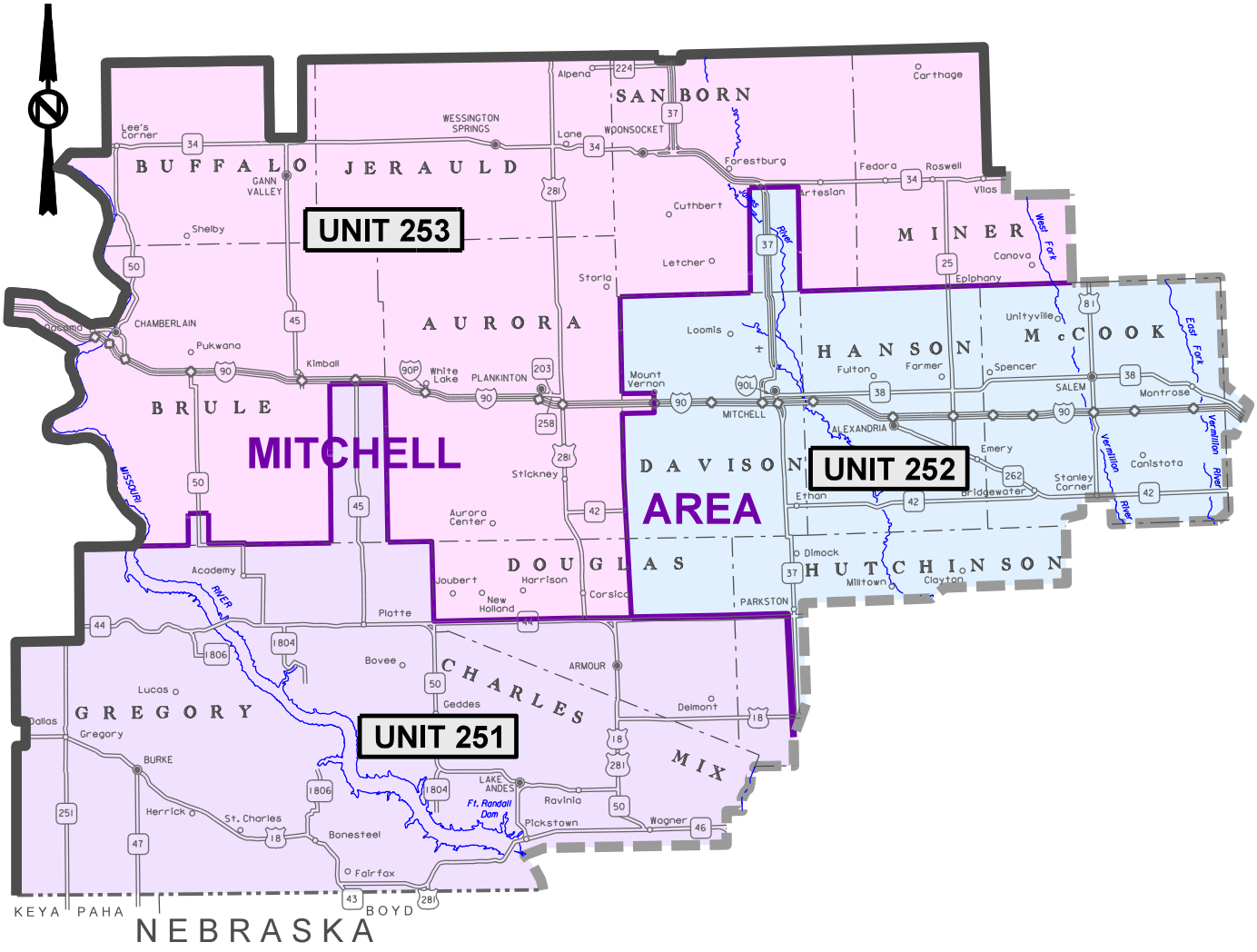
# GUARDRAIL REPAIR
# 000P-251, 000I-252 & 000I-253
# AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON, HUTCHINSON, JERAULD, LYMAN, MCCOOK, MINER & SANBORN COUNTIES
# PCN I40P, I40Q & I40R



## INDEX OF SHEETS

## 000P-251, 000I-252 & 000I-253 - GUARDRAIL REPAIR
## AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, DOUGLAS, GREGORY, HANSON, HUTCHINSON, JERAULD, LYMAN, McCOOK, MINER & SANBORN COUNTIES

# ESTIMATE OF QUANTITIES

| BID ITEM NUMBER | ITEM | | 000P-251 PCN I40P QUANTITY | 000I-252 PCN I40Q QUANTITY | 000I-253 PCN I40R QUANTITY | TOTAL QUANTITY | UNIT |
|---|---|---|---|---|---|---|---|
| 009E0197 | Mobilization 1 | *(Unit 251)* | 2 | - | - | 2 | Each |
| 009E0198 | Mobilization 2 | *(Unit 252)* | - | 5 | - | 5 | Each |
| 009E0199 | Mobilization 3 | *(Unit 253)* | - | - | 6 | 6 | Each |
| 629E0100 | 3 Cable Guardrail | | <---------- 100 ----------> | | | 100 | Ft |
| 629E0210 | Reset High Tension 3 Cable Guardrail | | <---------- 100 ----------> | | | 100 | Ft |
| 629E0211 | Reset High Tension 4 Cable Guardrail | | <---------- 250 ----------> | | | 250 | 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 | | 4 | 8 | 8 | 20 | Each |
| 629E0453 | Retension High Tension 3 Cable Guardrail | | <---------- 250 ----------> | | | 250 | Ft |
| 629E0454 | Retension High Tension 4 Cable Guardrail | | <---------- 500 ----------> | | | 500 | Ft |
| 629E1000 | Repair 3 Cable Guardrail | | 400 | 800 | 800 | 2000 | Ft |
| 629E1010 | Repair 3 Cable Guardrail Slip Base Anchor Assembly | | <---------- 1 ----------> | | | 1 | Each |
| 629E1100 | 3 Cable Guardrail End Post | *(I Beam)* | 2 | 4 | 4 | 10 | Each |
| 629E1102 | 3 Cable Guardrail Intermediate Post | *(Flanged)* | 20 | 50 | 50 | 120 | Each |
| 629E1102 | 3 Cable Guardrail Intermediate Post | *(I Beam)* | 2 | 4 | 4 | 10 | Each |
| 629E1103 | 3 Cable Guardrail Slip Base Anchor Post | | 1 | 1 | 1 | 3 | Each |
| 629E1104 | 3 Cable Guardrail Post, Winter | | 10 | 30 | 30 | 70 | Each |
| 629E1106 | Drive Down 3 Cable Guardrail Post | | 3 | 4 | 3 | 10 | Each |
| 629E1108 | Reset 3 Cable Guardrail Post | | 6 | 12 | 12 | 30 | Each |
| 629E1110 | Cable Anchor Bracket | | 1 | 1 | 1 | 3 | Each |
| 629E1112 | Cable Splice | | 2 | 2 | 2 | 6 | Each |
| 629E1114 | 3 Cable Guardrail J Hook Bolt | | 100 | 200 | 200 | 500 | Each |
| 629E1116 | Steel Turnbuckle Cable End Assembly | | 2 | 2 | 2 | 6 | Each |
| 629E1118 | Spring Cable End Assembly with Turnbuckle | | 2 | 2 | 2 | 6 | Each |
| 629E1120 | W Beam to 3 Cable Transition Bracket | | 2 | 2 | 2 | 6 | Each |
| 629E1122 | 3 Cable Guardrail End Post Cap | | 2 | 2 | 2 | 6 | Each |
| 629E1143 | High Tension 3 Cable Guardrail Post | | <---------- 1 ----------> | | | 1 | Each |
| 629E1144 | High Tension 4 Cable Guardrail Post | | <---------- 5 ----------> | | | 5 | Each |
| 629E1158 | High Tension 3 Cable Guardrail Post and Sleeve | | <---------- 1 ----------> | | | 1 | Each |
| 629E1159 | High Tension 4 Cable Guardrail Post and Sleeve | | <---------- 1 ----------> | | | 1 | Each |
| 629E1163 | High Tension 3 Cable Guardrail Sleeve | | <---------- 1 ----------> | | | 1 | Each |
| 629E1164 | High Tension 4 Cable Guardrail Sleeve | | <---------- 1 ----------> | | | 1 | Each |
| 629E1170 | High Tension Cable Guardrail Terminal Post | | <---------- 2 ----------> | | | 2 | Each |
| 630E0200 | Straight Class A Thrie Beam Rail | *(12 Gauge)* | 12.5 | 12.5 | 12.5 | 37.5 | Ft |
| 630E0210 | Straight Class B Thrie Beam Rail | *(10 Gauge)* | 12.5 | 12.5 | 12.5 | 37.5 | Ft |
| 630E1200 | Straight Class A W Beam Rail | *(12 Gauge)* | 50 | 75 | 75 | 200 | Ft |
| 630E1210 | Straight Class B W Beam Rail | *(10 Gauge)* | 12.5 | 12.5 | 12.5 | 37.5 | Ft |
| 630E2000 | W Beam to Thrie Beam Guardrail Transition | *(6.25')* | <---------- 1 ----------> | | | 1 | Each |
| 630E2015 | W Beam Guardrail Flared End Terminal | | <---------- 1 ----------> | | | 1 | Each |
| 630E2020 | W Beam Guardrail Tangent End Terminal | | <---------- 1 ----------> | | | 1 | Each |
| 630E2030 | W Beam Guardrail Breakaway Cable Terminal | | <---------- 1 ----------> | | | 1 | Each |
| 630E2050 | Beam Guardrail Trailing End Terminal | *(W or Thrie)* | <---------- 1 ----------> | | | 1 | Each |
| 630E2100 | Beam Guardrail Post | *(6" x 8" x 6', 6.5' or 7')* | 2 | 2 | 2 | 6 | Each |
| 630E2105 | Beam Guardrail Block | *(6" x 8" x 14" or 22.5"')* | 2 | 2 | 2 | 6 | Each |
| 630E2110 | Beam Guardrail Post and Block | *(6', 6.5' or 7' Post)* | 13 | 14 | 13 | 40 | Each |
| 630E2120 | Beam Guardrail Post and Block, Winter | | 7 | 6 | 7 | 20 | Each |
| 630E2150 | End Terminal Wood Breakaway Post | | 2 | 2 | 2 | 6 | Each |
| 630E2155 | End Terminal Hinged Breakaway Post | | 1 | 1 | 1 | 3 | Each |
| 630E2210 | Breakaway Cable Terminal End Rail | | 1 | 1 | 1 | 3 | Each |
| 630E2215 | W Beam Guardrail End Section Buffer | | 1 | 1 | 1 | 3 | Each |
| 630E2220 | Tangent End Terminal Extruder Head | | <---------- 1 ----------> | | | 1 | Each |
| 630E2235 | Tangent End Terminal Rail | | <---------- 25 ----------> | | | 25 | Ft |
| 630E2300 | Rubrail | | <---------- 14 ----------> | | | 14 | Ft |
| 630E5520 | Drive Down Beam Guardrail Post | | 2 | 2 | 2 | 6 | Each |
| 630E5550 | Reset Beam Guardrail Post and Block | | 2 | 4 | 4 | 10 | Each |
| 632E2220 | Guardrail Delineator | | 10 | 20 | 20 | 50 | Each |
| 632E2510 | Type 2 Object Marker Back to Back | | 1 | 1 | 1 | 3 | Each |
| 632E2520 | Type 2 Object Marker | | 2 | 4 | 4 | 10 | Each |
| 634E0010 | Flagging | | 1 | 1 | 1 | 3 | Hour |
| 634E0110 | Traffic Control Signs | | 48 | 80 | 80 | 208 | SqFt |
| 634E0120 | Traffic Control, Miscellaneous | | <---------- Lump Sum ----------> | | | Lump Sum | LS |
| 634E0420 | Type C Advance Warning Arrow Panel | | <---------- 1 ----------> | | | 1 | Each |

## ENVIRONMENTAL COMMITMENTS

An Environmental Commitment is a measure that SDDOT commits to implement in order to avoid, minimize, and/or mitigate a real or potential environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency mentioned below with permitting authority can influence a project if perceived environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office. The environmental commitments associated with this project are as follows:

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

### COMMITMENT B2: WHOOPING CRANE

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

**Action Taken/Required:**

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

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

**Action Taken/Required:**

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

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

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

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

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

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

**COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES**

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all designated option borrow sites provided within the plans.

**Action Taken/Required:**

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

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

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

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

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

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

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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 Mitchell Area.

## 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 251) - is the cost for mobilization per each time the Contractor is called in by the Area Engineer to perform guardrail repair within the Mitchell Area – Unit 251.

Mobilization 2 (Unit 252) - is the cost for mobilization per each time the Contractor is called in by the Area Engineer to perform guardrail repair within the Mitchell Area – Unit 252.

Mobilization 3 (Unit 253) - is the cost for mobilization per each time the Contractor is called in by the Area Engineer to perform guardrail repair within the Mitchell Area – Unit 253.

The maximum allowable contract unit price submitted for Mobilization 1 (Unit 251), Mobilization 2 (Unit 252) or Mobilization 3 (Unit 253) shall not exceed $1500.

Mobilization 1 (Unit 251), Mobilization 2 (Unit 252) or Mobilization 3 (Unit 253) 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.

## 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 any item of concern (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 or 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 fails to complete the required work within the time allowed, the Contractor shall install an approved safety treatment that complies with NCHRP 350, level 3, to protect the site.

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 for the item of concern. 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, etcetera) 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.

Entirely new flared beam and cable guardrail installations shall be placed at a flare rate no sharper than 34:1.

## OUTSIDE SHOULDER INSTALLATION

Whenever an outside shoulder beam end terminal is significantly damaged, the entire end terminal (25’ to 50’) shall be removed and replaced with an approved end terminal from the SDDOT Approved List of W Beam Guardrail Terminals. The Contractor may select from any of the terminals specified. Installation of these terminals shall be as per Standard Plate Nos. 630.45 and/or 630.46.

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 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

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 Standard Plate No. 630.99. 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’. When an obsolete median installation is replaced with this standard, the existing guardrail (if present) in the median, protecting the opposite direction traffic from the back of obsolete guardrail, shall be removed.

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 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.

## 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 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.

## BEAM GUARDRAIL

Contract unit prices for the various Post and Block items shall include the appropriate size wood block.

Beam Guardrail Post and Block, Winter - Includes the additional cost for removal and installation of wood 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 wood 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 Wood 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.

W Beam Guardrail End Terminals (except BCTs) must be selected from the SDDOT Approved Products List at: http://www.sddot.com/business/certification/products/Default.aspx

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.

## 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 less than 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.

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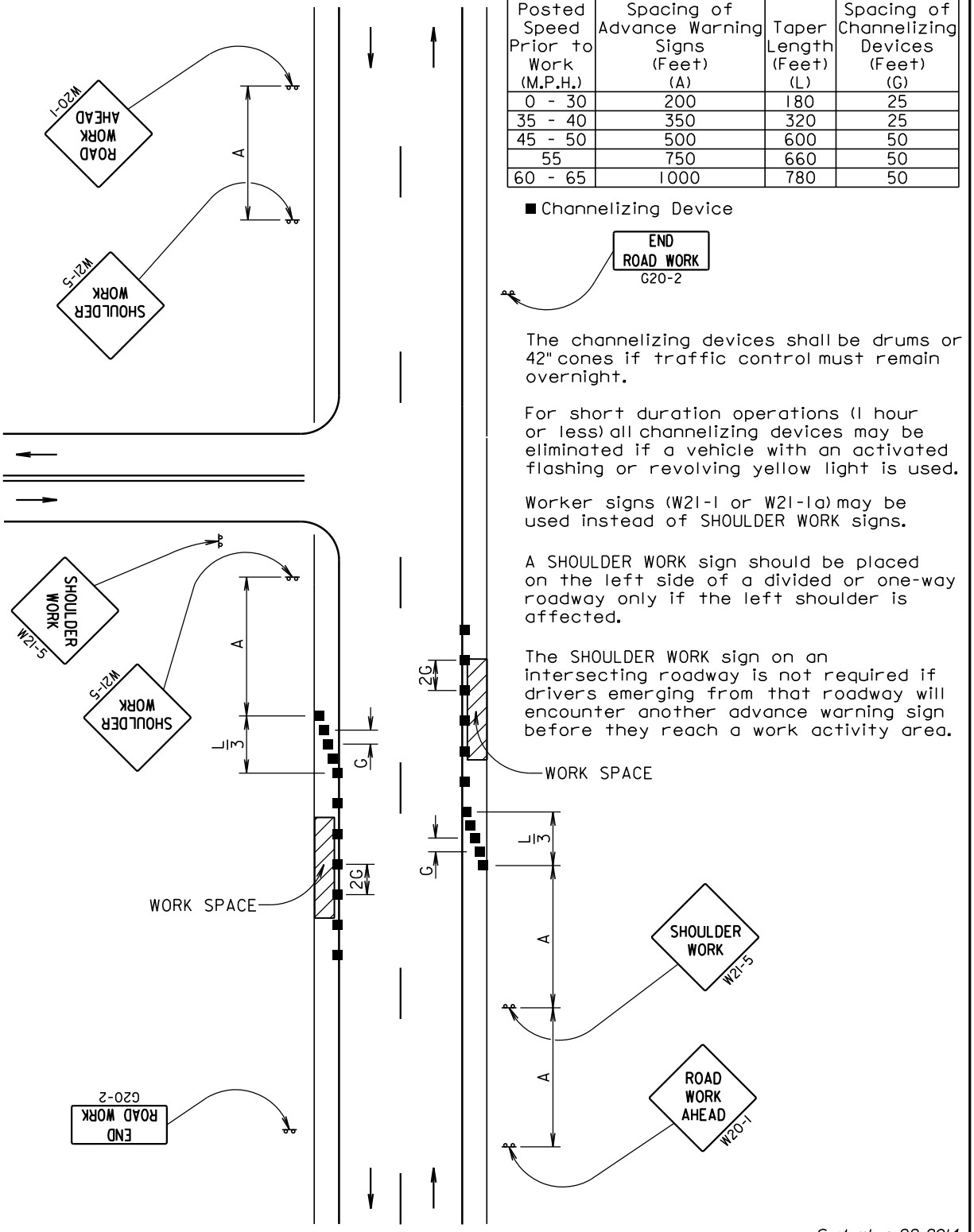
## ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

| | | EXPRESSWAY / INTERSTATE | | | |
|---|---|---|---|---|---|
| SIGN CODE | SIGN DESCRIPTION | NUMBER | SIGN SIZE | SQFT PER SIGN | SQFT |
| R1-1 | STOP | | 36" x 36" | 9 | |
| R1-2 | YIELD | | 60" x 60" | 25 | |
| R2-1 | SPEED LIMIT __ | | 36" x 48" | 12 | |
| R2-6aP | FINES DOUBLE (plaque) | | 36" x 24" | 6 | |
| R4-7 | KEEP RIGHT (symbol) | | 36" x 48" | 12 | |
| R5-1 | DO NOT ENTER | | 36" x 36" | 9 | |
| R5-1a | WRONG WAY | | 42" x 30" | 9 | |
| R11-2 | ROAD CLOSED | | 48" x 30" | 10 | |
| W1-1 | LEFT or RIGHT TURN ARROW | | 48" x 48" | 16 | |
| W1-2 | LEFT or RIGHT CURVE ARROW | | 48" x 48" | 16 | |
| W1-3 | REVERSE TURN (L or R) | | 48" x 48" | 16 | |
| W1-4 | REVERSE CURVE (L or R) | | 48" x 48" | 16 | |
| W3-1 | STOP AHEAD (symbol) | | 48" x 48" | 16 | |
| W3-2 | YIELD AHEAD (symbol) | | 48" x 48" | 16 | |
| W3-3 | SIGNAL AHEAD (symbol) | | 48" x 48" | 16 | |
| W3-4 | BE PREPARED TO STOP | | 48" x 48" | 16 | |
| W3-5 | SPEED REDUCTION AHEAD (__ MPH) | | 48" x 48" | 16 | |
| W4-1 | MERGE (symbol) | | 48" x 48" | 16 | |
| W4-2 | LEFT or RIGHT LANE ENDS (symbol) | 2 | 48" x 48" | 16 | 32 |
| W4-3 | ADDED LANE (symbol) | | 48" x 48" | 16 | |
| W5-3 | ONE LANE BRIDGE | | 48" x 48" | 16 | |
| W7-3aP | NEXT __ MILES (plaque) | | 36" x 30" | 8 | |
| W8-1 | BUMP | | 48" x 48" | 16 | |
| W8-6 | TRUCK CROSSING | | 48" x 48" | 16 | |
| W8-7 | LOOSE GRAVEL | | 48" x 48" | 16 | |
| W8-11 | UNEVEN LANES | | 48" x 48" | 16 | |
| W8-17 | SHOULDER DROP-OFF (symbol) | | 48" x 48" | 16 | |
| W13-1P | ADVISORY SPEED (plaque) | | 30" x 30" | 6 | |
| W20-1 | ROAD WORK AHEAD | 2 | 48" x 48" | 16 | 32 |
| W20-2 | DETOUR AHEAD | | 48" x 48" | 16 | |
| W20-3 | ROAD CLOSED AHEAD | | 48" x 48" | 16 | |
| W20-4 | ONE LANE ROAD AHEAD | 2 | 48" x 48" | 16 | 32 |
| W20-5 | LEFT or RIGHT LANE CLOSED AHEAD | 2 | 48" x 48" | 16 | 32 |
| W20-7 | FLAGGER (symbol) | 2 | 48" x 48" | 16 | 32 |
| W21-1 | WORKERS (symbol) | | 48" x 48" | 16 | |
| W21-2 | FRESH OIL | | 48" x 48" | 16 | |
| W21-3 | ROAD MACHINERY AHEAD | | 48" x 48" | 16 | |
| W21-5 | SHOULDER WORK | 2 | 48" x 48" | 16 | 32 |
| W21-5a | LEFT or RIGHT SHOULDER CLOSED | | 48" x 48" | 16 | |
| W21-5b | LEFT or RIGHT SHOULDER CLOSED AHEAD | | 48" x 48" | 16 | |
| G20-1 | ROAD WORK NEXT __ MILES | | 48" x 24" | 8 | |
| G20-2 | END ROAD WORK (36" x 18" may be used on Conventional Roads) | 2 | 48" x 24" | 8 | 16 |
| G20-5aP | WORK ZONE (plaque) | | 36" x 24" | 6 | |
| - | TYPE 3 OBJECT MARKER | | 12" x 36" | 3 | |
| | | TRAFFIC CONTROL SIGNS SQFT | | | 208 |




| 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 - 50 | 500 | 600 | 50 |
| 55 | 750 | 660 | 50 |
| 60 - 65 | 1000 | 780 | 50 |

■ Channelizing Device

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.

*September 22, 2014*

*Published Date: 3rd Qtr. 2015*

SDDOT

## GUIDES FOR TRAFFIC CONTROL DEVICES WORK ON SHOULDERS

PLATE NUMBER 634.03

Sheet 1 of 1

| 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 - 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.

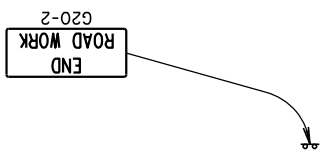
The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

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.

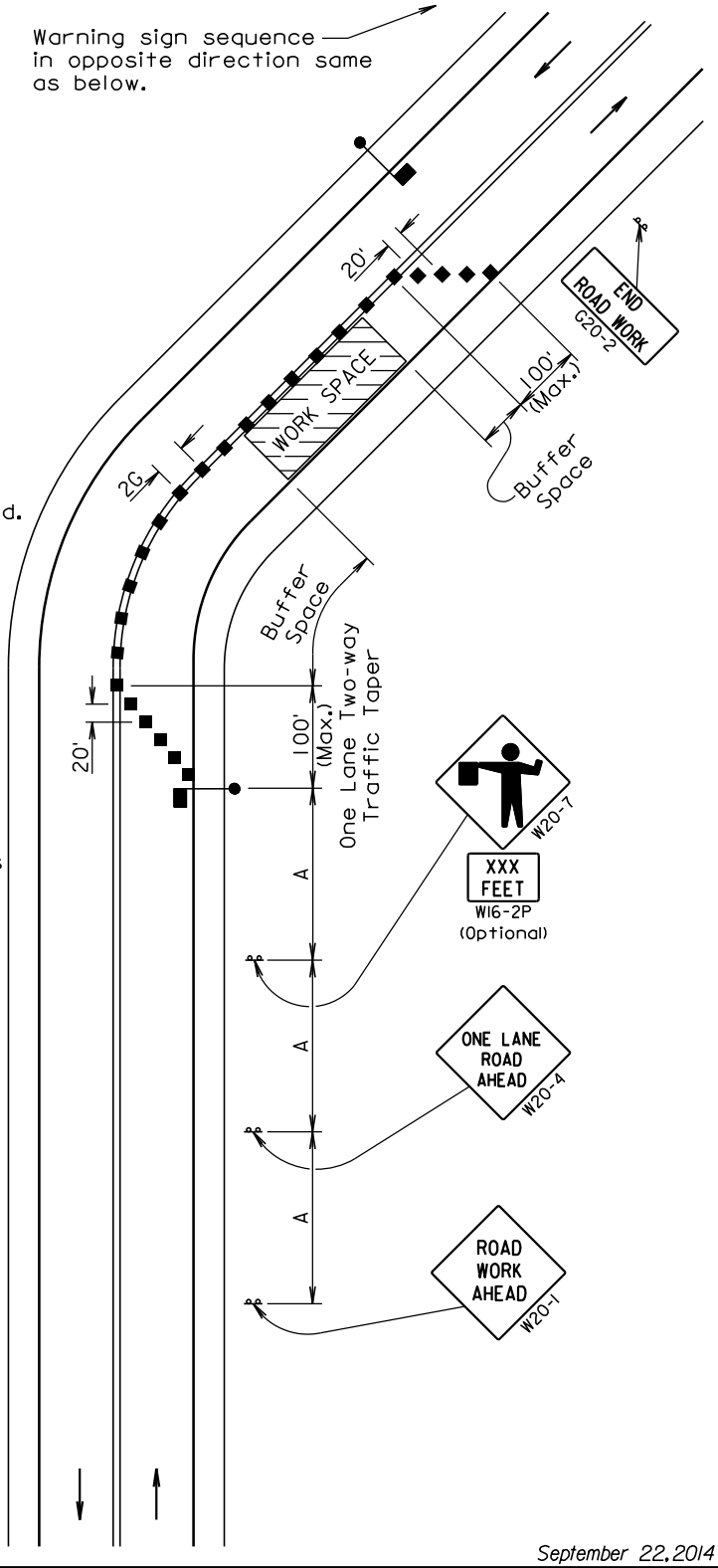
Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.




