EMMET COUNTY ROAD COMMISSION

2265 E. Hathaway Road
Harbor Springs, MI 49740
Office: (231) 347-8142
Fax: (231) 347-5787
www.emmetcrc.org

PROPOSAL

Project: **US-31 Crooked Lake Outlet**

The proposed work includes 2-inch Cold Milling and HMA overlay, spray applied waterproofing membrane, aggregate should repairs, guardrail, HMA sloped curbs, HMA spillways and riprap.

The Emmet County Road Commission will accept Bids until **9:00 a.m.** local time on **January 14, 2025** at: 2265 E. Hathaway Road, Harbor Springs, MI 49740. Bid packages are available at the Emmet County Road Commission Office or on Emmet County Road Commission website at www.emmetcrc.org.

ALL BIDS WILL BE SEALED AND PLAINLY MARKED AS TO THE PROJECT AND PROJECT NUMBER. MAILED BIDS MUST BE RECEIVED BY 3:30 P.M. THE PREVIOUS EMMET COUNTY ROAD COMMISSION BUSINESS DAY PRIOR TO BID OPENING.

The bidder has examined the plans, specification, special provisions and related materials in the proposal, as well as the location of the work described in the proposal for this project, and is fully informed as to the nature of the work and conditions relating to its performance and understands that the quantities shown are approximate only and are subject to either increase or decrease.

The bidder hereby proposes to furnish all necessary machinery, tools, apparatus and other means of construction, do all the work, furnish all the materials except as otherwise specified and, or each unit price, lump sum, or one each named in the itemized bid, to complete the work in strict conformity with the plans therefore and the entire proposal which is incorporated by reference in these pages, and in strict conformity with the requirements of the 2020 Standard Specifications for Construction, Michigan Department of Transportation and such other special provisions and supplemental specifications as may be part of the proposal for this project.

The bidder further proposes to do such extra work as may be authorized by the Emmet County Road Commission, prices for which are not included in the itemized bid. Compensation shall be made on the basis agreed upon before such extra work is begun.

THE BIDDER UNDERSTANDS AND AGREES THAT THE EMMET COUNTY ROAD COMMISSION RESERVES THE RIGHT TO REJECT ANY AND ALL BIDS; TO WAIVE IRREGULARITIES OR INFORMALITIES; AND NO CONTRACTUAL RELATIONSHIP SHALL EXIST BETWEEN THE BIDDER AND THE EMMET COUNTY ROAD COMMISSION FOR THE WORK DESCRIBED HEREIN UNTIL SUCH TIME AS THE CONTRACT HAS BEEN FORMALLY EXECUTED BY BOTH THE BIDDER AND THE EMMET COUNTY ROAD COMMISSION.

The Emmet County Road Commission, in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, 42 U.S.C 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office the Secretary, Part 21, Nondiscrimination in Federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contact entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

PROJECT DATES

A pre-construction meeting will be scheduled by the Emmet County Road Commission prior to project start. All project submittals are to be submitted for review at this meeting.

Project Start Date:	10 days after all Contracts are executed.
Project Completion Date:	May 21, 2025 (All Project Items)

PROJECT INFORMATION & BID PROPOSAL
US-31 CROOKED LAKE OUTLET SPILLWAYS, RIP RAP, AND SPRAY APPLIED WATERPROOFING MEMBRANE

SCOPE OF WORK

The proposed work includes 2-inch Cold Milling and HMA overlay, spray applied waterproofing membrane, aggregate shoulder repairs, guardrail, HMA sloped curbs, HMA spillways and riprap as described below and shown in the plan and detail sheets.

The HMA overlay material will be ***HMA, 4EML*** at an application rate of 220 lb/syd with PG Binder 64-28. The Contractor will provide a mix design to MDOT for review and approval. Place and compact aggregate in washout areas along shoulder where necessary. On the culvert structure, apply ***Spray Applied Waterproofing Membrane*** to milled surface from Sta 273+40 to Sta 273+65 (length of bridge plus 1 foot beyond each reference line).

Remove existing gravel and grass along the shoulder. Install ***Curb Slp, HMA*** according to the plan and detail sheets. Install ***Paved Ditch, HMA*** and place ***Riprap, Plain*** according to the plan and detail sheets. All riprap must be placed above the ordinary high water mark.

North of the bridge, along the southbound shoulder, remove 38 feet of existing guardrail and replace with ***Guardrail Approach Terminal, Type 2M*** according to the plan sheet. South of the bridge, along the northbound shoulder, remove 101 feet of existing guardrail from the guardrail terminal to the guardrail transition and replace with ***Guardrail Departing Terminal, Type B***, ***Guardrail, Curved, Type B, 72” Post***, and ***Guardrail, Type B, 72” Post*** according to the plan sheet.

The contractor is responsible for removing the milled material off site. MDOT will provide the traffic control and all work, except guardrail work and restoration, must be completed between 7pm and 6am. All work will be completed in accordance with the Michigan Department of Transportation 2020 Standard Specification for Construction.

PROJECT LOCATION

The project is located on US-31 (CS 24011) at the Crooked Lake Outlet (C01 of 24011) beginning at STA 271+50 and ending at STA 275+50, in Bear Creek Township, Emmet County.

PROJECT COORDINATION

The Contractor is advised that other projects in the vicinity may be under construction during the life of this contract. The projects include, but are not limited to

> 24011-208811: HMA Cold Milling and HMA Resurfacing along US-31 from Graham Road to Blumke Road and from Milton Road to Douglas Lake Road, village of Pellsoton, Emmet County.

PROJECT QUANTITIES

Quantities are provided for informational purposes only. The Contractor is responsible for verifying the work items and quantities. No additional compensation will be paid for increases in quantities or additional incidental items necessary to complete the work. All completed work will be measured and paid as one lump sum.

Work Items	Quantity	Unit
Mobilization	1	LSUM
Cold Milling HMA Surface	1,180	Syd
HMA, 4EML	132	Ton
Curb Slp, HMA	95	Ft
Paved Ditch, HMA	88	Syd
Riprap, Plain	46	Syd
Guardrail, Rem	139	Ft
Guardrail, Type B, 72 inch Post	113	Ft
Guardrail, Curved, Type B, 72 inch Post	25	Ft
Guardrail Approach Terminal, Type 2M	1	Ea
Guardrail Departing Terminal, Type B	1	Ea
Excavation, Earth	40	Cyd
Embankment, LM	20	Cyd
Aggregate Base, LM	8	Cyd
Aggregate Base, Conditioning	10	Syd
Slope Restoration, Non-Freeway, Type G	150	Syd
Spray Applied Waterproofing Membrane	117	Syd

TOTAL LUMP SUM BID _____

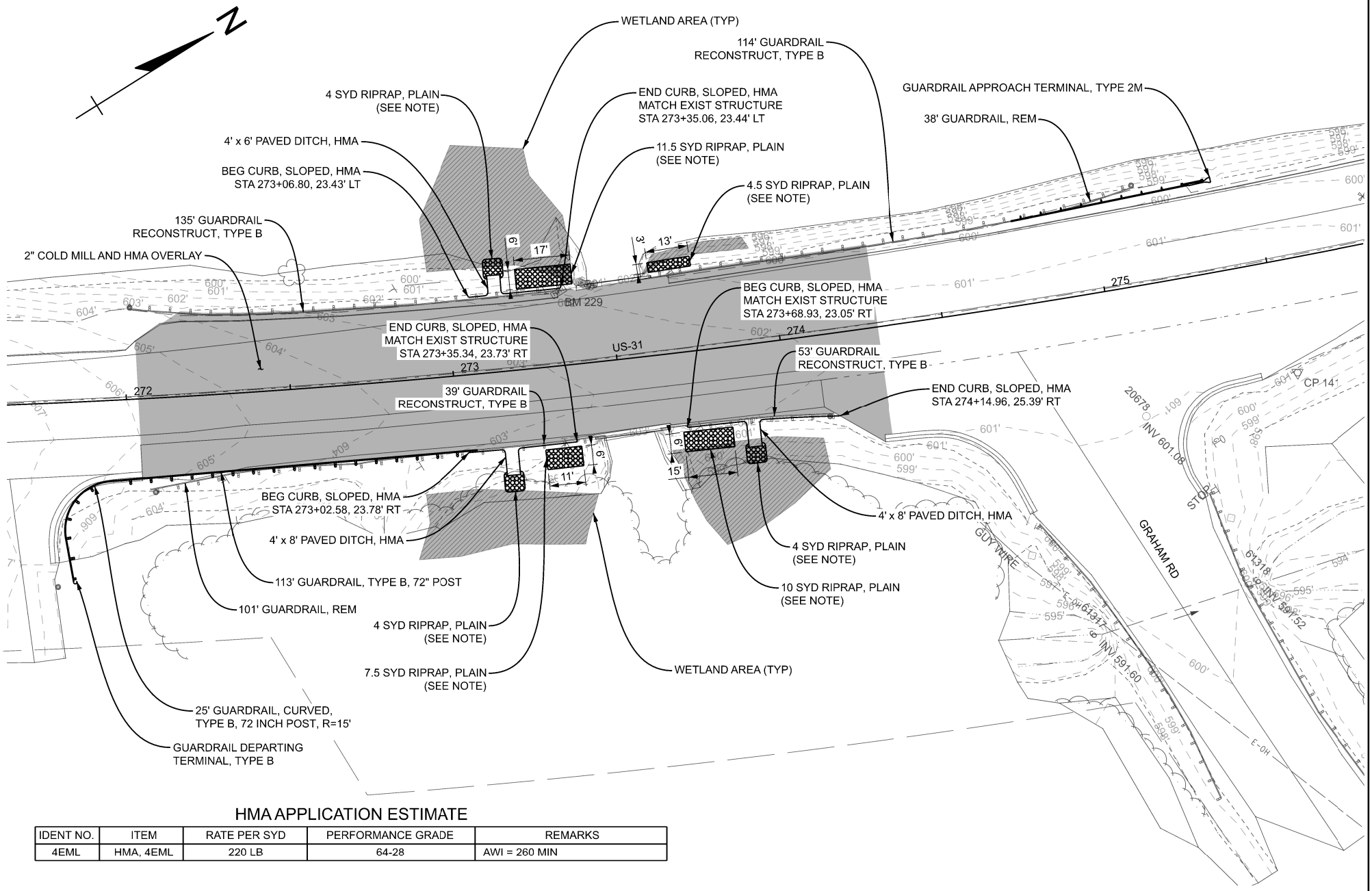
COMPANY NAME: _____

ADDRESS: _____

AUTHORIZED SIGNATURE: _____ **DATE:** _____

The Michigan Department of Transportation reserves the right to reject any and all bids.

-NOTE-
ALL RIPRAP MUST BE PLACED ABOVE THE ORDINARY HIGH WATER MARK.

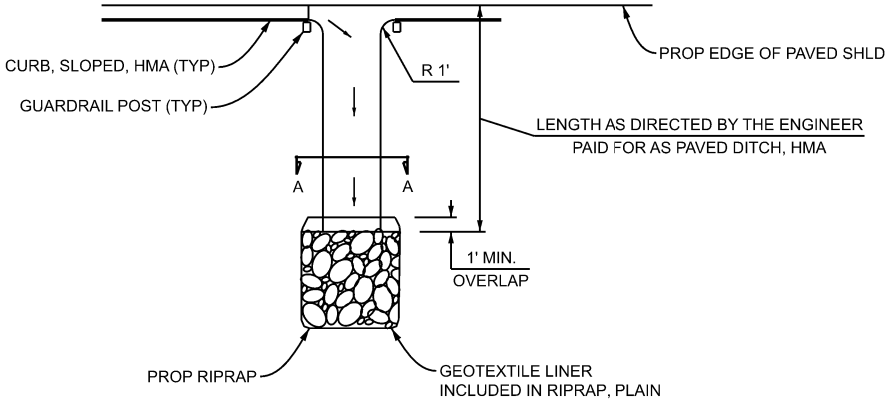


HMA APPLICATION ESTIMATE

IDENT NO.	ITEM	RATE PER SYD	PERFORMANCE GRADE	REMARKS
4EML	HMA, 4EML	220 LB	64-28	AWI = 260 MIN

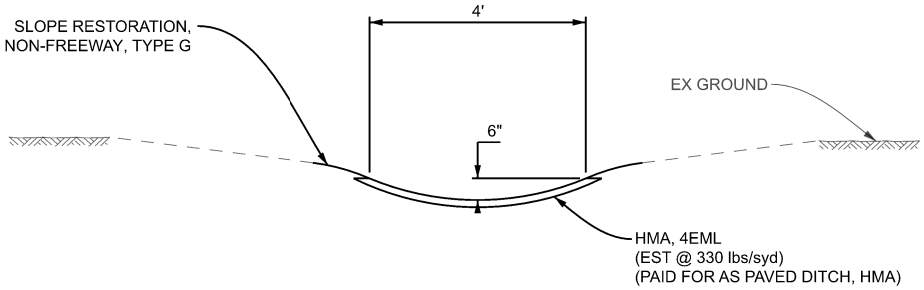
MDOT Michigan Department of Transportation	0 VERT. (FT) 0 HORZ. (FT) 40	DATE: 7/29/24	CS: 24011	CROOKED LAKE OUTLET	DRAWING	SHEET
		DESIGN UNIT: RADULSKI	JN: MAINTENANCE	PLAN	US31 PLAN 001	SECT 1
FILE:		TSC: GAYLORD				

-NOTE-
THE HMA SPILLWAY SHALL BE BUILT TO THE LEVELING COURSE ELEVATION ADJACENT TO THE PROPOSED PAVED SHOULDER. FEATHERING OF THE TOP COURSE WILL BE REQUIRED FOR PLACEMENT.

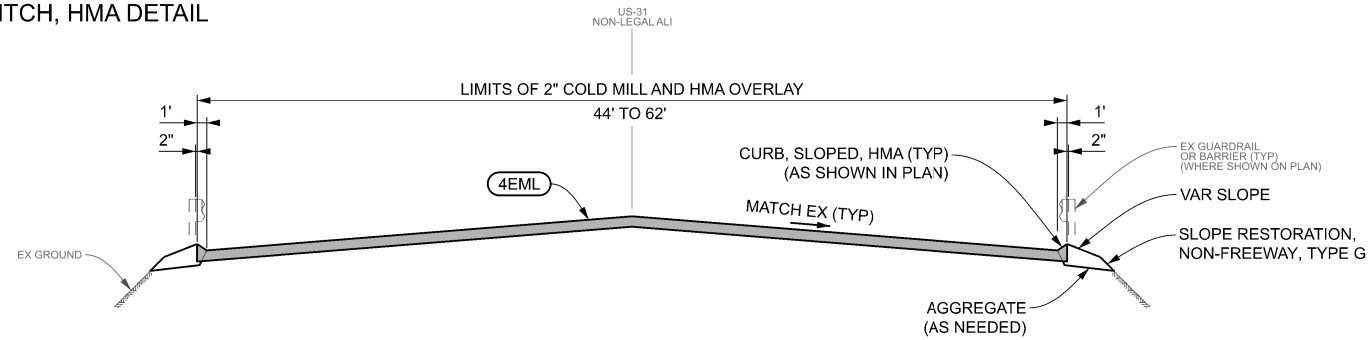


PAVED DITCH, HMA DETAIL

-NOTE-
ANY GRADING, EXCAVATION, OR FILL REQUIRED TO BRING THE EXISTING GROUND TO THE PROPER GRADE PRIOR TO PLACING THE PROP PAVED DITCH SHALL BE INCLUDED IN PAVED DITCH, HMA.

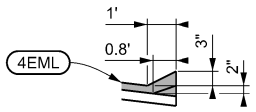


SECTION A - A

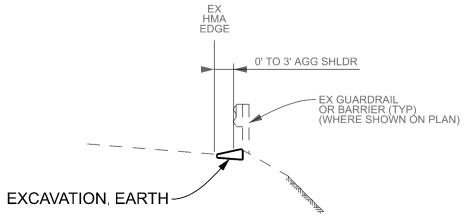


TYPICAL COLD MILL AND HMA OVERLAY SECTION

SECTION APPLIES TO: STA 272+03 TO STA 274+30



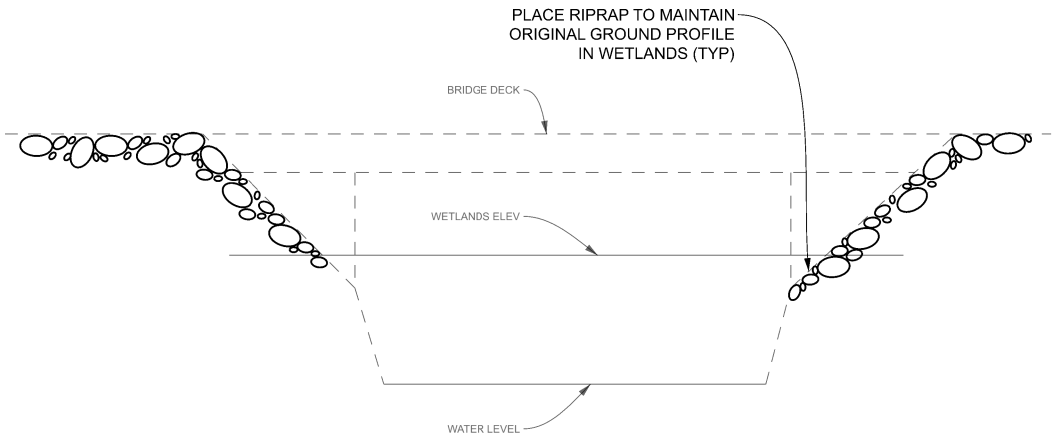
CURB SLOPED, HMA DETAIL



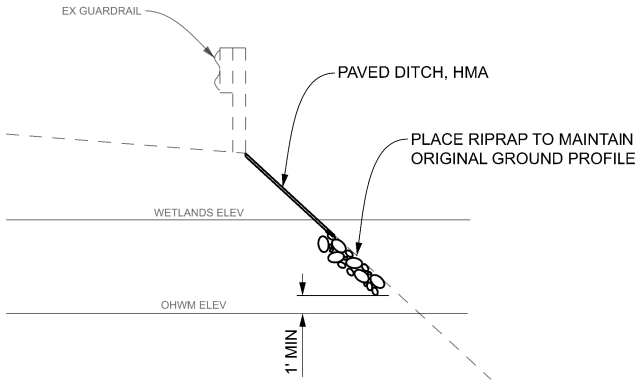
EARTH EXCAVATION DETAIL

APPLIES TO BOTH SIDES OF US-31

MDOT Michigan Department of Transportation	NO SCALE	DATE: 7/29/24	CS: 24011	CROOKED LAKE OUTLET	DRAWING	SHEET
		DESIGN UNIT: RADULSKI	JN: MAINTENANCE	DETAIL 1	US31 DET 01	SECT
FILE:		TSC: GAYLORD				

