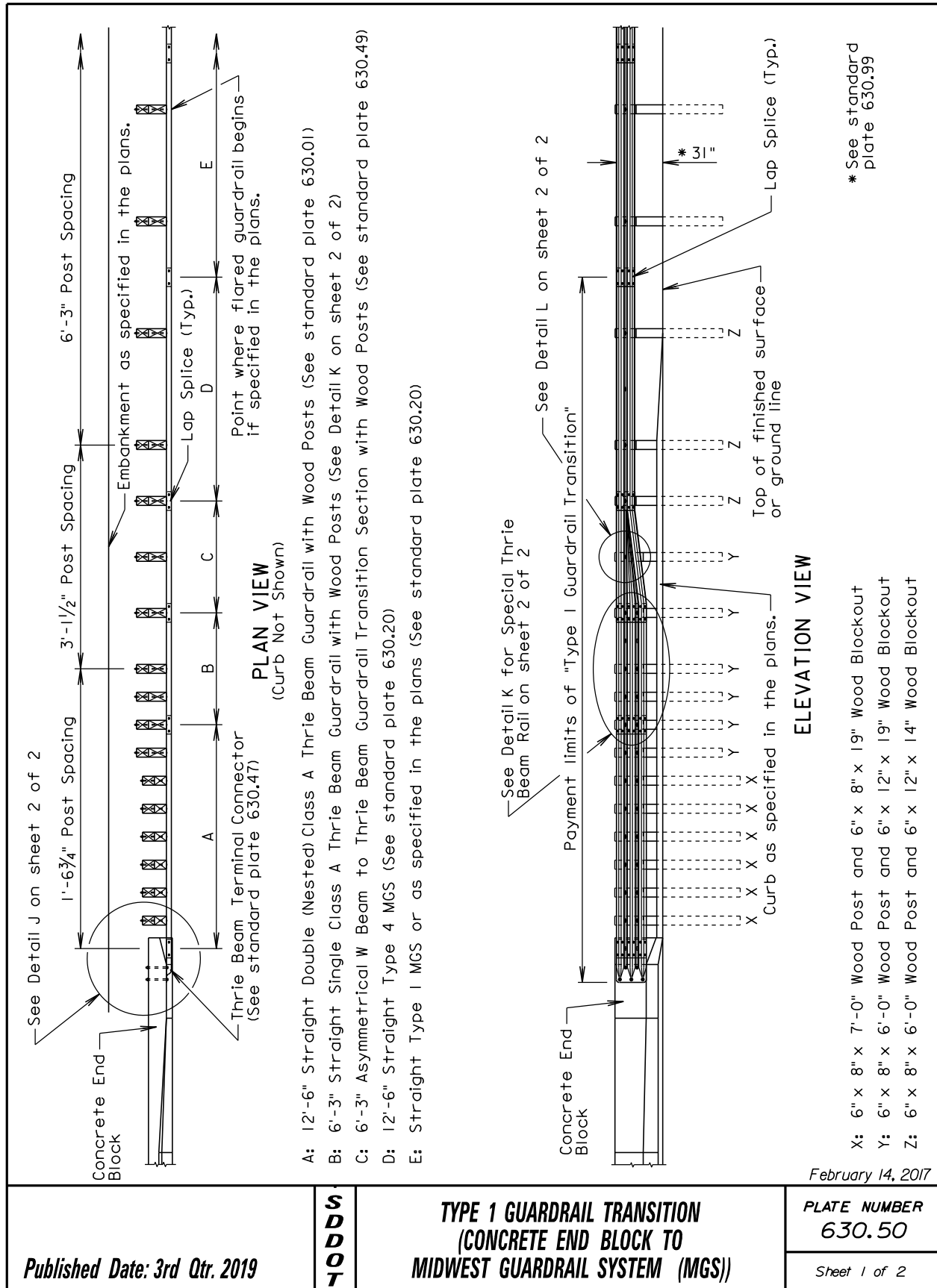
**PLATE NUMBER  
630.48**

*Sheet 1 of 1*

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



February 14, 2017

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**SDOT**

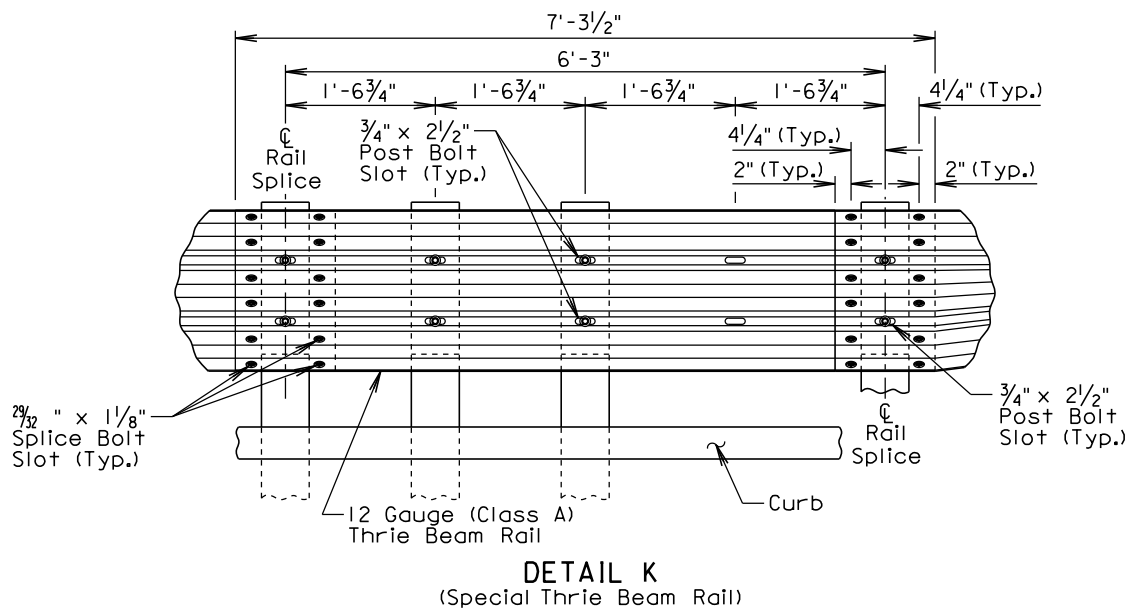
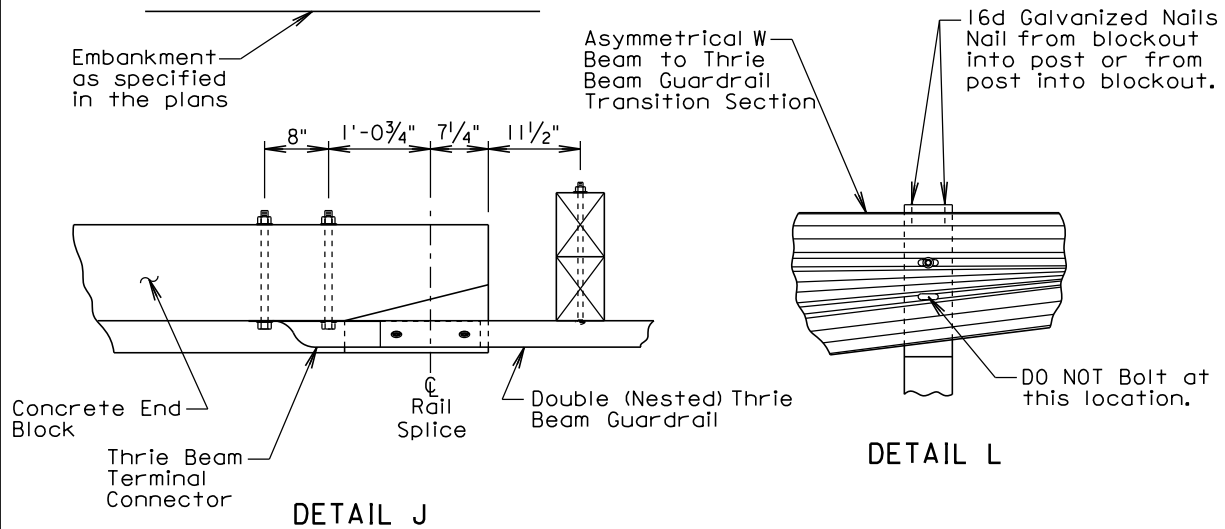
**TYPE 1 GUARDRAIL TRANSITION  
(CONCRETE END BLOCK TO  
MIDWEST GUARDRAIL SYSTEM (MGS))**

**PLATE NUMBER  
630.50**

Sheet 1 of 2



**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**GENERAL NOTES:**

Throughout the type I guardrail transition, slots in the rails shall 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 shall be smooth and free of burrs or notches.

All costs for furnishing and installing the type I guardrail transition including labor, equipment, and materials which includes all rail sections, posts and blockouts, hardware, and incidentals shall be included in the contract unit price per each for "Type I Guardrail Transition".

February 14, 2017

Published Date: 3rd Qtr. 2019

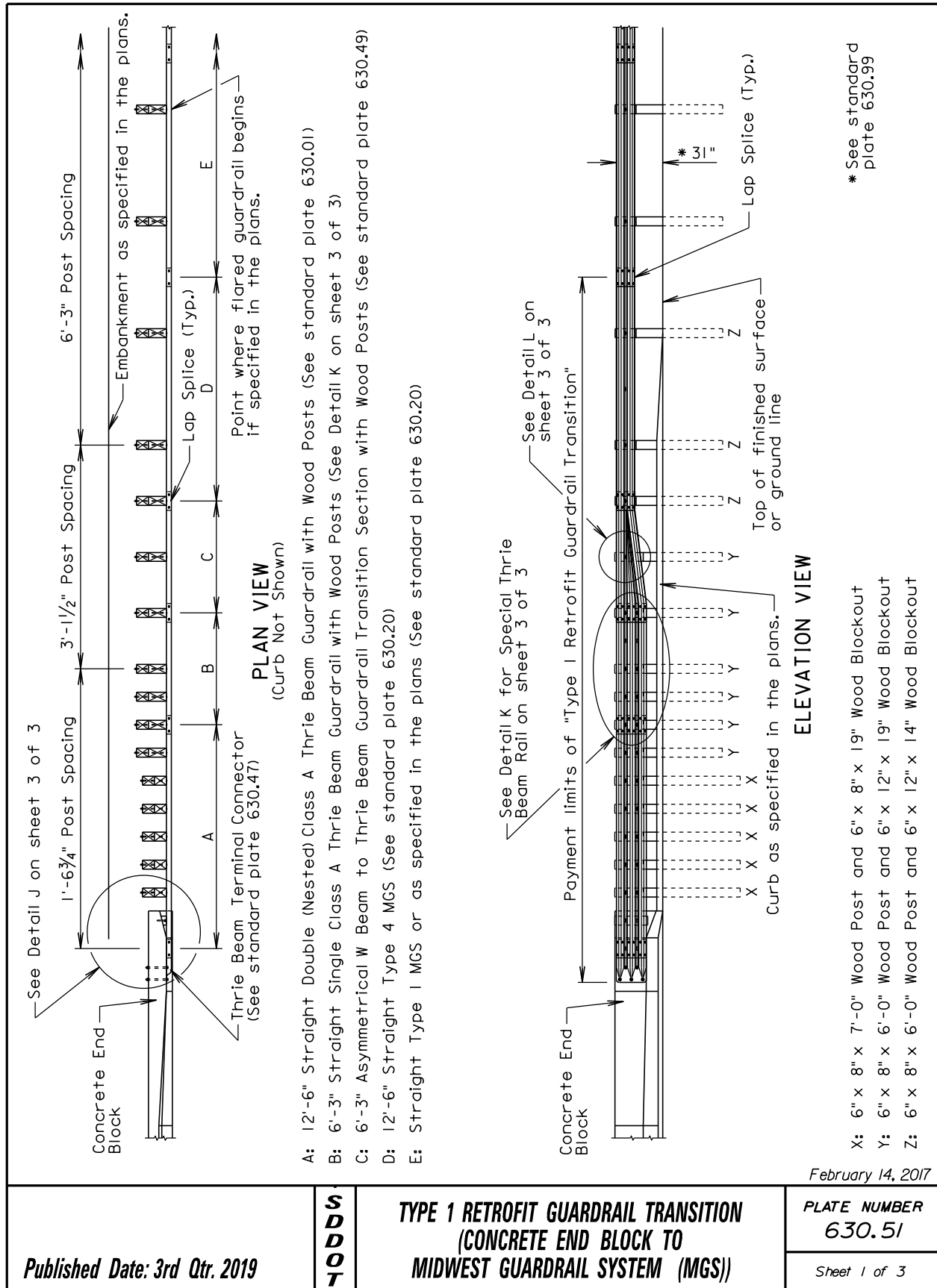
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**TYPE 1 GUARDRAIL TRANSITION  
(CONCRETE END BLOCK TO  
MIDWEST GUARDRAIL SYSTEM (MGS))**

**PLATE NUMBER  
630.50**

Sheet 2 of 2

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



February 14, 2017

Published Date: 3rd Qtr. 2019

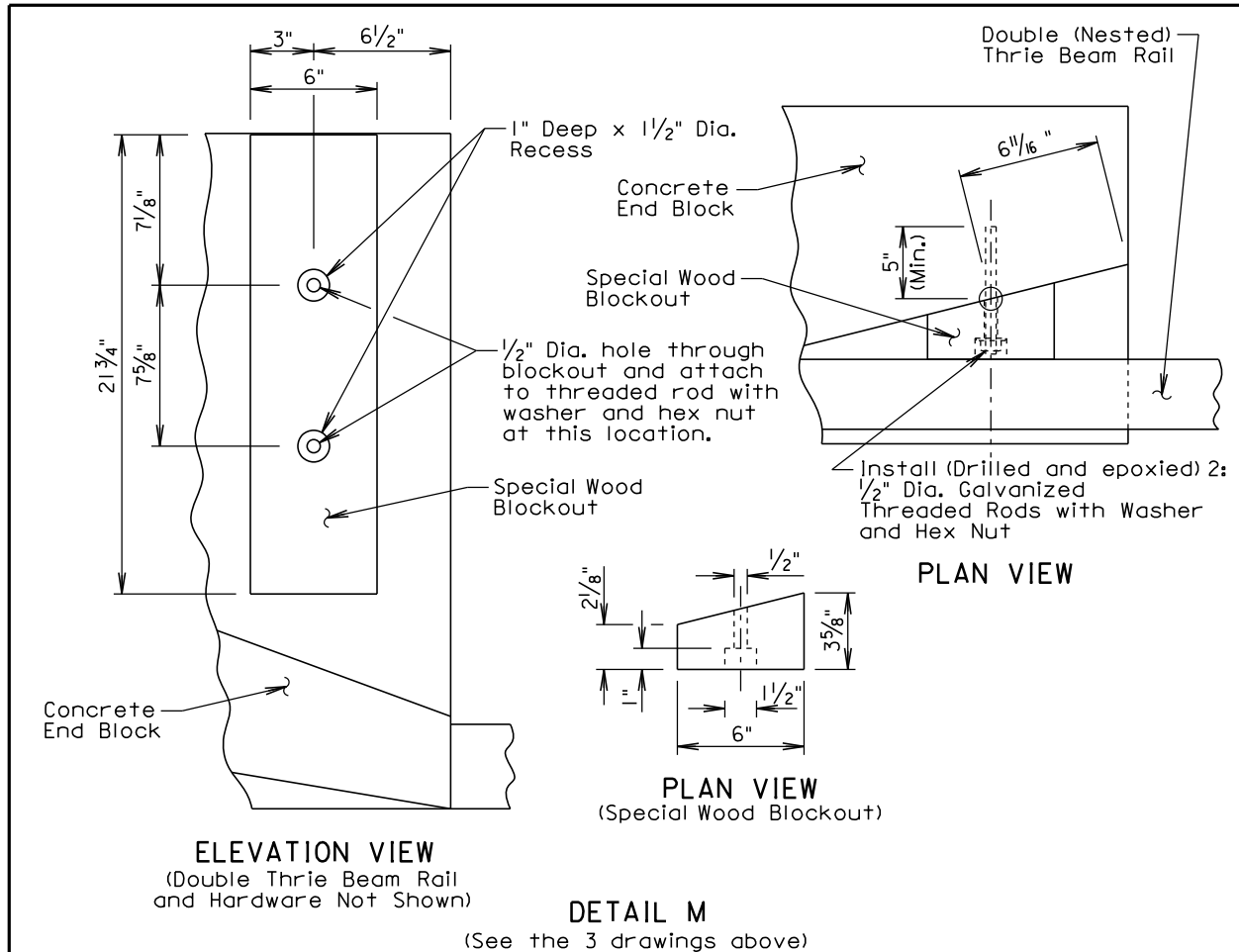
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**TYPE 1 RETROFIT GUARDRAIL TRANSITION  
(CONCRETE END BLOCK TO  
MIDWEST GUARDRAIL SYSTEM (MGS))**

**PLATE NUMBER  
630.51**

Sheet 1 of 3

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**GENERAL NOTES FOR INSTALLING THREADED RODS INTO CONCRETE:**

The special wood blockout may need to be installed at a different location than what is shown in Detail M as the in place concrete end block may not have been constructed to the exact dimensions. The blockout may be moved in the longitudinal (sideways) direction as necessary such that the blockout rests against the back of the double (nested) thrie beam rail and the rail is straight. The location shall be approved by the Engineer before installation of the blockout.

The threaded rods shall be 1/2" diameter and conform to ASTM F1554 Grade 55. The threaded rods shall be embedded a minimum of 5" into the concrete.

The diameter of the drilled holes shall not be less than 1/8" greater or more than 3/8" greater than the diameter of the threaded rods or as per the Manufacturer's recommendations. The holes shall not be drilled using core bits. The drilled holes shall be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to the epoxy injection.

The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).

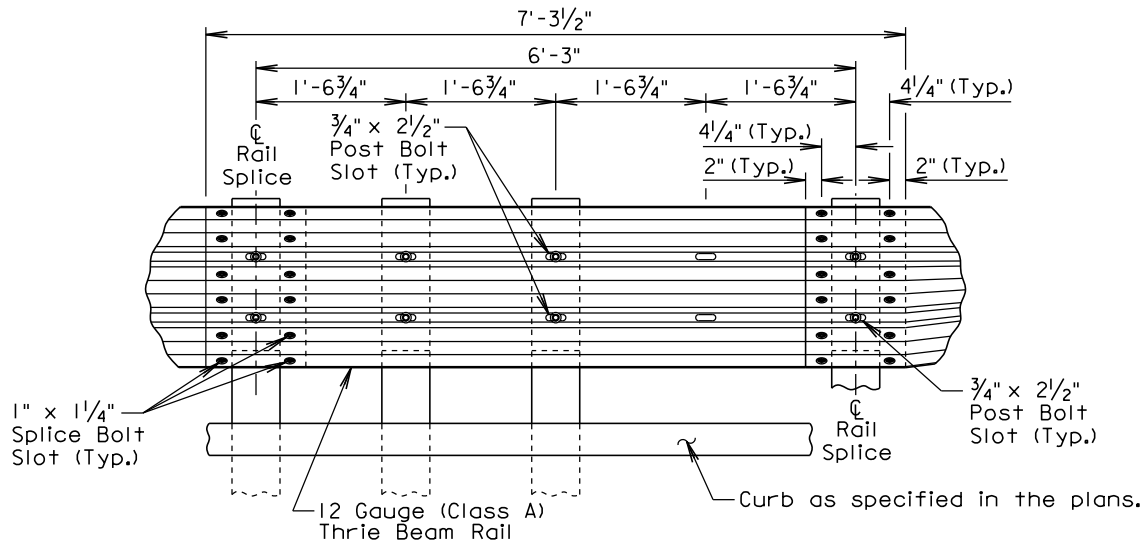
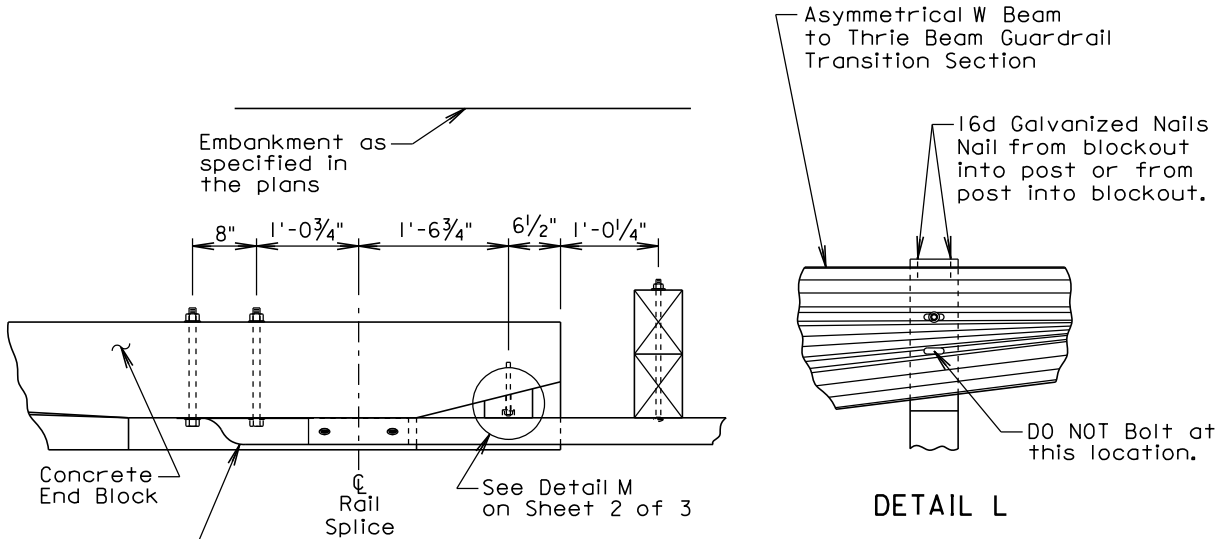
Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel rod. Rotate the steel rod during installation to eliminate voids and ensure complete bonding of the rod. Insertion of the rods by the dipping or painting methods will not be allowed.

Loads shall not be applied to the epoxy grouted threaded rods until the epoxy resin has had sufficient time to cure as specified by the epoxy resin Manufacturer.

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Published Date: 3rd Qtr. 2019	S D D O T	<b>TYPE 1 RETROFIT GUARDRAIL TRANSITION (CONCRETE END BLOCK TO MIDWEST GUARDRAIL SYSTEM (MGS))</b>	<b>PLATE NUMBER</b> <b>630.51</b>
			Sheet 2 of 3

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**DETAIL K**  
(Special Thrie Beam Rail)

**GENERAL NOTES:**

Throughout the type I retrofit guardrail transition, slots in the rails shall 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 shall be smooth and free of burrs or notches.

All costs for furnishing and installing the type I retrofit guardrail transition including labor, equipment, and materials which includes all rail sections, posts and blockouts, special blackout, hardware, and incidentals shall be included in the contract unit price per each for "Type I Retrofit Guardrail Transition".

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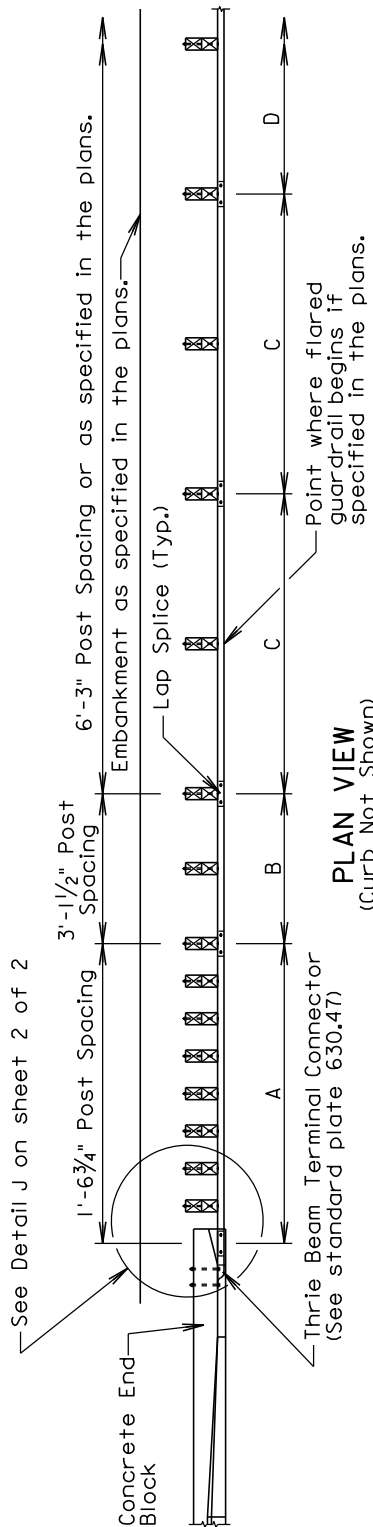
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**TYPE 1 RETROFIT GUARDRAIL TRANSITION  
(CONCRETE END BLOCK TO  
MIDWEST GUARDRAIL SYSTEM (MGS))**

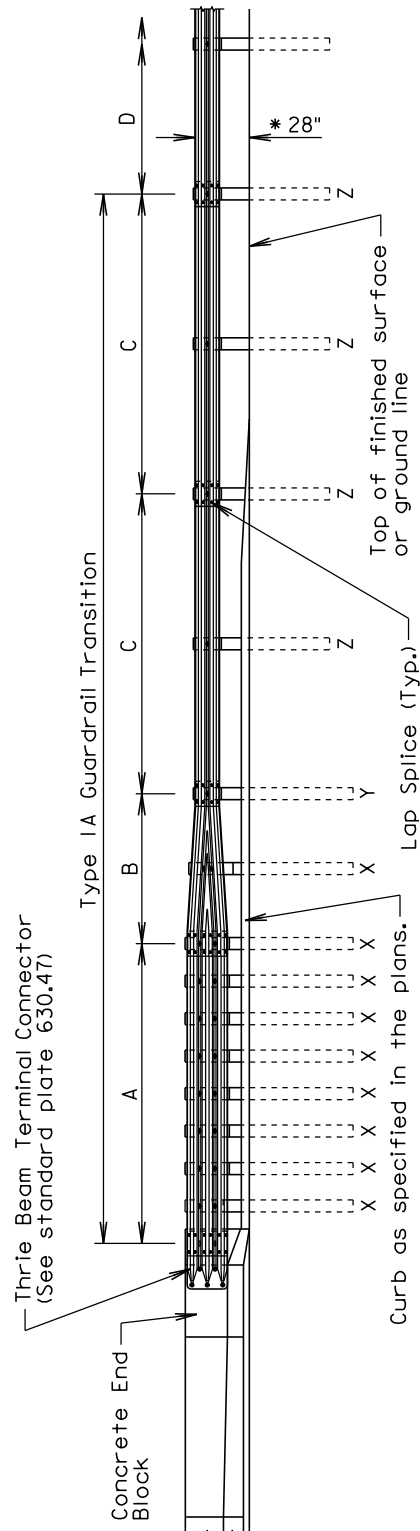
**PLATE NUMBER  
630.51**

Sheet 3 of 3

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



- PLAN VIEW**  
(Curb Not Shown)
- A: 12'-6" Straight Double (Nested) Class A Thrie Beam Guardrail with Wood Posts (See standard plate 630.01)  
B: 6'-3" W Beam to Thrie Beam Guardrail Transition Section with Wood Posts (See standard plate 630.48)  
C: 12'-6" Straight Class A W Beam Guardrail with Wood Posts (See standard plate 630.10) or as specified in the plans.  
D: Guardrail as specified in the plans.



**ELEVATION VIEW**

- X: 6" x 8" x 7'-0" Wood Post and 6" x 8" x 21 3/4" Wood Blockout  
Y: 6" x 8" x 7'-0" Wood Post and 6" x 8" x 14" Wood Blockout  
Z: 6" x 8" x 6'-0" Wood Post and 6" x 8" x 14" Wood Blockout
- \* See standard plate 630.99

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Published Date: 3rd Qtr. 2019

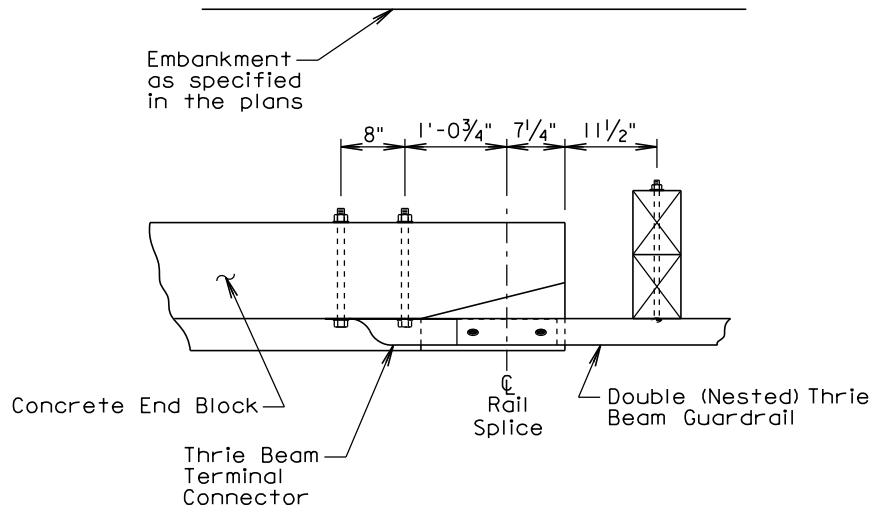
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**TYPE 1A GUARDRAIL TRANSITION  
(CONCRETE END BLOCK TO  
W BEAM GUARDRAIL)**

PLATE NUMBER  
**630.52**

Sheet 1 of 2

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**DETAIL J**

**GENERAL NOTES:**

Throughout the type 1A guardrail transition, slots in the rails shall 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 shall be smooth and free of burrs or notches.

