

# STANDARD SYMBOLS FOR PLAN SHEETS

## GENERAL SYMBOLS

<p>--- State Line</p> <p>----- County Line</p> <p>----- Township Line</p> <p>----- Section Line</p> <p>////// City Line</p> <p>----- Base Or Survey Line</p> <p>----- Right-Of-Way</p> <p>----- Easement Line</p> <p>---/---/--- Limited Access Line</p> <p>---x---x--- Fence Line</p> <p>..... National Or State Park Or Forest</p> <p>..... Grant Line</p> <p>+++++ Railroad (Drainage Maps)</p> <p>==== Railroad (Detail Plans)</p> <p>..... Fence (Limited Access)</p> <p>--- --- --- Box Culvert</p> <p>--- --- --- Bridge</p> <p>--- --- --- Pipe Culvert-Mitered End Section</p> <p>--- --- --- Pipe Culvert-Straight Endwall</p> <p>--- --- --- Pipe Culvert-U-Type Endwall</p> <p>--- --- --- Pipe Culvert-Median Drain</p> <p>--- --- --- Pipe Culvert-Other End Treatments</p> <p>---18" SD--- Storm Drain (Proposed)</p> <p>---18" SD--- Storm Drain (Existing)</p> <p>--- Inlet</p> <p>--- Manhole</p> <p>--- Tied Longitudinal Joint</p> <p>--- Keyed Longitudinal Joint</p> <p>--- Doweled Transverse Expansion Joint</p> <p>--- Doweled Transverse Contraction Joint</p> <p>--- Transverse Contraction Joint Without Dowels</p> <p>--- Survey Reference Point</p> <p>△ ALACHUA Triangulation Station</p> <p>⋈ B.M. NO. 112 Bench Mark</p> <p>△ Point Of Intersection</p> <p>↑ North Arrow</p> <p>--- TYP. --- PAV. --- WALK --- Edges Of Existing Pavement And Sidewalk</p> <p>--- Guardrail</p> <p>--- c.c. --- Crash Cushion (Attenuator)</p> <p>--- Piling Pier Column</p> <p>--- Concrete Monument</p> <p>--- Base Line</p> <p>--- Centerline</p> <p>--- Flow Line</p> <p>--- Property Line</p> <p>△ Delta Angle</p> <p>± Approximate</p> <p>∅ Round Or Diameter</p>	<p>==== Curb</p> <p>==== Curb And Gutter</p> <p>⊕ ⊙ Water Well, Spring</p> <p>      Levee</p> <p>◇ MP 327 Railroad Mile Post</p> <p>⚡ Railroad Signal With Gate</p> <p>⚡ Railroad Switch</p> <p>---x--- Gate</p> <p>○ Pump Island</p> <p>○ Storage Tank (Surface)</p> <p>○ Storage Tank (Underground)</p> <p>⊠ Mine Or Quarry</p> <p>⊠ B. P. Borrow Pit</p> <p>⊠ Church</p> <p>⊠ S Store</p> <p>⊠ RES Residence</p> <p>⊠ B Barn</p> <p>⊠ School</p> <p>○ Synthetic Bales</p> <p>--- Sediment Barrier</p> <p>--- Floating Turbidity Barrier</p> <p>--- Staked Turbidity Barrier</p> <p>--- Stream</p> <p>--- Shore Line</p> <p>--- Marsh</p> <p>--- Wetland Boundary (Proposed)</p> <p>--- Wetland Boundary (Existing)</p> <p>--- Hedge</p> <p>--- Trees</p> <p>--- Edge Of Wooded Area</p> <p>--- Shrubbery</p> <p>--- Grove Or Orchard</p> <p>--- Definition Of Skew For Cross Drains And Barrels Of Concrete Box Culverts</p> <p>--- Rt. --- Skew Lt. ---</p> <p>--- Concrete</p> <p>--- Wood</p> <p>e Rate Of Superelevation</p>
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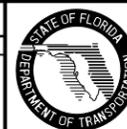
## UTILITY ADJUSTMENT SYMBOLS

	EXISTING	PROPOSED		EXISTING	PROPOSED
			Manhole	W - - - - 6" W - - - -	W W W W W W 6" W W W W W W
			Fire Hydrant	NPW - - - 6" NPW - - -	NPW NPW 6" NPW NPW
			Meter (Type)	S - - - - 8" S - - - -	S S S S S S 8" S S S S S S
			Valve (Type)	G - - - - 6" G - - - -	G G G G G G 6" G G G G G G
			Valve Box (Type)	RD - - - - 4" RD - - - -	RD RD RD 4" RD RD RD
			Valve Cover (Type)	PET - - - 8" PET - - -	PET PET 8" PET PET
			Vent (Type)	STM - - - 12" STM - - -	STM STM 12" STM STM
			Pump Station	CAS - - - 12" CAS - - -	CAS CAS 12" CAS CAS
			Sewage Pump Station	DT - - - 4"x4" DT - - -	DT DT 4"x4" DT DT
			Cleanout	BE - - (7.5 kV) BE - -	BE BE (7.5 kV) BE BE
			Cable TV Service Box	OE - - (7.5 kV) OE - -	OE OE (7.5 kV) OE OE
			Power Pole	BTV - - - 3" BTV - - -	BTV BTV 3" BTV BTV
			Telephone Pole	OTV - - - 2" OTV - - -	OTV OTV 2" OTV OTV
			Combination Pole	BT - - - - 2" BT - - - -	BT BT BT 2" BT BT BT
			Guy Wire And Anchor Pin	OT - - - - 2" OT - - - -	OT OT OT 2" OT OT OT
			Guy Pole Deadman	BFO - - - 2" BFO - - -	BFO BFO 2" BFO BFO
			Tower	OFO - - - -1" OFO - - -	OFO OFO 1" OFO OFO
			Light Pole		
			Transformer		

See General Note, Sheet 1 of 3

### REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
05/04/10	MTP	Rotated Linetypes. Changed the "Silt Fence" to "Sediment Barrier."			



2010 Interim Design Standard

**STANDARD SYMBOLS**

Interim Date 07/01/10	Sheet No. 2 of 3
Index No. <b>002</b>	

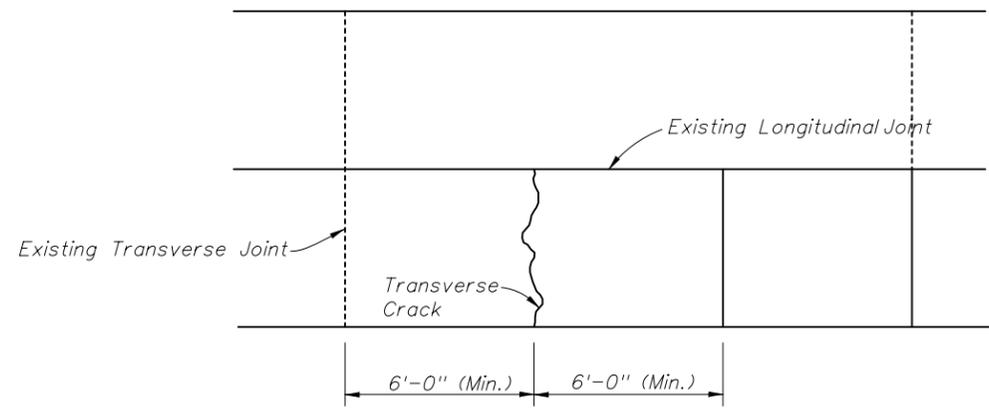


FIGURE 10.2 - REPAIR METHOD: NONE OR CLEAN AND SEAL

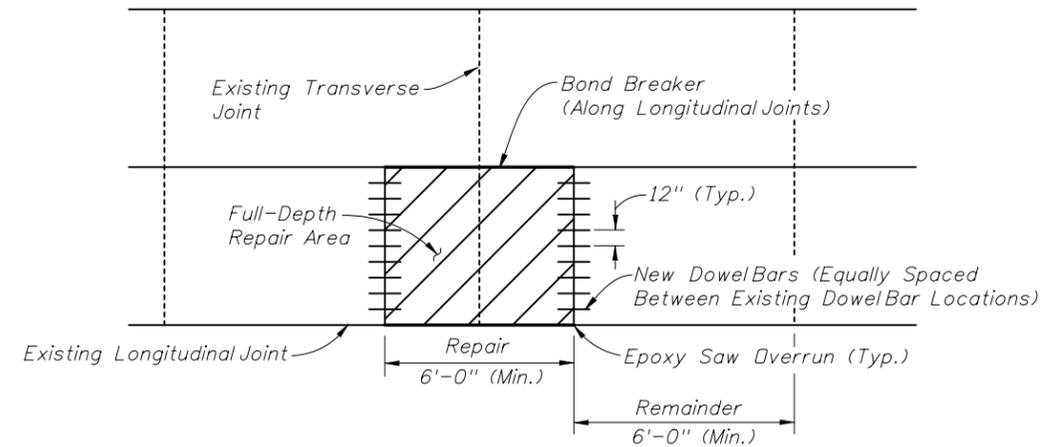


FIGURE 10.5 - FULL-DEPTH REPAIR ON BOTH SIDES OF THE JOINT

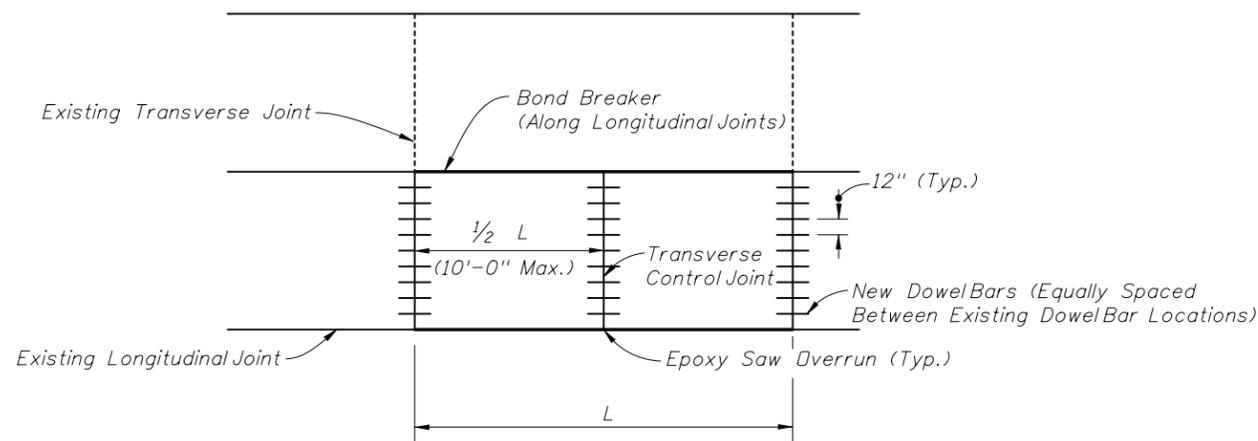


FIGURE 10.3 - FULL SLAB FULL DEPTH REPLACEMENT

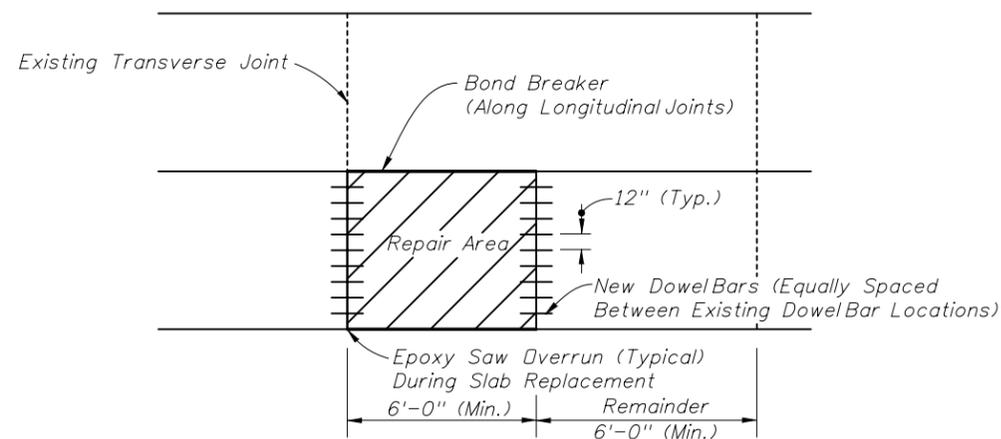


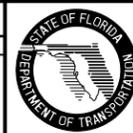
FIGURE 10.4 - PARTIAL SLAB FULL DEPTH REPLACEMENT

GENERAL NOTES

1. For Repair and Replacement Criteria see Sheet 2 of 2.
2. Full depth repairs consist of removing and replacing at least a portion of the existing slab to the bottom of the concrete.
3. Repair boundaries shall be sawed full-depth with diamond saw blades. On hot days, it may not be possible to make this cut without first making a wide, pressure relief cut within the repair boundaries. A carbide-tipped wheelsaw may be used for this purpose, but the wheelsaw must not intrude on the adjacent lane, unless the lane is slated for repair. The wheelsaw cuts produce a ragged edge that promotes excessive spalling along joints. Hence, if wheelsaw cuts are made, diamond saw cuts must be made 18 in. outside the wheelsaw cuts. To prevent damage to the base, the wheelsaw must not be allowed to penetrate more than 0.5 in. into the base.
4. No additional base or subgrade material shall be added and all loose base or subgrade material shall be removed prior to placement of the new concrete slab. The concrete slab shall be placed to the full depth of the material removed. No additional compensation will be allowed for additional concrete required to bring proposed concrete slab up to finished grade.
5. Removal of the damaged concrete pavement shall be by lifting. Any good concrete pavement which is damaged during removal of damaged areas shall be removed and replaced by the contractor at his expense.
6. If the roadway contract includes grinding, then the slab replacement shall be performed first.
7. During slab replacement operations, fill any saw cut over runs into adjacent slabs with epoxy.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	EU	From FIGURE 10.4-PARTIAL SLAB FULL DEPTH REPLACEMENT, deleted Saw Cut Existing Tie Bars from leader note.			



2010 Interim Design Standard

CONCRETE SLAB REPLACEMENT

Interim Date  
07/01/10  
Sheet No.  
1 of 2  
Index No.  
308

**SLAB REPAIR AND REPLACEMENT CRITERIA**

DISTRESS PATTERN	SEVERITY/DESCRIPTION		REPAIR METHOD	REFERENCE
<b>CRACKING</b>				
Longitudinal	Light	<1/8", no faulting, spalling <1/2" wide	None	Figure 10.2
	Moderate	1/8" <width <1/2", spalling <3" wide	Clean and Seal	Figure 10.2
	Severe	width >1/2", spalling >3" faulting >1/2"	Replace	Figure 10.3
Transverse	Light	<1/8", no faulting, spalling <1/2" wide	None	Figure 10.2
	Moderate	1/8" <width <1/2", spalling <3" wide	Clean and Seal	
	Severe	width >1/2", spalling >3" faulting >1/2"	Replace	Figure 10.3, 10.4 and 10.5
Corner Breaks	A corner of the slab is separated by a crack that intersects the adjacent longitudinal and transverse joint, describing an approximate 45° angle with the direction of traffic.		Full Depth	Figure 10.4 and 10.5
Intersecting Random Cracks (Shattered Slab)	Cracking patterns that divide the slab into three or more segments.		Full Depth	Figure 10.3 and 10.4
<b>JOINT DEFICIENCIES</b>				
Spall Nonwheel Path	Light	spall width <1 1/2", < 1/3 slab depth, <12" in length	None	Figure 10.4 and 10.5
	Moderate	1 1/2" <spall width <3", < 1/3 slab depth, <12" in length	None	Figure 10.4 and 10.5
	Severe	spall width >3" or length >12"	Full Depth	Figure 10.4 and 10.5
Spall Wheel Path	Light	spall width <1 1/2", <than 1/3 slab depth, <12" in length	None	Figure 10.4 and 10.5
	Moderate	1 1/2" <spall width <3", < 1/3 slab depth, <12" in length	Full Depth	Figure 10.4 and 10.5
	Severe	spall width >3" or length >12"	Full Depth	Figure 10.4 and 10.5
<b>SURFACE DETERIORATION</b>				
Pop Outs Nonwheel Path	Small pieces of surface pavement broken loose, normally ranging from 1 to 4 in. diameter and 1/2 to 2 in. in depth.			
	Light	Not deemed to be a traffic hazard	Keep under observation	
	Severe	Flying debris deemed a traffic hazard	Full Depth	Figure 10.4
Pop Outs Wheel Path	Small pieces of surface pavement broken loose, normally >3" diameter and 2" in depth.			
	Light	Deemed to be a traffic hazard	Full Depth	Figure 10.4
	Severe	Flying debris deemed a traffic hazard	Full Depth	Figure 10.4
<b>MISCELLANEOUS DISTRESS</b>				
Faulting	Elevation differences across joints or cracks.			
	Light	Faulting <4/32"	None	
	Moderate	4 <Faulting <16/32"	Grind	
	Severe	Faulting >16/32"	Grind	
Lane To Shoulder Drop-Off	Light	0 <drop-off <1"	None	N/A
	Moderate	1" <drop-off <3"	Build Up	
	Severe	drop-off >3 "	Build Up	
Water Bleeding Or Pumping	Seeping or ejection of water through joints or cracks.		Install appropriate drainage, edge drain, permeable subbase, reseal joints, etc.	N/A
Blowups	Upward movement at transverse joints or cracks often accompanied by shattering of the concrete.		Full Depth	Figure 10.3 and 10.4

**REVISIONS**

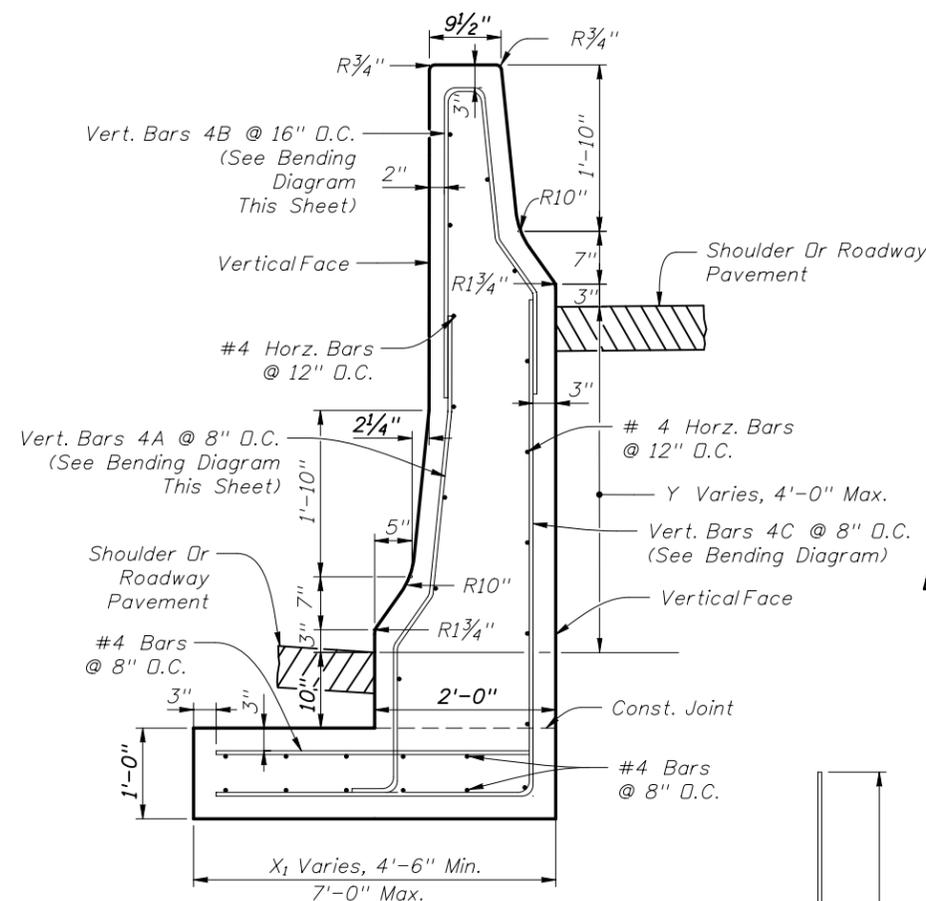
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	EU	In the JOINT DEFICIENCIES, both Spall Nonwheel Path and Spall Wheel Path, Moderate added < in front of the 1/3 slab depth.			



2010 Interim Design Standard

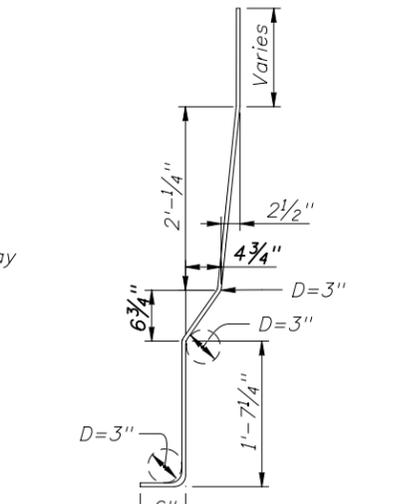
**CONCRETE SLAB REPLACEMENT**

Interim Date	Sheet No.
07/01/10	2 of 2
Index No.	
308	

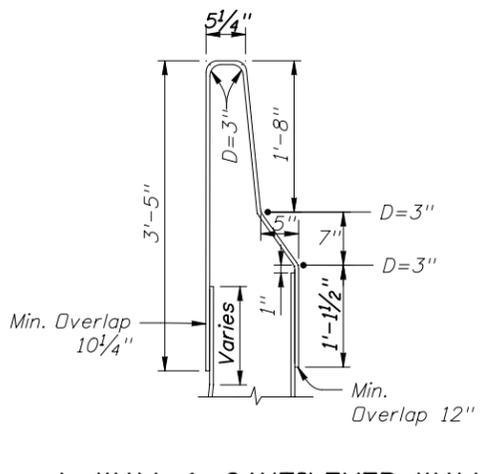


**L-WALL SUPERELEVATED SECTION**

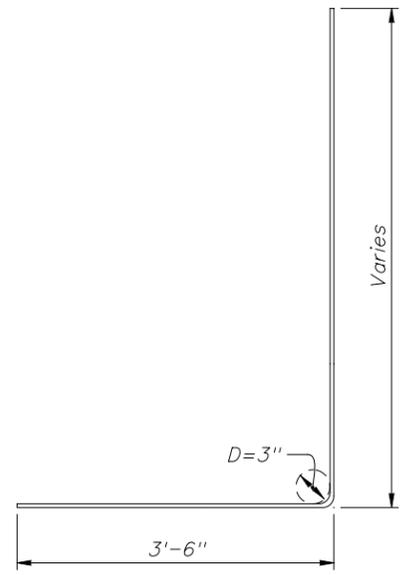
**Design Criteria:**  
 NCHRP report 350 Test Level (TL-4) Vehicle: 8000S, 50 mph, 25°, Avg. Lat. Impact.  
 Vehicle force: 54 kips Horiz.; 18 kips Vert. at 32" above pavement.  
 Unless the plans stipulate a specific wall type, either the cantilever wall or the "L" wall may be constructed at the Contractor's option.  
 Cost of the footing to be included in the contract unit price for Median Concrete Barrier Wall, LF.



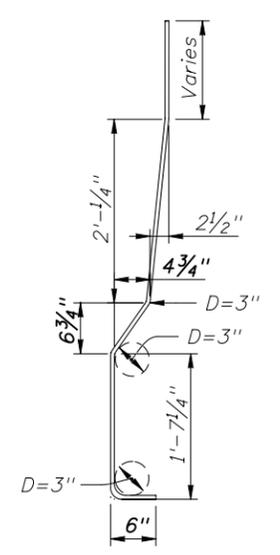
**L-WALL BAR 4A BENDING DIAGRAM**



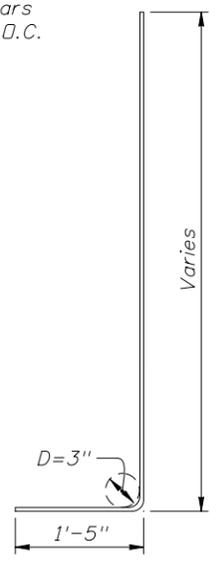
**L-WALL & CANTILEVER WALL BAR 4B BENDING DIAGRAM**



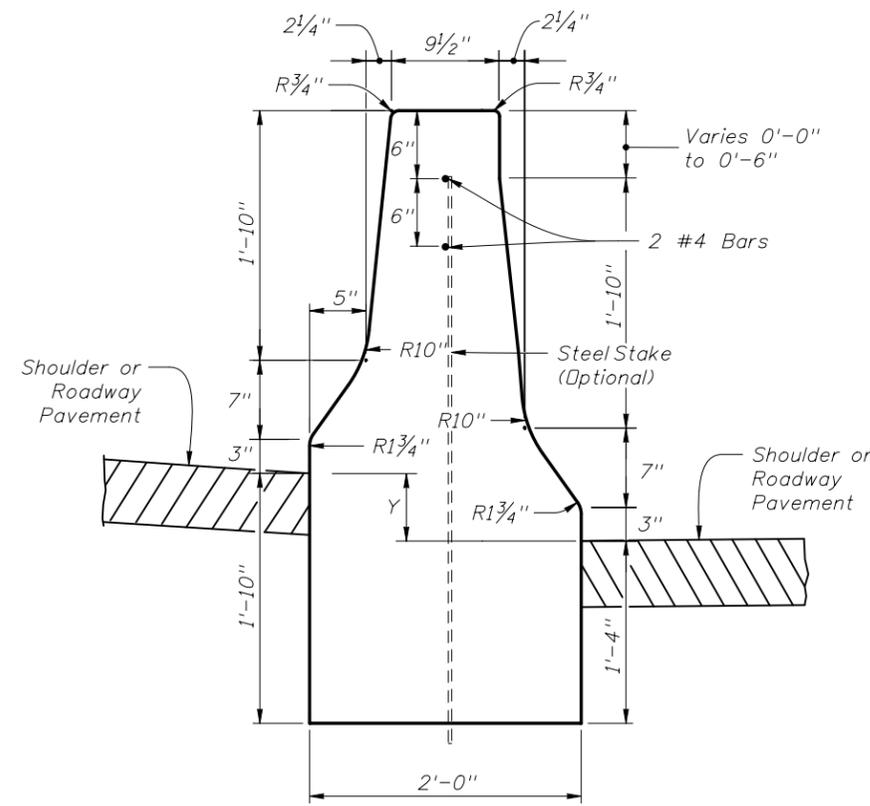
**L-WALL BAR 4C BENDING DIAGRAM**



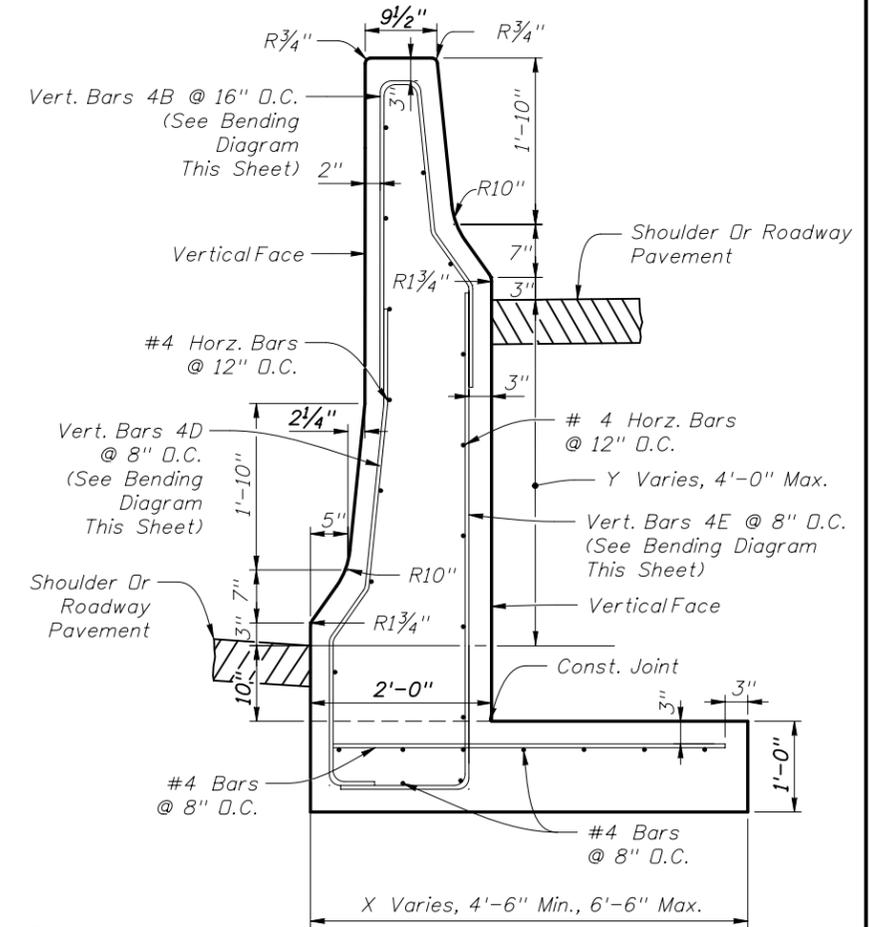
**CANTILEVER WALL BAR 4D BENDING DIAGRAM**



**CANTILEVER WALL BAR 4E BENDING DIAGRAM**



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



**CANTILEVER WALL SUPERELEVATED SECTION**

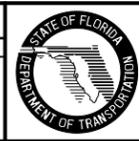
"L" Wall	Height Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
	Width X <sub>1</sub>	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-6"	7'-0"
	Min. Segment Wall Length	46'	44'	42'	41'	39'	36'	33'

Cantilever Wall	Height Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
	Width X	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-3"	6'-6"
	Min. Segment Wall Length	39'	35'	32'	29'	26'	24'	22'

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

**REVISIONS**

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	MTP	Changed: A portion of the face that varies from 0-6" to a vertical segment on the F-Shape Median Barrier.			

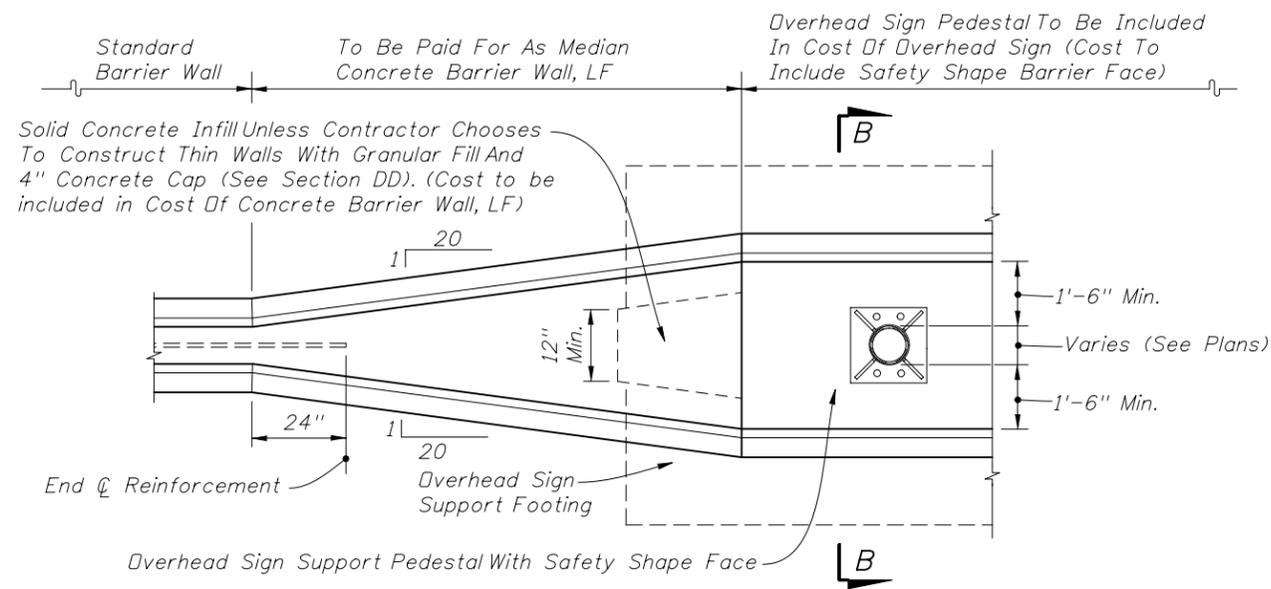


2010 Interim Design Standard

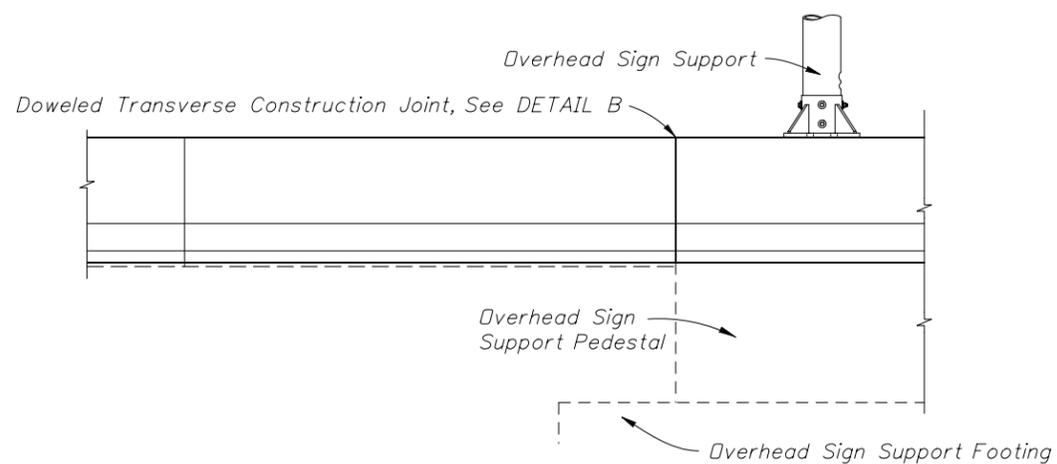
**CONCRETE BARRIER WALL**

Interim Date: 07/01/10  
 Sheet No.: 3 of 25

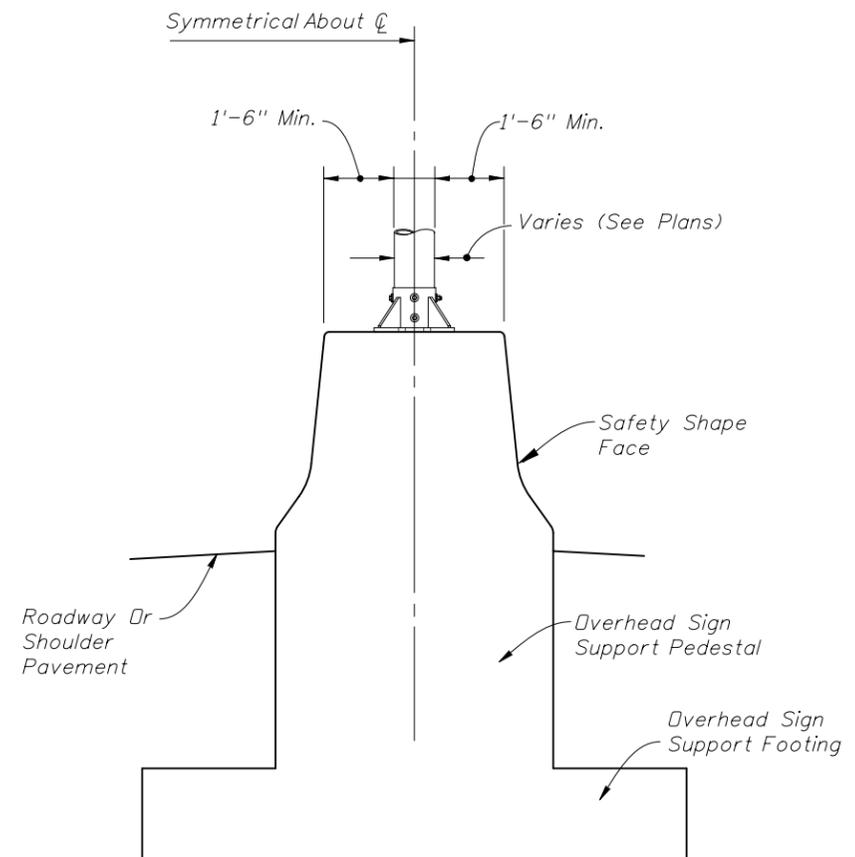
Index No.: 410



PLAN



ELEVATION

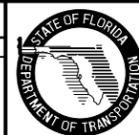


SECTION BB

CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT OVERHEAD SIGN SUPPORTS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	MTP	Deleted: Section CC & DD, along with the Plan and Elevation views for the Independent Barrier and Sign Pedestal			



2010 Interim Design Standard

CONCRETE BARRIER WALL

Interim Date

07/01/10

Sheet No.

5 of 25

Index No.

410

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

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

**FABRICATION NOTES:**

**FABRICATOR PREQUALIFICATION:** The Barrier Units shall be made in a prestressed concrete plant that meets the requirements of Specification Section 450 or in a precast plant meeting the requirements of Specification Section 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 2<sup>3</sup>/<sub>4</sub>" diameter pin must be used for the 180 degree bend test. After fabrication, all or part of Bars 6D shall be hot dip galvanized in accordance with Specification Section 962 or coated with a cold galvanizing compound in accordance with Specification Section 975. The minimum limit of galvanizing or coating is shown in the Bending Diagrams. At the Fabricator's option, the entire length of Bars 6D may be galvanized or coated. Install Bars 6D within 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 Sheet 2 may be utilized in lieu of Bars 4A and 5B.

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

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

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

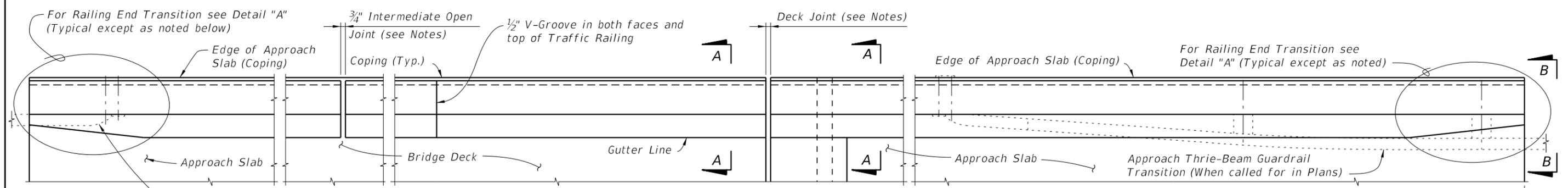
**MARKING:** Permanently mark the top left end of each Barrier Unit by the use of an embedded and anchored metallic plate with letters and figures a minimum of 0.5" tall. Ink stamps are not allowed. Permanently mark with the following information:

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

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

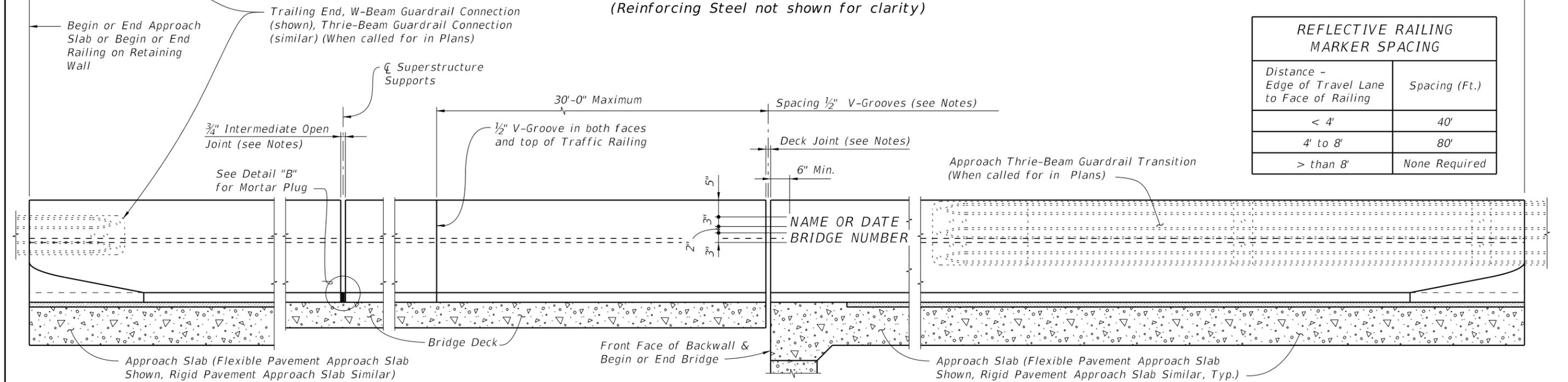
**ALTERNATE DESIGN:** Manufacturers seeking approval of proprietary concrete or steel barrier systems for inclusion on the Qualified Products List as pre-approved alternate designs must submit application along with design documentation showing the barrier system is crash tested to NCHRP Report 350 Test Level 3 criteria or MASH 2009 Test Level 3 criteria, is accepted by FHWA for use as a temporary concrete or steel 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							2010 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			07/01/10	1 of 15
07/01/10	SJN	Added MASH 2009 to ALTERNATE DESIGN note.				<b>TYPE K TEMPORARY CONCRETE BARRIER SYSTEM</b>	Index No.		
							414		



**PLAN**  
(Reinforcing Steel not shown for clarity)

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



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

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

**TRAFFIC RAILING NOTES**

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

- CONCRETE AND REINFORCING STEEL :** See Structures Plans General Notes.
- MARKERS :** Elevation Markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing. The Department will determine the vertical Datum information for the marker.
- GUARDRAIL :** For Guardrail connection details see Index Nos. 400 and 410.
- SUPERELEVATED BRIDGES :** At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. If an adjoining railing is constructed plumb, transition the end of the Traffic Railing from perpendicular to plumb over a minimum distance of 20'-0". The cost of all modifications will be at the Contractor's expense.
- PEDESTRIAN AND BICYCLE RAILING :** See Index Nos. 821 and 822 for Notes, Details and post spacings for Traffic Railings with Aluminum Pedestrian /Bicycle Bullet Railings.
- V-GROOVES :** Construct 1/2" V-Grooves plumb. Space V-Grooves equally between 3/4" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

- NAME, DATE AND BRIDGE NUMBER :** The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.
- REFLECTIVE RAILING MARKERS :** Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.
- JOINTS :** See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490.  
Provide 3/4" Intermediate Open Joints at :  
(1) - Superstructure supports where slab is continuous.  
(2) - Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

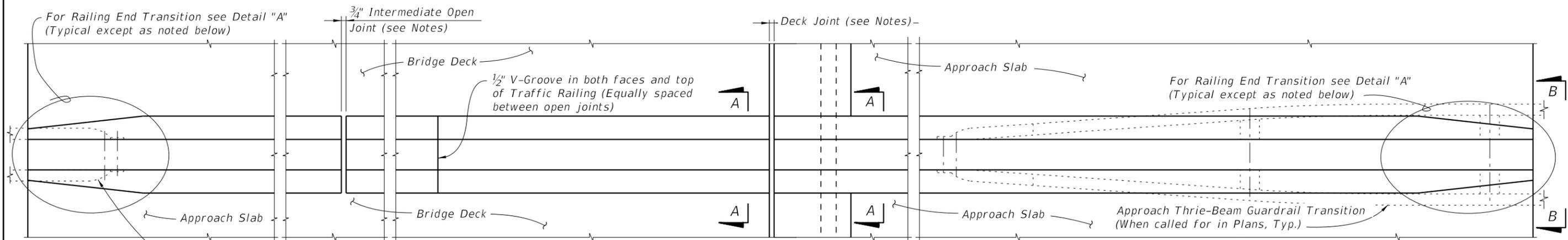
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed MARKERS and Joints notes.			



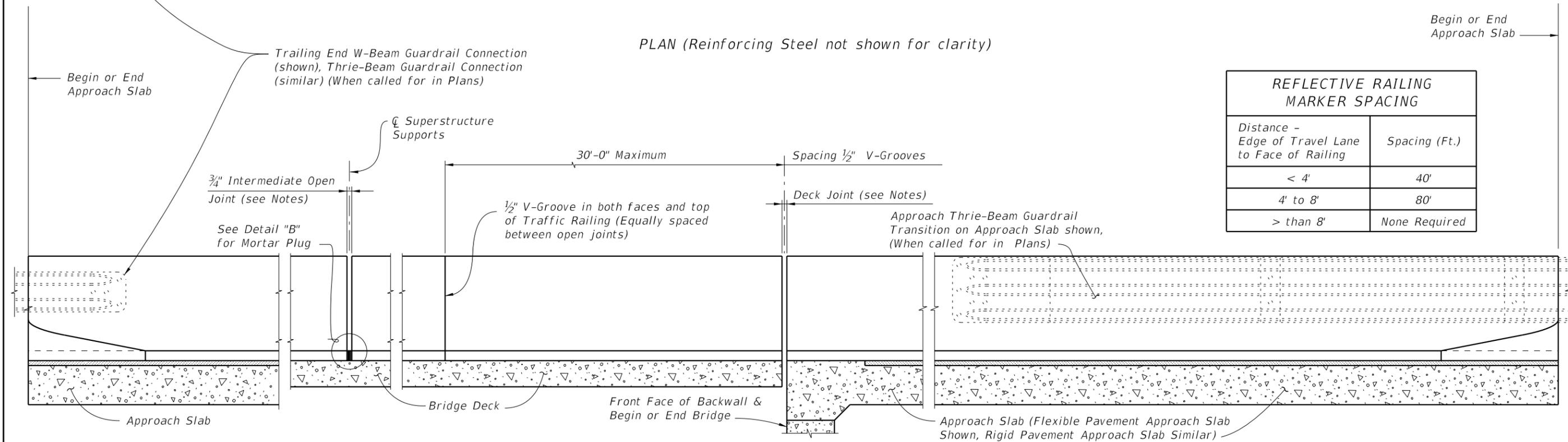
2010 Interim Design Standard

**TRAFFIC RAILING - (32" F SHAPE)**

Interim Date	Sheet No.
07/01/10	1 of 3
Index No.	
<b>420</b>	



PLAN (Reinforcing Steel not shown for clarity)



ELEVATION  
(Reinforcing Steel not shown for clarity)

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

TRAFFIC RAILING NOTES

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

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

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

SUPERELEVATED BRIDGES : At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. The cost of all modifications will be at the Contractor's expense.

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

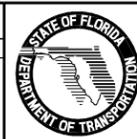
JOINTS : See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490.

Provide 3/4" Intermediate Open Joints at :  
(1) - Superstructure supports where slab is continuous.

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

For Detail "B" see Sheet 3.

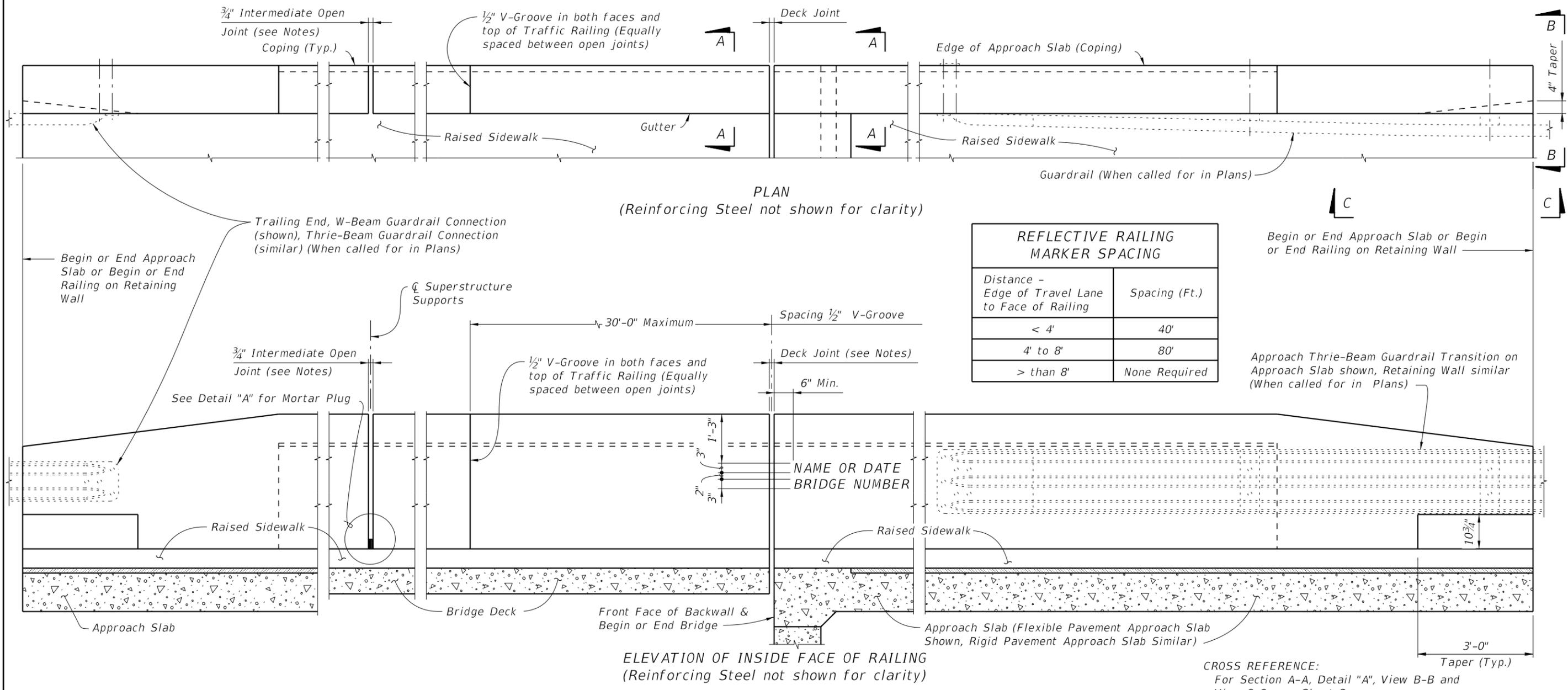
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed Joints note.			



2010 Interim Design Standard

TRAFFIC RAILING - (MEDIAN 32" F SHAPE)

Interim Date	Sheet No.
07/01/10	1 of 3
Index No.	
421	



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

**TRAFFIC RAILING NOTES**

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

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

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

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

**RAILINGS ON RETAINING WALLS :** If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Index No. 422, Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the 3/4" open joints and 1/2" V-Groove shall apply.

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

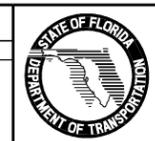
**V-GROOVES :** Construct 1/2" V-Grooves plumb and provide at 30'-0" maximum intervals as shown. Space V-Grooves equally between 3/4" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

**NAME, DATE, AND BRIDGE NUMBER :** The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

**JOINTS :** See Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490.

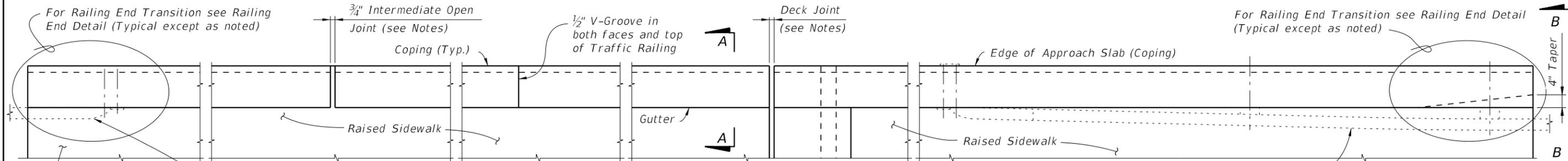
- Provide 3/4" Intermediate Open Joints at :
- (1) - Superstructure supports where slab is continuous.
  - (2) - Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed MARKERS and JOINTS notes.			



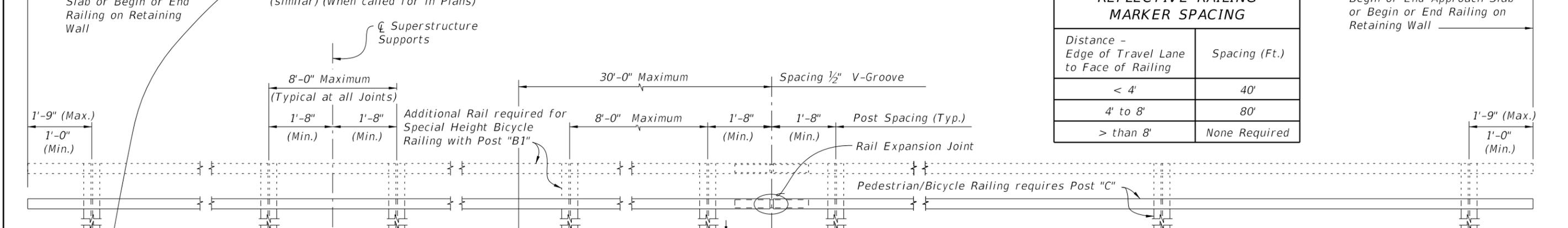
2010 Interim Design Standard  
**TRAFFIC RAILING - (42" VERTICAL SHAPE)**

Interim Date: 07/01/10  
 Sheet No.: 1 of 3  
 Index No.: 422



**PLAN**  
(Rails, Posts and Reinforcing Steel not shown for clarity)

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



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

**TRAFFIC RAILING NOTES**

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

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

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

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

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

**V-GROOVES :** Construct 1/2" V-Grooves plumb. Space V-Grooves equally between 3/4" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

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

**RAILINGS ON RETAINING WALLS :** If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the 3/4" open joints and 1/2" V-Groove shall apply.

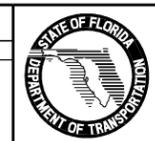
**NAME, DATE, AND BRIDGE NUMBER :** The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes of the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

**OPEN JOINTS :** See Structures Plans, Superstructure, Approach Slab Sheets and Retaining Walls for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490.

- Provide 3/4" Intermediate Open Joints at :
- (1) - Superstructure supports where slab is continuous.
  - (2) - Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

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

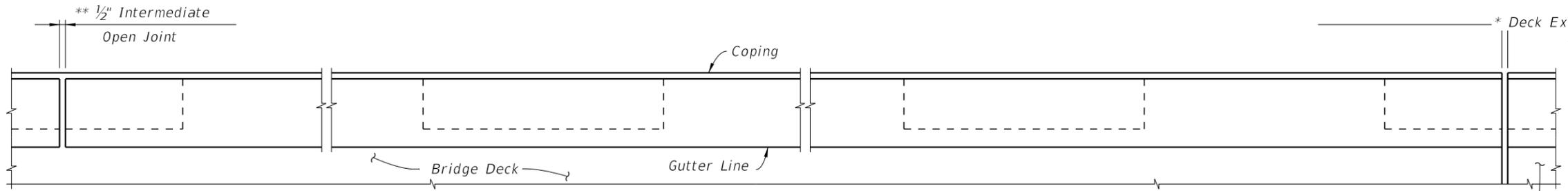
REVISIONS			
DATE	BY	DESCRIPTION	
07/01/10	GJM	Changed MARKERS and JOINTS notes.	



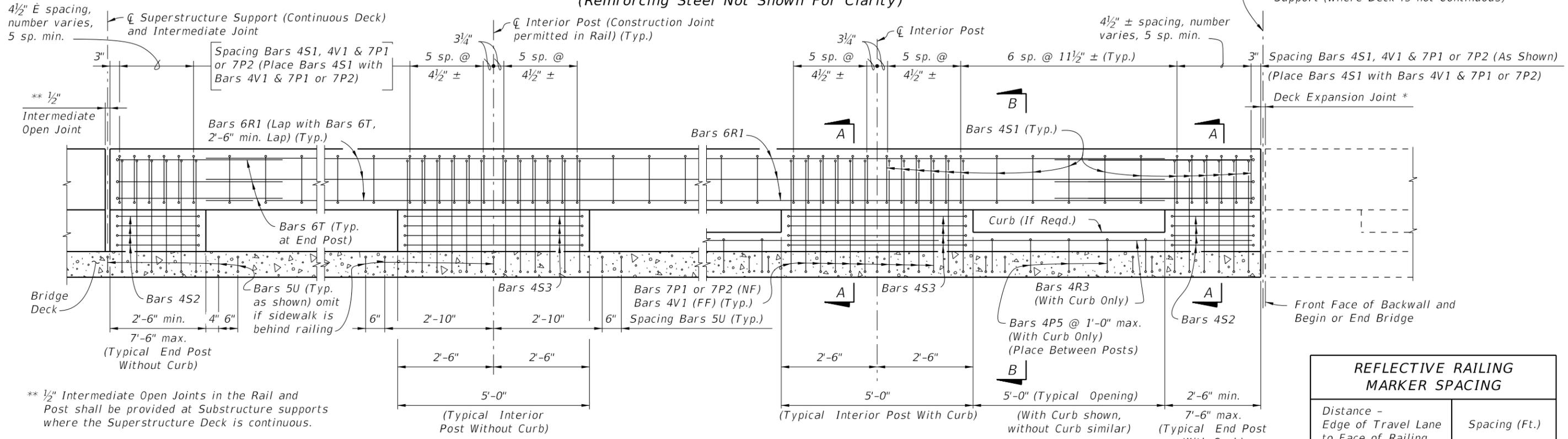
2010 Interim Design Standard

**TRAFFIC RAILING - (32" VERTICAL SHAPE)**

Interim Date: 07/01/10  
Sheet No.: 1 of 3  
Index No.: 423



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)

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

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

**TRAFFIC RAILING NOTES**

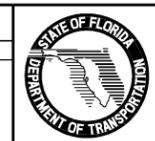
This railing has been structurally evaluated to be equivalent or greater in strength to other railings which have been crash tested to NCHRP Report 350 TL-4 Criteria.

**CONCRETE AND REINFORCING STEEL :** See Structures Plans General Notes.  
**AGGREGATE LIMITATION:** The aggregate used in the concrete mix shall be a #67 aggregate.  
**MARKERS :** Elevation markers shall be placed on top of the Traffic Railing at the end bents. On bridges longer than 100 ft. one marker shall be placed at each end of the bridge. On bridges 100 ft. or less one marker shall be placed at one end of the bridge only. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The cost of installing the markers shall be included in the Contract Unit Price for the Traffic Railing. The Department will determine the vertical Datum information for the marker.  
**GUARDRAIL :** For Guardrail connection details see Index No. 400.  
**SUPERELEVATED BRIDGES :** At the option of the Contractor the Traffic Railing on superelevated bridges may be constructed perpendicular to the roadway surface. The cost of all modifications will be at the Contractor's expense.

**RETAINING WALL :** If the Traffic Railing Barrier is to be provided on a retaining wall, the railing sections will be the same as on Sheets 3 and 4. See Retaining Wall Plans for payment.  
**NAME, DATE AND BRIDGE NUMBER :** The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be placed on the driver's left side when approaching the bridge. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.  
**REFLECTIVE RAILING MARKERS :** Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table above. Reflector color (white or yellow) shall match the color of the near edgeline. The cost of the reflective markers shall be included in the Contract Unit Price for the Traffic Railing.

NOTES:  
(NF) means Near Face, (FF) means Far Face.  
**CROSS REFERENCES:**  
 For Sections see Sheets 3 and 4.  
 For Quantities and Quantity Breakdown see Sheet 5.

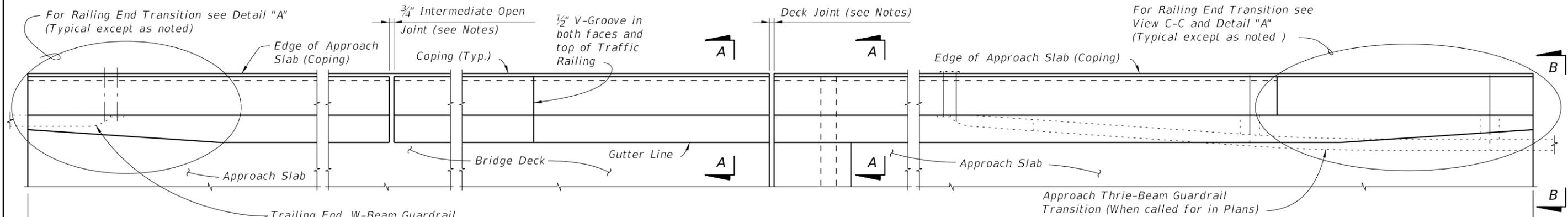
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed MARKERS note.			



2010 Interim Design Standard

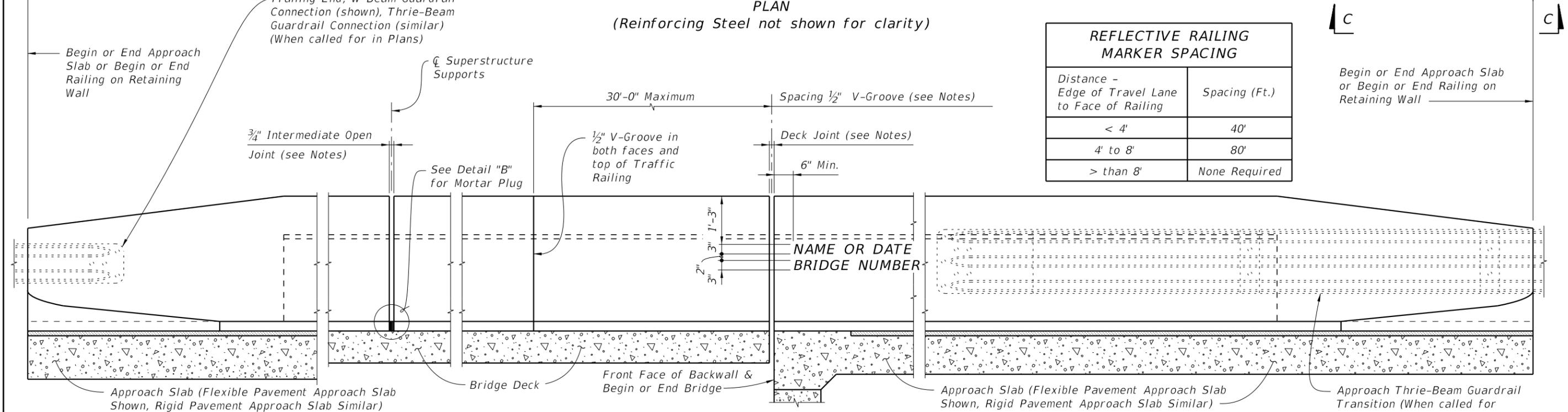
**TRAFFIC RAILING - (CORRAL SHAPE)**

Interim Date	Sheet No.
07/01/10	1 of 7
Index No.	
424	



**PLAN**  
(Reinforcing Steel not shown for clarity)

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



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

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

**TRAFFIC RAILING NOTES**

This railing has been structurally evaluated to be equivalent or greater in strength to other safety shape railings which have been crash tested to NCHRP Report 350 TL-5 Criteria.

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

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

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

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

**RAILINGS ON RETAINING WALLS :** If the Traffic Railing is to be provided on a retaining wall, the railing section will be the same as shown on Sheet 2. All other details such as the guardrail transition attachment, the maximum spacing of the 3/4" open joints and 1/2" V-groove shall apply.

**V-GROOVES :** Construct 1/2" V-Grooves plumb,. Space V-Grooves equally between 3/4" Open Joints and/or Deck Joints and at V-Groove locations on Retaining Wall footings.

**NAME, DATE, AND BRIDGE NUMBER :** The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Name shall be as shown in the General Notes in the Structures Plans. The Date shall be the year the bridge is completed. For a widening when the existing railing is removed, use both the existing date and the year of the widening. Black plastic letters and figures 3" in height may be used, as approved by the Engineer, in lieu of the letters and figures formed by 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

**JOINTS :** See Structures Plans, Superstructure, Approach Slab and Retaining Walls Sheets for actual dimensions and joint orientation. Provide open Railing Joints at Deck Expansion Joint locations matching the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490.

Provide 3/4" Intermediate Open Joints shall be provided at :  
 (1) - Superstructure supports where slab is continuous.  
 (2) - Ends of approach slabs when adjacent to retaining walls and at expansion joints on retaining wall junction slabs.

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

**TRAFFIC RAILING NOTES**

*This Traffic Railing Retrofit has been structurally evaluated to be equivalent or greater in strength to a design which has been successfully crash tested in accordance with NCHRP Report 350 TL-4 criteria.*

**CONCRETE:** Concrete for Transition Blocks and Curbs shall be Class II (Bridge Deck).

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

**THRIE-BEAM GUARDRAIL:** Steel Thrie-Beam Elements shall meet the requirements for Class B (10 Gauge) Guardrail of AASHTO M 180, Type II (Zinc coated). The minimum panel length for Thrie-Beam Elements shall be 12'-6". Field drilled holes for Post connections shall be 3/4" by 2 1/2" slotted holes.

**GUARDRAIL BOLTS:** Guardrail bolts, nuts and washers shall be in accordance with AASHTO M180.

**GUARDRAIL POSTS AND BASE PLATES:** Posts and Base Plates shall be in accordance with ASTM A36 or ASTM A709 Grade 36.

**ANCHOR BOLTS, NUTS AND WASHERS:** Adhesive-Bonded Anchors and Anchor Bolts shall be fully threaded rods in accordance with ASTM F1554 Grade 105 or ASTM A193 Grade B7. At the Contractor's option, Anchor Bolts for through bolting may be in accordance with ASTM 449. All Nuts shall be single self-locking hex nuts and in accordance with ASTM A563 or ASTM A194. Flat Washers shall be in accordance with ASTM F436 and Plate Washers (for long slotted holes only) shall be in accordance with ASTM A36 or ASTM A709 Grade 36. After the nuts have been snug tightened, the anchor bolt threads shall be distorted to prevent removal of the nuts. Distorted threads and the exposed trimmed ends of anchors shall be coated with a galvanizing compound in accordance with the Specifications.

**COATINGS:** All Nuts, Bolts, Anchors, Washers, Guardrail Posts, Anchor Plates and Base Plates shall be hot-dip galvanized in accordance with the Specifications. Guardrail Post Assemblies shall be hot-dip galvanized after fabrication.

**ADHESIVE-BONDED ANCHORS AND DOWELS:** Adhesive Bonding Material Systems for Anchors and Dowels shall comply with Specification Section 937 and be installed in accordance with Specification Section 416. The field testing proof loads required by Specification Section 416 shall be 15,000 lbs. for 7/8" Ø anchor bolts; 55,000 lbs. for the 1 1/4" anchor bolts with 13" embedment; and 30,500 lbs. for the 1 1/4" Ø anchor bolts with 5" embedment.

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

**POST SPACING:** Posts shall be located along the length of the bridge at typical 6'-3" or 3'-1 1/2" spaces. Utilize the Modified Post Spacing at Intermediate Deck Joints Details as required to clear deck joints. Establish post spacing along the bridge and Roadway Guardrail Transition beginning with the Key Post. The variable post spacings located near begin and end bridge may be utilized to optimize the typical post spacing. Variable lengths of guardrail overlap are also permitted to optimize the typical post spacing. Symmetry of post spacing is not necessary.

**THRIE-BEAM EXPANSION SECTION:** Thrie-Beam Expansion Sections shall be installed at locations shown in the Plans. Install nuts for splice bolts finger-tight at 2 1/2" slots in thrie beam expansion sections. Nuts shall fully engage bolts with a minimum of one bolt thread extending beyond the nuts. Distort the first thread on the outside of the nut to prevent loosening. Tighten guardrail bolts in 3 3/4" slots at guardrail post(s) that lie between the slotted expansion splice and bridge deck joint so that the bolt heads are in full contact with thrie-beam elements, but not so tight as to impede movement due to expansion.

**NEOPRENE PADS:** Neoprene pads must be plain pads with a durometer hardness of 60 or 70 and meet the requirements of Specification Section 932, except that testing of the finished pad will not be required.

**ELEVATION MARKERS:** Elevation Markers shall be placed on the top surface of the end bents as directed by the Engineer when portions of the existing traffic railing carrying existing elevation markers are removed. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The Department will determine the vertical Datum information for the marker.

**REFLECTIVE RAILING MARKERS:** Reflective Railing Markers shall conform to Section 993 of the Specifications. Install markers at the top of the guardrail posts at the spacings shown in the table below. Reflector color (white or yellow) shall conform to the color of the near edgeline.

**PEDESTRIAN SAFETY PIPE RAIL:** Pedestrian Safety Pipe Rail is required when called for in the Plans. See Index No. 400 for details.

**BRIDGE NAME PLATE:** If a portion of the existing Traffic Railing is to be removed that carries the bridge name, number and or date, or if the installation of the Traffic Railing (Thrie Beam Retrofit) will obscure the bridge name, number and or date, then replace the information that has been removed or obscured, with 3" tall black lettering on white nonreflective sheeting applied to the top of the adjacent guardrail. The information must be clearly visible from the right side of the approaching travel lane. The sheeting and adhesive backing shall comply with Specification Section 994 and may comprise of individual decals of letters and numbers.

**PAYMENT:** Payment will be made under Metal Traffic Railing (Thrie-Beam Retrofit) which shall include all materials and labor required to fabricate and install the barrier and lapped guardrail where necessary to maintain post spacing. The Pedestrian Safety Pipe Rail, Transition Blocks and Curbs, Bridge Name Plate, Reflective Railing Markers and installation of Elevation Markers, where required, will not be paid for directly but shall be considered as incidental work.

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

<b>REVISIONS</b>							2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		<b>TRAFFIC-RAILING (THRIE-BEAM RETROFIT) GENERAL NOTES &amp; DETAILS</b>		07/01/10	1 of 3
07/01/10	GJM	Changed ELEVATION MARKERS Note.							Index No. <b>470</b>	

**TRAFFIC RAILING NOTES**

This Traffic Railing Retrofit has been structurally evaluated to be equivalent or greater in strength to a design which has been successfully crash tested previously and approved for a NCHRP Report 350 Test Level 4 rating, except for the Tapered End Transition on Index No. 484.

**CONCRETE:** Concrete for the Traffic Railing (Vertical Face Retrofit), Spread Footing Approaches and replacement curb sections shall be Class IV. Concrete for Curb Transition Blocks shall be Class II (Bridge Deck).

**REINFORCING STEEL:** Reinforcing steel shall be ASTM A615, Grade 60, except Expansion Dowel Bar B which shall be ASTM A36 smooth round bar hot-dip galvanized in accordance with the Specifications.

**EXPANSION SLEEVE ASSEMBLY:** Pipe sleeve shall be ASTM D2241 PVC pipe, SDR13.5. End Cap shall be ASTM D2466 PVC socket fitting, Schedule 40. End of Sleeve assembly at railing open joint shall be sealed with silicone to prevent concrete intrusion during railing casting. A compressible expanded polystyrene plug is required in the opposite end of the assembly for correct dowel positioning during railing casting. Correct dowel positioning is required in order to provide for thermal movement of the deck.

**ADHESIVE-BONDED ANCHORS AND DOWELS:** Adhesive Bonding Material Systems for Anchors and Dowels shall comply with Specification Section 937 and be installed in accordance with Specification Section 416. The field testing proof loads required by Specification Section 416 shall be 23,800 lbs. for Dowel Bars 6D on the inside face (traffic side) of the railing (1'-0" embedment) and 18,500 lbs for Dowel Bars 6D along the outside face of the traffic railing (5" min. embedment).

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

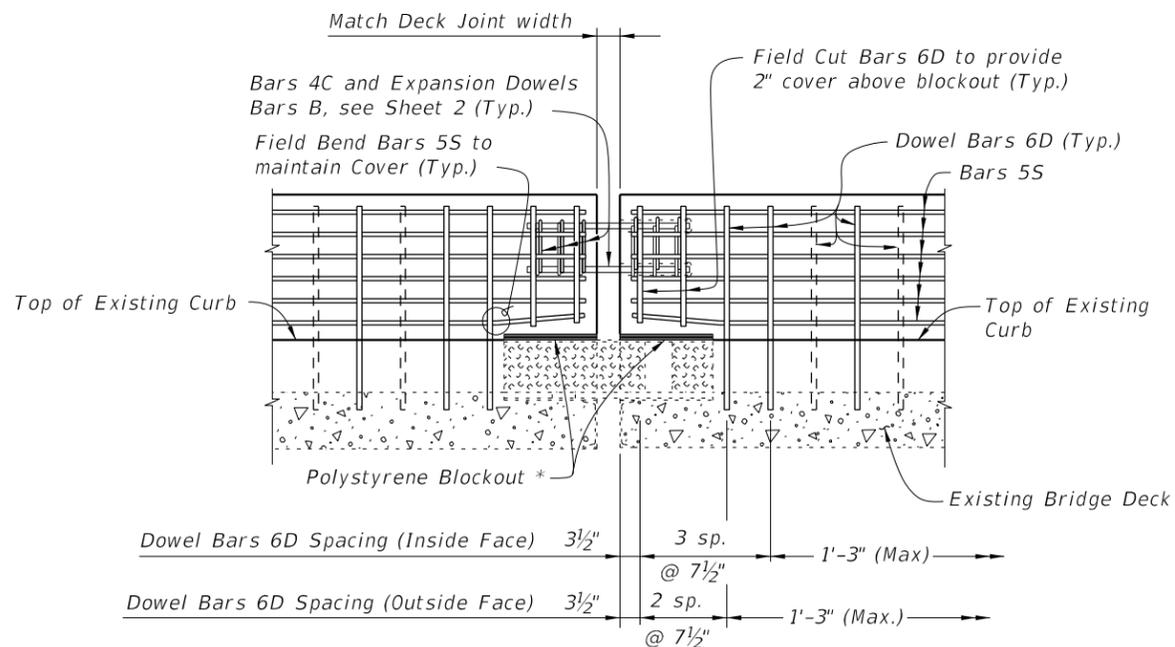
**NAME, DATE AND BRIDGE NUMBER:** The Name and Bridge Number shall be placed on the Traffic Railing so as to be seen on the driver's right side when approaching the bridge. The Date shall be placed on the driver's left side when approaching the bridge. The Date shall be the year the bridge was constructed. Letters and figures may be 3" tall black plastic as approved by the Engineer or 3/8" V-Grooves. V-Grooves shall be formed by preformed letters and figures.

**ELEVATION MARKERS:** Elevation Markers shall be placed on the top surface of the end bents as directed by the Engineer when portions of the existing traffic railing carrying existing elevation markers are removed. Markers are to be furnished by the Florida Department of Transportation and installed by the Contractor. The Department will determine the vertical Datum information for the marker.

**SURFACE FINISH:** Unless otherwise shown in the Plans, place a Class 5 Applied Finish Coating on the top and sides of the Traffic Railing (Vertical Face Retrofit).

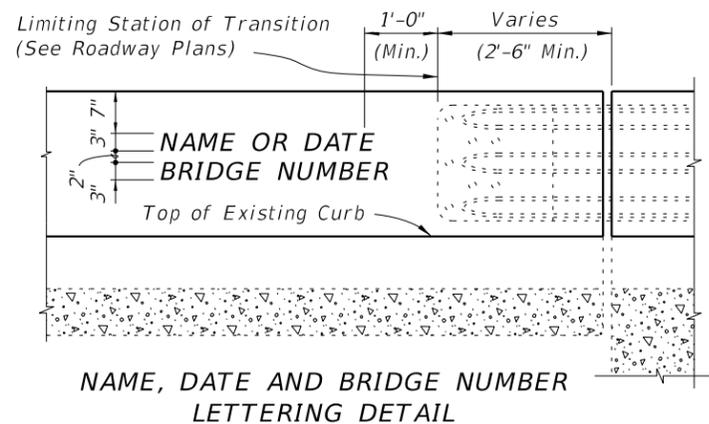
**REFLECTIVE RAILING MARKERS:** Reflective Railing Markers shall meet Specification Section 993. Install markers on top of the Traffic Railing 2" from the face on the traffic side at the spacing shown in the table below. Reflector color (white or yellow) shall match the color of the near edgeline.

**PAYMENT:** Payment under Traffic Railing (Vertical Face Retrofit) include all materials and labor required to construct the railing. Incidental work as required for transition blocks, curbs, spread footings approaches, reflective railing markers (including installation) shall also be included under Traffic Railing (Vertical Face Retrofit).



**PARTIAL ELEVATION OF RAILING SHOWING INTERIOR FINGER/SLIDING PLATE JOINT (Beam/Girder, Intermediate Bent or Pier not shown for clarity)**

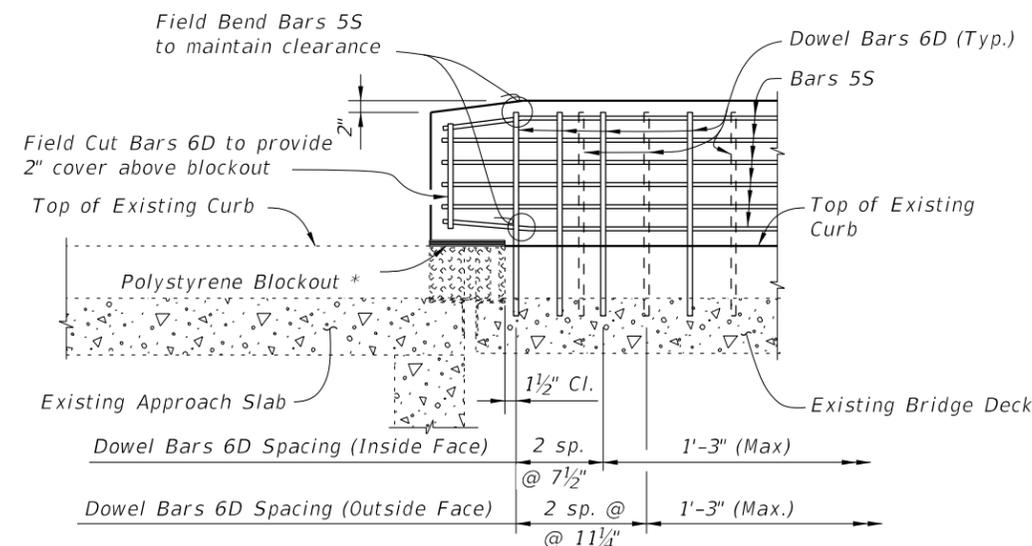
\* Place 1" thick polystyrene blockout over limits of bridge deck expansion joint full width to the end of the Traffic Railing to allow for thermal movement. Seal Forms to prevent mortar leakage into the expansion joint.



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

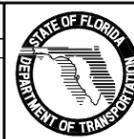
ESTIMATED TRAFFIC RAILING QUANTITIES			
ITEM	UNIT	QUANTITY	
		9" Curb	Increment
Concrete	CY/Ft.	0.064	0.003 per in. height
Reinforcing Steel	Lb./Ft.	13.27	0.10 per in. length

(Quantities are based on a 9" curb, no curb cross slope and 1'-0" embedment length of Bars 6D. If the curb height or embedment length differs from that shown, increase or decrease quantity by the given per inch increment.) See Index No. 484, Sheet 4 for Spread Footing Approach Quantities.



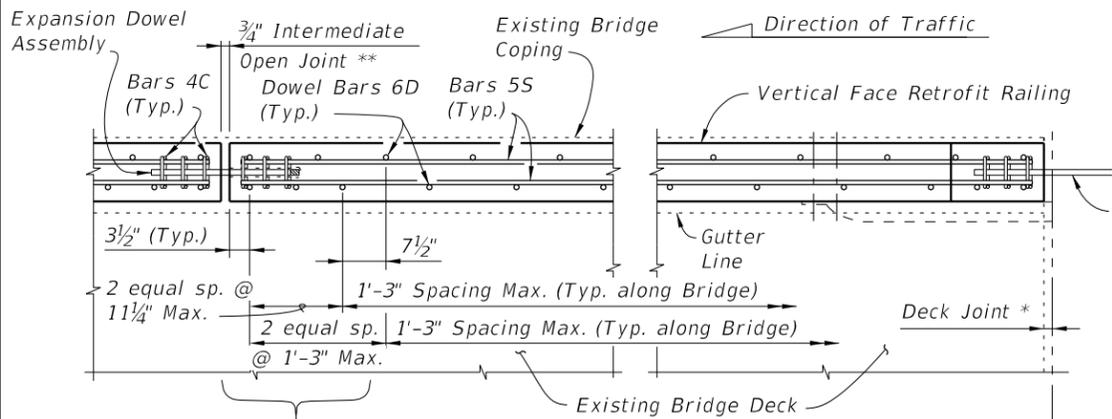
**PARTIAL ELEVATION OF RAILING SHOWING SLIDING PLATE JOINT AT BEGIN OR END BRIDGE (Scheme 1 shown, Schemes 2, 3 and 4 similar) (Guardrail Transition or continuation of Traffic Railing not show for clarity)**

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed ELEVATION MARKERS note.			



2010 Interim Design Standard  
**TRAFFIC RAILING - (VERTICAL FACE RETROFIT)**  
**GENERAL NOTES & DETAILS**

Interim Date: 07/01/10  
 Sheet No.: 1 of 2  
 Index No.: **480**



Bars 6D spacing at Railing Joints (Typ. on bridge except as noted for skewed deck joints)

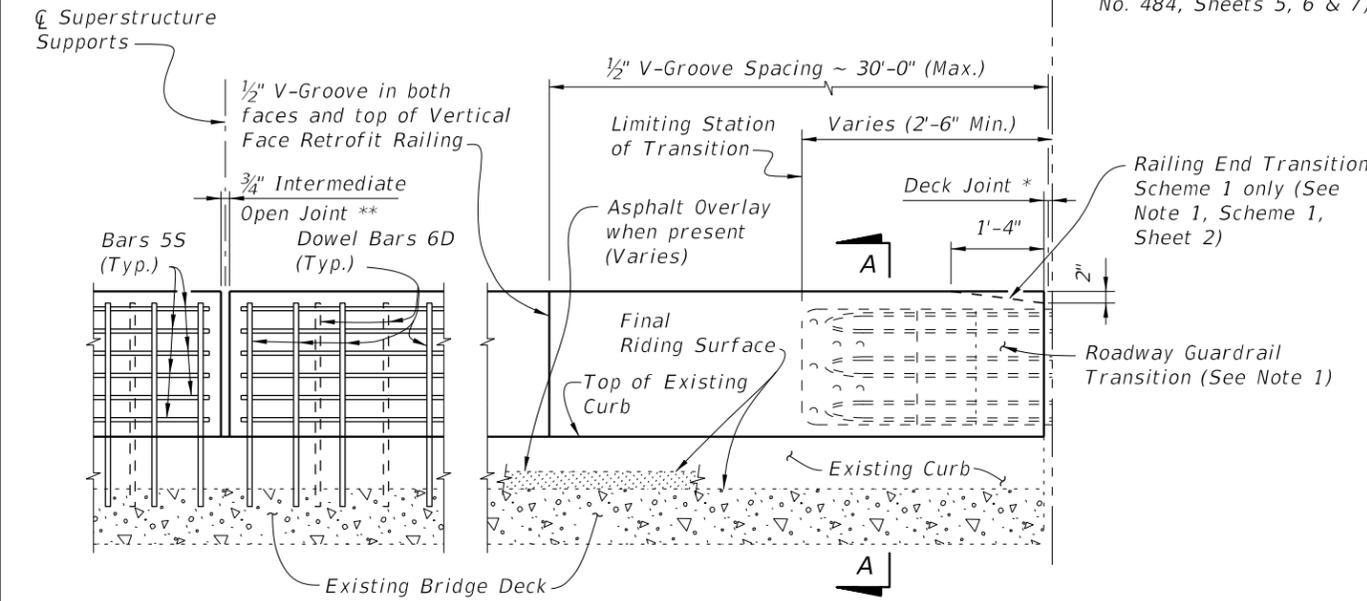
**PARTIAL PLAN OF RAILING**

Expansion Dowel & Bars 4C not required at end of railing for Scheme 1, except where traffic railing retrofit extends beyond ends of bridge, see Index No. 484

Front Face of Backwall, Begin or End Bridge & Match Line (See Sheet 2 & 3 & Index No. 484, Sheets 5, 6 & 7)

\* Non skewed deck joint shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail, Index No. 480. Provide open Railing Joints at Deck Expansion Joint locations matching the dimension of the Deck Joint.

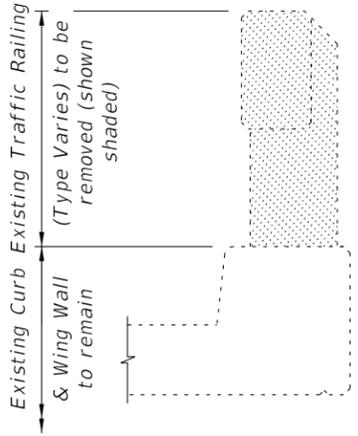
\*\* Provide  $\frac{3}{4}$ " Intermediate Open Joints at :  
(1) - Superstructure supports where slab is continuous.



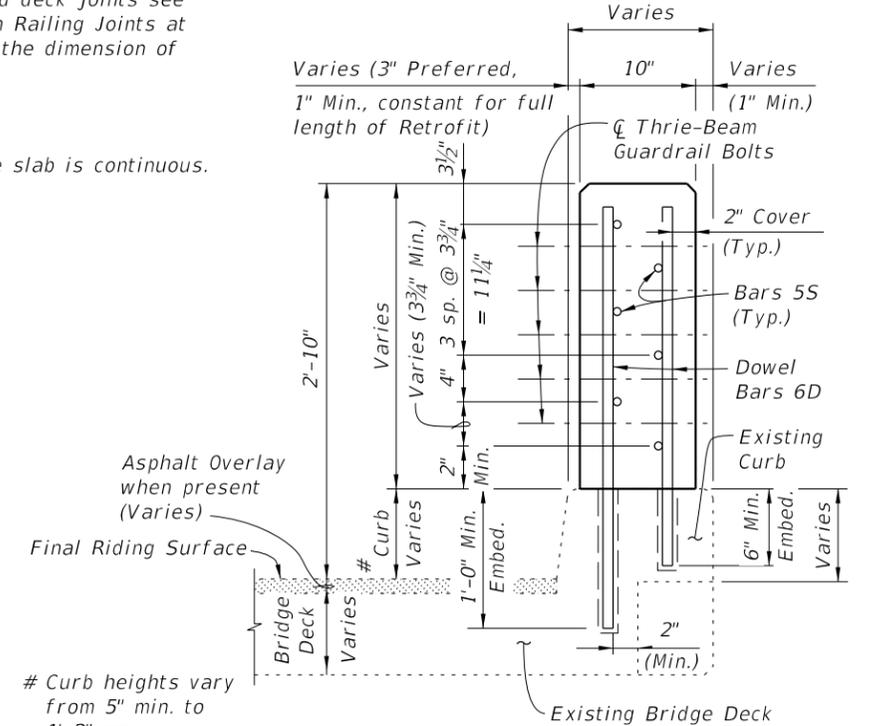
**PARTIAL ELEVATION OF INSIDE FACE OF RAILING**  
(Expansion Dowel Assemblies & Bars 4C not shown for clarity)

**TYPICAL TREATMENT OF RAILING ALONG BRIDGE**

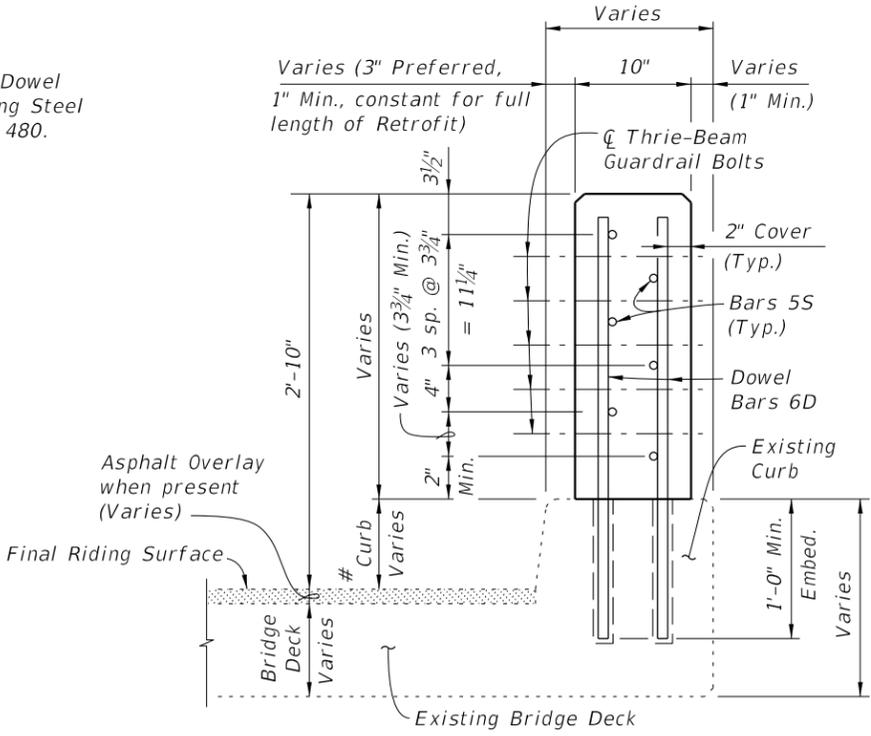
- NOTES:**
- On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2 or 3, Index No. 481, Sheet 2 and 3. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans. If vertical face retrofit extends beyond bridge and approach slab ends, see Index No. 484 for treatment and Details.
  - Field cut Bars 5S and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.
  - Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.



**TYPICAL SECTION THRU EXISTING TRAFFIC RAILING SHOWING LIMITS OF REMOVAL**  
(BRIDGE DECK SHOWN, WING WALL SIMILAR)



**SECTION A-A**  
**TYPICAL SECTION THRU RAILING ON CURB WITH CORBELS**

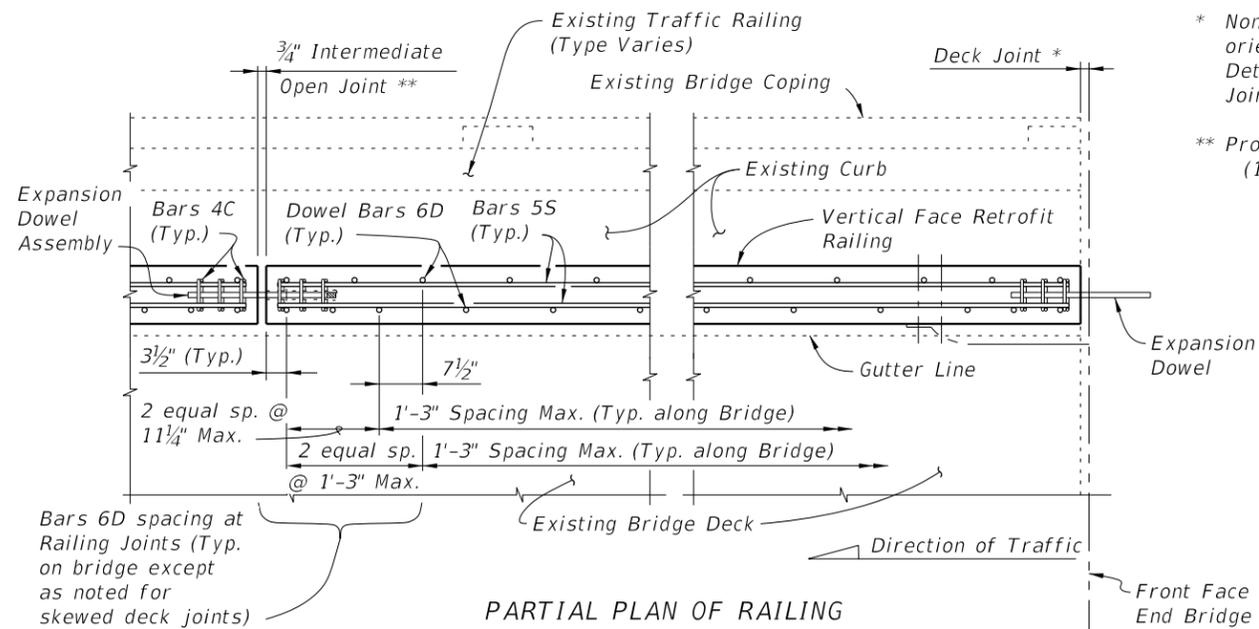


**SECTION A-A**  
**TYPICAL SECTION THRU RAILING ON FULL DEPTH CURB (BRIDGE SHOWN, WING WALL SIMILAR)**

**CROSS REFERENCE:**  
For General Notes, Estimated Quantities, Dowel Detail, Expansion Dowel Detail, Reinforcing Steel Notes & Bending Diagrams see Index No. 480.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed * and ** notes.			





PARTIAL PLAN OF RAILING

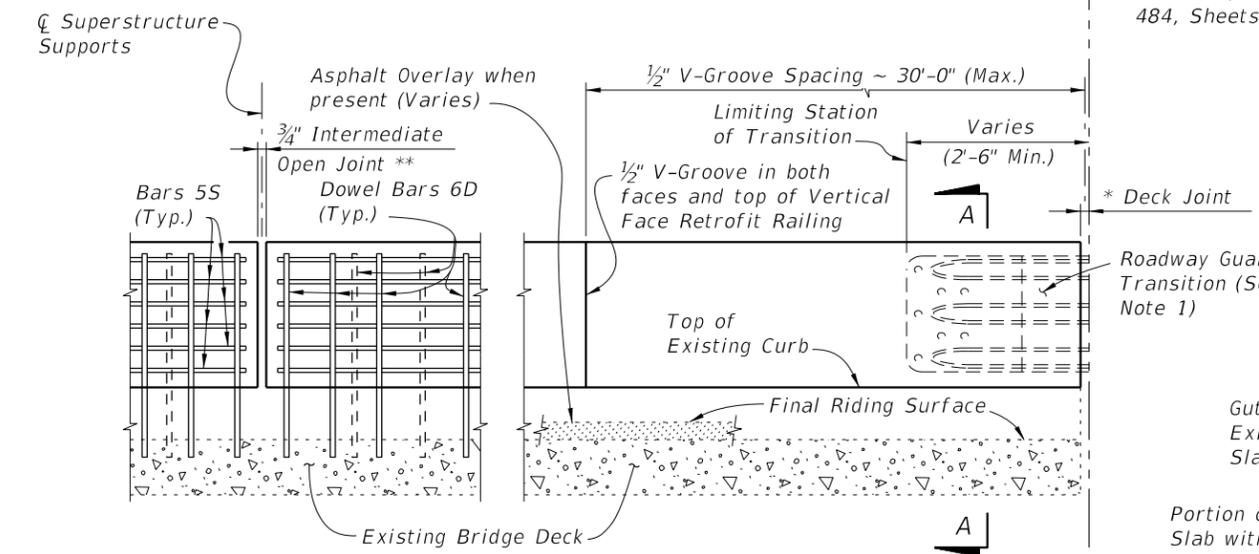
\* Non skewed deck shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail, Index No. 480. Provide open Railing Joints at Deck Expansion Joint locations matching the dimension of the Deck Joint.

\*\* Provide 3/4" Intermediate Open Joints at :  
(1) - Superstructure supports where slab is continuous.

CROSS REFERENCE:

For General Notes, Estimated Quantities, Dowel Detail, Expansion Dowel Detail, Reinforcing Steel Notes & Bending Diagrams see Index No. 480.

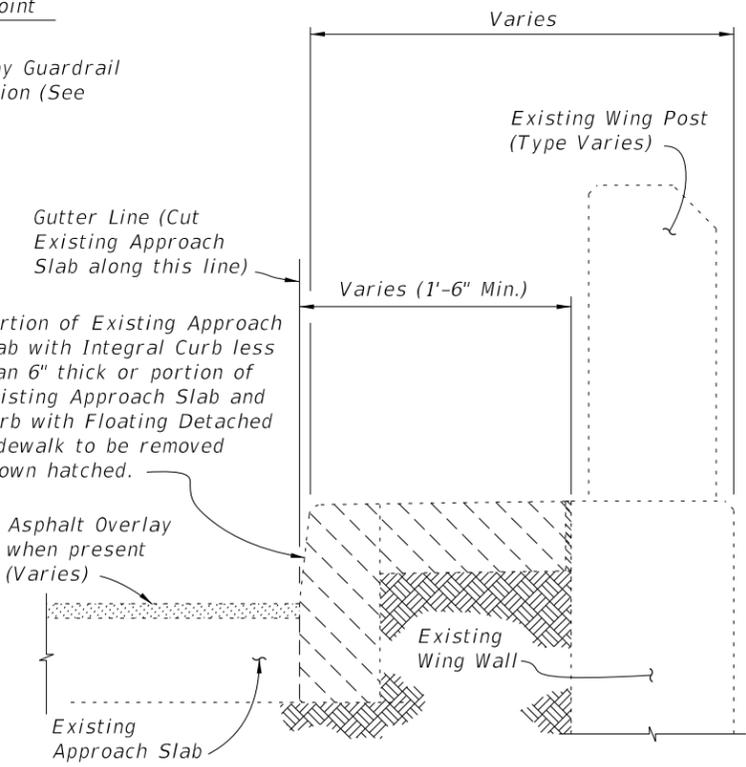
Front Face of Backwall, Begin or End Bridge & Match Line (See Sheets 2, 3 or 4, & Index No. 484, Sheets 5 & 8)



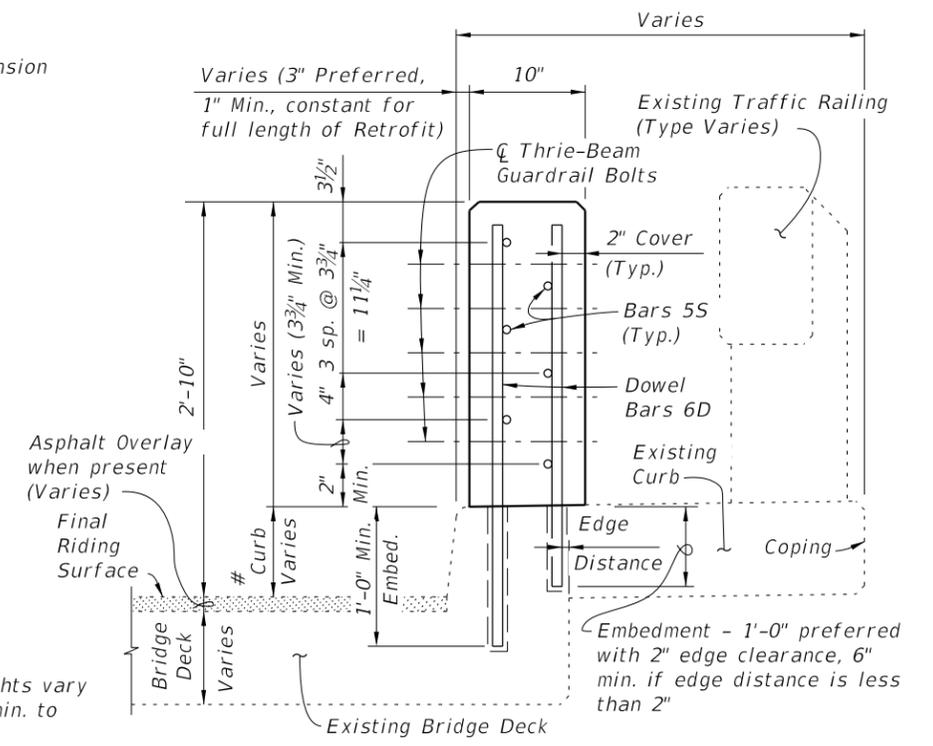
PARTIAL ELEVATION OF INSIDE FACE OF RAILING  
(Existing Traffic Railing, Expansion Dowel Assemblies & Bars 4C not shown for clarity)

TYPICAL TREATMENT OF RAILING ALONG BRIDGE

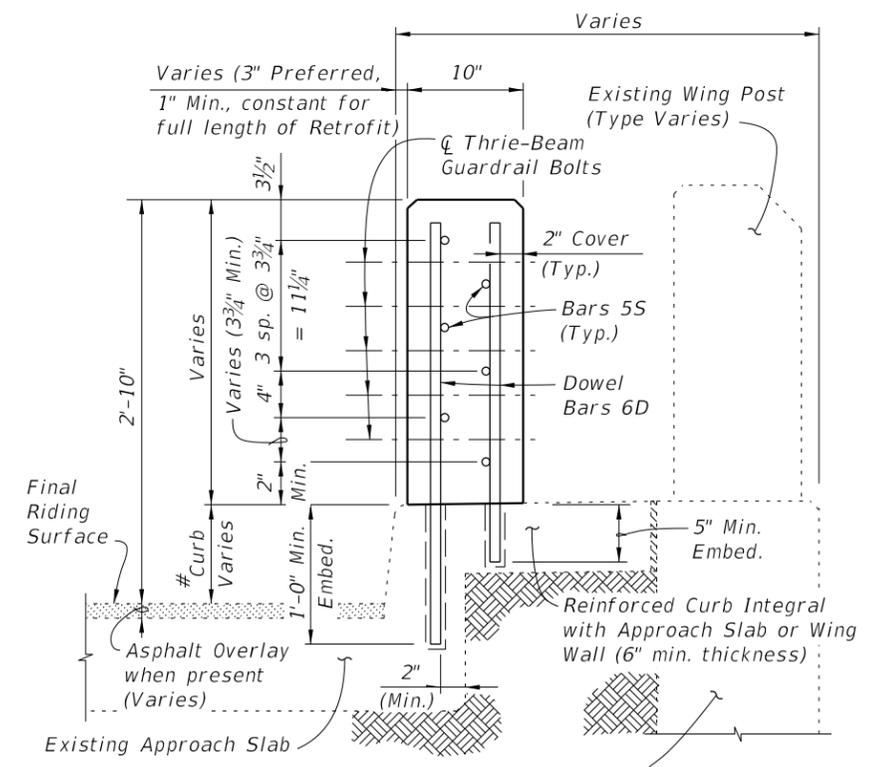
- NOTES:
1. On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2, 3, 4 or 5, Sheets 3 and 4. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans. If vertical face retrofit extends beyond bridge and approach slab ends, see Index No. 484 for treatment and Details.
  2. Field cut Bars 5S and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.
  3. Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.



TYPICAL SECTION THRU EXISTING APPROACH SLAB AND END BENT WING WALL SHOWING LIMITS OF REMOVAL (SCHEMES 4 AND 5 ONLY)



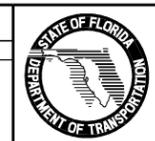
SECTION A-A  
TYPICAL SECTION THRU RAILING ON BRIDGE DECK



SECTION B-B  
TYPICAL SECTION THRU RAILING ALONG APPROACH SLAB (SCHEMES 2 AND 3 ONLY)

REVISIONS

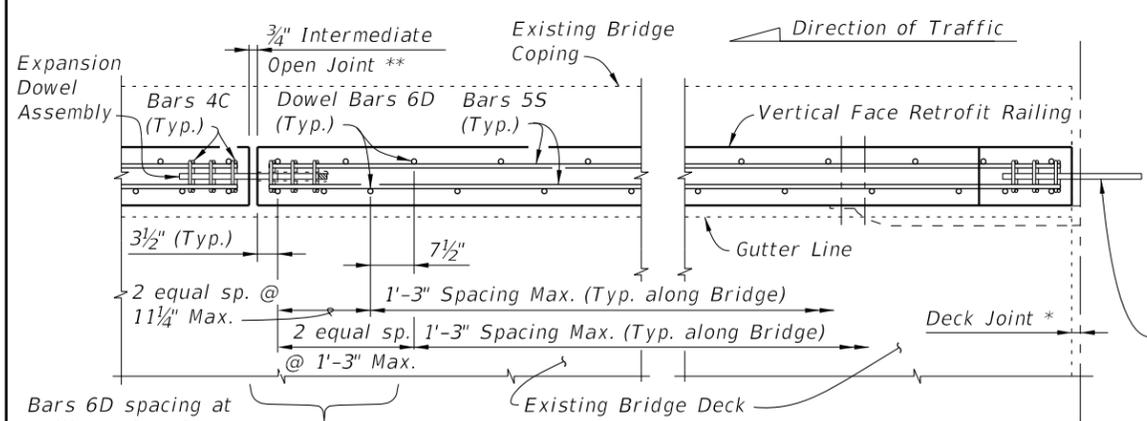
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed * and ** notes.			



2010 Interim Design Standard

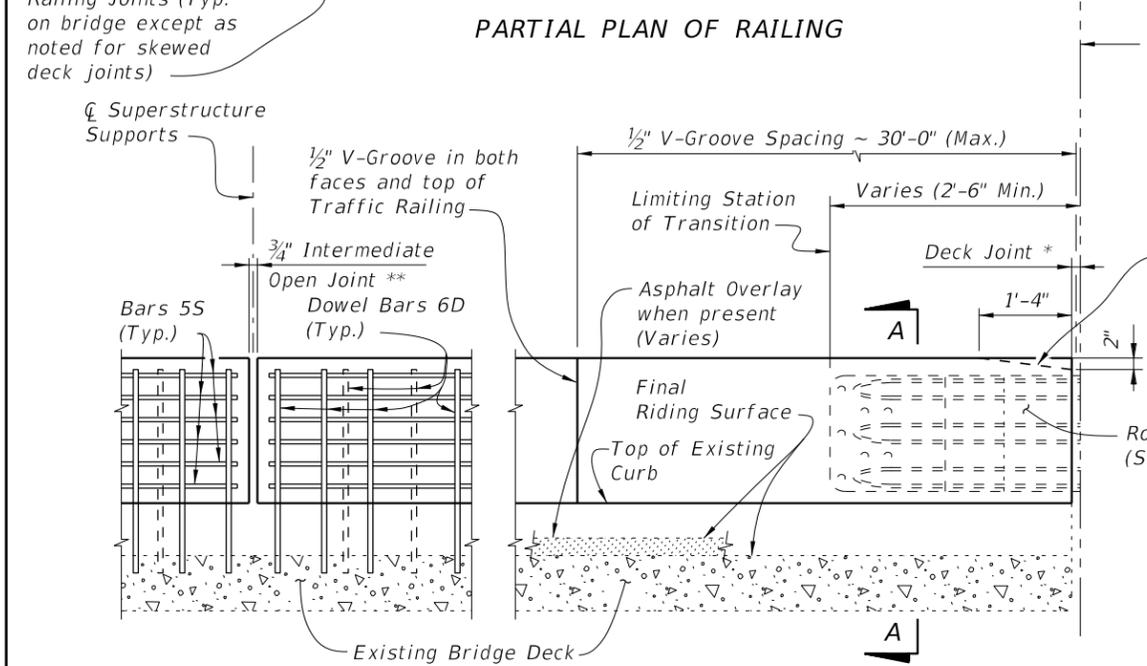
TRAFFIC RAILING - (VERTICAL FACE RETROFIT)  
WIDE CURB

Interim Date: 07/01/10  
Sheet No.: 1 of 4  
Index No.: 482



\* Non skewed deck joint shown, actual joint dimensions and orientation vary. For treatment at skewed deck joints see Skew Detail, Index No. 480. Provide open Railing Joints at Deck Expansion Joint locations matching the dimension of the Deck Joint.

\*\* Provide 3/4" Intermediate Open Joints at :  
(1) - Superstructure supports where slab is continuous.



Expansion Dowel & Bars 4C not required at end of railing for Scheme 1, except where traffic railing retrofit extends beyond ends of bridge, see Index No. 484

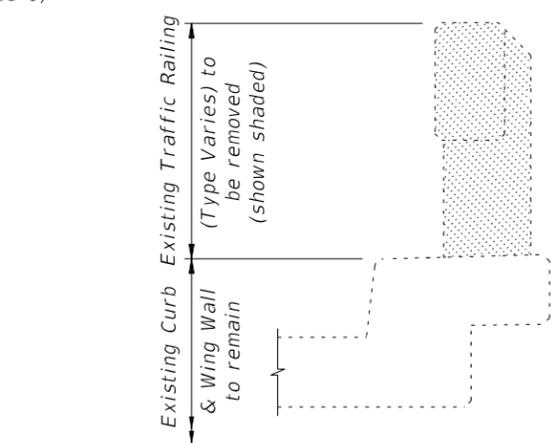
Front Face of Backwall, Begin or End Bridge & Match Line (See Sheet 2 and 3 and Index No. 484, Sheets 5, 9 & 10.)