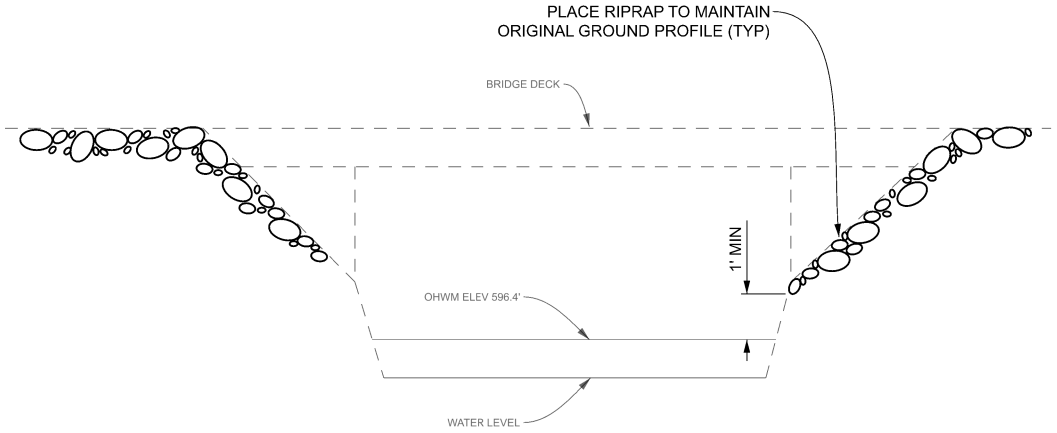


RIPRAP PLACEMENT IN WETLANDS

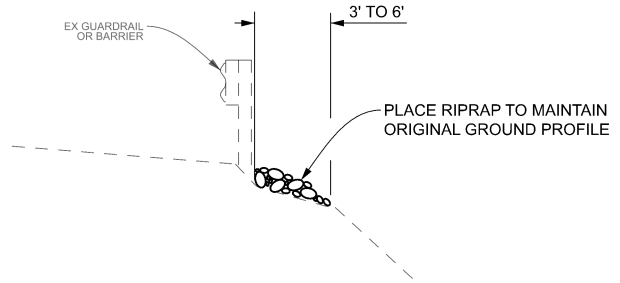


PAVED DITCH AND RIPRAP DETAIL

APPLIES TO BOTH SIDES OF US-31



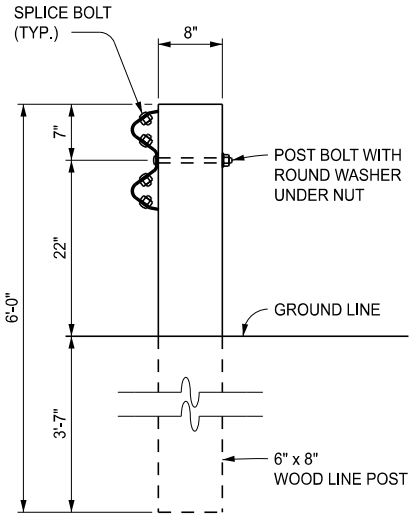
RIPRAP PLACEMENT AT OHWM ELEVATION



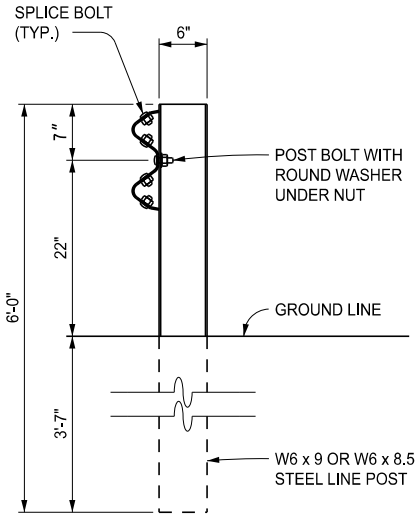
RIPRAP PLACEMENT IN SCOUR DETAIL

APPLIES TO BOTH SIDES OF US-31

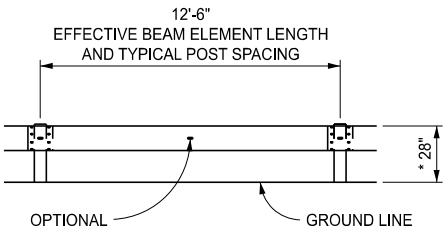
MDOT Michigan Department of Transportation	NO SCALE	DATE: 7/29/24	CS: 24011	CROOKED LAKE OUTLET	DRAWING	SHEET
		DESIGN UNIT: RADULSKI	JN: MAINTENANCE	DETAIL 2	US31 DET 02	SECT
FILE:		TSC: GAYLORD				



WOOD POST



STEEL POST



ELEVATION SHOWING POST SPACING

* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE A

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

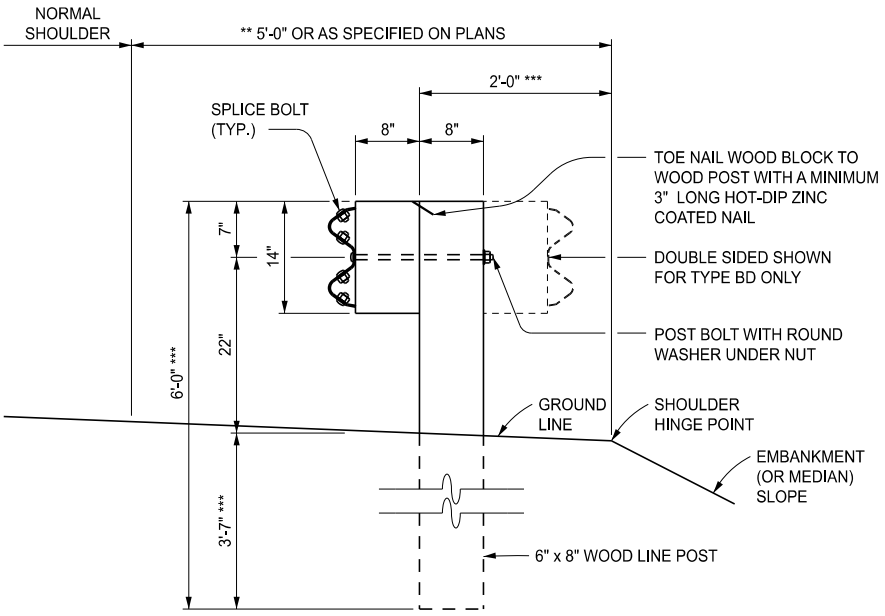
APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

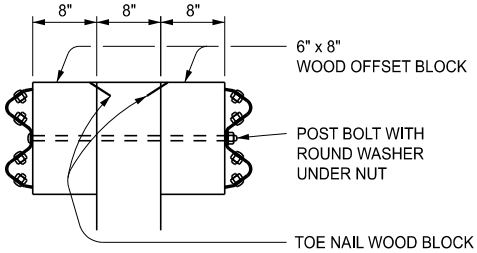
MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

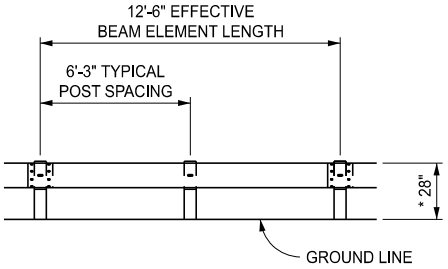
STANDARD PLAN FOR
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE	R-60-J	SHEET 1 OF 16





TYPE BD



ELEVATION SHOWING POST SPACING

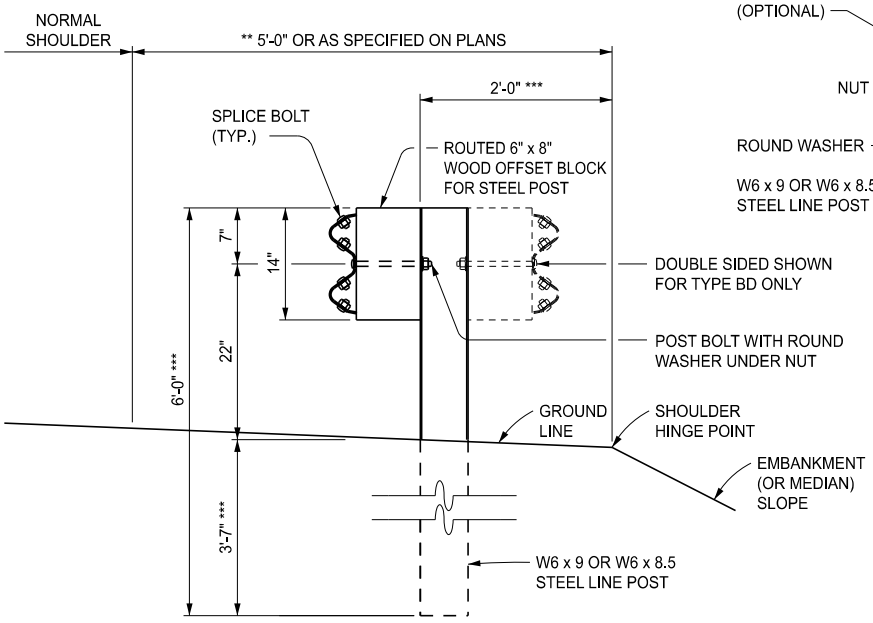
* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

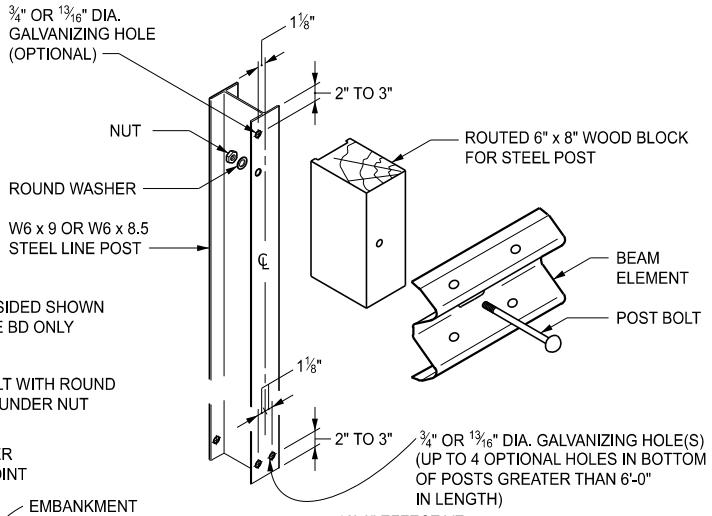
** FOR PAVED SHOULDER WIDTHS OF AT LEAST 12', USE 3'-0".

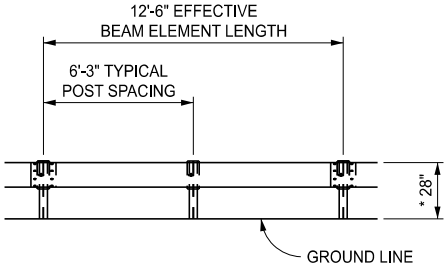
*** IF THE OFFSET FROM THE FACE OF POST TO THE SHOULDER HINGE POINT IS LESS THAN 2'-0" AND THE EMBANKMENT (OR MEDIAN) SLOPE IS STEEPER THAN 1:10, USE 8'-0" POST WITH THE ADDITIONAL LENGTH EMBEDDED.

GUARDRAIL, TYPE B (OR BD)

(WOOD POST)







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GUARDRAIL, TYPE B (OR BD)

(STEEL POST)

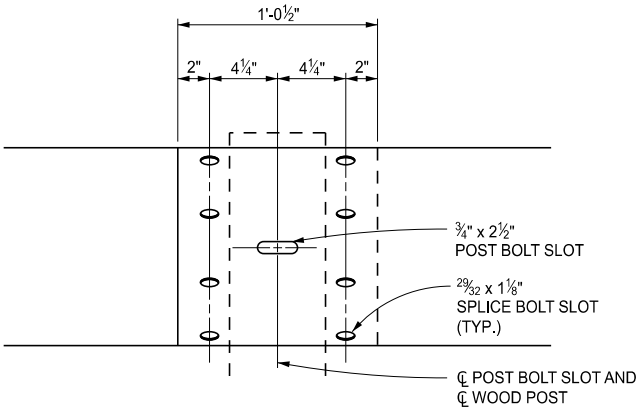
MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

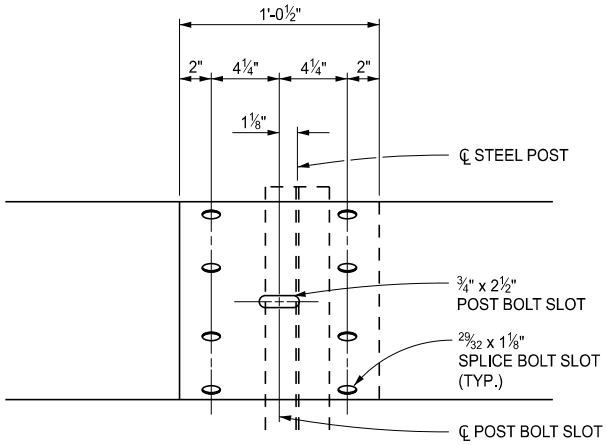
STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) / FHWA APPROVAL	01/29/2024 / PLAN DATE	R-60-J	SHEET 2 OF 16

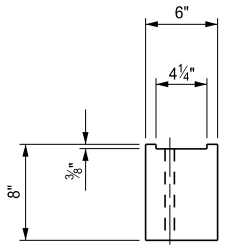


WOOD POST

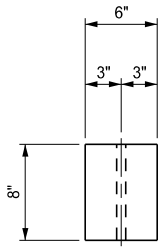


STEEL POST

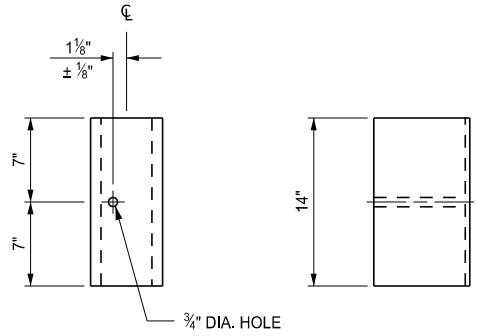
BEAM ELEMENT SPLICE DETAILS



TOP

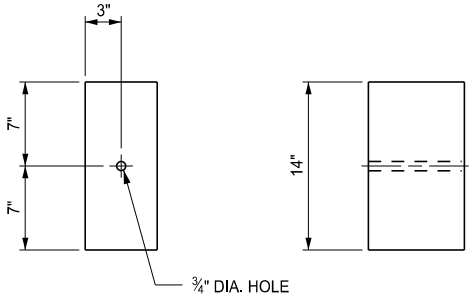


TOP



FRONT SIDE

FOR USE ON STEEL POSTS



FRONT SIDE

FOR USE ON WOOD POSTS

(SEE NOTES ON SHEET 16 OF 16)

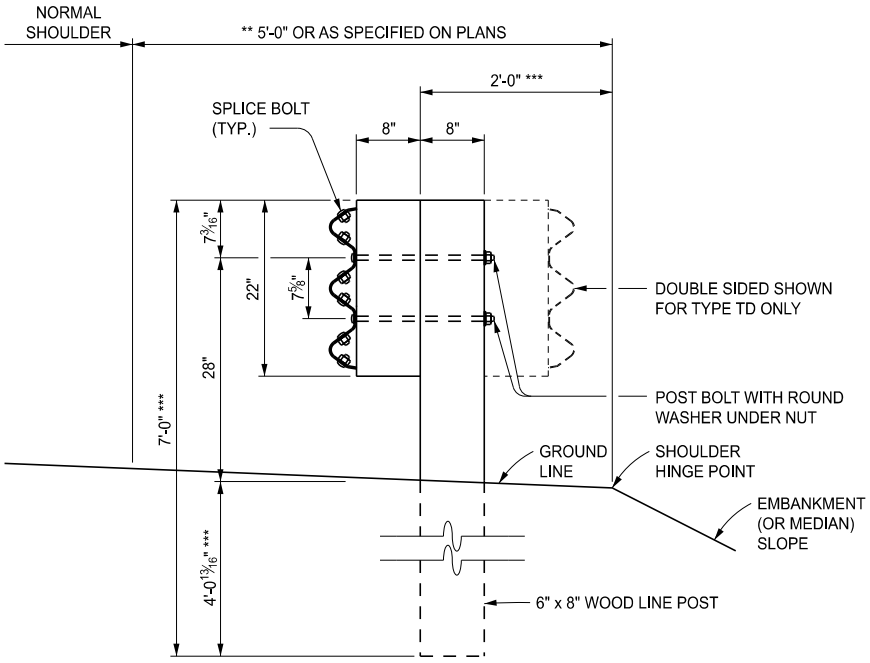
WOOD OFFSET BLOCKS FOR GUARDRAIL, TYPE B AND TYPE BD

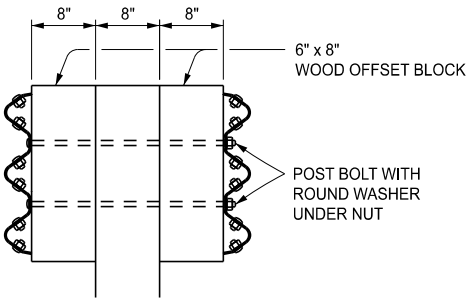
MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

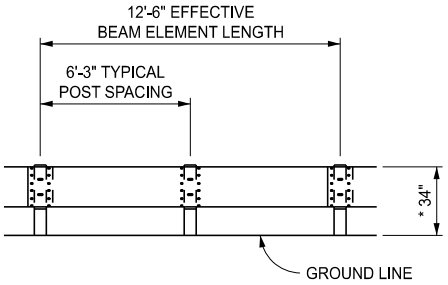
STANDARD PLAN FOR
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) / FHWA APPROVAL	01/29/2024 / PLAN DATE	R-60-J	SHEET 3 OF 16





TYPE TD



ELEVATION SHOWING POST SPACING

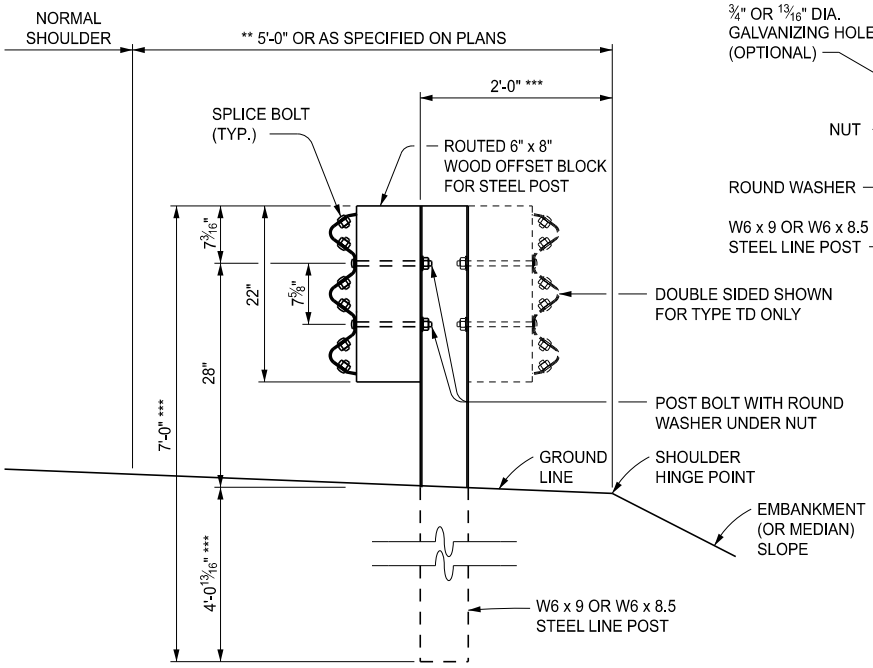
* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

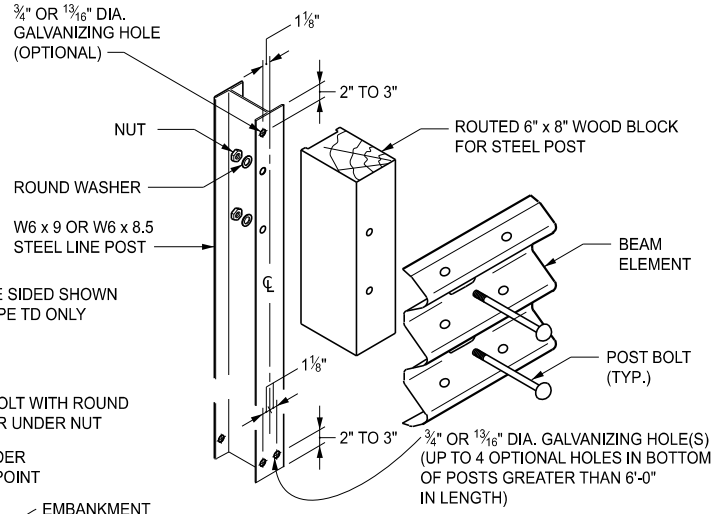
** FOR PAVED SHOULDER WIDTHS OF AT LEAST 12', USE 3'-0".

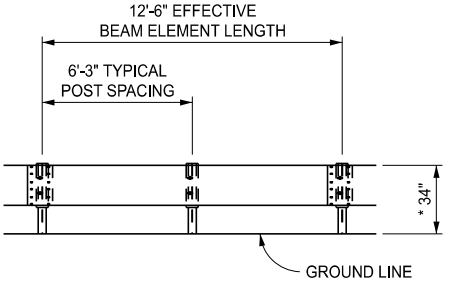
*** IF THE OFFSET FROM THE FACE OF POST TO THE SHOULDER HINGE POINT IS LESS THAN 2'-0" AND THE EMBANKMENT (OR MEDIAN) SLOPE IS STEEPER THAN 1:10, USE 8'-0" POST WITH THE ADDITIONAL LENGTH EMBEDDED.

