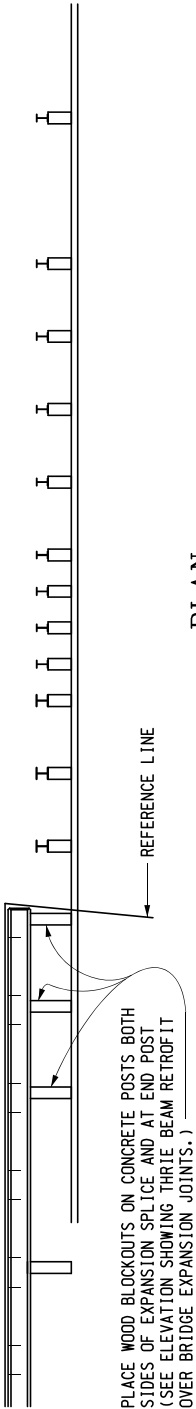


SPACE WOOD BLOCKOUTS AT ALTERNATE CONCRETE POSTS (CONCRETE HEADWALL - SEE NOTES)



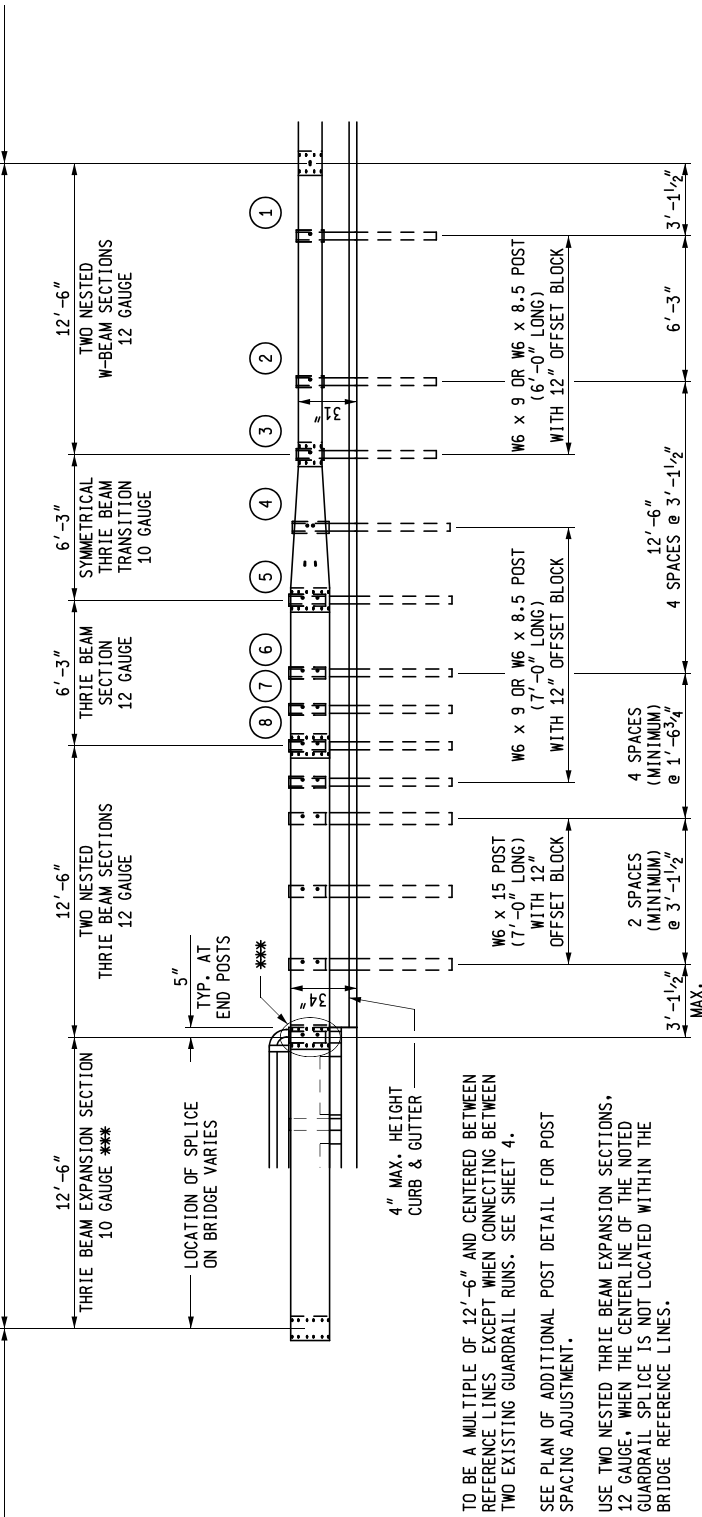
PLACE WOOD BLOCKOUTS ON CONCRETE POSTS BOTH SIDES OF EXPANSION SPLICE AND AT END POST (SEE ELEVATION SHOWING THRIE BEAM RETROFIT OVER BRIDGE EXPANSION JOINTS.)

