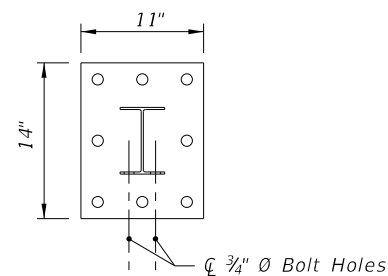
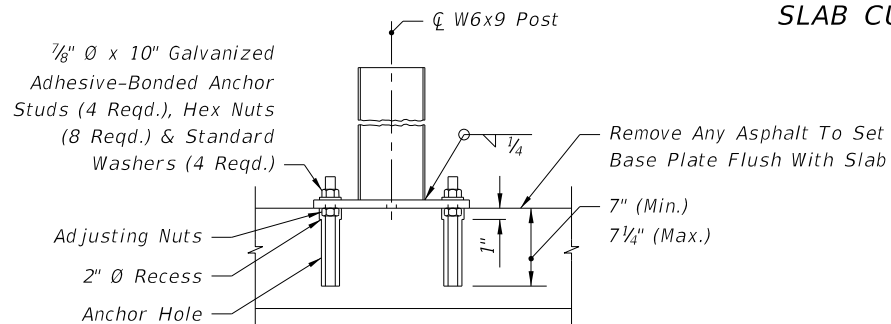


PICTORIAL

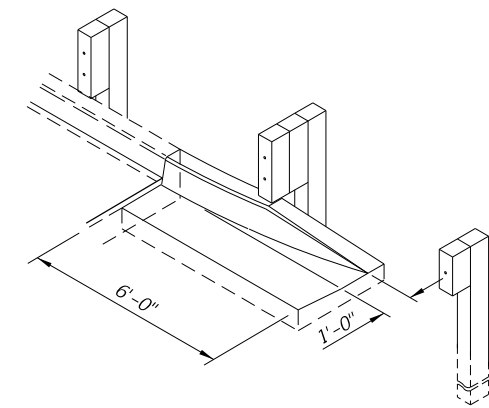


TOP VIEW

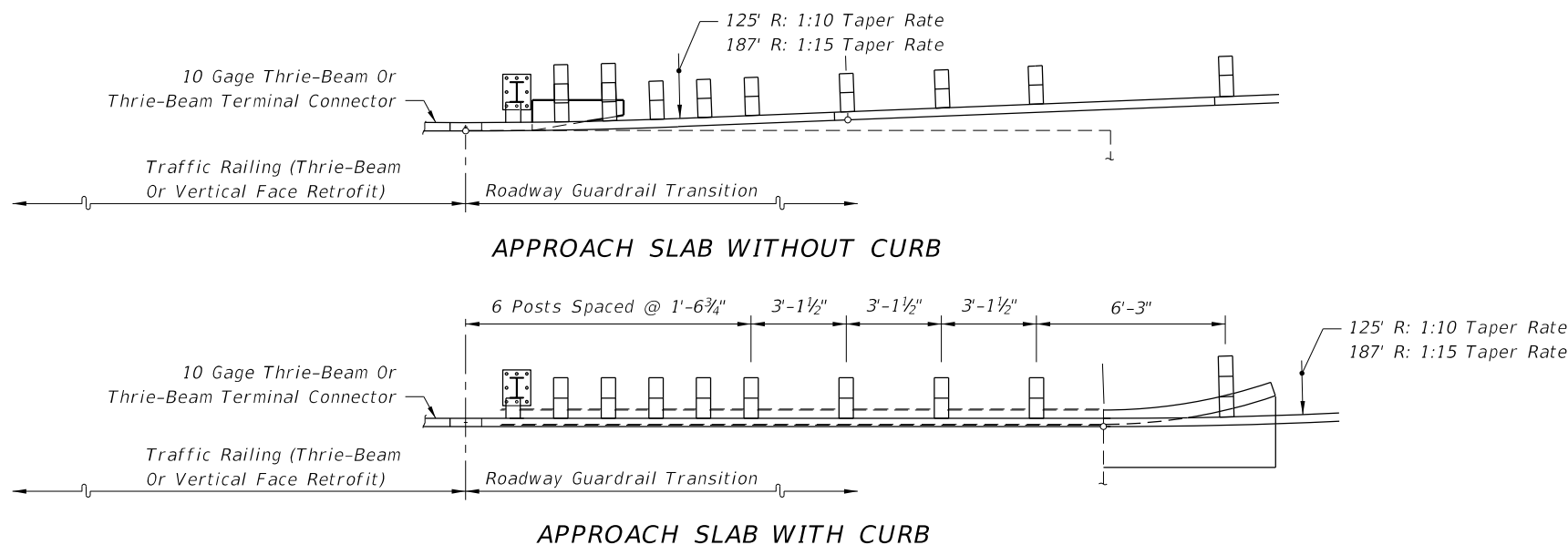


SIDE VIEW

**SPECIAL STEEL POST FOR ROADWAY THRIE-BEAM TRANSITIONS TO BRIDGE TRAFFIC RAILING RETROFITS**



**CURB TYPE F FLARE WHEN END OF EXISTING APPROACH SLAB CURB EXPOSED**



Longitudinal Location Of Transition Blocks And Curb End Flares Will Vary With Scheme Type

PARTIAL PLAN VIEWS

**GENERAL NOTES**

1. This index provides guardrail transition and connection details for approach end guardrail on existing bridges, and anchorage details for trailing end traffic railing retrofits and safety shapes on existing bridges. Sheets 1 through 26 apply to bridges with retrofitted traffic railings, (Sheet 26 shows the trailing end guardrail connections). Sheet 27 applies to bridges with safety shaped traffic railing. Construct the guardrail transitions and connections where shown in the plans.
2. For trailing end guardrail connections for existing bridges with either Vertical Face Retrofits or Safety Shape Traffic Railing, see the Trailing End Transition Connection to Rigid Barrier detail shown in Index 536-001. Likewise, for miscellaneous guardrail construction details that are not provided in this Index, refer to Index 536-001.

**NOTES FOR GUARDRAIL TRANSITIONS CONNECTING TO TRAFFIC RAILING RETROFITS ON EXISTING BRIDGES**

1. The transition detail shown on this sheet shows (a) the standard post spacings within the typical thrie-beam approach transitions connecting to existing bridges with retrofit traffic railings, and (b) depict the typical alignments of the approach transitions.
2. The curb and gutter flare shown on this sheet is typical of flares that are to be constructed when approach slab curbs extend to the beginning of the slab, and where other treatment to curb blunt ends are not in place.
3. The special steel post for roadway thrie-beam transitions detailed on this sheet is specific to all transition applications on this index that require one or more steel posts.

The special steel post and base plate assembly shall be fabricated in accordance with Specification 967.

Anchor studs shall be fully threaded rods in accordance with ASTM F1554 Grade 36 or ASTM A193 Grade B7. All nuts shall be heavy hex in accordance with ASTM A563 or ASTM A19

4. Anchor studs and nuts shall be hot-dip zinc coated in accordance with the Specifications. After the nuts have been snug tightened, the anchor stud threads shall be single punch distorted immediately above the top nuts to prevent loosening of the nuts. Distorted threads shall be coated with a galvanizing compound in accordance with the Specifications.

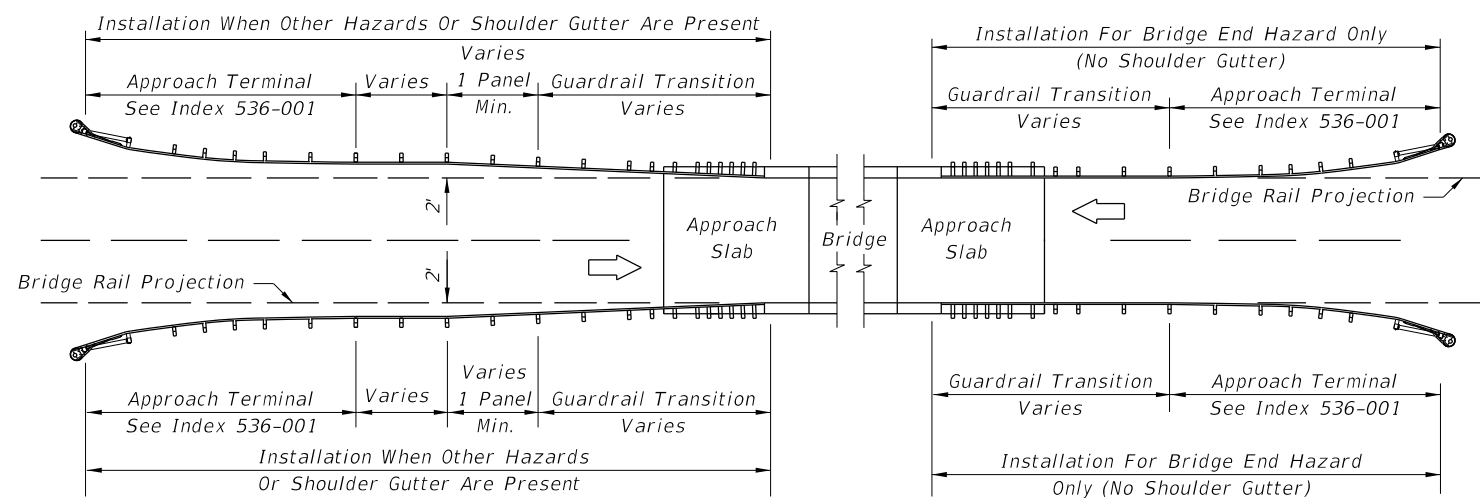
Adhesive bonding material systems for anchors shall comply with Specification 937 and be installed in accordance with Specification 416.4. Nested beam extensions and points for terminal connector attachments will vary for traffic railing barrier vertical face retrofits. The plan views for the vertical face retrofit barriers show the primary configurations for each particular scheme. The associated pictorial views show the variations.

5. For installing thrie-beam terminal connector to traffic railing vertical face retrofits, see notations on Sheets 15 through 18 and the flag notation on Sheet 26.
6. Payment for connections to traffic railing vertical face retrofits are to be made under the contract unit price for Bridge Anchorage Assembly, EA., and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate and bolts, nuts and washers.

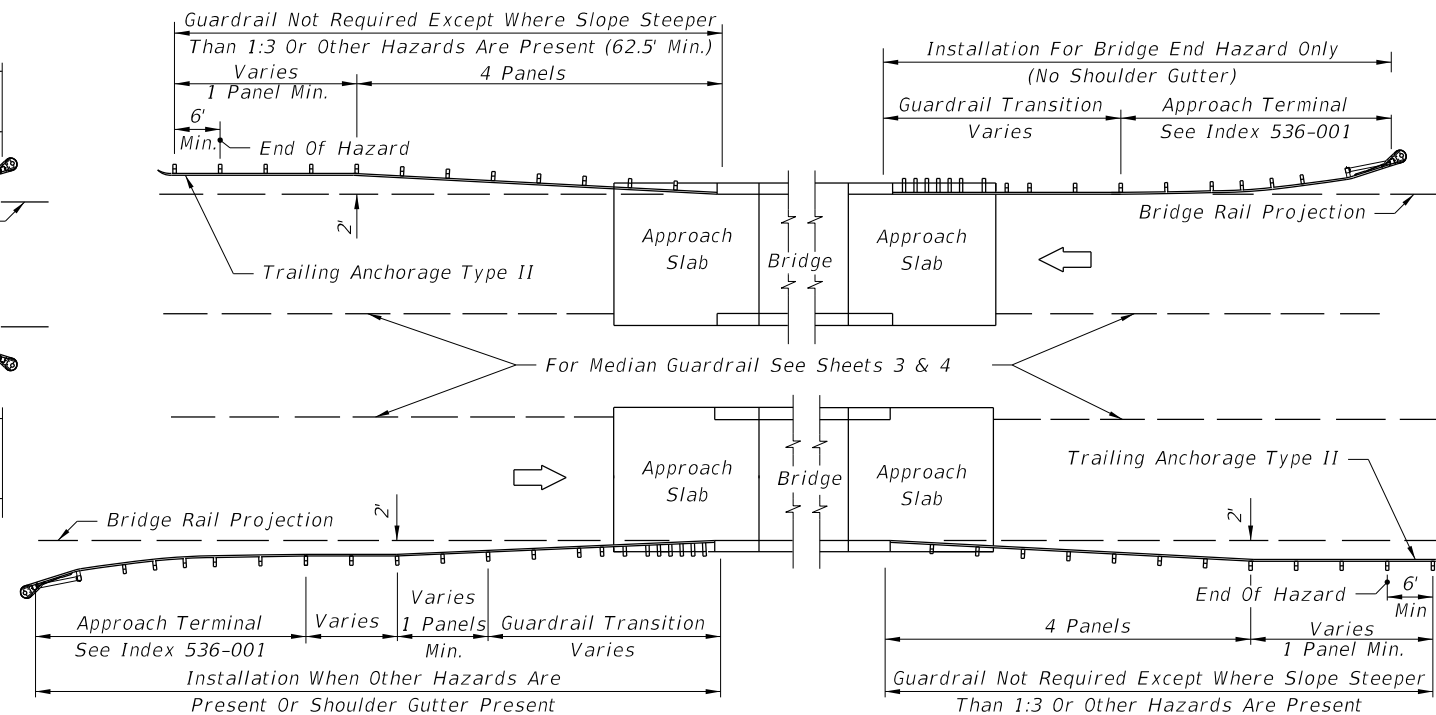
**GUARDRAIL TRANSITION ALIGNMENTS FOR BRIDGE THRIE-BEAM AND VERTICAL FACE TRAFFIC RAILING RETROFIT**

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LAST REVISION 11/01/17	DESCRIPTION:	FDOT FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 1 of 27
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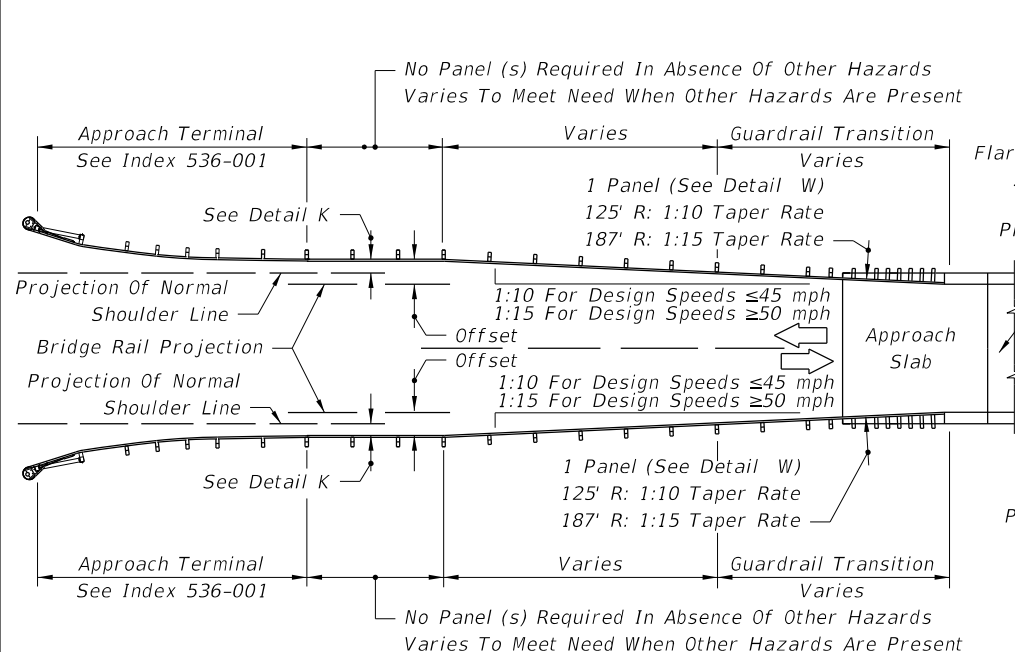


UNDIVIDED ROADWAY - DETAIL H

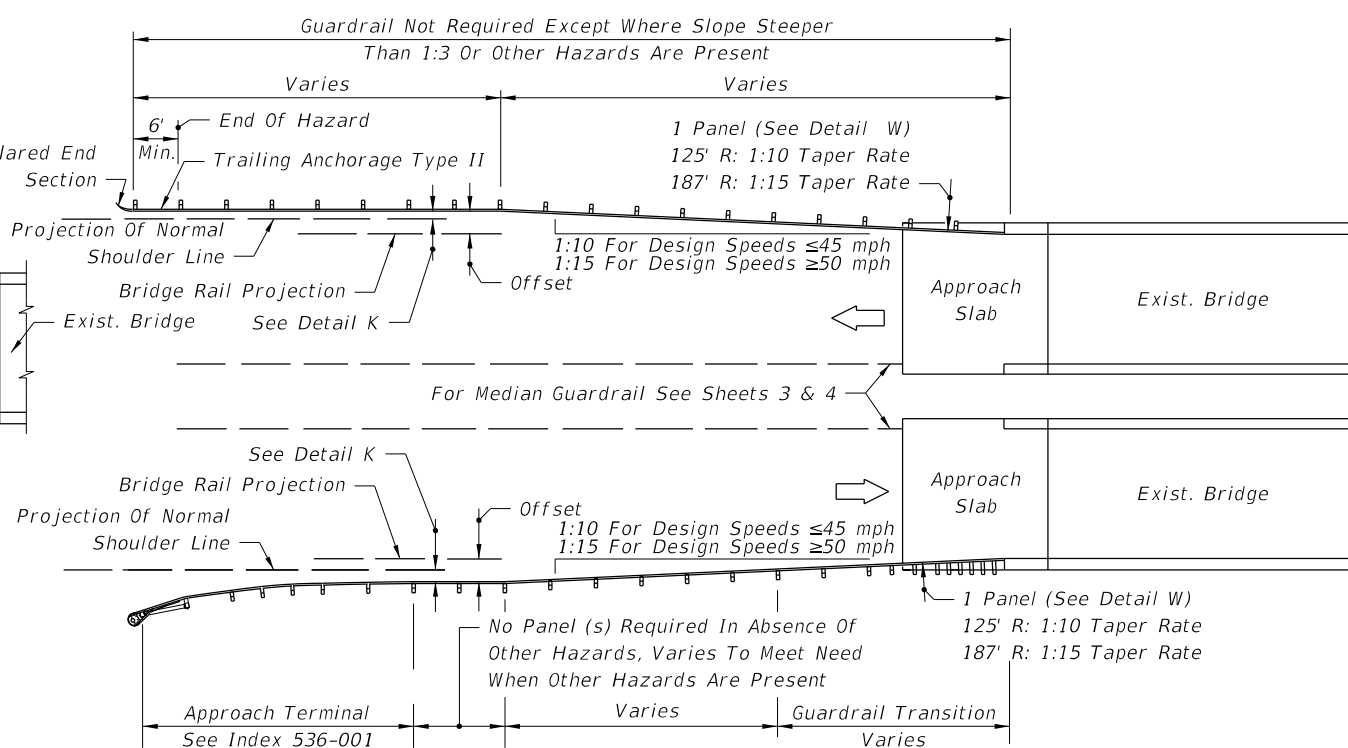


DIVIDED ROADWAY - DETAIL I

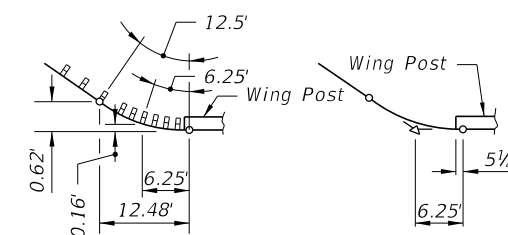
GUARDRAIL APPLICATIONS FOR BRIDGES WITH FULL WIDTH SHOULDERS AND SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH



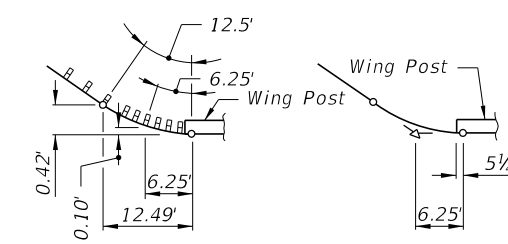
UNDIVIDED ROADWAY - DETAIL S



DIVIDED ROADWAY - DETAIL T



125' R LAYOUT



187' R LAYOUT

STANDARD PANELS SET TO RADIALS ADJOINING BRIDGES  
DETAIL W

GUARDRAIL APPLICATIONS FOR BRIDGES WITH LESS THAN FULL WIDTH SHOULDERS AND CONCRETE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH

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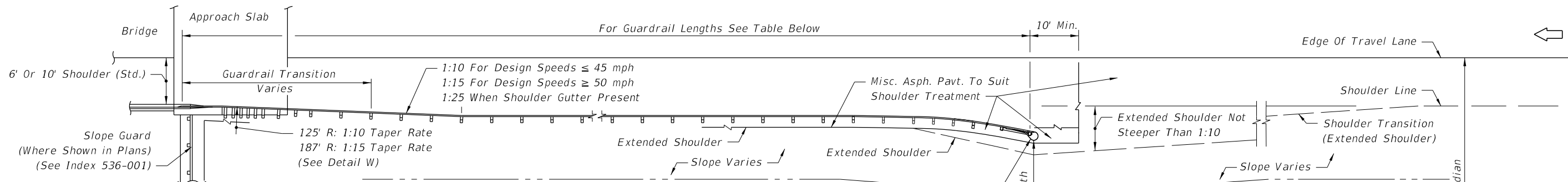


FY 2018-19  
STANDARD PLANS

GUARDRAIL TRANSITIONS AND  
CONNECTIONS FOR EXISTING BRIDGES

INDEX  
536-002

SHEET  
2 of 27

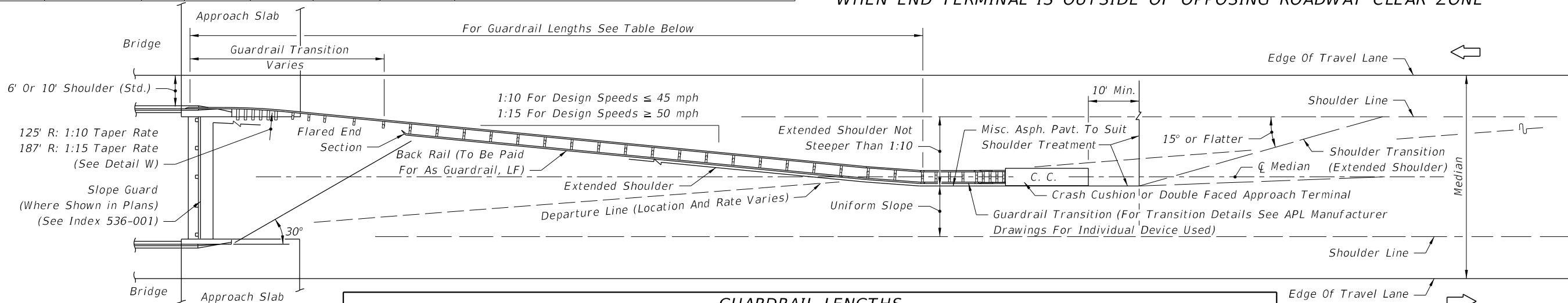


GUARDRAIL LENGTH (Ft.)						
Design Speed (mph)	Projected ADT	CZ (Ft.)	6' & 8' Rdwy. Shldr.		10' & 12' Rdwy. Shldr.	
			Min. Median Width	Guardrail Length	Min. Median Width	Guardrail Length
60-70	≥ 1500	36	50	362.5	54	312.5
60-70	< 1500	30	44	287.5	48	237.5
55	≥ 1500	30	44	287.5	48	237.5
55	< 1500	24	38	212.5	42	162.5
45-50	≥ 1500	24	38	212.5	42	162.5
45-50	< 1500	20	34	162.5	38	112.5
45-50	Urban w/o Curb	24	38	212.5	42	162.5
35-40	Urban w/o Curb	18	32	162.5	36	100.0

**Notes:**  
 Lengths are based on minimum median widths and on standard clear zone widths for travel lanes on tangent roadways, and the length of advancement needed for flared end anchorage assemblies to shield normal transverse underslope and bridge end hazards. Lengths may need to be adjusted for connection location on wing post or bridge traffic railing barrier, auxiliary lanes, curved roadways, parallel end anchorage assemblies, skewed crossings and other hazards present.

