

# Structures Design Office English Standards

## REVISIONS FOR ENGLISH STANDARD DRAWINGS, RELEASE 2005.1

Index No.	Revision Date	Description
I-500	01/31/05	Clarified wording in first paragraph under table.
S-500	01/31/05	Changed bearing plate configuration.
715-1 of 7	01/31/05	Changed (DRAWING NO. 1 OF 5) to (DRAWING NO. 1 of 7) in title box, "1'-6" in staked down configuration" to "1'-0" in staked down configuration" in ALTERNATE DESIGN note, and "Sheet 2 of 5" to "Drawing 2" in REINFORCING STEEL note.
715-2 of 7	01/31/05	Changed (DRAWING NO. 2 OF 5) to (DRAWING NO. 2 OF 7) in title box.
715-3 of 7	01/31/05	Changed (DRAWING NO. 3 OF 5) to (DRAWING NO. 3 OF 7) in title box, and changed TRANSITIONS note.
715-4 of 7	01/31/05	Changed (DRAWING NO. 4 OF 5) to (DRAWING NO. 4 OF 7) in title box. Added "Drawing 7 and" to 2nd paragraph of ANCHOR BOLTS, NUTS AND WASHERS note.
715-5 of 7	01/31/05	Changed (DRAWING NO. 4 OF 5) to (DRAWING NO. 4 OF 7) in title box . Added "Stakes must not be installed on both sides of the Barrier Units." to LIMITATION OF USE note, and "Drawing 7 and" to 2nd paragraph of STAKES note.
850-1 of 2	01/31/05	Added vehicular traffic definition and non-applicability statement to APPLICABILITY NOTE TO DESIGNER; Shop drawing requirement to ALTERNATE DESIGN note, "Expansion Bolts not permitted." to ANCHOR BOLT note. Changed SHOP DRAWINGS note to include "project specific geometry (line & grade)".
860-1 of 2	01/31/05	Added vehicular traffic definition and non-applicability statement to APPLICABILITY NOTE TO DESIGNER; Shop drawing requirement to ALTERNATE DESIGN note; "Expansion Bolts not permitted." to ANCHOR BOLT note. Changed SHOP DRAWINGS note to include "project specific geometry (line & grade)".
870-1 of 2	01/31/05	Added vehicular traffic definition and non-applicability statement to APPLICABILITY NOTE TO DESIGNER; Shop drawing requirement to ALTERNATE DESIGN note. Changed SHOP DRAWINGS note to include "project specific geometry (line & grade)".
1503	01/31/05	Removed the word ( Max. ) from Type "B", "C" and "D"
1508	01/31/05	Changed Pile Length to 26'-0" for Wall Type K, 20'- 0" Post Spacing. Added Note that Pile Length for Wall Type K, 20'-0" Post Spacing is 30'-0" for Option "D".

9031-1 of 3	01/31/05	Added Fence Application Note to the Fencing Notes to clarify where bridge fence may be used.
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**NEW ENGLISH STANDARD DRAWINGS IN RELEASE 2005.1**

<b>Index No.</b>	<b>Release Date</b>	<b>Title</b>
715	01/31/05	Temporary Traffic Railing Barrier – (Type K) (Drawings 6 & 7 of 7)
740	01/31/05	Traffic Railing Barrier – (Corral Shape) - (Drawings 1 thru 7 of 7)
1210	01/31/05	Navigation Light System Details (Fixed Bridges) (Drawings 1 & 2 of 2)
1212	01/31/05	Maintenance Lighting For Box Girders - (Drawings 1 & 2 of 2)
9010	01/31/05	Utility Conduit Details - (Drawings 1 & 2 of 2)

**GENERAL INSTRUCTIONS:**

Standard Drawing Index No. 501 depicts details and notes for elastomeric bearing pads for prestressed concrete beams with or without skewed end conditions.

Semi-Standard Drawing Index No. S-510 contains generic details and notes for beveled bearing plates. Completion of the table 'Beveled Bearing Plate B Dimensions' is required.

When completed, the Semi-Standard Drawing(s) shall be included in the plans in conjunction with Standard Drawing Index No. 501.

LIMITING PARAMETERS FOR ELASTOMERIC BEARING PADS USED WITH FDOT STANDARD PRESTRESSED CONCRETE BEAMS				
PAD TYPE	BEAM TYPE	MAX. TOTAL SERVICE LOAD REACTION	MAX. SERVICE LIVE LOAD REACTION	MAX. SHEAR DEFLECTION
A	II (AASHTO)	170 klps	65 klps	0.75"
	III (AASHTO)	180 klps	70 klps	
	IV AASHTO)	235 klps	90 klps	
	V & VI (AASHTO) AND FLORIDA BULB-T'S	310 klps	120 klps	
B	II (AASHTO)	240 klps	95 klps	1.0"
	III (AASHTO)	310 klps	120 klps	
	IV AASHTO)	320 klps	125 klps	
	V & VI (AASHTO) AND FLORIDA BULB-T'S	465 klps	185 klps	

The Service Live Load and Total Service Load Reactions can be determined from the beam design. The Shear Deflection is the product of the coefficient of thermal expansion, the temperature fall and the length of bridge contributing to movement, plus one-half the shortening along the bottom of beam due to creep and shrinkage after placement of the beam on the bearings (this value can be determined from data in the beam design output).

Standard Elastomeric bearing pads have been designed in accordance with AASHTO LRFD Specifications, Method "B", (Articles 14.7.5.3.2, .3, .4, .6 and .7) with the exception of Article 14.7.5.3.5 Combined Compression and Rotation. For standard AASHTO Girders and Florida Bulb-T's, the FDOT does not require checking for Combined Compression and Rotation.

For design values exceeding the limiting parameters shown on this sheet, the designer must develop custom designs and details. For skew angles greater than 30°, consider round pads using similar elastomer and plate thicknesses shown in Index No. 501.

**EXAMPLES:**

The following examples show the information required to determine the correct elastomeric bearing pad type to use:

**\*EXAMPLE 1**

**Given Information:**

Superstructure Type - One Simple Span  
 Type IV AASHTO Beams 105'-0" long, spaced at 7'-0" centers  
 No longitudinal restraints except friction between the pad and the concrete substructure  
 Service Live Load Reaction = 89.2 klps  
 Total Service (Live Load + Dead Load) Reaction = 186.6 klps  
 Coefficient of Thermal Expansion = 0.000006/°F  
 Thermal Gradient = 50°F  
 Shrinkage at the Bottom of Beam (from day 120 to day 240) = 0.429"  
 Shear Deflection = (0.000006/°F x 25°F x 52.5' x 12"/') + 0.429"/2 = 0.309"  
 Beam Grade = 2%

**Elastomeric Bearing Pad Type Determination:**

Use Index No. I-500 to compare the design values to the limiting parameters for Pad Type A for Type IV AASHTO Beams.

**Limiting Parameters Versus Design Values:**

Maximum Total Service Reaction of 235 klps versus Design Value of 186.6 klps; therefore, OK  
 Maximum Service Live Load Reaction of 90 klps versus Design Value of 89.2 klps; therefore, OK  
 Maximum Shear Deflection of 0.75" versus Design Value of 0.309"; therefore, OK

**Conclusion:**

Use Elastomeric Bearing Pad Type A.  
 No beveled plate is required.

**\*EXAMPLE 2**

**Given Information:**

Superstructure Type - Four Continuous Spans  
 Type IV AASHTO Beams 105'-0" long, spaced at 7'-0" centers  
 No longitudinal restraints except friction between the pad and the concrete substructure  
 Service Live Load Reaction = 89.2 klps  
 Total Service (Live load + dead load) Reaction = 186.6 klps  
 Coefficient of Thermal Expansion = 0.000006/°F  
 Thermal Gradient = 50°F  
 Shrinkage at the Bottom of Beam (from day 120 to day 240) = 0.429"  
 Shear Deflection = (0.000006/°F x 25°F x 210' x 12"/') + 0.429"/2 = 0.593"  
 Beam Grade = 5%

**Elastomeric Bearing Pad Type Determination:**

Use Index No. I-500 to compare the design values to the limiting parameters for Pad Type A for Type IV AASHTO Beams.

**Limiting Parameters Versus Design Values:**

Maximum Total Service Reaction of 235 klps versus Design Value of 186.6 klps; therefore, OK  
 Maximum Service Live Load Reaction of 90 klps versus Design Value of 89.20 klps; therefore, OK  
 Maximum Shear Deflection of 0.75" versus Design Value of 0.593"; therefore, OK

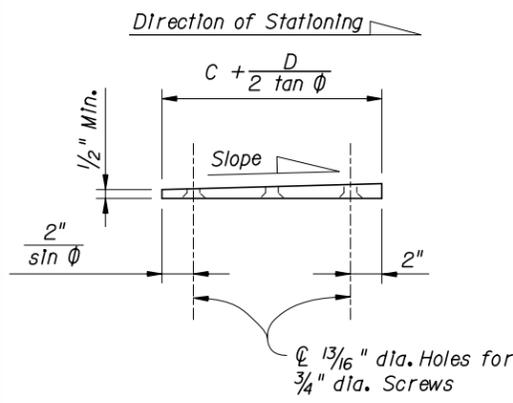
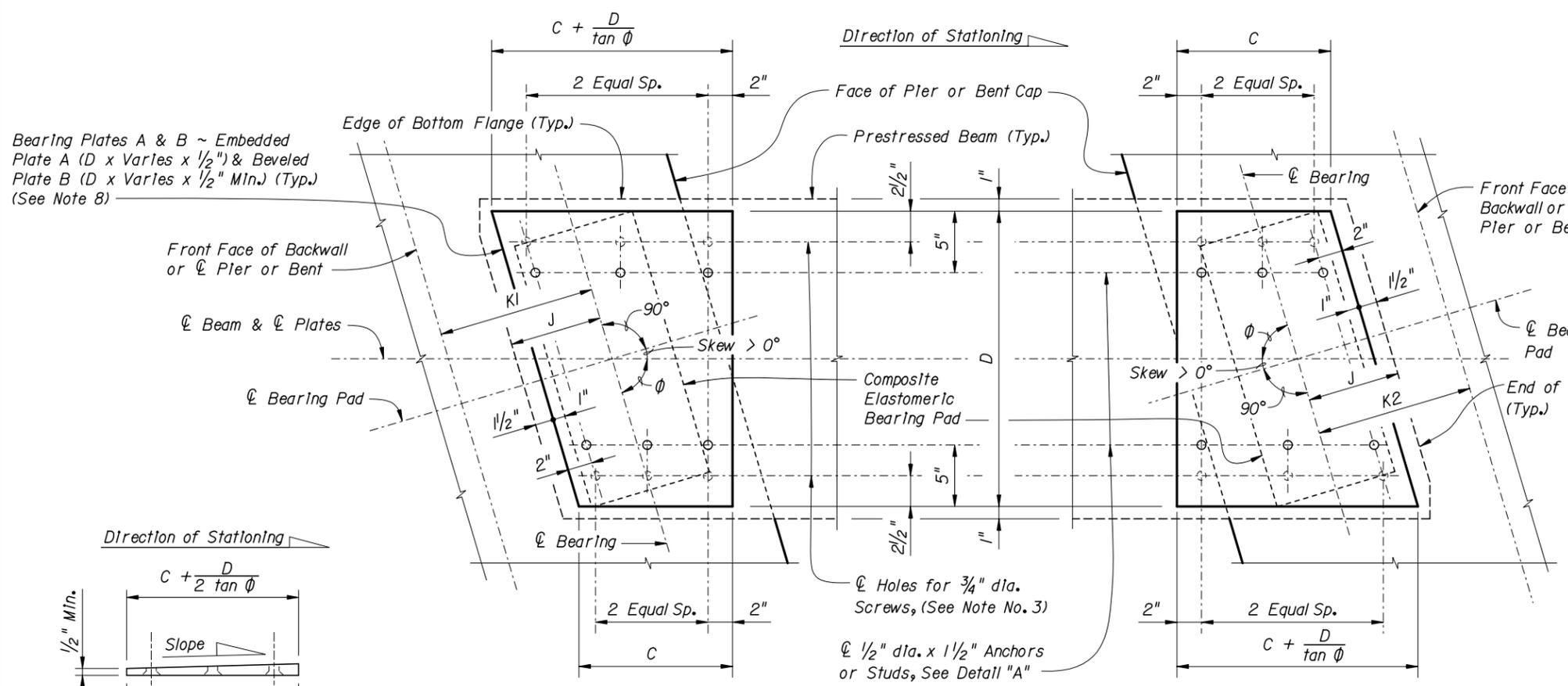
**Conclusion:**

Use Elastomeric Bearing Pad Type A. Additionally, complete 'Beveled Bearing Plate B Dimensions' on Index No. S-510 since beam grade exceeds 2%.

\*The above examples do not assume any wind or braking loads are applied to the elastomeric bearing pads.

REVISIONS						ENGINEER OF RECORD			SHEET TITLE				
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	NAMES	DATES	FLORIDA DEPARTMENT OF TRANSPORTATION			PROJECT NAME		
01-31-05	SDO	Instructional Standard Drawing Issue Date				DRAWN BY	AVP	12-02	CENTRAL OFFICE			COMPOSITE ELASTOMERIC BEARING PAD INSTRUCTIONS INDEX NO. I-500	
						CHECKED BY	DEK	12-02	605 Suwannee Street, MS 33				SHEET NO.
						DESIGNED BY	DEK	12-02	Tallahassee, Florida 32399-0450				
						CHECKED BY	AVP	12-02	ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
						APPROVED BY	REN						

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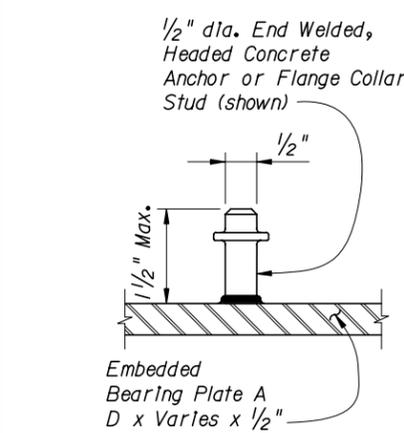
PLAN  
 (0° < Skew ≤ 30° shown, Skew = 0° Similar)

**NOT FOR CONSTRUCTION  
 PRELIMINARY AND SUBJECT TO CHANGE**

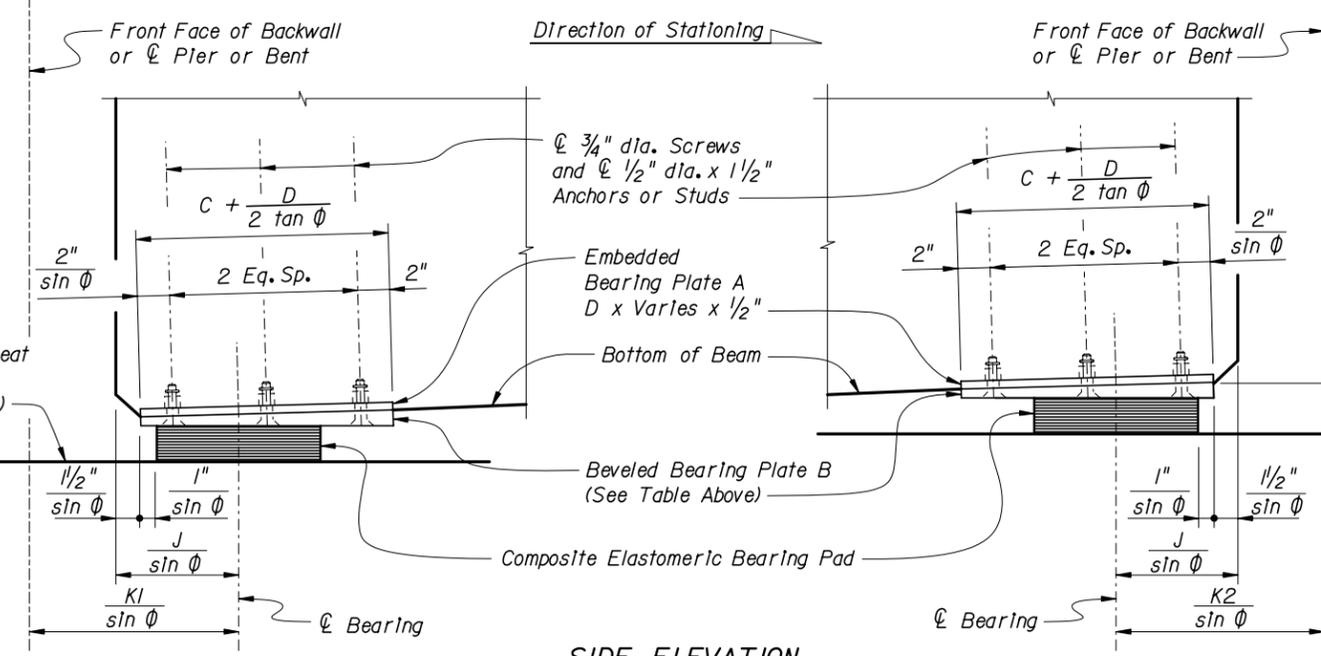
BEARING PLATE TABLE				
SPAN NO(s).	BEAM NO(s).	PAD TYPE	SLOPE	
			Begin Span	End Span

- NOTES:
1. Work this sheet with the following drawings:  
 Index No. 501 - Composite Elastomeric Bearing Pads.
  2. Bearing Plates are required for Beams only as scheduled in the 'TABLE OF BEAM VARIABLES' on Beam Sheets.
  3. Hot-dip galvanize Bearing Plates A & B after fabrication. Drill Bearing Plates A and B as an assembled unit, thread Bearing Plate B only. Drill and thread holes prior to plates being galvanized (ASTM A 123).
  4. Provide Electro-plated, Countersunk Flat Head Machine Screws in accordance with ASTM A 449, Type I. Provide screws long enough to maintain a 1" minimum embedment into Embedded Bearing Plate A and Galvanized Cap.
  5. Include the cost of Beveled Bearing Plates in the pay item for Prestressed Concrete Beams.
  6. For Dimensions C and D, see 'BEARING PLATE DIMENSIONS' on Index No. 501. For Dimensions J, K1 and K2, see 'TABLE OF BEAM VARIABLES' on Beam Sheets.
  7. All details and dimensions shown are along  $\bar{C}$  Beam, except for dimensions to  $\frac{3}{4}$ " dia. Screws and  $\frac{1}{2}$ " dia. x  $\frac{1}{2}$ " Anchors or Studs, which are along  $\bar{C}$  Screws or  $\bar{C}$  Anchors or Studs. Positive Slope shown, Negative Slope similar.
  8. When Skew = 0°, dimensions for Embedded Bearing Plate A are D x C x  $\frac{1}{2}$ " and for Beveled Plate B are D x C x  $\frac{1}{2}$ " Min.

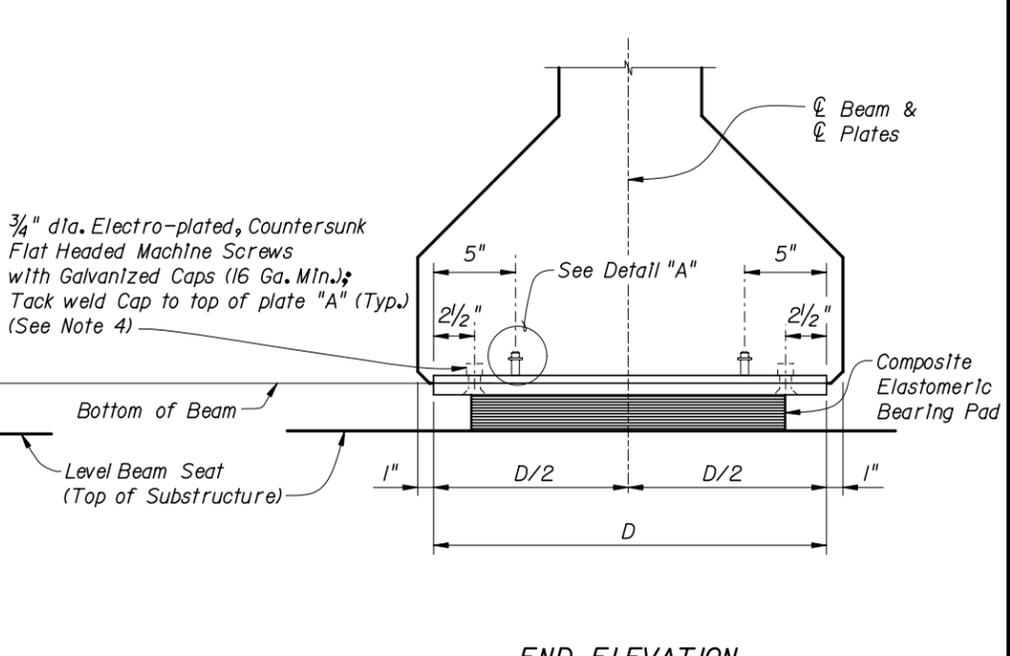
**BEVELED BEARING PLATE B  
 (Along  $\bar{C}$  Beam)**  
 (Positive Slope, Begin Bearing shown;  
 Negative Slope, End Bearing similar)



DETAIL "A"



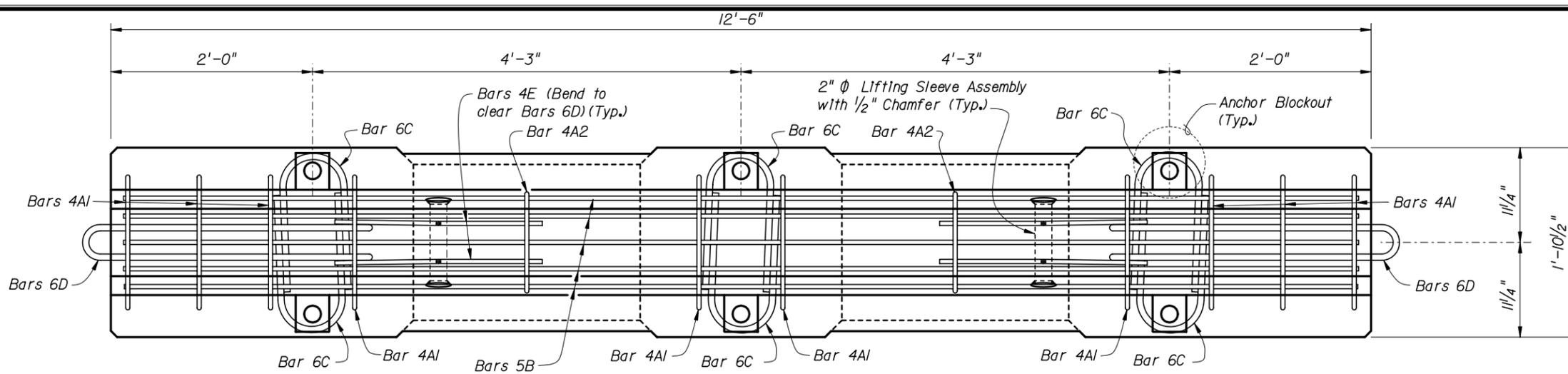
SIDE ELEVATION  
 (Along  $\bar{C}$  Beam) (See Note 7)



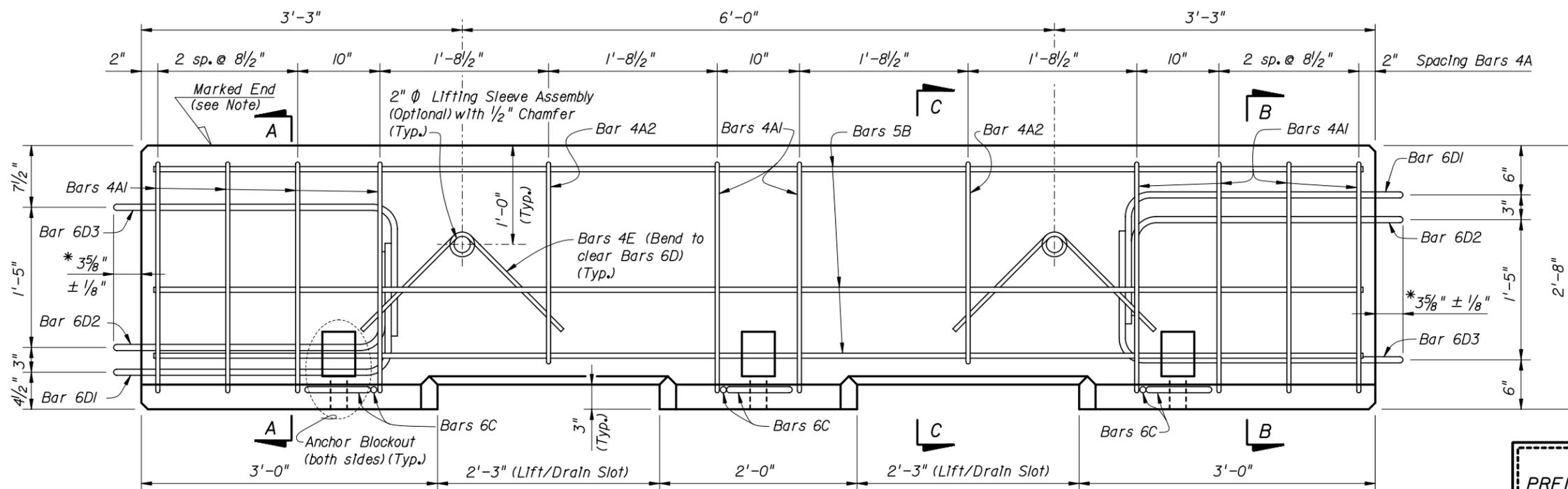
END ELEVATION  
 BRIDGE NO. XXXXXX

REVISIONS				DRAWN BY		ENGINEER OF RECORD		FLORIDA DEPARTMENT OF TRANSPORTATION			SHEET TITLE	
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	NAMES	DATES	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME	SHEET NO.
01-31-05	SDO	Semi-Standard Drawing Issue Date										

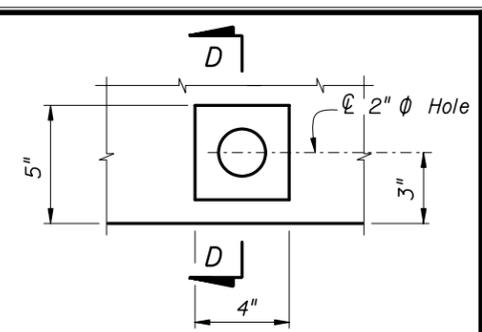
BEVELED BEARING PLATE DETAILS  
 INDEX NO. S-510



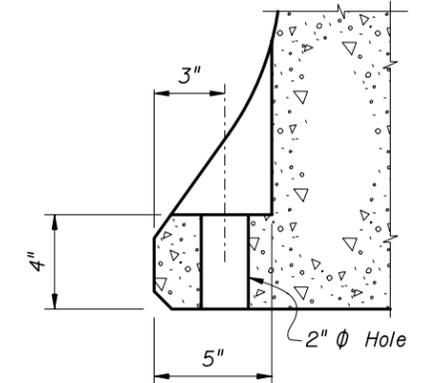
PLAN VIEW



ELEVATION VIEW



ANCHOR BLOCKOUT DETAIL



SECTION D-D  
(Reinforcement not shown for clarity)

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

**NOT FOR CONSTRUCTION  
PRELIMINARY AND SUBJECT TO CHANGE**

This 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 shown.

**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 6-8.  
**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 3/4" 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 971. 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 1/8" 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 Drawing 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.