PLAN

* BRIDGE RAILING THRIE BEAM RETROFIT

50'-0" GUARDRAIL ANCHORAGE, BRIDGE, DETAIL A3

GUARDRAIL TYPE MGS-8



ELEVATION

* TO BE A MULTIPLE OF 12'-6" AND CENTERED BETWEEN REFERENCE LINES. EXCEPT WHEN CONNECTING BETWEEN TWO EXISTING GUARDRAIL RUNS. SEE SHEET 4.

** SEE PLAN OF ADDITIONAL POST DETAIL FOR POST SPACING ADJUSTMENT.

*** USE TWO NESTED THRIE BEAM EXPANSION SECTIONS, 12 GAUGE, WHEN THE CENTERLINE OF THE NOTED GUARDRAIL SPLICE IS NOT LOCATED WITHIN THE BRIDGE REFERENCE LINES.

DETAILS FOR CONNECTING GUARDRAIL TYPE MGS-8 TO BRIDGE RAILING, THRIE BEAM RETROFIT



PREPARED BY DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: V.Z.

DEPARTMENT DIRECTOR Paul C. Ajegba

APPROVED BY: Matthew J. Chynoweth, P.E. Matthew J. Chynoweth Oct 14 2021 4:28 PM DIRECTOR, BUREAU OF BRIDGES AND STRUCTURES

APPROVED BY: Gregg Brunner, P.E. Gregg Brunner Oct 14 2021 12:29 PM DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: Bradley C. Wiefersich Bradley C. Wiefersich Oct 14 2021 10:58 AM DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR

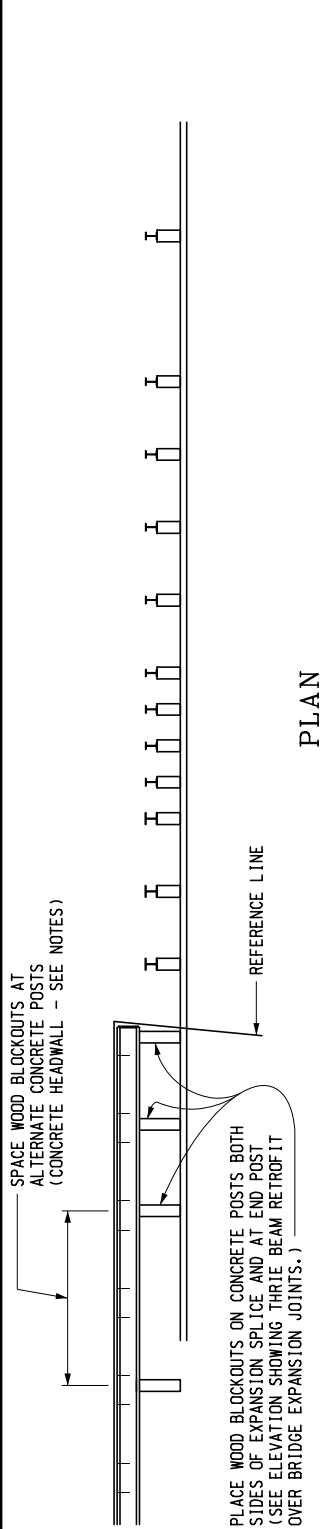
BRIDGE RAILING, THRIE BEAM RETROFIT (OPEN PARAPET TYPE BRIDGE RAILING)

