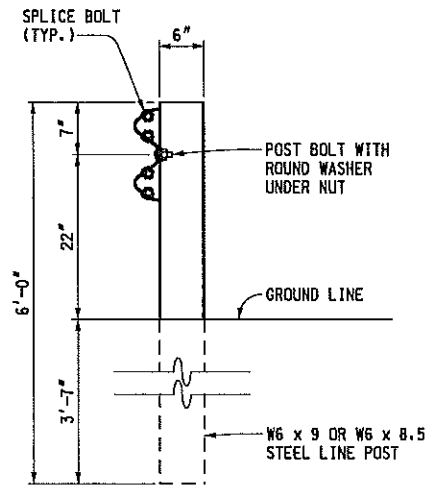
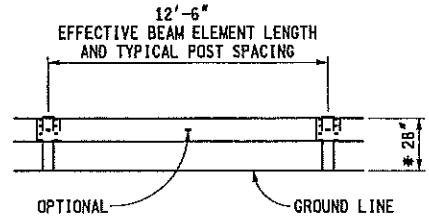


WOOD POST

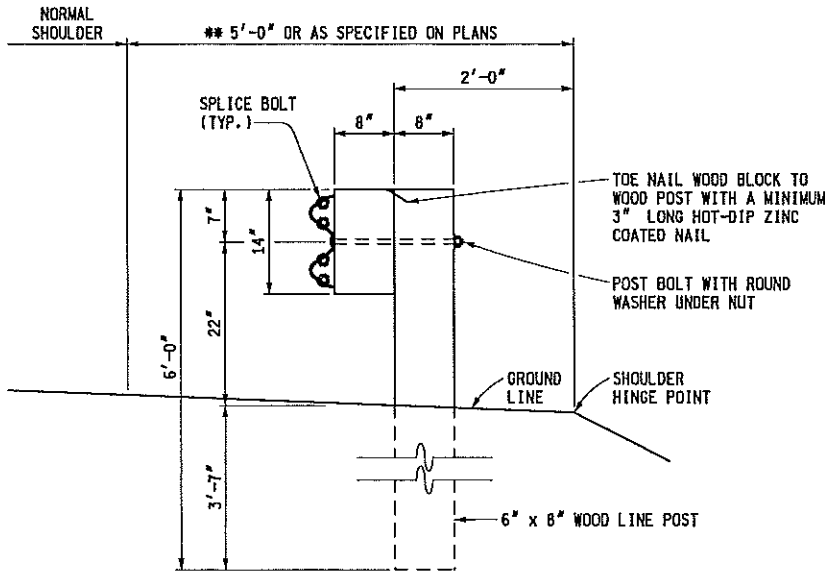


STEEL POST

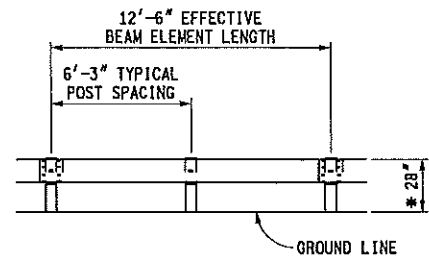


ELEVATION SHOWING POST SPACING
* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE A



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



ELEVATION SHOWING POST SPACING
* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE B
(WOOD POST)



PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Stuedle

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

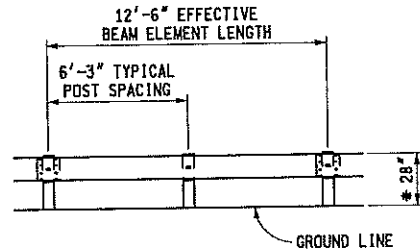
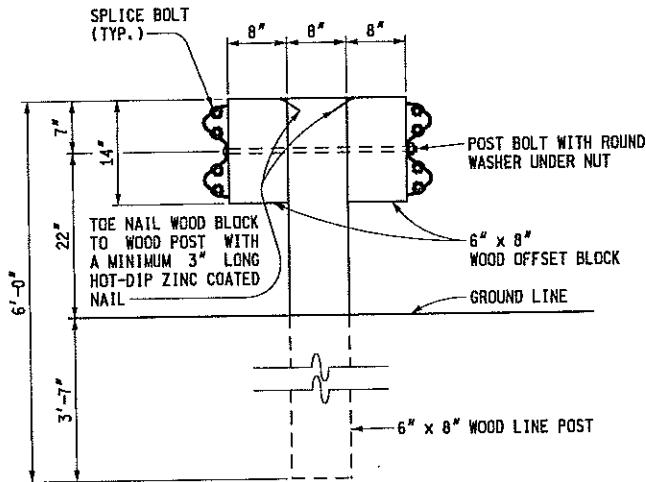
GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D

F.H.W.A. APPROVAL

7-26-2017
PLAN DATE

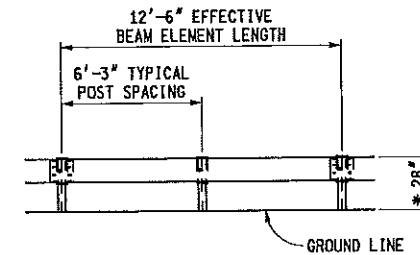
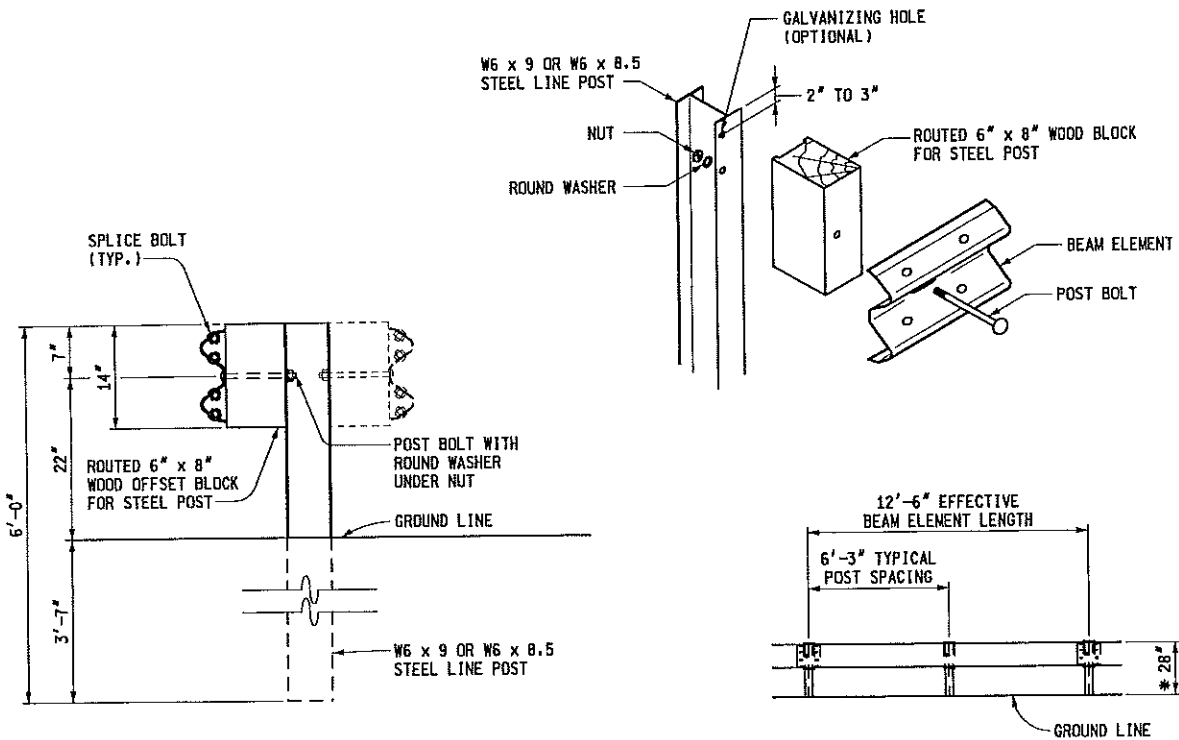
R-60-J

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ELEVATION SHOWING POST SPACING
* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE BD
(WOOD POST)



ELEVATION SHOWING POST SPACING
* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE B (OR BD)
(STEEL POST)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

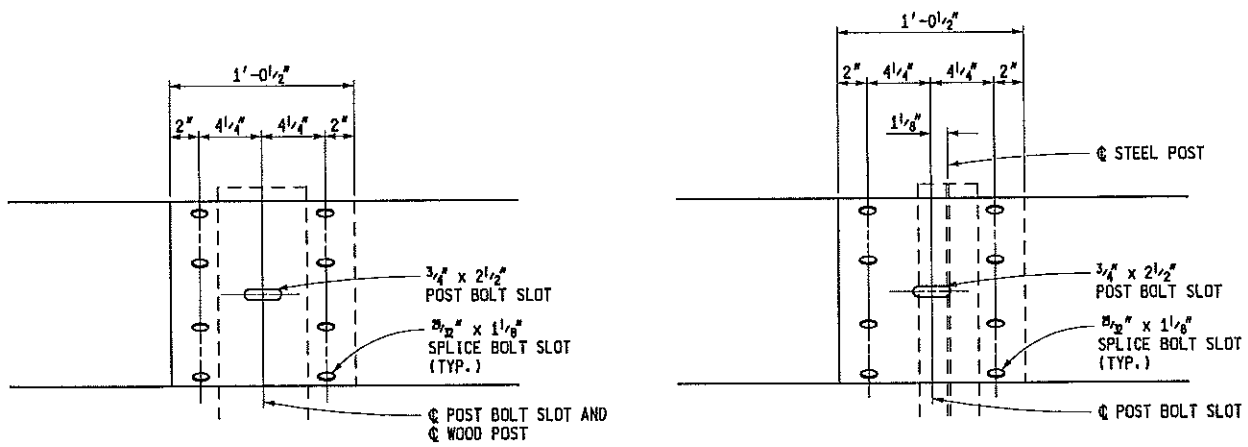
GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D

F.H.W.A. APPROVAL

7-26-2017
PLAN DATE

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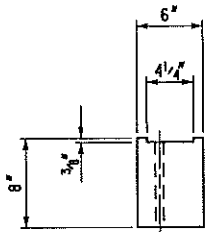
SHEET
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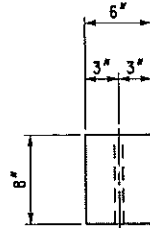
WOOD POST

STEEL POST

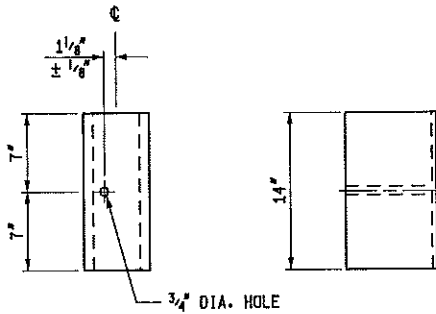
BEAM ELEMENT SPLICE DETAILS



TOP



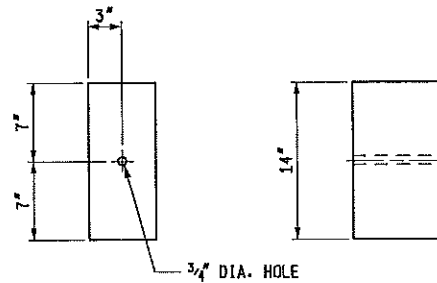
TOP



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

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

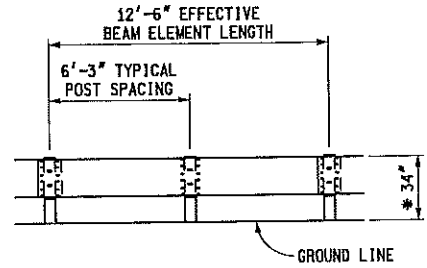
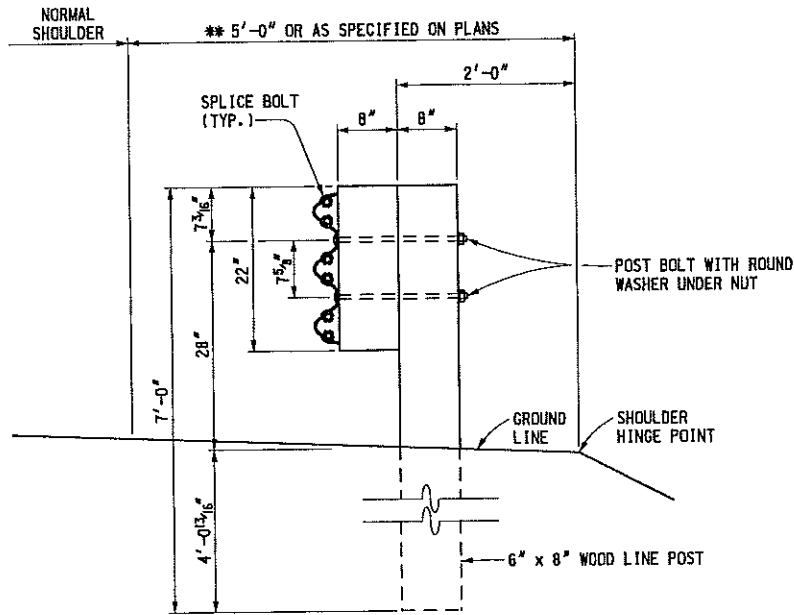
GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D

F.H.W.A. APPROVAL

7-26-1971
PLAN DATE

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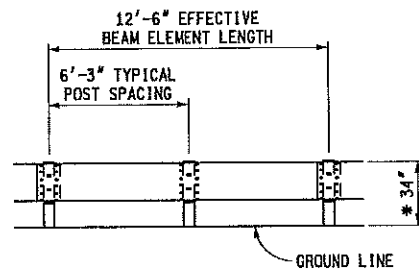
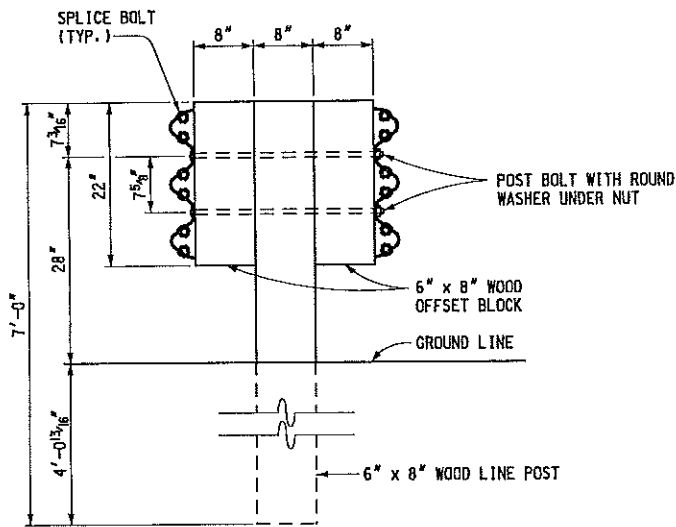
SHEET
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ELEVATION SHOWING POST SPACING
* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

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

GUARDRAIL, TYPE T
(WOOD POST)



ELEVATION SHOWING POST SPACING
* SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

GUARDRAIL, TYPE TD
(WOOD POST)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

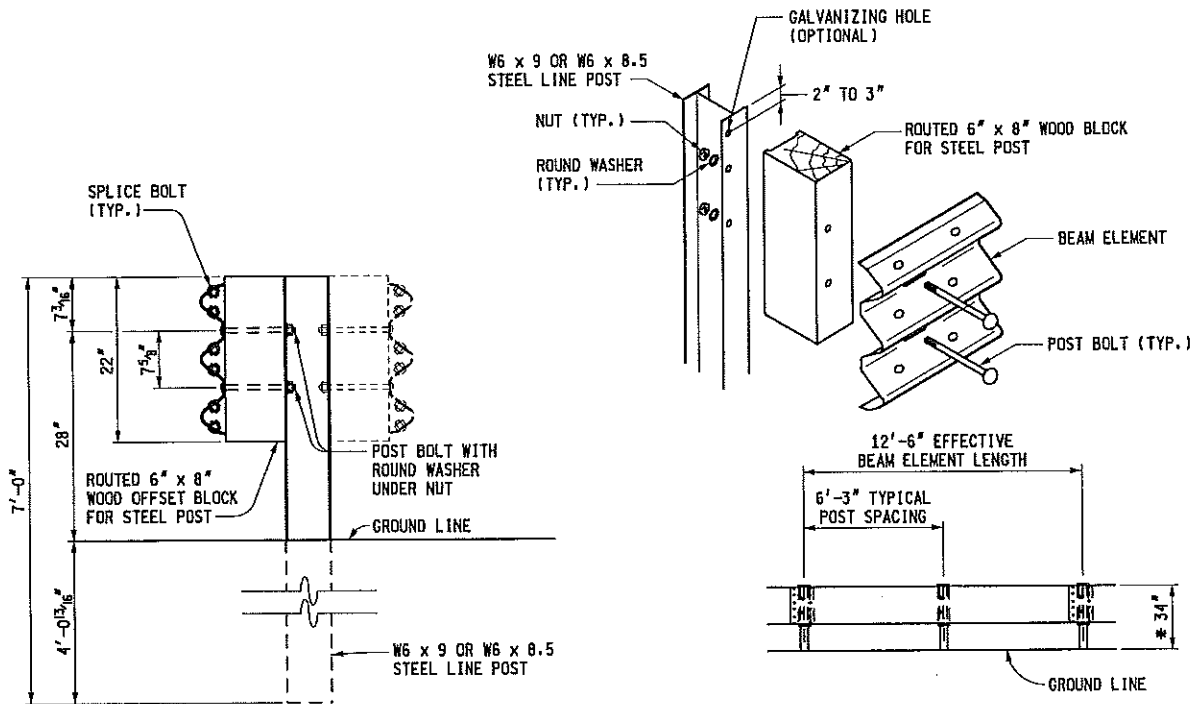
GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D

F.H.W.A. APPROVAL

7-26-2017
PLAN DATE

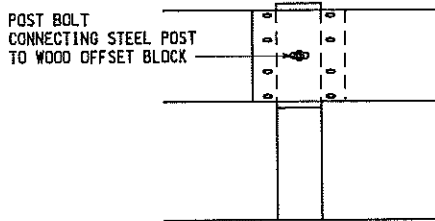
R-60-J

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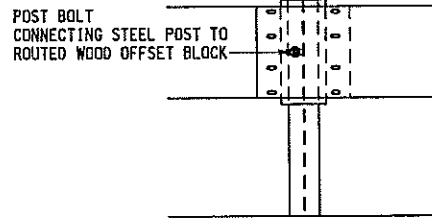


ELEVATION SHOWING POST SPACING
 * SEE NOTES FOR GUARDRAIL IN CONJUNCTION WITH CURB

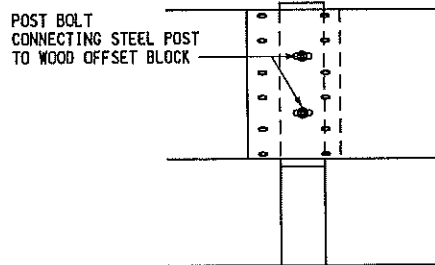
GUARDRAIL, TYPE T OR TD
 (STEEL POST)



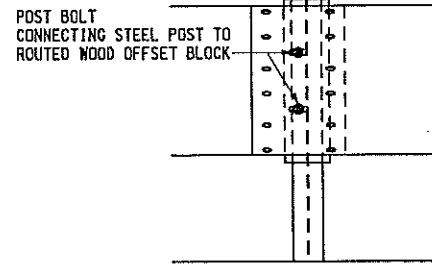
GUARDRAIL, TYPE B
 WOOD POST



GUARDRAIL, TYPE B
 STEEL POST



GUARDRAIL, TYPE T
 WOOD POST



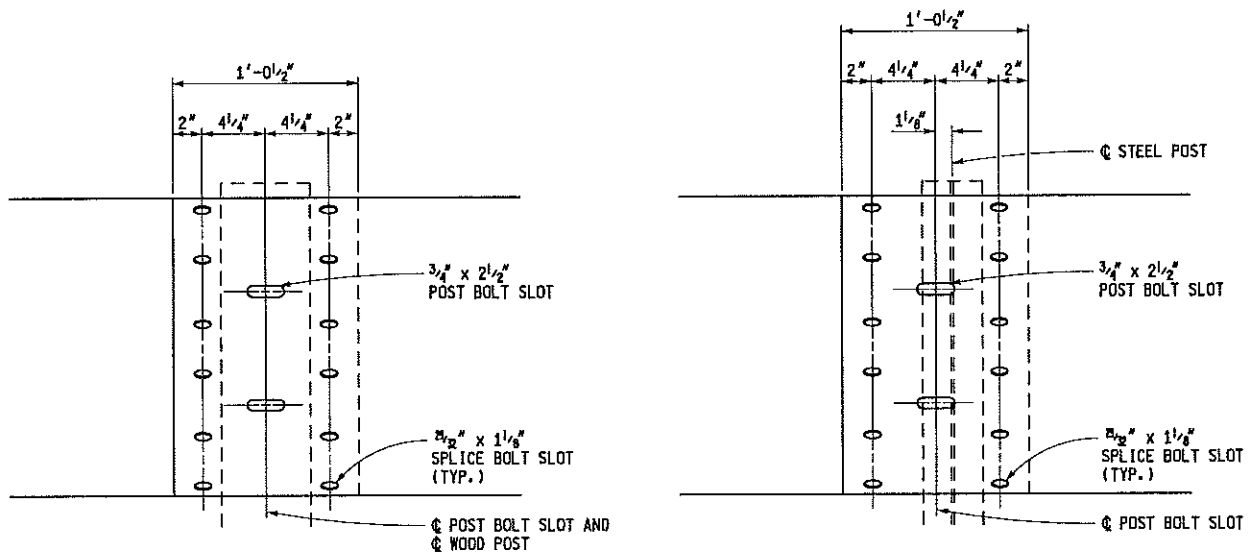
GUARDRAIL, TYPE T
 STEEL POST

BLOCK AND POST CONNECTION DETAILS

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR

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

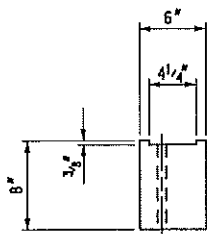
F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 5 OF 17
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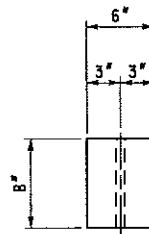
WOOD POST

STEEL POST

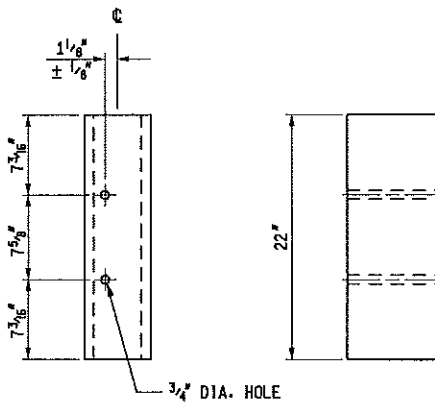
THREE BEAM ELEMENT SPLICE DETAILS



TOP



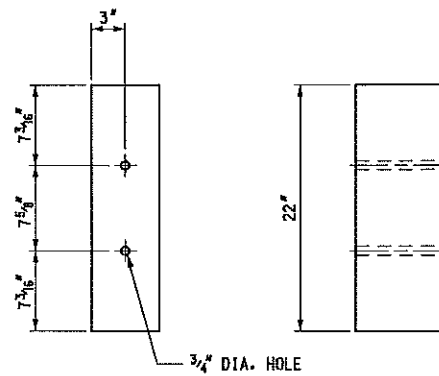
TOP



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 T AND TYPE TD

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

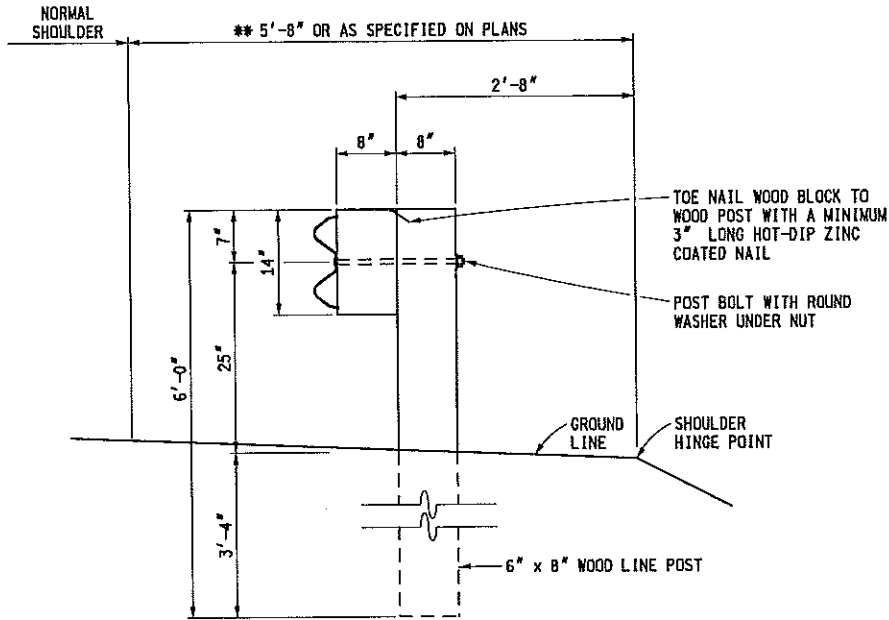
**GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D**

F.H.W.A. APPROVAL

7-26-2017
PLAN DATE

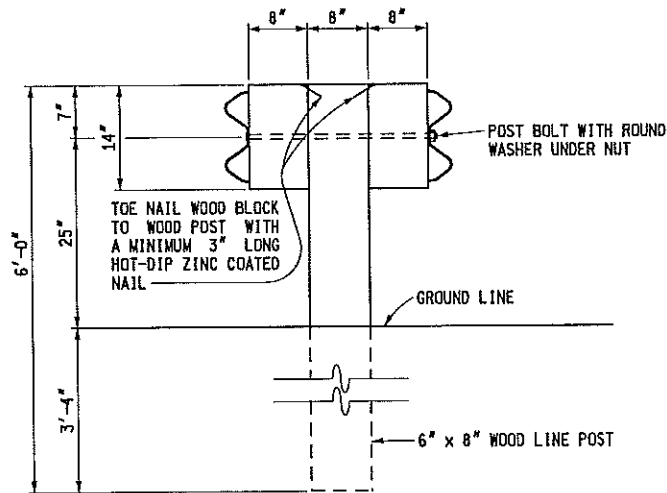
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**** FOR PAVED SHOULDER WIDTHS OF AT LEAST 12', USE 3'-8".**

**GUARDRAIL, TYPE MGS-8
(WOOD POST)**



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

**GUARDRAIL, TYPE MGS-8D
(WOOD POST)**

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

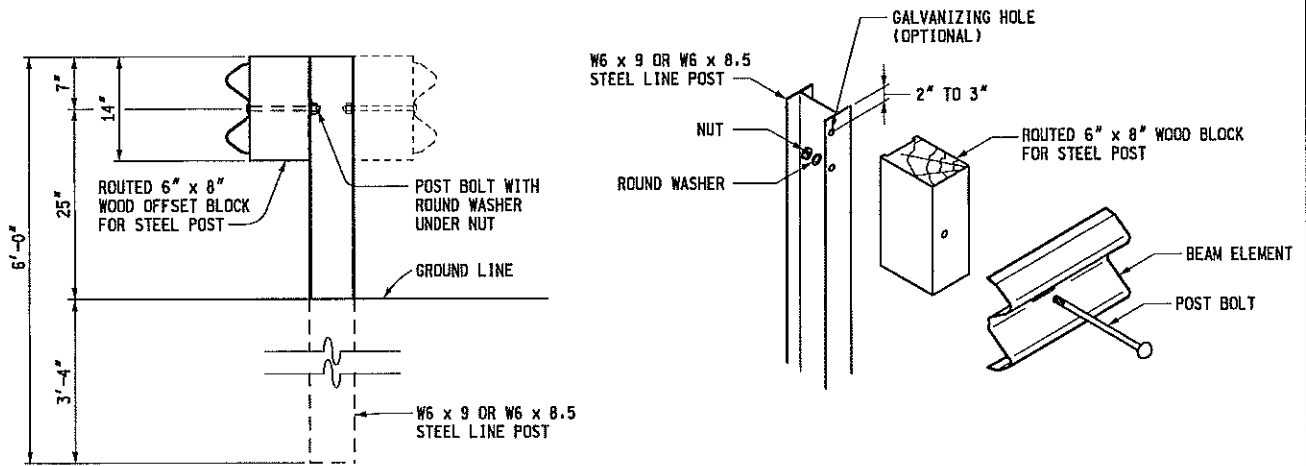
**GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D**

F.H.W.A. APPROVAL

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

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

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

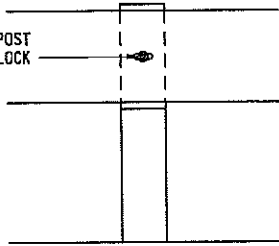
F.H.W.A. APPROVAL

7-26-2017
PLAN DATE

R-60-J

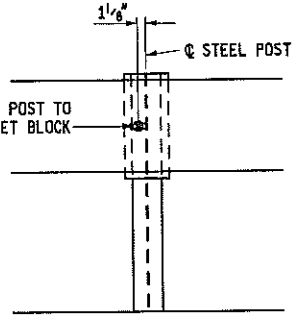
SHEET
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POST BOLT
CONNECTING WOOD POST
TO WOOD OFFSET BLOCK



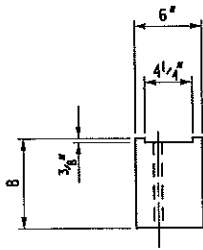
WOOD POST

POST BOLT
CONNECTING STEEL POST TO
ROUTED WOOD OFFSET BLOCK

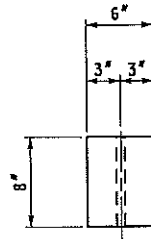


STEEL POST

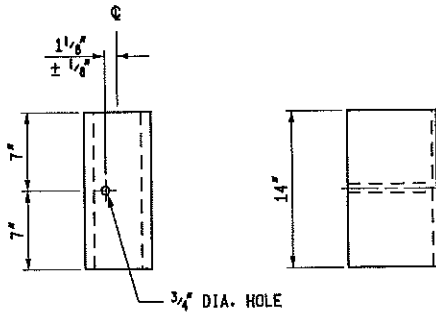
BLOCK AND POST CONNECTION DETAILS



TOP



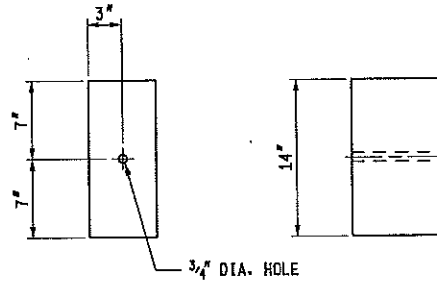
TOP



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 MGS-8 AND TYPE MGS-8D

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

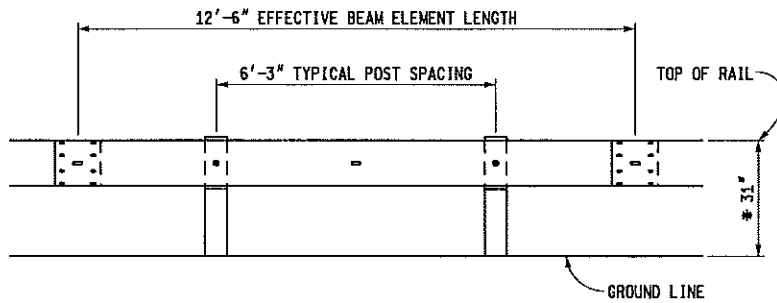
GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D

F.H.W.A. APPROVAL

7-26-2017
PLAN DATE

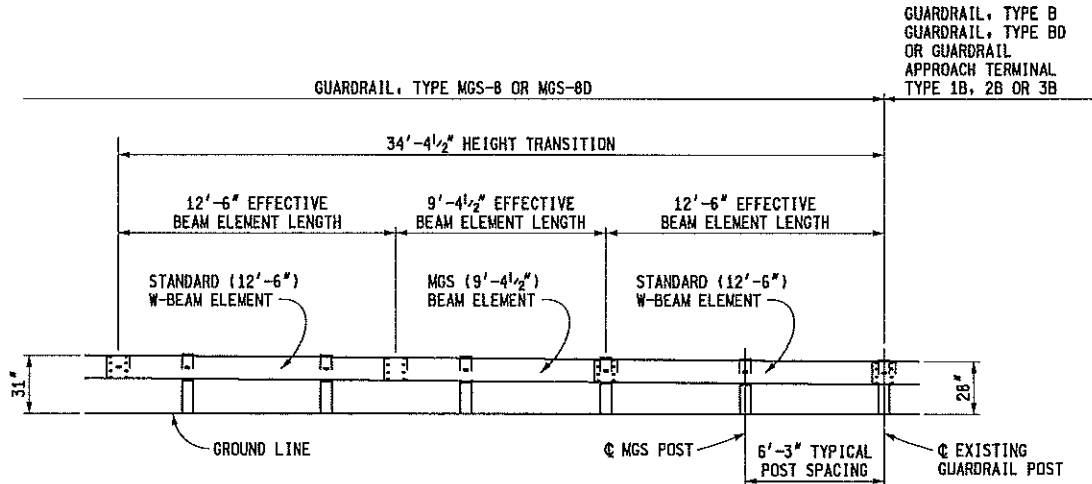
R-60-J

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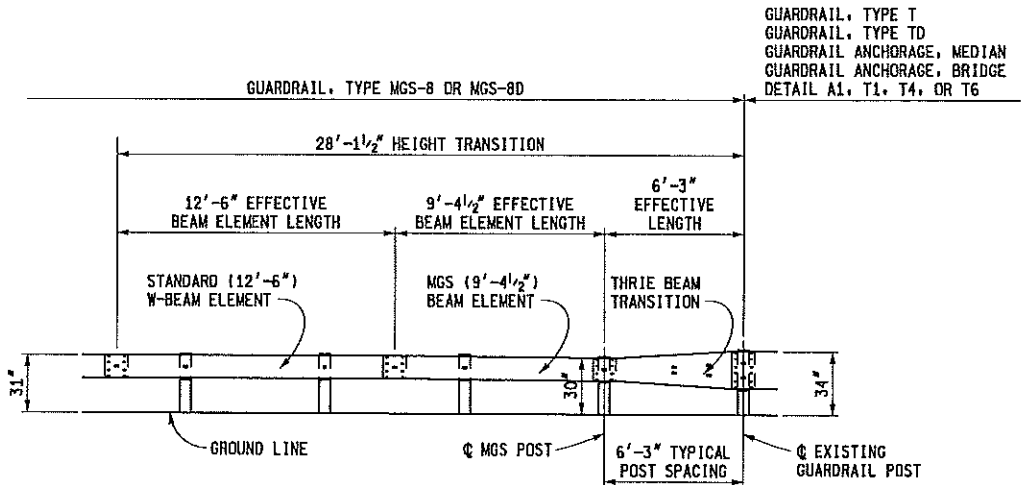


ELEVATION SHOWING POST SPACING FOR
 GUARDRAIL, TYPE MGS-8 OR MGS-8D

* 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

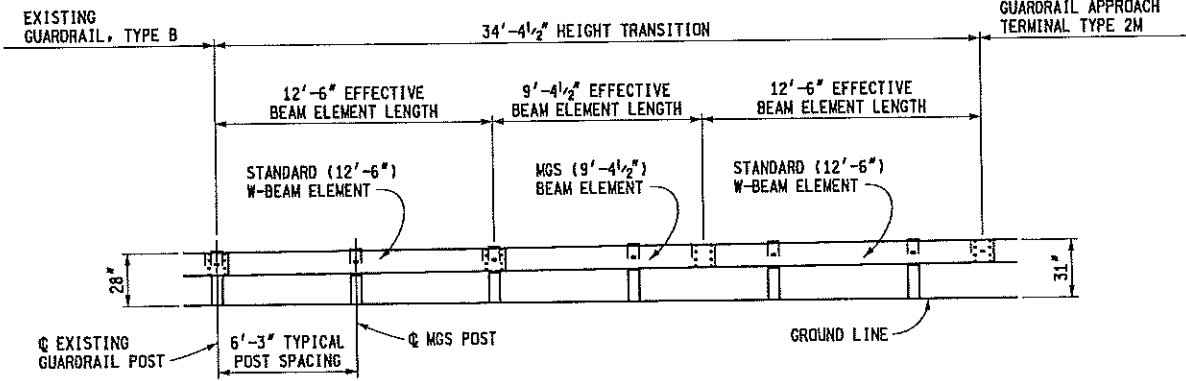


ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING
 GUARDRAIL, TYPE MGS-8 OR MGS-8D TO
 GUARDRAIL, TYPE T, GUARDRAIL, TYPE TD,
 GUARDRAIL ANCHORAGE, MEDIAN,
 GUARDRAIL ANCHORAGE, BRIDGE DETAIL A1, T1, T4 OR T6

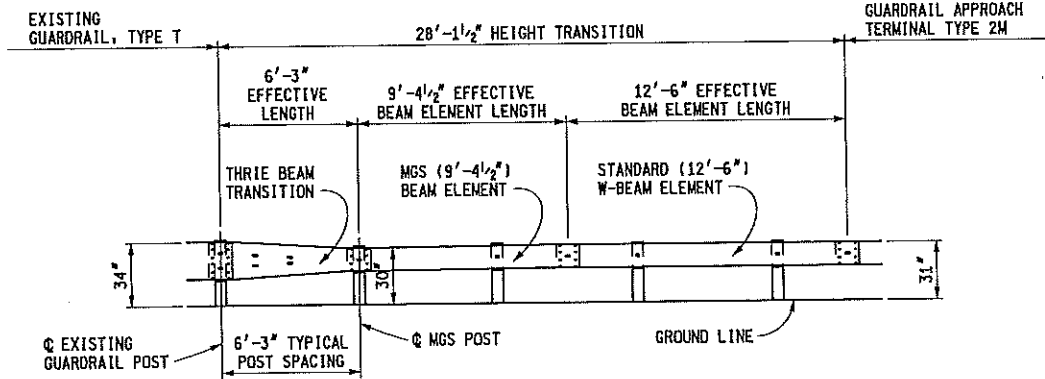
MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR

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

F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 10 OF 17
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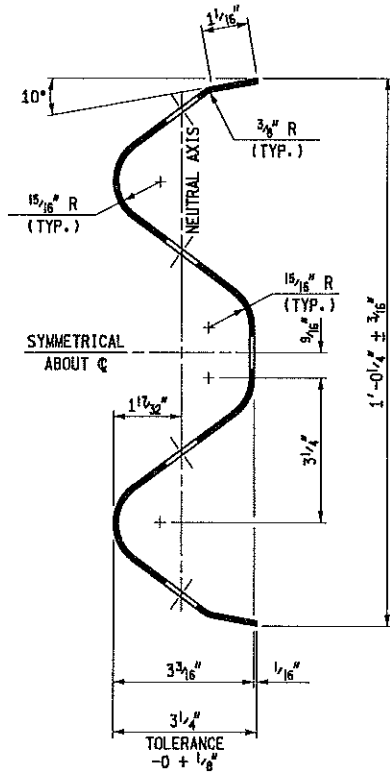


ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING GUARDRAIL, TYPE B TO GUARDRAIL APPROACH TERMINAL TYPE 2M

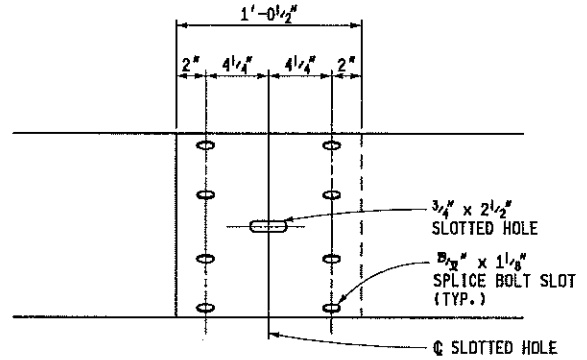


ELEVATION SHOWING TRANSITION DETAIL FOR CONNECTING GUARDRAIL, TYPE T TO GUARDRAIL APPROACH TERMINAL TYPE 2M

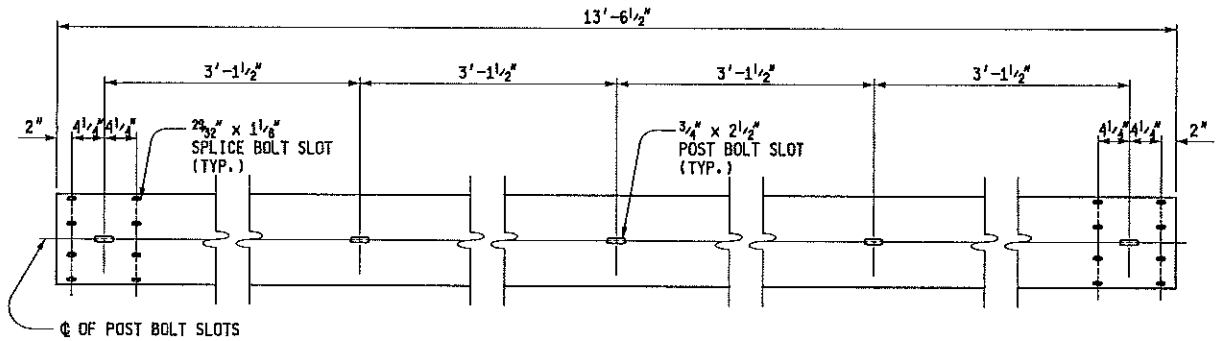
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D		
F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J
		SHEET 11 OF 17