Note: For approach end anchorage assemblies see sheets elsewhere in this Index and the plans.

**WHEN END TERMINAL IS OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE**



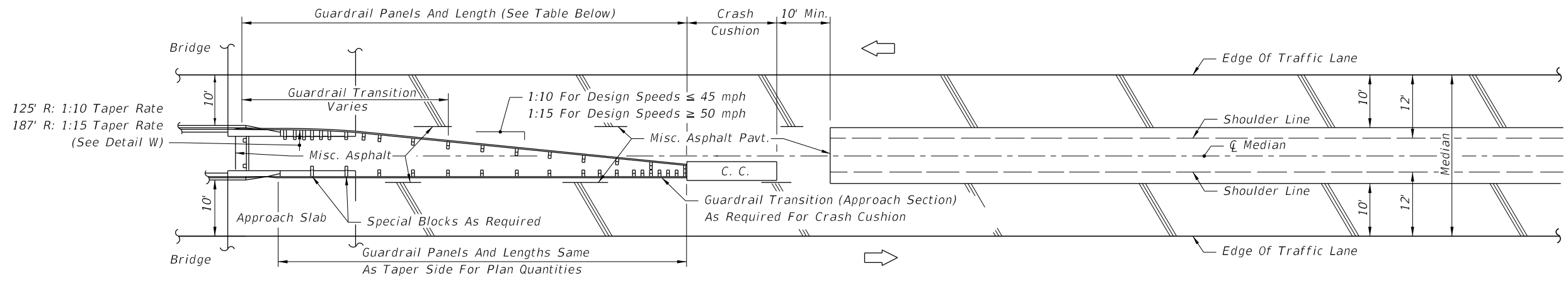
Median Width (ft.)	1:10 TAPER RATE								1:15 TAPER RATE							
	6' Bridge Shoulder			10' Bridge Shoulder			6' Bridge Shoulder			10' Bridge Shoulder						
	Front	Back	Total	Front	Back	Total	Front	Back	Total	Front	Back	Total	Front	Back	Total	
32	7.5	6	13.5	168.75	4.5	3	7.5	93.75	11.5	9	20.5	256.25	7.5	6	13.5	168.75
34	8.5	6	14.5	181.25	5.5	4	9.5	118.75	12.5	10	22.5	281.25	7.5	6	13.5	168.75
36	9.5	7	16.5	206.25	6.5	5	11.5	143.75	13.5	11	24.5	306.25	8.5	7	15.5	193.75
38	10.5	8	18.5	231.25	7.5	6	13.5	168.75	14.5	12	26.5	331.25	10.5	9	19.5	243.75
40	10.5	8	18.5	231.25	7.5	6	13.5	168.75	16.5	13	29.5	368.75	11.5	9	20.5	256.25
42	11.5	8	19.5	243.75	8.5	6	14.5	181.25	17.5	14	31.5	393.75	12.5	10	22.5	281.25
44	12.5	9	21.5	268.75	9.5	7	16.5	206.25	18.5	15	33.5	418.75	13.5	11	24.5	306.25
46	12.5	9	21.5	268.75	10.5	8	18.5	231.25	19.5	16	35.5	443.75	14.5	12	26.5	331.25
48	14.5	11	25.5	318.75	11.5	9	20.5	256.25	20.5	16	36.5	456.25	16.5	13	29.5	368.75

The lengths shown on this table are typical for roadways with standard width shoulders and a relocated connection to the existing wing post. Length requirements shall be determined on a site specific basis for both standard width and narrow bridge shoulders and for end anchorage or end shielding use.

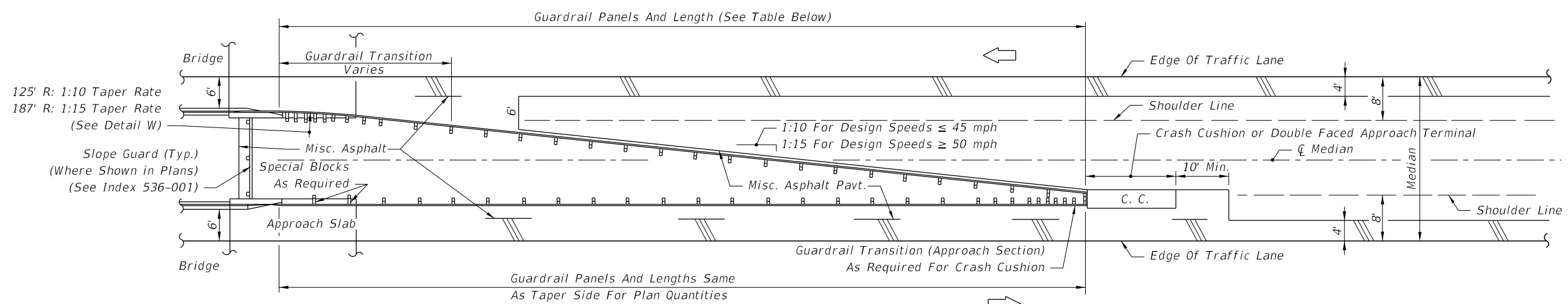
**WHEN END TERMINAL CANNOT BE LOCATED OUTSIDE OF OPPOSING ROADWAY CLEAR ZONE**

**APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH CONCRETE TRAFFIC RAILING  
 EXTENDING LESS THAN FULL APPROACH SLAB LENGTH IN WIDE MEDIANS WITH FLUSH SHOULDERS**

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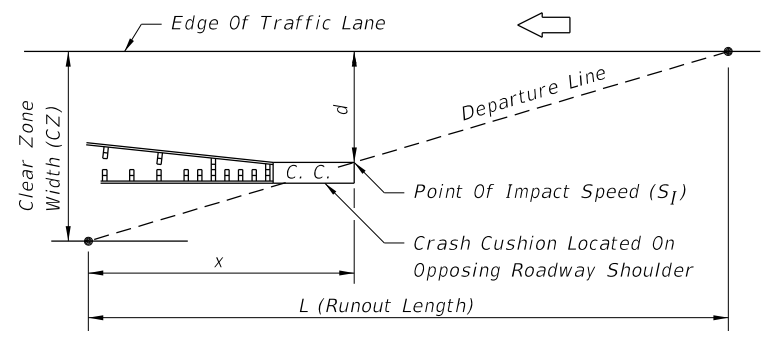


**MEDIANS WITH 10' BRIDGE SHOULDERS**



**MEDIANS WITH 6' BRIDGE SHOULDERS**

Note: The guardrail configurations shown apply only to parallel or near parallel bridges with open medians.



Speed ( $S_1$ ) For Determining Crash Cushion Size:

$$S_1 = \frac{x}{L} (\text{Design Speed}) = \left[ \frac{(CZ - d)}{CZ} \right] \text{Design Speed}$$

**SIZING CRASH CUSHIONS LOCATED ON OPPOSING ROADWAY SHOULDERS**

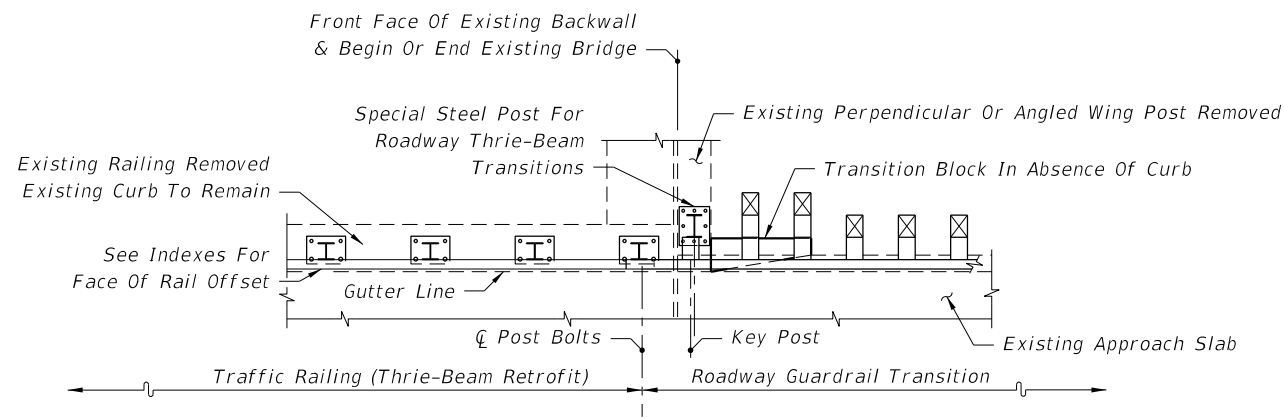
GUARDRAIL LENGTHS								
MEDIAN WIDTH (Ft.)	6' BRIDGE SHOULDERS				10' BRIDGE SHOULDERS			
	1:10 TAPER RATE		1:15 TAPER RATE		1:10 TAPER RATE		1:15 TAPER RATE	
	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)	PANELS (No.)	LENGTH (Ft.)
30	12.5	156.25	18.5	231.25	6.5	81.25	9.5	118.75
28	11.5	143.75	16.5	206.25	5.5	68.75	7.5	93.75
26	9.5	118.75	14.5	181.25	5.5*	68.75	5.5*	68.75
24	8.5	106.25	11.5	143.75	5.5*	68.75	5.5*	68.75

The lengths shown in this table are based on standard widths for roadway and bridge median shoulders. Length requirements for both standard width and narrow bridge shoulders and end anchorage or end shielding requirements shall be determined on a site specific basis. When crash cushions are required on opposing roadway shoulders, their sizes may be determined by the residual speeds ( $S_1$ 's) along the runouts from the approach roadways; however, when calculated speeds ( $S_1$ 's) are less than 30 mph crash cushions shall be no less in size than for 30 mph; see speed diagram left. The number of panels may be reduced when installing a crash cushion more than 2.5' in width; see \* below.

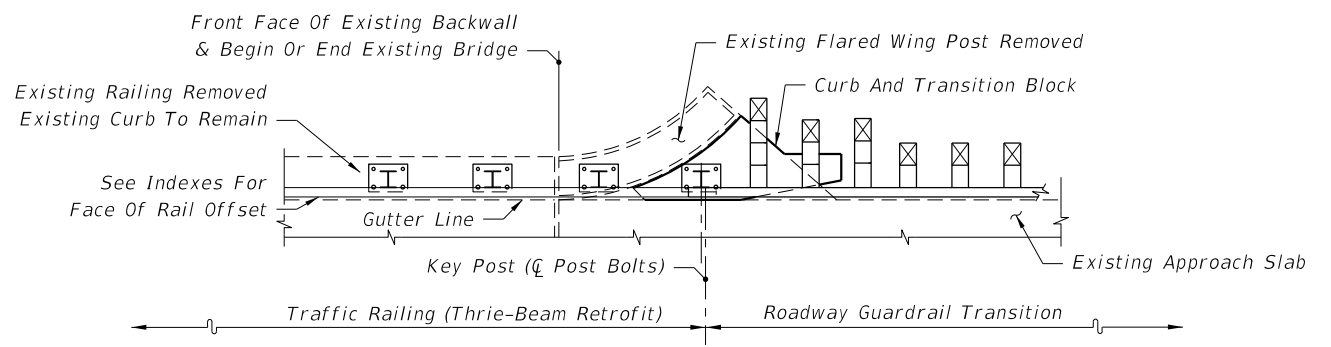
\*Number shown is the minimum number of panels plus a W-Thrie beam transition panel; single faced guardrail must have a length of five (5) or more panels.

**APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH CONCRETE TRAFFIC RAILING  
EXTENDING LESS THAN FULL APPROACH SLAB LENGTH IN NARROW MEDIANS WITH FLUSH SHOULDERS**

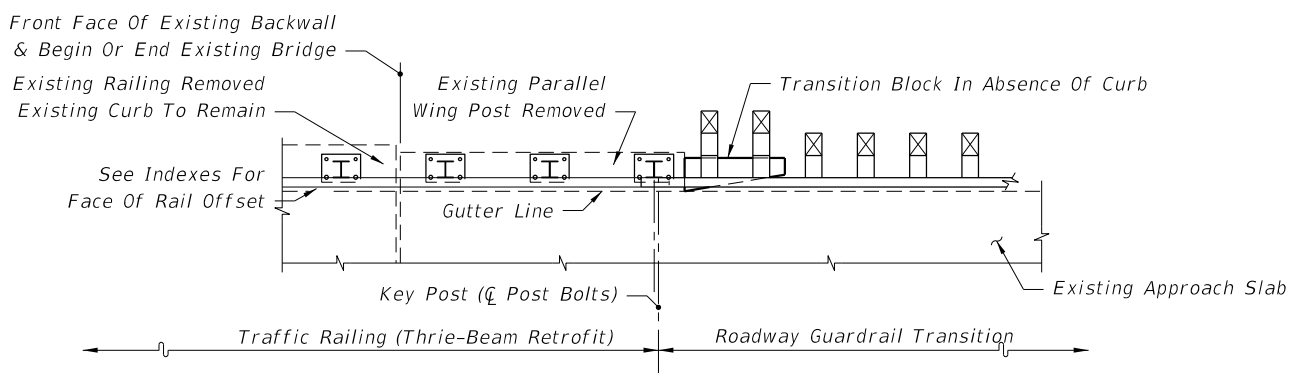
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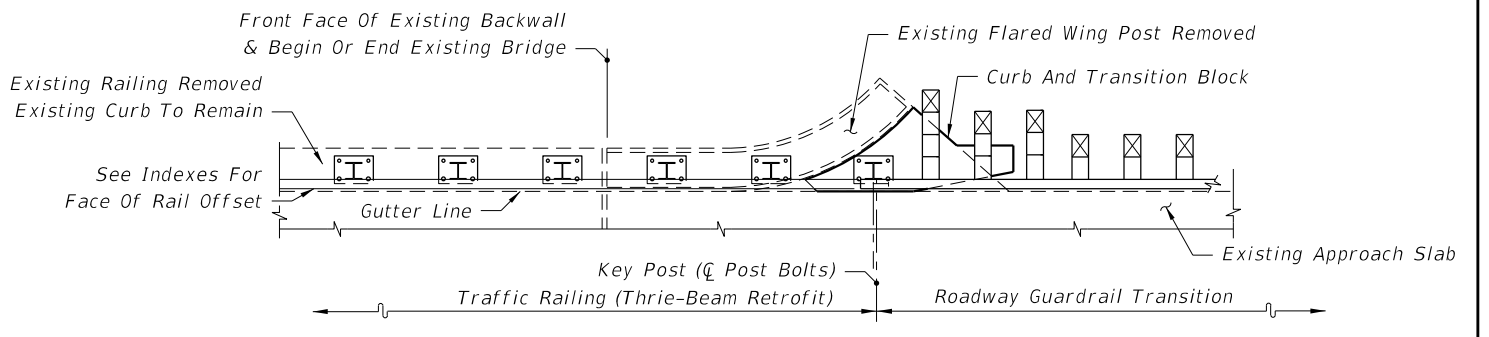
SEE INDEX 460-471 - SCHEME 1



SEE INDEX 460-471 - SCHEME 3




SEE INDEX 460-471 - SCHEME 2

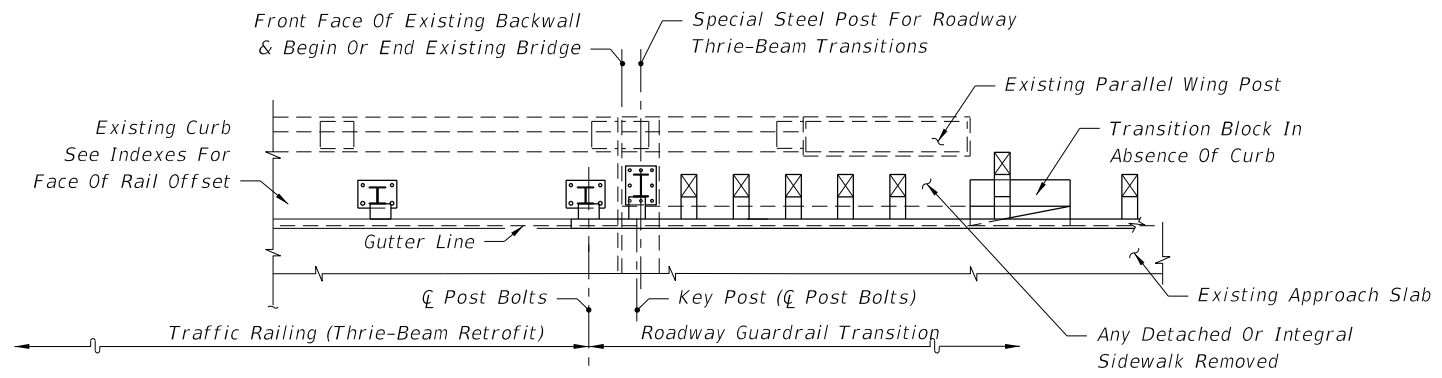


SEE INDEX 460-471 - SCHEME 3

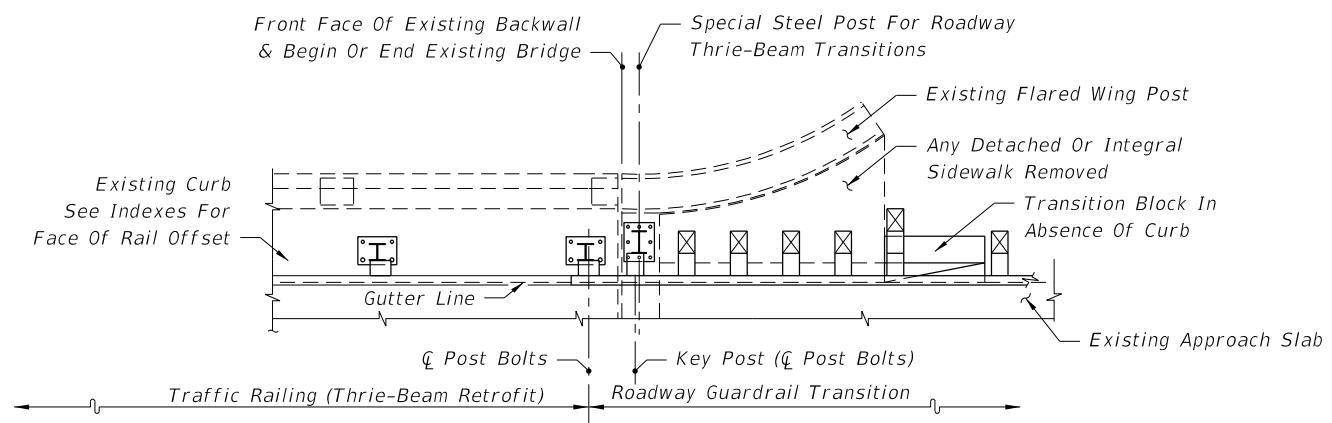
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