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.




September 22, 2014

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | GUIDES FOR TRAFFIC CONTROL DEVICES<br>LANE CLOSURE WITH FLAGGER PROVIDED | PLATE NUMBER<br>634.23<br>Sheet 1 of 1 |

| 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 - 50 | 500 | 600 | 50 * |
| 55 | 750 | 660 | 50 * |
| 60 - 65 | 1000 | 780 | 50 * |

* Spacing is 40' for 42" cones.

◎ Reflectorized Drum

■ Channelizing Device

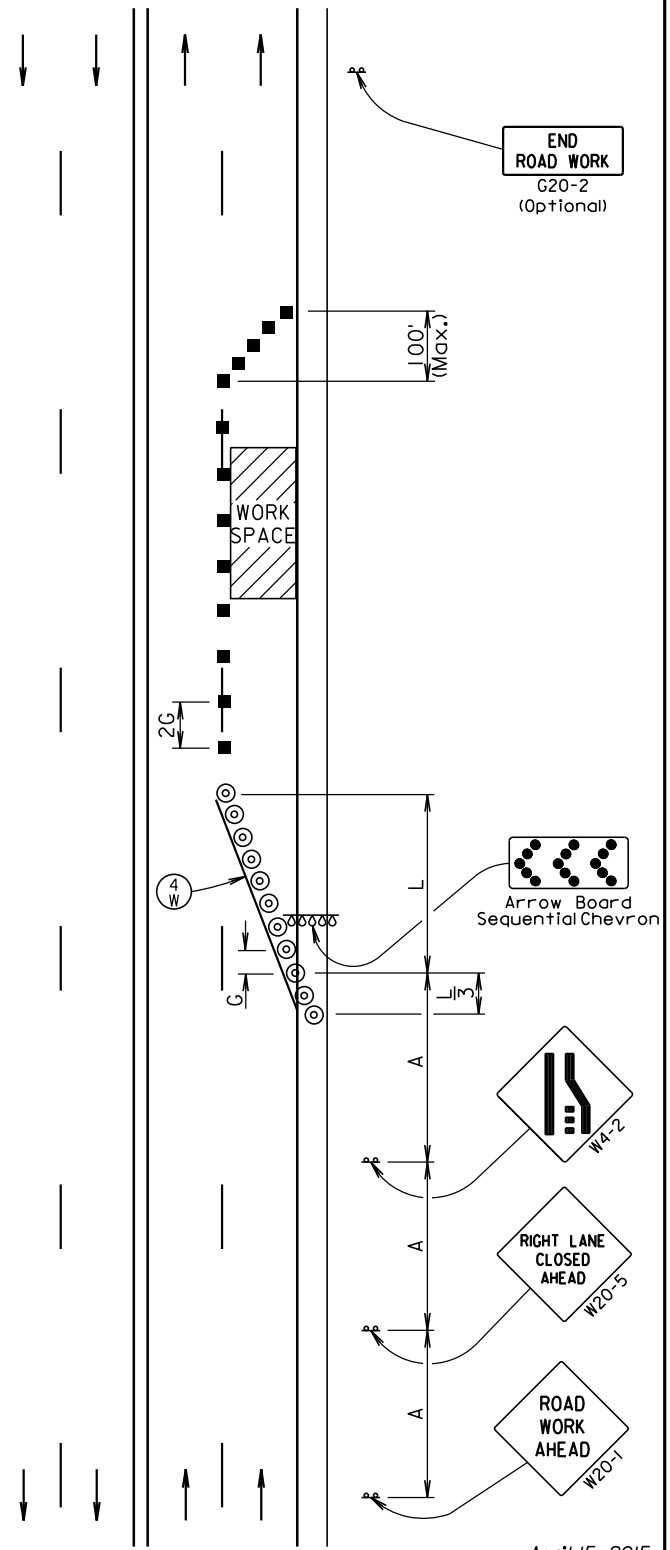
(4W) 4" White Temporary Pavement Marking

The channelizing devices shall be 42" cones or drums.

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

Temporary pavement markings shall be used if traffic control must remain overnight.

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




April 15, 2015

Published Date: 3rd Qtr. 2015

SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES
4-LANE UNDIVIDED, RIGHT LANE CLOSED

PLATE NUMBER
634.47

Sheet 1 of 1

◎ Reflectorized Drum

■ Channelizing Device

▭ Movable Concrete Barrier

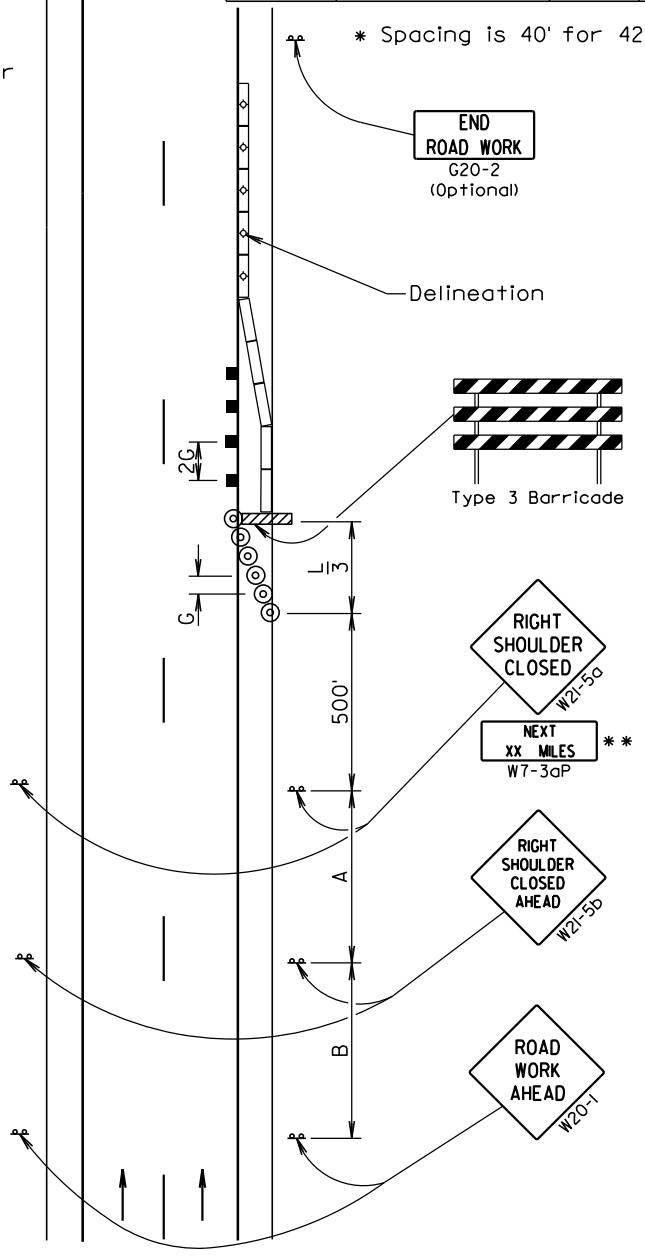
** For distances ½ mile or greater.

| Posted Speed Prior to Work (M.P.H.) | Spacing of Advance Warning Signs (Feet) (A) (B) (C) | Taper Length (Feet) (L) | Spacing of Channelizing Devices (Feet) (G) |
|---|---|---|---|
| 0 - 30 | 200 | 180 | 25 |
| 35 - 40 | 350 | 320 | 25 |
| 45 - 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.

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.




April 15, 2015

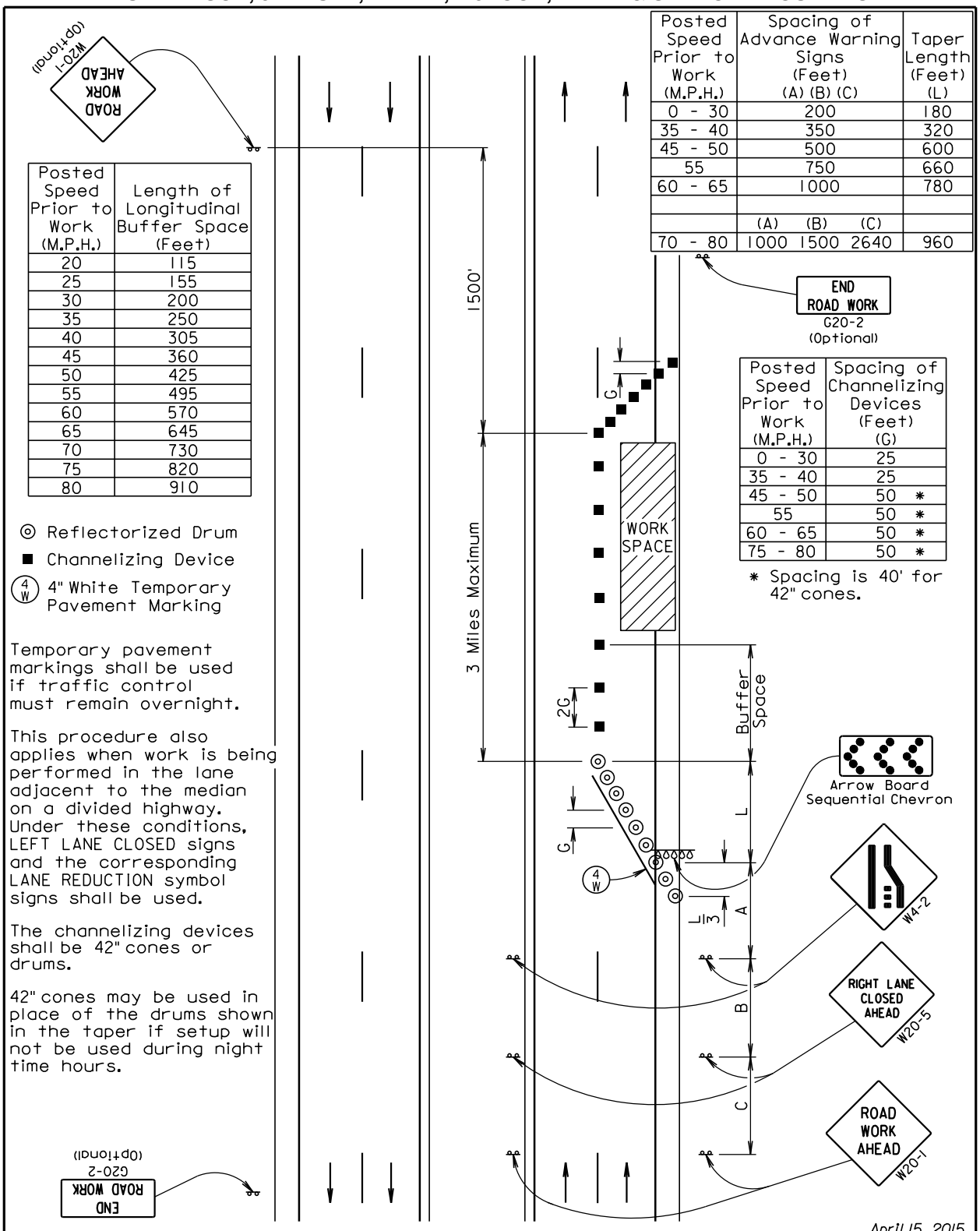
Published Date: 3rd Qtr. 2015

SDDOT

# GUIDES FOR TRAFFIC CONTROL DEVICES
# SHOULDER CLOSED

PLATE NUMBER
634.61

Sheet 1 of 1




| Posted Speed Prior to Work (M.P.H.) | Spacing of Advance Warning Signs (Feet) (A) (B) (C) | Taper Length (Feet) (L) |
|---|---|---|
| 0 - 30 | 200 | 180 |
| 35 - 40 | 350 | 320 |
| 45 - 50 | 500 | 600 |
| 55 | 750 | 660 |
| 60 - 65 | 1000 | 780 |
| | | |
| | (A) (B) (C) | |
| 70 - 80 | 1000 1500 2640 | 960 |

| Posted Speed Prior to Work (M.P.H.) | Length of Longitudinal Buffer Space (Feet) |
|---|---|
| 20 | 115 |
| 25 | 155 |
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |
| 50 | 425 |
| 55 | 495 |
| 60 | 570 |
| 65 | 645 |
| 70 | 730 |
| 75 | 820 |
| 80 | 910 |

| Posted Speed Prior to Work (M.P.H.) | Spacing of Channelizing Devices (Feet) (G) |
|---|---|
| 0 - 30 | 25 |
| 35 - 40 | 25 |
| 45 - 50 | 50 * |
| 55 | 50 * |
| 60 - 65 | 50 * |
| 75 - 80 | 50 * |

* Spacing is 40' for 42" cones.

◎ Reflectorized Drum

■ Channelizing Device

(4 W) 4" White Temporary Pavement Marking

Temporary pavement markings shall be used if traffic control must remain overnight.

This procedure also applies when work is being performed in the lane adjacent to the median on a divided highway. Under these conditions, LEFT LANE CLOSED signs and the corresponding LANE REDUCTION symbol signs shall be used.

The channelizing devices shall be 42" cones or drums.

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

April 15, 2015

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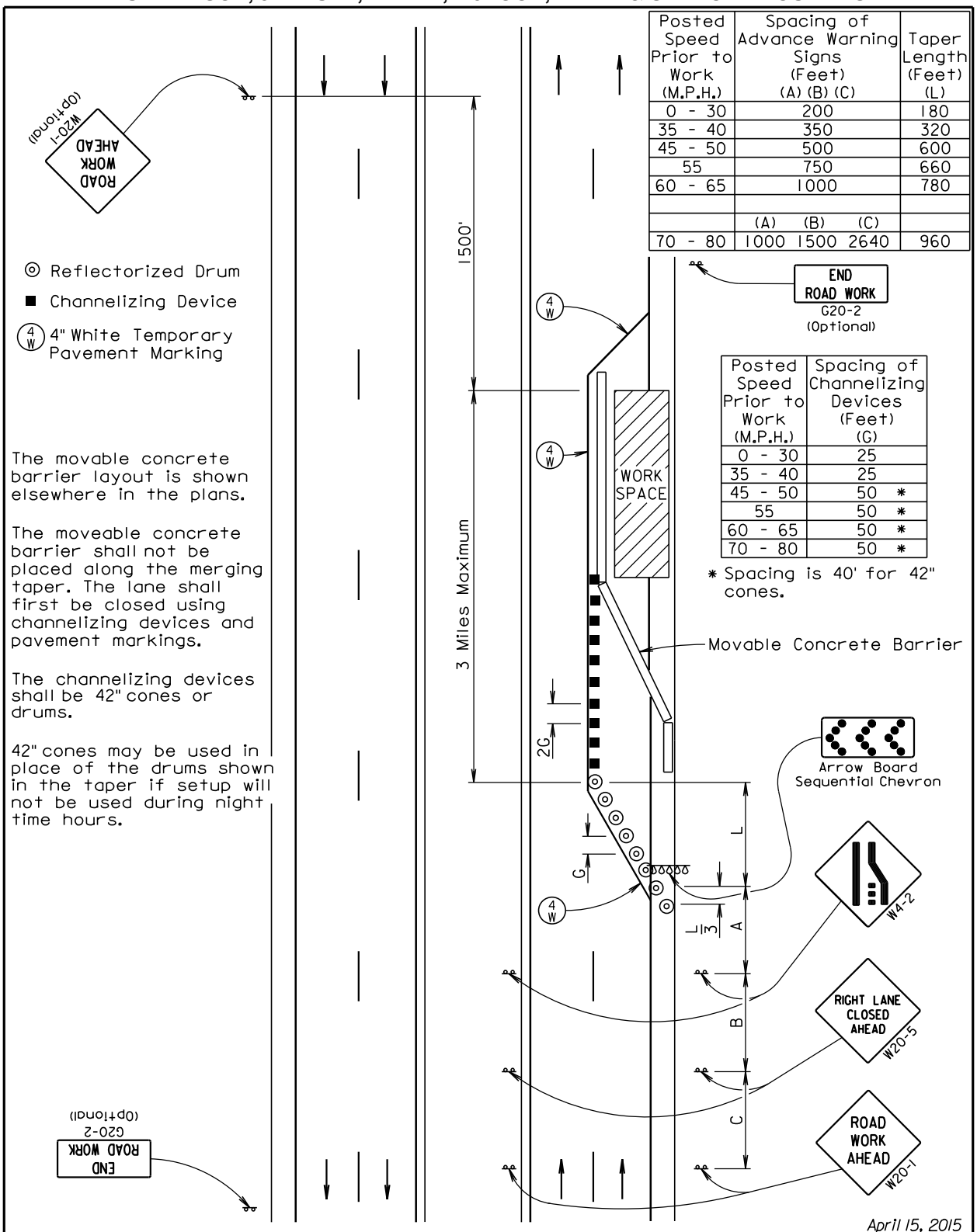
SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES
LANE CLOSURE WITHOUT BARRIER

PLATE NUMBER
634.64

Sheet 1 of 1




| Posted Speed Prior to Work (M.P.H.) | Spacing of Advance Warning Signs (Feet) (A) (B) (C) | Taper Length (Feet) (L) |
|---|---|---|
| 0 - 30 | 200 | 180 |
| 35 - 40 | 350 | 320 |
| 45 - 50 | 500 | 600 |
| 55 | 750 | 660 |
| 60 - 65 | 1000 | 780 |
| | | |
| | (A) (B) (C) | |
| 70 - 80 | 1000 1500 2640 | 960 |

| Posted Speed Prior to Work (M.P.H.) | Spacing of Channelizing Devices (Feet) (G) |
|---|---|
| 0 - 30 | 25 |
| 35 - 40 | 25 |
| 45 - 50 | 50 * |
| 55 | 50 * |
| 60 - 65 | 50 * |
| 70 - 80 | 50 * |

* Spacing is 40' for 42" cones.

April 15, 2015

Published Date: 3rd Qtr. 2015

SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES
LANE CLOSURE WITH BARRIER

PLATE NUMBER
634.65

Sheet 1 of 1

GENERAL NOTES:

Either flanged channel steel posts or S3x5.7 steel I beam posts shall be used, but post type shall be consistent thoughout 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 ± 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 ℄ 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 |

June 26, 2015

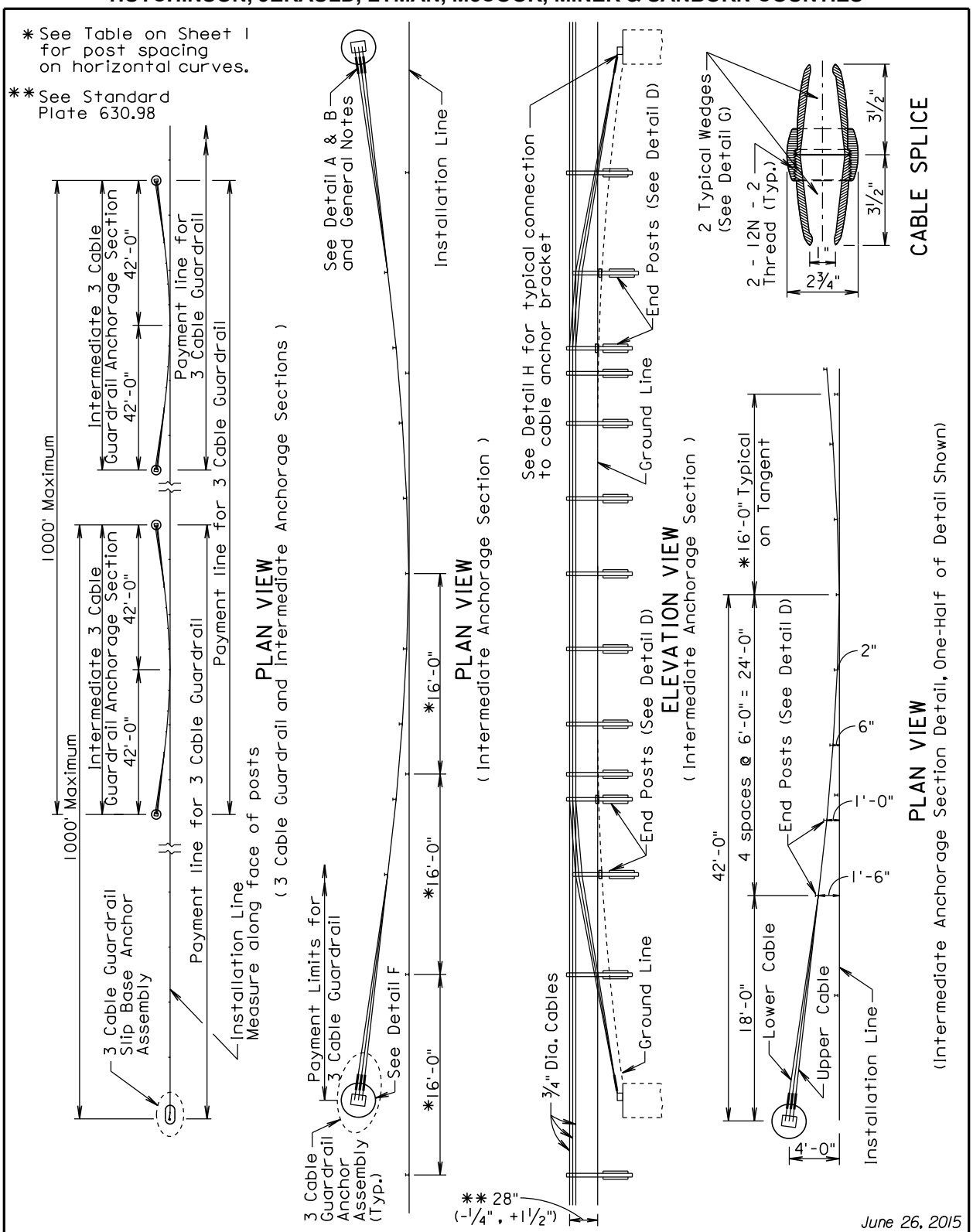
Published Date: 3rd Qtr. 2015

SDDOT

3 CABLE GUARDRAIL
(LOW TENSION)

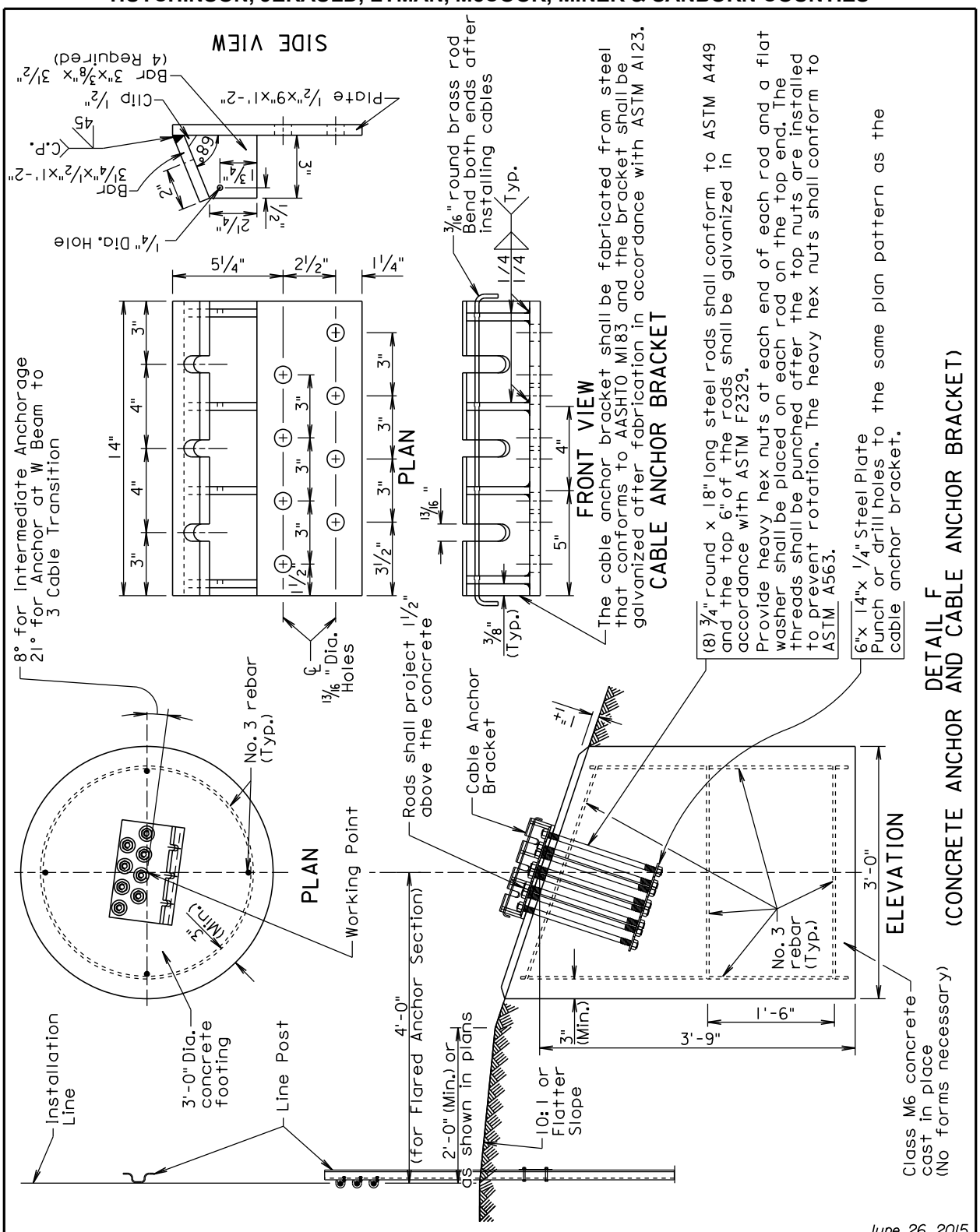
PLATE NUMBER
629.01

Sheet 1 of 6



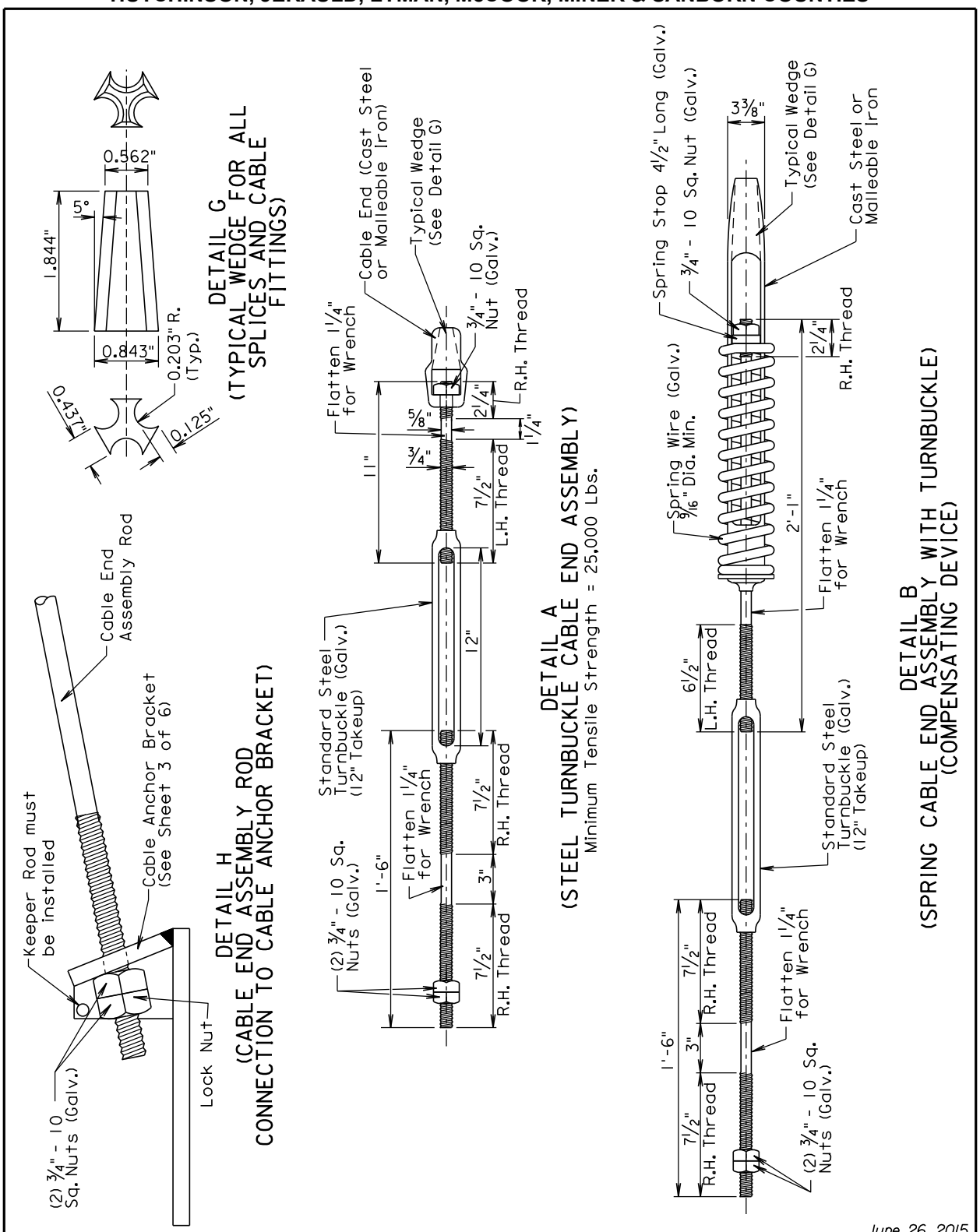

June 26, 2015

| | | | |
|---|---|---|---|
| *Published Date: 3rd Qtr. 2015* | SDDOT | **3 CABLE GUARDRAIL (LOW TENSION)** | PLATE NUMBER 629.01<br>Sheet 2 of 6 |