Railing End Transition Scheme 1 only (See Note 1, Scheme 1, Sheet 2, & Index No. 484, Sheet 5, 9 & 10)

Roadway Guardrail Transition (See Note 1)

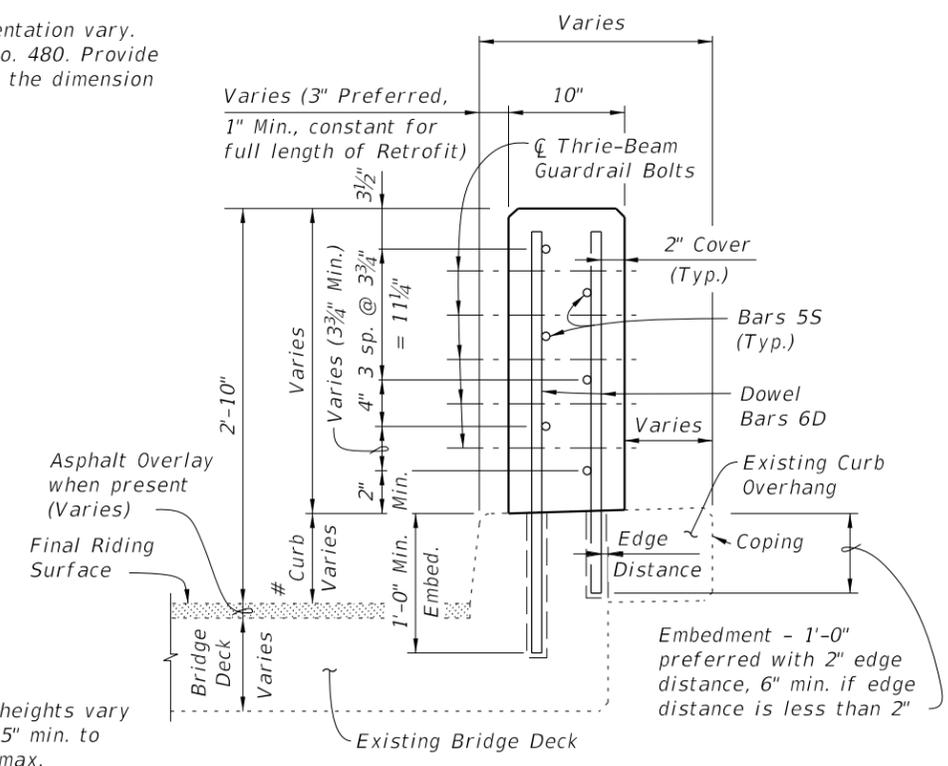
**TYPICAL TREATMENT OF RAILING ALONG BRIDGE**

- NOTES:**
- On approach end provide a Roadway Guardrail Transition, Index No. 402 (as shown) or other site specific treatment. See Roadway Plans for limiting station of Roadway Guardrail Transition or other site specific treatment. If limiting station of Roadway Guardrail Transition is on the bridge, attach Thrie-Beam Terminal Connector to railing as shown above. If limiting station of Roadway Guardrail Transition is along the Wing Wall, see Schemes 2 or 3, Sheets 2 & 3. On skewed bridges, if the skew along the deck joint extends across the width of the railing, the 2'-6" minimum dimension shall apply to both the front and back face of the railing. For treatment of trailing end see Roadway Plans. If vertical face retrofit extends beyond bridge and approach slab ends, see Index No. 484 for treatment and Details.
  - Field cut Bars 55 and Dowel Bars 6D to maintain clearance within Vertical Face Retrofit Railing.
  - Where existing structure has been removed and not encased in new concrete; match adjoining areas and finish flat by grouting or grinding as required. Exposed existing reinforcing steel not encased in new concrete shall be burned off 1" below existing concrete and grouted over.

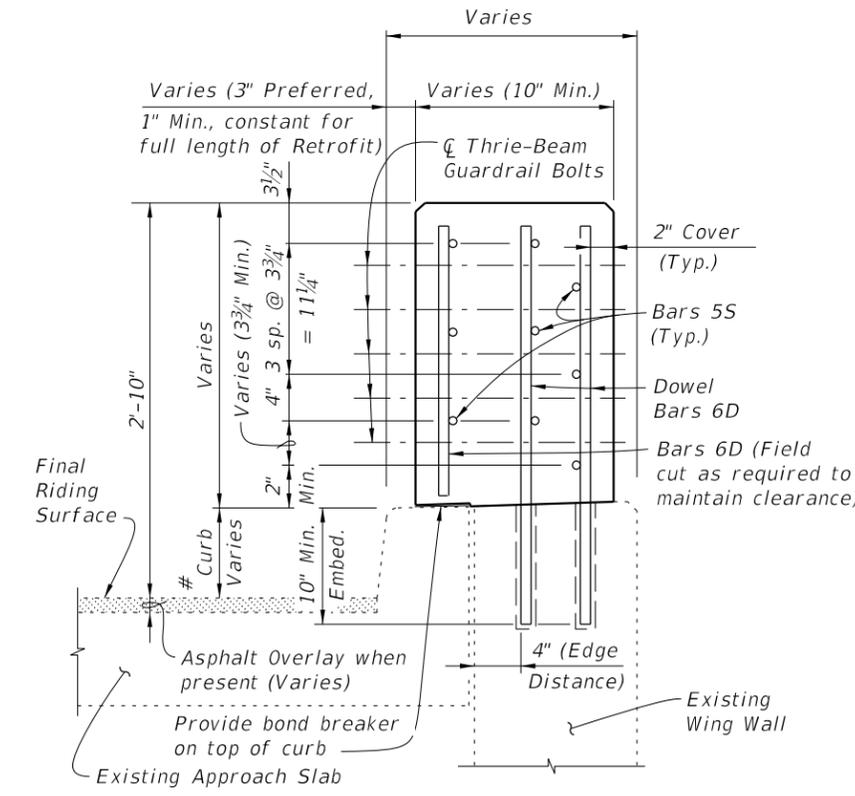


**TYPICAL SECTION THRU EXISTING TRAFFIC RAILING SHOWING LIMITS OF REMOVAL (BRIDGE DECK SHOWN, WING WALL SIMILAR)**

**CROSS REFERENCE:**  
For General Notes, Estimated Quantities, Dowel Detail, Expansion Dowel Detail, Reinforcing Steel Notes & Bending Diagram see Index No. 480.

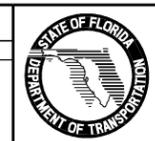


**SECTION A-A TYPICAL SECTION THRU RAILING ON BRIDGE DECK**



**SECTION B-B TYPICAL SECTION THRU RAILING ON WING WALL**

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Changed * and ** notes.			



**DESIGN NOTES**

- The information shown on this index is intended solely for the purpose of clear sight development and maintenance at intersecting highways, roads and streets, and is not intended to be used to establish roadway and roadside safety except as related to clear sight corridors. An analysis of sight distance shall be documented for all intersections.
- Details are based on the AASHTO 'A Policy On Geometric Design Of Highways And Streets, 2001', CHAPTER 9, INTERSECTION SIGHT DISTANCE, CASES B and F, and Department practices for channelized median openings (left turns from major roadways).
- The minimum driver eye setback of 14.5' from the edge of the traveled way may be adjusted on any intersection leg only when justified by a documented, site specific field study of vehicle stopping position and driver eye position.
- For SIGNALIZED INTERSECTIONS sight distances should be developed based on AASHTO 'Case D- Intersections With Traffic Signal Control'. 'At signalized intersections, the first vehicle stopped on one approach should be visible to the driver of the first vehicle stopped on each of the other approaches. Left- turning vehicles should have sufficient sight distance to select gaps in oncoming traffic and complete left turns. Apart from these sight conditions, there are generally no other approach or departure sight triangles needed for signalized intersections. However, if the traffic signal is to be placed on two -way flashing operation (i.e. flashing yellow on the major -road approaches and flashing red on the minor -road approaches) under off- peak or nighttime conditions, then the appropriate departure sight triangles for Case B, both to the left and to the right, should be provided for the minor -road approaches. In addition, if right turns on a red signal are to be permitted from any approach, then the appropriate departure sight triangle to the left for Case B2 should be provided to accommodate right turns from that approach.'
- Where curvature, superelevation, adverse split profiles or other conditions preclude the use of standard tree sizes and spacing, proof of view and shadowing restraints must be documented and the size and location of trees in medians detailed in the plans.
- Intersection sight distance values are provided for Passenger Vehicles, SU Vehicles and Combination Vehicles. Intersection sight distance based on the Passenger Vehicle is suitable for most intersections. Where substantial volumes of heavy vehicles enter the major -road, such as from ramp terminals with stop control or roadways serving truck terminals, the use of tabulated values for SU Vehicles or Combination Vehicles should be considered.

**TREE SPACING TABLE\*\***

Description Diameter (Within Limits Of Sight Window)	Speed (mph)													
	30		35		40		45		50		55		60	
	(Inches)													
	>4≤11	>11≤18	>4≤11	>11≤18	>4≤11	>11≤18	>4≤11	>11≤18	>4≤11	>11≤18	>4≤11	>11≤18	>4≤11	>11≤18
	(Feet)													
Minimum Spacing (c. to c. Of Trunk)	22	91	27	108	33	126	40	146	45	165	52	173	60	193

- \*\* Sizes and spacings are based on the following conditions:
- A single line of trees in the median parallel to but not necessarily colinear with the centerline,
  - A straight approaching mainline, within skew limits as described in No. 2 above.
  1. Trees and palms ≤ 11" in diameter casting a vertical 6' wide shadow band on a vehicle entering at stop bar location when viewed by mainline driver beginning at distance 'd'; see SHADOW DIAGRAM, Sheet 2.  
2. Sabalpalms with diameters >11" to ≤ 18" spaced at intervals providing a 2 second full view of entering vehicle at stop bar location when viewed by mainline driver beginning at distance 'd'; see PERCEPTION DIAGRAM, Sheet 2.
  - Trees with diameters ≤ 11" intermixed with trees with diameters >11" ≤ 18" are to be spaced based on trees with diameters >11" ≤ 18".

For any other conditions the tree sizes, spacings and locations shall be detailed in the plans; see Design Note 5.

**GENERAL NOTES**

- Details apply to both rural and urban intersections under stop sign control or flashing beacon control. For full signal controlled intersections see Design Note No 4. At intersections listed in the Department's High Crash Intersection Report, designers shall give attention to keeping to a minimum, objects that distract or affect sight distance.
- Sight distance 'd' applies to normal and skewed intersections (intersecting angles between 60° and 120°), and where vertical and/or horizontal curves are not present. Sight distance 'd' is measured along the major roadway from the center of the entrance lane of the minor roadway to the center of the near approach lane (right or left) of the major roadway. Distances 'd<sub>l</sub>' and 'd<sub>r</sub>' are measured from the centerline of the entrance lane of the minor roadway to a point on the edge of the near side outer traffic lane on the major roadway. Distance 'd<sub>m</sub>' is measured from the centerline of the entrance lane of the minor roadway to a point on the median clear zone limit or horizontal clearance limit for the far side roadway of the major roadway.
- A. The limits of clear sight define a corridor throughout which a clear sight window must be preserved. See WINDOW DETAIL, Sheet 2.  
B. Clear sight must be provided between vehicles at intersection stop locations, and vehicles on the major roadway within dimension 'd'.  
C. Since observations are made in both directions along the line of sight, the reference datum between roadways is 3'-6" above respective pavements.
- Barrier systems within intersection sight corridors, where penetration into the sight window might occur, shall be located to provide the least adverse affect practical.
- The corridor defined by the limits of clear sight is a restricted planting area. Drivers of vehicles on the intersecting roadway and vehicles on the major roadway must be able to see each other clearly throughout the limits of 'd' and 'd<sub>a</sub>'. If in the Engineers judgement, landscaping interferes with the line of sight corridor prescribed by these standards the Engineer may rearrange, relocate or eliminate plantings. Plants within the restricted areas are limited to selections as follows:

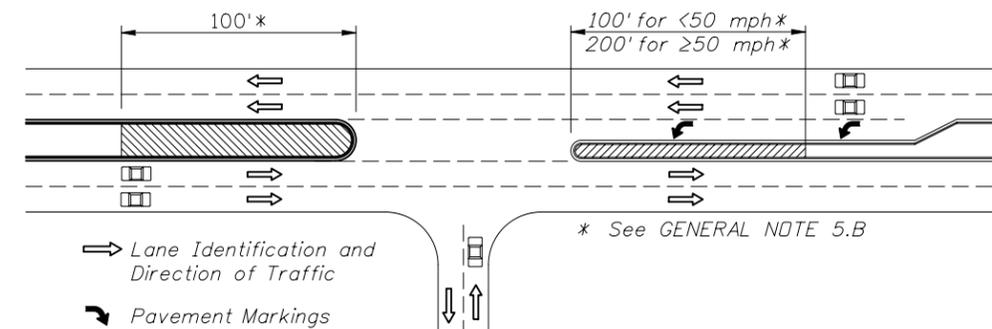
**Ground Cover & Trunked Plants (Separate or Combined):**

**Ground Covers** - Plant selection of low growing vegetation which at maturity does not attain a height greater than 18" below the sight line datum. For ground cover in combination with trees and palms; the following heights below the sight line datum will apply: 24" for trees and palms ≤ 11" dia.; and, 18" for sabalpalms > 11" but ≤ 18" dia. (dia. - within Sight Window).

**Trunked Plants** - Plant selection of a mature trunk diameter 4" or less measured at 6" above the ground. Canopy or high borne foliage shall never be lower than 5' above the sight line datum. These selections shall be spaced no closer than 20'.

**Trees** - Trees can be installed with sod; pavers; gravel; mulch; ground covers or other Department approved material. The clear sight window must be in conformance with the 'WINDOW DETAIL' modified to attain the height requirements listed in 'Ground Covers' above.

- Size and spacing shall conform to the Tree Spacing Table.
- Requirements for placement within medians at median openings and at unsignalized and signalized intersections:
  - Horizontal clearance for the mature specimen shall be maintained as specified in Index 700. Specimens whose mature trunk diameter is greater than 18 inches shall not be permitted,
  - Where left turns from the major road are permitted, no trees shall be located within the distance 'd<sub>b</sub>', Sheet 2 of 6; and not less than the distances called for in (c) or (d), as applicable,
  - Where no left turn lane is present, size and spacing shall conform to the Tree Spacing Table. No trees shall be permitted within 100' of median nose (measured from the edge of pavement),
  - Where left turn lane(s) are present, the following requirements apply:
    - For low speed facilities (design speed less than 50 mph), size and spacing shall conform to the Tree Spacing Table. No trees shall be permitted within 100' of the median nose (measured from the edge of pavement).
    - For high speed facilities (design speed 50 mph or greater), no trees shall be permitted within 200' of the median nose. Beyond this limit, size and spacing shall conform to the Tree Spacing Table.



**PLAN**  
**Special Areas Limited to Ground Cover**

**REVISIONS**

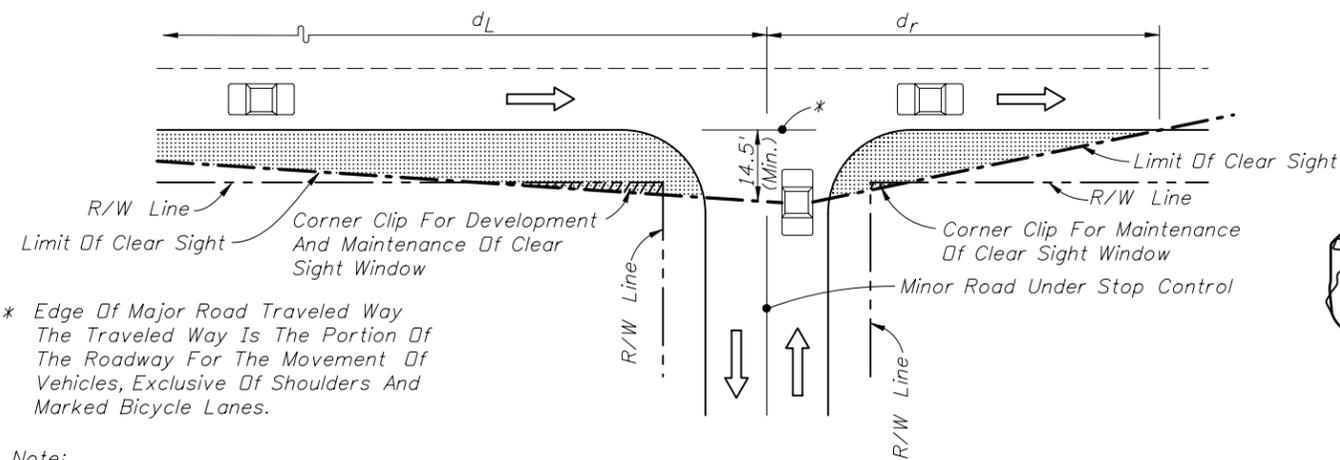
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	JM	Revised Special Areas Limited to Ground Cover detail, and updated GENERAL NOTES notes 1 and 5 with new policy			



2010 Interim Design Standard

**SIGHT DISTANCE AT INTERSECTIONS**

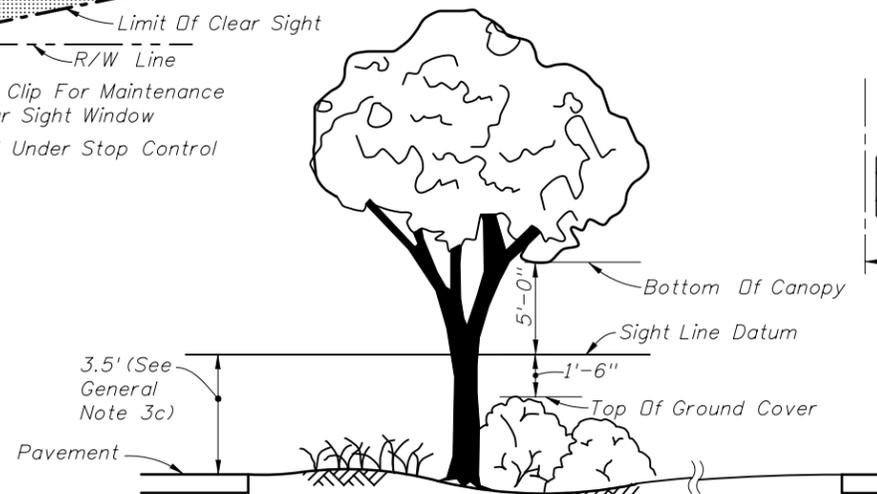
Interim Date  
07/01/10  
Sheet No.  
1 of 6  
Index No.  
**546**



\* Edge Of Major Road Traveled Way The Traveled Way Is The Portion Of The Roadway For The Movement Of Vehicles, Exclusive Of Shoulders And Marked Bicycle Lanes.

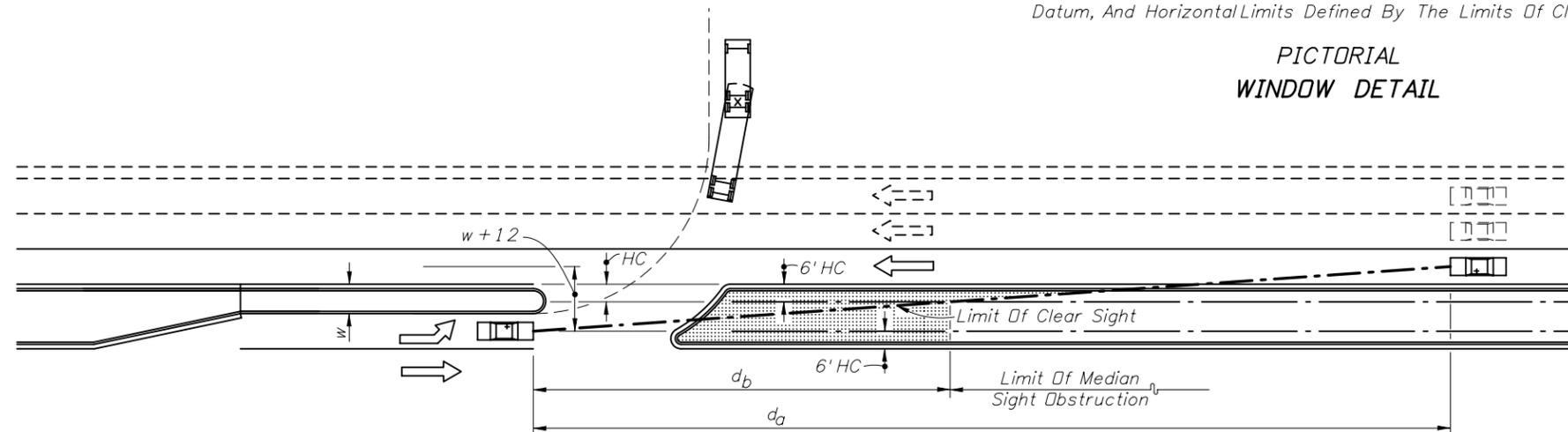
Note: Lines For 'Limit Of Clear Sight' Are Opposite Hand When Major Road Near Lane Traffic Moving Left (e.g., One-Way Left).

PICTORIAL ORIGIN OF CLEAR SIGHT LINE ON MINOR ROAD



The Intent Of This Standard Is To Provide A Window With Vertical Limits Of Not Less Than 5' Above And 1'-6" Below The Sight Line Datum, And Horizontal Limits Defined By The Limits Of Clear Sight.

PICTORIAL WINDOW DETAIL



PICTORIAL

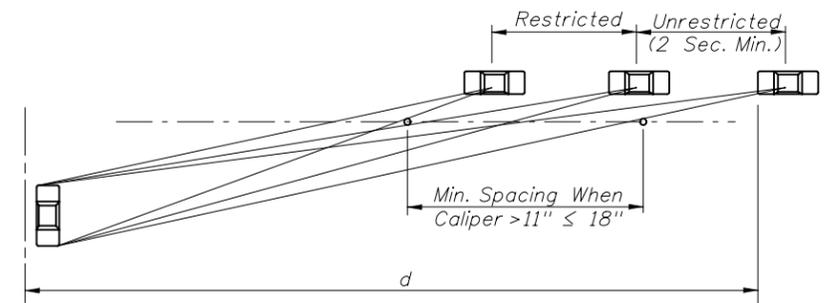
Design Speed MPH	$d_a$ (Feet)								
	1 Lane Crossed			2 Lanes Crossed			3 Lanes Crossed		
	P	SU	Comb.	P	SU	Comb.	P	SU	Comb.
30	245	285	330	265	320	360	285	350	390
35	285	335	385	310	370	420	335	405	460
40	325	380	440	355	425	480	380	465	525
45	365	430	495	395	475	540	430	520	590

★ See Note.

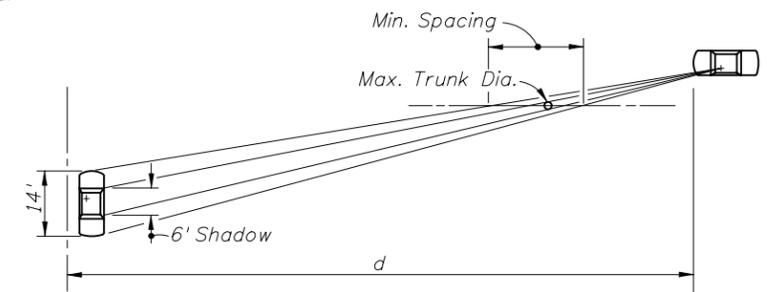
★ The  $d_a$  values in this table were established by the method referenced in Design Note 2, and are applicable to urban, predominantly curbed roadways with design speeds of 45 mph or less and meeting the restricted conditions defined in Index No. 700. For horizontal clearance (HC) of six feet (6'), the values for  $d_b$  may be determined by the equation  $d_b = d_a(w/(w+12))$ . For roadways with nonrestricted conditions,  $d_a$  and  $d_b$  should be based on the geometry for the left turn storage and on clear zone widths (See Index No. 700).

For wide medians where the turning vehicle can approach the through lanes at or near 90°, use  $d_v$  values from tables on sheets 5 or 6. (The clear sight line origin is assumed to be 14.5' from the edge of the near lane.)

CHANNELIZED DIRECTIONAL MEDIAN OPENINGS



PERCEPTION DIAGRAM SETTING SABAL PALM (STATE TREE) SPACING



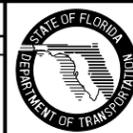
SHADOW DIAGRAM

LEGEND

Areas Free Of Sight Obstructions

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	JM	Removed "Area limited to ground cover" from sheet.			



2010 Interim Design Standard

SIGHT DISTANCE AT INTERSECTIONS

Interim Date: 07/01/10  
Sheet No.: 2 of 6  
Index No.: 546

MEDIAN 22' OR LESS				
Design Speed	d	d <sub>L</sub>	d <sub>r</sub>	d <sub>m</sub>
30	390	280	90	320
35	460	330	100	380
40	520	370	110	430
45	590	420	130	480
50	650	460	140	530
55	720	510	160	590
60	780	550	170	640
65	850	600	190	700

25'-64' MEDIAN				
Design Speed	d	d <sub>L</sub>	d <sub>v</sub>	d <sub>vL</sub>
30	290	210	330	230
35	330	230	390	280
40	380	270	440	310
45	430	300	500	350
50	480	340	550	390
55	530	370	610	430
60	570	400	660	470
65	620	440	720	510

PASSENGER VEHICLE (P)

MEDIAN 35' OR LESS				
Design Speed	d	d <sub>L</sub>	d <sub>r</sub>	d <sub>m</sub>
30	540	380	100	460
35	630	450	110	530
40	720	510	130	610
45	810	570	150	690
50	900	640	160	760
55	990	700	180	840
60	1080	760	200	920
65	1170	830	210	990

40'-64' MEDIAN				
Design Speed	d	d <sub>L</sub>	d <sub>v</sub>	d <sub>vL</sub>
30	370	260	420	300
35	440	310	490	350
40	500	350	560	400
45	560	400	630	450
50	620	440	700	500
55	690	490	770	540
60	750	530	840	590
65	810	570	910	640

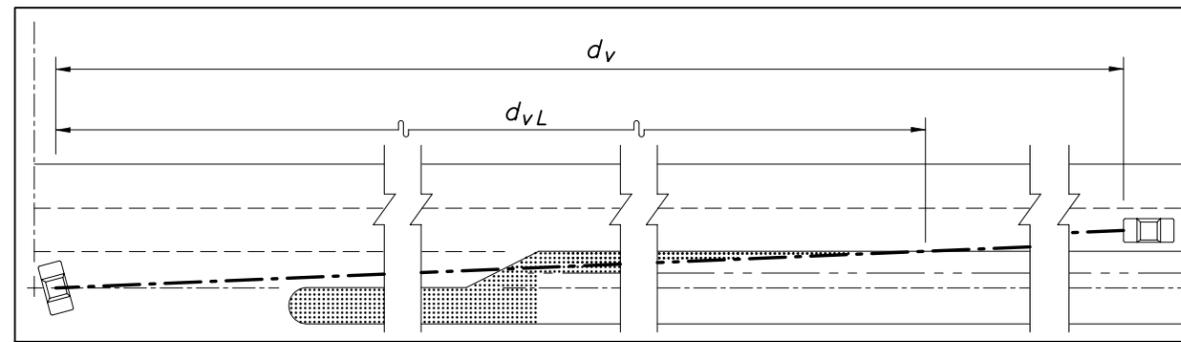
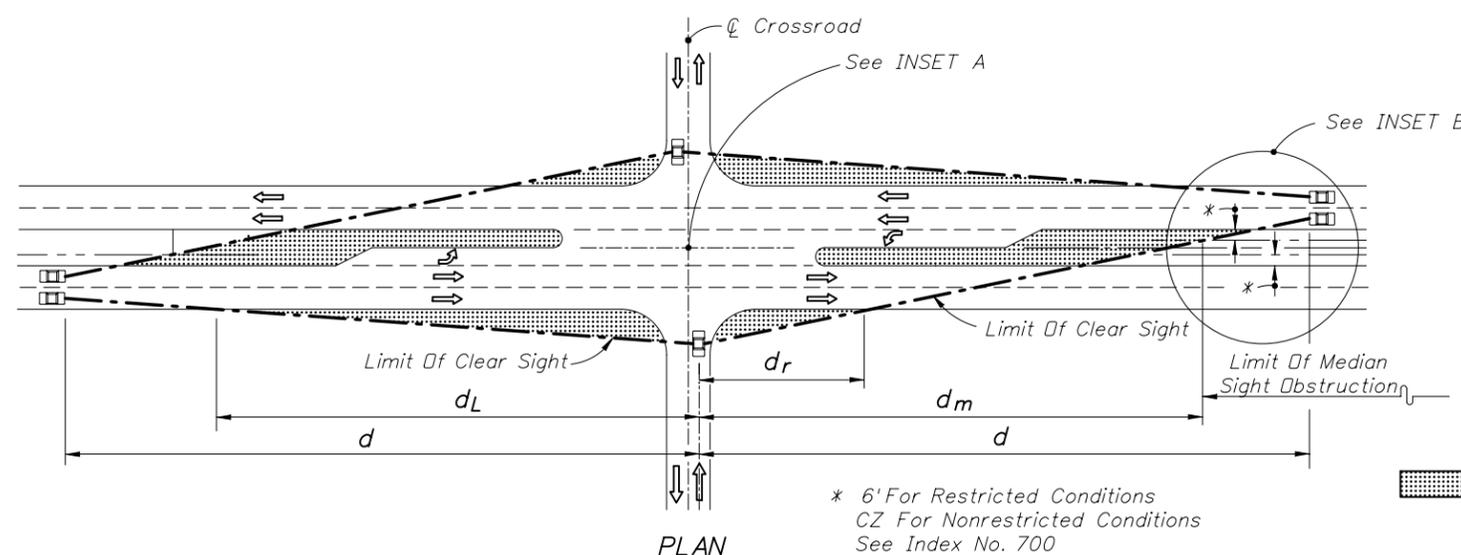
SINGLE-UNIT TRUCK (SU)

MEDIAN 30' OR LESS				
Design Speed	d	d <sub>L</sub>	d <sub>r</sub>	d <sub>m</sub>
30	620	440	120	520
35	720	510	140	600
40	820	580	160	690
45	930	660	180	780
50	1030	730	200	860
55	1130	800	220	950
60	1240	880	240	1040
65	1340	950	260	1120

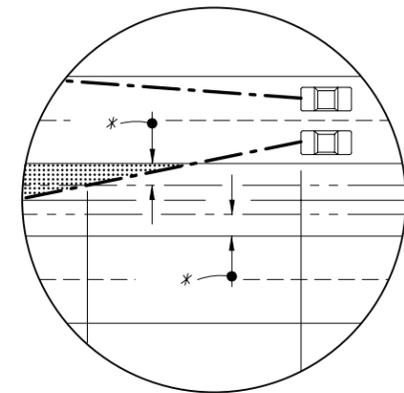
35'-50' MEDIAN				
Design Speed	d	d <sub>L</sub>	d <sub>r</sub>	d <sub>m</sub>
30	670	470	100	580
35	780	550	120	680
40	890	630	140	780
45	1000	710	150	870
50	1110	790	170	970
55	1220	860	190	1070
60	1330	940	200	1160
65	1440	1020	220	1260

INTERMEDIATE SEMI-TRAILERS (WB-40 & WB-50)

64' MEDIAN				
Design Speed	d	d <sub>L</sub>	d <sub>v</sub>	d <sub>vL</sub>
30	460	330	510	360
35	540	380	590	420
40	620	440	680	480
45	690	490	760	540
50	770	540	850	600
55	850	600	930	660
60	920	650	1020	720
65	1000	710	1100	780



Where The Median Is Sufficiently Wide For The Design Vehicle To Pause In The Median (Vehicle Length Plus 6' Min.) The Clear Line Of Sight To The Right (d<sub>v</sub>) Is Measured From The Vehicle Pause Location, i.e., Not From The Cross Road Stop Position; Distances d<sub>r</sub> & d<sub>m</sub> Do Not Apply.



INSET A

INSET B

Vehicle Type	Vehicle Length (Ft.)
Passenger (P)	19
Single Unit (SU)	30
Large School Bus	40
WB-40	45.5
WB-50	55

- NOTES FOR 4-LANE DIVIDED ROADWAY**
- See Sheet 2 for origin of clear sight line on the minor road.
  - Values shown in the tables are the governing (controlling) sight distances calculated based on 'AASHTO Case B - Intersection with Stop Control on the Minor Road.'

SIGHT DISTANCES (d) & (d<sub>v</sub>) AND RELATED DISTANCES (d<sub>L</sub>, d<sub>r</sub>, d<sub>m</sub> & d<sub>vL</sub>) (FEET)

4 LANE DIVIDED ROADWAY

MEDIAN 22' OR LESS				
Design Speed	$d_x$	$d_L$	$d_r$	$d_m$
30	410	290	80	350
35	480	340	90	410
40	550	390	100	470
45	620	440	110	530
50	690	490	130	580
55	760	540	140	640
60	830	590	150	700
65	900	640	170	760

25'-64' MEDIAN				
Design Speed	$d$	$d_L$	$d_v$	$d_{vL}$
30	310	220	330	230
35	360	250	390	280
40	410	290	440	310
45	460	330	500	350
50	510	360	550	390
55	570	400	610	430
60	620	440	660	470
65	670	470	720	510

PASSENGER VEHICLE (P)

MEDIAN 35' OR LESS				
Design Speed	$d_x$	$d_L$	$d_r$	$d_m$
30	590	420	90	510
35	690	490	110	600
40	780	550	120	680
45	880	620	140	760
50	980	690	160	850
55	1080	760	170	940
60	1170	830	190	1020
65	1270	900	200	1100

40'-64' MEDIAN				
Design Speed	$d$	$d_L$	$d_v$	$d_{vL}$
30	410	290	420	300
35	470	330	490	350
40	540	380	560	400
45	610	430	630	450
50	680	480	700	500
55	740	520	770	540
60	810	570	840	590
65	880	620	910	640

SINGLE-UNIT TRUCK (SU)

MEDIAN 30' OR LESS				
Design Speed	$d_x$	$d_L$	$d_r$	$d_m$
30	670	470	110	580
35	780	550	130	670
40	890	630	150	770
45	1000	710	170	860
50	1110	790	190	960
55	1220	860	200	1050
60	1330	940	220	1150
65	1440	1020	240	1240

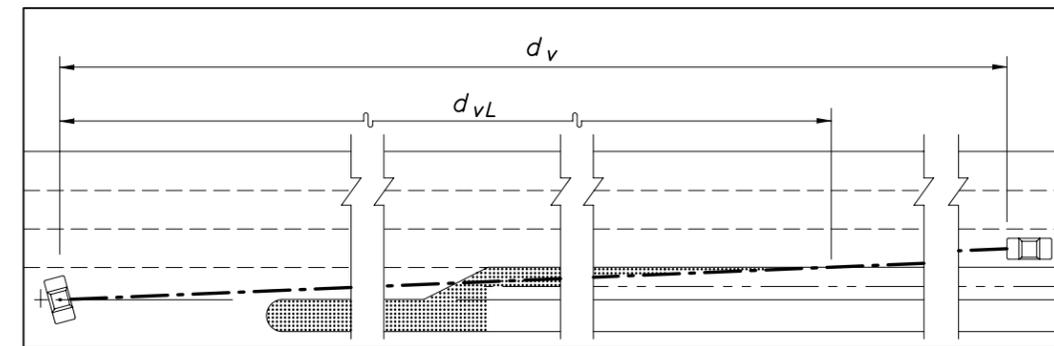
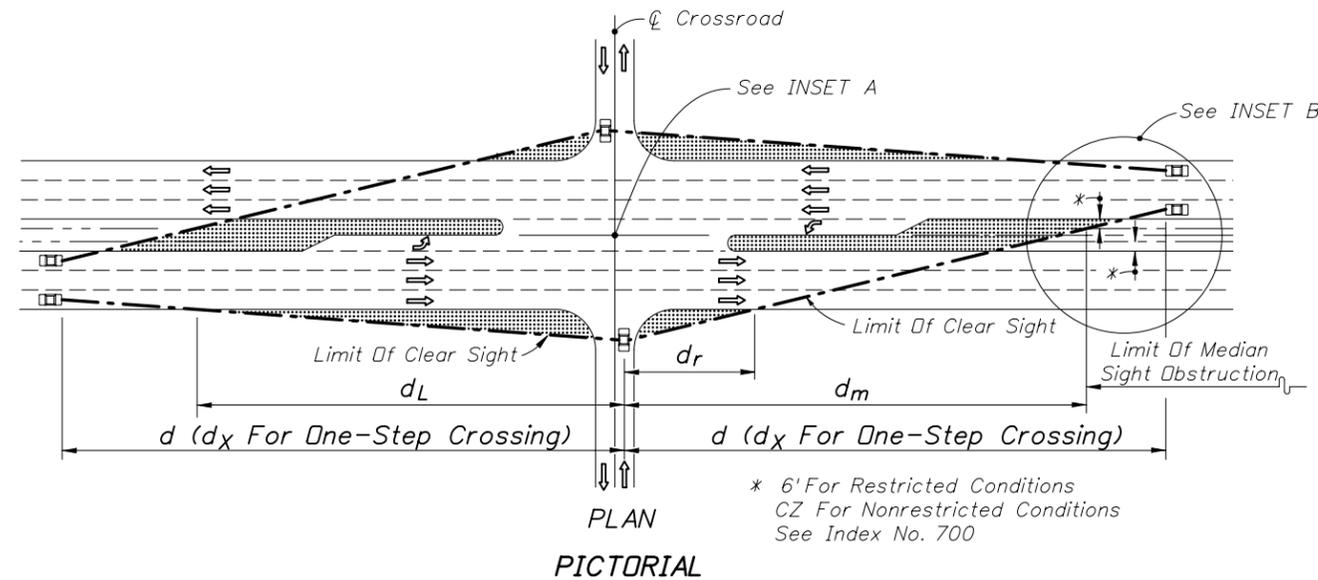
35'-50' MEDIAN				
Design Speed	$d_x$	$d_L$	$d_r$	$d_m$
30	720	510	100	640
35	830	590	110	740
40	950	670	130	840
45	1070	760	150	950
50	1190	840	160	1060
55	1310	930	180	1160
60	1430	1010	190	1270
65	1550	1100	210	1380

64' MEDIAN				
Design Speed	$d$	$d_L$	$d_v$	$d_{vL}$
30	490	350	510	360
35	580	410	590	420
40	660	470	680	480
45	740	520	760	540
50	820	580	850	600
55	910	640	930	660
60	990	700	1020	720
65	1070	760	1100	780

INTERMEDIATE SEMI-TRAILERS (WB-40 & WB-50)

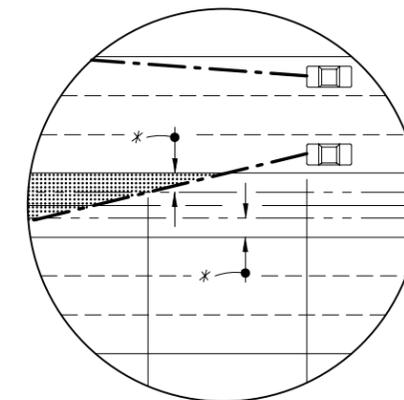
SIGHT DISTANCES ( $d$ ), ( $d_v$ ) & ( $d_x$ ) AND RELATED DISTANCES ( $d_L$ ,  $d_r$ ,  $d_m$  &  $d_{vL}$ ) (FEET)

6 LANE DIVIDED



Where The Median Is Sufficiently Wide For The Design Vehicle To Pause In The Median (Vehicle Length Plus 6' Min.) The Clear Line Of Sight To The Right ( $d_v$ ) Is Measured From The Vehicle Pause Location, i.e., Not From The Cross Road Stop Position; Distances  $d_r$  &  $d_m$  Do Not Apply.

INSET A



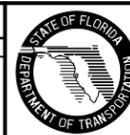
INSET B

NOTES FOR 6-LANE DIVIDED ROADWAY

1. See Sheet 2 for origin of clear sight line on the minor road.
2. Values shown in the tables are the governing (controlling) sight distances calculated based on 'AASHTO Case B - Intersection with Stop Control on the Minor Road.'

REVISIONS

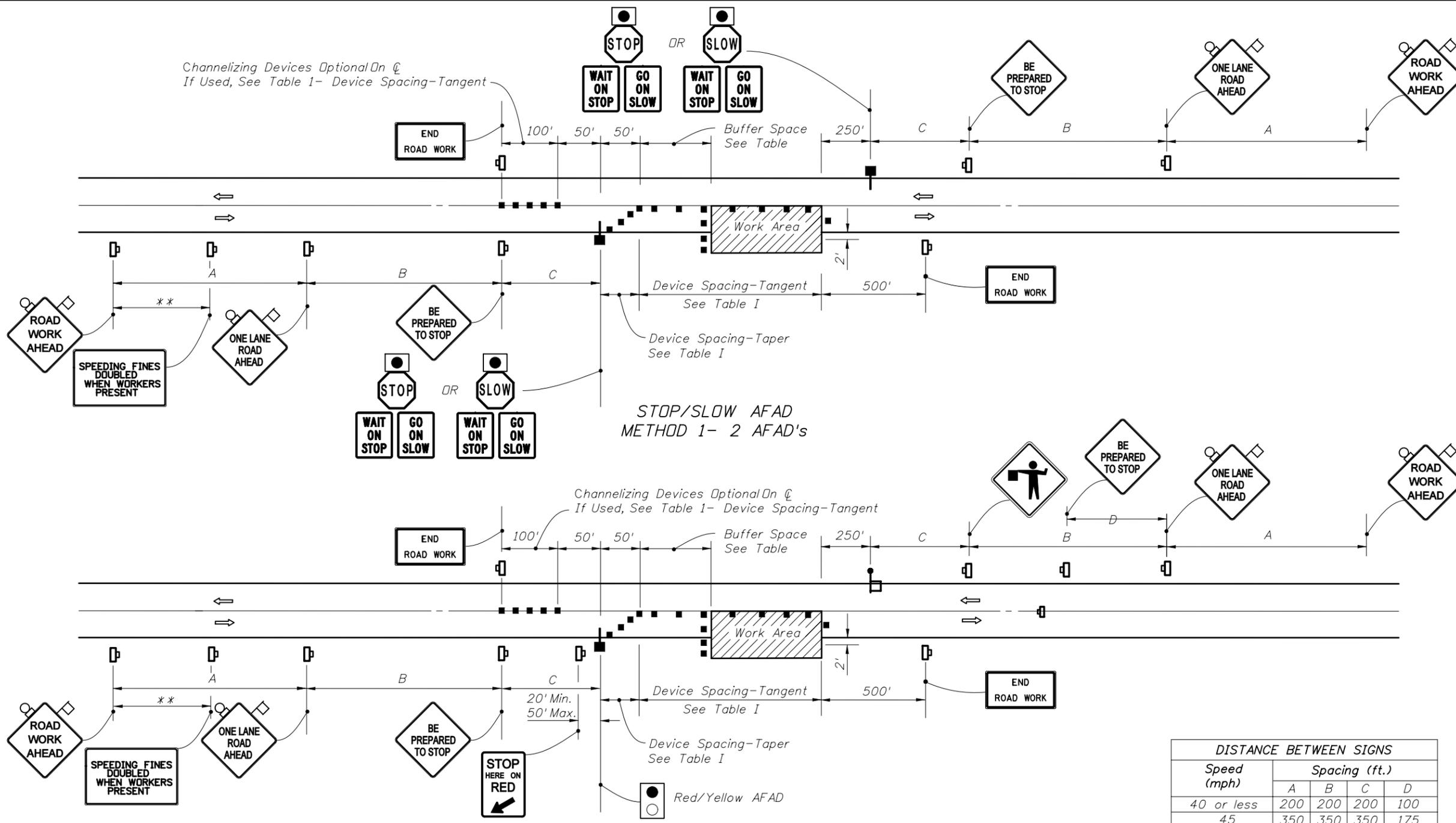
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	JM	Removed "Area limited to ground cover" from sheet.			



2010 Interim Design Standard

SIGHT DISTANCE AT INTERSECTIONS

Interim Date	Sheet No.
07/01/10	6 of 6
Index No.	
546	

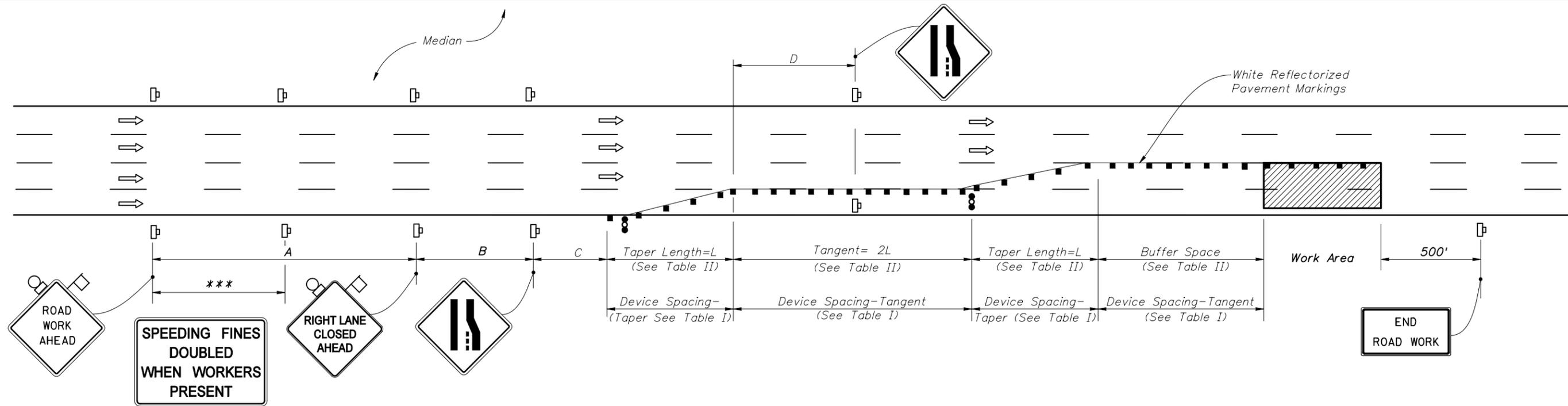


Speed (mph)	DISTANCE BETWEEN SIGNS			
	A	B	C	D
40 or less	200	200	200	100
45	350	350	350	175
50	500	500	500	250
55 or greater	2640	1640	1000	500

\* (See Sheet 1 Notes)  
\*\* (See Sheet 1 Notes)

**AUTOMATED FLAGGER ASSISTANCE DEVICES (AFAD) NOTES**

- AFAD's shall only be used in situations where there is only one lane of approaching traffic in the direction to be controlled.
  - When used at nighttime, the AFAD flagging station shall be illuminated.
  - When the AFAD is not in use, it shall be moved outside the clear zone or be shielded by a barrier or crash cushion and the signs associated with the AFAD shall be removed or covered.
  - Duration Notes shown on sheet 1 of 2 do not apply when AFAD are used.
  - Only qualified flaggers who have been trained in the operation of the AFAD may operate the AFAD. When in use, each AFAD must be in view of and attended at all times by the flagger operating the device. Use two flaggers and one of the following methods in the deployment of AFAD:  
 Method 1: Place an AFAD at each end of the temporary traffic control zone.  
 Method 2: Place an AFAD at one end of the temporary traffic control zone and a flagger at the opposite end.
- A single flagger may simultaneously operate two AFAD (Method 1) or may operate a single AFAD on one end of the temporary traffic control zone while being the flagger at the opposite end of the temporary traffic control zone (Method 2) if all four of the following conditions are present:
- The flagger has an unobstructed view of the AFAD(s);
  - The flagger has an unobstructed view of approaching traffic in both directions; and
  - For Method 1, the AFAD's are less than 800 ft apart. For Method 2, the AFAD and the flagger are less than 800 ft apart.
  - Ensure two trained flaggers are available on-site to provide normal flagging operations should an AFAD malfunction.



DISTANCE BETWEEN SIGNS				
Speed	Spacing (ft.)			
	A	B	C	D**
40 mph or less	200	200	200	L
45 mph	350	350	350	L
50 mph	500	500	500	L
*55 mph or greater	2640	1640	1000	L

\* The ROAD WORK 1 MILE sign may be used as an alternate to the ROAD WORK AHEAD sign and the RIGHT LANE CLOSED 1/2 MILE sign may be used as an alternate to the RIGHT LANE CLOSED AHEAD sign.

\*\* See Table II for L

\*\*\* 500' beyond the ROAD WORK AHEAD sign or midway between signs whichever is less.

Table I Device Spacing				
Speed (mph)	Max. Distance Between Devices (ft.)			
	Cones or Tubular Markers		Type I or Type II Barricades or Vertical Panels or Drums	
	Taper	Tangent	Taper	Tangent
25	25	50	25	50
30 to 45	25	50	30	50
50 to 70	25	50	50	100

Table II Buffer Space and Taper Length			
Speed (mph)	Buffer Space	Taper Length (12' Lateral Transition)	
	Dist. (ft.)	L (ft.)	Notes (Merge)
25	155	125	L = WS <sup>2</sup> /60
30	200	180	
35	250	245	
40	305	320	L = WS
45	360	540	
50	425	600	
55	495	660	
60	570	720	
65	645	780	
70	730	840	

When Buffer Space cannot be attained due to geometric constraints, the greatest attainable length shall be used, but not less than 200 ft.

For lateral transitions other than 12', use formula for L shown in the notes column.

Where:  
L = Length of taper in feet  
W = Width of lateral transition in feet  
S = Posted speed limit (mph)

### GENERAL NOTES

1. Work operations shall be confined to the two outside traffic lanes, leaving the adjacent lane(s) open to traffic.
2. On undivided highways the median signs as shown are to be omitted.
3. When work is performed in the median lane on divided highways, the channelizing device plan is inverted and left lanes closed and lane ends signs substituted for the right lanes closed and lane end signs.
4. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
5. For general TCZ requirements and additional information, refer to Index No. 600.
6. When paved shoulders having a width of 8 ft. or more are closed, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the travelway. See Index No. 612 for shoulder taper formulas.

### DURATION

Temporary white edgeline may be omitted for work operations less than three (3) days.

### CONDITIONS

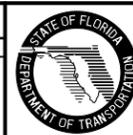
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCRDACH ON THE TWO LANES ADJACENT TO EITHER SHOULDER.

### SYMBOLS

- Work Area
- Sign With 18"x 18" (Min.) Orange Flag And Type B Light
- Channelizing Device (See Index No. 600)
- Work Zone Sign
- Advance Warning Arrow Panel

### REVISIONS

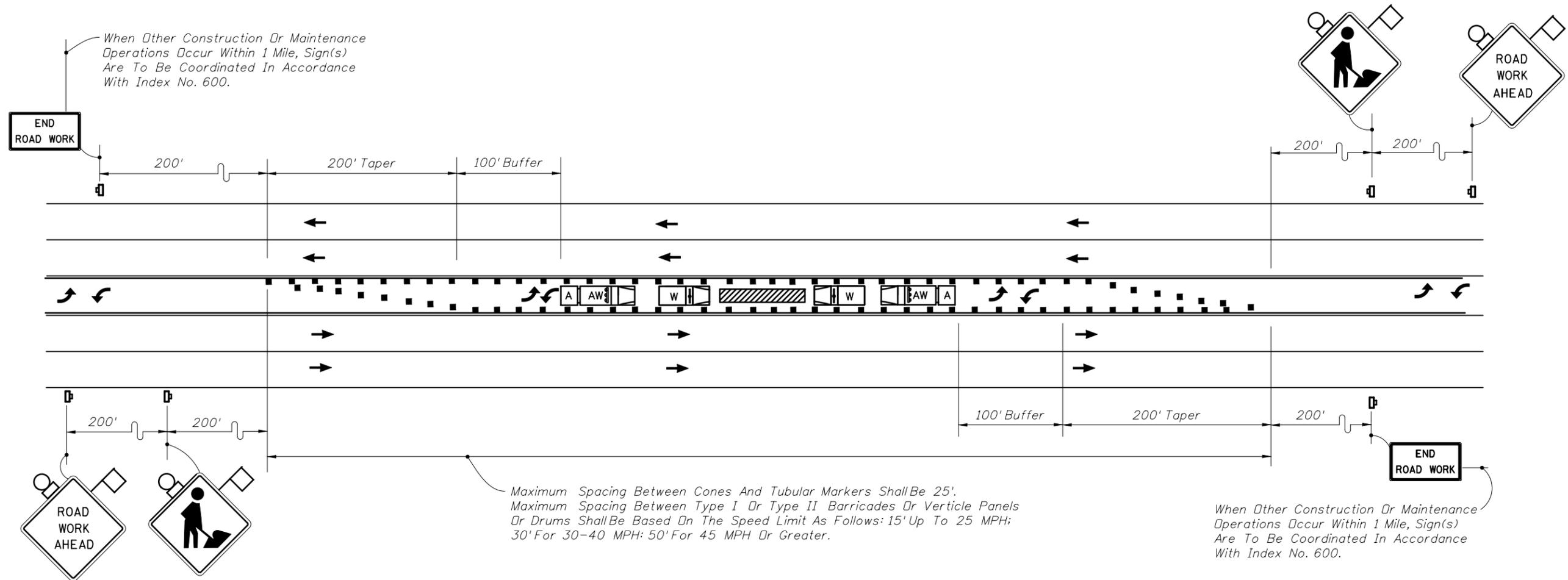
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	RJK	New Design Standard			



2010 Interim Design Standard

## MULTILANE, WORK WITHIN THE TRAVEL WAY DOUBLE LANE CLOSURE

Interim Date  
07/01/10  
Sheet No.  
1 of 1  
Index No.  
**623**



**SYMBOLS**

-  Work Area
-  Channelizing Device (See Index No. 600)
-  Work Zone Sign
-  Work Vehicle With Rotating/Strobe Lights
-  Shadow (S) Or Advance Warning (AW) Vehicle with Advance Warning Arrow Panel and Sign Message
-  Truck/Trailer Mounted Attenuator (TMA)
-  Sign With 18" x 18" (Min.) Orange Flag And Type B Light

**GENERAL NOTES**

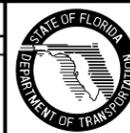
1. Work operations shall be confined to two way left turn lane, leaving the adjacent lanes open to traffic.
2. Advance Warning Vehicle will have an Advanced Warning Arrow Panel in the Warning Mode.
3. When a side road intersects the highway within the TTC zone, additional TTC devices shall be placed in accordance with other applicable TCZ Indexes.
4. For general TCZ requirements and additional information, refer to Index No. 600.

**CONDITIONS**

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ARE BEING CONDUCTED IN THE TWO WAY LEFT TURN LANE.

**REVISIONS**

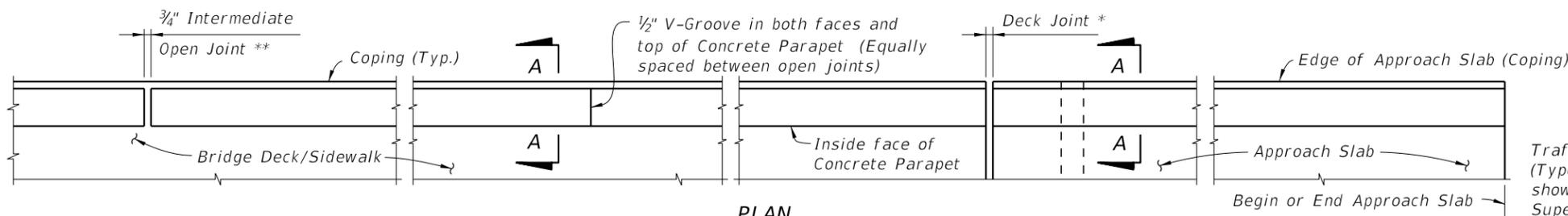
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	CA	Updating detail to comply with MUTCD			



2010 Interim Design Standard

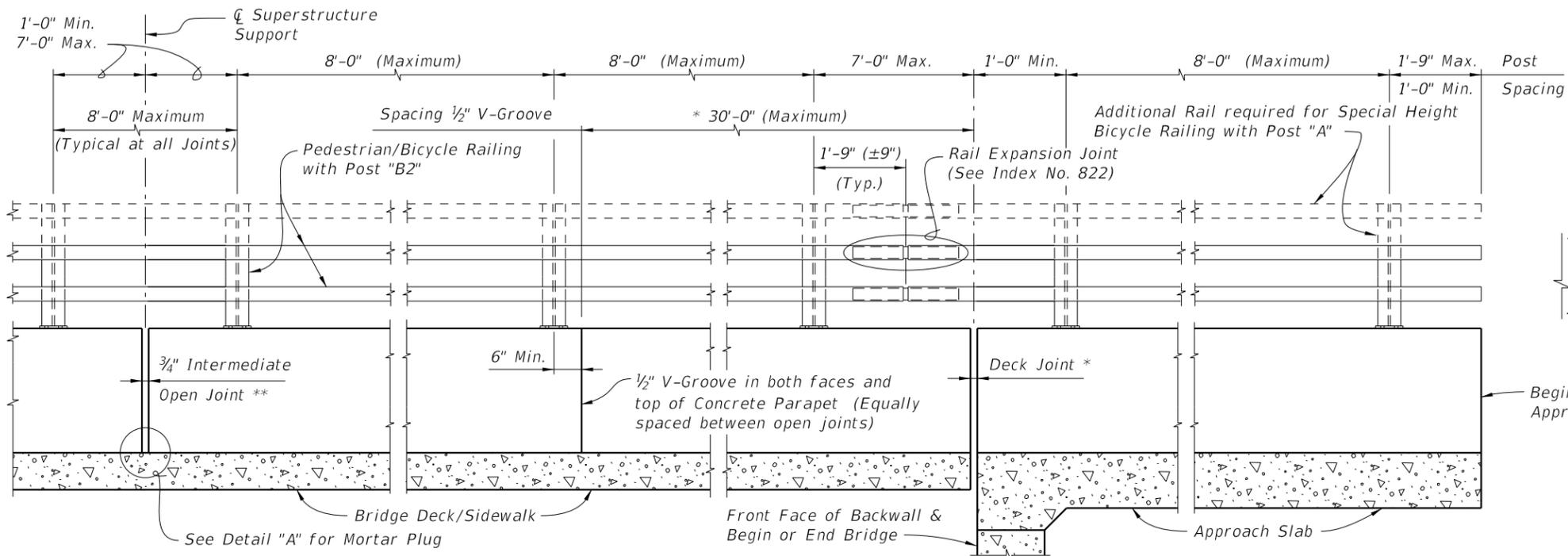
**TWO-WAY LEFT TURN LANE CLOSURE**

Interim Date	Sheet No.
07/01/10	1 of 1
Index No.	
628	



**PLAN**  
(Rails, Posts & Reinforcing Steel not shown for clarity)

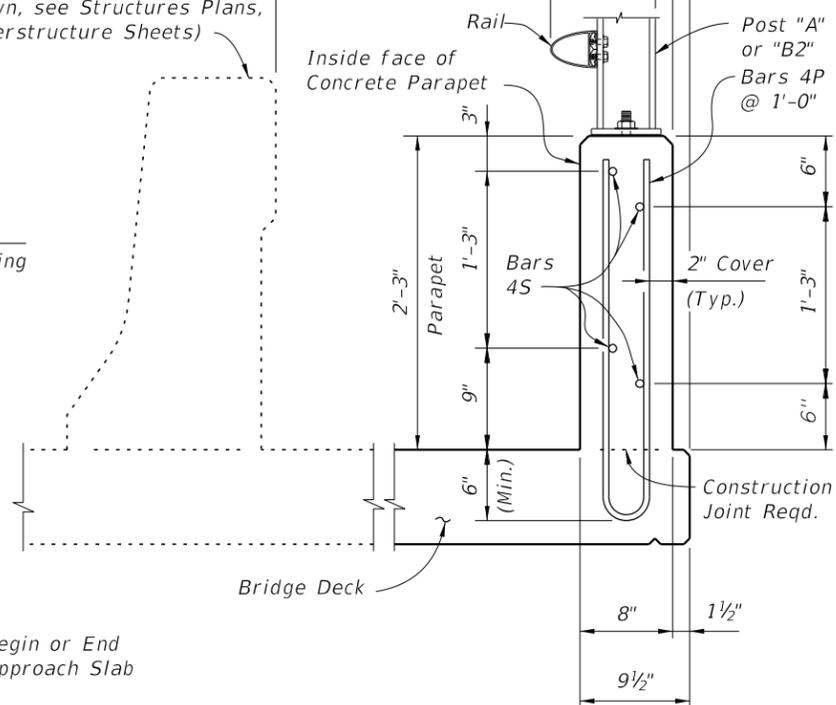
\*\* 3/4" Intermediate Open Joints shall be provided at locations coinciding with 3/4" Joints for the Traffic Railing.



**ELEVATION OF INSIDE FACE OF RAILING**  
(Reinforcing Steel not shown for clarity)  
(Aluminum Bullet Railing Shown, For Bridge Fencing see Index Nos. 810, 811 or 812)

\* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Parapet Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown. Deck Joint at Center Pier or Intermediate Bent similar.

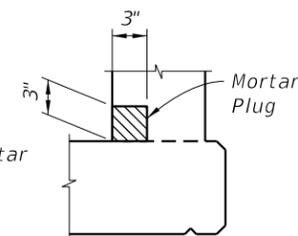
Traffic Railing required (Type Varies, 32" F Shape shown, see Structures Plans, Superstructure Sheets)



**SECTION A-A**  
(Typical Section Thru Bridge Deck Shown, Section Thru Approach Slab Similar)  
(Aluminum Bullet Railing Shown, For Bridge Fencing see Index Nos. 810, 811 or 812)

NOTE:

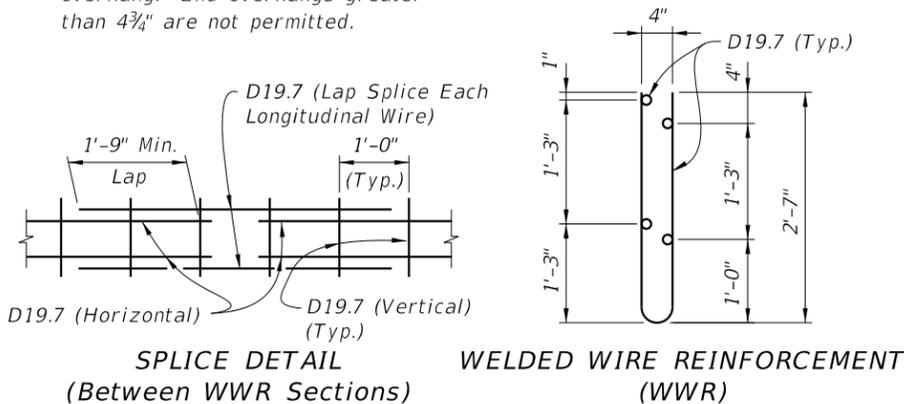
At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.



**DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT**

**ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS**

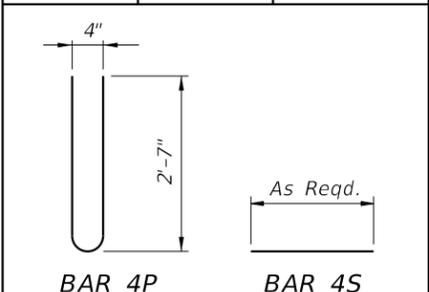
NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4 3/4" are not permitted.



**CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS**

**BILL OF REINFORCING STEEL**

MARK	SIZE	LENGTH
P	4	5'-5"
S	4	As Reqd.



**ESTIMATED CONCRETE PARAPET QUANTITIES**

ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.056
Reinforcing Steel	LB/LF	6.29

(The above quantities are based on a deck with a 2% cross slope)

**REINFORCING STEEL NOTES:**

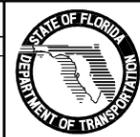
- All bar dimensions in the bending diagrams are out to out.
- The reinforcement for the parapet on a retaining wall shall be the same as detailed above for a 8" deck.
- All reinforcing steel at the open joints shall have a 2" minimum cover.
- Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
- At the option of the Contractor Welded Wire Reinforcement (WWR) may be used in lieu of all Bars 4P and 4S. Welded Wire Reinforcement shall conform to ASTM A497.

**PEDESTRIAN/BICYCLE RAILING NOTES:**

- CONCRETE PARAPET:** Concrete parapet shall be placed vertical and top surface shall be level transversely.
- RAIL AND POST DETAILS:** For Rail, Post, Rail Expansion Joint fabrication and installation details and notes see Index No. 822.
- BRIDGE FENCING:** For Bridge Fencing see Index Nos. 810, 811 or 812 in lieu of Posts and Rails on Index No. 822.
- PAYMENT:** Concrete Parapet shall be paid for under the contract unit price for 27" Concrete Parapet (Pedestrian/Bicycle), LF, and Rails shall be paid for under Aluminum Bullet Railings, LF.

**REVISIONS**

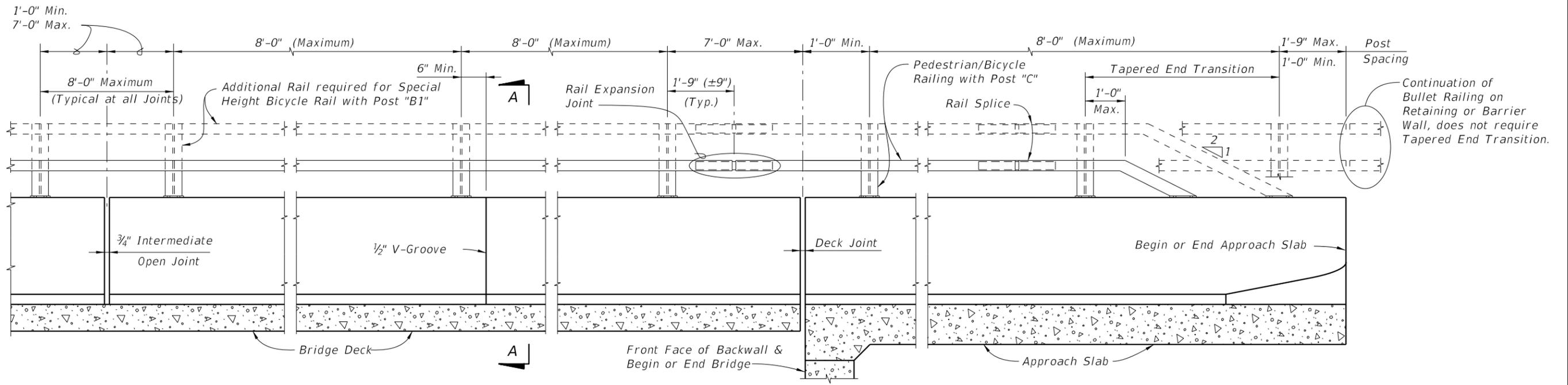
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	Changed Post offset dimensions to Joints.			
07/01/10	SJN	Added "PAYMENT" note to "PEDESTRIAN/BICYCLE NOTES:" Deleted Intermediate Open Joints in Concrete Parapet.			



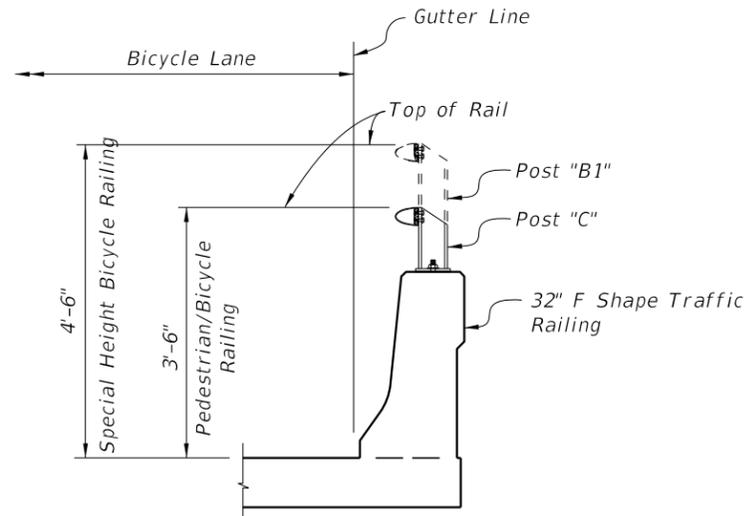
2010 Interim Design Standard

**PEDESTRIAN/BICYCLE BULLET RAILING**

Interim Date	Sheet No.
07/01/10	1 of 1
Index No.	
820	



ELEVATION OF INSIDE FACE OF TRAFFIC RAILING WITH PEDESTRIAN/BICYCLE BULLET RAILING



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

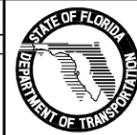
NOTES:

RAIL AND POST DETAILS: For Post, Rail and Rail Expansion Joint fabrication and installation Details and Notes see Index No. 822.

TRAFFIC RAILING DETAILS: For Traffic Railing Details, Reinforcement and Notes see Index No. 420.

REVISIONS

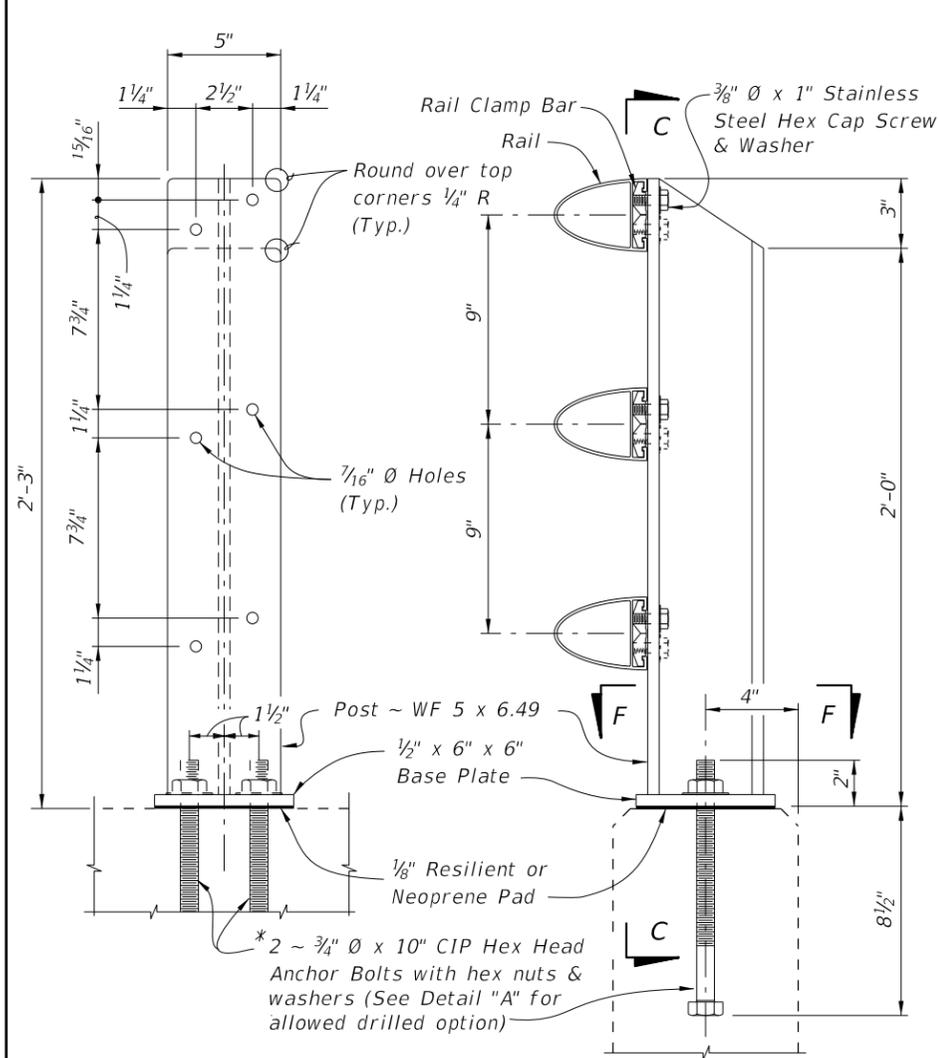
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	Changed Post offset dimensions to Joints.			
07/01/10	SJN	Added "Tapered End Transition" to Bullet Railing Deleted Instructions to Designer			



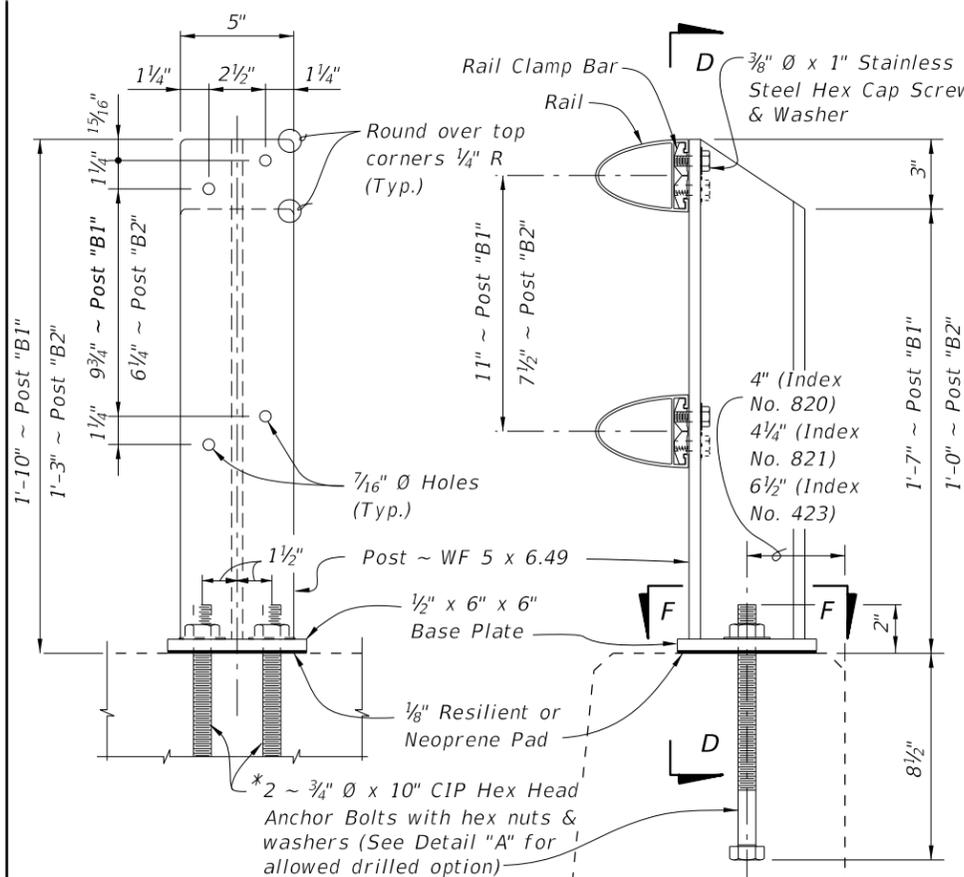
2010 Interim Design Standard

ALUMINUM PEDESTRIAN/BICYCLE BULLET RAILING  
FOR TRAFFIC RAILING (32" F SHAPE)

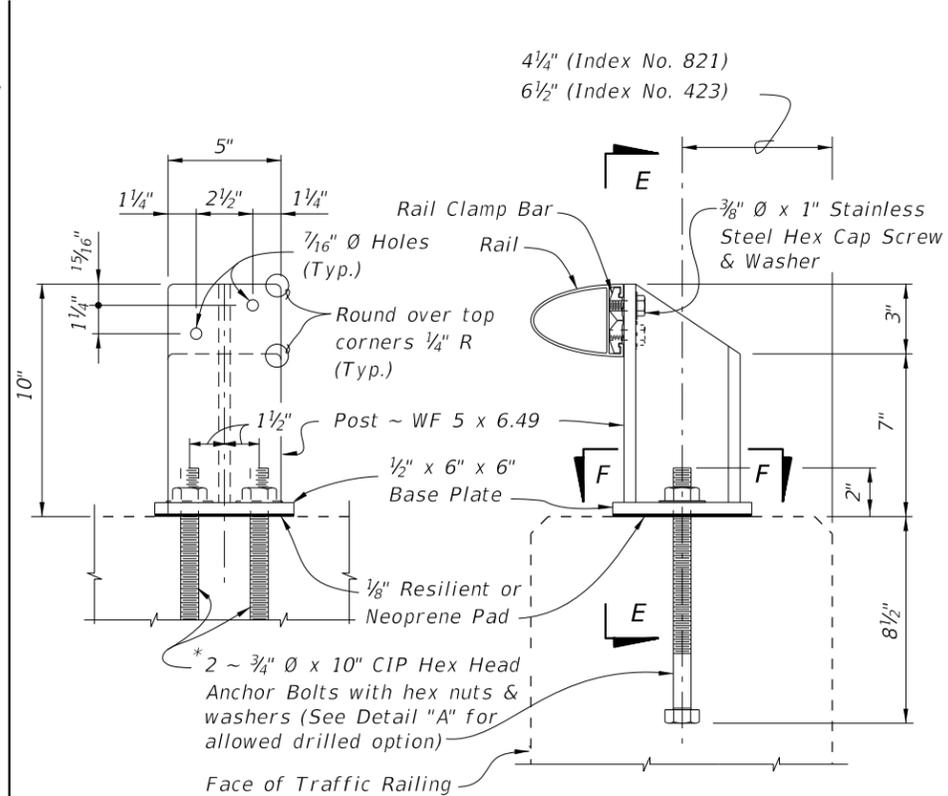
Interim Date	Sheet No.
07/01/10	1 of 1
Index No.	
821	



**SECTION C-C  
(RAILS NOT SHOWN)**  
**POST "A" DETAILS FOR SPECIAL HEIGHT BICYCLE RAILING  
ON CONCRETE PARAPET (INDEX NO. 820)**

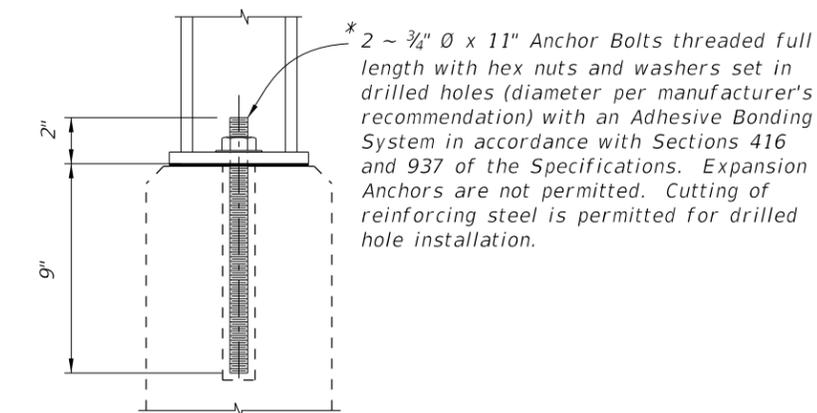


**SECTION D-D  
(RAILS NOT SHOWN)**  
**ELEVATION OF POST "B"**  
**POST "B1" DETAILS FOR SPECIAL HEIGHT BICYCLE RAILING ON  
TRAFFIC RAILINGS (INDEX NO. 423 AND 821)  
AND POST "B2" DETAILS FOR PEDESTRIAN/BICYCLE  
RAILING ON CONCRETE PARAPETS (INDEX NO. 820)**

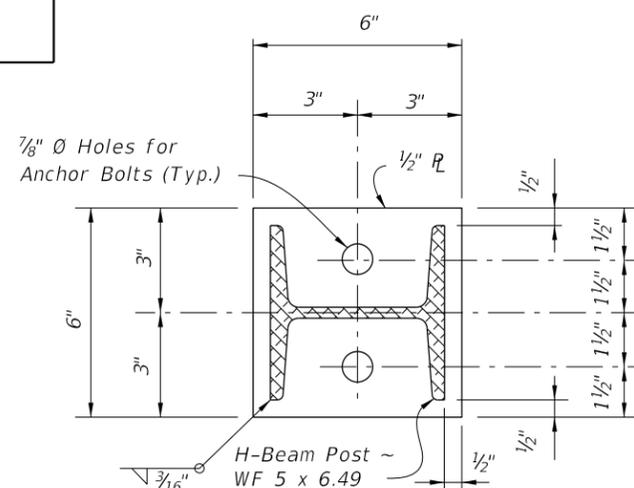


**SECTION E-E  
(RAIL NOT SHOWN)**  
**ELEVATION OF POST "C"**  
**POST "C" DETAILS FOR PEDESTRIAN/BICYCLE RAILING  
ON TRAFFIC RAILINGS (INDEX NO. 423 AND 821)**

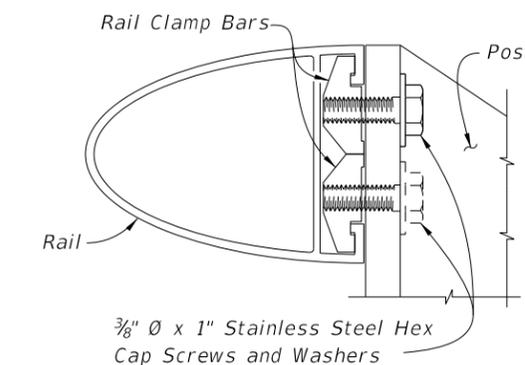
NOTE: After nuts have been tightened, the bolt threads shall be deformed to prevent removal of nuts. Tack welding of nuts to anchor bolts, to prevent theft, is permitted. Coat deformed or tack welded threads with a galvanizing compound in accordance with Section 562 of the Specifications.



**ALTERNATE ANCHOR BOLT DETAIL "A"**  
**(Concrete Parapet Shown,  
Traffic Railings Similar)**



**SECTION F-F  
BASE PLATE DETAIL**



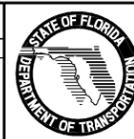
**RAIL TO POST CONNECTION DETAIL**

**CROSS REFERENCES:**

- For Post "A" and Post "B2" spacing see Index No. 820.
- For Post "B1" & Post "C" spacing see Index Nos. 423 or 821.
- For Rail Details see Index Sheet 2.
- For Railing Notes and Tapered End Transition Details see Sheet 3.

**REVISIONS**

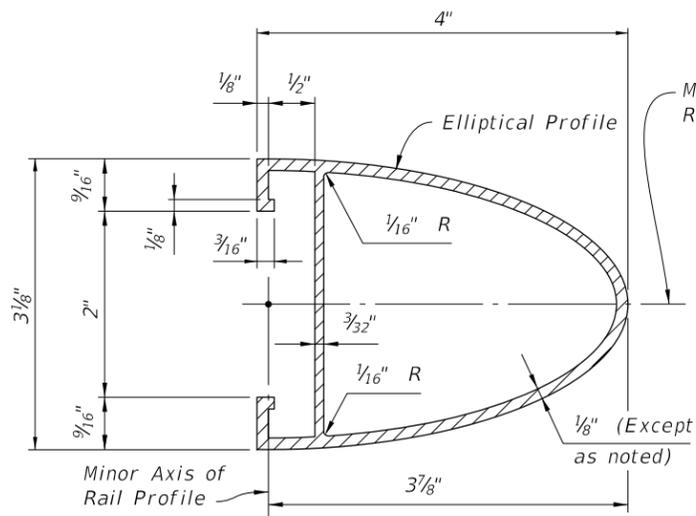
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Changed Cross Reference Note and total number of Sheets to 3.			



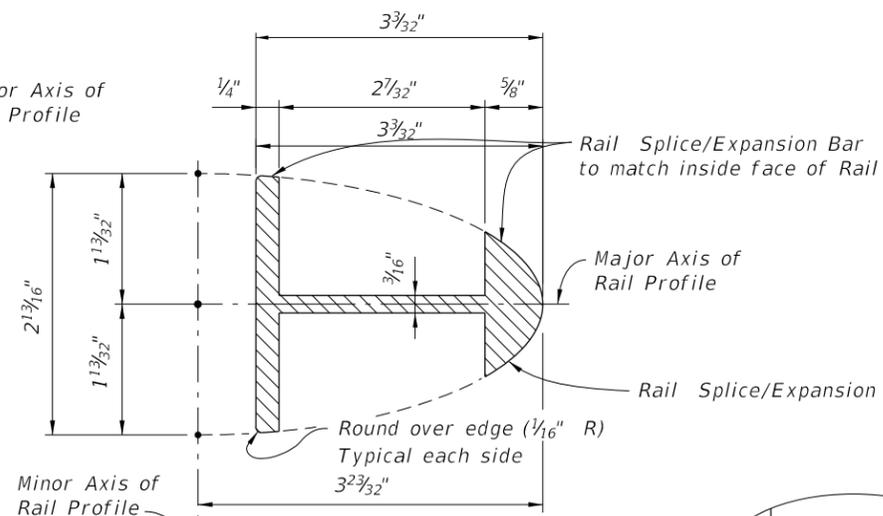
2010 Interim Design Standard

**ALUMINUM PEDESTRIAN/BICYCLE  
BULLET RAILING DETAILS**

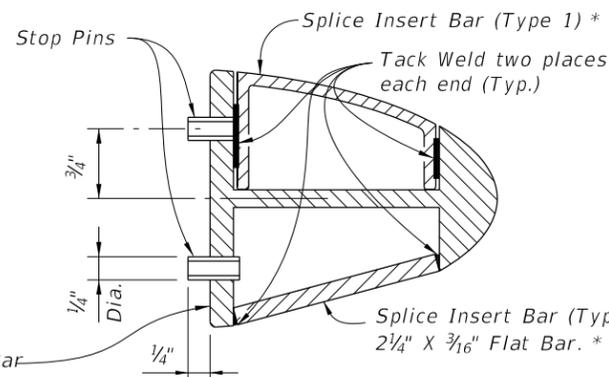
Interim Date: 07/01/10  
Sheet No.: 1 of 3  
Index No.: **822**



**SECTION A-A  
TYPICAL SECTION THRU RAIL**



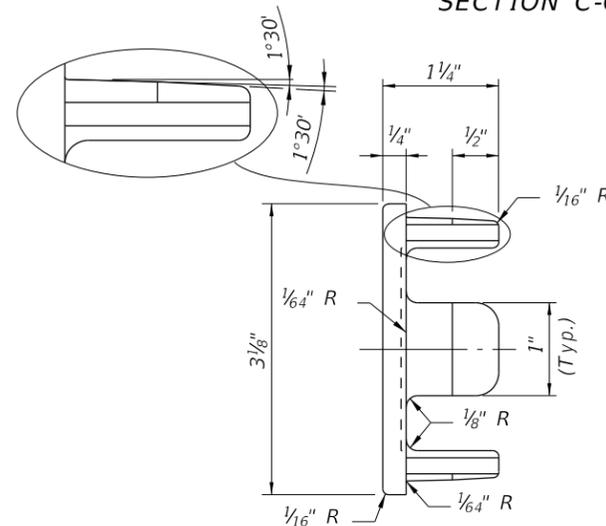
**SECTION B-B - RAIL SPLICE/EXPANSION BAR  
(Rail not shown for clarity)**



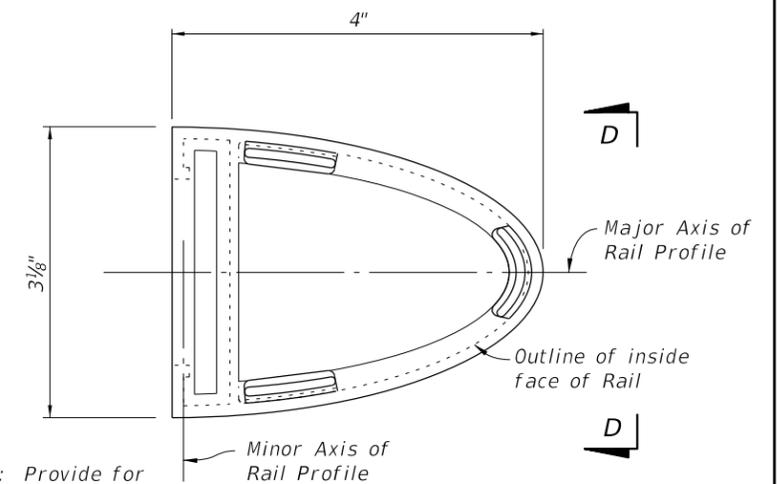
**SECTION C-C**

**SPLICE INSERT BAR DETAIL (TYPE 1)**

\* Use of either Type 1 or Type 2 Splice Insert Bars is at the option of the Contractor.

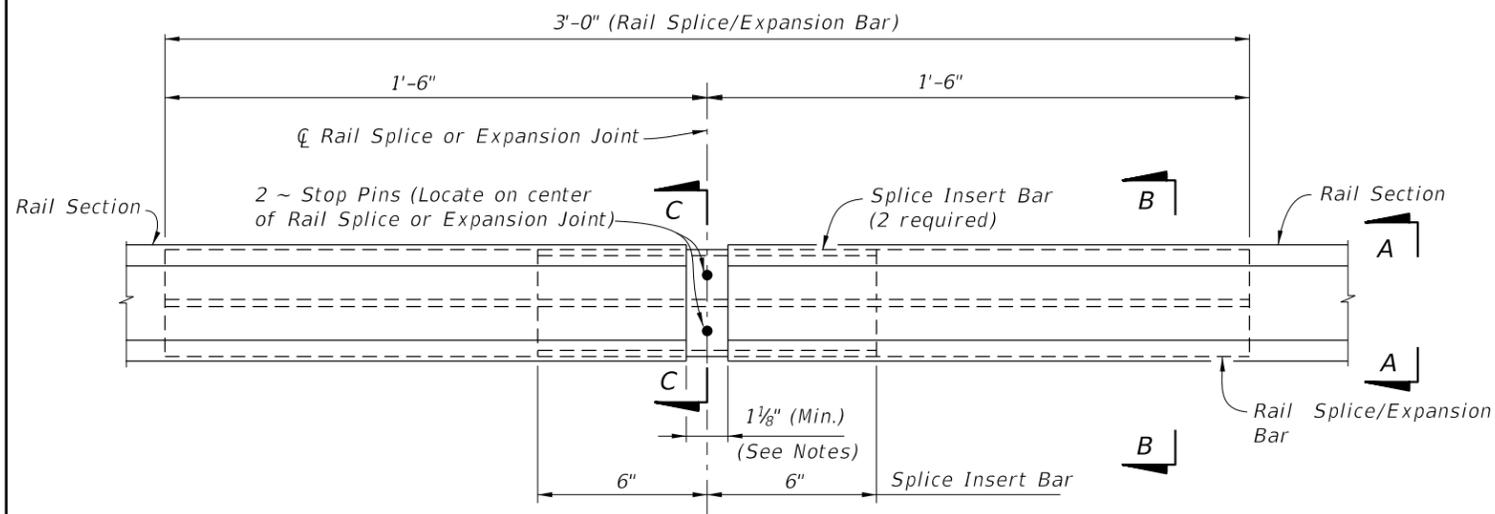


**VIEW D-D**

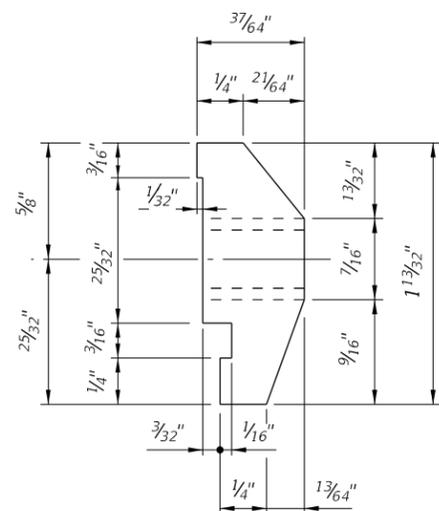


**RAIL END CAP DETAIL**

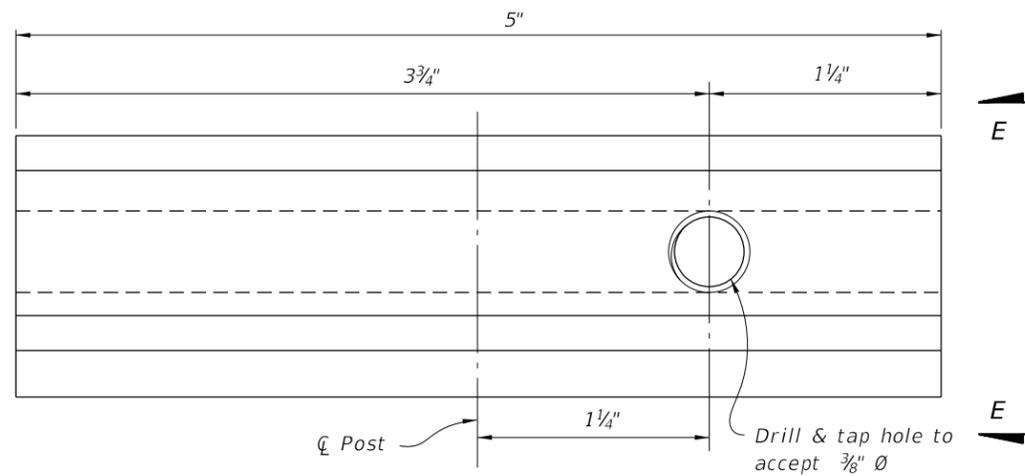
NOTE: Provide for drive fit.



**RAIL SPLICE ASSEMBLY DETAIL (TYPICAL AT BRIDGE EXPANSION JOINTS AND RAIL SPLICE LOCATIONS)**



**VIEW E-E**



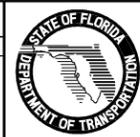
**RAIL CLAMP BAR DETAIL**

Drill & tap hole to accept 3/8" Ø Stainless Steel Fasteners

CROSS REFERENCE:  
For Railing Notes and Tapered End Transition Details,  
See Sheet 3.

**REVISIONS**

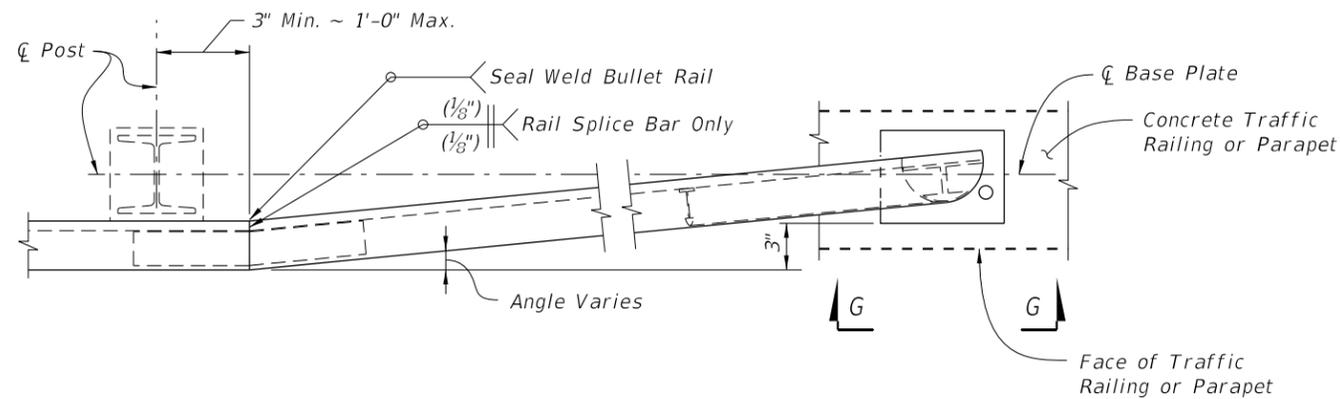
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Moved Railing Notes to Sheet 3. Changed Cross Reference.			



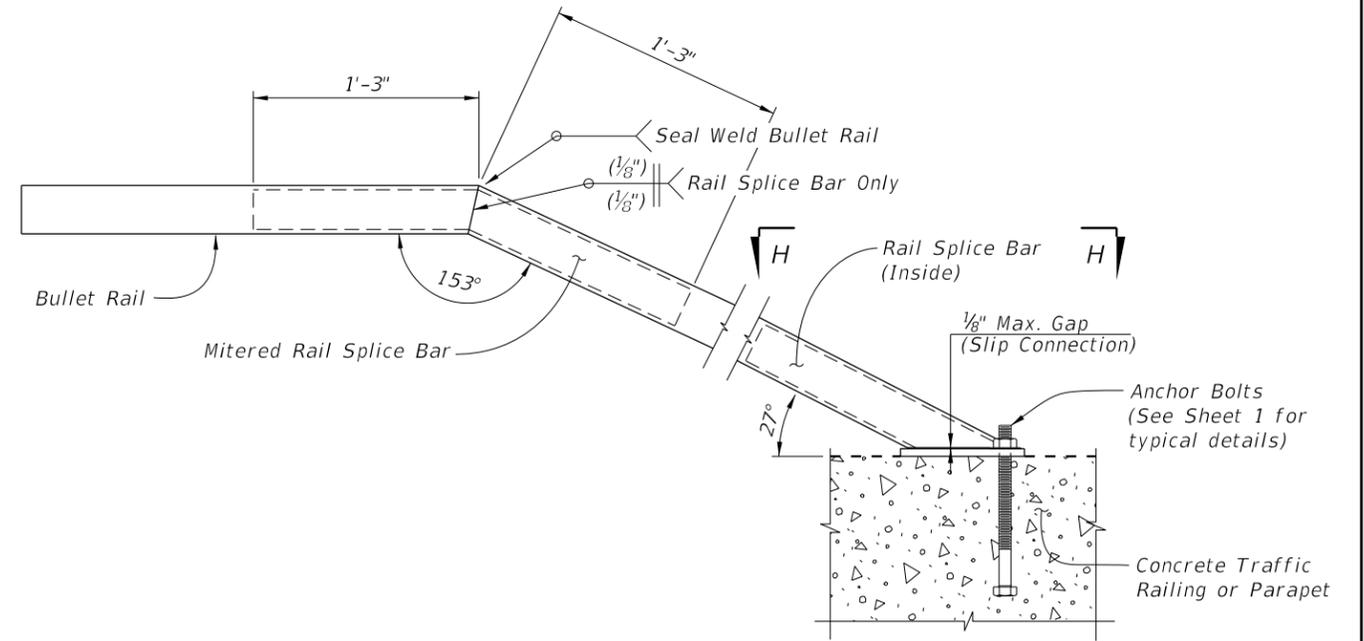
2010 Interim Design Standard

**ALUMINUM PEDESTRIAN/BICYCLE  
BULLET RAILING DETAILS**

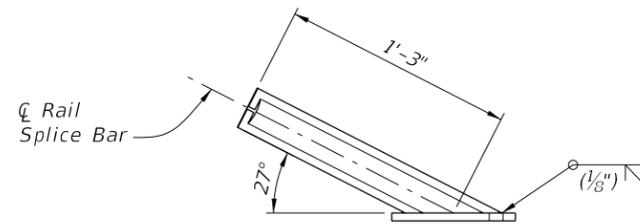
Interim Date	Sheet No.
07/01/10	2 of 3
Index No.	
<b>822</b>	



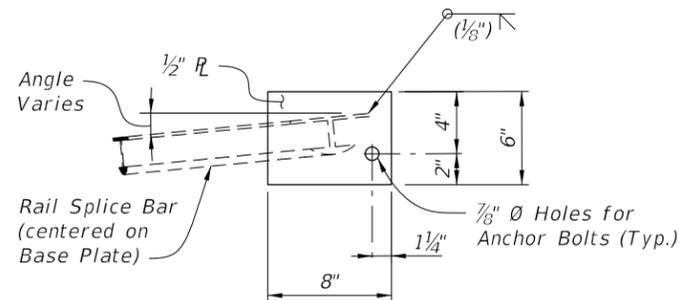
**PARTIAL PLAN OF TAPERED END TRANSITION**  
(Single Rail Shown, Double or Triple Rail Similar)



**ELEVATION OF TAPERED END TRANSITION**  
(Single Rail Shown, Double or Triple Rail Similar)



**VIEW G-G TRANSITION BASE PLATE**  
(Bullet Rail not shown for Clarity)



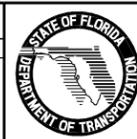
**VIEW H-H TRANSITION BASE PLATE**  
(Bullet Rail not shown for Clarity)

**RAILING NOTES:**

- PAYMENT:** Payment for the railing includes Rails, Posts, Rail Splice Assemblies, Rail Clamp Bars, Rail End Caps, Anchor Bolts, Nuts, Resilient Pads, Screws and Washers and all incidental materials and labor required to complete the installation.
- POST ASSEMBLY:** Fabricated wrought aluminum; Post - ASTM B221, alloy 6061-T6, or alloy 6351-T5; Base Plate - ASTM B209, alloy 6061-T6.
- WELDING:** Welding of aluminum components shall be in accordance with ANSI and AWS D1.2 "Structures Welding Code - Aluminum".
- RAIL AND RAIL SPLICE ASSEMBLIES:** Aluminum; ASTM B221, alloy 6061-T6, or alloy 6351-T5. Stop Pins shall be press-fit Aluminum or Stainless Steel pins or tubes, unless otherwise approved by the Engineer.
- RAIL CLAMP BAR:** Aluminum; ASTM B221, alloy 6061-T6, or alloy 6351-T5.
- STAINLESS STEEL FASTENERS:** 3/8" Ø Hex Cap Screws and Washers shall be ASTM F-593, alloy group 2 (316).
- ANCHOR BOLTS:** Anchor bolts shall be in accordance with ASTM A36 or ASTM F1554, Grade 36. Anchor Bolts, Nuts, and Washers shall be hot dip galvanized in accordance with Section 962 of the Specifications.
- RAIL END CAP:** ASTM B26 sand cast aluminum alloy 356.0-F.
- RAIL INSTALLATION:** Set Rail Posts normal to Profile Grade longitudinally and vertical transversely. Post spacings that land on barrier or parapet obstacles such as armor expansion plates etc. shall be adjusted to clear obstacles by 9" without exceeding maximum post spacing. Set Posts on 1/8" thick resilient or neoprene pads in accordance with Section 932 of the Specifications. The pad dimension shall be the same as the post base plate. Provide rail expansion joint in panels between posts on either side of Bridge Expansion Joints. Rail expansion joints shall be similar to rail splice with provision for movement equal to 1.5 times the bridge joint opening or 1" greater than the expected joint movement. Take care to ensure rails are set with the proper openings. Remove any burrs or sharp edges on rails and posts to prevent injury.
- RAIL SPLICES:** Rails shall be continuous over a minimum of 3 posts, except that lengths less than 12' need only be continuous over 2 posts. Space splices at 40'-0" maximum centers. Locate center of splice 1'-5" minimum from the edge of a post. Splice all rails in any railing section about the same center line.
- RESILIENT AND NEOPRENE PADS:** Resilient and Neoprene Pads shall be in accordance with the Specifications except that testing of the finished pads is not required. Neoprene pads shall be durometer hardness 60 or 70.
- SHOP DRAWINGS:** Submit complete details including rail, post and expansion joint locations and description of material of the proposed railing for the Engineer's approval prior to fabrication.
- CROSS REFERENCE:**  
For Post Details see Sheet 1.  
For Rail Details see Sheet 2.

**REVISIONS**

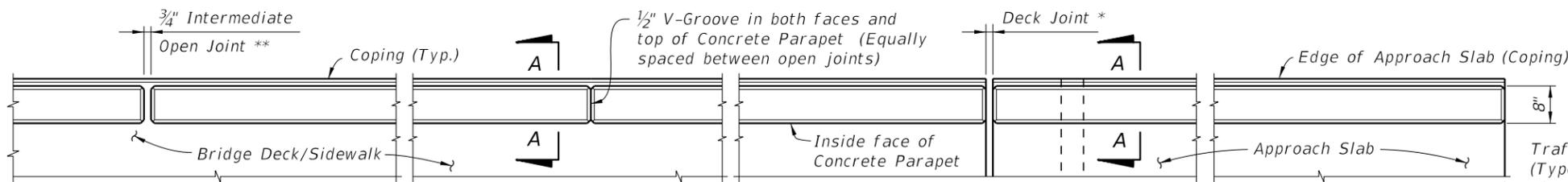
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Added Sheet 3			



2010 Interim Design Standard

**ALUMINUM PEDESTRIAN/BICYCLE  
BULLET RAILING DETAILS**

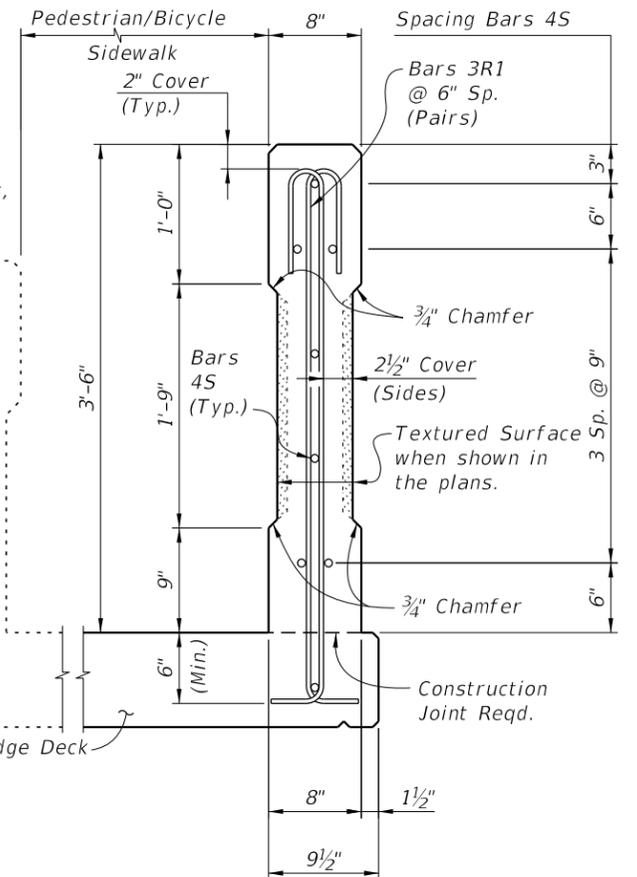
Interim Date	Sheet No.
07/01/10	3 of 3
Index No.	
<b>822</b>	



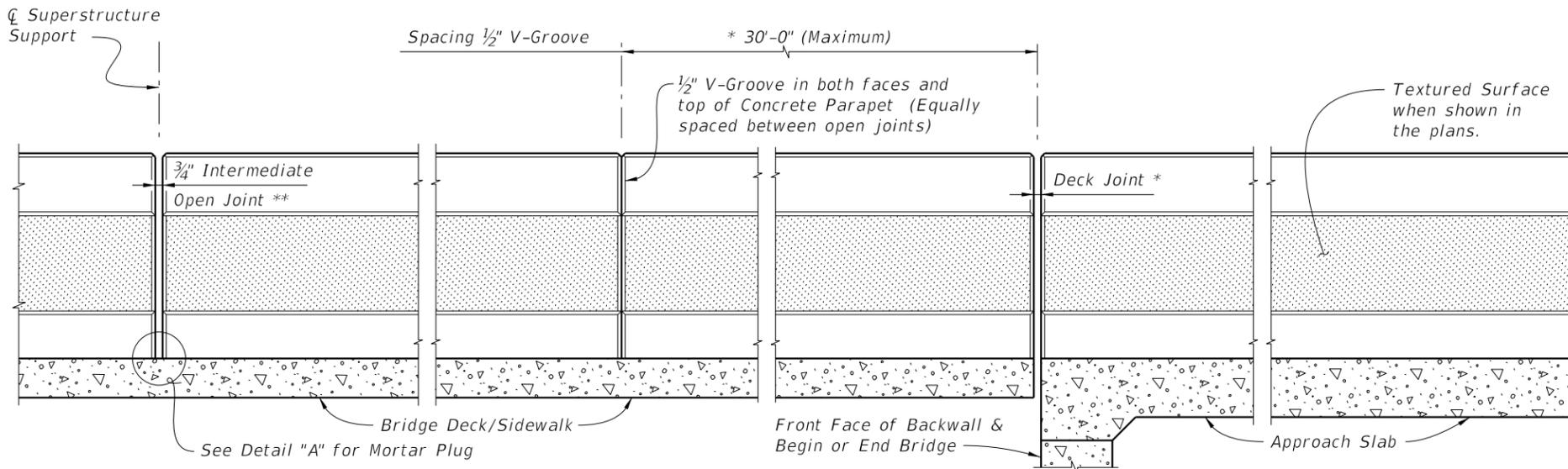
**PLAN**  
(Reinforcing Steel not shown for clarity)

\* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Parapet Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown. Deck Joint at  $\phi$  Pier or Intermediate Bent similar.

Traffic Railing required (Type Varies, 32" F Shape shown, see Structures Plans, Superstructure Sheets)



**SECTION A-A**  
(Typical C.I.P. Section Thru Bridge Deck Shown, Section Thru Approach Slab Similar)

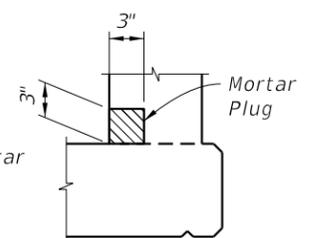


**ELEVATION OF INSIDE FACE OF RAILING**  
(Reinforcing Steel not shown for clarity)

\*\*  $\frac{3}{4}$ " Intermediate Open Joints shall be provided at locations coinciding with  $\frac{3}{4}$ " Joints for the Traffic Railing.

NOTE:

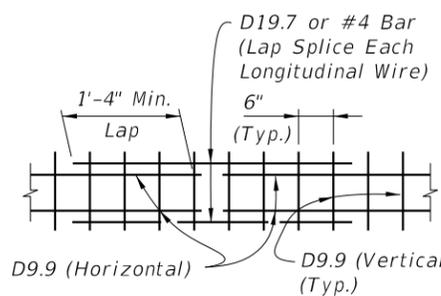
At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.



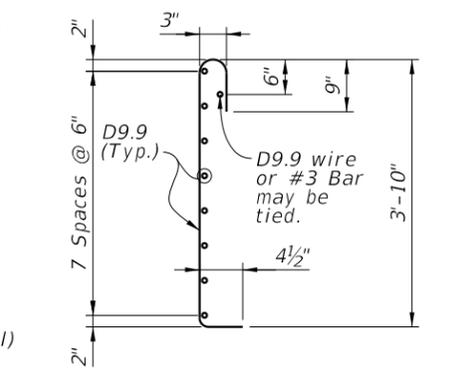
**DETAIL "A" - SECTION AT INTERMEDIATE OPEN JOINT**

**ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS**

NOTE: Place wire panels to ensure vertical wire is within 4" of open joints.



