GENERAL NOTES

1. The illustrations for guardrail applications are standard configurations; adjustments are to be made as required by site specific conditions to attain optimum design for function, economy and serviceability.

2. The beginning of guardrail need shall be at the greatest of the upstream distances from the hazard, as determined from Figures 1 and 2, and other application details of this Index.

3. One Panel (i.e., panel length) equals 12'–6". Guardrail shall be constructed with rail elements 12'–6" in length except where 25'–0" elements are called for by this and other standards (indexes) or specifically called for in the plans.

   Post spacing shall be 6'–3" except that reduced spacing shall be used for (a) transitions to anchorages at rigid structures such as bridges (See Detail J and Index No. 402) and transitions to redirective crash cushions, (b) the conditions in Note No. 7 below, (c) special post applications, (d) reduced post spacing required for specific end anchorage assemblies, and, (e) specific spacing called for in the plans.

4. Guardrail mounting height for the W–beam without rub rail and for thrie–beam is 1'–9" to the center of beam, and for W–beam with rub rail 2'–0" to center of beam. Modified thrie–beam shall be mounted at a height of 2'–0" to center of beam. The height is critical and shall be attained in all cases; a tolerance of 3" above and 1" below the standard mounting heights is permissible over necessary surface irregularities (e.g., across shoulder gutters, inlets and roadway surface break lines). For guardrail placed on slopes beyond the shoulder point, there shall be no deviation more than 1" below to 3" above the desired height within any 25 foot section of guardrail.

5. All guardrail panels, end sections and special end shoes shall be lapped in the direction of adjacent traffic.

6. Flared end anchorage assemblies providing 4' offset are the standard end treatments for single face free standing guardrail approach ends. Parallel end anchorage assemblies for guardrail approach end treatments will be constructed only when restraints prevent construction of flared end anchorages.

   Guardrail end anchorage assemblies shall be of the type called for in the plans. If the plans call for end anchorage assembly "flared" and does not identify the specific system(s) to be used, the contractor has the option to construct any FDOT approved flared assembly provided in this Index or identified on the Qualified Products List (QPL), subject to the conditions identified in the approved Index drawings, or QPL drawings if applicable.

   If the plans call for end anchorage assembly "parallel" and does not identify the specific system(s) to be used, the contractor has the option to construct any FDOT approved parallel assembly provided in this Index or identified on the QPL, subject to the conditions identified in the approved Index drawings, or QPL drawings if applicable.

   If the plans call for a specific end anchorage assembly, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. Approved substitutions will not be eligible for CSIP consideration.

   When an end treatment is attached to guardrail with Pedestrian Safety Treatment, only end treatment systems with timber posts are to be used.

   Existing approved proprietary end anchorage systems are identified on the Qualified Products List (QPL). After January 1, 2011 – manufacturers seeking approval of new proprietary end anchorage systems for inclusion on the QPL must submit application along with design documentation showing the end anchorage system; is crash tested to Test Level 3 criteria in accordance with the Manual for Assessing Safety Hardware (MASH), is accepted by FHWA for use as a guardrail end anchorage system, and is compatible with FDOT guardrail systems. System approvals will be contingent on FDOT's evaluation of crash test performance results for consistency with FDOT guardrail application and use. If approved, installation drawings signed and sealed by a professional engineer licensed in the State of Florida will be required.

7. At above ground rigid hazards where the face of guardrail is offset from the hazard less than the 4' minimum for standard W–beam, other guardrail configurations with reduced post spacing may be applicable; see General Note No. 11 and the minimum offset table on Sheet 19. For guardrail with post spacing less than 6'–3" the reduced spacing should extend a minimum of one panel in advance of the hazard. When minimum offset cannot be attained safety shape concrete barrier wall shall be used unless other shielding is approved by the Engineer of Record. See Index No. 410 for safety shape concrete barrier walls and typical applications, and the plans for special barrier shapes and applications.

8. In addition to use at roadside hazards or other areas where the Engineer has deemed guardrail necessary, guardrail should be considered on flush shoulder sections where fill slopes are steeper than 1:3 within the clear zone and fill heights are 6' or greater. Curbed sections where fill slopes are steeper than 1:3 and fill heights are 6' or greater within 22' of the traveled way should be evaluated for installation of guardrail. Additional guidance for evaluating the need for guardrail can be found in the Plans Preparation Manual.

9. The guardrail to bridge connections contained in this Index are for bridges with Test Level 4 traffic railing barriers. For guardrail to concrete barrier wall connections see Index No. 410. For existing bridges receiving retrofit traffic railing barriers see Index No. 402.

10. The W–beam guardrail system in this index is the standard system to be used on the State Highway System where a Test Level 3 semi–rigid barrier is required.

11. Thrie–beam guardrail panels shall be used in guardrail transitions to bridge traffic railing barriers, to concrete and certain water filled safety shaped barriers, certain crash cushions and as a continuous barrier when called for in the plans. For additional information on rail attachment, post spacings, nested rails, location of thrie–beam transition panels and offset block configurations see details elsewhere in this Index, and Index Nos. 402, 410 and 414. The use of thrie–beam guardrail with standard offset blocks (Test Level 3 semi–rigid system) may be considered where one or more of the conditions listed below or similar conditions are anticipated or exist:

    a. W–beam deflection is marginal,
    b. W–beam with rub rail considered functionally deficient,
    c. Vehicle overriding W–beam is probable,
    d. Drainage will be impeded or blocked by the use of concrete barrier wall (subject to deflection space requirements),
    e. High frequency of repairs to W–beam,
    f. Spandrel beam with low deflection needed around unrelocatable structure,
    g. Accommodating passenger vehicles heavier or larger than the standard passenger car (e.g., passenger vans and small buses).

    The modified thrie–beam guardrail is a Test Level 4 semi–rigid system and may be used where a Test Level 4 guardrail is required.

12. Single face median guardrail for bridges located on divided roadways shall be constructed the same as outer roadway guardrail under the following conditions:

    a. Wide medians where approach end anchor is located outside of opposing roadway clear zone,
    b. Medians of uniform width that are occupied by other transportation and joint use facilities,
    c. Medians of uniform or variable widths with independent vertical alignments not suited to normal median guardrail installations,
    d. Medians of bifurcated roadways.

13. Straight rail sections may be used to construct radii of 125' or greater. For radii less than 125' the rail must be fabricated (shop–bent) to fit.

14. Crash cushions may be required in lieu of or in conjunction with guardrail at locations where space does not permit development of sufficient guardrail length, offset or crashworthiness at terminals. Crash cushions shall be constructed at or in lieu of Type II assemblies located in the approach clear zones.

15. Corrugated sheet steel beams, end shoes, end sections and backup plates shall conform to the current requirements of AASHTO M180, Class A, Type II (zinc) coating. All other metallic components, hardware and accessories shall be in conformance with the appropriate current AASHTO requirements.

16. Offset blocks:
    a. Steel offset blocks other than modified thrie–beam offset blocks are not permitted for new guardrail construction. Existing steel offset blocks may remain throughout the service life of the existing guardrail. PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS are tabulated on Sheet 16.
    b. Plastic offset block installations shall be constructed on guardrail outside of approach end anchorage assemblies or any transition system connecting to a rigid or thrie–beam barrier.

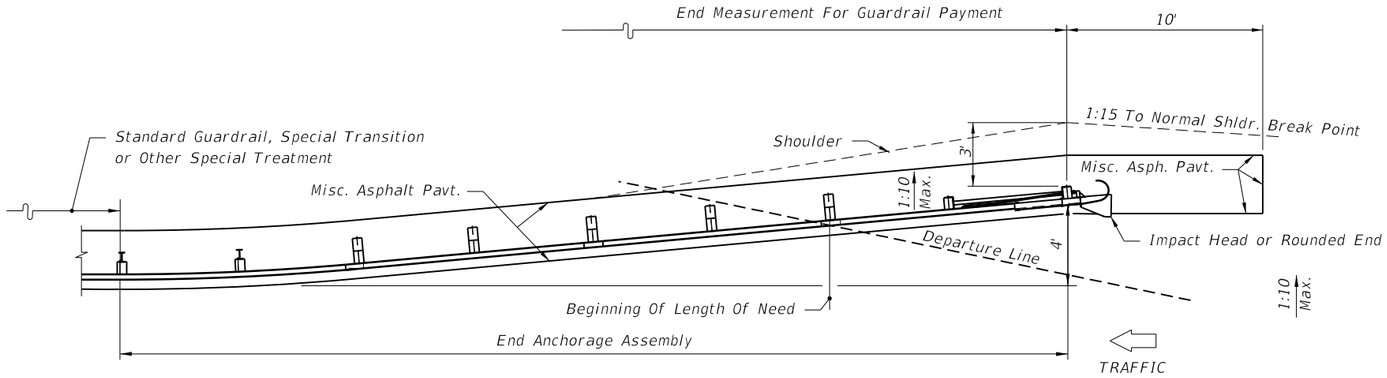
17. Where necessary to enlarge or add holes to galvanized guardrail, the work will be done by drilling or reaming. Damaged galvanized guardrail will be metalized in accordance with Sections 562 and 971 of the Standard Specifications. No burning of holes will be permitted.

18. For guardrail reflector details see Sheet 17.

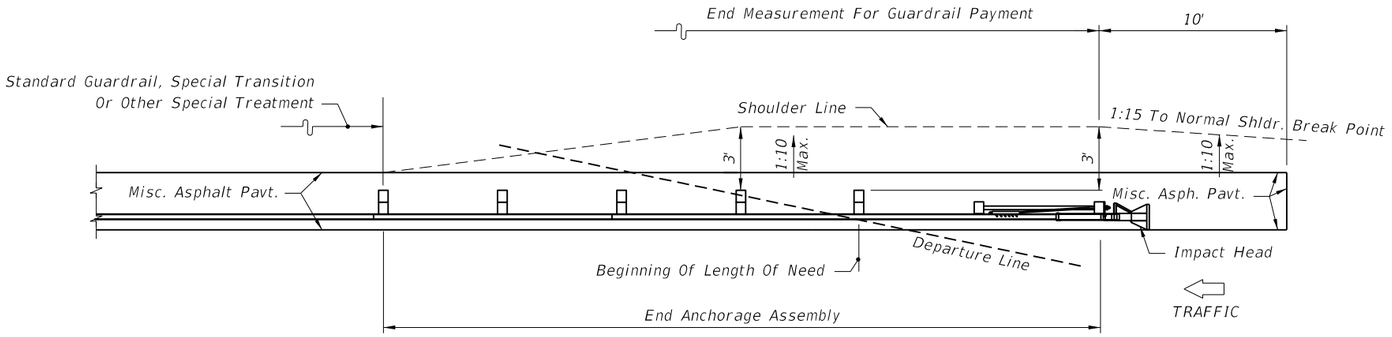
19. Any run of guardrail with existing concrete posts that is being reset under a construction or maintenance contract shall be reset using timber or steel posts. Repair within a run of guardrail with existing concrete posts can be made with either steel, timber, sound salvaged concrete posts; replacement in kind of damaged posts is to be made when like posts are on hand at time of repair.

20. Substitutions between thrie–beam guardrail and concrete barrier wall are not eligible for CSIP consideration.

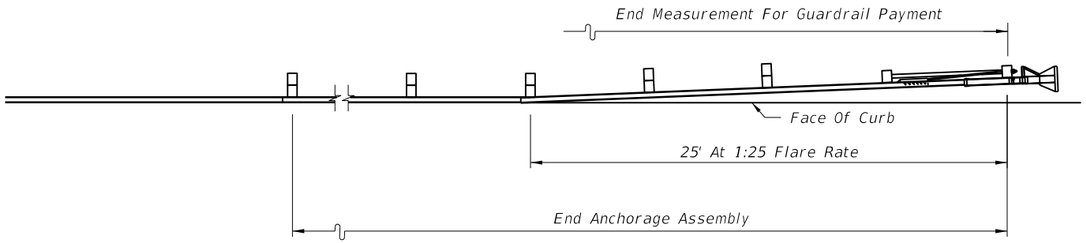
21. On roadways designated for reverse laning, all downstream ends of guardrail that are not shielded or that are not designed as approach end terminals shall be marked with post–mounted Type 3 Object Markers. Trailing bridge ends and trailing shoulder concrete barrier wall ends shall be marked with Type 3 Object Markers except where there is trailing end guardrail. Object markers to be installed facing reverse laning traffic. The cost of the object marker shall be included in the cost of the guardrail.



FLARED OPTION



PARALLEL OPTION



PLACEMENT OF PARALLEL OPTION AT CURBED LOCATIONS

GENERAL NOTES

1. These drawings are representative of the various proprietary guardrail end anchorage assemblies listed on the Department's Qualified Products List (QPL). For specific details and requirements see the vendor drawings on the QPL at

   www.dot.state.fl.us/specificationsoffice/

2. These drawings present the general graphics to show the limits of payment for guardrail and end anchorage assemblies, modifications to the shoulder and placement of the miscellaneous asphalt mow strips.

3. These drawings, along with the various vendor drawings on the QPL, are intended to show sufficient details for installation of the end anchorage assemblies and their connection to shoulder guardrail. This precludes the requirement for shop drawing submittals unless otherwise called for in the plans. The various end anchorage assemblies shall be assembled in accordance with the manufacturer's detailed drawings, procedures and specifications.

4. The various proprietary end treatments listed on the QPL are intended for use as approach end guardrail anchorages for shoulder guardrail. The effective length of the end treatments vary–refer to the vendor drawings on the QPL for the length and the use of special panels and details. Standard guardrail, guardrail transitions or other special treatments shall not be included within the limits of the end anchorage assembly. See the vendor drawings for the alignment of the end treatment with respect to the normal guardrail alignment.

5. Flared or parallel end anchorage assemblies shall not be used in medians where horizontal clearance requires use of a back rail.

6. Each of the various end anchorage assemblies have unique features. Careful attention should be given to the types and orientation of the posts and other components. Refer to the vendor drawings on the QPL for the specific requirements of each system.

7. For galvanizing requirements of the metallic components see Standard Specifications Section 967.

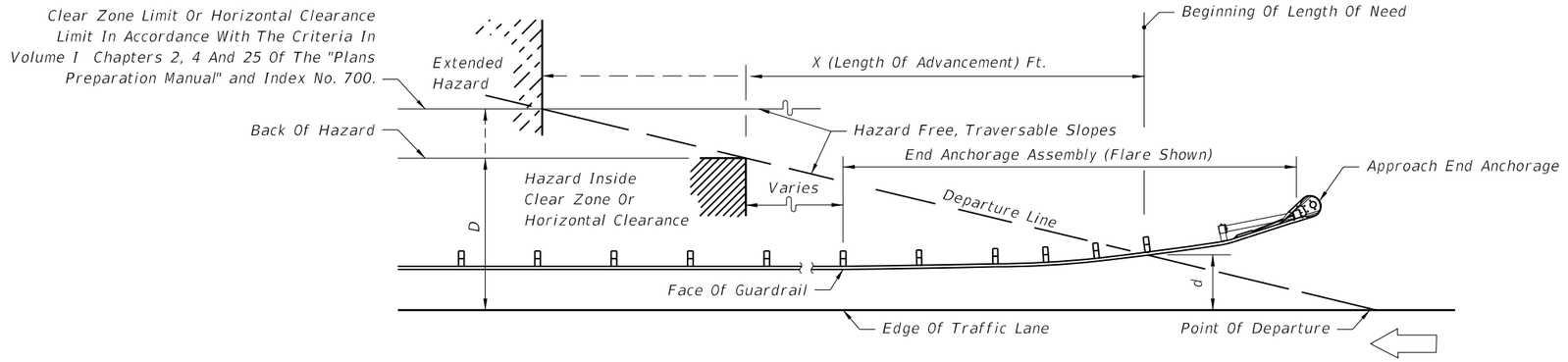
8. Test Level 3 crash tested end anchorage assemblies shown on the QPL are suitable for all design speeds.

9. Flared end anchorage assemblies shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Flared), EA.

   Parallel end anchorage assemblies shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Parallel), EA.

   The unit price for end anchorage assemblies shall be full compensation for furnishing and installing all components in accordance with the plans, the manufacturer's detail drawings, procedures and specifications and these drawings.

APPROACH END ANCHORAGE DETAILS



Design Speed mph	X (Length Of Advancement) Ft. (See NOTES 1 & 2)
≤ 45	= 16 (D–d)
≥ 50	= 13 (D–d)

NOTES

1. Length of advancement determined from the diagram and equations above establishes the location of the upstream beginning length of need for guardrail, however, the length of advancement can be no less than that required by other details of this index.

2. The flared end anchorage with 4' nose offset is shown in the diagram above, however, the diagram applies to other configurations that may occur at the beginning of length of need, such as, other flare designs; upstream returns; and, other upstream deflected, tangent and curvilinear conditions.

Equation Variables:

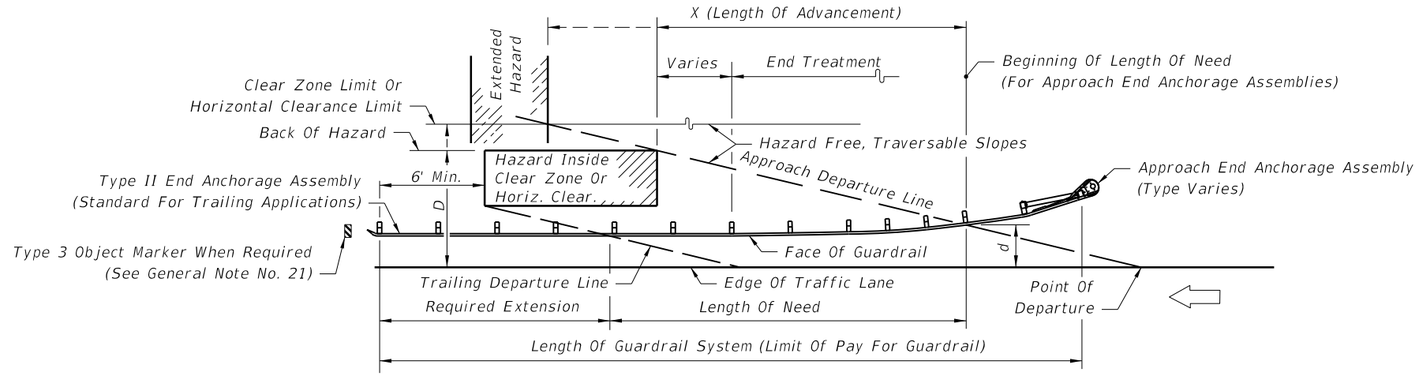
D = Distance in feet from near edge of the near approach traffic lane to either (a) the back of hazard, when the hazard is located inside the clear zone or horizontal clearance or (b) the clear zone or horizontal clearance outer limit, when the hazard extends to or goes beyond the clear zone or horizontal clearance limit. For left side hazards on two-way undivided facilities, D is measured from the inside edge of the near approach traffic lane (see Figure 2).

d = Distance in feet from the near edge of the near approach traffic lane to the face of guardrail at its intersection with the departure line. For left side hazards on two-way undivided facilities, d is measured from the inside edge of the near approach traffic lane (see Figure 2).

For flared and parallel end anchorage assemblies the beginning length of need is to be set at the center of post #3. That is, the departure line must intersect the face of the rail at post #3.

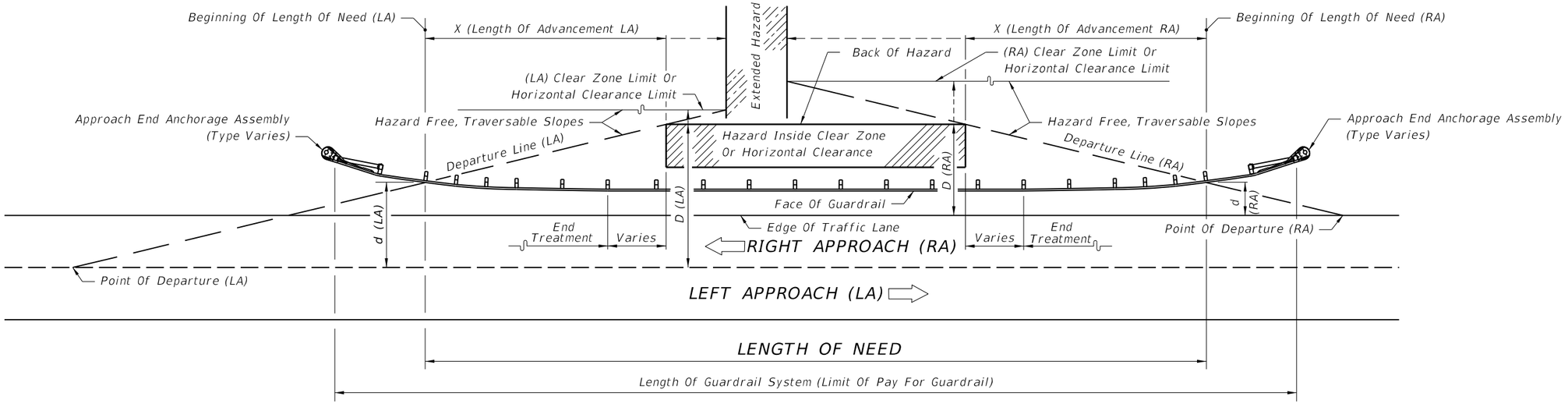
For flared end anchorage assemblies the offset distance "d" will equal the normal guardrail offset measured from the face of the guardrail to the edge of the near approach travel lane plus 1'-2" for 45 mph or less and 1'-9¼" for greater than 45 mph.

LENGTH OF ADVANCEMENT - FIGURE 1



(LEFT SIDE OPPOSITE HAND)

ONE-WAY TRAFFIC

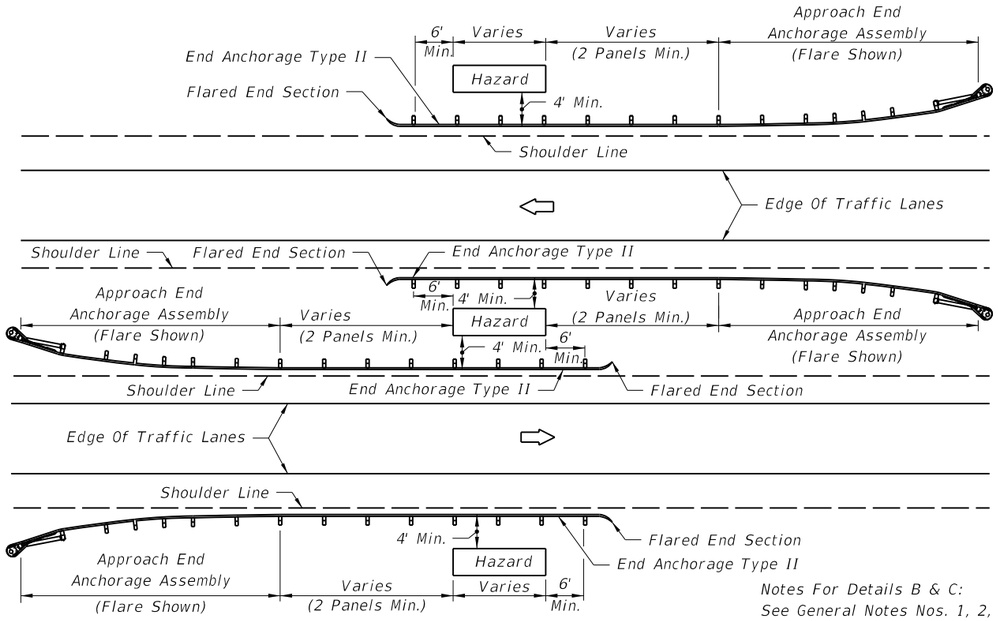


TWO-LANE TWO-WAY TRAFFIC

For description of the dimensions D, d and X, see Length of Advancement - Figure 1.
For additional shoulder guardrail information, see Details B and C.

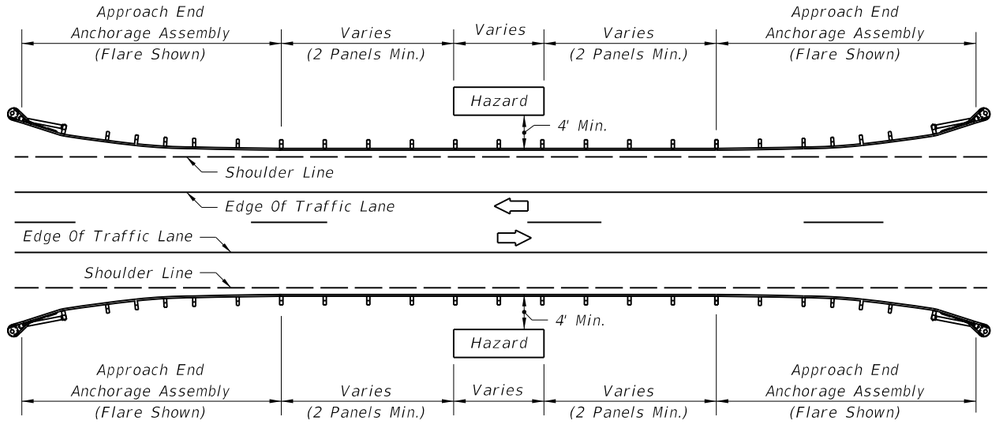
LOCATING TERMINALS ON SHOULDER GUARDRAILS - FIGURE 2

LAST REVISION	REVISION	DESCRIPTION:				
07/01/05			FDOT DESIGN STANDARDS 2013	GUARDRAIL	INDEX NO. 400	SHEET NO. 4



Median Guardrail Applications Shown Are For Locations Where Approach End Anchorage Assemblies Are Outside Of The Opposing Roadway Clear Zone.

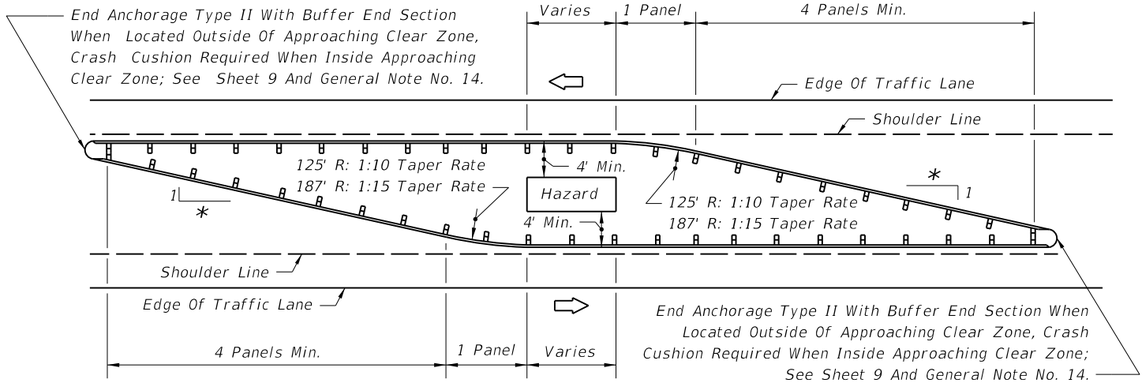
DIVIDED ROADWAY- DETAIL B



UNDIVIDED ROADWAY- DETAIL C

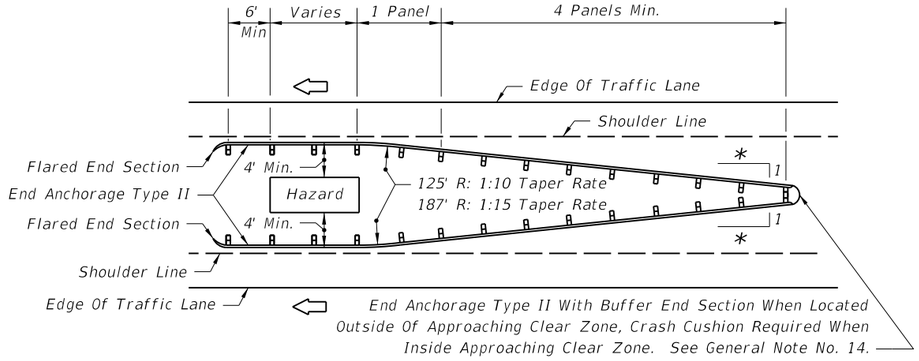
Notes For Details B & C:
See General Notes Nos. 1, 2, 3, 4, 5, 6, 7 and 8.
See Details K and L for guardrail offsets.
For end anchorage assemblies see sheets elsewhere in this Index and the plans.
For hazards that require shielding and are located back of curb see other sheets of this index, and where rigid barrier is required see Index No. 410.

GUARDRAIL APPLICATION FOR ROADSIDE HAZARDS



This Guardrail Configuration Applies Where Approach End Anchorage Assemblies Cannot be Located Outside Of The Opposing Roadway Clear Zone.

OPPOSING TRAFFIC- DETAIL D

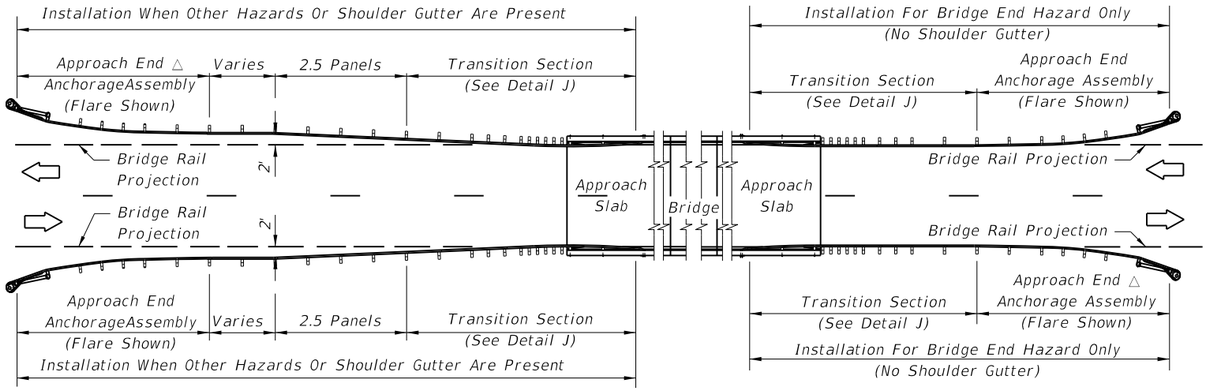


ONE-WAY TRAFFIC- DETAIL G

* 1:10 Taper Rate For Design Speeds ≤45 mph
1:15 Taper Rate For Design Speeds ≥50 mph

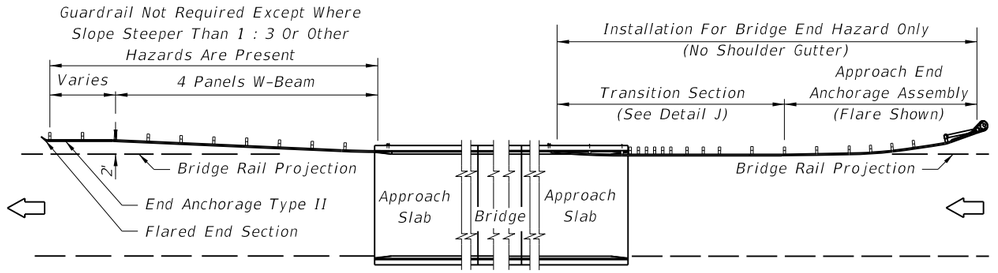
Notes For Details D & G:
See General Notes Nos. 1, 2, 3, 4, 5, 7, and 14.
See Details K and L for guardrail offsets.
For hazards that require shielding and are located back of curb see other sheets of this index, and where rigid barrier is required see Index No. 410.

GUARDRAIL APPLICATION FOR NARROW MEDIAN AND GORE HAZARDS

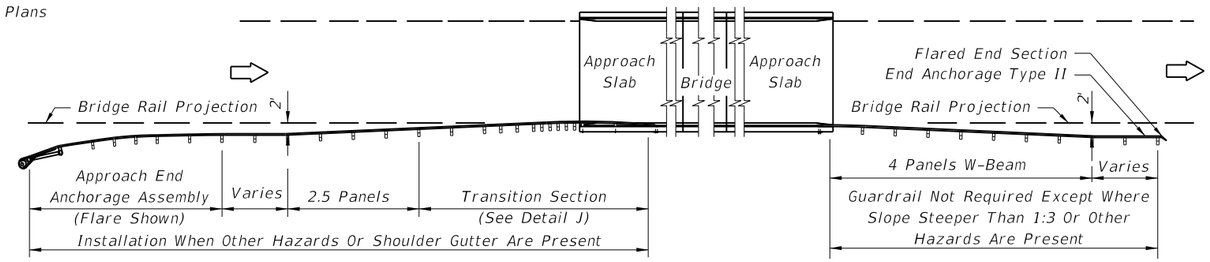


△ With Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown In Detail P Unless Other Anchorage Called Out In The Plans

UNDIVIDED ROADWAY - DETAIL O



For Median Guardrail See Sheets 8 & 9 And General Note 12.



DIVIDED ROADWAY - DETAIL P

Notes For Details O & P:
See General Notes Nos. 1, 2, 3, 4, 5, 6, 8 and 9. See Detail J for approach connections to bridges.
For end anchorage assemblies see sheets elsewhere in this Index and the plans.
Shoulder gutter in itself does not require the installation of guardrail.

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

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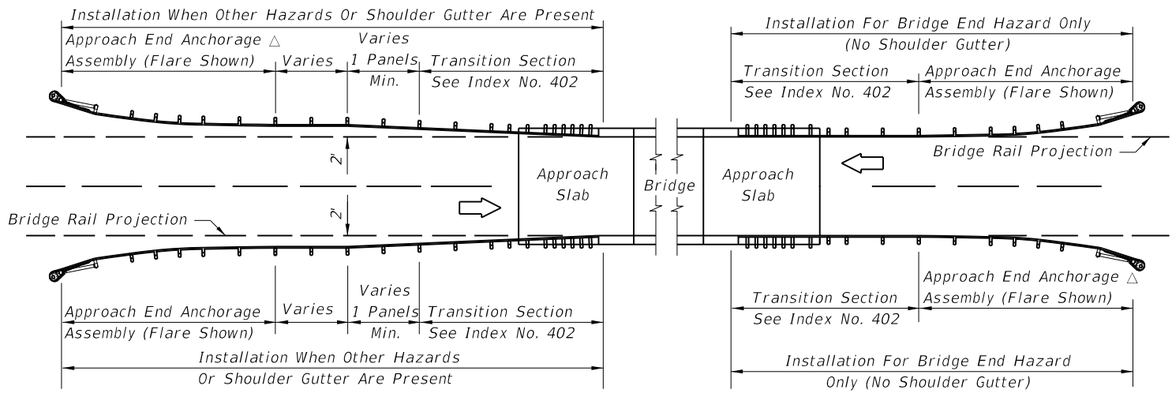
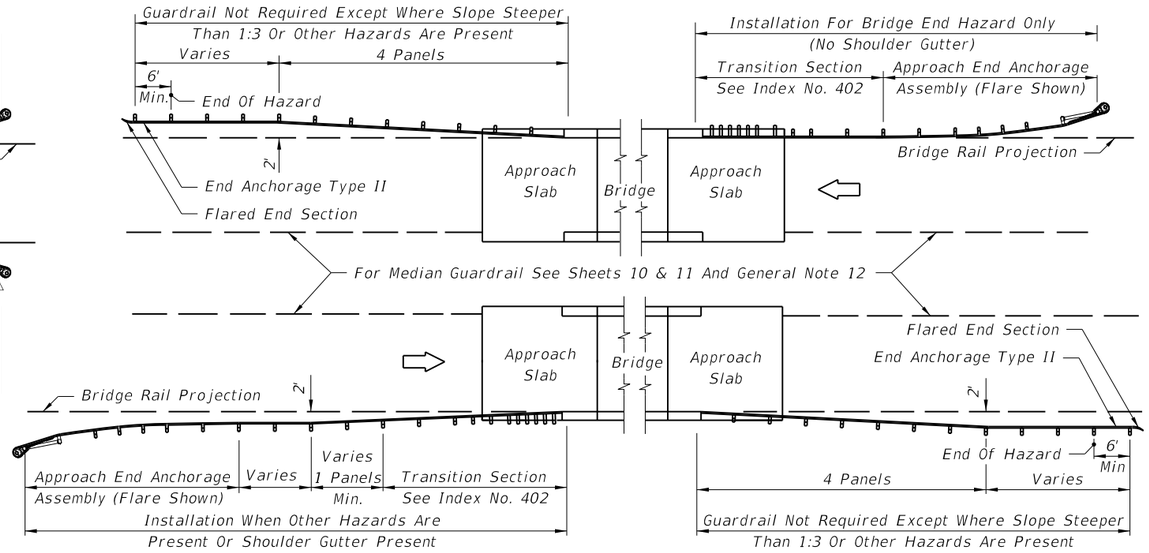
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL	INDEX NO.	SHEET NO.
02						400	6



△ With Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown In Detail I Unless Other Anchorage Called Out In The Plans

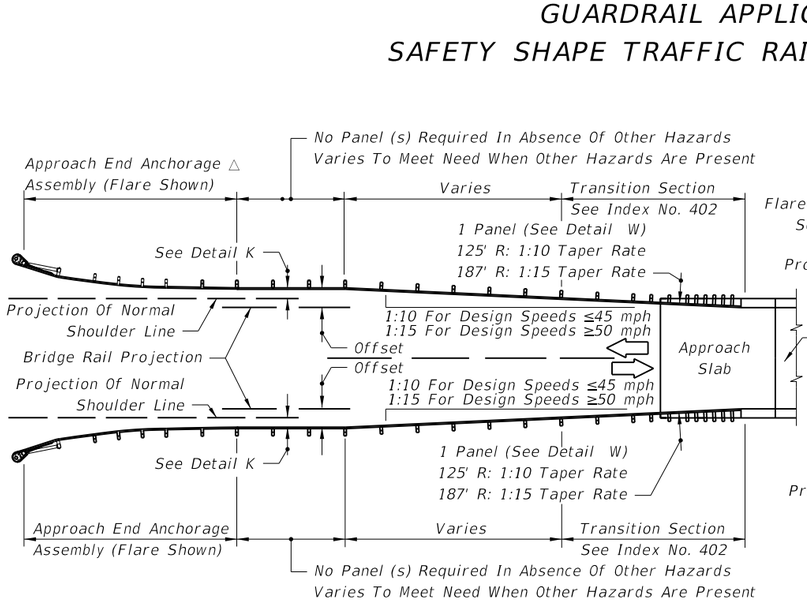
UNDIVIDED ROADWAY - DETAIL H



DIVIDED ROADWAY - DETAIL I

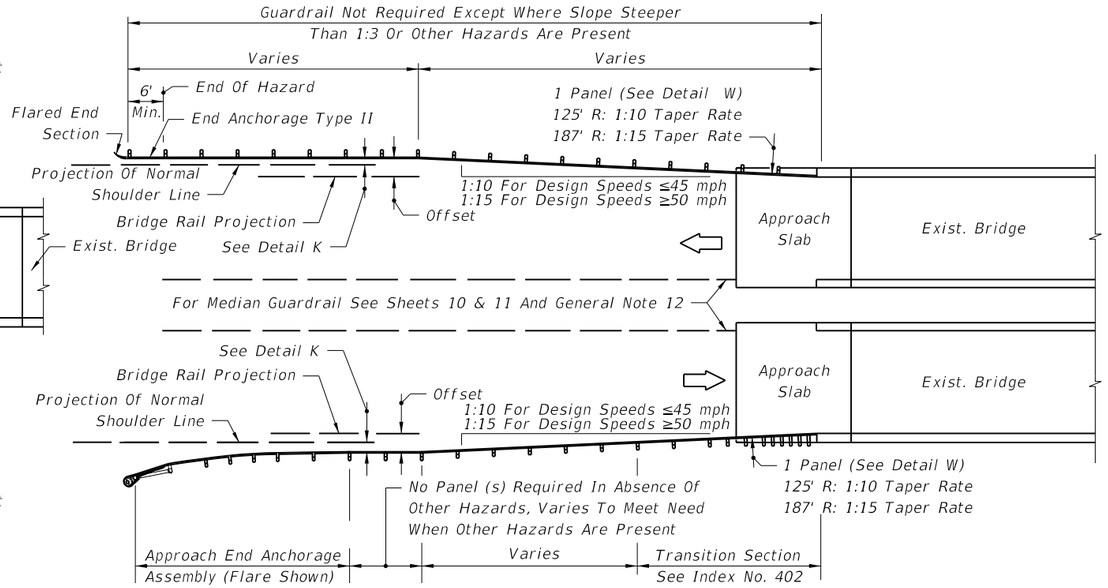
Notes For Details H & I:
See General Notes Nos. 1, 2, 3, 4, 5, 6, 8, and 9. See Index No. 402 for approach connections to bridges.
For end anchorage assemblies see sheets elsewhere in this Index and in the plans.
Shoulder gutter in itself does not require the installation of guardrail.

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



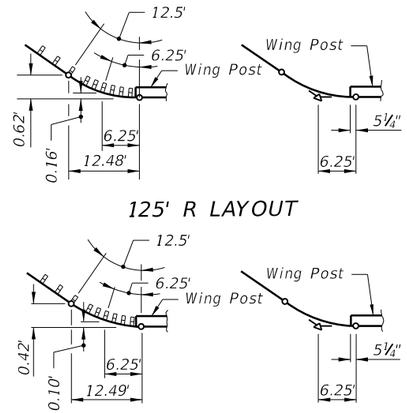
△ With Four Or More Lanes Trailing Guardrail Anchorages May Be As Shown In Detail I Unless Other Anchorage Called Out In The Plans

UNDIVIDED ROADWAY - DETAIL S



DIVIDED ROADWAY - DETAIL T

Notes for Details S & T:
See General Notes Nos. 1, 2, 3, 4, 5, 6, 8 and 9. See Index No. 402 for approach connections to bridges.
For end anchorage assemblies see sheets elsewhere in this Index and in the plans.

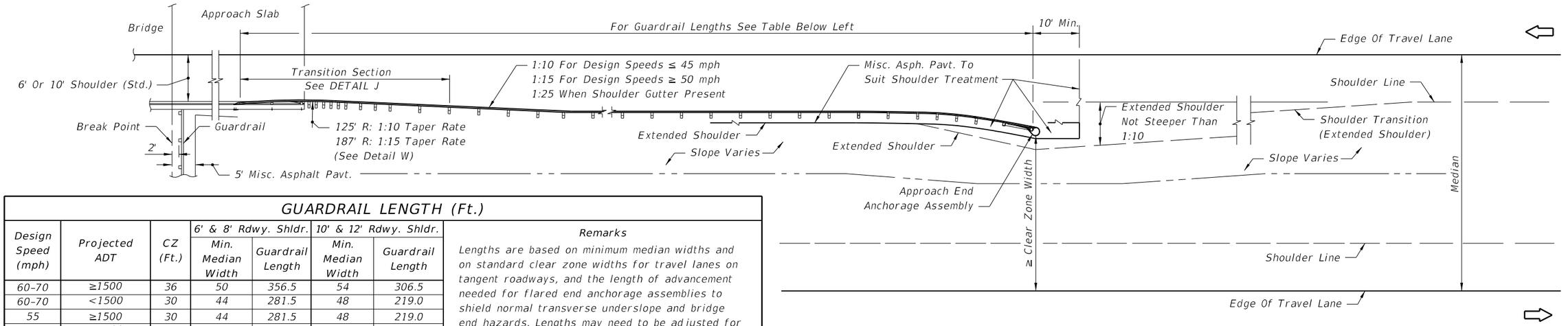


125' R LAYOUT

187' R LAYOUT
See General Note No. 13

STANDARD PANELS SET TO RADIALS ADJOINING BRIDGES DETAIL W

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



GUARDRAIL LENGTH (Ft.)

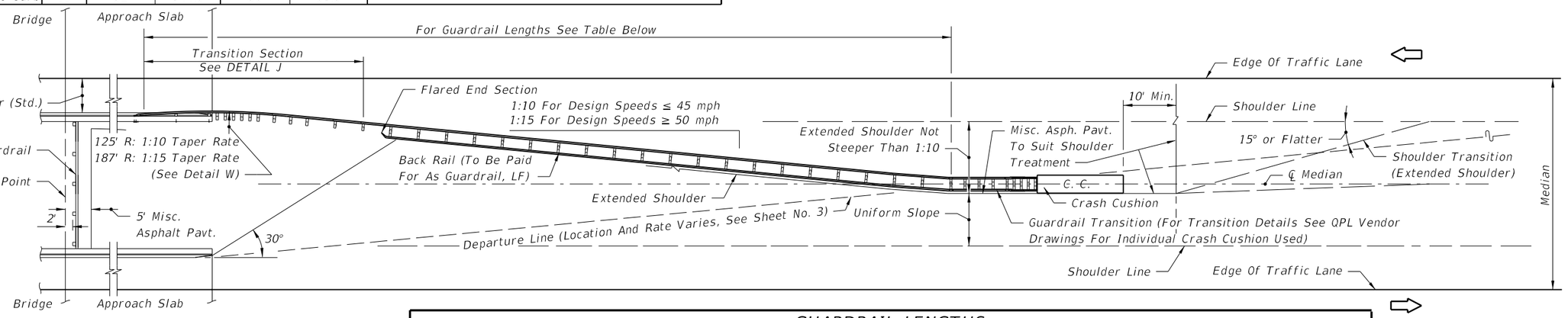
Design Speed (mph)	Projected ADT	CZ (Ft.)	6' & 8' Rdwy. Shldr. Min. Median Width	6' & 8' Rdwy. Shldr. Guardrail Length	10' & 12' Rdwy. Shldr. Min. Median Width	10' & 12' Rdwy. Shldr. Guardrail Length
60-70	≥1500	36	50	356.5	54	306.5
60-70	<1500	30	44	281.5	48	219.0
55	≥1500	30	44	281.5	48	219.0
55	<1500	24	38	194.0	42	144.0
45-50	≥1500	24	38	194.0	42	144.0
45-50	<1500	20	34	144.0	38	94.0
45-50	Urban w/o Curb	24	38	194.0	42	144.0
35-40	Urban w/o Curb	18	32	144.0	36	81.5

Remarks

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 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



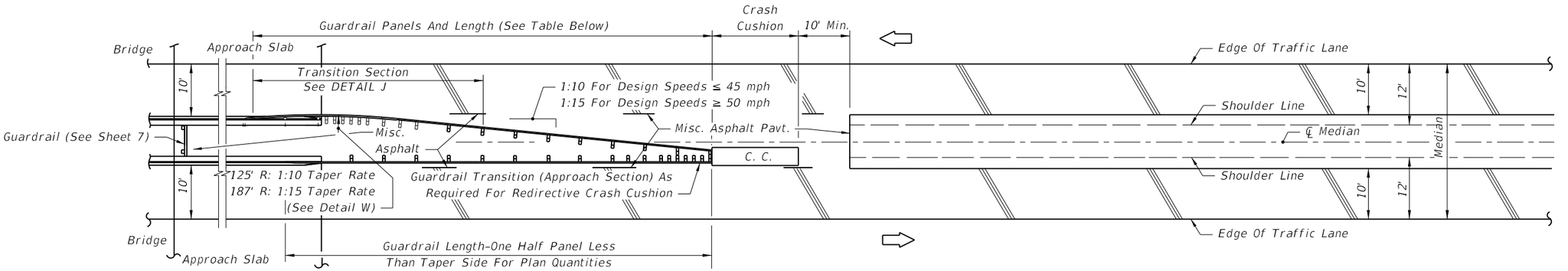
GUARDRAIL LENGTHS

Median Width (Ft.)	1:10 TAPER RATE								1:15 TAPER RATE							
	6' Bridge Shoulder				10' Bridge Shoulder				6' Bridge Shoulder				10' Bridge Shoulder			
	Panels (No.)			Length (Ft.)	Panels (No.)			Length (Ft.)	Panels (No.)			Length (Ft.)	Panels (No.)			Length (Ft.)
	Front	Back	Total	Total	Front	Back	Total	Total	Front	Back	Total	Total	Front	Back	Total	Total
32	9.5	6	15.5	193.75	6.5	4	10.5	131.25	13.5	10	23.5	293.75	8.5	6	14.5	181.25
34	10.5	7	17.5	218.75	7.5	5	12.5	156.25	14.5	11	25.5	318.75	9.5	7	16.5	206.25
36	10.5	7	17.5	218.75	7.5	5	12.5	156.25	15.5	12	27.5	343.75	10.5	8	18.5	231.25
38	11.5	8	19.5	243.75	8.5	6	14.5	181.25	16.5	13	29.5	368.75	11.5	9	20.5	256.25
40	12.5	9	21.5	268.75	9.5	6	15.5	193.75	17.5	13	30.5	381.25	13.5	11	24.5	306.25
42	13.5	9	22.5	281.25	10.5	7	17.5	218.75	19.5	15	34.5	431.25	14.5	11	25.5	318.75
44	14.5	10	24.5	306.25	10.5	7	17.5	218.75	20.5	16	36.5	456.25	15.5	12	27.5	343.75
46	14.5	10	24.5	306.25	11.5	8	19.5	243.75	21.5	17	38.5	481.25	16.5	13	29.5	368.75
48	15.5	11	26.5	331.25	12.5	9	21.5	268.75	22.5	17	39.5	493.75	17.5	13	30.5	381.25

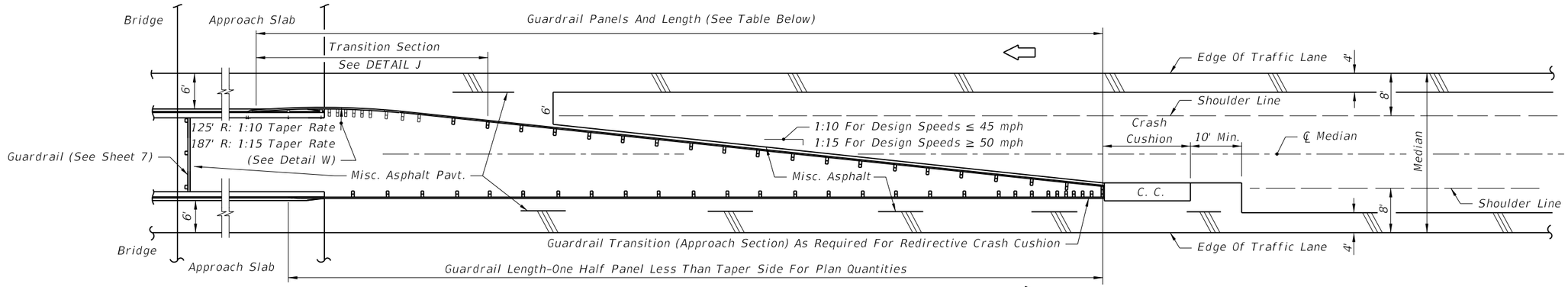
The lengths shown on this table are typical for roadways with standard width shoulders. Length requirements shall be determined on a site specific basis for both standard width and narrow bridge shoulders and end anchorage or end shielding use.

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

APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING FULL APPROACH SLAB LENGTH IN WIDE MEDIANS WITH FLUSH SHOULDERS

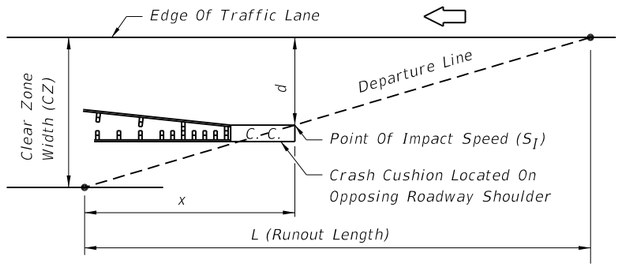


MEDIANS WITH 10' BRIDGE SHOULDERS



MEDIANS WITH 6' BRIDGE SHOULDERS

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



Speed (S_I) For Determining Crash Cushion Size:

$$S_I = \frac{x}{L}\,(\text{Design Speed}) = \left\lceil \frac{(CZ-d)}{CZ} \right\rceil \text{Design Speed}$$

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	14.5	181.25	20.5	256.25	7.5	93.75	10.5	131.25
28	12.5	156.25	18.5	231.25	6.5	81.25	8.5	106.25
26	11.5	143.75	15.5	193.75	5.5*	68.75	6.5	81.25
24	9.5	118.75	13.5	168.75	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_I's) along the runouts from the approach roadways; however, when calculated speeds (S_I'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 SAFETY SHAPE TRAFFIC RAILING EXTENDING FULL APPROACH SLAB LENGTH IN NARROW MEDIANS WITH FLUSH SHOULDERS

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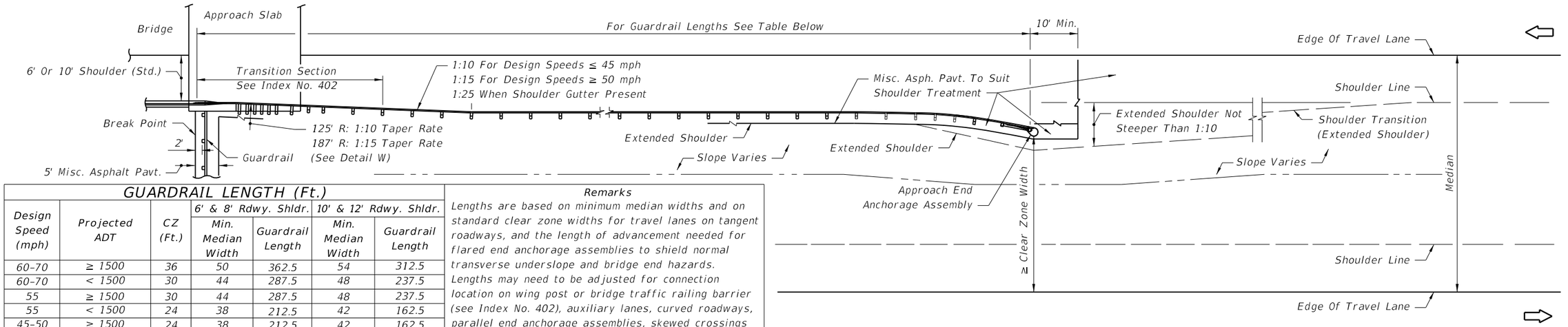
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL	INDEX NO.	SHEET NO.
07/01/07						400	9



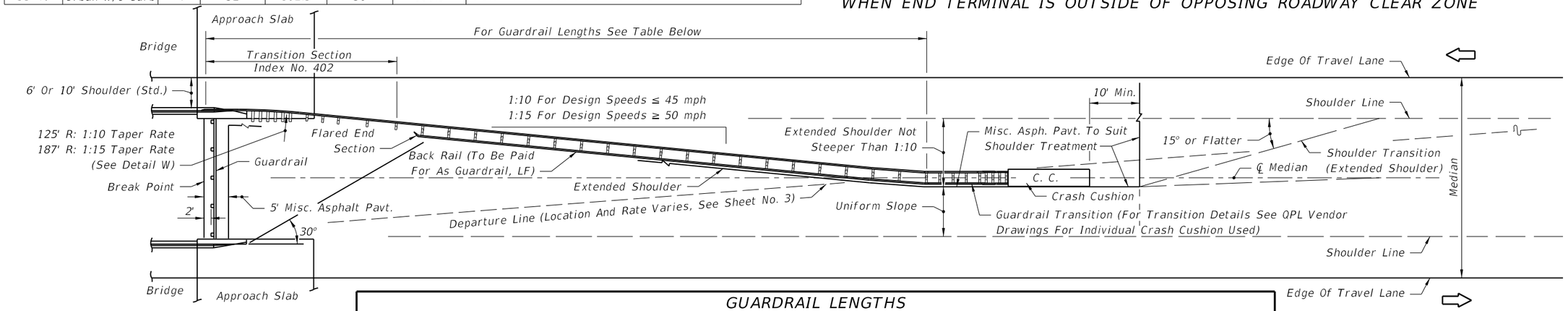
GUARDRAIL LENGTH (Ft.)						
			6' & 8' Rdwy. Shldr.		10' & 12' Rdwy. Shldr.	
Design Speed (mph)	Projected ADT	CZ (Ft.)	Min. Median Width	Guardrail Length	Min. Median Width	Guardrail Length
60–70	≥ 1500	36	50	362.5	54	312.5
60–70	< 1500	30	44	287.5	48	237.5
55	≥ 1500	30	44	287.5	48	237.5
55	< 1500	24	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

Remarks

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 (see Index No. 402), auxiliary lanes, curved roadways, parallel end anchorage assemblies, skewed crossings and other hazards present. When the wing post is replaced by bridge traffic railing barrier, reference Detail J and see Index No. 402.

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

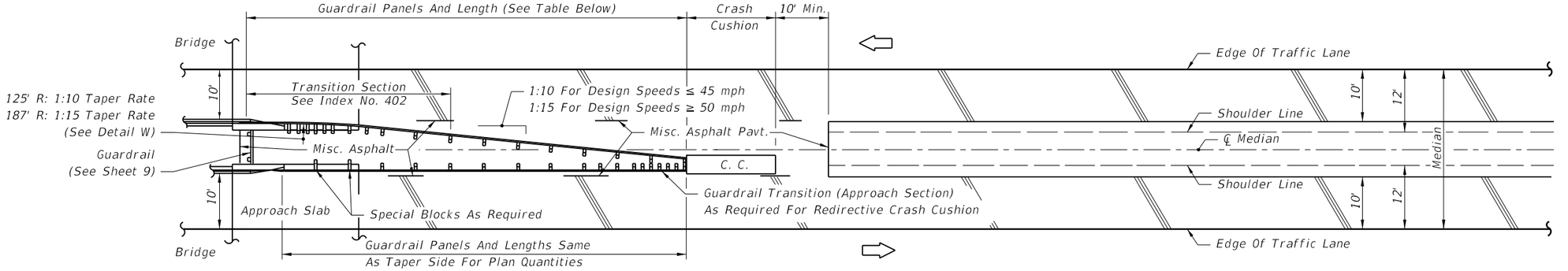


GUARDRAIL LENGTHS																
Median Width (ft.)	1:10 TAPER RATE								1:15 TAPER RATE							
	6' Bridge Shoulder				10' Bridge Shoulder				6' Bridge Shoulder				10' Bridge Shoulder			
	Panels (No.)			Length (Ft.)	Panels (No.)			Length (Ft.)	Panels (No.)			Length (Ft.)	Panels (No.)			Length (Ft.)
	Front	Back	Total	Total	Front	Back	Total	Total	Front	Back	Total	Total	Front	Back	Total	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

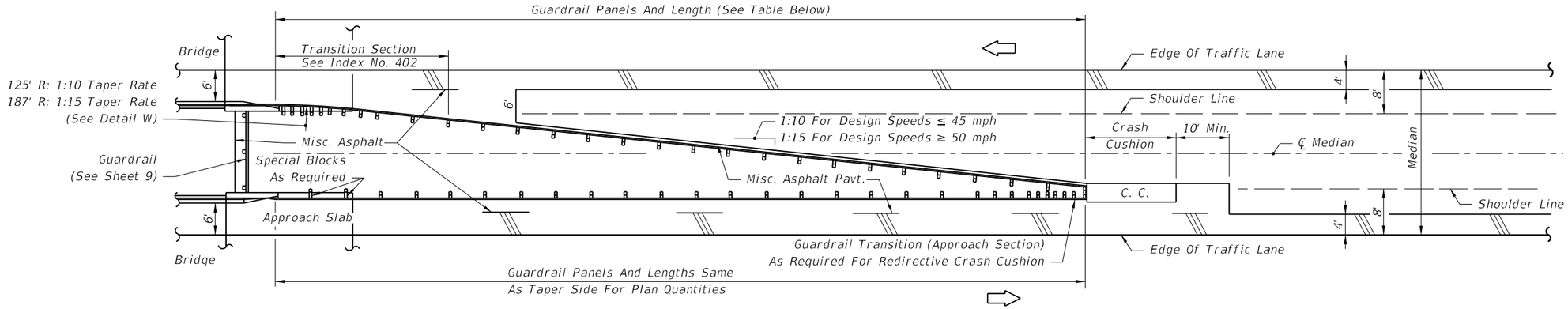
The lengths shown on this table are typical for roadways with standard width shoulders and a relocated connection to the existing wing post. When the wing post is replaced by bridge traffic railing barrier, reference Detail J and see Index No. 402. Length requirements shall be determined on a site specific 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

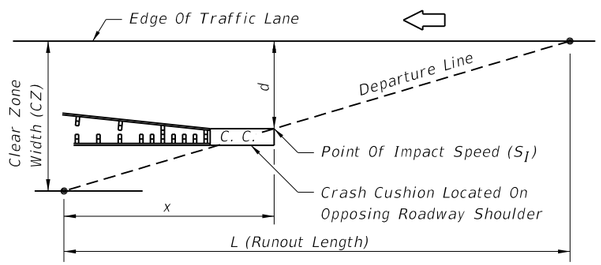
APPROACH GUARDRAIL TREATMENTS FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH IN WIDE MEDIANS WITH FLUSH SHOULDERS



MEDIANS WITH 10' BRIDGE SHOULDERS



MEDIANS WITH 6' BRIDGE SHOULDERS



Speed (S_I) For Determining Crash Cushion Size:

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

SIZING CRASH CUSHIONS LOCATED ON OPPOSING ROADWAY SHOULDERS

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

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_I's) along the runouts from the approach roadways; however, when calculated speeds (S_I'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 SAFETY SHAPE TRAFFIC RAILING EXTENDING LESS THAN FULL APPROACH SLAB LENGTH IN NARROW MEDIANS WITH FLUSH SHOULDERS

LEGEND

(1) Edge of traffic lane for simple curve turnouts.
Edge of travel lane for taper turnouts.

(2) Taper.

(3) Pavement return (radius R_1).

(4) Flared end anchorage to be installed except when existing guardrail on intersecting drive or side road adjoins the project.

(5) Post for locating flare, proximate to PC or PT:
No. 2 post for Radii 25' or less.
No. 3 post for Radii > 25' and < 50'.
Between No. 4 and No. 5 posts for Radii 50' or greater.

(6) Post for locating flare, proximate to PC or PT:
No. 3 post for Radii 25' or less.
Between No. 4 and No. 5 posts for Radii greater than 25'.

(7) Expanded shoulder for guardrail.

(8) Expanded shoulder for flared guardrail end anchorage.

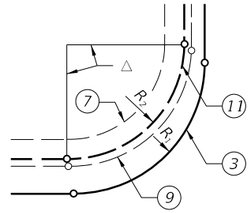
(9) Shoulder in absence of guardrail.

(10) Flared end anchorage assembly.

(11) Radial guardrail to be installed when guardrail required on the intersecting drive or side road (radius R_2).

(12) End anchorage Type II (radial return only).

(13) Guardrail installation limited to roadway right of way unless otherwise called for in the plans.

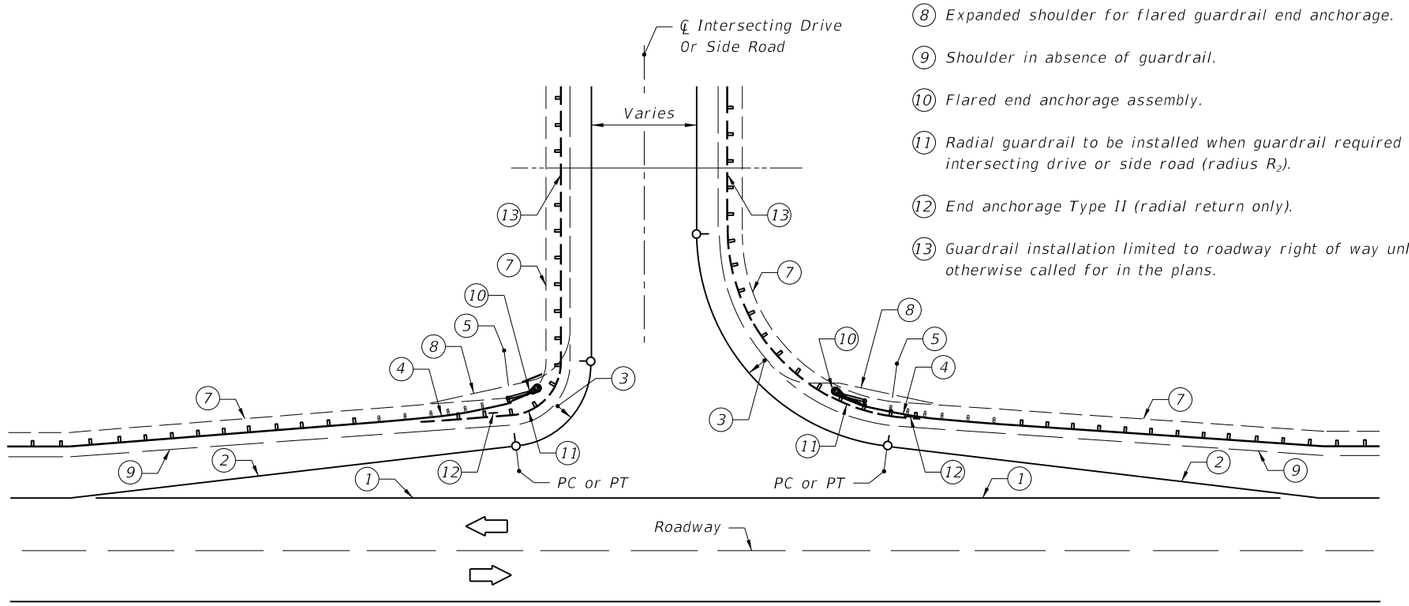


RADIAL GUARDRAIL

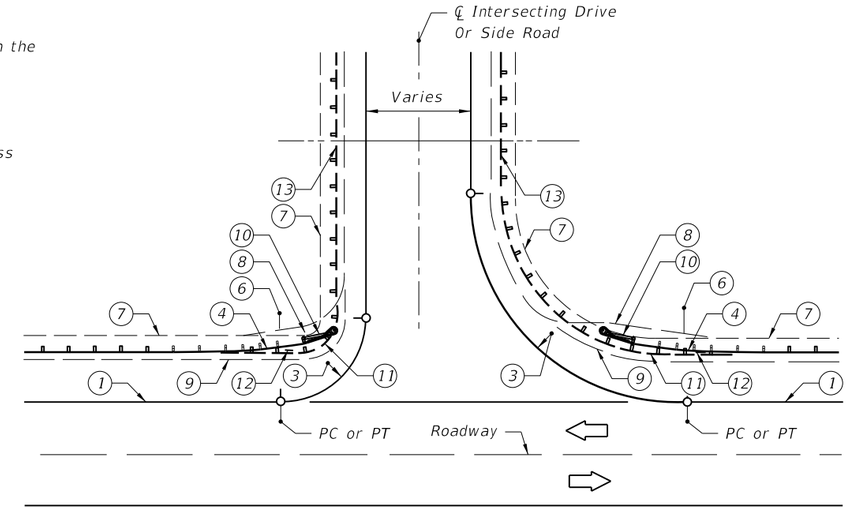
RADIAL GUARDRAIL

R_1	Normal Turnouts					
	Taper			Simple Curve		
	R_2	Panels Required	△	R_2	Panels Required	△
15'	25'	3	85°56'	25'	3	85°56'
20'	25'	3	85°56'	25'	3	85°56'
25'	25'	3	85°56'	25'	3	85°56'
30'	25'	3	85°56'	25'	3	85°56'
35'	25'	3	85°56'	25'	3	85°56'
40'	40'	5	89°31'	40'	5	89°31'
45'	40'	5	89°31'	40'	5	89°31'
50'	40'	5	89°31'	40'	5	89°31'

Note: Only 25' and 40' radius panels are to be used for return guardrail on normal turnouts. On skewed turnouts the number of panels used and their arrangement with straight panels will be as shown in the plans or as directed by the Engineer.



TAPER TURNOUTS



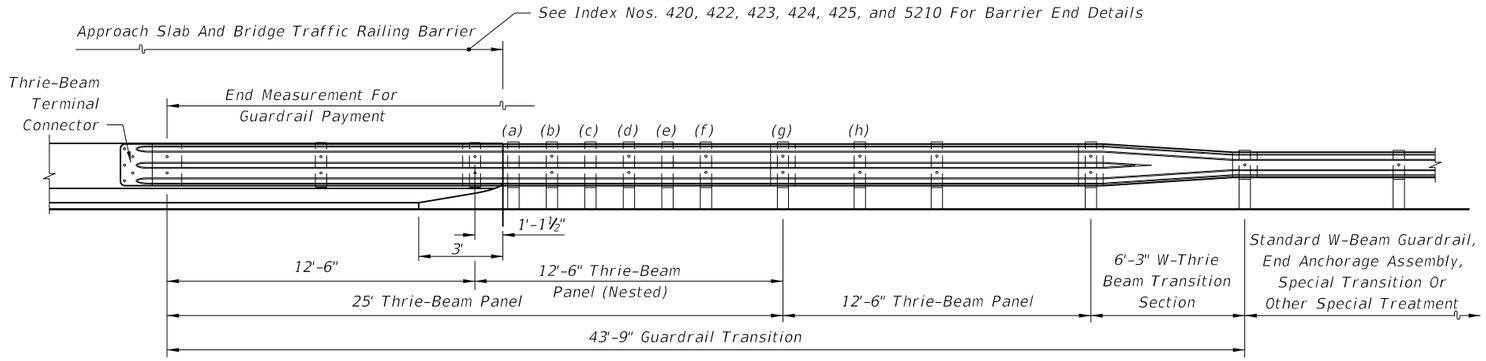
SIMPLE CURVE TURNOUTS

Note: The guardrail application shown on this sheet are for highways with flush shoulders and no restraints for constructing flared end anchorages and minimum lengths of guardrail. For highways with flush shoulders and restraints to constructing flared anchorages, see General Note No. 6.

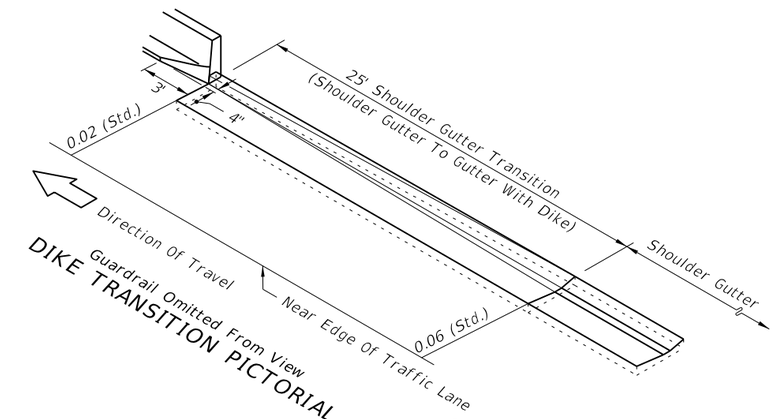
Where openings in guardrail are required in close proximity to bridge traffic rails or ends of concrete barrier walls, and minimum length guardrail with flared end anchorages can not be applied, either controlled release returns or energy absorbing terminals are to be applied.

GUARDRAIL APPLICATIONS FOR INTERSECTING DRIVES AND SIDE ROADS ON RURAL FACILITIES

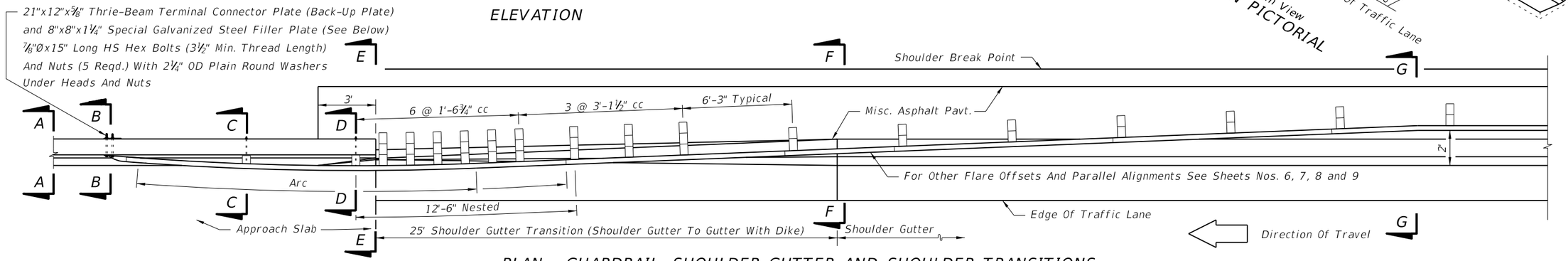
LAST REVISION	REVISION	DESCRIPTION:				
04			FDOT DESIGN STANDARDS 2013	GUARDRAIL	INDEX NO. 400	SHEET NO. 12



ELEVATION

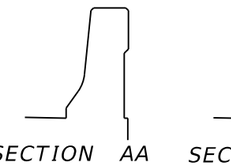


DIKE TRANSITION PICTORIAL

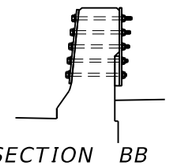


PLAN - GUARDRAIL, SHOULDER GUTTER AND SHOULDER TRANSITIONS

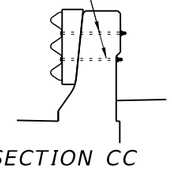
⅝" Øx18.5" Long Upper And 17.5" Long Lower Post Bolt And Nut With 1¾" OD Steel Washers Under Nuts



SECTION AA

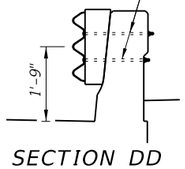


SECTION BB

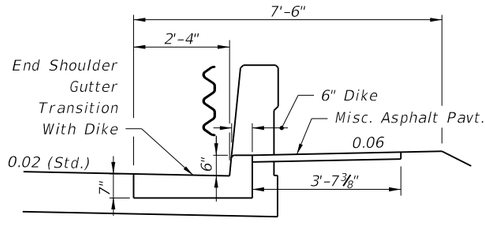


SECTION CC

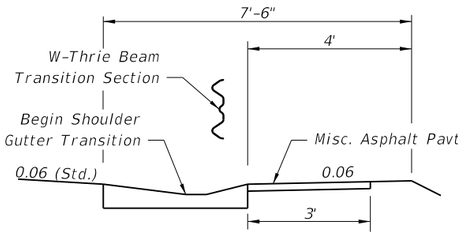
⅝" Øx20" Long Upper And 19" Long Lower Post Bolt And Nut With 1¾" OD Steel Washers Under Nuts



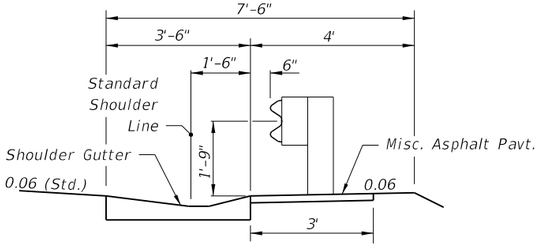
SECTION DD



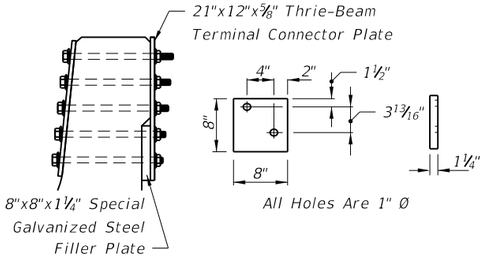
SECTION EE



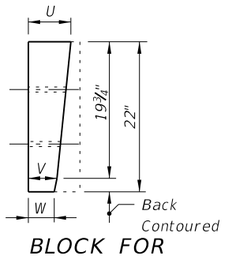
SECTION FF



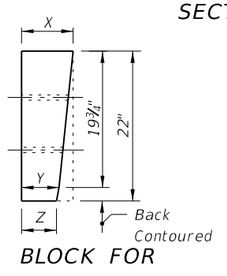
SECTION GG



SPECIAL GALVANIZED STEEL FILLER PLATE FOR USE AT SECTION BB



BLOCK FOR SECTION CC



BLOCK FOR SECTION DD

APPLICATIONS	SECTION CC			SECTION DD		
	U	V	W	X	Y	Z
Single Face Guardrail	6⅛"	4⅛"	3⅝"	7½" nom.	5½" nom.	5" nom.
Double Face Guardrail With Timber Posts	5⅛"	3⅛"	2⅝"	6½" nom.	4½" nom.	4" nom.
Double Face Guardrail With Steel Posts	4⅜"	2⅜"	1⅞"	5¾"	3¾"	3¼"

For Double Face Guardrail Connections To Median Bridge Traffic Railing Barrier, See Index No. 410, 'Guardrail Connection To Concrete Barrier Wall Approach Ends'.

GUARDRAIL TRANSITION NOTE

When shoulder gutter is required, the 25' long dike transition, shown in the 'PLAN' and 'PICTORIAL' above, is required. Double offset blocks are shown for guardrail installations adjacent to shoulder gutter/dike transitions; single offset blocks shall be installed in absence of shoulder gutter. Nested rails shall not be bolted to the blocks and posts at posts (a), (c), and (e). One 16d galvanized nail shall be driven between each post and block, and between double blocks, in order to prevent block rotation, see '16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION', this Index.

THRIE-BEAM OFFSET BLOCKS FIELD TRIMMED FOR USE AT SECTIONS CC & DD

GUARDRAIL APPROACH TRANSITION AND CONNECTION FOR BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIERS EXTENDING FULL LENGTH OF APPROACH SLAB

DETAIL J

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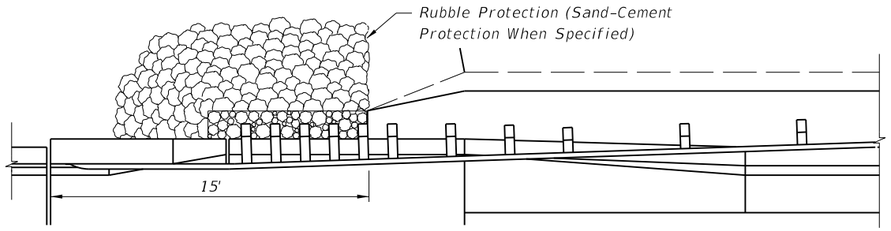
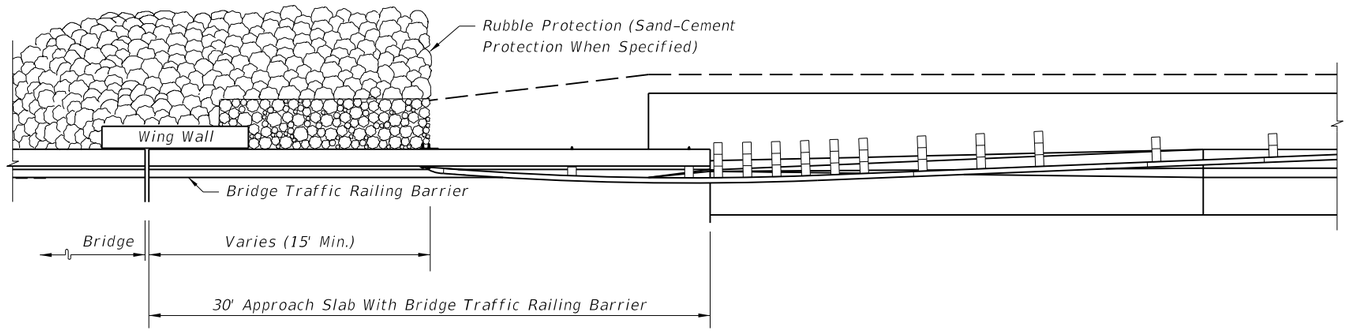
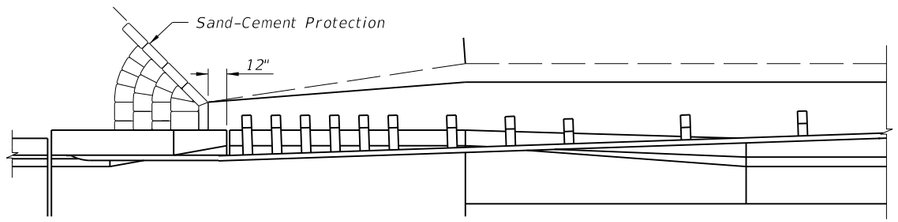
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/12			FDOT DESIGN STANDARDS 2013	GUARDRAIL	400	13



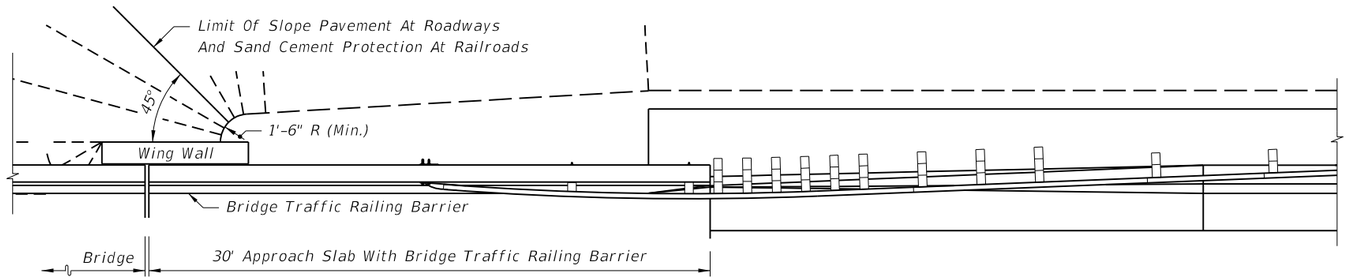
BRIDGES OVER STREAMS



BRIDGES OVER STREAMS



BRIDGES OVER RAILROADS



BRIDGES OVER ROADWAYS OR RAILROADS

For Additional Information See Index No. 402

SKETCHES - BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING LESS THAN FULL APPROACH SLAB LENGTH

For Additional Guardrail Information See Sheet 13

SKETCHES - BRIDGES WITH SAFETY SHAPE TRAFFIC RAILING BARRIER EXTENDING FULL APPROACH SLAB LENGTH

SKETCH NOTES

1. These sketches are for showing shoulder interface between roadways and bridges where crossings are normal to other roadways, railroads and streams. For site specific applications and details see the plans and the FDOT Structures Design Office "Detailing Manual" and "Design Guidelines".

2. Shoulder treatments shown in these sketches are for locations with shoulder gutter; shoulder hinge location will vary for facilities without shoulder gutter.

SHOULDER INTERFACE BETWEEN ROADWAYS AND BRIDGES

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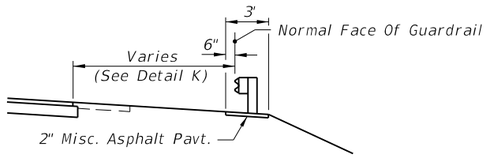
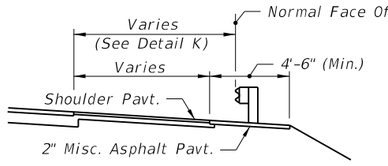
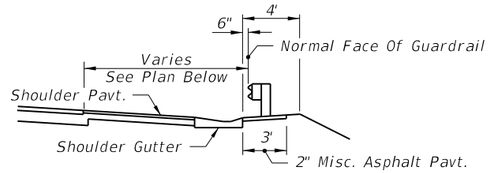


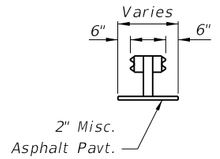
SHOULDER WITH OR WITHOUT 5' PAVEMENT



PAVED SHOULDERS

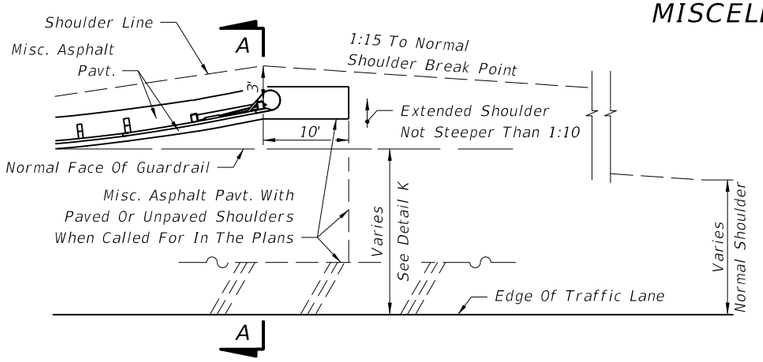


SHOULDER GUTTER

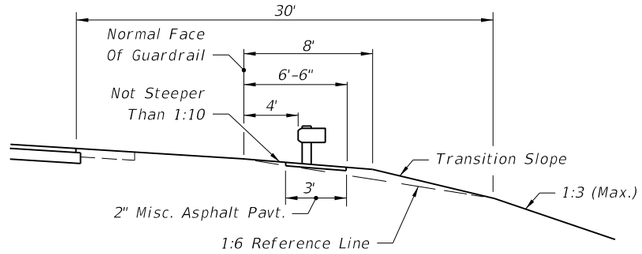


DOUBLE FACE RAIL

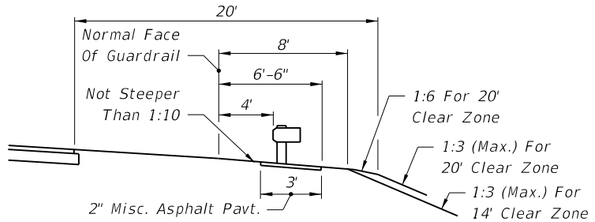
MISCELLANEOUS PAVING FOR STANDARD GUARDRAIL SECTIONS



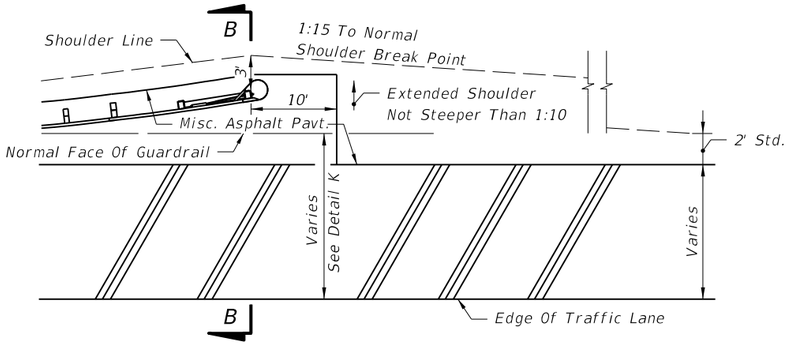
SHOULDER WITH OR WITHOUT 5' PAVEMENT



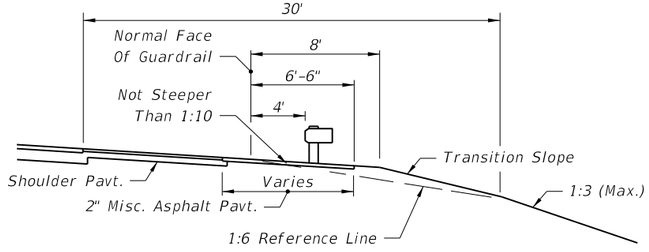
SECTION AA (EXAMPLE FOR 30' CLEAR ZONE)



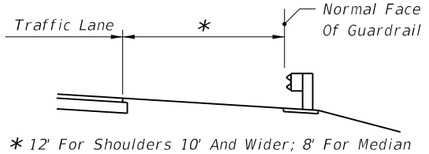
SECTION AA (EXAMPLE FOR 20' CLEAR ZONE)



PAVED SHOULDERS



SECTION BB (EXAMPLE FOR 30' CLEAR ZONE)

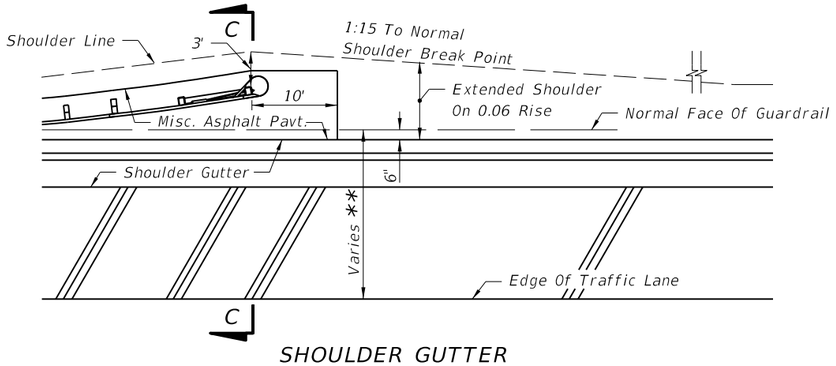


* 12' For Shoulders 10' And Wider; 8' For Median Shoulders 8' Or Less In Width; and, Shoulder Width Plus 2' For All Others Shoulders.

STANDARD LOCATIONS

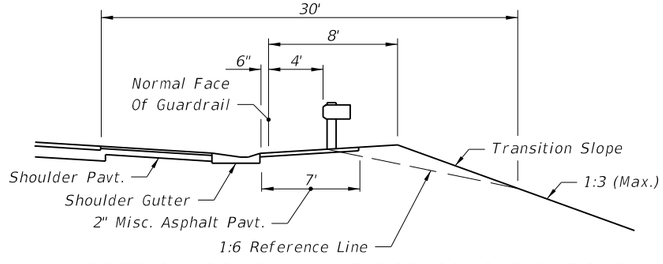
For Guardrail on slopes see Sheet 26.

GUARDRAIL LOCATION-DETAIL K



SHOULDER GUTTER

** 8' For 6' Shoulders 10' For 8' Shoulders 12' For 10' And 12' Shoulders Applies To Left And Right Side Shoulders. (See Index No. 525 For Shoulder Widths And Shoulder Gutter Locations On Ramps And Auxiliary Lanes)



SECTION CC (EXAMPLE FOR 30' CLEAR ZONE)

SHOULDERS, SLOPES AND MISCELLANEOUS PAVING FOR FLARED END ANCHORAGE ASSEMBLIES

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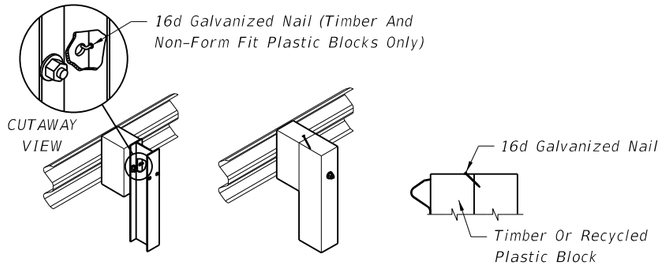
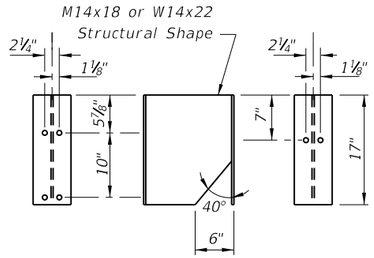


STEEL POST TIMBER POST

16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION



POST FACE SIDE VIEW TRAFFIC FACE

All Holes Are 13⁄16"Ø

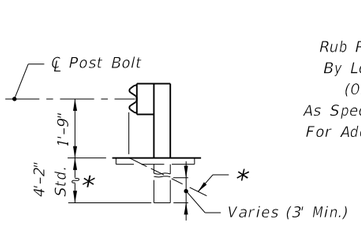
STEEL MODIFIED THRIE-BEAM OFFSET BLOCK

PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS

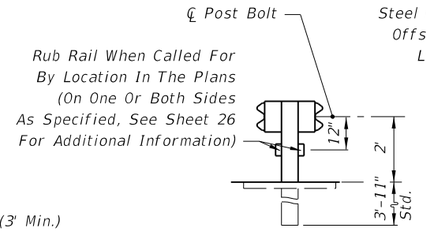
POSTS	OFFSET BLOCKS	REMARKS
Timber	Timber 6"x8"x14" (Nominal) For W-Beam And 6"x8"x22" (Nominal) For Thrie-Beam Recycled Plastic (See Notes)	Post bolt hole in timber and plastic blocks to be centered ± ¼"). All timber offset blocks shall be dressed on all four sides (S4S). One 16d galvanized nail per block is to be used to prevent rotation of block (see detail left).
Steel W6x8.5, W6x9 Or 6" C	Timber 6"x8"x14" (Nominal) For W-Beam And 6"x8"x22" (Nominal) For Thrie-Beam Recycled Plastic (See Notes)	Same as above for timber and plastic blocks except that form fit plastic block holes align with holes in steel posts and do not require nails.
Steel W6x8.5, W6x9 Or 6" C	W14x22x17" (M14x18x17") (Steel Modified Thrie-Beam)	5⁄8"Øx1½" long hex head bolts with full length thread and nuts (2 Reqd.) and 5⁄8" plain round washers (4 Reqd.) for mounting steel block to post. Bolts are to be installed in opposite holes, top and bottom.

Notes: 1. Timber and recycled plastic offset blocks of identical size and shape can be intermixed within a run of rail.

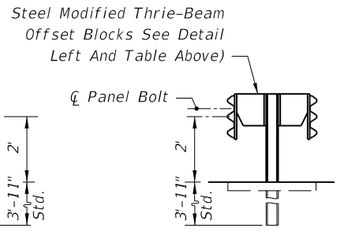
2. Recycled plastic offset blocks shall meet the passing evaluation criteria for Test Level 3 crash tests. The blocks shall be tested as a component in a semi-rigid guardrail test article under full scale crash test conditions. The blocks shall be in conformance with Sections 536 and 972 of the Specifications and be included on the Qualified Products List. W-Beam blocks shall be 14" in height and thrie-beam blocks shall be 22" in height. The blocks shall be capable of providing a 7½" (Min.) offset. For additional information on plastic offset block installations refer to Sheet 1, GENERAL NOTE 16.



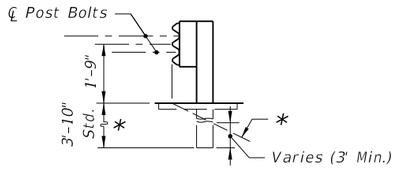
W-BEAM



W-BEAM WITH RUB RAIL



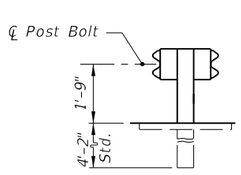
MODIFIED THRIE-BEAM



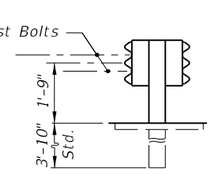
THRIE-BEAM

* Front Slope When Right Of Way, Environmental Or Other Restrictions Prohibit Normal Shoulder Extension

SINGLE FACED GUARDRAIL



W-BEAM

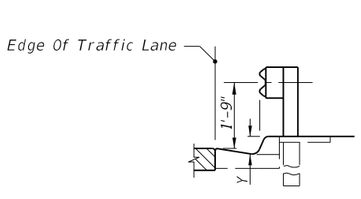


THRIE-BEAM

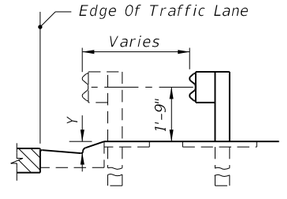
For Narrow Medians With No Median Swale. See Sheet 26 For Median With Swale.

DOUBLE FACED GUARDRAIL

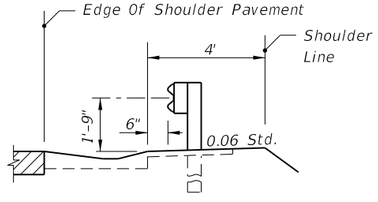
MOUNTING HEIGHTS ON SHOULDERS AND IN MEDIANS



Y = 6" Or Greater



Y = Less Than 6"

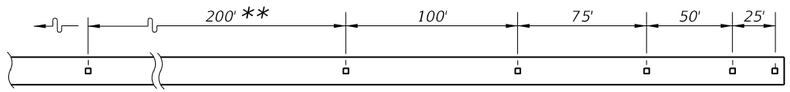


Shoulder Gutter

NOTE:
For location of guardrail with offset behind curb and gutter refer to the Plans Preparation Manual, Volume 1, Section 4.3.5.

LOCATION AT CURB & GUTTER SECTIONS-DETAIL L

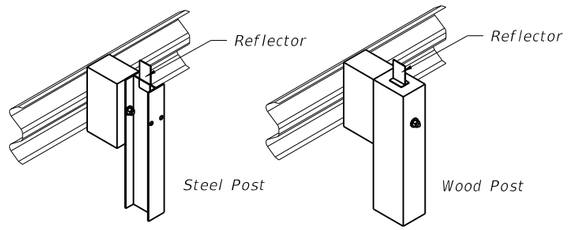
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL	INDEX NO.	SHEET NO.
07/01/09						400	16



Note: Adjustment in spacing may be required to fit exact guardrail lengths as directed by the Engineer. For minimum installations (length 62.5') provide one reflector at each end and one at the approximate center.

** For curves greater than 2° the spacing shall be reduced to 100' increments through the curve.

REFLECTOR ELEMENT SPACING

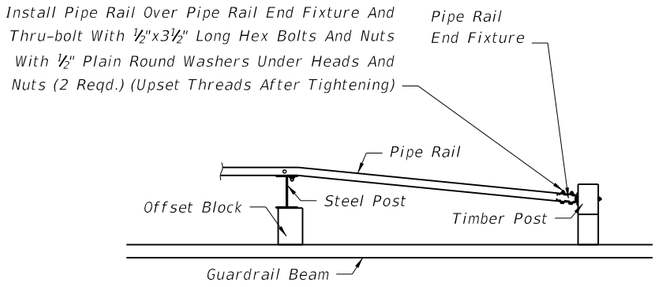


PICTORIAL VIEW
REFLECTOR MOUNTING

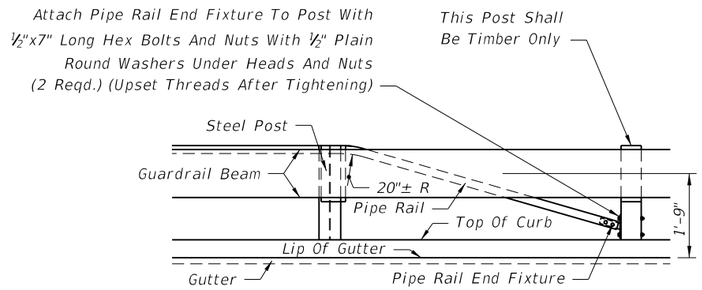
REFLECTORS-DETAIL M

REFLECTOR NOTES

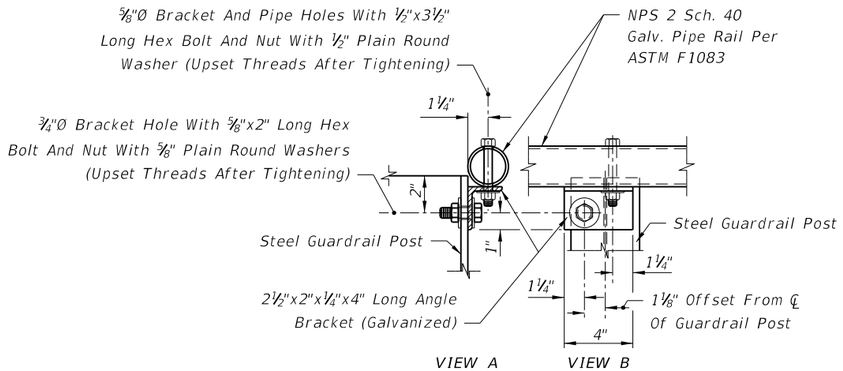
1. Reflectors shall conform to Section 993 of the Standard Specifications.
2. Reflector color (white or yellow) shall conform to the color of the near lane edgeline.
3. Reflectors installed on median guardrail shall have retro-reflective sheeting on both sides of the reflector.
4. The cost for reflectors shall be included in the contract unit price for Guardrail.



PLAN



ELEVATION



PIPE RAIL MOUNTING

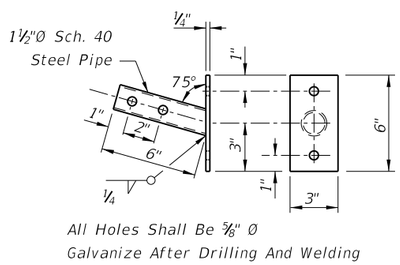
NOTES

1. Pipe Rail is required on steel guardrail posts when the front of sidewalks or shared use paths are located 4' or less from behind the back of the post. Pipe rail shall not extend beyond the last post of the approach end anchorage assembly. Begin and end the Pipe Rail in accordance with the PIPE RAIL END FIXTURE detail.

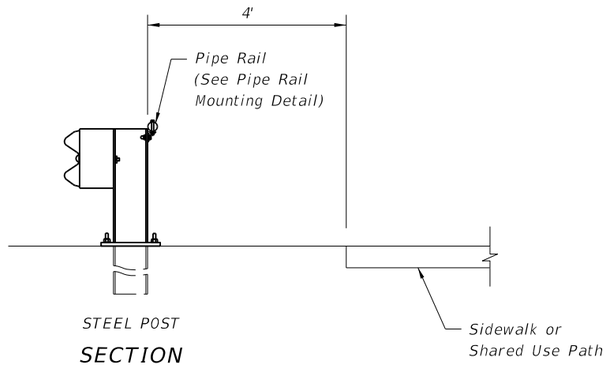
   Refer to Sheet 1, GENERAL NOTE 6 for guardrail end treatment requirements.

2. When guardrail with timber posts are located with the back of post 4' or less from the near front of sidewalks or shared use paths, the bolt ends will require one of the following treatments:

   a. Trim back flush with the face of nut and metalize or
   b. Use post bolts 15" in length with washers and nuts counter sunk into sinks 1" to 1½" deep or
   c. Use post bolts 15" in length with sleeve nuts and washers.

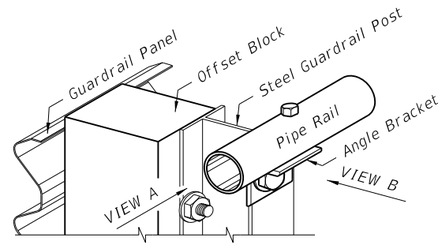


PIPE RAIL END FIXTURE



STEEL POST

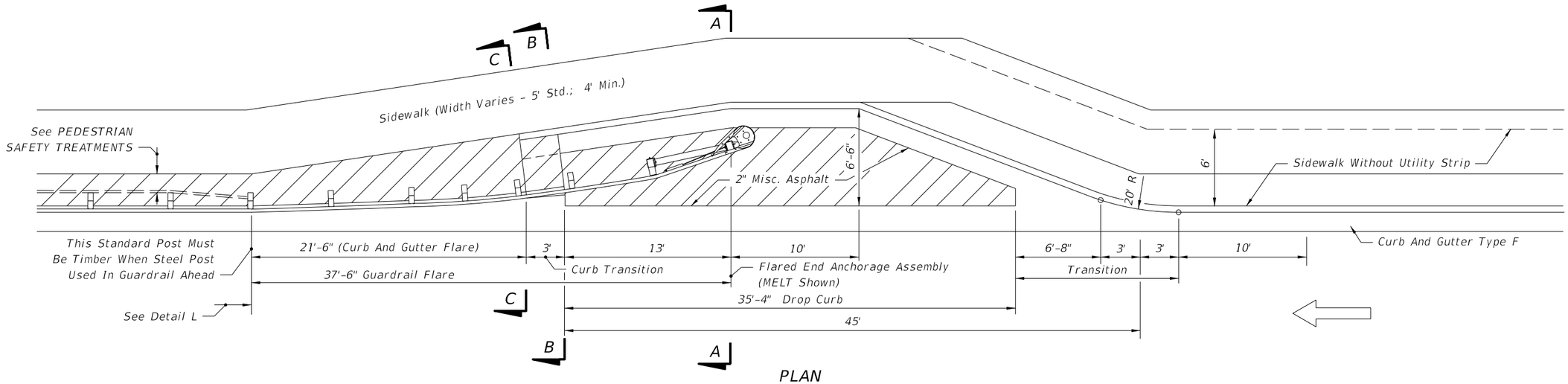
SECTION



PICTORIAL

FOR LOCATIONS USED BY PEDESTRIANS OR BICYCLISTS

PEDESTRIAN SAFETY TREATMENTS

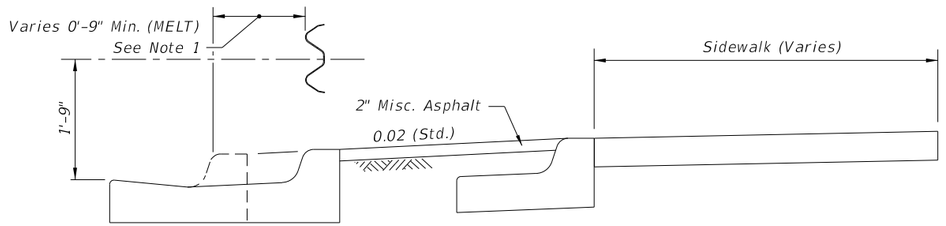


PLAN

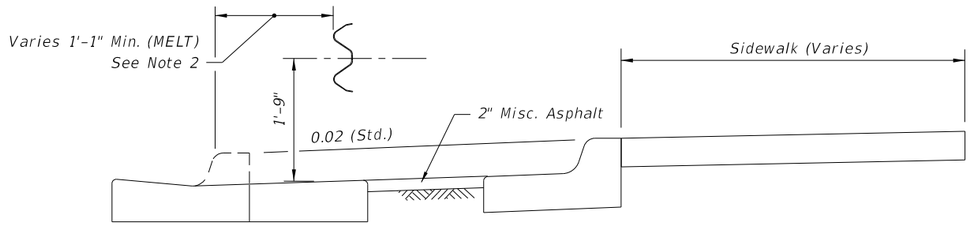
Notes

1. Curb And Gutter Flare shall follow guardrail flare, see elsewhere in this Index for additional guardrail flare information.

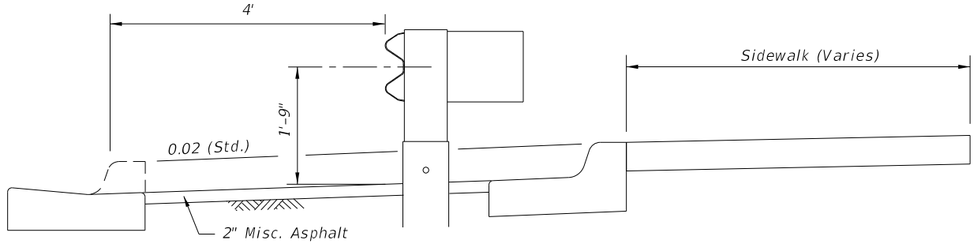
2. For Specific Details, Offset Requirements, and End Treatments of Proprietary End Anchorage Assembly – Flared Systems, see the Qualified Products List (QPL).



SECTION CC



SECTION BB



SECTION AA

APPROACH TREATMENT FOR CURB AND GUTTER

DETAIL Q

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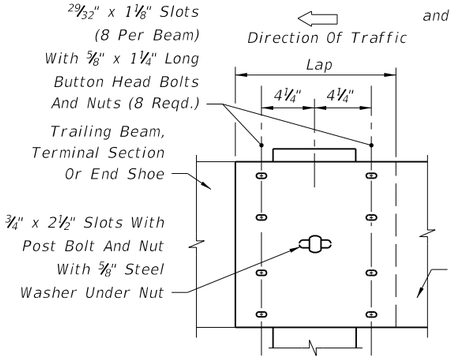
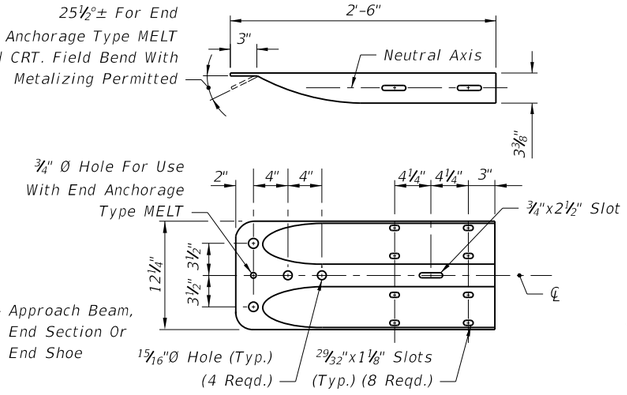
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL	INDEX NO.	SHEET NO.
07/01/12						400	18

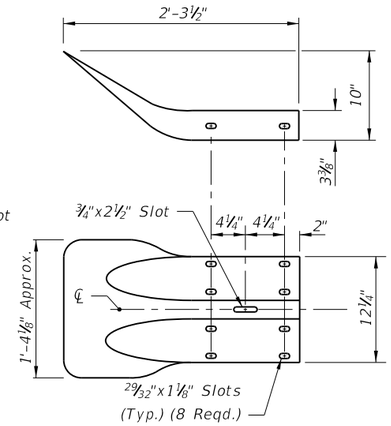


W-BEAM RAIL SPLICE

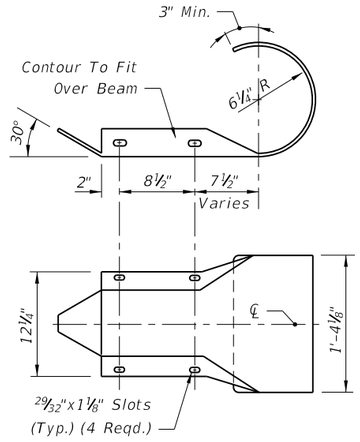


Note: ⅝"Ø Steel washer required with splice bolts

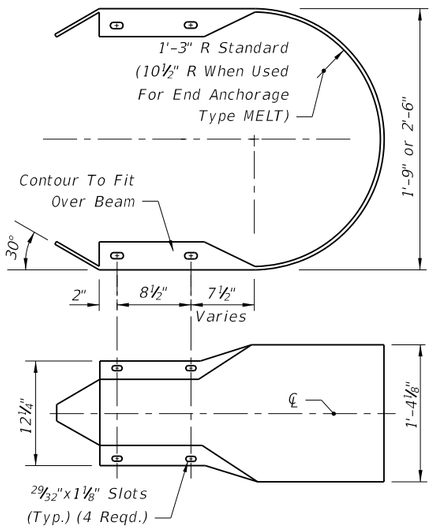
SPECIAL END SHOE



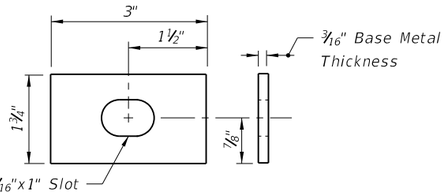
FLARED END SECTION



ROUNDED END SECTION

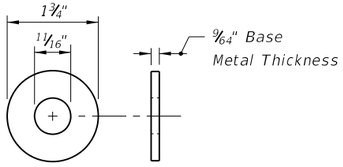


BUFFER END SECTION



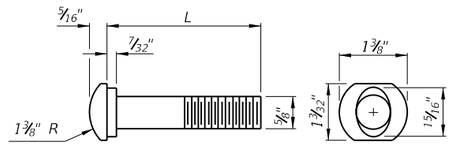
Note:
For beam washer requirements on end terminals, see individual end anchorage assembly details. Washers are to be used where necessary to accomplish alignment or where the posts bolt head shows tendency to pull through the rail slot. Washers installed on guardrail, between end anchorages, prior to July 1, 1990 may remain in place until the guardrail is relocated or until repairs require removal and reinstallment of a post bolt.

(RECTANGULAR PLATE WASHER) BEAM WASHER



Note:
The round washer is not intended for use under the recess nut for the beam to beam rail splice. The washer is required under the recess nut for connecting the beam to the special end shoe; under the post bolt nut for connecting the beam to the timber post and offset blocks; for connecting the beam to steel posts with timber offset blocks; under the hex bolt head for securing the beam anchor plate to the beam; and, for general guardrail connections by ⅝" Ø hex bolts and nuts and under hex nut for connecting rub rail to wood and steel posts. For supplemental information see BEAM ANCHOR PLATE, PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS, individual end anchorage assembly details, SPECIAL STEEL GUARDRAIL POSTS, SPECIAL END SHOE, W-BEAM RAIL SPLICE, THRIE-BEAM RAIL SPLICE, and THRIE-BEAM TERMINAL CONNECTOR details.

⅝" STEEL WASHER



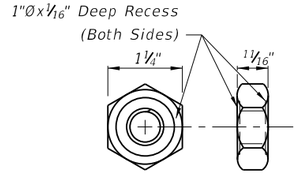
L (In.)	THREAD LENGTH (Min.) (In.)	APPLICATION
1¼"	Full Length	Rail Splice Bolt
10"	4"	Post Bolt – Single Or Double Faced Guardrail Timber Or Recycled Plastic Offset Block(s) On Steel Post As An Option, A Single 25"* Long Post Bolt May Be Used
18"	4"	Post Bolt – Single Faced Guardrail Timber Posts
25"*	4"	Post Bolt – Double Faced Guardrail Timber Posts Double Faced Guardrail Steel Posts

Special bolts having lengths of 10" or greater shall have a thread length of not less than 4".

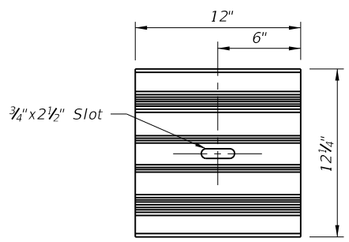
For applications where special bolts having lengths greater than 25" are required, the Contractor may use a 5/8"Ø threaded rod (field cut to length). A hex nut and beam washer shall be used at the guardrail face with no more than ¾" of the threaded rod projecting beyond the top of the nut. The projecting thread on both ends shall be distorted to secure the nuts, and both ends of the threaded rod metalized with organic zinc-rich coating.

*Use of the 25" AASHTO-AGC-ARTBA standard length post bolt on double faced guardrail that results in the bolt projecting more than ¾" beyond the face of the nut after pull-up shall be trimmed to ¾" reveal and metalized with organic zinc-rich coating.

⅝" OVAL SHOULDER BUTTON HEAD BOLT



⅝" MODIFIED HEAVY HEX NUT (RECESSED NUT)



Note: For application information see individual end anchorage assembly details.

W-BEAM BACK-UP PLATE

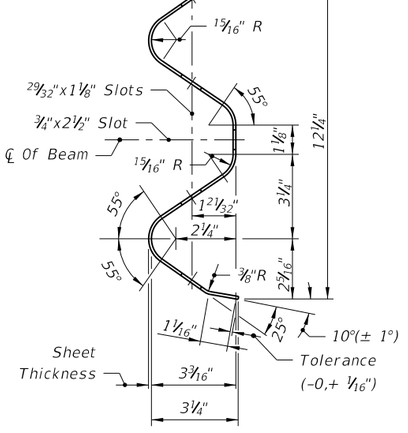
OFFSETS (Ft.) Measured From Face Of Guardrail To Front Of Above Ground Rigid Hazard				
POST SPACING (Ft.)	SINGLE BEAM		NESTED BEAMS	
	W-Beam	Thrie-Beam	W-Beam	Thrie-Beam
6'-3"	4'-0"	3'-4"	N/A	N/A
3'-1½"	3'-0"	2'-8"	2'-8"	2'-4"
1'-6¾"	N/A	N/A	2'-4"	2'-0"

Note:
The values shown should be utilized unless changes are supported by empirical validation. Those desiring to develop offset values from the simulated deflection values shown in Table 5.4 of the AASHTO Roadside Design Guide are cautioned to proceed only if background in the table development is understood.

MINIMUM OFFSET FOR SINGLE FACED GUARDRAIL (Ft.)

HS Hex bolts for THRIE-BEAM TERMINAL CONNECTORS shall conform to the requirements of ASTM A449 (Type 1) with heavy hex nuts and washers. All other hex bolts shall conform to the requirements of ASTM A563. Bolts, nuts and washers shall be hot dip galvanized. Heavy hex nut may be used in lieu of hex nuts and hex nuts used for jam nuts.

HEX BOLTS AND NUTS



W-BEAM

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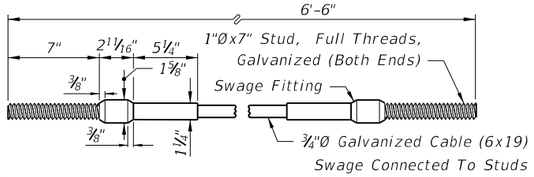
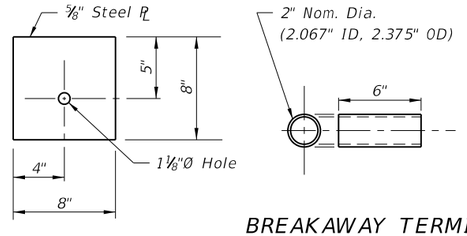
6/28/2012



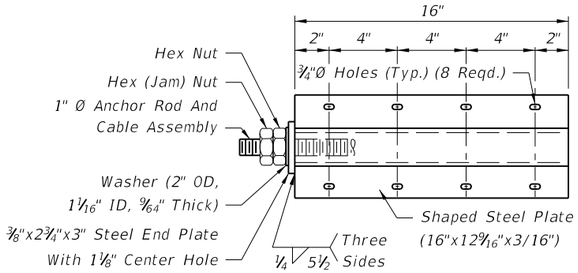
Note:
Cable assemblies shall be in accordance with the specifications of AASHTO-AGC-ARTBA 'A Guide To Standardized Highway Barrier Hardware' Cable Anchor Assembly FCA01. An additional cable assembly 9' in length with a swaged fitting on one (1) end is required for each end anchorage assembly Type CRT.

CABLE ASSEMBLY

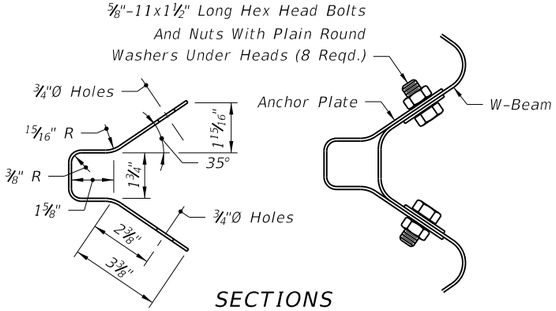


BEARING PLATE

BREAKAWAY TERMINAL POST SLEEVE

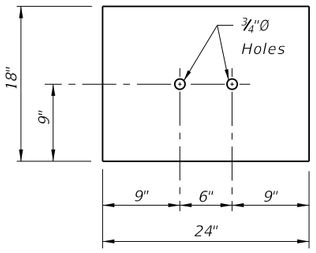


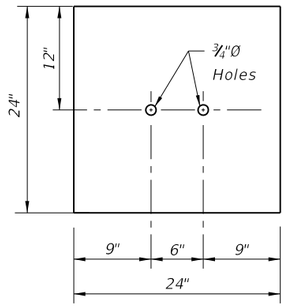
BACK VIEW



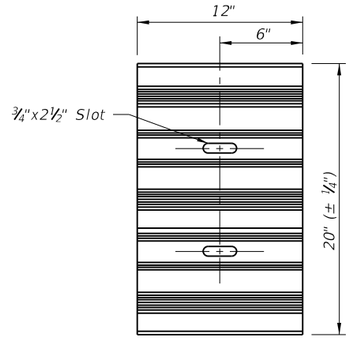
SECTIONS

BEAM ANCHOR PLATE



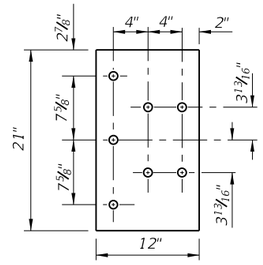


1/4" Steel PL, Galvanized
SOIL PLATES



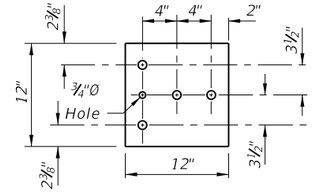
Back-up plate required behind rail elements at intermediate (non-splice) posts when steel offset block used.

THRIE-BEAM BACK-UP PLATE



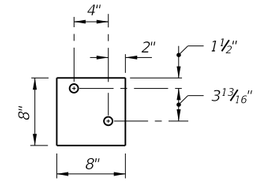
5/8" Plate For Bridge Traffic Railing Barrier
1/4" Plate For Barrier Walls

THRIE-BEAM TERMINAL CONNECTOR



1/4" Plate For All Applications

SPECIAL END SHOE

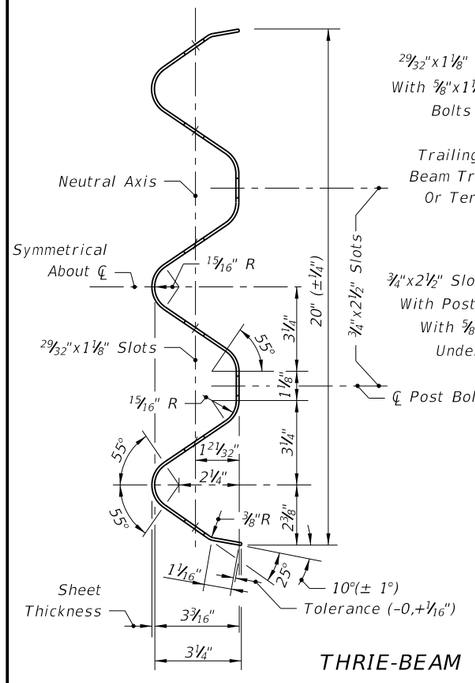


1 1/4" Plate
See Detail J For Application

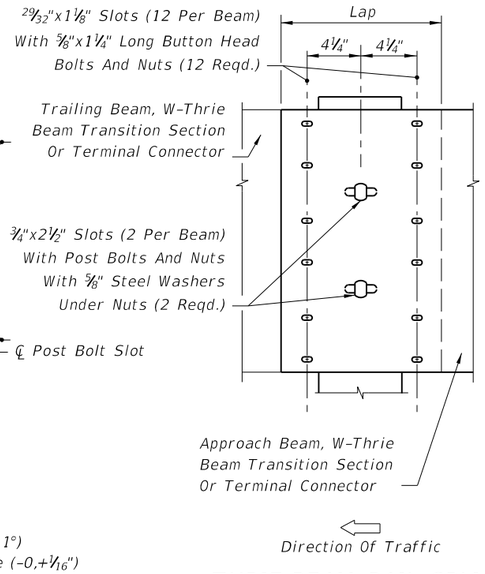
FILLER PLATE

All Holes 1" Ø Except As Shown

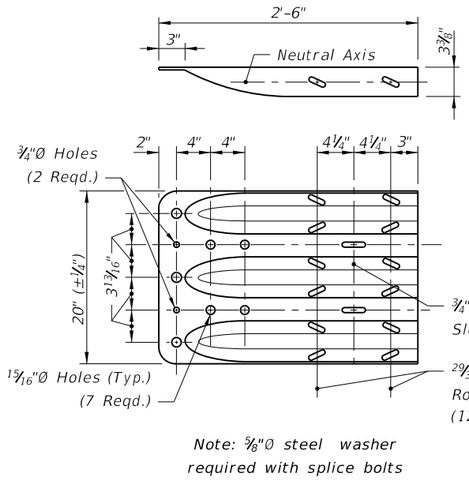
GALVANIZED STEEL BACK-UP PLATES FOR CONNECTING SPECIAL END SHOES AND TERMINAL CONNECTORS TO CONCRETE BRIDGE TRAFFIC RAILING BARRIERS AND CONCRETE BARRIER WALLS



THRIE-BEAM

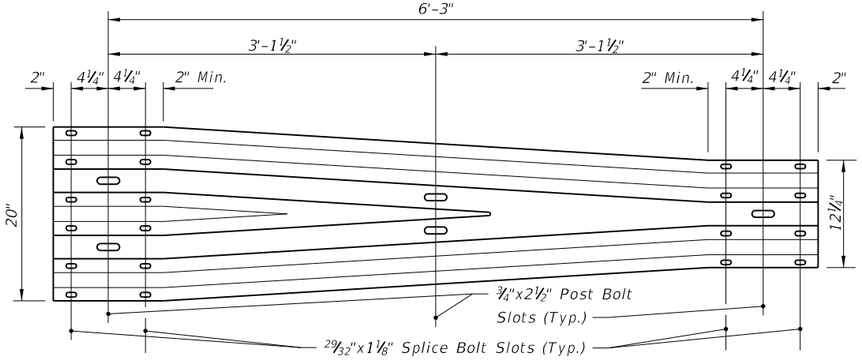


THRIE-BEAM RAIL SPLICE



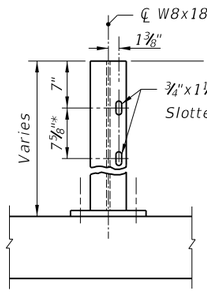
Note: 5/8"Ø steel washer required with splice bolts

THRIE-BEAM TERMINAL CONNECTOR

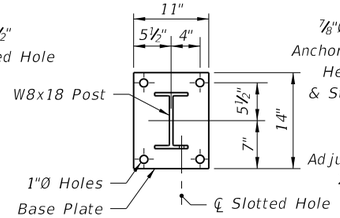


W-THRIE BEAM TRANSITION SECTION

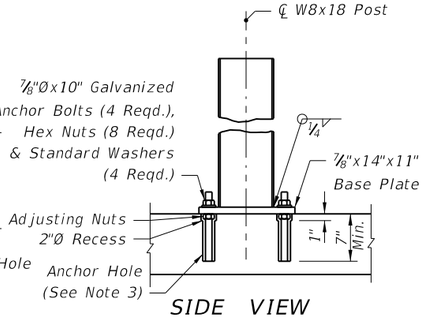
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/05			FDOT DESIGN STANDARDS 2013	GUARDRAIL	400	20



FRONT VIEW



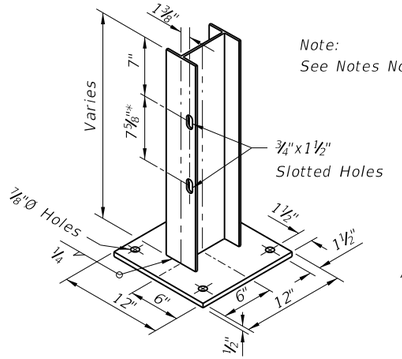
TOP VIEW



SIDE VIEW

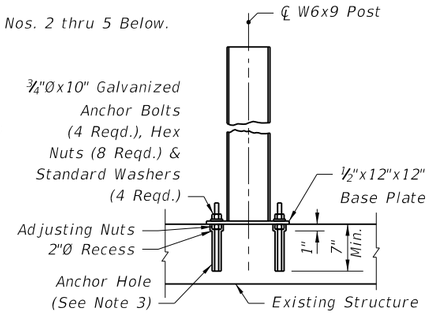
FOR REPLACEMENT OF EXISTING W8x18 GUARDRAIL POSTS ON APPROACH SLABS AND BRIDGES

* Additional slotted hole required when mounting thrie-beam guardrail

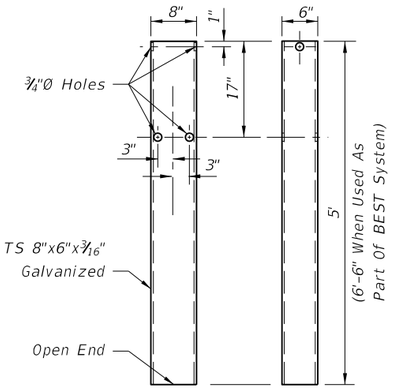


PROJECTION

Note:
See Notes Nos. 2 thru 5 Below.



SIDE VIEW



SIDE VIEW FRONT VIEW

For Use In Combination With
Short Timber Breakaway Post

STEEL TUBE

FOR CONSTRUCTION OF GUARDRAIL WHERE CULVERT, PIER FOOTING OR OTHER STRUCTURE PRECLUDES DRIVEN POST INSTALLATION

NOTES: (SPECIAL STEEL POST)

1. See Index No. 402 for special steel posts required for construction and repair of guardrail transitions to bridge traffic railing barrier retrofits on existing bridges. See Structures Index Nos. 470 through 476 for steel posts required to construct traffic railing barrier retrofits on existing bridges.

2. Either anchor bolts, concrete wedge anchors or approved Adhesive-Bonded Anchors for Structural Applications may be used. Anchor bolts, wedge anchors and adhesive anchors shall have a minimum tensile strength of 60,000 psi and galvanized in accordance with ASTM A153 (stainless steel components may be substituted but components plated in accordance with ASTM B-633 are not acceptable). Adhesive anchor rods shall be equal in diameter to that detailed for anchor bolts. Wedge anchors are to be installed in accordance with the manufacturer's recommendations, assuming 3,000 psi compressive strength for concrete. Wedge anchors shall also meet the following requirements:

   a. tensile load each anchor: approach slabs 14,000 lbs.; other structures 8,000 lbs.
   b. shear load each anchor: approach slabs 15,000 lbs.; other structures 7,800 lbs.

3. Posts are to be plumbed by adjusting nuts or mortar seating. Posts installed using anchor bolts and adhesive anchors are to be set with adjusting nuts as detailed, unless the Engineer approves the use of mortar seating in lieu of adjusting nuts. Posts installed using wedge anchors are to be set with mortar seating. Base plates shall be grouted with neat finish.

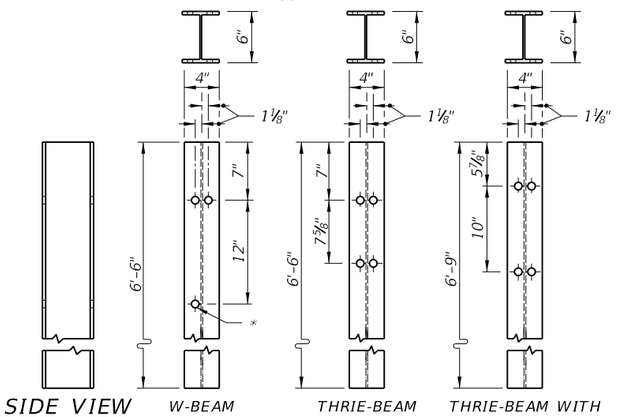
4. Adhesive-Bonded Anchors for Structural Applications shall comply with Section 937 and be installed in accordance with Section 416. Drilled hole diameter shall be in accordance with the manufacturer's instructions.

5. Anchor holes and recesses shall be drilled; wedge anchor holes are to be drilled in accordance with the manufacturer's specifications. Encountered reinforcing steel shall be drilled through. Holes shall be thoroughly cleaned when setting bolts and anchors and dry when setting wedge anchors.

6. Steel post and base units shall be galvanized in accordance with ASTM A123. Any damaged galvanized areas are to be metalized in accordance with Section 562 of the Standard Specifications.

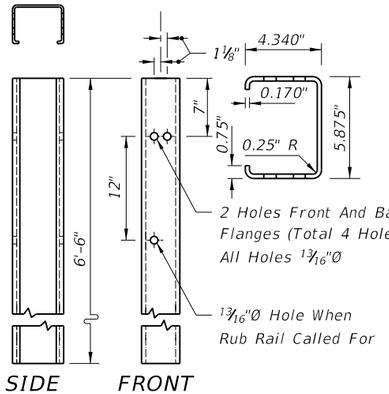
7. Special steel posts are not to be substituted for any post in a guardrail approach end treatment system.

SPECIAL STEEL GUARDRAIL POSTS



SIDE VIEW W-BEAM | THRIE-BEAM WITH STANDARD OFFSET BLOCKS | THRIE-BEAM WITH STEEL MODIFIED THRIE-BEAM OFFSET BLOCKS

*1 13/16"Ø Hole When Rub Rail Called For



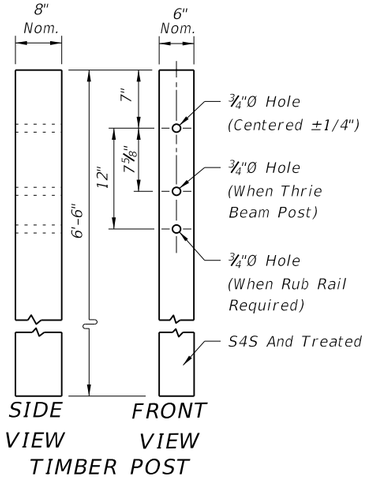
SIDE VIEW FRONT VIEW

FRONT VIEW FRONT VIEW FRONT VIEW

All Holes Shall Be 13/16"Ø Identical Front And Back Flanges

Note: 6"-C steel posts are to face the same direction in any continuous run of guardrail. Posts to be galvanized in accordance with ASTM A123.

6"-C STEEL POST

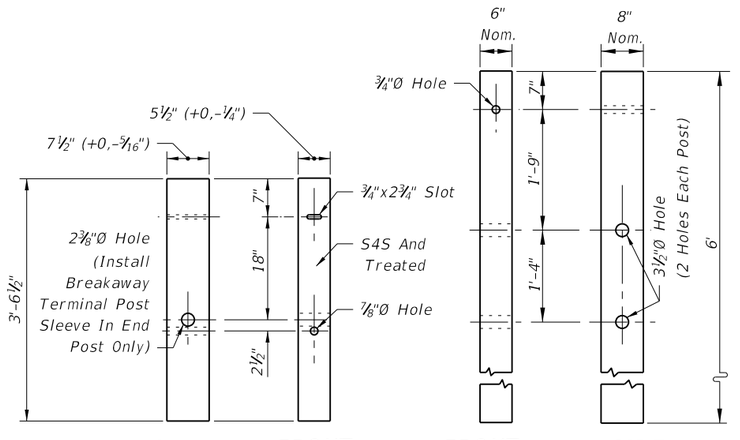


SIDE VIEW FRONT VIEW

TIMBER POST

Note:
W6x8.5 or W6x9 steel posts may be either rolled or welded structural shapes conforming to or exceeding the design properties of ASTM A6/A6M. Welding shall be in accordance with the requirements of ASTM A769/A769M. Posts shall be cut to length and the ends seal welded between web and flange before galvanizing. Posts to be galvanized in accordance with ASTM A123.

W6x8.5 OR W6x9 STEEL POST



SIDE VIEW FRONT VIEW FRONT VIEW SIDE VIEW

For Use In Combination With Steel Tube

SHORT TIMBER BREAKAWAY POST CRT TIMBER POST

SPECIAL TIMBER GUARDRAIL POSTS

STANDARD TIMBER AND STEEL GUARDRAIL POSTS

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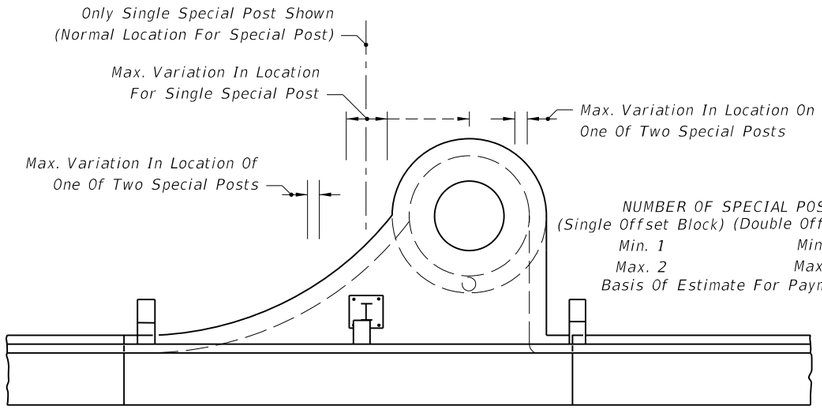
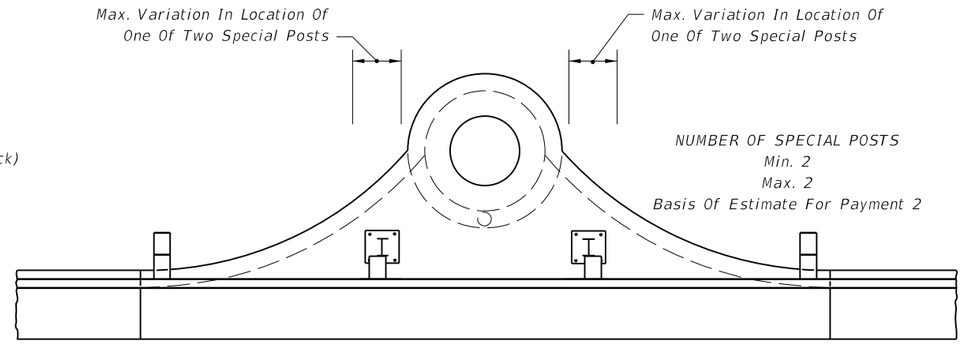
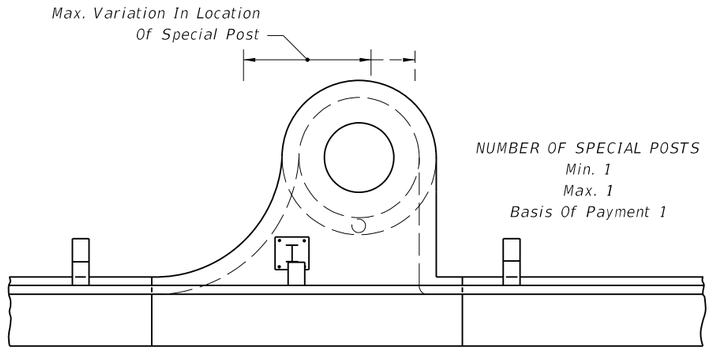
LAST REVISION	REVISION	DESCRIPTION:				
07/01/09			FDOT DESIGN STANDARDS 2013	GUARDRAIL	INDEX NO. 400	SHEET NO. 21



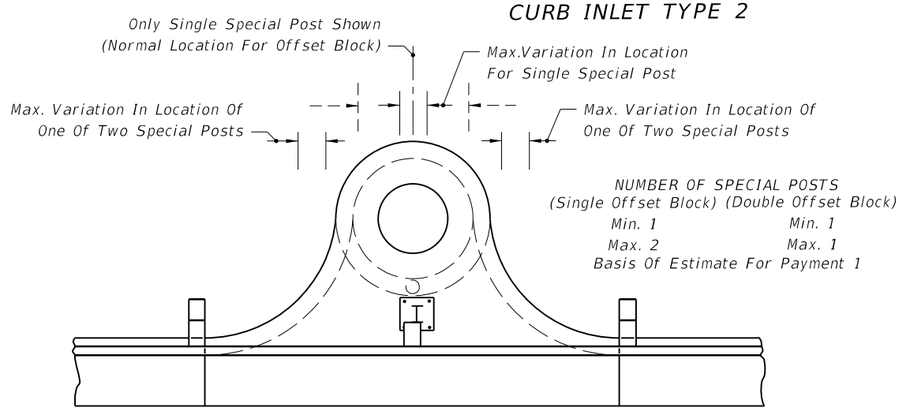
CURB INLET TYPE 1



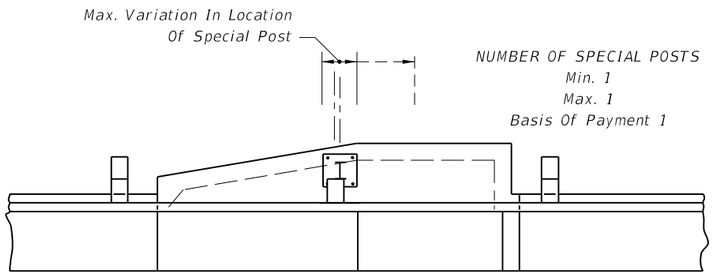
CURB INLET TYPE 2



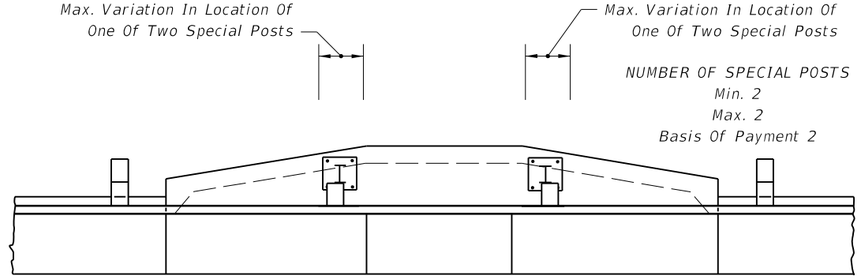
CURB INLET TYPE 3



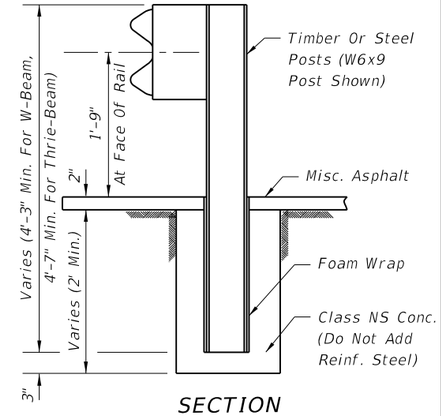
CURB INLET TYPE 4



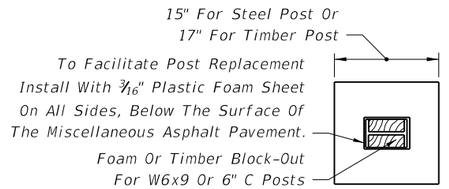
CURB INLET TYPE 5



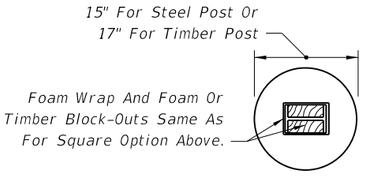
CURB INLET TYPE 6



SECTION



PLAN
(SQUARE OPTION)



PLAN
(ROUND OPTION)

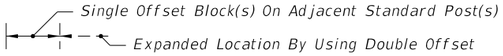
Note: For line post applications only, i.e., not to be used with breakaway post applications nor be used to modify End Anchorage Assemblies Type II.

TO BE USED PRINCIPALLY OVER SHALLOW UTILITIES

ENCASED GUARDRAIL POST

LEGEND

Variation In Location Of Special Post:



Notes:

1. The locations shown for special posts mounted on inlets are to be used as guidelines for positioning the posts and for estimating the number of required posts.
2. Special posts and their anchorages mounted on curb inlets shall be in accordance with special steel guardrail posts Sheet 21, and paid for under the contract unit price for Special Guardrail Post, EA.
3. Variations shown for the locations of special posts mounted on inlets are established from standard post spacing (6'-3"); clearance of standard posts from inlets (4" min.); use of single and double offset blocks on standard posts adjacent to the inlets; optional flange mountings; and, concrete anchor edge distances (2" for grouted and 3¾" for expansion anchors). The number of posts and their locations may vary by reducing post spacing and adjusting the length of rail panel (s).
4. Encased guardrail posts shall conform in section to standard timber and steel posts, and be paid for under the contract unit price for Special Guardrail Post, EA. Payment shall include cost of foam wrap and concrete encasement.

SPECIAL POST LOCATIONS ON CURB INLETS

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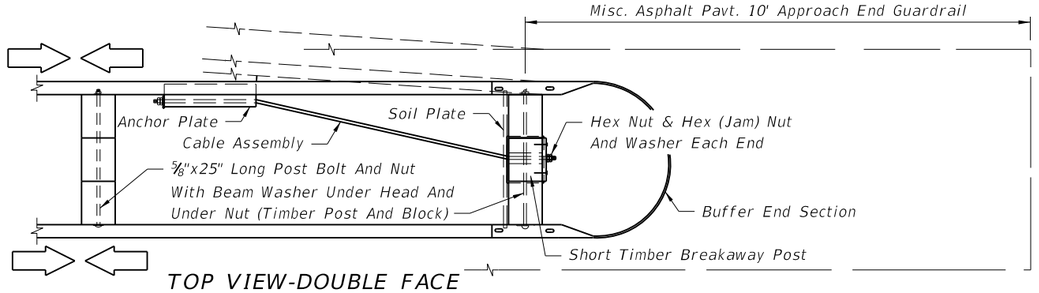
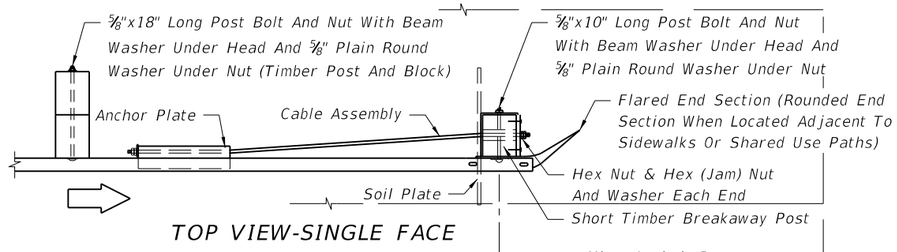
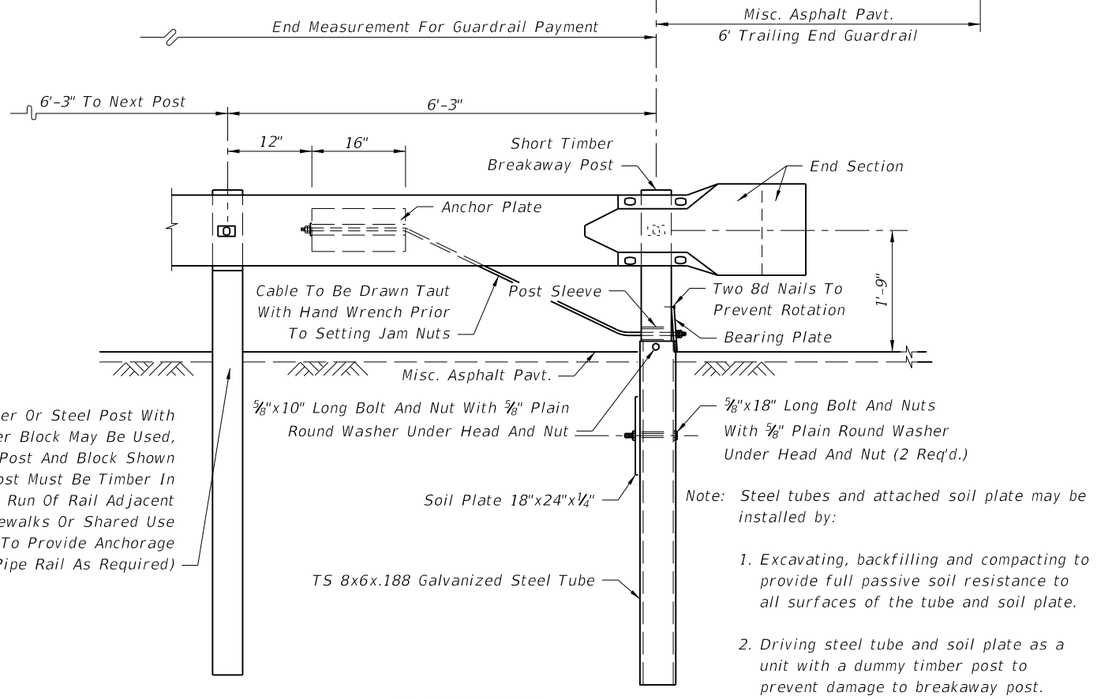
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/12			FDOT DESIGN STANDARDS 2013	GUARDRAIL	400	22



TOP VIEW-DOUBLE FACE



TOP VIEW-SINGLE FACE



FRONT VIEW

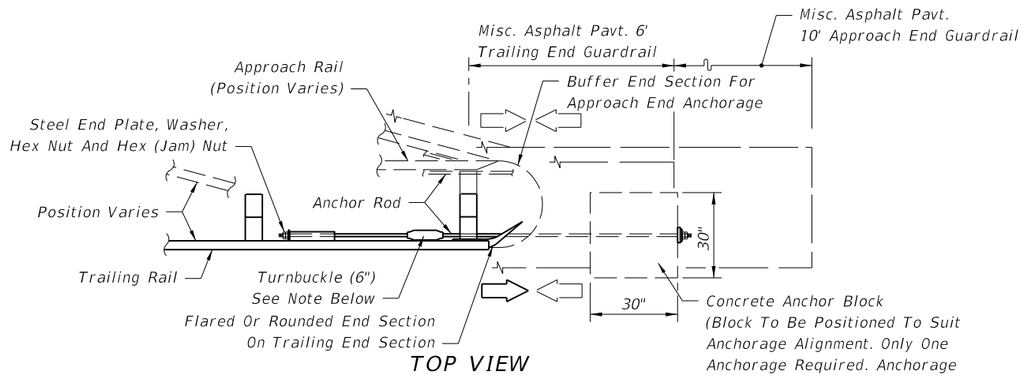
Note: Steel tubes and attached soil plate may be installed by:

1. Excavating, backfilling and compacting to provide full passive soil resistance to all surfaces of the tube and soil plate.
2. Driving steel tube and soil plate as a unit with a dummy timber post to prevent damage to breakaway post.