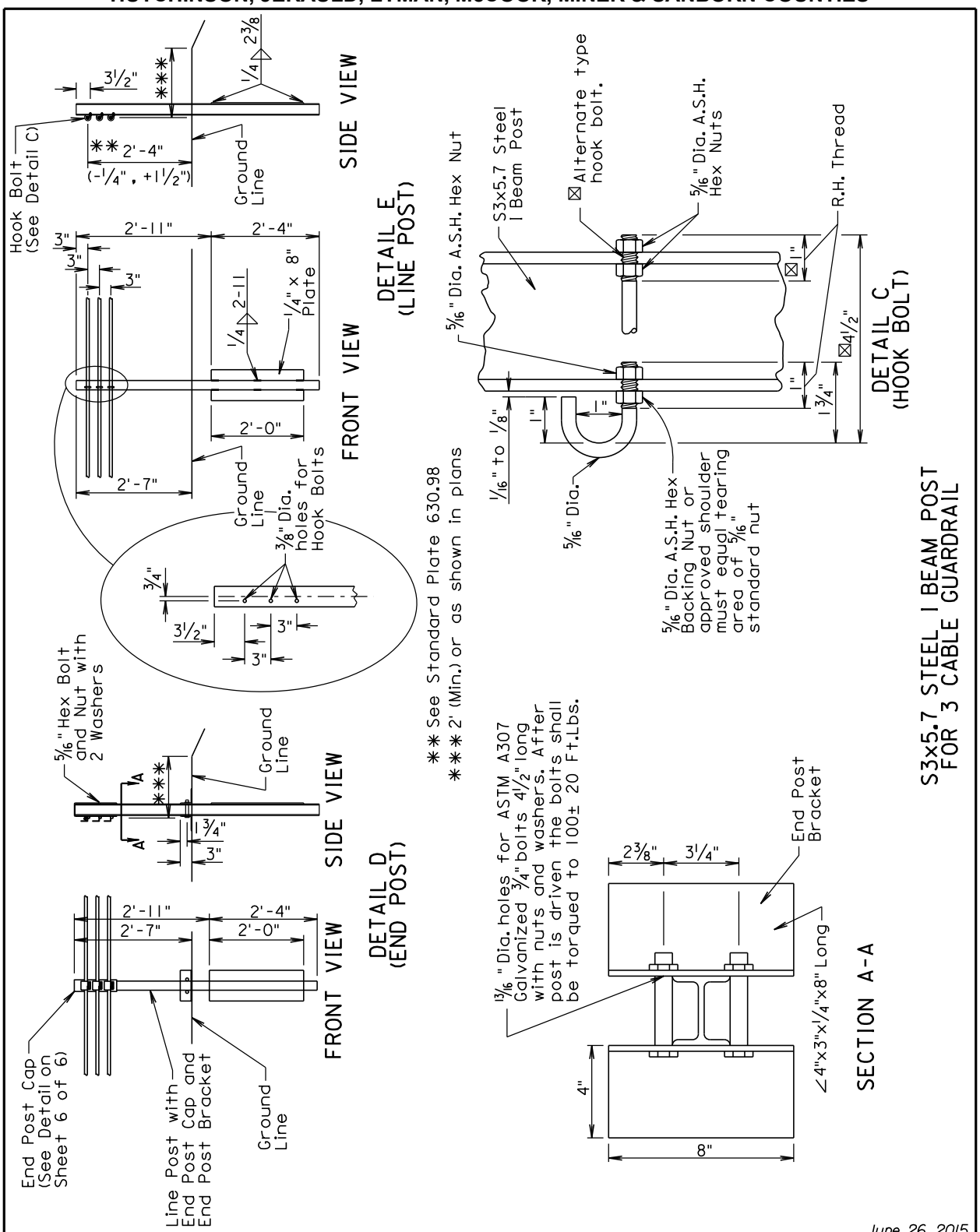

June 26, 2015

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | 3 CABLE GUARDRAIL (LOW TENSION) | PLATE NUMBER 629.01<br>Sheet 3 of 6 |



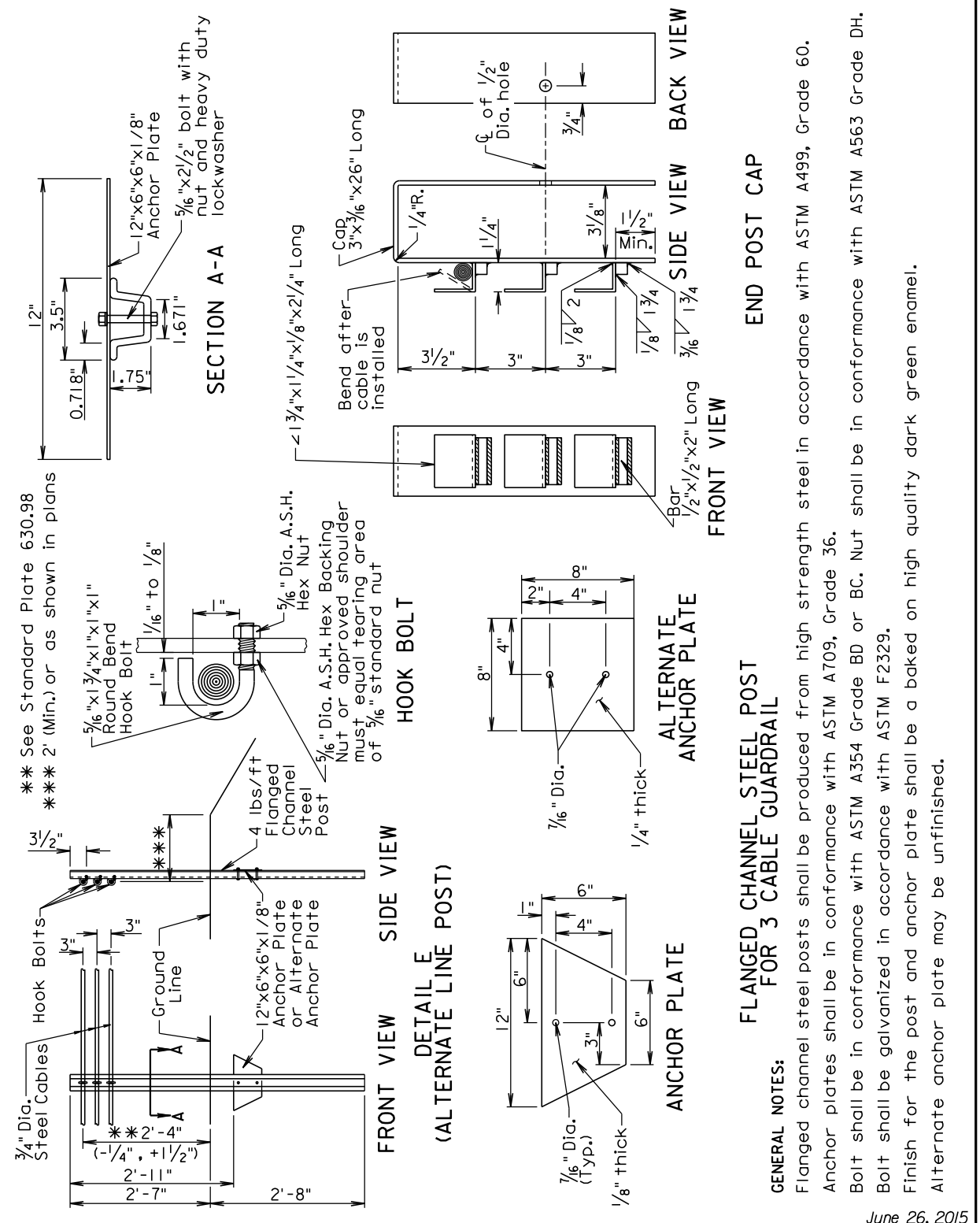

June 26, 2015

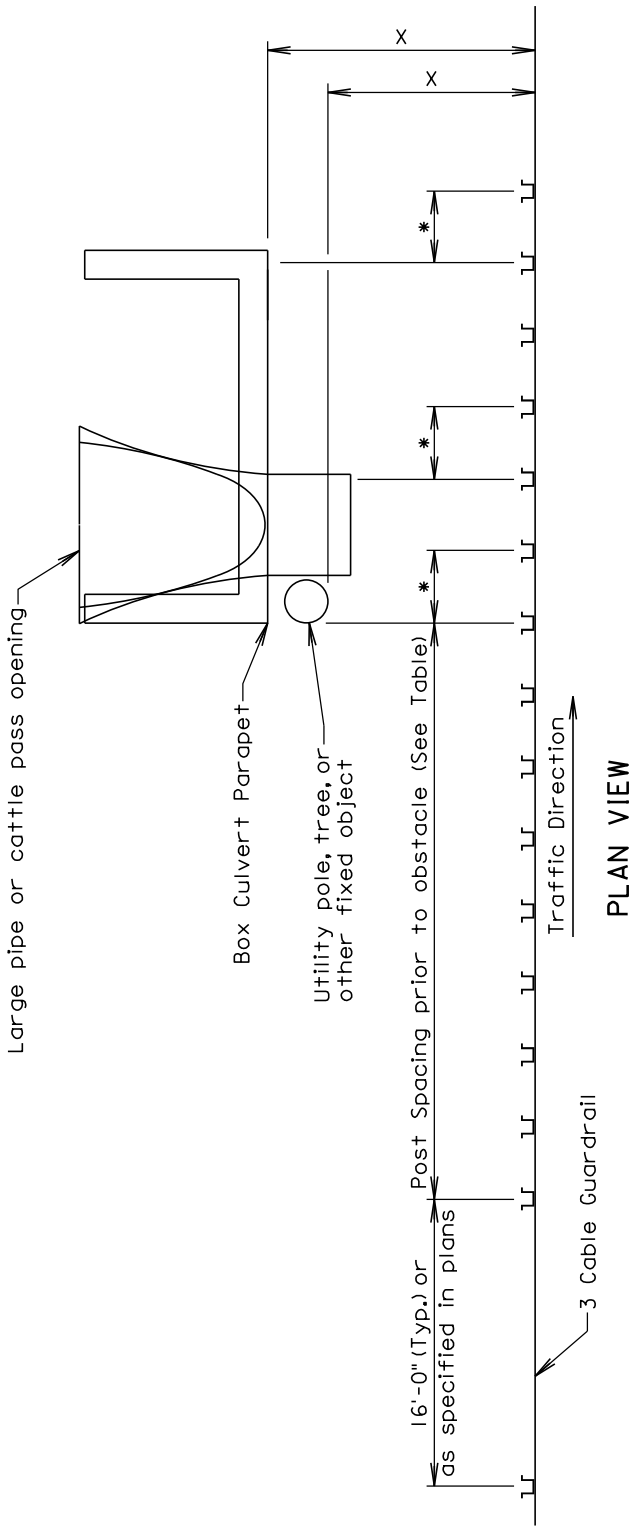
| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | 3 CABLE GUARDRAIL (LOW TENSION) | PLATE NUMBER 629.01<br>Sheet 4 of 6 |




June 26, 2015

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | 3 CABLE GUARDRAIL (LOW TENSION) | PLATE NUMBER 629.01<br>Sheet 5 of 6 |


SECTION A-A
12"
3.5"
0.718"
1.75"
1.671"
12"x6"x1/8" Anchor Plate
5/16"x2 1/2" bolt with nut and heavy duty lockwasher
** See Standard Plate 630.98
*** 2' (Min.) or as shown in plans
5/16"x1 3/4"x1"x1" Round Bend Hook Bolt
1/16" to 1/8"
1"
5/16" Dia. A.S.H. Hex Nut
5/16" Dia. A.S.H. Hex Backing Nut or approved shoulder must equal tearing area of 5/16" standard nut
HOOK BOLT
4 lbs/ft Flanged Channel Steel Post
3 1/2"
***
Hook Bolts
3"
3"
Ground Line
12"x6"x1/8" Anchor Plate or Alternate Anchor Plate
3/4" Dia. Steel Cables
**2'-4" (-1/4", +1 1/2")
2'-11"
2'-7"
2'-8"
FRONT VIEW SIDE VIEW
DETAIL E
(ALTERNATE LINE POST)
8"
2"
4"
8"
4"
7/16" Dia.
1/4" thick
ALTERNATE ANCHOR PLATE
6"
1"
4"
12"
6"
3"
6"
7/16" Dia. (Typ.)
1/8" thick
ANCHOR PLATE
1 3/4"x1 1/4"x1/8"x2 1/4" Long
Bend after cable is installed
Cap 3"x3/16"x26" Long
1/4"R.
1 1/4"
3 1/8"
1 1/2" Min.
3 1/2"
3"
3"
1/8
2
1/8
1 3/4
3/16
1 3/4
SIDE VIEW
BACK VIEW
℄ of 1/2" Dia. hole
3/4"
Bar 1/2"x1/2"x2" Long
FRONT VIEW
END POST CAP
FLANGED CHANNEL STEEL POST
FOR 3 CABLE GUARDRAIL
GENERAL NOTES:
Flanged channel steel posts shall be produced from high strength steel in accordance with ASTM A499, Grade 60.
Anchor plates shall be in conformance with ASTM A709, Grade 36.
Bolt shall be in conformance with ASTM A354 Grade BD or BC. Nut shall be in conformance with ASTM A563 Grade DH.
Bolt shall be galvanized in accordance with ASTM F2329.
Finish for the post and anchor plate shall be a baked on high quality dark green enamel.
Alternate anchor plate may be unfinished.
June 26, 2015
Published Date: 3rd Qtr. 2015
SDDOT
3 CABLE GUARDRAIL
(LOW TENSION)
PLATE NUMBER
629.01
Sheet 6 of 6




| 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

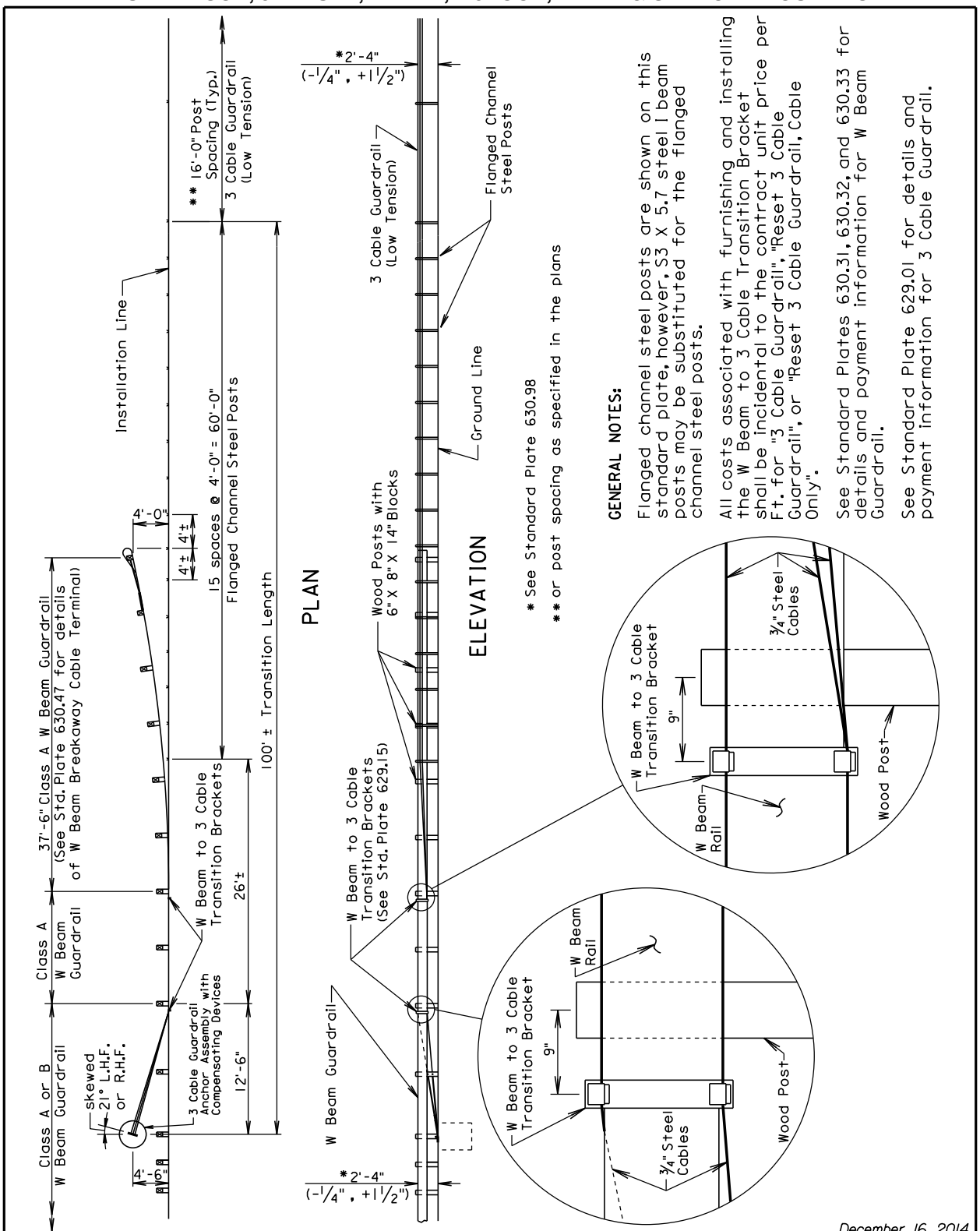
Published Date: 3rd Qtr. 2015

SDDOT

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

PLATE NUMBER
629.02

Sheet 1 of 1




**GENERAL NOTES:**

Flanged channel steel posts are shown on this standard plate, however, S3 X 5.7 steel I beam posts may be substituted for the flanged channel steel posts.

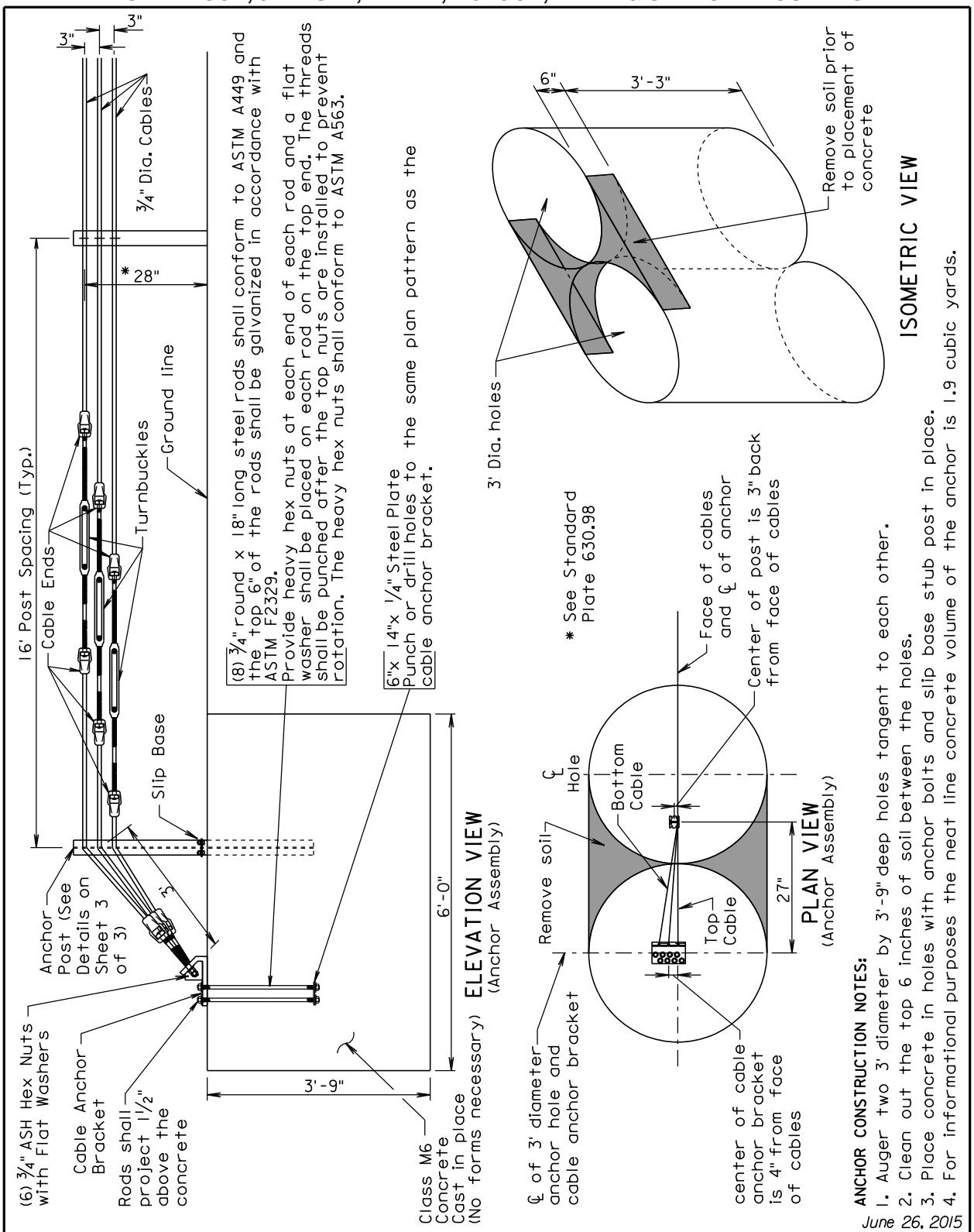
All costs associated with furnishing and installing the W Beam to 3 Cable Transition Bracket shall be incidental to the contract unit price per Ft. for "3 Cable Guardrail", "Reset 3 Cable Guardrail", or "Reset 3 Cable Guardrail, Cable Only".

See Standard Plates 630.31, 630.32, and 630.33 for details and payment information for W Beam Guardrail.

See Standard Plate 629.01 for details and payment information for 3 Cable Guardrail.

December 16, 2014

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | W BEAM TO 3 CABLE TRANSITION | PLATE NUMBER 629.05<br>Sheet 1 of 1 |




**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 in place.
4. For informational purposes the neat line concrete volume of the anchor is 1.9 cubic yards.