**SPLICE DETAIL**  
(Between WWR Sections)

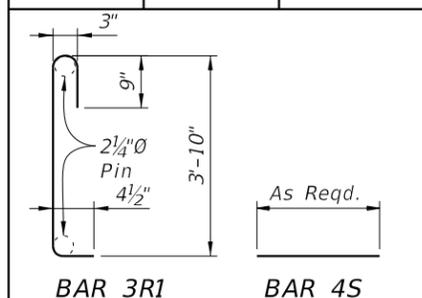


**WELDED WIRE REINFORCEMENT (WWR)**  
(2 Pieces Req'd.)

**CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS**

**BILL OF REINFORCING STEEL**

MARK	SIZE	LENGTH
R1	3	5'-2"
S	4	As Req'd.



**ESTIMATED CONCRETE PARAPET QUANTITIES**

ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.079
Reinforcing Steel	LB/LF	13.12

(The above quantities are based on a deck with a 2% cross slope)

**REVISIONS**

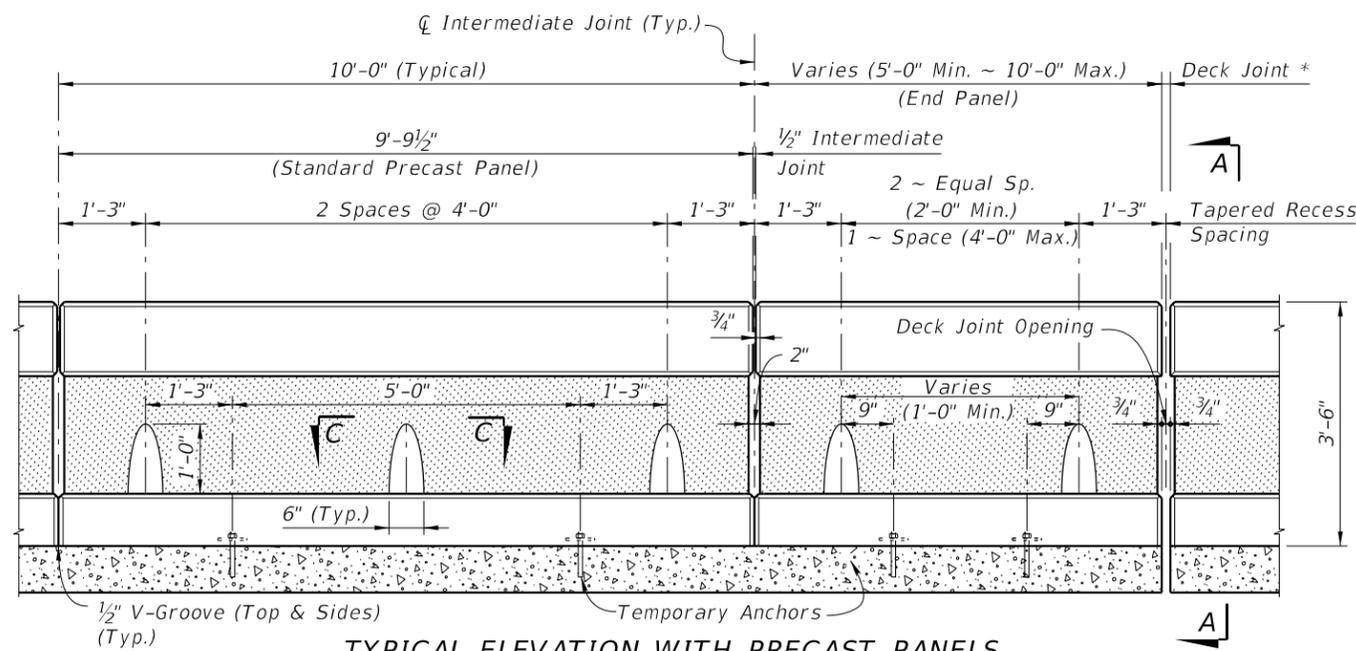
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	New Design Standard			



2010 Interim Design Standard

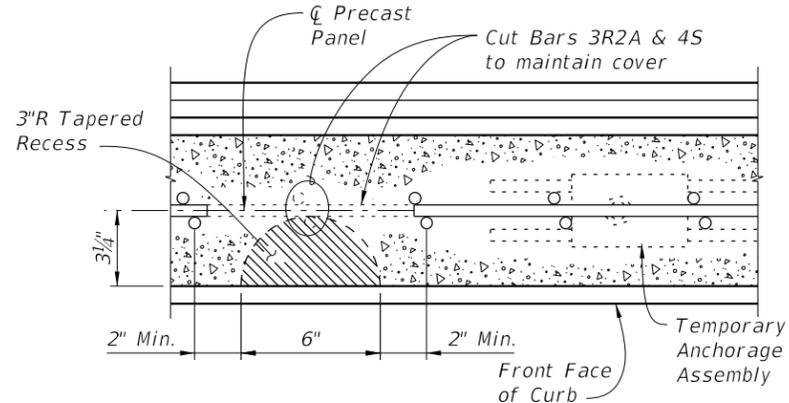
**42" CONCRETE PEDESTRIAN/ BICYCLE RAILING**

Interim Date	Sheet No.
07/01/10	1 of 2
Index No.	
<b>825</b>	



**TYPICAL ELEVATION WITH PRECAST PANELS**  
(Reinforcing Steel not shown for clarity)

\* See Note on Sheet 1



**SECTION C-C**  
**TAPERED RECESS DETAIL**  
(Curb Reinforcing not shown for clarity)

**CONCRETE PARAPET NOTES:**

1. Concrete parapet shall be placed vertical and top surface shall be level transversely.
2. Payment will be made under 42\"/>

**PRECAST PANEL NOTES:**

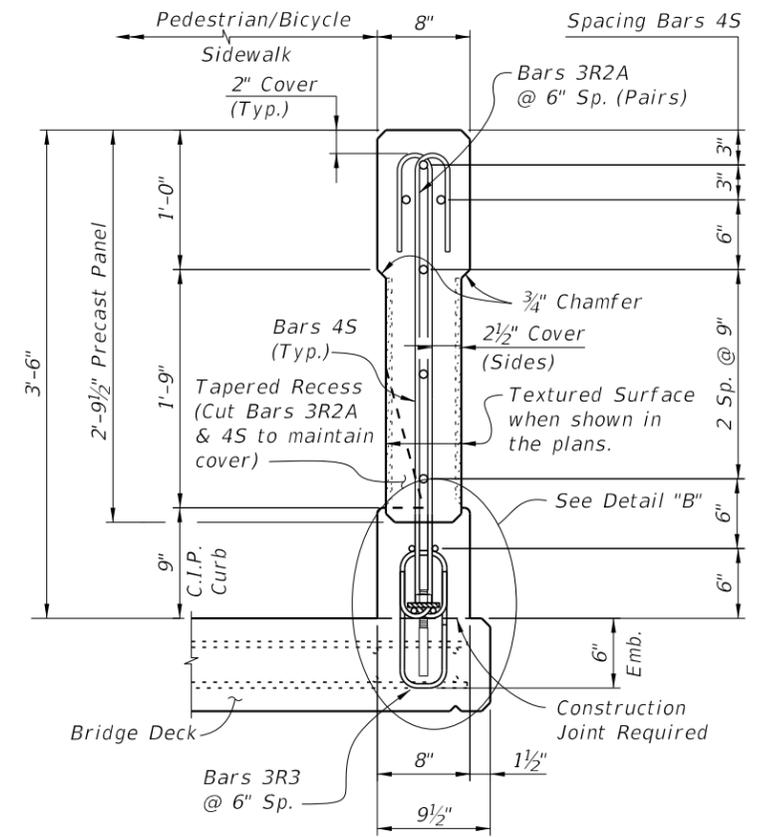
1. Panel concrete shall be Class III for slightly or moderately aggressive or Class IV for extremely aggressive environments.
2. Precast Panel Tolerances:
  - a. Overall Height & Width:  $\pm 1/4$ "
  - b. Thickness:  $\pm 1/4$ "
  - c. Plane of side mold:  $\pm 1/16$ "
  - d. Openings:  $\pm 1/2$ "
  - e. Out of Square:  $1/8$ " per 5ft.
  - f. Warping:  $1/16$ " per foot distance to nearest corner.
  - g. Bowing:  $1/240$  panel dimension.
  - h. Surface Smoothness:  $\pm 1/16$ " along 10ft. straight edge (Non-textured Surface)
  - j. Adjacent panel alignment:  $\pm 1/4$ "

**TEMPORARY ANCHORAGE ASSEMBLY NOTES:**

1. Anchor plate shall be ASTM A36.
2. Anchor Bolts shall be zinc plated with pullout strength of 16,000 lbs. for 5\"/>

**REINFORCING STEEL NOTES:**

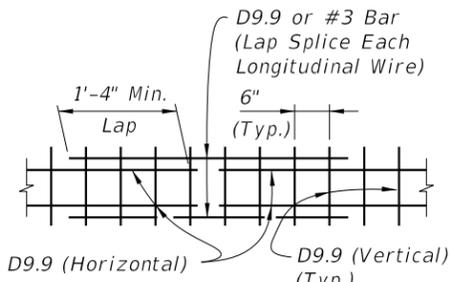
1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the parapet on a retaining wall shall be the same as detailed above for a 8\"/>
- 3. All reinforcing steel at the open joints shall have a 2\"/>
- 4. Bars 45 in C.I.P. curb may be continuous or spliced at the construction joints. Bar splices for Bars 45 shall be a minimum of 1'-4\"/>
- 5. At the option of the Contractor Welded Wire Reinforcement (WWR) may be used in lieu of all Bars 3R2A and 45. Welded Wire Reinforcement shall conform to Specification Section 931.



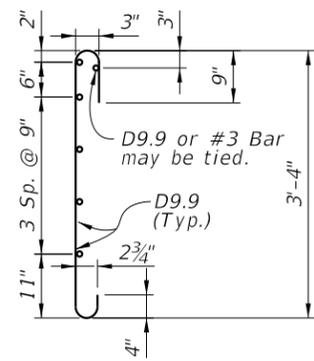
**SECTION A-A**  
(Typical Precast Section Thru Bridge Deck Shown,  
Section Thru Approach Slab Similar)

**ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS**

NOTE: Place wire panels to ensure vertical wire is within 4\"/>



**SPLICE DETAIL**  
(Between WWR Sections)

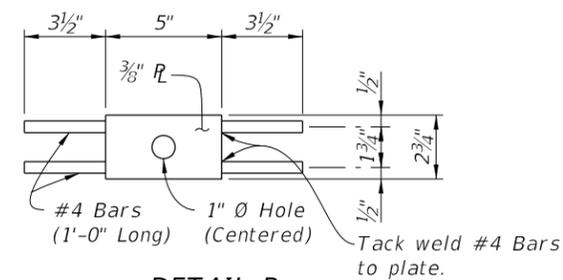
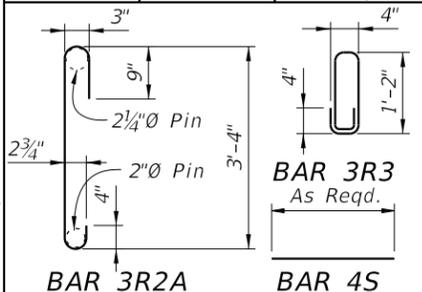


**WELDED WIRE REINFORCEMENT (WWR)**  
(2 Pieces Req'd.)

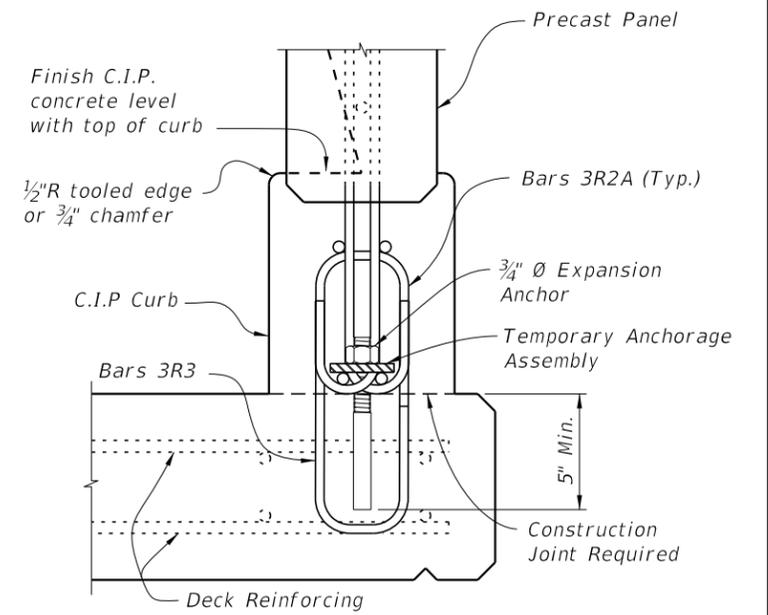
**CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS**

**BILL OF REINFORCING STEEL**

MARK	SIZE	LENGTH
R2A	3	4'-11"
R3	3	4'-0"
S	4	As Req'd.



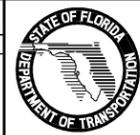
**DETAIL B**  
**TEMPORARY ANCHORAGE ASSEMBLY**



**DETAIL B-B**  
**PRECAST PANEL ANCHORAGE**

**REVISIONS**

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	New Design Standard			

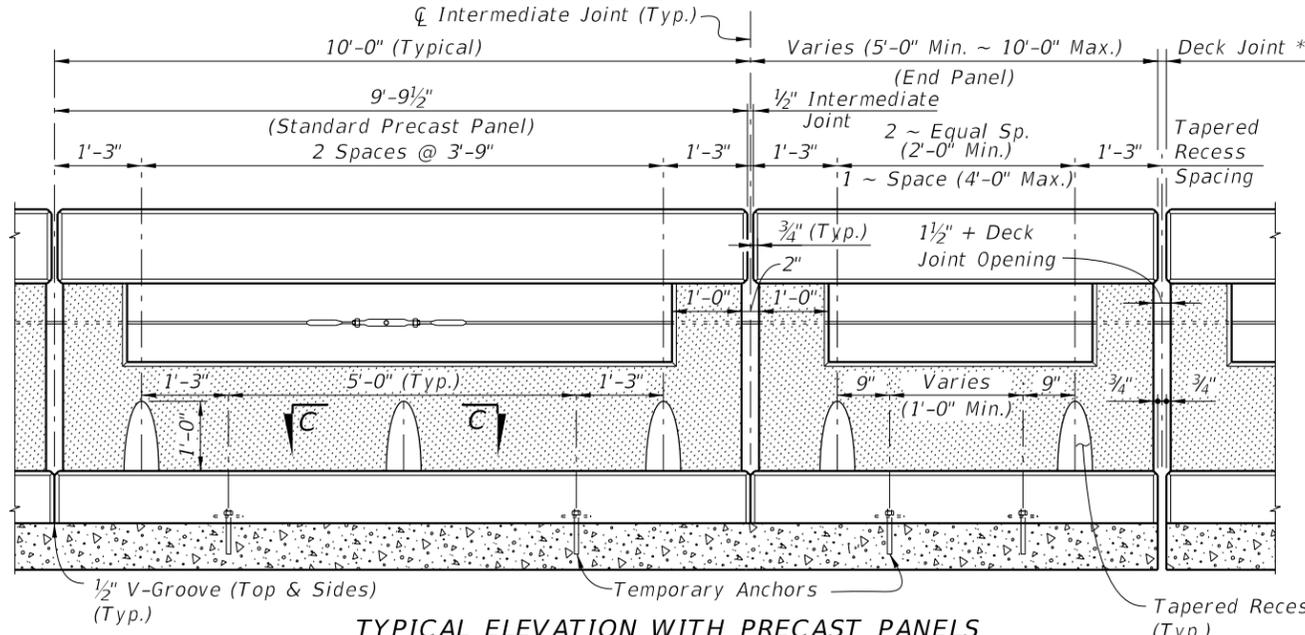


2010 Interim Design Standard

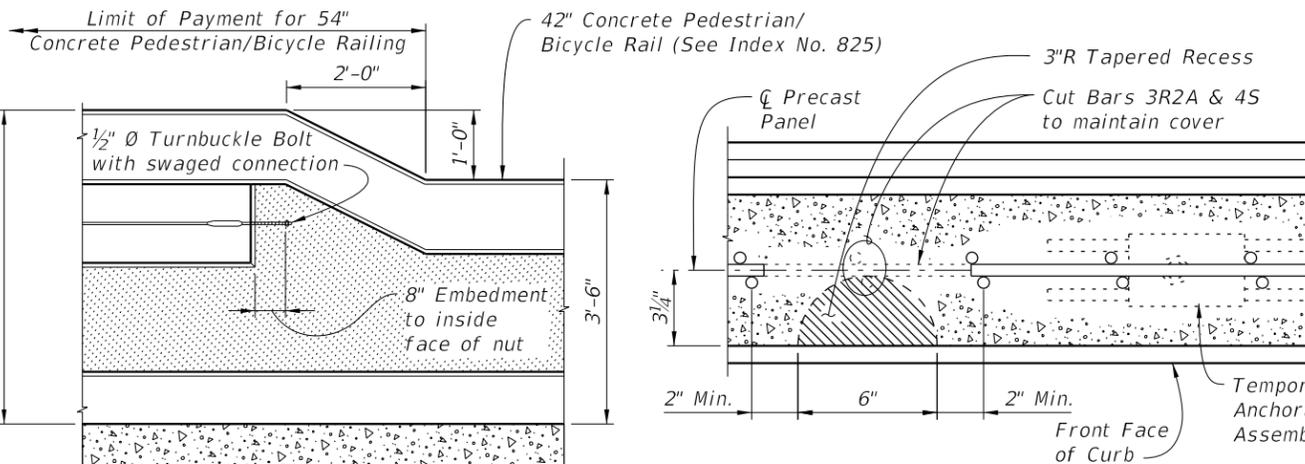
**42" CONCRETE PEDESTRIAN/BICYCLE RAILING**

Interim Date: 07/01/10  
Sheet No.: 2 of 2  
Index No.: 825



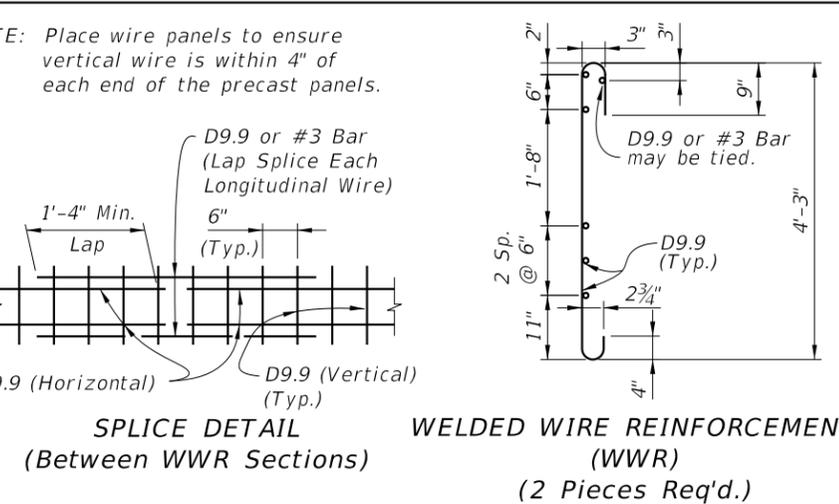


**TYPICAL ELEVATION WITH PRECAST PANELS**  
(Reinforcing Steel not shown for clarity)

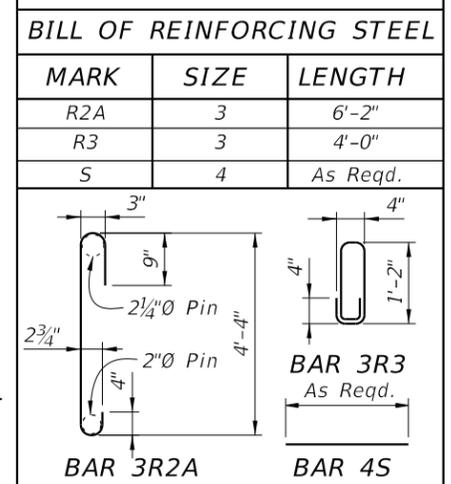


**TYPICAL ELEVATION OF TRANSITION TO 42" CONCRETE PEDESTRIAN/BICYCLE RAILING**

**ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS**



**CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS**



**CONCRETE PARAPET NOTES:**

1. Concrete parapet shall be placed vertical and top surface shall be level transversely.
2. Payment will be made under 54" Concrete Parapet (Pedestrian/Bicycle), LF (Item No. 521-6-13).

**PRECAST PANEL NOTES:**

1. Panel concrete shall be Class III for slightly or moderately aggressive or Class IV for extremely aggressive environments.
2. Precast Panel Tolerances:
  - a. Overall Height & Width:  $\pm 1/4$ "
  - b. Thickness:  $\pm 1/4$ "
  - c. Plane of side mold:  $\pm 1/16$ "
  - d. Openings:  $\pm 1/2$ "
  - e. Out of Square:  $1/8$ " per 5ft.
  - f. Warping:  $1/16$ " per foot distance to nearest corner.
  - g. Bowing:  $1/240$  panel dimension.
  - h. Surface Smoothness:  $\pm 1/16$ " along 10ft. straight edge (Non-textured Surface)
  - j. Adjacent panel alignment:  $\pm 1/4$ "

**WIRE CABLE NOTES:**

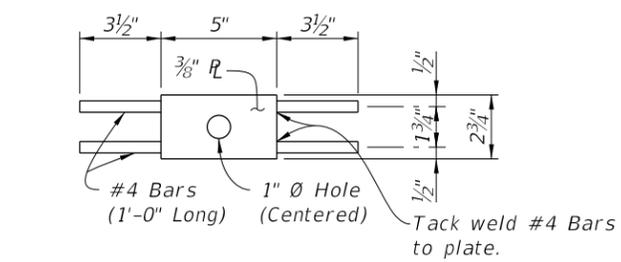
1. Turnbuckles shall be ASTM F1145, Type III (Rigging), Class D  $1/2$ "  $\phi$  x 12" hot-dip galvanized.
2. Wire Cable shall be  $1/4$ "  $\phi$  7x7 or 6x7 SC PRE drawn-galvanized IPS ASTM A1023.
3. Cable connections to Turnbuckles, Eye Bolts and End Stops shall be swagged aluminum or stainless steel.
4. Cable shall be stressed to 1000 lbs. minimum 1500 lbs. maximum at time of installation.
5. After cable stressing, jam nuts shall be tack welded to Turnbuckle body to prevent loosening. Tack weld and damaged galvanizing shall be coated with a galvanizing compound in accordance with the Specifications.

**TEMPORARY ANCHORAGE ASSEMBLY NOTES:**

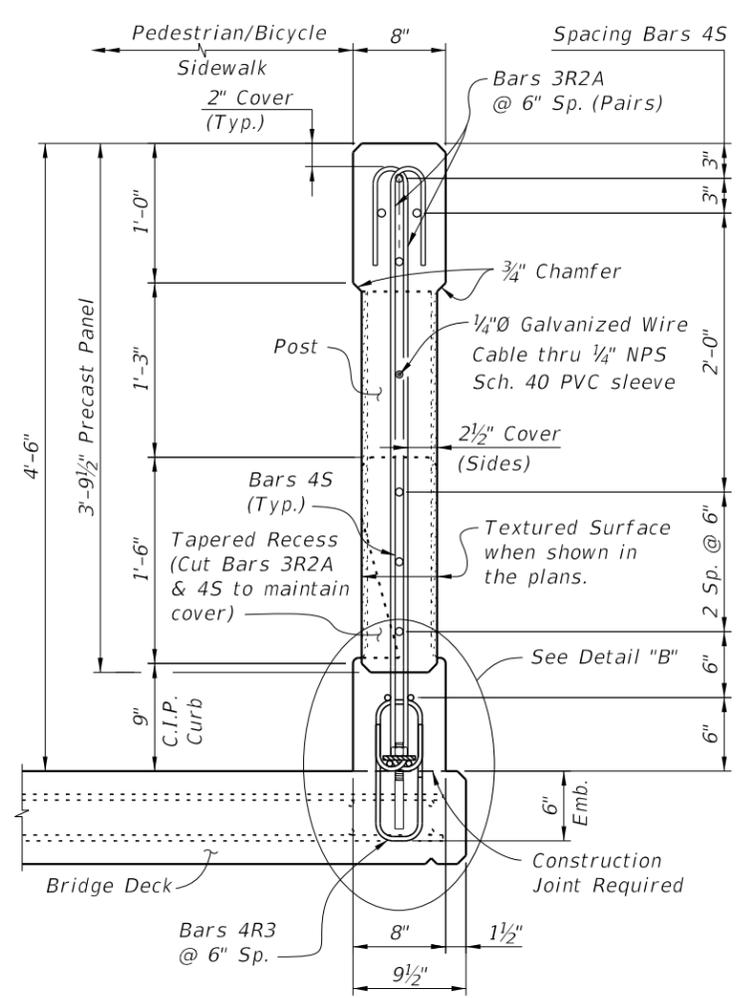
1. Anchor plate shall be ASTM A36.
2. Anchor Bolts shall be zinc plated with pullout strength of 16,000 lbs. for 5" embedment in Class II concrete.

**REINFORCING STEEL NOTES:**

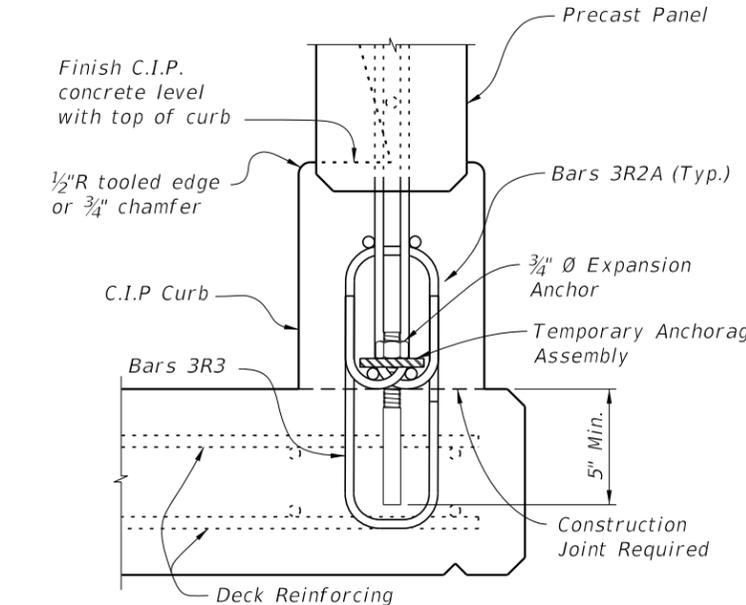
1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the parapet on a retaining wall shall be the same as detailed above for a 8" deck.
3. All reinforcing steel at the open joints shall have a 2" minimum cover.
4. Bars 4S in C.I.P. curb may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-4".
5. At the option of the Contractor Welded Wire Reinforcement (WWR) may be used in lieu of all Bars 3R2A and 4S. Welded Wire Reinforcement shall conform to Specification Section 931.



**DETAIL B TEMPORARY ANCHORAGE ASSEMBLY**

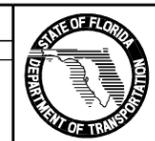


**SECTION A-A**  
(Typical Precast Section Thru Bridge Deck Shown, Section Thru Approach Slab Similar)



**DETAIL B-B PRECAST PANEL ANCHORAGE**

REVISIONS			REVISIONS		
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	New Design Standard			



**NOTES**

**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. See Index No. 851 for special requirements and modifications for use on bridges. 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 these drawings requires a handrail for ramps steeper than a 5% grade to conform with the requirements of the Americans with Disabilities Act (ADA). 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 1½" 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.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

**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 or neoprene pads and all incidental materials and labor required to complete installation of the railing.

**RAILS, PICKETS & POSTS:**

Pipe Rails and Pickets shall be in accordance with ASTM A500 Grade B, C or D, or 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 or terminate at adjoining sections with mitered end sections when handrails are not required. 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 and handrails shall be shop bent to match the alignment radius.

RAILING MEMBER DIMENSIONS TABLE			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" x 4" Rectangular Tube	2.00" x 4.00"	0.188"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1½" NPS (Sch. 40)	1.900"	0.145"
Handrail Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1½" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A
Pickets	½" NPS (Sch. 40)	0.840"	0.109"
	¾" Ø Round Bar	0.750"	N/A

**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 or 6063. Shim plates shall be used for foundation height adjustments greater than ¼" and localized irregularities greater than ⅛". Field trim shim plates when necessary to match the contours of the foundation. Beveled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with an adhesive bonding material and limited to a maximum total thickness of ½", unless longer anchor bolts are provided for the exposed thread length.

**COATINGS:**

The railing shall be hot-dip galvanized after fabrication in accordance with Section 962 of the Specifications. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 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. Cutting of reinforcing steel is permitted for drilled hole installation. Expansion Anchors are not permitted. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking 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 and tack welds 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 PRESTRESSED 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 is not required.

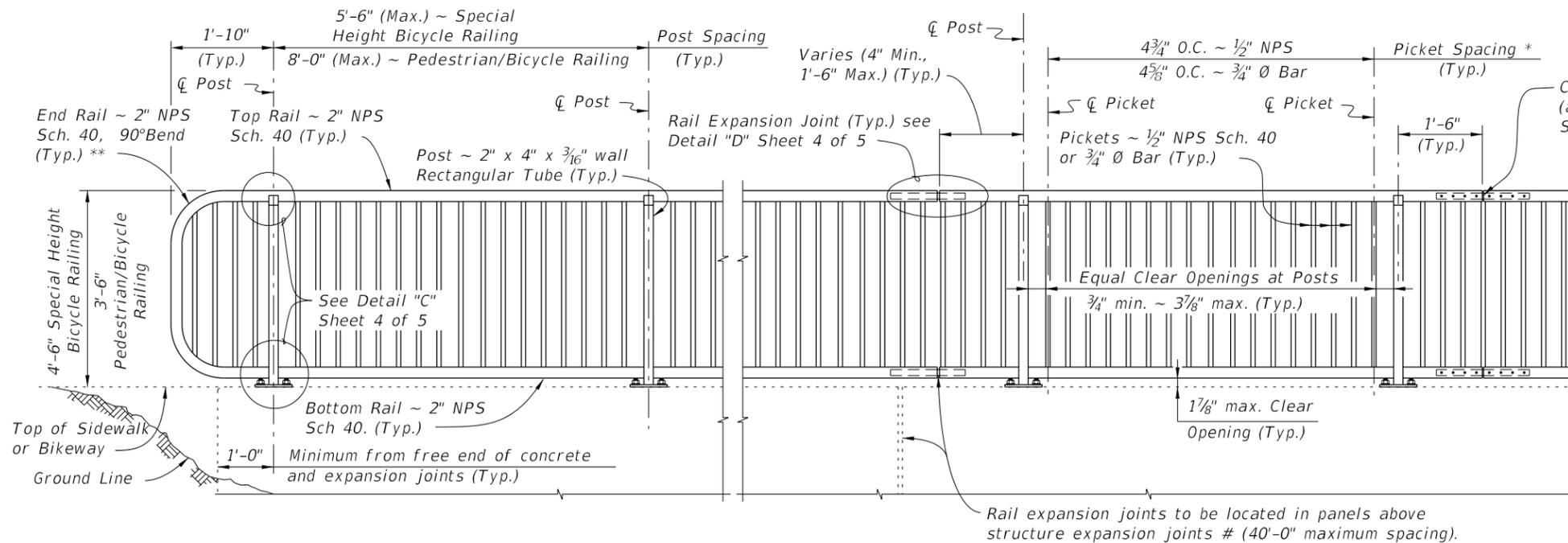
**WEEP HOLES:**

Weep holes shall be ¼" Ø and located at the low point between adjacent posts for both top and bottom rails. Holes shall be drilled through the underside of the rails prior to hot-dip galvanizing.

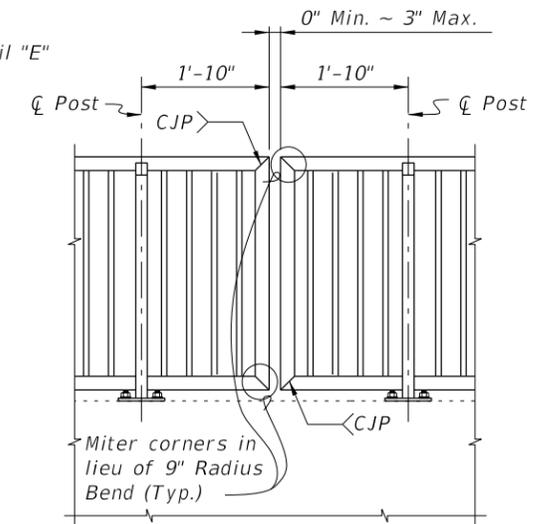
**SHOP DRAWINGS:**

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations, anchor bolt installation "Case" or lengths, 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							2010 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			07/01/10	1 of 5
01/01/10	SJN	Added "ASTM A500 Grade B, C or D" for Pipe Rails and Pickets in RAILS, PICKETS AND POSTS note.				<p style="text-align: center;"><b>STEEL PEDESTRIAN/BICYCLE PICKET RAILING</b></p>	Index No.		
07/01/10	SJN	Deleted Design Criteria Notes.					<b>850</b>		



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



**EXPANDED ELEVATION AT CORNERS**

**TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%**

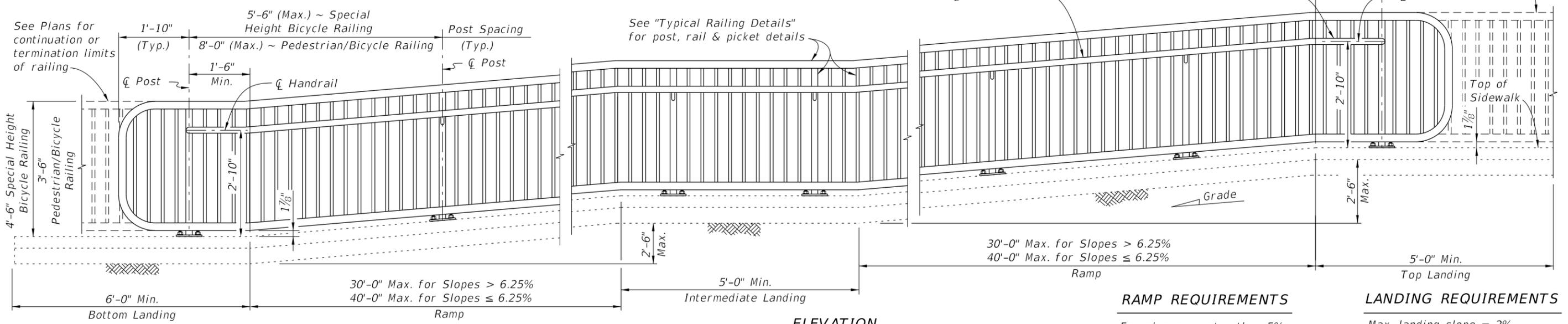
**DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS**

**NOTES:**

- \* Picket Spacing based on the optional picket members shown. 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

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

**CROSS REFERENCE:**  
For Details "C", "D" and "E", see Sheet 4 of 5.



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

**RAMP REQUIREMENTS**

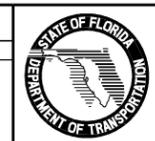
For slopes greater than 5%:  
Max. ramp slope = 8.33%  
Max. ramp cross-slope = 2.0%

**LANDING REQUIREMENTS**

Max. landing slope = 2%  
Max. landing cross-slope = 2%

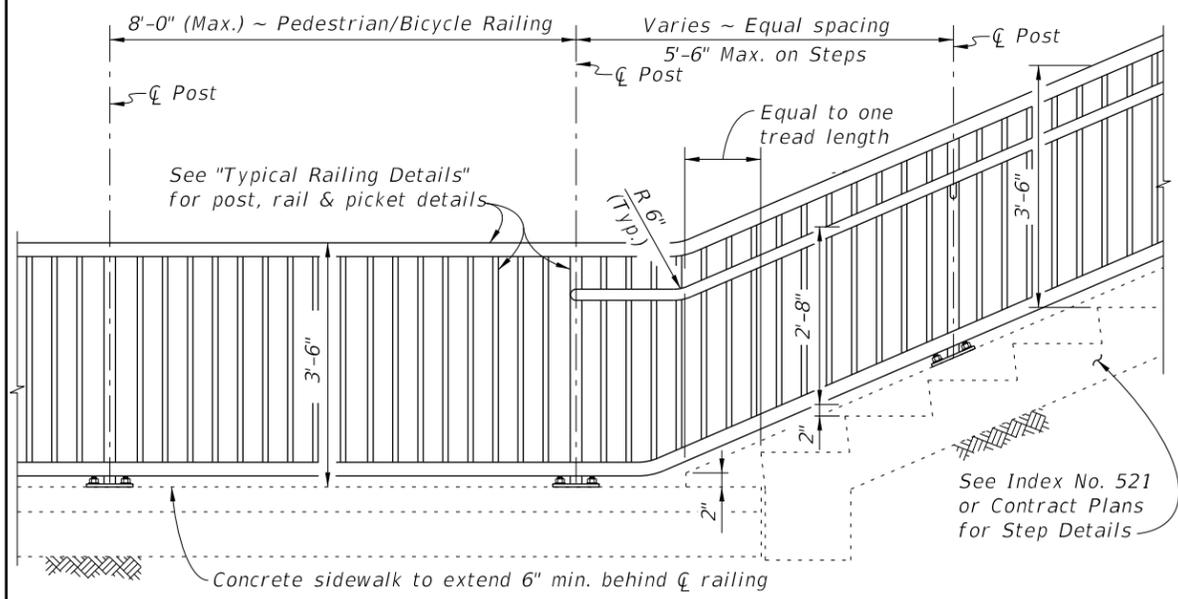
**RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%**

REVISIONS			
DATE	BY	DESCRIPTION	
07/01/10	SJN	Changed 2'-10" dimension to mid-height of handrail.	

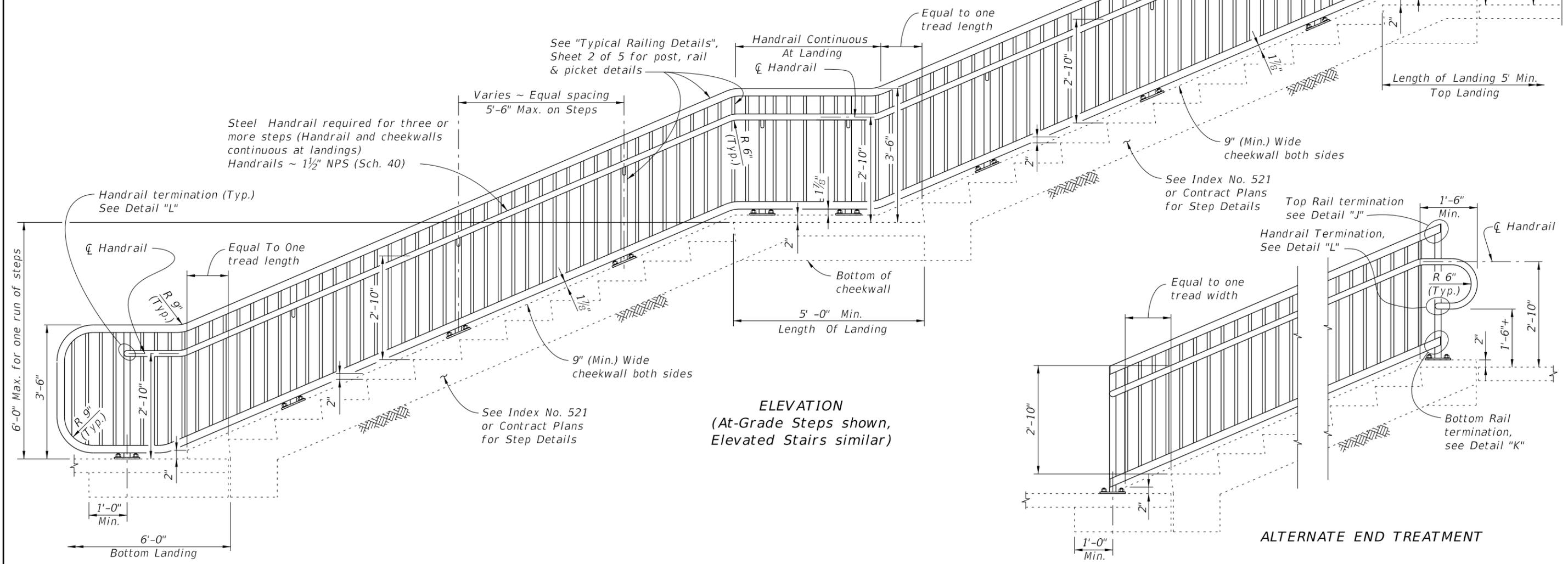
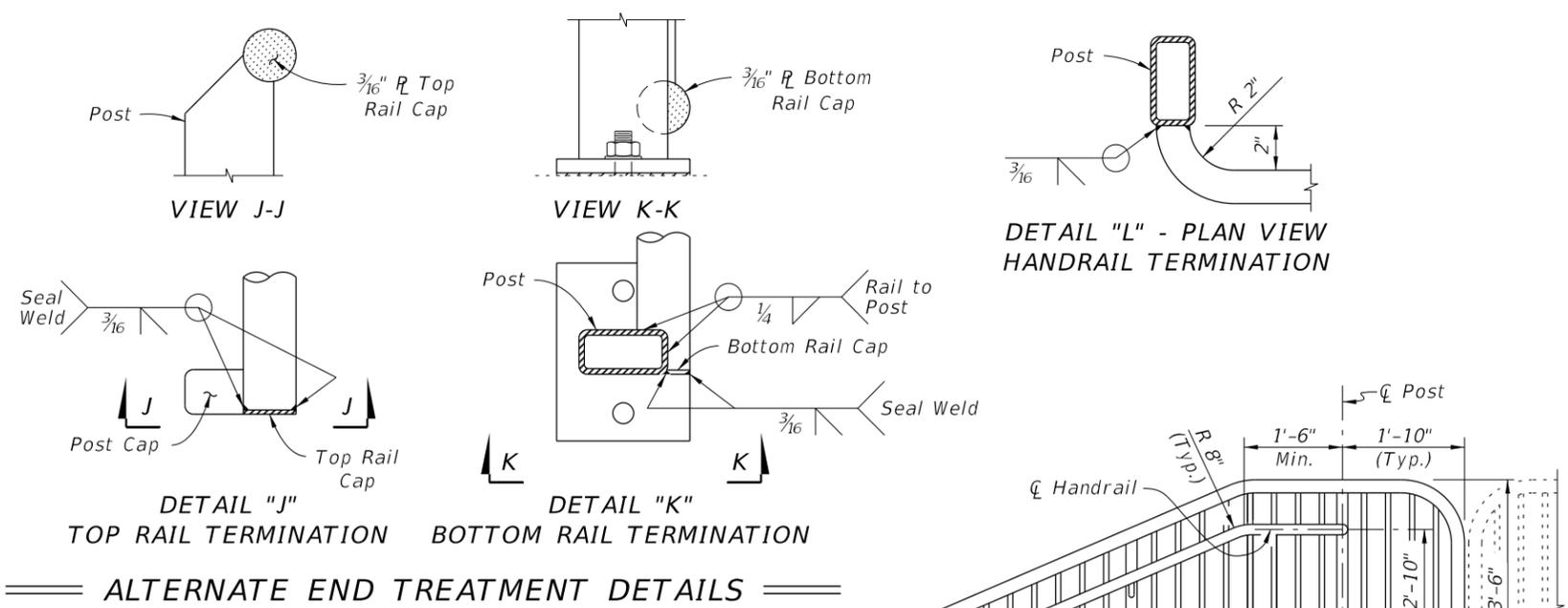


2010 Interim Design Standard  
**STEEL PEDESTRIAN/BICYCLE PICKET RAILING**

Interim Date: 07/01/10  
Sheet No.: 2 of 5  
Index No.: **850**

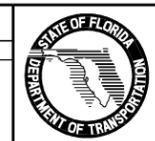


**RAILING CONTINUATION BEYOND STEPS OR STAIRS**  
(Bottom shown, Top similar)



**RAILINGS ON STEPS & STAIRS**

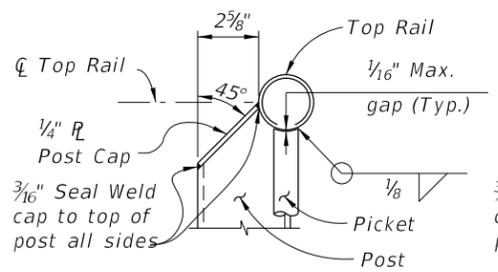
REVISIONS			
DATE	BY	DESCRIPTION	
07/01/10	SJN	Deleted minimum extension of handrail at base of steps. Changed 2'-10" dimension to mid-height of handrail.	



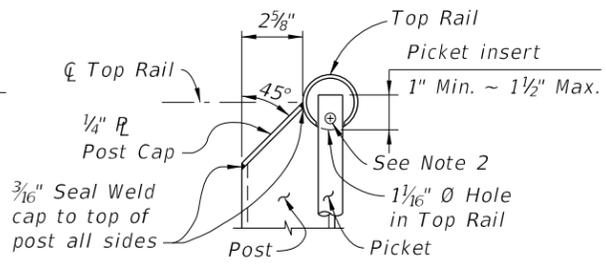
2010 Interim Design Standard

**STEEL PEDESTRIAN/BICYCLE PICKET RAILING**

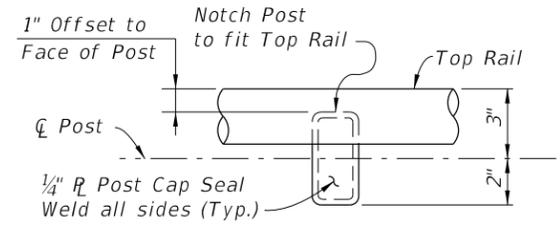
Interim Date: 07/01/10  
Sheet No.: 3 of 5  
Index No.: 850



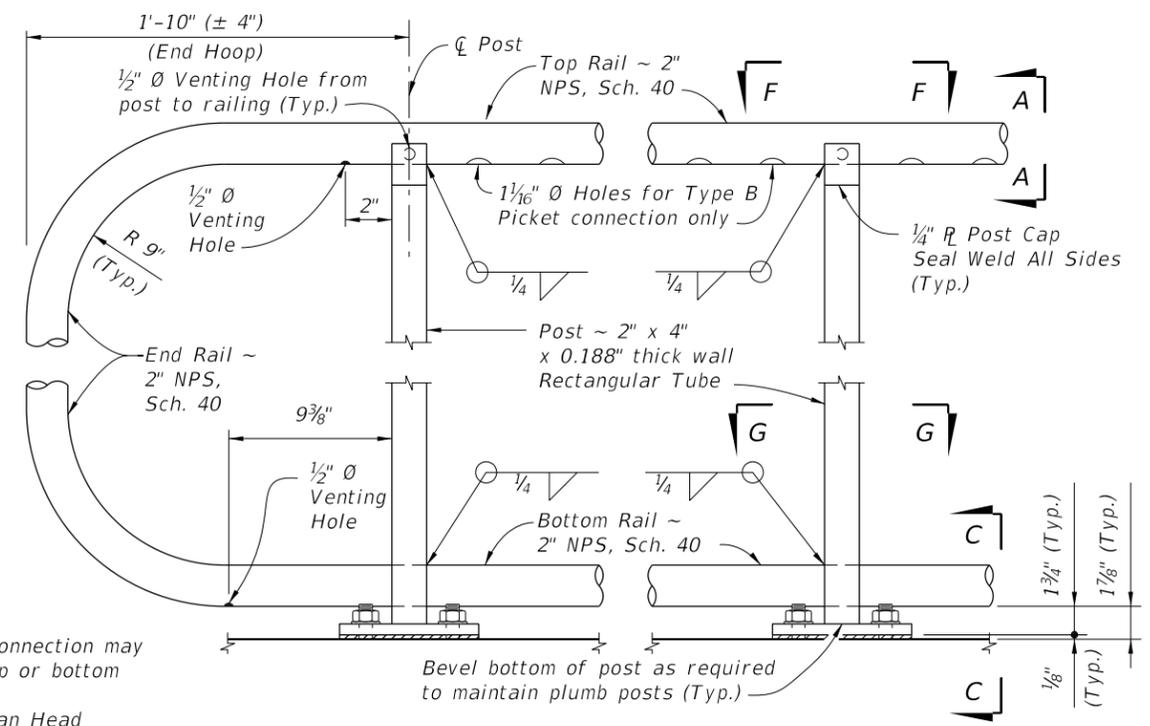
**TYPE A (WELDED)**



**TYPE B (NONWELDED)**



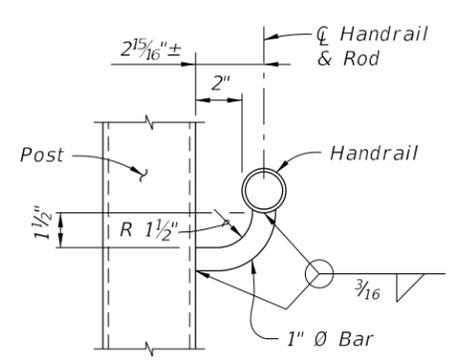
**VIEW F-F  
TOP RAIL CONNECTION  
(Base Plate Not Shown for Clarity)**



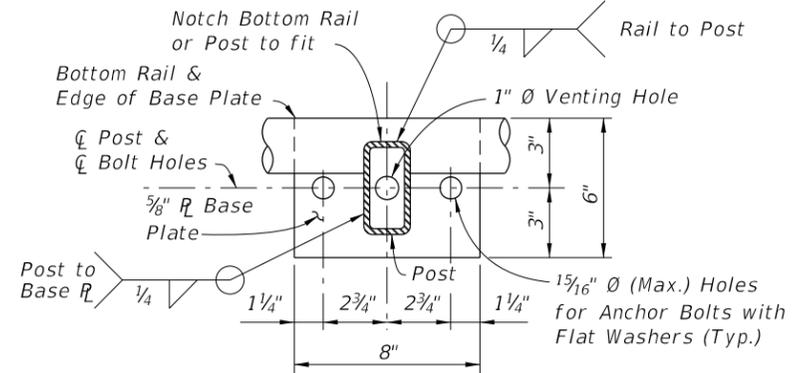
**DETAIL "C" - RAIL CONNECTIONS  
(Showing Outside Face of Structure and Railing,  
Pickets and Handrail Not Shown for Clarity)**

- Notes:**
1. Type A or Type B connection may be used on either top or bottom picket connection.
  2. Provide #10 x 1/2" Pan Head Stainless Steel (316 or 18-8 Alloy) Screw in the last picket at each expansion or field splice joint to secure the end of the top rail.

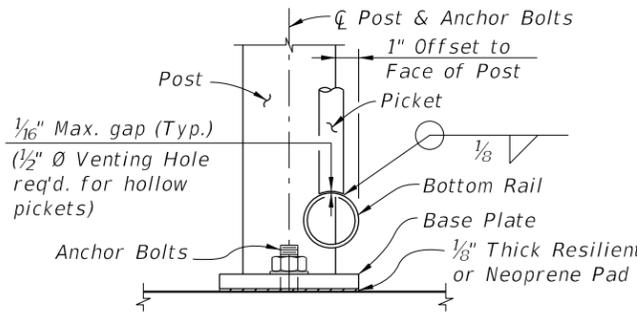
**SECTION A-A  
(Top of Picket Connection)**



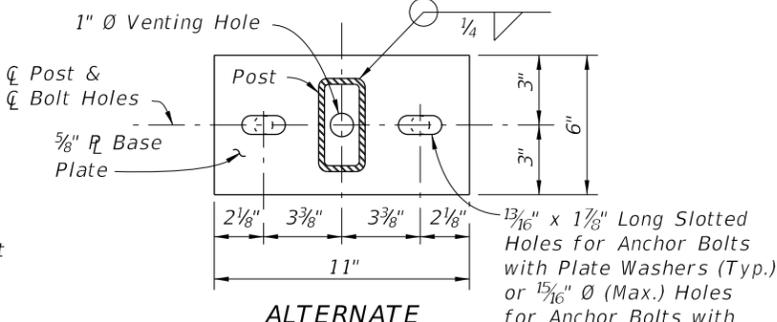
**SECTION B-B  
(Handrail Connection)**



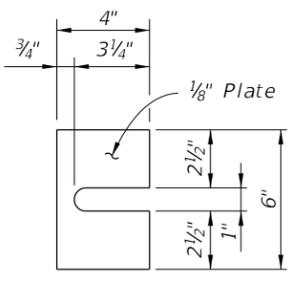
**SECTION G-G  
BASE PLATE & BOTTOM RAIL CONNECTION**



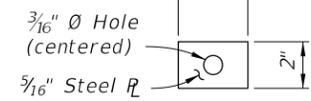
**SECTION C-C  
(Bottom of Picket Connection)**



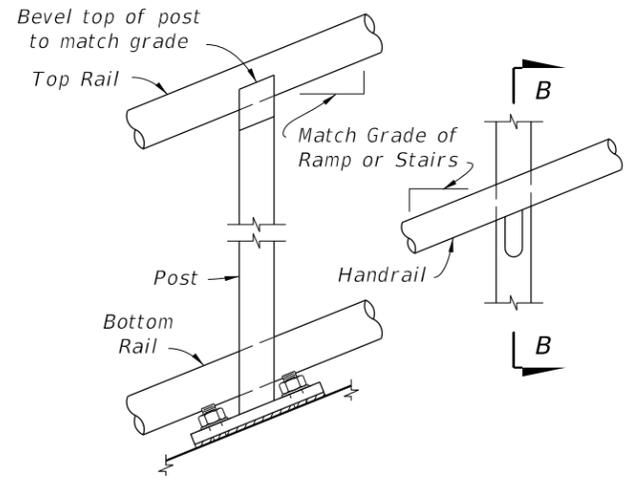
**ALTERNATE  
BASE PLATE DETAIL  
(Recommended for Top of Step Cheekwalls)**



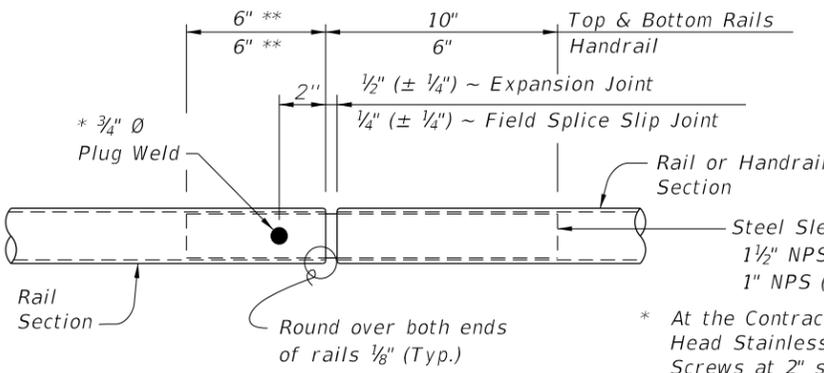
**SHIM PLATE  
DETAIL**



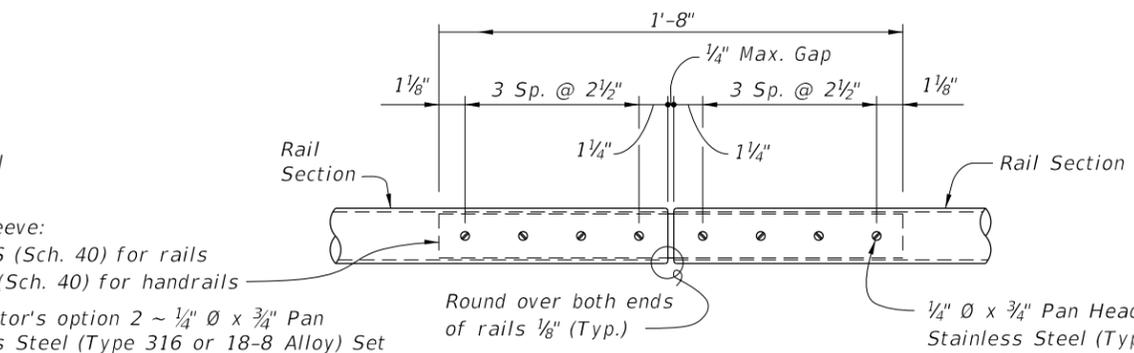
**PLATE WASHER  
DETAIL**



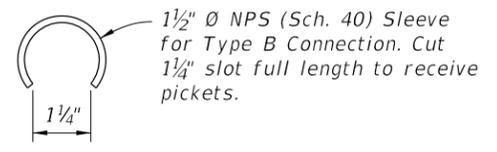
**DETAIL "B" - RAIL AND HANDRAIL  
(Showing Sloped Condition for Stairs or Ramp)**



**DETAIL "D" - EXPANSION JOINT  
(FIELD SPLICE SLIP JOINT SIMILAR)**



**DETAIL "E" - CONTINUITY  
FIELD SPLICE**

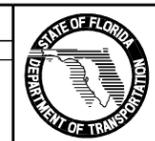


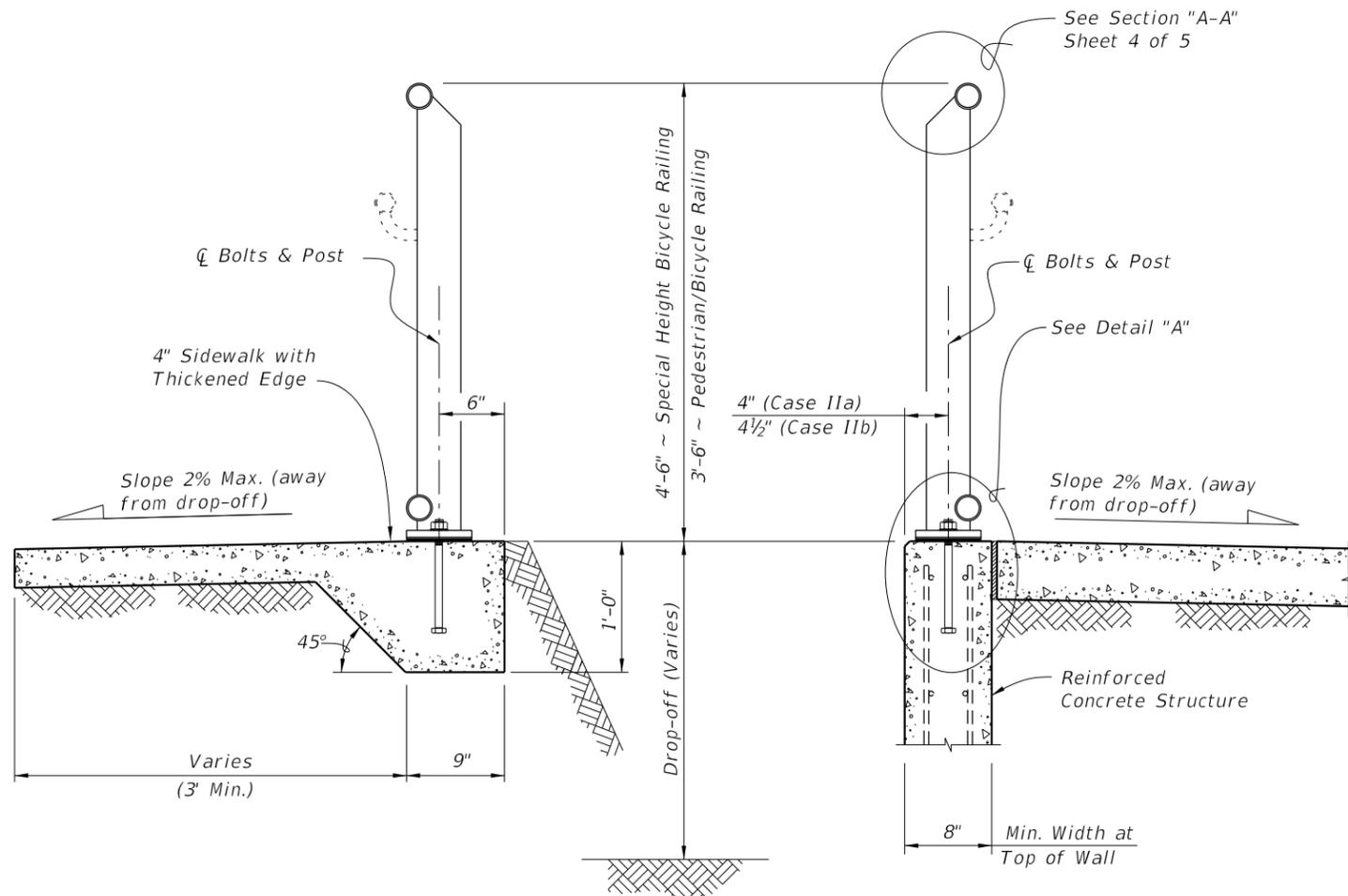
**SLEEVE MODIFICATION FOR  
TYPE B CONNECTION  
(Top Rail Sleeve Shown, Bottom Rail Sleeve Similar)**

- \* At the Contractor's option 2 ~ 1/4" Ø x 3/4" Pan Head Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2" spacing may be substituted for the 3/4" Ø plug weld. Set screws must be set flush against the outside face of rail and underside of handrail.
- \*\* Embedded length may be 4" for plug welded connection. Maintain venting of ends of pickets during galvanizing.

**CROSS REFERENCE:**  
For locations of Details "C", "D" and "E", see Sheet 2 of 5.

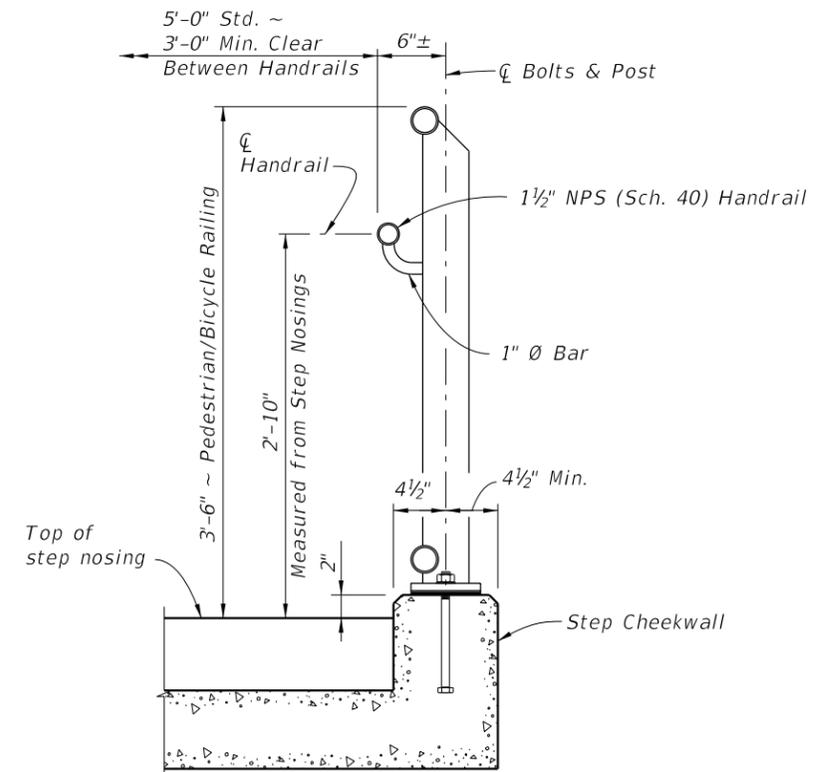
REVISIONS			
DATE	BY	DESCRIPTION	
01/01/10	SJN	Added (± 4") tolerance to End Hoop length in Detail "C".	
07/01/10	SJN	Added Type B connection for pickets.	



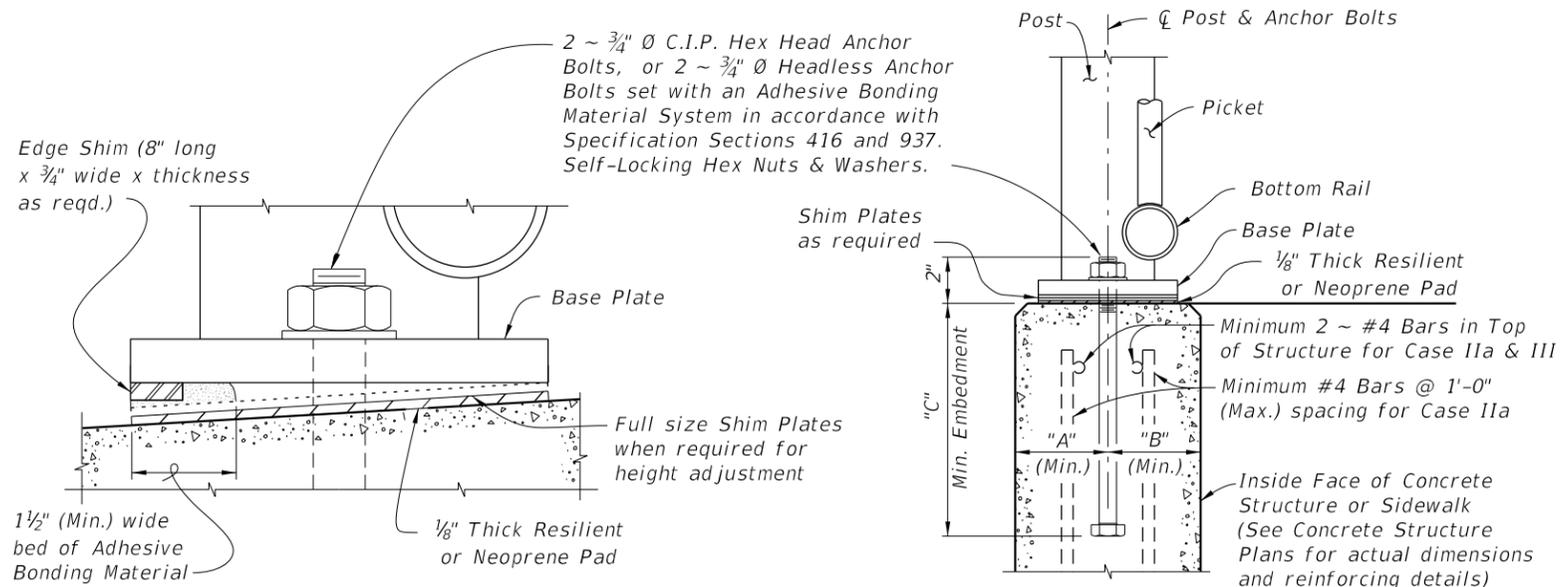


TYPICAL SECTION ON CONCRETE SIDEWALK (Case I)

TYPICAL SECTION ON RETAINING WALL (Case II)



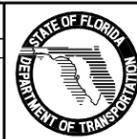
TYPICAL SECTION ON STEPS & STAIRS (Case III)



ANCHOR BOLT TABLE							
CASE	STRUCTURE TYPE	DIMENSIONS			ANCHOR LENGTH		ANCHOR SIZE
		"A" Edge Dist.	"B" Edge Dist.	"C" Embedment	C.I.P. Hex Head Bolt	Adhesive Anchor	
I	Unreinforced Concrete	6"	1'-2"	9"	10 1/2"	11"	3/4" Ø
IIa	Reinforced Concrete	4"	4"	9"	10 1/2"	11"	3/4" Ø
IIb	Gravity Wall Index No. 520	4 1/2"	3 1/2" @ top	1'-0" *	1'-1 1/2"	1'-2"	3/4" Ø
III	Step Cheekwall	4 1/2"	4 1/2"	9"	10 1/2"	11"	3/4" Ø

\* Embedment length "C" may be reduced to 9" for the 3'-6" height railings for Case IIb, when the post spacing does not exceed 5'-0".

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Changed 2'-10" dimension to mid-height of handrail.			



2010 Interim Design Standard

STEEL PEDESTRIAN/BICYCLE PICKET RAILING

Interim Date	Sheet No.
07/01/10	5 of 5
Index No.	
850	

**NOTES**

**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. See Index No. 861 for special requirements and modifications for use on bridges. 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 these drawings requires a handrail for ramps steeper than a 5% grade to conform with the requirements of the Americans with Disabilities Act (ADA). 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 1½" 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.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

**RAILS, PICKETS & POSTS:**

Structural Tube, Pipe and Bar 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 or terminate at adjoining sections with mitered end sections when handrails are not required. 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 and handrails shall be shop bent to match the alignment radius.

RAILING MEMBER DIMENSIONS TABLE			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" x 4" Rectangular Tube	2.00" x 4.00"	0.250"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1½" NPS (Sch. 40)	1.900"	0.145"
Handrail Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1½" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A
Pickets	¾" NPS (Sch. 40)	1.050"	0.113"

**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 or 6063. Shim plates shall be used for foundation height adjustments greater than ¼" and localized irregularities greater than ⅛". Field trim shim plates when necessary to match the contours of the foundation. Beveled shim plates may be used in lieu of trimmed flat shim plates shown. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of ½", unless longer anchor bolts are provided for the exposed thread length.

**COATINGS:**

The aluminum railing shall be mill finish unless otherwise noted in the Contract Documents. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 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. Cutting of reinforcing steel is permitted for drilled hole installation. Expansion Anchors are not permitted. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking 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 and tack welds 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 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 is not required. Filler metal for picket welds may be ER4043.

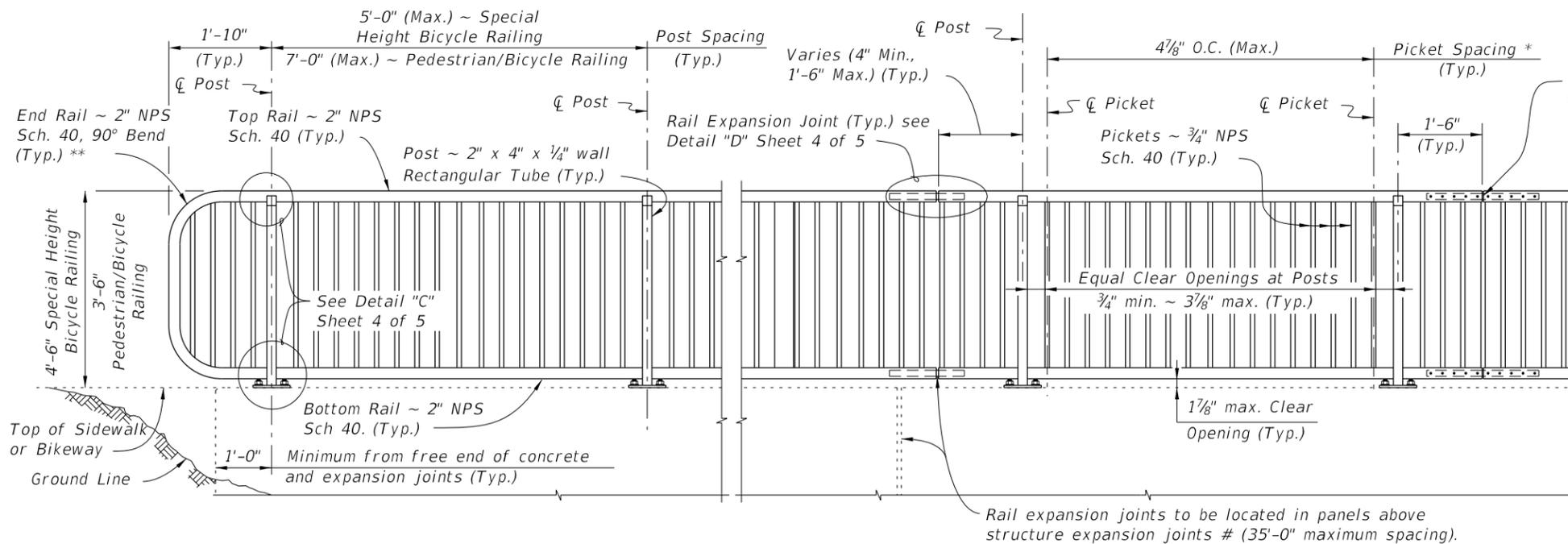
**SHOP DRAWINGS:**

Complete details addressing project specific geometry (line & grade) showing post and expansion joint locations, anchor bolt installation "Case" or lengths, 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.

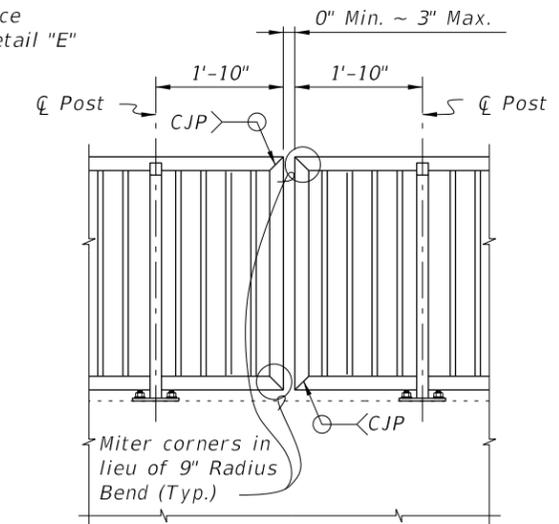
**PAYMENT:**

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 or neoprene pads and all incidental materials and labor required to complete installation of the railing.

REVISIONS						2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			07/01/10	1 of 5
07/01/10	SJN	Deleted Design Criteria Notes.							
								<b>ALUMINUM PEDESTRIAN/BICYCLE PICKET RAILING</b> <b>860</b>	



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



**EXPANDED ELEVATION AT CORNERS**

**TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%**

**DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS**

**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

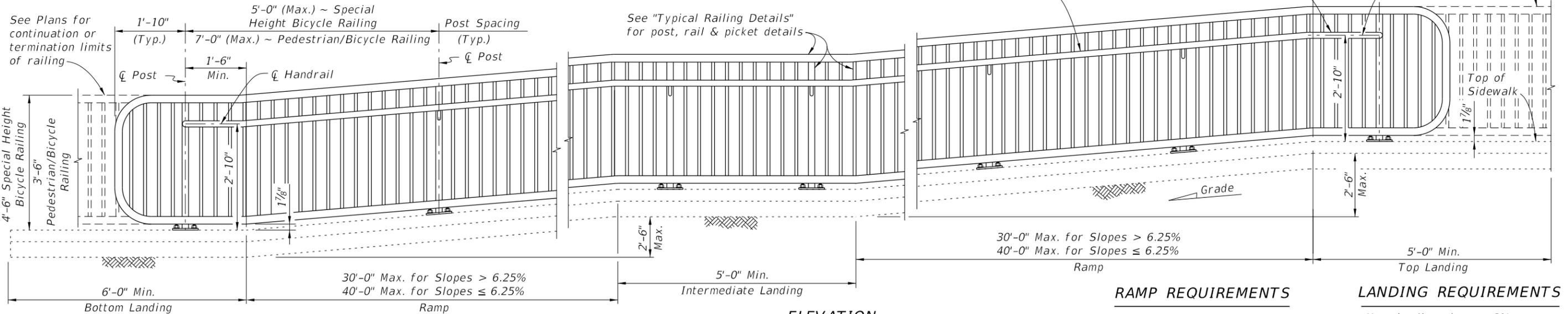
**STRUCTURES EXPANSION JOINTS NOTE:**

# Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.

**CROSS REFERENCE:**

For Details "C", "D" and "E", see Sheet 4 of 5.

Handrail required for ramps (Handrail continuous at landings between runs)  
Handrail ~ 1 1/2" NPS Sch. 40



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

**RAMP REQUIREMENTS**

For slopes greater than 5%:  
Max. ramp slope = 8.33%  
Max. ramp cross-slope = 2.0%

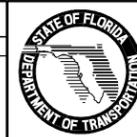
**LANDING REQUIREMENTS**

Max. landing slope = 2%  
Max. landing cross-slope = 2%

**RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%**

**REVISIONS**

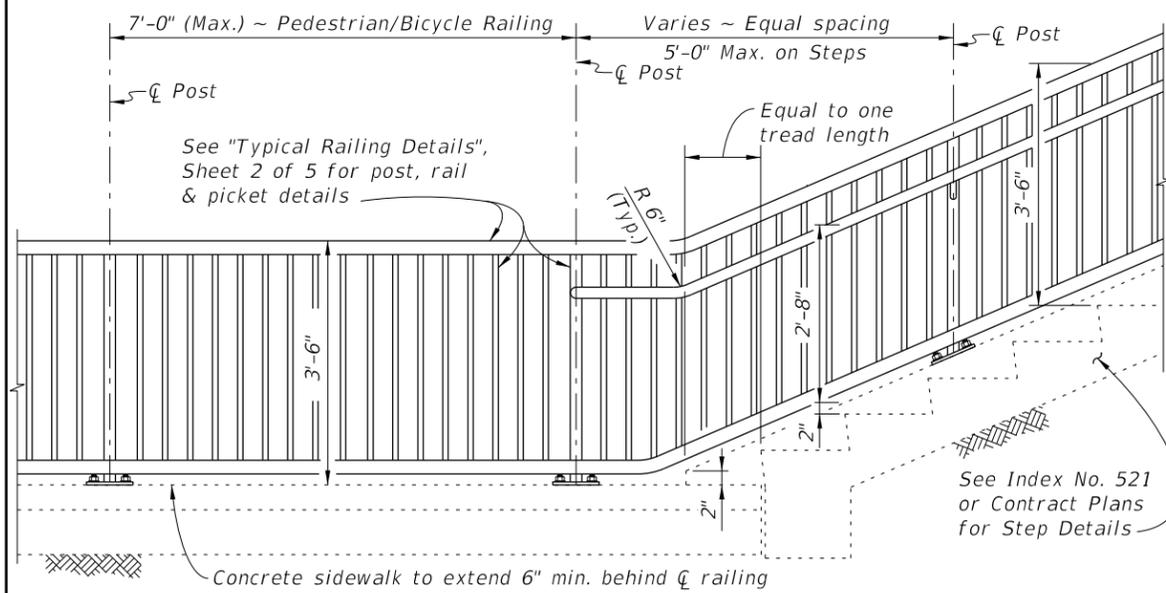
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Changed 2'-10" dimension to mid-height of handrail.			



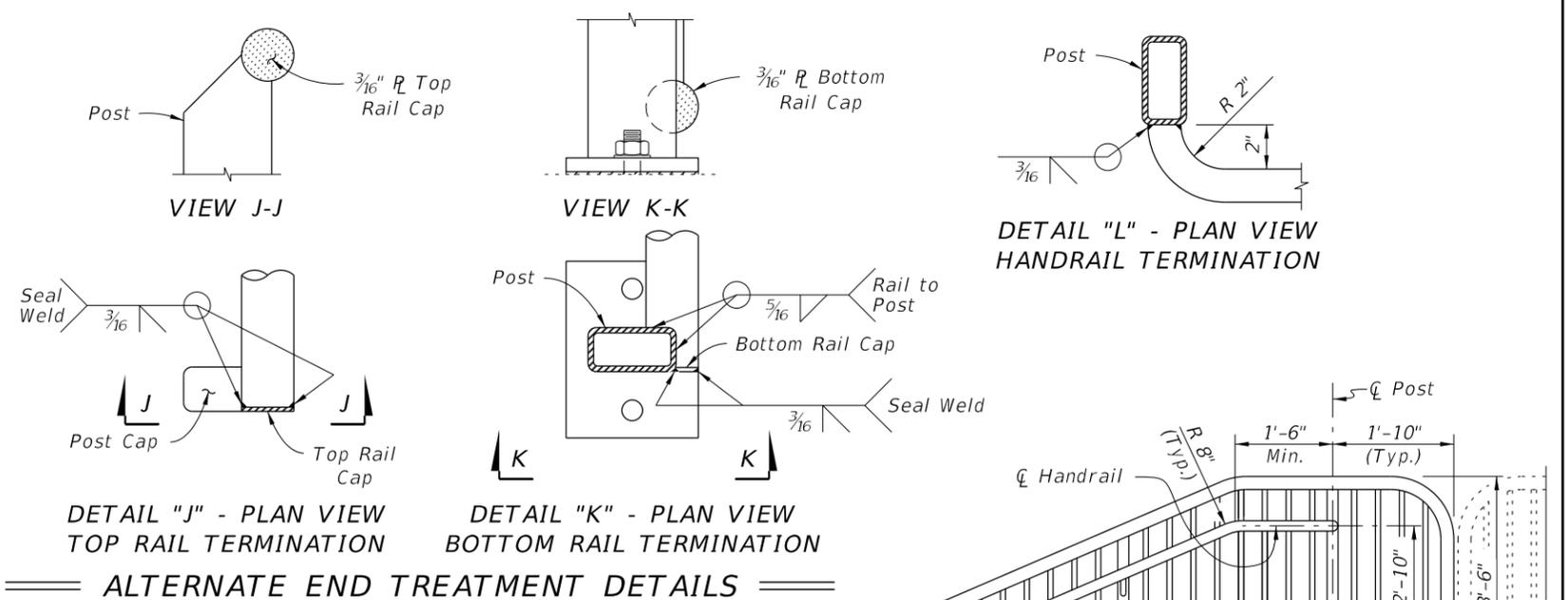
2010 Interim Design Standard

**ALUMINUM PEDESTRIAN/BICYCLE PICKET RAILING**

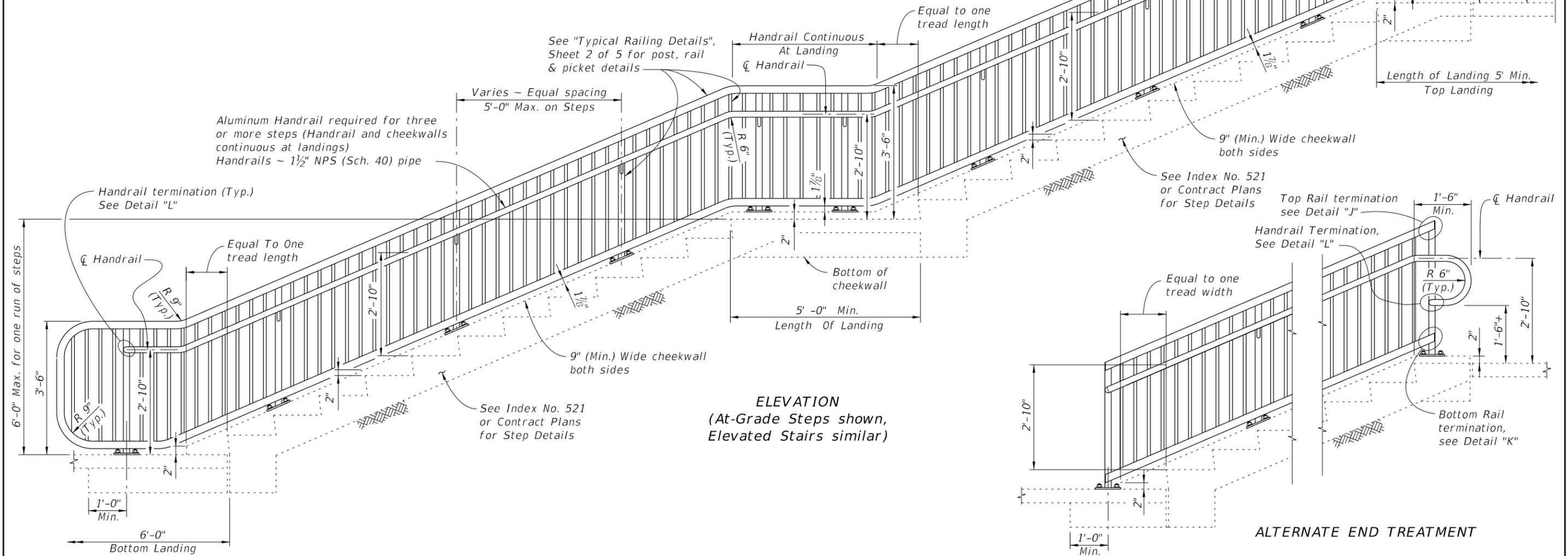
Interim Date	Sheet No.
07/01/10	2 of 5
Index No.	
<b>860</b>	



**RAILING CONTINUATION BEYOND STEPS OR STAIRS**  
(Bottom shown, Top similar)



**ALTERNATE END TREATMENT DETAILS**

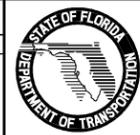


**ELEVATION**  
(At-Grade Steps shown, Elevated Stairs similar)

**ALTERNATE END TREATMENT**

**RAILINGS ON STEPS & STAIRS**

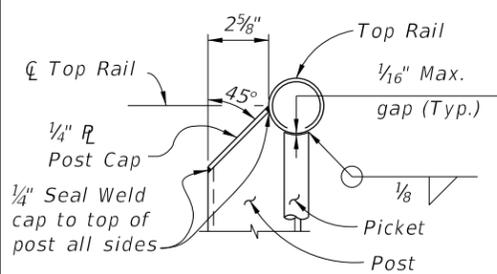
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Deleted minimum extension of handrail at base of steps. Changed 2'-10" dimension to mid-height of handrail.			



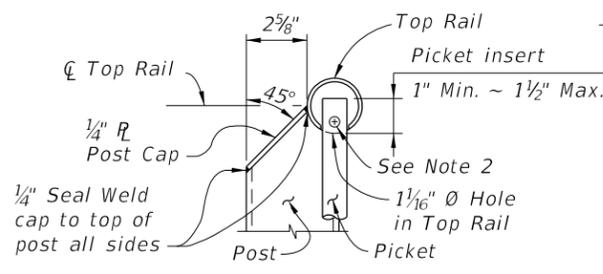
2010 Interim Design Standard

**ALUMINUM PEDESTRIAN/BICYCLE PICKET RAILING**

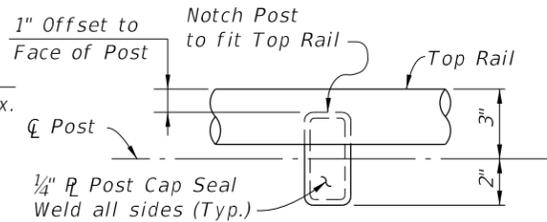
Interim Date: 07/01/10  
Sheet No.: 3 of 5  
Index No.: 860



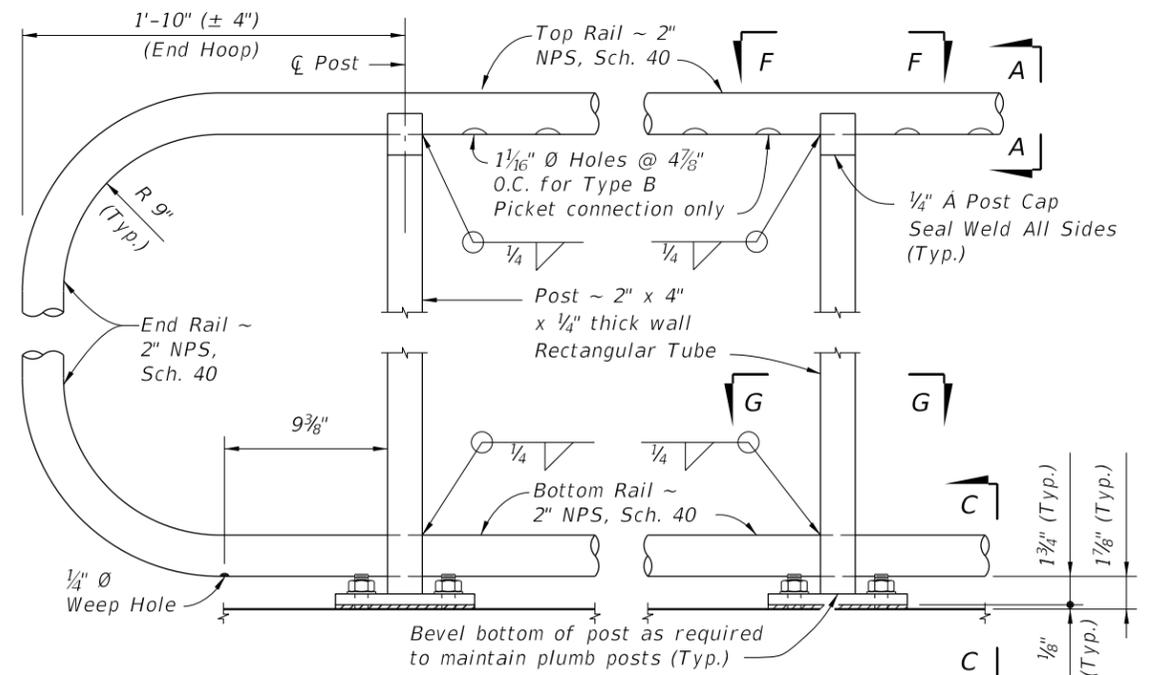
**TYPE A (WELDED)**



**TYPE B (NONWELDED)**

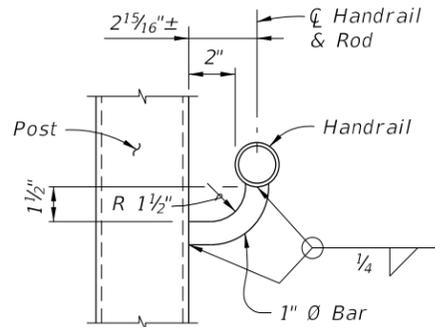


**VIEW F-F  
TOP RAIL CONNECTION  
(Base Plate Not Shown for Clarity)**

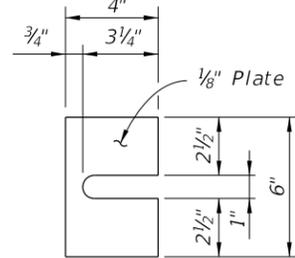


**DETAIL "C" - RAIL CONNECTIONS  
(Showing Outside Face of Structure and Railing,  
Pickets and Handrail Not Shown for Clarity)**

**SECTION A-A  
(Top of Picket Connection)**

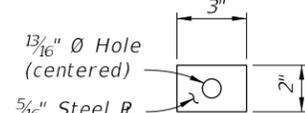


**SECTION B-B  
(Handrail Connection)**

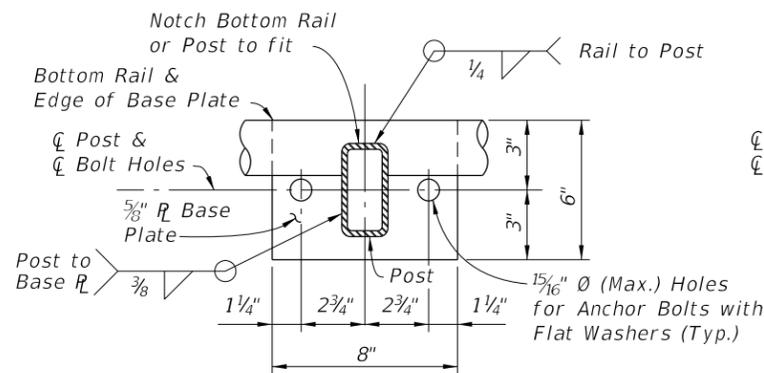


**SHIM PLATE  
DETAIL**

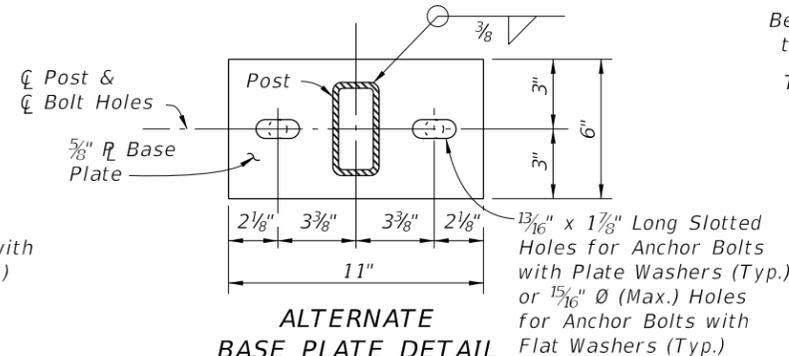
**Notes:**  
 1. Type B connection is required for use with Index No. 861 on bridges, except End Hoops may use Type A connections. Optional for other installations and for connection to bottom rail.  
 2. Provide #10 x 1/2" Pan Head Stainless Steel (316 or 18-8 Alloy) Screw in the last picket at each expansion or field splice joint to secure the end of the top rail.



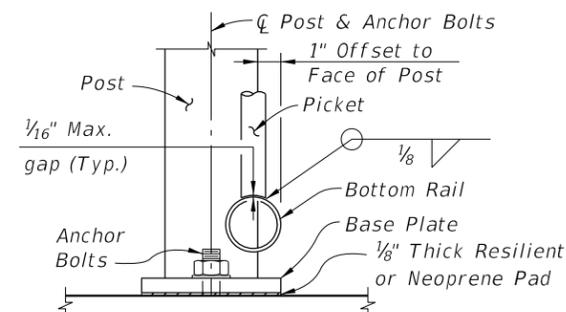
**PLATE WASHER  
DETAIL**



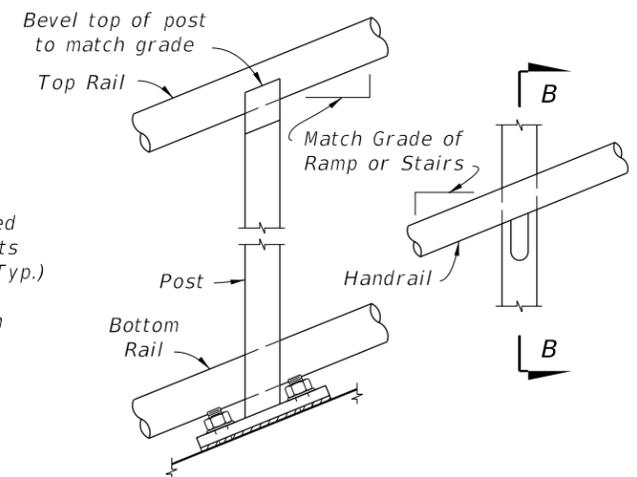
**SECTION G-G  
BASE PLATE & BOTTOM RAIL CONNECTION**



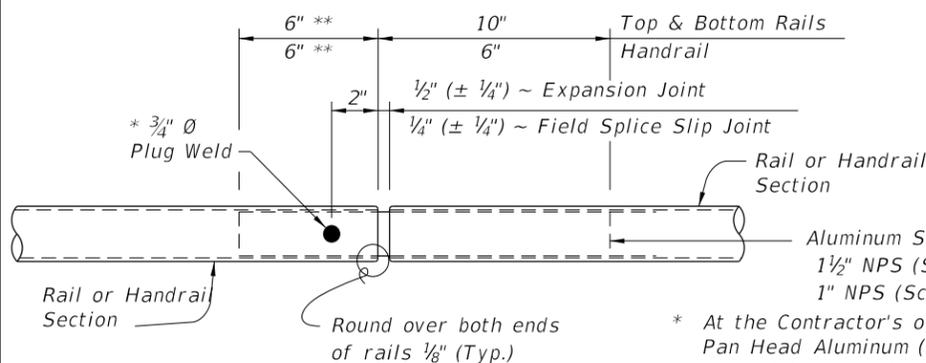
**ALTERNATE  
BASE PLATE DETAIL  
(Recommended for Top of Step Cheekwalls)**



**SECTION C-C  
(Bottom of Picket connection)**

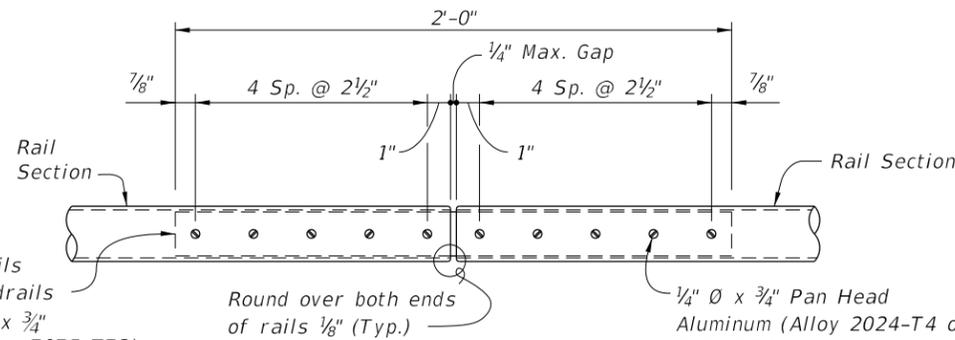


**DETAIL "B" - RAIL AND HANDRAIL  
(Showing Sloped Condition for Stairs or Ramp)**

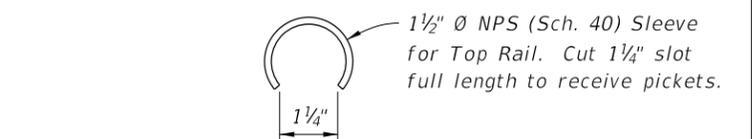


**DETAIL "D" - EXPANSION JOINT  
(FIELD SPLICE SLIP JOINT SIMILAR)**

\* At the Contractor's option 2 ~ 1/4" x 3/4" Pan Head Aluminum (Alloy 2024-T4 or 7075-T73) or Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2" spacing may be substituted for the 3/4" diameter plug weld. Set screws must be set flush against the outside face of rails and underside of handrails.  
 \*\* Embedded length may be 4" for plug welded connection.



**DETAIL "E" - CONTINUITY  
FIELD SPLICE**

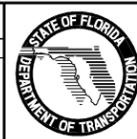


**SLEEVE MODIFICATION FOR  
TOP RAIL TYPE B CONNECTION**

**CROSS REFERENCE:**  
 For locations of Details "C", "D" and "E", see Sheet 2 of 5.

**REVISIONS**

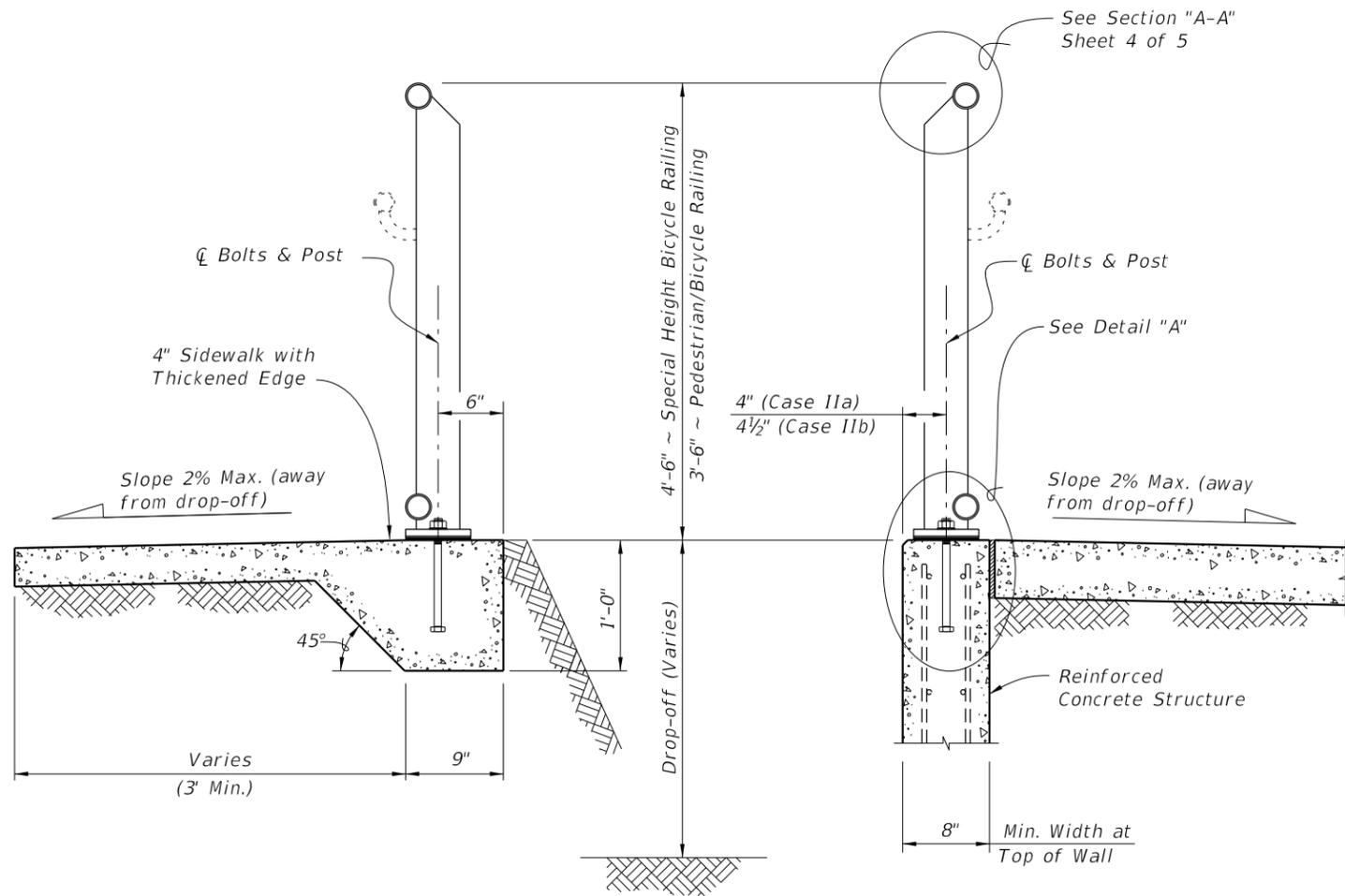
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	Added (± 4") tolerance to End Hoop length in Detail "C".			
07/01/10	SJN	No Change			



2010 Interim Design Standard

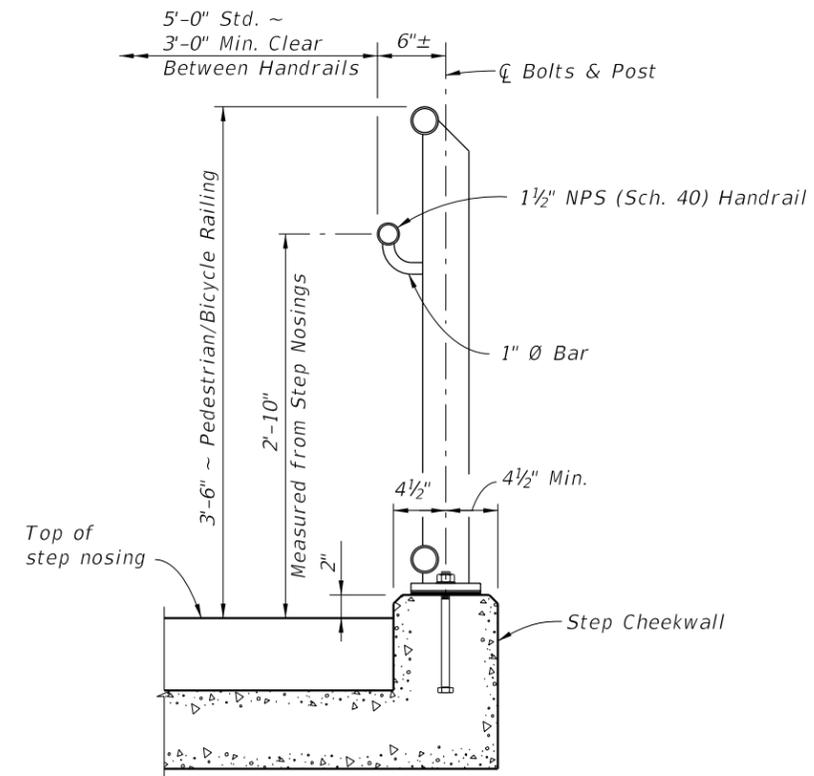
**ALUMINUM PEDESTRIAN/BICYCLE PICKET RAILING**

Interim Date	Sheet No.
07/01/10	4 of 5
Index No.	
860	

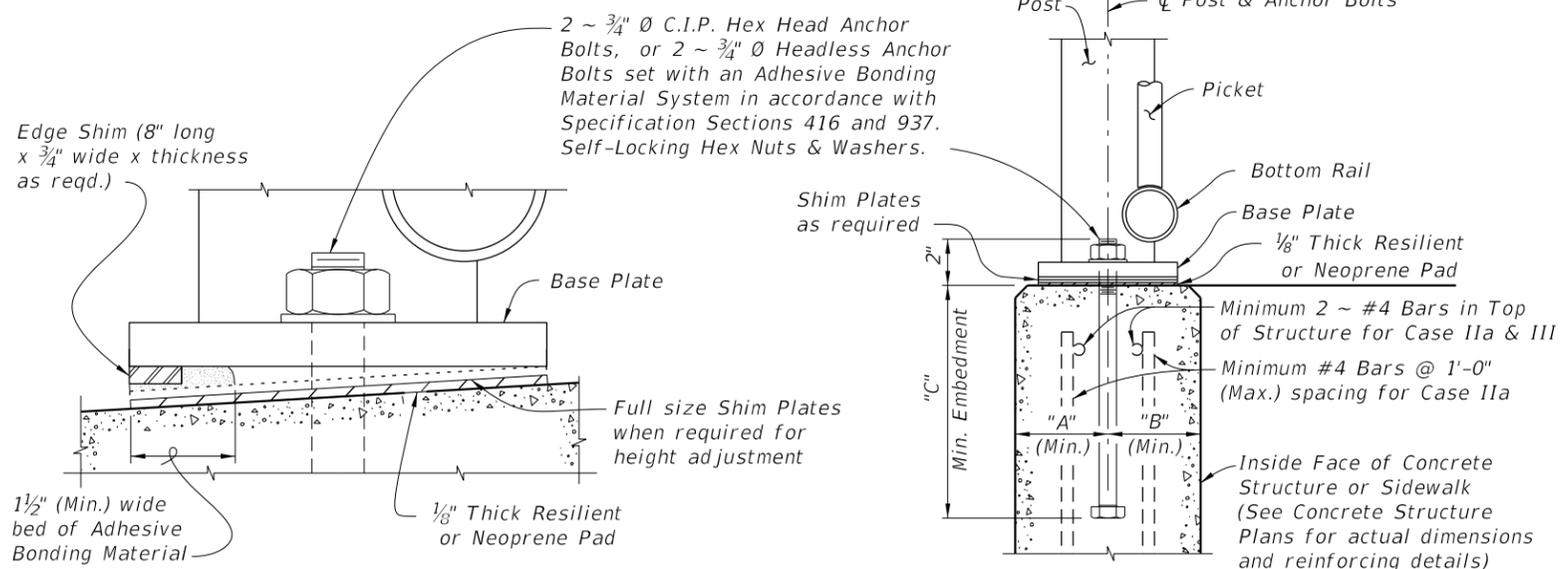


TYPICAL SECTION ON CONCRETE SIDEWALK (Case I)

TYPICAL SECTION ON RETAINING WALL (Case II)



TYPICAL SECTION ON STEPS & STAIRS (Case III)

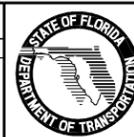


ANCHOR BOLT TABLE							
CASE	STRUCTURE TYPE	DIMENSIONS			ANCHOR LENGTH		ANCHOR SIZE
		"A" Edge Dist.	"B" Edge Dist.	"C" Embedment	C.I.P. Hex Head Bolt	Adhesive Anchor	
I	Unreinforced Concrete	6"	1'-2"	9"	10 1/2"	11"	3/4" Ø
IIa	Reinforced Concrete	4"	4"	9"	10 1/2"	11"	3/4" Ø
IIb	Gravity Wall Index No. 520	4 1/2"	3 1/2" @ top	1'-0" *	1'-1 1/2"	1'-2"	3/4" Ø
III	Step Cheekwall	4 1/2"	4 1/2"	9"	10 1/2"	11"	3/4" Ø

\* Embedment length "C" may be reduced to 9" for the 3'-6" height railings for Case IIb, when the post spacing does not exceed 5'-0".

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Changed 2'-10" dimension to mid-height of handrail.			



2010 Interim Design Standard

ALUMINUM PEDESTRIAN/BICYCLE PICKET RAILING

Interim Date: 07/01/10  
Sheet No.: 5 of 5  
Index No.: 860

**NOTES**

**APPLICABILITY NOTE TO DESIGNER:**

This Index is not approved for use on bridges. 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 hazards do not exceed 2'-6", Pedestrian/Bicycle Railings for customary applications are provided in Index No's. 850 or 860. Also applicable for select uses on sidewalks within service areas and similar locations or maintenance areas where the drop off exceeds 2'-6". 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. 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 live load and geometric requirements specified herein, provides a minimum 50 year design life and that deflections due to the Design Live Loads do not exceed 1½" at midspan of the top rail. 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 1½" 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.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

**PIPE RAILING & POSTS:**

Structural Tube, Pipe and Bar 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. Corners and changes in tangential longitudinal alignment, may be made continuous with a 9" bend radius or terminated at adjoining sections with a standard end hoop when handrails are not required. 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 and handrails shall be shop bent to match the alignment radius.