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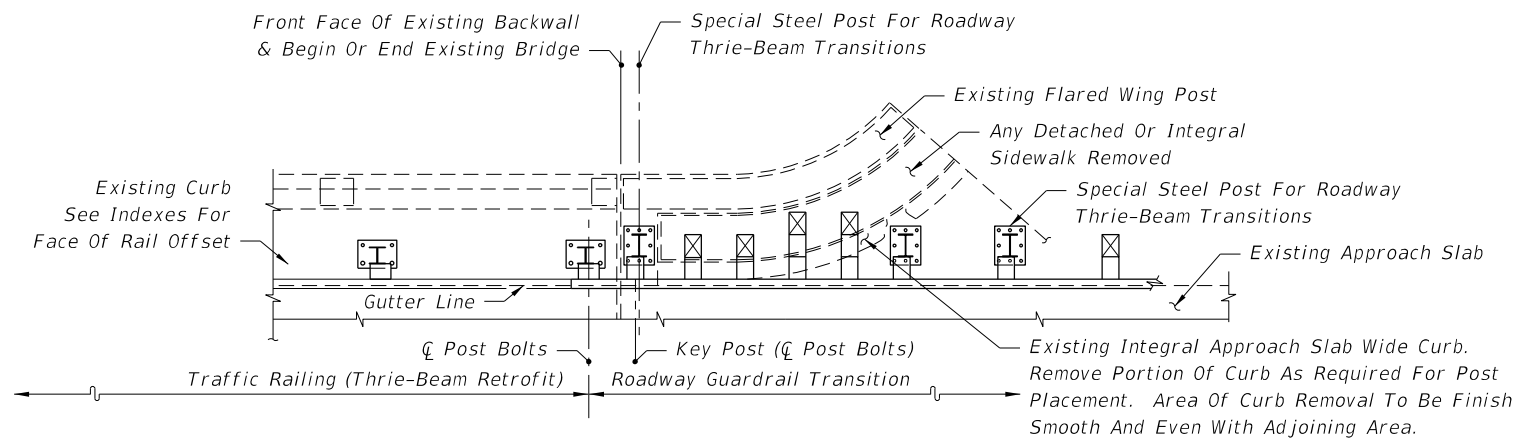
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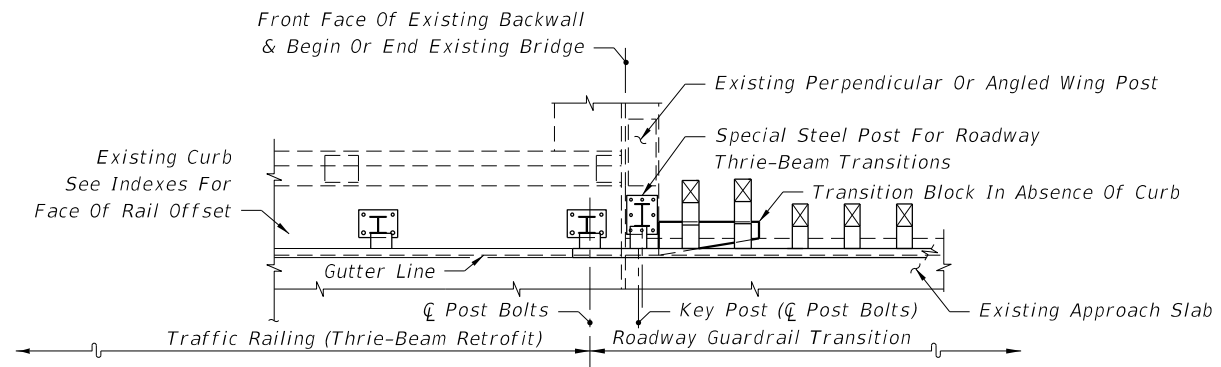
SEE INDEXES 460-472 & 460-475 - SCHEME 2



SEE INDEXES 460-472 & 460-475 - SCHEME 2



SEE INDEXES 460-472 & 460-475 - SCHEME 2

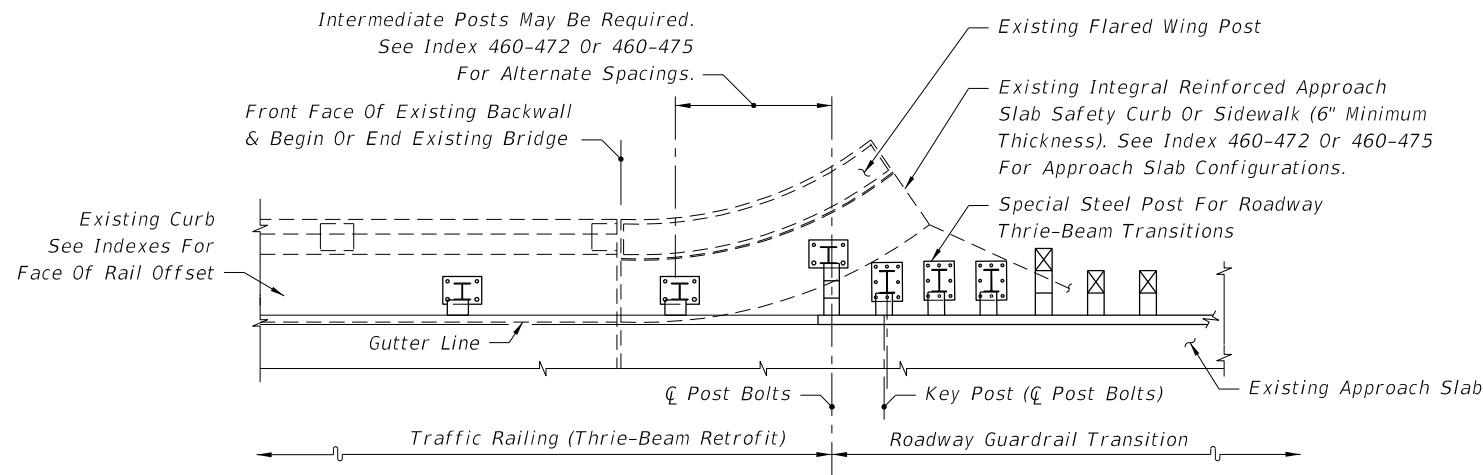


SEE INDEXES 460-472 & 460-475 - SCHEME 1

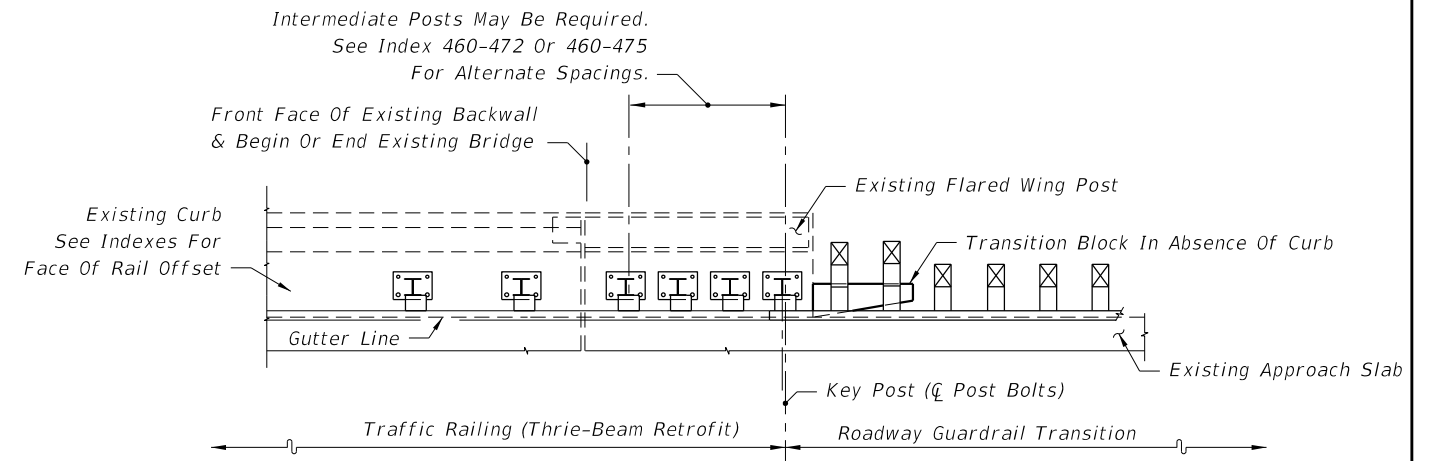
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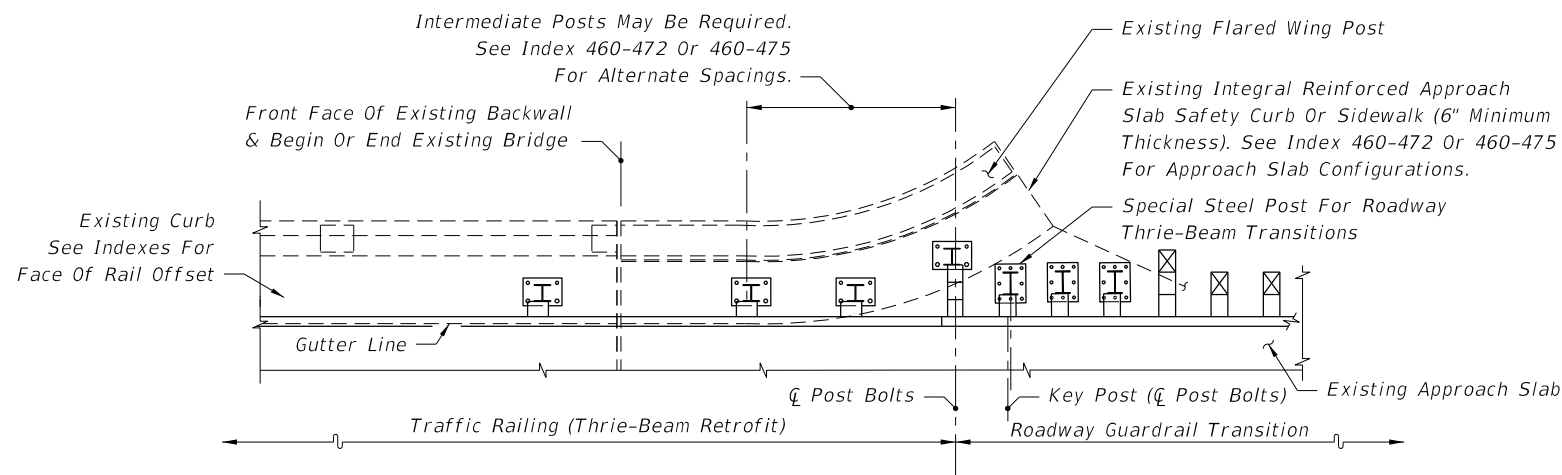
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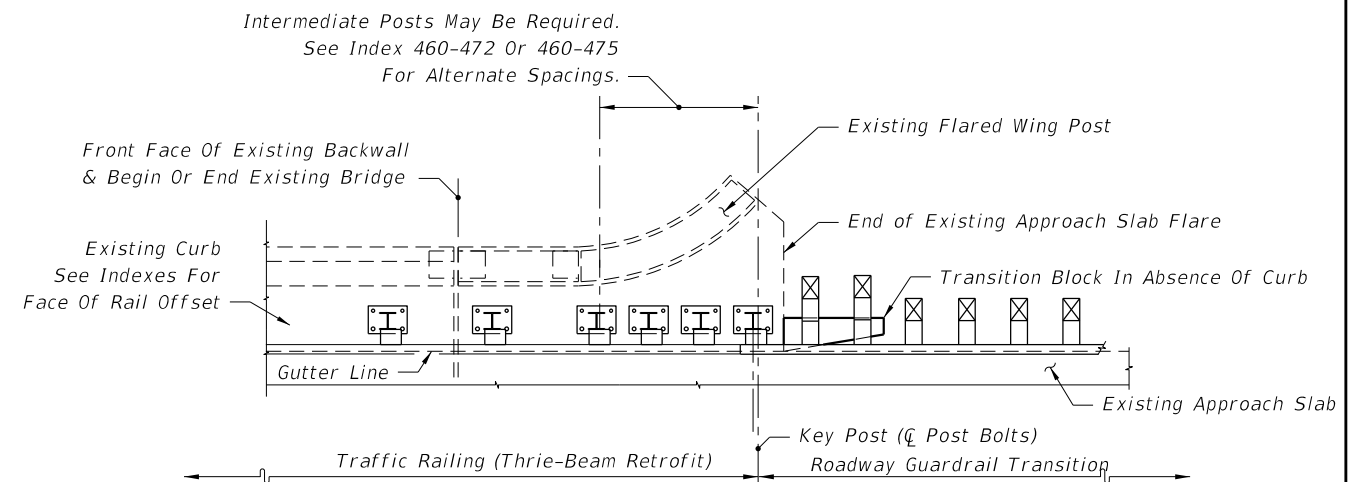
SEE INDEXES 460-472 & 460-475 - SCHEMES 3 & 4



SEE INDEXES 460-472 & 460-475 - SCHEMES 5 & 6




SEE INDEXES 460-472 & 460-475 - SCHEMES 3 & 4

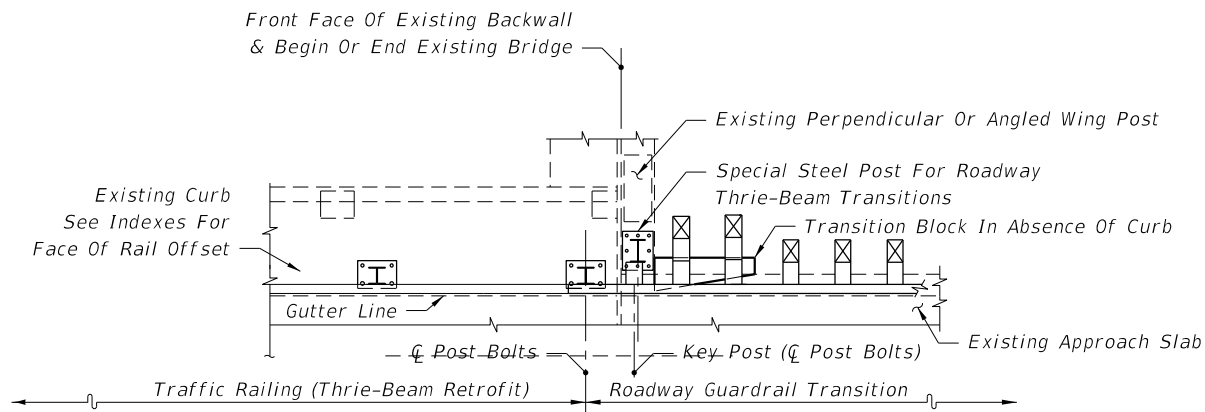


SEE INDEXES 460-472 & 460-475 - SCHEMES 5 & 6

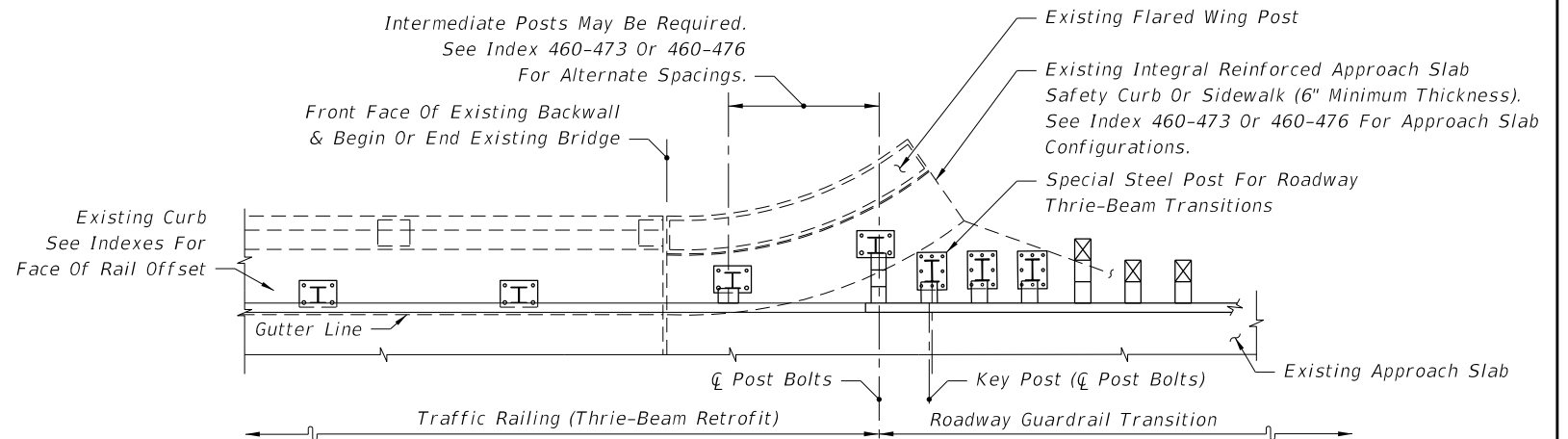
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS  
FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

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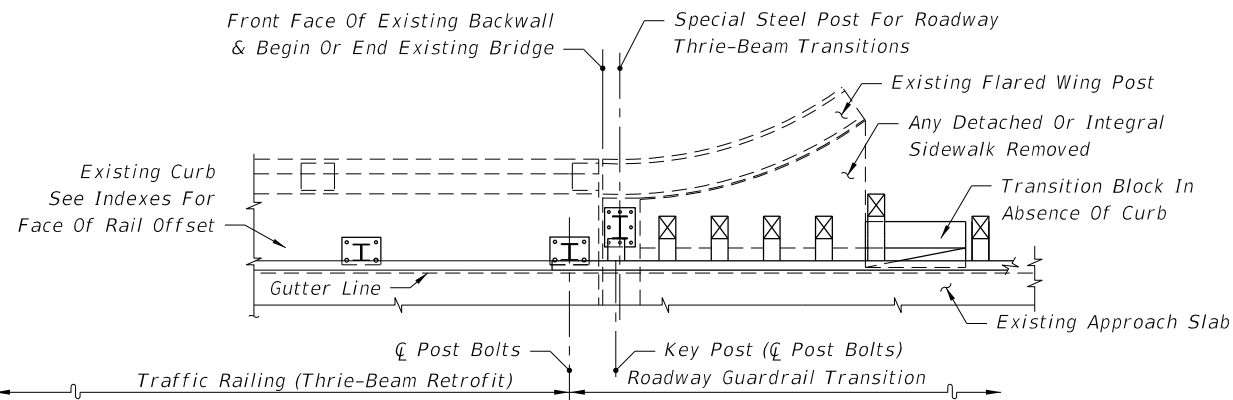
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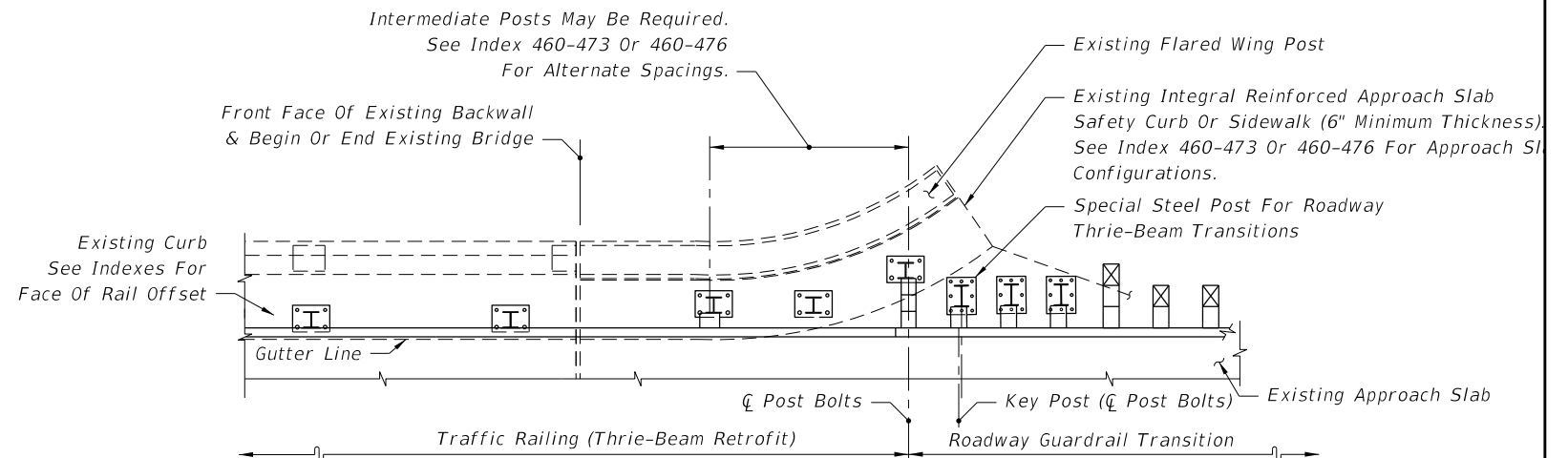
SEE INDEXES 460-473 & 460-476 - SCHEME 1



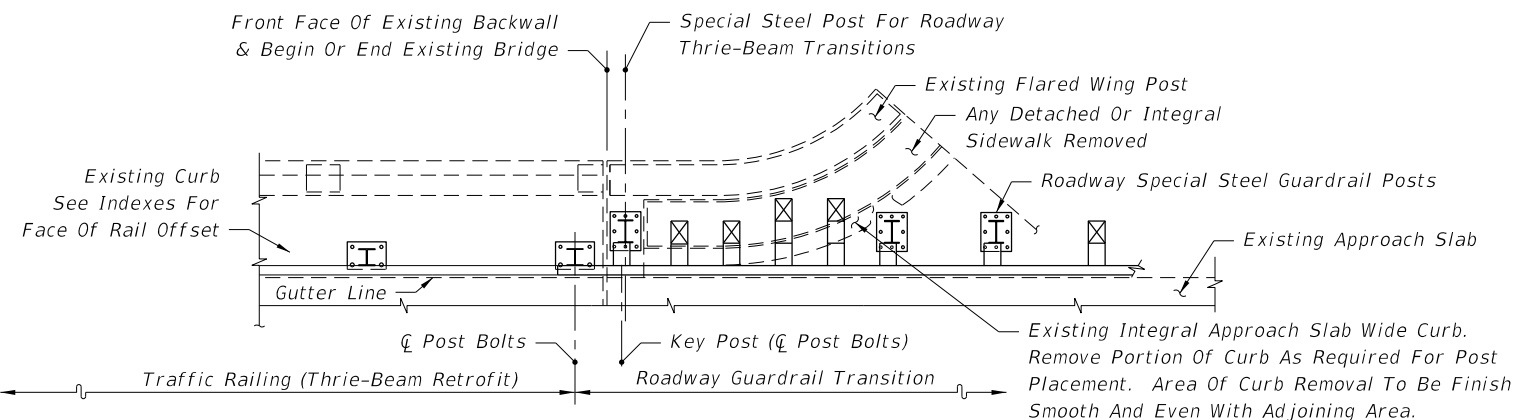
SEE INDEXES 460-473 & 460-476 - SCHEMES 3 & 4