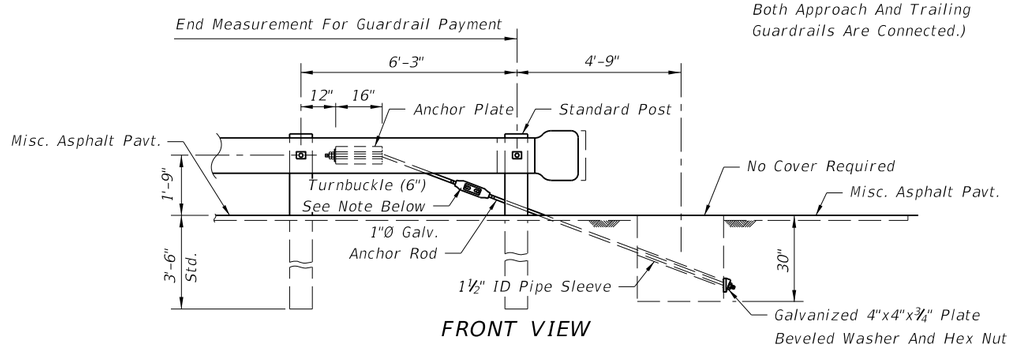
The payment for the items of End Anchorage Assembly Type II shall be full compensation for furnishing and installing either the Round or the Buffer End Section, the Beam Anchor Plate, Cable Assembly, Pipe Sleeve, Soil Plate, Steel Tube, Bearing Plate, Short Timber Breakaway Post, Offset Blocks and the necessary hardware.

CABLE ANCHOR OPTION

END ANCHORAGE ASSEMBLY TYPE II



TOP VIEW



FRONT VIEW

Turnbuckle shall be field cut, threaded 4" on each end, and, metalized in accordance with Sections 562 and 975 of the Standard Specifications. The cost for cutting, threading, metalizing and the turnbuckle shall be included in the contract unit price for Reset Guardrail, LF.

The payment for the items of End Anchorage Assembly Type II shall be full compensation for furnishing and installing the Beam Anchor Plate, Anchor Rod, Pipe Sleeve, Anchor Block, either Flared, Rounded or Buffer End Section, and the necessary hardware.

CONCRETE ANCHOR BLOCK OPTION

TYPE II NOTES

1. Unless specified in the plans, the contractor can supply either the cable anchor option or the concrete anchor block option.

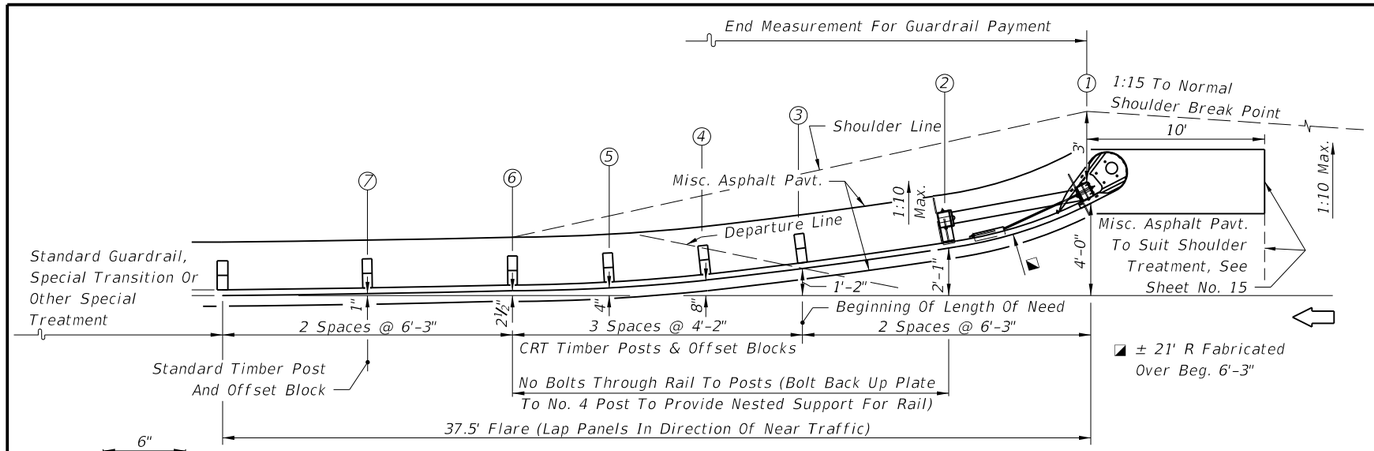
2. Type II end anchorage assemblies are approved for all speeds and are intended for use as:

   a. trailing end anchorages for single face free standing guardrail systems;
   b. approach end anchorages for single face free standing guardrail systems when end anchorage is located outside of the clear zone; and,
   c. both approach and trailing ends of double face guardrail systems.

   Crash cushions shall be constructed at or in lieu of approach Type II end anchorages located inside the clear zone.

   End anchorage for thrie beam guardrail shall be constructed the same as detailed for W-beam, except use thrie beam rail and end section; and the Anchor Plate is to be attached to the bottom corrugation of the thrie beam.

3. These end anchors are to be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Type II), EA as called for in the plans or by permit.

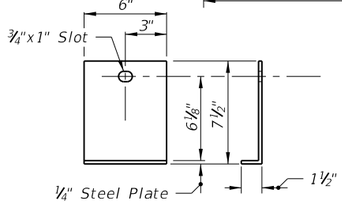


PLAN

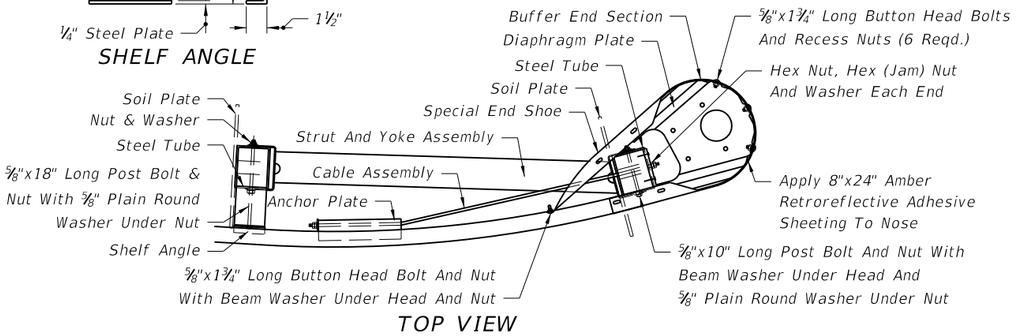
MODIFIED ECCENTRIC LOADER TERMINAL (MELT)

MODIFIED ECCENTRIC LOADER TERMINAL NOTES

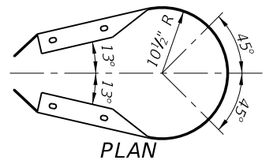
1. The MELT is applicable for design speeds up to 45 mph. The MELT is intended for use as an approach end guardrail anchorage for shoulder guardrail. Its alignment is a flare from the normal guardrail alignment with an effective length of 37.5' including three standard W-beam panel outside of any standard guardrail, guardrail transitions or other special treatments.
2. This standard drawing is produced by the Florida Department Of Transportation solely for use by the Department and its assignees. This standard drawing provides the general graphics and information necessary to field identify component parts of the MELT and their incorporation into a whole system.
3. This standard drawing is sufficient for plan details for the MELT when installed in connection with shoulder guardrail and precludes the requirement for shop drawing submittals unless the plans otherwise call for such submittals. The MELT shall be assembled in accordance with the distributor's detailed drawings, procedures and specifications.
4. The first two post must be short timber breakaway posts with steel foundation tubes and soil plates, post Nos. 3 thru 6 must be CRT timber posts and post No. 7 must be a standard timber post.
5. The MELT can not be used in medians where horizontal clearance requires the use of a backrail.
6. See the General Notes for galvanizing requirements of metallic components.
7. If the plans call for the MELT at a specific location, substitutions with other end anchorage assemblies will not be permitted unless approved by the Engineer. If the plans call for end anchorage assembly 'flared' at a specific location, the contractor has the option to construct any FDOT approved flared assembly that meet the applications for that location. Where a flared end anchorage is called for in the plans, any approved substitution with a parallel end anchorage will not be eligible for CSIP consideration.
8. The MELT shall be paid for under the contract unit price for Guardrail, End Anchorage Assembly (Flared), EA and shall be full compensation for furnishing and installing all components in accordance with the plans; the distributor's detailed drawings, procedures and specifications and this Index.



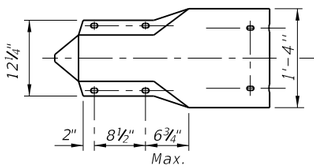
SHELF ANGLE



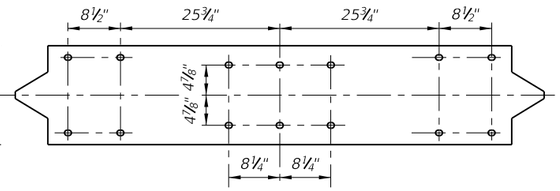
TOP VIEW



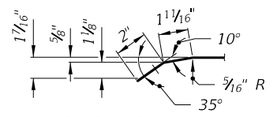
PLAN



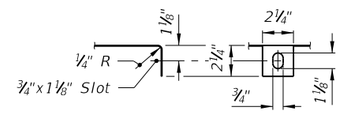
ELEVATION



FLAT PLATE LAYOUT



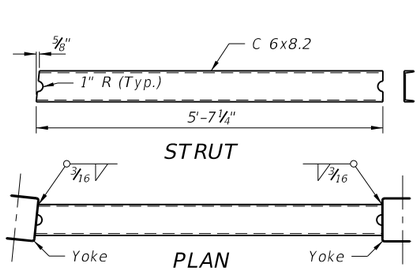
SECTION AA



SECTION BB

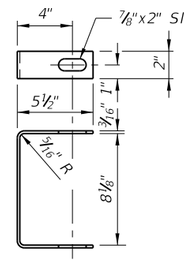
All Slots Shall Be 29/32"x1⅛"

BUFFERED END SECTION



STRUT

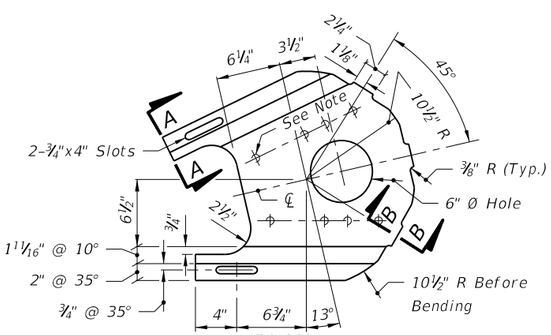
PLAN



YOKE (2 Reqd.)

Note: Assembly installed with channel turned down for right side guardrail and turned up for left side guardrail.

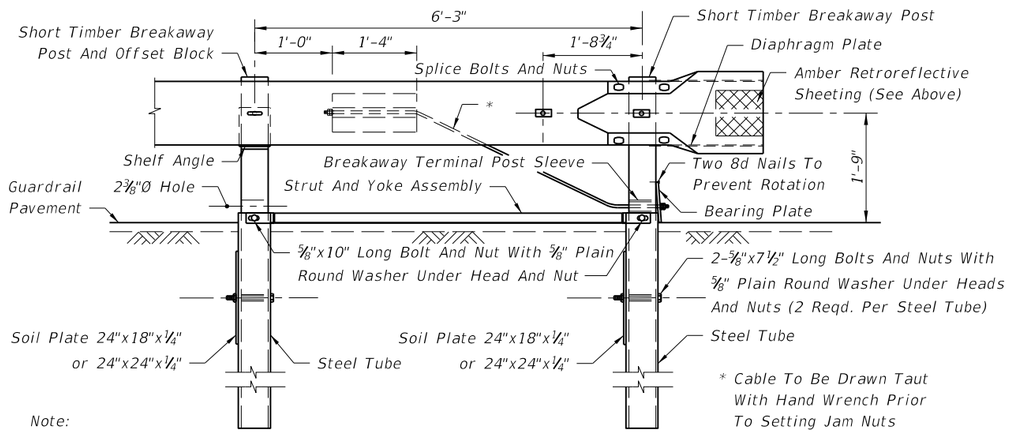
STEEL STRUT AND YOKE ASSEMBLY



PLAN

Note: Bolt holes are not required, but, diaphragms with either manufacturer produced two or three hole in line patterns are acceptable.

DIAPHRAGM PLATE (2 Reqd.)



Note:
Steel tubes and attached soil plate may be installed by:
1. Excavating, backfilling and compacting to provide full passive soil resistance to all surfaces of the tube and soil plate.
2. Driving steel tube and soil plate as a unit with a dummy timber post to prevent damage to breakaway post.

FRONT VIEW

END ANCHORAGE ASSEMBLY TYPE MELT

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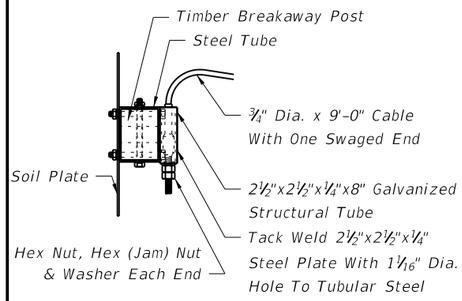
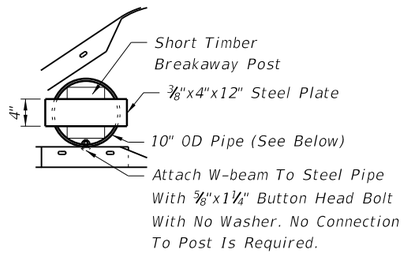
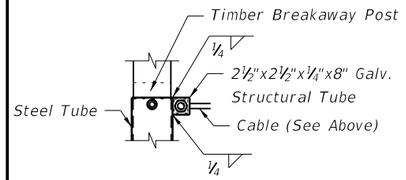
LAST REVISION	REVISION	DESCRIPTION:				
02			FDOT DESIGN STANDARDS 2013	GUARDRAIL	INDEX NO. 400	SHEET NO. 24



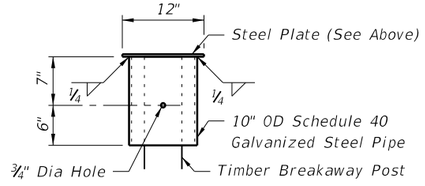
TOP VIEW



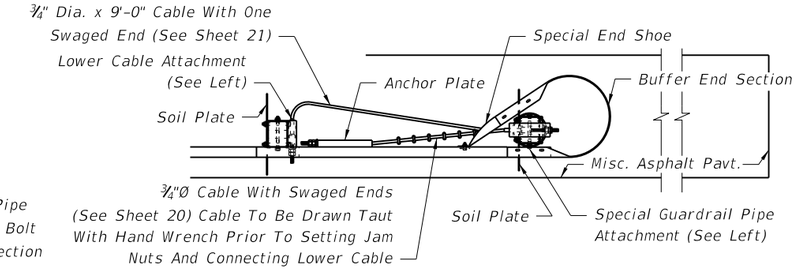
TOP VIEW



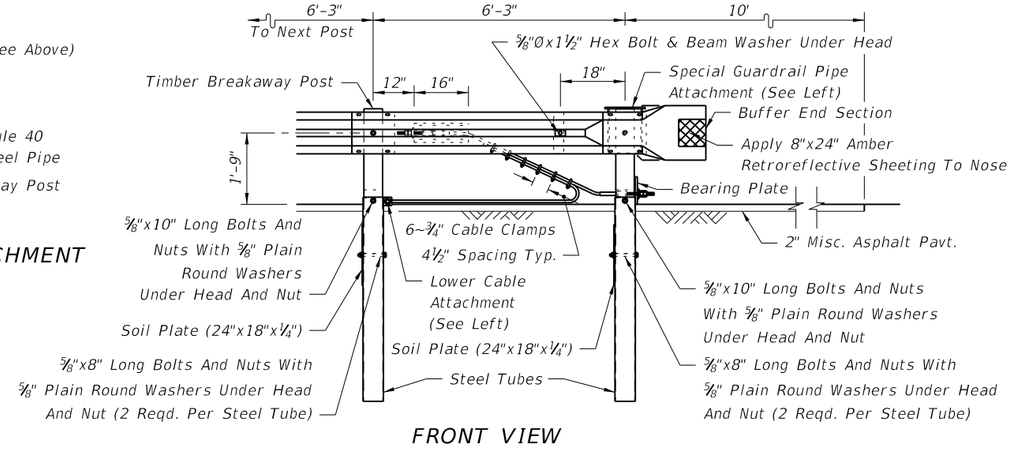
FRONT VIEW
LOWER CABLE ATTACHMENT



FRONT VIEW
SPECIAL GUARDRAIL PIPE ATTACHMENT

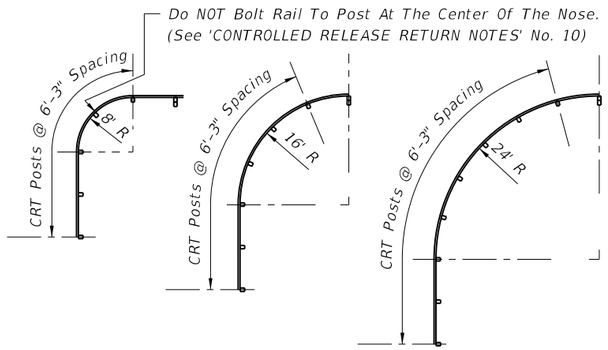


TOP VIEW

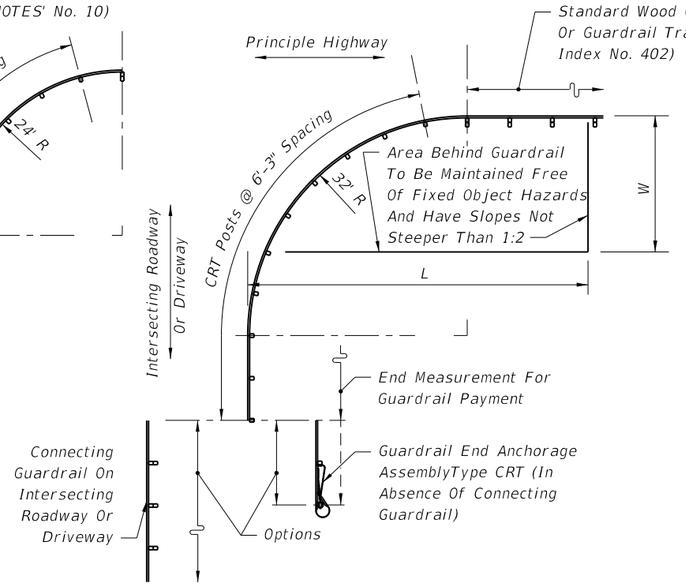


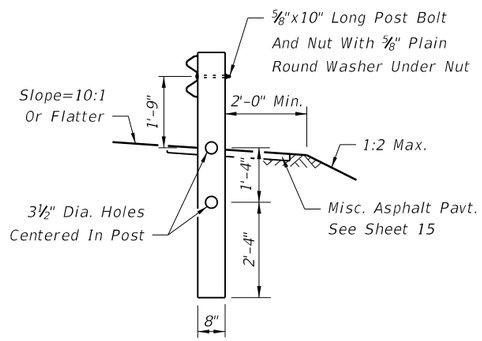
FRONT VIEW

GUARDRAIL END ANCHORAGE ASSEMBLY TYPE CRT



Return Nom. R	Length Of Shop Bent Panels	No. Of CRT Posts	Required Area Free Of Hazards L x W
8'	12.5'	5	25' x 15'
16'	25'	6	30' x 15'
24'	37.5'	8	40' x 20'
32'	50'	11	50' x 20'





Note: To be constructed when flares and transitions or standard radial returns can not be applied. See Sheet 12.

CRT TIMBER POST

CONTROLLED RELEASE RETURN FOR SIDE ROAD AND DRIVEWAY ACCESS

CONTROLLED RELEASE RETURN NOTES

1. Controlled release returns are intended for use (a) in openings in continuous guardrail for driveway and side road access when flares and transitions or standard radial returns can not be applied (Sheet 12); and, (b) for shielding the ends of bridge traffic rails and barrier walls where the driveway and side road access is in close proximity to the structure and space does not permit the proper use of approved flared and parallel types of Guardrail End Anchorage Assemblies.
2. Controlled release returns are not intended as a substitute or replacement for the appropriate use of approved vehicle impact attenuators.
3. Controlled release returns with either 8', 16' or 24' radii are designed for highway speeds of 60 mph or less.
4. The controlled release returns shown are designed as full returns based on an intersection angle of 90°. The return can be terminated with the Guardrail End Anchorage Assembly Type CRT or connected to standard guardrail as shown or as otherwise detailed in the plans.
5. The Guardrail End Anchorage Assembly Type CRT is to be used only for the controlled release returns with 8', 16', 24' and 32' radii as shown; the assembly is not to be used in any tangent rail or flared rail applications. Other types of end anchorage assemblies are not to be used in the controlled release returns.
6. The area immediately behind the control release return shall have slopes not steeper than 1:2 and be maintained free of fixed objects in accordance with the area limits tabulated in the plan below.
7. The surface approaching the controlled release return shall have a transverse slope not exceeding 1:10. The effective width of the transverse surface is to be based on standard vehicle departure, return radii and preceding shielding; the width (beyond shoulder) shall be not greater than the corresponding 15' and 20', 'W' values tabulated below.
8. The curved guardrail portion of the controlled release return shall be full section shop bent panels (12.5' or 25' panels).
9. Washers are not to be used between the guardrail beam and the head of the button head post bolts at any controlled release terminal (CRT) post or at any Guardrail End Anchorage Assembly Type CRT breakaway timber post.
10. The guardrail beam of the 8' radius return is not bolted to the center control release post.
11. See the General Notes for galvanizing requirements of metallic components.
12. Controlled release return systems shall be paid for under the contract unit prices for Guardrail (Roadway), LF, Guardrail (Shop-bent Panels), LF, and Guardrail, End Anchorage Assembly (Type CRT), EA as called for in the plans or by permit and shall be full compensation for furnishing and installing all components in accordance with the plans and with this index. CRT posts are included in the cost for guardrail.

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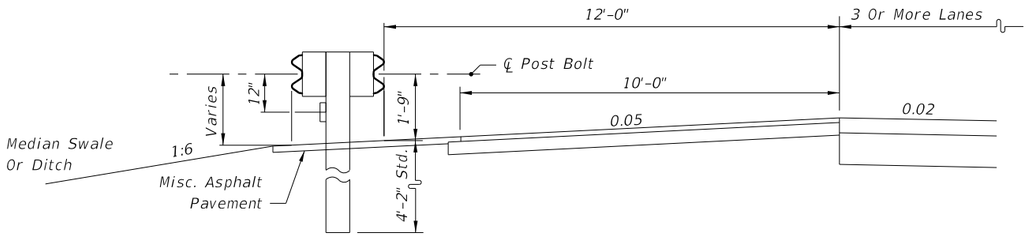
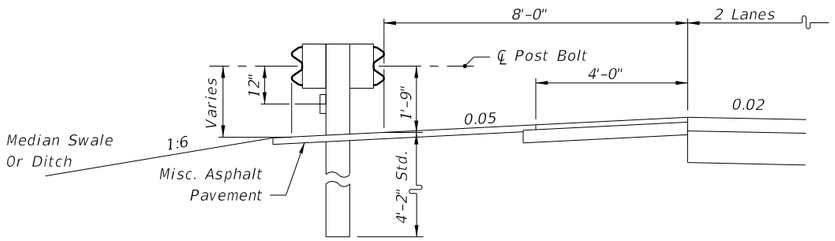
LAST REVISION	REVISION	DESCRIPTION:				
04			FDOT DESIGN STANDARDS 2013	GUARDRAIL	INDEX NO. 400	SHEET NO. 25





Notes:

1. Typical placement shown. May be constructed at other locations as called for in the plans.

2. Rub Rail is required on the median side or ditch side of the barrier.

MOUNTING HEIGHT FOR DOUBLE FACED GUARDRAIL ON MEDIAN SHOULDERS (FREEWAYS)

LATERAL PLACEMENT ON SLOPES (FROM EDGE OF NEAR TRAFFIC LANE)[1]

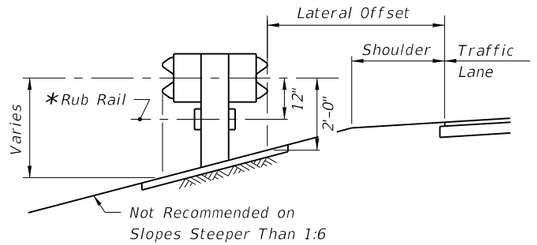
Slope	Standard Guardrail[2]	Guardrail Not Recommended	Guardrail With Rub Rail[3]
1:4	to 13'	14' to 27'	28' to 45'
1:5	to 14'	15' to 25'	26' to 45'
1:6	to 16'	17' to 22'	23' to 45'
1:7	to 20'	21' to 24'	25' to 45'
1:8	to 25'		26' to 45'
1:9	to 26'		27' to 45'
1:10	to 27'		28' to 45'

Notes:

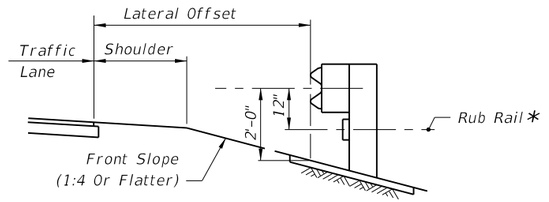
1. For shoulders less than 12' in width the tabulated values will be reduced by the difference between 12' and the shoulder width. Placement of guardrail on front slopes steeper than 1:4 not recommended.

2. Standard guardrail; 1'-9" to ℄ post bolt. Rub Rail is required on the median side when double face guardrail is used.

3. Guardrail with Rub Rail; 2'-0" to ℄ post bolt.



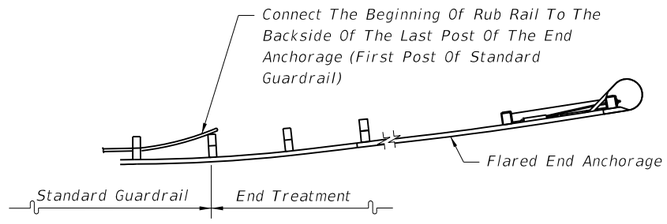
GUARDRAIL ON MEDIAN SLOPES



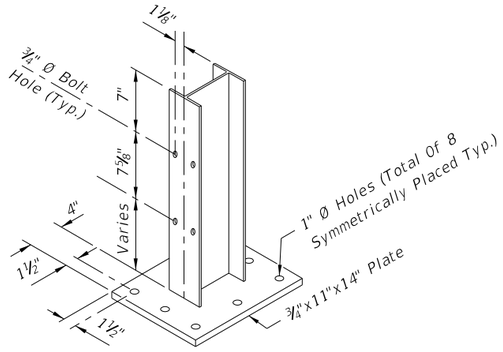
GUARDRAIL ON OUTSIDE SLOPES

∗ C6x8.2, Plates And Fasteners or Bent Plate And Fasteners In Accordance With Standards RLR01 And RER01 Of AASHTO-AGC-ARTBA "A Guide To Standardized Highway Barrier Hardware"

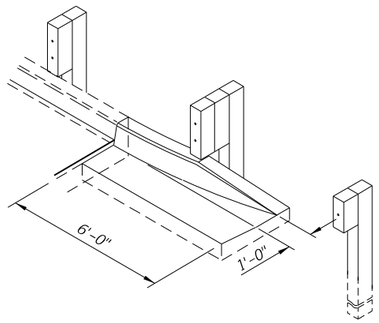
GUARDRAIL ON SLOPES



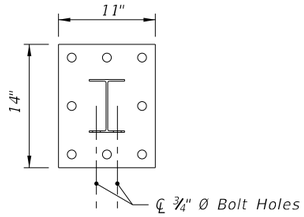
RUB RAIL TERMINATION



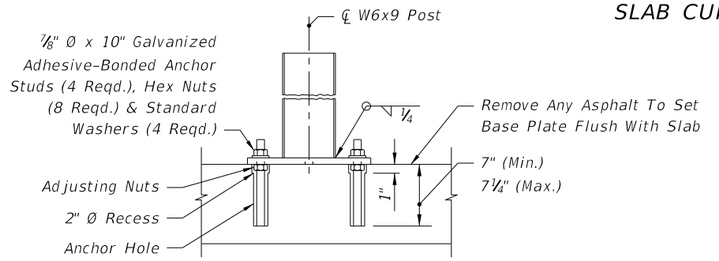
PICTORIAL



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

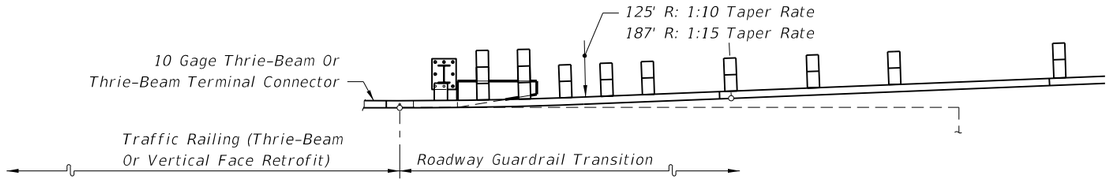


TOP VIEW

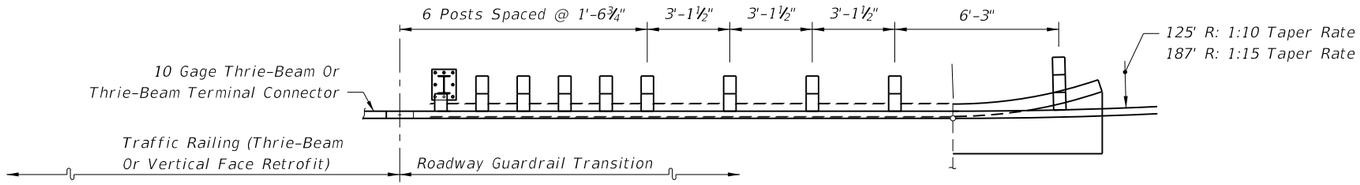


SIDE VIEW

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



APPROACH SLAB WITHOUT CURB



APPROACH SLAB WITH CURB

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

PARTIAL PLAN VIEWS

GENERAL NOTES

1. This index provides thrie-beam 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 23 apply to bridges with retrofitted traffic railings, (Sheet 23 shows the trailing end guardrail connections). Sheet 24 applies to bridges with safety shaped traffic railing.

2. The schemes identified by Arabic numerals in this index are complementary to the bridge traffic railing barrier retrofit schemes with like numeral identification in Index Nos. 470, 471 through 476, 480 through 483. The schemes in this index identified by Roman numerals are complementary to bridge safety shaped traffic railing barrier where determined to be in accordance with applications of criteria specified in the Structures Manual.

3. For guardrail applications and details of related hardware and accessories that are not provided on this index, refer to Index No. 400.

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 using ASTM A36 or ASTM A709 Grade 36 steel. Welding shall conform to ANSI/AASHTO/AWS D1.5. The assembly shall be hot-dip zinc coated in accordance with Section 536 of the Specifications.

   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 Section 937 and be installed in accordance with Specification Section 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 12 through 15 and the flag notation on Sheet 23.

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.

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

1. For selection of an appropriate transition scheme, see the Structures Manual for instructions to the Structures and Roadway engineers.

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

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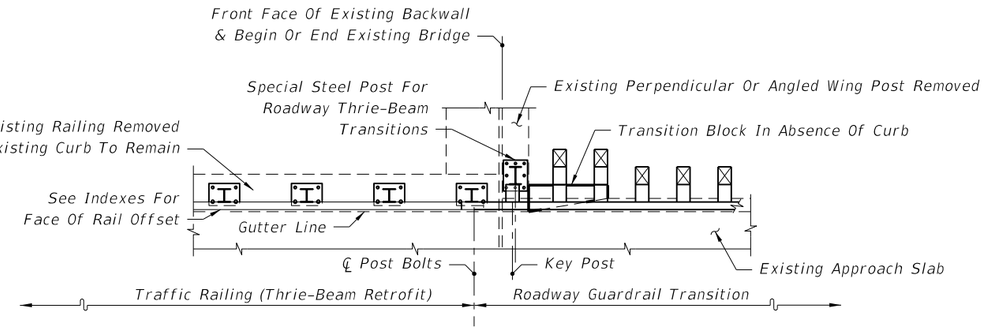
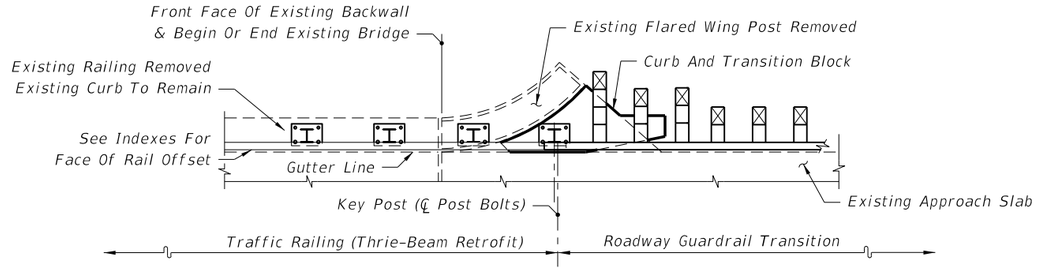
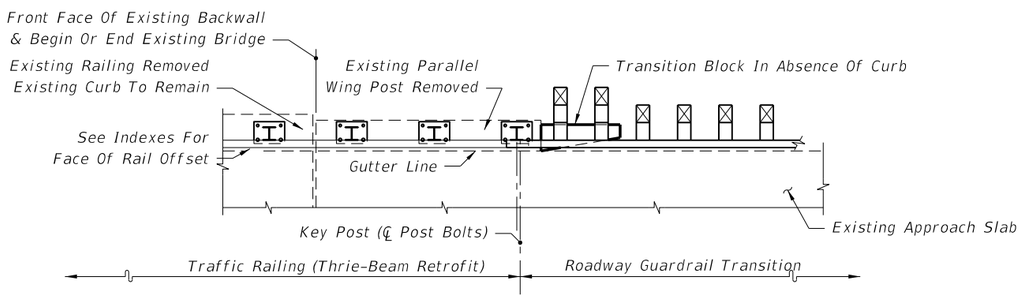
LAST REVISION	REVISION	DESCRIPTION:				
07/01/07			FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 1



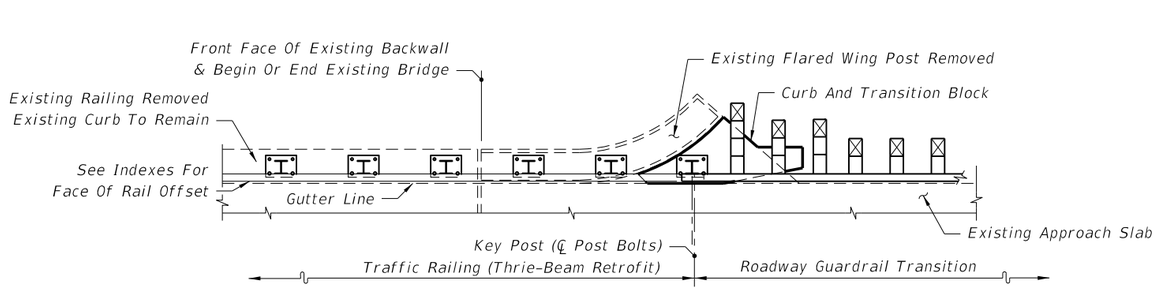
SEE INDEX NO. 471 - SCHEME 1



SEE INDEX NO. 471 - SCHEME 3



SEE INDEX NO. 471 - SCHEME 2



SEE INDEX NO. 471 - SCHEME 3

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

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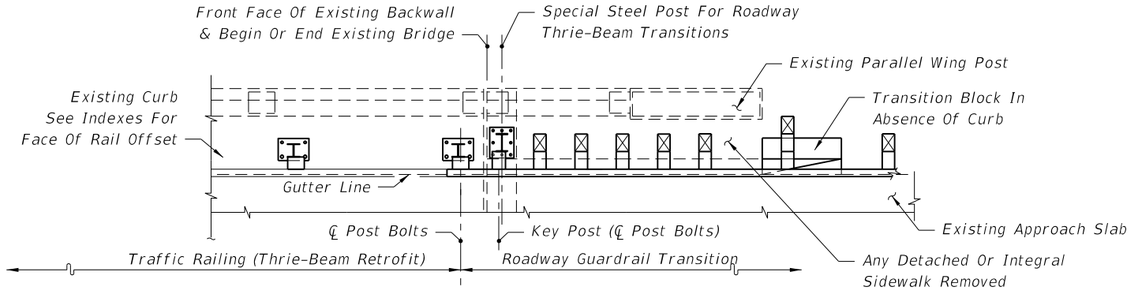
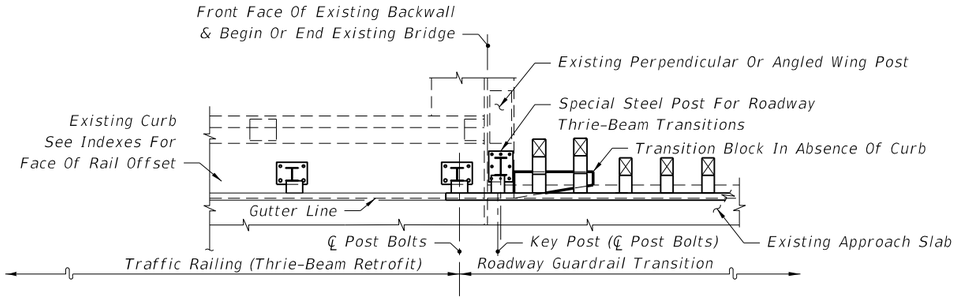
rd960rh
2:43:00 PM
6/28/2012

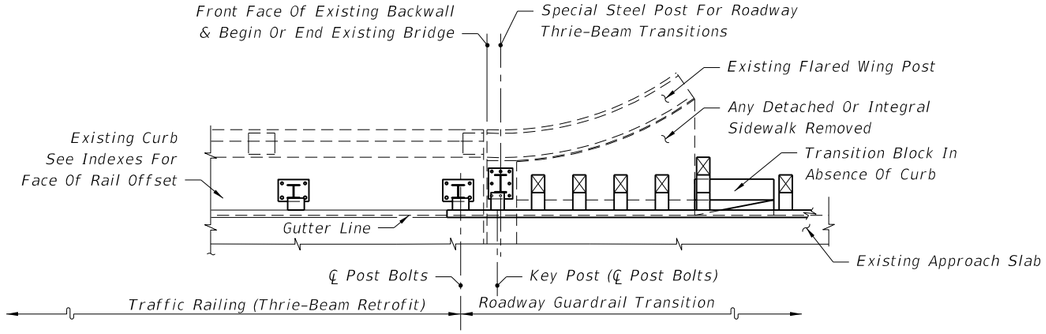
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	2



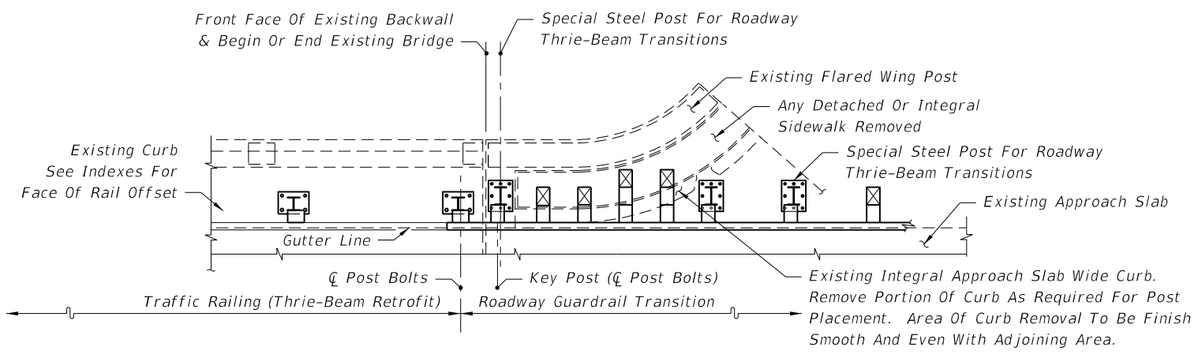
SEE INDEX NOS. 472 & 475 - SCHEME 2



SEE INDEX NOS. 472 & 475 - SCHEME 1



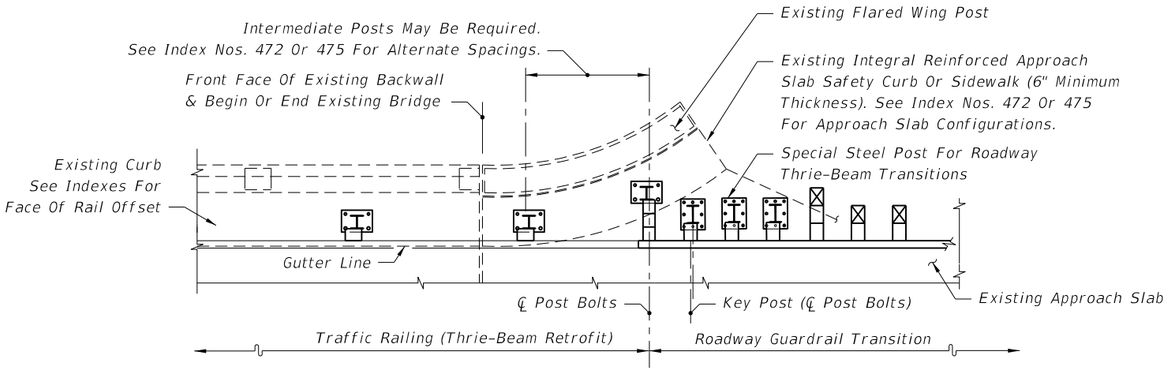
SEE INDEX NOS. 472 & 475 - SCHEME 2



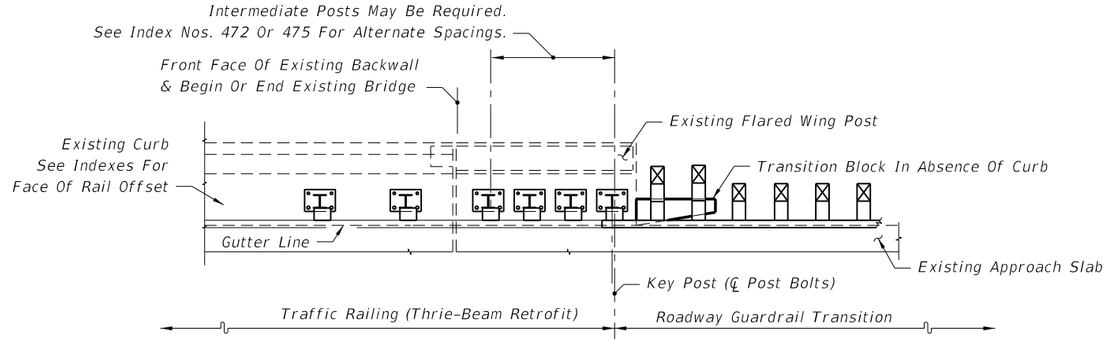
SEE INDEX NOS. 472 & 475 - SCHEME 2

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

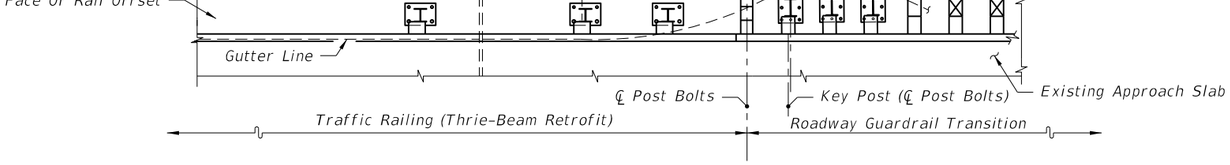
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	3



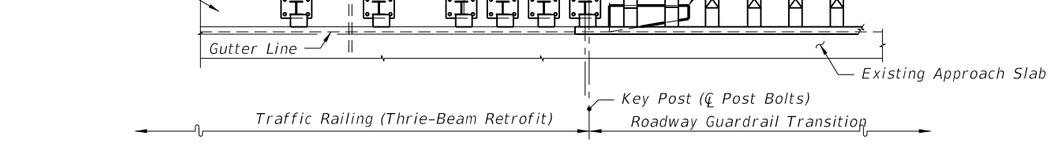
SEE INDEX NOS. 472 & 475 - SCHEMES 3 & 4



SEE INDEX NOS. 472 & 475 - SCHEMES 5 & 6



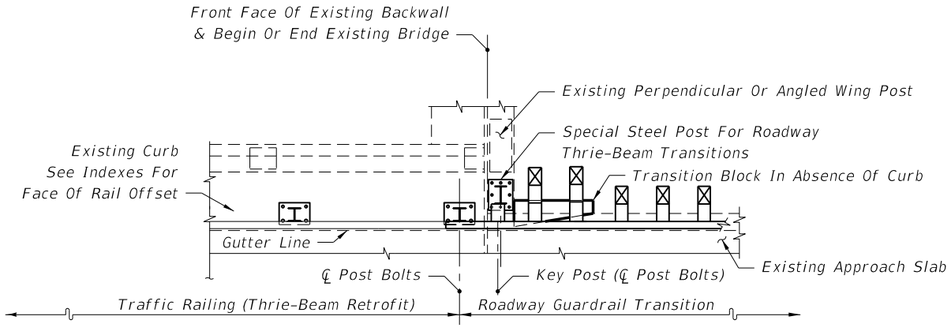
SEE INDEX NOS. 472 & 475 - SCHEMES 3 & 4



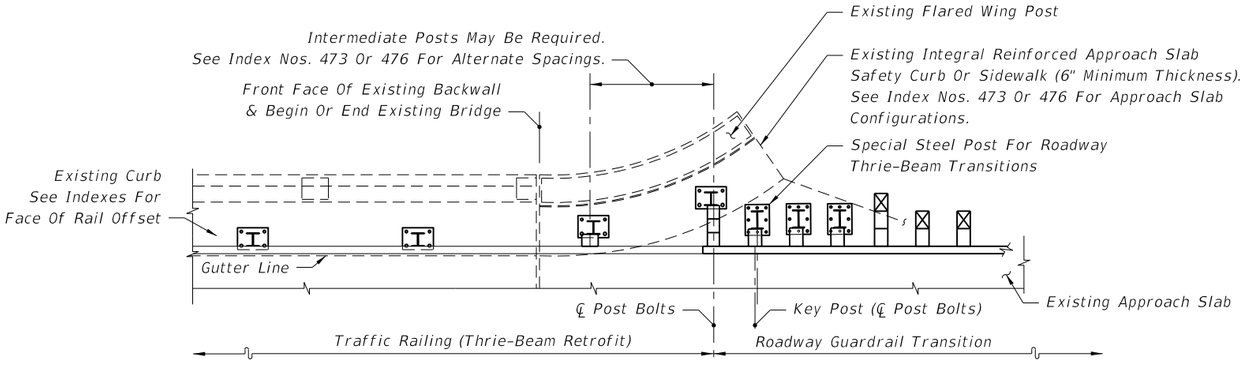
SEE INDEX NOS. 472 & 475 - SCHEMES 5 & 6

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

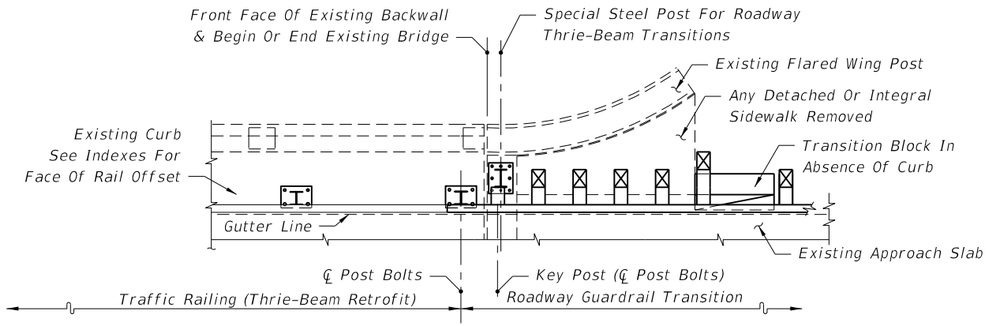
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	4



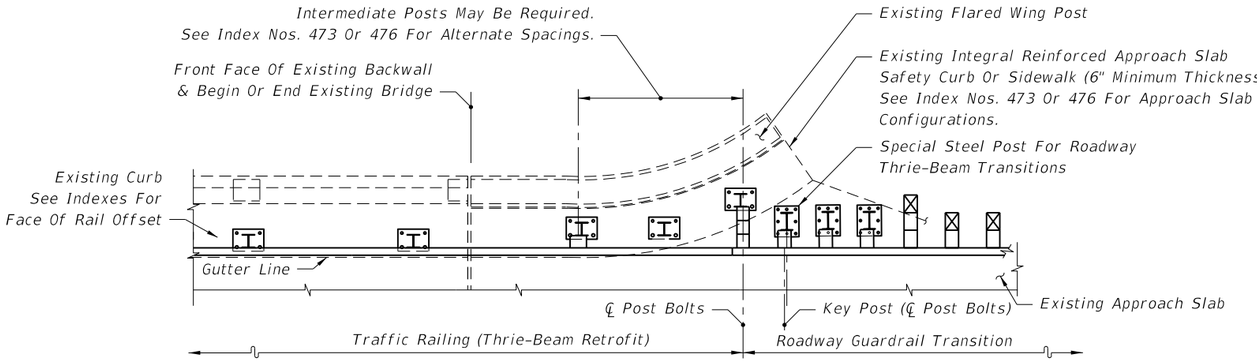
SEE INDEX NOS. 473 & 476 - SCHEME 1



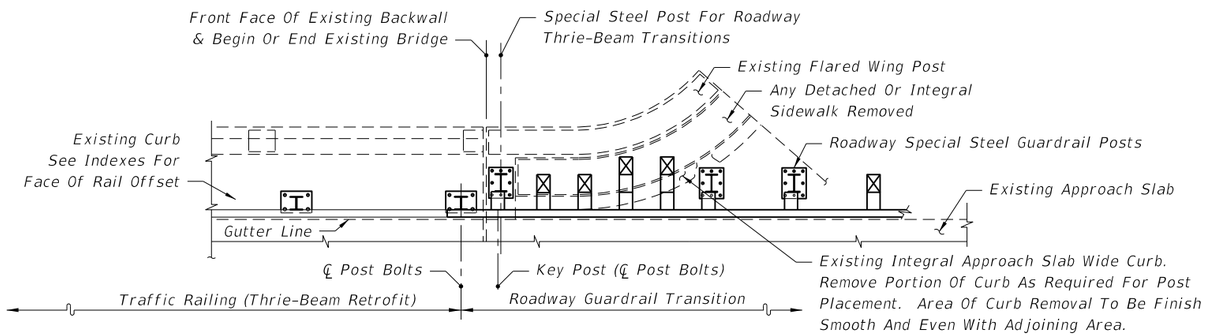
SEE INDEX NOS. 473 & 476 - SCHEMES 3 & 4



SEE INDEX NOS. 473 & 476 - SCHEME 2



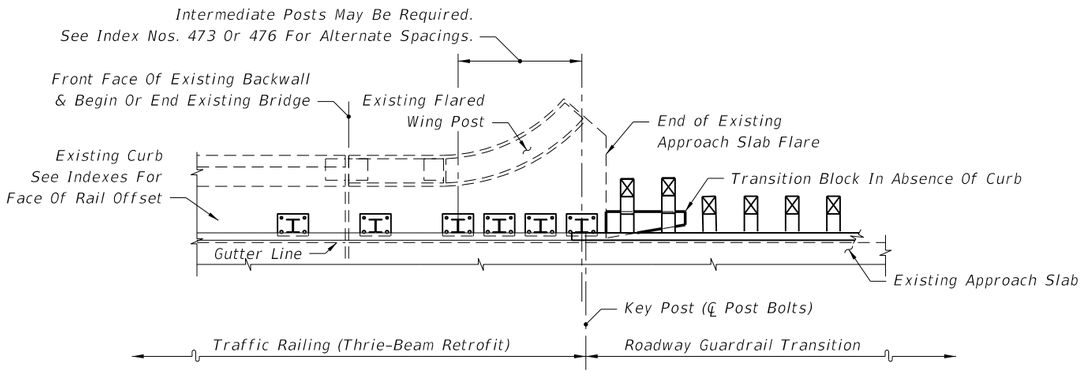
SEE INDEX NOS. 473 & 476 - SCHEMES 3 & 4



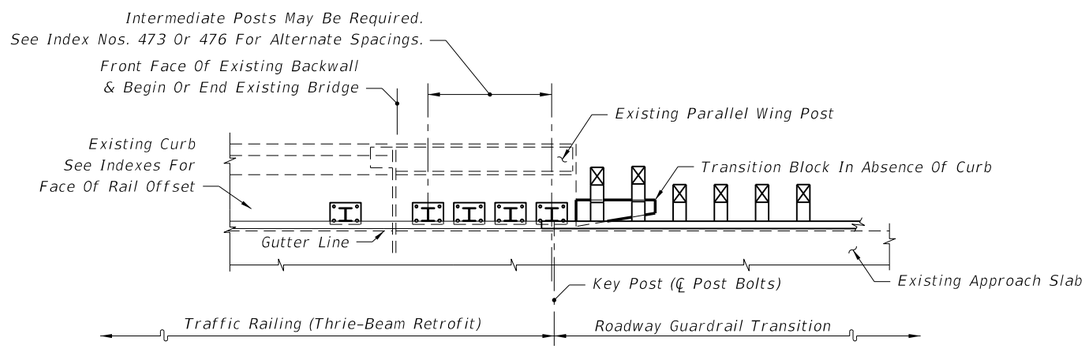
SEE INDEX NOS. 473 & 476 - SCHEME 2

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

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	402	5



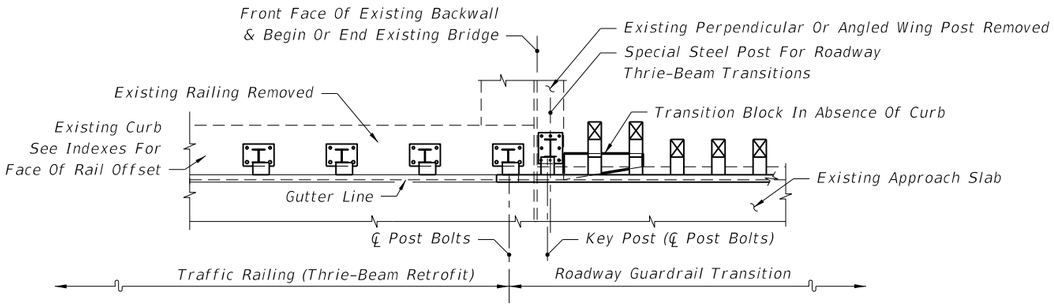
SEE INDEX NOS. 473 & 476 - SCHEMES 5 & 6



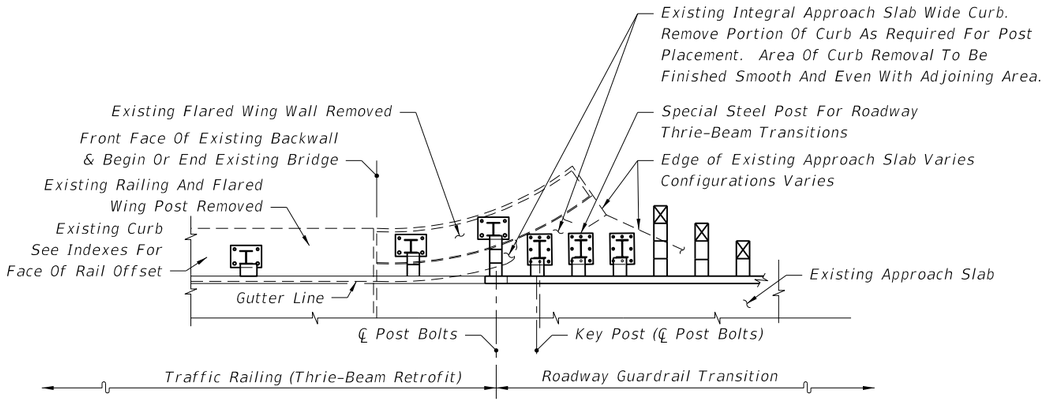
SEE INDEX NOS. 473 & 476 - SCHEMES 5 & 6

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

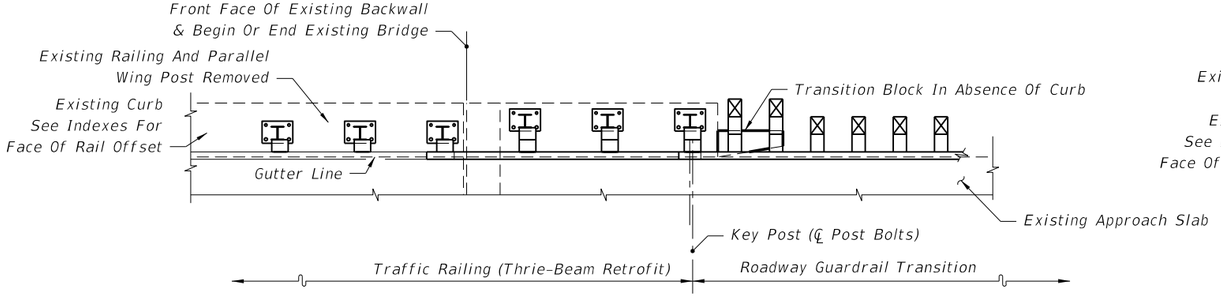
LAST REVISION	REVISION	DESCRIPTION:				
07/01/07			FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 6



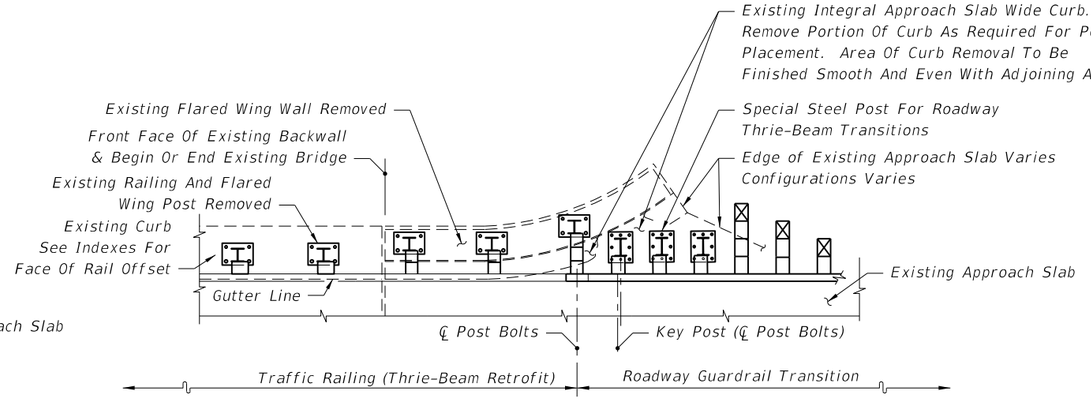
SEE INDEX NO. 474 - SCHEME 1



SEE INDEX NO. 474 - SCHEME 3



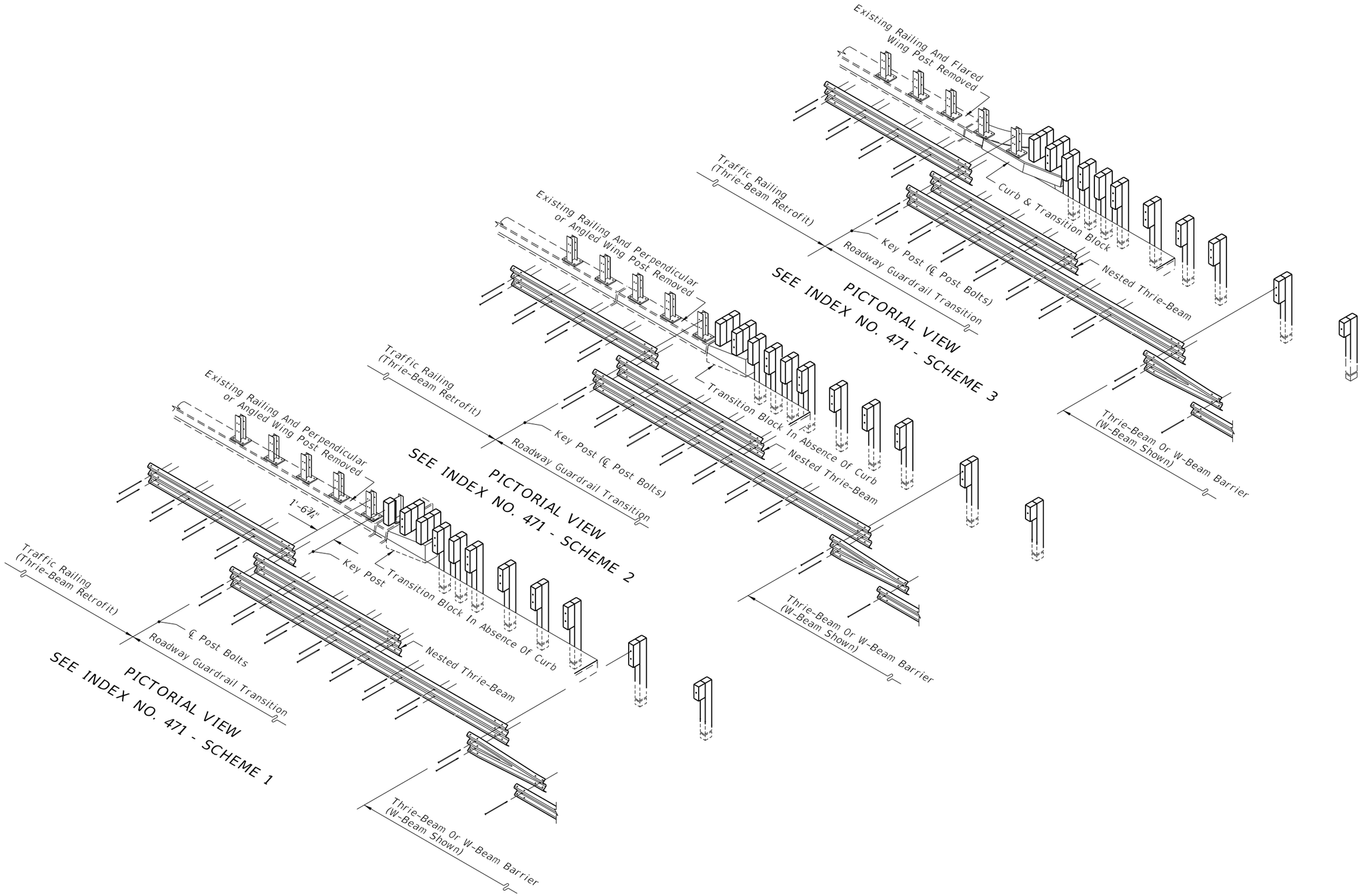
SEE INDEX NO. 474 - SCHEME 2



SEE INDEX NO. 474 - SCHEME 3

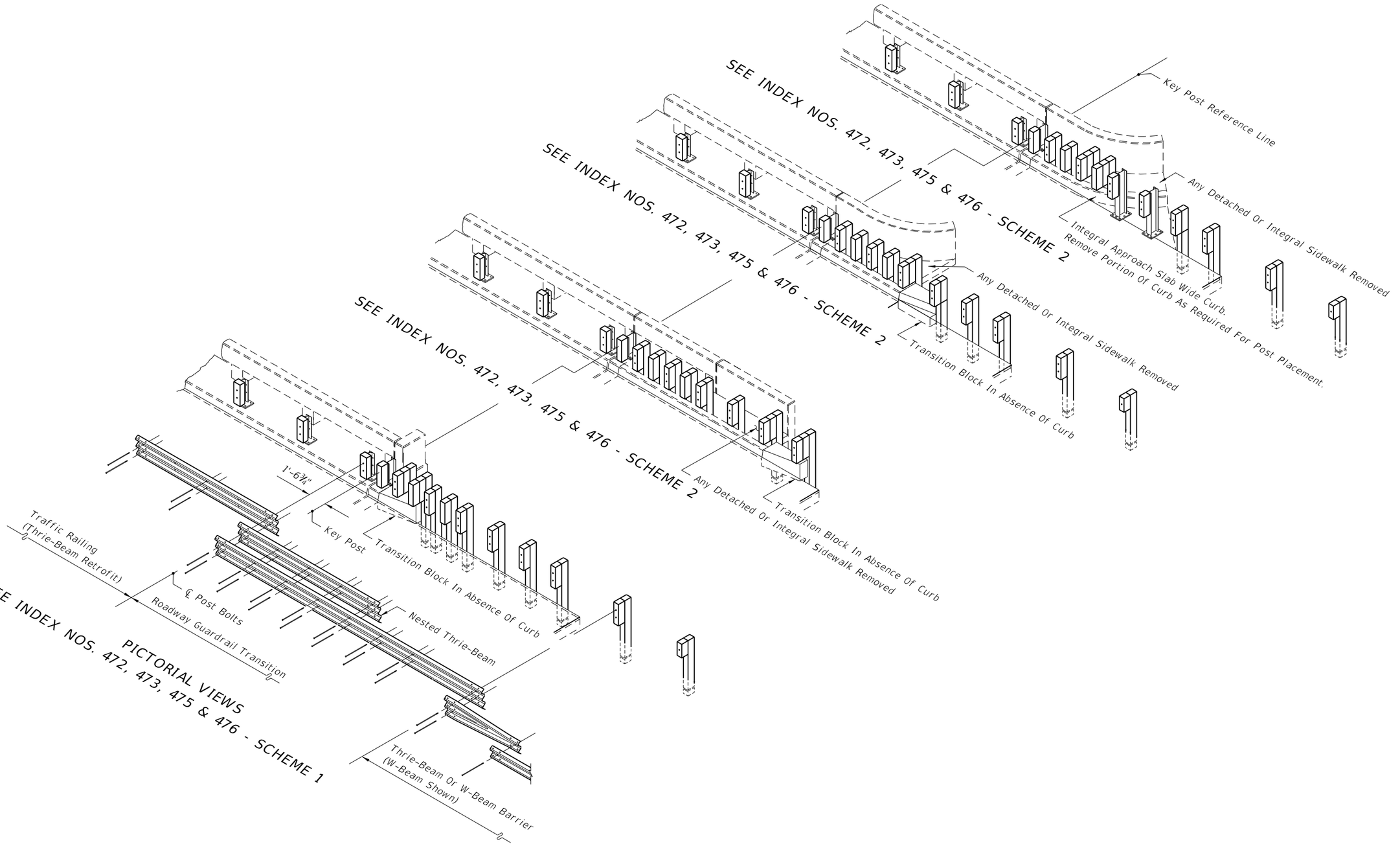
PARTIAL PLAN VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	7



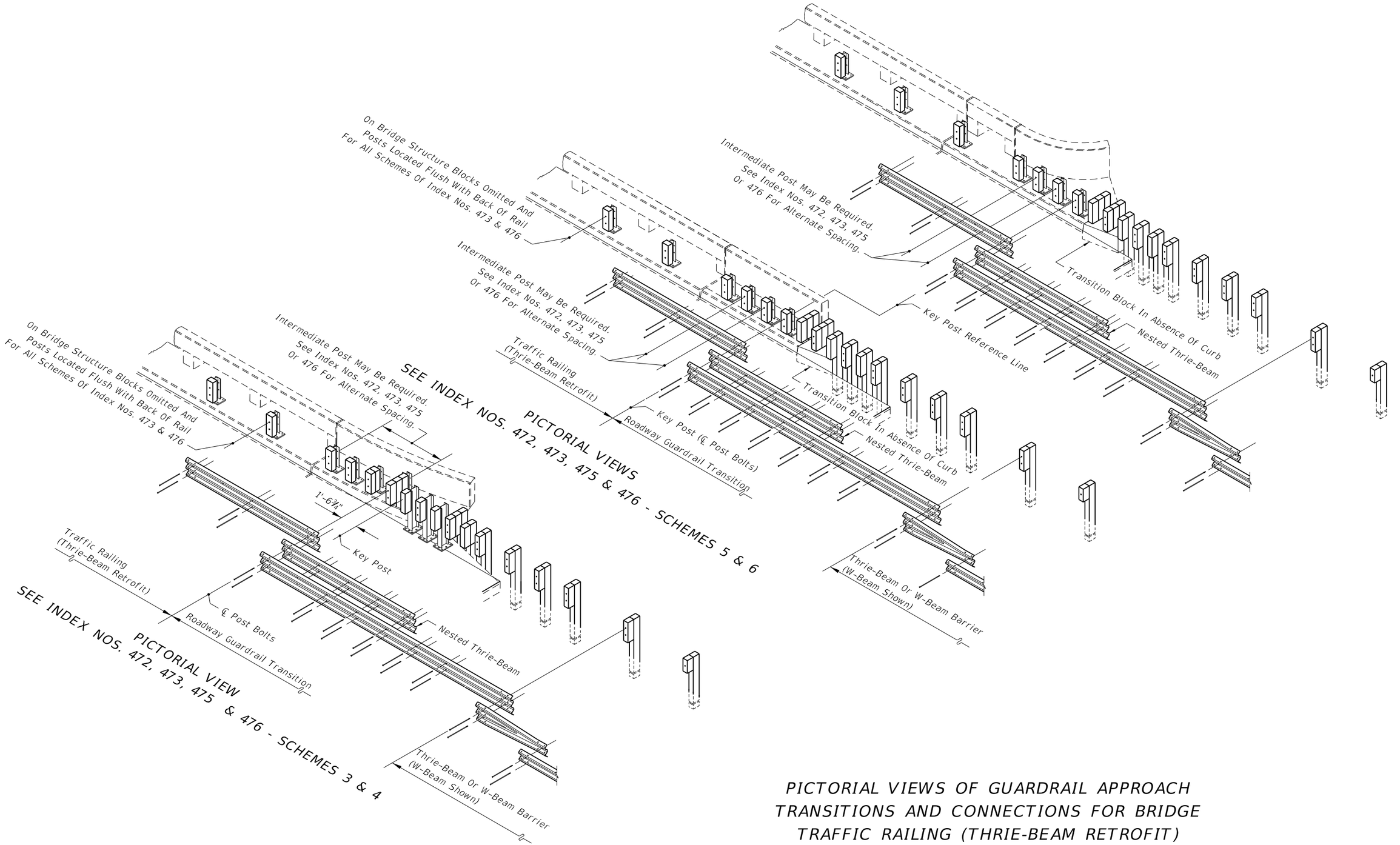
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	8



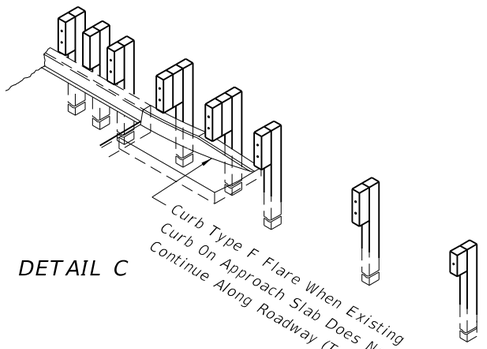
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	9

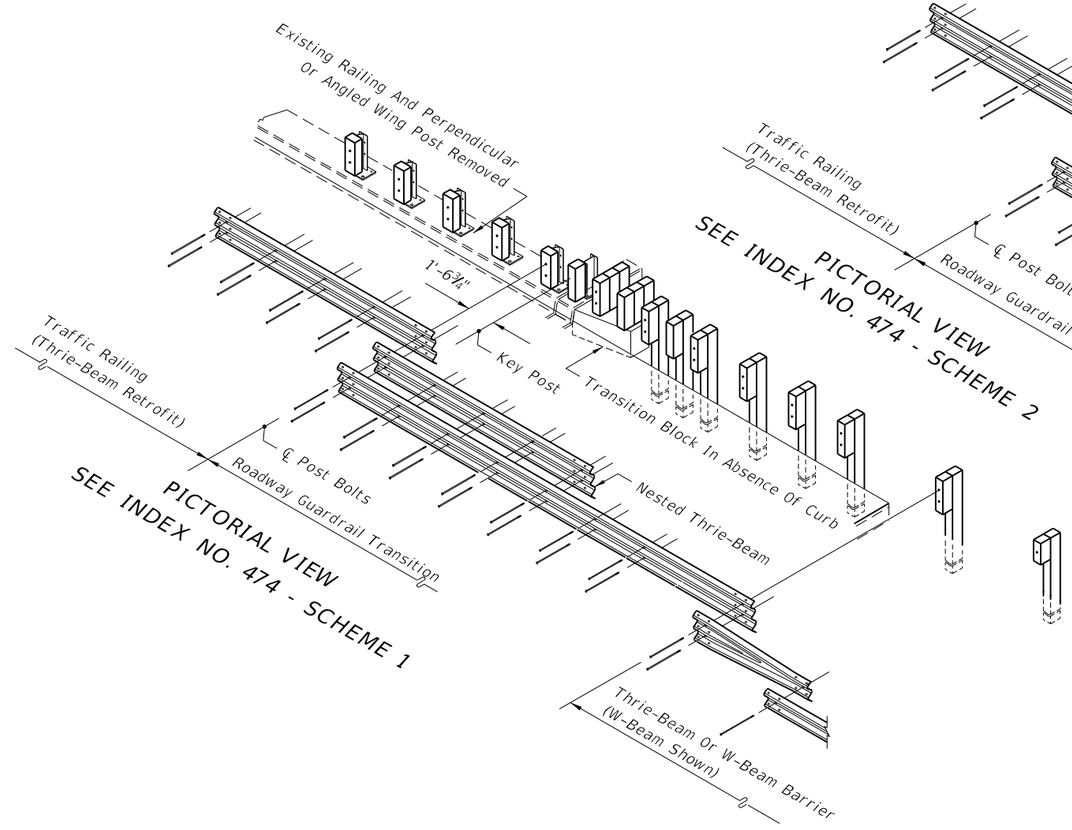


PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (THRIE-BEAM RETROFIT)

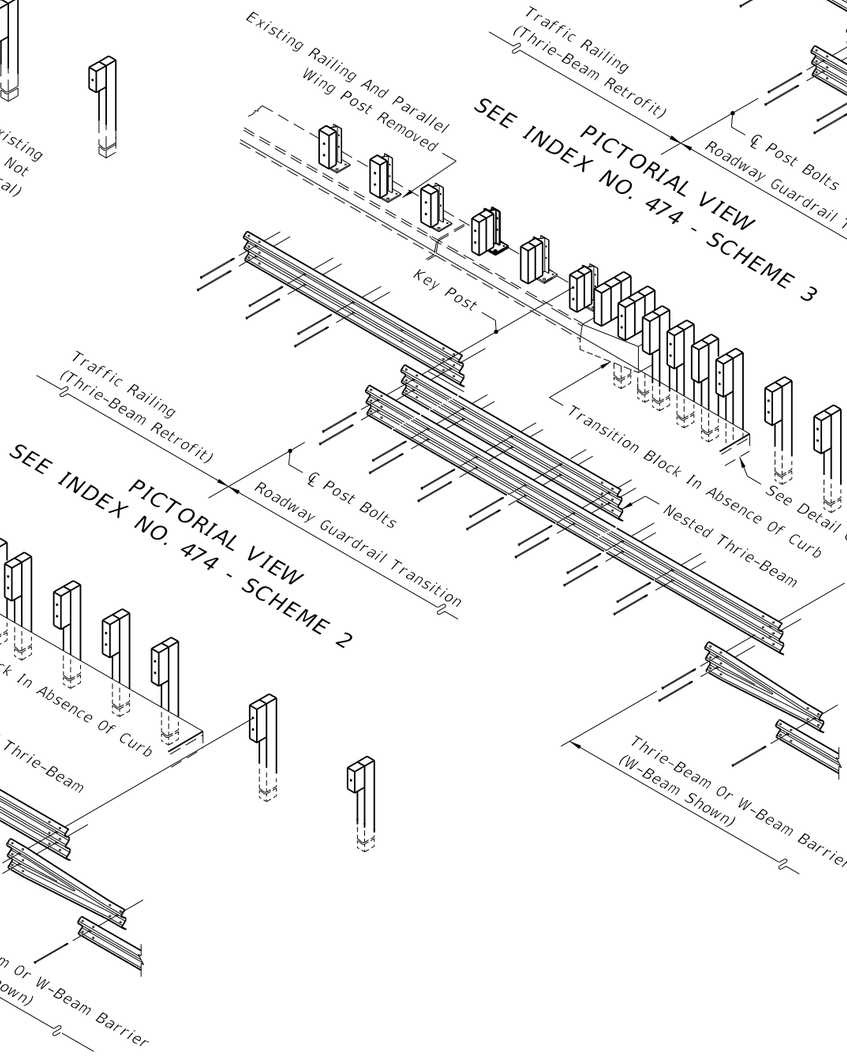
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	10



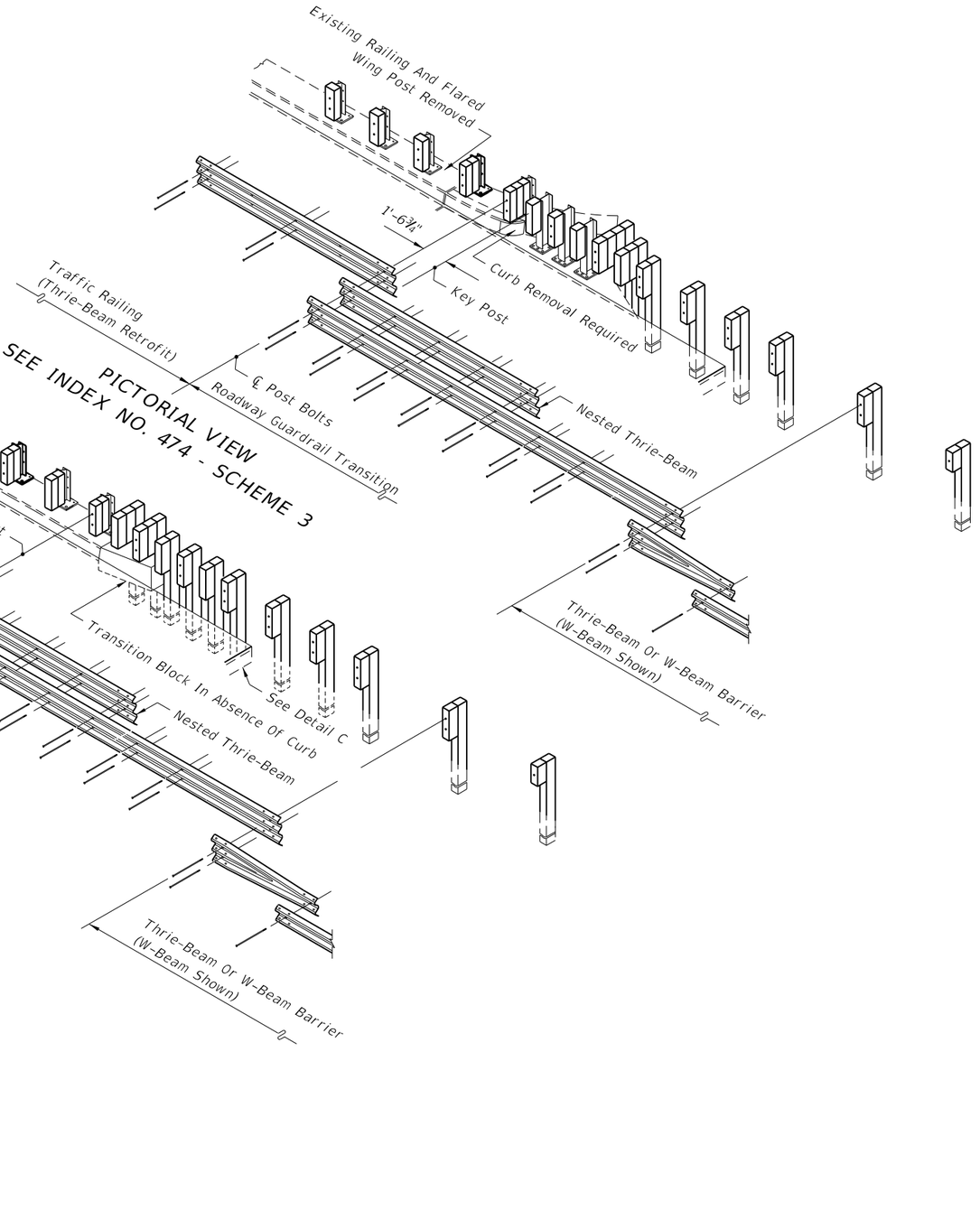
DETAIL C



PICTORIAL VIEW
SEE INDEX NO. 474 - SCHEME 1



PICTORIAL VIEW
SEE INDEX NO. 474 - SCHEME 2



PICTORIAL VIEW
SEE INDEX NO. 474 - SCHEME 3

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

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	11

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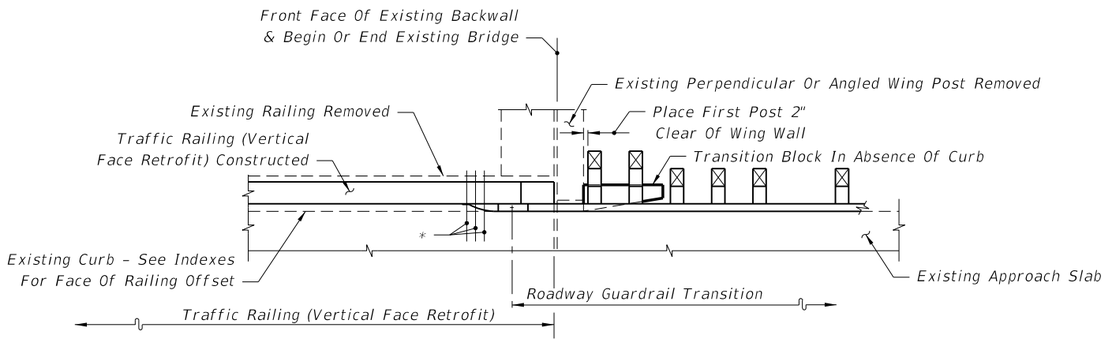
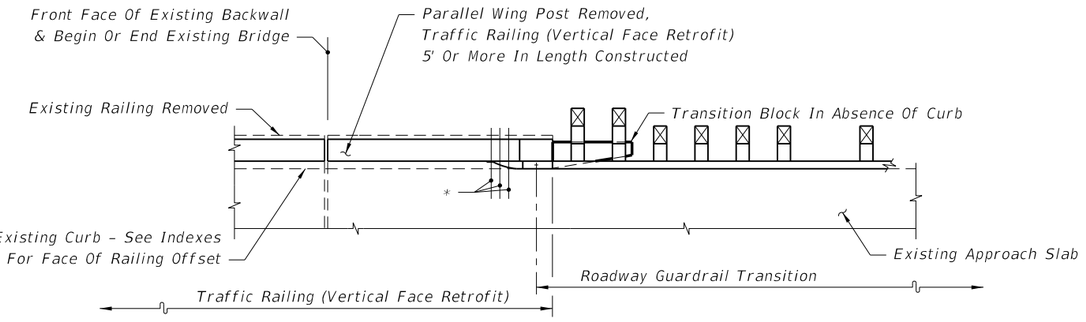
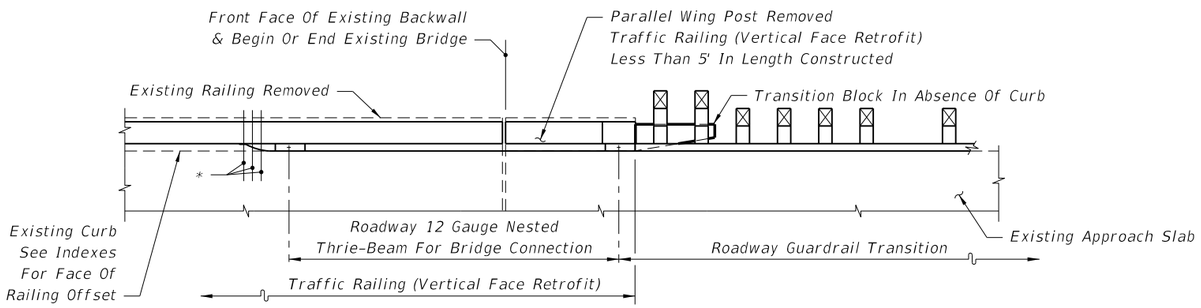


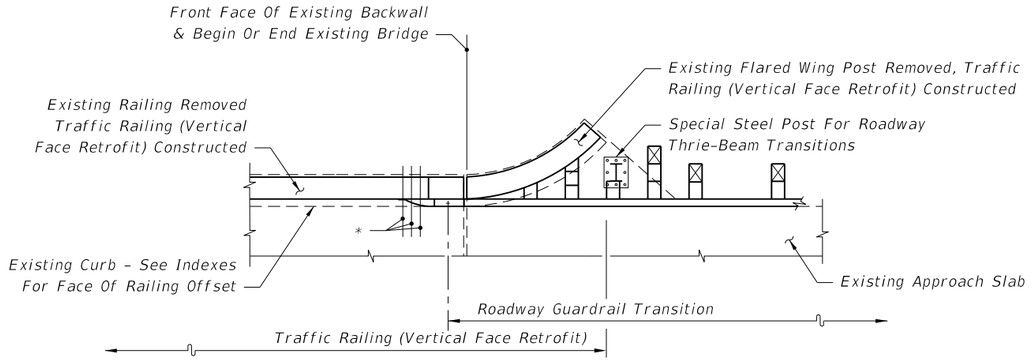
SEE INDEX NO. 481 - SCHEME 1



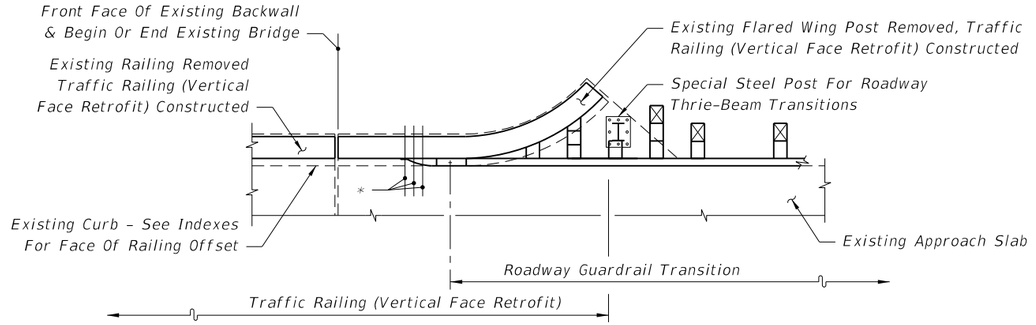
SEE INDEX NO. 481 - SCHEME 2



SEE INDEX NO. 481 - SCHEME 2



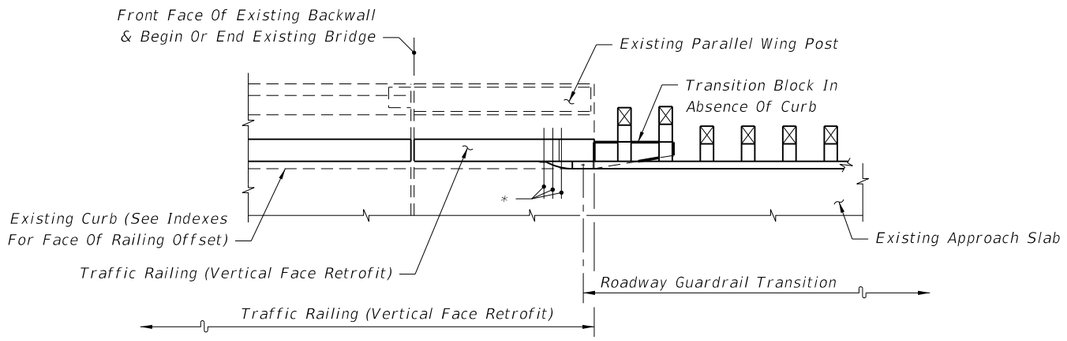
SEE INDEX NO. 481 - SCHEME 3



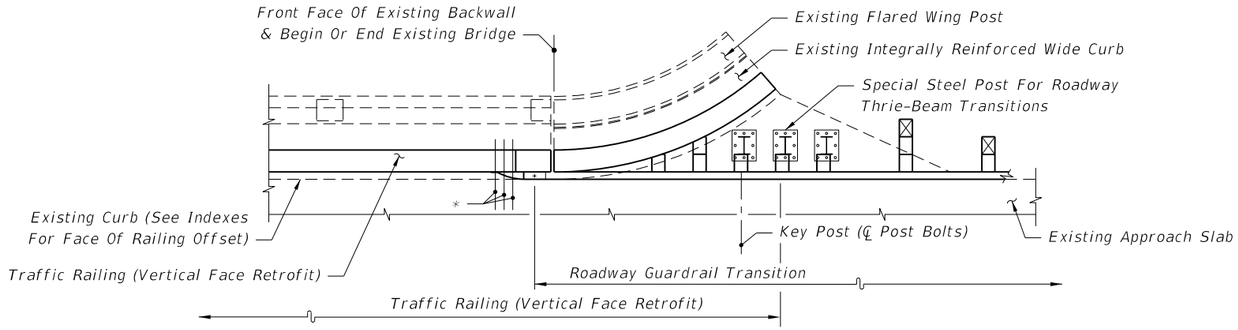
SEE INDEX NO. 481 - SCHEME 3

Note:
* 21"x 12" x ⅜" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And ⅞"Ø x 12" Long HS Hex Bolts And Nuts (5 Reqd.) With 2¼" OD Plain Round Washers Under Heads And Nuts

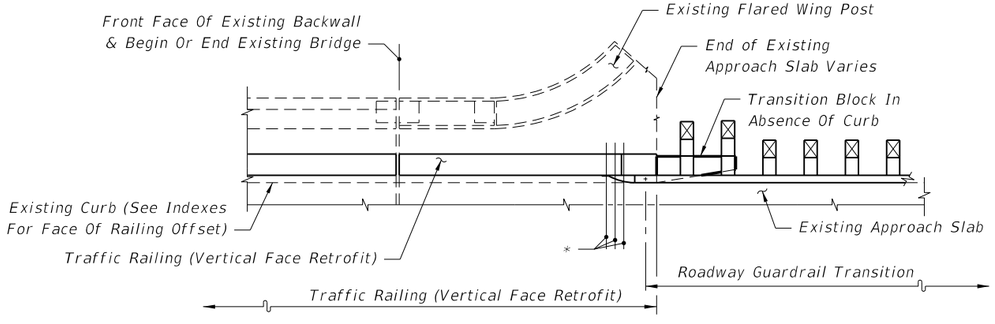
PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)



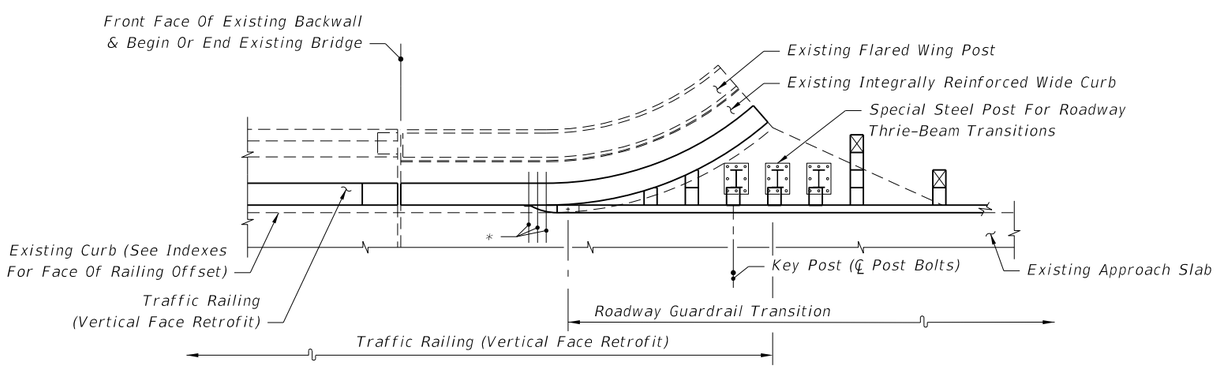
SEE INDEX NO. 482 - SCHEME 2



SEE INDEX NO. 482- SCHEME 3



SEE INDEX NO. 482 - SCHEME 2



SEE INDEX NO. 482- SCHEME 3

Note:
* 21" x 12" x ⅝" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And ⅞"Ø x 12" Long
HS Hex Bolts And Nuts (5 Reqd.) With 2¼" OD Plain Round Washers Under Heads And Nuts

PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)

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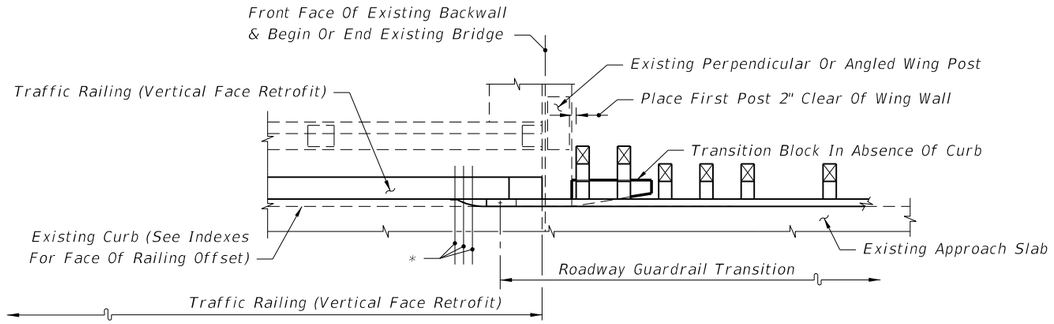
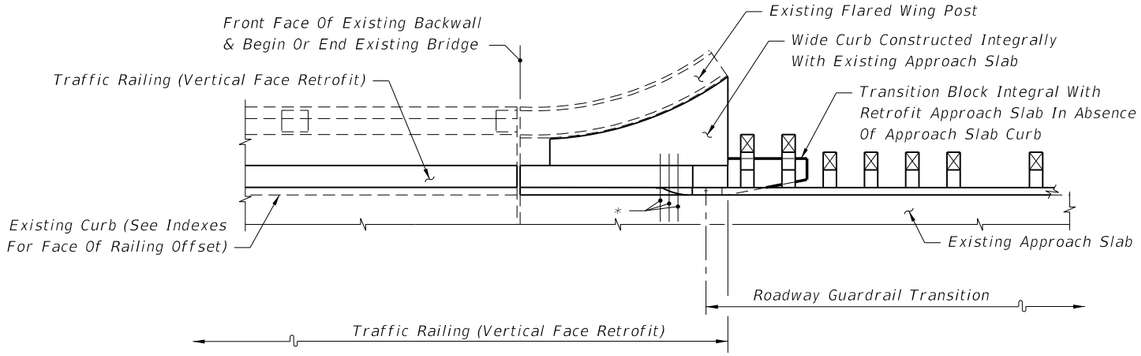
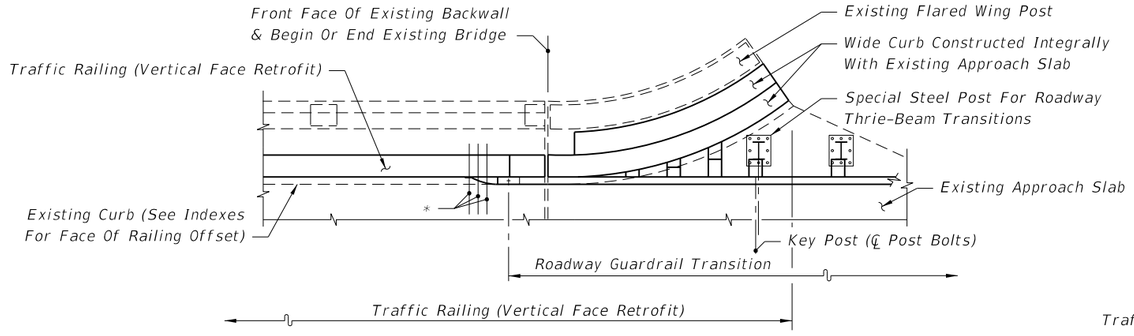
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	402	13



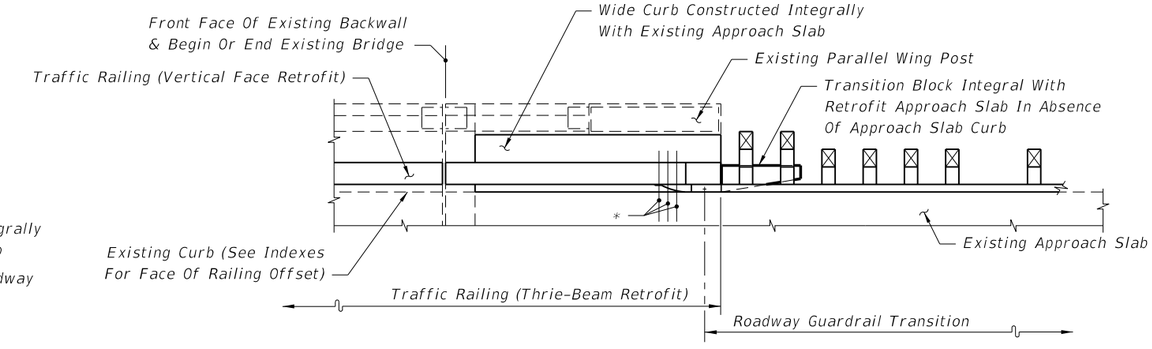
SEE INDEX NO. 482 - SCHEME 1



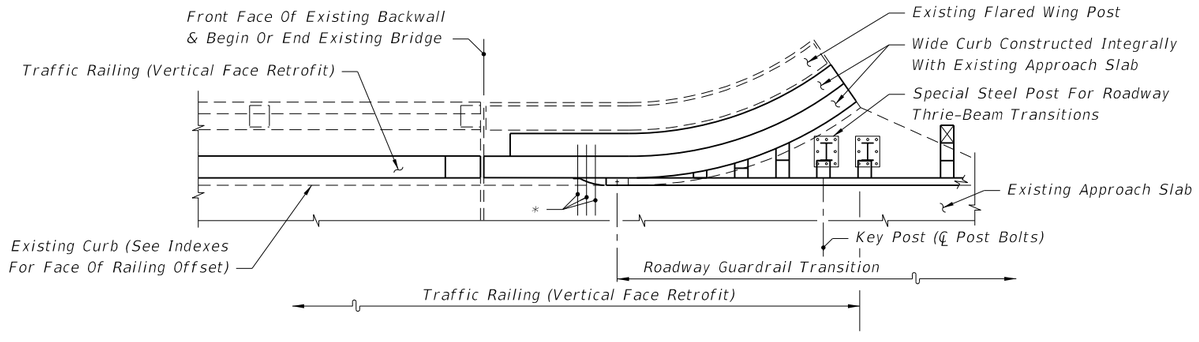
SEE INDEX NO. 482 - SCHEME 5



SEE INDEX NO. 482 - SCHEME 4



SEE INDEX NO. 482 - SCHEME 5

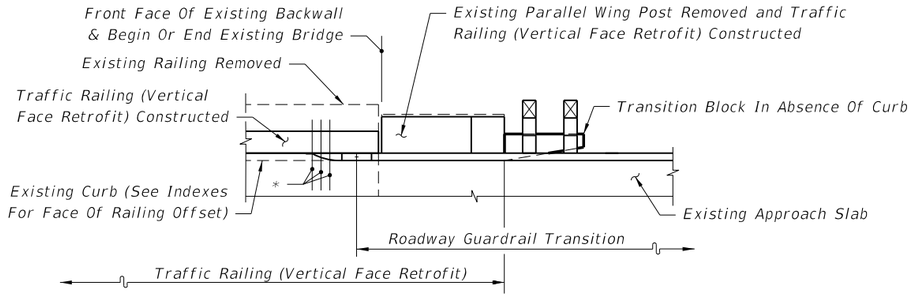


SEE INDEX NO. 482 - SCHEME 4

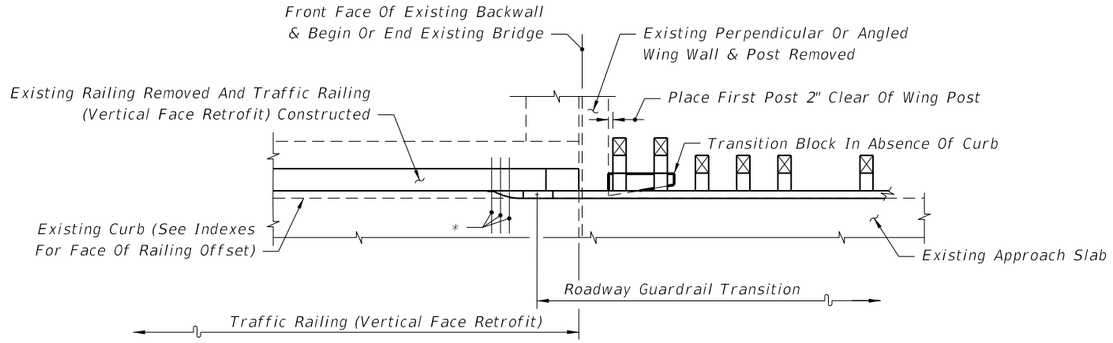
Note:
* 21" x 12" x ⅝" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And ⅞"Ø x 12" Long HS Hex Bolts And Nuts (5 Reqd.) With 2¼" OD Plain Round Washers Under Heads And Nuts

PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)

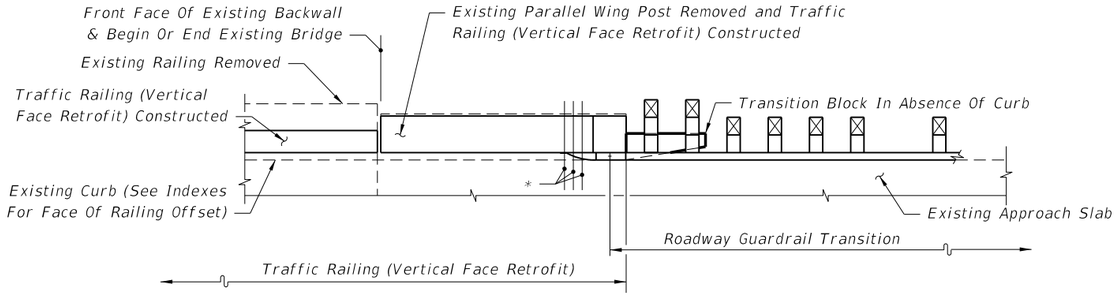
LAST REVISION	REVISION	DESCRIPTION:				
07/01/07			FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO. 402	SHEET NO. 14



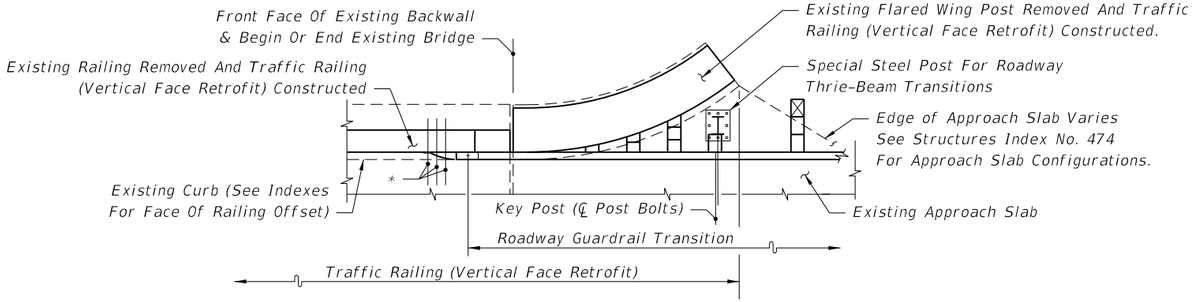
SEE INDEX NO. 483 - SCHEME 2



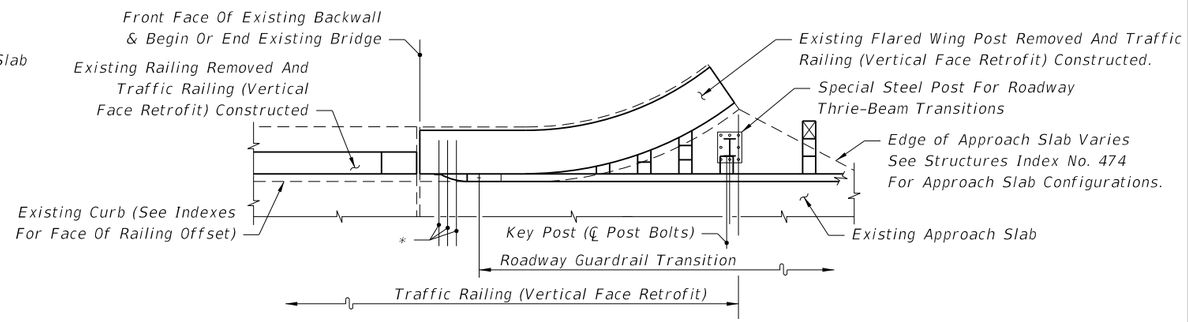
SEE INDEX NO. 483 - SCHEME 1



SEE INDEX NO. 483 - SCHEME 2



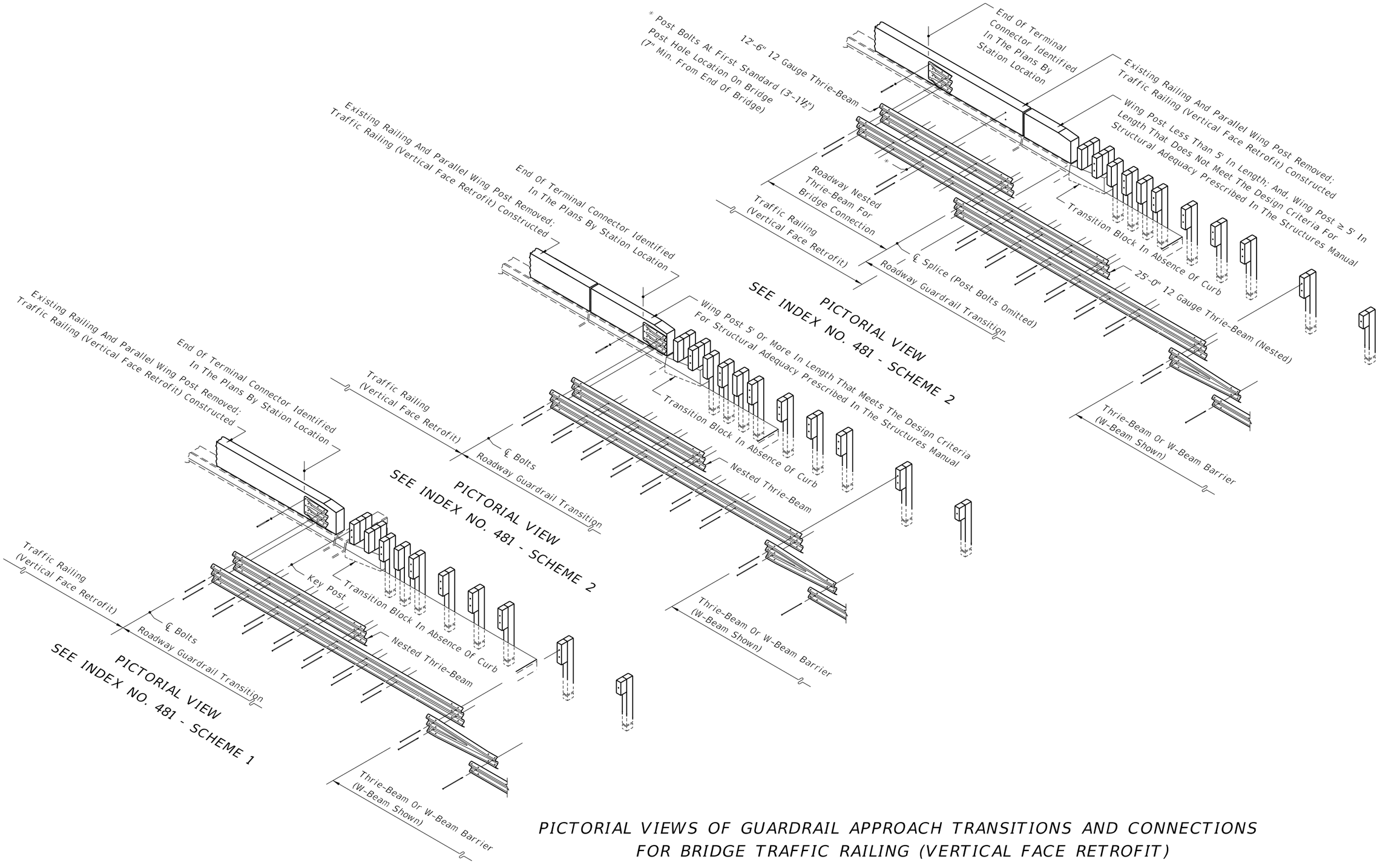
SEE INDEX NO. 483 - SCHEME 3



SEE INDEX NO. 483 - SCHEME 3

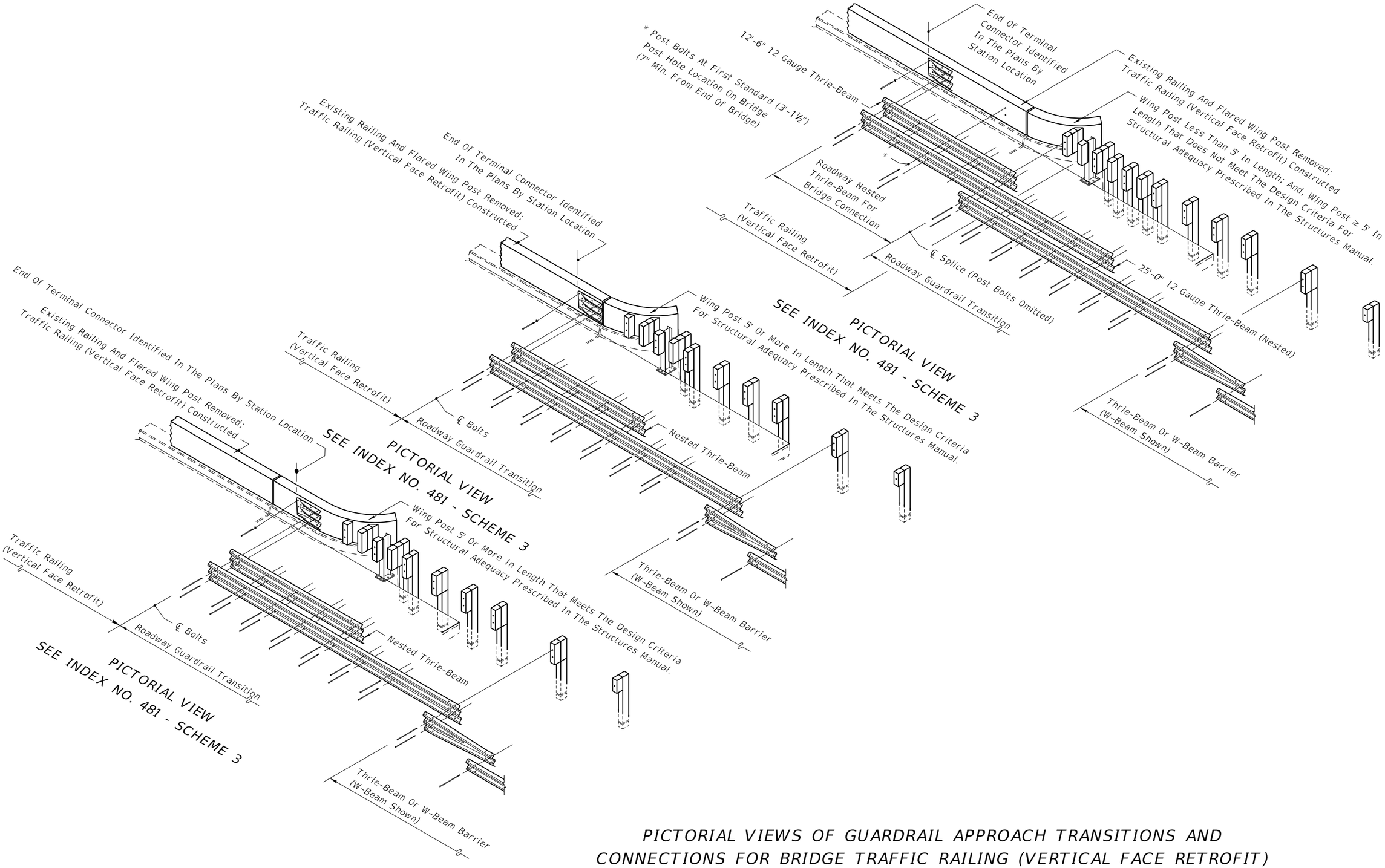
Note:
*21" x 12" x ⅝" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And ⅞"Ø HS Hex Bolts And Nuts (12" Long For Scheme 1 And Length To Fit For Schemes 2 And 3) (5 Reqd.) With 2¼" OD Plain Round Washers Under Heads And Nuts

PARTIAL PLAN VIEWS OF TRAFFIC RAILING (VERTICAL FACE RETROFIT)



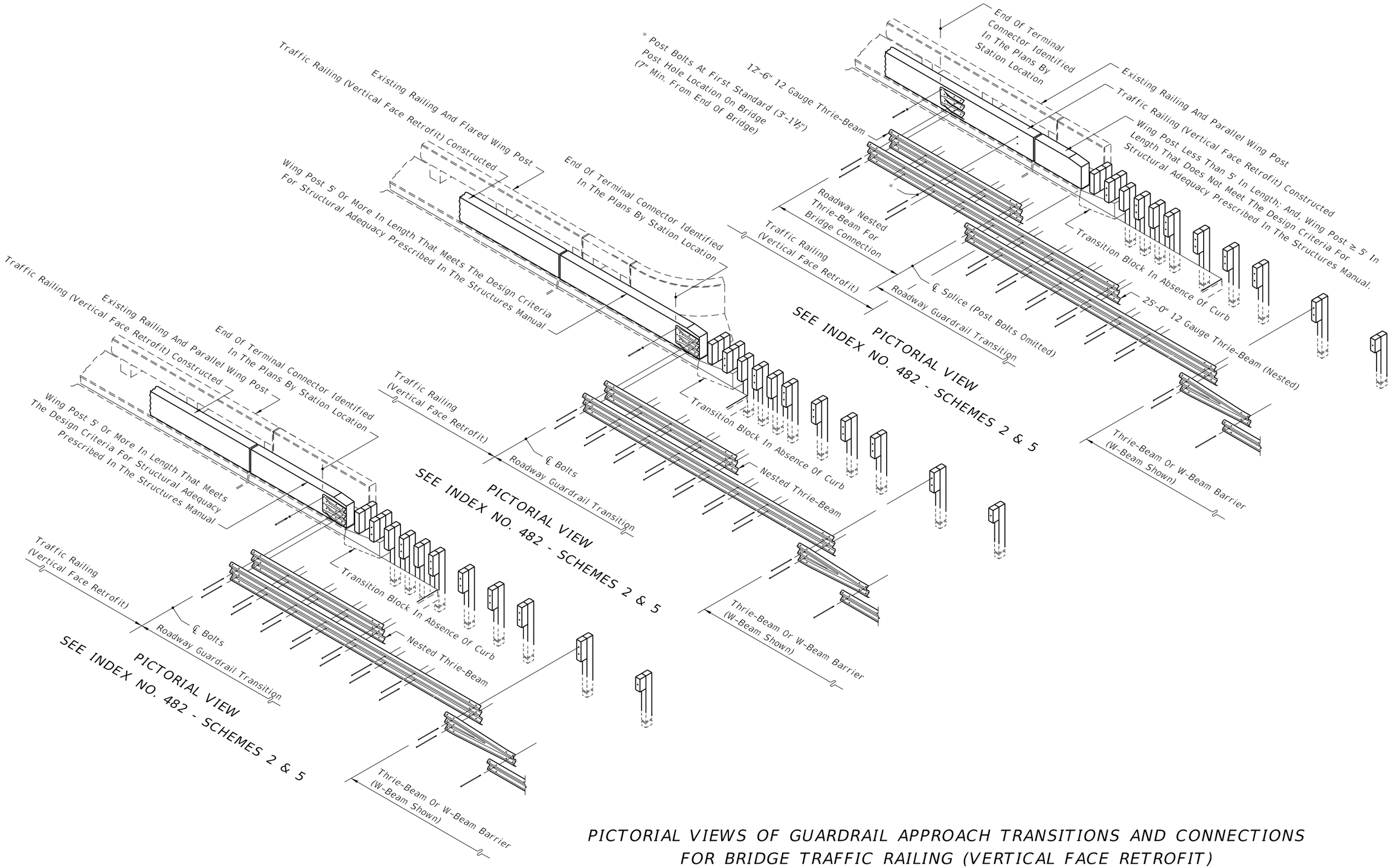
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	16



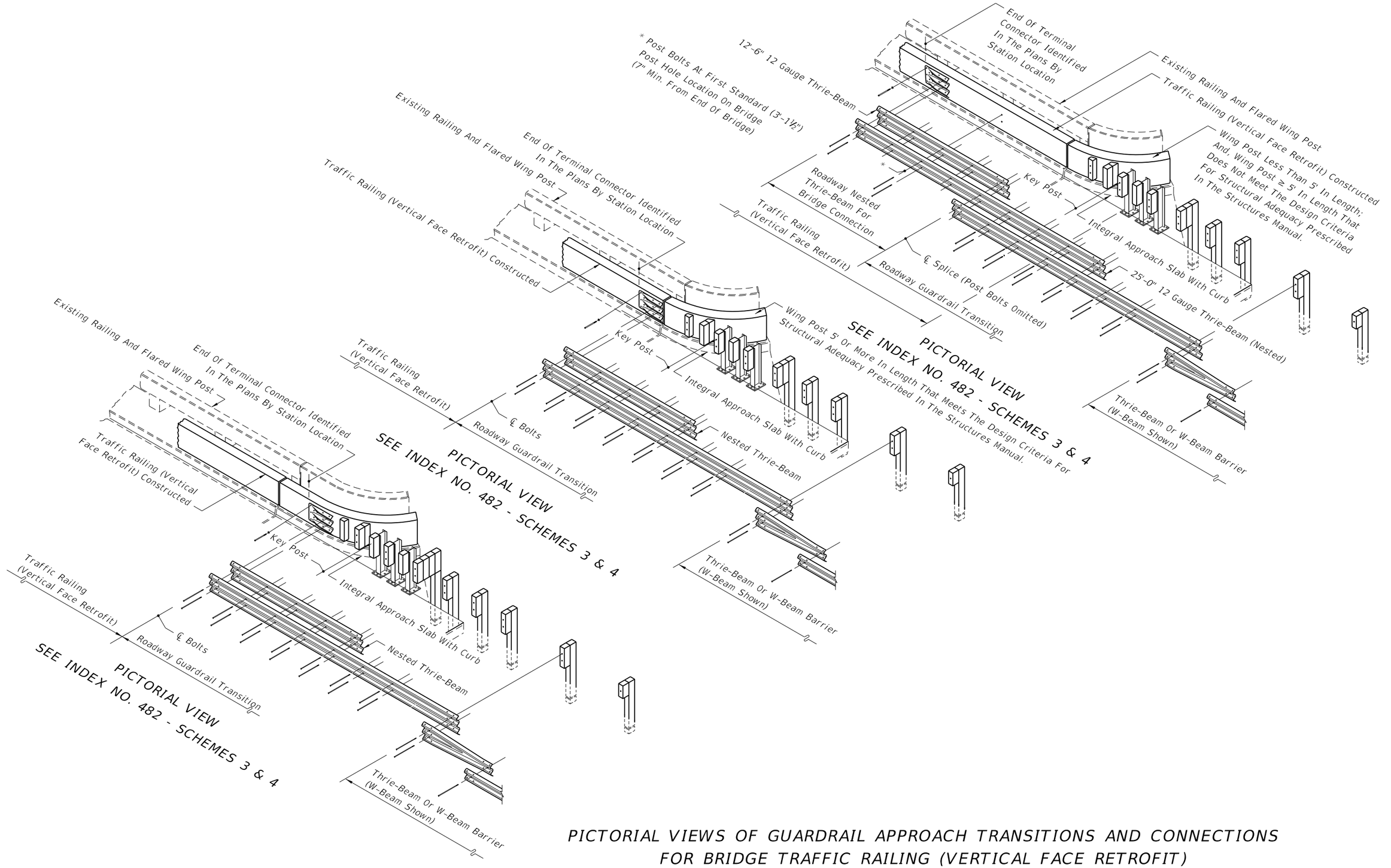
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	17



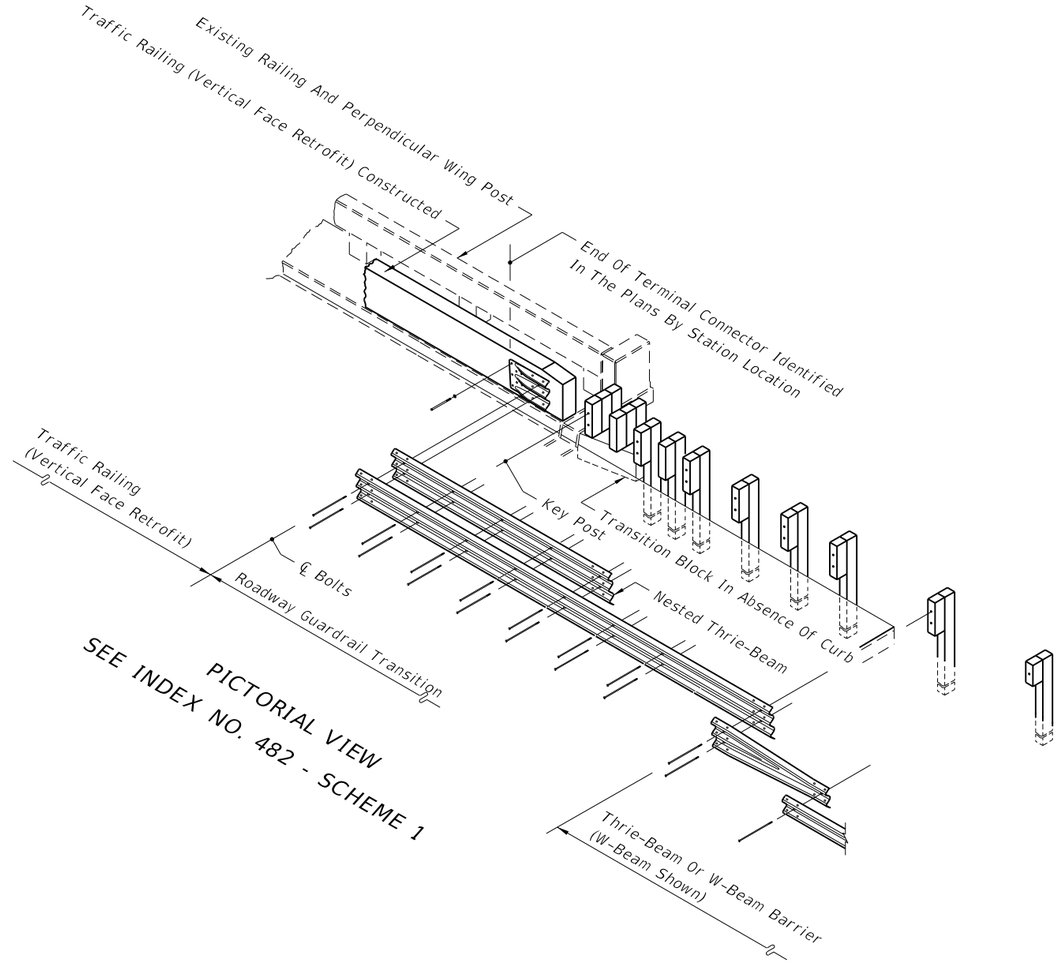
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07			STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	2013		402	18



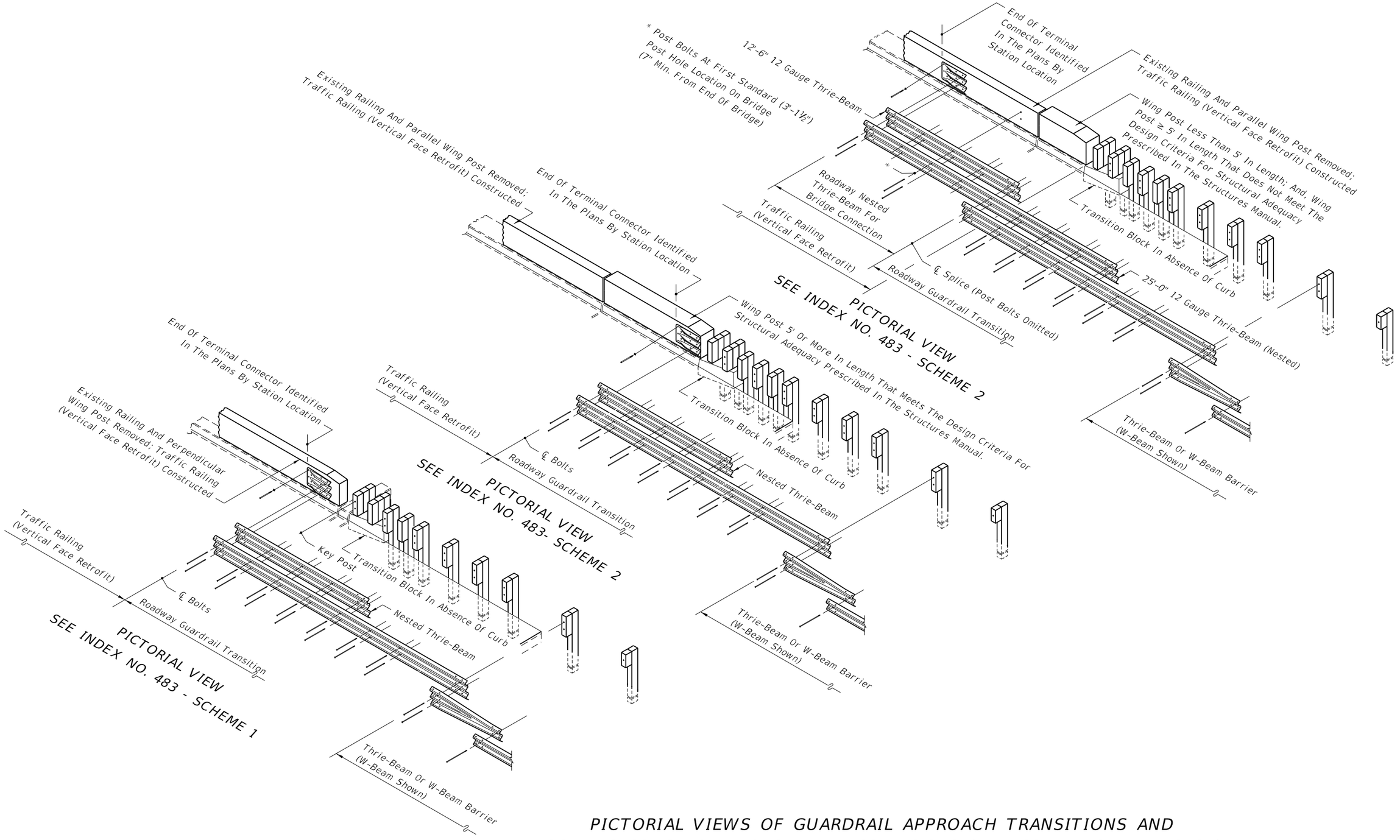
PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	19



PICTORIAL VIEW
SEE INDEX NO. 482 - SCHEME 1

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



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

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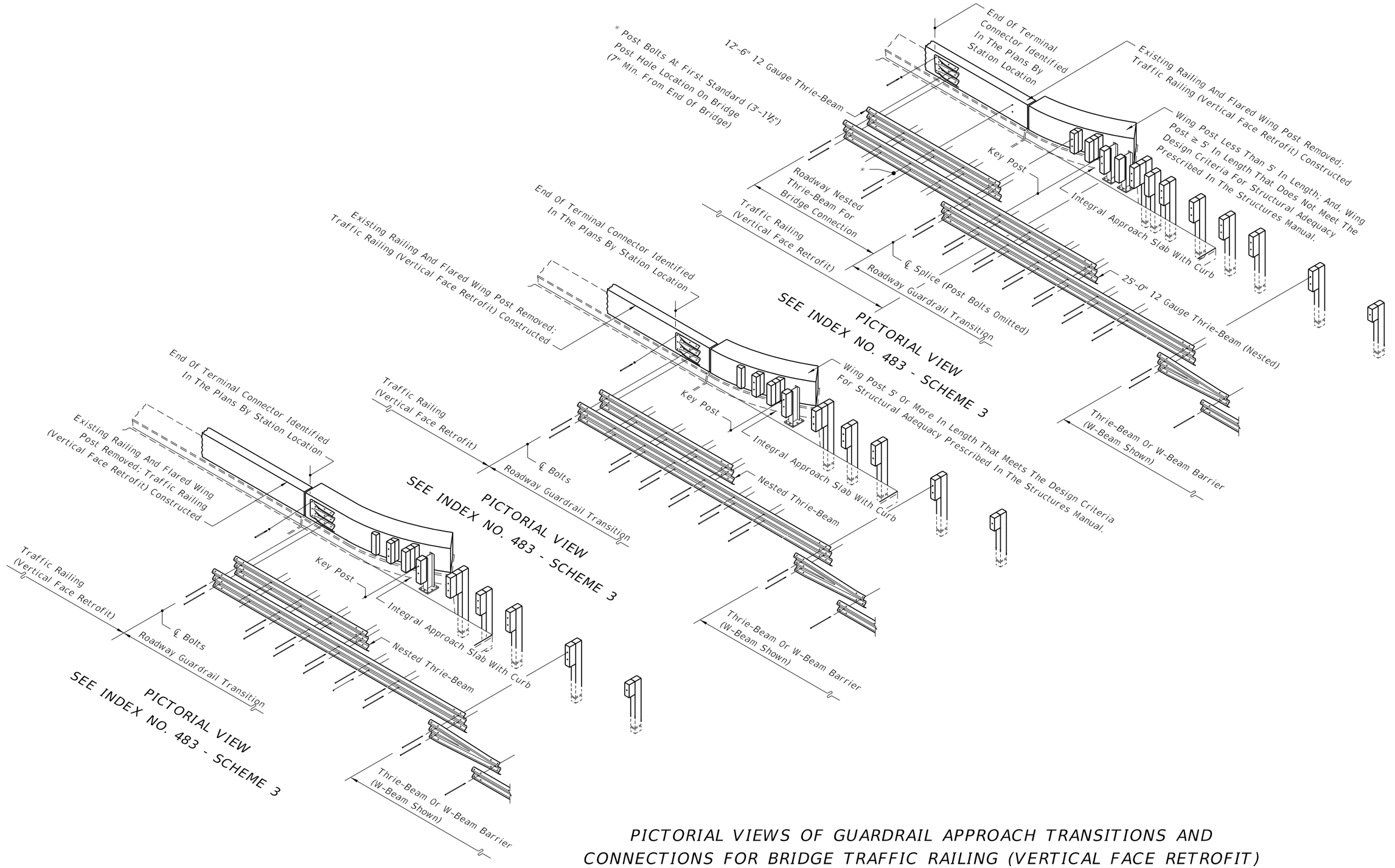
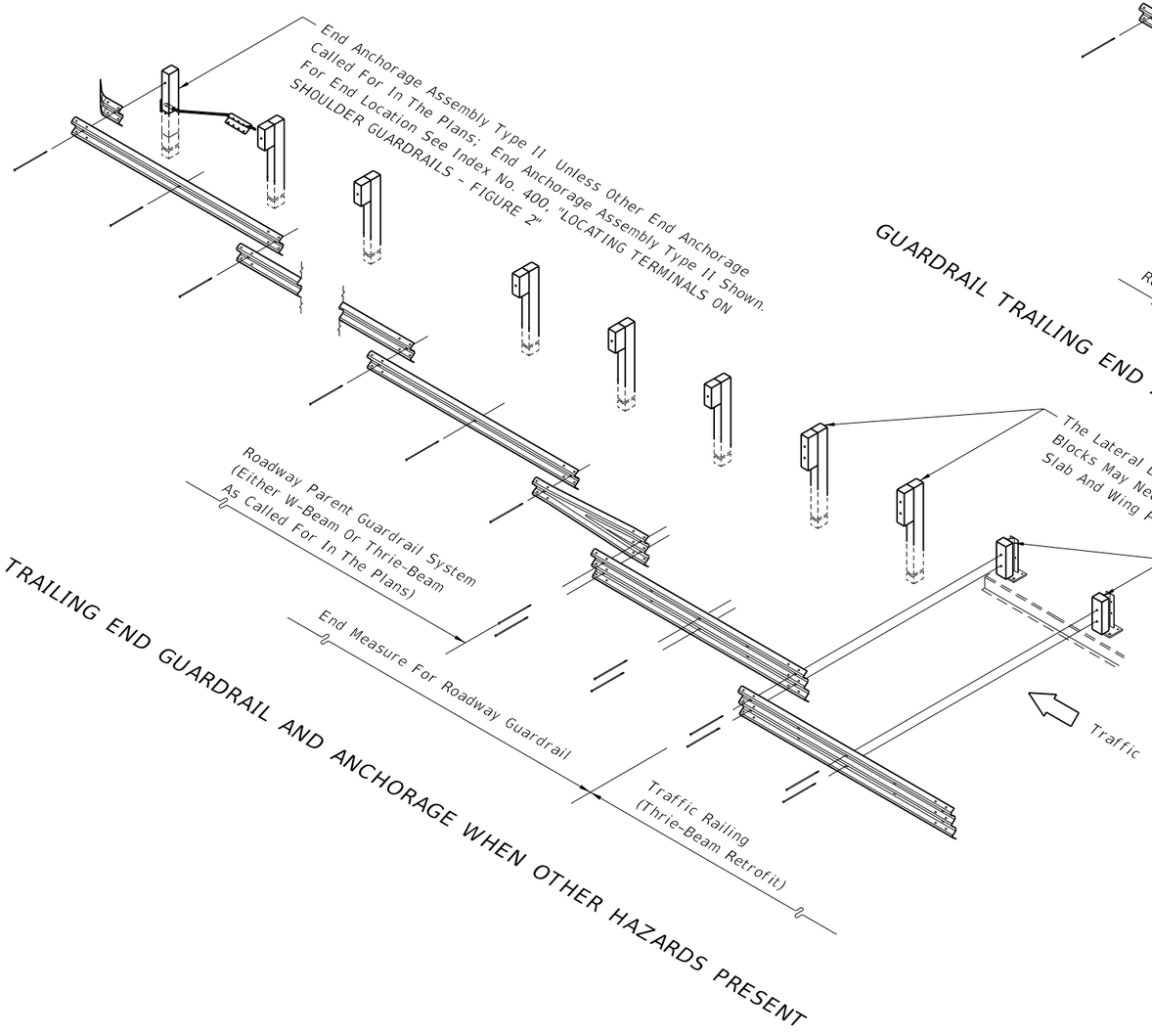
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	21

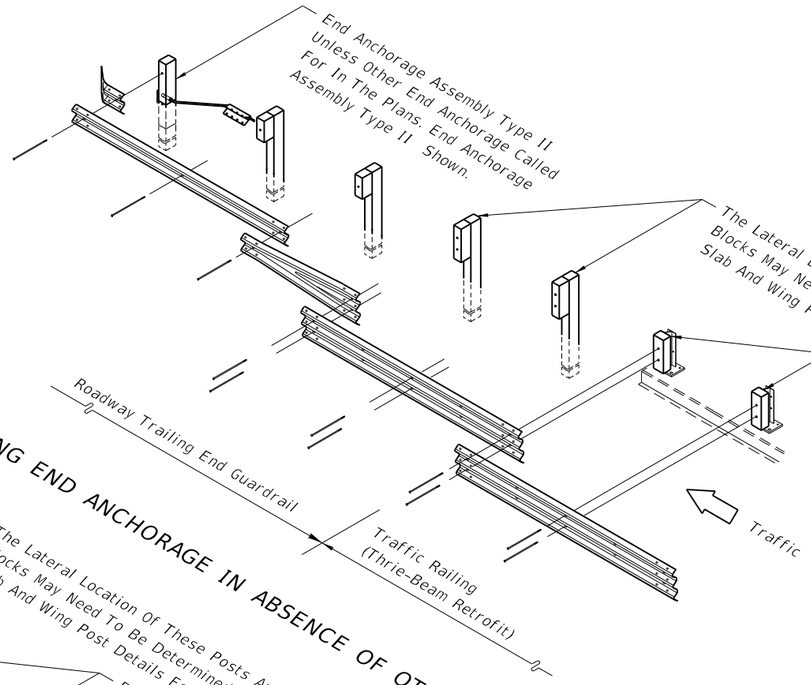


PICTORIAL VIEWS OF GUARDRAIL APPROACH TRANSITIONS AND CONNECTIONS FOR BRIDGE TRAFFIC RAILING (VERTICAL FACE RETROFIT)

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	22



TRAILING END GUARDRAIL AND ANCHORAGE WHEN OTHER HAZARDS PRESENT



GUARDRAIL TRAILING END ANCHORAGE IN ABSENCE OF OTHER HAZARDS

THRIE-BEAM RETROFIT NOTES

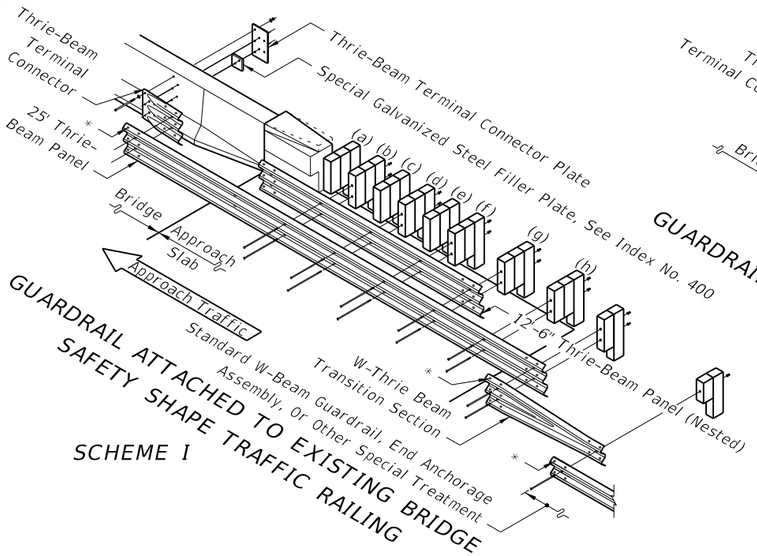
1. See indexes for bridge thrie-beam traffic railing retrofits.
2. Trailing end guardrail to be paid for under the contract unit price for the parent roadway guardrail; end measure includes length of end anchorage assembly; additional payment made for end anchorage assembly. No additional payment for connecting roadway thrie-beam to bridge thrie-beam retrofit.

NOTES FOR TRAILING END TRAFFIC RAILING VERTICAL FACE RETROFITS

1. Where Guardrail Extensions Are Required Beyond The Trailing End Of Bridges With Traffic Railing Vertical Face Retrofits, Guardrail Connections To The Bridge Railing Will Be By SPECIAL END SHOE For W-Beam Guardrail Extensions And By THRIE-BEAM TERMINAL CONNECTOR For Thrie-Beam Guardrail Extensions.
2. Install W-Beam Special End Shoes and Thrie-Beam Terminal Connectors With Back-up Plates, And ⅞"Ø HS Hex Bolts And Nuts (12" Long) with 2¼" OD Plain Round Washers Under Heads And Nuts (4 Required For Special End Shoes And 5 Required For Thrie-Beam Terminal Connectors). Back-Up Plates For Special End Shoes are 12"x12"x⅝" And For Terminal Connector 21"x12"x⅝".
3. Payment For Connecting Trailing End Special End Shoes And Thrie-Beam Terminal Connectors To Traffic Railing Vertical Face Retrofits Will Be Made Under The Contract Unit Price For Guardrail Bridge Anchorage Assembly, EA..

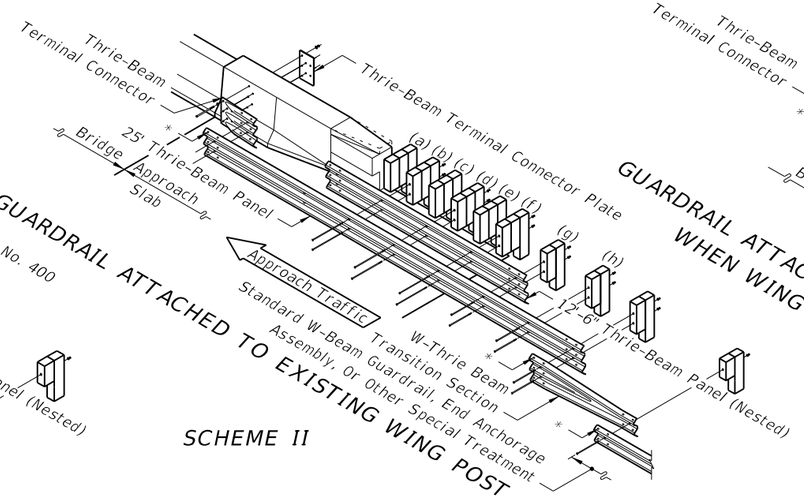
TRAILING END GUARDRAIL AND ANCHORAGE FOR BRIDGE TRAFFIC RAILING (THRIE BEAM RETROFITS)

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	INDEX NO.	SHEET NO.
07/01/07						402	23



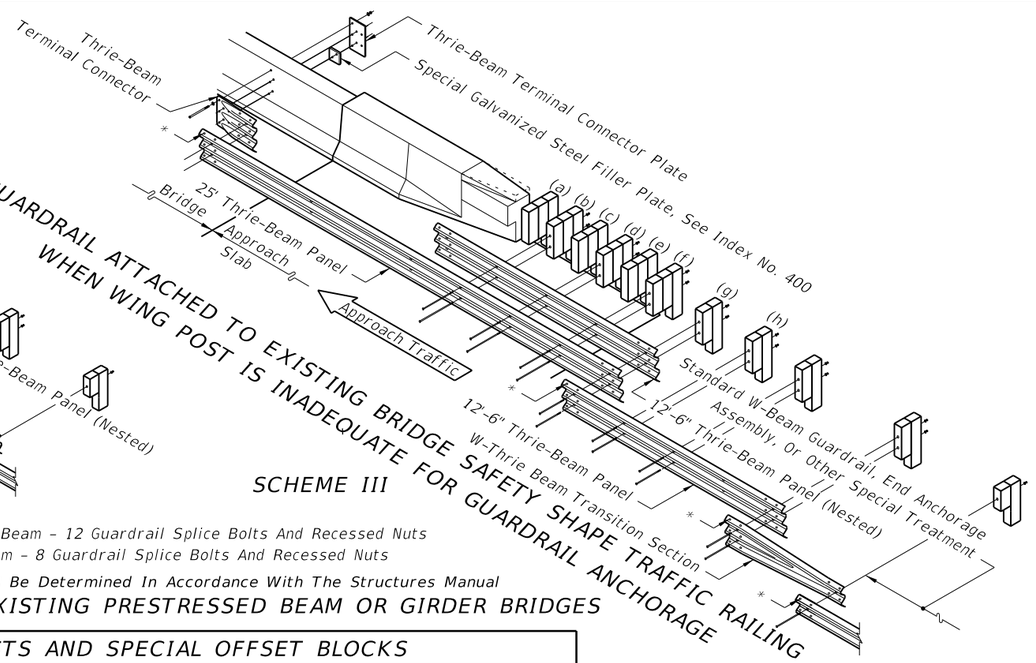
SCHEME I

GUARDRAIL ATTACHED TO EXISTING BRIDGE SAFETY SHAPE TRAFFIC RAILING



SCHEME II

GUARDRAIL ATTACHED TO EXISTING WING POST



SCHEME III

GUARDRAIL ATTACHED TO EXISTING BRIDGE SAFETY SHAPE TRAFFIC RAILING WHEN WING POST IS INADEQUATE FOR GUARDRAIL ANCHORAGE

* Splice Locations: Thrie-Beam – 12 Guardrail Splice Bolts And Recessed Nuts
W-Beam – 8 Guardrail Splice Bolts And Recessed Nuts

Use Of Scheme I Shall Be Determined
In Accordance With The Structures Manual

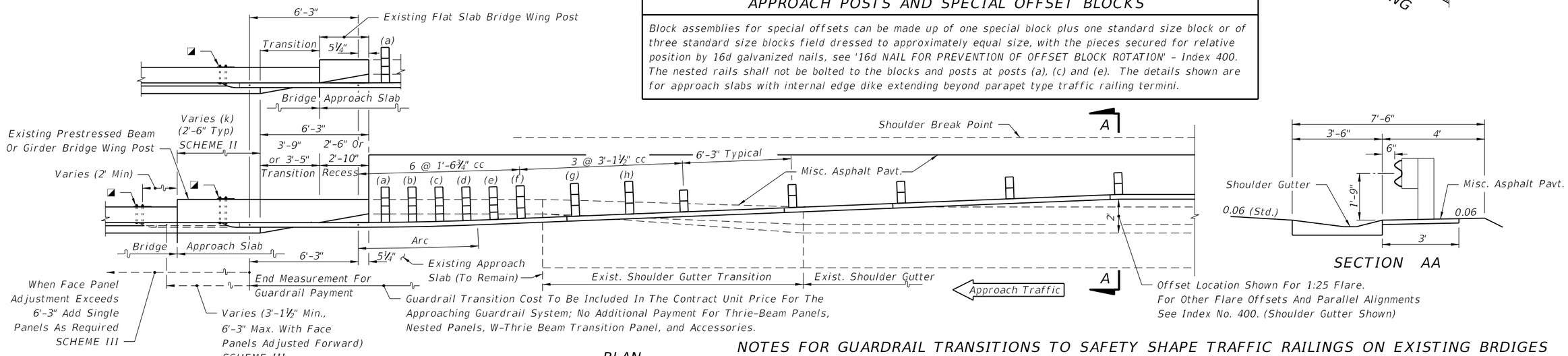
Use Of Schemes II And III Shall Be Determined In Accordance With The Structures Manual

GUARDRAIL TRANSITION TO EXISTING FLAT SLAB BRIDGES

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 400. 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.