RAILING MEMBER DIMENSIONS TABLE			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" NPS (Sch. 40)	2.375"	0.154"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1½" NPS (Sch. 40)	1.900"	0.145"
Handrails Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1½" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A

**BASE PLATES:**

Base 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 or 6063. Shim plates shall be used for foundation height adjustments greater than ¼" and localized irregularities greater than ⅛". 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. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of ½", unless longer anchor bolts are provided for the exposed thread length.

**COATINGS:**

The aluminum railing shall be mill finish unless otherwise noted in the Contract Documents. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 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. Cutting of reinforcing steel is permitted for drilled hole installation. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking 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 and tack welds 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 of 30'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate shipping and handling, but rails 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 is not required.

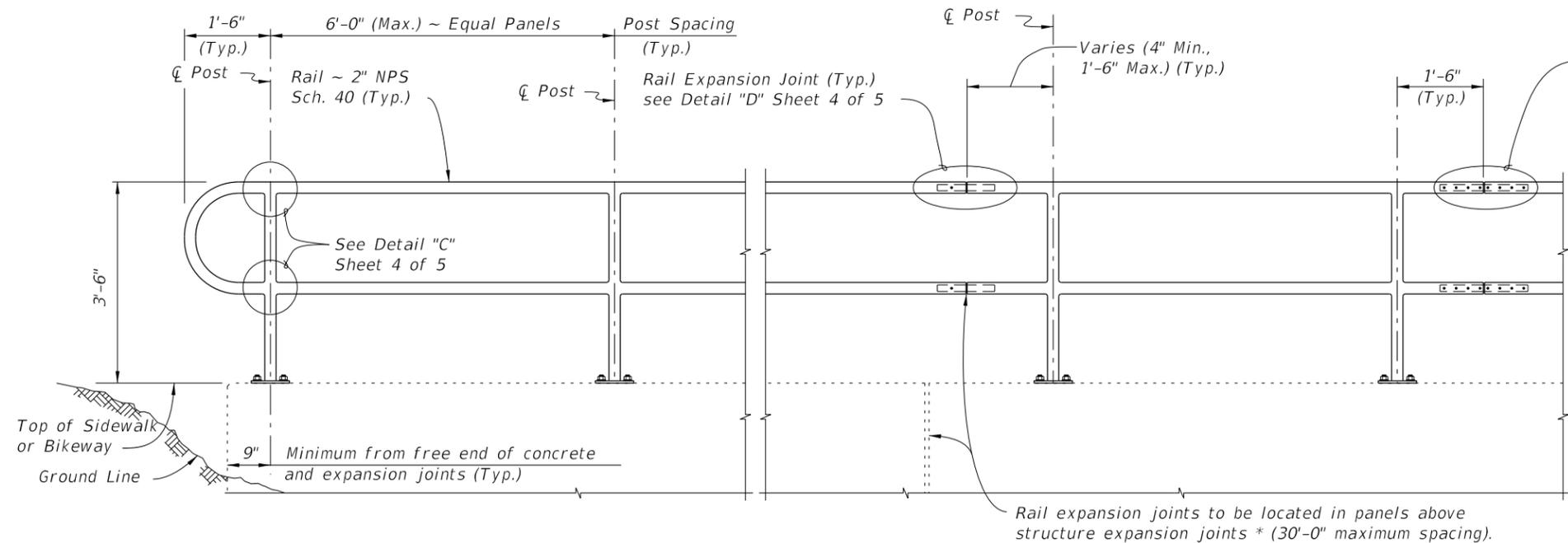
**SHOP DRAWINGS:**

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.

**PAYMENT:**

Guiderail shall be paid for under the contract unit price for Pipe Guiderail (Aluminum), LF (Item No. 515-1-2). Payment for the Guiderail will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the Guiderail.

REVISIONS						2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			07/01/10	1 of 5
07/01/10	SJN	Deleted Design Criteria Notes.							
								<b>ALUMINUM PIPE GUIDERAIL</b>	



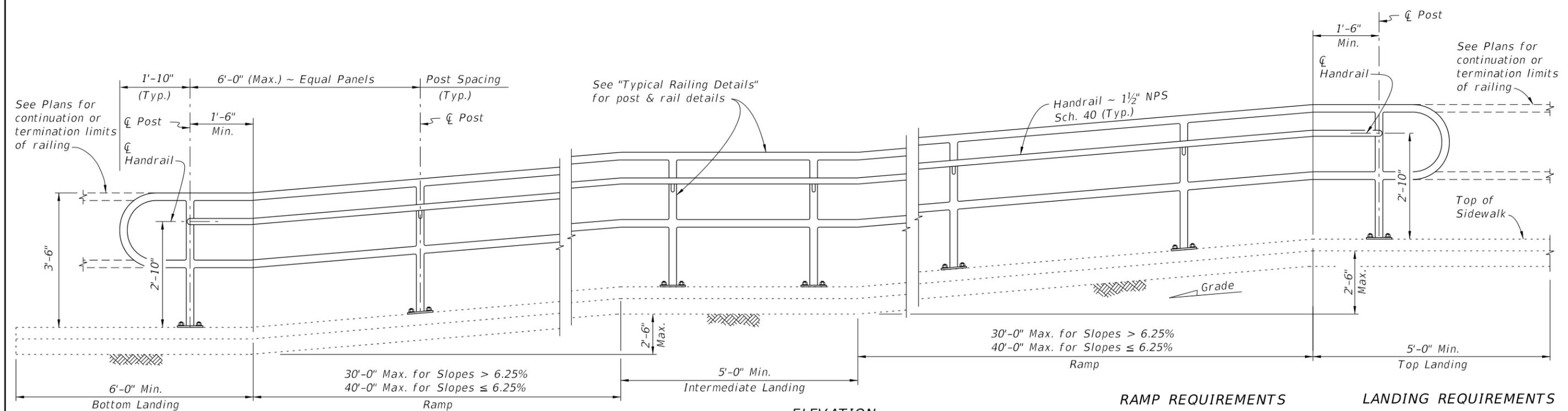
NOTES:  
 NPS = Nominal Pipe Size

STRUCTURES EXPANSION JOINTS NOTE:  
 \* Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.

CROSS REFERENCE:  
 For Details "C", "D" and "E", see Sheet 4 of 5.

ELEVATION

TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%



RAMP REQUIREMENTS

For slopes greater than 5%:  
 Max. ramp slope = 8.33%  
 Max. ramp cross-slope = 2.0%

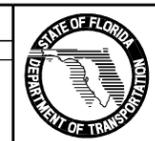
LANDING REQUIREMENTS

Max. landing slope = 2%  
 Max. landing cross-slope = 2%

ELEVATION  
 (Showing Inside Face of Railing)

RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%

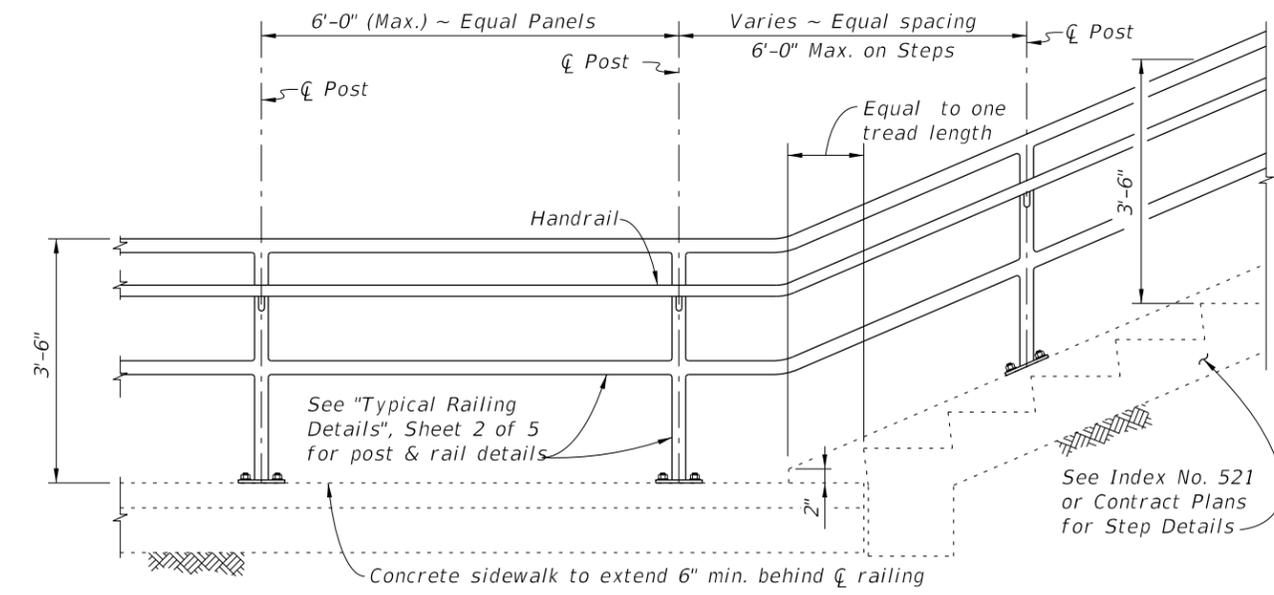
REVISIONS			
DATE	BY	DESCRIPTION	
07/01/10	SJN	Added 2'-10" dimensions to mid-height of handrail.	



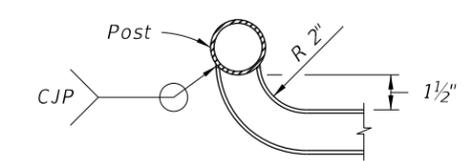
2010 Interim Design Standard

**ALUMINUM PIPE GUIDERAIL**

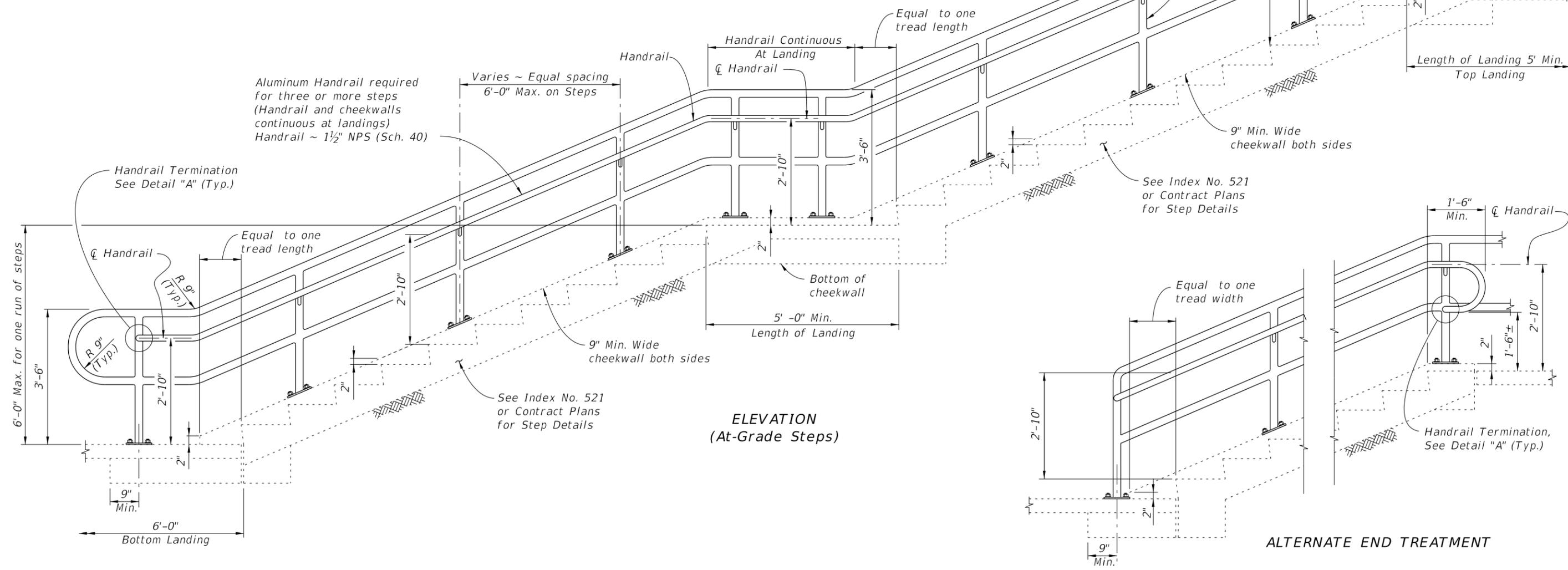
Interim Date: 07/01/10  
 Sheet No.: 2 of 5  
 Index No.: 870



**RAILING CONTINUATION BEYOND STEPS**  
(Bottom shown, Top similar)



**DETAIL "A" - PLAN VIEW  
HANDRAIL TERMINATION**

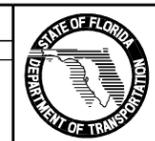


**ELEVATION  
(At-Grade Steps)**

**ALTERNATE END TREATMENT**

**GUIDERAIL ON STEPS & STAIRS**

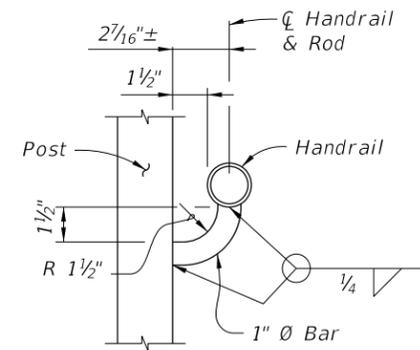
REVISIONS			
DATE	BY	DESCRIPTION	
07/01/10	SJN	Deleted minimum extension of handrail at base of steps. Changed 2'-10" dimension to mid-height of handrail.	



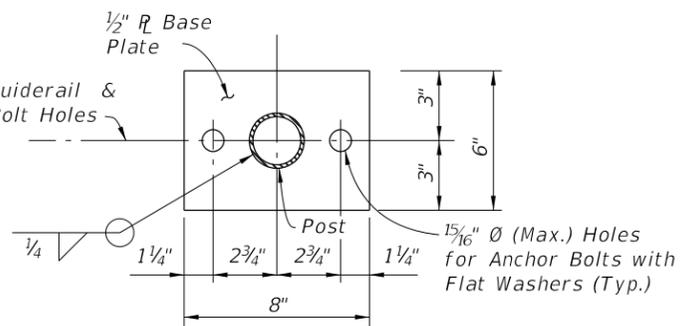
2010 Interim Design Standard

**ALUMINUM PIPE GUIDERAIL**

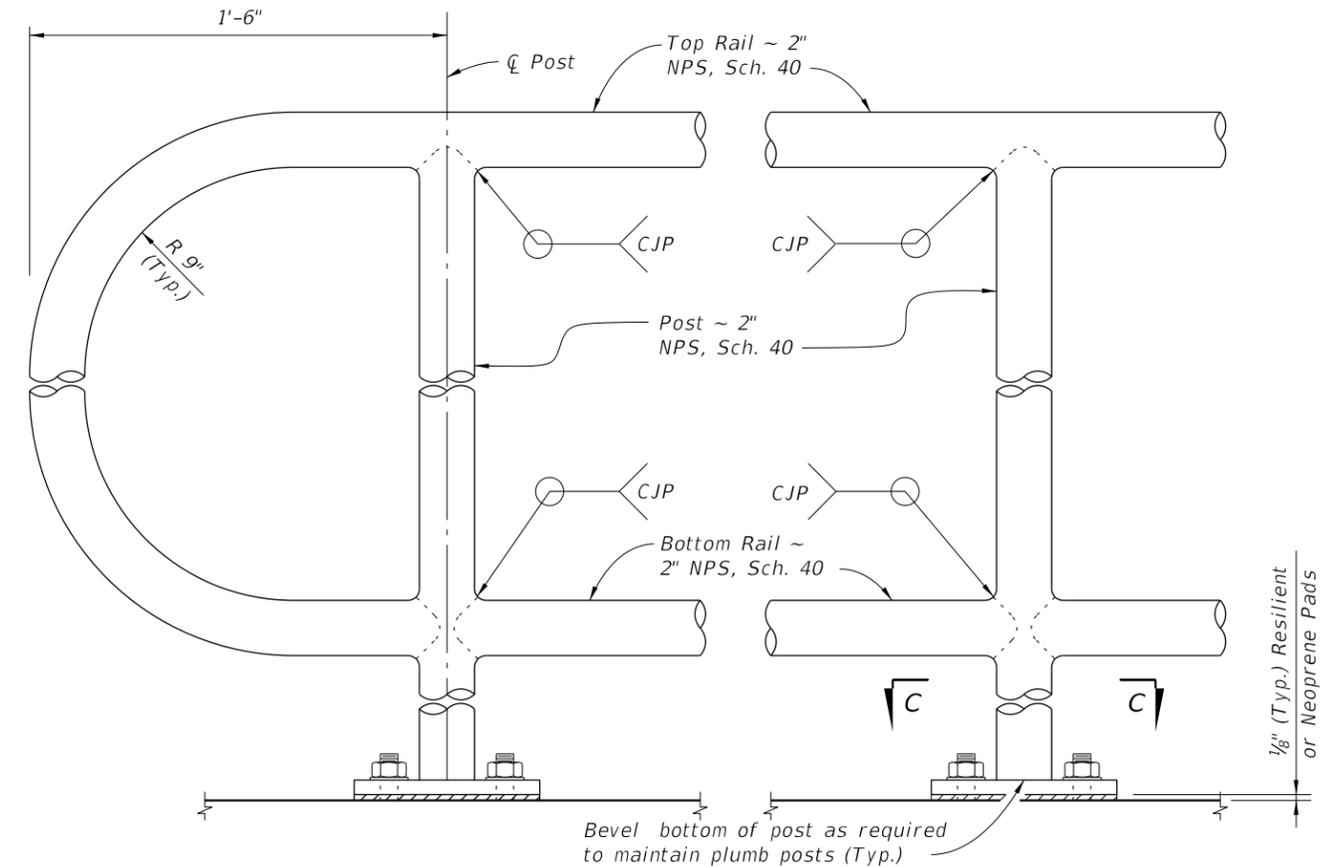
Interim Date	Sheet No.
07/01/10	3 of 5
Index No.	
<b>870</b>	



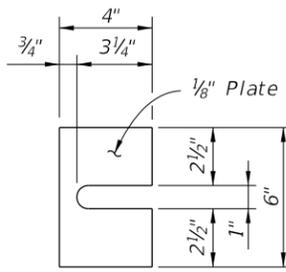
**SECTION B-B**  
(Handrail Connection)



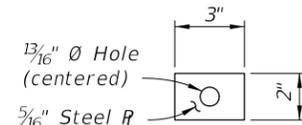
**SECTION C-C**  
BASE PLATE DETAIL



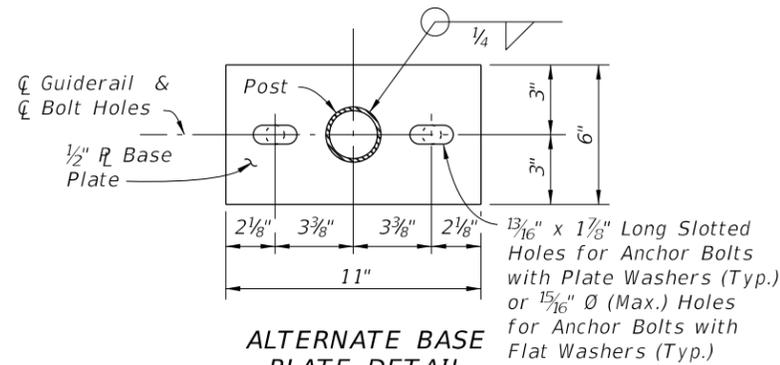
**DETAIL "C" - RAIL CONNECTIONS**  
(Handrail Not Shown)



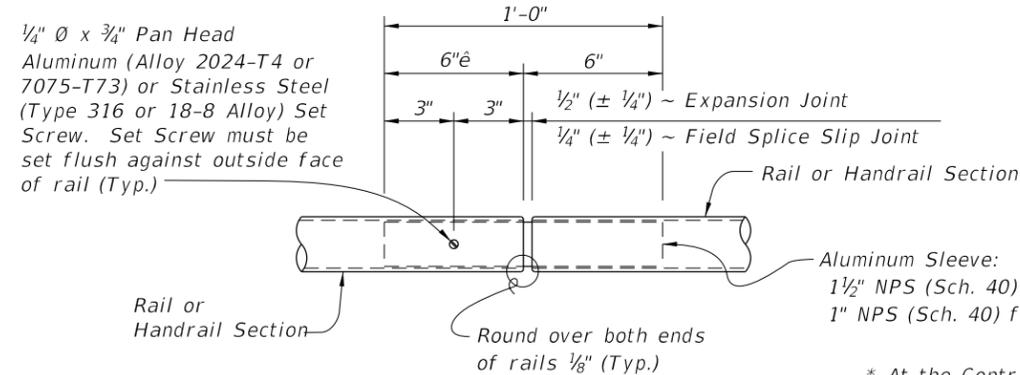
**SHIM PLATE**  
DETAIL



**PLATE WASHER**  
DETAIL

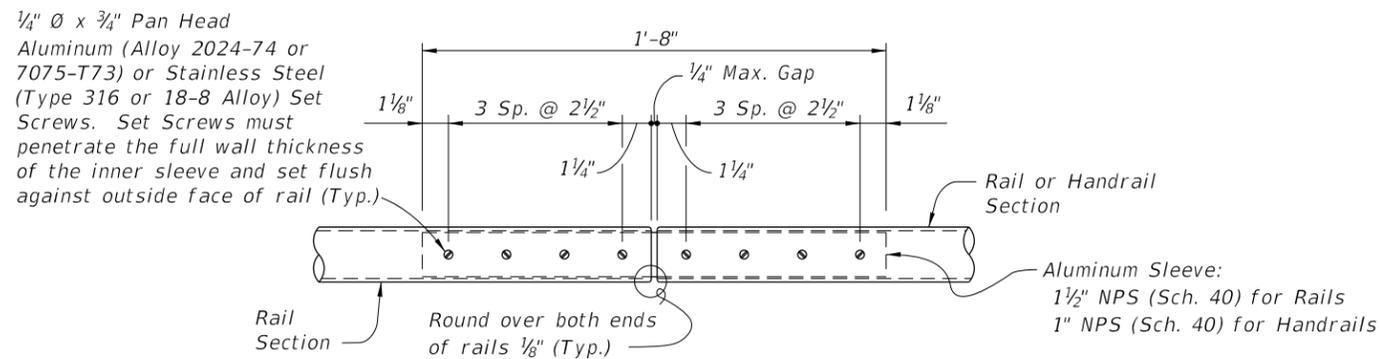


**ALTERNATE BASE**  
PLATE DETAIL  
(Recommended for Top of Step Cheekwalls)

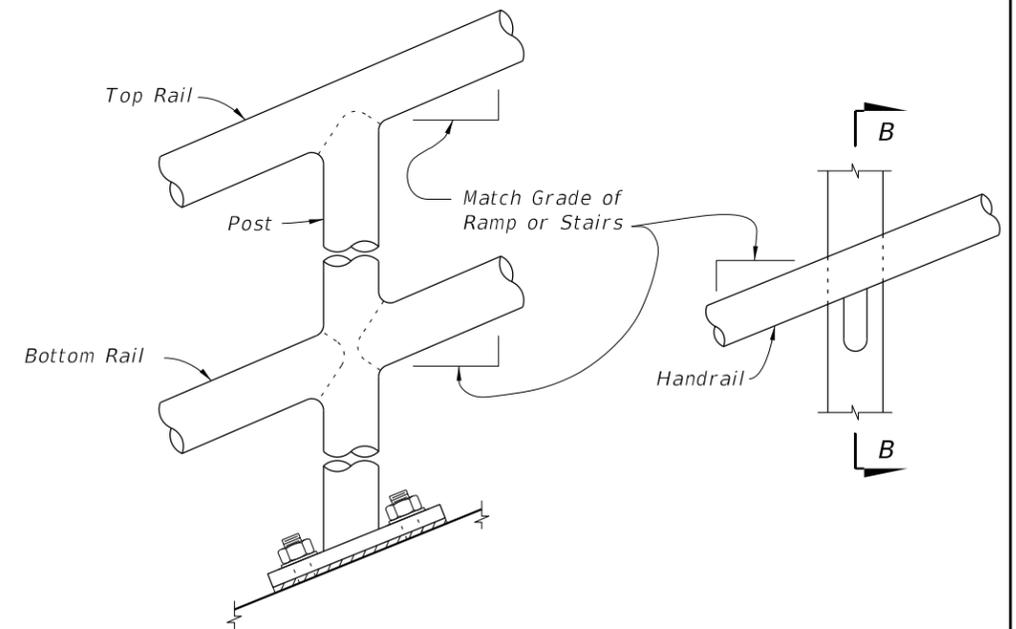


**DETAIL "D" - EXPANSION JOINT**  
(FIELD SPLICE SLIP JOINT SIMILAR)

\* At the Contractor's option, embedded length may be 4" when a 3/4 inch diameter plug weld is substituted for the 1/4 inch diameter set screw.



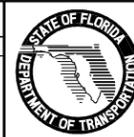
**DETAIL "E" - CONTINUITY**  
FIELD SPLICE



**DETAIL "B" - RAIL AND HANDRAIL**  
(Showing Sloped Condition for Stairs or Ramp)

CROSS REFERENCE:  
For locations of Details "C", "D" and "E", see Sheet 2 of 5.

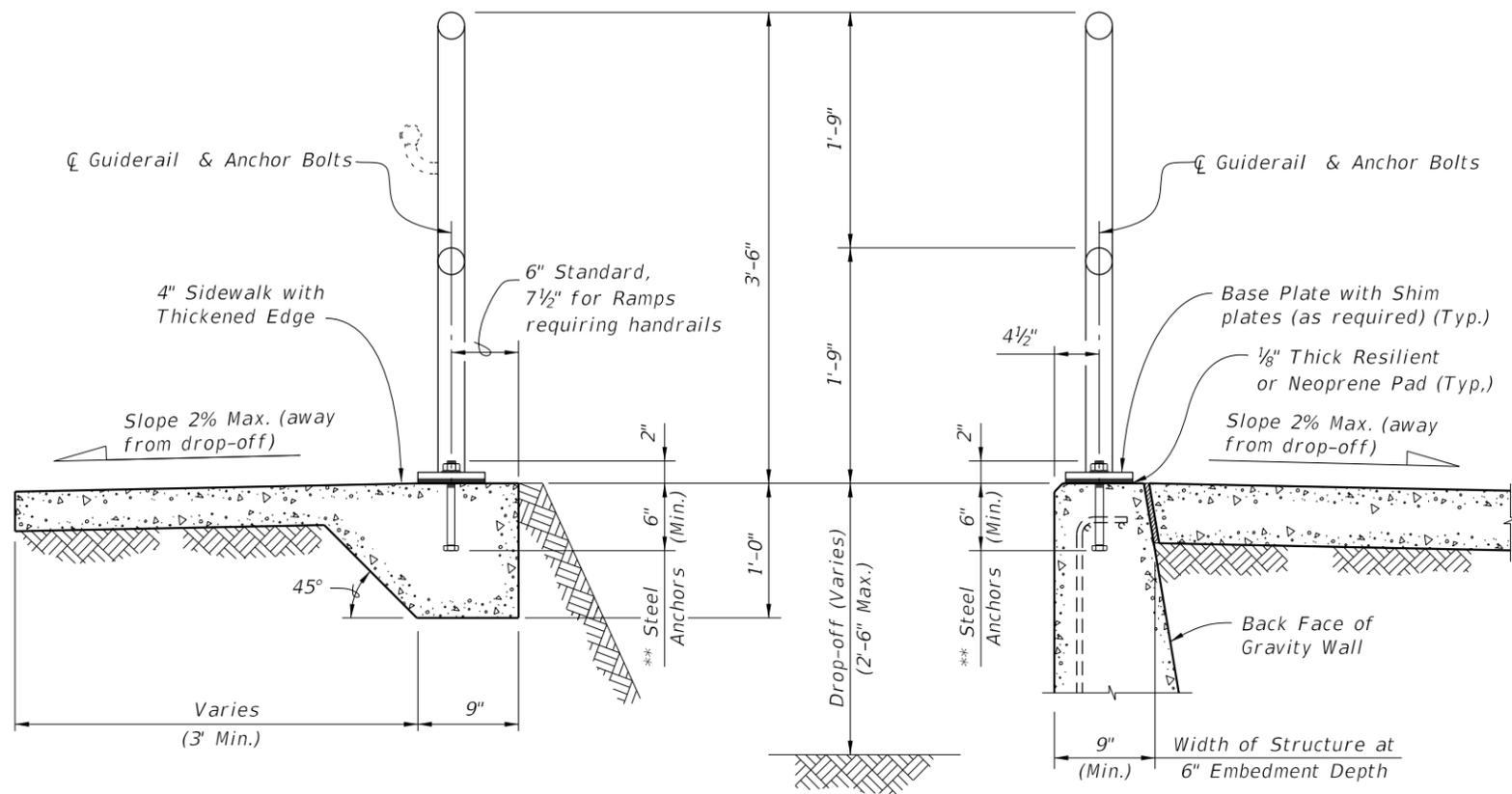
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	No Change			



2010 Interim Design Standard

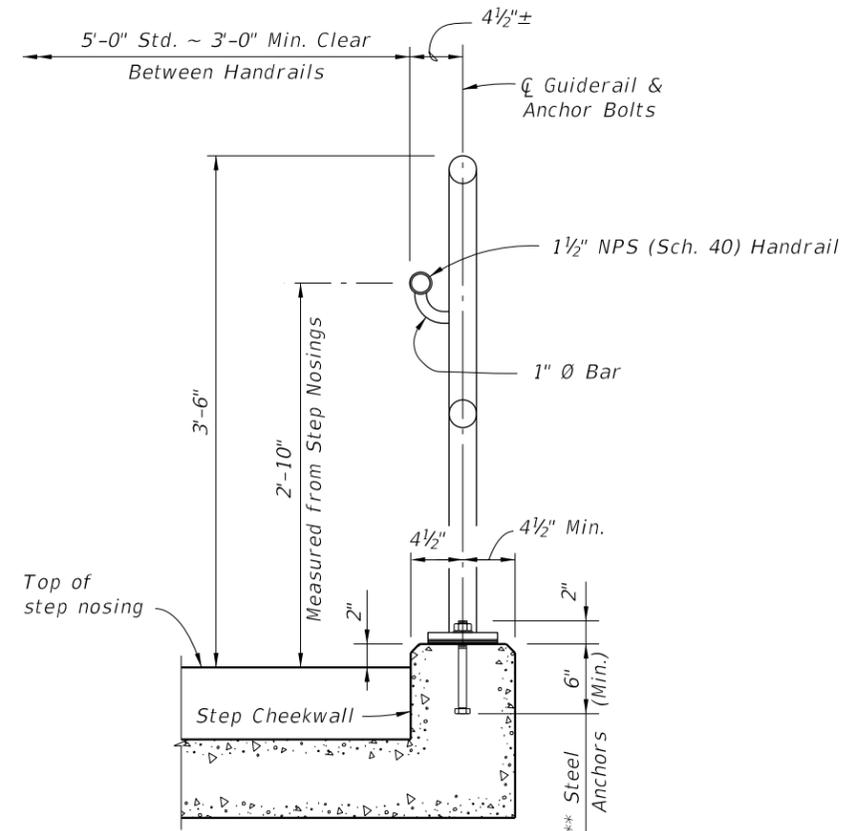
**ALUMINUM PIPE GUIDERAIL**

Interim Date	Sheet No.
07/01/10	4 of 5
Index No.	
<b>870</b>	

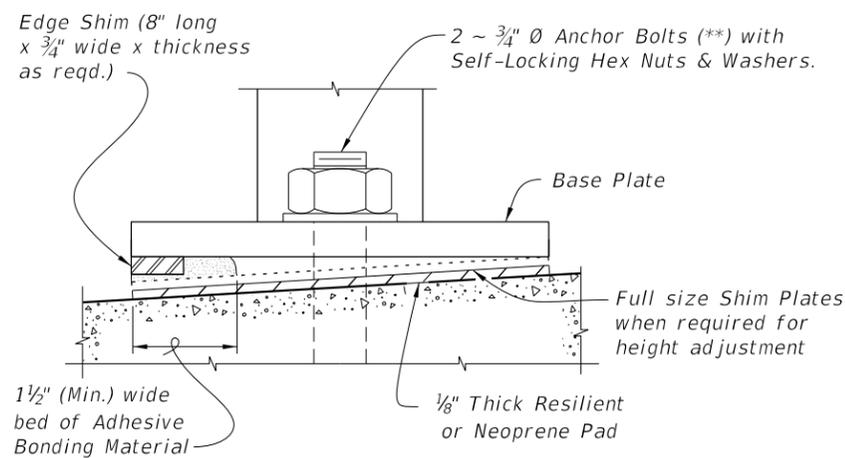


TYPICAL SECTION ON CONCRETE SIDEWALK

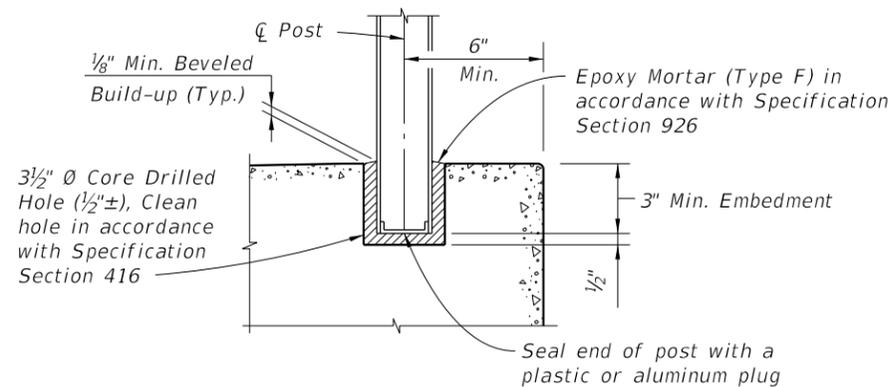
TYPICAL SECTION ON GRAVITY WALL  
(Other Retaining Walls Similar)



TYPICAL SECTION ON STEPS & STAIRS



DETAIL "F" (OPTIONAL SHIMMING DETAIL  
FOR CROSS SLOPE CORRECTION)  
(Used in lieu of Beveled Shim Plates)



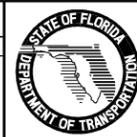
OPTIONAL SIDEWALK ANCHORAGE DETAIL

NOTES:

- \*\* 2 ~ 3/4"  $\varnothing$  x 8" Steel Anchors: Galvanized Steel Bolts (As Shown) (C-I-P); Galvanized U-Bolts Permitted (C-I-P); Galvanized Adhesive Anchors Permitted (\*\*); Expansion Anchors Not Permitted.
- \*\*\* Adhesive anchors shall be fully threaded headless anchor bolts set in drilled holes (manufacturer recommended diameter) with an Adhesive Bonding Material System in accordance with Specification Section 937 and installed in accordance with Specification Section 416. The minimum embedment is 6".

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Changed 2'-10" dimension to mid-height of handrail.			



2010 Interim Design Standard

ALUMINUM PIPE GUIDERAIL

Interim Date	Sheet No.
07/01/10	5 of 5
Index No.	
870	

**NOTES**

**APPLICABILITY NOTE TO DESIGNER:**

This Index is not approved for use on bridges. 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 hazards do not exceed 2'-6", Pedestrian/Bicycle Railings for customary applications are provided in Index No's. 850 or 860. Also applicable for select uses on sidewalks within service areas and similar locations or maintenance areas where the drop off exceeds 2'-6". 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. 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 live load and geometric requirements specified herein, provides a minimum 50 year design life and that deflections due to the Design Live Loads do not exceed 1½" at midspan of the top rail. 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 1½" 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.

In lieu of design calculations, submit certified test reports from an approved independent testing agency. Test railing systems in accordance with ASTM E935 (Test Method A & C) using test loads at least 175% of the design load. Test proprietary or nonstandard anchorage systems in accordance with ASTM E894 (Flexural Test). Anchorage systems must resist the minimum of 175% of the design load for failure of the steel anchors or 220% of the design load for failure in the concrete foundation.

**PIPE RAILING & POSTS:**

Pipe Rails and Posts shall be in accordance with ASTM A53 Grade B for standard weight pipe and ASTM A500 Grade B, C or D or ASTM A501 for structural tube. Bars for handrail supports shall be ASTM A36. Posts and End Rails shall be fabricated and installed plumb, ± 1" tolerance when measured at 3'-6" above the foundation. Corners and changes in tangential longitudinal alignment, may be made continuous with a 9" bend radius or terminated at adjoining sections with a standard end hoop when handrails are not required. 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 and handrails shall be shop bent to match the alignment radius.

RAILING MEMBER DIMENSIONS TABLE			
MEMBER	DESIGNATION	OUTSIDE DIMENSION	WALL THICKNESS
Posts	2" NPS (Sch. 40)	2.375"	0.154"
Rails	2" NPS (Sch. 40)	2.375"	0.154"
Rail Joint/Splice Sleeves	1½" NPS (Sch. 40)	1.900"	0.145"
Handrails Joint/Splice Sleeves	1" NPS (Sch. 40)	1.315"	0.133"
Handrails	1½" NPS (Sch. 40)	1.900"	0.145"
Handrail Support Bar	1" Ø Round Bar	1.000"	N/A

**BASE PLATES:**

Base 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 or 6063. Shim plates shall be used for foundation height adjustments greater than ¼" and localized irregularities greater than ⅛". 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. Stacked shim plates must be bonded together with adhesive bonding material and limited to a maximum total thickness of ½", unless longer anchor bolts are provided for the exposed thread length.

**COATINGS:**

The railing shall be hot-dip galvanized after fabrication in accordance with Section 962 of the Specifications. All nuts, bolts and washers shall be hot-dip galvanized in accordance with Section 962 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. Cutting of reinforcing steel is permitted for drilled hole installation. All anchor bolts shall have single self-locking hex nuts. Tack welding of the nut to the anchor bolt may be used in lieu of self-locking 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 and tack welds 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 of 30'-0". Field splices similar to the expansion joint detail may be approved by the Engineer to facilitate shipping and handling, but rails 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 (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required.

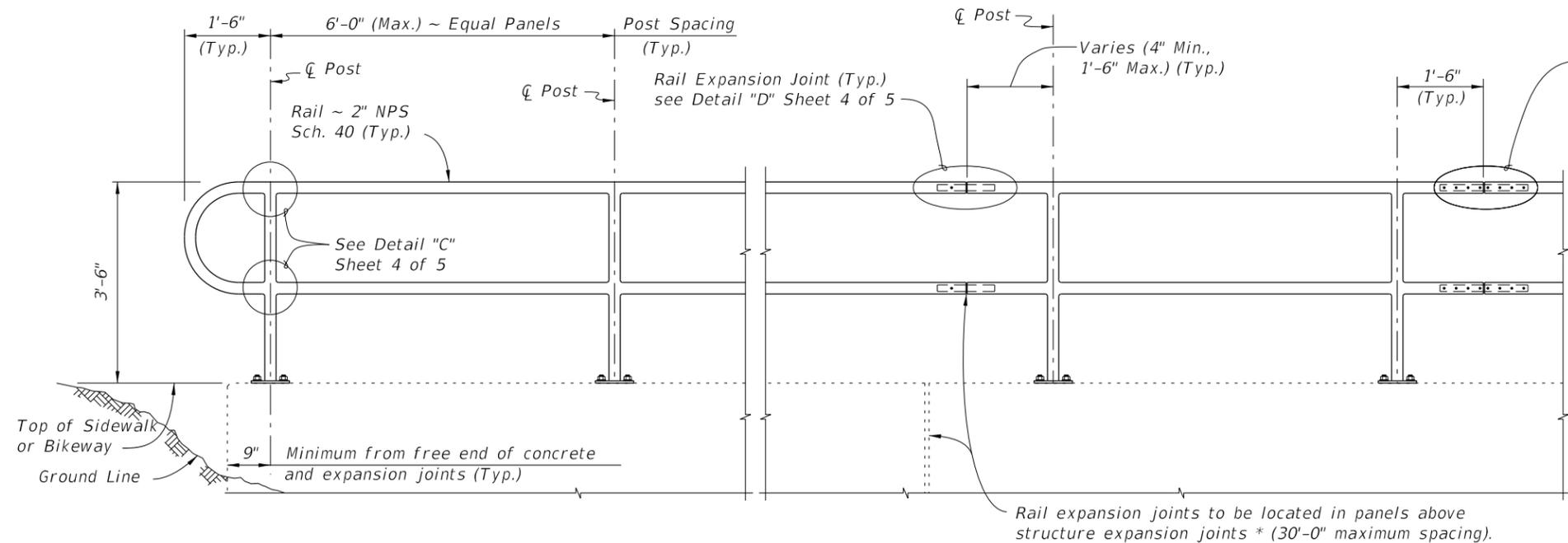
**SHOP DRAWINGS:**

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.

**PAYMENT:**

Guiderail shall be paid for under the contract unit price for Pipe Guiderail (Steel), LF (Item No. 515-1-1). Payment for the Guiderail will be plan quantity measured as the length along the center line of the top rail, and includes rails, posts, rail splice assembly, base plates, anchor bolts, nuts, washers, resilient or neoprene pads and all incidental materials and labor required to complete installation of the Guiderail.

REVISIONS							2010 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			07/01/10	1 of 5
07/01/10	SJN	Deleted Design Criteria Notes.					Index No. <b>880</b>		



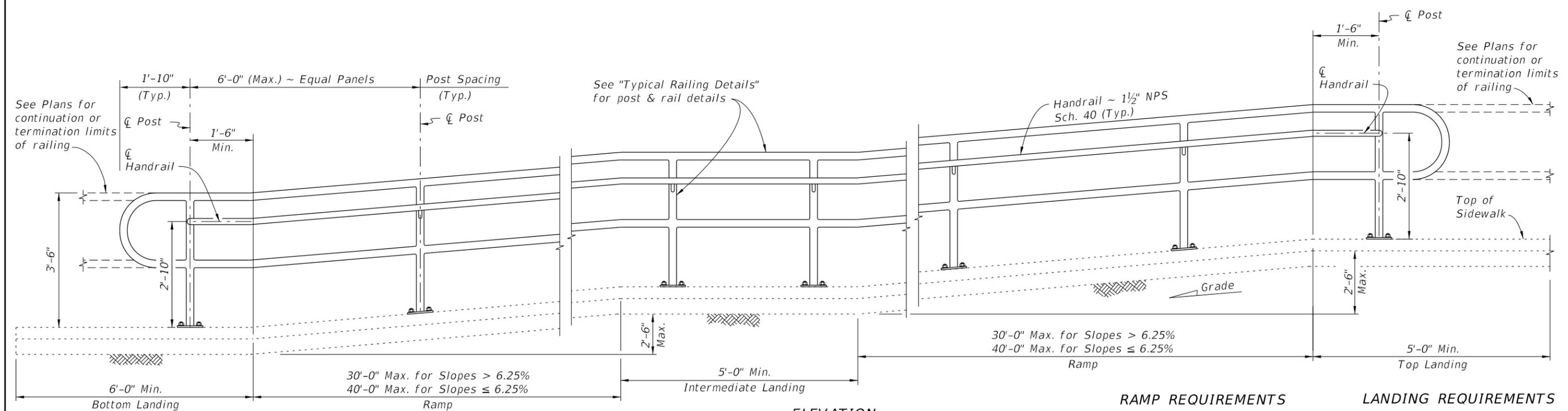
NOTES:  
 NPS = Nominal Pipe Size

STRUCTURES EXPANSION JOINTS NOTE:  
 \* Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.

CROSS REFERENCE:  
 For Details "C", "D" and "E", see Sheet 4 of 5.

ELEVATION

TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%



ELEVATION  
 (Showing Inside Face of Railing)

RAMP REQUIREMENTS

For slopes greater than 5%:  
 Max. ramp slope = 8.33%  
 Max. ramp cross-slope = 2.0%

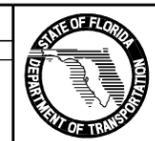
LANDING REQUIREMENTS

Max. landing slope = 2%  
 Max. landing cross-slope = 2%

RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Added 2'-10" dimension to mid-height of handrail.			

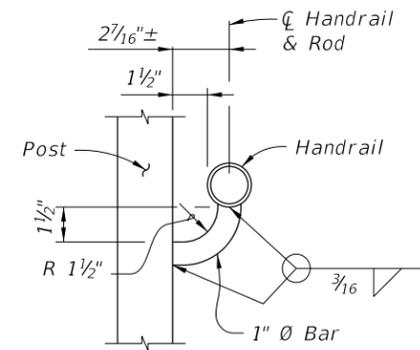


2010 Interim Design Standard

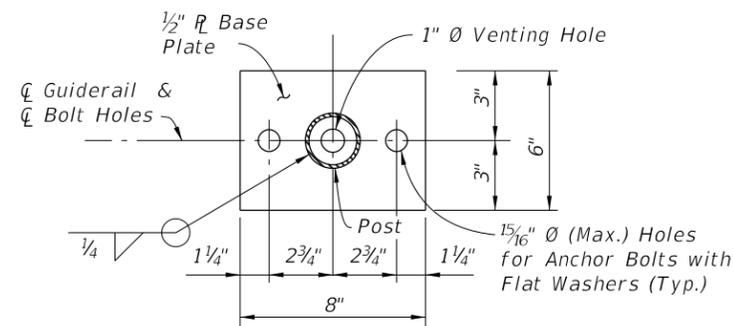
STEEL PIPE GUIDERAIL

Interim Date	Sheet No.
07/01/10	2 of 5
Index No.	
880	

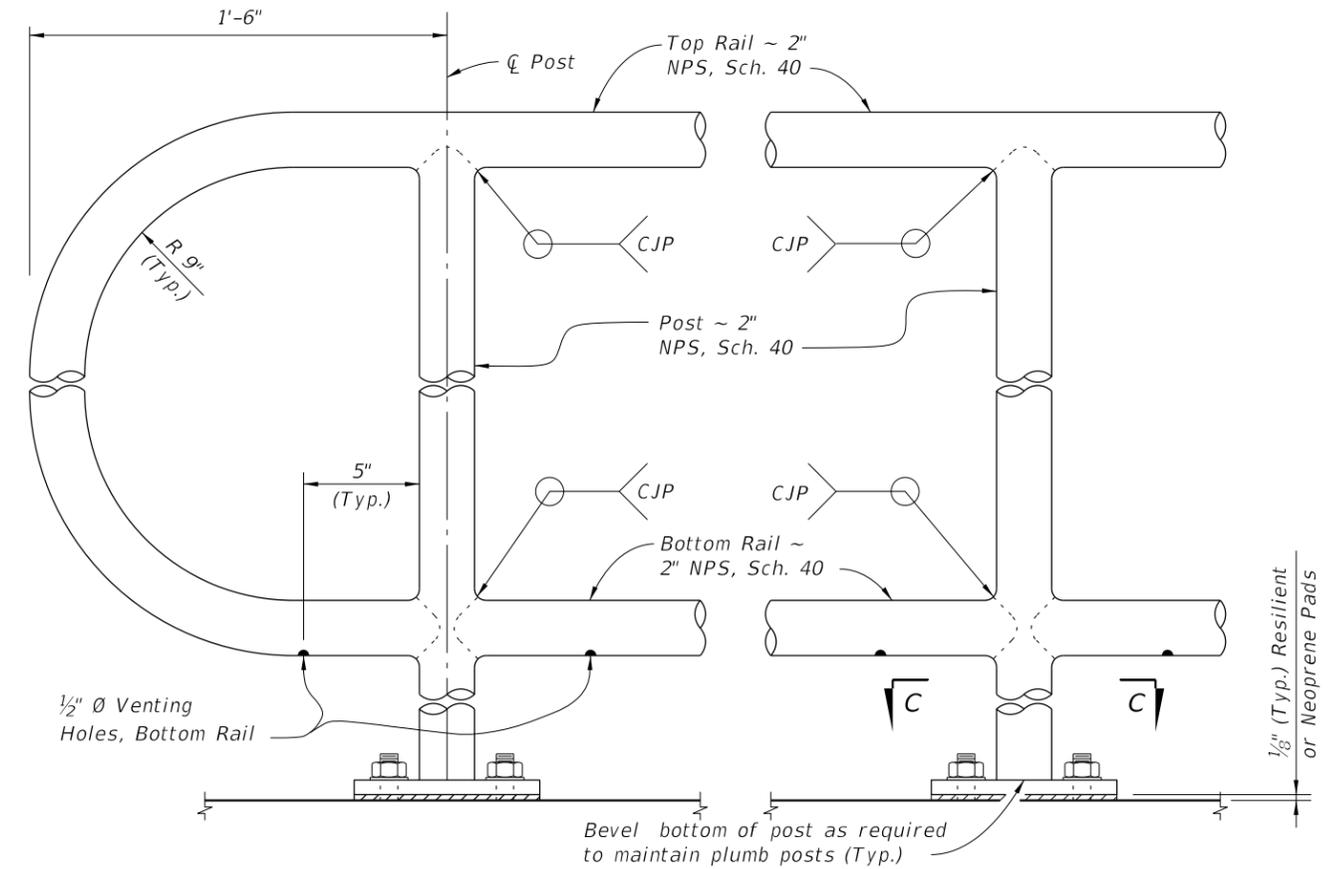




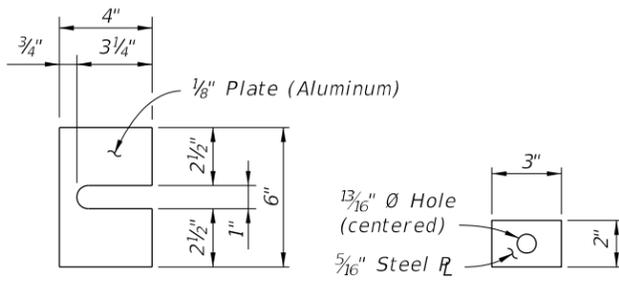
**SECTION B-B**  
(Handrail Connection)



**SECTION C-C**  
BASE PLATE DETAIL

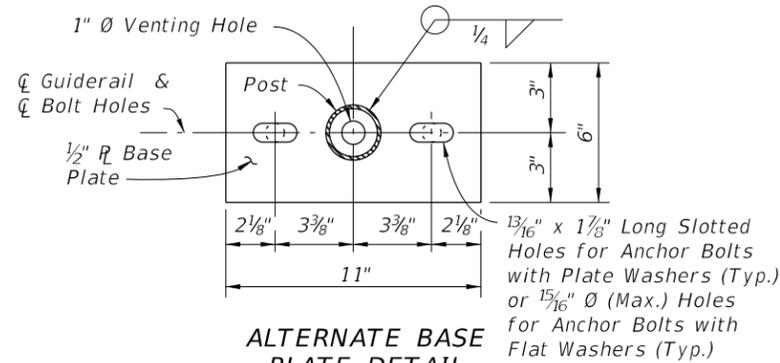


**DETAIL "C" - RAIL CONNECTIONS**  
(Handrail Not Shown)

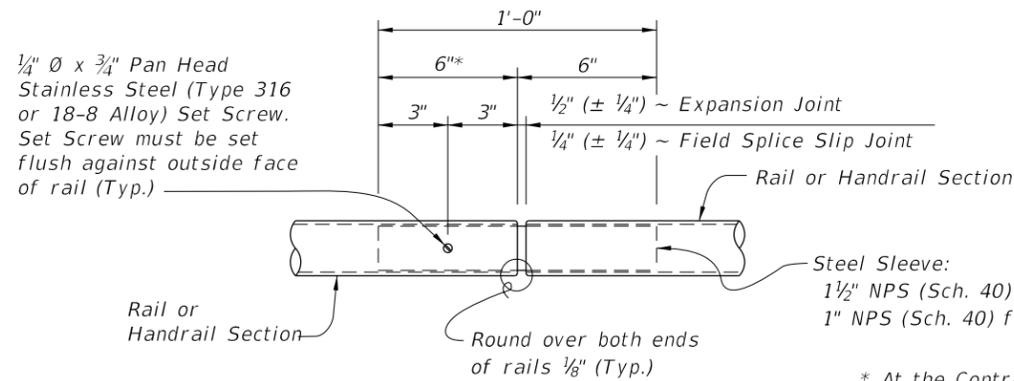


**SHIM PLATE**  
DETAIL

**PLATE WASHER**  
DETAIL

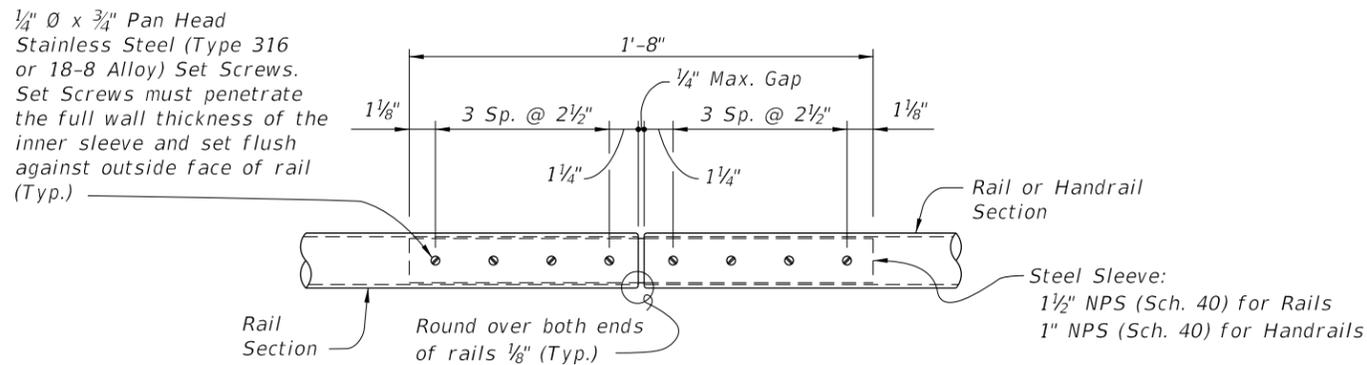


**ALTERNATE BASE**  
PLATE DETAIL  
(Recommended for Top of Step Cheekwalls)

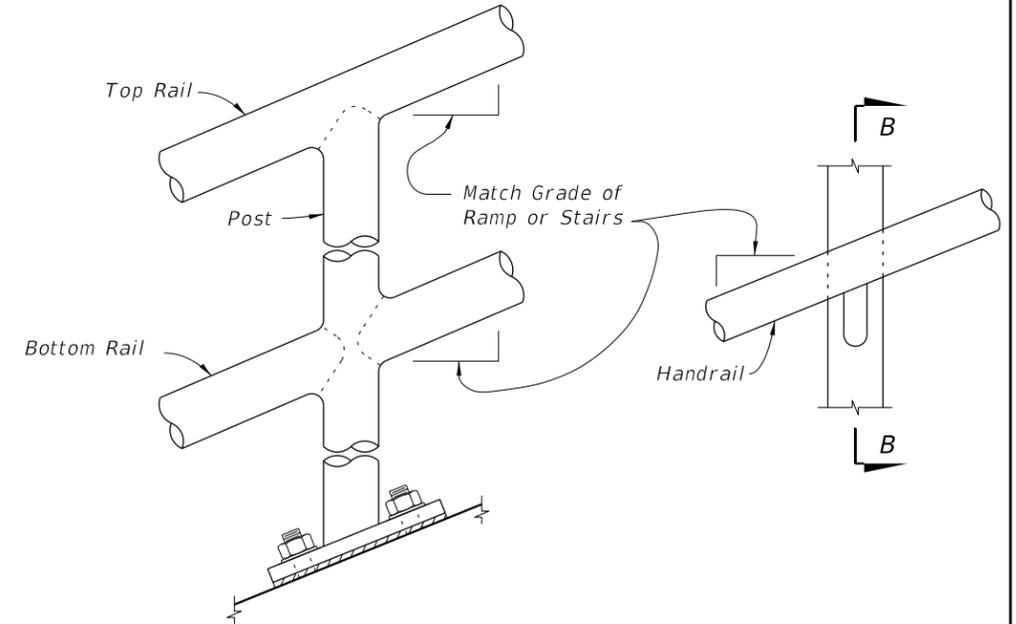


**DETAIL "D" - EXPANSION JOINT**  
(FIELD SPLICE SLIP JOINT SIMILAR)

\* At the Contractor's option, embedded length may be 4" when a 3/4" diameter plug weld is substituted for the 1/4" diameter set screw.



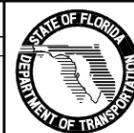
**DETAIL "E" - CONTINUITY**  
FIELD SPLICE



**DETAIL "B" - RAIL AND HANDRAIL**  
(Showing Sloped Condition for Stairs or Ramp)

CROSS REFERENCE:  
For locations of Details "C", "D" and "E", see Sheet 2 of 5.

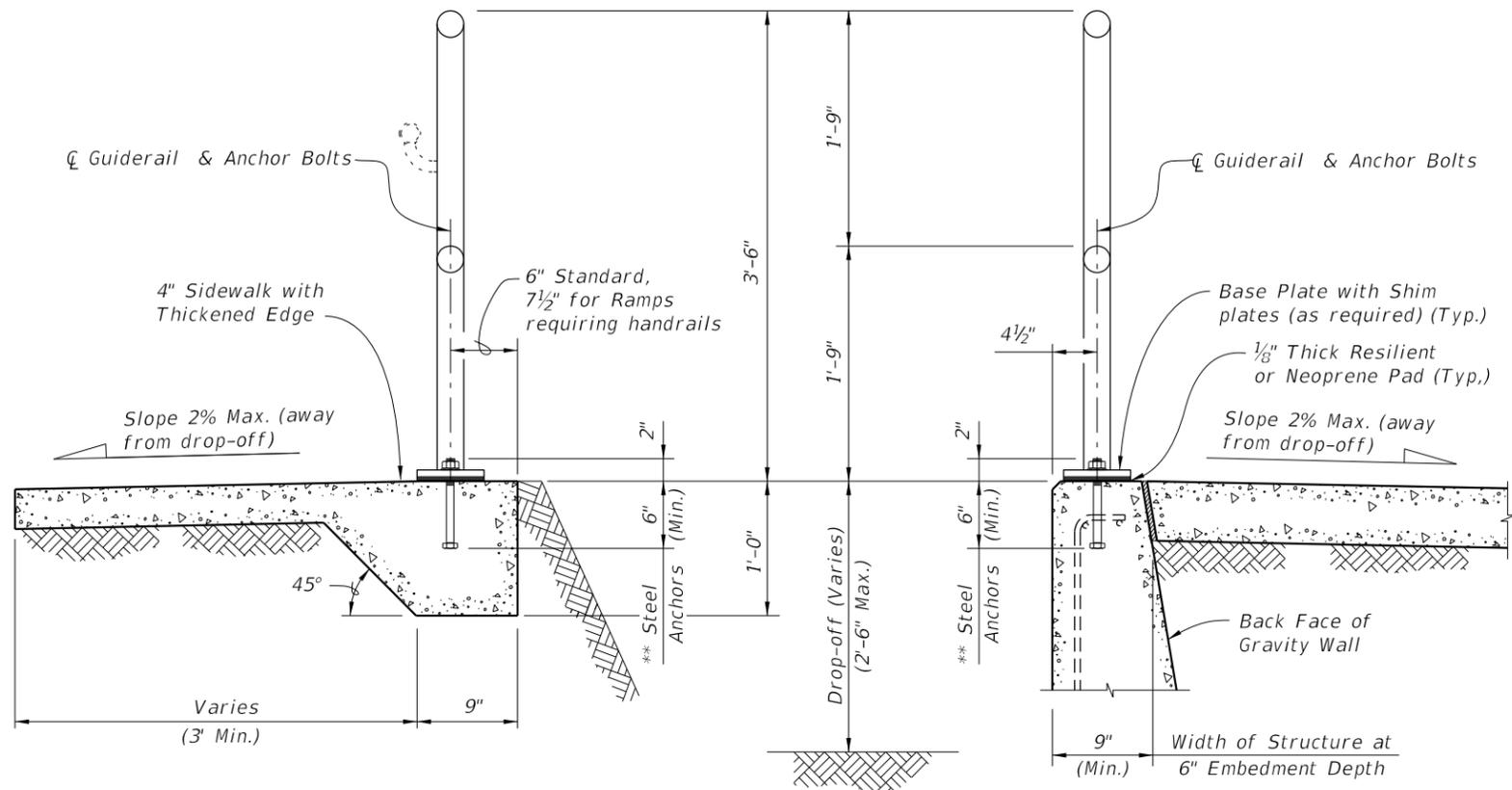
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DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	No Change			



2010 Interim Design Standard

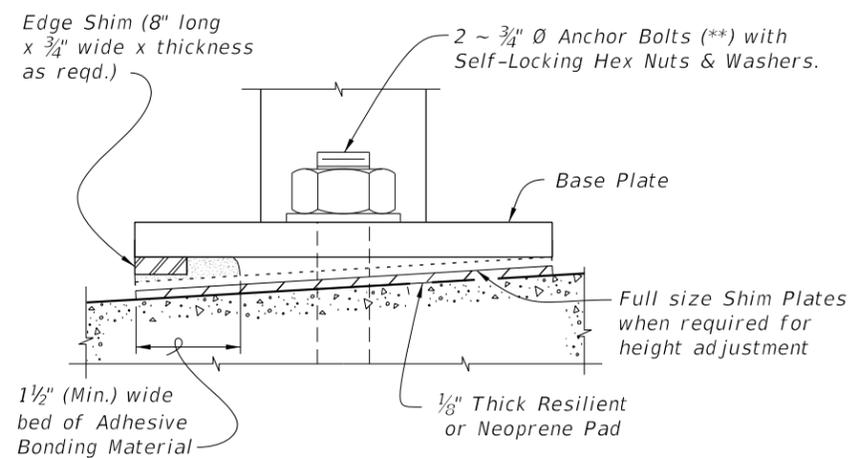
**STEEL PIPE GUIDERAIL**

Interim Date	Sheet No.
07/01/10	4 of 5
Index No.	
<b>880</b>	

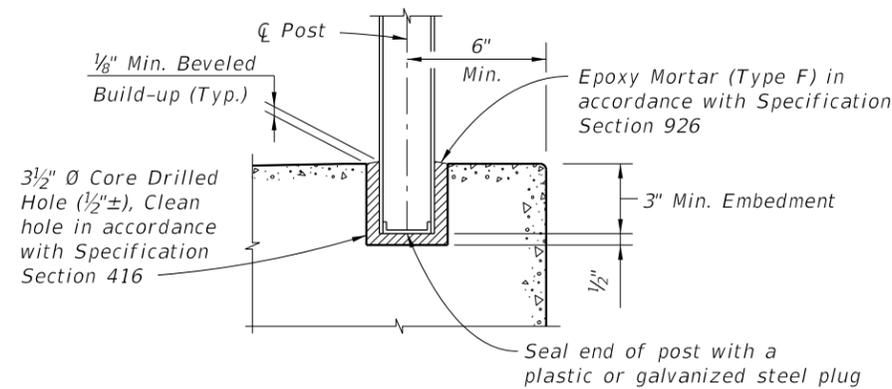


TYPICAL SECTION ON CONCRETE SIDEWALK

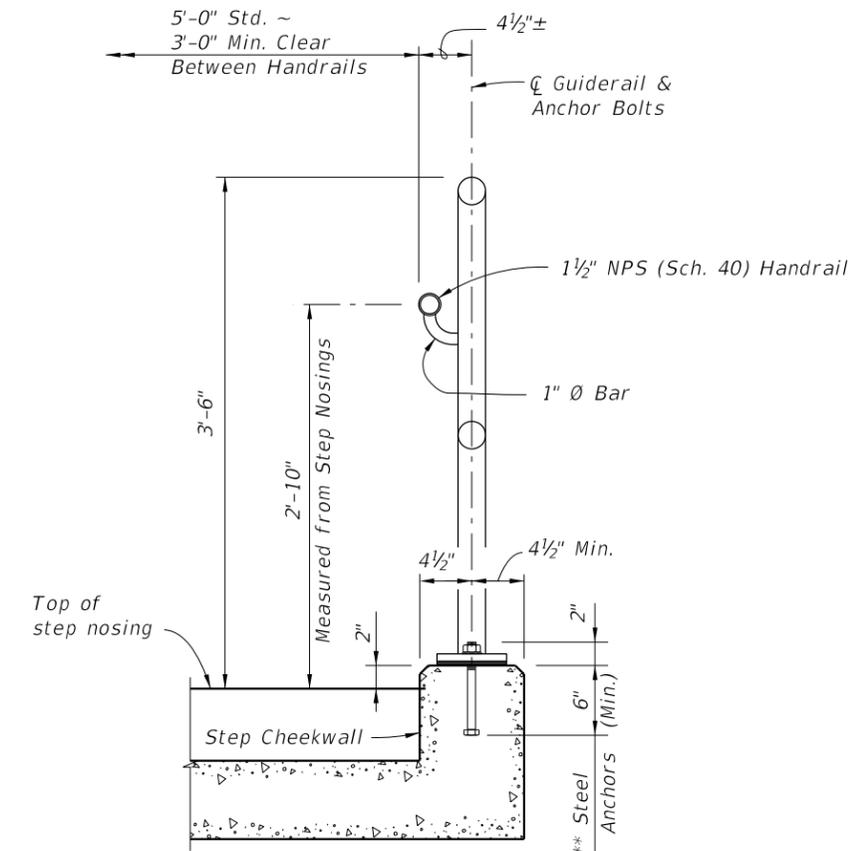
TYPICAL SECTION ON GRAVITY WALL  
(Other Retaining Walls Similar)



DETAIL "F" (OPTIONAL SHIMMING DETAIL  
FOR CROSS SLOPE CORRECTION)  
(Used in lieu of Beveled Shim Plates)



OPTIONAL SIDEWALK ANCHORAGE DETAIL



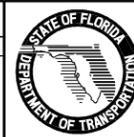
TYPICAL SECTION ON STEPS & STAIRS

NOTES:

- \*\* 2 ~ 3/4"  $\varnothing$  x 8" Steel Anchors: Galvanized Steel Bolts (As Shown) (C-I-P); Galvanized U-Bolts Permitted (C-I-P); Galvanized Adhesive Anchors Permitted (\*\*\*) ; Expansion Anchors Not Permitted.
- \*\*\* Adhesive anchors shall be fully threaded headless anchor bolts set in drilled holes (manufacturer recommended diameter) with an Adhesive Bonding Material System in accordance with Specification Section 937 and installed in accordance with Specification Section 416. The minimum embedment is 6".

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	Changed 2'-10" dimension to mid-height of handrail.			



2010 Interim Design Standard

STEEL PIPE GUIDERAIL

Interim Date	Sheet No.
07/01/10	5 of 5
Index No.	
880	

**NOTES**

**A. DESIGN SPECIFICATIONS:**

1. AASHTO Standard Specifications for Highway Bridges (Current Edition),
2. AASHTO Guide Specifications for Structural Design of Sound Barriers (Current Edition)
3. Florida Department of Transportation's Plans Preparation Manual, Volume I (Current Edition).

**B. DESIGN CRITERIA:**

The Precast Sound Barriers are pre-designed and based on the criteria in the Plans Preparation Manual, Volume I.

**C. CONCRETE AND GROUT:**

1. Concrete Class and Compressive Strength:
  - a. Cast-in-Place Collars: Class IV ( $f'c = 5500$  psi)
  - b. Precast Panels, Collars and Post Caps: Class IV ( $f'c = 5500$  psi)
  - c. Posts: Class IV ( $f'c = 5500$  psi)
2. Grout for Auger Cast Piling:
  - a. Maximum Working Compressive Strength = 2200 psi
  - b. Minimum 28 Day Strength = 5500 psi
3. Minimum Compressive Strength for Form Removal and Handling of Posts and Panels:
  - a. 2,500 psi for horizontally cast post and panels.
  - b. 2,000 psi for vertically cast panels or when tilt-up form tables are used for horizontally cast panels.

**D. REINFORCING STEEL:**

1. Reinforcing steel shall conform to ASTM A 615, Grade 60.
2. Welded wire fabric shall conform to ASTM A 185 (smooth wire) or ASTM A497 (deformed wire).
3. Concrete Cover of 2" shall be provided, unless otherwise noted.
4. In addition to the requirements of Specification Section 415, tie post and pile stirrups at the following locations as a minimum:
  - a. Post Stirrups - Tie at all four corner bars and at every third interior bar intersection.
  - b. Pile Stirrups - Tie to the main vertical reinforcing at alternate intersections for circular configurations and for rectangular configurations at the four corners and at every third interior bar intersection.

**E. SURFACE FINISHES:**

Provide a Class 5 Finish in accordance with Specification Section 400, unless otherwise shown on the Wall Control Drawings. See Index No. 5201 for texture finish options.

**F. PILING:**

Construct Auger Cast Piling in accordance with the Plans and Specification Section 455.

**G. UTILITIES:**

Field verify the locations of all overhead and underground utilities shown in the Wall Control Drawings.

**H. NEOPRENE PADS AND RESILIENT PADS:**

1. Neoprene Pads for Panel Bearing Points Between the Stacked Panels:  
The Neoprene pads for the panel bearing points shall be Plain Pads, Grade 50 durometer hardness in accordance with Specifications Sections 932-2.1.
2. Neoprene Pads for Collar Bearing Points:  
Neoprene Pads shall be Fiber Reinforced Pads, with a durometer hardness between Grade 50 and Grade 80, in accordance with Specification Section 932-2.1. Plain Pads may be substituted for Fiber Reinforced Pads when sufficient bearing area is available on the concrete collar, as follows:
  - a. 10' post spacing: 4" x 4" x 1/2" Plain Pads, Grade 50 durometer hardness.
  - b. 20' post spacing and < 18' wall height: 4" x 4" x 1/2" Plain Pads, Grade 50 durometer hardness.
  - c. 20' post spacing and ≥ 18' wall height: 4" x 5" x 1/2" Plain Pads, Grade 50 durometer hardness.

**J. CASTING TOLERANCES:**

1. Overall Height & Width: +/- 1/4"
2. Thickness: +/- 1/4"
3. Plane of side mold: +/- 1/16"
4. Openings: +/- 1/2"
5. Out of Square: 1/8" per 6 ft., but not more than 3/8" total along any side
6. Warping: 1/16" per foot distance to nearest corner
7. Bowing: 1/240 panel dimension
8. Surface Smoothness for Type "A" (Smooth) Surface Texture Option: +/- 1/16" along a 10 ft. straightedge.

**P. TEST WALL:**

The Contractor shall construct a test wall at the beginning of the project consistent with Specification Section 534. The Contractor shall demonstrate that all casting and erection tolerances can be met in order to assure that the prefabricated elements fit together as intended.

**K. SOUND BARRIER WALL NOTES:**

1. Distance between piles shall be a maximum of 20 ft. from centerline to centerline. These Sound Barrier Wall Standard Indexes allow for 5 Pile/Post connection options based on either 10 or 20 ft. post spacing. The panel system depicted in Index Nos. 5202 through 5204 is based on a 20 ft. post spacing.
2. Walls greater than 12 ft. in height shall consist of 2 or 3 stacked panels (upper and lower), each less than 12 ft. in height. The height of the upper panel shall be a minimum 8 ft. or greater as necessary to any graphic relief (if applicable). The lower panel(s) shall be not less than 4 ft. in height. Walls equal to or less than 12 ft. in height shall consist of either a single panel or 2 stacked panels with an 8 ft. upper panel provided that any graphic relief (if applicable) will fit within the upper panel.
3. Horizontal panel joints shall be located outside of the graphic relief (if applicable). Horizontal panel joints shall be held at a constant elevation for a given wall, where possible.
4. Posts shall be "H" type cross-section with panels installed from above.
5. See Index No. 5205 for the five pile/post connection options. The Contractor may choose any of these options, unless specifically excluded in the Wall Control Drawings. The patents associated with Pile/Post Connection Option E, Index 5205 (Sheets 6 & 7 of 7), have an expiration date of August 10, 2010. Any use of Pile/Post Connection Option E on or before August 10, 2010 is subject to the rights of the patent holder (U.S. Patent Nos. 5,234,288 & 5,429,455) and all patent royalties or license fees shall be the sole responsibility of the user. To construct Pile/Post Connection Option E on or before the patent expiration date, contact:  
State Contracting and Engineering, Corp.  
3800 North 29th Street  
Hollywood, FL 33020  
Phone: (954) 923-4747
6. All posts shall be held plumb in auger cast piles with an installation template. The template shall be adjustable for horizontal placement, vertical placement and plumbness of posts. The template shall be such that the installation tolerances can be held. Template shall remain in place for a minimum of 12 hours after post installation.
7. The Contractor shall be responsible for meeting OSHA requirements. Any utility adjustments, charges for power stoppages, all realignments, special erection methods, etc. to meet these requirements shall be included in bid.
8. Structural Steel shall be in accordance with ASTM A 36.
9. Structural Steel - Pile/Post Connection Option D: Post assemblies shall be shop fabricated in accordance with Specification Section 460. Welding details and welding operations shall be in accordance with the current edition of ANSI/AWS D1.1 Welding Code. Field welding is not permitted.
10. Structural Steel with Concrete Casting - Pile/Post Connection Option C: Store steel posts in a location protected against environmental conditions. Prior to pouring the concrete around the structural post, post shall be free of loose rust, scale, dirt, paint, oil and foreign material.
11. Shimming of wall panels above the pile collar, beneath the bearing pads is permitted up to a maximum of 1 1/2" height. Shims must be either stainless steel (Type 304 or 316) or engineered polymer (copolymer or multipolymer) plastic. Plastic shims must have a minimum compressive strength of 8,000 psi without any fractures. Stacking of shims is permitted as follows:
  - a. For shimming height of 1" or less, provide up to 4 ~ 1/4" shims;
  - b. For shimming heights greater than 1", use a minimum 3/4" thick single shim and up to 3 ~ 1/4" shims. Stacked shim plates must be bonded together with a compatible epoxy adhesive.

**L. VECP OR CONTRACTOR REDESIGN:**

1. In no case will VECP's or Contractor Redesigns be allowed to modify foundation designs, or post spacing.
2. Substitution of proprietary panels or systems not listed in the Wall Control Drawings will not be allowed.

**M. QUALIFIED PRODUCTS LIST:**

Manufacturers seeking approval of proprietary sound barrier panels, posts and foundations or systems for inclusion on the Qualified Products List as pre-approved suppliers must submit a QPL Product Evaluation Application along with design documentation, vendor drawings and other information as required in the Sound Barrier QPL Acceptance Criteria showing the proprietary product is designed to meet all specified requirements. Project specific Shop Drawings are required for sound barrier projects in accordance with Specification Section 534.

**N. ALTERNATES**

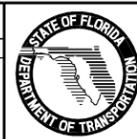
The Contractor shall construct the standard precast 20'-0" panel option depicted in the plans or shall construct one of the proprietary sound barrier panel or proprietary system options (panel and foundation) listed in the Wall Control Drawings.

**O. FINISH COATING:**

1. All wall areas not shown to receive an anti-graffiti coating shall be coated in accordance with Specification Section 400 of the Specifications with a Class 5 Applied Finish Coating. The color of the system shall be same as the anti-graffiti system or as directed by the Engineer.
2. Structural Steel Post Assembly Coating System - Pile/Post Connection Option D: The steel post assembly shall receive a shop applied three-coat system comprised of one coat of inorganic zinc primer and two coats of Type M coal tar-epoxy in accordance with Specifications Section 560. The limits of the coating system shall be the exposed surface area of the post assembly from the top of post to 2'-0" below Top of Collar (Elev. A). After the post assembly is installed, it shall be coated with an approved compatible Class 5 Applied Finish Coating in accordance with Specification Section 400 or an anti-graffiti coating. The color of the Class 5 Coating shall match the color of the panel unless otherwise noted in the plans. All components of coating system shall be on the Department's Qualified Products List. The material supplier shall certify compatibility of paint system.

**REVISIONS**

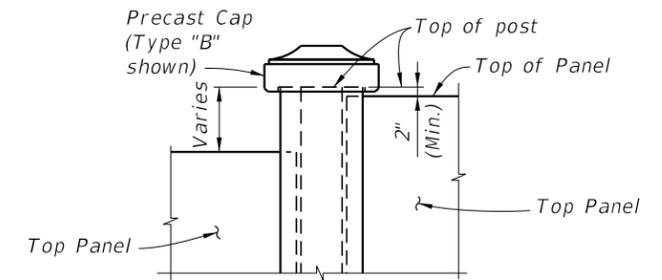
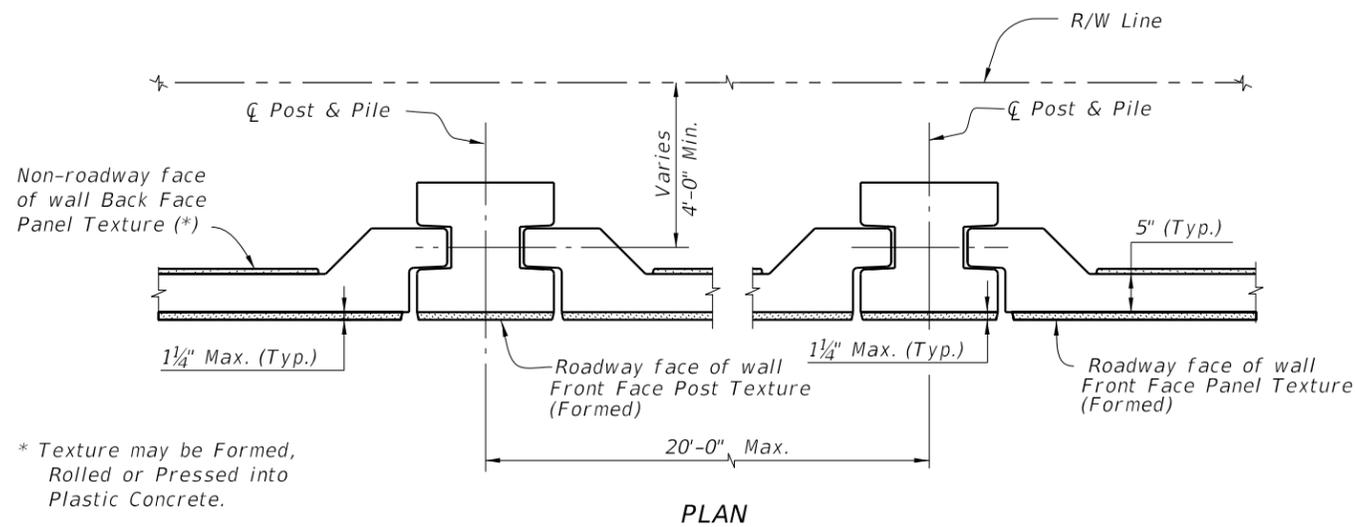
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	CMH	Changed Note K. 4.			
07/01/10	CMH	Added patent information to Note K. 5. Changed Note B and Note H.2.			



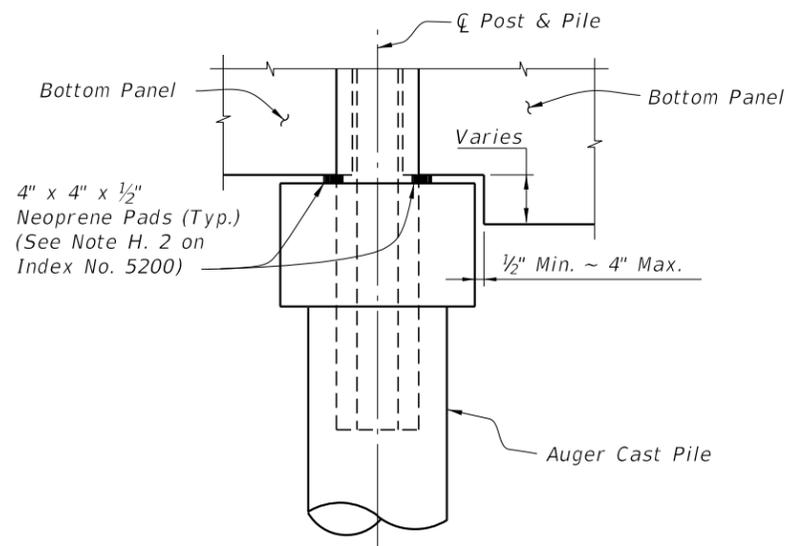
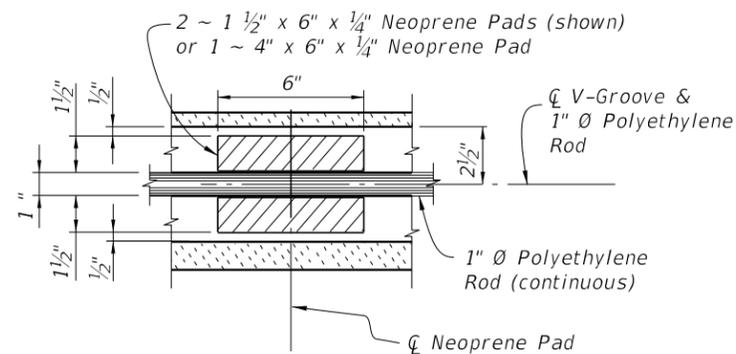
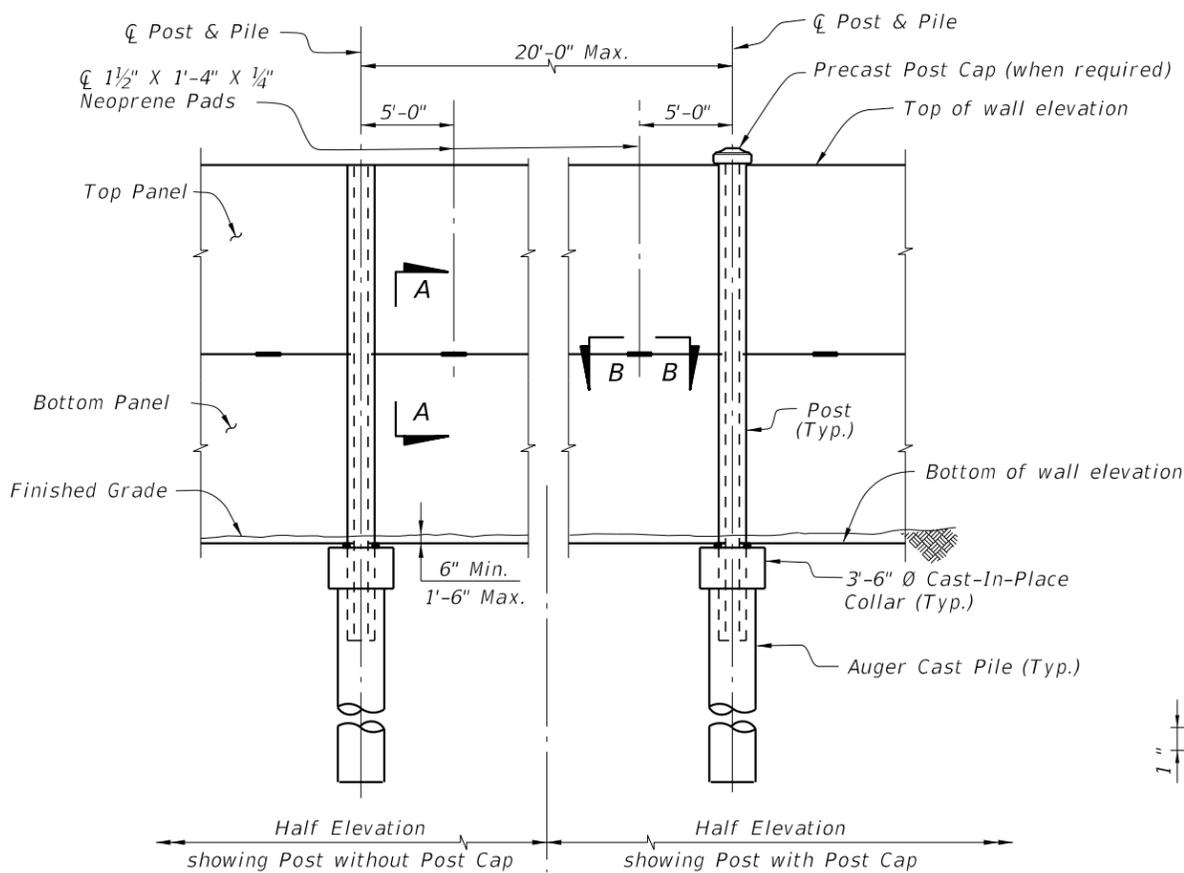
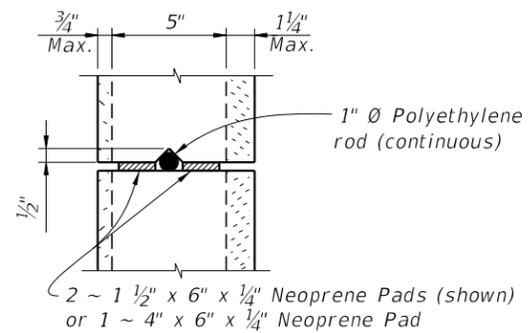
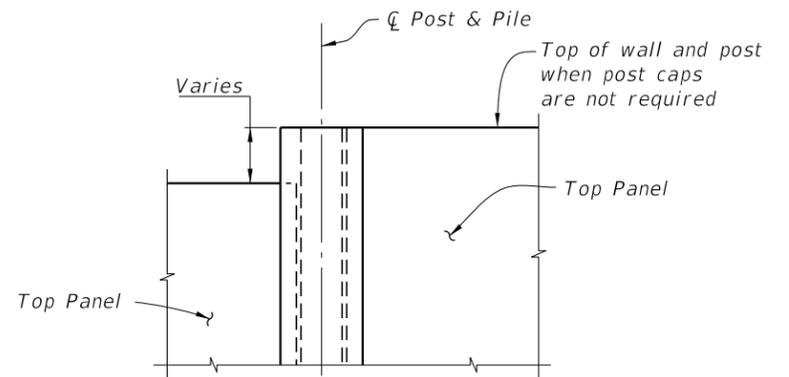
2010 Interim Design Standard

Interim Date	Sheet No.
07/01/10	1 of 1
Index No.	
5200	

**PRECAST SOUND BARRIERS - GENERAL NOTES**

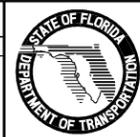


Note: See plans for Post Cap requirements.  
See Index No. 5207 for Post Cap details.



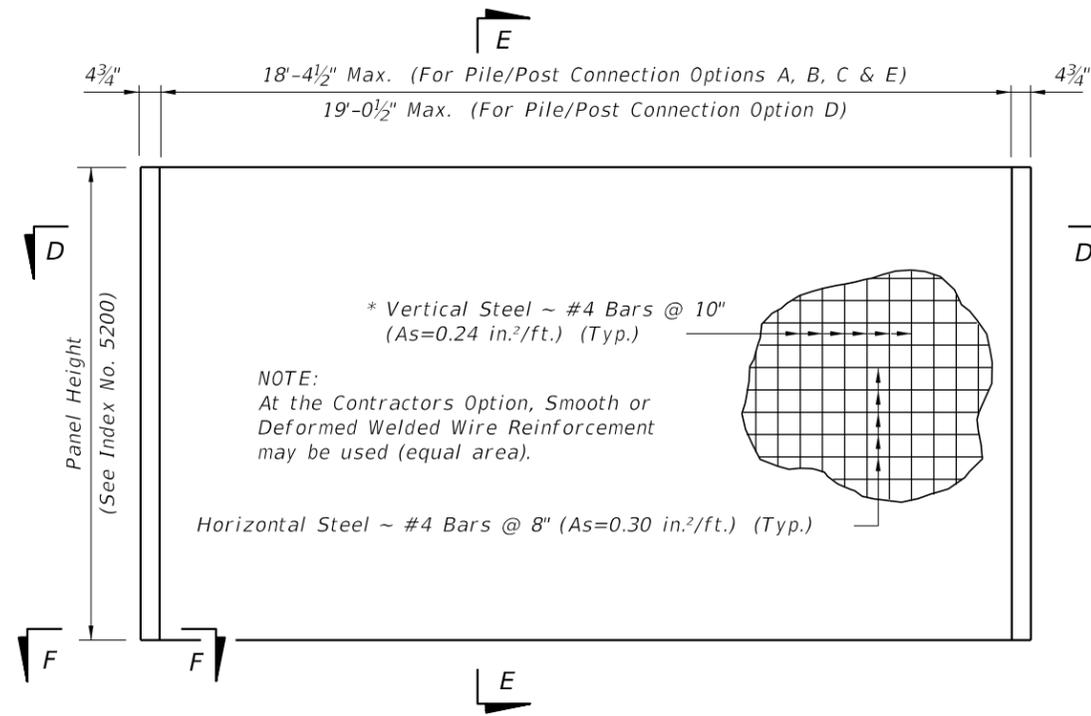
TYPICAL PANELS AND POSTS

REVISIONS			
DATE	BY	DESCRIPTION	
01/01/10	CMH	Changed Total Number of Sheets	
07/01/10	CMH	Added optional texture for non-roadway face of wall.	



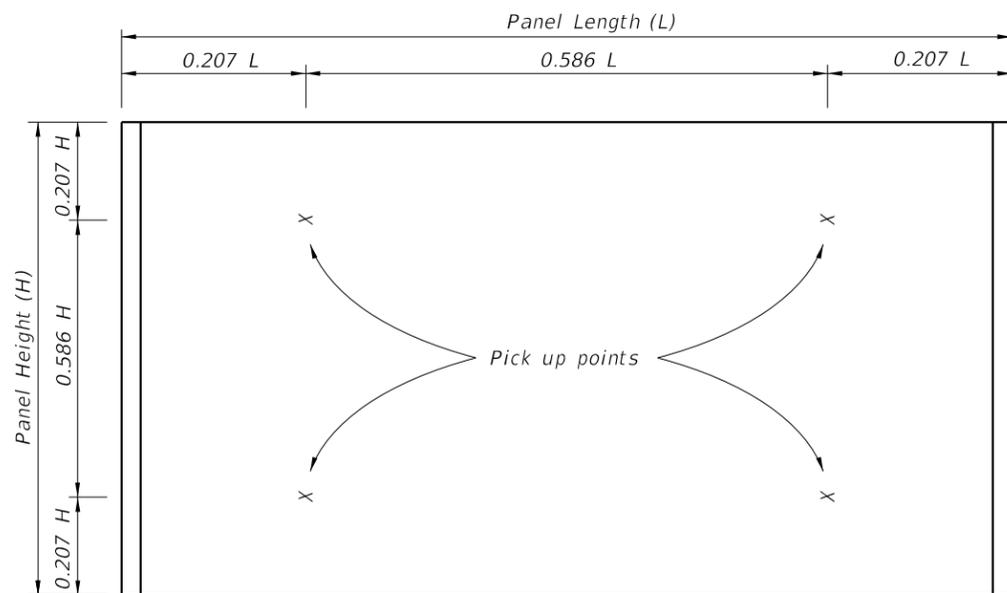
2010 Interim Design Standard  
**PRECAST SOUND BARRIERS**  
- FLUSH PANEL OPTION

Interim Date: 07/01/10  
Sheet No.: 1 of 6  
Index No.: **5202**

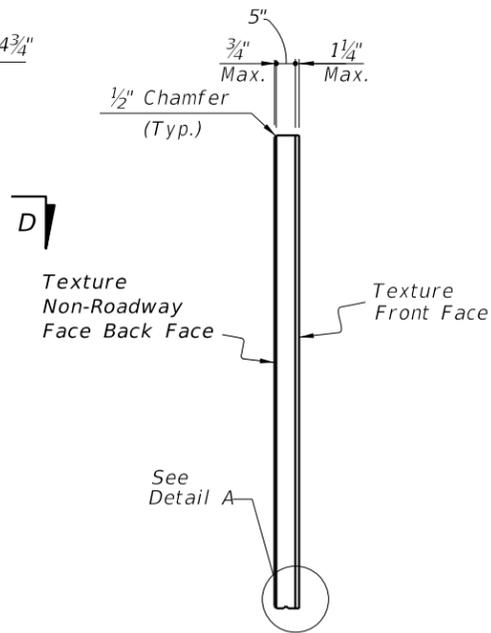


TYPICAL PANEL ELEVATION

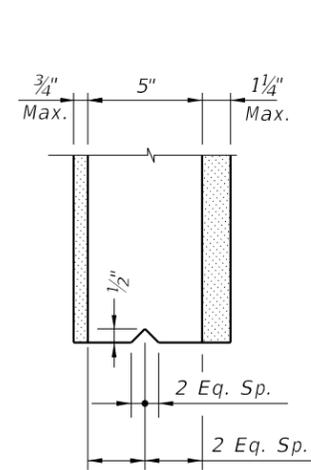
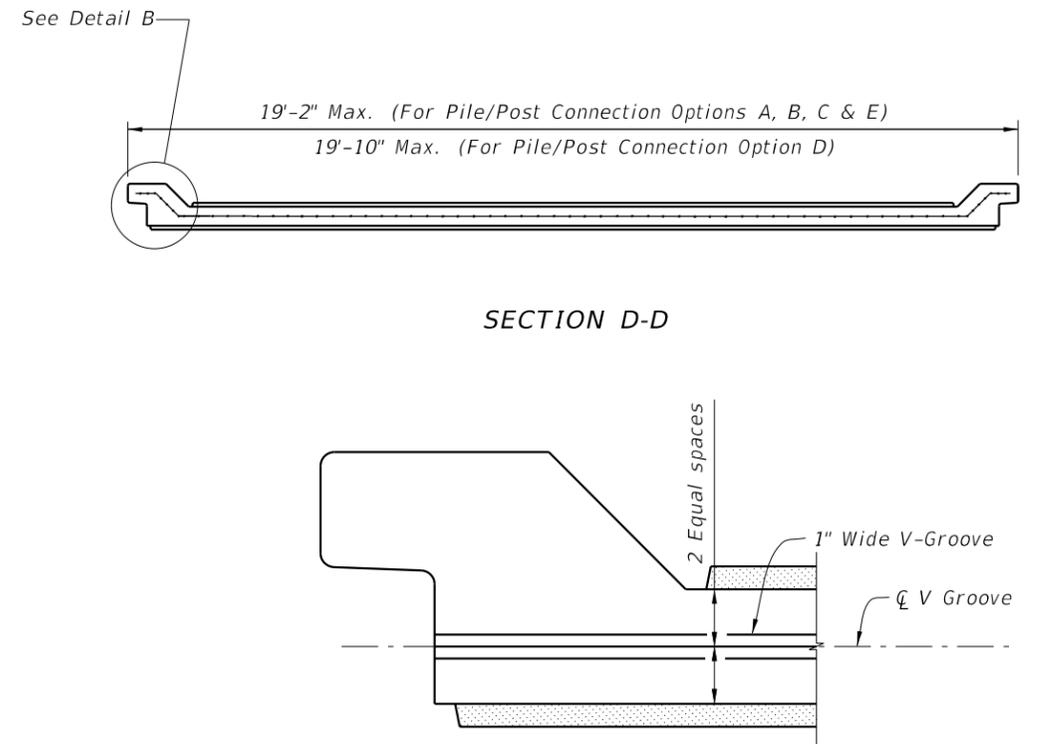
\* In lieu of utilizing the pick up points below, panels may be cast vertically or cast horizontally then tilted upright using tilt-tables prior to lifting from form. In this case, the vertical steel may be reduced to #4 Bars @ 1'-3" (As=0.15 in.<sup>2</sup>/ft.).



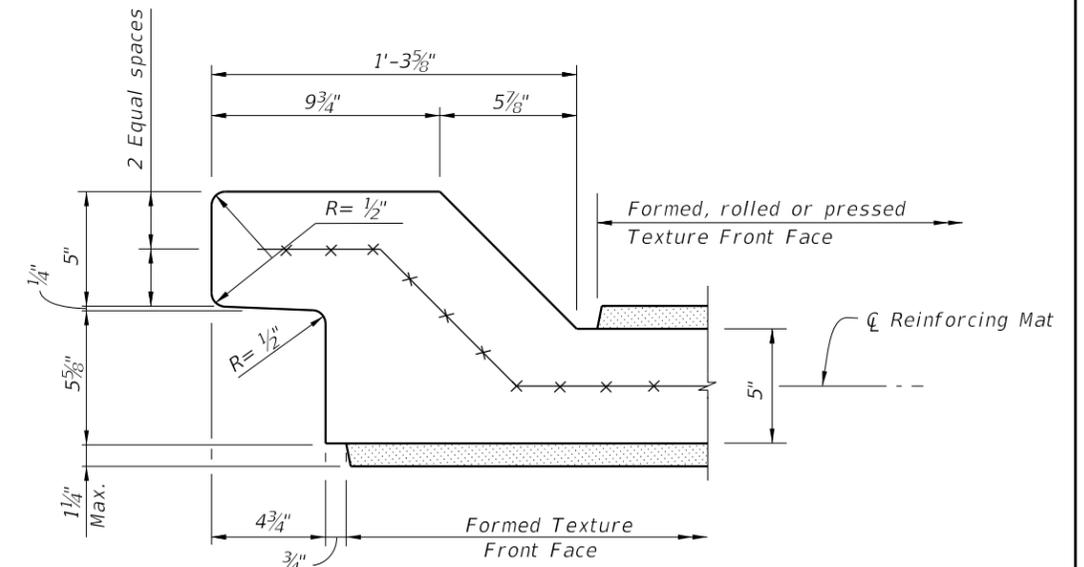
REQUIRED PICK UP POINTS FOR PANELS  
(Panels shall be rotated about long axis only)



SECTION E-E



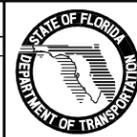
DETAIL A



DETAIL B  
(Typical both ends)

TYPICAL PANELS AND POSTS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	CMH	Changed Total Number of Sheets			
07/01/10	CMH	Added optional texture for non-roadway face of wall.			

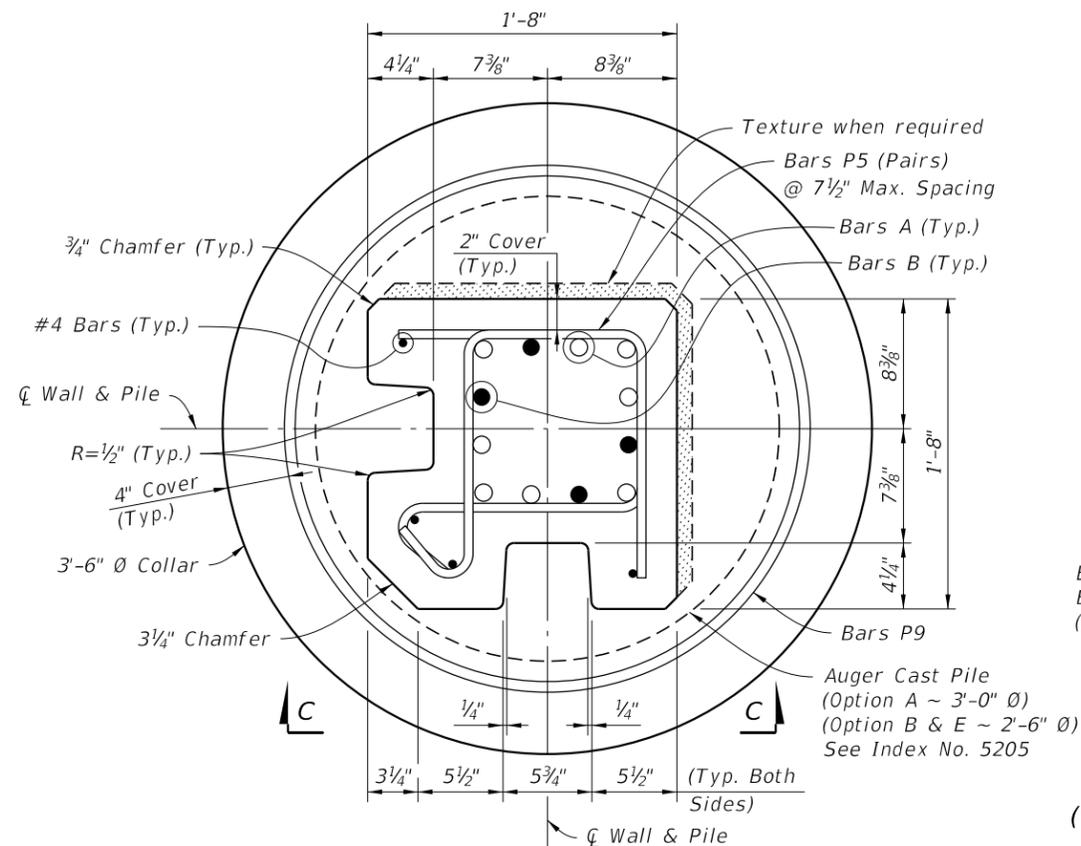


2010 Interim Design Standard

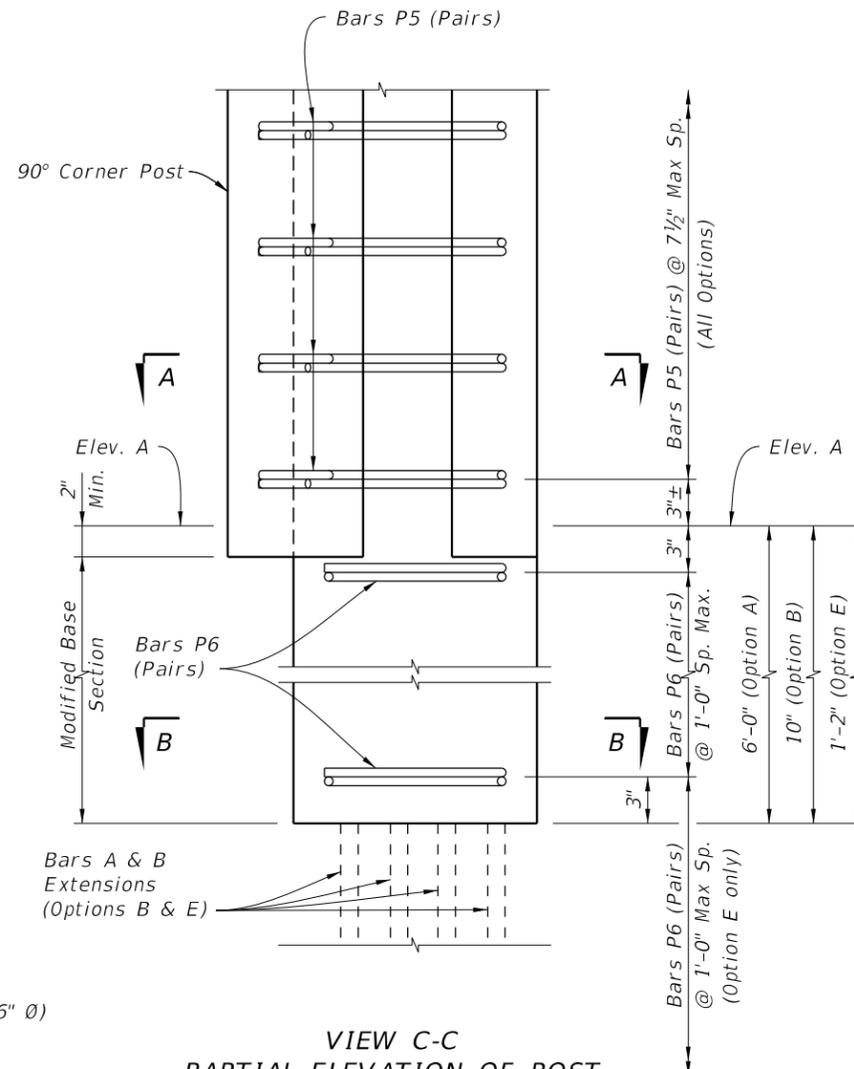
PRECAST SOUND BARRIERS  
- FLUSH PANEL OPTION

Interim Date	Sheet No.
07/01/10	2 of 6
Index No.	
5202	

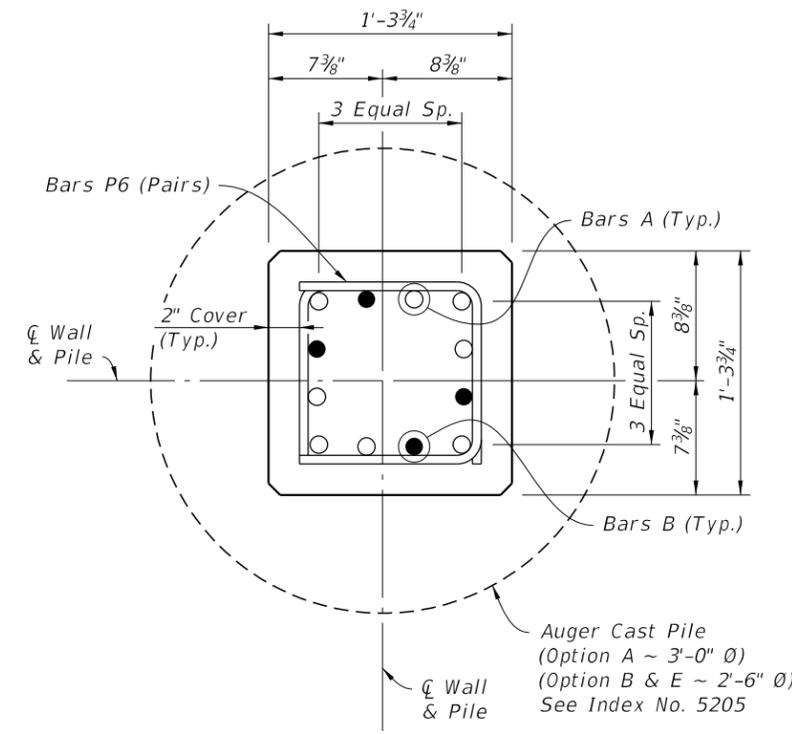




**SECTION A-A**  
TYPICAL SECTION ABOVE PILE



**VIEW C-C**  
PARTIAL ELEVATION OF POST  
(Vertical Reinforcing & Pile not shown for clarity)



**SECTION B-B**  
(Modified Base Section)

**SPECIAL POSTS FOR 90° CORNERS FOR PILE/POST CONNECTION OPTIONS A, B & E**  
Collars for Special Posts shall be 3'-6" Ø

**NOTES:**

1. For Pile/Post Connection Options A, B & E, see Index No. 5205.
2. Use 3'-6" CIP Collar for all 90° corner posts.
3. For Post & Pile Lengths, see Index No. 5206.
4. For Table of Reinforcing Steel, see Index No. 5206. Bars P10 not required for corner pile.
5. Reduce standard panel length or adjust post spacing by 3 1/2" at each 90° Corner Post to accommodate the Special Post dimensions.