4-7-2022 F.H.W.A. APPROVAL

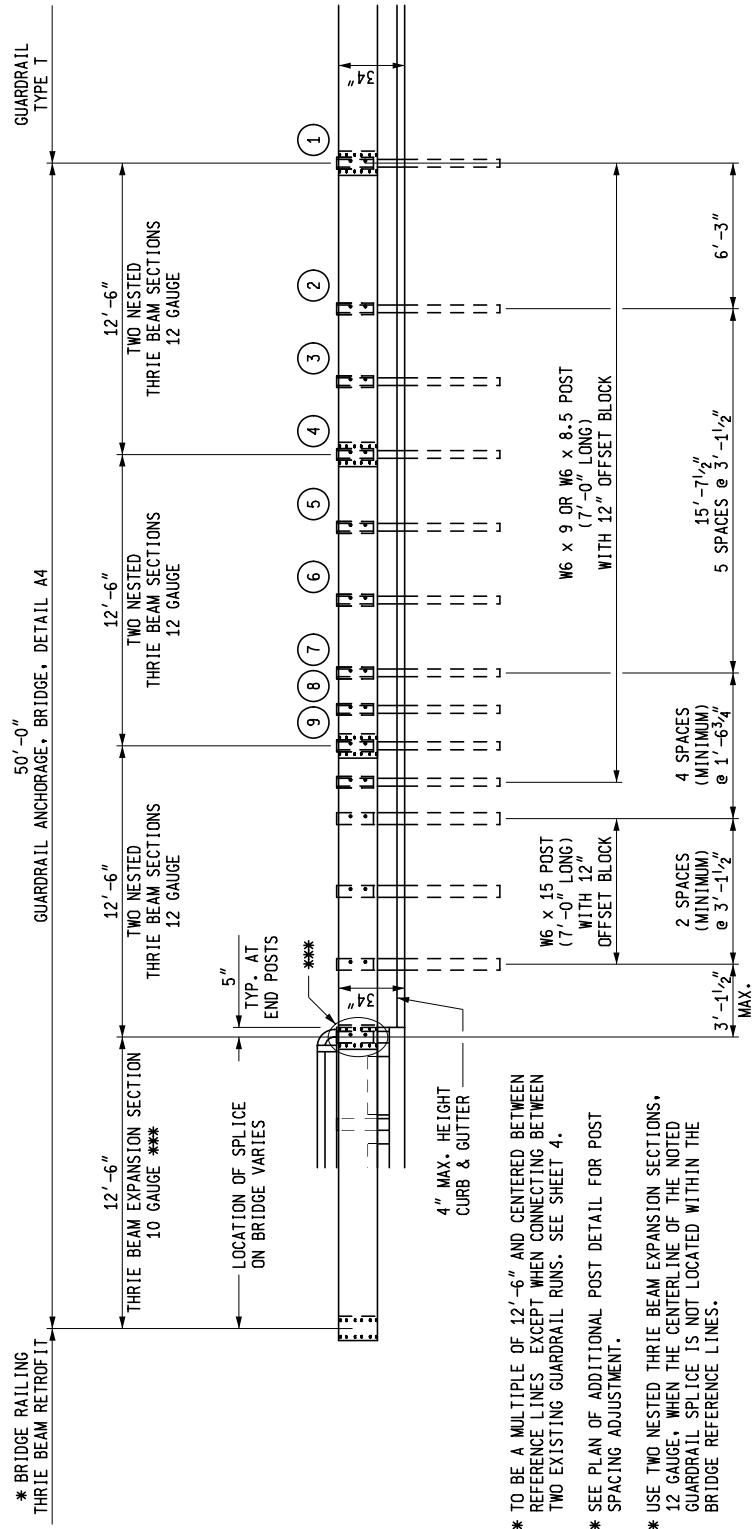
10-23-2019 PLAN DATE

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PLAN



ELEVATION

* BRIDGE RAILING THRIE BEAM RETROFIT

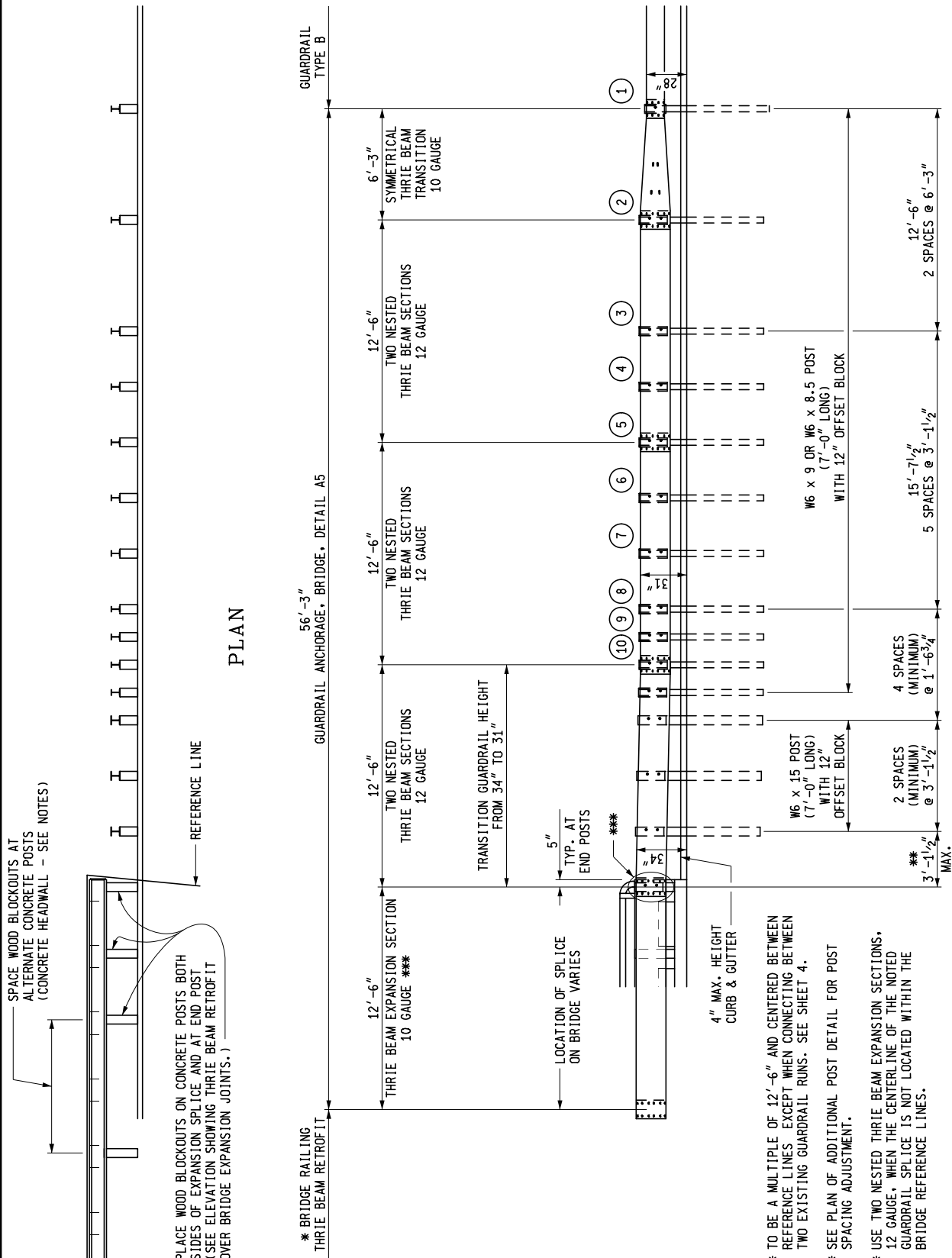
*** TO BE A MULTIPLE OF 12'-6" AND CENTERED BETWEEN REFERENCE LINES EXCEPT WHEN CONNECTING BETWEEN TWO EXISTING GUARDRAIL RUNS. SEE SHEET 4.

*** SEE PLAN OF ADDITIONAL POST DETAIL FOR POST SPACING ADJUSTMENT.

*** USE TWO NESTED THRIE BEAM EXPANSION SECTIONS, 12 GAUGE, WHEN THE CENTERLINE OF THE NOTED GUARDRAIL SPLICE IS NOT LOCATED WITHIN THE BRIDGE REFERENCE LINES.

DETAILS FOR CONNECTING GUARDRAIL TYPE T TO BRIDGE RAILING, THRIE BEAM RETROFIT

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR BRIDGE RAILING, THRIE BEAM RETROFIT (OPEN PARAPET TYPE BRIDGE RAILING)		
4-7-2022 F.H.W.A. APPROVAL	10-23-2019 PLAN DATE	B-23-F
		SHEET 2 OF 6