PLAN

SECTION AA

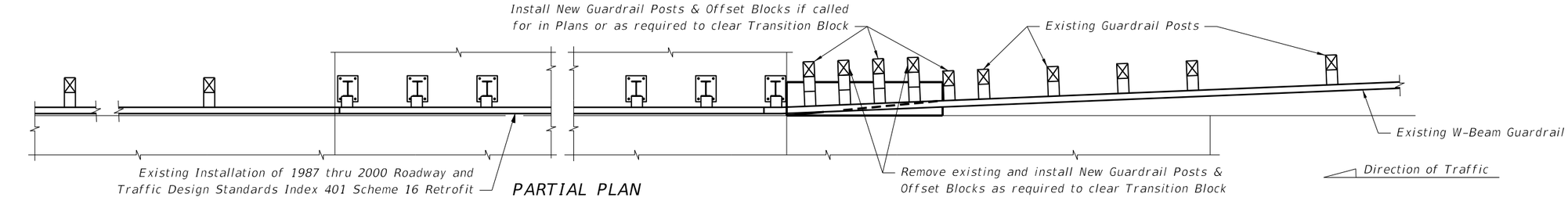
◪ 21"x12"x⅞" Thrie-Beam Terminal Connector Plate (Back-Up Plate), And ⅞"Ø x 18" Long [15" Long With 3½" Min. Thread Length For Bridge Safety Shape Railing] HS Hex Bolts And Nuts (5 Reqd.) With 2¼" OD Plain Round Washers Under Heads And Nuts. [When Attaching Guardrail To Existing Wing Posts Or Bridge 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 ⅞" 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 BRDIGES

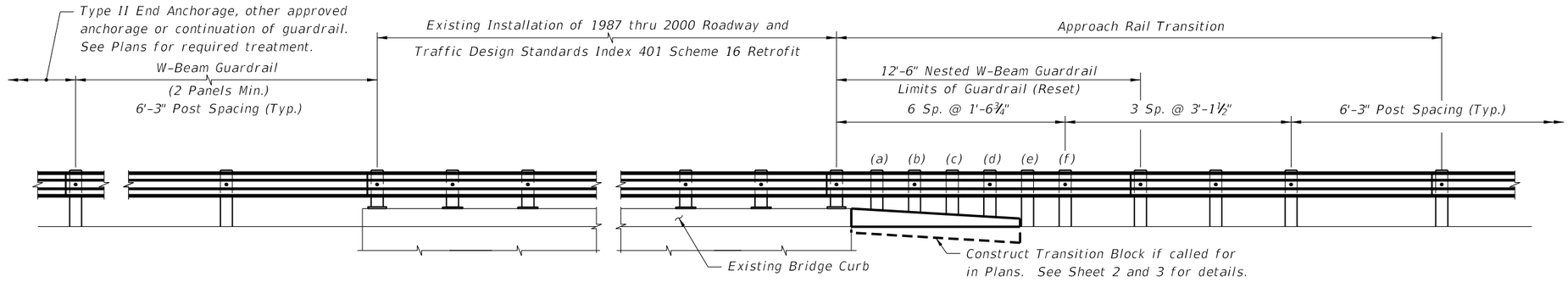
1. When the existing wing post is to be replaced with a bridge traffic railing in accordance with the Structures Manual, the thrie-beam guardrail connection shall be in accordance with Detail J of Index No. 400.
2. When the guardrail attachment overlays the Bridge Number, Bridge Name or Date on the traffic 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 ½"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.
3. 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	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/10			FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS AND CONNECTIONS FOR EXISTING BRIDGES	402	24



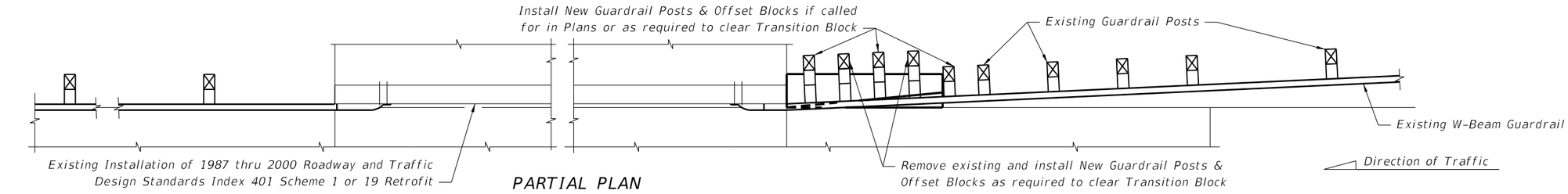
PARTIAL PLAN



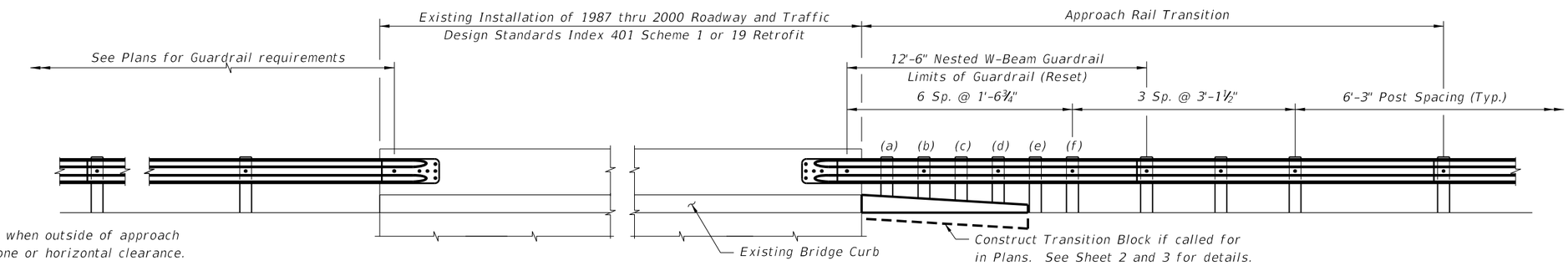
Note:
Do not bolt nested W-Beam to Posts and Offset Blocks at Posts (a), (c) & (e), (Typ.)

TRAILING END * — APPROACH END

PARTIAL ELEVATION
W-BEAM BRIDGE TRAFFIC RAILING RETROFITS



PARTIAL PLAN

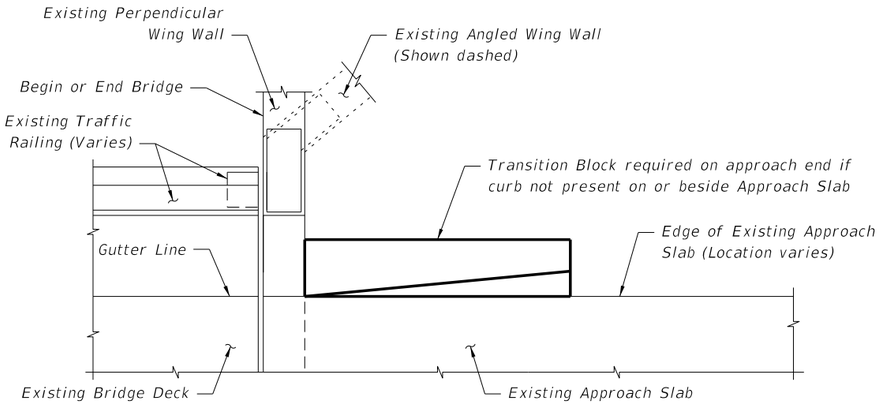


* For use when outside of approach clear zone or horizontal clearance.

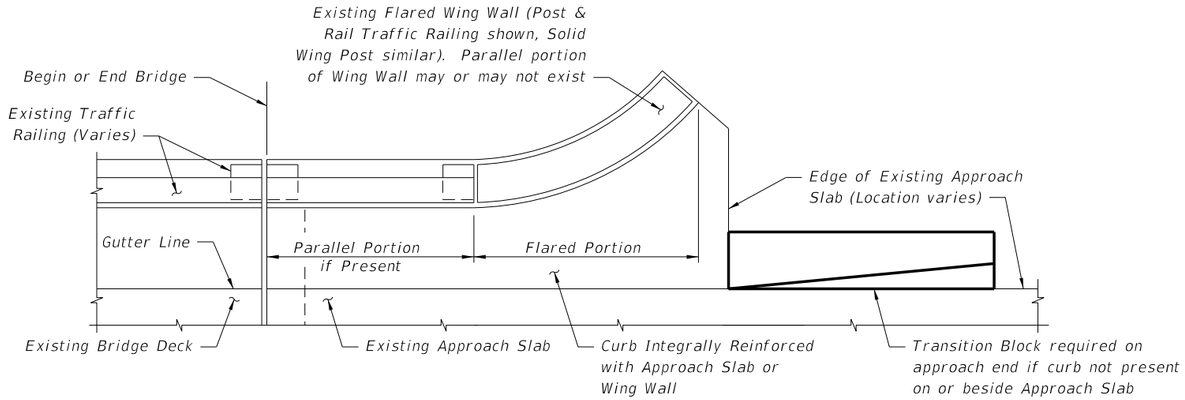
TRAILING END * — APPROACH END

PARTIAL ELEVATION
VERTICAL FACE BRIDGE TRAFFIC RAILING RETROFITS

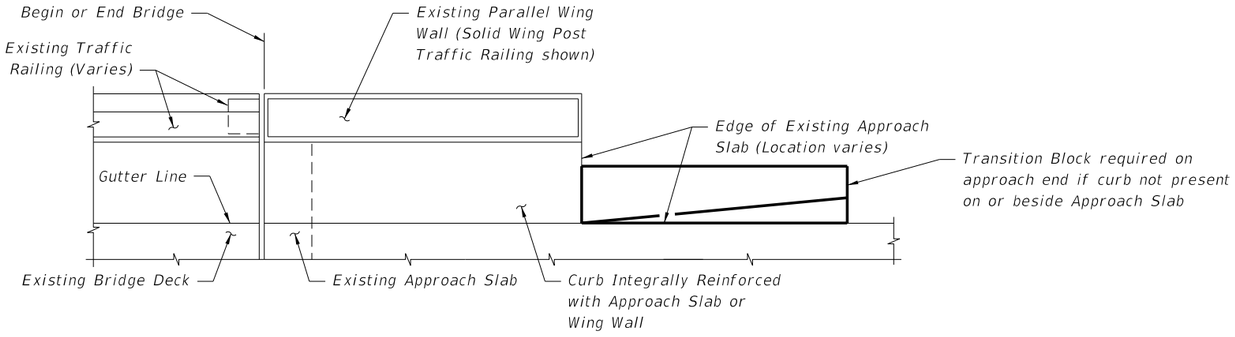
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/05			FDOT DESIGN STANDARDS 2013	GUARDRAIL TRANSITIONS FOR EXISTING BRIDGE TRAFFIC RAILING RETROFITS	403	1



PARTIAL PLAN VIEW OF EXISTING BRIDGE WITH PERPENDICULAR OR ANGLED WING WALLS

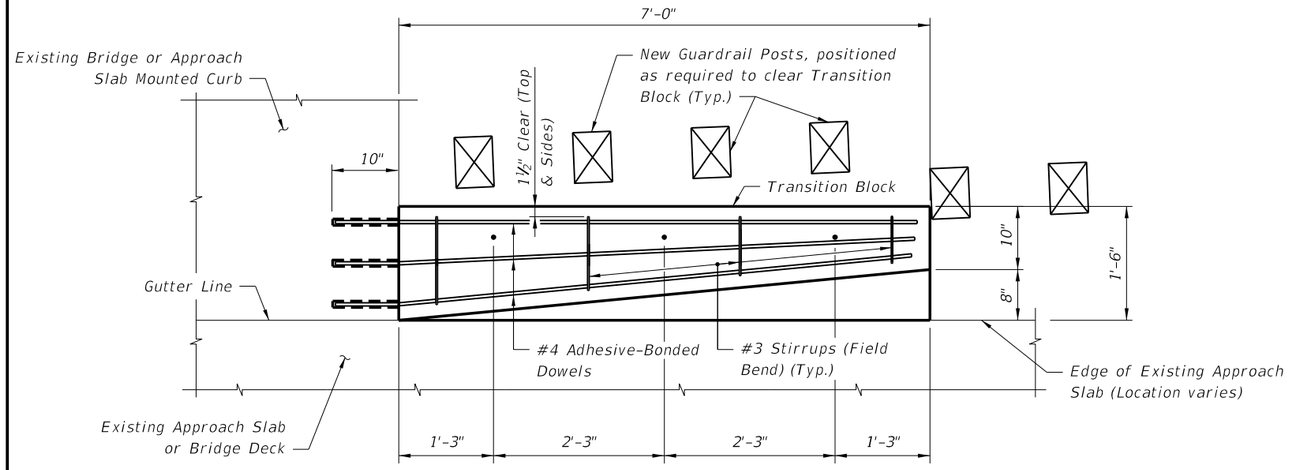


PARTIAL PLAN VIEW OF EXISTING BRIDGE WITH FLARED WING WALLS AND PARALLEL INTEGRALLY REINFORCED APPROACH SLAB CURBS (APPROACH SLAB WITH DETACHED CURBS OR SIDEWALK SIMILAR)

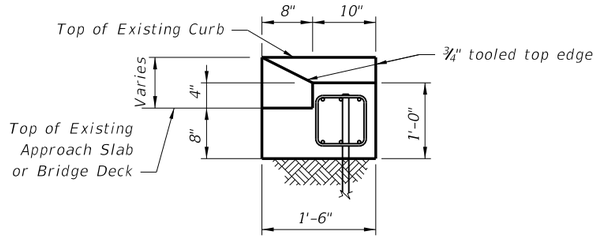


PARTIAL PLAN VIEW OF EXISTING BRIDGE WITH PARALLEL WING WALLS AND INTEGRALLY REINFORCED APPROACH SLAB CURBS (APPROACH SLAB WITH DETACHED CURBS OR SIDEWALK SIMILAR)

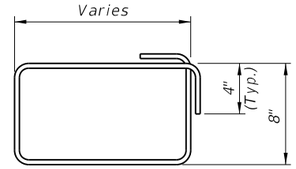
CROSS REFERENCE:
For Transition Block Details, Quantities and reinforcement see Sheet 3.



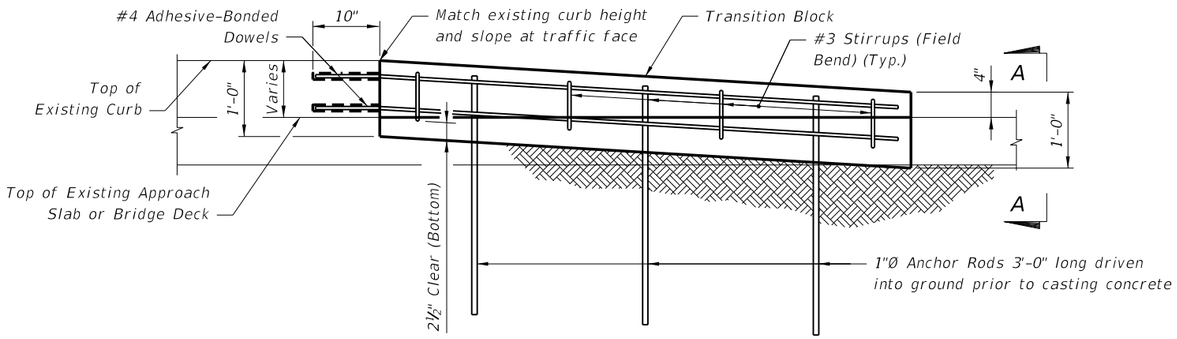
PLAN VIEW OF TRANSITION BLOCK
(GUARDRAIL NOT SHOWN FOR CLARITY)



END VIEW A-A



#3 STIRRUP (FIELD BEND)



ELEVATION OF TRANSITION BLOCK
(GUARDRAIL AND POSTS NOT
SHOWN FOR CLARITY)

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete Class NS	CY	0.4
Reinforcing Steel	LB	61
Guardrail (Reset)	LF	12.5

NOTES:

CONCRETE: Concrete for Transition Blocks shall be Class NS.

REINFORCING STEEL: Reinforcing steel shall be ASTM A615, Grade 60.

ANCHOR RODS: Steel Anchor Rods shall be ASTM A36, ASTM A709 Grade 36 or ASTM A615 Grade 60 hot-dip galvanized in accordance with Specification Section 962.

W BEAM GUARDRAIL: Guardrail components and installation shall be in accordance with Design Standards Index 400.

ADHESIVE-BONDED DOWELS: Adhesive Bonding Material Systems for Dowels shall comply with Specification Section 937 (Type HV) and be installed in accordance with Specification Section 416.

Adhesive Bonded Dowels are shown installed in an existing curb or sidewalk integrally reinforced with Approach Slab, Wingwall or Bridge Deck. For installations in existing detached curbs or sidewalks, install dowels in available sound concrete.

PAYMENT: Payment for Guardrail work will be made under Pay Item Guardrail (Reset) LF. Payment for Transition Block will be made under Pay Item Concrete Curb (Special), LF.

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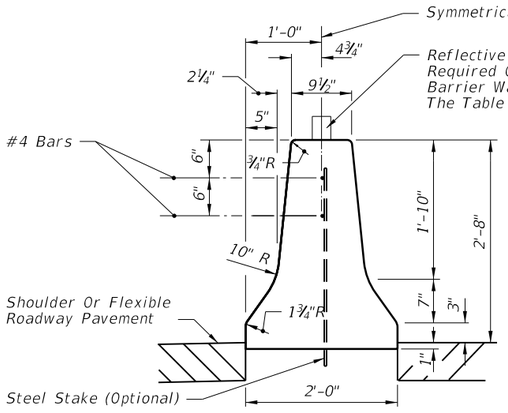
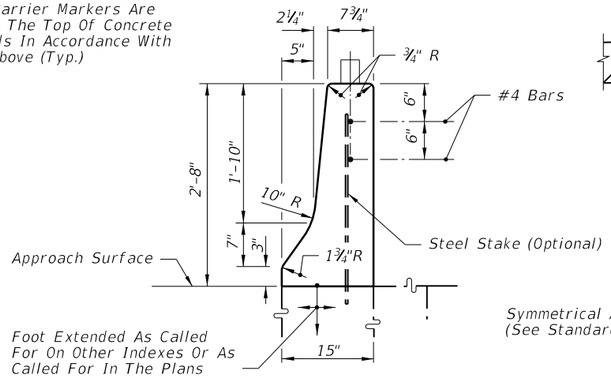
REFLECTIVE BARRIER MARKER SPACING ON WALL		
Distance- Edge of Travel Lane to Barrier Wall (ft)	Spacing (Ft.)	REMARKS
< 4'	40'	1. Reflectors shall conform to Section 993 of the Standard Specifications. 2. Reflector color (white or yellow) shall conform to the color of the near edgeline. 3. The cost for reflectors shall be included in the contract unit price for barrier wall.
4' to 8'	80'	
> than 8'	none required	



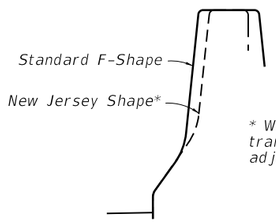
FULL WALL



HALF WALL

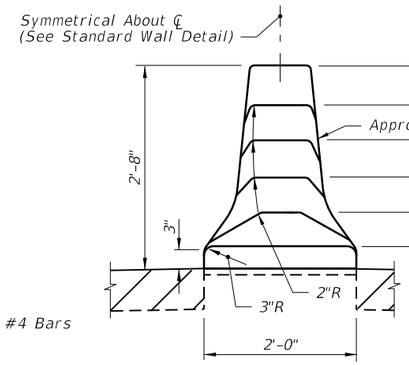
For concrete barrier wall details at piers, highway lighting and guardrail connections, see other sheets of this Index.
Standard barrier to be paid for under the contract unit price for Median Concrete Barrier Wall, LF.

STANDARD BARRIER WALL SECTIONS

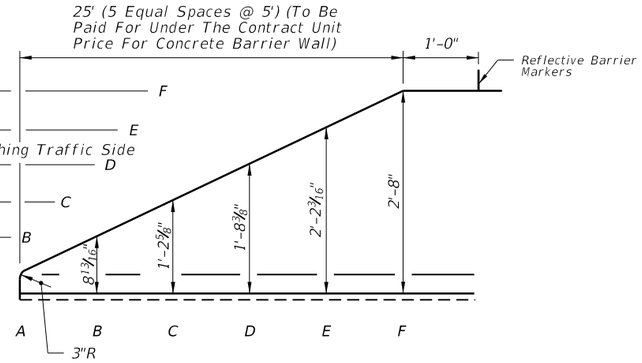


* Where standard F-Shape walls abut existing NJ Shape walls, face transitions of not less than 5' in length shall be constructed at the adjoining end of the F-Shape wall.

WALL FACE SAFETY SHAPES



END ELEVATION

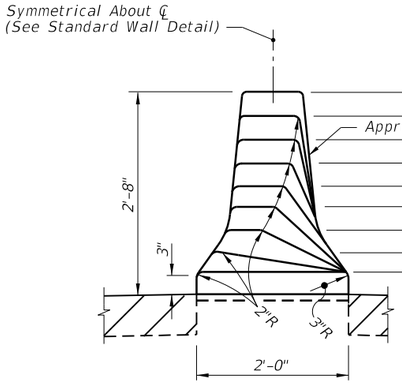


SIDE ELEVATION

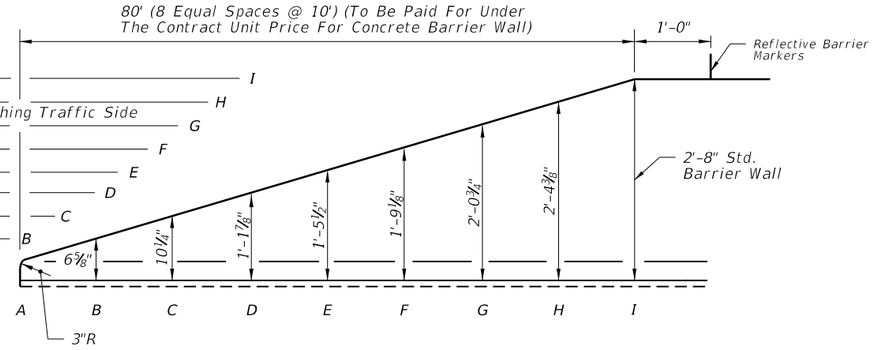
TO BE USED ONLY WHERE TERMINAL LOCATED CLEAR ZONE WIDTH FROM EDGE OF THE NEAR APPROACH TRAFFIC LANE.

CONCRETE BARRIER WALL TERMINAL

DETAIL II



END ELEVATION



SIDE ELEVATION

DESIGN SPEED 45 MPH OR LESS
CONCRETE BARRIER WALL TERMINAL FOR NARROW MEDIAN

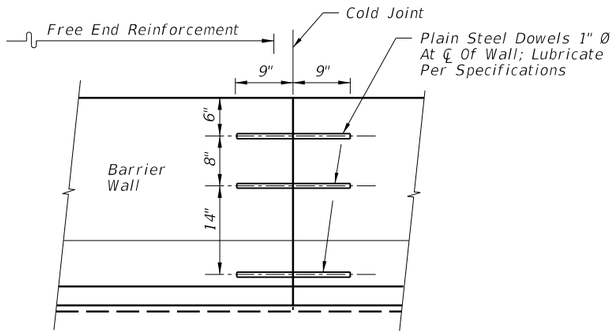
DETAIL III

GENERAL NOTES

1. Class II concrete shall be used for all reinforced and plain (nonreinforced) concrete barrier walls; except, in moderately and extremely aggressive environments, Class IV concrete shall be used. All reinforcing steel with undesignated size shall be #4 bars. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Standard Specifications, unless other finish called for in plans. The surfaces shall have a Class 5 Applied Finished Coating in accordance with Section 400 only when called for in the plans.
2. Concrete barrier wall terminal notes for design speeds ≥ 50 mph.
   a. Terminated outside clear zone of the approach traffic with 'DETAIL II' end treatment.
   b. Terminated within a shielded location.
   c. Terminal protection by the use of a crash cushion system.
   d. Terminated in conjunction with a suitably designed transition to another barrier.
3. Expansion joints in wall required only at bridge ends and/or at locations where wall is an integral part of existing or proposed concrete slab; wall joints are to match an existing or proposed expansion joint.
4. When the barrier is installed adjacent to the pavement the top 12" of the subgrade shall be compacted to at least 98% of the maximum density determined by FM 1-T 180, Method D.
5. For cast-in-place barrier wall segments constructed with the slip form method, score 3/8" deep crack control V-Grooves while the concrete is still plastic and mold them when walls are constructed with the stationary form method. All 3/8" deep V-Grooves shall be spaced at 20' intervals, the end of the side face grooves shall be in line with the ends of the top face groove and the long dimension of all grooves shall align at 90 degrees to the longitudinal axis of the wall. When wall segments are less than 40' in length, space the V-Groove equally between open joints. Dowel transverse construction joints for abutting segments less than 40' (See Detail B).
6. Precast construction is allowed as an alternate to cast-in-place construction.
   a. Wall segments <40' in length shall be joined by a transverse joint in accordance with Details C & D on Sheet 2. The minimum segment length is 20'.
   b. Bedding of the precast sections shall be facilitated by the use of sand-cement grout or equal method to assure uniform bearing.
   c. Reinforcement may be required for handling stresses.
7. On roadways designated for reverse laning all downstream, ends that are not shielded or outside the clear zone shall be marked by Type 3 Object Markers.
8. Cost of reinforcing steel and reflective barrier markers shall be included in the contract unit price for concrete barrier wall. See individual details for pay item information.
9. For barrier wall inlet details see Indexes Nos. 217, 218 and 219.
10. Concrete barrier wall with New Jersey Safety Shape may not be substituted for the Standard F Shape Barrier.

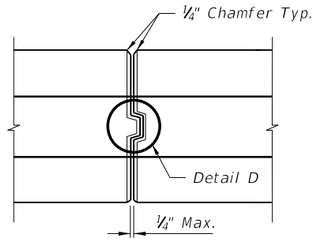
C:\d\projects\standards\roadway\00400-s\00410-01.dgn
rd960rh
2:43:55 PM
6/28/2012

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/12			FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	410	1



DOWELED TRANSVERSE CONSTRUCTION JOINT WHEN ABUTTING SEGMENT(S) LESS THAN 40' IN LENGTH

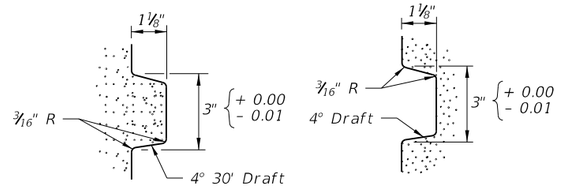
DETAIL B



TOP VIEW

PRECAST BARRIER TRANSVERSE JOINTS

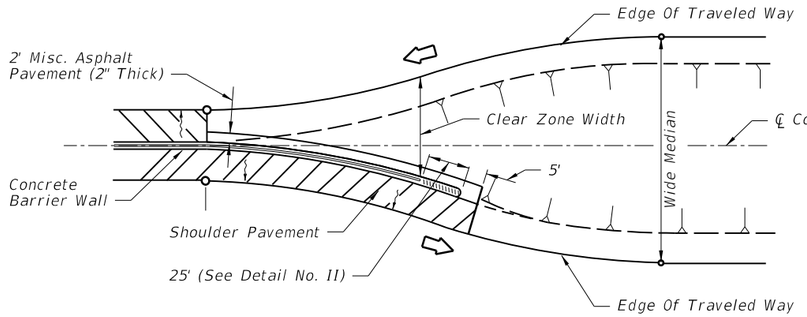
DETAIL C



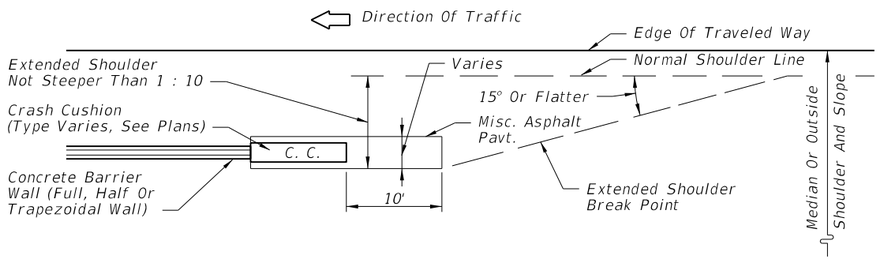
TOP VIEW

STRAIGHT TONGUE AND GROOVE

DETAIL D

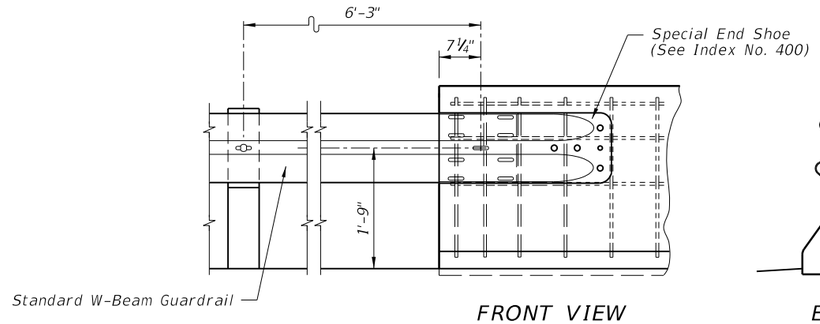


CONCRETE BARRIER WALL TRANSITION BETWEEN WIDE AND NARROW MEDIANS WHEN BARRIER WALL END LOCATED OUTSIDE APPROACH CLEAR ZONE OR HORIZONTAL CLEARANCE

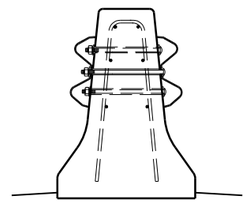


SHOULDER TREATMENT WHEN CRASH CUSHIONS SHIELDING CONCRETE BARRIER WALL END LOCATED INSIDE APPROACH CLEAR ZONE OR HORIZONTAL CLEARANCE

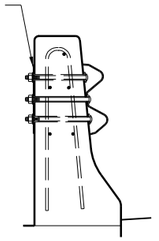
DETAIL A



FRONT VIEW



END VIEW



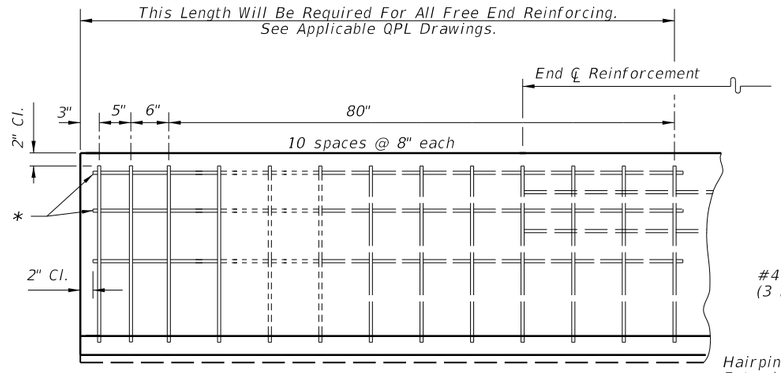
END VIEW

NOTES

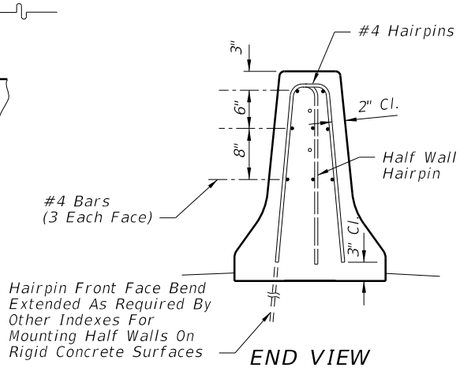
1. End of wall flush mounted connections are not applicable to two-lane two-way facilities. See Sheets 20, 24, and 25 for trailing end connections on two-lane two-way facilities and for approach guardrail connections.

2. Trailing guardrail connections to double face safety shaped walls will be under one of the following traffic conditions and mounting methods:
   (a) One-way traffic trailing condition one side only – flush mount with flat steel back-up plate on back side.
   (b) One-way traffic trailing condition both sides – flush mount both sides.
   (c) For trailing condition one side and approach traffic condition opposite side – see "Median Barrier Wall" mounting, Sheet 25.

W-BEAM GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL TRAILING ENDS



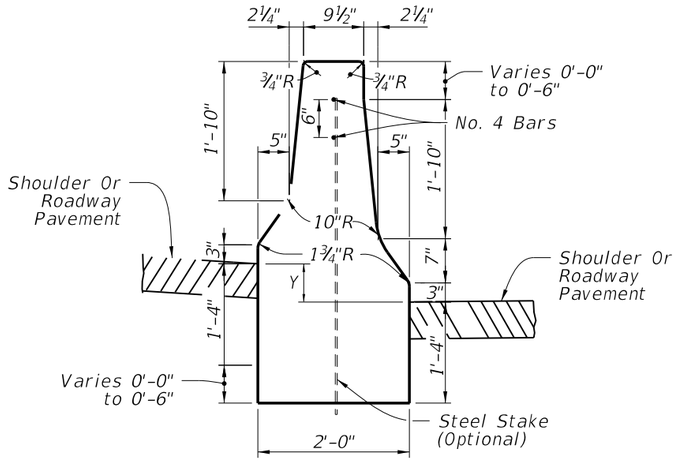
SIDE VIEW



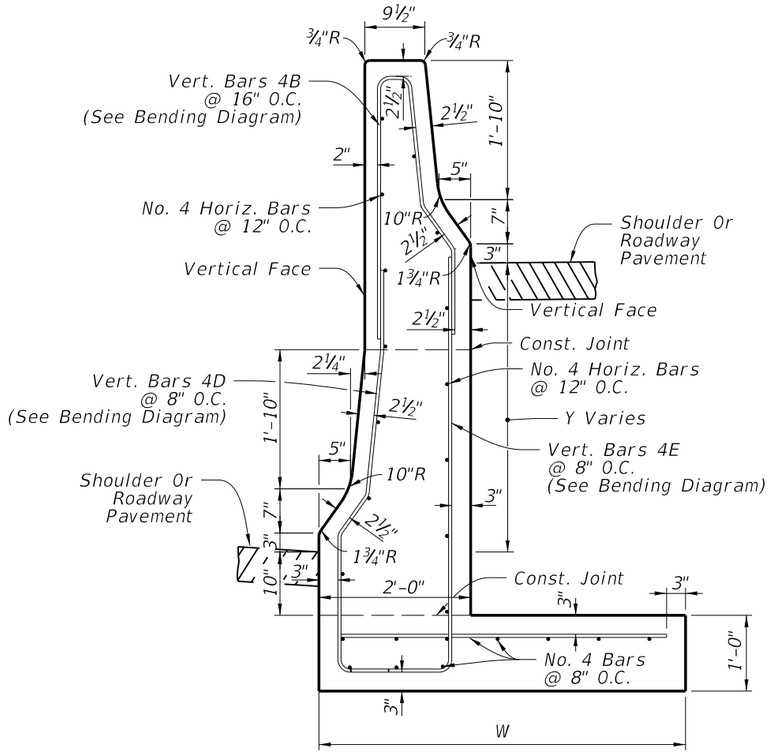
END VIEW

* Note: Free end reinforcement required for nonreinforced walls at the following locations: All exposed ends; abutting ends of true joints; ends with guardrail connections; ends with redirective crash cushion connections; and, ends connecting to bridge traffic rails or other rigid barrier walls.

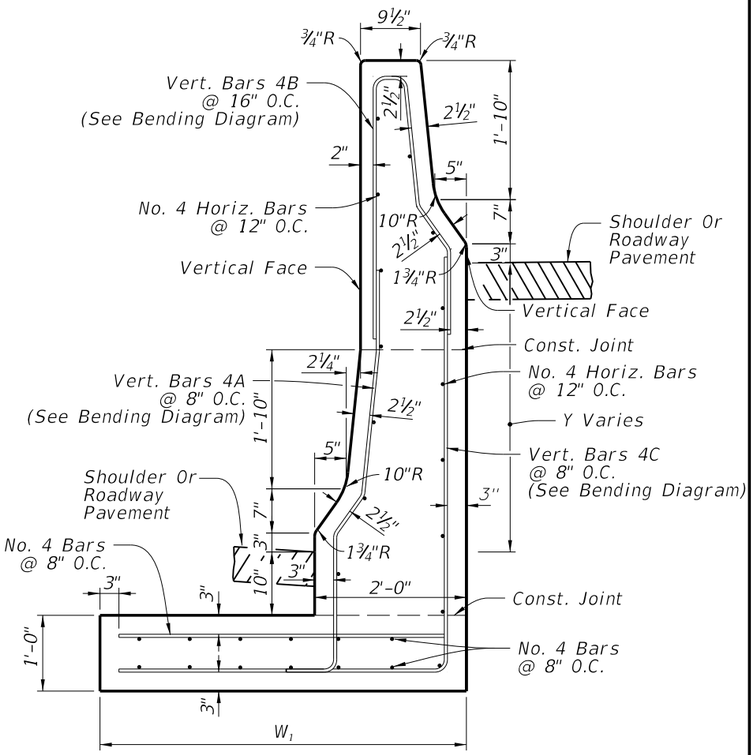
FREE END REINFORCEMENT



F-SHAPE MEDIAN BARRIER
WHEN Y IS LESS THAN OR EQUAL TO 6 INCHES

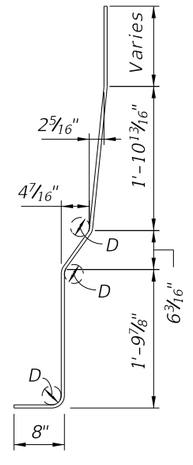


CANTILEVER WALL
SUPERELEVATED SECTION

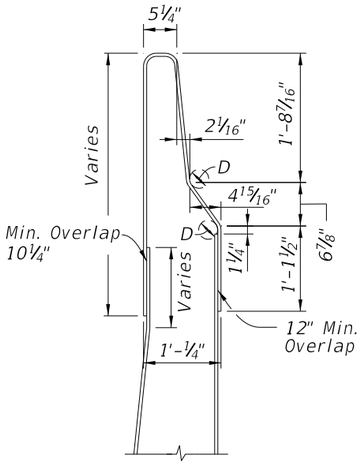


L-WALL
SUPERELEVATED SECTION

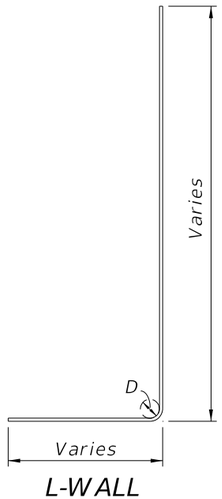
BENDING DIAGRAMS



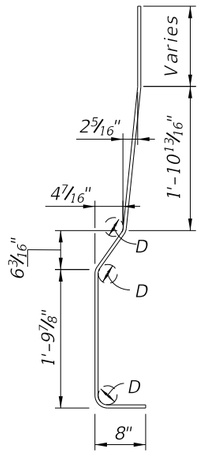
L-WALL
BAR 4A



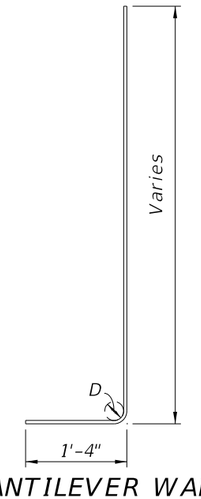
L-WALL & CANTILEVER WALL
BAR 4B



L-WALL
BAR 4C



CANTILEVER WALL
BAR 4D



CANTILEVER WALL
BAR 4E

Design Criteria:

This barrier wall has been structurally evaluated to be equivalent or greater in strength to other safety shapes which have been crash tested to NCHRP Report 350 TL-4 criteria.

Unless the plans stipulate a specific wall type, either the Cantilever wall or the "L" wall may be constructed at the Contractor's option.

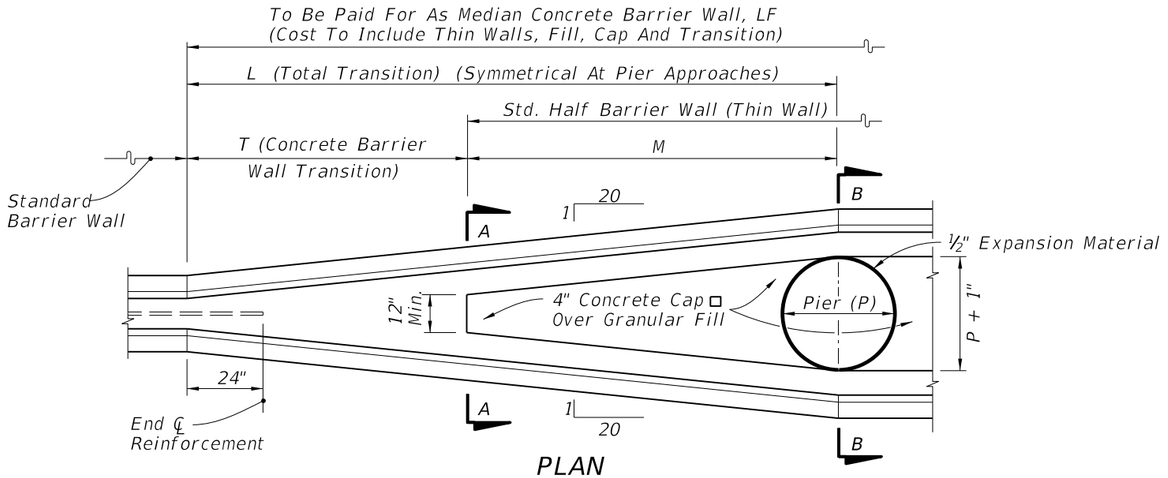
Cost of the footing to be included in the contract unit price for Median Concrete Barrier Wall, LF.

Cantilever Wall								
	Height Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
	Width W	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-3"	6'-6"
Min. Segment Wall Length		39'	35'		29'	26'	24'	22'

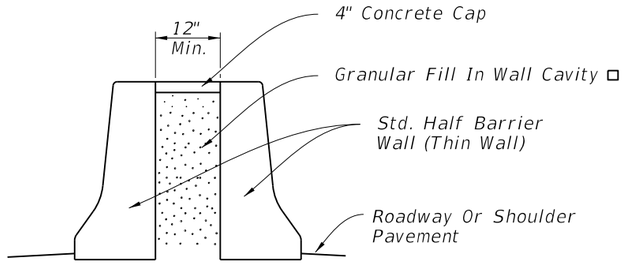
"L" Wall								
	Height Y		1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
	Width W_1	5'-0"	5'-3"	5'-6"	5'-9"		6'-6"	7'-0"
Min. Segment Wall Length		46'	44'	42'	41'	39'	36'	33'

MEDIAN BARRIER WALL FOR SUPERELEVATED SECTIONS OR FOR VARIABLE ROADWAY PROFILE GRADES

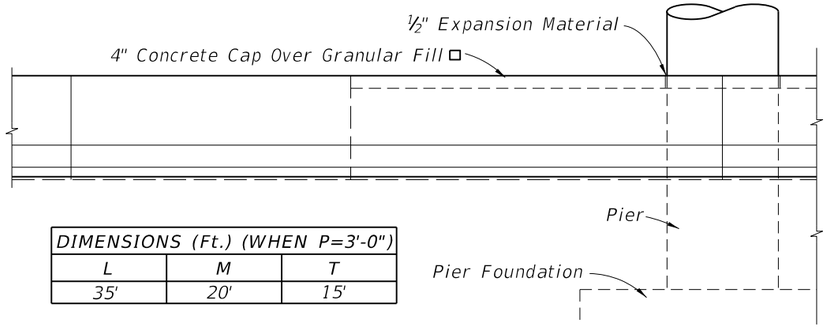
LAST REVISION	REVISION	DESCRIPTION:				
01/01/11			FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 3



PLAN

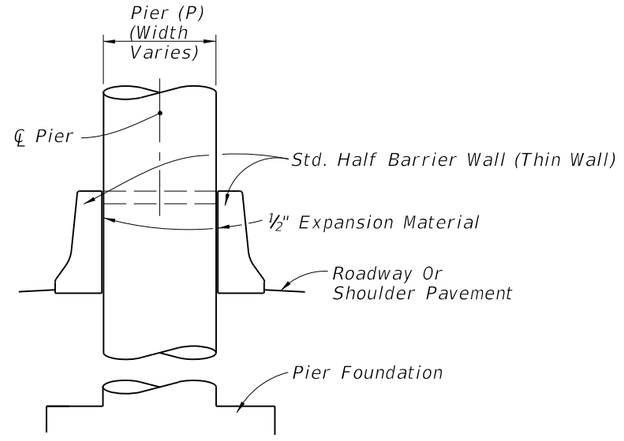


SECTION AA



DIMENSIONS (Ft.) (WHEN P=3'-0")		
L	M	T
35'	20'	15'

ELEVATION

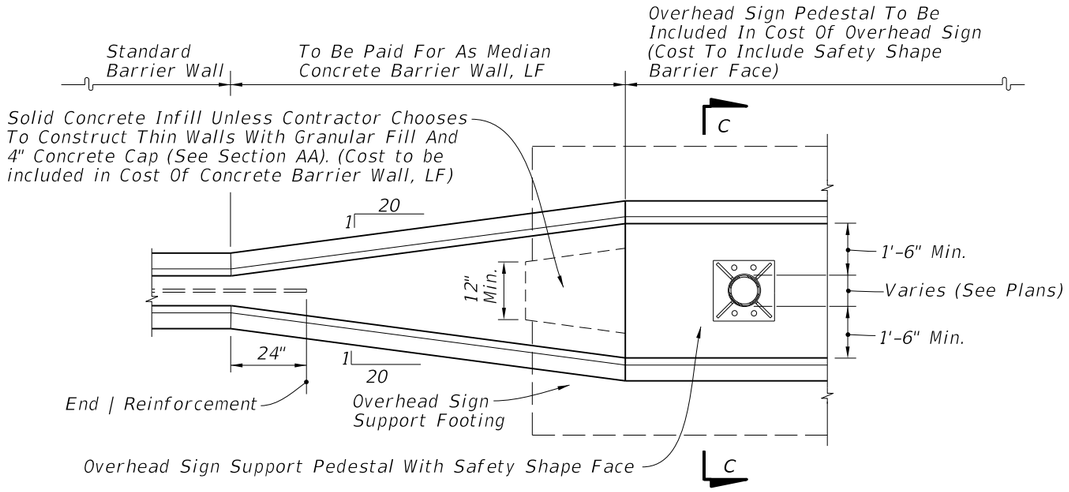


SECTION BB
BRIDGE PIERS

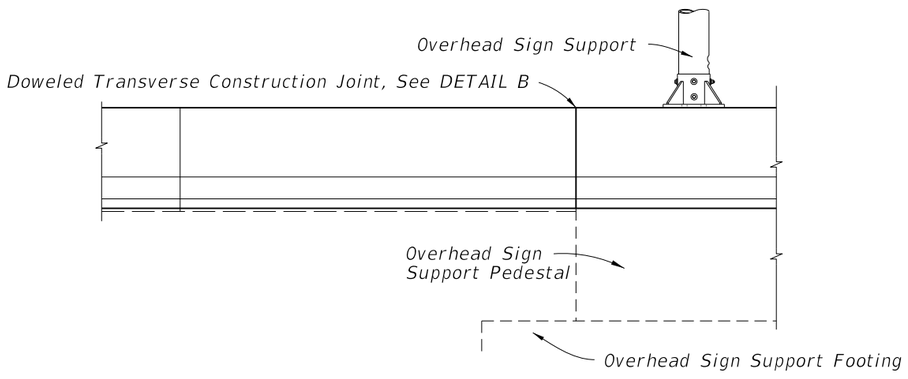
□ Fill To Be Free Of Deleterious And Cementitious Material

CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT BRIDGE PIERS WHEN DESIGN SPEED < 45 MPH

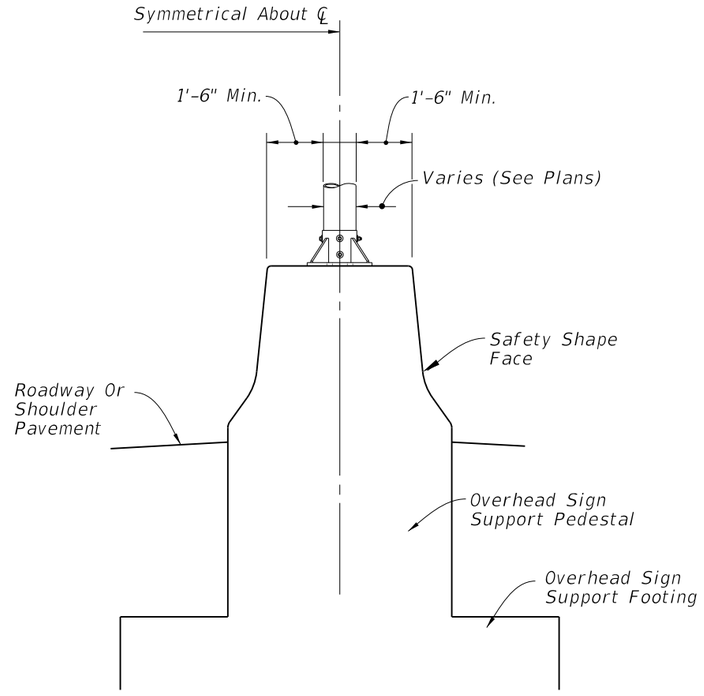
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO.	SHEET NO.
07/01/07						410	4



PLAN



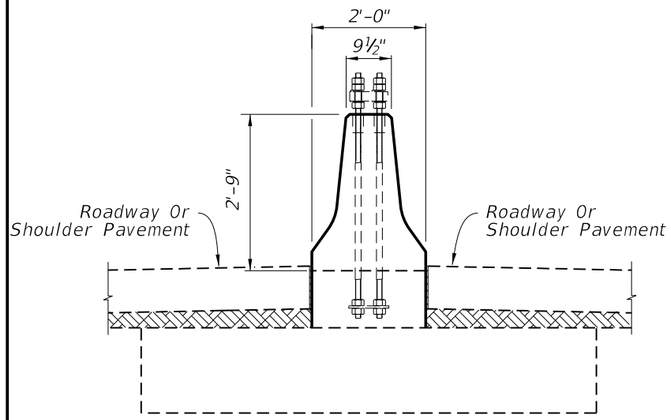
ELEVATION



SECTION CC

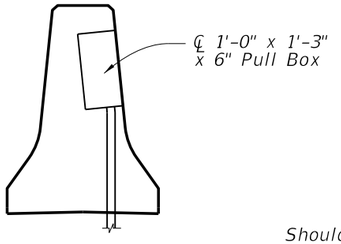
CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT OVERHEAD SIGN SUPPORTS WHEN DESIGN SPEED < 45 MPH

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO.	SHEET NO.
07/01/10						410	5



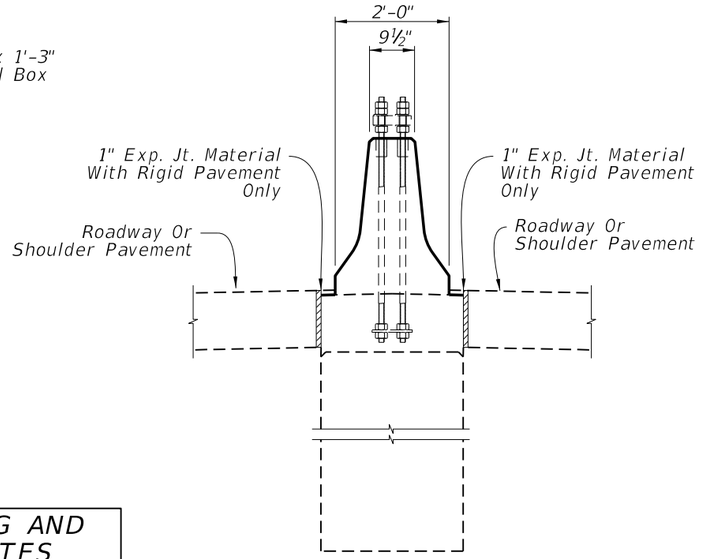
END VIEW

SPREAD FOOTING OPTION



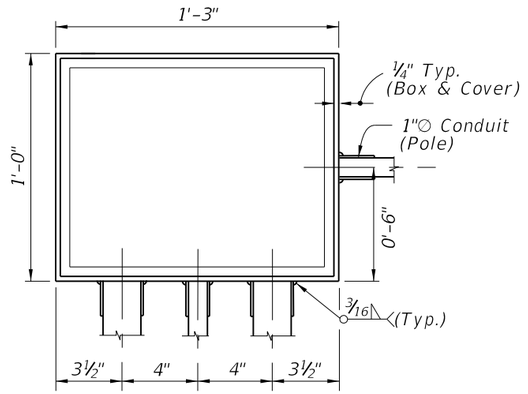
TRANSVERSE SECTION

INSTALLATION



END VIEW

CYLINDRICAL OPTION

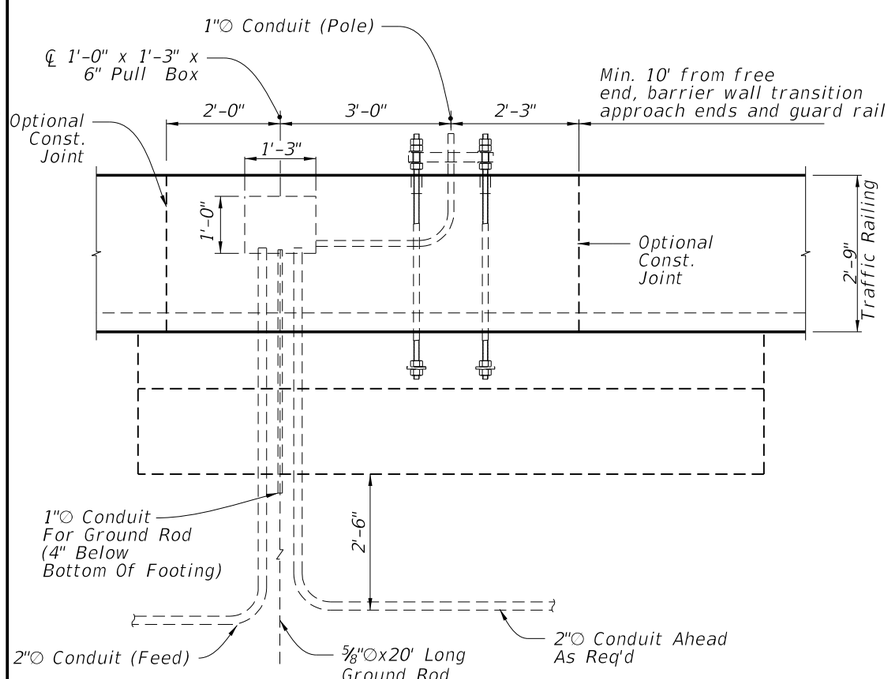


FRONT VIEW

PULL BOX

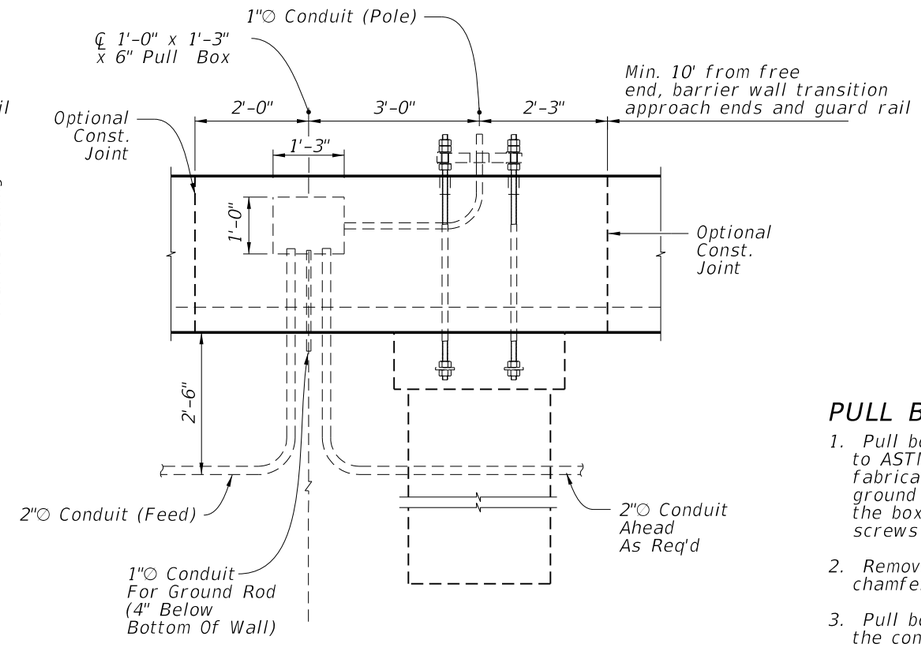
SPREAD FOOTING AND CYLINDRICAL NOTES

The Reinforcement Details And Dimensions For Both The Spread Footing And Cylindrical Foundations Can Be Found In Index 17515.



ELEVATION

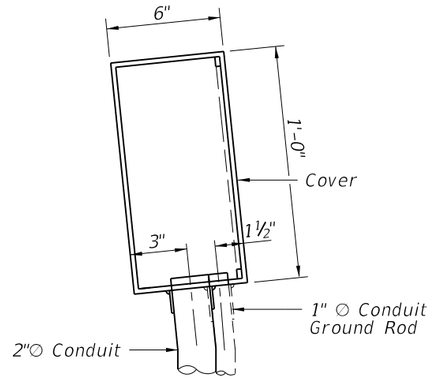
SPREAD FOOTING OPTION



ELEVATION

CYLINDRICAL OPTION

LIGHT POLE MOUNTING IN MEDIAN BARRIER WALL



SIDE VIEW

PULL BOX

PULL BOX NOTES

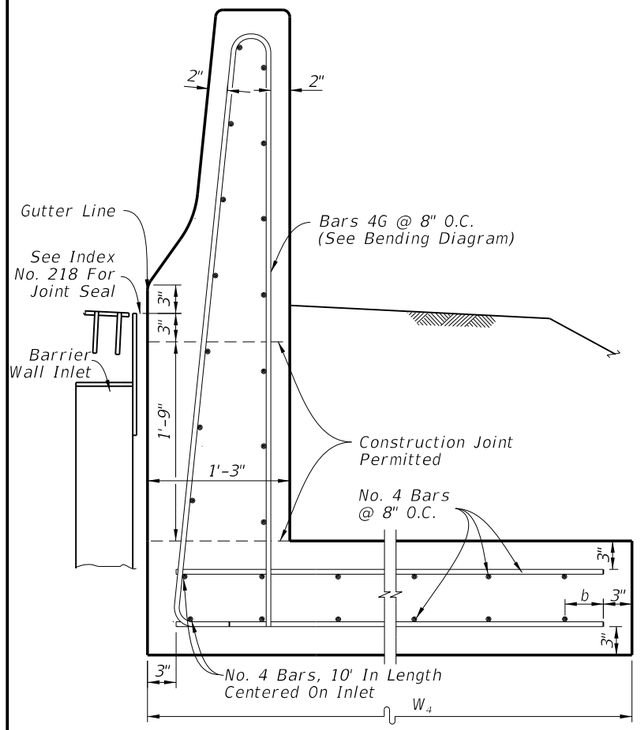
1. Pull boxes are to be fabricated from steel conforming to ASTM A36 and be hot-dip galvanized after fabrication. All seams shall be continuously welded and ground smooth. A neoprene gasket shall be attached to the box to provide a watertight cover. The cover screws shall be fully galvanized.

2. Remove excess concrete while green and hand form chamfers.

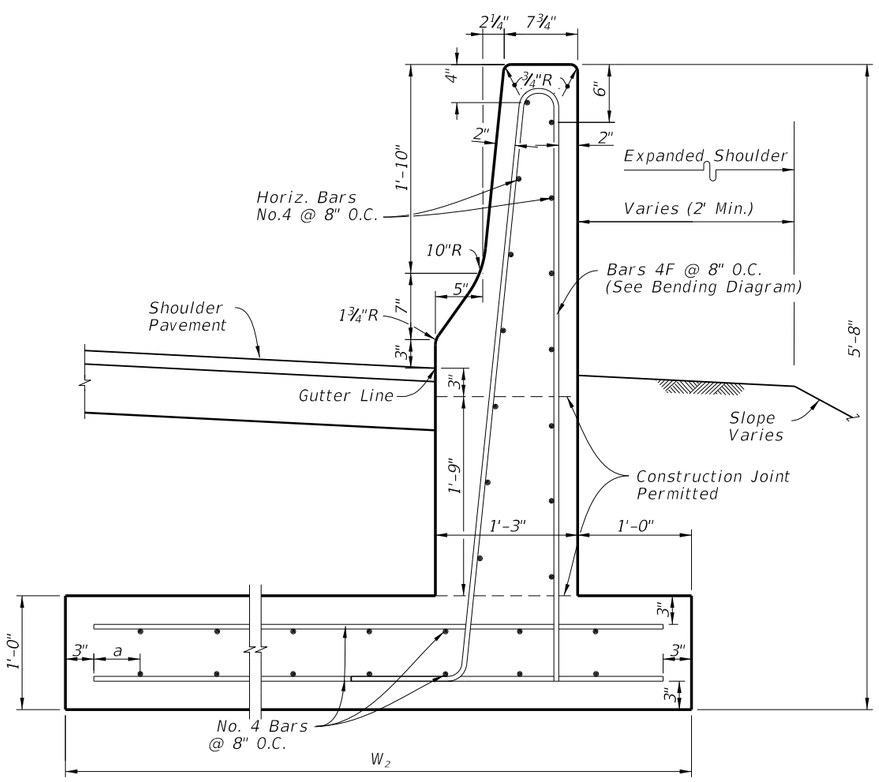
3. Pull box complete and conduit risers are incidental to the construction and cost of the barrier wall; there is to be no separate compensation for the box, risers or installation unless specifically called for in the plans.

PULL BOX - ELECTRICAL

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/09			FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	410	6

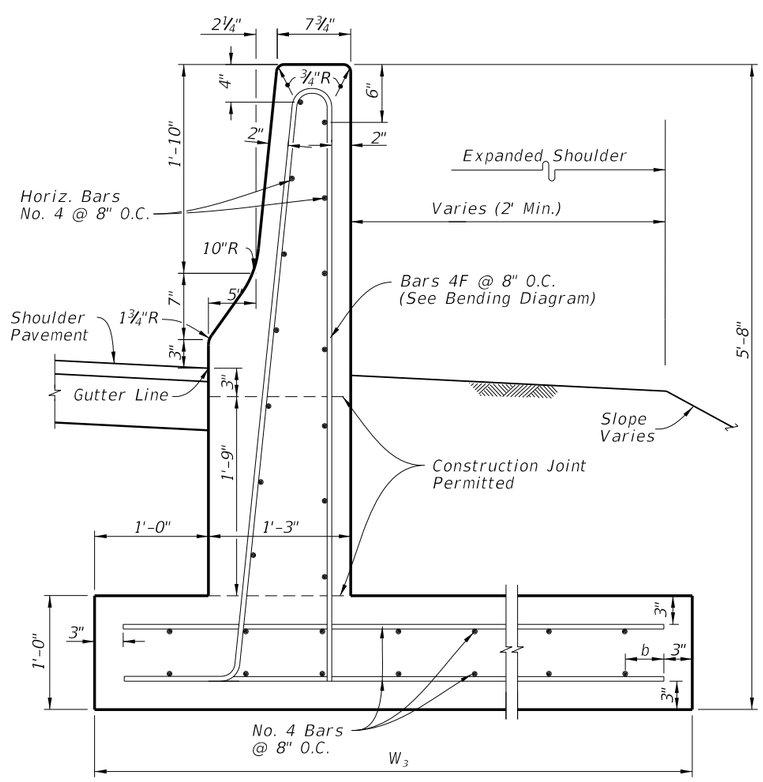


REINFORCING STEEL MODIFICATIONS
AT BARRIER WALL INLETS (INDEX NO. 218)



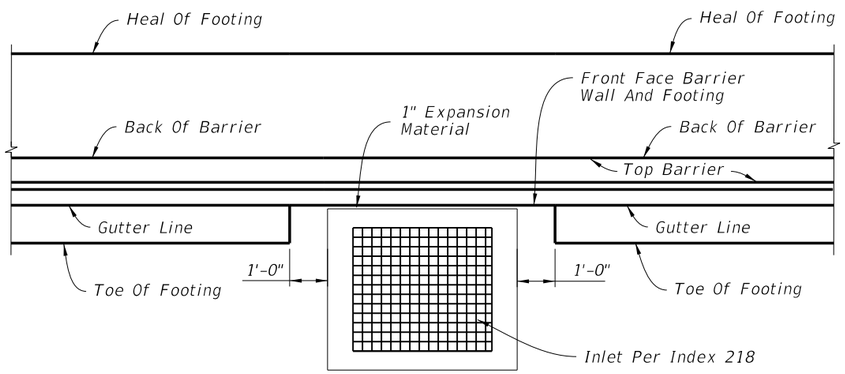
NOTE: All longitudinal reinforcement #4 bars.

CANTILEVER WALL



NOTE: All longitudinal reinforcement #4 bars.

L-WALL



BARRIER WALL FOOTING
TRANSITION AT INLETS
PLAN VIEW

GENERAL NOTES:

1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet each side of all cold joints.
2. This barrier wall has been structurally evaluated to be equivalent or greater in strength to other safety shapes which have been crash tested to NCHRP Report 350 TL-4 criteria.
3. Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Shoulder), LF.

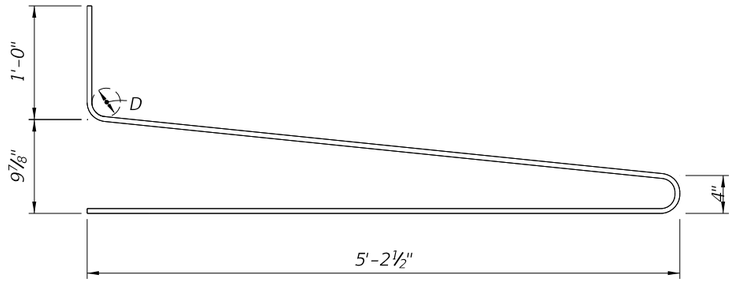
DIMENSIONS AND QUANTITIES

CANTILEVER WALL					L-WALL					
Length* Of Barrier Wall (LF)	W_2 (LF)	a	Class II Conc. CY Per LF	Rein. Steel Lbs. Per LF	Length* Of Barrier Wall	W_3 (LF)	W_4 (LF)	b	Class II Conc. CY Per LF	Rein. Steel Lbs. Per LF
≥ 65'	3'-3"	5"	0.30	31	≥ 60'	3'-6"	2'-6"	7"	0.31	32
57' to 64'	3'-9"	3"	0.32	33	50' to 59'	4'-0"	3'-0"	5"	0.33	34
50' to 56'	4'-3"	3"	0.33	35	40' to 49'	4'-9"	3'-9"	6"	0.35	37
41' to 49'	5'-0"	7"	0.36	38	35' to 39'	5'-3"	4'-3"	4"	0.37	39
36' to 40'	5'-6"	5"	0.38	40	30' to 34'	5'-9"	4'-9"	2"	0.39	42
28' to 35'	6'-6"	3"	0.42	44	25' to 29'	6'-6"	5'-6"	3"	0.42	44
25' to 27'	7'-0"	7"	0.44	46	20' to 24'	7'-6"	6'-6"	2"	0.45	49

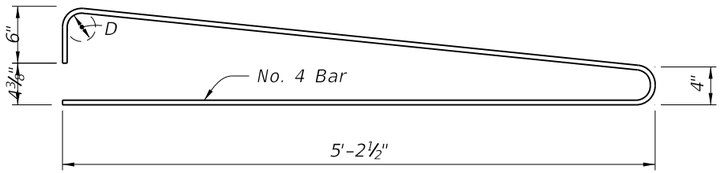
Quantities shown are for information only. For method of payment see payment note.
Barrier wall inlets (Index 218) shall be isolated from the barrier wall stem and footing by 1" expansion material.
* All walls may be made up of segments of 20' or more in length provided the segments are joined by a transverse joint in accordance with Detail B. Segments shall have dimensions same as walls above.

REINFORCED CONCRETE BARRIER WALL (SHOULDER)

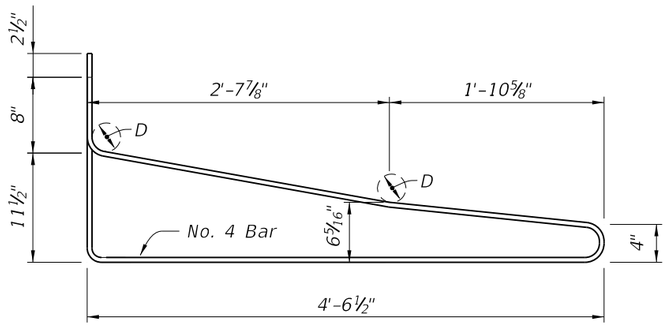
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO.	SHEET NO.
01/01/11						410	7



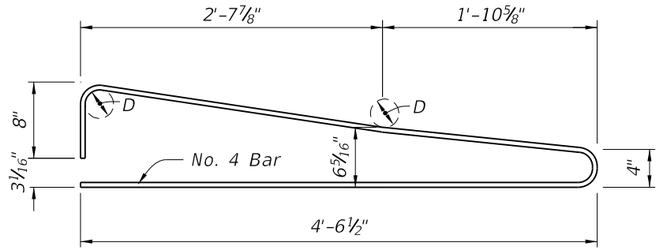
BAR 4F



BAR 4G



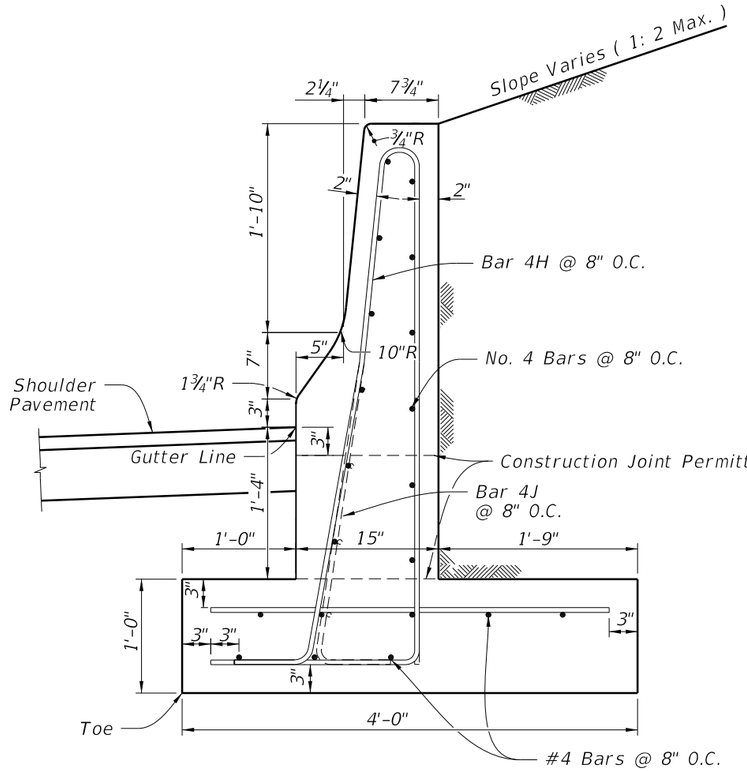
BAR 4H



For Use In Areas Where Obstructions
Require Localized Omission Of Toe

BAR 4J

BENDING DIAGRAMS



Note: All longitudinal reinforcement No. 4 bars.
Minimum segment length for this wall is 20 feet.
Wall to be paid for under the contract unit price
for Shoulder Concrete Barrier Wall (Rigid-Retaining), LF.

QUANTITIES: Class II Concrete 0.29 CY/LF
Reinforcing Steel (Bar 4H) 28.6 LBS/LF
Reinforcing Steel (Bar 4J) 26.8 LBS/LF

REINFORCED CONCRETE BARRIER WALL (RETAINING)

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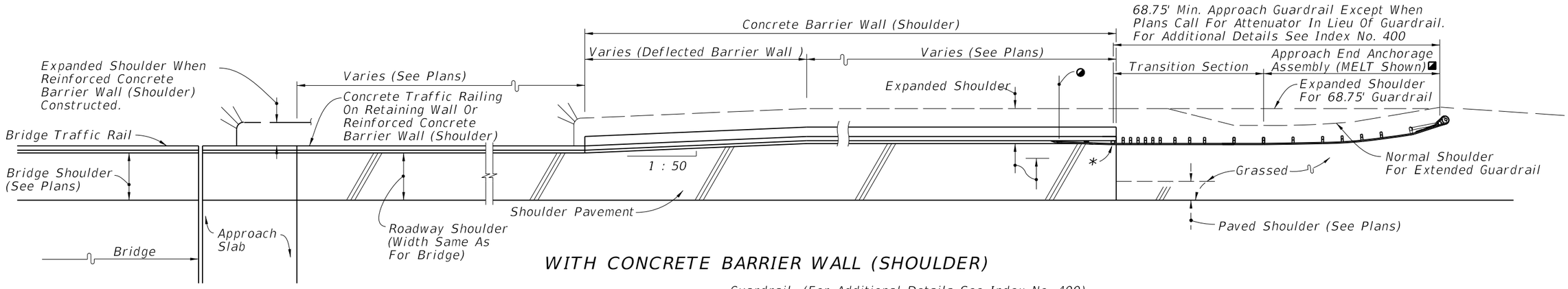
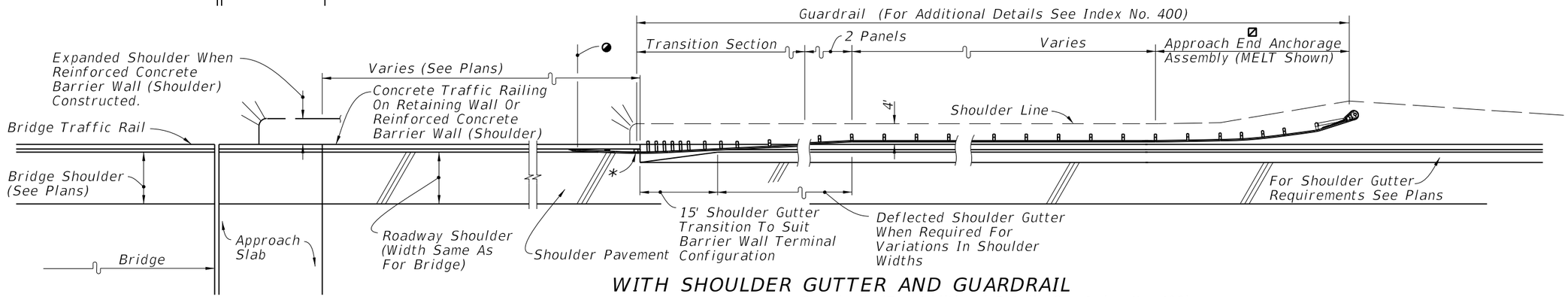
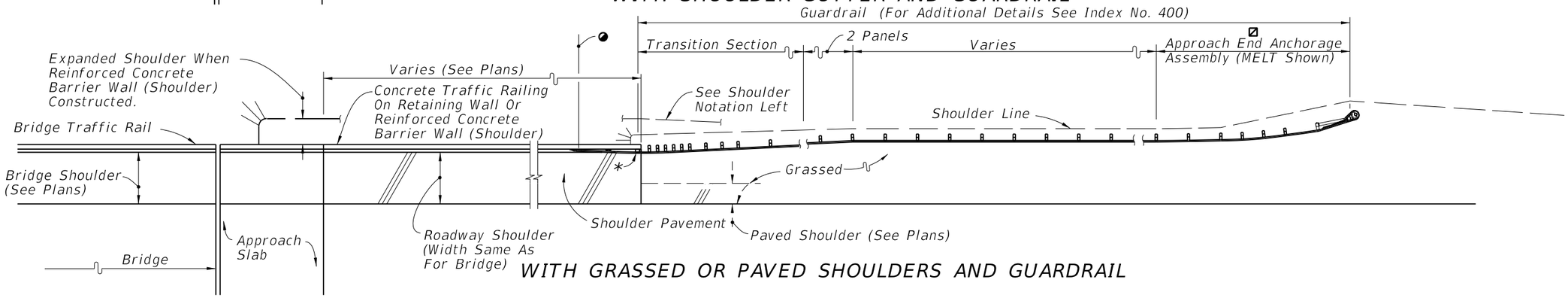
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO.	SHEET NO.
01/01/11						410	8



WITH CONCRETE BARRIER WALL (SHOULDER)



WITH SHOULDER GUTTER AND GUARDRAIL



WITH GRASSED OR PAVED SHOULDERS AND GUARDRAIL

◪ To be deleted on trailing ends except for 2-lane 2-way facilities. The tangent guardrail shall be anchored by End Anchorage Type II, Index No. 400.

◪ To be deleted on trailing ends except for 2-lane 2-way facilities.

◕ End measurement for guardrail payment when guardrail connected to shoulder barrier walls. See Index No. 400, Detail J for end measurement when guardrail connected to concrete traffic rails constructed with approach slab or on retaining walls.

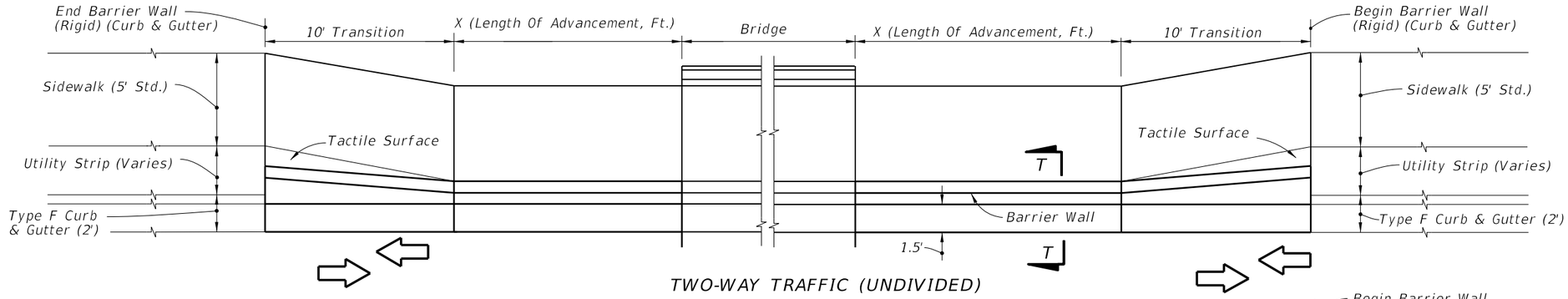
△ Views show approach roadside barriers when length of need exceeds the length of either retaining walls with concrete traffic railings* or Reinforced Concrete Barrier Wall (Shoulder) on shoulders. When either of these rigid barriers alone satisfies the approach length of need, the wall ends shall be shielded by crash cushions, or, by guardrail the same as for bridge traffic rails, as detailed in Index No. 400. See other flagged notes for trailing end treatments. Miscellaneous asphalt paving under guardrail not shown.

* Guardrail connection to concrete traffic railings on retaining walls shall be in accordance with the Structures Design Office Standard Drawings and the plans. Approach guardrail connections to shoulder concrete barrier walls shall be in accordance with the details shown on Sheets 2, 24 and 25 of this Index and Index No. 400, Detail J.

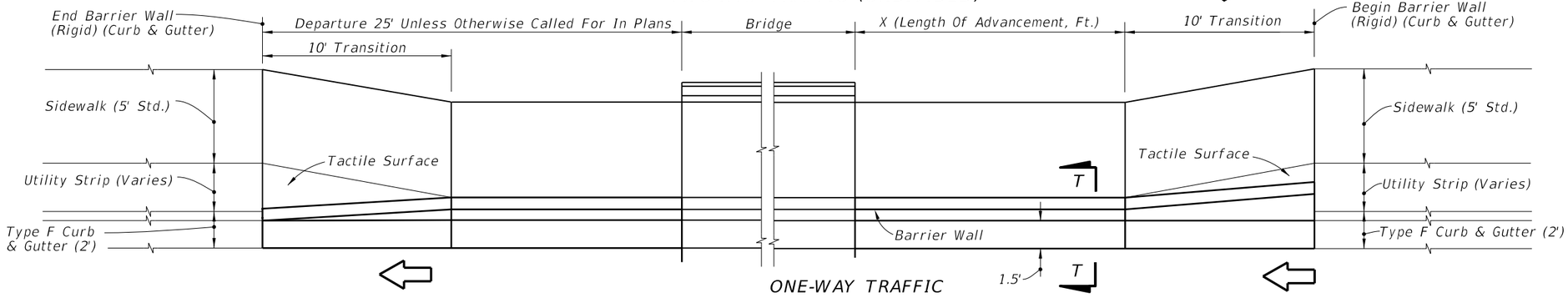
EITHER REINFORCED CONCRETE BARRIER WALL (SHOULDER) OR RETAINING WALL WITH CONCRETE TRAFFIC RAILING △

CONCRETE BARRIER WALLS ON APPROACHES TO BRIDGES

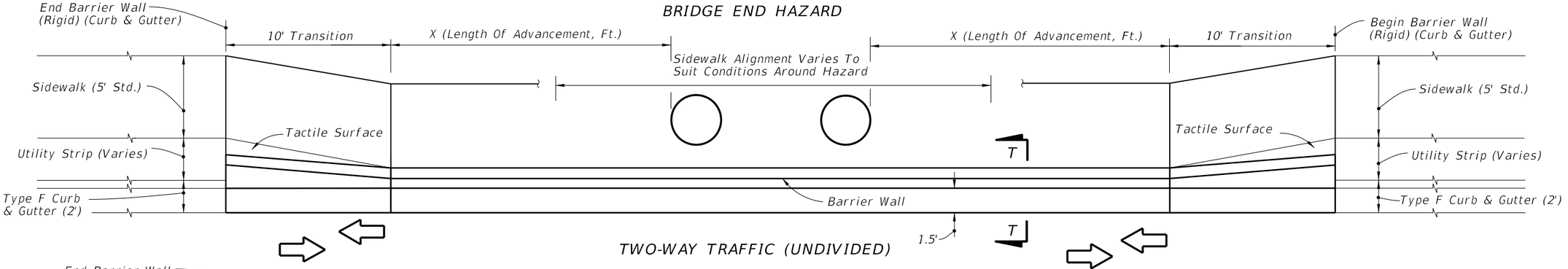
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO.	SHEET NO.
00						410	9



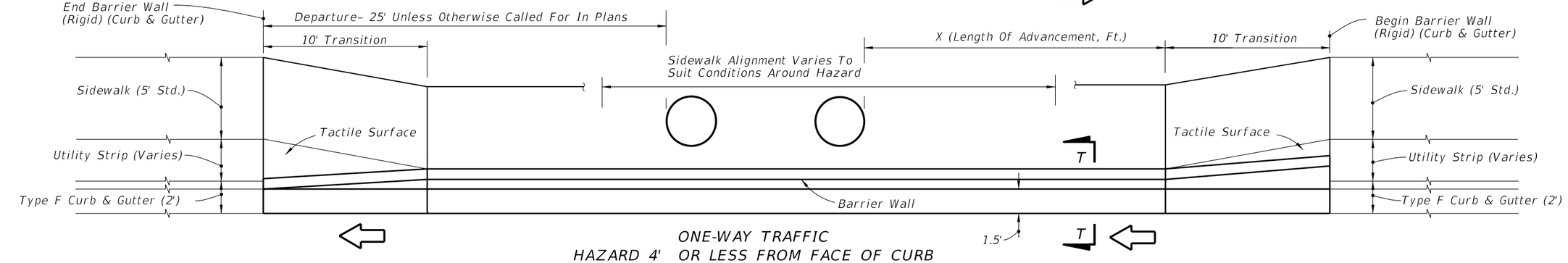
TWO-WAY TRAFFIC (UNDIVIDED)



ONE-WAY TRAFFIC
BRIDGE END HAZARD



TWO-WAY TRAFFIC (UNDIVIDED)



ONE-WAY TRAFFIC
HAZARD 4' OR LESS FROM FACE OF CURB

NOTE:

X=Length of advancement in feet for near and opposing approach lanes. See Sheet 14.

For locations without utility strips see Sheet 11.
For transition and sidewalk details see Sheets 12 & 13 and for sectional details see Sheet 14.

The 1.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the details on Sheets 22 & 23.

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) ● CURB AND GUTTER WITH UTILITY STRIP AND WITH ADJACENT BICYCLE LANE

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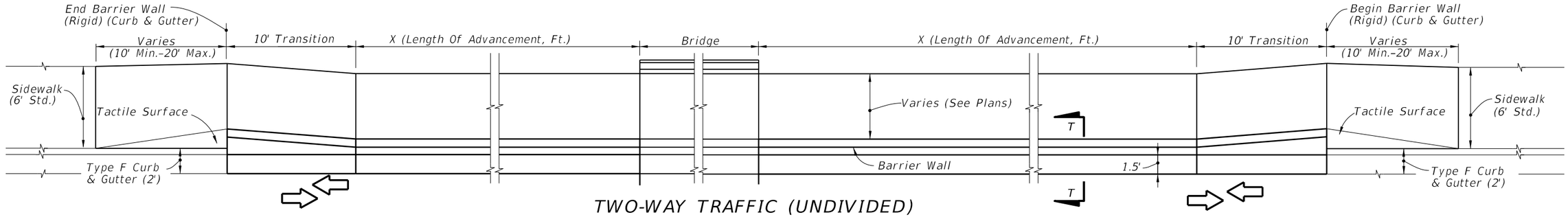
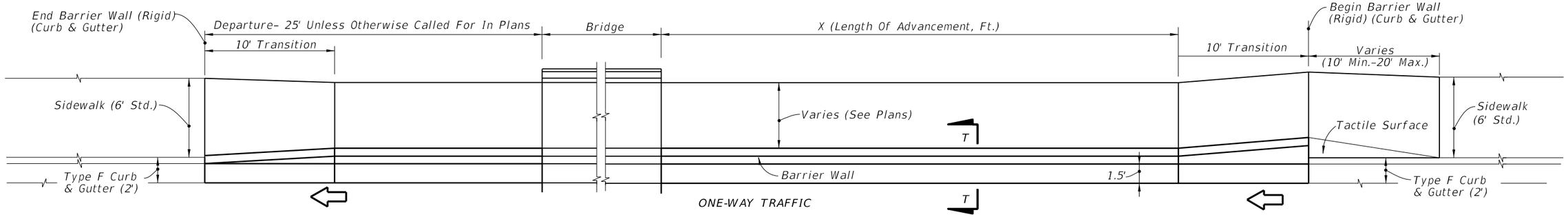
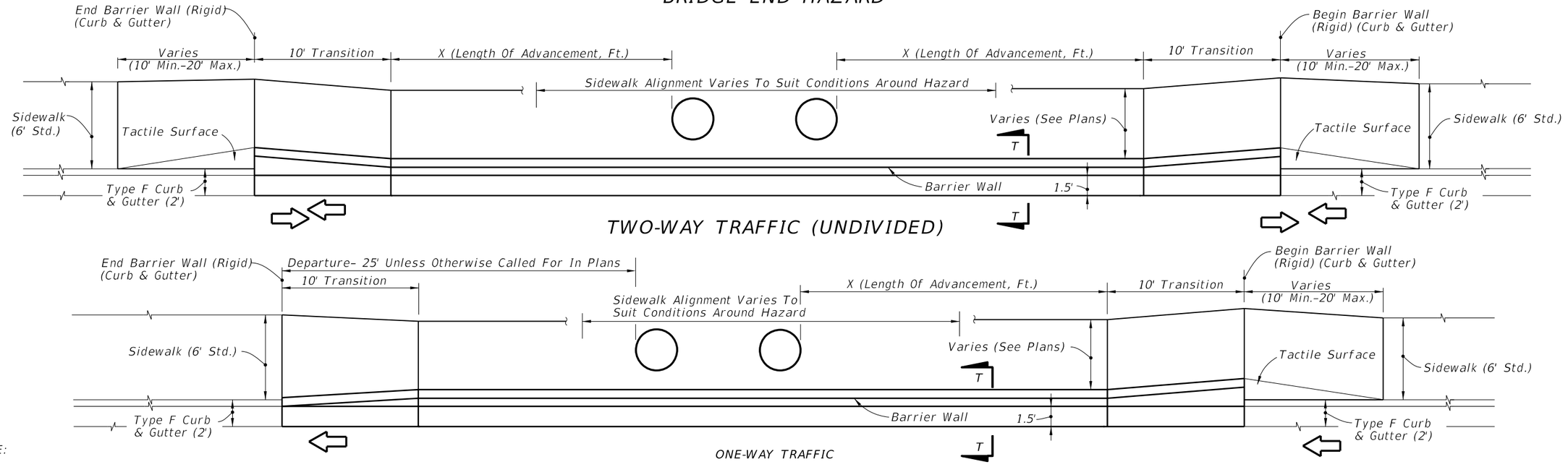
LAST REVISION	REVISION	DESCRIPTION:				
07/01/07			FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 10



TWO-WAY TRAFFIC (UNDIVIDED)



BRIDGE END HAZARD



HAZARD 4' OR LESS FROM FACE OF CURB

NOTE:

X=Length of advancement in feet for near and opposing approach lanes. See Sheet 14.

For locations with utility strips see Sheet 10. For transition and sidewalk see Sheets 12 & 13, for sectional details see Sheet 14.

The 1.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the detail on Sheets 22 & 23.

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)

CURB AND GUTTER WITHOUT UTILITY STRIP AND WITH ADJACENT BICYCLE LANE

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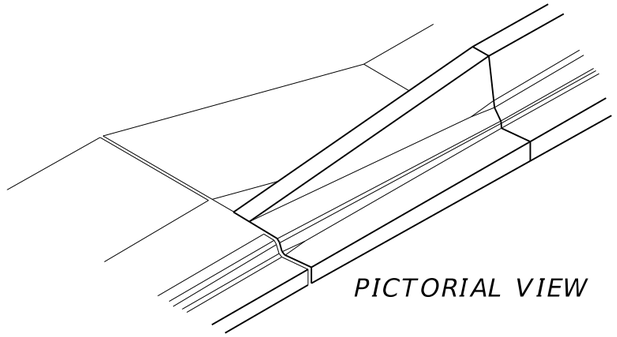
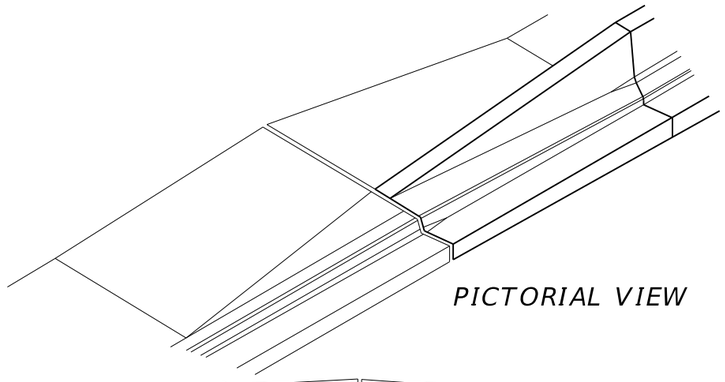
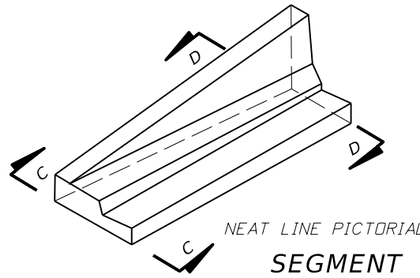
LAST REVISION	REVISION	DESCRIPTION:				
07/01/07			FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 11



PICTORIAL VIEW

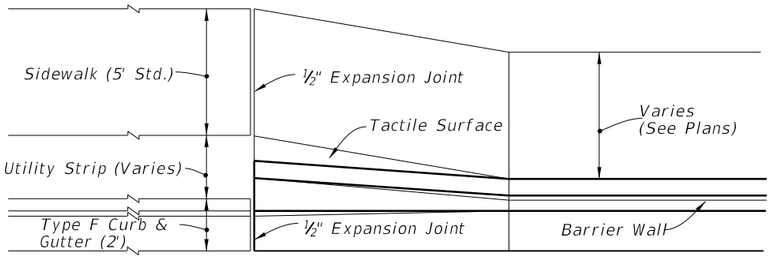


PICTORIAL VIEW

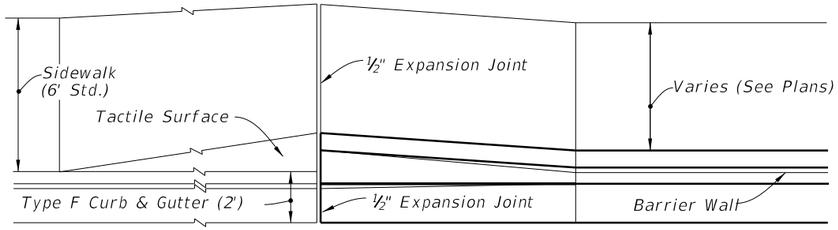


NEAT LINE PICTORIAL VIEW

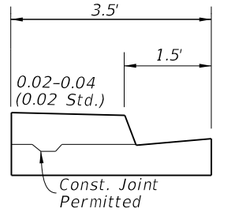
SEGMENT



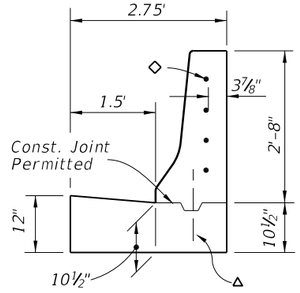
PLAN
WITH UTILITY STRIP



PLAN
WITHOUT UTILITY STRIP

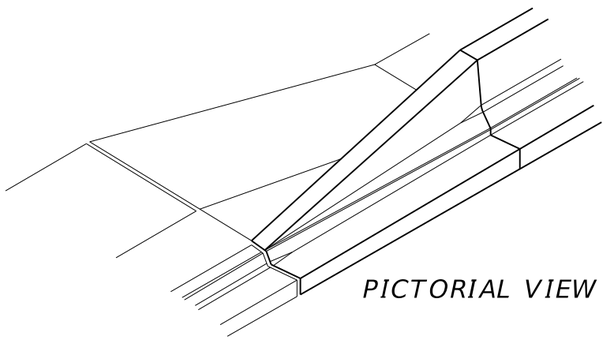


SECTION CC

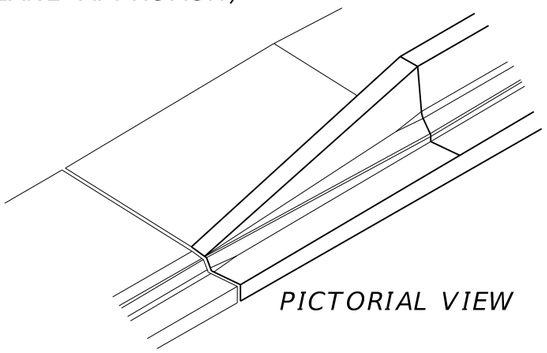


SECTION DD

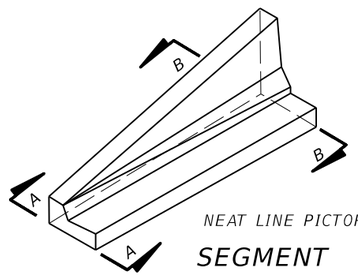
TWO-WAY TRAFFIC (OPPOSING LANE APPROACH)



PICTORIAL VIEW

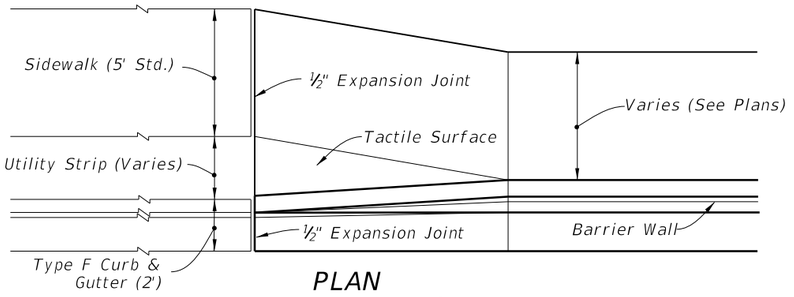


PICTORIAL VIEW

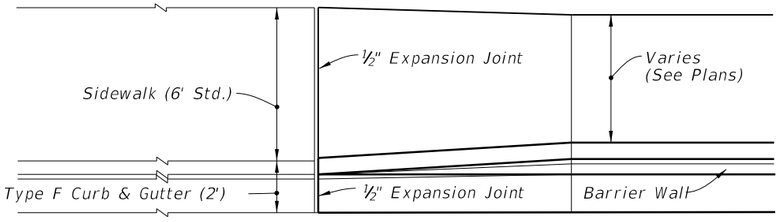


NEAT LINE PICTORIAL VIEW

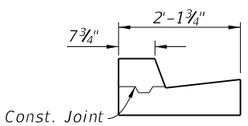
SEGMENT



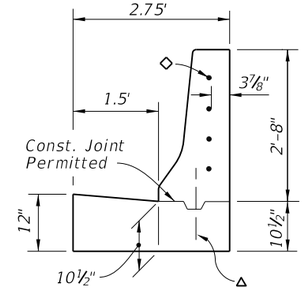
PLAN
WITH UTILITY STRIP



PLAN
WITHOUT UTILITY STRIP



SECTION AA



SECTION BB

◇ See Notes Sheet 13

△ See Notes Sheet 13

ONE-WAY TRAFFIC (TRAILING END)

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • TRANSITION SEGMENTS • WITH ADJACENT BICYCLE LANE

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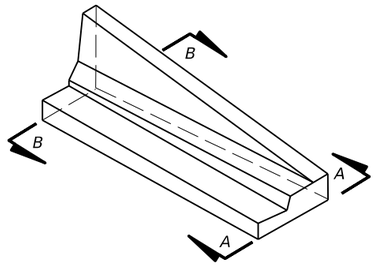
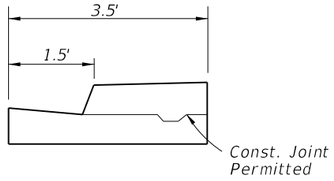
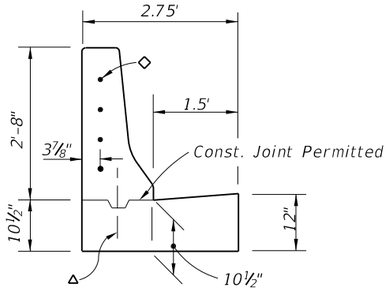
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	410	12



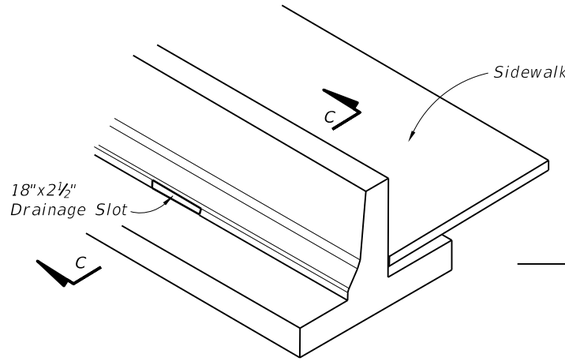
WITH OR WITHOUT UTILITY STRIP
NEAT LINE PICTORIAL VIEW



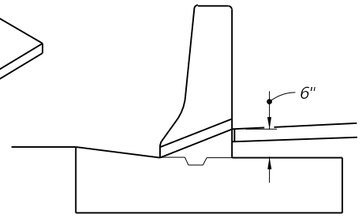
SECTION AA



SECTION BB



NEAT LINE PICTORIAL VIEW



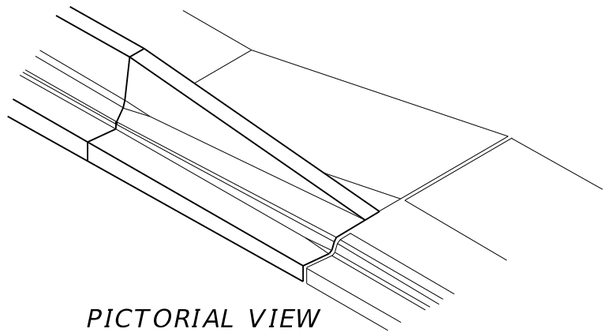
SECTION CC

NOTE: Drainage slots shall be located at all low points along the sidewalk, and, unless otherwise shown in the plans, slots shall be spaced at intervals not exceeding 50' in fill sections and 20' in cut sections. Slots shall be located such that only one bar is cut away or deleted in front and back lines of vertical reinforcement.

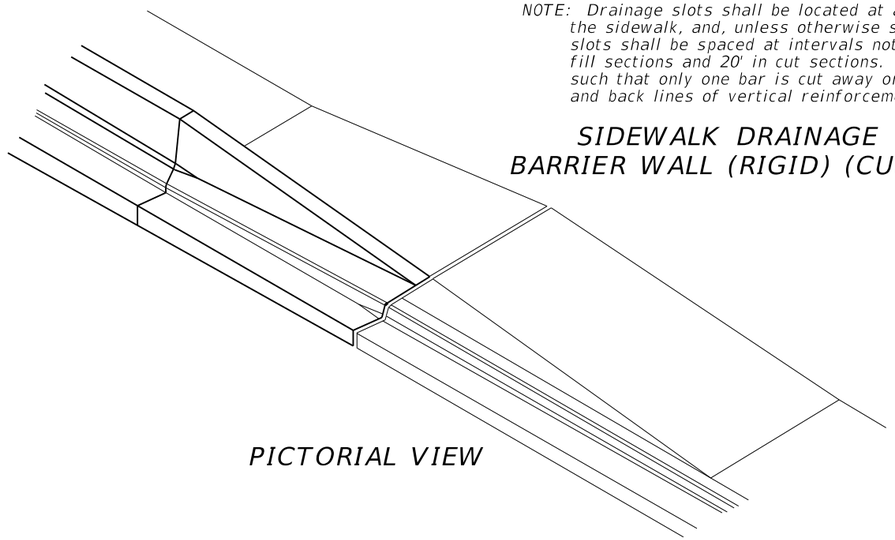
SIDEWALK DRAINAGE SLOT FOR
BARRIER WALL (RIGID) (CURB & GUTTER)

◇ Transition Segments Shall Be Doweled Into The End Of The Barrier Wall In The Following Manner:
Four 1" diameter holes 6" deep on 6" centers shall be drilled in the end of the barrier and #6 bars 15" long set in an Adhesive Bonded Material System. The ends of the dowels extending into the transition segment shall be wrapped with one layer of 15 lb. Type I asphalt-saturated roofing felt with the ends crimped.

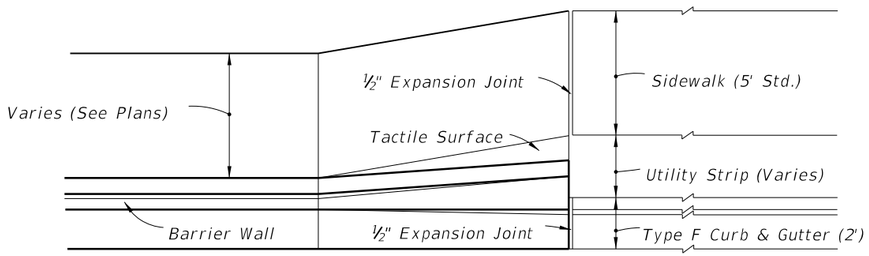
△ When Construction Joints Are Utilized For Transition Segment Construction The Stem Shall Be Doweled To The Footing In The Following Manner:
Five #5 bars 15" long shall be embedded 7" into the footing. The dowels shall be spaced 15" on centers with the first dowel located 12" from the barrier wall. Dowels may be placed within or adjacent to the keyway.



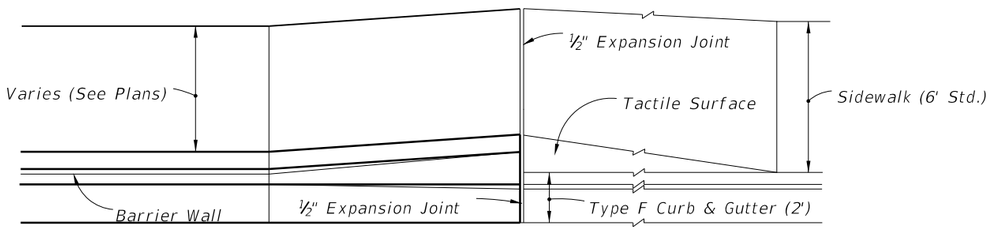
PICTORIAL VIEW



PICTORIAL VIEW



PLAN
WITH UTILITY STRIP



PLAN
WITHOUT UTILITY STRIP

RIGHT SIDE SHOWN, LEFT SIDE OPPOSITE HAND
ONE-WAY AND TWO-WAY TRAFFIC (NEAR LANE APPROACH)

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • TRANSITION SEGMENT • WITH ADJACENT BICYCLE LANE

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
00			FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	410	13

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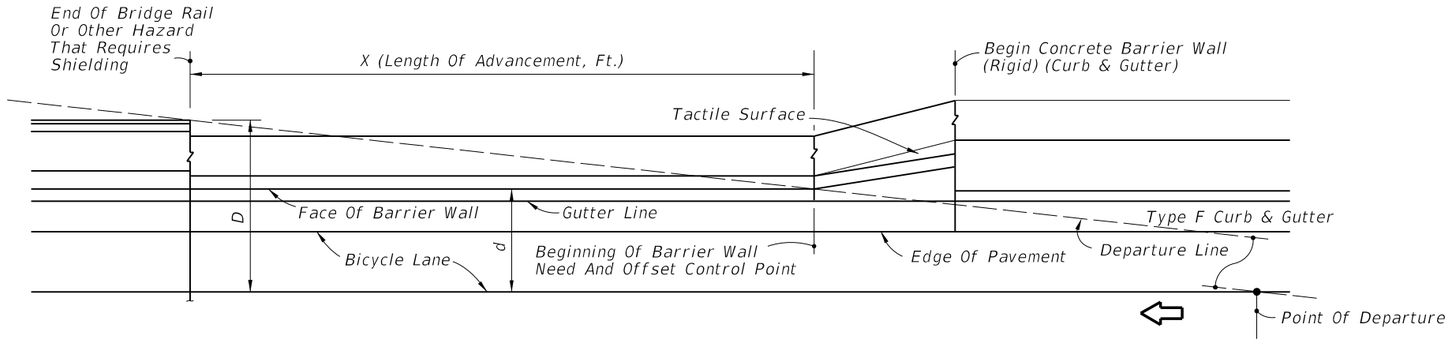
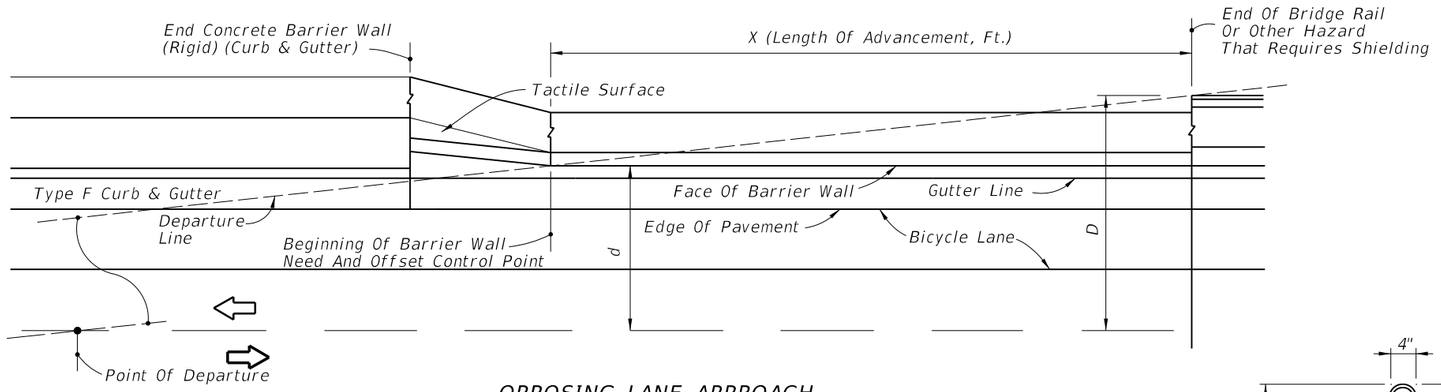


RIGHT SIDE APPROACH SHOWN - LEFT SIDE OPPOSITE HAND

NEAR LANE APPROACH



OPPOSING LANE APPROACH

WITH OR WITHOUT UTILITY STRIP - UTILITY STRIP SHOWN
- SEE SHEET 10 & 11 FOR APPLICATIONS

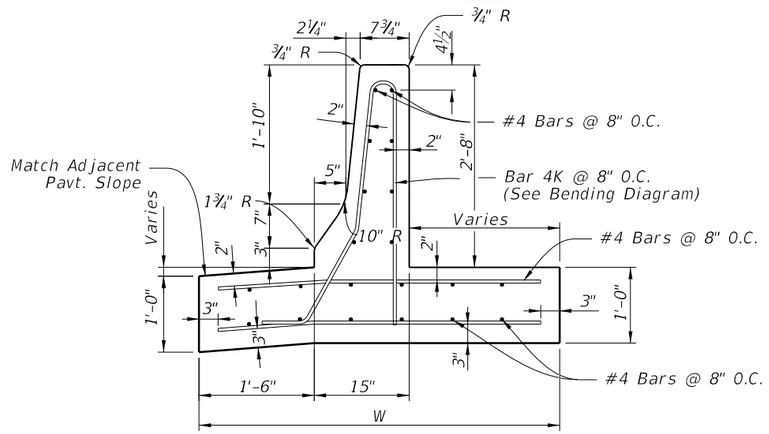
Design Speed mph	Length Of Advancement, Ft. (X)
≤ 45	= 16 (D–d)
Note: The minimum length of advancement for both near and opposing lane approaches is 40'.	

Equation Variables:

D = Distance in feet from near edge of the near approach traffic lane to back of hazard or clear zone width whichever is lesser. For left side hazards and clear zones on two-way undivided facilities D is measured from the inside edge of the near approach traffic lane.

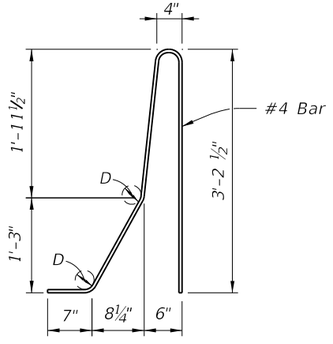
d = Distance in feet from near edge of the near approach traffic lane to the face of barrier (at offset control point). For left side hazards on two-way undivided facilities d is measured from the inside edge of the nearest opposing traffic lane.

LENGTH OF ADVANCEMENT

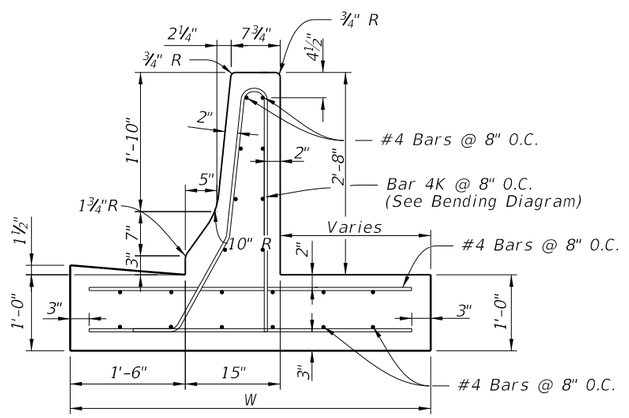


FOR HIGH SIDE
SECTION TT

QUANTITIES			
Length* Of Barrier Wall (LF)	W LF	Class II Conc. CY Per LF	Rein. Steel Lbs Per LF
>73'	4'-9"	0.26	29
56' to 73'	5'-6"	0.29	32
48' to 55'	6'-0"	0.31	34
41' to 47'	6'-6"	0.33	37
36' to 41'	7'-0"	0.35	39
29' to 35'	8'-0"	0.38	42



BAR 4K
BENDING DIAGRAM



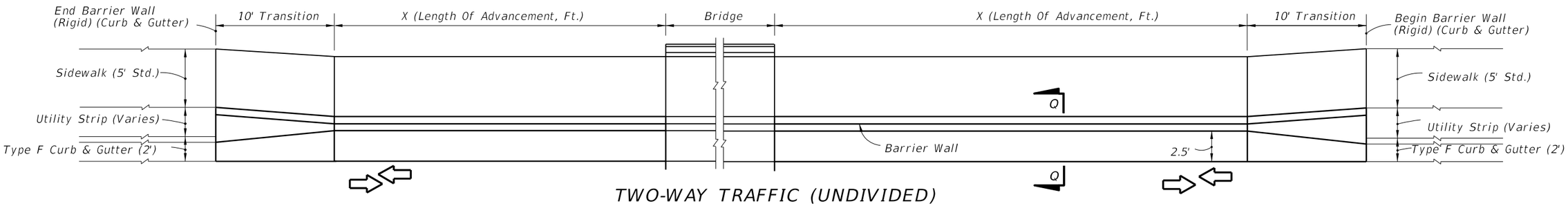
FOR LOW SIDE
SECTION TT

Note: All longitudinal reinforcement No. 4 bars. Shorter segments due to construction or expansion joint shall be doweled in the manner described for 'Transition Segments' on Sheet 13.

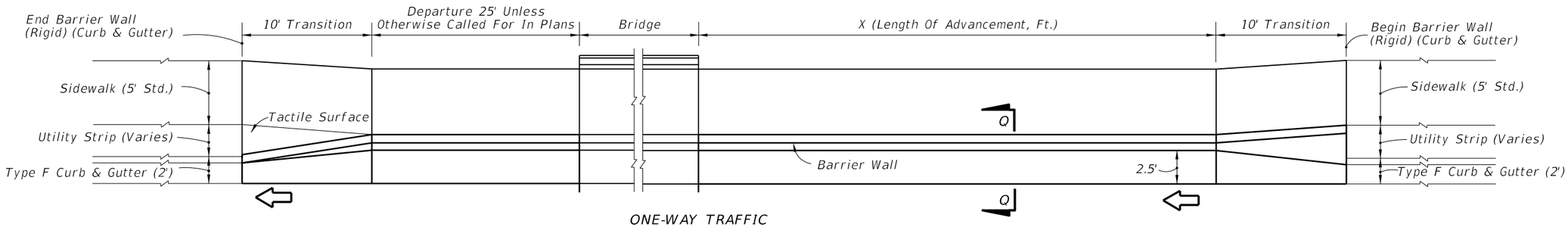
Transverse expansion joints are to be constructed at the juncture of wall transitions and curb and gutter, and at intervals so that spacing will not exceed 100'.

For barrier wall inlet details see Index No. 219. Inlet extends into bicycle lane 12". Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Curb & Gutter), LF.

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) WITH ADJACENT BICYCLE LANE

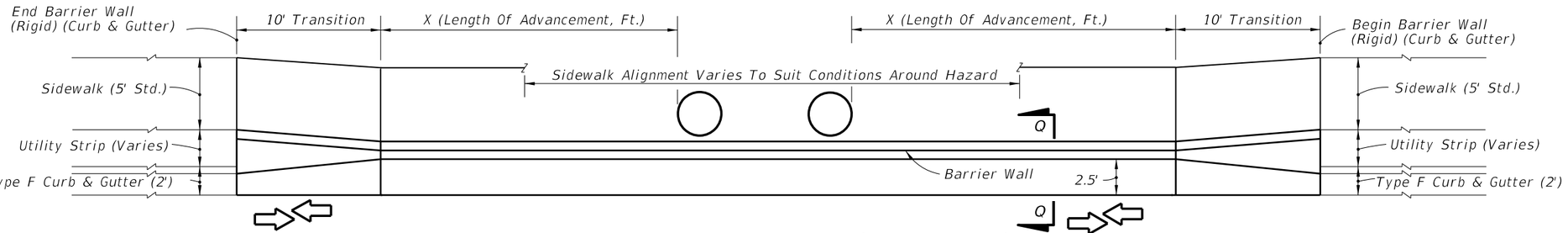


TWO-WAY TRAFFIC (UNDIVIDED)

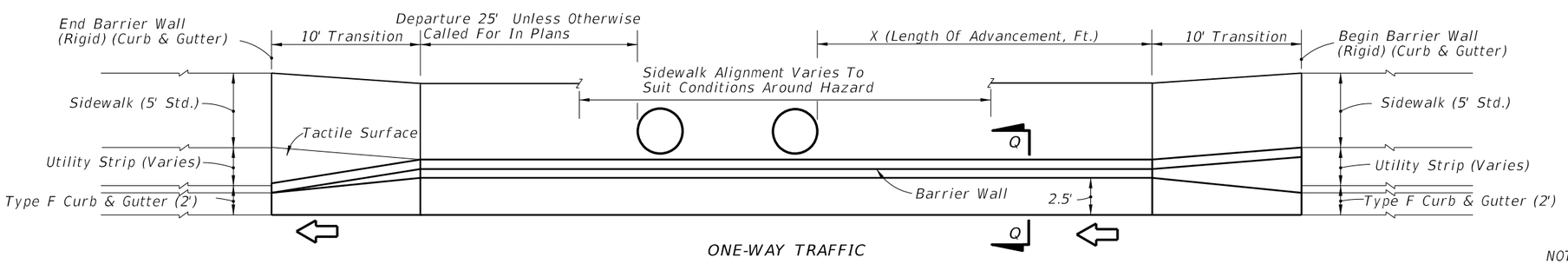


ONE-WAY TRAFFIC

BRIDGE END HAZARD



TWO-WAY TRAFFIC (UNDIVIDED)



ONE-WAY TRAFFIC

HAZARD 4' OR LESS FROM FACE OF CURB

NOTE:
X=Length of advancement in feet for near and opposing approach lanes. See Sheet 19.
For locations without utility strips see Sheet 16.
For transition and sidewalk see Sheets 17 & 18 and for sectional details see Sheet 19.
The 2.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the details on Sheets 22 & 23.

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)
CURB AND GUTTER WITH UTILITY STRIP AND WITHOUT ADJACENT BICYCLE LANE

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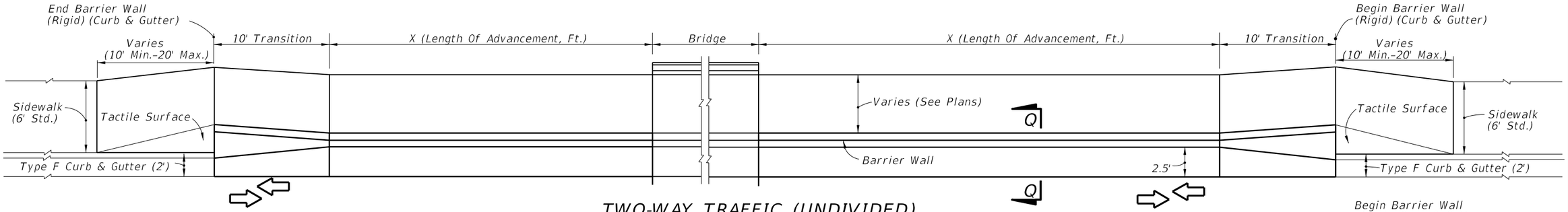
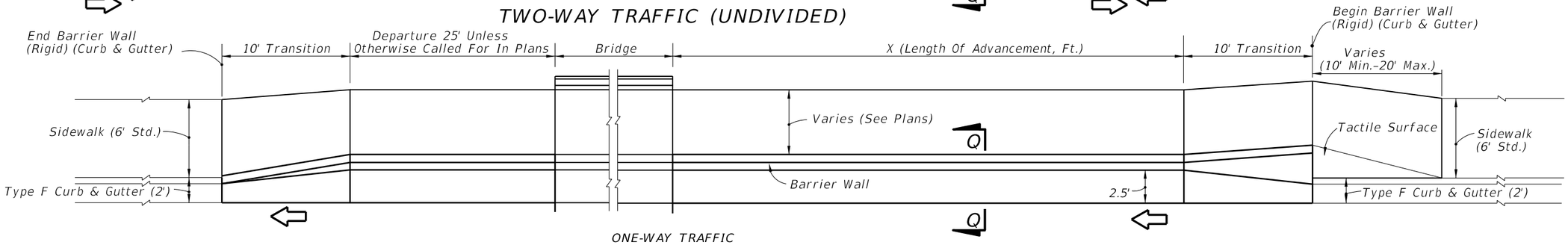
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
00			FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	410	15

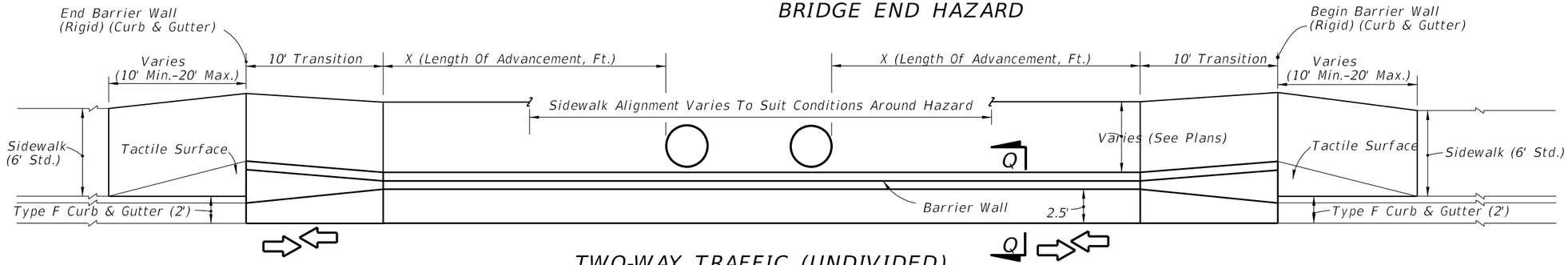


TWO-WAY TRAFFIC (UNDIVIDED)

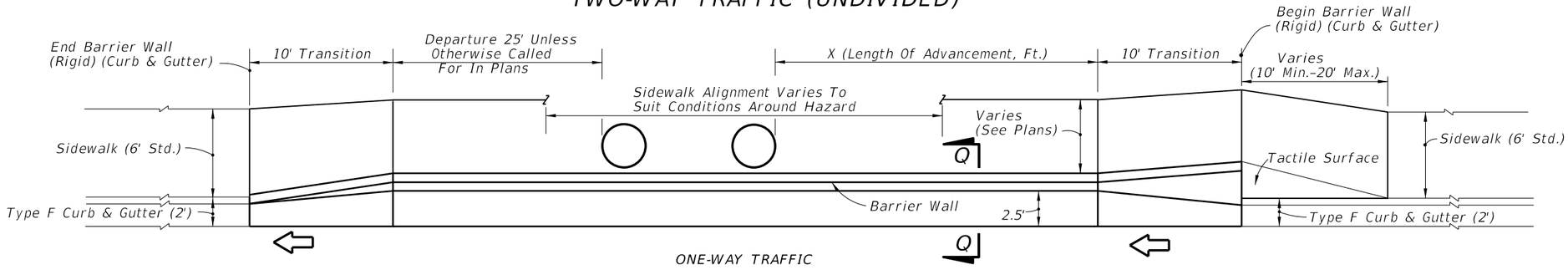


ONE-WAY TRAFFIC

BRIDGE END HAZARD



TWO-WAY TRAFFIC (UNDIVIDED)



ONE-WAY TRAFFIC

HAZARD 4' OR LESS FROM FACE OF CURB

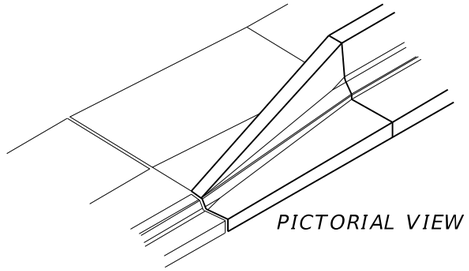
CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)
CURB AND GUTTER WITHOUT UTILITY STRIP AND WITHOUT ADJACENT BICYCLE LANE

NOTE:
X=Length of advancement in feet for near and opposing approach lanes. See Sheet 19.

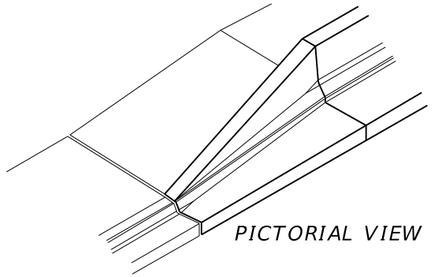
For locations with utility strips see Sheet 15. For transition and sidewalk see Sheets 17 & 18 and for sectional details see Sheet 19.

The 2.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the detail on Sheets 22 & 23.

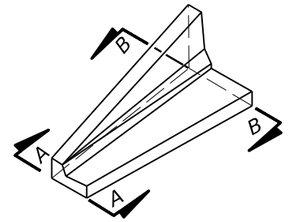
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	410	16



PICTORIAL VIEW



PICTORIAL VIEW

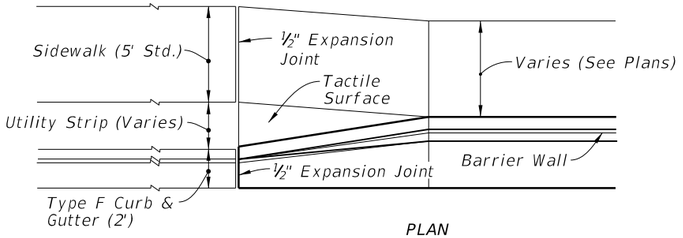


NEAT LINE PICTORIAL VIEW

SEGMENT

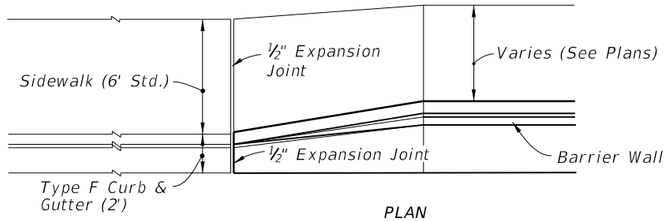
◇ See Sheet 19

△ See Sheet 19



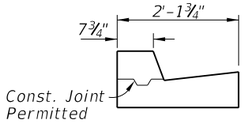
PLAN

WITH UTILITY STRIP

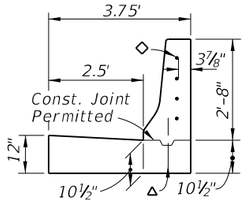


PLAN

WITHOUT UTILITY STRIP

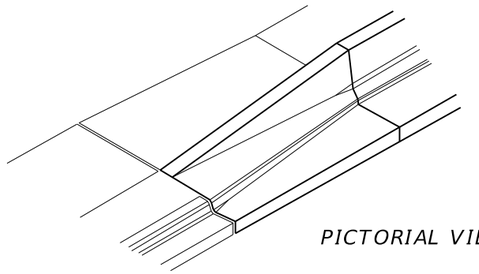


SECTION AA

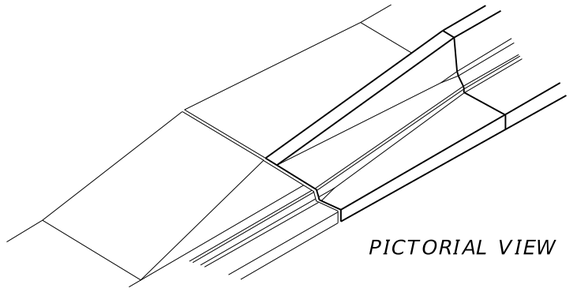


SECTION BB

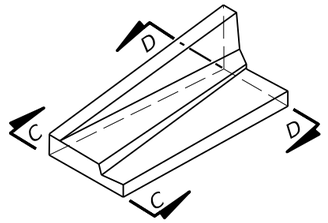
ONE-WAY TRAFFIC (TRAILING END)



PICTORIAL VIEW

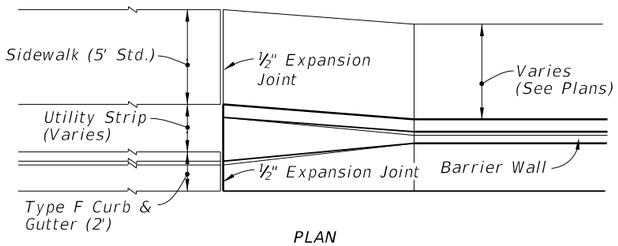


PICTORIAL VIEW



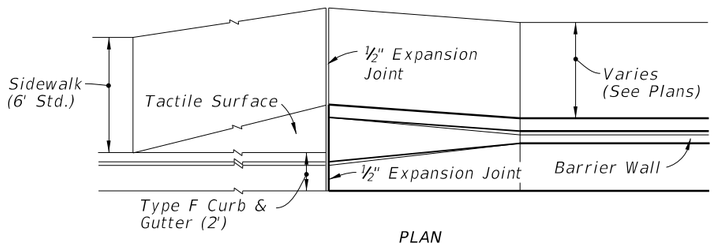
NEAT LINE PICTORIAL VIEW

SEGMENT



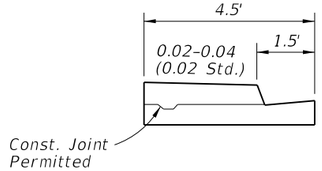
PLAN

WITH UTILITY STRIP

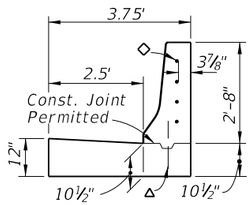


PLAN

WITH UTILITY STRIP



SECTION CC



SECTION DD

TWO-WAY TRAFFIC (OPPOSING LANE APPROACH)

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • TRANSITION SEGMENTS • WITHOUT ADJACENT BICYCLE LANE

LAST REVISION	REVISION	DESCRIPTION:		INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	410	17

CONCRETE BARRIER WALL

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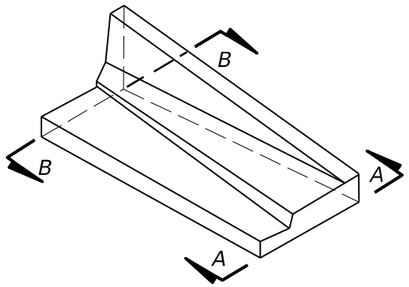
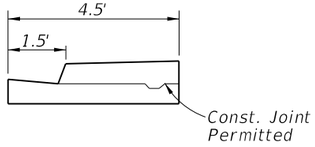
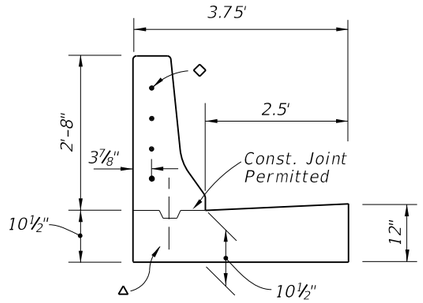


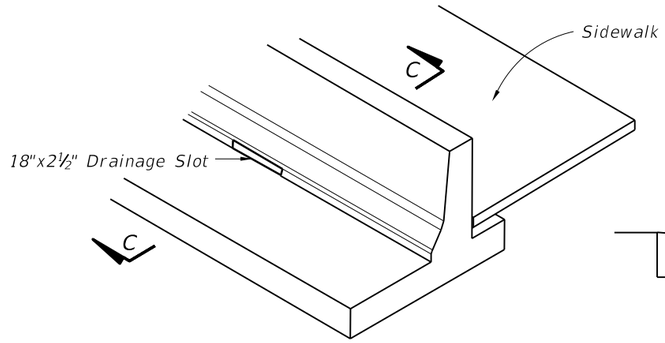
WITH OR WITHOUT UTILITY STRIP
NEAT LINE PICTORIAL VIEW



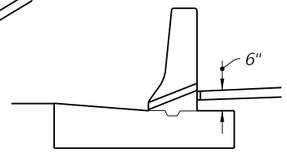
SECTION AA



SECTION BB



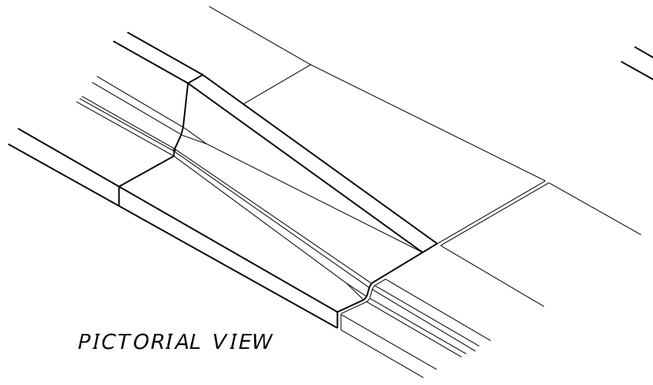
NEAT LINE PICTORIAL VIEW



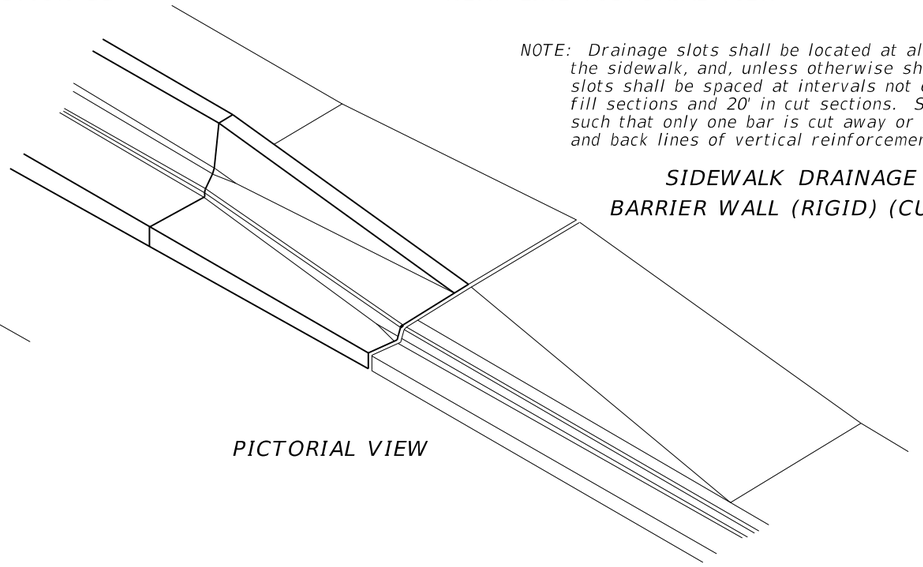
SECTION CC

◇ *Transition Segments Shall Be Doweled Into The End Of The Barrier Wall In The Following Manner:*
Four 1" diameter holes 6" deep on 6" centers shall be drilled in the end of the barrier and #6 bars 15" long set in an Adhesive Bonded Material System. The ends of the dowels extending into the transition segment shall be wrapped with one layer of 15 lb. Type I asphalt-saturated roofing felt with the ends crimped.

△ *When Construction Joints Are Utilized For Transition Segment Construction The Stem Shall Be Doweled To The Footing In The Following Manner:*
Five #5 bars 15" long shall be embedded 7" into the footing. The dowels shall be spaced 15" on centers with the first dowel located 12" from the barrier wall. Dowels may be placed within or adjacent to the keyway.



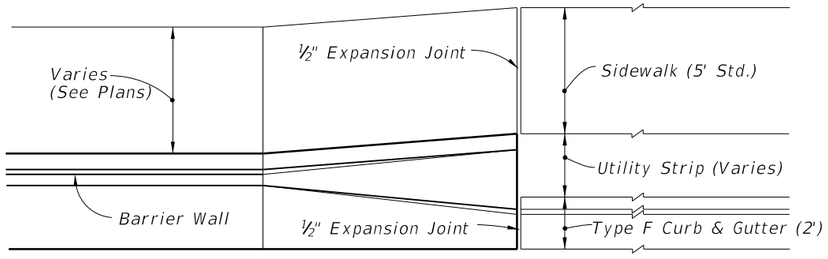
PICTORIAL VIEW



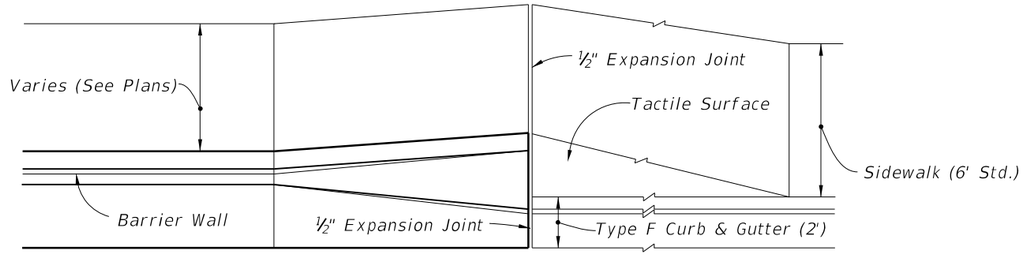
PICTORIAL VIEW

NOTE: Drainage slots shall be located at all low points along the sidewalk, and, unless otherwise shown in the plans, slots shall be spaced at intervals not exceeding 50' in fill sections and 20' in cut sections. Slots shall be located such that only one bar is cut away or deleted in front and back lines of vertical reinforcement.

SIDEWALK DRAINAGE SLOT FOR
BARRIER WALL (RIGID) (CURB & GUTTER)



PLAN
WITH UTILITY STRIP

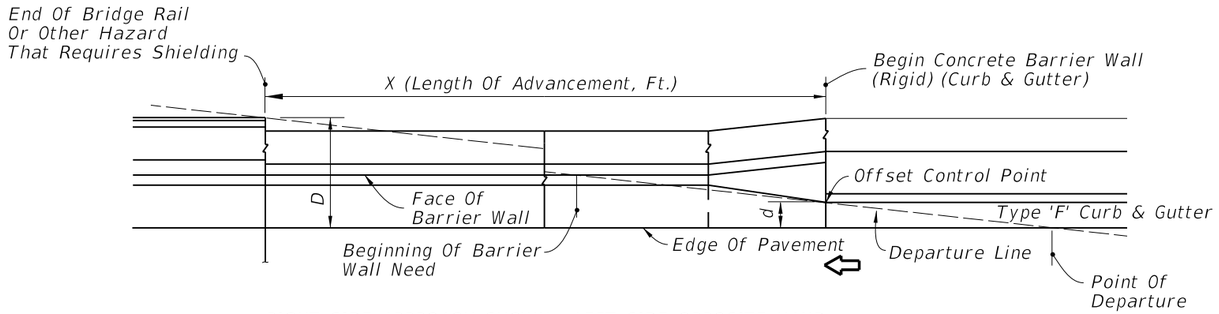


PLAN
WITHOUT UTILITY STRIP

RIGHT SIDE SHOWN, LEFT SIDE OPPOSITE HAND

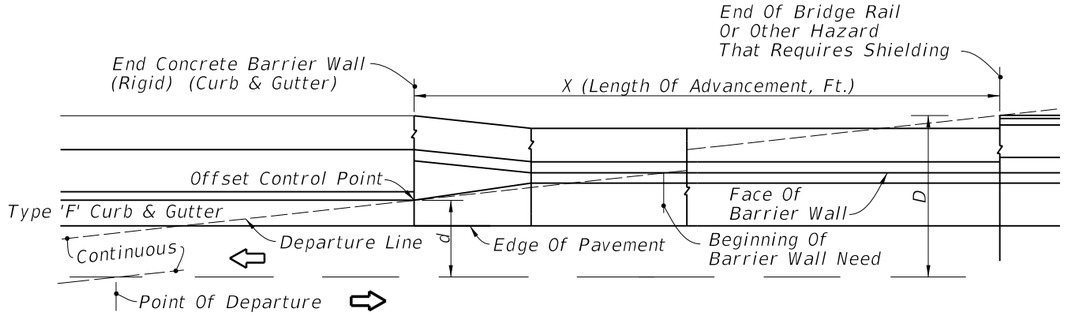
ONE-WAY AND TWO-WAY TRAFFIC (NEAR LANE APPROACH)
CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) ● TRANSITION SEGMENT ● WITHOUT ADJACENT BICYCLE LANE

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO.	SHEET NO.
00						410	18



RIGHT SIDE APPROACH SHOWN - LEFT SIDE OPPOSITE HAND

NEAR LANE APPROACH



OPPOSING LANE APPROACH

WITH OR WITHOUT UTILITY STRIP - UTILITY STRIP SHOWN
SEE SHEET 15 & 16 FOR APPLICATIONS

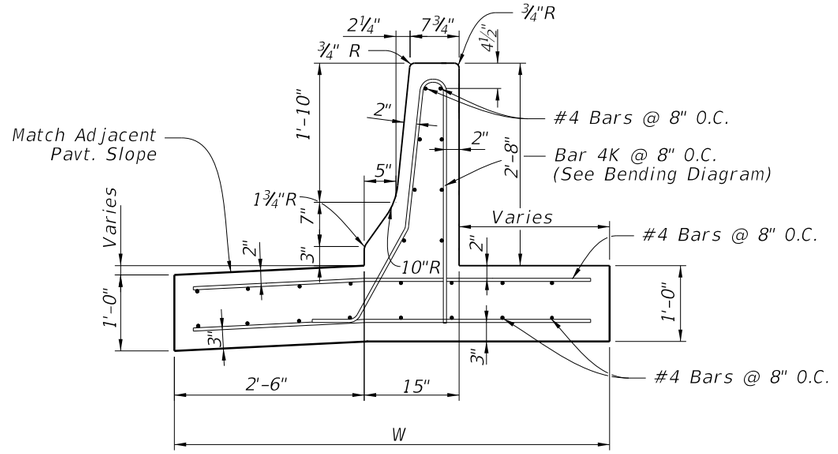
Design Speed mph	Length Of Advancement, Ft.(X)
≤ 45	16 (D-d)
Note: The minimum length of advancement for both near and opposing lane approaches is 40'.	

Equation Variables:

D= Distance in feet from near edge of the near approach traffic lane to back of hazard or clear zone width whichever is lesser. For left side hazards and clear zones on two-way undivided facilities D is measured from the inside edge of the near approach traffic lane.

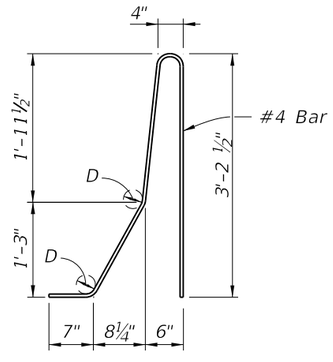
d= Distance in feet from near edge of the near approach traffic lane to the face of curb (at offset control point). For left side hazards on two-way undivided facilities d is measured from the inside edge of the nearest opposing traffic lane.

LENGTH OF ADVANCEMENT

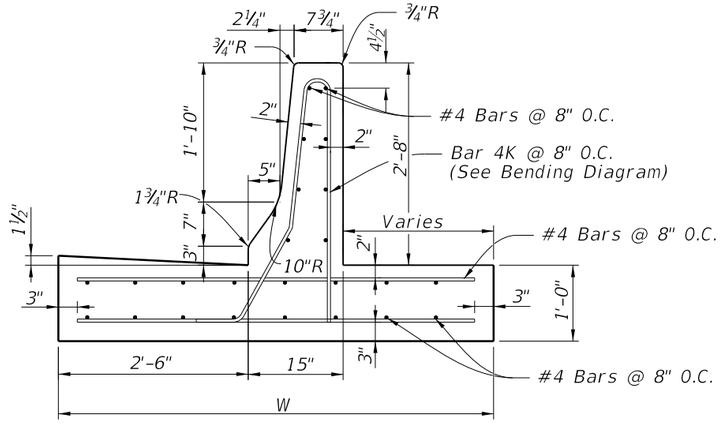


FOR HIGH SIDE
SECTION QQ

QUANTITIES			
Length* Of Barrier Wall (LF)	W LF	Class II Conc. CY Per LF	Rein. Steel Lbs Per LF
>73'	4'-9"	0.26	29
56' to 73'	5'-6"	0.29	32
48' to 55'	6'-0"	0.31	34
41' to 47'	6'-6"	0.33	37
36' to 41'	7'-0"	0.35	39
29' to 35'	8'-0"	0.38	42



BAR 4K
BENDING DIAGRAM



FOR LOW SIDE
SECTION QQ

Note: All longitudinal reinforcement #4 bars. Shorter segments due to construction or expansion joint shall be doweled in the manner described for 'Transition Segments' on Sheet 18.

Transverse expansion joints are to be constructed at the juncture of wall transitions and curb and gutter, and at intervals so that spacing will not exceed 100'.