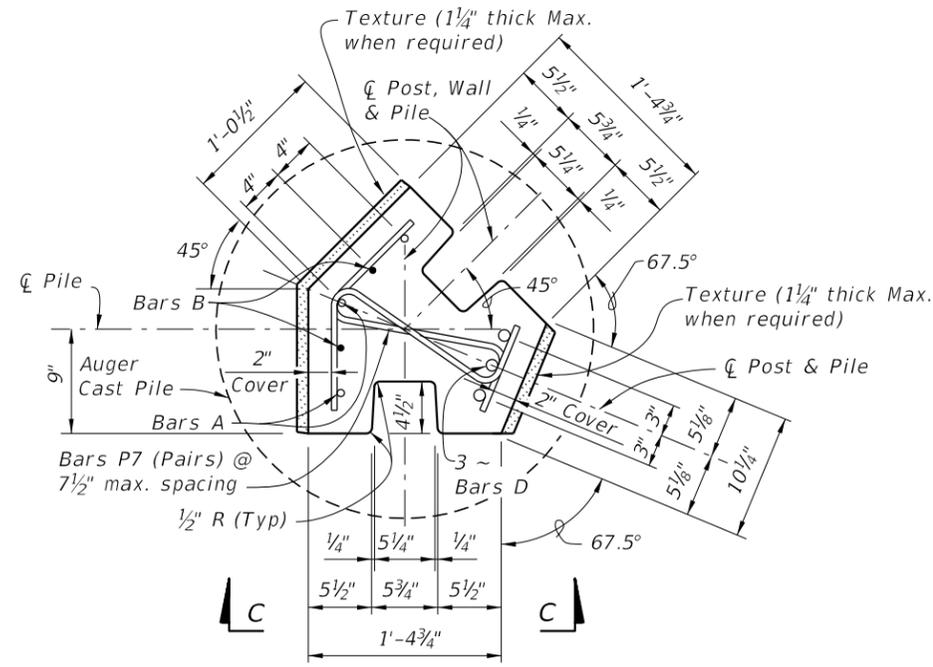
SPECIAL 90° CORNER POST

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	CMH	New Sheet			
07/01/10	CMH	No Change			

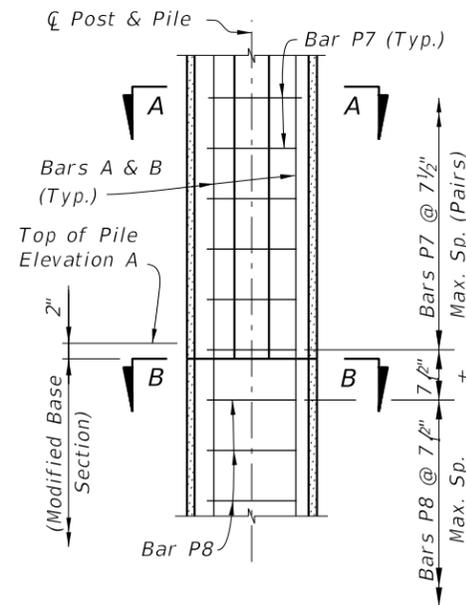


2010 Interim Design Standard  
**PRECAST SOUND BARRIERS**  
- FLUSH PANEL OPTION

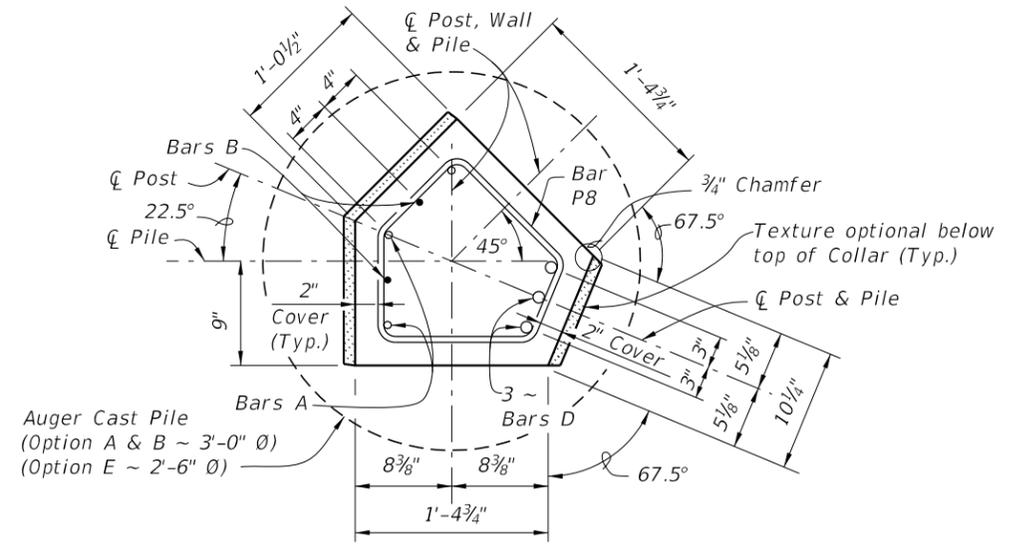
Interim Date	Sheet No.
07/01/10	4 of 6
Index No.	
<b>5202</b>	



SECTION A-A  
TYPICAL SECTION ABOVE PILE

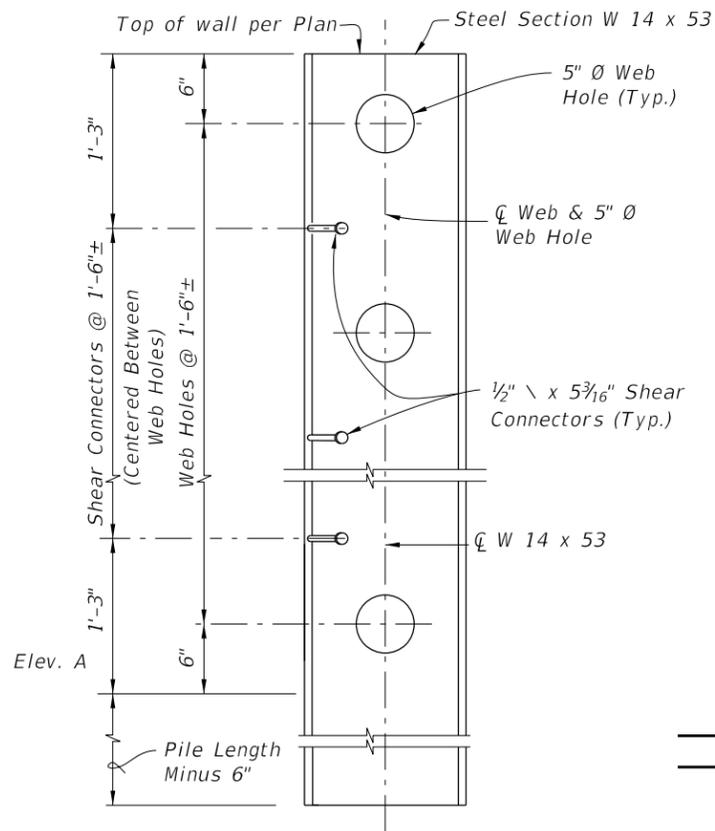


VIEW C-C (PARTIAL ELEVATION)  
(Only Front Faces Shown for Clarity)

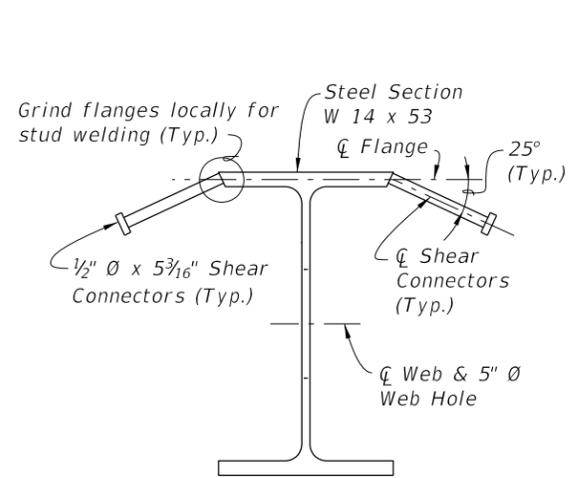


SECTION B-B  
PRECAST COLLAR SECTION

SPECIAL POSTS FOR 45° CORNERS FOR  
PILE/POST CONNECTION OPTIONS A, B & E

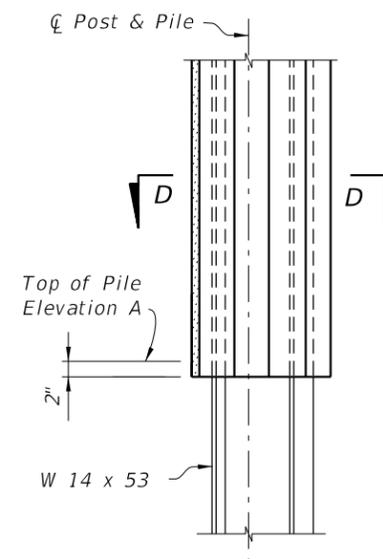


WEB HOLE AND SHEAR CONNECTOR  
SPACING DETAIL  
(Concrete not shown for clarity)

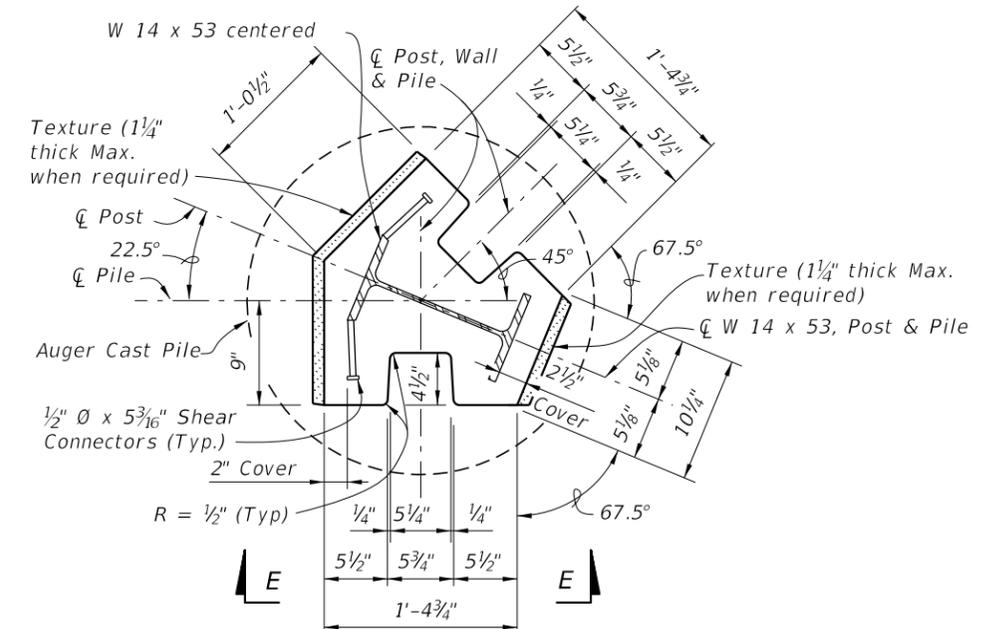


W 14 x 53 POST DETAIL

NOTE: The W 14 x 53 Section shall extend into the Auger Cast Pile.



VIEW E-E (PARTIAL ELEVATION)  
(Only Front Faces Shown for Clarity)



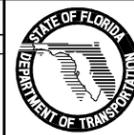
SECTION D-D  
TYPICAL SECTION ABOVE PILE

SPECIAL POSTS FOR 45° CORNERS FOR  
PILE/POST CONNECTION OPTIONS C & D

- NOTES:
1. For Table of Reinforcing Steel Sizes, see Index No. 5206.
  2. For Pile/Post Connection Options A through E, see Index No. 5205.
  3. For Post & Pile Lengths, see Index No. 5206.
  4. Shear Connectors shall be 5" long after welding.

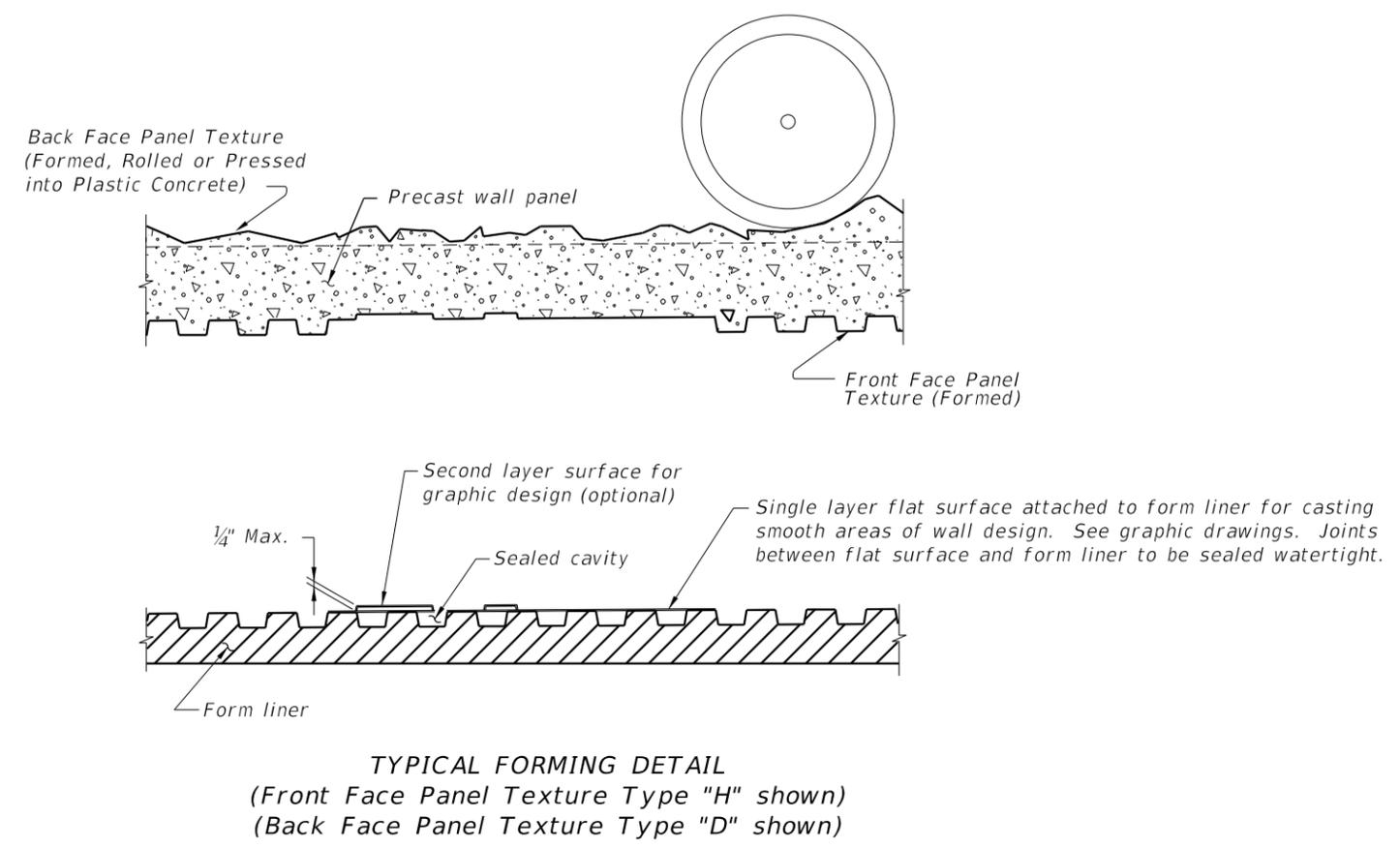
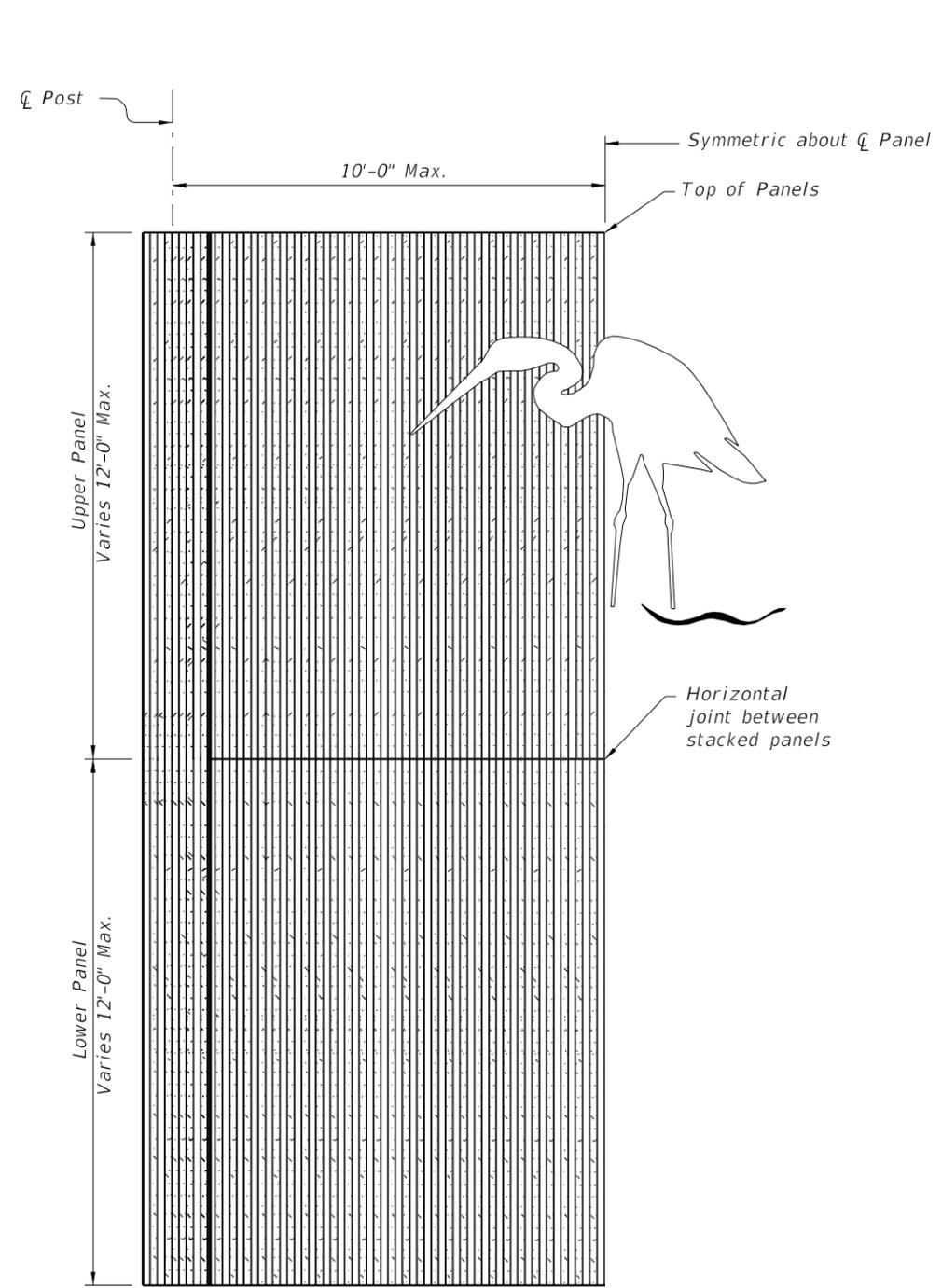
SPECIAL 45° CORNER POSTS

REVISIONS			
DATE	BY	DESCRIPTION	
01/01/10	CMH	New Sheet	
07/01/10	CMH	No Change	



2010 Interim Design Standard  
**PRECAST SOUND BARRIERS**  
- FLUSH PANEL OPTION

Interim Date  
07/01/10  
Sheet No.  
5 of 6  
Index No.  
**5202**

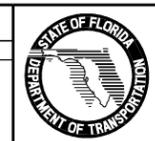


- NOTES:
1. Contractor shall submit specific form liner samples for approval by the Engineer.
  2. Textures and graphics shown are for demonstration purposes only. See Wall Control Drawings for project specific texture and graphic requirements.

**HALF ELEVATION**  
 (Pile/Post Connection Options A, B, C and E Shown.)  
 (Front Face Panel Texture Type "H" and Front Face Post Texture Type "H" Shown.)  
 (Graphic Type SE-2 Shown.)

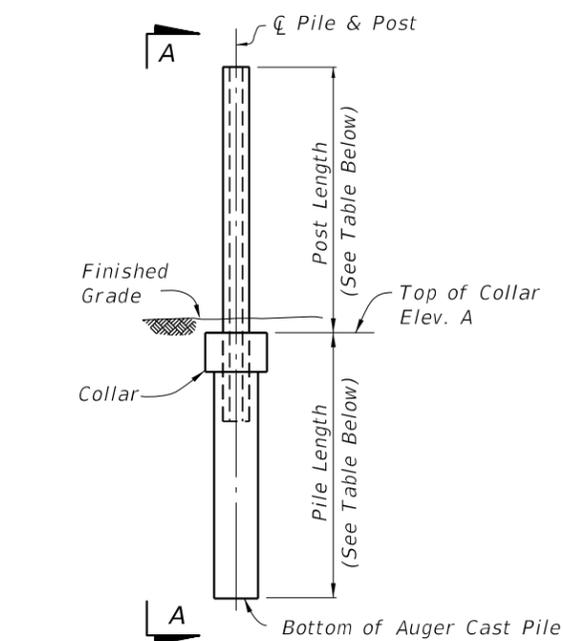
GRAPHICS AND TEXTURE DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	CMH	Sheet renumbered			
07/01/10	CMH	Added optional texture for non-roadway face of wall.			

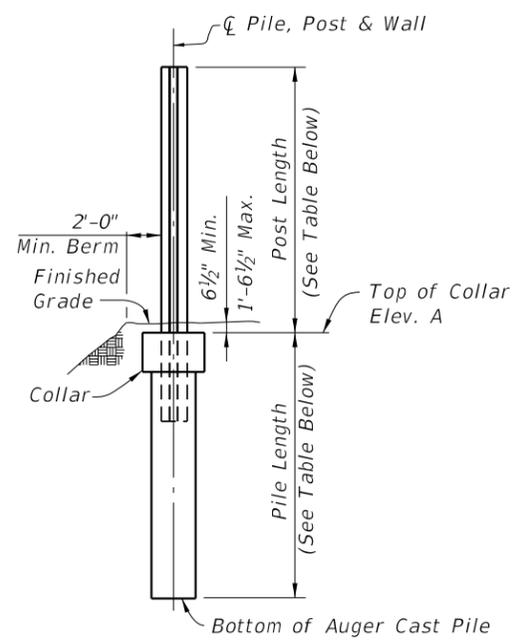


2010 Interim Design Standard  
**PRECAST SOUND BARRIERS**  
**- FLUSH PANEL OPTION**

Interim Date	Sheet No.
07/01/10	6 of 6
Index No.	
<b>5202</b>	



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



VIEW A-A  
(Pile/Post Connection Option A Shown)

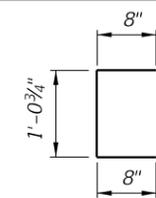
NOTES:  
 Bars A, B & P1 are used in Options A, B & E.  
 Bars C are only used in Option A.  
 Bars C2 are only used in Option B.  
 Bars P2 are used in Options A & E.  
 Bars P3 are only used in Option A.  
 Bars P4 are only used in Option B.  
 Bars P5 & P6 are only used in 90° Corner Posts.  
 Bars P7 & P8 are only used in 45° Corner Posts.  
 Bars P9 & P10 are used in the Cast-In-Place Collar Options.

For Bar Designations, See Index No. 5205.

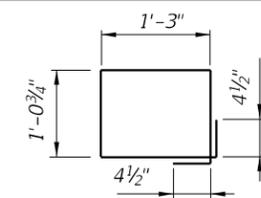
**BAR BENDING DETAILS**

All bar dimensions in bending diagrams are out-to-out. All bars not shown in the bending diagrams are straight.

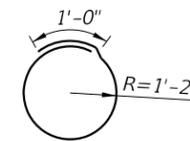
**POST & PILE**



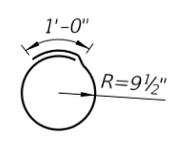
BAR P1  
Bar Length = 2'-5"



BAR P2  
Bar Length = 5'-5"

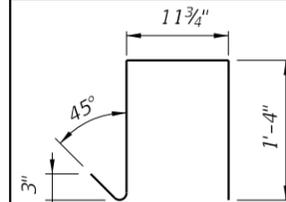


BAR P3  
Bar Length = 8'-4"

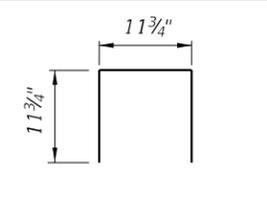


BAR P4  
Bar Length = 6'-0"

**90° CORNER POST & PILE**

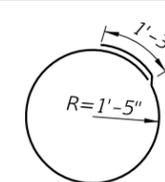


BAR P5  
Bar Length = 4'-0"

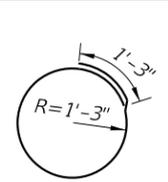


BAR P6  
Bar Length = 2'-11 1/4"

**CAST-IN-PLACE COLLAR**

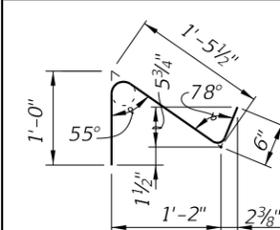


BAR P9  
Bar Length = 10'-2"

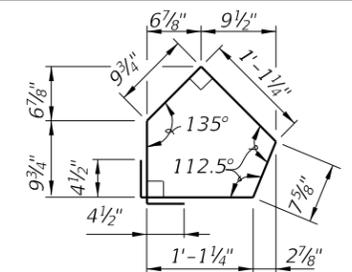


BAR P10  
Bar Length = 9'-2"

**45° CORNER POST & PILE**



BAR P7 (POST)  
Bar Length = 2'-8"



BAR P8 (PILE)  
Bar Length = 5'-0 1/4"

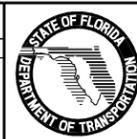
TABLE 1 - FOUNDATIONS FOR MEDIUM DENSE GRANULAR SOILS (Soil SPT N<sub>60</sub> Values between 10 and 40)

POST AND PILE DIMENSIONS							TABLE OF REINFORCING STEEL												
WALL TYPE	POST LENGTH WITHOUT CAP	POST LENGTH WITH CAP	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, P2, P3, P4, P5, P6, P7 & P8	BARS P9	BARS P10	
							BARS A	BARS B		BARS D	BARS A	BARS B							BARS D
SIZE	SIZE	DIM 'A'	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	SIZE	
A	12'-0 1/2"	12'-2 1/2"	11'-0"	14'-0"	12'-0"	15'-0"	#4	#4	10'-0"	#4	#5	#5	9'-0"	#6	#9	#7	#4	#5	#5
B	13'-0 1/2"	13'-2 1/2"	11'-0"	15'-0"	12'-0"	16'-0"	#4	#4	10'-7"	#5	#5	#5	8'-10"	#7	#9	#7	#4	#5	#5
C	14'-0 1/2"	14'-2 1/2"	12'-0"	16'-0"	13'-0"	17'-0"	#4	#4	10'-5"	#5	#6	#6	10'-4"	#7	#9	#7	#4	#5	#5
D	15'-0 1/2"	15'-2 1/2"	12'-0"	17'-0"	13'-0"	18'-0"	#5	#5	12'-11"	#6	#6	#6	10'-3"	#8	#9	#7	#4	#5	#5
E	16'-0 1/2"	16'-2 1/2"	13'-0"	17'-0"	14'-0"	18'-0"	#5	#5	12'-9"	#6	#7	#7	11'-10"	#8	#9	#7	#4	#5	#5
F	17'-0 1/2"	17'-2 1/2"	14'-0"	18'-0"	14'-0"	19'-0"	#5	#5	12'-7"	#6	#7	#7	11'-8"	#9	#9	#7	#4	#5	#5
G	18'-0 1/2"	18'-2 1/2"	14'-0"	19'-0"	15'-0"	20'-0"	#6	#6	14'-11"	#7	#8	#8	13'-1"	#10	#9	#7	#4	#5	#5
H	19'-0 1/2"	19'-2 1/2"	15'-0"	20'-0"	15'-0"	21'-0"	#6	#6	14'-10"	#7	#8	#8	13'-0"	#10	#9	#7	#4	#5	#5
I	20'-0 1/2"	20'-2 1/2"	15'-0"	21'-0"	16'-0"	22'-0"	#6	#6	14'-9"	#8	#9	#9	14'-3"	#11	#9	#7	#4	#5	#5
J	21'-0 1/2"	21'-2 1/2"	16'-0"	22'-0"	16'-0"	24'-0"	#6	#6	14'-8"	#8	#9	#9	14'-2"	#11	#9	#7	#4	#5	#5
K	22'-0 1/2"	22'-2 1/2"	16'-0"	23'-0"	17'-0"	26'-0" *	#7	#7	17'-1"	#8	#9	#9	14'-1"	2~ #14 1 ~ #9	#9	#7	#4	#5	#5

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

NOTE: USE THIS INDEX ONLY WHEN SOIL SPT N VALUES ARE BETWEEN 10 AND 40

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	CMH	Changed Bar P3 radius. Changed Bars P5 & P6.			
07/01/10	CMH	Added table title and renumbered sheet.			



2010 Interim Design Standard

**PRECAST SOUND BARRIERS -  
PILE DEPTH AND REINFORCING SUMMARY**

Interim Date: 07/01/10  
 Sheet No.: 1 of 2  
 Index No.: 5206

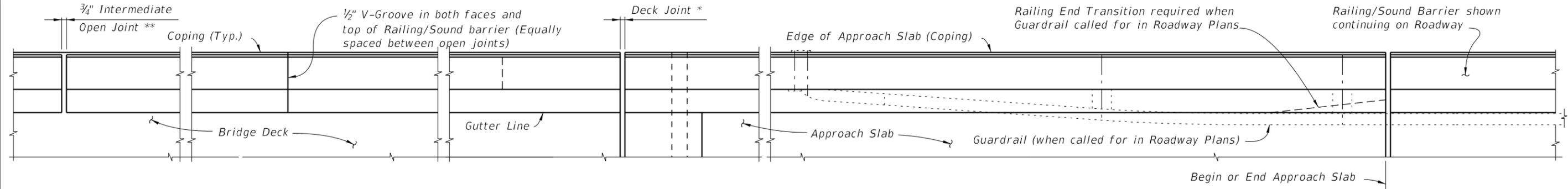
TABLE 2 - FOUNDATIONS FOR LOOSE GRANULAR SOILS (SPT N<sub>60</sub> Values between 4 and 9)

POST AND PILE DIMENSIONS							TABLE OF REINFORCING STEEL												
WALL TYPE	POST LENGTH WITHOUT CAP	POST LENGTH WITH CAP	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, P2, P3, P4, P5, P6, P7 & P8	BARS P9	BARS P10		
							BARS A	BARS B		BARS D	BARS A	BARS B						BARS D	
							SIZE	SIZE	DIM 'A'	SIZE	SIZE	SIZE						DIM 'A'	SIZE
A	12'-0 1/2"	12'-2 1/2"	12'-0"	17'-0"	13'-0"	17'-0"	#4	#4	10'-0"	#4	#5	#5	9'-0"	#6	#9	#7	#4	#5	#5
B	13'-0 1/2"	13'-2 1/2"	13'-0"	17'-0"	14'-0"	18'-0"	#4	#4	10'-7"	#5	#5	#5	8'-10"	#7	#9	#7	#4	#5	#5
C	14'-0 1/2"	14'-2 1/2"	14'-0"	18'-0"	14'-0"	19'-0"	#4	#4	10'-5"	#5	#6	#6	10'-4"	#7	#9	#7	#4	#5	#5
D	15'-0 1/2"	15'-2 1/2"	14'-0"	19'-0"	15'-0"	20'-0"	#5	#5	12'-11"	#6	#6	#6	10'-3"	#8	#9	#7	#4	#5	#5
E	16'-0 1/2"	16'-2 1/2"	15'-0"	20'-0"	16'-0"	21'-0"	#5	#5	12'-9"	#6	#7	#7	11'-10"	#8	#9	#7	#4	#5	#5
F	17'-0 1/2"	17'-2 1/2"	16'-0"	21'-0"	16'-0"	22'-0"	#5	#5	12'-7"	#6	#7	#7	11'-8"	#9	#9	#7	#4	#5	#5
G	18'-0 1/2"	18'-2 1/2"	16'-0"	22'-0"	17'-0"	23'-0"	#6	#6	14'-11"	#7	#8	#8	13'-1"	#10	#9	#7	#4	#5	#5
H	19'-0 1/2"	19'-2 1/2"	17'-0"	23'-0"	18'-0"	25'-0"	#6	#6	14'-10"	#7	#8	#8	13'-0"	#10	#9	#7	#4	#5	#5
I	20'-0 1/2"	20'-2 1/2"	17'-0"	24'-0"	18'-0"	26'-0"	#6	#6	14'-9"	#8	#9	#9	14'-3"	#11	#9	#7	#4	#5	#5
J	21'-0 1/2"	21'-2 1/2"	18'-0"	25'-0"	19'-0"	29'-0"	#6	#6	14'-8"	#8	#9	#9	14'-2"	#11	#9	#7	#4	#5	#5
K	22'-0 1/2"	22'-2 1/2"	18'-0"	26'-0"	19'-0"	*	#7	#7	17'-1"	#8	#9	#9	14'-1"	2~ #14 & 1 ~ #9	#9	#7	#4	#5	#5

\* Do not use for walls with 30" dia. foundations, 20' spacing, & greater than 21' high.

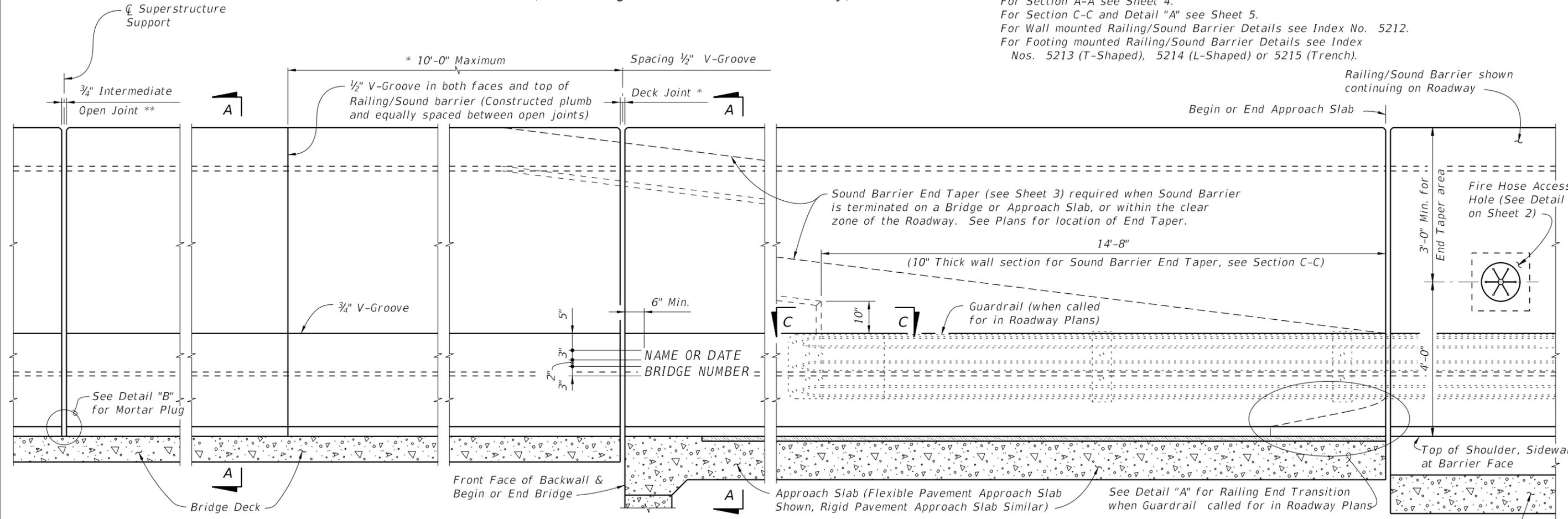
NOTE: USE THIS INDEX ONLY WHEN SOIL SPT N VALUES ARE BETWEEN 4 AND 9

REVISIONS				2010 Interim Design Standard				Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	07/01/10		2 of 2	
07/01/10	CMH	New sheet.							
						<b>PRECAST SOUND BARRIERS - PILE DEPTH AND REINFORCING SUMMARY</b>		Index No. <b>5206</b>	



**PLAN (BRIDGE MOUNTED RAILING/SOUND BARRIER SHOWN, WALL OR FOOTING MOUNTED RAILING/SOUND BARRIER SIMILAR) (Reinforcing Steel not shown for clarity)**

**CROSS REFERENCE:**  
 For Detail "B" and V-Groove Lettering Detail see Sheet 2.  
 For Section A-A see Sheet 4.  
 For Section C-C and Detail "A" see Sheet 5.  
 For Wall mounted Railing/Sound Barrier Details see Index No. 5212.  
 For Footing mounted Railing/Sound Barrier Details see Index Nos. 5213 (T-Shaped), 5214 (L-Shaped) or 5215 (Trench).



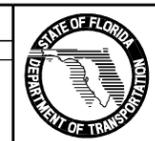
**ELEVATION OF INSIDE FACE OF RAILING/SOUND BARRIER (BRIDGE MOUNTED RAILING/SOUND BARRIER SHOWN, WALL OR FOOTING MOUNTED RAILING/SOUND BARRIER SIMILAR) (Reinforcing Steel not shown for clarity)**

T-Shaped Spread Footing Shown, L-Shaped Spread Footing, Trench Footing Similar and Junction Slab similar

\* On Bridges see Superstructure and Approach Slab Sheets for actual dimensions and joint orientation. Open Railing/Sound Barrier Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railing/Sound Barrier walls on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown, Deck Joint at  $\phi$  Pier or Intermediate Bent, Junction Slab or Footing similar.

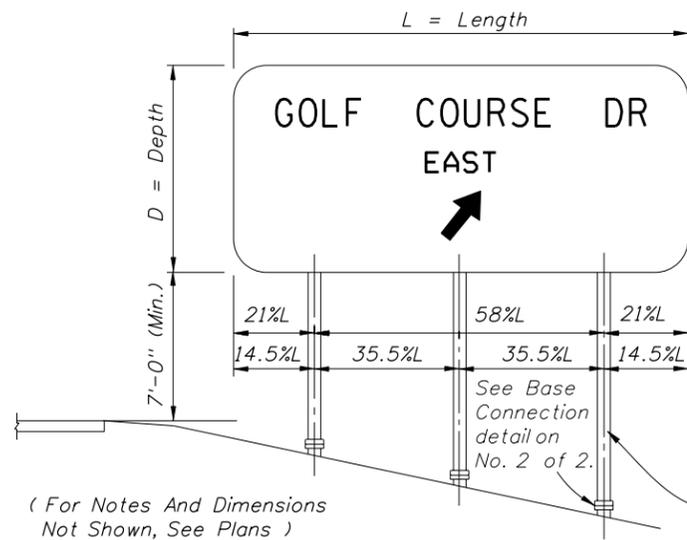
\*\*  $\frac{3}{4}$ " Intermediate Open Joints shall be constructed plumb and provided at :  
 (1) - Superstructure supports where slab is continuous.  
 (2) - Construction Joints for Junction Slabs and Footings.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Deleted INSTRUCTIONS TO DESIGNER. Changed spacing of V-Grooves and Intermediate Open Joint.			



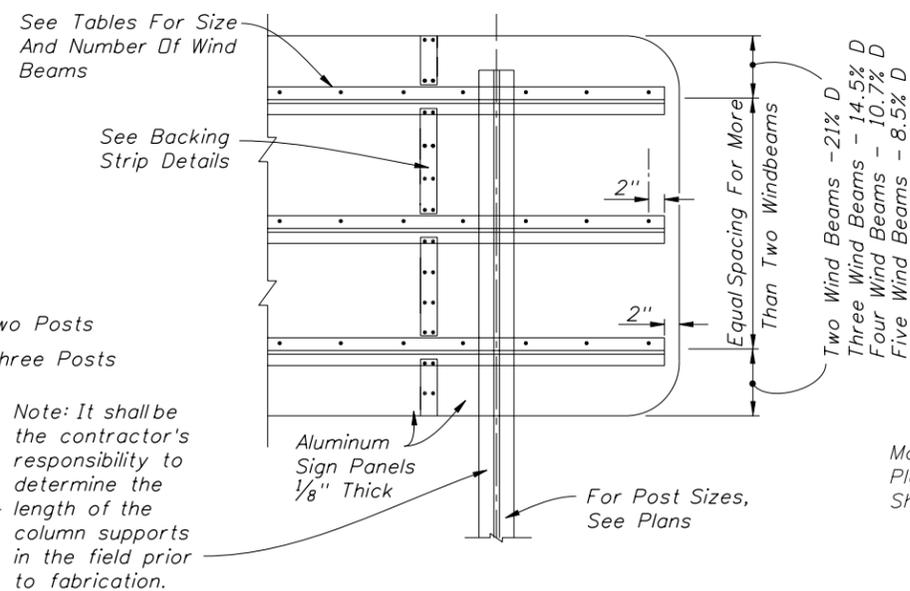
2010 Interim Design Standard  
**TRAFFIC RAILING/SOUND BARRIER (8'-0")**

Interim Date: 07/01/10  
 Sheet No.: 1 of 5  
 Index No.: **5210**

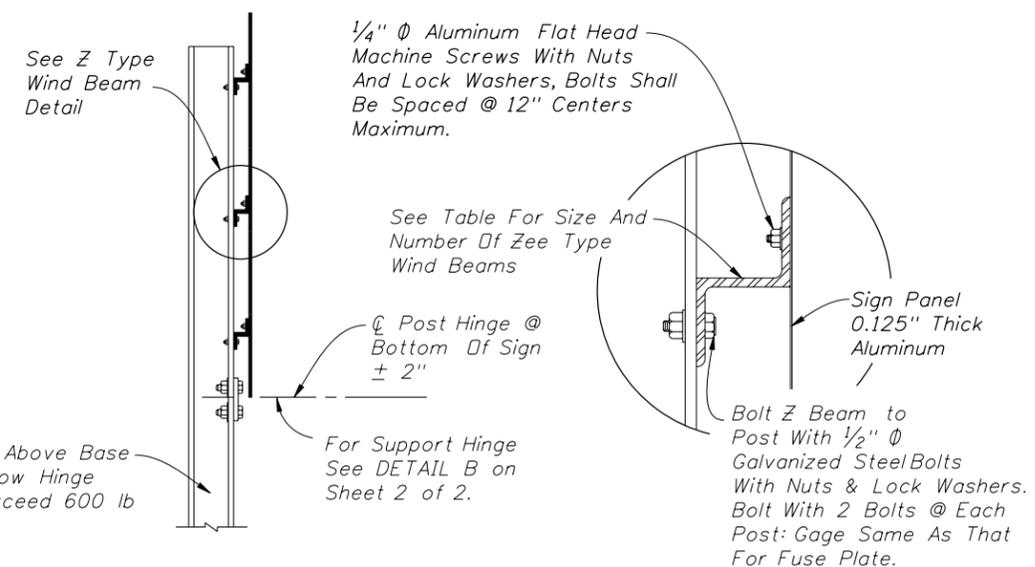


TYPICAL ELEVATION

(For Notes And Dimensions Not Shown, See Plans)



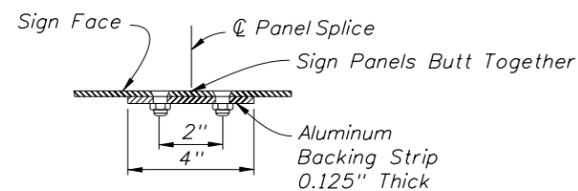
PARTIAL REAR ELEVATION



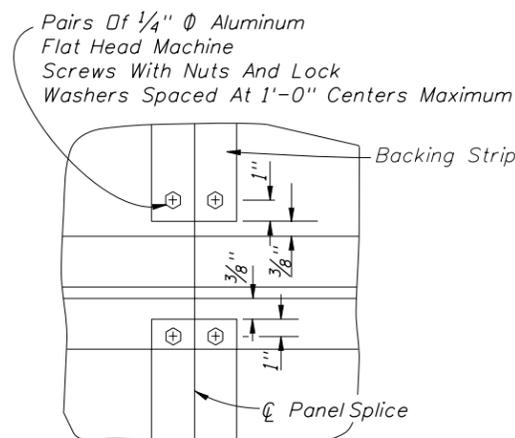
SIDE VIEW

Z TYPE WIND BEAM

Note: If the sign panels are deeper than 10', a Horizontal Panel Splice is allowed at an interior Z Beam, shop drawings shall be required. Minimum panel section width = 2'-6".



BACKING STRIP DETAILS



GENERAL NOTES

DESIGN SPECIFICATIONS: Design according to FDOT Structures Manual (current edition).  
 WELDING: Perform all welding in accordance with the American Welding Society Structural welding code (Steel), ANSI/AWS D1-1 current edition.  
 ALUMINUM MATERIALS: All aluminum materials shall meet the requirements of the Aluminum Association's Alloy 6061-T6 and also the following ASTM specifications: Sheets and plates, B209; extruded tube, bars, rods & shapes, B221; and standard structural shapes, B308. No stenciling permitted on sheets. Aluminum welding rods shall meet the requirements of Aluminum Association Alloy No. 5556 filler wire.  
 ALTERNATE MATERIAL: Material meeting the requirements of ASTM B209 or Aluminum Association Alloys 5154-H38 or 5052-H38 may be used for sheet and plate. Material meeting the requirements of Aluminum Association Alloy 6351-T5 and ASTM B221 may be used for extruded bars, rods, shapes and tubes.  
 SIGN FACE: All sign face corners shall be rounded.  
 STRUCTURAL STEEL: All structural steel shall meet the requirements of ASTM A36 and shall be galvanized in accordance with ASTM A123.  
 ALUMINUM BOLTS, NUTS, & LOCK WASHERS: Aluminum bolts shall meet the requirements of Aluminum Association Alloy 2024-T4 (ASTM F468). The bolts shall have an anodic coating at least 0.0002" thick and be Chromate sealed. Lock washers shall meet the requirements of Aluminum Association Alloy 7075-T6 (ASTM B221). Nuts shall meet the requirements of Aluminum Association Alloy 6061-T6 or 6262-T9 (ASTM F467).  
 STEEL BOLTS, NUTS, & WASHERS: All steel bolts, nuts and washers shall meet the requirements of ASTM A325 and shall be galvanized in accordance with ASTM F2329.  
 BASE CONNECTION: High strength bolts L<sub>2</sub> in the base connection shall be tightened only to the torque shown in the table on sheet 2 of 2. Overtightened base connections will not be permitted.  
 FUSE PLATE: All holes in fuse plates shall be drilled. All plate cuts shall, preferably, be saw cuts; however, flame cutting will be permitted provided all edges are round. Metal projecting beyond the plane of the plate face will not be permitted.  
 BRASS SHIM: Provide shim plate per ASTM B36.  
 SHOP DRAWINGS: When ground sign supports are fabricated in accordance with these plans no shop drawings are required. Shop drawings will be required for approval when the column length exceeds the length shown in the plans by more than 2'-0".  
 FABRICATOR NOTE: All bolts, except L<sub>2</sub> bolts and Z Beam to post bolts, shall be tightened in accordance with Section 700 of the Specifications.  
 FOUNDATION: Contractor may use precast foundations in pre-drilled holes a minimum of 12" larger than the foundation indicated on the plans in either wet or dry conditions. The holes shall be clean and without loose material. Temporary casing shall be required if the soil is unstable. Fill the void around the precast foundation with flowable fill meeting the requirements of Section 121 or clean sand placed using hydraulic methods. The cost of flowable fill, installing and removal of casing shall be included in the unit price of Sign Multi-Post.

DESIGN WIND SPEEDS BY COUNTY

- 110 mph Alachua, Baker, Bradford, Clay, Columbia, Gadsden, Gilchrist, Hamilton, Hardee, Jackson, Jefferson, Lafayette, Lake, Leon, Madison, Marion, Polk, Putnam, Sumter, Suwannee, and Union Counties.
- 130 mph Bay, Brevard, Calhoun, Charlotte, Citrus, DeSoto, Dixie, Duval, Flagler, Franklin, Glades, Gulf, Hendry, Hernando, Highlands, Hillsborough, Holmes, Lee, Levy, Liberty, Manatee, Nassau, Okaloosa, Okeechobee, Orange, Osceola, Pasco, Pinellas, Sarasota, Seminole, St. Johns, Taylor, Volusia, Wakulla, Walton, and Washington Counties.
- 150 mph Broward, Collier, Escambia, Indian River, Martin, Miami-Dade, Monroe, Palm Beach, Santa Rosa, and St. Lucie Counties.

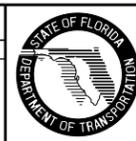
NUMBER OF WIND BEAMS FOR GIVEN DEPTH & WIND					
Wind	No. Beams	Max. Depth	Wind	No. Beams	Max. Depth
110	2	7'-0"	150	2	6'-0"
110	3	12'-0"	150	3	10'-4"
110	4	16'-4"	150	4	14'-0"
110	5	20'-8"	150	5	17'-8"
130	2	6'-8"			
130	3	11'-4"			
130	4	15'-4"			
130	5	19'-0"			

SIZE OF WIND BEAMS		
Size Of Zee*	Length Of Sign (Feet)	
	2 Posts	3 Posts
Z 1.75 x 1.75 x 1.08	0 - 11'-0"	0 - 17'-4"
Z 3 x 2.69 x 2.33	11'-1"-19'-0"	17'-5"-29'-6"
Z 3 x 2.69 x 3.38	19'-1"-20'-8"	29'-7"-31'-6"

\*Note: Z Beams Are Aluminum - No Steel Equivalent Available Designation Gives (Member Depth) x (Flange=Width) x (lb/ft)

REVISIONS

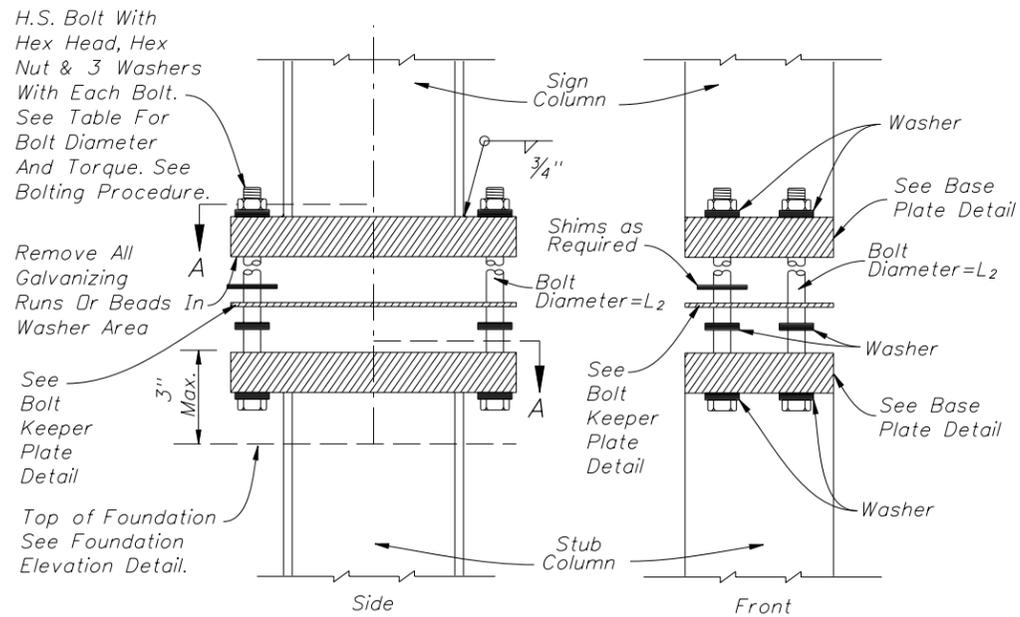
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
6/15/10	DYW	Welding note, Base Connection note, Fuse Plate note and Shop Drawings note were revised. Tolerances note was deleted.			



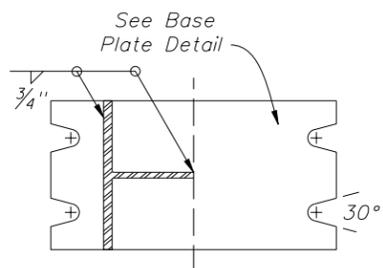
2010 Interim Design Standard

MULTI-COLUMN GROUND SIGN

Interim Date	Sheet No.
07/01/10	1 of 2
Index No.	
11200	



SIGN COLUMN & STUB COLUMN ELEVATION  
BASE CONNECTION



SECTION A-A

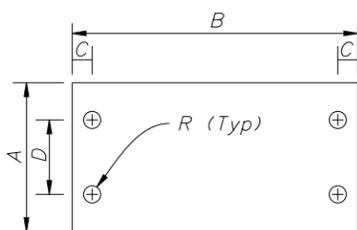


Plate Thickness=0.0149" (28 GAUGE)  
BOLT KEEPER PLATE

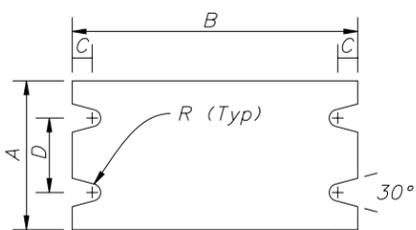
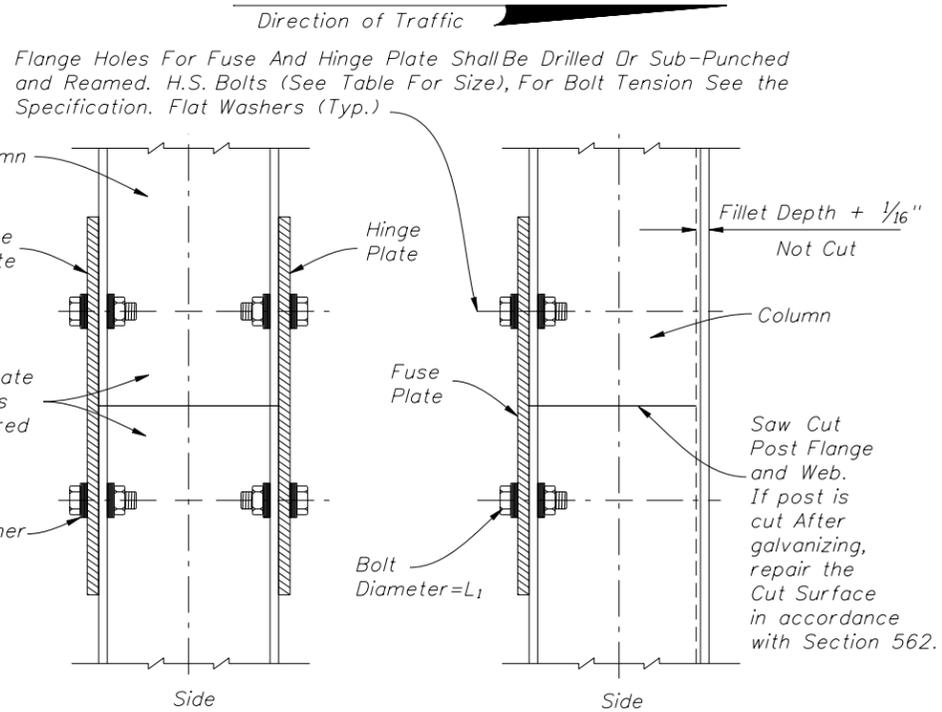
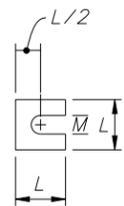


Plate Thickness=t<sub>1</sub>  
BASE PLATE

SHIM DETAIL

Provide 2- 0.0149" Thick (28 gauge) and 2- 0.0329" Thick (21 gauge) Brass Shims Per Post.

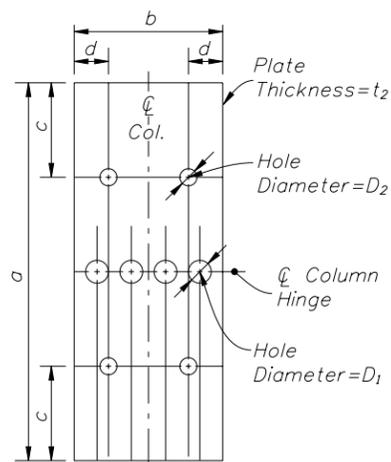


OPTIONAL HINGE Elevation

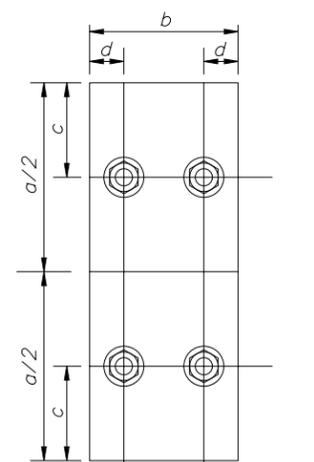
TYPICAL HINGE Elevation

DETAIL B

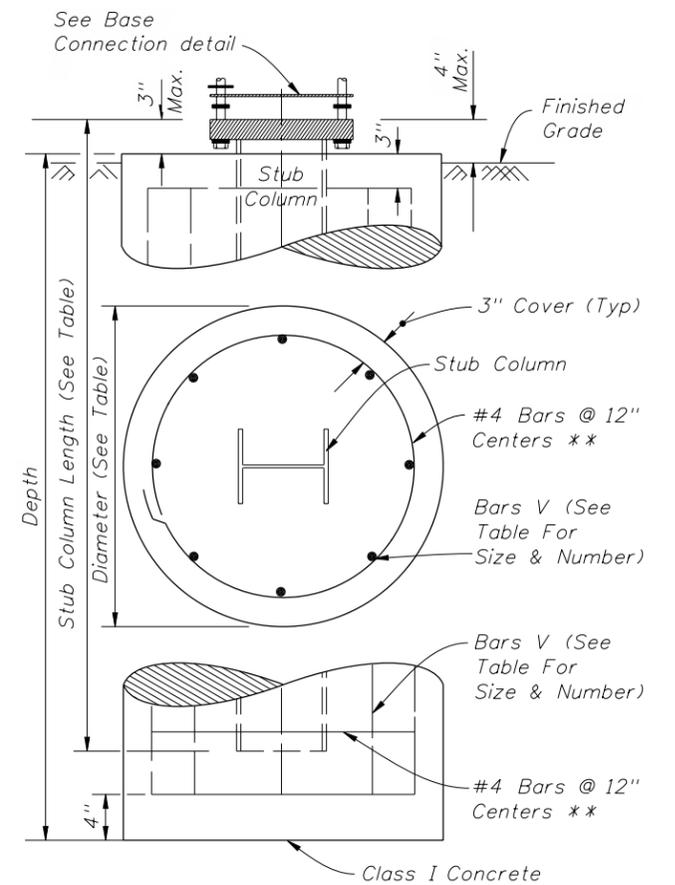
(See Fabricator Note on Sheet 1 of 2)



FUSE PLATE



(Match Post Flange Thickness)  
HINGE PLATE



FOUNDATION ELEVATION

NOTE: All Reinforcing To Be Grade 60.

\*\* At the Option of the Contractor, D10 Spiral Wire @ 6" Pitch, Three Flat Turns Top and One Flat Turn Bottom may be Utilized in Lieu of Specified.

Shop-weld assemblies of foundation stirrup reinforcing bars are permitted in reinforced concrete foundation provided that:

1. The reinforcing bars conform to ASTM Specification A706/706M.
2. The holding wires conform to ASTM Specification A82 or A496.
3. The Shop welding is performed by machines under a continuous, controlled process, approved by the Engineer.
4. Quality control test are performed on shop-welded specimens and the test results are available, upon request, to the Engineer.

PROCEDURE FOR ASSEMBLY OF BASE CONNECTION

1. Assemble post to stub with bolts and flat washers as shown.
2. Shim as required to plumb post (see shim detail).
3. Tighten all L<sub>2</sub> bolts the maximum possible with 1'-0" to 1'-3" wrench to bed washers and shims and to clean bolt threads.
4. Burr threads at junction with nut using a center punch to prevent nut loosening.

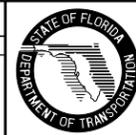
Section*	BASE CONNECTION DATA								FUSE (HINGE) PLATE DATA								SHIM		FOUNDATION DATA				
	A	B	C	D	R	t <sub>1</sub>	L <sub>2</sub>	Torque (lbf·in)	a	b	c	d	e	t <sub>2</sub>	D <sub>1</sub>	D <sub>2</sub>	L <sub>1</sub>	L	M	Dia.	Depth	Stub Length	Reinf. Bars V
S 3x5.7	4"	7"	3/4"	2"	5/16"	1"	1/2"	90±20	14 1/2"	2 3/8"	3 5/8"	7/16"	9/16"	7/16"	7/16"	9/16"	1/2"	1 9/16"	9/16"	2'-0"	5'-6"	3'-3"	10-#6
W 6x12	4"	10"	3/4"	2"	3/8"	1 5/8"	5/8"	270±45	14 1/2"	4"	3 5/8"	7/8"	15/16"	7/16"	13/16"	11/16"	5/8"	1 13/16"	11/16"	2'-0"	7'-6"	4'-3"	10-#6
W 8x24	6 1/2"	12 1/2"	7/8"	3 1/4"	7/16"	1 3/4"	3/4"	445±75	16 1/2"	6 1/2"	4 1/8"	1 1/2"	1 1/2"	1/2"	1"	13/16"	3/4"	2 3/16"	13/16"	2'-4"	8'-6"	6'-3"	8-#8
W 10x33	8"	16"	1 1/4"	4 3/4"	9/16"	2"	1"	580±90	18 1/2"	8"	4 5/8"	1 1/4"	1 3/4"	5/8"	1 1/8"	1 1/16"	1"	2 3/8"	1 1/16"	2'-4"	10'-3"	8'-3"	8-#8
W 12x45	10"	18"	1 1/4"	6"	9/16"	2"	1"	580±90	22"	10"	5 1/2"	2 1/4"	2 1/4"	3/4"	1 5/16"	1 1/16"	1"	2 3/4"	1 1/16"	2'-8"	11'-3"	8'-3"	10-#8

\* Designations: Normal Depth in inches and weight in pounds per linear foot.

STEEL POST, BASE, FOUNDATION & FUSE PLATE DETAILS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
04/27/10	DYW	Weld symbol revised. Detail B revised.			
06/15/10	DYW	Brass Shims added to Shim Detail.			

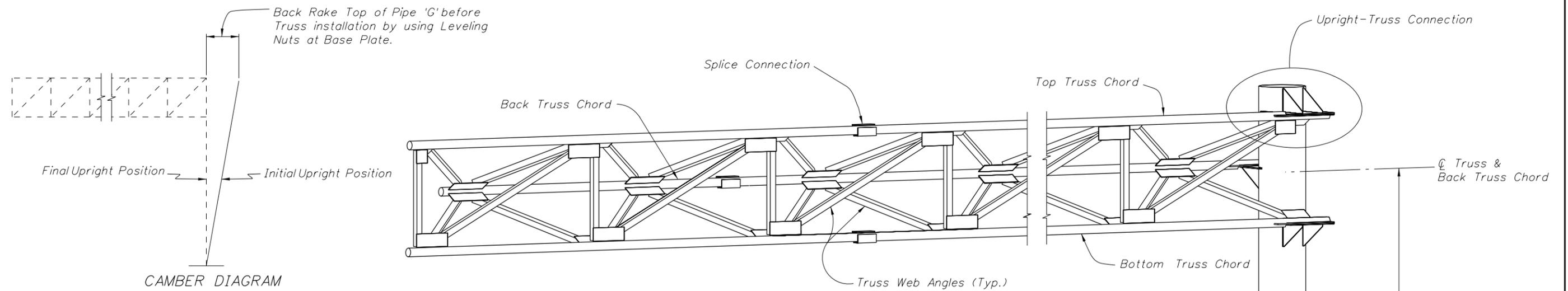


2010 Interim Design Standard

MULTI-COLUMN GROUND SIGN

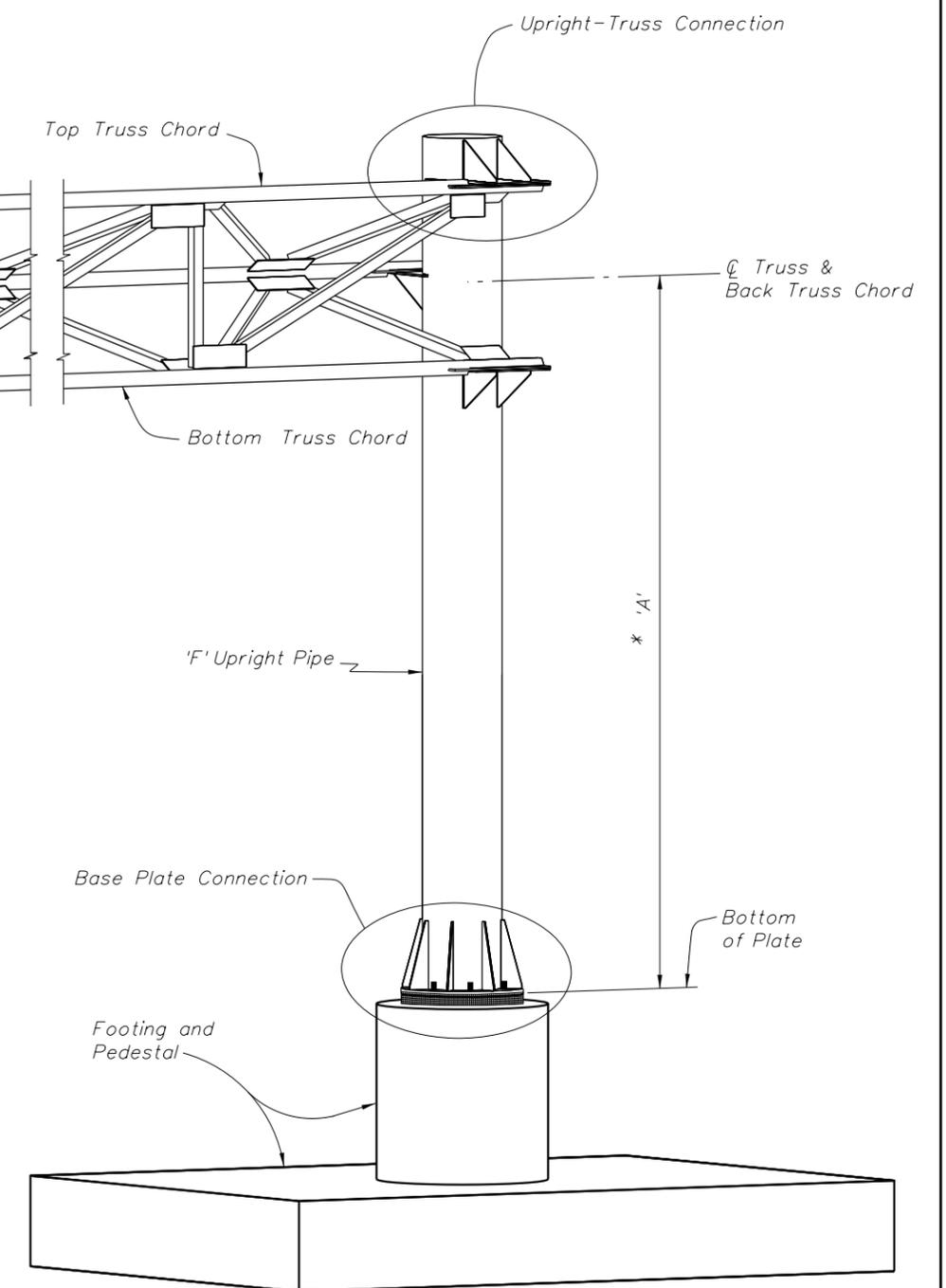
Interim Date 07/01/10 Sheet No. 2 of 2

Index No. 11200



### CANTILEVER SIGN STRUCTURE NOTES

- 1) Design according to FDDT Structures Manual. Alternate Designs are not allowed.
- 2) Submit shop drawings for all work. Include:
  - a. Field verification of all upright heights.
  - b. Foundation elevations necessary to insure minimum vertical clearances as per traffic plans.
  - c. Anchor bolt orientation with respect to centerline of truss and the direction of traffic.
  - d. Show chord splices a minimum distance of 2 truss panel lengths apart. "SD" Panel from upright is the closest panel in which a chord splice may be used. See plans for Cantilever Sign Structure Data Table. Upright splices are not allowed.
- 3) Shop Fabrication, Assembly, Handling and Shipping:
  - a. Do not begin fabrication before receiving shop drawing approval.
  - b. Welding: Conform to American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).
  - c. Shop assemble the entire structure after galvanizing and prior to shipment.
  - d. If necessary, disassemble and secure components for shipment.
- 4) Sign Structure Materials:
  - a. Upright and Chords (Steel Pipe): API -5L-X42 (42 ksi yield) or ASTM A500, Grade B.
  - b. Steel Angles: ASTM A 709, Grade 36.
  - c. Steel Plates: ASTM A 709, Grade 36.
  - d. Weld Metal: E70XX.
  - e. Bolts: ASTM A325 Type 1, (install per Specification Section 700) with single, self-locking nuts.
  - f. Anchor Bolts: ASTM F1554, Grade 55 with ASTM A563 Grade A heavy-hex double nuts.
  - g. Install all nuts per manufacturer's instructions.
  - h. Bolt hole diameters: equal to the bolt diameter plus  $\frac{1}{16}$ ".
  - i. Anchor bolt hole diameters: equal to the bolt diameter plus  $\frac{1}{2}$ ".
- 5) Galvanization: Nuts, bolts and washers: ASTM F2329. Other steel items: ASTM A123
- 6) Sign Panels: Aluminum. See Elevation drawing for sizes and locations.
- 7) Foundation Materials:
  - a. Reinforcing Steel: ASTM A615, Grade 60.
  - b. Concrete: Class IV, minimum 5.5 ksi compressive strength at 28-days for all environmental classifications for Spread Footing. Class IV (Drilled Shaft), minimum 4.0 ksi compressive strength at 28-days for all environmental classifications for Drilled Shaft.
- 8) Construct the Sign Structure foundation in accordance with FDDT Specification Section 455.
- 9) Prior to erection, record the as-built anchor locations and provide to the Engineer.
- 10) After placement of the upright and prior to installation of the truss, adjust the leveling nuts beneath the base plate to achieve the back rake shown on the Camber Diagram.
- 11) Place backfill above the footing prior to installation of the sign panels. Do not remove or reduce in height without prior approval of the Engineer.
- 12) Install sign panels as shown on the Elevation drawing.
- 13) Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location  $\pm$  two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.

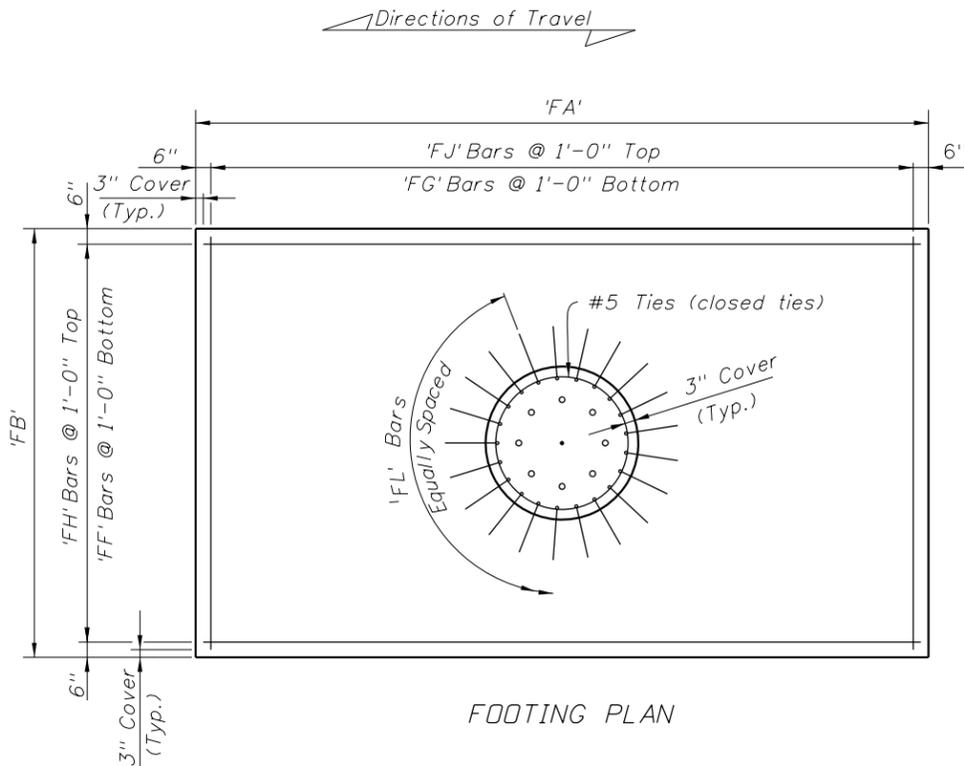


### ISOMETRIC VIEW

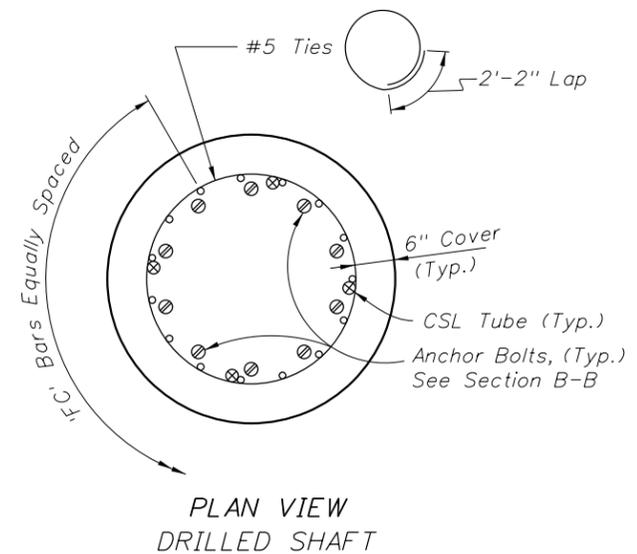
\*NOTE: Contractor shall verify these Dimensions prior to Fabrication of Upright.

NOTE: See Plans for Cantilever Sign Structure Data Table.

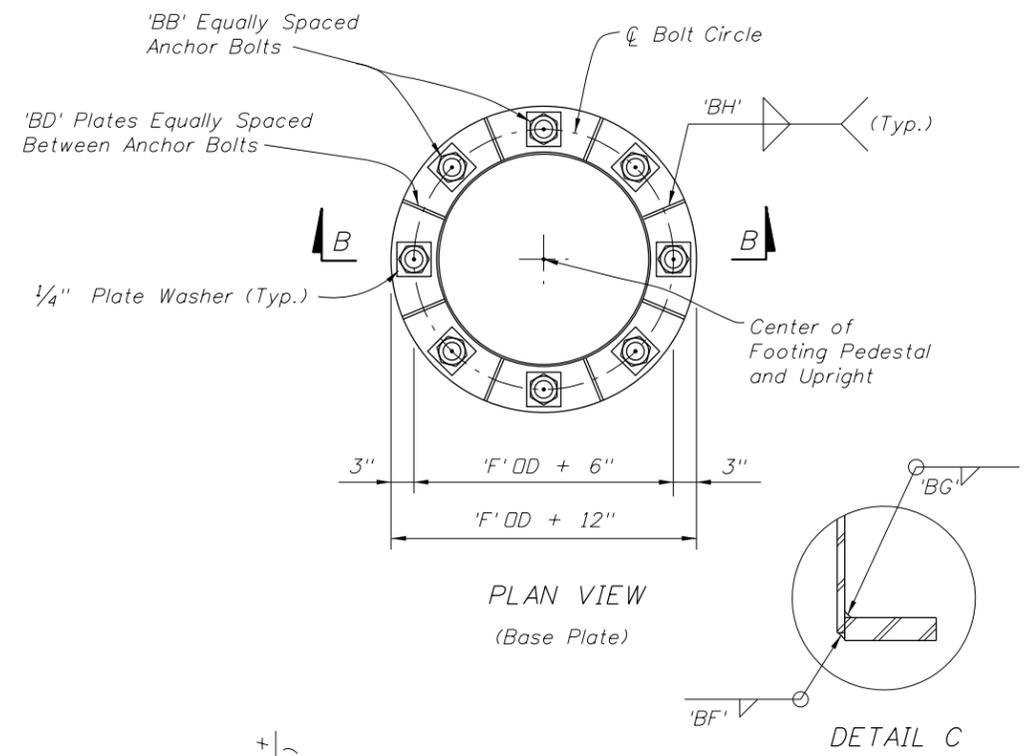
REVISIONS						2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			07/01/10	1 of 5
07/01/10	CBH	Removed payment note.							
								<b>CANTILEVER SIGN STRUCTURE</b> Index No. <b>11310</b>	



FOOTING PLAN

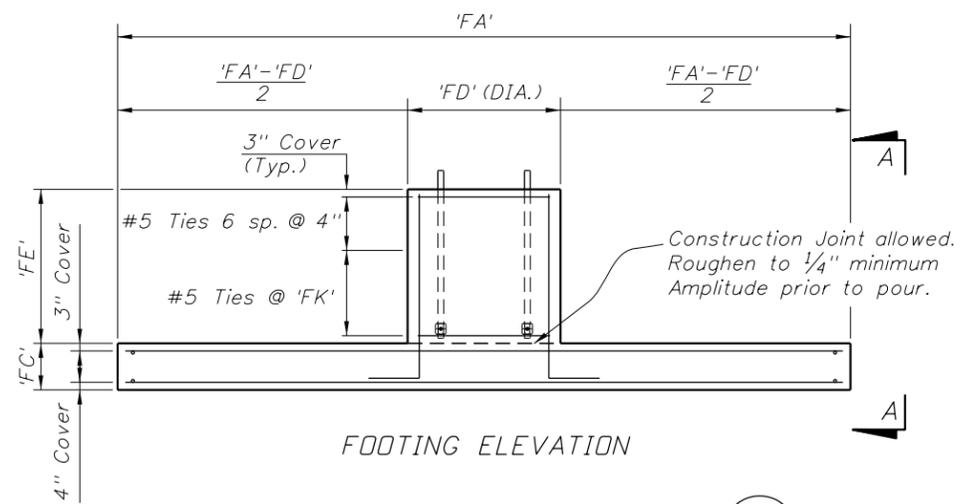


PLAN VIEW DRILLED SHAFT

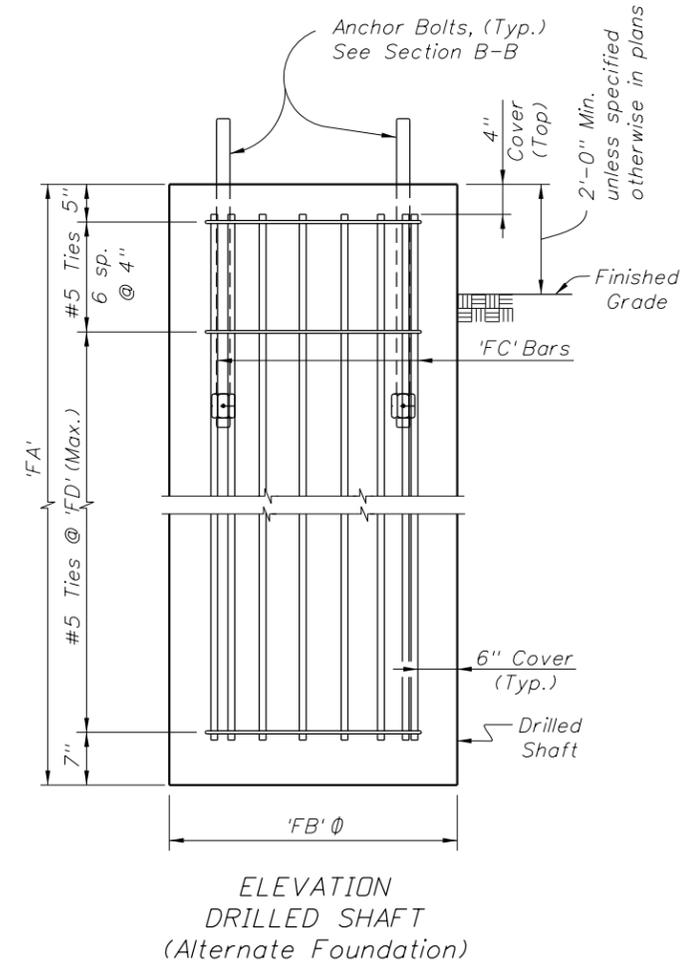


PLAN VIEW (Base Plate)

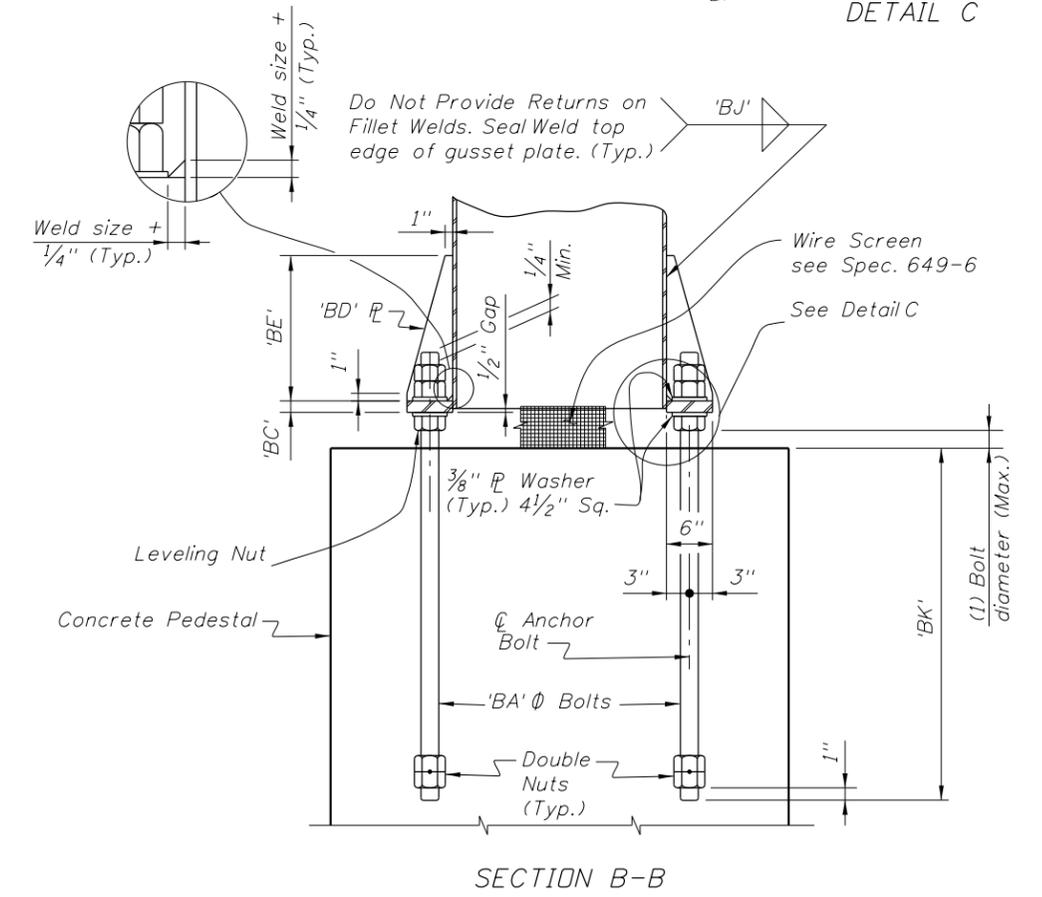
DETAIL C



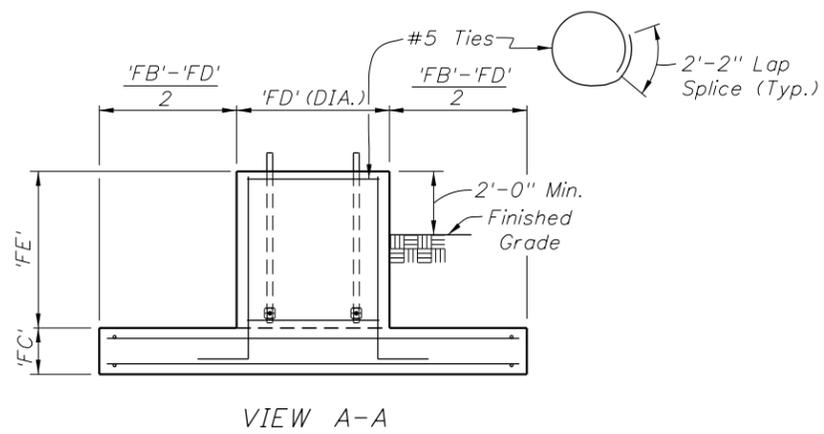
FOOTING ELEVATION



ELEVATION DRILLED SHAFT (Alternate Foundation)

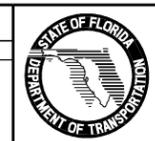


SECTION B-B



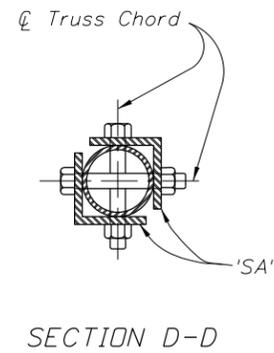
VIEW A-A

REVISIONS			
DATE	BY	DESCRIPTION	
07/01/10	DYW	Modified anchor bolt extension details, foundation offset details, seal weld details, gusset R clip details & R washer thickness.	



2010 Interim Design Standard  
**CANTILEVER SIGN STRUCTURE**

Interim Date: 07/01/10  
 Sheet No.: 2 of 5  
 Index No.: 11310



'SC'  $\emptyset$  Bolts 'SB' Required  
(One Half Each Side of Splice)

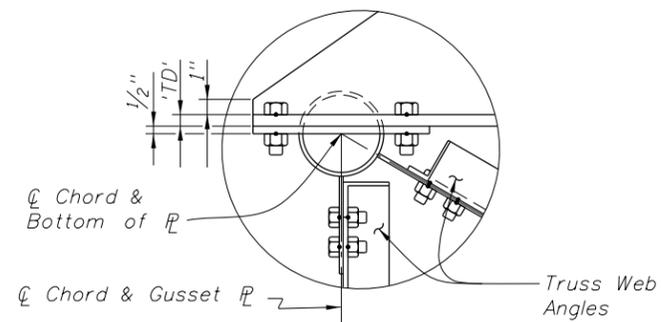
NOTE: Only 6 Bolts  
shown for clarity

Maximum Gap Between  
Pipes is  $\frac{1}{8}$ "

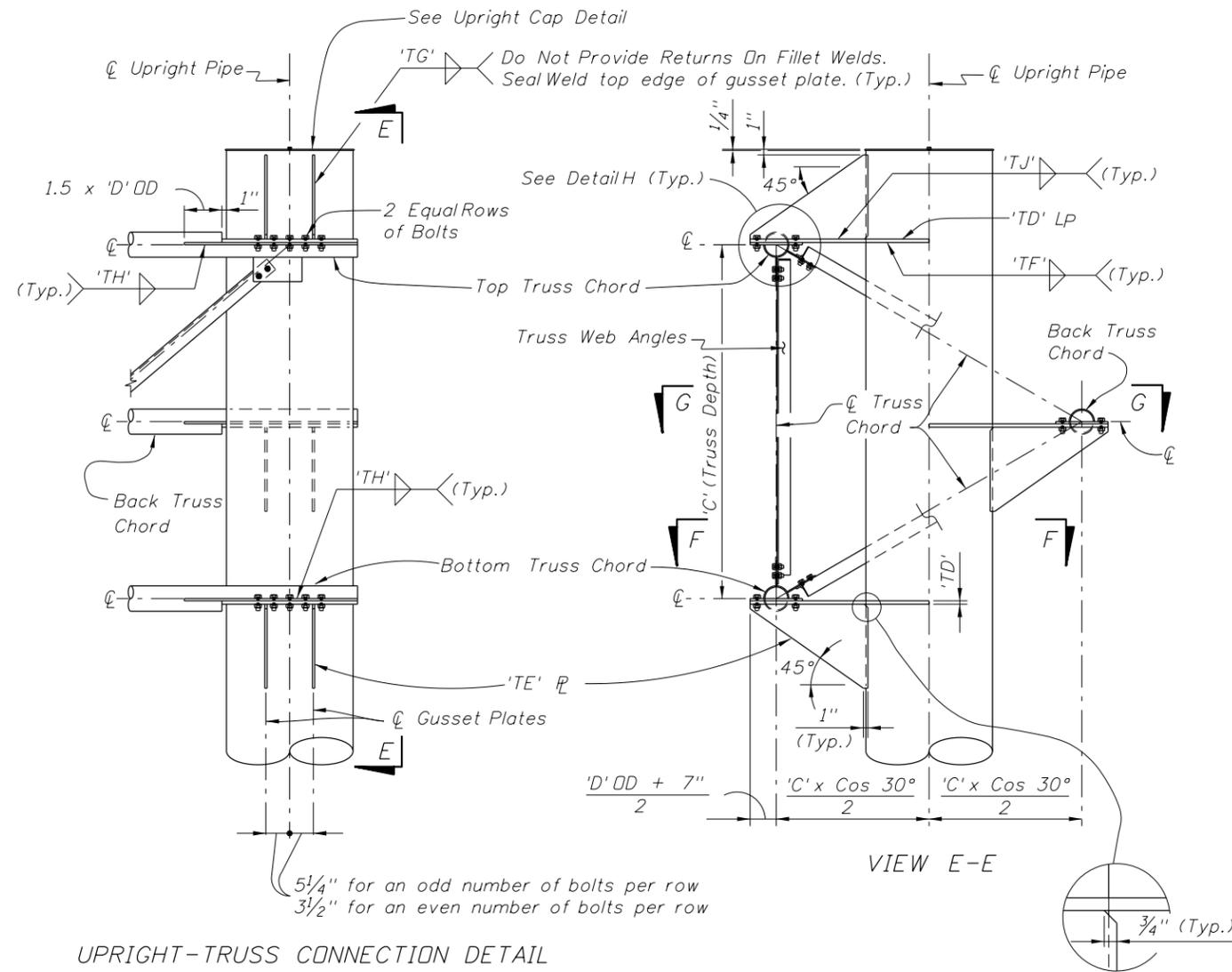
$1\frac{3}{4}$ " for 1"  $\emptyset$  Bolts  
 $1\frac{1}{2}$ " for  $\frac{7}{8}$ "  $\emptyset$  Bolts  
 $1\frac{1}{4}$ " for  $\frac{3}{4}$ "  $\emptyset$  Bolts

$3\frac{1}{2}$ " for 1"  $\emptyset$  Bolts  
3" for  $\frac{7}{8}$ "  $\emptyset$  Bolts  
 $2\frac{1}{2}$ " for  $\frac{3}{4}$ "  $\emptyset$  Bolts

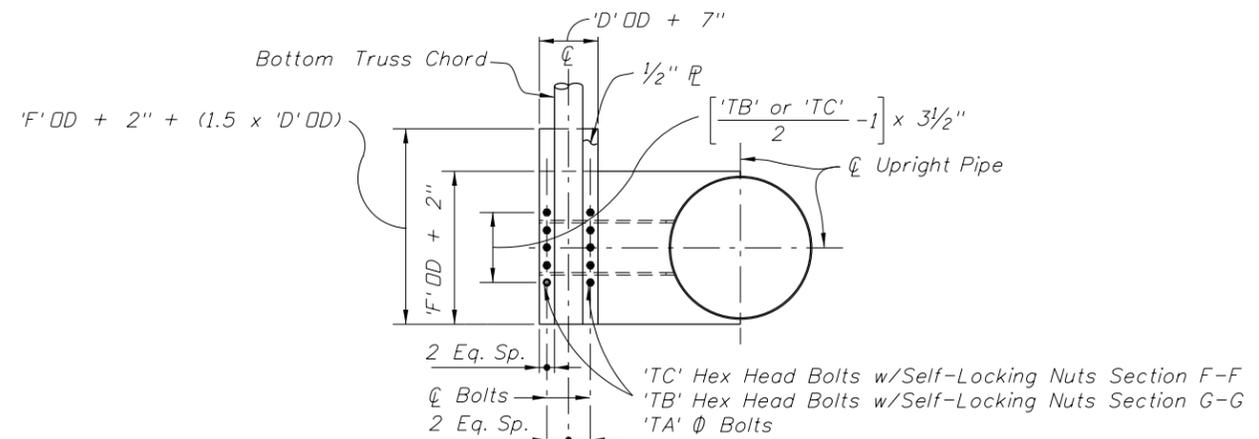
SPLICE CONNECTION DETAIL



DETAIL H



UPRIGHT-TRUSS CONNECTION DETAIL  
(Web Members from back Truss Chord omitted for clarity)

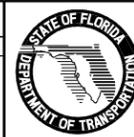


SECTION F-F, SECTION G-G SIMILAR  
(With Gusset Plate & Angles omitted for clarity)

NOTE:  
Abbreviation  
OD ~ Outside Diameter

REVISIONS

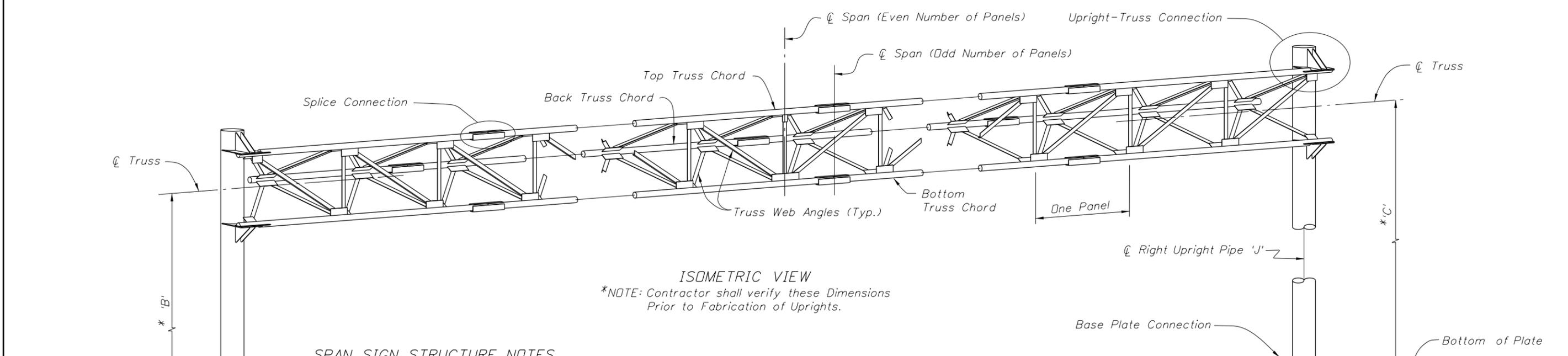
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	CBH	Modified sealweld details.			



2010 Interim Design Standard

CANTILEVER SIGN STRUCTURE

Interim Date	Sheet No.
07/01/10	3 of 5
Index No.	
11310	



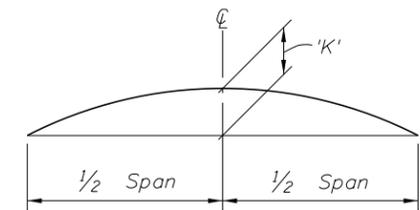
ISOMETRIC VIEW

\*NOTE: Contractor shall verify these Dimensions Prior to Fabrication of Uprights.

SPAN SIGN STRUCTURE NOTES

- 1) Design according to FDDT Structures Manual. Alternate Designs are not allowed.
- 2) Submit shop drawings for all work. Include:
  - a. Field verification of all upright heights.
  - b. Foundation elevations necessary to insure minimum vertical clearances as per traffic plans.
  - c. Anchor bolt orientation with respect to centerline of truss and the direction of traffic.
  - d. The method to be used to provide the required parabolic camber. (See Camber Diagram)
- 3) Shop Fabrication, Assembly, Handling and Shipping:
  - a. Do not begin fabrication before receiving shop drawing approval.
  - b. Welding: Conform to American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).
  - c. Shop assemble the entire structure after galvanizing and prior to shipment.
  - d. If necessary, disassemble and secure components for shipment.
- 4) Sign Structure Materials:
  - a. Upright and Chords (Steel Pipe): API -5L-X42 (42 ksi yield) or ASTM A500, Grade B.
  - b. Steel Angles: ASTM A 709, Grade 36.
  - c. Steel Plates: ASTM A 709, Grade 36.
  - d. Weld Metal: E70XX.
  - e. Bolts: ASTM A325 Type 1, (install per Specification Section 700) with single, self-locking nuts.
  - f. Anchor Bolts: ASTM F1554, Grade 55 with ASTM A563 Grade A heavy-hex double nuts.
  - g. Install all nuts per manufacturer's instructions.
  - h. Bolt hole diameters: equal to the bolt diameter plus  $\frac{1}{16}$ ".
  - i. Anchor bolt hole diameters: equal to the bolt diameter plus  $\frac{1}{2}$ ".
- 5) Galvanization; Nuts, bolts and washers: ASTM F2329. Other steel items: ASTM A123
- 6) Sign Panels: Aluminum. See Elevation drawing for sizes and locations.
- 7) Foundation Materials:
  - a. Reinforcing Steel: ASTM A615, Grade 60.
  - b. Concrete: Class IV (Drilled Shaft), minimum 4.0 ksi compressive strength at 28-days for all environmental classifications.
- 8) Construct the Sign Structure foundation in accordance with FDDT Specification Section 455.
- 9) Prior to erection, record the as-built anchor locations and provide to the Engineer.
- 10) Provide a parabolic camber with the maximum upward deflection as shown on the Camber Diagram.
- 11) Locate Chord splices a minimum of 3 truss panel lengths apart. Chord splices may be either the Standard splice or the Alternate splice but not both on this structure. Upright splices are not allowed.
- 12) Install sign panels as shown on the Elevation drawing.
- 13) Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location  $\pm$  two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations

NOTE: See Plans for Span Sign Structure Data Table.



CAMBER DIAGRAM

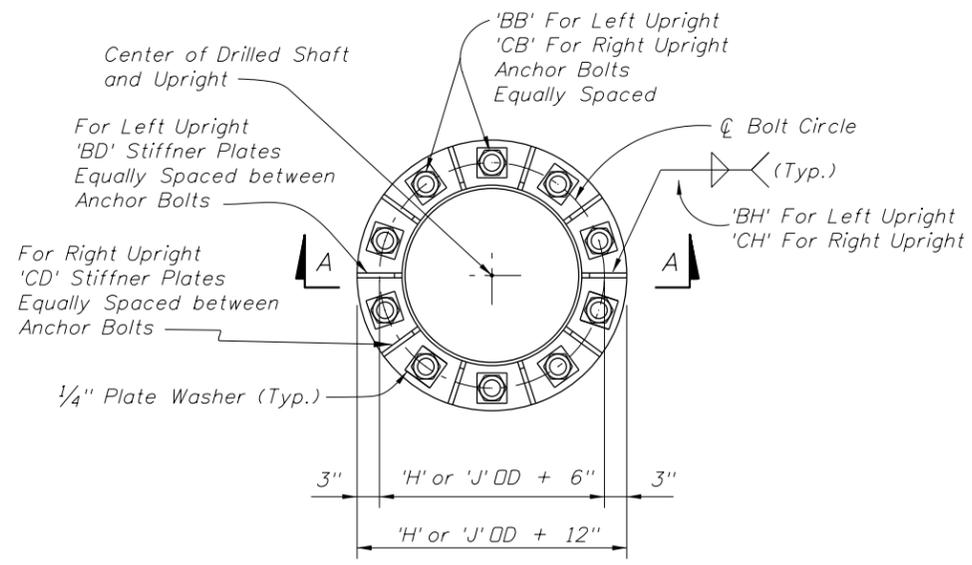
REVISIONS			
DATE	BY	DESCRIPTION	
07/01/10	CBH	Removed payment note.	



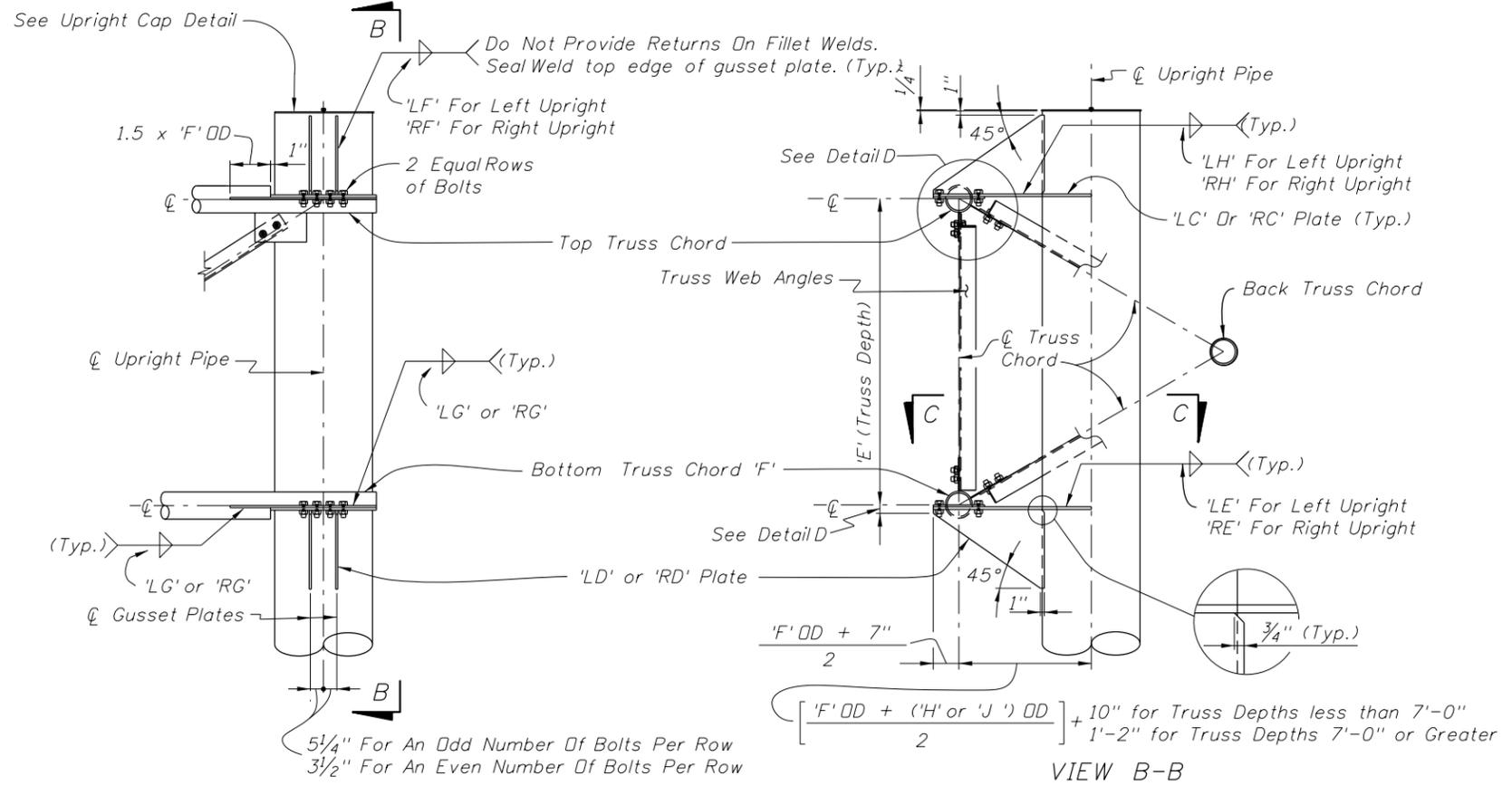
2010 Interim Design Standard

SPAN SIGN STRUCTURE

Interim Date	Sheet No.
07/01/10	1 of 5
Index No.	
11320	



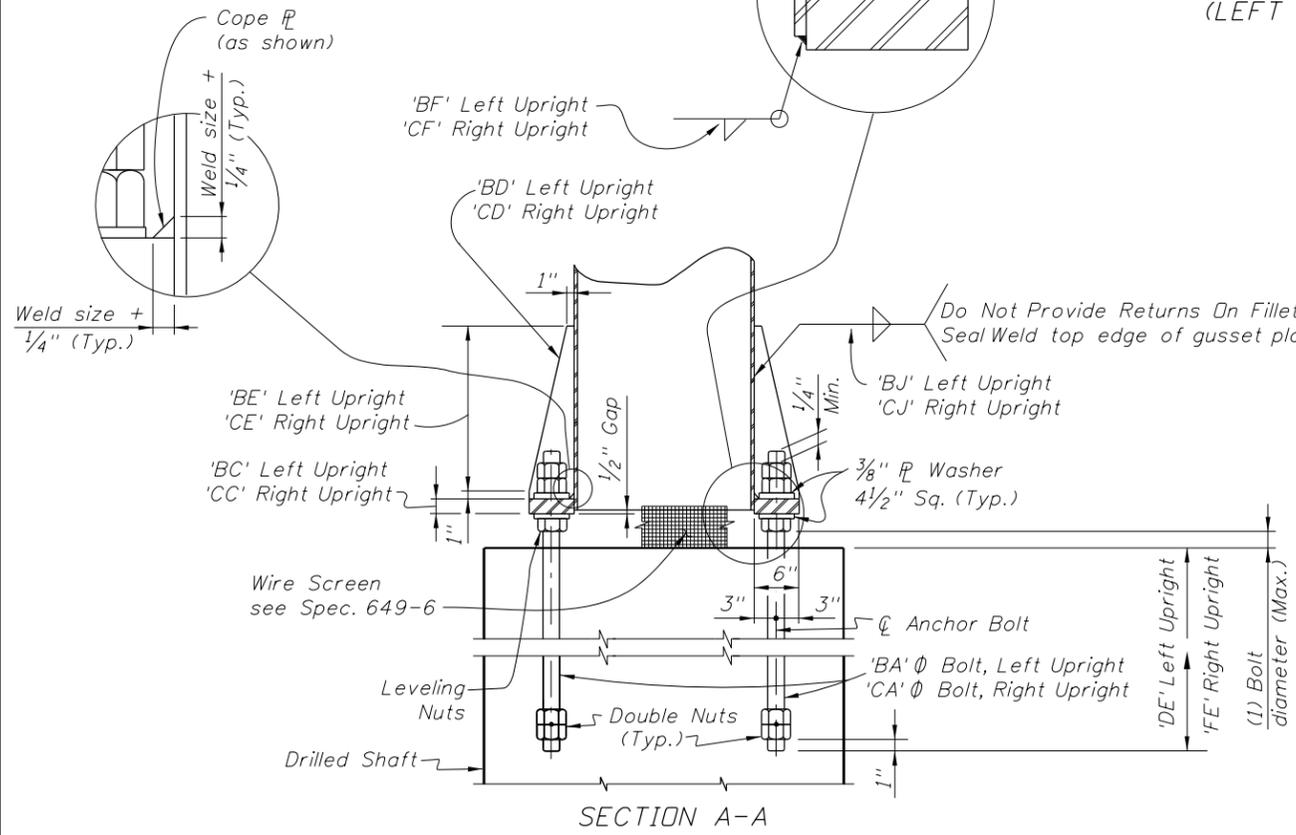
PLAN VIEW  
BASE PLATE



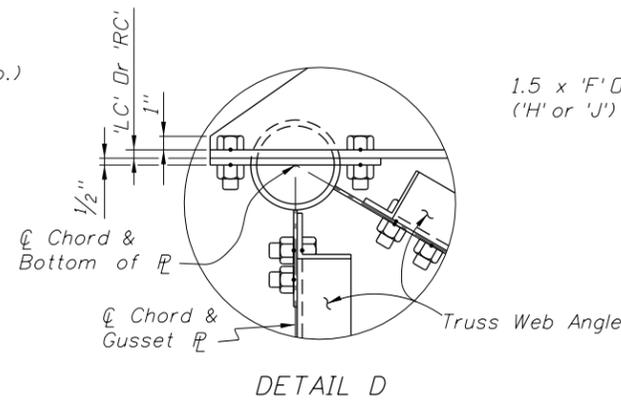
RIGHT UPRIGHT-TRUSS CONNECTION DETAIL  
(LEFT UPRIGHT - TRUSS CONNECTION SIMILAR)

Web Members From Back Truss  
Chord Omitted For Clarity

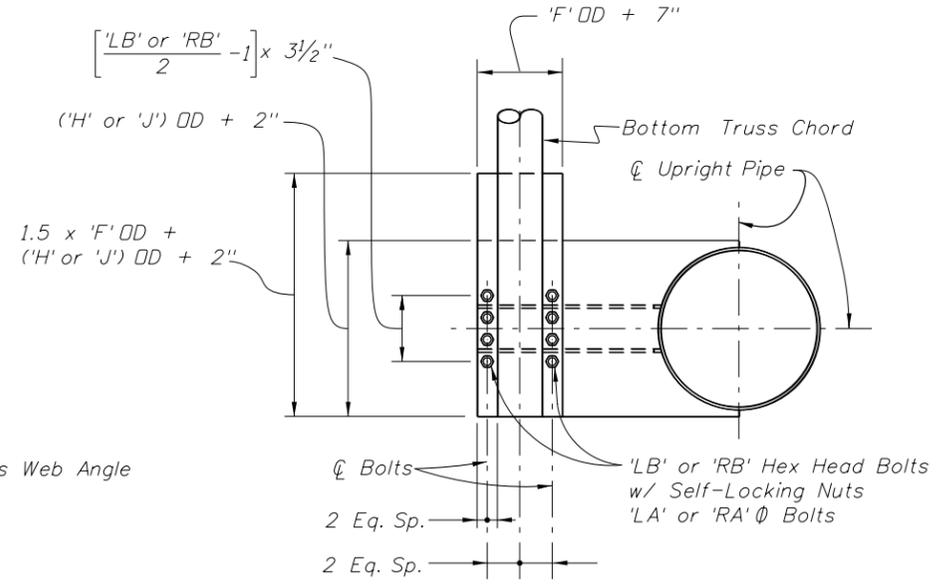
VIEW B-B



SECTION A-A



DETAIL D



SECTION C-C  
(With Gusset Plate and Angles omitted for clarity)

NOTE:  
Abbreviation  
OD ~ Outside Diameter

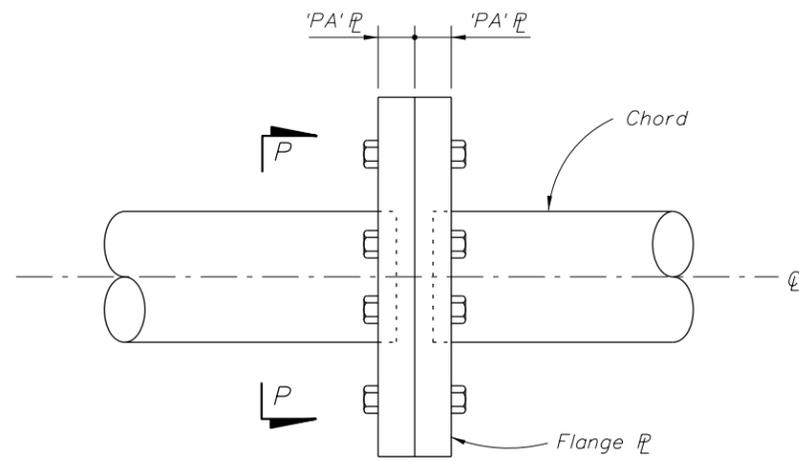
REVISIONS			
DATE	BY	DESCRIPTION	
07/01/10	DYW	Modified anchor bolt extension details, gusset R clip details, seal weld details & R washer thickness.	