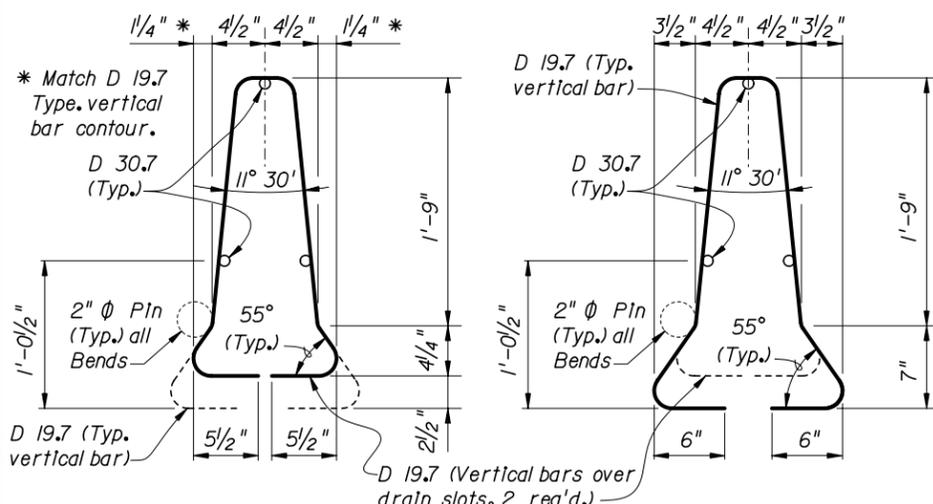
**LIFTING SLEEVE ASSEMBLY:** Inclusion of the Lifting Sleeve Assemblies is optional. Steel for Pipe Sleeve shall be in accordance with ASTM A 53. Hot dip galvanize the Lifting Sleeve Assemblies after fabrication in accordance with the Specifications.  
**SURFACE FINISH:** Construct Barrier Units in accordance 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 DESIGN:** Manufacturers seeking approval of proprietary concrete barrier systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the barrier system is crash tested to NCHRP Report 350 Test Level 3 criteria, is accepted by FHWA for use as a temporary concrete barrier in the configurations shown herein, is a minimum of 2'-8" tall, has transitions and connections comparable to the standard design and has permanent deflections due to TL-3 crash test impacts not to exceed 3'-9" in freestanding configuration, 3.5" in bolted down configuration and 1'-0" in staked down configuration.

REVISIONS				NAMES		DATES		ENGINEER OF RECORD			SHEET TITLE	
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	TEMPORARY TRAFFIC RAILING BARRIER - (TYPE K) INDEX NO. 715 (DRAWING 1 OF 7)	
01-31-05	SDO	Standard Drawing Issue Date									PROJECT NAME	
											SHEET NO.	

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**ALTERNATE REINFORCING STEEL (WELDED WIRE FABRIC) DETAILS**

**CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS**

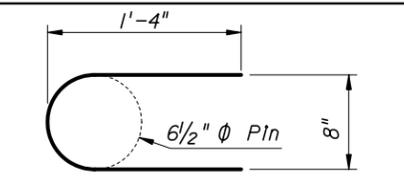


**NOTES:**  
 Place 2 ~ Bars D 30.7 (12'-2" long) In Bottom of WWF cage.  
 See Section A-A for location.  
 D 19.7 spacing shall match spacings for Bars 4A shown in Elevation View, Drawing 1.

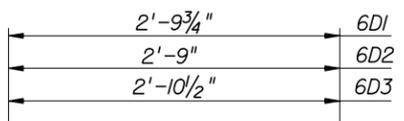
**CONFIGURATION ONE**

**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"

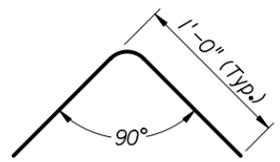


**BAR 6C**

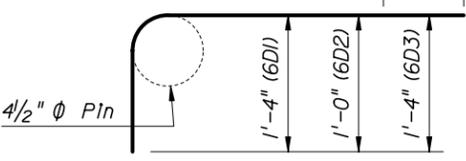


**TOP VIEW BARS 6D1, 6D2 & 6D3**

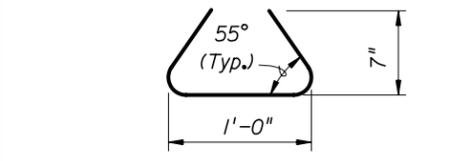
8" Min. (Limit of Galvanizing)



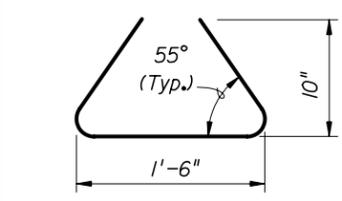
**BAR 4E**



**SIDE VIEW BARS 6D1, 6D2 & 6D3**

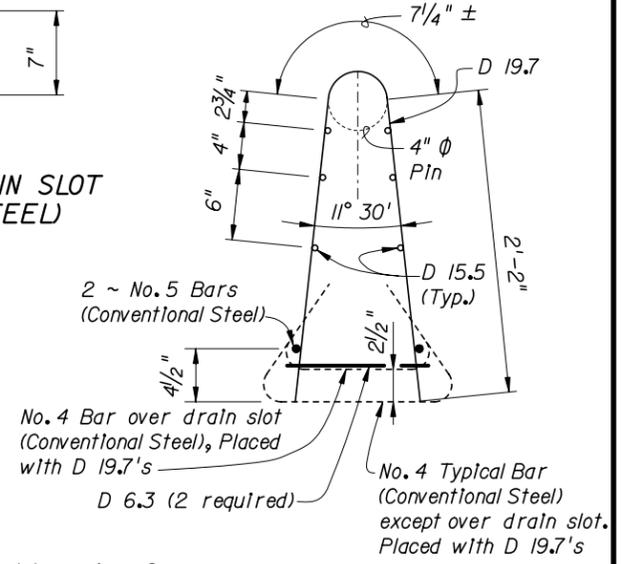


**NO. 4 BAR OVER DRAIN SLOT (CONVENTIONAL STEEL)**

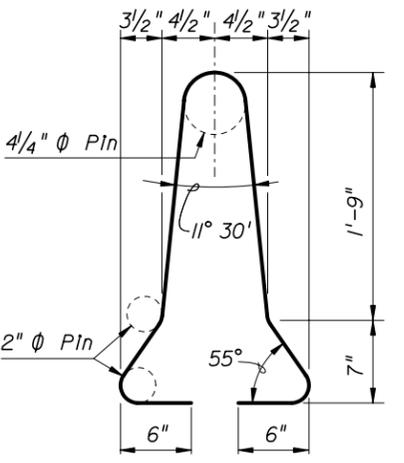


**NO. 4 TYPICAL BAR (CONVENTIONAL STEEL)**

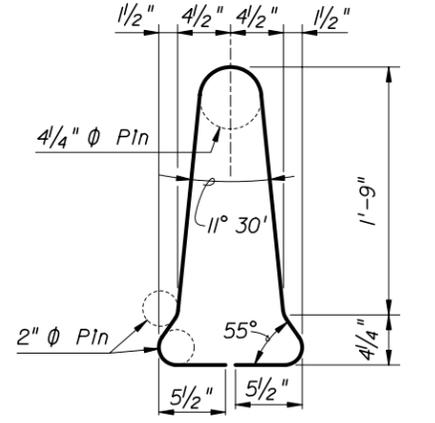
**NOTE:**  
 D 19.7 spacing shall match spacings for Bars 4A shown in Elevation View, Drawing 1.



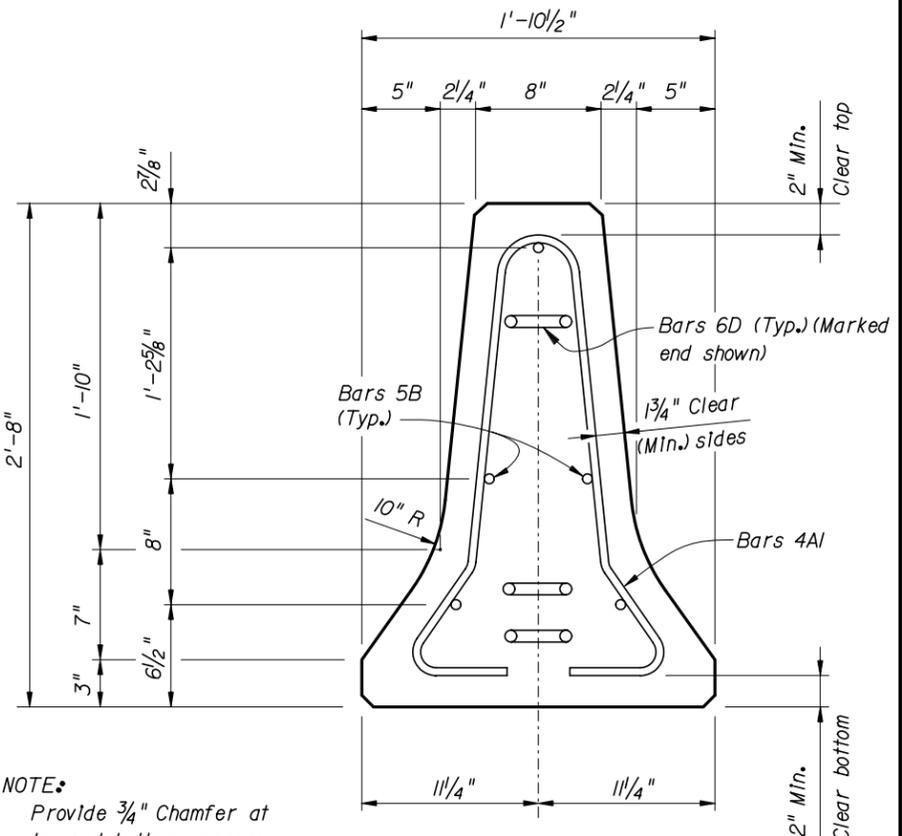
**CONFIGURATION TWO**



**STIRRUP BAR 4A1**

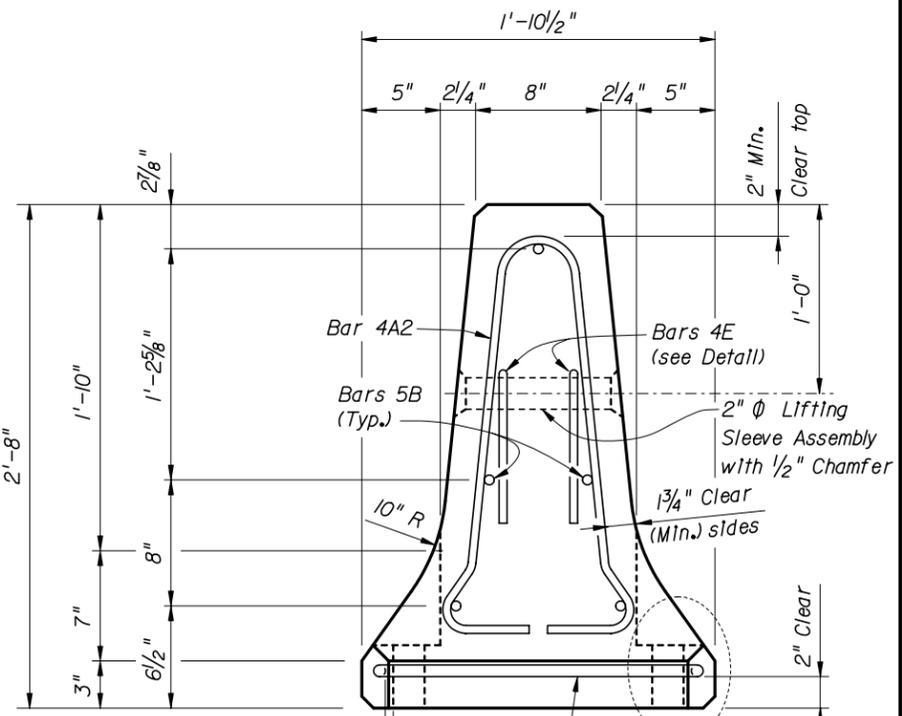


**STIRRUP BAR 4A2**



**NOTE:**  
 Provide 3/4" Chamfer at top and bottom corners of Railing.

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



1/2" Clear - Bars 6C to 2" Holes (Typ.)  
 Anchor Blockout (see Detail)

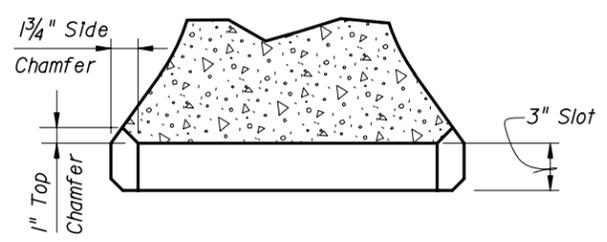
**SECTION C-C (Bars 6D not shown for clarity)**

**ESTIMATED TEMPORARY CONCRETE BARRIER QUANTITIES**

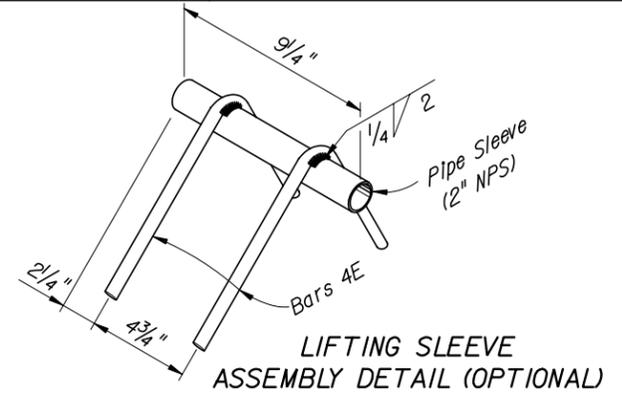
ITEM	UNIT	QUANTITY
Concrete	C.Y.	1.29
Reinforcing Steel	LB.	218

The above quantities are for one Barrier Unit.

**NOT FOR CONSTRUCTION PRELIMINARY AND SUBJECT TO CHANGE**

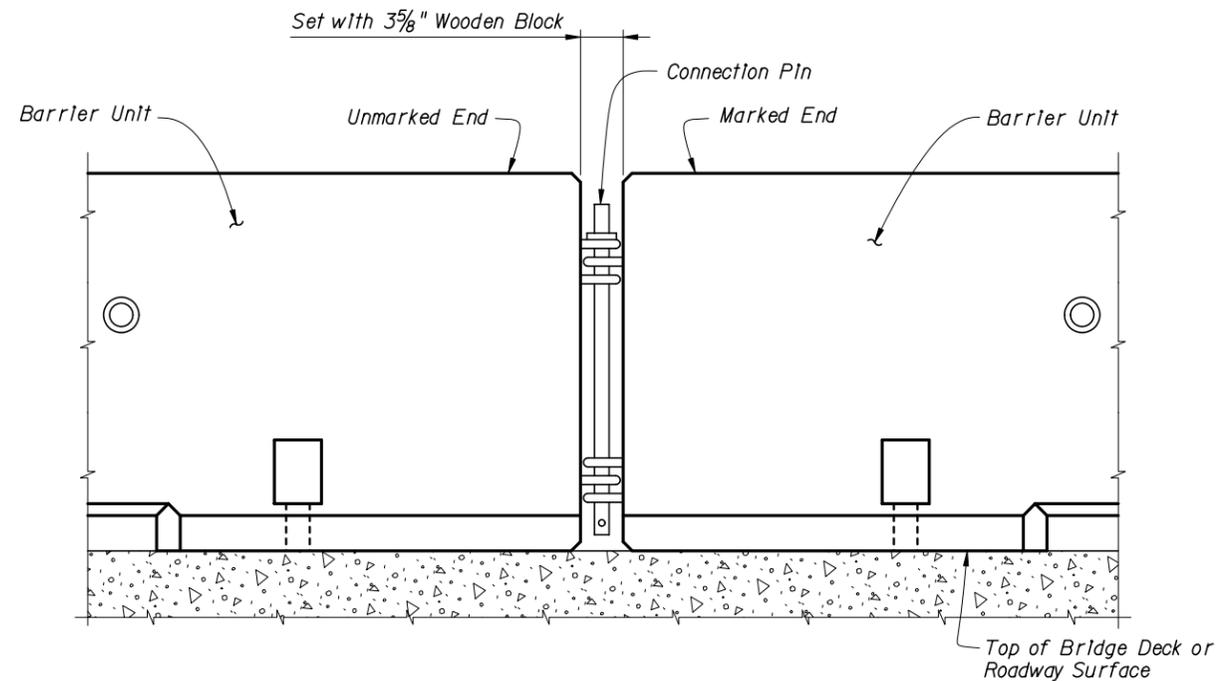


**SECTION THRU LIFT/DRAIN SLOT**

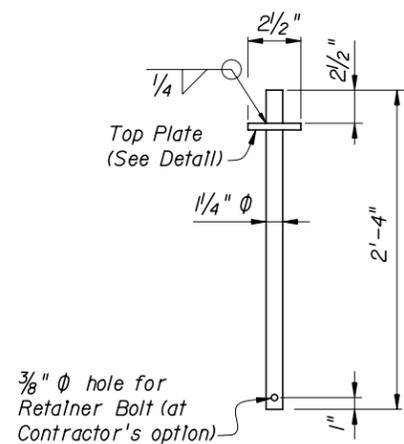


**LIFTING SLEEVE ASSEMBLY DETAIL (OPTIONAL)**

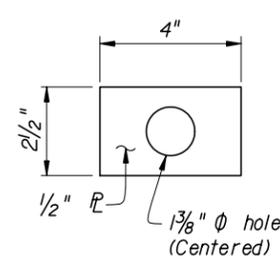
REVISIONS				NAMES		DATES		ENGINEER OF RECORD			SHEET TITLE	
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	TEMPORARY TRAFFIC RAILING BARRIER - (TYPE K) INDEX NO. 715 (DRAWING 2 OF 7)	
01-31-05	SDO	Standard Drawing Issue Date									PROJECT NAME	
											SHEET NO.	



DETAIL OF CONNECTION BETWEEN BARRIER UNITS



CONNECTION PIN DETAIL



TOP PLATE DETAIL

NOTES FOR ALL INSTALLATIONS:

**LIMITATION OF USE:** This Temporary Concrete Barrier 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. 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.

**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:** 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 3/8" diameter hole may be provided at the bottom of the Connection Pin, as shown, for the installation of a vandal resistance bolt.

**INSTALLATION:** Set Barrier Units by using a 3 5/8" wooden block between ends of adjacent units. Install Connection Pins between adjacent Barrier Units as shown. 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 Design Standards 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.

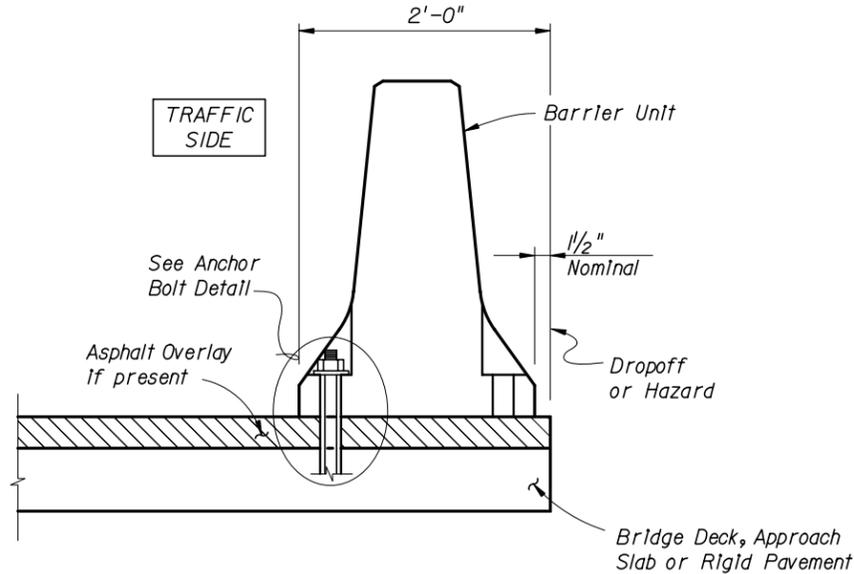
**TRANSITIONS:** Transitions are required between freestanding, bolted down, staked down and back filled Type K Barrier Installations, see Drawing 7 for transition requirements and details. Transitions are also required between installations of Type K Barrier and other types of temporary barrier, see Design Standards Index No. 415 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 Barrier Units shall become the property of the Contractor and shall be removed from the site prior to acceptance of the completed project.

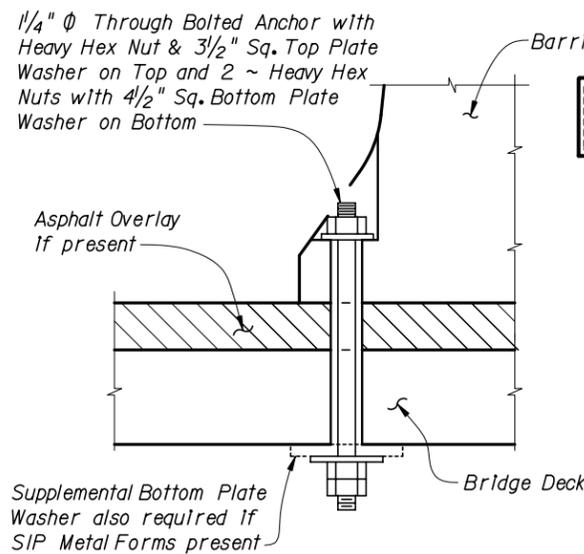
NOT FOR CONSTRUCTION  
PRELIMINARY AND SUBJECT TO CHANGE

REVISIONS				NAMES		DATES		ENGINEER OF RECORD			SHEET TITLE					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	DESCRIPTION	FLORIDA DEPARTMENT OF TRANSPORTATION			TEMPORARY TRAFFIC RAILING BARRIER - (TYPE K) INDEX NO. 715 (DRAWING 3 OF 7)					
01-31-05	SDO	Standard Drawing Issue Date				2-03		<b>CENTRAL OFFICE</b> 605 Suwannee Street, MS 33 Tallahassee, Florida 32399-0450			PROJECT NAME					
						2-03	ROAD NO.						COUNTY	FINANCIAL PROJECT ID	SHEET NO.	
						2-03										
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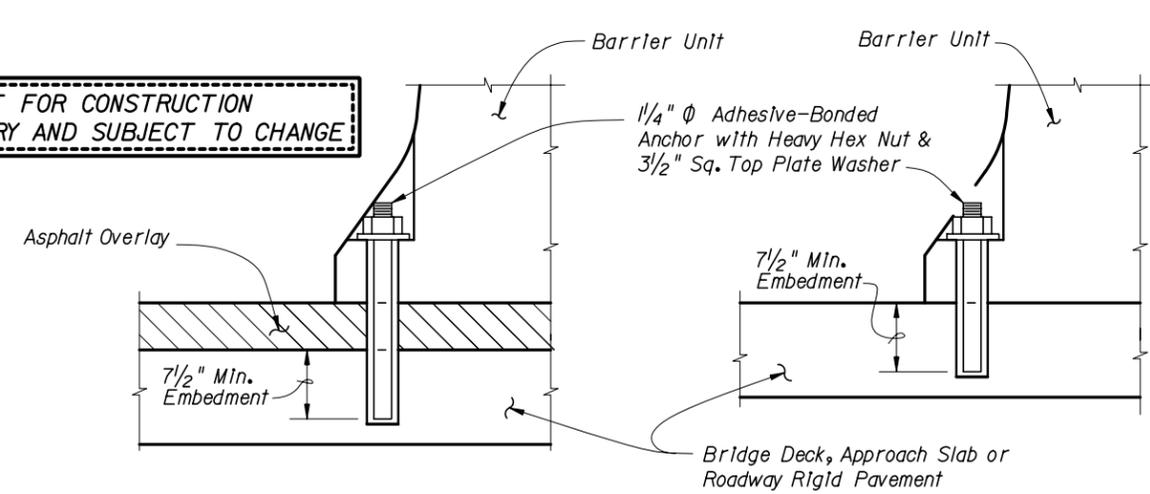


**TYPICAL SECTION  
(BRIDGE DECK SHOWN, APPROACH SLAB  
OR RIGID PAVEMENT SIMILAR)**



**THROUGH BOLTED ANCHOR  
INSTALLATION ON BRIDGE DECK**

**NOT FOR CONSTRUCTION  
PRELIMINARY AND SUBJECT TO CHANGE**



**WITH ASPHALT  
OVERLAY**

**WITHOUT ASPHALT  
OVERLAY**

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

**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.

**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 of Anchor Bolts required in Transition Installations see Drawing 7 and Design Standards 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 1/2". 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.

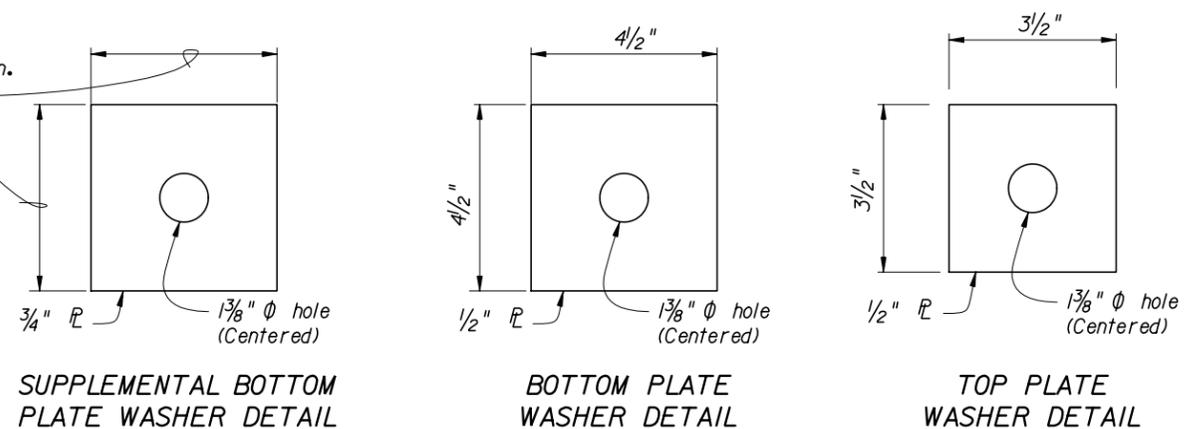
Omit one (1) Anchor Bolt within a single Barrier Unit if a conflict exists between the Anchor Bolt location and a bridge deck expansion joint or drain. The adjacent Barrier Units must each be installed with the standard three (3) Anchor Bolts.

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.