For barrier wall inlet details see Index No. 219. Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Curb & Gutter), LF.

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • WITHOUT ADJACENT BICYCLE LANE

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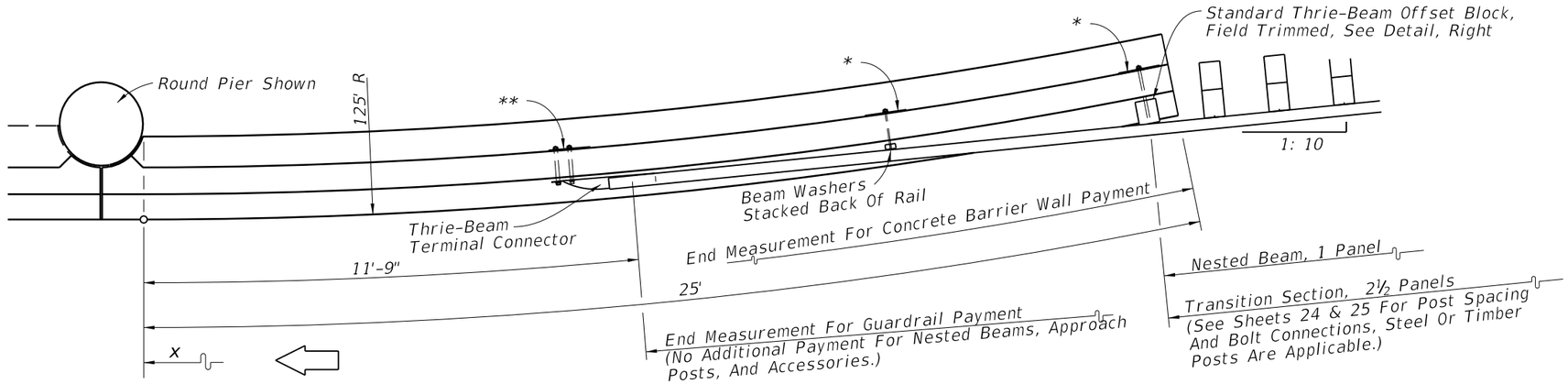
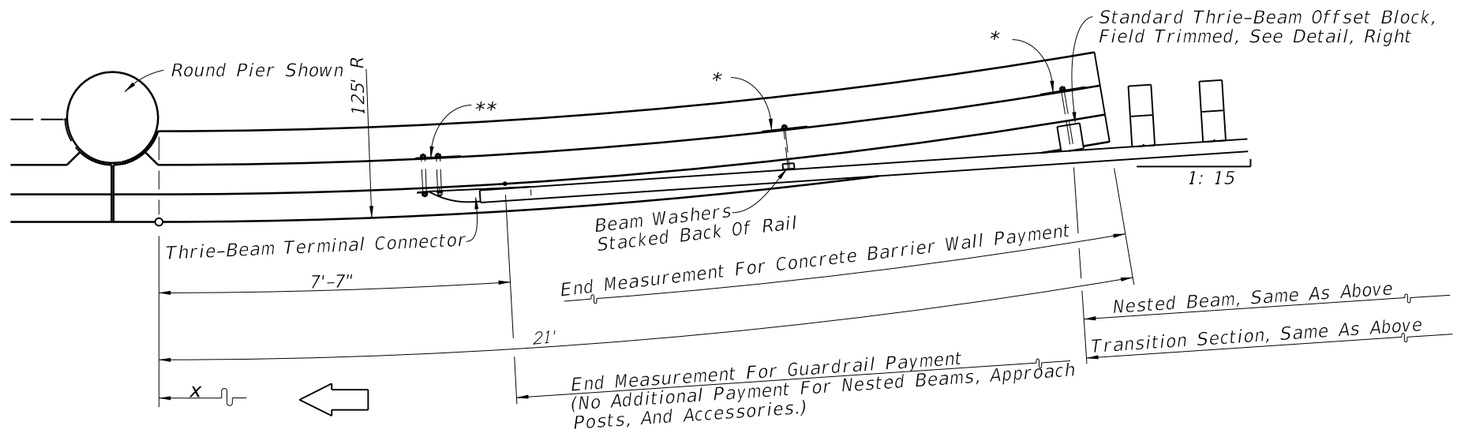
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO.	SHEET NO.
07/01/09						410	19



PLAN FOR DESIGN SPEED ≤ 45 MPH

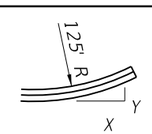
NOTE:
For details at Rigid Hazard see Sheet 21.



PLAN FOR DESIGN SPEED ≥ 50 MPH

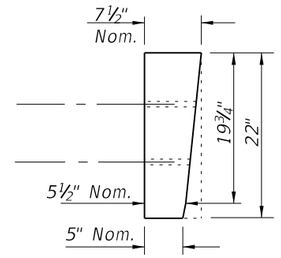
Note: For continuous barrier between independent bents or single pier columns see Sheets 21-23.

ARC LENGTH (FT)	DISTANCE "x" (FT)	OFFSETS "y" (FT)
4	4.00	0.06
8	7.99	0.26
12	11.98	0.58
16	15.96	1.02
20	19.91	1.60
21	20.91	1.76
24	23.85	2.30
25	24.83	2.49



Note:
Wall may be constructed in chords having lengths ≤ 4 feet.

SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS
WHEN GUARDRAIL OFFSET FROM HAZARD LESS THAN 3'



FOR USE WITH EITHER
1: 10 OR 1: 15
GUARDRAIL TRANSITIONS

STANDARD THRIE-BEAM
OFFSET BLOCK
(FIELD TRIMMED)

NOTES

1. This wall is intended for use where the wall has bearing against the hazard; when the length between bent supports or pier columns exceeds 13', the affected segments shall be constructed in accordance with the detail for 'Reinforced Concrete Barrier Wall (Shoulder)', 'Section TT' or 'Section QQ', this index. In cases where the barrier wall and slope pavement or other structure would occupy the same location, the wall and structure are to be modified as detailed in the plans.

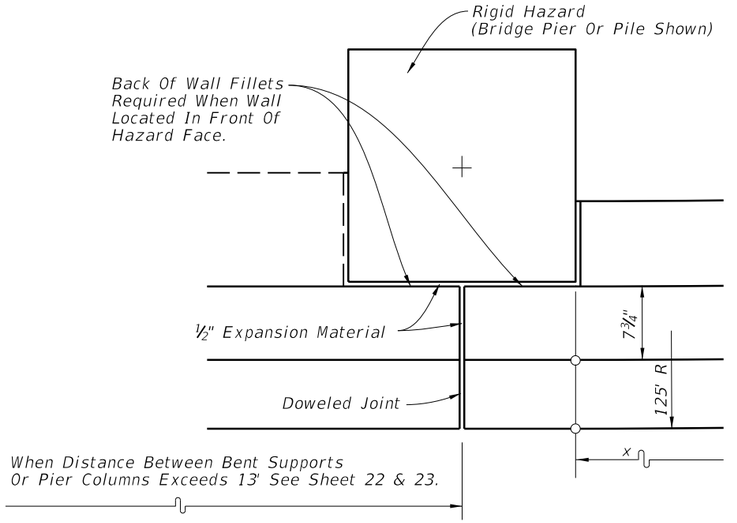
2. The barrier wall radial segments are intended for use on approach and trailing ends of both one-way and two-way facilities. The guardrail connections shown on this sheet apply to one-way approaches and to the approaching and trailing ends of two-lane two-way facilities. On trailing ends of two-way multilane and one-way facilities the end connection on Sheet 1 may be used. For walls with normal offsets from hazards and their guardrail connections, see Sheet 24 & 25.

3. Refer to Index No. 400 for additional guardrail information.

4. Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Shoulder), LF.

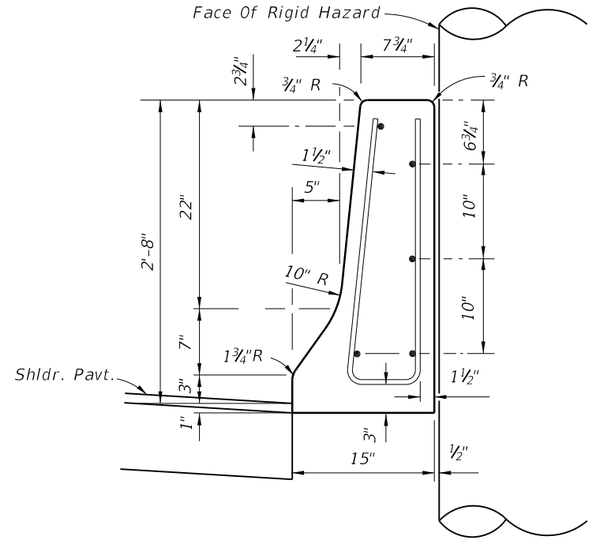
* 12"x12"x¼" galvanized steel back-up plate with ⅝" post bolts (either 14" or 18" long) and nuts with ⅝" plain round washers under nuts.

** Attach thrie-beam terminal connector to shoulder barrier wall with a 21"x12"x⅝" thrie beam terminal connector plate and 5-⅞"x12" long HS hex bolts and nuts with ⅞" plain round washers under heads and nuts.

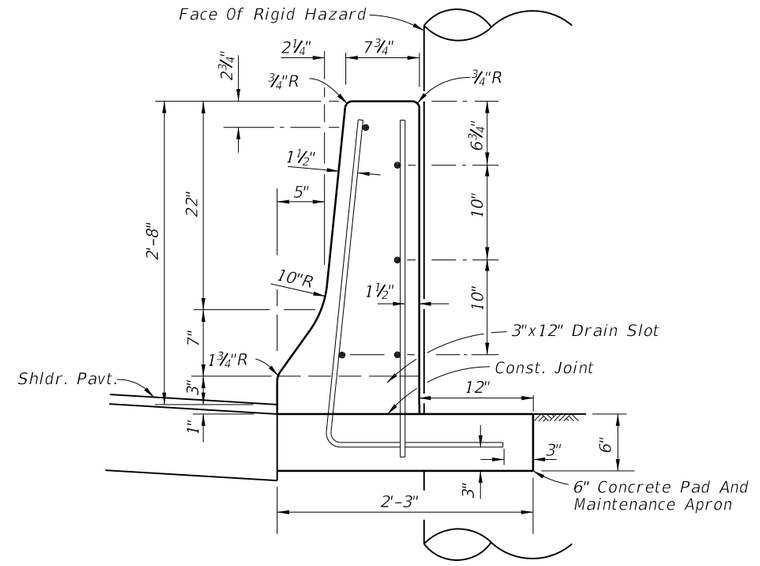


BARRIER WALL AT SQUARE OR RECTANGULAR SHAPED HAZARD

PARTIAL PLAN

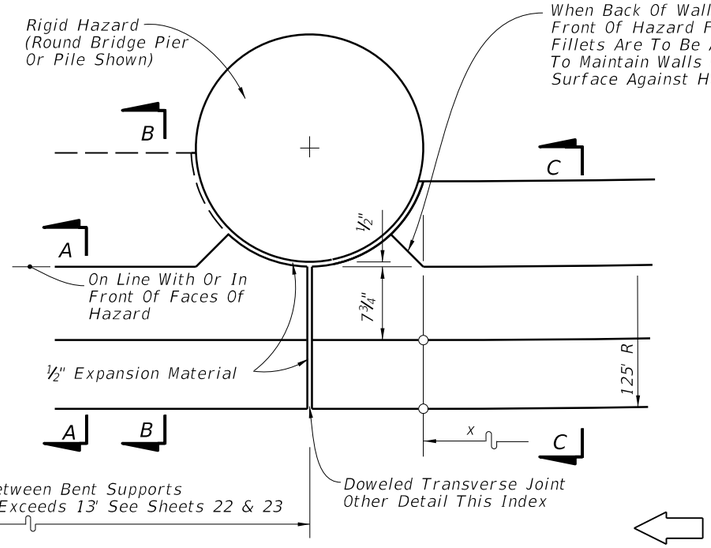


SECTION AA



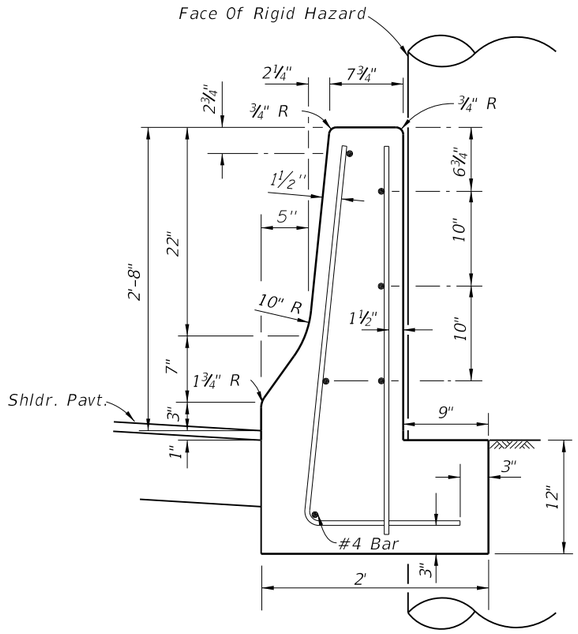
TO BE CONST. IN LIEU OF SECTION AA WHEN THRU DRAINAGE REQUIRED

SECTION BB



BARRIER WALL AT ROUND HAZARD

PARTIAL PLAN

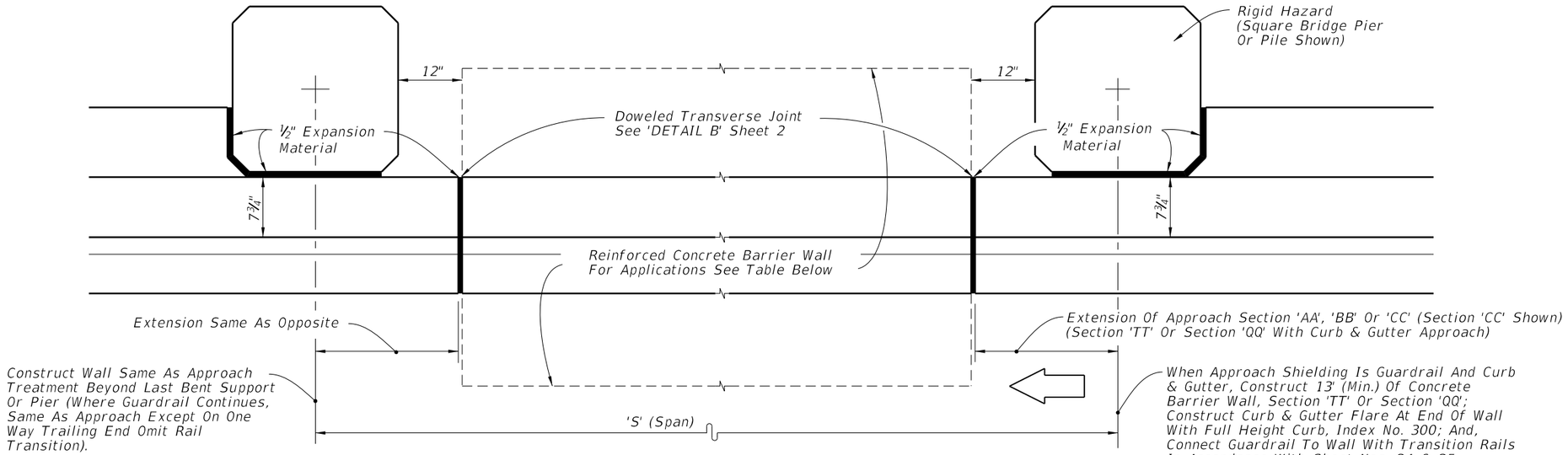


SECTION CC

NOTE:
All vertical reinforcement #4 bars at 12" centers.
All horizontal reinforcement #5 bars.

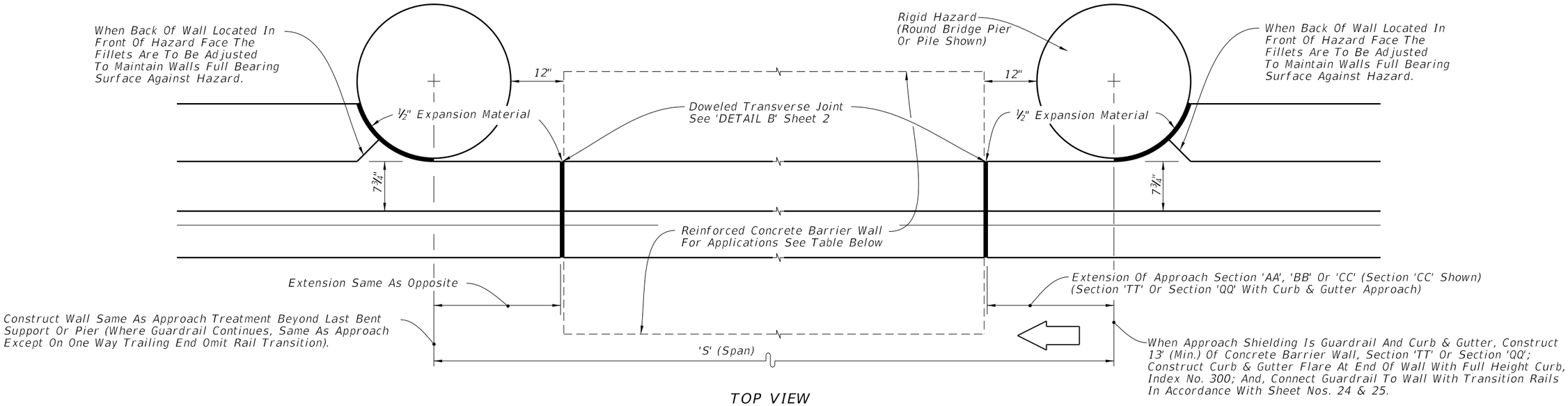
SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS WHEN GUARDRAIL OFFSET FROM HAZARD LESS THAN 3'

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO.	SHEET NO.
07/01/05						410	21



TOP VIEW

BARRIER WALL AT SQUARE PIER



TOP VIEW

BARRIER WALL AT ROUND PIER

CONCRETE BARRIER WALL WHEN SPAN BETWEEN BENT SUPPORTS OR PIER COLUMNS EXCEEDS 13'

'S' Feet	REINFORCED CONCRETE BARRIER WALL APPLICATIONS
> 13'	'Reinforced Concrete Barrier Wall (Shoulder)' With Flush Shoulders; Or, Section 'TT' Or Section 'QQ' With Curb & Gutter
Barrier wall footings that conflict with bent or pier foundations shall be modified as described in the plans.	

CONCRETE BARRIER WALL WHEN GUARDRAIL OFFSET FROM BENT OR PIER LESS THAN 3 FEET OR WHERE WALL STEM ABUTS SUPPORTS OR PIER COLUMN

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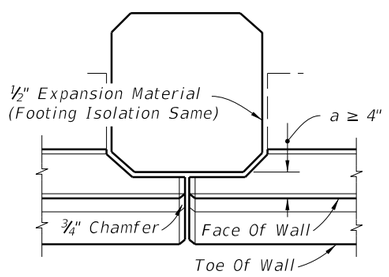
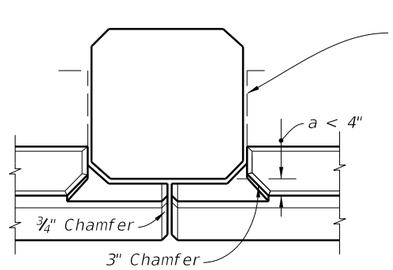
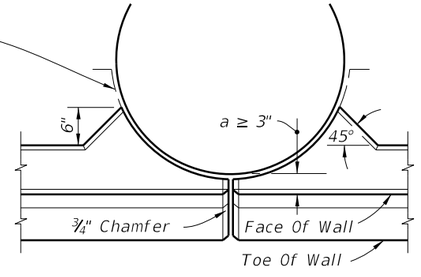
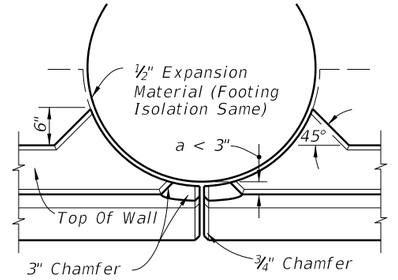
LAST REVISION	REVISION	DESCRIPTION:				
00			FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 22









TOP VIEWS

'a' Varies (Circular Or Octagonal Hazard Not More Than 2" In Front Of Face Of Wall).
Applicable To Sections 'AA' And 'BB' With Spans Of ≤ 13', And To Section 'CC', Sheet No. 21.
Applicable To Other Rigid Walls Of This Index For Spans > 13' Unless Otherwise Shown In The Plans.

HAZARD PENETRATING STEM OF RIGID CONCRETE BARRIER WALLS

The details on sheets 22 & 23 are treatments to the F-shape concrete barrier walls depicted on Sheet Nos. 9 through 19, where site conditions impose reduced clearances between above ground hazards and the walls. Bridge bent supports and piers are shown. These treatments are not applicable to hazards that cannot provide lateral support for the walls. See the plans for limits of wall sections applied and other associated wall treatments.

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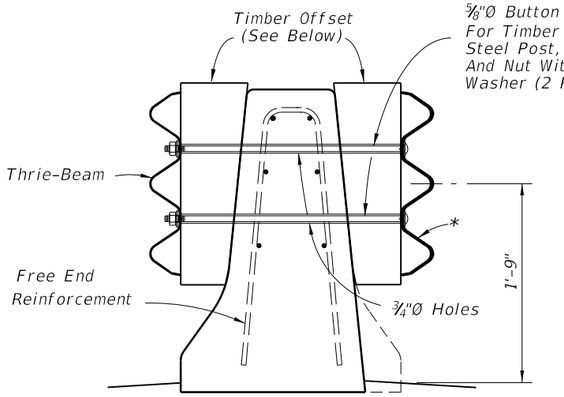
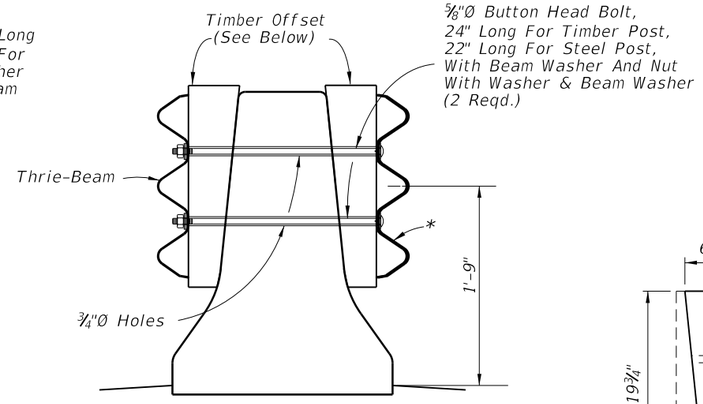
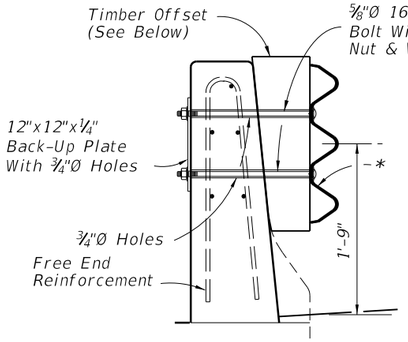


SECTION AA



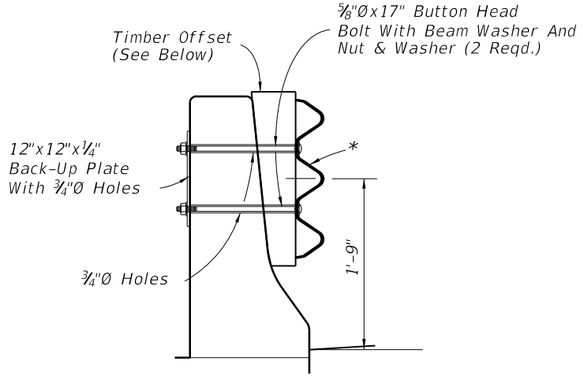
SECTION BB

NOTE: See Sheet 25 For Locations Of Sections.

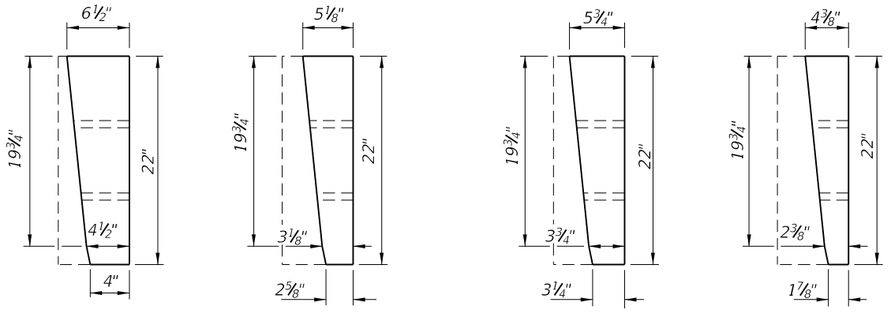


SECTION CC

* Single Thrie-Beam On Trailing Ends Of Barrier Wall; Nested Thrie-Beams On Approaches To Barrier Wall.



SECTION DD



AA & CC

BB & DD

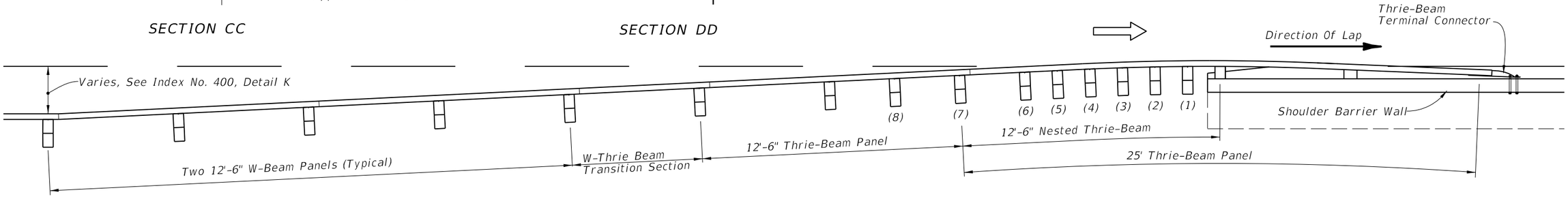
FOR DOUBLE FACED GUARDRAIL USING TIMBER POSTS AND FOR SINGLE FACED GUARDRAIL USING EITHER TIMBER OR STEEL POSTS

AA

BB

FOR DOUBLE FACED GUARDRAIL USING STEEL POSTS

STANDARD TIMBER OR PLASTIC OFFSET BLOCKS • FIELD TRIMMED FOR USE AT SECTIONS AA, BB, CC & DD



STANDARD GUARDRAIL APPROACH TO SHOULDER BARRIER

TRANSITION SECTION NOTES

1. The longitudinal dimensions and payment limits shown for median concrete barrier wall also apply to shoulder concrete barrier walls.

2. W-beam elements do not apply to these transition schemes. For barrier wall trailing end guardrail connections for one-way lanes, see Sheet 2.

3. Where reaming is necessary to fit nested beams the reamed surfaces shall be metalized in accordance with Section 562 of the Standard Specifications.

4. Either steel or timber guardrail post may be used, timber posts shown.

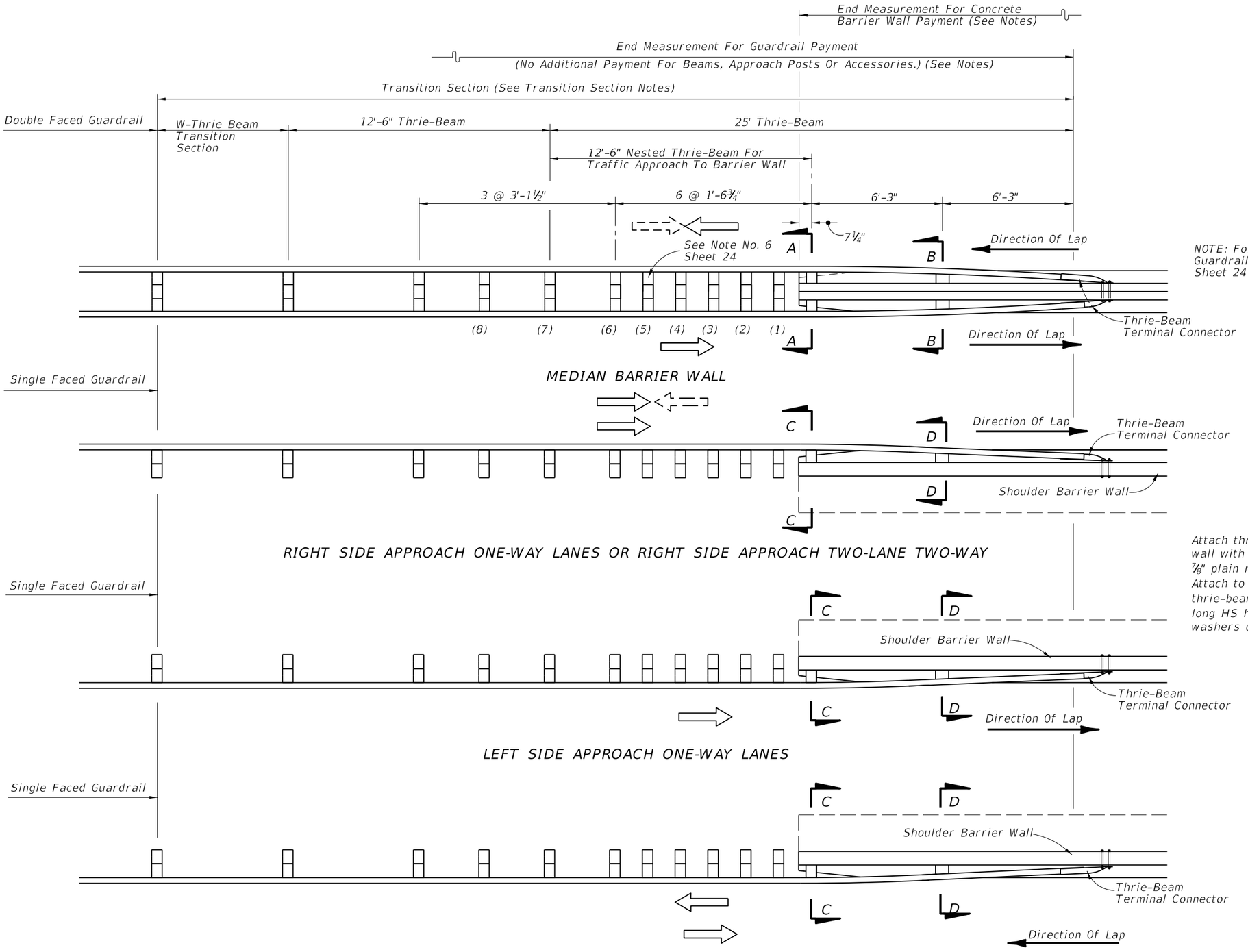
5. The nested beams shall not be bolted to blocks and posts at posts numbers (1), (3) and (5).

6. On the trailing side of MEDIAN BARRIER WALL, offset blocks may be omitted at posts numbers (1), (2), (3), (5), (6) and (8). (See Sheet 25)

7. For additional guardrail information refer to Index No. 400.

GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS

LAST REVISION	REVISION	DESCRIPTION:				
01/01/11			FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 24



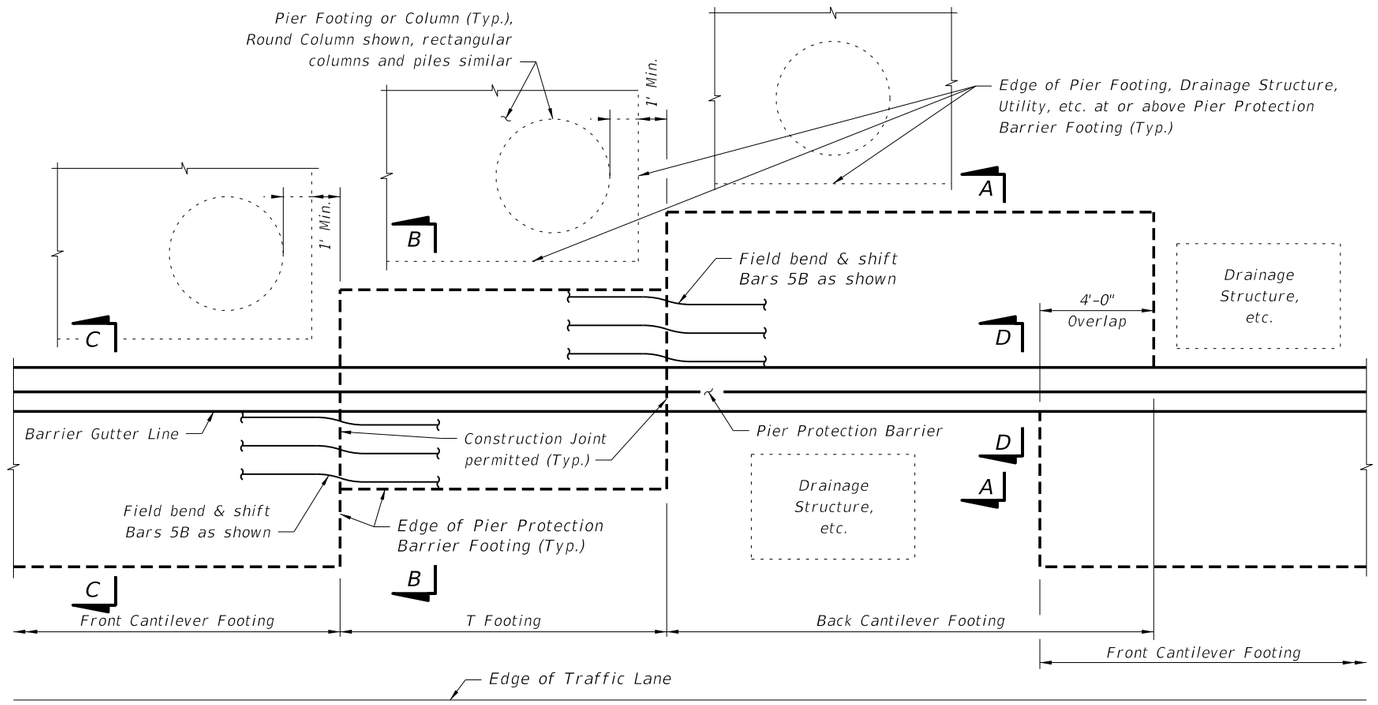
GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	CONCRETE BARRIER WALL	INDEX NO.	SHEET NO.
00						410	25

This Pier Protection Barrier has been structurally evaluated to be equivalent or greater in strength to other safety shape traffic barriers which have been crash tested to NCHRP Report 350 TL-5 criteria. This barrier meets the requirements of the AASHTO LRFD Bridge Design Specifications for a barrier used for bridge pier protection.

GENERAL NOTES

1. Concrete shall be Class III or IV unless otherwise called for in the plans. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Specifications, unless another finish is called for in the plans. The surfaces shall have a Class 5 Applied Finished Coating in accordance with Section 400 only when called for in the plans.
2. Construct Pier Protection Barrier continuous without transverse contraction or expansion joints. Transverse construction joints may be used at a spacing greater than or equal to 40'. Provide longitudinal reinforcing steel continuous across construction joints.
3. When the Pier Protection Barrier is installed adjacent to Roadway or Shoulder pavement, compact the top 12" of the subgrade to at least 98% of the maximum density determined by FM 1-T 180, Method D.
4. Isolate Barrier Wall Inlets, Index 218, from Pier Protection Barriers and Footings with 1" expansion material.
5. On roadways designated for reverse laning, mark all downstream barrier ends that are not shielded or outside the clear zone with Type 3 Object Markers. Include the cost of the Object Marker in the cost of the Pier Protection Barrier.
6. Payment: Pier Protection Barrier and Crash Wall to be paid for under the contract unit price for Shoulder Concrete Barrier Wall (Rigid-Shoulder 42"), LF, or Shoulder Concrete Barrier Wall (Rigid-Shoulder 54"), LF.
7. Provide 3/8" deep crack control V-grooves at 15' to 30' spacing. Locate V-grooves above any joint or discontinuity in the barrier footing. Align V-Grooves perpendicular to the longitudinal axis of the Pier Protection Barrier and make continuous across the top surface and both side faces. For slip formed barriers, score 3/8" V-Grooves while the concrete is still plastic, otherwise pre-form the joints when stationary forms are utilized.

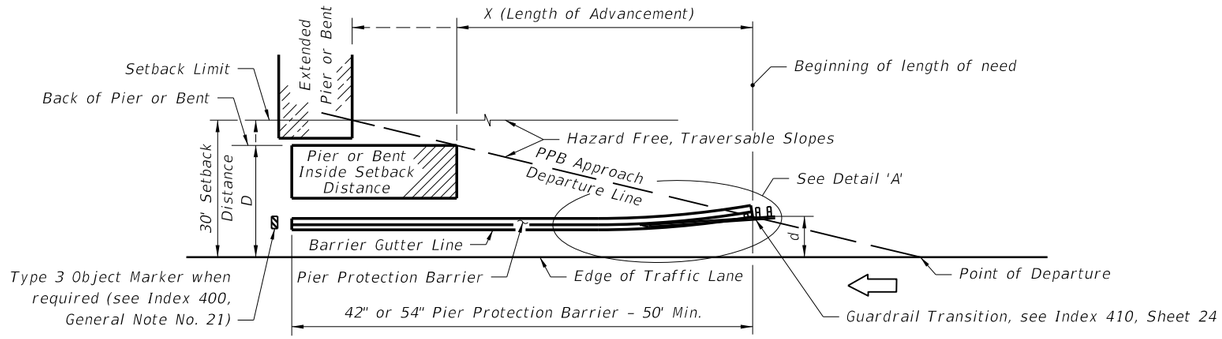


PLAN VIEW

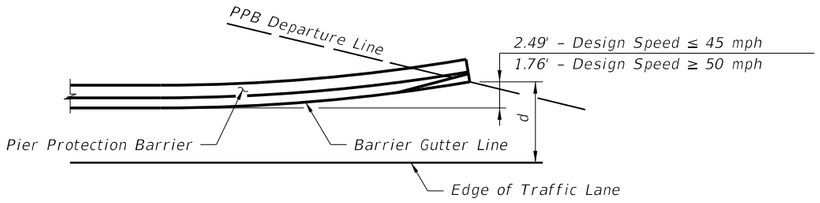
SECTION

PIER PROTECTION BARRIER FOOTING LAYOUT SCHEMATICS

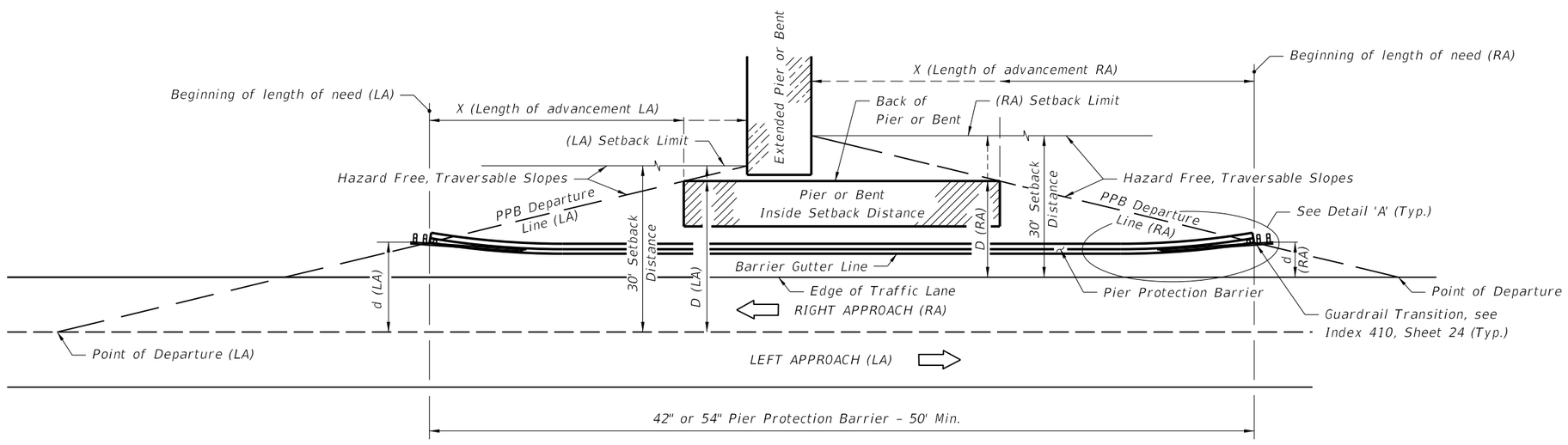
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/12			FDOT DESIGN STANDARDS 2013	PIER PROTECTION BARRIER	411	1



(LEFT SIDE OPPOSITE HAND)
ONE-WAY TRAFFIC



DETAIL 'A'
(Guardrail not shown for clarity)



TWO-LANE TWO-WAY TRAFFIC

Design Speed mph	X (Length of Advancement) Ft.
≤45	= 16 (D–d)
≥50	= 13 (D–d)

NOTE:

Length of Advancement determined from the diagrams and equations shown establishes the location of the upstream beginning length of need for a Pier Protection Barrier, however, the Length of Advancement for the combination of Pier Protection Barrier and required guardrail can be no less than that required by other details of Index 400.

Equation Variables:

D = Distance in feet from the near edge of the near approach traffic lane to either (a) the back of pier, when the pier is located inside the Setback Distance or (b) the Setback Distance, when the pier extends to or goes beyond the Setback Distance. For left side piers on two-way undivided facilities, D is measured from the inside edge of the near approach traffic lane.

d = Distance in feet from the near edge of the near approach traffic lane to the Pier Protection Barrier gutter line at its intersection with the departure line or the face of guardrail at its intersection with the departure line. For left side hazards on two-way undivided facilities, d is measured from the inside edge of the near approach traffic lane.

NOTE:
See Index 400 for Clear Zone and Horizontal Clearance Length of Advancement Diagrams.

PPB = Pier Protection Barrier

LENGTH OF ADVANCEMENT DIAGRAMS - PIER PROTECTION BARRIER WITH GUARDRAIL CONTINUATION

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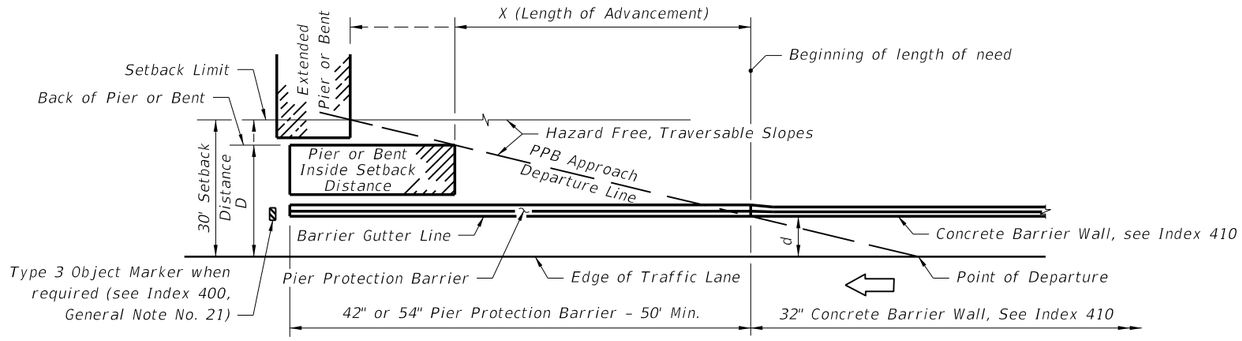
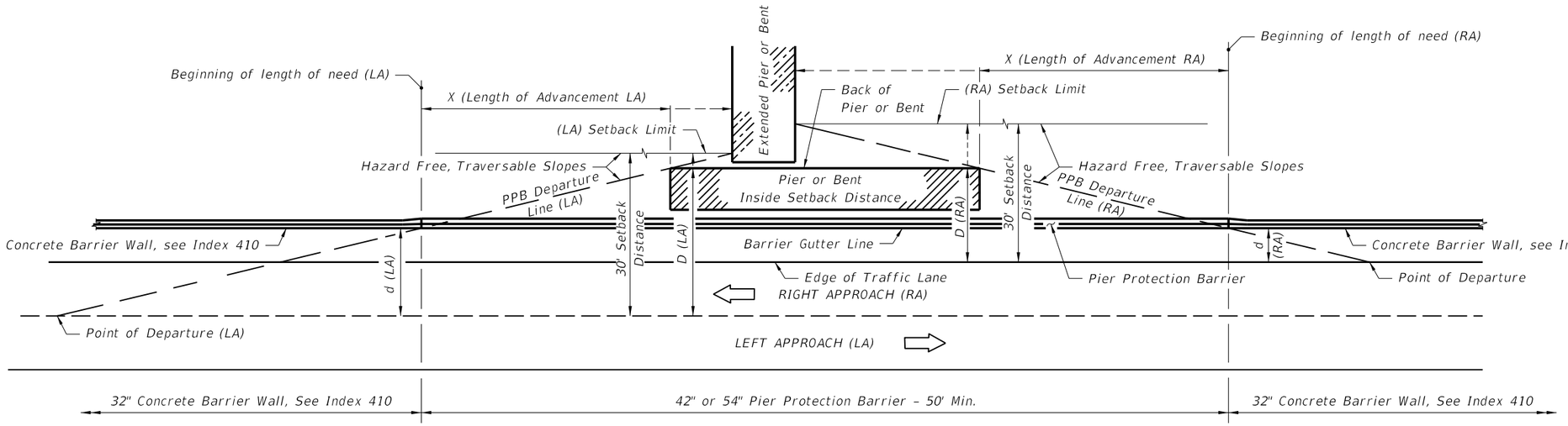
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/09			FDOT DESIGN STANDARDS 2013	PIER PROTECTION BARRIER	411	2



(LEFT SIDE OPPOSITE HAND)
ONE-WAY TRAFFIC



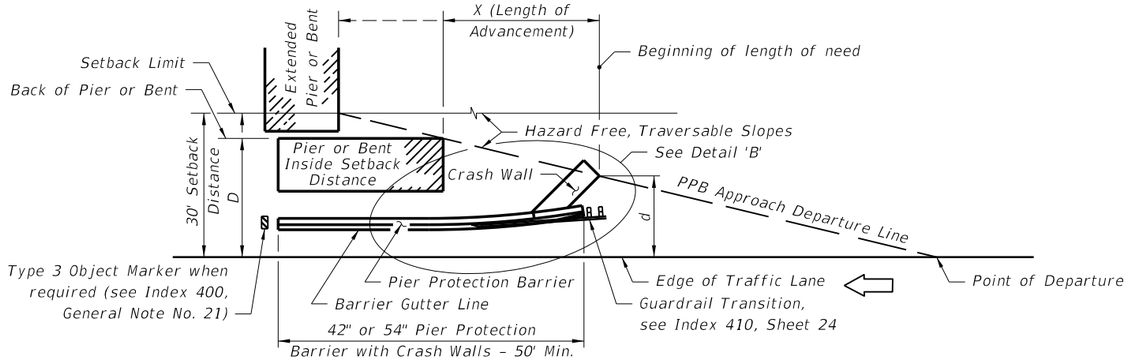
TWO-LANE TWO-WAY TRAFFIC

NOTES:
See Index 400 for Clear Zone and Horizontal Clearance Length of Advancement Diagrams.
PPB = Pier Protection Barrier

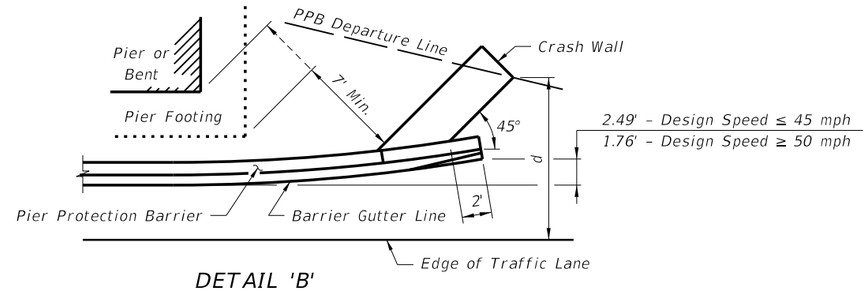
See Notes on Sheet 2.

LENGTH OF ADVANCEMENT DIAGRAMS - PIER PROTECTION BARRIER WITH CONCRETE BARRIER WALL CONTINUATION

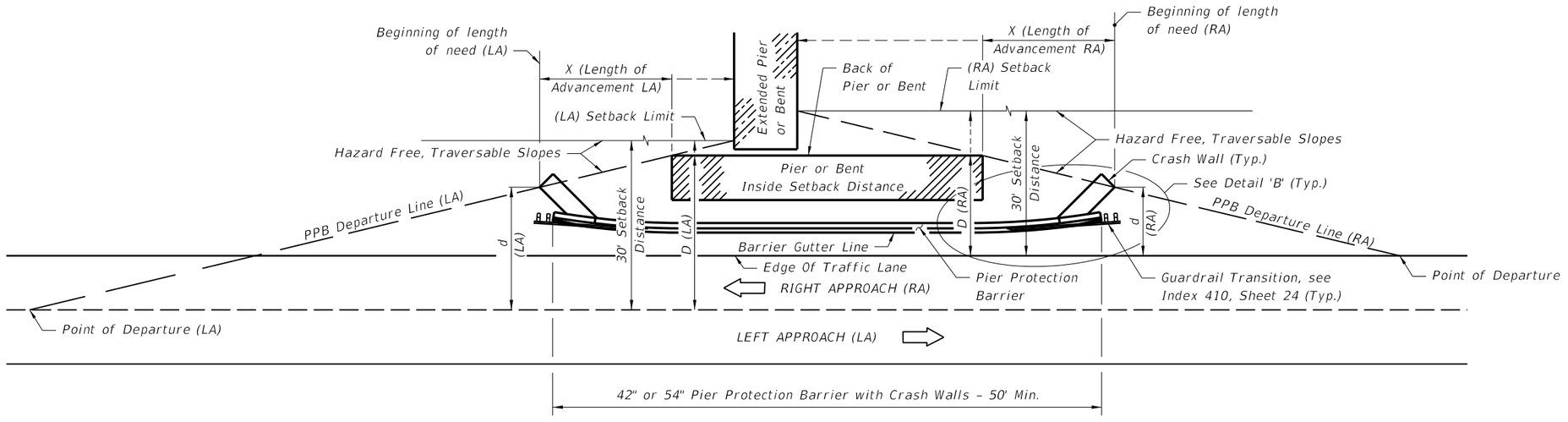
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/06			FDOT DESIGN STANDARDS 2013	PIER PROTECTION BARRIER	411	3



(LEFT SIDE OPPOSITE HAND)
ONE-WAY TRAFFIC



DETAIL 'B'
(Guardrail not shown for clarity)



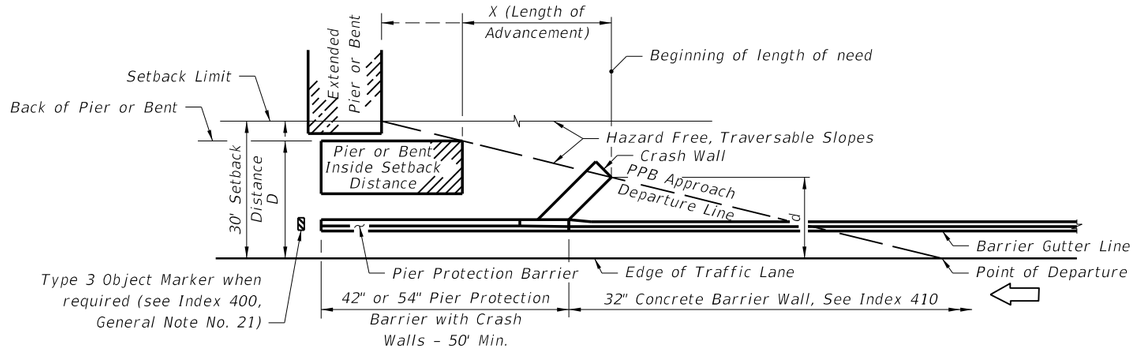
TWO-LANE TWO-WAY TRAFFIC

NOTES:
See Index 400 for Clear Zone and Horizontal Clearance Length of Advancement Diagrams.
PPB = Pier Protection Barrier

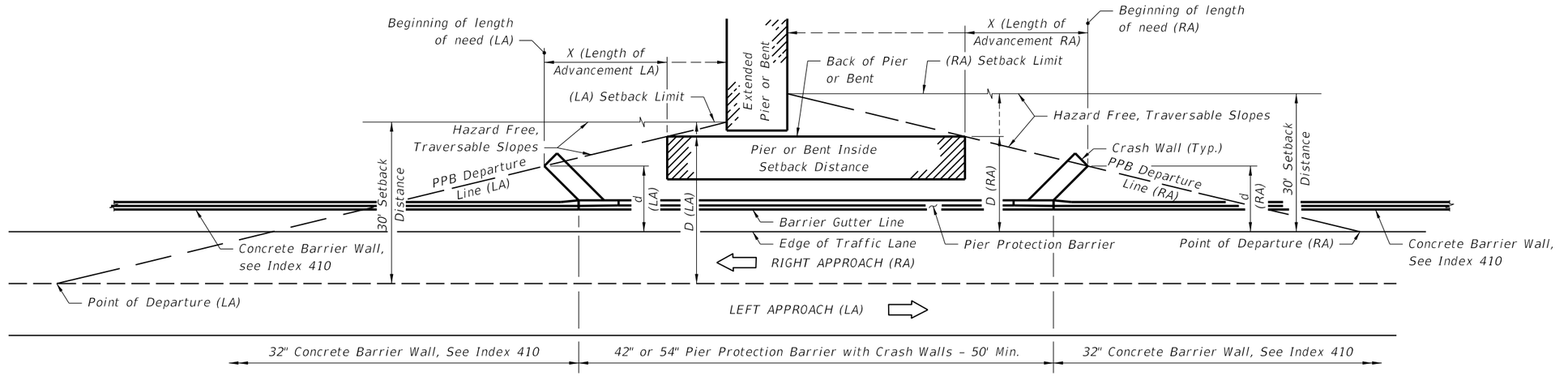
See Notes on Sheet 2.

LENGTH OF ADVANCEMENT DIAGRAMS - PIER PROTECTION BARRIER WITH CRASH WALL AND GUARDRAIL CONTINUATION

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	PIER PROTECTION BARRIER	INDEX NO.	SHEET NO.
07/01/09						411	4



(LEFT SIDE OPPOSITE HAND)
ONE-WAY TRAFFIC



TWO-LANE TWO-WAY TRAFFIC

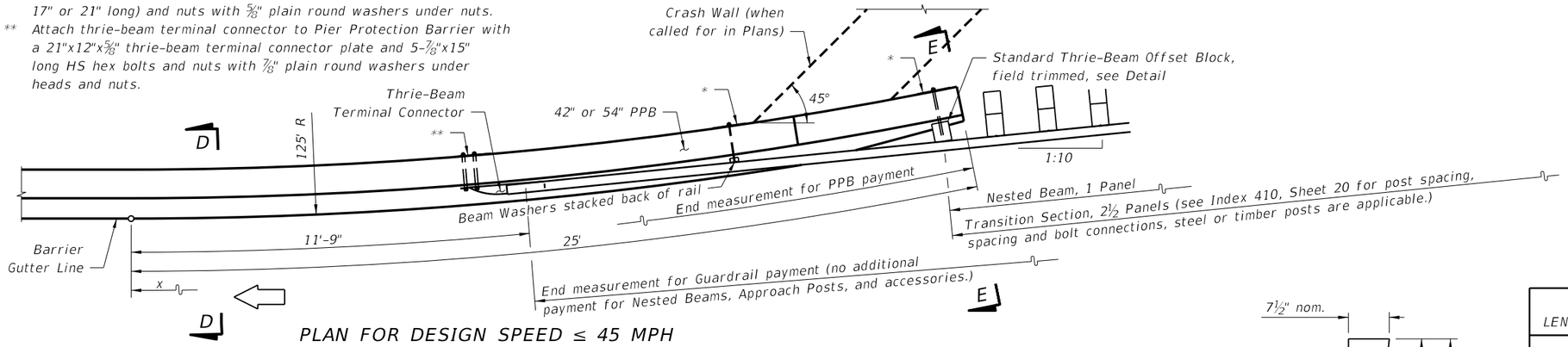
NOTES:
See Index 400 for Clear Zone and Horizontal Clearance Length of Advancement Diagrams.
PPB = Pier Protection Barrier

See Notes on Sheet 2.

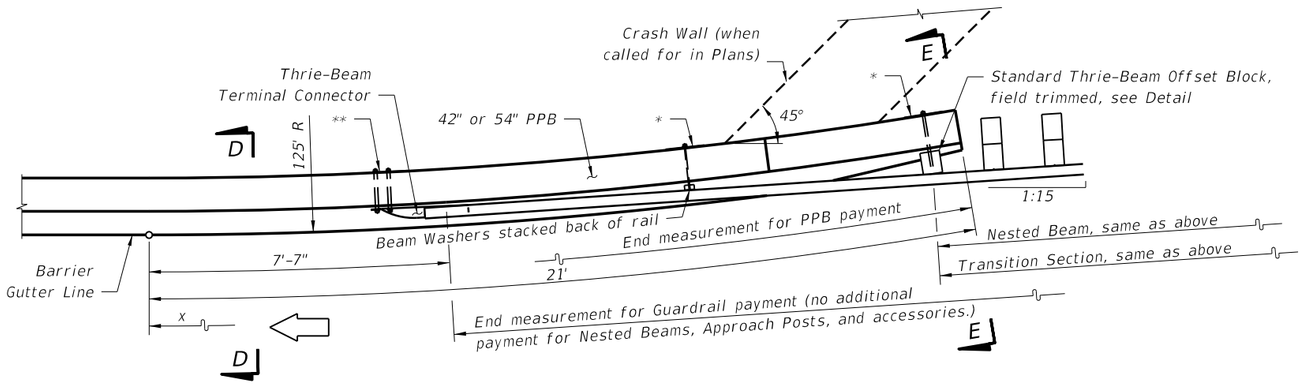
LENGTH OF ADVANCEMENT DIAGRAMS - PIER PROTECTION BARRIER WITH CRASH WALL AND CONCRETE BARRIER WALL CONTINUATION

* 12"x12"x¼" galvanized steel back-up plate with ⅝" post bolts (either 17" or 21" long) and nuts with ⅝" plain round washers under nuts.

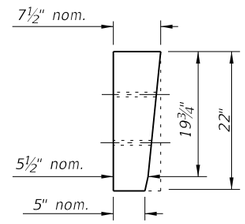
** Attach thrie-beam terminal connector to Pier Protection Barrier with a 21"x12"x⅝" thrie-beam terminal connector plate and 5-⅞"x15" long HS hex bolts and nuts with ⅞" plain round washers under heads and nuts.



PLAN FOR DESIGN SPEED ≤ 45 MPH



PLAN FOR DESIGN SPEED ≥ 50 MPH



FOR USE WITH EITHER 1:10 OR 1:15 GUARDRAIL TRANSITIONS

STANDARD THRIE-BEAM OFFSET BLOCK (FIELD TRIMMED)

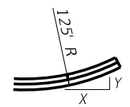
NOTES

1. The Pier Protection Barrier radial segments are intended for use on approach and trailing ends of both one-way and two-way facilities. The guardrail connections shown on this sheet apply to one-way approaches and to the approaching and trailing ends of two-lane two-way facilities. On trailing ends of two-way multilane and one-way facilities the end connection on Index 410, Sheet 2 may be used.

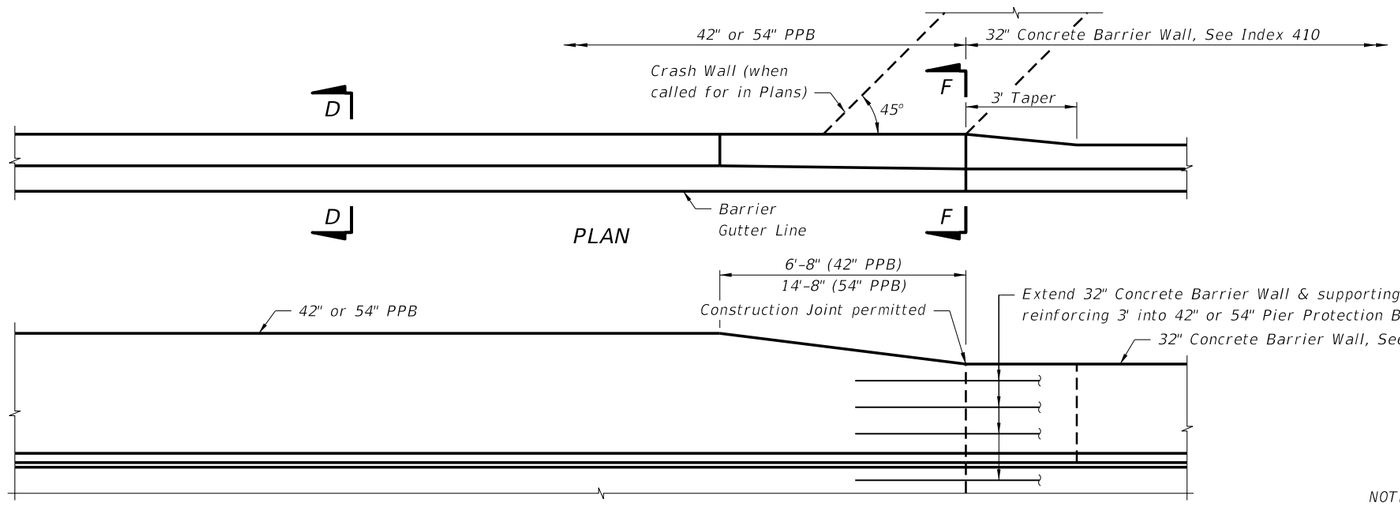
   For guardrail connections, see Index 410, Sheet 20.

2. Refer to Index No. 400 Detail J for additional guardrail information.

ARC LENGTH (Ft.)	DISTANCE "x" (Ft.)	OFFSETS "y" "y" (Ft.)
4	4.00	0.06
8	7.99	0.26
12	11.98	0.58
16	15.96	1.02
20	19.91	1.60
21	20.91	1.76
24	23.85	2.30
25	24.83	2.49



Note: Barrier may be constructed in chords having lengths ≤4 feet.

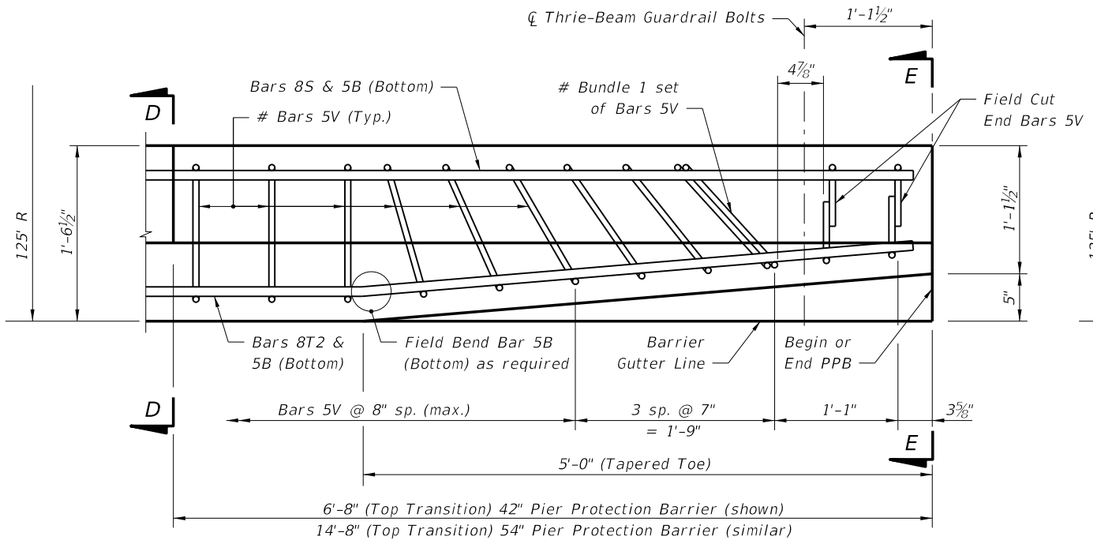


NOTE:
PPB = Pier Protection Barrier.

FLARED END TREATMENT - PIER PROTECTION BARRIER WITH GUARDRAIL CONTINUATION

END TREATMENT - PIER PROTECTION BARRIER WITH CONCRETE BARRIER WALL CONTINUATION

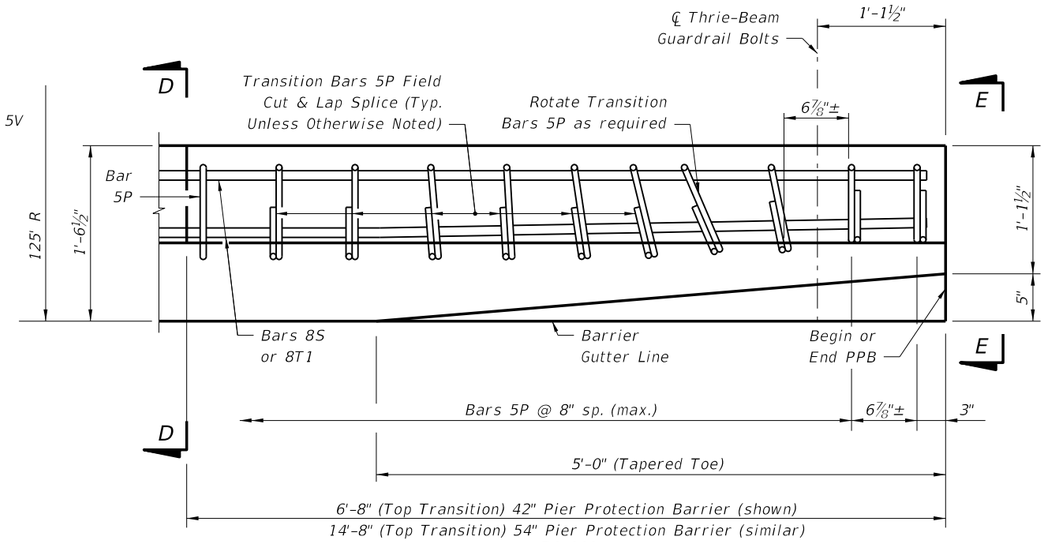
LAST REVISION	REVISION	DESCRIPTION:				
07/01/06			FDOT DESIGN STANDARDS 2013	PIER PROTECTION BARRIER	INDEX NO. 411	SHEET NO. 6



PLAN

(Showing Bars 5V, 8S, 5B & 8T2)

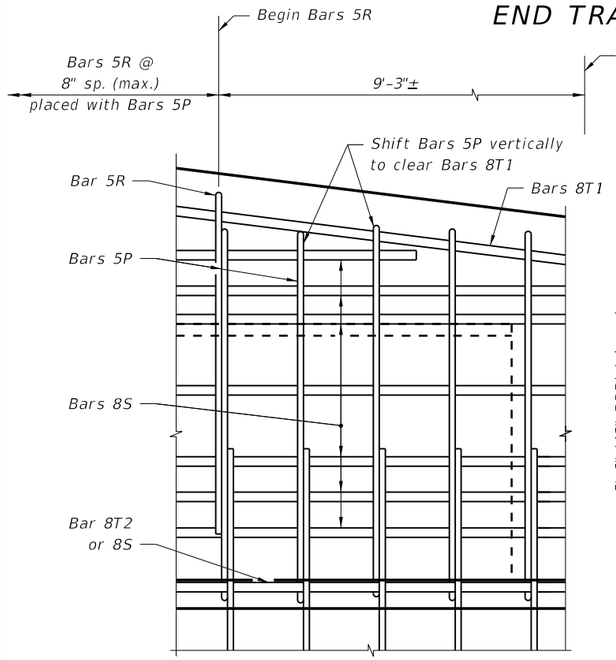
Rotate Bars 5V as shown to maintain clearance.



PLAN

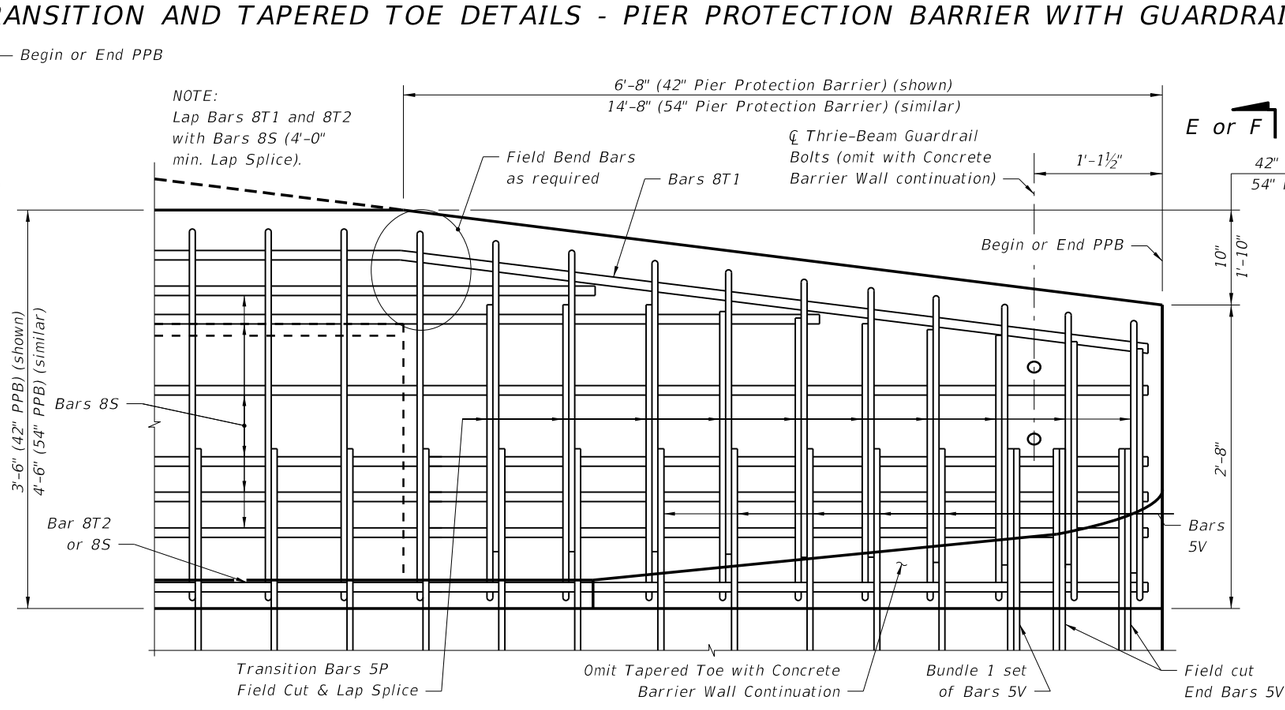
(Showing Transition Bars 5P and Bars 8S & 8T1)

END TRANSITION AND TAPERED TOE DETAILS - PIER PROTECTION BARRIER WITH GUARDRAIL CONTINUATION



PARTIAL ELEVATION - 54" PPB DETAIL

NOTE:
Lap Bars 8T1 and 8T2 with Bars 8S (4'-0" min. Lap Splice).



NOTES:
1. See Sheet 9 for Footing Details.
2. See Sheet 8 for Cross Sections.

ESTIMATED 42" PPB QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.141
Reinforcing Steel (w/out Bars 5V)	LB/LF	33.10

ESTIMATED 54" PPB QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.172
Reinforcing Steel (w/out Bars 5V)	LB/LF	48.74

NOTE:
PPB = Pier Protection Barrier.

ELEVATION - BARRIER END TRANSITION - 42" PPB (shown); 54" PPB (similar)

(Guardrail and back leg of Stirrups not shown for clarity)

END TRANSITION DETAILS - PIER PROTECTION BARRIER WITH GUARDRAIL OR CONCRETE BARRIER WALL CONTINUATION

LAST REVISION	REVISION	DESCRIPTION:				
07/01/06			FDOT DESIGN STANDARDS 2013	PIER PROTECTION BARRIER	INDEX NO. 411	SHEET NO. 7

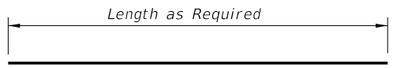
BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
P	5	7'-6"
R	5	6'-7"
S	8	As Reqd.
42" PPB T1 & T2	8	13'-0"
54" PPB T1 & T2	8	21'-0"
V	5	9'-2"

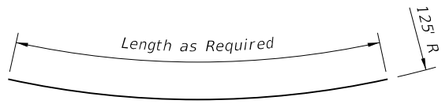
REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. Bars 8S may be continuous or spliced at the construction joints. Lap splices for Bars 8S shall be a minimum of 4'-0".
3. The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.

NOTE: PPB = Pier Protection Barrier

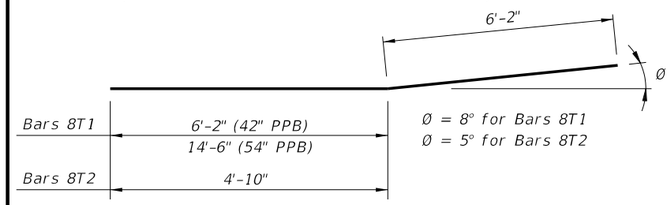
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS



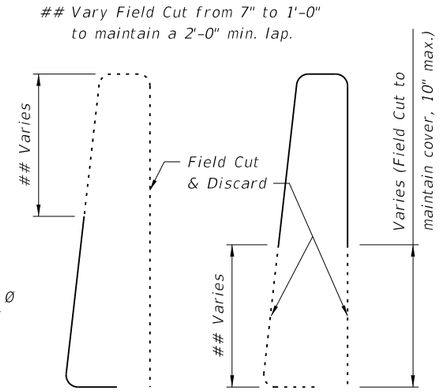
BARS 8S



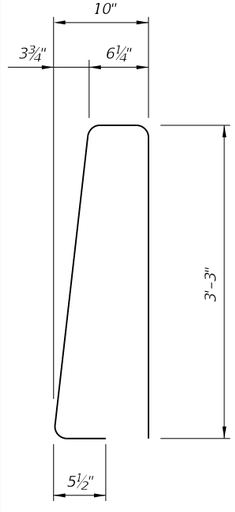
BARS 8S
(within Flared End Treatments)



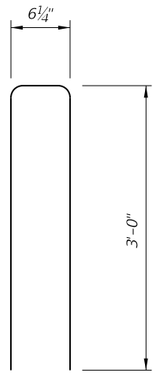
TRANSITION BARS 8T1 & 8T2



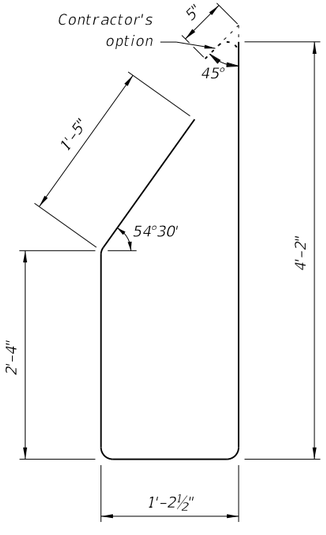
TRANSITION STIRRUP BARS 5P
To Be Field Cut (10 of each required per Railing End Transition)



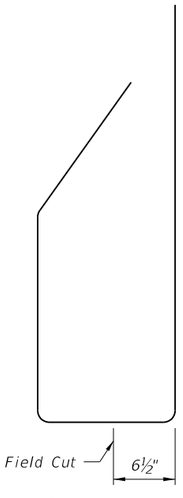
STIRRUP BAR 5P



STIRRUP
BAR 5R

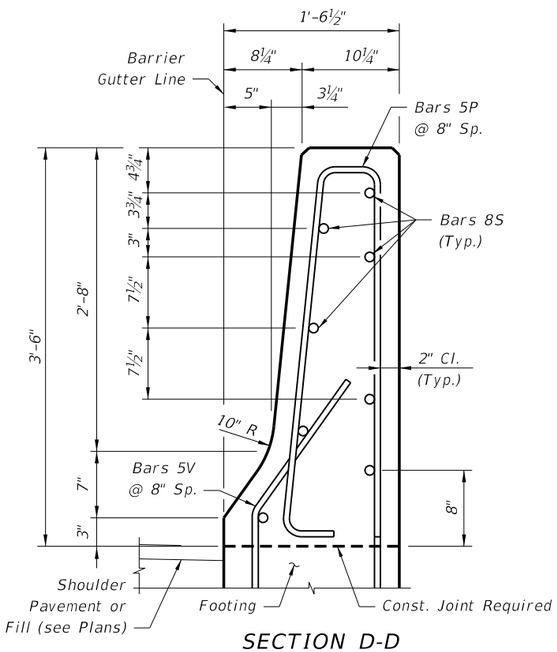


STIRRUP BAR 5V

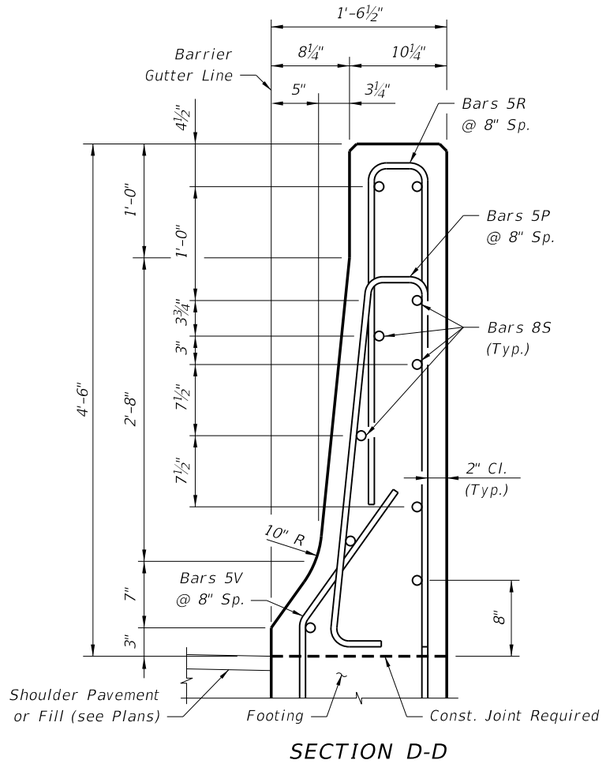


END STIRRUP BAR 5V
To Be Field Cut
(Two required per
Barrier End Transition
w/ Tapered Toe)

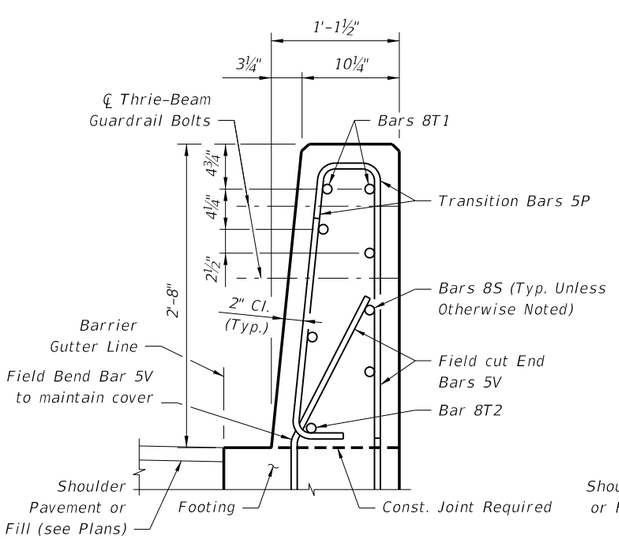
NOTES:
1. See Sheet 9 for Footing Details.
2. See Sheet 7 for bar spacings and details within End Transitions.



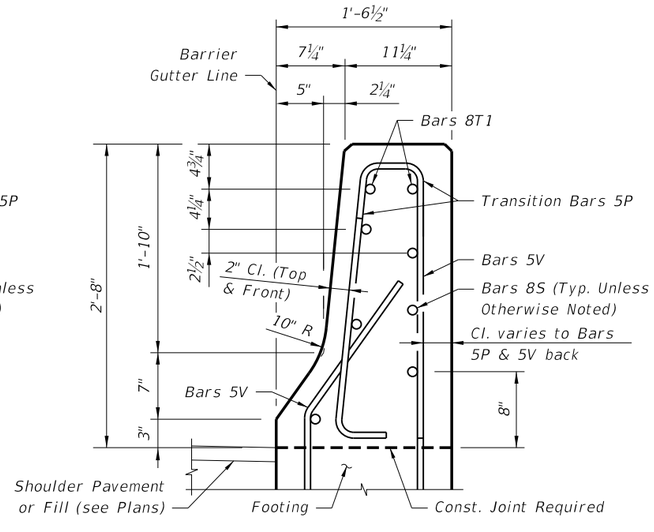
SECTION D-D
TYPICAL SECTION THRU
42" PIER PROTECTION BARRIER



SECTION D-D
TYPICAL SECTION THRU
54" PIER PROTECTION BARRIER



END VIEW E-E
(with Tapered Toe)



END VIEW F-F
(without Tapered Toe)

BARRIER DETAILS

LAST REVISION	REVISION	DESCRIPTION:	FDOT DESIGN STANDARDS 2013	PIER PROTECTION BARRIER	INDEX NO.	SHEET NO.
07/01/07					411	8

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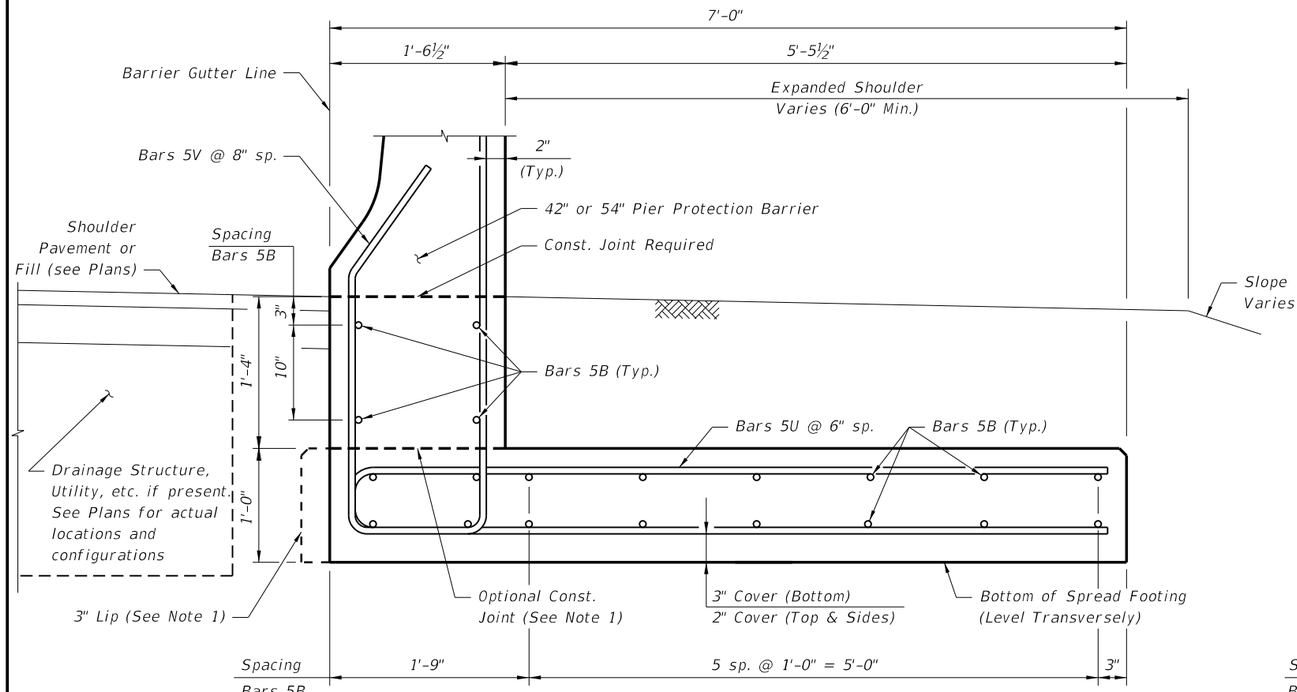
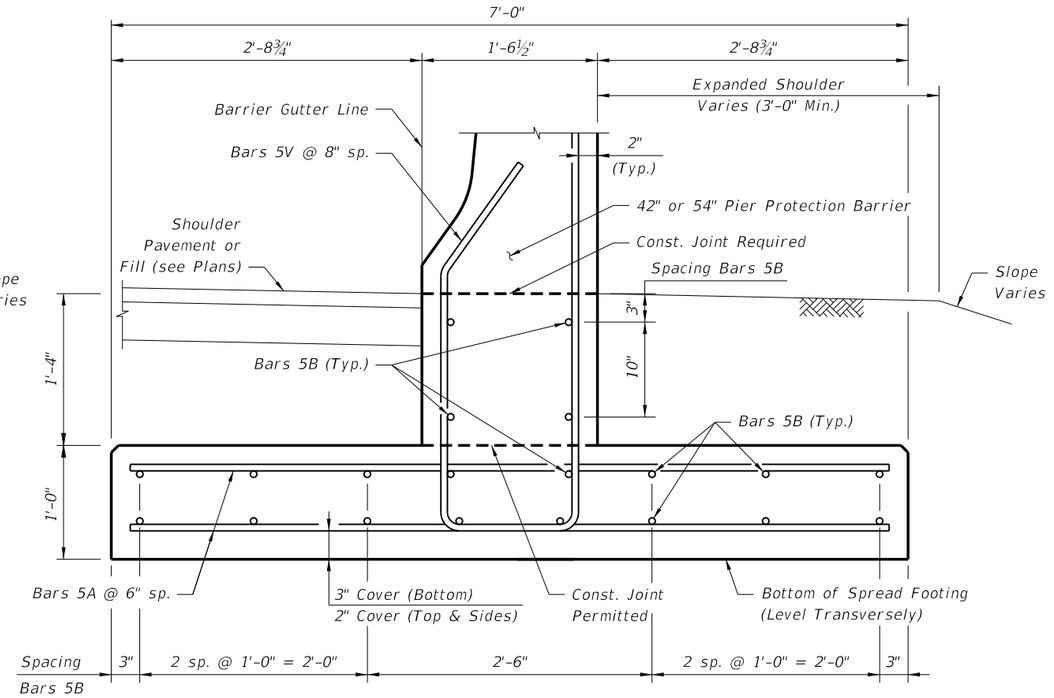
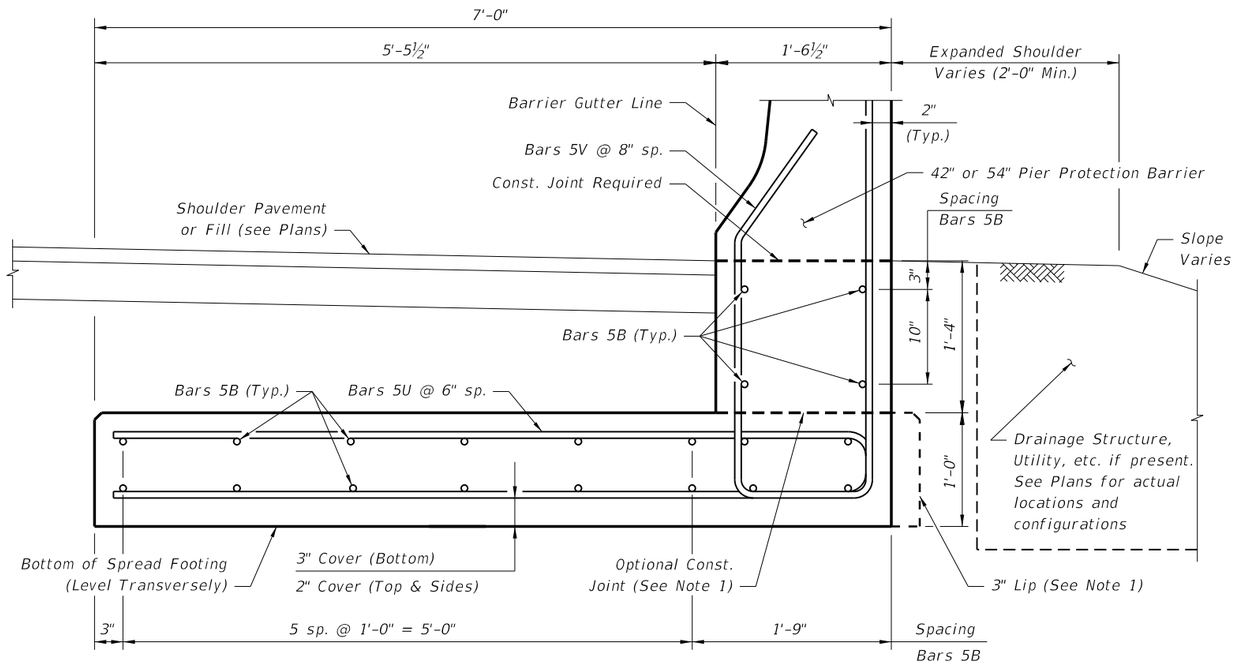


SECTION A-A TYPICAL SECTION THRU BACK CANTILEVER FOOTING



SECTION B-B TYPICAL SECTION THRU T FOOTING



SECTION C-C TYPICAL SECTION THRU FRONT CANTILEVER FOOTING

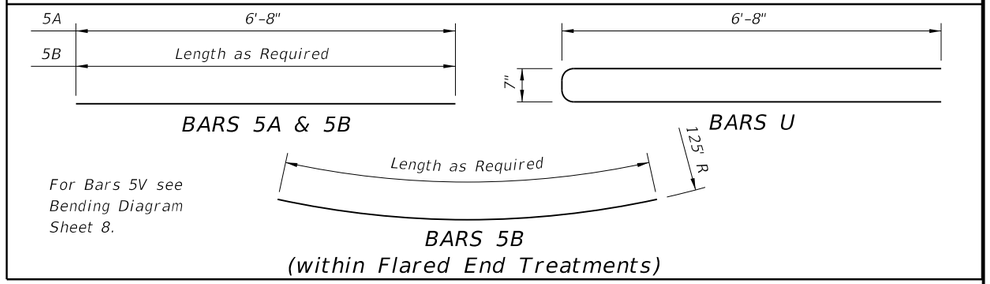
BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
A	5	6'-8"
B	5	As Reqd.
U	5	14'-0"

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. Lap splices for Bars 5B shall be a minimum of 2'-2".
3. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A 497.

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS



ESTIMATED BARRIER FOOTING QUANTITIES

ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.335
Reinforcing Steel (w/ Bars 5V) Cantilever Footing	LB/LF	64.32
Reinforcing Steel (w/ Bars 5V) T Footing	LB/LF	63.01

NOTES:

1. Provide 3" lip when optional construction joint is used. Omit 3" lip adjacent to Barrier Wall Inlets and as required to provide 2" min. clear between Cantilever Footing and adjacent Pier Footing or Column.
2. See Sheets 7 & 8 for Barrier Details.

BARRIER FOOTING DETAILS

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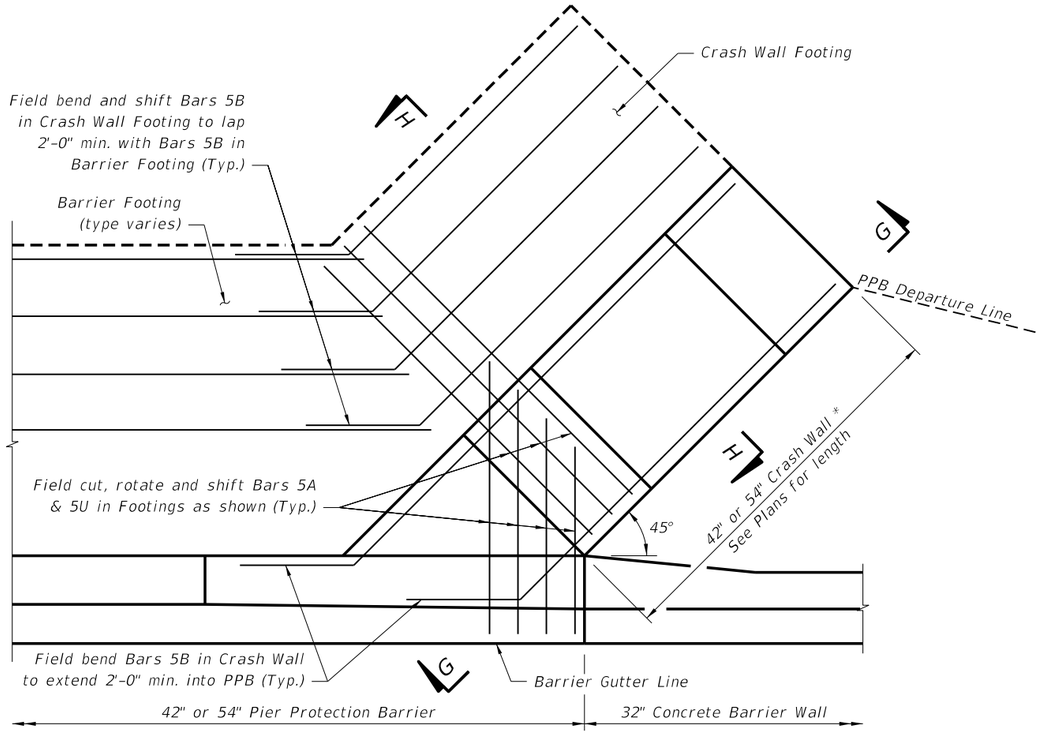
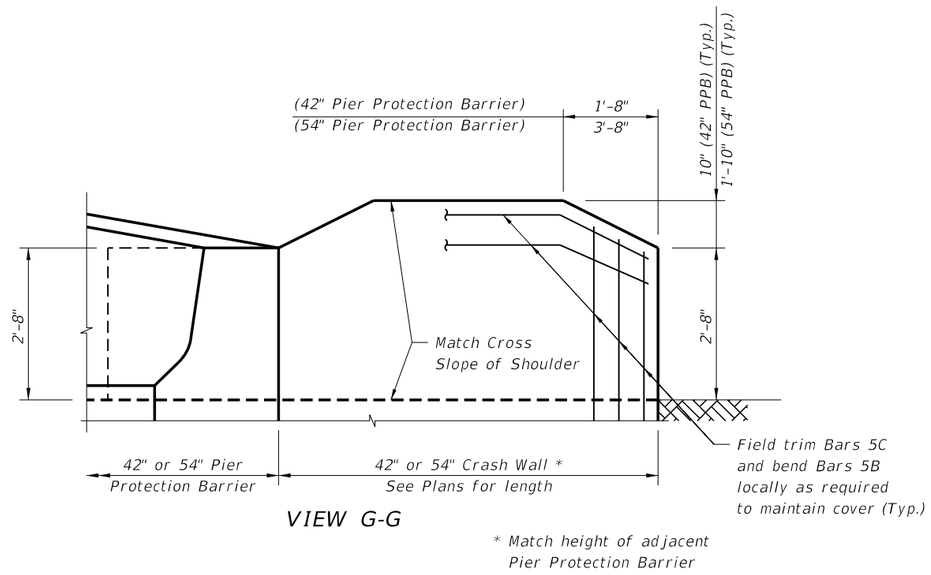
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	PIER PROTECTION BARRIER	411	9



PLAN VIEW

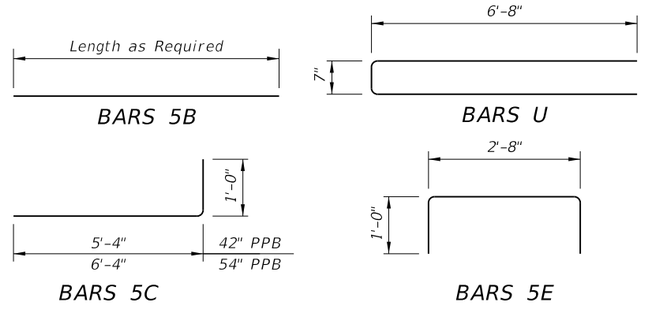
(Concrete Barrier Wall Continuation shown, Guardrail Continuation similar)



VIEW G-G

* Match height of adjacent Pier Protection Barrier

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS



BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
B	5	As Reqd.
C	5	6'-4" / 7'-4"
E	5	4'-8"
U	5	11'-0"

REINFORCING STEEL NOTES:

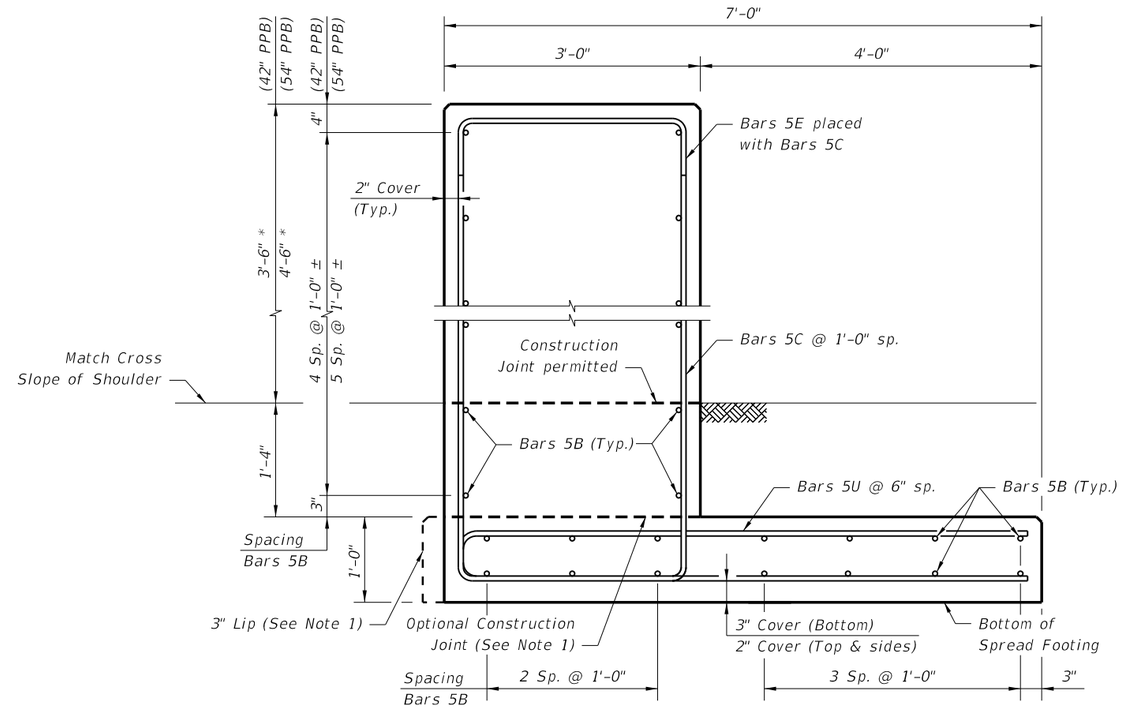
1. All bar dimensions in the bending diagrams are out to out.
2. Lap splices for Bars 5B shall be a minimum of 2'-2".
3. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A 497.

ESTIMATED CRASH WALL & FOOTING QUANTITIES

ITEM	UNIT	QUANTITY
Concrete (Footing)	CY/LF	0.260
Concrete (42" Crash Wall)	CY/LF	0.389
Concrete (54" Crash Wall)	CY/LF	0.500
Reinforcing Steel (42" Crash Wall)	LB/LF	66.06
Reinforcing Steel (54" Crash Wall)	LB/LF	70.23

NOTES:

1. Provide 3" lip when optional construction joint is used.
2. See Sheet 8 for Barrier Details and Sheet 9 for Barrier Footing details.



SECTION H-H

NOTE:
PPB = Pier Protection Barrier

CRASH WALL & FOOTING DETAILS

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	PIER PROTECTION BARRIER	INDEX NO.	SHEET NO.
07/01/07						411	10

GENERAL NOTES

1. The 'Portable Temporary Low Profile Barrier For Roadside Safety' is a licensed design by the University Of Florida. Any infringement on the rights of the designer shall be the sole responsibility of the user.

2. This standard drawing (Index No. 412) is provided by the Florida Department Of Transportation solely for use by the Department and its assignees. The purpose for this standard drawing is to indicate the approval of use of the barrier on the State Highway System; to provide sufficient pictorials for identifying the barrier unit; and, to provide general installation geometry for the barrier.

3. Only those barrier units cast by producers licensed by the University Of Florida will be allowed for installation on the State Highway System in Florida. Barrier wall units shall conform to Section 521 of the Standard Specification and shall be produced in Department approved plants with quality control plans for precasting concrete barrier walls. Each barrier wall unit shall be permanently marked with an identification that is traceable to the manufacturer, the producing precast concrete plant and the date of production. This permanent identification mark will serve as certification that the unit has been manufactured in accordance with University of Florida drawings and specifications, and the approved quality control program.

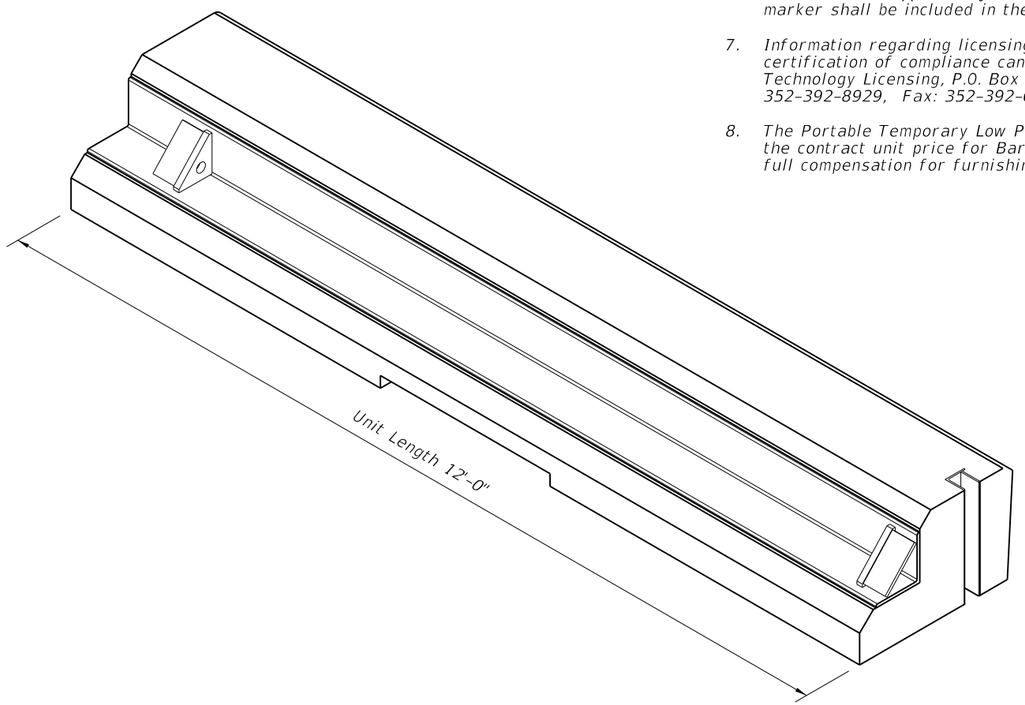
4. The low profile barrier is to be installed only with hardware and accessories furnished by the licensed barrier producer. Units shall be used for no purpose other than as interconnected segments in a run of barrier. Low profile barrier wall units shall maintain firm contact with adjoining units. Nuts on tensioning rods shall be installed snug tight.

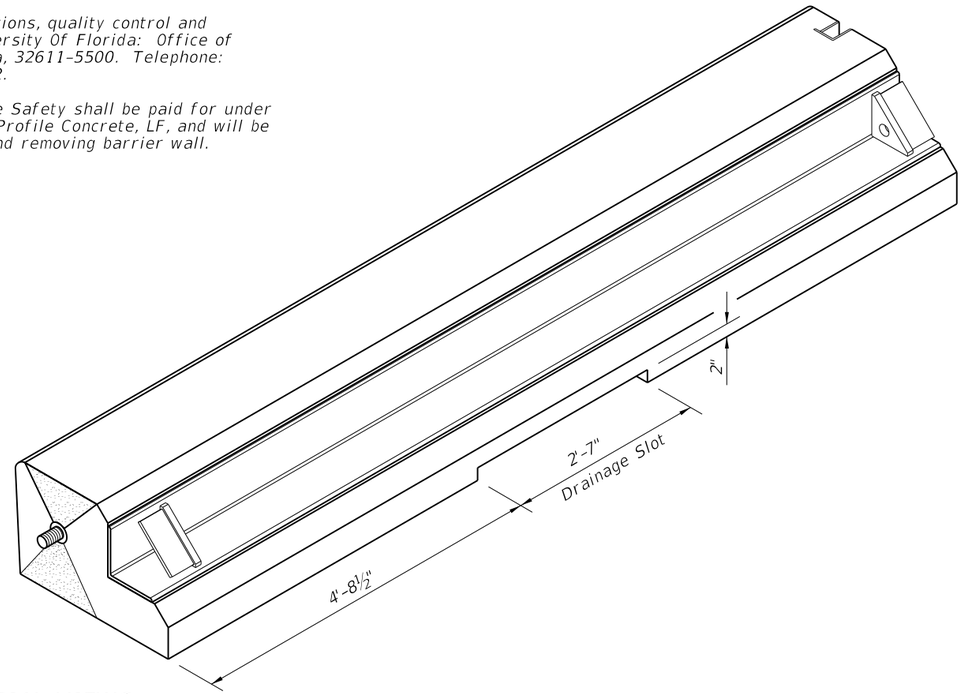
5. The low profile barrier is applicable for work zone speeds of 45 mph or less.

6. Tubular markers shall be installed along the run of barrier at the ends and at 50' centers on tangents and 25' centers on radii. The markers shall be fixed to the top of the barrier by an adhesive or other method approved by the engineer. Approach end units shall be marked with a Type I object marker. The cost of the tubular markers and Type I object marker shall be included in the cost of the low profile barrier.

7. Information regarding licensing, shop drawings, specifications, quality control and certification of compliance can be obtained from the University Of Florida: Office of Technology Licensing, P.O. Box 115500, Gainesville, Florida, 32611-5500. Telephone: 352-392-8929, Fax: 352-392-6600. Reference UF#11052.

8. The Portable Temporary Low Profile Barrier For Roadside Safety shall be paid for under the contract unit price for Barrier Wall (Temporary) Low Profile Concrete, LF, and will be full compensation for furnishing, installing, maintaining and removing barrier wall.

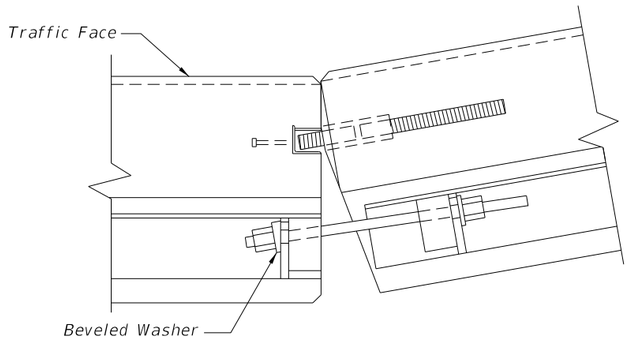




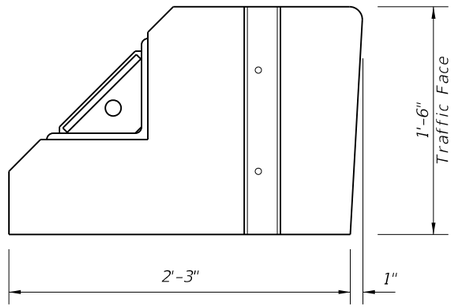
BACKSIDE AND END PICTORIAL VIEWS

PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY

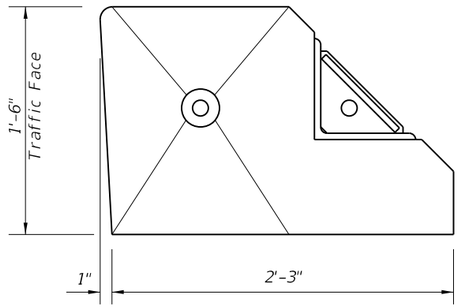
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/12			FDOT DESIGN STANDARDS 2013	LOW PROFILE BARRIER	412	1



CONCAVE CONNECTION

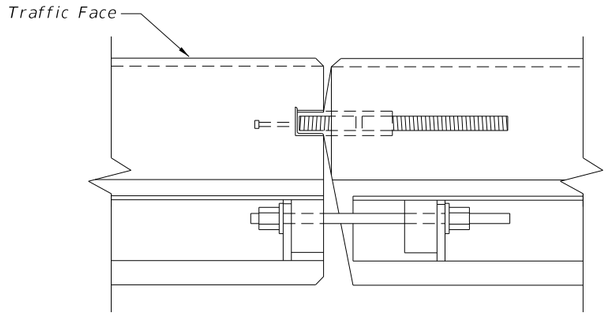


FLAT FACE FEMALE END

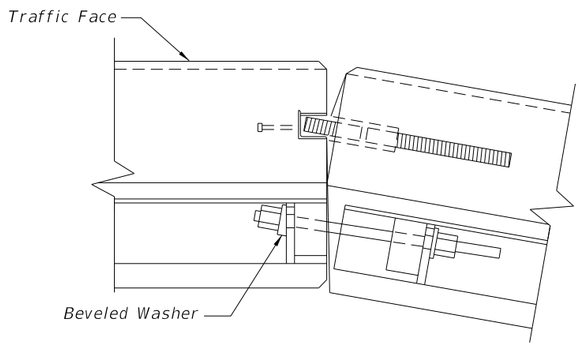


BEVELED FACE MALE END

END VIEWS



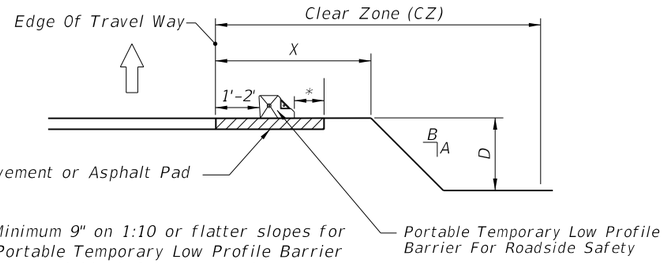
PARALLEL CONNECTION



CONVEX CONNECTION

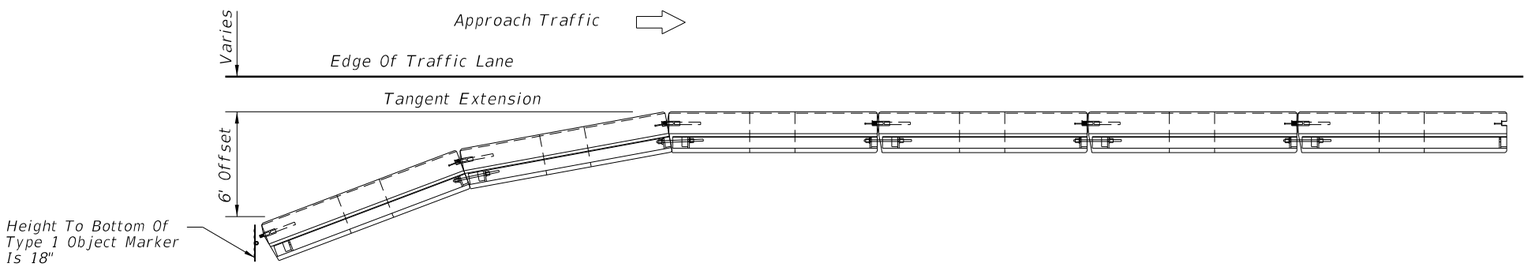
PLAN VIEWS OF CONNECTIONS

WORK POSTED SPEED	OFFSET TO TRAVELWAY	DEFLECTION SPACE
45 MPH OR LESS	1' MIN. 2' PREFERRED	9"



* Minimum 9" on 1:10 or flatter slopes for 'Portable Temporary Low Profile Barrier For Roadside Safety.' For values A, B, D and X see Index No. 600.

DEFLECTION SPACE AT DROPOFFS



PLAN VIEW OF APPROACH END OFFSET

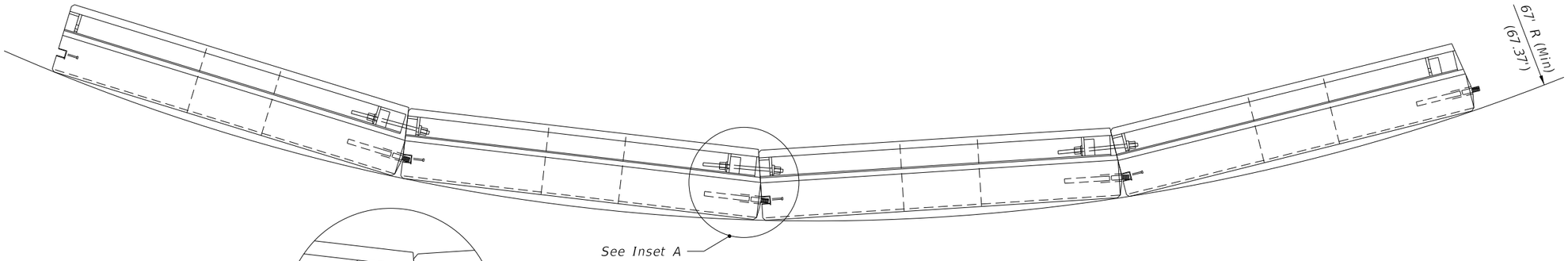
Notes:

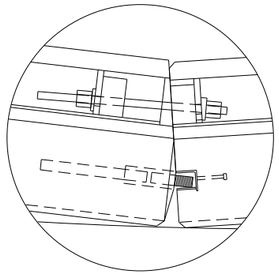
LIMITATION OF USE: This installation technique can only be used on flexible or rigid pavement or on an asphalt pad as shown.

ASPHALT PAD: Where exisiting pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	LOW PROFILE BARRIER	INDEX NO.	SHEET NO.
01/01/12						412	2

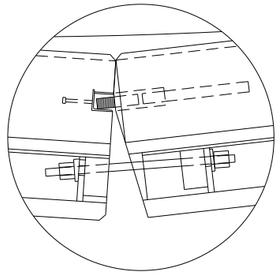




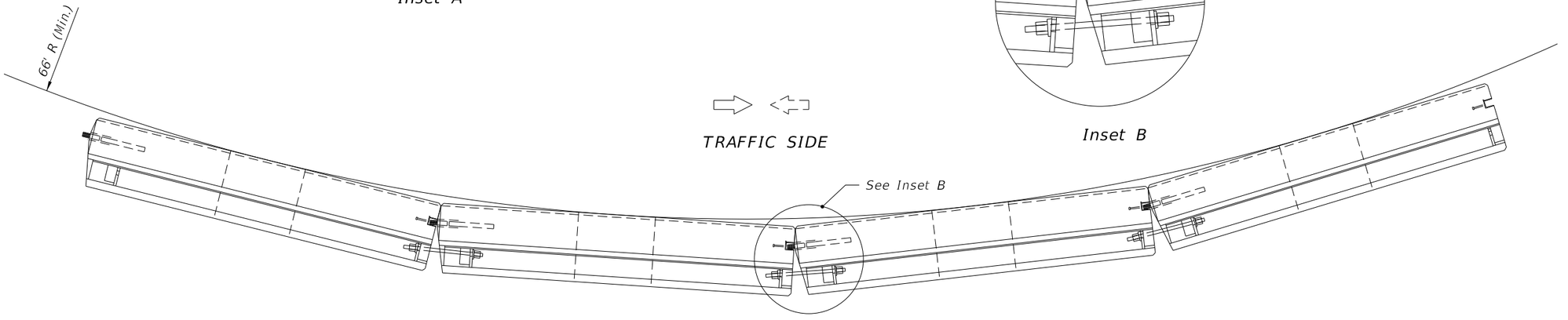
Inset A

TRAFFIC SIDE

CONVEX CURVATURE



Inset B



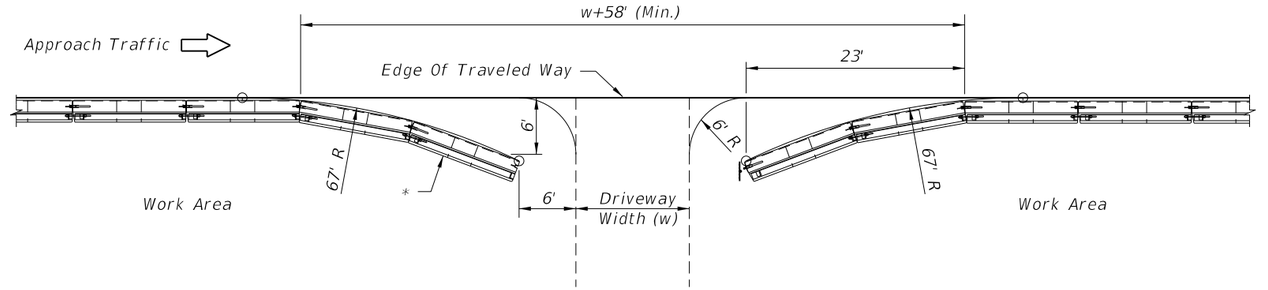
TRAFFIC SIDE

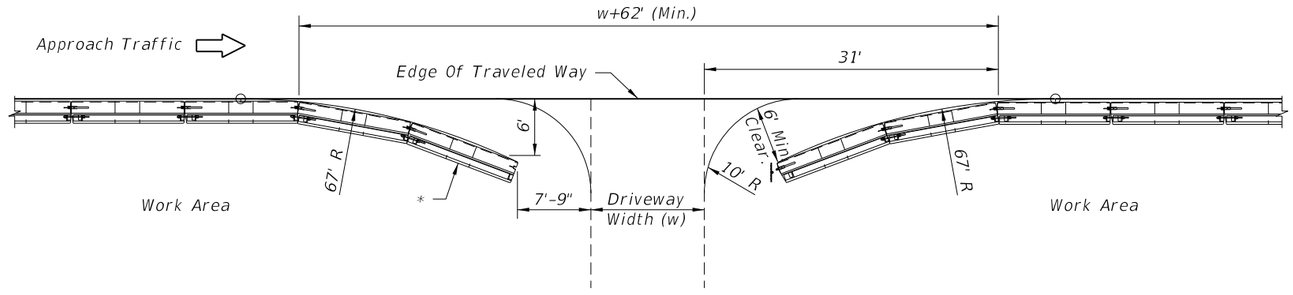
CONCAVE CURVATURE

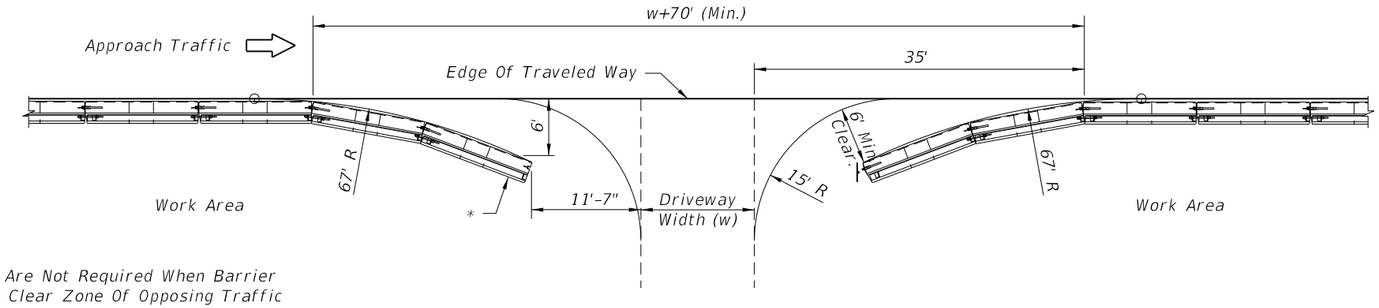
MAXIMUM CURVATURE ● MINIMUM RADIUS

PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	LOW PROFILE BARRIER	INDEX NO.	SHEET NO.
07/01/05						412	3







* *Trailing End Flares Are Not Required When Barrier Located Outside The Clear Zone Of Opposing Traffic*

Type I Object Marker To Be Installed When Trailing End Flare Falls Within The Clear Zone Of Opposing Traffic

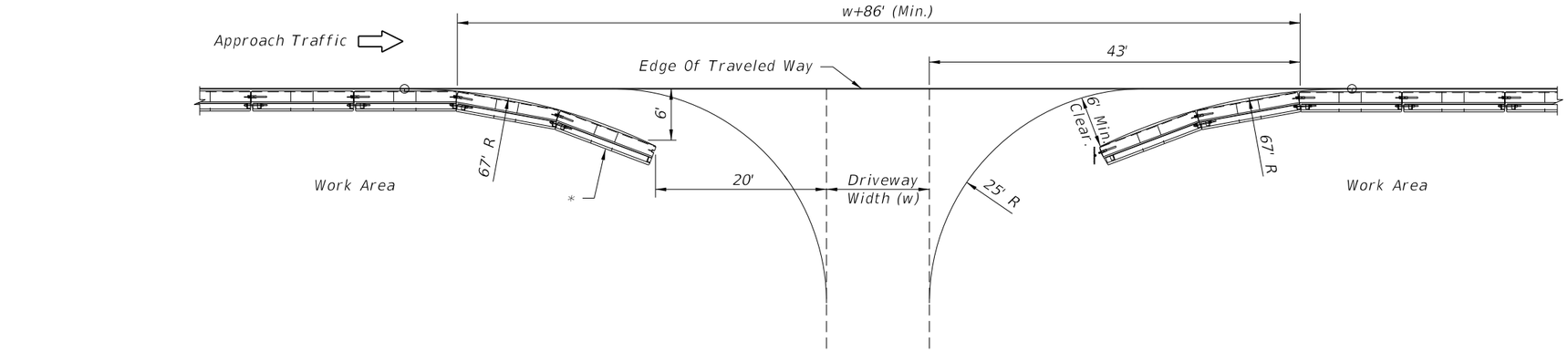
LEGEND

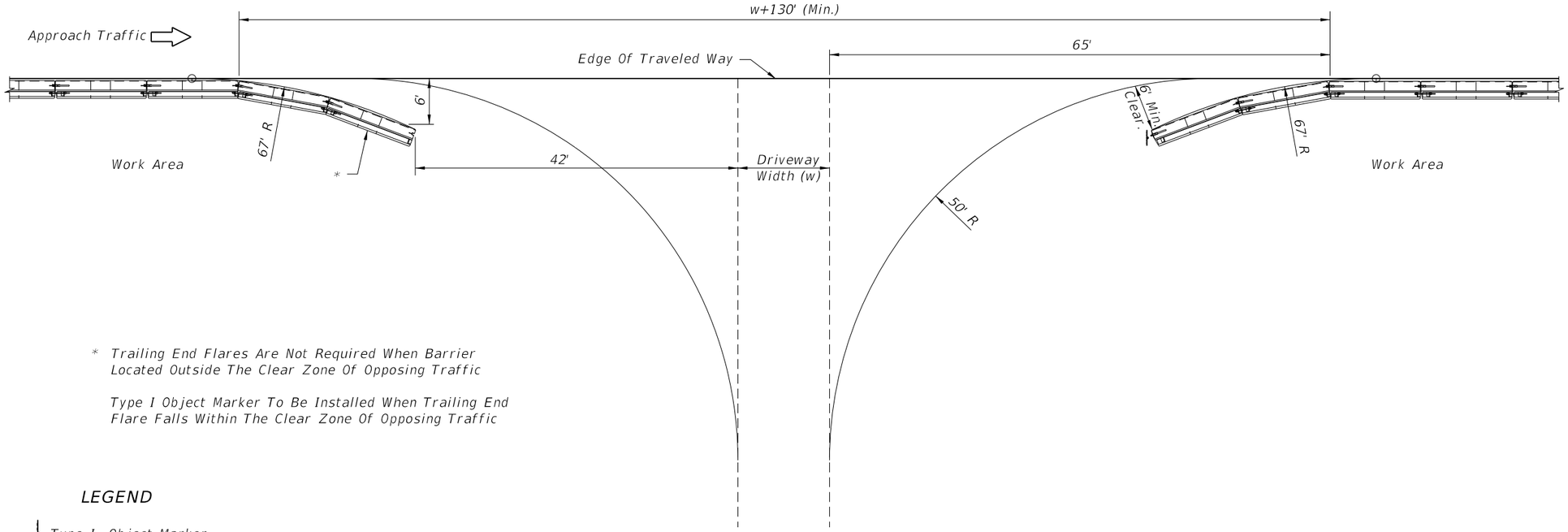
Type I Object Marker

BARRIER OPENINGS AT DRIVEWAYS

PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	LOW PROFILE BARRIER	INDEX NO.	SHEET NO.
01/01/12						412	4





* *Trailing End Flares Are Not Required When Barrier Located Outside The Clear Zone Of Opposing Traffic*

Type I Object Marker To Be Installed When Trailing End Flare Falls Within The Clear Zone Of Opposing Traffic

LEGEND

Type I Object Marker

BARRIER OPENINGS AT DRIVEWAYS

PORTABLE TEMPORARY LOW PROFILE BARRIER FOR ROADSIDE SAFETY

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	LOW PROFILE BARRIER	INDEX NO.	SHEET NO.
01/01/12						412	5

The Type K Temporary Concrete Barrier System has been crash tested to NCHRP Report 350 TL-3 criteria or structurally evaluated to meet the requirements of NCHRP Report 350 TL-3 criteria for the installation configurations as shown utilizing the types, sizes, lengths, shapes, strengths and grades of the fabrication and installation materials as shown.

In order to maintain crashworthiness of the system, do not substitute different grades, sizes, shapes or types of reinforcing steel for those shown for constructing Type K Barrier Units. Also, do not substitute different type, size, length or material grade anchor bolts, nuts, washers, adhesives, connector pins, stakes, keeper pins, or guardrail components for installing Type K Barrier Units.

FABRICATION NOTES:

FABRICATOR PREQUALIFICATION: The Barrier Units shall be made in a prestressed concrete plant that meets the requirements of Specification Section 450 or in a precast plant meeting the requirements of Specification Section 105.

CONCRETE: Concrete shall be Class IV in accordance with Specification Section 346. Specification Sections 346-10.2 through 346-10.4 are not applicable. Barrier Units represented by concrete acceptance strength tests which fall below 5000 psi will be rejected.

REINFORCING STEEL: All reinforcing steel shall be ASTM A 615, Grade 60 except for Bars 6D1, 6D2 and 6D3. Bars 6D1, 6D2 and 6D3 shall be ASTM A 706 except that a 2¾" diameter pin must be used for the 180 degree bend test. After fabrication, all or part of Bars 6D shall be hot dip galvanized in accordance with Specification Section 962 or coated with a cold galvanizing compound in accordance with Specification Section 975. The minimum limit of galvanizing or coating is shown in the Bending Diagrams. At the Fabricator's option, the entire length of Bars 6D may be galvanized or coated. Install Bars 6D within ⅛" of the plan dimensions. Correct placement of Bars 6D is critical for proper fit up and performance of individual Barrier Units.

At the option of the Fabricator, Deformed Welded Wire Fabric in accordance with ASTM A 497 and the details shown on Sheet 2 may be utilized in lieu of Bars 4A and 5B.

All dimensions in the Bending Diagrams are out to out. All reinforcing steel shall have a 2" minimum cover except as noted.

LIFTING SLEEVE ASSEMBLY: Inclusion of the Lifting Sleeve Assemblies is optional. Steel for Pipe Sleeve shall be in accordance with ASTM A 53. Hot-dip galvanize the Lifting Sleeve Assemblies after their fabrication in accordance with the Specifications.

SURFACE FINISH: Construct Barrier Units in accordance with Specification Sections 400 and 521. Finish the top and sides of the Barrier Units with a General Surface Finish. Finish the bottom of the Barrier Units to a dense uniform surface by floating in lieu of the General Surface Finish. Use stationary metal forms or stationary timber forms with a form liner.

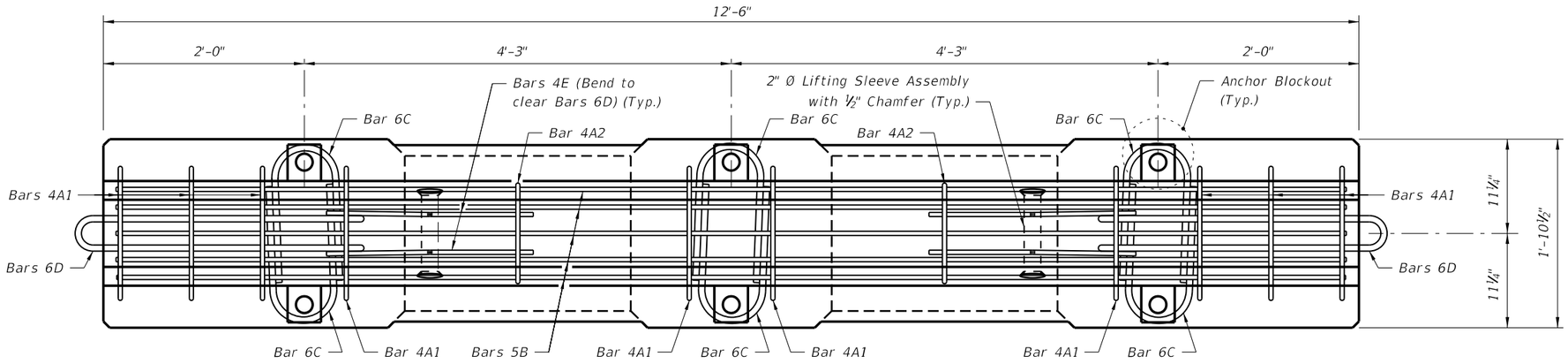
MARKING: Permanently mark the top left end of each Barrier Unit by the use of an embedded and anchored metallic plate with letters and figures a minimum of 0.5" tall. Ink stamps are not allowed. Permanently mark with the following information:

- Type K1
- Fabricator's name or symbol
- Date of manufacture (day, month and year)

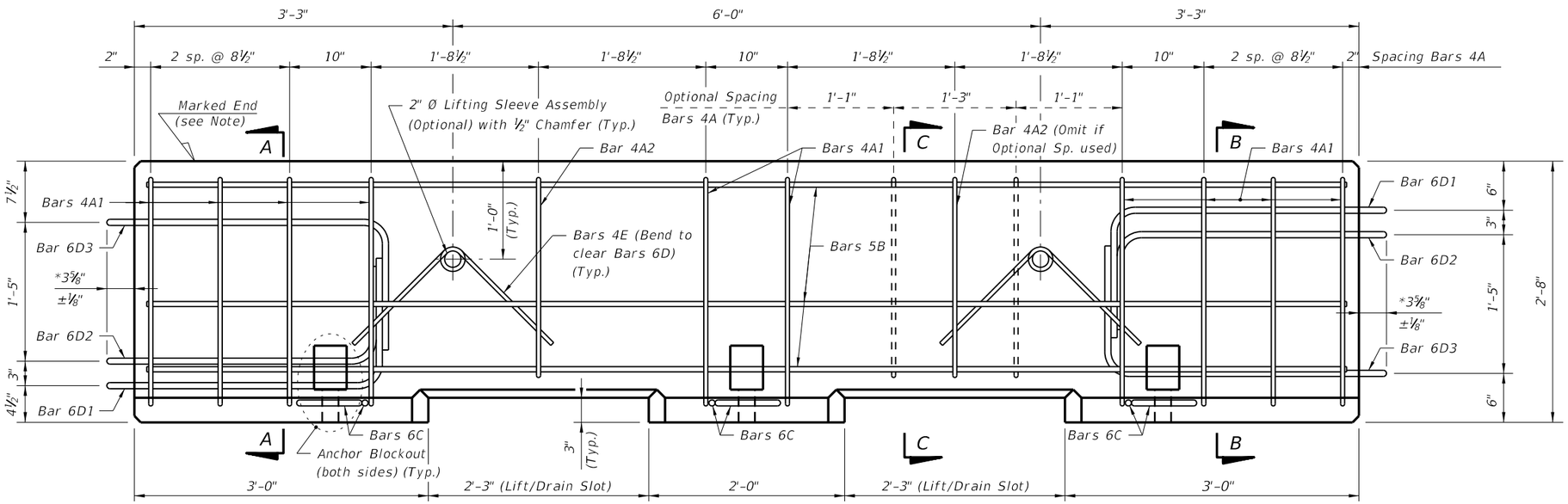
HANDLING: At no time shall the Barrier Units be lifted or moved by use of Bars 6D that extend from the ends of the units. Approximate weight of one unit equals 2.7 tons.

Alternate Designs: Manufacturers/vendors seeking approval of proprietary Temporary Barrier Systems for inclusion on the Qualified Products List (QPL) as alternative designs shall submit a Product Application package. The application package shall include manufacturer's product drawings, specifications, installation manual, National Cooperative Highway Research Program (NCHRP) Report 350 or Manual for Assessing Safety Hardware (MASH) Test Level 3 (TL-3) crash test documentation and the FHWA "Letter of Acceptance." The posted QPL drawings will need to include the following:

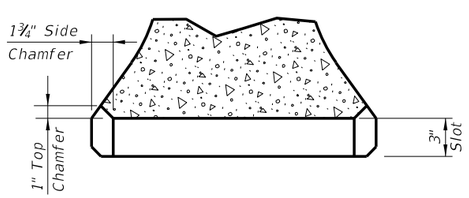
1. Anchorage, bolting, and staking details for connections to asphalt and concrete pavement.
2. Sections and tables showing required deflection space and minimum offsets to above ground hazards or drop-offs.
3. Alignment and length of need details.
4. Transition and overlap details.
5. End treatment details.



PLAN VIEW



ELEVATION VIEW

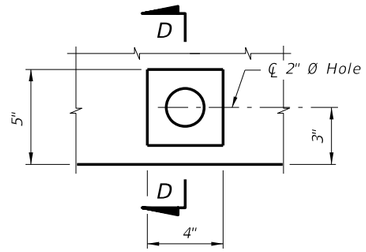


SECTION THRU LIFT/DRAIN SLOT

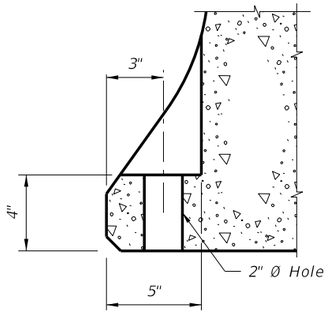
ESTIMATED TEMPORARY CONCRETE BARRIER QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY	1.29
Reinforcing Steel	LB	218

The above quantities are for one Barrier Unit.

Cross References:
For Section A-A, Section B-B and Section C-C see Sheet 3.

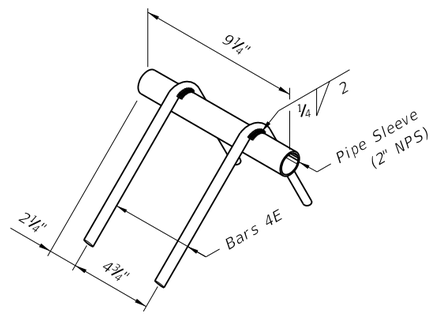


ANCHOR BLOCKOUT DETAIL



SECTION D-D
(Reinforcement not shown for clarity)

* Measured from end of Barrier Unit to outside edge of Bars 6D.



LIFTING SLEEVE
ASSEMBLY DETAIL (OPTIONAL)

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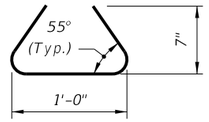
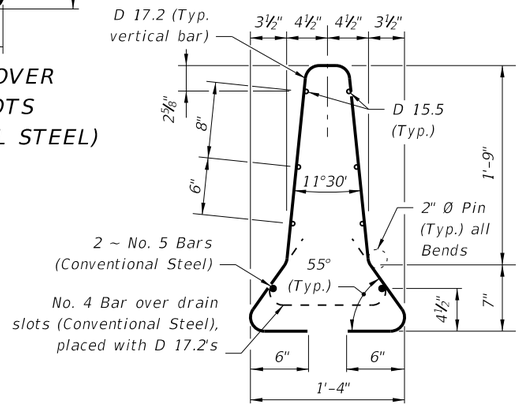
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	414	2

ALTERNATE REINFORCING STEEL DETAIL
WELDED WIRE REINFORCEMENT

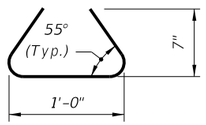


NO. 4 BAR OVER
DRAIN SLOTS
(CONVENTIONAL STEEL)

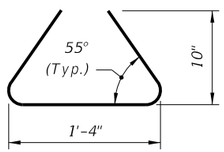


NOTES:
Place 2 ~ No. 5 Bars (12'-3" long) in bottom of Welded Wire Reinforcement cage as shown.
D 17.2 spacing shall match spacings for Bars 4A shown in Elevation View, Sheet 2. Field trim D 17.2's to clear drain slots by 2".

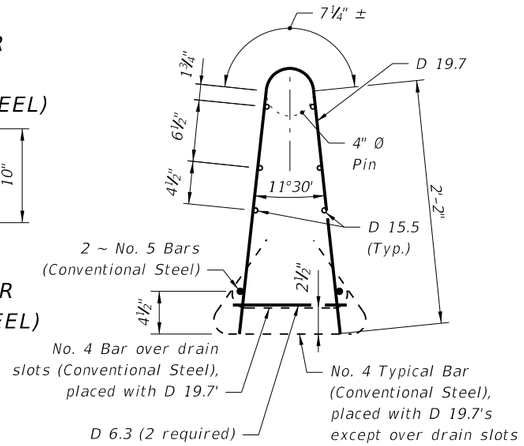
CONFIGURATION ONE



NO. 4 BAR OVER
DRAIN SLOTS
(CONVENTIONAL STEEL)



NO. 4 TYPICAL BAR
(CONVENTIONAL STEEL)



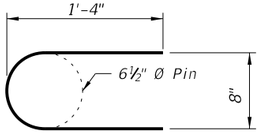
NOTES:
Place 2 ~ No. 5 Bars (12'-3" long) in bottom of Welded Wire Reinforcement cage as shown.
D 19.7 spacing shall match spacings for Bars 4A shown in Elevation View, Sheet 2. Field trim D 19.7's to clear drain slots by 2".

CONFIGURATION TWO

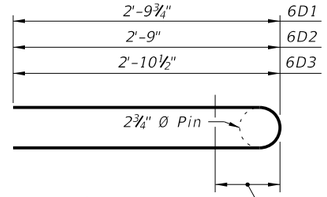
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

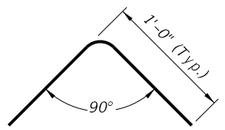
MARK	SIZE	NUMBER	LENGTH
A1	4	10	6'-1"
A2	4	2	5'-5"
B	5	5	12'-3" (Straight)
C	6	6	3'-1"
D1	6	2	8'-4"
D2	6	2	7'-6"
D3	6	2	8'-6"
E	4	4	2'-0"



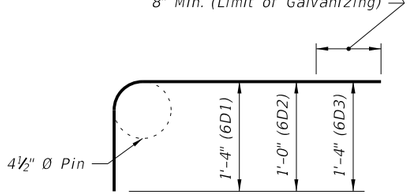
BAR 6C



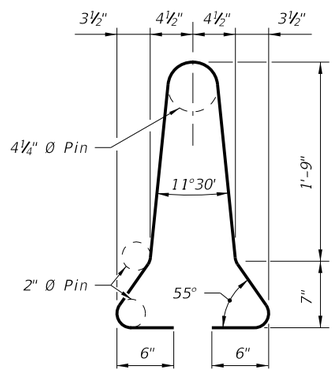
TOP VIEW
BARS 6D1, 6D2 & 6D3



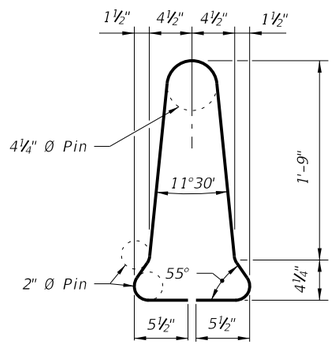
BAR 4E



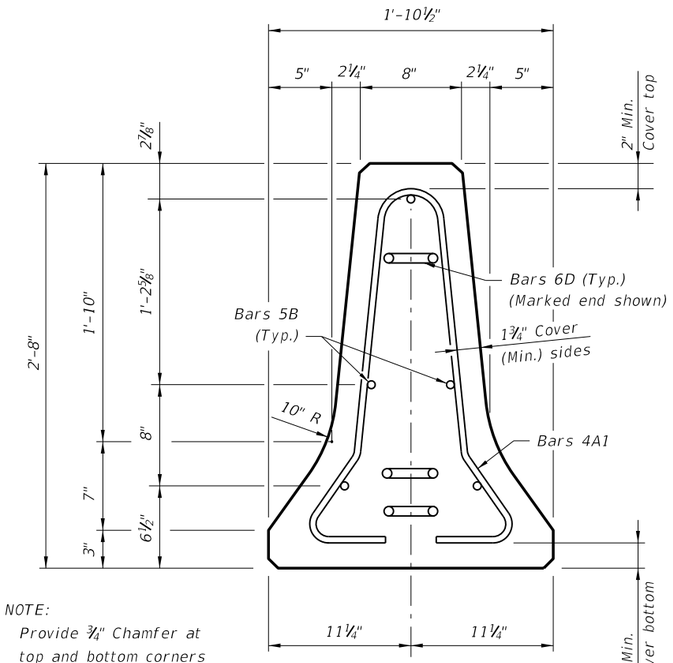
SIDE VIEW
BARS 6D1, 6D2 & 6D3



STIRRUP BAR 4A1

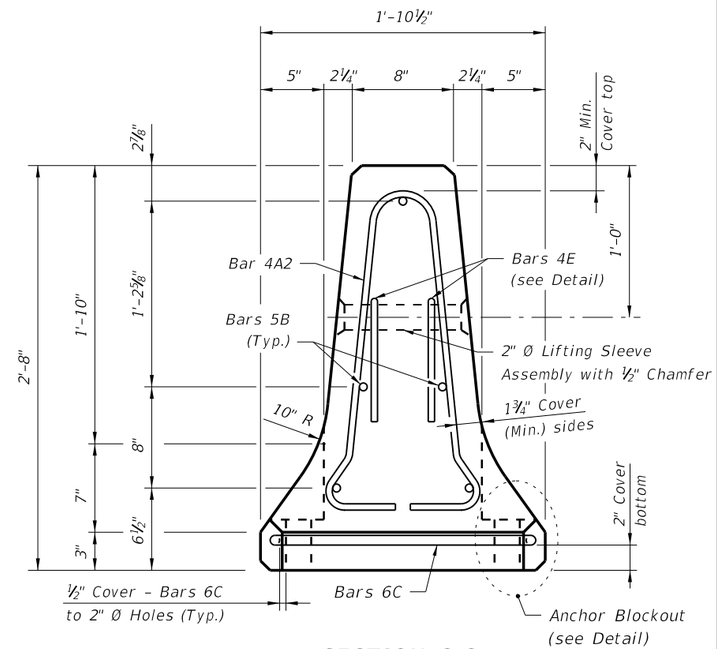


STIRRUP BAR 4A2



NOTE:
Provide ¾" Chamfer at top and bottom corners of Barrier.

SECTION A-A (SHOWN)
(SECTION B-B SIMILAR)



SECTION C-C
(Bars 6D not shown for clarity)

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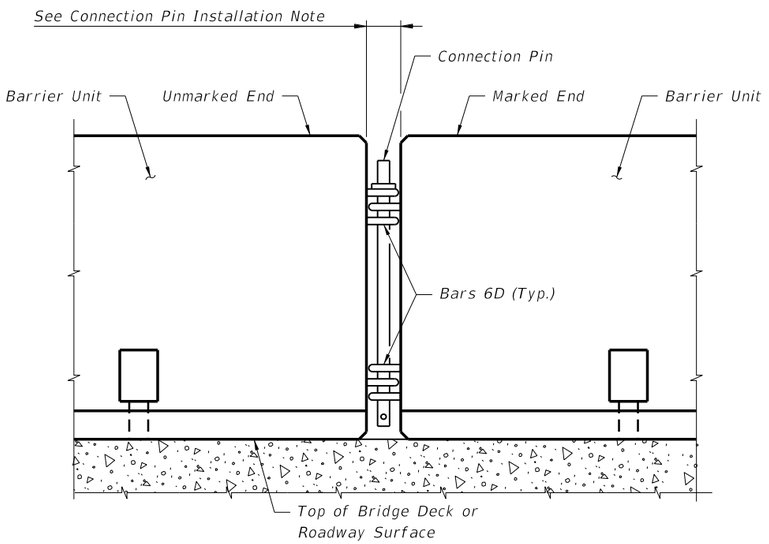
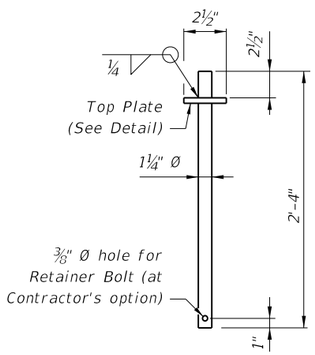
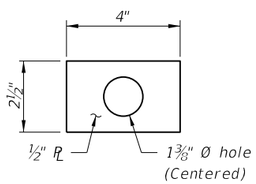
LAST REVISION	REVISION	DESCRIPTION:				
07/01/07			FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX NO. 414	SHEET NO. 3



DETAIL OF CONNECTION BETWEEN BARRIER UNITS



CONNECTION PIN DETAIL



TOP PLATE DETAIL

NOTES FOR ALL INSTALLATIONS:

LIMITATION OF USE: This Temporary Concrete Barrier System is intended for work zone traffic control and other temporary applications. It shall not be used for permanent traffic railing construction unless specifically permitted by the Plans. Except as shown for the Back Filled Roadway Installations, the Barrier Units must be installed on a flexible pavement (asphalt) or rigid pavement (concrete) surface as shown with a cross slope of 1:10 or flatter. Except as shown for transition installations, Type K Barrier Units are not intended to be bolted down or staked down in locations where they can be impacted from the back side.

HANDLING: At no time shall the Barrier Units be lifted or moved by use of Bars 6D that extend from the ends of the units. Approximate weight of one unit equals 2.7 tons.

SURFACE PREPARATION: Except as shown for the Back Filled Roadway Installations, remove all debris, loose dirt and sand from the pavement, bridge deck or Asphalt Pad surface within the barrier footprint just prior to placement of the Barrier Units.