*June 26, 2015*

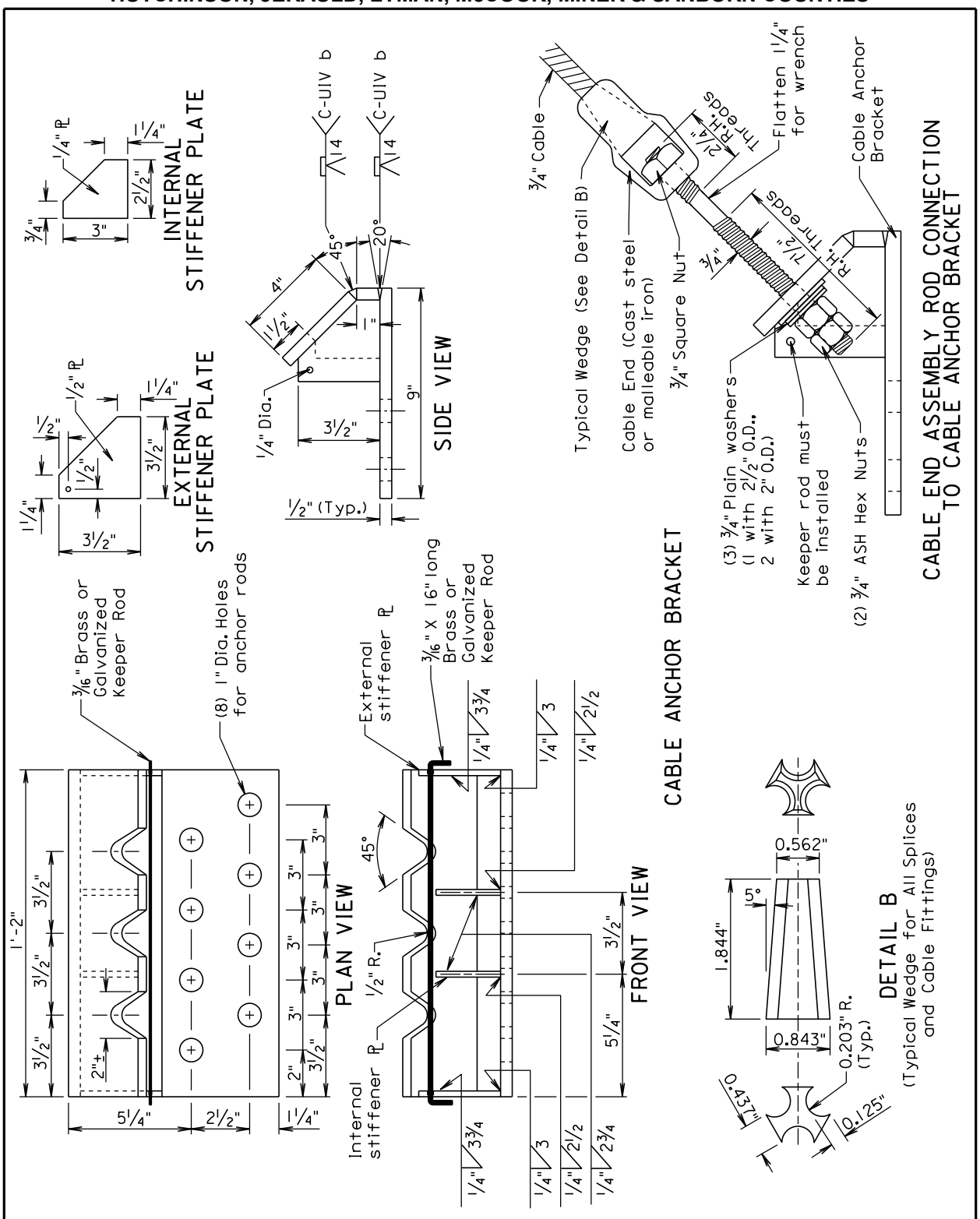
*Published Date: 3rd Qtr. 2015*

SDDOT

## *3 CABLE GUARDRAIL SLIP BASE ANCHOR ASSEMBLY*

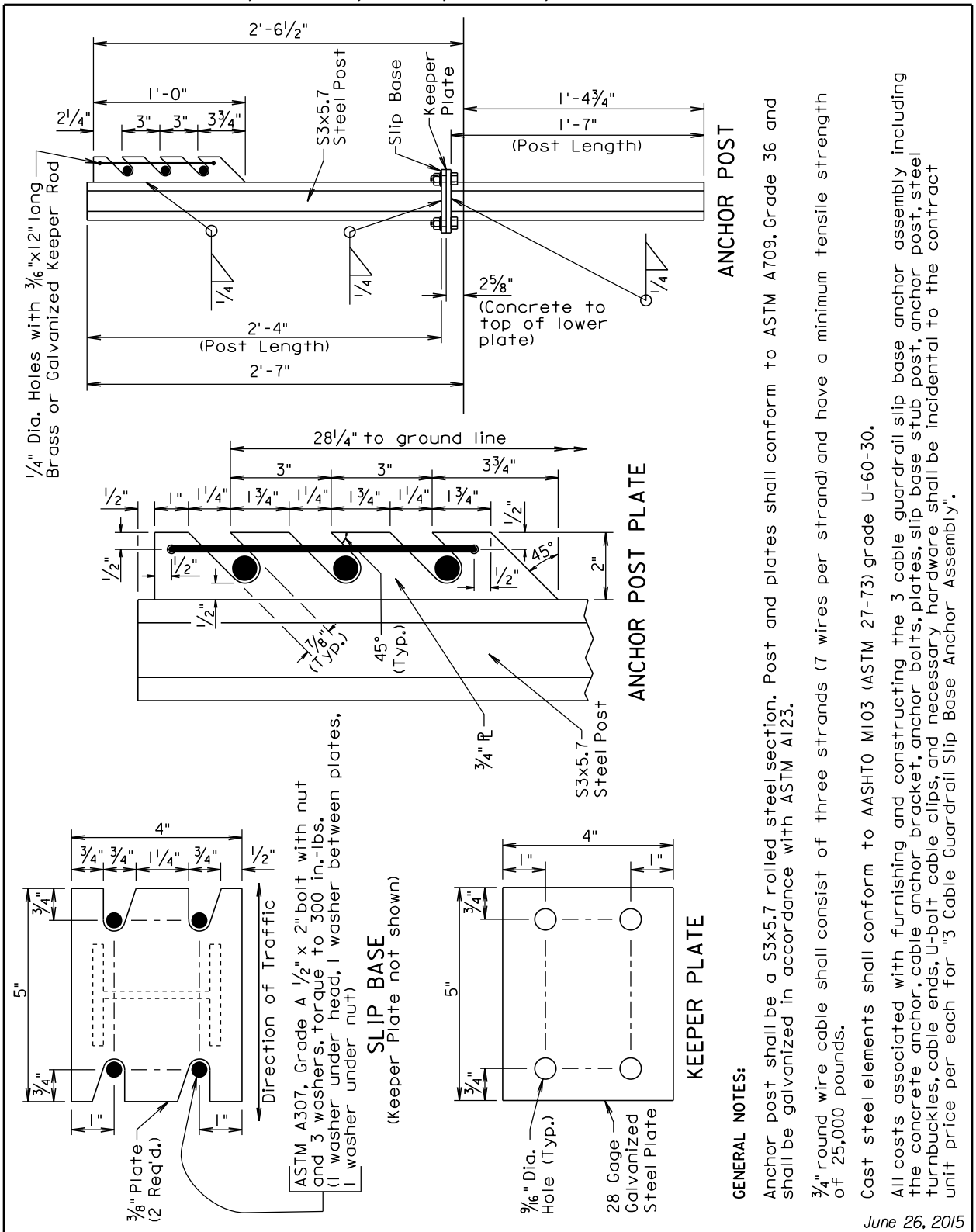
*PLATE NUMBER*
*629.10*

*Sheet 1 of 3*




June 26, 2015

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | 3 CABLE GUARDRAIL SLIP BASE ANCHOR ASSEMBLY | PLATE NUMBER 629.10<br>Sheet 2 of 3 |




**GENERAL NOTES:**

Anchor post shall be a S3x5.7 rolled steel section. Post and plates shall conform to ASTM A709, Grade 36 and shall be galvanized in accordance with ASTM A123.

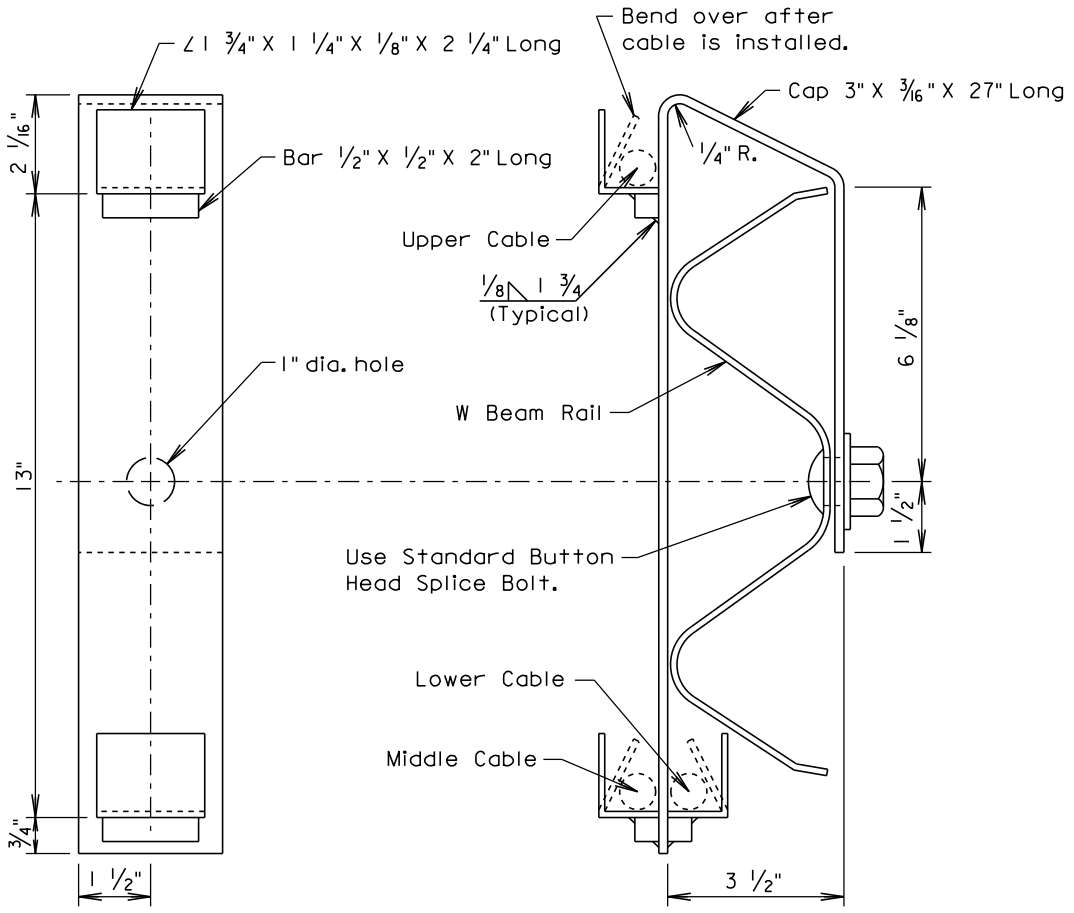
¾" round wire cable shall consist of three strands (7 wires per strand) and have a minimum tensile strength of 25,000 pounds.

Cast steel elements shall conform to AASHTO M103 (ASTM 27-73) grade U-60-30.

All costs associated with furnishing and constructing the 3 cable guardrail slip base anchor assembly including the concrete anchor, cable anchor bracket, anchor bolts, plates, slip base stub post, anchor post, steel turnbuckles, cable ends, U-bolt cable clips, and necessary hardware shall be incidental to the contract unit price per each for "3 Cable Guardrail Slip Base Anchor Assembly".

June 26, 2015

| | | | |
|---|---|---|---|
| *Published Date: 3rd Qtr. 2015* | SDDOT | *3 CABLE GUARDRAIL SLIP BASE ANCHOR ASSEMBLY* | *PLATE NUMBER* 629.10<br>*Sheet 3 of 3* |




ELEVATION
(TRANSITION BRACKET)

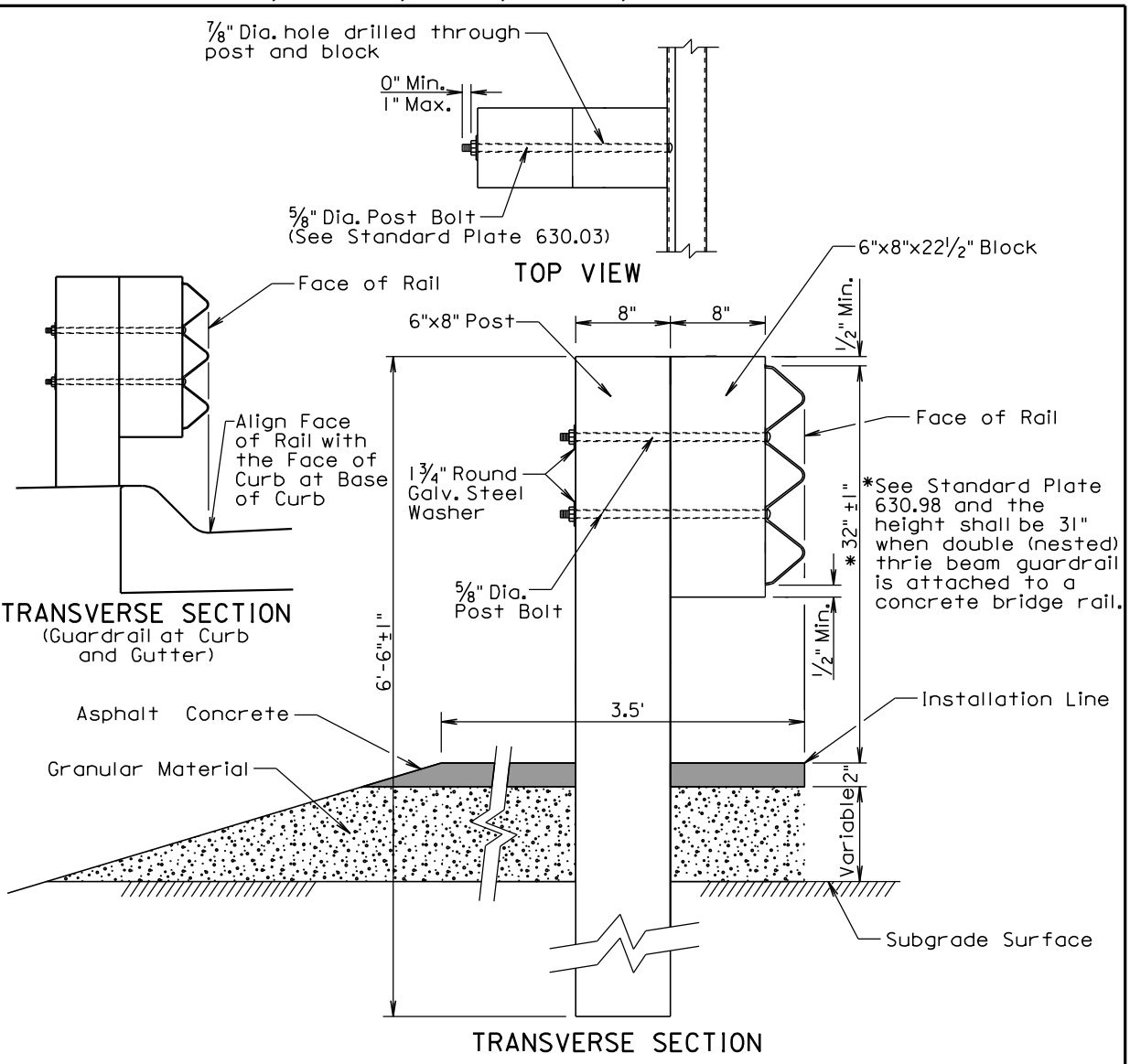
END VIEW
(W BEAM RAIL AND
TRANSITION BRACKET)

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: 3rd Qtr. 2015 | SDDOT | W BEAM TO 3 CABLE TRANSITION BRACKET | PLATE NUMBER 629.15<br>Sheet 1 of 1 |




**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." For informational purposes, the Rate of Materials for the 3.5' wide section of asphalt concrete as shown above shall be 4.80 Tons per Station.

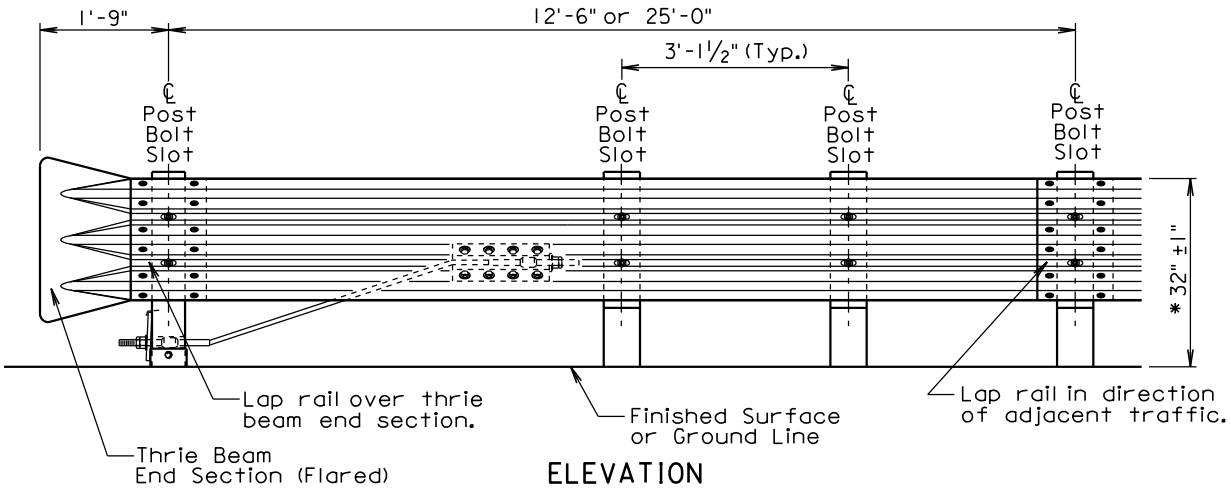
Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline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

The cross slope for the surfacing and subgrade surface shall be as specified in the plans (See Typical Sections and/or Cross Sections).

The top of post and top of block shall have a true square cut. The top of block shall be ±1 inch from the top of the post.

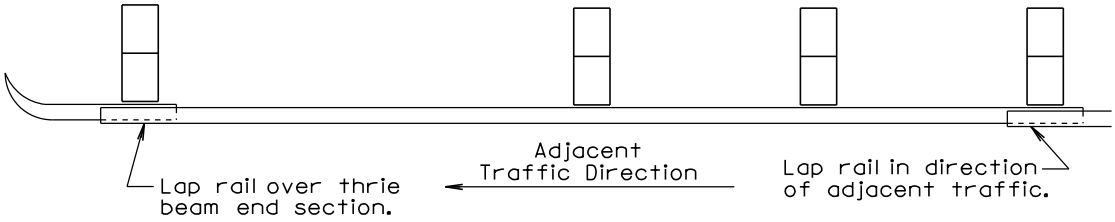
*June 26, 2015*

| | | | |
|---|---|---|---|
| *Published Date: 3rd Qtr. 2015* | SDDOT | *THRIE BEAM GUARDRAIL POST INSTALLATION* | *PLATE NUMBER* 630.01<br>*Sheet 1 of 1* |




ELEVATION

* See Standard Plate 630.98 and the height shall be 31" when double (nested) thrie beam guardrail is attached to a concrete bridge rail.




PLAN

| THRIE BEAM GUARDRAIL DEFLECTION CRITERIA | |
|---|---|
| POST SPACING | MAXIMUM DEFLECTION |
| 6'-3" | 2'-6" |
| 3'-1½" | 1'-9" |

For Informational Purposes Only

GENERAL NOTES:

All thrie beam rail shall be Type 1.

There will be no separate payment for furnishing and installing Thrie Beam End Sections (Flared) and Thrie Beam Terminal Connectors. All costs for the Thrie Beam End Sections (Flared) and Thrie Beam Terminal Connectors shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

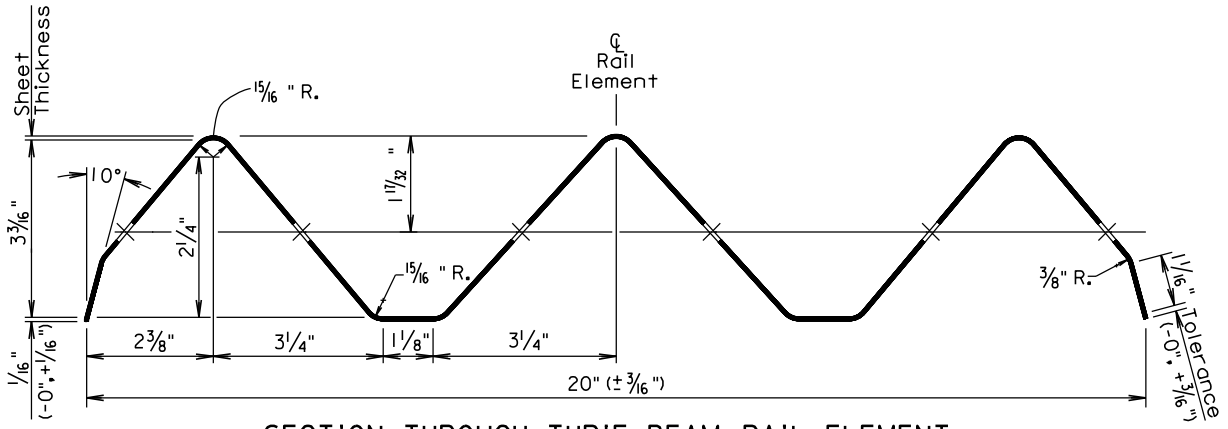
Thrie beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used shall be compatible with the total length of rail per site as shown in the plans.

Thrie Beam End Sections (Flared) shall only be used in a one-way traffic situation. See Standard Plate 630.80 for Thrie Beam End Section (Flared) in the Beam Guardrail Trailing End Terminal.

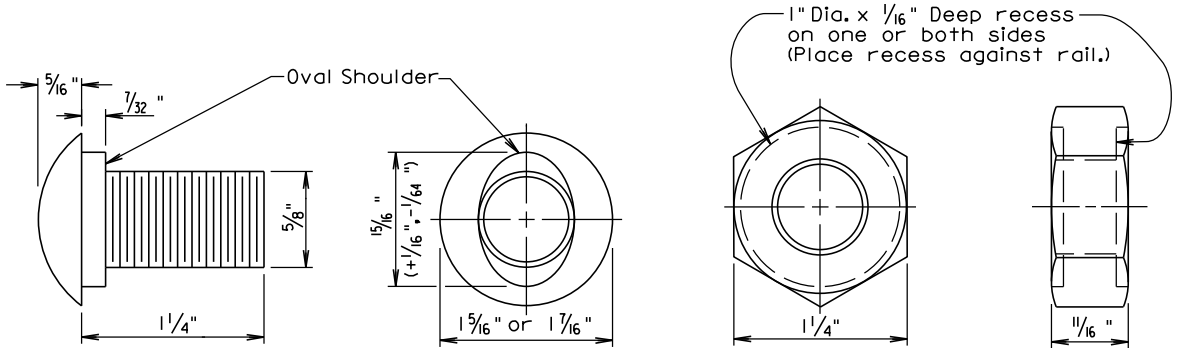
All costs for constructing thrie beam guardrail including labor, equipment, and materials including all posts, blocks, steel beam rail, and hardware shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

June 26, 2015

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | THRIE BEAM GUARDRAIL INSTALLATION | PLATE NUMBER 630.02<br>Sheet 1 of 1 |

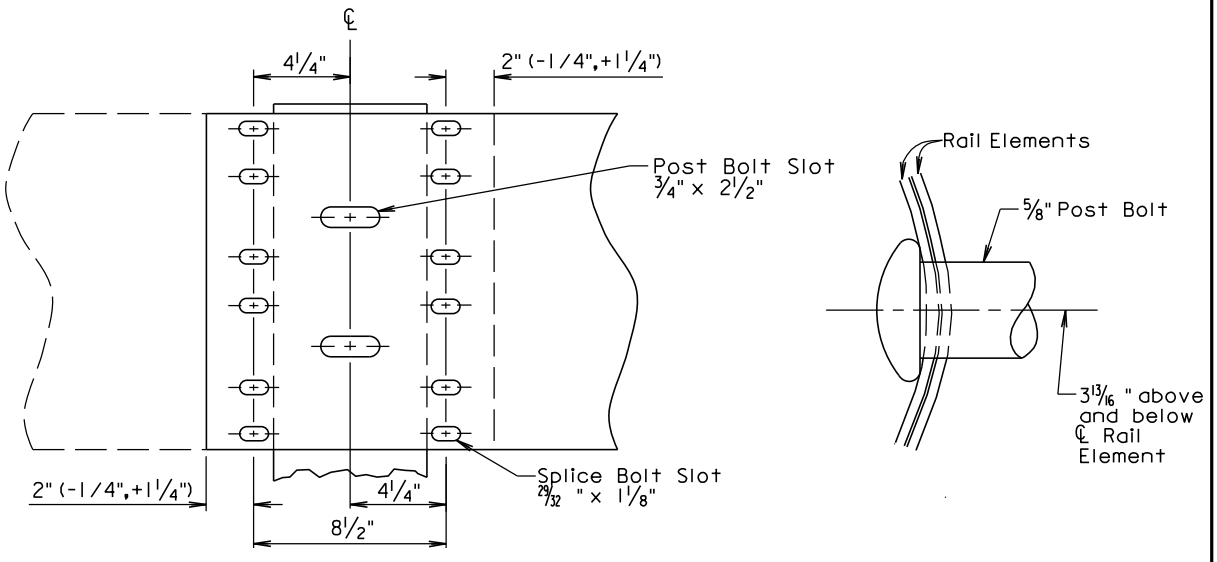



SECTION THROUGH THRIE BEAM RAIL ELEMENT




The Post Bolt is similar except the post bolt is 18" long.