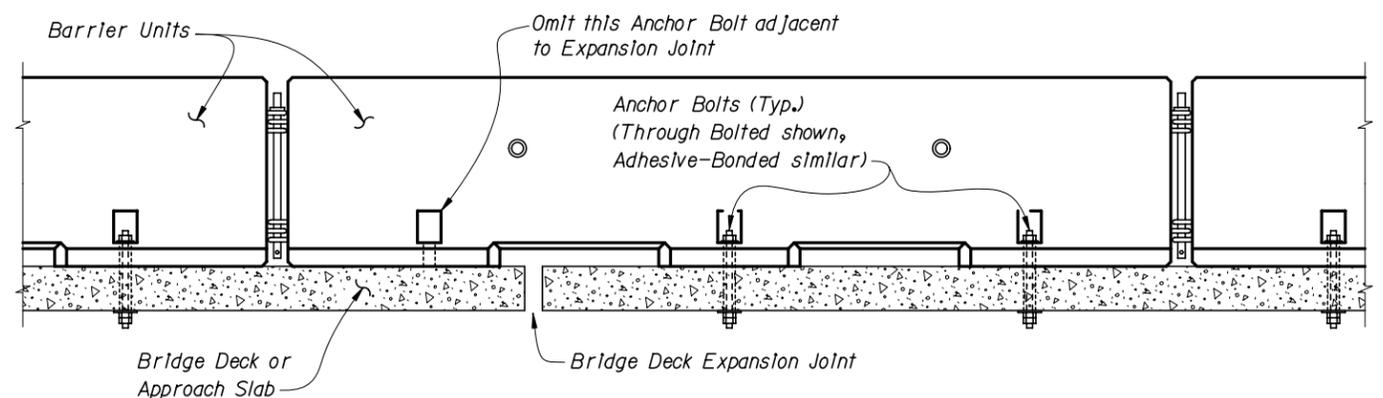
Dimension as required to span SIP Metal Form Corrugations plus 1/2" Min. overlap each side



**SUPPLEMENTAL BOTTOM  
PLATE WASHER DETAIL**

**BOTTOM PLATE  
WASHER DETAIL**

**TOP PLATE  
WASHER DETAIL**

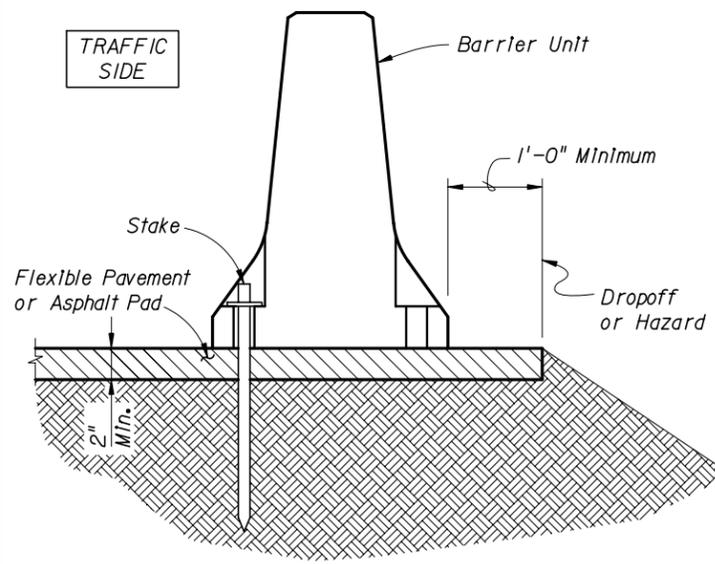


**TREATMENT AT BRIDGE DECK EXPANSION JOINT SCHEMATIC**

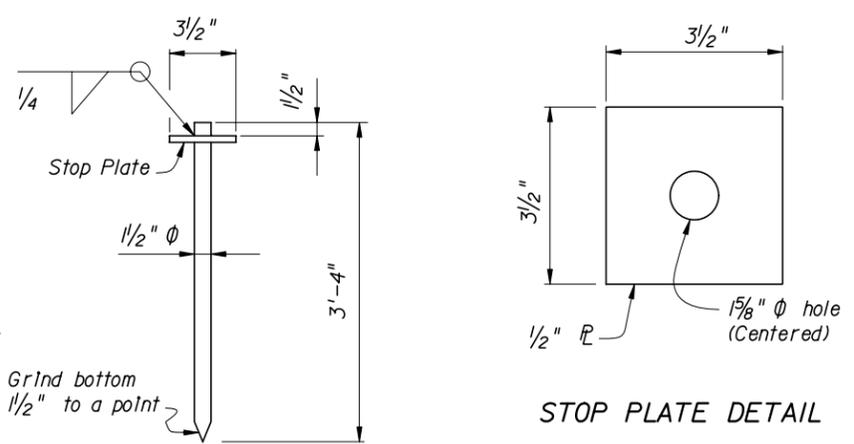
**BOLTED DOWN BRIDGE, APPROACH SLAB, ROADWAY AND TRANSITION INSTALLATIONS**

REVISIONS				NAMES		DATES		ENGINEER OF RECORD			SHEET TITLE				
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	DESCRIPTION	FLORIDA DEPARTMENT OF TRANSPORTATION			TEMPORARY TRAFFIC RAILING BARRIER - (TYPE K) INDEX NO. 715 (DRAWING 4 OF 7)				
01-31-05	SDO	Standard Drawing Issue Date						CENTRAL OFFICE 605 Suwannee Street, MS 33 Tallahassee, Florida 32399-0450			ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME	SHEET NO.

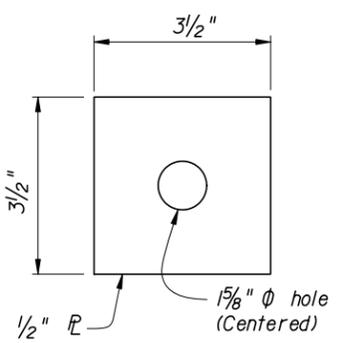
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PRELIMINARY AND SUBJECT TO CHANGE



TYPICAL SECTION



STAKE 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. Install the Miscellaneous Asphalt Pavement at the rate of 100 pounds per square yard per inch thickness of pad. 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.

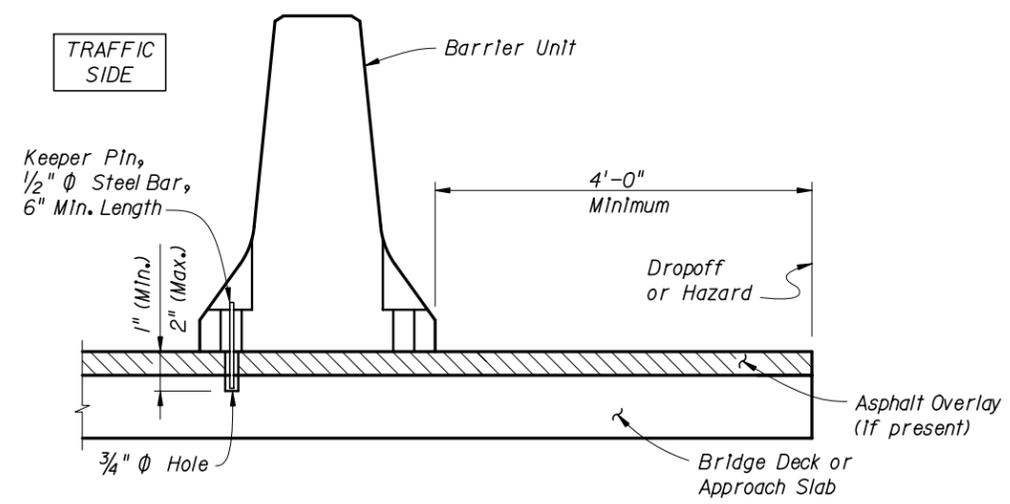
Install Stakes on the traffic side of the Barrier Units as shown. For the number of stakes required in Transition Installations see Drawing 7 and Design Standards Index No. 415. Install Stakes so that the Stop Plate is snug against the bottom of the Anchor Blockout.

**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)

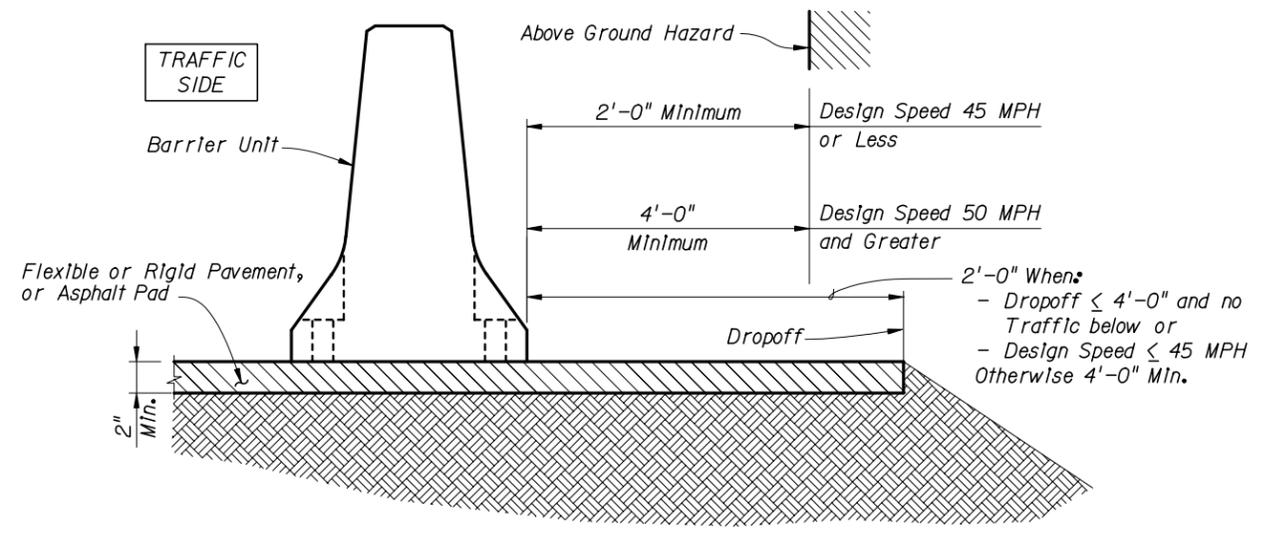
**NOTES FOR FREE STANDING BRIDGE OR APPROACH SLAB INSTALLATIONS:**

**KEEPER PINS:** Keeper Pins shall be 1/2" 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:**

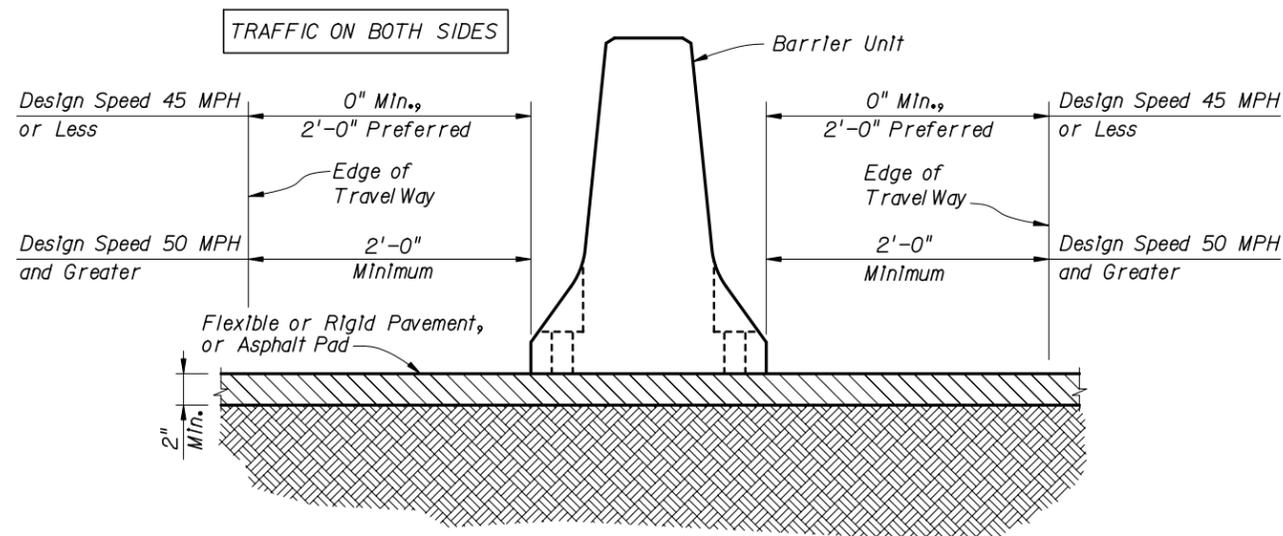
**LIMITATION OF USE:** This installation technique can only be used on flexible or rigid pavement or on an Asphalt Pad as shown.

**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. Install the Miscellaneous Asphalt Pavement at the rate of 100 pounds per square yard per inch thickness of pad. No separate payment will be made for the Asphalt Pad.

**FREESTANDING ROADWAY INSTALLATION**

REVISIONS						NAMES		DATES		ENGINEER OF RECORD			SHEET TITLE	
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DRAWN BY	NAME	DATE	NAME	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	TEMPORARY TRAFFIC RAILING BARRIER - (TYPE K) INDEX NO. 715 (DRAWING 5 OF 7)	
01-31-05	SDO	Standard Drawing Issue Date				JLF	JLF	11-04	CEB				PROJECT NAME: _____ SHEET NO. _____	
						CEB	CEB	11-04	XXX					
						XXX	XXX	11-04						
						CENTRAL OFFICE 605 Suwannee Street, MS 33 Tallahassee, Florida 32399-0450				FLORIDA DEPARTMENT OF TRANSPORTATION				

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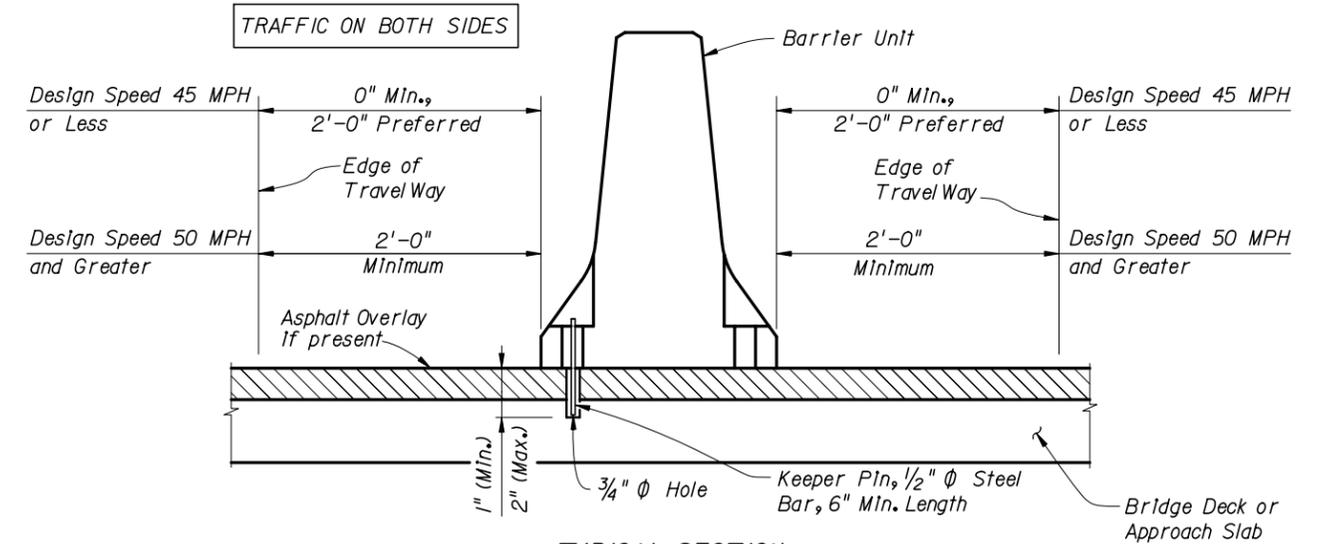
TYPICAL SECTION

NOTES FOR FREE STANDING ROADWAY MEDIAN 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. Install the Miscellaneous Asphalt Pavement at the rate of 100 pounds per square yard per inch thickness of pad. No separate payment will be made for the Asphalt Pad.

**FREESTANDING ROADWAY MEDIAN INSTALLATION**



TYPICAL SECTION

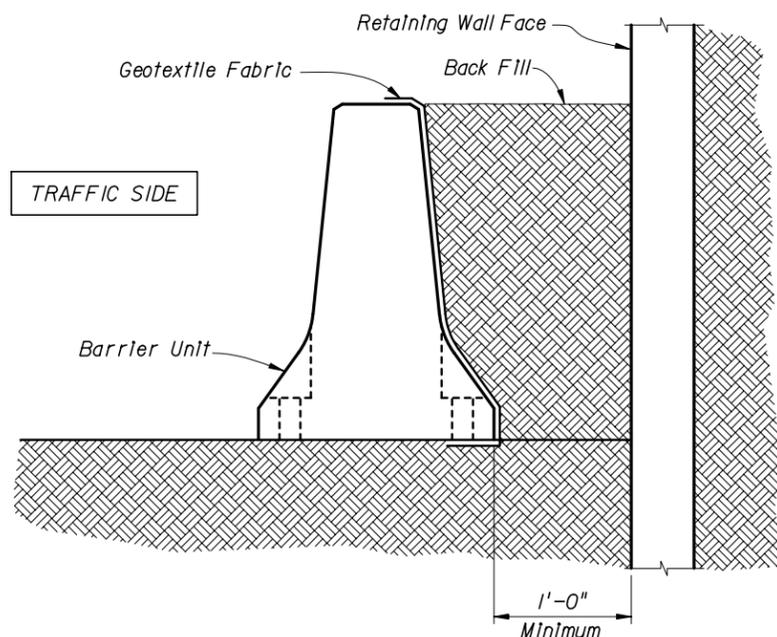
NOTES FOR FREE STANDING BRIDGE OR APPROACH SLAB MEDIAN INSTALLATION:

KEEPER PINS: Keeper Pins shall be 1/2" 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.

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 MEDIAN INSTALLATION**



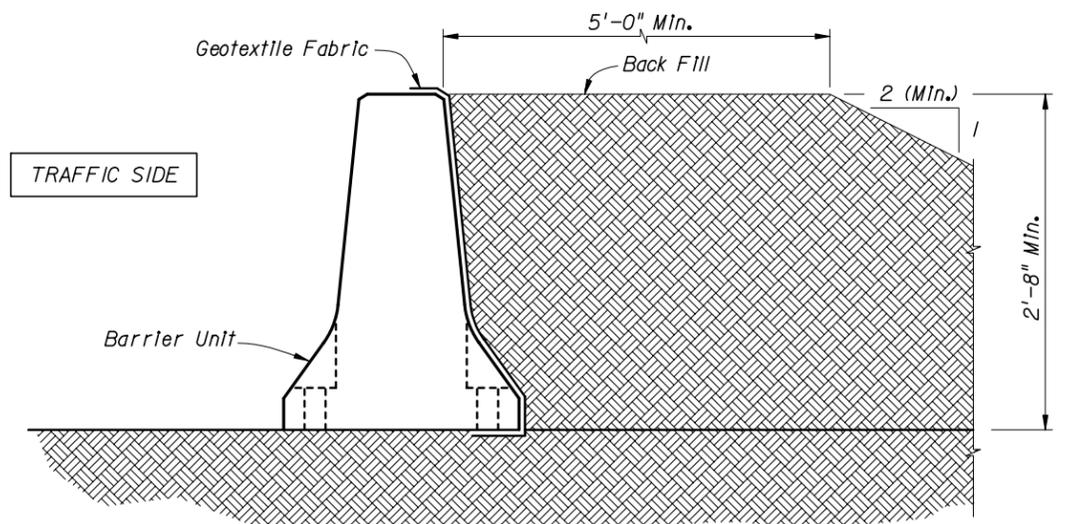
TYPICAL SECTION  
ADJACENT TO RETAINING WALL

NOT FOR CONSTRUCTION  
PRELIMINARY AND SUBJECT TO CHANGE

NOTES FOR BACKFILLED ROADWAY INSTALLATIONS:

BACKFILL MATERIAL: Provide Backfill Material consisting of any available clean soil. Compact Backfill 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 backfill 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.



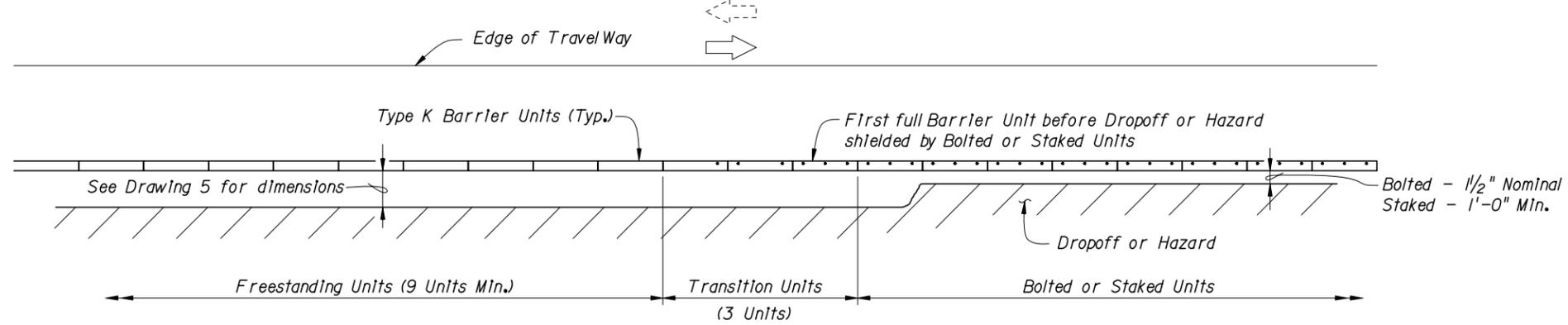
TYPICAL SECTION

**BACK FILLED ROADWAY INSTALLATIONS**

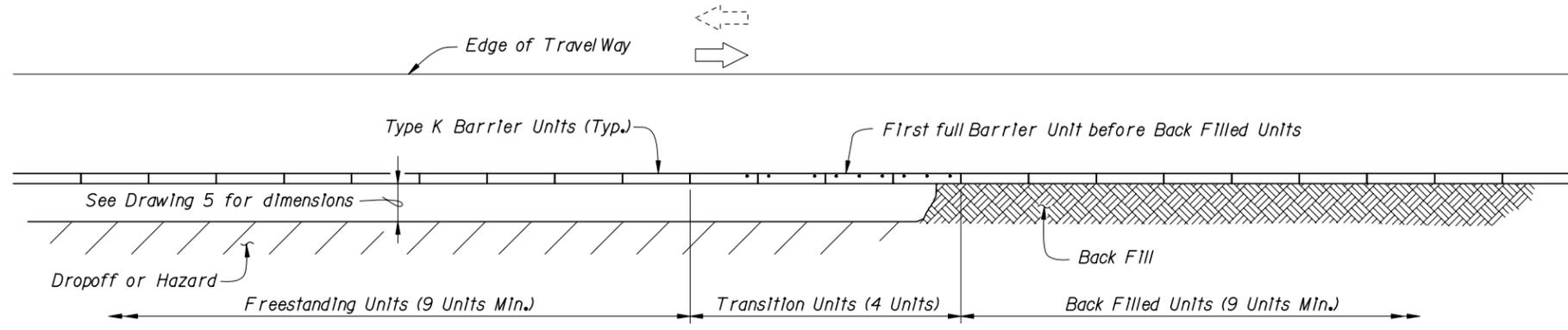
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DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	DESCRIPTION	FLORIDA DEPARTMENT OF TRANSPORTATION			TEMPORARY TRAFFIC RAILING BARRIER - (TYPE K)	
01-31-05	SDO	Standard Drawing Issue Date						CENTRAL OFFICE 605 Suwannee Street, MS 33 Tallahassee, Florida 32399-0450			INDEX NO. 715 (DRAWING 6 OF 7)	
								ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME	
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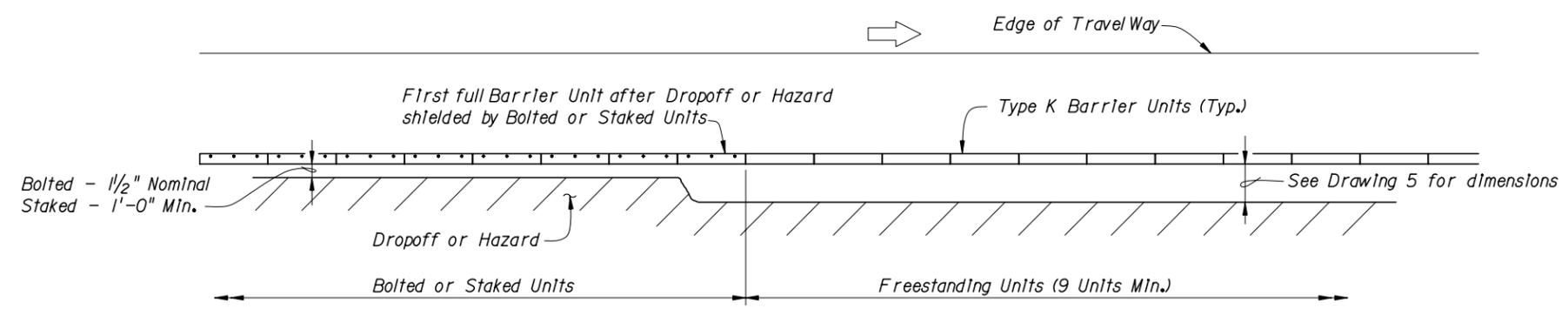
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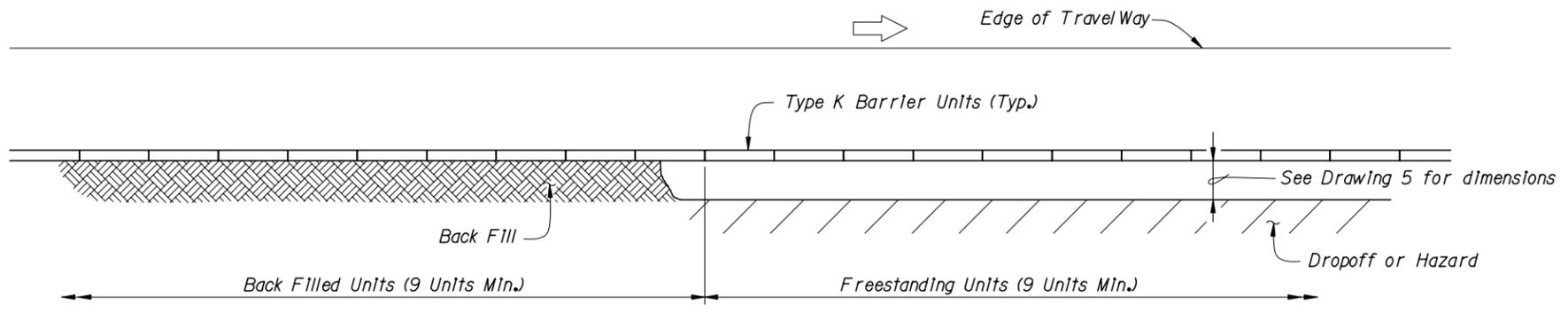
APPROACH TRANSITION FROM FREESTANDING TO BOLTED OR STAKED DOWN TYPE K TEMPORARY CONCRETE BARRIERS



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



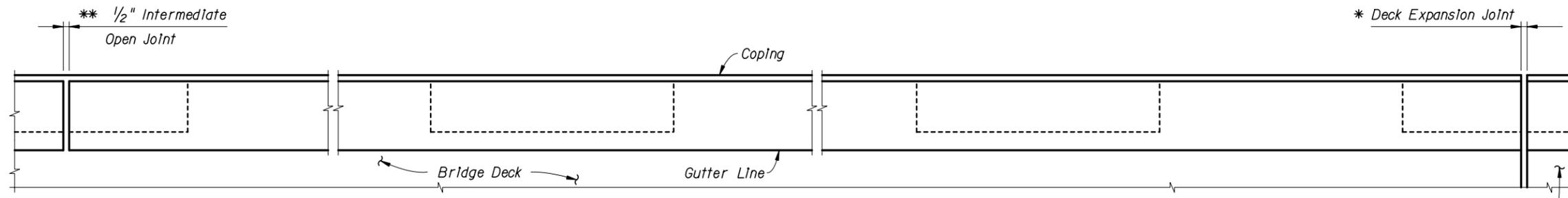
DEPARTURE TRANSITION FROM BOLTED OR STAKED DOWN TO FREESTANDING TYPE K TEMPORARY CONCRETE BARRIERS



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

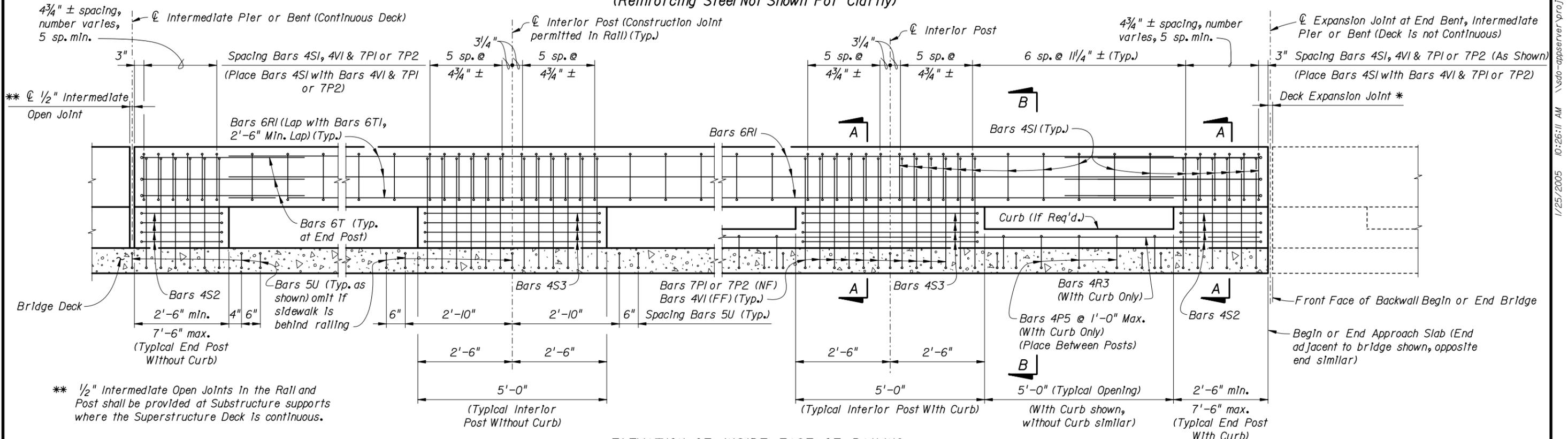
**LEGEND:**  
 Dot Indicates number and position of Bolts or Stakes

REVISIONS						NAMES		DATES		ENGINEER OF RECORD			SHEET TITLE	
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DRAWN BY	NAME	DATE	NAME	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME	SHEET NO.
01-31-05	SDO	Standard Drawing Issue Date				JLF	JLF	11-04	CEB				TEMPORARY TRAFFIC RAILING BARRIER - (TYPE K) INDEX NO. 715 (DRAWING 7 OF 7)	
						CEB	CEB	11-04	XXX					
						DCP	DCP	11-04						



\* See 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. Deck Joint at Begin Bridge or End Bridge shown. Deck Joint at  $\phi$  Pier or Intermediate Bent similar.