CONNECTION PIN ASSEMBLY: Steel for Connection Pin and Top Plate assemblies shall be in accordance with ASTM A36 or ASTM A709 Grade 36. Nondestructive testing of welds shall not be required. At the Contractor's option, a ⅞" diameter hole may be provided at the bottom of the Connection Pin, as shown, for the installation of a vandal resistance bolt.

CONNECTION PIN INSTALLATION: Initially set Barrier Units by using a 3⅝" wooden block between ends of adjacent units. Install Connection Pin between adjacent Barrier Units as shown, then pull newly placed Barrier Unit away from adjacent Barrier Unit to remove slack between Connection Pin and Bars 6D (except as shown on Sheet 5). Barrier Units shall not be used unconnected.

DELINEATION: Mount Type C Steady-Burn Lights on top of Barrier Units that are used as traffic barriers along travel ways in work zones. Space the lights at 50' centers in transitions, 100' centers on curves and 200' centers on tangent alignments. Refer to "Warning Lights" on Index No. 600 for additional information.

REUSE OF UNITS: Barrier Units may be reused provided they have the structural integrity and surface qualities of new units. Do not use Barrier Units without Marking Plates.

REUSE OF CONNECTION PINS: Connection pins may be reused if they have the structural integrity of new pins.

INSTALLATIONS ON CURVED ALIGNMENTS: The details presented in these Standards are shown for installations on tangent alignments. Details for horizontally curved alignments are similar.

TRANSITIONS: Transitions are required between freestanding, bolted down, staked down and back filled Type K Barrier installations, see Sheet 8 for transition requirements and details. Transitions are also required between installations of Type K Barrier and other types of temporary barrier, see Index No. 415 for transition requirements and details. Splices and transitions are required between installations of Type K Barrier and permanent Bridge or Roadway Traffic Railings, see Sheets 9 through 13 for transition requirements and details. Transitions are required between installations of Type K Barrier and Proprietary (QPL) Barrier Systems, See Sheets 14 and 15 for transition requirements and details.

PAYMENT: Barrier Units for work zone traffic control and other temporary applications shall be paid for under the contract unit price for Barrier Wall (Temporary) (F&I) (Type K), LF. Any relocation of the Barrier Units required for the project shall be paid for under the contract unit price for Barrier Wall (Temporary) (Relocate) (Type K), LF. Type C Steady-Burn Lights shall be paid for under the contract unit price for Lights (Temp. Barrier Wall Mount) (Type C, Steady Burn), ED. The Contractor shall furnish Barrier Units except when the Plans stipulate the availability of Department owned units. Regardless of unit source the Contractor shall furnish all hardware and shall be responsible for all handling including loading, transport, unloading, stockpiling, installation, removal and return. Unless otherwise noted on the Plans, the BarrierUnits shall become the property of the Contractor and shall be removed from the site prior to acceptance of the completed project.

NOTES FOR THRIE BEAM GUARDRAIL SPLICE INSTALLATIONS:

THRIE-BEAM GUARDRAIL: Provide Thrie-Beam Guardrail for splices in accordance with AASHTO M 180, Type II (Zinc coated) and as follows:
Two panels per splice (One panel per side) of Class B (10 Gauge), or
Four panels per splice (Two nested panels per side) of Class A (12 Gauge).
Guardrail panel length shall be 12'-6". Provide and install all other associated metallic guardrail components (Terminal Connectors, Shoulder Bolts, Hex Bolts and Nuts, Filler Plates, etc.) in accordance with Index No. 400.
Install five Guardrail Anchor Bolts at each end of each splice in any of the standard seven anchor bolt holes in the Thrie-Beam Terminal Connector.
If reinforcing steel is encountered when drilling holes for Guardrail Anchor Bolts in Type K Barrier Units, shift Thrie-Beam Terminal Connector so as to clear reinforcing steel within the given tolerances or select a different bolt hole to use. Do not drill or cut through reinforcing steel within Type K Barrier Units. Drilling or cutting through reinforcing steel within permanent concrete traffic railings is permitted. Do not drill or cut through utilities or conduits within permanent concrete traffic railings.

GUARDRAIL OFFSET BLOCKS: Provide and install timber Offset Blocks meeting the material requirements of Index No. 400. Field trim Offset Blocks as required for proper fit. Utilize Offset Blocks as shown and required in order to prevent bending or kinking of Thrie-Beam Guardrail panels.

CONCRETE FOR FILLING TAPERED TRAFFIC RAILING TOES: Provide concrete for filling tapered toes of Traffic Railings as shown meeting the material requirements of Specification Section 346, any Class, or a commercially available prebagged concrete mix (3000 psi minimum compressive strength). Sampling, testing, evaluation and certification of the concrete in accordance with Specification Section 346 is not required. Saturate with water the surfaces upon and against which the concrete fill will be placed prior to placing concrete. Place and finish concrete fill using forms or by hand methods to the general configurations shown so as to provide a smooth shape transition between the Type K Barrier and the adjacent traffic railing. A low slump is desirable if placing and finishing concrete by hand methods. Cure the concrete fill by application of a curing compound, or by covering with a wet tarp or burlap for a minimum of 24 hours. Completely remove the concrete fill upon relocation or removal of the Type K Temporary Concrete Barrier.

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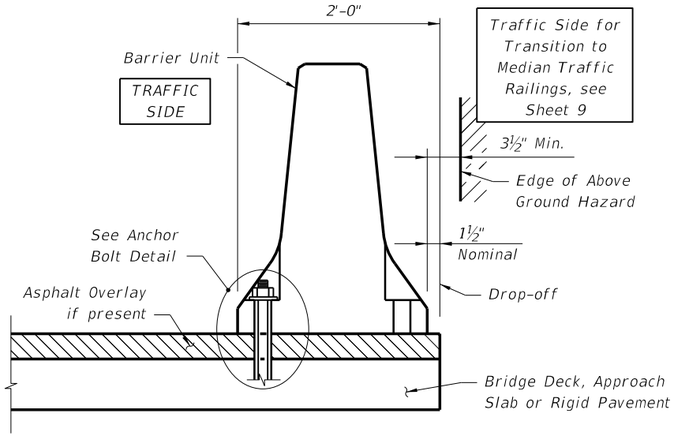
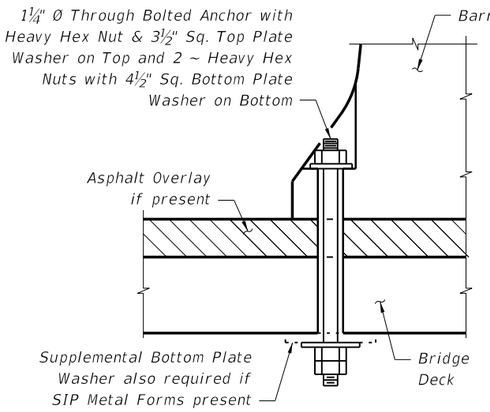
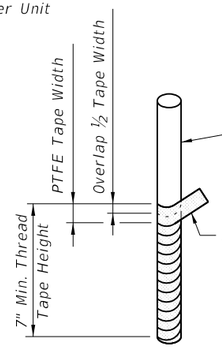
LAST REVISION	REVISION	DESCRIPTION:				
01/01/11			FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX NO. 414	SHEET NO. 4



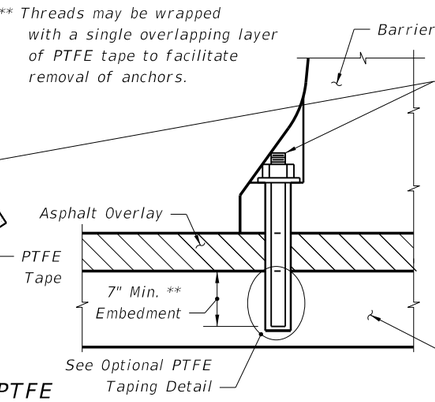
TYPICAL SECTION (BRIDGE DECK SHOWN, APPROACH SLAB OR RIGID PAVEMENT SIMILAR; INSTALLATION ADJACENT TO DROP-OFF SHOWN, MEDIAN TRANSITION INSTALLATION SIMILAR)



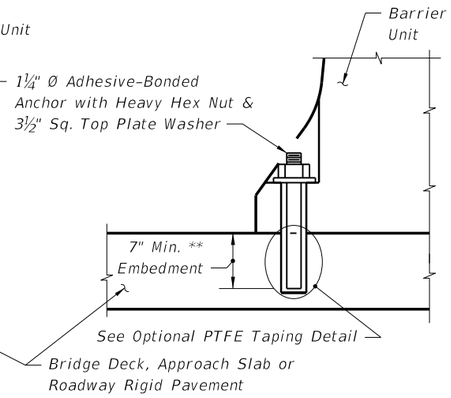
THROUGH BOLTED ANCHOR INSTALLATION ON BRIDGE DECK



OPTIONAL PTFE TAPING DETAIL

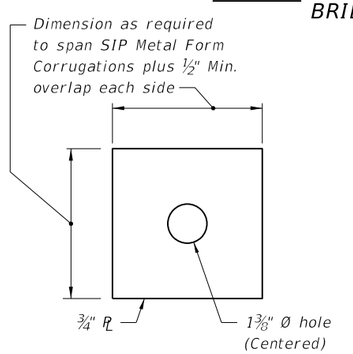


WITH ASPHALT OVERLAY

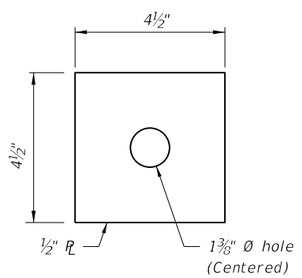


WITHOUT ASPHALT OVERLAY

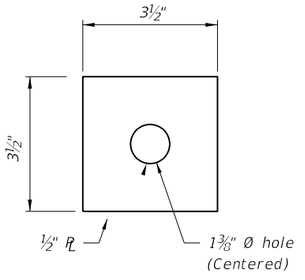
ADHESIVE BONDED ANCHOR INSTALLATION ON BRIDGE DECK, APPROACH SLAB OR RIGID PAVEMENT



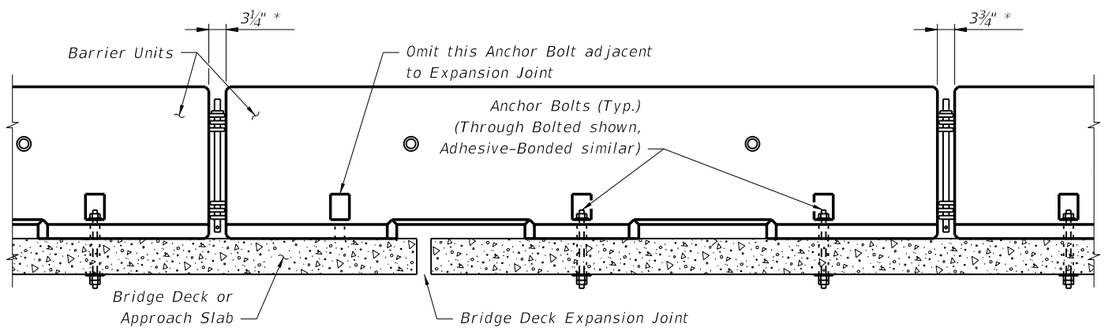
SUPPLEMENTAL BOTTOM PLATE WASHER DETAIL



BOTTOM PLATE WASHER DETAIL



TOP PLATE WASHER DETAIL



* To accommodate movement at Expansion Joint, set Barrier Units with 3¾" gap at locations shown.

TREATMENT AT BRIDGE DECK EXPANSION JOINT SCHEMATIC

NOTES FOR BOLTED DOWN BRIDGE, APPROACH SLAB, ROADWAY AND TRANSITION INSTALLATIONS:

LIMITATION OF USE: This installation technique can only be used on rigid pavement and concrete bridge decks as shown. Barrier Units shall not be bolted down on bridge superstructures that contain post-tensioned tendons within the concrete deck (top flange of concrete box girders) or on bridge superstructures consisting of longitudinally prestressed, transversely post-tensioned, solid or voided concrete slab units. Anchor Bolts must not be installed on both sides of the Barrier Units. Do not bolt down Barrier Units across bridge finger or modular expansion joints.

ANCHOR BOLTS, NUTS AND WASHERS: Adhesive-Bonded Anchor Bolts shall be fully threaded rods in accordance with ASTM F 1554 Grade 36. Anchor Bolts for through bolting shall be in accordance with ASTM A 307 or ASTM F 1554 Grade 36. Nuts shall be in accordance with ASTM A 563 or ASTM A 194. Flat Washers shall be in accordance with ASTM F 436 and Plate Washers shall be in accordance with ASTM A 36 or ASTM A 709 Grade 36.

Install three (3) Anchor Bolts per Barrier Unit on the traffic side of the Barrier Units as shown, except for Transition Installations. For the number and positions of Anchor Bolts required in Transition Installations see Sheets 8 and 9 and Index No. 415. Drilling through deck reinforcing steel to install Anchor Bolts is permitted. Unless otherwise shown in the Plans, at the Contractor's option Barrier Units may be installed by through bolting (where geometrically possible) or by the use of Adhesive-Bonded Anchor Bolts. Do not drill into or otherwise damage the tops of supporting beams or girders, bridge deck expansion joints or drains. Install Anchor Bolts and Nuts so that the maximum extension beyond the face of the Barrier Units is ½". Snug tighten the Nuts on the Anchor Bolts. For through bolted installations, snug tighten the double Nuts on the underside of the deck against each other to minimize the potential for loosening.

Omit one (1) Anchor Bolt within a single Barrier Unit if a conflict exists between the Anchor Bolt location and a bridge deck expansion joint or drain. The adjacent Barrier Units must each be installed with the standard three (3) Anchor Bolts.

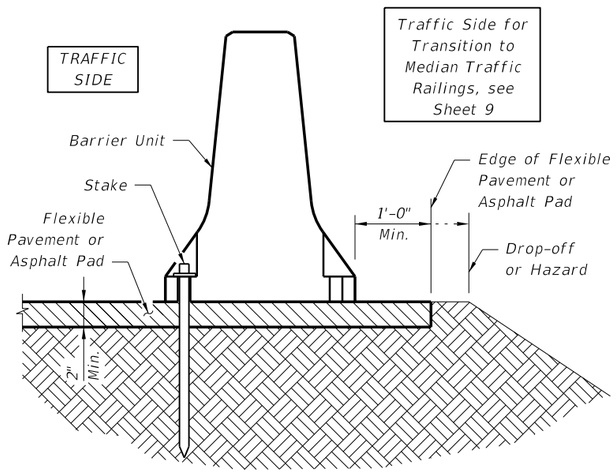
Omit one (1) Anchor Bolt within a single Barrier Unit as shown in the Treatment at Bridge Deck Expansion Joint Schematic if the Barrier Unit straddles a bridge deck expansion joint. The adjacent Barrier Units must each be installed with the standard three (3) Anchor Bolts.

ADHESIVE-BONDING MATERIAL SYSTEMS: Adhesive Bonding Material Systems for Anchor Bolts shall be Type HSHV in accordance with Specification Section 937 and shall be installed in accordance with Specification Section 416. Prior to installation of the Barrier Units in the Plan location(s), install a demonstration Barrier Unit using the proposed production installation method, at a location approved by the Engineer. In lieu of the production test requirements of Specification Section 416-6, install six (6) Adhesive-Bonded Anchor Bolts in the demonstration Barrier Unit and test each Anchor Bolt with a 29,800 pound tensile proof load. Install and test additional demonstration Barrier Units when requested by the Engineer. Remove the demonstration Barrier Unit prior to testing the Anchor Bolts. Remove the test Anchor Bolts after testing as directed by the Engineer.

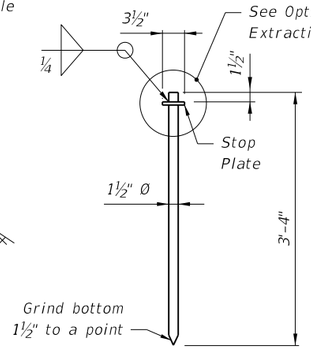
REMOVAL OF ANCHOR BOLTS: Upon removal or relocation of Barrier Units, remove all Anchor Bolts and completely fill the remaining holes in bridge decks, approach slabs and roadway rigid pavements that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification Section 930 or with an Epoxy Resin Compound, Type I or Q, in accordance with Specification Section 926. If a flexible pavement overlay is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.

BOLTED DOWN BRIDGE, APPROACH SLAB, ROADWAY AND TRANSITION INSTALLATIONS

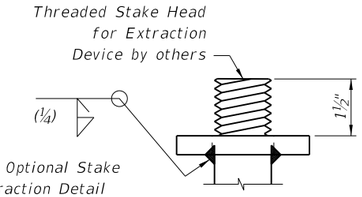
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/08			FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	414	5



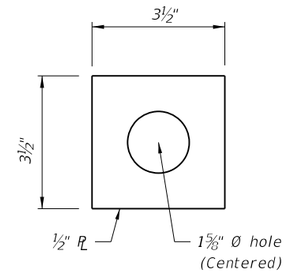
TYPICAL SECTION (INSTALLATION ADJACENT TO DROP-OFF SHOWN, MEDIAN TRANSITION INSTALLATION SIMILAR)



STAKE DETAIL



OPTIONAL STAKE EXTRACTION DETAIL



STOP PLATE DETAIL

NOTES FOR STAKED DOWN ROADWAY AND TRANSITION INSTALLATIONS:

LIMITATION OF USE: This installation technique can only be used on flexible pavement or an Asphalt Pad as shown. Stakes must not be installed on both sides of the Barrier Units.

ASPHALT PAD: Where existing flexible pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

STAKES: Provide steel for Stake assemblies in accordance with ASTM A 36 or ASTM A 709 Grade 36. All welding shall be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required.

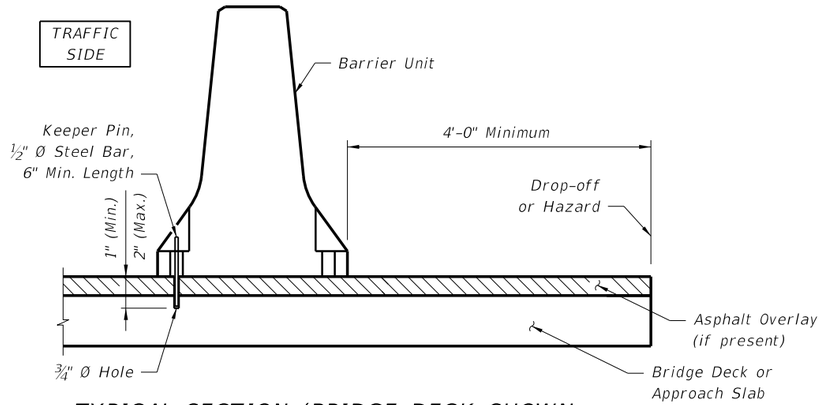
Install three (3) Stakes on the traffic side of the Barrier Units as shown, except for Transition Installations. For the number and positions of stakes required in Transition Installations see Sheets 8 and 9 and Index No. 415. Install Stakes so that the Stop Plate is snug against the bottom of the Anchor Blockout.

BURIED UTILITIES: Prior to installation of Stakes verify locations of all adjacent buried utilities, drainage structures, pipes, etc. If conflicts between Stake locations and buried elements exist, a maximum of two (2) Stakes within a single Barrier Unit may be omitted if the adjacent Barrier Units are installed with the standard three (3) Stakes.

REMOVAL OF STAKES: Upon removal or relocation of Barrier Units, completely remove all Stakes and completely fill the remaining holes in flexible pavement that is to remain with hot or cold patch asphalt material.

REUSE OF STAKES: Stakes may be reused if they have the structural integrity of new stakes.

STAKED DOWN ROADWAY AND TRANSITION INSTALLATIONS



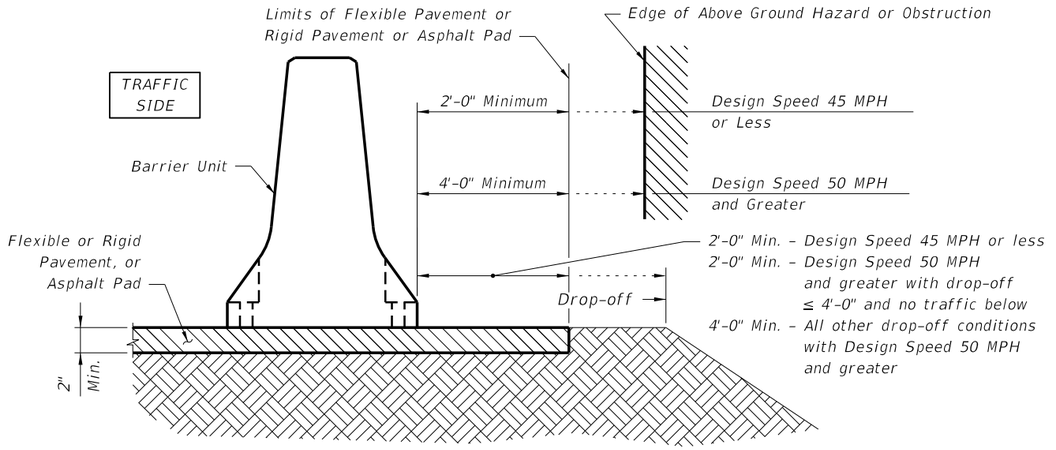
TYPICAL SECTION (BRIDGE DECK SHOWN, APPROACH SLAB SIMILAR)

NOTES FOR FREE STANDING BRIDGE OR APPROACH SLAB INSTALLATIONS:

KEEPER PINS: Keeper Pins shall be ½" diameter, smooth steel bar in accordance with ASTM A 36 or ASTM A 709 Grade 36. As directed by the Engineer in order to limit vibration induced translation of the Barrier Units, install one (1) Keeper Pin per Barrier Unit on the traffic side of the Barrier Units as shown. Do not drill into or otherwise damage bridge deck expansion joints or drains.

REMOVAL OF KEEPER PINS: Upon removal or relocation of Barrier Units, remove all Keeper Pins and completely fill the remaining holes in bridge decks and approach slabs that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification Section 930 or with an Epoxy Resin Compound, Type I or Q, in accordance with Specification Section 926. If a flexible pavement overlay is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.

FREESTANDING BRIDGE OR APPROACH SLAB INSTALLATIONS



TYPICAL SECTION

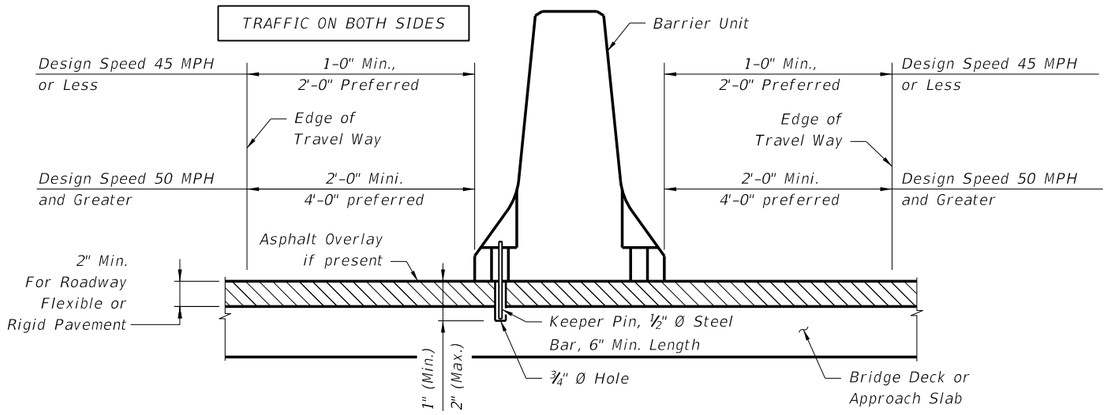
NOTES FOR FREE STANDING ROADWAY INSTALLATION:

LIMITATION OF USE: This installation technique can only be used on flexible or rigid pavement or on an Asphalt Pad as shown.

ASPHALT PAD: Where existing pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

FREESTANDING ROADWAY INSTALLATION

LAST REVISION	REVISION	DESCRIPTION:				
01/01/11			FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX NO. 414	SHEET NO. 6



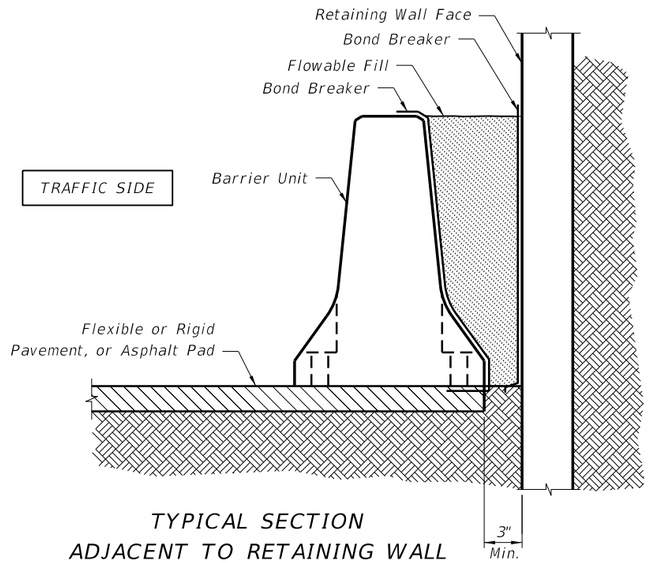
TYPICAL SECTION

NOTES FOR FREESTANDING MEDIAN INSTALLATION:

KEEPER PINS: Required for Bridge Decks only, Keeper Pins shall be ½" diameter, smooth steel bar in accordance with ASTM A 36 or ASTM A 709 Grade 36. As directed by the Engineer in order to limit vibration induced translation of the Barrier Units, install one (1) Keeper Pin per Barrier Unit as shown. Alternate Keeper Pin locations from side to side of Barrier Units along the length of the installation. Do not drill into or otherwise damage bridge deck expansion joints or drains. Upon removal or relocation of Barrier Units, remove all Keeper Pins and completely fill the remaining holes in bridge decks and approach slabs that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification Section 930 or with an Epoxy Resin Compound, Type I or Q, in accordance with Specification Section 926. If a flexible pavement overlay is present and is to remain, completely fill the remaining holes in the flexible pavement with hot or cold patch asphalt material.

ASPHALT PAD: Where existing pavement is not present, construct the Asphalt Pad using Miscellaneous Asphalt Pavement in accordance with Specification Section 339 with the exception that the use of a pre-emergent herbicide is not required. No separate payment will be made for the Asphalt Pad.

FREESTANDING MEDIAN INSTALLATION
(BRIDGE DECK SHOWN, APPROACH SLAB, ASPHALT PAD, FLEXIBLE OR RIGID PAVEMENT SIMILAR)

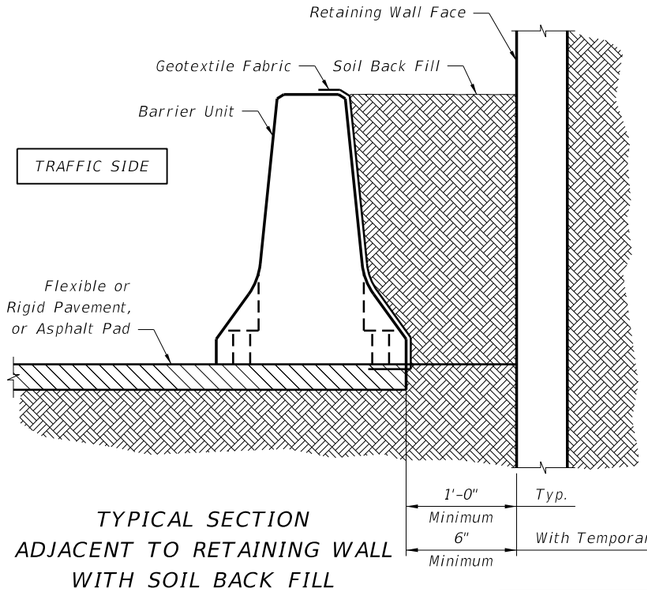


TYPICAL SECTION
ADJACENT TO RETAINING WALL
WITH FLOWABLE FILL BACK FILL

NOTES FOR FLOWABLE FILL BACK FILLED ROADWAY INSTALLATIONS:

FLOWABLE FILL: Provide Flowable Fill in accordance with Specification Section 121.

FLOWABLE FILL BACK FILL ROADWAY INSTALLATIONS

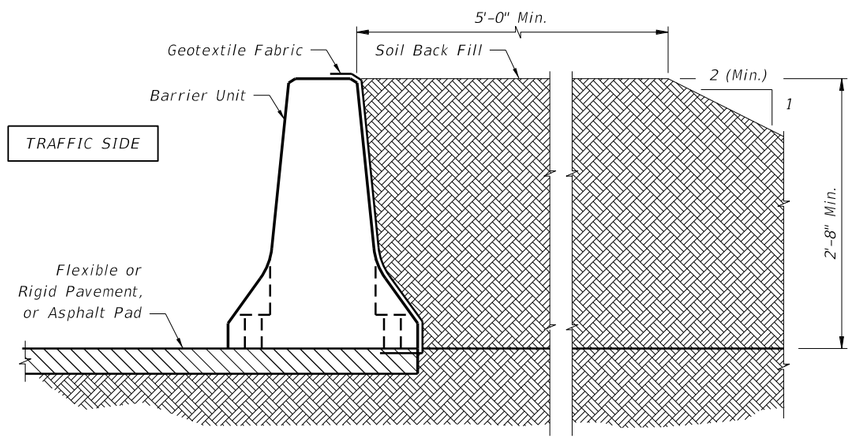


TYPICAL SECTION
ADJACENT TO RETAINING WALL
WITH SOIL BACK FILL

NOTES FOR SOIL BACK FILLED ROADWAY INSTALLATIONS:

SOIL BACK FILL MATERIAL: Provide Back Fill Material consisting of any available clean soil. Compact Back Fill Material until the soil mass is firm and unyielding. Provide erosion control as specified in the Plans. If none is specified in the Plans, provide erosion control as required to maintain the integrity of the Back Fill embankment.

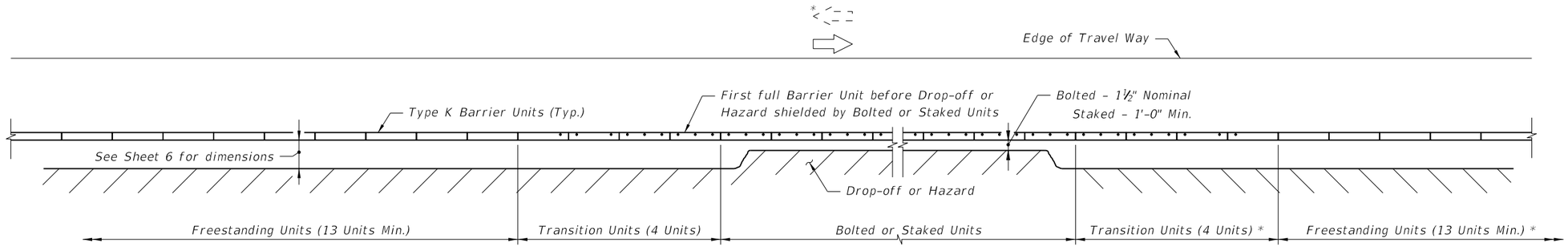
GEOTEXTILE FABRIC: Provide Type D-5 Geotextile Fabric in accordance with Index No. 199 to contain Back Fill Material behind Barrier Units. Geotextile Fabric may be continuous over the length and height of the installation or may be individual pieces as required to cover the Lift / Drain Slots and open vertical joints between Barrier Units.



TYPICAL SECTION
WITH SOIL BACK FILL

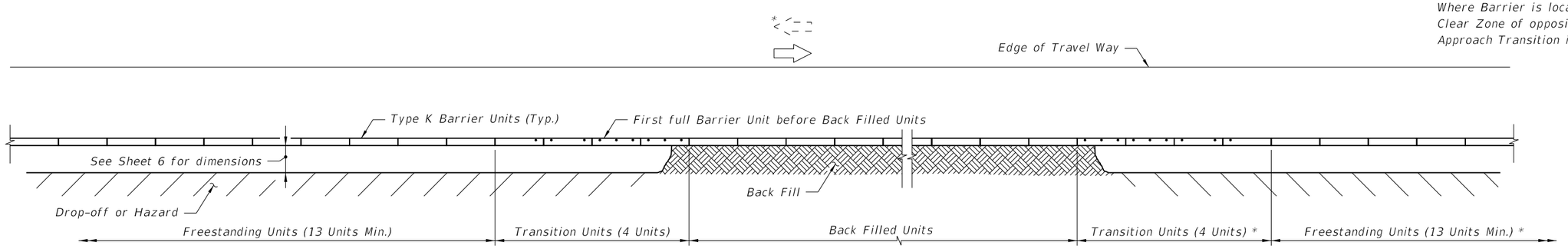
SOIL BACK FILLED ROADWAY INSTALLATIONS

LAST REVISION	REVISION	DESCRIPTION:				
01/01/11			FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX NO. 414	SHEET NO. 7

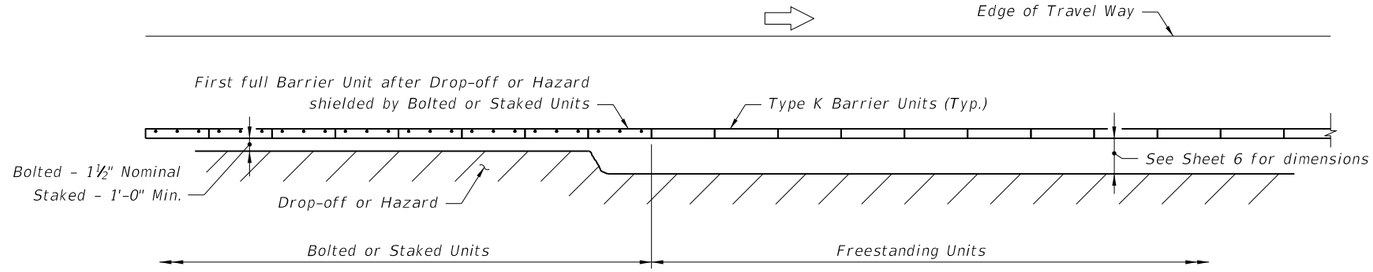


APPROACH TRANSITION FROM FREESTANDING TO BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS

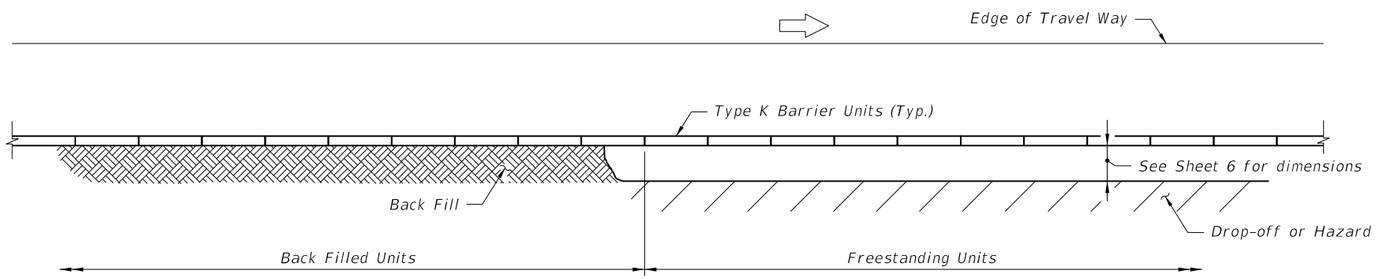
* NOTE:
Where Barrier is located within Clear Zone of opposing traffic, Approach Transition is required.



APPROACH TRANSITION FROM FREESTANDING TO BACK FILLED TYPE K TEMPORARY CONCRETE BARRIERS



TRAILING END TRANSITION FROM BOLTED OR STAKED DOWN TO FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS

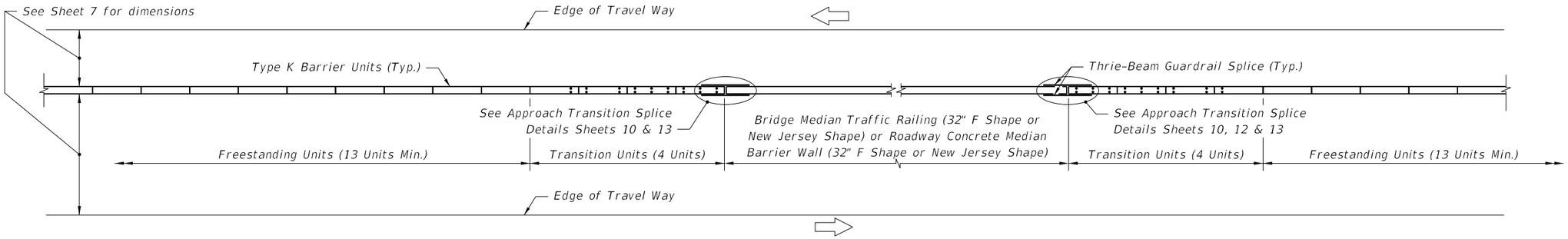


TRAILING END TRANSITION FROM BACK FILLED TO FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS

LEGEND:

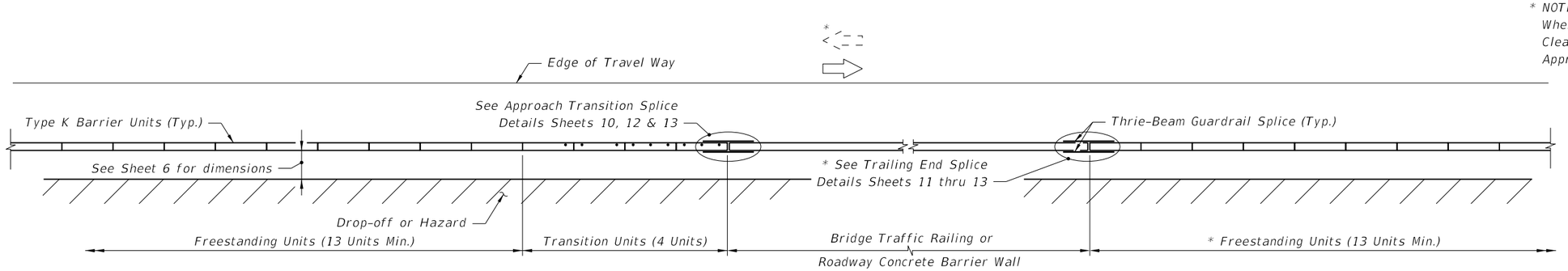
Dot indicates number and position of Bolts or Stakes

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	414	8

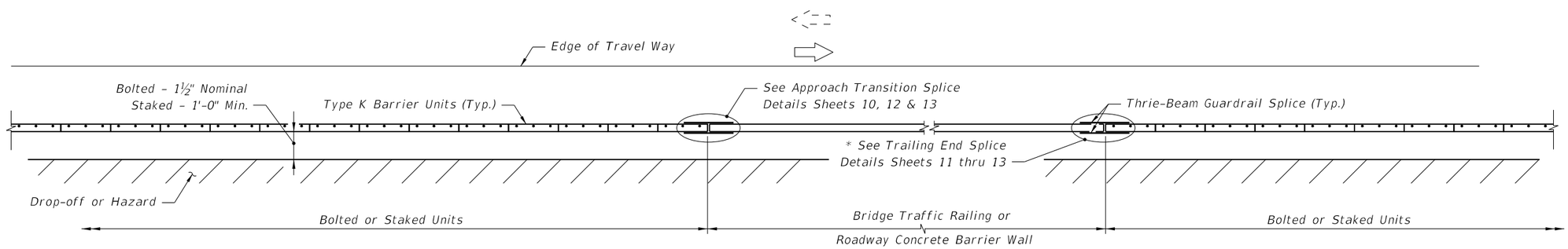


TRANSITION FROM FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS TO BRIDGE MEDIAN TRAFFIC RAILING OR ROADWAY MEDIAN CONCRETE BARRIER WALL

* NOTE:
Where Barrier is located within Clear Zone of opposing traffic, Approach Transition is required.



TRANSITION FROM FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS TO BRIDGE TRAFFIC RAILING OR ROADWAY CONCRETE BARRIER WALL



TRANSITION FROM BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS TO BRIDGE TRAFFIC RAILING OR ROADWAY CONCRETE BARRIER WALL

LEGEND:

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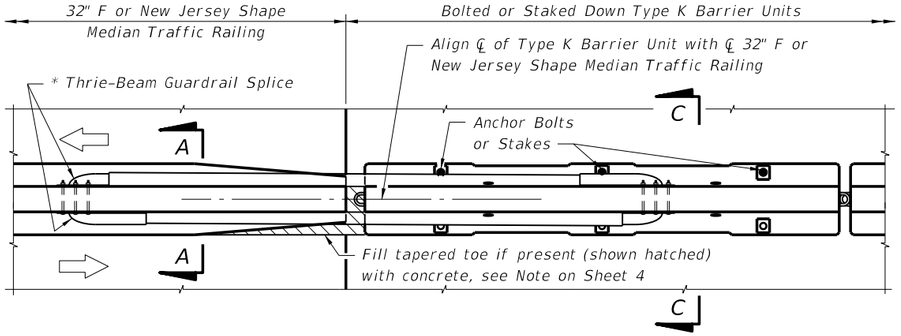
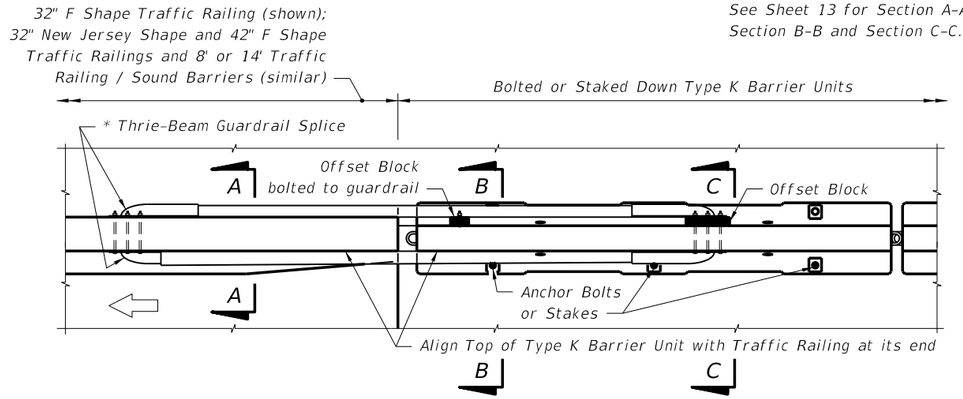
LAST REVISION	REVISION	DESCRIPTION:				
07/01/07			FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX NO. 414	SHEET NO. 9

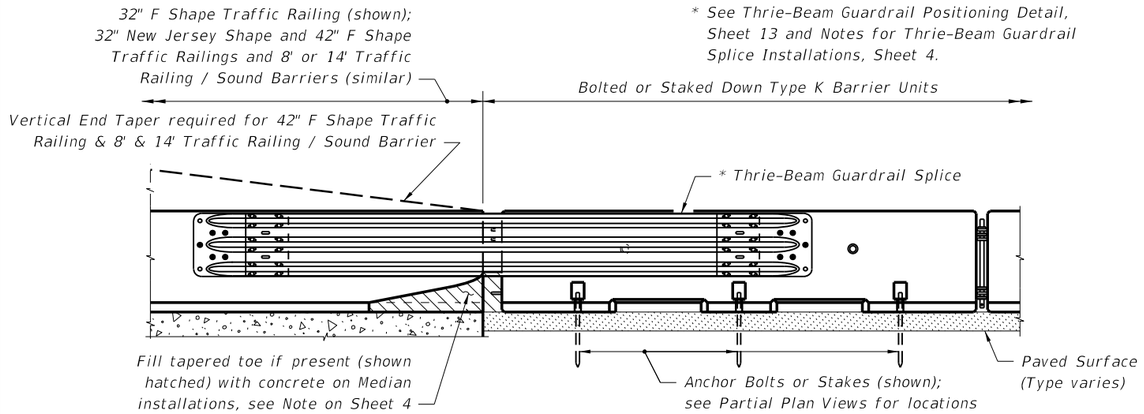


PARTIAL PLAN VIEW AT MEDIAN TRAFFIC RAILING



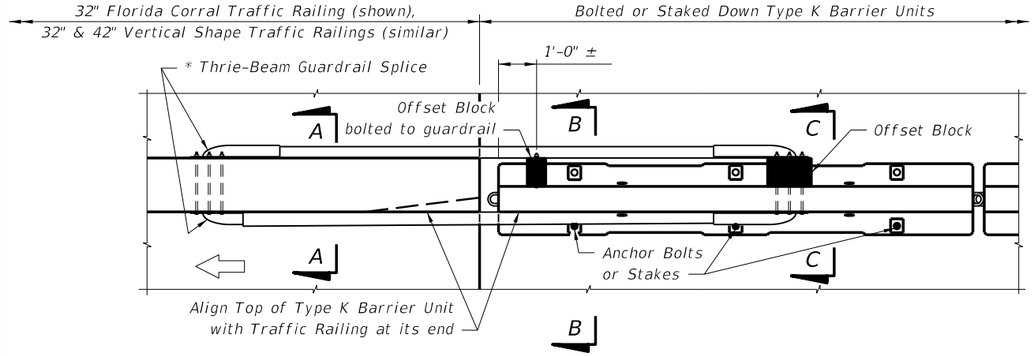
Cross References:
See Sheet 13 for Section A-A,
Section B-B and Section C-C.

PARTIAL PLAN VIEW AT SHOULDER TRAFFIC RAILING



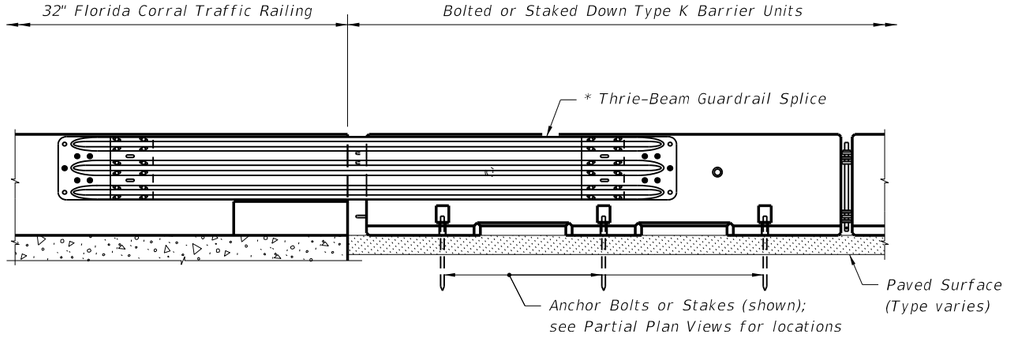
PARTIAL ELEVATION VIEW

APPROACH TRANSITION SPLICE DETAIL
FOR F AND NEW JERSEY SHAPE TRAFFIC RAILINGS AND 8' & 14' TRAFFIC RAILING / SOUND BARRIERS (CONCRETE BARRIER WALL SIMILAR)

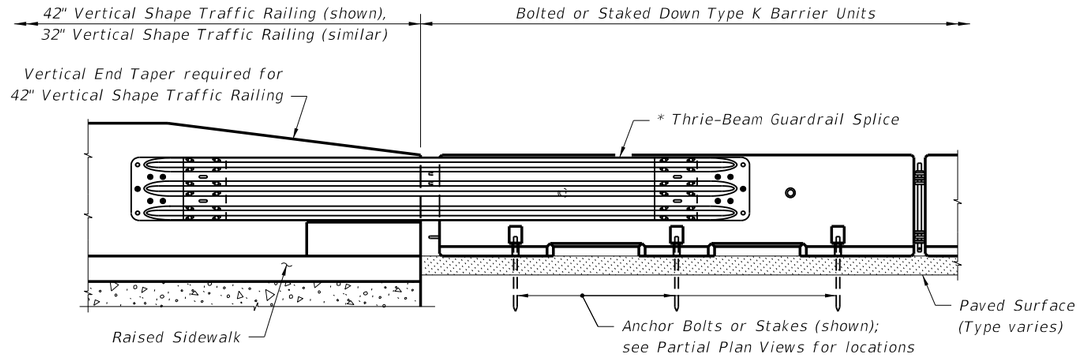


PARTIAL PLAN VIEW

Cross References:
See Sheet 13 for Section A-A,
Section B-B and Section C-C.



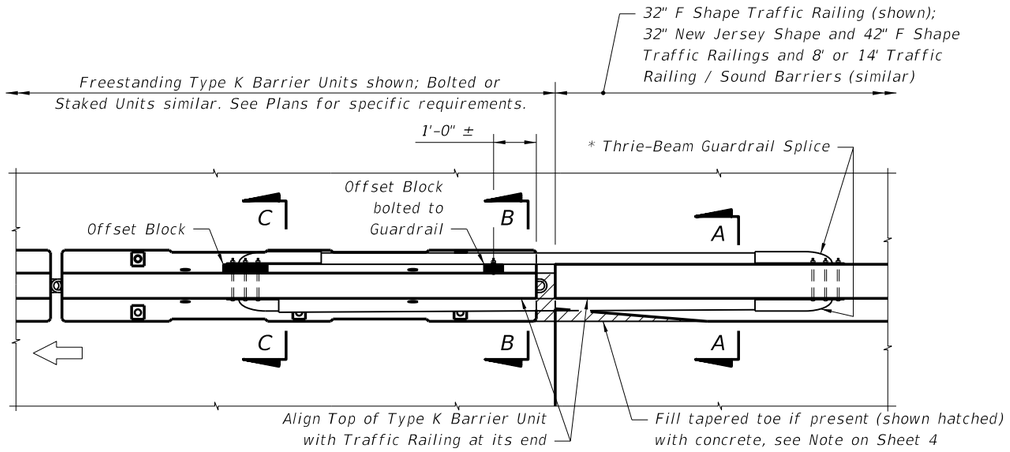
PARTIAL ELEVATION VIEW - FLORIDA CORRAL TRAFFIC RAILING



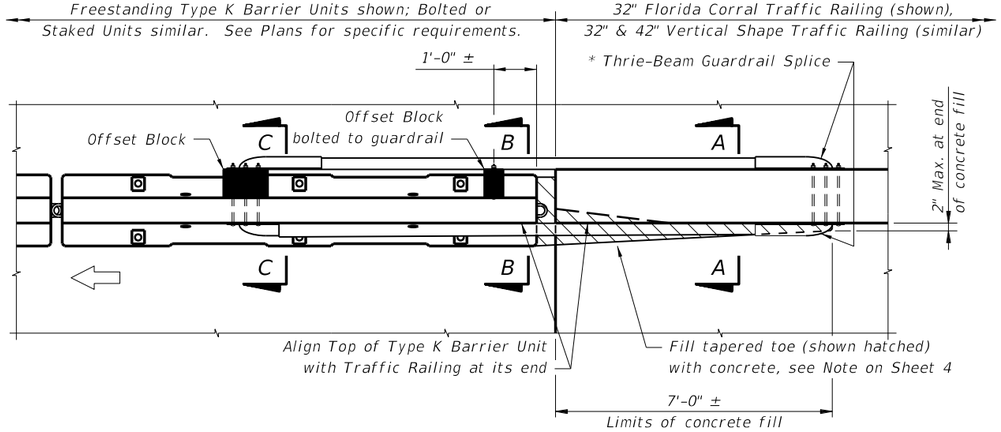
PARTIAL ELEVATION VIEW - VERTICAL SHAPE TRAFFIC RAILINGS

APPROACH TRANSITION SPLICE DETAIL
FOR FLORIDA CORRAL AND VERTICAL SHAPE TRAFFIC RAILINGS

LAST REVISION	REVISION	DESCRIPTION:				
07/01/01			FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX NO. 414	SHEET NO. 10

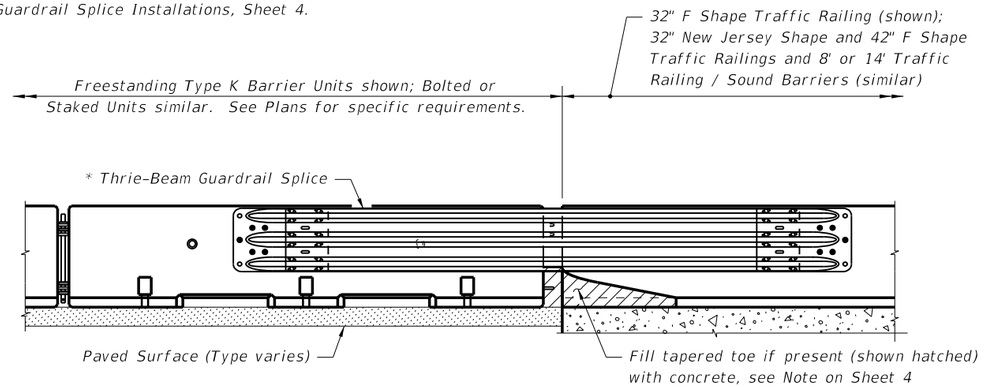


PARTIAL PLAN VIEW



PARTIAL PLAN VIEW

* See Thrie-Beam Guardrail Positioning Detail, Sheet 13 and Notes for Thrie-Beam Guardrail Splice Installations, Sheet 4.



PARTIAL ELEVATION VIEW

Cross References:
See Sheet 13 for Section A-A,
Section B-B and Section C-C.

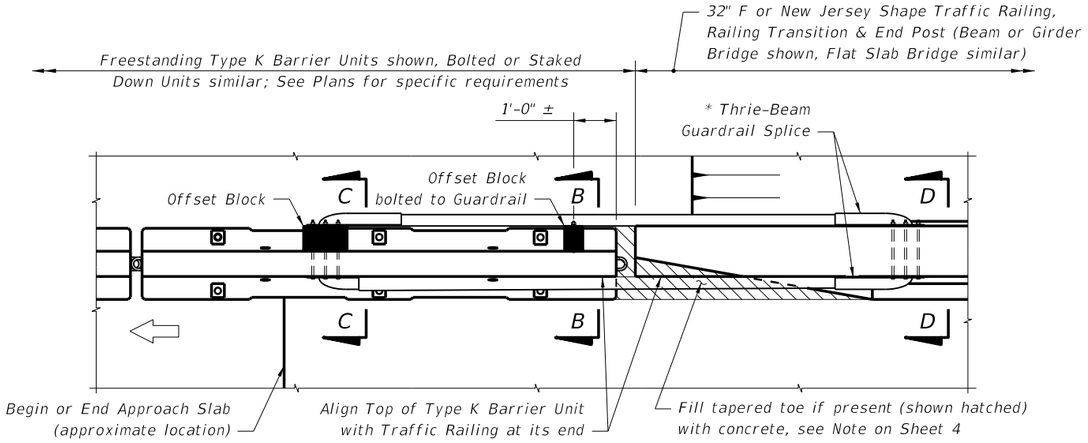
TRAILING END SPLICE DETAIL
FOR F AND NEW JERSEY SHAPE TRAFFIC RAILINGS AND 8' & 14' TRAFFIC RAILING / SOUND BARRIERS

PARTIAL ELEVATION VIEW

Cross References:
See Sheet 13 for Section A-A,
Section B-B and Section C-C.

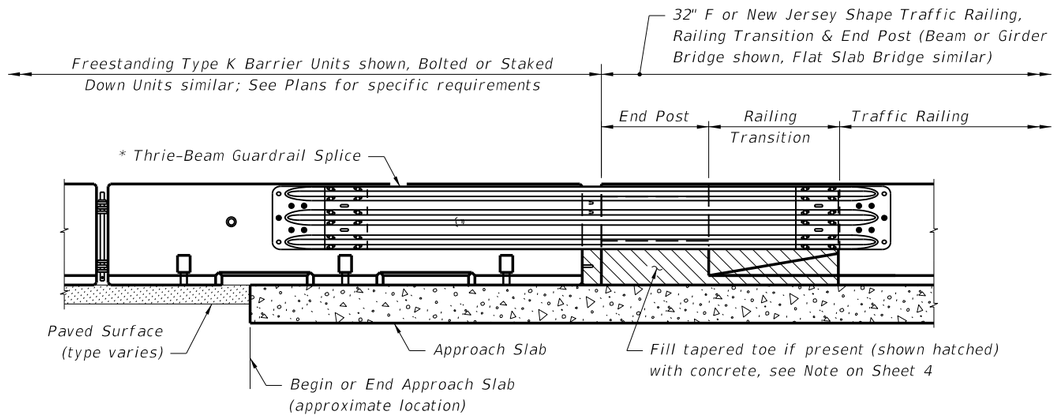
TRAILING END SPLICE DETAIL
FOR FLORIDA CORRAL AND VERTICAL SHAPE TRAFFIC RAILINGS

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	414	11



PARTIAL PLAN VIEW

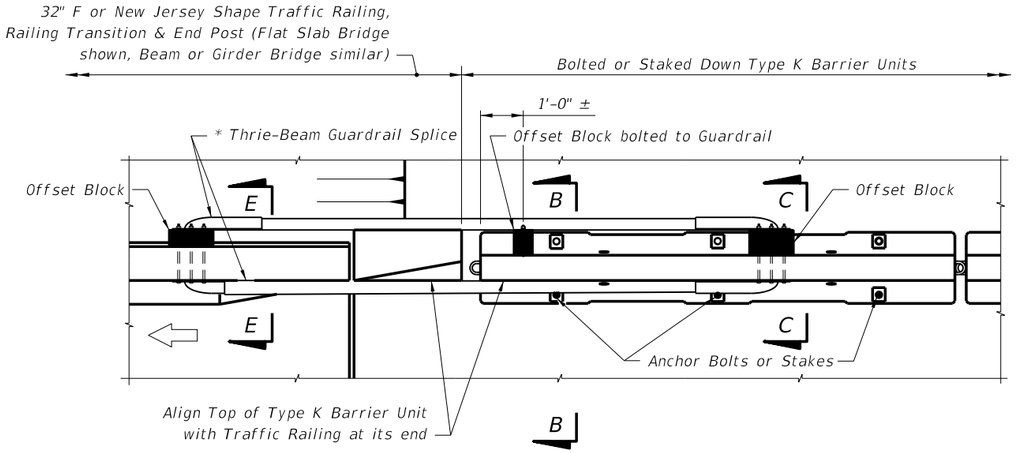
* See Thrie-Beam Guardrail Positioning Detail, Sheet 13 and Notes for Thrie-Beam Guardrail Splice Installations, Sheet 4.



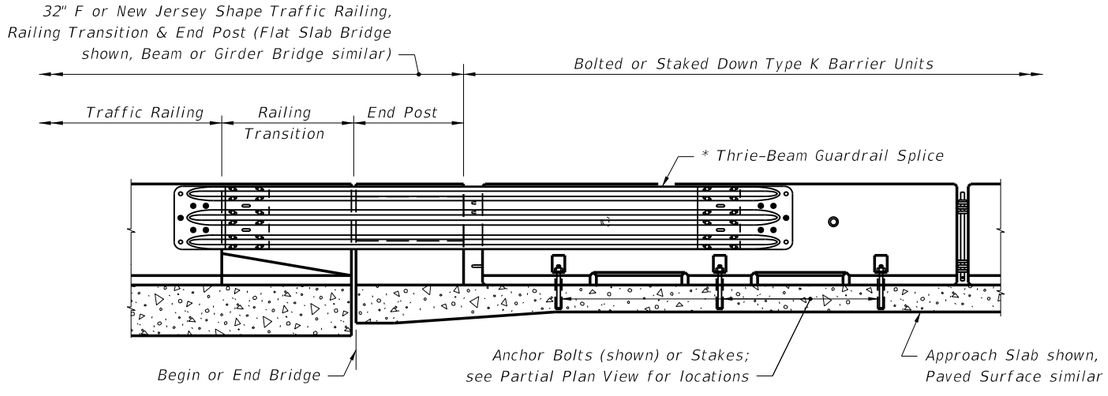
PARTIAL ELEVATION VIEW

Cross References:
See Sheet 13 for Section B-B,
Section C-C and Section D-D.

TRAILING END SPLICE DETAIL
FOR 32" F AND NEW JERSEY SHAPE TRAFFIC RAILINGS WITH RAILING TRANSITION AND END POST



PARTIAL PLAN VIEW



PARTIAL ELEVATION VIEW

Cross References:
See Sheet 13 for Section B-B,
Section C-C and Section E-E.

APPROACH TRANSITION SPLICE DETAIL
FOR 32" F AND NEW JERSEY SHAPE TRAFFIC RAILINGS WITH RAILING TRANSITION AND END POST

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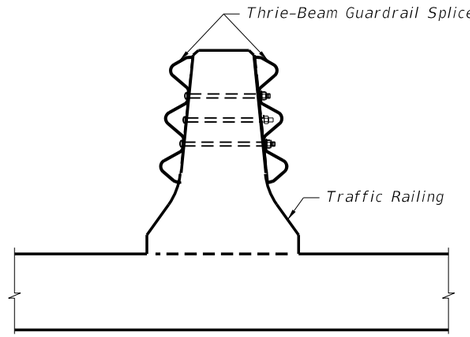
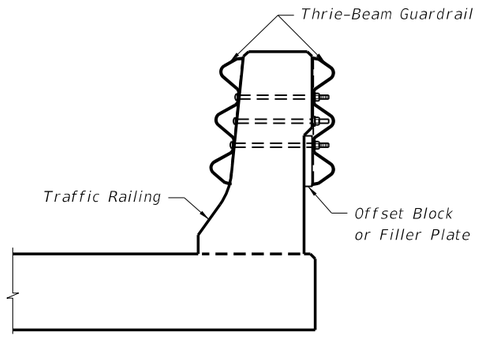
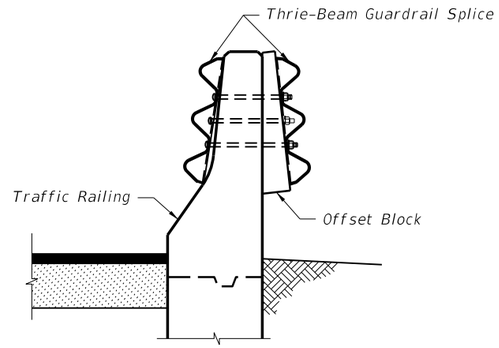
LAST REVISION	REVISION	DESCRIPTION:				
07/01/07			FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX NO. 414	SHEET NO. 12



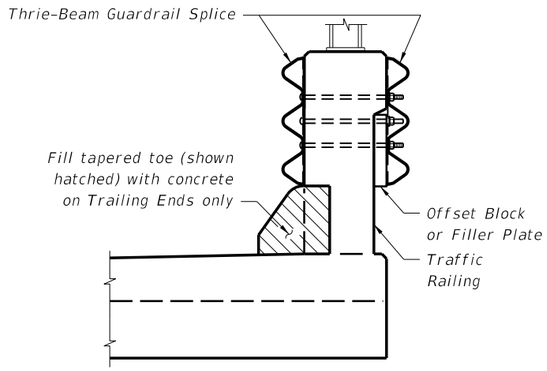
SECTION A-A
32" F Shape Median Traffic Railing (shown), Median Concrete Barrier Wall (similar)



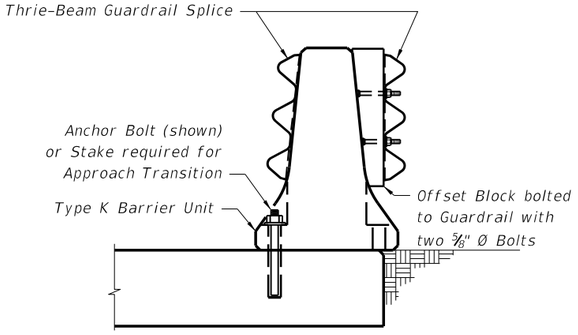
SECTION A-A
32" F Shape Traffic Railing (shown), 42" Traffic Railing and 8' & 14' Traffic Railing / Sound Barriers (similar)



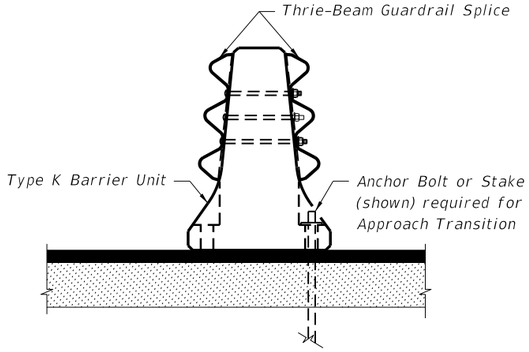
SECTION A-A
32" New Jersey Shape Concrete Barrier Wall (shown), 32" New Jersey Shape Traffic Railing & other Narrow Traffic Railings (similar)



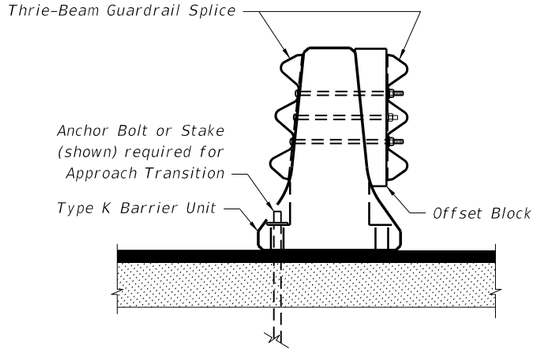
SECTION A-A
32" & 42" Vertical Shape Traffic Railing (shown), Florida Corral Traffic Railing (similar)



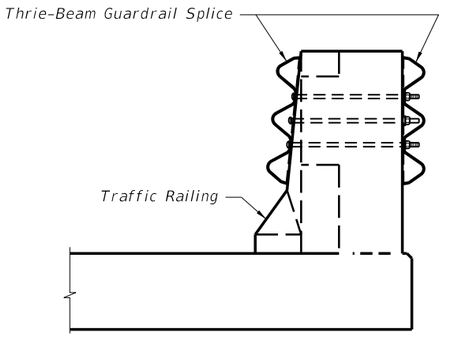
SECTION B-B
Adjacent to Shoulder Traffic Railings



SECTION C-C
Adjacent to 32" F or New Jersey Shape Median Traffic Railing or Median Concrete Barrier Wall

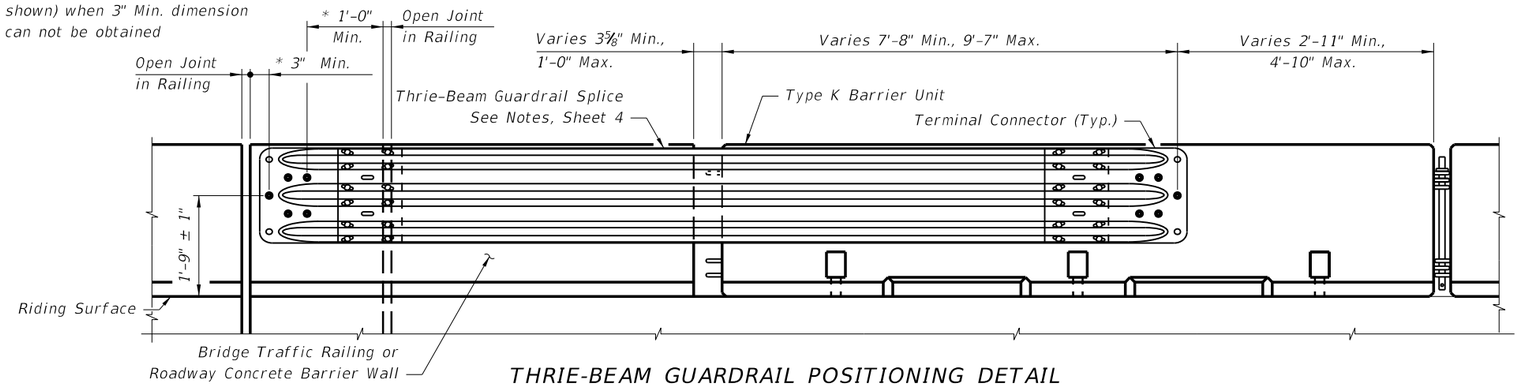


SECTION C-C
Adjacent to Shoulder Traffic Railings

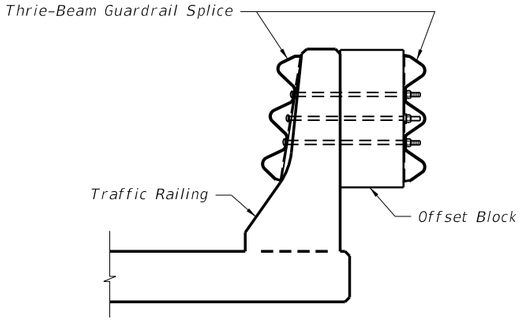


SECTION D-D
32" F or New Jersey Shape Traffic Railing, Railing Transition & End Post

* Shift Thrie-Beam Guardrail Splice beyond Open Joint 1'-0" Min. (as shown) when 3" Min. dimension can not be obtained

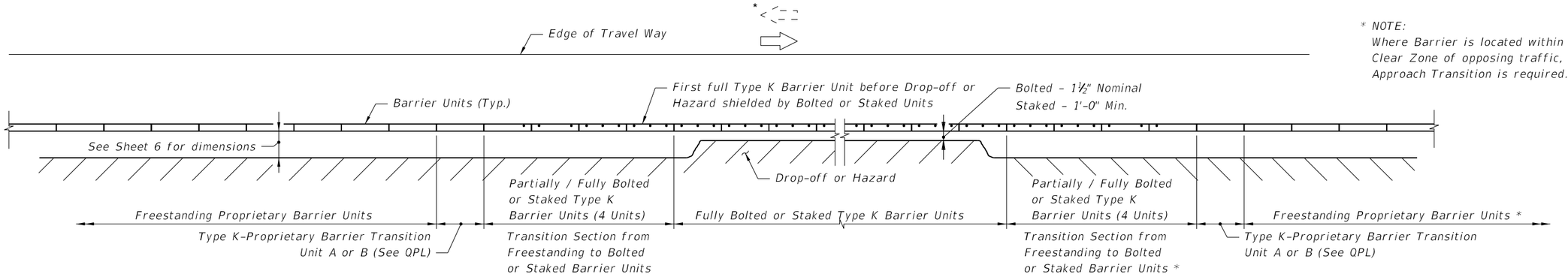


THRIE-BEAM GUARDRAIL POSITIONING DETAIL



SECTION E-E
32" New Jersey Shape Traffic Railing (shown), 32" F Shape Traffic Railing (similar)

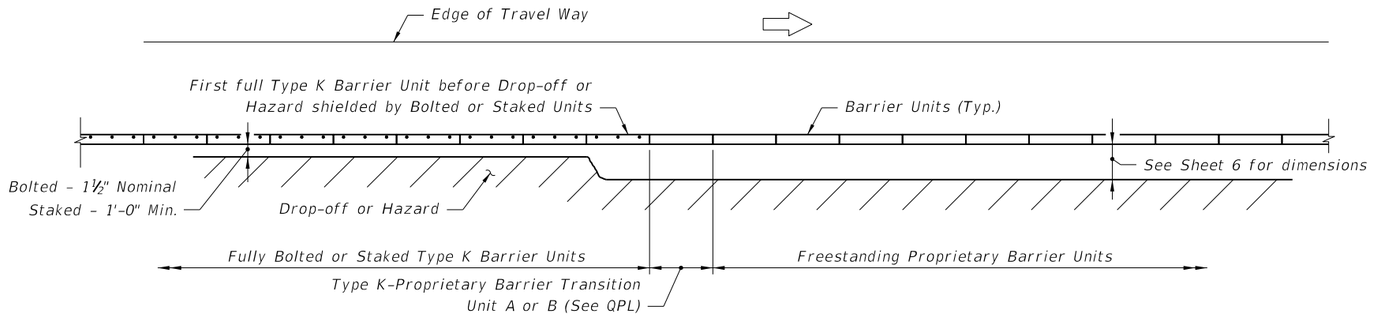
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	414	13



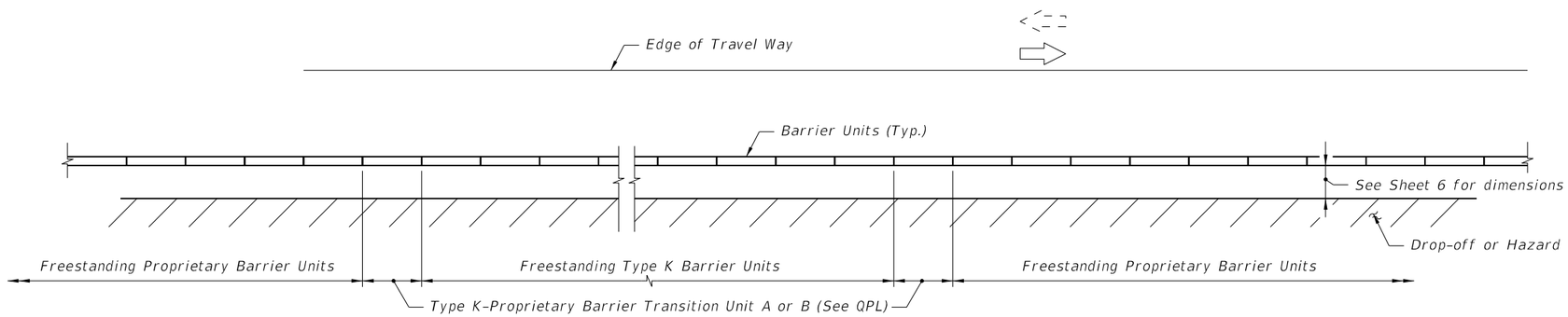
* NOTE:
Where Barrier is located within Clear Zone of opposing traffic, Approach Transition is required.

APPROACH TRANSITION FROM FREESTANDING PROPRIETARY TEMPORARY BARRIERS TO BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS

LEGEND:



TRAILING END TRANSITION FROM BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS TO FREESTANDING PROPRIETARY TEMPORARY BARRIERS

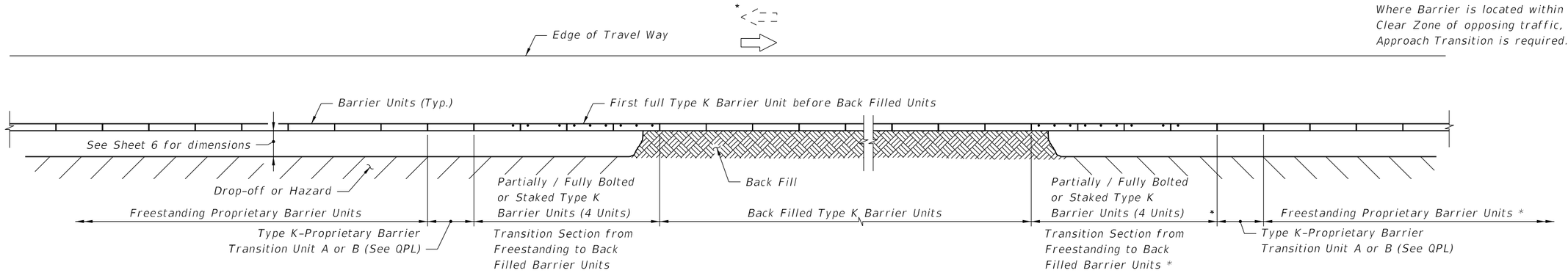


APPROACH AND TRAILING END TRANSITIONS FROM FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS TO FREESTANDING PROPRIETARY TEMPORARY BARRIERS

TYPE K-PROPRIETARY TEMPORARY CONCRETE BARRIER TRANSITIONS

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX NO.	SHEET NO.
07/01/07						414	14

* NOTE:
Where Barrier is located within Clear Zone of opposing traffic, Approach Transition is required.



APPROACH TRANSITION FROM FREESTANDING PROPRIETARY TEMPORARY BARRIERS TO BACK FILLED TYPE K TEMPORARY CONCRETE BARRIERS

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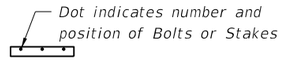
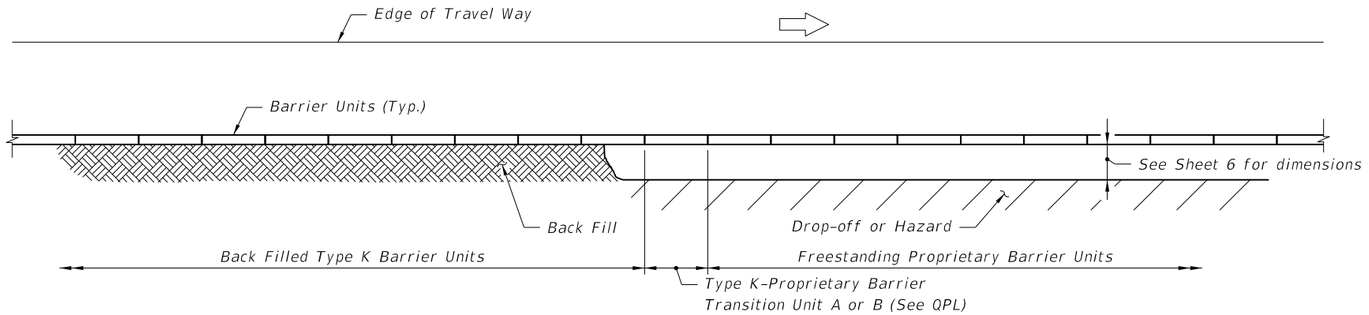
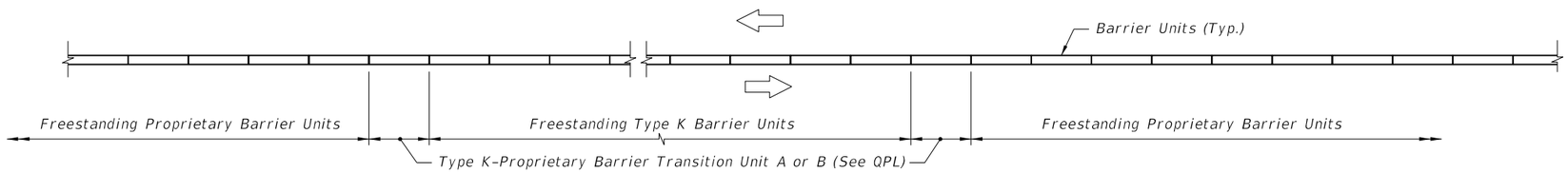




TRAILING END TRANSITION FROM BACK FILLED TYPE K TEMPORARY CONCRETE BARRIERS TO FREESTANDING PROPRIETARY BARRIERS



MEDIAN APPROACH AND TRAILING END TRANSITIONS FROM FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS TO FREESTANDING PROPRIETARY TEMPORARY BARRIERS

TYPE K-PROPRIETARY TEMPORARY CONCRETE BARRIER TRANSITIONS

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TYPE K TEMPORARY CONCRETE BARRIER SYSTEM	INDEX NO.	SHEET NO.
07/01/07						414	15

GENERAL NOTES

1. Temporary concrete barrier systems on roadways may be any of the following:

   a. The FDOT Type K Temporary Concrete Barrier system (Design Standard Index 414). F-Shape Units. For temporary concrete barrier systems on bridges see Design Standard Index No. 414.

   b. Proprietary temporary concrete barrier systems meeting NCHRP Report 350 Test Level 3 criteria which are included on the Qualified Products List.

2. Barrier units of dissimilar types may be interconnected within a single line barriers using transition units.

3. Alignment, length of need, anchorage and end treatment shall be in accordance with this Index.

4. Temporary concrete barrier units shown herein shall not be used for permanent barrier wall construction regardless of unit length.

5. If the plans specify Barrier (Temporary) (Type K), substitution with other barrier types is not permitted.

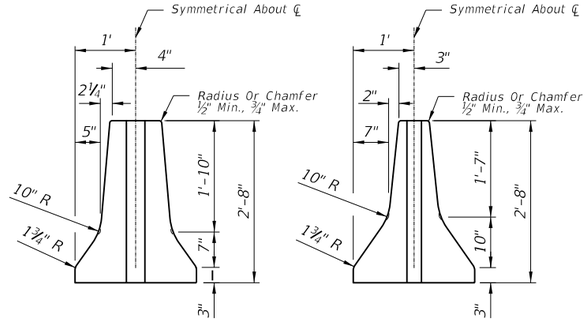
6. If the plans specify temporary concrete barrier system, substitution with water filled barriers is not permitted.

7. Where existing pavement is not present, construct an Asphalt Pad using Miscellaneous Asphalt Pavement. Cost of the Asphalt Pad to be included in the cost of the Barrier system.

8. Type C Steady-Burn Lights are to be mounted on top of temporary concrete barriers that are used as barriers along traveled ways in work zones. The lights are to be spaced at 50' centers in transitions, 100' centers on curves and 200' centers on tangent roadways. For additional information refer to Index 600.

9. Barrier units used for work zone traffic control and other temporary applications shall be paid for under the contract unit price for Barrier (Temporary), LF. Type C Steady-Burn Lights shall be paid for under the contract unit price for Lights, Temporary, Barrier Mount (Steady-Burn), ED.

10. Deflection space shall be clear of any construction debris, stockpiled materials, equipment, and objects.

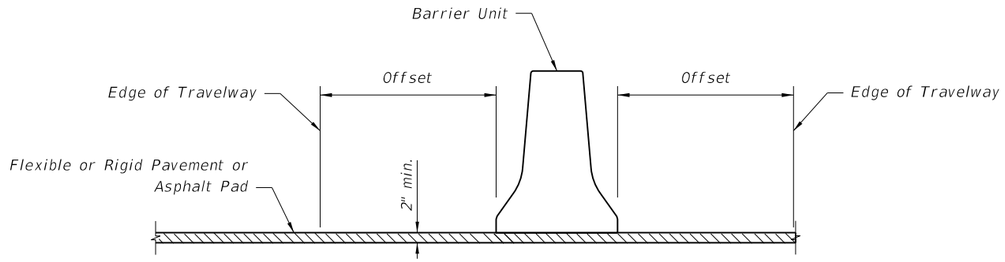


F-SHAPE N.J. SHAPE

END VIEWS

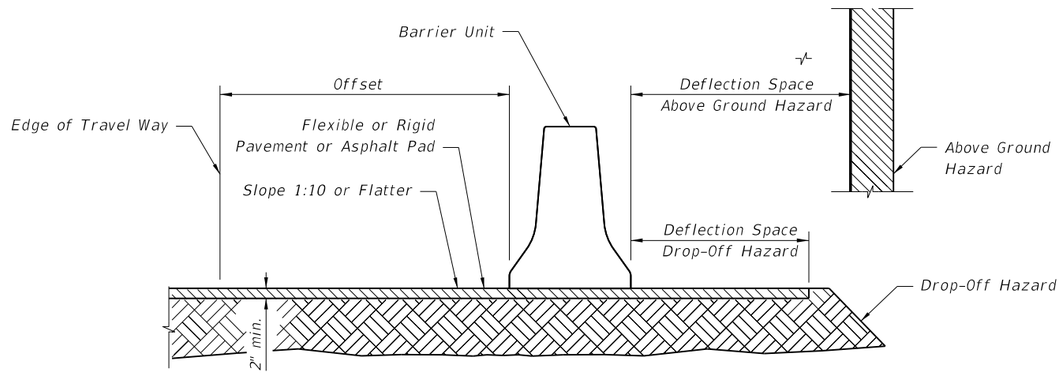
REINFORCEMENT AND OTHER UNIT FABRICATION DETAILS NOT SHOWN.

PERMITTED BARRIER UNIT END VIEWS



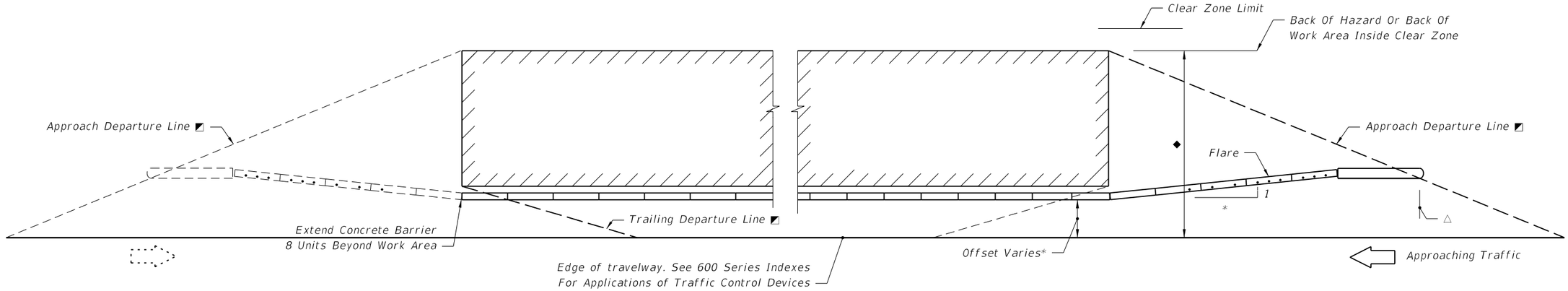
MEDIAN INSTALLATION

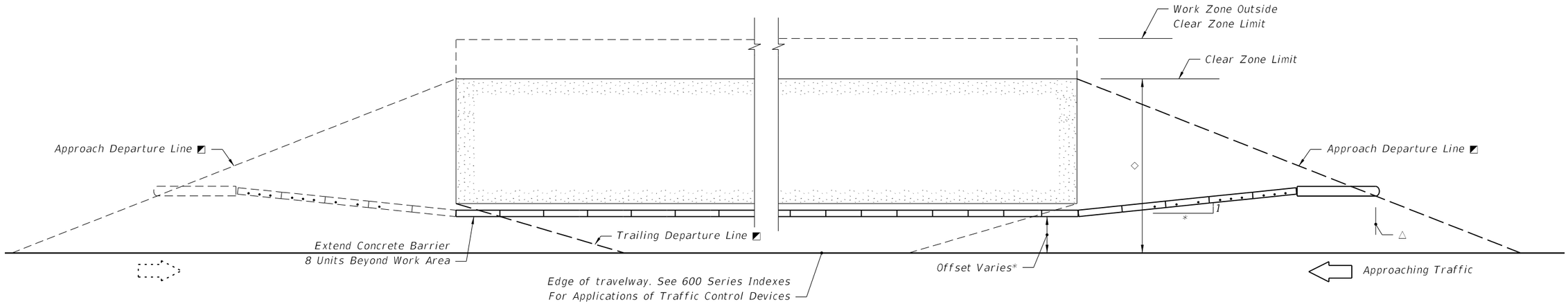
OFFSET AND DEFLECTION SPACE REQUIREMENTS				
Installation	Shielding	Work Zone Speed	Offset to Travelway	Deflection Space
Right Shoulder	Above Ground Hazards	45 mph or Less	1' min, 2' preferred	2' min.
		50 mph and Greater	2' min, 4' preferred	4' min.
	Drop-Off Hazards	45 mph or Less	1' min, 2' preferred	2' min.
		50 mph and Greater		
		a. Drop-offs 4' or Less and NO traffic below	2' min, 4' preferred	2' min.
		b. All drop-off conditions other than 'a'	2' min, 4' preferred	4' min.
Separating Traffic	Adjacent Opposing Traffic	45 mph or Less	1' min, 2' prefered	1' min., 2' prefered
		50 mph and Greater	2' min, 4' preferred	2' min., 4' preferred



ROADWAY INSTALLATION

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TEMPORARY CONCRETE BARRIER	INDEX NO.	SHEET NO.
01/01/12						415	1





△ The approach departure line location is determined by the line intersect with the back of the hazard or the area to be shielded, however the intersect offset distance is not to be beyond the clear zone limit. The trailing departure line is determined by the line intersect with the front of the downstream end of the hazard or the area to be shielded.

The length of barrier wall need is the distance from the approach departure line intersect with the upstream toe of the temporary concrete barrier wall to the trailing departure line intersect with the downstream toe of the temporary concrete barrier wall.

Where temporary concrete barrier wall Temporary concrete barrier wall end units shall be located at or outside the clear zone or shielded by other structure, earth embedment or a crash cushion.

Proprietary redirective crash cushions designed for use with temporary concrete barriers have the beginning length of need and departure line intersect point indicated on the respective QPL drawing for each proprietary crash cushion. Where redirective crash cushions are located on the departure line by their length of need reference point, the wall upstream end unit must be aligned with the crash cushion, and the wall's end unit secured with bolts or stakes. See Sheets 3 through 6 for configurations requiring end unit anchorage.

* The wall offset from the near traffic lane, wall flare rate and wall flare length are to be in conformance with the alignment called for in the plans and the alignments called for by Department Design Standards specified in the plans; in absence of either plan requirement, the offset shall be as determined by the Engineer, and, unless other flare rates are approved by the Engineer the flare rates to be applied are 1:10 or flatter for speeds ≤ 45 mph and 1:15 or flatter for speeds ≥ 50 mph; see Index No. 642 for other flare rates on freeway facilities.

The surface cross slope approaching the barrier wall and continuing across the required deflection space shall not exceed a rate of 1 vertical: 10 horizontal.

◩ Departure Rates
1:16 For Speeds ≤ 45 mph
1:13 For Speeds ≥ 50 mph

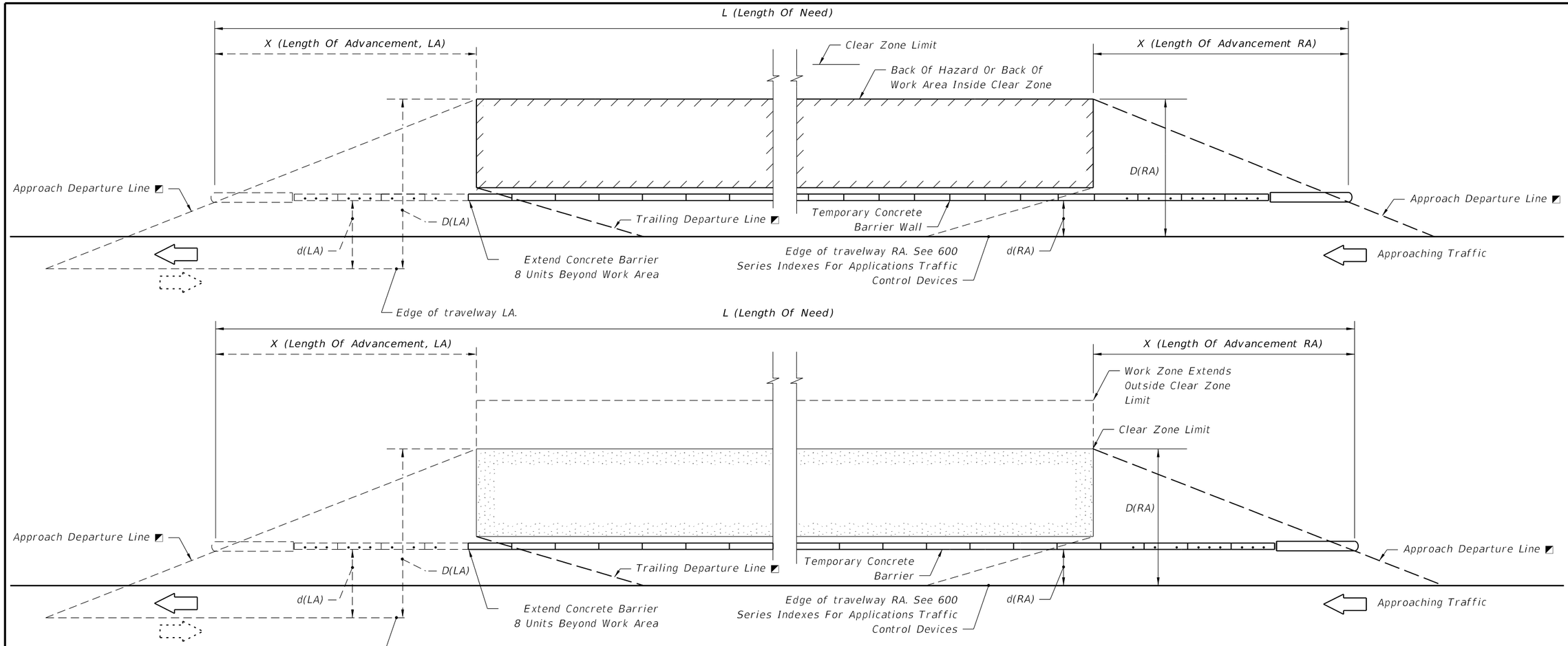
◆ Area Shielded When Work Zone Hazards Or The Work Area Occupy Space Less Than Clear Zone Width

◇ Area Shielded When Work Zone Hazards Or The Work Area Extend To Or Beyond Clear Zone Limit

Dot Indicates Number And Position Of Bolts Or Stakes

ALIGNMENT AND LENGTH OF NEED

LAST REVISION	REVISION	DESCRIPTION:				
01/01/12			FDOT DESIGN STANDARDS 2013	TEMPORARY CONCRETE BARRIER	INDEX NO. 415	SHEET NO. 2



CLEAR ZONE WIDTHS FOR WORK ZONES

The term 'clear zone' describes the unobstructed relatively flat area, impacted by construction, extending outward from the edge of the traffic lane. The table below gives clear zone widths in work zones for medians and roadside conditions other than for roadside canals; where roadside canals are present, clear zone widths are to conform with the distances to canals as described in Volume I, Chapter 4, Section 4.2 and Exhibit 4-A and 4-B of the Plans Preparation Manual.

CLEAR ZONE WIDTHS FOR WORK ZONES		
WORK ZONE SPEED (MPH)	TRAVEL LANES & MULTILANE RAMPS (feet)	AUXILIARY LANES & SINGLE LANE RAMPS (feet)
60–70	30	18
55	24	14
45–50	18	10
30–40	14	10
ALL SPEEDS CURB & GUTTER	4' BEHIND FACE OF CURB	4' BEHIND FACE OF CURB

Work Zone Speed (mph)	X (Length Of Advancement) Ft.
≤45	= 16 (D–d)
≥50	= 13 (D–d)

Equation Variables:

L=(Length of Need) = The distance a longitudinal barrier must be extended in advance of an area of concern in order to adequately shield the hazard.

X=(Length of advancement) = The distance a longitudinal barrier must be extended in advance of an area of concern in order to adequately shield the hazard

D(RA), D(LA) = Distance in feet from the near edge of the travel way to the back of the hazard or the clear zone limit, which ever is less

d(RA), d(LA) = Distance in feet from the near edge of the travel way to the face of the Barrier

Departure line = A line extending from the Point of Departure to the back of a hazard or clear zone. The point at which a barrier intersects the departure line establishes the beginning of both the Length of Need and the Length of Advancement.

LEGEND

LA : Left Approach
RA : Right Approach

◩ Departure Rates
1:16 For Speeds ≤ 45 mph
1:13 For Speeds ≥ 50 mph

Area Shielded When Work Zone Hazards Or The Work Area Occupy Space Less Than Clear Zone Width

Area Shielded When Work Zone Hazards Or The Work Area Extend To Or Beyond Clear Zone Limit

Dot Indicates Number And Position Of Bolts Or Stakes

STRAIGHT ALIGNMENT AND LENGTH OF NEED

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/12			FDOT DESIGN STANDARDS 2013	TEMPORARY CONCRETE BARRIER	415	3

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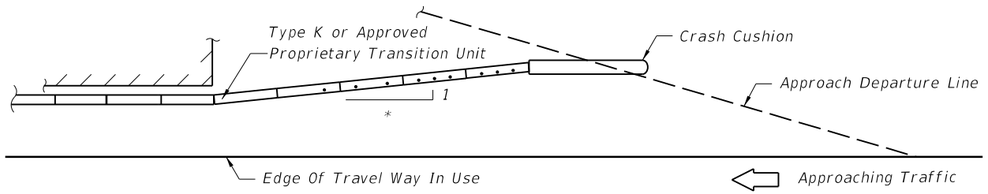
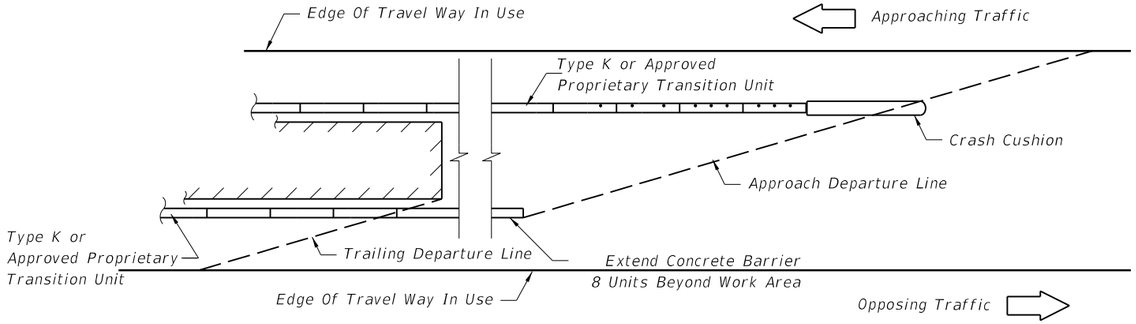
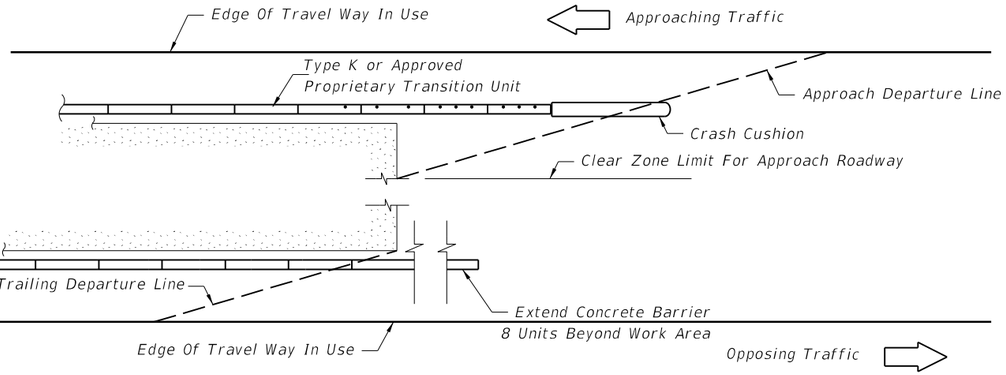


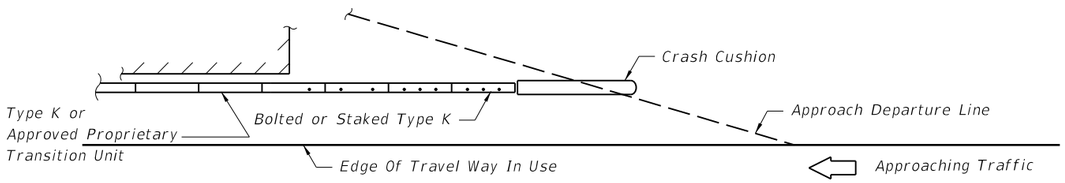
* Flare rates to be applied are 1:10 or flatter
for speeds ≤ 45 mph and 1:15 or flatter
for speeds ≥ 50 mph



MEDIAN HAZARDS WITHIN CLEAR ZONES BOTH ROADWAYS



MEDIAN HAZARDS EXTENDS TO OR BEYOND CLEAR ZONES BOTH ROADWAYS



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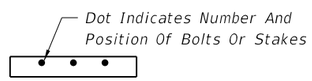
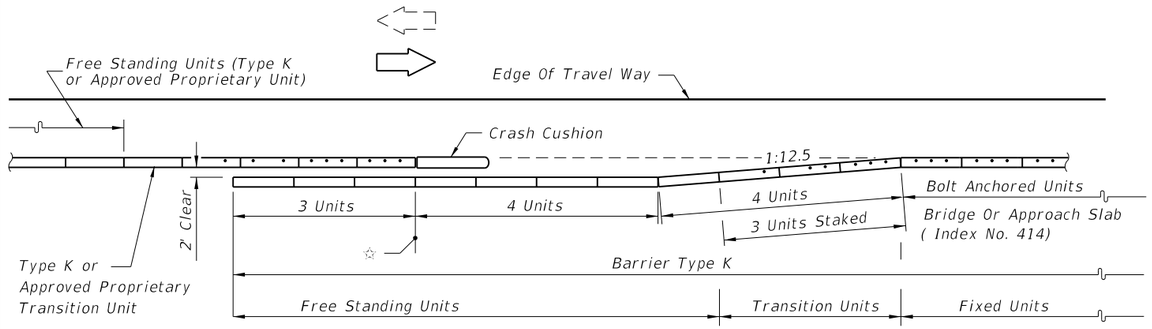
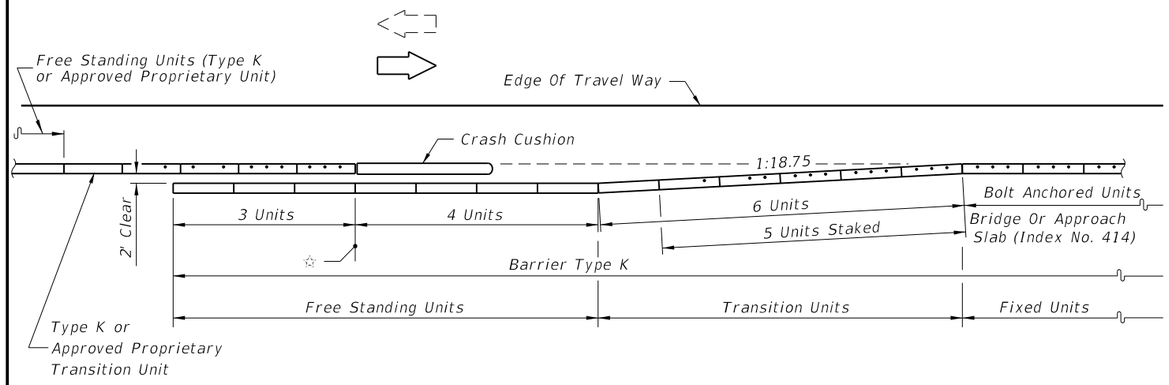


BARRIER END UNIT ANCHORAGE

LAST REVISION	REVISION	DESCRIPTION:				
07/01/12			FDOT DESIGN STANDARDS 2013	TEMPORARY CONCRETE BARRIER	INDEX NO. 415	SHEET NO. 4



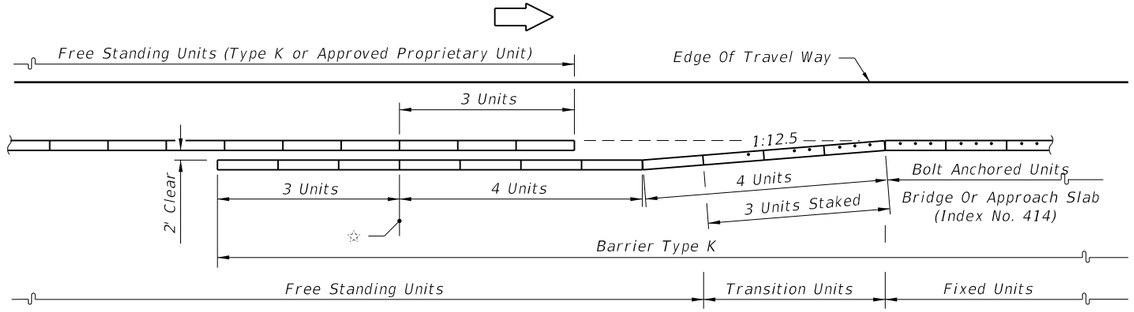
45 MPH OR LESS



50 MPH OR GREATER

☆ Overlap Reference Line

APPROACH SHOULDER BARRIER ON UNDIVIDED FACILITIES



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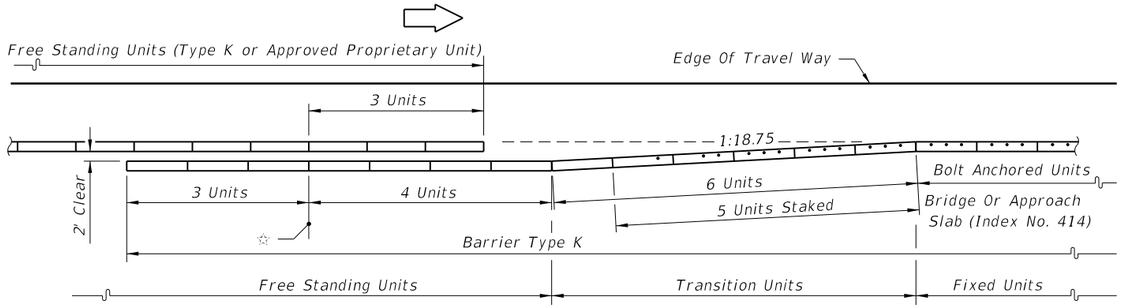
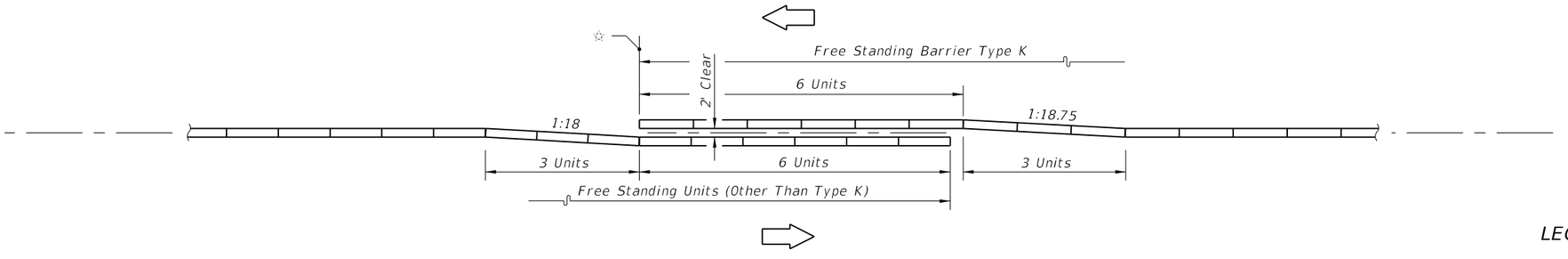


50 MPH OR GREATER

APPROACH SHOULDER BARRIER ON DIVIDED FACILITIES



INTERIOR MEDIAN BARRIER

LEGEND

Dot Indicates Number And Position Of Bolts Or Stakes

CONTINUATION OF BARRIER • FROM OTHER TYPE BARRIERS TO BARRIER TYPE K

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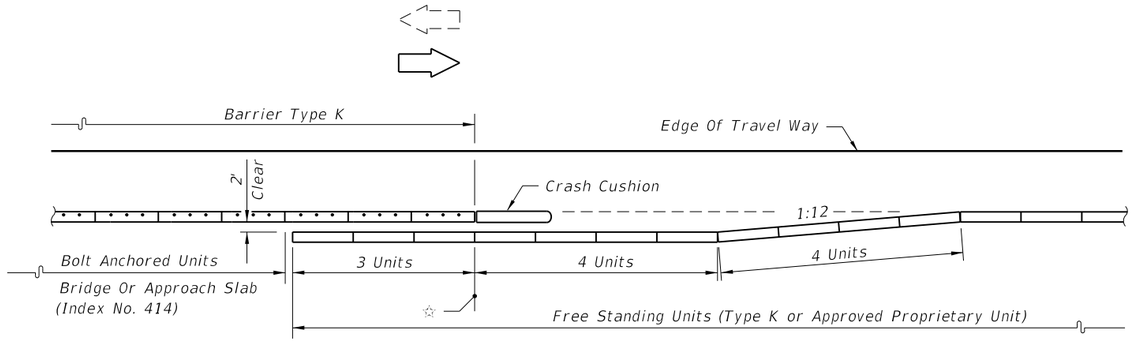
LAST REVISION	REVISION	DESCRIPTION:				
07/01/12			FDOT DESIGN STANDARDS 2013	TEMPORARY CONCRETE BARRIER	INDEX NO. 415	SHEET NO. 5



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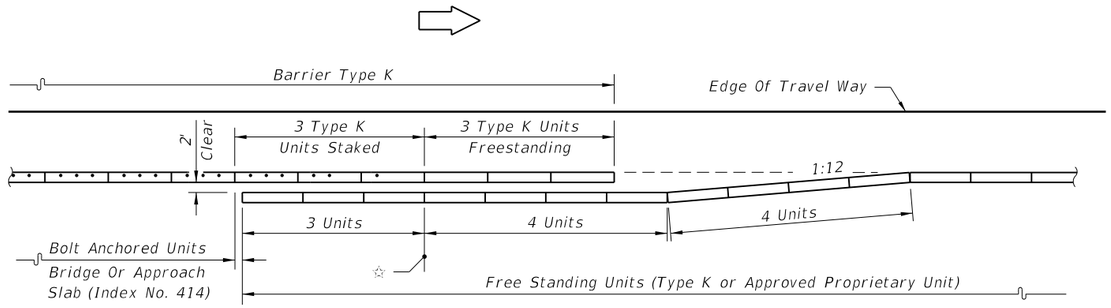

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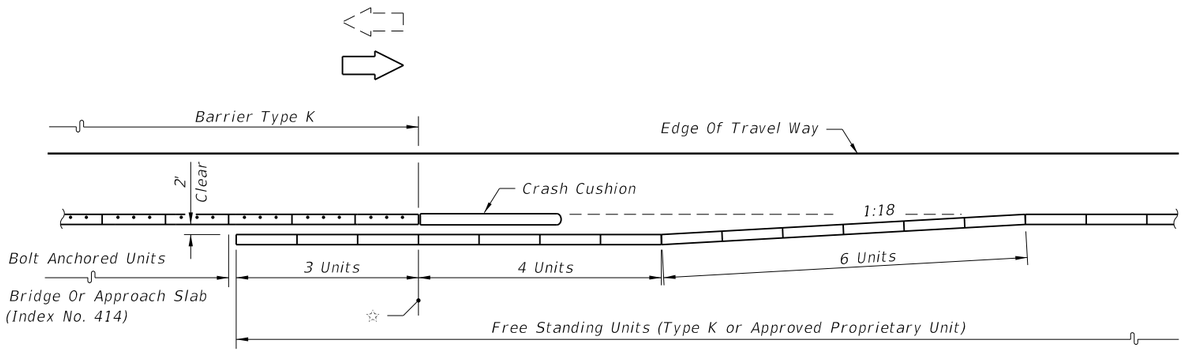
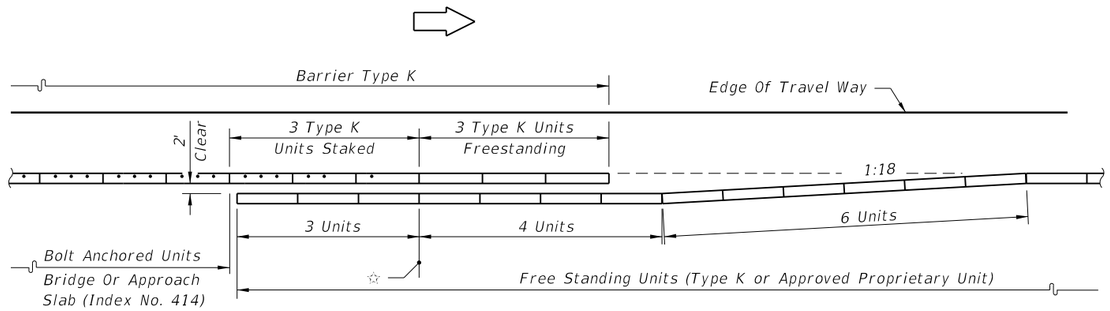


50 MPH OR GREATER

☆ Overlap Reference Line

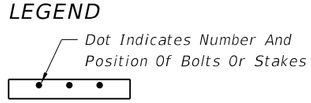
DEPARTURE (TRAILING) SHOULDER BARRIER ON UNDIVIDED FACILITIES



50 MPH OR GREATER

DEPARTURE (TRAILING) SHOULDER BARRIER ON DIVIDED FACILITIES

LEGEND



CONTINUATION OF BARRIER • FROM BARRIER TYPE K TO OTHER TYPE BARRIERS

BARRIER TYPE K ON BRIDGES AND APPROACH SLABS

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/12			FDOT DESIGN STANDARDS 2013	TEMPORARY CONCRETE BARRIER	415	6

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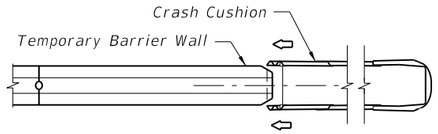
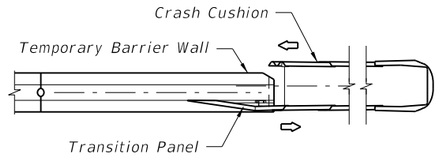


UNIDIRECTIONAL -
SEPARATED TRAFFIC



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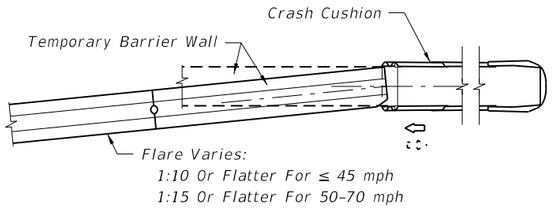
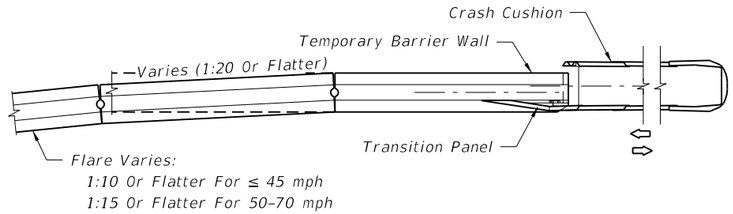


TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED OUTSIDE
OPPOSING LANE CLEAR ZONE OR ONE-WAY TRAFFIC



TWO-WAY TRAFFIC WITH CRASH CUSHION LOCATED
WITHIN OPPOSING LANE CLEAR ZONE

SHOULDER - RIGHT OR LEFT (RIGHT SIDE SHOWN)

WALL END TREATMENT WHEN SHIELDED BY A CRASH CUSHION

NOTES FOR WALL END SHIELDING

1. Redirective crash cushions are the principal (standard) device to be used for shielding approach ends of temporary concrete barrier walls. The contractor has the option to construct any of the redirective crash cushions listed on the Qualified Products List at "102 Temporary Crash Cushion", subject to the uses and limitations described on their respective drawings. The barrier wall four end unit abutting crash cushions must be anchored to a paved surface using anchors/stakes in accordance with Standard Index 414.

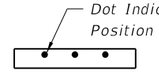
2. Temporary redirective crash cushions shall be installed in accordance with the manufacturer's specifications and recommendations. Temporary crash cushions can be either new or functionally sound used devices. Performance of intended function is the only condition for acceptance, whether the crash cushion is new, used, refurbished, purchased, leased, rented, on loan, shared between projects, or made up of mixed new and used components.

3. A yellow post mounted Type 1 Object Marker shall be centered 3' in front of the nose of all temporary crash cushions. Mounting hardware shall be in accordance with Index Nos. 11860. The cost of the Object Marker shall be included in the cost of the crash cushion.

4. Equipment, stockpile material, etc., shall not be placed behind the crash cushion.

5. Optional temporary redirective crash cushions are to be paid for per location under the contract unit price for Crash Cushion (Redirective Option) (Temporary), LO.

LEGEND



SHIELDING WALL ENDS WITH REDIRECTIVE CRASH CUSHIONS (REDIRECTIVE OPTION)

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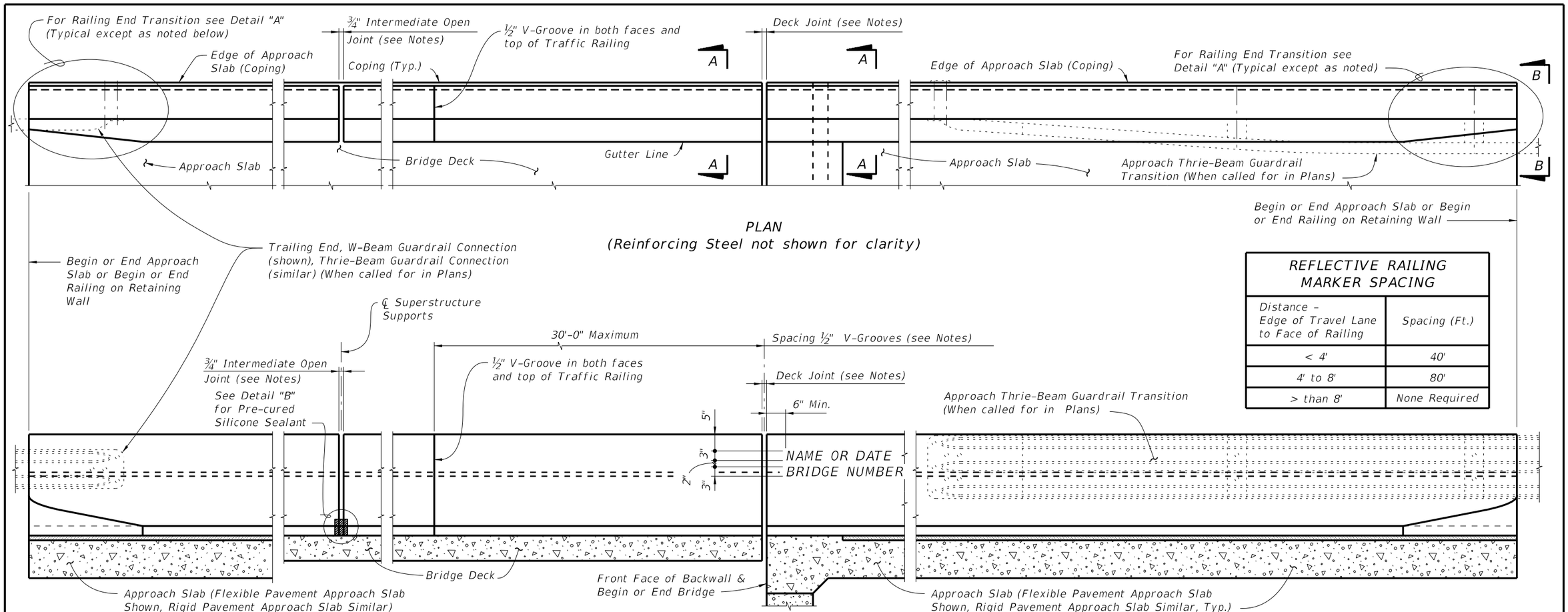
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TEMPORARY CONCRETE BARRIER	INDEX NO.	SHEET NO.
01/01/12						415	7



PLAN
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)
(Railing on Bridge Deck and Approach Slab shown, Railing on Retaining Wall similar)

CROSS REFERENCE:
For Section A–A, View B–B and Detail "A", see Sheet 2.
For Detail "B", see Sheet 4.

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing. The Department will determine the vertical Datum information for the marker.

GUARDRAIL : For Guardrail connection details see Index Nos. 400 and 410.

SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. If an adjoining railing is constructed plumb, transition the end of the Traffic Railing from perpendicular to plumb over a minimum distance of 20'-0". The cost of all modifications will be at the Contractor's expense.

PEDESTRIAN AND BICYCLE RAILING : See Index Nos. 821 and 822 for Notes, Details and post spacings for Traffic Railings with Aluminum Pedestrian /Bicycle Bullet Railings.

V-GROOVES : Construct ½" V-Grooves plumb. Space V-Grooves equally between ¾" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

NAME, DATE AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

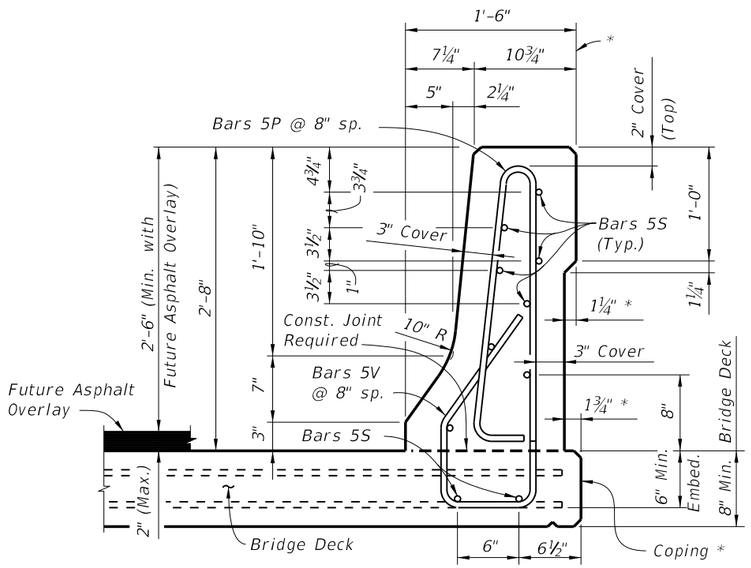
REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Sheet No. 3.

Provide ¾" Intermediate Open Joints at :

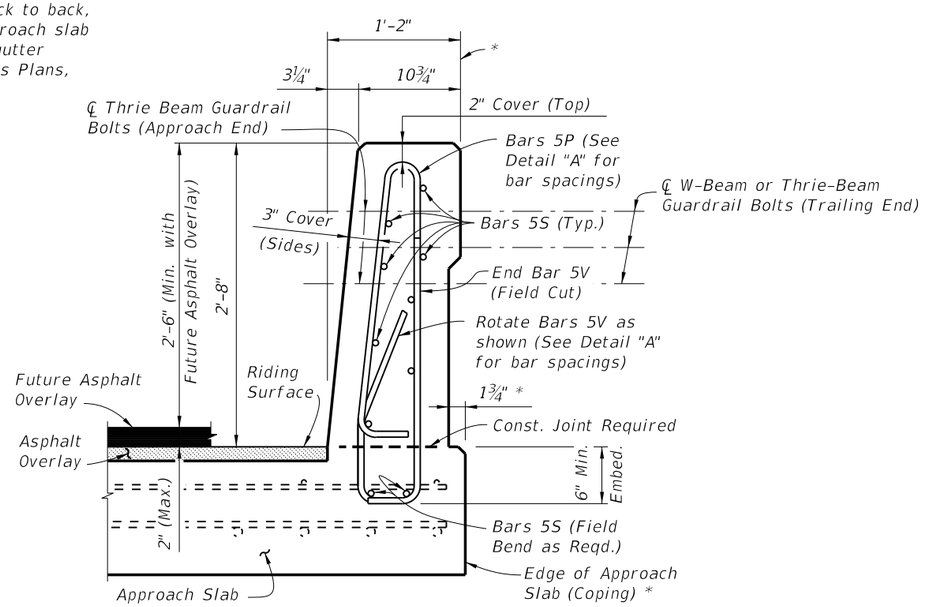
(1) – Superstructure supports where slab is continuous.

(2) – Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

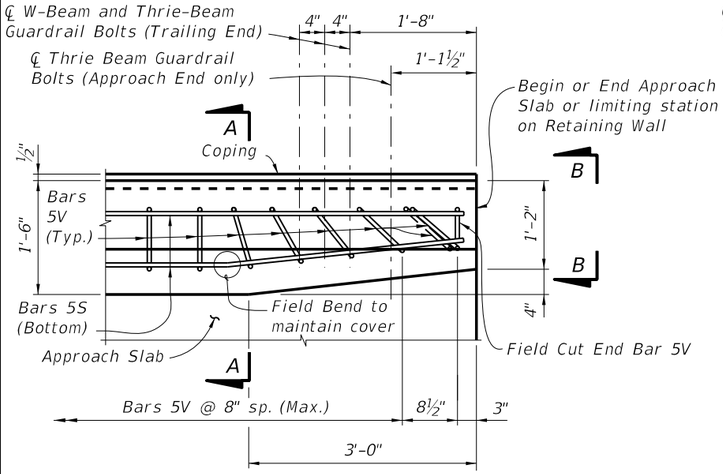


* *Where railings of adjacent bridges are to be built back to back, the outside vertical plane of the railing and deck/approach slab may coincide along a plane centered 1'-6" from each gutter line. A bond breaker will be required. See Structures Plans, Superstructure Sheets for Details.*

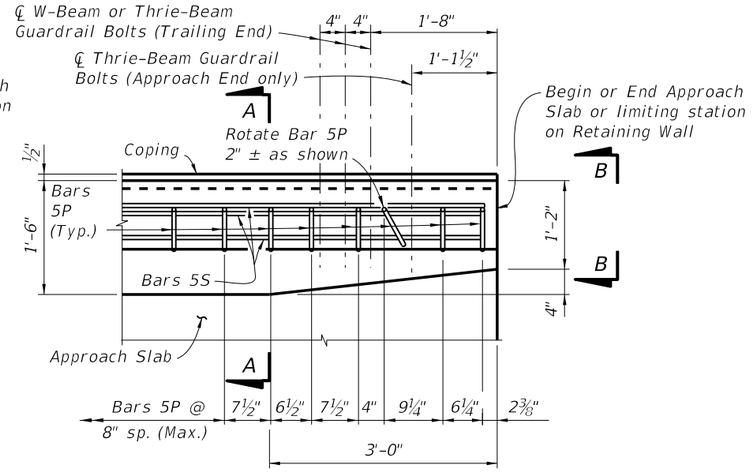
SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(Section thru Bridge Deck shown, Section thru Approach Slab and Retaining Walls similar)



VIEW B-B
(Section thru Approach Slab shown, Section thru Retaining Walls similar)



PLAN - Railing End Transition
(Showing Bars 5V and 5S)



PLAN - Railing End Transition
(Showing Bars 5P and 5S)

DETAIL "A"

(Railing on Approach Slab shown, Railing on Retaining Wall similar)

NOTE: Omit Railing End Transition and Guardrail if Index 410 Concrete Barrier Wall is used beyond the Approach Slab or Retaining Wall. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Transition is omitted, extend Typical Section to end of the Approach Slab or limiting station on Retaining Wall, and space Bars 5P and 5V at 8" (Typ.)

NOTES:

Rotate Bars 5V in Railing End Transition to maintain cover. Begin placing Railing Bars 5P and 5V on Approach Slab at the barrier end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge.

CROSS REFERENCE:

For locations of Section A-A and View B-B see Sheet 1.

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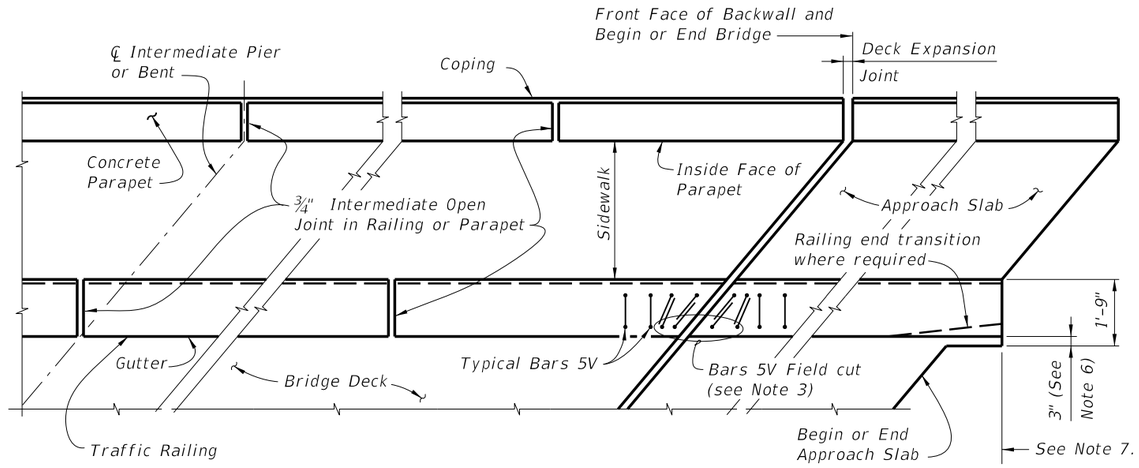
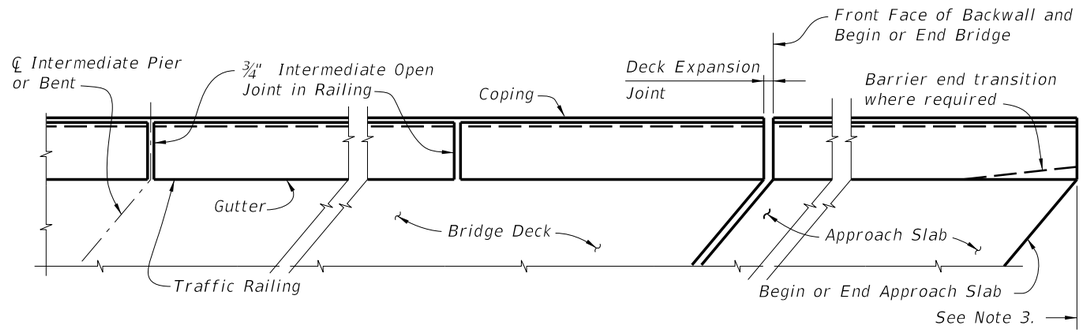
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/12			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (32" F SHAPE)	420	2



PARTIAL PLAN VIEW OF SKEWED BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK, F SHAPE TRAFFIC RAILING AND PEDESTRIAN/BICYCLE RAILING INDEX NO. 820, 825 or 826, OTHER TRAFFIC RAILINGS SIMILAR

NOTES:
1) Concrete Parapet reinforcement is not effected by skew angle, see Index No. 820 for details.
2) Parapet expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure Sheets for details.
3) Traffic Railing reinforcement vertical Bars 5V & 5P may be shifted up to 1" (Max.) and rotated up to 10 degrees as required to allow proper placement. Bars 5V adjacent to expansion joints shall be field adjusted to maintain clearance and spacing, extra Bars 5V will be required. Bars 5V bottom horizontal portion shall be cut so as to maintain maximum bottom horizontal length of bar to each vertical leg being placed, the remainder of bar shall be discarded. Cut Bars 5V may be rotated to maintain clearance.
4) Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. Expansion joint at the inside face of parapet shall be turned perpendicular or radial to this line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
5) ¾" Intermediate Open Joints and V-Grooves in railing and parapet shall be placed perpendicular or radial to the gutter line or inside face of parapet line. See Structures Plans, Superstructure Sheets for locations.
6) At begin or end approach slab extend slab at the railing ends 3" (gutter side or back face of railing as required) as shown to provide a base for casting of the railing.
7) Begin placing Railing Bars 5P and 5V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge.



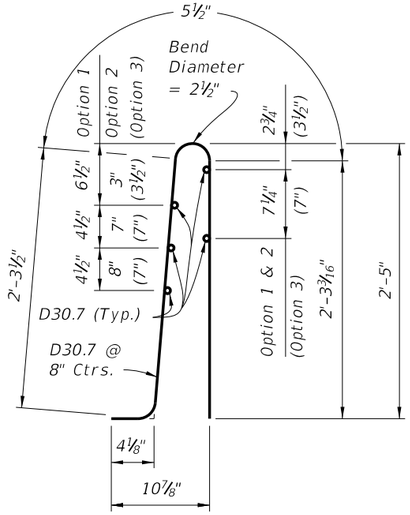
PARTIAL PLAN VIEW OF SKEWED BRIDGE DECK AND APPROACH SLAB WITH F SHAPE TRAFFIC RAILING, OTHER TRAFFIC RAILINGS SIMILAR

NOTES:
1) Railing expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure Sheets for details.
2) ¾" Intermediate Open Joints and ½" V-Grooves in railing shall be placed perpendicular or radial to the gutter line. See Structures Plans, Superstructure and Approach Slab Sheets for locations.
3) Begin placing Railing Bars 5P and 5V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge.

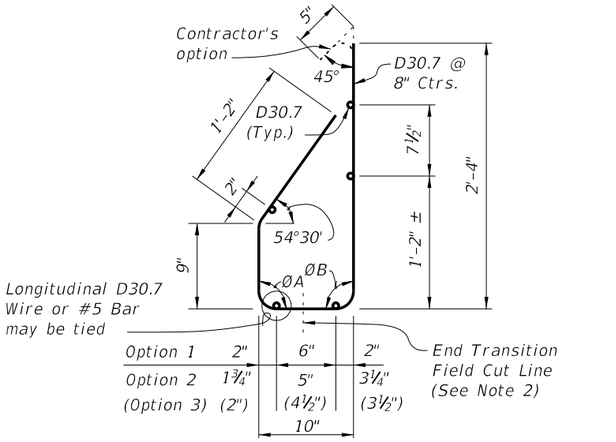
GENERAL NOTES:
1) Work this Sheet with Traffic Railing, Pedestrian/Bicycle Railing, and Approach Slab Indexes as applicable.
2) Deck Expansion Joint at begin or end bridge shown. Deck Expansion Joints at ℄ Pier or Intermediate Bents are similar.
3) Partial Plan Views shown are intended as guides only. See Structures Plans, Superstructure and Approach Slab Sheets for skew angles, joint orientation, dimensions and details.
4) Railings on Raised Sidewalks shall be treated similar to the Partial Plan View of Bridge Deck with Traffic Railing.
5) If Welded Wire Reinforcement is used in lieu of conventional reinforcement, placement of the WWR vertical elements shall be similar to those shown above. Clipping of horizontal elements to facilitate placement shall be minimized where possible. When clipping is required, supplement horizontal elements by lap splicing with deformed bars having an equivalent area of steel.

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (32" F SHAPE)	INDEX NO.	SHEET NO.
01/01/11						420	3

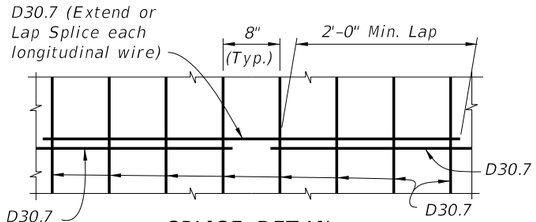
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



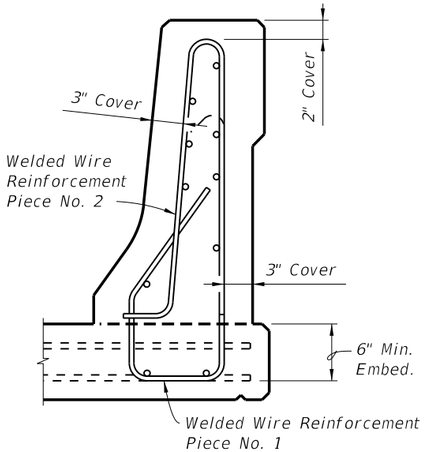
Welded Wire Reinforcement (WWR) Piece No. 2



Welded Wire Reinforcement (WWR) Piece No. 1



SPLICE DETAIL
(Between WWR Sections)



WELDED WIRE REINFORCEMENT NOTES:

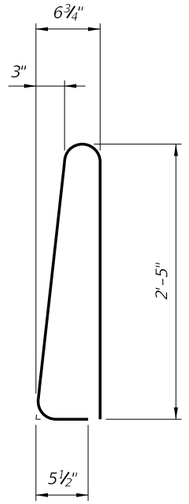
1. At the option of the Contractor Welded Wire Reinforcement (WWR) may be utilized in lieu of all Bars 5P, 5S and 5V. Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded Wire Reinforcement at Railing End Transition shall be field bent inward as required (Pieces 1 & 2) to maintain cover. The vertical wires (D30.7) in Piece 1 shall be cut as shown and the gutter side portion bent inward as required to allow placement.

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

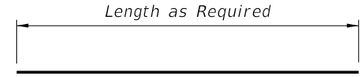
ROADWAY CROSS-SLOPE	LOW GUTTER		HIGH GUTTER	
	ØA	ØB	ØA	ØB
0% to 2%	90°	90°	90°	90°
2% to 6%	93°	87°	87°	93°
6% to 10%	96°	84°	84°	96°

ØA and ØB shall be 90° if Contractor elects to place railing perpendicular to the deck and approach slabs.

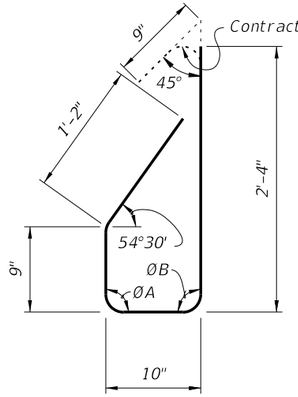
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
P	5	5'-7"
S	5	As Reqd.
V	5	5'-1"



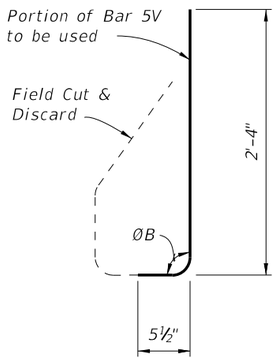
STIRRUP BAR 5P



BAR 5S



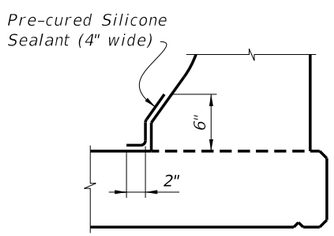
STIRRUP BAR 5V



END STIRRUP BAR 5V
To Be Field Cut
(One Required per
Railing End Transition)

REINFORCING STEEL NOTES:

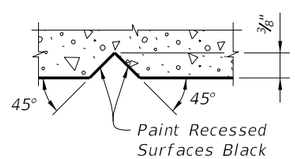
1. All bar dimensions in the bending diagrams are out to out.
2. The 9" and the 2'-4" vertical dimensions shown for Bar 5V are based on a bridge deck without a raised sidewalk. If a raised sidewalk is to be provided, increase these dimensions to achieve a 6" minimum embedment into the bridge deck. See Structures Plans, Superstructure and Approach Slab Sheets.
3. The reinforcement for the railing on a retaining wall shall be the same as detailed above for a 8" deck with ØA = ØB = 90°
4. All reinforcing steel at the open joints shall have a 2" minimum cover.
5. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-0".



DETAIL "B" - SECTION
AT INTERMEDIATE OPEN JOINT

INTERMEDIATE JOINT SEAL NOTES:

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Specification Section 932.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.

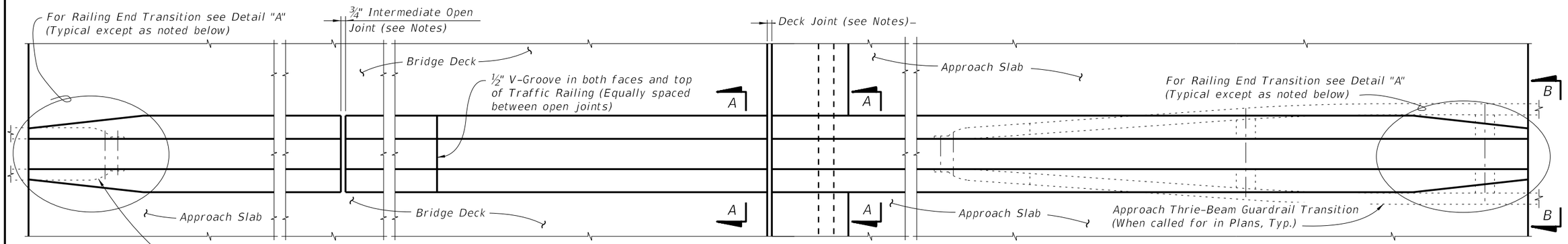


SECTION THRU RECESSED
"V" GROOVE TO FORM INSCRIBED
LETTERS AND FIGURES

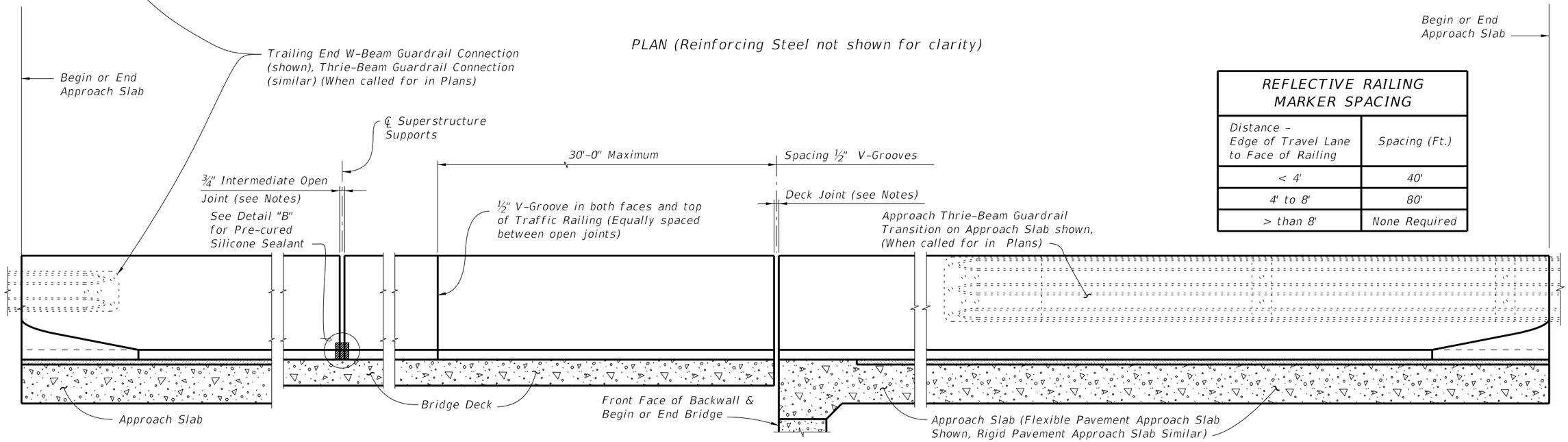
ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.104
Reinforcing Steel	LB/LF	27.12

(The above quantities are based on a 2% deck cross slope; railing on low side of deck.)

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (32" F SHAPE)	INDEX NO.	SHEET NO.
01/01/11						420	4



PLAN (Reinforcing Steel not shown for clarity)



ELEVATION
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

CROSS REFERENCE:
For Section A-A, View B-B and Detail "A" see Sheet 2.

For Detail "B" see Sheet 4.

TRAFFIC RAILING NOTES

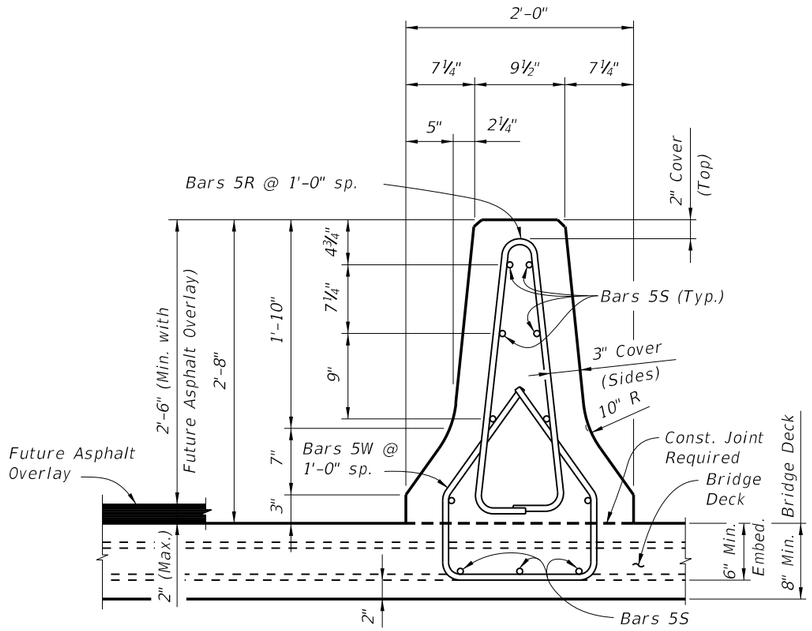
This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-4 criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.
GUARDRAIL : For Guardrail connection details see Index No. 400.
SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. The cost of all modifications will be at the Contractor's expense.
REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing along the centerline at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

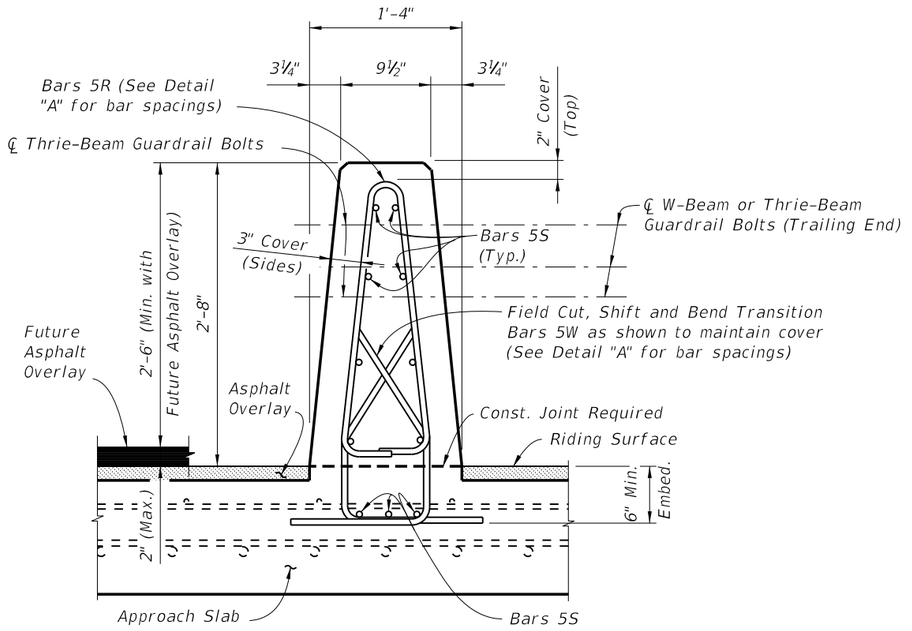
JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Sheet No. 3.

Provide ¾" Intermediate Open Joints at :
(1) – Superstructure supports where slab is continuous.