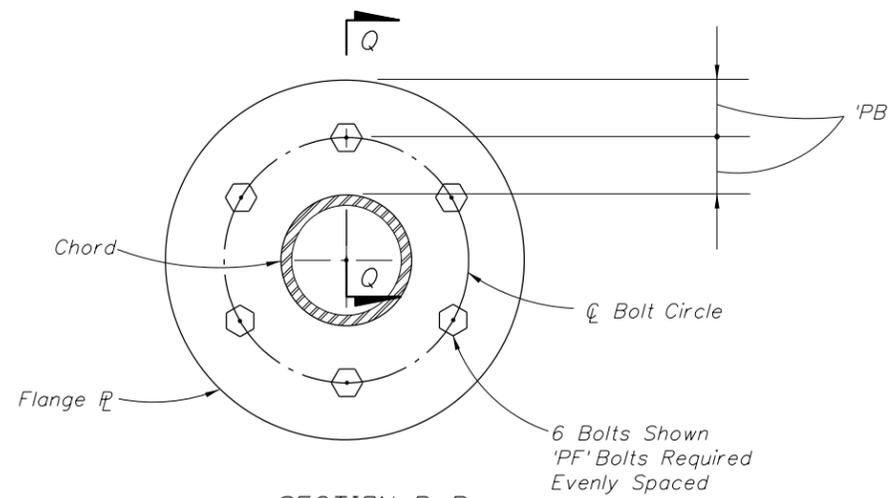
2010 Interim Design Standard

SPAN SIGN STRUCTURE

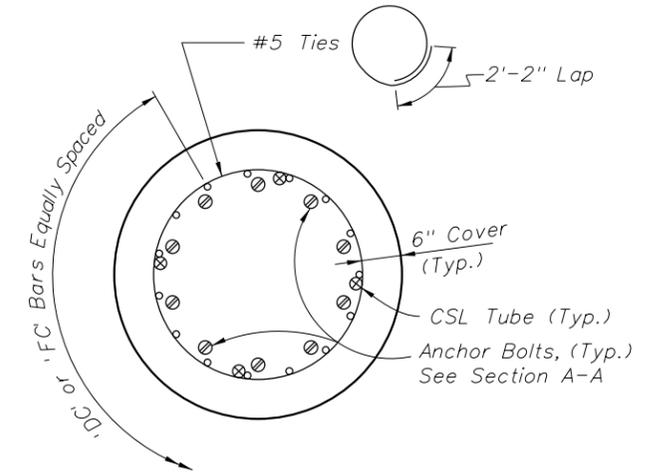
Interim Date	Sheet No.
07/01/10	2 of 5
Index No.	
11320	



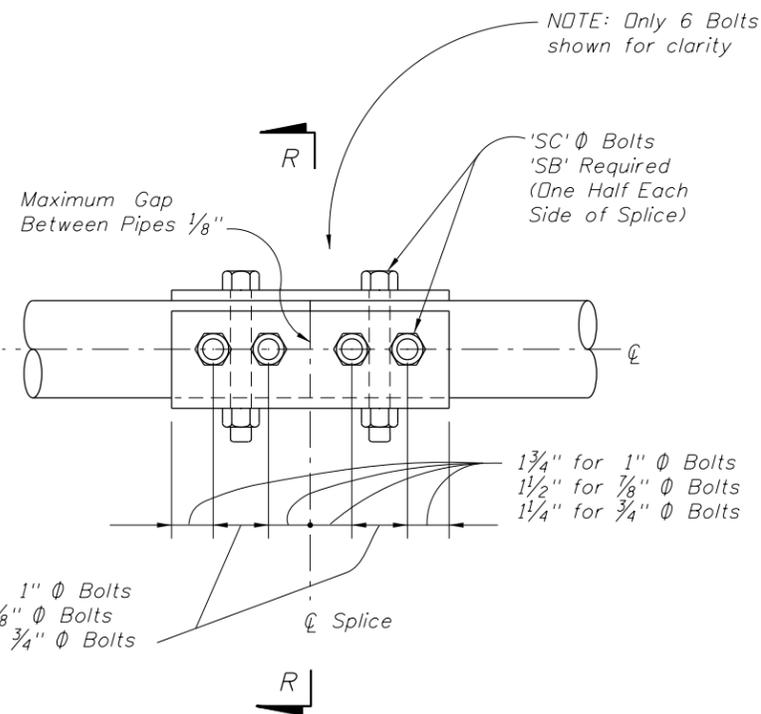
ELEVATION  
ALTERNATE SPLICE CONNECTION



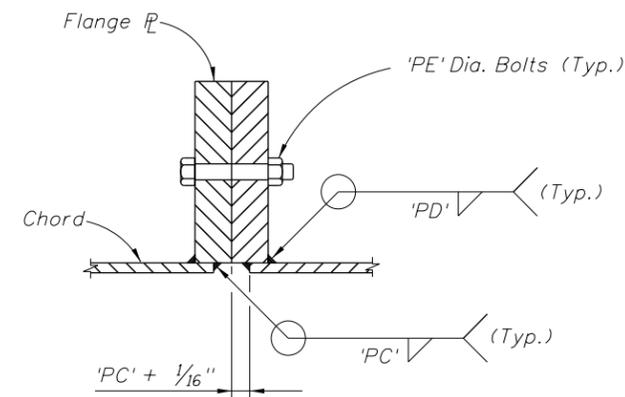
SECTION P-P



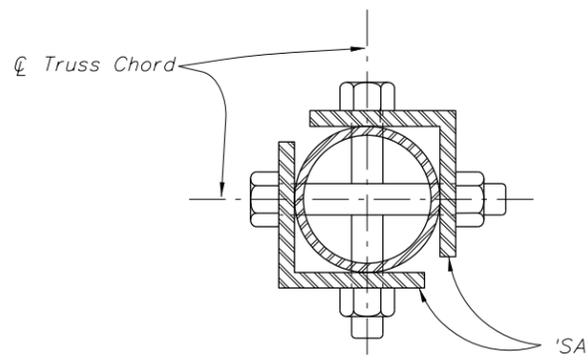
PLAN VIEW  
DRILLED SHAFT



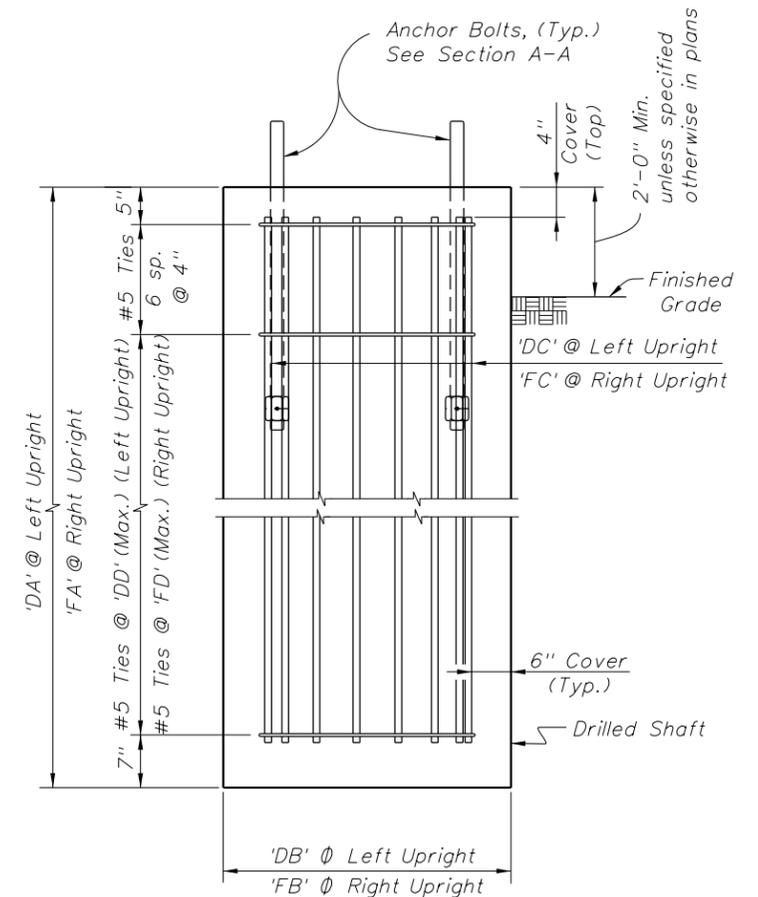
ELEVATION  
SPLICE CONNECTION



SECTION Q-Q



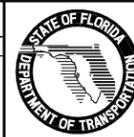
SECTION R-R



ELEVATION  
DRILLED SHAFT

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	DYW	Modified anchor bolt extension details & foundation offset details.			



2010 Interim Design Standard

SPAN SIGN STRUCTURE

Interim Date  
07/01/10

Sheet No.  
5 of 5

Index No.  
11320

**SINGLE COLUMN GROUND SIGN NOTES:**

- 1) DESIGN WIND SPEED: See Wind Speeds by County.
- 2) GENERAL SPECIFICATIONS: Current FDOT Standard Specifications for Road and Bridge Construction and supplements thereto.
- 3) DESIGN SPECIFICATIONS: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, as modified by the FDOT Structures Manual.
- 4) ALUMINUM: Aluminum Materials shall meet the requirements of Aluminum Association Alloy 6061-T6 (ASTM B209, B221, or B308), except as noted below.
- 5) CONCRETE: Class I.
- 6) SIGN PANELS: 0.08 inches min. thick Aluminum Plate with all corners rounded.
- 7) ALUMINUM BOLTS, NUTS, AND LOCK WASHERS:
  - a. Aluminum bolts: ASTM F468, Alloy 2042-T4 with at least 0.0002 inches thick anodic coating and chromate sealed.
  - b. Nuts: ASTM F467, Alloy 6061-T6 or 6262-T9.
  - c. Lockwashers: ASTM B221, Alloy 7075-T6.
- 8) STAINLESS STEEL BOLTS, NUTS, AND LOCKWASHERS:
 

Stainless Steel Bolts, Nuts, and Lockwashers: ASTM F593 and ASTM F594, Alloy Group 2. Condition A, CW2, or SH4 may be provided in lieu of Aluminum Bolts, Nuts, and Washers.
- 9) U-BOLTS, NUTS, AND LOCKWASHERS:
 

U-bolts, Nuts, and Lockwashers: ASTM A307, Grade A, galvanized in accordance with ASTM F2329.
- 10) BREAKAWAY SUPPORTS REQUIREMENTS: Install non-frangible aluminum column (post) (larger than 3 1/2") with breakaway supports as shown on Sheet 5 of 8. Signs shielded by barrier wall or guardrail do not require breakaway support.
- 11) QPL: Manufacturers seeking approval of alternate aluminum round tube, steel U-channel or square tube single post ground sign assemblies for inclusion on the Qualified Products List (QPL), must submit a QPL application, design calculations, detailed drawings and design tables showing the product meets all the requirements.

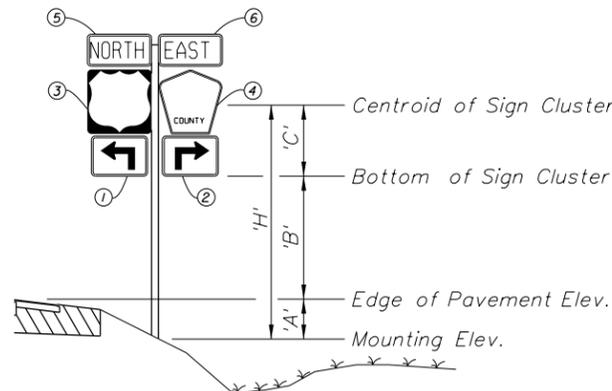
**WIND SPEEDS BY COUNTY:**

- 110 MPH**  
Alachua, Baker, Bradford, Clay, Columbia, Gadsden, Gilchrist, Hamilton, Hardee, Jackson, Jefferson, Lafayette, Lake, Leon, Madison, Marion, Polk, Putnam, Sumter, Suwannee and Union counties.
- 130 MPH**  
Bay, Brevard, Calhoun, Charlotte, Citrus, De Soto, Dixie, Duval, Flagler, Franklin, Glades, Gulf, Hendry, Hernando, Highlands, Hillsborough, Holmes, Lee, Levy, Liberty, Manatee, Nassau, Okaloosa, Okeechobee, Orange, Osceola, Pasco, Pinellas, Sarasota, Seminole, St Johns, Taylor, Volusia, Wakulla, Walton and Washington counties.
- 150 MPH**  
Broward, Collier, Dade, Escambia, Indian River, Martin, Monroe, Palm Beach, Santa Rosa and St. Lucie counties.

**GUIDE TO USE THIS STANDARD:**

1. Calculate the area and the centroid for an individual sign or a sign cluster. Note that the centroid and areas have been calculated for frequently used sign clusters. These are shown on Sheet No. 6, 7 & 8 of 8.
2. Determine the height 'H' from groundline for the individual sign or the cluster.
3. Select the appropriate Column (Post) Selection Tables by Wind Speed and find the intersection point.
4. Design the post and the foundation according to the dark-bold lines or shaded area (if cantilever sign) in the Column (Post) Selection Tables and Post and Foundation Table. For sign posts with signs oriented in two directions, only the sign with the largest area should be analyzed to determine the post requirements.

**EXAMPLE:**



Size H x V	Centroid			'A <sub>n</sub> '	'X' <sub>n</sub> ' x 'A' <sub>n</sub> '	'Y' <sub>n</sub> ' x 'A' <sub>n</sub> '
	local 'Y' <sub>n</sub> '	global 'X' <sub>n</sub> '	global 'Y' <sub>n</sub> '			
(IN x IN)	(IN)	(IN)	(IN)	(IN <sup>2</sup> )	(IN <sup>3</sup> )	(IN <sup>3</sup> )
① 21 x 15	7.5	-10.5-1.5-1.5 = -13.5	7.5	315	-4,252.5	2,362.5
② 21 x 15	7.5	10.5+1.5+1.5 = 13.5	7.5	315	+4,252.5	2,362.5
③ 24 x 24	12	-12-1.5 = -13.5	15+1+12= 28	576	-7,776	16,128
④ 24 x 24	12	12+1.5 = 13.5	15+1+12= 28	436	5,886	12,208
⑤ 24 x 12	6	-12-1.5 = -13.5	15+1+24+ 1+6=47	288	-3,888	13,536
⑥ 24 x 12	6	12+1.5 = 13.5	15+1+24+ 1+6=47	288	3,888	13,536
				<b>2,218</b>	<b>-1,890</b>	<b>60,133</b>
						<b>TOTALS</b>

$\Sigma('A_n') = 2,218 \text{ IN}^2 = 15.4 \text{ FT}^2$        $\Sigma('X_n' \times 'A_n') = -1,890 \text{ IN}^3 = -1.09 \text{ FT}^3$        $\Sigma('Y_n' \times 'A_n') = 60,133 \text{ IN}^3 = 34.8 \text{ FT}^3$

$'X'_c = \frac{\Sigma('X_n' \times 'A_n')}{\Sigma 'A_n'} = -0.1 \text{ FT}$        $'Y'_c = \frac{\Sigma('Y_n' \times 'A_n')}{\Sigma 'A_n'} = 2.26 \text{ FT}$

Assume: Bay County, 'A' = 1 FT, 'B' = 7 FT  
 Calculated: 'X'<sub>c</sub> = -0.1 FT 'C' = 'Y'<sub>c</sub> = 2.26 FT  
 Since 'X'<sub>c</sub> < 6", it is not a cantilever sign, only dark-bold lines in the table will be referenced to.

'H' = 'A' + 'B' + 'C' = 10.26 FT ==> **USE 11 FT**       $\Sigma('A_n') = 15.4 \text{ FT}^2$  ==> **USE 16 FT<sup>2</sup>**

**ALUMINUM COLUMN (POST) SELECTION TABLE**  
(WIND SPEED = 130 MPH)

TOTAL PANEL AREA (SF)	'H' (FT)												
	8	9	10	11	12	13	14	15	16	17	18	19	20
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
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28													
29													
30													

For WIND SPEED = 130 MPH,  
'H' = 11 FT, Area = 16 FT<sup>2</sup>

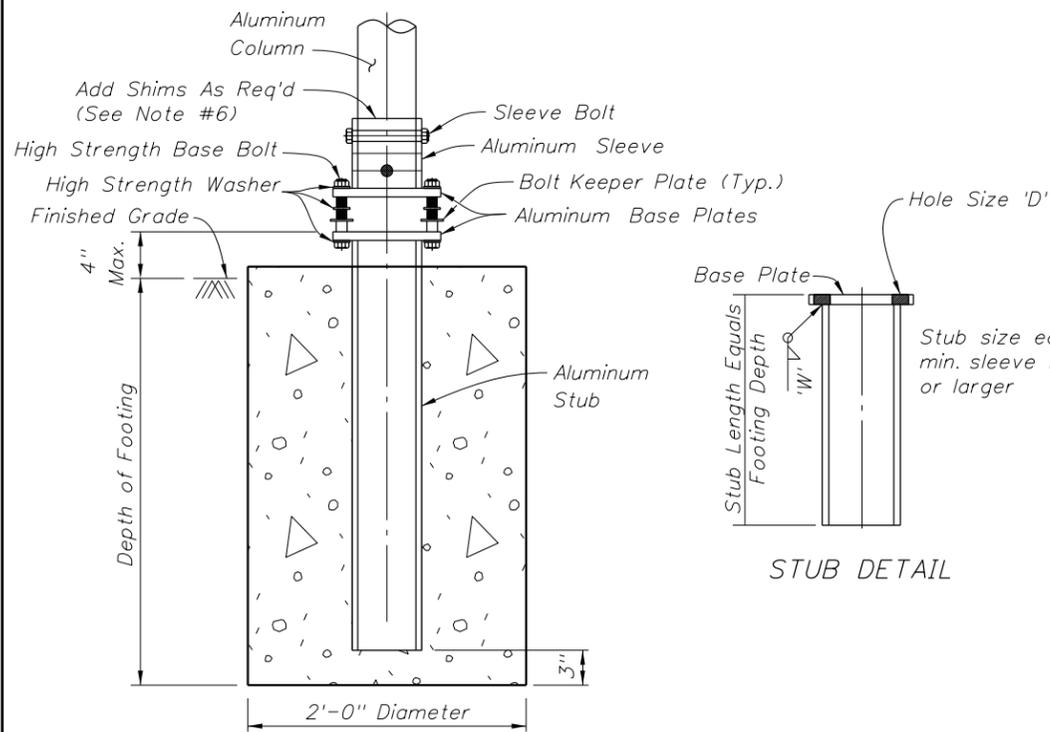
- Refer to the 130 mph Column (Post) Selection Table, as copied from Sheet 3 of 8 and shown here.
- Using the 16 ft<sup>2</sup> area on the left hand side of the table, go across to the 11 ft height and find the cell marked with X.
- find the symbol **4** which the dark-bold line under the X cell leads to.
- In the Post and Foundation Table, the symbol **4** concludes that the design requires a 4.0" diameter and 0.25" thick Aluminum Column (Post) and a 2.0' diameter and 4.0' deep Concrete Foundation.

= If CANTILEVER SIGN configuration (see Cantilever Sign Details) falls in this region, use next larger post size than that indicated.

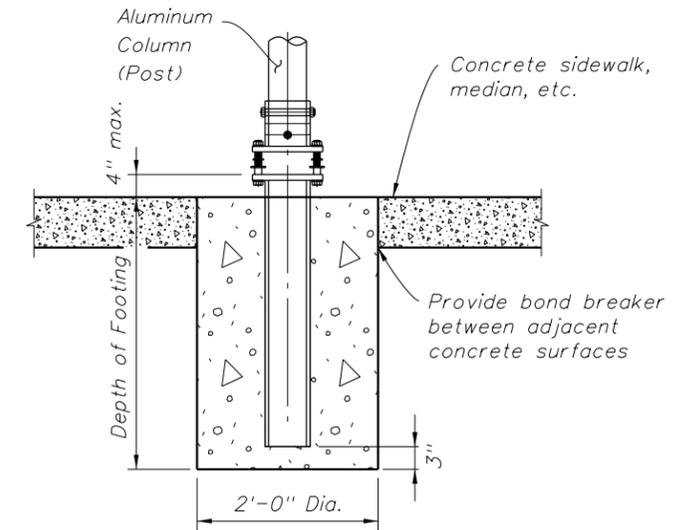
**NOTES AND EXAMPLE**

**SLIP BASE NOTES:**

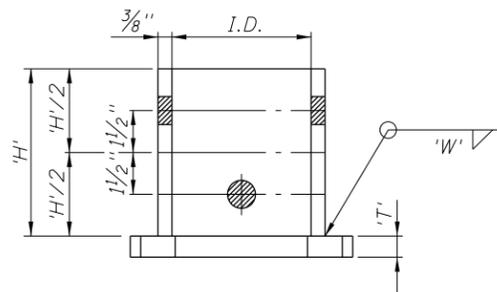
1. Use sleeves with an inside diameter (I.D.) no more than  $\frac{1}{16}$ " larger than the outside diameter (O.D.) of the column.
2. Sleeve Bolts: ASTM A-307,  $\frac{1}{2}$ "  $\Phi$  galvanized steel bolt (with lock nuts) or Alloy 2024-T4 or 6061-T6 (ASTM B-211).
3. Base bolts, Nuts, and Washers: high strength ASTM A-325 with ASTM B633 SC3, Type II electroplated zinc coating.
4. Base plates may have either single or double beveled slots.
5. An alternate cast base plate of aluminum alloy 356 and T6 temper in lieu of the fabricated base plate may be submitted for approval. If a cast base plate is used, the stub will be the same size as the column and will be bolted to the casting.
6. Assemble the slip base connection in the following manner:
  - a. Connect column to sleeve using two  $\frac{1}{2}$ "  $\Phi$  machine bolts.
  - b. Assemble top base plate to stub base plate using high strength bolts with three hardened washers per bolt. One of the three washers per bolt and two bolt keeper plates go between the base plates. Orient the bolt keeper plates in the Directions of Traffic.
  - c. Use shim stock as required to plumb the column.
  - d. Tighten all bolts to the maximum possible with a 12" to 15" wrench. (This will bed the washers and shims and clear the bolt threads.)
  - e. Loosen each bolt one turn and using a calibrated wrench retighten to the prescribed torque (see table) under the supervision of the Project Engineer.
  - f. Burr threads at junction with nut using a center punch to prevent nut loosening.
7. Use galvanized steelshims to obtain a tight fit between the column face and the sleeve. Place shims in all quadrants between the  $\frac{1}{2}$ "  $\Phi$  sleeve bolts. Use shims that are 1" shorter than the height of the sleeve.
8. Both fabricated and cast base assemblies were impact tested by the Texas Transportation Institute, College Station, TX on February 10, 2003, and both alternate assemblies were determined to be compliant with the performance recommendations of the National Cooperative Highway Research Program (NCHRP) report 350.



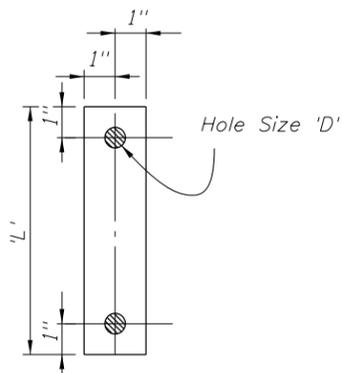
SLIP BASE AND FOOTING DETAIL (non-frangible post)



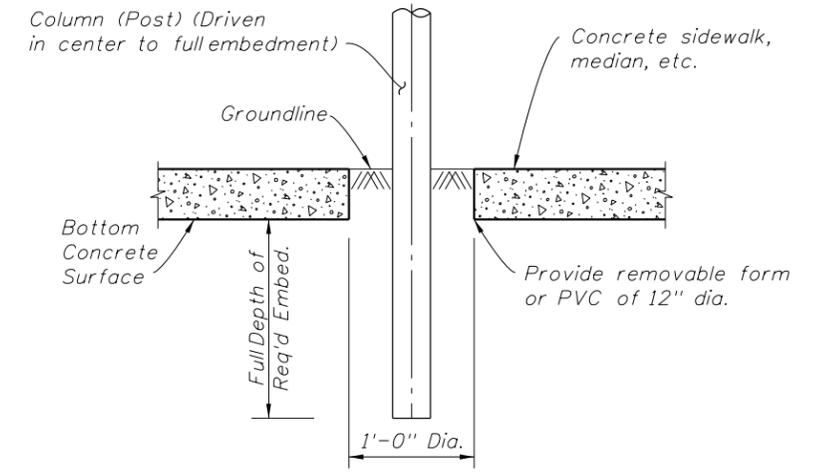
SLIP BASE AND FOOTING DETAIL IN CONCRETE (non-frangible post in crossovers, medians, & sidewalks)



ALUMINUM SLEEVE & BASE PLATE DETAILS (DOUBLE BEVELED SLOTS)



0.0149" Thick Alum. Strip - 2 Req'd Per Base  
BOLT KEEPER PLATE DETAIL



DRIVEN POST DETAIL IN CONCRETE (frangible post in crossovers, medians, & sidewalks)

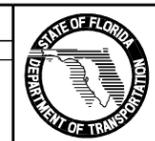
**SLIP BASE DETAILS**

Column Size	Sleeve I.D. (Max)	Sleeve Height 'H'	Weld 'W'	Base Plate		Radius 'R'	Base Bolt		Base Plate Torque		Hole Size 'D'
				'L'	'T'		Size	Length	Ft-lbs	In-lbs	
4 x 1/4	4 1/16	6	5/8	8	3/4	1 1/32	5/8	3	29	345	1 1/16
4 1/2 x 1/4	4 9/16	6	5/8	8	7/8	1 1/32	5/8	3 1/4	29	345	1 1/16
5 x 1/4	5 1/16	7	5/8	8	7/8	1 1/32	5/8	3 1/4	29	345	1 1/16
6 x 1/4	6 1/16	8	1 1/16	9	1	1 3/32	3/4	3 1/2	46	554	1 3/16
8 x 5/16	8 1/16	10	3/4	11	1	1 5/32	7/8	3 3/4	53	640	1 5/16

Note: Unless noted otherwise, all dimensions are in inches.

**BASE AND FOUNDATION DETAILS**

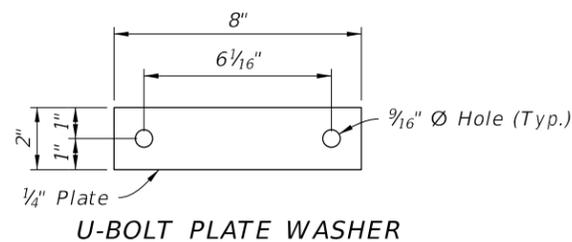
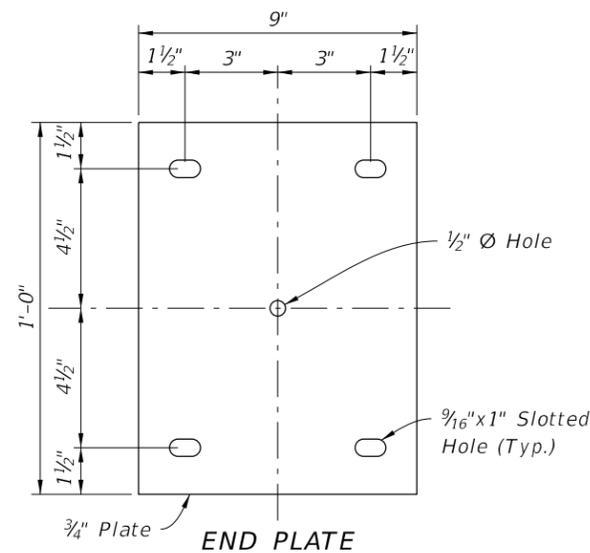
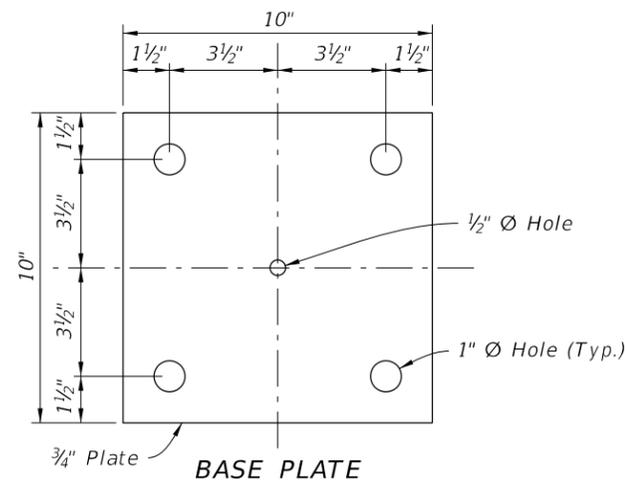
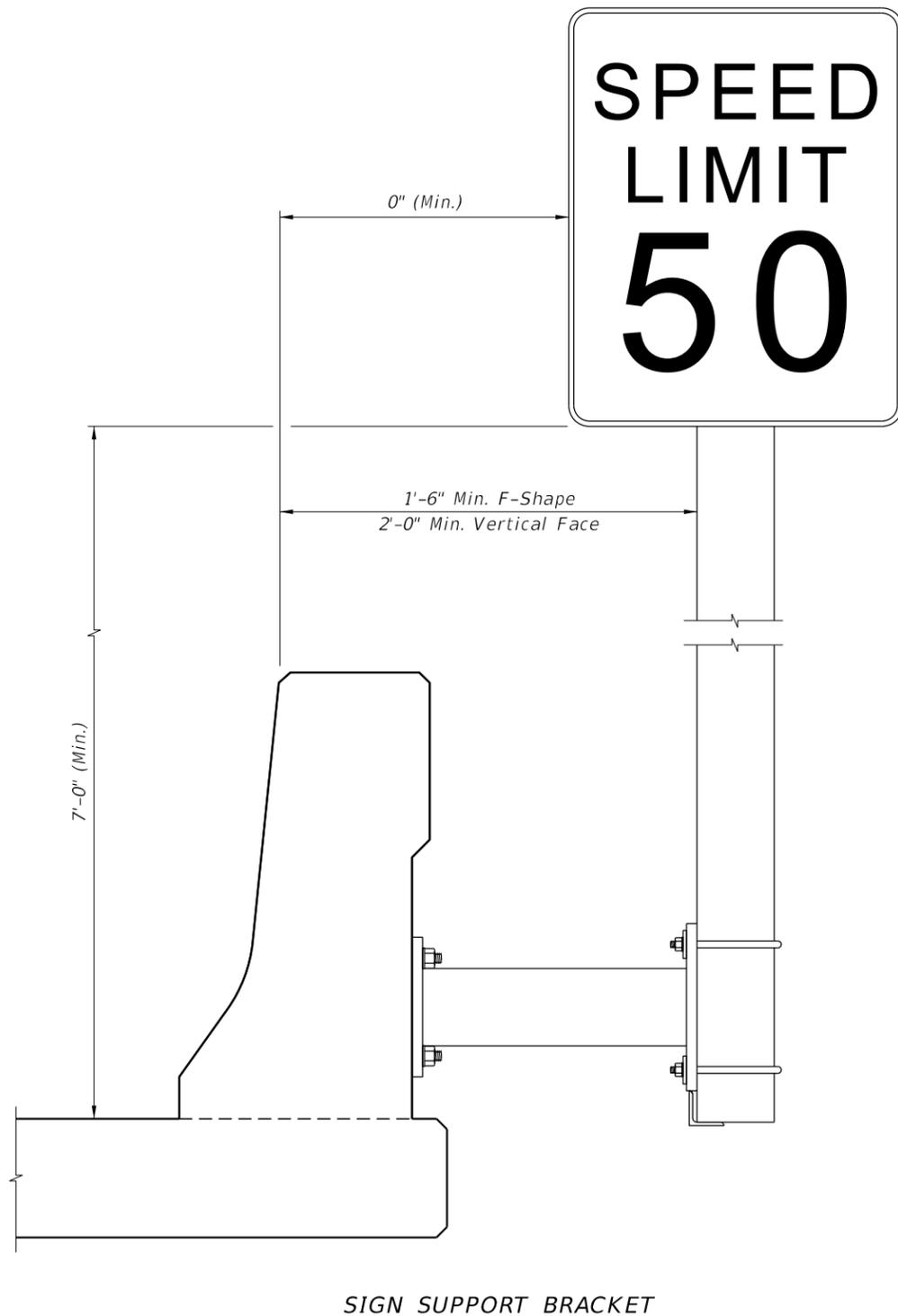
REVISIONS			
DATE	BY	DESCRIPTION	DATE
01/01/10	DYW	Changed Note 6.b.	
07/01/10	DYW	Added 8" column to SLIP BASE DETAILS table.	



2010 Interim Design Standard

**SINGLE COLUMN GROUND SIGNS**

Interim Date: 07/01/10  
Sheet No.: 5 of 8  
Index No.: 11860



**NOTES:**

**DESIGN SPECIFICATIONS:** AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals as modified by the FDOT Structures Manual.

**WIND SPEEDS:** See Index 11860 - Wind Speeds by County note.

**GEOMETRY:** Install signs with bottom of sign panel at 7' above the gutter line. Edge of sign panels must not extend beyond the inside face of the top of the traffic railing. Sign posts shall be installed plumb.

**APPLICABILITY:** Mount only to concrete traffic barriers in locations where ground mounting is not possible. Work this Index in conjunction with Index No. 11860.

**SHOP DRAWINGS:** Shop drawings are not required.

**PAYMENT:** Payment for sign support bracket shall be included in the cost of the sign.

**LIMITATIONS:** Signs or sign clusters shall not exceed a maximum width of 48".

**MATERIALS:**

**Coatings:** All steel and fasteners shall be hot dip galvanized in accordance with Specification Section 962. Sign Support Weldment shall be hot dip galvanized after fabrication. Paint sign support brackets and posts when shown in the plans in accordance with Specification Section 649-4.

**Support Posts:** ASTM A501 5" NPS Schedule 40 Steel Pipe.

**Sign Posts:** Aluminum Association Alloy 6061-T6 (ASTM B209, B221 or B308) 5" NPS Schedule 40 Aluminum Pipe.

**Steel Plates:** ASTM A36 or A709 Grade 36.

**Anchor Bolts:** ASTM F1554 Grade 55 with a single self-locking hex nut and washers. Install anchor bolts perpendicular to the base plates on back of traffic railing. See Anchor Bolt Notes, Sheet 2 of 2.

**Adhesive Bonded Anchors:** Fully threaded Anchor Bolts with Type HV Adhesive Bonding Material System in accordance with Specification Section 416 & 937.

**U-Bolts:** ASTM A449 sized for sign post, with flat washers and locking hex nuts.

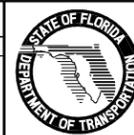
**Welding:** Weld in accordance with American Welding Society Structural Welding Code (Steel), ANSI/AWS D1.1 (current edition). Required weld material is E70XX. Nondestructive testing is not required.

**SIGN AREA & WIND SPEED TABLE**

WIND SPEED MAX. (mph)	MAX. SIGN SIZE (sf)
110	30
130	25
150	20

**REVISIONS**

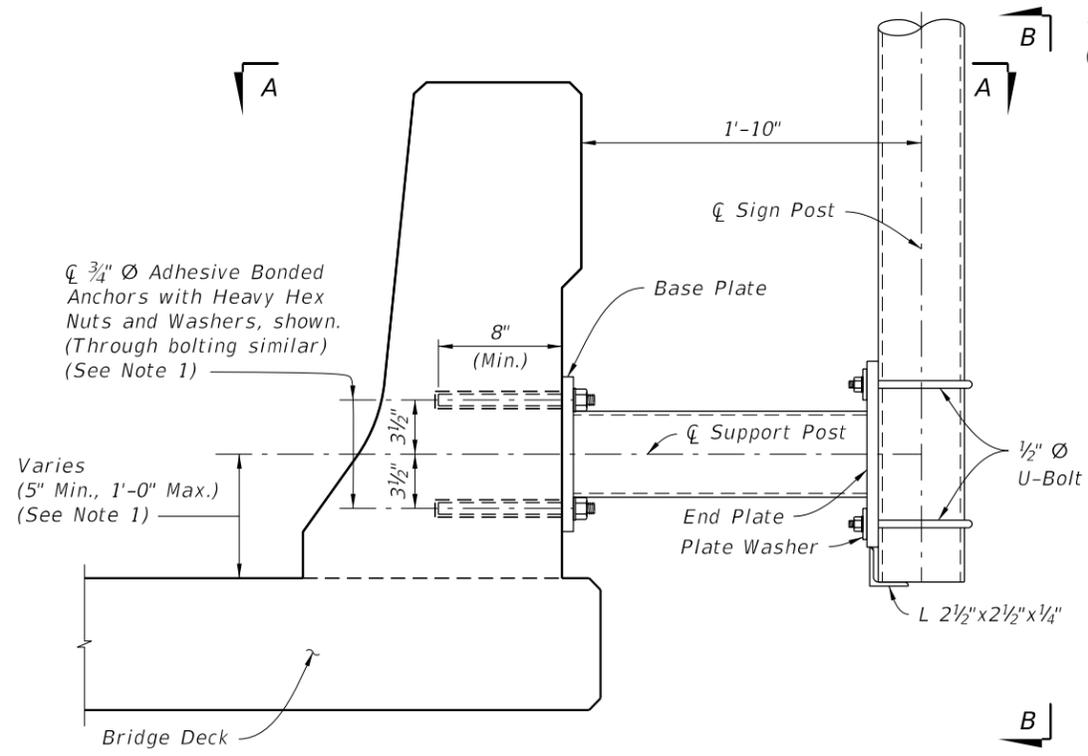
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	CMH	New Design Standard			



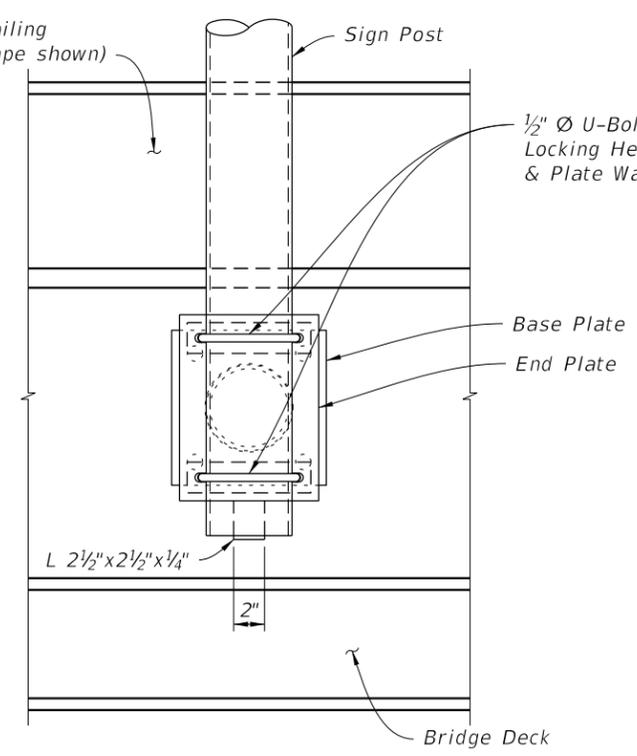
2010 Interim Design Standard

**SINGLE POST BRIDGE MOUNTED SIGNS**

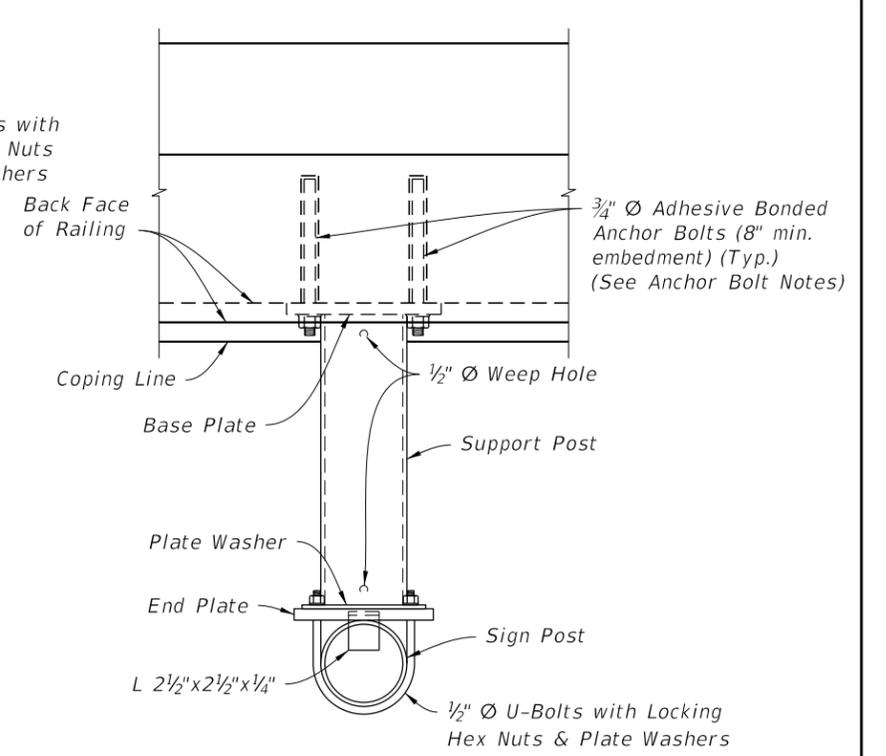
Interim Date	Sheet No.
07/01/10	1 of 2
Index No.	
11870	



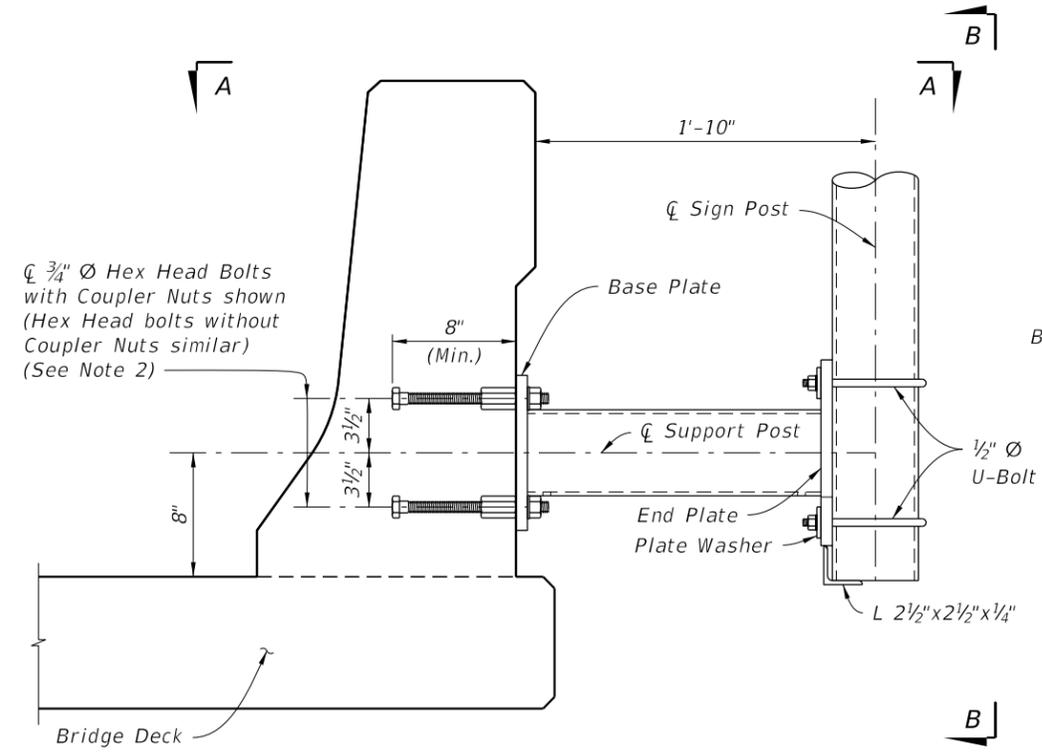
TYPICAL SECTION THRU EXISTING TRAFFIC RAILING AT SIGN SUPPORT BRACKET  
(32" F-Shape Traffic Railing shown, other Traffic Railings & Parapet similar)  
(Bridge Deck shown, Approach Slab and Retaining Wall Similar)



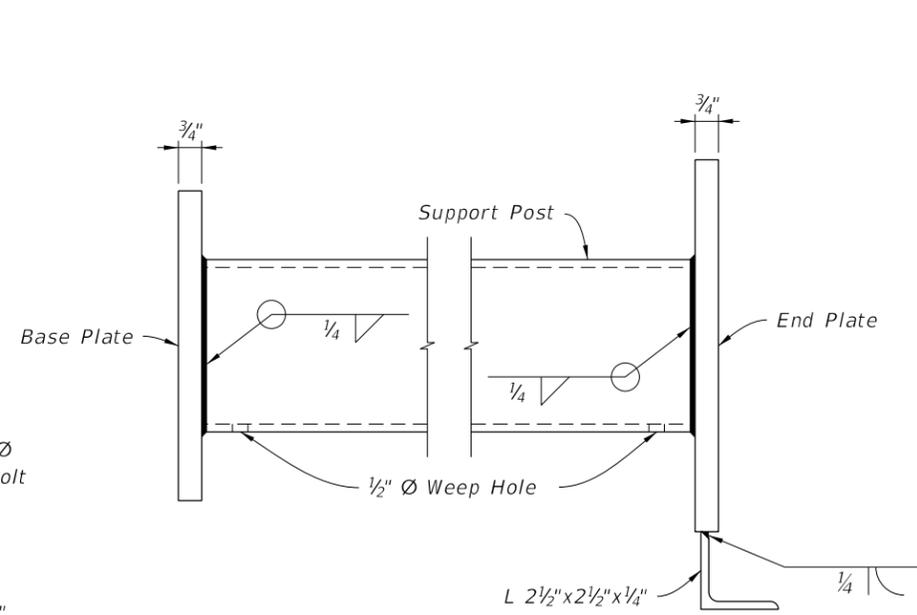
VIEW B-B  
SIGN SUPPORT BRACKET



PLAN VIEW A-A  
SIGN SUPPORT BRACKET



TYPICAL SECTION THRU TRAFFIC RAILING AT SIGN SUPPORT BRACKET (NEW CONSTRUCTION)  
(32" F-Shape Traffic Railing shown, other Traffic Railings & Parapet similar)  
(Bridge Deck shown, Approach Slab and Retaining Wall Similar)



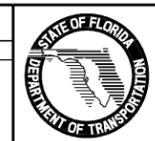
SIGN SUPPORT WELDMENT DETAIL

ANCHOR BOLT NOTES:

- Existing Traffic Railings:  
Locate existing conduit prior to drilling. Adjust placement as necessary to avoid existing conduit. Base plate must be flush with back of traffic railing. Maintain a minimum cover 2" from face of traffic railing to tip of Adhesive Anchor.  
For concrete parapets less than 10" thick, through bolt 3/4" Ø Heavy Hex Head Bolts with Nuts and Washers in lieu of Adhesive Bonded Anchors. Bolt heads shall not protrude more than 1 1/2" beyond traffic face of railing.
- New Traffic Railings:  
Tie Anchor Bolts securely and use templates as necessary to maintain bolt spacing.  
Optional Couplers are shown for slipforming; keep coupler threads for Anchor Bolts free of concrete.

CROSS REFERENCES:  
For Base Plate, End Plate & U-Bolt Plate Washer Details see Sheet 1.

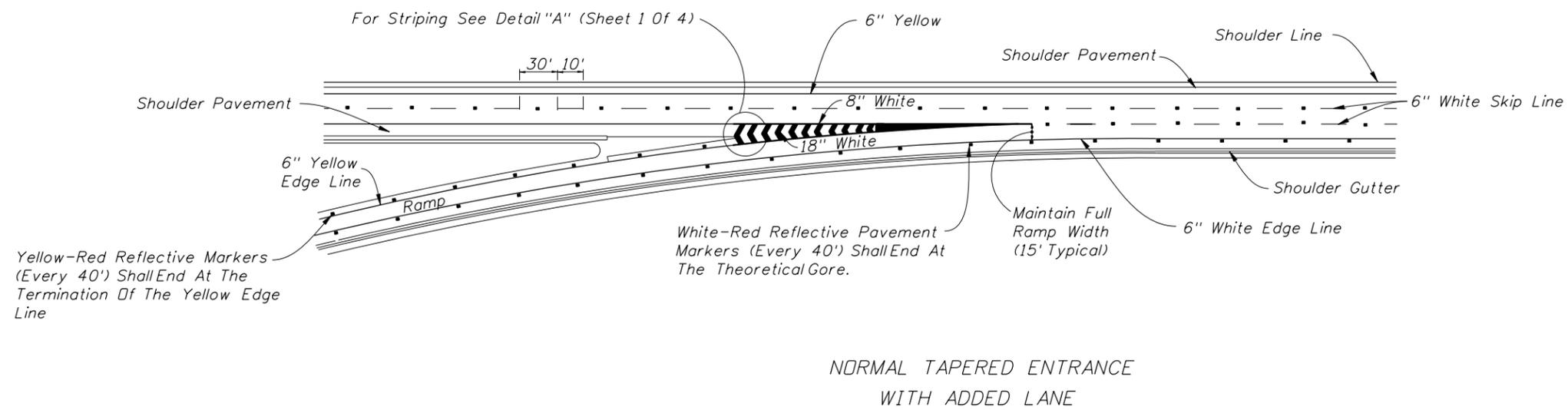
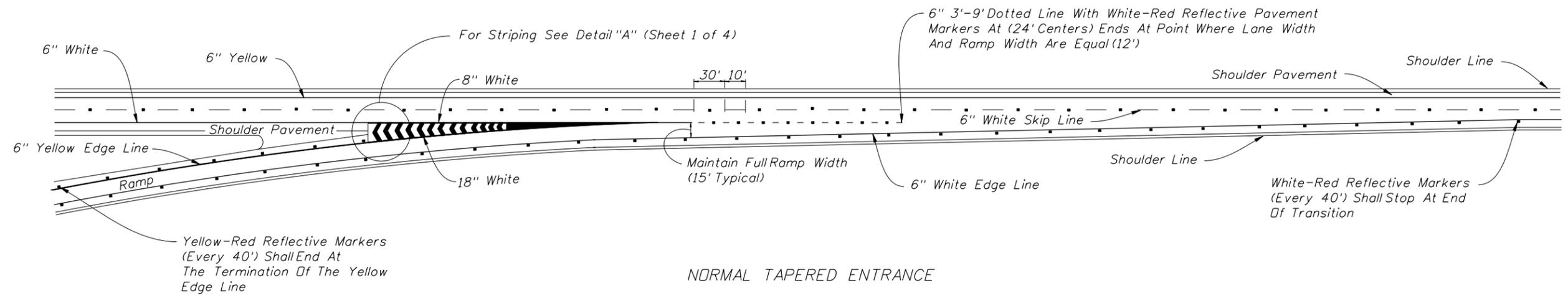
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	CMH	New Design Standard			



2010 Interim Design Standard

SINGLE POST BRIDGE MOUNTED SIGNS

Interim Date	Sheet No.
07/01/10	2 of 2
Index No.	
11870	



**REVISIONS**

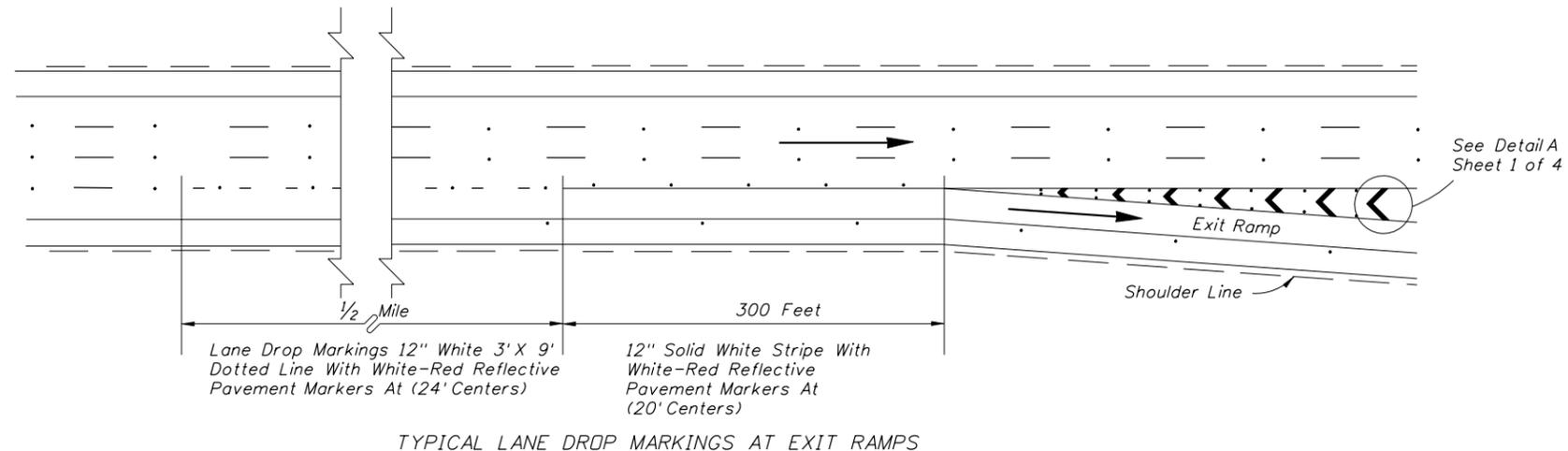
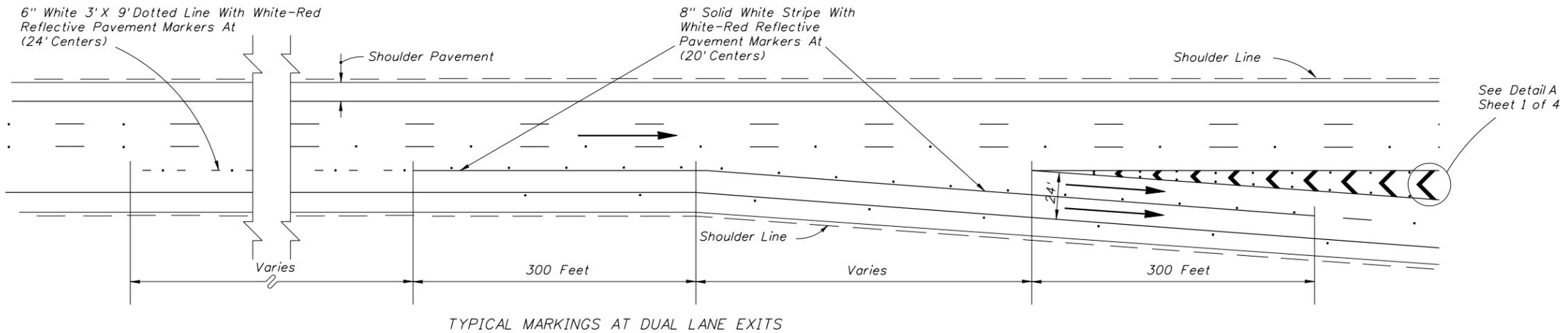
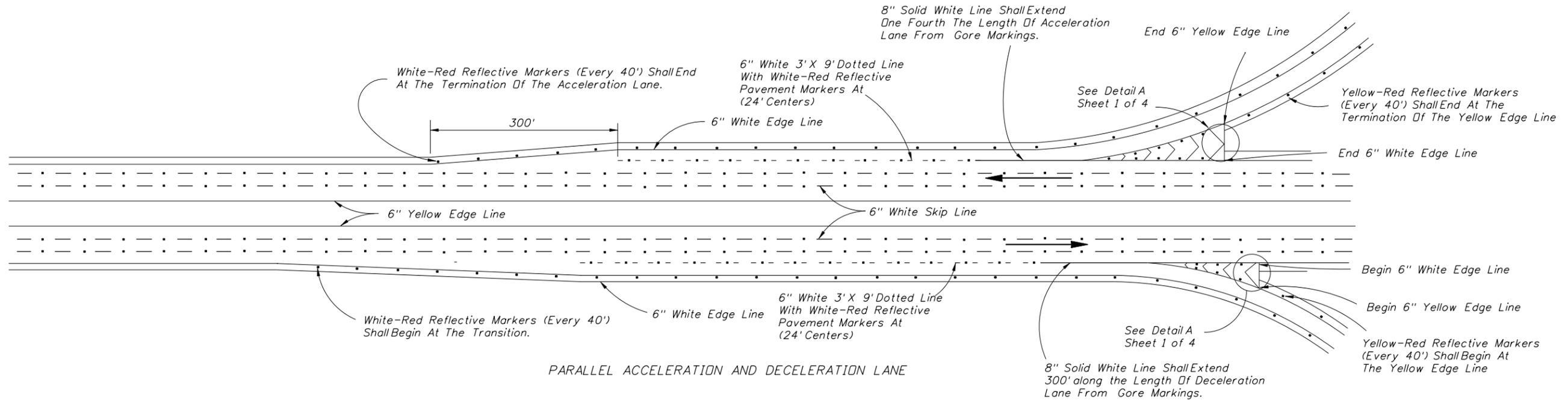
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
06/10/10	C.H.	Marking width changed.			



2010 Interim Design Standard

**INTERCHANGE MARKINGS**

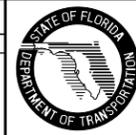
Interim Date	Sheet No.
07/01/10	2 of 4
Index No.	
17345	



Note: Arrows indicate direction of travel and are not shown for pavement marking.

REVISIONS

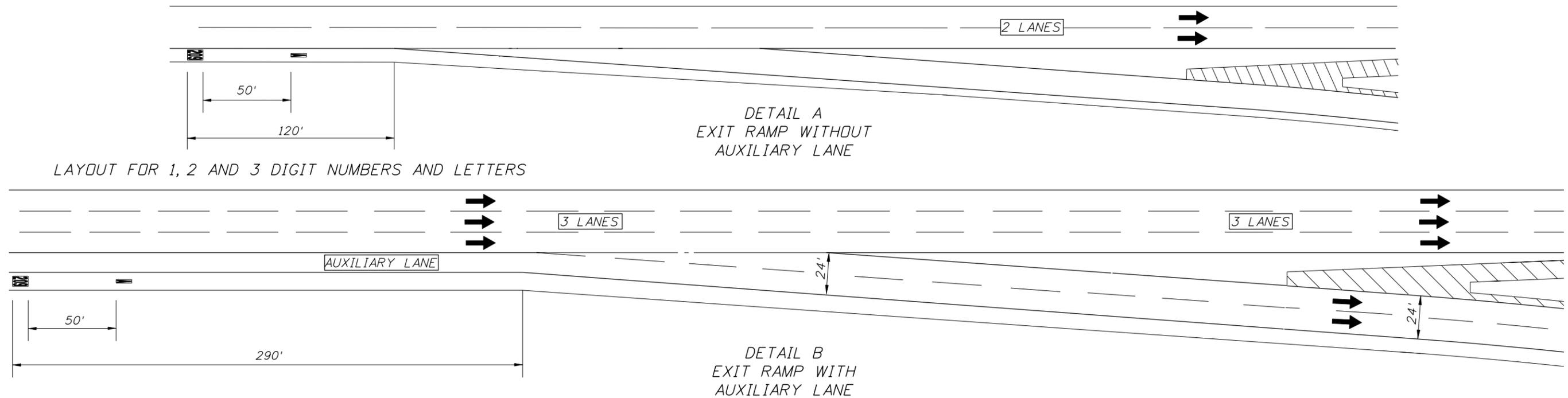
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/16/10	C.H.	Revised Acceleration and Deceleration Lanes with 12" Solid White Lines, And 6" or 12" White 3'-9' Skip Line to Comply With The 2009 M.U.T.C.D.			



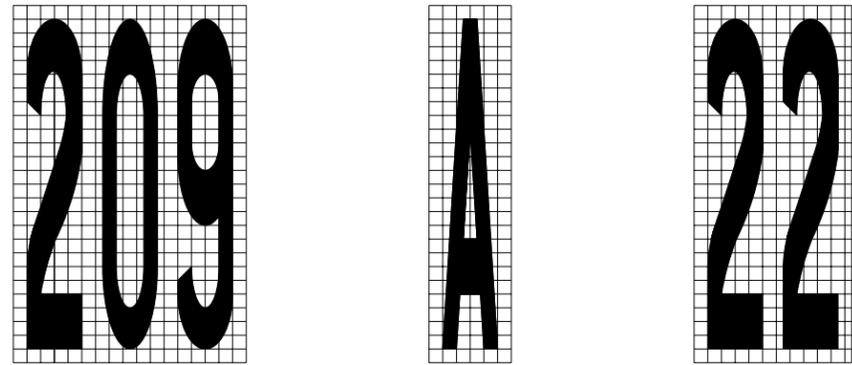
2010 Interim Design Standard

INTERCHANGE MARKINGS

Interim Date	Sheet No.
07/01/10	3 of 4
Index No.	
17345	



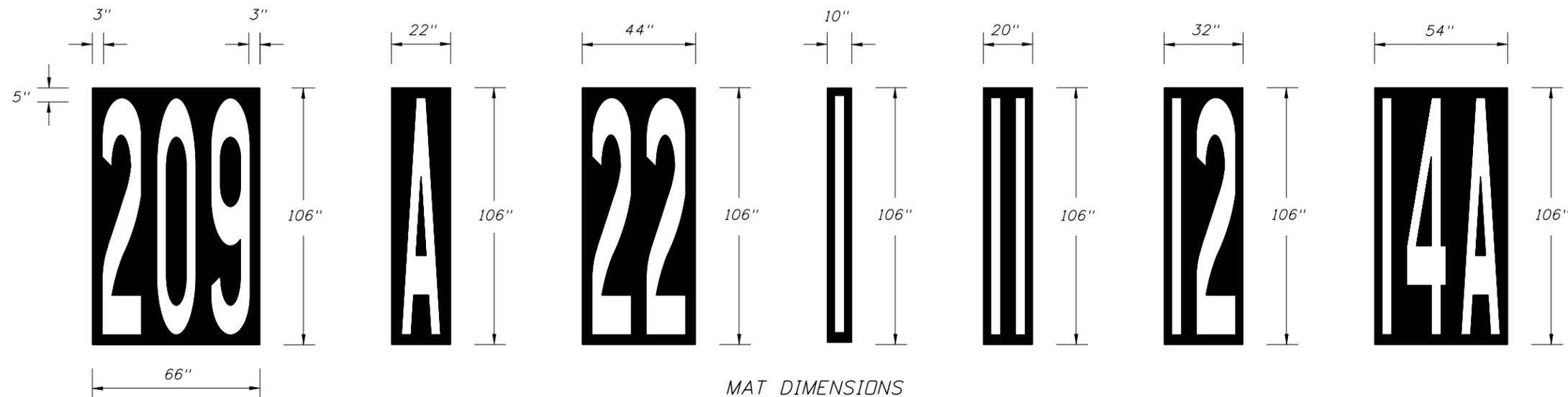
LAYOUT FOR 1, 2 AND 3 DIGIT NUMBERS AND LETTERS



MESSAGE SIZE AND SPACING  
4" X 4" squares

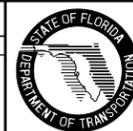
NOTES:

1. Messages shall meet requirements of Specification Section 971-6 and Section 711.
2. The thickness of the preformed message shall be 125 mils.
3. The message shall consist of white letters and numbers with black contrasting material. The black material shall meet the mat dimensions shown and have a minimum skid resistance value of 55 BPN.
4. The "EXIT NUMBER" position remains the same distance from the beginning of taper regardless of the number of lines of information.



REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
06/02/09	L.W.	Added New Detail B-Exit Ramp with Auxiliary Lane. Note 1, and 4 Revised.			
05/07/10	L.W.	Detail A distance 117'-8" revised to 120' and 50' dimension removed from first letter.			



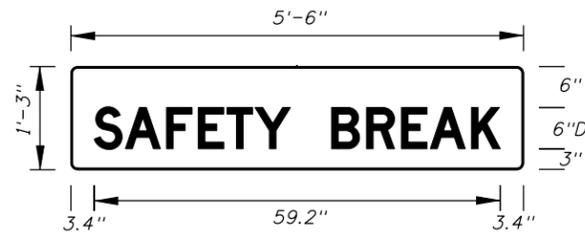
2010 Interim Design Standard

SPECIAL MARKING AREAS

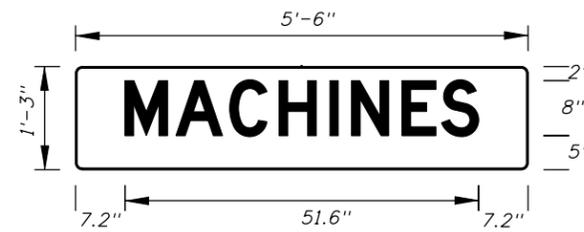
Interim Date	Sheet No.
07/01/10	7 of 14
Index No.	
17346	



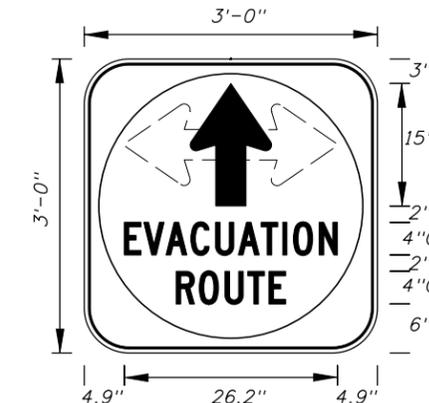
FTP-74-06  
5'-6" X 2'-6"  
4" Radii 3/4" Border  
6" Series D Legend  
Blue Background  
White Legend and Border



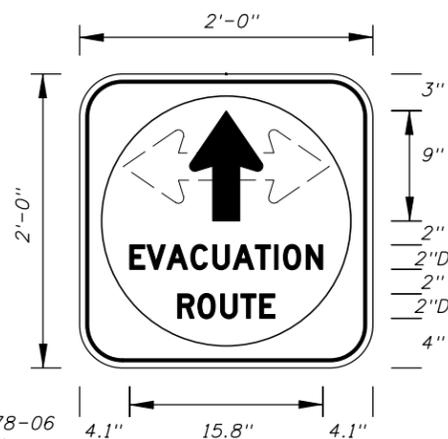
FTP-75-06  
5'-6" X 1'-3"  
1" Radii  
6" Series D Legend  
Blue Background  
White Legend



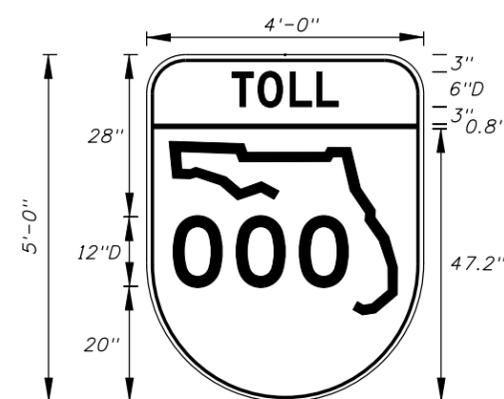
FTP-76-06  
5'-6" X 1'-3"  
1" Radii  
8" Series D Legend  
Blue Background  
White Legend



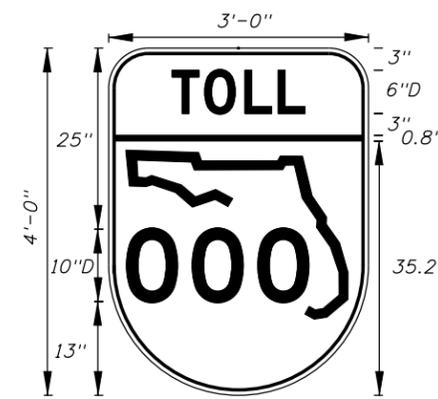
FTP-77-06  
3' X 3'  
5" Radii 3/4" Border  
4" Series C Legend  
White Background with Blue Circle Background  
White Legend and Black Border



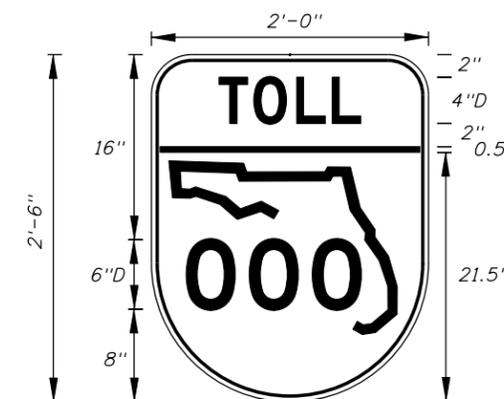
FTP-78-06  
2' X 2'  
3" Radii 3/4" Border  
2" Series D Legend  
White Background with Blue Circle Background  
White Legend and Black Border



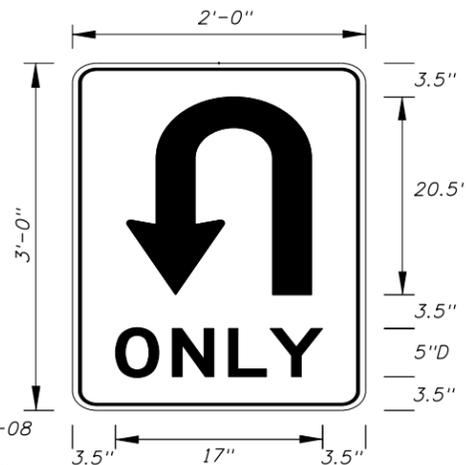
FTP-79-06  
4' X 5'  
6" Radii 3/4" Border  
6" and 12" Series D Legend  
Top Green Background with White Legend and Black Border  
Bottom White Background with Black Legend and Border



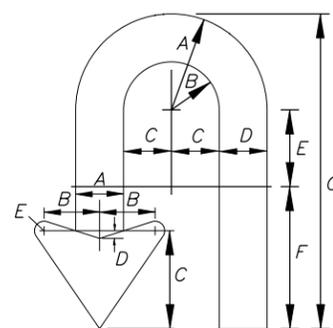
FTP-80-06  
3' X 4'  
5" Radii 3/4" Border  
6" and 10" Series D Legend  
Top Green Background with White Legend and Black Border  
Bottom White Background with Black Legend and Border



FTP-81-06  
2' X 2'-6"  
3" Radii 3/4" Border  
4" and 6" Series D Legend  
Top Green Background with White Legend and Black Border  
Bottom White Background with Black Legend and Border



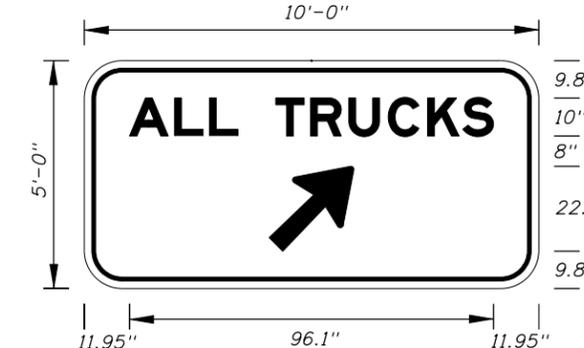
FTP-82-08  
2' X 3'  
1.5" Radii  
5" Series D Legend  
White Background  
Black Legend and Border



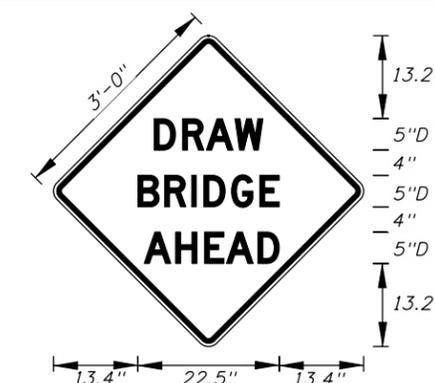
ARROW BODY						
A	B	C	D	E	F	G
6.25	3.125	3.125	3.125	5	9.25	20.5

ARROW HEAD				
A	B	C	D	E
3.125	3.625	6.375	.5	.625



FTP-83-08  
10'-0" X 5'-0"  
8" Radii  
10" Series E Legend  
Green Background  
White Legend



FTP-84-09  
3' X 3'  
1.5" Radii  
5" Series D Legend  
Yellow Background  
Black Legend



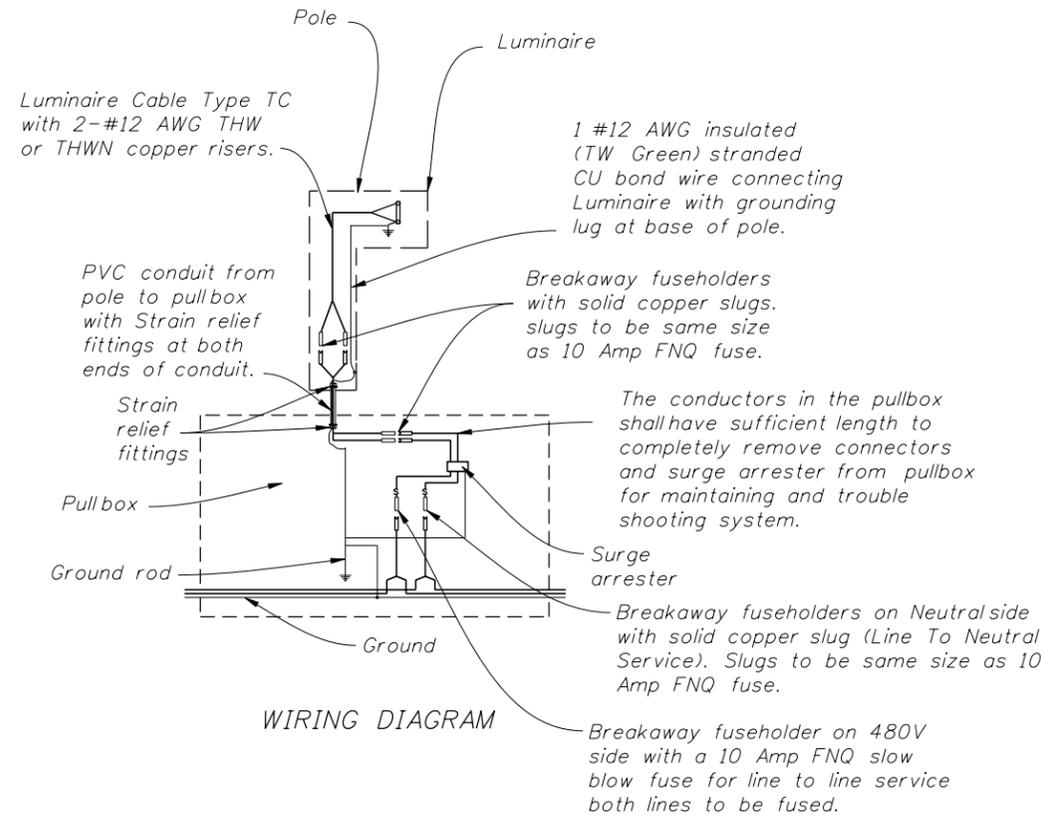
2010 Interim Design Standard

SPECIAL SIGN DETAILS

Interim Date: 07/01/10  
Sheet No.: 9 of 11  
Index No.: 17355

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
02/19/10	C.H.	FTP-84-09 (DRAW BRIDGE AHEAD) sign added to sheet.			



WIRING DIAGRAM

NOTES:

1. Barrier wall or bridge mounted poles: The wiring shall be in accordance with Section 992 of the Standard Specifications.

Provide cable length to remove fuseholders from transformer base, pole base or pullbox for maintenance. Remove slack from the luminaire cable to provide tension on the fuseholders if the pole breaks away. Pull excess cable into pullbox tighten strain relief fittings or cable clamps at both ends of conduit to prevent cable from slipping.

Breakaway fuseholders with solid copper slugs. Slugs to be same size as 10 Amp FNQ fuse.

Breakaway fuseholder on 480V side with a 10 Amp FNQ slow blow fuse for line to line service both lines to be fused.

Breakaway fuseholders on Neutral side with solid copper slug (Line To Neutral Service). Slugs to be same size as 10 Amp FNQ fuse.

1 #6 AWG insulated (TW Green) stranded CU bond wire connecting all poles, and insulated (THW or THWN) stranded copper circuit conductors in schedule 40 PVC conduit. Circuit conductors and conduit size as shown in plans. (Typical)

12" bed of Pearrock or crushed stone for drainage.

#6 TW Green Ground Wire

U.L. approved Ground Rod 5/8" diameter 20' long copper clad with approved ground connection (At all pullboxes)

1 #12 AWG insulated (TW Green) stranded CU bond wire connecting Luminaire with grounding lug at base of pole.

Luminaire Cable Type TC with 2-#12 AWG THW or THWN copper risers.

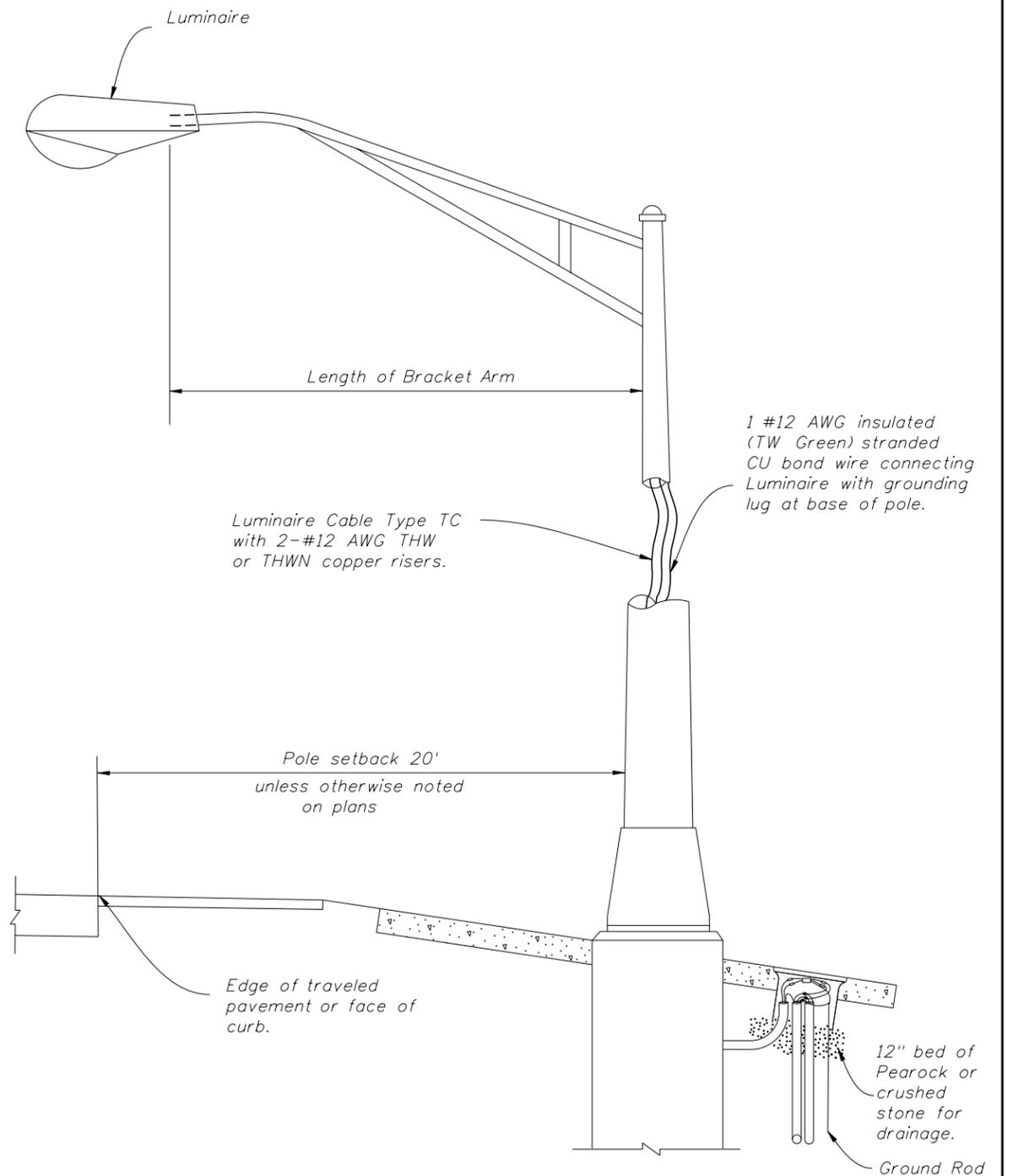
Breakaway fuseholders with solid copper slugs. Slugs to be same size as 10 Amp FNQ fuse.

1 #6 AWG insulated (TW Green) Stranded CU ground wire

Ground lug located opposite handhole.

1" PVC conduit with 1-#6 AWG insulated (TW Green) Stranded CU ground wire TC Type Cable and 2-#12 AWG THW or THWN TC Type stranded copper risers.

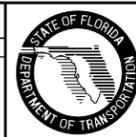
METAL POLE WIRING DETAIL



METAL POLE DETAIL

WIRING DETAILS

REVISIONS			
DATE	BY	DESCRIPTION	
06/22/10	C.H.	Removed Grounding Conduit Between PullBox and Pole. Ran Ground Wire in Conduit with Hot and Neutral Wires.	



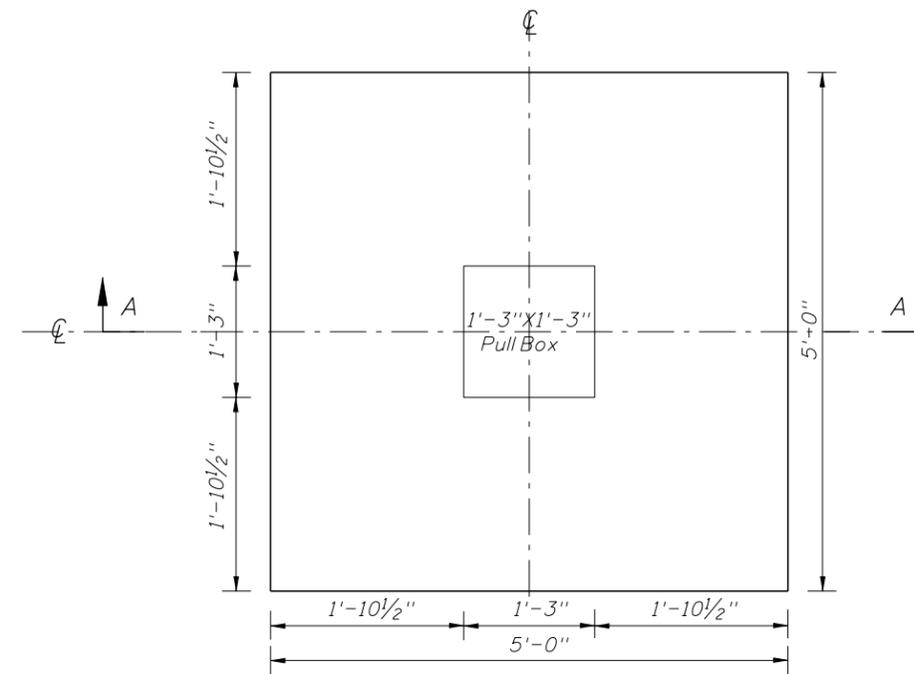
2010 Interim Design Standard

CONVENTIONAL LIGHTING

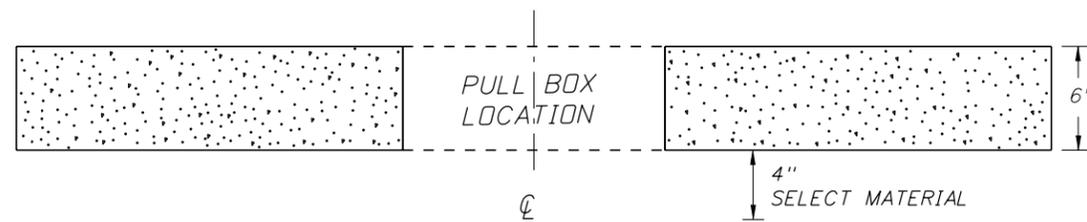
Interim Date	Sheet No.
07/01/10	1 of 3
Index No.	
17500	

NOTES:

1. Use compacted select material in accordance with Index 505.
2. Concrete shall be Class NS with a minimum strength at 28 days of  $f'c=2.5$  ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pullbox shown is 1'-3" x 1'-3"; others approved under Section 635 of the Standard Specifications may be used.
5. Slabs to be placed around all Poles and Pull Boxes in rural locations. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around pullboxes shall be included in the price of pull box.



SLAB DIMENSIONS



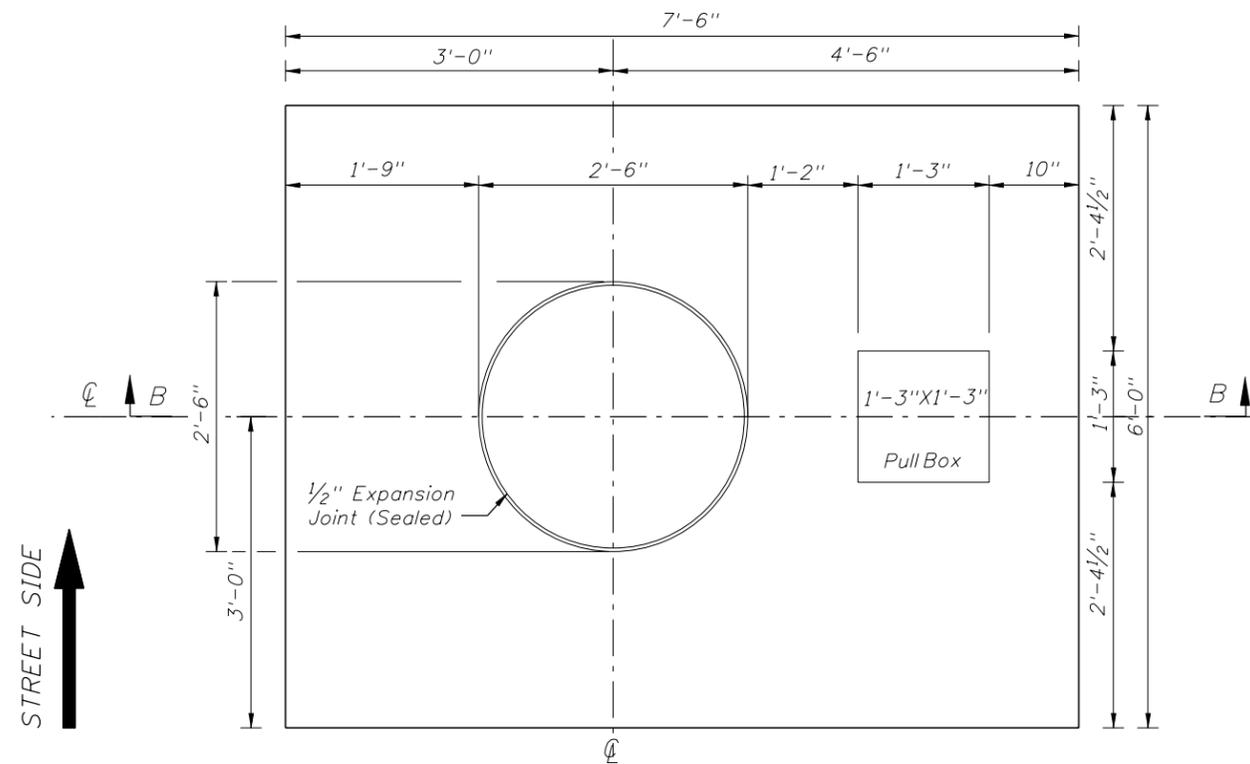
SECTION A-A

SLAB DETAILS FOR INTERMEDIATE PULLBOX LOCATIONS

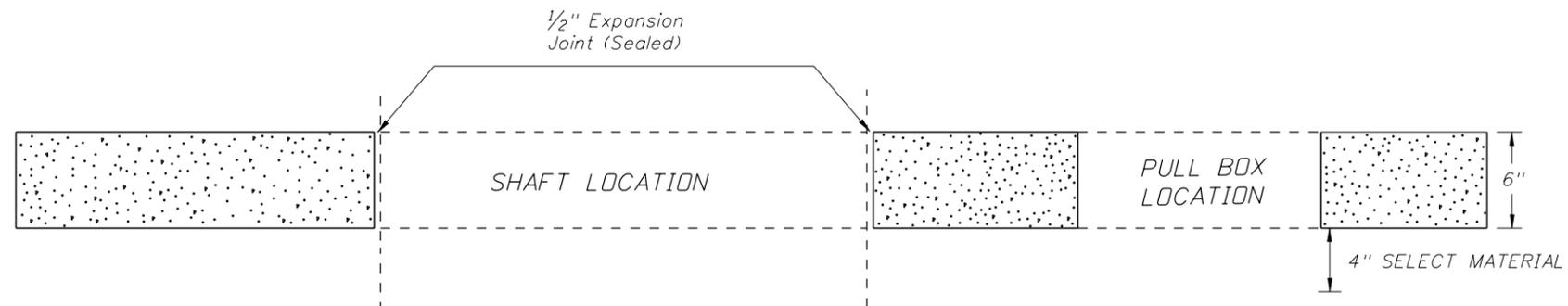
REVISIONS							2010 Interim Design Standard  <b>CONVENTIONAL LIGHTING</b>	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			07/01/10	2 of 3
06/10/10	C.H.	Reinforcing removed from slabs, notes revised, new dimensions were added to slab dimensions.					Index No. <b>17500</b>		

**NOTES:**

1. Use compacted select material in accordance with Index 505.
2. Concrete shall be Class NS with a minimum strength at 28 days of  $f'c=2.5$  ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pullbox shown is 1'-3" x 1'-3"; others approved under Section 635 of the Standard Specifications may be used.
5. Slabs to be placed around all Poles and PullBoxes in rural locations. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around poles and pullboxes shall be included in the price of pole or pullbox.
7. The 1/2" thick expansion joint between the pole shaft and slab shall be sealed with a hot poured elastic joint sealer.



SLAB DIMENSIONS



SECTION B-B

SLAB DETAILS FOR POLE AND PULL BOX LOCATIONS

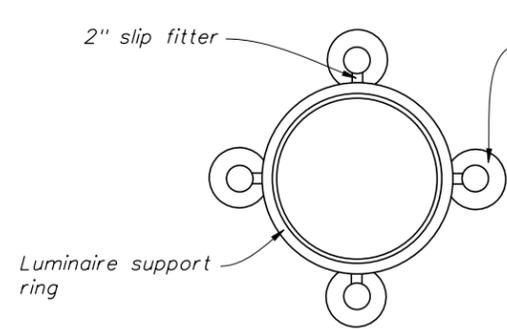
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
06/10/10	C.H.	Reinforcing removed from slab, notes revised, new dimensions were added to slab dimensions.			



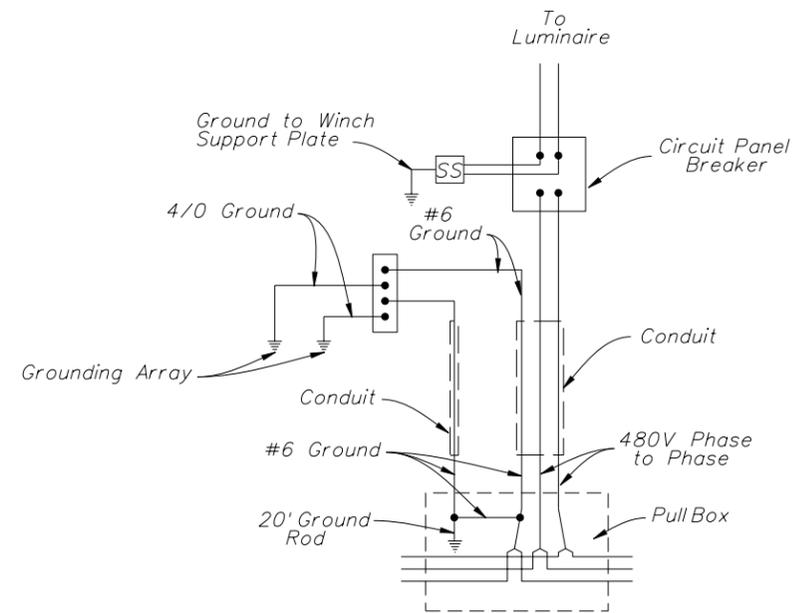
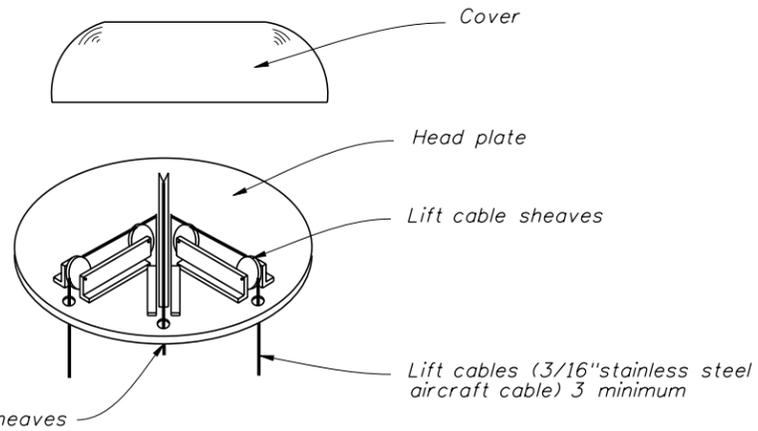
2010 Interim Design Standard

**CONVENTIONAL LIGHTING**

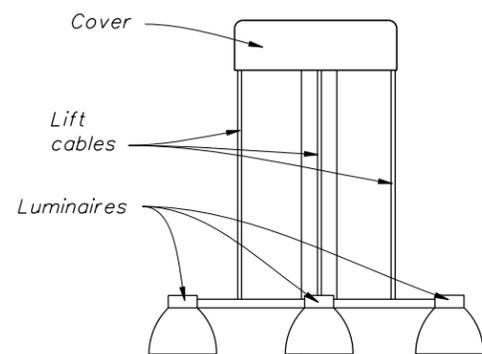
Interim Date	Sheet No.
07/01/10	3 of 3
Index No.	
17500	



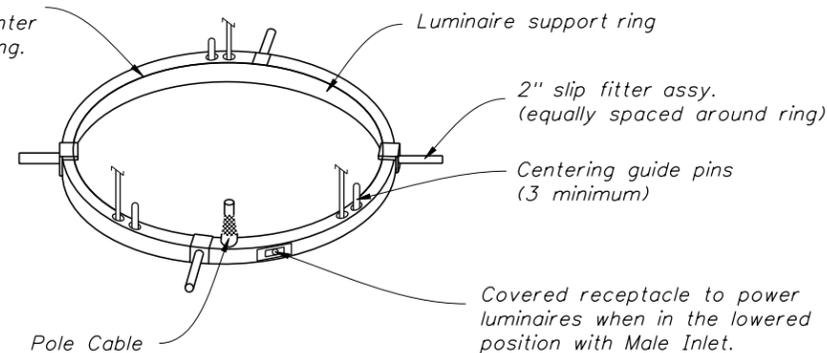
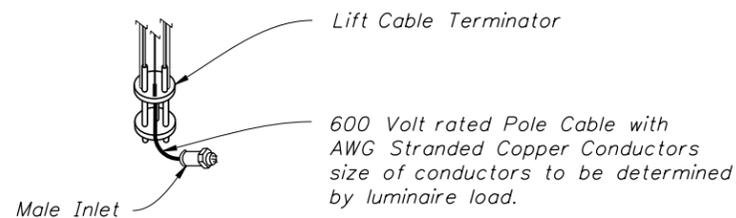
See legend for number of luminaires, lamp wattage and light distribution.



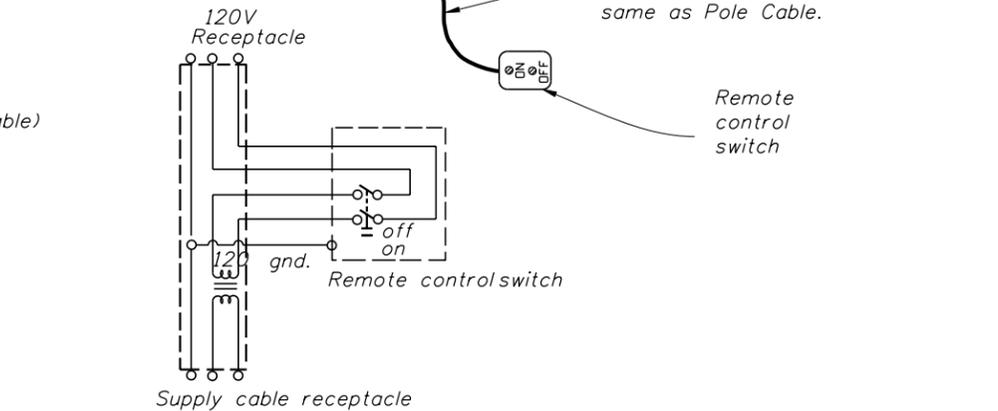
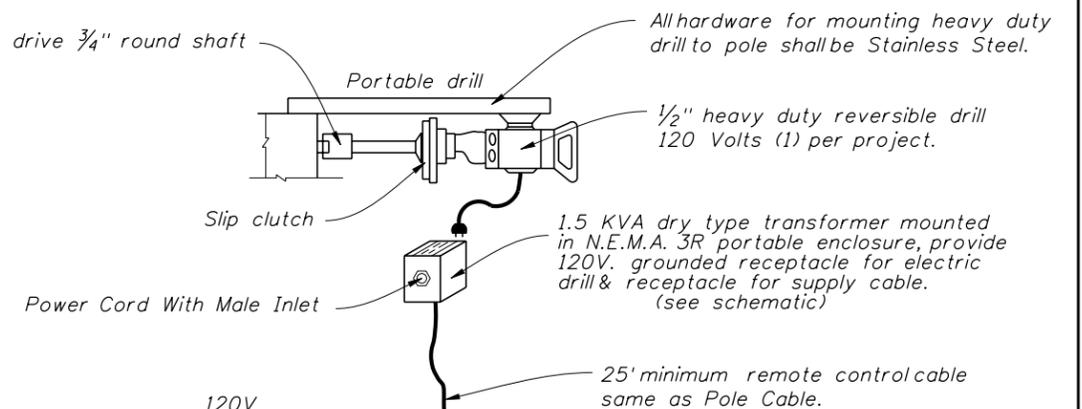
HIGH MAST POLE WIRING DIAGRAM



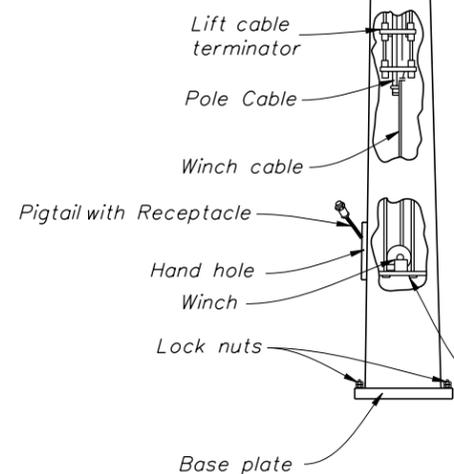
Spring supported centering arms provided to center the luminaire ring.



5/8" hex drive 3/4" round shaft

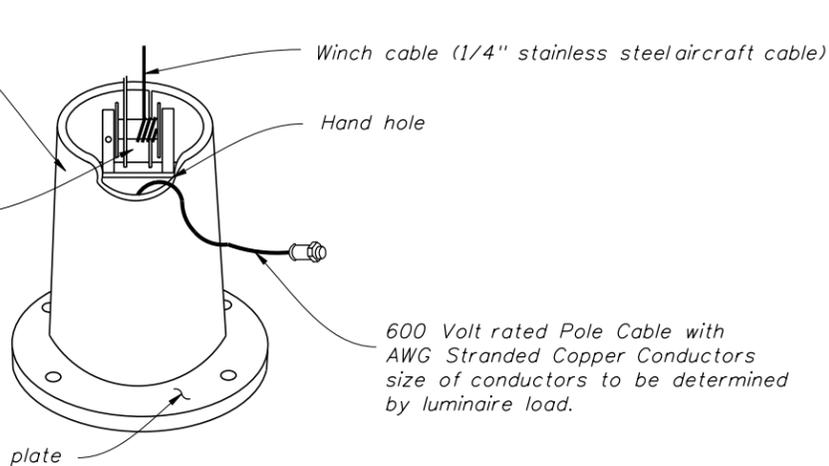


SCHEMATIC OF REMOTE AUXILIARY POWER UNIT



Positive drive reversible winch. The complete enclosed drum gear shall directly mesh with the worm gear train, in the same enclosure.

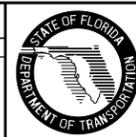
A surge protector shall be located in the pole with the circuit breaker. The surge protector shall be mounted at the front near hand hole for easy access.



LOWERING DETAILS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
04/15/10	C.H.	HIGH MAST POLE WIRING DIAGRAM added to sheet.			



2010 Interim Design Standard

HIGHMAST LIGHTING

Interim Date 07/01/10  
Sheet No. 2 of 7  
Index No. 17502

HIGHMAST LIGHTING NOTES:

- 1) High Mast materials:
  - a. Pole: ASTM A1011 Grade 50, 55, 60 or 65 (Less than 1/4") or ASTM A572 Grade 50, 55, 60, or 65 (1/4" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield).
  - b. Steel Plates: ASTM A709 Grade 36 or ASTM A36
  - c. Weld Metal: E70XX
  - d. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563, Grade A heavy-hex nuts and plate washer.
  - e. Handhole: ASTM A709 Grade 36 or ASTM A36 Frame with ASTM A36 cover.
  - f. Caps: ASTM A1011 Grade 50, 55, 60 or 65 or ASTM B209.
  - g. Nut Covers: ASTM B26 (319-F)
  - h. Stainless Steel Screws: AISI Type 316
- 2) Reinforcing steel: ASTM A615, Grade 60.
- 3) Concrete: Class IV (Drilled Shaft) with a minimum 4,000 psi compressive strength at 28 days for all environmental classifications.
- 4) Welding: American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (Current edition).
- 5) Galvanization:
  - a. Nuts, Bolts, Washers and Threaded Bars/Studs: ASTM F2329.
  - b. Other items (Including Pole): ASTM A123
- 6) Hole diameters for anchor bolts: not greater than the bolt diameter plus 1/2".
- 7) Poles: Tapered with the diameter changing at a rate of 0.14 inch per foot with a minimum 16-sided pole shaft and only one longitudinal seam weld. Circumferentially welded pole shaft butt splices and laminated pole shafts are not permitted. Longitudinal seam welds within 6 inches of pole to base must be complete penetration welds. Longitudinal seam welds at telescopic field joints must be complete penetration welds for the splice length plus 6 inches.
- 8) One hundred percent of full-penetration groove welds and a random 25 percent of partial penetration groove welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive methods of radiography or ultrasonics.
- 9) Furnish each pole with a 2"x4" (max.) aluminum identification tag. Submit details for approval. Secure to pole with 0.124" stainless steel rivets or screws. Locate identification tag on the inside of pole and visible from handhole. Include the following information: Financial Project ID, Pole Mounting Height, Manufacturer's Name, Certification Number and QPL Number.
- 10) Manufacturers seeking approval of a Highmast Lighting structural assembly (exclude lowering system) for inclusion on the Qualified Products List must submit a QPL Production Evaluation Application along with drawings showing the product meets all specified requirements of this Index.
- 11) Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location ± two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.