PLAN

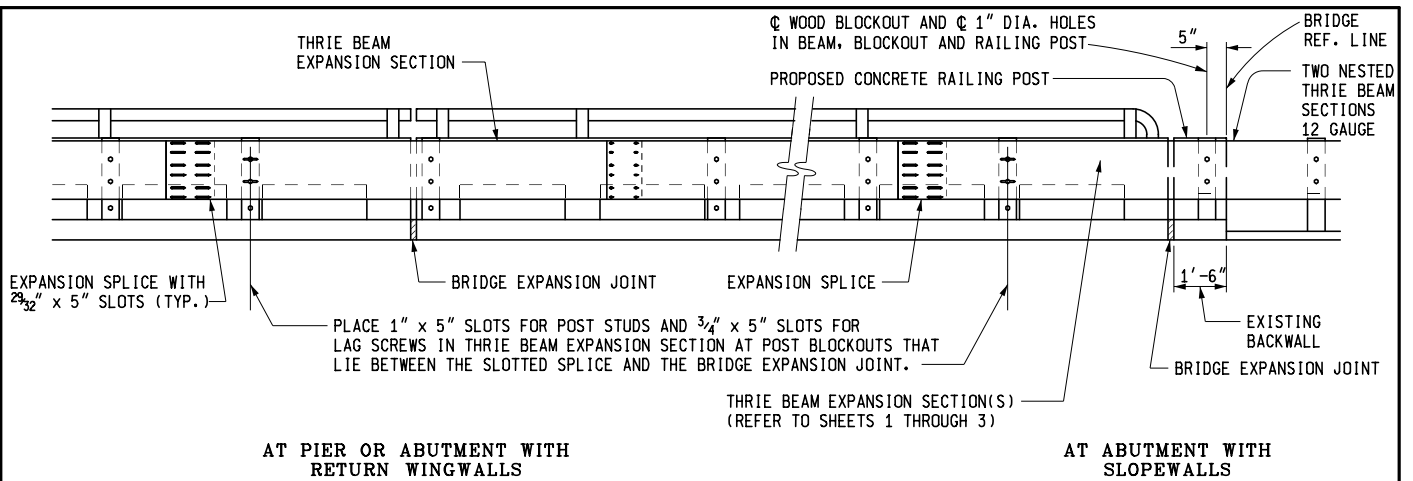
ELEVATION

DETAILS FOR CONNECTING GUARDRAIL TYPE B TO BRIDGE RAILING, THRIE BEAM RETROFIT

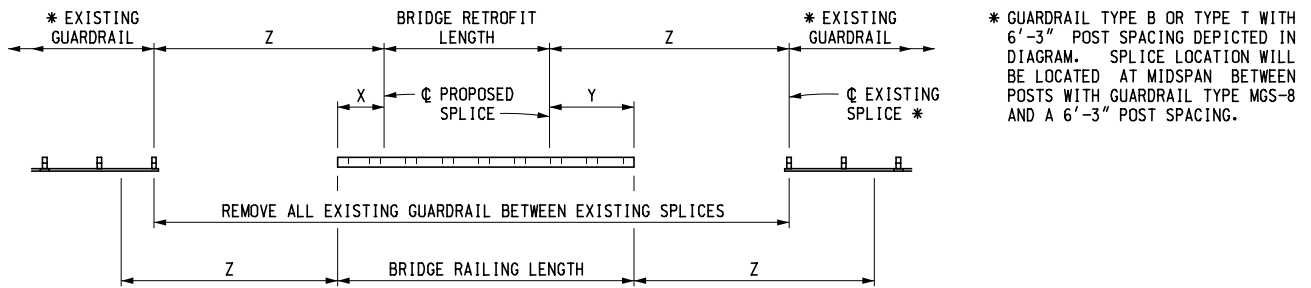
MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF DEVELOPMENT STANDARD PLAN FOR

**BRIDGE RAILING,
 THRIE BEAM RETROFIT**
 (OPEN PARAPET TYPE BRIDGE RAILING)

4-7-2022 F.H.W.A. APPROVAL	10-23-2019 PLAN DATE	B-23-F	SHEET 3 OF 6
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ELEVATION SHOWING THRIE BEAM RETROFIT OVER BRIDGE EXPANSION JOINTS

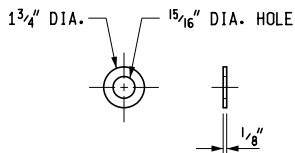


- Z = 50'-0" WHEN CONNECTING TO BEAM GUARDRAIL, TYPE MGS-8. USE GUARDRAIL ANCHORAGE, BRIDGE, DETAIL A3
- Z = 50'-0" WHEN CONNECTING TO BEAM GUARDRAIL, TYPE T. USE GUARDRAIL ANCHORAGE, BRIDGE, DETAIL A4
- Z = 56'-3" WHEN CONNECTING TO BEAM GUARDRAIL, TYPE B. USE GUARDRAIL ANCHORAGE, BRIDGE, DETAIL A5