SPLICE BOLT
(5/8" BUTTON HEAD BOLT AND RECESS NUT)

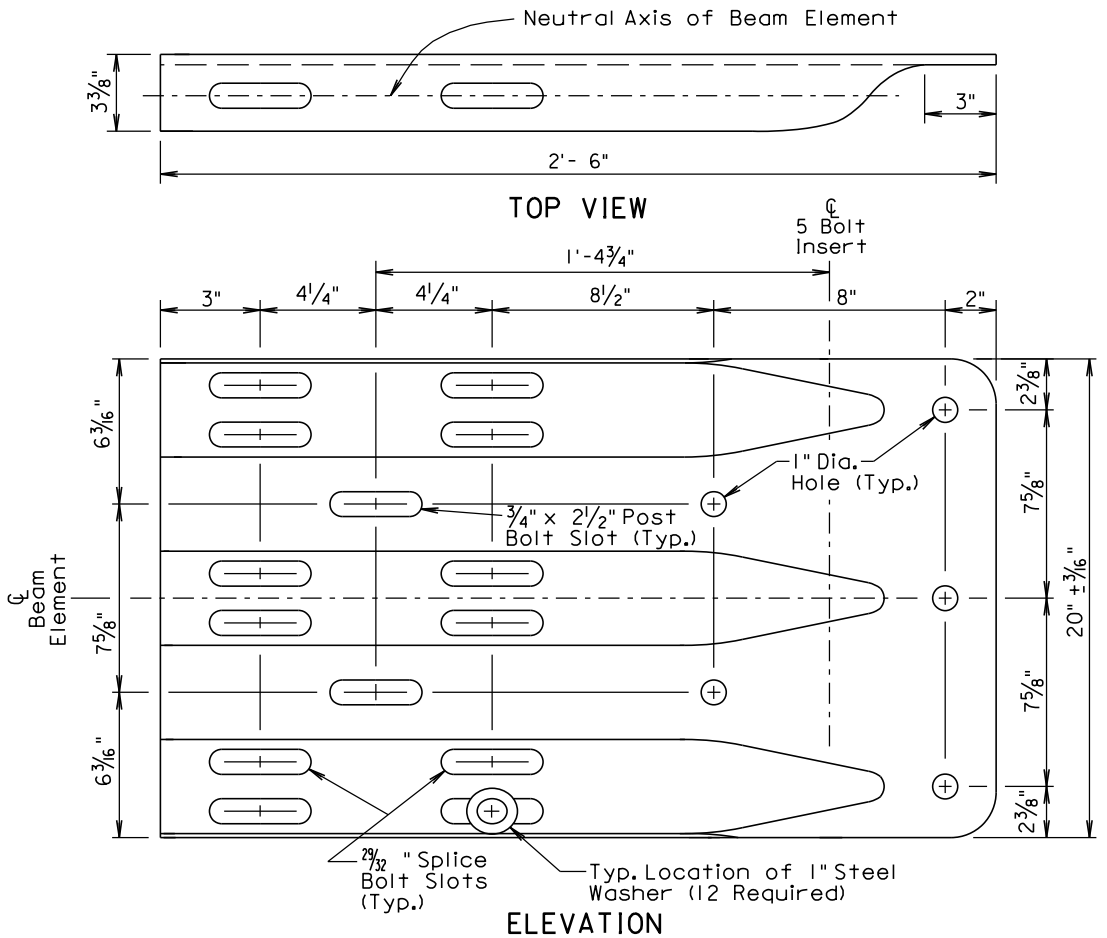


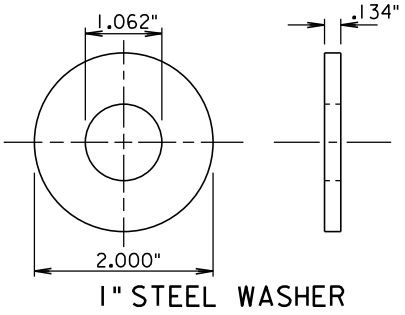

Lap in direction of traffic.

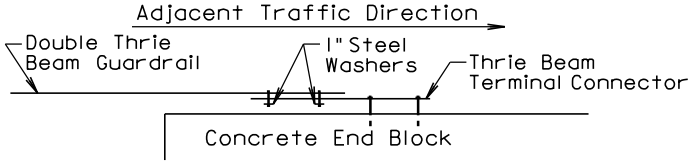
RAIL SPLICE

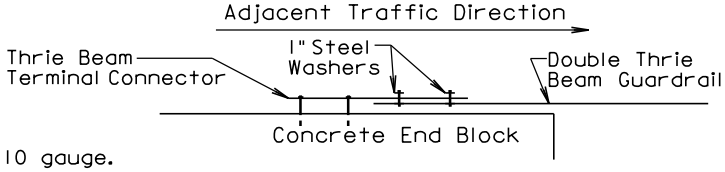
*March 31, 2000*

| | | | |
|---|---|---|---|
| *Published Date: 3rd Qtr. 2015* | SDDOT | *THRIE BEAM RAIL, RAIL SPLICE, AND HARDWARE* | *PLATE NUMBER* 630.03<br>*Sheet 1 of 1* |




**GENERAL NOTES:**

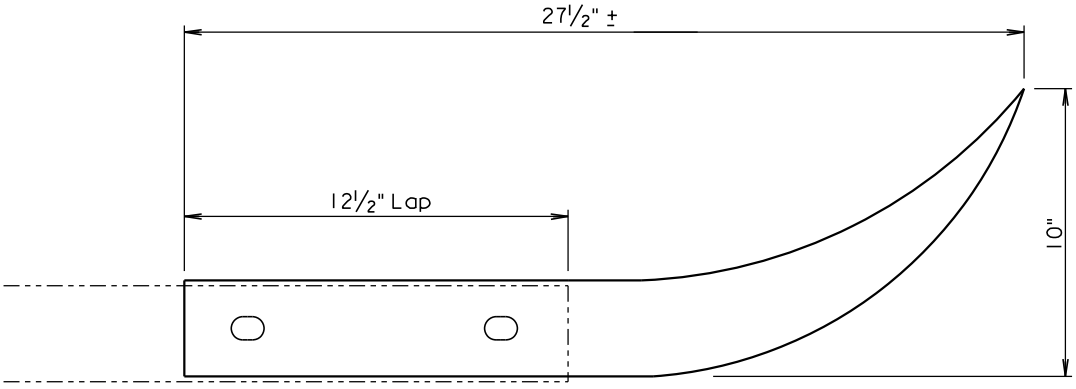
Thrie Beam Terminal Connectors shall be 10 gauge.

When the thrie beam terminal connector is used to connect the rail to the bridge, 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.

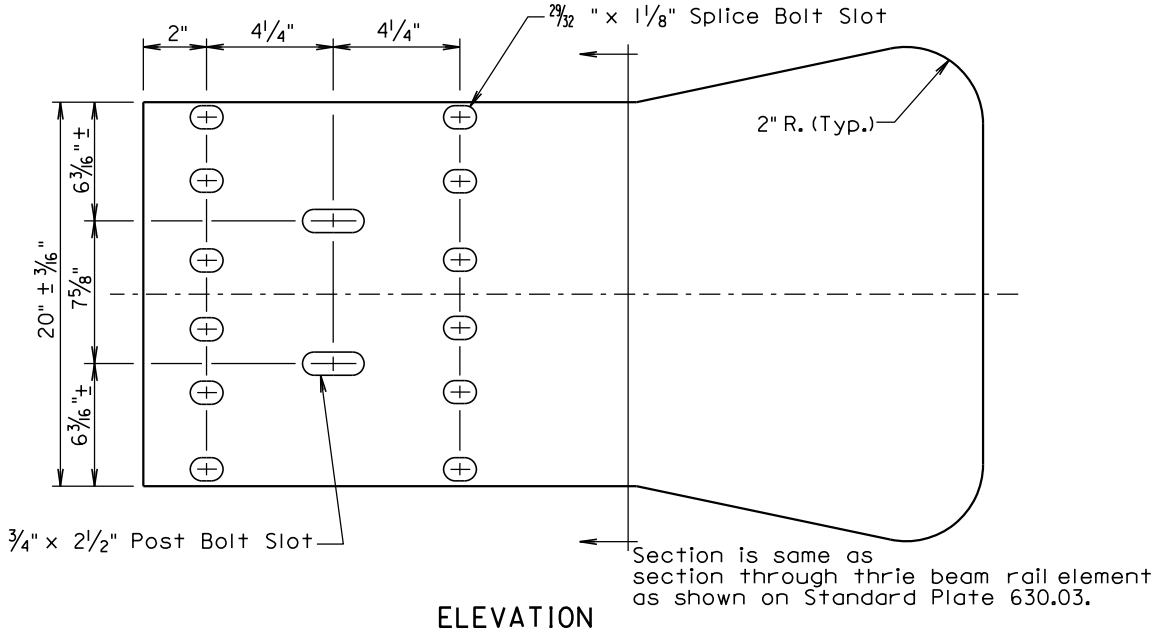
There will be no separate payment for furnishing and installing the Thrie Beam Terminal Connector. All costs for the Thrie Beam Terminal Connector shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

*September 14, 2001*

| | | | |
|---|---|---|---|
| *Published Date: 3rd Qtr. 2015* | SDDOT | ***THRIE BEAM TERMINAL CONNECTOR AND 1" STEEL WASHER*** | ***PLATE NUMBER*** *630.05* *Sheet 1 of 1* |




TOP VIEW




ELEVATION

GENERAL NOTES:

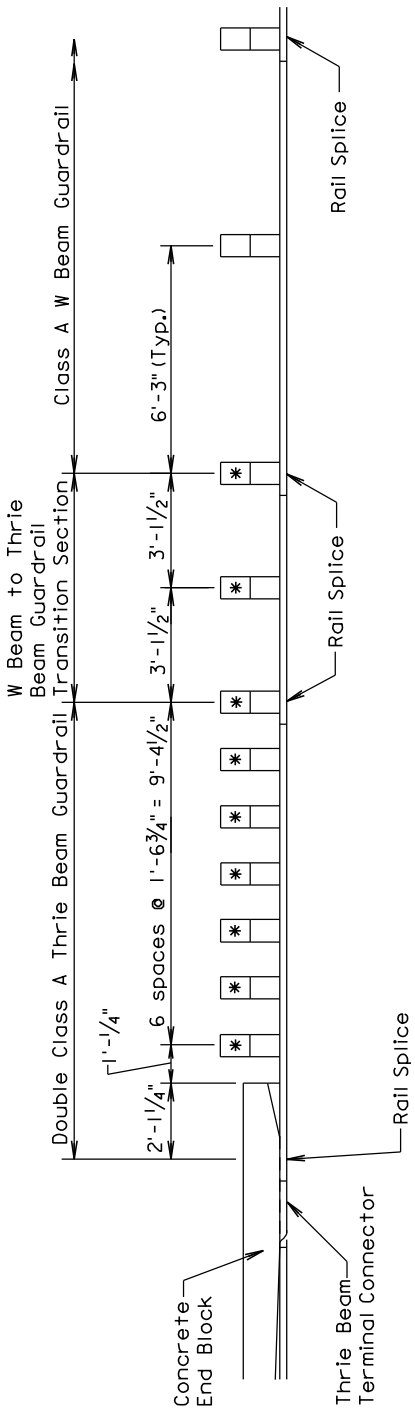
Thrie Beam End Sections (Flared) shall be 12 gage.

There will be no separate payment for furnishing and installing Thrie Beam End Sections (Flared). All costs for the Thrie Beam End Sections (Flared) shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

Thrie Beam End Sections (Flared) shall only be used in a one way traffic situation. See Standard Plate 630.80 for Thrie Beam End Section (Flared) in the Beam Guardrail Trailing End Terminal.

*March 31, 2000*

| | | | |
|---|---|---|---|
| *Published Date: 3rd Qtr. 2015* | SDDOT | *THRIE BEAM END SECTION (FLARED)* | *PLATE NUMBER* 630.10<br>*Sheet 1 of 1* |

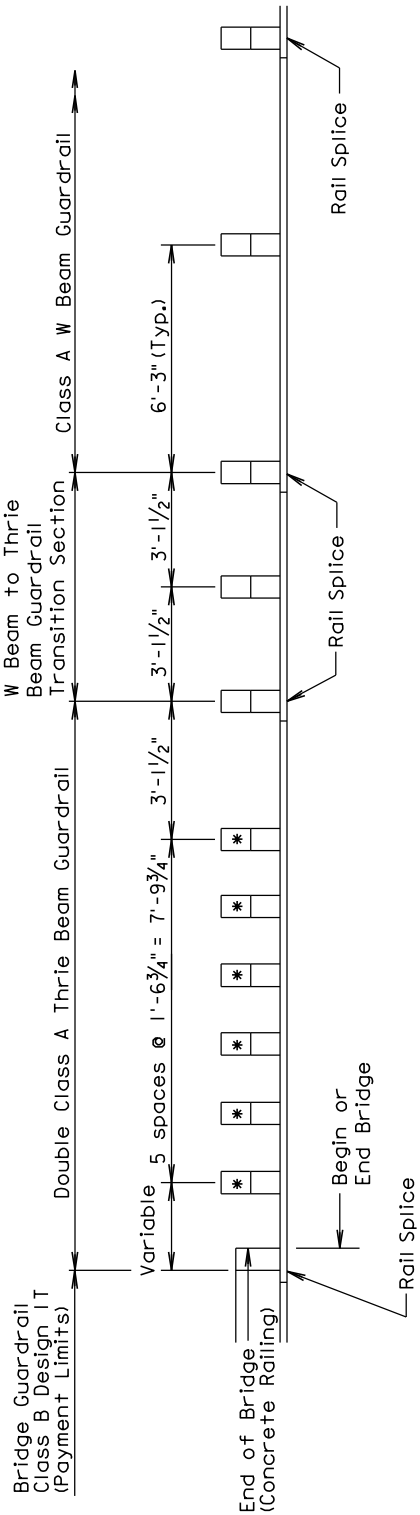



* 6" x 8" x 7' posts shall be used at these locations.

## POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END

December 23, 2002

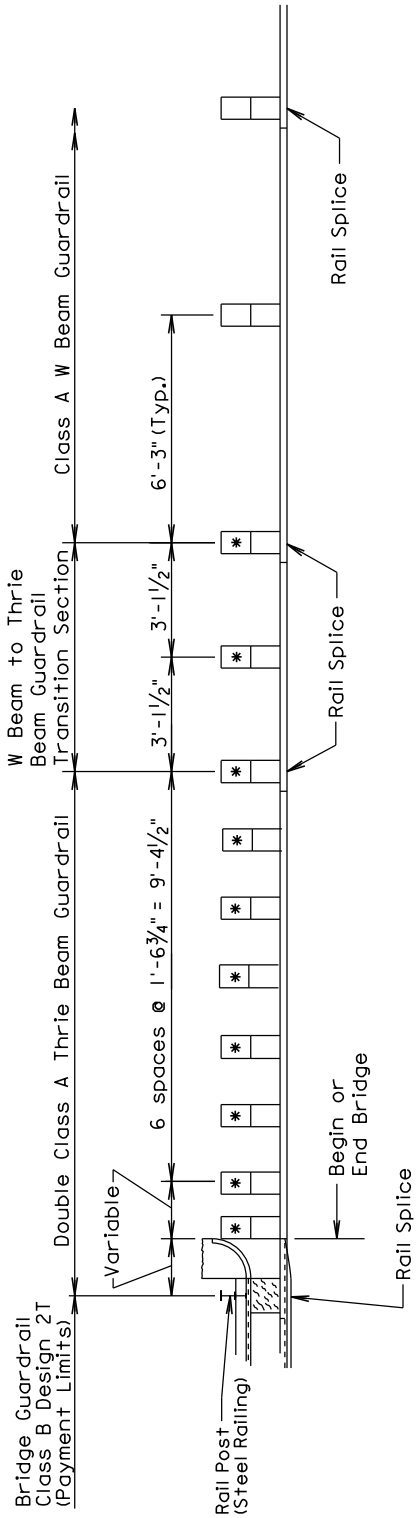
| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END | PLATE NUMBER 630.15<br>Sheet 1 of 1 |




## POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END

March 31, 2000

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END (BRIDGE GUARDRAIL DESIGN 1T) | PLATE NUMBER 630.20<br>Sheet 1 of 1 |

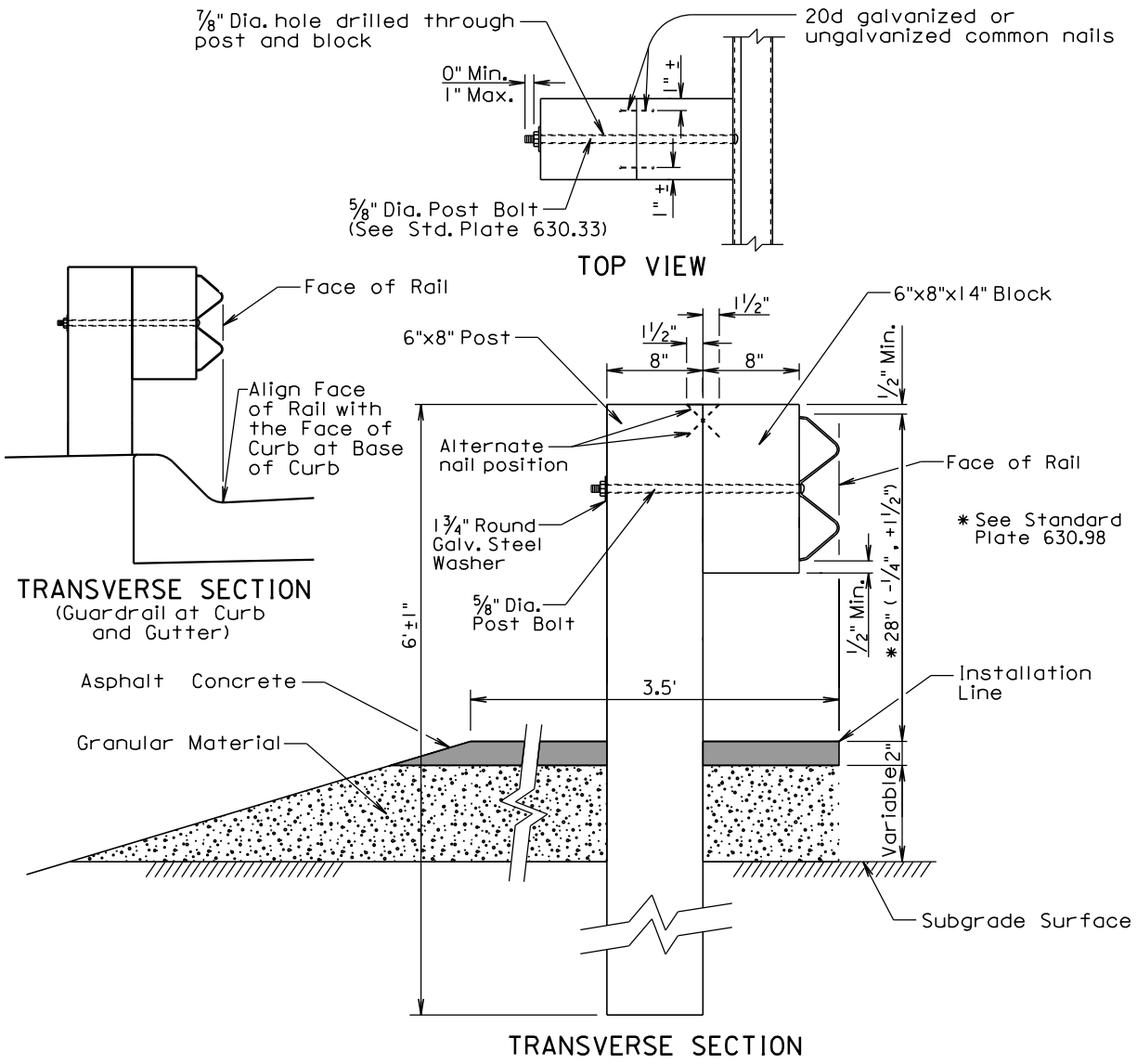



* 6" x 8" x 7' posts shall be used at these locations.

POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END

December 23, 2002

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END (BRIDGE GUARDRAIL DESIGN 2T) | PLATE NUMBER 630.21<br>Sheet 1 of 1 |




**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." For informational purposes, the Rate of Materials for the 3.5' wide section of asphalt concrete as shown above shall be 4.80 Tons per Station.

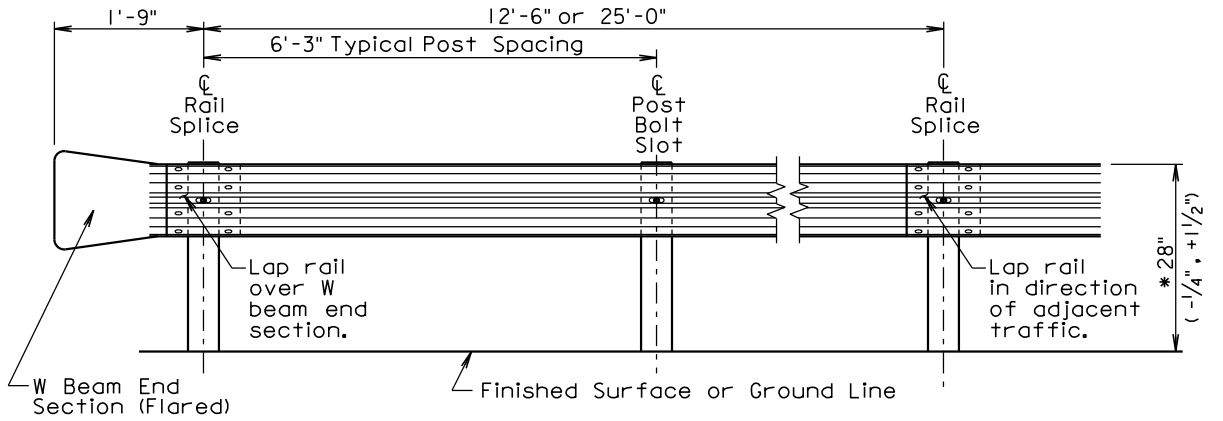
Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline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

The cross slope for the surfacing and subgrade surface shall be as specified in the plans (See Typical Sections and/or Cross Sections).

The top of post and top of block shall have a true square cut. The top of block shall be ±1 inch from the top of the post.

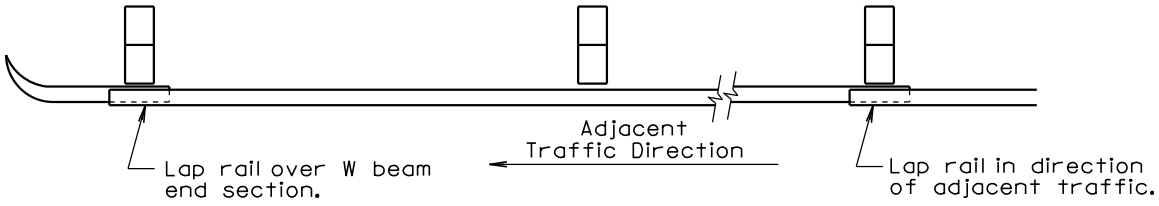
*June 26, 2015*

| | | | |
|---|---|---|---|
| *Published Date: 3rd Qtr. 2015* | SDDOT | *W BEAM GUARDRAIL POST INSTALLATION* | *PLATE NUMBER* 630.31<br>*Sheet 1 of 1* |




ELEVATION

*See Standard Plate 630.98




PLAN

| W BEAM GUARDRAIL DEFLECTION CRITERIA | |
|---|---|
| POST SPACING | MAXIMUM DEFLECTION |
| 6'-3" | 5'-0" |
| 3'-1 1/2" | 3'-9" |

For Informational Purposes Only

GENERAL NOTES:

All W beam rail shall be Type I.

There will be no separate payment for furnishing and installing W Beam End Sections (Flared) and W Beam Terminal Connectors. All costs for the W Beam End Sections (Flared) and W Beam Terminal Connectors shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

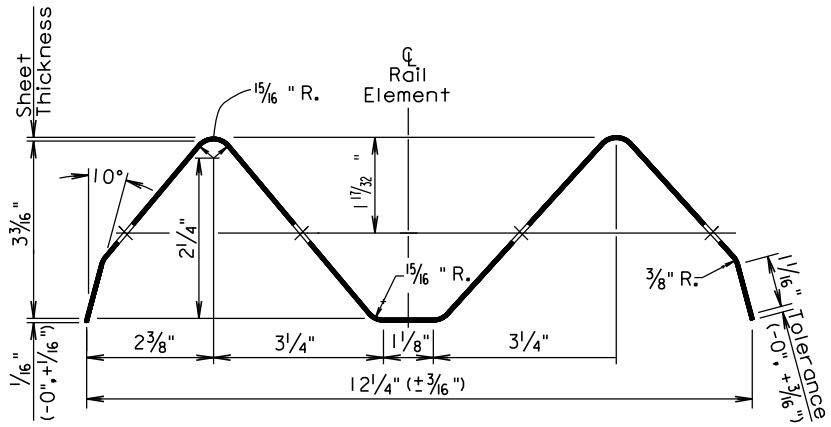
W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used shall be compatible with the total length of rail per site as shown in the plans.

W Beam End Sections (Flared) shall only be used in a one way traffic situation. See Standard Plate 630.80 for W Beam End Section (Flared) in the Beam Guardrail Trailing End Terminal.