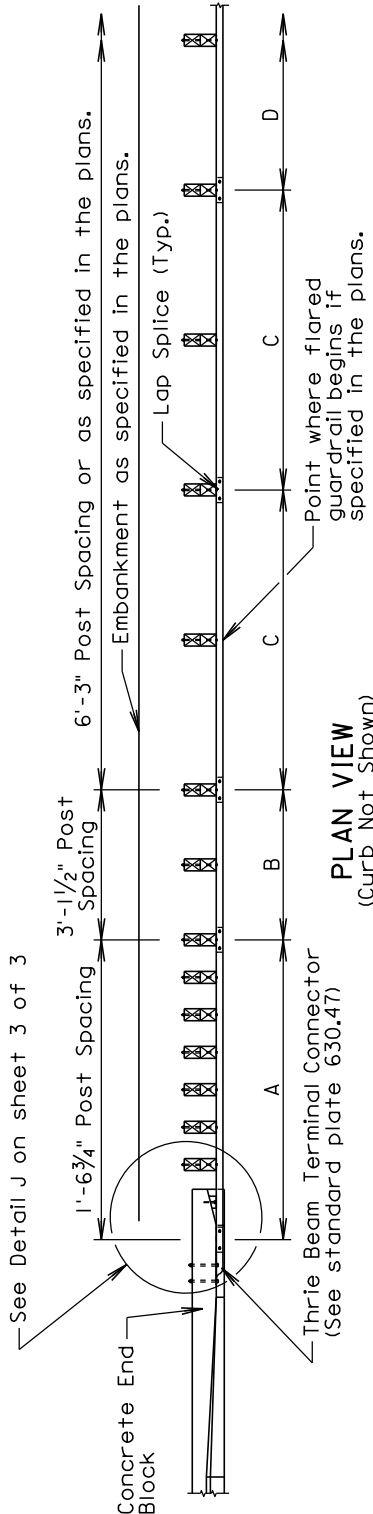
All costs for furnishing and installing the straight double class A thrie beam guardrail including labor, equipment, and materials including the thrie beam rails, posts, blockouts, thrie beam terminal connector, and hardware shall be incidental to the contract unit price per foot for "Straight Double Class A Thrie Beam Guardrail with Wood Posts".

All costs for furnishing and installing the type 1A guardrail transition including labor, equipment, and materials shall be included in the contract unit price for the respective guardrail bid items.

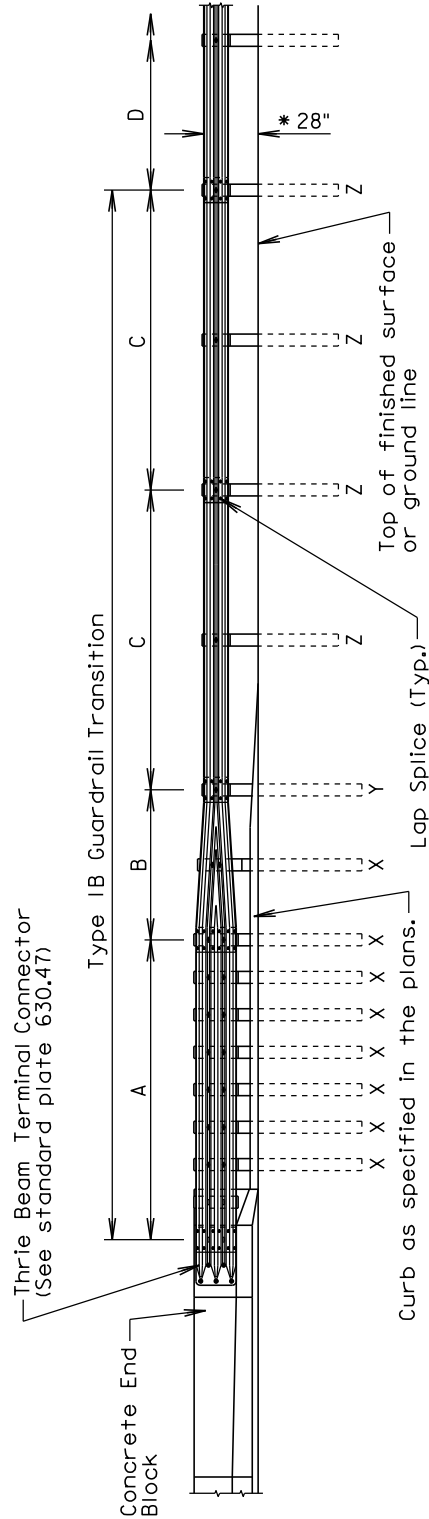
February 14, 2017

Published Date: 3rd Qtr. 2019	<b>S D D O T</b>	<b>TYPE 1A GUARDRAIL TRANSITION (CONCRETE END BLOCK TO W BEAM GUARDRAIL)</b>	<b>PLATE NUMBER</b> 630.52
			Sheet 2 of 2

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



- PLAN VIEW**  
(Curb Not Shown)
- A: 12'-6" Straight Double (Nested) Class A Thrie Beam Guardrail with Wood Posts (See standard plate 630.01)
  - B: 6'-3" W Beam to Thrie Beam Guardrail Transition Section with Wood Posts (See standard plate 630.48)
  - C: 12'-6" Straight Class A W Beam Guardrail with Wood Posts (See standard plate 630.10) or as specified in the plans.
  - D: Guardrail as specified in the plans.



**ELEVATION VIEW**

- X: 6" x 8" x 7'-0" Wood Post and 6" x 8" x 2 3/4" Wood Blockout
- Y: 6" x 8" x 7'-0" Wood Post and 6" x 8" x 14" Wood Blockout
- Z: 6" x 8" x 6'-0" Wood Post and 6" x 8" x 14" Wood Blockout

\* See standard plate 630.99

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Published Date: 3rd Qtr. 2019

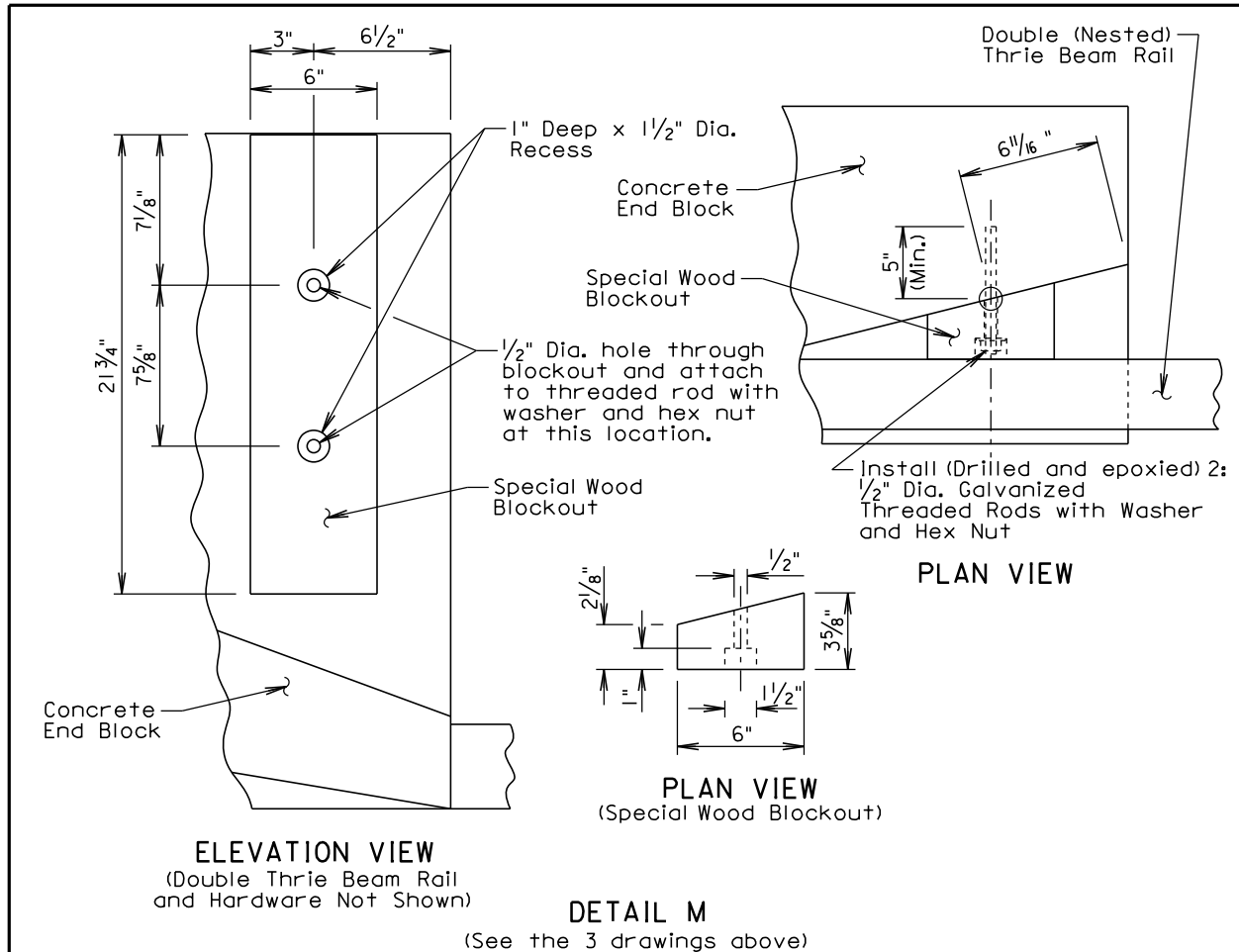
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**TYPE 1B GUARDRAIL TRANSITION  
(CONCRETE END BLOCK TO  
W BEAM GUARDRAIL)**

**PLATE NUMBER  
630.53**

Sheet 1 of 3

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**GENERAL NOTES FOR INSTALLING THREADED RODS INTO CONCRETE:**

The special wood blackout may need to be installed at a different location than what is shown in Detail M as the in place concrete end block may not have been constructed to the exact dimensions. The blackout may be moved in the longitudinal (sideways) direction as necessary such that the blackout rests against the back of the double (nested) thrie beam rail and the rail is straight. The location shall be approved by the Engineer before installation of the blackout.

The threaded rods shall be 1/2" diameter and conform to ASTM F1554 Grade 55. The threaded rods shall be embedded a minimum of 5" into the concrete.

The diameter of the drilled holes shall not be less than 1/8" greater or more than 3/8" greater than the diameter of the threaded rods or as per the Manufacturer's recommendations. The holes shall not be drilled using core bits. The drilled holes shall be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to the epoxy injection.

The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).

Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel rod. Rotate the steel rod during installation to eliminate voids and ensure complete bonding of the rod. Insertion of the rods by the dipping or painting methods will not be allowed.

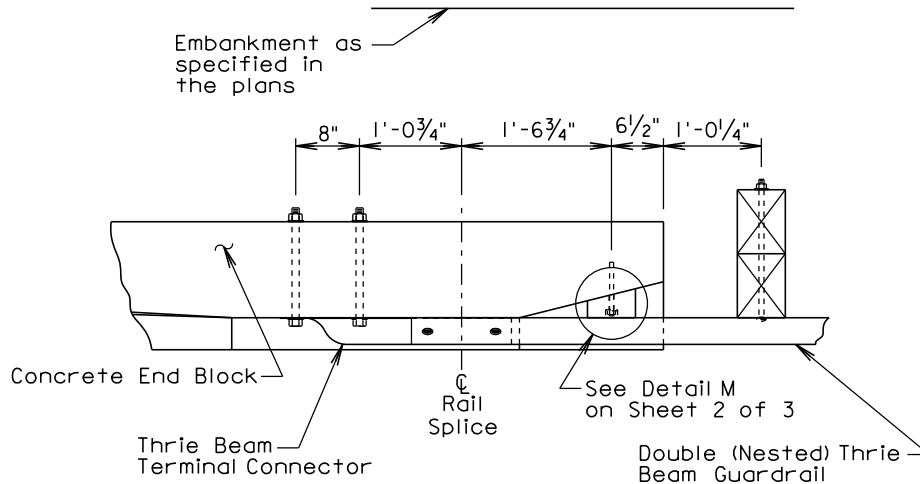
Loads shall not be applied to the epoxy grouted threaded rods until the epoxy resin has had sufficient time to cure as specified by the epoxy resin Manufacturer.

February 14, 2017

Published Date: 3rd Qtr. 2019	S D D O T	TYPE 1B GUARDRAIL TRANSITION (CONCRETE END BLOCK TO W BEAM GUARDRAIL)	PLATE NUMBER 630.53
			Sheet 2 of 3



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**DETAIL J**

**GENERAL NOTES:**

Throughout the type 1B guardrail transition, slots in the rails shall 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 shall be smooth and free of burrs or notches.

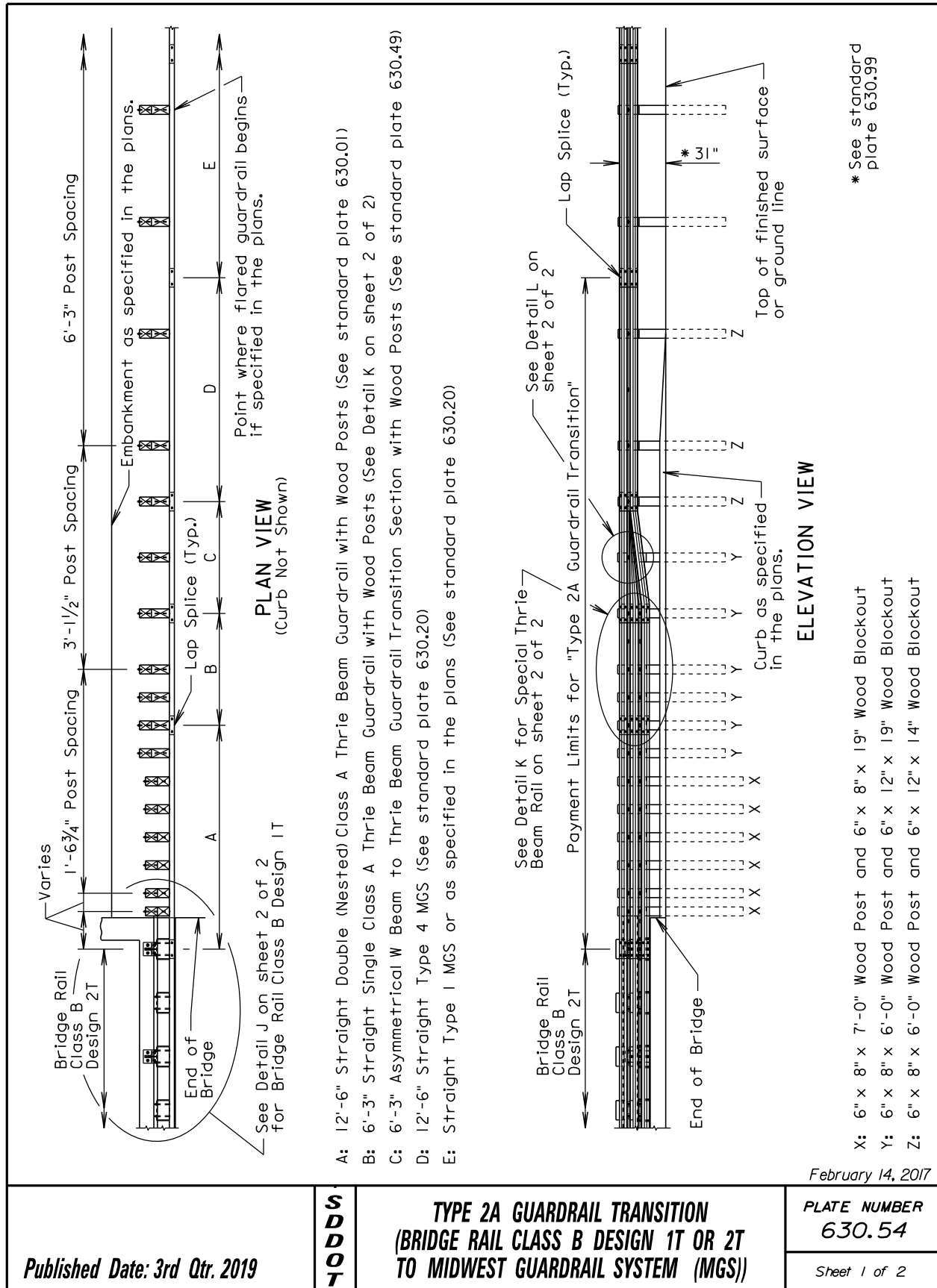
All costs for furnishing and installing the straight double class A thrie beam guardrail including labor, equipment, and materials including the thrie beam rails, posts, blockouts, special blockout, thrie beam terminal connector, and hardware shall be incidental to the contract unit price per foot for "Straight Double Class A Thrie Beam Guardrail with Wood Posts".

All costs for furnishing and installing the type 1B guardrail transition including labor, equipment, and materials shall be included in the contract unit price for the respective guardrail bid items.

February 14, 2017

Published Date: 3rd Qtr. 2019	<b>S D D O T</b>	<b>TYPE 1B GUARDRAIL TRANSITION (CONCRETE END BLOCK TO W BEAM GUARDRAIL)</b>	<b>PLATE NUMBER</b> <b>630.53</b>
			Sheet 3 of 3

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



Published Date: 3rd Qtr. 2019

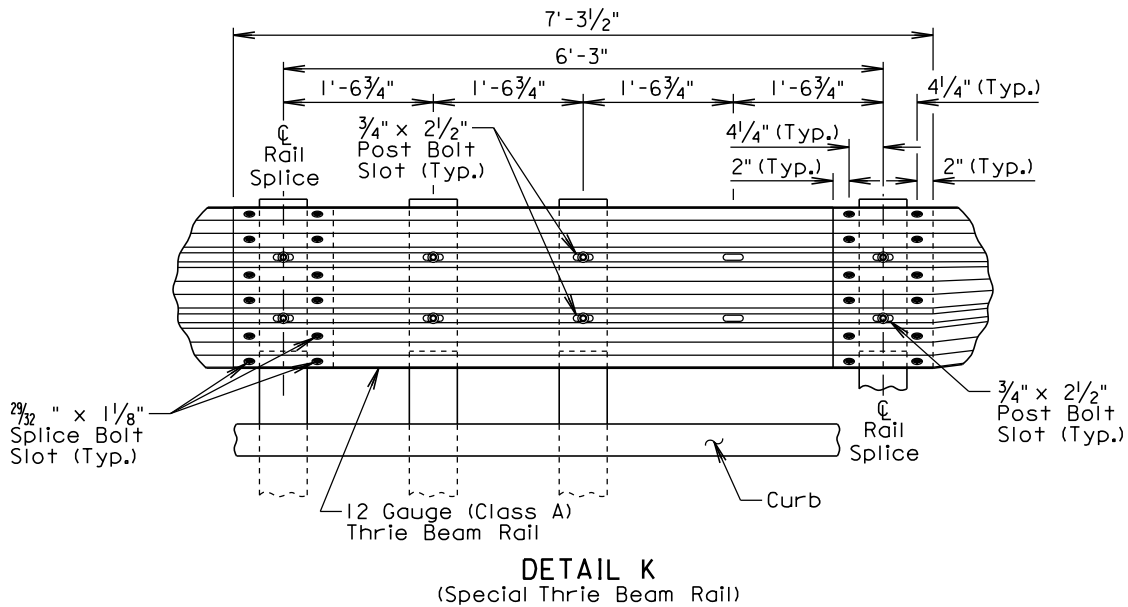
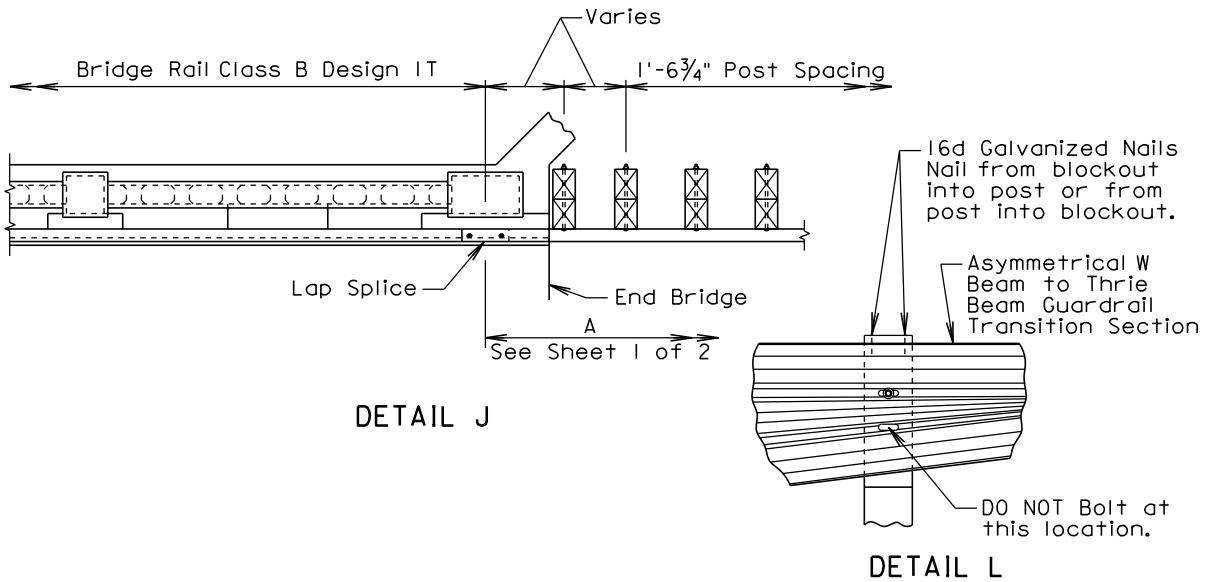
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**TYPE 2A GUARDRAIL TRANSITION  
(BRIDGE RAIL CLASS B DESIGN 1T OR 2T  
TO MIDWEST GUARDRAIL SYSTEM (MGS))**

**PLATE NUMBER  
630.54**

Sheet 1 of 2

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**GENERAL NOTES:**

Throughout the type 2A guardrail transition, slots in the rails shall 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 shall be smooth and free of burrs or notches.

All costs for furnishing and installing the type 2A guardrail transition including labor, equipment, and materials which includes all rail sections, posts and blockouts, hardware, and incidentals shall be included in the contract unit price per each for "Type 2A Guardrail Transition".

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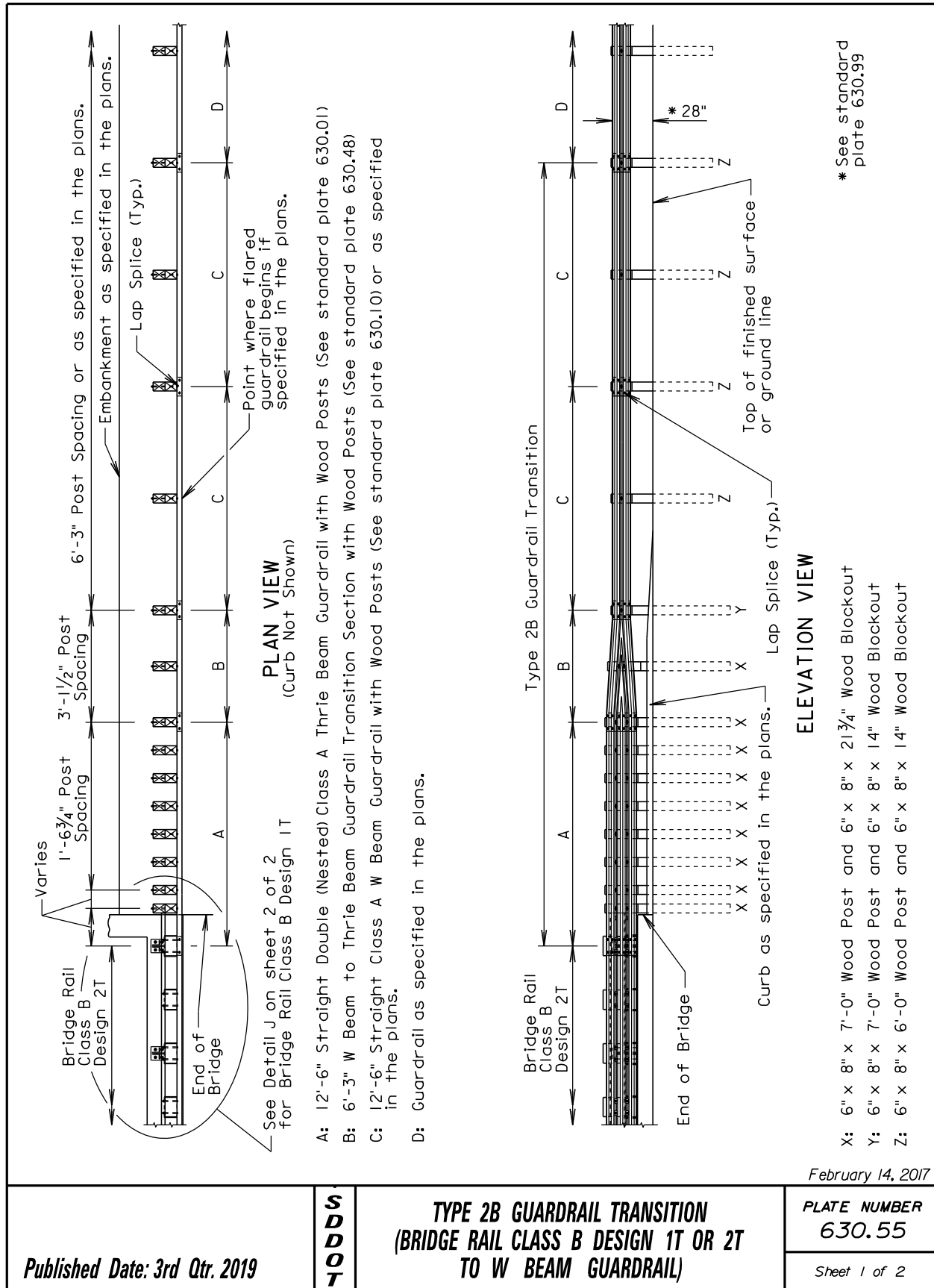
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**TYPE 2A GUARDRAIL TRANSITION  
(BRIDGE RAIL CLASS B DESIGN 1T OR 2T  
TO MIDWEST GUARDRAIL SYSTEM (MGS))**

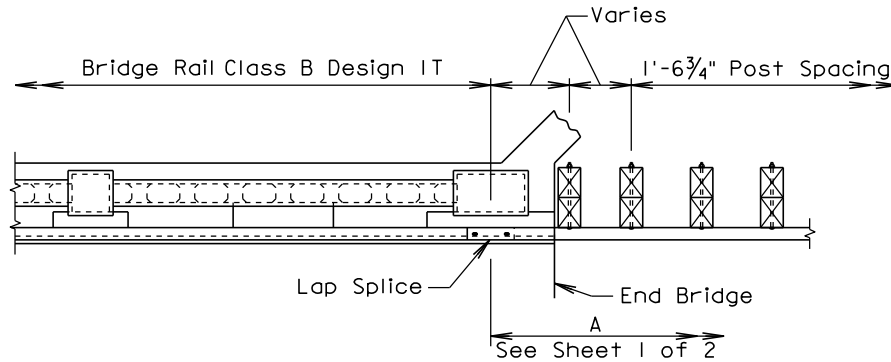
**PLATE NUMBER  
630.54**

*Sheet 2 of 2*

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**DETAIL J**

**GENERAL NOTES:**

Throughout the type 2B guardrail transition, slots in the rails shall 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 shall be smooth and free of burrs or notches.

All costs for furnishing and installing the type 2B guardrail transition including labor, equipment, and materials shall be included in the contract unit price for the respective guardrail bid items.