GUARDRAIL, TYPE T (OR TD)

(WOOD POST)







ELEVATION SHOWING POST SPACING

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GUARDRAIL, TYPE T (OR TD)

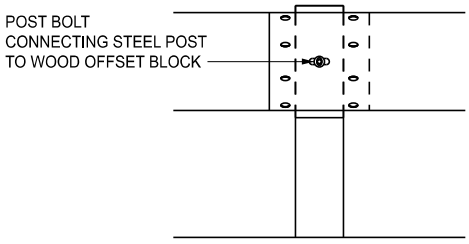
(STEEL POST)

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

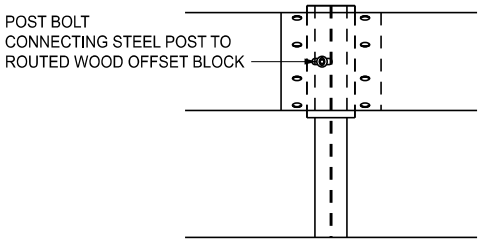
STANDARD PLAN FOR
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) / FHWA APPROVAL	01/29/2024 / PLAN DATE	R-60-J	SHEET 4 OF 16



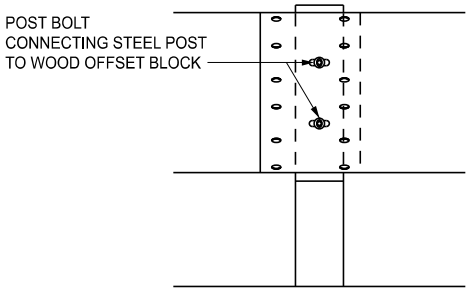
GUARDRAIL, TYPE B

WOOD POST



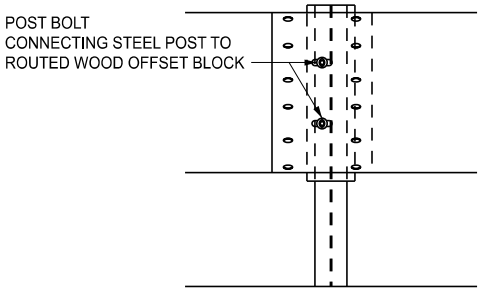
GUARDRAIL, TYPE B

STEEL POST



GUARDRAIL, TYPE T

WOOD POST



GUARDRAIL, TYPE T

STEEL POST

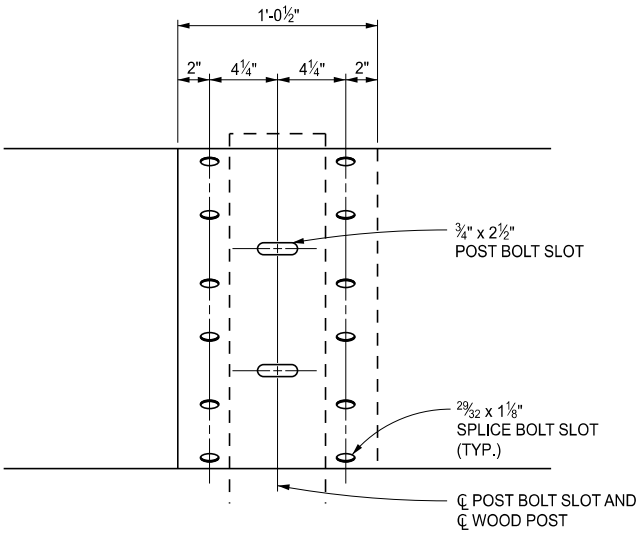
BLOCK AND POST CONNECTION DETAILS

MDOT
Michigan Department of Transportation

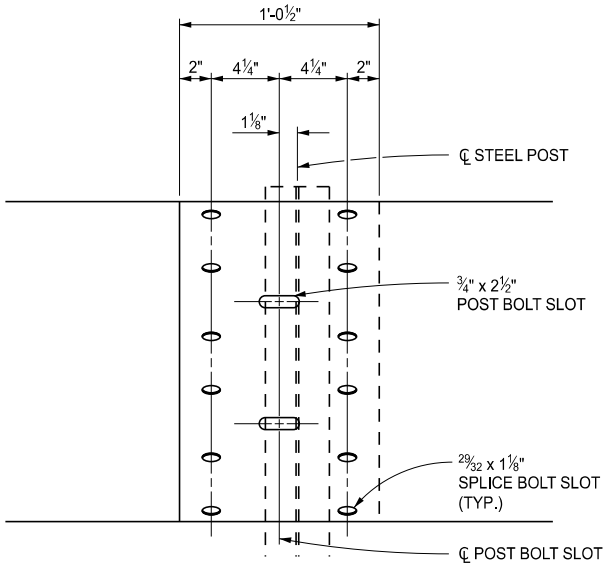
DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE	R-60-J	SHEET 5 OF 16

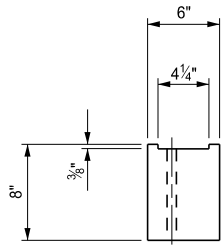


WOOD POST



STEEL POST

THRIE BEAM ELEMENT SPLICE DETAILS



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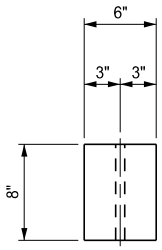

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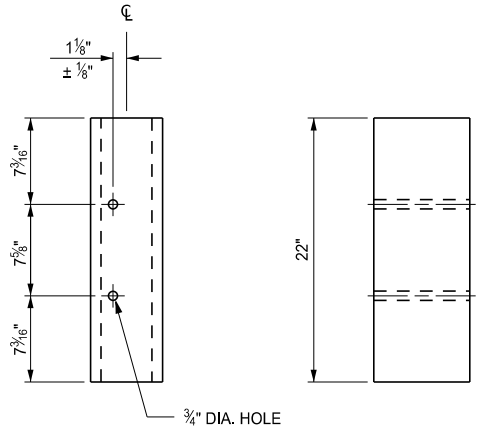
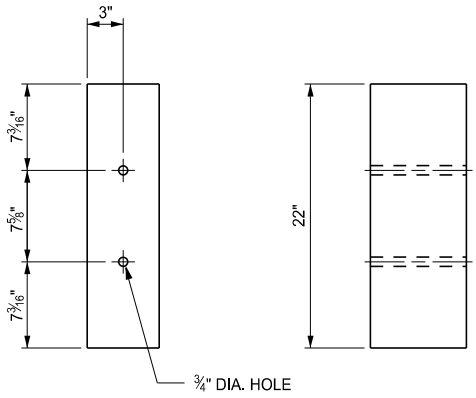


FRONT SIDE

FOR USE ON STEEL POSTS



FRONT SIDE

FOR USE ON WOOD POSTS
(SEE NOTES ON SHEET 16 OF 16)

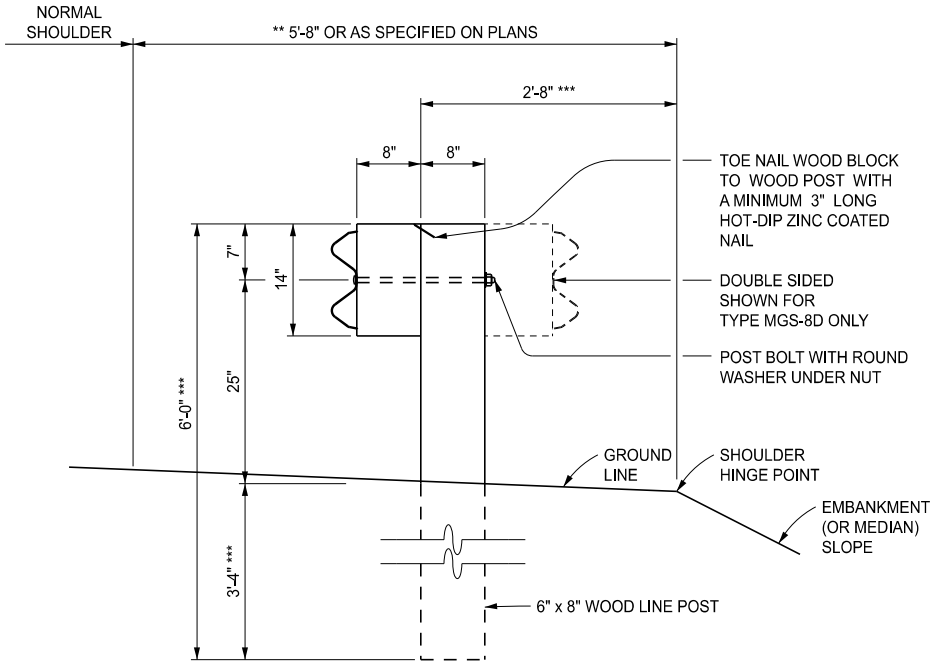
WOOD OFFSET BLOCKS FOR GUARDRAIL, TYPE T AND TYPE TD

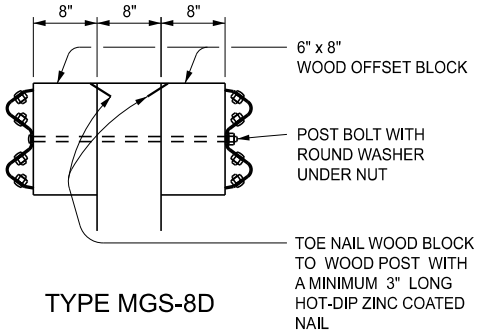
MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE	R-60-J	SHEET 6 OF 16





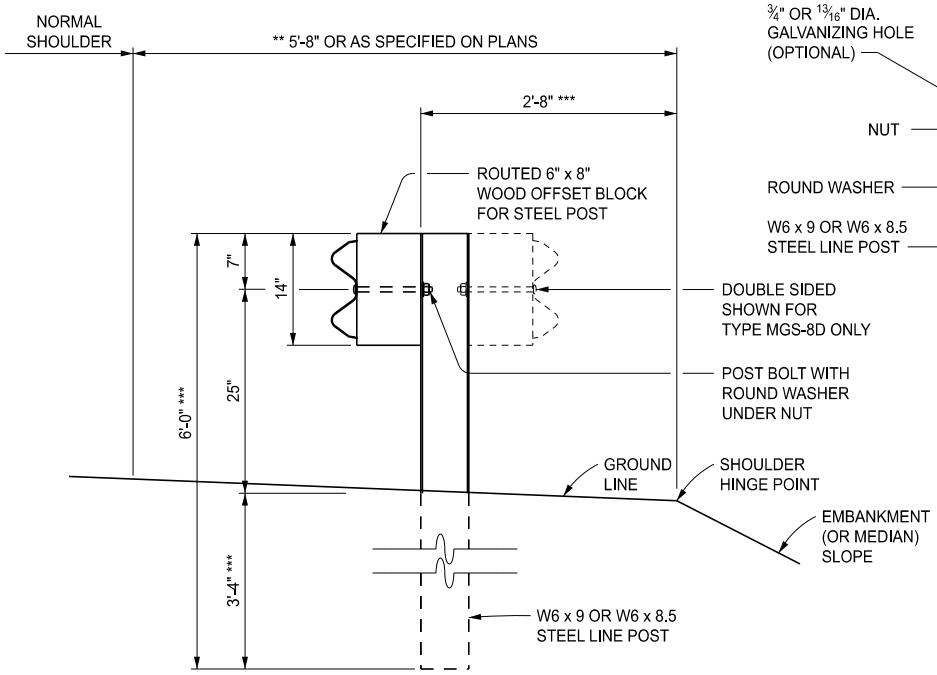
TYPE MGS-8D

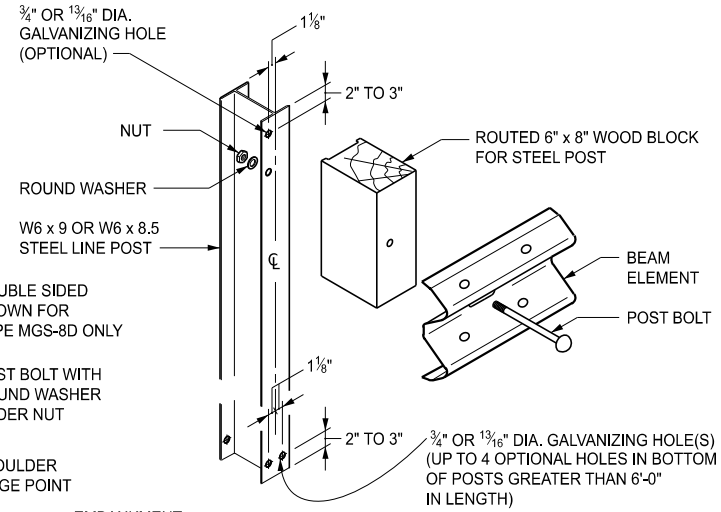
** FOR PAVED SHOULDER WIDTHS OF AT LEAST 12', USE 3'-8".

*** IF THE OFFSET FROM THE FACE OF POST TO THE SHOULDER HINGE POINT IS LESS THAN 2'-8" AND THE EMBANKMENT (OR MEDIAN) SLOPE IS STEEPER THAN 1:10, USE 9'-0" POST WITH THE ADDITIONAL LENGTH EMBEDDED.

GUARDRAIL, TYPE MGS-8 (OR MGS-8D)

(WOOD POST)





** FOR PAVED SHOULDER WIDTHS OF AT LEAST 12', USE 3'-8".

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GUARDRAIL, TYPE MGS-8 (OR MGS-8D)

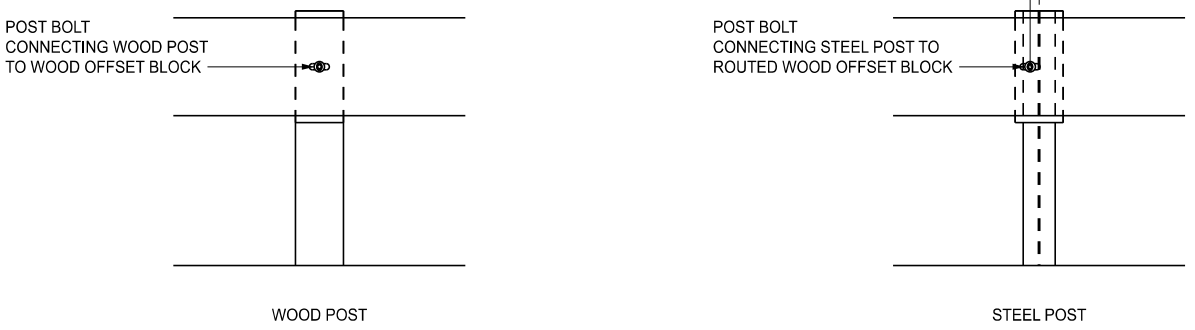
(STEEL POST)

MDOT Michigan Department of Transportation

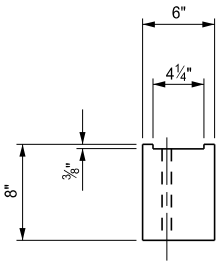
DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL)	01/29/2024	R-60-J	SHEET
FHWA APPROVAL	PLAN DATE		7 OF 16



BLOCK AND POST CONNECTION DETAILS



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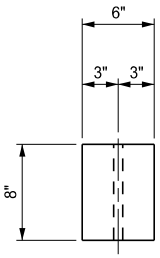

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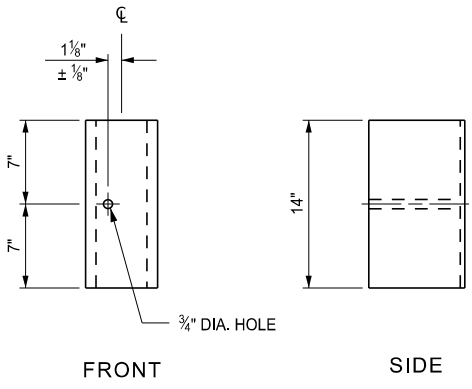
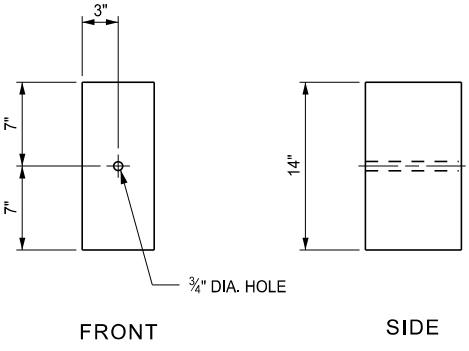


FRONT SIDE

FOR USE ON STEEL POSTS



FRONT SIDE

FOR USE ON WOOD POSTS

(SEE NOTES ON SHEET 16 OF 16)

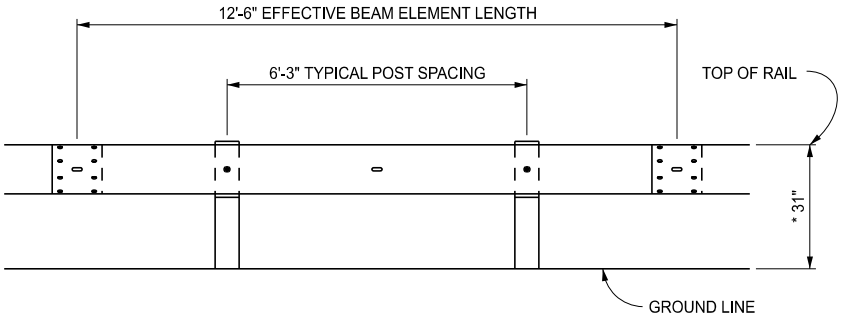
WOOD OFFSET BLOCKS FOR GUARDRAIL, TYPE MGS-8 AND TYPE MGS-8D

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

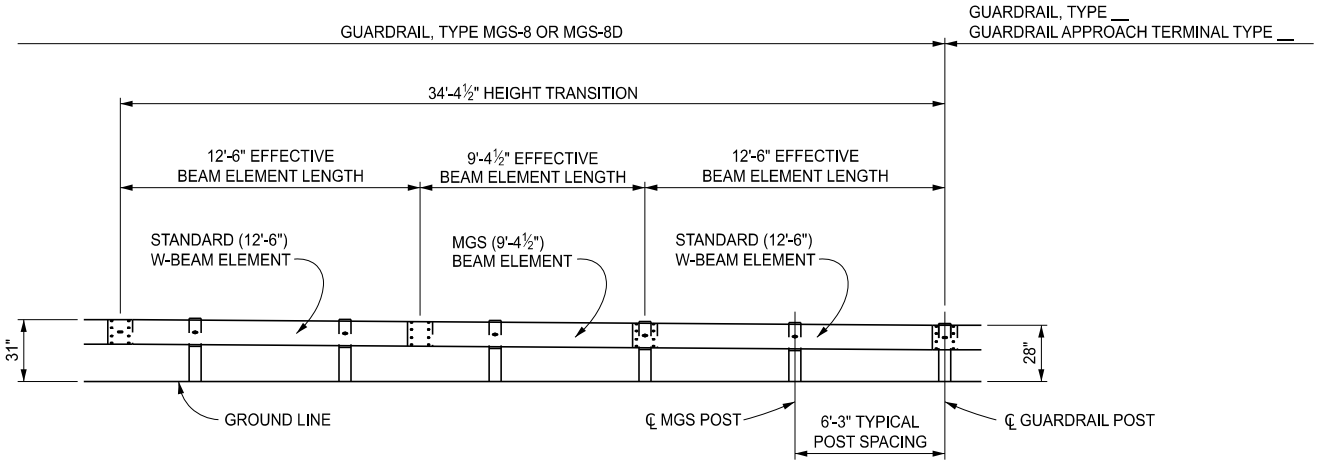
STANDARD PLAN FOR
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE	R-60-J	SHEET 8 OF 16

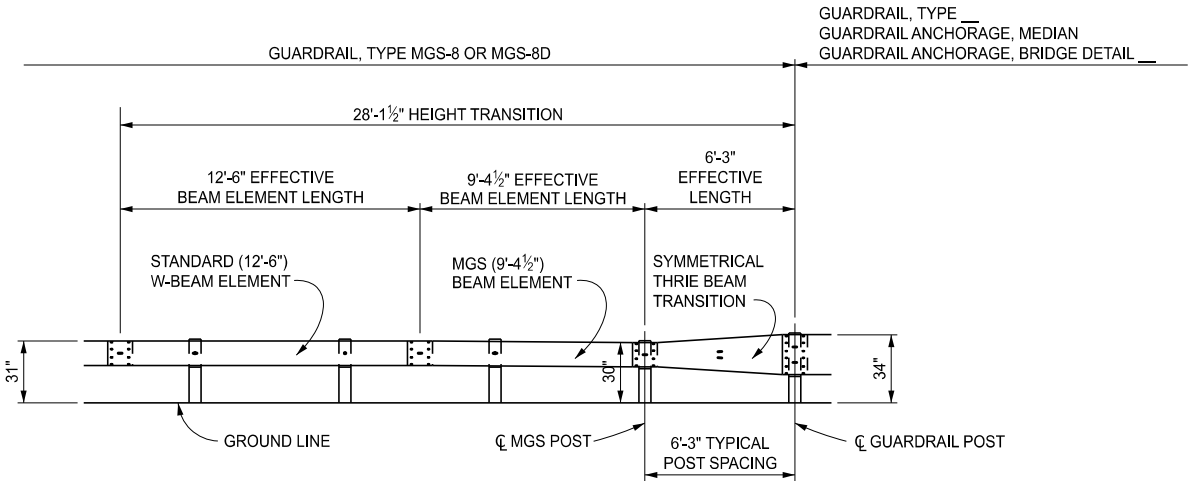


ELEVATION SHOWING POST SPACING FOR
GUARDRAIL, TYPE MGS-8 (OR MGS-8D)

* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB



ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING
GUARDRAIL, TYPE MGS-8 (OR MGS-8D) TO
GUARDRAIL, TYPE B, GUARDRAIL, TYPE BD, OR
GUARDRAIL APPROACH TERMINAL TYPE 1B, 2B, OR 3B



ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING
GUARDRAIL, TYPE MGS-8 (OR MGS-8D) TO
GUARDRAIL, TYPE T, GUARDRAIL, TYPE TD,
GUARDRAIL ANCHORAGE, MEDIAN,
GUARDRAIL ANCHORAGE, BRIDGE DETAIL A1, T1, T4 OR T6

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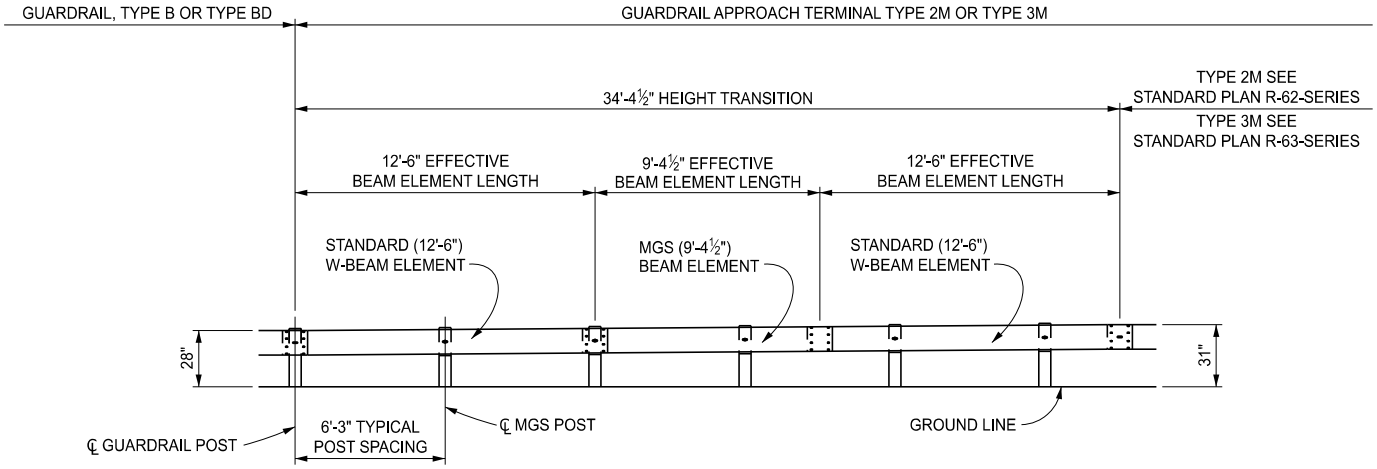
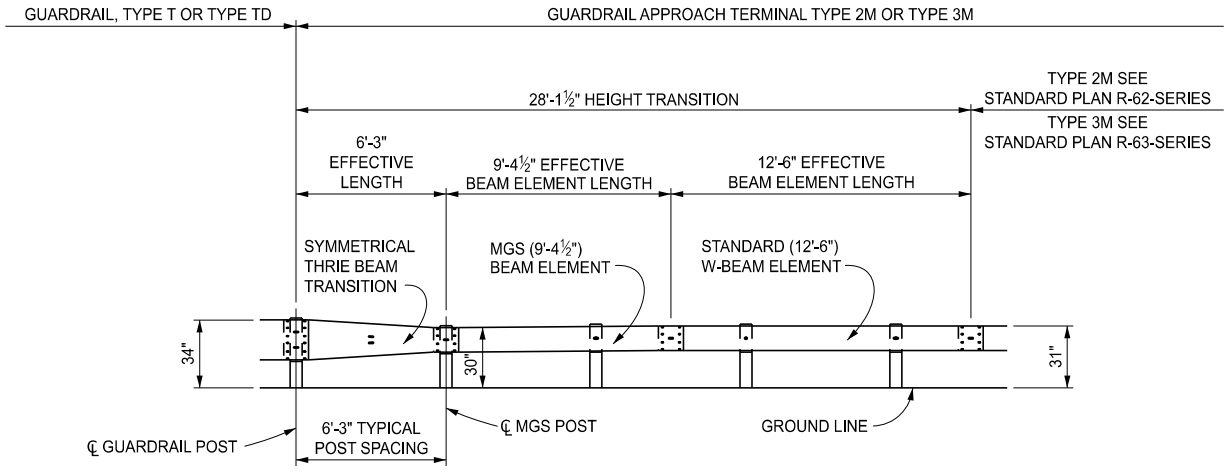
STANDARD PLAN FOR
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

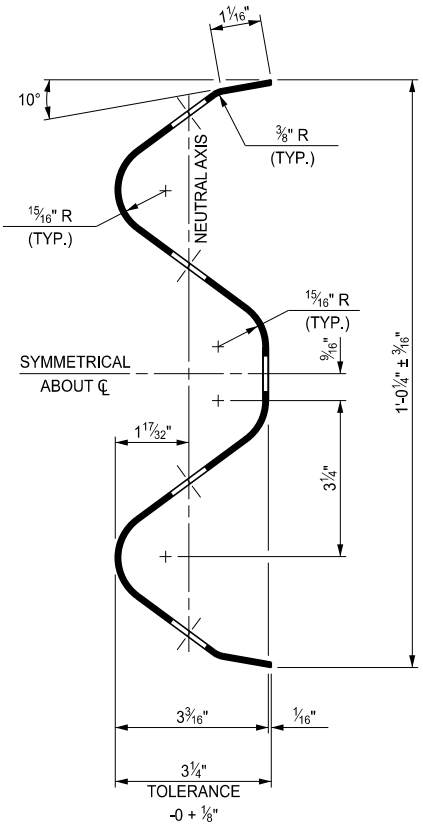
(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE	R-60-J	SHEET 9 OF 16



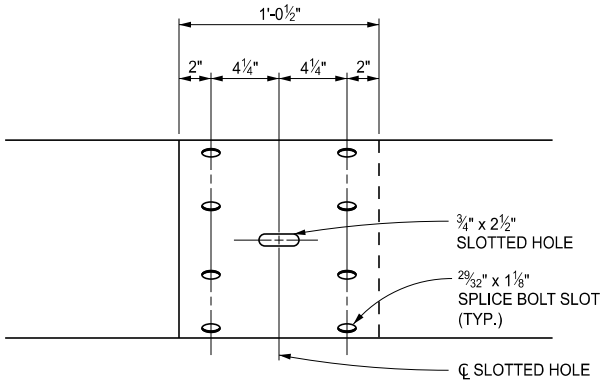
ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING
GUARDRAIL, TYPE B (OR TYPE BD) TO
GUARDRAIL APPROACH TERMINAL TYPE 2M OR TYPE 3M



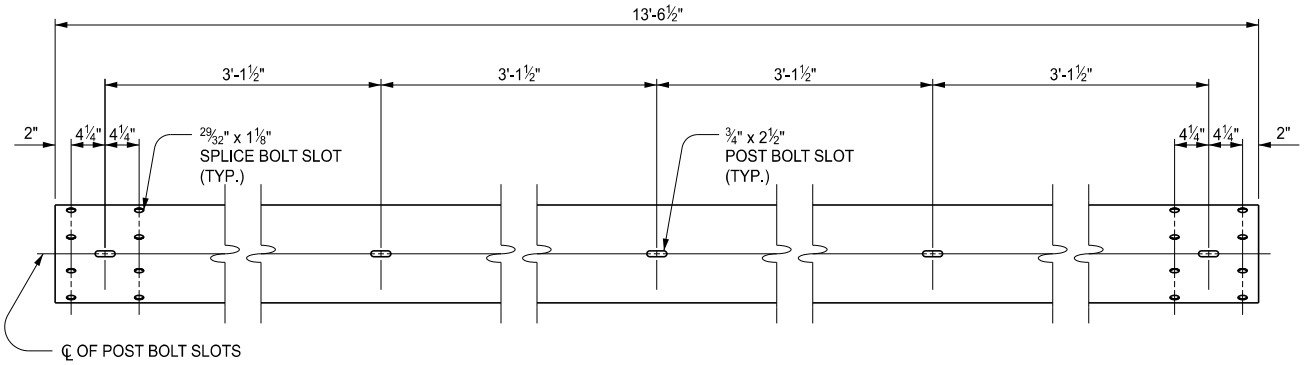
ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING
GUARDRAIL, TYPE T (OR TYPE TD) TO
GUARDRAIL APPROACH TERMINAL TYPE 2M OR TYPE 3M



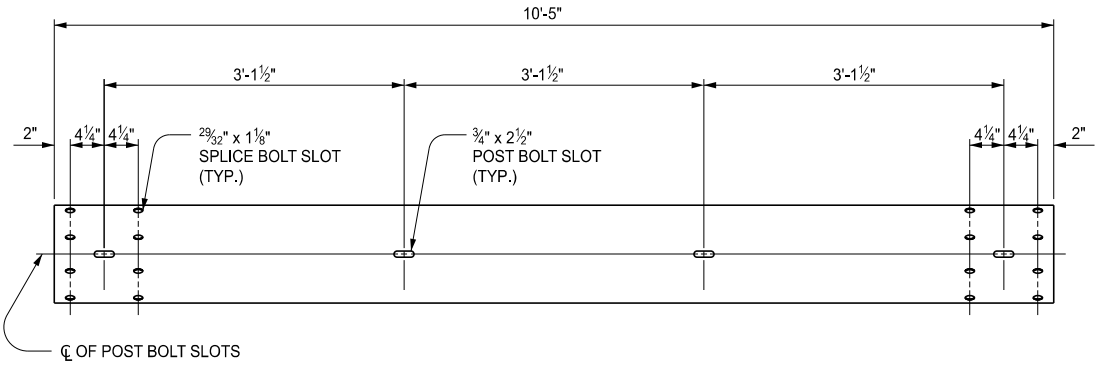
SECTION THROUGH BEAM ELEMENT



BEAM ELEMENT SPLICE DETAILS



FRONT ELEVATION OF BEAM ELEMENT



FRONT ELEVATION OF MGS (9'-4 1/2") BEAM ELEMENT

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Michigan Department of Transportation

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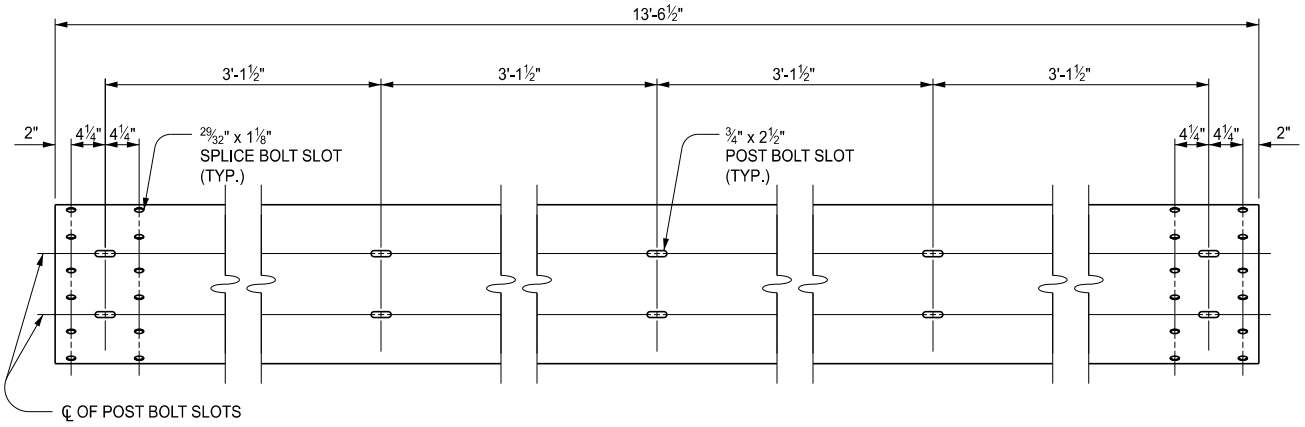
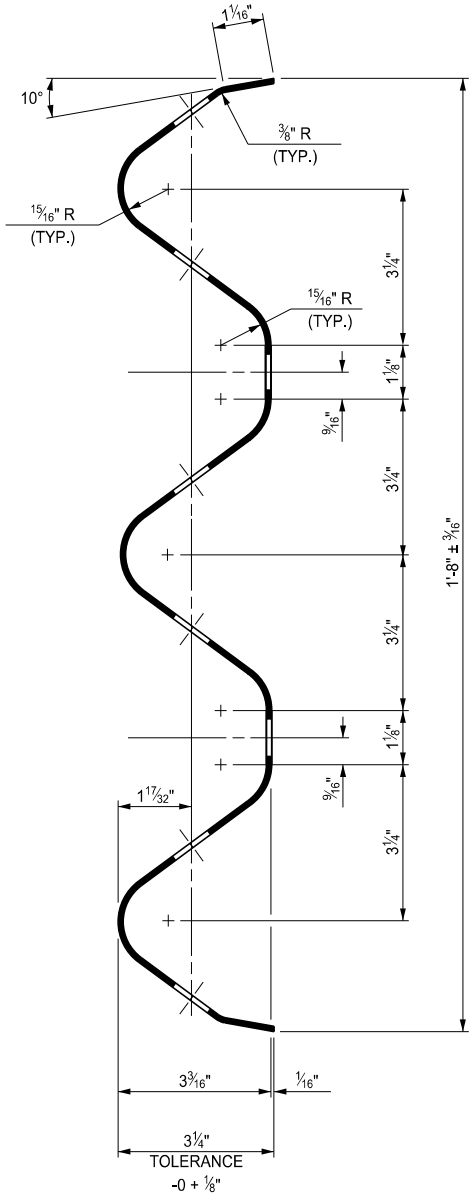
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL)	01/29/2024	R-60-J	SHEET
FHWA APPROVAL	PLAN DATE		11 OF 16



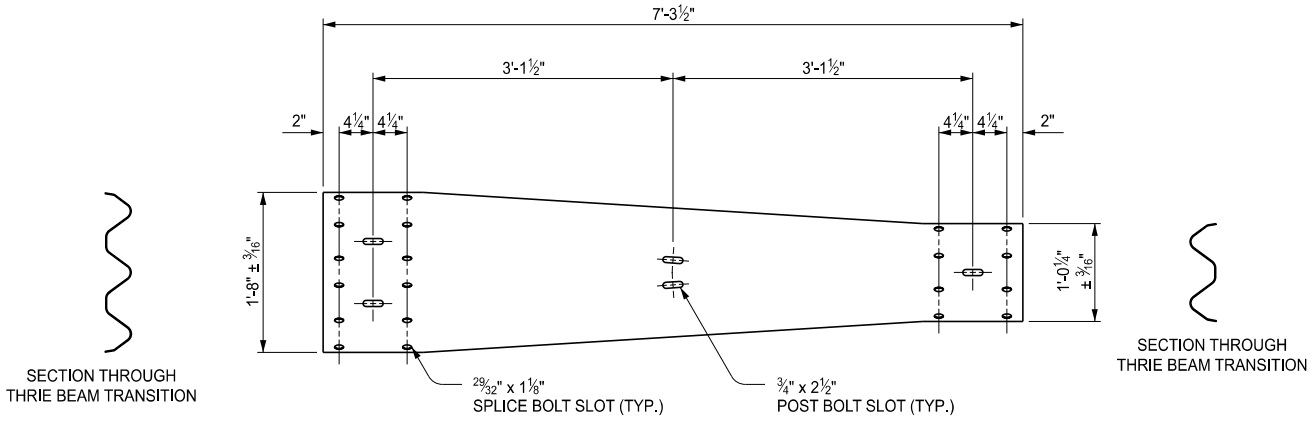
FRONT ELEVATION OF THRIE BEAM ELEMENT



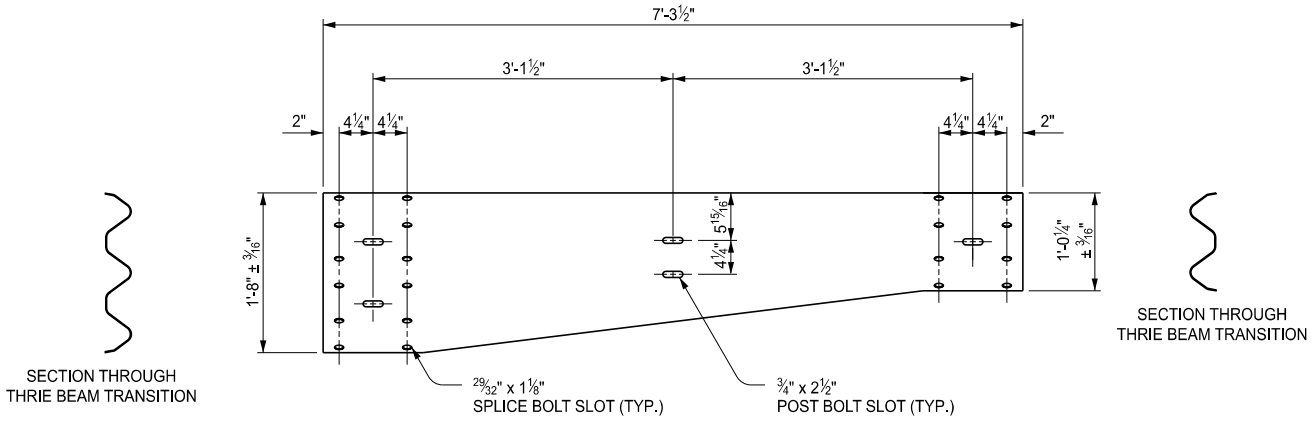
SECTION THROUGH THRIE BEAM ELEMENT

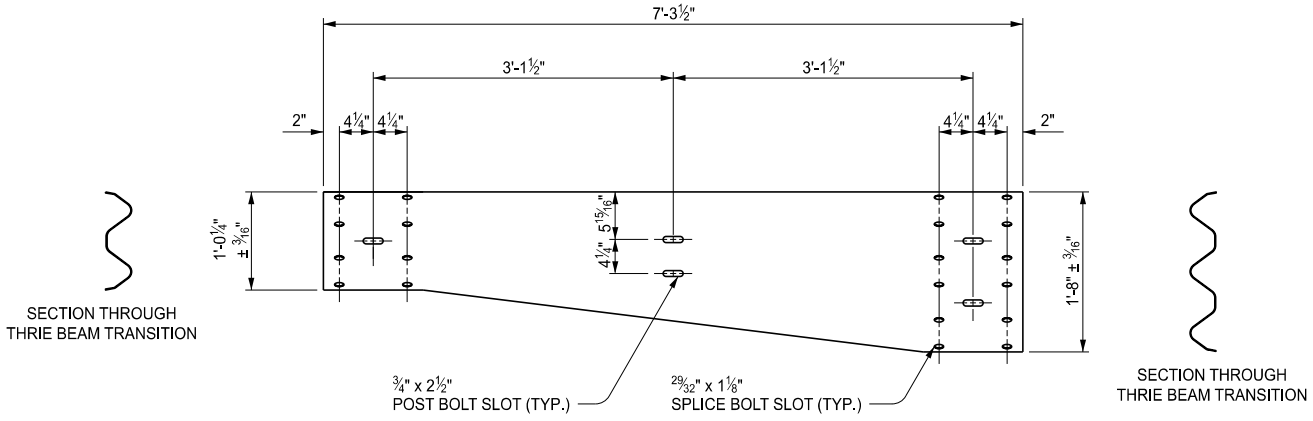
(FOR GUARDRAIL, TYPE T AND TD)

MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D			
	(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE	R-60-J	SHEET 12 OF 16