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)



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

\*\* 1/2" 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.

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

**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 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.
- GUARDRAIL: For Guardrail connection details see Design Standards 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 Drawings 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 Date shall be placed on the driver's left side when approaching the bridge. The Date shall be the year the bridge is constructed. For a major widening the date shall be 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 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

CROSS REFERENCES:  
For Sections see Drawings 3 and 4.  
For Quantities and Quantity Breakdown see Drawing 5.

INSTRUCTION TO DESIGNER  
1. Indicate use of Curb beneath railing on low side of deck without sidewalks and other locations where required to contain bridge deck runoff. Define Curb location in Superstructure Plans by Stationing Limits or other appropriate methods.  
2. Define length of End Post in Superstructure Plans.

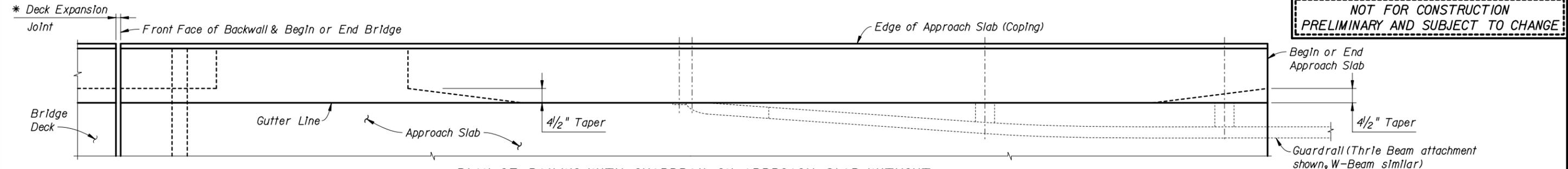
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BRIDGE NO. XXXXXX

REVISIONS				NAMES		DATES		ENGINEER OF RECORD			SHEET TITLE	
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	TRAFFIC RAILING BARRIER - (CORRAL SHAPE) INDEX NO. 740 (DRAWING 1 OF 7)	
01-31-05	SDO	Standard Drawing Issue Date									PROJECT NAME	
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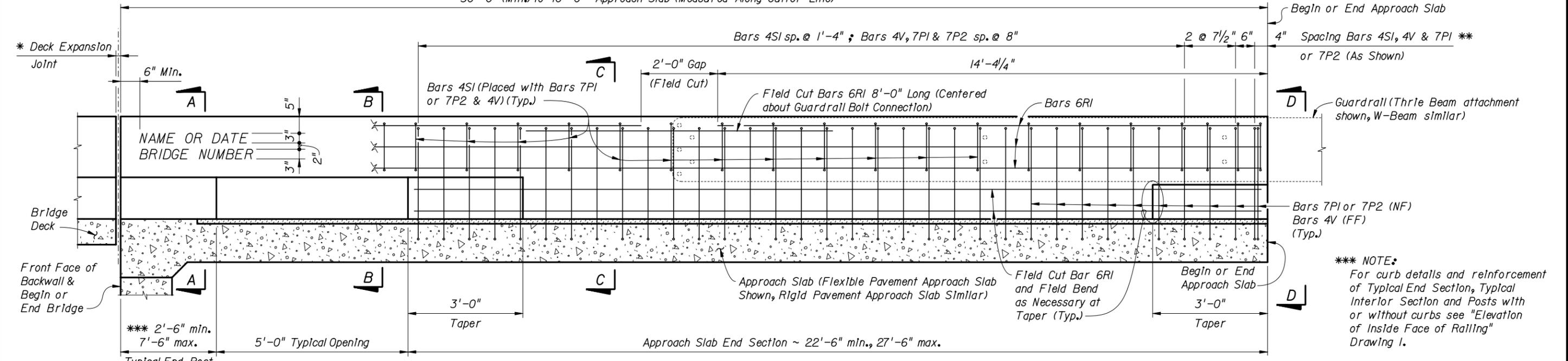


PLAN OF RAILING WITH GUARDRAIL ON APPROACH SLAB WITHOUT SIDEWALK (APPROACH SLAB WITH ADJACENT SIDEWALK SIMILAR)  
(Reinforcing Steel Not Shown For Clarity)

30'-0" (Min.) to 40'-0" Approach Slab (Measured Along Gutter Line)

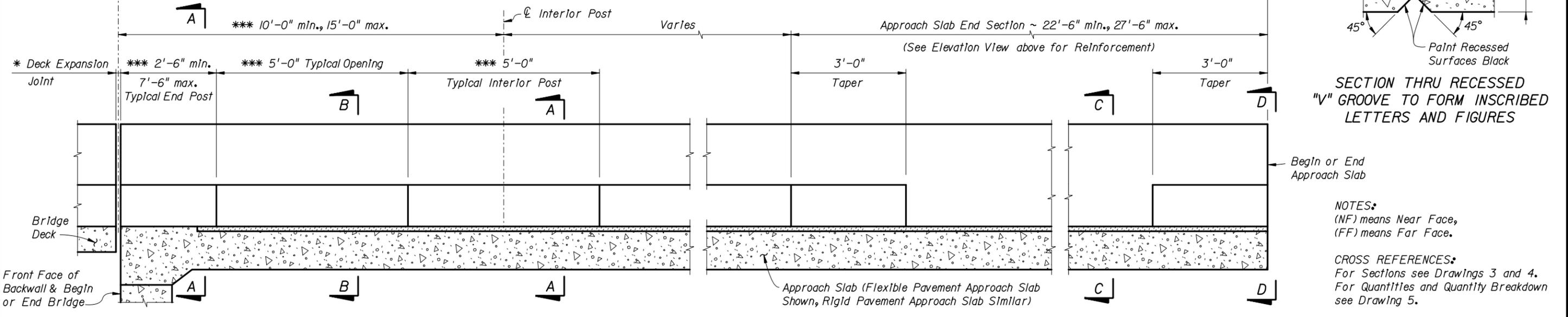
\*\* Begin placing Railing Bars 7P1 or 7P2 and 4V on Approach Slab at the barrier end and proceed toward Begin or End Bridge to ensure placement of guardrail bolt holes. If required, adjustments to the bar spacing for Bars 7P1 or 7P2 and 4V shall be made immediately adjacent to Begin or End Bridge.

\* See 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 Standard Index No. 1010.



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

Approach Slabs greater than 40'-0" (Measured Along Gutter Line)

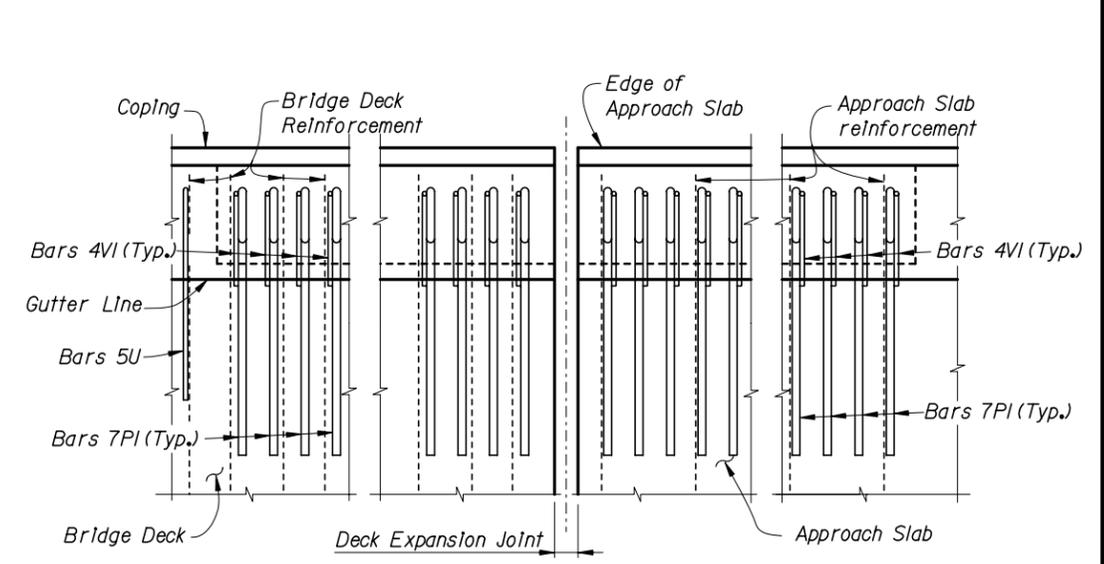
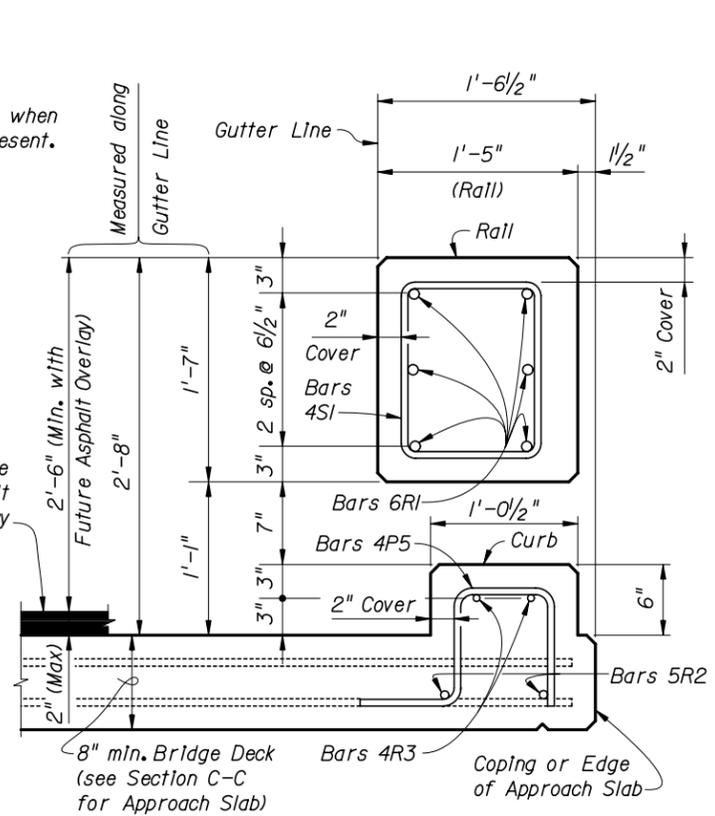
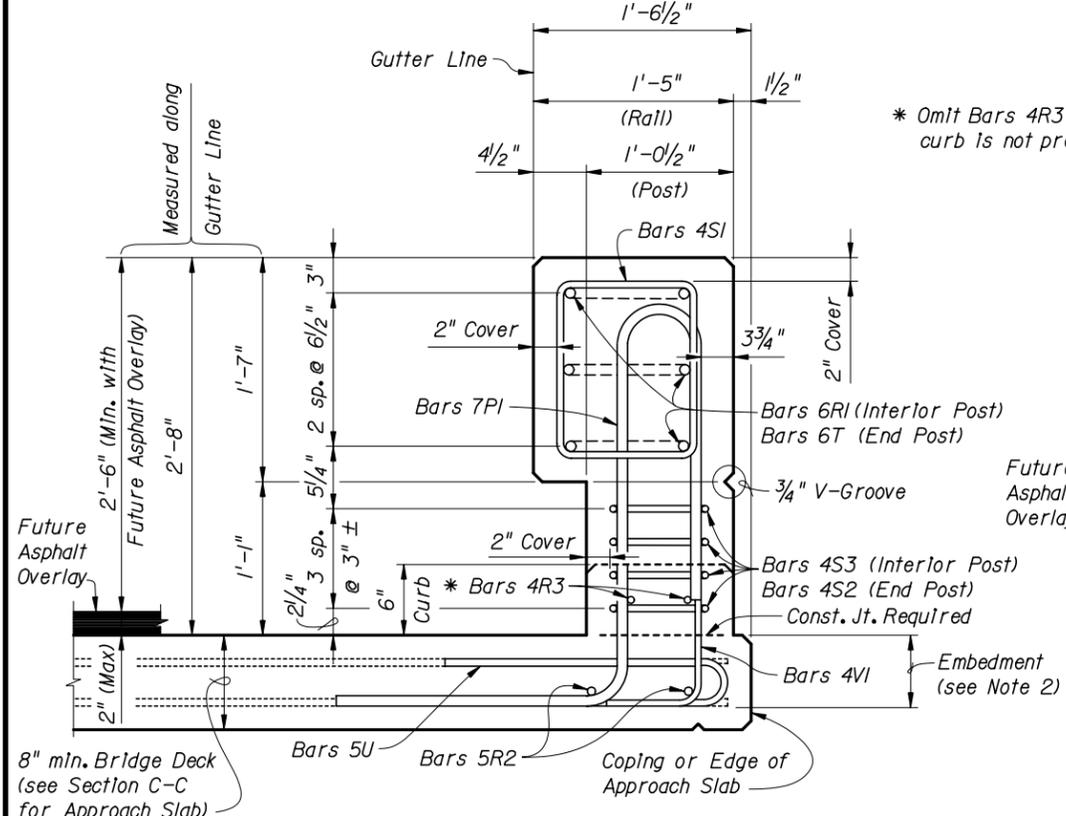


ELEVATION OF INSIDE FACE OF RAILING WITH GUARDRAIL ON APPROACH SLABS GREATER THAN 40'-0" ALONG GUTTER (WITHOUT CURB SHOWN, WITH CURB SIMILAR)

BRIDGE NO. XXXXXX

REVISIONS				NAMES		DATES		ENGINEER OF RECORD			SHEET TITLE	
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME	SHEET NO.
01-31-05	SDO	Standard Drawing Issue Date									TRAFFIC RAILING BARRIER - (CORRAL SHAPE) INDEX NO. 740 (DRAWING 2 OF 7)	

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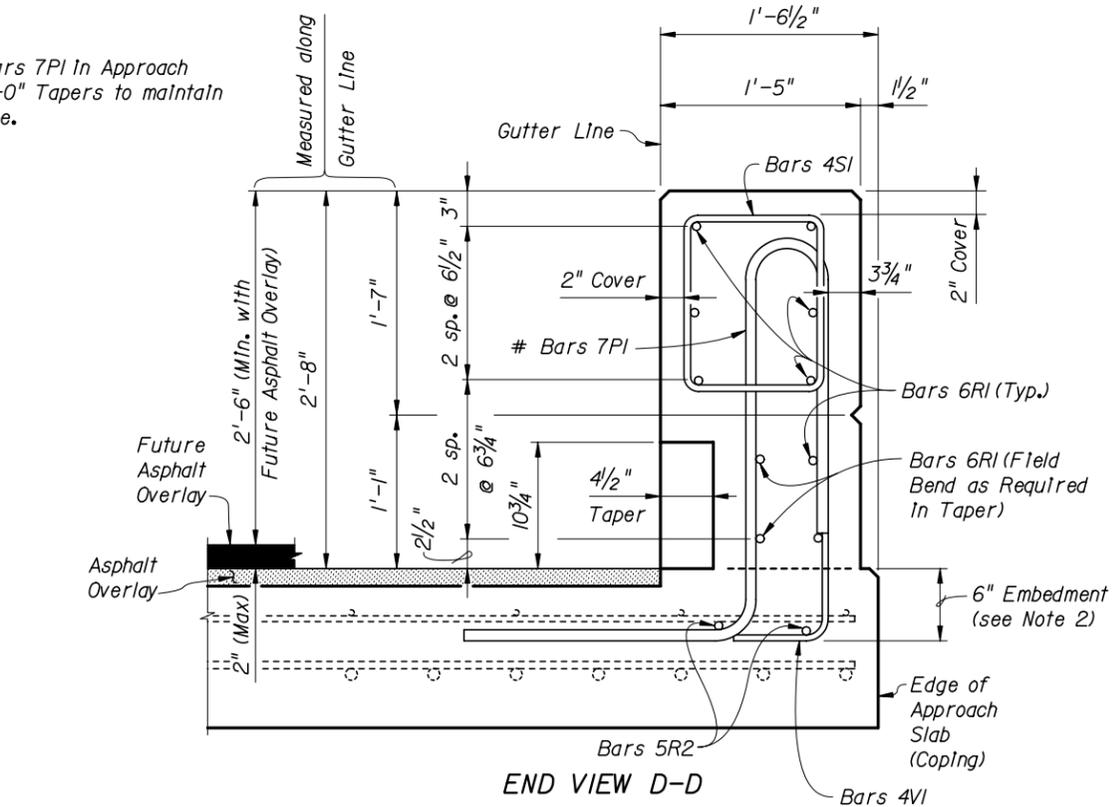
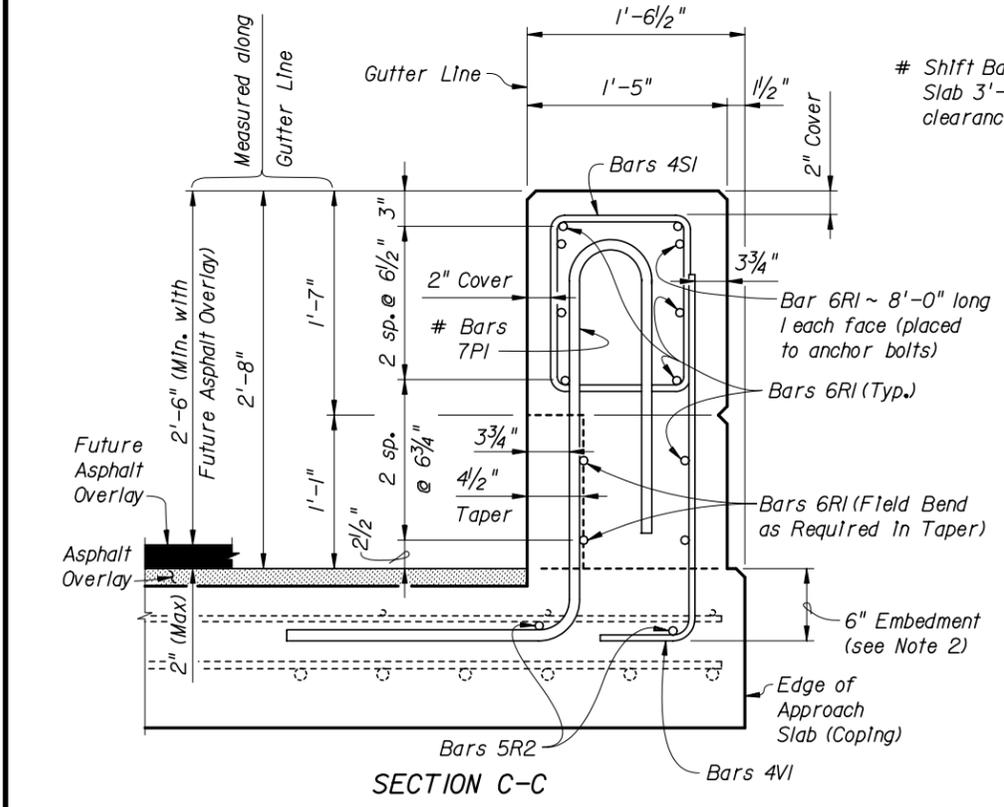


PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB  
(END POST SHOWN, INTERIOR POST SIMILAR)  
(Bars R, S and T not shown for clarity)

- NOTES:
- 1) Shift deck and approach slab transverse reinforcement minimally to allow placement of Bars 7P & 4V.
  - 2) For decks to 8 1/2" place Bars 7P & 4V with the bottom mat of reinforcement as shown in Section A-A. For decks and slabs thicker than 8 1/2" place Bars 7P and 4V with 6" embedment.

SECTION A-A (WITH CURB SHOWN, WITHOUT CURB SIMILAR)  
TYPICAL SECTIONS THRU RAILING ON BRIDGE DECK (SHOWN)  
(RAILING ON APPROACH SLAB SIMILAR)

SECTION B-B



NOT FOR CONSTRUCTION  
PRELIMINARY AND SUBJECT TO CHANGE

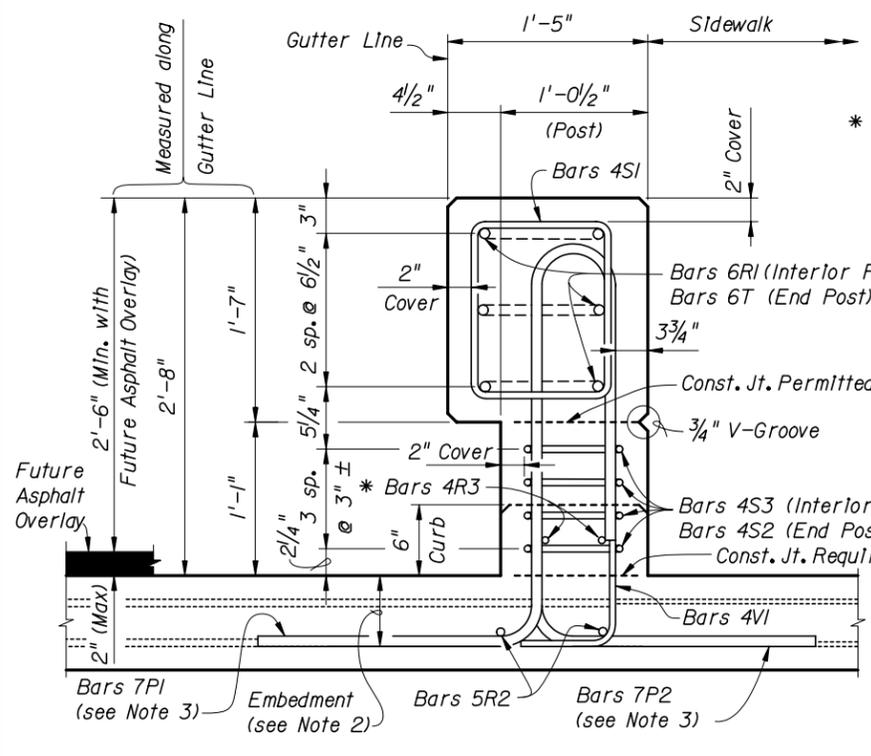
CROSS REFERENCES:  
For Locations of Sections see Drawings 1 and 2.  
For Quantities and Rebar Details see Drawing 5.

SECTION C-C  
TYPICAL SECTIONS THRU RAILING END SECTIONS ON APPROACH SLAB WITH GUARDRAIL  
(APPROACH SLAB (FLEXIBLE PAVEMENT APPROACHES) SHOWN, APPROACH SLAB (RIGID PAVEMENT APPROACHES) SIMILAR)

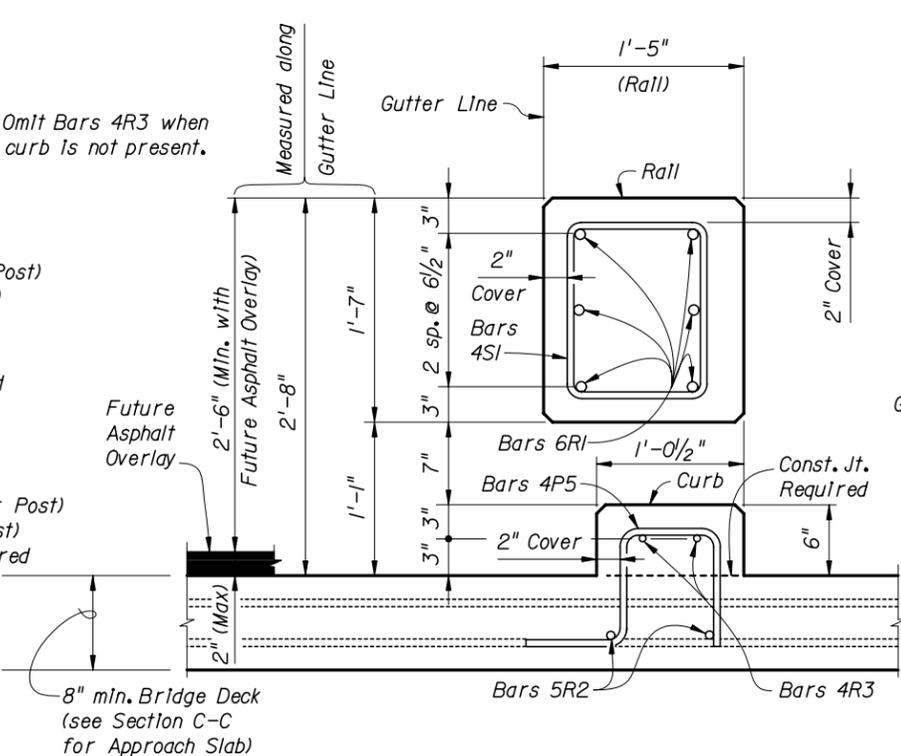
END VIEW D-D

BRIDGE NO. XXXXXX

REVISIONS			REVISIONS			ENGINEER OF RECORD			SHEET TITLE			
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	FLORIDA DEPARTMENT OF TRANSPORTATION			TRAFFIC RAILING BARRIER - (CORRAL SHAPE) INDEX NO. 740 (DRAWING 3 OF 7)			
01-31-05	SDO	Standard Drawing Issue Date				CENTRAL OFFICE 605 Suwannee Street, MS 33 Tallahassee, Florida 32399-0450			ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME
						DRAWN BY: JLF 5-04 CHECKED BY: CEB 11-04 DESIGNED BY: CEB 5-04						SHEET NO.