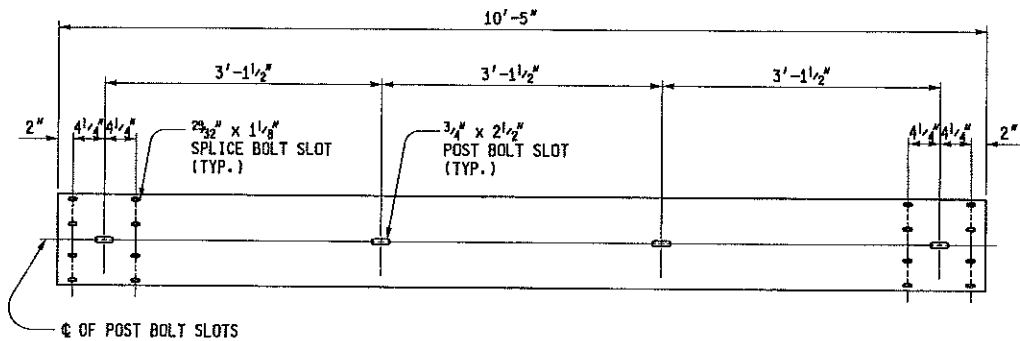
SECTION THROUGH BEAM ELEMENT



BEAM ELEMENT SPLICE DETAILS



FRONT ELEVATION OF BEAM ELEMENT



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

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

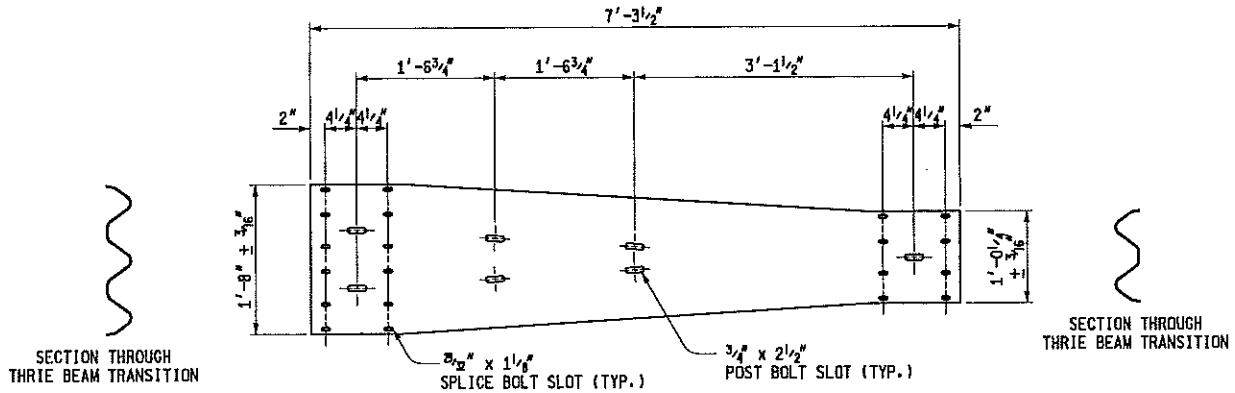
**GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D**

F.H.W.A. APPROVAL

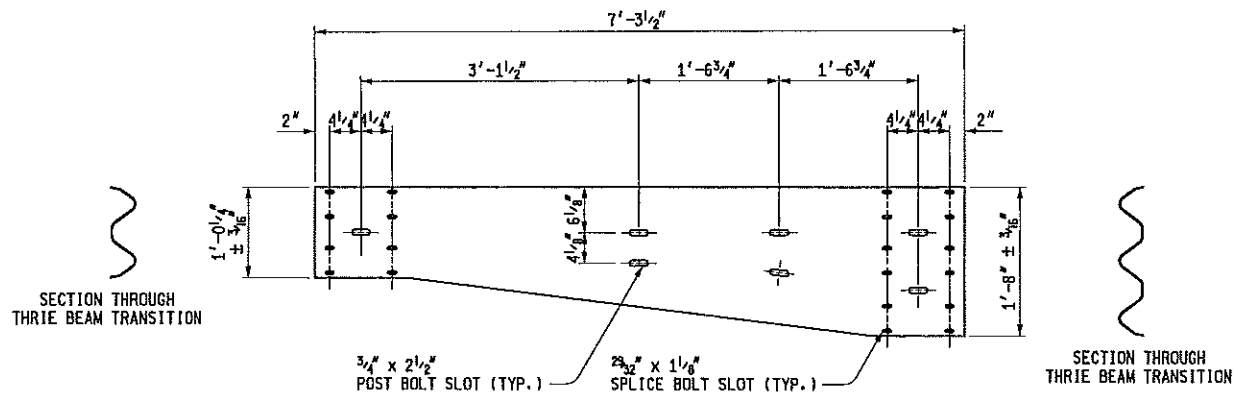
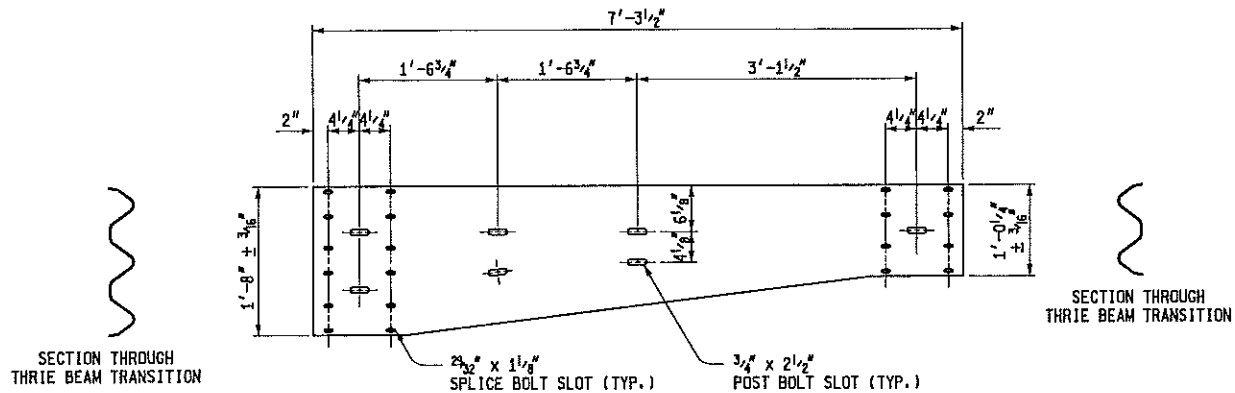
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THRIE BEAM TRANSITION



ASYMMETRICAL THRIE BEAM TRANSITIONS

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

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

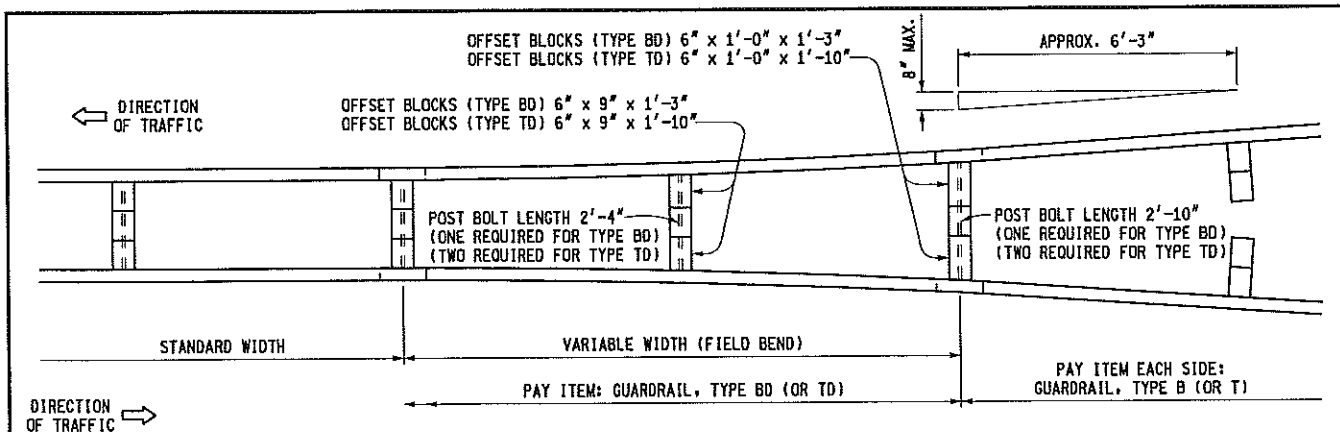
GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D

F.H.W.A. APPROVAL

7-26-2017
PLAN DATE

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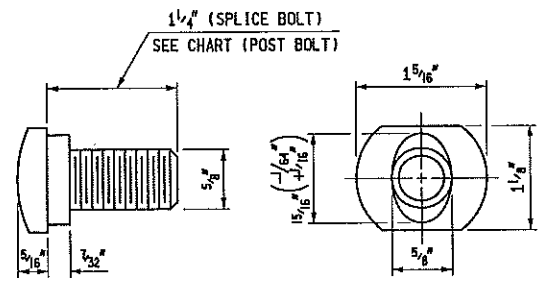
DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE B (OR TYPE T) TO GUARDRAIL, TYPE BD (OR TYPE TD)

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

GUARDRAIL TYPE	POST	OFFSET BLOCK	POST BOLTS		SPLICE BOLTS (1 1/4" LONG) (NO. REQ'D)	WASHERS (ROUND) (NO. REQ'D)
			NO. REQ'D	LENGTH		
A	WOOD	N/A	1	9 1/2"	8	1
	STEEL	N/A	1	2"		
B	WOOD	WOOD	1	18"	8	1
	STEEL	WOOD	1	9 1/2"		
BD	WOOD	WOOD	1	*26 1/2"	16	2
	STEEL	WOOD	2	9 1/2"		
T	WOOD	WOOD	2	18"	12	2
	STEEL	WOOD	2	9 1/2"		
TD	WOOD	WOOD	2	*26 1/2"	24	4
	STEEL	WOOD	4	9 1/2"		

MINIMUM POST BOLT THREAD LENGTH

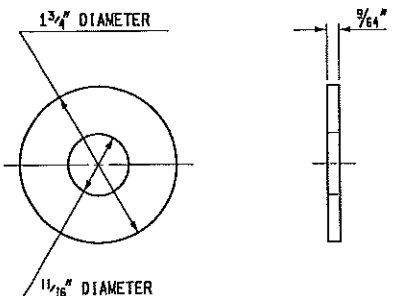
BOLT LENGTH	MINIMUM THREAD LENGTH
9 1/2"	1 3/4"
18"	2 1/2"
26 1/2"	3"



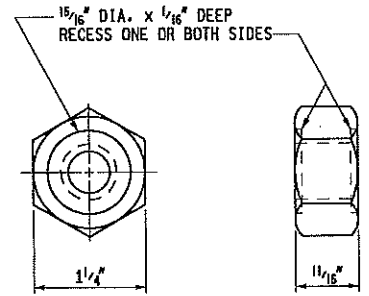
SPLICE BOLT AND POST BOLT

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

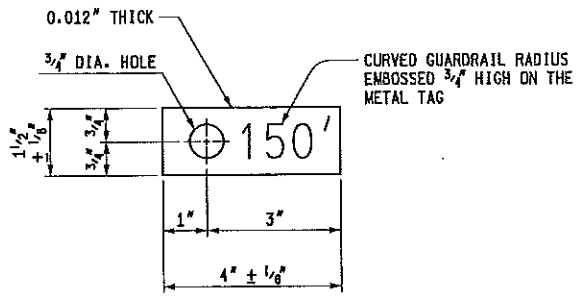
* EXCEPT AS SPECIFIED ON DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE B (OR TYPE T) TO GUARDRAIL, TYPE BD (OR TYPE TD). POST BOLTS SHALL NOT EXTEND MORE THAN 1/2" BEYOND NUT.



ROUND WASHER



NUT

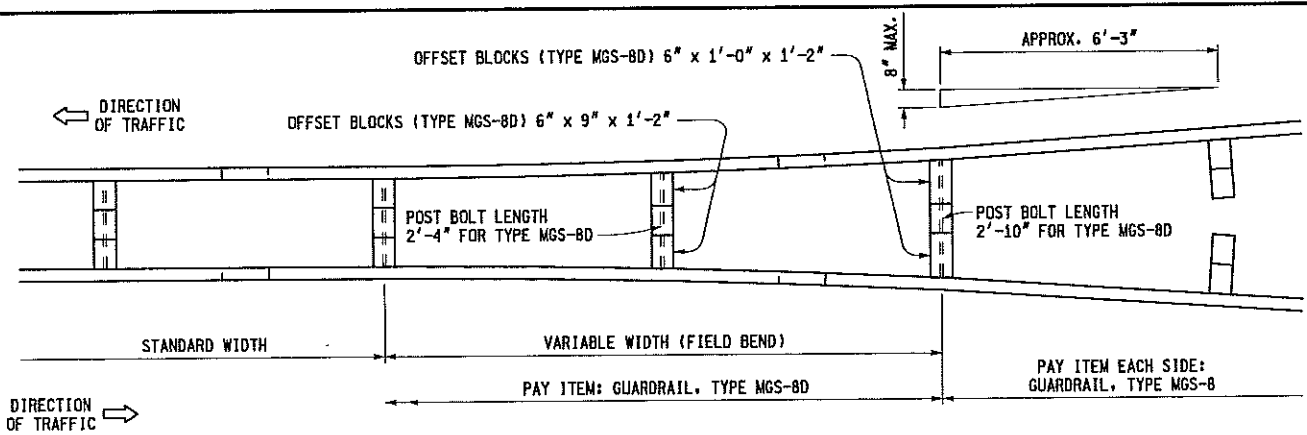


METAL TAG

FOR CURVED GUARDRAIL WITH RADIUS OF 150' OR LESS

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR
**GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D**

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

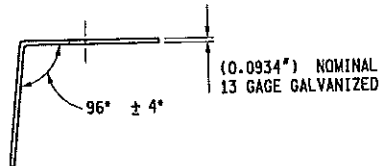
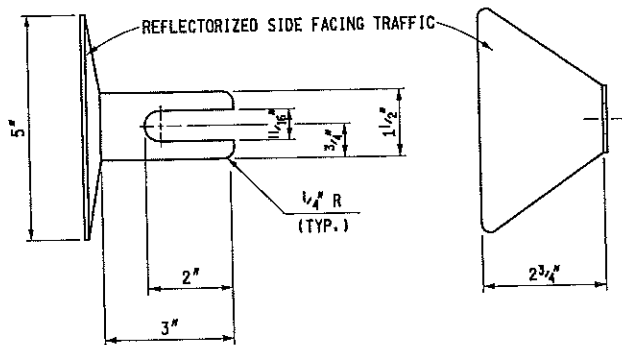
POST BOLTS, SPLICE BOLTS AND WASHERS AT BEAM ELEMENT SPLICE POSTS AND AT INTERMEDIATE POSTS						
GUARDRAIL TYPE	POST	OFFSET BLOCK	POST BOLTS		SPLICE BOLTS (1 1/4" LONG) (NO. REQ'D)	WASHERS (ROUND) (NO. REQ'D)
			NO. REQ'D	LENGTH		
MGS-8	WOOD	WOOD	1	18"	8	1
	STEEL	WOOD	1	9 1/2"		1
MGS-8D	WOOD	WOOD	1	*26 1/2"	16	—
	STEEL	WOOD	2	9 1/2"		2

MINIMUM POST BOLT THREAD LENGTH	
BOLT LENGTH	MINIMUM THREAD LENGTH
9 1/2"	1 3/4"
18"	2 1/2"
26 1/2"	3"

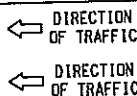
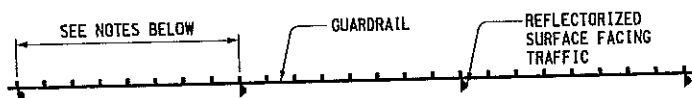
THREE BEAM TRANSITIONS REQUIRE 20 SPLICE BOLTS EACH (12 ON TYPE T END AND 8 ON TYPE MGS END).

* EXCEPT AS SPECIFIED ON DETAIL SHOWING TRANSITION FROM GUARDRAIL, TYPE MGS-8 TO GUARDRAIL, TYPE MGS-8D POST BOLTS SHALL NOT EXTEND MORE THAN 1/2" BEYOND NUT.

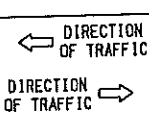
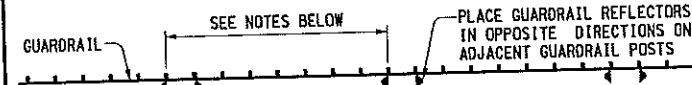
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR GUARDRAIL, TYPES A, B, BD, T, TD, MGS-8, & MGS-8D			
F.H.W.A. APPROVAL	7-26-2017 PLAN DATE	R-60-J	SHEET 16 OF 17



GUARDRAIL REFLECTOR



ONE-WAY TRAFFIC

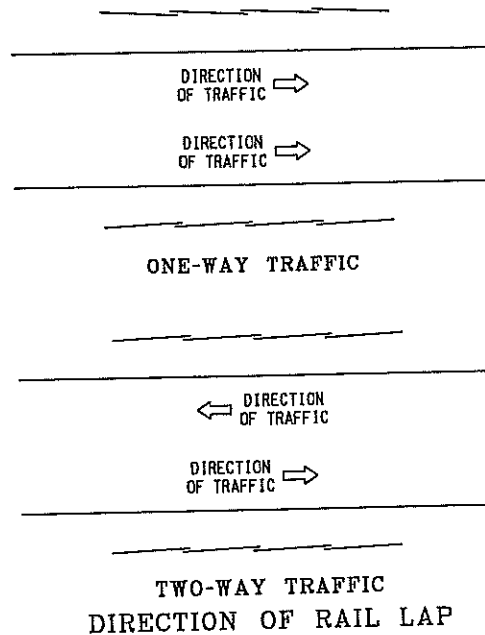


TWO-WAY TRAFFIC

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.



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-61-SERIES, 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.

WHEN THE PLANS SPECIFY GUARDRAIL (TYPE B OR T) TO BE PLACED ON THE SHOULDER HINGE POINT, RATHER THAN AS SPECIFIED ON THIS PLAN, 8'-0" POSTS SHALL BE PROVIDED, WITH THE ADDITIONAL LENGTH EMBEDDED FOR ADDED STABILITY. (NOT NECESSARY WHEN THE SLOPE IS REASONABLY LEVEL BEYOND THE SHOULDER HINGE POINT, AS DETERMINED BY THE ENGINEER.)

WHEN THE PLANS SPECIFY GUARDRAIL TYPE MGS-8 TO BE PLACED ON THE SHOULDER HINGE POINT, RATHER THAN AS SPECIFIED ON THIS PLAN, 9'-0" POSTS SHALL BE PROVIDED, WITH THE ADDITIONAL LENGTH EMBEDDED FOR ADDED STABILITY. (NOT NECESSARY WHEN THE SLOPE IS REASONABLY LEVEL BEYOND THE SHOULDER HINGE POINT, AS DETERMINED BY THE ENGINEER.)

WOOD POSTS WITH 1/2" 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 1/2" 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.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

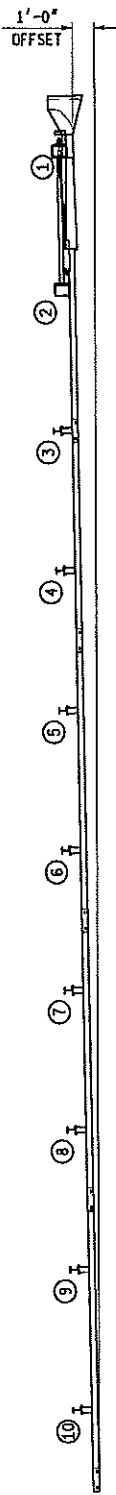
**GUARDRAIL,
TYPES A, B, BD, T, TD,
MGS-8, & MGS-8D**

F.H.W.A. APPROVAL

7-26-2017
PLAN DATE

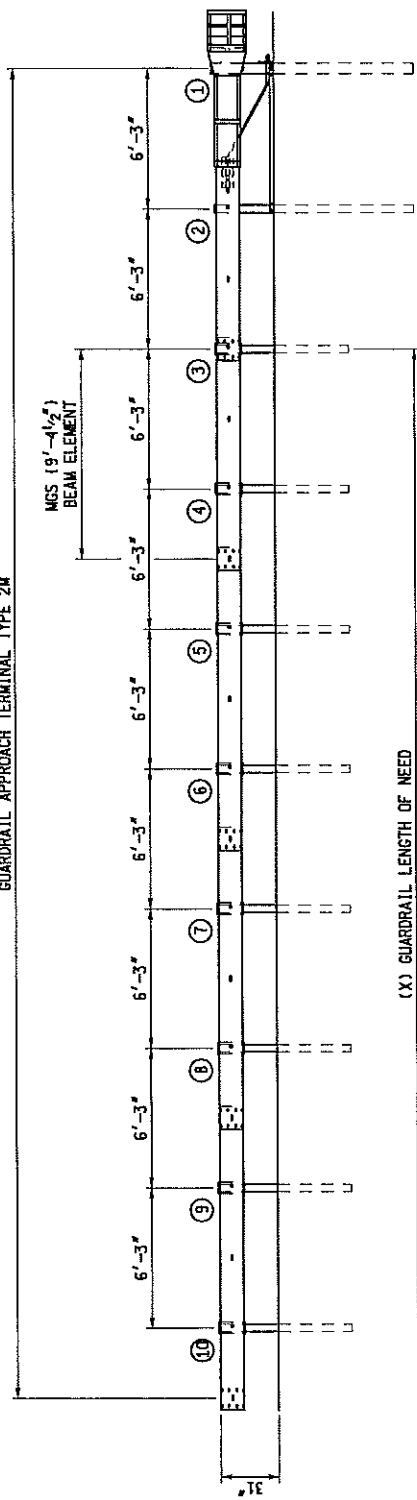
R-60-J

SHEET
17 OF 17



PLAN VIEW

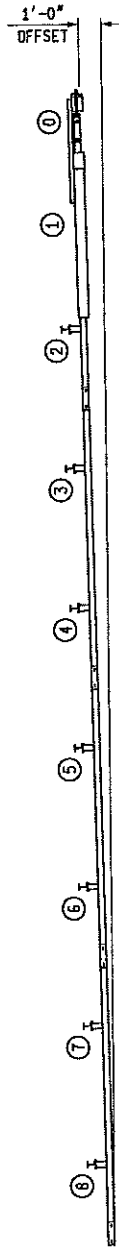
59'-4 1/2" GUARDRAIL APPROACH TERMINAL TYPE 2M



ELEVATION
GUARDRAIL APPROACH TERMINAL TYPE 2M
"MSKT"

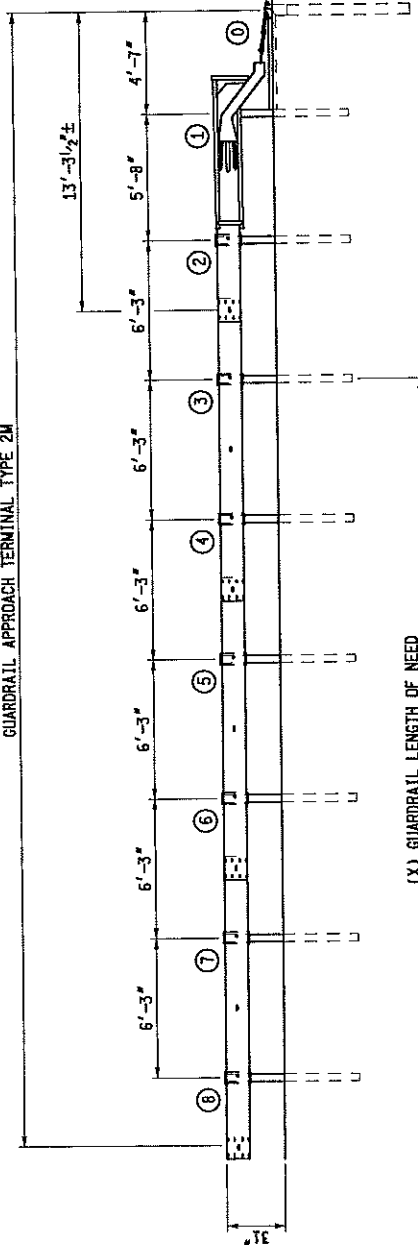
OPTION 1

	DEPARTMENT DIRECTOR Kirk T. Stuedle	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR			
	PREPARED BY DESIGN DIVISION	APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES	GUARDRAIL APPROACH TERMINAL TYPE 2M		
DRAWN BY: <u>B.L.T.</u>	APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT	F.H.W.A. APPROVAL	5-1-2018 PLAN DATE	R-62-H	SHEET 1 OF 4
CHECKED BY: <u>W.K.P.</u>					



PLAN VIEW

50'-9 1/2"
 GUARDRAIL APPROACH TERMINAL TYPE 2M

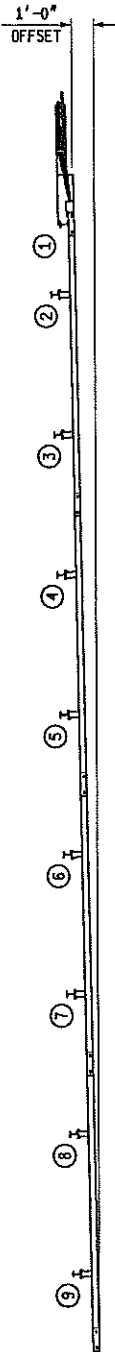


(X) GUARDRAIL LENGTH OF NEED

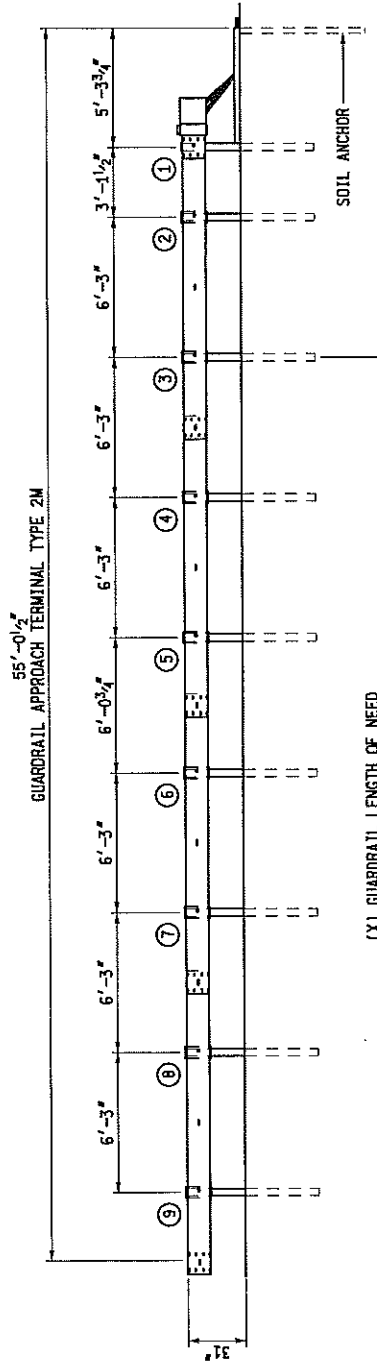
ELEVATION
 GUARDRAIL APPROACH TERMINAL TYPE 2M
 "SOFT-STOP"

OPTION 2

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR			
GUARDRAIL APPROACH TERMINAL TYPE 2M			
F.H.W.A. APPROVAL	5-1-2018 PLAN DATE	R-62-H	SHEET 2 OF 4



PLAN VIEW



ELEVATION
 GUARDRAIL APPROACH TERMINAL TYPE 2M
 "MAX-TENSION"

OPTION 3

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL APPROACH
 TERMINAL TYPE 2M**

F.H.W.A. APPROVAL

5-1-2018
 PLAN DATE

R-62-H

SHEET
 3 OF 4

NOTES:

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.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

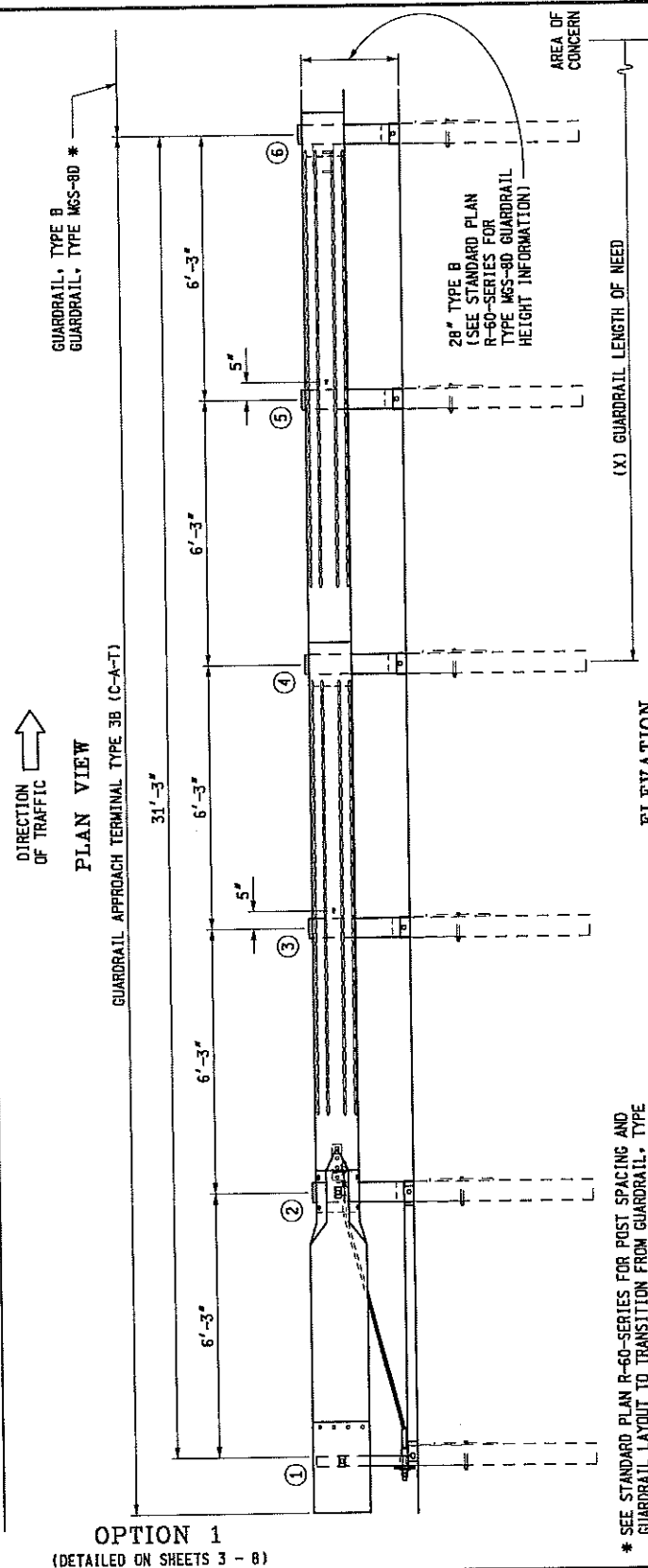
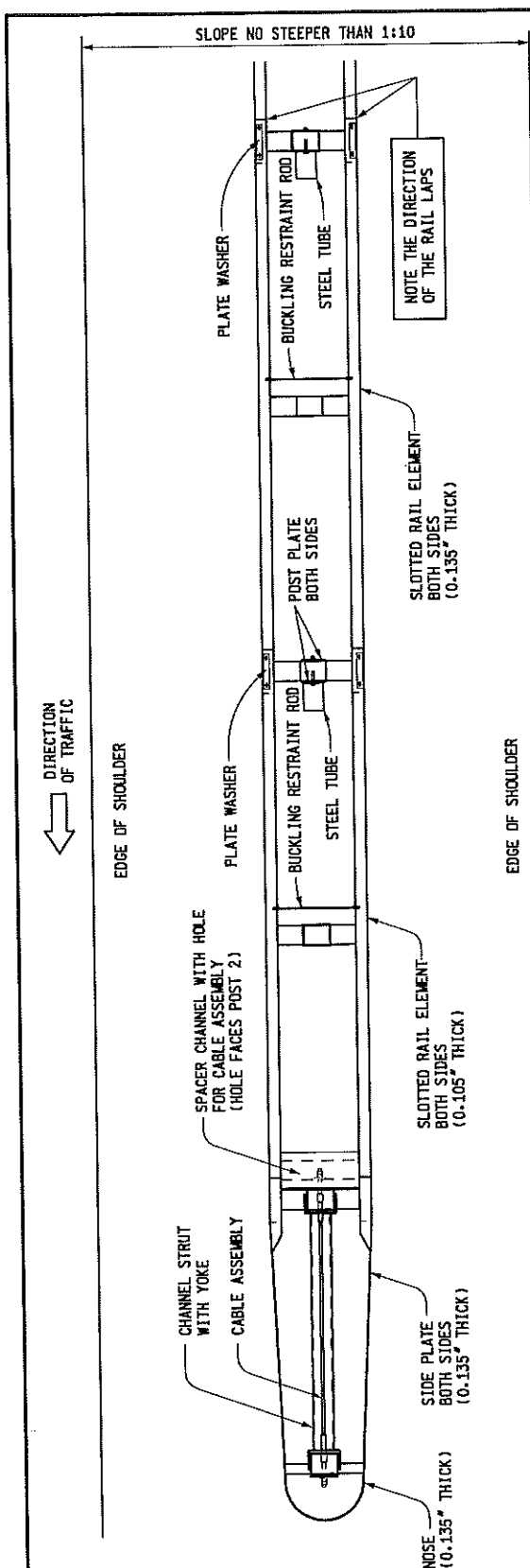
**GUARDRAIL APPROACH
TERMINAL TYPE 2M**

F.H.W.A. APPROVAL

5-1-2018
PLAN DATE

R-62-H

SHEET
4 OF 4



OPTION 1
(DETAILED ON SHEETS 3 - 8)

* SEE STANDARD PLAN R-60-SERIES FOR POST SPACING AND GUARDRAIL LAYOUT TO TRANSITION FROM GUARDRAIL, TYPE MGS-80 TO GUARDRAIL APPROACH TERMINAL, TYPE 3B

ELEVATION
GUARDRAIL APPROACH TERMINAL, TYPE 3B
"C-A-T"

MDOT
Michigan Department of Transportation

PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Stuedle

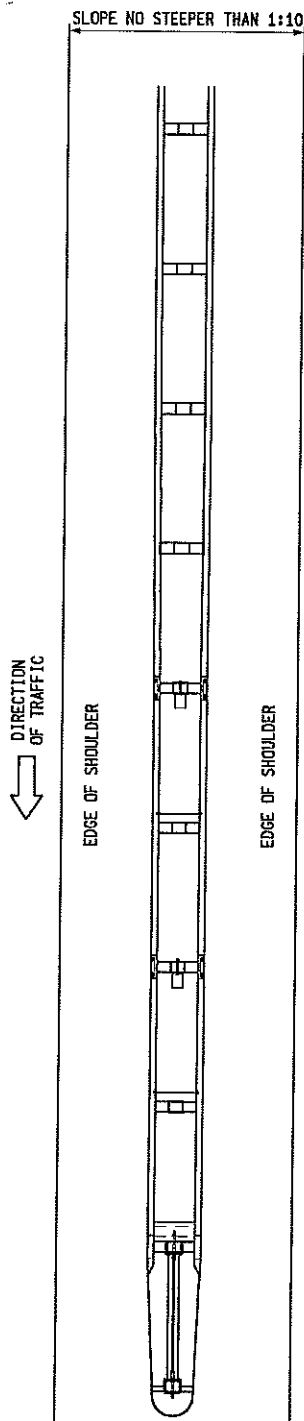
APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

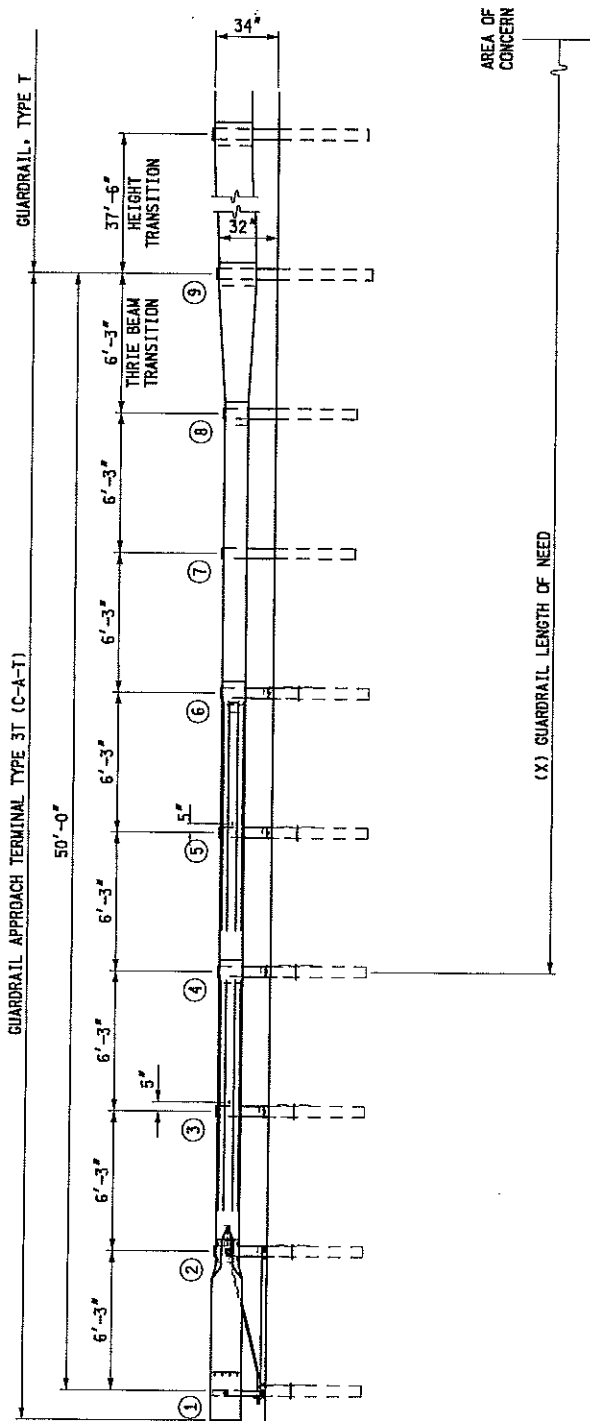
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL APPROACH
TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL	3-15-2016 PLAN DATE	R-63-C	SHEET 1 OF 16
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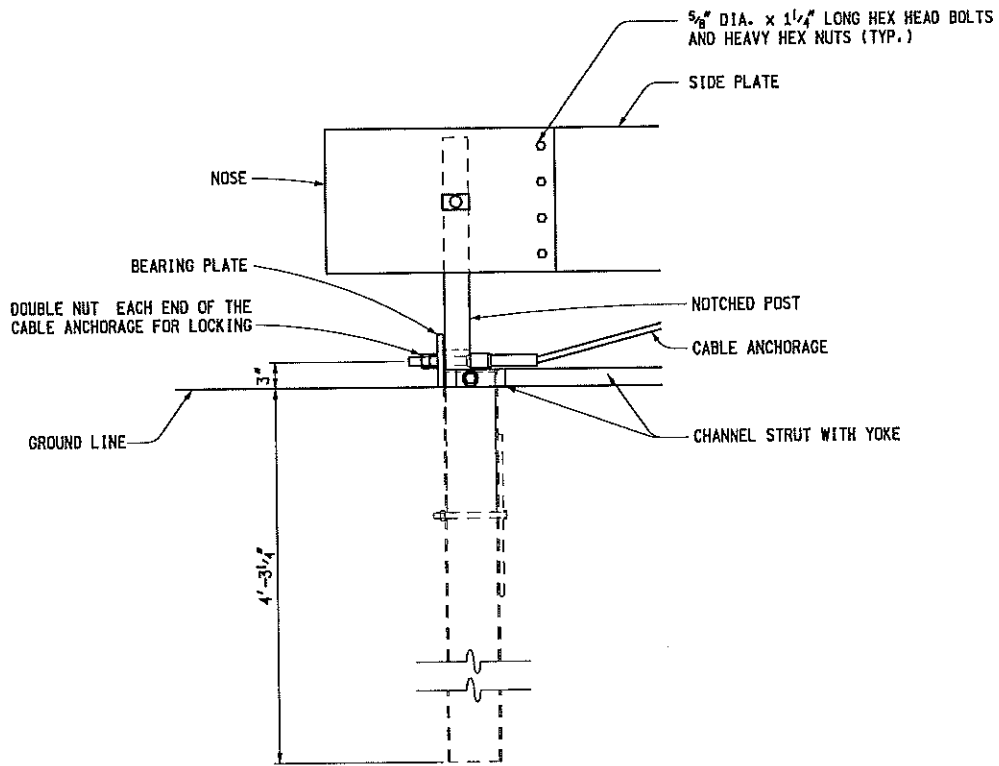
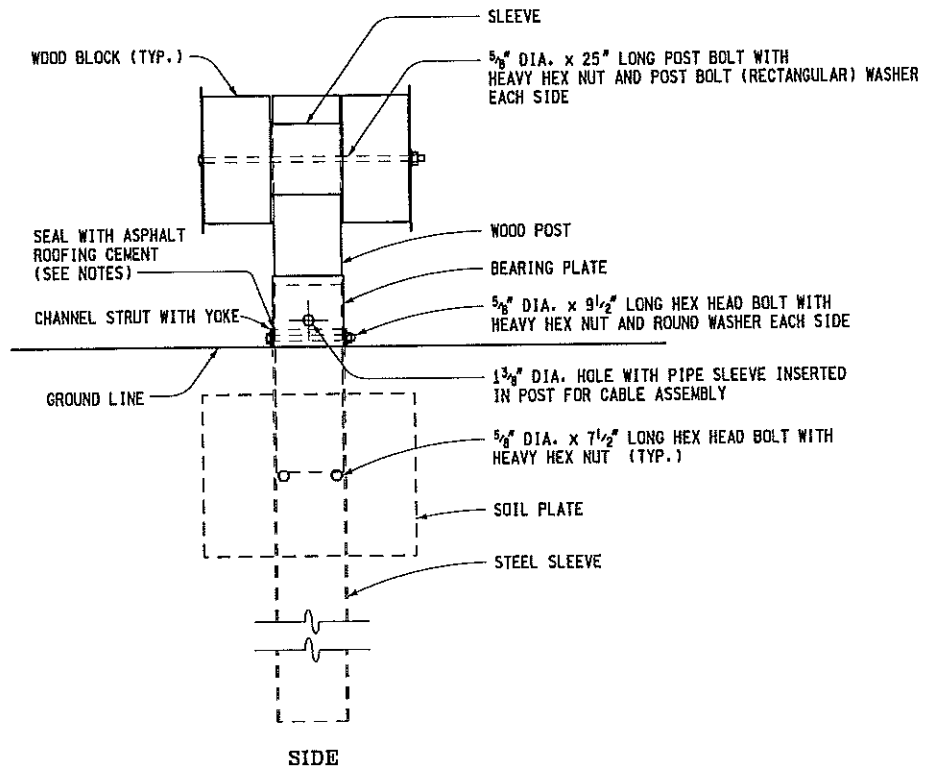
DIRECTION OF TRAFFIC
↑
PLAN VIEW



ELEVATION
GUARDRAIL APPROACH TERMINAL, TYPE 3T
"C-A-T"