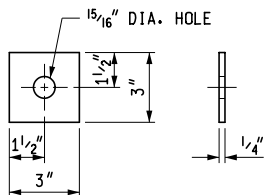
SKETCH FOR RETROFITTING BETWEEN TWO EXISTING RUNS OF GUARDRAIL

INSTRUCTIONS FOR LAYING OUT RETROFIT BETWEEN TWO EXISTING RUNS OF GUARDRAIL

1. MEASURE THE APPROPRIATE "Z" DISTANCE FROM ONE END OF THE BRIDGE RAILING AND LOCATE THE FIRST EXISTING SPLICE BACK TOWARD THE BRIDGE.
2. FROM THIS SPLICE, MEASURE THE SAME "Z" DISTANCE BACK TOWARD THE BRIDGE TO OBTAIN THE "X" DIMENSION. THIS DIMENSION WILL VARY FROM 0 TO 12'-6".
3. REPEAT STEPS 1 AND 2, FROM OPPOSITE END OF THE BRIDGE TO OBTAIN "Y" DIMENSION.
4. SUBTRACT THE SUM OF "X" + "Y" FROM BRIDGE RAILING LENGTH. THIS WILL BE THE BRIDGE RETROFIT LENGTH.
5. DIVIDE THE BRIDGE RETROFIT LENGTH BY 12'-6" TO OBTAIN THE NUMBER OF BEAM ELEMENTS PLUS A REMAINDER. THE REMAINDER WILL BE THE LENGTH OF A SHORTENED ELEMENT.
6. WHEN THE REMAINDER IS LESS THAN 2'-6", ADD 12'-6" TO THE REMAINDER AND DIVIDE BY TWO. THE BRIDGE RETROFIT WILL CONTAIN TWO SHORTENED BEAM ELEMENTS WITH ONE LESS 12'-6" BEAM ELEMENT THAN CALCULATED IN STEP 5.

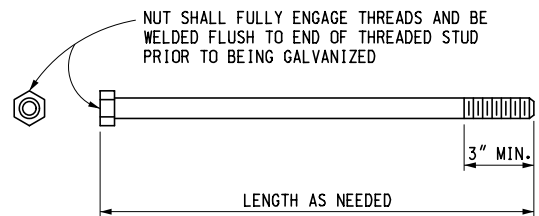


ROUND WASHER



SQUARE WASHER

WASHERS USED WITH 7/8" DIA. STUDS



7/8" DIA. THREADED STUD

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

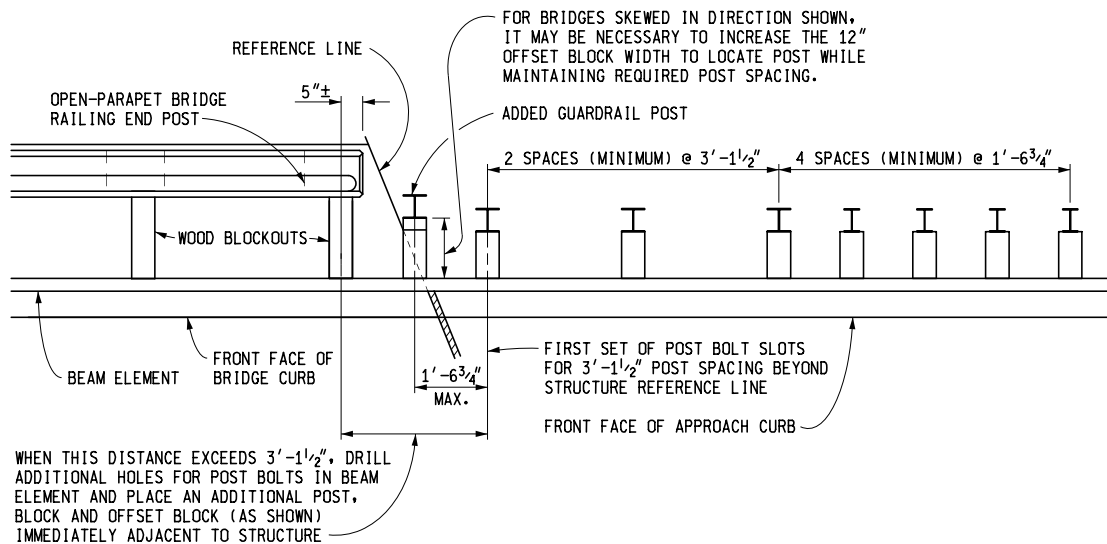
BRIDGE RAILING,
THRIE BEAM RETROFIT
(OPEN PARAPET TYPE BRIDGE RAILING)