*February 14, 2017*

*Published Date: 3rd Qtr. 2019*

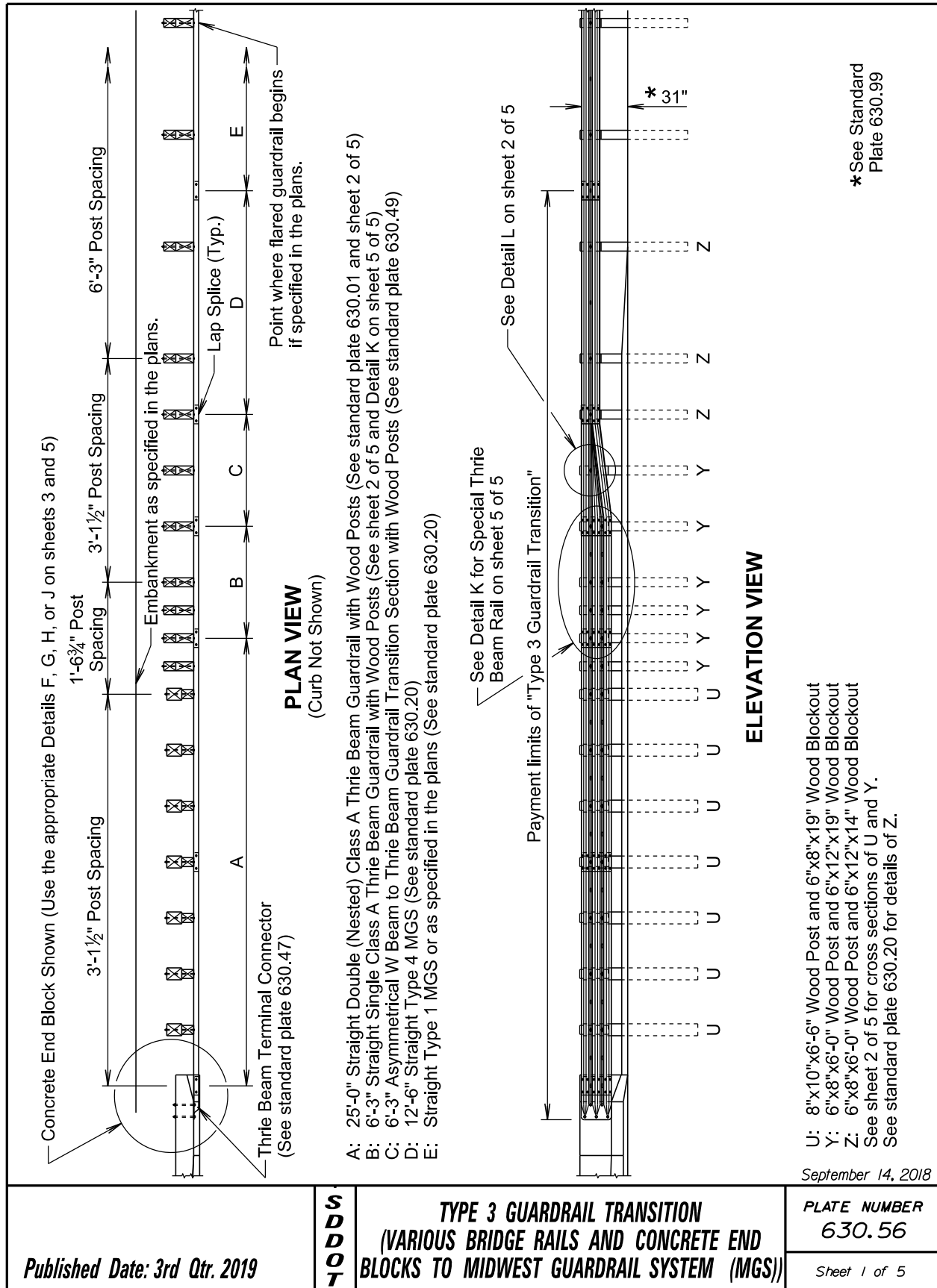
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**TYPE 2B GUARDRAIL TRANSITION  
(BRIDGE RAIL CLASS B DESIGN 1T OR 2T  
TO W BEAM GUARDRAIL)**

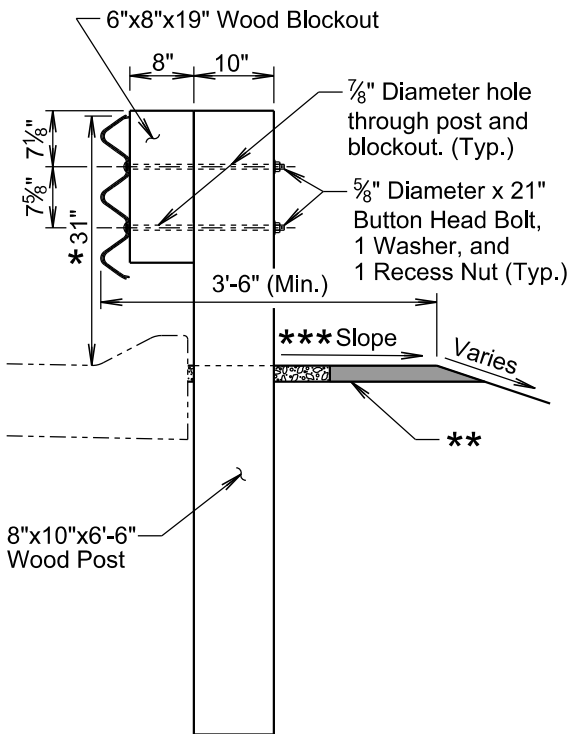
**PLATE NUMBER  
630.55**

*Sheet 2 of 2*

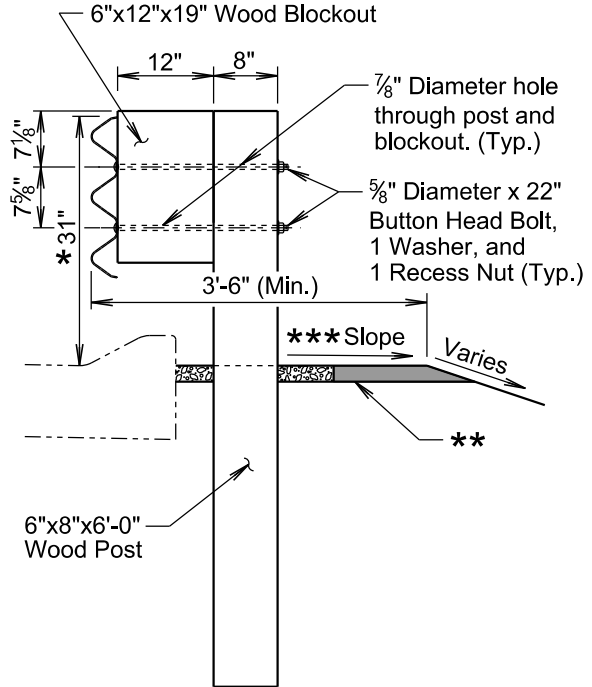
**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**CROSS SECTION**  
(Post U)

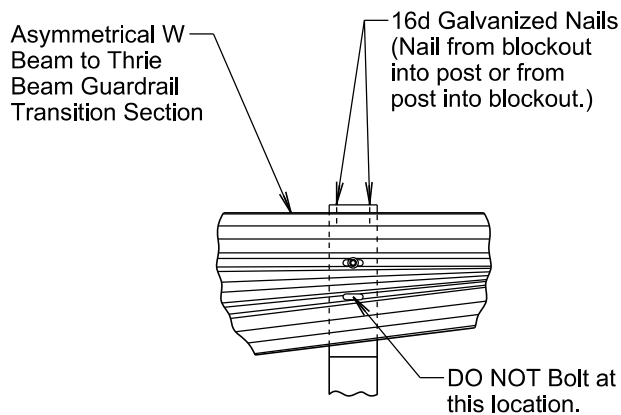


**CROSS SECTION**  
(Post Y)  
(Section through special  
single thrie beam rail portion)

\* See Standard Plate 630.99

\*\* 2" asphalt concrete or as specified in the plans and see standard plate 630.98 for leave-out and backfill requirements.

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



**DETAIL L**

September 14, 2018

*Published Date: 3rd Qtr. 2019*

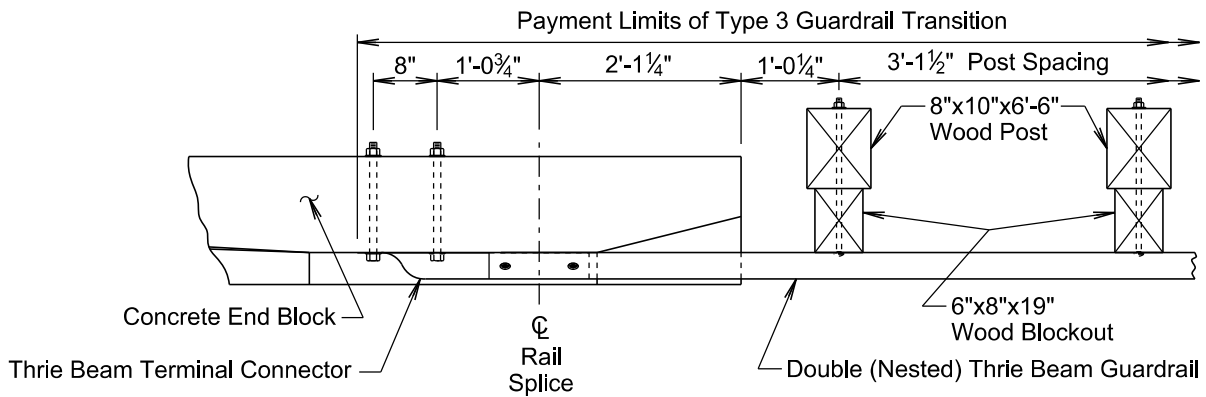
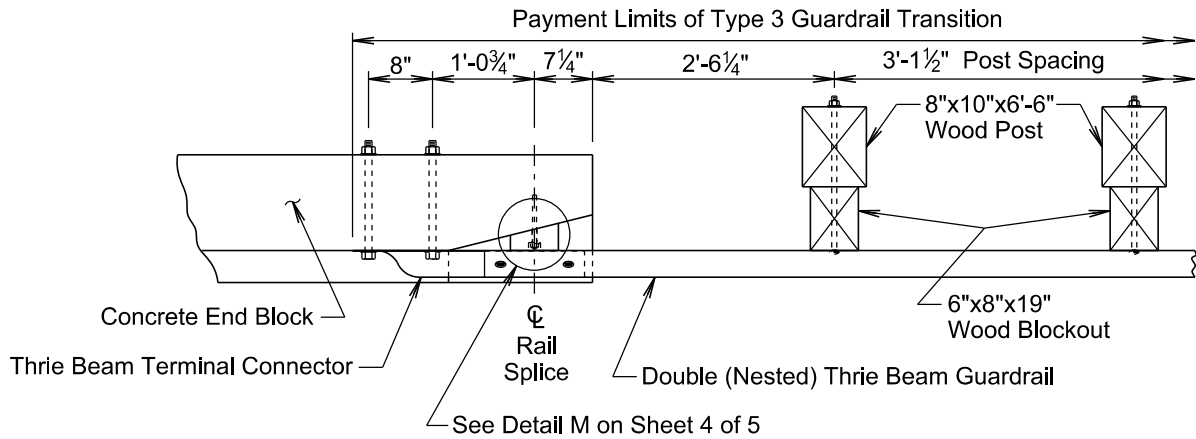
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**TYPE 3 GUARDRAIL TRANSITION  
(VARIOUS BRIDGE RAILS AND CONCRETE END  
BLOCKS TO MIDWEST GUARDRAIL SYSTEM (MGS))**

**PLATE NUMBER  
630.56**

Sheet 2 of 5

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



September 14, 2018

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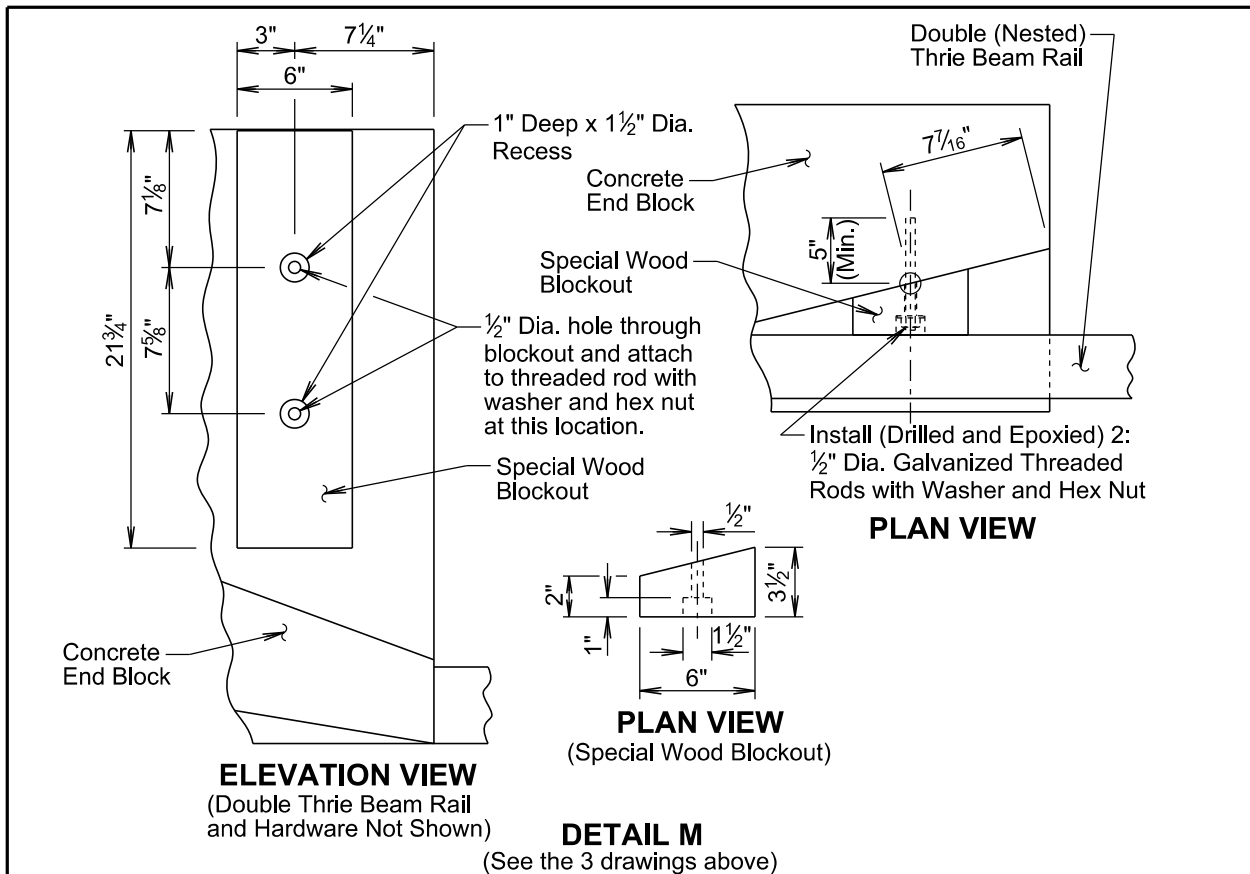
**TYPE 3 GUARDRAIL TRANSITION  
(VARIOUS BRIDGE RAILS OR CONCRETE END  
BLOCKS TO MIDWEST GUARDRAIL SYSTEM (MGS))**

**PLATE NUMBER  
630.56**

*Sheet 3 of 5*



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**GENERAL NOTES FOR INSTALLING THREADED RODS INTO CONCRETE:**

The special wood blockout may need to be installed at a different location than what is shown in Detail M as the in place concrete end block may not have been constructed to the exact dimensions. The blockout may be moved in the longitudinal (sideways) direction as necessary such that the blockout rests against the back of the double (nested) thrie beam rail and the rail is straight. The location will be approved by the Engineer before installation of the blockout.

The threaded rods will be 1/2" diameter and conform to ASTM F1554, Grade 55. The threaded rods will be embedded a minimum of 5" into the concrete.

The diameter of the drilled holes will not be less than 1/8" greater or more than 3/8" greater than the diameter of the threaded rods or as per the Manufacturer's recommendations. The holes will not be drilled using core bits. The drilled holes will be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to the epoxy injection.

The epoxy resin mixture will be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).

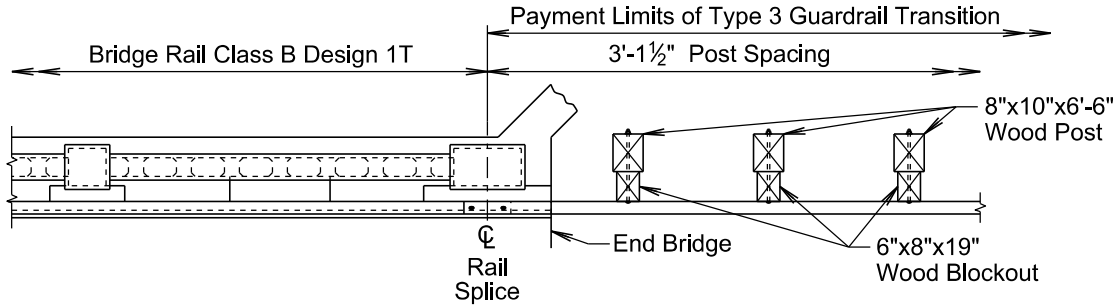
Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel rod. Rotate the steel rod during installation to eliminate voids and ensure complete bonding of the rod. Insertion of the rods by the dipping or painting methods will not be allowed.

Loads will not be applied to the epoxy grouted threaded rods until the epoxy resin has had sufficient time to cure as specified by the epoxy resin Manufacturer.

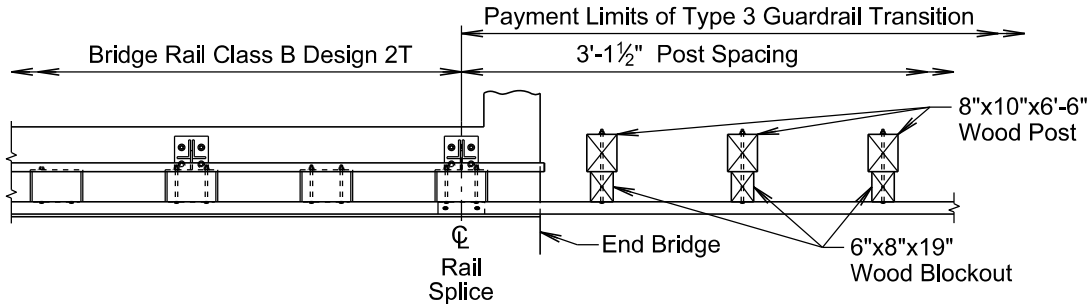
September 14, 2018

Published Date: 3rd Qtr. 2019	S D D O T	<b>TYPE 3 GUARDRAIL TRANSITION (VARIOUS BRIDGE RAILS OR CONCRETE END BLOCKS TO MIDWEST GUARDRAIL SYSTEM (MGS))</b>	PLATE NUMBER <b>630.56</b>
			Sheet 4 of 5

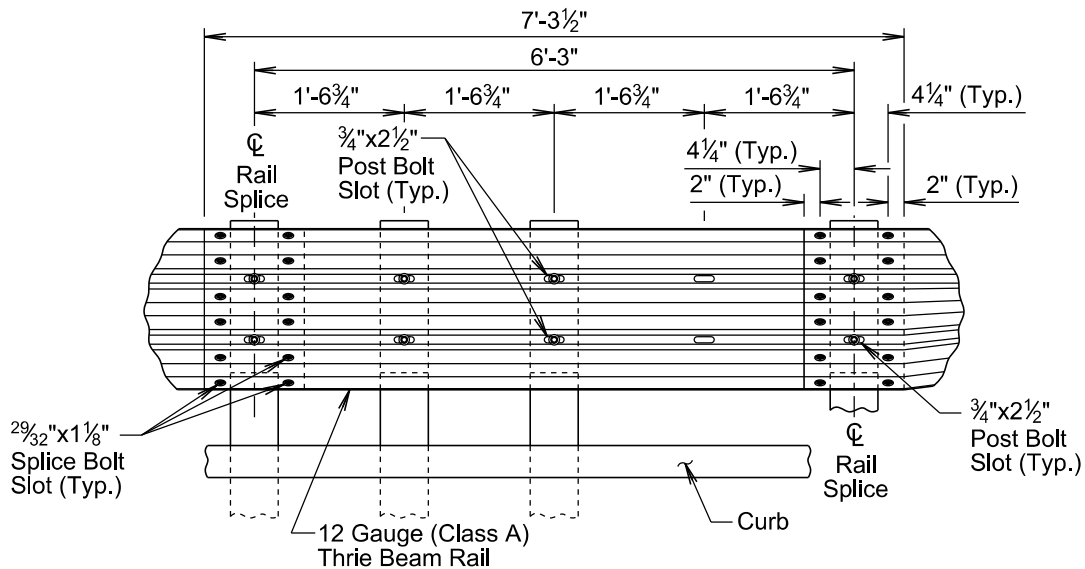
**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**DETAIL H**



**DETAIL J**



**DETAIL K**

**GENERAL NOTES:**

(Special Thrie Beam Rail)

Throughout the type 3 guardrail transition, 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 installing the type 3 guardrail transition including labor, equipment, and materials which includes all rail sections, posts and blockouts, hardware, and incidentals will be included in the contract unit price per each for "Type 3 Guardrail Transition".

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*Published Date: 3rd Qtr. 2019*

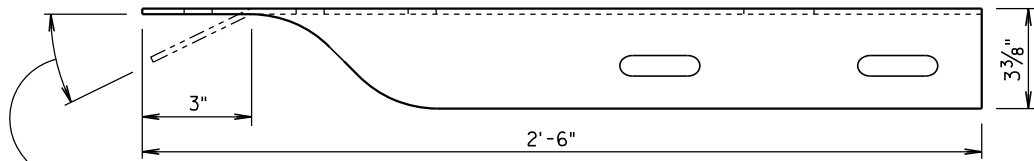
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**TYPE 3 GUARDRAIL TRANSITION  
(VARIOUS BRIDGE RAILS AND CONCRETE END  
BLOCKS TO MIDWEST GUARDRAIL SYSTEM (MGS))**

**PLATE NUMBER  
630.56**

Sheet 5 of 5

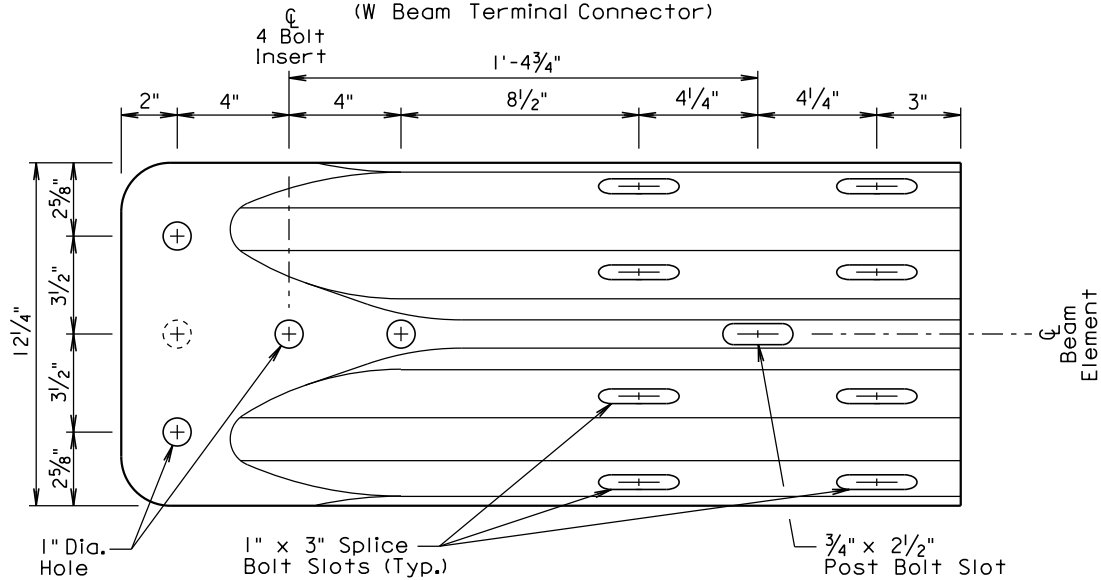
**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



An extra hole and an approximate 26° bend shall be required only for the Special Anchor Assembly and Breakaway Cable Terminal. The Modified W Beam Terminal Connector placement detail is shown on standard plates 630.84 and 630.85.

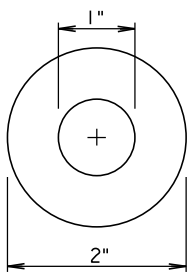
**TOP VIEW**

(W Beam Terminal Connector)

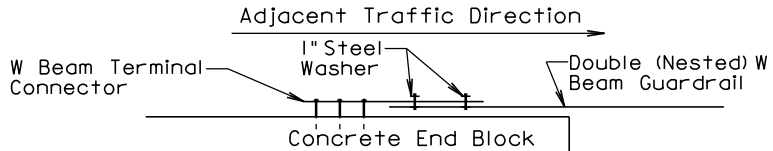
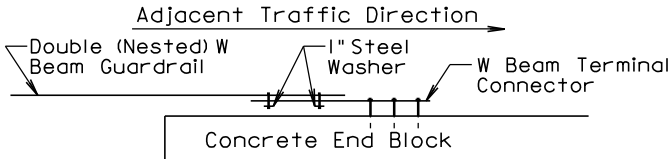
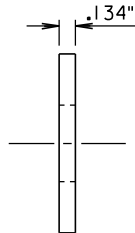


**ELEVATION VIEW**

(W Beam Terminal Connector)



**1" STEEL WASHER**  
(8 washers required)



**PLAN VIEWS**

(Typical Locations of 1" Steel Washers)  
(Washers are required at these lap splices)

**GENERAL NOTES:**

W Beam Terminal Connectors shall be 10 gauge.

When the W beam terminal connector is used to connect the rail to the bridge or concrete end block, 1" steel washers shall be used at the lap splice and the washers shall be in direct contact with the 3" slots of the W beam terminal connector. See the drawings above for the typical locations of the 1" steel washers.

There will be no separate payment for furnishing and installing the W beam terminal connector. All costs for furnishing and installing the W beam terminal connector shall be incidental to the contract unit price of the respective guardrail item it is attached to.

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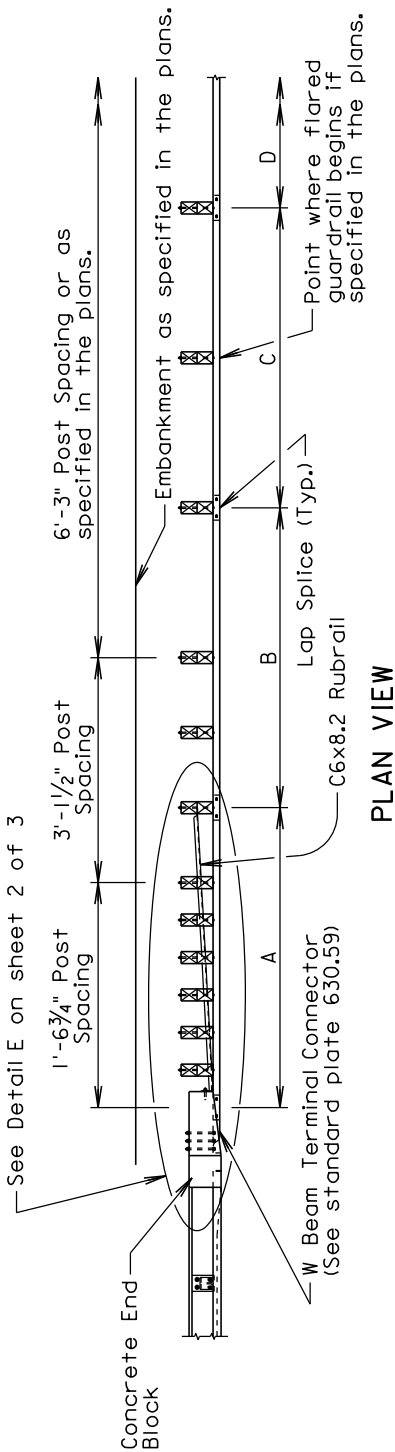
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**W BEAM TERMINAL CONNECTOR**

**PLATE NUMBER  
630.59**

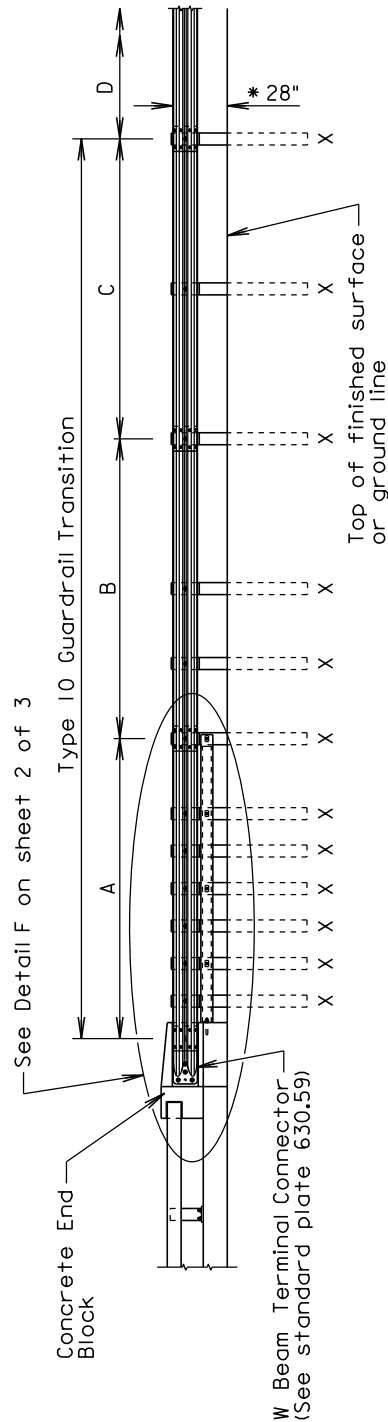
Sheet 1 of 1

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**PLAN VIEW**

- A: 12'-6" Straight Double (Nested) Class B W Beam Guardrail with Wood Posts (See standard plate 630.10)  
 B: 12'-6" Straight Class B W Beam Guardrail with Wood Posts (See standard plate 630.10)  
 C: 12'-6" Straight Class A W Beam Guardrail with Wood Posts (See standard plate 630.10) or as specified in the plans.  
 D: Guardrail as specified in the plans.