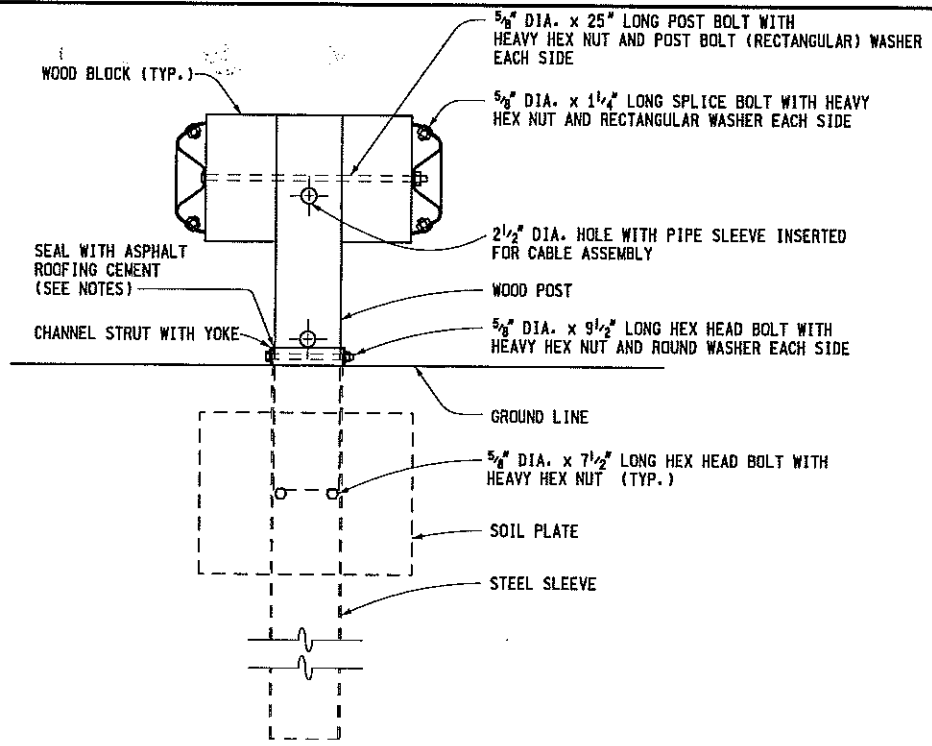
OPTION 1
(DETAILED ON SHEETS 3 - 8)

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR			
GUARDRAIL APPROACH TERMINAL, TYPE 3B & 3T			
F.H.W.A. APPROVAL	3-15-2016 PLAN DATE	R-63-C	SHEET 2 OF 16

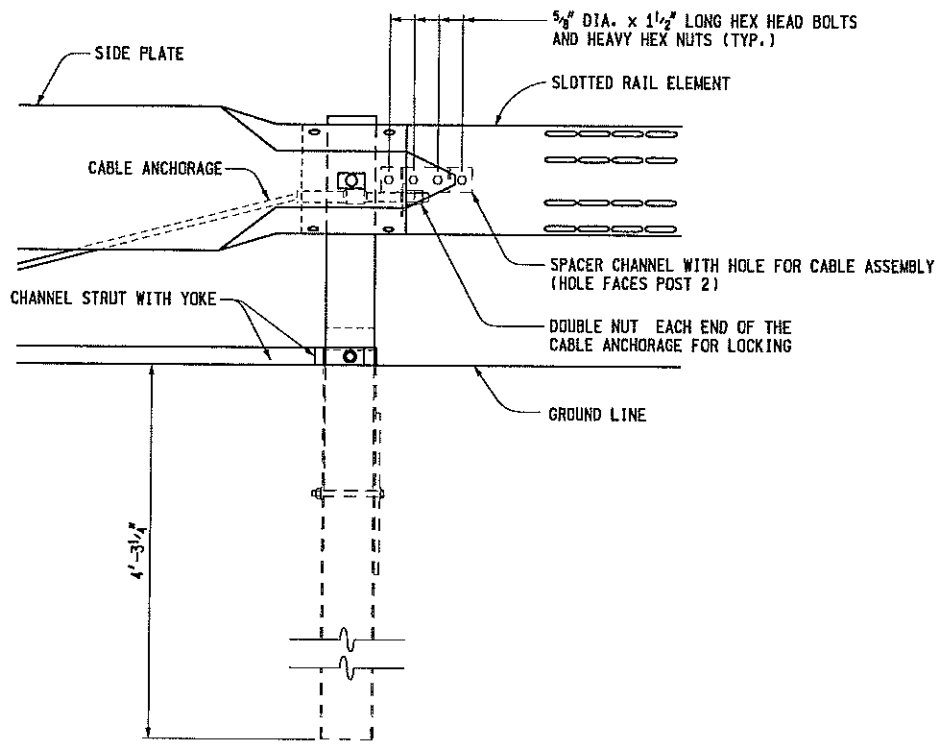


POST 1 DETAILS
(C-A-T)

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR			
GUARDRAIL APPROACH TERMINAL, TYPE 3B & 3T			
F.H.W.A. APPROVAL	3-15-2016 PLAN DATE	R-63-C	SHEET 3 OF 16



SIDE



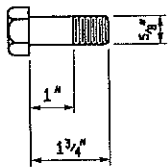
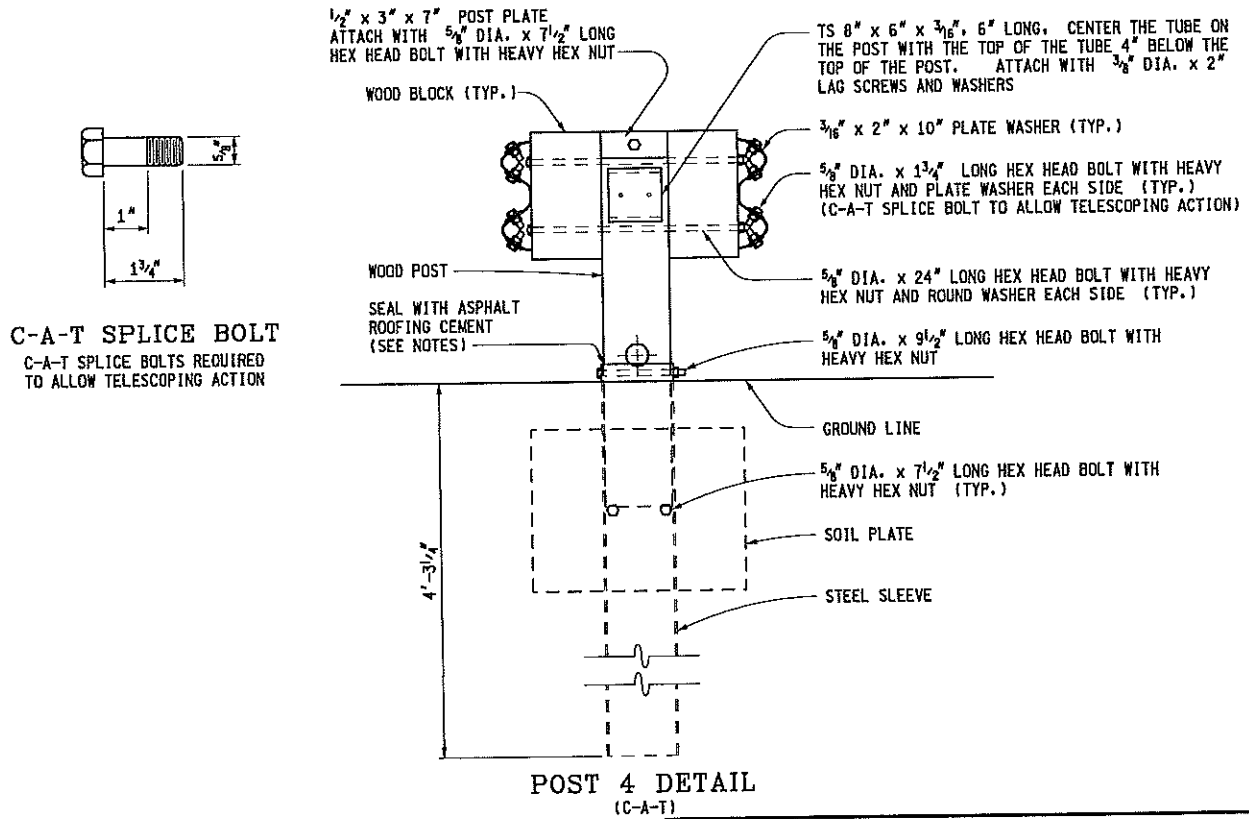
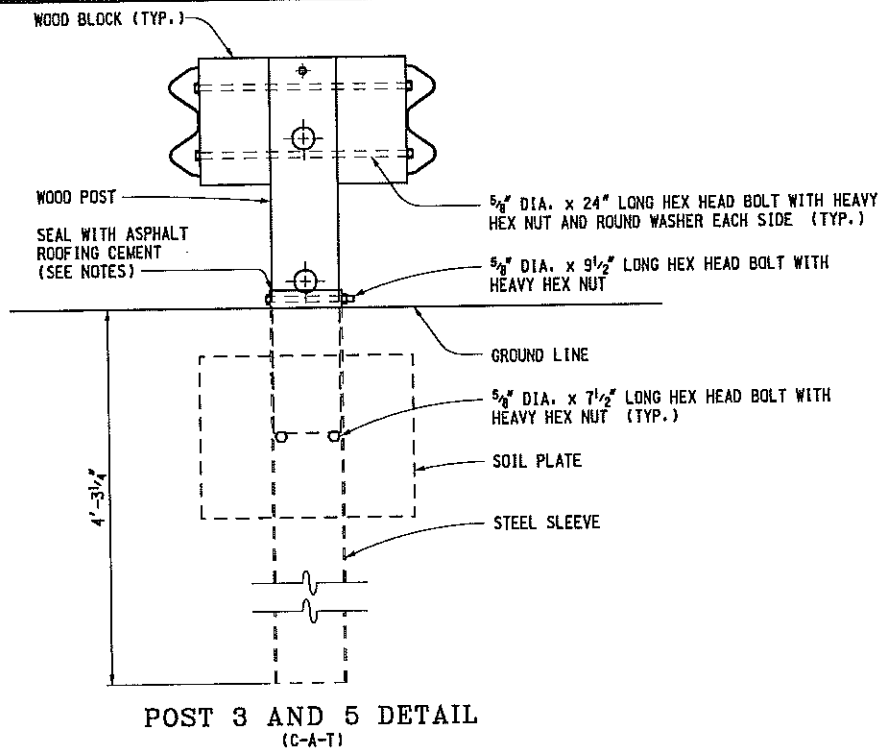
ELEVATION

POST 2 DETAILS
(C-A-T)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL APPROACH
TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL	3-15-2016 PLAN DATE	R-63-C	SHEET 4 OF 16
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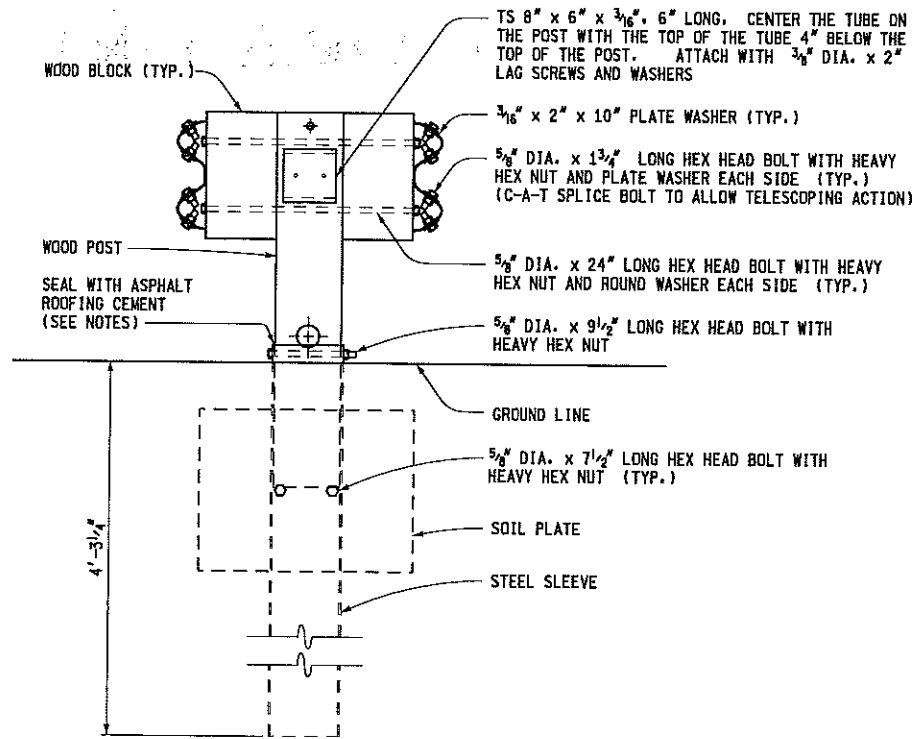


C-A-T SPLICE BOLT
C-A-T SPLICE BOLTS REQUIRED TO ALLOW TELESCOPING ACTION

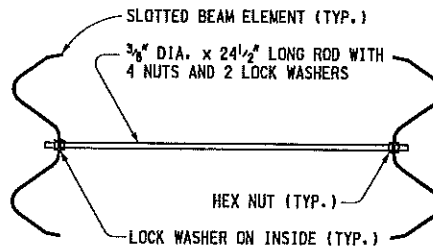
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL APPROACH
TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL	3-15-2016 PLAN DATE	R-63-C	SHEET 5 OF 16
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POST 6 DETAIL
(C-A-T)



BUCKLING RESTRAINT ROD DETAIL
(C-A-T)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

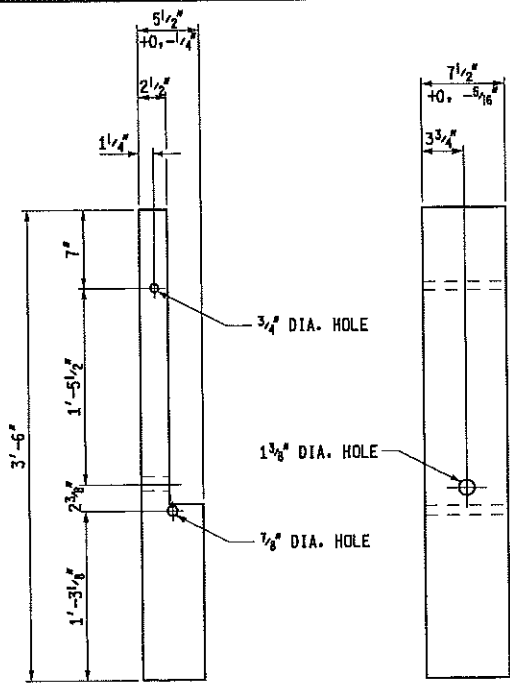
**GUARDRAIL APPROACH
TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL

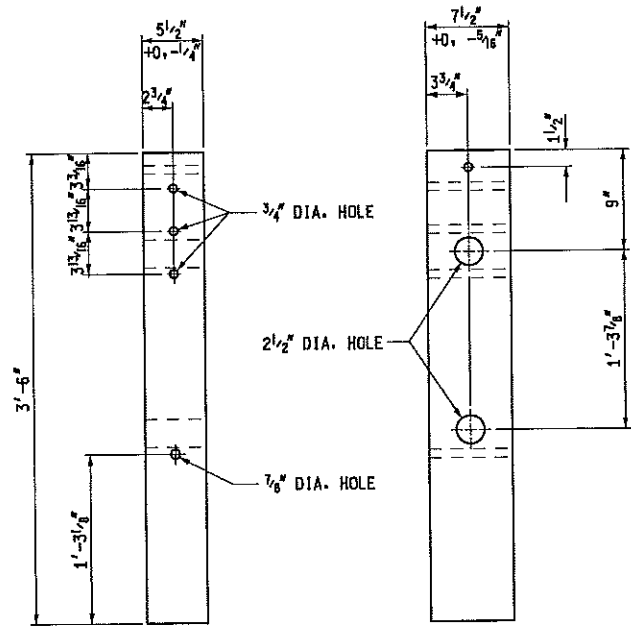
3-15-2016
PLAN DATE

R-63-C

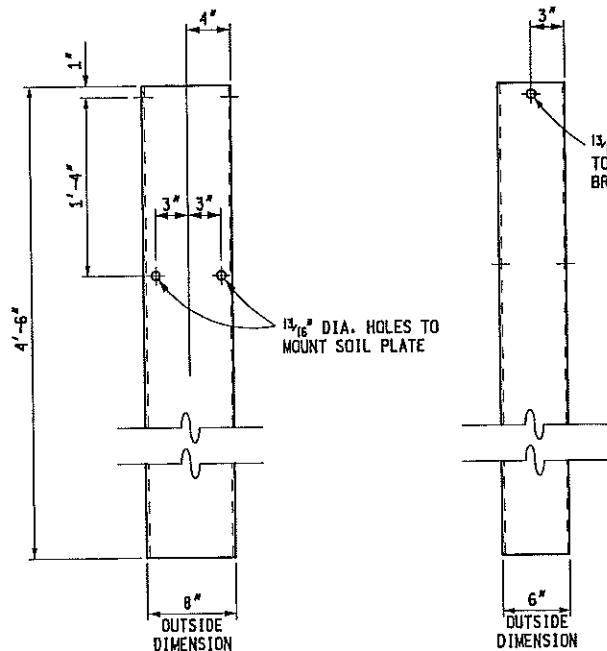
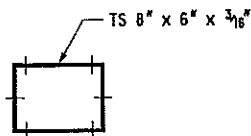
SHEET
6 OF 16



WOOD BREAKAWAY POST
(C-A-T POST 1)



WOOD BREAKAWAY POST
(C-A-T POST 2 - 6)



STEEL SLEEVE
(C-A-T)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

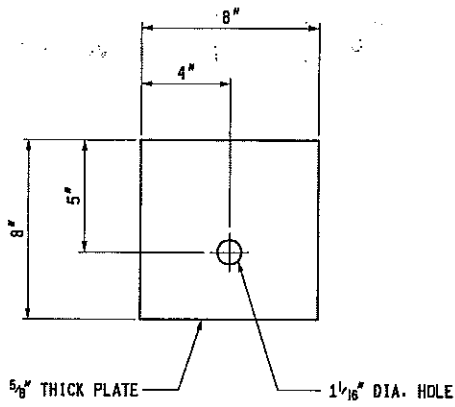
**GUARDRAIL APPROACH
TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL

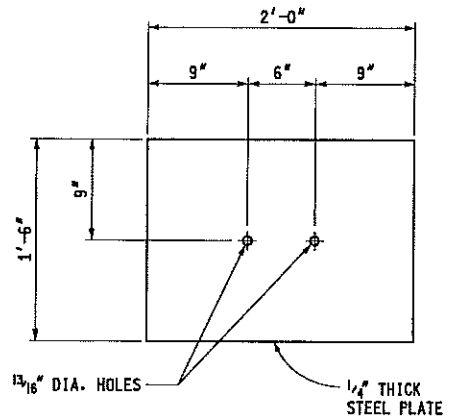
3-15-2016
PLAN DATE

R-63-C

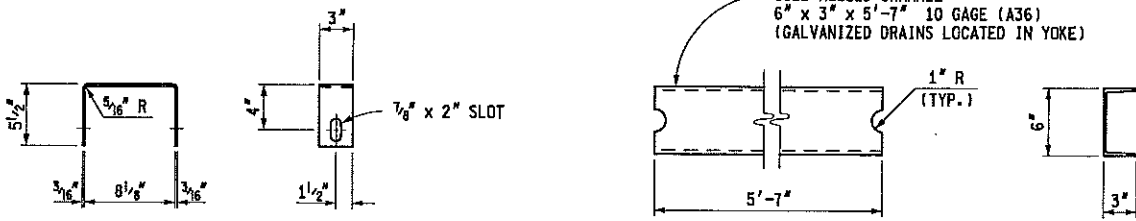
SHEET
7 OF 16



BEARING PLATE
(C-A-T)

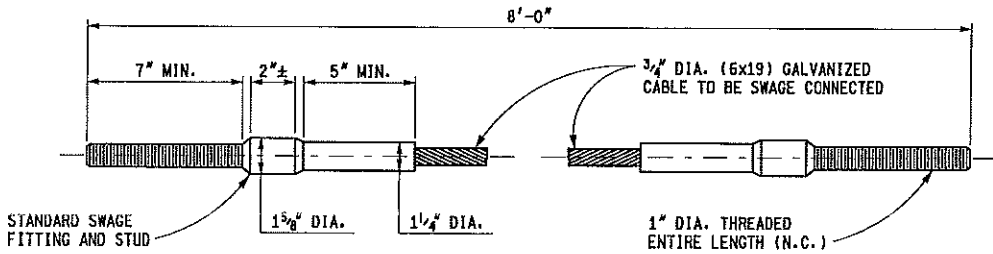


SOIL PLATE
(C-A-T)



ASSEMBLY DETAIL

STRUT DETAILS
(C-A-T)



CABLE ASSEMBLY
(C-A-T)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

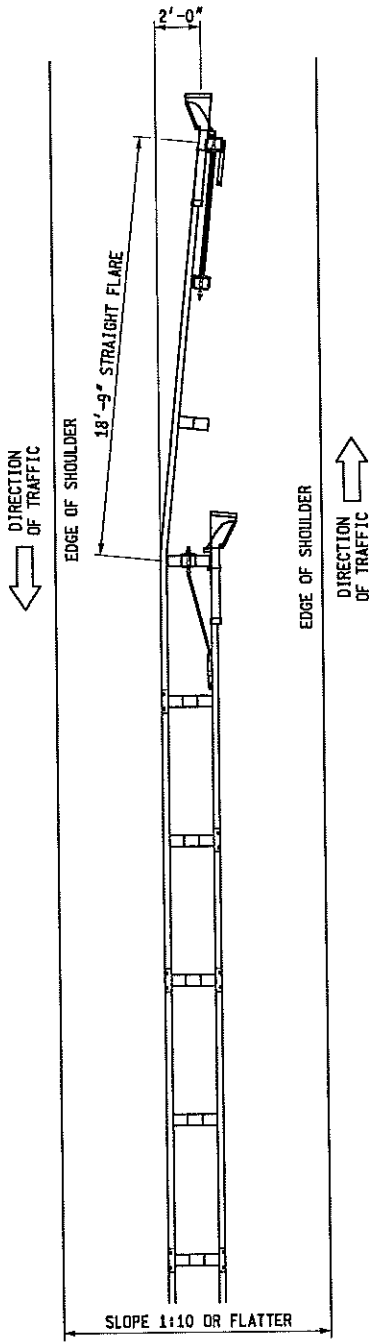
**GUARDRAIL APPROACH
TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL

3-15-2016
PLAN DATE

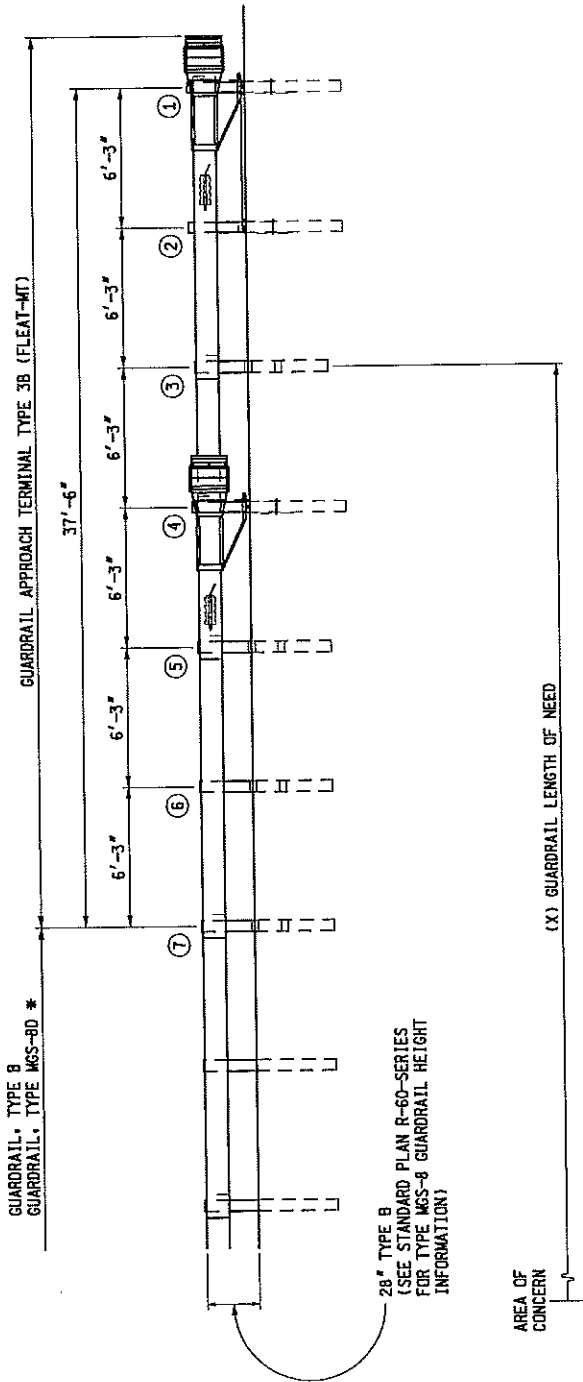
R-63-C

SHEET
8 OF 16



* SEE STANDARD PLAN R-60-SERIES FOR POST SPACING AND
 GUARDRAIL LAYOUT TO TRANSITION FROM GUARDRAIL, TYPE
 WGS-8D TO GUARDRAIL APPROACH TERMINAL, TYPE 3B

PLAN VIEW



GUARDRAIL, TYPE B
 GUARDRAIL, TYPE WGS-8D *

28" TYPE B
 (SEE STANDARD PLAN R-60-SERIES
 FOR TYPE WGS-8 GUARDRAIL HEIGHT
 INFORMATION)

AREA OF
 CONCERN

(X) GUARDRAIL LENGTH OF NEED

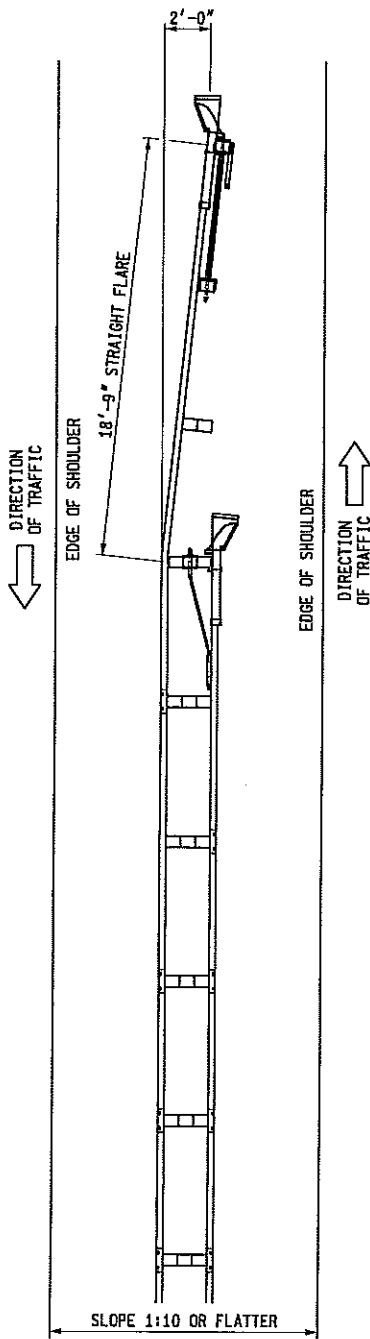
ELEVATION
 GUARDRAIL APPROACH TERMINAL, TYPE 3B
 "FLEAT - MT"

OPTION 2
 (DETAILED ON SHEETS 11 - 15)

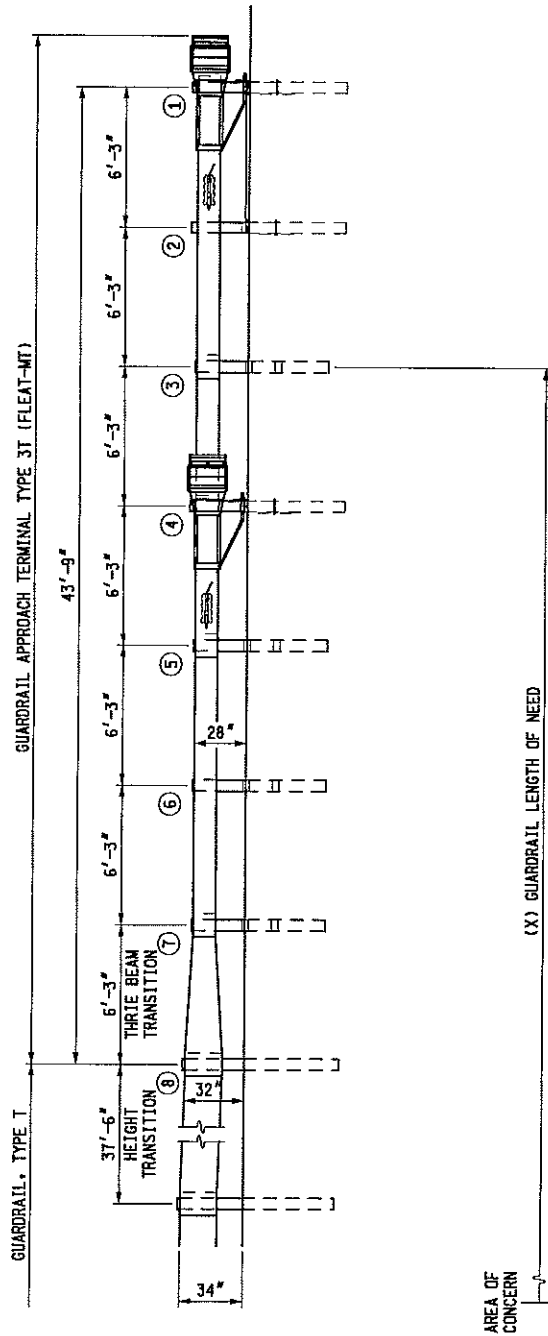
MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL APPROACH
 TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL	3-15-2016 PLAN DATE	R-63-C	SHEET 9 OF 16
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PLAN VIEW



ELEVATION
 GUARDRAIL APPROACH TERMINAL, TYPE 3T
 "FLEAT - MT"

OPTION 2
 (DETAILED ON SHEETS 11 - 15)

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR

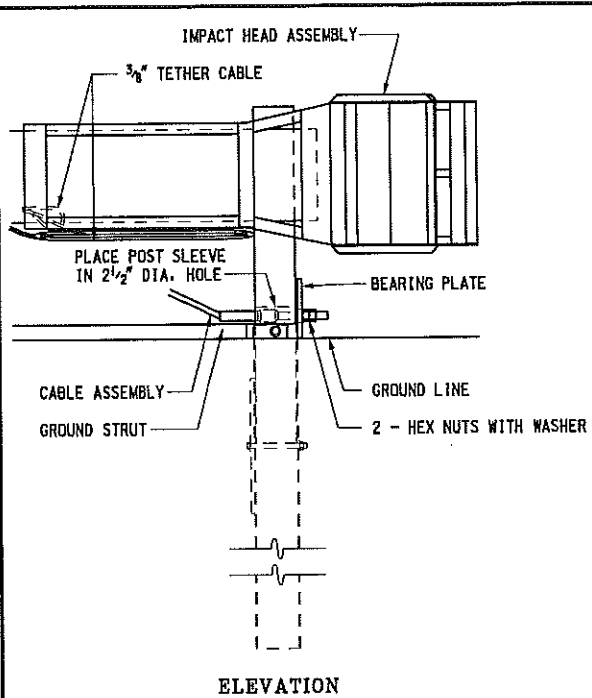
**GUARDRAIL APPROACH
 TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL

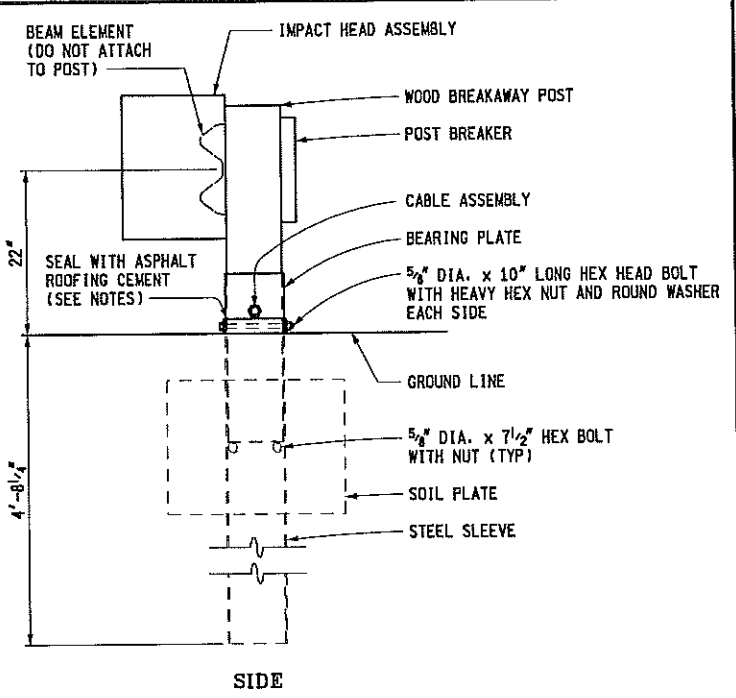
3-15-2016
 PLAN DATE

R-63-C

SHEET
 10 OF 16

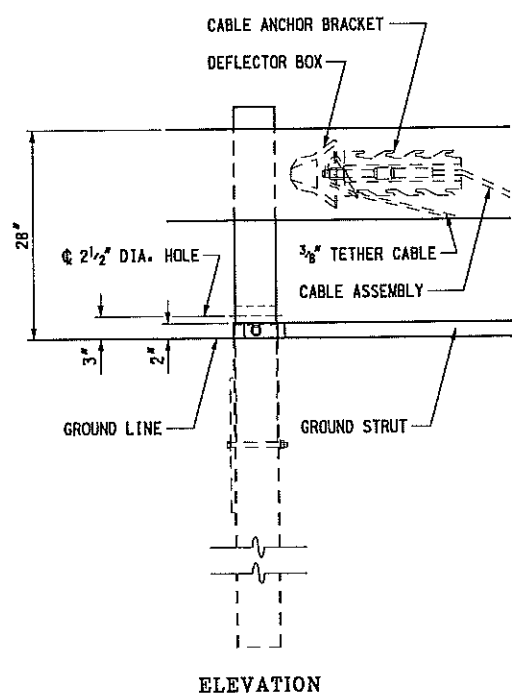


ELEVATION

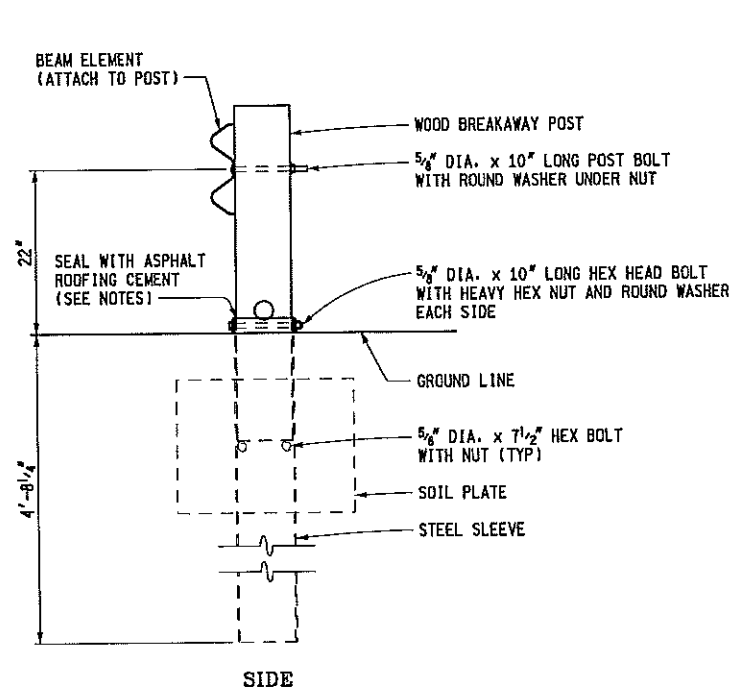


SIDE

POST 1 DETAIL (FLEAT-MT)



ELEVATION



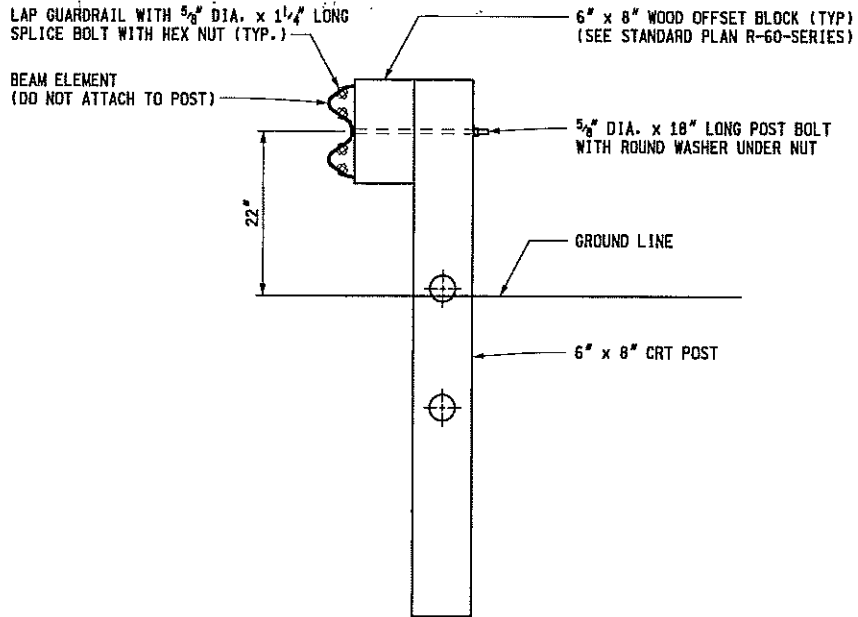
SIDE

POST 2 DETAIL (FLEAT-MT)

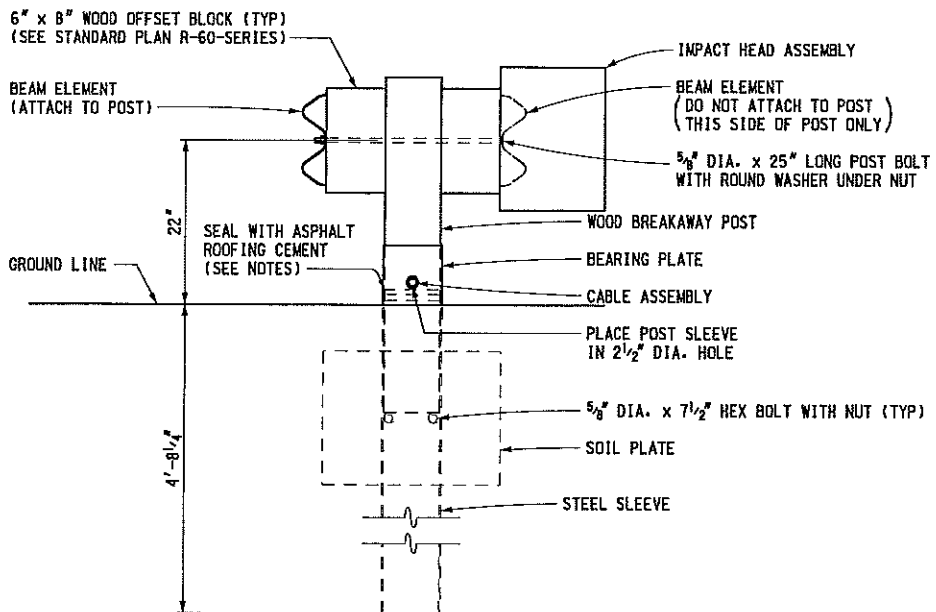
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL APPROACH
TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL	3-15-2016 PLAN DATE	R-63-C	SHEET 11 OF 16
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POST 3 DETAIL
(FLEAT-MT)



POST 4 DETAIL
(FLEAT-MT)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

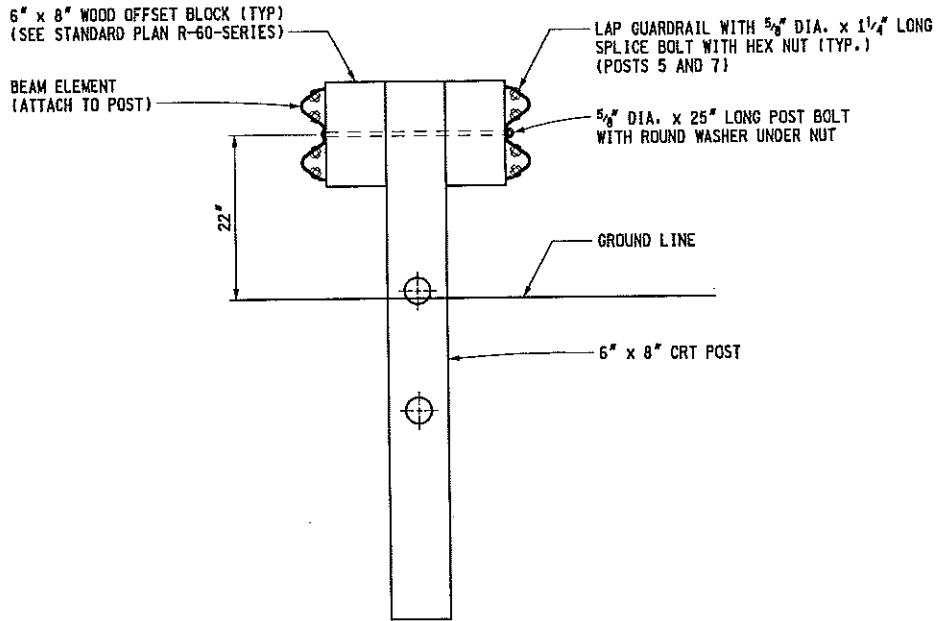
**GUARDRAIL APPROACH
TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL

3-15-2016
PLAN DATE

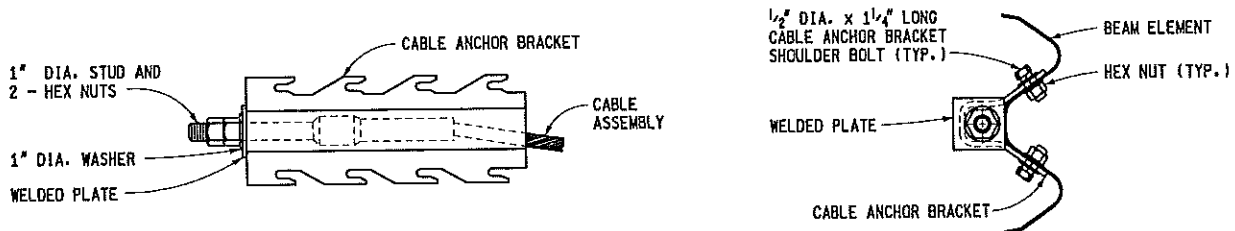
R-63-C

SHEET
12 OF 16



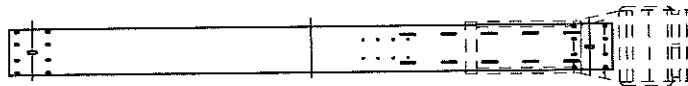
POST 5, 6 AND 7 DETAIL

(FLEAT-MT)
NOTE: POST 8 IS A STANDARD LINE POST



CABLE ANCHOR BRACKET DETAIL

(FLEAT-MT)