SYMMETRICAL THRIE BEAM TRANSITIONS





ASYMMETRICAL THRIE BEAM TRANSITIONS

NOTE: ASYMMETRICAL TRANSITION TYPE WILL VARY BY LOCATION DEPENDING ON GUARDRAIL LAYOUT

MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
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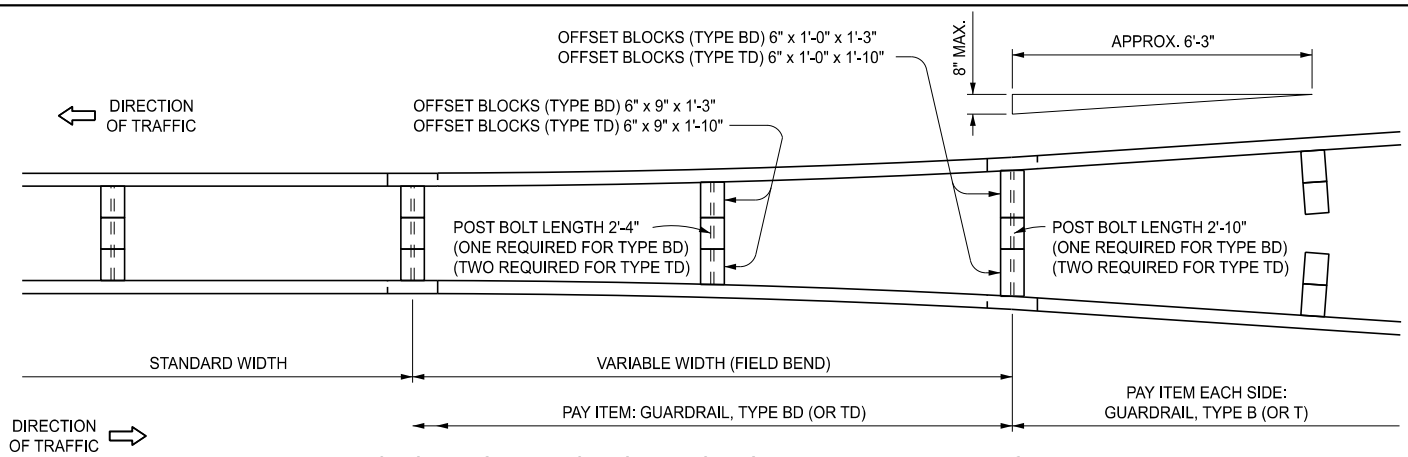
STANDARD PLAN FOR
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE	R-60-J	SHEET 13 OF 16



DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE B (OR TYPE T) TO GUARDRAIL, TYPE BD (OR TYPE TD)

POST BOLTS, SPLICE BOLTS AND WASHERS AT BEAM ELEMENT SPLICE POSTS AND AT INTERMEDIATE POSTS

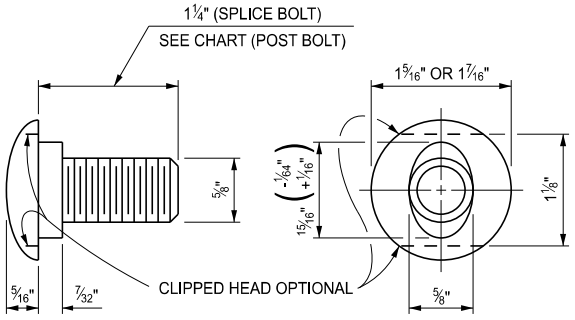
GUARDRAIL TYPE	POST	OFFSET BLOCK	POST BOLTS		SPLICE BOLTS (1¼" LONG) (NO. REQ'D)		WASHERS (ROUND) (NO. REQ'D)
			NO. REQ'D	LENGTH			
A	WOOD	N/A	1	9½"	8	NOT NEEDED AT INTERMEDIATE POSTS	1
	STEEL	N/A	1	2"			1
B	WOOD	WOOD	1	18"	8		1
	STEEL	WOOD	1	9½"			1
BD	WOOD	WOOD	1	* 26½"	16		———
	STEEL	WOOD	2	9½"			2
T	WOOD	WOOD	2	18"	12		2
	STEEL	WOOD	2	9½"			2
TD	WOOD	WOOD	2	* 26½"	24		———
	STEEL	WOOD	4	9½"			4

THRIE BEAM TRANSITIONS REQUIRE 20 SPLICE BOLTS EACH (12 0N TYPE T END AND 8 ON TYPE B END).

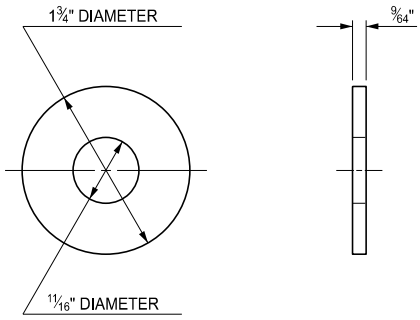
* EXCEPT AS SPECIFIED ON DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE B (OR TYPE T) TO GUARDRAIL, TYPE BD (OR TYPE TD). POST BOLTS SHALL NOT EXTEND MORE THAN ½" BEYOND NUT.

MINIMUM POST BOLT THREAD LENGTH

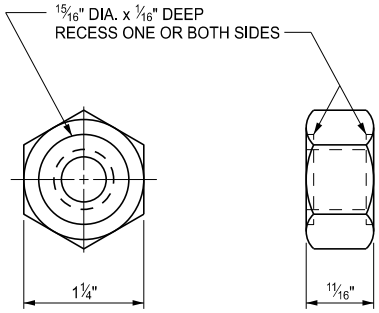
BOLT LENGTH	MINIMUM THREAD LENGTH
9½"	1¾"
18"	2½"
26½"	3"



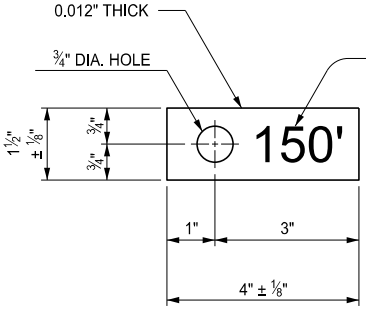
SPLICE BOLT AND POST BOLT



ROUND WASHER



NUT



METAL TAG
FOR CURVED GUARDRAIL WITH RADIUS OF 150' OR LESS

MDOT Michigan Department of Transportation

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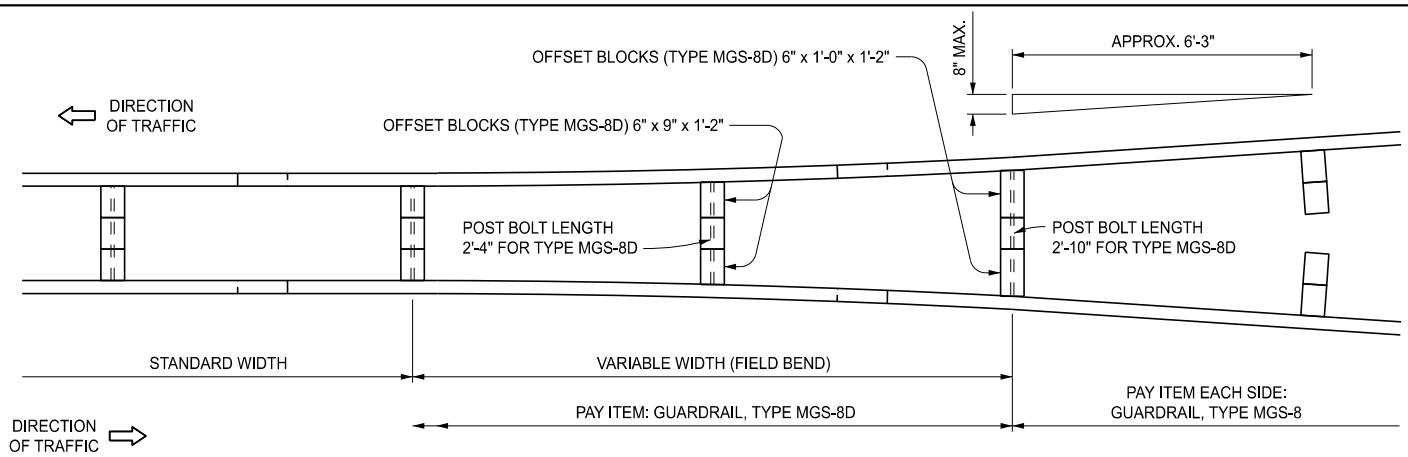
STANDARD PLAN FOR
GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE	R-60-J	SHEET 14 OF 16



DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE MGS-8 TO GUARDRAIL, TYPE MGS-8D

POST BOLTS, SPLICE BOLTS AND WASHERS AT BEAM ELEMENT SPLICE POSTS AND AT INTERMEDIATE POSTS						
GUARDRAIL TYPE	POST	OFFSET BLOCK	POST BOLTS		SPLICE BOLTS	WASHERS
			NO. REQ'D	LENGTH	(1¼" LONG) (NO. REQ'D)	(ROUND) (NO. REQ'D)
MGS-8	WOOD	WOOD	1	18"	8	1
	STEEL	WOOD	1	9½"		1
MGS-8D	WOOD	WOOD	1	* 26½"	16	———
	STEEL	WOOD	2	9½"		2

THRIE BEAM TRANSITIONS REQUIRE 20 SPLICE BOLTS EACH (12 0N TYPE T END AND 8 ON TYPE MGS END).

* EXCEPT AS SPECIFIED ON DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE MGS-8 TO GUARDRAIL, TYPE MGS-8D POST BOLTS SHALL NOT EXTEND MORE THAN ½" BEYOND NUT.

MINIMUM POST BOLT THREAD LENGTH	
BOLT LENGTH	MINIMUM THREAD LENGTH
9½"	1¾"
18"	2½"
26½"	3"

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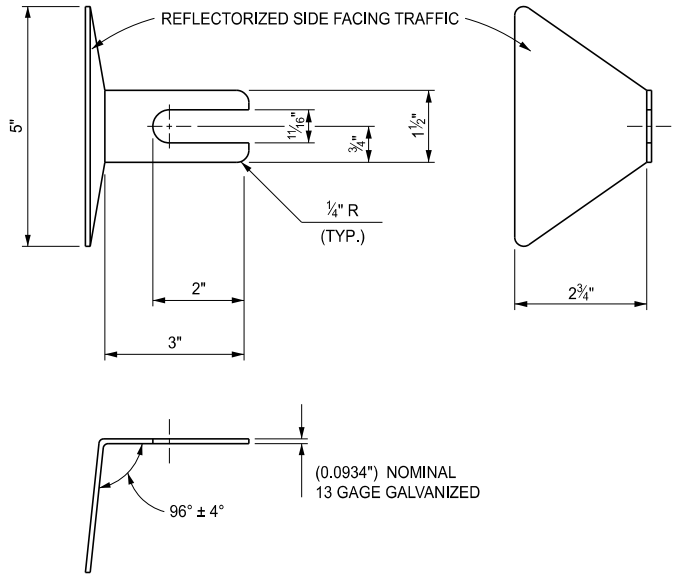
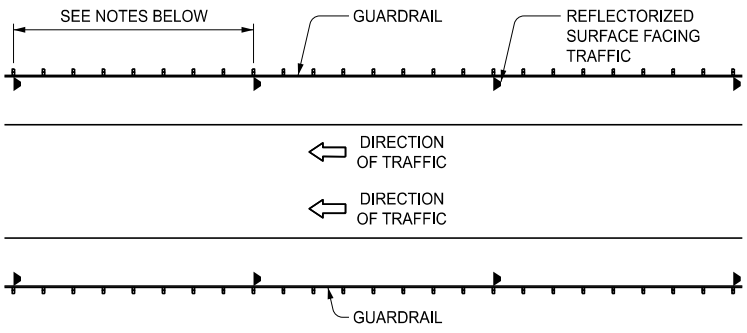
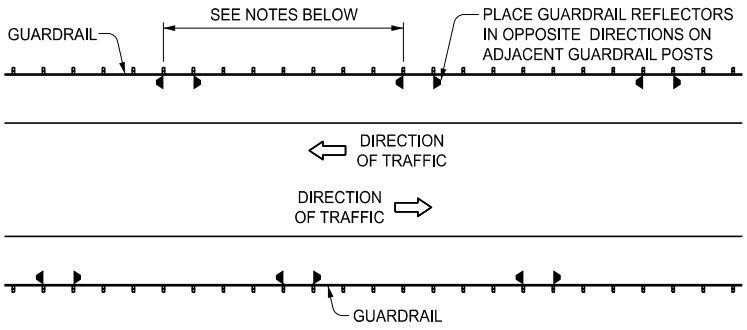
(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE	R-60-J	SHEET 15 OF 16



GUARDRAIL REFLECTOR



ONE-WAY TRAFFIC

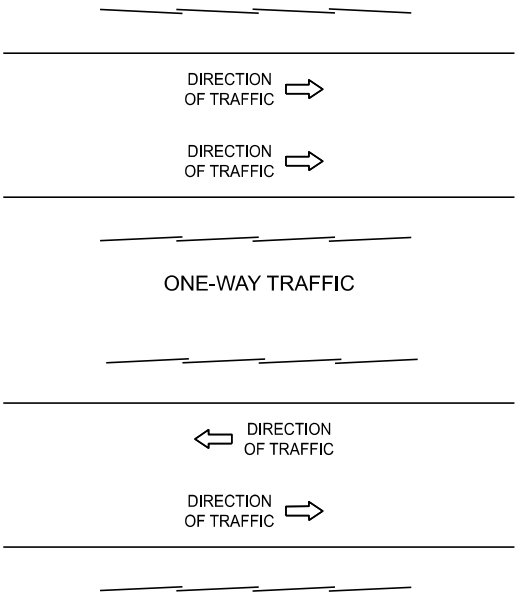


TWO-WAY TRAFFIC

PLACEMENT OF GUARDRAIL REFLECTORS

NOTES GOVERNING THE USE OF GUARDRAIL REFLECTORS

1. GUARDRAIL REFLECTORS SHALL BE USED ON ALL STANDARD GUARDRAIL RUNS, REGARDLESS OF ROADWAY LIGHTING.
2. GUARDRAIL REFLECTORS ARE TO BE SPACED AT THE FOLLOWING INTERVALS:
   a) 50'-0" ON TANGENT SECTIONS AND CURVES WITH A RADIUS OF 1150' OR MORE.
   b) 25'-0" ON CURVES WITH A RADIUS LESS THAN 1150'.
3. FOR GUARDRAIL REFLECTOR PLACEMENT ON APPROACH TERMINALS, SEE THE APPROPRIATE GUARDRAIL APPROACH TERMINAL STANDARD PLAN.
4. A GUARDRAIL REFLECTOR IS TO BE PLACED ON THE SECOND POST FROM THE GUARDRAIL DEPARTING TERMINAL.
5. ON GUARDRAIL, TYPE T AND TYPE TD GUARDRAIL REFLECTORS ARE TO BE PLACED ON THE UPPER POST BOLT.
6. GUARDRAIL REFLECTORS SHALL MATCH COLOR OF EDGE LINE.



TWO-WAY TRAFFIC

DIRECTION OF RAIL LAP

NOTES:

DETAILS SPECIFIED ON THIS STANDARD ARE ACCORDING TO THE AASHTO-AGC-ARTBA JOINT COMMITTEE, TASK FORCE 13 PUBLICATION TITLED "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE."

BEAM ELEMENTS SHALL BE SHOP BENT TO PLAN RADIUS FOR CURVE RADII 150' OR LESS. A TAG IDENTIFYING THE CURVATURE OF THE SHOP BENT SECTION WILL BE REQUIRED FOR EACH CURVED ELEMENT.

SEE STANDARD PLAN R-62-SERIES OR R-63-SERIES FOR GUARDRAIL APPROACH TERMINALS, STANDARD PLAN R-66-SERIES FOR GUARDRAIL DEPARTING TERMINALS AND STANDARD PLAN R-67-SERIES FOR GUARDRAIL ANCHORAGE, BRIDGE.

WOOD POSTS WITH ½" BEVELS AT THE TOP MAY BE USED IN LIEU OF WOOD POSTS WITHOUT BEVELS SPECIFIED. THE LENGTH, WIDTH AND DEPTH OF THE POST SHALL BE AS SPECIFIED ON THIS STANDARD AND THE POST BOLT HOLES SHALL BE LOCATED TO ENSURE PROPER RAIL HEIGHT.

WOOD OFFSET BLOCKS WITH ½" BEVELS AT THE TOP AND BOTTOM OR A 1" BEVELED TOP MAY BE USED IN LIEU OF WOOD BLOCKS WITHOUT BEVELS SPECIFIED. THE LENGTH (FRONT AND BACK FACE), WIDTH AND DEPTH OF THE BLOCK SHALL BE AS SPECIFIED ON THIS STANDARD AND THE POST BOLT HOLES SHALL BE LOCATED TO ENSURE PROPER RAIL HEIGHT AND COMPATIBILITY WITH POST HOLES.

WHEN THE FACE OF GUARDRAIL IS PLACED FLUSH WITH FACE OF CURB, THE RAIL HEIGHT SHOULD BE MEASURED FROM THE FRONT EDGE OF THE GUTTER PAN, WHICH IS THE POINT ON THE GUTTER PAN THAT IS CLOSEST TO THE EDGE OF THE TRAVELED LANE. WHEN THE FACE OF THE GUARDRAIL PANEL IS LOCATED BEHIND THE CURB THE RAIL HEIGHT SHOULD BE MEASURED FROM THE GROUND JUST IN FRONT OF THE GUARDRAIL.

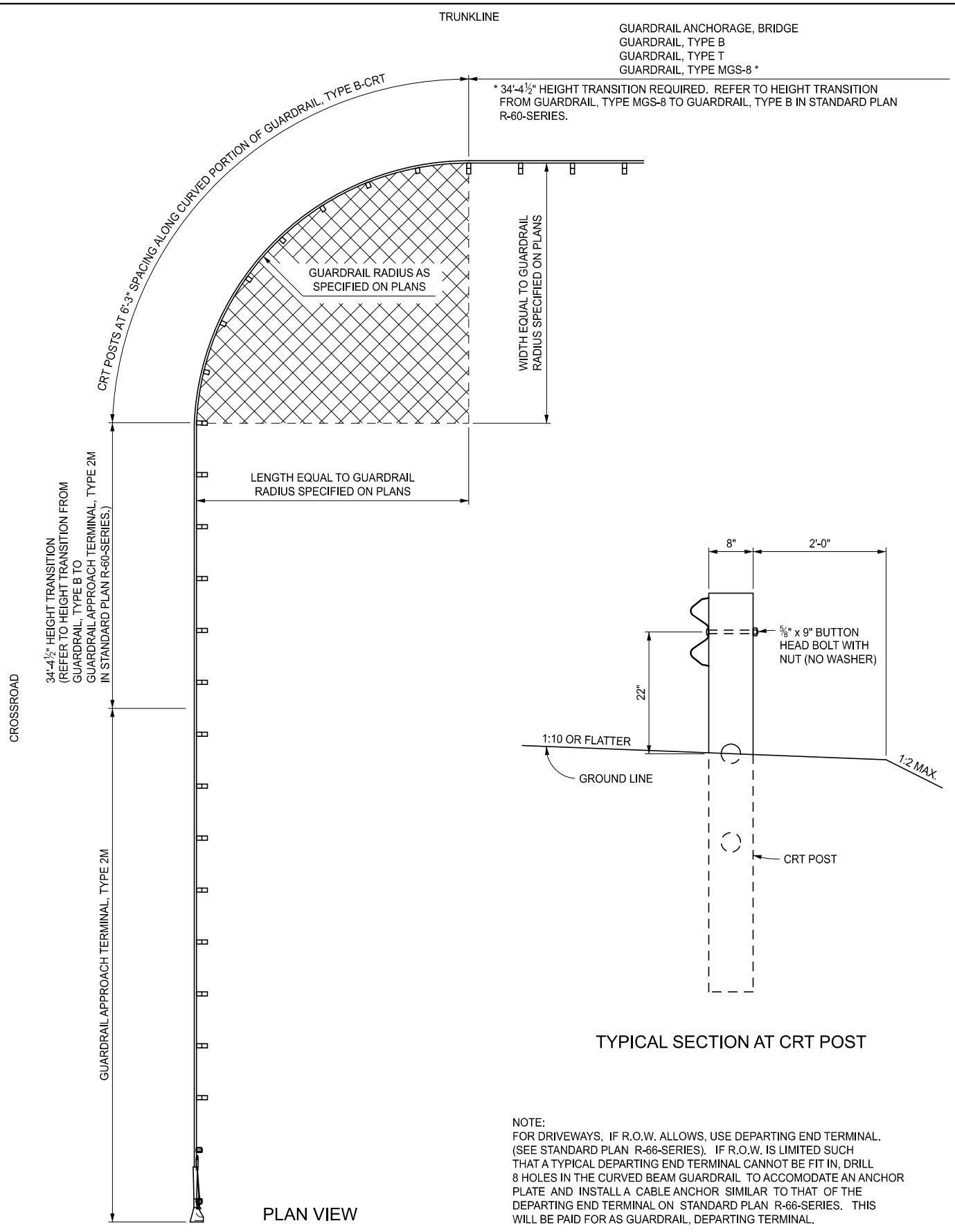
MDOT Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR

GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D

(SPECIAL DETAIL) FHWA APPROVAL	01/29/2024 PLAN DATE	R-60-J	SHEET 16 OF 16



NOTE:
FOR DRIVEWAYS, IF R.O.W. ALLOWS, USE DEPARTING END TERMINAL. (SEE STANDARD PLAN R-66-SERIES). IF R.O.W. IS LIMITED SUCH THAT A TYPICAL DEPARTING END TERMINAL CANNOT BE FIT IN, DRILL 8 HOLES IN THE CURVED BEAM GUARDRAIL TO ACCOMODATE AN ANCHOR PLATE AND INSTALL A CABLE ANCHOR SIMILAR TO THAT OF THE DEPARTING END TERMINAL ON STANDARD PLAN R-66-SERIES. THIS WILL BE PAID FOR AS GUARDRAIL, DEPARTING TERMINAL.