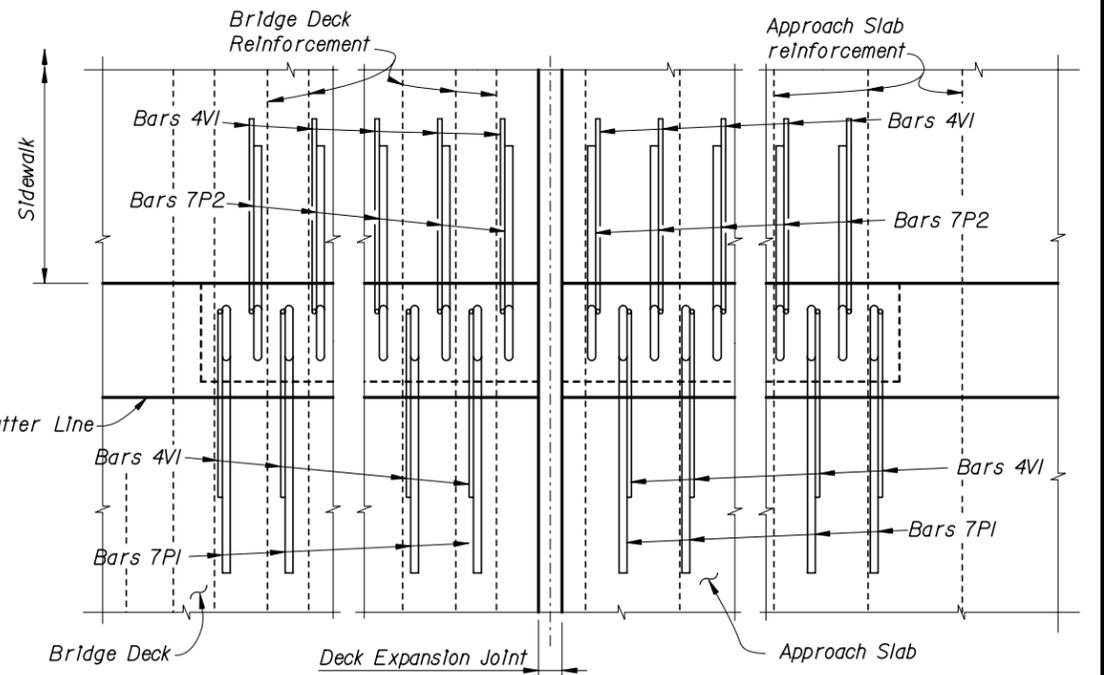


SECTION A-A (WITH CURB SHOWN, WITHOUT CURB SIMILAR)



SECTION B-B

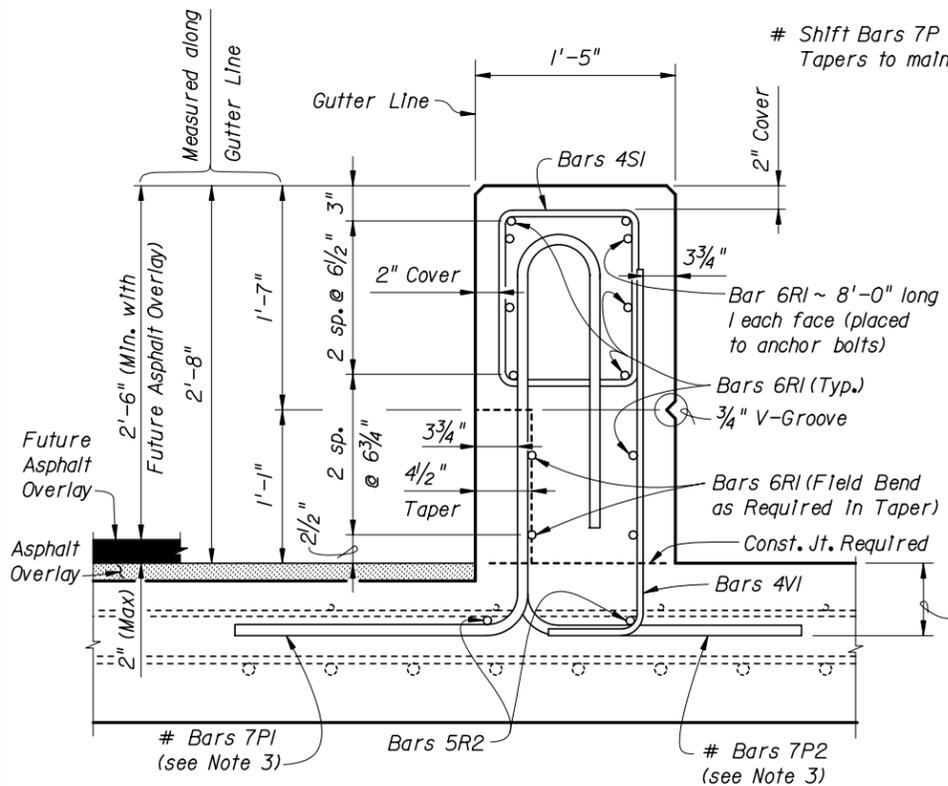
TYPICAL SECTIONS THRU RAILING ON BRIDGE DECK WITH SIDEWALK (SHOWN) (RAILING ON APPROACH SLAB SIMILAR)



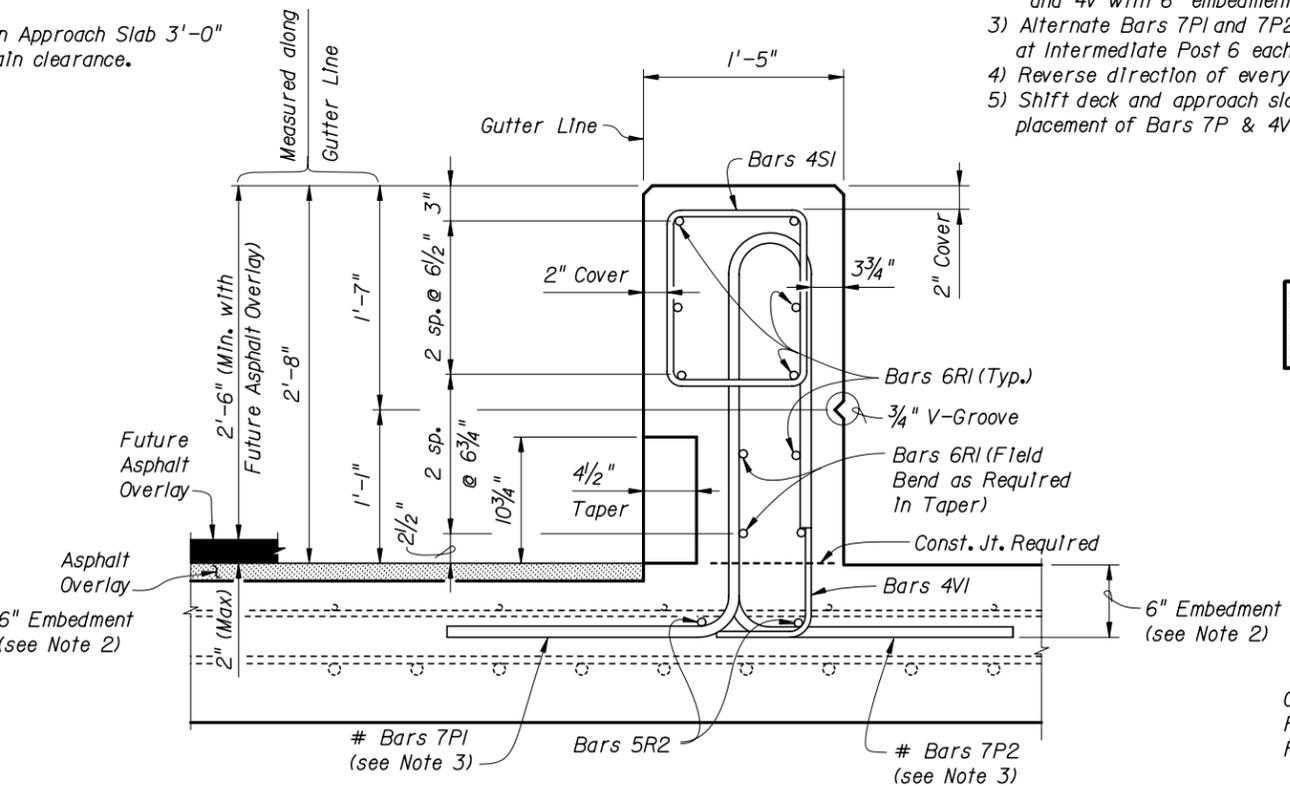
PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK (Bars R, S and T not shown for clarity)

RAILING ADJACENT TO SIDEWALK NOTES:

- 1) End Post detailed above, Interior Post and Approach Slab End Section similar.
- 2) For decks to 8 1/2" place Bars 7P & 4V with the bottom mat of reinforcement as shown in Section A-A. For decks and slabs thicker than 8 1/2" place Bars 7P 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 4VI 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)

NOT FOR CONSTRUCTION  
PRELIMINARY AND SUBJECT TO CHANGE

CROSS REFERENCES:  
For Locations of Sections see Drawings 1 and 2.  
For Quantities and Rebar Details see Drawing 5.

REVISIONS			NAMES			DATES			ENGINEER OF RECORD:			SHEET TITLE:		
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DRAWN BY	JLF	5-04	FLORIDA DEPARTMENT OF TRANSPORTATION			TRAFFIC RAILING BARRIER - (CORRAL SHAPE)		
01-31-05	SDO	Standard Drawing Issue Date				CHECKED BY	CEB	11-04	STRUCTURES DESIGN OFFICE			INDEX NO. 740 (DRAWING 4 OF 7)		
						DESIGNED BY	CEB	5-04	CENTRAL OFFICE			ROAD NO.		
						CHECKED BY			605 Suwannee Street, MS 33			COUNTY		
						APPROVED BY			Tallahassee, Florida 32399-0450			FINANCIAL PROJECT ID		
									PROJECT NAME:			SHEET NO.		

BRIDGE NO. XXXXXX

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CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

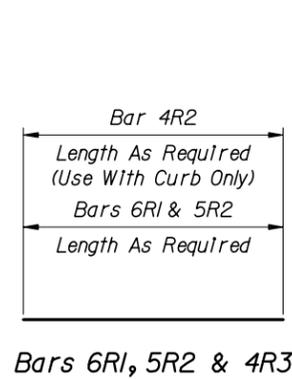
BILL OF REINFORCING STEEL			
MARK	SIZE	LENGTH	LB/BAR
P1	7	7'-6"	15.25
P2	7	7'-5"	15.10
P3	7	7'-6"	15.25
*** P4	7	7'-2"	14.58
* P5	4	2'-11"	1.92
RI	6	AS REQ'D	14.52
* R2	5	AS REQ'D	1.04 (lb/ft)
* R3	4	AS REQ'D	0.67 (lb/ft)
** SI	4	5'-0"	3.33
** S2	4	6'-2"	4.13
** S3	4	11'-2"	7.74
T	6	11'-0"	16.54
U	5	4'-8"	4.89
VI	4	3'-2"	2.14
*** V2	4	4'-1"	2.73

- \* Bars 4P5 and 4R3 are to be used with the curb only.
- \*\* Bend Bars 4SI, 4S2 & 4S3 around a #3 Stirrup Pin.
- \*\*\* Bars 7P4 & 4V2 shall be used on retaining walls when necessary.

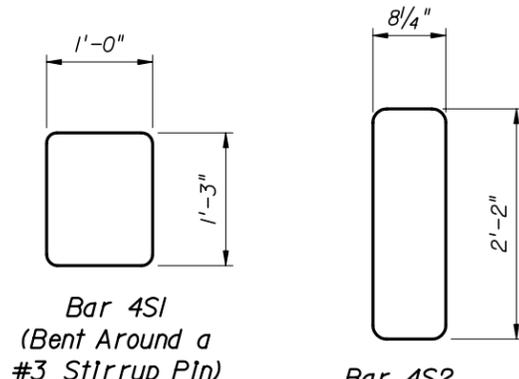
REINFORCING STEEL NOTES:

- All bar dimensions in the bending diagrams are out to out.
- The reinforcement for the railing on a retaining wall shall be the same as detailed above for a 8" deck with  $\phi A = 90^\circ$ , 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. 180° Hooks may be added to Bars 7P4 and 4V2 to reduce the embedment length and maintain the development length. The retaining wall cap may need to be modified if the cap dimensions prohibit placement the railing reinforcement.
- All reinforcing steel at the open joints shall have a 2" minimum cover unless otherwise noted.
- 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.
- Bar splices for Bars 5T to Bars 6R1 shall be a minimum of 2'-6".
- The skew angle for Bars 7P3 may vary from joint to joint.

NOT FOR CONSTRUCTION  
PRELIMINARY AND SUBJECT TO CHANGE

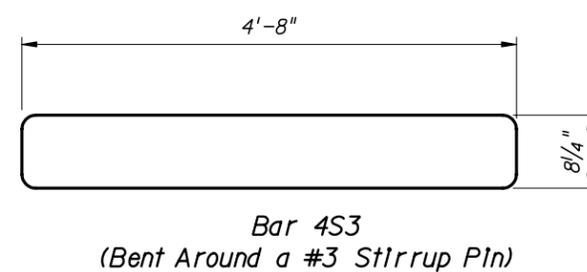


Bars 6R1, 5R2 & 4R3

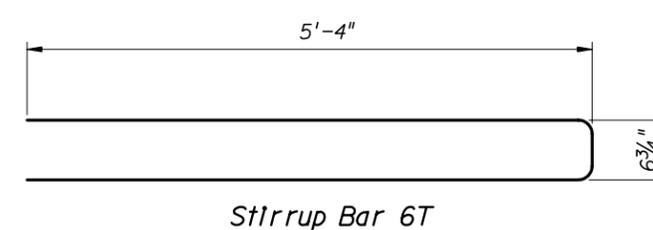


Bar 4S1  
(Bent Around a #3 Stirrup Pin)

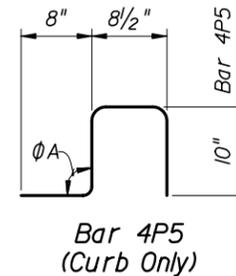
Bar 4S2  
(Bent Around a #3 Stirrup Pin)



Bar 4S3  
(Bent Around a #3 Stirrup Pin)



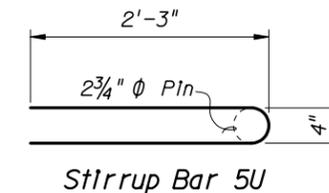
Stirrup Bar 6T



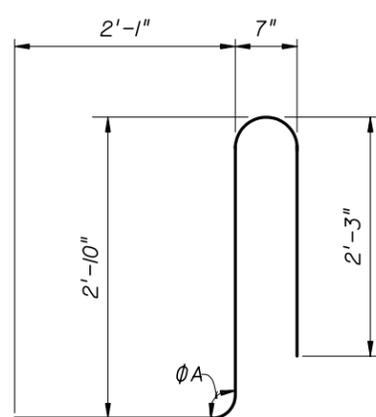
Bar 4P5  
(Curb Only)

ROADWAY OR SIDEWALK CROSS-SLOPE	LOW SIDE	HIGH SIDE
	$\phi A$	$\phi A$
0% to 2%	90°	90°
2% to 6%	93°	87°
6% to 10%	96°	84°

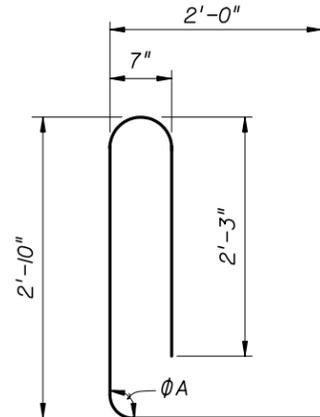
$\phi A$  shall be 90° if Contractor elects to place Railing Perpendicular to the Deck.



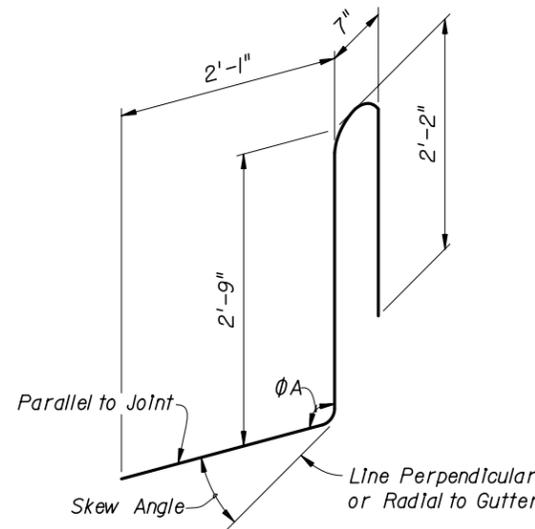
Stirrup Bar 5U



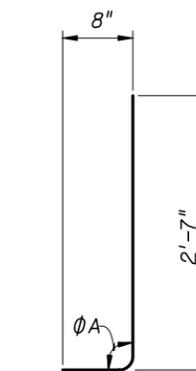
Bar 7P1



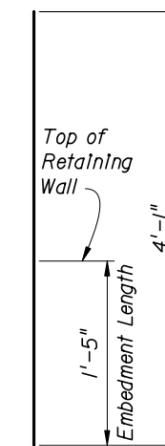
Bar 7P2 (Use with Railings adjacent to Sidewalks)



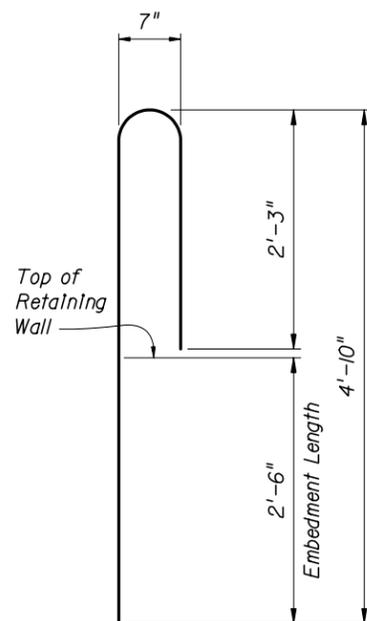
Bar 7P3



Bar 4V1



Bar 4V2



Bar 7P4

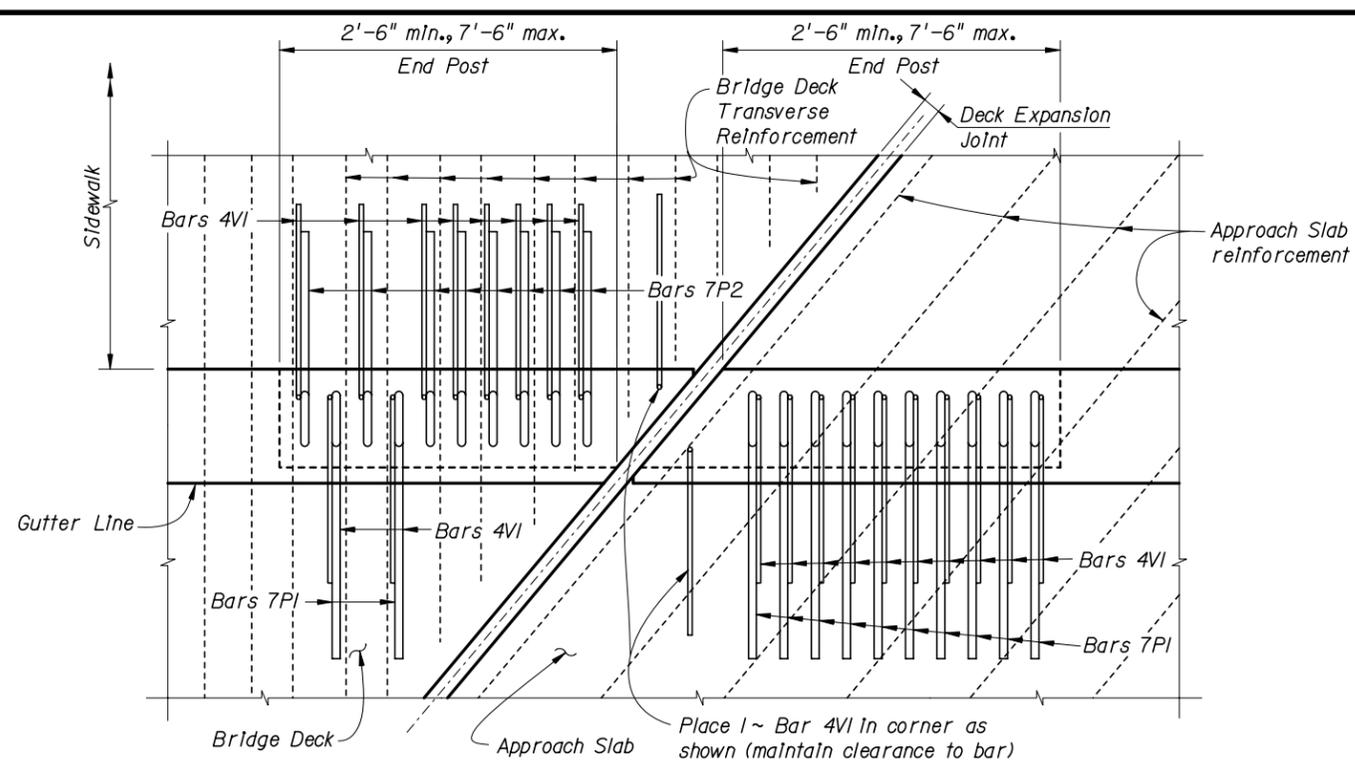
TYPICAL TRAFFIC RAILING QUANTITIES		
ITEM	CONCRETE QUANTITY (CY)	REBAR QUANTITY (LB)
Typical 10'-0" Section w/Curb	1.13	455
Typical 10'-0" Section w/o Curb	1.03	432
Approach Slab with Guardrail End Section	0.14 (Lin. Ft)	47 (Lin. Ft.)

BRIDGE NO. XXXXX

REVISIONS			NAMES		DATES		ENGINEER OF RECORD			SHEET TITLE	
DATE	BY	DESCRIPTION	DATE	BY	DATE	DESCRIPTION	FLORIDA DEPARTMENT OF TRANSPORTATION			TRAFFIC RAILING BARRIER - (CORRAL SHAPE) INDEX NO. 740 (DRAWING 5 OF 7)	
01-31-05	SDO	Standard Drawing Issue Date					CENTRAL OFFICE 605 Suwannee Street, MS 33 Tallahassee, Florida 32399-0450			PROJECT NAME	
							ROAD NO.	COUNTY	FINANCIAL PROJECT ID	SHEET NO.	

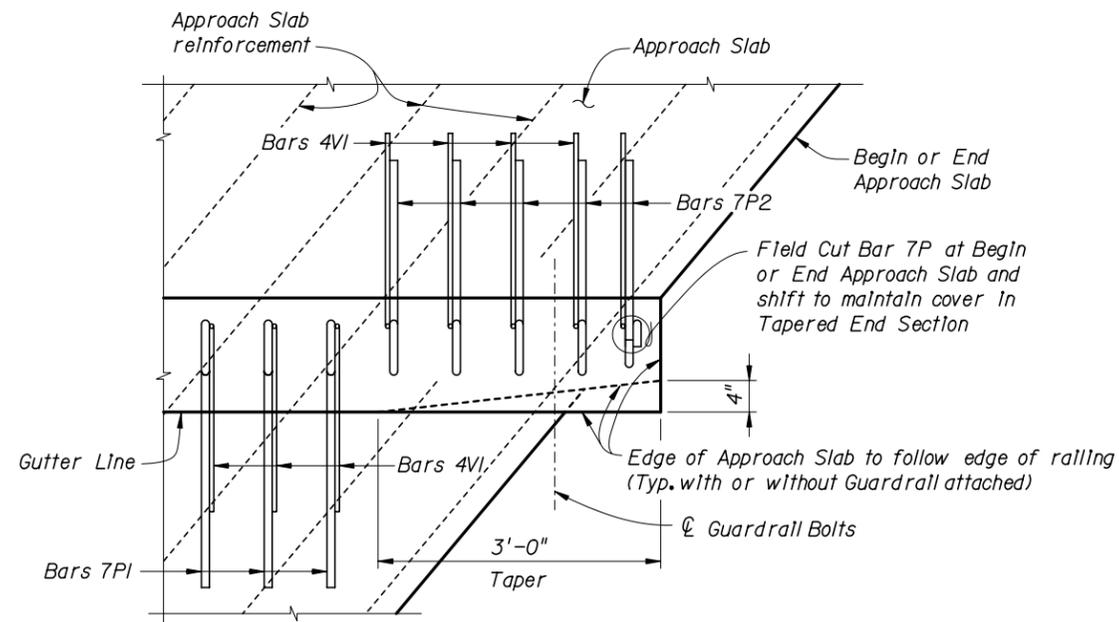
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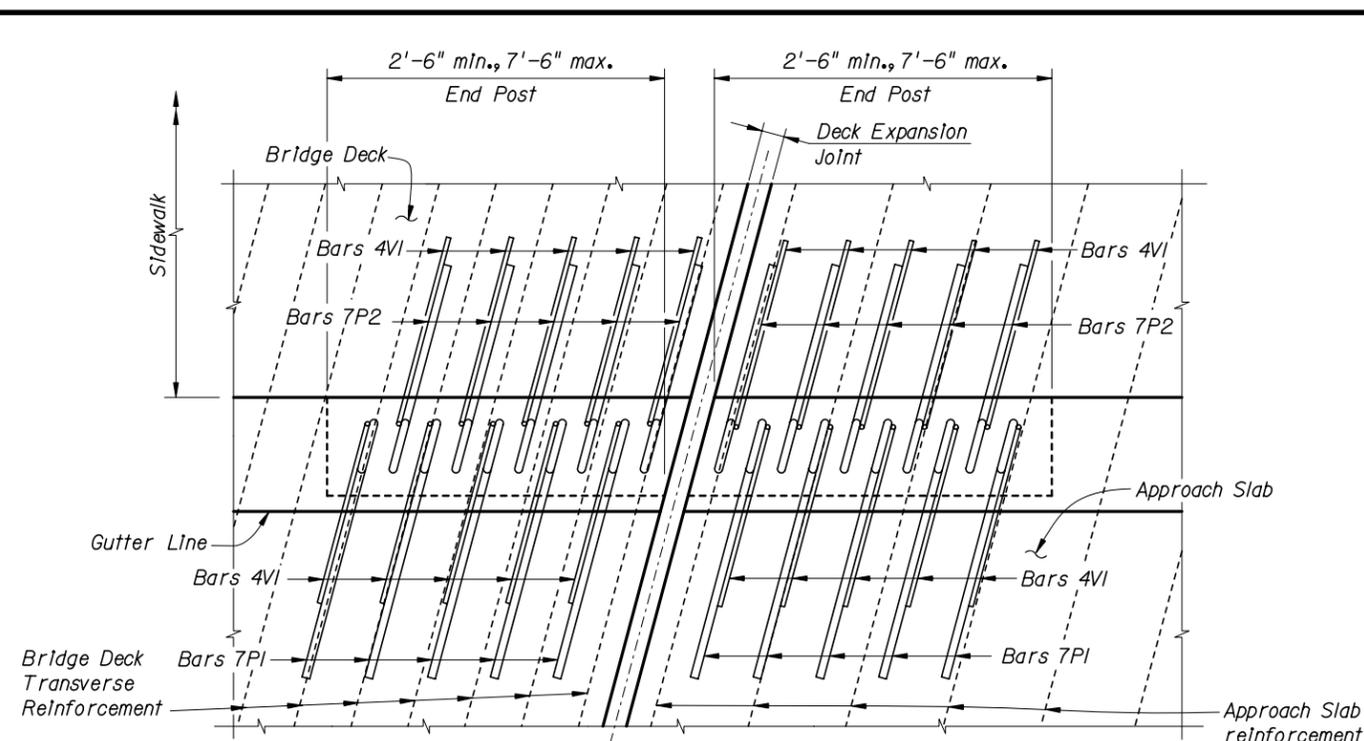


PARTIAL PLAN VIEW OF BRIDGE DECK AND APPROACH SLAB WITH SIDEWALK  
- SKEW ANGLE GREATER THAN 15 DEGREES

NOT FOR CONSTRUCTION  
PRELIMINARY AND SUBJECT TO CHANGE



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



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 Superstructure and Approach Slab Sheets for details.
  - 2) Bars 4SI (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 7PI with Bars 7P2 and reverse direction of every other Bar 4VI 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.
  - 7) Increase length of Railing End Post to ensure proper clearance to Bars 7P & 4V.
- APPROACH SLAB WITH GUARDRAIL ATTACHED (NOT SHOWN):**
- 8) 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.