W-BEAM GUARDRAIL END SECTION

(USE WITH IMPACT HEAD ASSEMBLY)

NOTE: ALL (FLEAT-MT) ITEMS ILLUSTRATED WITHOUT DIMENSIONS SHALL BE ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

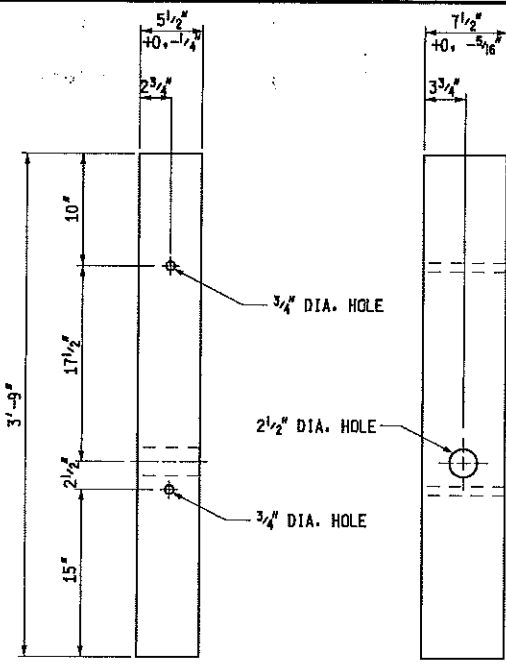
**GUARDRAIL APPROACH
TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL

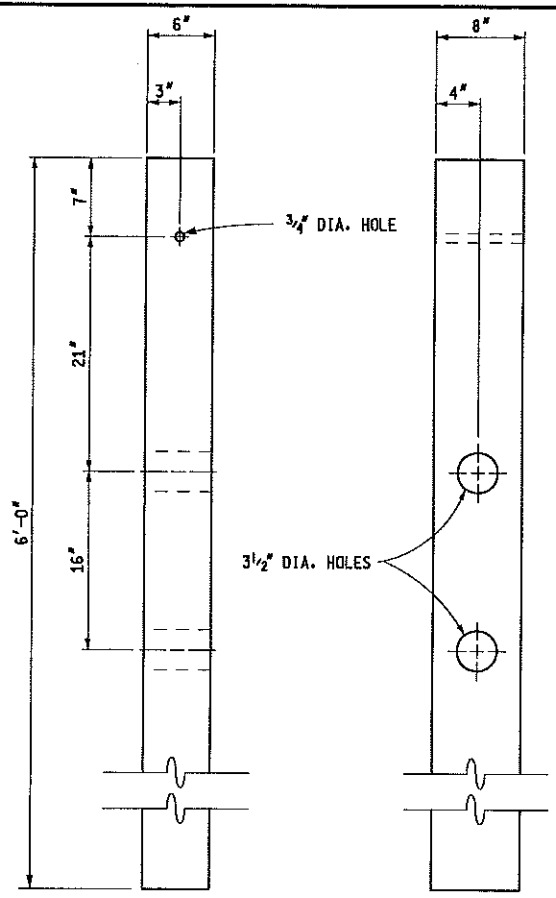
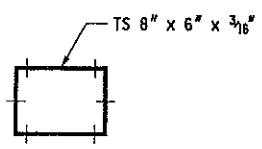
3-15-2016
PLAN DATE

R-63-C

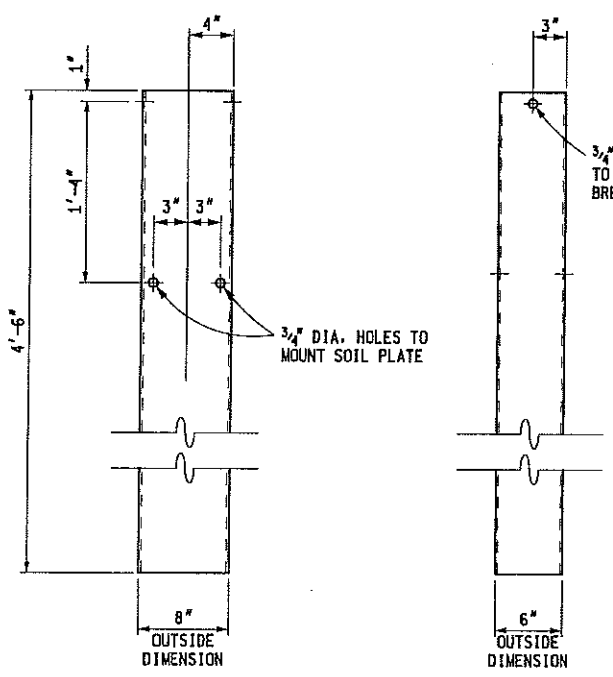
SHEET
13 OF 16



WOOD BREAKAWAY POST
(FLEAT-MT POST 1, 2, & 4)

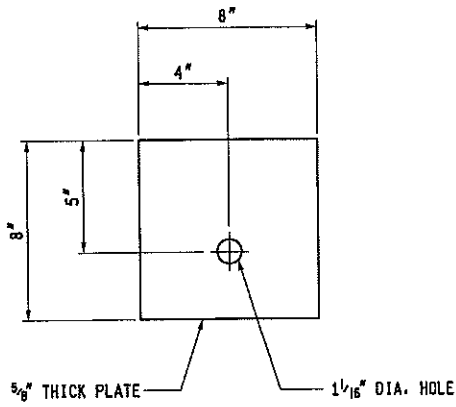


CRT POST
(FLEAT-MT POST 3, 5, 6, & 7)

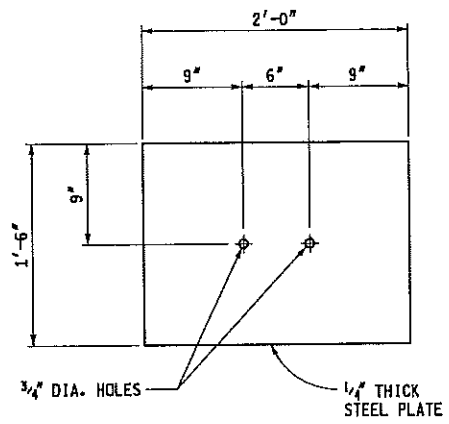


STEEL SLEEVE
(FLEAT-MT)

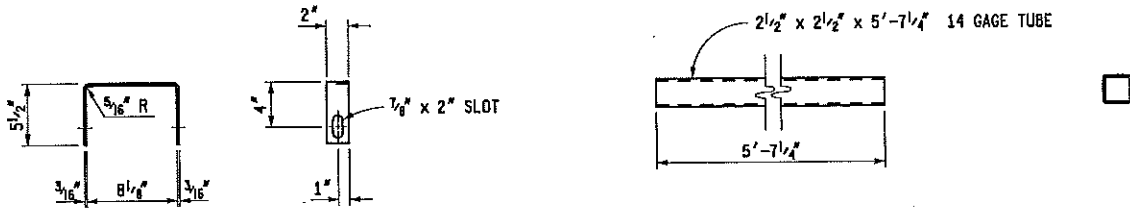
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR		
GUARDRAIL APPROACH TERMINAL, TYPE 3B & 3T		
F.H.W.A. APPROVAL	3-15-2016 PLAN DATE	R-63-C SHEET 14 OF 16



BEARING PLATE
(FLEAT-MT)

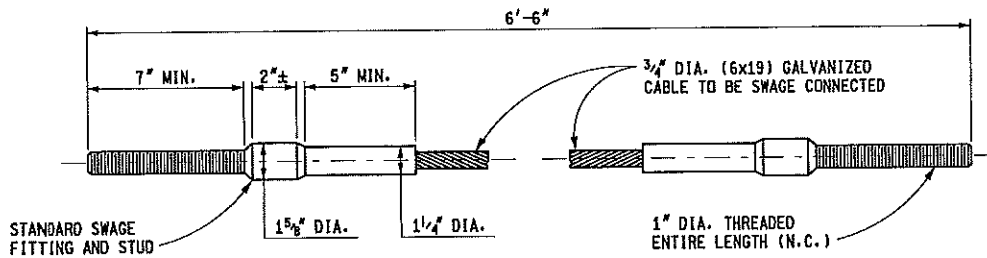


SOIL PLATE
(FLEAT-MT)



ASSEMBLY DETAIL

STRUT DETAILS
(FLEAT-MT)



CABLE ASSEMBLY
(FLEAT-MT)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL APPROACH
TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL

3-15-2016
PLAN DATE

R-63-C

SHEET
15 OF 16

NOTES:

ALL POSTS, OFFSET BLOCKS, BEAM ELEMENTS, AND HARDWARE (INCLUDING BOLTS, NUTS, AND WASHERS) SHALL CONFORM TO THE CURRENT STANDARD SPECIFICATIONS AND TO THE CURRENT 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-56-SERIES, AND R-59-SERIES.

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

HARDWARE BETWEEN POST 1 AND POST 6 (OPTION 1) ARE PROPRIETARY ITEMS OF THE C-A-T AND MUST BE PURCHASED FROM AN AUTHORIZED DISTRIBUTER.

HARDWARE BETWEEN POST 1 AND POST 7 (OPTION 2) ARE PROPRIETARY ITEMS OF THE FLEAT-MT AND MUST BE PURCHASED FROM AN AUTHORIZED DISTRIBUTER.

GUARDRAIL REFLECTORS ARE NOT TO BE USED ON THE "C-A-T" OR "FLEAT-MT". 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

ON THE "C-A-T", THE CURVED PORTION OF THE NOSE FACING TRAFFIC SHALL BE COMPLETELY COVERED WITH HIGH INTENSITY ADHESIVE REFLECTIVE SHEETING.

ON THE "FLEAT-MT", THE PORTION OF THE IMPACT HEAD ASSEMBLIES FACING TRAFFIC SHALL BE COMPLETELY COVERED WITH HIGH INTENSITY ADHESIVE REFLECTIVE SHEETING.

ASPHALT ROOFING CEMENT SHALL BE USED TO SEAL THE PERIMETER AREA BETWEEN THE STEEL SLEEVE (SOIL TUBE) AND THE WOOD BREAKAWAY POST.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

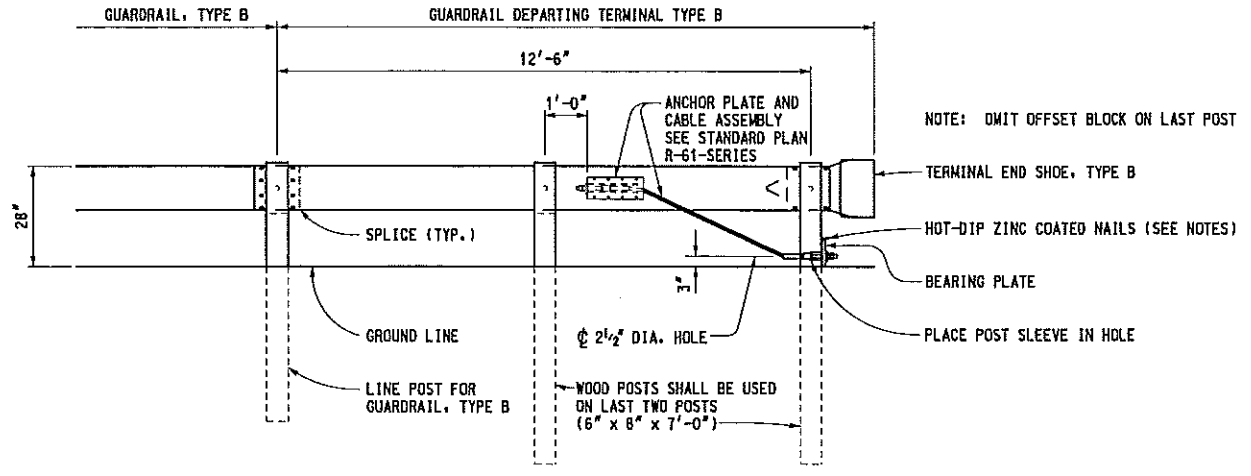
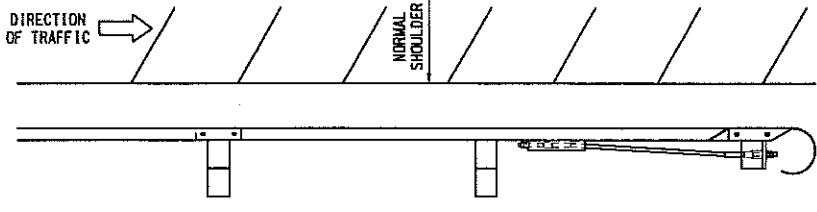
**GUARDRAIL APPROACH
TERMINAL, TYPE 3B & 3T**

F.H.W.A. APPROVAL

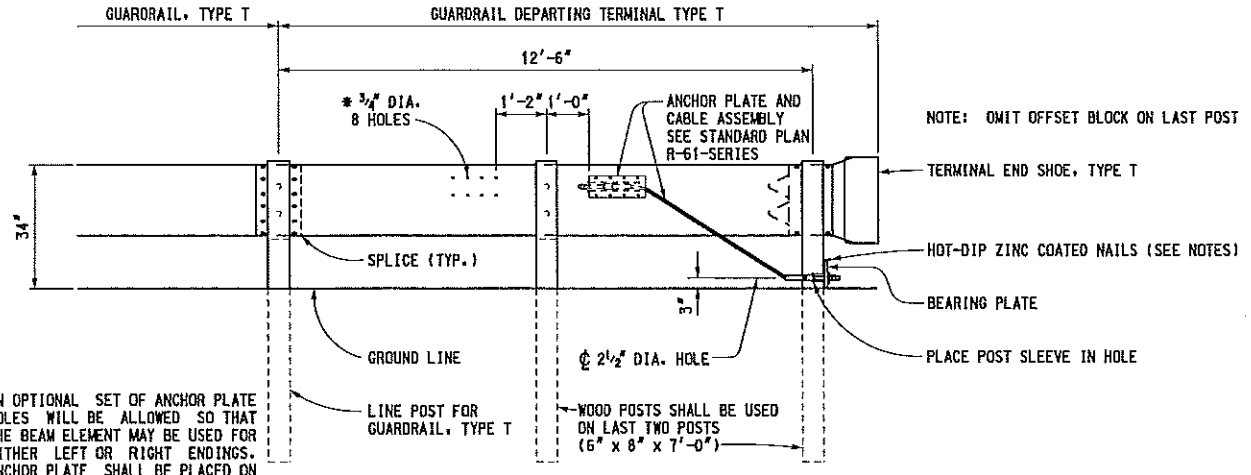
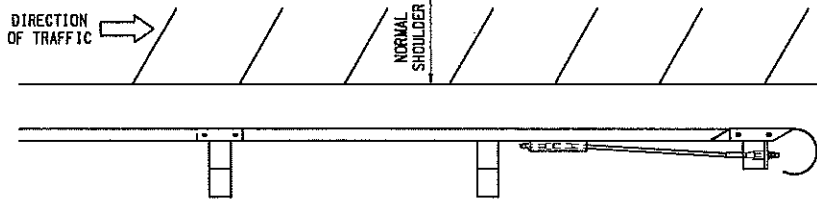
3-15-2016
PLAN DATE

R-63-C

SHEET
16 OF 16



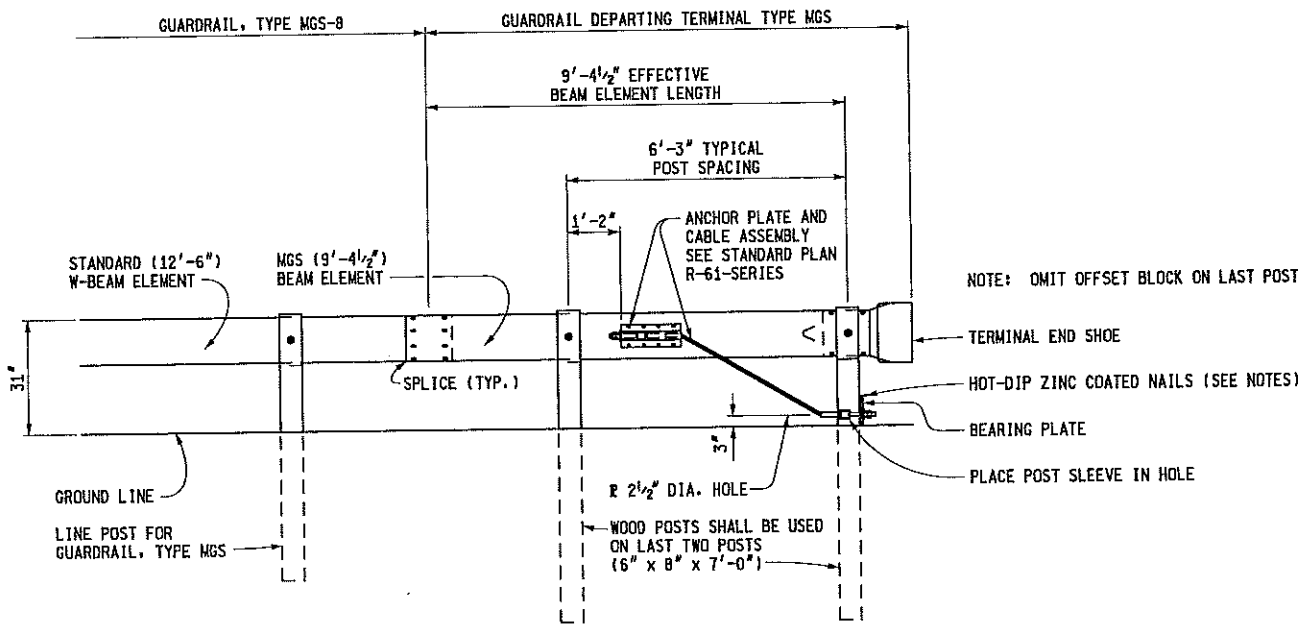
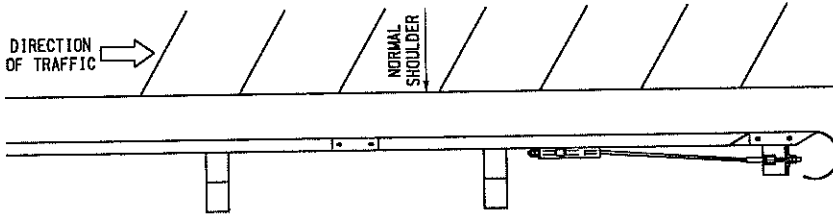
GUARDRAIL DEPARTING TERMINAL TYPE B



* 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

<p>PREPARED BY DESIGN DIVISION</p> <p>DRAWN BY: B.L.T.</p> <p>CHECKED BY: W.K.P.</p>	<p>DEPARTMENT DIRECTOR Kirk T. Stuedle</p> <p>APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES</p>	<p>MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR</p> <p>GUARDRAIL DEPARTING TERMINAL TYPES B, T, & MGS</p>		
	<p>APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT</p>	<p>F.H.W.A. APPROVAL</p>	<p>4-27-2016 PLAN DATE</p>	<p>R-66-E</p>

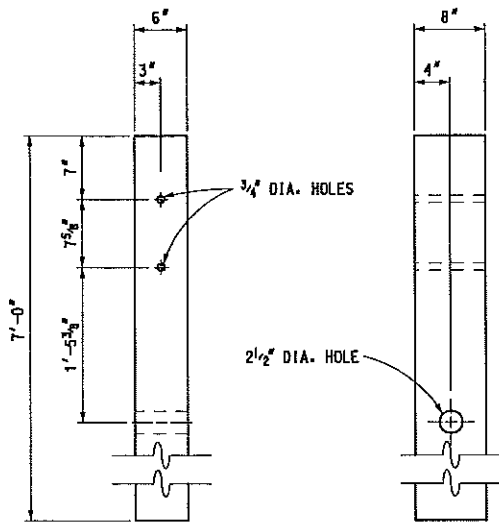


GUARDRAIL DEPARTING TERMINAL TYPE MGS

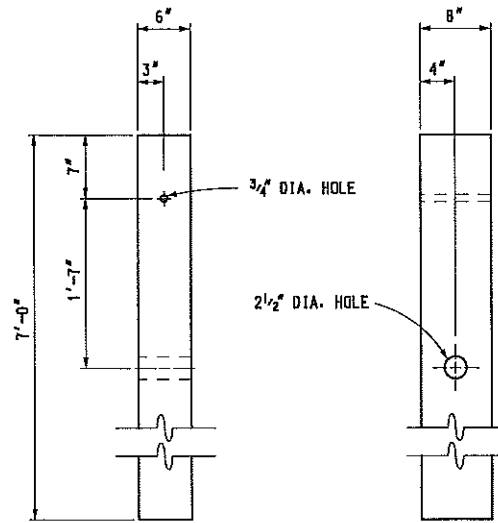
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL DEPARTING
TERMINAL TYPES B, T, & MGS**

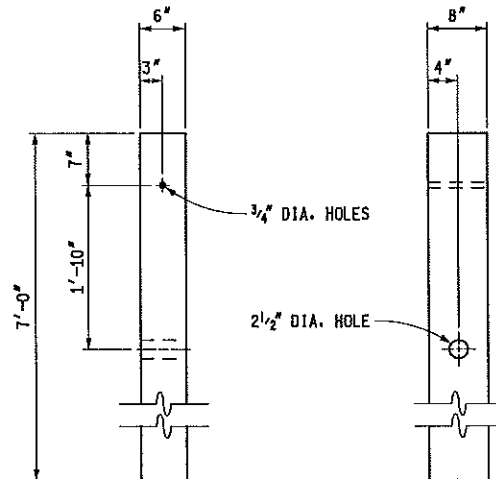
F.H.W.A. APPROVAL	4-27-2016 PLAN DATE	R-66-E	SHEET 2 OF 4
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WOOD POST DETAIL
(FOR LAST POST, GUARDRAIL DEPARTING TERMINAL TYPE T)

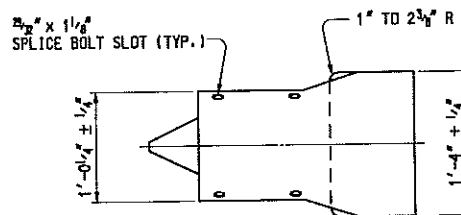
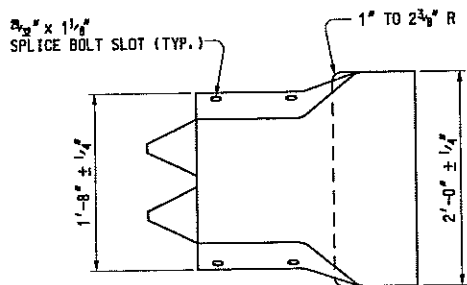
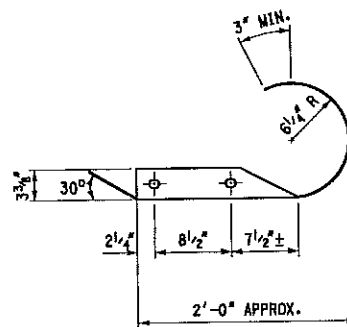
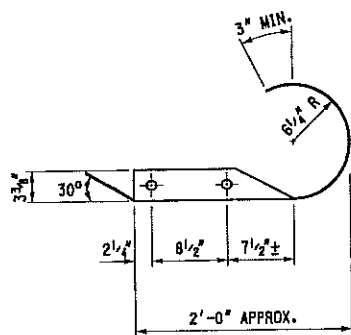


WOOD POST DETAIL
(FOR LAST POST, GUARDRAIL DEPARTING TERMINAL TYPE B)



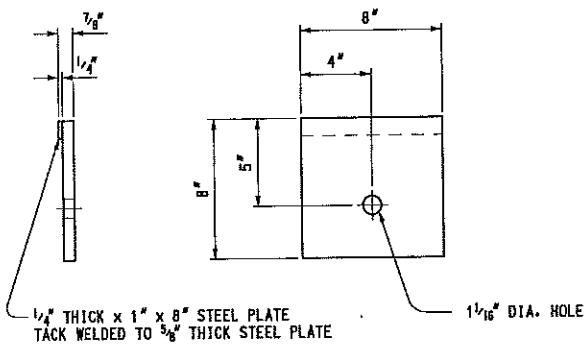
WOOD POST DETAIL
(FOR LAST POST, GUARDRAIL DEPARTING TERMINAL TYPE MGS)

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR			
GUARDRAIL DEPARTING TERMINAL TYPES B, T, & MGS			
F.H.W.A. APPROVAL	4-27-2016 PLAN DATE	R-66-E	SHEET 3 OF 4



TERMINAL END SHOE, TYPE T

TERMINAL END SHOE,
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 CURRENT STANDARD SPECIFICATIONS AND TO THE CURRENT 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.

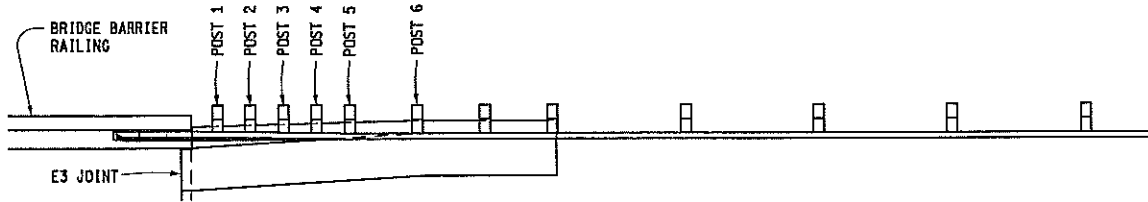
AFTER THE CABLE ASSEMBLY HAS BEEN TIGHTENED, A SECOND NUT SHALL BE INSTALLED ON EACH END OF THE CABLE SO THAT THE CABLE WILL NOT LOOSEN.

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.

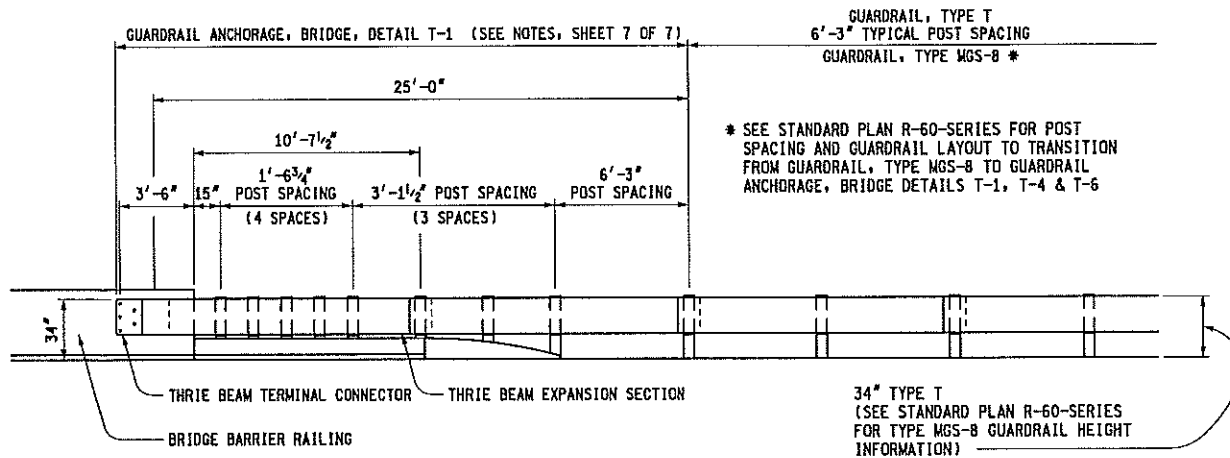
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL DEPARTING
TERMINAL TYPES B, T, & MGS**

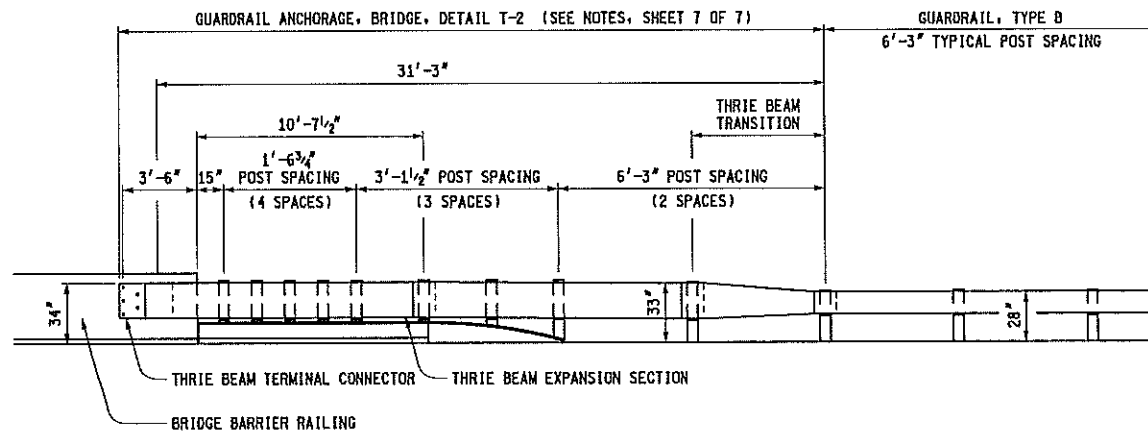
F.H.V.A. APPROVAL	4-27-2016 PLAN DATE	R-66-E	SHEET 4 OF 4
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PLAN VIEW



ELEVATION VIEW
(TO BE USED WITH GUARDRAIL, TYPE T & TYPE MGS-8)



ELEVATION VIEW
(TO BE USED WITH GUARDRAIL, TYPE B)

**DETAILS FOR CONNECTING GUARDRAIL TO
BRIDGE BARRIER RAILINGS, TYPE 4, 2-TUBE, 4-TUBE,
AESTHETIC PARAPET TUBE, OR 3 TUBE WITH PICKETS
(WITHOUT EXPANSION AT BACKWALL)**

MDOT
Michigan Department of Transportation

PREPARED BY
DESIGN DIVISION

DRAWN BY: _____

CHECKED BY: _____

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

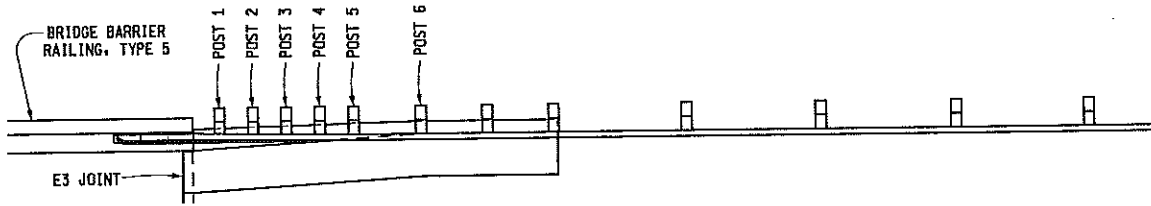
**GUARDRAIL ANCHORAGE,
BRIDGE, DETAILS**

F.H.W.A. APPROVAL

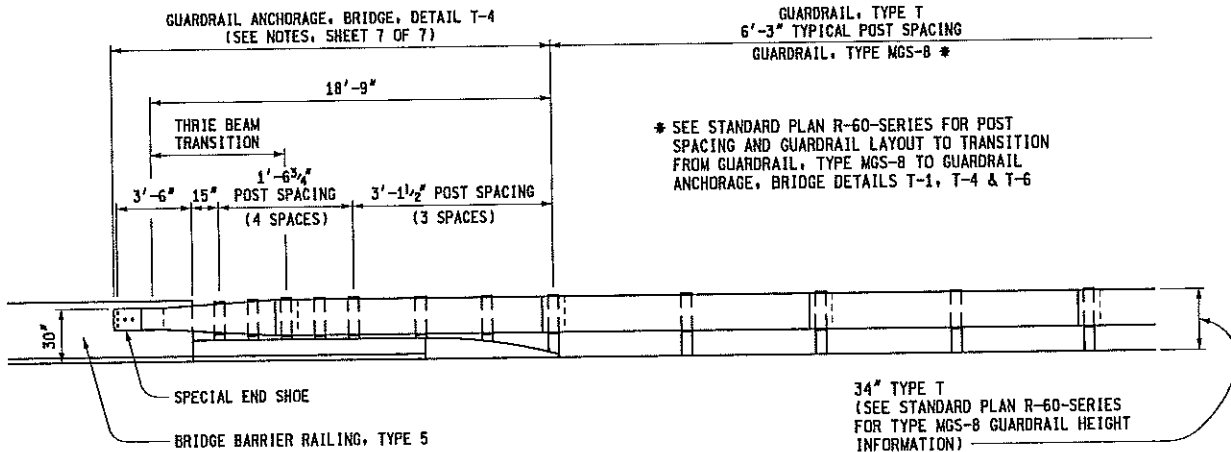
8-9-2017
PLAN DATE

R-67-G

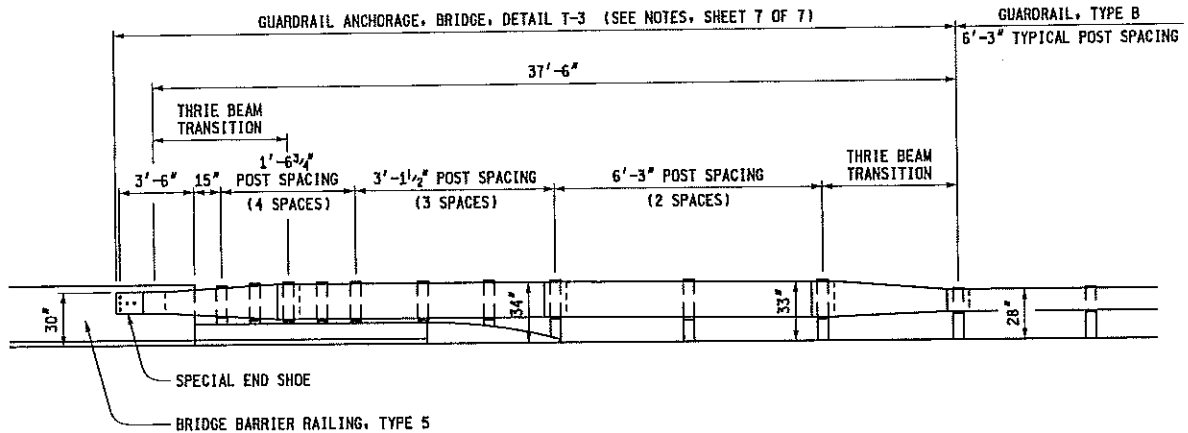
SHEET
1 OF 7



PLAN VIEW



ELEVATION VIEW
(TO BE USED WITH GUARDRAIL, TYPE T & TYPE MGS-8)



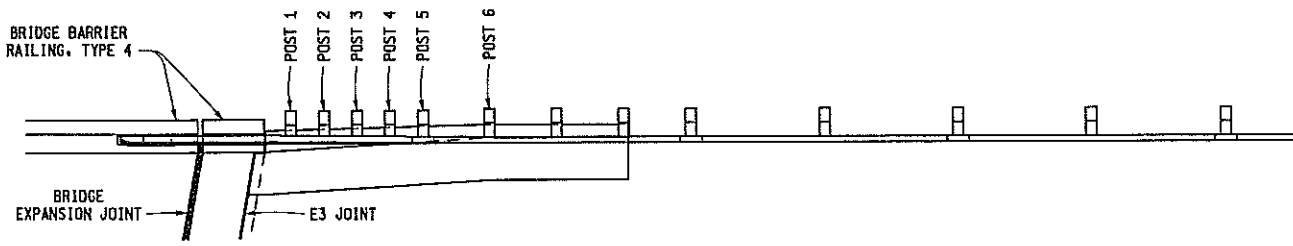
ELEVATION VIEW
(TO BE USED WITH GUARDRAIL, TYPE B)

DETAILS FOR CONNECTING GUARDRAIL TO BRIDGE BARRIER RAILINGS, TYPE 5
(WITHOUT EXPANSION AT BACKWALL)

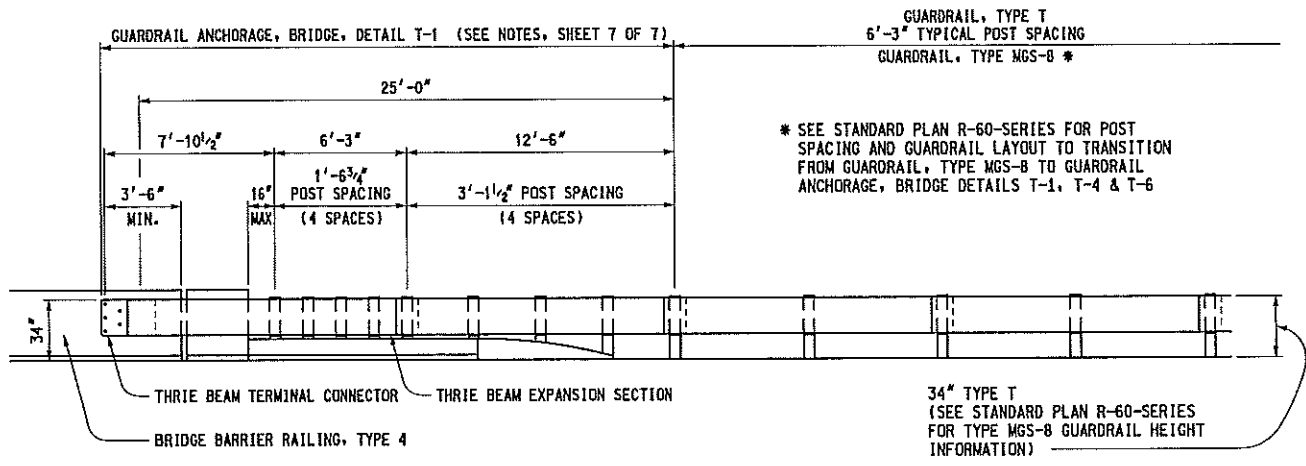
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL ANCHORAGE,
BRIDGE, DETAILS**

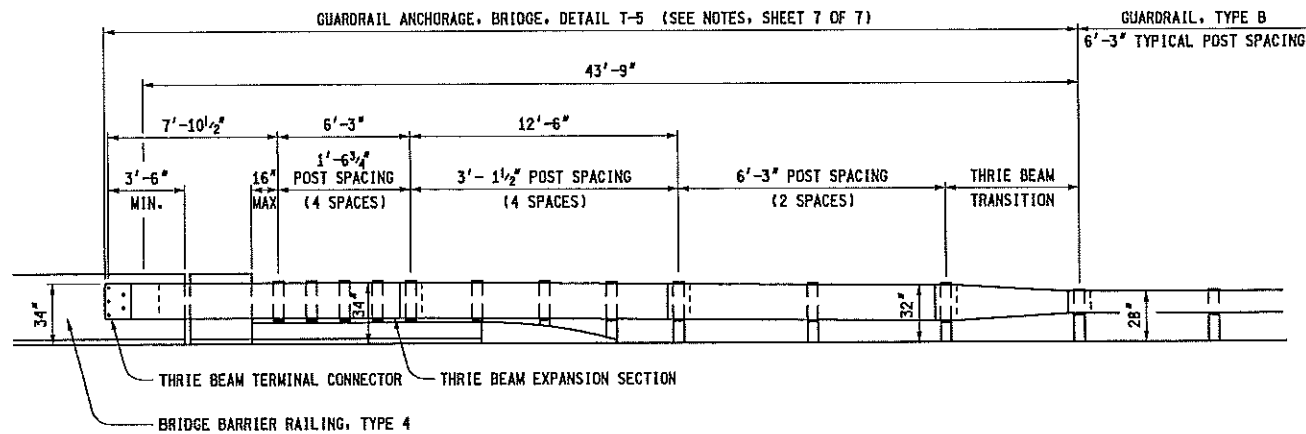
F.H.W.A. APPROVAL	8-9-2017	R-67-G	SHEET
	PLAN DATE		2 OF 7



PLAN VIEW



ELEVATION VIEW
(TO BE USED WITH GUARDRAIL, TYPE T & TYPE MGS-8)



ELEVATION VIEW
(TO BE USED WITH GUARDRAIL, TYPE B)

**DETAILS FOR CONNECTING GUARDRAIL TO
BRIDGE BARRIER RAILINGS, TYPE 4, 2-TUBE, 4-TUBE,
AESTHETIC PARAPET TUBE, OR 3 TUBE WITH PICKETS
(WITH EXPANSION AT BACKWALL)**

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL ANCHORAGE,
BRIDGE, DETAILS**

F.H.W.A. APPROVAL

8-9-2017
PLAN DATE

R-67-G

SHEET
3 OF 7

NOTE: FILLER WALL END BLOCK MAY BE OMITTED WHEN FIRST ANCHORAGE POST CAN BE INSTALLED FULL DEPTH 1'-3" FROM BRIDGE PIER.