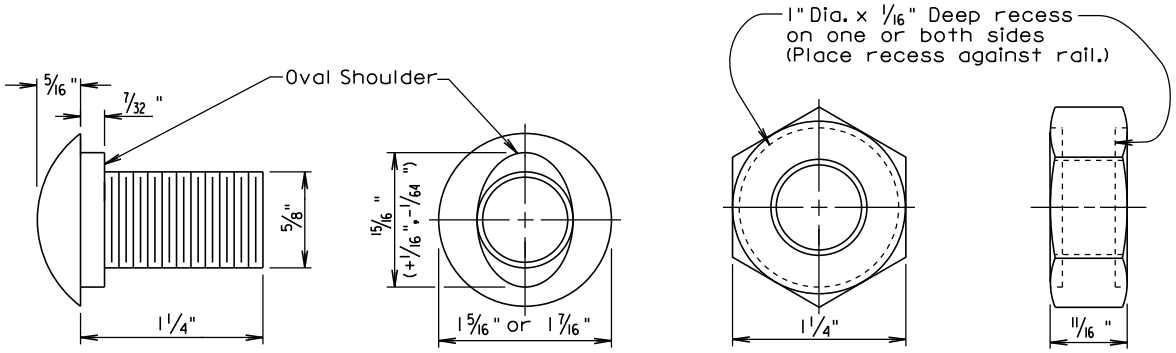
All costs for constructing W beam guardrail including labor, equipment, and materials including all posts, blocks, steel beam rail, and hardware shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

June 26, 2015

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | W BEAM GUARDRAIL INSTALLATION | PLATE NUMBER 630.32<br>Sheet 1 of 1 |

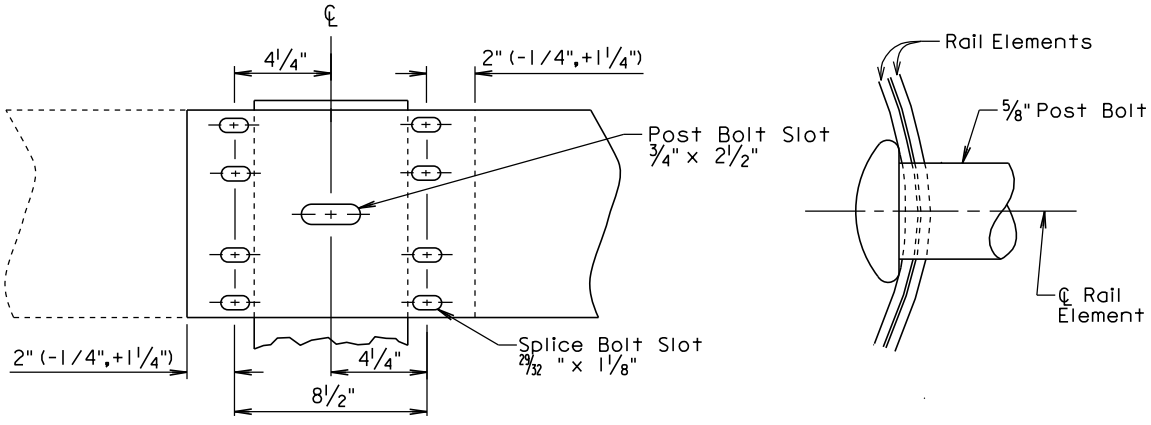



SECTION THROUGH W BEAM RAIL ELEMENT




The Post Bolt is similar except the post bolt is 18" long.

SPLICE BOLT
(5/8" BUTTON HEAD BOLT AND RECESS NUT)

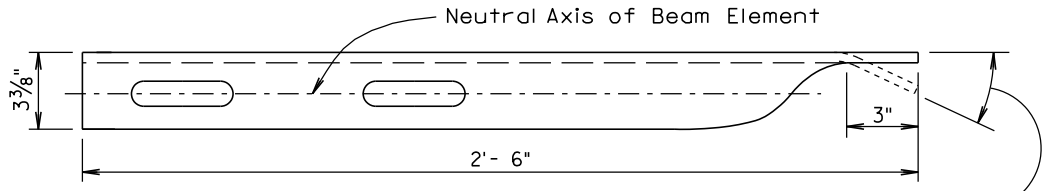



Lap in direction of traffic.

RAIL SPLICE

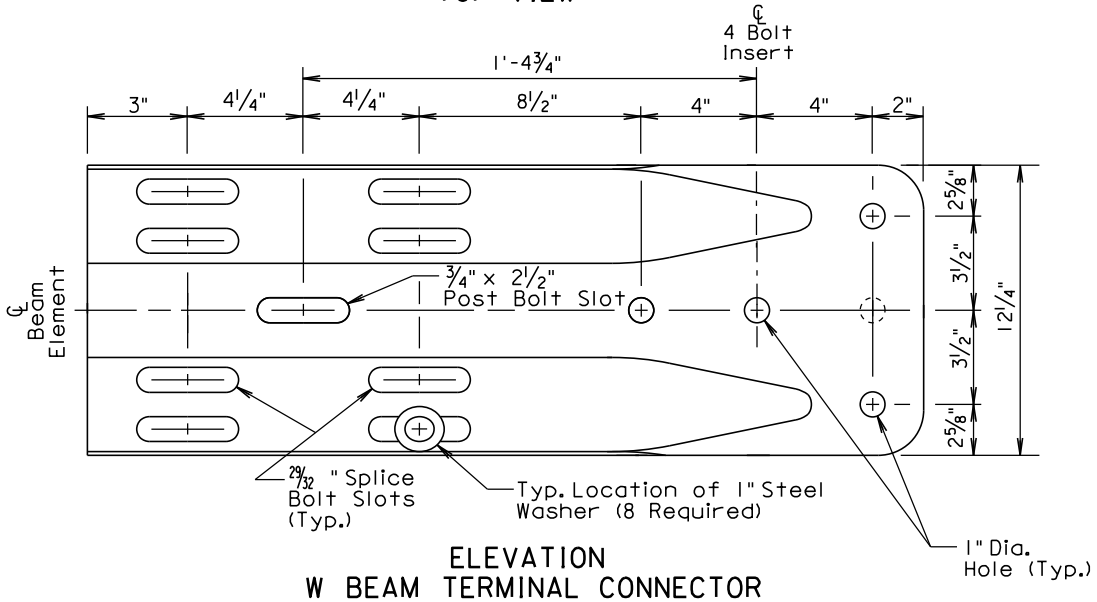
December 23, 2004

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | W BEAM RAIL, RAIL SPLICE, AND HARDWARE | PLATE NUMBER 630.33<br>Sheet 1 of 1 |

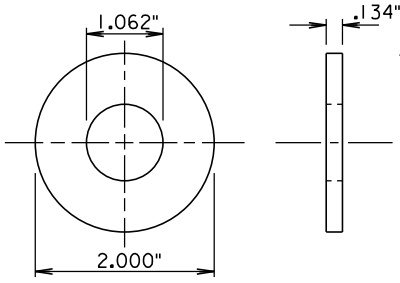



An extra hole and an approximate 26° bend shall be required only for the Breakaway Cable Terminal. The Modified W Beam Terminal Connector placement detail is shown on Standard Plate 630.47.

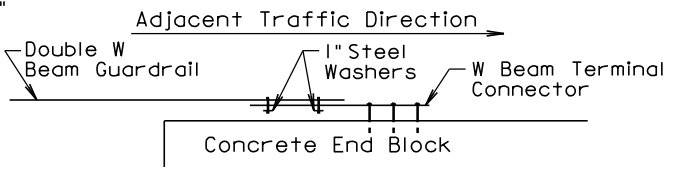
TOP VIEW

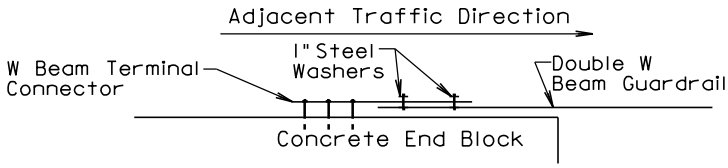



ELEVATION
W BEAM TERMINAL CONNECTOR




1" STEEL WASHER




GENERAL NOTES:

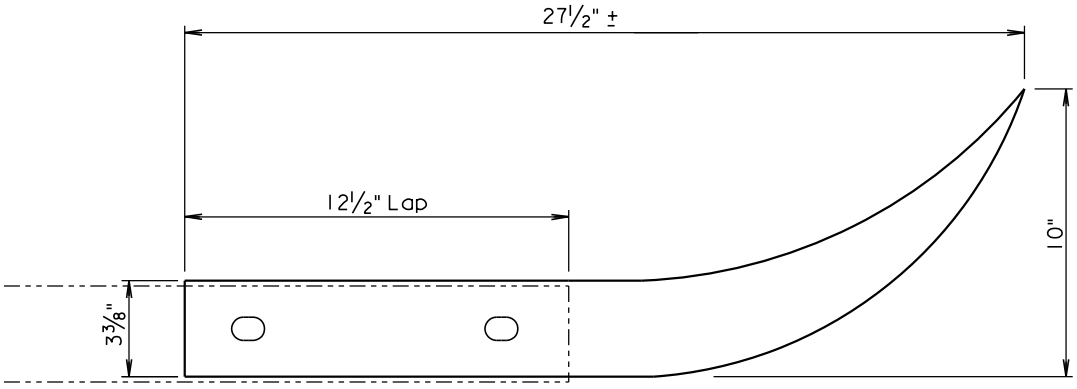
W Beam Terminal Connectors shall be 10 gauge.

When the W beam terminal connector is used to connect the rail to the bridge, 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.

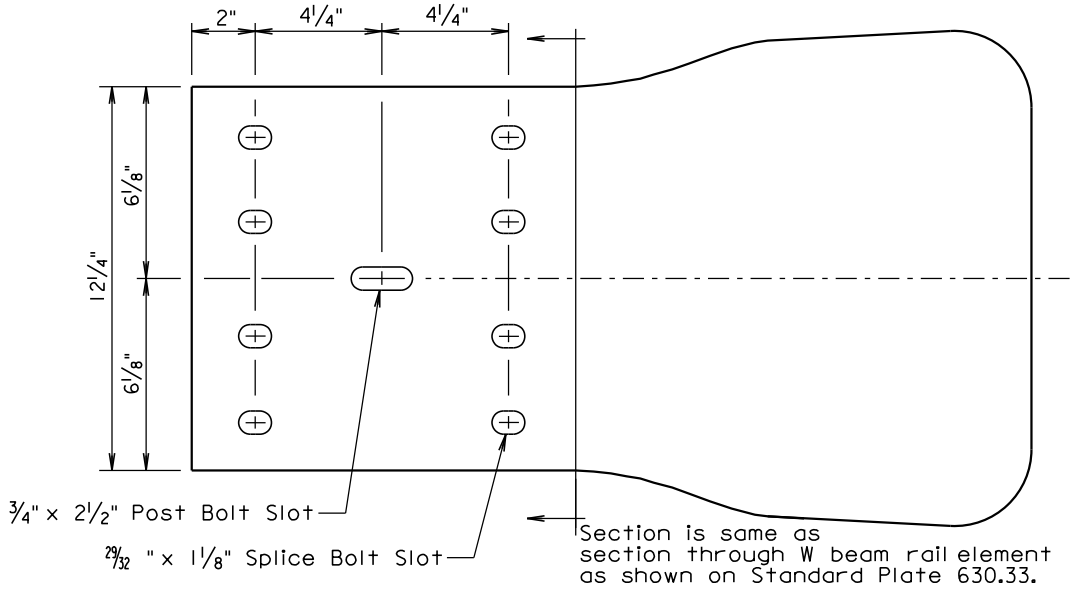
There will be no separate payment for furnishing and installing the W Beam Terminal Connector. All costs for the W Beam Terminal Connector shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

*September 14, 2001*

| | | | |
|---|---|---|---|
| *Published Date: 3rd Qtr. 2015* | SDDOT | *W BEAM TERMINAL CONNECTOR AND 1" STEEL WASHER* | *PLATE NUMBER* 630.35<br>*Sheet 1 of 1* |




TOP VIEW




ELEVATION

**GENERAL NOTES:**

W Beam End Sections (Flared) shall be 12 gage.

There will be no separate payment for furnishing and installing W Beam End Sections (Flared). All costs for the W Beam End Sections (Flared) shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

W Beam End Sections (Flared) shall only be used in a one way traffic situation. See Standard Plate 630.80 for W Beam End Section (Flared) in the Beam Guardrail Trailing End Terminal.

*March 31, 2000*

| | | | |
|---|---|---|---|
| *Published Date: 3rd Qtr. 2015* | SDDOT | *W BEAM END SECTION (FLARED)* | *PLATE NUMBER* 630.40<br>*Sheet 1 of 1* |

**GENERAL NOTES:**

The W beam guardrail flared end terminal shall be installed according to the manufacturer's installation instructions.

** An adhesive object marker shall be placed on the end section buffer or extruder after placement of the end section buffer or extruder. The adhesive object marker dimensions may be 16" x 16" or other variation due to the shape of the end section buffer or extruder. 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.

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 material 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.

December 16, 2014

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | EMBANKMENT AND SURFACING FOR W BEAM GUARDRAIL FLARED END TERMINAL | PLATE NUMBER 630.45<br>Sheet 1 of 1 |

PLAN

2" Asphalt concrete surfacing with variable thickness granular material

① Same inslope as mainline inslope
② 4:1 inslope
③ 2:1 inslope or flatter, or inslope as specified in plans
④ Same slope as roadway cross slope

* The length of inslope transition varies with the amount of change between inslopes. The length of the transition shall 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'.

**GENERAL NOTES:**

The W beam guardrail tangent end terminal shall be installed according to the manufacturer's installation instructions.

**An adhesive object marker shall be placed on the end section buffer or extruder after placement of the end section buffer or extruder. The adhesive object marker dimensions may be 16" x 16" or other variation due to the shape of the end section buffer or extruder. 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.

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 material 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.

December 16, 2014

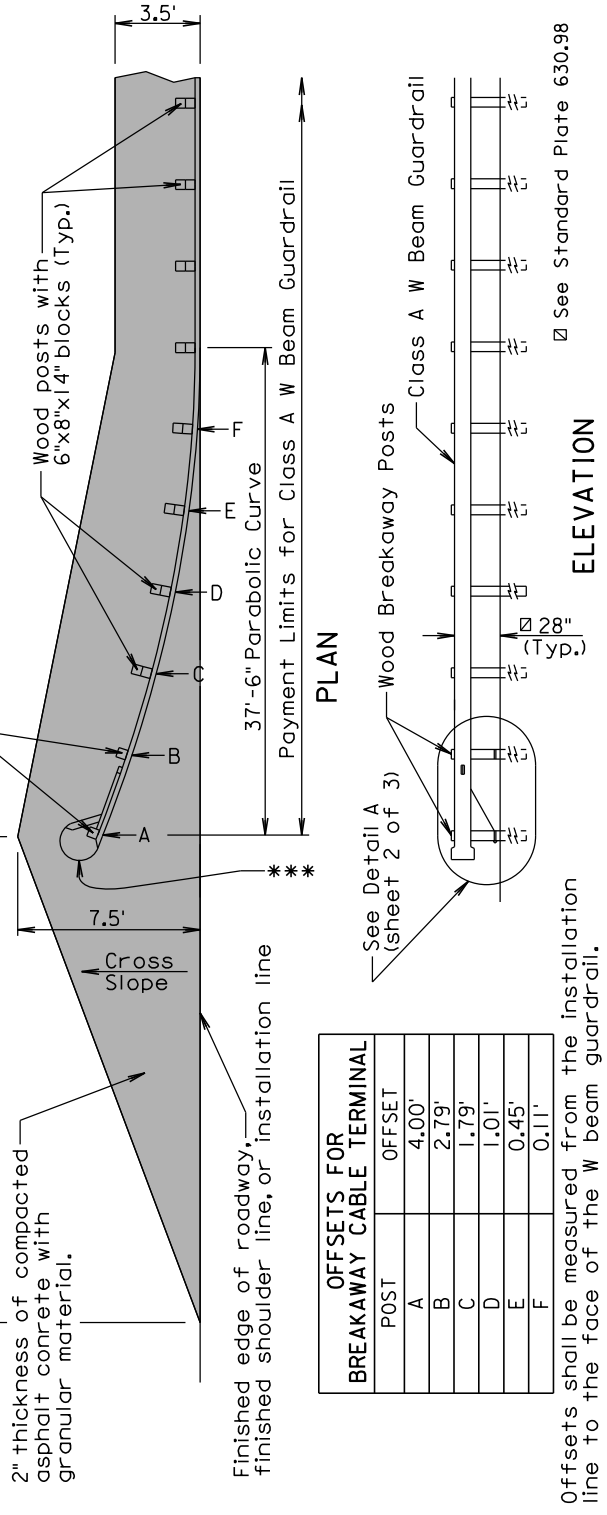
Published Date: 3rd Qtr. 2015

SDDOT

EMBANKMENT AND SURFACING FOR
W BEAM GUARDRAIL TANGENT END TERMINAL

PLATE NUMBER
630.46

Sheet 1 of 1




**OFFSETS FOR BREAKAWAY CABLE TERMINAL**

| POST | OFFSET |
|---|---|
| A | 4.00' |
| B | 2.79' |
| C | 1.79' |
| D | 1.01' |
| E | 0.45' |
| F | 0.11' |

**GENERAL NOTES:**

The finished embankment surfacing cross slope 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".

December 16, 2014

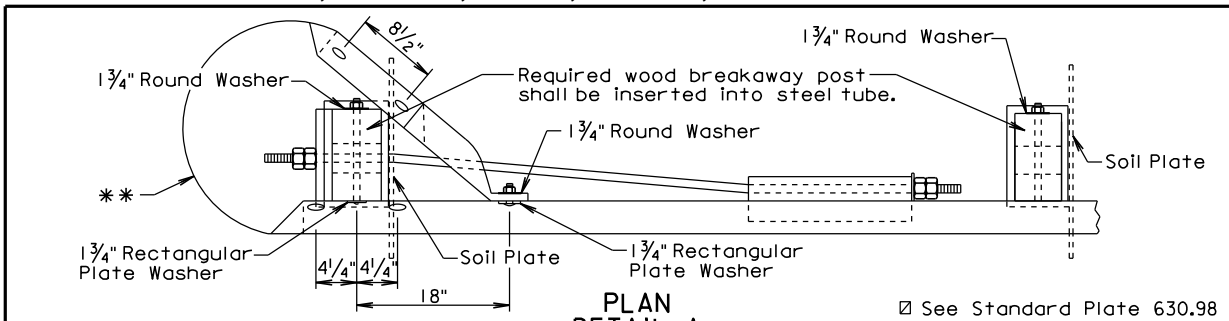
Published Date: 3rd Qtr. 2015

SDDOT

# W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL

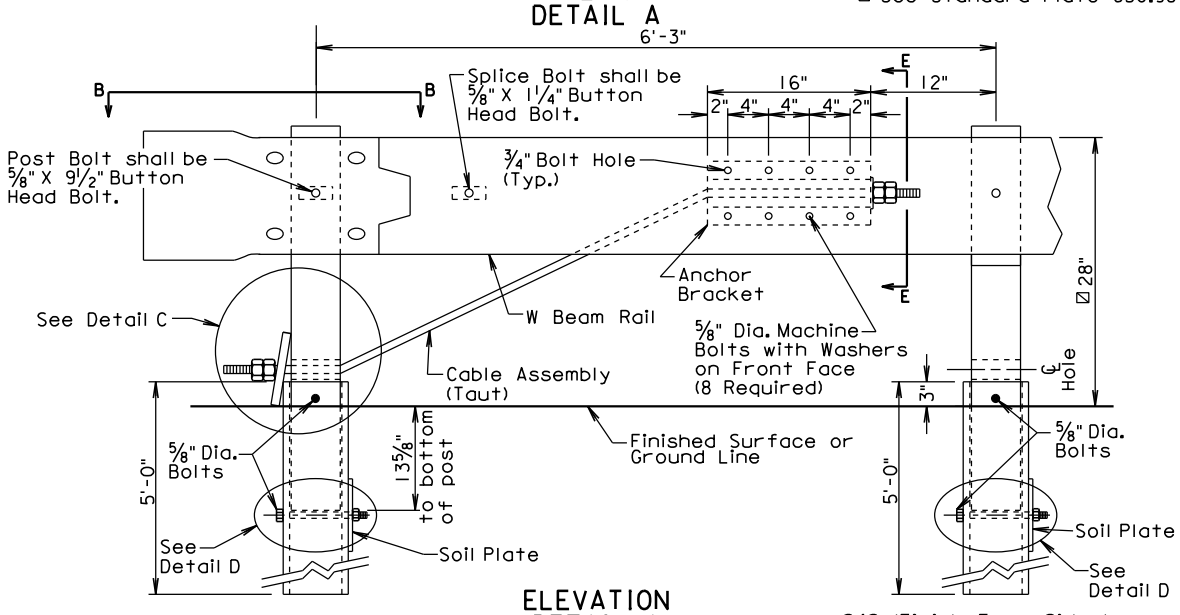
PLATE NUMBER
630.47

Sheet 1 of 3

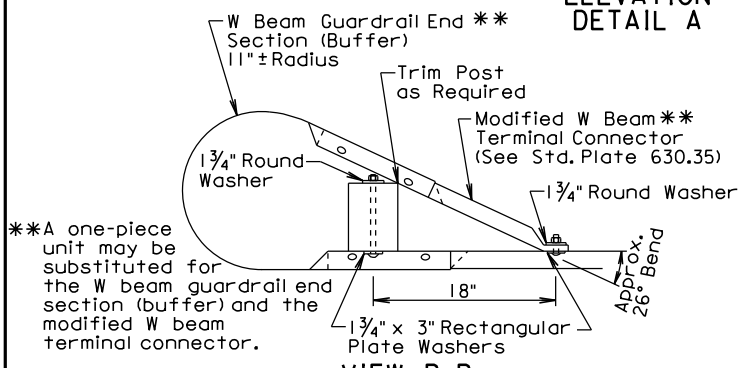



PLAN
DETAIL A

Ø See Standard Plate 630.98

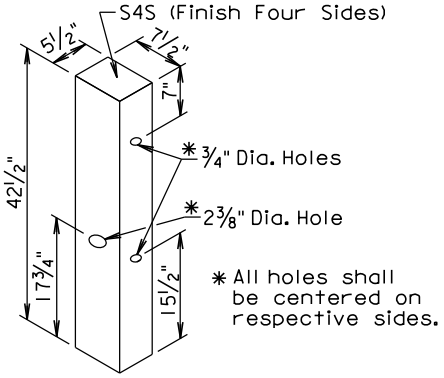



ELEVATION
DETAIL A




**A one-piece unit may be substituted for the W beam guardrail end section (buffer) and the modified W beam terminal connector.

VIEW B-B




WOOD BREAKAWAY POST

GENERAL NOTES:

All hardware shall be galvanized in accordance with ASTM A153.

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

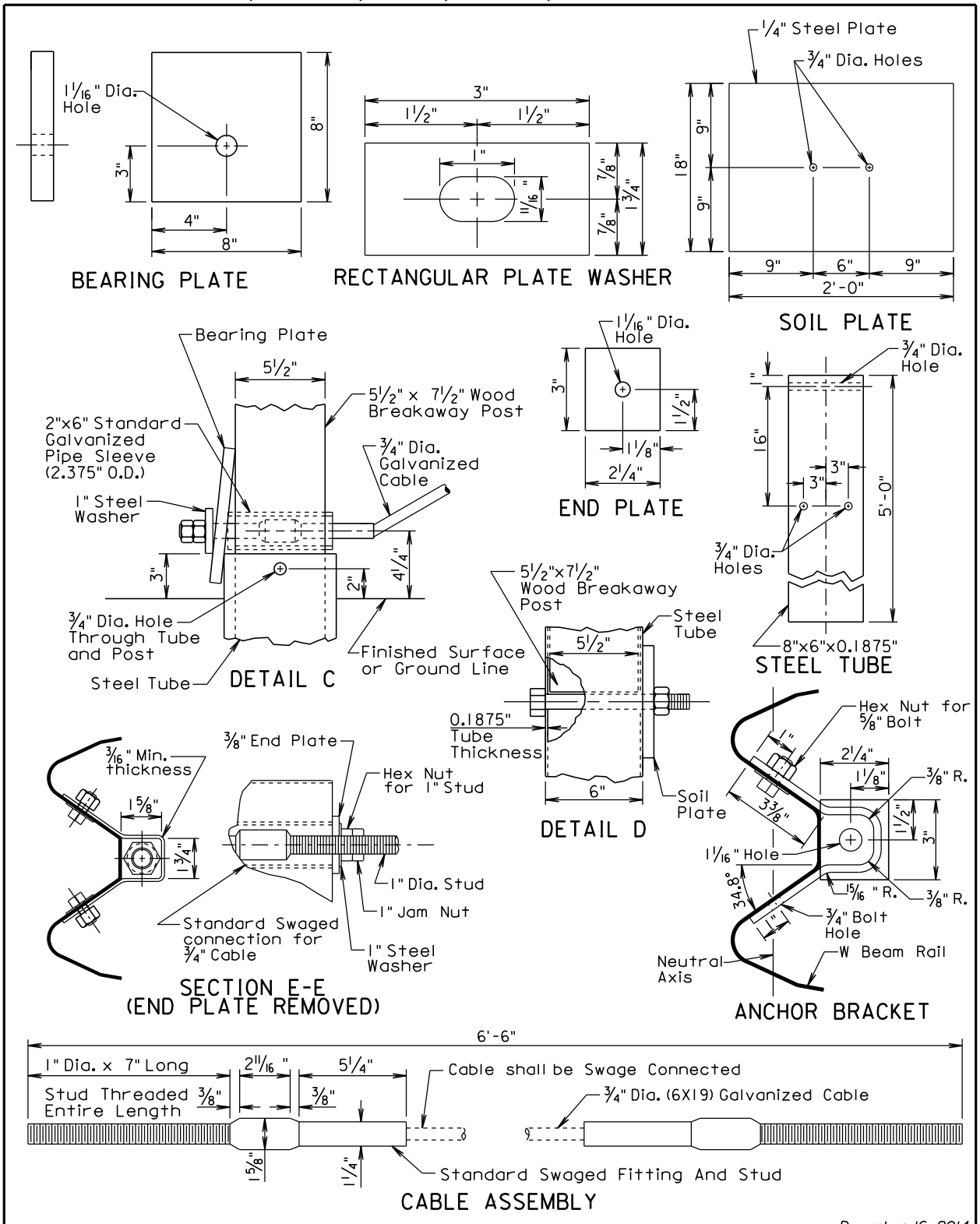
The anchor bracket, soil plate, and bearing plate shall be fabricated from steel that meets ASTM A36 Specifications. They shall be galvanized after fabrication in accordance with ASTM A123.

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

The cable shall be ¾", Type II, with Class A coating in conformance with AASHTO M30.