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

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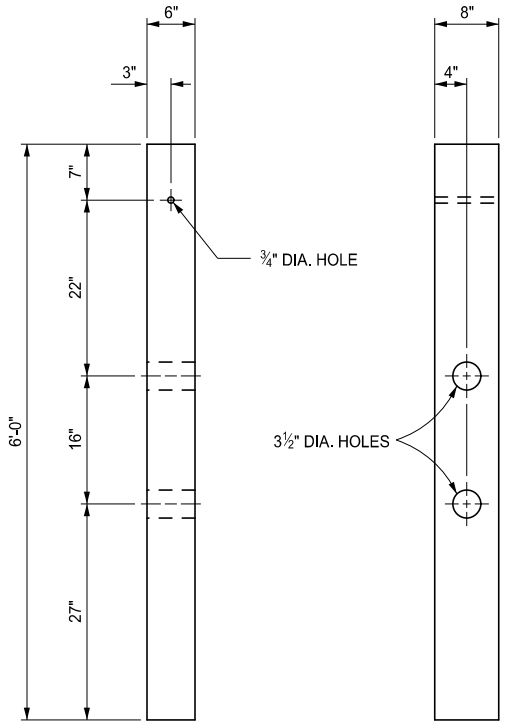
SPECIAL DETAIL FOR
GUARDRAIL AT INTERSECTIONS

(SPECIAL DETAIL) FHWA APPROVAL	06/06/2022 PLAN DATE	SPECIAL DETAIL 21	SHEET 1 OF 2



CONTROLLED RELEASING TERMINAL POST
(CRT)

NOTES:

THE SLOPE IN FRONT OF THE INSTALLATION SHOULD NOT EXCEED 1:10 AND EXTEND TO 2'-0" BEYOND THE GUARDRAIL POST. THE SLOPE BEYOND THIS HINGE LINE SHALL BE 1:2 OR FLATTER.

THE CROSS HATCHED AREA BEHIND THE CURVED GUARDRAIL SHOULD BE KEPT FREE OF FIXED OBJECTS.

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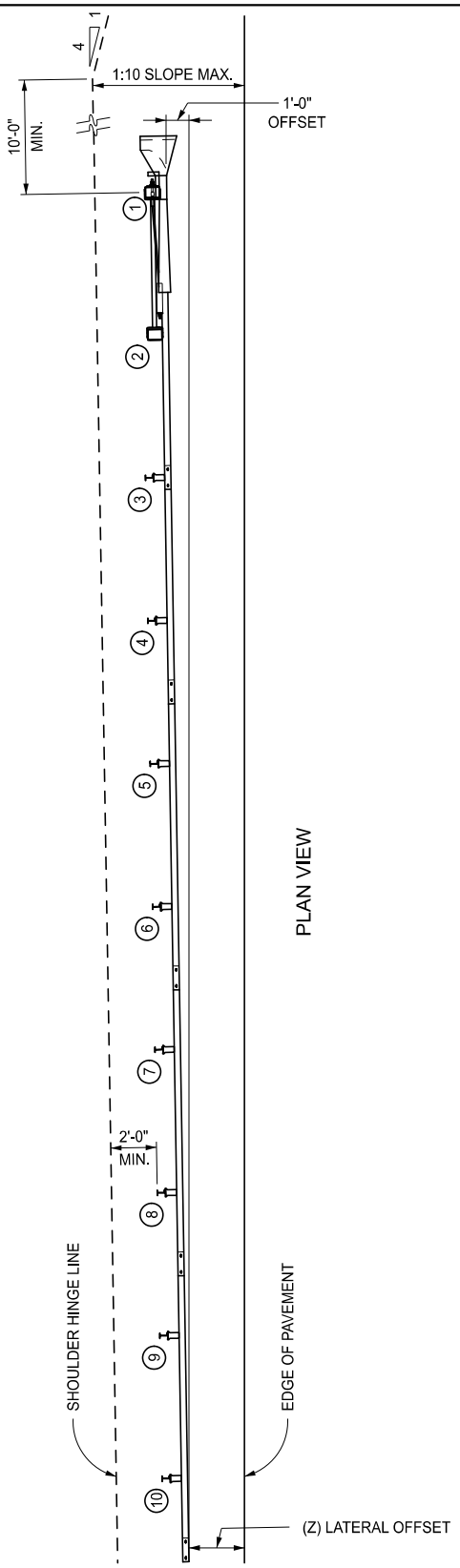
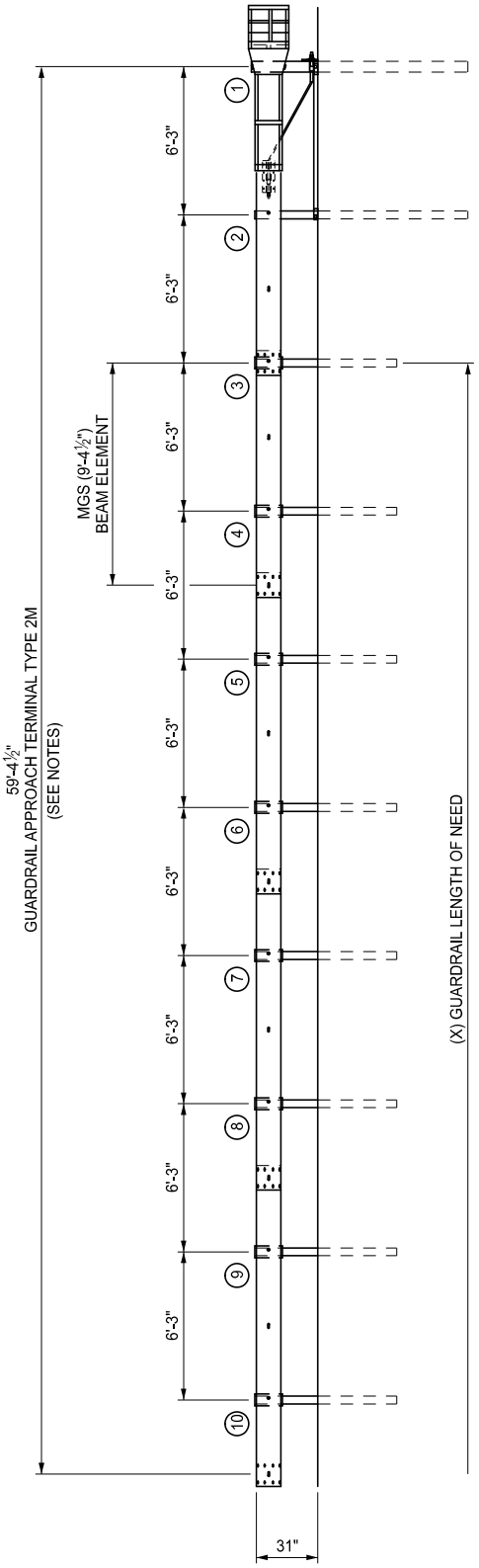
SPECIAL DETAIL FOR
GUARDRAIL AT INTERSECTIONS

(SPECIAL DETAIL) FHWA APPROVAL	06/06/2022 PLAN DATE	SPECIAL DETAIL 21	SHEET 2 OF 2





OPTION 1

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

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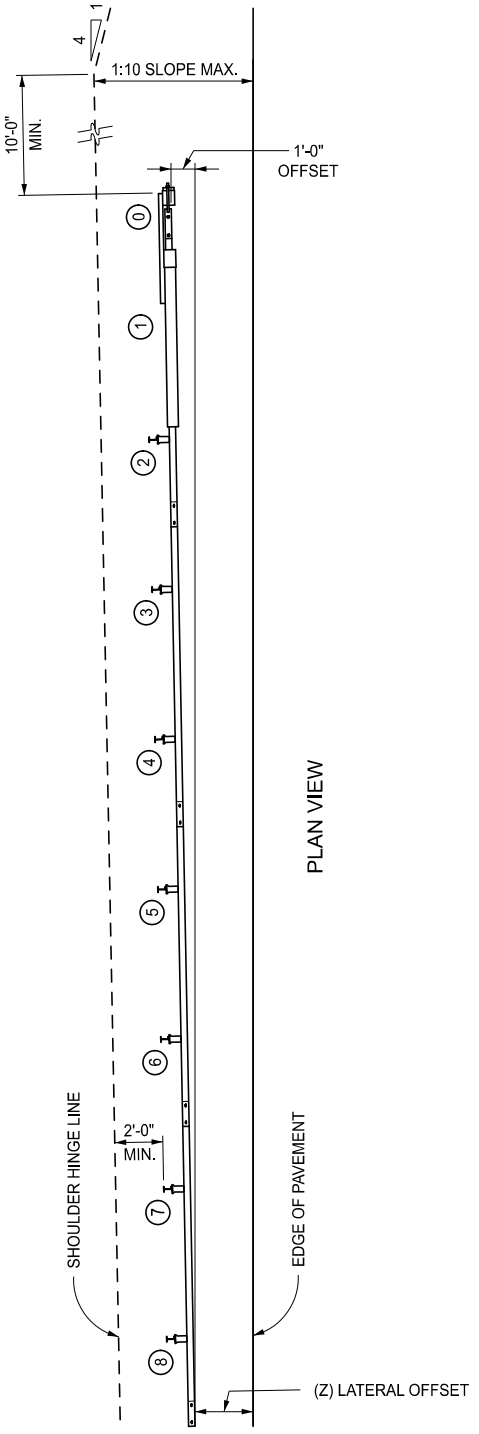
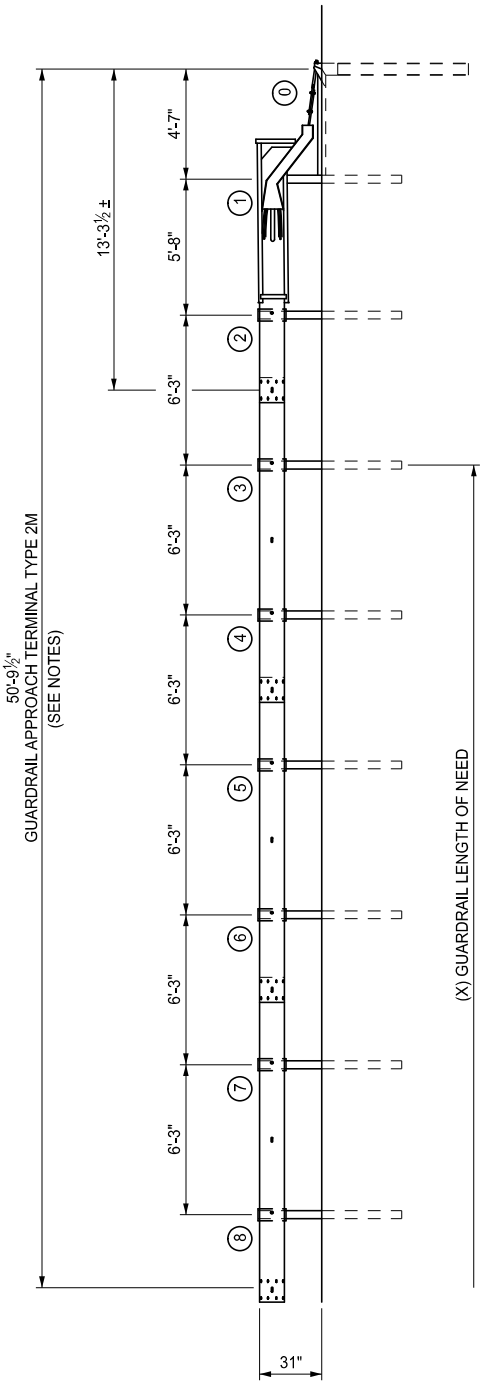
STANDARD PLAN FOR
GUARDRAIL APPROACH TERMINAL TYPE 2M

(SPECIAL DETAIL) FHWA APPROVAL	06/16/2022 PLAN DATE	R-62-H	SHEET 1 OF 4



PLAN VIEW



ELEVATION

GUARDRAIL APPROACH TERMINAL TYPE 2M
"SOFT-STOP"

OPTION 2

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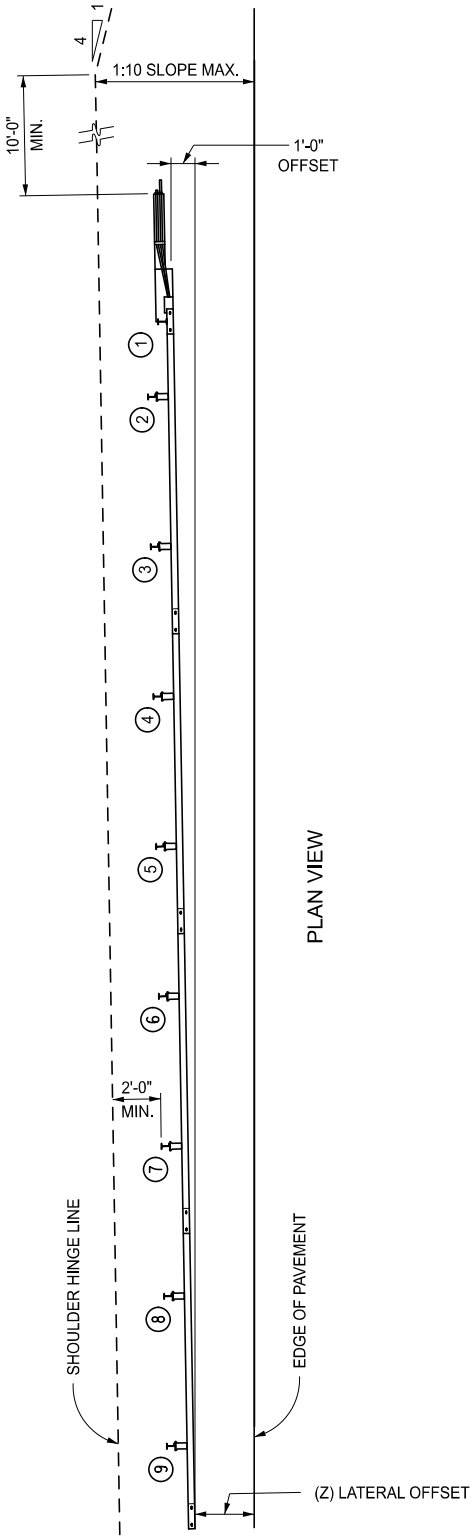
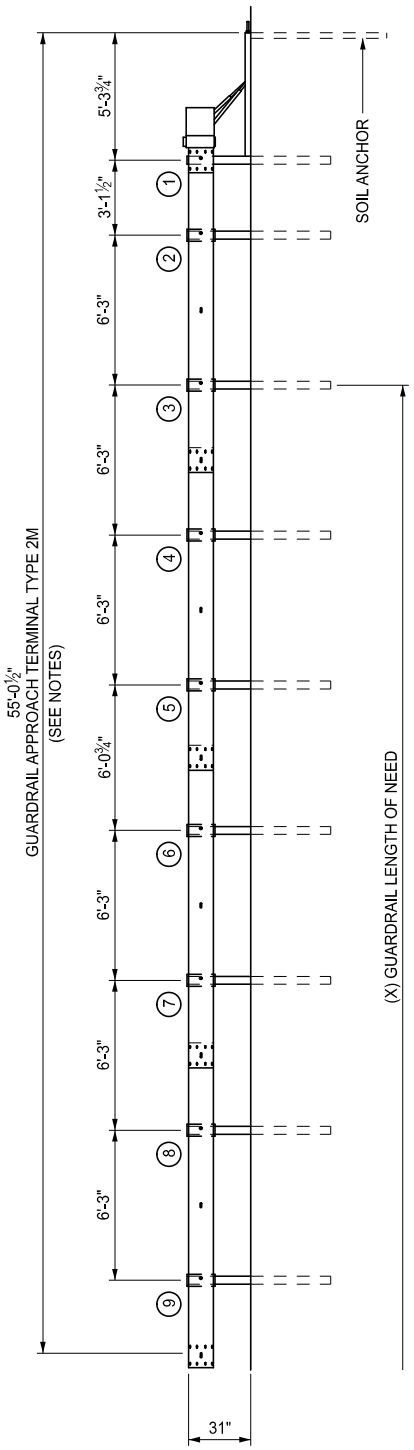
STANDARD PLAN FOR
GUARDRAIL APPROACH TERMINAL TYPE 2M

(SPECIAL DETAIL) FHWA APPROVAL	06/16/2022 PLAN DATE	R-62-H	SHEET 2 OF 4



PLAN VIEW



ELEVATION

GUARDRAIL APPROACH TERMINAL TYPE 2M
"MAX-TENSION"

OPTION 3

MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR GUARDRAIL APPROACH TERMINAL TYPE 2M			
	(SPECIAL DETAIL) FHWA APPROVAL	06/16/2022 PLAN DATE	R-62-H	SHEET 3 OF 4

NOTES:

SEE STANDARD PLAN R-60-SERIES FOR ADDITIONAL TRANSITION LENGTHS WHEN ATTACHING TERMINALS TO OTHER THAN TYPE MGS-8 GUARDRAIL.

ALL POSTS, OFFSET BLOCKS, BEAM ELEMENTS, AND HARDWARE (INCLUDING BOLTS, NUTS, AND WASHERS) SHALL CONFORM TO THE MANUFACTURER'S DETAILS AND SPECIFICATIONS.

ALL 1:10 SLOPES SHALL BE GRADED TO CLASS A SLOPE TOLERANCES.

WHEN SITE CONDITIONS WARRANT AND WITH THE APPROVAL OF THE ENGINEER, GUARDRAIL APPROACH TERMINAL TYPE 2M CAN BE INSTALLED STRAIGHT (WITHOUT THE 1'-0" OFFSET FROM THE TANGENT LINE TO THE TRAFFIC FACE OF POST 1).

GUARDRAIL REFLECTORS AND OTHER ATTACHMENTS ARE NOT TO BE USED ON THE GUARDRAIL APPROACH TERMINAL. PLACE REFLECTORS BEGINNING ON STANDARD RUN OF GUARDRAIL.

USE REFLECTIVE SHEETING ACCORDING TO THE FOLLOWING TRAFFIC CONDITIONS: (NOTE: ALTERNATE 3" BLACK AND 3" YELLOW STRIPES ON A 45° ANGLE)

TRAFFIC PASSING ON THE LEFT SIDE

TRAFFIC PASSING ON BOTH SIDES

TRAFFIC PASSING ON THE RIGHT SIDE

THE PORTION OF THE IMPACT HEAD ASSEMBLY FACING TRAFFIC SHALL BE COMPLETELY COVERED WITH HIGH INTENSITY ADHESIVE REFLECTIVE SHEETING.