APPROACH POST SPACING REQUIREMENTS

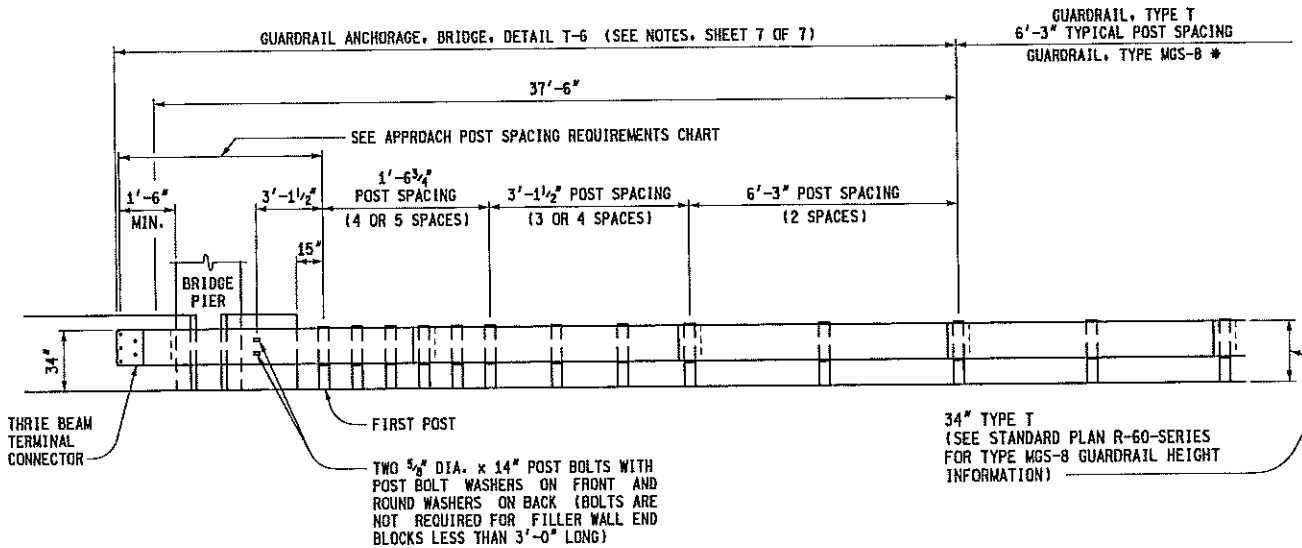
DISTANCE FROM ANCHOR BOLTS TO FIRST POST	7'-11 ³ / ₄ "	9'-6 ¹ / ₂ "	11'-1 ¹ / ₄ "	12'-8"
NUMBER OF 1'-6 ³ / ₄ " POST SPACINGS	4	5	4	5
NUMBER OF 3'-1 ¹ / ₂ " POST SPACINGS	4	3	3	4



INSTALL BOLTS THROUGH FILLER WALL (SEE CHART FOR BOLT REQUIREMENTS FOR CONNECTING GUARDRAIL TO BRIDGE RAILINGS AND FILLER WALLS, SHEET 5 OF 7)

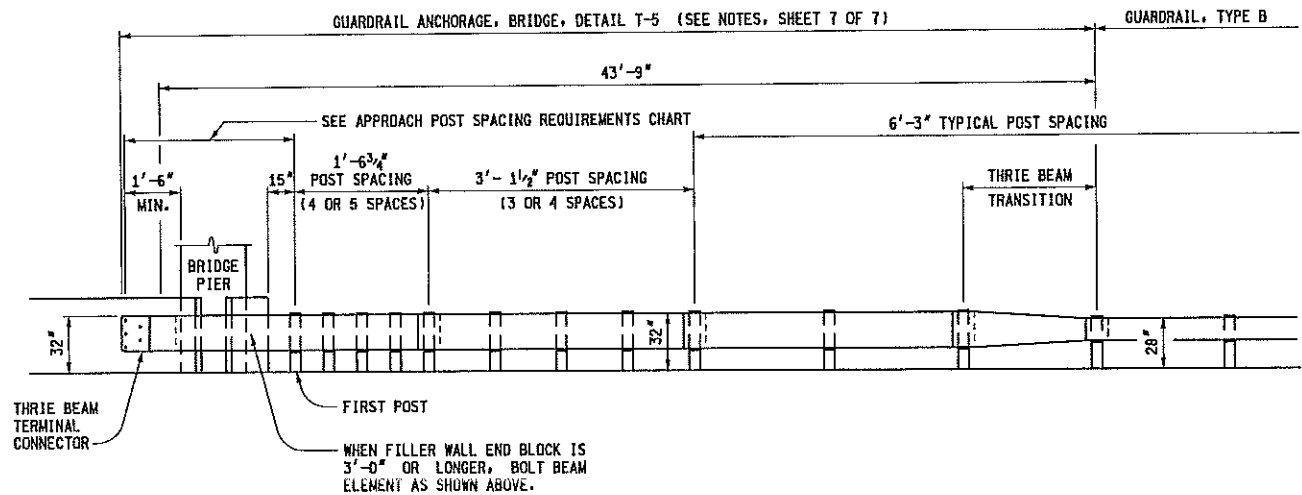
* SEE STANDARD PLAN R-60-SERIES FOR POST SPACING AND GUARDRAIL LAYOUT TO TRANSITION FROM GUARDRAIL, TYPE MGS-8 TO GUARDRAIL ANCHORAGE, BRIDGE DETAILS T-1, T-4 & T-6

PLAN VIEW



ELEVATION VIEW

(TO BE USED WITH GUARDRAIL, TYPE T & TYPE MGS-8)



ELEVATION VIEW

(TO BE USED WITH GUARDRAIL, TYPE B)

DETAILS FOR CONNECTING GUARDRAIL TO FILLER WALLS

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL ANCHORAGE,
BRIDGE, DETAILS

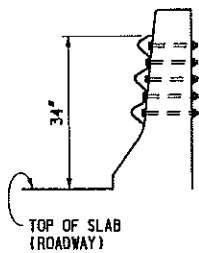
F.H.W.A. APPROVAL

8-9-2017
PLAN DATE

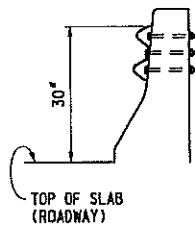
R-67-G

SHEET
4 OF 7

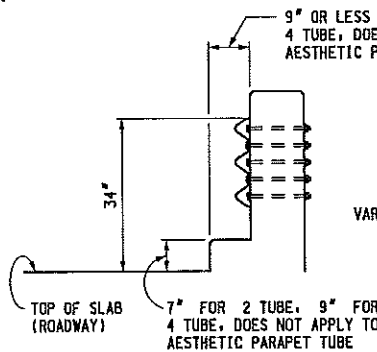
HIGH STRENGTH $\frac{3}{8}$ " DIA. HEX HEAD BOLT AND NUTS SHALL BE USED TO CONNECT GUARDRAIL TO BRIDGE RAILINGS WITH ROUND WASHERS ON FRONT AND SQUARE WASHERS ON BACK. (SEE CHART BELOW FOR LENGTHS AND NUMBER REQUIRED.) WASHER DETAILS ARE SHOWN ON SHEET 6 OF 7.



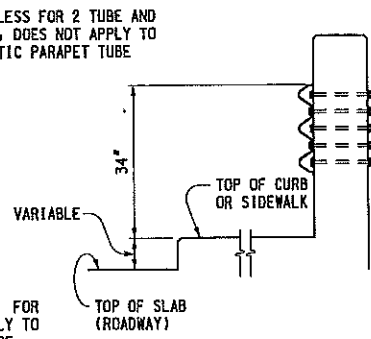
BRIDGE BARRIER RAILING TYPE 4



BRIDGE BARRIER RAILING TYPE 5

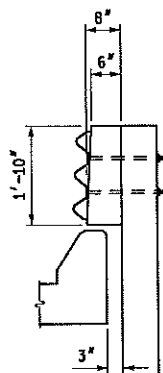


BRIDGE RAILING, 2 TUBE, 4 TUBE, OR AESTHETIC PARAPET TUBE (WITHOUT SIDEWALK OR BRUSH BLOCK)

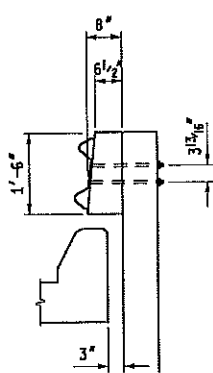


BRIDGE RAILING, 4 TUBE OR AESTHETIC PARAPET TUBE (WITH SIDEWALK)

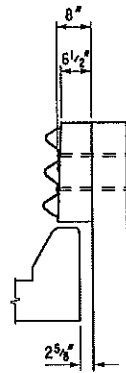
SECTIONS AT BRIDGE RAILINGS



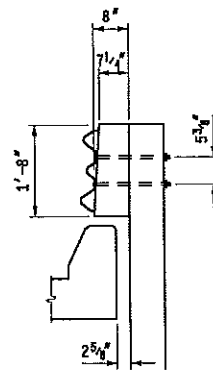
POST 1 FOR BRIDGE BARRIER RAILING, TYPE 4



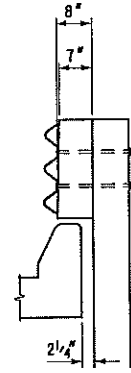
POST 1 FOR BRIDGE BARRIER RAILING, TYPE 5



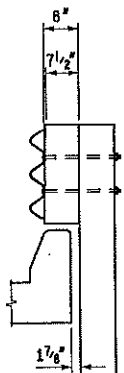
POST 2 FOR BRIDGE BARRIER RAILING, TYPE 4



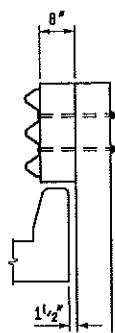
POST 2 FOR BRIDGE BARRIER RAILING, TYPE 5



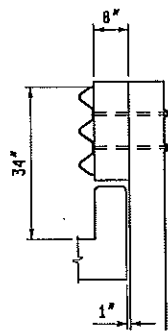
POST 3



POST 4



POST 5



POST 6

BOLT REQUIREMENTS FOR CONNECTING GUARDRAIL TO BRIDGE RAILINGS & FILLER WALLS			
BRIDGE RAILING	BOLT LENGTH	MINIMUM THREAD LENGTH	NUMBER REQUIRED
TYPE 4	12 1/2"	4"	5
TYPE 5	11 1/2"	4"	4
2 TUBE	WALL THICKNESS + 2"	2"	5
4 TUBE	WALL THICKNESS + 2"	2"	5
AESTHETIC PARAPET	WALL THICKNESS + 2"	2"	5
** FILLER WALL	WALL THICKNESS + 2"	2"	5

SHORTER BOLT LENGTHS MAY BE USED PROVIDED THE BOLT EXTENDS 1/4" BEYOND THE NUT WHEN TIGHTENED.

** THE USE OF $\frac{3}{8}$ " DIA. ADHESIVE ANCHORED BOLTS EMBEDDED 8" TO ATTACH GUARDRAIL TO FILLER WALLS WILL BE ALLOWED, INSTEAD OF BOLTING THROUGH THE FILLER WALL, IN THE FOLLOWING LOCATIONS:

1. AT OR NEAR THE JOINT LINE WHEN A FILLER WALL IS A DIFFERENT THICKNESS THAN THE FILLER WALL EXTENSION.
2. IN EXISTING FILLER WALLS THICKER THAN 1'-6".
3. WHEN CONDITIONS PROHIBIT THE USE OF BOLTS.

GUARDRAIL POST SECTIONS FOR GUARDRAIL ANCHORAGE, BRIDGE

NOTE: ADHESIVE ANCHORS SHALL BE SELECTED FROM THE QUALIFIED PRODUCTS LIST OF THE MATERIALS SAMPLING GUIDE.

NOTE: POST AND BLOCK SECTIONS FOR THE 2 TUBE, 4 TUBE, AND AESTHETIC PARAPET TUBE BRIDGE RAILINGS SHALL BE THE SAME AS THAT SHOWN ON POST 6. POST SPACING SHALL BE AS SHOWN IN ELEVATION VIEWS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

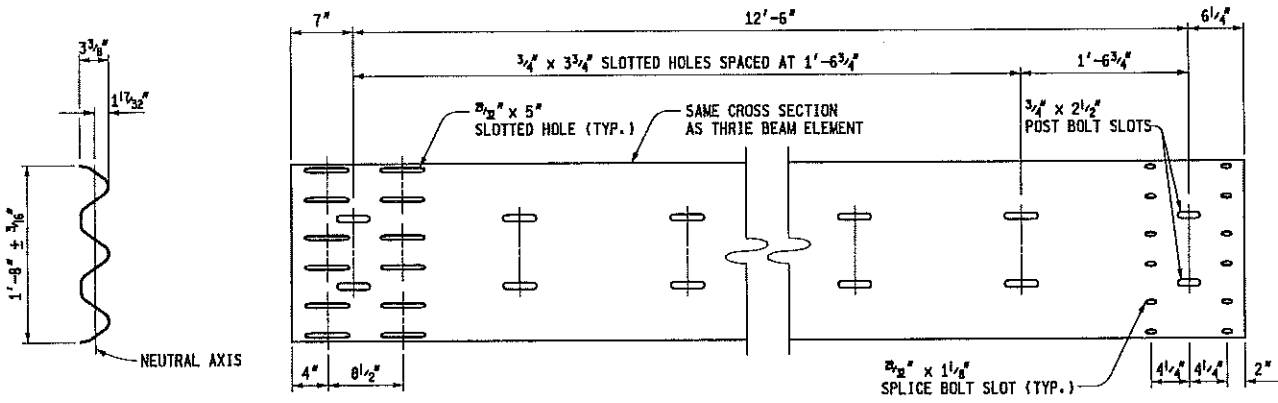
GUARDRAIL ANCHORAGE,
BRIDGE, DETAILS

F.H.W.A. APPROVAL

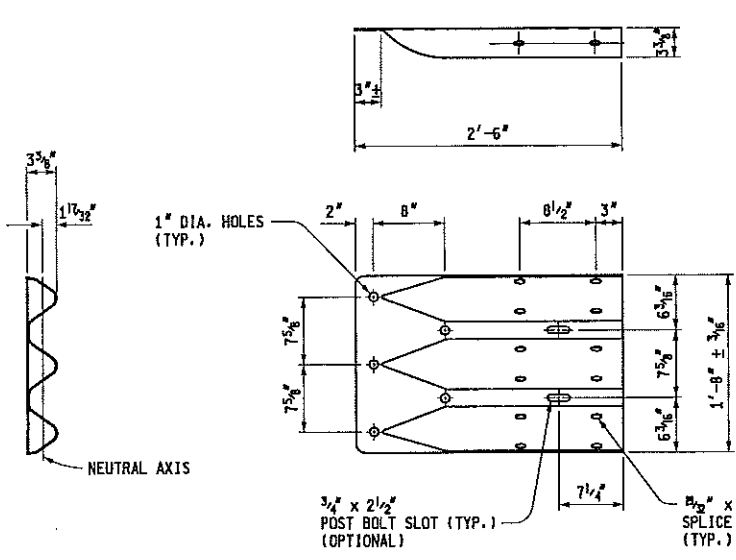
8-9-2017
PLAN DATE

R-67-G

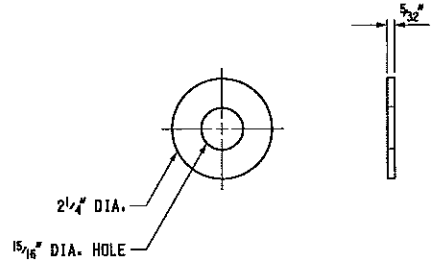
SHEET
5 OF 7



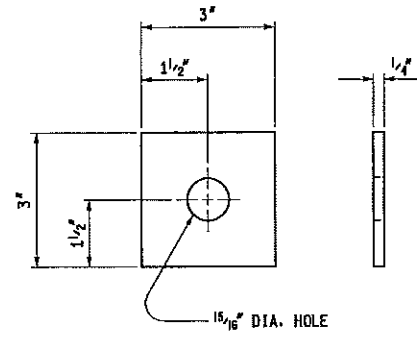
THRIE BEAM EXPANSION SECTION



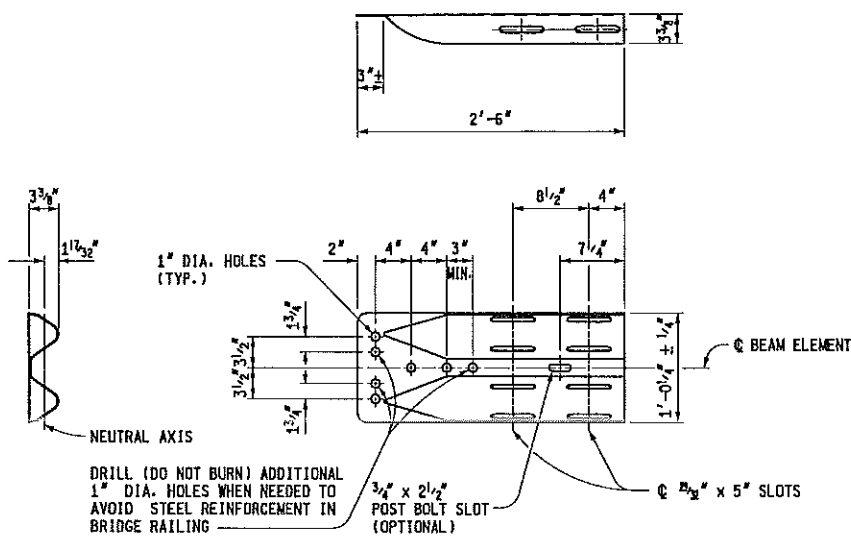
THRIE BEAM TERMINAL CONNECTOR



ROUND WASHER FOR 1/8" DIA. BOLTS



SQUARE WASHER FOR 1/8" DIA. BOLTS



SPECIAL END SHOE

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR
**GUARDRAIL ANCHORAGE,
 BRIDGE, DETAILS**

F.H.W.A. APPROVAL	8-9-2017 PLAN DATE	R-67-G	SHEET 6 OF 7
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NOTES:

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

ALL POSTS USED TO CONSTRUCT GUARDRAIL ANCHORAGE, BRIDGE SHALL BE 7'-0" LONG.

THE THRIE BEAM TERMINAL CONNECTOR AND SPECIAL END SHOE SHALL BE THE SAME MATERIAL AS ADJACENT RUN OF GUARDRAIL, EXCEPT THAT THEY SHALL NOT BE LIGHTER THAN 10 GAGE (0.138").

SECTIONS OF THE THRIE BEAM ELEMENT REQUIRED TO BE TWISTED FOR USE IN ANCHORAGE SHALL BE FIELD BENT.

GUARDRAIL BEAM ELEMENTS SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC, EXCEPT FOR THE THRIE BEAM TERMINAL CONNECTOR WHICH MAY BE LAPPED IN EITHER DIRECTION.

STANDARD SPLICE BOLTS SHALL BE USED WHEN SPLICING THE THRIE BEAM TERMINAL CONNECTOR TO THE THRIE BEAM EXPANSION SECTION AND WHEN SPLICING THE SPECIAL END SHOE TO THE TRANSITION SECTION. THE SPLICE BOLT NUT SHALL BE INSTALLED FINGER-TIGHT AND SHALL FULLY ENGAGE THE SPLICE BOLT WITH A MINIMUM OF ONE THREAD EXTENDING BEYOND THE NUT. THIS SHALL BE FOLLOWED UP BY UPSETTING THE FIRST THREAD ON THE OUTSIDE OF THE NUT WITH A CENTER PUNCH OR COLD CHISEL, SO THAT IT WILL NOT LOOSEN.

SEE THE CURRENT STANDARD PLAN R-32-SERIES FOR APPROACH CURB AND GUTTER AND DOWNSPOUT HEADER.

GUARDRAIL ANCHORAGE, BRIDGE, DETAILS T-1, T-2, T-5, AND T-6 REQUIRE THAT THE THRIE BEAM TERMINAL CONNECTOR BE ATTACHED TO THE $2\frac{3}{32}$ " x 5" LONG SLOTTED HOLES IN THE THRIE BEAM EXPANSION SECTION.

SEE APPROPRIATE PLANS TO DETERMINE WHETHER GUARDRAIL ANCHORAGE, BRIDGE SPANS A BRIDGE EXPANSION JOINT.

SEE THE CURRENT STANDARD PLAN R-55-SERIES FOR FILLER WALLS AND FILLER WALL END BLOCK.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

GUARDRAIL ANCHORAGE,
BRIDGE, DETAILS

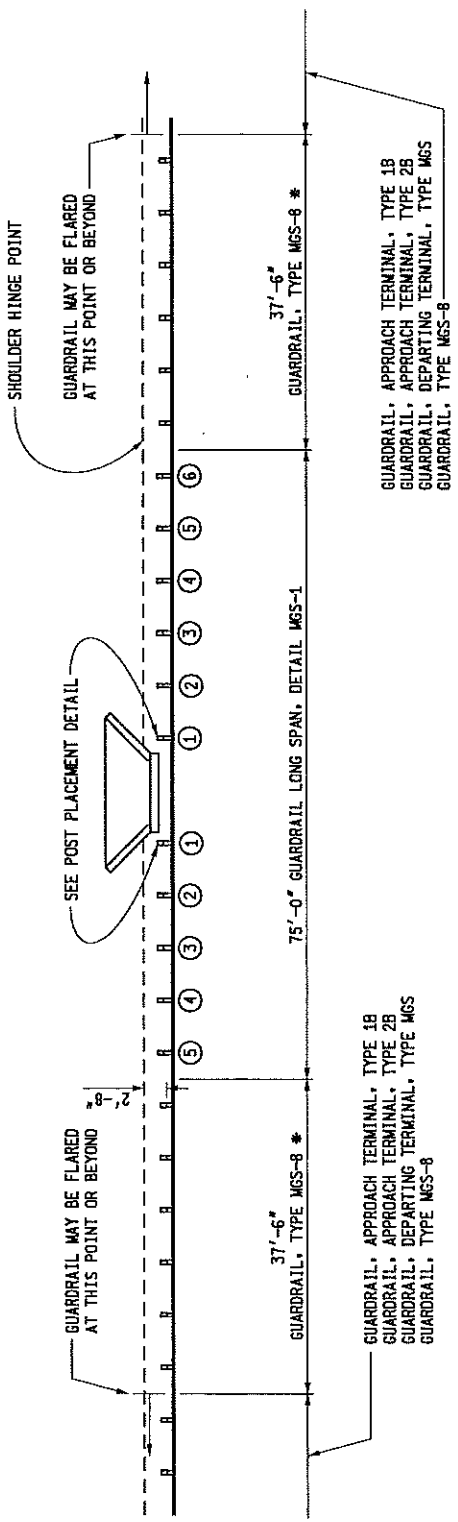
F.H.W.A. APPROVAL

8-9-2017
PLAN DATE

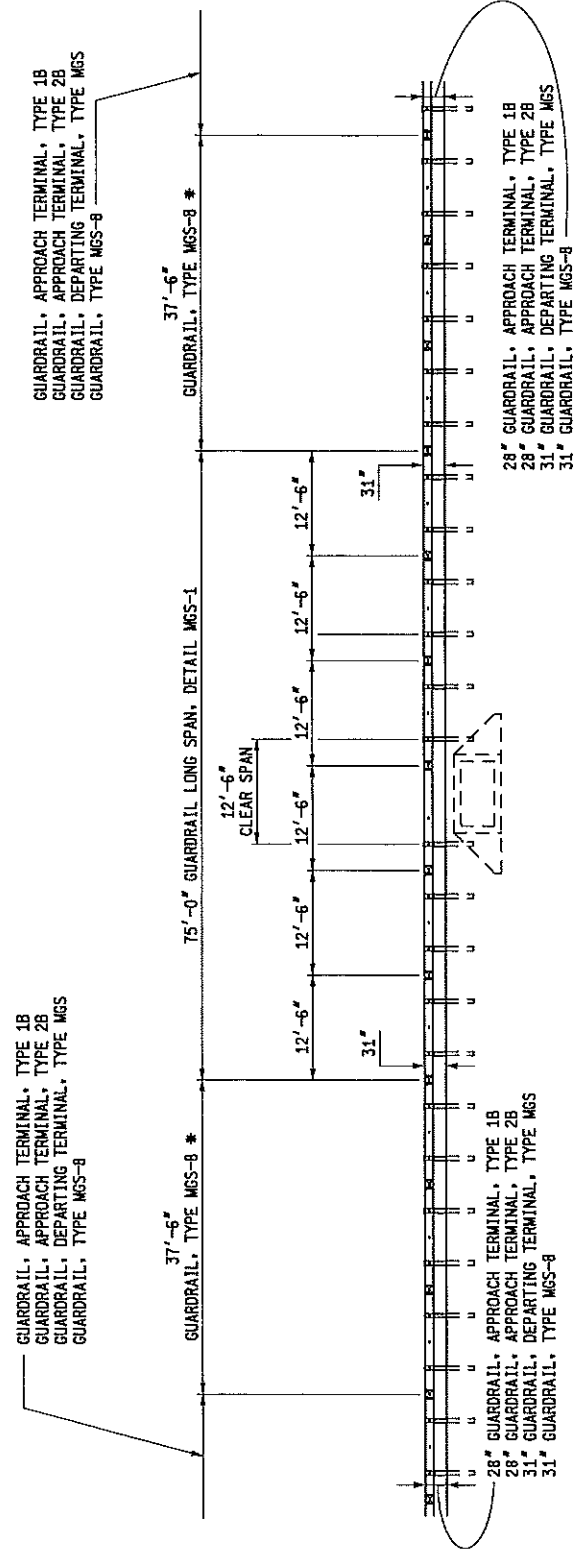
R-67-G

SHEET
7 OF 7

* SEE STANDARD PLAN R-60-SERIES FOR POST SPACING AND GUARDRAIL LAYOUT TO TRANSITION FROM GUARDRAIL, TYPE MGS-8 TO GUARDRAIL, APPROACH TERMINAL, TYPE 1B OR GUARDRAIL, APPROACH TERMINAL, TYPE 2B.



PLAN



ELEVATION

GUARDRAIL LONG SPAN, DETAIL MGS-1

MDOT
Michigan Department of Transportation

PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

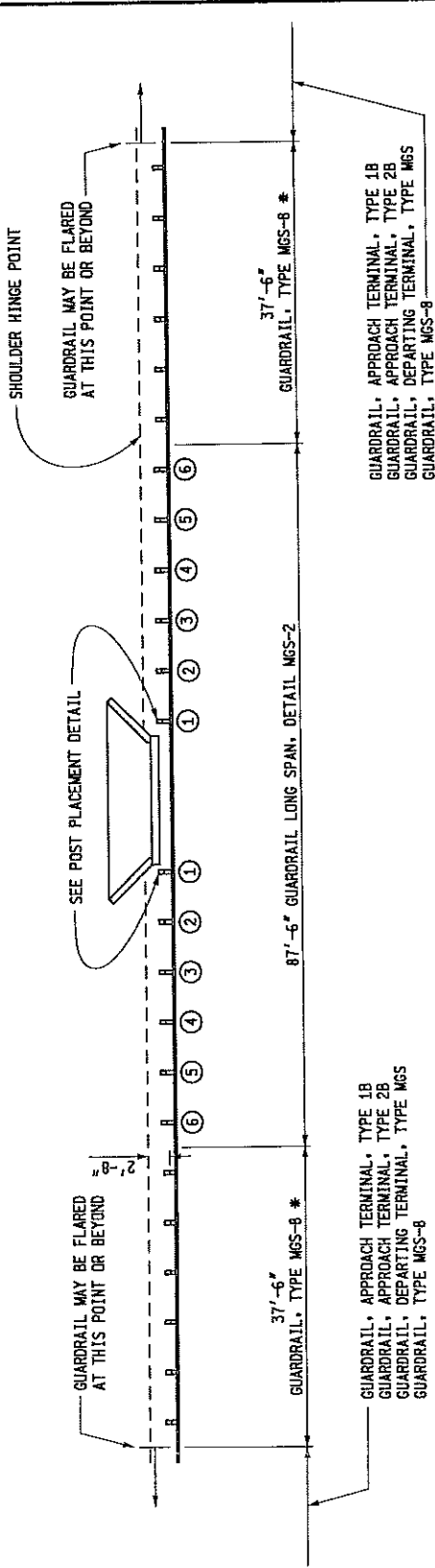
APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

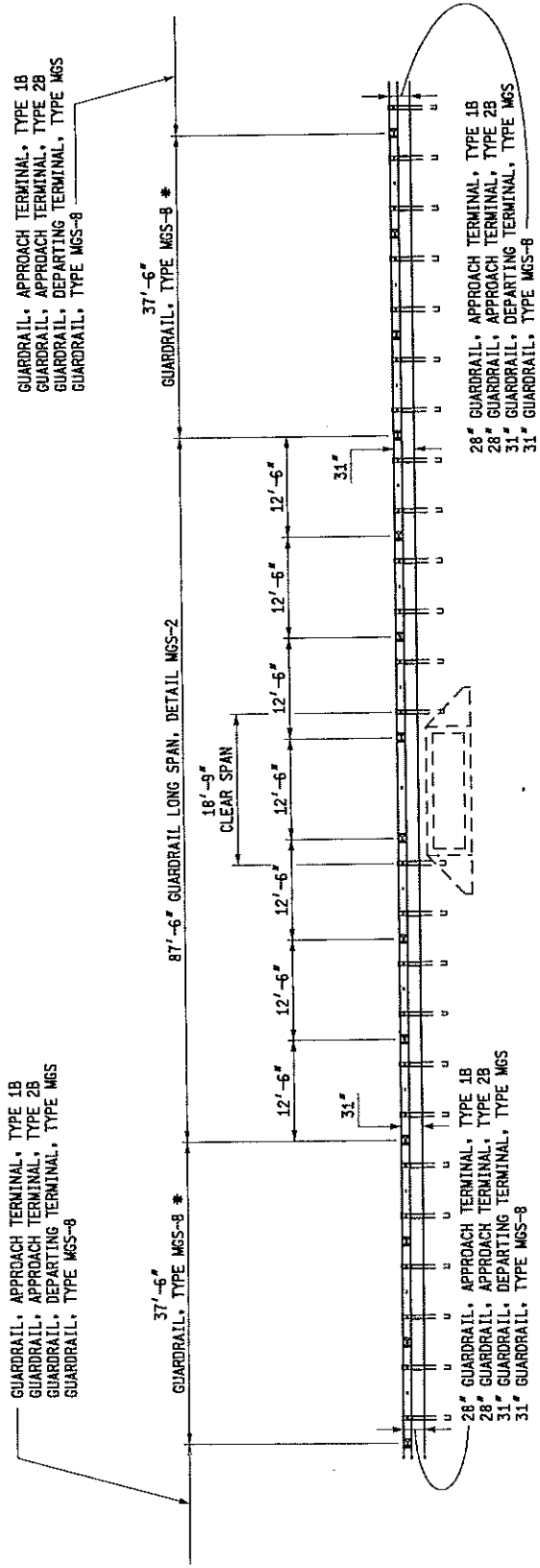
**W-BEAM BACKED GUARDRAIL
AND GUARDRAIL LONG SPAN
INSTALLATIONS**

F.H.W.A. APPROVAL	5-11-2016 PLAN DATE	R-72-D	SHEET 1 OF 11
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* SEE STANDARD PLAN R-60-SERIES FOR POST SPACING AND GUARDRAIL LAYOUT TO TRANSITION FROM GUARDRAIL, TYPE MGS-8 TO GUARDRAIL APPROACH TERMINAL, TYPE 1B OR GUARDRAIL APPROACH TERMINAL, TYPE 2B.



PLAN



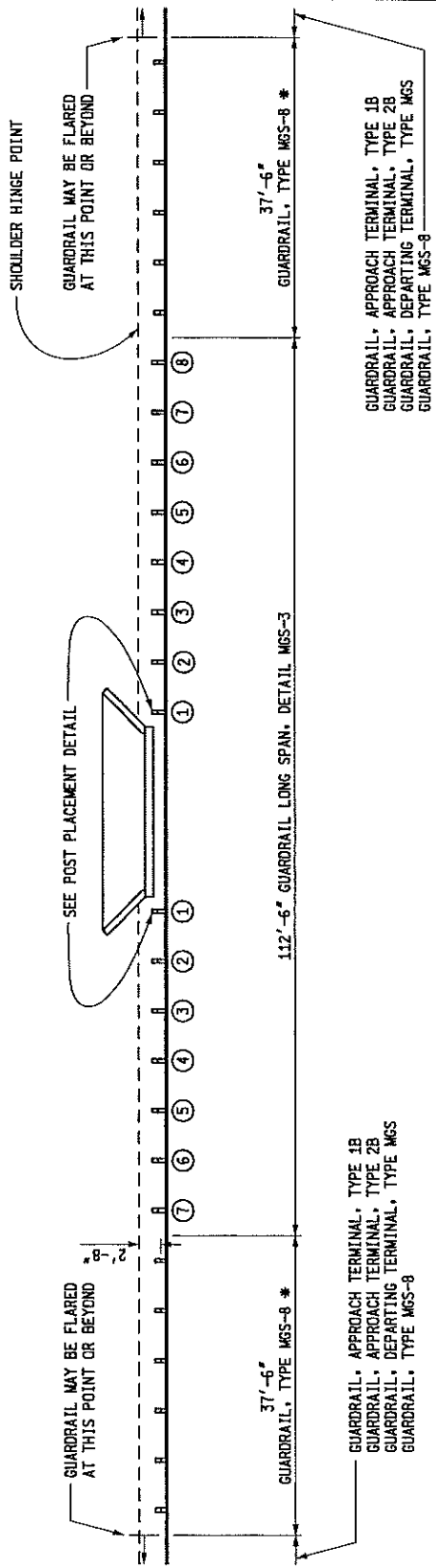
ELEVATION

GUARDRAIL LONG SPAN, DETAIL MGS-2

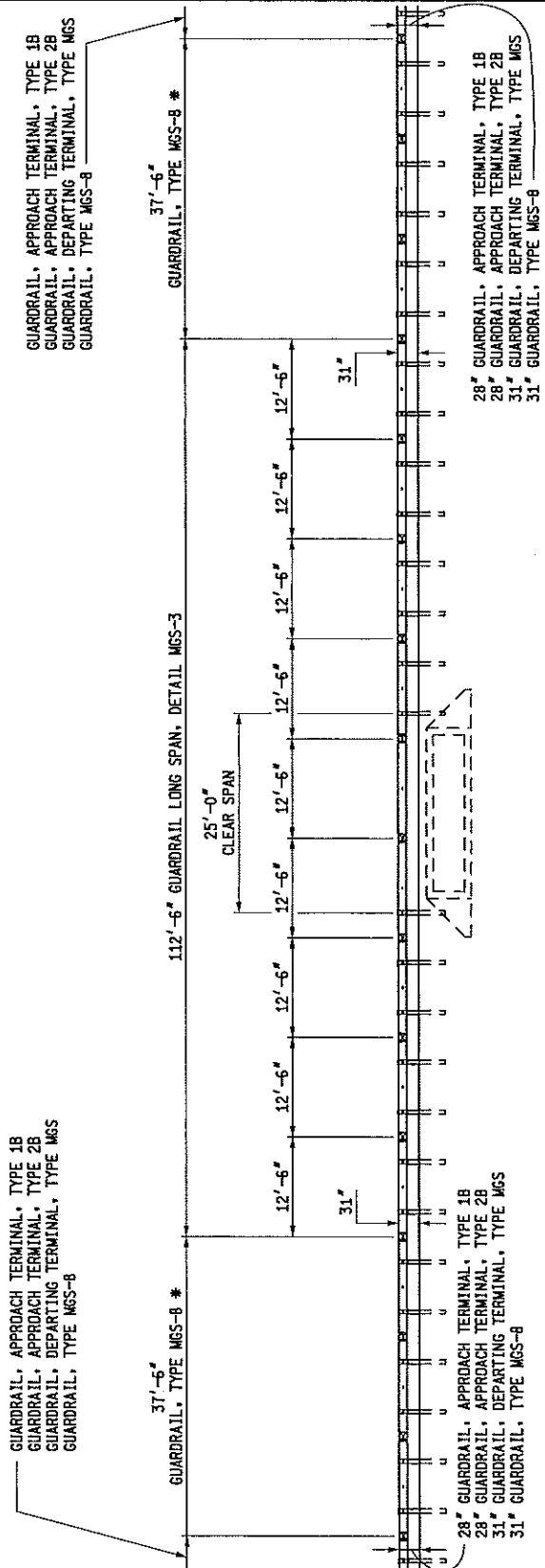
MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR
**W-BEAM BACKED GUARDRAIL
 AND GUARDRAIL LONG SPAN
 INSTALLATIONS**

F.H.W.A. APPROVAL	5-11-2016 PLAN DATE	R-72-D	SHEET 2 OF 11
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* SEE STANDARD PLAN R-60-SERIES FOR POST SPACING AND GUARDRAIL LAYOUT TO TRANSITION FROM GUARDRAIL, TYPE MGS-8 TO GUARDRAIL APPROACH TERMINAL, TYPE 1B OR GUARDRAIL APPROACH TERMINAL, TYPE 2B.



PLAN



ELEVATION

GUARDRAIL LONG SPAN, DETAIL MGS-3

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR
**W-BEAM BACKED GUARDRAIL
 AND GUARDRAIL LONG SPAN
 INSTALLATIONS**

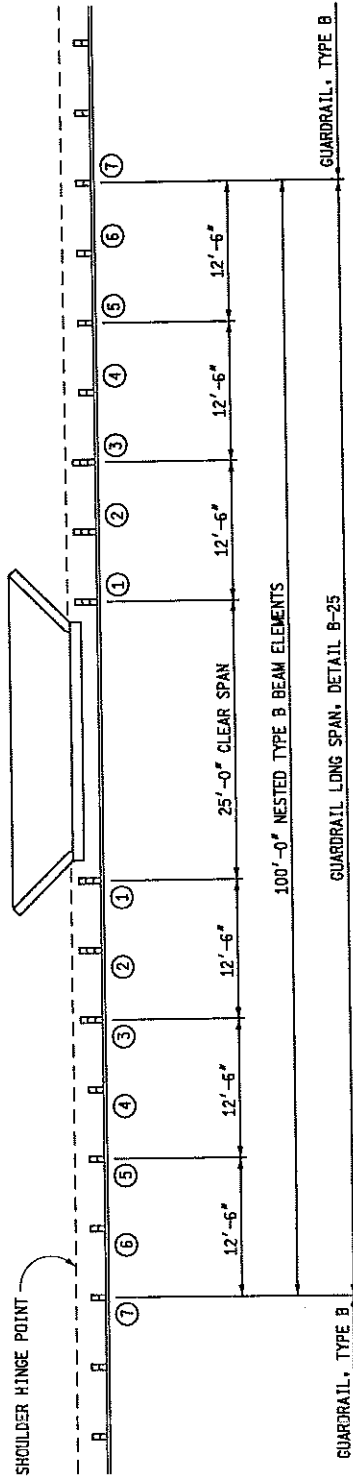
F.H.W.A. APPROVAL	5-11-2016 PLAN DATE	R-72-D	SHEET 3 OF 11
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NOTES:

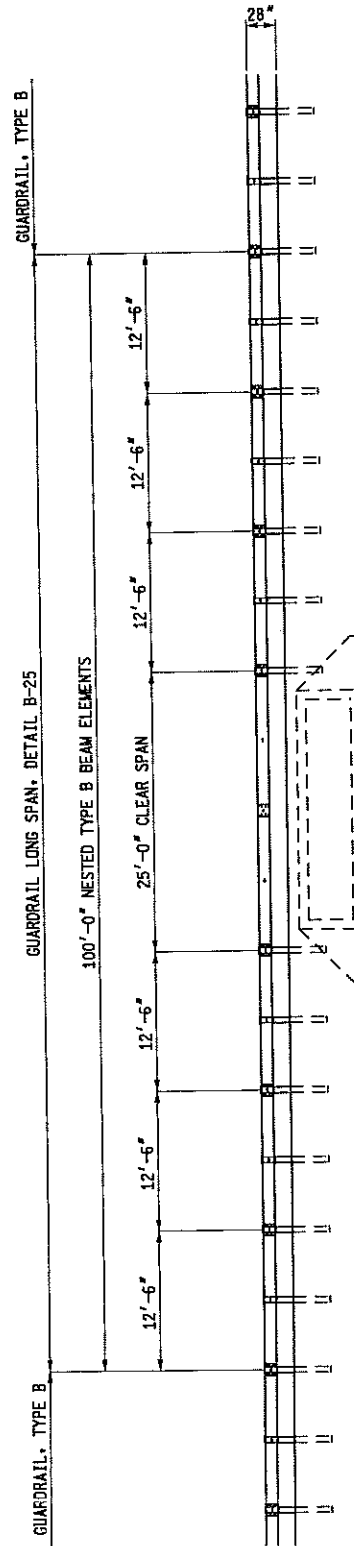
POSTS 1, 2, AND 3 ARE CRT POSTS WITH TWO STANDARD WOOD OFFSET BLOCKS ATTACHED TO THE POST. SEE SHEET 10 FOR CRT POST DETAIL.

POSTS 4, 5, 6, AND 7 ARE STANDARD STEEL OR WOOD TYPE B POSTS WITH OFFSET BLOCK. SEE STANDARD PLAN R-60-SERIES.

INSTALL A MINIMUM OF 12'-6" OF TYPE B GUARDRAIL BETWEEN POST 7 AND GUARDRAIL TERMINAL.