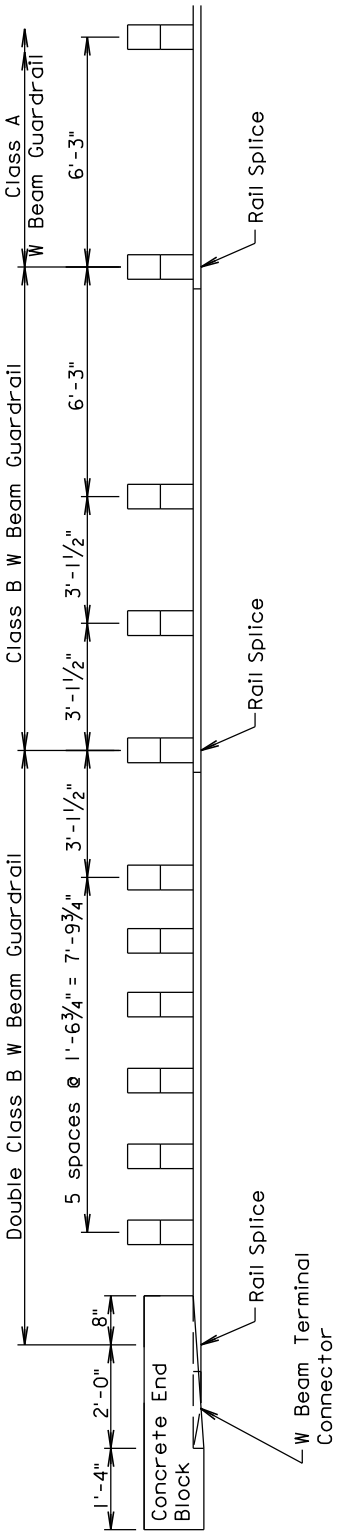
*December 16, 2014*

| | | | |
|---|---|---|---|
| *Published Date: 3rd Qtr. 2015* | SDDOT | **W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL** | PLATE NUMBER 630.47<br>Sheet 2 of 3 |




December 16, 2014

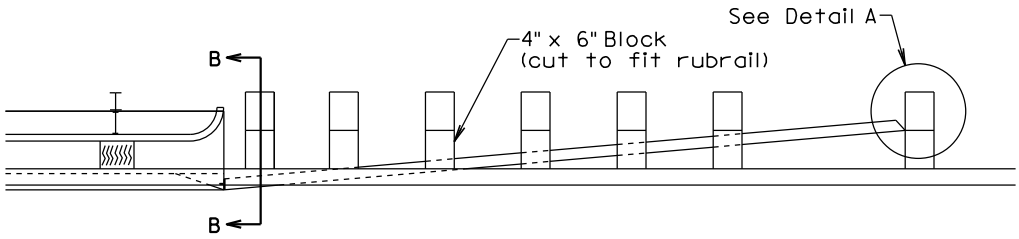
| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL | PLATE NUMBER 630.47<br>Sheet 3 of 3 |



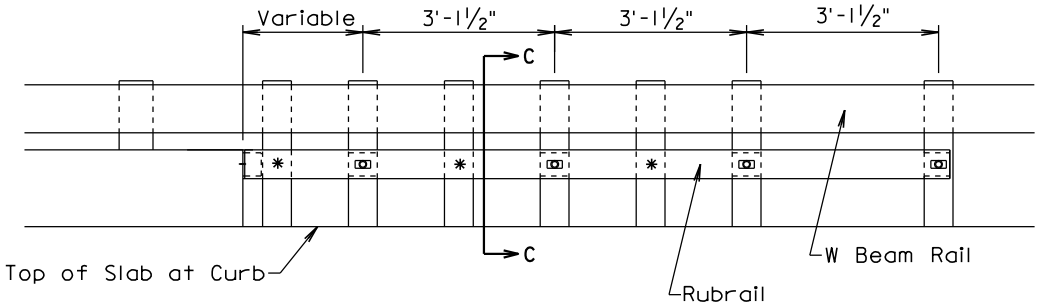

POST SPACING ARRANGEMENT FOR W BEAM GUARDRAIL AT BRIDGE END

March 31, 2000

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | POST SPACING ARRANGEMENT FOR W BEAM GUARDRAIL AT BRIDGE END | PLATE NUMBER 630.50<br>Sheet 1 of 1 |

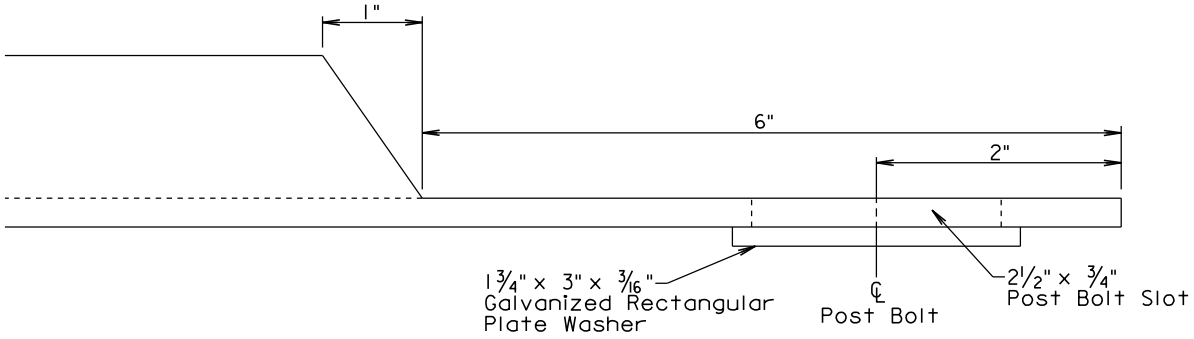



PLAN




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

ELEVATION




DETAIL A
(Post, Block, and Post Bolt not shown)

GENERAL NOTES:

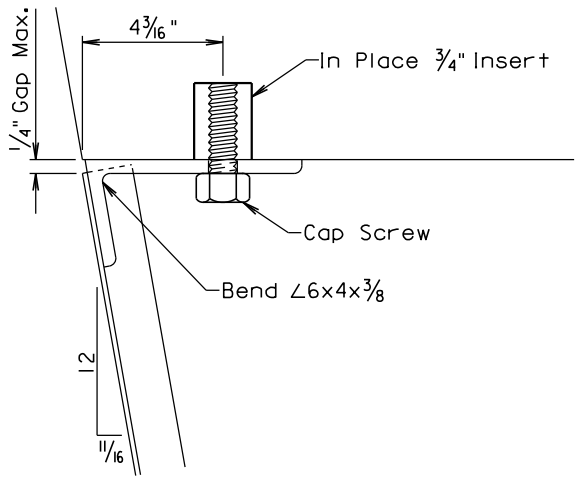
The steel shall be in conformance with ASTM A 36 and shall be galvanized after fabrication in conformance with ASTM A 123. If pre-galvanized steel members are used, all cuts and welds shall be coated with an approved galvanizing paint.

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

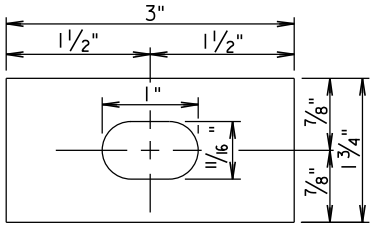
All hardware shall be in conformance with the requirements of AASHTO M 180.

March 31, 2000

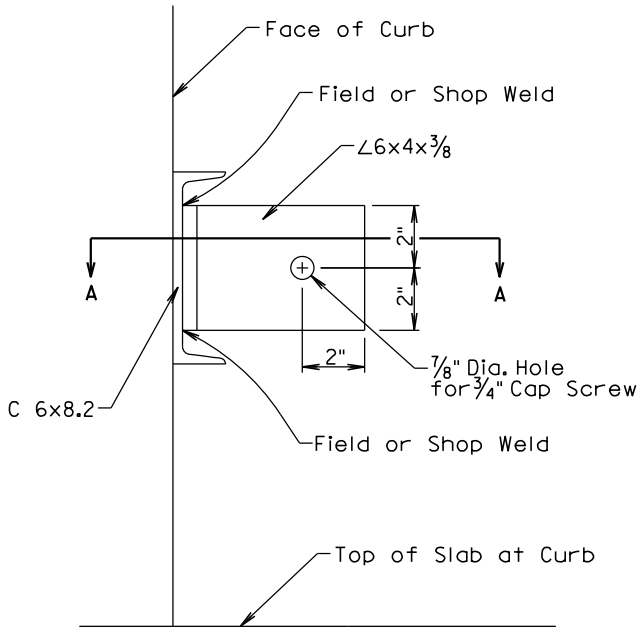
| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | RUBRAIL AT BRIDGE END (W BEAM RETROFIT AND CAST IN INSERT) | PLATE NUMBER 630.77<br>Sheet 1 of 2 |



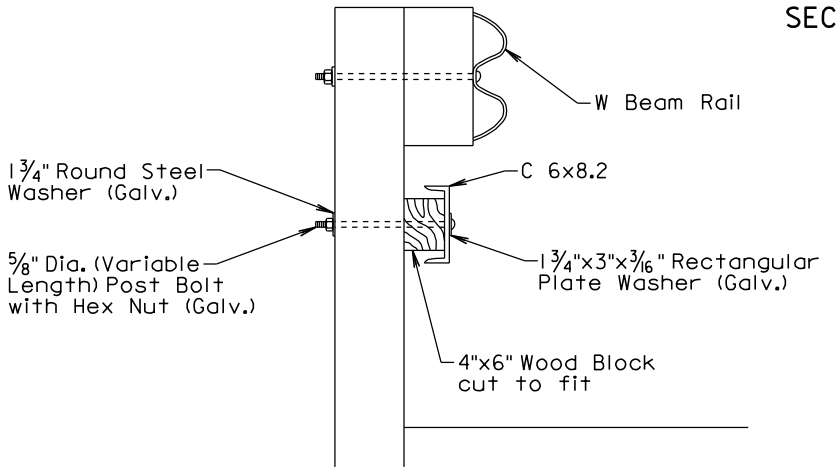

SECTION A-A




RECTANGULAR PLATE WASHER



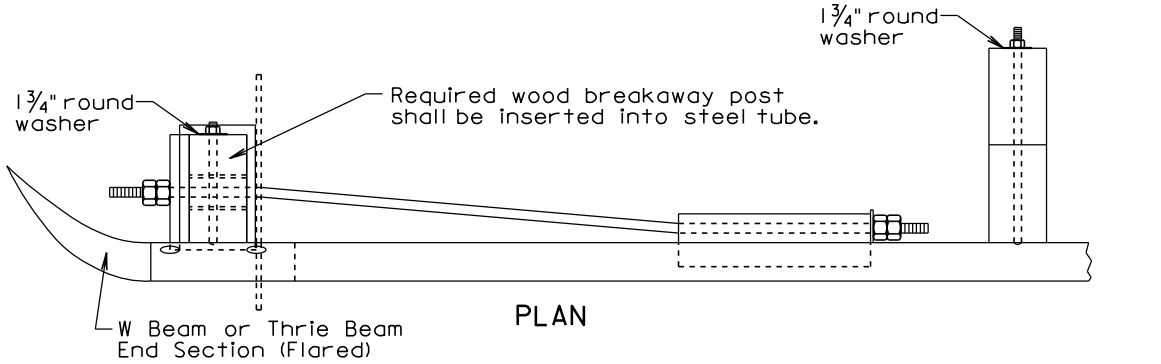

SECTION B-B



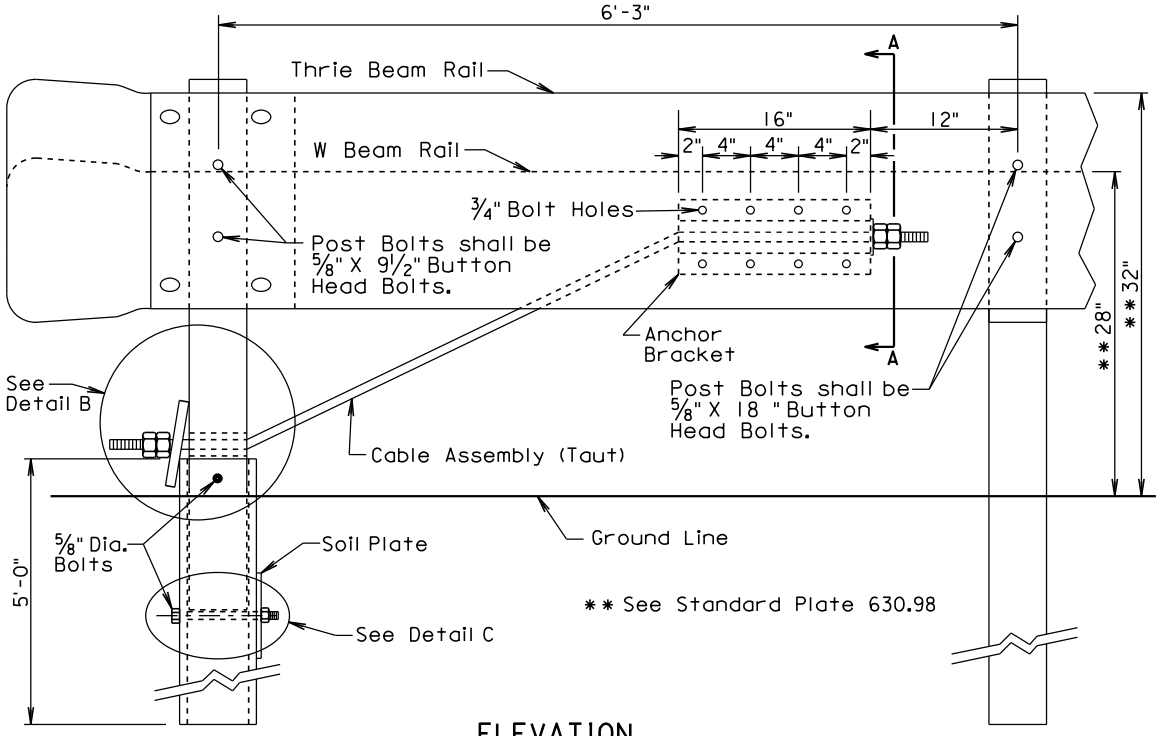

SECTION C-C

March 31, 2000

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | RUBRAIL AT BRIDGE END (W BEAM RETROFIT AND CAST IN INSERT) | PLATE NUMBER 630.77<br>Sheet 2 of 2 |




PLAN




ELEVATION

GENERAL NOTES:

All hardware shall be galvanized in accordance with ASTM A153.

The cable shall be ¾", 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 M111.

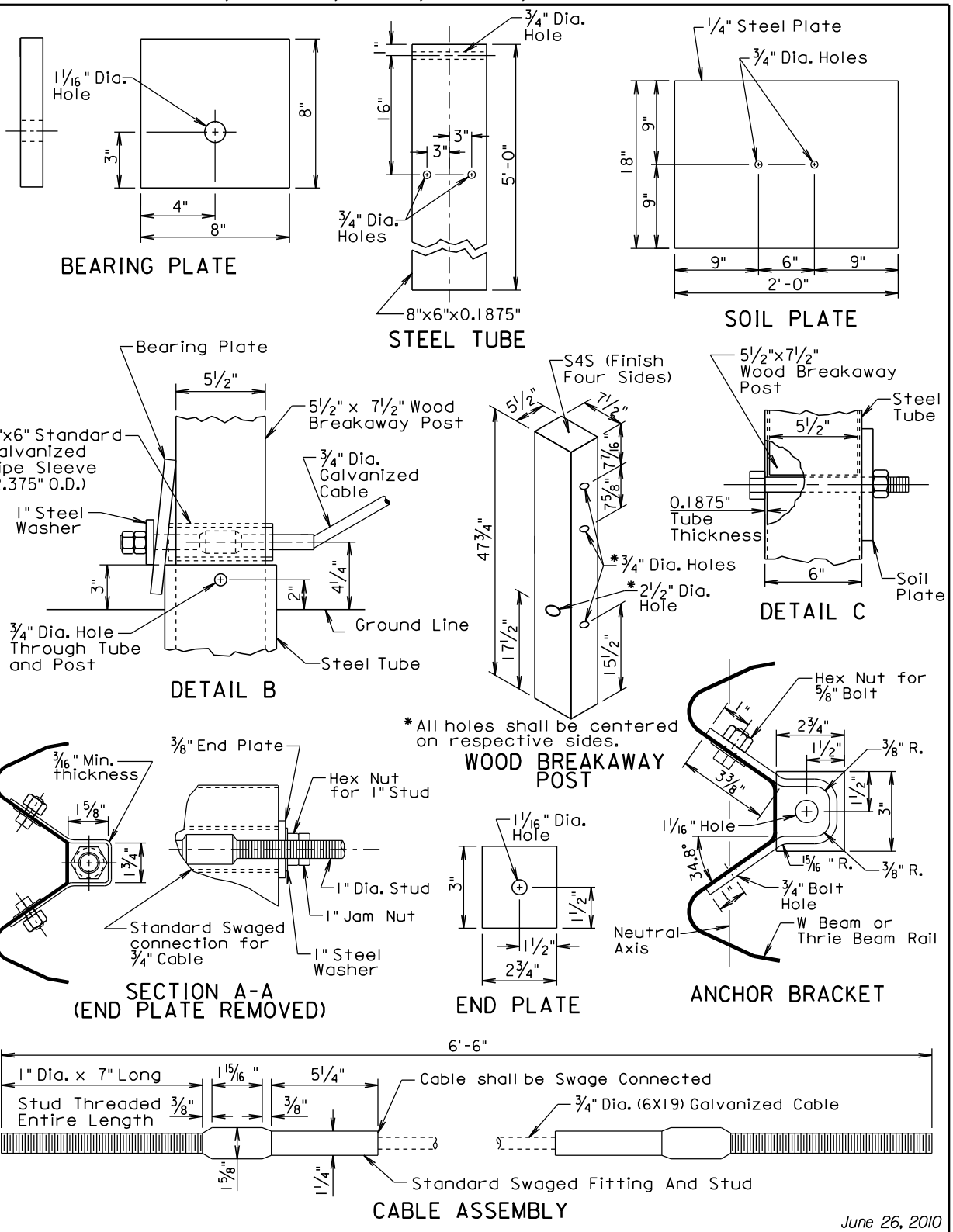
The anchor bracket, soil plate, and bearing plate shall be fabricated from steel that meets ASTM A36 Specifications. They shall be galvanized after fabrication in accordance with ASTM A123.

Costs for constructing the beam guardrail trailing end terminal and furnishing the anchor bracket, cable assembly, steel tube, soil plate, bearing plate, pipe sleeve, wood breakaway post, and all hardware necessary to attach anchor bracket, cable assembly, steel tube, soil plate, bearing plate, pipe sleeve, and wood breakaway post shall be incidental to the contract unit price per each for "Beam Guardrail Trailing End Terminal".

Costs for the thrie beam or W beam guardrail and the thrie beam or W beam end sections (Flared) shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" or "W Beam Guardrail" bid items.

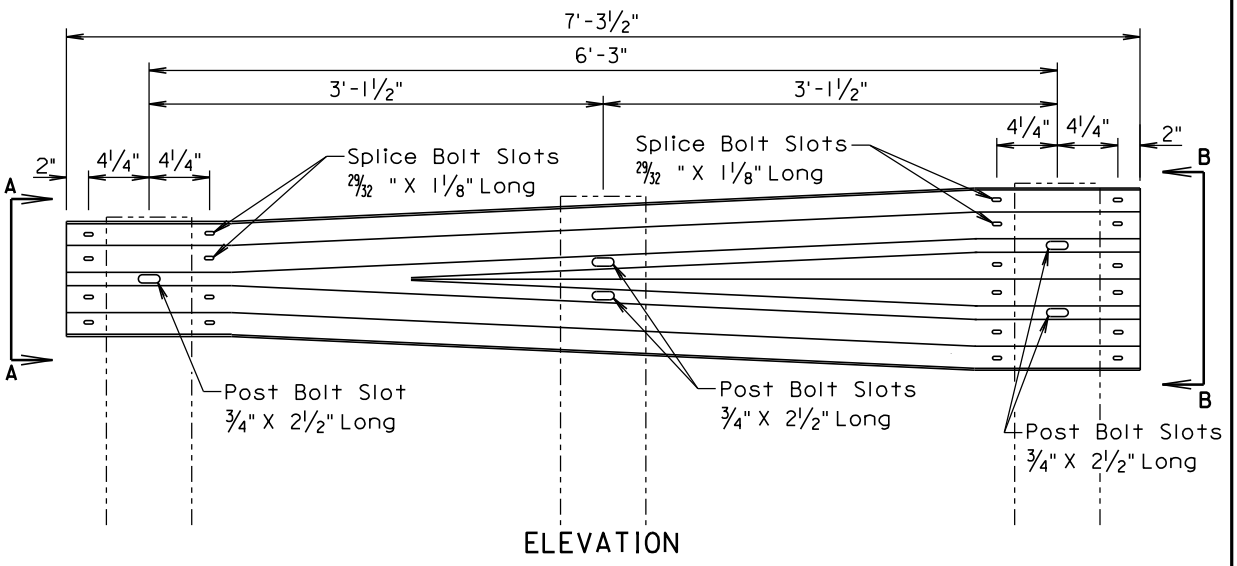
*June 26, 2010*

| | | | |
|---|---|---|---|
| *Published Date: 3rd Qtr. 2015* | SDDOT | **BEAM GUARDRAIL TRAILING END TERMINAL** | PLATE NUMBER 630.80<br>Sheet 1 of 2 |

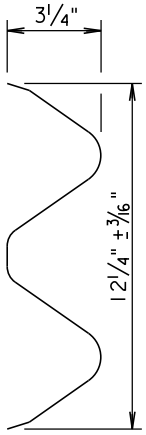



June 26, 2010

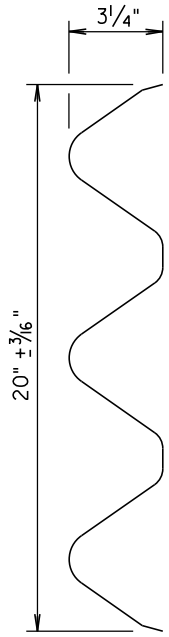
| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | BEAM GUARDRAIL TRAILING END TERMINAL | PLATE NUMBER 630.80<br>Sheet 2 of 2 |




ELEVATION




VIEW A-A



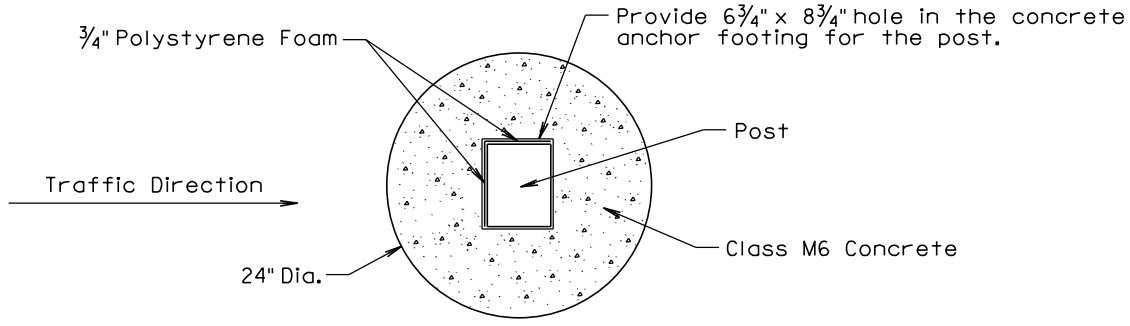

VIEW B-B

GENERAL NOTE:

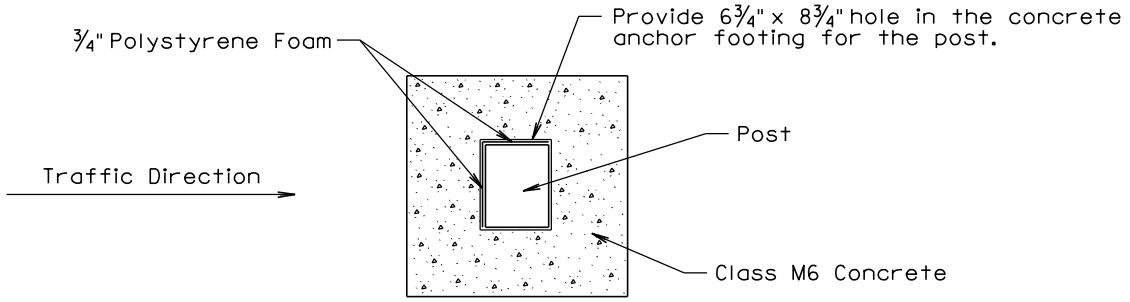
All costs for constructing the W Beam to Thrie Beam Guardrail Transition including labor, equipment, and materials including two posts, two blocks, W beam to thrie beam transition section, and hardware shall be incidental to the contract unit price per each for "W Beam to Thrie Beam Guardrail Transition".

March 31, 2000

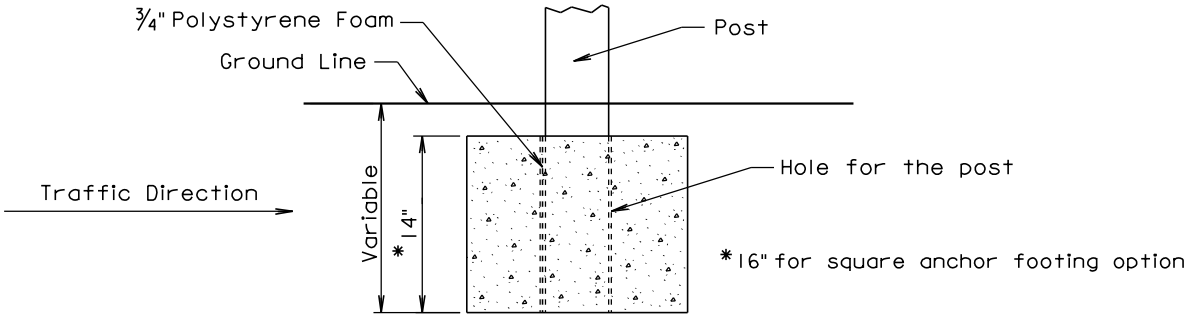
| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | W BEAM TO THRIE BEAM GUARDRAIL TRANSITION SECTION | PLATE NUMBER 630.82<br>Sheet 1 of 1 |




PLAN
(PREFERRED 24" DIA. ROUND
CONCRETE ANCHOR FOOTING)




PLAN
(20" x 20" SQUARE
CONCRETE ANCHOR FOOTING)




ELEVATION

GENERAL NOTES:

In areas where the required guardrail wood post depth is not obtainable, shorter posts may be used and shall be anchored in concrete in accordance with the details shown on this standard plate.

A 20" x 20" square concrete anchor footing may be used in lieu of the 24" diameter round anchor footing.

Forms for the concrete anchor footing hole is not required.