**ELEVATION VIEW**

X: 6" x 8" x 6'-0" Wood Post and 6" x 8" x 14" Wood Blockout

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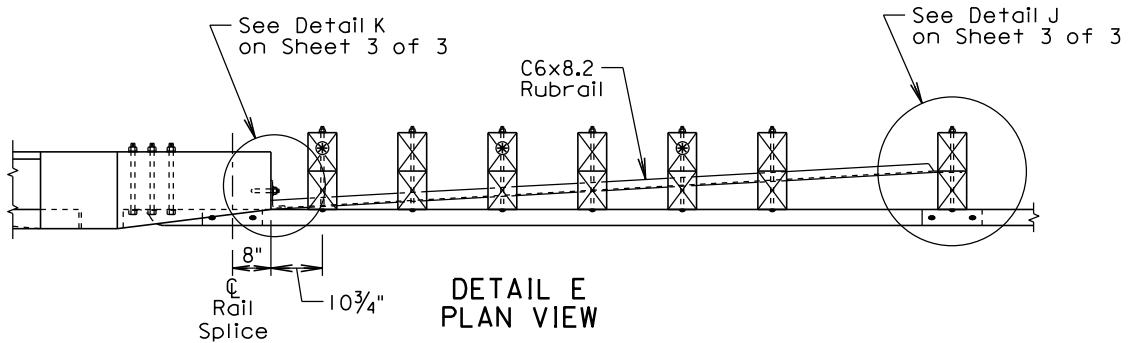
**SDOT**

**TYPE 10 GUARDRAIL TRANSITION  
(CONCRETE END BLOCK TO  
W BEAM GUARDRAIL)**

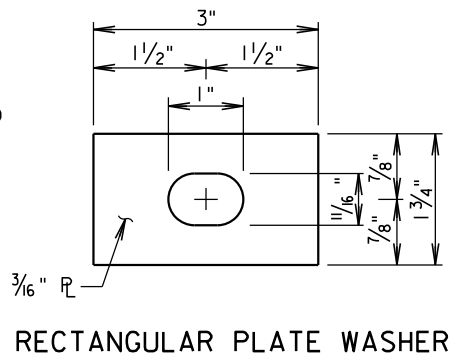
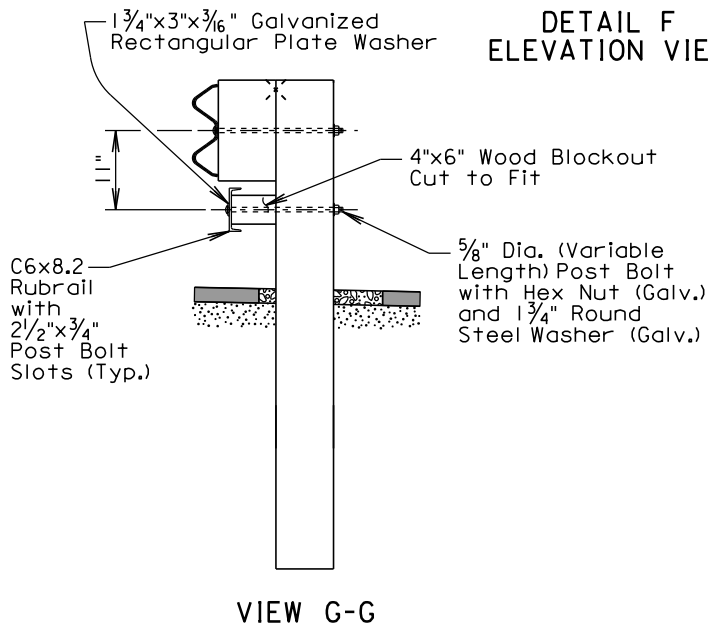
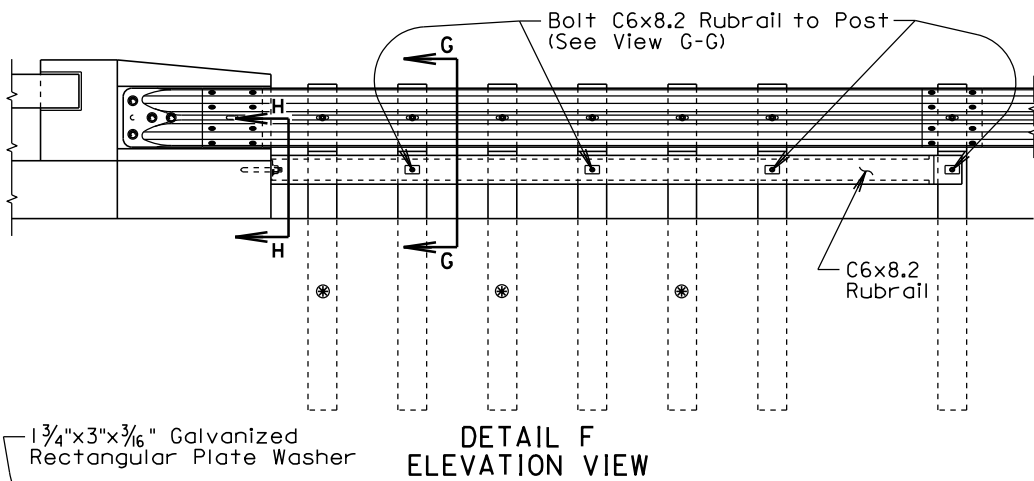
**PLATE NUMBER  
630.60**

Sheet 1 of 3

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



⊗ Rubrail shall not be attached to these posts.



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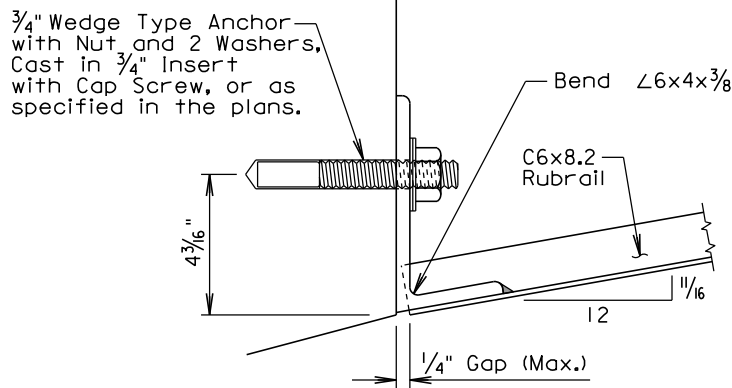
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**TYPE 10 GUARDRAIL TRANSITION  
(CONCRETE END BLOCK TO  
W BEAM GUARDRAIL)**

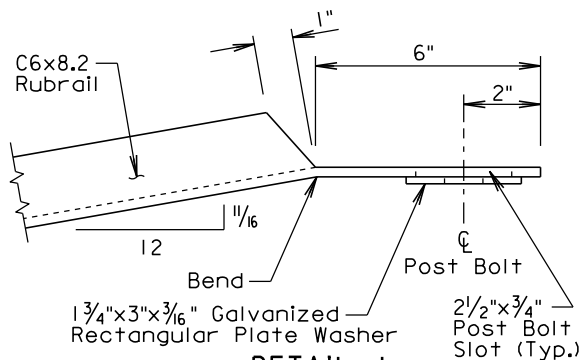
**PLATE NUMBER  
630.60**

*Sheet 2 of 3*

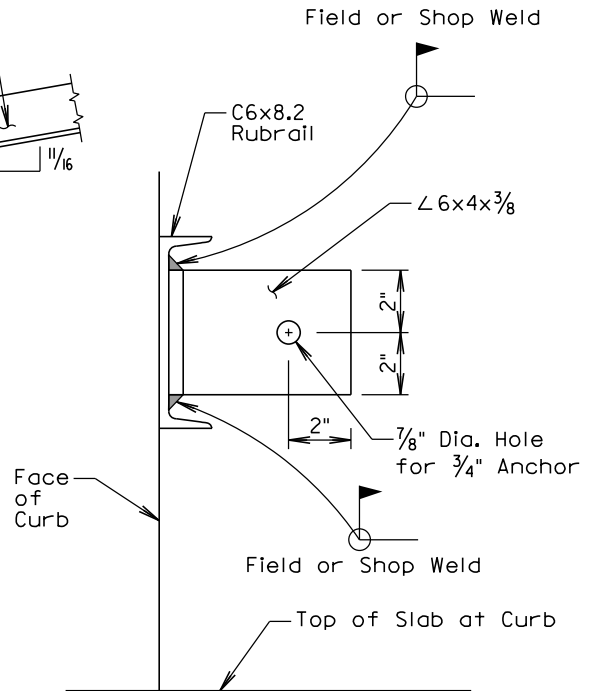
**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**DETAIL K**  
(Double Class B Rail Not Shown)



**DETAIL J**  
(Post, Blockout, Post Bolt, and Rail Not Shown)



**VIEW H-H**  
(Anchor and Rail Not Shown)

**GENERAL NOTES:**

Throughout the type 10 guardrail transition, slots in the rails shall 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 shall be smooth and free of burrs or notches.

The rubrail steel shall be in conformance with ASTM A36 and shall be galvanized after fabrication in conformance with ASTM A123. If pre-galvanized steel members are used, all cuts and welds shall be coated with an approved galvanizing paint.

The wedge type anchor bolt, nut, and washers shall be hot dipped galvanized or made of a corrosion resistant material. The wedge type anchor shall be capable of sustaining an ultimate load in tension or shear of 17,000 pounds when the anchor is set in 4,500 psi compressive strength concrete. The anchor shall be installed according to the manufacturer's recommendations. The Contractor shall obtain certification from the manufacturer that the anchor meets the tensile and shear requirements and shall submit the certification to the Engineer. The cost for furnishing and installing the wedge type anchor, nut, and washers shall be incidental to the contract unit price per foot for "Rubrail".

All costs for furnishing and installing the straight double class B W beam guardrail including labor, equipment, and materials including the W beam rails, posts, blockouts, W beam terminal connector, and hardware shall be incidental to the contract unit price per foot for "Straight Double Class B W Beam Guardrail with Wood Posts".

All costs for furnishing and installing the type 10 guardrail transition including labor, equipment, and materials shall be included in the contract unit price for the respective guardrail bid items.

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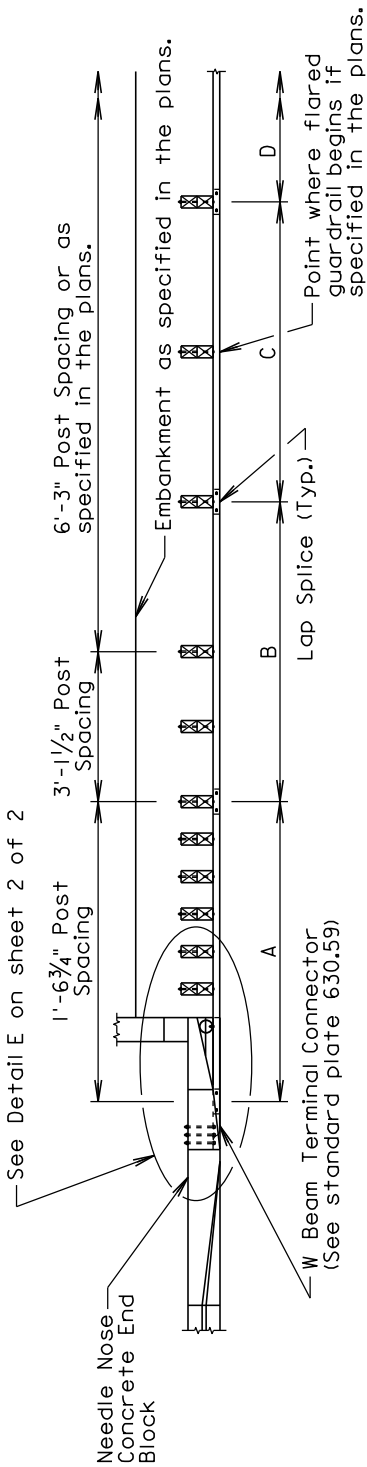
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**TYPE 10 GUARDRAIL TRANSITION  
(CONCRETE END BLOCK TO  
W BEAM GUARDRAIL)**

**PLATE NUMBER  
630.60**

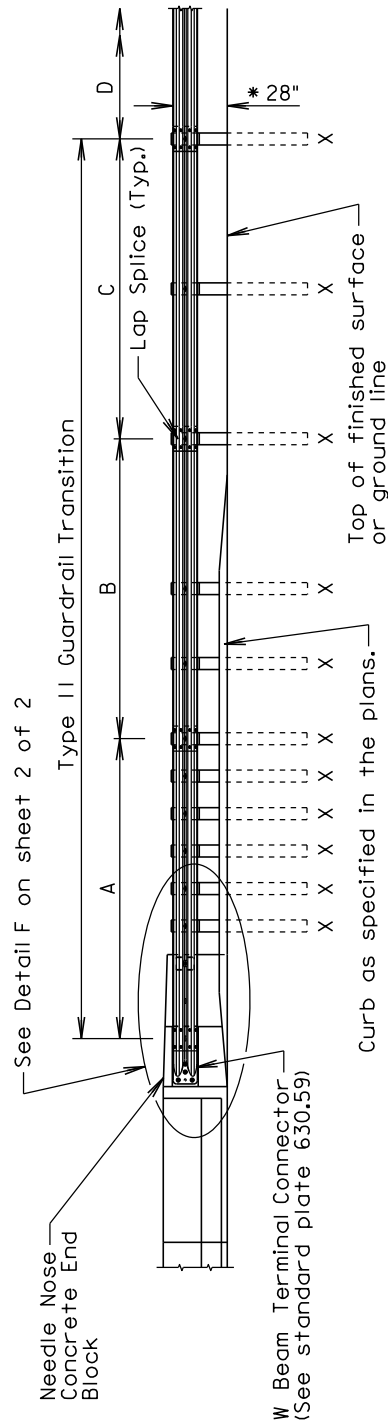
Sheet 3 of 3

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**PLAN VIEW**  
(Curb Not Shown)

- A: 12'-6" Straight Double (Nested) Class B W Beam Guardrail with Wood Posts (See standard plate 630.10)
- B: 12'-6" Straight Class B W Beam Guardrail with Wood Posts (See standard plate 630.10)
- C: 12'-6" Straight Class A W Beam Guardrail with Wood Posts (See standard plate 630.10) or as specified in the plans.
- D: Guardrail as specified in the plans.



**ELEVATION VIEW**

\* See standard plate 630.99

X: 6" x 8" x 6'-0" Wood Post and 6" x 8" x 14" Wood Blockout

February 14, 2017

Published Date: 3rd Qtr. 2019

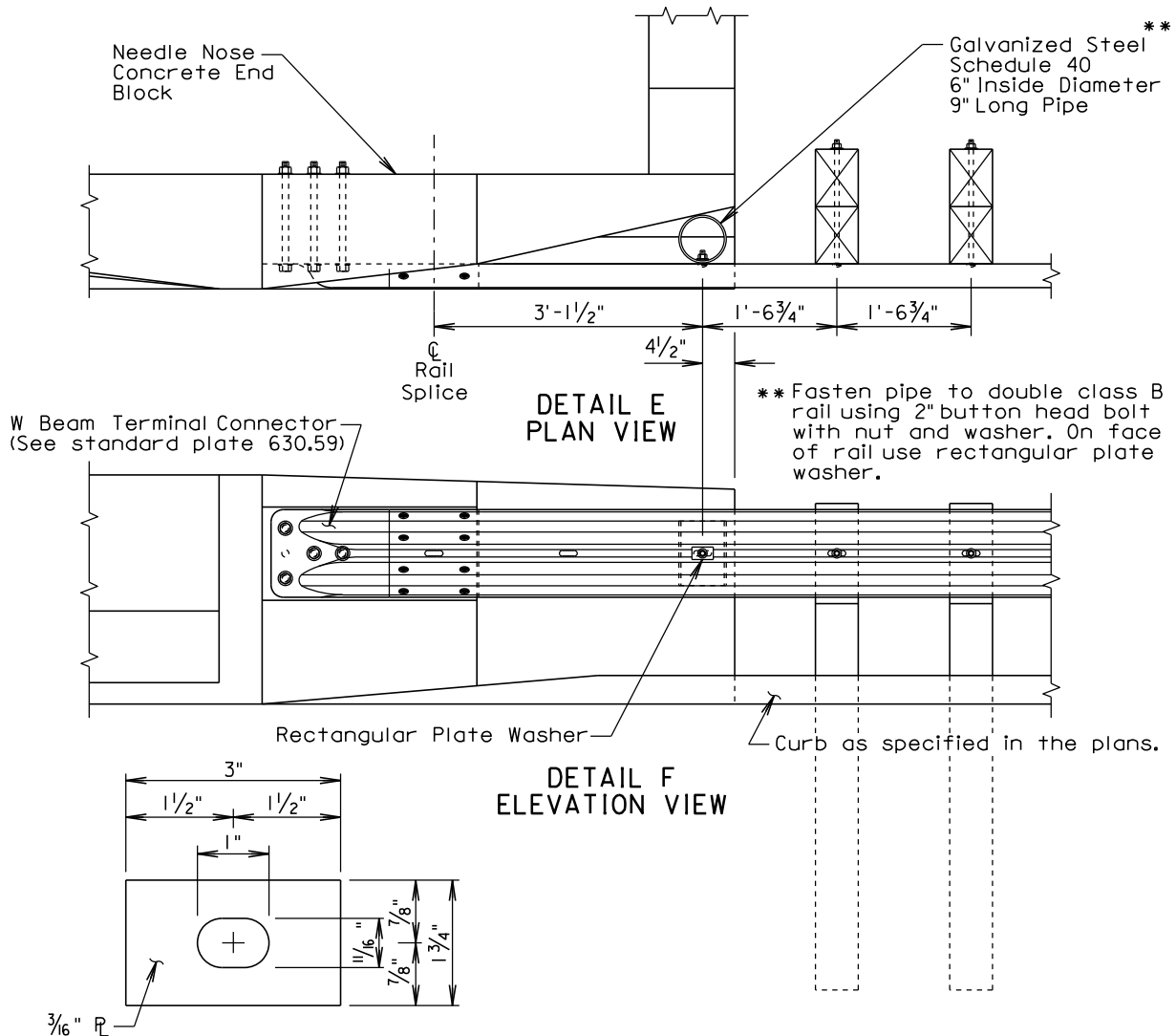
**SDOT**

**TYPE 11 GUARDRAIL TRANSITION  
(NEEDLE NOSE CONCRETE END BLOCK  
TO W BEAM GUARDRAIL)**

**PLATE NUMBER**  
**630.61**

Sheet 1 of 2

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**RECTANGULAR PLATE WASHER**

**GENERAL NOTES:**

Throughout the type II guardrail transition, slots in the rails shall 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 shall be smooth and free of burrs or notches.

All costs for furnishing and installing the straight double class B W beam guardrail including labor, equipment, and materials including the W beam rails, posts, blockouts, W beam terminal connector, steel pipe, and hardware shall be incidental to the contract unit price per foot for "Straight Double Class B W Beam Guardrail with Wood Posts".

All costs for furnishing and installing the type II guardrail transition including labor, equipment, and materials shall be included in the contract unit price for the respective guardrail bid items.

February 14, 2017

*Published Date: 3rd Qtr. 2019*

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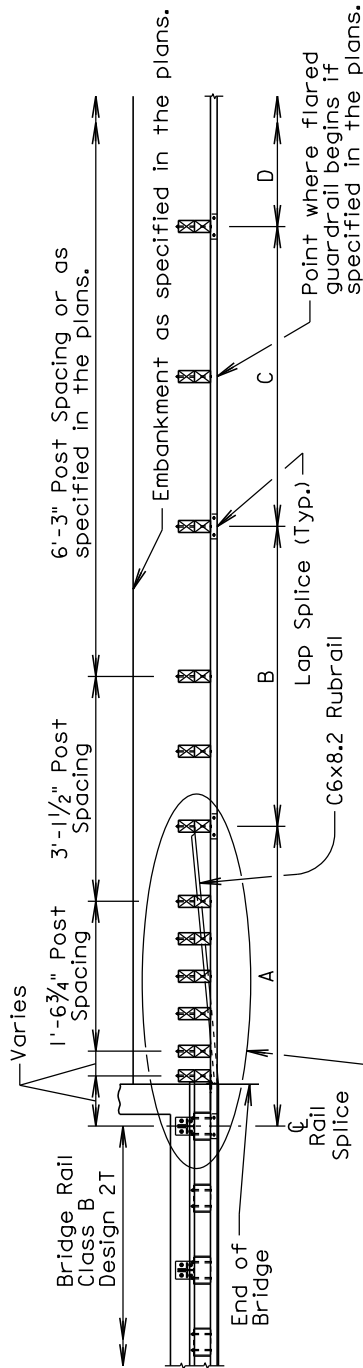
**TYPE 11 GUARDRAIL TRANSITION  
(NEEDLE NOSE CONCRETE END BLOCK  
TO W BEAM GUARDRAIL)**

**PLATE NUMBER  
630.61**

Sheet 2 of 2



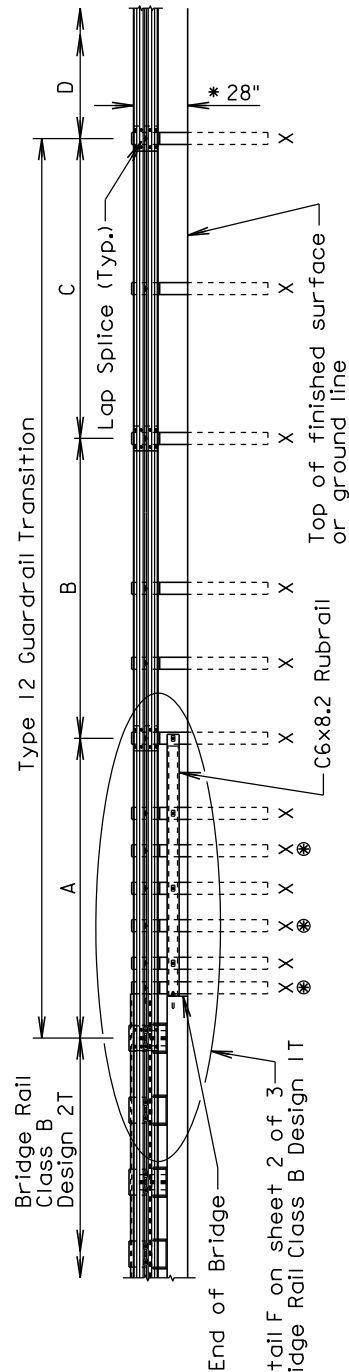
**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**PLAN VIEW**

See Detail E on sheet 2 of 3 for Bridge Rail Class B Design 1T

- A: 12'-6" Straight Double (Nested) Class B W Beam Guardrail with Wood Posts (See standard plate 630.10)
- B: 12'-6" Straight Class B W Beam Guardrail with Wood Posts (See standard plate 630.10)
- C: 12'-6" Straight Class A W Beam Guardrail with Wood Posts (See standard plate 630.10) or as specified in the plans.
- D: Guardrail as specified in the plans.



**ELEVATION VIEW**

See Detail F on sheet 2 of 3 for Bridge Rail Class B Design 1T

February 14, 2017

\* See standard plate 630.99

- X: 6" x 8" x 6'-0" Wood Post and 6" x 8" x 14" Wood Blockout
- ⊗: Rubrail shall not be attached to these posts.

*Published Date: 3rd Qtr. 2019*

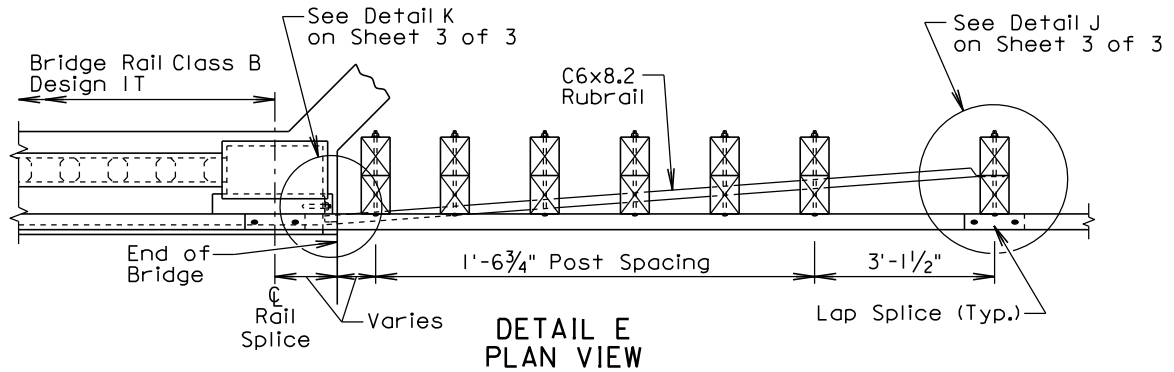
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**TYPE 12 GUARDRAIL TRANSITION  
(W BEAM BRIDGE RAIL CLASS B DESIGN  
1T OR 2T TO W BEAM GUARDRAIL)**

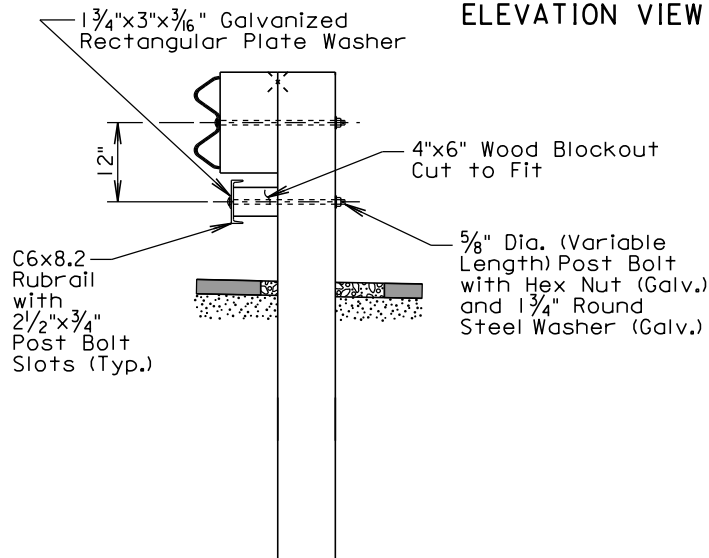
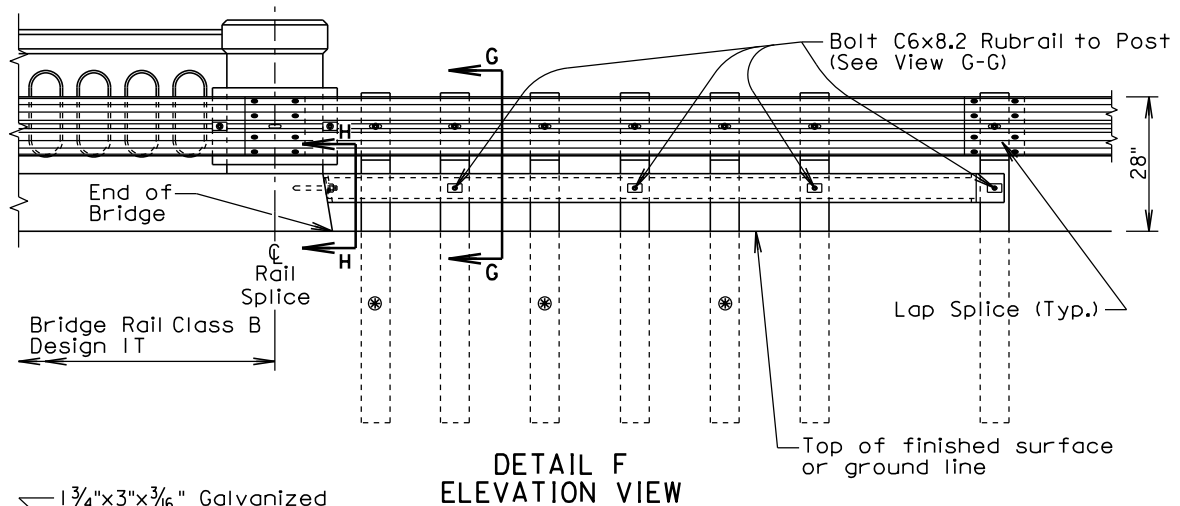
**PLATE NUMBER  
630.63**

Sheet 1 of 3

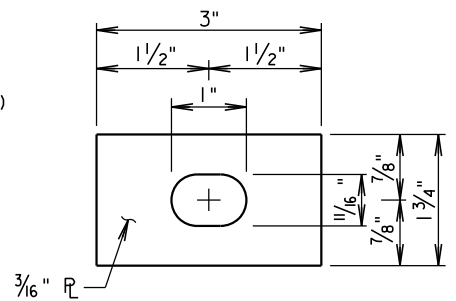
**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



\* Rubrail shall not be attached to these posts.