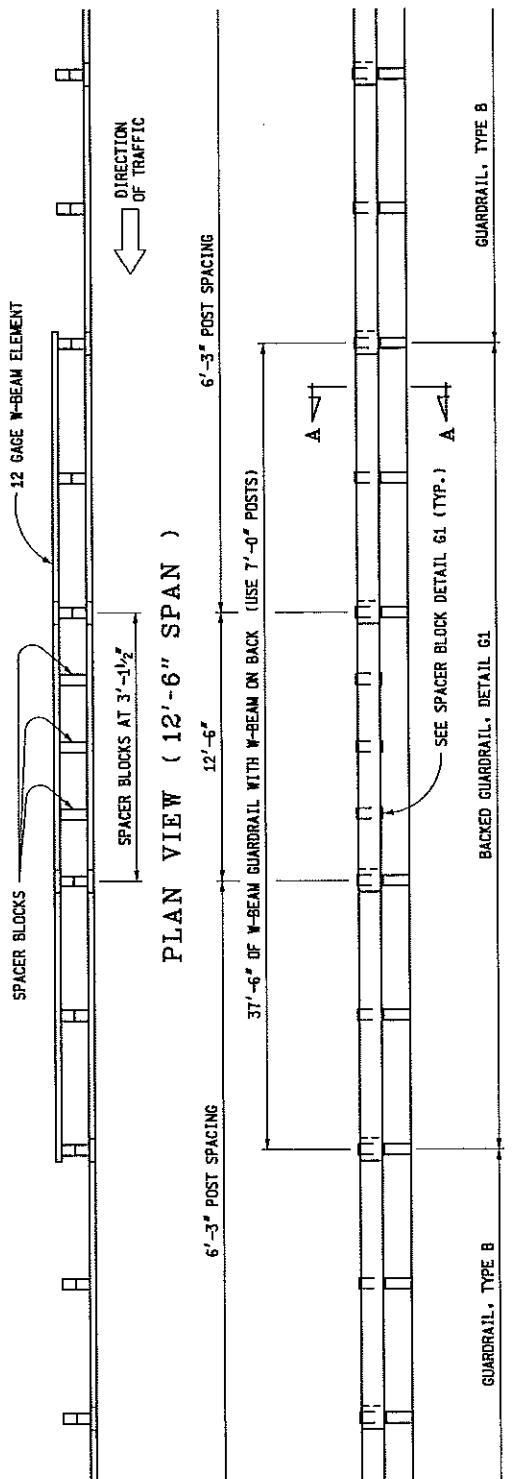
PLAN



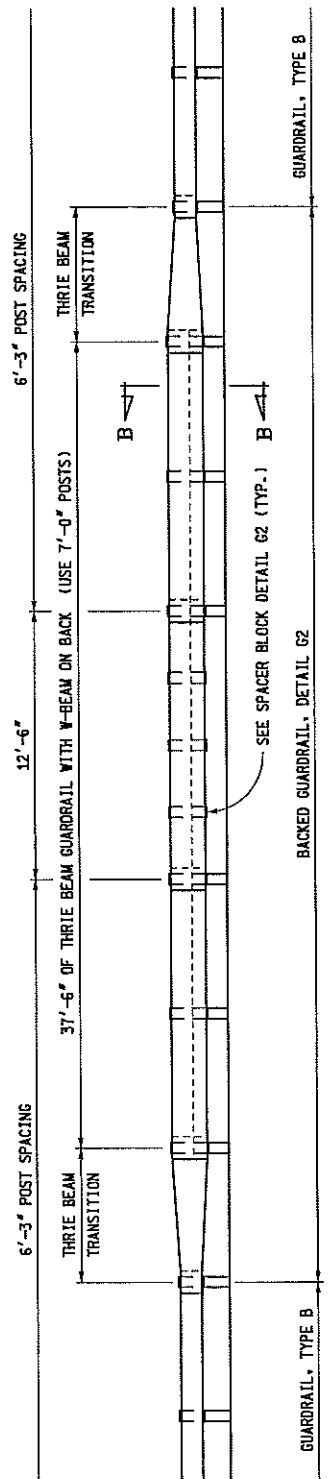
ELEVATION
GUARDRAIL LONG SPAN, DETAIL B-25

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR
**W-BEAM BACKED GUARDRAIL
AND GUARDRAIL LONG SPAN
INSTALLATIONS**

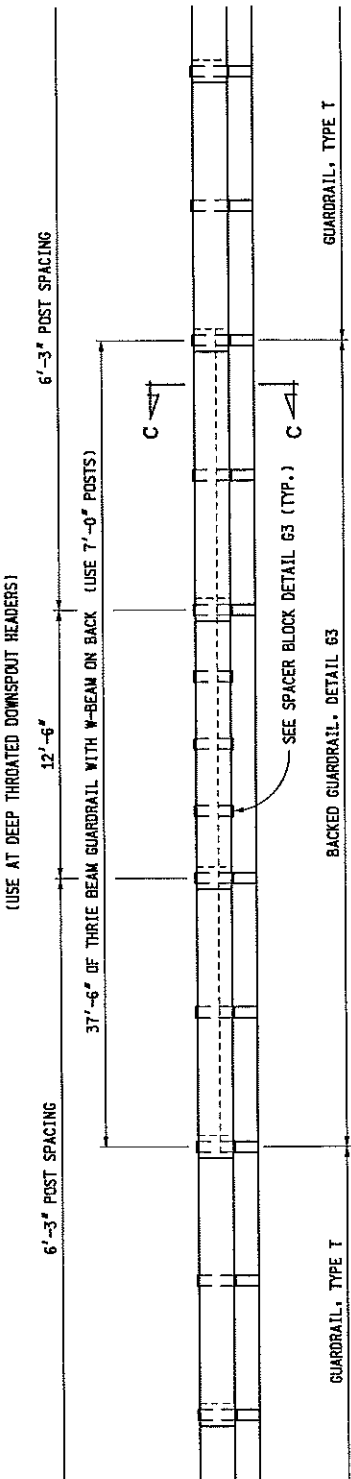
F.H.W.A. APPROVAL	5-11-2016 PLAN DATE	R-72-D	SHEET 4 OF 11
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W-BEAM BACKED GUARDRAIL, TYPE B (12'-6" SPAN)



W-BEAM BACKED GUARDRAIL, TYPE T (12'-6" SPAN)

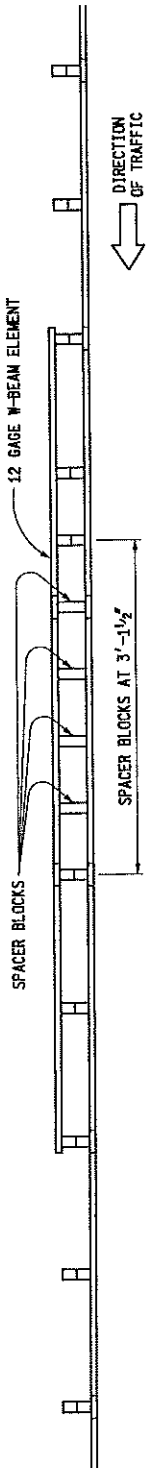


W-BEAM BACKED GUARDRAIL, TYPE T (12'-6" SPAN)

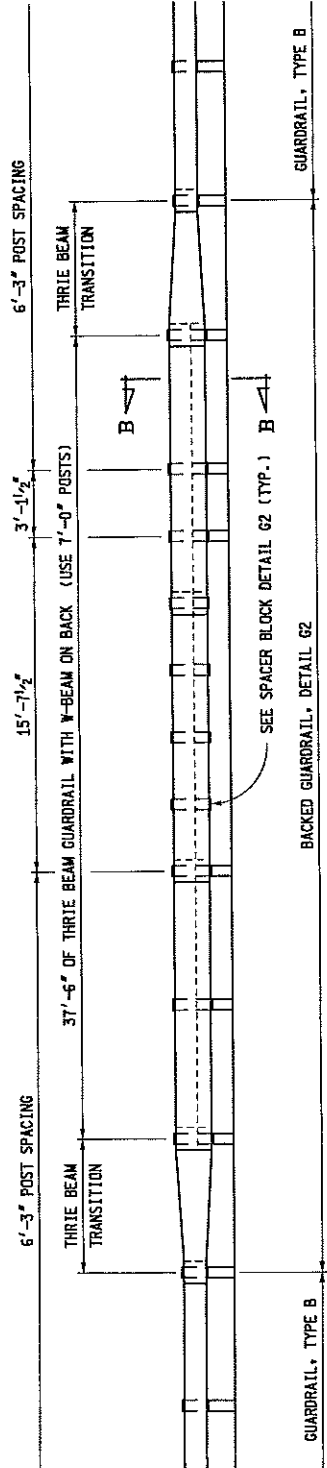
MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**W-BEAM BACKED GUARDRAIL
 AND GUARDRAIL LONG SPAN
 INSTALLATIONS**

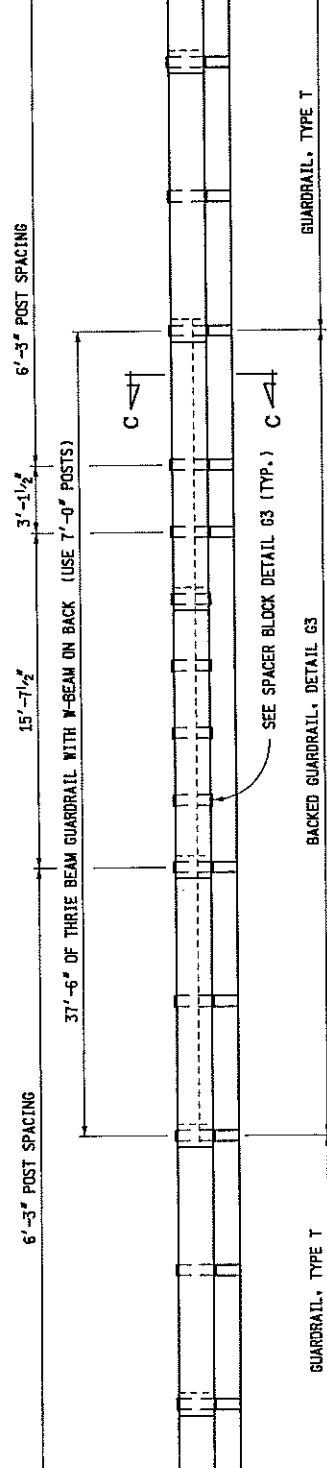
F.H.W.A. APPROVAL	5-11-2016 PLAN DATE	R-72-D	SHEET 5 OF 11
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PLAN VIEW (15'-7 1/2" SPAN)



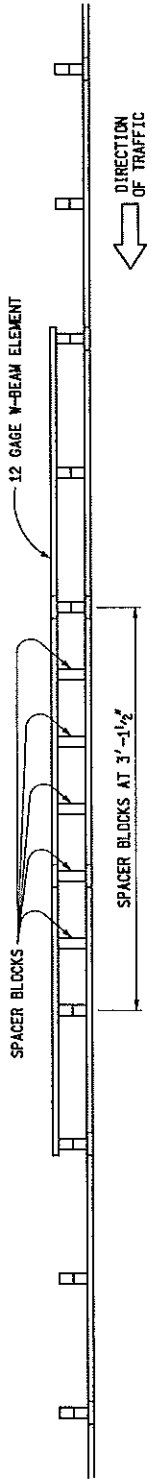
W-BEAM BACKED GUARDRAIL, TYPE T (15'-7 1/2" SPAN)



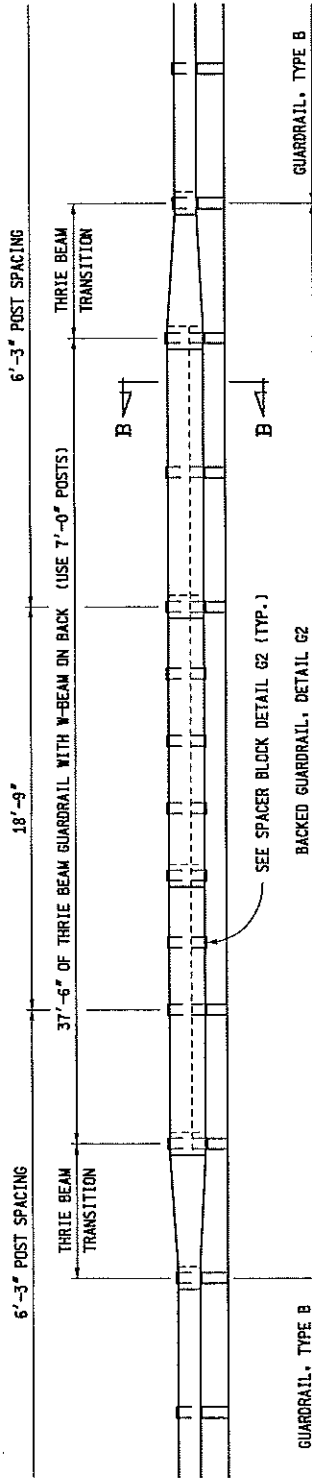
W-BEAM BACKED GUARDRAIL, TYPE T (15'-7 1/2" SPAN)

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR
**W-BEAM BACKED GUARDRAIL
 AND GUARDRAIL LONG SPAN
 INSTALLATIONS**

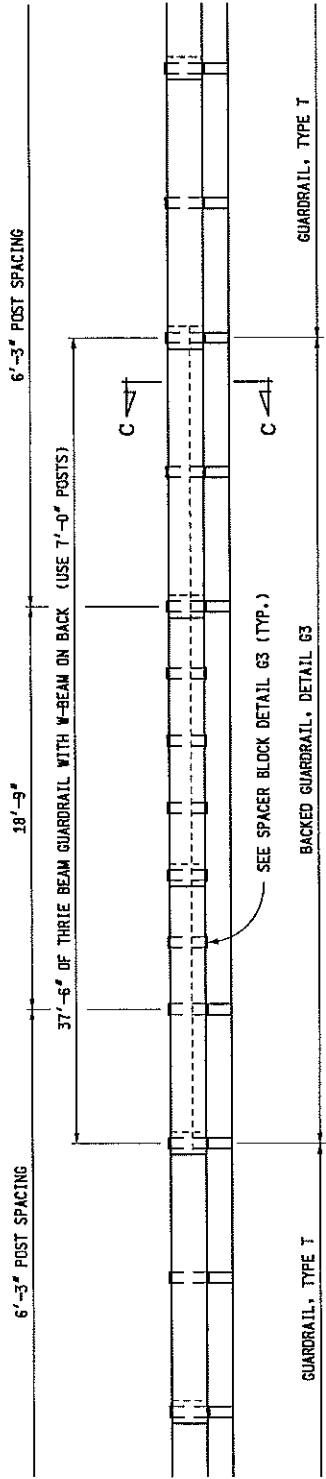
F.H.W.A. APPROVAL	5-11-2016 PLAN DATE	R-72-D	SHEET 6 OF 11
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PLAN VIEW (18'-9" SPAN)

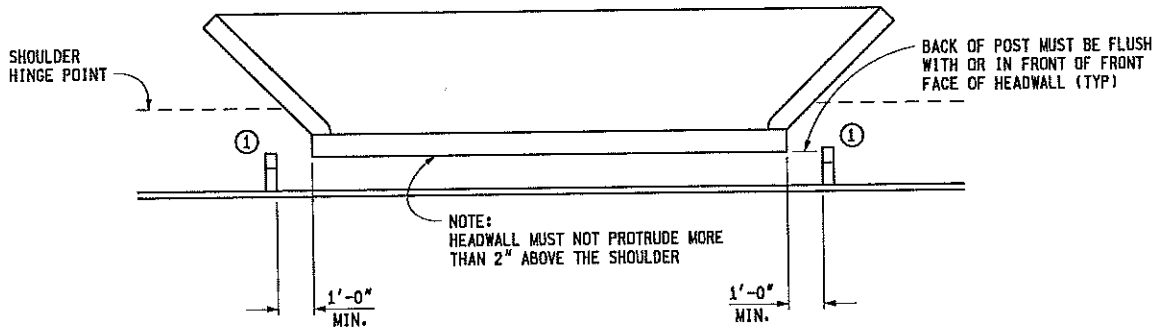


W-BEAM BACKED GUARDRAIL, TYPE T (18'-9" SPAN)

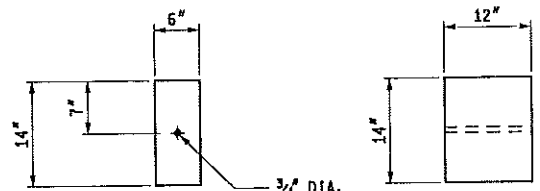
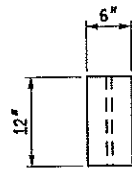
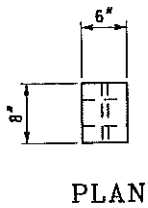


W-BEAM BACKED GUARDRAIL, TYPE T (18'-9" SPAN)

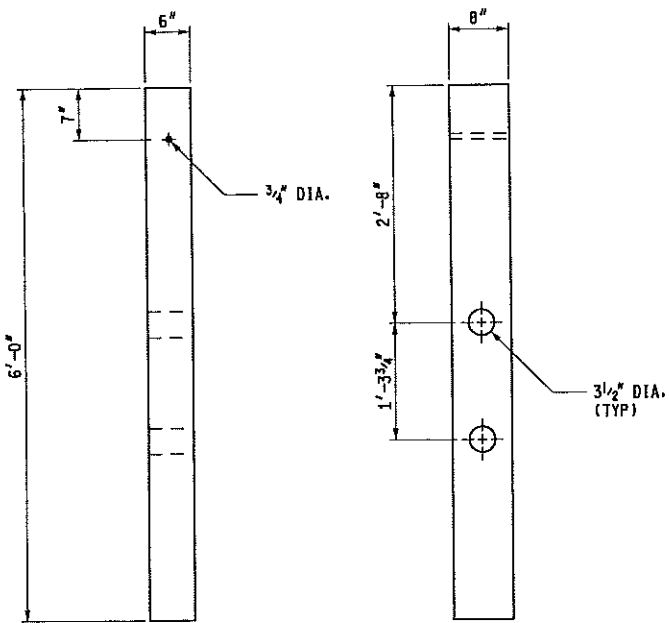
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR W-BEAM BACKED GUARDRAIL AND GUARDRAIL LONG SPAN INSTALLATIONS		
F.H.W.A. APPROVAL	5-11-2016 PLAN DATE	R-72-D SHEET 7 OF 11



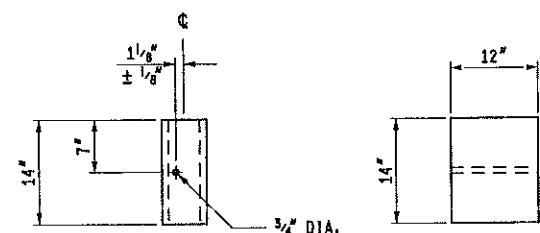
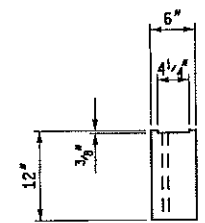
POST PLACEMENT DETAIL



MGS 12" OFFSET BLOCK
FOR USE ON WOOD POSTS



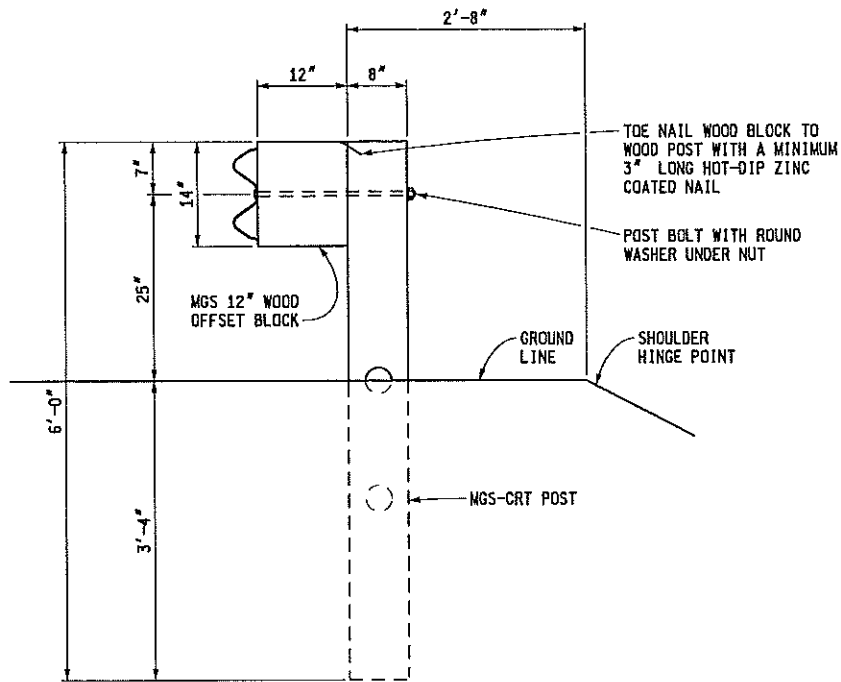
MGS-CRT POST



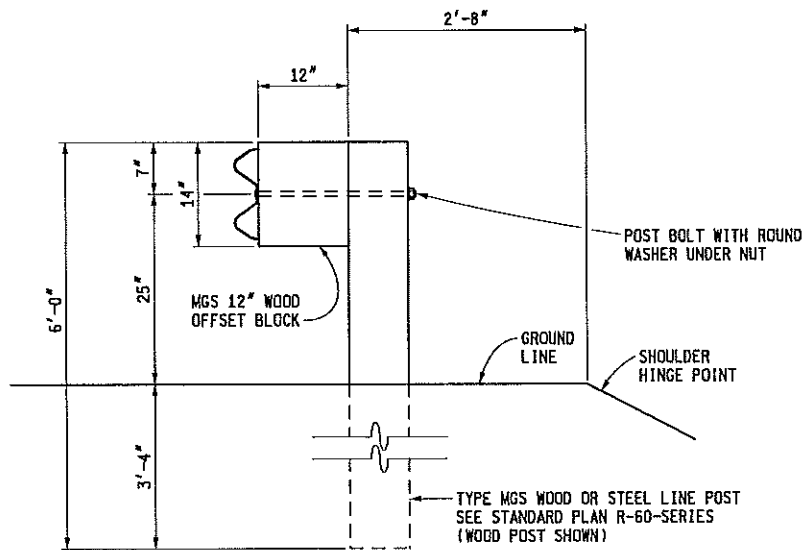
MGS 12" OFFSET BLOCK
FOR USE ON STEEL POSTS

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR
**W-BEAM BACKED GUARDRAIL
AND GUARDRAIL LONG SPAN
INSTALLATIONS**

F.H.W.A. APPROVAL	5-11-2016 PLAN DATE	R-72-D	SHEET 8 OF 11
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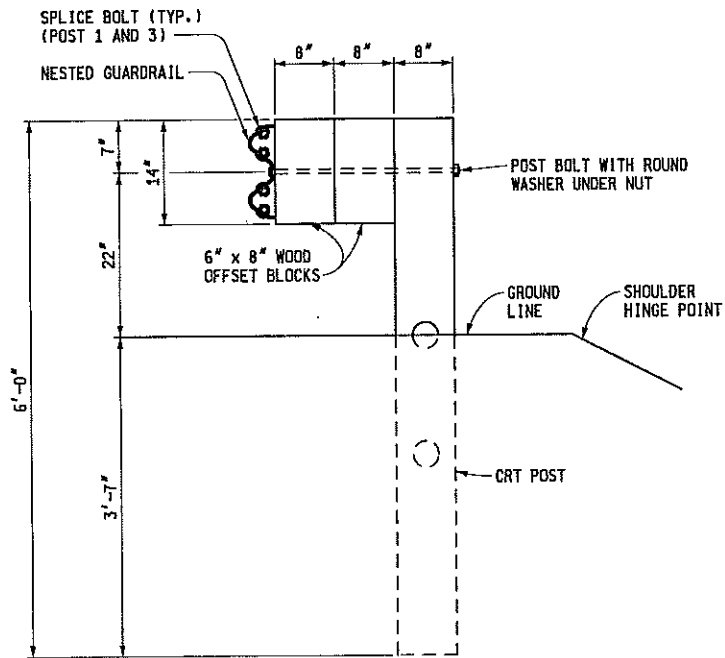
POST 1 THROUGH 3 DETAIL
 GUARDRAIL LONG SPAN DETAILS MGS-1, MGS-2, & MGS-3



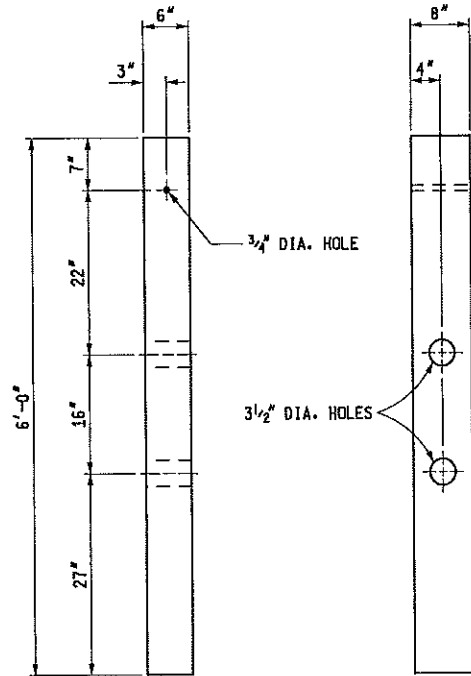
POST 4 THROUGH 6 DETAIL
 GUARDRAIL LONG SPAN DETAILS MGS-1 & MGS-2

POST 4 THROUGH 8 DETAIL
 GUARDRAIL LONG SPAN DETAIL MGS-3

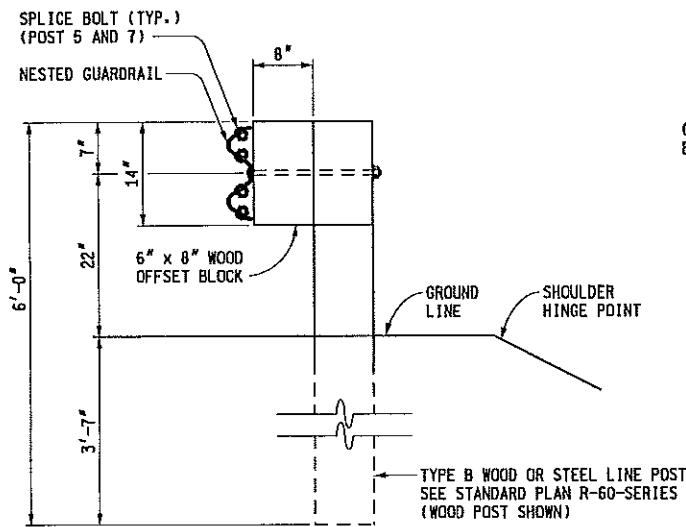
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR W-BEAM BACKED GUARDRAIL AND GUARDRAIL LONG SPAN INSTALLATIONS			
F.H.W.A. APPROVAL	5-11-2016 PLAN DATE	R-72-D	SHEET 9 OF 11



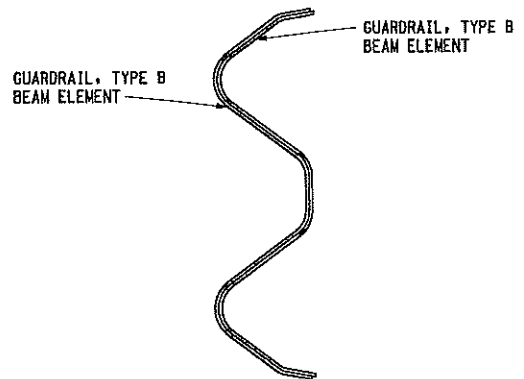
POST 1 THROUGH 3 DETAIL
 GUARDRAIL LONG SPAN DETAIL B-25



CONTROLLED RELEASING
 TERMINAL POST
 (CRT)



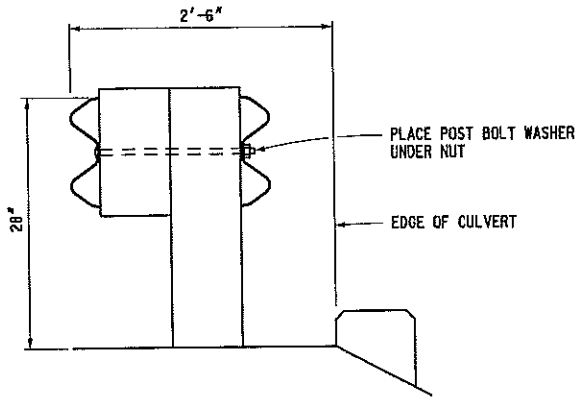
POST 4 THROUGH 7 DETAIL
 GUARDRAIL LONG SPAN DETAIL B-25



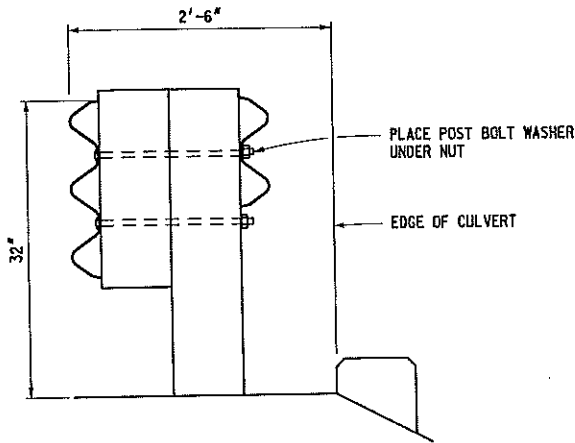
NESTED GUARDRAIL
 DETAIL

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR
**W-BEAM BACKED GUARDRAIL
 AND GUARDRAIL LONG SPAN
 INSTALLATIONS**

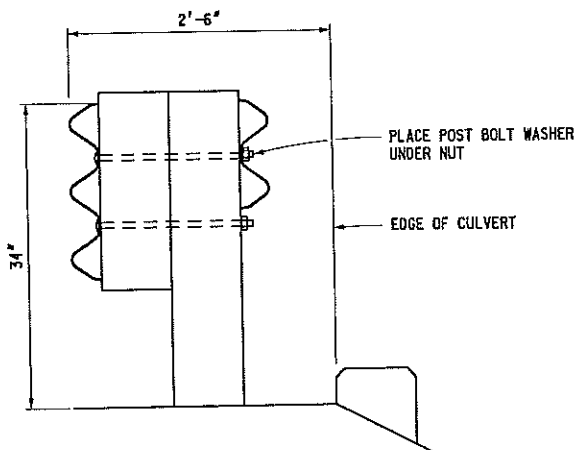
F.H.W.A. APPROVAL	5-11-2016 PLAN DATE	R-72-D	SHEET 10 OF 11
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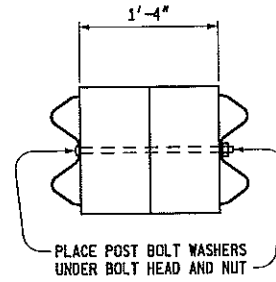
SECTION A - A



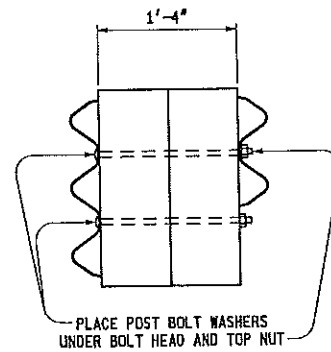
SECTION B - B



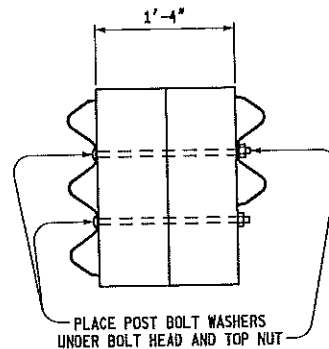
SECTION C - C



SPACER BLOCK DETAIL G1



SPACER BLOCK DETAIL G2



SPACER BLOCK DETAIL G3

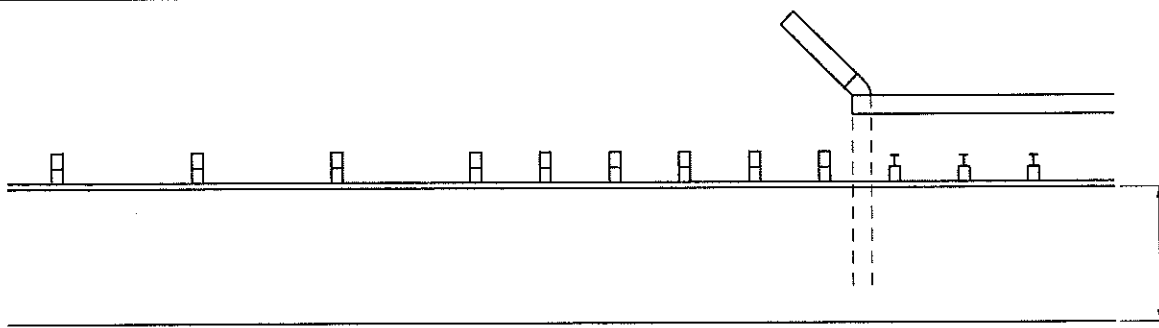
NOTES:

ALL POSTS, OFFSET BLOCKS, BEAM ELEMENTS, AND HARDWARE (INCLUDING BOLTS, NUTS, AND WASHERS) SHALL BE ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS AND THE CURRENT STANDARD PLAN R-60-SERIES, WHERE APPLICABLE, EXCEPT WHERE NOTED ON THIS STANDARD.

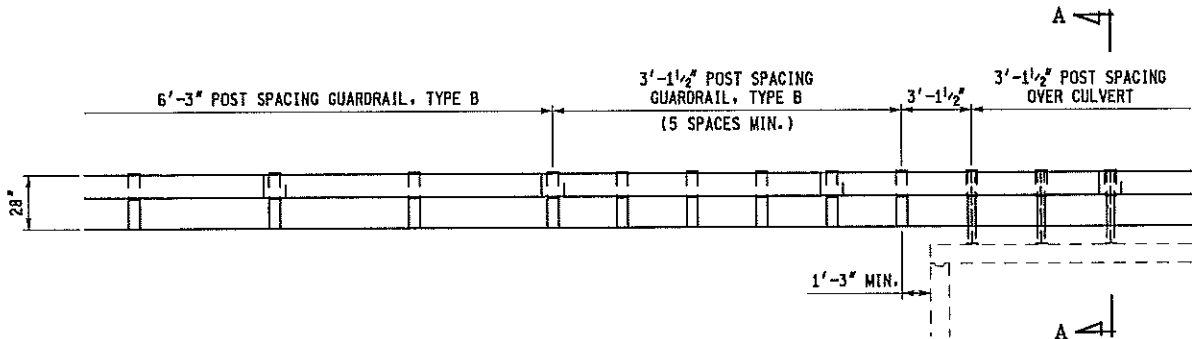
THE GUARDRAIL MODIFICATIONS DETAILED ON THIS STANDARD SHOULD ONLY BE USED WHERE 6'-3" POST SPACING AND POST EMBEDMENT CANNOT BE MET, WHEN THE SPANNING DISTANCE BETWEEN POSTS IS 15'-7 1/2", THE 3'-1 1/2" POST SPACING SHOULD BE PLACED ON THE APPROACH END.

IF USE OF THIS DESIGN WOULD INTERFERE WITH THE POST SPACING WITHIN A GUARDRAIL BRIDGE ANCHORAGE AS SPECIFIED ON STANDARD PLAN R-67-SERIES, OTHER OPTIONS SHOULD BE INVESTIGATED AND USED.

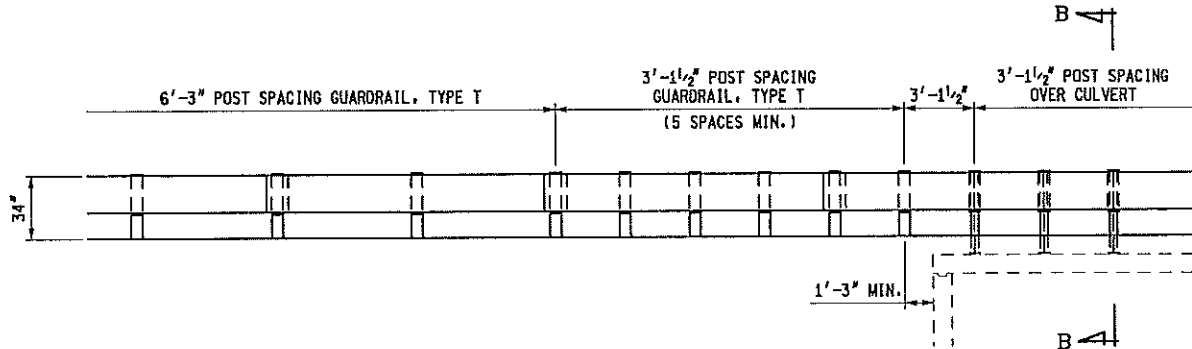
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR W-BEAM BACKED GUARDRAIL AND GUARDRAIL LONG SPAN INSTALLATIONS			
F.H.W.A. APPROVAL	5-11-2016 PLAN DATE	R-72-D	SHEET 11 OF 11



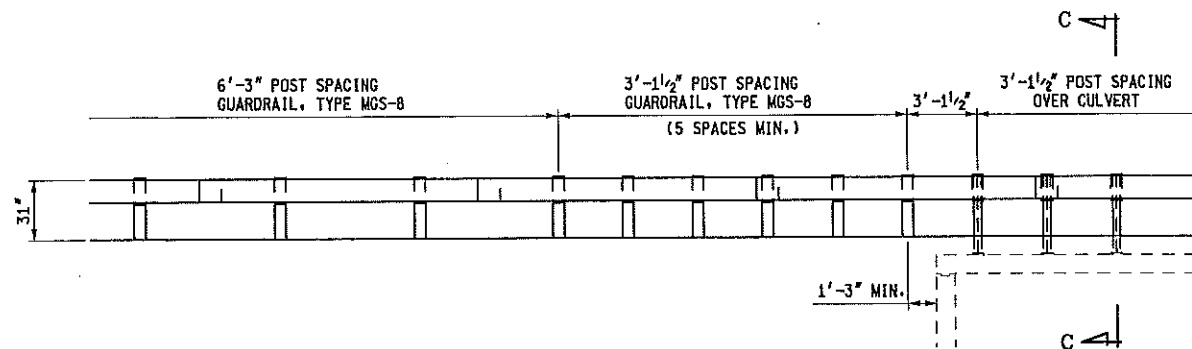
PLAN VIEW



ELEVATION SHOWING GUARDRAIL, TYPE B

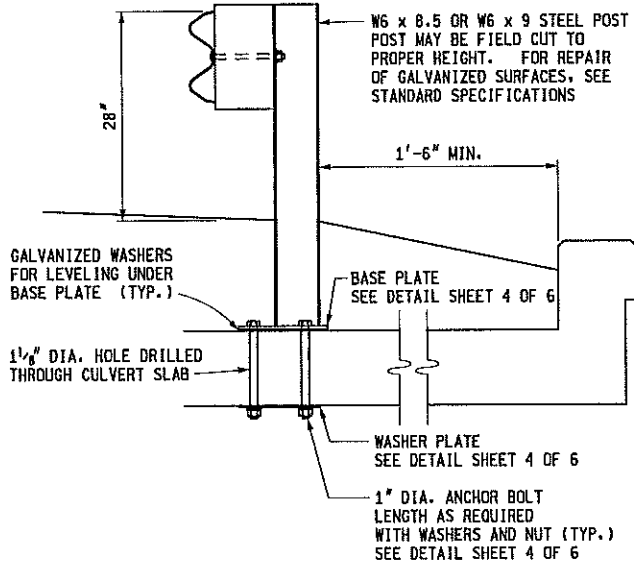


ELEVATION SHOWING GUARDRAIL, TYPE T

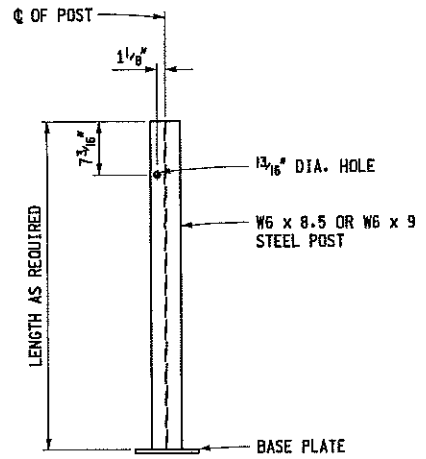


ELEVATION SHOWING GUARDRAIL, TYPE MGS-8

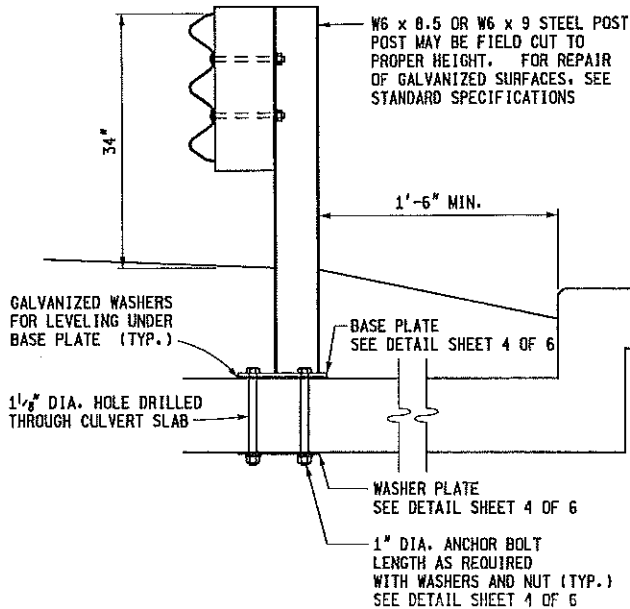
	DEPARTMENT DIRECTOR Kirk T. Steudle	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR	
	APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES	GUARDRAIL OVER BOX OR SLAB CULVERTS	
PREPARED BY DESIGN DIVISION	APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT	3-15-2016 PLAN DATE	R-73-F SHEET 1 OF 6
DRAWN BY: <u>B.L.T.</u>		F.H.W.A. APPROVAL	
CHECKED BY: <u>W.K.P.</u>			



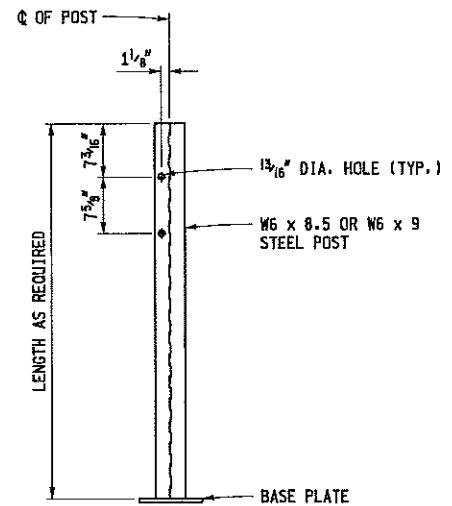
SECTION A - A



STEEL POST DETAIL FOR GUARDRAIL, TYPE B



SECTION B - B



STEEL POST DETAIL FOR GUARDRAIL, TYPE T

PREFERRED CONSTRUCTION METHOD

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

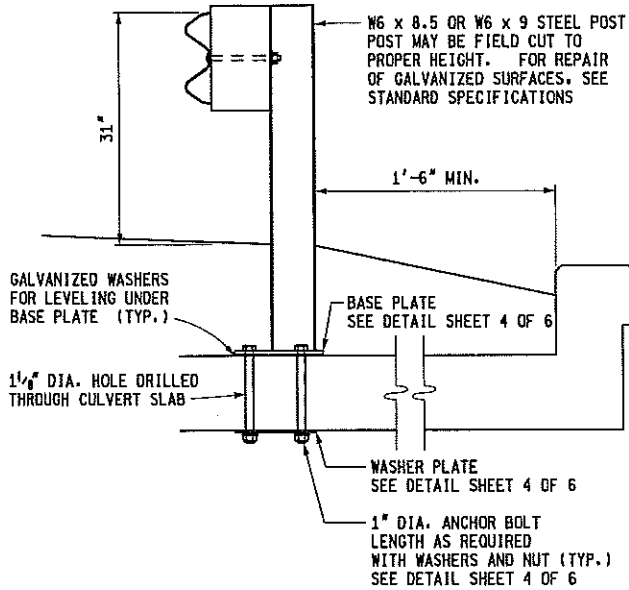
GUARDRAIL OVER
BOX OR SLAB CULVERTS

F.H.W.A. APPROVAL

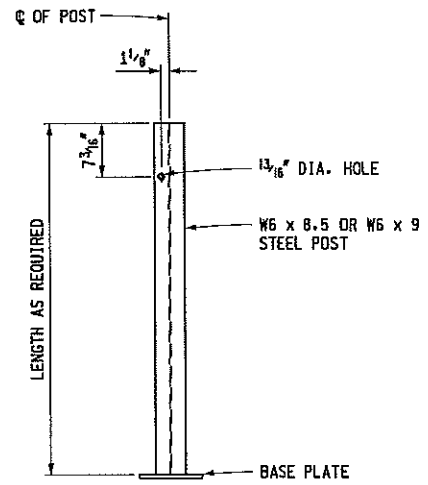
3-15-2016
PLAN DATE

R-73-F

SHEET
2 OF 6



SECTION C - C
GUARDRAIL, TYPE MGS-8



**STEEL POST DETAIL FOR
GUARDRAIL, TYPE MGS-8**

PREFERRED CONSTRUCTION METHOD

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

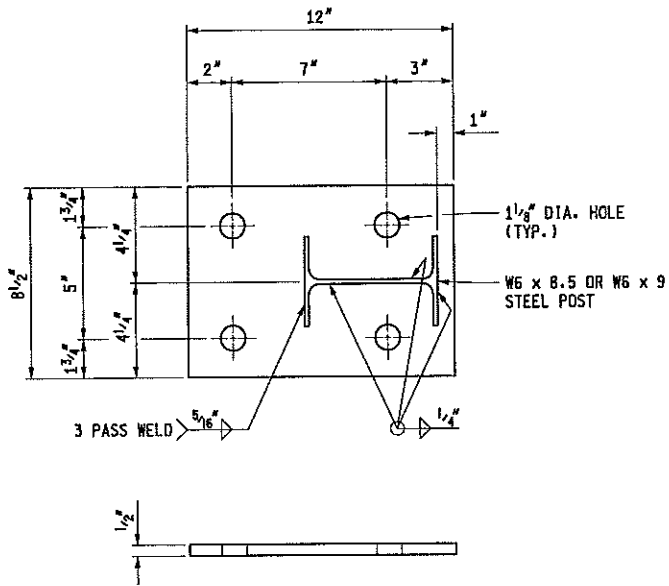
**GUARDRAIL OVER
BOX OR SLAB CULVERTS**

F.H.W.A. APPROVAL

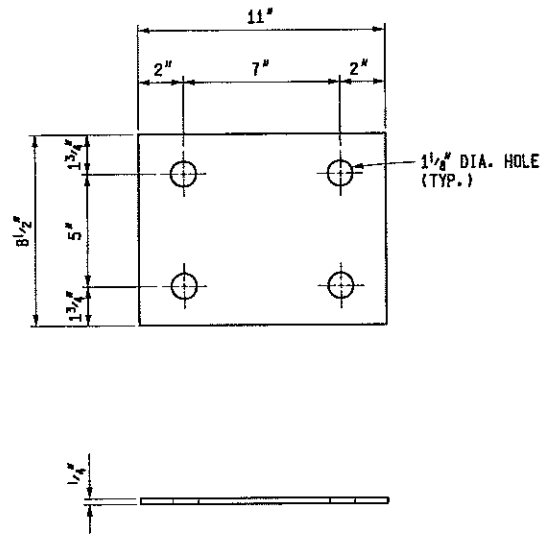
3-15-2016
PLAN DATE

R-73-F

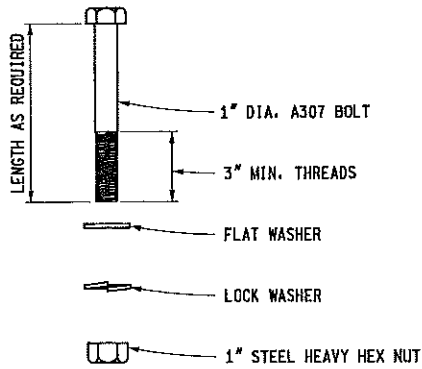
SHEET
3 OF 6



BASE PLATE DETAIL



WASHER PLATE DETAIL



ANCHOR BOLT DETAIL

NOTES:

GUARDRAIL SHALL BE CONSTRUCTED AND PAID FOR ACCORDING TO THE CURRENT STANDARD PLAN R-60-SERIES AND THE CURRENT STANDARD SPECIFICATIONS. IN ADDITION, POSTS ANCHORED TO THE CULVERT SLAB WILL BE PAID FOR AS "GUARDRAIL POST, CULV", WHICH INCLUDES ALL LABOR AND MATERIALS REQUIRED TO CONSTRUCT THE POST AS DETAILED ON THIS PLAN.