SEE INDEXES 460-473 & 460-476 - SCHEME 2




SEE INDEXES 460-473 & 460-476 - SCHEMES 3 & 4



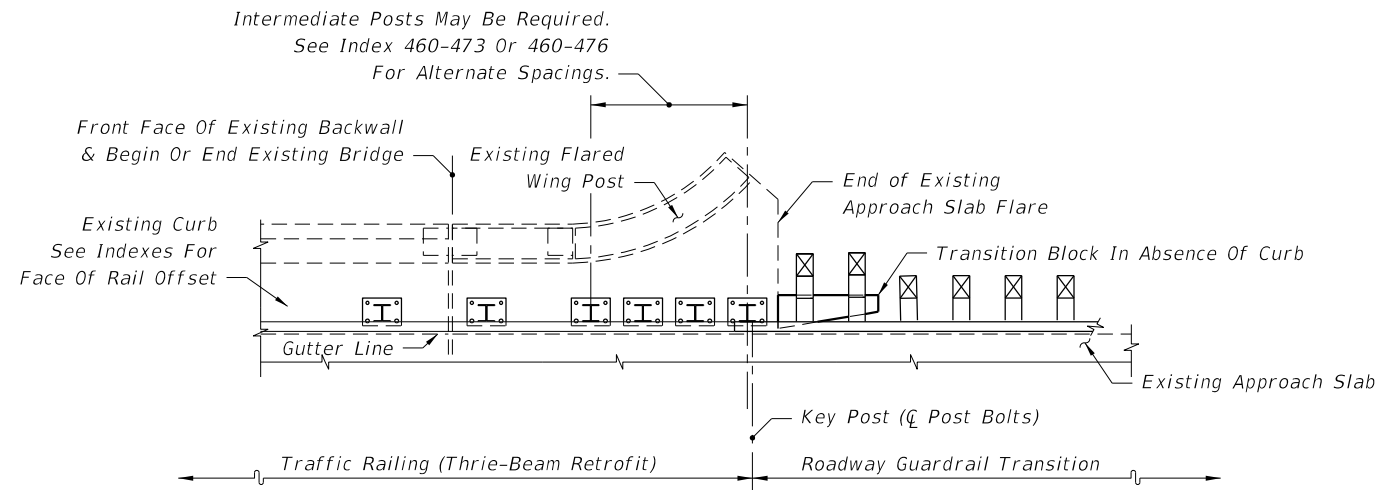
SEE INDEXES 460-473 & 460-476 - SCHEME 2

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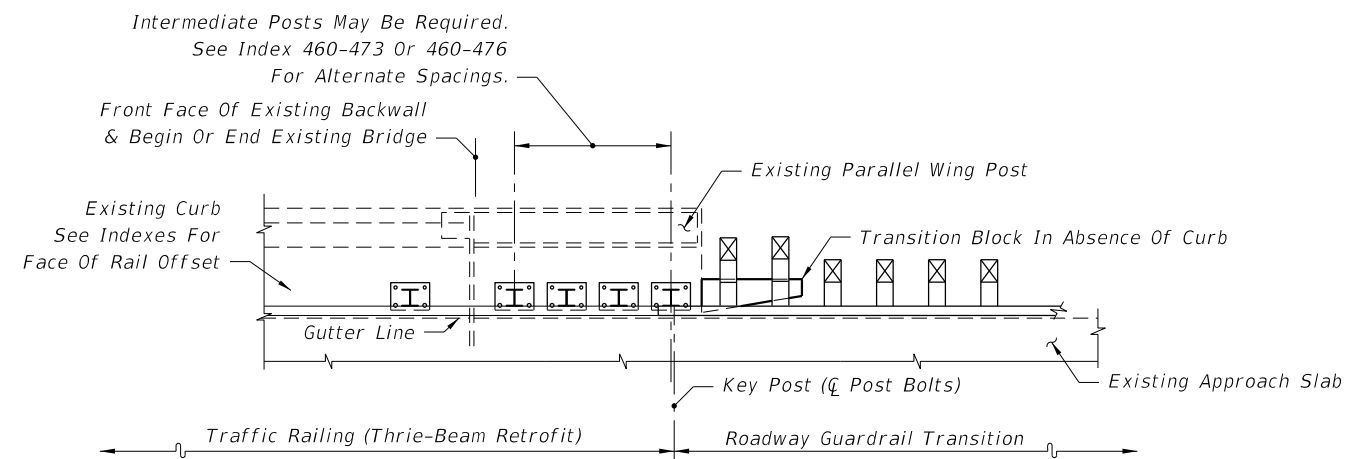
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LAST REVISION 11/01/17	DESCRIPTION:	 FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 8 of 27
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SEE INDEXES 460-473 & 460-476 - SCHEMES 5 & 6

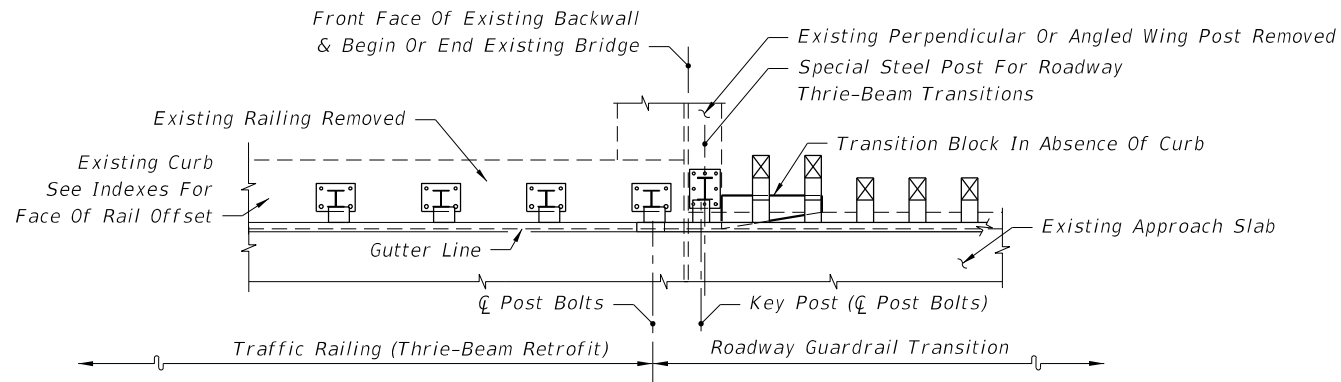


SEE INDEXES 460-473 & 460-476 - SCHEMES 5 & 6

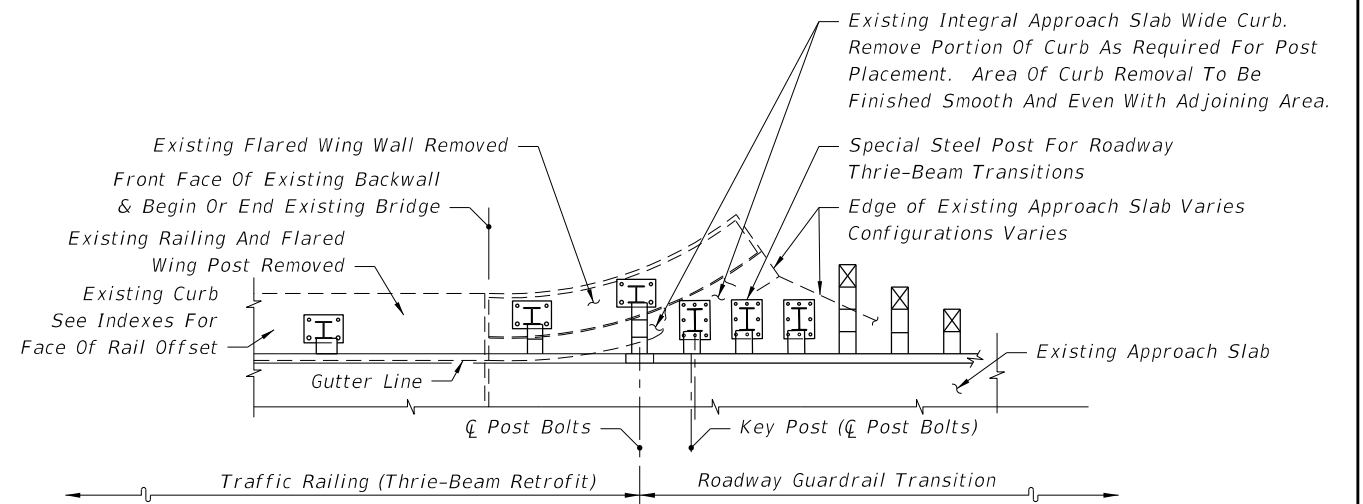
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS  
FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

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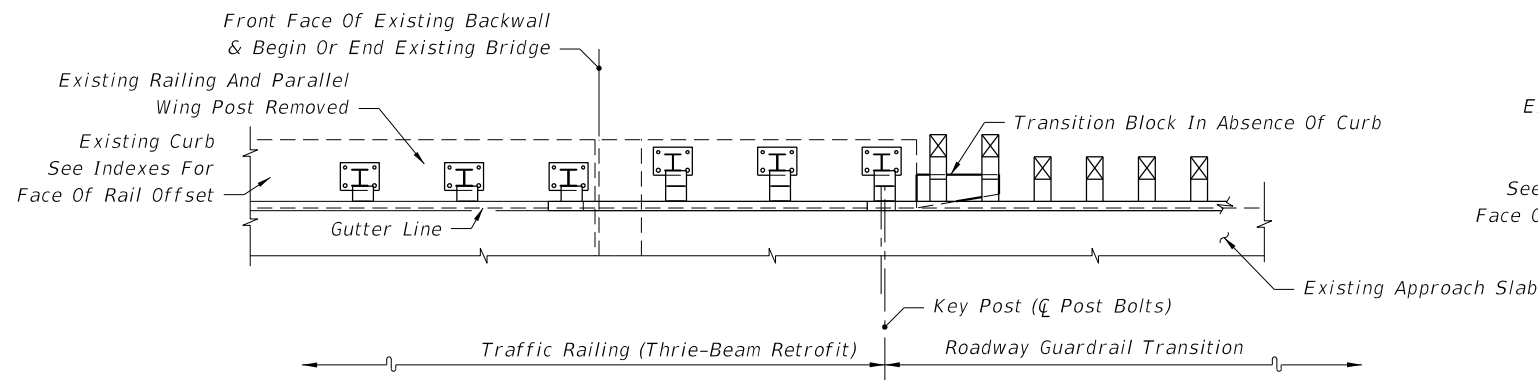
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---------------------------	-----------------------	--	---	------------------	------------------



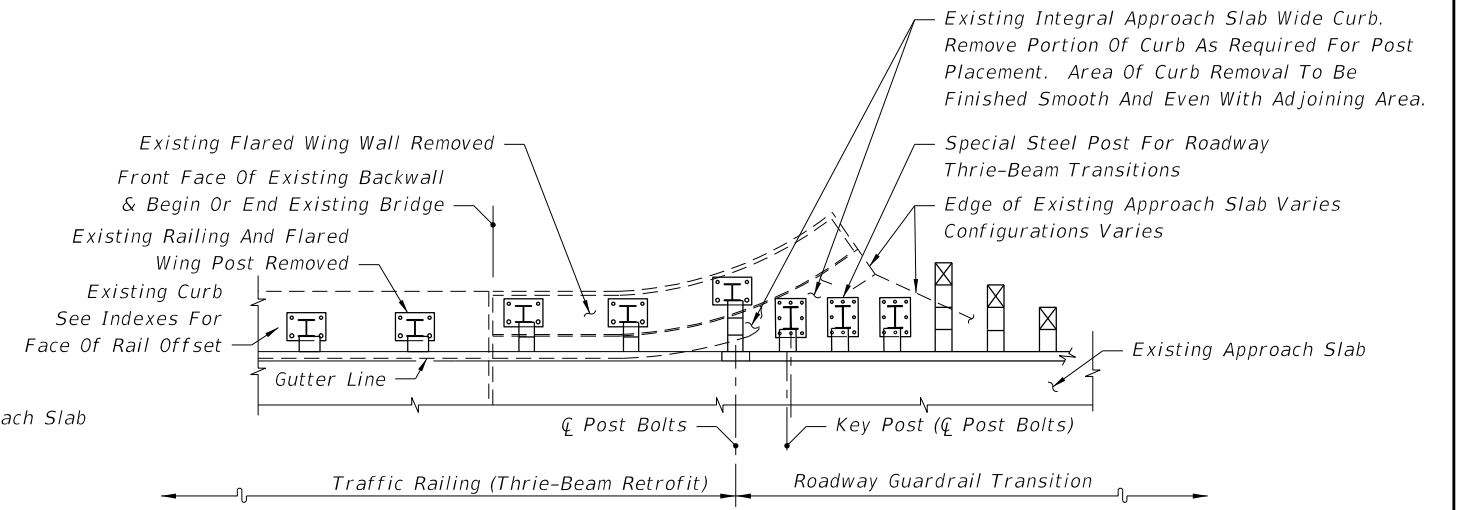
SEE INDEX 460-474 - SCHEME 1



SEE INDEX 460-474 - SCHEME 3




SEE INDEX 460-474 - SCHEME 2

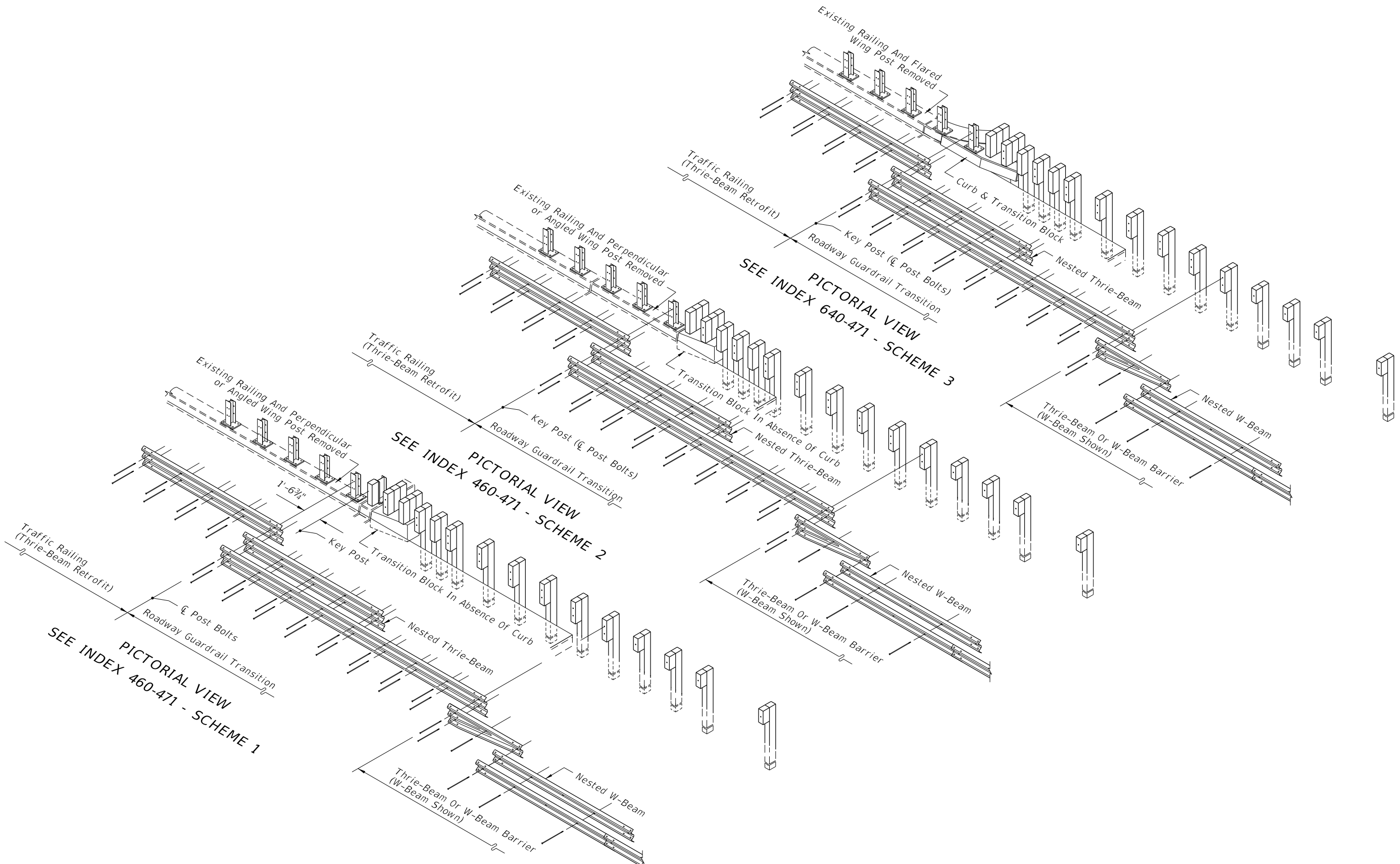


SEE INDEX 460-474 - SCHEME 3

PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

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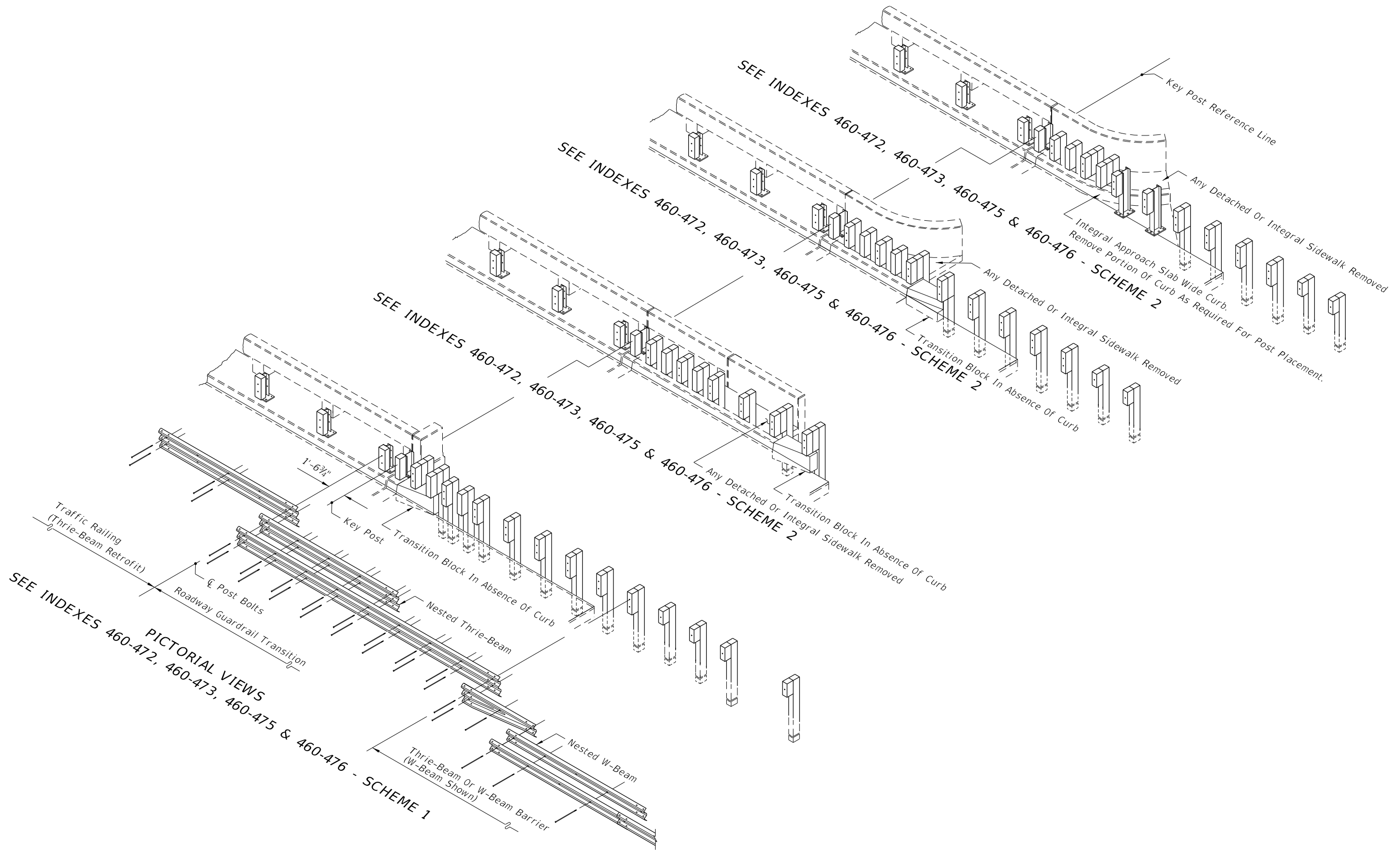
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PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

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LAST REVISION 11/01/17	DESCRIPTION:  FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 11 of 27
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PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