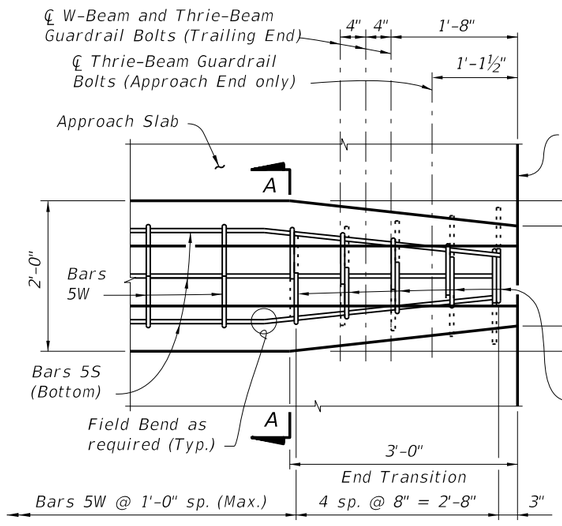
LAST REVISION	REVISION	DESCRIPTION:				
01/01/12			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (MEDIAN 32" F SHAPE)	INDEX NO. 421	SHEET NO. 1



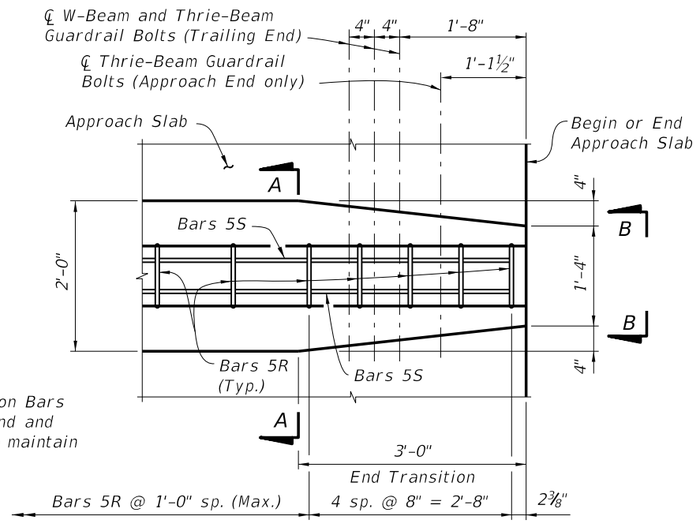
SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(SECTION THRU BRIDGE DECK SHOWN -
SECTION THRU APPROACH SLAB SIMILAR)



VIEW B-B



PLAN - Railing End Transition
(Showing Bars 5W and 5S)

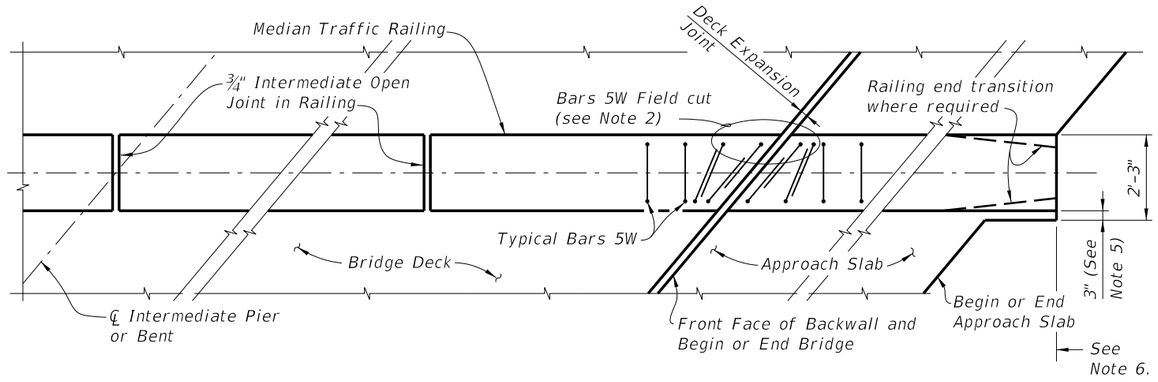


PLAN - Railing End Transition
(Showing Bars 5R and 5S)

NOTE:
Begin placing Railing Bars 5R and 5W on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5R and 5W shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5R and 5W as required to maintain cover in Railing End Transition.

Omit Railing End Transition and Guardrail if Index 410 Concrete Barrier Wall is used beyond the Approach Slab. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Transition is omitted, extend Typical Section to the end of Approach Slab and space Bars 5R and 5W at 1'-0" (Typ.)

DETAIL "A"



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH MEDIAN TRAFFIC RAILING

NOTES:

1) Median Traffic Railing reinforcement vertical Bars 5W may be shifted up to 1" (Max.) and rotated up to 10 degrees as required to allow proper placement.

2) Transition Stirrup Bars 5W shall be used as required at railing ends adjacent to expansion joints to facilitate placement of bars in acute corners. Place Transition Bars 5W in a fan pattern to maintain spacing. Rotate bars in 10° (Max.) increments as required.

3) Median Traffic Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. See Structures Plans, Superstructure and Approach Slab Sheets for Details.

4) ¾" Intermediate Open Joints and V-Grooves in railing shall be placed perpendicular or radial to the ℄ of the median railing. See Structures Plans, Superstructure and Approach Slab Sheets for locations.

5) At begin or end approach slab extend slab at the median railing ends 3" (open side) as shown to provide a base for casting of the railing.

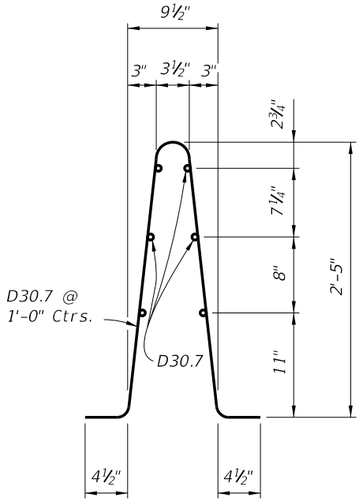
6) Work this Sheet with Approach Slab Indexes as applicable.

7) Deck Expansion Joint at begin or end bridge shown. Deck Expansion Joints at ℄ Pier or Intermediate Bents are similar.

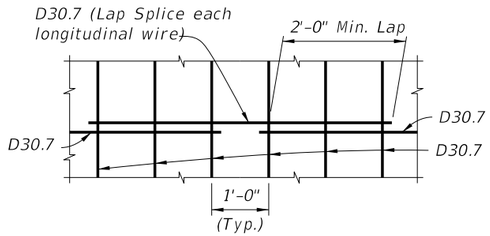
8) Partial Plan Views shown are intended as guides only. See Structures Plans, Superstructure and Approach Slab Sheets for skew angles, joint orientation, dimensions and details.

9) If Welded Wire Reinforcement is used in lieu of conventional reinforcement, placement of the WWR vertical elements shall be similar to those shown above. Clipping of horizontal elements to facilitate placement shall be minimized where possible. Where clipping is required, supplement horizontal elements by lap splicing deformed bars with an equivalent area of steel.

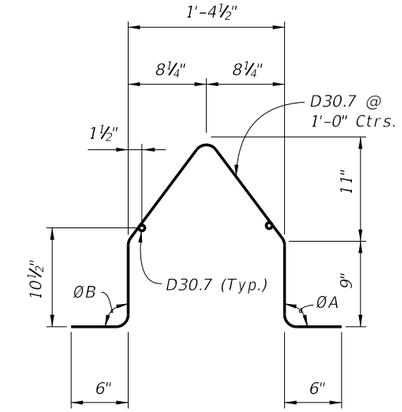
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



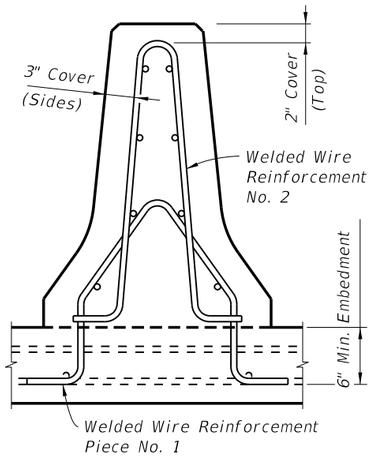
Welded Wire Reinforcement (WWR)
Piece No. 2



SPLICE DETAIL
(Between WWR Sections)



Welded Wire Reinforcement (WWR)
Piece No. 1



WELDED WIRE REINFORCEMENT NOTES:

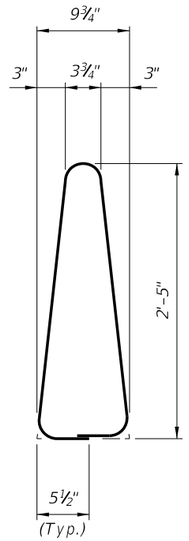
1. At the option of the Contractor Welded Wire Reinforcement may be utilized in lieu of all Bars 5R, 5S and 5W. Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded Wire Reinforcement at Railing End Transition shall be field bent inward as required (Pieces 1 & 2) to maintain cover. The top of Piece 1 shall be cut to allow overlap.
3. Place WWR panels so as to minimize the end overhang of longitudinal wires at Railing Ends and Open Joints. Overhangs greater than 6" are not permitted.

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

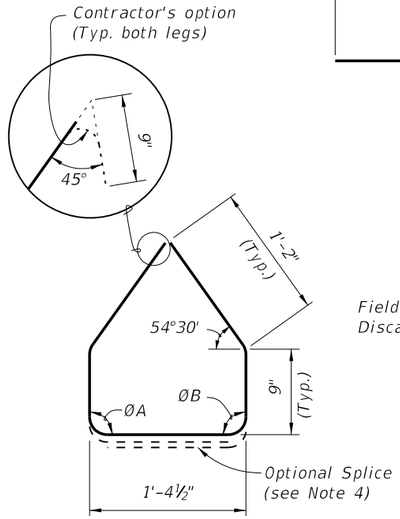
ROADWAY CROSS-SLOPE	ON SLOPE		AT CROWN	
	ØA	ØB	ØA	ØB
0% to 2%	90°	90°	90°	90°
2% to 6%	93°	87°	90°	90°
6% to 10%	96°	84°	90°	90°

ØA and ØB shall be 90° if Contractor elects to place railing perpendicular to the deck, and approach slabs.

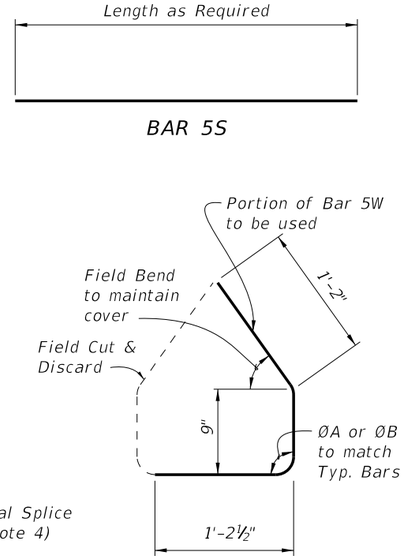
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
R	5	6'-1"
S	5	As Reqd.
W	5	5'-3"



STIRRUP BAR 5R



STIRRUP BAR 5W

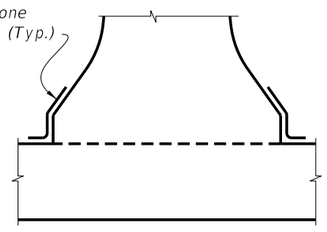


BAR 5S

TRANSITION STIRRUP BAR 5W
To Be Field Cut and Bent
(10 required per Railing
End Transition)

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at the open joints shall have a 2" minimum cover.
3. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-0".
4. At the Contractor's option, Bars 5W may be fabricated as a two piece bar with a 1'-2" lap splice of the bottom legs.



DETAIL "B" - SECTION
AT INTERMEDIATE OPEN JOINT

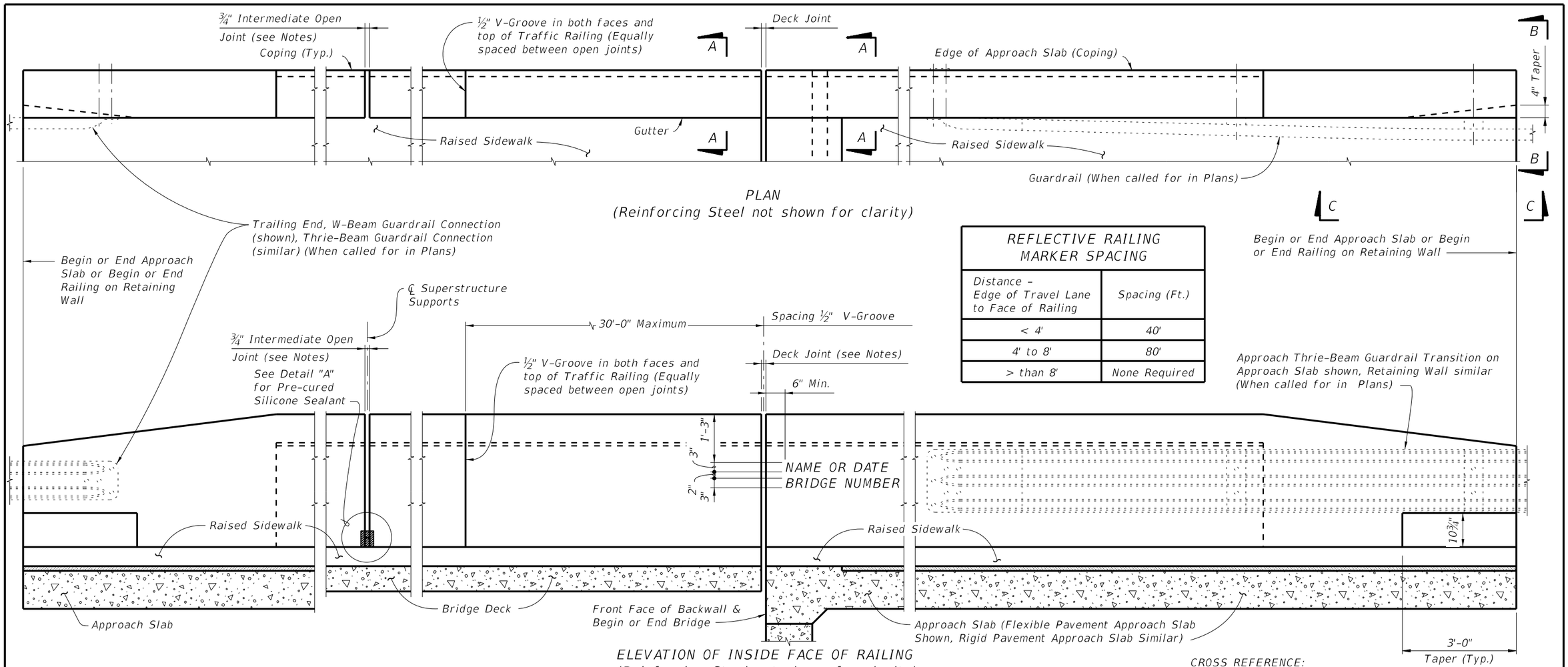
INTERMEDIATE JOINT SEAL NOTES:

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Specification Section 932.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.120
Reinforcing Steel	LB/LF	23.29

(The above quantities are based on a crowned roadway, with a 2% cross slope)

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (MEDIAN 32" F SHAPE)	INDEX NO.	SHEET NO.
01/01/11						421	4



PLAN
(Reinforcing Steel not shown for clarity)

ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

CROSS REFERENCE:
For Section A-A, View B-B and View C-C, see Sheet 2.
For Detail "A" see Sheet 3.

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 Ft. one marker shall be placed at each end of the bridge. On bridges 100 Ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing. The Department will determine the vertical Datum information for the marker.

GUARDRAIL : For Guardrail connection details, see Index No. 400.

RAILINGS ON RETAINING WALLS : If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Index No. 422, Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the ¾" open joints and ½" V-Groove shall apply.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

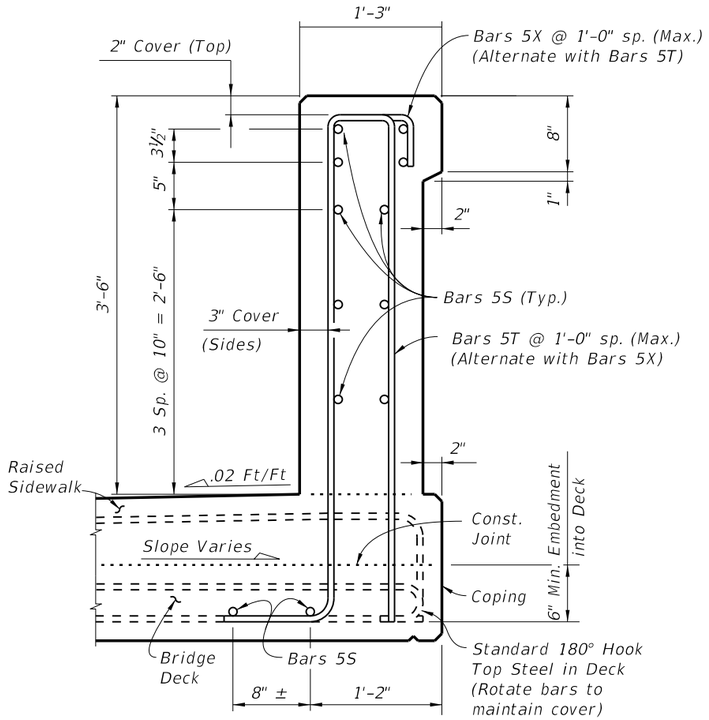
V-GROOVES : Construct ½" V-Grooves plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between ¾" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

NAME, DATE, AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

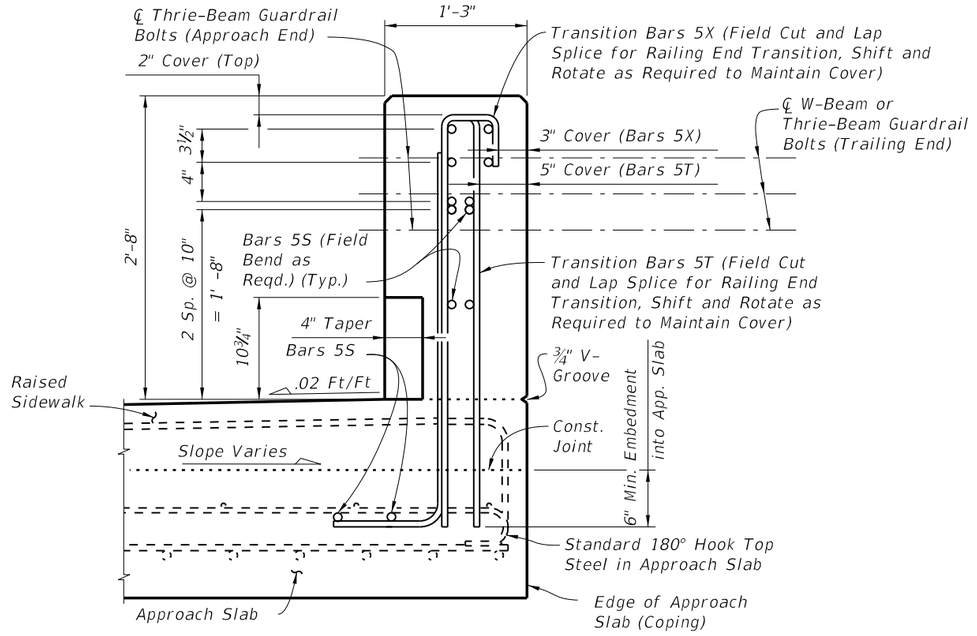
JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 420.

Provide ¾" Intermediate Open Joints at :
(1) – Superstructure supports where slab is continuous.
(2) – Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

LAST REVISION	REVISION	DESCRIPTION:				
01/01/12			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (42" VERTICAL SHAPE)	INDEX NO. 422	SHEET NO. 1



SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
SECTION THRU BRIDGE DECK SHOWN

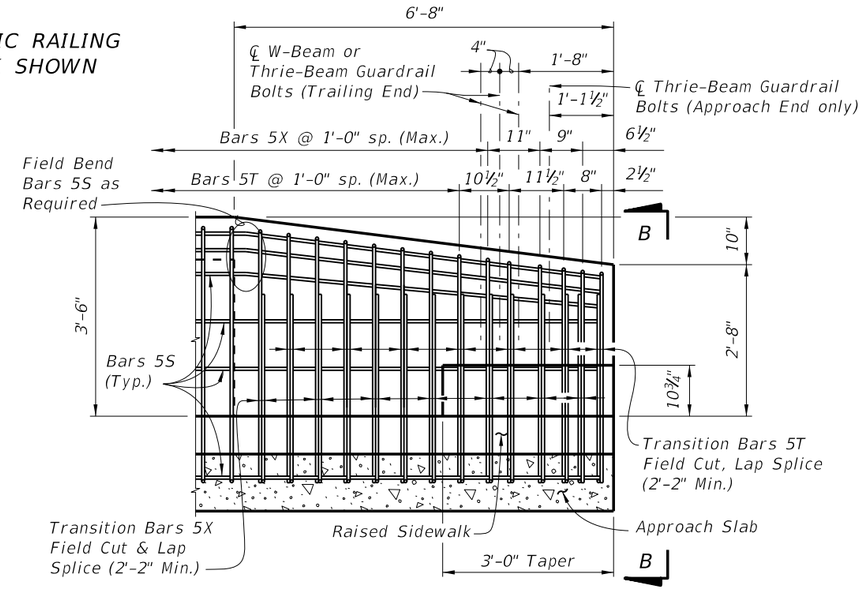


VIEW B-B
(End View of Traffic Railing, Approach Slab shown,
Retaining Wall Junction Slab similar)

NOTES:

Begin placing Railing Bars 5T and 5X on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5T and 5X shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5T and 5X as required to maintain cover in Railing End Transition.

Omit Railing Taper, End Transition and Guardrail if Concrete Barrier Wall is used beyond the Approach Slab or Retaining Wall. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Taper and Railing End Transition is omitted, extend Typical Section to end of the Approach Slab or limiting station on Retaining Wall, and space Bars 5T and 5X at 1'-0" (Typ.)



VIEW C-C
RAILING END TRANSITION
(Guardrail Not Shown For Clarity)

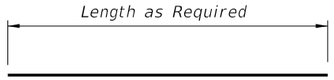
CROSS REFERENCE:
For location of Section A-A, View B-B and View C-C, see Sheet 1.

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/12			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (42" VERTICAL SHAPE)	422	2

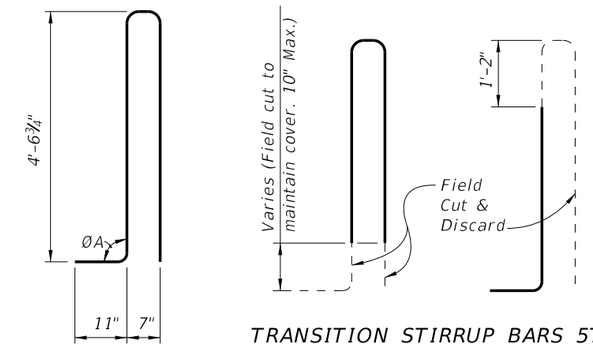
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
S	5	As Reqd.
T	5	10'-8"
X	5	6'-9"

ROADWAY CROSS-SLOPE	ØA	
	LOW GUTTER	HIGH GUTTER
0% to 2%	90°	90°
2% to 6%	87°	83°
6% to 10%	84°	96°



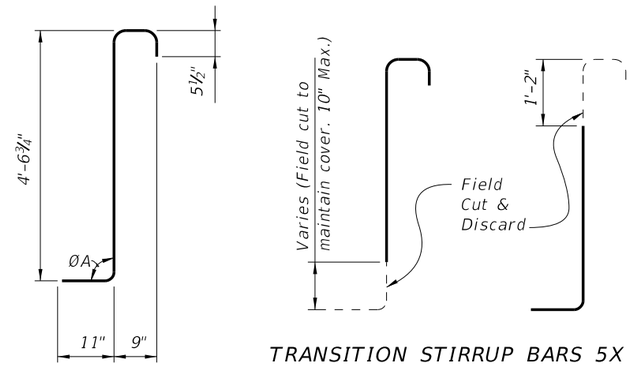
BAR 5S



TRANSITION STIRRUP BARS 5T

To Be Field Cut (7 of each required per Railing End Transition)

STIRRUP BAR 5T



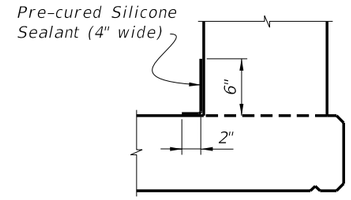
TRANSITION STIRRUP BARS 5X

To Be Field Cut (7 of each required per Railing End Transition)

STIRRUP BAR 5X

REINFORCING STEEL NOTES:

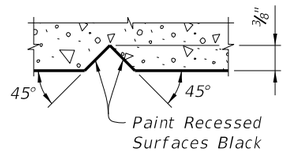
1. All bar dimensions in the bending diagrams are out to out.
2. The 4'-6¾" vertical dimension shown for Bars 5T and 5X is based on a bridge deck with a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and a counter 2% raised sidewalk cross slope. If the raised sidewalk thickness, width or cross slope vary from the above amounts, adjust this dimension accordingly to achieve a 6" minimum embedment into the bridge deck. See Structures Plans, Superstructure and Approach Slab Sheets.
3. The reinforcement for the railing on a retaining wall shall be the same as detailed above with ØA = 90°.
4. All reinforcing steel at the open joints shall have a 2" minimum cover.
5. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-2".
6. The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "A" - SECTION
AT INTERMEDIATE OPEN JOINT

INTERMEDIATE JOINT SEAL NOTES:

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Specification Section 932.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.



SECTION THRU RECESSED "V" GROOVE
TO FORM INSCRIBED LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.145
Reinforcing Steel	LB/LF	30.68

(The above quantities are based on a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and counter 2% sidewalk cross slope)

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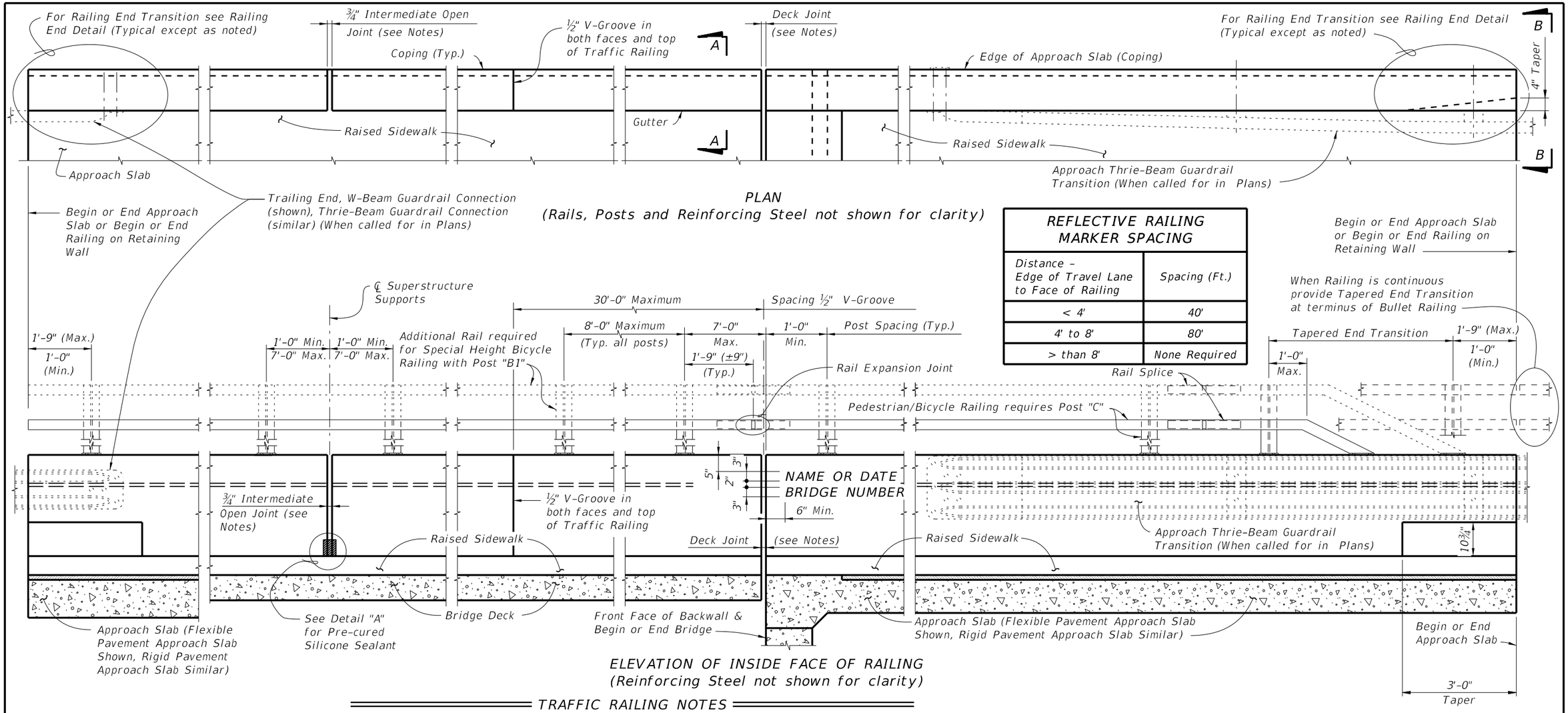
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/11			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (42" VERTICAL SHAPE)	422	3



ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 Ft. one marker shall be placed at each end of the bridge. On bridges 100 Ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing. The Department will determine the vertical Datum information for the marker.

GUARDRAIL : For Guardrail connection details, see Index No. 400.

PEDESTRIAN/BICYCLE RAILING AND SPECIAL HEIGHT BICYCLE RAILING DETAILS : See Index No. 822 for Post, Rail and Rail Expansion Joint fabrication and installation Details and Notes.

V-GROOVES : Construct ½" V-Grooves plumb. Space V-Grooves equally between ¾" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

RAILINGS ON RETAINING WALLS : If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the ¾" open joints and ½" V-Groove shall apply.

NAME, DATE, AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes of the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

OPEN JOINTS : See Structures Plans, Superstructure, Approach Slab Sheets and Retaining Walls for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 420.

Provide ¾" Intermediate Open Joints at :

(1) – Superstructure supports where slab is continuous.

(2) – Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

CROSS REFERENCE:
For Section A-A and View B-B, see Sheet 2.
For Detail "A" see Sheet 3.

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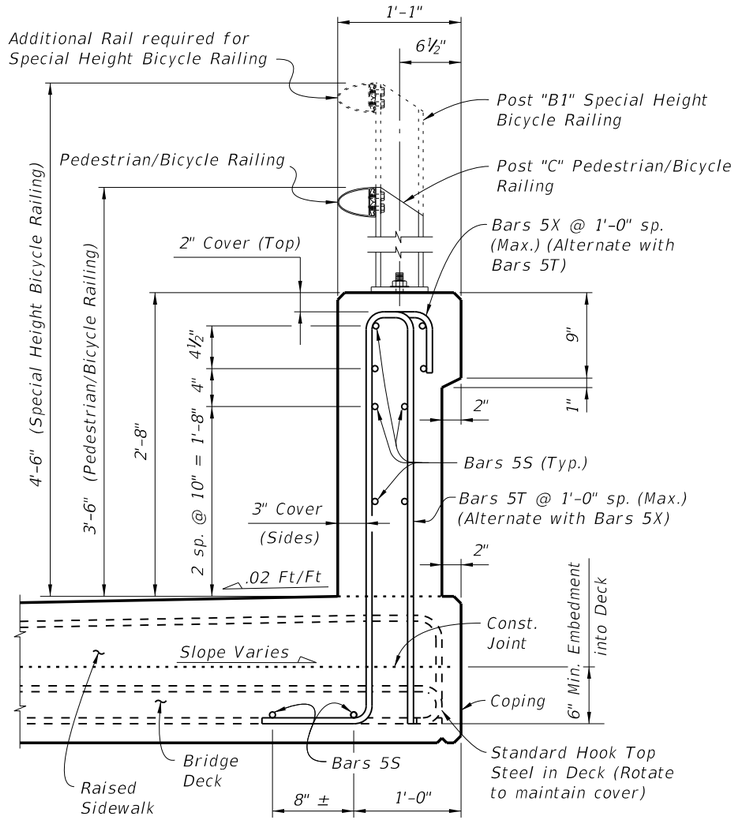
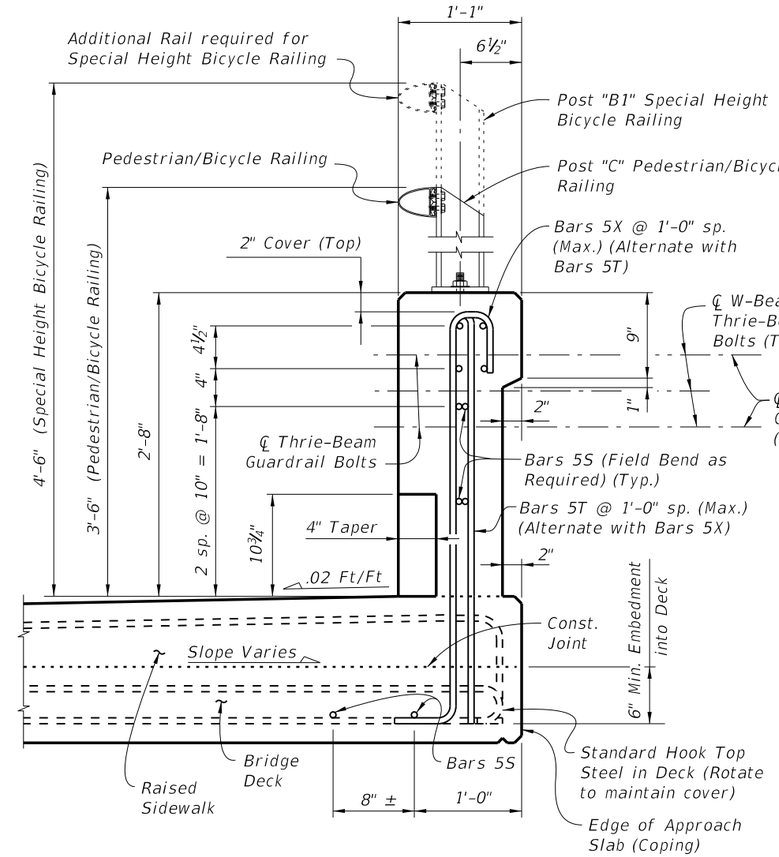
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/12			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (32" VERTICAL SHAPE)	423	1



SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
SECTION THRU BRIDGE DECK SHOWN

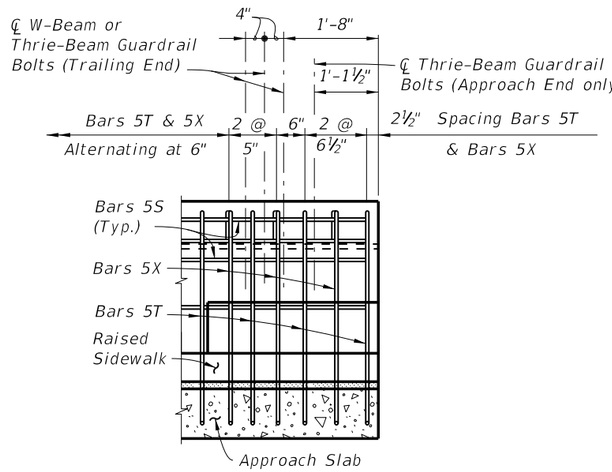


VIEW B-B
APPROACH SLAB END VIEW
OF TRAFFIC RAILING

CROSS REFERENCE:
For location of Section A-A and View B-B see Sheet 1.

NOTE: For Post "B1", Post "C" and Rail Details, see Index No. 822.

NOTES:
Omit Railing End Taper and Guardrail if Concrete Barrier Wall is used beyond the Approach Slab. See Structures Plans, Plan and Elevation Sheet and Roadway Plans. If Railing End Taper is omitted, extend Typical Section to the end of the Approach Slab. Begin placing Railing Bars 5T and 5X on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5T and 5X shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5T and 5X on Approach Slab in end taper section as required to maintain cover.

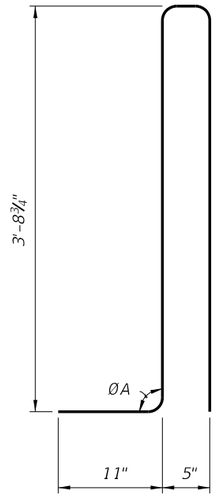


RAILING END DETAIL

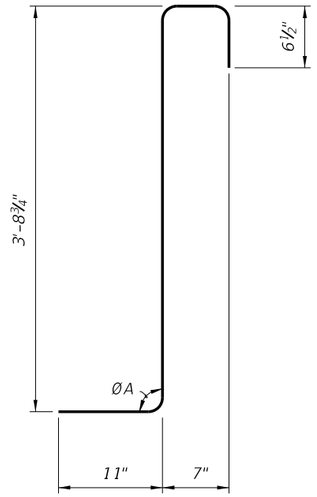
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
S	5	As Reqd.
T	5	9'-0"
X	5	5'-10"

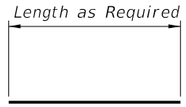
ROADWAY CROSS-SLOPE	ØA	
	LOW GUTTER	HIGH GUTTER
0% to 2%	90°	90°
2% to 6%	87°	93°
6% to 10%	84°	96°



STIRRUP BAR 5T



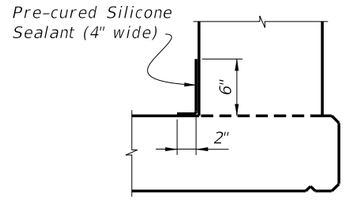
STIRRUP BAR 5X



BAR 5S

REINFORCING STEEL NOTES:

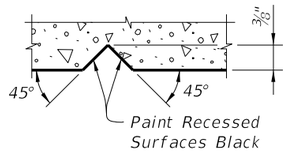
1. All bar dimensions in the bending diagrams are out to out.
2. The 3'-8¾" vertical dimensions shown for Bars 5T and 5X are based on a bridge deck with a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and a counter 2% raised sidewalk cross slope. If the raised sidewalk thickness, width or cross slopes vary from the above amounts, adjust these vertical dimensions accordingly to achieve a 6" minimum embedment into the bridge deck.
3. The reinforcement for the railing on a Retaining Wall shall be the same as detailed with ØA = 90°.
4. All reinforcing steel at the open joints shall have a 2" minimum cover.
5. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-2".
6. The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "A" - SECTION
AT INTERMEDIATE OPEN JOINT

INTERMEDIATE JOINT SEAL NOTES:

1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Specification Section 932.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.



SECTION THRU RECESSED "V" GROOVE
TO FORM INSCRIBED LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.095
Reinforcing Steel	LB/LF	25.90

(The above quantities are based on a 6" thick x 6' wide raised sidewalk at low side of deck, 2% deck cross slope and counter 2% sidewalk cross slope.)

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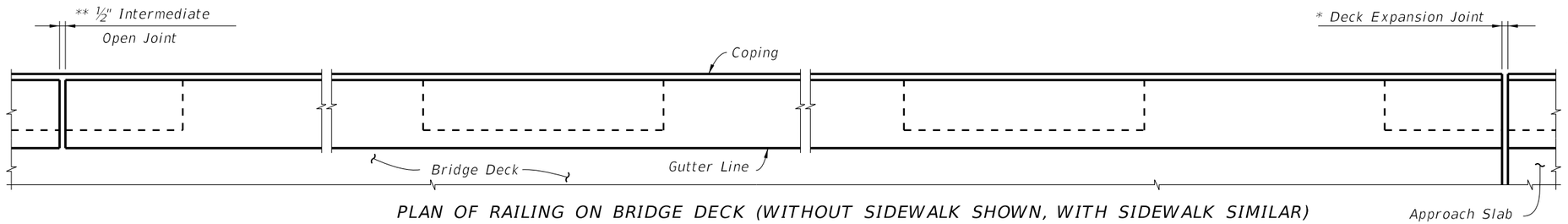
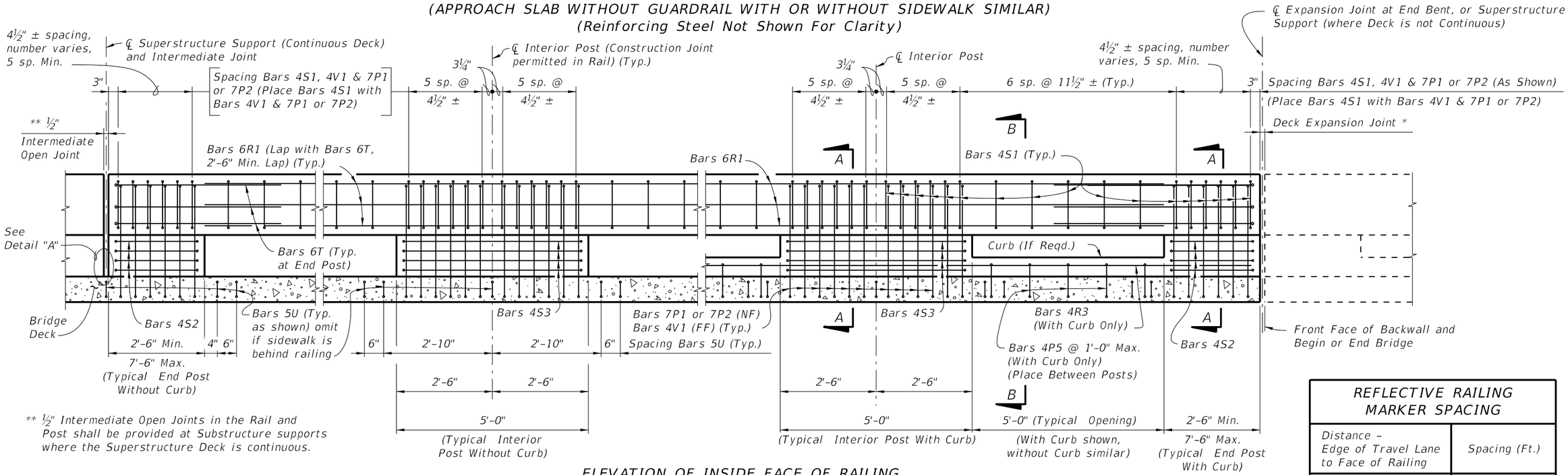


* See Structures Plans Superstructure and Approach Slab Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimension of the Deck Joint. See Sheets 6 and 7 for details at Skewed Deck Joints.

PLAN OF RAILING ON BRIDGE DECK (WITHOUT SIDEWALK SHOWN, WITH SIDEWALK SIMILAR)
(APPROACH SLAB WITHOUT GUARDRAIL WITH OR WITHOUT SIDEWALK SIMILAR)
(Reinforcing Steel Not Shown For Clarity)



** ½" Intermediate Open Joints in the Rail and Post shall be provided at Substructure supports where the Superstructure Deck is continuous.

NOTE:
End Post dimensions for a given span shall match.

ELEVATION OF INSIDE FACE OF RAILING
(BRIDGE DECK SHOWN,
APPROACH SLAB WITHOUT GUARDRAIL OR ADJACENT TO ROADWAY BARRIER SIMILAR)

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans General Notes.
AGGREGATE LIMITATION: The aggregate used in the concrete mix shall be a #67 aggregate.
MARKERS : Elevation markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 Ft. one marker shall be placed at each end of the bridge. On bridges 100 Ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing. The Department will determine the vertical Datum information for the marker.
GUARDRAIL : For Guardrail connection details see Index No. 400.
SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. The cost of all modifications will be at the Contractor's expense.
RETAINING WALL : If the Traffic Railing Barrier is to be provided on a retaining wall, the railing sections will be the same as on Sheets 3 and 4. See Retaining Wall Plans for payment.
NAME, DATE AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be placed on the driver's left side when approaching the bridge. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.
REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

NOTES:
(NF) means Near Face, (FF) means Far Face.

CROSS REFERENCES:
For Sections see Sheets 3 and 4.
For Detail "A" see Sheet 3.
For Quantities and Quantity Breakdown see Sheet 5.

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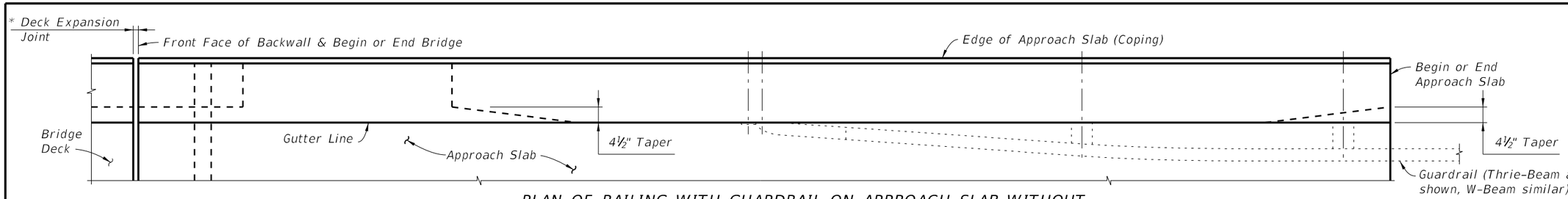
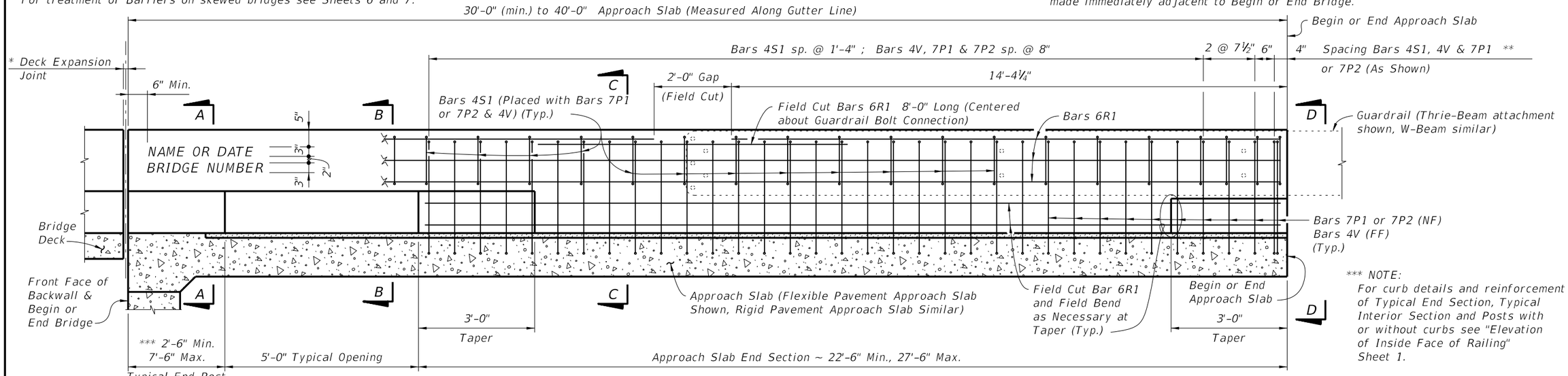
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (CORRAL SHAPE)	INDEX NO.	SHEET NO.
01/01/11						424	1



* See Structures Plans, Superstructure and Approach Slab Sheets for actual dimensions and joint orientation. Open railing Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Barriers on skewed bridges see Sheets 6 and 7.

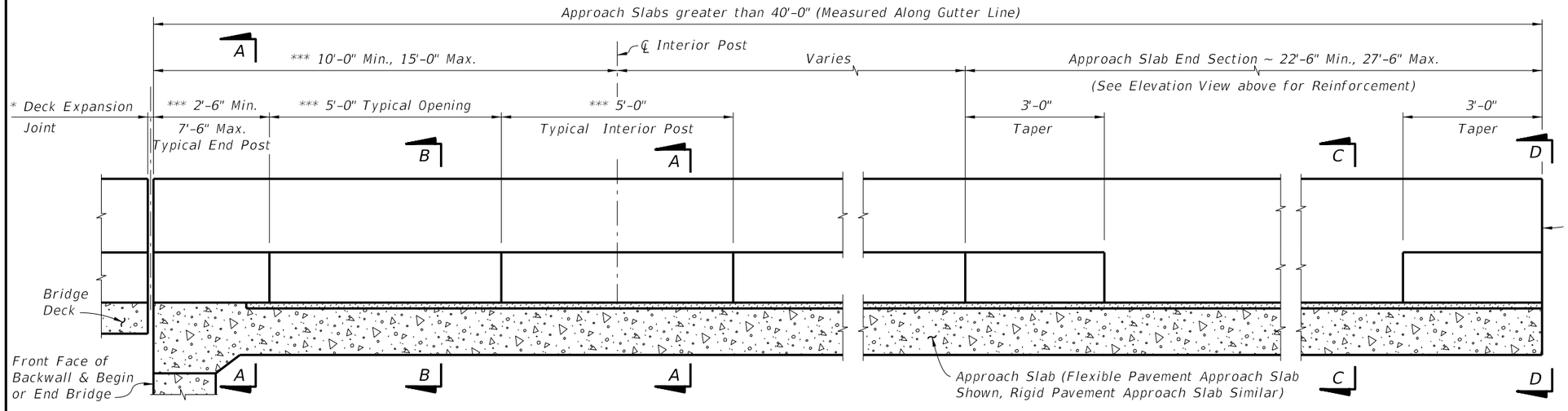
PLAN OF RAILING WITH GUARDRAIL ON APPROACH SLAB WITHOUT SIDEWALK (APPROACH SLAB WITH ADJACENT SIDEWALK SIMILAR) (Reinforcing Steel Not Shown For Clarity)

** Begin placing Railing Bars 7P1 or 7P2 and 4V on Approach Slab at the barrier end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes If required, adjustments to the bar spacing for Bars 7P1 or 7P2 and 4V shall be made immediately adjacent to Begin or End Bridge.

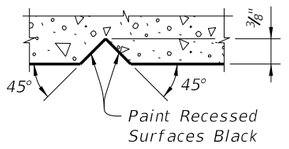


*** NOTE:
For curb details and reinforcement of Typical End Section, Typical Interior Section and Posts with or without curbs see "Elevation of Inside Face of Railing" Sheet 1.

ELEVATION OF INSIDE FACE OF RAILING WITH GUARDRAIL ON APPROACH SLABS 40'-0" OR LESS ALONG GUTTER (WITHOUT CURB SHOWN, WITH CURB SIMILAR)



ELEVATION OF INSIDE FACE OF RAILING WITH GUARDRAIL ON APPROACH SLABS GREATER THAN 40'-0" ALONG GUTTER (WITHOUT CURB SHOWN, WITH CURB SIMILAR)



SECTION THRU RECESSED V-GROOVE TO FORM INSCRIBED LETTERS AND FIGURES

NOTES:
(NF) means Near Face.
(FF) means Far Face.

CROSS REFERENCES:
For Sections see Sheets 3 and 4.
For Quantities and Quantity Breakdown see Sheet 5.

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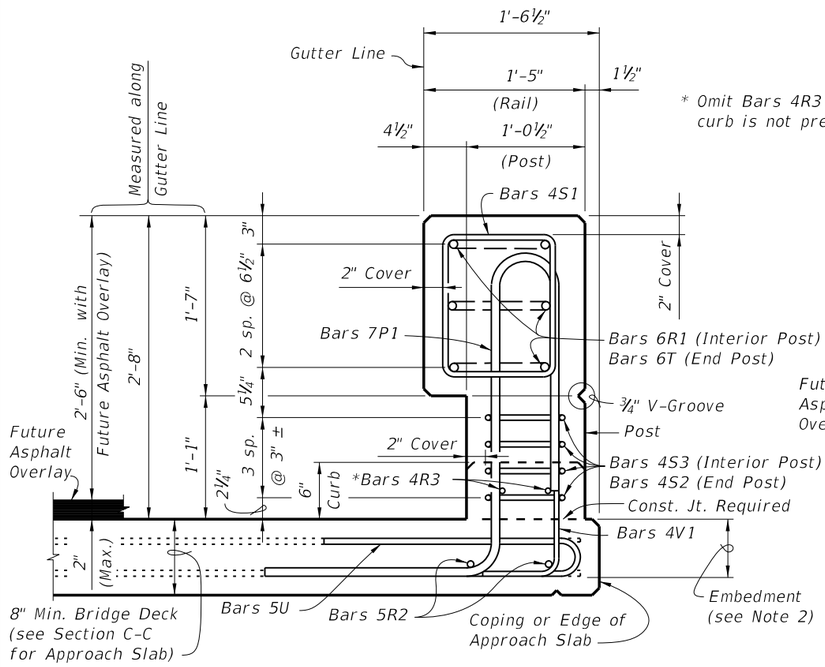
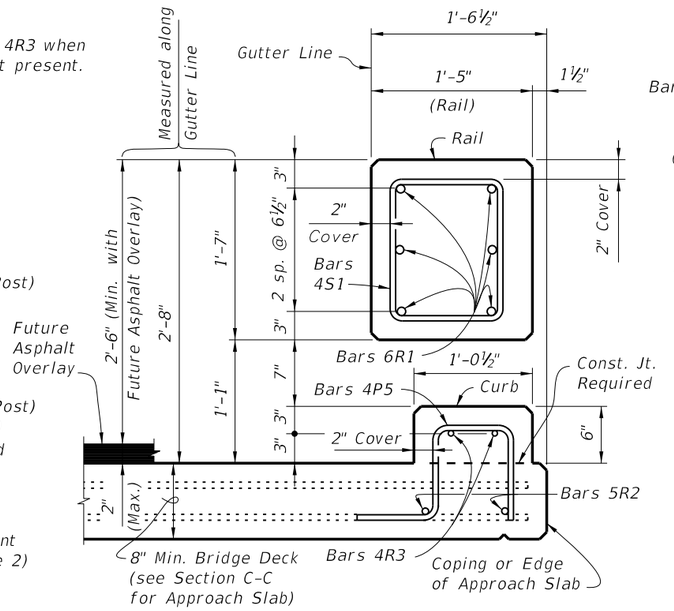
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (CORRAL SHAPE)	INDEX NO.	SHEET NO.
01/01/11						424	2

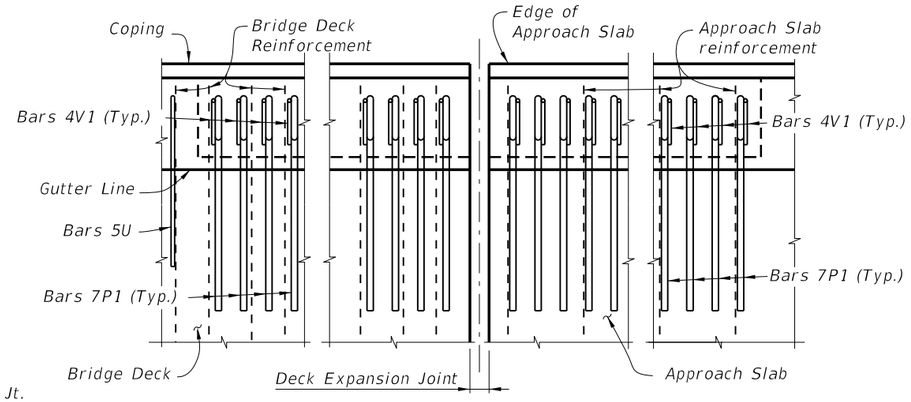


SECTION A-A (WITH CURB SHOWN, WITHOUT CURB SIMILAR)

* Omit Bars 4R3 when curb is not present.



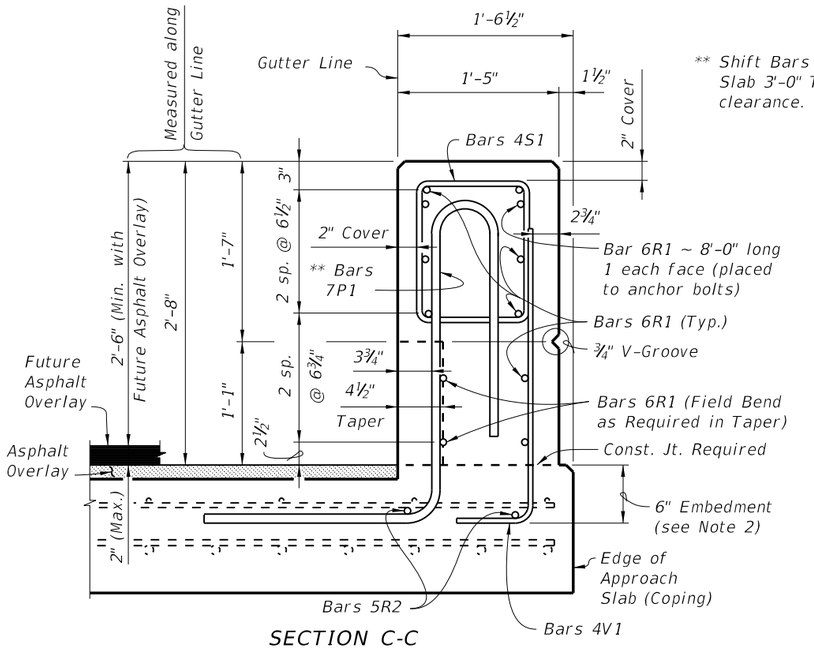
SECTION B-B (WITH CURB SHOWN, WITHOUT CURB SIMILAR)



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB
(END POST SHOWN, INTERIOR POST SIMILAR)
(Bars R, S and T not shown for clarity)

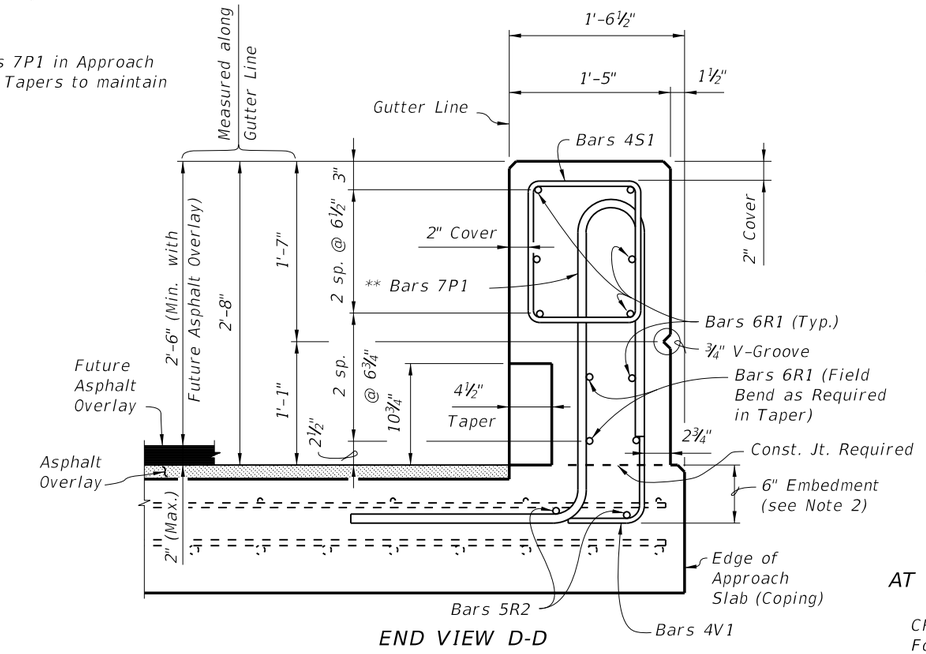
NOTES:
1) Shift deck and approach slab transverse reinforcement minimally to allow placement of Bars 7P & 4V.
2) For decks to 8½" place Bars 7P1 & 4V with the bottom mat of reinforcement as shown in Section A-A. For decks and slabs thicker than 8½" place Bars 7P1 and 4V with 6" embedment. At skewed joints, place Bars 7P3 and 4V with 5" embedment.

TYPICAL SECTIONS THRU RAILING (BRIDGE DECK SHOWN, APPROACH SLAB SIMILAR)

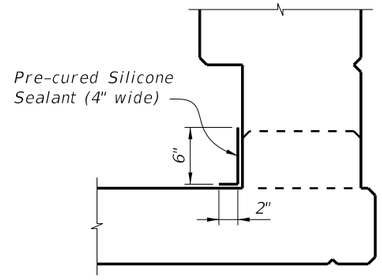


SECTION C-C

** Shift Bars 7P1 in Approach Slab 3'-0" Tapers to maintain clearance.



END VIEW D-D

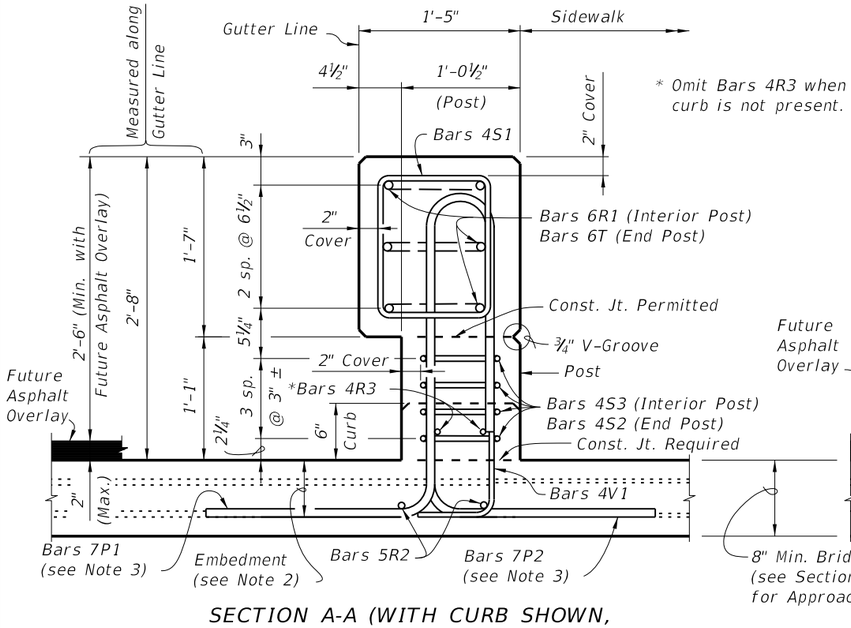


INTERMEDIATE JOINT SEAL NOTES:
1. At Intermediate Open Joints in Curb Sections, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Specification Section 932.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.

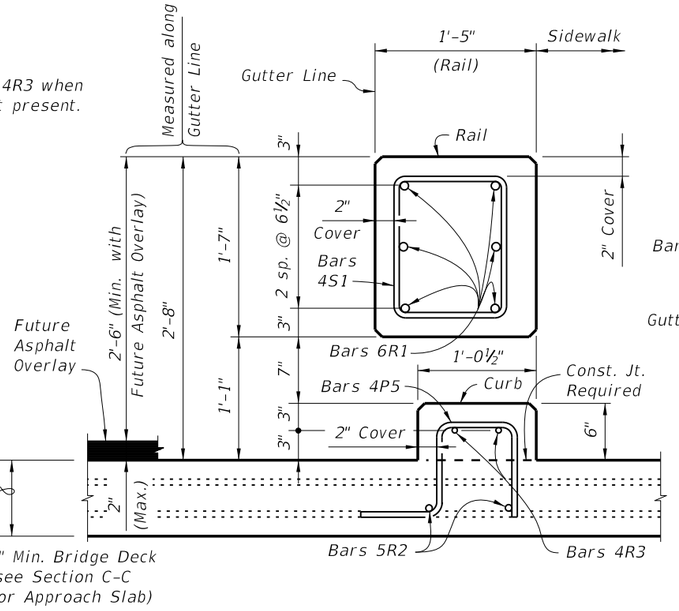
DETAIL "A" - SECTION
AT INTERMEDIATE OPEN JOINT WITH CURB

CROSS REFERENCES:
For Locations of Sections and Detail "A", see Sheets 1 and 2.
For Quantities and Rebar Details see Sheet 5.

TYPICAL SECTIONS THRU RAILING END SECTIONS ON APPROACH SLAB WITH GUARDRAIL
(APPROACH SLAB (FLEXIBLE PAVEMENT APPROACHES) SHOWN, APPROACH SLAB (RIGID PAVEMENT APPROACHES) SIMILAR)

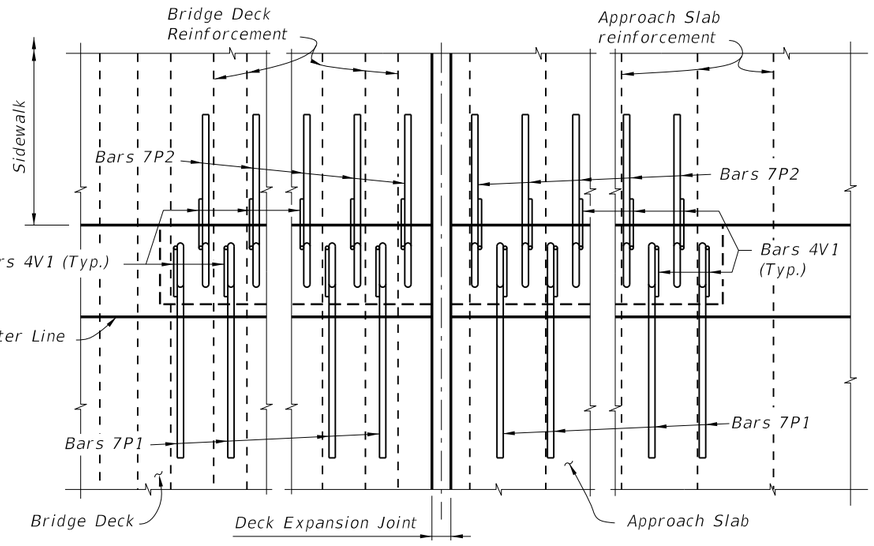


SECTION A-A (WITH CURB SHOWN, WITHOUT CURB SIMILAR)



SECTION B-B

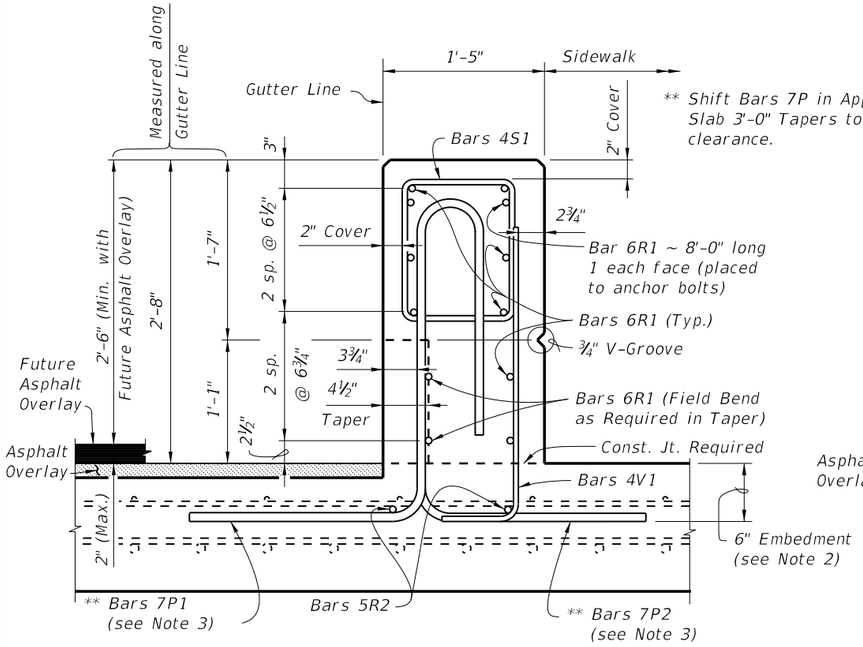
TYPICAL SECTIONS THRU RAILING ON BRIDGE DECK WITH SIDEWALK (SHOWN)
(RAILING ON APPROACH SLAB SIMILAR)



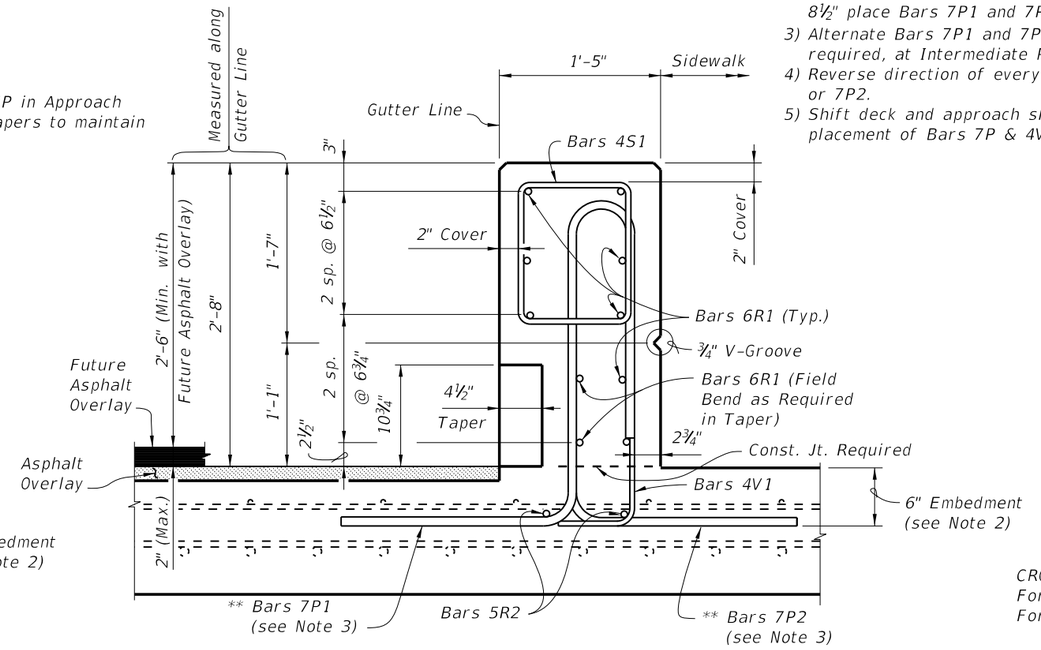
PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK
(Bars R, S and T not shown for clarity)

RAILING ADJACENT TO SIDEWALK NOTES:

1) End Post detailed above, Interior Post and Approach Slab End Section similar.
2) For decks to 8½" place Bars 7P1 and 7P2 and 4V with the bottom mat of reinforcement as shown in Section A-A. For decks and slabs thicker than 8½" place Bars 7P1 and 7P2 and 4V with 6" embedment.
3) Alternate Bars 7P1 and 7P2 at each post. At End Posts 3 each (Min.) required, at Intermediate Post 6 each required.
4) Reverse direction of every other Bar 4V1 to match direction of Bars 7P1 or 7P2.
5) Shift deck and approach slab transverse reinforcement minimally to allow placement of Bars 7P & 4V.



SECTION C-C



END VIEW D-D

TYPICAL SECTIONS THRU RAILING END SECTION ON APPROACH SLAB WITH SIDEWALK AND GUARDRAIL
(APPROACH SLAB (FLEXIBLE PAVEMENT APPROACHES) SHOWN, APPROACH SLAB (RIGID PAVEMENT APPROACHES) SIMILAR)

CROSS REFERENCES:
For Locations of Sections see Sheets 1 and 2.
For Quantities and Rebar Details see Sheet 5.

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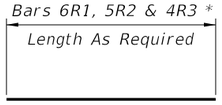
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

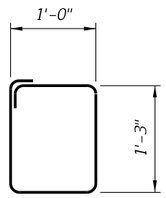
BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH	LB/BAR
P1	7	7'-4"	15.00
P2	7	7'-3"	14.82
P3	7	7'-2"	14.65
*** P4	7	7'-3"	14.82
* P5	4	2'-11"	1.94
R1	6	As Reqd.	1.5 (LB/LF)
R2	5	As Reqd.	1.04 (LB/LF)
* R3	4	As Reqd.	0.67 (LB/LF)
** S1	4	5'-0"	3.34
** S2	4	Varies 6'-3" Min. 16'-3" Max.	Varies 4.18 Min. 10.86 Max.
** S3	4	11'-3"	7.52
T	6	11'-4"	17.02
U	5	4'-8"	4.87
V1	4	3'-2"	2.12
*** V2	4	3'-6"	2.34

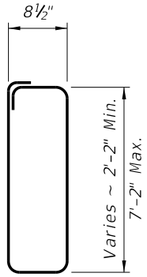
* Bars 4P5 and 4R3 are to be used with a curb only.
** Bend Bars 4S1, 4S2 & 4S3 around a #3 Stirrup Pin.
*** Bars 7P4 & 4V2 are to be used on C-I-P Concrete Retaining Walls.



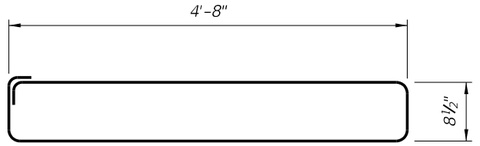
Bars 6R1, 5R2 & 4R3



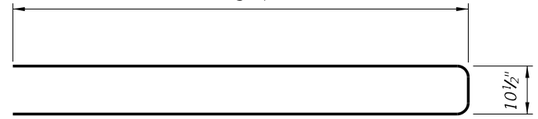
Stirrup Bar 4S1



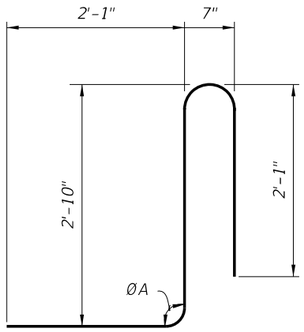
Stirrup Bar 4S2



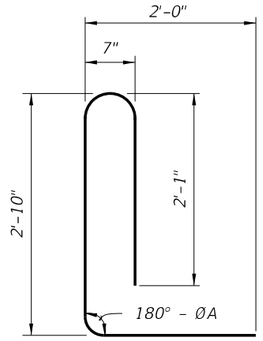
Stirrup Bar 4S3



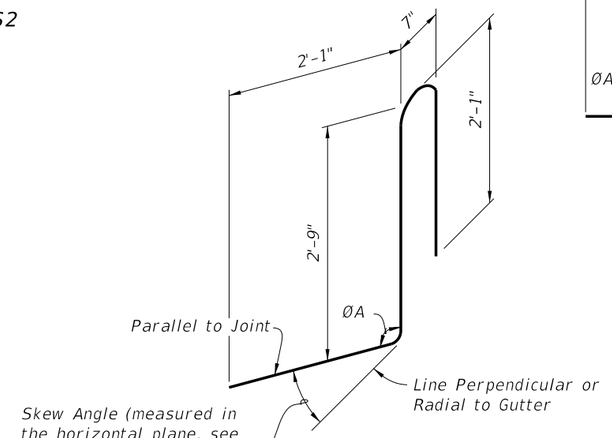
Stirrup Bar 6T



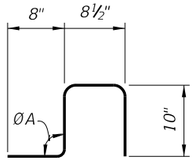
Bar 7P1



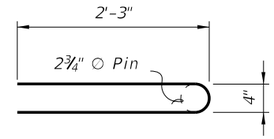
Bar 7P2



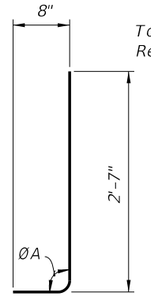
Bar 7P3 (Requires 3 Dimensional Bend)



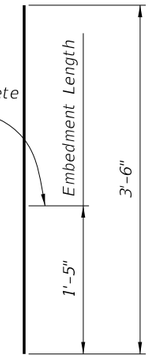
Bar 4P5 *



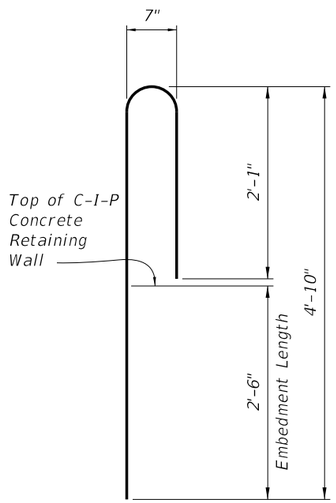
Stirrup Bar 5U



Bar 4V1



Bar 4V2 ***



Bar 7P4 ***

REINFORCING STEEL NOTES:

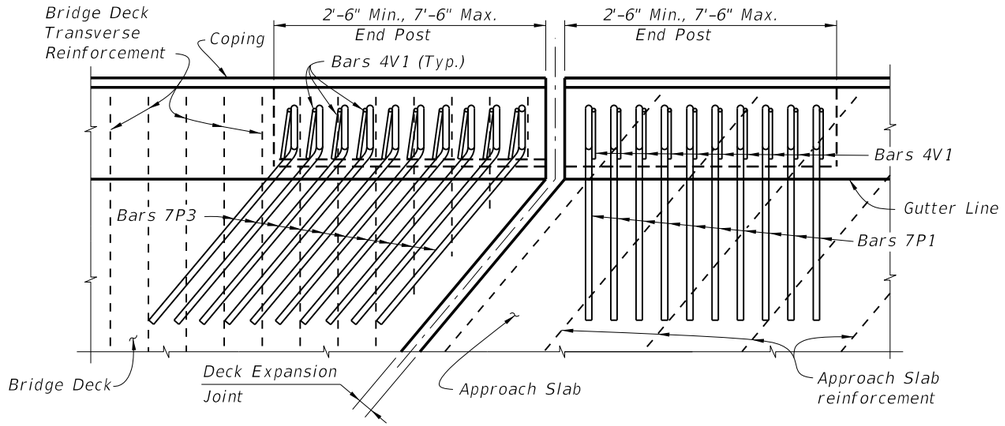
1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the railing on a C-I-P Concrete Retaining Wall shall be the same as detailed above for a 8" deck with ØA = 90°, where applicable. If bottom horizontal legs of Bars 7P1, 7P3 and 4V1 prohibit placement, Bars 7P4 and 4V2 may be substituted for Bars 7P1, 7P3 and 4V1 as shown.
3. All reinforcing steel at the open joints shall have a 2" minimum cover unless otherwise noted.
4. At Construction Joints Bars 6R1, 5R2 and 4R3 may be continuous or spliced. Where bars are spliced provide a 2'-6" Min. lap length for Bar 6R1, a 2'-0" Min. lap length for Bars 5R2 and a 1'-3" Min. lap length for Bars 4R3.
5. The skew angle for Bars 7P3 may vary from joint to joint and side to side, see Structures Plans, Superstructure Sheets for details.

ROADWAY OR SIDEWALK CROSS-SLOPE	HIGH SIDE ØA	LOW SIDE ØA
0% to 2%	90°	90°
2% to 6%	93°	87°
6% to 10%	96°	84°

ØA shall be 90° if Contractor elects to place Railing Perpendicular to the Deck.

ESTIMATED TRAFFIC RAILING QUANTITIES

ITEM	CONCRETE QUANTITY (CY)	REBAR QUANTITY (LB)
Typical 10'-0" Section w/Curb	1.13	451
Typical 10'-0" Section w/o Curb	1.03	428
Approach Slab with Guardrail End Section	0.14 (per LF)	44 (per LF)



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB - SKEW ANGLE GREATER THAN 15 DEGREES

NOTES:

1) Railing expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure and Approach Slab Sheets for details.

2) Bars 4S1 (not shown) shall be placed perpendicular or radial to the gutter.

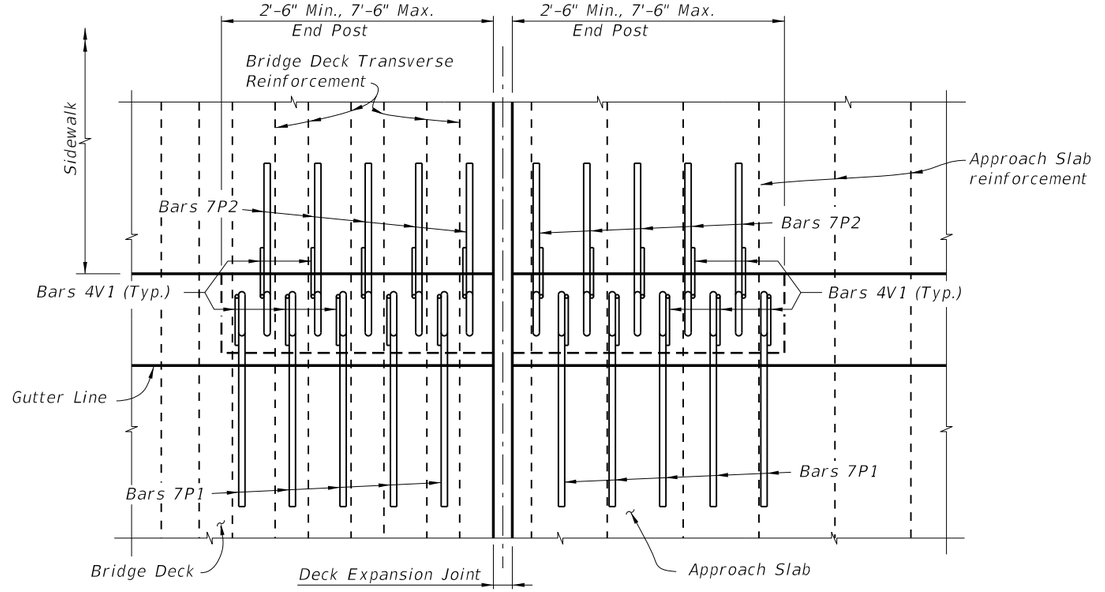
BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (SHOWN):

3) End Post & Approach Slab End Section – Place Bars 7P1 & 4V1 in obtuse corners of intersection of deck joint and gutter line. Place Bars 7P3 & 4V1 in acute corners of intersection of deck joint and gutter line as required. Interior Post – use Bars 7P1 and 4V1 placed with bottom mat of reinforcement. Shift deck or slab reinforcement minimally to allow proper placement of Bars 7P and 4V and to facilitate placement of concrete.

APPROACH SLAB WITH GUARDRAIL ATTACHED (NOT SHOWN):

4) Place Bars 7P1 & 4V1 in obtuse corners of intersection of deck joint and gutter line and Bars 7P3 & 4V1 in acute corners of intersection of deck joint and gutter line as required. Shift deck or slab reinforcement minimally to allow proper placement of Bars 7P & 4V and to facilitate placement of concrete.

5) Begin placing Railing Bars 7P & 4V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 7P & 4V shall be made immediately adjacent to Begin or End Bridge.

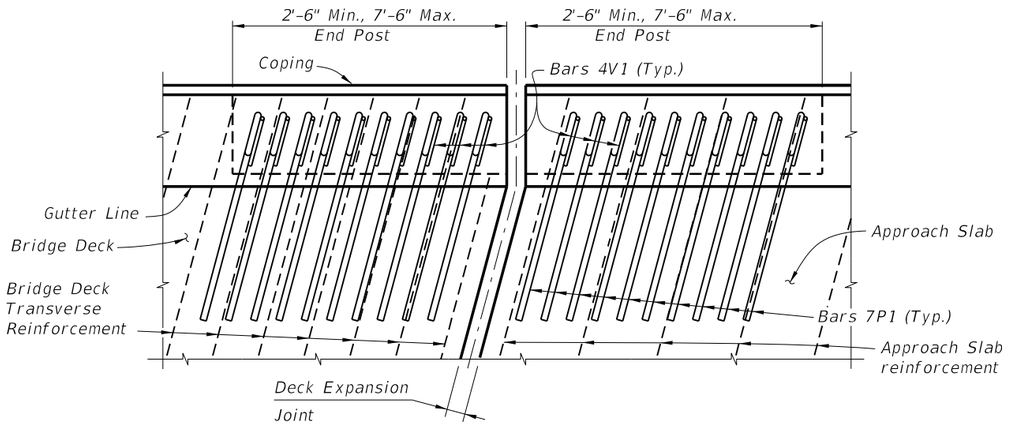


PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK - 0 DEGREE SKEW ANGLE

NOTES:

1) Alternate Bars 7P1 with Bars 7P2 and reverse direction of every other Bar 4V1 as detailed above to facilitate placement of concrete.

2) Shift deck transverse reinforcement minimally to allow placement of Bars 7P & 4V.



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB - SKEW ANGLE 15 DEGREES OR LESS

NOTES:

1) Railing expansion joint shall match the deck expansion joint which shall be turned perpendicular or radial to the gutter line. See Structures Plans, Superstructure and Approach Slab Sheets for details.

2) Bars 4S1 (not shown) shall be placed perpendicular or radial to the gutter.

3) Bars 7P & 4V in the Approach Slab may be rotated to match Approach Slab reinforcement or placed perpendicular or radial to the gutter line.

BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (SHOWN):

4) Rotate vertical Bars 7P & 4V to match bridge deck reinforcement. Shift deck & slab transverse reinforcement to allow proper placement of Bars 7P & 4V and to facilitate placement of concrete.

APPROACH SLAB WITH GUARDRAIL ATTACHED (NOT SHOWN):

5) Begin placing Railing Bars 7P & 4V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 7P & 4V shall be made immediately adjacent to Begin or End Bridge.

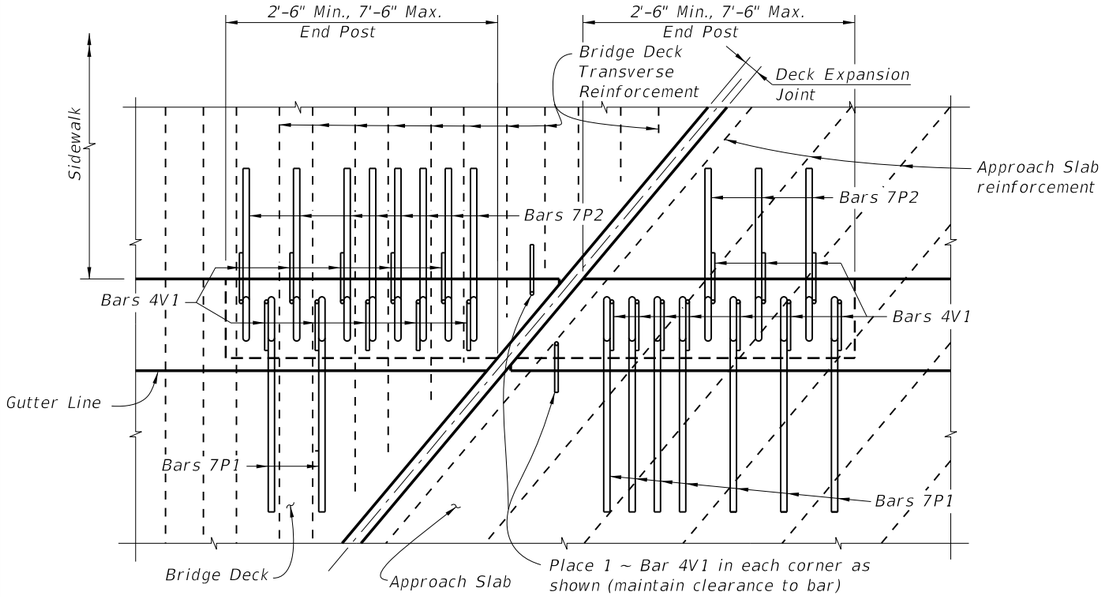
6) Bars 7P at end of the railing shall be field cut and shifted to maintain clearance, see Railing End Taper Detail Sheet 2 for similar details.

GENERAL NOTES:

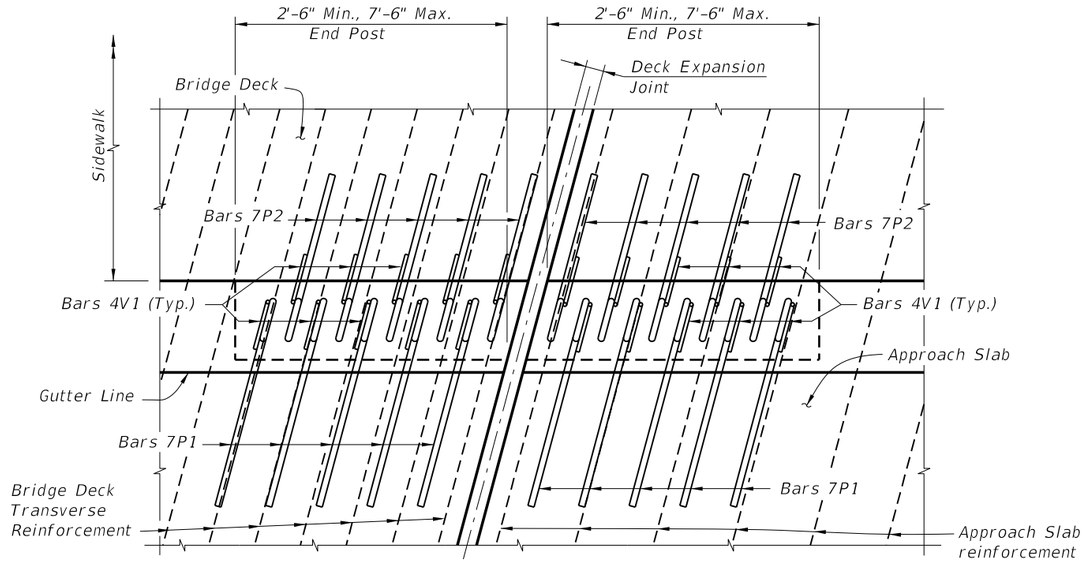
1) Deck Expansion Joint at begin or end bridge shown. Deck Expansion Joints at ℄ Pier or Intermediate Bents are similar.

2) Partial Plan Views shown are intended as guides only. See Structures Plans, Superstructure and Approach Slab Sheets for skew angles, joint orientation, dimensions and details.

LAST REVISION	REVISION	DESCRIPTION:				
07/01/05			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (CORRAL SHAPE)	INDEX NO. 424	SHEET NO. 6



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK - SKEW ANGLE GREATER THAN 15 DEGREES



PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK - SKEW ANGLE 15 DEGREES OR LESS

NOTES:

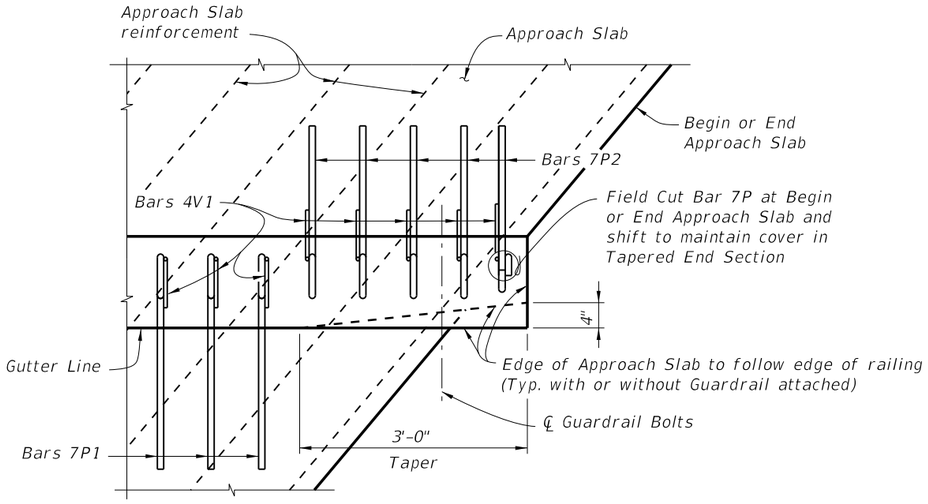
1) Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. Expansion joint at the inside face of parapet shall be turned perpendicular or radial to this line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
2) Bars 4S1 (not shown) shall be placed perpendicular or radial to the gutter.
3) Edge of Approach Slab adjacent to the roadway shall follow end of railing, Bars 7P at end of the railing shall be field cut and shifted to maintain clearance, see detail bottom left this sheet for similar details.

BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (SHOWN):

4) Alternate Bars 7P1 with Bars 7P2 and reverse direction of every other Bar 4V1 to facilitate placement of concrete.
5) Bars 7P & 4V shall be rotated to match bridge deck reinforcement. Shift deck transverse reinforcement minimally to allow placement of Bars 7P & 4V.
6) Railing End Post and reinforcement detailed above. Railing Interior Post reinforcement similar.

APPROACH SLAB WITH GUARDRAIL ATTACHED (NOT SHOWN):

7) Begin placing Railing Bars 7P & 4V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 7P & 4V shall be made immediately adjacent to Begin or End Bridge.



PARTIAL PLAN VIEW AT BEGIN OR END APPROACH SLAB WITH SIDEWALK AND RAILING WITH GUARDRAIL ATTACHED - SKEW ANGLE GREATER THAN 15 DEGREES SHOWN, 15 DEGREES OR LESS SIMILAR

NOTES:

1) Railing ends at deck expansion joints shall follow the deck joint with allowance for joint movement. Expansion joint at the inside face of parapet shall be turned perpendicular or radial to this line. See Structures Plans, Superstructure and Approach Slab Sheets for details.
2) Bars 4S1 (not shown) shall be placed perpendicular or radial to the gutter.

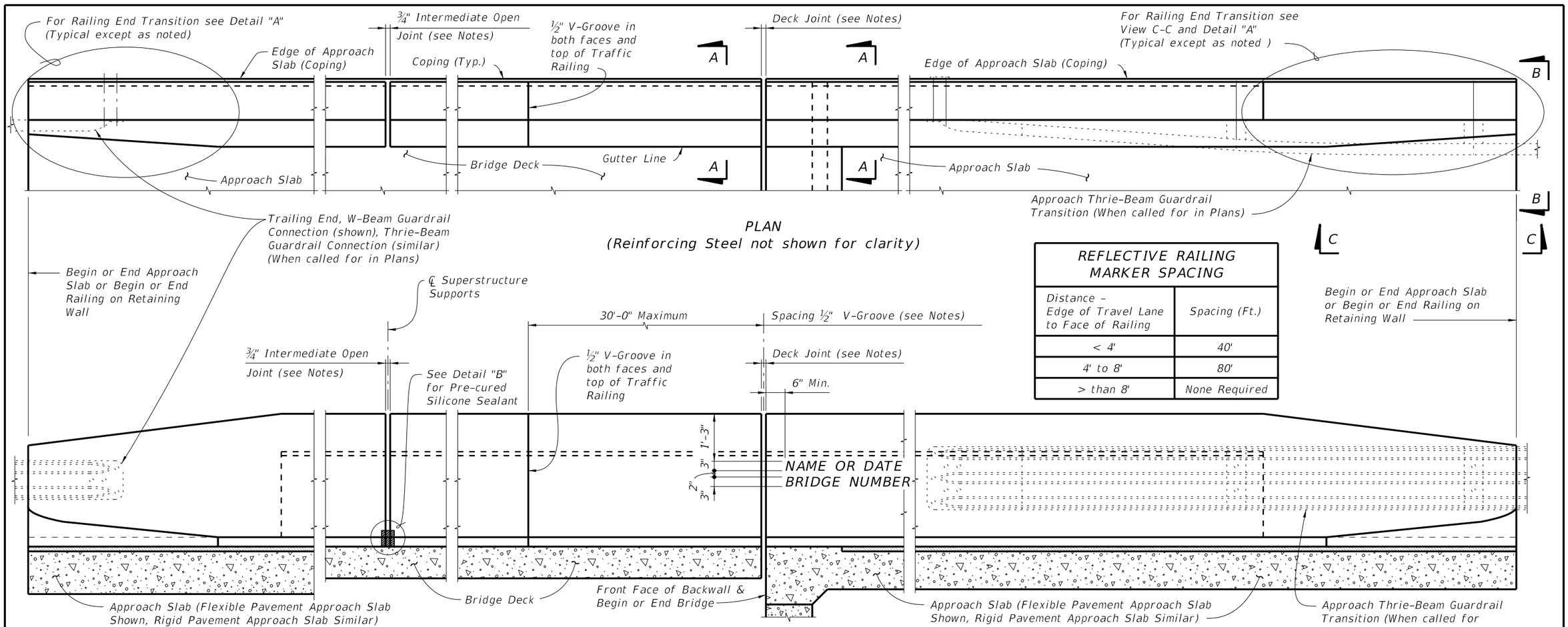
BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (NOT SHOWN):

3) Deck transverse reinforcement may be shifted minimally as required to allow proper placement of Bars 7P & 4V and to facilitate placement of concrete. Bars 7P1 & 4V1 or 7P2 & 4V1 shall be used on opposing sides of the joint depending on the direction of the skew, see Detail above. Approach Slab reinforcement may be shifted if conflicts occur.
4) Interior Post – alternate Bars 7P1 with Bars 7P2 and reverse direction of every other Bar 4V1 to facilitate placement of concrete.
5) End Post – alternate Bars 7P1 with Bars 7P2 and reverse direction of Bars 4V1 (as detailed) where possible.

APPROACH SLAB WITH GUARDRAIL ATTACHED (SHOWN):

6) Use Bars 7P2 and reverse direction of Bars 4V1 where skew restricts use of Bars 7P1 & 4P1.
7) Begin placing Railing Bars 7P & 4V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 7P & 4V shall be made immediately adjacent to Begin or End Bridge.

LAST REVISION	REVISION	DESCRIPTION:				
07/01/05			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (CORRAL SHAPE)	INDEX NO. 424	SHEET NO. 7



PLAN
(Reinforcing Steel not shown for clarity)

REFLECTIVE RAILING MARKER SPACING	
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

ELEVATION OF INSIDE FACE OF RAILING
(Reinforcing Steel not shown for clarity)
(Railing on Bridge Deck and Approach Slab shown, Railing on Retaining Wall Similar)

CROSS REFERENCE:
For Section A-A, End View B-B and Detail "A" see Sheet 2.
For Detail "B" see Sheet 3.

TRAFFIC RAILING NOTES

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-5 Criteria.

CONCRETE AND REINFORCING STEEL : See Structures Plans, General Notes.

MARKERS : Elevation Markers shall be placed on top of the Traffic Railing Railing at the end bents. On bridges longer than 100 Ft. one marker shall be placed at each end of the bridge. On bridges 100 Ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing. The Department will determine the vertical Datum information for the marker.

SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. If an adjoining railing is constructed plumb, transition the end of the Traffic Railing from perpendicular to plumb over a minimum distance of 20'-0". The cost of all modifications will be at the Contractor's expense.

GUARDRAIL : For Guardrail connection details, see Index No. 400.

RAILINGS ON RETAINING WALLS : If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the ¾" open joints and ½" V-groove shall apply.

V-GROOVES : Construct ½" V-Grooves plumb. Space V-Grooves equally between ¾" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

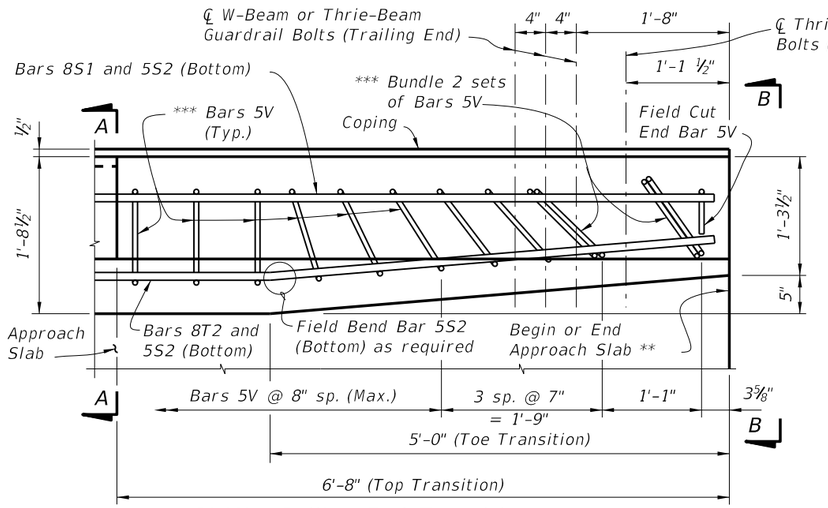
NAME, DATE, AND BRIDGE NUMBER : The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

JOINTS : See Structures Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 420.

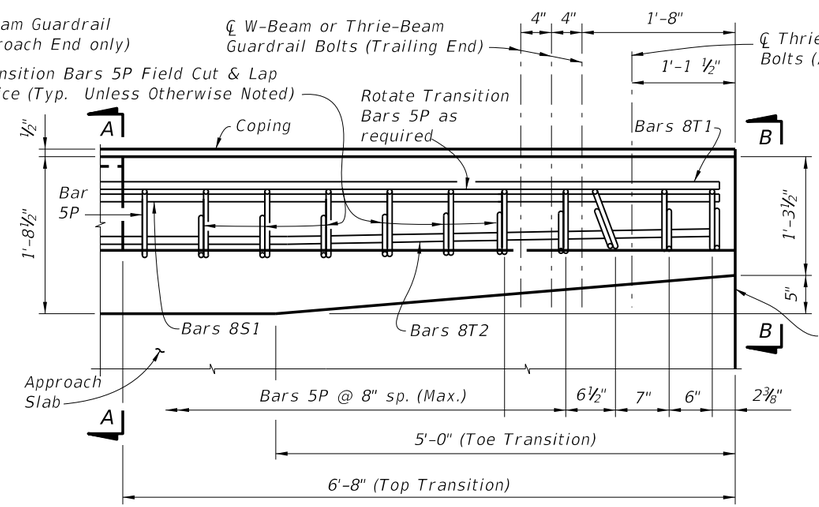
Provide ¾" Intermediate Open Joints shall be provided at :
(1) – Superstructure supports where slab is continuous.
(2) – Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing

LAST REVISION	REVISION	DESCRIPTION:				
01/01/11			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (42" F SHAPE)	INDEX NO. 425	SHEET NO. 1



PLAN - Railing End Transition
(Showing Bars 5V, 8S1, 5S2 and 8T2)



PLAN - Railing End Transition
(Showing Transition Bars 5P and Bars 8S1, 8T1 & 8T2)

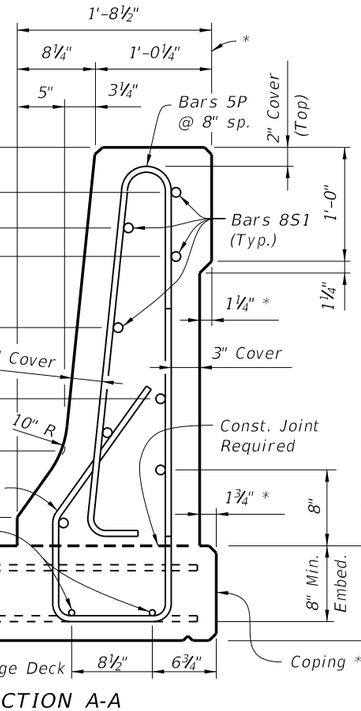
NOTE:
Begin placing Railing Bars 5P and 5V on Approach Slab at the railing end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 5P and 5V shall be made immediately adjacent to Begin or End Bridge. Shift and rotate Bars 5P and 5V (see Detail "A") as required to maintain cover in Railing End Transition.

* Where railings of adjacent bridges are to be built back to back, the outside vertical plane of the railing and deck may coincide along a plane centered 1'-8½" from each gutter line. A bond breaker will be required. See Structures Plans, Superstructure Sheets for Details.

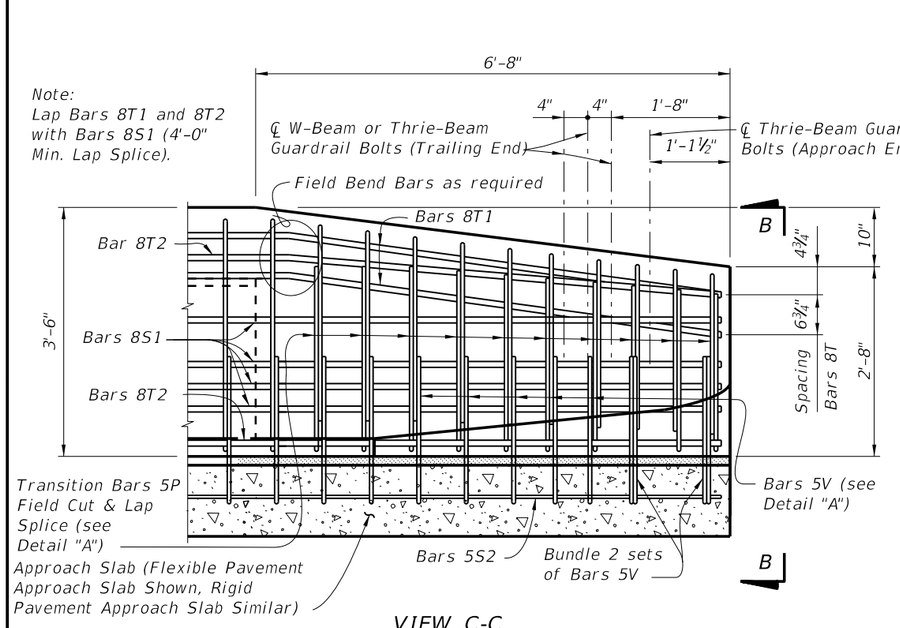
** See joint orientation note on Sheet 1.

*** Rotate Bars 5V as shown to maintain clearance.

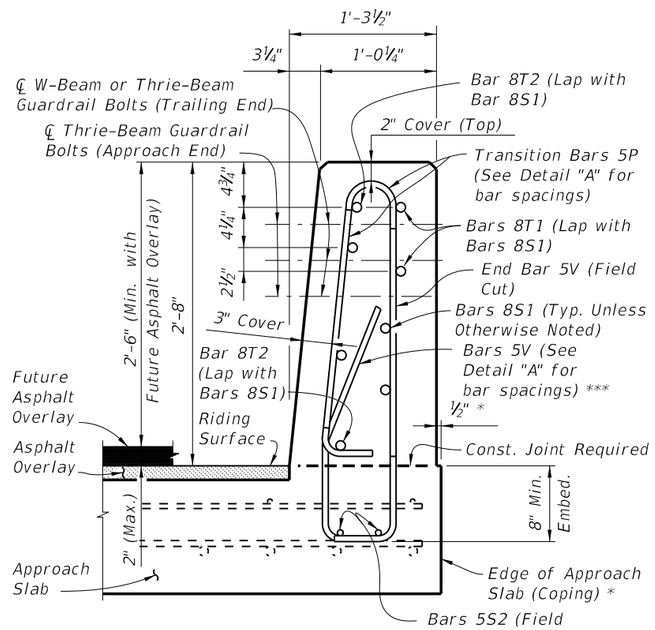
DETAIL "A"



SECTION A-A
TYPICAL SECTION THRU TRAFFIC RAILING
(SECTION THRU BRIDGE DECK SHOWN - SECTION THRU APPROACH SLAB SIMILAR)



VIEW C-C
ELEVATION - RAILING END TRANSITION
(Guardrail and back leg of Stirrups not shown for clarity)



VIEW B-B
(Section thru Approach Slab shown, Section thru Retaining Walls similar)

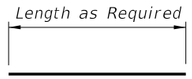
LAST REVISION	REVISION	DESCRIPTION:	FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (42" F SHAPE)	INDEX NO.	SHEET NO.
01/01/11					425	2

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

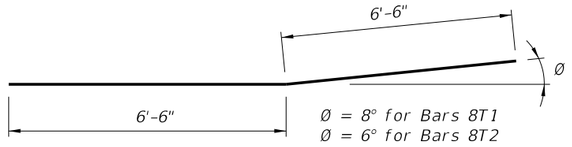
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
P	5	7'-5"
S1	8	As Reqd.
S2	5	As Reqd.
T1 & T2	8	13'-0"
V	5	6'-2"

ROADWAY CROSS-SLOPE	LOW GUTTER		HIGH GUTTER	
	ØA	ØB	ØA	ØB
0% to 2%	90°	90°	90°	90°
2% to 6%	93°	87°	87°	93°
6% to 10%	96°	84°	84°	96°

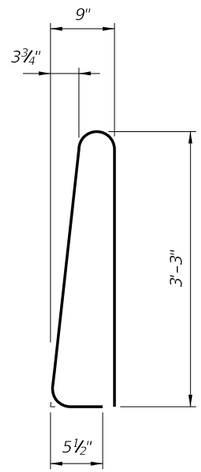
ØA and ØB shall be 90° if Contractor elects to place Railing perpendicular to the Deck.



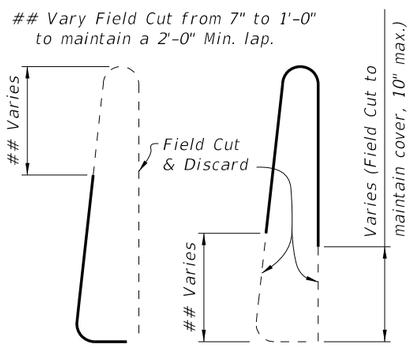
BARS 8S1 & 5S2



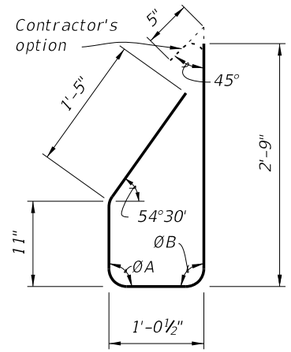
TRANSITION BARS 8T1 & 8T2
(2 of each required per Railing End Transition)



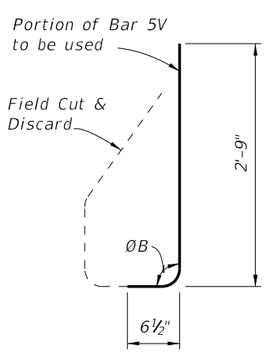
STIRRUP BAR 5P



TRANSITION STIRRUP BARS 5P
To Be Field Cut (10 of each required per Railing End Transition)

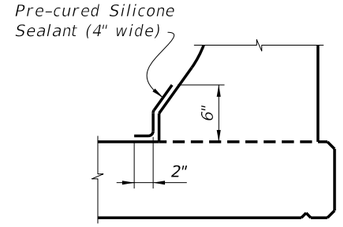


STIRRUP BAR 5V



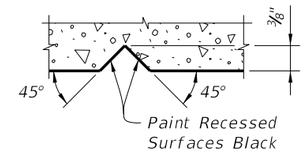
END STIRRUP BAR 5V
To Be Field Cut
(One required per Railing End Transition)

REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the railing on a retaining wall shall be the same as detailed above for a 10" deck with ØA = ØB = 90°.
3. All reinforcing steel at the open joints shall have a 2" minimum cover.
4. Bars 8S1 may be continuous or spliced at the construction joints. Lap splices for Bars 8S1 and 5S2 shall be a minimum of 4'-0" and 2'-0", respectively.
5. The Contractor may utilize Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement shall conform to ASTM A497.



DETAIL "B" - SECTION
AT INTERMEDIATE OPEN JOINT

INTERMEDIATE JOINT SEAL NOTES:
1. At Intermediate Open Joints, seal the lower 6" portion of the open joint with Pre-cured Silicone Sealant in accordance with Specification Section 932.
2. Apply sealant prior to any Class V finish coating and remove all curing compound and loose material from the surface prior to application of bonding agent.
3. The cost of the Pre-cured Silicone Sealant shall be included in the Contract Unit Price for the Traffic Railing.



SECTION THRU RECESSED
"V" GROOVE TO FORM INSCRIBED
LETTERS AND FIGURES

ESTIMATED TRAFFIC RAILING QUANTITIES		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.154
Reinforcing Steel	LB/LF	44.71

Note:
The estimated railing quantities are based on a 2% deck cross slope; railing on low side of deck.

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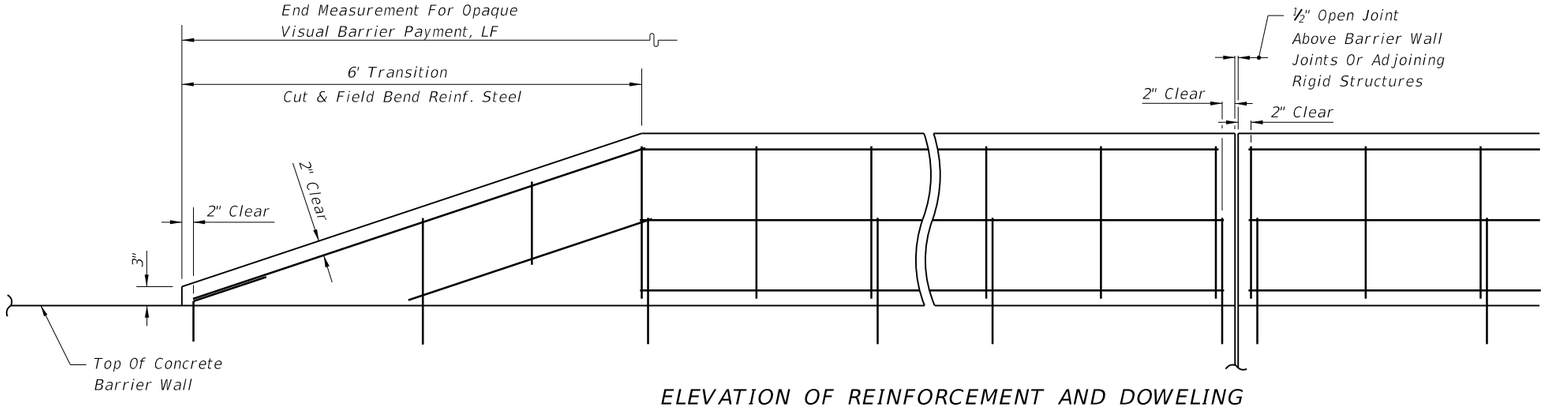
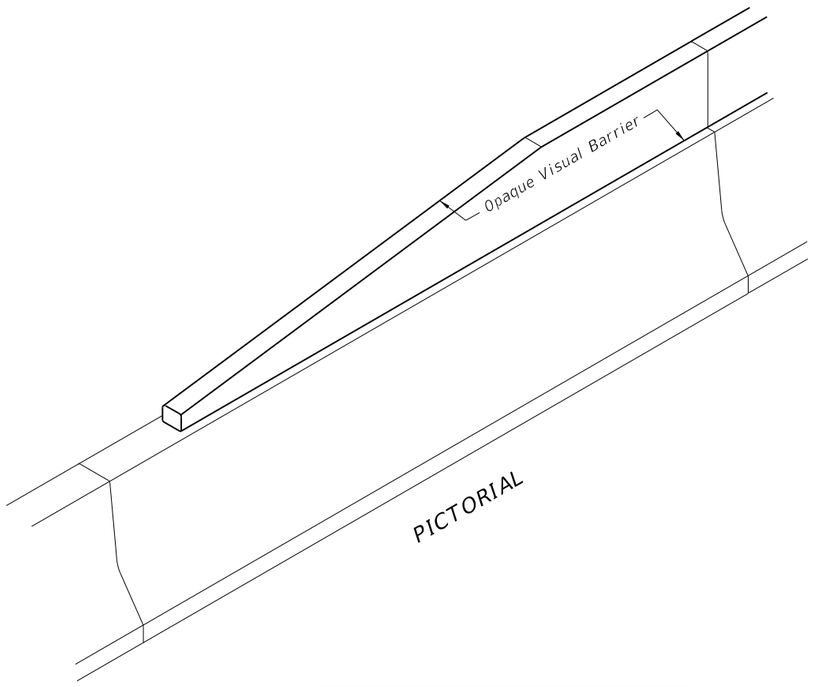
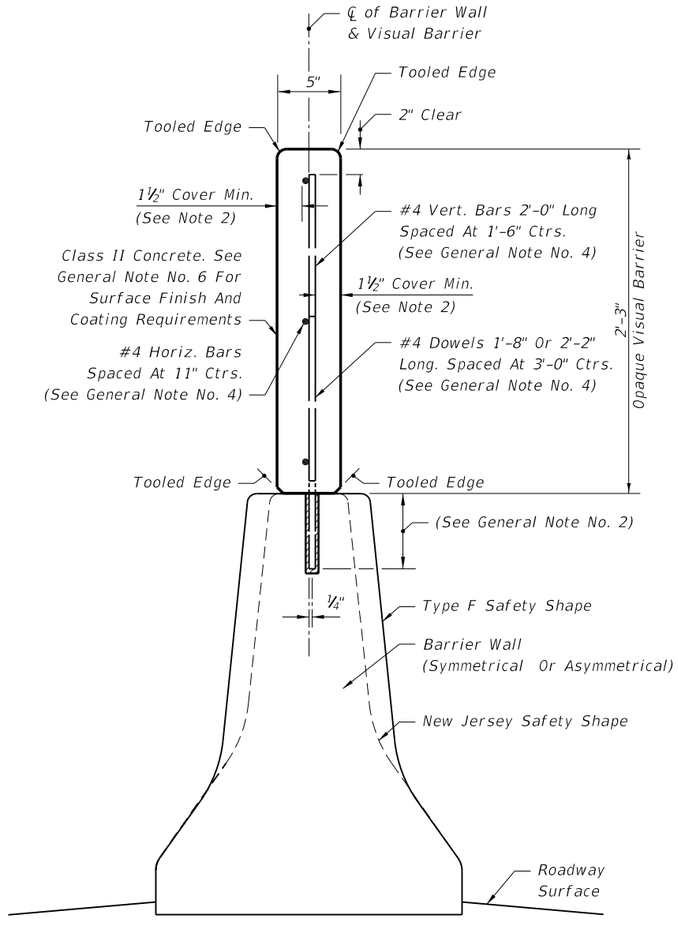


ELEVATION OF REINFORCEMENT AND DOWELING



PICTORIAL



END VIEW

ESTIMATED QUANTITIES, LF	
Concrete	0.042 CY
Reinforcing Steel	3.27 Lbs.*
*3.38 Lbs. With 2'-2" Dowels	

GENERAL NOTES

1. The opaque visual barrier is intended to function as a visual screen, and is not intended to resist vehicle impact loads nor to restrain, contain or restrict vehicles or cargo. The barrier is designed to withstand zone wind loading and strikes by light debris; and, designed to yield to exceptional strikes by vehicles or cargo, and to contain ruptured segments of the screen when yielding to such strikes.

2. When the opaque visual barrier is constructed on an existing barrier wall, dowels shall be 1'-8" in length, embedded 6" into the barrier wall and set with an approved chemical grout. Embedment holes shall be ⅝" diameter, drilled to a depth ¼" below the tip of the dowel unless greater depth is required to accept manufactured grout capsules.

   When the opaque visual barrier is constructed in conjunction with project concrete barrier walls, dowels may be set as described above, in either the drilled or preformed holes; or, placed when the barrier wall is cast. For dowels that are placed when the wall is cast, the dowel shall be 2'-2" in length and embedded to a depth of 12".

   When longitudinal reinforcing bars are encountered in the stem of existing barrier, shift the dowels to clear, maintaining the 1½" Cover Minimum to the face of the Opaque Visual Barrier.

3. For both double and single faced concrete barrier walls the opaque visual barrier is to be located in the center of the top of the wall.

   For single faced barrier walls that are constructed around other vertical structures, the opaque visual barrier shall follow the alignments of only one of the walls and be centered atop that wall.

   For dual median barrier walls that follow differential profiles, the opaque visual barrier shall be constructed atop the wall with the higher elevation, unless conditions dictate otherwise. Lateral transitions or end overlaps for opaque visual barriers that alternate between dual walls shall be detailed in the plans.

   For median barrier walls that are divided when connecting to separated bridges, the opaque visual barrier shall be constructed atop the approach side barrier wall, unless differential profiles dictate locating the opaque visual barrier on the departure side barrier wall.

   Opaque visual barriers to be located on capped fills between dual barrier walls shall be detailed in the plans.

4. In lieu of the reinforcement shown, the Contractor may substitute welded wire fabric equal to or better than that shown, when approved by the Engineer. Details shall be submitted with requests for substitution.

5. The Contractor may construct contiguous precast concrete panels in lieu of the cast-in-place opaque screen when approved by the Engineer. Panel design and method for anchorage to the barrier wall shall be detailed by shop drawings when requesting the Engineer's approval.

   The Contractor may construct the opaque screen monolithically with the barrier wall; however, the screen design shall not be modified so as to cause the wall to be dynamically active from strikes on the screen; see design considerations in Note No. 1 above.

6. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Standard Specification, unless another finish is called for in the plans. The surfaces shall have a Class 5 Applied Finish Coating in accordance with Section 400 only when called for in the plans.

7. Payment for opaque visual barrier shall be full compensation for concrete, reinforcement, dowels, casting, placement, drilling, grouting, tooling, finishing and work incidental thereto, and shall be paid for under the contract unit price for Opaque Visual Barrier (Concrete) (2'-3" Height), LF.

LAST REVISION	REVISION	DESCRIPTION:				
07/01/07			FDOT DESIGN STANDARDS 2013	OPAQUE VISUAL BARRIER	INDEX NO. 461	SHEET NO. 1

TRAFFIC RAILING NOTES

This Traffic Railing Retrofit has been structurally evaluated to be equivalent or greater in strength to a design which has been successfully crash tested in accordance with NCHRP Report 350 TL-4 criteria.

CONCRETE: Concrete for Transition Blocks and Curbs shall be Class II (Bridge Deck).

REINFORCING STEEL: Reinforcing steel shall be ASTM A615, Grade 60.

THRIE-BEAM GUARDRAIL: Steel Thrie-Beam Elements shall meet the requirements for Class B (10 Gauge) Guardrail of AASHTO M 180, Type II (Zinc coated). The minimum panel length for Thrie-Beam Elements shall be 12'-6". Field drilled holes for Post connections shall be ¾" by 2½" slotted holes.

GUARDRAIL BOLTS: Guardrail bolts, nuts and washers shall be in accordance with AASHTO M180.

GUARDRAIL POSTS AND BASE PLATES: Posts and Base Plates shall be in accordance with ASTM A36 or ASTM A709 Grade 36.

ANCHOR BOLTS, NUTS AND WASHERS: Adhesive-Bonded Anchors and Anchor Bolts shall be fully threaded rods in accordance with ASTM F1554 Grade 105 or ASTM A193 Grade B7. At the Contractor's option, Anchor Bolts for through bolting may be in accordance with ASTM 449. All Nuts shall be single self-locking hex nuts and in accordance with ASTM A563 or ASTM A194. Flat Washers shall be in accordance with ASTM F436 and Plate Washers (for long slotted holes only) shall be in accordance with ASTM A36 or ASTM A709 Grade 36. After the nuts have been snug tightened, the anchor bolt threads shall be distorted to prevent removal of the nuts. Distorted threads and the exposed trimmed ends of anchors shall be coated with a galvanizing compound in accordance with the Specifications.

COATINGS: All Nuts, Bolts, Anchors, Washers, Guardrail Posts, Anchor Plates and Base Plates shall be hot-dip galvanized in accordance with the Specifications. Guardrail Post Assemblies shall be hot-dip galvanized after fabrication.

ADHESIVE-BONDED ANCHORS AND DOWELS: Adhesive Bonding Material Systems for Anchors and Dowels shall comply with Specification Section 937 and be installed in accordance with Specification Section 416. The field testing proof loads required by Specification Section 416 shall be 15,000 lbs. for ⅞" Ø anchor bolts; 55,000 lbs. for the 1¼" anchor bolts with 13" embedment; and 30,500 lbs. for the 1¼" Ø anchor bolts with 5" embedment.

BRIDGES ON CURVED ALIGNMENTS: The details presented in these Standards are shown for bridges on tangent alignments. Details for bridges on horizontally curved alignments are similar.

POST SPACING: Posts shall be located along the length of the bridge at typical 6'-3" or 3'-1½" spaces. Utilize the Modified Post Spacing at Intermediate Deck Joints Details as required to clear deck joints. Establish post spacing along the bridge and Roadway Guardrail Transition beginning with the Key Post. The variable post spacings located near begin and end bridge may be utilized to optimize the typical post spacing. Variable lengths of guardrail overlap are also permitted to optimize the typical post spacing. Symmetry of post spacing is not necessary.

THRIE-BEAM EXPANSION SECTION: Thrie-Beam Expansion Sections shall be installed at locations shown in the Plans. Install nuts for splice bolts finger-tight at 2½" slots in thrie beam expansion sections. Nuts shall fully engage bolts with a minimum of one bolt thread extending beyond the nuts. Distort the first thread on the outside of the nut to prevent loosening. Tighten guardrail bolts in 3¾" slots at guardrail post(s) that lie between the slotted expansion splice and bridge deck joint so that the bolt heads are in full contact with thrie-beam elements, but not so tight as to impede movement due to expansion.

NEOPRENE PADS: Neoprene pads must be plain pads with a durometer hardness of 60 or 70 and meet the requirements of Specification Section 932, except that testing of the finished pad will not be required.

ELEVATION MARKERS: Elevation Markers shall be placed on the top surface of the end bents as directed by the Engineer when portions of the existing traffic railing carrying existing elevation markers are removed. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The Department will determine the vertical Datum information for the marker.

REFLECTIVE RAILING MARKERS: Reflective Railing Markers shall conform to Section 993 of the Specifications. Install markers at the top of the guardrail posts at the spacings shown in the table below. Reflector color (white or yellow) shall conform to the color of the near edgeline.

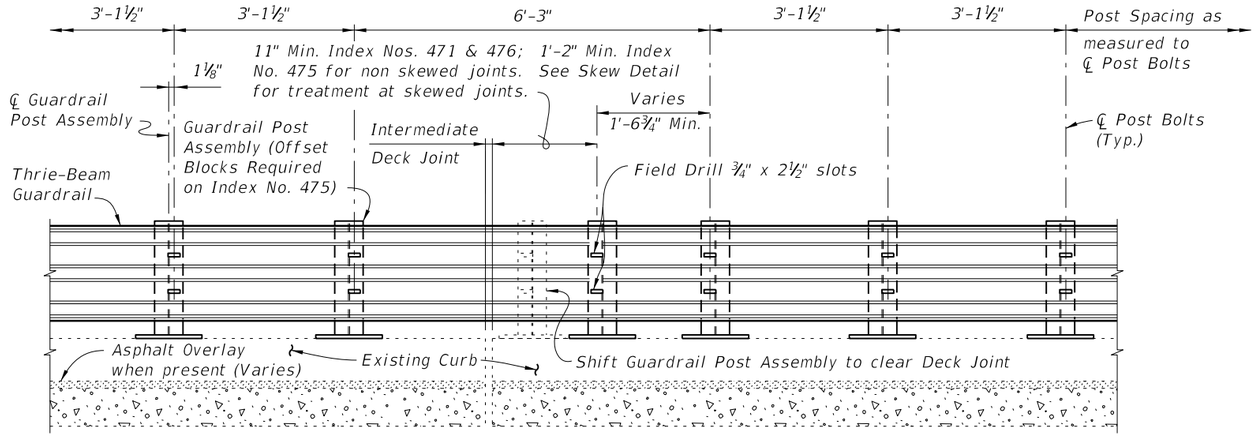
PEDESTRIAN SAFETY TREATMENTS: Pedestrian Safety Treatment is required when called for in the Plans. See Index No. 400 for details.

BRIDGE NAME PLATE: If a portion of the existing Traffic Railing is to be removed that carries the bridge name, number and or date, or if the installation of the Traffic Railing (Thrie Beam Retrofit) will obscure the bridge name, number and or date, then replace the information that has been removed or obscured, with 3" tall black lettering on white nonreflective sheeting applied to the top of the adjacent guardrail. The information must be clearly visible from the right side of the approaching travel lane. The sheeting and adhesive backing shall comply with Specification Section 994 and may comprise of individual decals of letters and numbers.

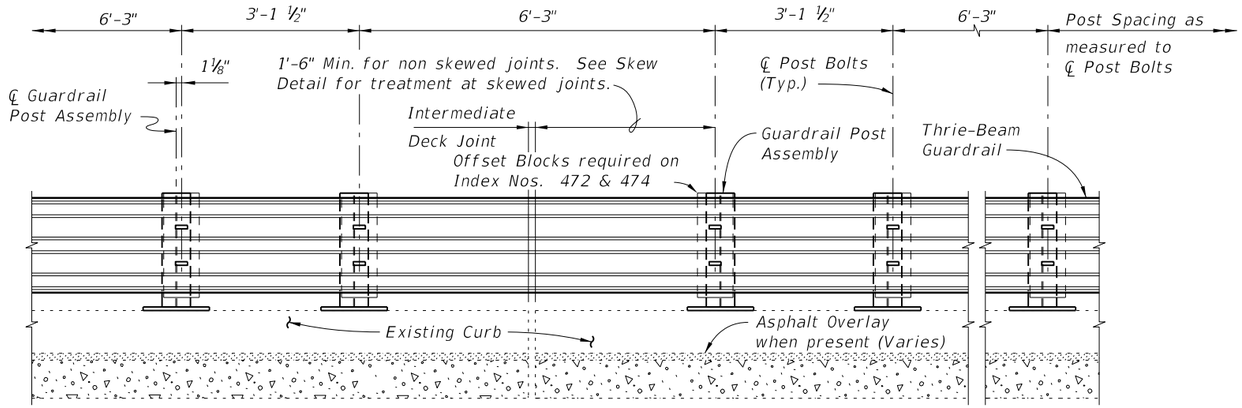
PAYMENT: Payment will be made under Metal Traffic Railing (Thrie-Beam Retrofit) which shall include all materials and labor required to fabricate and install the barrier and lapped guardrail where necessary to maintain post spacing. Transition Blocks and Curbs, Bridge Name Plate, Reflective Railing Markers and installation of Elevation Markers, where required, will not be paid for directly but shall be considered as incidental work.

REFLECTIVE RAILING MARKER SPACING

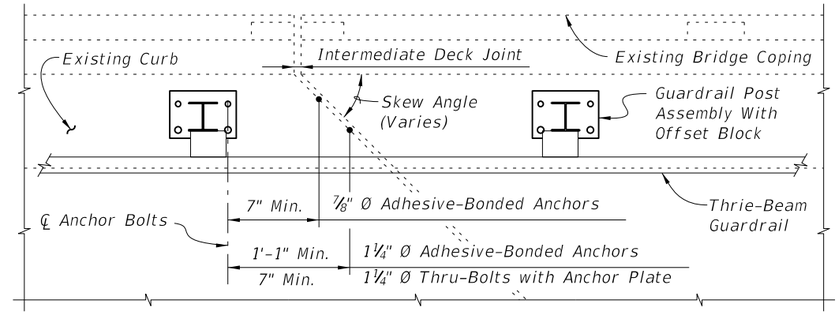
Distance – Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required



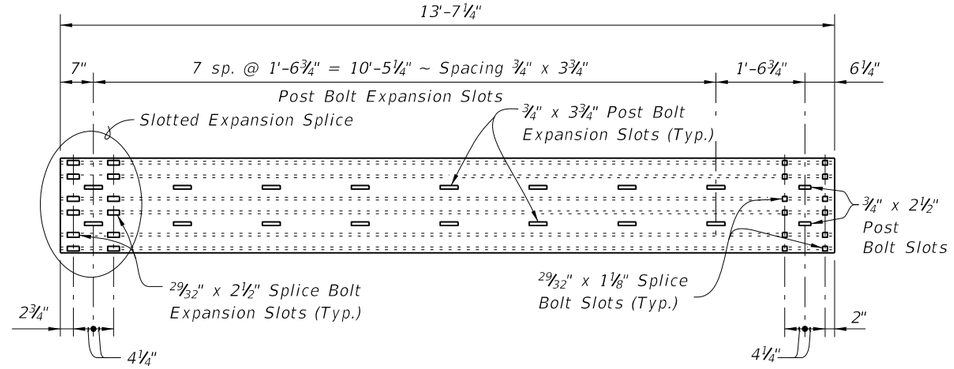
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
MODIFIED POST SPACING AT INTERMEDIATE DECK JOINTS DETAIL FOR INDEX NOS. 471, 475 & 476



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
MODIFIED POST SPACING AT INTERMEDIATE DECK JOINTS DETAIL FOR INDEX NOS. 472, 473 & 474



PARTIAL PLAN
INTERMEDIATE JOINT SKEW DETAIL



THRIE-BEAM EXPANSION SECTION

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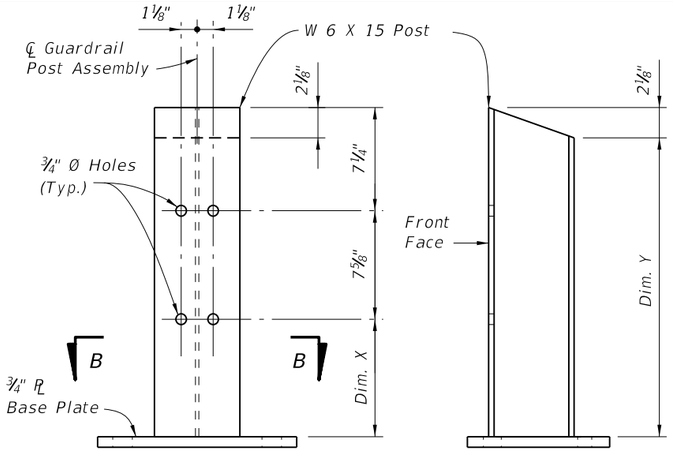
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) GENERAL NOTES & DETAILS	INDEX NO.	SHEET NO.
01/01/08			STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			470	2

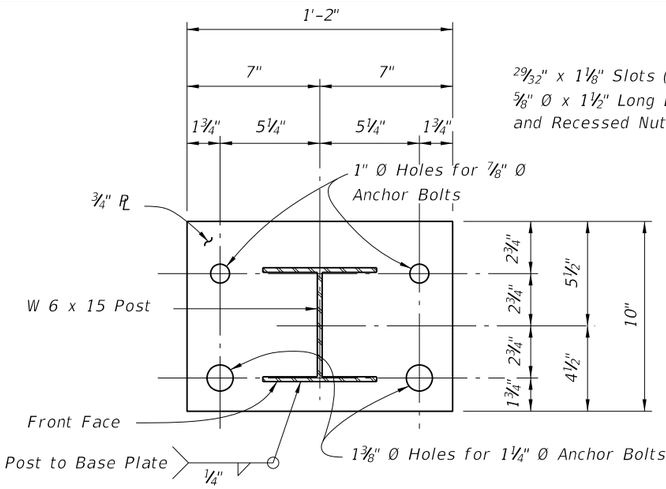


FRONT VIEW SIDE VIEW

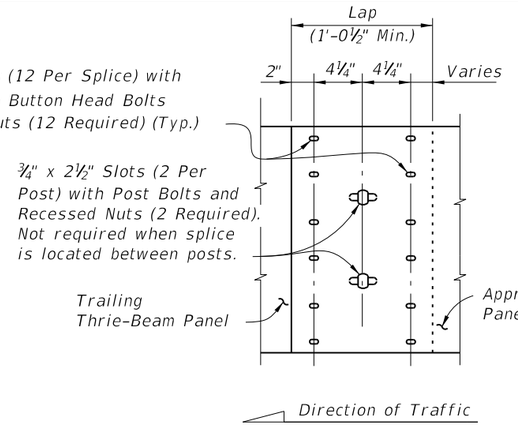
POST DIMENSION TABLE			
POST	CURB HEIGHT (DIM. A)	DIM. X	DIM. Y
Post "A"	5" to 7"	11¼"	2'-0"
Post "B"	> 7" to 10"	9¼"	1'-10"
Post "C"	> 10" to 1'-0"	7¼"	1'-8"

Note: Dim. A is equal to the exposed curb height. For location of Dim. A see Index Nos. 471 thru 476, Sheet 1.

GUARDRAIL POST ASSEMBLY DETAIL

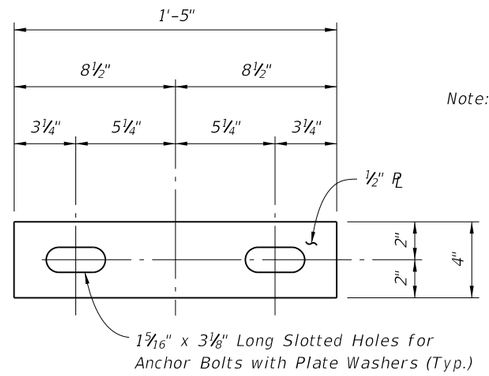


SECTION B-B



THRIE-BEAM GUARDRAIL SPLICE

Note: All Thrie Beam Panels shall be lapped in the direction of adjacent traffic. At the Contractor's option, laps may be extended. Field drill holes in Trailing Thrie Beam Guardrail Panel as required.



ANCHOR PLATE DETAIL

Note: The Anchor Plate and Plate Washer are applicable only to 1¼" Ø Anchor Bolts that are to be thru-bolted for Index Nos. 471 & 476.

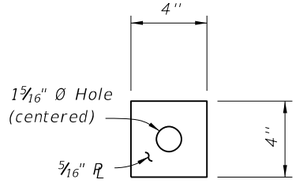
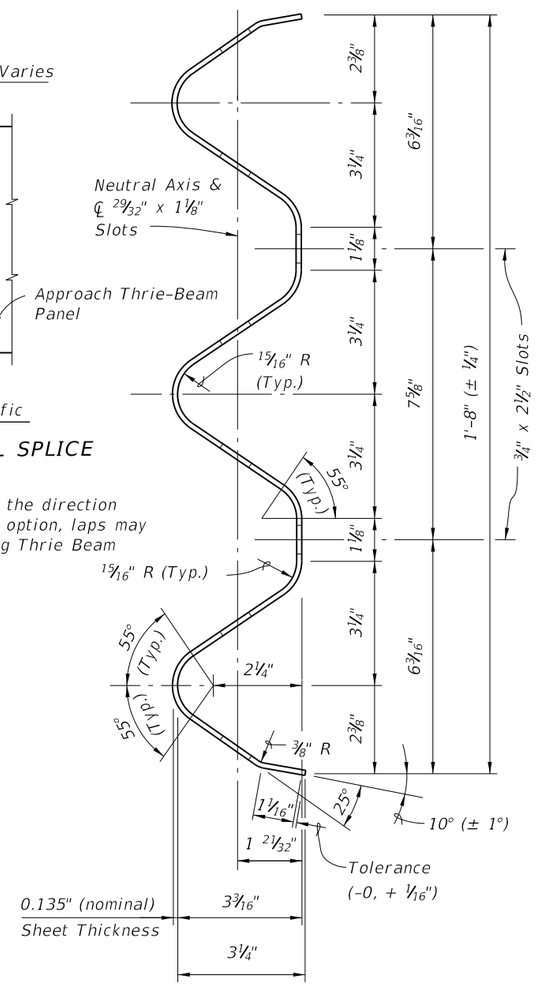
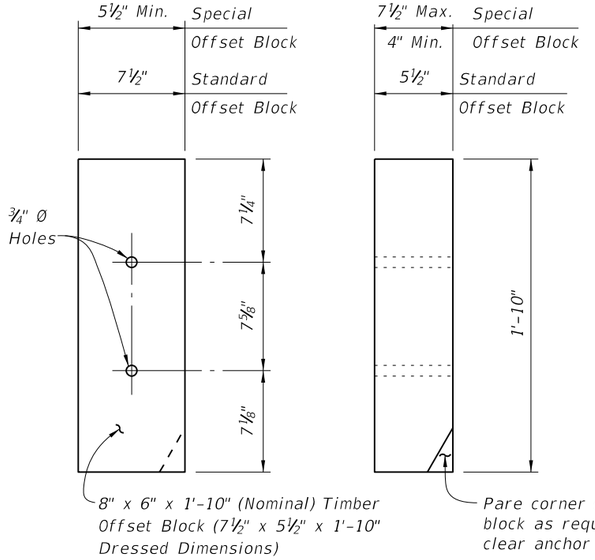


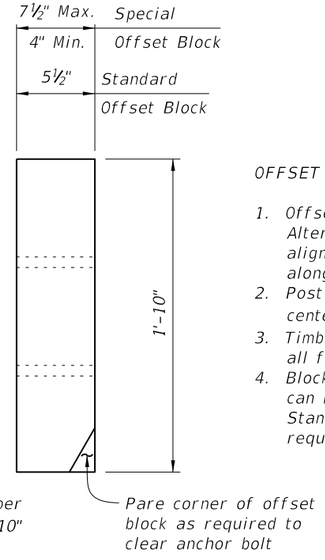
PLATE WASHER DETAIL



TYPICAL SECTION THRU THRIE-BEAM GUARDRAIL (EXPANSION SECTION SIMILAR)



FRONT VIEW

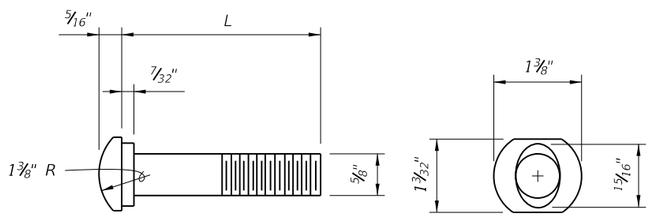


SIDE VIEW

OFFSET BLOCK NOTES:

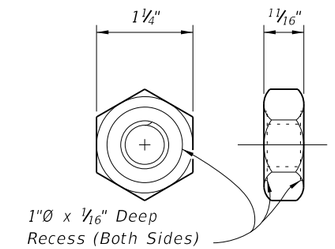
1. Offset blocks shall be timber or Approved Alternate. Uniformity of block size and alignment of guardrail shall be maintained along length of retrofit.
2. Post bolt holes in offset blocks to be centered (± ¼").
3. Timber offset blocks shall be dressed on all four sides (S4S).
4. Block assemblies for Special Offset Blocks can be made up of 2 or 3 Special or Standard Offset Blocks, field dressed as required.

OFFSET BLOCK DETAIL



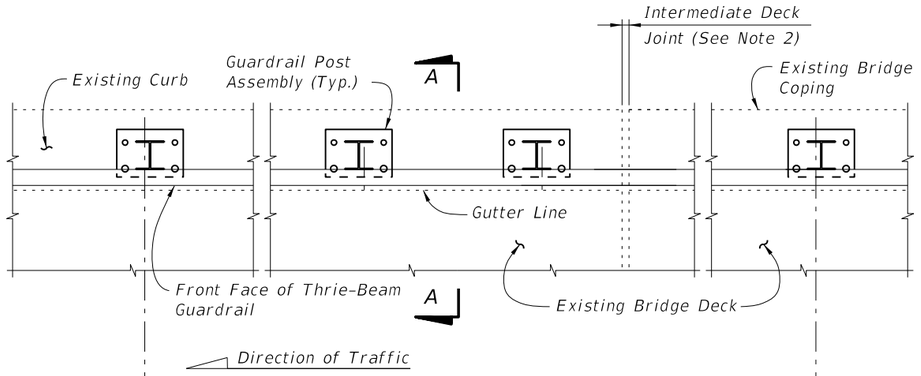
⅝" OVAL SHOULDER BUTTON HEAD BOLT

L	THREAD LENGTH	APPLICATION
1½"	Full Length	Rail Splice Bolt, Post Bolt for Index Nos. 471, 473 & 476
Varies (8" Min.)	4" Min.	Post Bolt for Index Nos. 472, 473, 474, 475 & 476



⅝" MODIFIED HEAVY HEX NUT (RECESSED NUT)

LAST REVISION	REVISION	DESCRIPTION:				
01/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) GENERAL NOTES & DETAILS	INDEX NO. 470	SHEET NO. 3

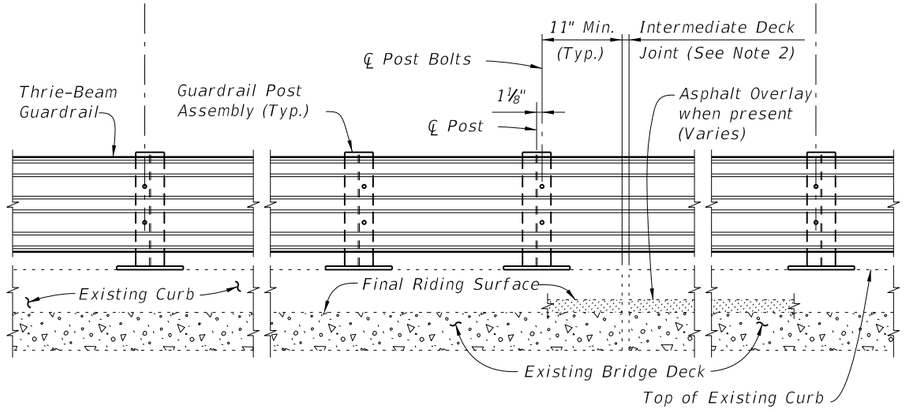


PARTIAL PLAN OF RAILING

℄ Post Bolts and Match Line (Trailing End) (See Sheets 3 and 4)

℄ Post Bolts and Match Line (Approach End) (See Sheets 3 and 4)

3'-1½" spacing (Typ. except as noted along bridge, see Note 2)



PARTIAL ELEVATION OF INSIDE FACE OF RAILING

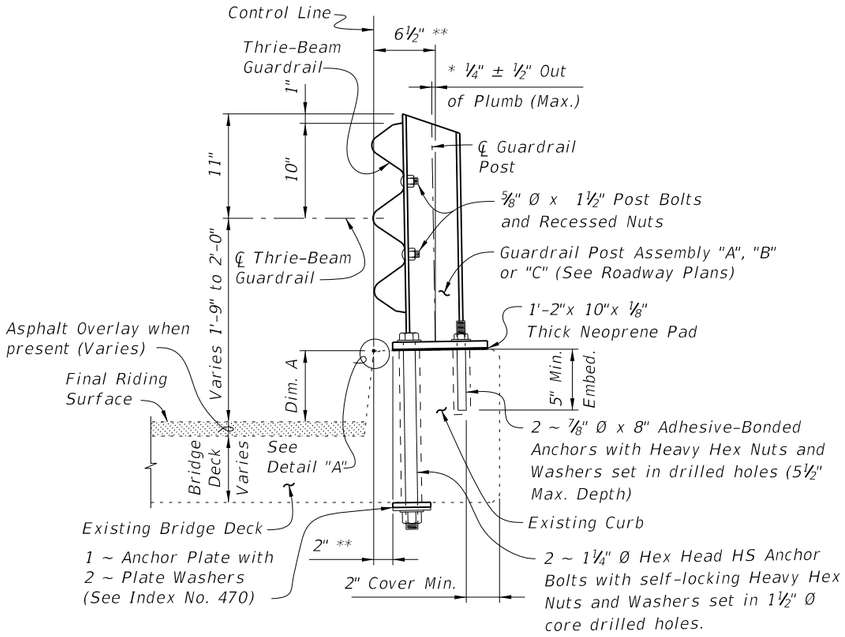
TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

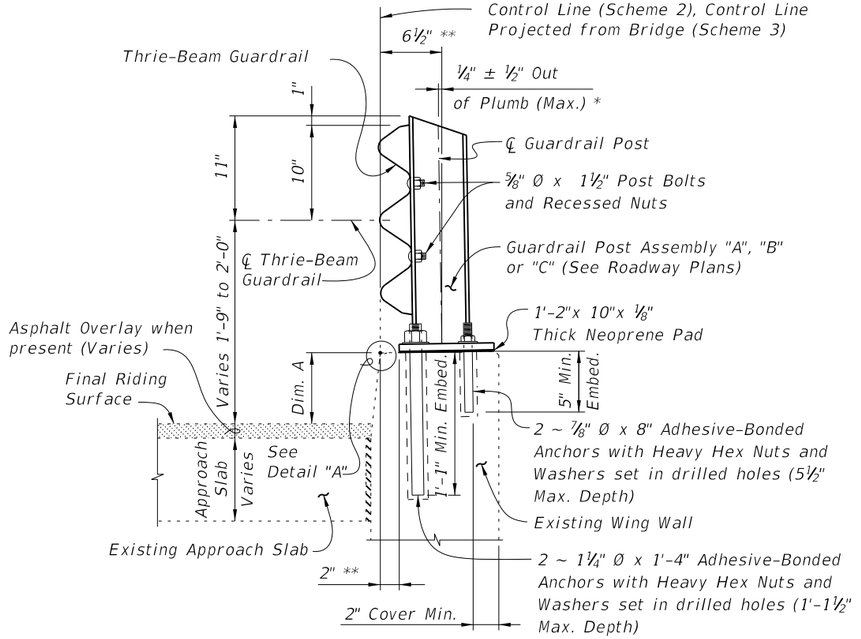
1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be removed off 1" below existing concrete and grouted over.