ALL MATERIALS FOR GUARDRAIL POST, CULVERT SHALL MEET THE CURRENT STANDARD SPECIFICATIONS FOR BRIDGE RAILINGS.

ALL WORK AND MATERIALS SHALL BE ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

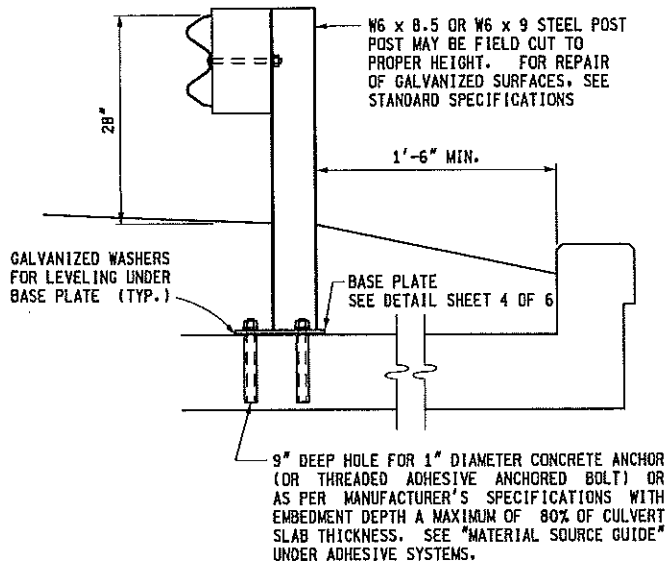
**GUARDRAIL OVER
BOX OR SLAB CULVERTS**

F.H.W.A. APPROVAL

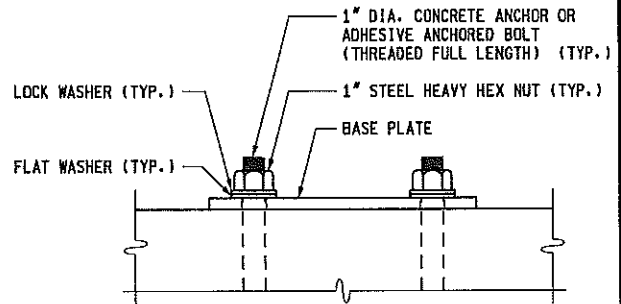
3-15-2016
PLAN DATE

R-73-F

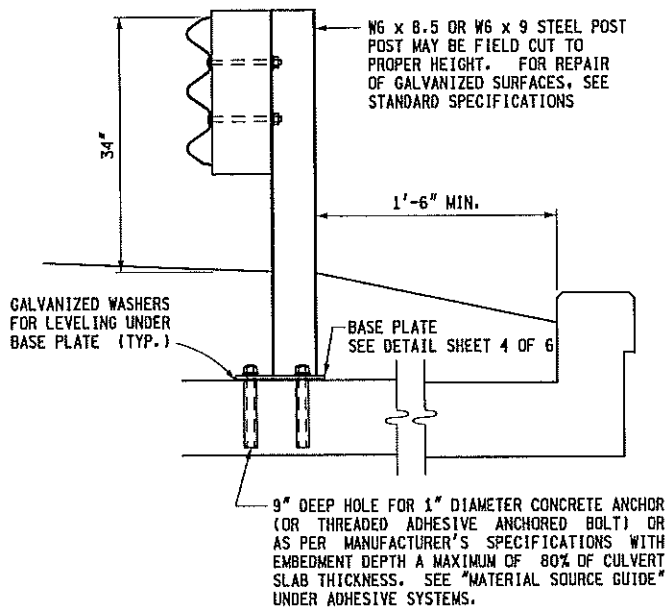
SHEET
4 OF 6



SECTION A - A



ANCHOR DETAIL



SECTION B - B

ALTERNATE CONSTRUCTION METHOD

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

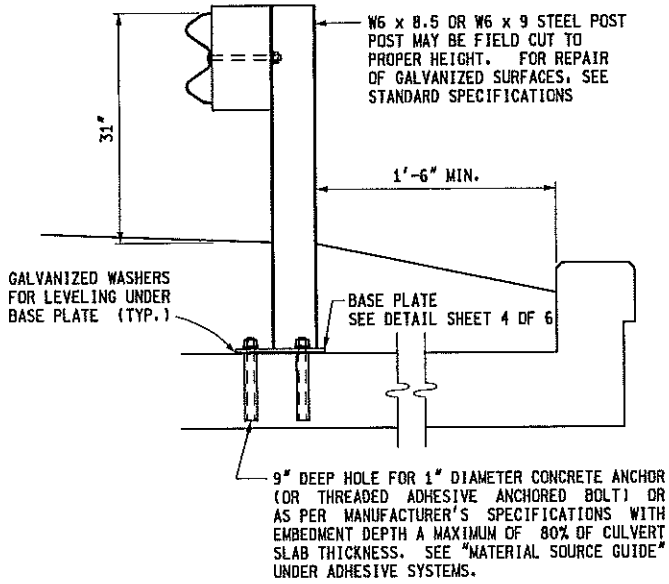
GUARDRAIL OVER
BOX OR SLAB CULVERTS

F.H.W.A. APPROVAL

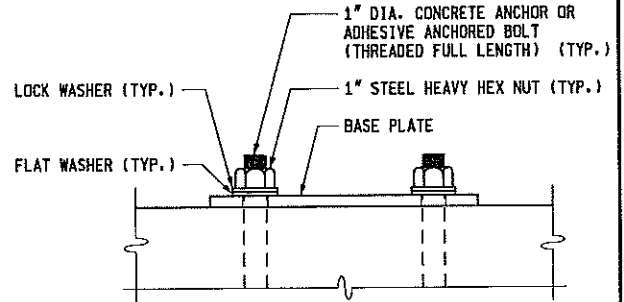
3-15-2016
PLAN DATE

R-73-F

SHEET
5 OF 6



SECTION C - C
 GUARDRAIL, TYPE MGS-8



ANCHOR DETAIL

ALTERNATE CONSTRUCTION METHOD

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR

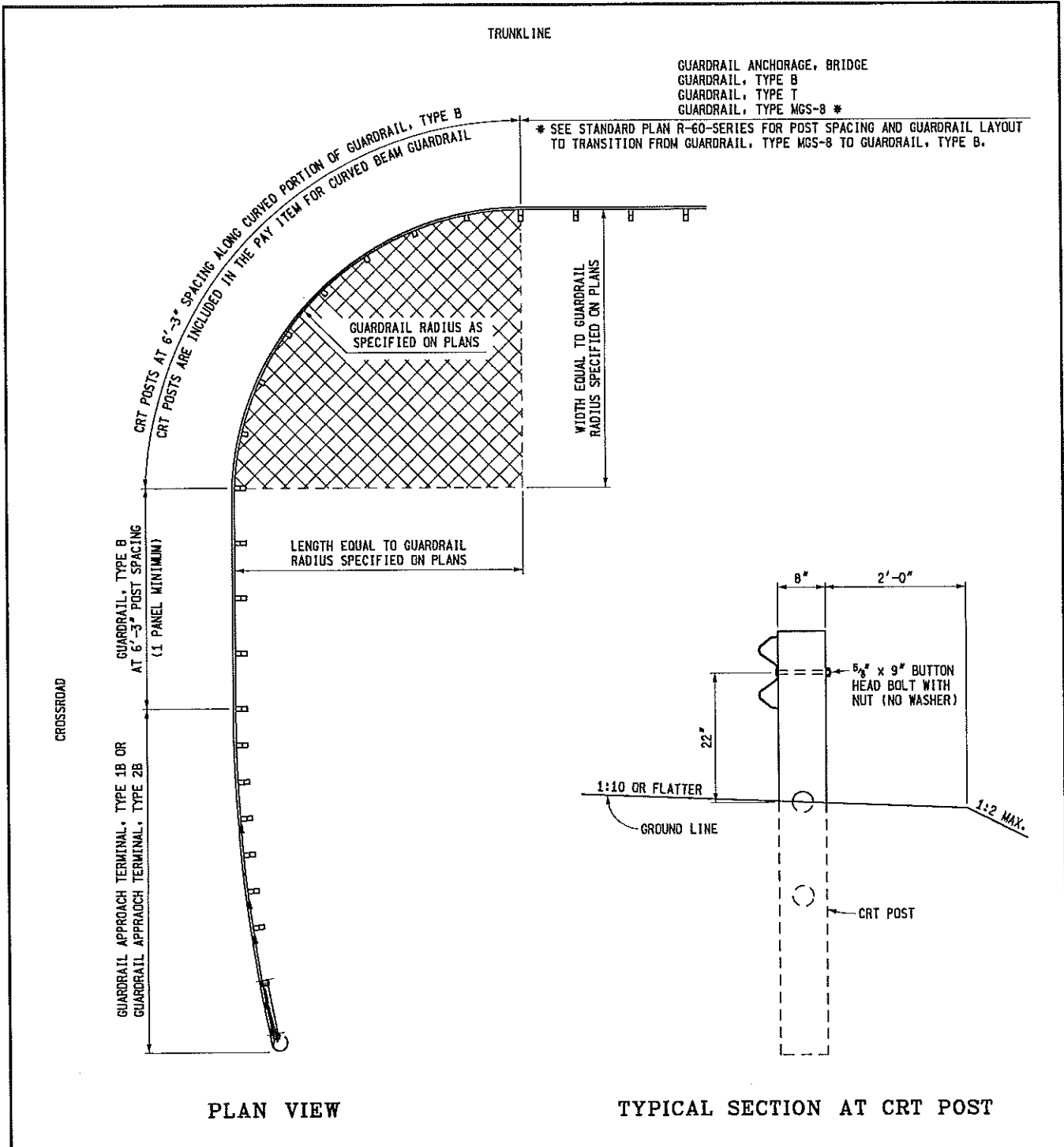
**GUARDRAIL OVER
 BOX OR SLAB CULVERTS**

F.H.W.A. APPROVAL

3-15-2016
 PLAN DATE

R-73-F

SHEET
 6 OF 6



GUARDRAIL ANCHORAGE, BRIDGE
 GUARDRAIL, TYPE B
 GUARDRAIL, TYPE T
 GUARDRAIL, TYPE MGS-8 *

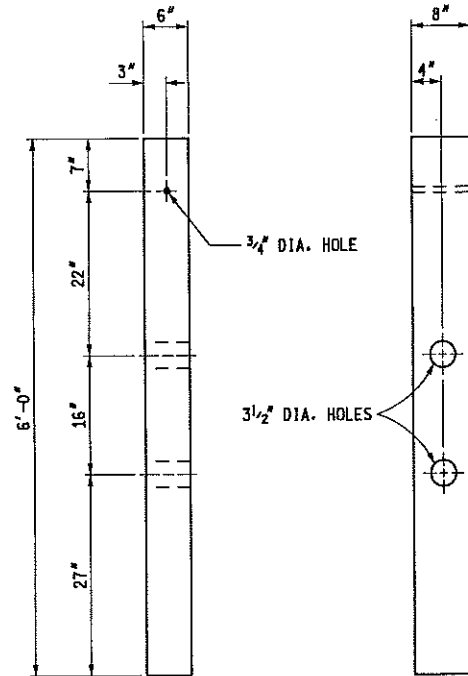
* SEE STANDARD PLAN R-60-SERIES FOR POST SPACING AND GUARDRAIL LAYOUT TO TRANSITION FROM GUARDRAIL, TYPE MGS-8 TO GUARDRAIL, TYPE B.

PLAN VIEW

TYPICAL SECTION AT CRT POST

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 ACCOMMODATE 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.

	DEPARTMENT DIRECTOR Kirk T. Steudle	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT SPECIAL DETAIL	
	APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES	GUARDRAIL AT INTERSECTIONS	
PREPARED BY DESIGN DIVISION	APPROVED BY: _____ DIRECTOR, BUREAU OF DEVELOPMENT	3-14-2016 PLAN DATE	SPECIAL DETAIL 21
DRAWN BY: B.L.T. CHECKED BY: W.K.P.		F.H.W.A. APPROVAL	SHEET 1 OF 2



**CONTROLLED RELEASING TERMINAL POST
(CRT)**

NOTES:

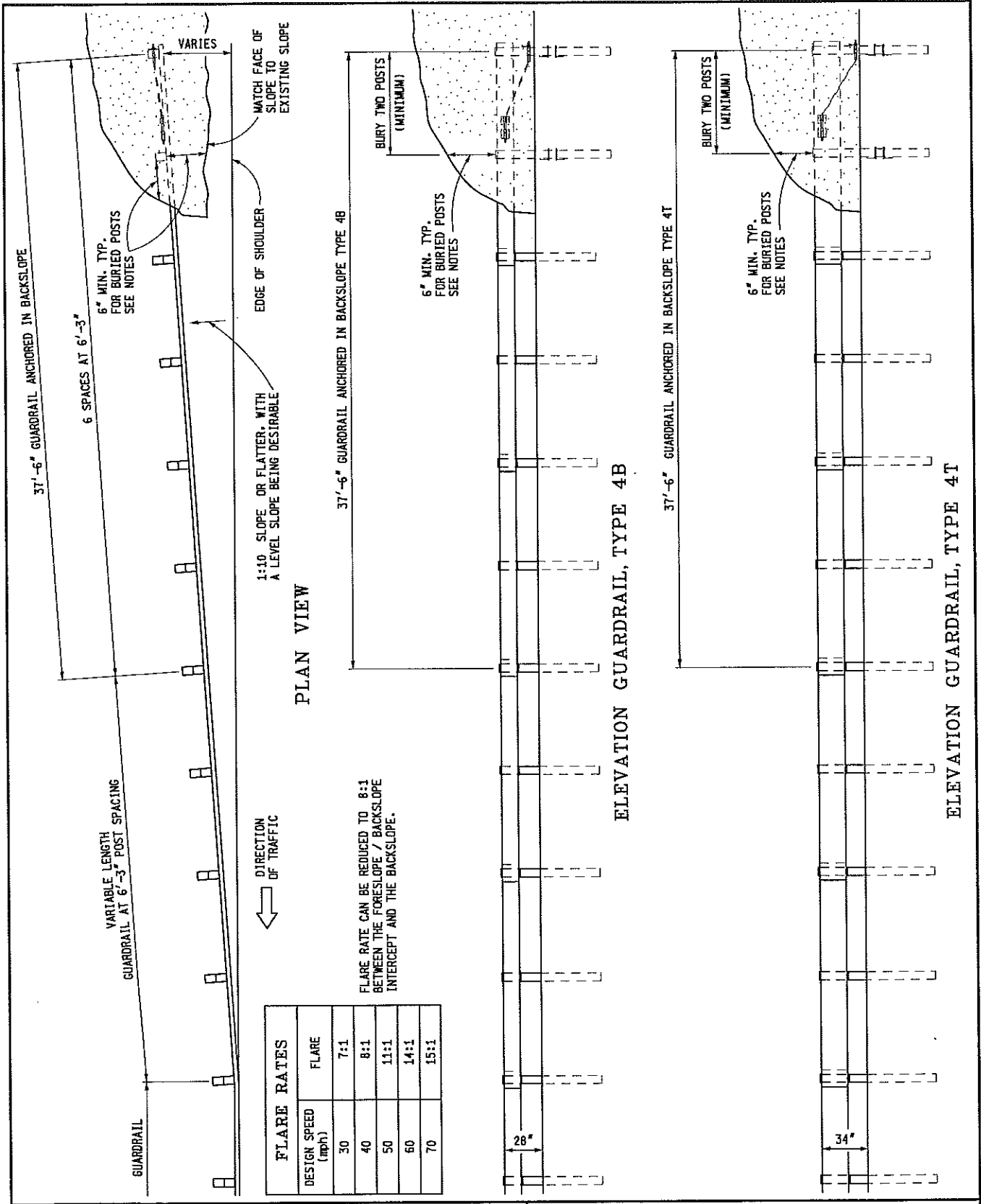
THE SLOPE IN FRONT OF THE INSTALLATION SHOULD NOT EXCEED 1:10 AND EXTEND TO 2'-0" BEYOND THE GUARDRAIL POST. THE SLOPE BEYOND THIS HINGE LINE SHALL BE 1:2 OR FLATTER.

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

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT SPECIAL DETAIL

GUARDRAIL AT INTERSECTIONS

	3-14-2016 PLAN DATE	SPECIAL DETAIL	21	SHEET 2 OF 2
F.H.W.A. APPROVAL				



FLARE RATES	
DESIGN SPEED (mph)	FLARE
30	7:1
40	8:1
50	11:1
60	14:1
70	15:1

FLARE RATE CAN BE REDUCED TO 8:1 BETWEEN THE FORESLOPE / BACKSLOPE INTERCEPT AND THE BACKSLOPE.

MDOT
Michigan Department of Transportation

PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT SPECIAL DETAIL FOR

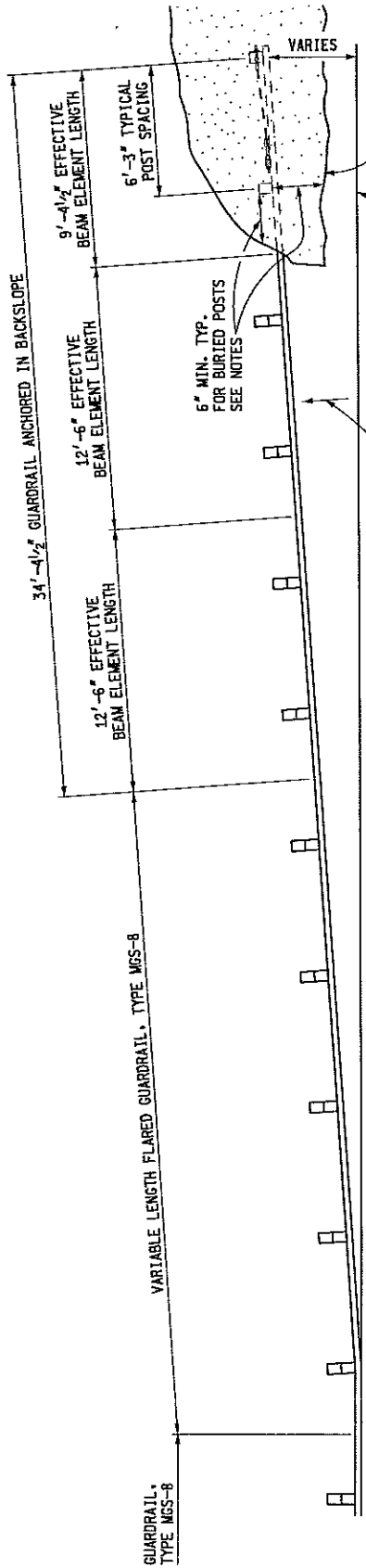
**GUARDRAIL ANCHORED IN
BACKSLOPE TYPES
4B, 4T, & 4MGS-8**

F.H.W.A. APPROVAL _____

4-25-2016
PLAN DATE

SPECIAL DETAIL **24**

SHEET 1 OF 8



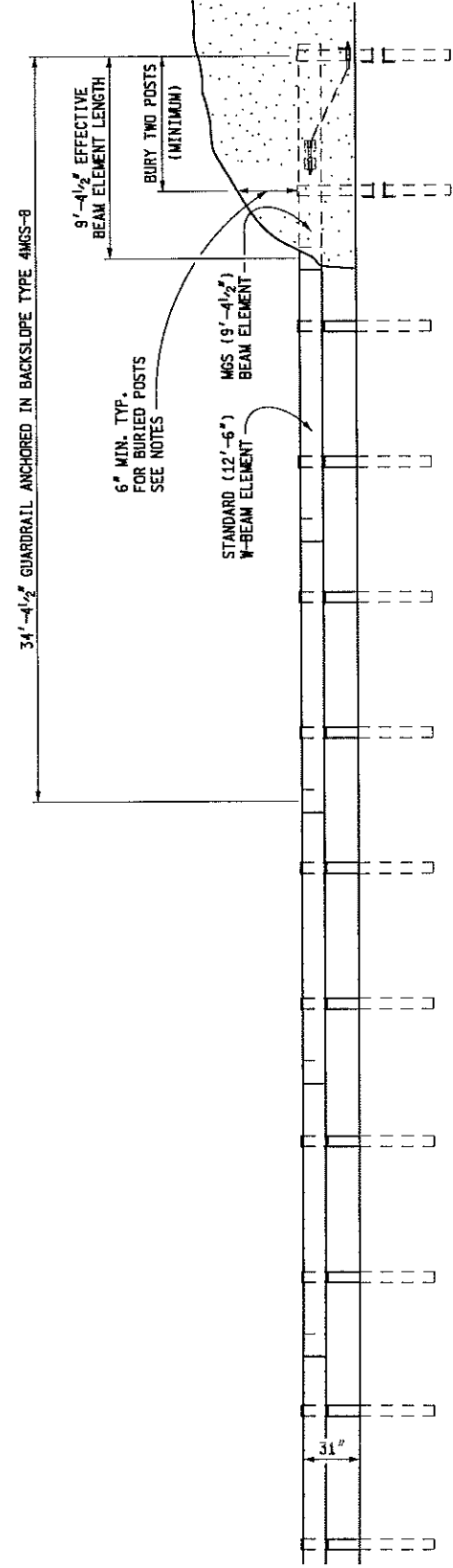
EDGE OF SHOULDER
 1:10 SLOPE OR FLATTER, WITH A LEVEL SLOPE BEING DESIRABLE
 MATCH FACE OF SLOPE TO EXISTING SLOPE
 VARIES

PLAN VIEW

DIRECTION OF TRAFFIC

FLARE RATES	
DESIGN SPEED (mph)	FLARE
30	7:1
40	8:1
50	11:1
60	14:1
70	15:1

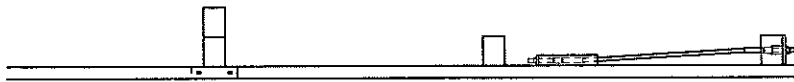
FLARE RATE CAN BE REDUCED TO 8:1 BETWEEN THE FORESLOPE / BACKSLOPE INTERCEPT AND THE BACKSLOPE.



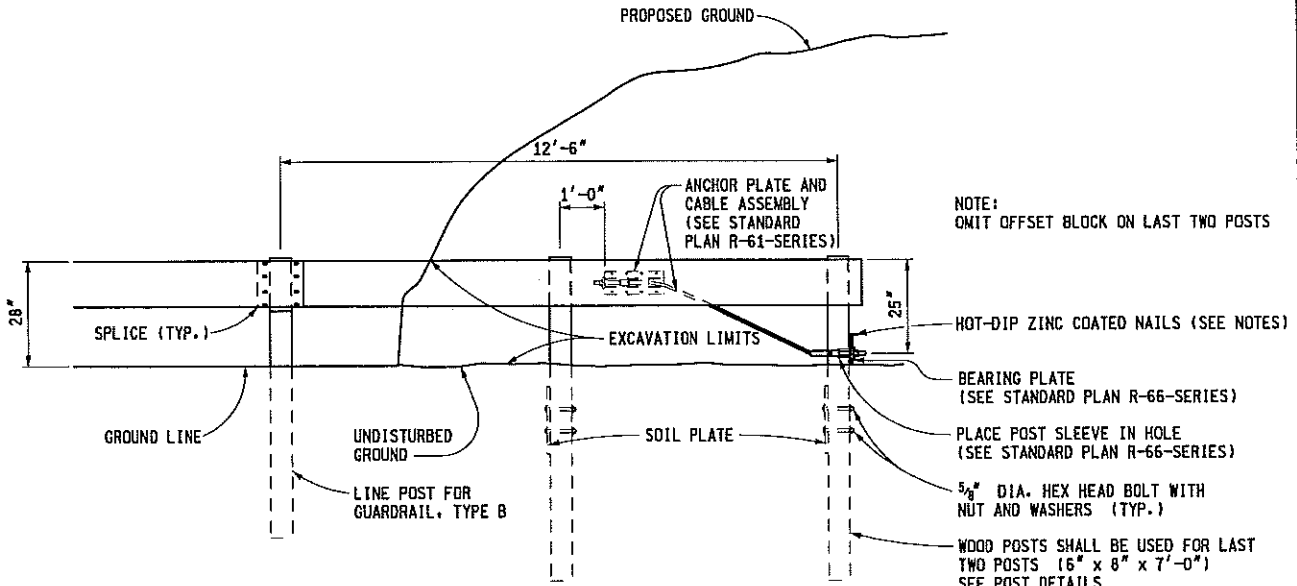
ELEVATION GUARDRAIL, TYPE 4MGS-8

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT SPECIAL DETAIL FOR
GUARDRAIL ANCHORED IN BACKSLOPE TYPES 4B, 4T, & 4MGS-8

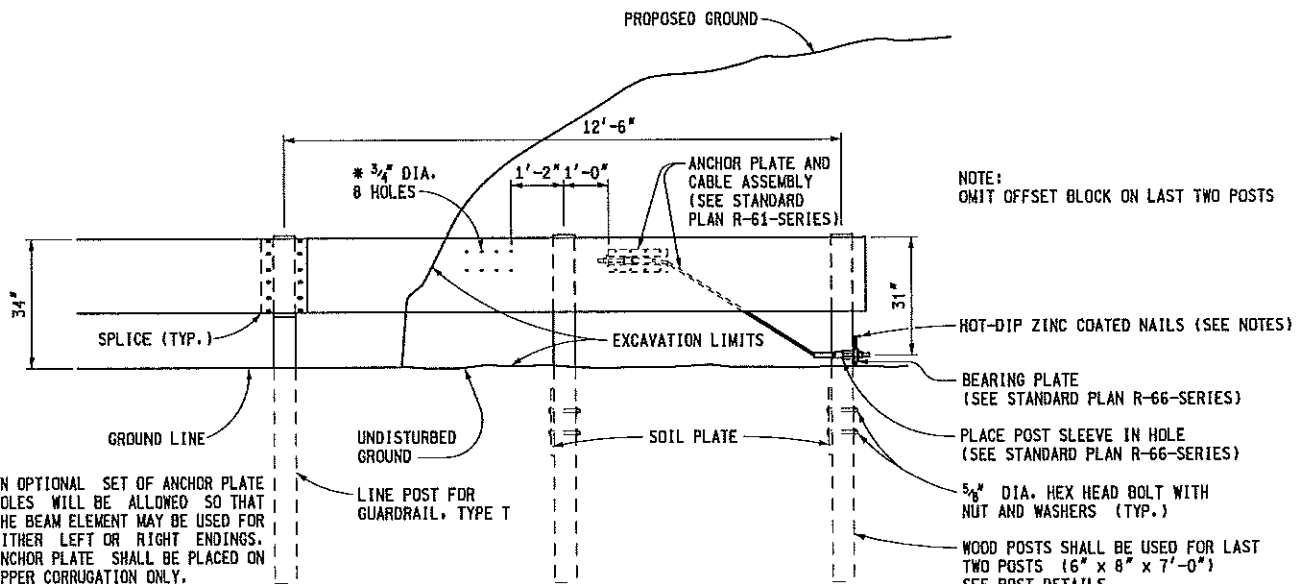
F.H.W.A. APPROVAL	4-25-2016 PLAN DATE	SPECIAL DETAIL 24	SHEET 2 OF 8
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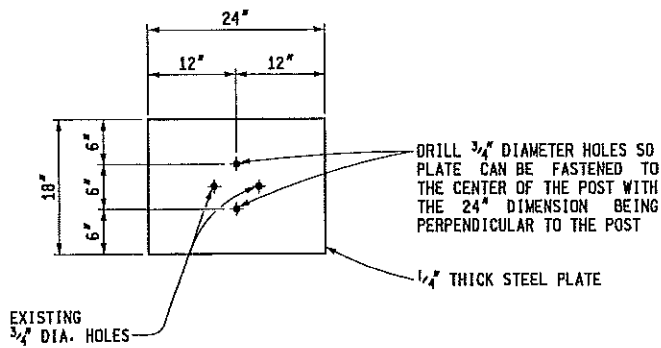
PLAN VIEW



ELEVATION GUARDRAIL, TYPE 4B



ELEVATION GUARDRAIL, TYPE 4T



SOIL PLATE

MODIFIED FROM SOIL PLATE SPECIFIED ON STANDARD PLAN R-61-SERIES BY ADDING TWO HOLES

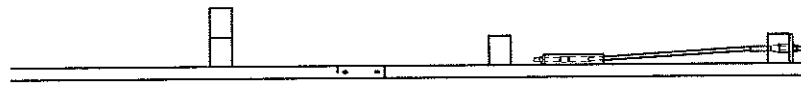
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT SPECIAL DETAIL FOR
**GUARDRAIL ANCHORED IN
BACKSLOPE TYPES
4B, 4T, & 4MGS-8**

F.H.W.A. APPROVAL

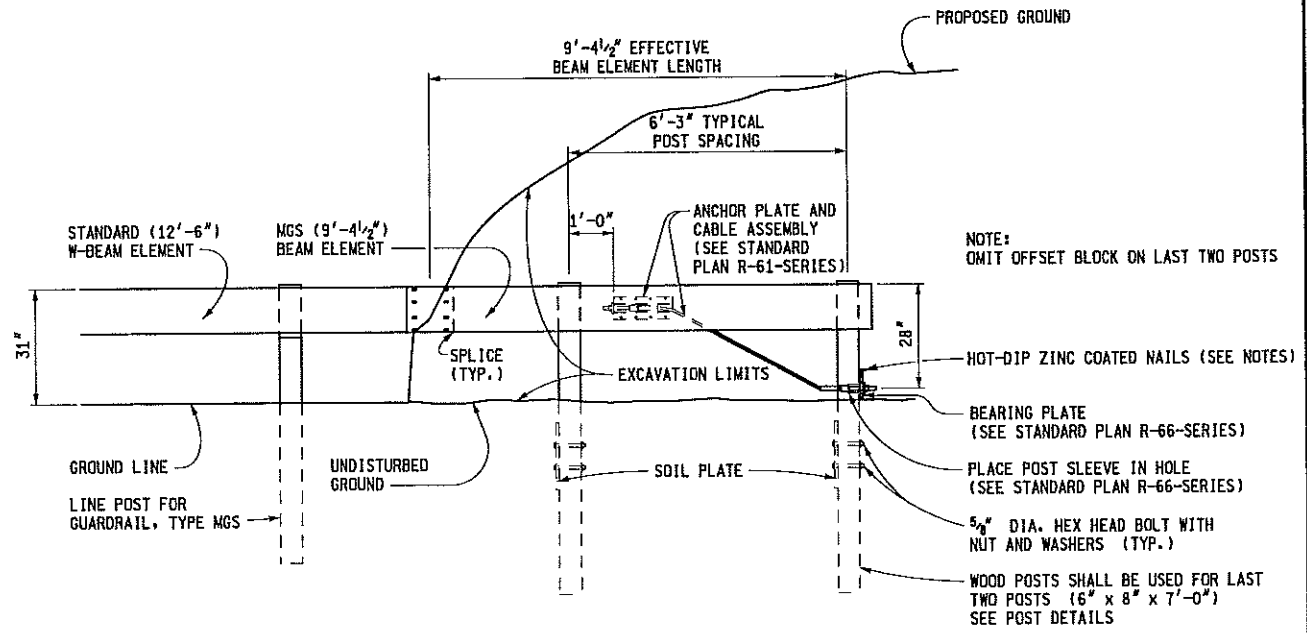
4-25-2016
PLAN DATE

SPECIAL
DETAIL 24

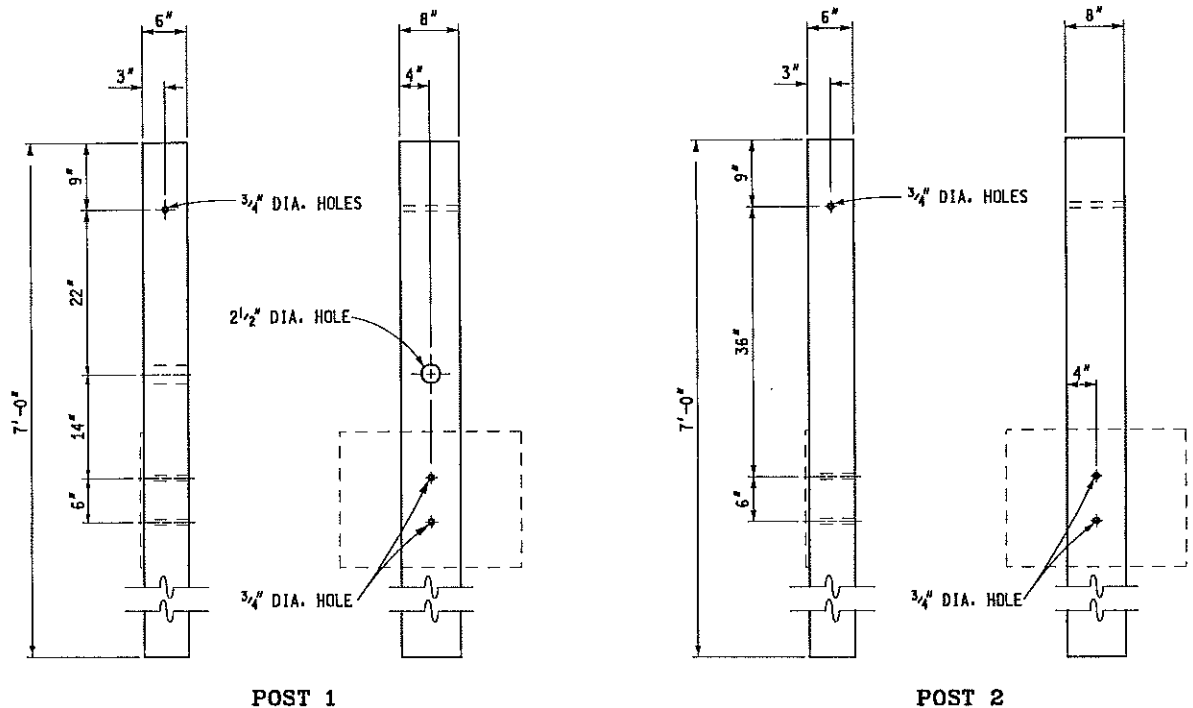
SHEET
3 OF 8



PLAN VIEW



ELEVATION GUARDRAIL, TYPE 4MGS-8

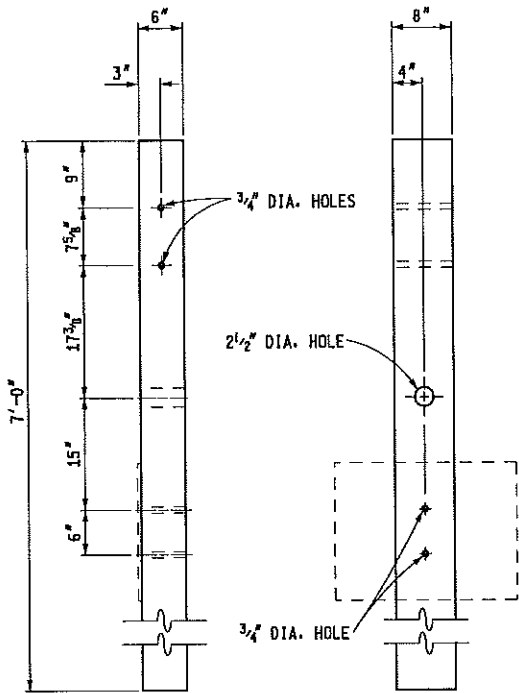


WOOD POST DETAILS
GUARDRAIL ANCHORED IN BACKSLOPE TYPE 4MGS-8

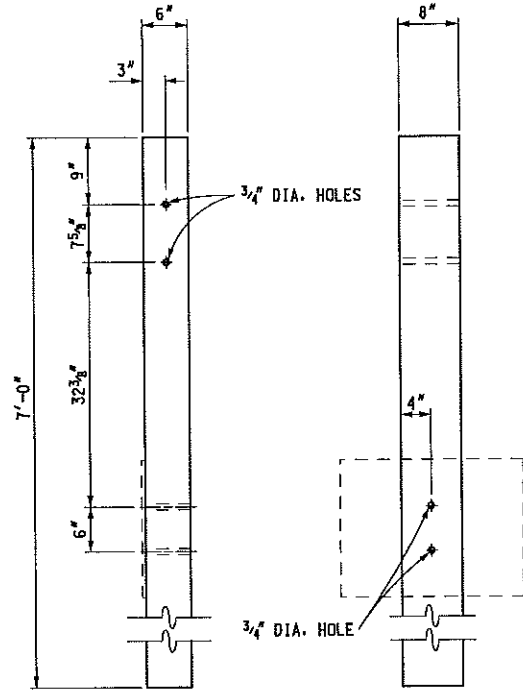
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT SPECIAL DETAIL FOR

**GUARDRAIL ANCHORED IN
BACKSLOPE TYPES
4B, 4T, & 4MGS-8**

F.H.W.A. APPROVAL	4-25-2016 PLAN DATE	SPECIAL DETAIL 24	SHEET 4 OF 8
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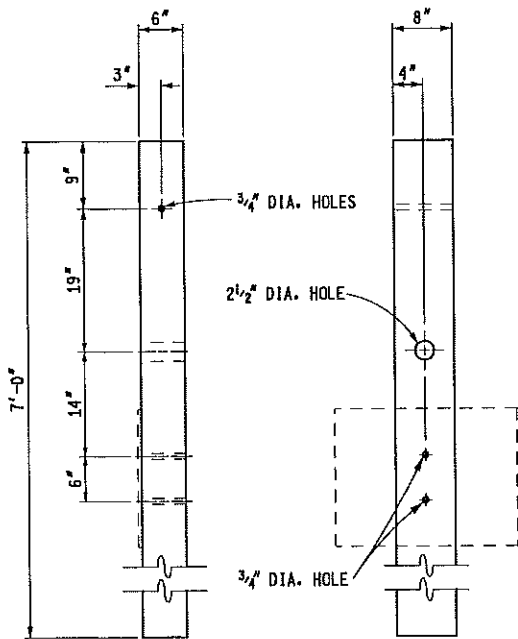


POST 1

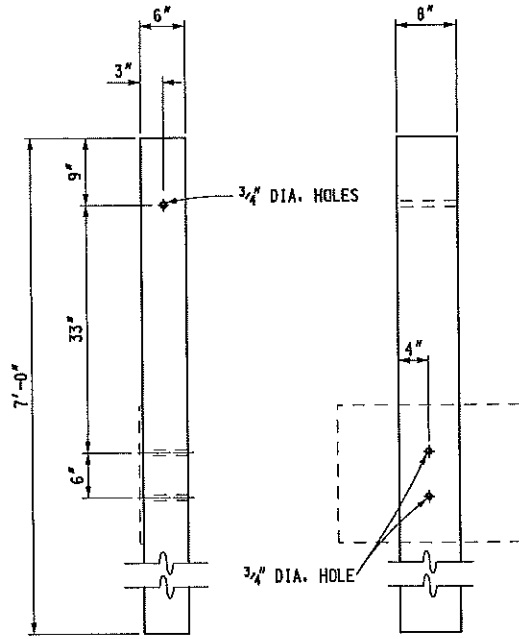


POST 2

WOOD POST DETAILS
 GUARDRAIL ANCHORED IN BACKSLOPE TYPE 4T



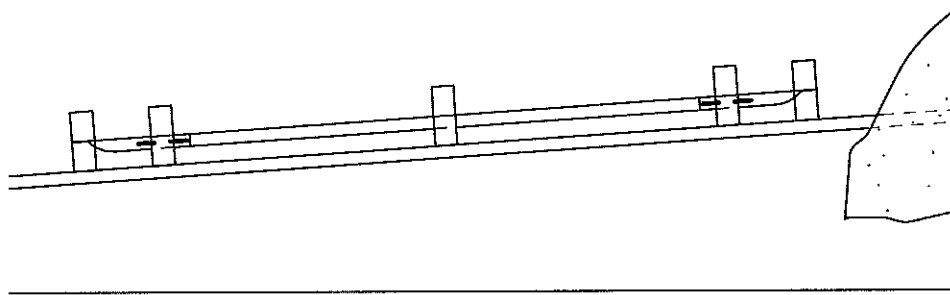
POST 1



POST 2

WOOD POST DETAILS
 GUARDRAIL ANCHORED IN BACKSLOPE TYPE 4B

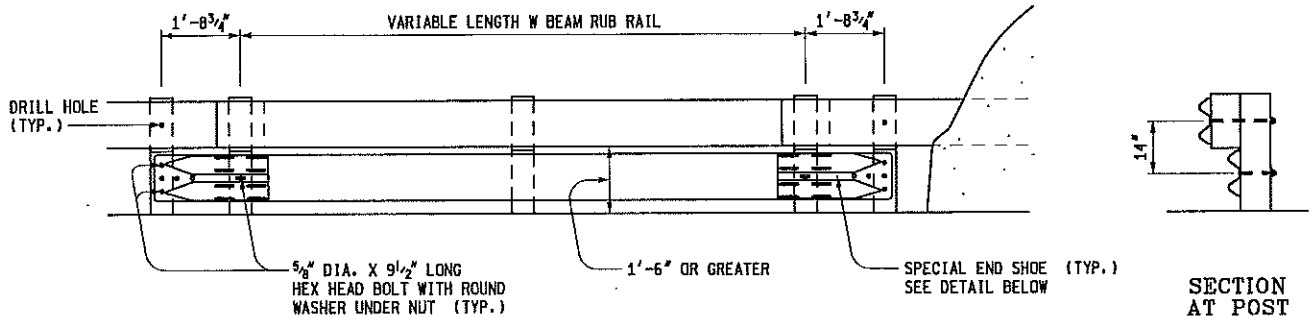
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT SPECIAL DETAIL FOR			
GUARDRAIL ANCHORED IN BACKSLOPE TYPES 4B, 4T, & 4MGS-8			
F.H.W.A. APPROVAL	4-25-2016 PLAN DATE	SPECIAL DETAIL 24	SHEET 5 OF 8



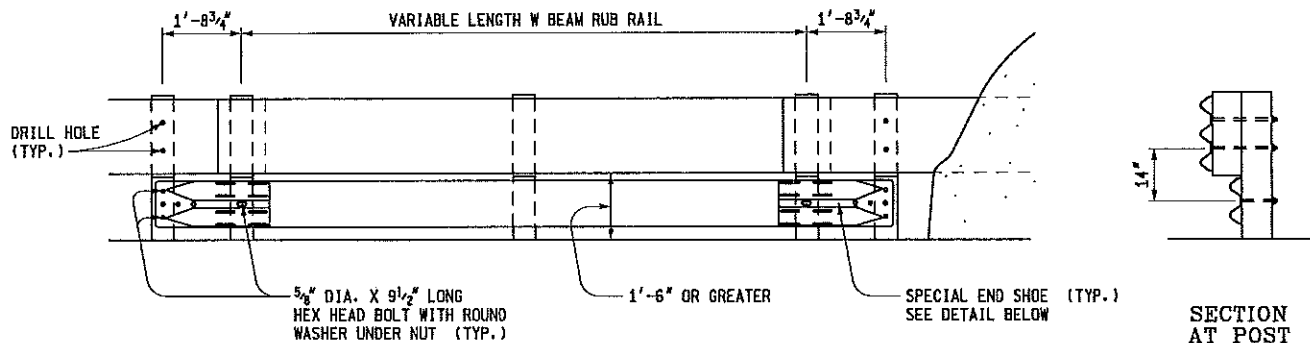
PLAN VIEW
WITH RUB RAIL

NOTE:

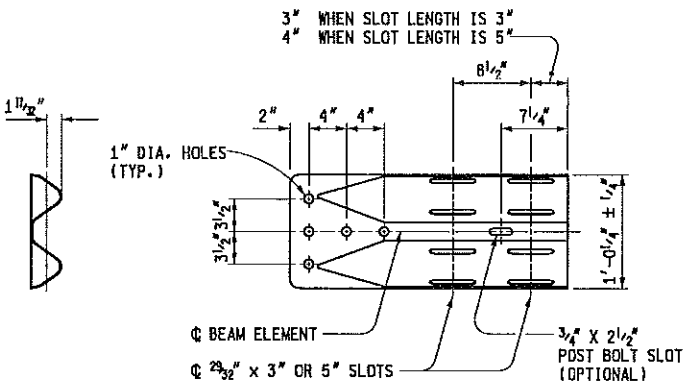
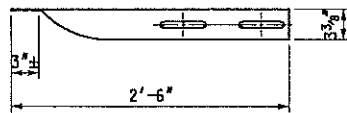
EXTRA POSTS, SPECIAL END SHOES, GUARDRAIL, HARDWARE AND ANY EXTRA WORK ARE INCLUDED IN THE BID ITEM GUARDRAIL ANCHORED IN BACKSLOPE TYPE 4B OR TYPE 4T.