(For Bridge Rail Class B Design 1T or 2T)



February 14, 2017

*Published Date: 3rd Qtr. 2019*

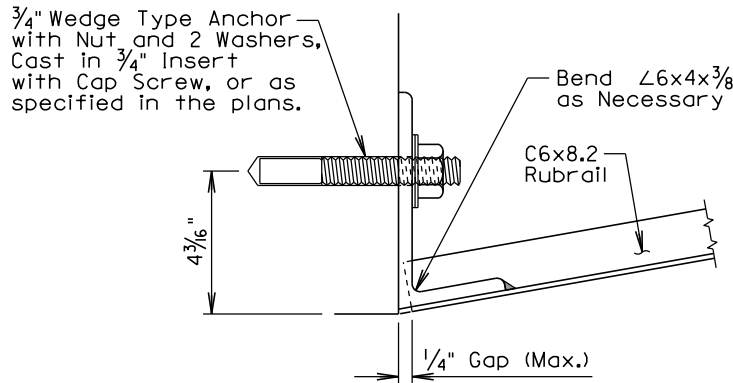
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**TYPE 12 GUARDRAIL TRANSITION  
(W BEAM BRIDGE RAIL CLASS B DESIGN  
1T OR 2T TO W BEAM GUARDRAIL)**

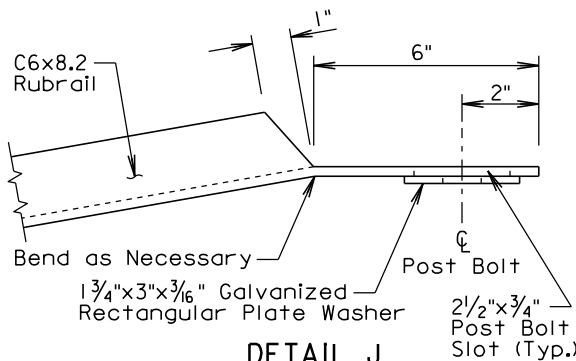
**PLATE NUMBER  
630.63**

*Sheet 2 of 3*

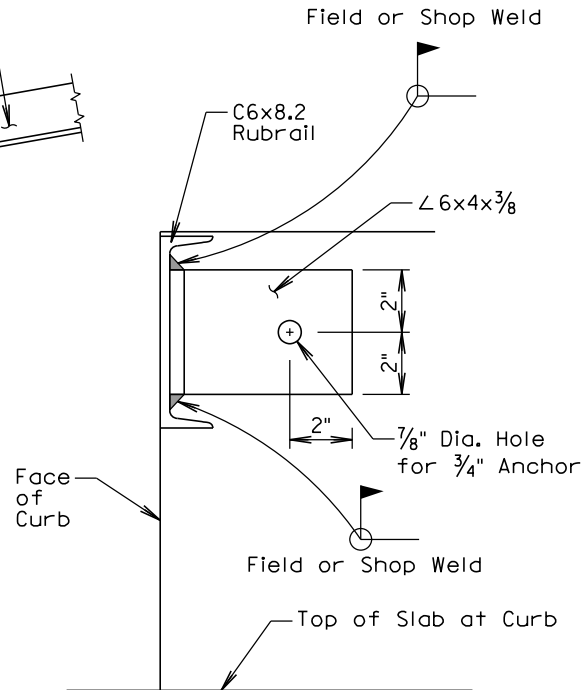
**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**DETAIL K**  
(Double Class B Rail Not Shown)  
(For Bridge Rail Class B Design 1T or 2T)



**DETAIL J**  
(Post, Blockout, Post Bolt, and Rail Not Shown)  
(For Bridge Rail Class B Design 1T or 2T)



**VIEW H-H**  
(Anchor and Rail Not Shown)  
(For Bridge Rail Class B Design 1T or 2T)

**GENERAL NOTES:**

Throughout the type 12 guardrail transition, slots in the rails shall 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 shall be smooth and free of burrs or notches.

The rubrail steel shall be in conformance with ASTM A36 and shall be galvanized after fabrication in conformance with ASTM A123. If pre-galvanized steel members are used, all cuts and welds shall be coated with an approved galvanizing paint.

The wedge type anchor bolt, nut, and washers shall be hot dipped galvanized or made of a corrosion resistant material. The wedge type anchor shall be capable of sustaining an ultimate load in tension or shear of 17,000 pounds when the anchor is set in 4,500 psi compressive strength concrete. The anchor shall be installed according to the manufacturer's recommendations. The Contractor shall obtain certification from the manufacturer that the anchor meets the tensile and shear requirements and shall submit the certification to the Engineer. The cost for furnishing and installing the wedge type anchor, nut, and washers shall be incidental to the contract unit price per foot for "Rubrail".

All costs for furnishing and installing the straight double class B W beam guardrail including labor, equipment, and materials including the W beam rails, posts, blockouts, W beam terminal connector, and hardware shall be incidental to the contract unit price per foot for "Straight Double Class B W Beam Guardrail with Wood Posts".

All costs for furnishing and installing the type 12 guardrail transition including labor, equipment, and materials shall be included in the contract unit price for the respective guardrail bid items.

February 14, 2017

*Published Date: 3rd Qtr. 2019*

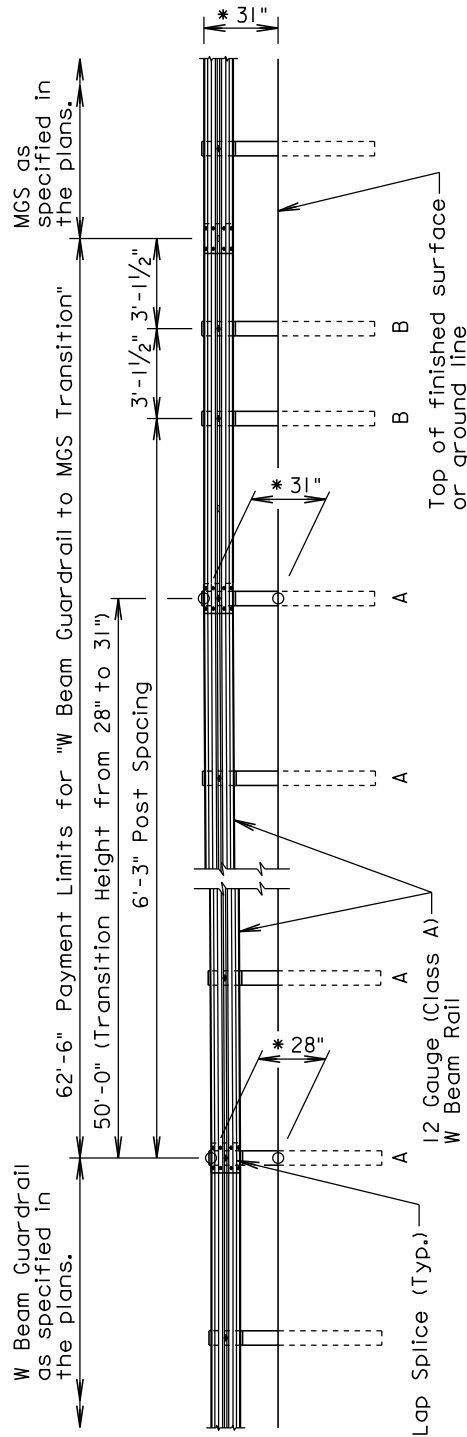
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**TYPE 12 GUARDRAIL TRANSITION  
(W BEAM BRIDGE RAIL CLASS B DESIGN  
1T OR 2T TO W BEAM GUARDRAIL)**

**PLATE NUMBER  
630.63**

Sheet 3 of 3

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**ELEVATION VIEW**

- A: 6" x 8" x 6'-0" Wood Post and 6" x 8" x 14" Wood Blockout (See standard plate 630.10)  
B: 6" x 8" x 6'-0" Wood Post and 6" x 12" x 14" Wood Blockout (See standard plate 630.20)

\* See standard plate 630.99

**GENERAL NOTES:**

All costs for furnishing and installing the W beam guardrail to MGS transition including labor, equipment, and materials, which includes all rail sections, posts and blockouts, hardware, and incidentals shall be included in the contract unit price per each for "W Beam Guardrail to MGS Transition".

February 14, 2017

*Published Date: 3rd Qtr. 2019*

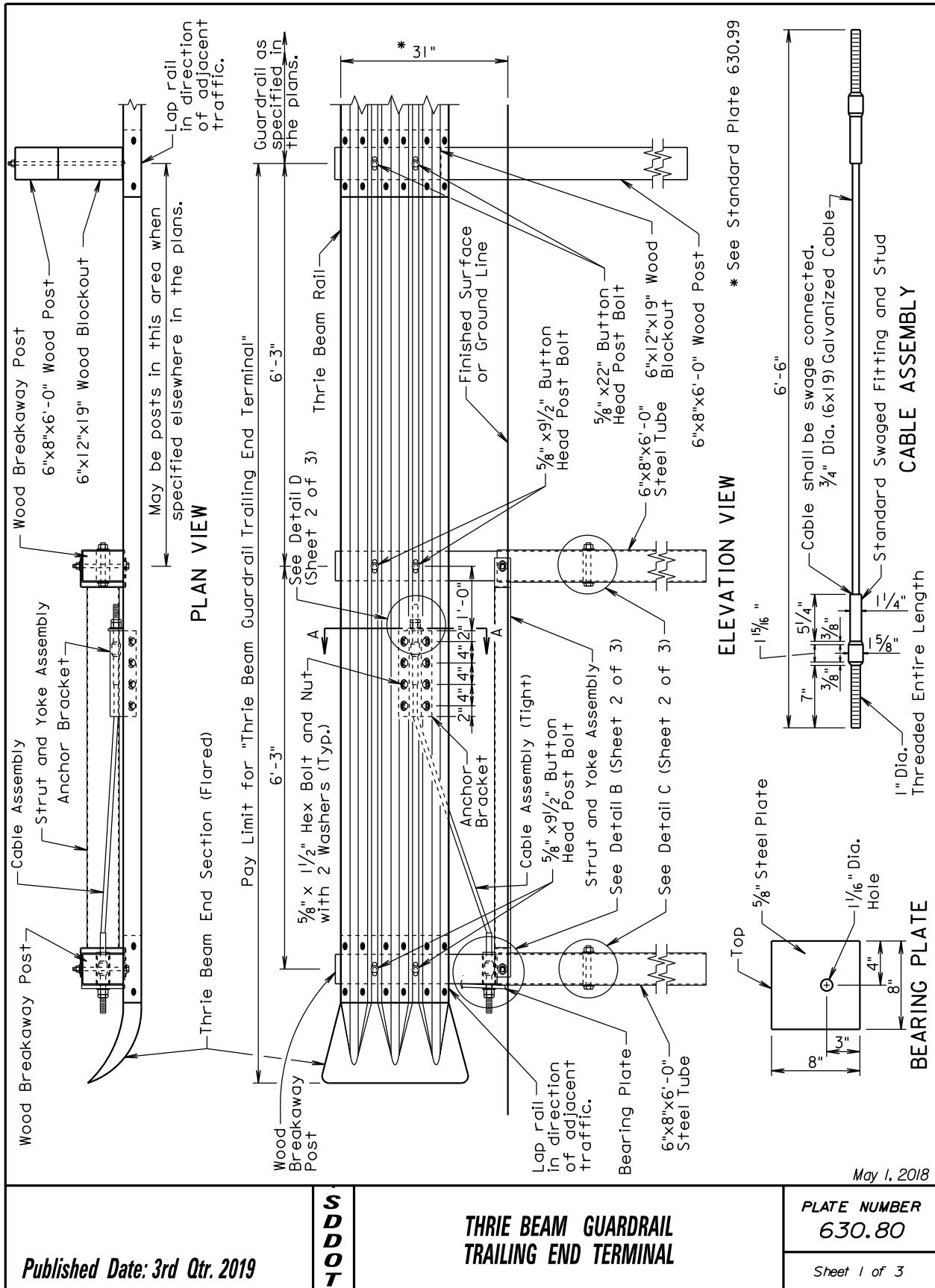
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**W BEAM GUARDRAIL TO  
MGS (MIDWEST GUARDRAIL SYSTEM)  
TRANSITION**

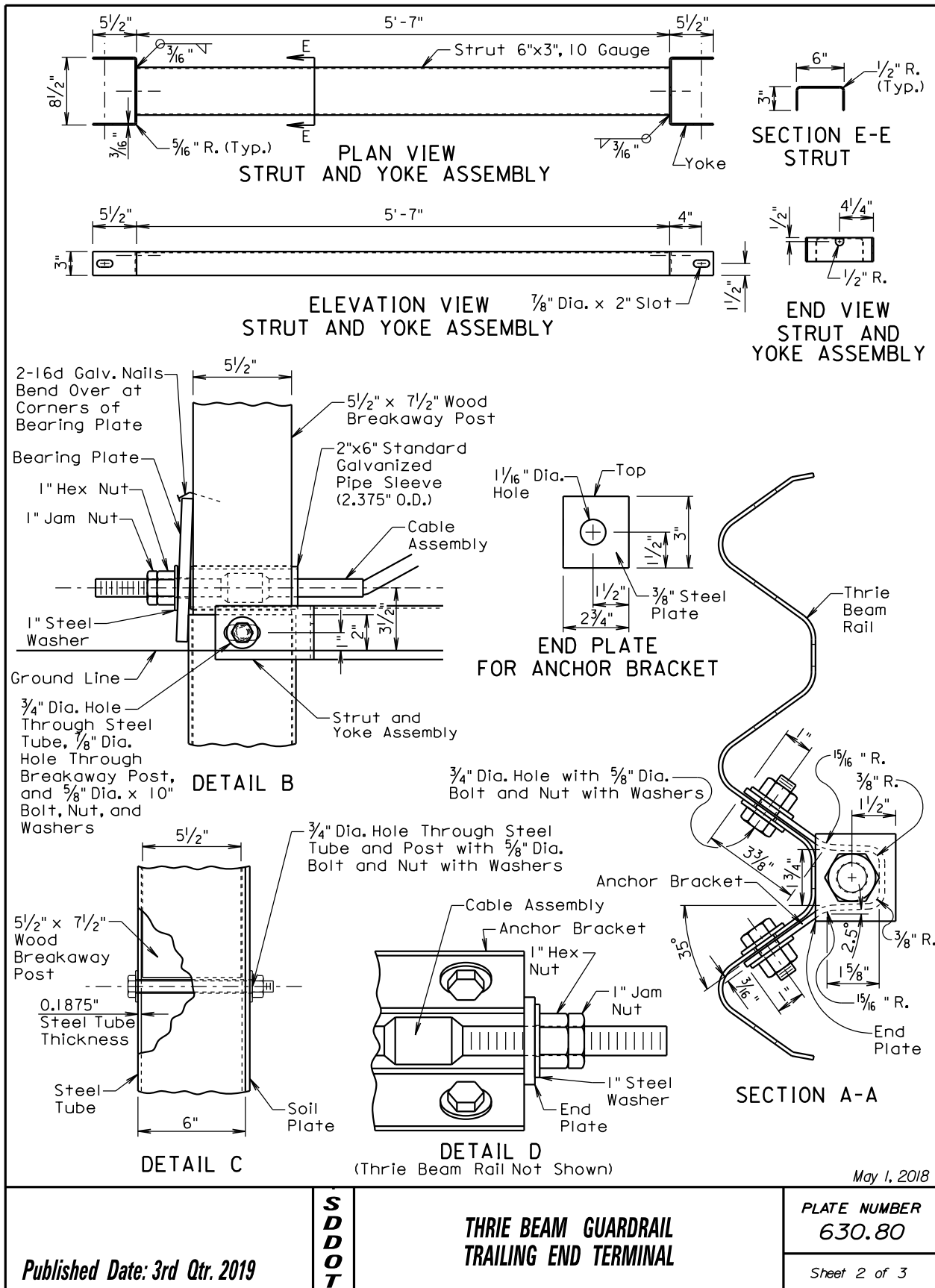
**PLATE NUMBER  
630.64**

Sheet 1 of 1

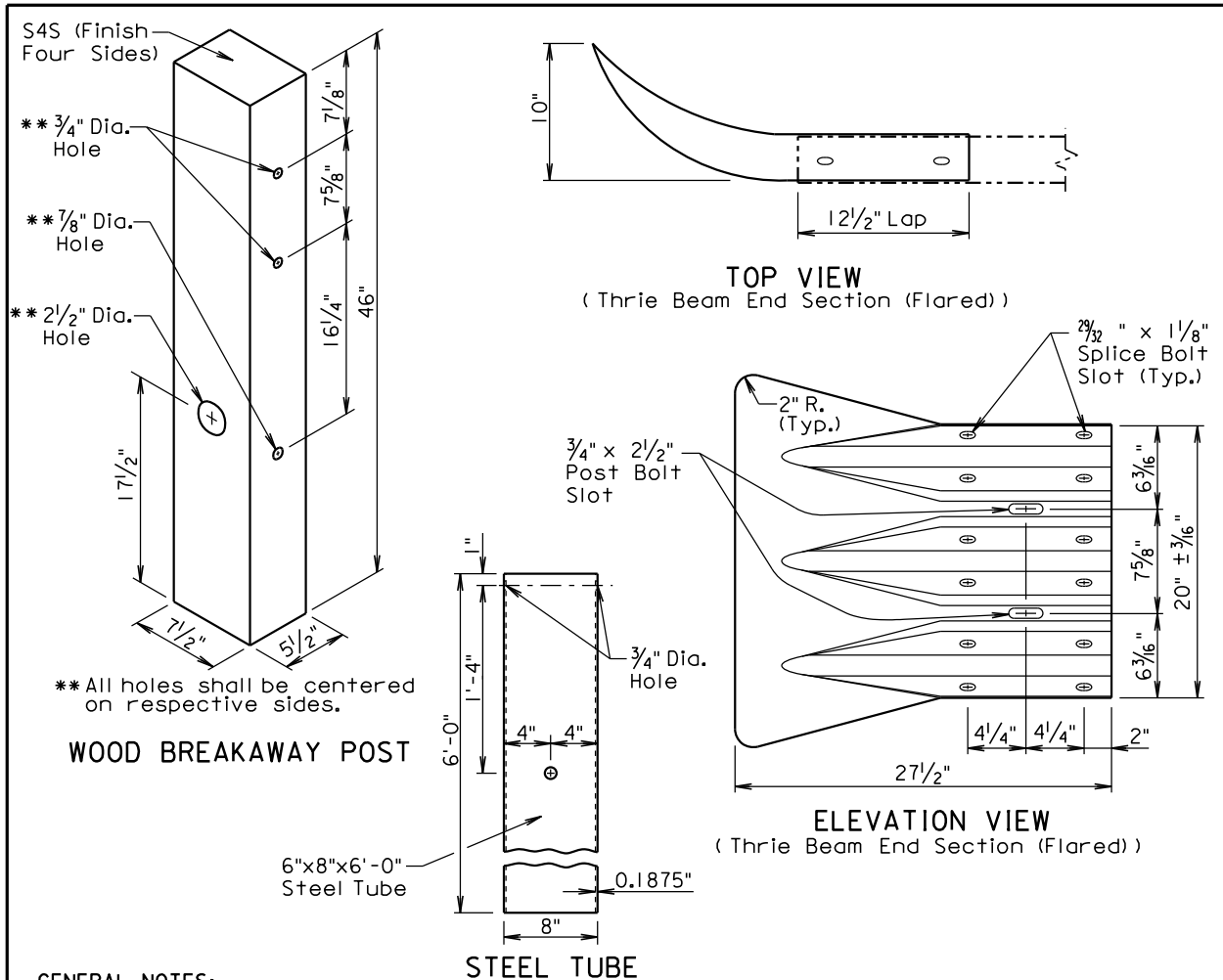
**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**GENERAL NOTES:**

The thrie beam guardrail trailing end terminal shall only be used in a one-way traffic situation.

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

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

The steel tube shall meet the requirements of ASTM Specification A500, Grade B, and shall be galvanized after fabrication in accordance with the requirements of AASHTO Specification M11.

All hardware shall be galvanized in accordance with ASTM A153.

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

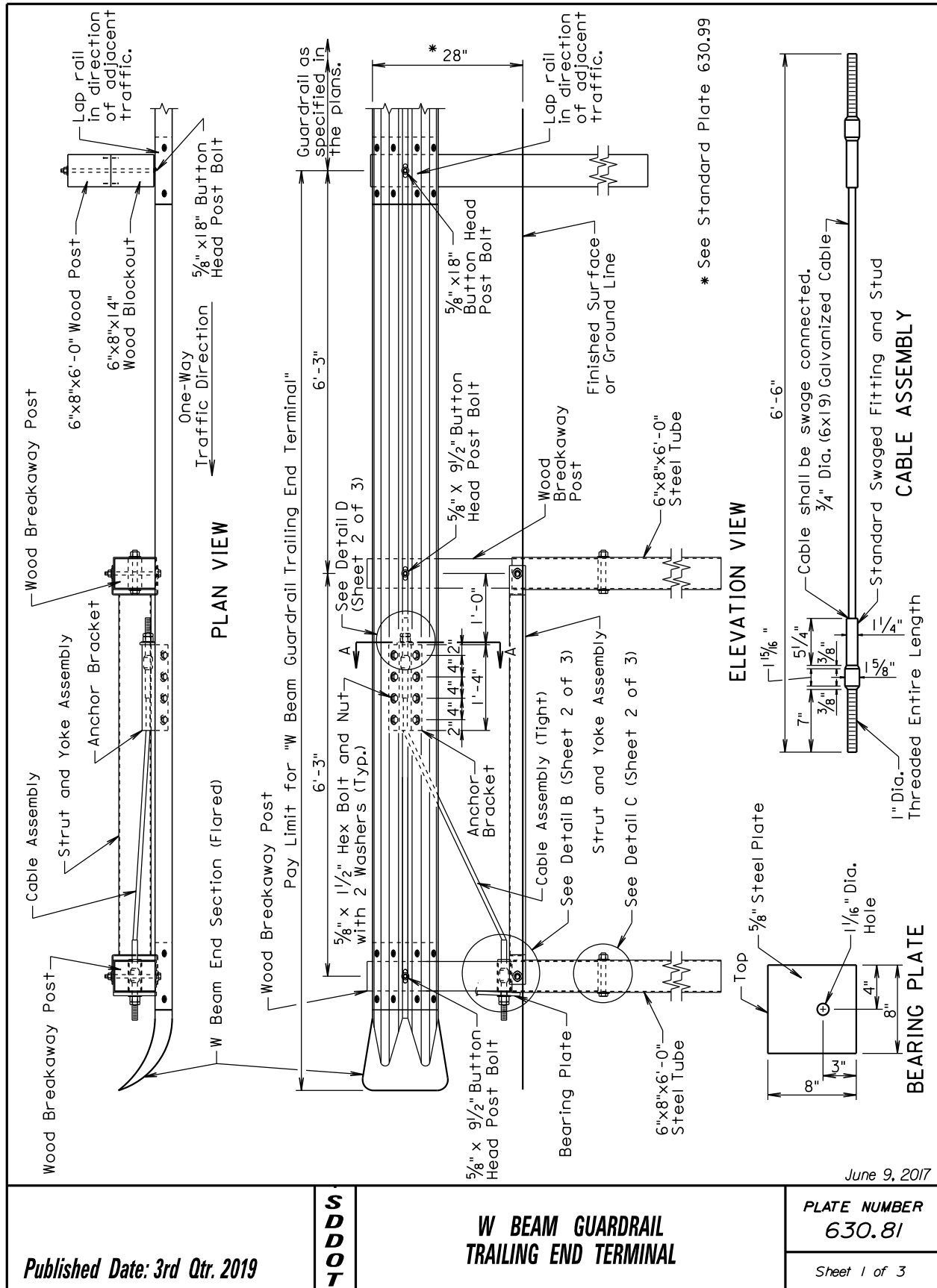
Slots in the rails shall be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges shall be smooth and free of burrs or 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 shall be included in the contract unit price per each for "Thrie Beam Guardrail Trailing End Terminal".