CROSS REFERENCES:
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) NARROW CURB	INDEX NO.	SHEET NO.
01/01/08						471	1

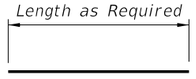


SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK

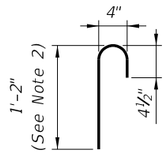


SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEME 2 SHOWN, SCHEME 3 SIMILAR)

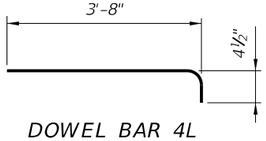
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
A	4	AS REQUIRED
D	4	1'-11"
L	4	4'-1"



BAR 4A



Dowel Bar 4D
(Standard 180° Hook)



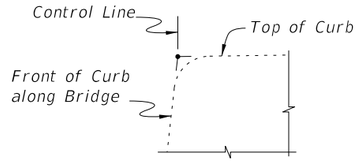
DOWEL BAR 4L

BAR BENDING DIAGRAMS

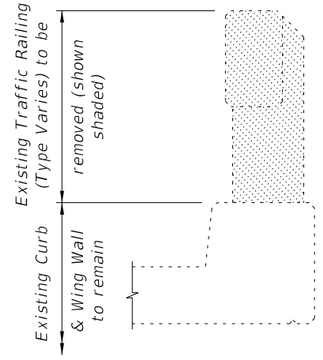
NOTES:
1. All bar dimensions are out to out.
2. The 1'-2" vertical dimension shown for Bar 4D is based on a curb height of 9". If curb height is less or more than 9", decrease or increase this dimension by an amount equal to the difference in curb height.

* Shim with washers around Anchors as required to maintain tolerance.

** Offset may vary ± 1" for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

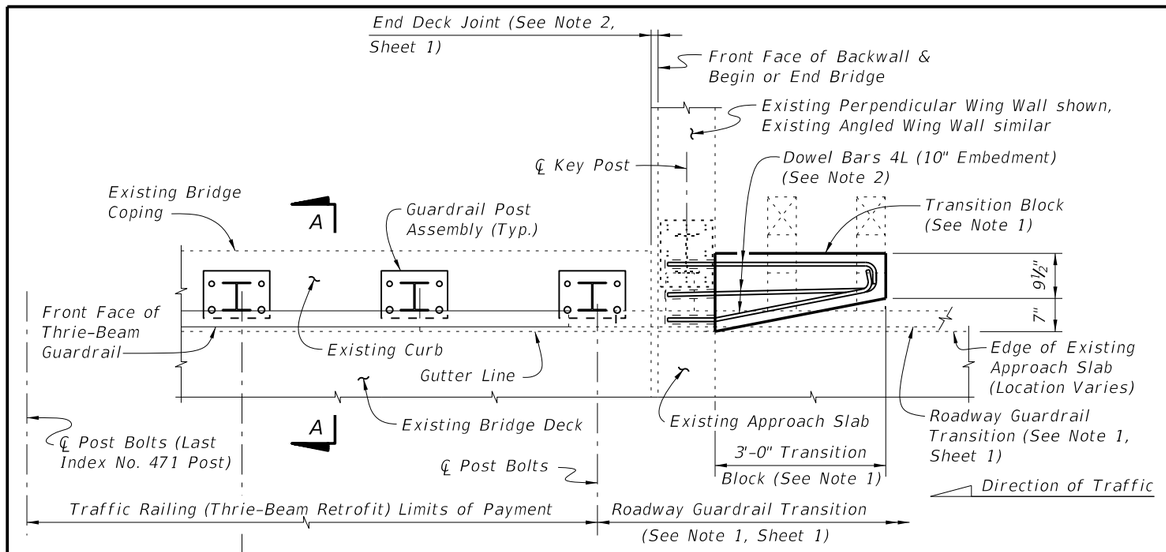


DETAIL "A"

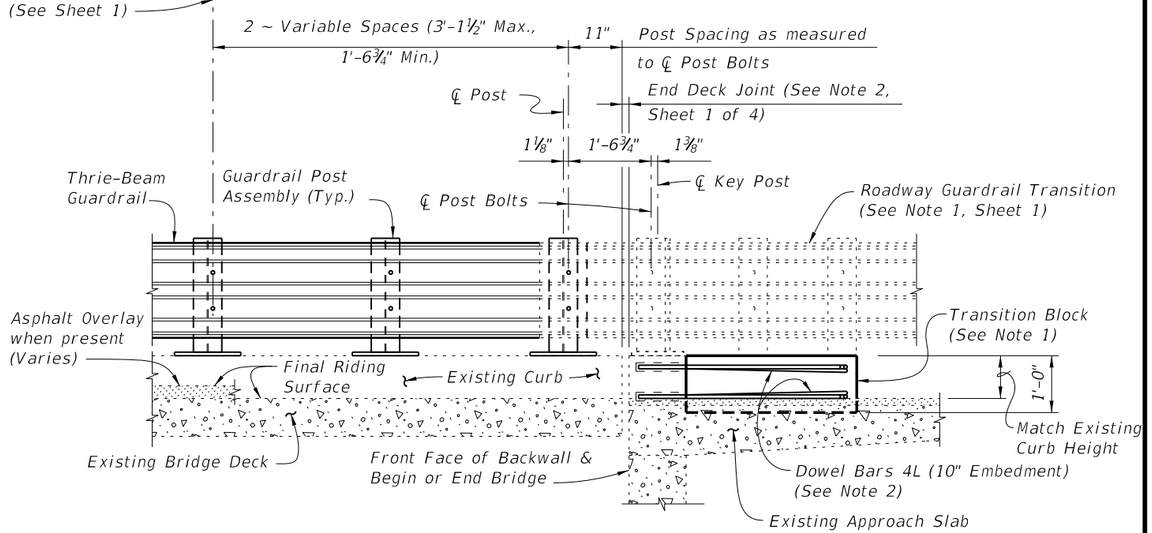


TYPICAL SECTION THRU EXISTING TRAFFIC RAILING SHOWING LIMITS OF REMOVAL (BRIDGE DECK SHOWN, WING WALL SIMILAR)

CROSS REFERENCES:
For location of Section A-A see Sheets 1, 3 & 4.
For location of Section B-B see Sheets 3 & 4.
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING

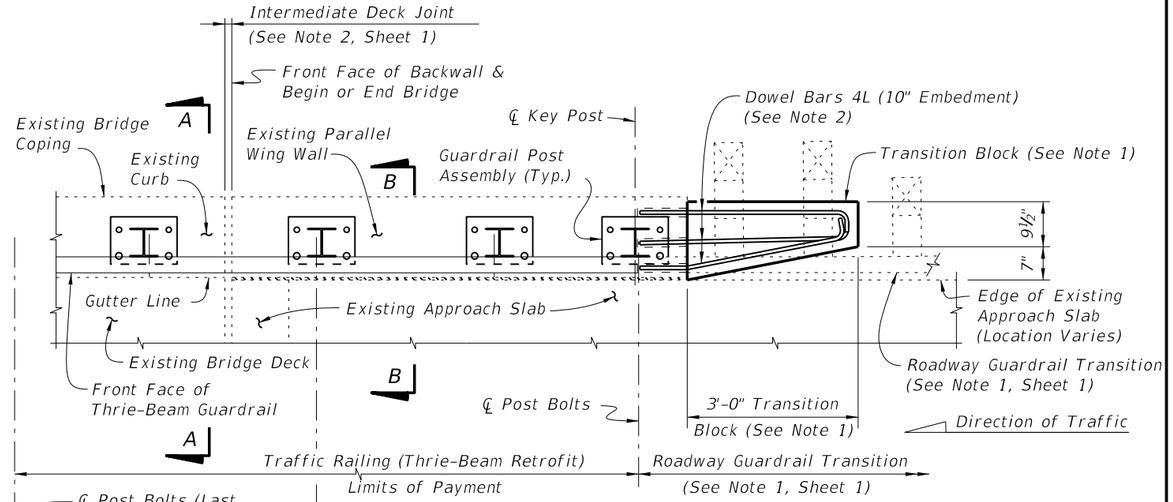
SCHEME 1

RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

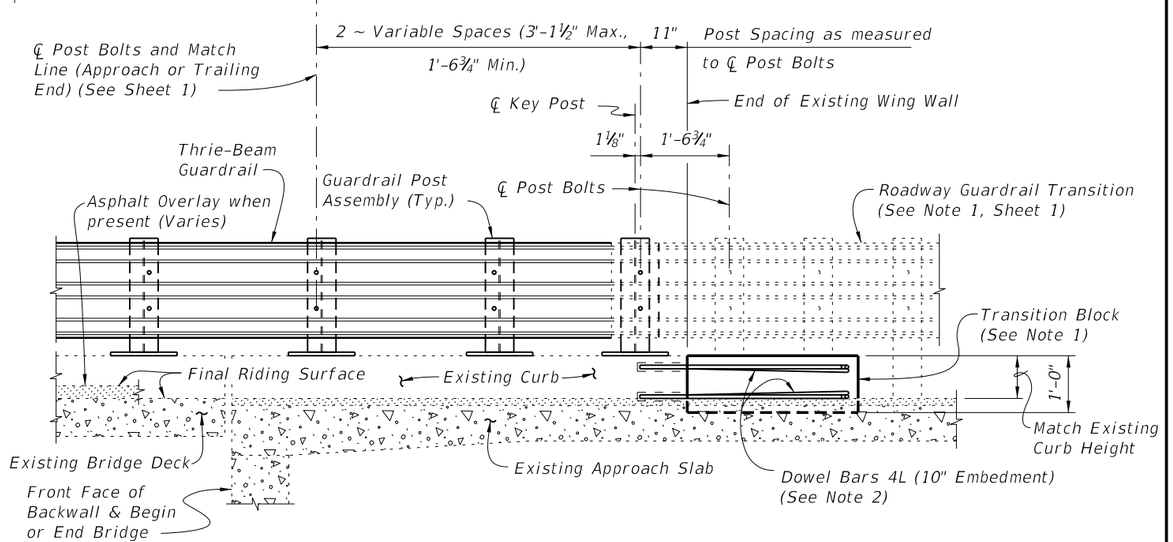
SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING

SCHEME 2

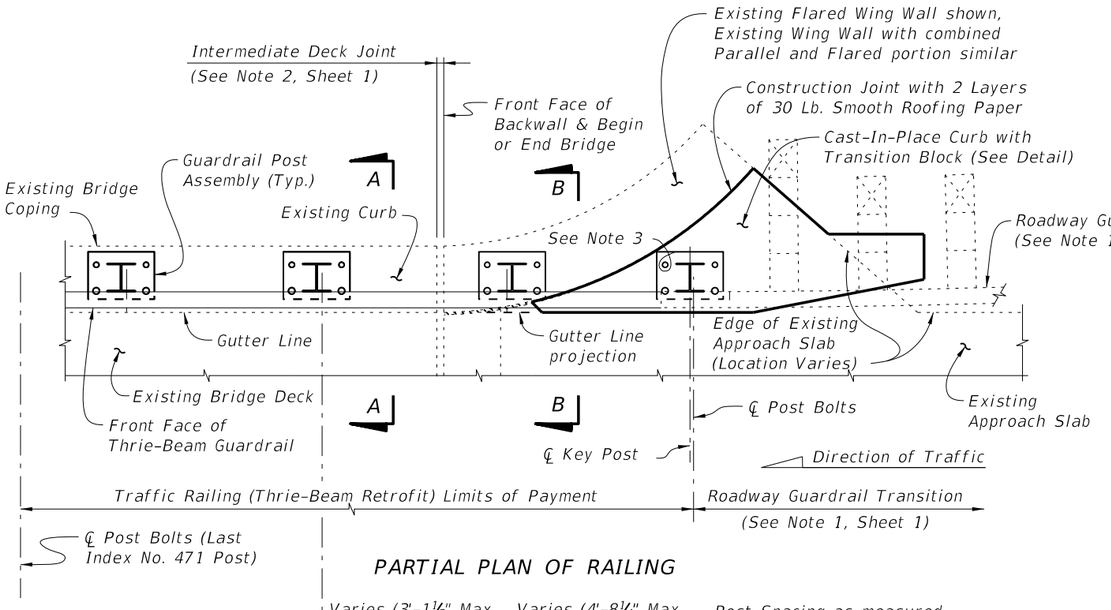
RAILING END TREATMENT FOR PARALLEL WING WALLS

SCHEME 2 NOTES:

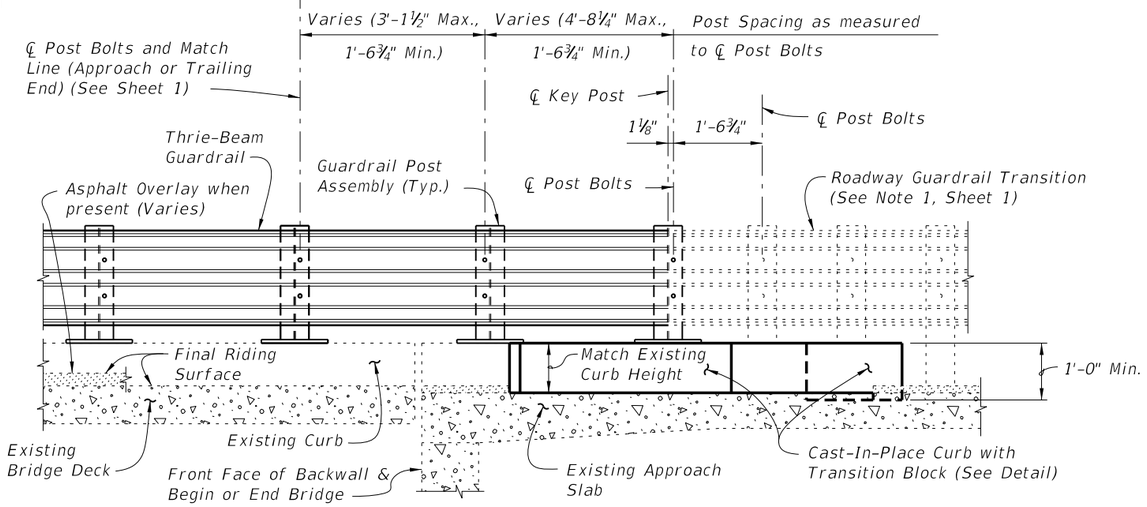
1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

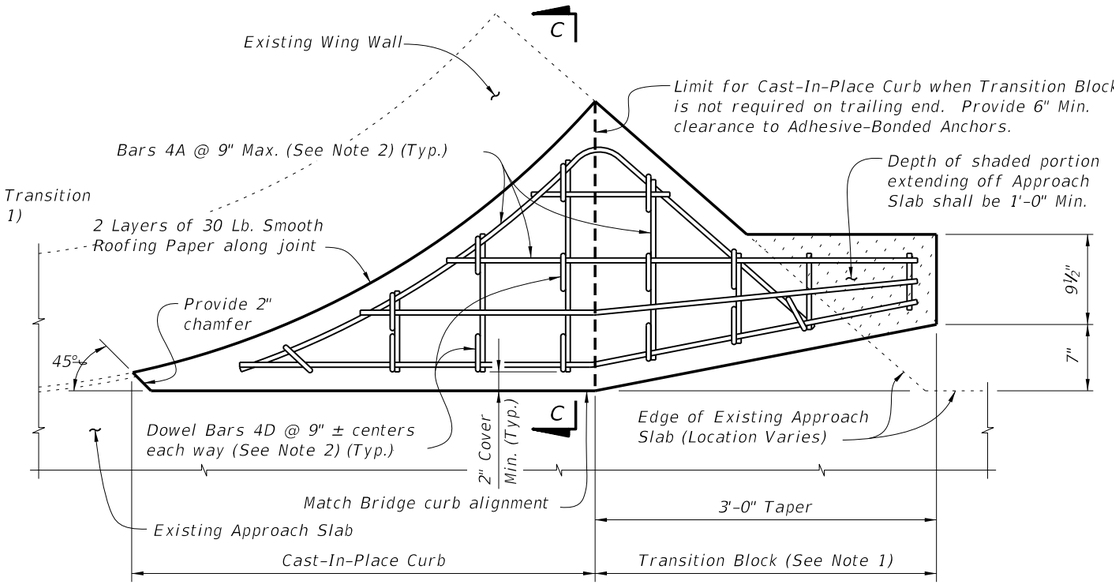
LAST REVISION	REVISION	DESCRIPTION:				
01/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) NARROW CURB	INDEX NO. 471	SHEET NO. 3



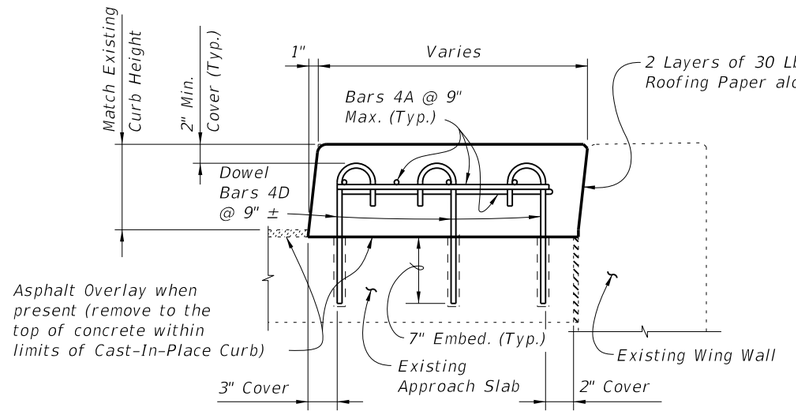
PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING



PLAN OF CAST-IN-PLACE CURB & TRANSITION BLOCK DETAIL
(Approach End with Transition Block Shown, Trailing End without Transition Block Similar)



SECTION C-C

SCHEME 3

RAILING END TREATMENT FOR FLARED WING WALLS

SCHEME 3 NOTES:

1. Provide Cast-In-Place Curb as shown. Shape and height of Transition Block and Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field cut and bend Bars 4A and rotate Dowel Bars 4B within Curb and Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

3. A single ⅞" Ø x 8" Adhesive-Bonded Anchor may be omitted as shown when 2" clear cover cannot be provided.

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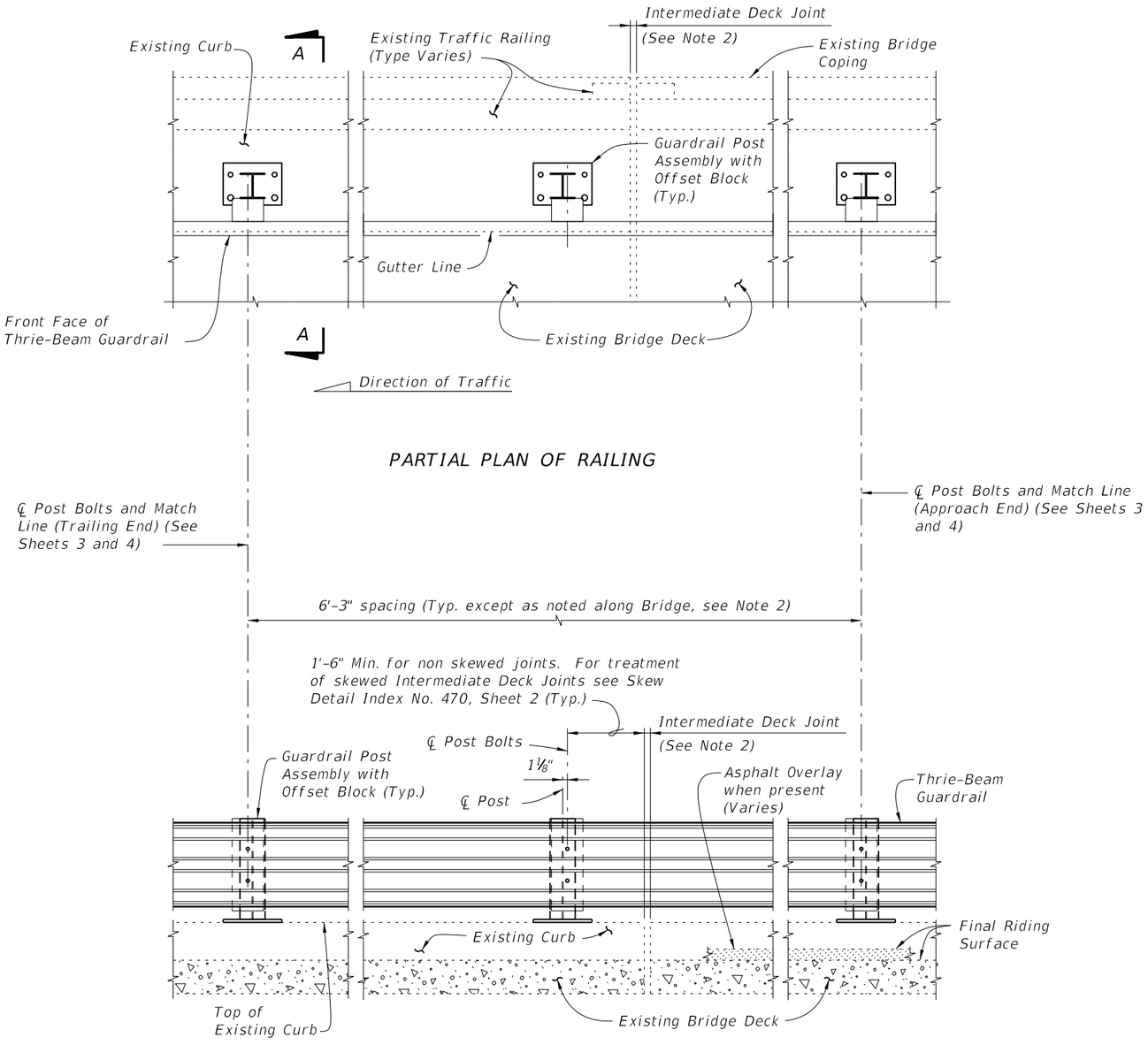
LAST REVISION	REVISION	DESCRIPTION:				
01/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) NARROW CURB	INDEX NO. 471	SHEET NO. 4



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing not shown for clarity)

TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details
see Index No. 470.

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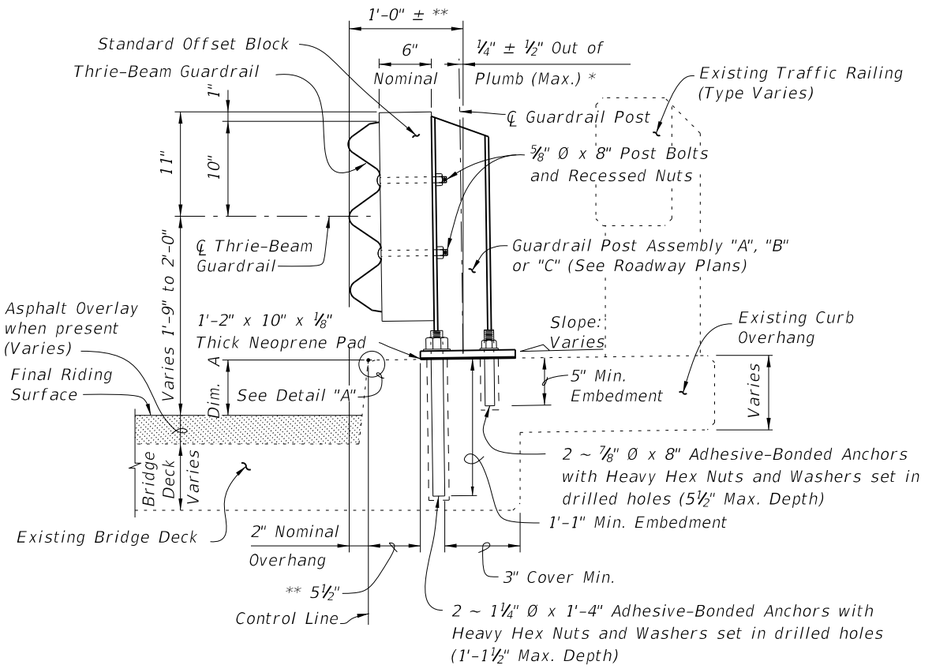
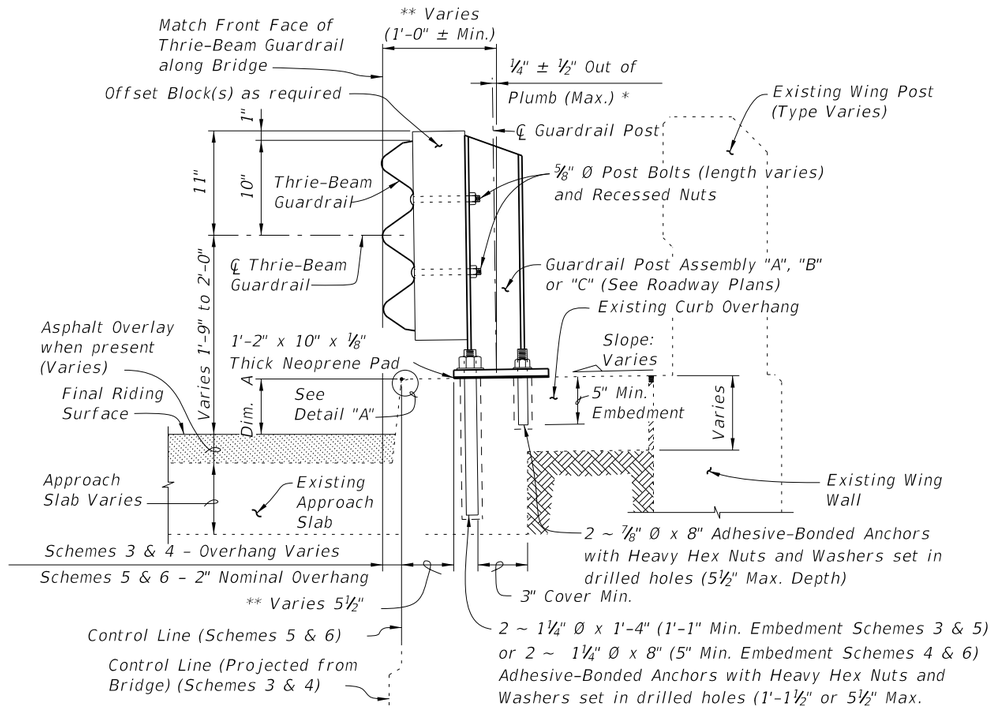
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE STRONG CURB TYPE 1	INDEX NO.	SHEET NO.
01/01/08						472	1



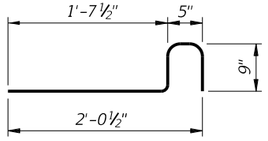
SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



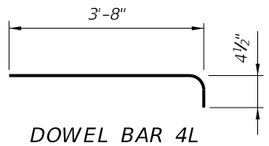
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 5 AND 6 SHOWN, SCHEMES 3 AND 4 SIMILAR)

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
D	4	3'-7"
L	4	4'-1"
M	4	2'-8"

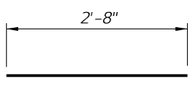
BAR BENDING DIAGRAMS



DOWEL BAR 4D



DOWEL BAR 4L

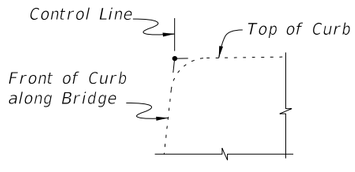


BAR 4M

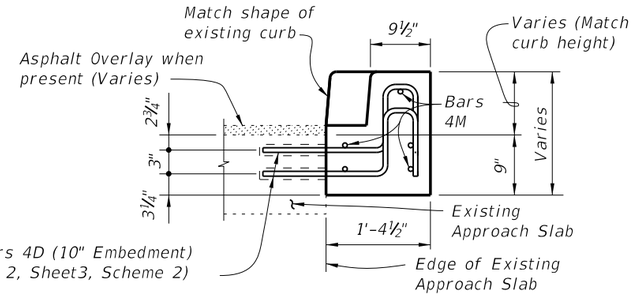
NOTE: All bar dimensions are out to out.

* Shim with washers around Anchors as required to maintain tolerance.

** Offset may vary ± 1" for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

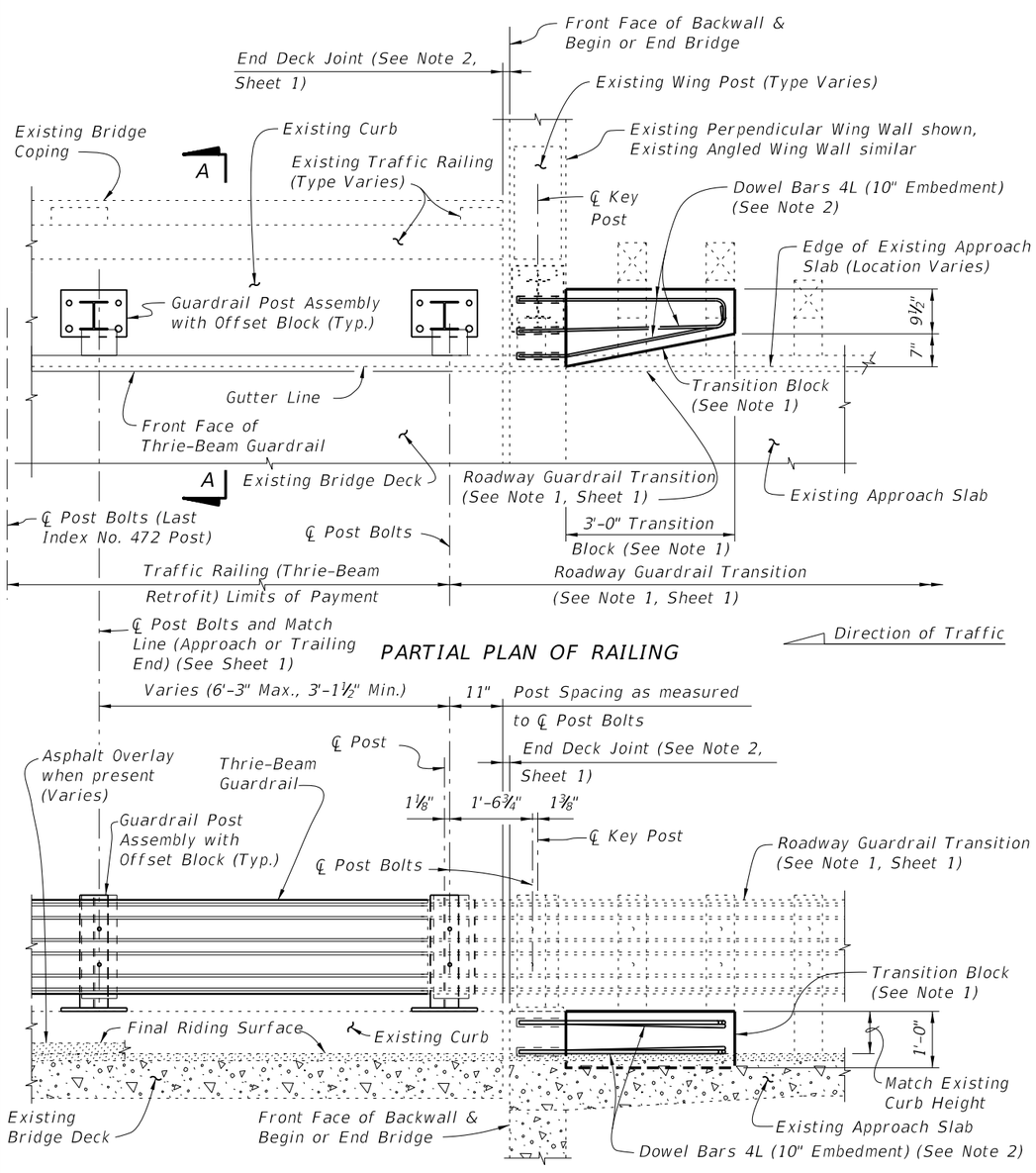


DETAIL "A"



VIEW C-C

CROSS REFERENCES:
For location of Section A-A see Sheets 1, 3 & 4.
For location of Section B-B see Sheet 4.
For location of View C-C see Sheet 3.
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

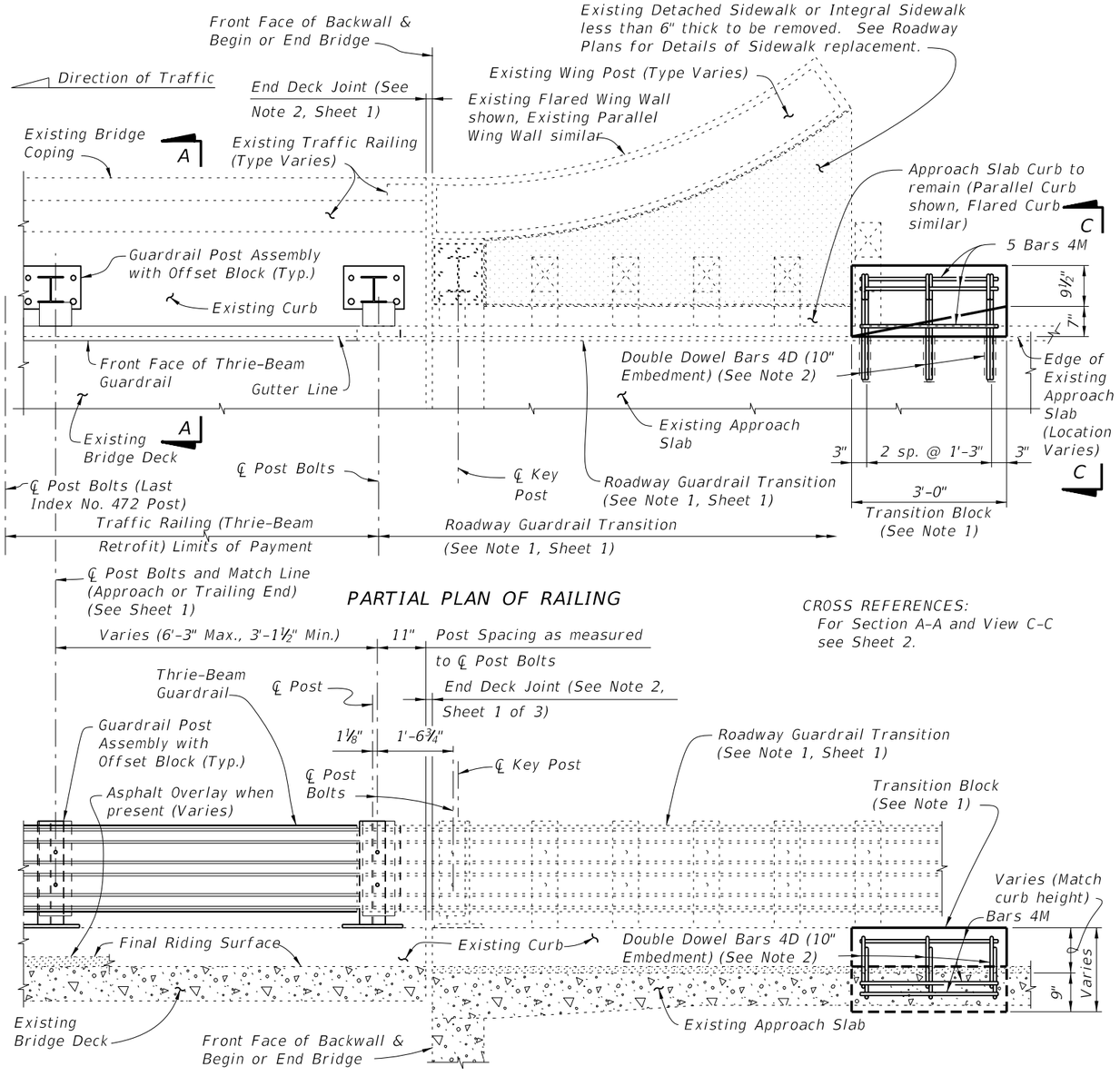
SCHEME 1

RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING

CROSS REFERENCES:
For Section A-A and View C-C see Sheet 2.

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEME 2

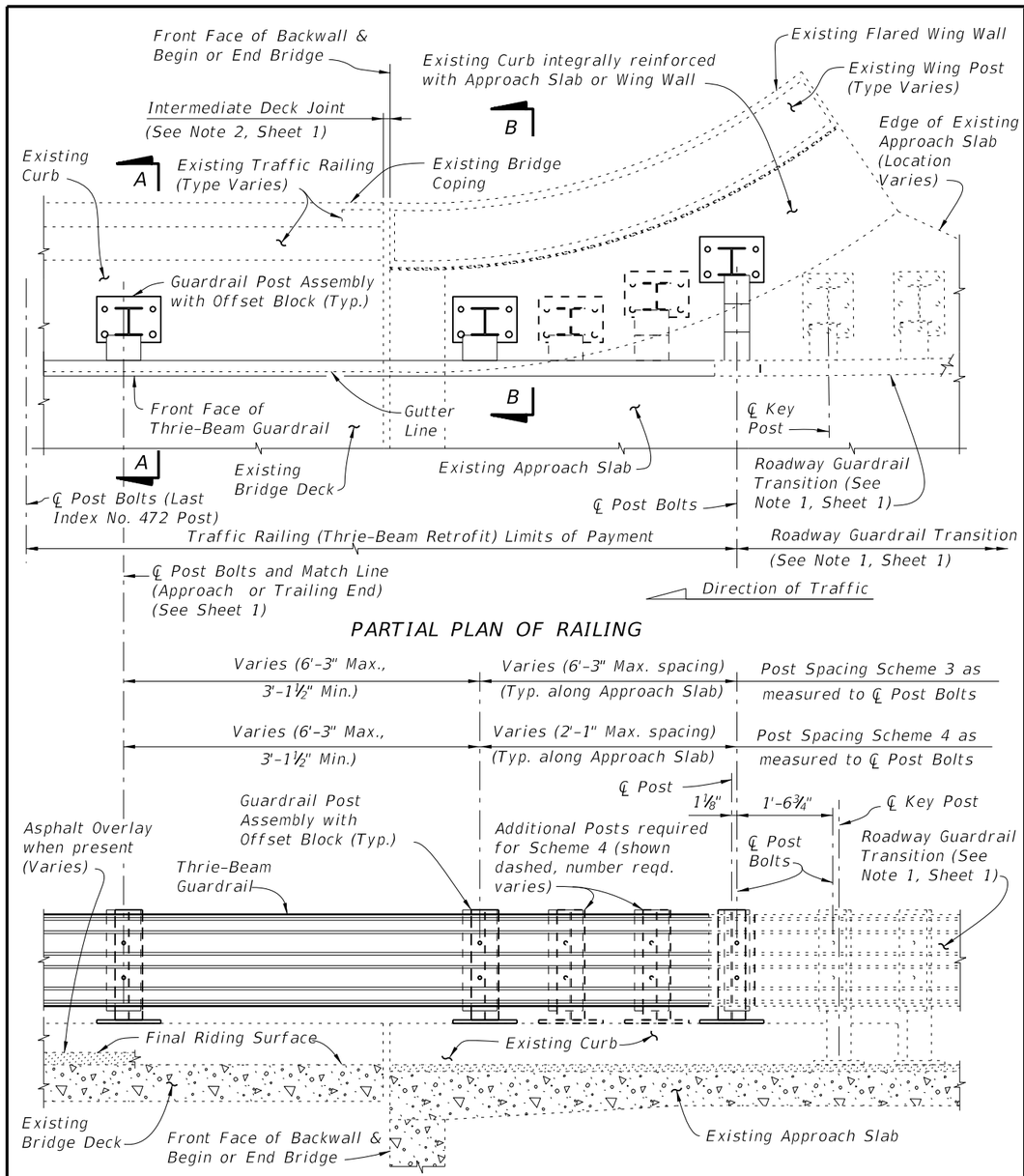
RAILING END TREATMENT FOR PARALLEL OR FLARED CURBS WITH DETACHED SIDEWALKS OR INTEGRAL SIDEWALKS LESS THAN 6" THICK

SCHEME 2 NOTES:

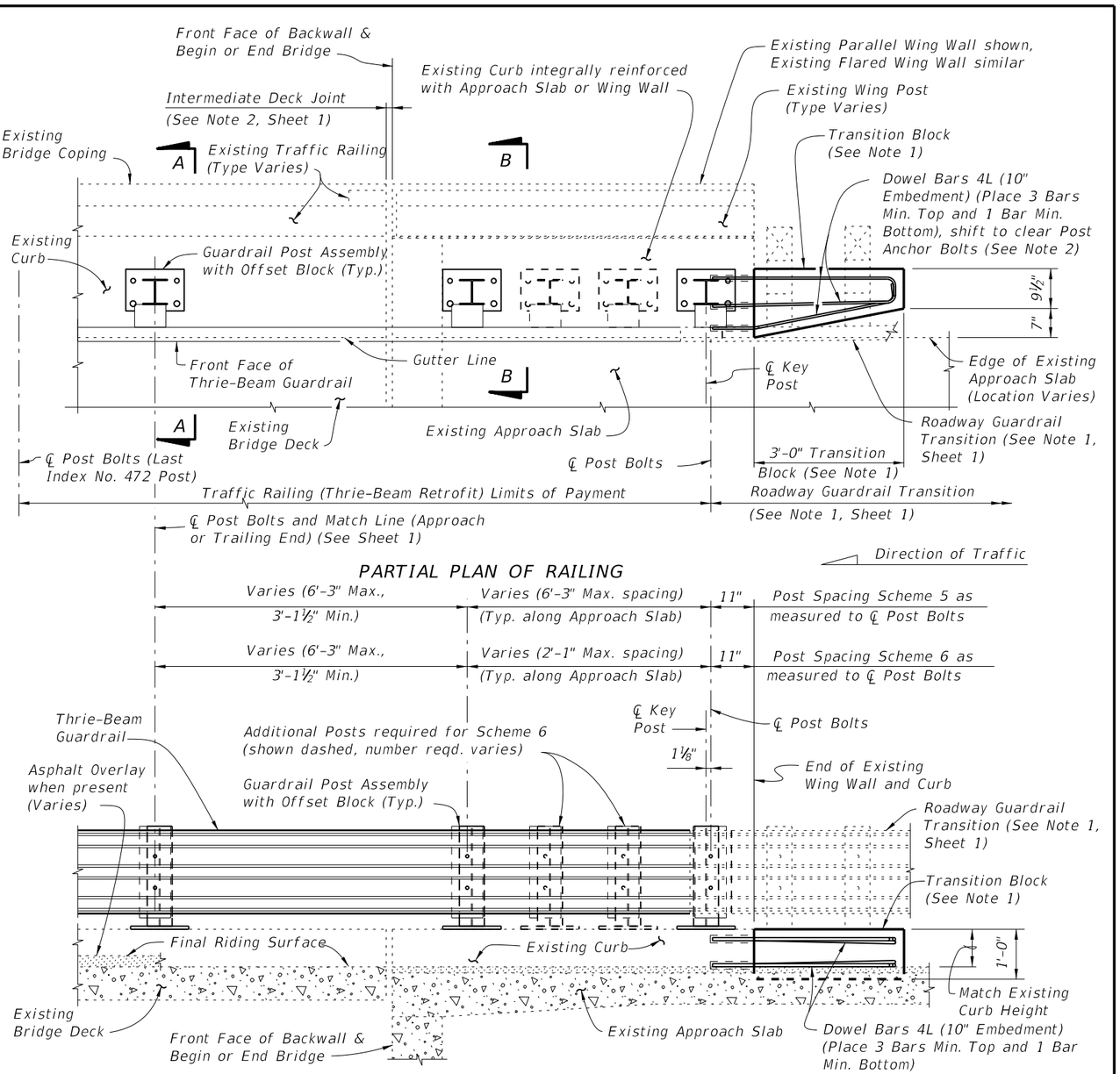
1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic and on bridges with flared Approach Slab Curbs.

2. Field bend or tilt Dowel Bars 4D and Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE STRONG CURB TYPE 1	INDEX NO.	SHEET NO.
01/01/08						472	3



SCHEMES 3 AND 4
RAILING END TREATMENT FOR FLARED INTEGRAL CURBS



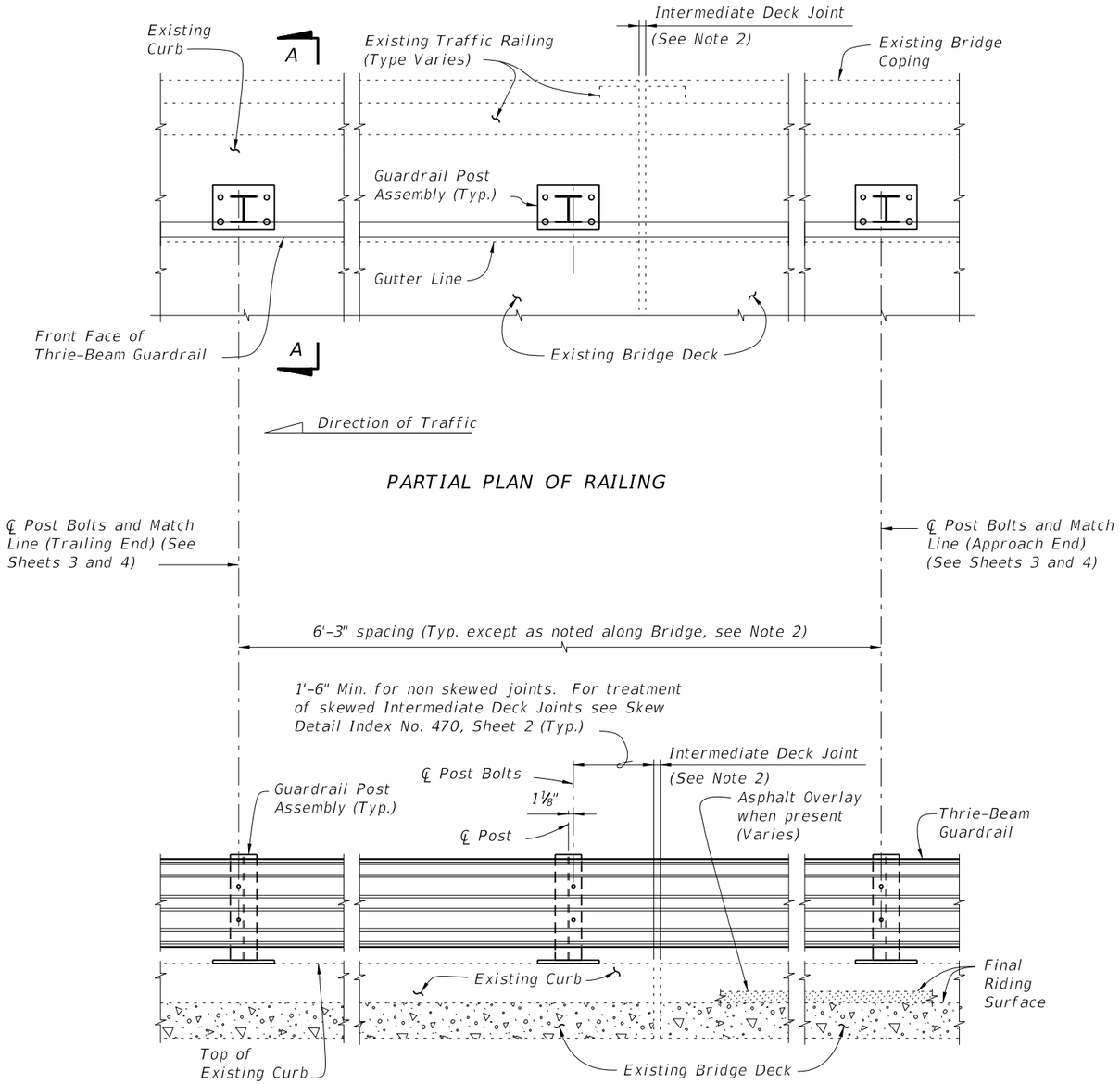
SCHEMES 5 AND 6
RAILING END TREATMENT FOR PARALLEL INTEGRAL CURBS

SCHEMES 5 AND 6 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

LAST REVISION	REVISION	DESCRIPTION:				
01/01/08			STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION	FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE STRONG CURB TYPE 1	INDEX NO. 472 / SHEET NO. 4



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing not shown for clarity)

TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.

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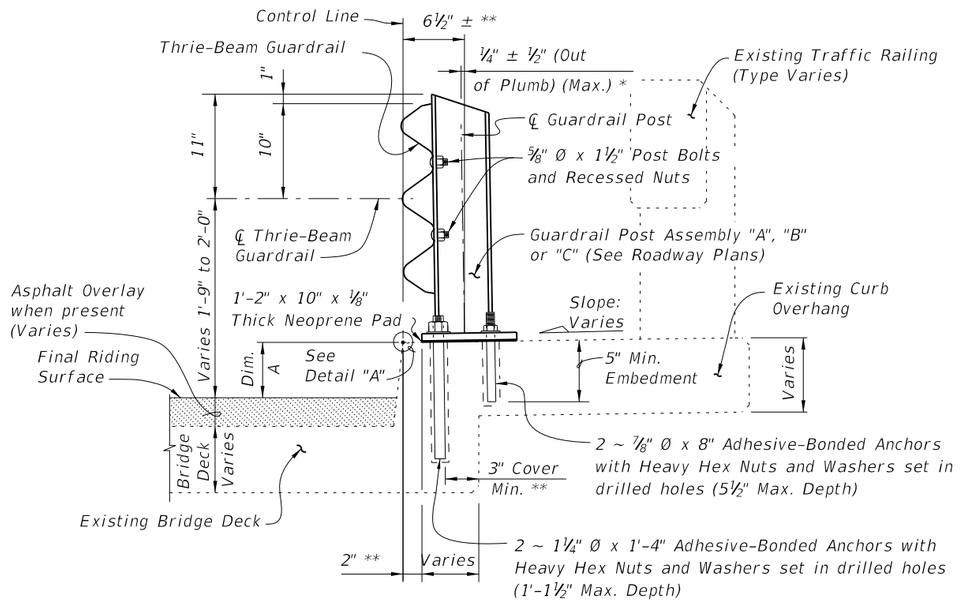
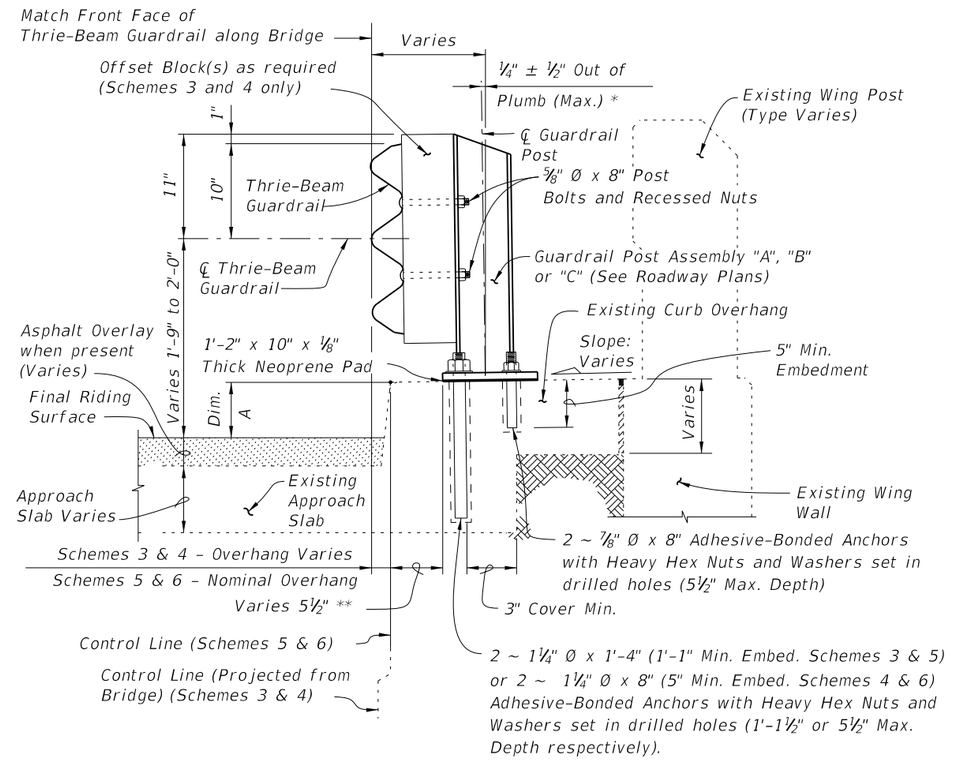
LAST REVISION	REVISION	DESCRIPTION:				
01/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE STRONG CURB TYPE 2	INDEX NO. 473	SHEET NO. 1



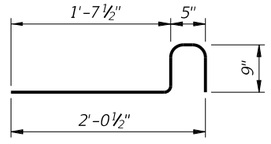
SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



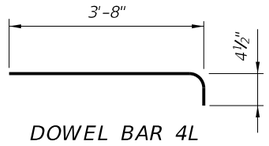
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 5 AND 6 SHOWN, SCHEMES 3 AND 4 SIMILAR)

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
D	4	3'-7"
L	4	4'-1"
M	4	2'-8"

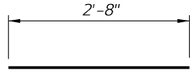
BAR BENDING DIAGRAMS



DOWEL BAR 4D



DOWEL BAR 4L

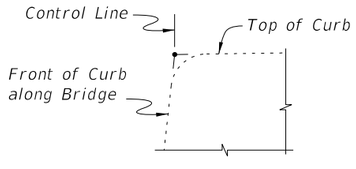


BAR 4M

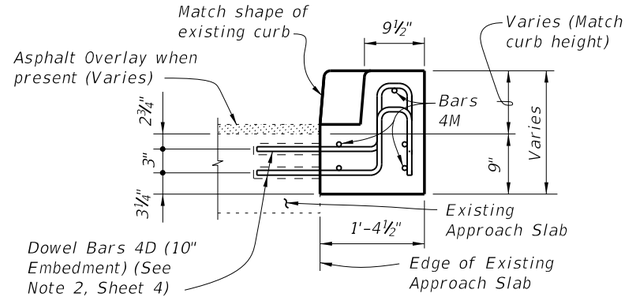
NOTE: All bar dimensions are out to out.

* Shim with washers around Anchor Bolts and Anchors as required to maintain tolerance.

** Offset may vary ± 1" for Adhesive-Bonded Anchors and Anchor Bolts to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

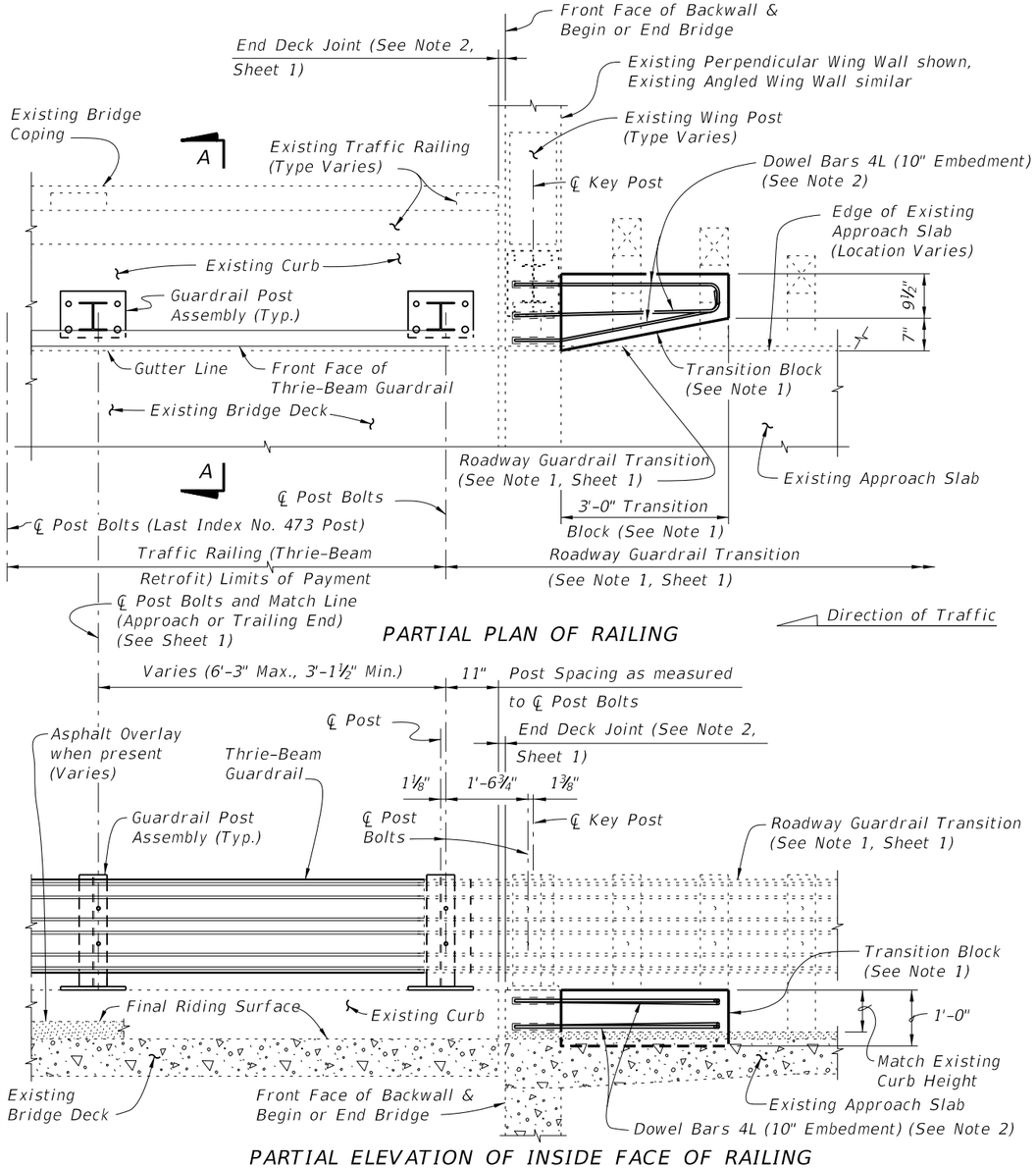


DETAIL "A"



VIEW C-C

CROSS REFERENCES:
For location of Section A-A see Sheet 1, 3 and 4.
For location of Section B-B see Sheet 4.
For location of View C-C see Sheet 3.
For Traffic Railing Notes and Details see Index No. 470.
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

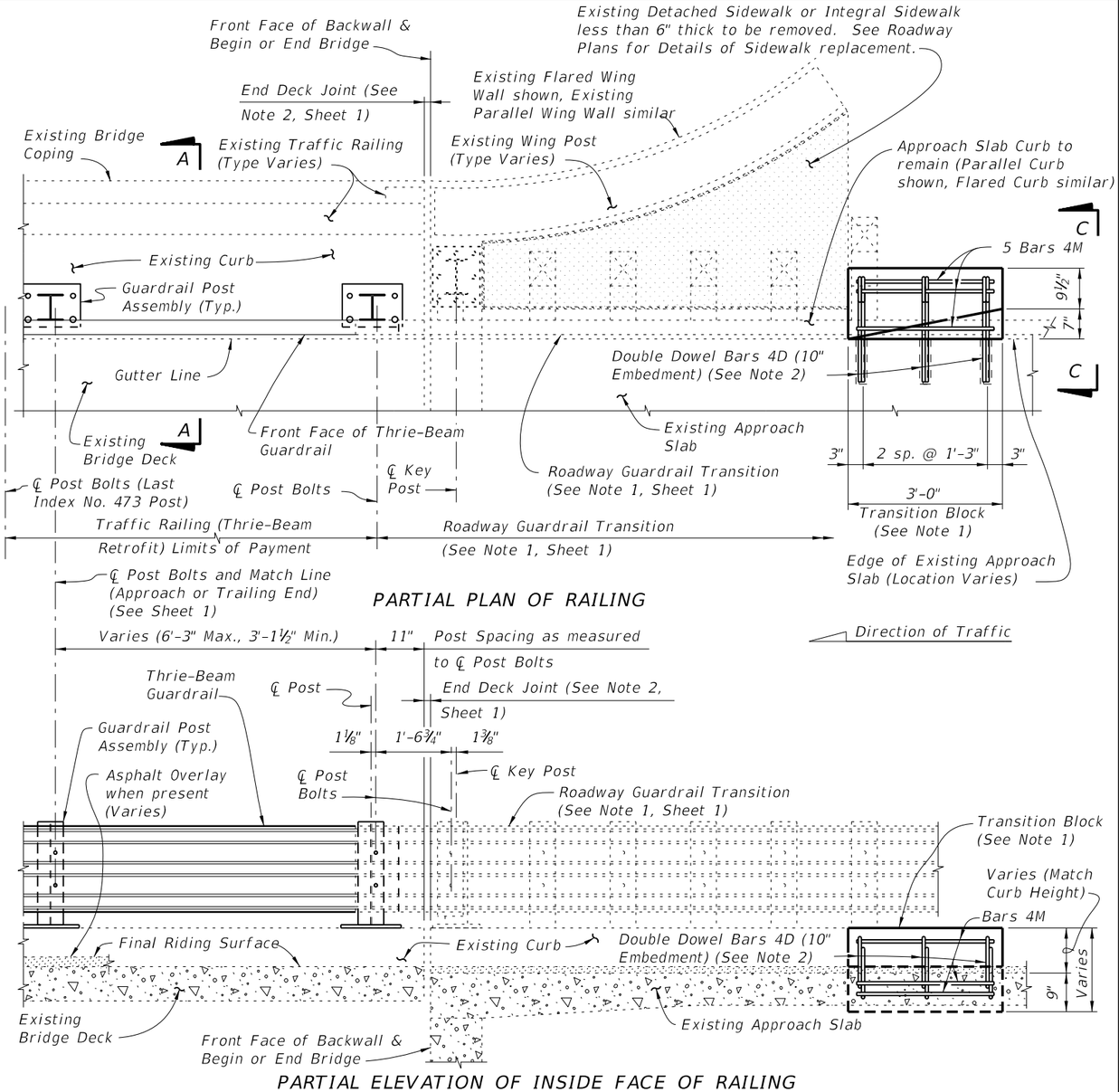
SCHEME 1

RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEME 2

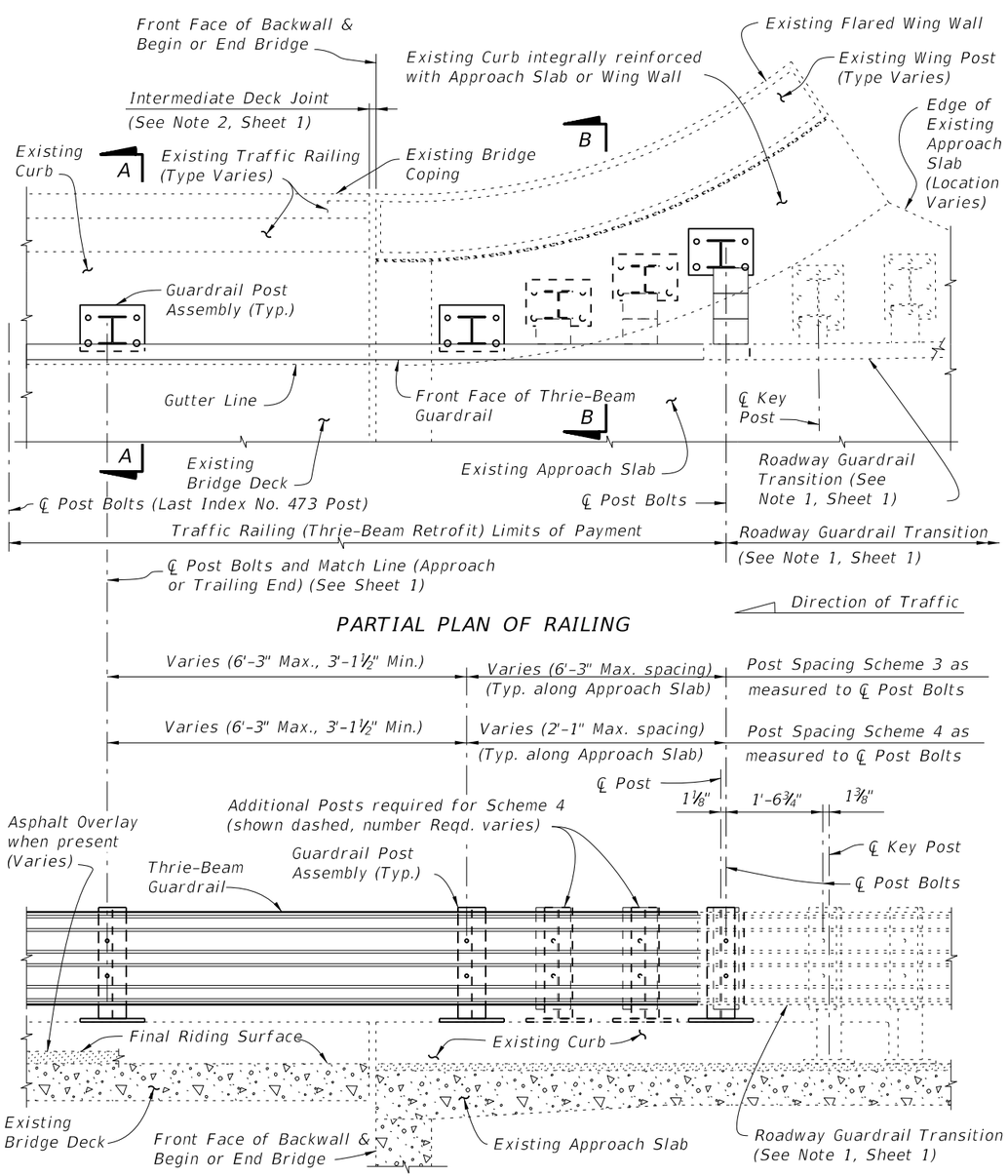
RAILING END TREATMENT FOR PARALLEL OR FLARED CURBS WITH DETACHED SIDEWALKS OR INTEGRAL SIDEWALK LESS THAN 6" THICK

SCHEME 2 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic and on bridges with flared Approach Slab Curbs.

2. Field bend or tilt Dowel Bars 4D and Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

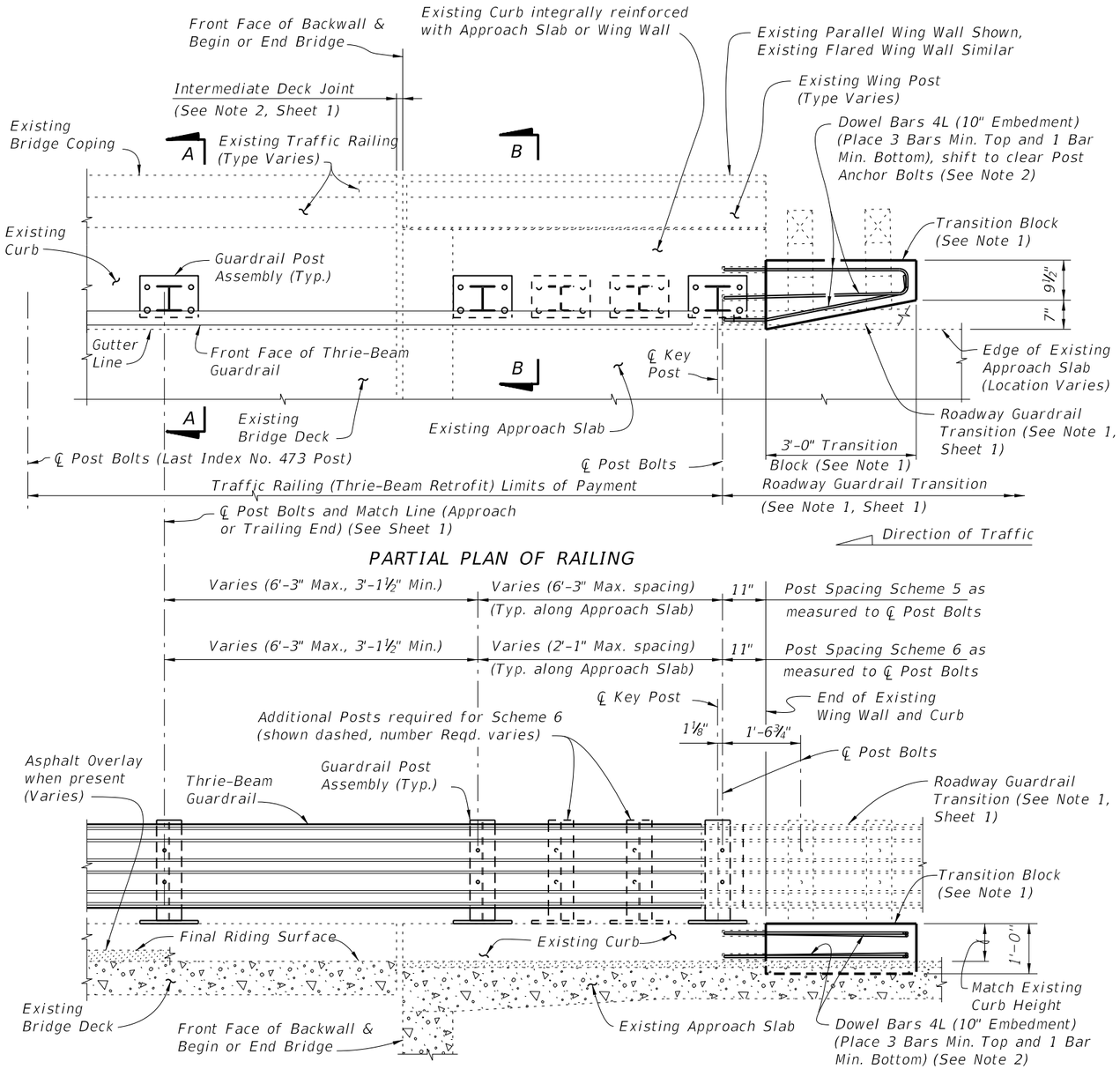
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE STRONG CURB TYPE 2	473	3



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 3 AND 4
RAILING END TREATMENT FOR FLARED INTEGRAL CURBS



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 5 AND 6
RAILING END TREATMENT FOR PARALLEL INTEGRAL CURBS

SCHEMES 5 AND 6 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

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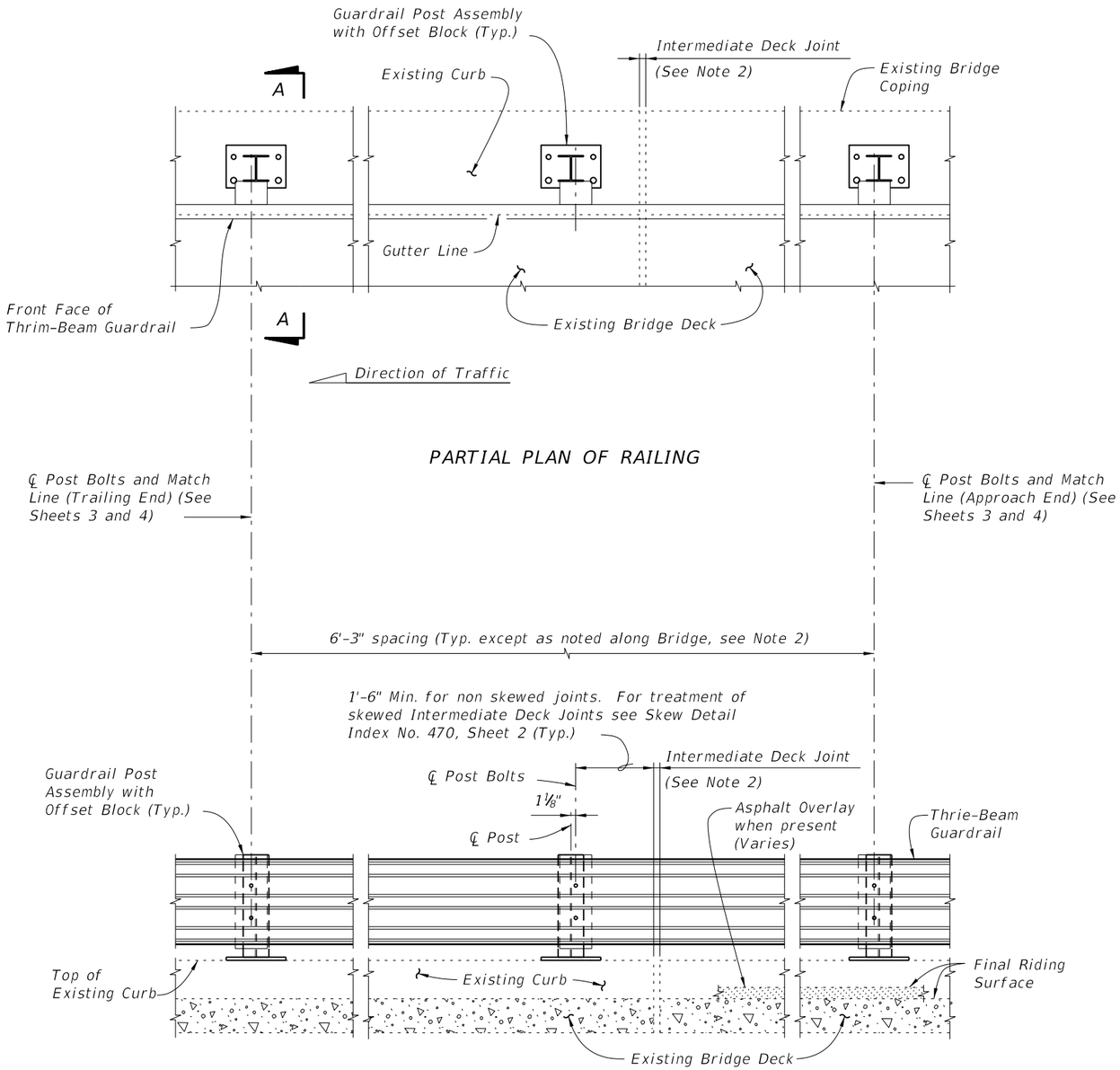
LAST REVISION	REVISION	DESCRIPTION:				
01/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE STRONG CURB TYPE 2	INDEX NO. 473	SHEET NO. 4



PARTIAL ELEVATION OF INSIDE FACE OF RAILING

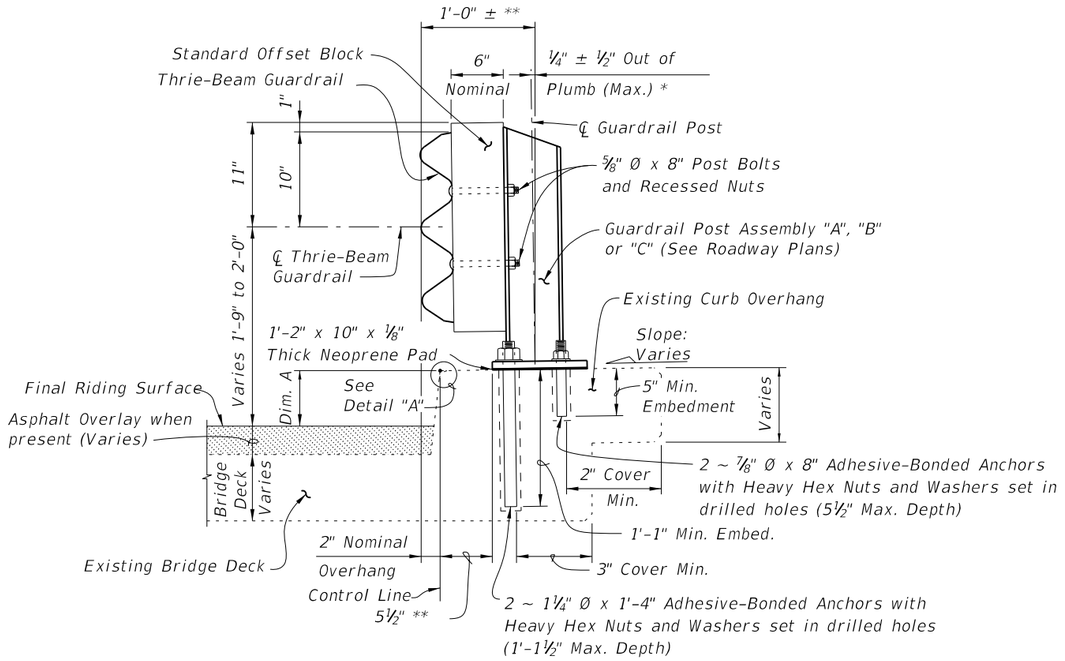
TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

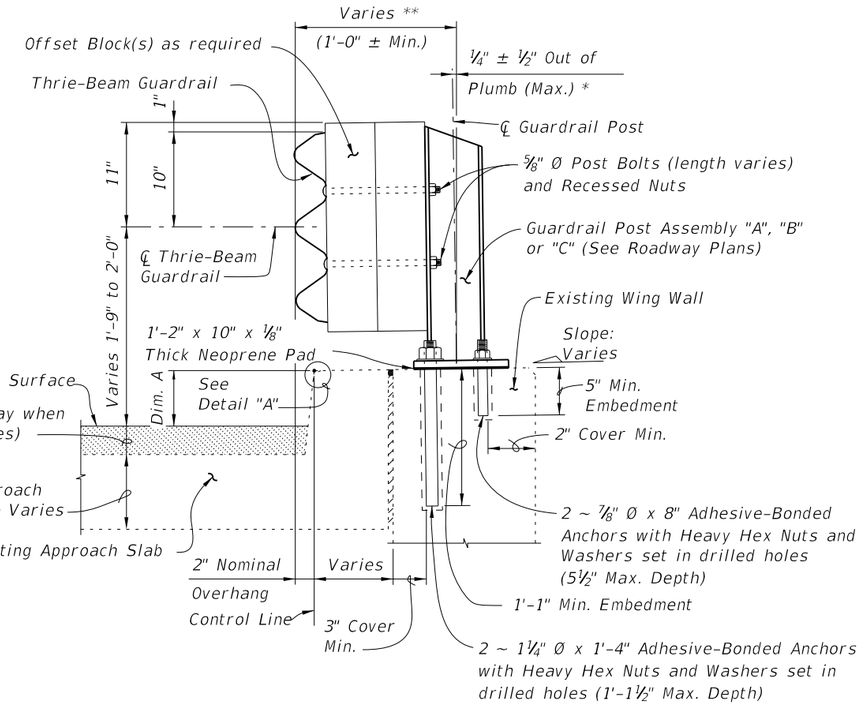
1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:
For Match Line see Sheets 3 & 4.
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.

LAST REVISION	REVISION	DESCRIPTION:				
01/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) INTERMEDIATE CURB	INDEX NO. 474	SHEET NO. 1



SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK

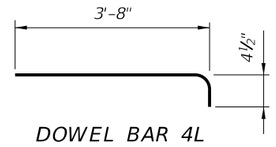


SECTION B-B (SCHEME 2)
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB

* Shim with washers around Anchor Bolts and Anchors as required to maintain tolerance.

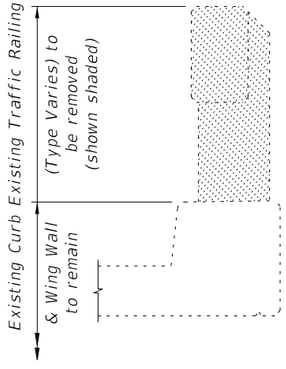
** Offset may vary ± 1" for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
L	4	4'-1"
BAR BENDING DIAGRAM		

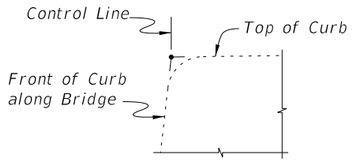


DOWEL BAR 4L

NOTE: All bar dimensions are out to out.



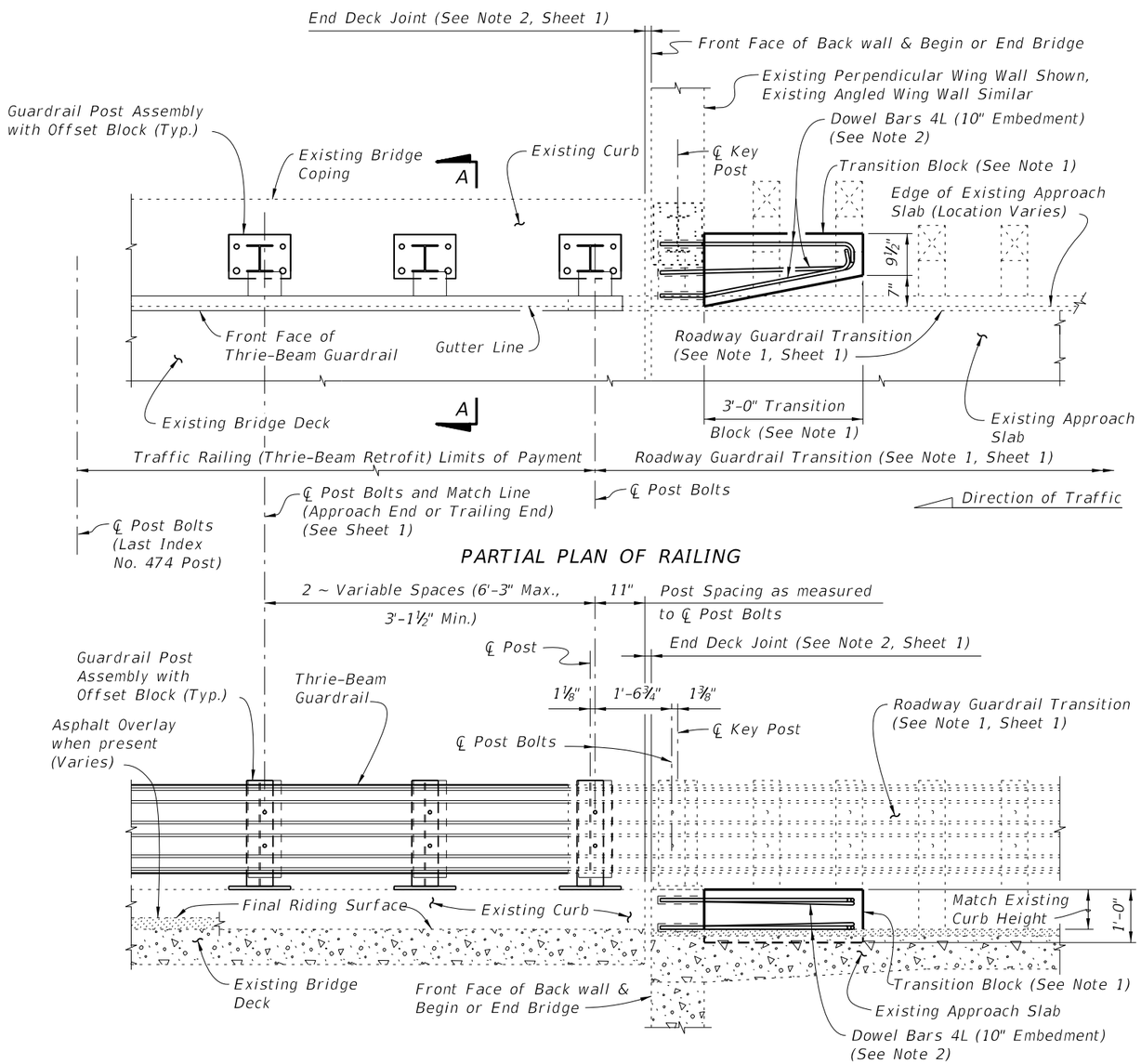
TYPICAL SECTION THRU EXISTING TRAFFIC RAILING SHOWING LIMITS OF REMOVAL (BRIDGE DECK SHOWN, WING WALL SIMILAR)



DETAIL "A"

CROSS REFERENCES:
For location of Section A-A see Sheet 1 and 3.
For location of Section B-B see Sheet 3
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.

LAST REVISION	REVISION	DESCRIPTION:				
07/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) INTERMEDIATE CURB	INDEX NO. 474	SHEET NO. 2



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING

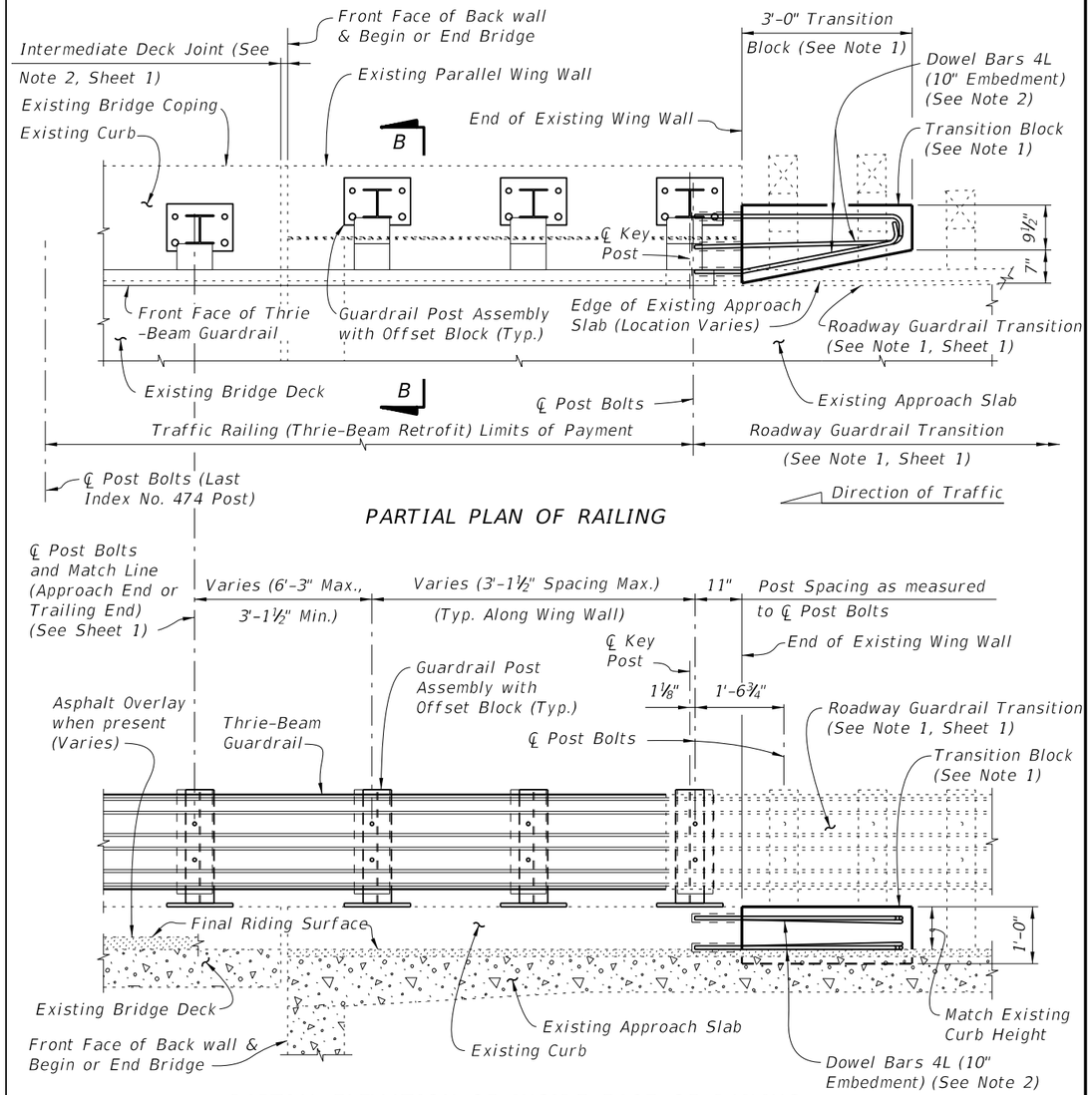
SCHEME 1

RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING

SCHEME 2

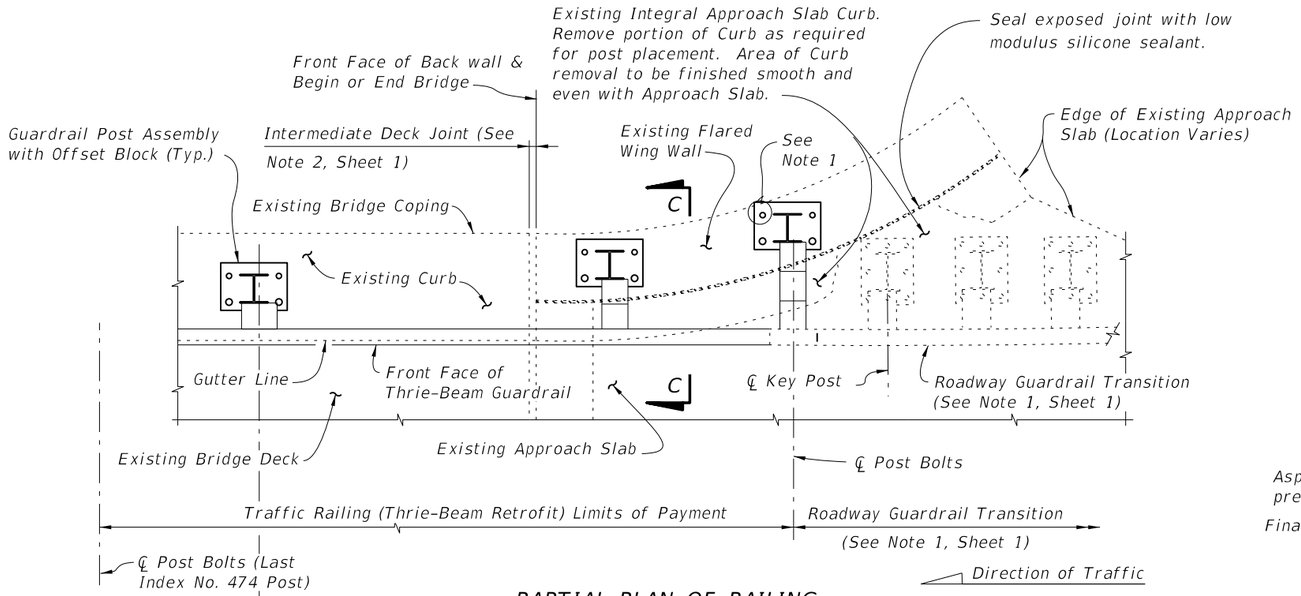
RAILING END TREATMENT FOR PARALLEL WING WALLS

SCHEME 2 NOTES:

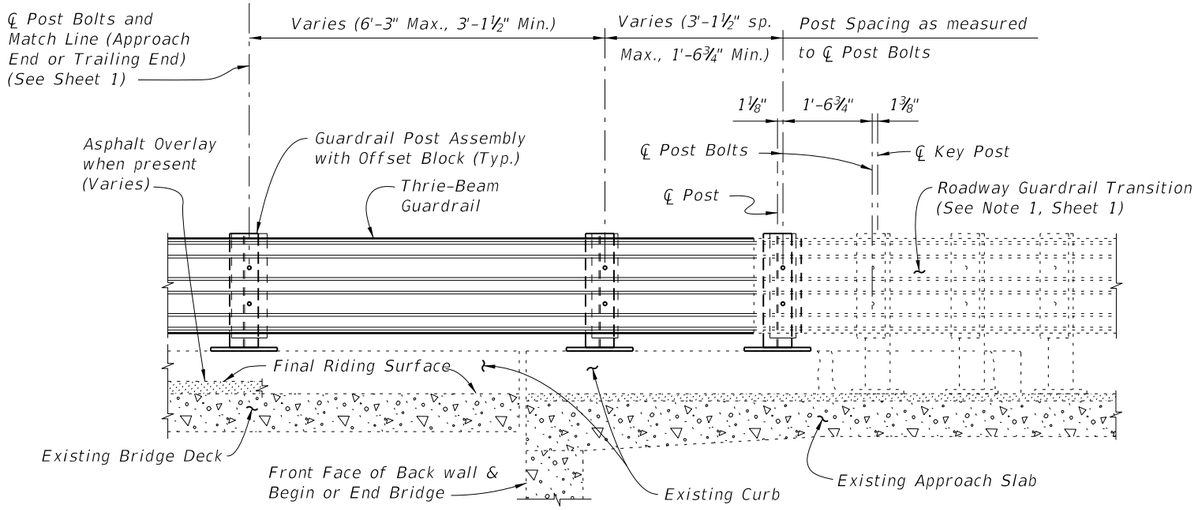
1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) INTERMEDIATE CURB	474	3

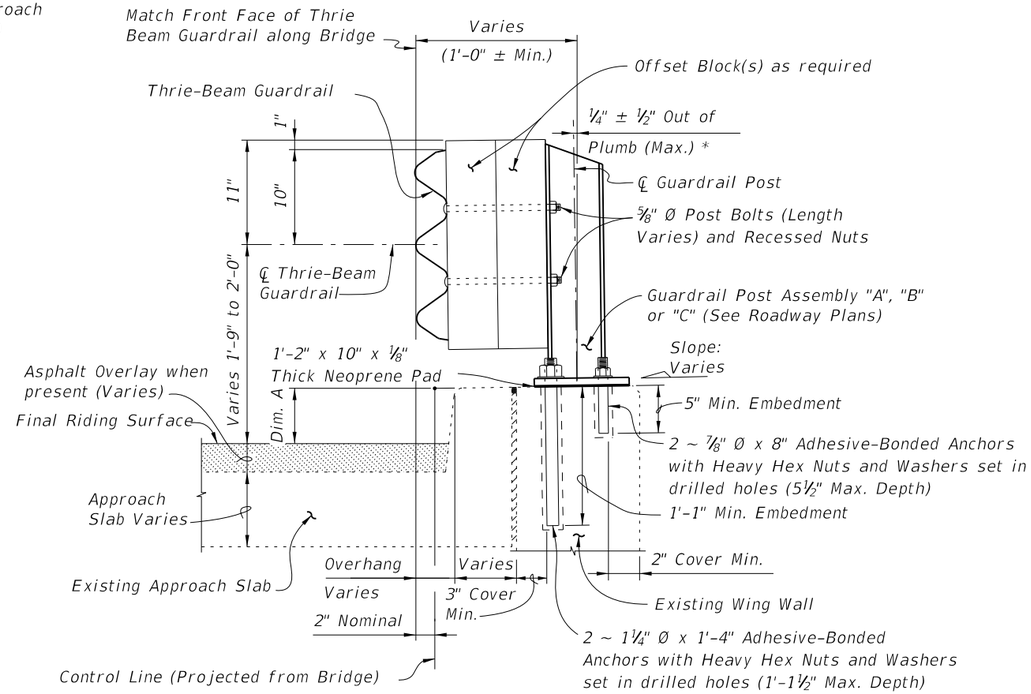


PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING

SCHEME 3
RAILING END TREATMENT FOR FLARED WING WALLS



SECTION C-C (SCHEME 3)
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB

SCHEME 3 NOTE:

1. A single ⅞" Ø x 8" Adhesive-Bonded Anchor may be omitted as shown when 2" clear cover cannot be provided (see Section C-C).

CROSS REFERENCE:
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.

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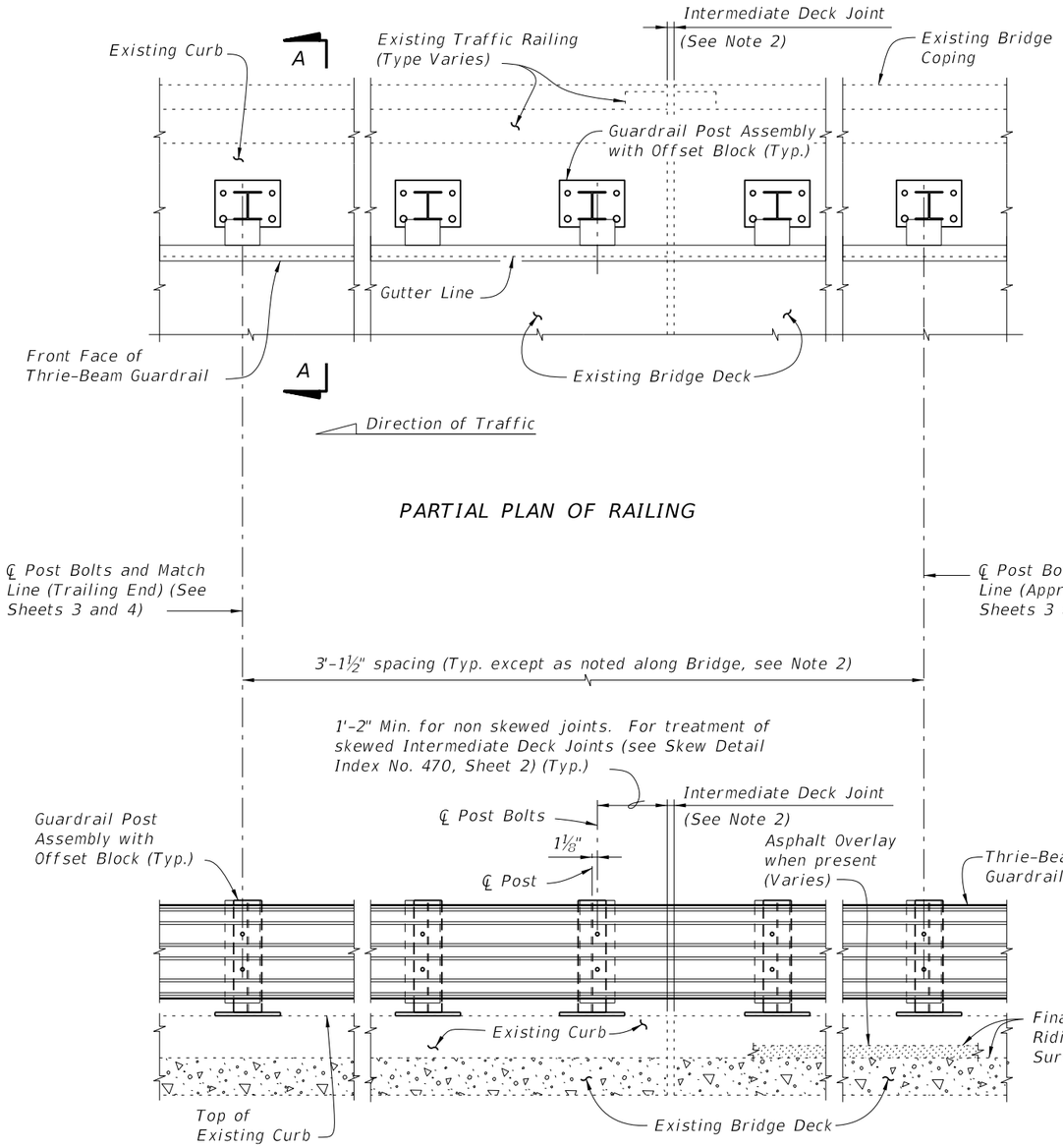
LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/09			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) INTERMEDIATE CURB	474	4



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing not shown for clarity)

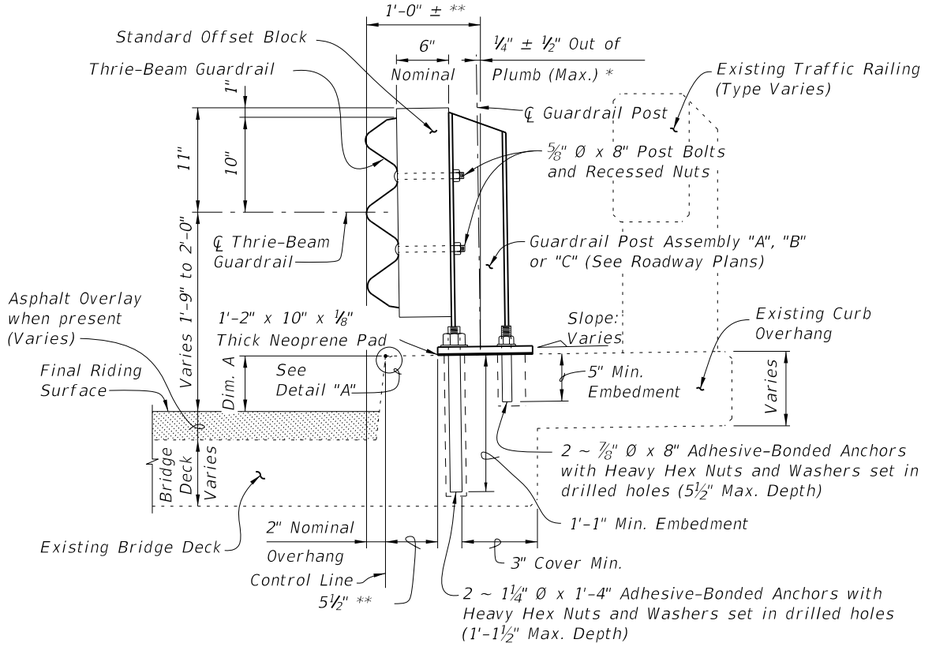
TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

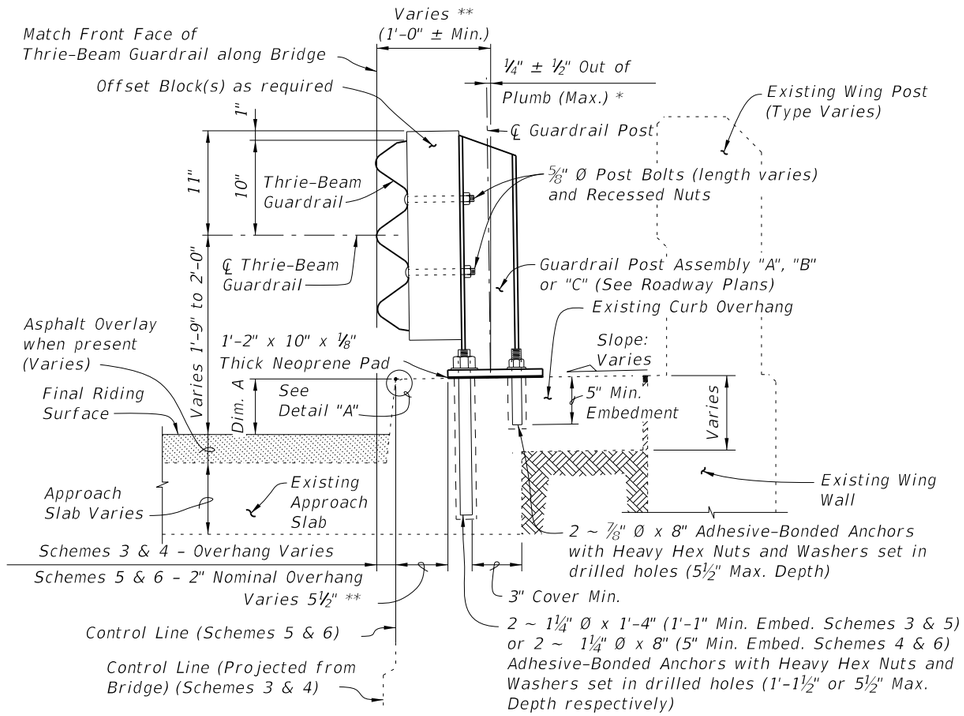
1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.

LAST REVISION	REVISION	DESCRIPTION:				
01/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE CURB TYPE 1	INDEX NO. 475	SHEET NO. 1



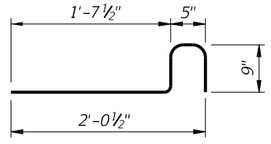
SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



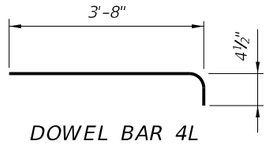
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 5 AND 6 SHOWN, SCHEMES 3 AND 4 SIMILAR)

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
D	4	3'-7"
L	4	4'-1"
M	4	2'-8"

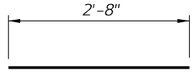
BAR BENDING DIAGRAMS



DOWEL BAR 4D



DOWEL BAR 4L

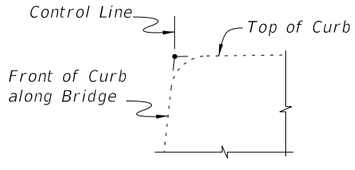


BAR 4M

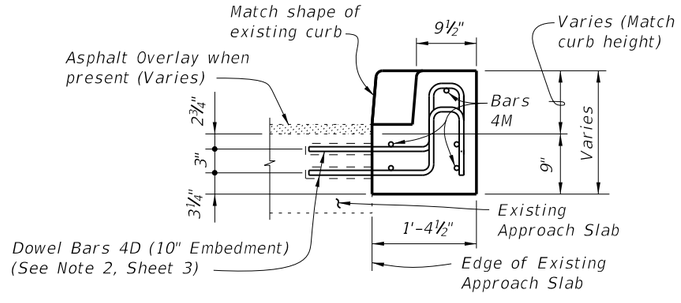
NOTE: All bar dimensions are out to out.

* Shim with washers around Anchors as required to maintain tolerance.

** Offset may vary ± 1" for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

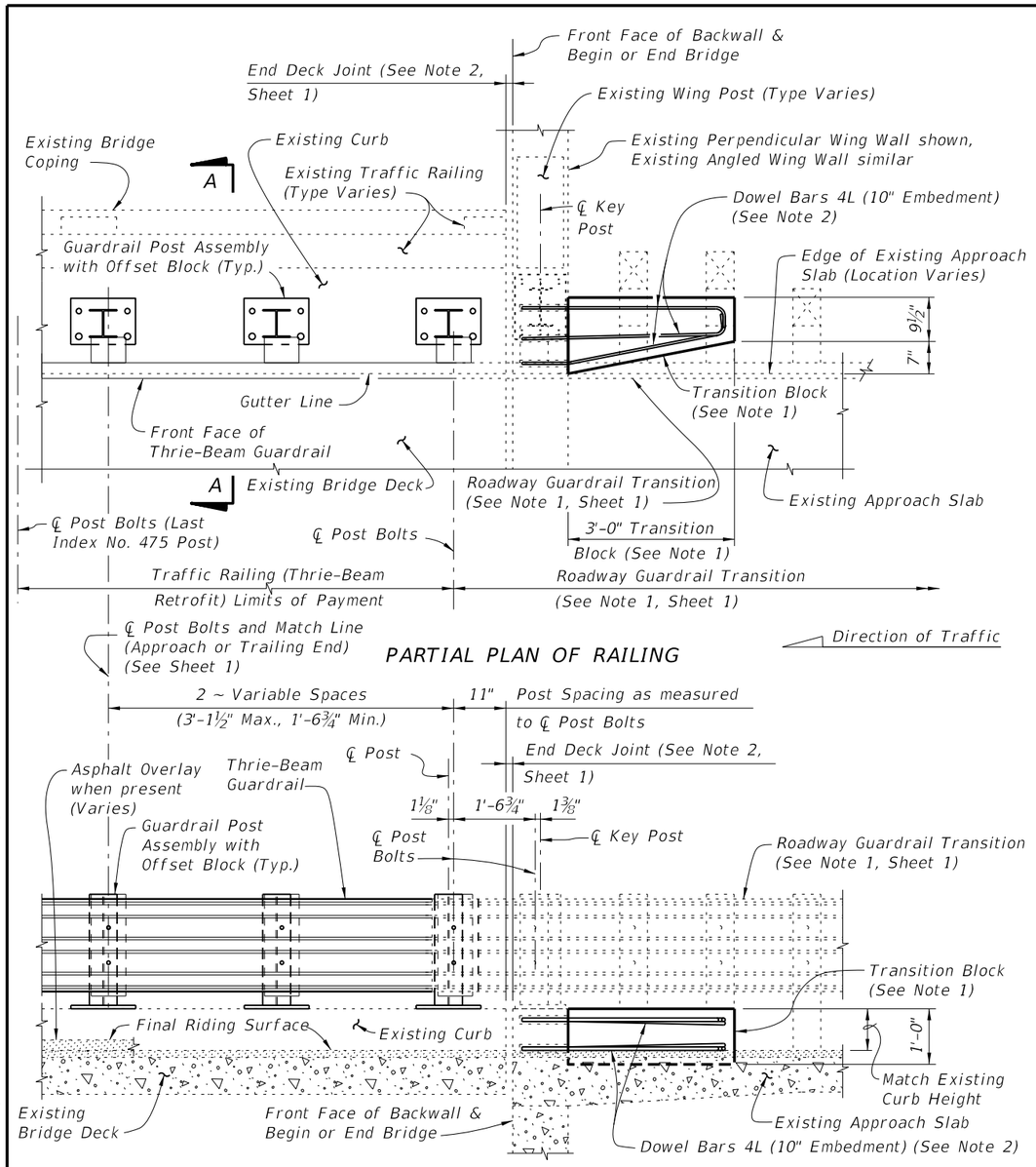


DETAIL "A"



VIEW C-C

CROSS REFERENCES:
For location of Section A-A see Sheet 1, 3 & 4.
For location of Section B-B see Sheet 4.
For location of View C-C see Sheet 3.
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

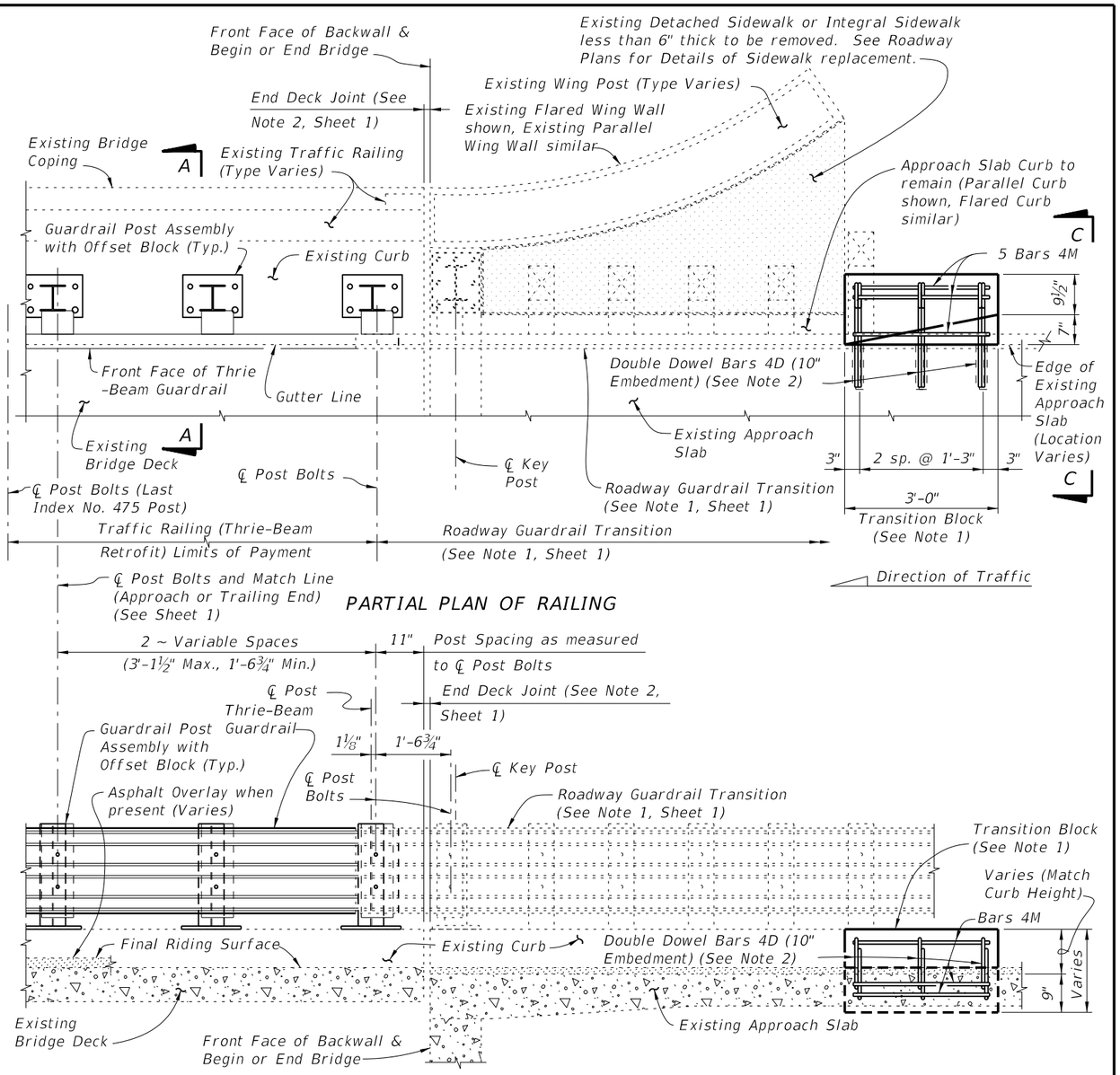
SCHEME 1

RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEME 2

RAILING END TREATMENT FOR PARALLEL OR FLARED CURBS WITH DETACHED SIDEWALKS OR INTEGRAL SIDEWALKS LESS THAN 6" THICK

SCHEME 2 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic and on bridges with flared Approach Slab Curbs.

2. Field bend or tilt Dowel Bars 4D and Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE CURB TYPE 1	475	3

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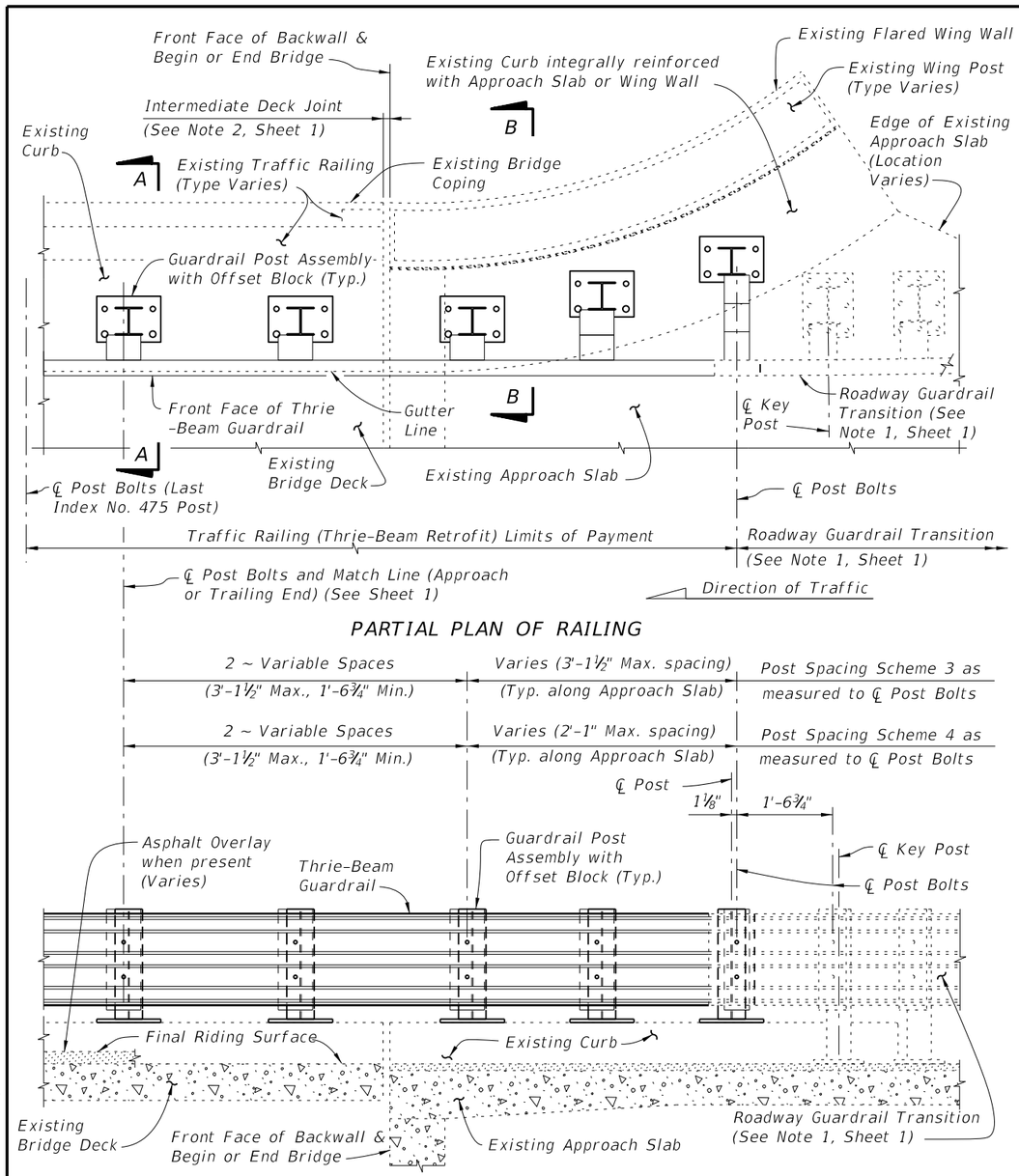
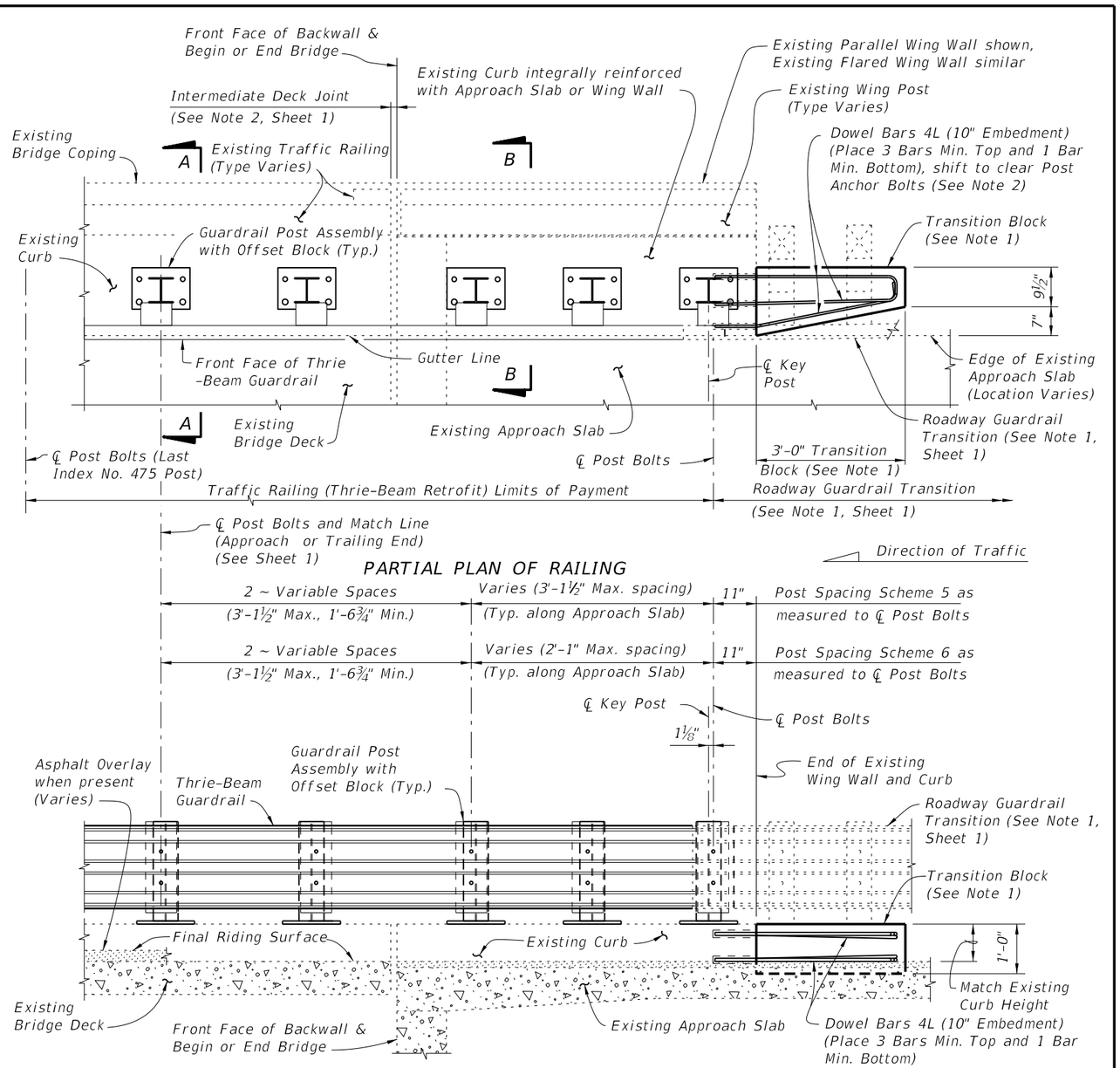


PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 3 AND 4
RAILING END TREATMENT FOR FLARED INTEGRAL CURBS



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

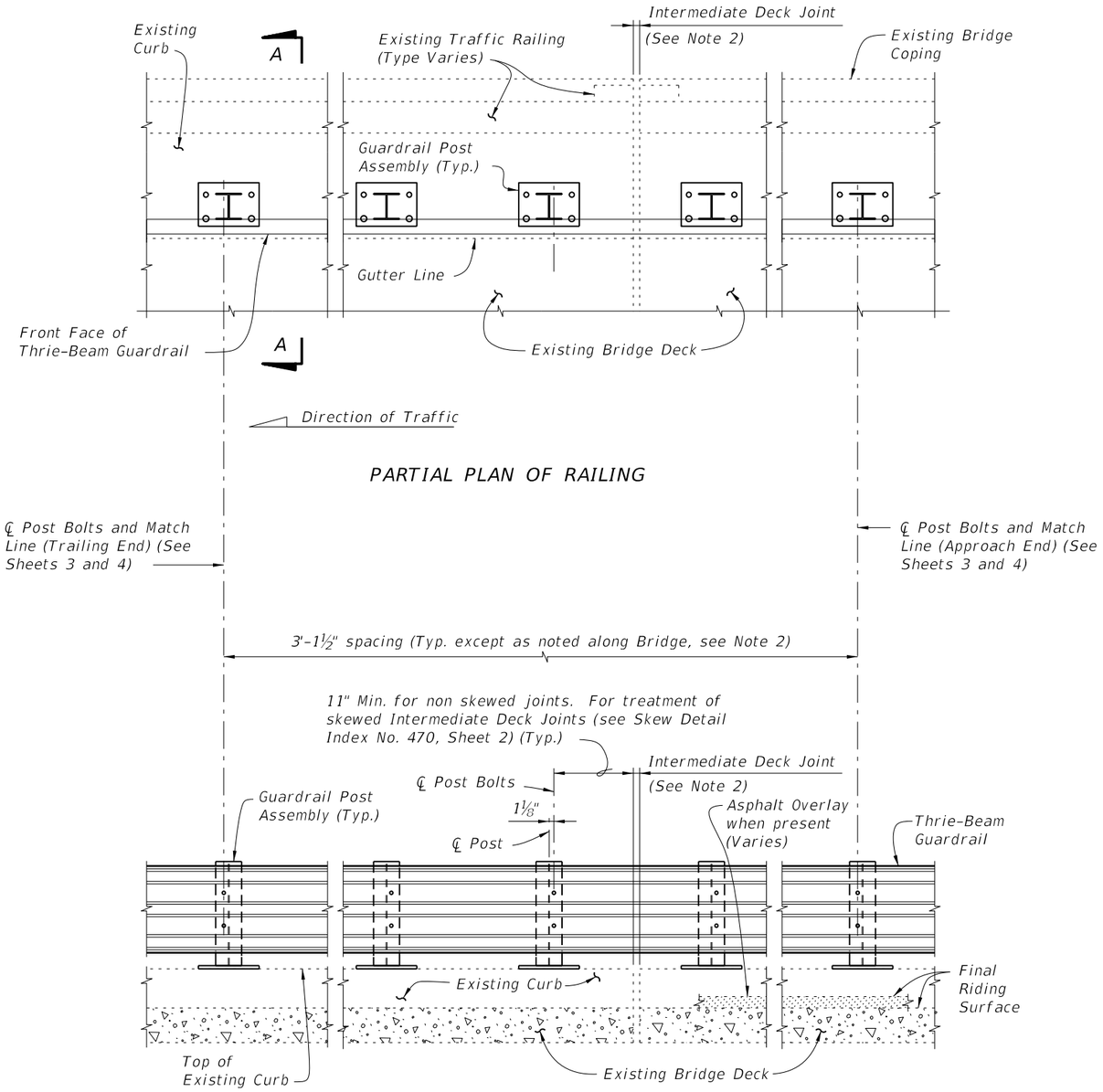
SCHEMES 5 AND 6
RAILING END TREATMENT FOR PARALLEL INTEGRAL CURBS

SCHEMES 5 AND 6 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE CURB TYPE 1	INDEX NO.	SHEET NO.
01/01/08						475	4



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing not shown for clarity)

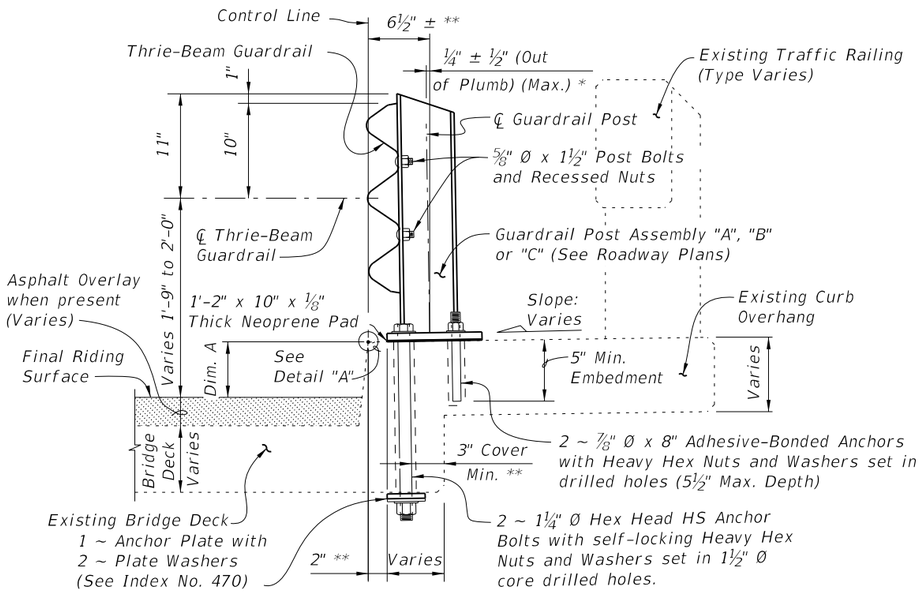
TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

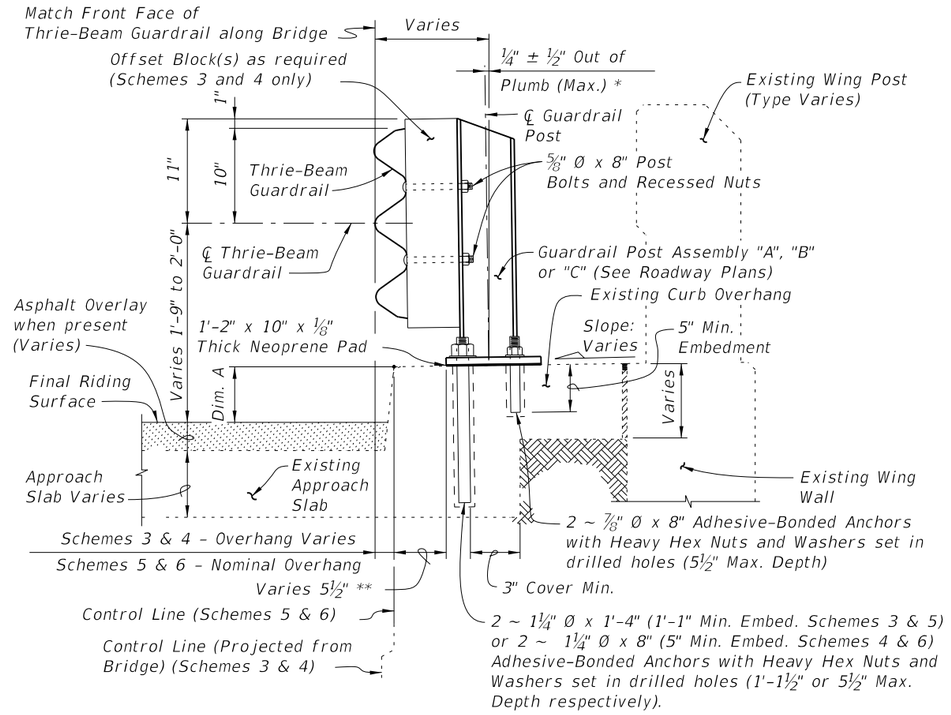
1. On approach end provide Index No. 402 (as shown) or other site specific treatment, see Roadway Plans. For treatment of trailing end see Roadway Plans.
2. Actual joint dimension and orientation vary. For Intermediate Deck Joints use the Modified Post Spacing at Intermediate Deck Joints Detail, Index No. 470, Sheet 2, as required.
3. Areas where existing structure has been removed shall match adjoining areas and shall be finished flat by grouting or grinding as required. Exposed existing reinforcing steel shall be burned off 1" below existing concrete and grouted over.

CROSS REFERENCES:
For Section A-A see Sheet 2.
For Traffic Railing Notes and Details see Index No. 470.

LAST REVISION	REVISION	DESCRIPTION:				
01/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE CURB TYPE 2	INDEX NO. 476	SHEET NO. 1



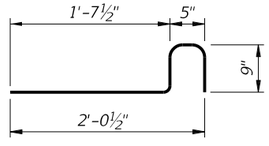
SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



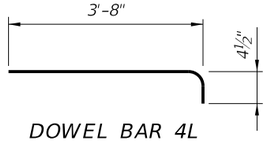
SECTION B-B
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEMES 5 AND 6 SHOWN, SCHEMES 3 AND 4 SIMILAR)

BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
D	4	3'-7"
L	4	4'-1"
M	4	2'-8"

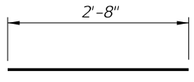
BAR BENDING DIAGRAMS



DOWEL BAR 4D



DOWEL BAR 4L

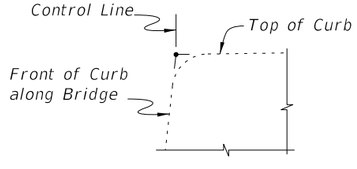


BAR 4M

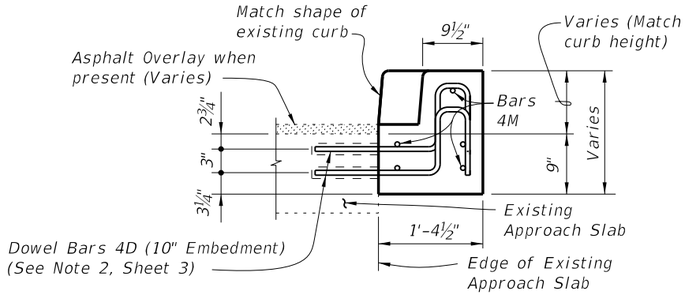
NOTE: All bar dimensions are out to out.

* Shim with washers around Anchors as required to maintain tolerance.

** Offset may vary ± 1" for Adhesive-Bonded Anchors to clear existing curb reinforcing and provide minimum edge clearance. Offset shall be consistent along length of bridge.

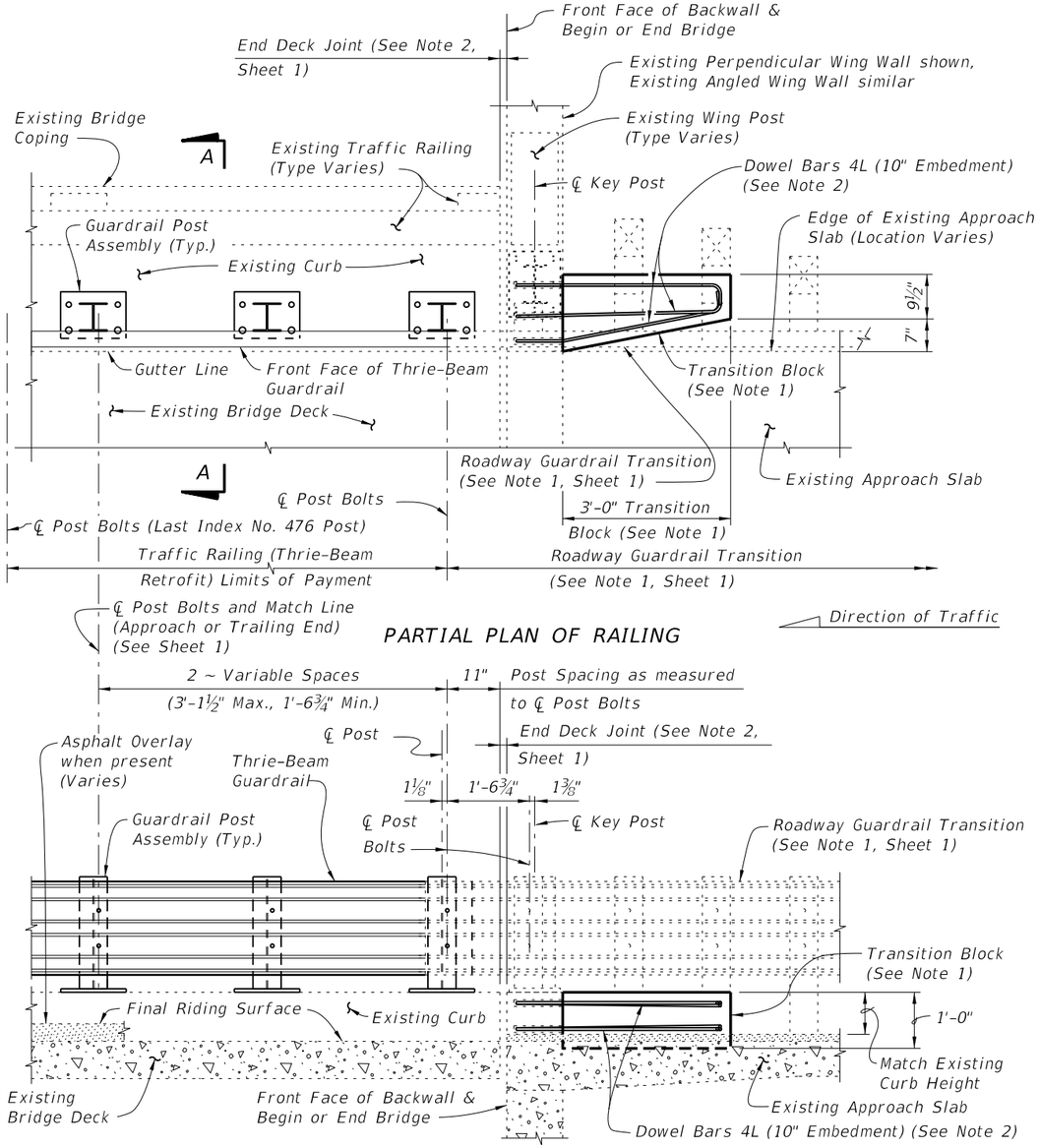


DETAIL "A"



VIEW C-C

CROSS REFERENCES:
For location of Section A-A see Sheet 1, 3 & 4.
For location of Section B-B see Sheet 4.
For location of Section C-C see Sheet 3.
For application of Dim. A see Post Dimension Table on Index 470, Sheet 3.



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

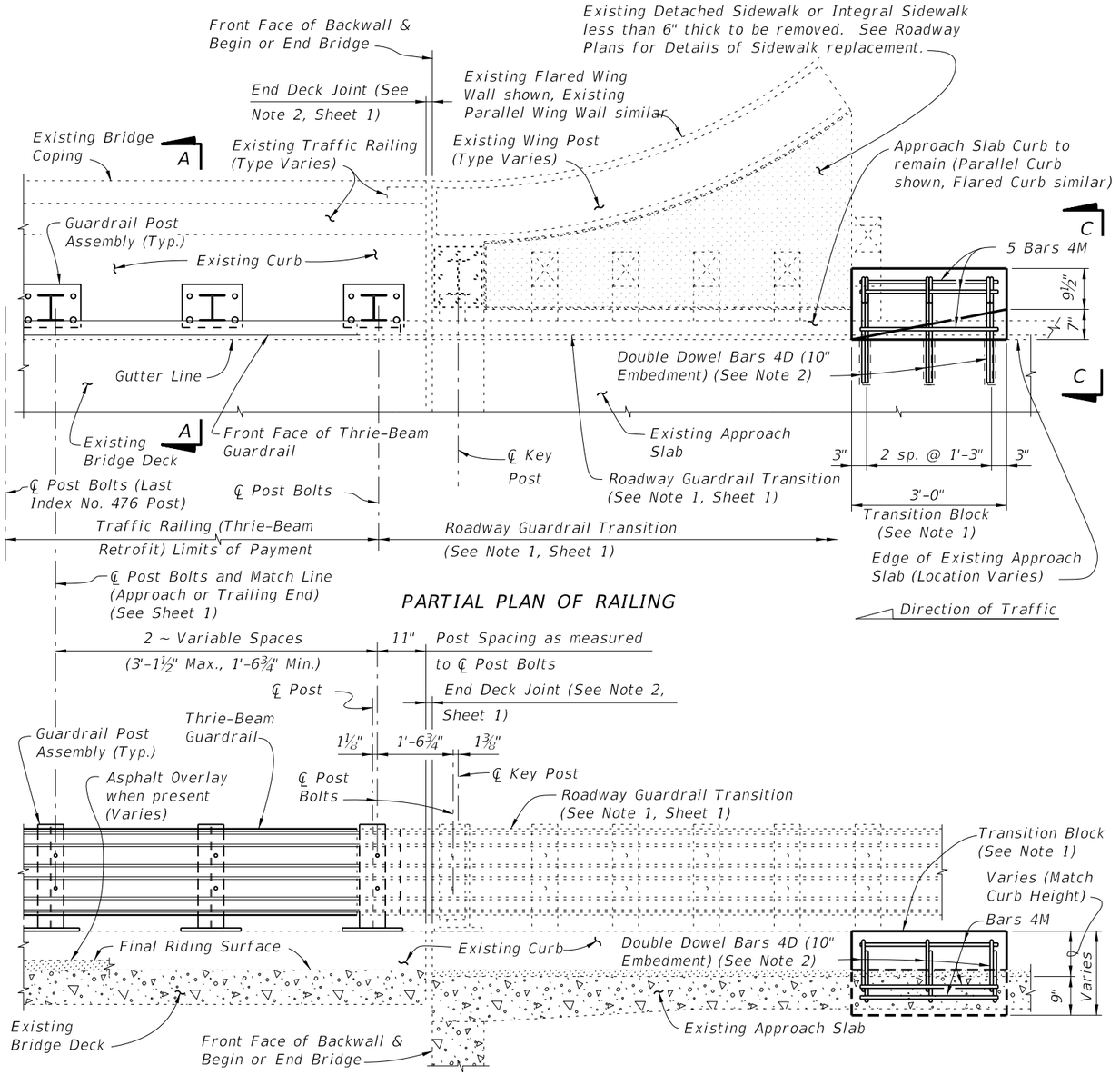
SCHEME 1

RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEME 2

RAILING END TREATMENT FOR PARALLEL OR FLARED CURBS WITH DETACHED SIDEWALKS OR INTEGRAL SIDEWALK LESS THAN 6" THICK

SCHEME 2 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic and on bridges with flared Approach Slab Curbs.

2. Field bend or tilt Dowel Bars 4D and Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
01/01/08			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE CURB TYPE 2	476	3

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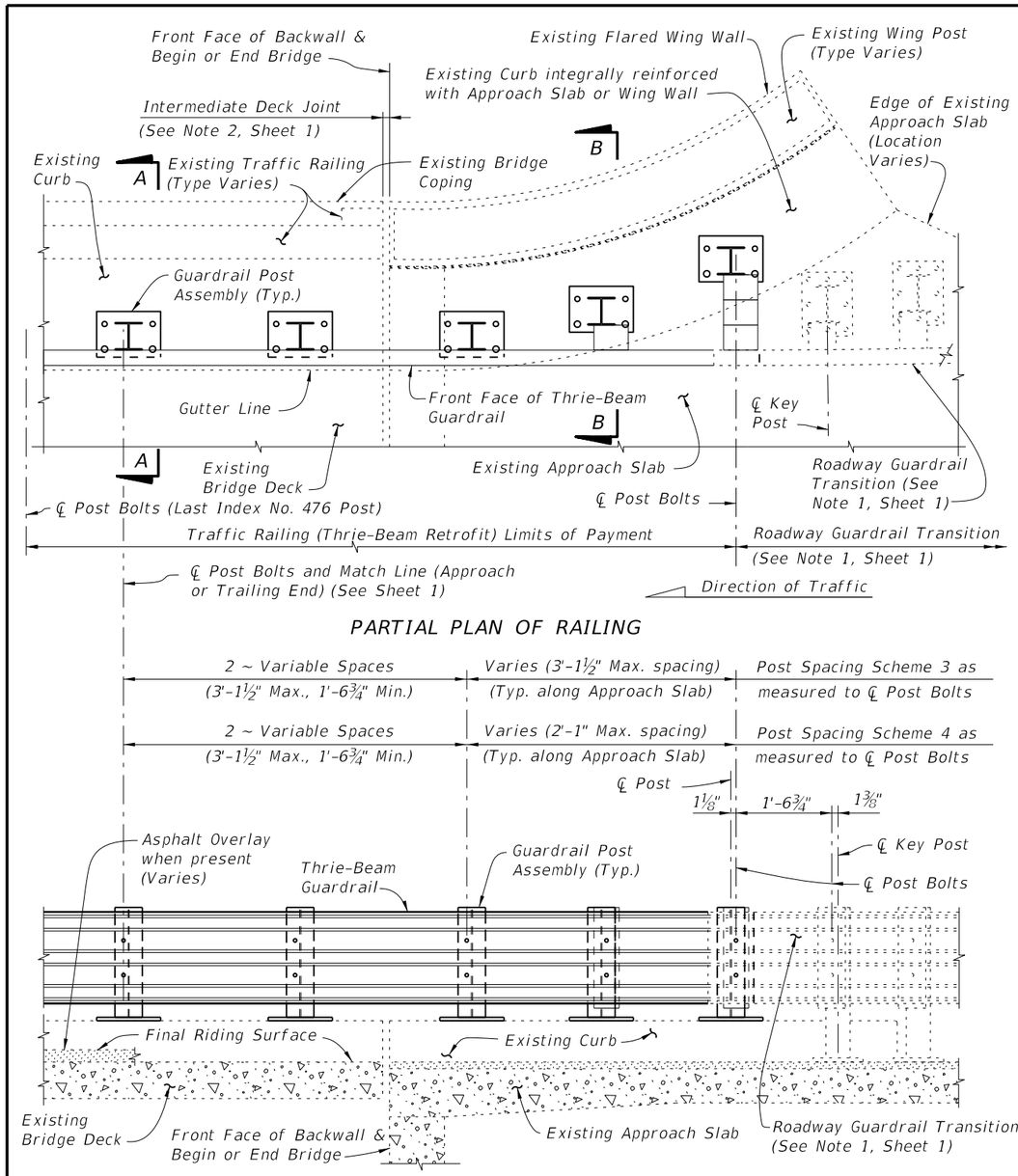
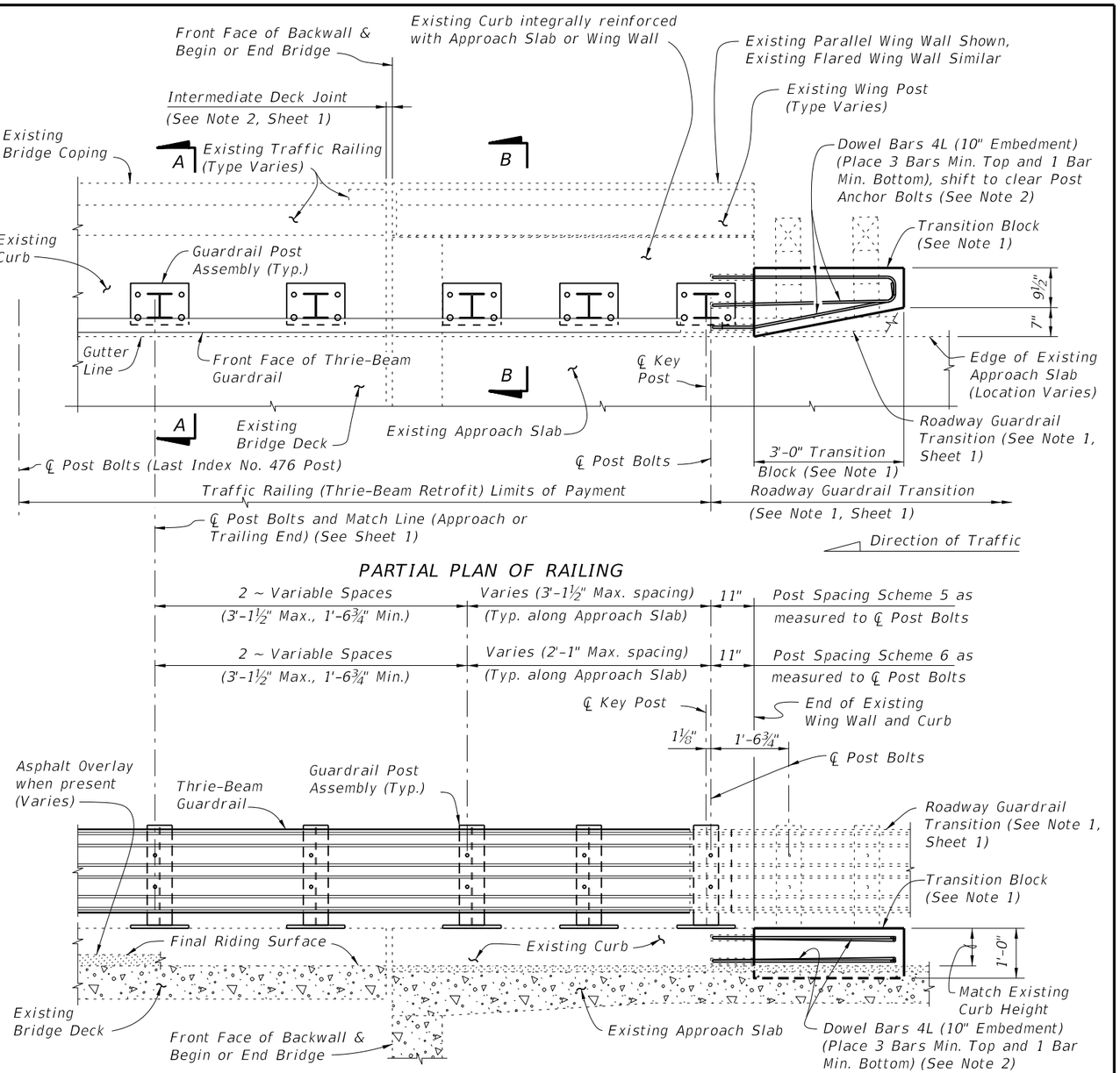


PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 3 AND 4
RAILING END TREATMENT FOR FLARED INTEGRAL CURBS



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post and Traffic Railing not shown for clarity)

SCHEMES 5 AND 6
RAILING END TREATMENT FOR PARALLEL INTEGRAL CURBS

SCHEMES 5 AND 6 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend to end of Approach Slab. Shape and height of Transition Block or Curb shall match existing bridge curb. Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (THRIE-BEAM RETROFIT) WIDE CURB TYPE 2	INDEX NO.	SHEET NO.
01/01/08						476	4

TRAFFIC RAILING NOTES

This Traffic Railing Retrofit has been structurally evaluated to be equivalent or greater in strength to a design which has been successfully crash tested previously and approved for a NCHRP Report 350 Test Level 4 rating, except for the Tapered End Transition on Index No. 484.