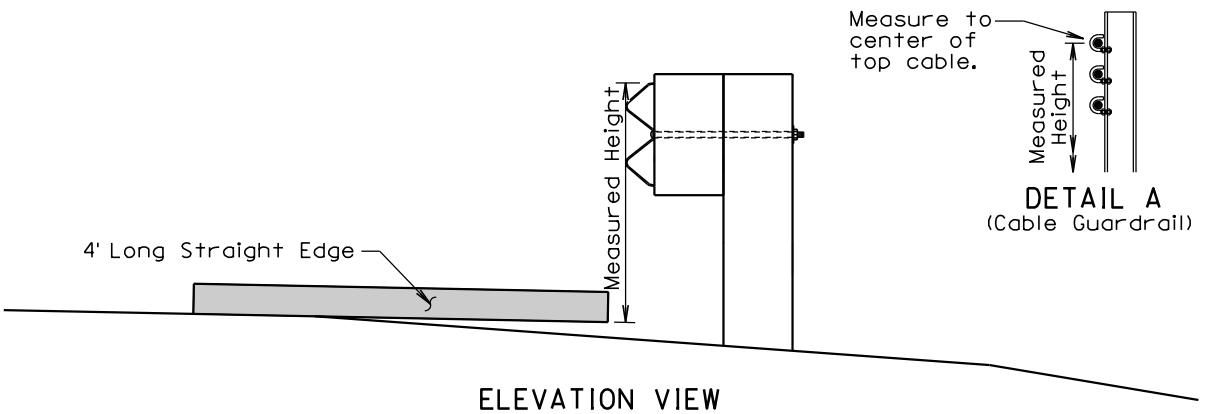
Concrete for the concrete anchor footing shall be Class M6.

Three quarter inch polystyrene foam shall be attached to two sides of the posts. See details above for placement position of the polystyrene foam.

There will be no separate payment for furnishing and installing the concrete anchor footing for short guardail post. All costs for concrete anchor footings shall be incidental to the contract unit price per foot for the respective "Thrie Beam or W Beam Guardrail" bid item.

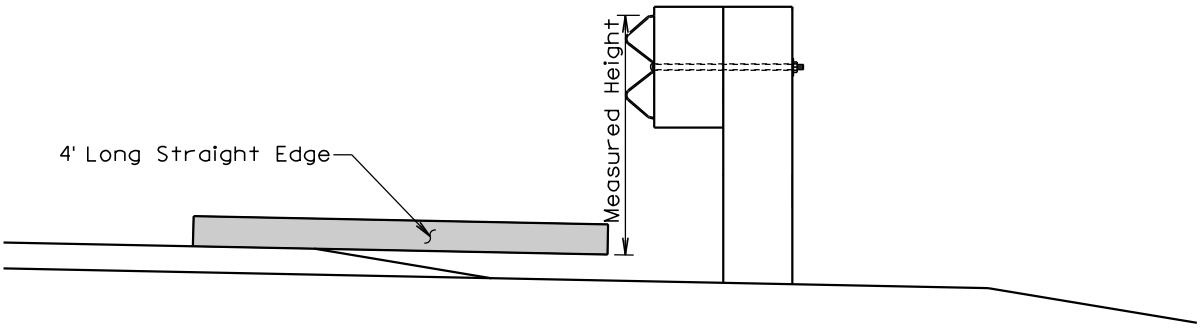
March 31, 2000

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | CONCRETE ANCHOR FOOTING FOR SHORT GUARDRAIL POST | PLATE NUMBER 630.84<br>Sheet 1 of 1 |

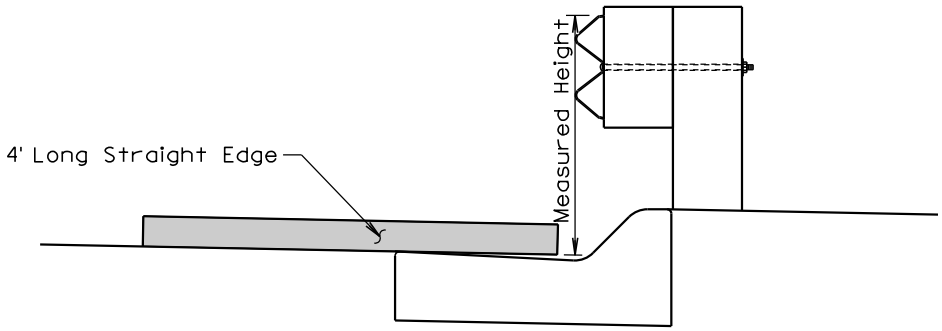



DETAIL A
(Cable Guardrail)

ELEVATION VIEW
(Guardrail Adjacent to Differential Slopes)




ELEVATION VIEW
(Guardrail Adjacent to Differential Surfacing Elevations)




ELEVATION VIEW
(Guardrail at Curb and Gutter)

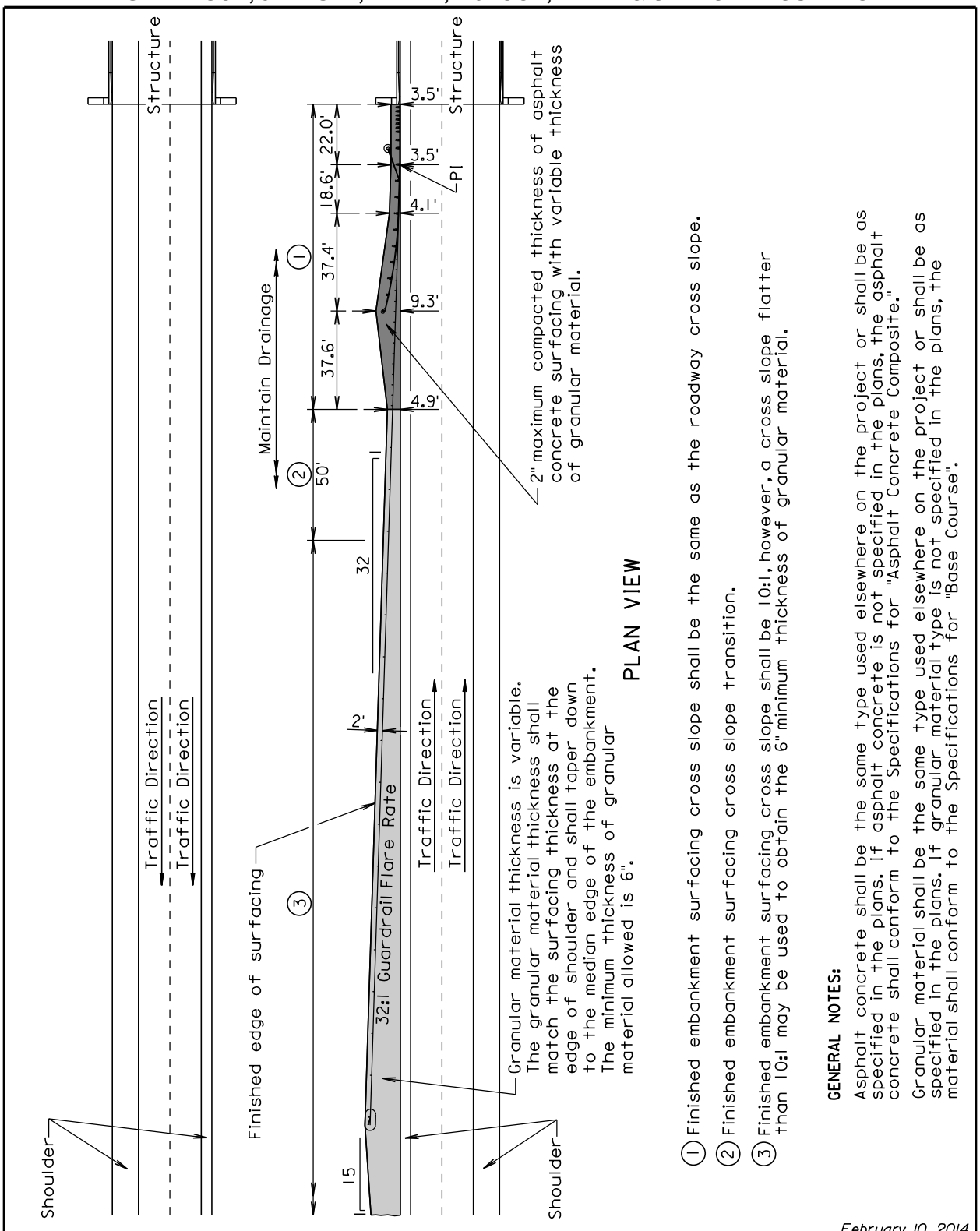
GENERAL NOTES:

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

When measuring height of cable guardrail or cable barrier the height shall be measured to the center of the top cable. See Detail A.

June 26, 2010

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | MEASURING GUARDRAIL HEIGHT | PLATE NUMBER 630.98<br>Sheet 1 of 1 |




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.

**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".

February 10, 2014

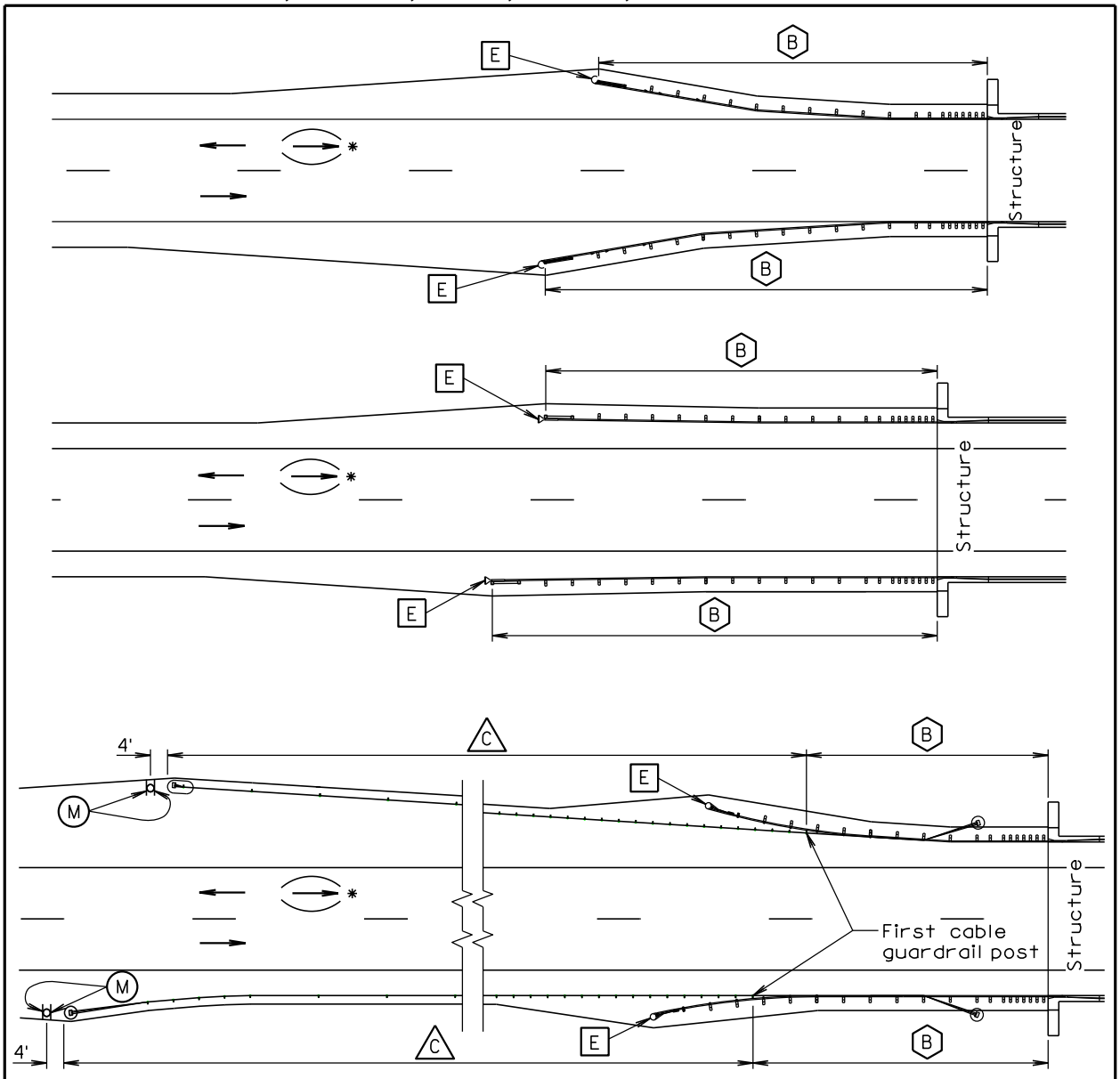
Published Date: 3rd Qtr. 2015

SDDOT

# EMBANKMENT AND SURFACING FOR TYPICAL MEDIAN PROTECTION

PLATE NUMBER
630.99

Sheet 1 of 1




TYPICAL GUARDRAIL LAYOUTS

B Steel Beam Guardrail Delineation

E Guardrail Terminal End Object Marker

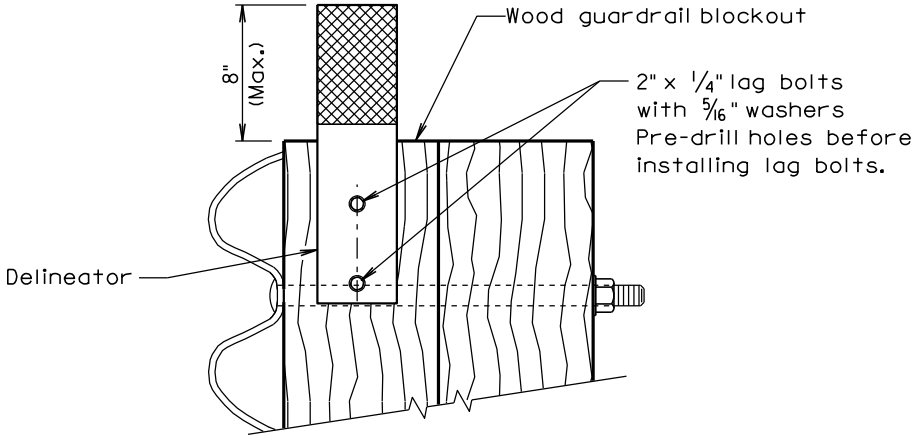
C 3 Cable Guardrail Delineation

M Type 2 Object Marker

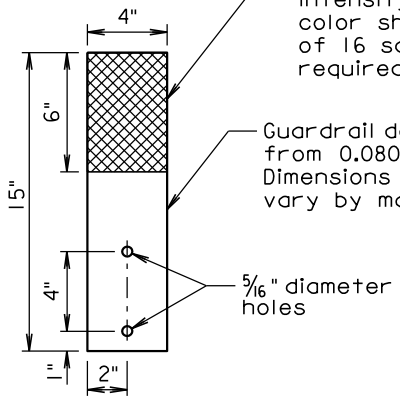
* For two-way traffic, install delineation at the opposite end of structure the same as shown. Back-to-back delineation is required for two-way traffic, single-sided delineation for one-way traffic.

June 26, 2011

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | DELINEATION OF GUARDRAIL AT BRIDGES | PLATE NUMBER 632.40<br>Sheet 1 of 4 |



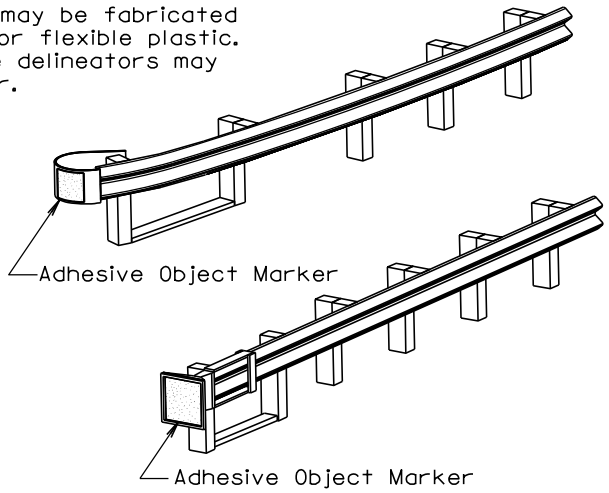

(B) STEEL BEAM GUARDRAIL DELINEATION



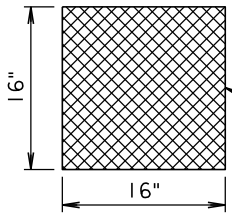

White or yellow super or very high intensity fluorescent sheeting. Sheeting color shall match edgeline color. A minimum of 16 square inches of sheeting area is required.

Guardrail delineators may be fabricated from 0.080" aluminum or flexible plastic. Dimensions of flexible delineators may vary by manufacturer.

DELINEATOR
(For Steel Beam Guardrail)




(E) GUARDRAIL TERMINAL END OBJECT MARKER

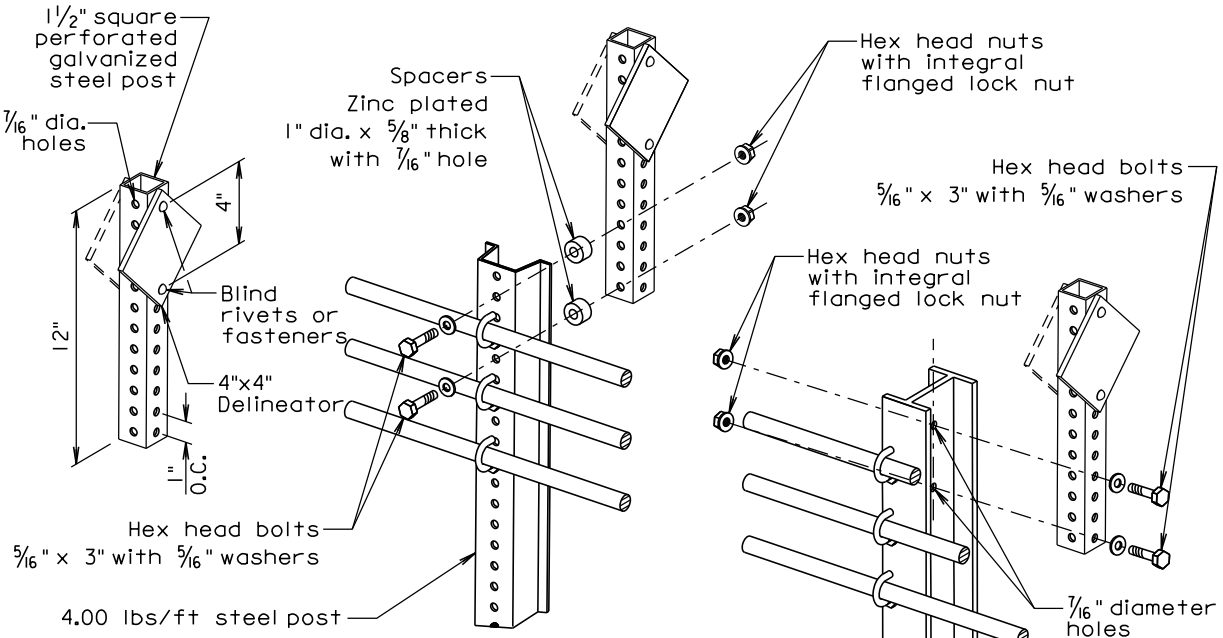



ADHESIVE OBJECT MARKER

Adhesive object marker dimensions may vary due to shape of terminal end. A minimum of 256 square inches of object marker sheeting area is required. The sheeting shall be fluorescent yellow super or very high intensity.

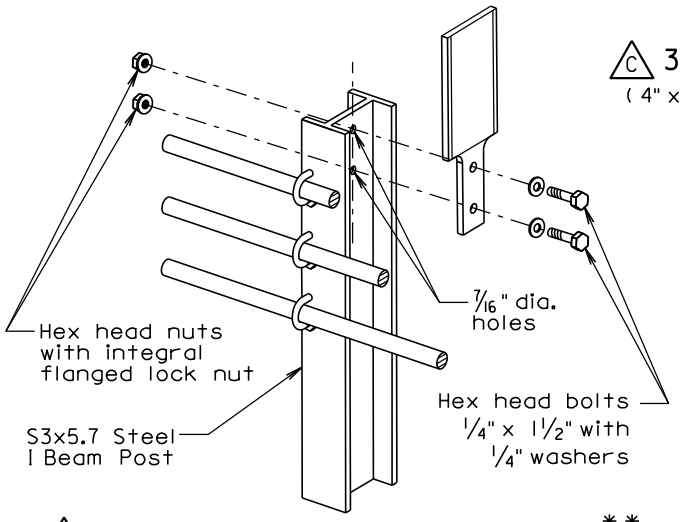
June 26, 2011

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | DELINEATION OF GUARDRAIL AT BRIDGES | PLATE NUMBER 632.40<br>Sheet 2 of 4 |

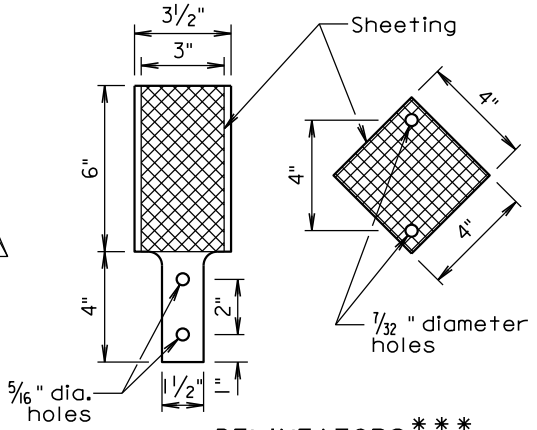



C 3 CABLE GUARDRAIL DELINEATION
( 4" x 4" Delineator on Flanged Channel Steel Post )

C 3 CABLE GUARDRAIL DELINEATION
( 4" x 4" Delineator on I Beam Steel Post )




C 3 CABLE GUARDRAIL DELINEATION**
( Flexible 3" x 6" Delineator on I Beam Post )



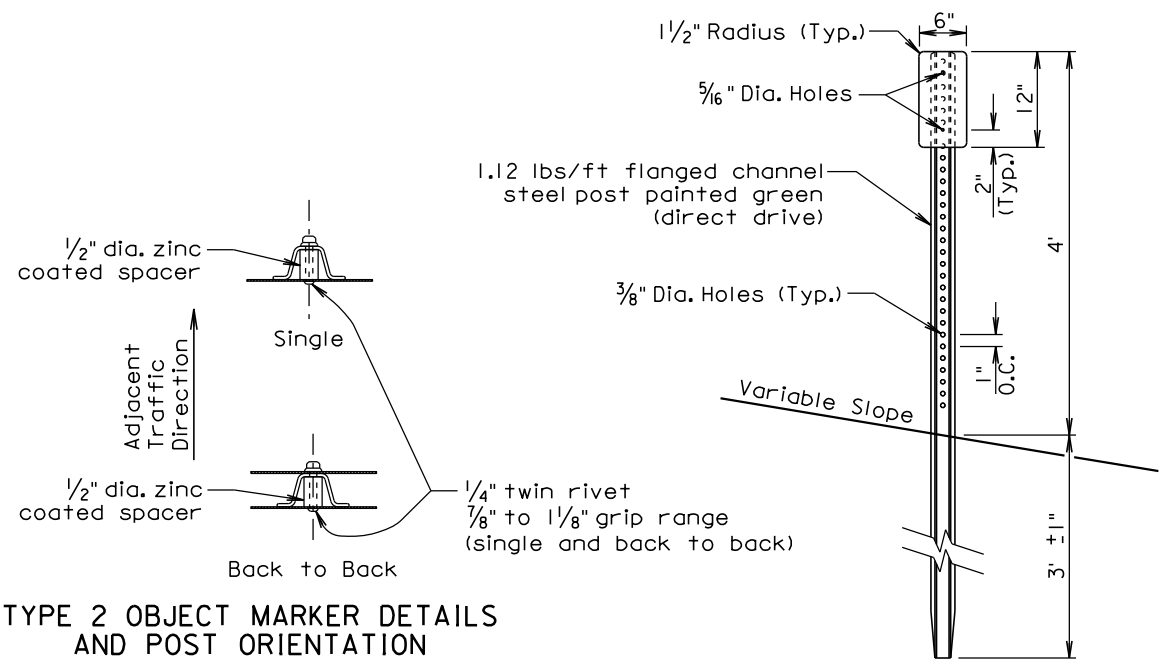

DELINEATORS***
( For 3 Cable Guardrail )

** Flexible delineators may be attached to post with manufacturer approved adhesive instead of bolts.

*** Dimensions of flexible delineators may vary by manufacturer. A minimum of 16 square inches of sheeting area is required. The sheeting shall be white or yellow super or very high intensity fluorescent sheeting. The sheeting color shall match the edgeline color.

June 26, 2011

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | DELINEATION OF GUARDRAIL AT BRIDGES | PLATE NUMBER 632.40<br>Sheet 3 of 4 |




TYPE 2 OBJECT MARKER DETAILS AND POST ORIENTATION

Ⓜ TYPE 2 OBJECT MARKER
( For Marking 3 Cable Guardrail Anchor )

GENERAL NOTES:

The delineators shall be covered with a minimum of 16 square inches of reflective sheeting. The reflective sheeting shall be of either very high intensity or super high intensity material. For bridges along two-way roadways the sheeting shall be on both sides of the delineator 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.

The first delineator shall be attached to the post nearest the bridge with additional delineators spaced in advance of the bridge at approximately 50 foot intervals. At bridges with short lengths of guardrail, less than 200 feet, a minimum of 4 delineators shall be placed in addition to the yellow object marker. The spacing between the delineators shall be approximately one third of the length of the guardrail. This will provide for a shorter spacing. At bridges with longer lengths of guardrail, greater than 200 feet, including bridges that have cable guardrail transitioning into the steel beam guardrail, the delineators will 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 shall be included in the contract unit price per each for "Guardrail Delineator".

An adhesive object marker shall be placed on the end of the W beam guardrail 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 super or very high intensity. 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 at the location noted on sheet 1 of this standard plate. The type 2 object marker (6" x 12") shall have a fluorescent yellow very high or super high intensity reflective sheeting. 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 26, 2011

| | | | |
|---|---|---|---|
| Published Date: 3rd Qtr. 2015 | SDDOT | DELINEATION OF GUARDRAIL AT BRIDGES | PLATE NUMBER 632.40<br>Sheet 4 of 4 |