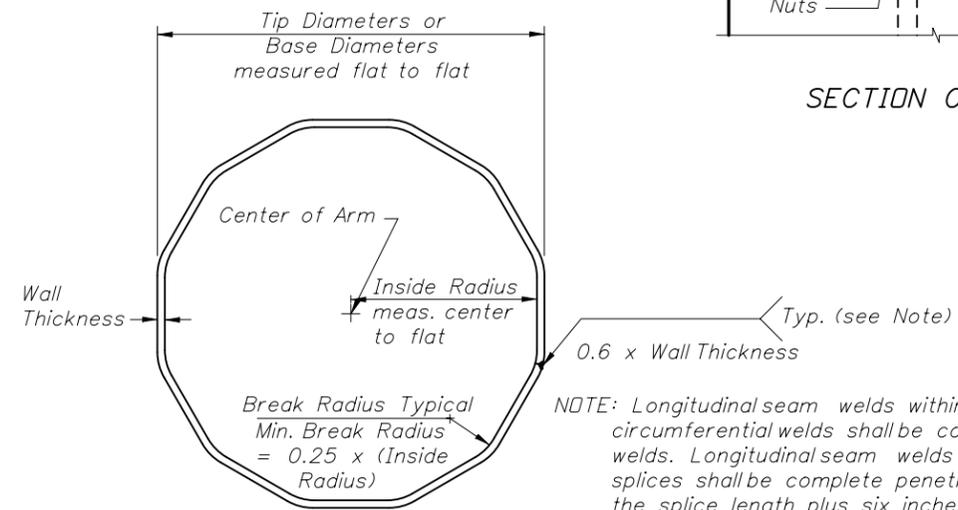
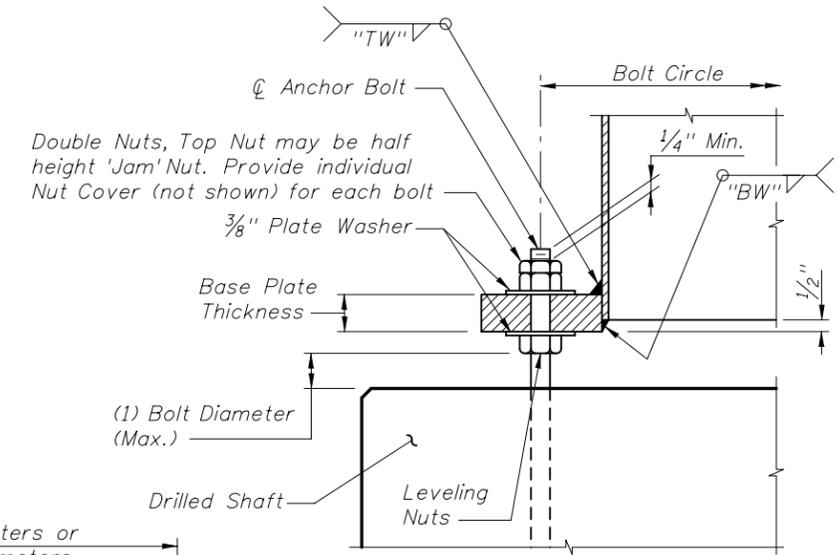
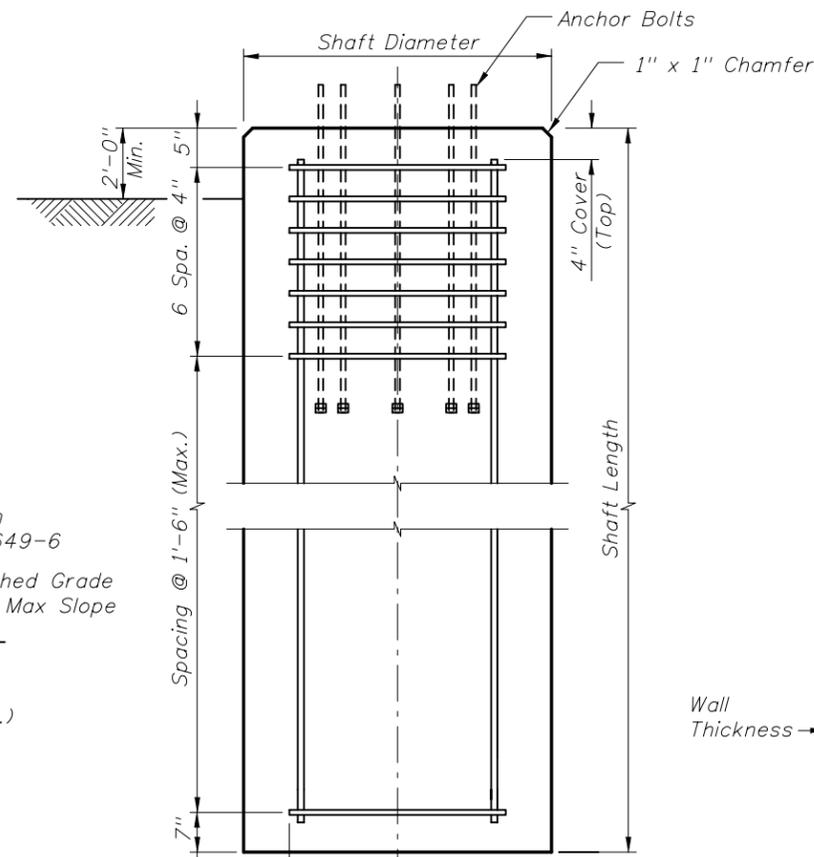
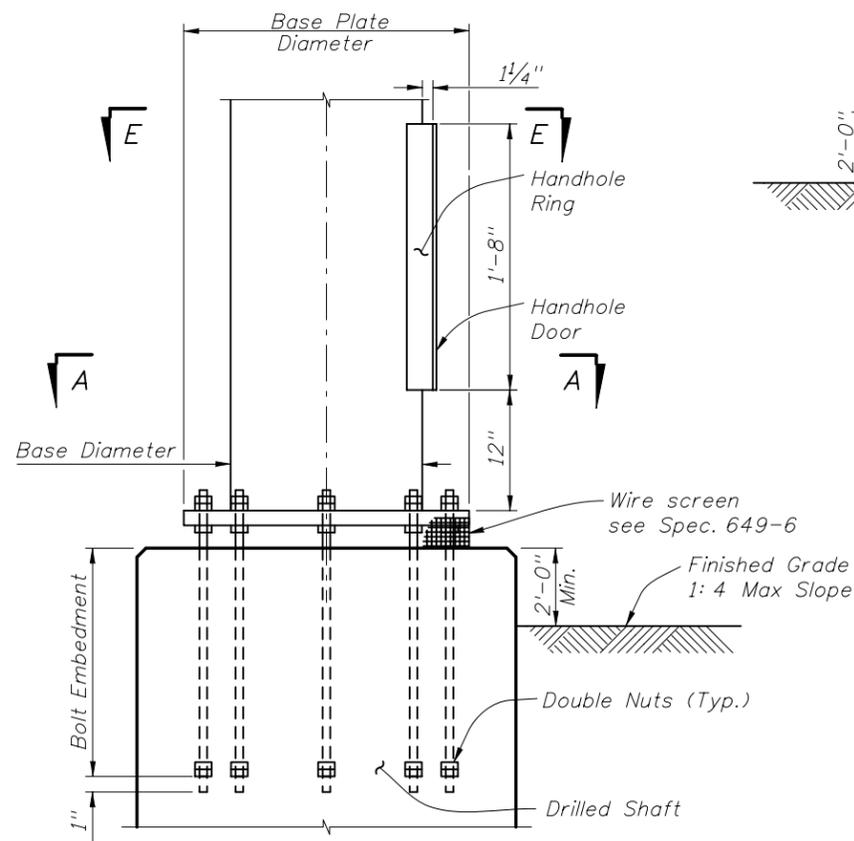
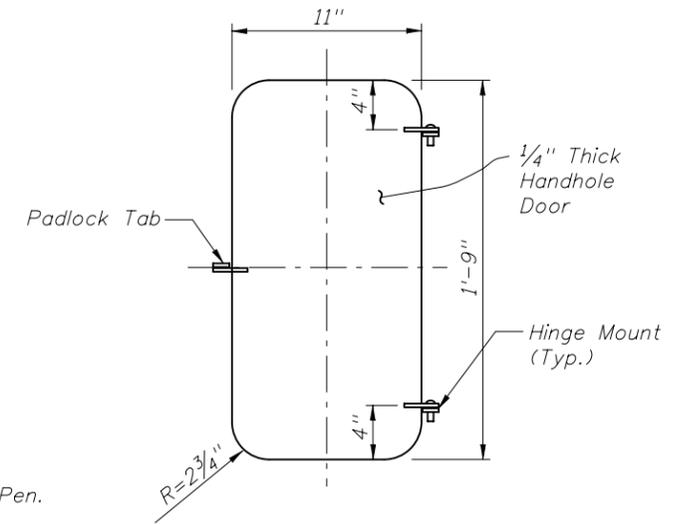
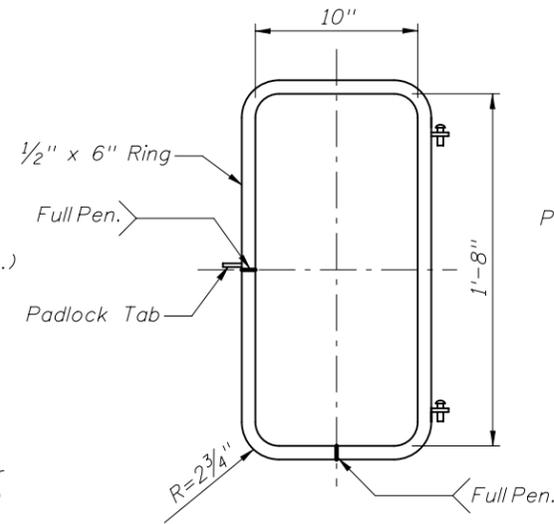
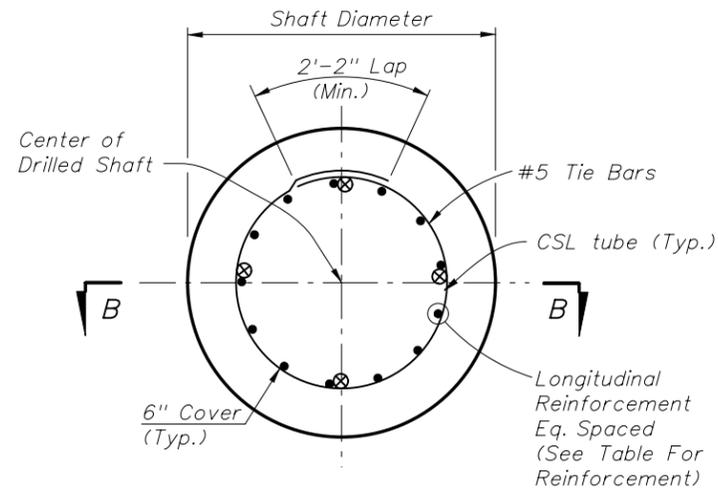
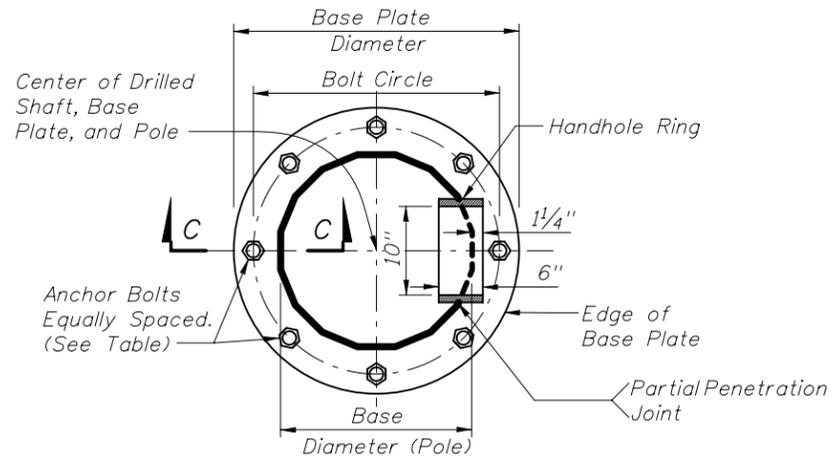
DESIGN CRITERIA:

- 1) Designed in accordance with the FDOT Structures Manual.
- 2) Poles are designed to support the following:
  - a. (1) cylindrical head assembly with a maximum effective projected area of 6 Sq. ft. (Cd=1) and 340 lbs (Max).
  - b. (8) cylindrical luminaires with a maximum effective projected area of 3.0 Sq. ft (Cd=0.5) and 77 lbs. each.
- 3). Foundation design based upon the following soil criteria:
  - Classification = Cohesionless (Fine Sand)
  - Friction Angle = 30 Degrees (30°)
  - Unit Weight = 50 lbs./cu. Ft. (assumed saturated)

Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.
- 4) Foundation applies only to slopes of 1:4 or flatter. Provide a minimum 24" shaft projection on the high side.
- 5) Poles are designed for 6 mil galvanization thickness.

STANDARD POLE DESIGN NOTES

REVISIONS							2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION					
07/01/10	DYW	Modified washer specification.				<h2 style="margin: 0;">HIGHMAST LIGHTING</h2>	07/01/10	3 of 7	Index No. <b>17502</b>	

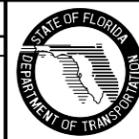


NOTE: Longitudinal seam welds within six inches of circumferential welds shall be complete penetration welds. Longitudinal seam welds at telescopic field splices shall be complete penetration welds for the splice length plus six inches.

POLE FOUNDATION

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	DYW	Modified longitudinal seam weld note & washer thickness.			



2010 Interim Design Standard

HIGHMAST LIGHTING

Interim Date

07/01/10

Sheet No.

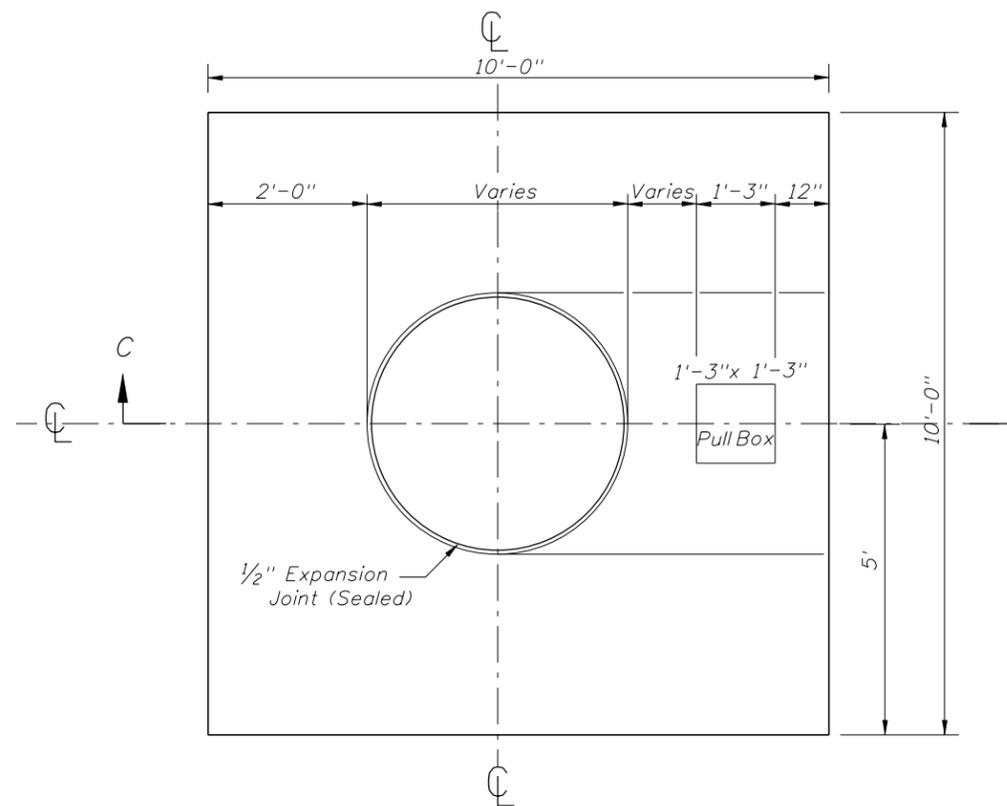
5 of 7

Index No.

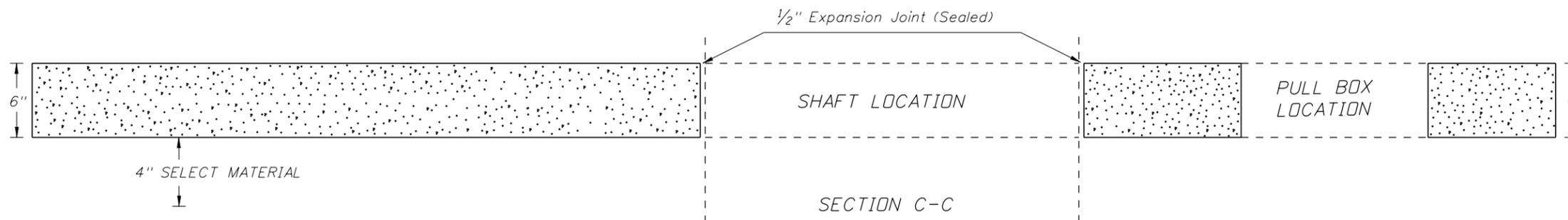
17502

**NOTES:**

1. Use compacted select material in accordance with Index 505.
2. Concrete shall be Class NS with a minimum strength at 28 days of  $f'c=2.5$  ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is 1'-3" x 1'-3"; others approved under Section 635 of the Standard Specifications may be used.
5. Slabs to be placed around all Poles and Pull Boxes in rural locations. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around poles and pull boxes shall be included in the price of pole or pull box.
7. The 1/2" thick expansion joint between the pole shaft and slab shall be sealed with a hot poured elastic joint sealer.

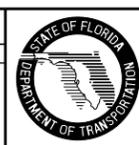


SLAB DIMENSIONS



SLAB DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
06/10/10	C.H.	Reinforcing removed from slab, notes revised, new dimensions were added to slab dimensions.			



2010 Interim Design Standard  
**HIGHMAST LIGHTING**

Interim Date	Sheet No.
07/01/10	7 of 7
Index No.	
17502	

SIGN LIGHTING INSTALLATION

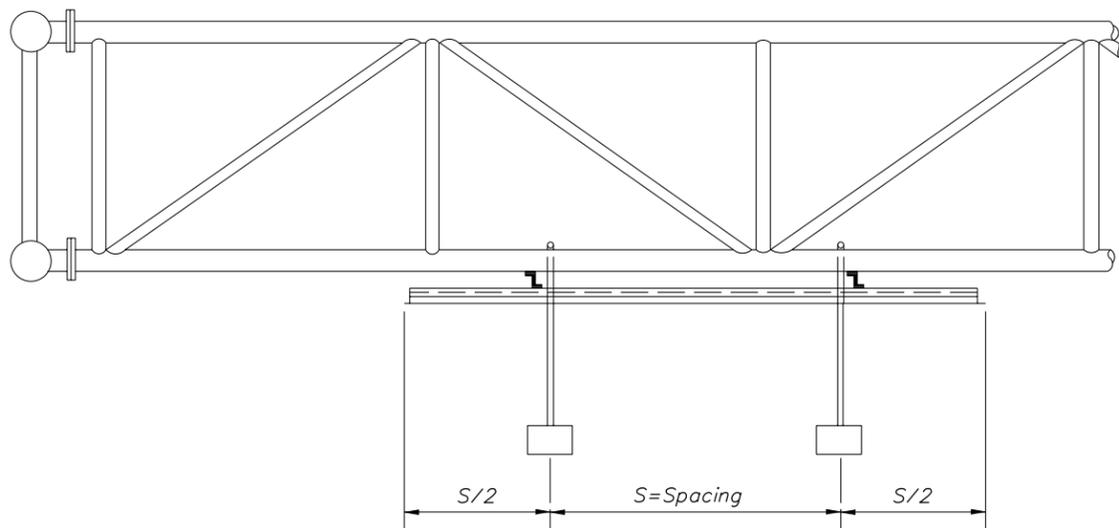
Roadway Lighting included in contract:

The power for the sign lighting shall be provided from the roadway lighting circuit. The lighting plans shall indicate the sign location and a pullbox location for connection to the sign lights. The lighting contractor shall install pullbox and loop 2' of lighting circuit conductors in the pullbox for connection by the signing contractor

The signing contractor shall furnish and install luminaires, Nema 3R enclosure, 30 amp breaker, conduit, conductors and all other electrical equipment necessary for connection to the lighting circuit.

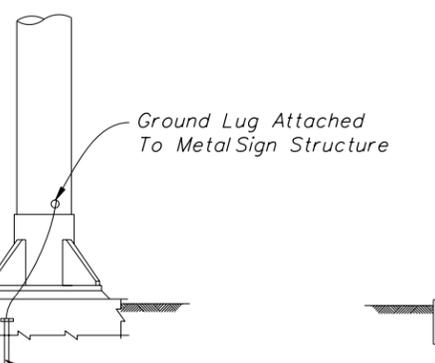
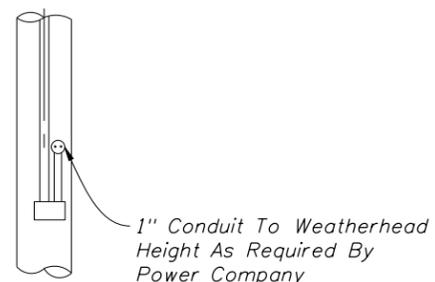
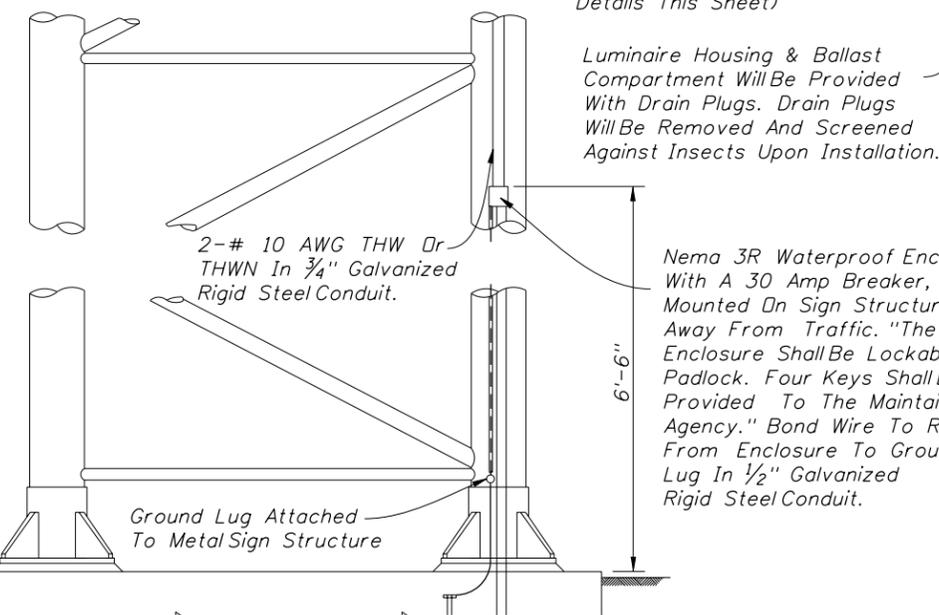
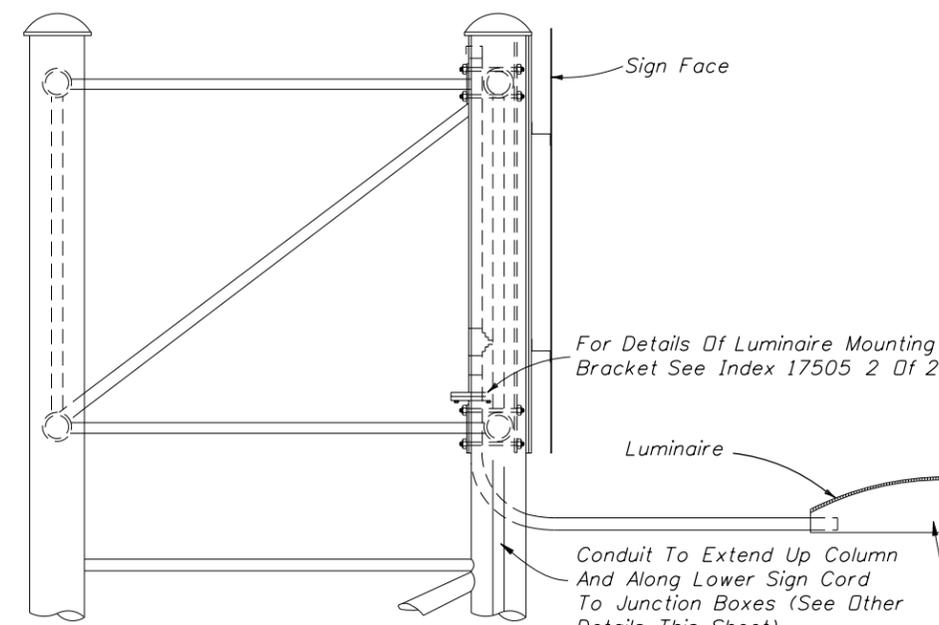
Roadway Lighting not included in contract:

The signing plans shall include pay item numbers to furnish and install conduit, conductors, ground rods, pullboxes and service point equipment. The signing plans shall indicate the location of the service point equipment and circuit runs. The signing contractor shall provide all electrical equipment necessary for connection of the sign lights.



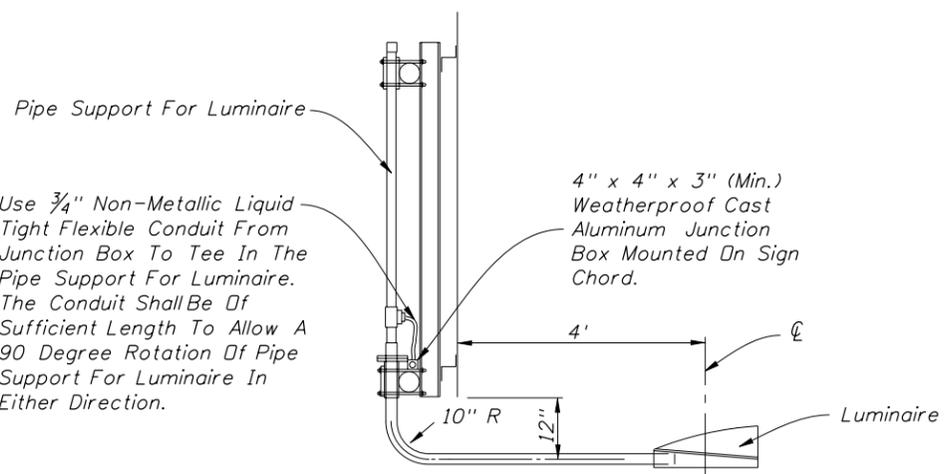
PLACEMENT OF SIGN LIGHTS

1. Luminaire shall be mounted so the lamp center is 4' in front of the sign face.
2. Luminaire shall be mounted so the back of the fixture is placed 1' below the bottom edge of the sign face.
3. Luminaires from manufacturers who recommended their fixture be tilted shall be mounted on a bracket which provides this recommended tilt.
4. Photometric data for the Induction luminaire proposed for sign lighting shall be submitted for approval to the District Lighting Engineer, Florida Department Of Transportation.



PLAN OVERHEAD POWER SUPPLY

U.L. Approved Ground Rod 5/8" x 20' Copper Clad With Approved Ground Connection To Be Placed In Pull Box For Inspection Purposes. Splices To Be Made With Compression Sleeves Then Properly Insulated & waterproofed



REVISIONS

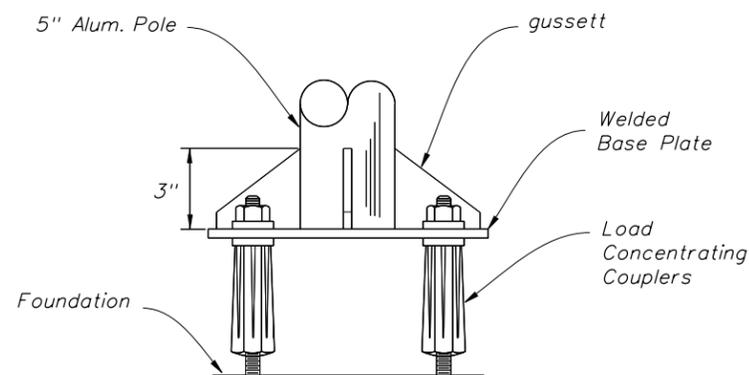
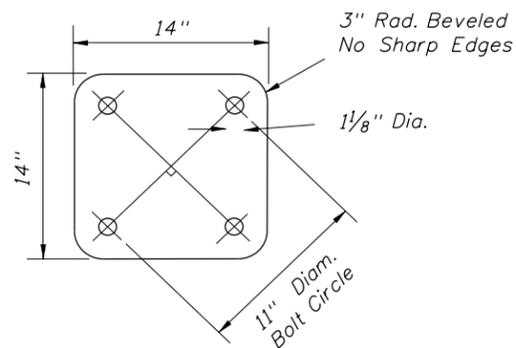
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
05/20/10	C.H.	Revised Notes and Detail in lower left PLAN OVERHEAD POWER SUPPLY.			



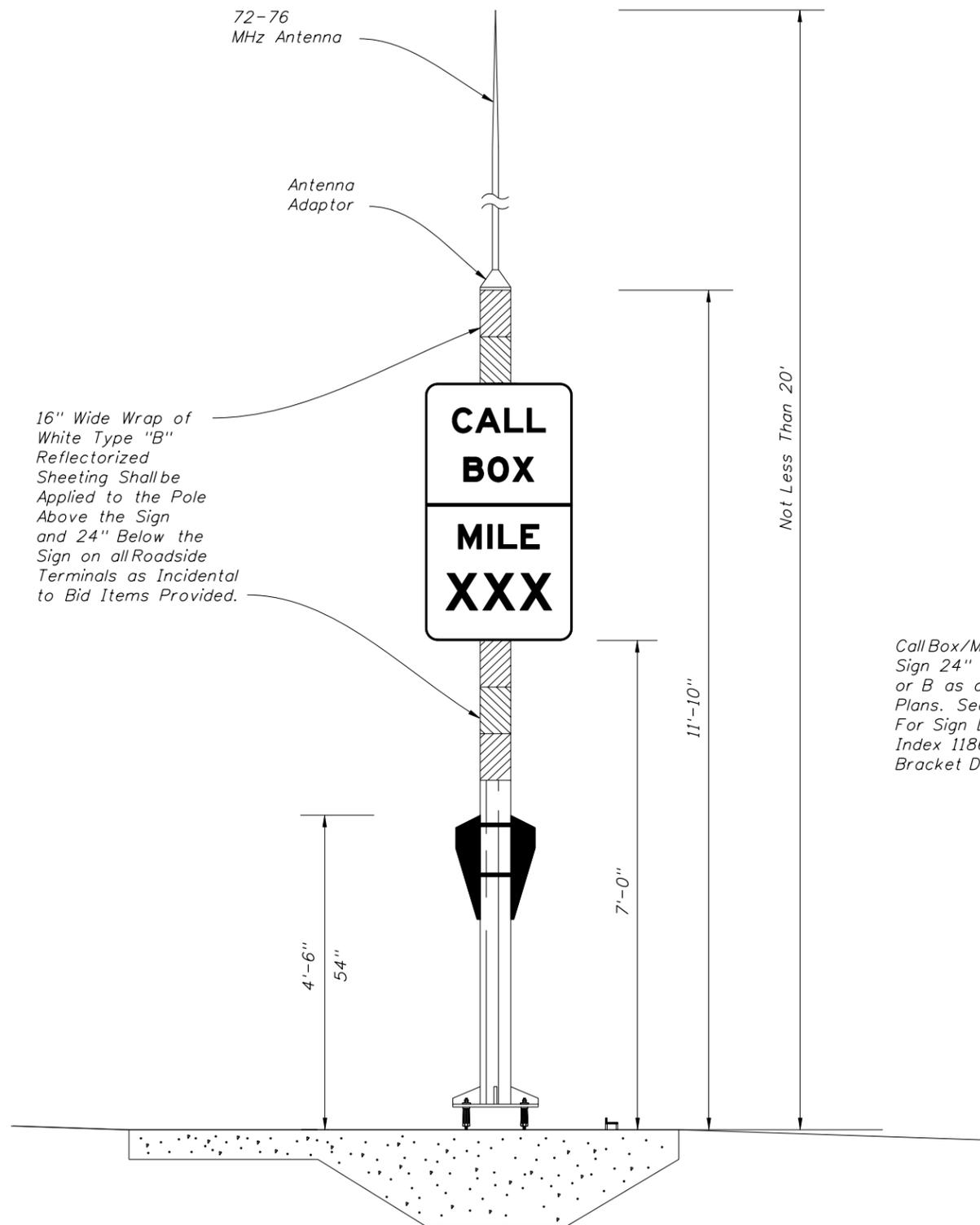
2010 Interim Design Standard

EXTERNAL LIGHTING FOR SIGNS

Interim Date	Sheet No.
07/01/10	1 of 2
Index No.	
17505	



BASE PLATE & BOLT PATTERN



See Sheet 3 of 3 for Concrete Pad Details.

TYPICAL MOTORIST AID CALL BOX TERMINAL



FTP-63-06 SIGN A

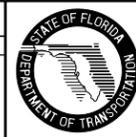


FTP-64-06 SIGN B

Call Box/Mile Marker Sign 24" X 42". Sign A or B as called for in Plans. See Index 17355 For Sign Details and Index 11860 for Sign Bracket Details.

REVISIONS

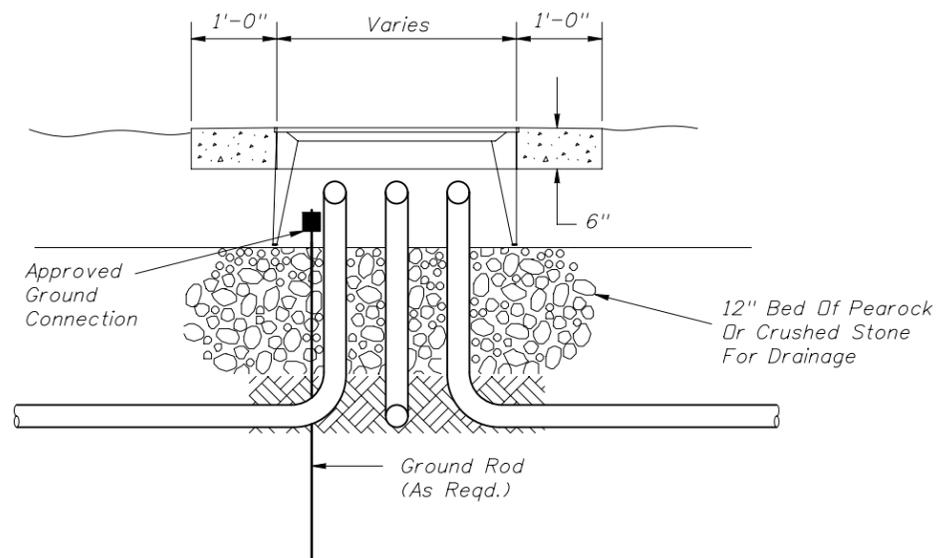
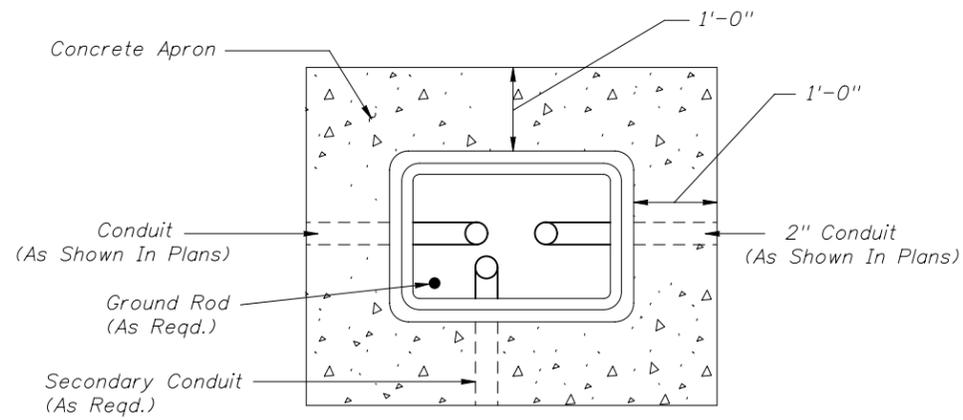
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
05/07/10	C.H.	Type ** deleted form CallBox / Mile Marker note.			



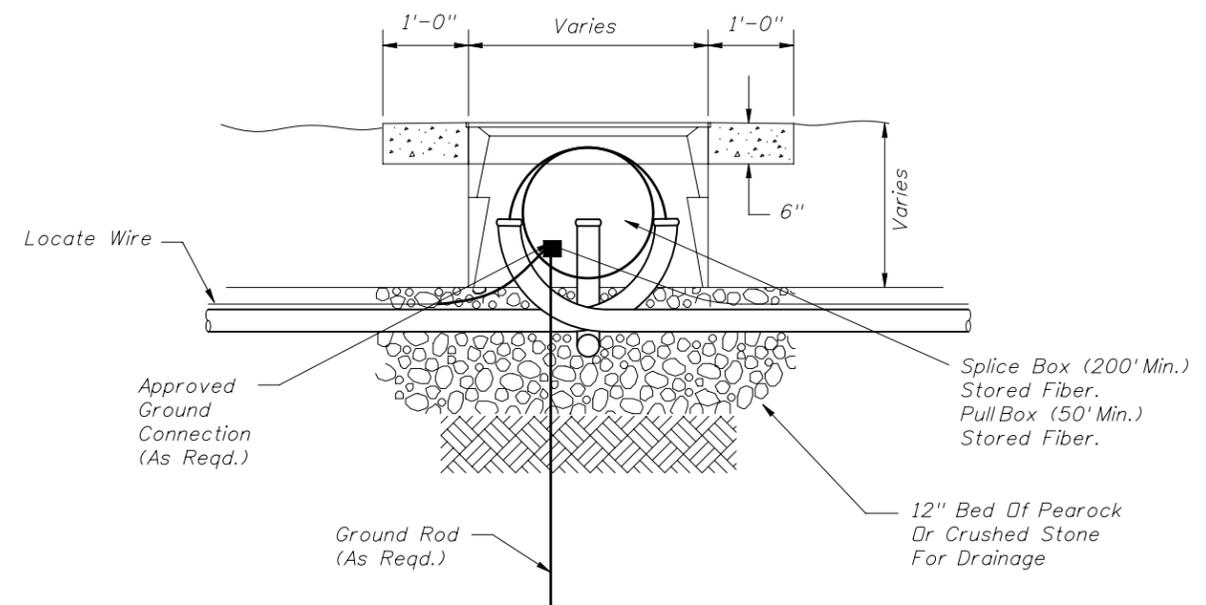
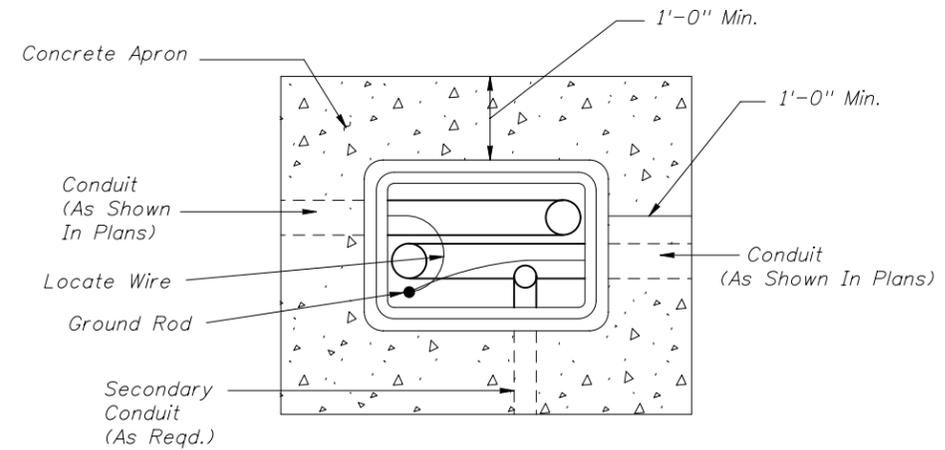
2010 Interim Design Standard

MOTORIST AID CALL BOX

Interim Date	Sheet No.
07/01/10	1 of 3
Index No.	
17600	



**PULL BOX**



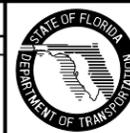
**FIBER OPTIC BOX**

1. Boxes shall not be installed in roadways or driveways.
2. Box shall be on the Approved Products List.
3. Boxes shall be installed flush with the finished grade surface.
4. All splice boxes shall be provided with cable hanger racks designed to support cables and splice enclosures. Cost of racks to be included in cost of splice box.
5. Fiber optic boxes shall contain only Fiber Optic Cable, Conduit, and Locate Wire.
6. Conduit center line shall be aligned to top edge of box to facilitate cable pulling.

7. All boxes shall have 1'-0" wide (min) concrete apron. Aprons shall be sloped away from box. Cost of apron to be included in the cost of each box.
8. Prevent the ingress of Water, Dirt, Sand, and other foreign materials into the conduit prior to, during and after construction using a foam-sealing material, rubber plug, or other device designed for this application and approved.
9. The use of ground rods shall be shown in the plans.
10. Concrete for concrete aprons shall be Class NS with a minimum strength at 28 days of f'c=2.5 Ksi.

**REVISIONS**

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	CH	New sheet added to Standards (07/01/10)			



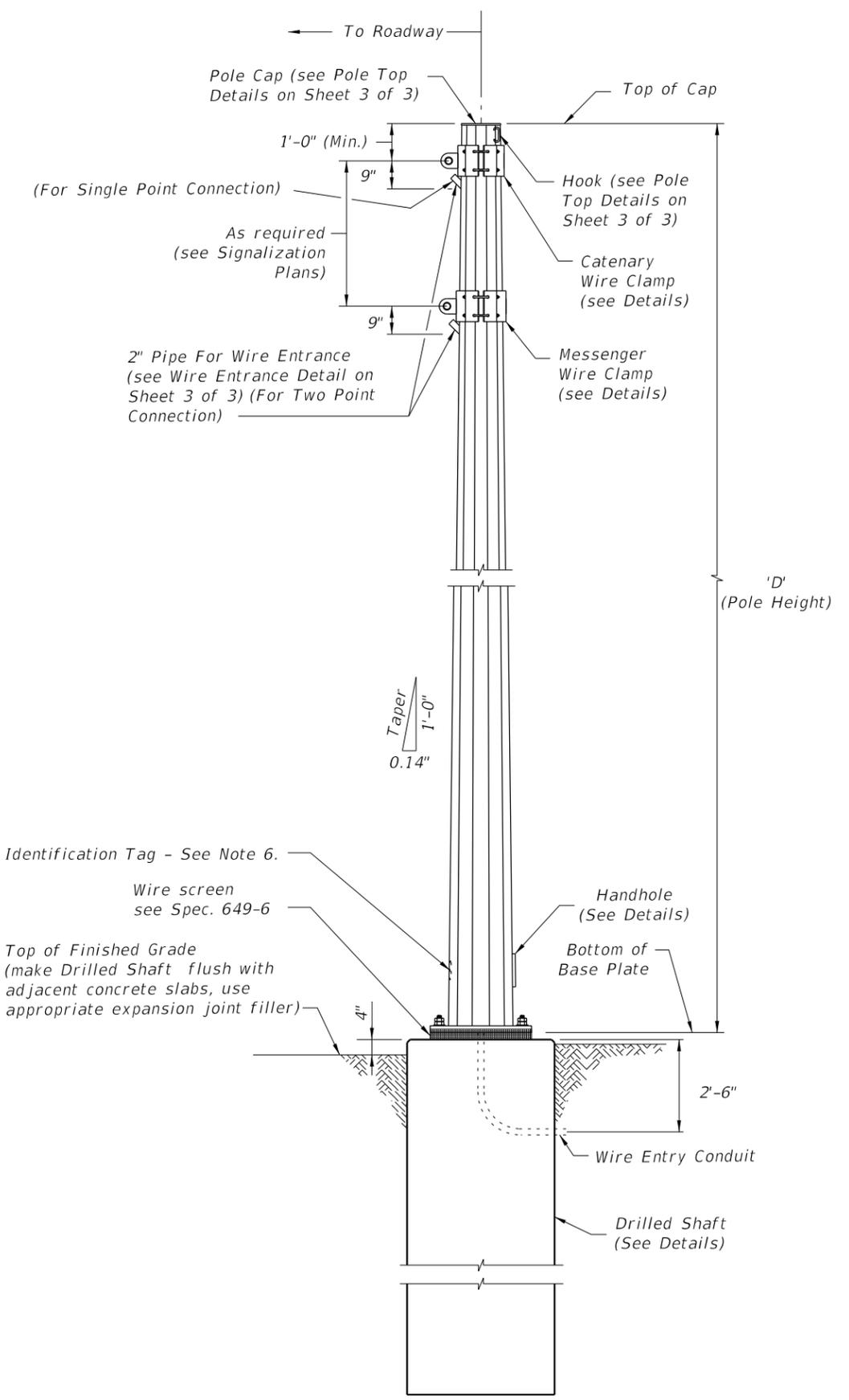
2010 Interim Design Standard

**PULL, SPLICE, AND JUNCTION BOX DETAILS**

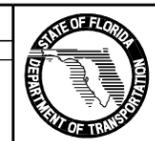
Interim Date	Sheet No.
07/01/10	1 of 1
Index No.	
17700	

**STEEL STRAIN POLE NOTES**

- 1) Designed in accordance with FDOT Structures Manual (current edition) and the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" with Interims.
- 2) Perform all welding in accordance with the American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). No Field welding is permitted on any part of the pole.
- 3) See Standard Index No. 17727 for grounding and span wire details.
- 4) Foundation Materials:
  - a. Reinforcing Steel: ASTM A615 Grade 60.
  - b. Concrete: Class IV, (Drilled Shaft) 4,000 psi (f'c) minimum Compressive Strength at 28-days for all environmental classifications.
  - c. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade A heavy-hex nuts and plate washers (all galvanized in accordance with ASTM F2329).
- 5) Strain Pole Specifications:
  - a. Poles: ASTM A1011 Grade 50, 55, 60 or 65 (less than 1/4") or ASTM A572 Grade 50, 55, 60, or 65 (1/4" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield).
  - b. Steel Plates: ASTM A36.
  - c. Weld Metal: E70XX.
  - d. Bolts: A325, Type 1. Hole Diameter: Bolt diameter plus 1/16".
  - e. Base Plate: Hole Diameter; anchor bolt diameter plus 1/2".
  - f. Handhole: Frame; ASTM A709 Grade 36 or ASTM A36, Cover; ASTM A1011 Grade 50, 55, 60 or 65.
  - g. Aluminum Caps and Covers: ASTM B-26 (319-F).
  - h. Stainless Steel Screws: AISI Type 316.
  - i. Galvanization: All nuts, bolts and washers; ASTM F2329, All other steel; ASTM A123.
- 6) Pole Notes:
  - a. See the Signalization Plans for clamp spacing, cable sizes and forces, signal and sign mounting locations and details.
  - b. Tapered with the diameter changing at a rate of 0.14 inch per foot.
  - c. Transverse welds are allowed only at the base.
  - d. Poles constructed out of two or more sections with overlapping splices are not permitted.
  - e. Locate the handhole 180 degrees from 2-inch wire entrance pipe.
  - f. Furnish each pole with a 2"x4" (max) aluminum identification tag. Submit details for approval. Secure to pole with 0.125" stainless steel rivets or screws. Locate Identification Tag on the inside of pole and visible from handhole. Include the following information: Financial Project ID, Pole Type, Pole Height, Manufacturer's Name & Certification number and QPL number.
- 7) One hundred percent of full-penetration groove welds and a random 25 percent of partial penetration groove welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive methods of radiography or ultrasonics.
- 8) Manufacturers seeking approval of a steel strain pole assembly for inclusion on the Qualified Products List must submit a QPL Product Evaluation Application along with drawings showing the product meets all specified requirements of this Standard.
- 9) Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location ± two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.

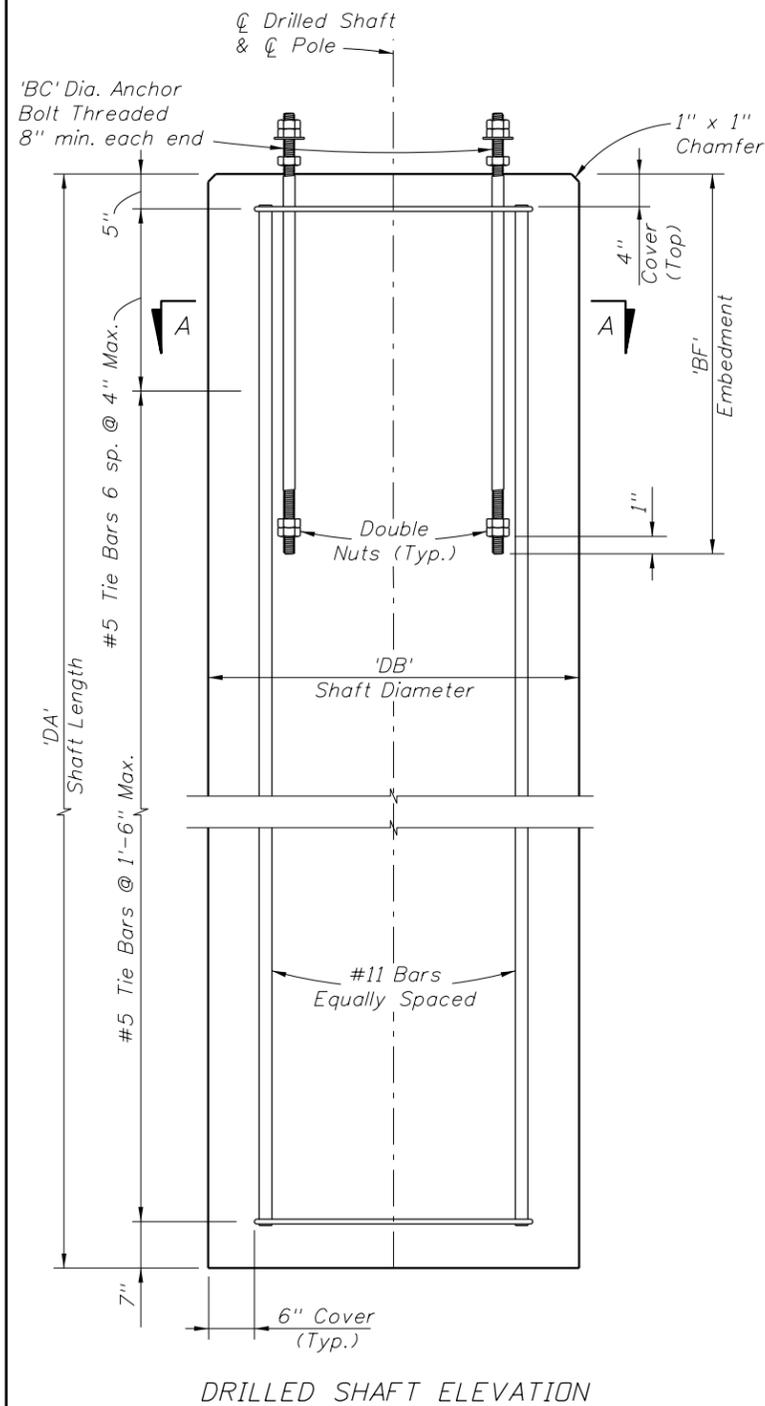


REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Added "(current edition)" and deleted edition number for Design Specification in Note 1.			
07/01/10	DYW	Modified washer specifications.			

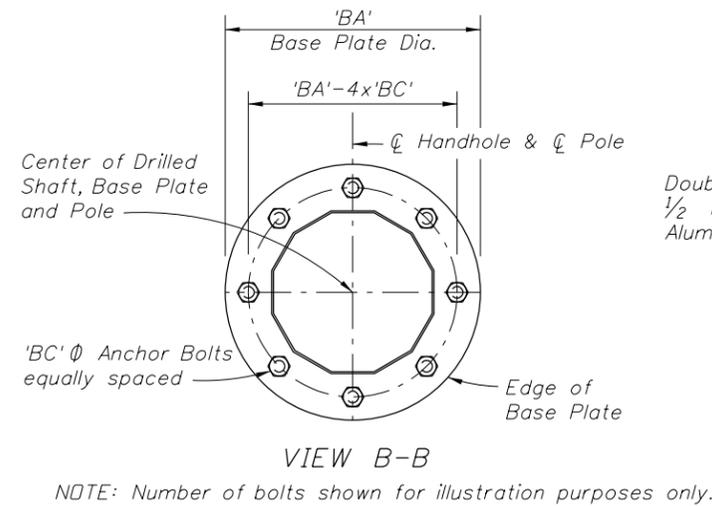


2010 Interim Design Standard  
**STEEL STRAIN POLE**

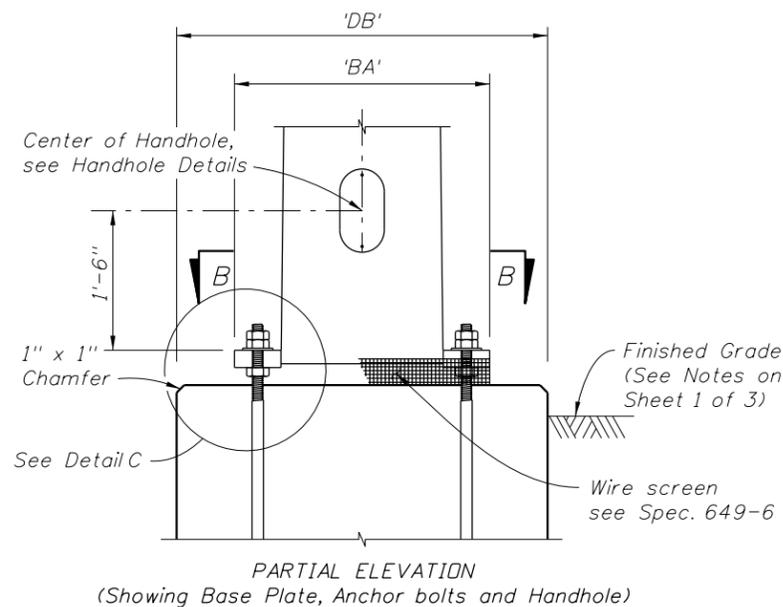
Interim Date: 07/01/10  
 Sheet No.: 1 of 3  
 Index No.: **17723**



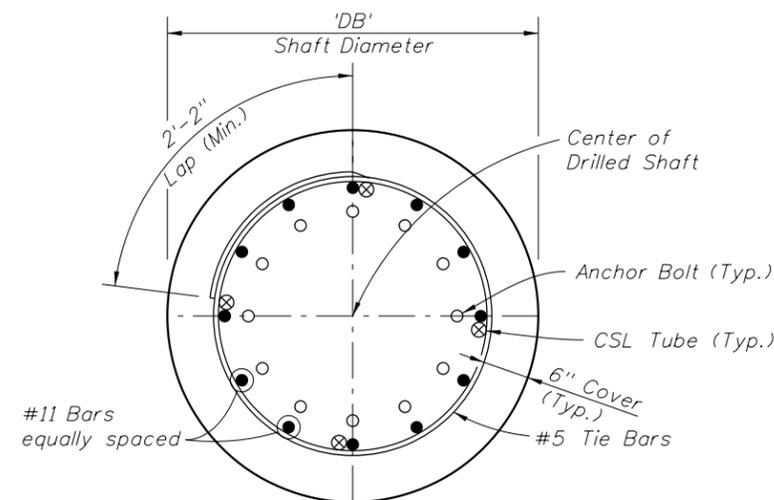
DRILLED SHAFT ELEVATION



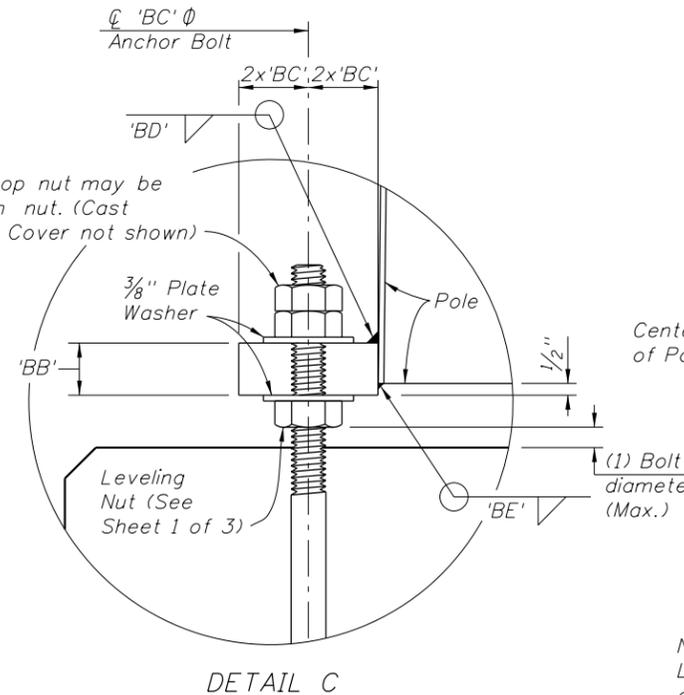
VIEW B-B  
NOTE: Number of bolts shown for illustration purposes only.



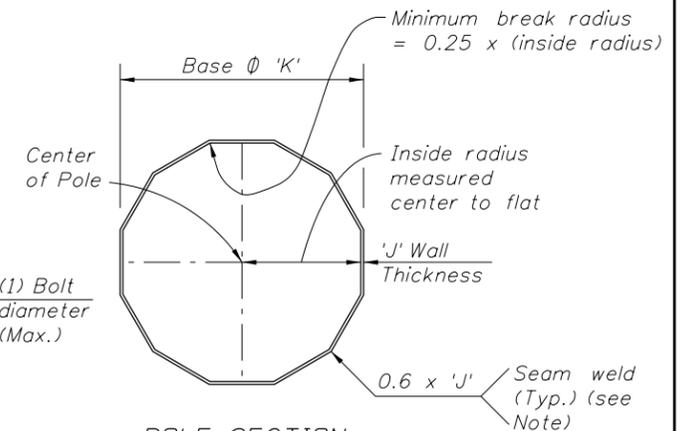
PARTIAL ELEVATION  
(Showing Base Plate, Anchor bolts and Handhole)



SECTION A-A  
(Number of bars shown is for illustration purposes only)



DETAIL C



POLE SECTION  
NOTE: Longitudinal seam welds within 6" of circumferential welds shall be complete penetration welds.

POLE TYPE	MAXIMUM ALLOWABLE MOMENT (kip-ft)	POLE									SHAFT		
		J (in.)	K (in.)	No. of Bolts	BA (in.)	BB (in.)	BC (in.)	BD (in.)	BE (in.)	BF (in.)	DA (ft)	DB (ft)	No. of #11 bars
PS-IV	95.4	0.250	14	8	25	2.25	1 3/8	7/16	3/16	57	15.0	3.5	10
PS-V	158.9	0.313	16	10	28	2.50	1 1/2	1/2	1/4	56	16.5	3.5	10
PS-VI	203.6	0.313	18	12	30	2.50	1 1/2	1/2	1/4	55	17.0	3.5	10
PS-VII	280.3	0.313	21	14	33	2.50	1 1/2	9/16	1/4	56	17.0	4.0	14
PS-VIII	338.0	0.313	23	16	35	2.50	1 1/2	9/16	1/4	55	18.0	4.0	14
PS-IX	400.9	0.313	25	12	39	2.75	1 3/4	9/16	1/4	57	17.5	4.5	16
PS-X	469.1	0.313	27	14	41	2.75	1 3/4	9/16	1/4	56	18.5	4.5	16

FOUNDATION NOTES:

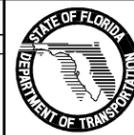
The foundations for SteelStrain Poles are designed based upon the following conservative soil criteria which covers the great majority of soil types found in Florida:

- Classification = Cohesionless (Fine Sand)
- Friction Angle = 30 Degrees (30°)
- Unit Weight = 50 lbs./cu. ft. (assumed saturated)

Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single boring or sounding may cover several foundations. Furthermore, borings in the area that were performed for other purposes may be used to confirm the assumed soil properties.

BASE AND FOUNDATION DETAILS AND TABLE OF VARIABLES

REVISIONS			
DATE	BY	DESCRIPTION	
07/01/10	DYW	Revised $\varnothing$ washer thickness.	



2010 Interim Design Standard

STEEL STRAIN POLE

Interim Date	Sheet No.
07/01/10	2 of 3
Index No.	
17723	

**DESIGN NOTES:**

Design according to FDOT Structures Manual (current edition) and the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" with Interims.

Manufacturers seeking approval of a prestressed concrete pole for inclusion on the Qualified Products List must submit a QPL Products Evaluation Application along with design documentation and drawings showing the product meets all specified requirements of this Index.

Place the prestressing symmetrically about one axis. Supply a sufficient amount of prestressing to provide a calculated compressive stress of 1.0 ksi for Type P-II pole (12 ft) and 1.8 ksi for Type P-II (36 ft) pole and Type P-III pole at the top of pole after all losses.

Design concrete Strain poles using Class V Special with strength of 6 ksi minimum at 28 days and 4 ksi minimum at transfer of the Prestressing force.

Reinforcing steel shall be A615 Grade 60. Provide a minimum area of non-prestressed reinforcement equal to 0.33% of the concrete area.

Prestressed Strands shall be A416 Grade 270 stress relieved or low relaxation.

One turn required for spiral splices and two turns required at the top and bottom of poles. Spiral shall be manufactured from cold-drawn steel wire meeting the requirements of ASTM A82.

Use cover plates made of non-corrosive materials and attached to the pole using lead anchors or threaded inserts embedded in the pole and round head chrome plated screws.

Attach ground wires to the reinforcing steel in the pole as necessary to prevent the ground wire from being displaced during concreting operations.

Identify concrete poles as to pole manufacturer, Department's pole type, length and Qualified Product List qualification number by inset numerals 1" in height inscribed on the same face of the pole as the handhole and ground wire.

Provide a Class 3 Surface Finish as specified in Section 400-15.2.4 of the Standard Specifications.

Provide a minimum cover of 1".

Provide all poles with a total taper of 0.162 IN/FT.

**INSTALLATION NOTES:**

Attach span wire assemblies (consisting of the catenary wire, the messenger wire, and the tether wire) to the concrete poles in accordance with Section 634 of the Standard Specifications.

If a two point attachment is required by the plans, provide an eye bolt hole for the messenger wire, or field drill one at the location indicated in the plans. Field drill the eyebolt hole for the tether wire, when required, prior to installation.

Rake pole back from the span wire as necessary to achieve a final rake of  $\frac{1}{2} \pm \frac{1}{4}$  inch per foot.

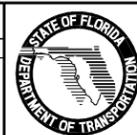
TABLE I MINIMUM REQUIRED ALLOWABLE SERVICE MOMENT CAPACITY (Ms)					
H (feet)	TYPE OF STRAIN POLE				
	P-IV (k-ft)	P-V (k-ft)	P-VI (k-ft)	P-VII (k-ft)	P-VIII (k-ft)
20	21	86	121	165	204
22	24	90	126	171	210
24	26	93	131	176	215
26	29	97	135	182	221
28	32	101	140	187	227
30	34	104	144	192	232
32	37	108	149	197	238
34	39	111	153	202	243
36	41	114	157	207	248
38	44	117	161	212	253
40	46	120	165	217	258
42	48	123	169	221	263
44	50	126	173	226	268
46	52	129	177	230	272
48	54	132	180	235	277
50	56	135	184	239	281

TABLE I shall be used for checking allowable stress in concrete for Dead Load.  $MS \geq MDL$ , where MDL = moment due to dead load only.

TABLE II MINIMUM REQUIRED ULTIMATE MOMENT CAPACITY ( $\emptyset M_n$ )					
H (feet)	TYPE OF STRAIN POLE				
	P-IV (k-ft)	P-V (k-ft)	P-VI (k-ft)	P-VII (k-ft)	P-VIII (k-ft)
20	43	138	198	273	346
22	48	145	206	283	357
24	53	151	215	294	369
26	58	158	224	304	381
28	63	165	232	315	392
30	68	172	241	325	404
32	73	178	250	335	415
34	77	185	258	346	427
36	82	192	267	356	439
38	87	199	276	367	450
40	92	205	284	377	462
42	97	212	293	387	474
44	102	219	302	398	485
46	107	226	310	408	497
48	112	232	319	419	508
50	117	239	328	429	520

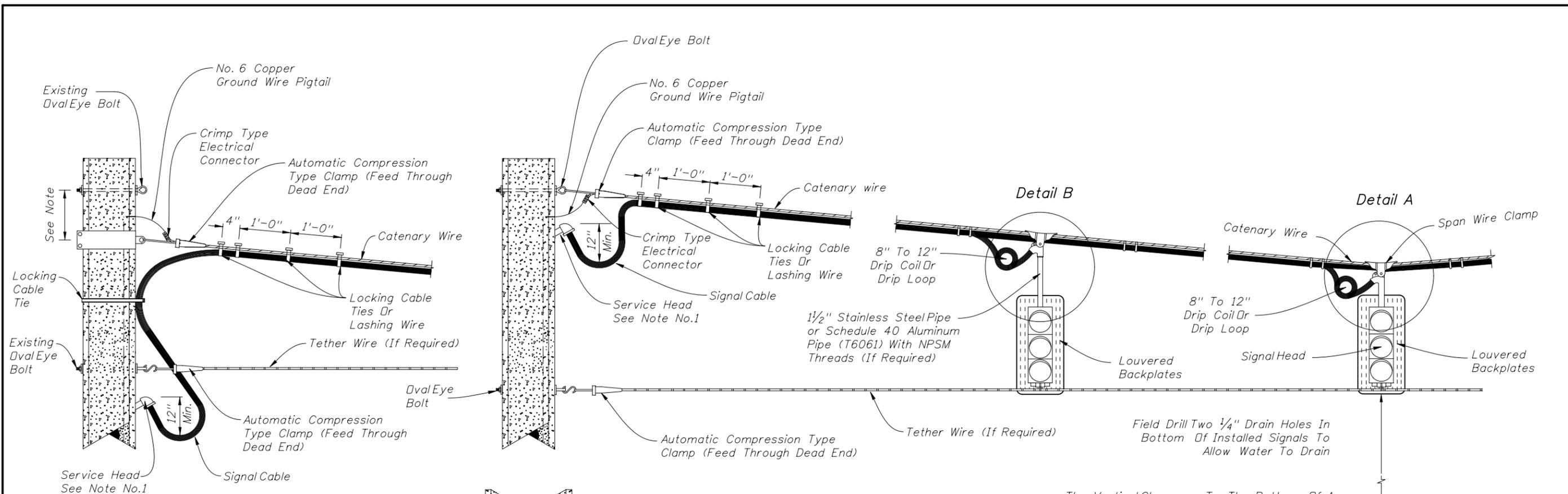
TABLE II shall be used for checking ultimate moment strength under factored loading combinations of dead load plus wind load, and is the Nominal Moment Strength ( $M_n$ ) multiplied by Strength Reduction factor ( $\emptyset = 0.9$ )  $\emptyset M_n \geq M_u = 1.3 (MDL+MWL)$ , where MDL = moment due to dead load, and MWL = moment due to wind load.

REVISIONS						2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			07/01/10	2 of 2
07/01/10	GJM	Deleted edition date from design specification reference.							



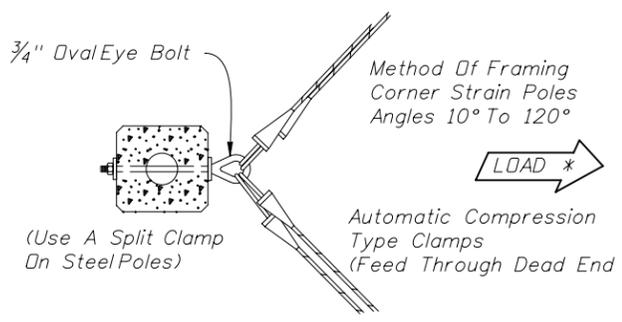
**CONCRETE POLES**

Index No.  
**17725**



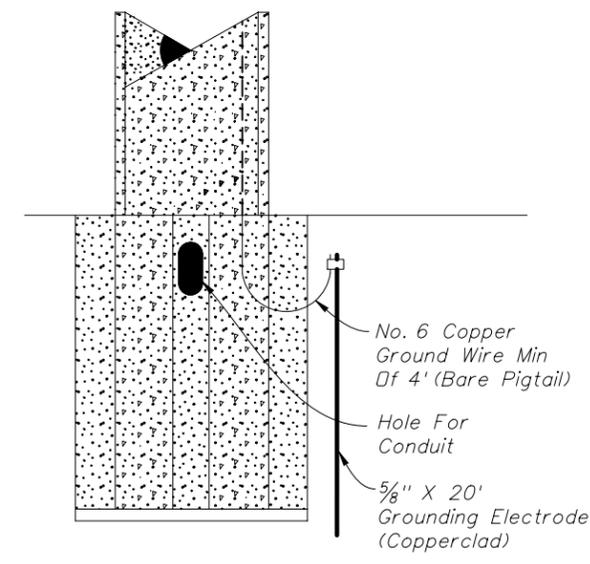
**RETROFIT INSTALLATION**

Note:  
Clamp location shall be adjusted to compensate for reduced sag and vertical clearance to bottom of signal head.



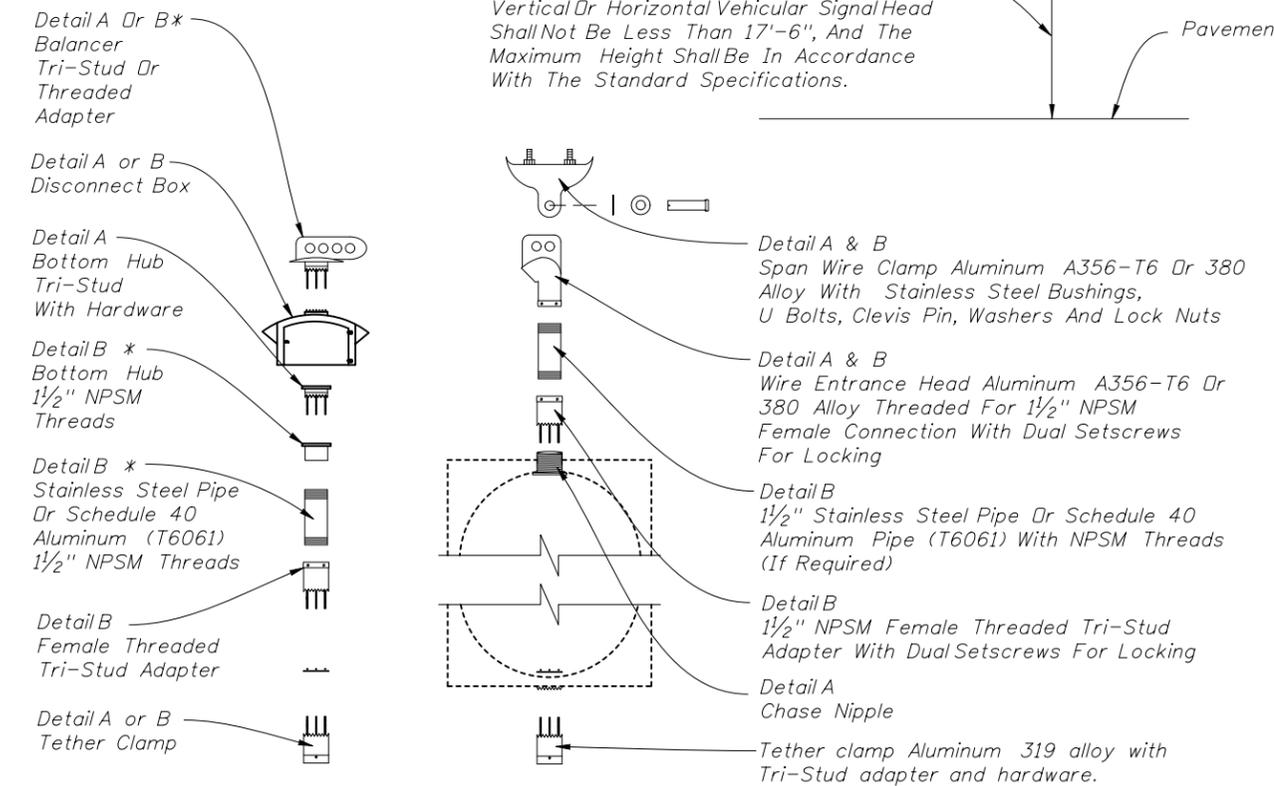
\* The load face of pole shall be perpendicular to load.

**PRESTRESSED CONCRETE POLE NEW CONSTRUCTION**



- Notes:
1. With the approval of the resident engineer, the service head hole for joint use poles may be drilled by the utility company at an angle of 90° but not less than 45° to the face of the pole.
  2. Lashing wire should normally be used for distances of 12' or greater.
  3. All hardware for signal attachment shall be stainless steel.
  4. Meet all grounding requirements of Section 620 of the Standard Specifications.

The Vertical Clearance To The Bottom Of A Vertical Or Horizontal Vehicular Signal Head Shall Not Be Less Than 17'-6", And The Maximum Height Shall Be In Accordance With The Standard Specifications.



\* For long pipe hangers a wire entrance head may be substituted for balancer and the drop pipe installed above the disconnect box.

**SINGLE POINT ATTACHMENT**

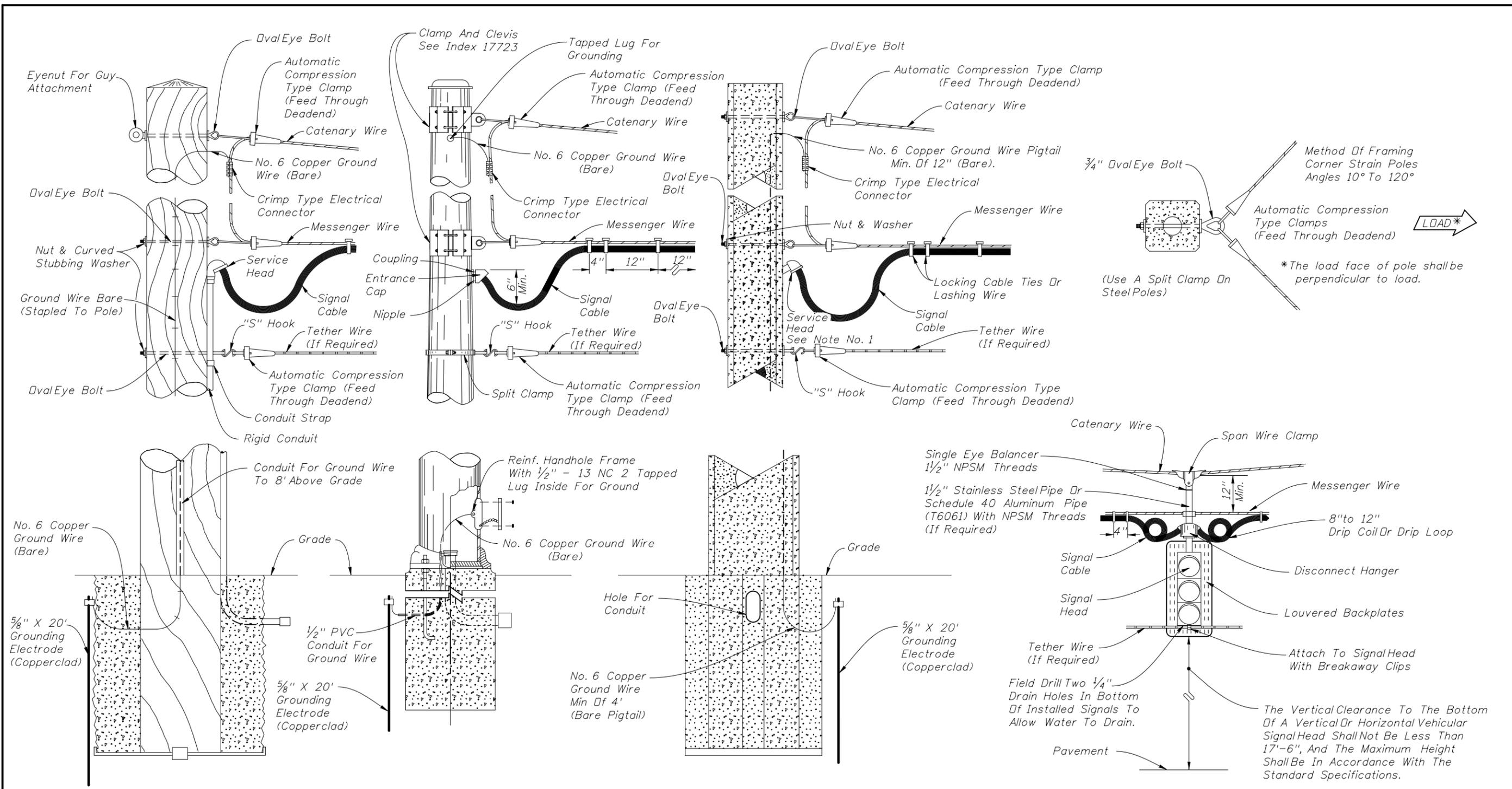
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	C.H.	Schedule 40 aluminum pipe (T6061) added as alternate to stainless steel pipe on assembly details and signal head notes.	06/15/09	C.H.	Vertical Clearance Note Revised.
11/05/08	C.H.	Back Plates added to Signal Head Detail. Vertical clearance note Revised.			



2010 Interim Design Standard

**SIGNAL CABLE & SPAN WIRE INSTALLATION DETAILS**

Interim Date	Sheet No.
01/01/10	1 of 2
Index No.	
17727	



WOOD POLE

STEEL POLE

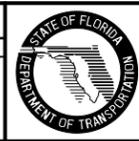
PRESTRESSED CONCRETE POLE

Notes:

1. With the approval of the resident engineer, the service head hole for joint use poles may be drilled by the utility company at an angle of 90° but not less than 45° to the face of the pole.
2. Lashing wire should normally be used for distances of 12' or greater.
3. The overlapped connection of adjustable hangers shall use a minimum of 2 bolts with a minimum spacing of 2" between bolts.
4. Meet all grounding requirements of Section 620 of the Standard Specifications.

TWO POINT ATTACHMENT

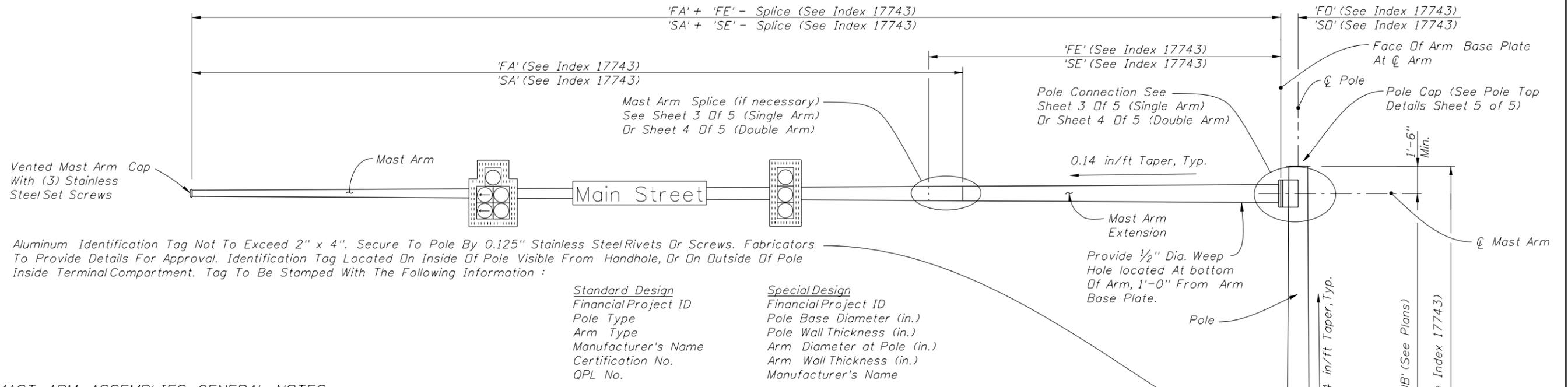
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	C.H.	Schedule 40 aluminum pipe (T6061) added as alternate to Stainless Steel pipe on assembly details and signal head notes.	06/15/09	C.H.	Vertical Clearance Note Revised.
07/01/08	C.H.	Back Plates added to Signal Head details. Vertical Clearance note Revised.			



2010 Interim Design Standard

**SIGNAL CABLE & SPAN WIRE  
INSTALLATION DETAILS**

Interim Date	Sheet No.
01/01/10	2 of 2
Index No.	
17727	



**MAST ARM ASSEMBLIES GENERAL NOTES**

<u>Standard Design</u>	<u>Special Design</u>
Financial Project ID	Financial Project ID
Pole Type	Pole Base Diameter (in.)
Arm Type	Pole Wall Thickness (in.)
Manufacturer's Name	Arm Diameter at Pole (in.)
Certification No.	Arm Wall Thickness (in.)
QPL No.	Manufacturer's Name

1) Signal Structure Materials shall be as follows:

- Poles & Mast Arms → ASTM A1011 Grade 50, 55, 60 or 65 (less than 1/4" ) or ASTM A572 Grade 50, 55, 60 or 65 ( 1/4" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
- Steel Plates → ASTM A36
- Weld Metal → E70XX
- Bolts (except Anchor Bolts) → ASTM A325 Type 1
- Anchor Bolts → ASTM F1554 Grade 55 ksi
- Nuts for Anchor Bolts → ASTM A563 Grade A Heavy Hex
- Washers for Anchor Bolts → ASTM F436 Type 1
- Handhole Frame → ASTM A709 Grade 36 ksi or ASTM A36
- Handhole Cover → ASTM A1011 Grade 50, 55, 60 or 65 ksi
- Caps → ASTM A1011 Grade 50, 55, 60 or 65 ksi or ASTM B209
- Nut Covers → ASTM B26 (319-F)
- Stainless Steel Screws → AISI Type 316
- Threaded Bars/Studs → ASTM A36 or ASTM A307

2) Reinforcing Steel shall be ASTM A615 Grade 60 ksi.

3) Concrete shall be Class IV (Drilled Shaft) with a minimum 28-day compressive strength of 4,000 psi for all environmental classifications.

4) All welding shall conform to American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition).

5) All steel items shall be galvanized as follows:

- All Nuts, Bolts, Washers and Threaded Bars/Studs → F2329
- All other steel items (including Pole & Mast Arm) → ASTM A123

6) Locate handhole 180° from arm on single arm poles or 180° from first arm of double arm poles or see special instructions on Mast Arm Tabulation Sheet.

7) Except for Anchor Bolts, all bolt hole diameters shall be equal to the bolt diameter plus 1/16", prior to galvanizing. Hole diameters for Anchor Bolts shall not exceed the bolt diameter plus 1/2".

8) Sign Panels and Signals attached to the Mast Arm shall be centered in elevation on the arm. Wire access holes shall not exceed 1 1/2" in diameter.

9) Mast Arms and Poles shall be tapered with the diameter changing at a rate of 0.14 inch per foot.

10) The Pole shall be installed vertically. Camber shall be accounted for in the Mast Arm connection as detailed.

11) If a Mast Arm damping device is required by the Engineer, it shall be installed within eight feet of the Mast Arm tip.

12) Design according to FDOT Structures Manual (current edition). Alternate Designs for Special Mast Arm Assemblies are not allowed.

13) Provide "J", "S" or "C"-Hook at top of pole for signal cable support.

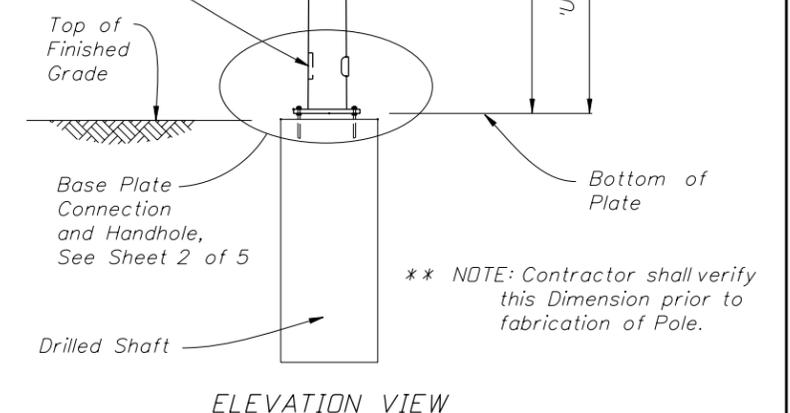
14) First and Second Arm Camber Angle = 2°.

15) Details for Signal and Sign Locations, Signal Head attachment, Sign Attachment, Pedestrian Head Attachment, and Foundation Conduit are not shown for clarity.

16) One hundred percent of full-penetration groove welds and a random 25 percent of partial penetration groove welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive methods of radiography or ultrasonics.

17) Manufacturers seeking approval of a steel mast arm assembly for inclusion on the Qualified Products List must submit a QPL Product Evaluation Application along with design documentation and drawings showing the product meets all specified requirements of this Index and Index 17743.

18) Verify CSL access tubes will not interfere with anchor bolt installation before excavating the shaft. When CSL access tube locations conflict with anchor bolt locations, move the CSL access tube location +/- two inches along the inner circumference of the reinforcing cage. Notify the Engineer before excavating the shaft if the CSL access tube locations cannot be moved out of conflict with anchor bolt locations.

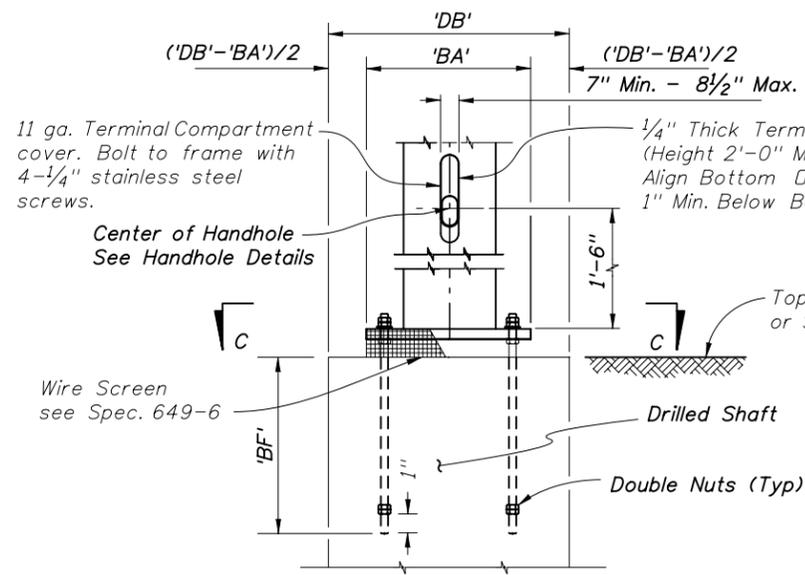


**ELEVATION VIEW**

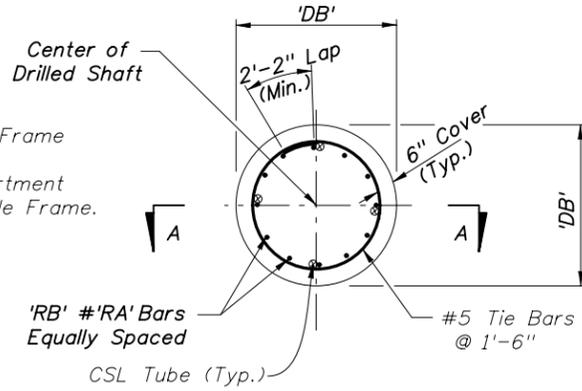
(Single Arm Shown, Double Arm Similar)  
(Luminaire Arm Not Shown)

TYPICAL ELEVATION AND NOTES

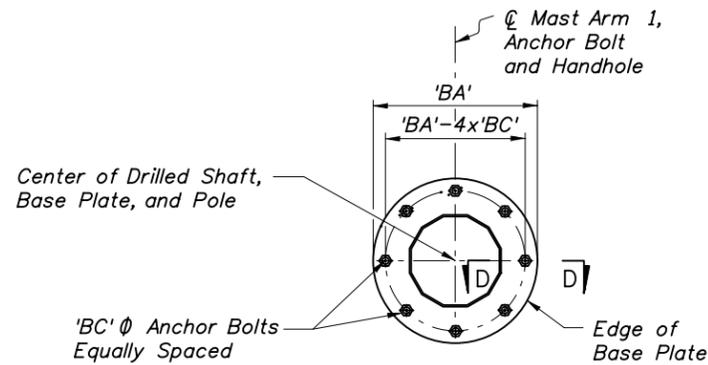
<b>REVISIONS</b>					2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE		BY	DESCRIPTION	07/01/10	1 of 5
06/09/10	DYW	Modified notes 8 and 15. Modified 'UB' dimension.					Index No. <b>17745</b>	
					<b>MAST ARM ASSEMBLIES</b>			



BASE PLATE AND ANCHORAGE ELEVATION  
(Reinforcement Not Shown)

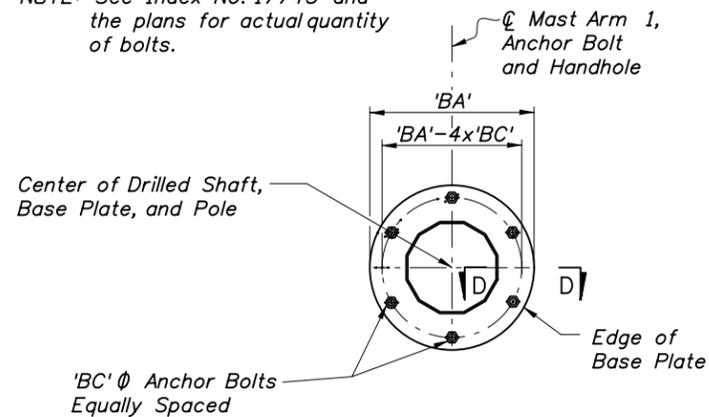


FOUNDATION PLAN

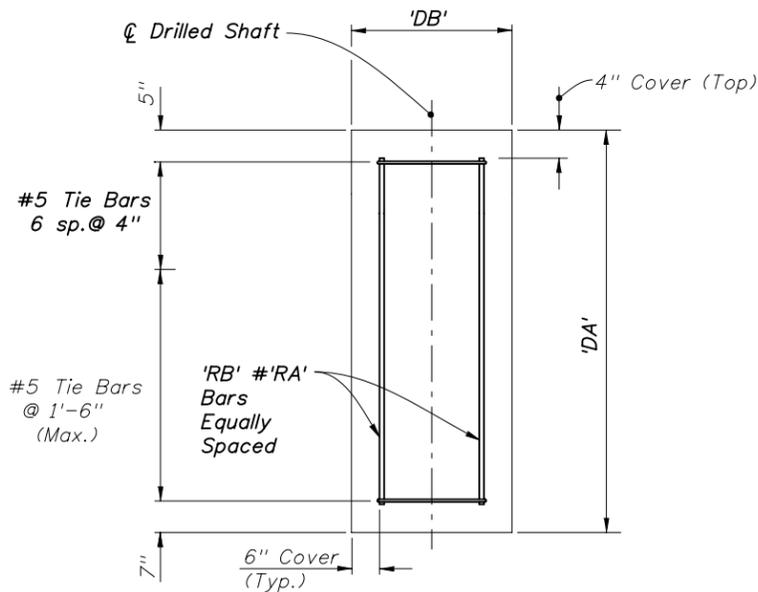


SECTION C-C  
Alternate Detail  
(8 Anchor Bolts)

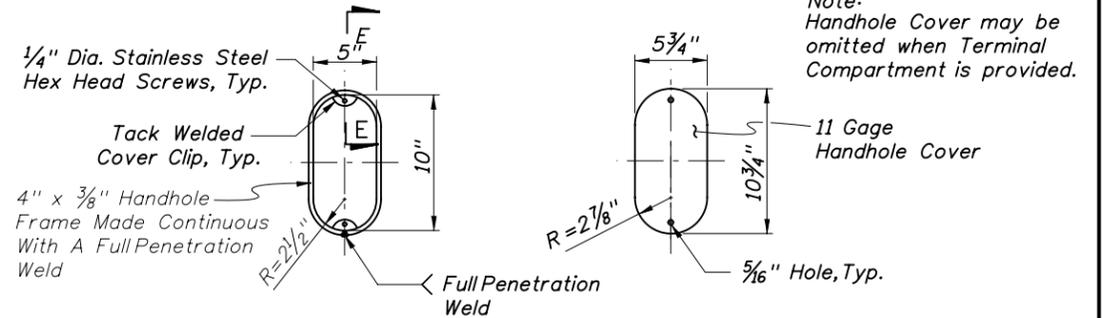
NOTE: See Index No. 17743 and the plans for actual quantity of bolts.



SECTION C-C  
(6 Anchor Bolts)



SECTION A-A

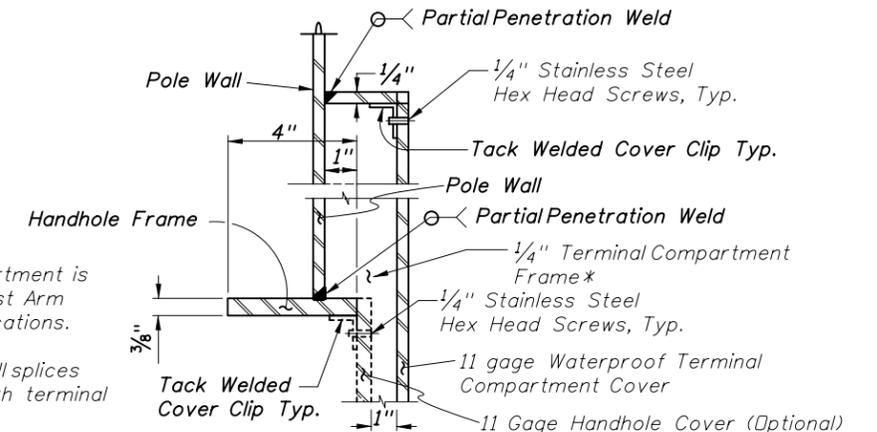


HANDHOLE FRAME  
(w/ Terminal Compartment Omitted)

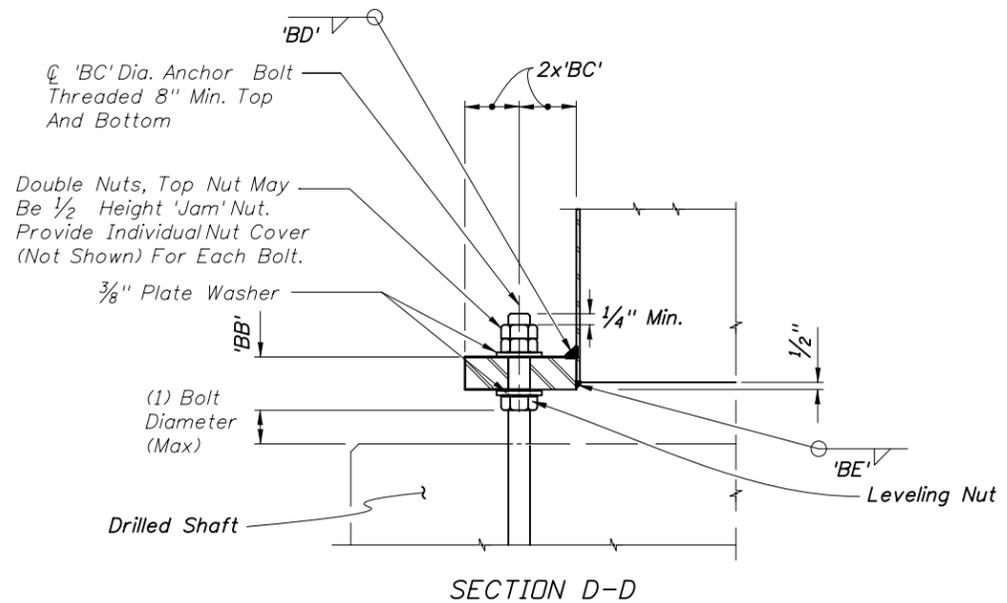
HANDHOLE COVER

\* Terminal Compartment is optional. See Mast Arm Tabulation for locations.

\*\* Water proof all splices or use gasket with terminal compartment.



SECTION E-E  
(Thru Handhole & Terminal Compartment)

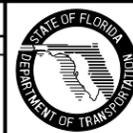


SECTION D-D

TYPICAL FOUNDATION AND BASE PLATE DETAILS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/14/10	CH	Modified anchor bolt standoff details.			
06/09/10	DYW	Modified plate washer detail.			



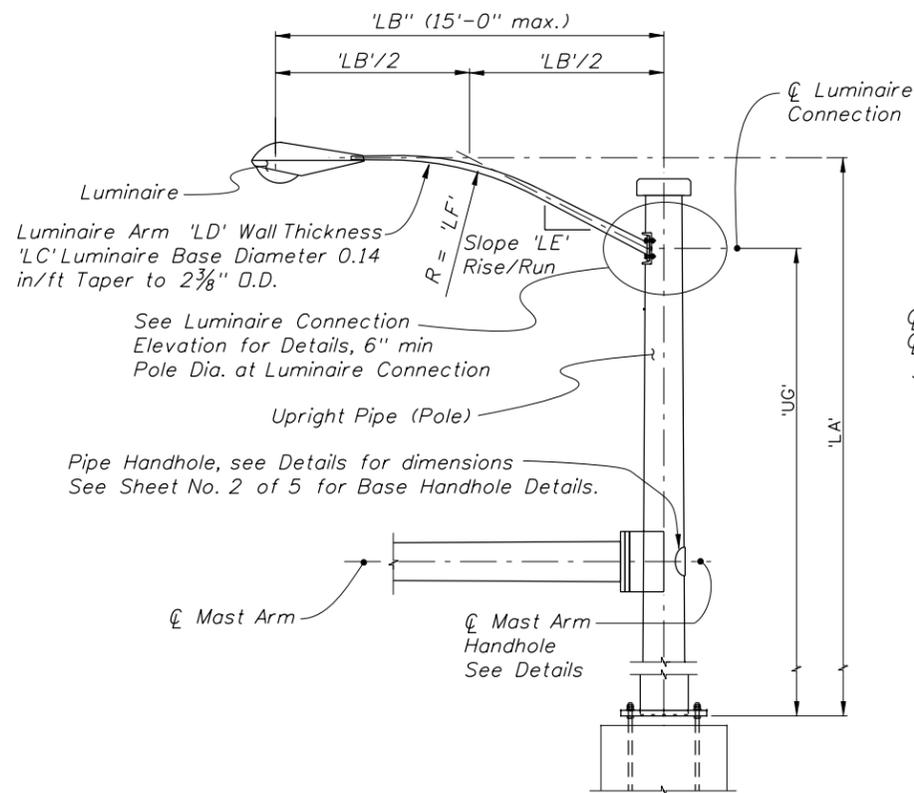
2010 Interim Design Standard

MAST ARM ASSEMBLIES

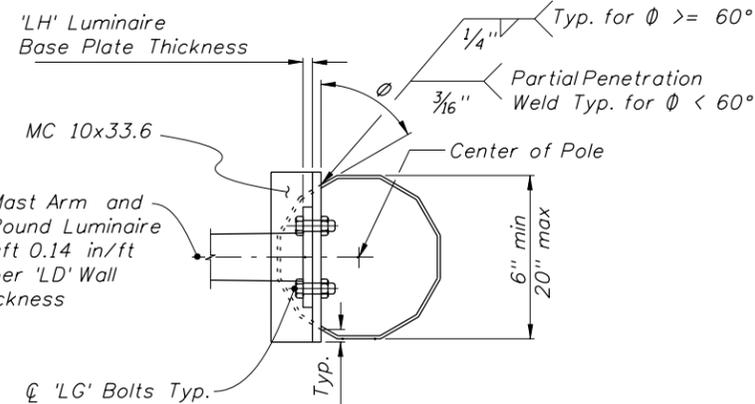
Interim Date  
07/01/10

Sheet No.  
2 of 5

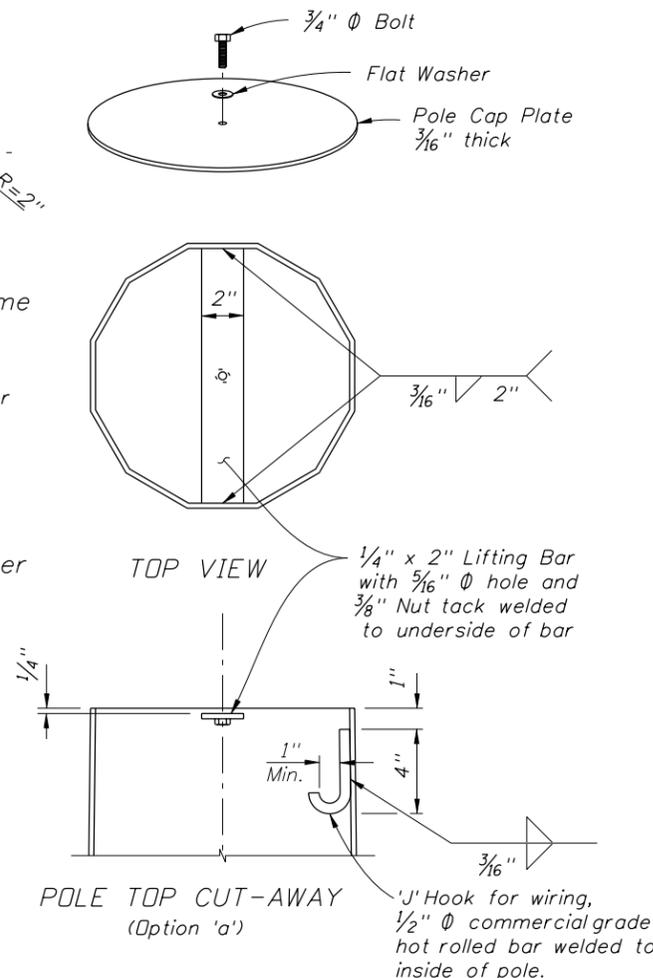
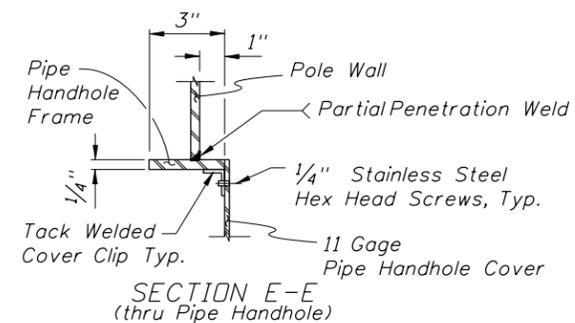
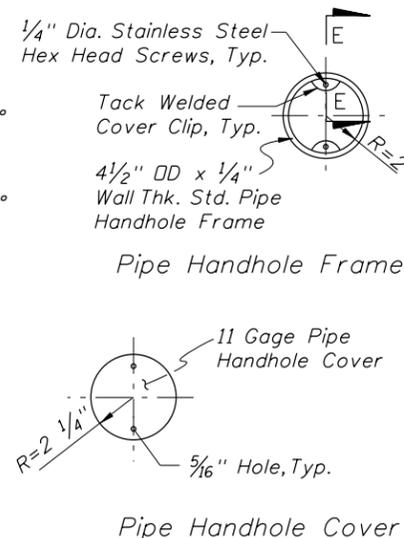
Index No.  
17745



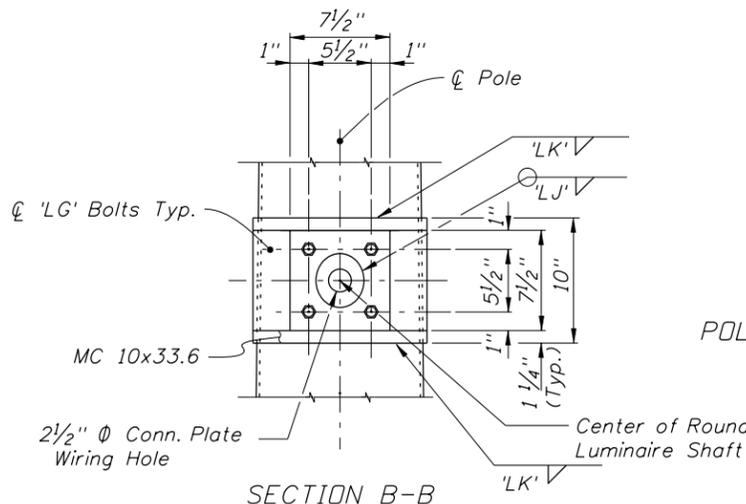
LUMINAIRE ELEVATION



SECTION A-A

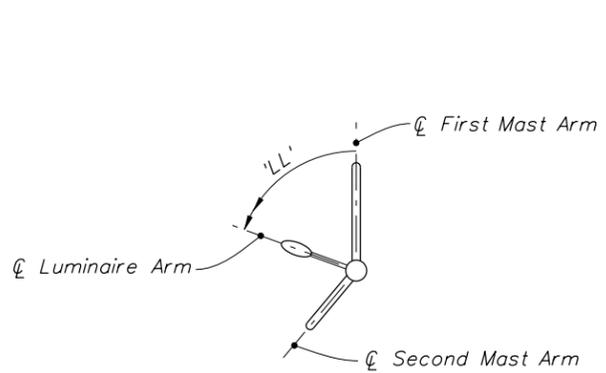


POLE TOP DETAILS



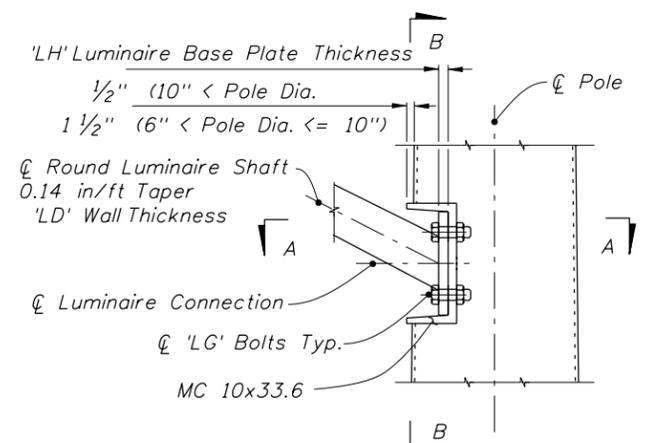
NOTE: The Fabricator may substitute a 1/2" thick bent plate with the same flange width, height, and length as the MC 10x33.6 Channel section.

NOTE: Any combination of the above two options may be used, provided both lifting and wiring is accommodated.



LUMINAIRE ORIENTATION

NOTE: 'LL' measured counter clockwise from First Arm.



NOTE: The Pole shown on this sheet is a 12 sided section. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced

TYPICAL LUMINAIRE ARM AND CONNECTION DETAILS

- NOTES:
- Luminaire type and Luminaire to Arm Connection Details can be found elsewhere.
  - Align Luminaire Arm with single Mast Arm or first Arm of Double Mast Arm unless indicated otherwise in plans.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
1/13/10	CH	Revised J hook detail and 'LL' definition.			
6/9/10	DYW	Remove grout pad, change cap bolt size and revise 'LL' definition.			



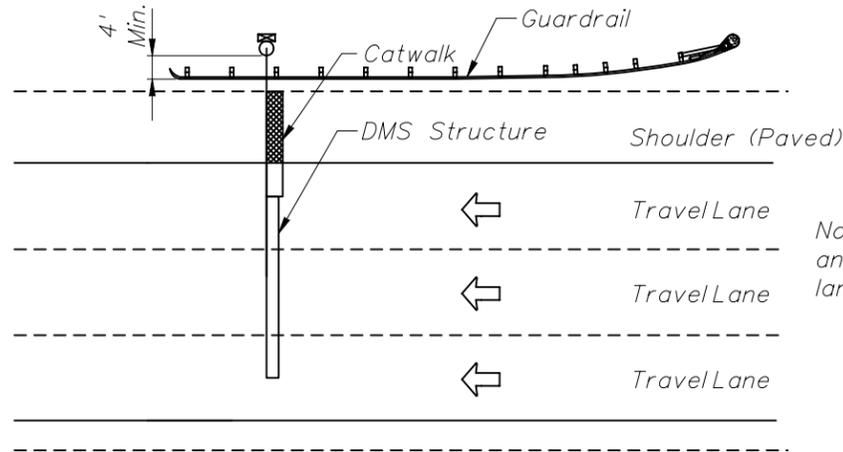
2010 Interim Design Standard

MAST ARM ASSEMBLIES

Interim Date	Sheet No.
07/01/10	5 of 5
Index No.	
17745	

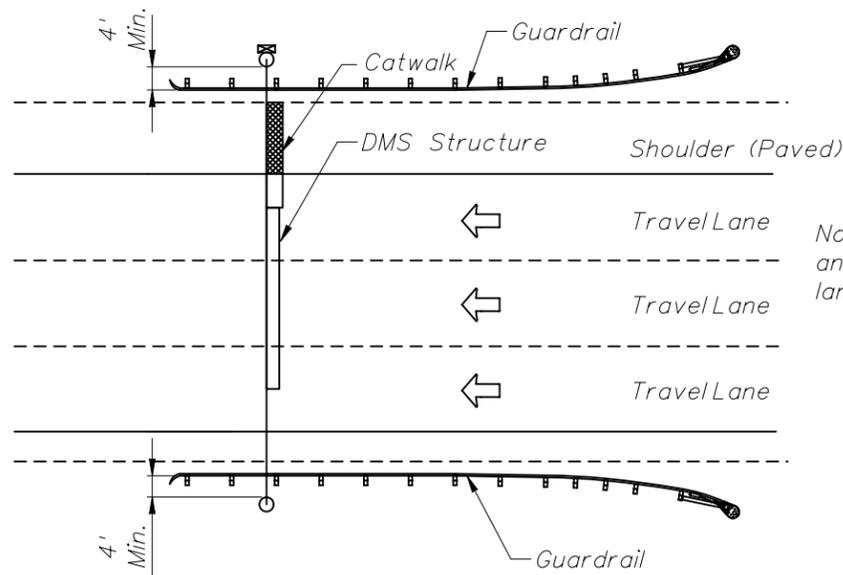
**GENERAL NOTES:**

1. If no guardrail or barrier wall exists, structure shall be outside the clear zone. Clear zone shall be measured to edge of the drilled shaft if drilled shaft is more than 4" above adjacent grade.
2. Extend Catwalk from DMS to outer edge of paved shoulder but not less than four feet in length.
3. Clear zone distance and setbacks from edge of travel lane shall be in accordance with Plans Preparation Manual Volume I, Chapters 2 and 4.



Note: Actual number and direction of travel lanes varies.