ELEVATION GUARDRAIL, TYPE 4B
WITH RUB RAIL

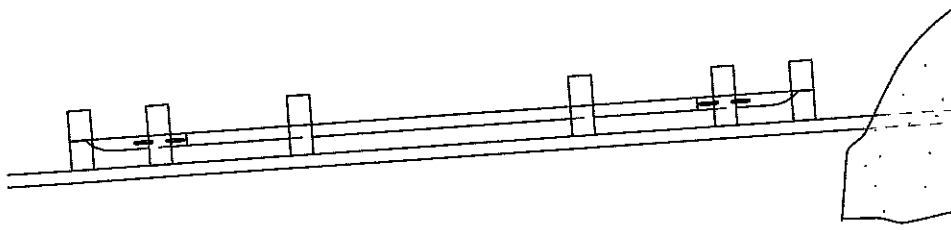


ELEVATION GUARDRAIL, TYPE 4T
WITH RUB RAIL

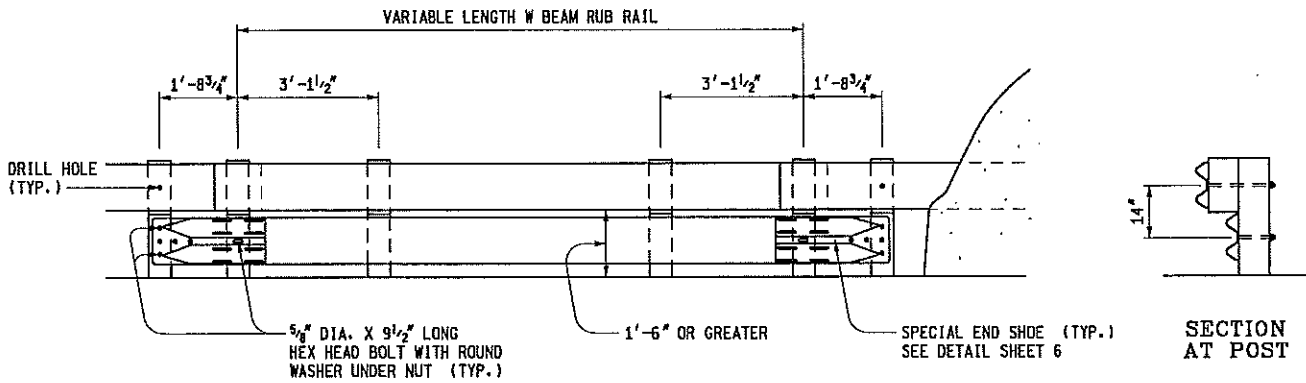


SPECIAL END SHOE
(3" OR 5" SLOT LENGTHS)

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT SPECIAL DETAIL FOR			
GUARDRAIL ANCHORED IN BACKSLOPE TYPES 4B, 4T, & 4MGS-8			
F.R.W.A. APPROVAL	4-25-2016 PLAN DATE	SPECIAL DETAIL 24	SHEET 6 OF 8



PLAN VIEW GUARDRAIL, TYPE 4MGS-8
WITH RUB RAIL

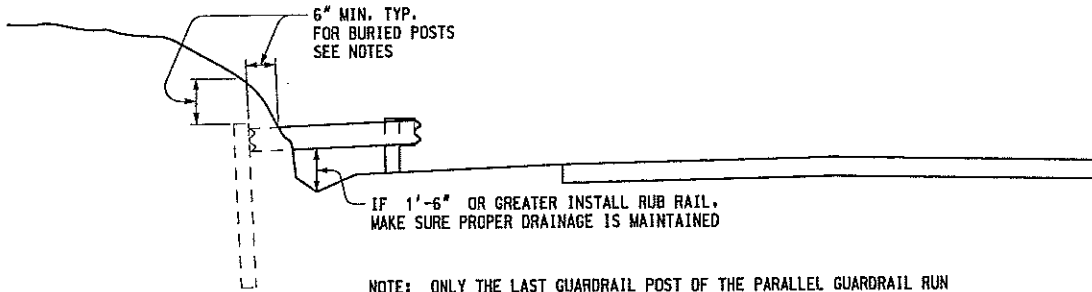


ELEVATION GUARDRAIL, TYPE 4MGS-8
WITH RUB RAIL

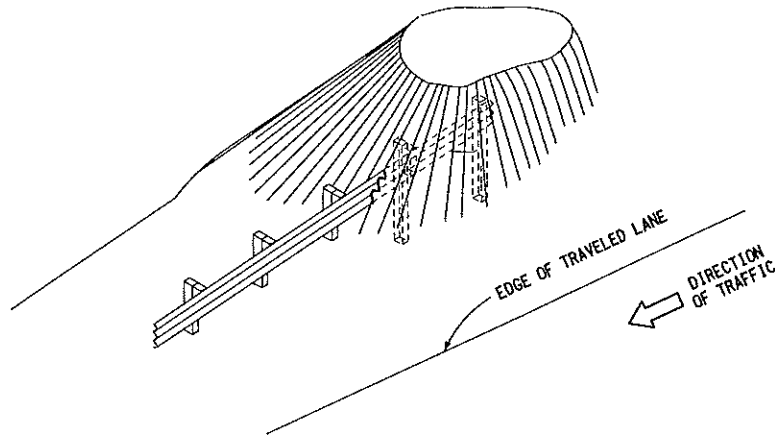
NOTE:

EXTRA POSTS, SPECIAL END SHOES, GUARDRAIL, HARDWARE AND ANY EXTRA WORK ARE INCLUDED IN THE BID ITEM GUARDRAIL ANCHORED IN BACKSLOPE TYPE 4MGS-8

MICHIGAN DEPARTMENT OF TRANSPORTATION			
BUREAU OF DEVELOPMENT SPECIAL DETAIL FOR			
GUARDRAIL ANCHORED IN BACKSLOPE TYPES 4B, 4T, & 4MGS-8			
F.H.W.A. APPROVAL	4-25-2016 PLAN DATE	SPECIAL DETAIL 24	SHEET 7 OF 8



NOTE: ONLY THE LAST GUARDRAIL POST OF THE PARALLEL GUARDRAIL RUN AND THE LAST BURIED GUARDRAIL POST ARE SHOWN.
(OTHER POSTS ALONG THE FLARED GUARDRAIL RUN ARE NOT SHOWN)



BURIED ENDING SKETCHES

NOTES:

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

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

AFTER THE CABLE ASSEMBLY HAS BEEN TIGHTENED, A SECOND NUT SHALL BE INSTALLED 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.

WHEN ADDITIONAL POST BOLT SLOTS ARE REQUIRED, THEY SHALL BE DRILLED OR PUNCHED AND REGALVANIZED. BURNING WILL NOT BE ALLOWED.

TERMINAL SHALL BE SET A MINIMUM 6" INTO THE BACKSLOPE AND HAVE 6" OF COVER ON ALL SIDES TO LESSEN THE POSSIBILITY IT WILL BE EXPOSED BY EROSION AND SNAG AN IMPACTING VEHICLE.

THE GUARDRAIL SHALL REMAIN AT A CONSTANT HEIGHT RELATIVE TO THE LOCAL GRADE. A W BEAM RUB RAIL WILL BE REQUIRED IF THE OPENING UNDER THE PRIMARY RAIL IS 1'-6" OR MORE. SEE DETAILS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT SPECIAL DETAIL FOR

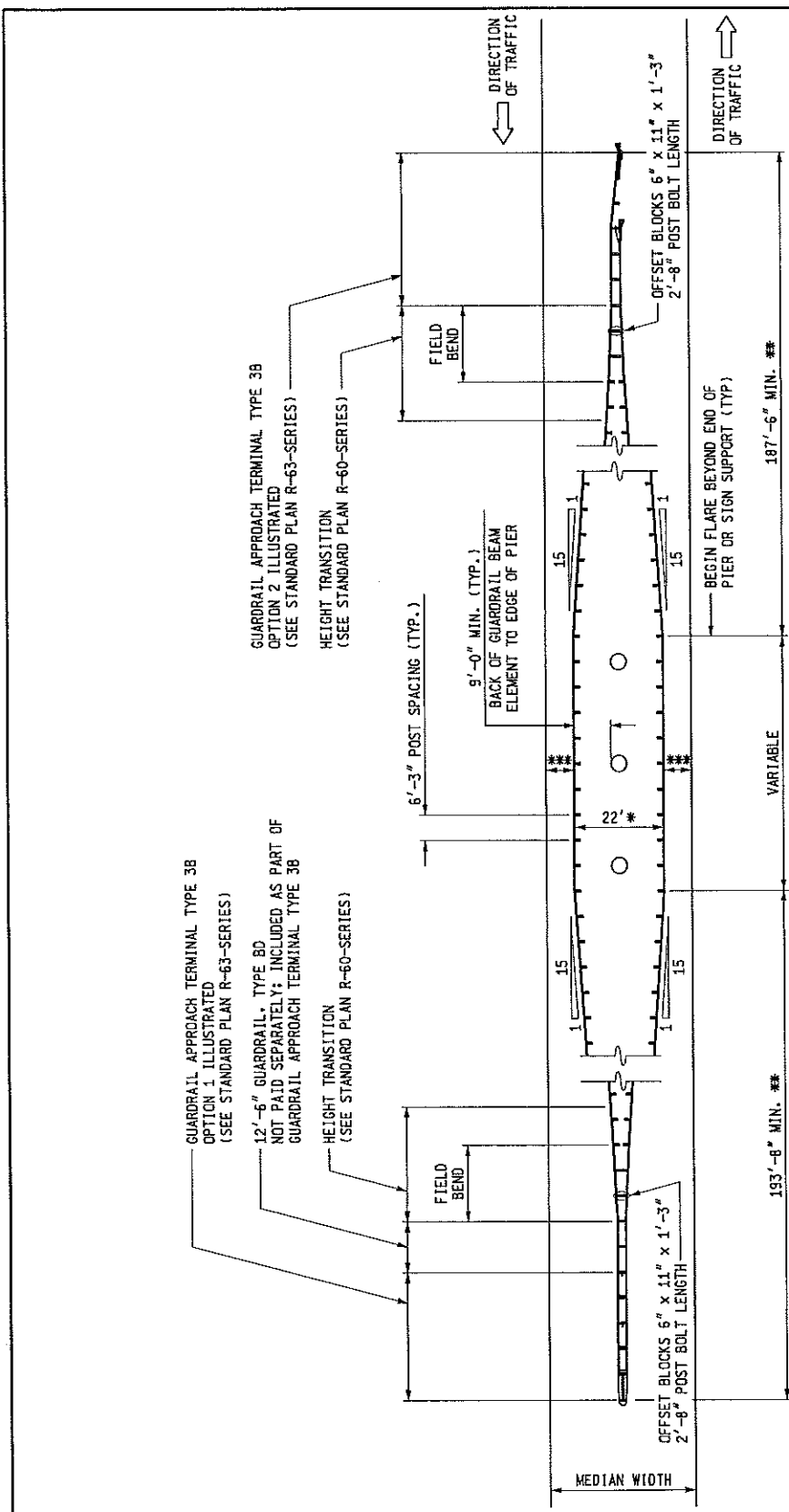
GUARDRAIL ANCHORED IN BACKSLOPE TYPES 4B, 4T, & 4MGS-8

F.H.W.A. APPROVAL

4-25-2016
PLAN DATE

SPECIAL
DETAIL 24

SHEET
8 OF 8



TYPICAL LAYOUT AT PIERS AND SIGN SUPPORTS USING GUARDRAIL TYPE MGS-8

* THE 22' DIMENSION IS CENTERED ON THE PIER OR MEDIAN FROM BACK OF GUARDRAIL TO BACK OF GUARDRAIL. FOR PIERS GREATER THAN 4' IN WIDTH/DIAMETER, INCREASE THE 22' DIMENSION TO PIER WIDTH/DIAMETER + 18'.

** INCREASE LENGTH BY 7.5' FOR EACH FOOT OF PIER WIDTH/DIAMETER ABOVE 4'.

*** ENSURE NO PORTION OF GUARDRAIL ENCRANGES ON SHOULDER.

FOR MEDIANS 36' WIDE
TO MEDIANS LESS THAN 70' WIDE
USING GUARDRAIL TYPE MGS-8

MDOT
Michigan Department of Transportation

PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

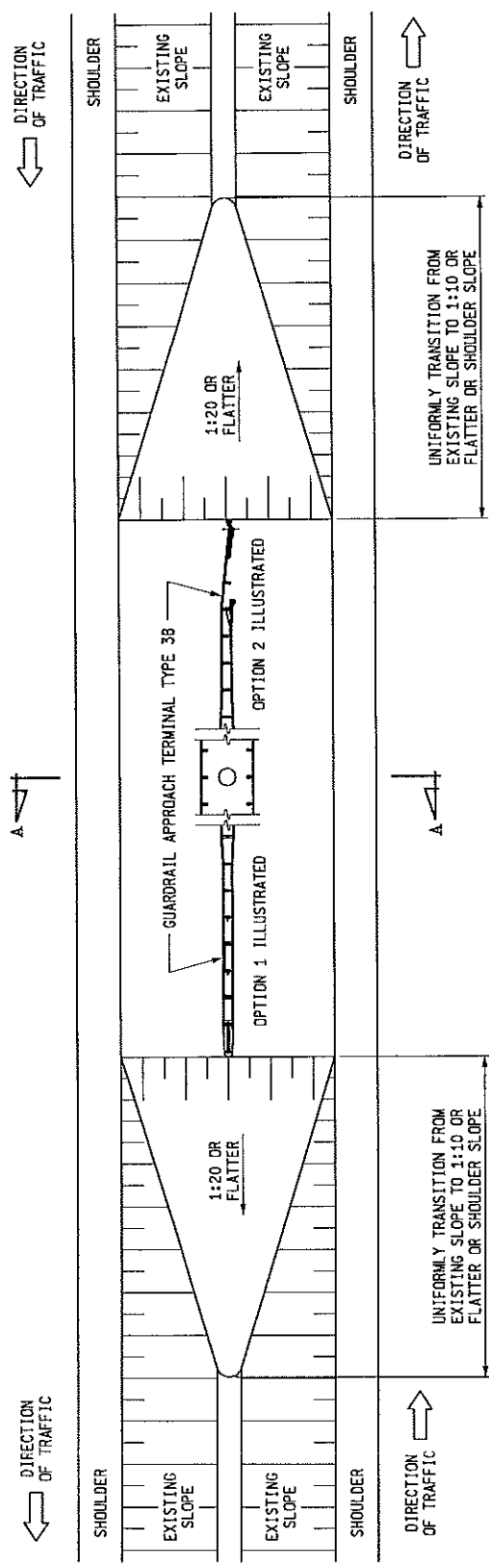
**GUARDRAIL
MEDIAN OBJECT PROTECTION**

F.H.W.A. APPROVAL

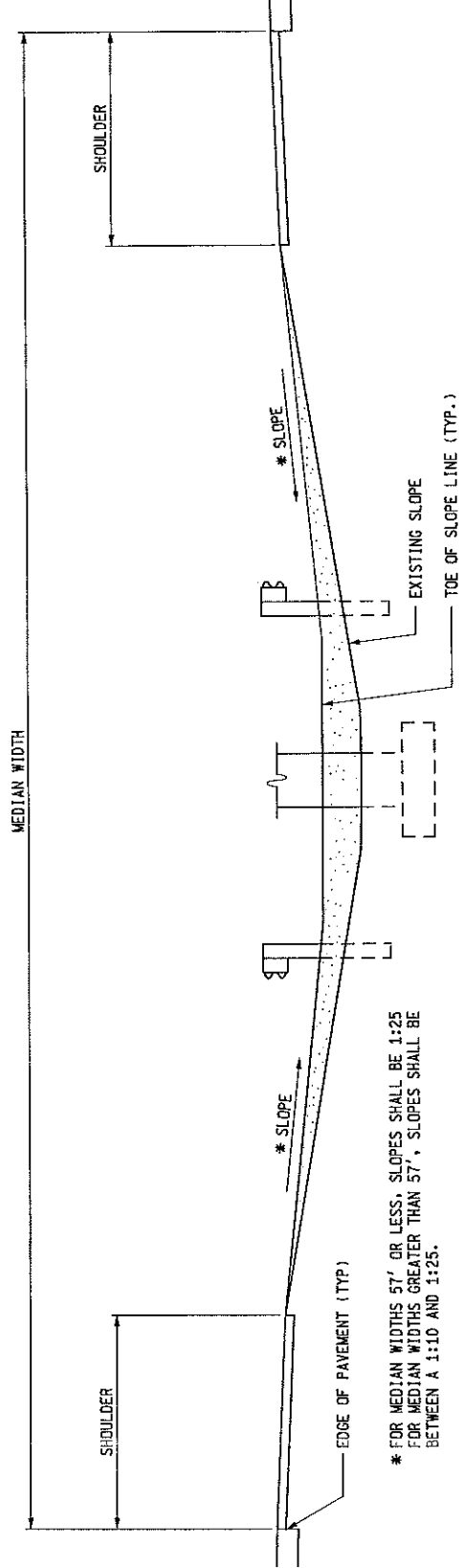
4-9-2018
PLAN DATE

R-56-F

SHEET
1 OF 6



GRADING OF SLOPES AT PIERS



SECTION A-A
 GRADING IN MEDIANS FROM 36' TO LESS THAN 70' IN WIDTH
 USING GUARDRAIL TYPE MGS-8

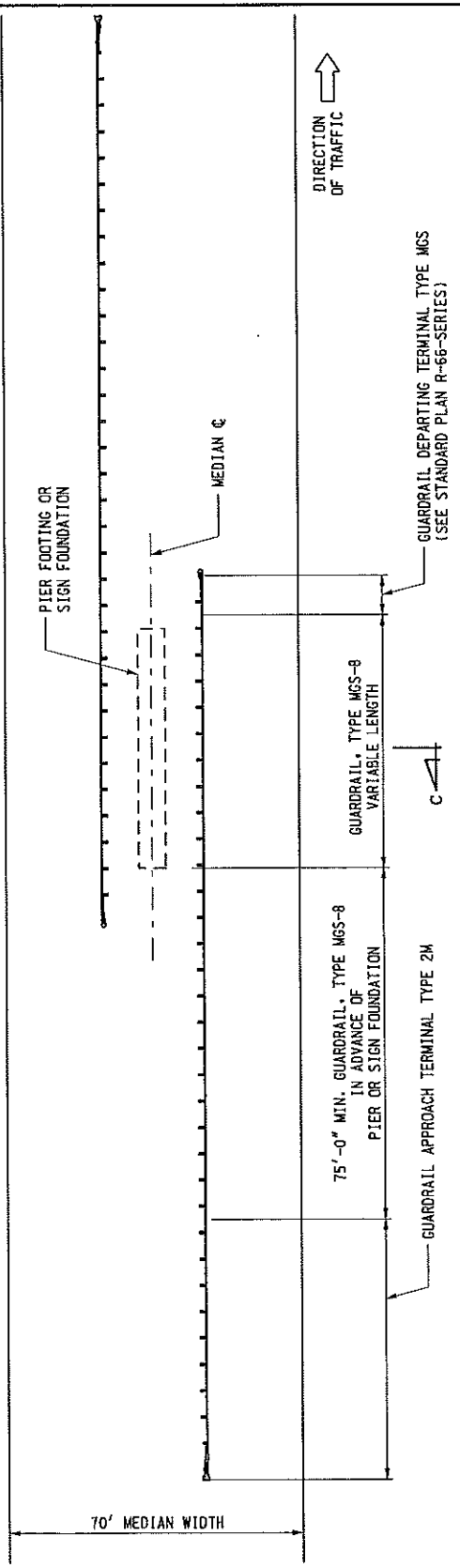
MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL
 MEDIAN OBJECT PROTECTION**

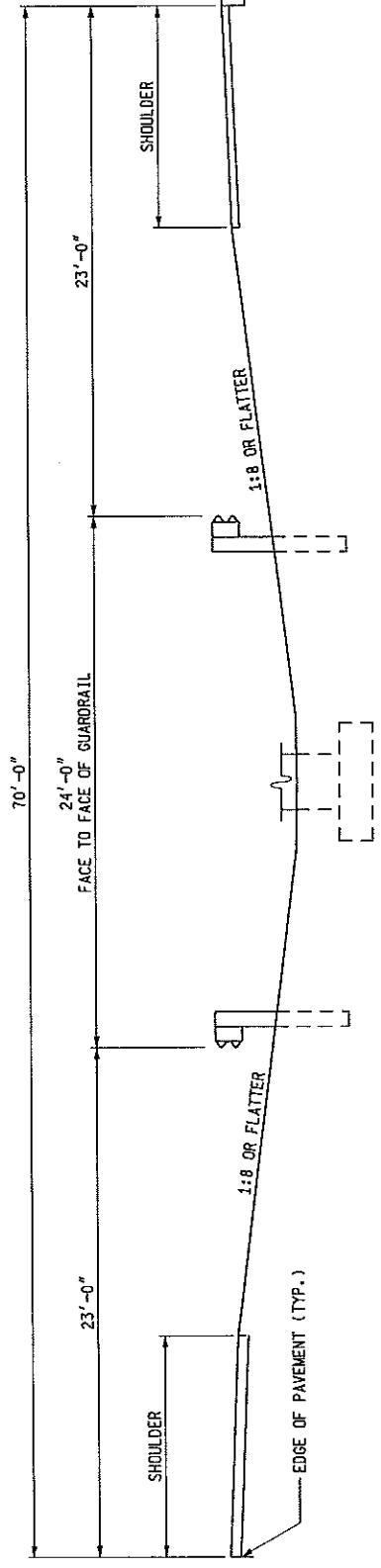
F.H.W.A. APPROVAL	4-9-2010 PLAN DATE	R-56-F	SHEET 2 OF 6
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DIRECTION OF TRAFFIC
←

C



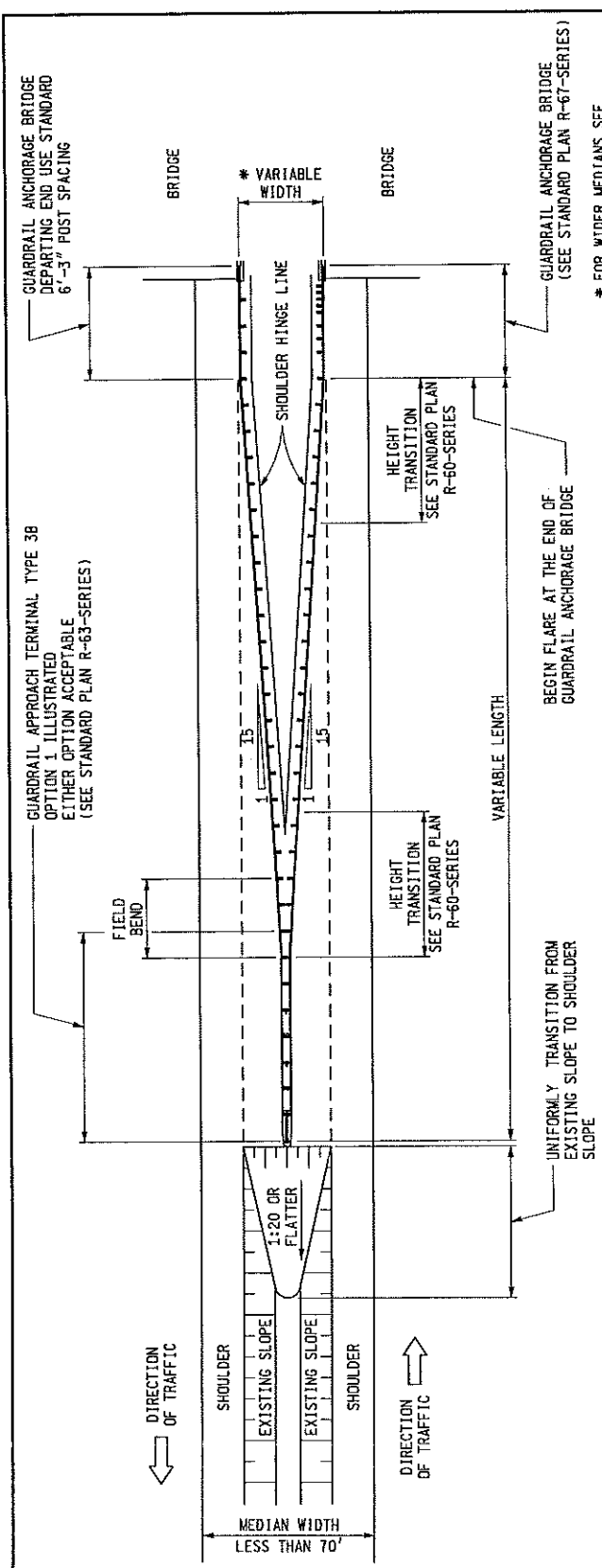
TWIN PARALLEL GUARDRAIL RUNS USING GUARDRAIL TYPE MGS-8



SECTION C-C

MEDIANS 70' IN WIDTH
USING GUARDRAIL TYPE MGS-8

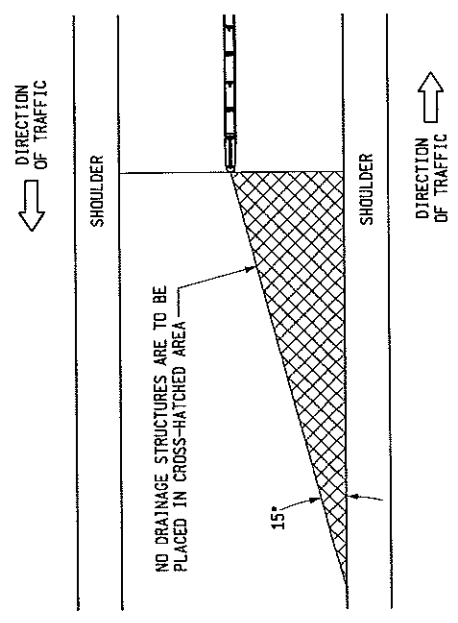
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR		
GUARDRAIL MEDIAN OBJECT PROTECTION		
F.H.W.A. APPROVAL	4-9-2018 PLAN DATE	R-56-F
		SHEET 3 OF 6



GUARDRAIL AT TWIN BRIDGE APPROACH USING GUARDRAIL TYPE MGS-8

NOTES:

- ALL 1:10 OR FLATTER SLOPES SHALL BE GRADED TO CLASS A SLOPE TOLERANCES.
- GUARDRAIL ANCHORAGE, BRIDGE SHALL BE CONSTRUCTED ACCORDING TO STANDARD PLAN R-67-SERIES.
- UNLESS INDICATED BY A RADIUS, ALL CURVED GUARDRAIL SHALL BE FIELD BENT.
- ANY EXISTING CURB OVER 4" IN HEIGHT SHALL BE REMOVED 150' IN ADVANCE OF THE GUARDRAIL APPROACH TERMINAL OF THE MEDIAN GUARDRAIL INSTALLATION. WHEN IT BECOMES NECESSARY TO USE CURB AND GUTTER IN CONJUNCTION WITH MEDIAN GUARDRAIL INSTALLATIONS, CONTACT THE GEOMETRIC DESIGN UNIT OF THE DESIGN DIVISION.
- SLOPES SPECIFIED ON THIS PLAN ARE FOR TYPICAL MEDIAN GUARDRAIL INSTALLATIONS. THE PLACEMENT OF DRAINAGE CULVERTS AND END SECTIONS, WHEN REQUIRED, SHALL BE AS DETAILED ON PLANS OR AS DIRECTED BY THE ENGINEER.
- IF THE SPECIFIED MINIMUM OFFSETS FROM THE EDGE OF PIER OR MEDIAN OBJECT TO THE GUARDRAIL CANNOT BE ACHIEVED, EITHER STIFFEN THE GUARDRAIL SYSTEM, AS NEEDED, BY DECREASING THE POST SPACING OR USE CONCRETE BARRIER TO SHIELD THE PIER(S)/MEDIAN OBJECT(S). CONTACT THE GEOMETRIC DESIGN UNIT OF THE DESIGN DIVISION FOR GUIDANCE.
- MEDIAN GUARDRAIL INSTALLATIONS ARE NOT REQUIRED IN MEDIANS THAT ARE GREATER THAN 70' IN WIDTH, UNLESS THE OBJECT BEING PROTECTED IS IN THE TARGET PATH OF A CURVE.
- WHEN MEDIAN GUARDRAIL INSTALLATIONS ARE TO BE PLACED ON CURVES, CONTACT THE GEOMETRIC DESIGN UNIT OF THE DESIGN DIVISION.

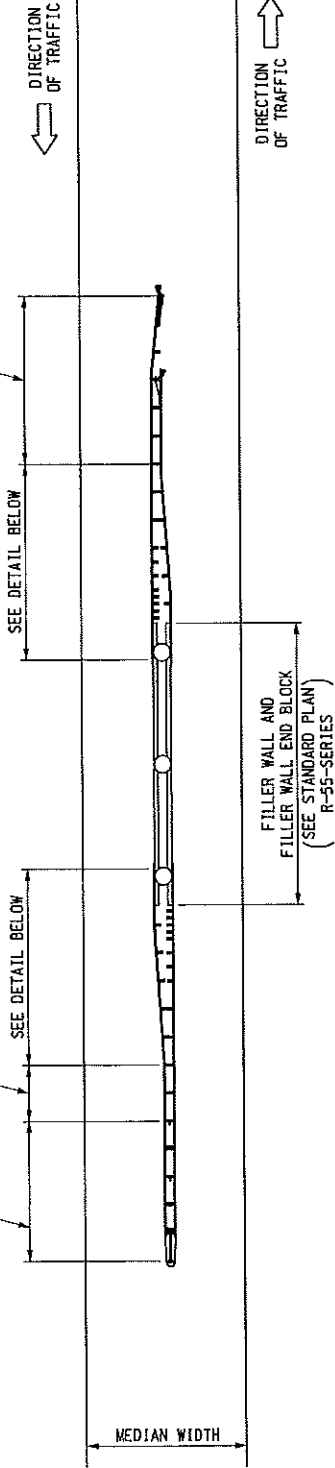


MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR			
GUARDRAIL MEDIAN OBJECT PROTECTION			
F.H.W.A. APPROVAL	4-9-2018 PLAN DATE	R-56-F	SHEET 4 OF 6

GUARDRAIL APPROACH TERMINAL TYPE 3B
OPTION 1 ILLUSTRATED
(SEE STANDARD PLAN R-63-SERIES)

12'-6" GUARDRAIL, TYPE B0
(PAID FOR AS PART OF THE TYPE 3 TERMINAL)

GUARDRAIL APPROACH TERMINAL TYPE 3B
OPTION 2 ILLUSTRATED
(SEE STANDARD PLAN R-63-SERIES)



TYPICAL LAYOUT

PAID FOR AS GUARDRAIL ANCHORAGE BRIDGE, DETAIL T-5 (EACH SIDE)

THIRIE BEAM TERMINAL CONNECTOR
& THIRIE BEAM EXPANSION SECTION
(SEE STANDARD PLAN R-67-SERIES)

6'-3" POST SPACING
TRANSITION GUARDRAIL TO CONNECT TO GUARDRAIL TYPE B FOR GUARDRAIL APPROACH TERMINAL TYPE 3 (OPTION 1) OR
TRANSITION GUARDRAIL TO CONNECT TO GUARDRAIL APPROACH TERMINAL TYPE 3 (OPTION 2)

VARIABLE WIDTH
TO MATCH
PIER

EXISTING PIER
DIA. OR WIDTH

PLAN VIEW

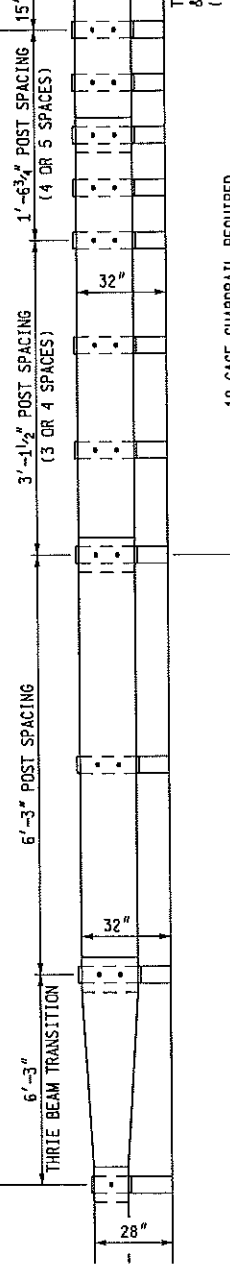
FILLER WALL AND FILLER WALL END BLOCK
(SEE STANDARD PLAN R-55-SERIES)

PAID FOR AS GUARDRAIL ANCHORAGE BRIDGE, DETAIL T-5 (EACH SIDE)

43'-9"

FOR POST SPACING SEE STANDARD PLAN R-67-SERIES (APPROACH POST SPACING REQUIREMENTS CHART)

EXISTING PIER



THIRIE BEAM TERMINAL CONNECTOR
& THIRIE BEAM EXPANSION SECTION
(SEE STANDARD PLAN R-67-SERIES)

10 GAGE GUARDRAIL REQUIRED
IN AREA OF REDUCED POST SPACING

ELEVATION VIEW

GUARDRAIL WITH DIRECT CONNECTION TO PIER

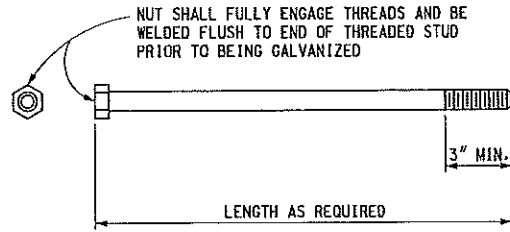
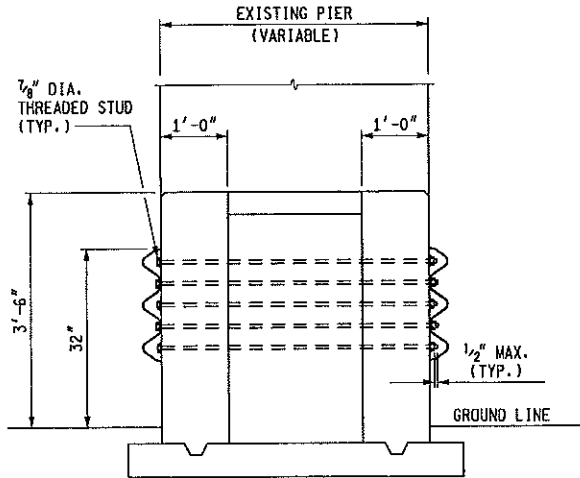
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR
GUARDRAIL
MEDIAN OBJECT PROTECTION

F.H.W.A. APPROVAL

4-9-2018
PLAN DATE

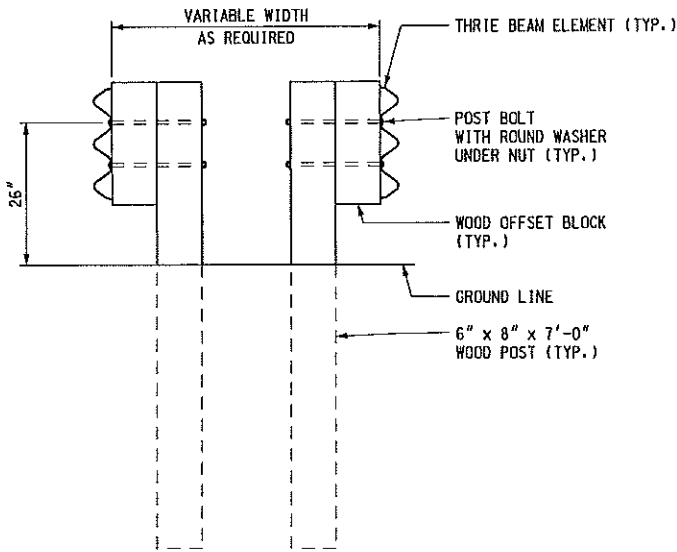
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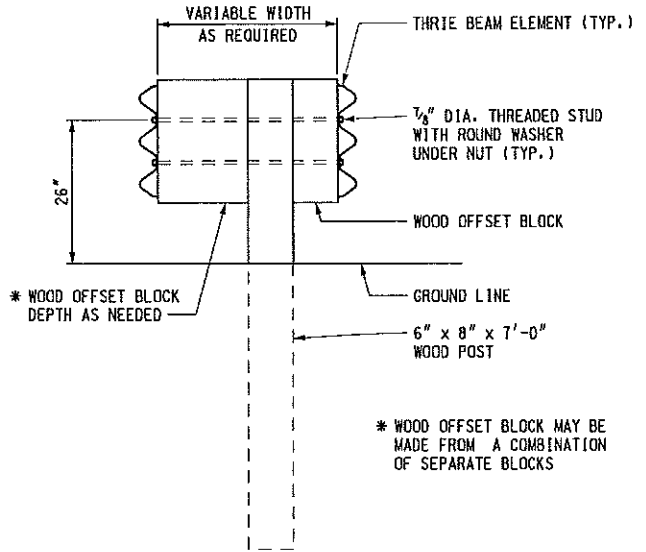


7/8" DIA. THREADED STUD

**GUARDRAIL CONNECTION
AT FILLER WALL**
(FOR FILLER WALL DETAILS SEE STANDARD PLAN R-55-SERIES)



POST DETAIL
WHEN WIDTH CAN ACCOMMODATE
TWO GUARDRAIL POSTS



POST DETAIL
WHEN WIDTH CAN ACCOMMODATE
ONLY ONE GUARDRAIL POST

* WOOD OFFSET BLOCK MAY BE
MADE FROM A COMBINATION
OF SEPARATE BLOCKS

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**GUARDRAIL
MEDIAN OBJECT PROTECTION**

F.H.W.A. APPROVAL

4-9-2018
PLAN DATE

R-56-F

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