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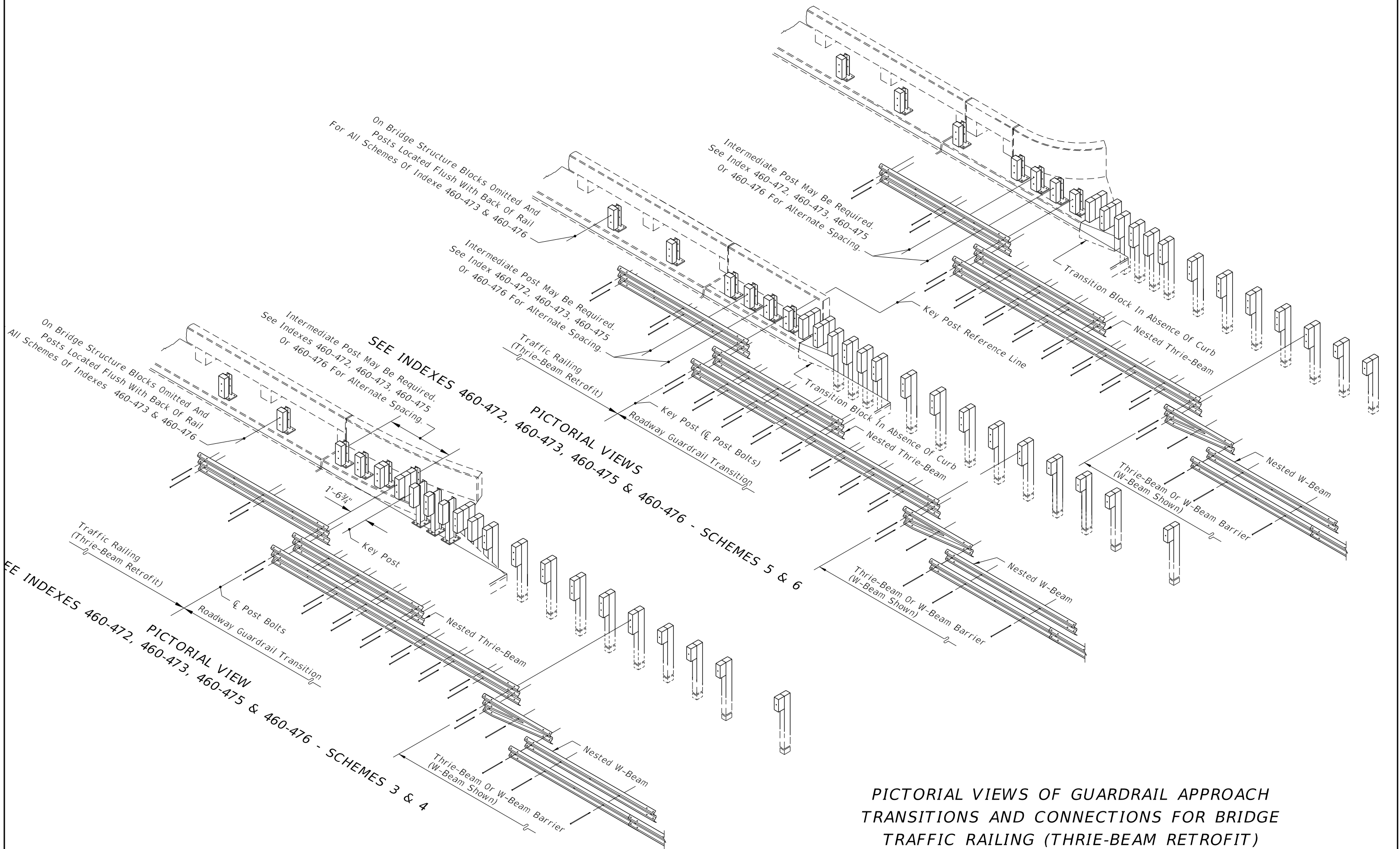
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FY 2018-19  
 STANDARD PLANS

GUARDRAIL TRANSITIONS AND  
 CONNECTIONS FOR EXISTING BRIDGES

INDEX 536-002	SHEET 12 of 27
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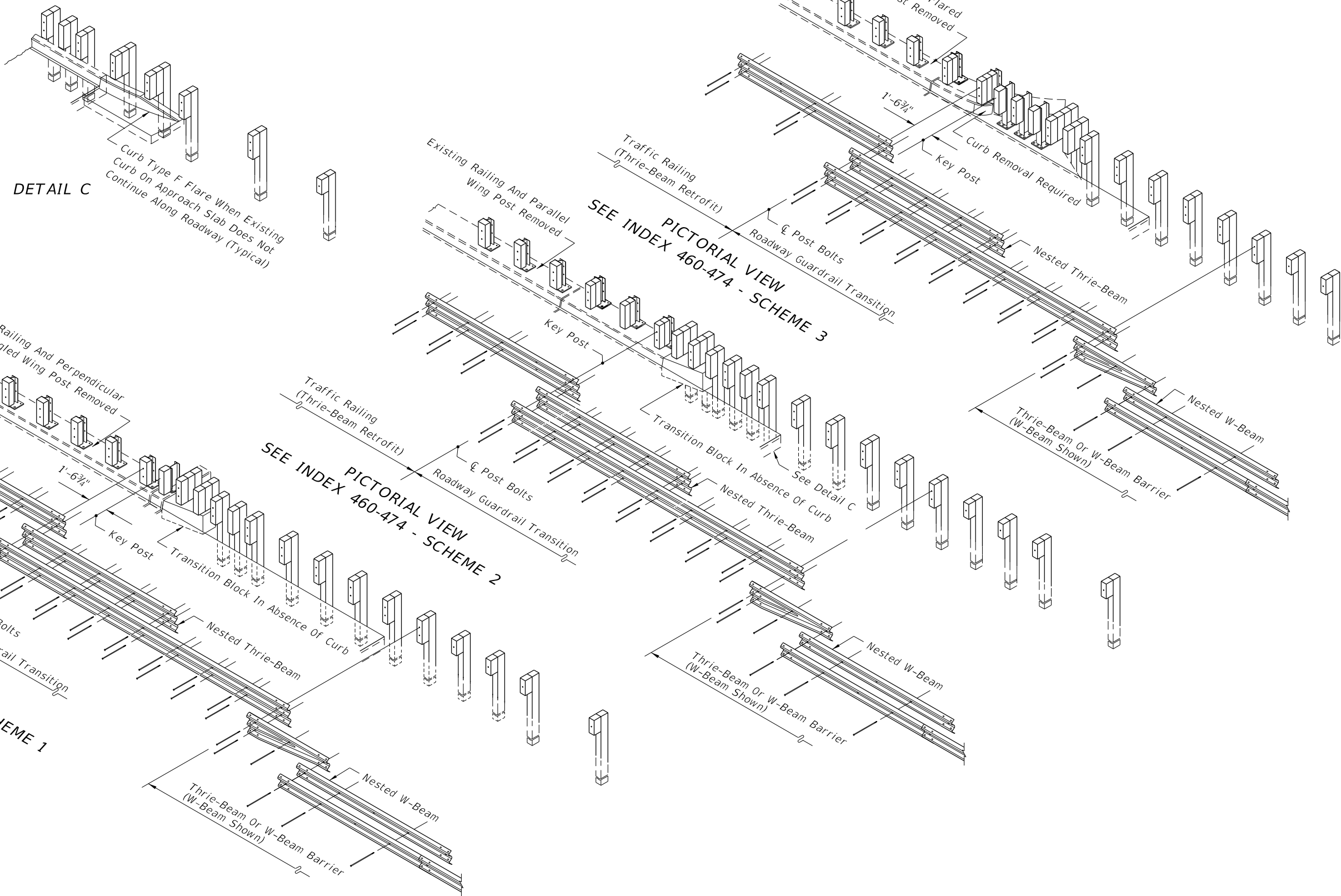
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

LAST REVISION 11/01/17	DESCRIPTION:
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FY 2018-19  
STANDARD PLANS

GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES

INDEX 536-002	SHEET 13 of 27
------------------	-------------------



PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

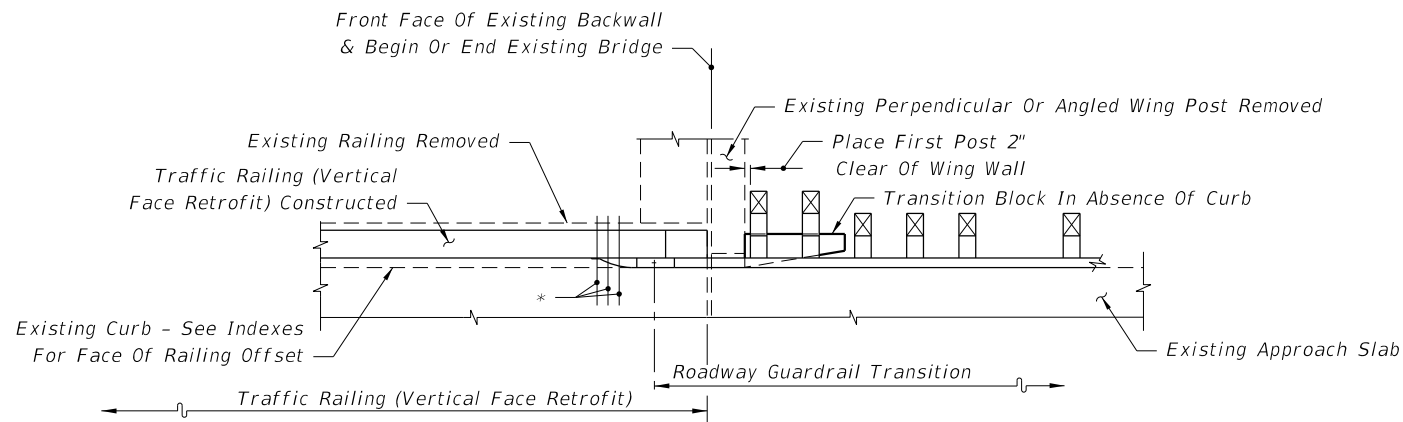
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LAST REVISION 11/01/17	DESCRIPTION:
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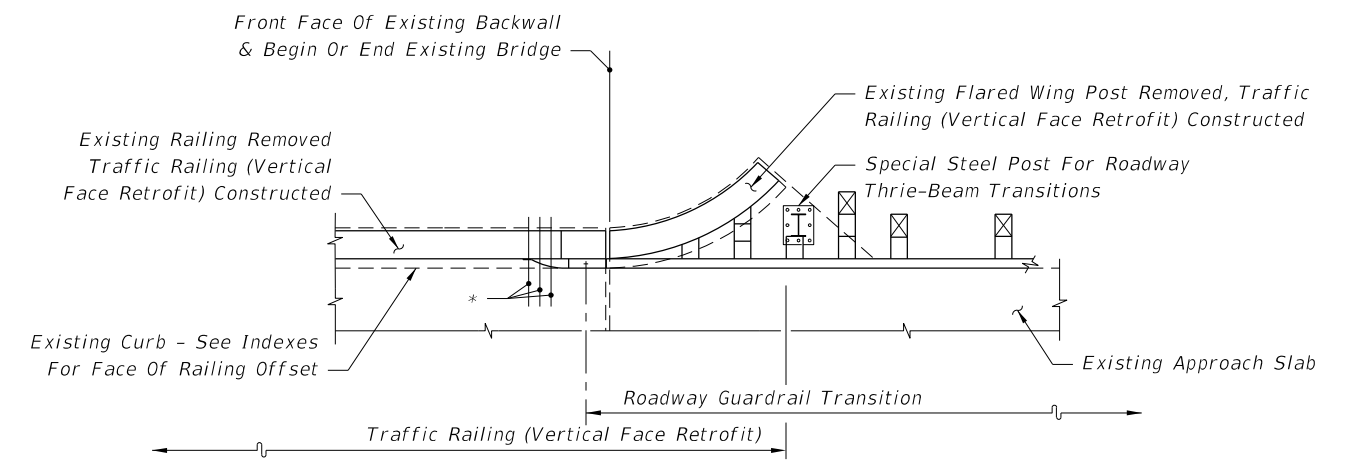

 FY 2018-19  
 STANDARD PLANS

GUARDRAIL TRANSITIONS AND  
 CONNECTIONS FOR EXISTING BRIDGES

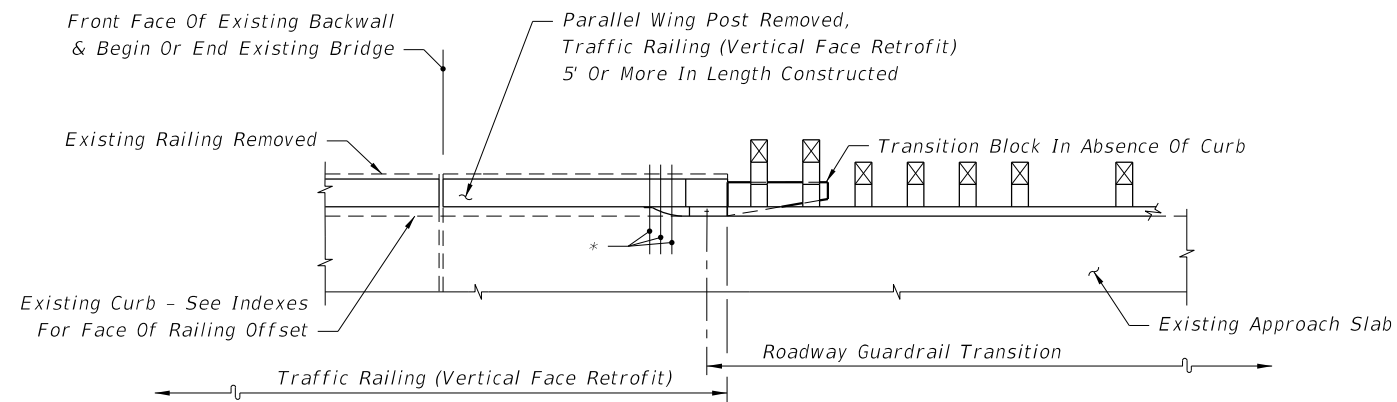
INDEX 536-002	SHEET 14 of 27
------------------	-------------------



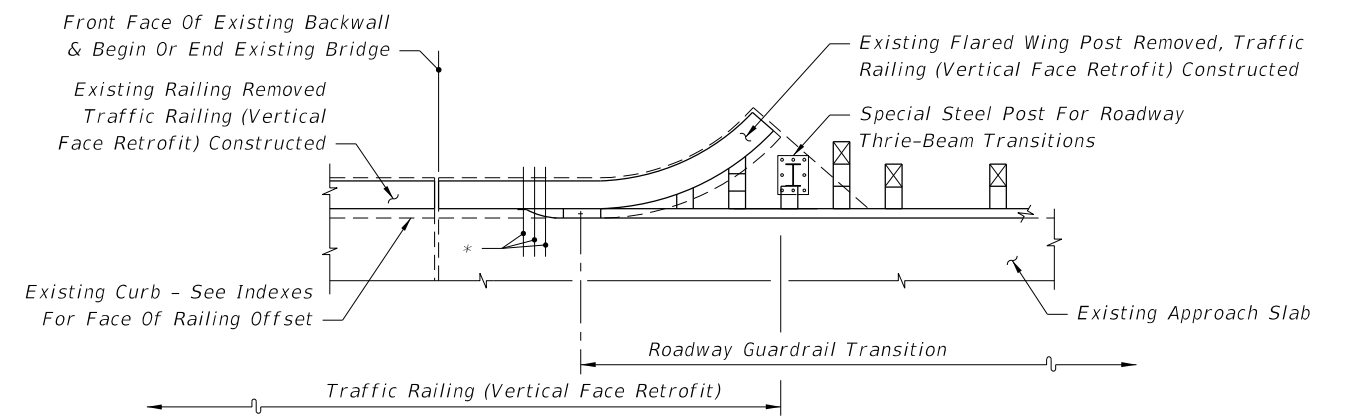
SEE INDEX 460-481 - SCHEME 1



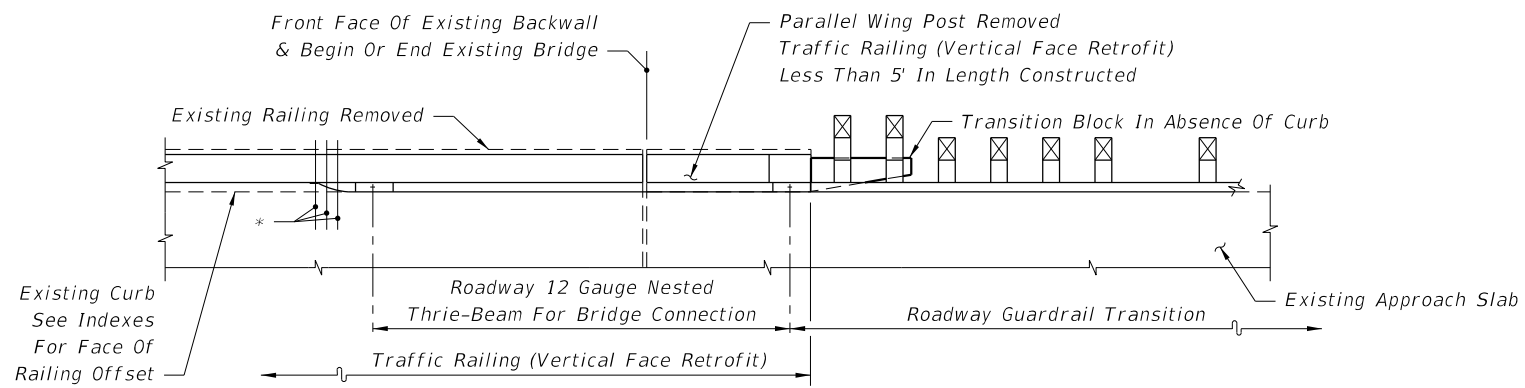
SEE INDEX 521-481 - SCHEME 3



SEE INDEX 521-481 - SCHEME 2



SEE INDEX 521-481 - SCHEME 3




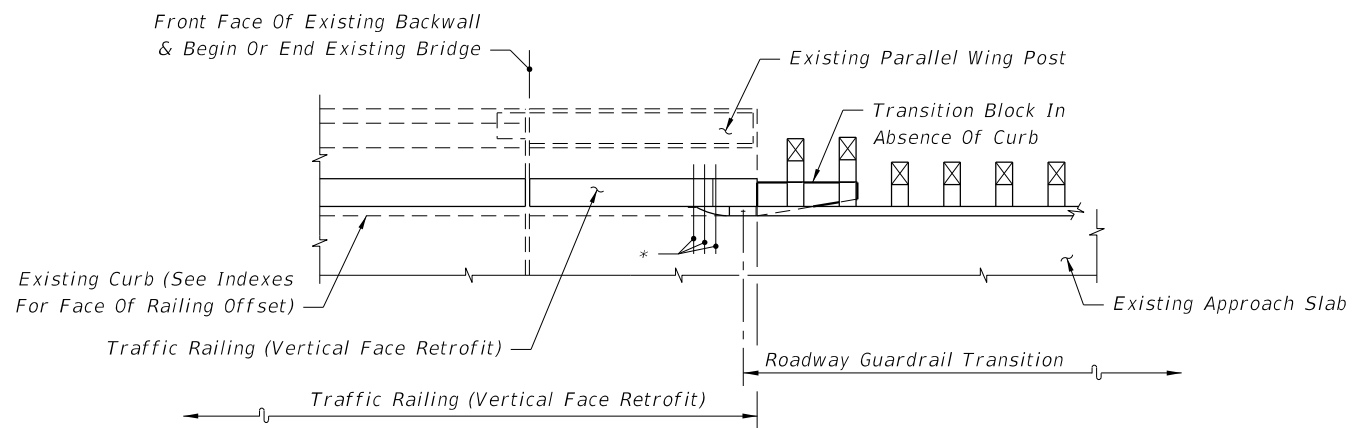
SEE INDEX 521-481 - SCHEME 2

Note:  
 \* 21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8"Ø x 12" Long HS  
 Hex Bolts And Nuts (5 Reqd.) With 2 1/4" OD Plain Round Washers Under Heads And Nuts

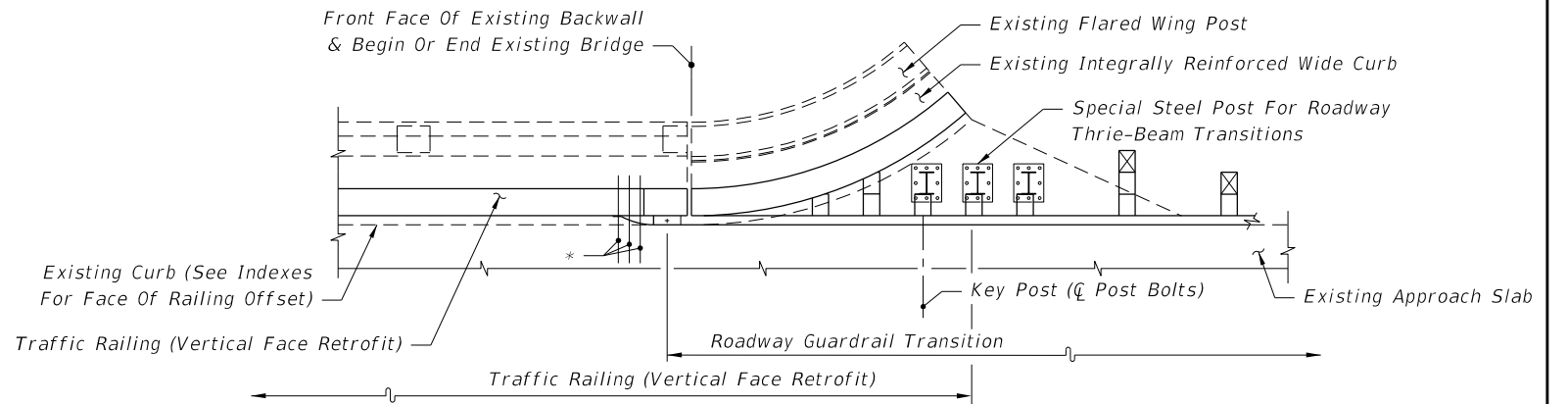
PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)