*May 1, 2018*

<b>Published Date: 3rd Qtr. 2019</b>	<b>S D D O T</b>	<b>THRIE BEAM GUARDRAIL TRAILING END TERMINAL</b>	<b>PLATE NUMBER</b> <b>630.80</b>
			Sheet 3 of 3

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



June 9, 2017

Published Date: 3rd Qtr. 2019

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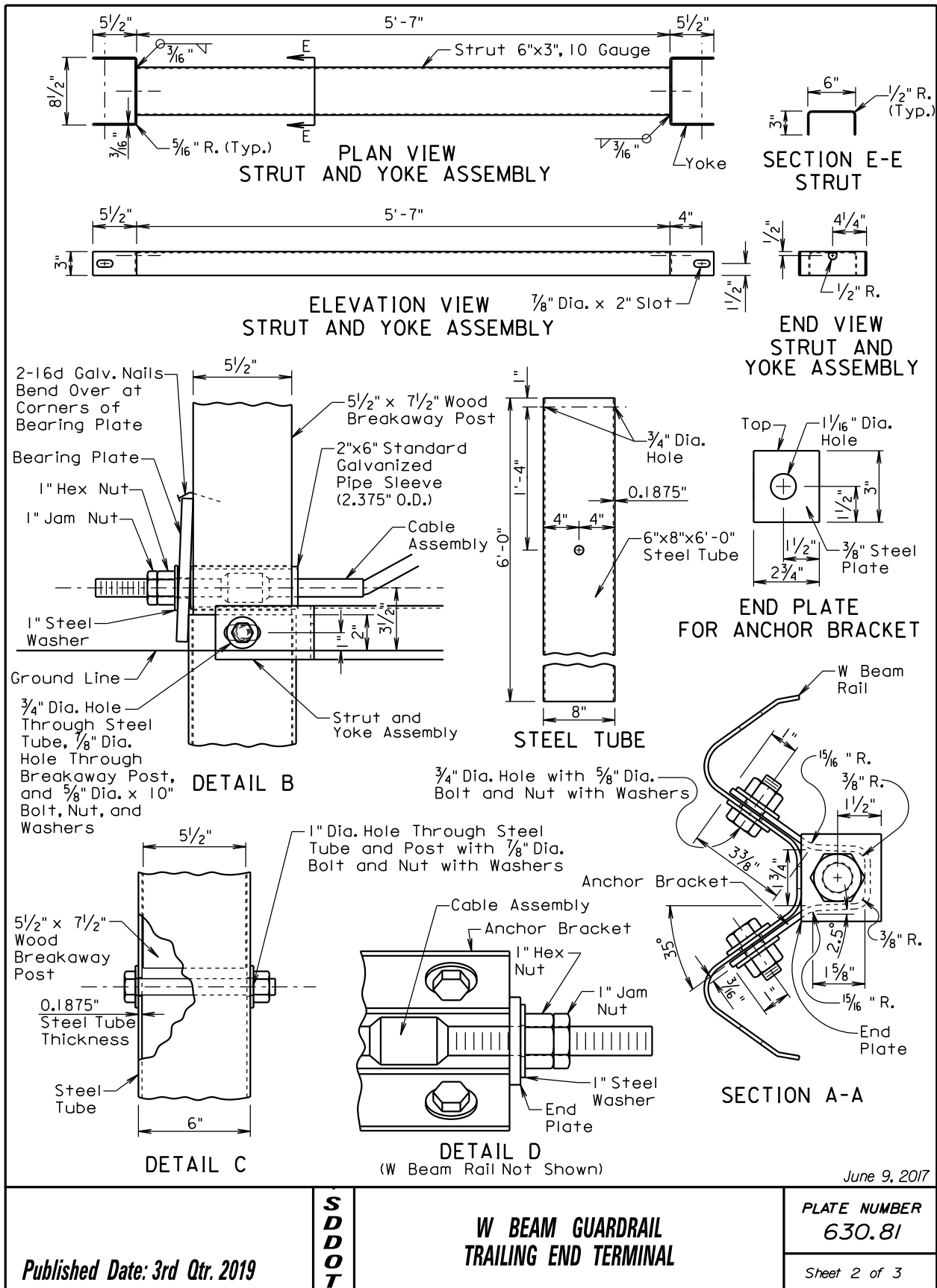
**W BEAM GUARDRAIL  
TRAILING END TERMINAL**

**PLATE NUMBER  
630.81**

Sheet 1 of 3



**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



June 9, 2017

Published Date: 3rd Qtr. 2019

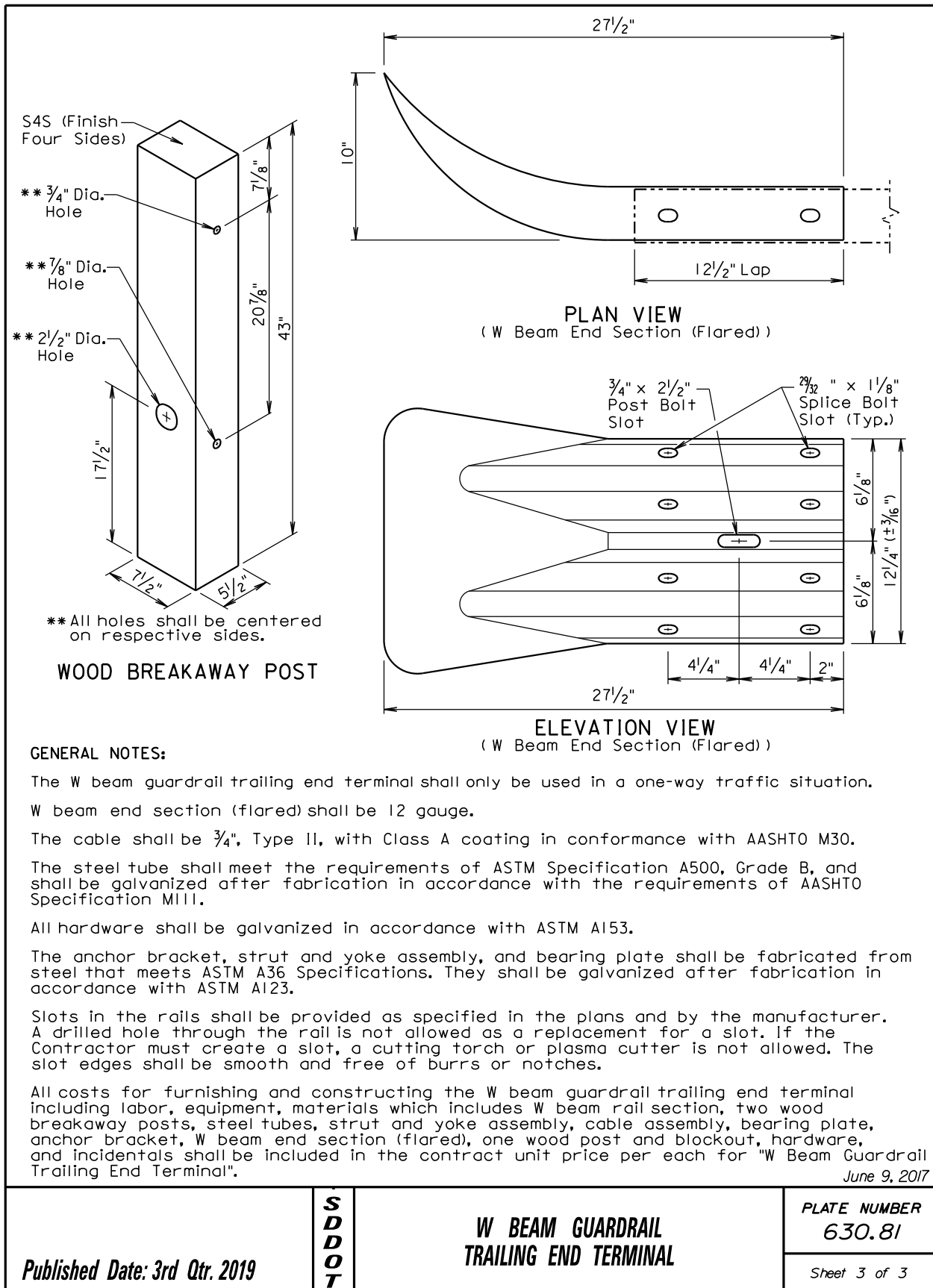
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**W BEAM GUARDRAIL  
TRAILING END TERMINAL**

**PLATE NUMBER  
630.81**

Sheet 2 of 3

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**PLAN VIEW**

Wood Breakaway Post  
6"x8"x6'-0" Wood Post  
6"x12"x14" Wood Blockout  
Lap rail in direction of adjacent traffic.  
One-Way Traffic Direction  
5/8" x 22" Button Head Post Bolt  
W Beam End Section (Flared)  
Cable Assembly  
Strut and Yoke Assembly  
Anchor Bracket  
Wood Breakaway Post  
Pay Limit for "MGS Trailing End Terminal"  
6'-3"  
3'-1 1/2"  
Guardrail as specified in the plans.  
31"  
Lap rail in direction of adjacent traffic.  
5/8" x 22" Button Head Post Bolt  
5/8" x 9 1/2" Button Head Post Bolt  
See Detail D (Sheet 2 of 3)  
5/8" x 1 1/2" Hex Bolt and Nut with 2 Washers (Typ.)  
2" 4" 4" 4" 2"  
1'-4"  
1'-1 1/4"  
Anchor Bracket  
Cable Assembly (Tight)  
See Detail B (Sheet 2 of 3)  
Strut and Yoke Assembly  
See Detail C (Sheet 2 of 3)  
Bearing Plate  
6"x8"x6'-0" Steel Tube  
\* See Standard Plate 630.99  
Finished Surface or Ground Line

**ELEVATION VIEW**

1 5/16"  
6'-8"  
Cable shall be swage connected.  
3/4" Dia. (6x19) Galvanized Cable  
Standard Swaged Fitting and Stud  
CABLE ASSEMBLY  
1" Dia. Threaded Entire Length  
5 1/4"  
3/8"  
3/8"  
7"  
1 1/4"  
5/8"  
BEARING PLATE  
Top  
5/8" Steel Plate  
1 1/16" Dia. Hole  
4"  
8"  
3"

June 9, 2017

Published Date: 3rd Qtr. 2019

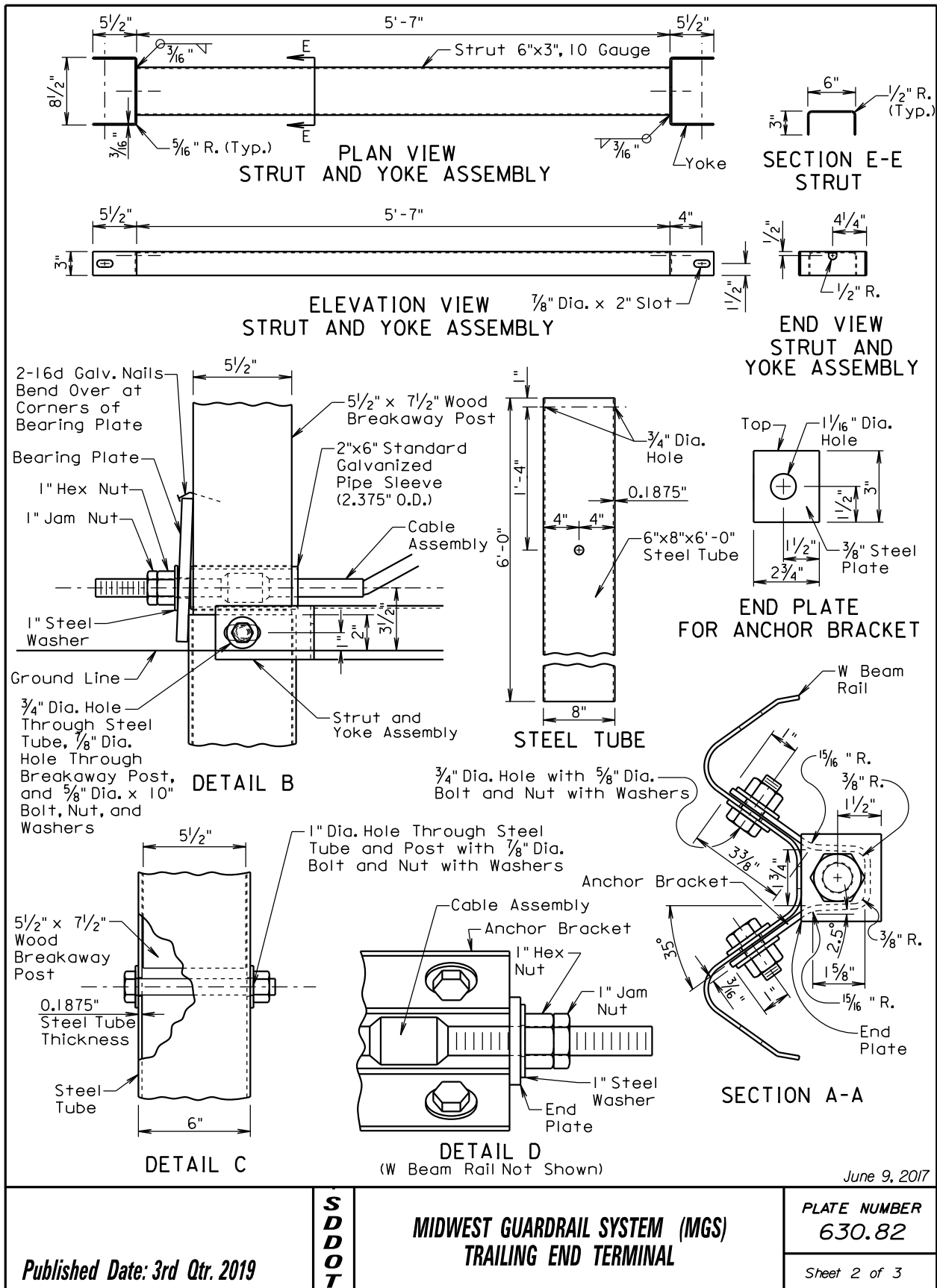
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MIDWEST GUARDRAIL SYSTEM (MGS)  
TRAILING END TERMINAL

PLATE NUMBER  
630.82

Sheet 1 of 3

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



June 9, 2017

Published Date: 3rd Qtr. 2019

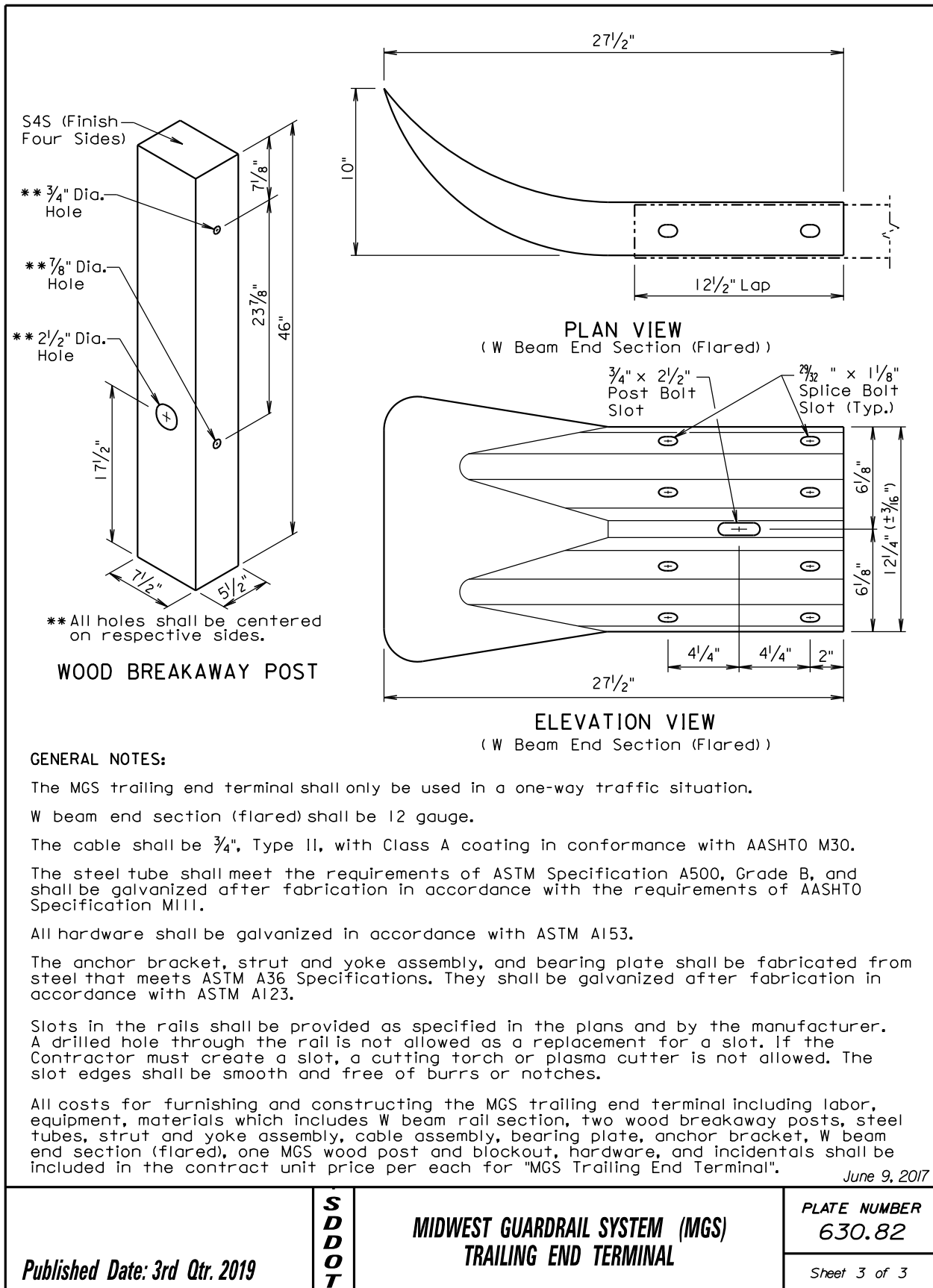
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**MIDWEST GUARDRAIL SYSTEM (MGS)  
TRAILING END TERMINAL**

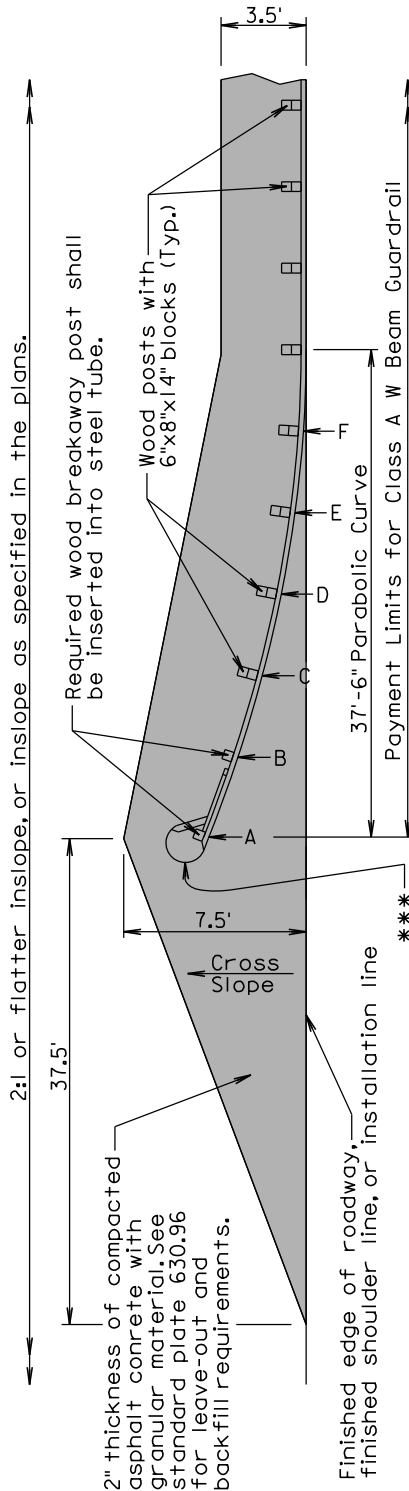
**PLATE NUMBER  
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Sheet 2 of 3

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**

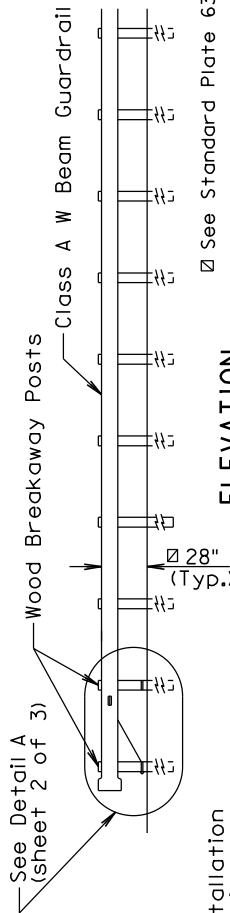


**PLAN**

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'

Offsets shall be measured from the installation line to the face of the W beam guardrail.

**ELEVATION**



**GENERAL NOTES:**

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

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

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

\*\*\* An adhesive object marker shall be placed on the end section buffer after placement of the end section buffer. The adhesive object marker dimensions may be 16" x 16" 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 shall be fluorescent yellow super or very high intensity. All costs for furnishing and installing the adhesive object marker shall 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 shall be incidental to the contract unit price per each for "W Beam Guardrail Breakaway Cable Terminal".

February 14, 2017

*Published Date: 3rd Qtr. 2019*

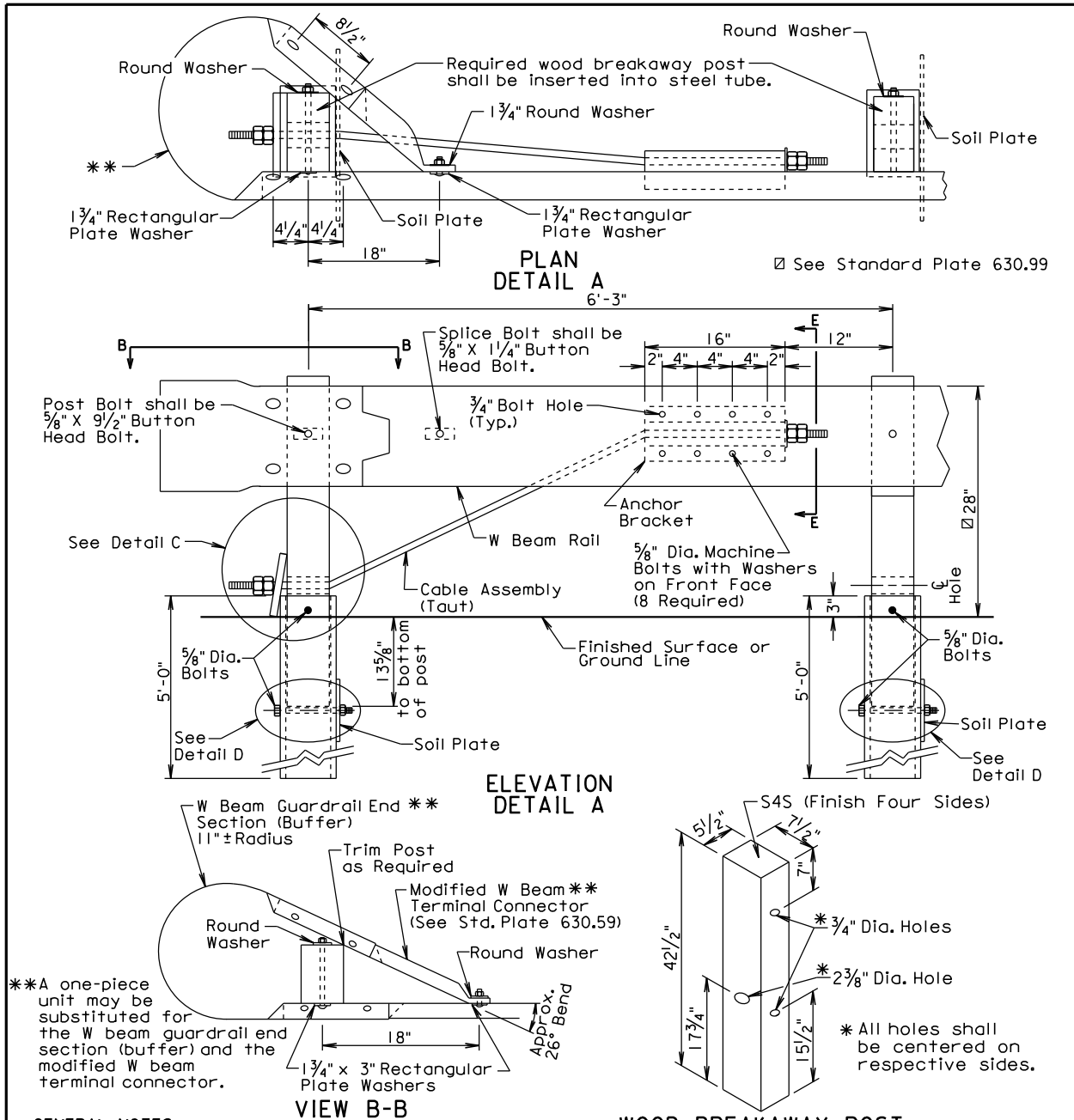
**SDOT**

**W BEAM GUARDRAIL  
BREAKAWAY CABLE TERMINAL**

**PLATE NUMBER  
630.85**

Sheet 1 of 3

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



Published Date: 3rd Qtr. 2019

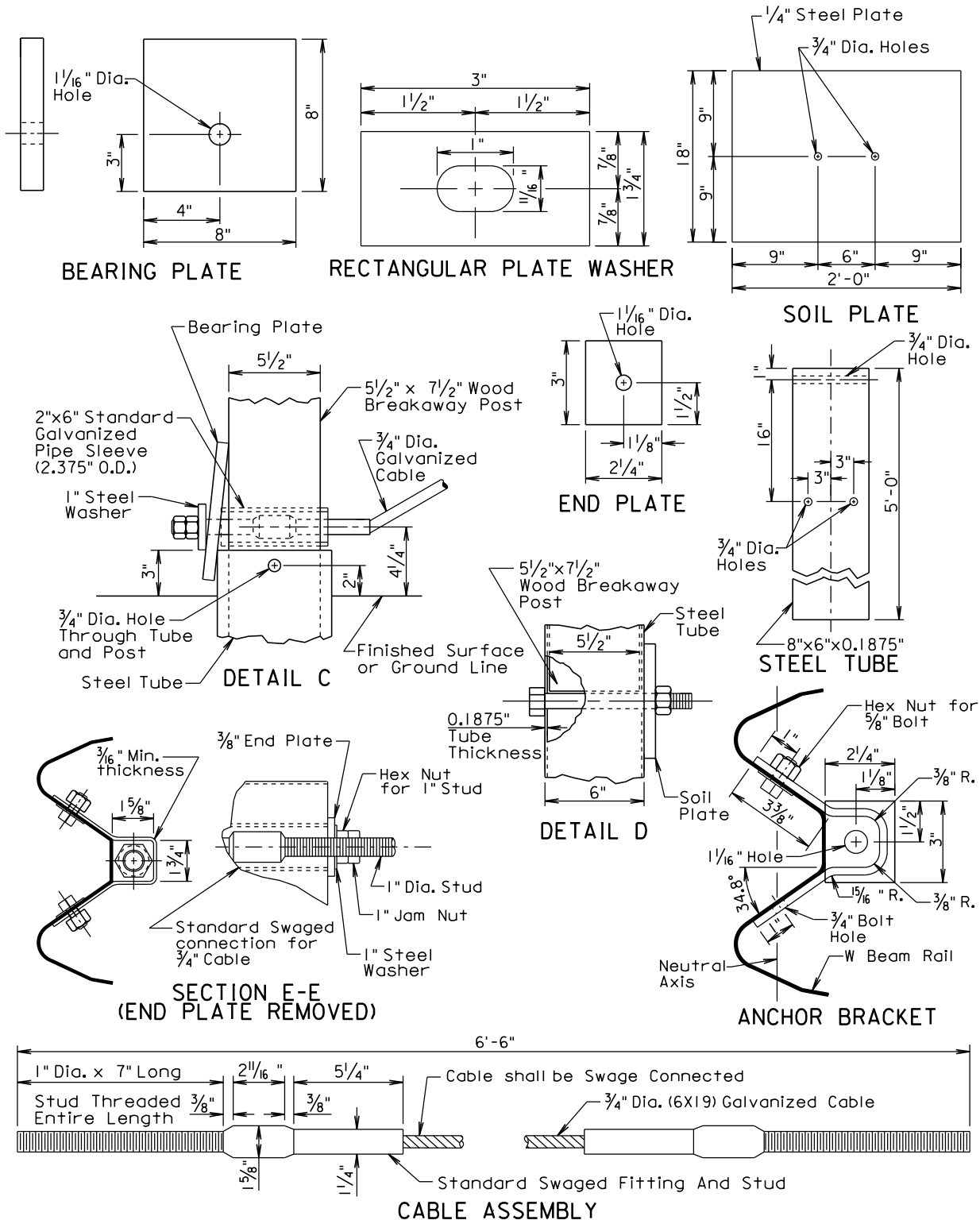
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**W BEAM GUARDRAIL  
BREAKAWAY CABLE TERMINAL**

**PLATE NUMBER  
630.85**

Sheet 2 of 3

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



February 14, 2017

Published Date: 3rd Qtr. 2019

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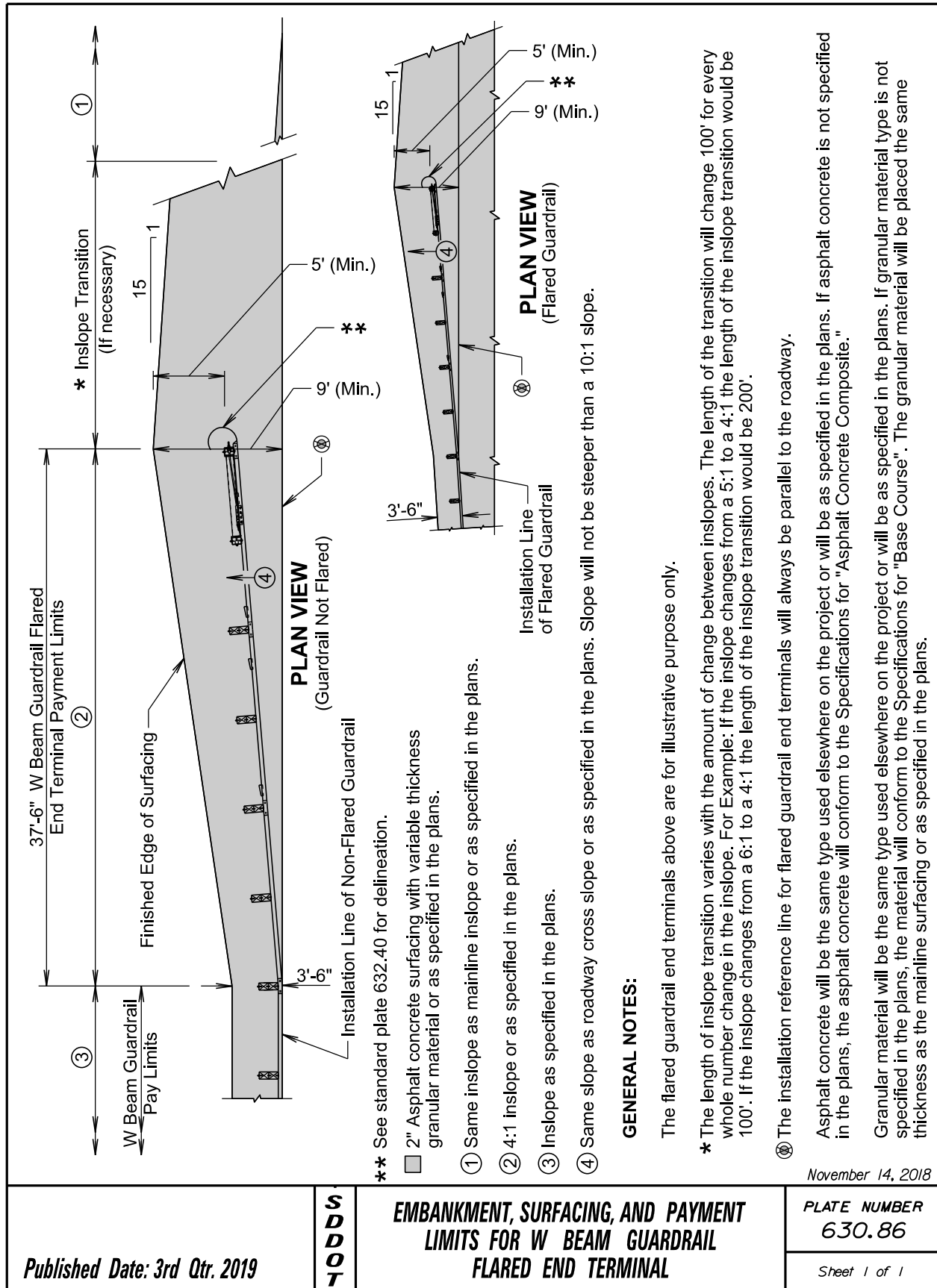
**W BEAM GUARDRAIL  
BREAKAWAY CABLE TERMINAL**