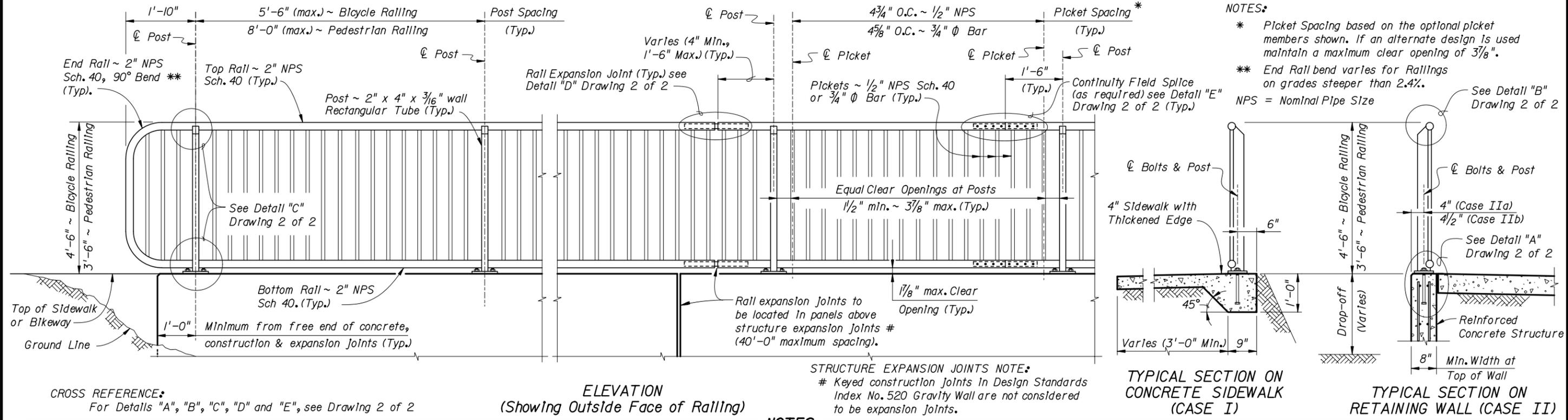
**NOTES:**

- 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 Superstructure and Approach Slab Sheets for details.
  - 2) Increase length of Railing End Post to ensure proper clearance to Bars 7P & 4V.
  - 3) Bars 4SI shall be placed perpendicular or radial to the gutter.
- BRIDGE DECK AND APPROACH SLAB WITHOUT GUARDRAIL ATTACHED (NOT SHOWN):**
- 4) Deck transverse reinforcement may be shifted minimally as required to allow proper placement of Bars 7P & 4V and to facilitate placement of concrete. Bars 7PI & 4VI or 7P2 & 4VI shall be use 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.
  - 5) Interior Post - alternate Bars 7PI with Bars 7P2 and reverse direction of every other Bar 4VI to facilitate placement of concrete.
  - 6) End Post - alternate Bars 7PI with Bars 7P2 and reverse direction of Bars 4VI (as detailed) where possible.
- APPROACH SLAB WITH GUARDRAIL ATTACHED (SHOWN):**
- 7) Use Bars 7P2 and reverse direction of Bars 4VI where skew restricts use of Bars 7PI & 4PI.
  - 8) 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.

BRIDGE NO. XXXXX

REVISIONS						ENGINEER OF RECORD			SHEET TITLE				
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	FLORIDA DEPARTMENT OF TRANSPORTATION			TRAFFIC RAILING BARRIER - (CORRAL SHAPE) INDEX NO. 740 (DRAWING 7 OF 7)				
01-31-05	SDO	Standard Drawing Issue Date				CENTRAL OFFICE 605 Suwannee Street, MS 33 Tallahassee, Florida 32399-0450			ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME	SHEET NO.

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**NOTES:**

- \* Picket Spacing based on the optional picket members shown. If an alternate design is used maintain a maximum clear opening of 3/8".
- \*\* End Rail bend varies for Railings on grades steeper than 2.4%.

NPS = Nominal Pipe Size

See Detail "B" Drawing 2 of 2

See Detail "A" Drawing 2 of 2

**CROSS REFERENCE:**  
 For Details "A", "B", "C", "D" and "E", see Drawing 2 of 2

**GENERAL SPECIFICATIONS:**  
 The Florida Department of Transportation "Standard Specifications for Road and Bridge Construction".

**DESIGN SPECIFICATIONS:**  
 American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", current edition, including 75 year Design Life  
 Florida Department of Transportation (FDOT) "Structures Design Guidelines", current edition.  
 State of Florida "Florida Building Code", current edition.

**DESIGN LIVE LOADS:**  
 Post and Base Plate: Equivalent point load = 200 lb. load + (50 lb/ft x Post Spacing (ft)) applied transversely at top rail connection.  
 Top and Bottom Rails: 50 lb/ft uniform load applied simultaneously vertically and transversely + 200 lb. concentrated point load applied at midspan in the directions for both maximum stress and deflection.  
 Pickets: Concentrated 200 lb load applied transversely over an area of 1.0 square foot.

**GEOMETRY:**  
 Clear Opening between Pickets: Shall reject the passage of a 4" diameter sphere below 42" height, and a 8" diameter sphere above 42" height.  
 Clear Opening under Bottom Rail: Shall reject the passage of a 2" diameter sphere.  
 Pedestrian Railing Height: 42" minimum.  
 Bicycle Railing Height: 54" minimum.

**DEFLECTION:**  
 Total combined deflection of the railing system including the resilient or neoprene pads, due to the top rail design live loads, shall not exceed 1/2" when measured at midspan of the top rail.

**APPLICABILITY NOTE TO DESIGNER:**  
 This railing is not applicable for shielding drop-off hazards for vehicular traffic. This railing is applicable for all cases where a pedestrian or bicyclist drop-off hazard exceeds 2'-6" or when a drop-off hazard is less than 2'-6" and is required by design. Adequate foundation support shall be provided for anchorage and stability against overturning. For unusual site conditions a site specific railing is to be designed by the responsible engineer. The railing shown on this drawing requires a handrail for ramps steeper than a 5% grade to conform with the requirements of the Americans with Disabilities Act (ADA). This railing is not approved for use on bridges. Refer to FDOT Plans Preparation Manual (Volume I) Chapters 4 & 8, for the definition of vehicular, pedestrian and bicyclist "drop-off hazards".

**ALTERNATE DESIGN:**  
 Manufacturers seeking approval of proprietary railing systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the proprietary railing system is designed to meet the design life, live loads, geometry and deflection requirements specified herein. All fixed joints are to be either welded or commercially designed fixed joint systems. Each field section of railing must be identified with a permanently affixed label with the manufacturer's name and the FDOT QPL approval number. Labels must be a maximum of 1/2" by 3" and located at the base of a post within the field section. Project specific shop drawings are required for QPL approved railings, see Shop Drawings note.

**PAYMENT:**  
 Railing shall be paid for per linear foot (Item No. 515-2-abb). Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient pads and all incidental materials and labor required to complete installation of the railing.

**NOTES**

**RAILS, PICKETS & POSTS:**  
 Pipe Rails and Pickets shall be in accordance with ASTM A53 Grade B for standard weight pipe (Schedule 40) or ASTM A36 for bars. Structural Tube Posts shall be in accordance with ASTM A500 Grade A, B, C or D, or ASTM A501. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Pickets shall be fabricated parallel to the posts. Corners and changes in tangential longitudinal alignment, shall be made continuous with a 9" bend radius. For changes in tangential longitudinal alignment greater than 45°, posts shall be positioned at a maximum distance of 2'-0" each side of the corner and shall not be located at the corner apex. For curved longitudinal alignments the top and bottom rails shall be shop bent to match the alignment radius.

**BASE PLATES & POST CAPS:**  
 Base Plates and Post Cap plates shall be in accordance with ASTM A36 or ASTM A709 Grade 36.

**SHIM PLATES:**  
 Shim Plates shall be aluminum in accordance with ASTM B209, Alloy 6061-T6 or 6063-T5. Shim plates shall be used for foundation height adjustments greater than 1/4" and localized irregularities greater than 1/8". Field trim shim plates when necessary to match the contours of the foundation. Bevelled shim plates may be used in lieu of trimmed flat shim plates shown.

**COATINGS:**  
 The railing shall be hot-dip galvanized after fabrication in accordance with Section 962-7 of the Specifications. All nuts bolts and washers shall be hot dip galvanized in accordance with Section 962-7 of the Specifications.

**ANCHOR BOLTS:**  
 Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Headless anchor bolts for Adhesive Anchors shall be threaded full length. Expansion Anchors are not permitted. All anchor bolts shall have Single Self-Locking Hex Nuts. All nuts shall be 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 shall be coated with a galvanizing compound in accordance with the Specifications.

**RESILIENT AND NEOPRENE PADS**  
 Resilient and Neoprene pads shall be in accordance with Specification Section 932 except that testing of the finished pads shall not be required. Neoprene pads shall be durometer hardness 60 or 70.

**JOINTS:**  
 All fixed joints are to be welded all around and ground smooth. Expansion joints shall be spaced at a maximum 40'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate hot-dip galvanizing and handling, but railing must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments. Metallize rail ends with a galvanizing compound when field adjustments are required.

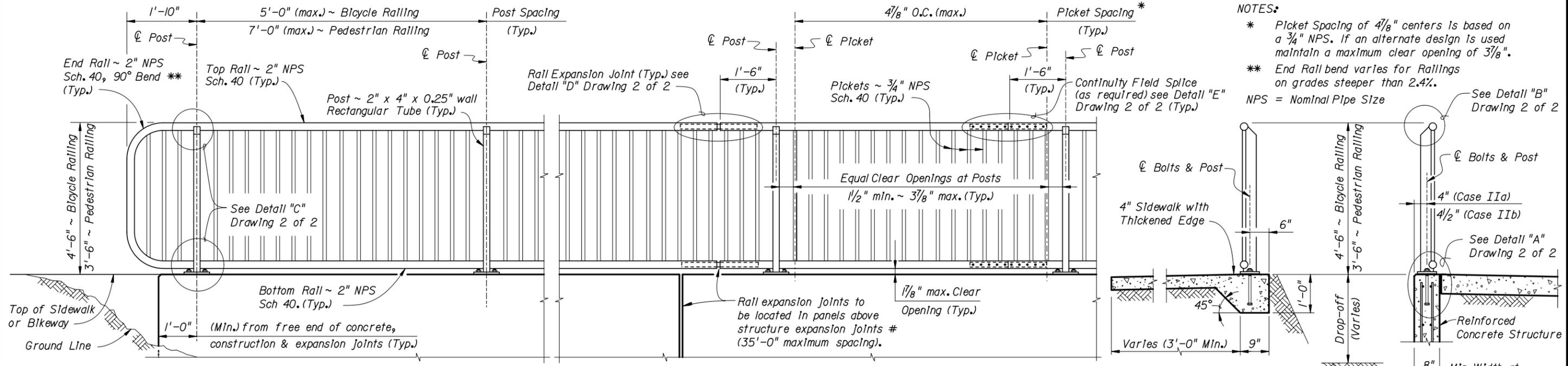
**WELDING:**  
 All welding shall be in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds shall not be required.

**WEEP HOLES:**  
 Weep holes shall be 1/4" Ø and located at the low point in sag vertical curves for both top and bottom rails. Holes shall be drilled through the underside of the rails prior to hot-dip galvanizing.

**SHOP DRAWINGS:**  
 Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations, and venting holes for galvanizing, must be submitted by the Contractor for the Engineer's approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.

REVISIONS				NAMES		DATES		ENGINEER OF RECORD:			SHEET TITLE:				
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	DESCRIPTION	FLORIDA DEPARTMENT OF TRANSPORTATION			ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME	SHEET NO.
01-31-05	SDO	Standard Drawing Issue Date						CENTRAL OFFICE 605 Suwannee Street, MS 33 Tallahassee, Florida 32399-0450						STEEL PEDESTRIAN/BICYCLE PICKET RAILING INDEX NO. 850 (DRAWING 1 OF 2)	

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**NOTES:**  
 \* Picket Spacing of 4 7/8" centers is based on a 3/4" NPS. If an alternate design is used maintain a maximum clear opening of 3 7/8".  
 \*\* End Rail bend varies for Railings on grades steeper than 2.4%.  
 NPS = Nominal Pipe Size

**STRUCTURE EXPANSION JOINTS NOTE:**  
 # Keyed construction joints in Design Standards Index No. 520 Gravity Wall are not considered to be expansion joints.

**TYPICAL SECTION ON CONCRETE SIDEWALK (CASE I)**

**TYPICAL SECTION ON RETAINING WALL (CASE II)**

**ELEVATION (Showing Outside Face of Railing)**

**CROSS REFERENCE:**  
 For Details "A", "B", "C", "D" and "E", see Drawing 2 of 2

**NOTES**

**GENERAL SPECIFICATIONS:**

The Florida Department of Transportation "Standard Specifications for Road and Bridge Construction".

**DESIGN SPECIFICATIONS:**  
 American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", current edition, including 75 year Design Life.  
 Florida Department of Transportation (FDOT) "Structures Design Guidelines", current edition.  
 State of Florida "Florida Building Code", current edition.

**DESIGN LIVE LOADS:**  
 Post and Base Plate: Equivalent point load = 200 lb. load + (50 lb/ft x Post Spacing (ft)) applied transversely at top rail connection.  
 Top and Bottom Rails: 50 lb/ft uniform load applied simultaneously vertically and transversely + 200 lb. concentrated point load applied at midspan in the directions for both maximum stress and deflection.  
 Pickets: Concentrated 200 lb load applied transversely over an area of 1.0 square foot.

**GEOMETRY:**  
 Clear Opening between Pickets: Shall reject the passage of a 4" diameter sphere below 42" height, and a 8" diameter sphere above 42" height.  
 Clear Opening under Bottom Rail: Shall reject the passage of a 2" diameter sphere.  
 Pedestrian Railing Height: 42" minimum.  
 Bicycle Railing Height: 54" minimum.

**DEFLECTION:**  
 Total combined deflection of the railing system including the resilient or neoprene pads, due to the top rail design live loads, shall not exceed 1/2" when measured at midspan of the top rail.

**APPLICABILITY NOTE TO DESIGNER:**  
 This railing is not applicable for shielding drop-off hazards for vehicular traffic. This railing is applicable for all cases where a pedestrian or bicyclist drop-off hazard exceeds 2'-6" or when a drop-off hazard is less than 2'-6" and is required by design. Adequate foundation support shall be provided for anchorage and stability against overturning. For unusual site conditions a site specific railing is to be designed by the responsible engineer. The railing shown on this drawing requires a handrail for ramps steeper than a 5% grade to conform with the requirements of the Americans with Disabilities Act (ADA). This railing is not approved for use on bridges. Refer to FDOT Plans Preparation Manual (Volume I) Chapters 4 & 8, for the definition of vehicular, pedestrian and bicyclist "drop-off hazards".

**ALTERNATE DESIGN:**  
 Manufacturers seeking approval of proprietary railing systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the proprietary railing system is designed to meet the design life, live loads, geometry and deflection requirements specified herein. All fixed joints are to be either welded or commercially designed fixed joint systems. Each field section of railing must be identified with a permanently affixed label with the manufacturer's name and the FDOT QPL approval number. Labels must be a maximum of 1/2" by 3" and located at the base of a post within the field section. Project specific shop drawings are required for QPL approved railings, see Shop Drawings note.

**PAYMENT:**  
 Railing shall be paid for per linear foot (Item No. 515-2-abb). Payment will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, pickets, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient pads and all incidental materials and labor required to complete installation of the railing.

**RAILS, PICKETS & POSTS:**

Structural Tube and Pipe shall be in accordance with ASTM B221 or ASTM B429, Alloy 6061-T6. End Rail 90° Bends and corner bends with maximum 4'-0" post spacing, may be Alloy 6063-T6. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Pickets shall be fabricated parallel to the posts. Corners and changes in tangential longitudinal alignment, shall be made continuous with a 9" bend radius. For changes in tangential longitudinal alignment greater than 45°, posts shall be located at a maximum distance of 2'-0" each side of the corner and shall not be located at the corner apex. For curved longitudinal alignments the top and bottom rails shall be shop bent to match the alignment radius.

**BASE PLATES & POST CAPS:**

Base Plates and Post Cap plates shall be in accordance with ASTM B209, Alloy 6061-T6.

**SHIM PLATES:**

Shim Plates shall be aluminum in accordance with ASTM B209, Alloy 6061-T6 or 6063-T5. Shim plates shall be used for foundation height adjustments greater than 1/4" and localized irregularities greater than 1/8". Field trim shim plates when necessary to match the contours of the foundation. Bevelled shim plates may be used in lieu of trimmed flat shim plates shown.

**COATINGS:**

The aluminum railing shall be mill finish unless otherwise noted in the Contract Documents. All anchor bolts, nuts and washers shall be hot dip galvanized in accordance with Section 962-7 of the Specifications.

**ANCHOR BOLTS:**

Anchor bolts shall be in accordance with ASTM F1554 Grade 36. Headless anchor bolts shall be threaded full length. Expansion Anchors are not permitted. All anchor bolts shall have Single Self-Locking Hex Nuts. All nuts shall be 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 shall be coated with a galvanizing compound in accordance with the Specifications.

**RESILIENT AND NEOPRENE PADS**

Resilient and Neoprene pads shall be in accordance with Specification Section 932 except that testing of the finished pads shall not be required. Neoprene pads shall be durometer hardness 60 or 70.

**JOINTS:**

All fixed joints are to be welded all around and ground smooth. Expansion joints shall be spaced at a maximum 35'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate handling, but the railing must be continuous across a minimum of two posts. Only use the Continuity Field Splice (Detail "E") to make the railing continuous for unforeseen field adjustments.

**WELDING:**

All welding shall be in accordance with the American Welding Society Structural Welding Code (Aluminum) ANSI/AWS D1.2 (current edition). Filler metal shall be either ER5183, ER5356 or ER5556. Nondestructive testing of welds shall not be required.

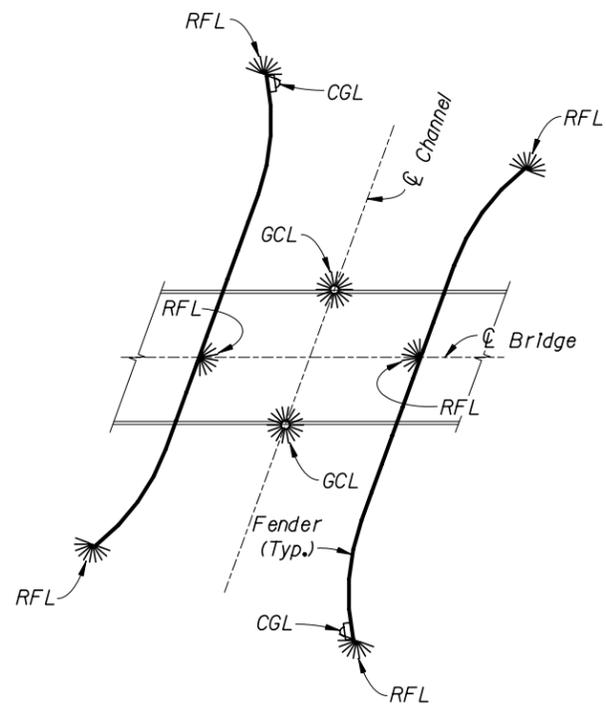
**SHOP DRAWINGS:**

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations must be submitted by the Contractor for the Engineer's approval prior to fabrication of the railing. Shop drawings shall be in accordance with the Specifications.

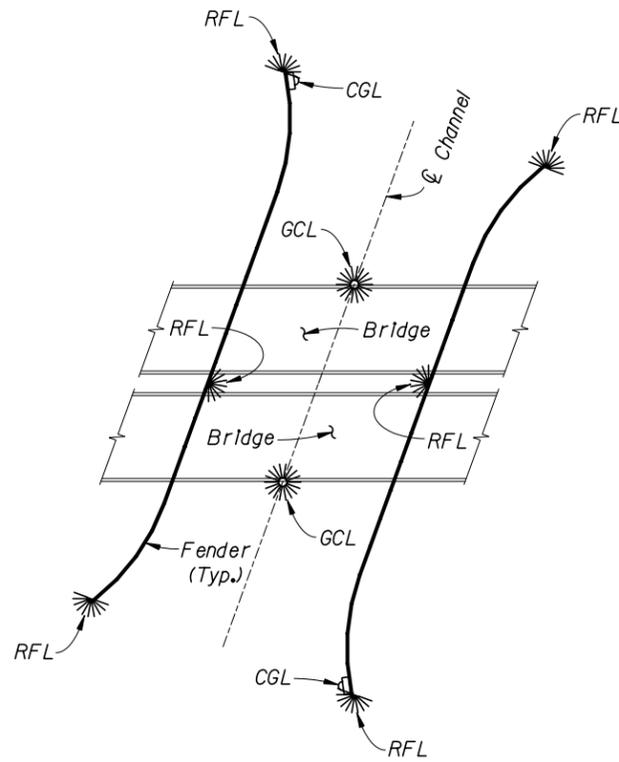
REVISIONS			NAMES		DATES		ENGINEER OF RECORD			SHEET TITLE		
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	FLORIDA DEPARTMENT OF TRANSPORTATION			PROJECT NAME
01-31-05	SDO	Standard Drawing Issue Date							CENTRAL OFFICE 605 Suwannee Street, MS 33 Tallahassee, Florida 32399-0450			
									ROAD NO.	COUNTY	FINANCIAL PROJECT ID	SHEET NO.

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NAVIGATION LIGHT SYSTEM SCHEMATIC FOR SINGLE BRIDGE WITH FENDERS



NAVIGATION LIGHT SYSTEM SCHEMATIC FOR DUAL BRIDGES WITH FENDERS

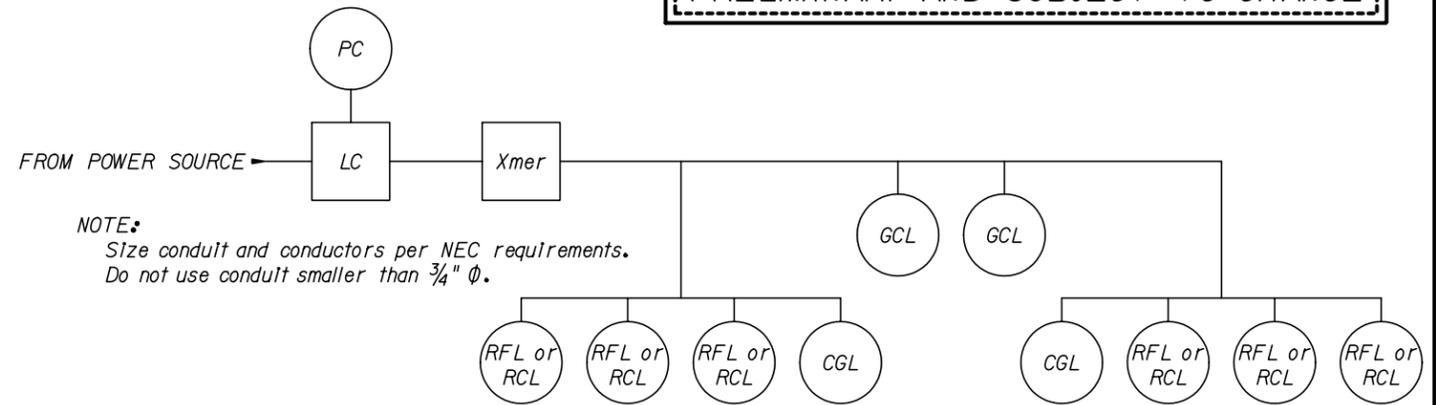
NAVIGATION LIGHT NOTES:

1. Provide Navigation Light System in compliance with Specifications Section 510.

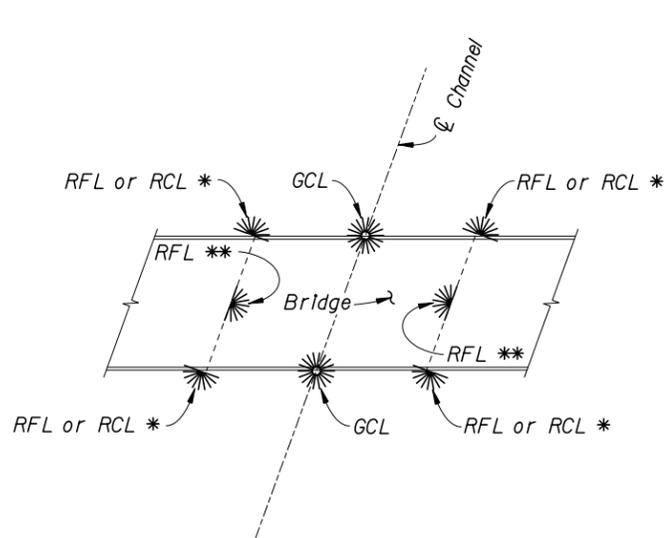
CROSS REFERENCES:

1. For more Navigation Light details, see drawing 2 of 2.

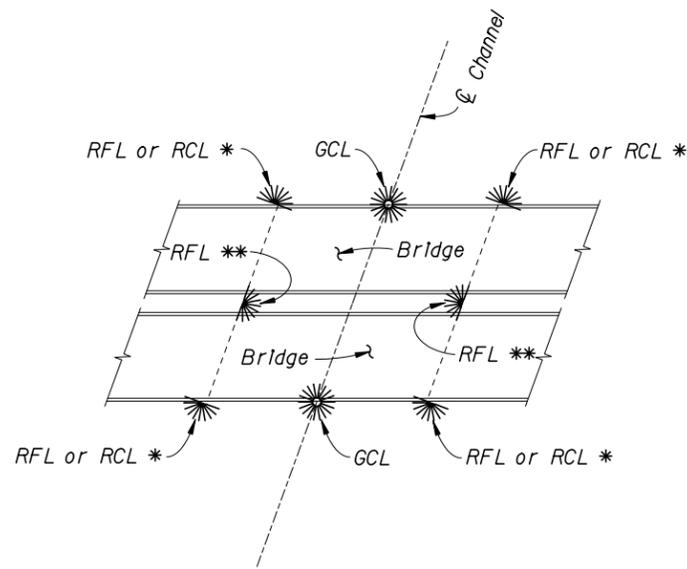
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TYPICAL ELECTRICAL SCHEMATIC DIAGRAM



NAVIGATION LIGHT SYSTEM SCHEMATIC FOR SINGLE BRIDGE WITHOUT FENDERS



NAVIGATION LIGHT SYSTEM SCHEMATIC FOR DUAL BRIDGES WITHOUT FENDERS

\* Use RFL when Pier is at Channel Edge and see CFR, Title 33, part 118 for Mounting Height restrictions. Use RCL otherwise.  
\*\* Mounted only on the Pier that defines CM, otherwise does not apply.

LEGEND

SYMBOL	DESCRIPTION
LC	Lighting Contactor
PC	Photocell Control
Xmer	Transformer (If Required)
	RFL Red Pier/Fender Light or RCL Red Channel Margin Light
	GCL Green Center Channel Light
	CGL Clearance Gauge Light
CM	Channel Margin or Pier Inner surface whichever defines Channel Edge.