CONCRETE: Concrete for the Traffic Railing (Vertical Face Retrofit), Spread Footing Approaches and replacement curb sections shall be Class IV. Concrete for Curb Transition Blocks shall be Class II (Bridge Deck).

REINFORCING STEEL: Reinforcing steel shall be ASTM A615, Grade 60, except Expansion Dowel Bar B which shall be ASTM A36 smooth round bar hot-dip galvanized in accordance with the Specifications.

EXPANSION SLEEVE ASSEMBLY: Pipe sleeve shall be ASTM D2241 PVC pipe, SDR13.5. End Cap shall be ASTM D2466 PVC socket fitting, Schedule 40. End of Sleeve assembly at railing open joint shall be sealed with silicone to prevent concrete intrusion during railing casting. A compressible expanded polystyrene plug is required in the opposite end of the assembly for correct dowel positioning during railing casting. Correct dowel positioning is required in order to provide for thermal movement of the deck.

ADHESIVE-BONDED ANCHORS AND DOWELS: Adhesive Bonding Material Systems for Anchors and Dowels shall comply with Specification Section 937 and be installed in accordance with Specification Section 416. The field testing proof loads required by Specification Section 416 shall be 23,800 lbs. for Dowel Bars 6D on the inside face (traffic side) of the railing (1'-0" embedment) and 18,500 lbs for Dowel Bars 6D along the outside face of the traffic railing (5" min. embedment).

BRIDGES ON CURVED ALIGNMENTS: The details presented in these Standards are shown for bridges on tangent alignments. Details for bridges on horizontally curved alignments are similar.

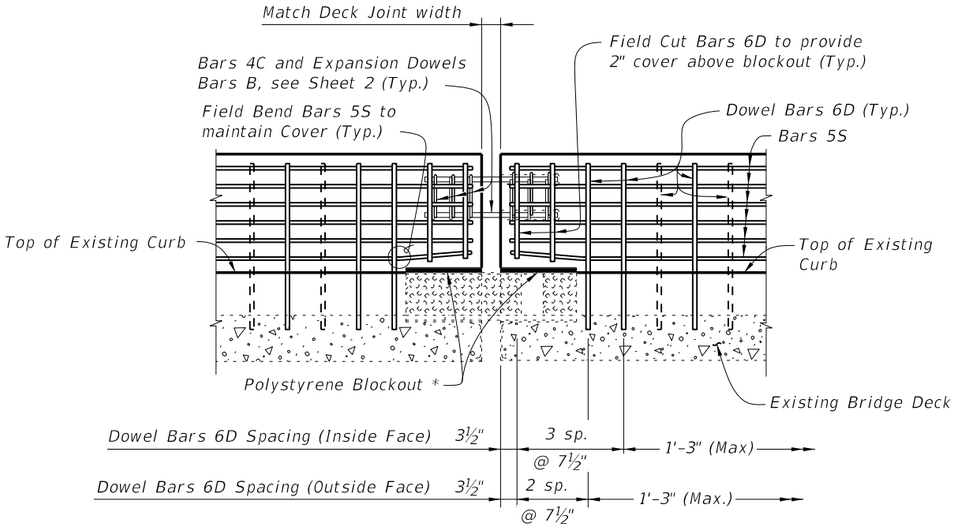
NAME, DATE AND BRIDGE NUMBER: The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Date shall be the year the bridge was constructed. Letters and figures may be 3" tall black plastic as approved by the Engineer or ⅜" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

ELEVATION MARKERS: Elevation Markers shall be placed on the top surface of the end bents as directed by the Engineer when portions of the existing traffic railing carrying existing elevation markers are removed. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The Department will determine the vertical Datum information for the marker.

SURFACE FINISH: Unless otherwise shown in the Plans, place a Class 5 Applied Finish Coating on the top and sides of the Traffic Railing (Vertical Face Retrofit).

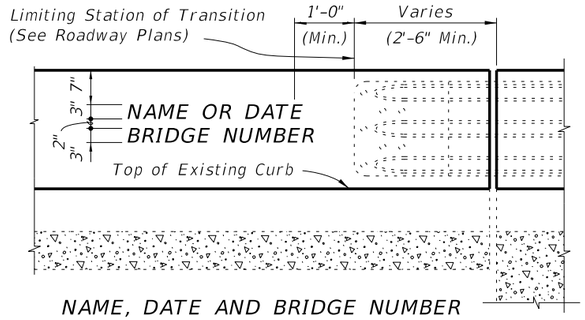
REFLECTIVE RAILING MARKERS: Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table below. Reflector color (white or yellow) shall match the color of the near edgeline.

PAYMENT: Payment under Traffic Railing (Vertical Face Retrofit) include all materials and labor required to construct the railing. Incidental work as required for transition blocks, curbs, spread footings approaches, reflective railing markers (including installation) shall also be included under Traffic Railing (Vertical Face Retofit).



PARTIAL ELEVATION OF RAILING SHOWING INTERIOR FINGER/SLIDING PLATE JOINT
(Beam/Girder, Intermediate Bent or Pier not shown for clairty)

* Place 1" thick polystyrene blockout over limits of bridge deck expansion joint full width to the end of the Traffic Railing to allow for thermal movement. Seal Forms to prevent mortar leakage into the expansion joint.

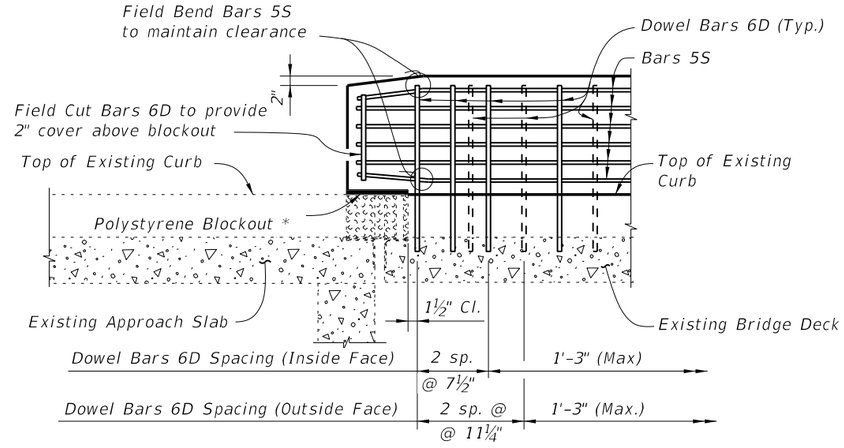


NAME, DATE AND BRIDGE NUMBER LETTERING DETAIL

REFLECTIVE RAILING MARKER SPACING	
Distance - Edge of Travel Lane to Face of Railing	Spacing (Ft.)
< 4'	40'
4' to 8'	80'
> than 8'	None Required

ESTIMATED TRAFFIC RAILING QUANTITIES			
ITEM	UNIT	QUANTITY	
		9" Curb	Increment
Concrete	CY/FT	0.064	0.003 per in. height
Reinforcing Steel	LB/FT	13.27	0.10 per in. length

(Quantities are based on a 9" curb, no curb cross slope and 1'-0" embedment length of Bars 6D. If the curb height or embedment length differs from that shown, increase or decrease quantity by the given per inch increment.) See Index No. 484, Sheet 4 for Spread Footing Approach Quantities.



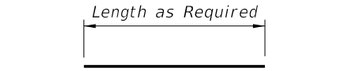
PARTIAL ELEVATION OF RAILING SHOWING SLIDING PLATE JOINT AT BEGIN OR END BRIDGE
(Scheme 1 shown, Schemes 2, 3 and 4 similar)
(Guardrail Transition or continuation of Traffic Railing not show for clarity)

LAST REVISION	REVISION	DESCRIPTION:				
07/01/10			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) GENERAL NOTES & DETAILS	INDEX NO. 480	SHEET NO. 1

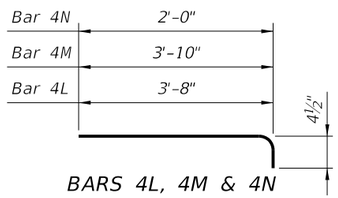
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAM

BILL OF REINFORCING STEEL

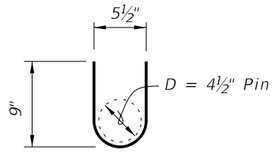
MARK	SIZE	LENGTH	INDEX NO.	NOTE NOS.
A	4	AS REQD.	482 ONLY	3
B	1" Ø	2'-0"	481 THRU 483	2 & 5
C	4	2'-0"	481 THRU 484	1, 2 & 3
D	6	AS REQD.	481 THRU 484	2 & 3
E	5	7'-4"	484 ONLY	1 & 3
F	5	4'-3"	484 ONLY	3
G	4	AS REQD.	484 ONLY	3
L	4	4'-1"	481 THRU 483	1 & 3
M	4	4'-3"	482 ONLY	1 & 3
N	4	2'-5"	482 ONLY	1 & 3
S	5	AS REQD.	481 THRU 484	2, 3 & 4



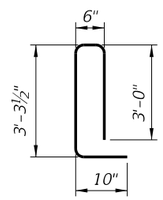
BARS 4A, B, 6D, 5F, 4G & 5S



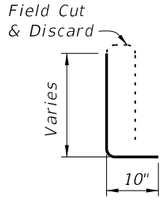
BARS 4L, 4M & 4N



BARS 4C
(12 required per open joint)

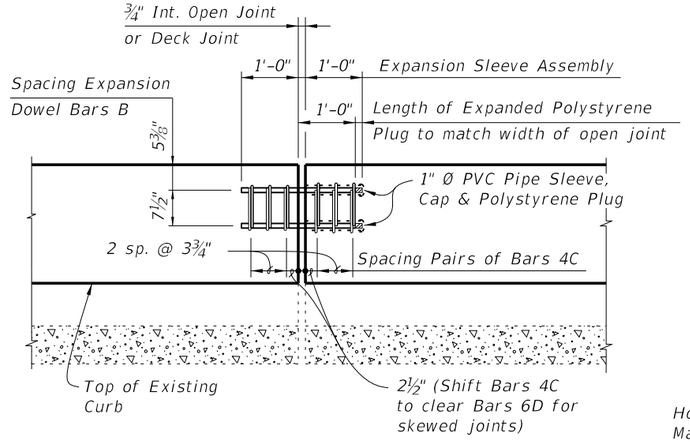


BARS 5E
(Typical Section)

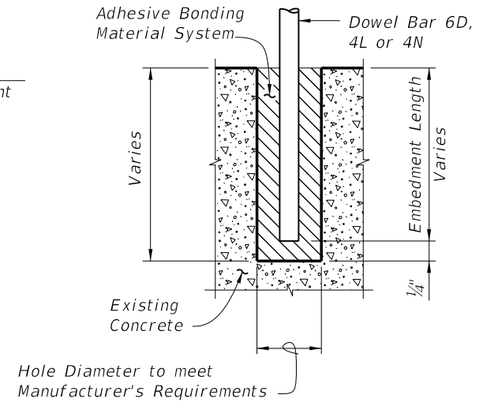


BARS 5E
(Tapered End Transition)

REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the railing on a retaining wall shall be the same as detailed for a bridge deck.
3. All reinforcing steel in the Vertical Face Retrofit Railing shall have a 2" minimum cover.
4. Bars 5S may be continuous or spliced at the construction joints. Bar splices for Bars 5S shall be a minimum of 2'-0".
5. Expansion Dowel Bars B shall be ASTM A36 smooth round bar and hot-dip galvanized in accordance with the Specifications.



OPEN JOINT EXPANSION DOWEL DETAIL
(Railing Reinforcing Not Shown For Clarity)

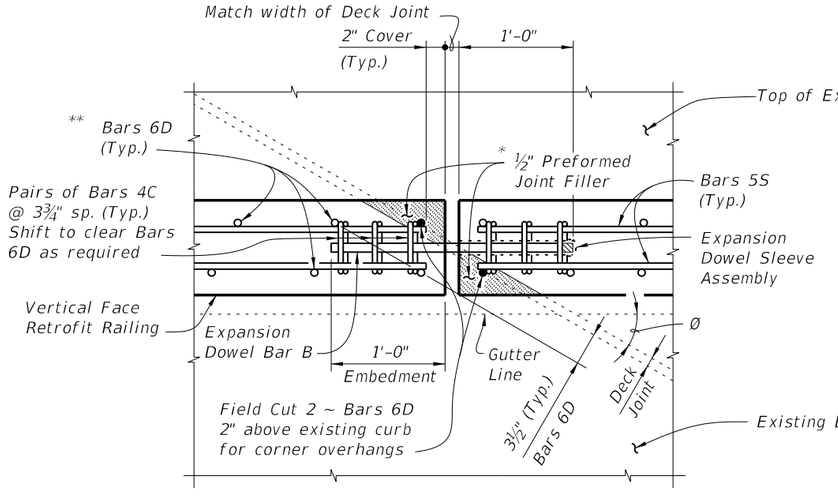


DOWEL DETAIL

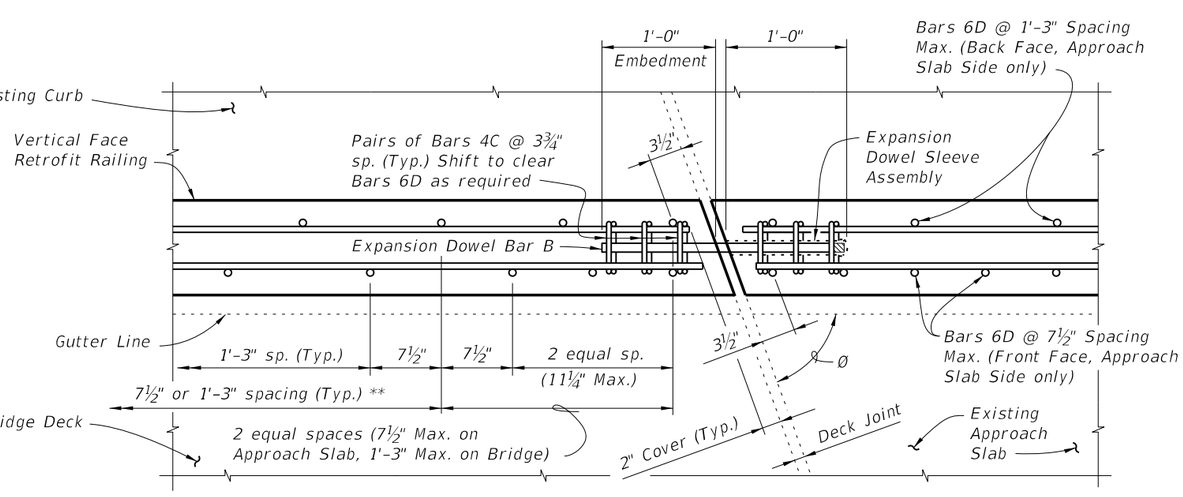
Dowel Installation Notes:
1. Shift dowel holes to clear if the existing reinforcement is encountered.
2. See individual Standards Index Nos. 481 thru 484 for required embedment length of Bars 6D, 4L or 4N.

* ½" Preformed Joint Filler at top of Existing Curb shall extend beyond the joint material (Silicone, poured rubber, armored neoprene seal or sliding plates) as shown to prevent concrete intrusion during railing casting and shall be placed so as not to restrict in any way normal joint movement.

** See individual Standard Index Nos. 481 thru 484 for spacing of Bars 6D.



PARTIAL PLAN OF RAILING (SKEW ANGLE Ø LESS THAN 70°)
(Skewed Deck Joint at Begin or End Bridge Shown, Skewed Deck Joint at Intermediate Pier or Bent Similar)



PARTIAL PLAN OF RAILING (SKEW ANGLE Ø = 70° OR GREATER)
(Skewed Deck Joint at Begin or End Bridge Shown, Skewed Deck Joint at Intermediate Pier or Bent Similar)

SKEW DETAIL

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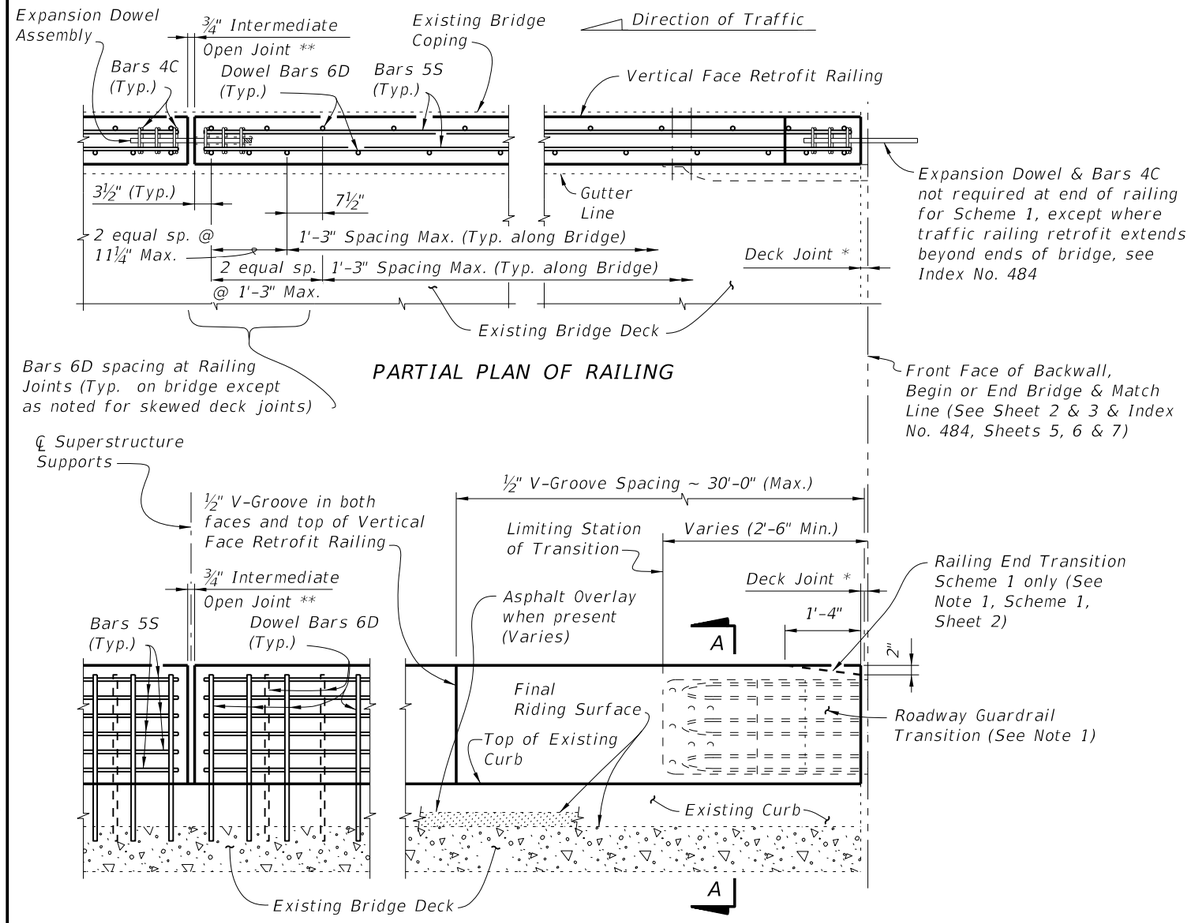
LAST REVISION	REVISION	DESCRIPTION:				
07/01/09			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) GENERAL NOTES & DETAILS	INDEX NO. 480	SHEET NO. 2



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies & Bars 4C not shown for clarity)

TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2 or 3, Index No. 481, Sheet 2 and 3. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans. If vertical face retrofit extends beyond bridge and approach slab ends, see Index No. 484 for treatment and Details.

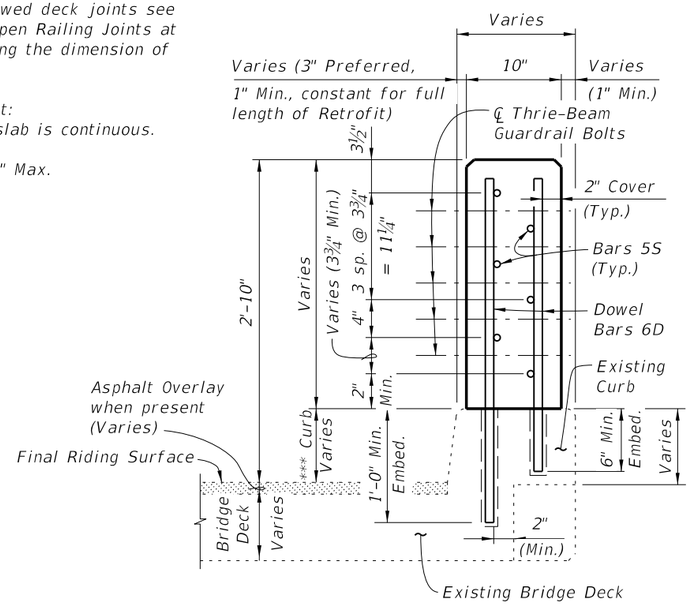
2. Field cut Bars 5S and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.

3. Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.

* Non skewed deck joint shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail, Index No. 480. Provide open Railing Joints at Deck Expansion Joint locations matching the dimension of the Deck Joint.

** Provide ¾" Intermediate Open Joints at:
(1) – Superstructure supports where slab is continuous.

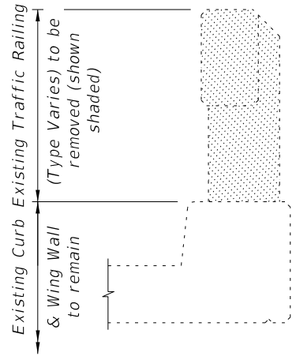
*** Curb heights vary from 5" Min. to 1'-2" Max.



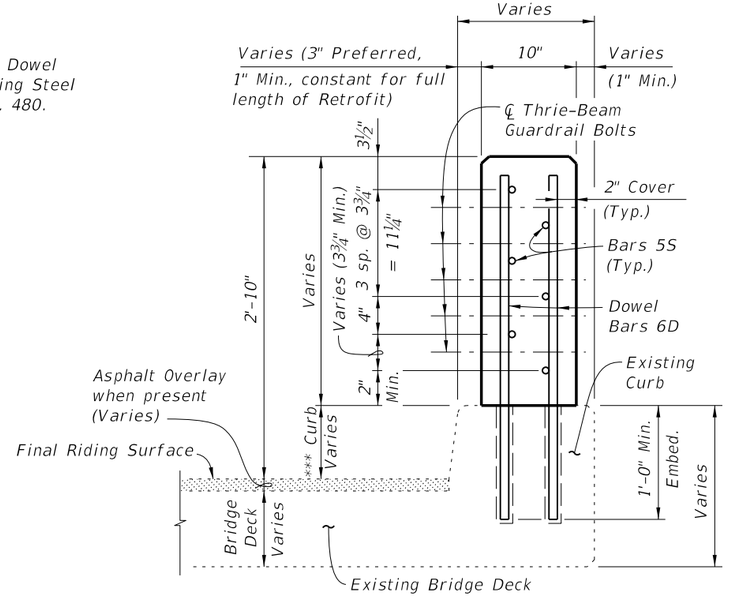
SECTION A-A
TYPICAL SECTION THRU RAILING ON CURB WITH CORBELS

CROSS REFERENCE:

For General Notes, Estimated Quantities, Dowel Detail, Expansion Dowel Detail, Reinforcing Steel Notes & Bending Diagrams see Index No. 480.



TYPICAL SECTION THRU EXISTING TRAFFIC RAILING SHOWING LIMITS OF REMOVAL
(BRIDGE DECK SHOWN, WING WALL SIMILAR)



SECTION A-A
TYPICAL SECTION THRU RAILING ON FULL DEPTH CURB (BRIDGE SHOWN, WING WALL SIMILAR)

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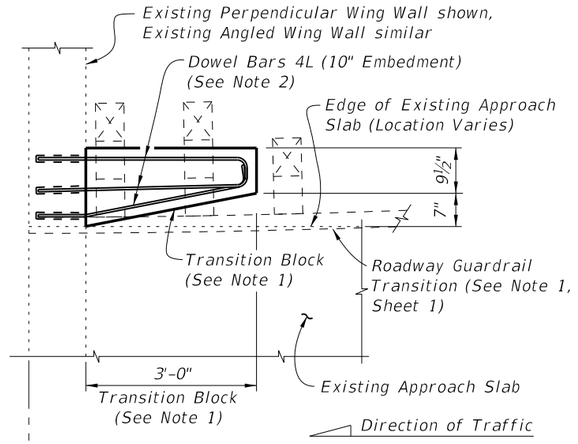
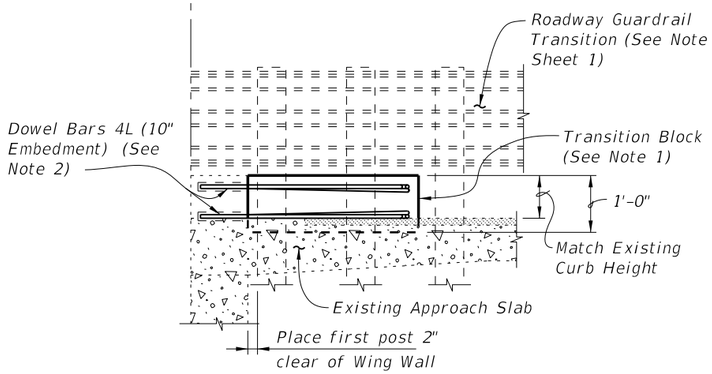
LAST REVISION	REVISION	DESCRIPTION:				
07/01/10			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) NARROW CURB	INDEX NO. 481	SHEET NO. 1



PARTIAL PLAN OF GUARDRAIL



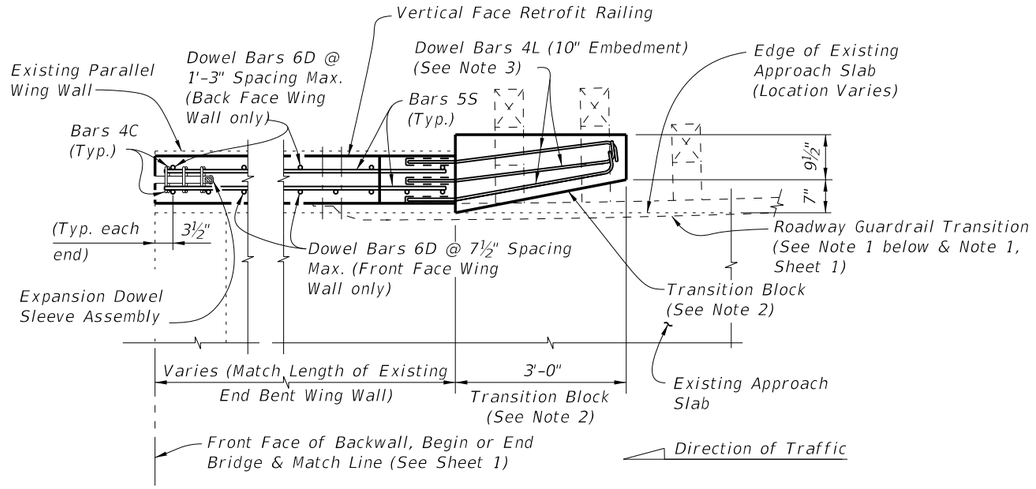
PARTIAL ELEVATION OF INSIDE FACE OF GUARDRAIL

SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

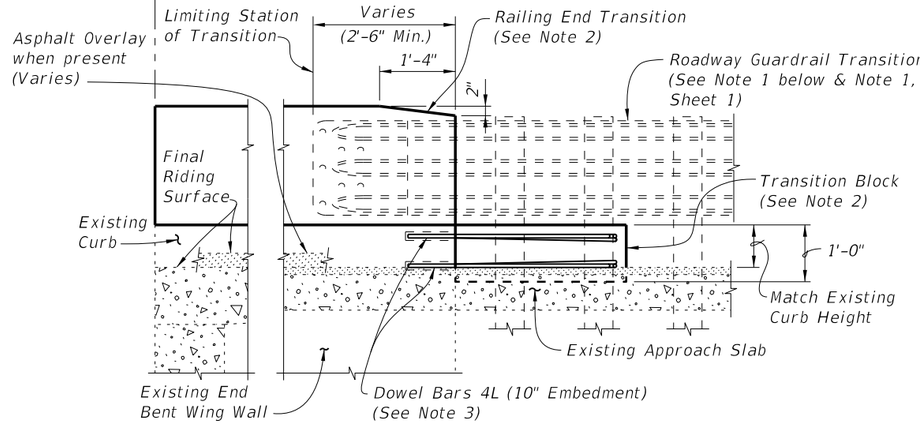
SCHEME 1 NOTES:

1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 2
RAILING END TREATMENT FOR PARALLEL WING WALLS

SCHEME 2 NOTES:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Index No. 481, Sheet 1. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing.

2. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.

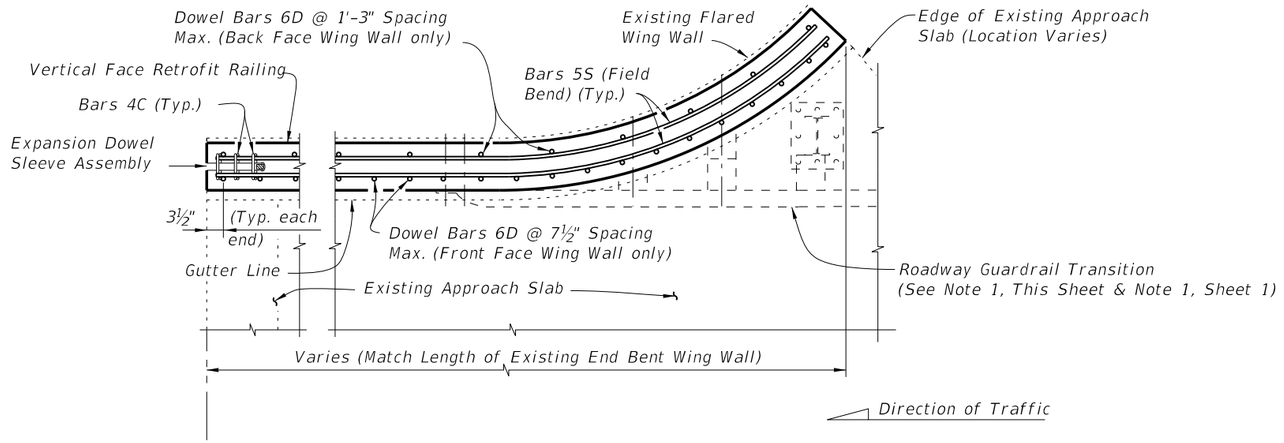
3. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

LAST REVISION	REVISION	DESCRIPTION:
07/01/07		

FDOT DESIGN STANDARDS
2013

TRAFFIC RAILING - (VERTICAL FACE RETROFIT) NARROW CURB

INDEX NO.	SHEET NO.
481	2



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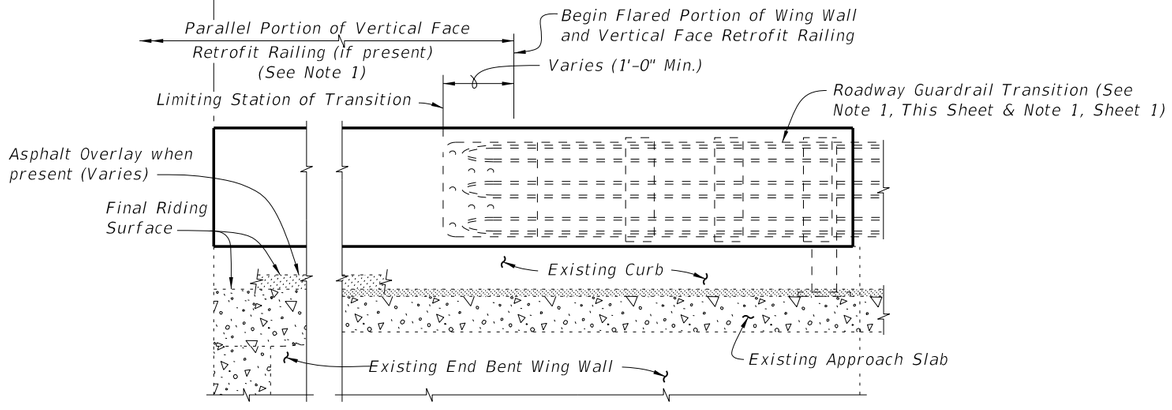


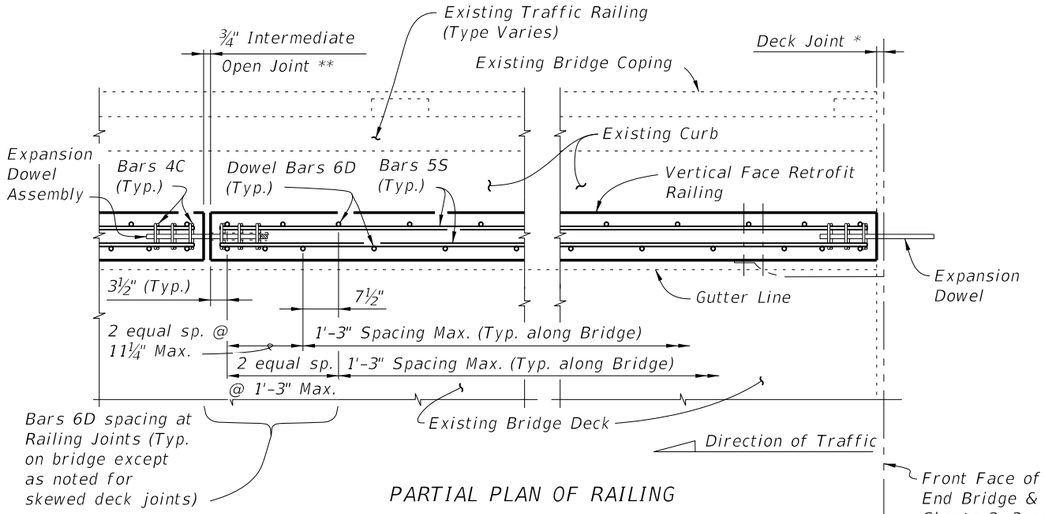
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 3 NOTE:

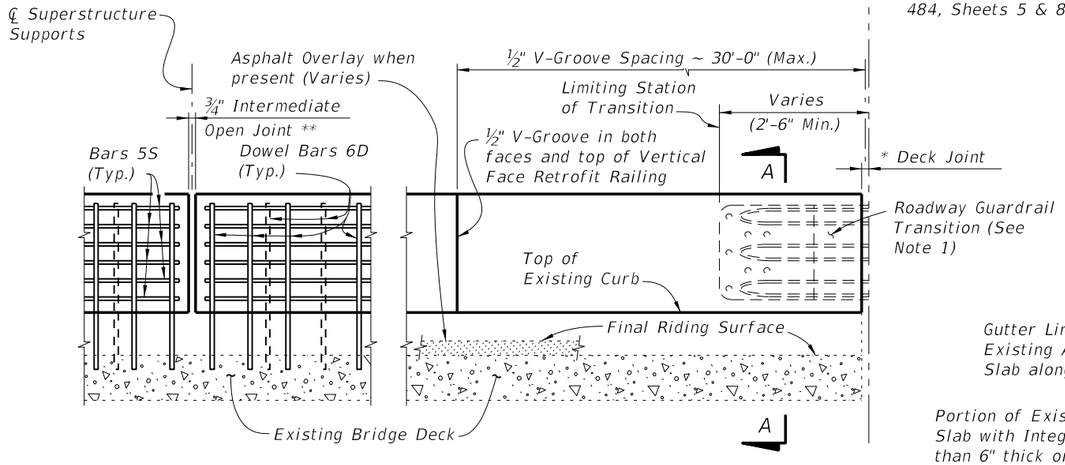
1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.

SCHEME 3
RAILING END TREATMENT FOR FLARED WING WALLS

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) NARROW CURB	INDEX NO.	SHEET NO.
07/01/07						481	3



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Traffic Railing, Expansion Dowel
Assemblies & Bars 4C not shown for clarity)

TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2, 3, 4 or 5, Sheets 3 and 4. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans. If vertical face retrofit extends beyond bridge and approach slab ends, see Index No. 484 for treatment and Details.

2. Field cut Bars 5S and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.

3. Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.

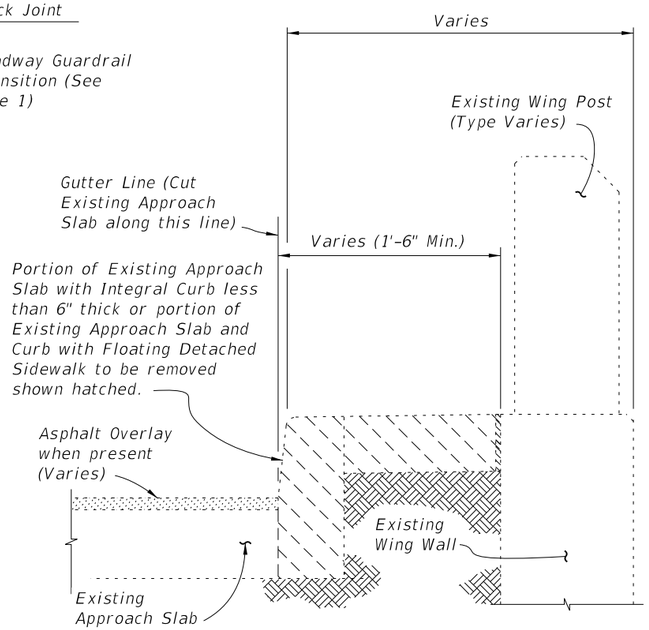
* Non skewed deck joint shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail, Index No. 480. Provide open Railing Joints at Deck Expansion Joint locations matching the dimension of the Deck Joint.

** Provide ¾" Intermediate Open Joints at:
(1) – Superstructure supports where slab is continuous.

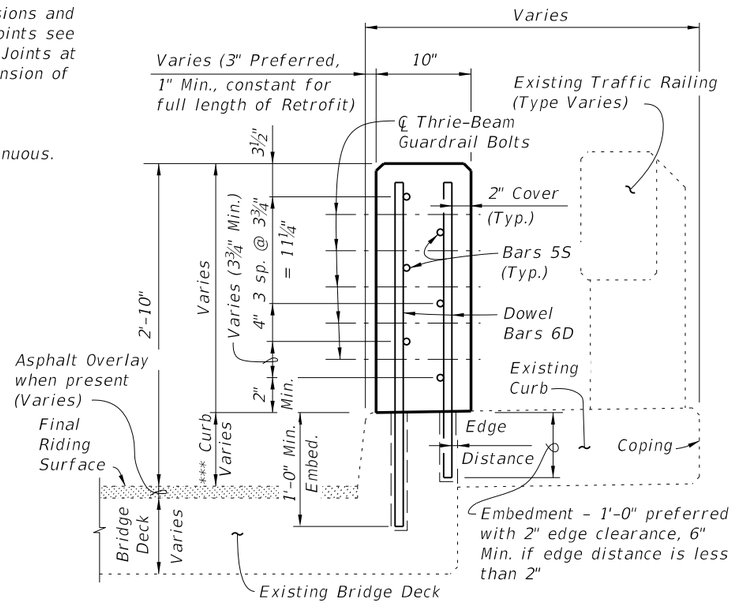
*** Curb heights vary from 5" Min. to 1'-2" Max.

CROSS REFERENCE:

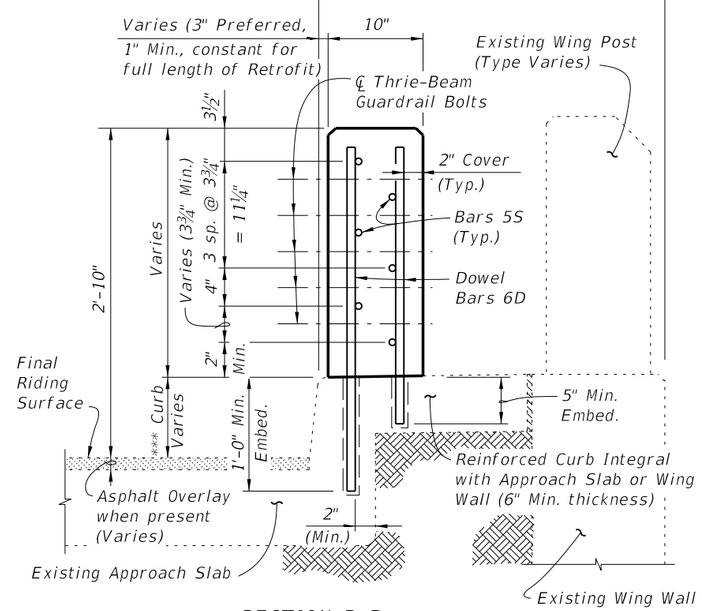
For General Notes, Estimated Quantities, Dowel Detail, Expansion Dowel Detail, Reinforcing Steel Notes & Bending Diagrams see Index No. 480.



TYPICAL SECTION THRU EXISTING APPROACH
SLAB AND END BENT WING WALL
SHOWING LIMITS OF REMOVAL
(SCHEMES 4 AND 5 ONLY)



SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



SECTION B-B
TYPICAL SECTION THRU
RAILING ALONG APPROACH SLAB
(SCHEMES 2 AND 3 ONLY)

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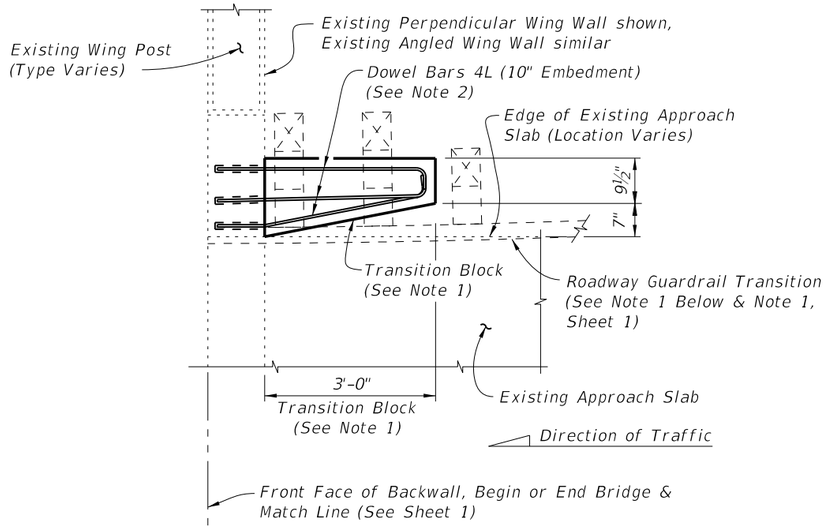
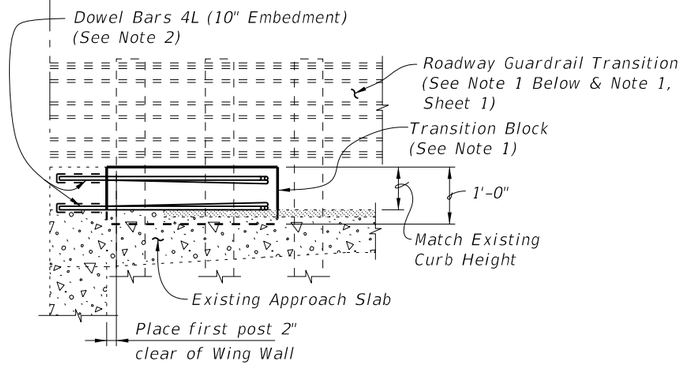
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) WIDE CURB	INDEX NO.	SHEET NO.
07/01/10						482	1



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF GUARDRAIL
(Existing Wing Post not shown for clarity)

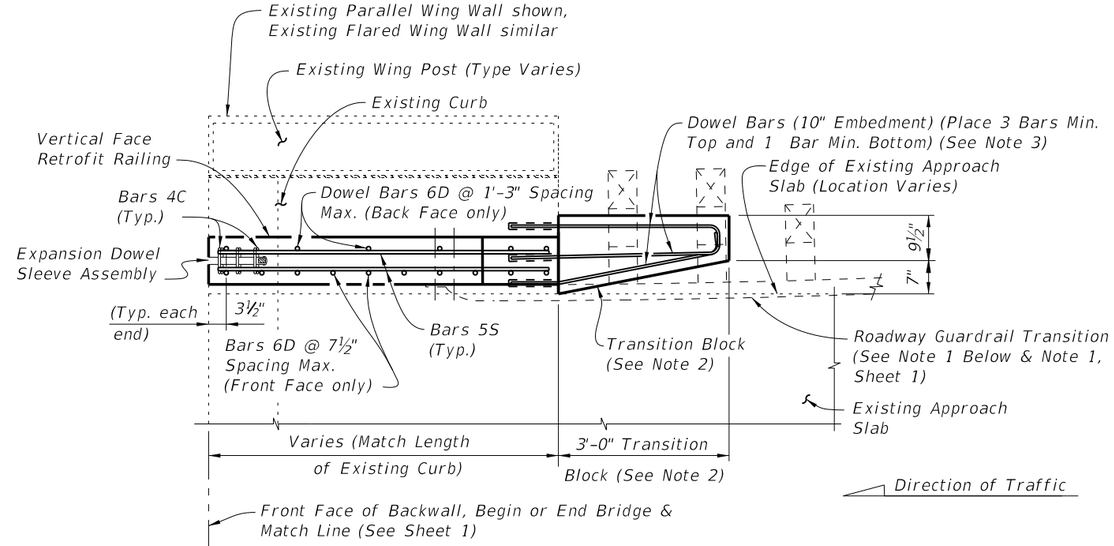
SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

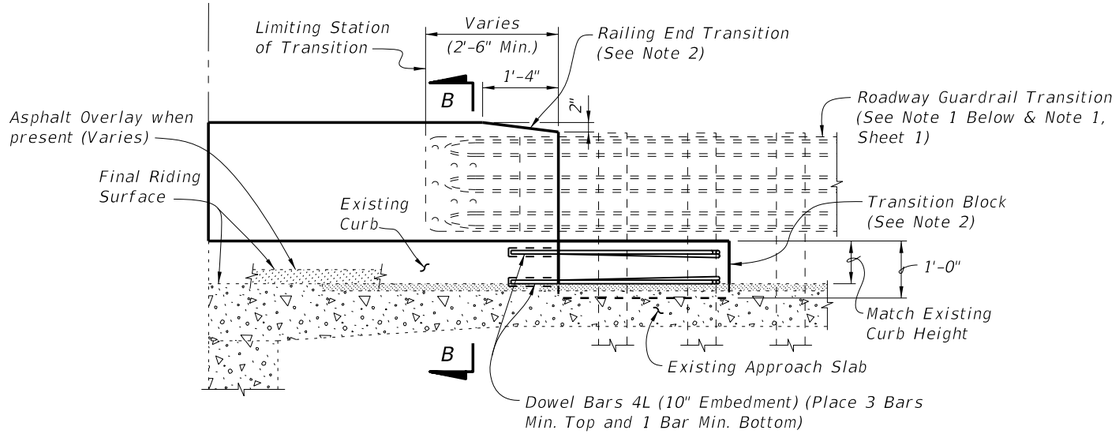
1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

3. If a Special Steel Guardrail Post is required for attachment to the top of a sloping Wing Wall, saw cut and remove a wedge shaped portion of the sloping Wing Wall as required to provide a level surface for post installation.



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 2
RAILING END TREATMENT FOR PARALLEL CURBS

SCHEME 2 NOTES:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing.

2. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend beyond end of existing End Bent Wing Wall, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.

3. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

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LAST REVISION	REVISION	DESCRIPTION:				
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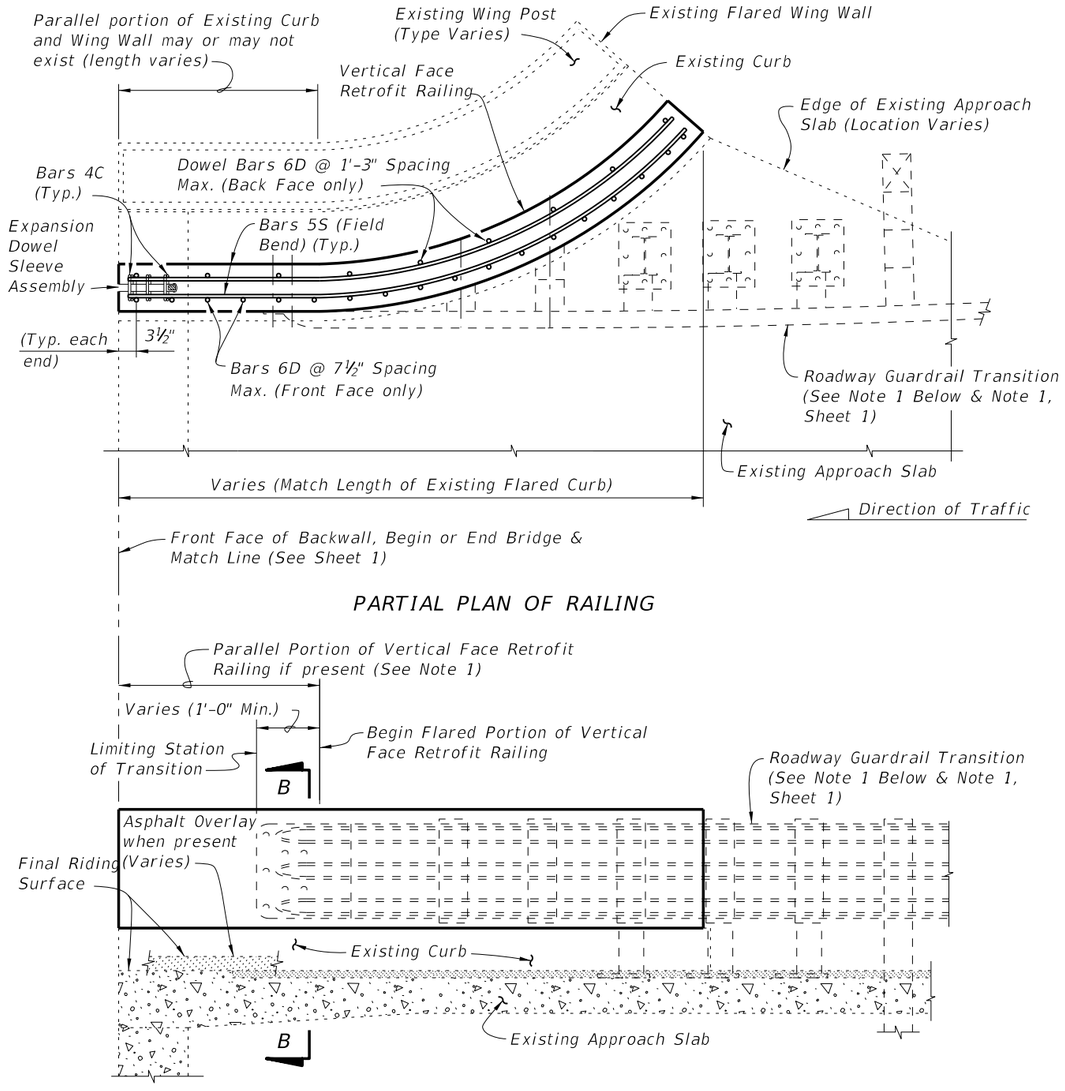


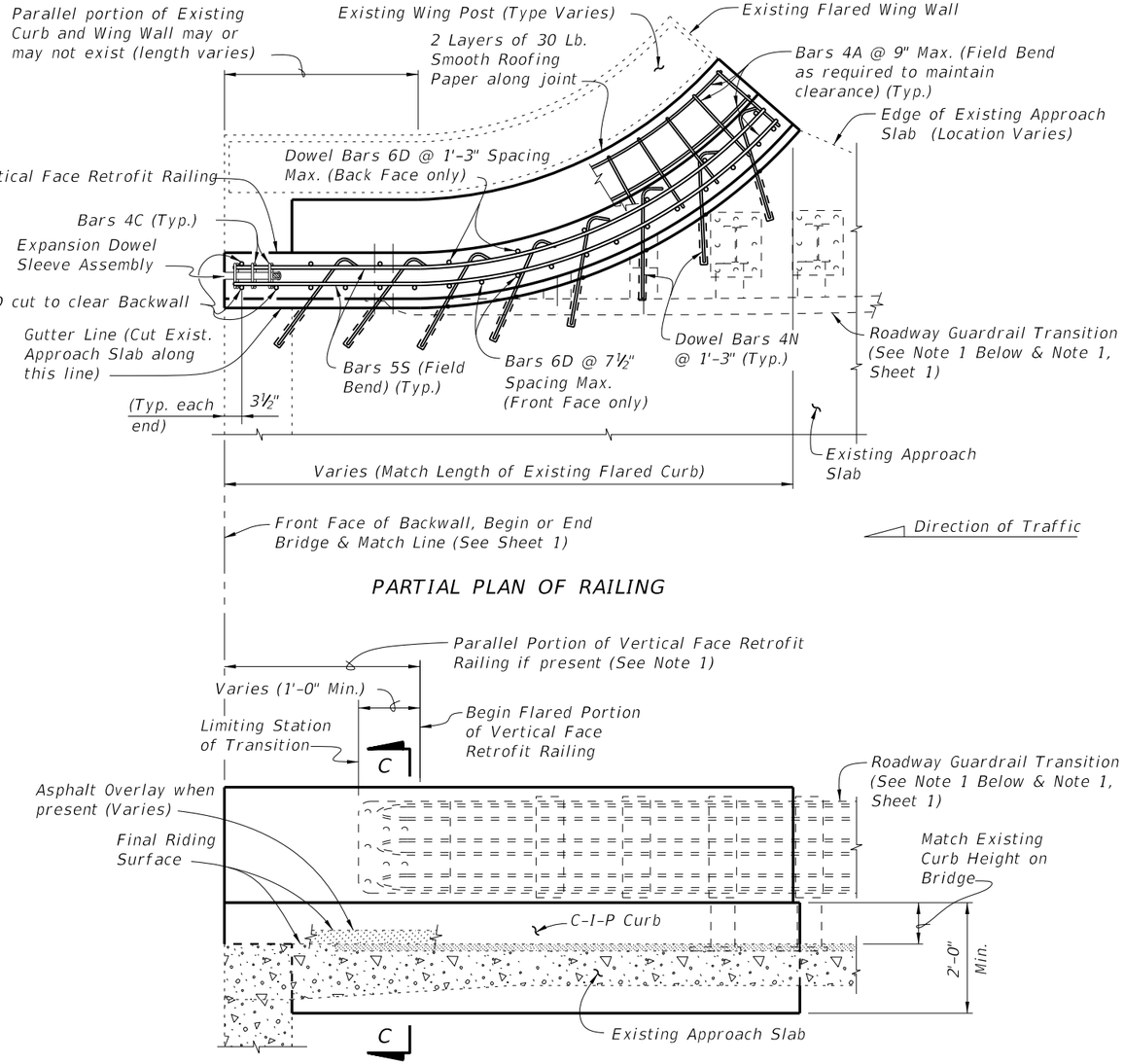
PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 3
RAILING END TREATMENT FOR FLARED CURBS

SCHEME 3 NOTE:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.



PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 4
RAILING END TREATMENT FOR FLARED CURBS

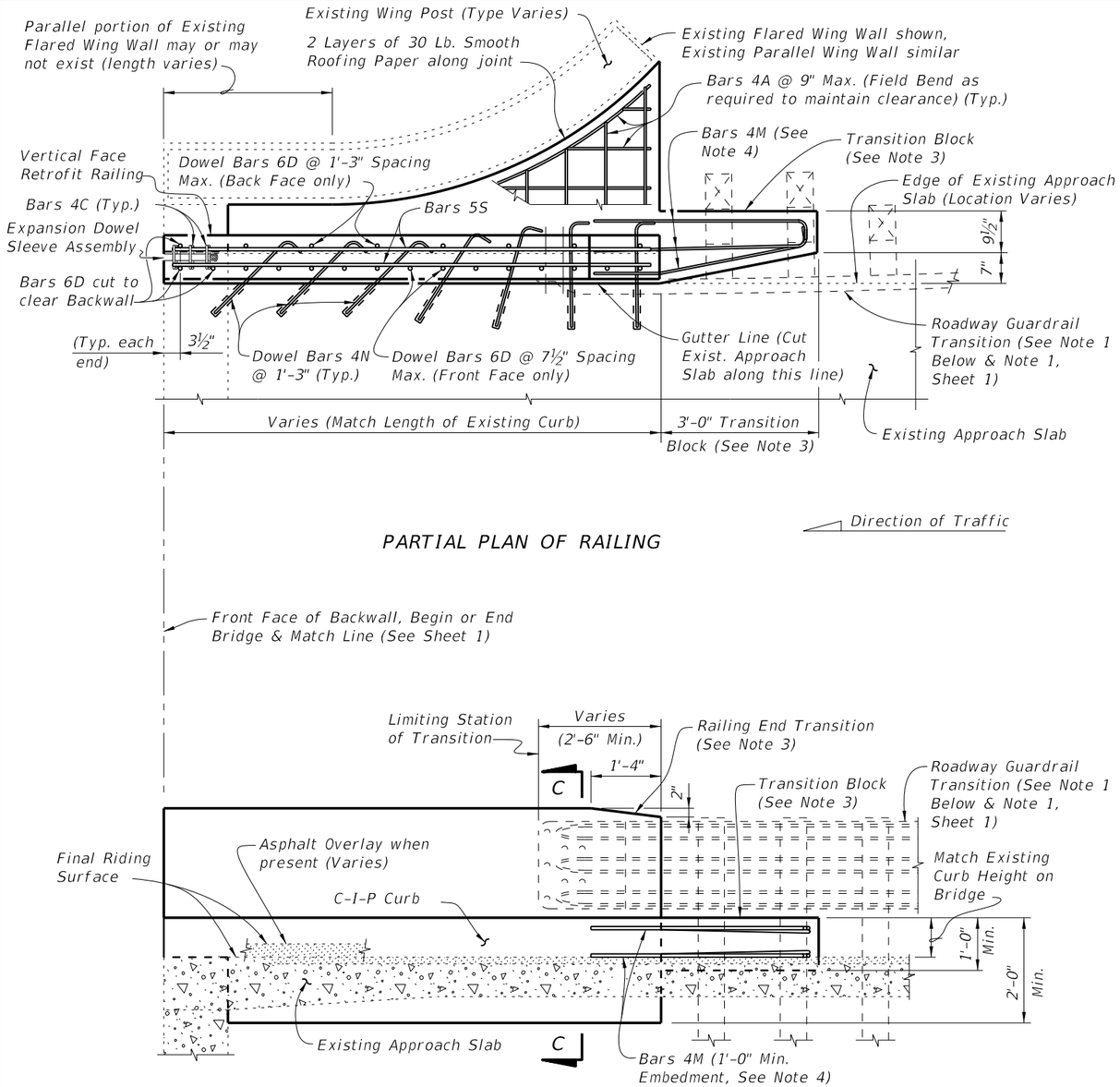
SCHEME 4 NOTES:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.

2. Dowel Bars 4N may be installed on a maximum angle of 45° to the cut edge of the Approach Slab as shown to facilitate drilling of holes and installation of bars.

3. At the Contractor's option, along the length of the Approach Slab curb that is to be replaced, Dowel Bars 6D may be cast in with the new section of curb as shown or they may be installed in drilled holes in the new section of curb using an Adhesive Bonding Material System with a 1'-0" minimum embedment.

LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) WIDE CURB	INDEX NO.	SHEET NO.
07/01/05						482	3

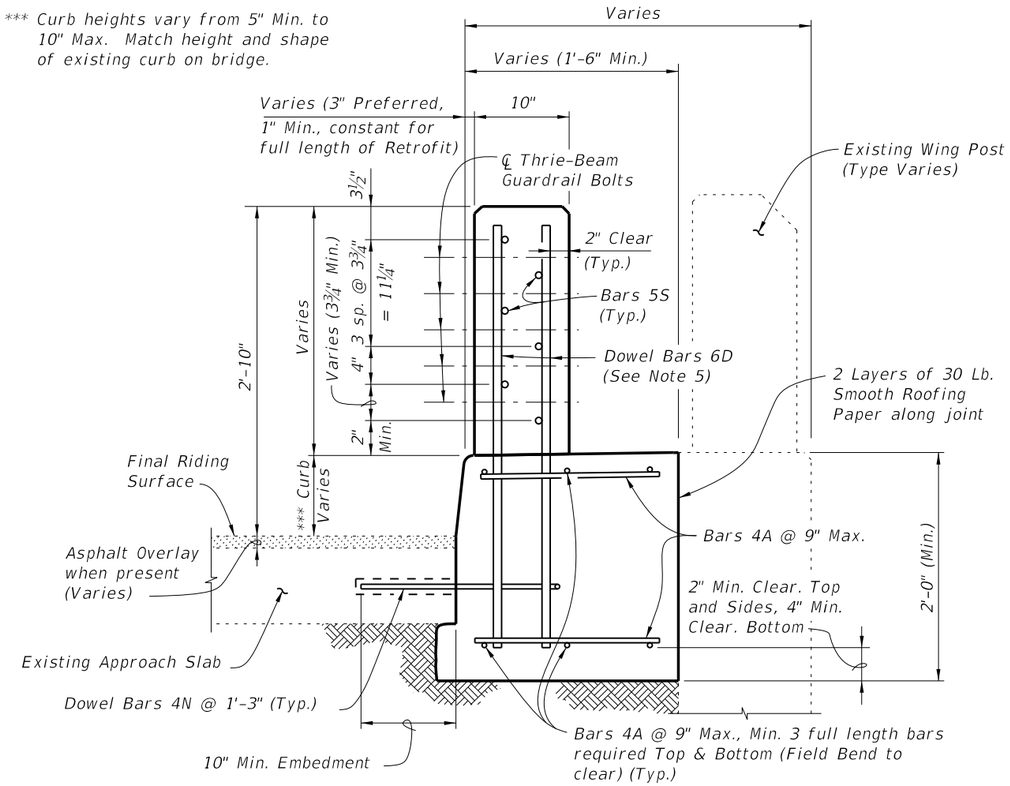


PARTIAL PLAN OF RAILING

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 5
RAILING END TREATMENT FOR PARALLEL CURBS

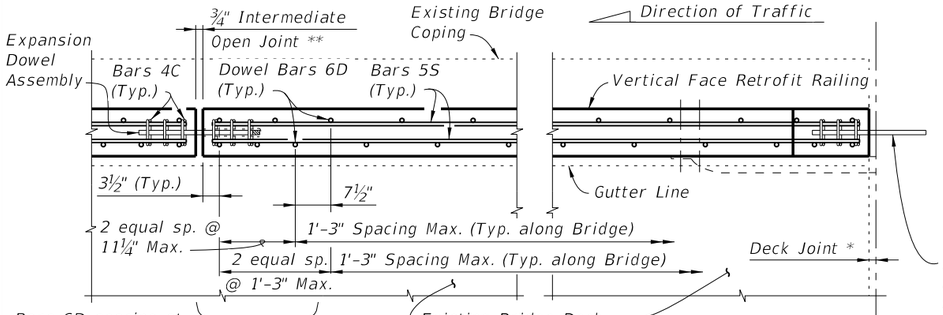
*** Curb heights vary from 5" Min. to 10" Max. Match height and shape of existing curb on bridge.



SECTION C-C
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB
(SCHEME 4 SHOWN, SCHEME 5 SIMILAR)

SCHEME 5 NOTES:

1. *See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.*
2. *Dowel Bars 4N may be installed on a maximum angle of 45° to the cut edge of the Approach Slab as shown to facilitate drilling of holes and installation of bars.*
3. *Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend beyond end of existing End Bent Wing Wall, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.*
4. *Field bend Dowel Bars 4M within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.*
5. *At the Contractor's option, along the length of the Approach Slab curb that is to be replaced, Dowel Bars 6D may be cast in with the new section of curb as shown or they may be installed in drilled holes in the new section of curb using an Adhesive Bonding Material System with a 1'-0" minimum embedment.*



PARTIAL PLAN OF RAILING

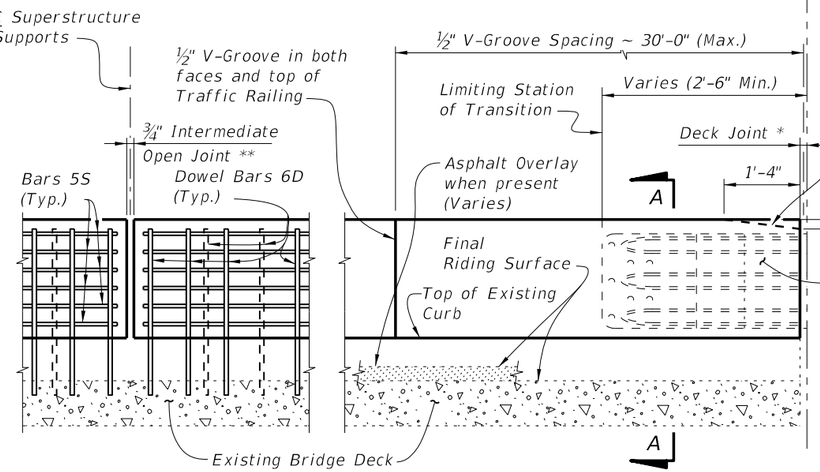
* *Non skewed deck joint shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail, Index No. 480. Provide open Railing Joints at Deck Expansion Joint locations matching the dimension of the Deck Joint.*

** *Provide ¾" Intermediate Open Joints at : (1) – Superstructure supports where slab is continuous.*

*** *Curb heights vary from 5" Min. to 1'-2" Max.*

Expansion Dowel & Bars 4C not required at end of railing for Scheme 1, except where traffic railing retrofit extends beyond ends of bridge, see Index No. 484

Front Face of Backwall, Begin or End Bridge & Match Line (See Sheet 2 and 3 and Index No. 484, Sheets 5, 9 & 10.)



Railing End Transition Scheme 1 only (See Note 1, Scheme 1, Sheet 2, & Index No. 484, Sheet 5, 9 & 10)

Roadway Guardrail Transition (See Note 1)

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity

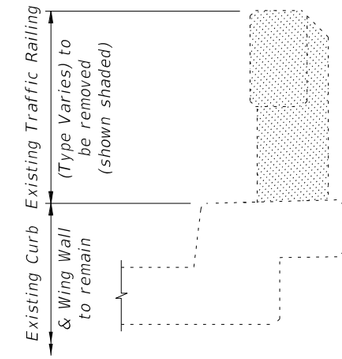
TYPICAL TREATMENT OF RAILING ALONG BRIDGE

NOTES:

1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2 or 3, Sheets 2 & 3. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans. If vertical face retrofit extends beyond bridge and approach slab ends, see Index No. 484 for treatment and Details.

2. Field cut Bars 5S and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.

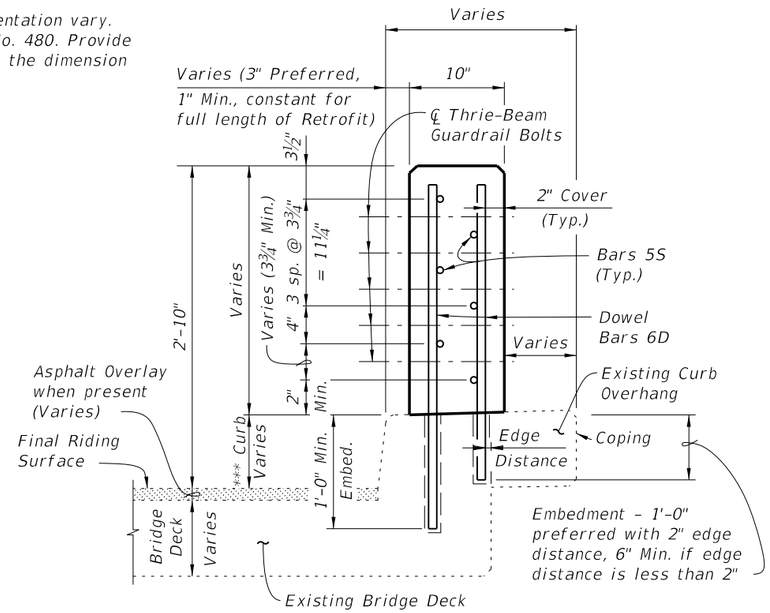
3. Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.



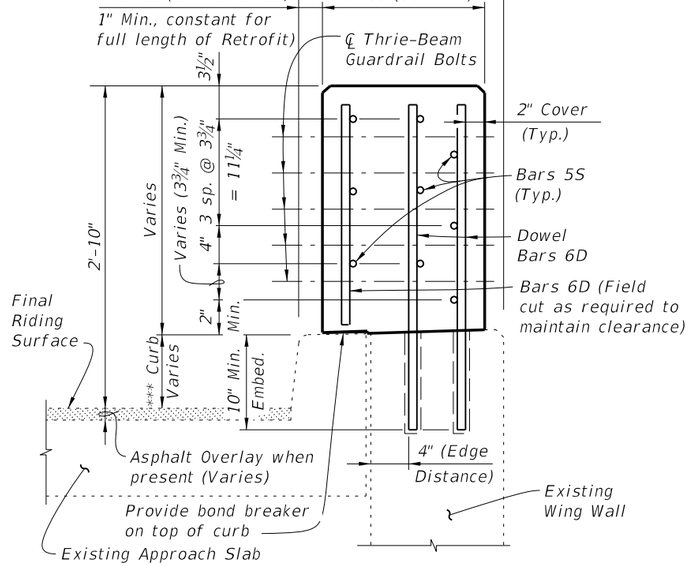
TYPICAL SECTION THRU EXISTING TRAFFIC RAILING
SHOWING LIMITS OF REMOVAL
(BRIDGE DECK SHOWN, WING WALL SIMILAR)

CROSS REFERENCE:

For General Notes, Estimated Quantities, Dowel Detail, Expansion Dowel Detail, Reinforcing Steel Notes & Bending Diagram see Index No. 480.

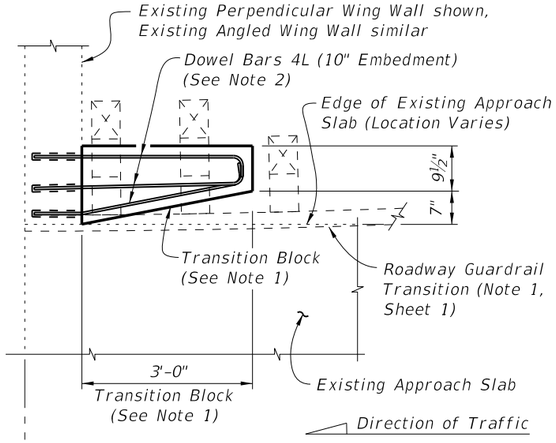


SECTION A-A
TYPICAL SECTION THRU RAILING ON BRIDGE DECK

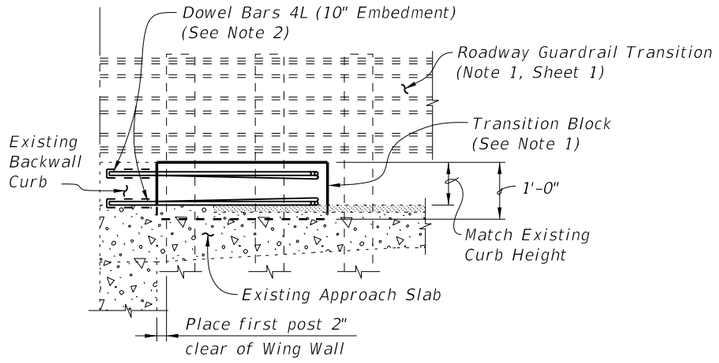


SECTION B-B
TYPICAL SECTION THRU RAILING ON WING WALL

LAST REVISION	REVISION	DESCRIPTION:				
07/01/10			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) INTERMEDIATE CURB	INDEX NO. 483	SHEET NO. 1



PARTIAL PLAN OF GUARDRAIL



PARTIAL ELEVATION OF INSIDE FACE OF GUARDRAIL

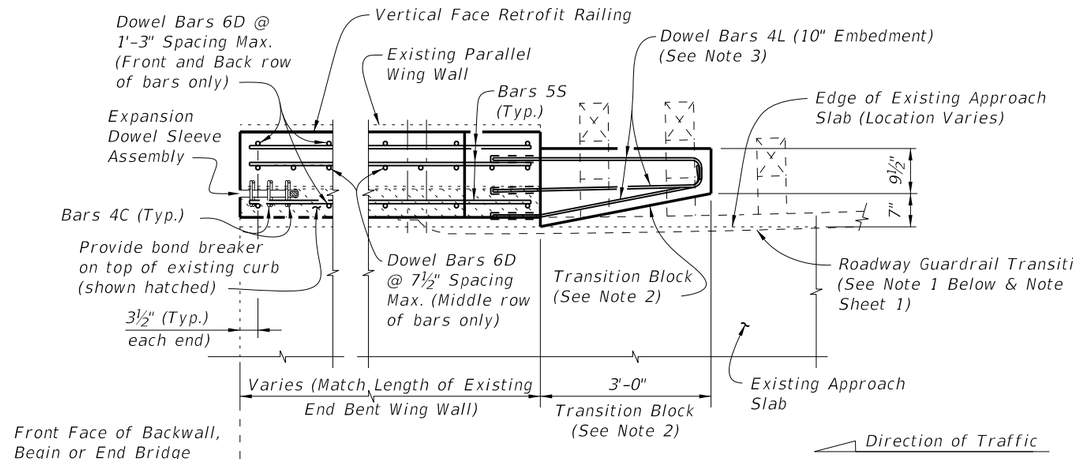
SCHEME 1
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS

SCHEME 1 NOTES:

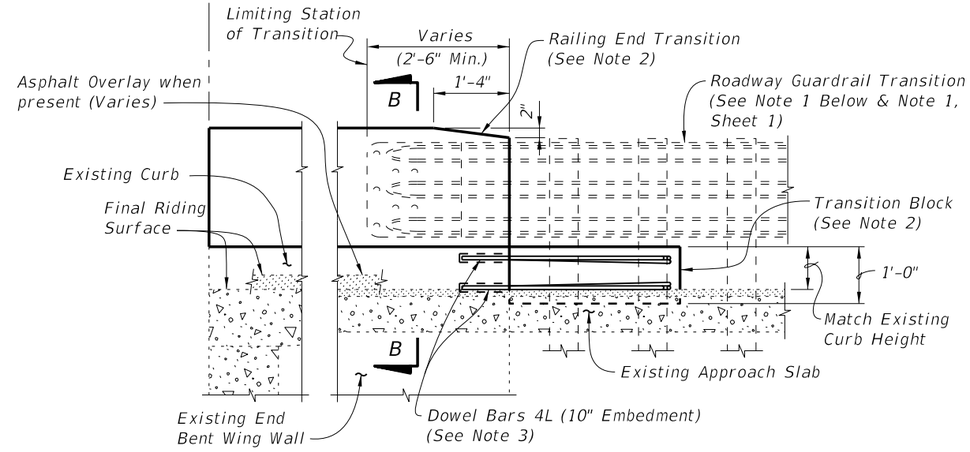
1. Provide Transition Block (as shown) or Curb if existing Approach Slab does not have a curb, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.

2. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

3. If a Special Steel Guardrail Post is required for attachment to the top of a sloping Wing Wall, saw cut and remove a wedge shaped portion of the sloping Wing Wall as required to provide a level surface for post installation.



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 2
RAILING END TREATMENT FOR PARALLEL WING WALLS

SCHEME 2 NOTES:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" mminimum dimension shall apply to both the front and back face of the railing.

2. Provide Transition Block (as shown) or Curb if existing Approach Slab Curb does not extend beyond end of existing End Bent Wing Wall, see Roadway Plans. Shape and height of Transition Block or Curb shall match existing bridge curb. Railing End Transition and Transition Block may be omitted on trailing ends with no opposing traffic.

3. Field bend Dowel Bars 4L within Transition Block as required to maintain 2" top and side clearance and 3" bottom clearance.

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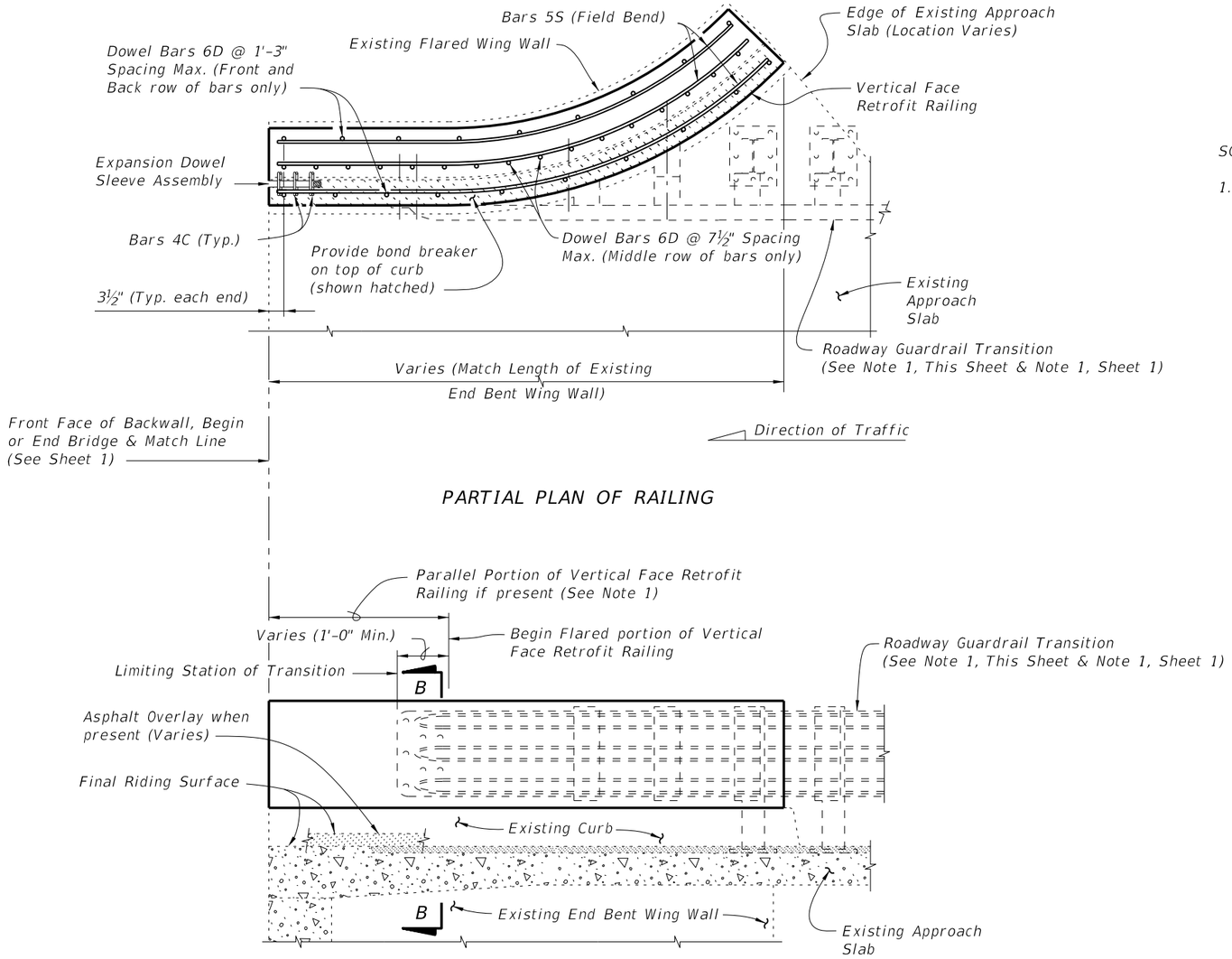
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) INTERMEDIATE CURB	INDEX NO.	SHEET NO.
07/01/07						483	2



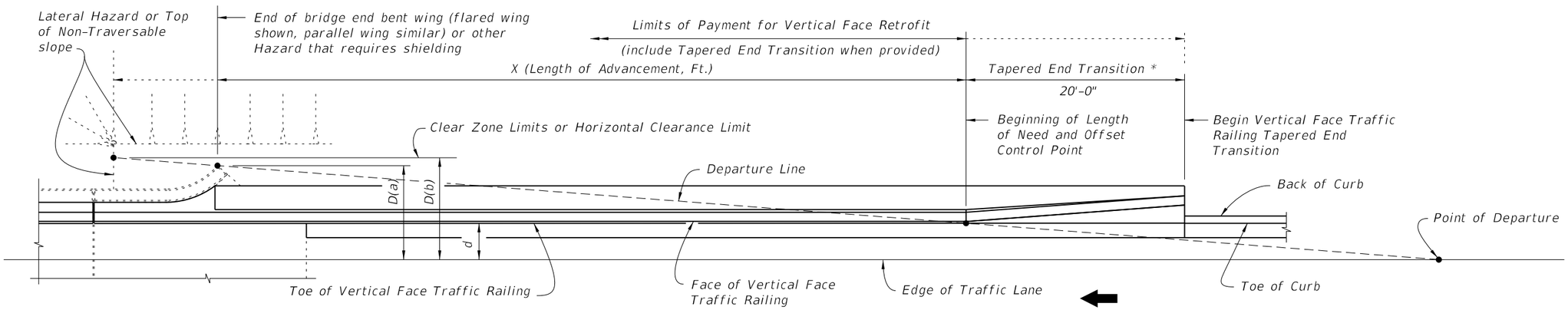
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Railing Reinforcing and Expansion Dowel Assemblies not shown for clarity)

SCHEME 3 NOTE:

1. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is along the Wing Wall, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is on the bridge, see Sheet 1.

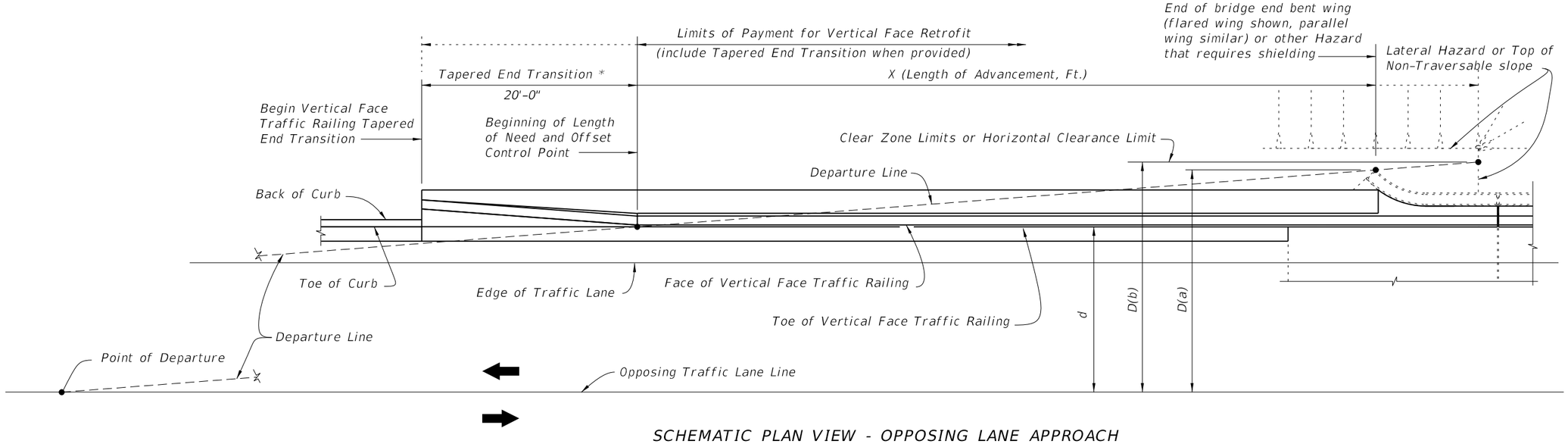
SCHEME 3
RAILING END TREATMENT FOR FLARED WING WALLS

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/07			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) INTERMEDIATE CURB	483	3



* Guardrail or Crash Cushion may also be shown in the Contract Plans, in lieu of the Tapered End Transition.

SCHEMATIC PLAN VIEW - NEAR LANE APPROACH



SCHEMATIC PLAN VIEW - OPPOSING LANE APPROACH

LENGTH OF ADVANCEMENT - TAPERED END TRANSITION (40 MPH OR LESS)

Design Speed (mph)	Length of Advancement, Ft. (X)
≤ 40	= 16 (D-d)

Notes:
1. The minimum length of advancement for both near lane and opposing lane approaches is 20'.
2. For Design Speeds greater than 40 mph the Tapered End Transition is not permitted. See Index No. 400 for length of Advancement of guardrail or other project specific end treatments.

DESIGN NOTES:
The Tapered End Transition should only be used when space is limited which precludes the use of a guardrail end treatment or crash cushion.

D = Distance in feet from near edge of near approach traffic lane to either:
(a) the back of hazard, when the hazard is located inside the clear zone or horizontal clearance;
(b) the clear zone or horizontal clearance outer limits, when hazard extends to, or goes beyond the clear zone or horizontal clearance limits.
For left side hazards on two way undivided facilities, "D" is measured from the inside edge of the near approach traffic lane as shown above.

d = Distance in feet from near edge of near approach traffic lane to face of traffic railing (at offset control point). For left side hazards on two-way undivided facilities "d" is measured from the inside edge of the nearest opposing traffic lane as shown above.

CROSS REFERENCES:
For General Notes, Dowel Details, Expansion Dowel Details, Reinforcing Steel Notes and Reinforcing Steel Bending Diagram see Index No. 480.

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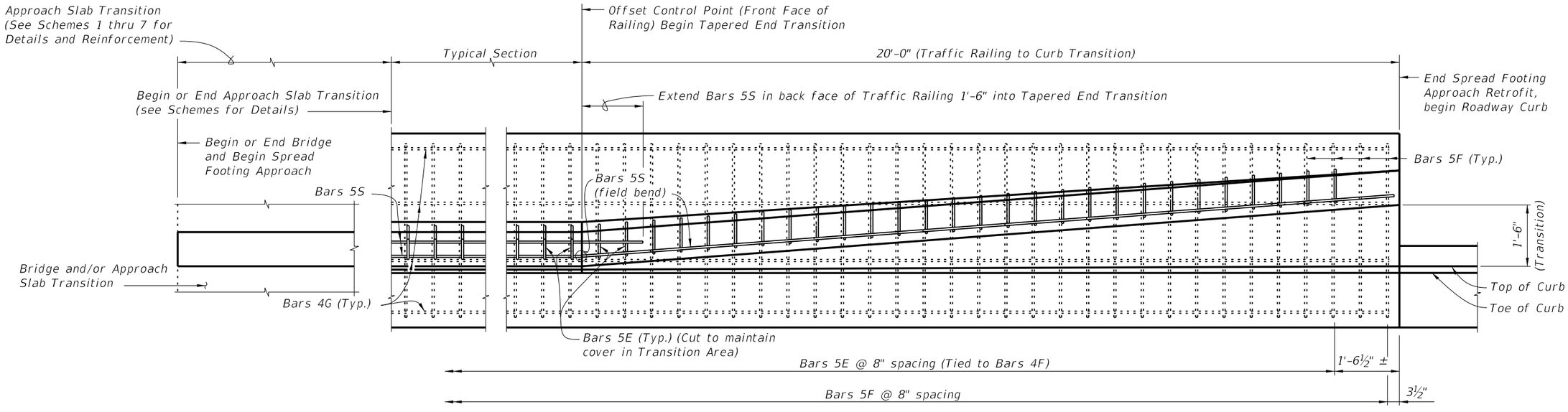
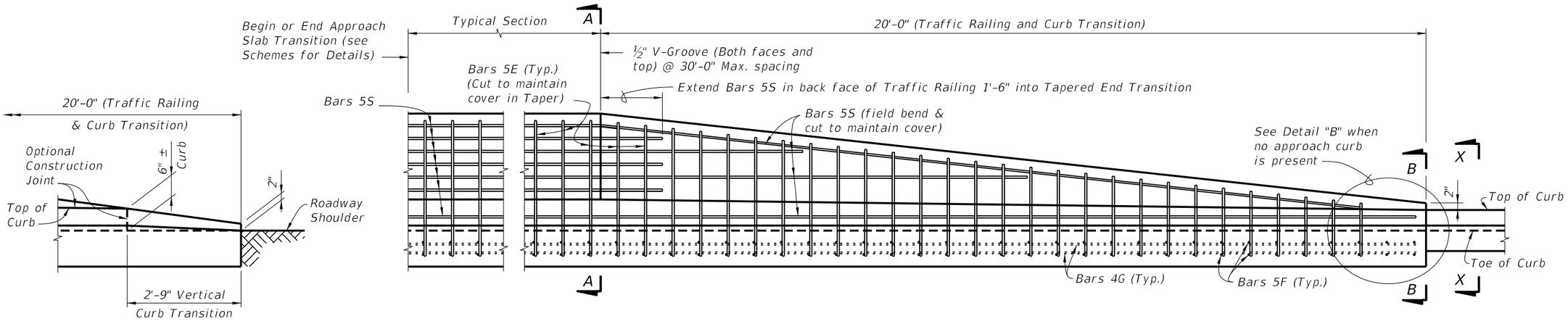
LAST REVISION	REVISION	DESCRIPTION:	FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH	INDEX NO.	SHEET NO.
07/01/09					484	1



PARTIAL PLAN VIEW



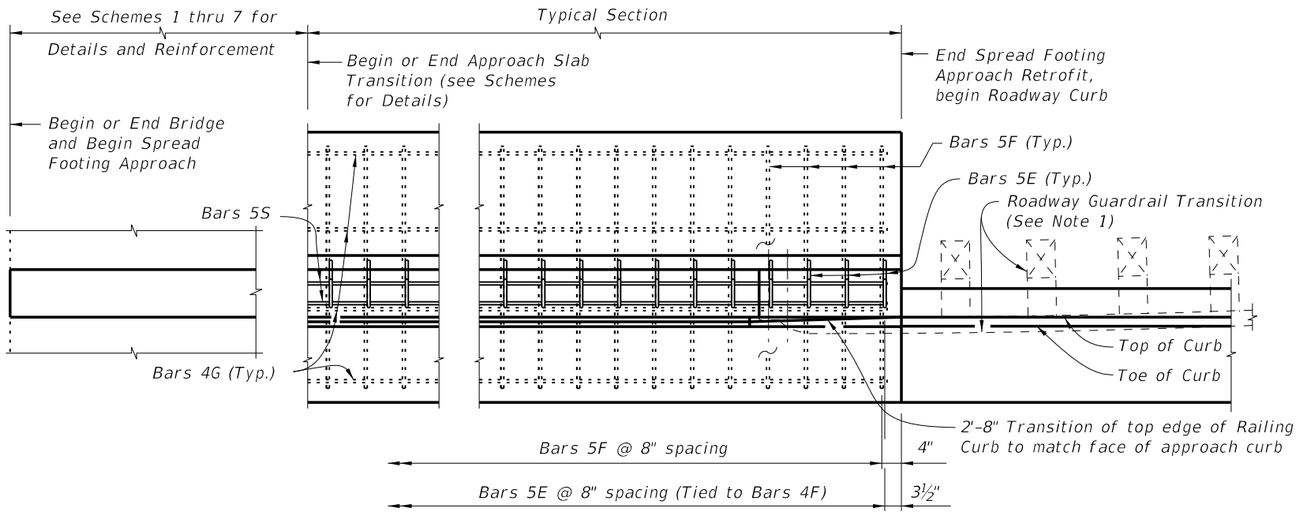
PARTIAL ELEVATION VIEW

DETAIL "B"
TRANSITION TO NON-CURB APPROACH
(Reinforcing Not Shown For Clarity)

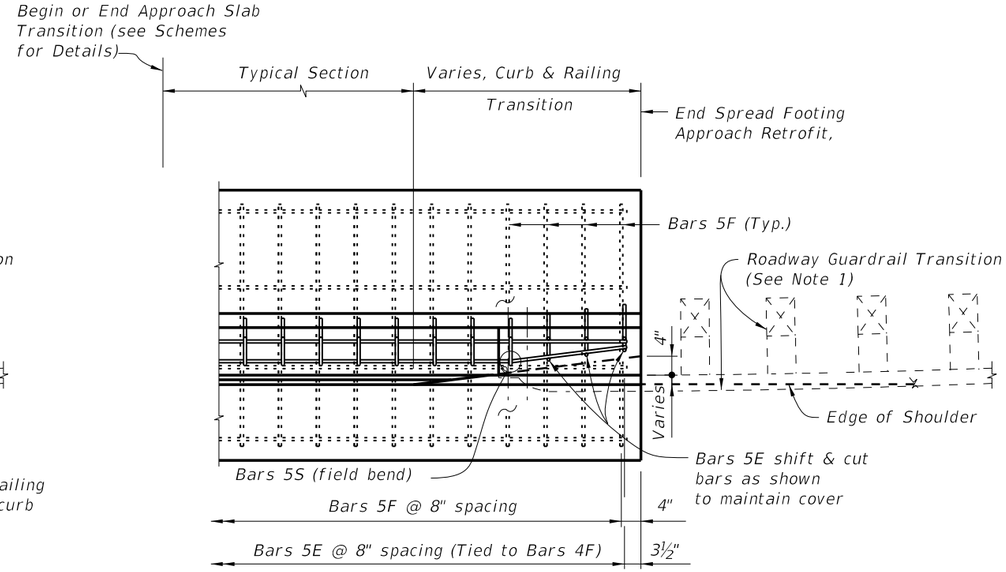
TAPERED END TRANSITION

CROSS REFERENCES:
For Section A-A, B-B and X-X see Sheet 4.

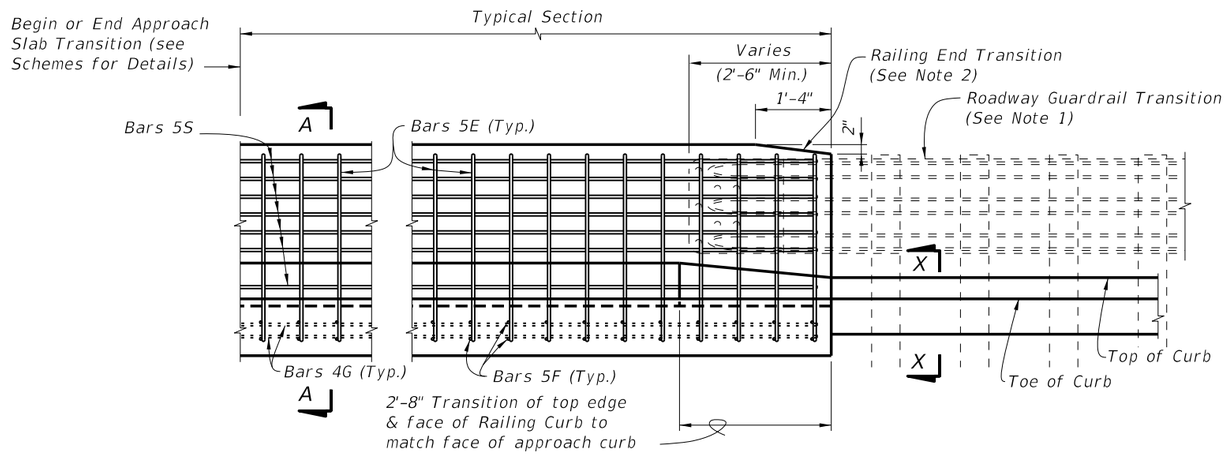
LAST REVISION	REVISION	DESCRIPTION:				
07/01/09			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH	INDEX NO. 484	SHEET NO. 2



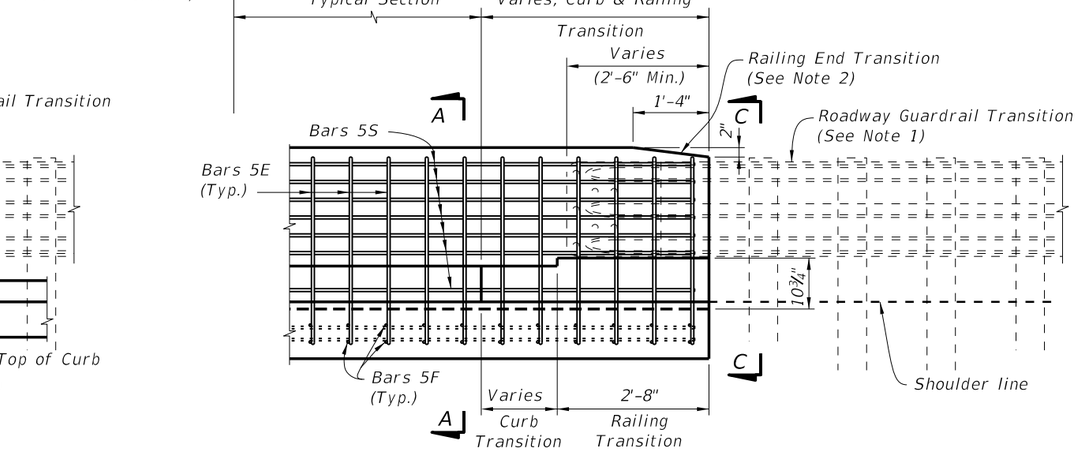
PARTIAL PLAN VIEW
(With Curb Approach)



PARTIAL PLAN VIEW
(Without Curb Approach)



PARTIAL ELEVATION VIEW
(With Curb Approach)



PARTIAL ELEVATION VIEW
(Without Curb Approach)

GUARDRAIL END TRANSITION

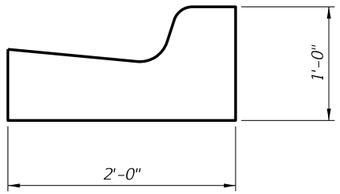
NOTES:
1. *On approach end provide a Roadway Guardrail Transition, Index No. 402 (Sheet 16 – Scheme 1) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment.*
2. *Provide Railing & Curb Base Transitions (as shown) if curb does not extend beyond end of Spread Footing Approach, see Roadway Plans. Railing End Transition & Railing & Curb Base Transitions may be omitted on trailing ends with no opposing traffic.*

CROSS REFERENCES:
For Section A–A, C–C and X–X see Sheet 4.

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/09			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH	484	3

ESTIMATED TRAFFIC RAILING RETROFIT SPREAD FOOTING APPROACH QUANTITIES		
ITEM	UNIT	QUANTITY
		9" Curb
Concrete – Typical Section	CY/Ft.	0.25
Reinforcing Steel – Typical Section	Lb./Ft.	38
Concrete – 20'-0" Tappered End Transition plus Footing	CY	4.57 Total
Reinforcing Steel – 20'-0" Tapered End Transition plus Footing	Lb.	776 Total

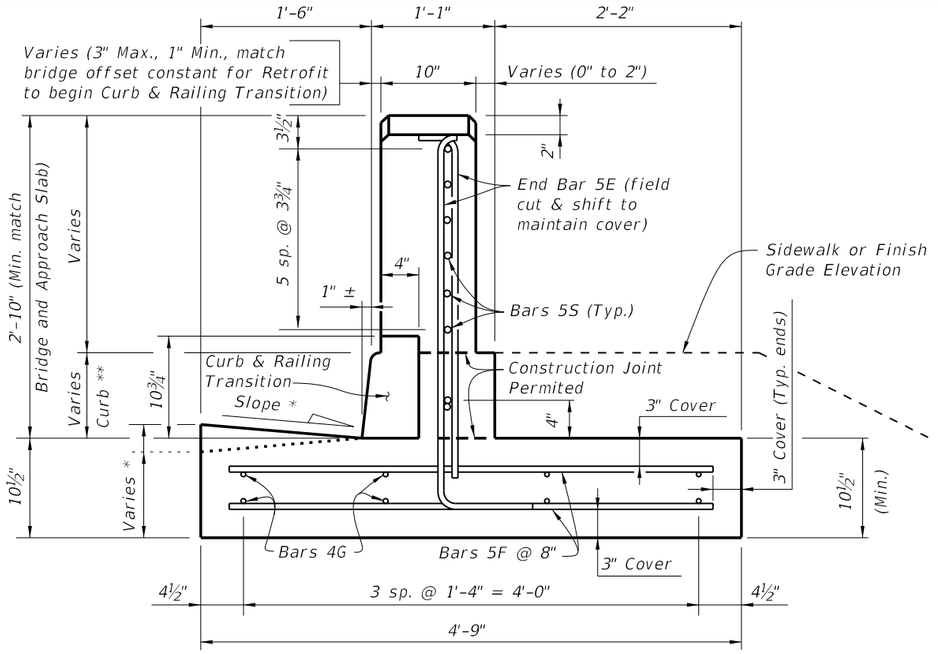
NOTE: Quantities are based on a 9" curb, no curb cross slope.



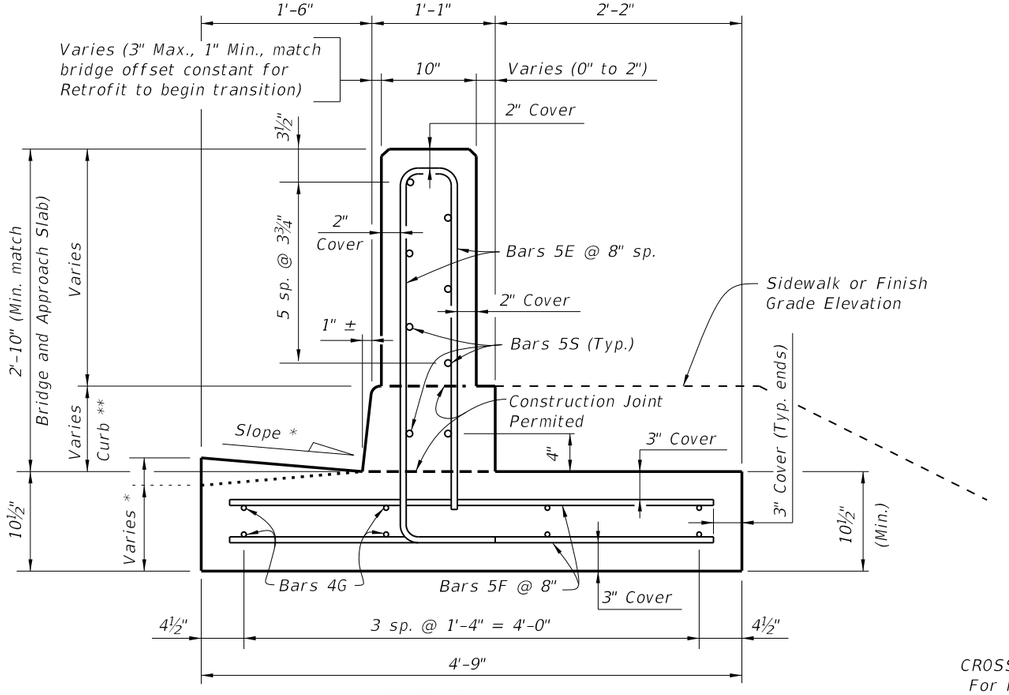
SECTION X-X (TYPICAL CURB, TYPE VARIES, TYPE F SHOWN)
(See Index No. 300 and Plans for Details)

* Match Cross Slope of high side and low side at begin or end bridge or approach slab.

** Match curb height of adjacent bridge and approach slab. Adjust height in Transition area to match adjoining Roadway curb.

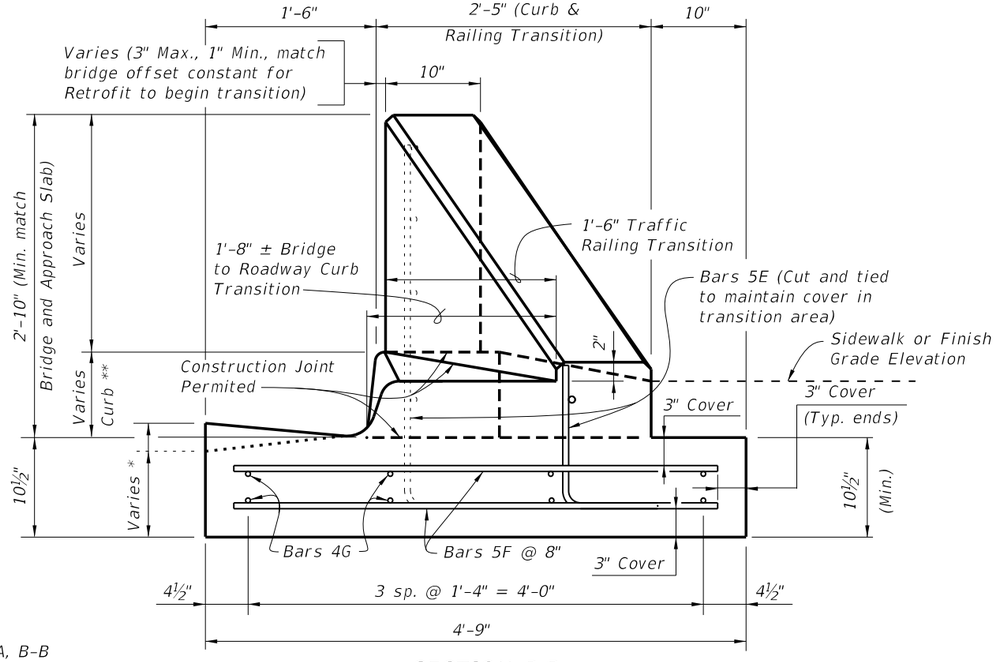


SECTION C-C
(GUARDRAIL END TRANSITION)



SECTION A-A
TYPICAL SECTION
(9" Curb shown, 6" Curb similar)

CROSS REFERENCES:
For location of Sections A-A, B-B and X-X see Sheet 2.
For location of Section C-C see Sheet 3.



SECTION B-B
TAPERED END TRANSITION
(Bars 5S not shown for clarity)

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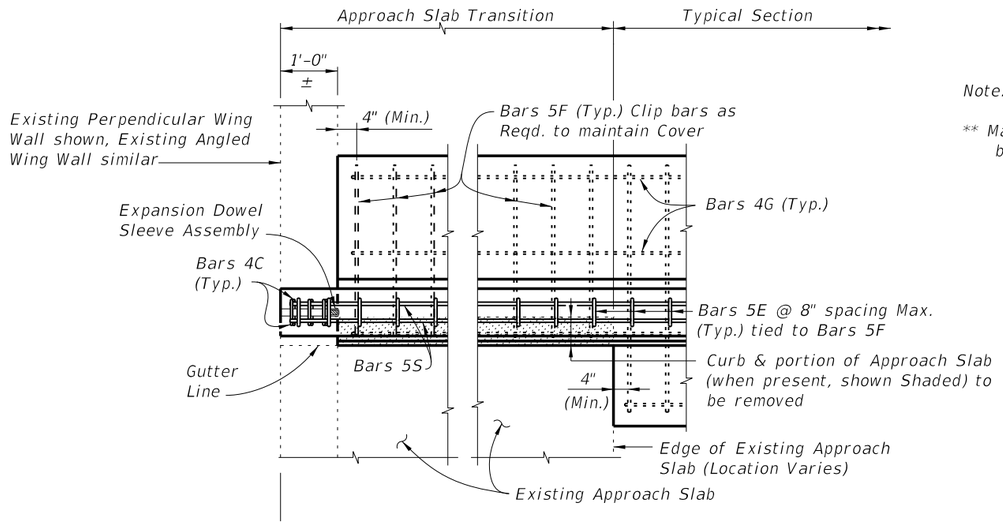
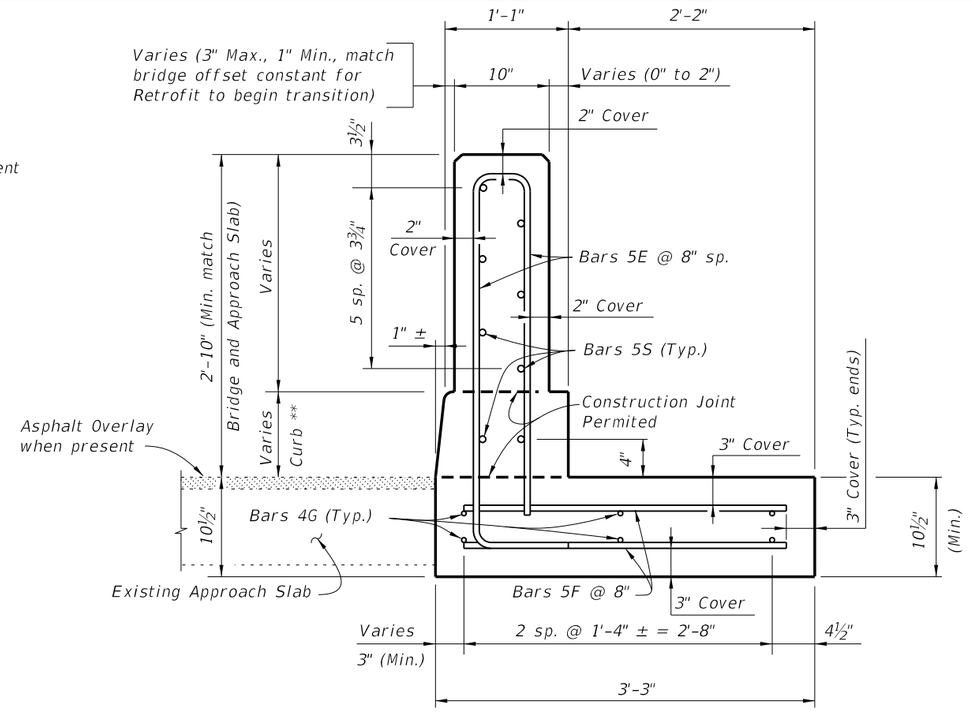
LAST REVISION	REVISION	DESCRIPTION:				
07/01/09			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH	INDEX NO. 484	SHEET NO. 4



PARTIAL PLAN

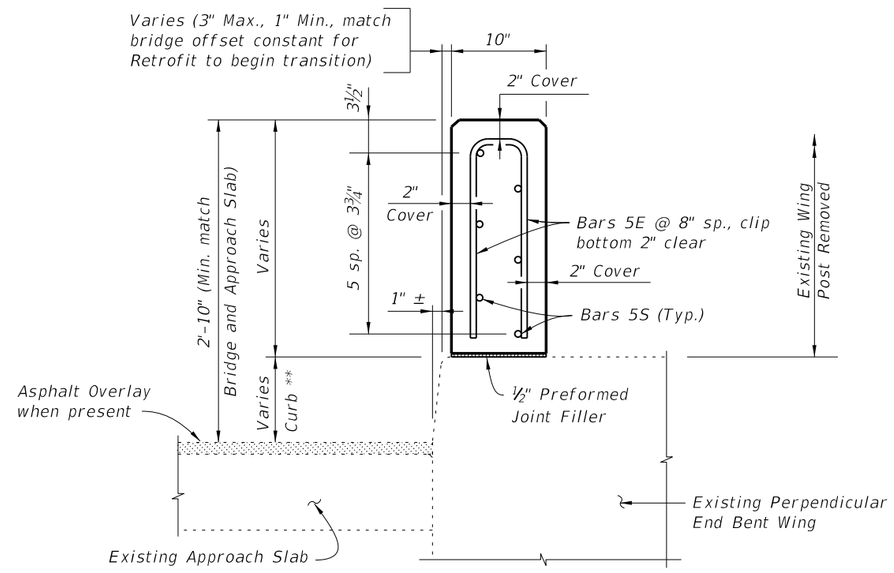
Note:

** Match curb height of adjacent bridge and approach slab.



SECTION D-D

PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)



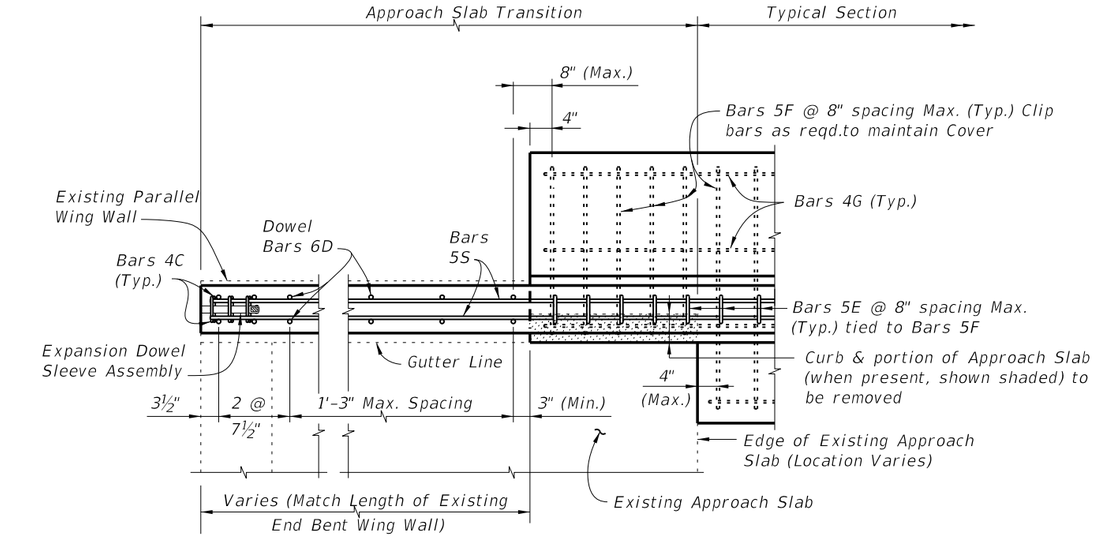
SECTION E-E (NARROW CURB SHOWN, WIDE AND INTERMEDIATE CURBS SIMILAR)

SCHEME 1 ~ MODIFICATION FOR INDEX NO. 481, 482 AND 483 - SCHEME 1

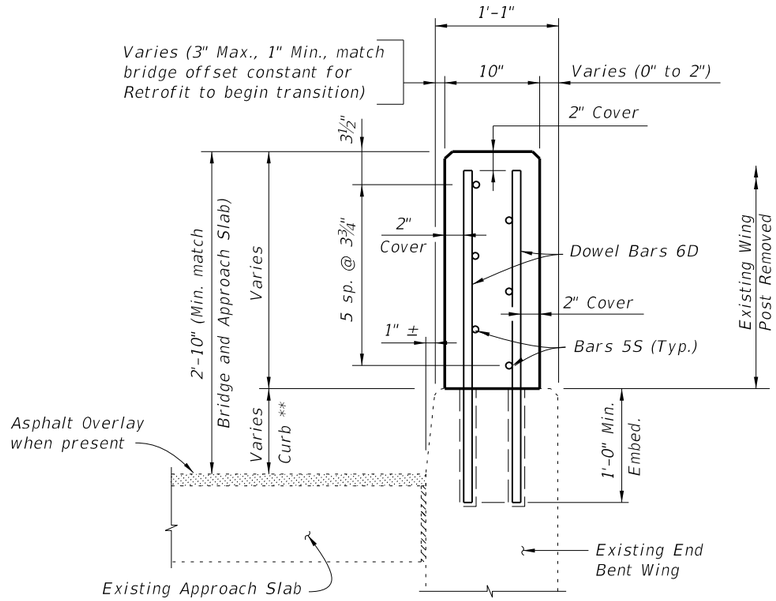
RAILING END TREATMENT FOR PERPENDICULAR OR ANGLED WING WALLS WITH NARROW CURBS (SHOWN), WIDE CURBS AND INTERMEDIATE CURBS (SIMILAR)

CROSS REFERENCE:
For Section A-A see Sheet 4.
For Expansion Dowel Assembly and placement of Dowel Bars 6D Details see Index 480.

LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/09			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH	484	5

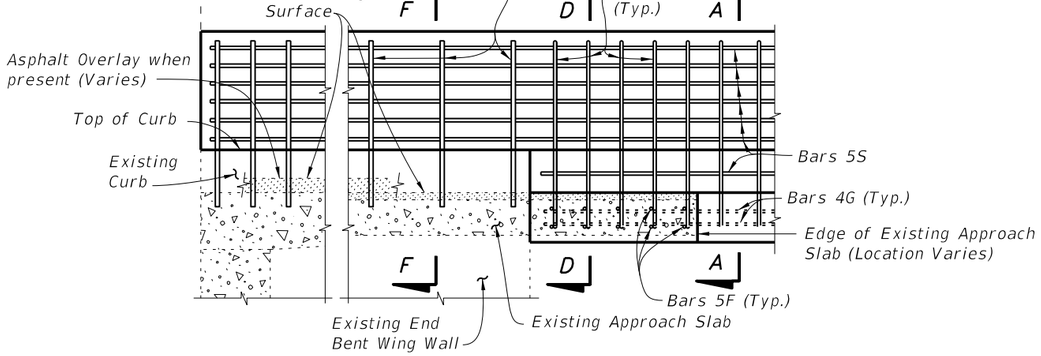


PARTIAL PLAN

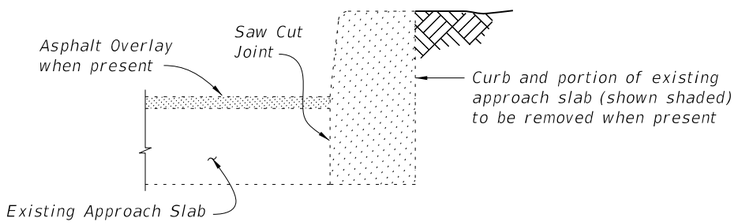


Note:
** Match curb height at adjoining existing end bent wing.

SECTION F-F



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)



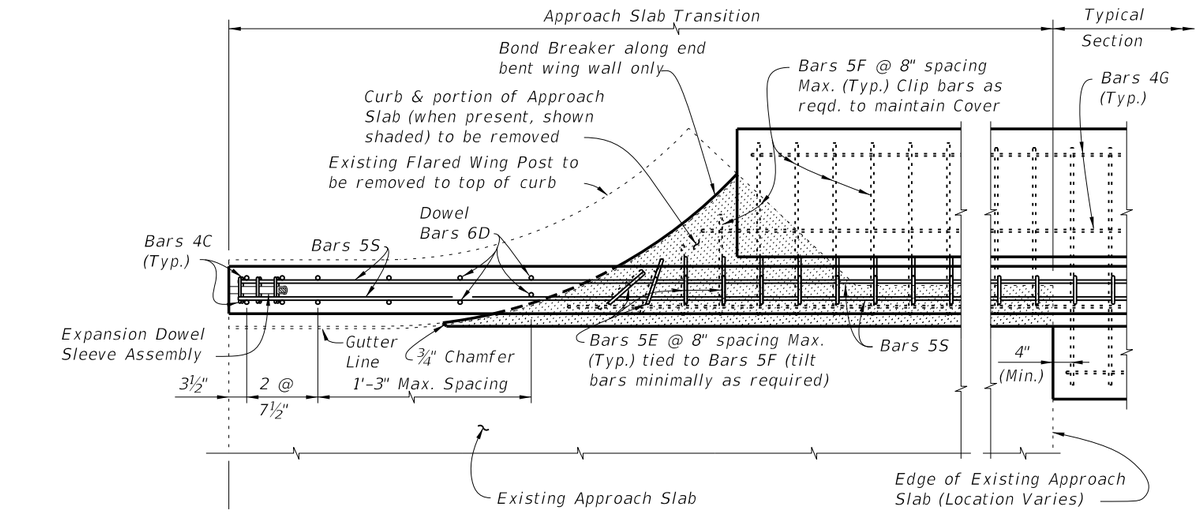
SECTION THRU EXISTING CURB AND
APPROACH SLAB TO BE REMOVED
(Free Standing Curb Similar)

SCHEME 2 ~ MODIFICATION FOR INDEX NO. 481 - SCHEME 2
RAILING END TREATMENT FOR PARALLEL WING WALLS WITH NARROW CURBS

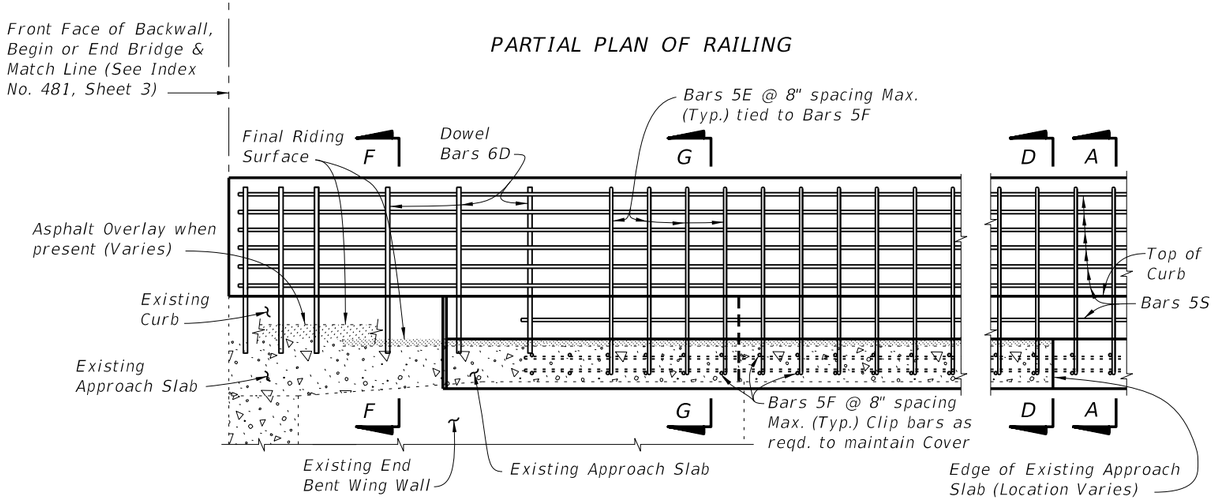
NOTES:
1. Remove existing concrete along saw cut joints. Existing reinforcing steel may be cut at joint or extended into new concrete. Exposed existing reinforcing not encased in new concrete shall be removed 1" below existing concrete surface and grouted over.

CROSS REFERENCES:
For Section A-A see Sheet 4.
For Section D-D see Sheet 5.
For Expansion Dowel Assembly and placement of Dowel Bars 6D Details see Index 480.

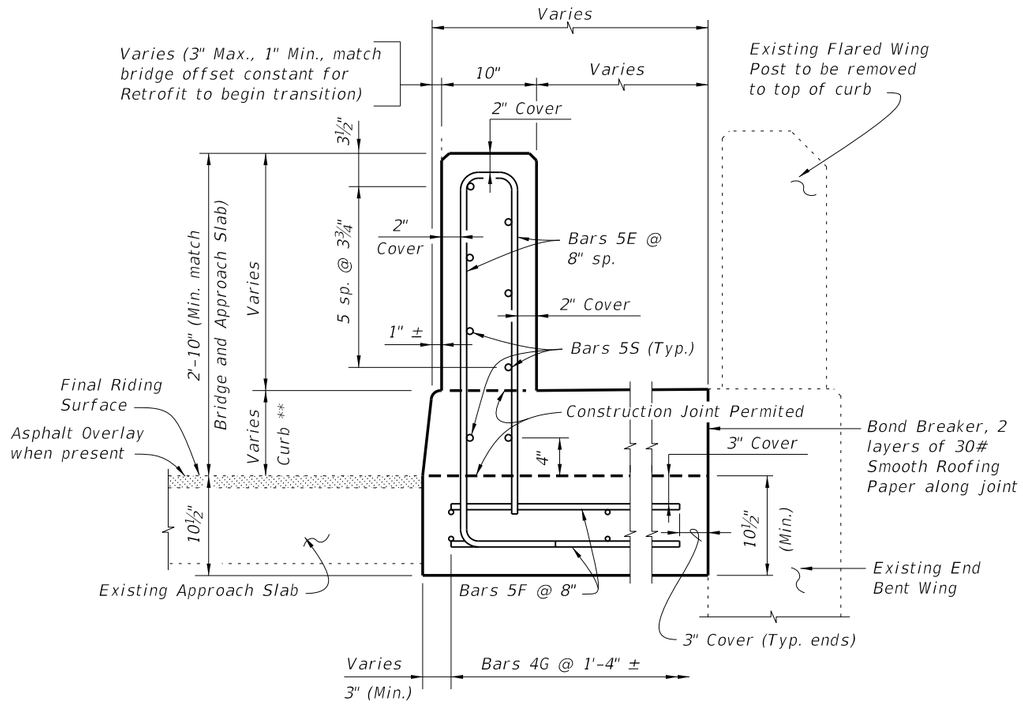
LAST REVISION	REVISION	DESCRIPTION:		FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH	INDEX NO.	SHEET NO.
07/01/09						484	6



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)



SECTION G-G

Note:
** Match curb height at adjoining existing end bent wing.

CROSS REFERENCES:
For Section A-A see Sheet 4.
For Section D-D see Sheet 5.
For Section F-F see Sheet 6.
For Expansion Dowel Assemblies Details and placement of Dowel Bars 6D see Index 480.

SCHEME 3 ~ MODIFICATION FOR INDEX NO. 481 SCHEME 3
RAILING END TREATMENT FOR FLARED WING WALLS WITH NARROW CURBS

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LAST REVISION	REVISION	DESCRIPTION:				
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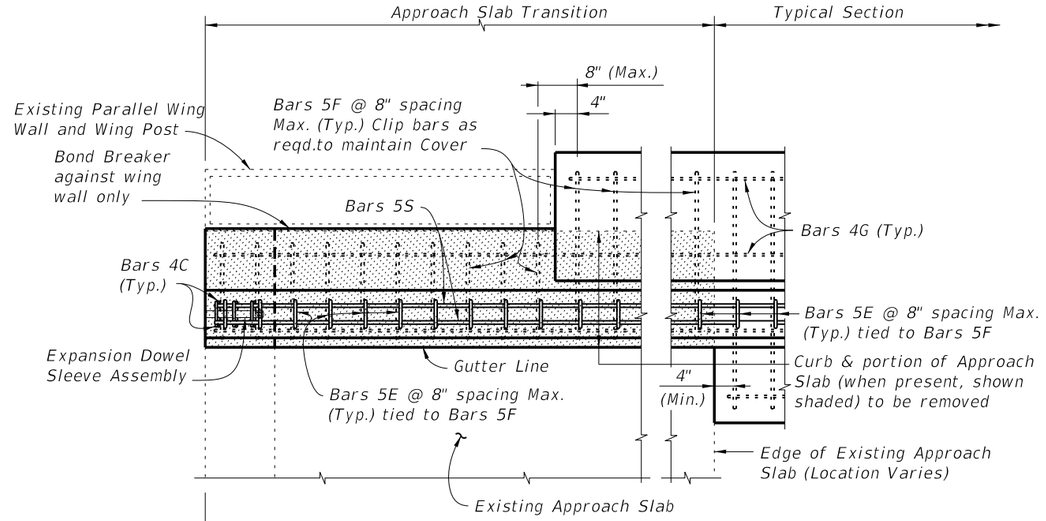
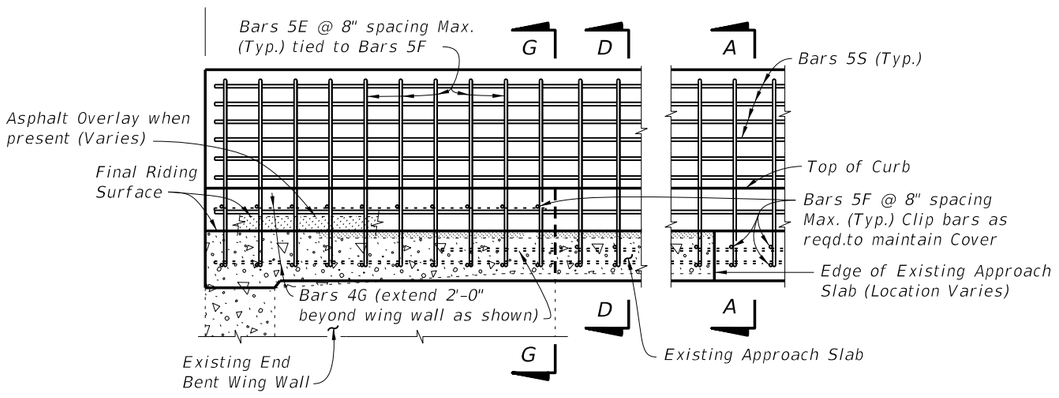
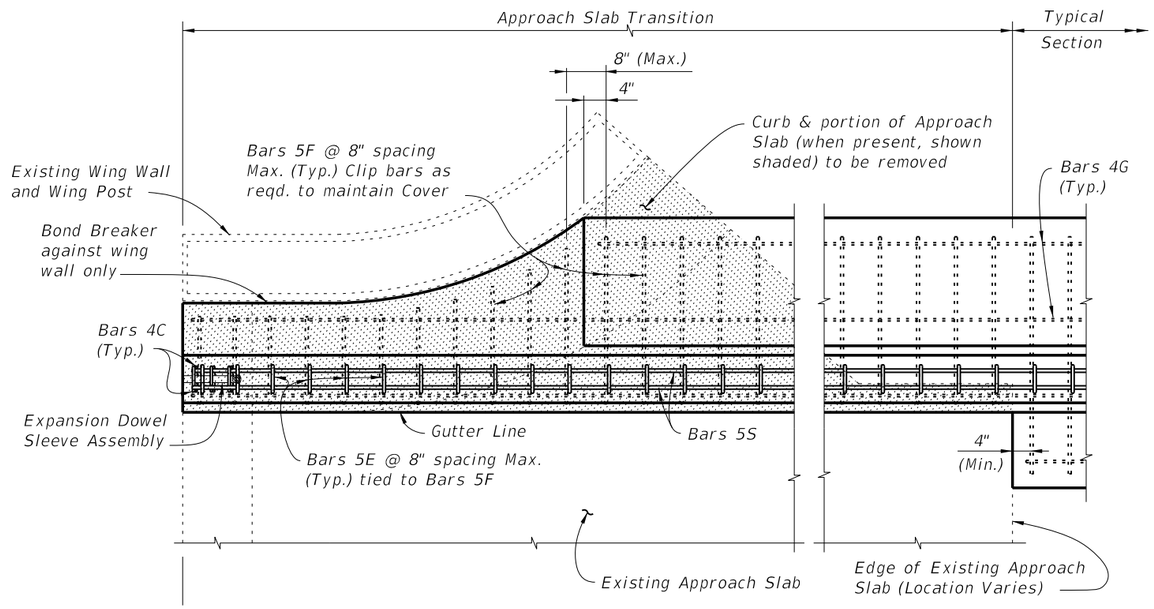


PARTIAL PLAN OF RAILING

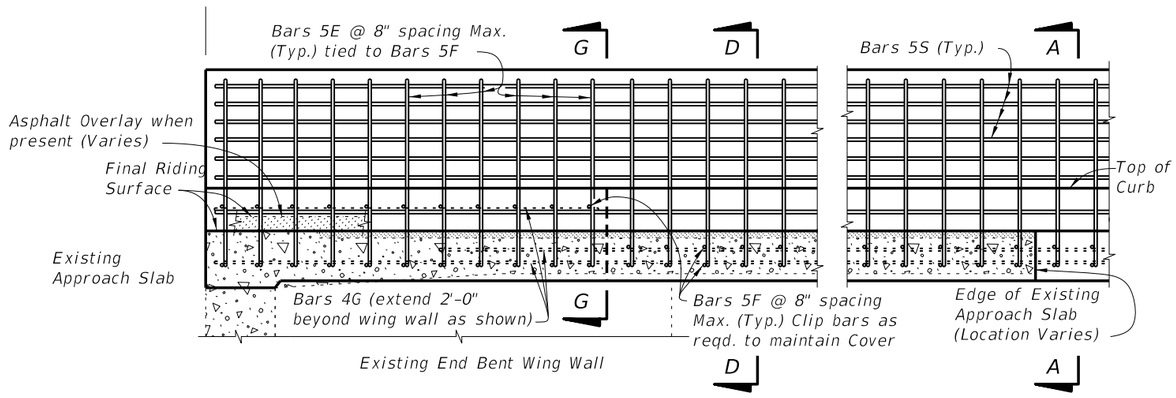


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Expansion Dowel Assemblies and Bars 4C not shown for clarity)

SCHEME 4 ~ MODIFICATION FOR INDEX NO. 482 SCHEME 2
RAILING END TREATMENT FOR PARALLEL CURBS AND WING WALLS WITH WIDE CURBS



PARTIAL PLAN OF RAILING

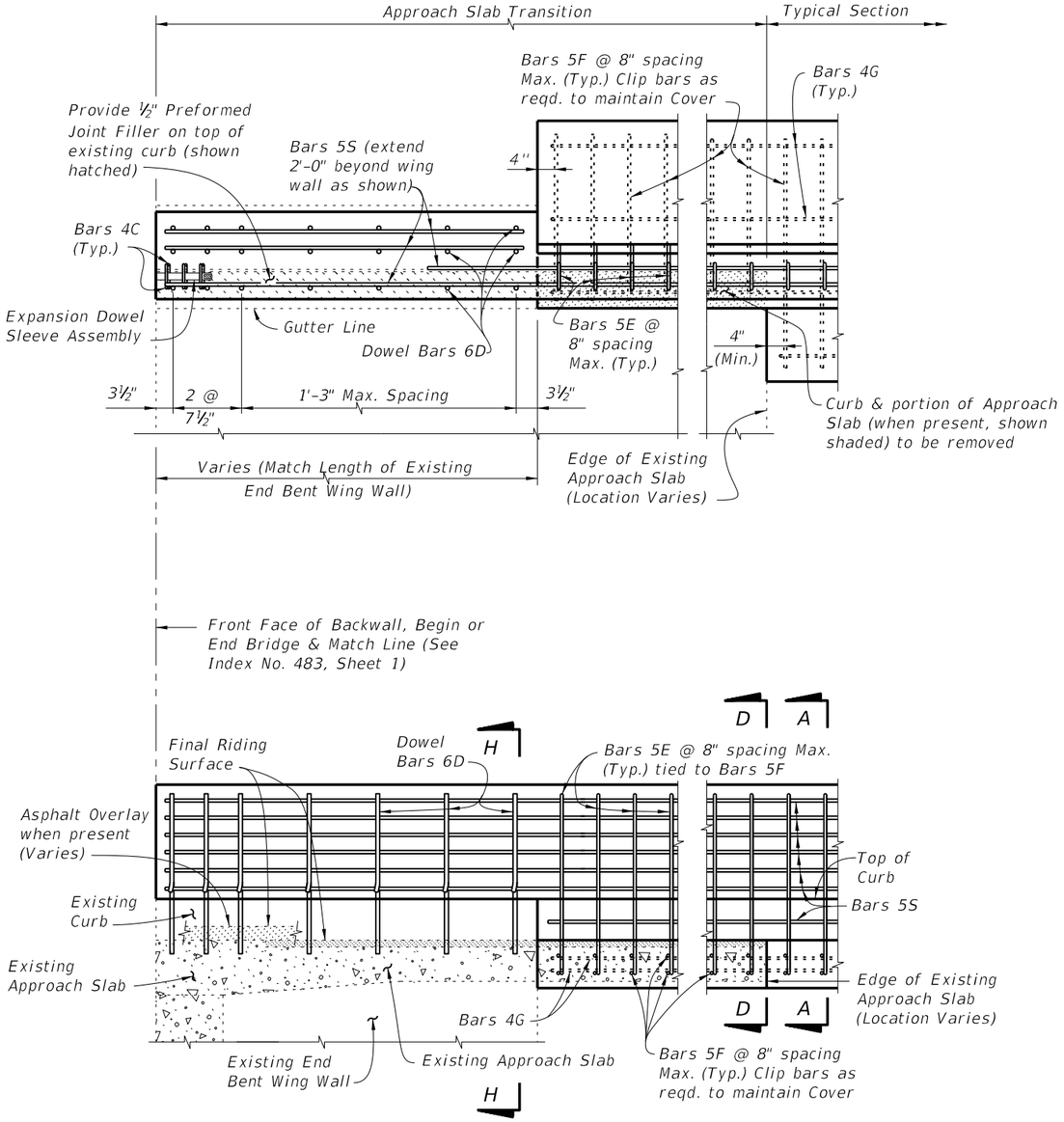


PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Existing Wing Post, Expansion Dowel Assemblies and Bars 4C not shown for clarity)

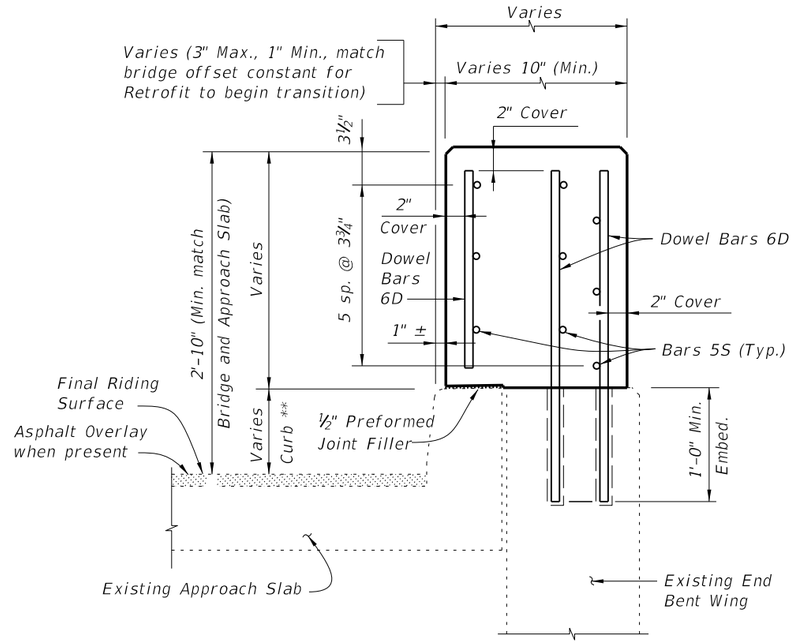
SCHEME 5 ~ MODIFICATION FOR INDEX NO. 482 SCHEME 3 AND 4
RAILING END TREATMENT FOR PARALLEL CURBS AND FLARED WING WALLS WITH WIDE CURBS

CROSS REFERENCES:
For Section A-A see Sheet 4
For Section D-D see Sheet 5.
For Section G-G see Sheet 7.
For Expansion Dowel Assemblies Details see Index 480.

LAST REVISION	REVISION	DESCRIPTION:				
07/01/09			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH	INDEX NO. 484	SHEET NO. 8



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)

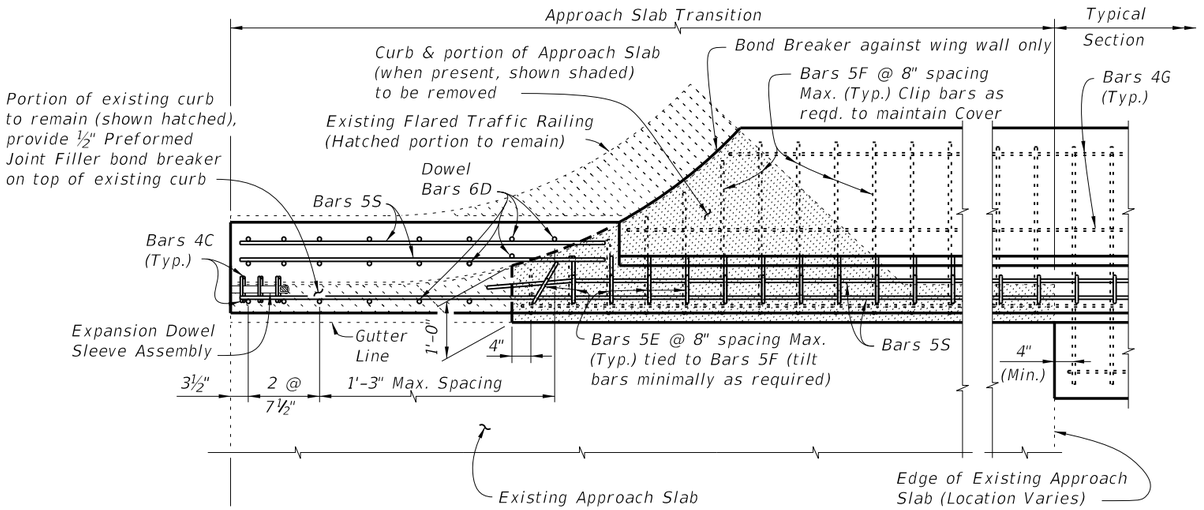


SECTION H-H

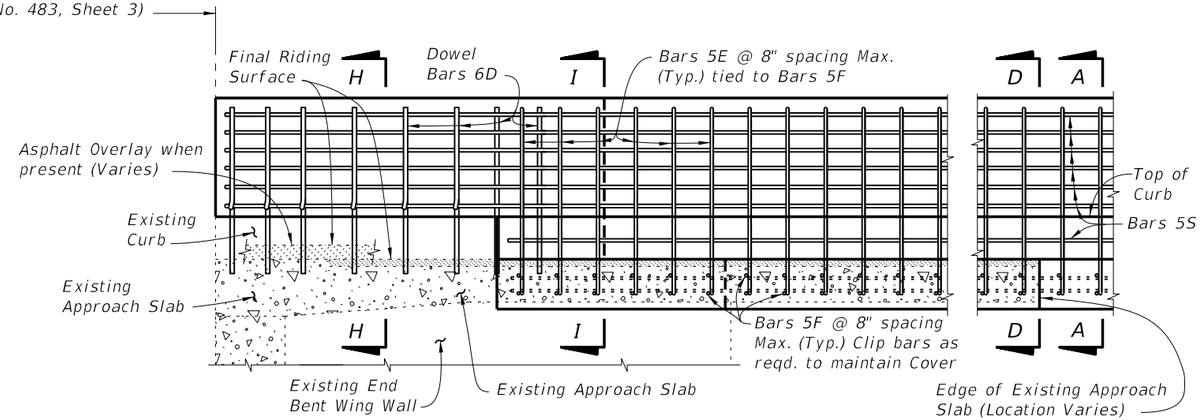
Note:
*** Match curb height at adjoining existing end bent wing.*

CROSS REFERENCES:
For Section A-A see Sheet 4.
For Section D-D see Sheet 5.
For Expansion Dowel Assembly and placement of Dowel Bars 6D Details see Index 480.

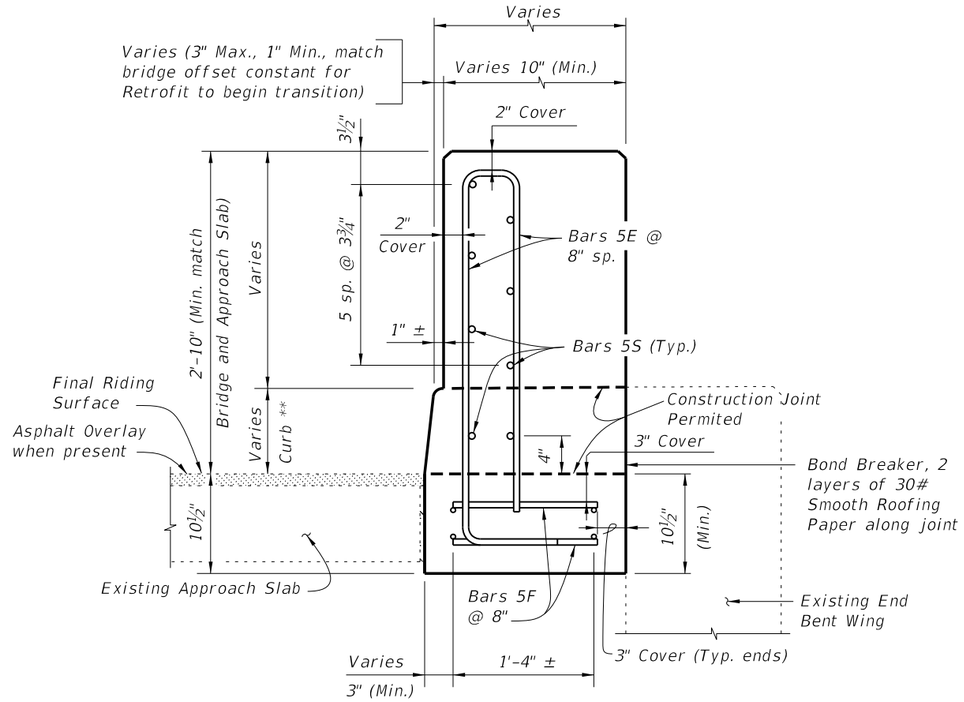
SCHEME 6 ~ MODIFICATION FOR INDEX NO. 483 SCHEME 2
RAILING END TREATMENT FOR PARALLEL CURBS AND WING WALLS WITH INTERMEDIATE CURBS



PARTIAL PLAN OF RAILING



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
(Expansion Dowel Assemblies and Bars 4C not shown for clarity)



SECTION I-I

Note:
*** Match curb height at adjoining existing end bent wing.*

CROSS REFERENCES:
For Section A-A see Sheet 4.
For Section D-D see Sheet 5.
For Section H-H see Sheet 9.
For Expansion Dowel Assemblies and placement of Dowel Bars 6D Details see Index 480.

SCHEME 7 ~ MODIFICATION FOR INDEX NO. 483 SCHEME 3
RAILING END TREATMENT FOR PARALLEL CURBS AND FLARED WING WALLS WITH INTERMEDIATE CURBS

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LAST REVISION	REVISION	DESCRIPTION:			INDEX NO.	SHEET NO.
07/01/09			FDOT DESIGN STANDARDS 2013	TRAFFIC RAILING - (VERTICAL FACE RETROFIT) SPREAD FOOTING APPROACH	484	10