**PLATE NUMBER  
630.85**

Sheet 3 of 3



**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



Published Date: 3rd Qtr. 2019

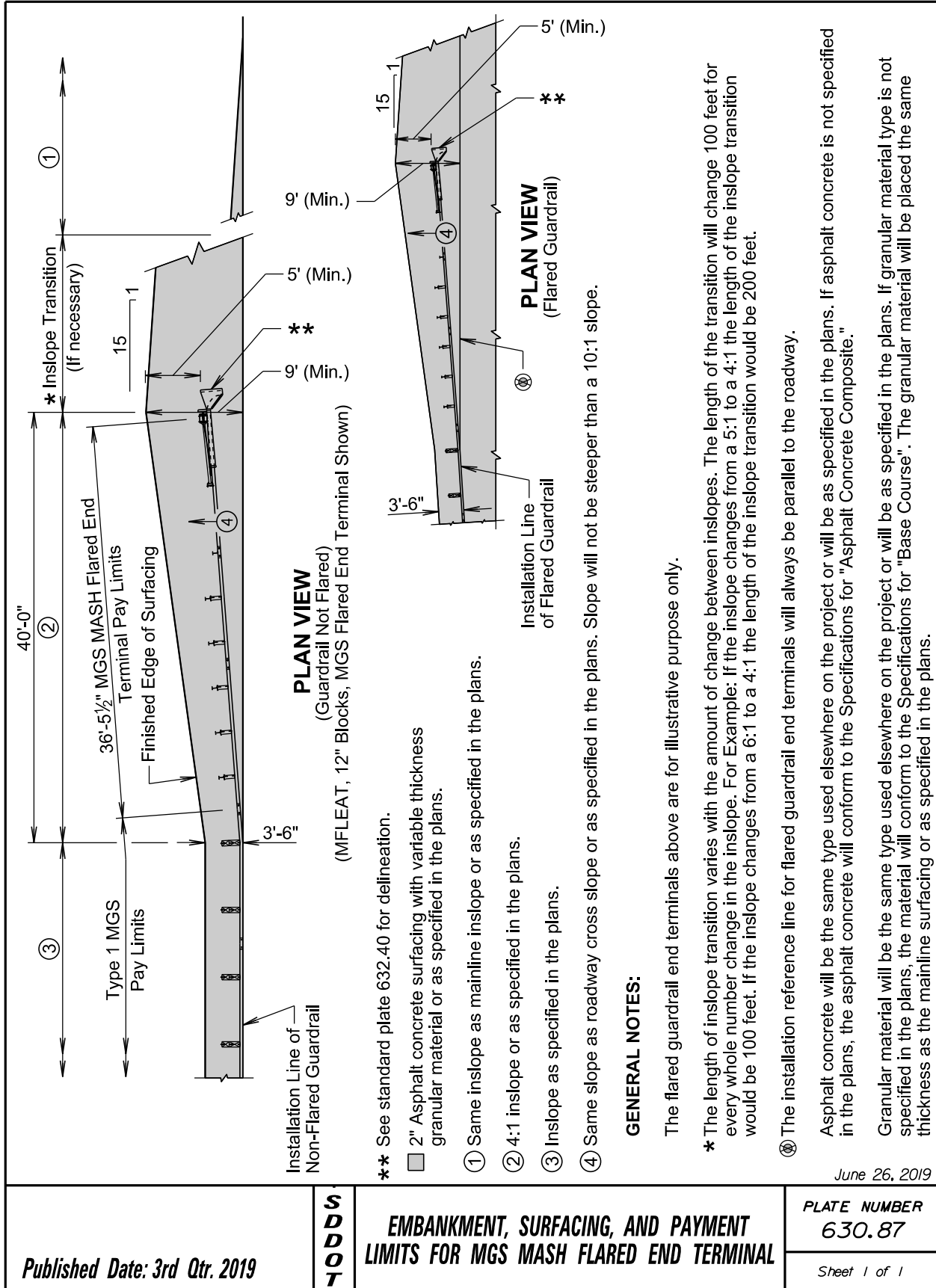
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**EMPAKMENT, SURFACING, AND PAYMENT  
LIMITS FOR W BEAM GUARDRAIL  
FLARED END TERMINAL**

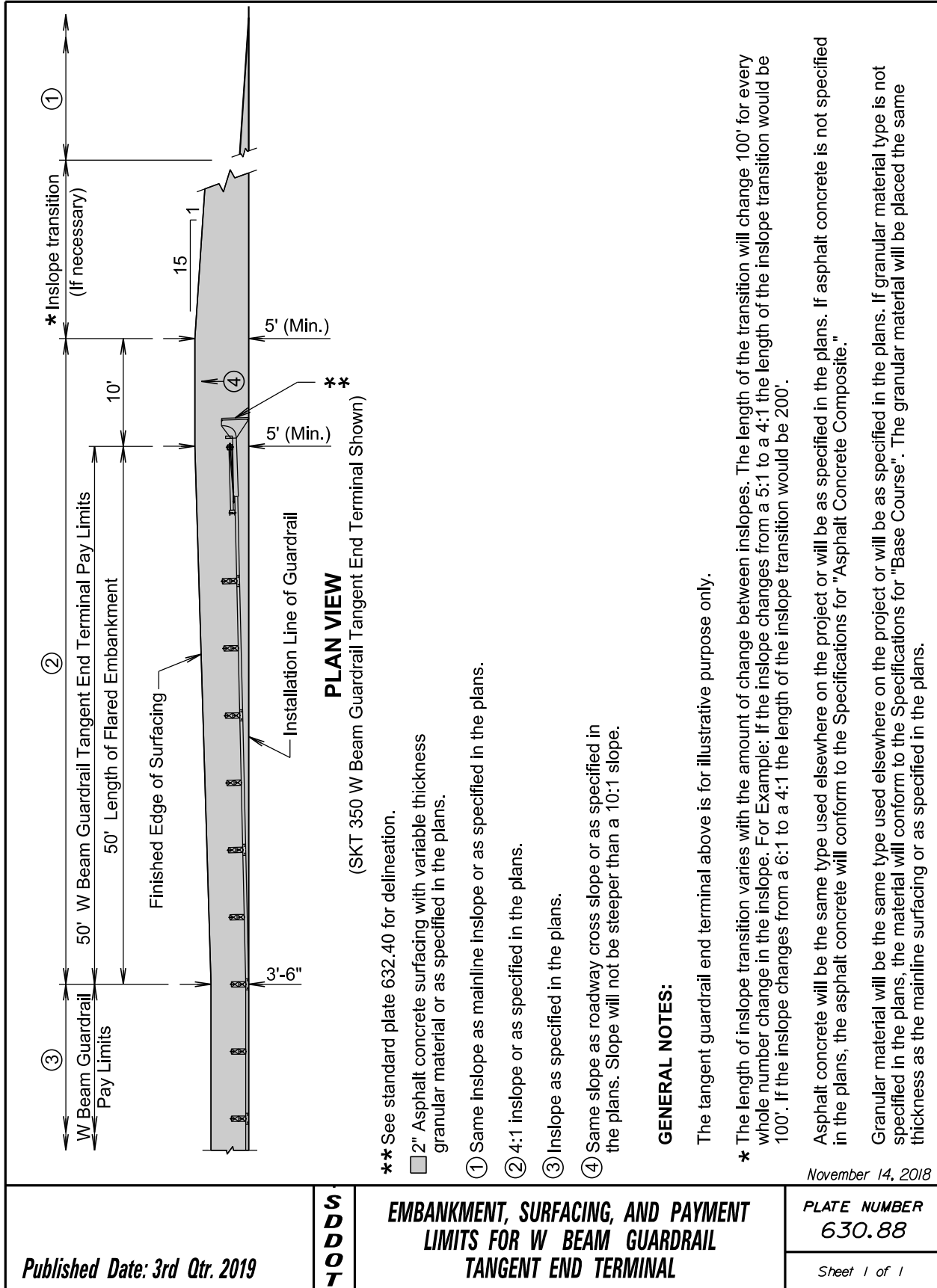
**PLATE NUMBER  
630.86**

Sheet 1 of 1

**0001-271, 0001-272, 0001-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



Published Date: 3rd Qtr. 2019

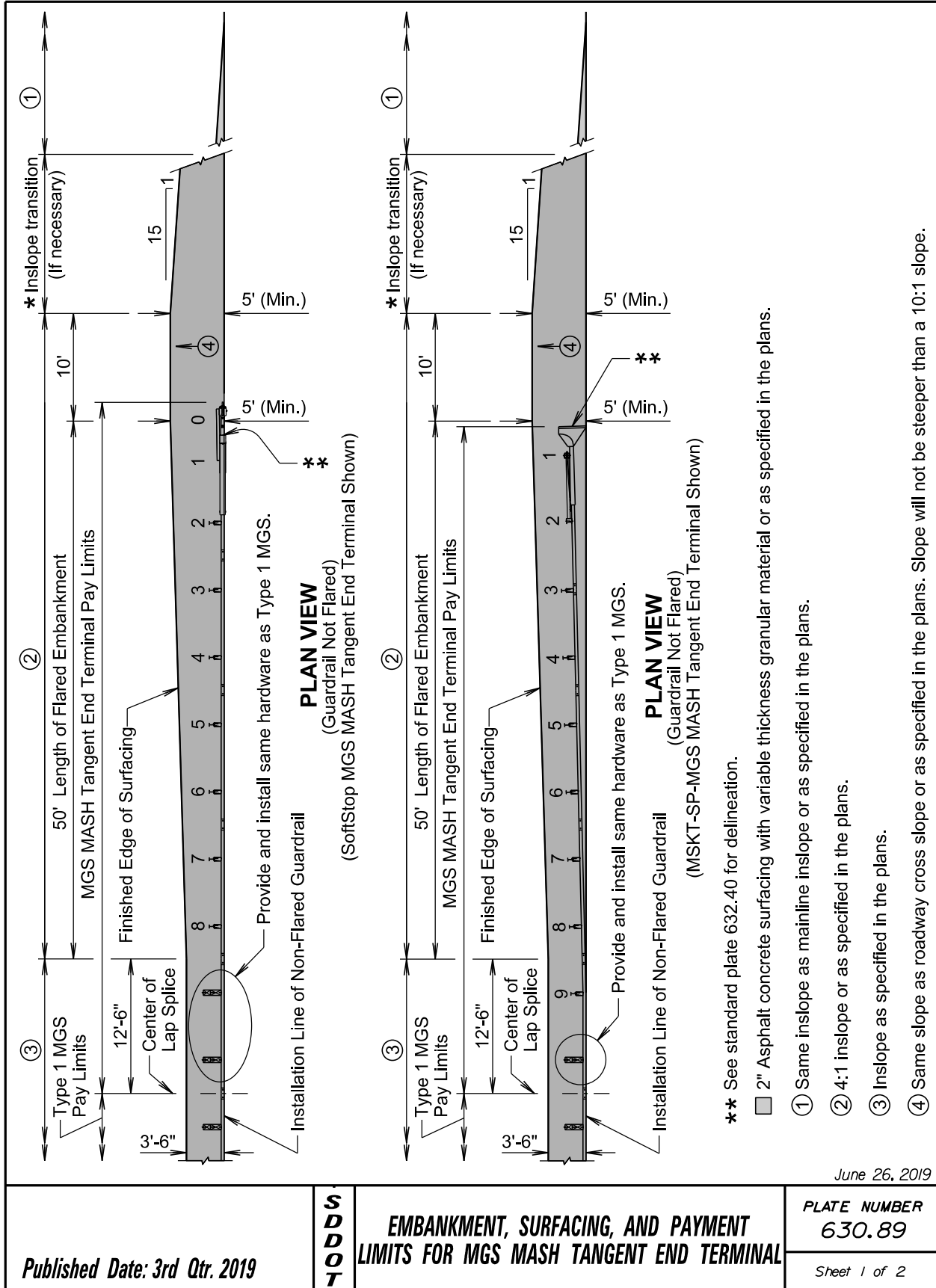
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**EMBANKMENT, SURFACING, AND PAYMENT  
LIMITS FOR W BEAM GUARDRAIL  
TANGENT END TERMINAL**

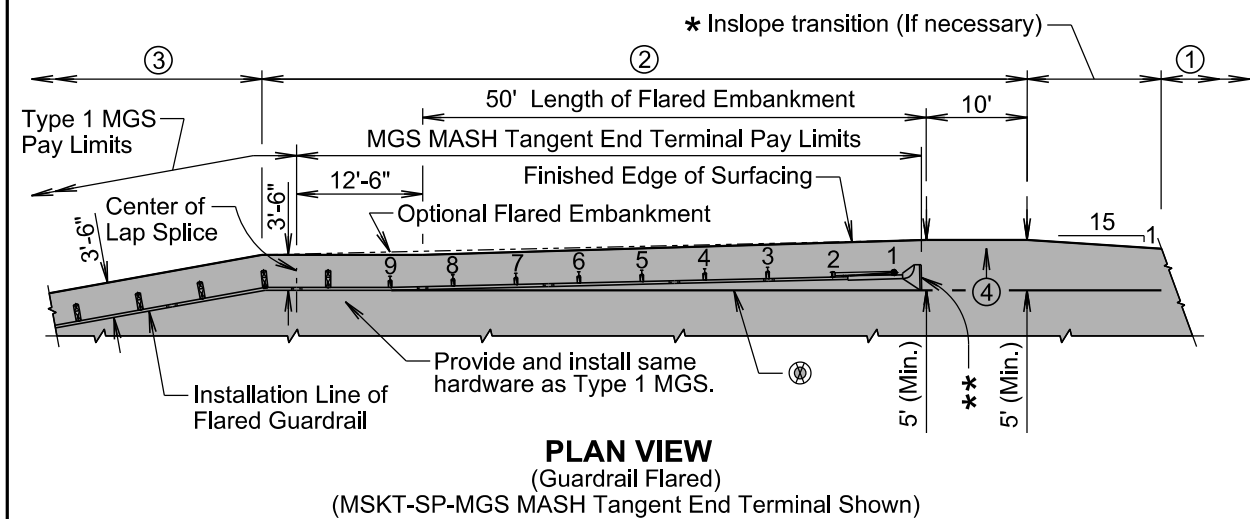
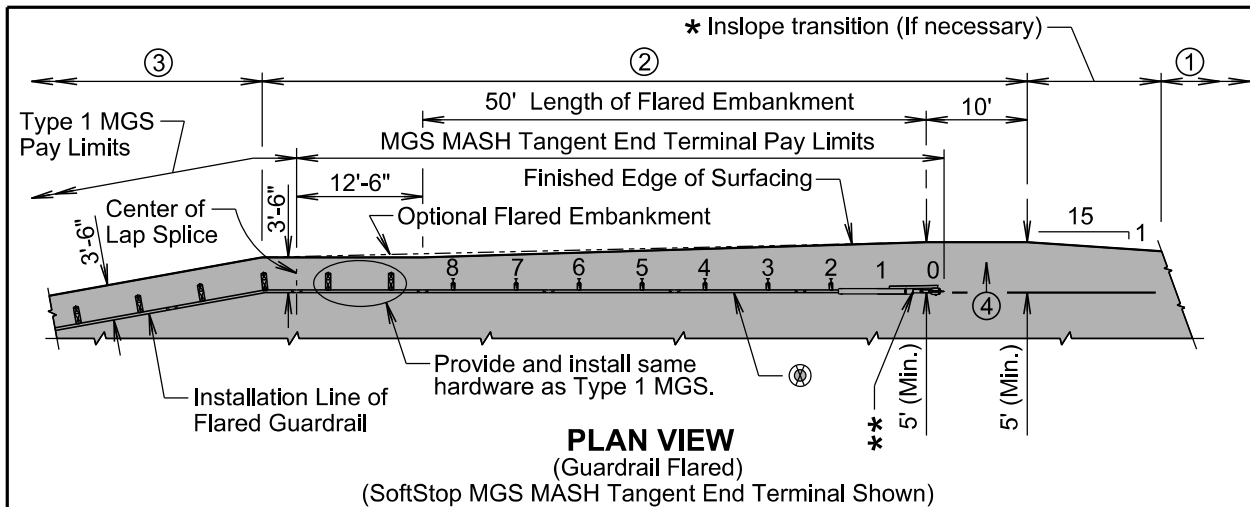
PLATE NUMBER  
**630.88**

Sheet 1 of 1

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**GENERAL NOTES:**

The MGS MASH tangent end terminals above are for illustrative purpose only.

- \* The length of inslope transition varies with the amount of change between inslopes. The length of the transition will change 100' for every whole number change in the inslope. For Example: If the inslope changes from a 5:1 to a 4:1 the length of the inslope transition would be 100'. If the inslope changes from a 6:1 to a 4:1 the length of the inslope transition would be 200'.

- ⊗ The installation reference line for MGS MASH tangent end terminals will always be parallel to the roadway.

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.

June 26, 2019

*Published Date: 3rd Qtr. 2019*

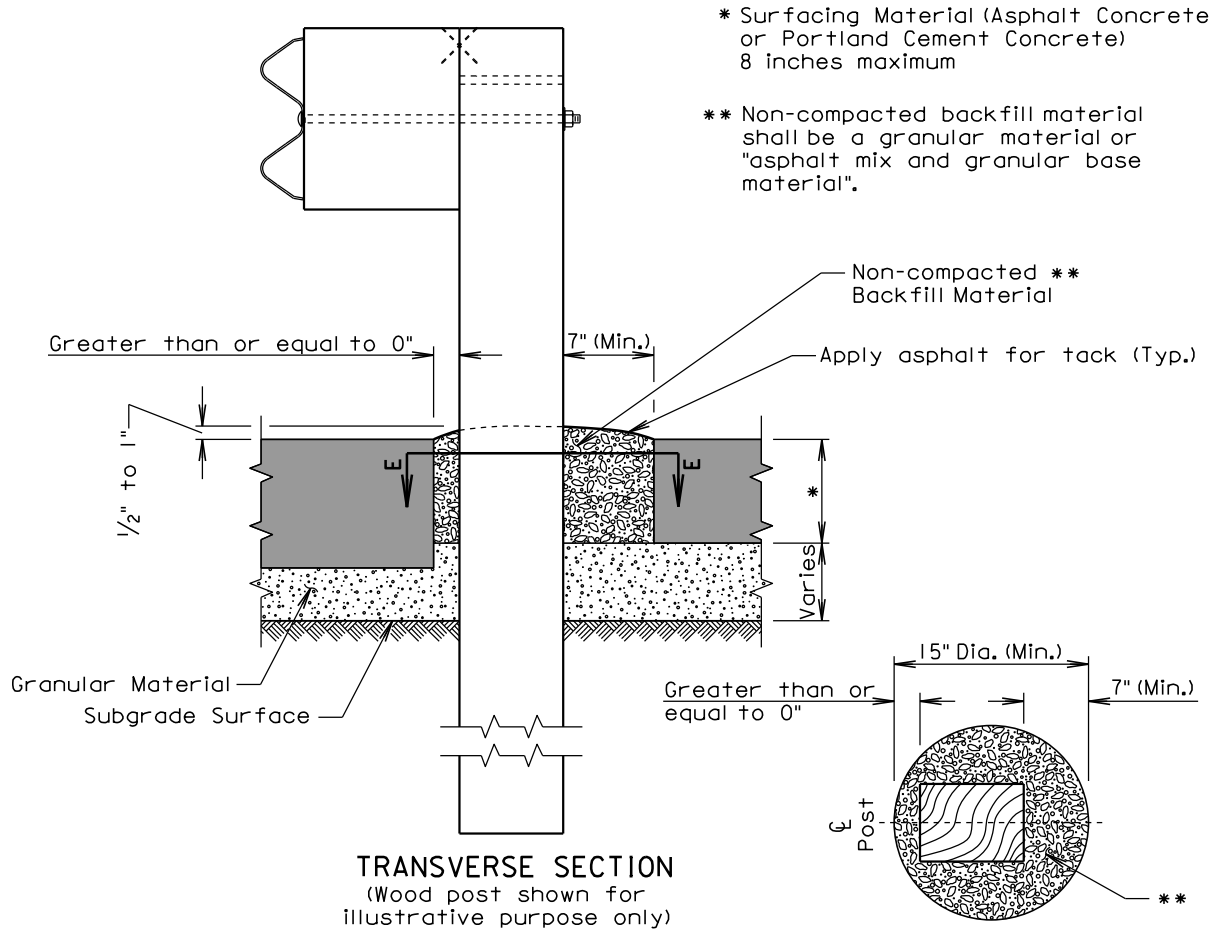
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**EMBANKMENT, SURFACING, AND PAYMENT  
LIMITS FOR MGS MASH TANGENT END TERMINAL**

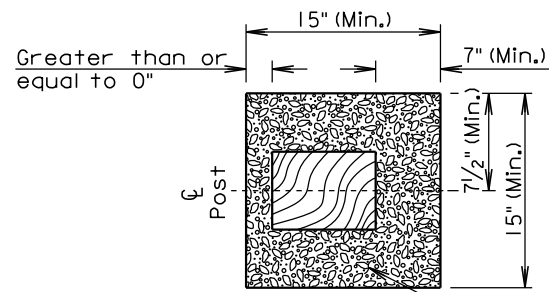
**PLATE NUMBER  
630.89**

Sheet 2 of 2

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**SECTION E-E**  
(Round option for leave-out and backfill limits)  
(Wood post shown for illustrative purpose only)



**SECTION E-E**  
(Square option for leave-out and backfill limits)  
(Wood post shown for illustrative purpose only)

**GENERAL NOTES:**

The leave-out limits may be increased to accommodate construction equipment and tolerances.

The backfill material shall be mounded  $\frac{1}{2}$  inch to 1 inch above the top of the adjacent surfacing as illustrated above.

Asphalt for tack shall be applied to the surface of the backfill material at the rate of .15 to .20 gallons per square yard.

All costs for constructing the leave-out including labor, equipment, and materials which includes the backfill material and tack coat shall be incidental to the contract unit price for the respective guardrail bid item.

February 14, 2017

Published Date: 3rd Qtr. 2019

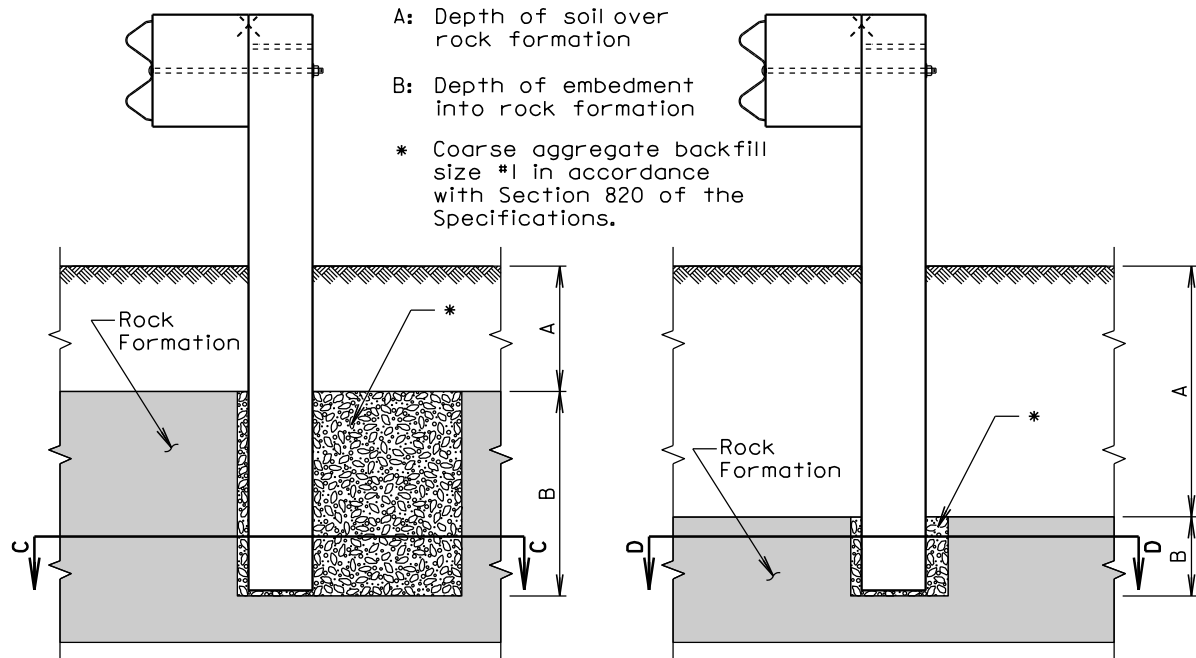
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**GUARDRAIL POST INSTALLED IN  
ASPHALT CONCRETE OR  
PORTLAND CEMENT CONCRETE**

**PLATE NUMBER  
630.96**

Sheet 1 of 1

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**

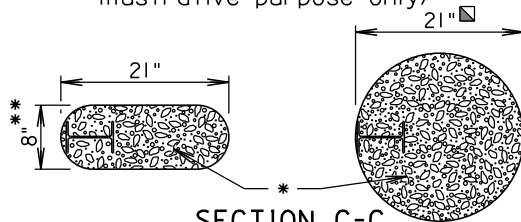


**TRANSVERSE SECTION**

(Configuration Type 1)  
(Wood post shown for illustrative purpose only)

**TRANSVERSE SECTION**

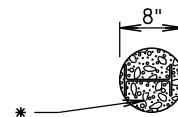
(Configuration Type 2)  
(Wood post shown for illustrative purpose only)



**SECTION C-C**

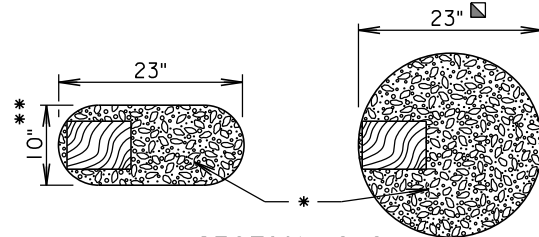
(Configuration Type 1)

(Steel posts, either hole shown is acceptable.)



**SECTION D-D**

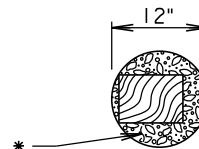
(Configuration Type 2)  
(Steel Posts)



**SECTION C-C**

(Configuration Type 1)

(Wood posts, either hole shown is acceptable.)



**SECTION D-D**

(Configuration Type 2)  
(Wood Posts)

**GENERAL NOTES FOR CONFIGURATION TYPE 1:**

The overlying soil depth "A" is 0 to 18 inches and the depth into rock "B" is 24 inches.

\*\* May be increased to 15 inches to accommodate construction tolerances.

■ May be increased to 24 inches to accommodate construction tolerances.

**GENERAL NOTES FOR CONFIGURATION TYPE 2:**

The overlying soil depth "A" is 18 inches to full post embedment depth. The required depth into rock "B" is equal to full post embedment depth minus "A".