10/16/2017 1:13:08 PM

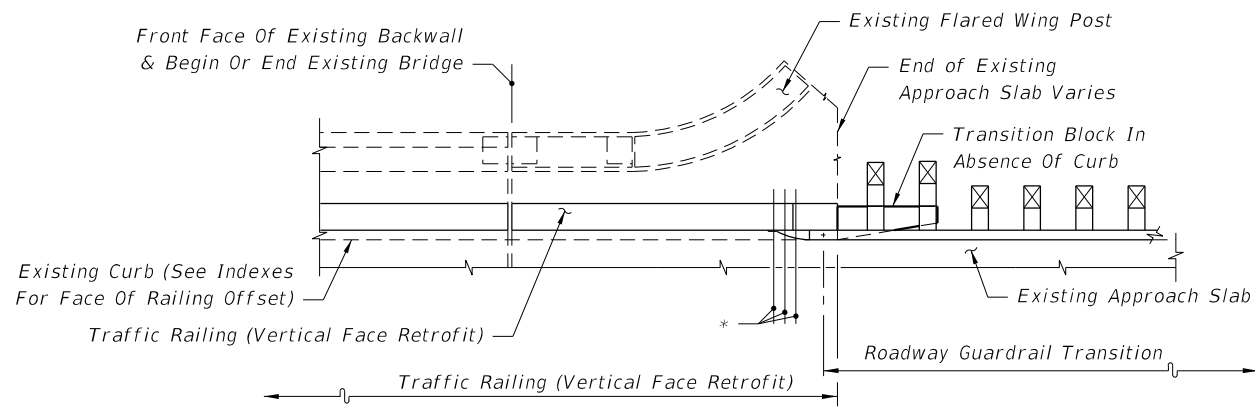
LAST REVISION 11/01/17	REVISION	DESCRIPTION:	 FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 15 of 27
---------------------------	----------	--------------	--	---	------------------	-------------------



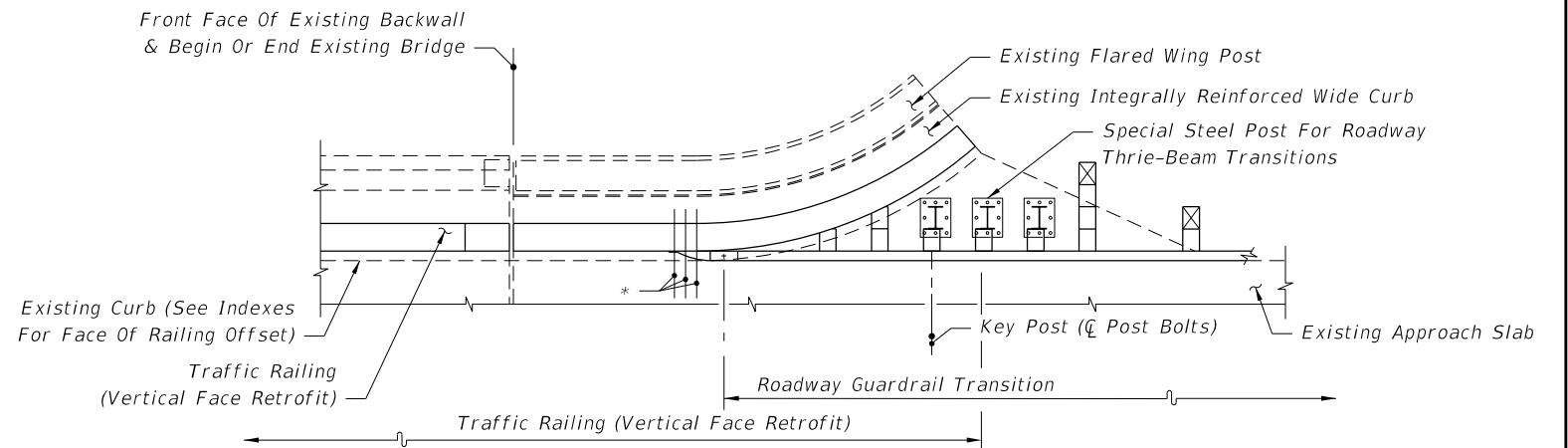
SEE INDEX 521-405 OR 521-482 - SCHEME 2



SEE INDEX 521-405 OR 521-482 - SCHEME 3



SEE INDEX 521-405 OR 521-482 - SCHEME 2




SEE INDEX 521-405 OR 521-482 - SCHEME 3

Note:

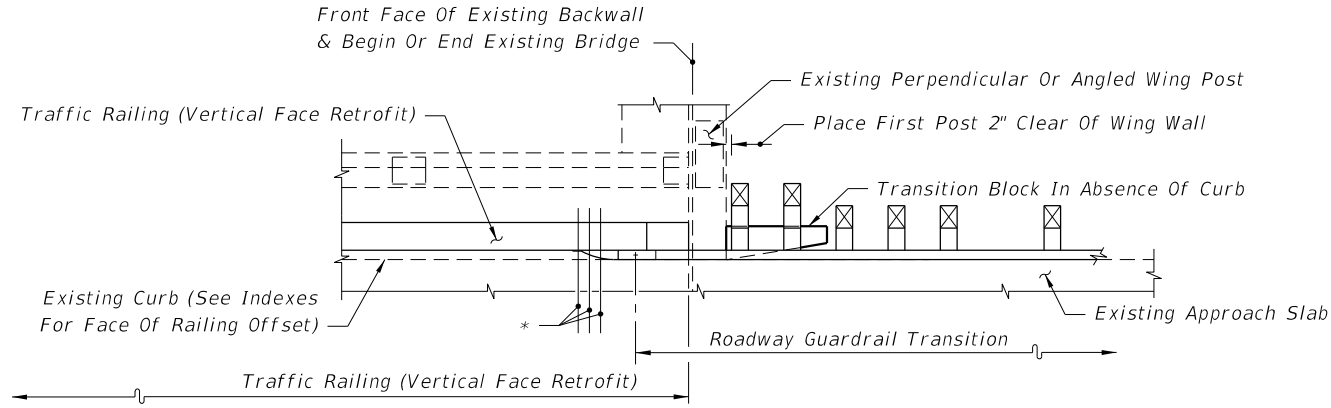
\*21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8"Ø x 12" Long HS Hex Bolts And Nuts (5 Reqd.) With 2 1/4" OD Plain Round Washers Under Heads And Nuts

PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)  
(INDEX 521-482 SHOWN, INDEX 521-405 SIMILAR)

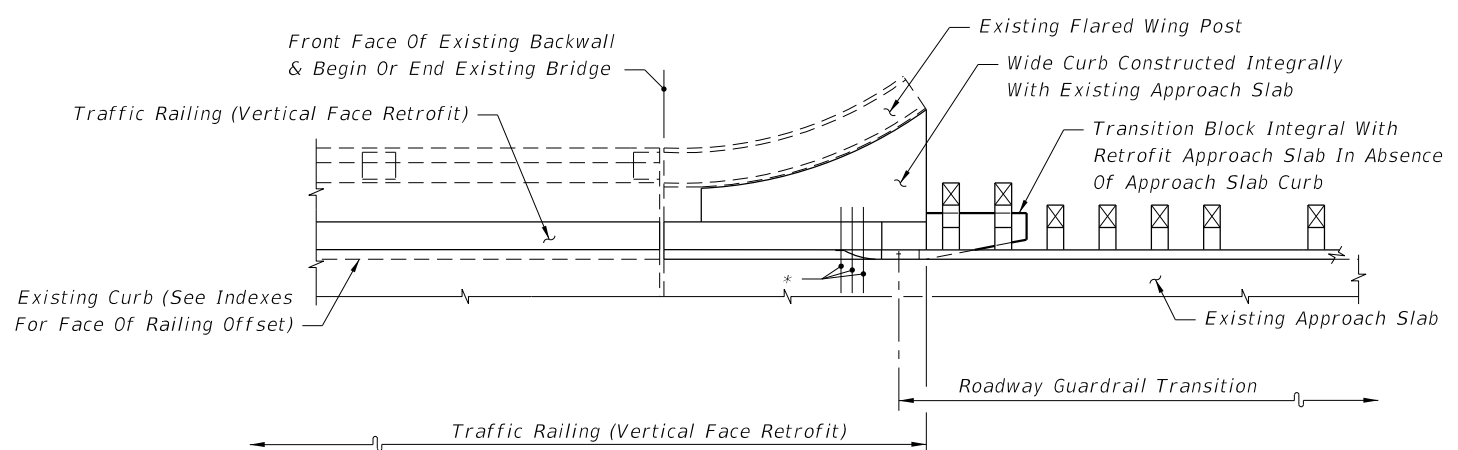
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LAST REVISION 11/01/17	DESCRIPTION:	 FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 16 of 27
---------------------------	--------------	--	---	------------------	-------------------

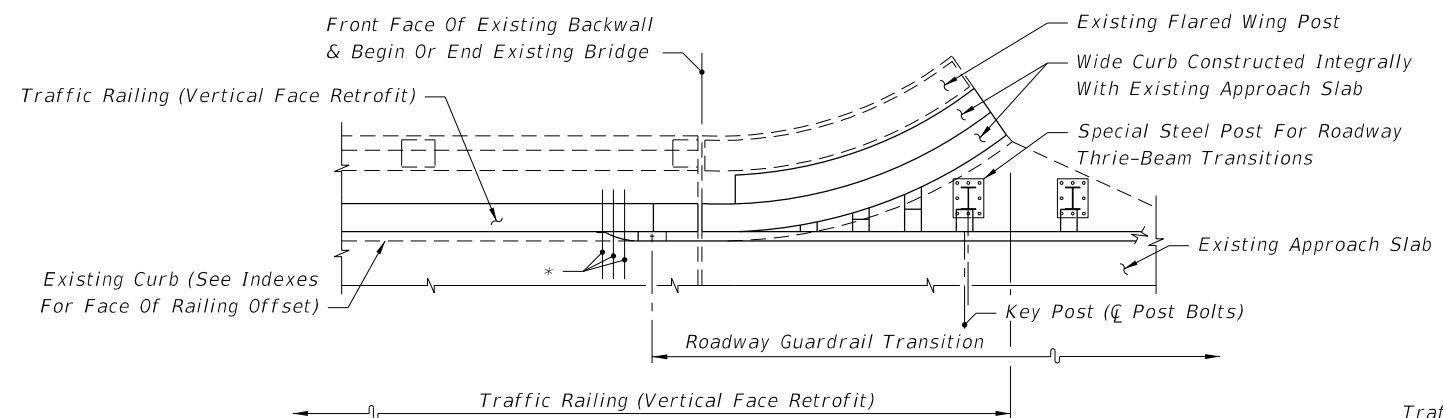




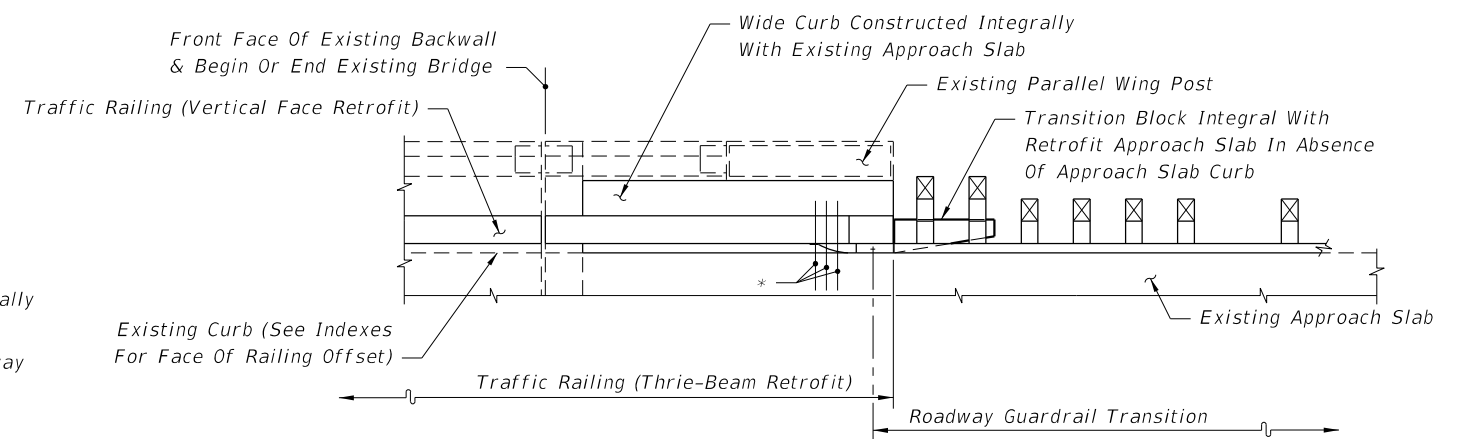
SEE INDEX 521-405 OR 521-482 - SCHEME 1



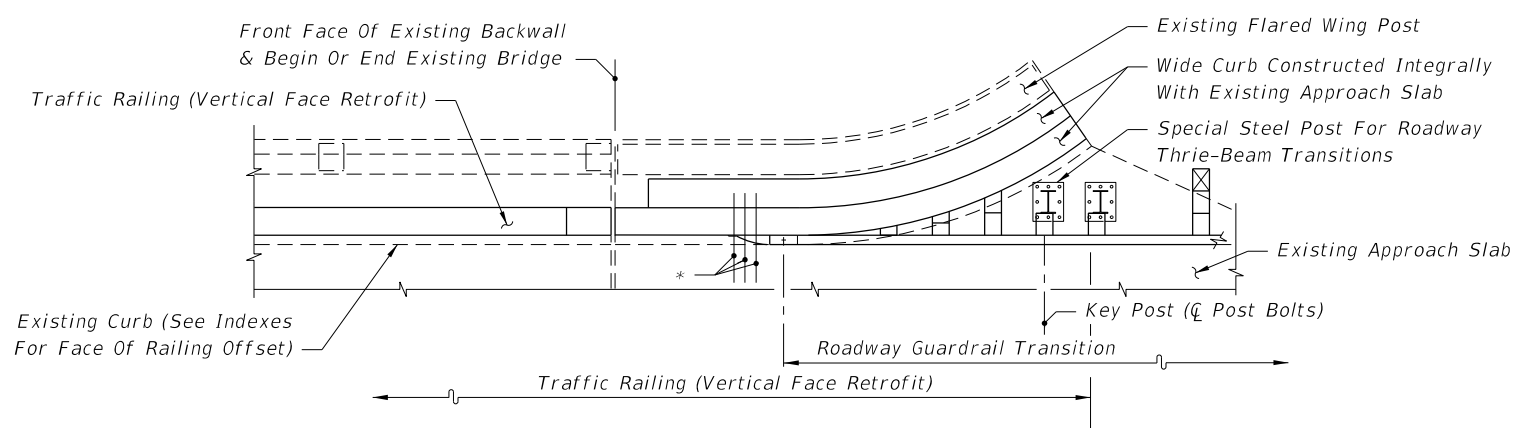
SEE INDEX 521-405 OR 521-482 - SCHEME 5



SEE INDEX 521-405 OR 521-482 - SCHEME 4



SEE INDEX 521-405 OR 521-482 - SCHEME 5



SEE INDEX 521-405 OR 521-482 - SCHEME 4

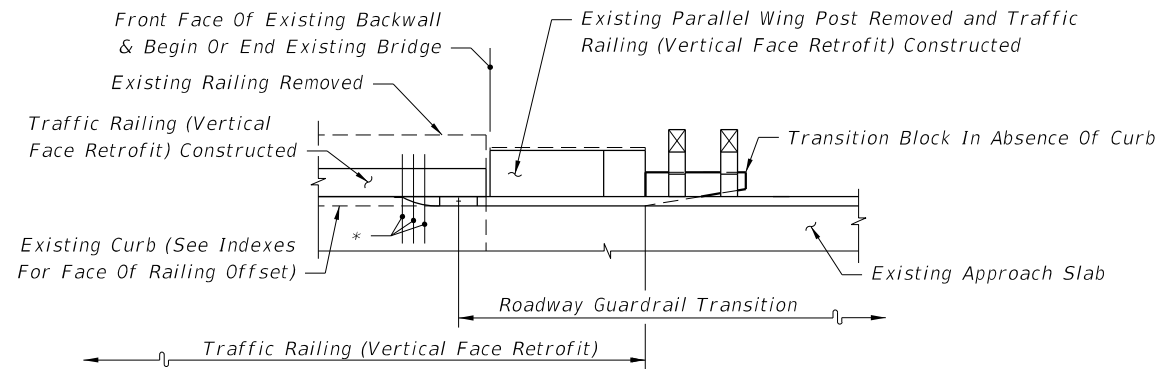
Note:  
 \* 21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8"Ø x 12" Long HS Hex Bolts And Nuts (5 Req'd.) With 2 1/4" OD Plain Round Washers Under Heads And Nuts

PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)  
 (INDEX 521-482 SHOWN, INDEX 521-405 SIMILAR)

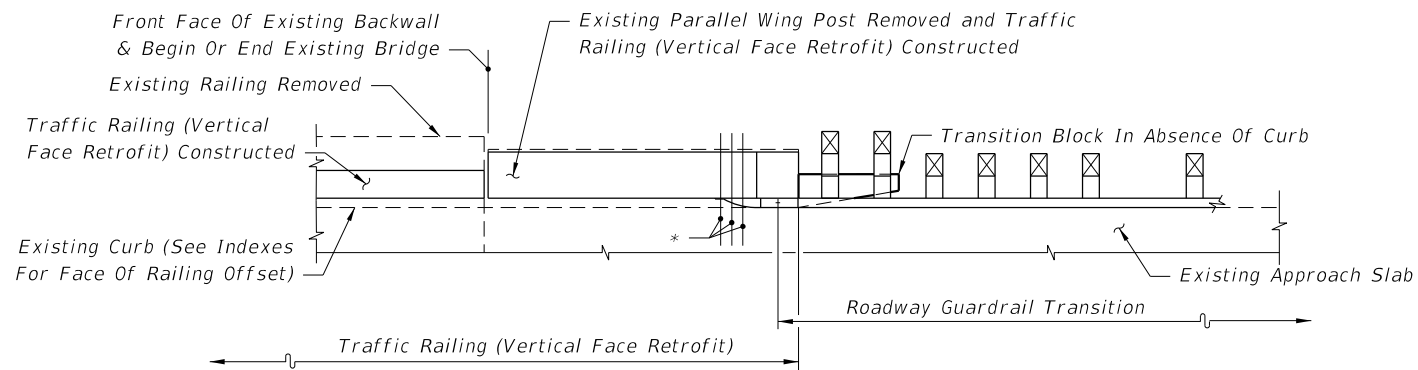
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LAST REVISION 11/01/17	REVISION	DESCRIPTION:	 FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 17 of 27
---------------------------	----------	--------------	--	---	------------------	-------------------

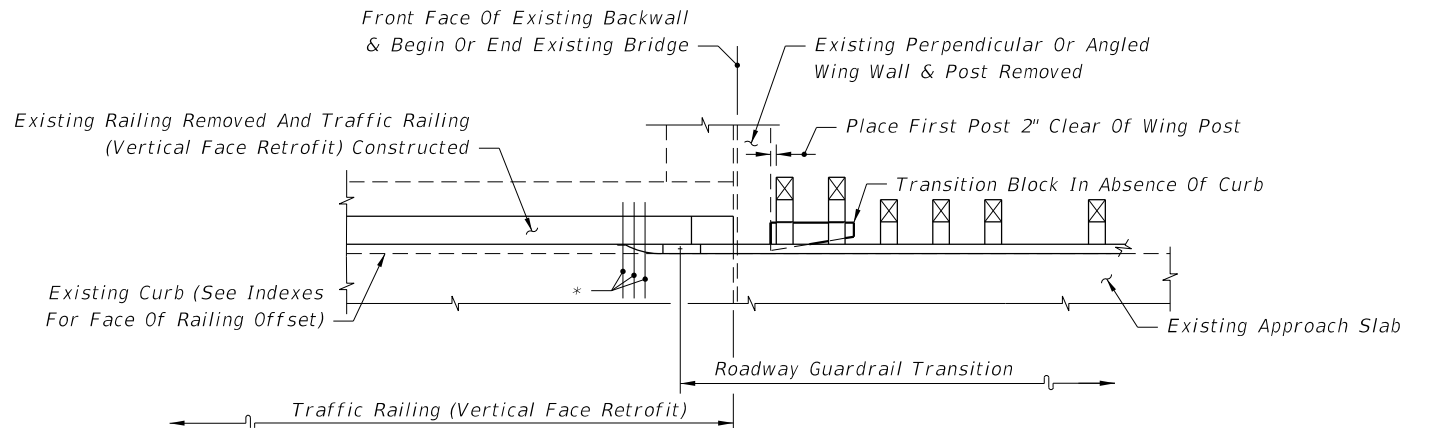
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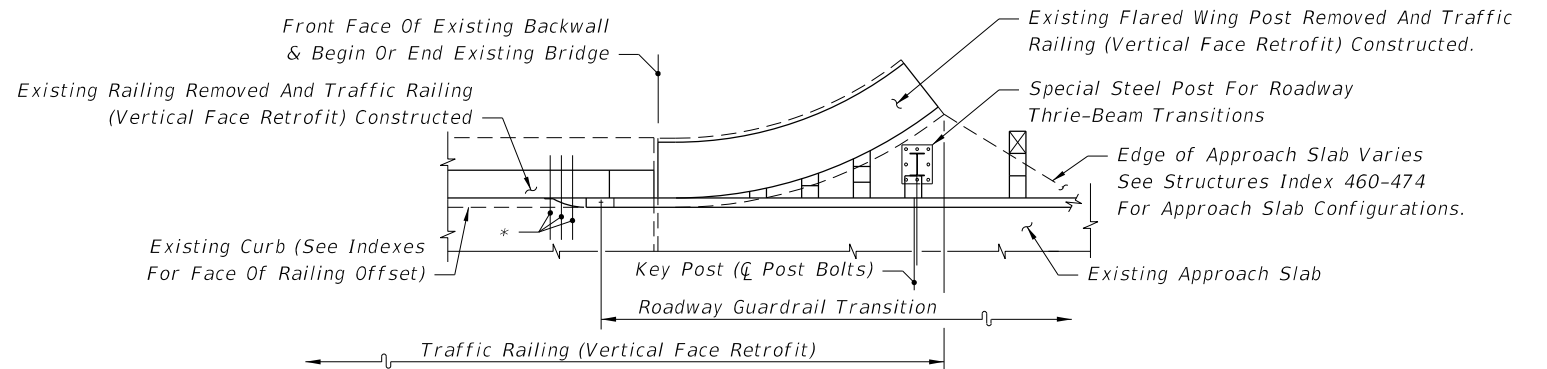
SEE INDEX 521-483 - SCHEME 2