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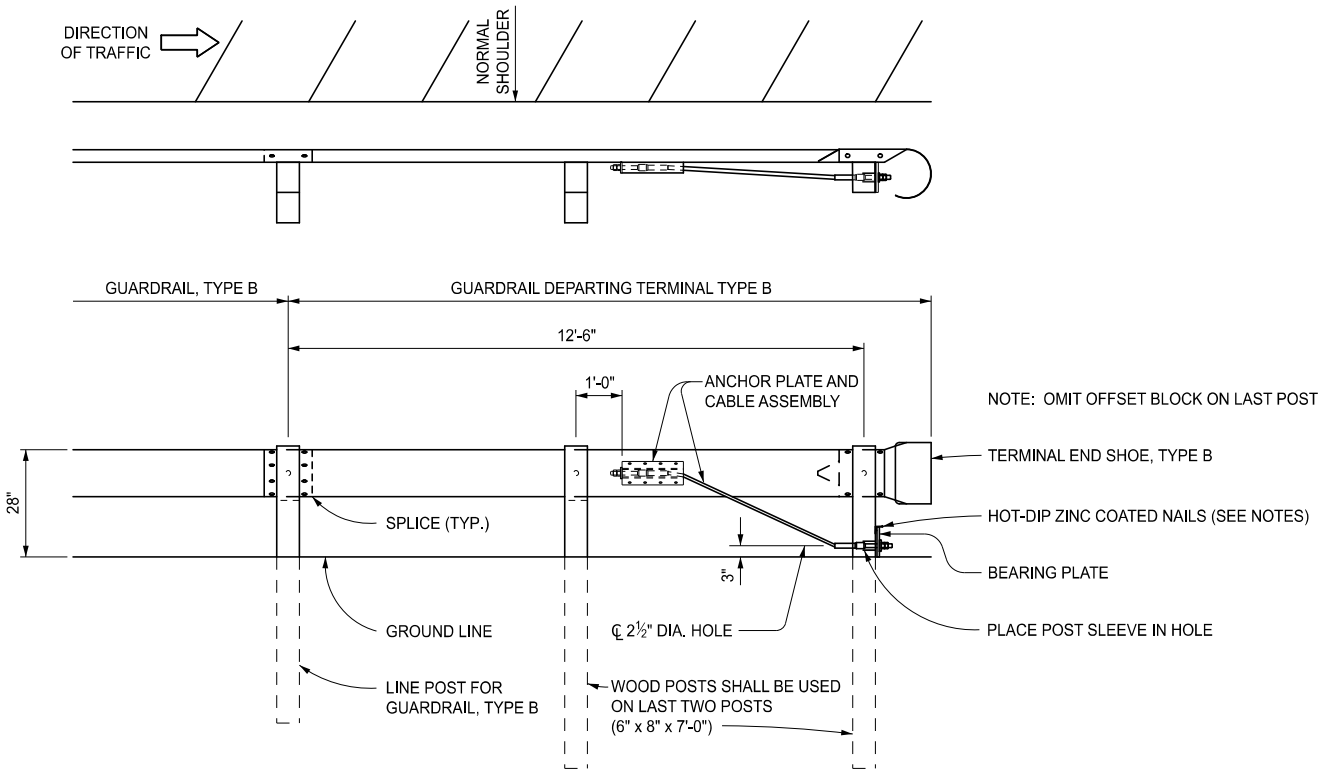
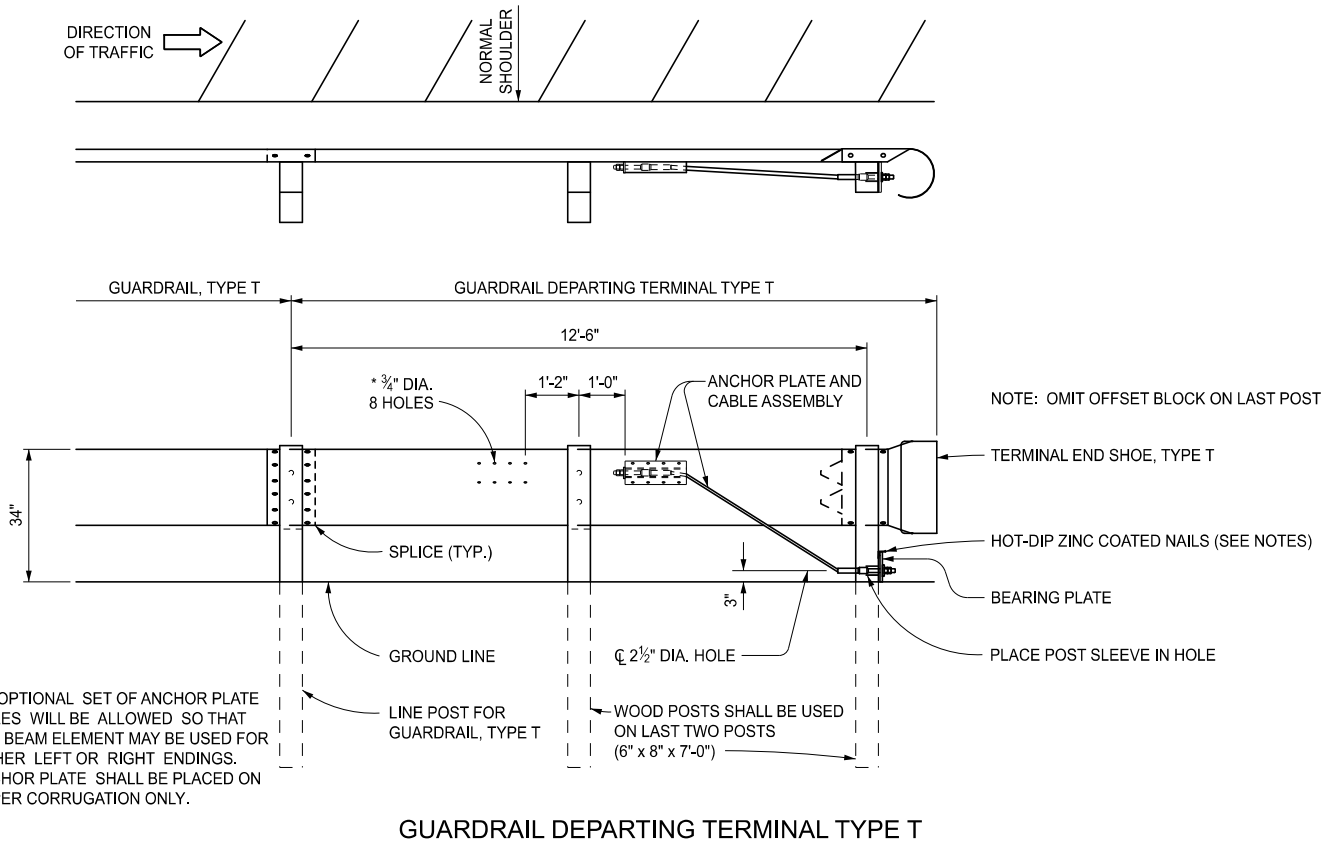
STANDARD PLAN FOR
GUARDRAIL APPROACH TERMINAL TYPE 2M

(SPECIAL DETAIL) / FHWA APPROVAL	06/16/2022 / PLAN DATE	R-62-H	SHEET 4 OF 4



GUARDRAIL DEPARTING TERMINAL TYPE B



* AN OPTIONAL SET OF ANCHOR PLATE HOLES WILL BE ALLOWED SO THAT THE BEAM ELEMENT MAY BE USED FOR EITHER LEFT OR RIGHT ENDINGS. ANCHOR PLATE SHALL BE PLACED ON UPPER CORRUGATION ONLY.

GUARDRAIL DEPARTING TERMINAL TYPE T

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

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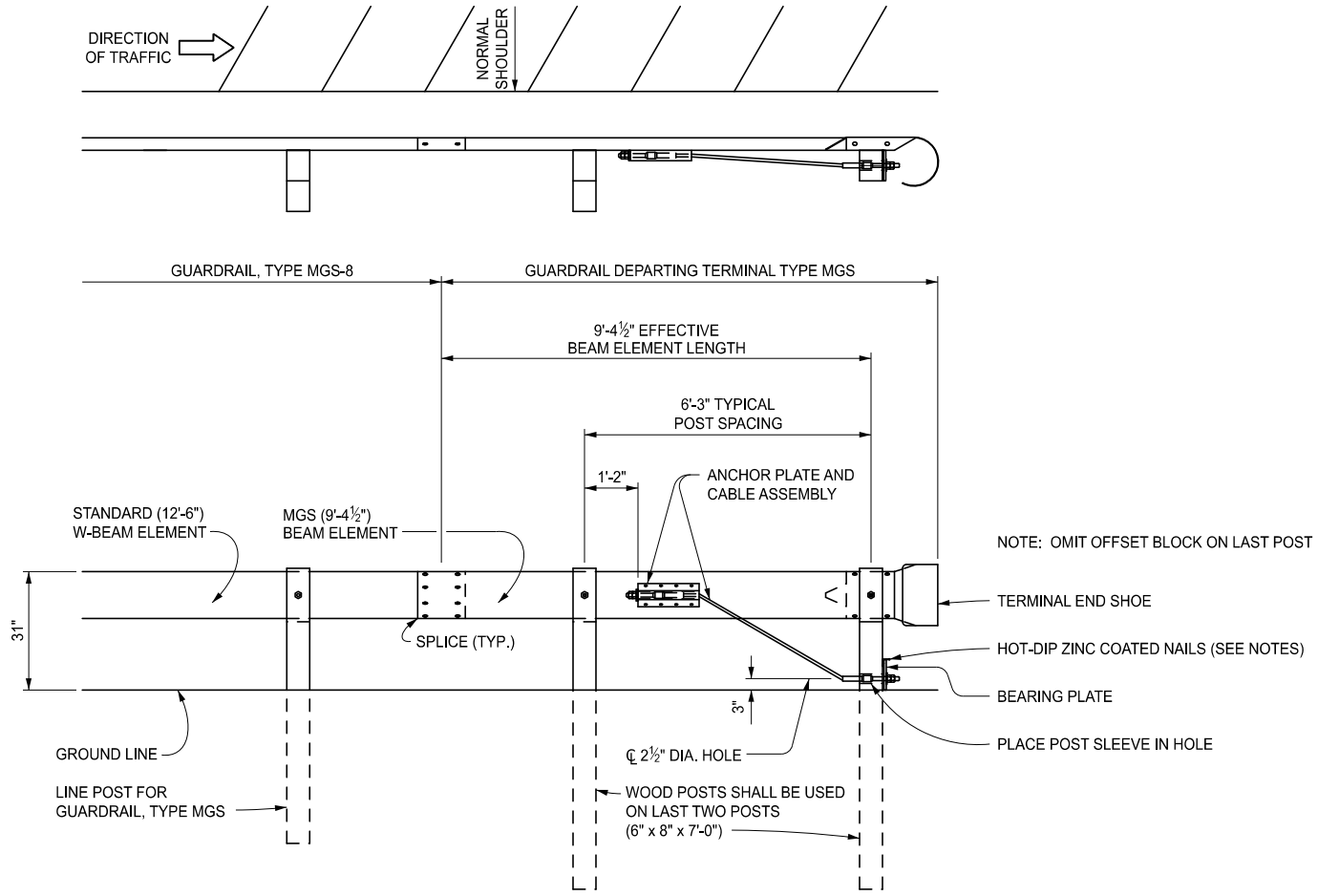
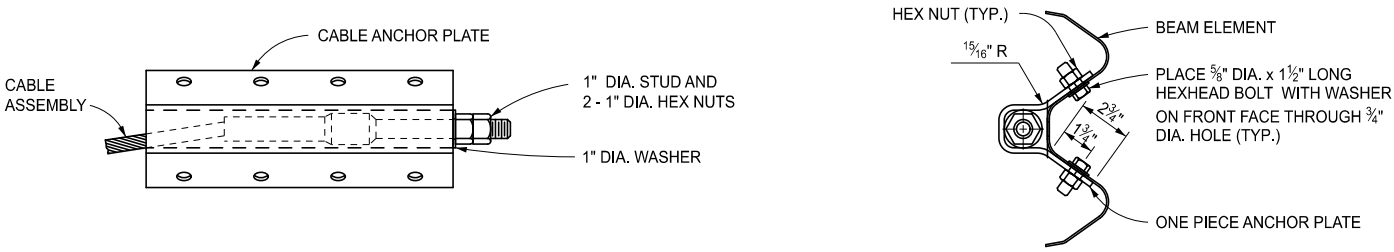
STANDARD PLAN FOR
GUARDRAIL DEPARTING TERMINAL TYPES B, T, & MGS

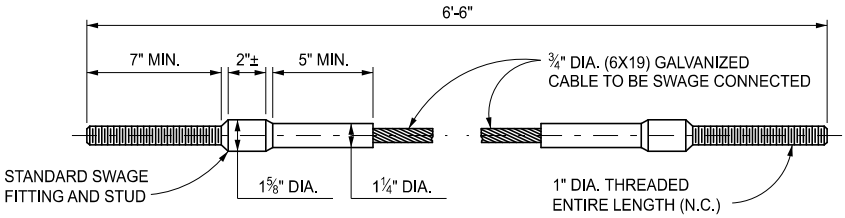
(SPECIAL DETAIL) FHWA APPROVAL	09/14/2023 PLAN DATE	R-66-E	SHEET 1 OF 4



GUARDRAIL DEPARTING TERMINAL TYPE MGS



CABLE ANCHOR PLATE DETAILS



CABLE ASSEMBLY

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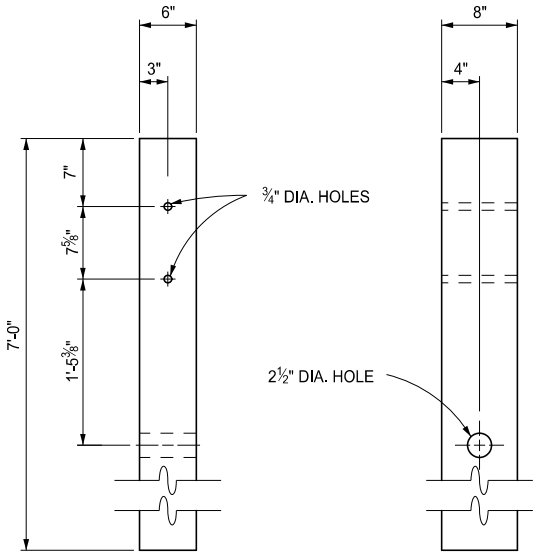
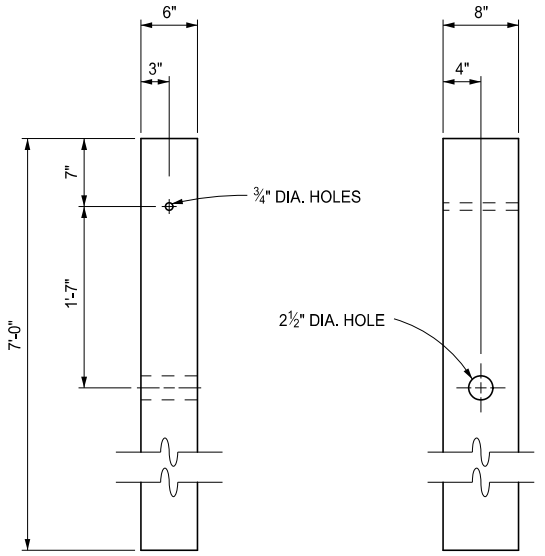
STANDARD PLAN FOR
GUARDRAIL DEPARTING TERMINAL TYPES B, T, & MGS

(SPECIAL DETAIL) FHWA APPROVAL	09/14/2023 PLAN DATE	R-66-E	SHEET 2 OF 4



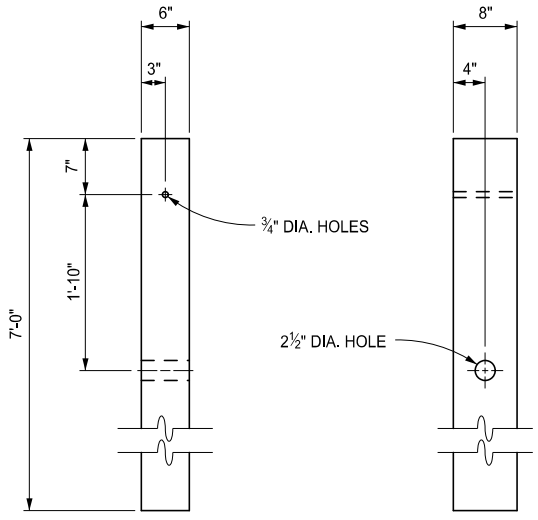
WOOD POST DETAIL

(FOR LAST POST, GUARDRAIL DEPARTING TERMINAL TYPE T)



WOOD POST DETAIL

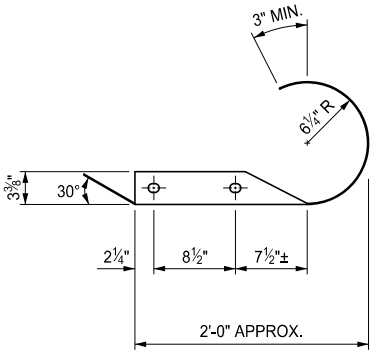
(FOR LAST POST, GUARDRAIL DEPARTING TERMINAL TYPE B)

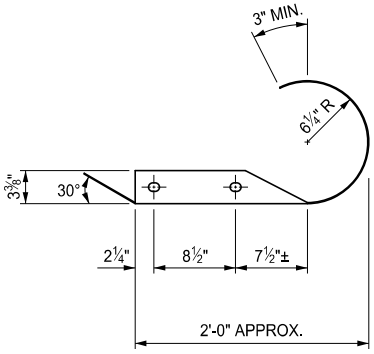


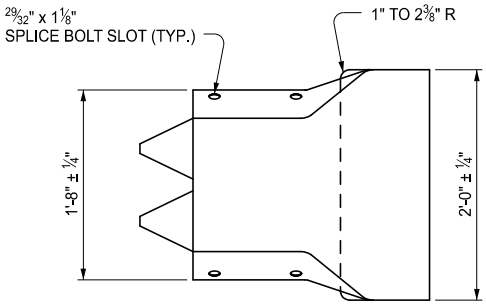
WOOD POST DETAIL

(FOR LAST POST, GUARDRAIL DEPARTING TERMINAL TYPE MGS)

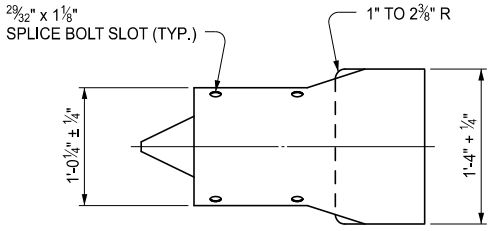
MDOT Michigan Department of Transportation DEPARTMENT DIRECTOR BRADLEY C. WIEFERICH, PE	STANDARD PLAN FOR GUARDRAIL DEPARTING TERMINAL TYPES B, T, & MGS			
	(SPECIAL DETAIL) FHWA APPROVAL	09/14/2023 PLAN DATE	R-66-E	SHEET 3 OF 4



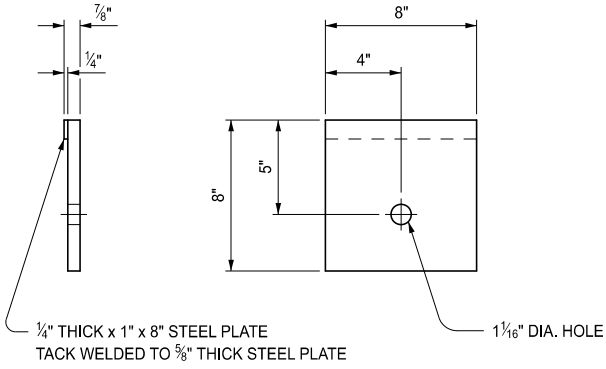




TERMINAL END SHOE, TYPE T



TERMINAL END SHOE,
TYPE A, TYPE B OR TYPE MGS



BEARING PLATE

POST SLEEVE

NOTES:

ALL POSTS, OFFSET BLOCKS, BEAM ELEMENTS, AND HARDWARE (INCLUDING BOLTS, NUTS, AND WASHERS) SHALL CONFORM TO THE STANDARD SPECIFICATIONS FOR CONSTRUCTION AND TO STANDARD PLAN R-60-SERIES, WHERE APPLICABLE, EXCEPT AS SPECIFIED ON THIS STANDARD.

ALL 1:10 SLOPES SHALL BE GRADED TO CLASS A SLOPE TOLERANCES.

FOR DETAILS OF GUARDRAIL PLACEMENT, SEE STANDARD PLAN R-59-SERIES.