4-7-2022
F.H.W.A. APPROVAL

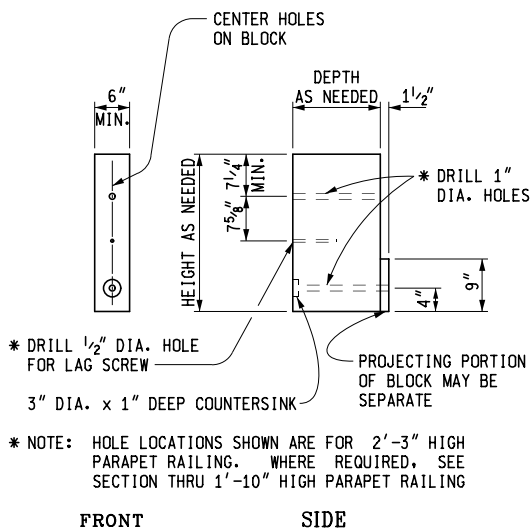
10-23-2019
PLAN DATE

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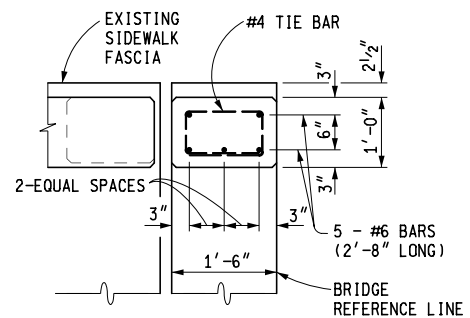
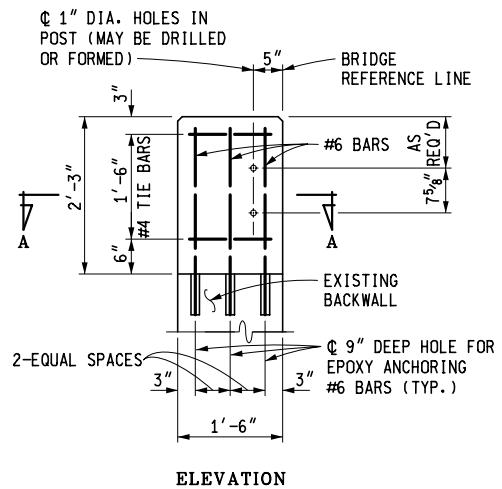
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PLAN OF ADDITIONAL POST DETAIL



WOOD BLOCKOUT DETAIL
WOOD BLOCKOUTS MAY BE MADE FROM A COMBINATION OF SEPARATE BLOCKS



CONCRETE RAILING POST DETAIL

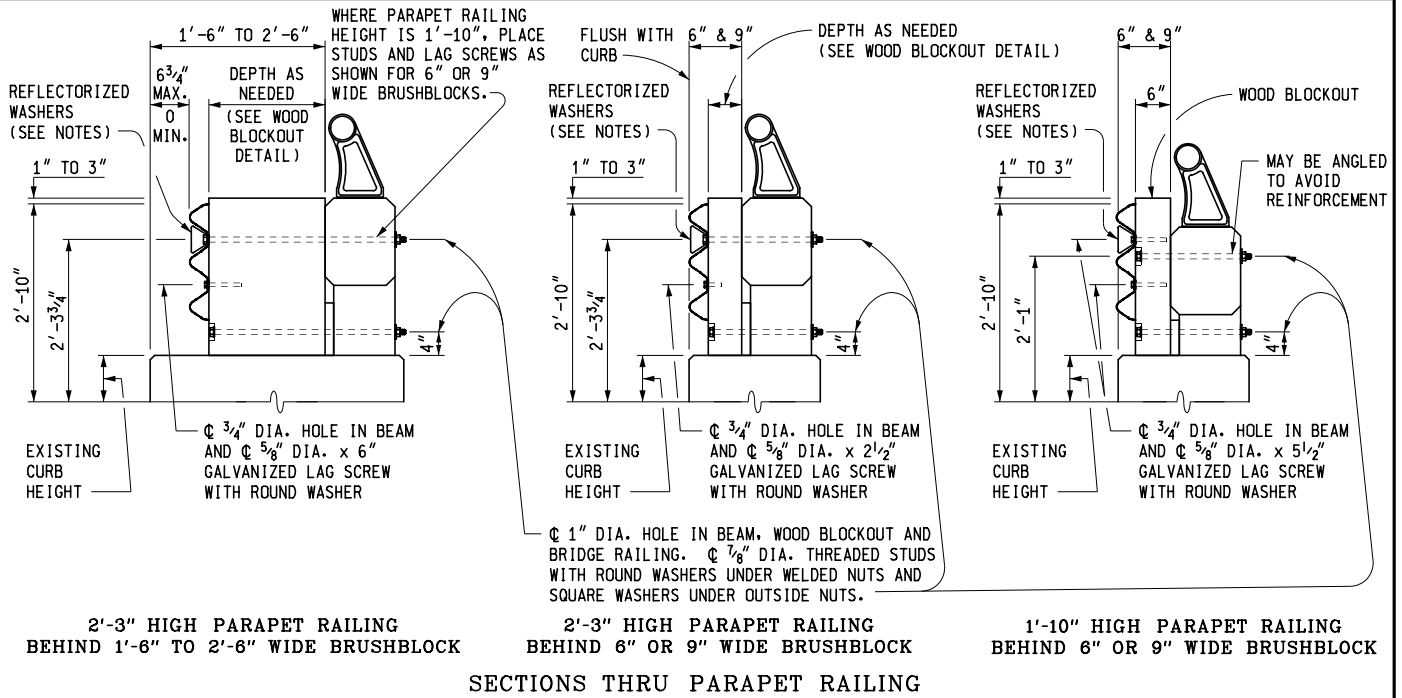
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR
**BRIDGE RAILING,
THREE BEAM RETROFIT**
(OPEN PARAPET TYPE BRIDGE RAILING)