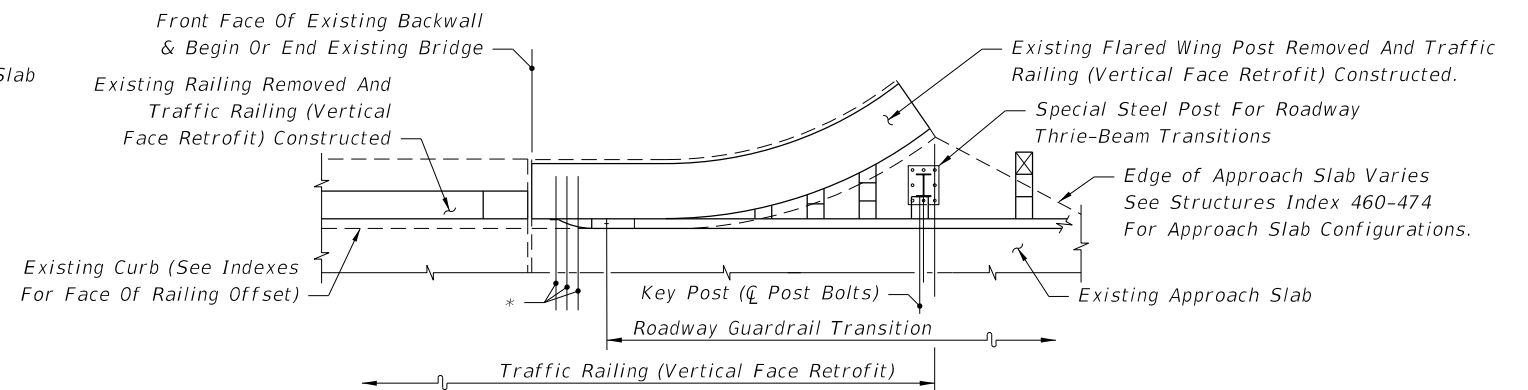
SEE INDEX 521-483 - SCHEME 2



SEE INDEX 521-483 - SCHEME 1



SEE INDEX 521-483 - SCHEME 3



SEE INDEX 521-483 - SCHEME 3

Note:

\* 21" x 12" x 5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8"Ø HS Hex Bolts And Nuts (12" Long For Scheme 1 And Length To Fit For Schemes 2 And 3) (5 Req'd.) With 2 1/4" OD Plain Round Washers Under Heads And Nuts

**PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)**

LAST REVISION 11/01/17	REVISION	DESCRIPTION:
---------------------------	----------	--------------

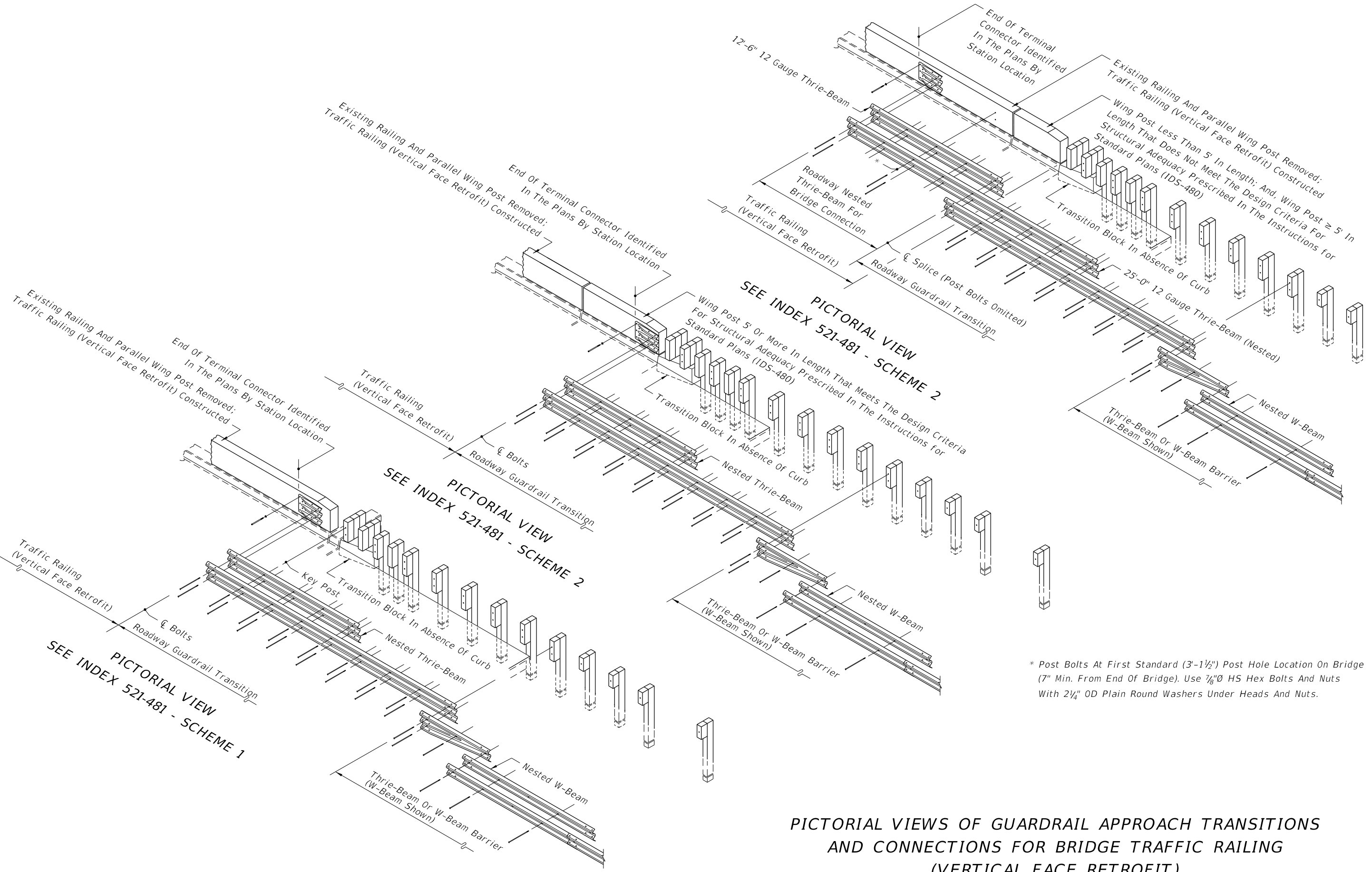


FY 2018-19  
STANDARD PLANS

**GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES**

INDEX  
536-002

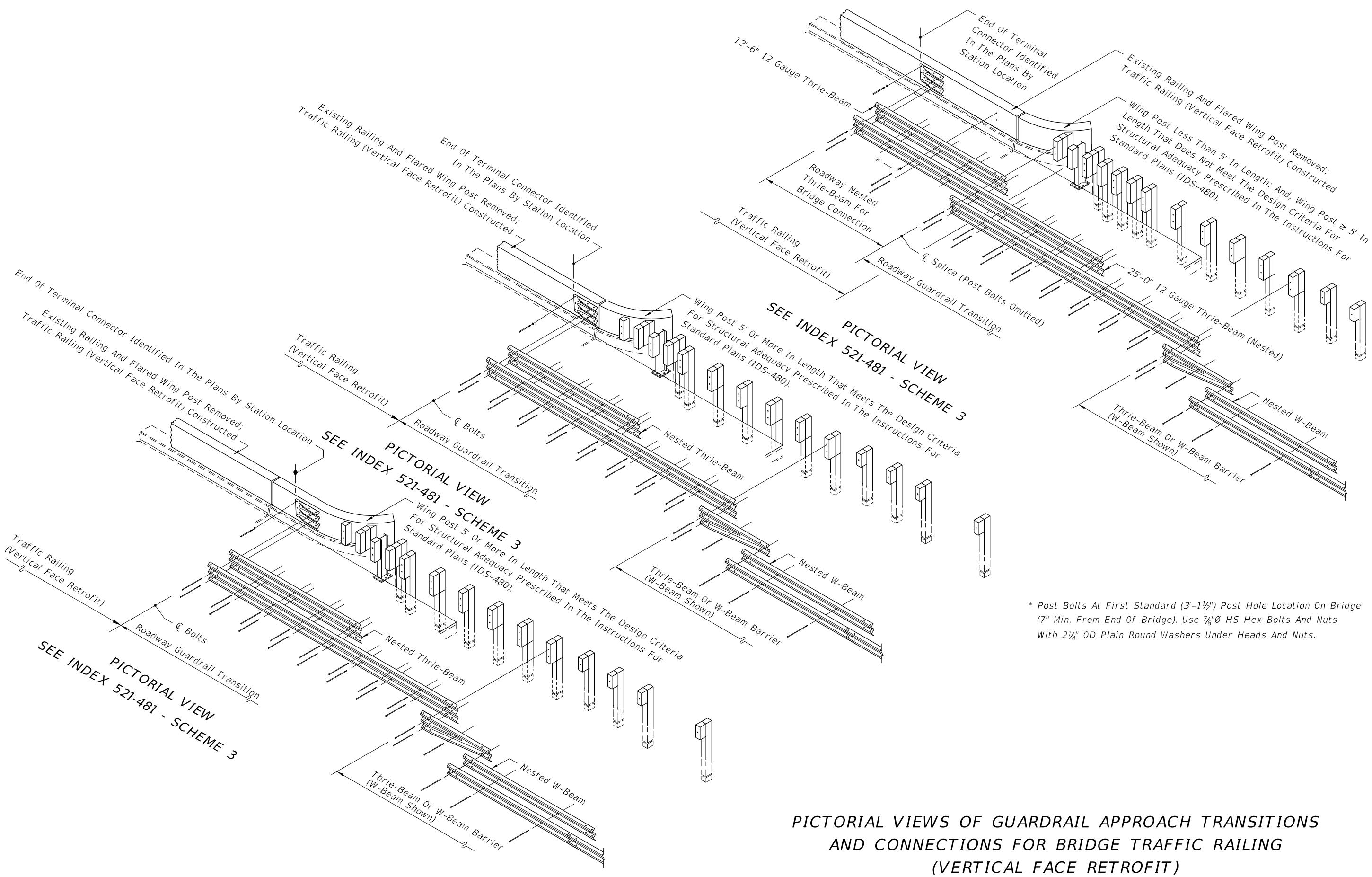
SHEET  
18 of 27



PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

10/16/2017 1:13:10 PM

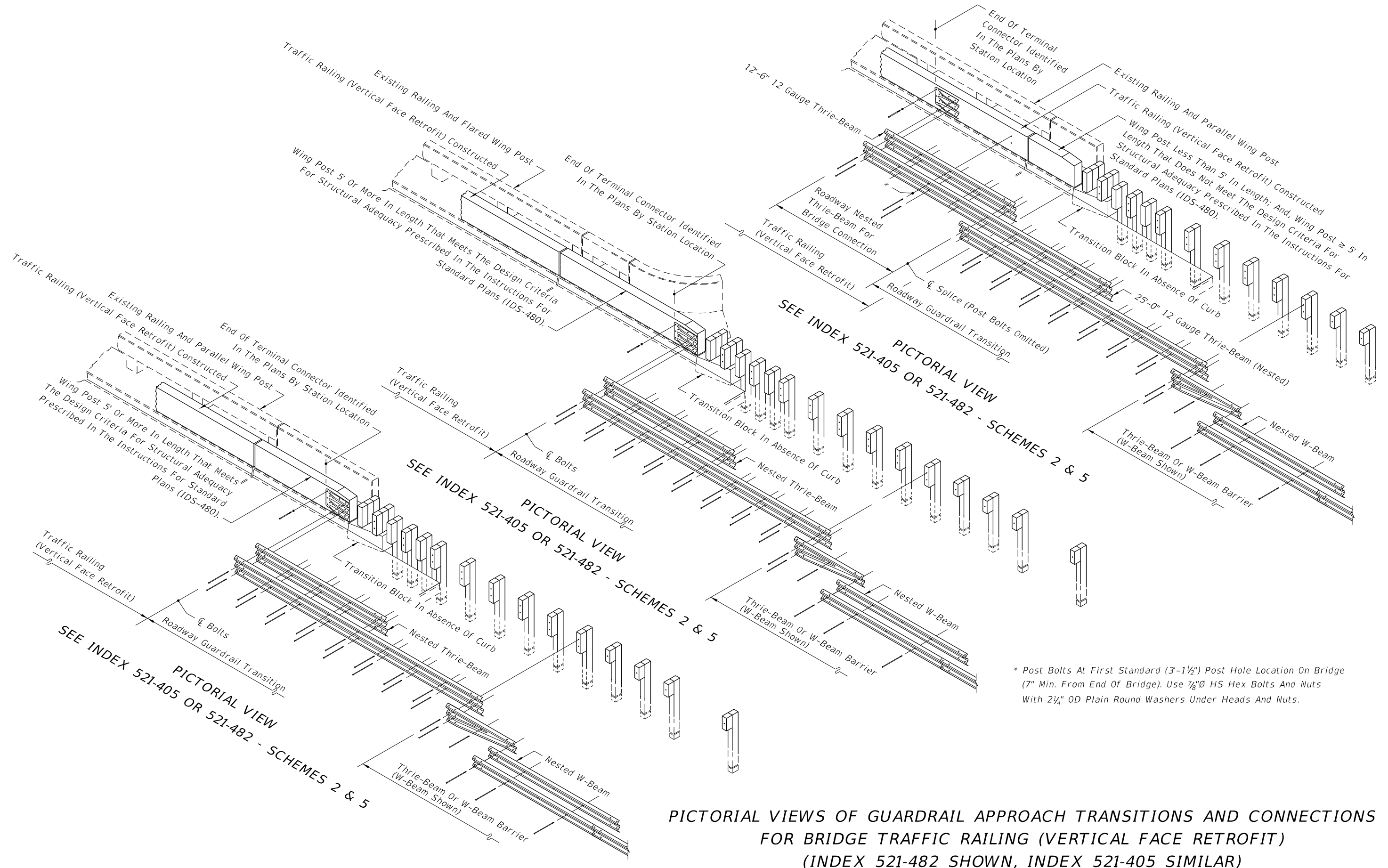
LAST REVISION 11/01/17	REVISION	DESCRIPTION:	 FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 19 of 27
---------------------------	----------	--------------	--	---	------------------	-------------------



**PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS  
AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING  
(VERTICAL FACE RETROFIT)**

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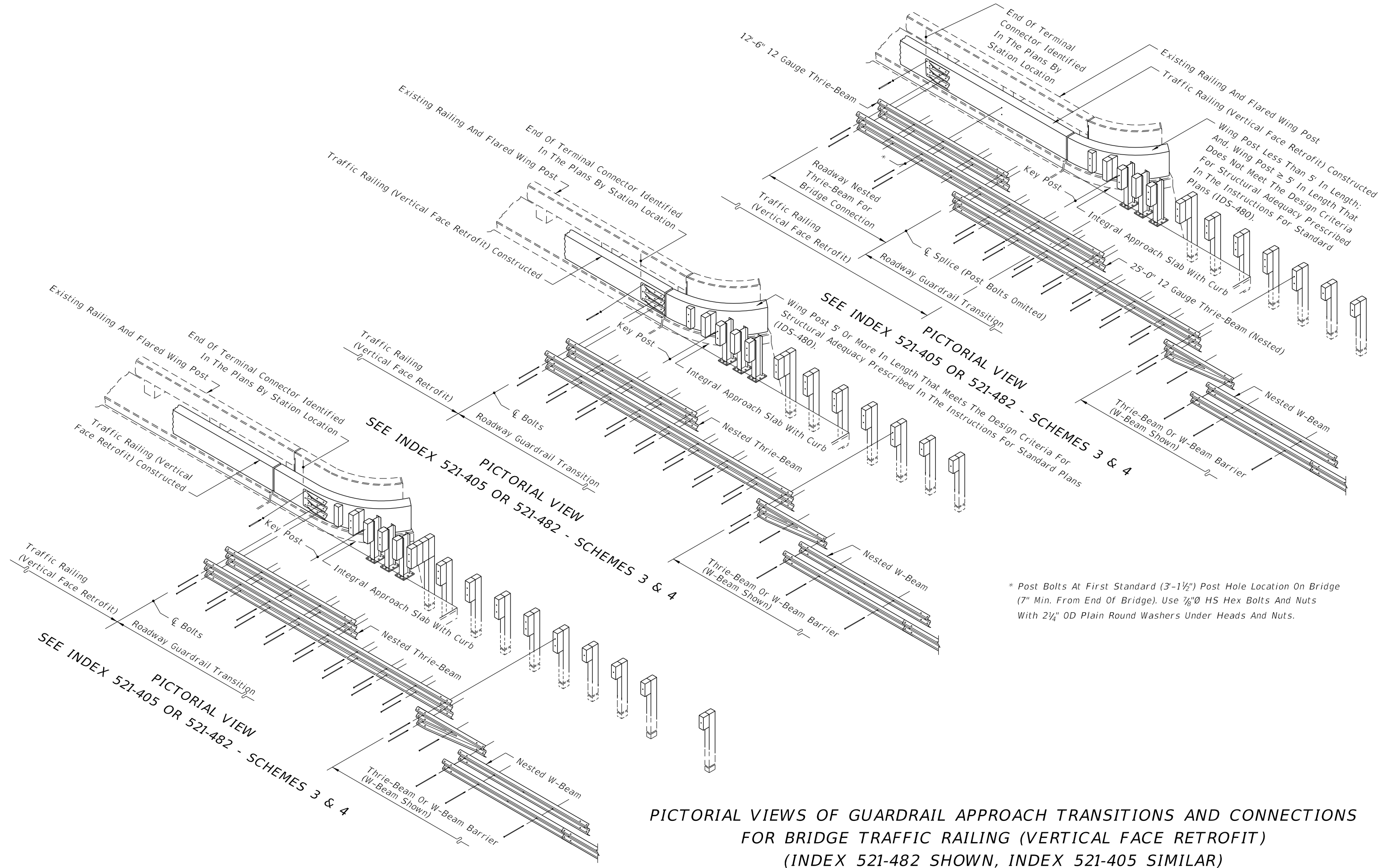
LAST REVISION 11/01/17	DESCRIPTION:	 FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 20 of 27
---------------------------	--------------	---	---	------------------	-------------------



PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT) (INDEX 521-482 SHOWN, INDEX 521-405 SIMILAR)

10/16/2017 1:13:11 PM

LAST REVISION 11/01/17	DESCRIPTION:  	 FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 21 of 27
---------------------------	----------------------	--	--	------------------	-------------------

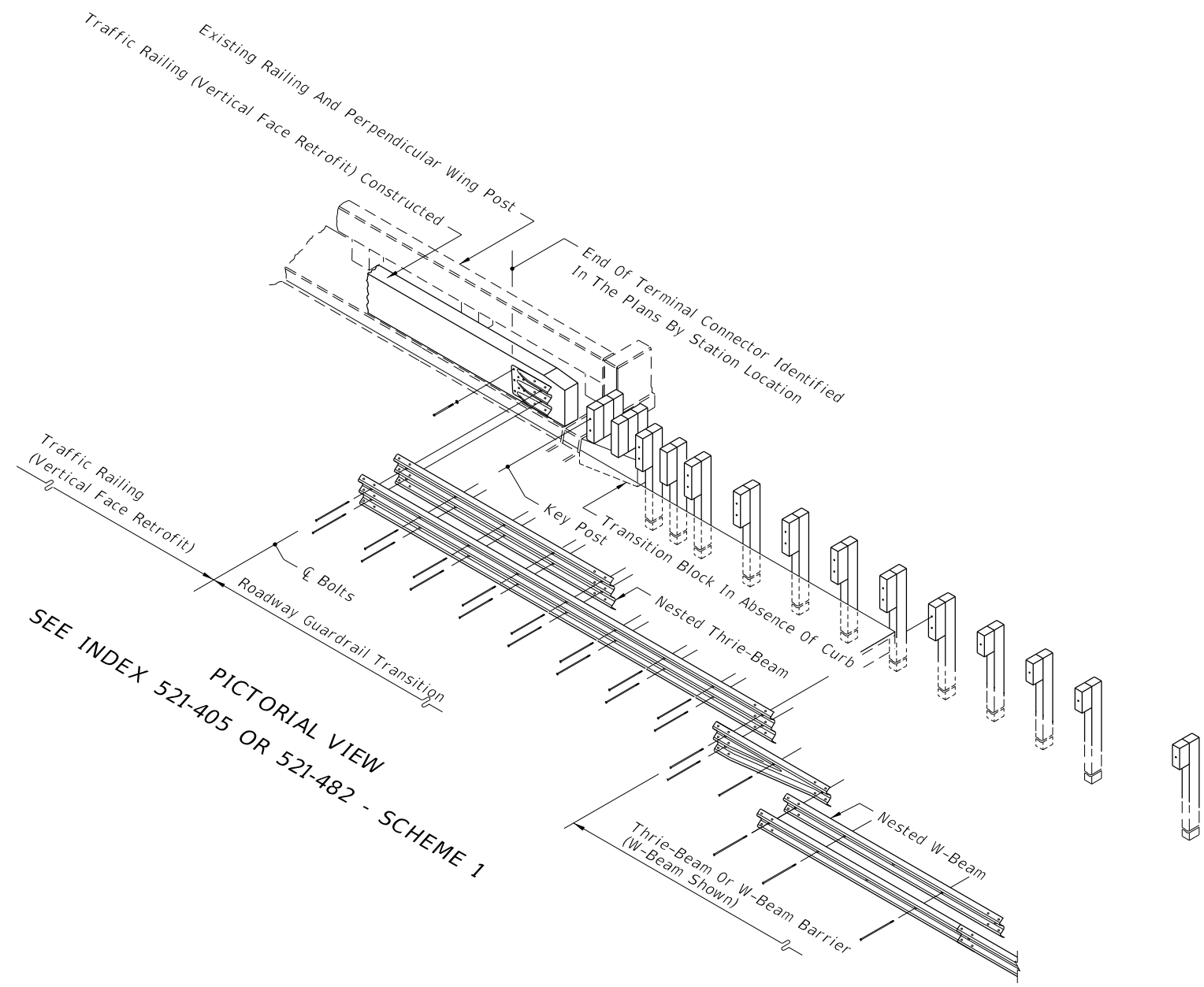


PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT) (INDEX 521-482 SHOWN, INDEX 521-405 SIMILAR)