POWER CONDUCTORS			
DISTANCE (feet)	VOLTS	CONDUCTOR	TRANSFORMER
0 - 75	120	#12 AWG	N/A
75 - 500	120 or 240	#10 AWG	N/A
500-1000	240	#10 AWG	N/A
1000-2000	480	#10 AWG	2 KVA
2000-5000	480	#8 AWG	2 KVA
5000-10000	480	#6 AWG	2 KVA
over 10000	480	#4 AWG	2 KVA

INSTRUCTIONS TO DESIGNER:

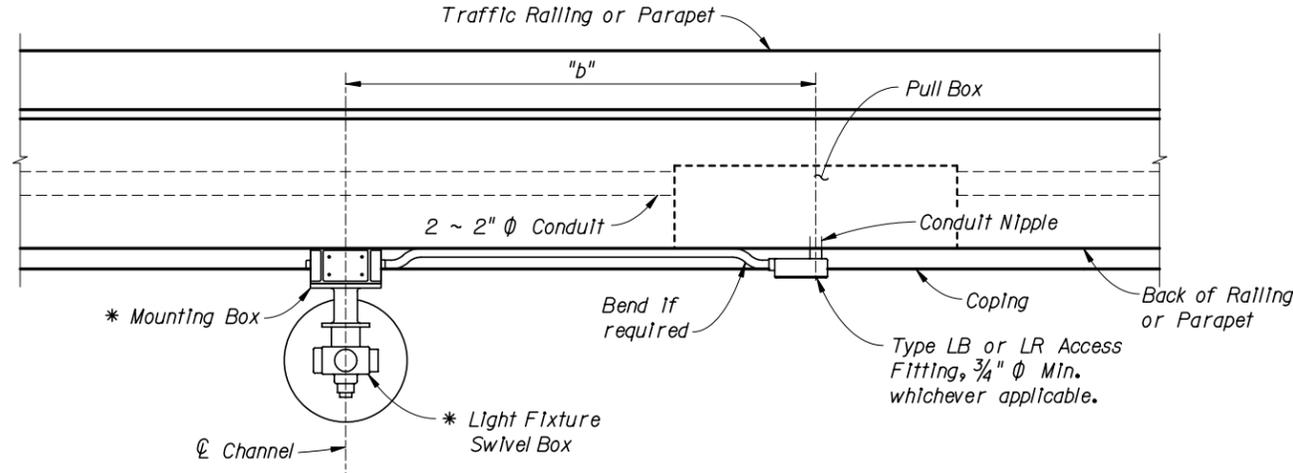
1. Provide design of CGL locations, configurations and its supporting structures.
2. Provide design of RFL locations and configurations in Fender System drawings if applicable.
3. If actual conditions differ from the typical configurations shown on this sheet, provide Navigation Light System design to comply with Code of Federal Regulations Title 33, Chapter 1, Part 118.
4. Provide dimensions "a" and "b" to ensure visibility from an approaching vessel and not encroach in vertical clearances.
5. Provide automatic lock positions for service and operating.
6. Specify Service Chain mounting location.

BRIDGE NO. XXXXXX

REVISIONS						ENGINEER OF RECORD			SHEET TITLE		
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	FLORIDA DEPARTMENT OF TRANSPORTATION			NAVIGATION LIGHT SYSTEM DETAILS (FIXED BRIDGES)		
01-31-05	SDO	Standard Drawing Issue Date				CENTRAL OFFICE 605 Suwannee Street, MS 33 Tallahassee, Florida 32399-0450			INDEX NO. 1210 (DRAWING 1 OF 2)		
						ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME		SHEET NO.

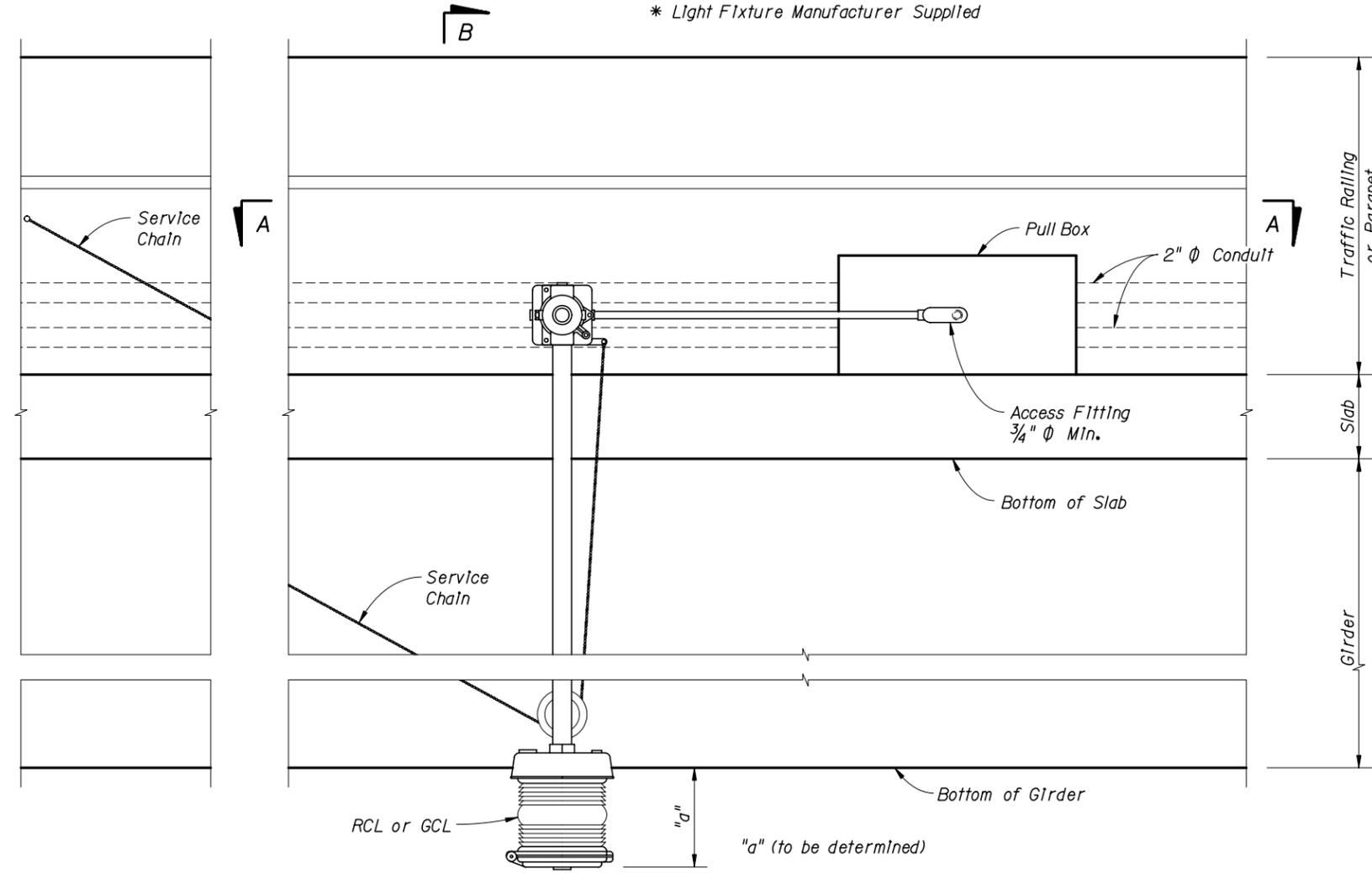
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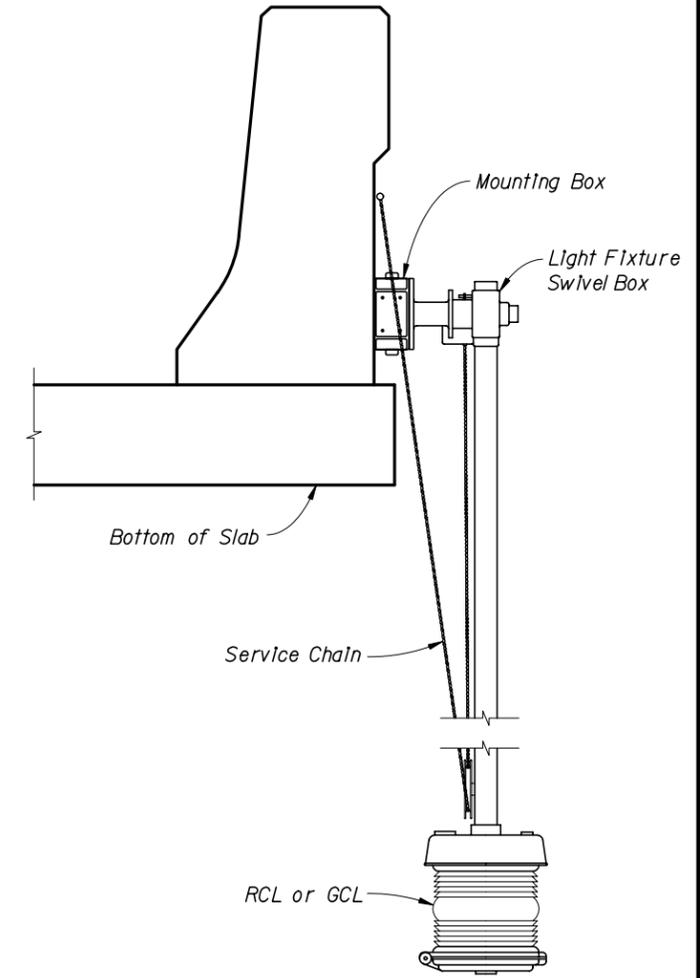


**CROSS REFERENCES:**  
 1. For Navigation Light System notes and legend, see Drawing 1 of 2.  
 2. See Utility Conduit Detail sheet for pull box dimensions & locations.

**GCL OR RCL MOUNTING DETAILS (SCHEMATIC)  
 VIEW A-A**  
 (Traffic Railing - 32" F Shape shown, other railings similar)  
 \* Light Fixture Manufacturer Supplied



**GCL OR RCL MOUNTING DETAILS (SCHEMATIC)  
 ELEVATION VIEW**  
 (Traffic Railing - 32" F Shape shown, other railings similar)



**SECTION B-B  
 TYPICAL POSITION OF RCL OR GCL  
 RELATIVE TO SUPERSTRUCTURES**

BRIDGE NO. XXXXXX

REVISIONS						DRAWN BY		ENGINEER OF RECORD		SHEET TITLE			
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	NAMES	DATES	FLORIDA DEPARTMENT OF TRANSPORTATION		NAVIGATION LIGHT SYSTEM DETAILS (FIXED BRIDGES)			
01-31-05	SDO	Standard Drawing Issue Date				JMB	8-04	STRUCTURES DESIGN OFFICE CENTRAL OFFICE 605 Suwannee Street, MS 33 Tallahassee, Florida 32399-0450		INDEX NO. 1210 (DRAWING 2 OF 2)			
						DYW	9-04			ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME
						AFR/DYW	7-04						
											SHEET NO.		

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**BOX GIRDER MAINTENANCE LIGHTING NOTES:**

1. Submit to the Engineer shop drawings detailing the layout of the maintenance lighting system for the entire structure. The shop drawings must include, but not be limited to, the following items:
  - a. Conduit layout and installation details through diaphragms, around post-tensioning (PT) ducts, lateral bracing and cross frames as necessary.
  - b. Conduit access through box girder end diaphragm with minimum 1" clearance in all direction.
  - c. Conduit expansion fitting details.
  - d. Fastener details for the interior electrical system.
  - e. Single line diagram showing mini power centers, switches, contactors, timers, etc.
  - f. Mini power center details including circuit breaker details.
  - g. Mini power center mounting details if required.
  - h. Feeder schedule.
2. Ensure installation meets all requirements of the latest edition of the National Electrical Code (NEC) and local ordinances. Install grounding in accordance with NEC Article 250.
3. Furnish all labor, equipment, materials, and incidentals required for a complete and functional installation.
4. Use only new, unused and Underwriters Laboratories (UL) listed equipment and materials for outdoor use.
5. Furnish and install polyvinyl chloride (PVC) conduit in conformance with UL Section 651, NEC Section 347 and NEMA TC-2, UV-resistant and schedule 80. Bend conduits as necessary to connect to loads.
6. Provide PVC sleeve 2" bigger in diameter than conduit to accommodate construction tolerance.
7. Install an expansion fitting for specified PVC conduit at all structure expansion joints. Provide certification that the expansion fitting meets the following minimum requirements: Compatibility with the connected conduits, waterproof, UV protected and allows longitudinal movement equal to that of the expansion joint.
8. Use only ASTM 316 stainless steel supporting hardware. Provide minimum 3/16"  $\phi$  fasteners. For concrete or SIP form mounting, provide anchor bolts (expansion, drop-in or adhesive) suitable for dynamic loading (due to vibration caused by traffic). Install fasteners to avoid conflicts with reinforcing steel and PT ducts. For structural steel mounting, do not attach fasteners to main members, i.e. webs and flanges.
9. Furnish power distribution at 480V AC, 1 phase, with step down transformers at regular intervals. Furnish 7.5 KVA mini power center with eight 20A breakers as the step down transformer, feeding a maximum of 20 lamps and 20 receptacles. Each mini power center will provide power to no more than 1000' of bridge, preferably 500' on each side of the mini power center.
10. Furnish and install lighting contactors to switch the 480V AC feeding the mini power centers.
11. Furnish and install copper conductors, Type XHHW. Do not use any conductor larger than #4 AWG.
12. Provide enough slack in all interior cable terminations to allow for minor shifting of the structure.
13. Furnish and install National Electric Manufacturers Association (NEMA) Type 4X (non-metallic) surface mounted boxes sized in conformance with the NEC.
14. Furnish and install 120V duplex receptacles (GFI, NEMA Type 5-20R), in non-metallic outlet boxes at 50' maximum on centers. Provide each receptacle with a gasketed weather-protective outdoor plate.
15. Furnish and install surface mounted, fully enclosed, incandescent light fixtures with gasketed clear globes and wire guards at 50' maximum on centers. Provide 100 watt, 130 volt, vibration resistant and brass base incandescent lamps.
16. Locate switches at each end of each span and at every access door.
17. Provide six hour reset timers for each circuit to turn off the lighting system automatically.
18. Include the cost of the box maintenance lighting in the individual bid items. Include all incidental work for the box maintenance lighting system, as shown in the Plans but not specifically covered under an individual bid item, in the cost of related electrical bid items.

**INSTRUCTIONS TO DESIGNER:**

1. These standard drawings do not show all structure elements and are not intended to show the exact location of conduit runs. Coordinate these with the other trades to avoid conflicts. Coordinate all lighting fixtures and equipment locations with the Structure Plans.
2. Tabulate in the plans and include in the TRNS\*PORT, for bid purposes, the bid items for the maintenance box lighting system such as conductors, conduit, electrical work, etc.

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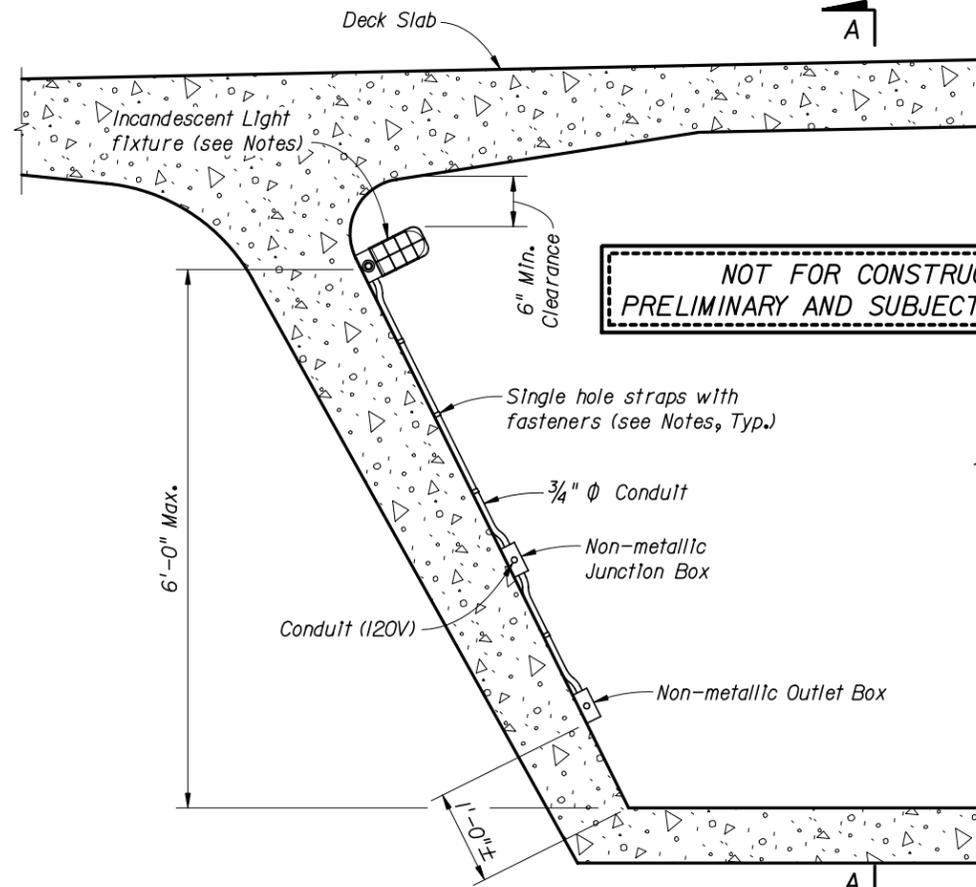
**CROSS REFERENCES:**

1. For Maintenance Light Details, see Drawing 2 of 2.
2. For actual bridge section, see Structures Plans.

BRIDGE NO. XXXXXX

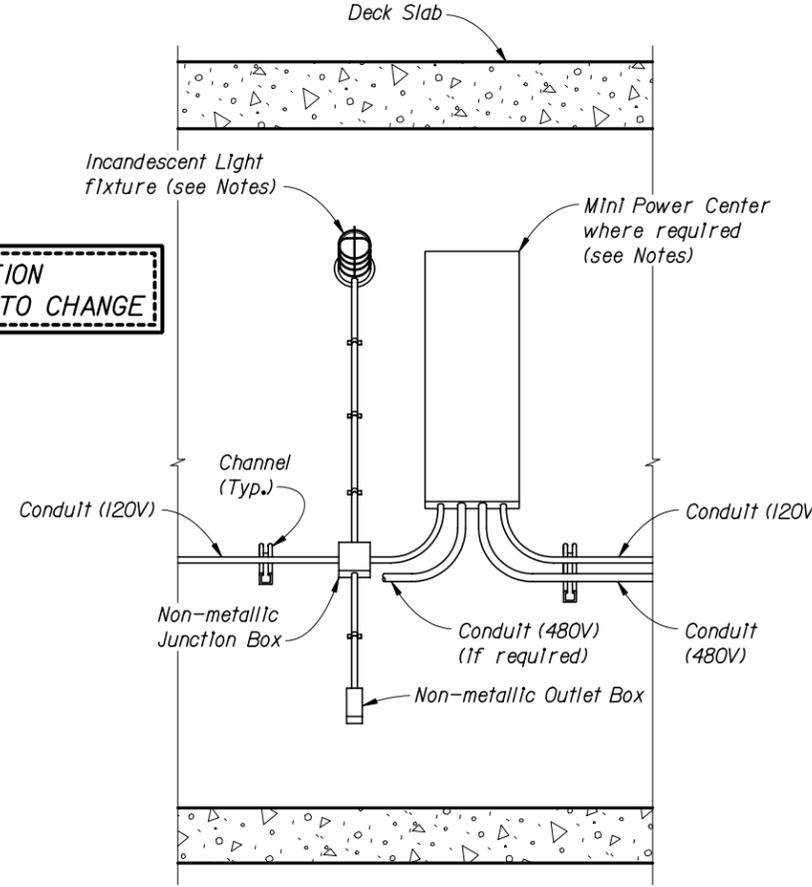
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DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DRAWN BY	JMC	2-04	CHECKED BY	DYW	2-04	DESIGNED BY	AFR/DYW	2-04	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME	SHEET NO.
01-31-05	SDO	Standard Drawing Issue Date																MAINTENANCE LIGHTING FOR BOX GIRDERS INDEX NO. 1212 (DRAWING 1 OF 2)	

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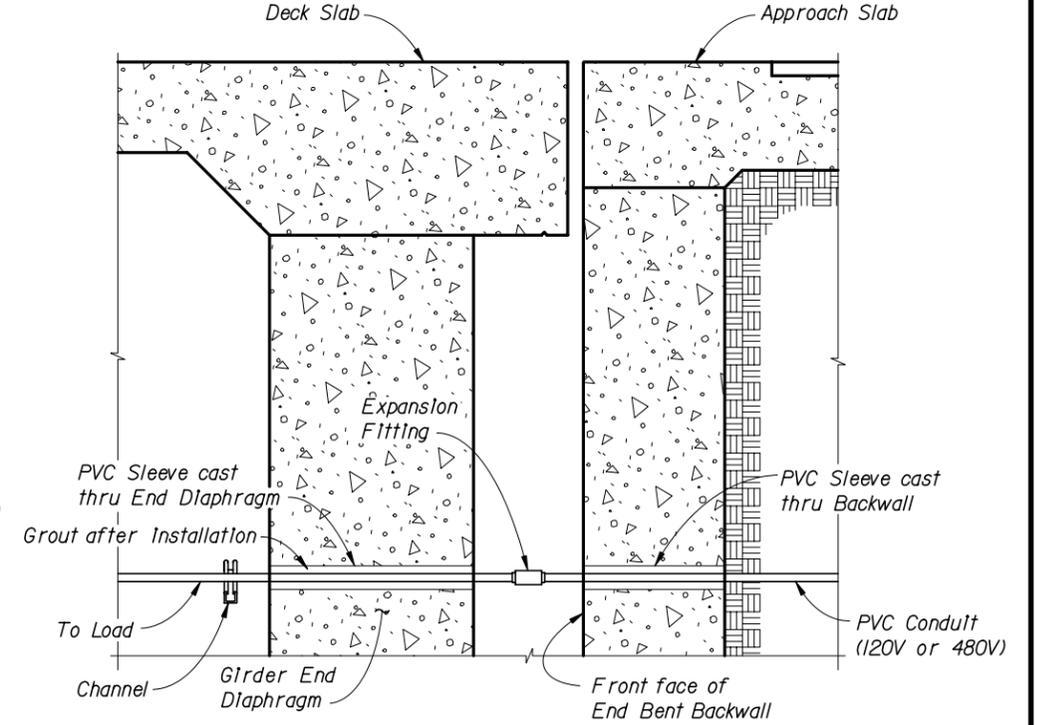


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LIGHTING DETAILS FOR CONCRETE BOX GIRDER BRIDGE

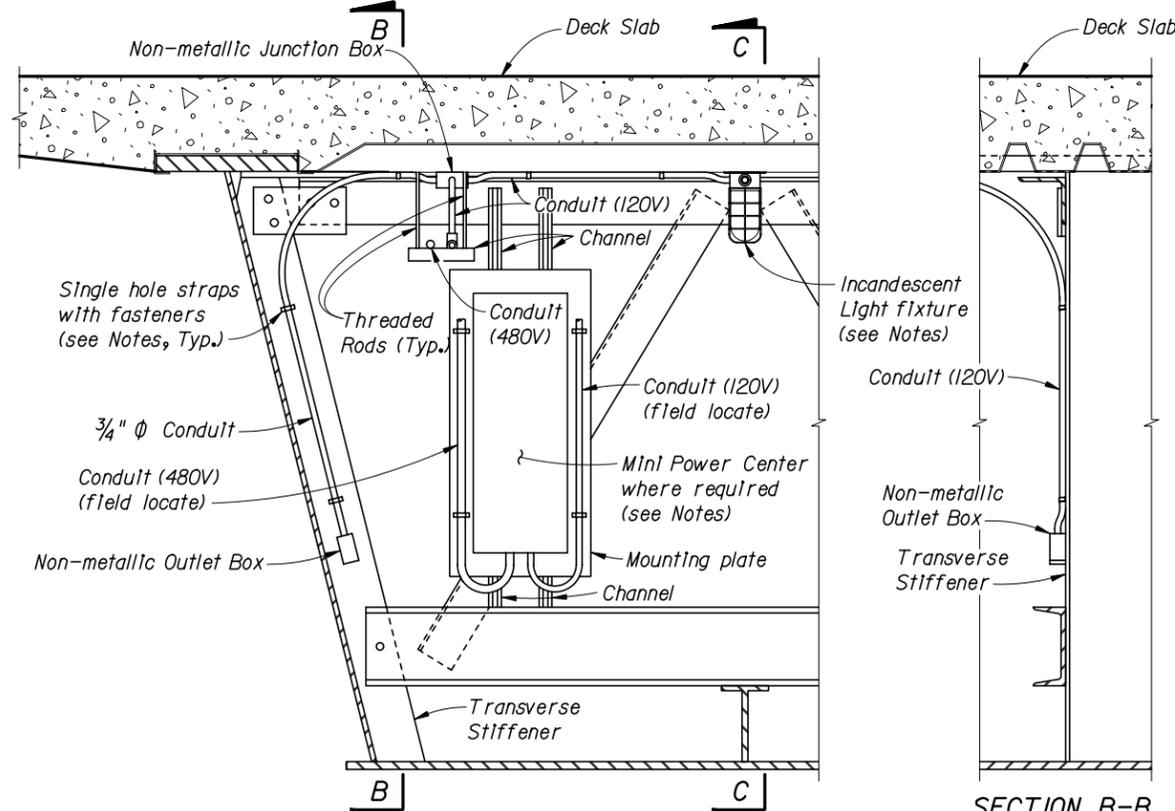


VIEW A-A

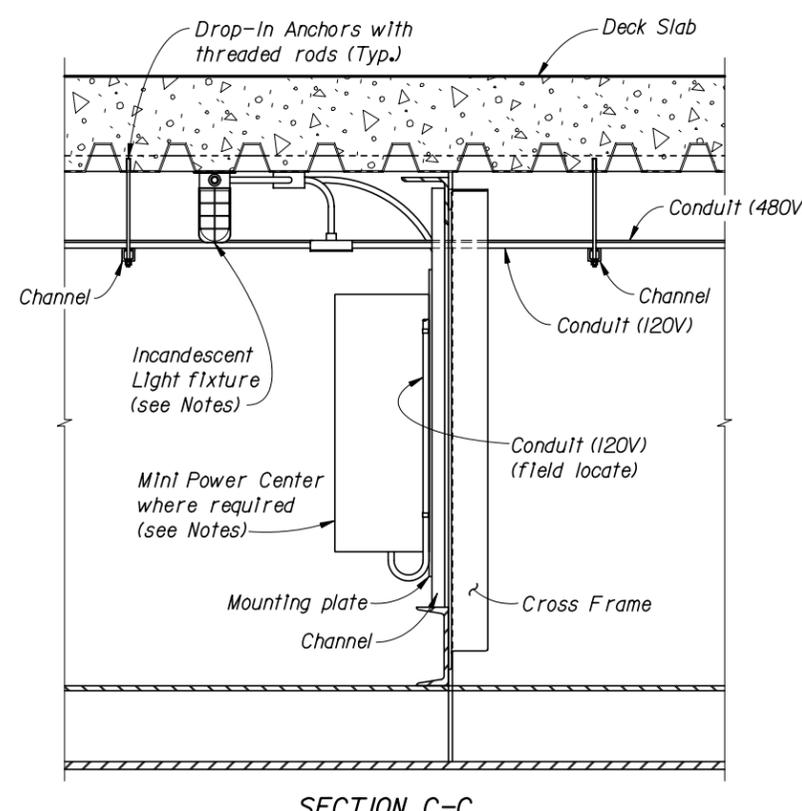


CONCRETE BOX GIRDER BRIDGE SECTION THRU END BENTS

CROSS REFERENCE:  
1. For Box Girder Maintenance Lighting Notes see Drawing 1 of 2.