4-7-2022
F.H.W.A. APPROVAL

10-23-2019
PLAN DATE

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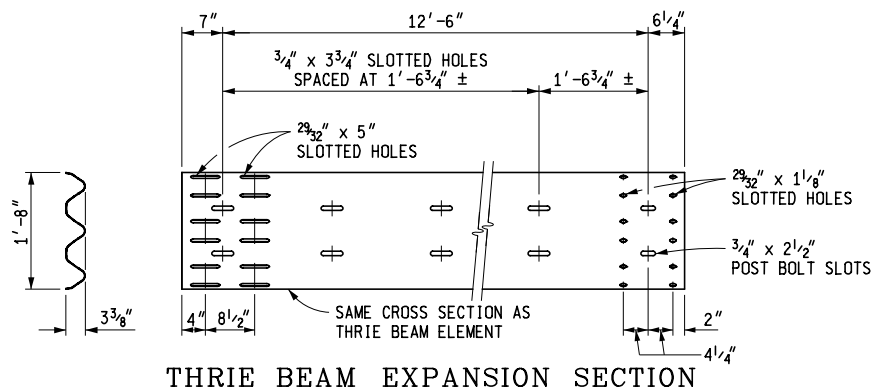


2'-3" HIGH PARAPET RAILING BEHIND 1'-6" TO 2'-6" WIDE BRUSHBLOCK

2'-3" HIGH PARAPET RAILING BEHIND 6" OR 9" WIDE BRUSHBLOCK

1'-10" HIGH PARAPET RAILING BEHIND 6" OR 9" WIDE BRUSHBLOCK

SECTION THRU PARAPET RAILING



NOTES:

THIS STANDARD IS INTENDED FOR USE IN UPGRADING OF EXISTING OPEN-PARAPET TYPE BRIDGE RAILINGS AND APPROACH GUARDRAIL.

BRIDGE RAILING, THRIE BEAM RETROFIT AND GUARDRAIL ANCHORAGES SHALL CONFORM TO THE CURRENT STANDARD PLAN R-60 SERIES, WHERE APPLICABLE, EXCEPT AS SHOWN ON THIS PLAN.

ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH SECTIONS 807 & 908 OF THE STANDARD SPECIFICATIONS.

REFLECTORIZED WASHERS SHALL BE SPACED AT 25'-0" INTERVALS AT BEAM ELEMENT SPLICES. THEY SHALL BE ATTACHED AT UPPER POST BOLT SLOTS WITH STANDARD SPLICE BOLTS.

FOR PRECAST THREE SIDED OR ARCH CULVERTS SPACE BLOCKOUTS FOR THRIE BEAM GUARDRAIL AT A DISTANCE OF 10'-7 3/4" OR LESS CENTER TO CENTER. PLACE FIRST AND LAST BLOCK ON HEADWALL AS DETAILED ON THIS STANDARD.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

BRIDGE RAILING,
THRIE BEAM RETROFIT
(OPEN PARAPET TYPE BRIDGE RAILING)

4-7-2022
F.H.W.A. APPROVAL

10-23-2019
PLAN DATE

B-23-F

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