AFTER THE CABLE ASSEMBLY HAS BEEN TIGHTENED, A SECOND NUT SHALL BE INSTALLED ON EACH END OF THE CABLE SO THAT THE CABLE WILL NOT LOOSEN.

TWO HOT-DIP ZINC COATED NAILS SHALL BE DRIVEN INTO THE WOOD POST AT THE TOP OF THE BEARING PLATE TO KEEP THE BEARING PLATE FROM ROTATING.

MDOT
Michigan Department of Transportation

DEPARTMENT DIRECTOR
BRADLEY C. WIEFERICH, PE

STANDARD PLAN FOR
GUARDRAIL DEPARTING TERMINAL TYPES B, T, & MGS

(SPECIAL DETAIL) FHWA APPROVAL	09/14/2023 PLAN DATE	R-66-E	SHEET 4 OF 4

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
SLOPE RESTORATION, NON-FREEWAY

RSD:NJM 1 of 5 APPR:DMG:JJG:11-30-23

a. Description. This work consists of preparing all lawns and slopes on non-freeway projects designated for slope restoration on the plans or as directed by the Engineer and applying topsoil, fertilizer, seed, mulch with mulch anchor, mulch blanket, high velocity mulch blanket, permanent turf reinforcement mat (TRM), bonded fiber matrix (BFM), or modified mulch blanket to those areas. Ensure turf establishment is in accordance with section 816 and 917 of the Standard Specifications for Construction and Standard Plan R-100 Series, except as modified herein or otherwise directed by the Engineer.

b. Materials. The materials, application rates, and construction methods specified in sections 816 and 917 of the Standard Specifications for Construction apply unless modified by this special provision or otherwise directed by the Engineer. Furnish the following materials on this project:

1. Seeding mixture as called for on the plans.

2. Chemical fertilizer nutrient, Class A.

3. Topsoil. The following percentages of furnished and salvaged topsoil are estimated for this project and provided for informational purposes only.

Topsoil Furnished: 100 percent
Topsoil Salvaged: 0 percent

4. Mulching material.

5. Permanent Turf Reinforcement Mat (TRM) for Slope Restoration, Non-Freeway, Type D, must be 100 percent synthetic and consist of 100 percent ultraviolet (UV) stabilized polyolefin fibers sewn between two layers of UV stabilized polypropylene netting with polyolefin thread. The TRM must meet the following “minimum average roll value” requirements:

Property	Test Method	Requirement
Mass/Unit Area	*ASTM D6566*	10 oz/syd
UV Stability @ 1000 hrs	*ASTM D4355/D4355M*	80 percent
Tensile Strength (MD)	*ASTM D6818*	165 lbs/ft

Acceptance. Supply a general certification for the permanent TRM from one of the following manufacturers or approved equal:

Recyclex TRM	American Excelsior Co., Arlington, TX	(800) 777-7645
P300 TRM	North American Green, Poseyville, IN	(800) 772-2040

Landlok 450 TRM	Propex, Inc., Chattanooga, TN	(800) 621-1273
Excel PP5-10 TRM	Western Excelsior, Evansville, IN	(866) 540-9810
Vmax P550 TRM	North American Green, Poseyville, IN	(800) 772-2040

6. Bonded Fiber Matrix (BFM) for use in Slope Restoration, Non-Freeway, Type E. Furnish a product from the list below or an approved equal.

Soil Guard	Mat Inc., Floodwood, MN	(888) 477-3028
HydroStraw BFM	HydroStraw, LLC, Rockford, WA	(800) 545-1755
HydraMax	North American Green, Poseyville, IN	(800) 772-2040
Bindex BFM	American Excelsior Co., Arlington, TX	(800) 777-7645
ProMatrix EFM	Profile Products LLC, Buffalo Grove, IN	(800) 508-8681

If multiple grades of the selected product are available, use the grade appropriate for the application as approved by the Engineer.

Approved equal BFMs must consist of long strand, virgin wood fibers (90 percent by weight) bound together by a pre-blended, high-strength polymer adhesive (10 percent by weight). The virgin wood fibers will be thermally refined from clean whole wood chips. Ensure the organic binders are a high-viscosity colloidal polysaccharide tackifier with activating agents to render the resulting matrix insoluble upon drying.

7. Modified Mulch Blanket. Where modified mulch blanket is required, furnish an excelsior mulch blanket free of chemical additives. Ensure the netting thread is 100 percent biodegradable and manufactured with non-plastic materials such as jute, sisal, or coir fiber. Degradable, photodegradable, UV-degradable, oxo-degradable, or oxo-biodegradable plastic netting including polypropylene, nylon, polyethylene, and polyester is not an acceptable alternative. All netting materials must have a loose weave design with movable junctions between the machine and cross-machine direction twines that move independently and reduce the potential for wildlife entanglement.

For Slope Restoration, Non-Freeway, Type F, furnish a single net modified mulch blanket from the list below or an approved equal.

Premier Straw Single Net FibreNet	American Excelsior Co.	(800) 777-7645
Curlex NetFree 100% Biodegradable	American Excelsior Co.	(800) 777-7645
ECS-1B Biodegradable Single Straw	East Coast Erosion Control	(800) 582-4005
S1000BD Single Net	Enviroscape ECM, Ltd.	(888) 550-1999
Excel SR-1 All Natural	Western Excelsior Corp.	(866) 540-9810
S75BN	Western Excelsior Corp.	(866) 540-9810

For Slope Restoration, Non-Freeway, Type G, furnish a double net modified mulch blanket from the list below or an approved equal.

Premier Straw Double Net FibreNet	American Excelsior Co.	(800) 777-7645
Curlex II FibreNet	American Excelsior Co.	(800) 777-7645
ECX-2B Double Net Biodegradable	East Coast Erosion Control	(800) 582-4005
S2000BD Double Net	Enviroscape ECM, Ltd.	(888) 550-1999
Excel R-2 All Natural	Western Excelsior Corp.	(866) 540-9810
Excel SS-2 All Natural	Western Excelsior Corp.	(866) 540-9810
S150BN	Western Excelsior Corp.	(866) 540-9810

c. Construction. Ensure construction methods are in accordance with subsection 816.03 of the Standard Specifications for Construction. Begin this work as soon as possible after final grading of the areas designated for slope restoration but no later than the maximum time frames specified in subsection 208.03 of the Standard Specifications for Construction. It may be necessary, as directed by the Engineer, to place materials by hand.

Shape, compact, and ensure all areas to be seeded are weed-free prior to placing topsoil. Place topsoil to the minimum depth as detailed herein and in accordance with the plans and standard specifications to meet proposed finished grade. If the area being restored requires more than the minimum depth of topsoil to meet finished grade, fill this additional depth using topsoil or, at the Contractor's option, embankment. Furnishing and placing this additional material is included in this item of work.

Ensure topsoil is weed and weed seed free and friable prior to placing seed. Remove any stones greater than 1/2-inch in diameter or other debris. Apply seed mixture and fertilizer to prepared soil surface. Incorporate seed into top 1/2-inch of topsoil.

Spread mulch at a rate of two tons per acre. If the Engineer allows dormant seeding spread mulch at a rate of 3 tons per acre. Place mulch anchoring over the mulch at a rate in accordance with subsection 816.03.F of the Standard Specifications for Construction. Place mulch blanket and high-velocity mulch blanket in accordance with subsection 816.03.G of the Standard Specifications for Construction and Standard Plan R-100 Series.

Install areas constructed with the TRM on prepared (seeded) grades as shown on the plans in accordance with the manufacturer's published installation guidelines. Anchor the top edge of the TRM in a minimum six-inch deep trench. Operation of equipment on the slope is prohibited after placement of the TRM. No credit for splices, overlaps, tucks, or wasted material will be made.

Mix the BFM and organic binders thoroughly at a rate of 40 pounds for each 100 gallons of water or as otherwise recommended by the manufacturer. Hydraulically apply the BFM slurry in successive layers, from two or more directions, to fully cover 100 percent of the soil surface. Ensure the minimum application rate is at least 3000 pounds of BFM for each acre or otherwise apply in accordance with the manufacturer's recommendations as appropriate depending on site conditions.

Do not apply BFM on saturated soils or immediately before, during, or after rainfall.

Install modified mulch blanket in accordance with the manufacturer's published guidelines and as directed by the Engineer.

If an area washes out after this work has been properly completed and approved by the Engineer, make the required corrections to prevent future washouts and replace the topsoil, fertilizer, seed, and mulch treatment. This replacement will be paid for as additional work using the applicable pay items.

If an area washes out for reasons attributable to the Contractor's activity or failure to take proper precautions, replacement will be at no cost to the contract.

The Engineer will inspect the seeded turf to ensure it is well-established, in a vigorous growing condition, and contains the species called for in the seeding mixture.

If the seeded turf is not well-established at the end of the first growing season, the Contractor is responsible to re-seed until the turf is well established and approved by the Engineer at no cost to the contract.

Provide weed control, if weeds are determined by the Engineer to cover more than 10 percent of the total area of slope restoration, in accordance with subsection 816.03.I of the Standard Specifications for Construction. Weed control will be at no additional cost to the contract.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

Pay Item	**Pay Unit**
Slope Restoration, Non-Freeway, Type __	Square Yard

1. Place **Slope Restoration, Non-Freeway, Type A** in all areas not described in the other types of slope restoration and will be measured by area in square yards in place. **Slope Restoration, Non-Freeway, Type A** includes installing Topsoil Surface, Furn, LM or Topsoil Surface, Salv, 4 inch; Fertilizer, Chemical Nutrient, Class A; seeding mixture; Mulch; and Mulch Anchoring.

2. Place **Slope Restoration, Non-Freeway, Type B** parallel (8 feet minimum) to the edge of the roadway in areas that have a 1 on 3 slope or less, in any ditch with a grade less than 1.5 percent, as shown on the plans, or as directed by the Engineer. **Slope Restoration, Non-Freeway, Type B** will be measured by area in square yards in place. **Slope Restoration, Non-Freeway, Type B** includes installing Topsoil Surface, Furn, LM or Topsoil Surface, Salv, 4 inch; Fertilizer, Chemical Nutrient, Class A; seeding mixture; and Mulch Blanket.

3. Place **Slope Restoration, Non-Freeway, Type C** in areas that have a 1 on 2 slope, any ditch with a grade of 1.5 percent to 3 percent as shown on the plans, or as directed by the Engineer. **Slope Restoration, Non-Freeway, Type C** will be measured by area in square yards in place. **Slope Restoration, Non-Freeway, Type C** includes installing Topsoil Surface, Furn, LM or Topsoil Surface, Salv, 4 inch; Fertilizer, Chemical Nutrient, Class A; seeding mixture; and Mulch Blanket, High Velocity.

4. Place **Slope Restoration, Non-Freeway, Type D** in areas that have a slope steeper than 1 on 2, any ditch with a grade steeper than 3 percent as shown on the plans, or as directed by the Engineer. **Slope Restoration, Non-Freeway, Type D** will be measured by area in square yards in place. **Slope Restoration, Non-Freeway, Type D** includes installing Topsoil Surface, Furn, LM or Topsoil Surface, Salv, 4 inch; Fertilizer, Chemical Nutrient, Class A; seeding mixture; and Turf Reinforcement Mat.

5. Place **Slope Restoration, Non-Freeway, Type E** as shown on the plans, or as directed by the Engineer and measured by area in square yards in place. **Slope Restoration, Non-Freeway, Type E** includes installing Topsoil Surface, Furn, LM or Topsoil Surface, Salv, 4 inch; Fertilizer, Chemical Nutrient, Class A; seeding mixture; and Bonded Fiber Matrix.

6. Place **Slope Restoration, Non-Freeway, Type F** parallel (8 feet minimum) to the edge of the roadway, in areas that have a 1 on 3 slope or less, and in any ditch with a grade

less than 1.5 percent. **Slope Restoration, Non-Freeway, Type F** includes installing Topsoil Surface, Furn, LM or Topsoil Surface, Salv, 4 inch; Fertilizer, Chemical Nutrient, Class A; seeding mixture; and single net modified Mulch Blanket.

7. Place **Slope Restoration, Non-Freeway, Type G** in areas that have a 1 on 2 slope and in any ditch with a grade of 1.5 percent to 3 percent. **Slope Restoration, Non-Freeway, Type G** includes installing Topsoil Surface, Furn, LM or Topsoil Surface, Salv, 4 inch; Fertilizer, Chemical Nutrient, Class A; seeding mixture; and double net modified Mulch Blanket.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
SPRAY APPLIED WATERPROOFING MEMBRANE

STR:JAB 1 of 2 APPR:TEB:SCK:02-07-24

a. Description. This work consists of preparing the substrate concrete surfaces and for the application of spray applied waterproofing membrane as specified on the plans. Perform this work in accordance with the contract.

b. Materials. Use materials from one of the following suppliers or approved equal:

1. PPG, Bridge Deck Membrane, 913-321-9000.

2. D.S.Brown, Deckguard Spray Membrane, 419-257-3561.

3. Wasser Coatings, Polyflex Bridge Deck System, 216-536-6777.

4. FPT Infrastructure, Matacryl Spray Applied System, 336-789-7259.

c. Construction. Furnish a copy of the manufacturer's recommendations and contact information for the manufacturer's technical representative to the Engineer at least 21 calendar days prior to starting the work. Follow the selected manufacturer's recommendations for surface preparation and application, except as modified by this special provision.

Protect utilities, drainage structures, curbs, bridge joints, and any other structure from surface preparation activities and application of the membrane. For the purposes of this special provision, the term bridge joints does not include sawed construction joints.

1. Surface Preparation. Ensure all concrete to be sealed is at least 28 days old prior to preparation and installation. Ensure all surfaces to receive the concrete sealer are dry and free from contamination such as oil, grease, laitance, curing compounds, and anything that will interfere with the bonding and curing of the membrane. Ensure that traffic paint lines are removed. Abrasive blasting followed by moisture-free oil-free compressed air cleaning is required. The use of shotblasting is permitted. The use of water blasting, wire brushing, and brooms is prohibited.

Verify that the compressed air used for any work is free of oil and moisture contamination in accordance with *ASTM D4285*. Use either an absorbent or a nonabsorbent white collector positioned within 24 inches of the air-discharge point, centered in the air stream. Allow air to discharge onto the collector for a minimum of 1 minute. Visually examine the collector for the presence of oil and/or water. Conduct the test at least one time per shift for each compressor system in operation in the presence of the Engineer. If air contamination is evident, make adjustments to achieve clean, dry air. Examine the work performed since the last acceptable test for evidence of defects or contamination due to contaminated compressed air. Repair contaminated work at no additional cost to the contract.

The cleaned concrete surface must meet the *International Concrete Repair Institute Guideline 310.2R*, *Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays and Concrete Repair*, CSP 3. Ensure mortar is sound and sufficiently bonded to the coarse aggregate and presents a uniform CSP necessary for adequate bond.

The Engineer will inspect and approve patching and cleaning operations prior to placement of the membrane. The Engineer's approval is required prior to placement of the membrane.

No visible moisture can be present on the surface of the concrete at the time of membrane application.

Conduct moisture testing in accordance with *ASTM D4263*. Tape an 18 inch by 18 inch transparent polyethylene sheet (4 mil) to the concrete surface per every 500 square feet of surface area. Seal all edges with tape that will stick to the concrete substrate. Leave the plastic sheet in place for a minimum of 16 hours. Ensure there is no moisture visible on the polyethylene sheet. Ensure any alternate method to detect moisture is approved by the Engineer.

2. Application. Ensure patching and cleaning operations are inspected and approved prior to installation. Follow the selected manufacturer's recommendations for application procedures and rates. When the spray applied membrane is to be overlaid with a wearing course provide the necessary manufacturer's recommended tack coats, aggregate course, and/or additional layers. Protect from overspray in accordance with subsection 715.03.D.4 of the Standard Specifications for Construction.

3. Joints and Cracks. Furnish and install manufacturer's recommended joint systems at all joints in accordance with the manufacturer's recommendations. Furnish and install manufacturer's recommended joint systems at cracks in accordance with the manufacturer's recommendations.

4. Bond Testing. Conduct bond testing in accordance with the manufacturer's recommendations. Perform bond testing a minimum of three times per 5,000 square feet of surface area and as directed by the Engineer. The minimum required tensile bond strength between the primer and the substrate is 150 psi.

d. Measurement and Payment. The complete work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	**Pay Unit**
Spray Applied Waterproofing Membrane.	Square Yard

Spray Applied Waterproofing Membrane will be measured based on plan quantity. No compensation will be made to the Contractor for surplus materials. Payment includes all costs associated with testing for moisture and bond. Payment also includes all costs associated with protection of utilities, drainage structures, curbs, bridge joints, and any other structures from preparation and overspray. Payment also includes furnishing and installing joint systems, aggregate courses, and tack coats.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
EASTERN MASSASAUGA RATTLESNAKE

ENV:JDG 1 of 2 APPR:DWS:MJO:03-18-20
FHWA:APPR:03-18-20

a. Description. Contractors are advised that the project area has a known population of the Eastern Massasauga Rattlesnake or is within its known range. This species is listed as federally threatened under the U. S. Endangered Species Act of 1973 (Act). Taking (killing, harming, or disturbing in any manner) of Eastern Massasauga Rattlesnake without a federal permit from the U.S. Fish and Wildlife Service is prohibited under federal law. The Act provides enforcement authority to the U.S. Fish and Wildlife Service and contains severe penalties for violations. The Contractor is liable to the Department for any penalties imposed for violations to the Act due to the Contractor's failure to comply with this special provision. Fines and penalties range up to $50,000 and 1 year in prison. Violation of any requirement listed below can lead to an immediate work stoppage in Eastern Massasauga Rattlesnake habitat. FHWA is required under federal law to assure MDOT is compliant with these provisions or risk losing federal funding for the project. This special provision addresses education, notification and intentional take requirements of the Contractor and their workers to protect the Eastern Massasauga Rattlesnake as required under the Act.

b. Materials. None specified.

c. Construction. Adhere to the following requirements:

1. Prior to construction, all Contractor staff working onsite must read the attached fact sheet (2 of 2). The purpose of the fact sheet is to provide the Contractor easy identification tips, notification that a venomous snake may be onsite, and raise awareness regarding its protected legal status.

2. Immediately report any possible Eastern Massasauga Rattlesnake sightings to the Engineer.

3. Intentionally 'take' is prohibited.

d. Measurement and Payment. All costs associated with complying with this special provision will not be paid for separately but will be considered to have been included in other pay items in the contract.

Eastern Massasauga Rattlesnake (*Sistrurus catenatus*)

Protected as federally threatened

Photos courtesy of the Michigan Department of Natural Resources and Michigan State University

This species is suspected to occur at or near the work site. Please have staff read the following information.

What Does an Eastern Massasauga Rattlesnake Look Like?

The eastern massasauga rattlesnake is a thick-bodied and short venomous snake. Adults typically measure 18 to 30 inches long. This species is gray to grayish-brown with dark blotches bordered by white down the middle of its back. The head is thick and triangular and has an obvious neck. Like many venomous snakes, the massasauga has vertical slitted pupils like a cat and heat sensing pits below the eyes. A rattle is present on the tail that "buzzes" as a warning signal, although they may strike without rattling. This is the only rattlesnake in Michigan.

Where Does It Live?

These snakes prefer wet areas, such as marshes, wet prairies, wet woods, and along rivers and lakes. They also use adjacent upland during parts of the year, especially in the summer. They hibernate during the winter in crayfish burrows, under logs and tree roots, and in small mammal burrows.

What Should You Do If You See a Massasauga Rattlesnake?

Massasaugas are shy and try to avoid confrontation but that does not mean they won't bite to protect themselves. Never try to handle, chase, provoke, or threaten a snake. When in potential snake habitat, wear thick boots that cover your ankles, long pants, and do not reach into thickets or under logs. If you hear the buzzing of a rattle stay calm and back away from the sound slowly. The snake will leave if you give it space.

If an eastern massasauga rattlesnake is found at a Michigan Department of Transportation (MDOT) project, the construction engineer should be contacted immediately. The construction engineer should then contact the MDOT ecologist at 517-335-2633.

How is the Massasauga Protected Under the Law?

The eastern massasauga rattlesnake is protected under federal law by the Endangered Species Act. This status prohibits harming or harassing the species along with policies to protect the species habitat.

For More Information:

60-Second Snakes: The Eastern Massasauga Rattlesnake
www.youtube.com/watch?v=-PFnXe_e02w

Photos
http://animaldiversity.org/site/accounts/pictures/Sistrurus_catenatus.html

General Information
http://mnfi.anr.msu.edu/emr