February 14, 2017

*Published Date: 3rd Qtr. 2019*

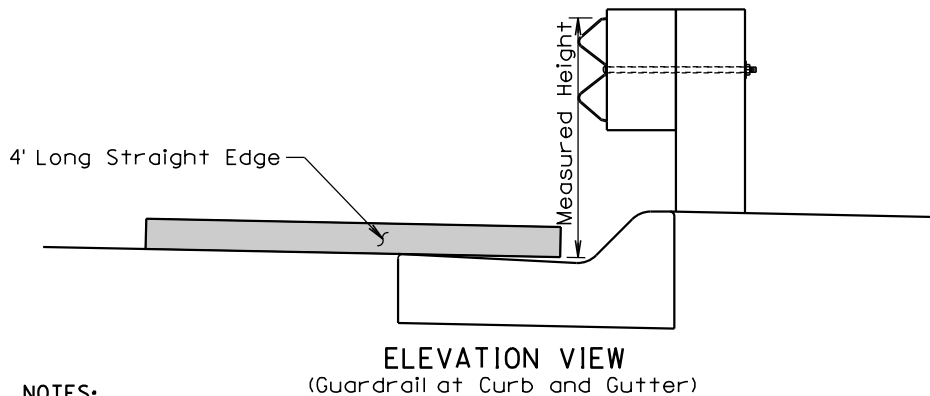
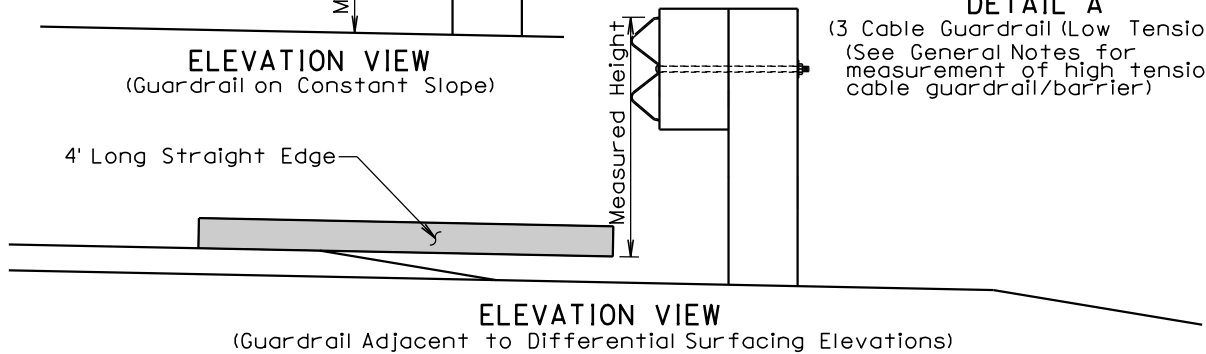
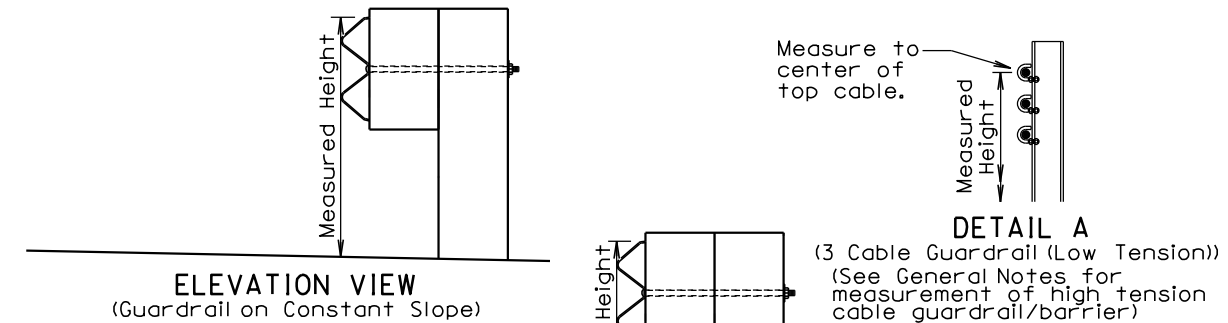
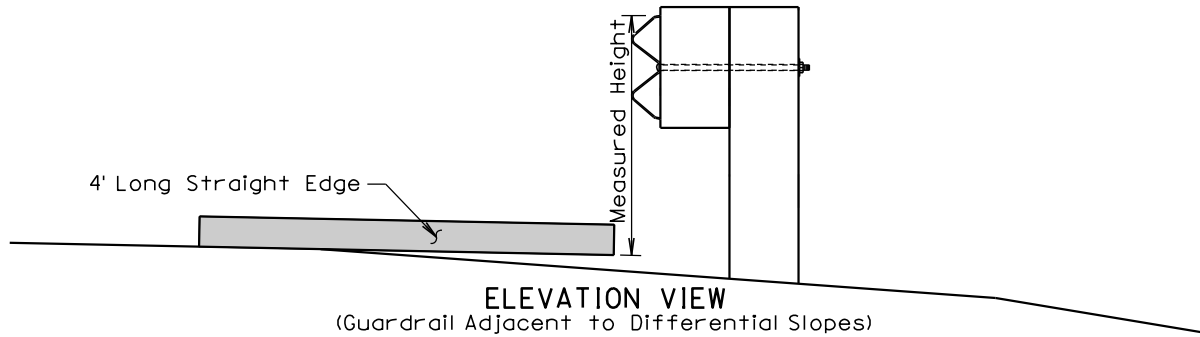
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**GUARDRAIL POST INSTALLED  
IN ROCK FORMATION**

**PLATE NUMBER  
630.97**

*Sheet 1 of 1*

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**GENERAL NOTES:**

The W Beam guardrail shown is for illustrative purpose. The guardrail height for all types of guardrail systems except for high tension cable guardrail/barrier shall be measured in accordance with this standard plate.

When measuring height of 3 cable guardrail (low tension) the height shall be measured to the center of the top cable. See Detail A.

The height of high tension cable guardrail/barrier shall be measured in accordance with the Manufacturer's installation instructions.

*December 23, 2017*

*Published Date: 3rd Qtr. 2019*

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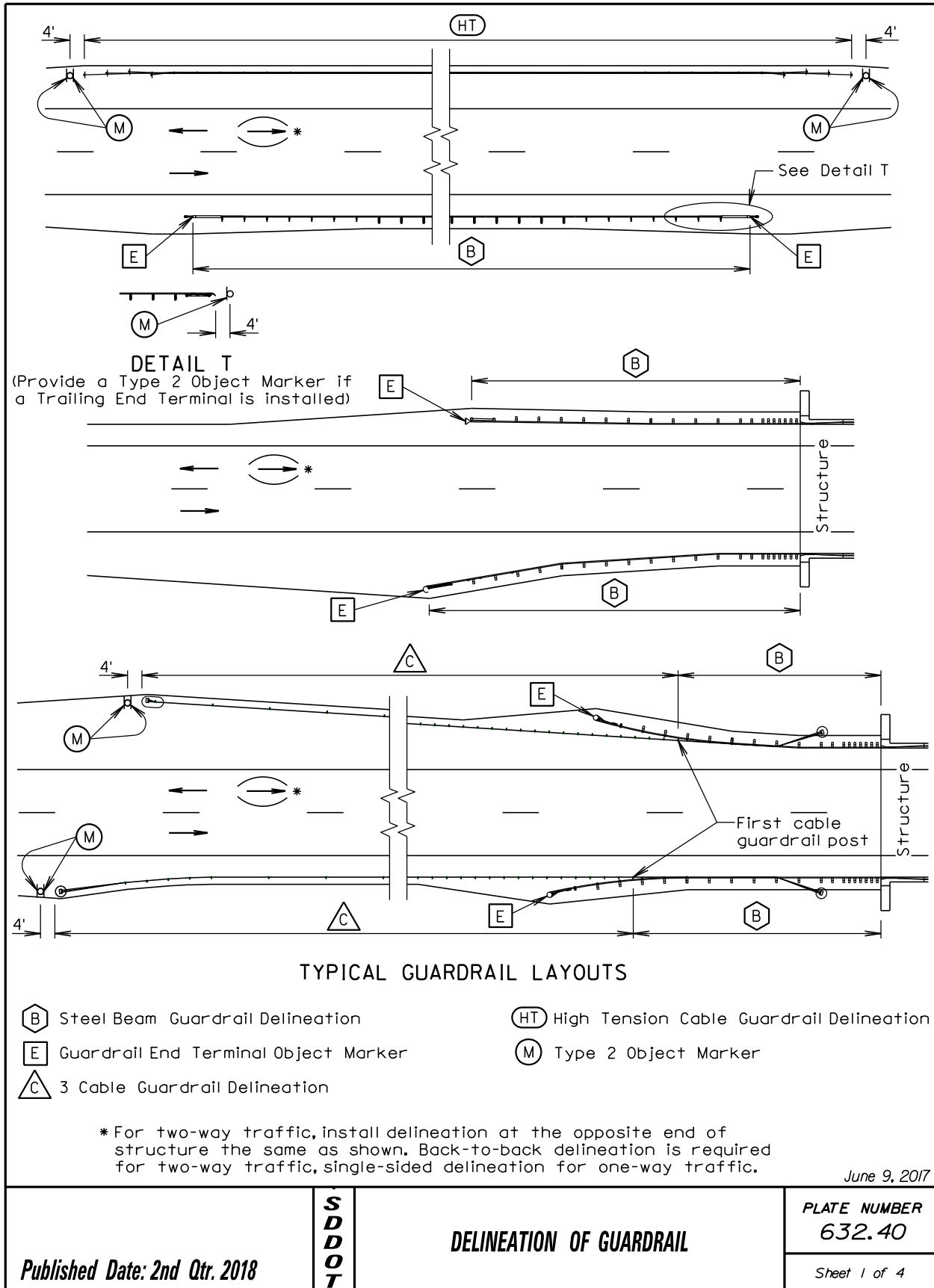
**MEASURING GUARDRAIL HEIGHT**

**PLATE NUMBER  
630.99**

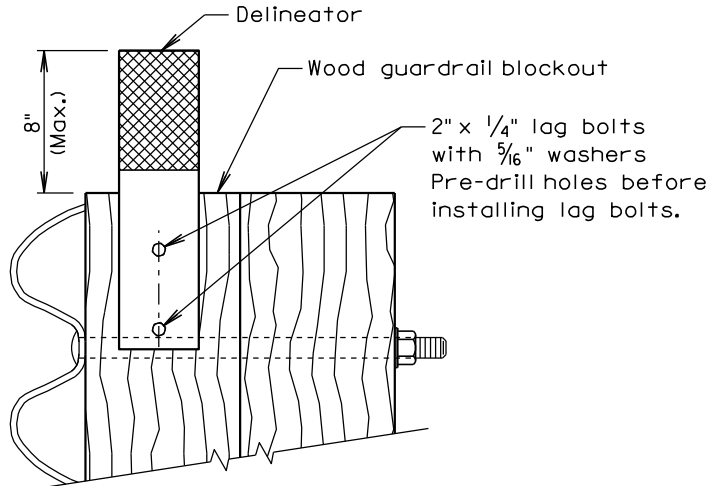
*Sheet 1 of 1*



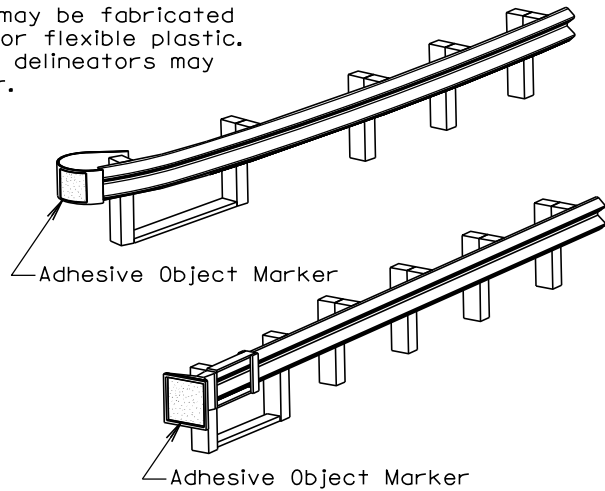
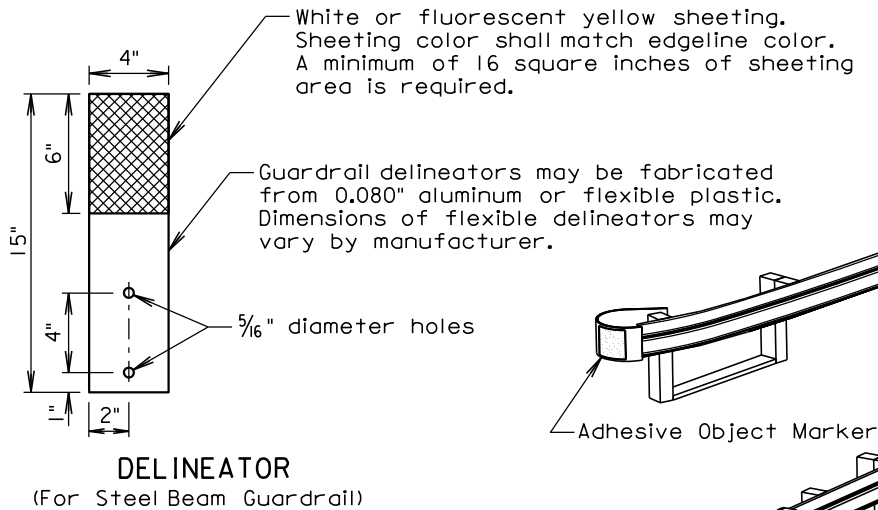
**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



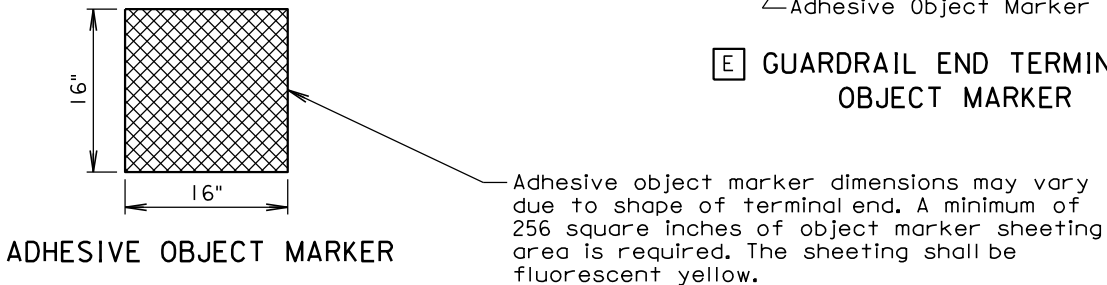
**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**B STEEL BEAM GUARDRAIL DELINEATION**



**E GUARDRAIL END TERMINAL  
OBJECT MARKER**



June 9, 2017

*Published Date: 2nd Qtr. 2018*

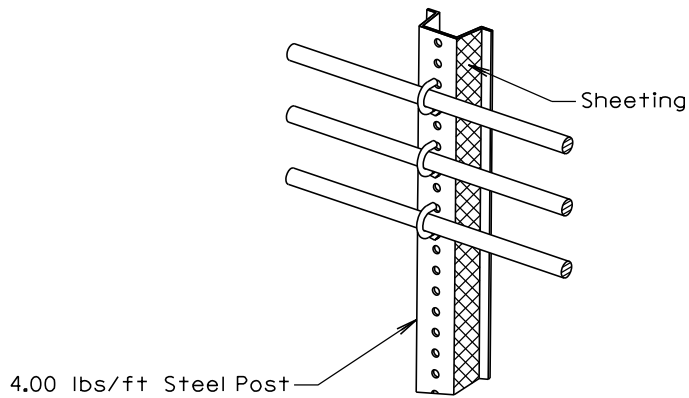
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**DELINEATION OF GUARDRAIL**

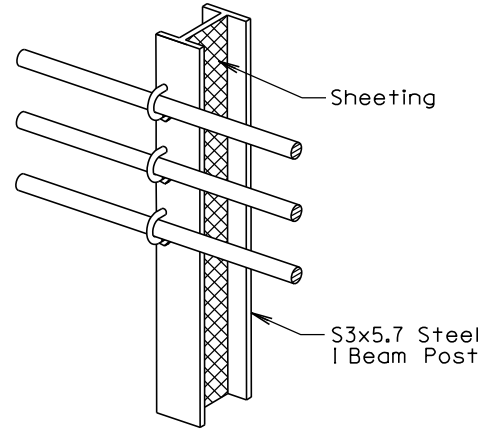
**PLATE NUMBER  
632.40**

Sheet 2 of 4

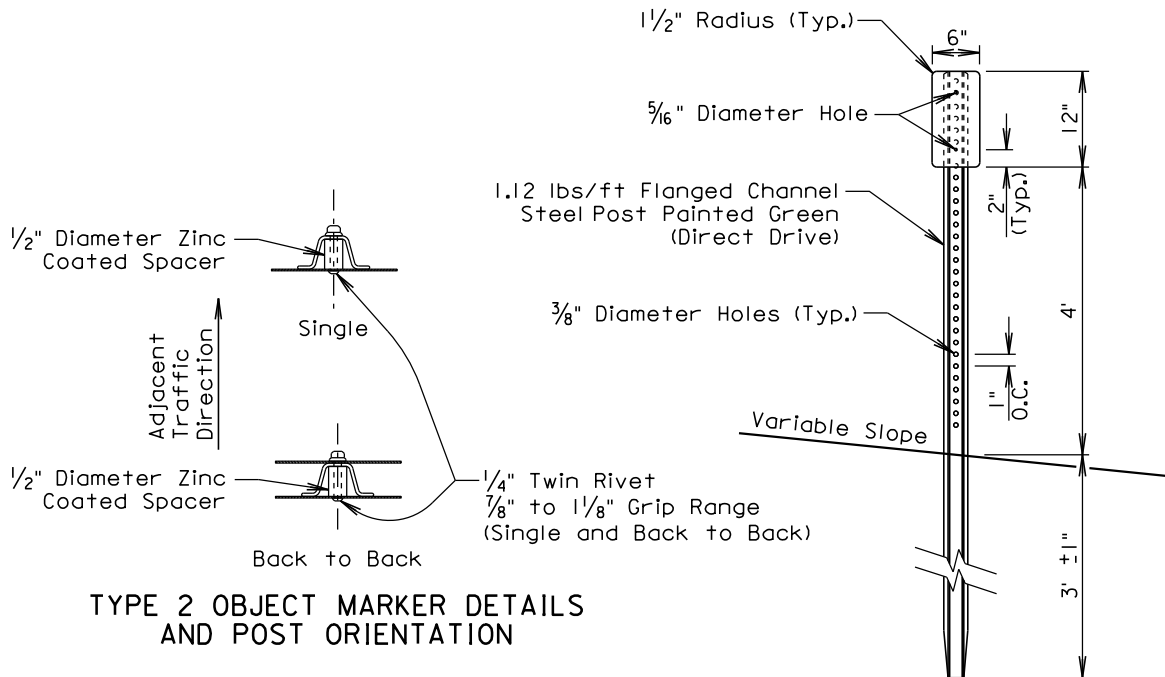
**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



**△ 3 CABLE GUARDRAIL DELINEATION**



**△ 3 CABLE GUARDRAIL DELINEATION**



**TYPE 2 OBJECT MARKER DETAILS  
AND POST ORIENTATION**

**Ⓜ TYPE 2 OBJECT MARKER**

(For Marking 3 Cable Guardrail Anchor,  
High Tension Cable Guardrail Anchor,  
and Trailing End Terminal)

June 9, 2017

Published Date: 2nd Qtr. 2018

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**DELINEATION OF GUARDRAIL**

**PLATE NUMBER  
632.40**

Sheet 3 of 4

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**

**GENERAL NOTES:**

The delineation of high tension cable guardrail shall be reflective sheeting placed back to back on every other post cap or cable spacer. The sheeting shall 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 posts shall be covered with a minimum of 16 square inches of reflective sheeting. The reflective sheeting shall be type XI in conformance with ASTM D4956. Along two-way roadways the sheeting shall be on both sides of the delineators and guardrail posts and shall 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 shall be attached to the post nearest the bridge.

At bridges with guardrail less than 200 feet in length, a minimum of 4 delineators shall be placed in addition to the end terminal yellow object marker. The spacing between the delineators shall 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, the delineators shall be placed at a spacing of approximately 50 feet. Delineation shall 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 shall be placed in addition to the end terminal yellow object markers. The spacing between the delineators shall 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, the delineators shall be placed at a spacing of approximately 50 feet. Delineation shall 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 shall 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 shall be incidental to the respective high tension cable guardrail bid item.

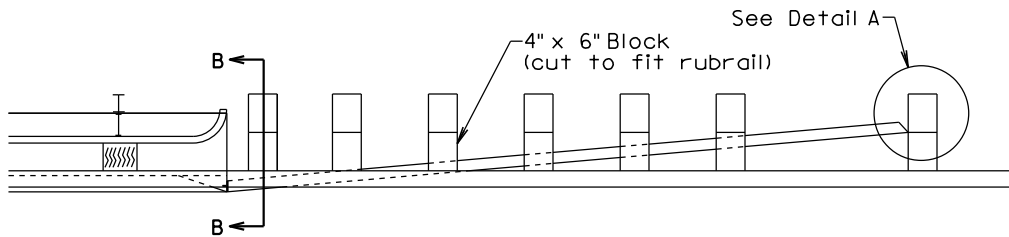
An adhesive object marker shall be placed on the end of the W beam guardrail or MGS end terminal. The adhesive object marker dimensions may vary due to the shape of the terminal end. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting shall be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

A type 2 object marker shall be placed adjacent to the 3 cable guardrail 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") shall 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 shall 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.

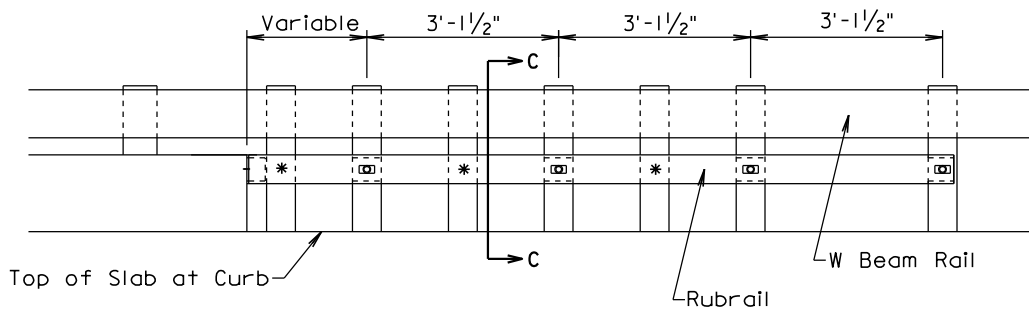
June 9, 2017

<i>Published Date: 2nd Qtr. 2018</i>	<b>S D D O T</b>	<b>DELINEATION OF GUARDRAIL</b>	<b>PLATE NUMBER</b> <b>632.40</b>
			Sheet 4 of 4

**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**

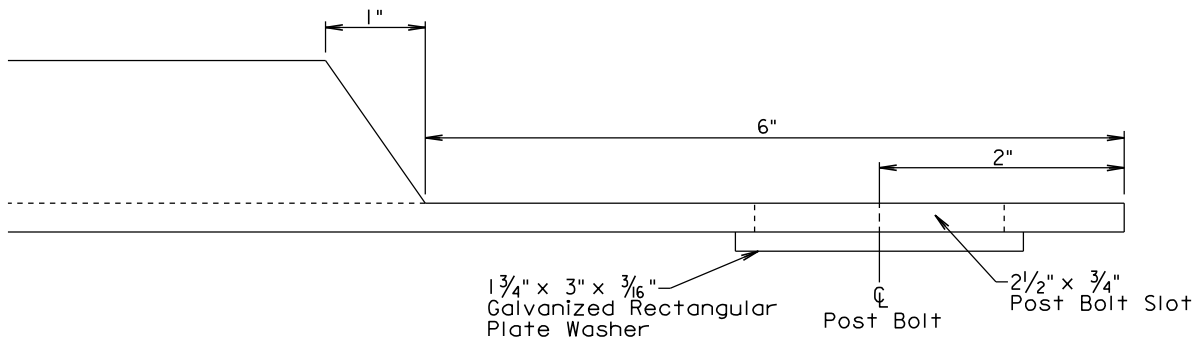


**PLAN**



\*Rubrail does not have to be attached to these posts.

**ELEVATION**



**DETAIL A**

(Post, Block, and Post Bolt not shown)

**GENERAL NOTES:**

The steel shall be in conformance with ASTM A 36 and shall be galvanized after fabrication in conformance with ASTM A 123. If pre-galvanized steel members are used, all cuts and welds shall be coated with an approved galvanizing paint.

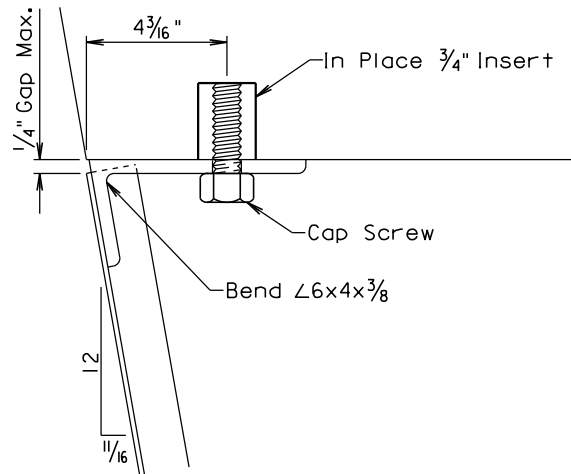
Offset blocks shall be in conformance with section 630 of the Standard Specifications.

All hardware shall be in conformance with the requirements of AASHTO M 180.

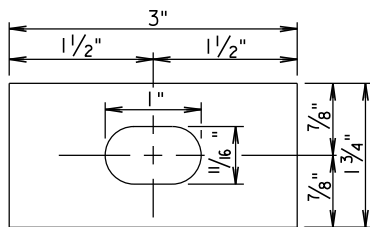
March 31, 2000

**RUBRAIL (1 of 2)**

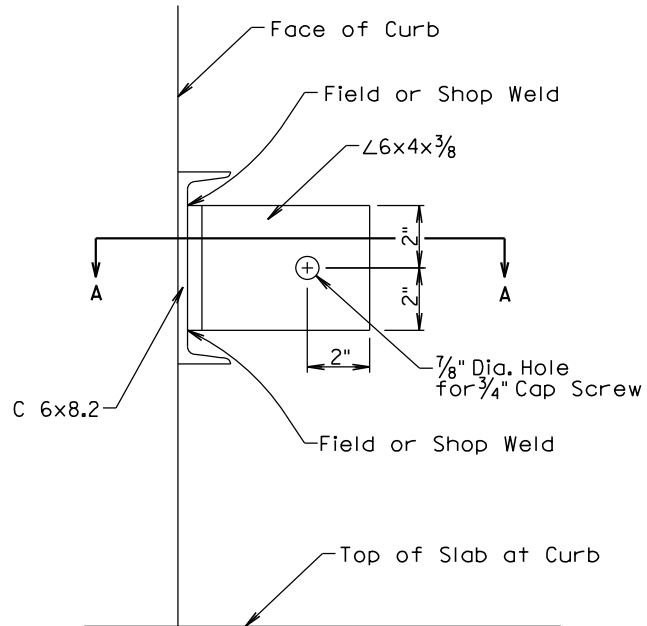
**000I-271, 000I-272, 000I-291 & 000P-292 - GUARDRAIL REPAIR  
BON HOMME, CHARLES MIX, CLAY, HUTCHINSON, LAKE, LINCOLN, MINER,  
MINNEHAHA, MOODY, TURNER, UNION & YANKTON COUNTIES**



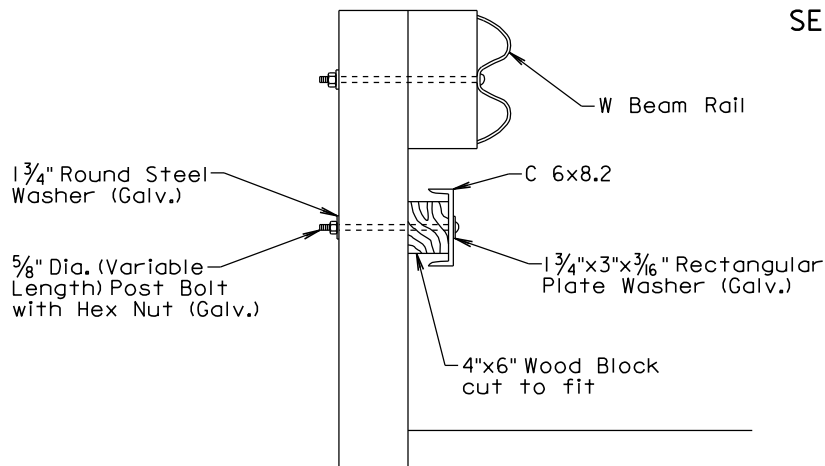
**SECTION A-A**



**RECTANGULAR PLATE WASHER**



**SECTION B-B**



**SECTION C-C**

March 31, 2000

**RUBRAIL (2 of 2)**

**PLAN VIEW**

**GENERAL NOTES:**

- 1 Finished embankment surfacing cross slope shall be the same as the roadway cross slope.
- 2 Finished embankment surfacing cross slope transition.
- 3 Finished embankment surfacing cross slope shall be 10:1, however, a cross slope flatter than 10:1 may be used to obtain the 6" minimum thickness of granular material.

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

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