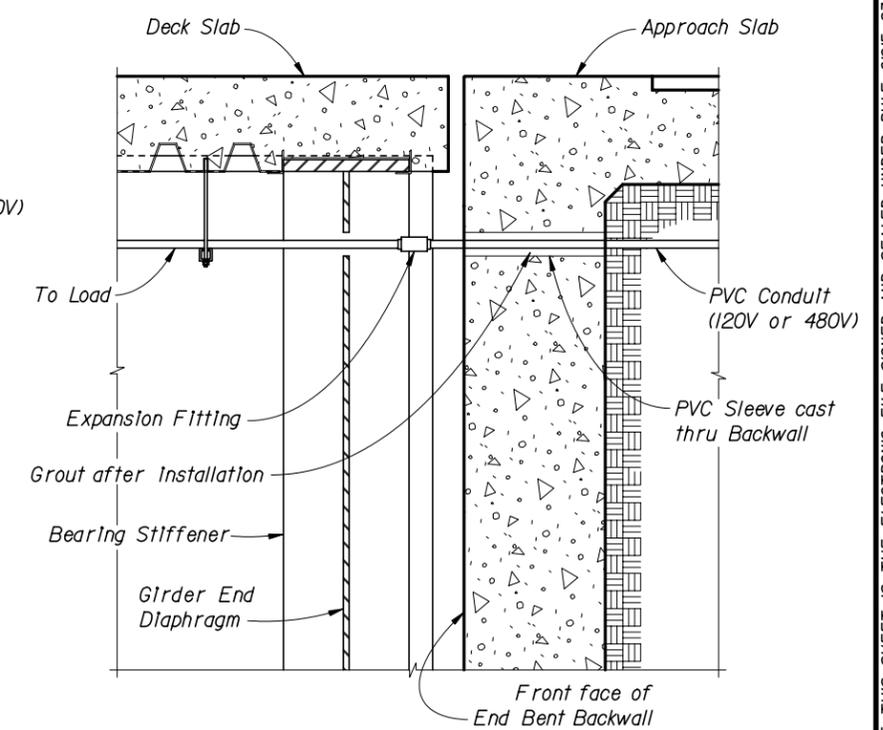


LIGHTING DETAILS FOR STEEL BOX GIRDER BRIDGE  
(Cross Frame section shown, other Transverse Stiffener sections similar)



SECTION B-B

SECTION C-C



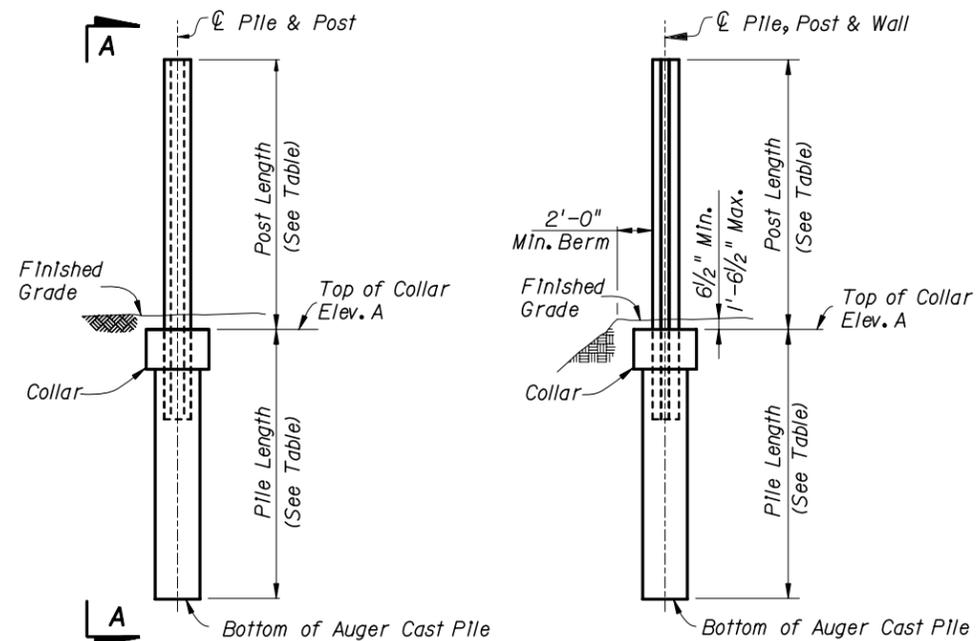
STEEL BOX GIRDER BRIDGE SECTION THRU END BENTS

BRIDGE NO. XXXXXX

REVISIONS				NAMES		DATES		ENGINEER OF RECORD			SHEET TITLE					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DRAWN BY	JMB	6-04	<b>FLORIDA DEPARTMENT OF TRANSPORTATION</b> CENTRAL OFFICE 605 Suwannee Street, MS 33 Tallahassee, Florida 32399-0450			<b>MAINTENANCE LIGHTING FOR BOX GIRDERS</b> INDEX NO. 1212 (DRAWING 2 OF 2)				
01-31-05	SDO	Standard Drawing Issue Date				CHECKED BY	DYW	2-04				ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PROJECT NAME	SHEET NO.
						DESIGNED BY	AFR/DYW	2-04								
						CHECKED BY										
						APPROVED BY										

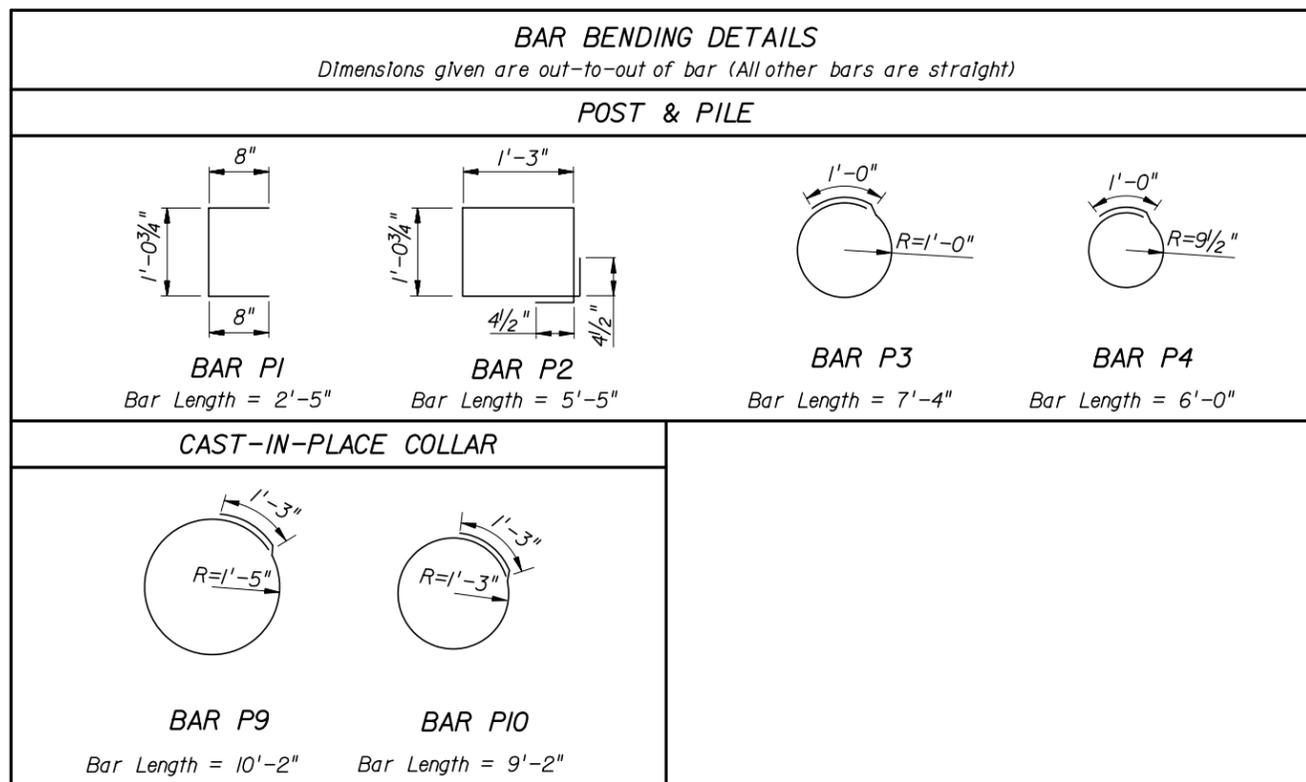
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PILE/POST ELEVATION (Pile/Post Connection Option A Shown) VIEW A-A (Pile/Post Connection Option A Shown)

NOTES:  
 Bars A, B & P1 are used in Options A, B & E.  
 Bars C are only used in Option A.  
 Bars C2 are only used in Option B.  
 Bars P2 are used in Options A & E.  
 Bars P3 are only used in Option A.  
 Bars P4 are only used in Option B.  
 Bars P9 & P10 are used in the Cast-In-Place Collar Options.

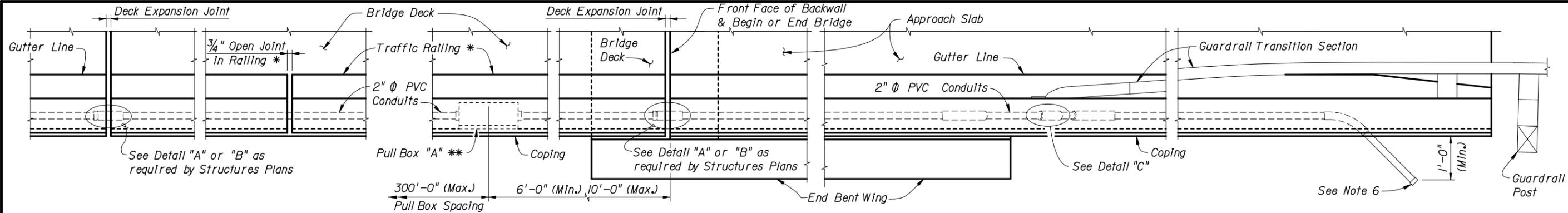


DIMENSION POST AND PILE						TABLE OF REINFORCING STEEL													
WALL TYPE	POST LENGTH	PILE LENGTH OPTION A		PILE LENGTH OPTIONS B,C,D & E		PILE/POST REINFORCING												CAST-IN PLACE COLLAR	
		10'-0" POST SPACING	20'-0" POST SPACING	10'-0" POST SPACING	20'-0" POST SPACING	10'-0" POST SPACING			20'-0" POST SPACING			BARS C	BARS C2	BARS P1	BARS P2	BARS P3	BARS P4	BARS P9	BARS P10
						BARS A	BARS B	DIM 'A'	BARS A	BARS B	DIM 'A'								
						SIZE	SIZE	SIZE	SIZE	SIZE	SIZE								
A	12'-0 1/2"	11'-0"	14'-0"	12'-0"	15'-0"	#4	#4	10'-0"	#5	#5	9'-0"	#9	#7	#4	#4	#4	#4	#5	#5
B	13'-0 1/2"	11'-0"	15'-0"	12'-0"	16'-0"	#4	#4	10'-7"	#5	#5	8'-10"	#9	#7	#4	#4	#4	#4	#5	#5
C	14'-0 1/2"	12'-0"	16'-0"	13'-0"	17'-0"	#4	#4	10'-5"	#6	#6	10'-4"	#9	#7	#4	#4	#4	#4	#5	#5
D	15'-0 1/2"	12'-0"	17'-0"	13'-0"	18'-0"	#5	#5	12'-11"	#6	#6	10'-3"	#9	#7	#4	#4	#4	#4	#5	#5
E	16'-0 1/2"	13'-0"	17'-0"	14'-0"	18'-0"	#5	#5	12'-9"	#7	#7	11'-10"	#9	#7	#4	#4	#4	#4	#5	#5
F	17'-0 1/2"	14'-0"	18'-0"	14'-0"	19'-0"	#5	#5	12'-7"	#7	#7	11'-8"	#9	#7	#4	#4	#4	#4	#5	#5
G	18'-0 1/2"	14'-0"	19'-0"	15'-0"	20'-0"	#6	#6	14'-11"	#8	#8	13'-1"	#9	#7	#4	#4	#4	#4	#5	#5
H	19'-0 1/2"	15'-0"	20'-0"	15'-0"	21'-0"	#6	#6	14'-10"	#8	#8	13'-0"	#9	#7	#4	#4	#4	#4	#5	#5
I	20'-0 1/2"	15'-0"	21'-0"	16'-0"	22'-0"	#6	#6	14'-9"	#9	#9	14'-3"	#9	#7	#4	#4	#4	#4	#5	#5
J	21'-0 1/2"	16'-0"	22'-0"	16'-0"	24'-0"	#6	#6	14'-8"	#9	#9	14'-2"	#9	#7	#4	#4	#4	#4	#5	#5
K	22'-0 1/2"	16'-0"	23'-0"	17'-0"	26'-0" *	#7	#7	17'-1"	#9	#9	14'-1"	#9	#7	#4	#4	#4	#4	#5	#5

\* For Steel Post Option "D", use 30'-0".

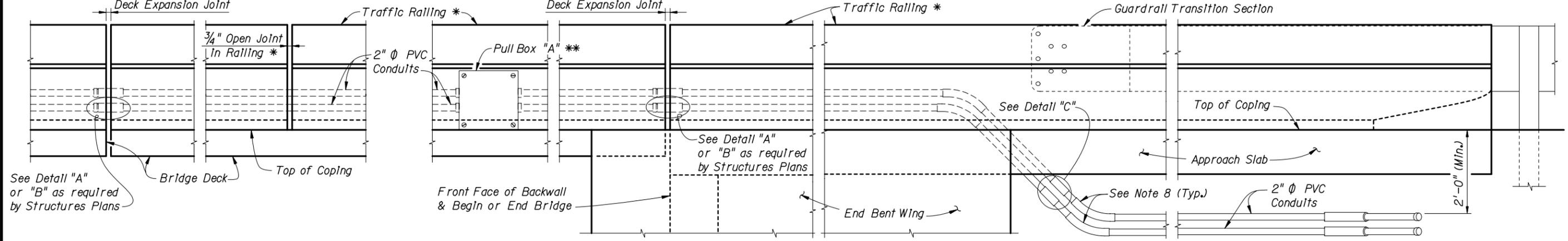
SOILS WITH SPT N VALUES BETWEEN 10 AND 40

REVISIONS						NAMES			DATES			ENGINEER OF RECORD			SHEET TITLE		
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DRAWN BY	CHECKED BY	DESIGNED BY	CHECKED BY	APPROVED BY	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	PILE DEPTH AND REINFORCING SUMMARY PRECAST SOUND BARRIERS, INDEX NO. 1508			
01-31-05	SDO	Standard Drawing Issue Date				TAA	TJB	TAA	TJB	REN							



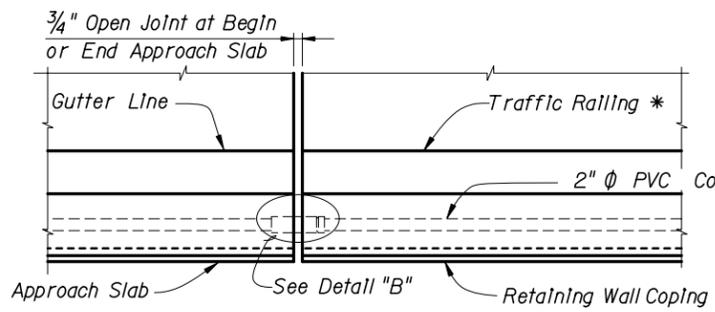
PARTIAL PLAN VIEW ALONG BRIDGE

PARTIAL PLAN VIEW ALONG APPROACH SLAB WITHOUT CONTINUING TRAFFIC RAILING

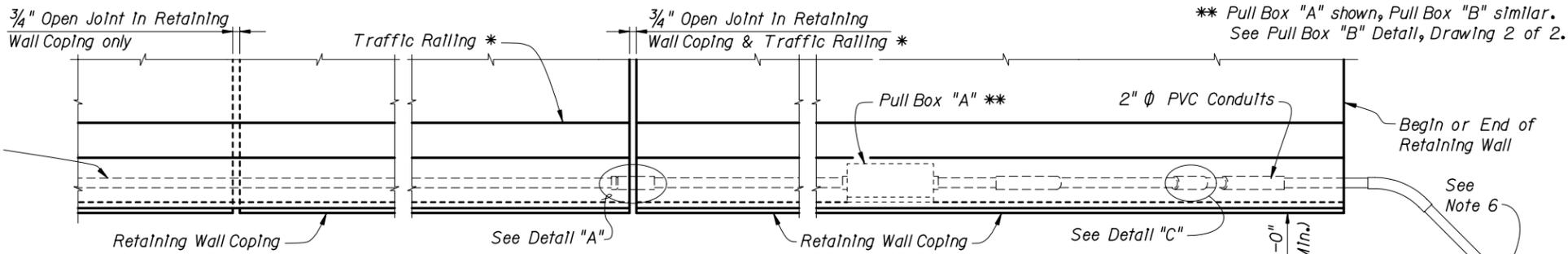


PARTIAL ELEVATION VIEW ALONG BRIDGE

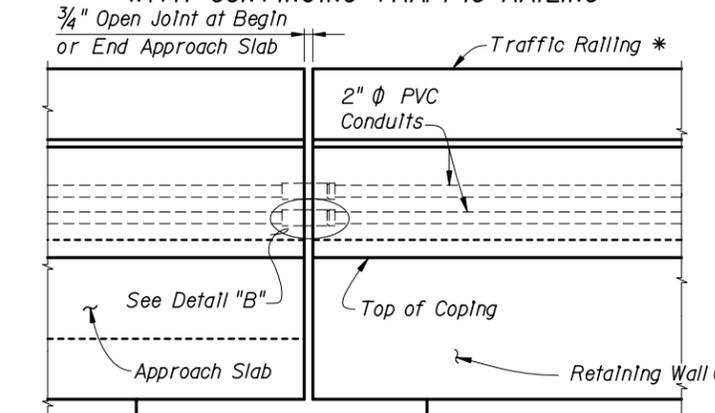
PARTIAL ELEVATION VIEW ALONG APPROACH SLAB WITHOUT CONTINUING TRAFFIC RAILING



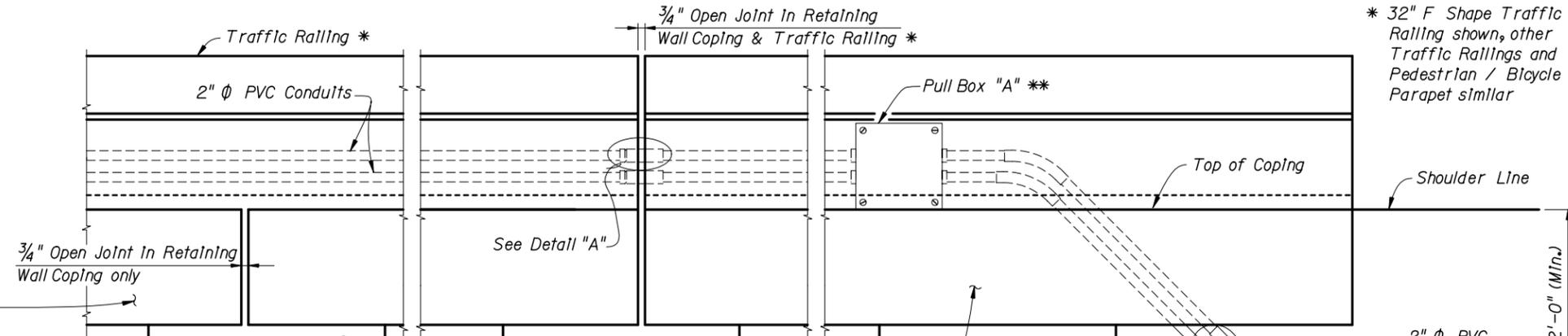
PARTIAL PLAN VIEW ALONG APPROACH SLAB WITH CONTINUING TRAFFIC RAILING



PARTIAL PLAN VIEW ALONG RETAINING WALL



PARTIAL ELEVATION VIEW ALONG APPROACH SLAB WITH CONTINUING TRAFFIC RAILING



PARTIAL ELEVATION VIEW ALONG RETAINING WALL

NOT FOR CONSTRUCTION  
PRELIMINARY AND SUBJECT TO CHANGE

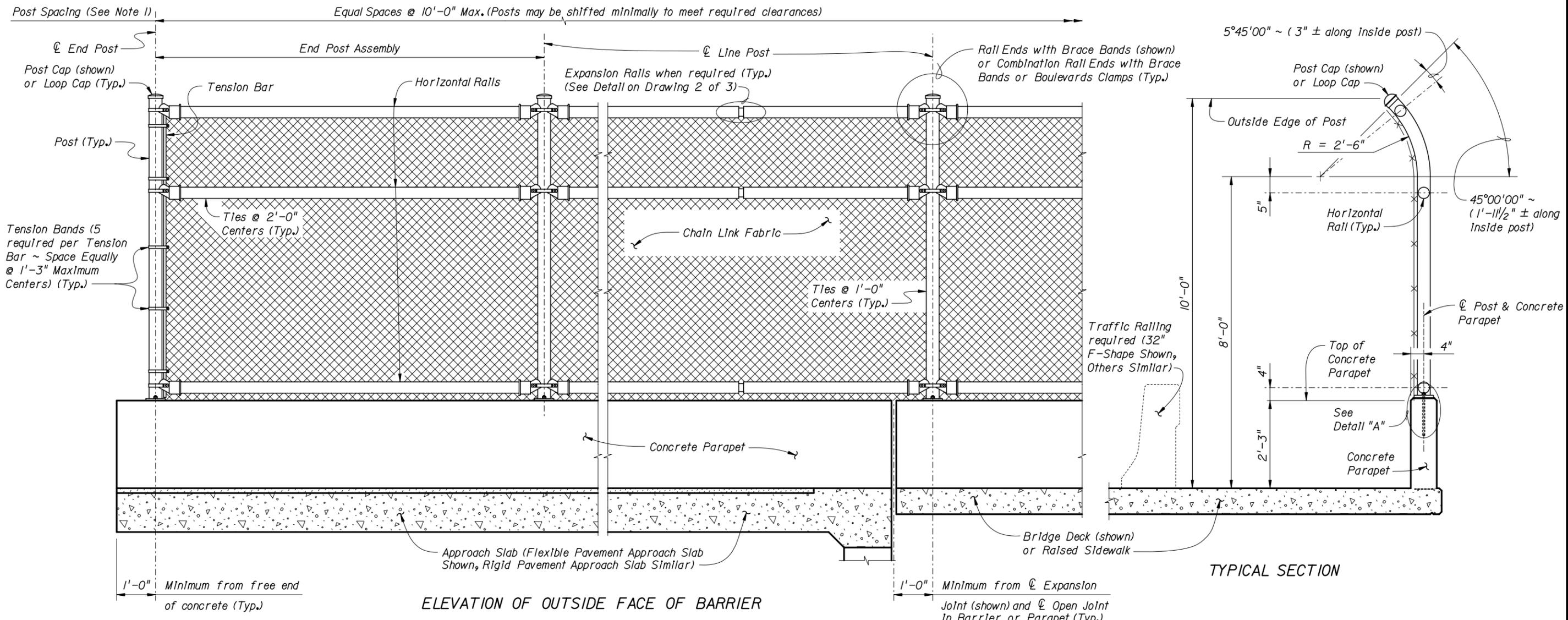
(Retaining Wall Mounted Traffic Railing shown, Roadway Concrete Barrier similar)

BRIDGE NO. XXXXXX

REVISIONS			REVISIONS			ENGINEER OF RECORD			SHEET TITLE		
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	FLORIDA DEPARTMENT OF TRANSPORTATION			UTILITY CONDUIT DETAILS		
01-31-05	SDO	Standard Drawing Issue Date				CENTRAL OFFICE			INDEX NO. 9010 (DRAWING 1 OF 2)		
						605 Suwannee Street, MS 33			PROJECT NAME		
						Tallahassee, Florida 32399-0450			SHEET NO.		

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ELEVATION OF OUTSIDE FACE OF BARRIER

TYPICAL SECTION

**INSTRUCTIONS TO DESIGNER:**

Specify the type of chain link fabric and tension wire required for bridge fencing in the General Notes. See Drawing 2 of 3 for available options.

When PVC coated chain link fabric is specified, provide the following information in the General Notes:

1. A note specifying the color of the PVC coating for chain link fabric.
2. A note to paint the fence framework to match the color of the PVC chain link fabric.
3. A note for preparation of galvanized steel for painting.
4. A note to coat tension wire and fence fittings to match the color of the PVC chain link fabric.

Determine if bridge fencing requires grounding. If required, provide details in the superstructure sheets.

Evaluate the expansion joints movements of the bridge. Expansion rails (see Drawing 2 of 3) are required at expansion joints where the total movement exceeds 1". If the total movement at an individual expansion joint is 6" or less, the bridge fence will span the joint without using an expansion assembly. If the total movement at an individual expansion joint exceeds 6", an Expansion Assembly must be installed at that location (see Drawing 2 of 3). Provide locations for expansion joints requiring expansion rails or expansion assemblies in the superstructure layout sheets.

Show the limits of fencing in the plans if they are not from begin of approach slab at Begin Bridge to end of approach slab at End Bridge.

Include estimated quantities for bridge fencing with estimated quantities for concrete parapets in the superstructure details sheets.

**NOTES:**

1. A Pull Post Assembly is required at maximum intervals of 500'-0". See Drawing 2 of 3.

**FENCING NOTES**

**FENCE APPLICATION:**

This bridge fence can only be used on sidewalk installations behind a traffic railing.

**FENCE INSTALLATION:**

Install posts plumb (within a tolerance of ± 1/2"). Use shim plates as required to achieve plumb. The required quantity and thickness of shim plates will be determined in the field. Install chain link fence in accordance with ASTM F 567 as applicable.

**CONCRETE PARAPET DETAILS:**

See Index No. 800 - Pedestrian/Bicycle Railing for Concrete Parapet details. Provide fencing in lieu of aluminum bullet railing as shown on Index No. 800.

**LIMITS OF FENCING:**

Limits of fencing are from begin of approach slab at Begin Bridge to end of approach slab at End Bridge, unless otherwise shown in the plans.

**PAYMENT:**

Payment will be made under Fencing, Type R (Pedestrian Overpass). Payment includes posts, horizontal and expansion rails, brace bands, rail ends, combination rail ends, boulevard clamps, chain link fabric, ties, tension bars and bands, post and loop caps, base plates, anchor rods, bolts, nuts, washers, shim plates, neoprene pads, miscellaneous fence fittings and hardware and all incidental materials and labor required to complete installation of the fence.

**CROSS REFERENCE:**

For Table of Fence Components and Pull Post Assembly Detail see Drawing 2 of 3.  
For Table of Post Attachment Components and Detail "A" see Drawing 3 of 3.

BRIDGE NO. XXXXXX

REVISIONS				NAMES		DATES		ENGINEER OF RECORD			SHEET TITLE	
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	ROAD NO.	COUNTY	FINANCIAL PROJECT ID	BRIDGE FENCING (CURVED TOP) INDEX NO. 9031 (DRAWING 1 OF 3)	
01-31-05	SDO	Standard Drawing Issue Date									PROJECT NAME	
											SHEET NO.	

DRAWN BY	LSM	7-03
CHECKED BY	AVP	7-03
DESIGNED BY	GEH	7-03
CHECKED BY	LSM	7-03
APPROVED BY	DAO	

**STRUCTURES DESIGN OFFICE**  
CENTRAL OFFICE  
605 Suwannee Street, MS 33  
Tallahassee, Florida 32399-0450

FLORIDA DEPARTMENT OF TRANSPORTATION		
ROAD NO.	COUNTY	FINANCIAL PROJECT ID

PROJECT NAME		SHEET NO.
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