10/16/2017 1:13:12 PM

LAST REVISION 11/01/17	REVISION	DESCRIPTION:	 FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 22 of 27
---------------------------	----------	--------------	--	---	------------------	-------------------

10/16/2017 1:13:13 PM



PICTORIAL VIEW  
 SEE INDEX 521-405 OR 521-482 - SCHEME 1

PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT) (INDEX 521-482 SHOWN, INDEX 521-405 SIMILAR)

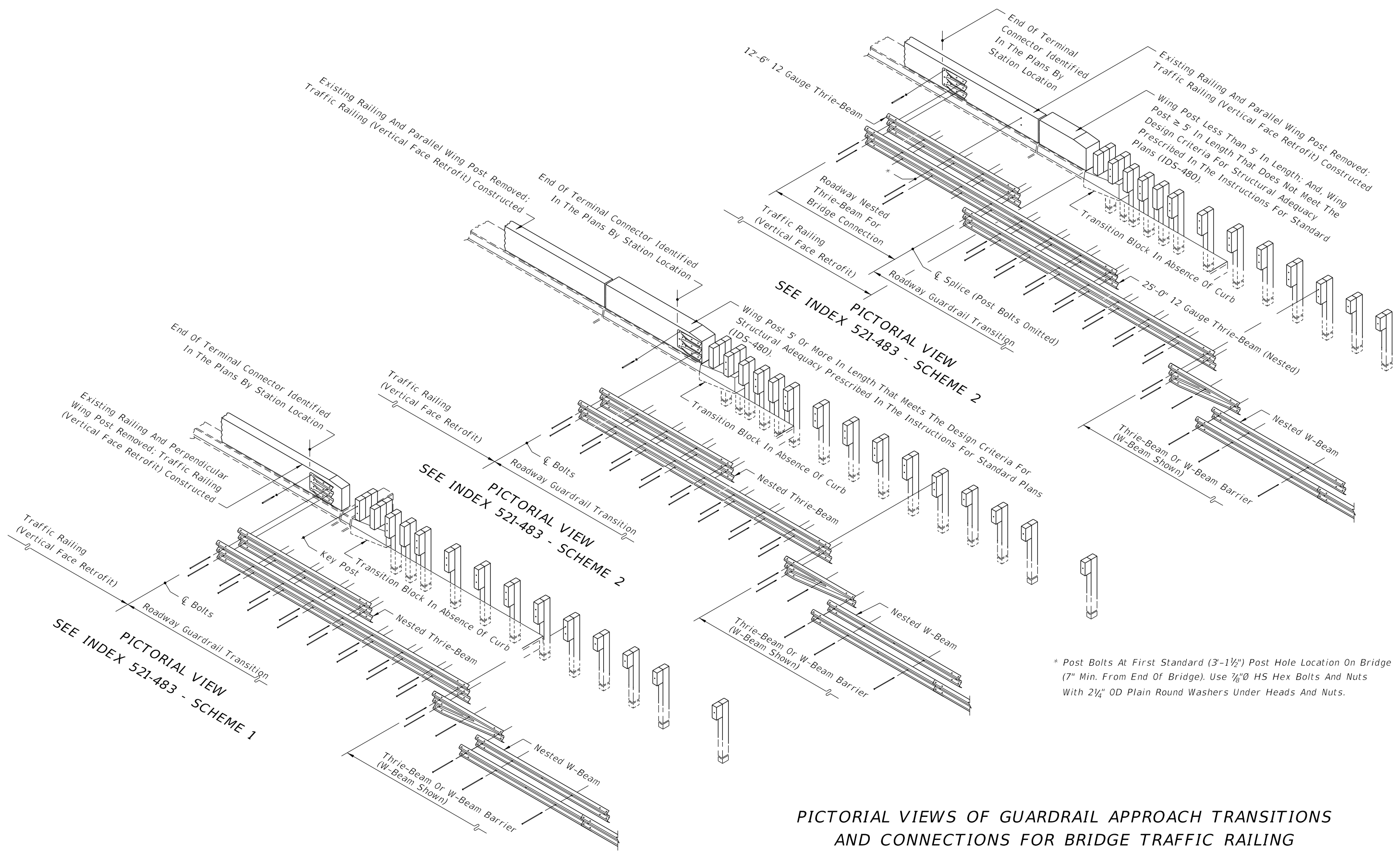
LAST REVISION 11/01/17	DESCRIPTION:
---------------------------	--------------


 FY 2018-19  
 STANDARD PLANS

GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES


INDEX 536-002	SHEET 23 of 27
------------------	-------------------

10/16/2017 1:13:13 PM

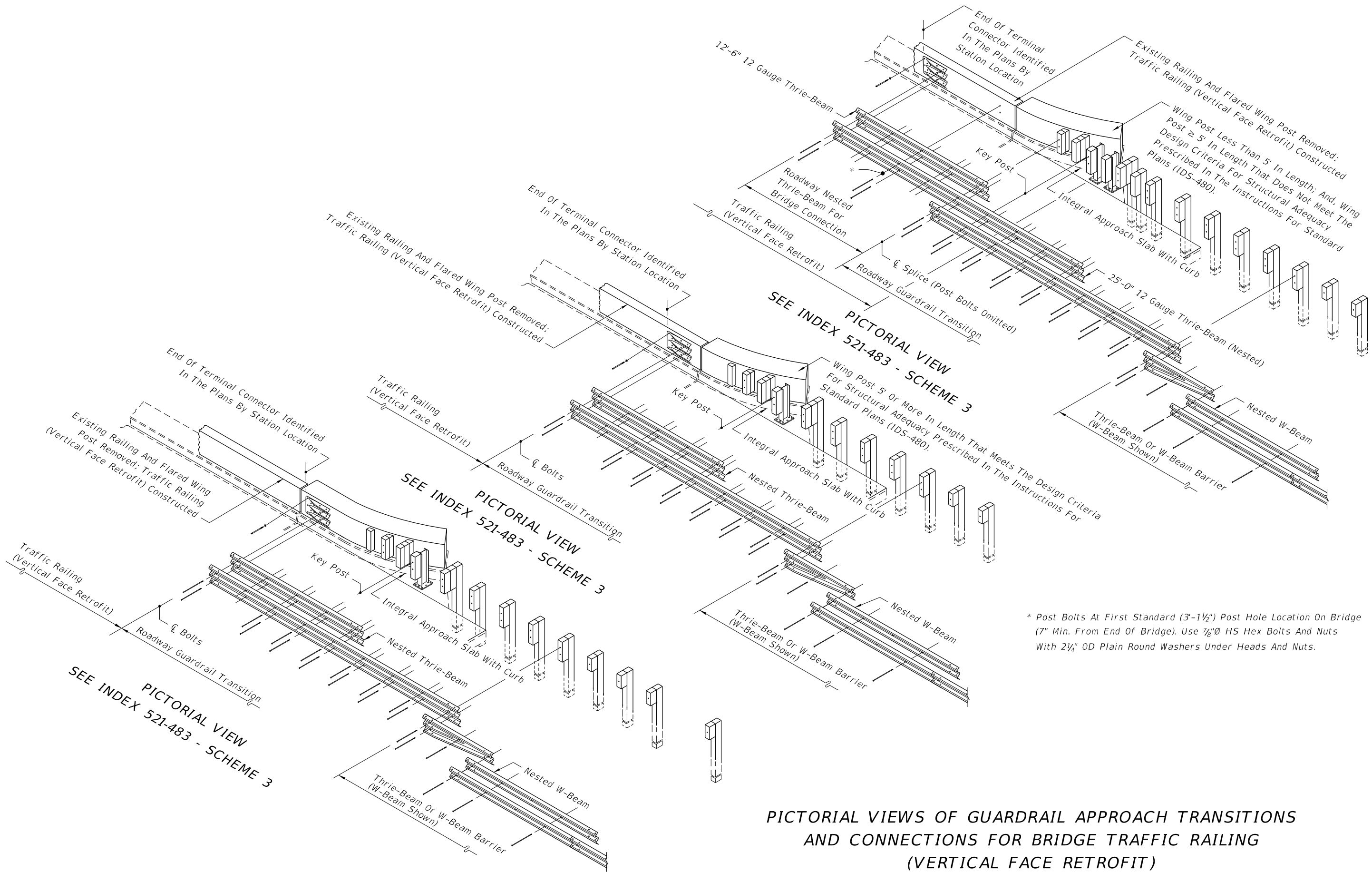


\* Post Bolts At First Standard (3'-1 1/2") Post Hole Location On Bridge (7" Min. From End Of Bridge). Use 7/8" Ø HS Hex Bolts And Nuts With 2 1/4" OD Plain Round Washers Under Heads And Nuts.

PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

LAST REVISION 11/01/17	DESCRIPTION:	 FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 24 of 27
---------------------------	--------------	---	--	------------------	-------------------

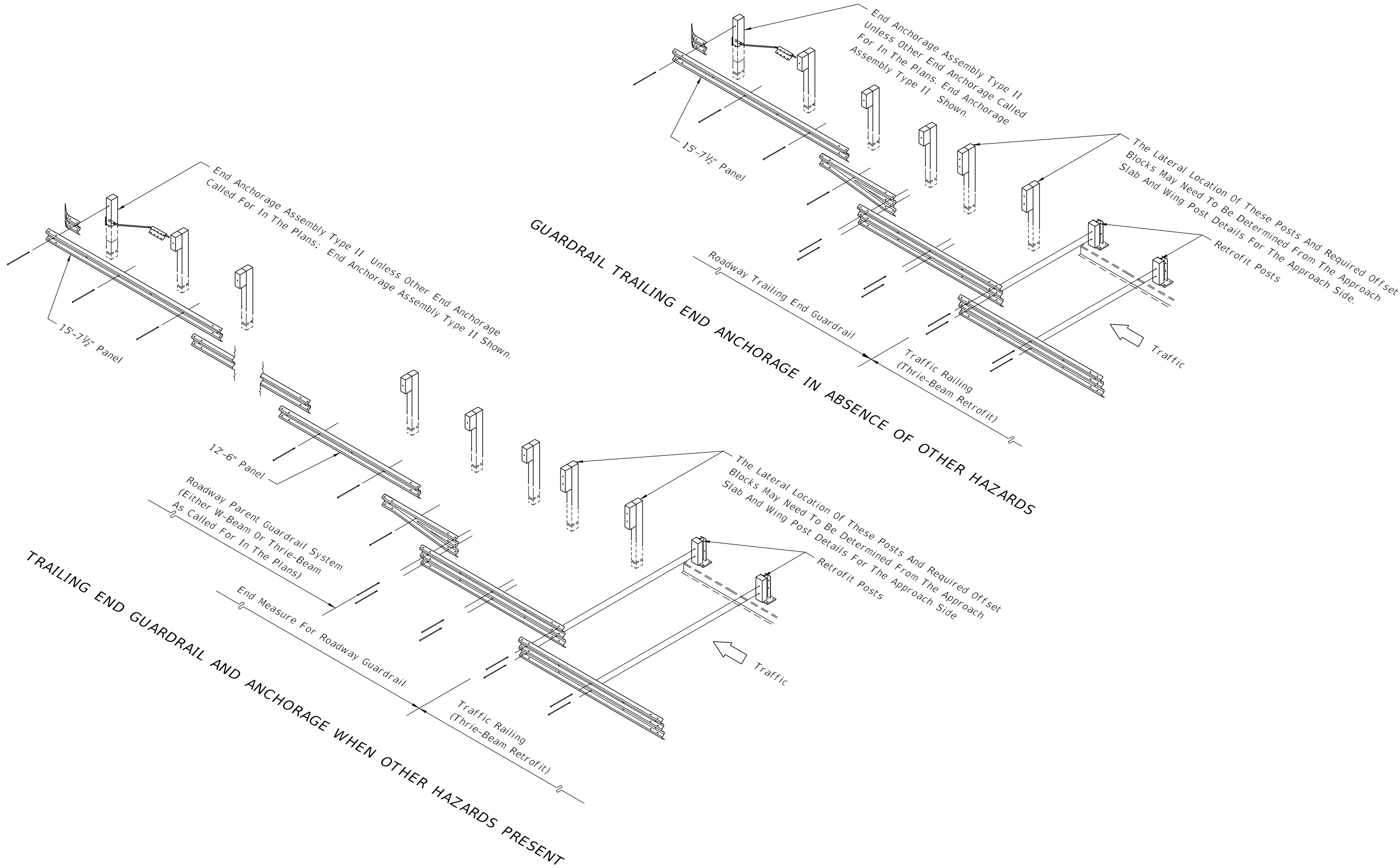




PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

10/16/2017 1:13:14 PM

LAST REVISION 11/01/17	DESCRIPTION:  	 FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 25 of 27
---------------------------	----------------------	---	--	------------------	-------------------



TRAILING END GUARDRAIL AND ANCHORAGE FOR BRIDGE TRAFFIC RAILING (THRIE BEAM RETROFITS)

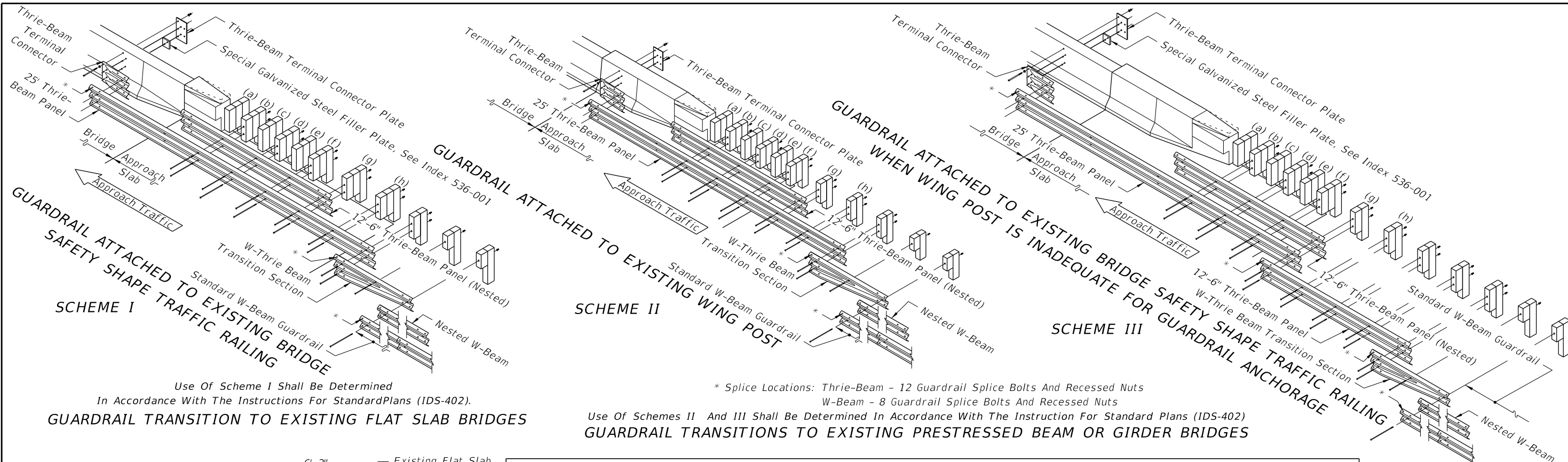
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LAST REVISION 11/01/17	REVISION	DESCRIPTION:
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 FY 2018-19  
 STANDARD PLANS

GUARDRAIL TRANSITIONS AND  
 CONNECTIONS FOR EXISTING BRIDGES

INDEX 536-002	SHEET 26 of 27
------------------	-------------------

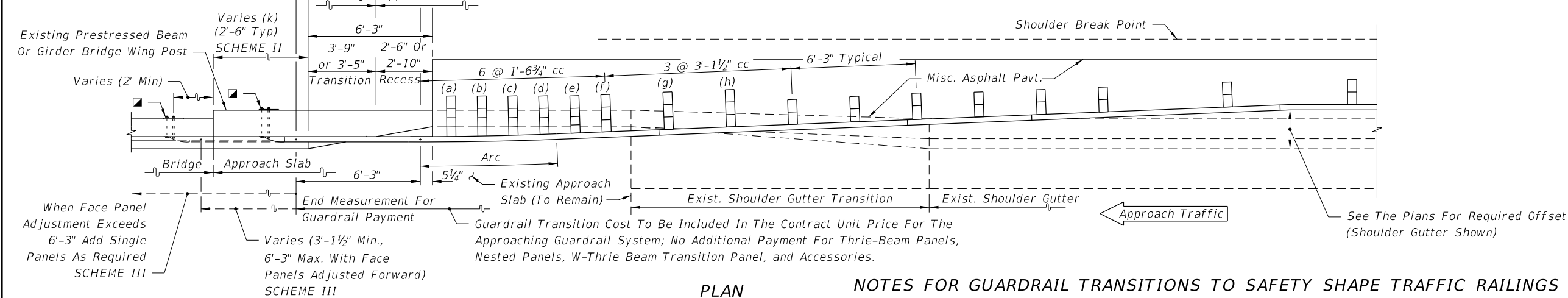


Use Of Scheme I Shall Be Determined In Accordance With The Instructions For Standard Plans (IDS-402).  
**GUARDRAIL TRANSITION TO EXISTING FLAT SLAB BRIDGES**

\* Splice Locations: Thrie-Beam - 12 Guardrail Splice Bolts And Recessed Nuts  
 W-Beam - 8 Guardrail Splice Bolts And Recessed Nuts  
 Use Of Schemes II And III Shall Be Determined In Accordance With The Instruction For Standard Plans (IDS-402)  
**GUARDRAIL TRANSITIONS TO EXISTING PRESTRESSED BEAM OR GIRDER BRIDGES**

**APPROACH POSTS AND SPECIAL OFFSET BLOCKS**

Block assemblies for special offsets can be made up of one special block plus one standard size block or of three standard size blocks field dressed to approximately equal size, with the pieces secured for relative position by 16d galvanized nails, see '16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION' - Index 536-001. The nested rails shall not be bolted to the blocks and posts at posts (a), (c) and (e). The details shown are for approach slabs with internal edge dike extending beyond parapet type traffic railing termini.



21"x12"x5/8" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And 7/8"Ø x 18" Long [15" Long With 3 1/2" Min. Thread Length For Bridge Safety Shape Railing] HS Hex Bolts And Nuts (5 Req'd.) With 2 1/4" OD Plain Round Washers Under Heads And Nuts. [When Attaching Guardrail To Existing Wing Posts Or Bridge Rails, Care Should Be Exercised To Avoid Damaging Conduits And Their Utilities That May Be Routed Through Wing Posts Or Bridge Rails. When Conduits And Their Utilities Are Encountered, At Least Five 7/8" HS Hex Bolts Shall Be Installed In Any Of The Seven Holes Provided In The Thrie-Beam Terminal Connector.]

**NOTES FOR GUARDRAIL TRANSITIONS TO SAFETY SHAPE TRAFFIC RAILINGS ON EXISTING BRIDGES**

- When the guardrail attachment overlays the Bridge Number, Bridge Name or Date on the traffic railing, provide an aluminum sign panel with the obscured information. Attach the sign panel to the face of the traffic railing adjacent to the Thrie-Beam Terminal Connector with 1/4"Ø x 1" long concrete screws or expansion anchors at each corner, as approved by the Engineer. The sign panel shall be a minimum 1/16" thick and meet the requirements of Specification Section 700 with a white background and 3" tall black letters and sized appropriately to contain the information required. The cost of the sign panel shall be included in the cost of the Guardrail Bridge Anchorage Assembly.
- When retrofitting thrie-beam guardrail to existing wing posts or existing bridge safety shape traffic railing, attachment construction to be paid for under the contract unit price for Guardrail Bridge Anchorage Assembly, EA., and shall be full compensation for bolt hole construction, terminal connector, terminal connector plate(s) and bolts, nuts and washers.

**GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR EXISTING FLAT SLAB, PRESTRESSED BEAM AND GIRDER BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH**

LAST REVISION 11/01/17	REVISION	DESCRIPTION:	 FY 2018-19 STANDARD PLANS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX 536-002	SHEET 27 of 27
---------------------------	----------	--------------	----------------------------------	---	------------------	-------------------

10/16/2017 1:13:15 PM