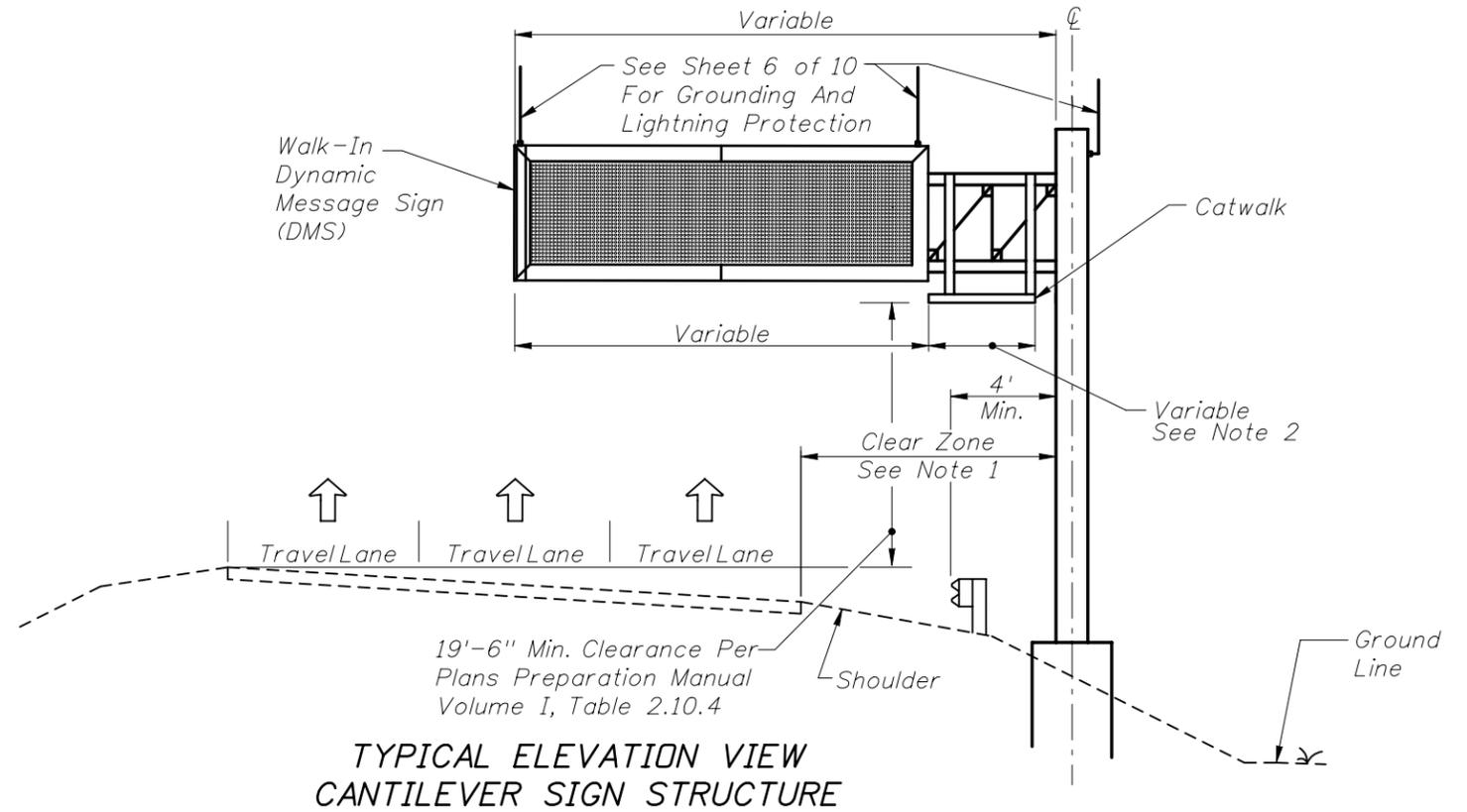
**TYPICAL PLAN VIEW  
DMS CANTILEVER SIGN STRUCTURE**



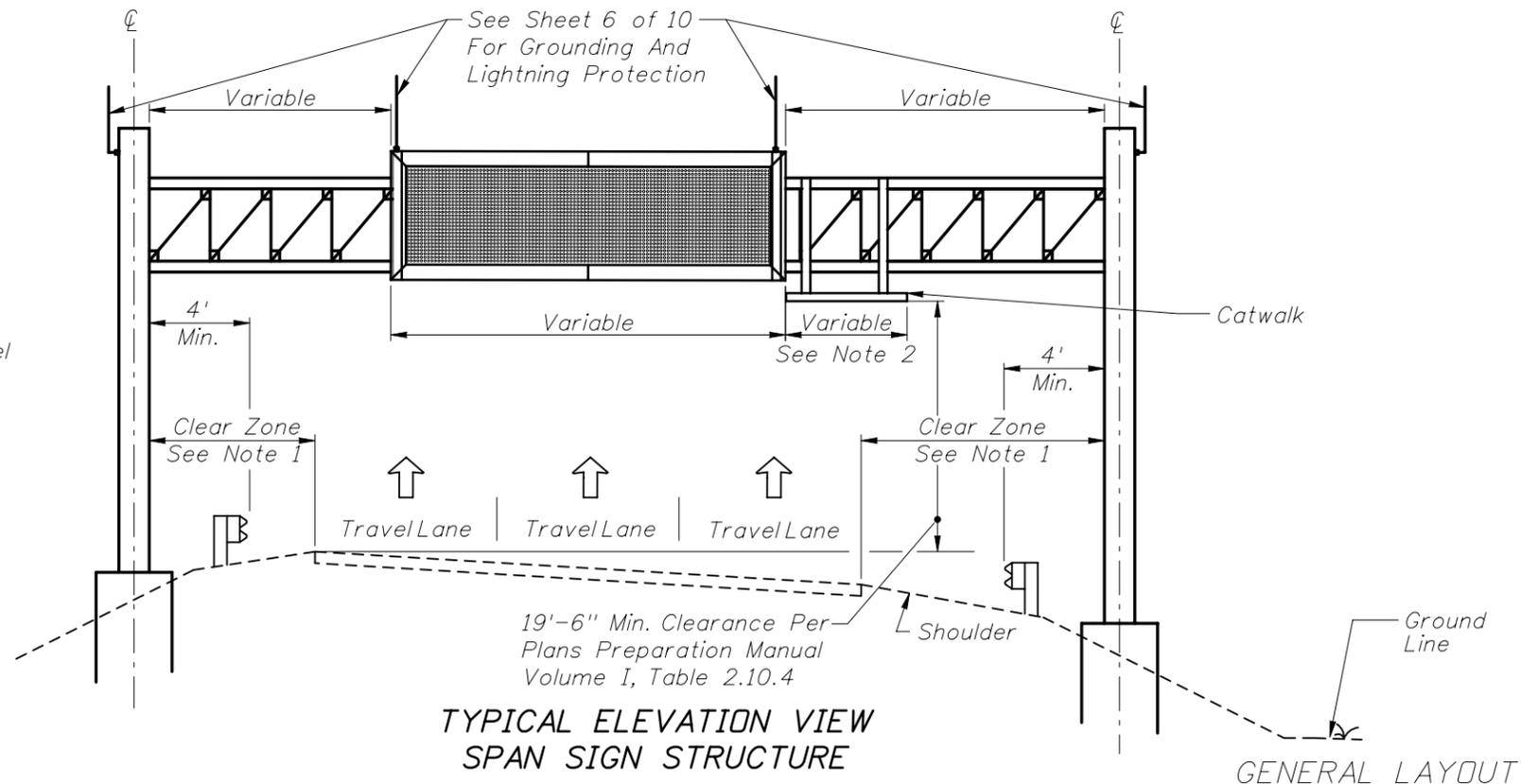
Note: Actual number and direction of travel lanes varies.

**TYPICAL PLAN VIEW  
SPAN SIGN STRUCTURE**

Not To Scale



**TYPICAL ELEVATION VIEW  
CANTILEVER SIGN STRUCTURE**

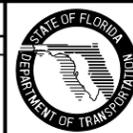


**TYPICAL ELEVATION VIEW  
SPAN SIGN STRUCTURE**

GENERAL LAYOUT

**REVISIONS**

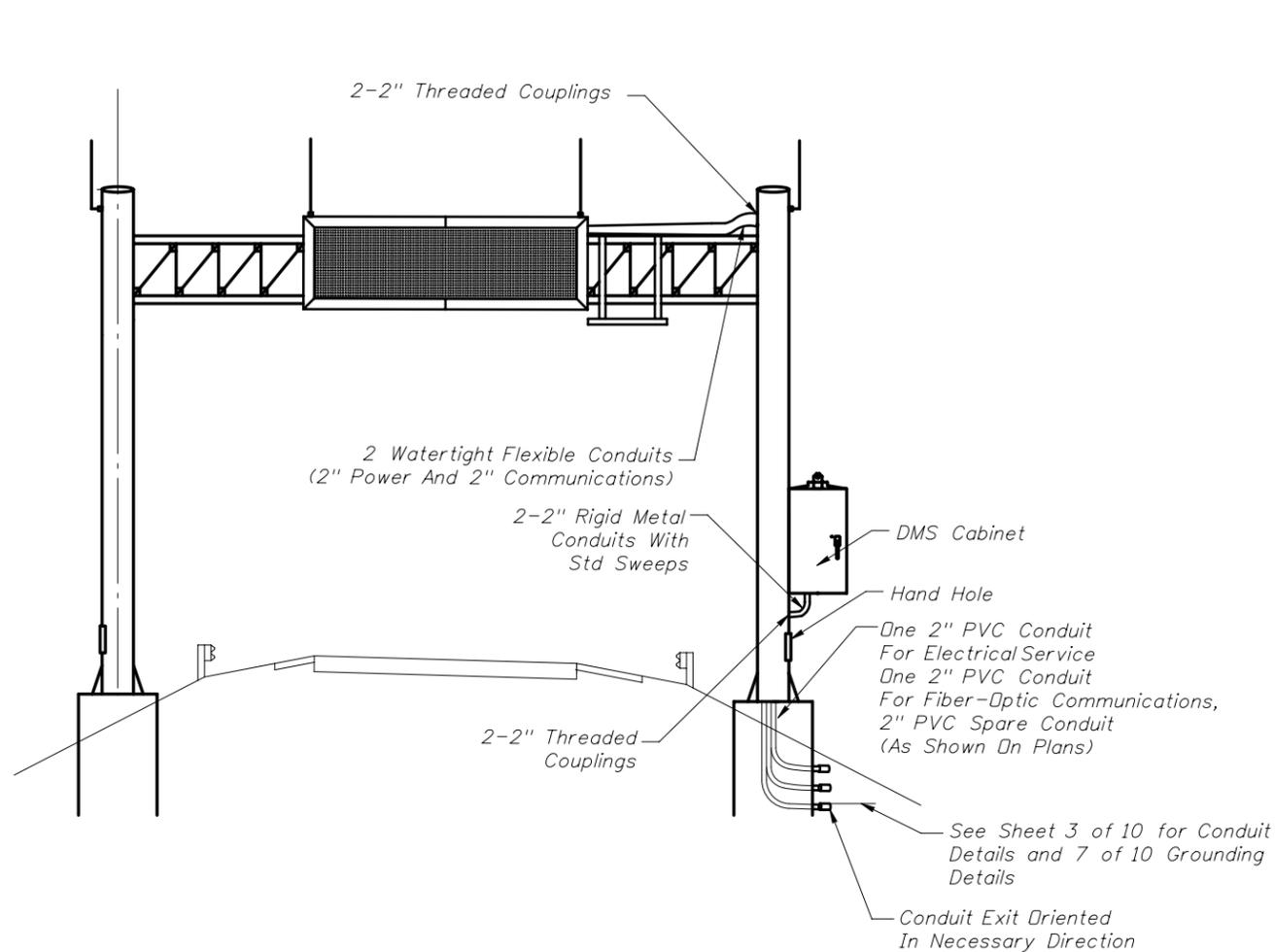
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
05/14/10	HAB	Updated and Renumbered Index 18302 to 18300 Sheet 1 of 10.			



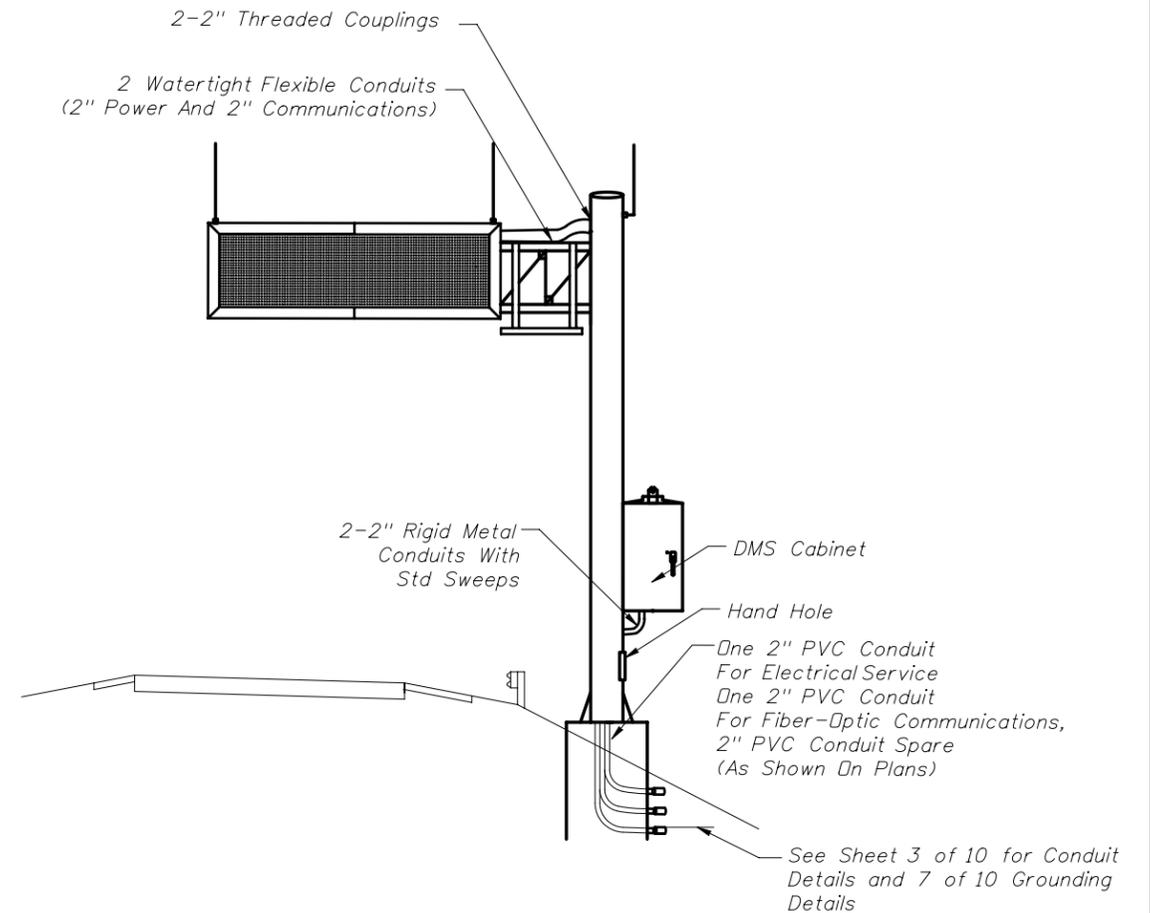
2010 Interim Design Standard

**DYNAMIC MESSAGE SIGN  
WALK-IN**

Interim Date 07/01/10	Sheet No. 1 of 10
Index No. <b>18300</b>	



**SPAN DMS**



**CANTILEVER DMS**

**GENERAL NOTES:**

1. Conductors for grounding shall be connected to steel framework that have been cleaned to base metal, by use of bonding plates having contact area of not less than 8 square inches or by welding or brazing. Drilling and tapping the steel structure to accept a threaded connector is also an acceptable method.
2. If steel framework is to be drilled and tapped to accept threaded connector, the threaded connector shall have at least 5 threads fully engaged and secured with a jam nut to the steel framework.
3. Bends in the conduit shall not be less than the minimum bending radius for the cable contained in the conduit.
4. Catwalk and handrail design and installation shall comply with AISC, AASHTO, and OSHA requirements as applicable.
5. All data, fiber-optic and power cable for the DMS shall be completely encased within the sign structure or in conduit.
6. Permanently stamp/mark foundation to conduit locations.
7. Transition conduit in foundation to underground conduit with appropriate reducer outside the limits of the foundation.

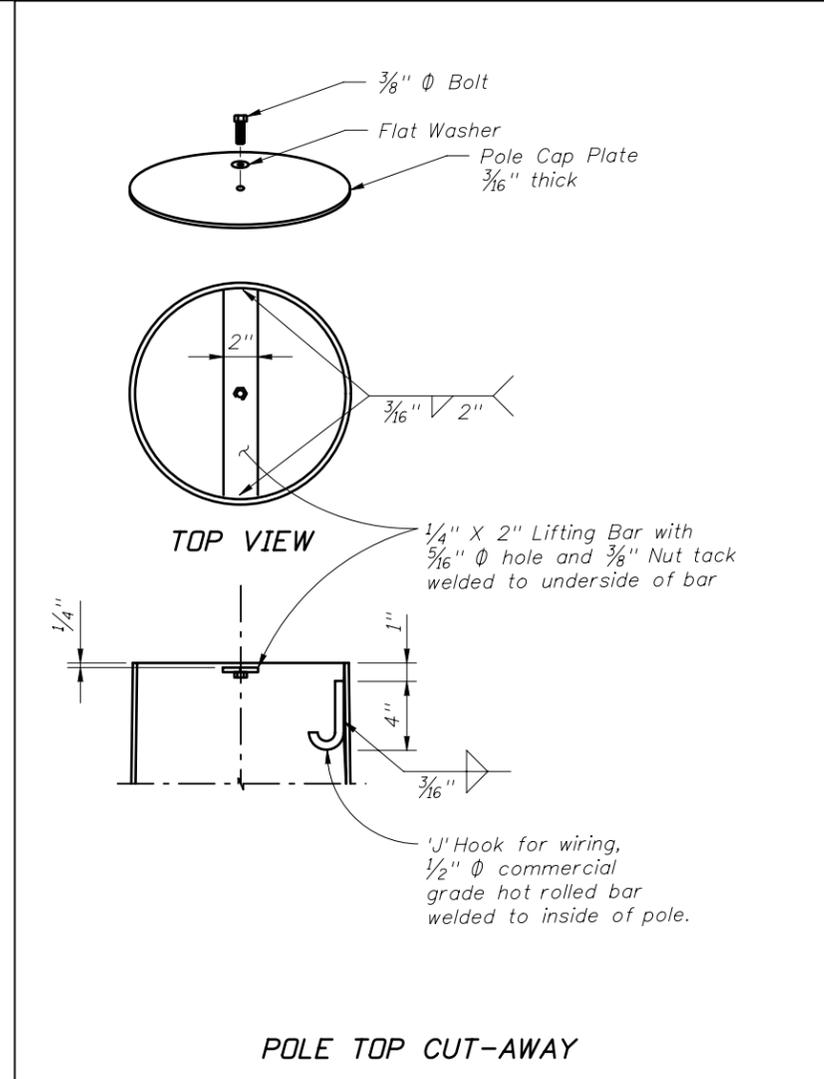
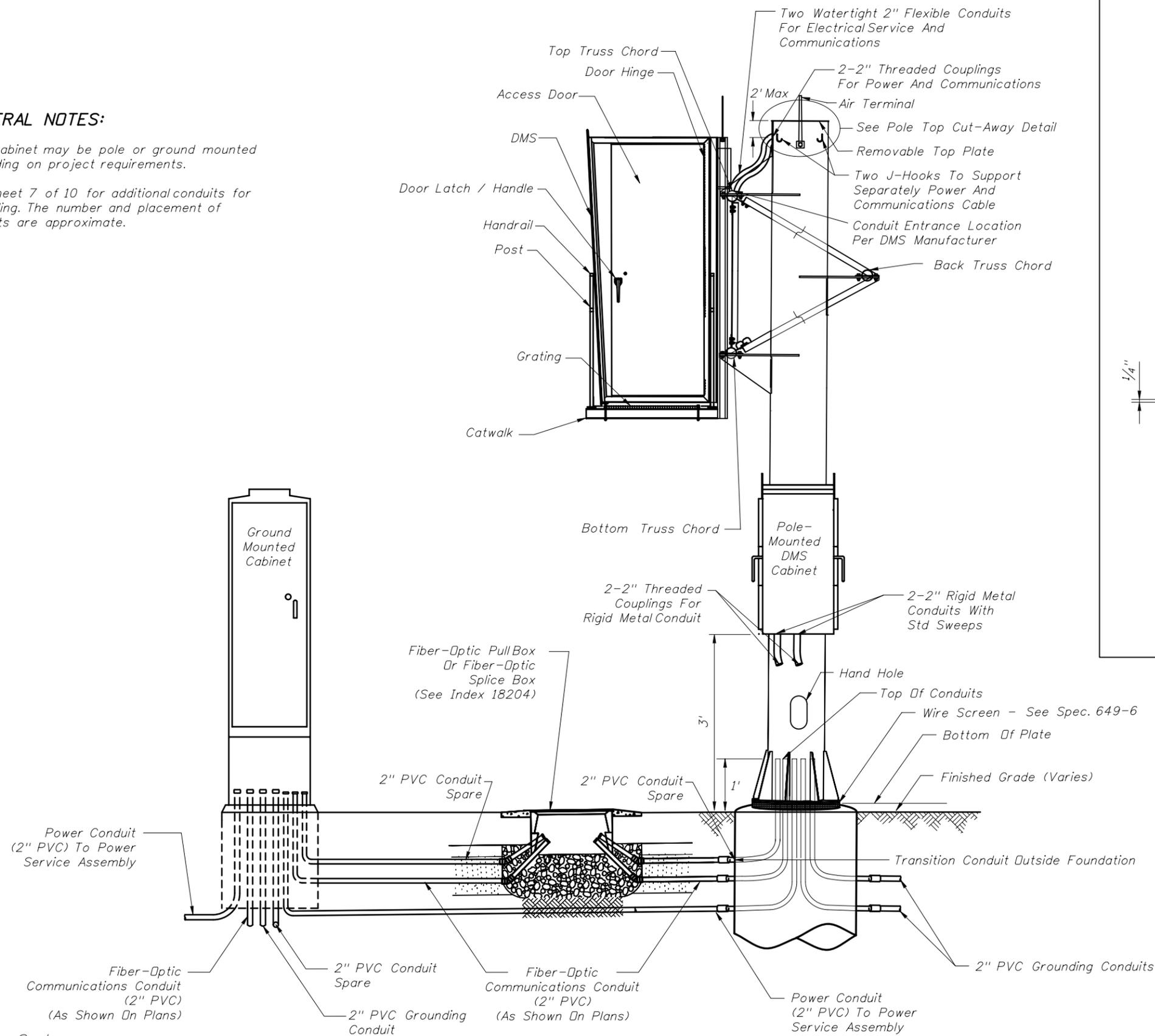
Not To Scale

GENERAL DETAILS (1 of 2)

REVISIONS							2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		<b>DYNAMIC MESSAGE SIGN WALK-IN</b>		07/01/10	2 of 10
05/14/10	HAB	Renumbered Index 18303, sheet 2 of 2 to Index Number 18300 2 of 10.								Index No. <b>18300</b>

**GENERAL NOTES:**

1. DMS Cabinet may be pole or ground mounted depending on project requirements.
2. See sheet 7 of 10 for additional conduits for grounding. The number and placement of conduits are approximate.

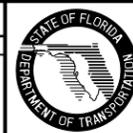


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GENERAL DETAILS (2 OF 2)

**REVISIONS**

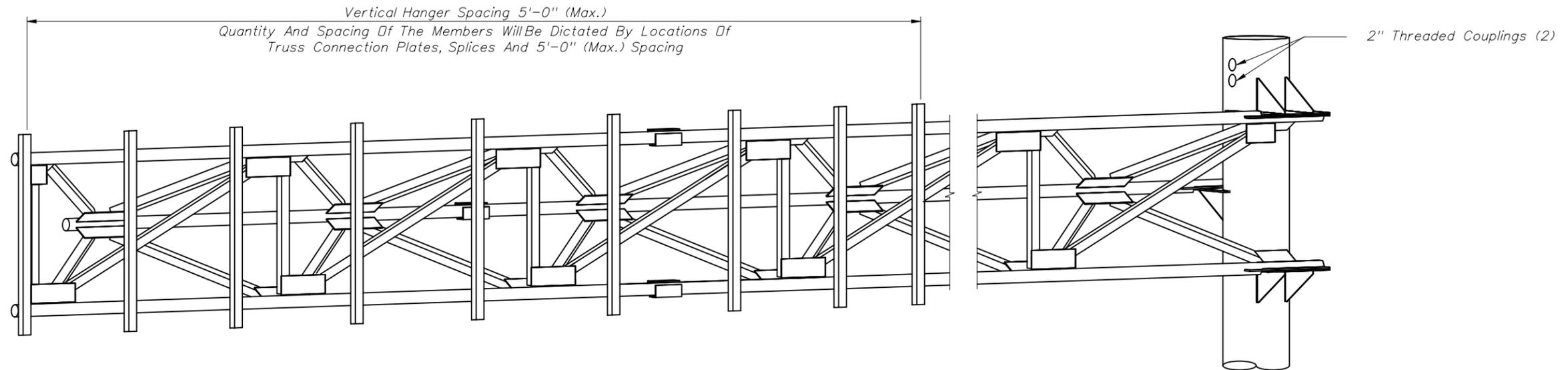
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
05/14/10	HAB	Renumbered Index 18303, sheet 1 of 2 to Index Number 18300 3 of 10. Revised conduit and cabling details and conduit sizes.			



2010 Interim Design Standard

**DYNAMIC MESSAGE SIGN  
WALK-IN**

Interim Date 07/01/10	Sheet No. 3 of 10
Index No. <b>18300</b>	



**HANGER LOCATION DETAIL**  
(Cantilever Sign Structure Shown, Span Sign Structure Similar)

**GENERAL NOTES:**

1. Design Specifications: FDOT Structures Manual (current edition) and AASHTO standard specifications for structural supports for highway signs, luminaries and traffic signals.
2. Design Wind Speed: 150 miles per hour. maximum DMS box weight for design: 4500lb.
3. Shop drawings including the DMS connection are required and fabrication shall not begin until these shop drawings are approved.
4. Before erection, after both the delivery of the DMS sign enclosure and the steel truss, the contractor shall carefully measure the exact locations for field drilling the 1/2" bolt holes in the vertical hangers and horizontal mounting member attached to the sign enclosure.
5. Insure that the field located holes center justify vertically the sign enclosure with the centerline of the truss.
6. Locate the sign laterally on the structure as shown in the plans.
7. Insure that the field located holes allow the vertical hangers to be placed as shown on the plans with no conflicts with gusset or splice plates.
8. All steel items shall be galvanized as follows:  
All nuts, bolts and washers ASTM F2329  
All other steel items ASTM A123
9. All bolt hole diameters shall be equal to the bolt diameter plus 1/16", prior to galvanizing.
10. All bolts shall have single self-locking nuts or, proprietary locking nut system, installed in accordance with the manufacturer's recommendations.
11. Cost of the installation of the DMS sign enclosure on truss including the vertical hangers associated members and hardware shall be incidental in the cost of the sign structure.
12. Threaded couplings shall be located on sign side of column above the sign truss.

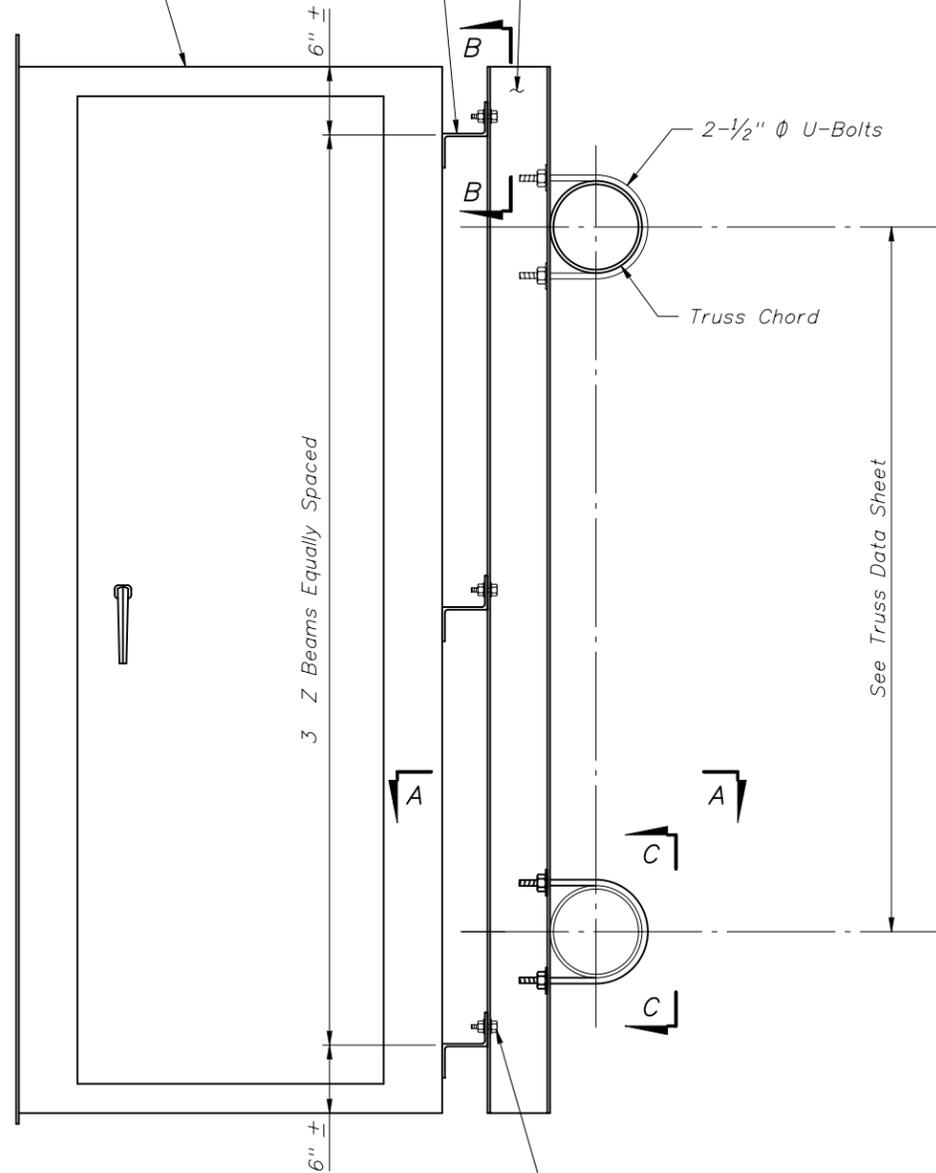
SIGN ATTACHMENT (1 of 2)

REVISIONS					2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE		BY	DESCRIPTION	07/01/10	4 of 10
05/14/10	HAB	Added Call-out for 2-2" Threaded Couplings.				<b>DYNAMIC MESSAGE SIGN WALK-IN</b>		Index No. <b>18300</b>

6061-T6 Structural Aluminum  
Z 4x3.13x3.58 Horizontal  
Member Attached To The  
Internal Framework And  
Included With The DMS Sign

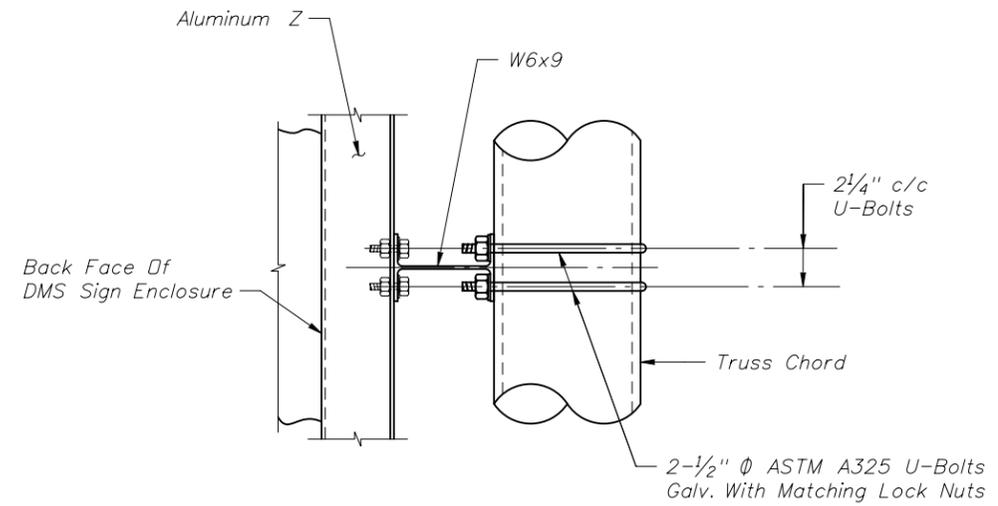
ASTM A709, Gr.36 Steel W6x9  
Hanger @ 5' (Max.) Spacing

DMS Sign Enclosure

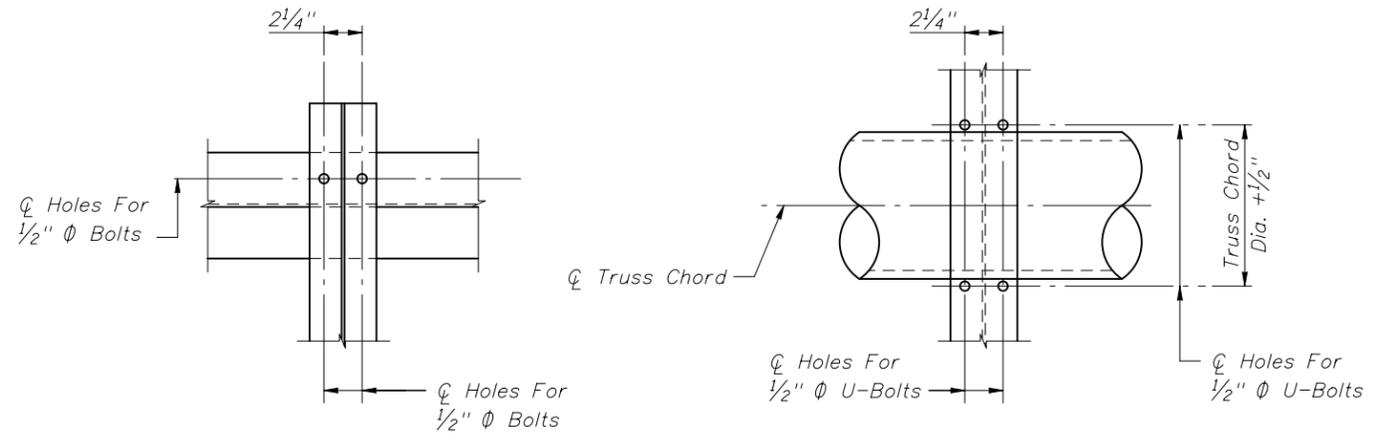


END VIEW

Field Drill Holes And Provide  
2-1/2"  $\Phi$  ASTM A325 Bolts  
Galvanized With Matching  
Lock Nuts



SECTION A-A



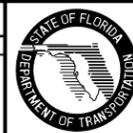
SECTION B-B

SECTION C-C

SIGN ATTACHMENT (2 of 2)

REVISIONS

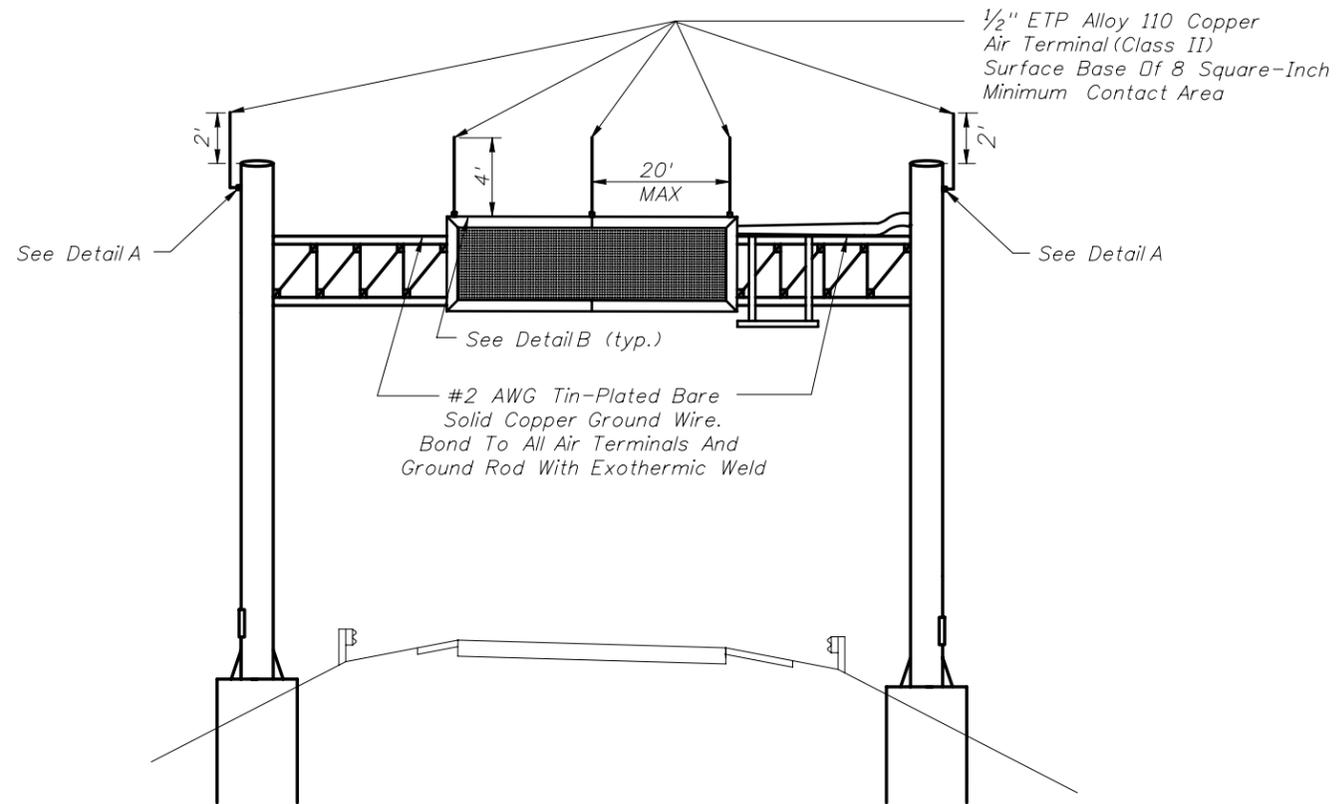
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	RM	Created new sheet			



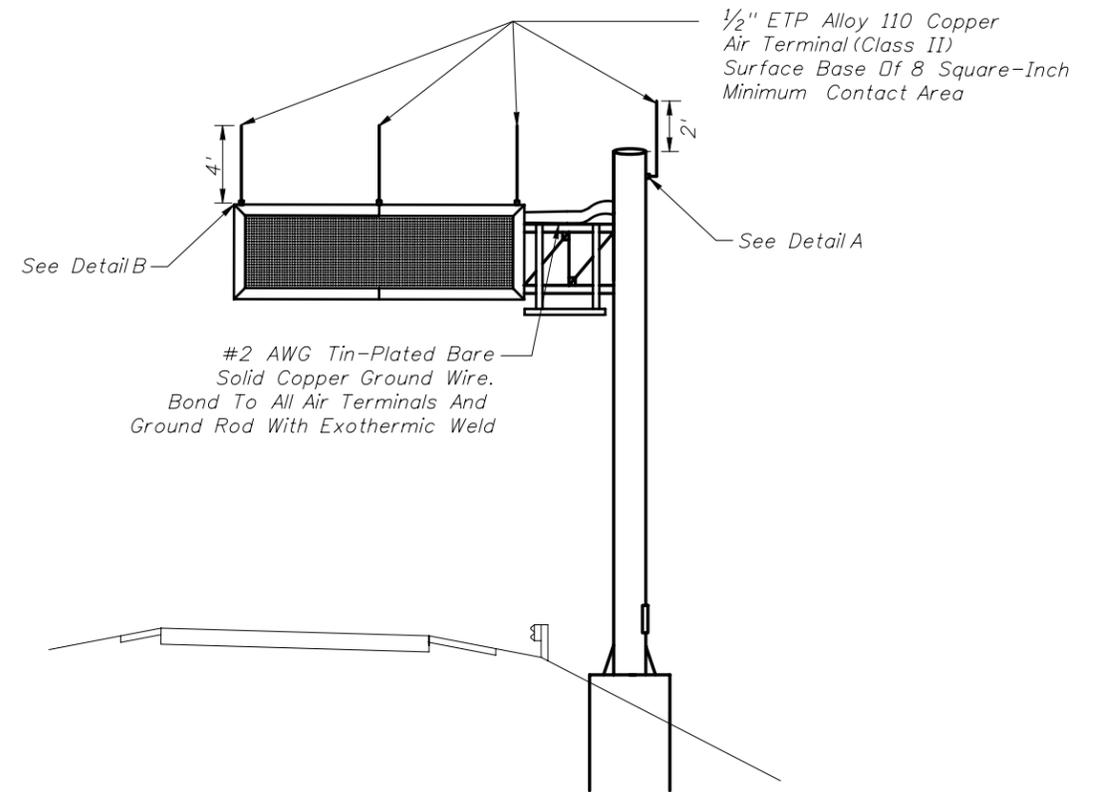
2010 Interim Design Standard

**DYNAMIC MESSAGE SIGN  
WALK-IN**

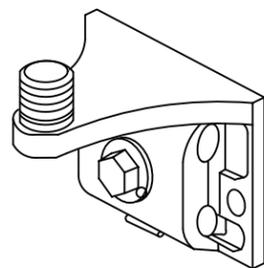
Interim Date	Sheet No.
07/01/10	5 of 10
Index No.	
18300	



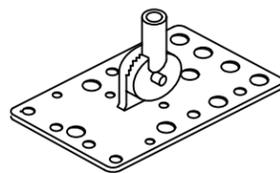
SPAN DMS



CANTILEVER DMS



DETAIL A



DETAIL B

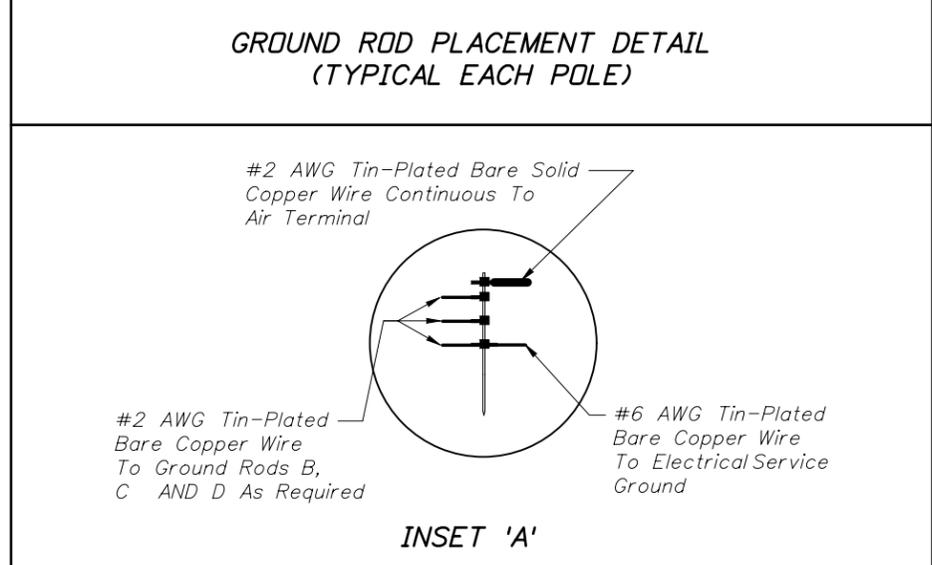
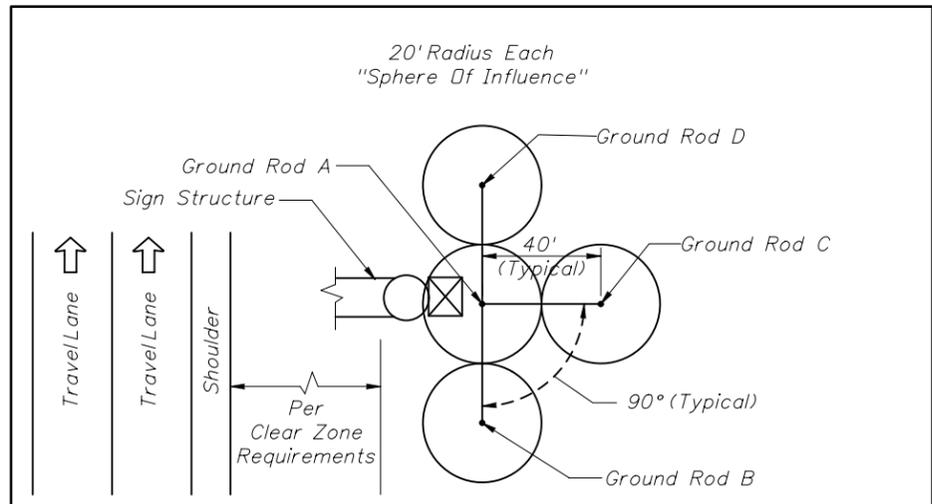
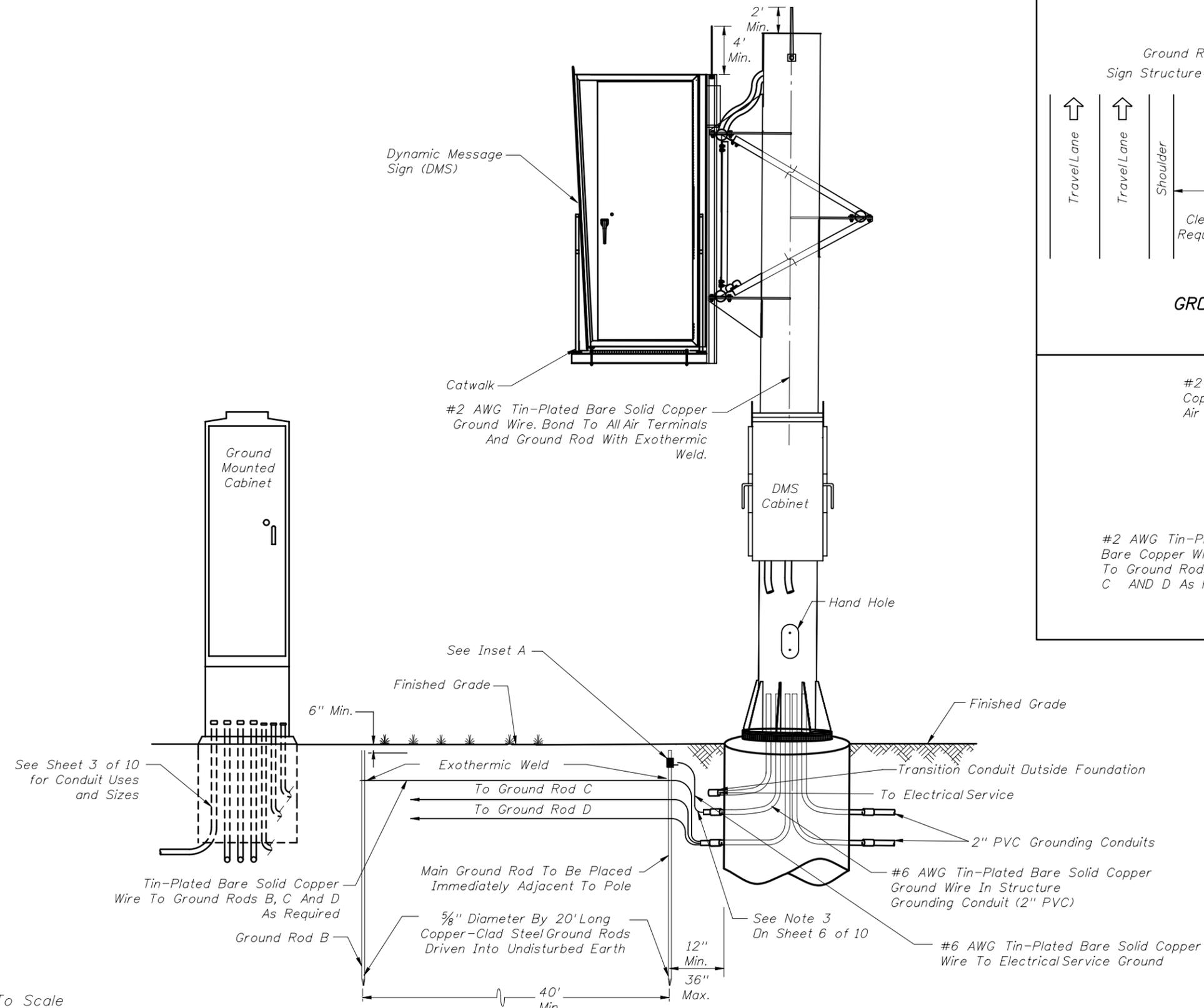
**GENERAL NOTES:**

1. All grounding materials shall meet the requirements of Section A620 of the current Minimum Specifications For Traffic Control Signal Devices (MSTCSD), except as noted.
2. Exothermically weld all connections to ground rods.
3. The contractor may, upon approval of the Engineer, install a 30-foot sectional ground rod for instances when conditions will not allow for the installation of the 3 auxiliary ground rods.
4. Install marker tape directly above all grounding electrodes and conductors.
5. Copper flat surfaces shall be bolted, welded, or brazed securely to framework to maintain electrical continuity.
6. All air terminals must meet UL-96A.
7. Grounding system shall be placed within right of way.
8. See Sheet 7 of 10 for ground rod placement detail.
9. Lightning protection shall conform to NFPA 780. Spacing between air terminals shall not exceed 20 feet.

Not To Scale

GROUNDING DETAILS (1 of 2)

REVISIONS							2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		DYNAMIC MESSAGE SIGN WALK-IN		07/01/10	6 of 10
05/14/10	HAB	Renumbered Index 18305, sheet 2 of 2 to Index Number 18300 6 of 10. Revised conduit and cabling details and conduit sizes.							Index No. 18300	

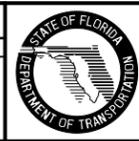


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GROUNDING DETAILS (2 of 2)

**REVISIONS**

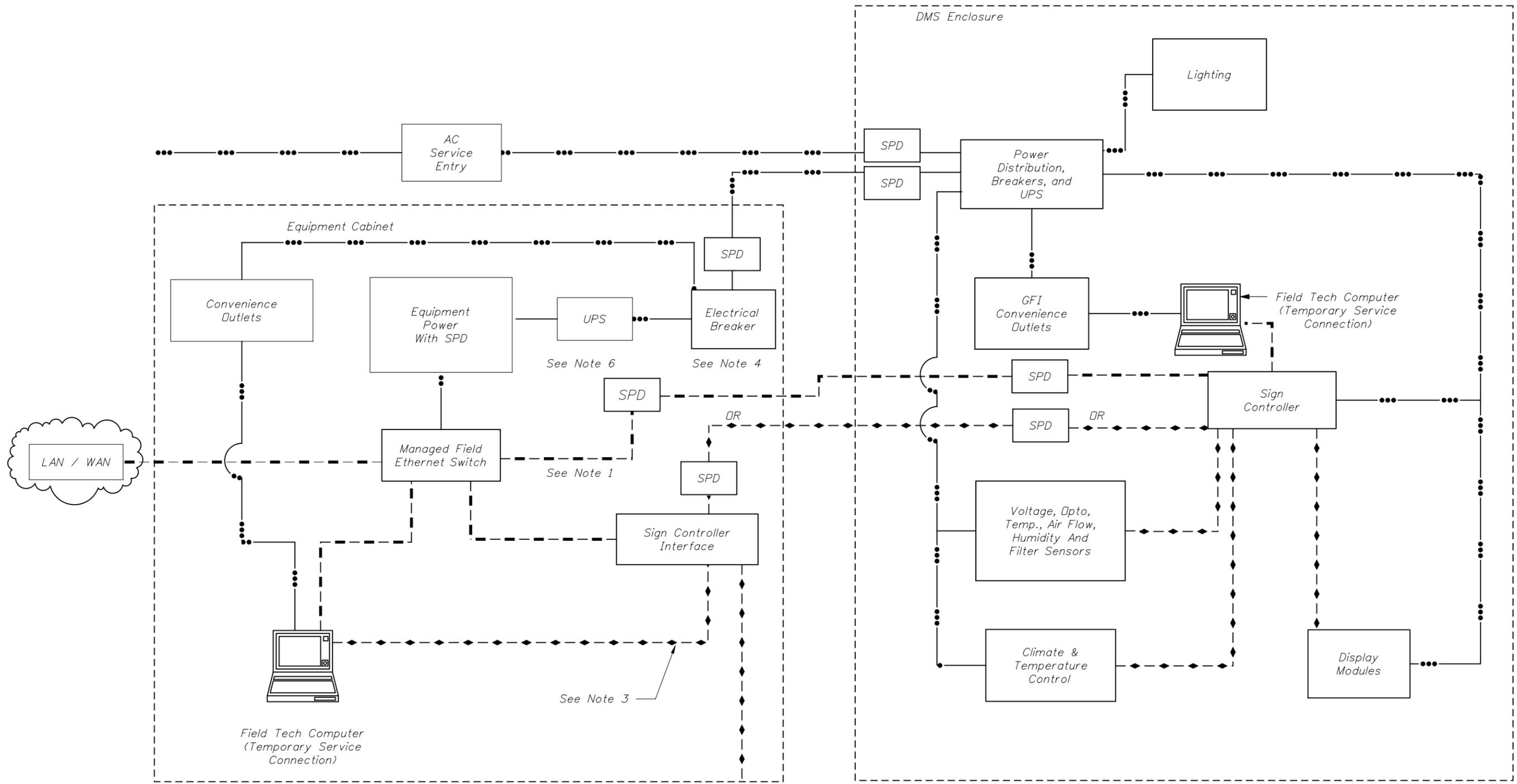
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
05/14/10	HAB	Renumbered Index 18305, sheet 1 of 2 to Index Number 18300 7 of 10. Revised conduit and cabling details and conduit sizes.			



2010 Interim Design Standard

**DYNAMIC MESSAGE SIGN  
WALK-IN**

Interim Date  
07/01/10  
Sheet No.  
7 of 10  
Index No.  
**18300**

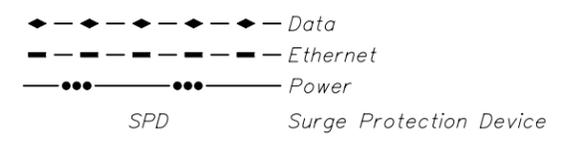


**GENERAL NOTES:**

1. Provide single ethernet connection from the managed field ethernet switch to either the sign controller interface in cabinet or sign controller in sign enclosure.
2. Locate cabinet as shown in plans.
3. Serial data link is for communications directly to the DMS controller.
4. Cabinet must include at least one breaker to control all cabinet power.
5. AC service entrance may be located in cabinet or sign housing.
6. UPS equipment location may vary. Diagram indicates functional requirements that uninterrupted power must be available in cabinet and sign housing.

Dial-up Telephone and Modem (optional)

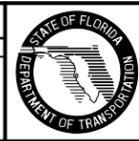
**LEGEND**



SIGN AND CABINET WIRING DIAGRAM

**REVISIONS**

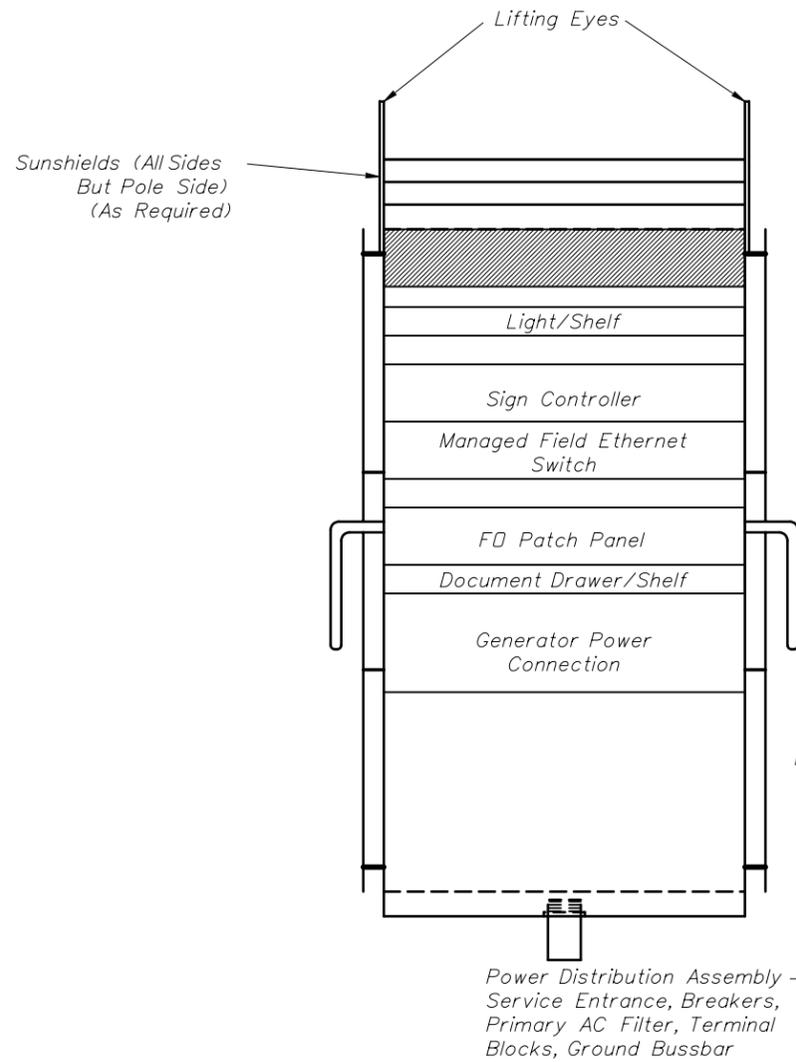
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
05/14/10	HAB	Renumbered Index 18300 to Index Number 18300 8 of 10. Moved Ethernet equipment from sign to cabinet.			



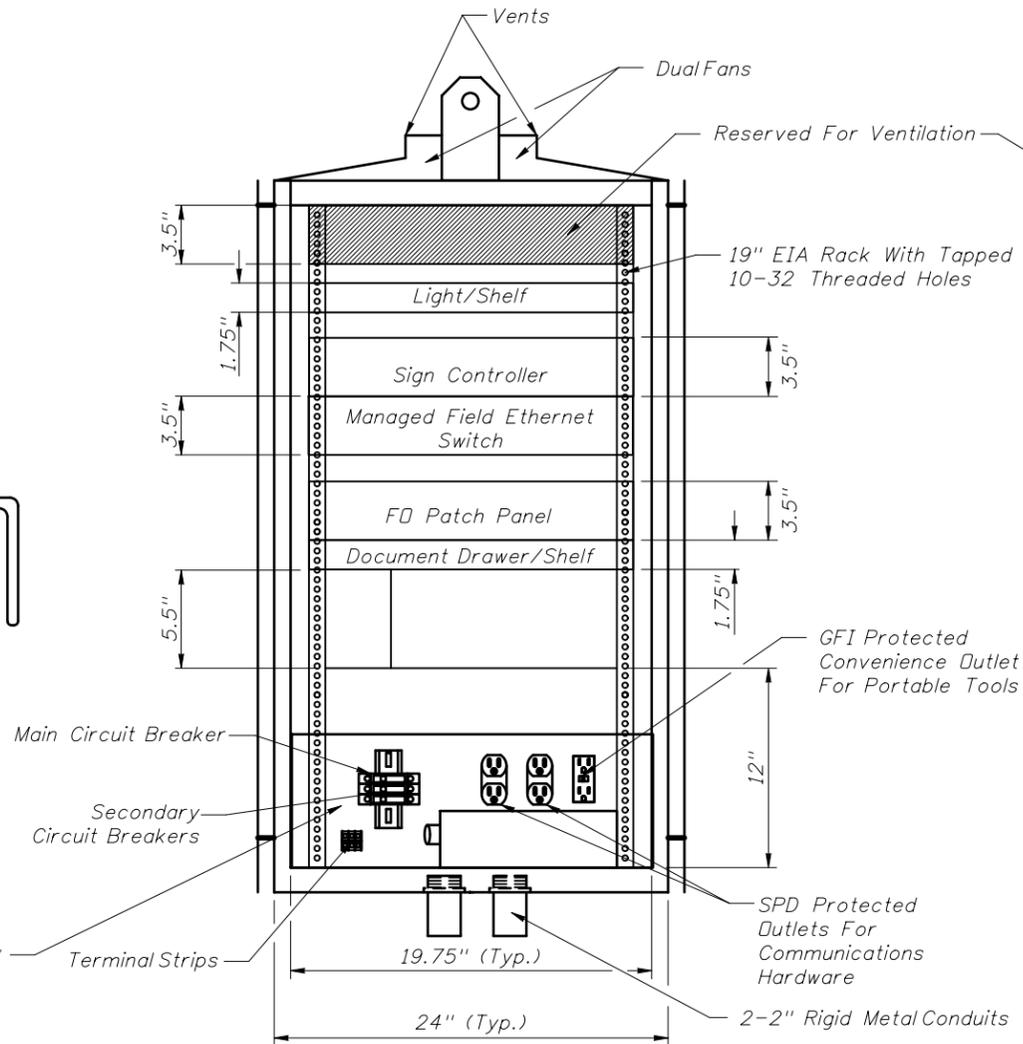
2010 Interim Design Standard

**DYNAMIC MESSAGE SIGN WALK-IN**

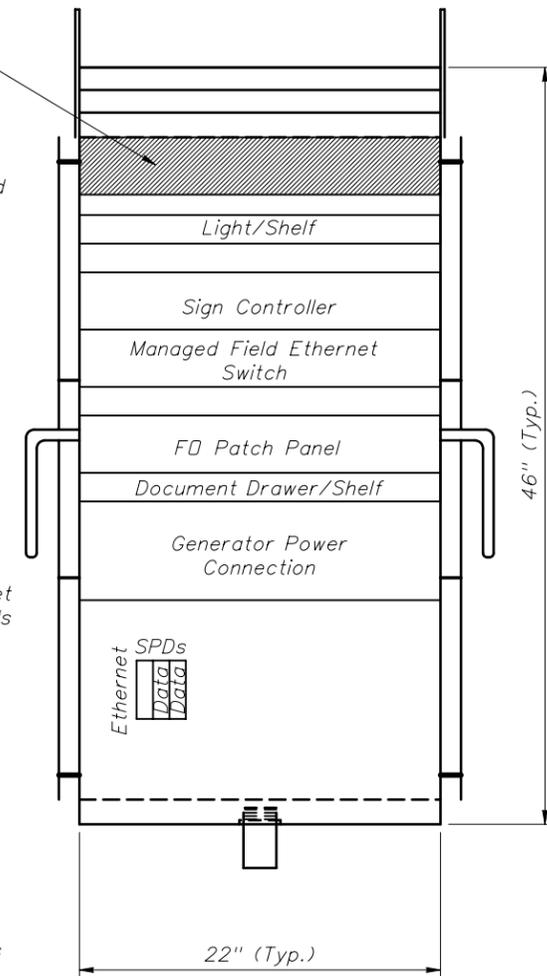
Interim Date: 07/01/10  
 Sheet No.: 8 of 10  
 Index No.: 18300



LEFT SIDE VIEW



FRONT VIEW  
POLE MOUNTED DMS CABINET



RIGHT SIDE VIEW

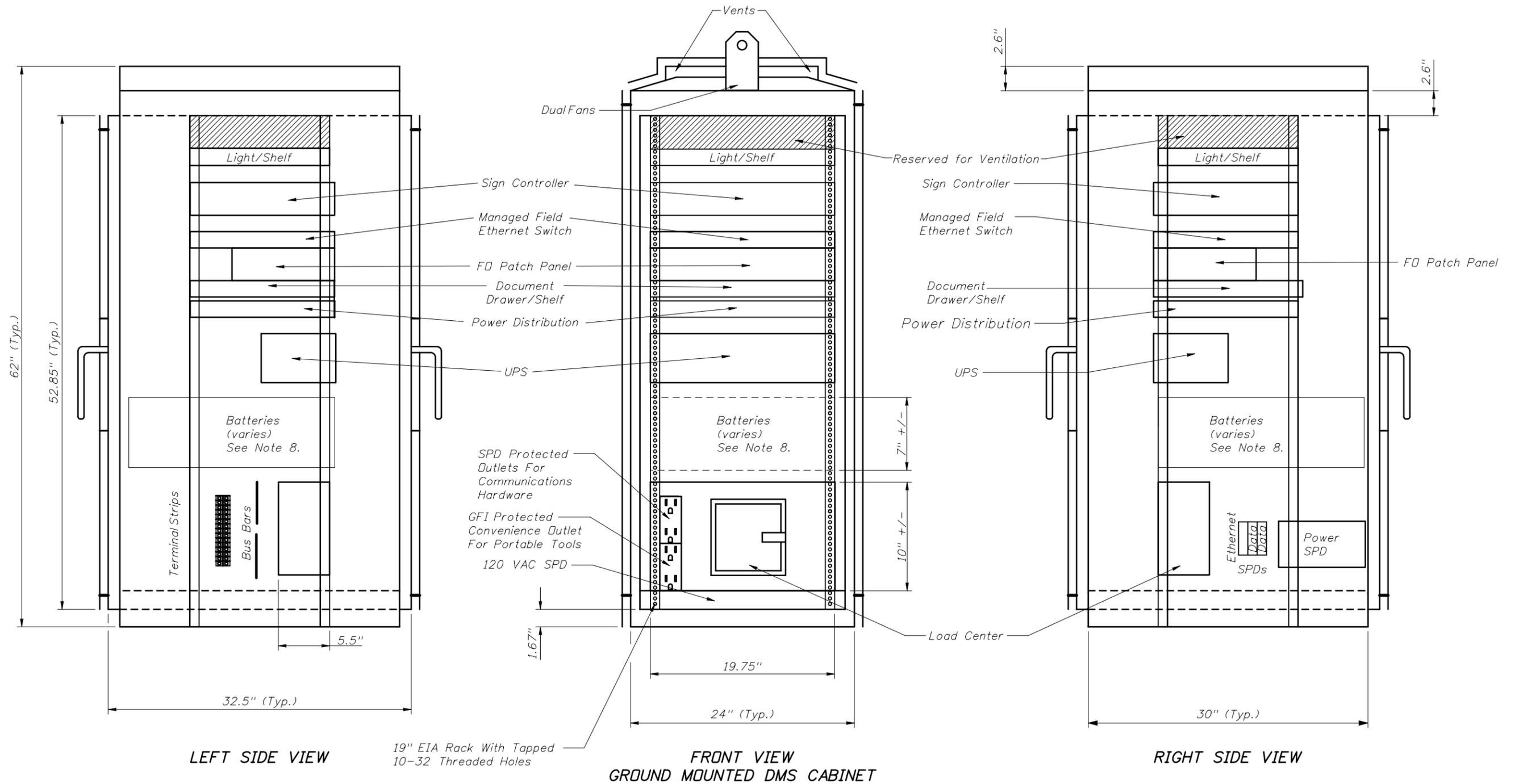
**GENERAL NOTES:**

1. Cabinet layout is for pole or ground mounted installations.
2. All dimensions and equipment locations are approximate.
3. Conduit entrances are at bottom of cabinet.
4. Minimum number of duplex outlets is three, (2) SPD protected and (1) GFI protected.
5. Either an access controller or local access panel shall be provided to provide full access to DMS sign for control, programming and troubleshooting.
6. Load center shall be sized for connected equipment and convenience outlets with at least one main disconnect and three circuit breakers.
7. Batteries and UPS may be located in sign housing or cabinet.
8. Power Distribution Assembly component layout, orientation and location may vary.

Not To Scale

CABINET LAYOUT (1 of 2)

REVISIONS							2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		DYNAMIC MESSAGE SIGN WALK-IN		07/01/10	9 of 10
05/14/10	HAB	Renumbered Index 18301 to Index Number 18300 10 of 10. Added shelves, drawer, generator connection, sunshields, revised load center.							Index No. 18300	

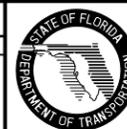


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CABINET LAYOUT (2 of 2)

REVISIONS

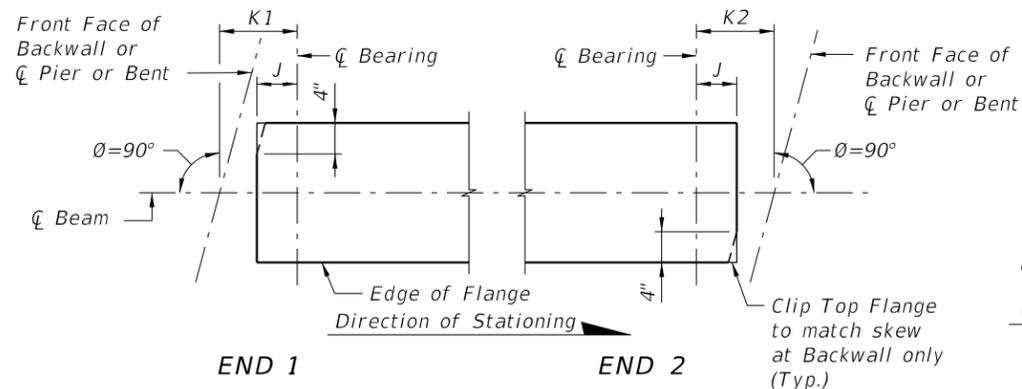
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	HAB	Added as new sheet for base mounted cabinet.			



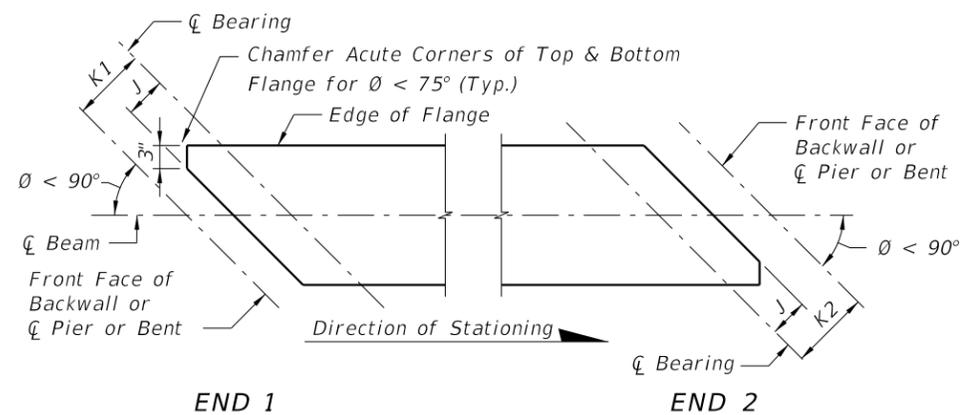
2010 Interim Design Standard

**DYNAMIC MESSAGE SIGN  
WALK-IN**

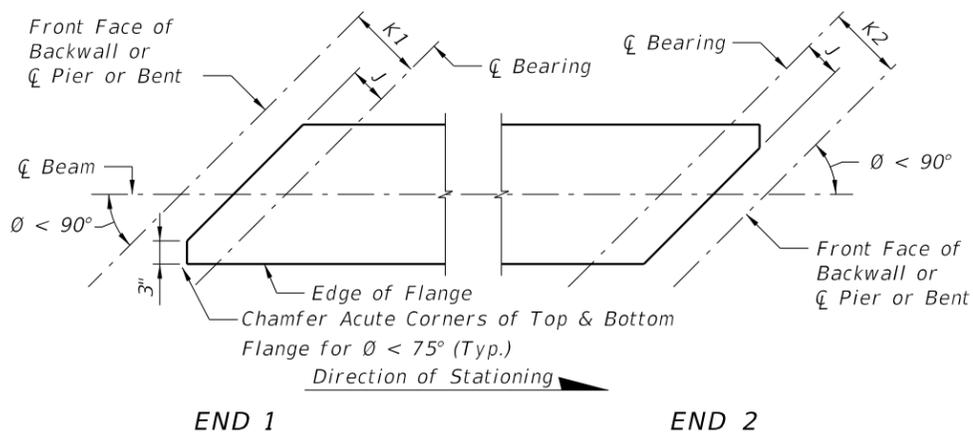
Interim Date	Sheet No.
07/01/10	10 of 10
Index No.	
<b>18300</b>	



**CASE 1**  
(Standard Orientation for New Construction)

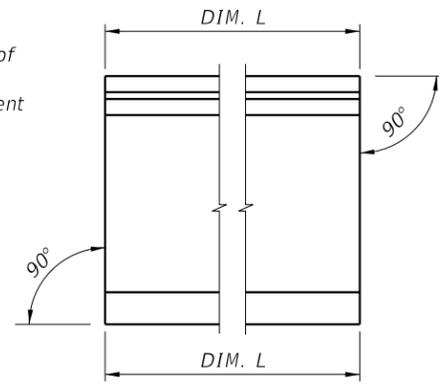


**CASE 2**  
(Special Orientation for Widening)

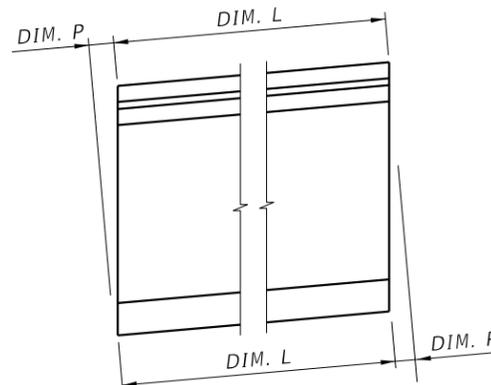


**CASE 3**  
(Special Orientation for Widening)

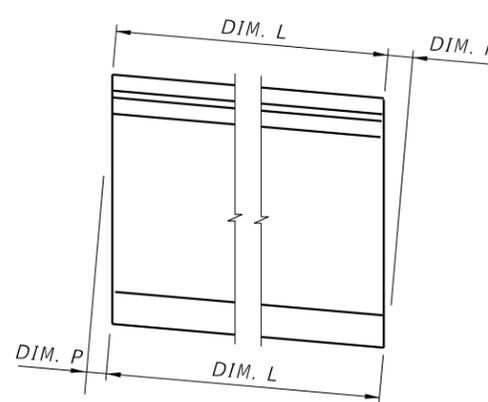
**SCHEMATIC PLAN VIEWS AT BEAM ENDS**



**CONDITION 1**  
(P = 0.0)



**CONDITION 2**



**CONDITION 3**

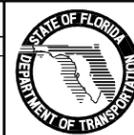
**SCHEMATIC END ELEVATIONS OF BEAMS**  
(Showing Vertical Bevel of Beam End)

**BEAM NOTES**

- All bar dimensions are out-to-out.
- Place one (1) Bar 5K or 5Z at each location as detailed alternating the direction of the ends for each bar (see "ELEVATION AT END OF BEAM", Index Nos. 20036, 20045, 20054, 20063, 20072 and 20078).
- Strands N shall be either ASTM A416, Grade 250 or Grade 270, seven-wire strands  $\frac{3}{8}$ "  $\phi$  or larger, stressed to 10,000 lbs. each.
- Cut all Prestressing Strands flush with the end of the beam after detensioning and remove recessed strand grommets without damaging the surrounding concrete.
- Epoxy coat ends of beams, including clipped and chamfer surfaces, with two layers of Type F-1 epoxy compound within 7 days of detensioning. Prepare concrete surface and apply in accordance with the manufacturer's recommendations. The finish thickness of the epoxy coating must be a minimum  $\frac{1}{16}$ ".
- Unless otherwise noted, the minimum concrete cover for reinforcing steel shall be 2".
- At the Contractor's option, welded deformed wire reinforcement may be used in lieu of Bars 3D, 5K, 4M, and 5Z as shown on the Standard Details for each beam size. Welded deformed wire reinforcement shall conform to AASHTO M221, with a minimum yield strength of 75 ksi.
- Install Safety Sleeves approximately 2'-0" from ends of beam and spaced on 8'-0" (Max.) centers. Safety Sleeves shall be 2 1/2" NPS x 5" Sch. 40 PVC Pipe with Cap. Holes shall be free of debris and water prior to casting deck.
- For beams with skewed end conditions, the end reinforcement, defined as Bars 3C1, 3C2, 3D1, 3D2, 5K, 4M1, 4M2, 5Y and 5Z placed within the limits of the spacing for Bars 3C in "ELEVATION AT END OF BEAM", shall be placed parallel to the skewed end of the beam. Bars 3D3, 5K and 4M3 located beyond the limits of Bars 3C shall be placed perpendicular to the longitudinal axis of the beam. Fan Bars as needed to avoid overlapping bars at the transition to Bars 3D3 and 4M3, and field cut to maintain minimum cover. Provide additional Bars 4M1, 4M2, 3D1 and 3D2 as required; additional bars are not included in the Number Required on the "BILL OF REINFORCING STEEL". For placement locations, see "SKEWED BEAM END DETAILS". Adjust the dimensions of Bars 3C1, 3C2, 3D1, 3D2, 4M1 and 4M2 as shown on the "BENDING DIAGRAM" for skewed end conditions.
- Placement of Bars 3C1, 3D1 and 4M1 correspond to END 1, and Bars 3C2, 3D2 and 4M2 correspond to END 2. END 1 and END 2 are shown on the beam "ELEVATION".
- For Beams with vertically beveled end conditions, place first row of Bars 3C1, 3C2, 3D1, 3D2, 5K, 5Y and 5Z parallel to the end of the beam. Progressively rotate remaining bars within the limits of Bars 5Z until vertical by adjusting the spacing at the top of beam up to a maximum of 1". For welded deformed wire reinforcement, cut top cross wire and rotate bars as required or reduce end cover at top of the beam to minimum 1".
- For beams with skewed end conditions, welded deformed wire reinforcement shall not be used for end reinforcement (Bars 3D1, 3D2, 4M1 and 4M2).
- Bars 5K and 5Z shall be placed and tied to the fully bonded strands in the bottom or center row (see "STRAND PATTERN" on the Table of Beam Variables in Structures Plans). At the Contractor's option the length of the bottom legs of Bars 5K and 5Z may be extended to facilitate tying to the exterior strands. For welded deformed wire reinforcement, supplemental transverse #4 bars are permitted to support Pieces K & S under the cross wires on the bottom row of strands.
- At the Contractor's option, Bars 3D1, 3D2 and 3D3 may be fabricated as a single bar with a 1'-0" minimum lap splice of the top legs, or the length of the bottom legs may be extended to facilitate tying to the exterior strands.
- For referenced Dimensions, Angles and Case Numbers, see the Table of Beam Variables in Structures Plans.

**REVISIONS**

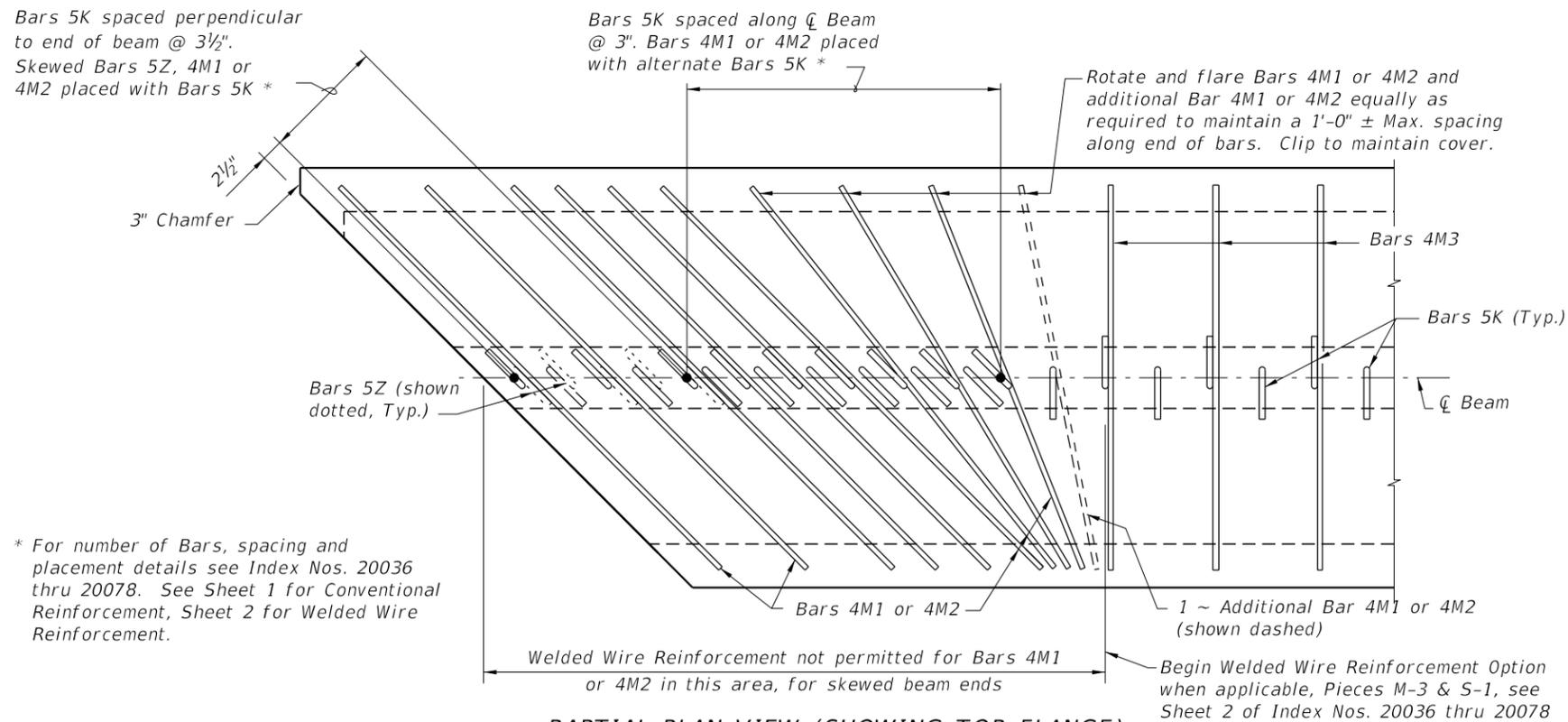
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	New Design Standard			
07/01/10	SJN	Changed SCHEMATIC PLAN VIEWS AT BEAM ENDS, Notes 3, 4, and 5. Deleted INSTRUCTIONS TO DESIGNER.			



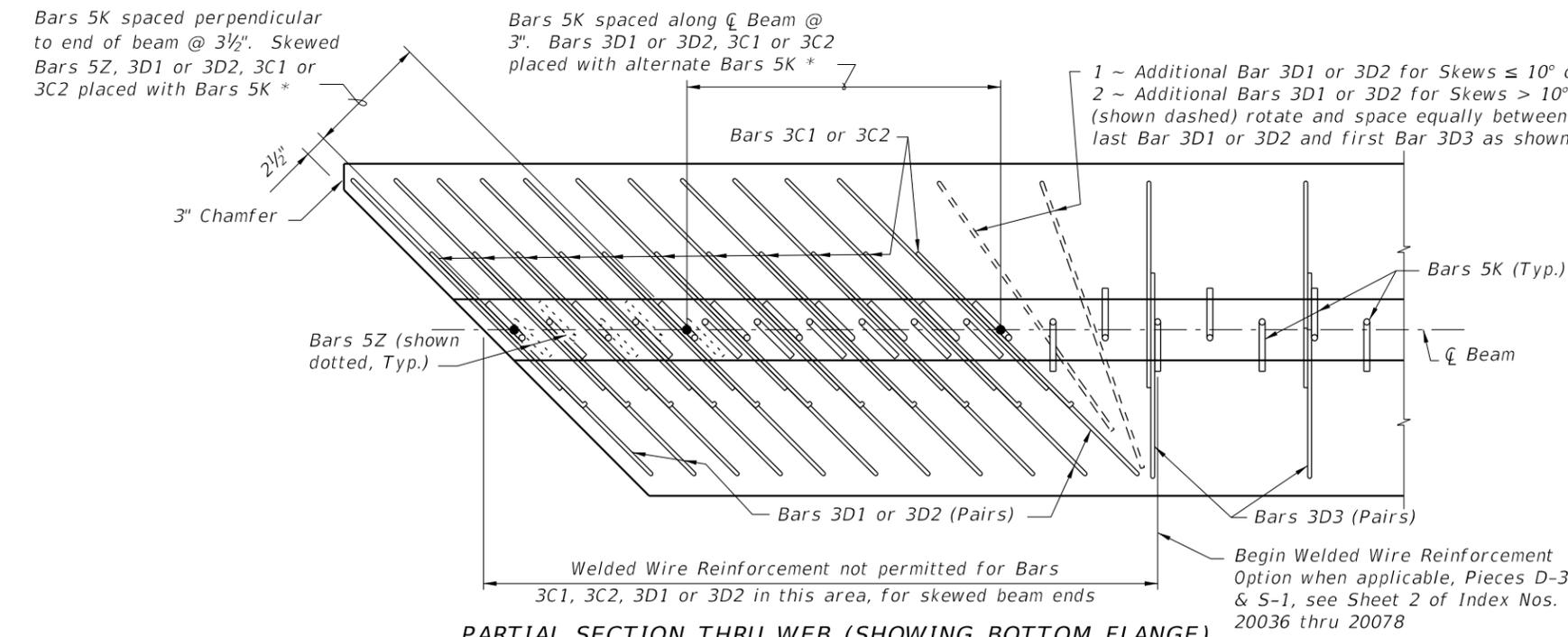
2010 Interim Design Standard

**TYPICAL FLORIDA-I BEAM  
DETAILS AND NOTES**

Interim Date	Sheet No.
07/01/10	1 of 2
Index No.	
<b>20010</b>	

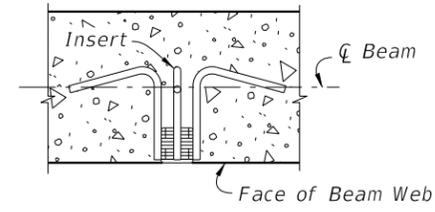


**PARTIAL PLAN VIEW (SHOWING TOP FLANGE)**  
 (End 1 Shown, End 2 Similar)  
 (Bars 5A, 4L, 5Y & Strands N not shown for clarity)



**PARTIAL SECTION THRU WEB (SHOWING BOTTOM FLANGE)**  
 (End 1 Shown, End 2 Similar)  
 (Bars 4L, Bars 5Y & Strands not shown for clarity)

**SKewed BEAM END DETAILS FOR WIDENING EXISTING BRIDGES**  
 (Florida-I 36 Beam shown, others similar)

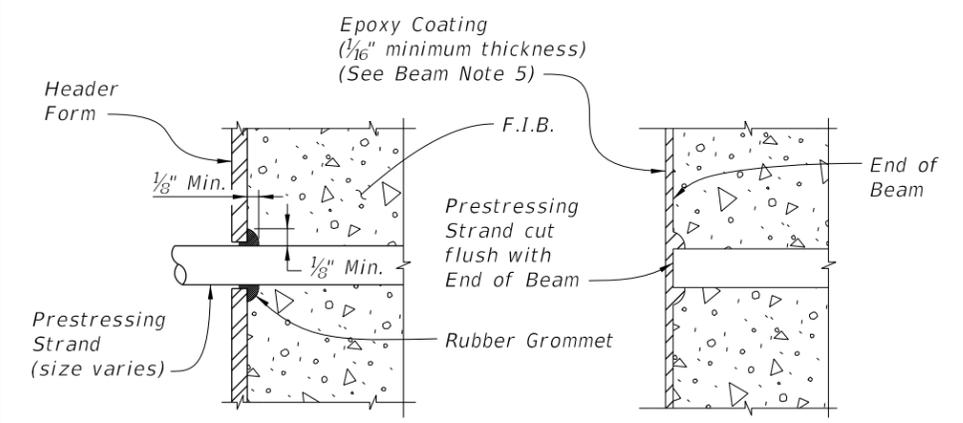


**PLAN SECTION THRU BEAM WEB AT INSERT FOR DIAPHRAGM REINFORCING**  
 (When Intermediate Diaphragms are Required by Design)

**INSERT NOTES**

1. Provide 1" Ø, zinc-electroplated, ferrule wing nut or coil inserts, UNC threads, 1/0 minimum gage wire, not more than 4" in depth with a minimum ultimate tensile strength of 11,400 lbs. in 4,000 p.s.i. concrete.
2. If inserts are needed on both sides (faces) of beam webs, an assembly as long as the thickness of the beam web, consisting of two (2) ferrule or coil inserts attached by two (2) or more struts may be utilized. The connecting struts shall have a minimum ultimate tensile strength of 11,400 lbs.
3. Inserts for diaphragm reinforcing are required at each end of each intermediate diaphragm shown on the Beam Framing Plan and may be required at the end of the beams when end diaphragms are shown. See Superstructure and Beam Framing Plans for longitudinal location of inserts for each face of beam.

**INSERT DETAIL**



**TYPICAL SECTION DURING BEAM CASTING**      **TYPICAL SECTION AFTER EPOXY COATING**

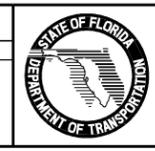
**STRAND GROMMET NOTES**

1. Grommet shall be natural rubber or polychloroprene (neoprene).
2. Grommets shall be sized to fit snugly around strands. Split grommets are permitted if they fit snugly into the form header holes and prevent mortar leakage.
3. Remove grommets prior to epoxy coating the ends of the beams.

**RECESSED STRAND GROMMET DETAILS AT BEAM ENDS**

**REVISIONS**

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	New Design Standard			
07/01/10	SJN	Added RECESSED STRAND GROMMET DETAIL AT BEAMS ENDS.			
		Changed first sentence of INSERT NOTE 3.			

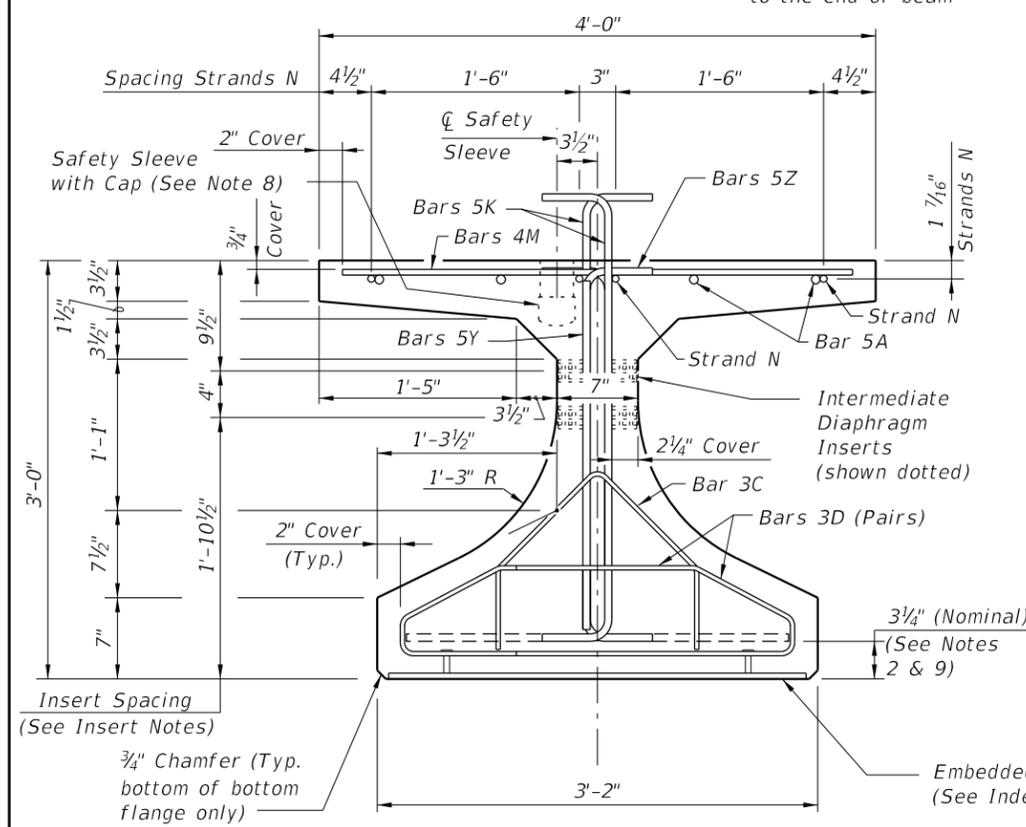


2010 Interim Design Standard

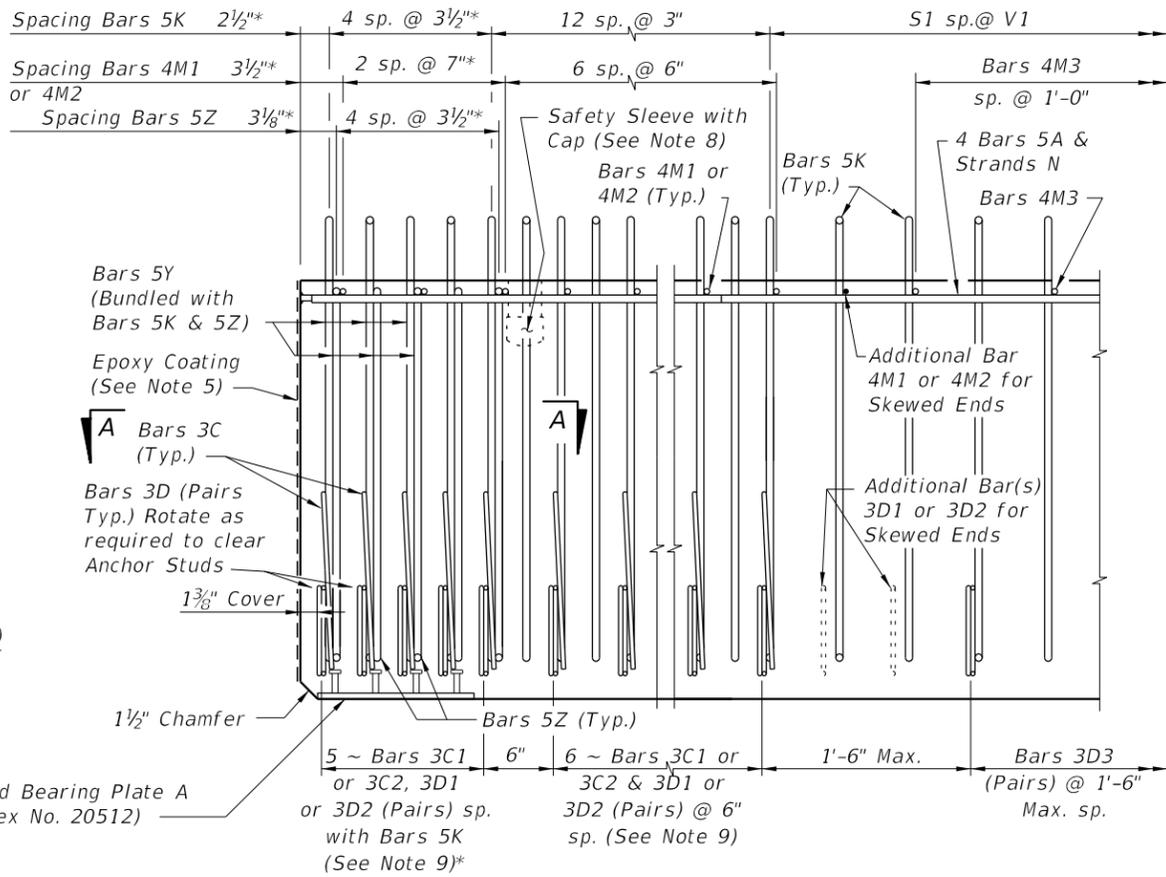
**TYPICAL FLORIDA-I BEAM DETAILS AND NOTES**

Interim Date: 07/01/10  
 Sheet No.: 2 of 2  
 Index No.: 20010

\* These dimensions are measured perpendicular to the end of beam



END VIEW

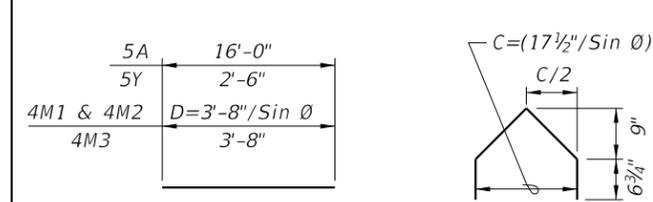


ELEVATION AT END OF BEAM  
(Flanges Not Shown For Clarity)  
(End 1 Shown, End 2 Similar)

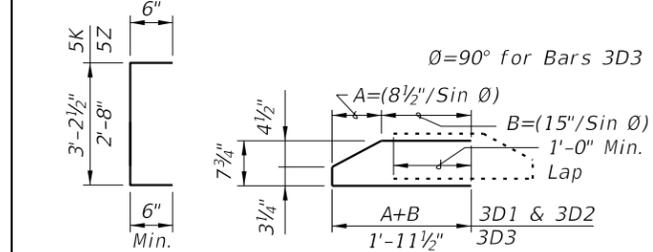
CONVENTIONAL REINFORCING BAR BENDING DETAILS

BILL OF REINFORCING STEEL				
MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	8	16'-0"
C1	9, 10 & 11	3	11 (End 1)	Varies
C2	9, 10 & 11	3	11 (End 2)	Varies
D1	9, 10, 11 & 14	3	22 (End 1)	Varies
D2	9, 10, 11 & 14	3	22 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	4'-2"
M1	9 & 10	4	9 (End 1)	Varies
M2	9 & 10	4	9 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	3/8" Ø Strand	4	DIM L
Y	9 & 11	5	12	2'-6"
Z	2, 9, 11 & 13	5	10	3'-8"

BENDING DIAGRAMS (See Note 1)

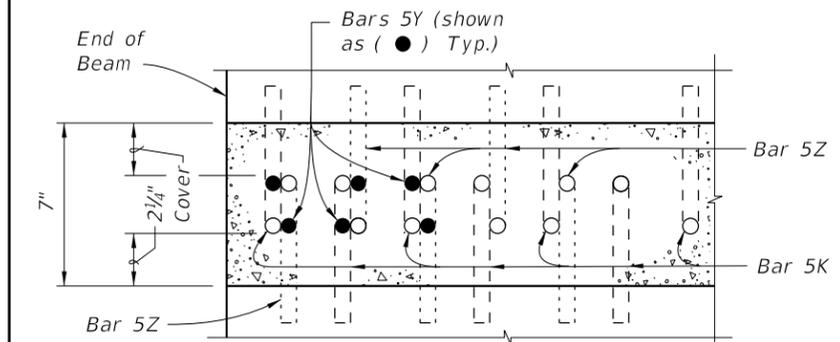


BARS 5A, 4M1, 4M2, BARS 3C1 & 3C2  
4M3 & 5Y

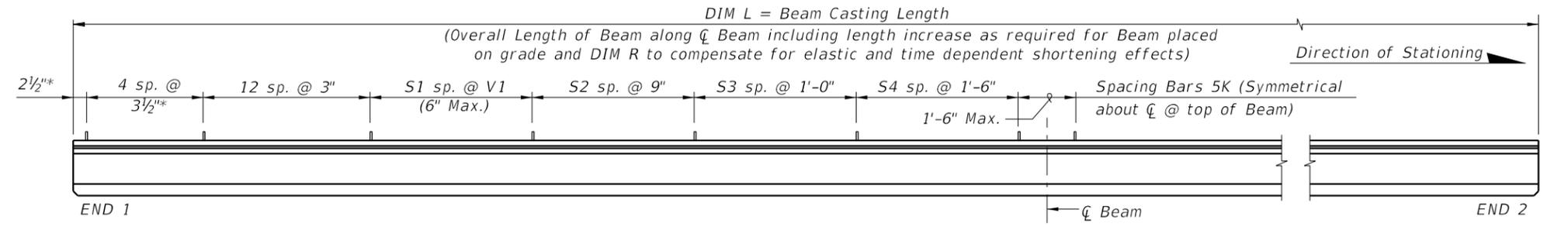


BARS 5K & 5Z BARS 3D1, 3D2 & 3D3

NOTES:  
 A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.  
 B. For referenced notes, see Index No. 20010.  
 C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.

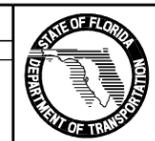


SECTION A-A FOR CONVENTIONAL REINFORCING  
(Showing Bars 5K, 5Y & 5Z Only)

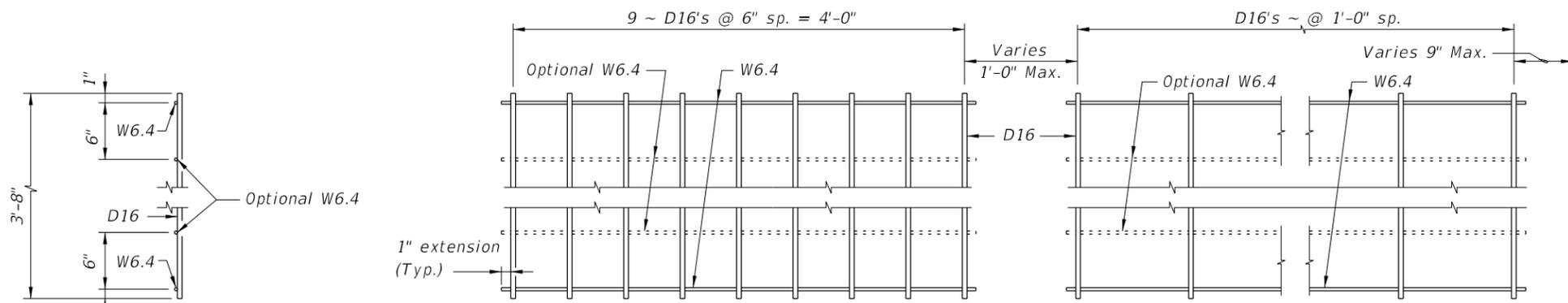


ELEVATION

REVISIONS			
DATE	BY	DESCRIPTION	
01/01/10	RMS	New Design Standard	
07/01/10	SJN	Deleted Bars 4L; Changed NOTE NUMBERS for Strand N; and Embedded Bearing Plate A to Index No. 20512; Added Epoxy Coating to end of beam.	

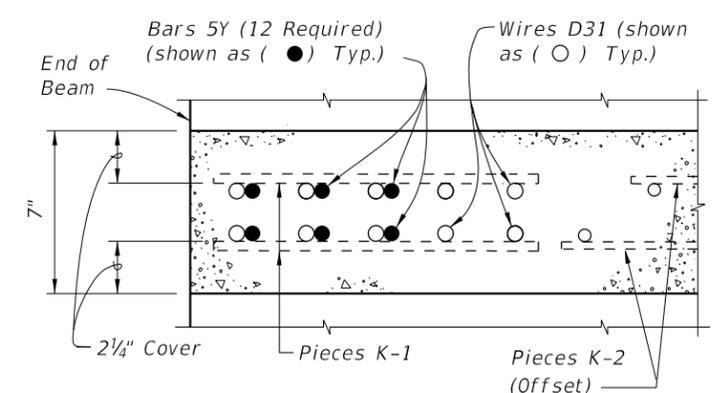


ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS

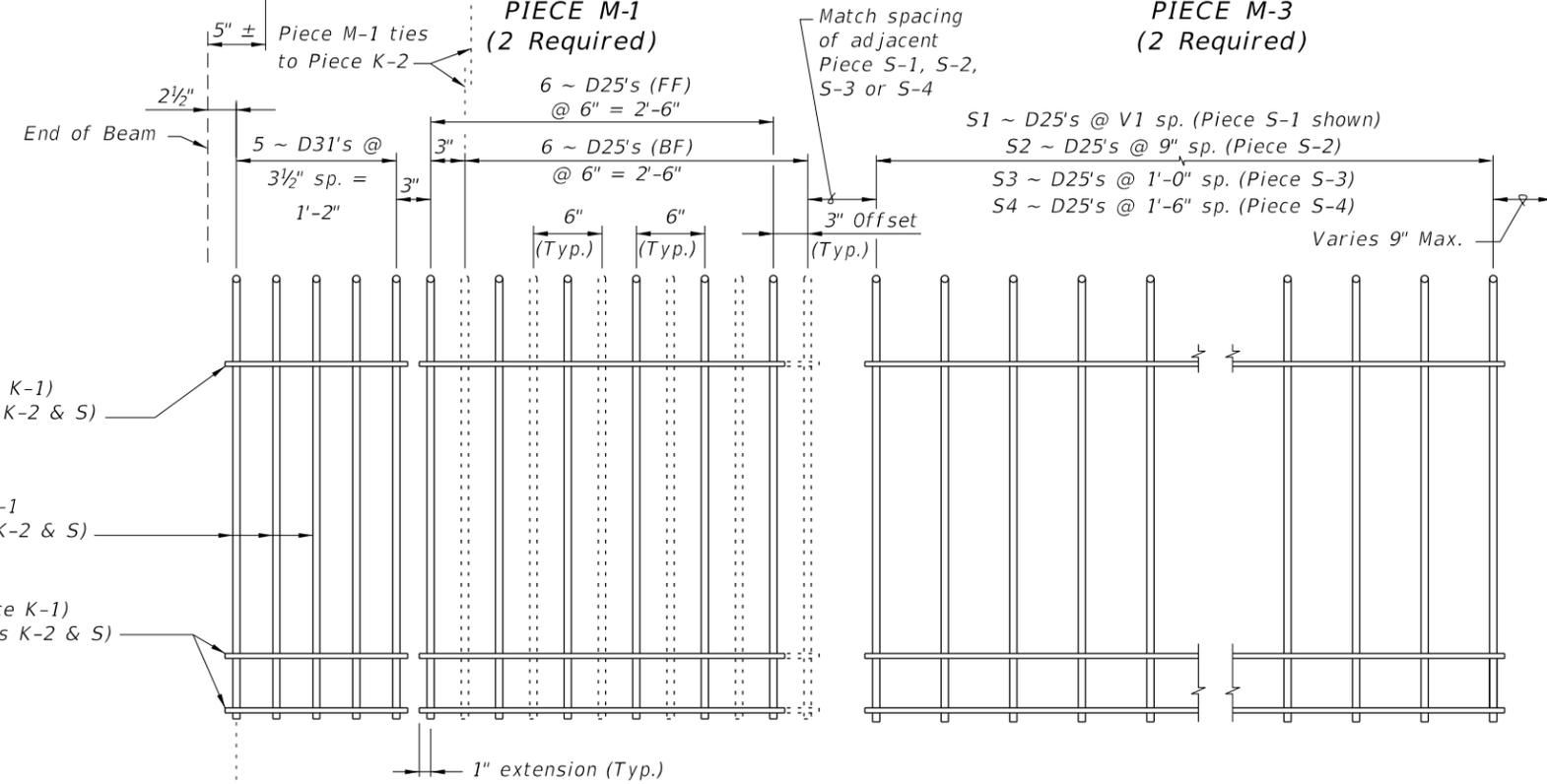


PLAN VIEW  
PIECE M-1  
(2 Required)

PLAN VIEW  
PIECE M-3  
(2 Required)



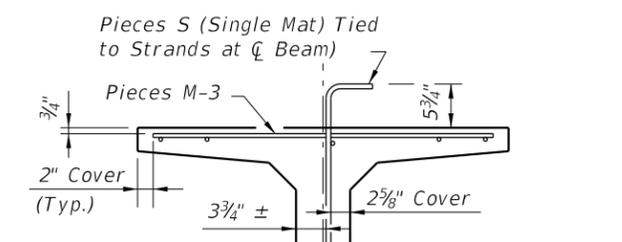
SECTION A-A  
FOR WELDED WIRE REINFORCEMENT



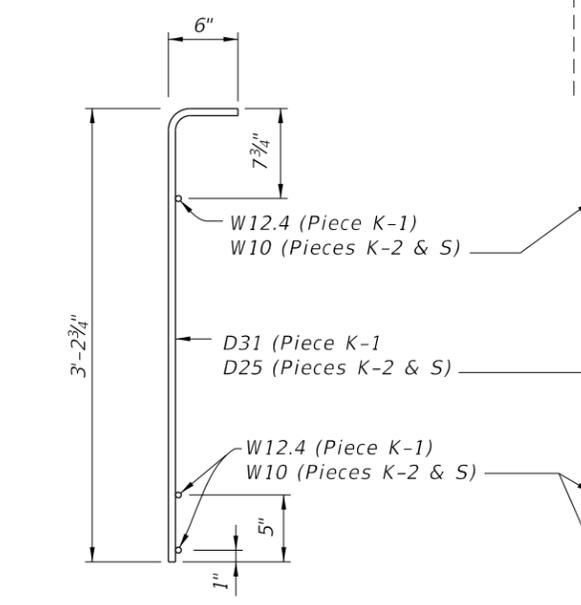
PIECE K-1  
(Aligned EF)  
(4 Required ~ 2 Pairs)

PIECE K-2  
(FF Shown Solid,  
BF Shown Dashed)  
(4 Required)

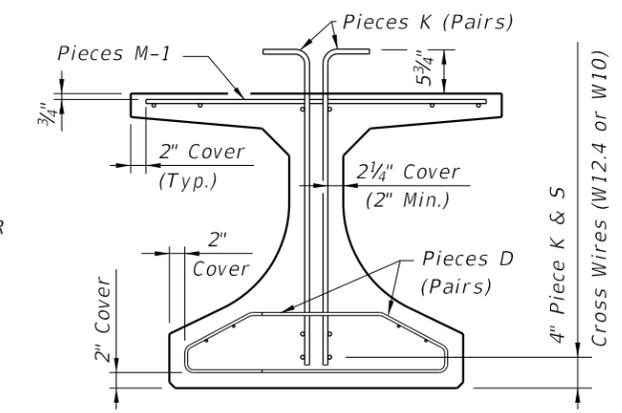
PIECE S-1, S-2, S-3 or S-4  
(2 Required Each Piece)



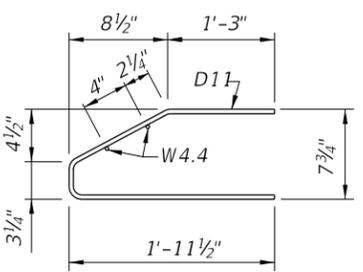
PARTIAL SECTION AT CENTER BEAM



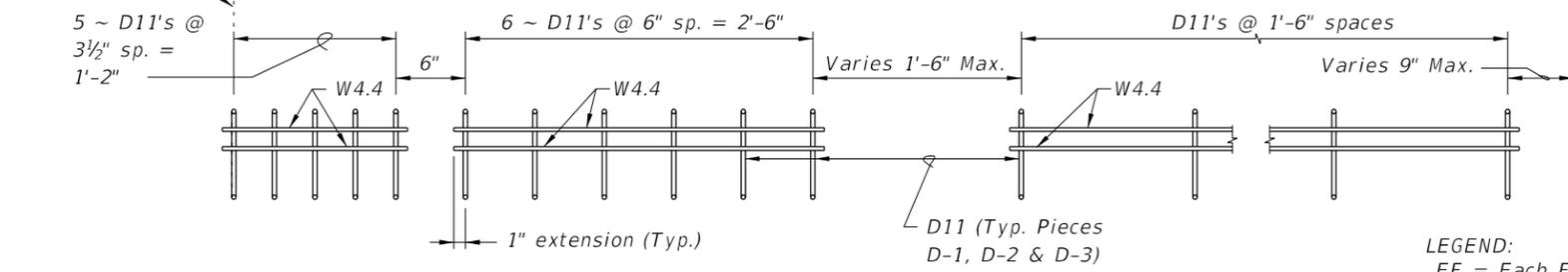
PIECES K & S  
END VIEW



PARTIAL BEAM END VIEW  
(Conventional Reinforcing Bars A, C, Y  
and Strands not shown for Clarity)



PIECES D  
END VIEW



PIECE D-1  
(4 Required ~ 2 Pairs)

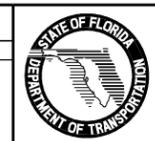
PIECE D-2  
(4 Required ~ 2 Pairs)

PIECE D-3  
(4 Required ~ 2 Pairs)

LEGEND:  
EF = Each Face  
FF = Front Face  
BF = Back Face

- NOTES:
- See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
  - Place Conventional Reinforcing Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
  - Pieces may be fabricated in multiple length sections.
  - For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcing Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars L references			
		Changed interior W6.4 wires to "Optional" for PIECES M.			



2010 Interim Design Standard

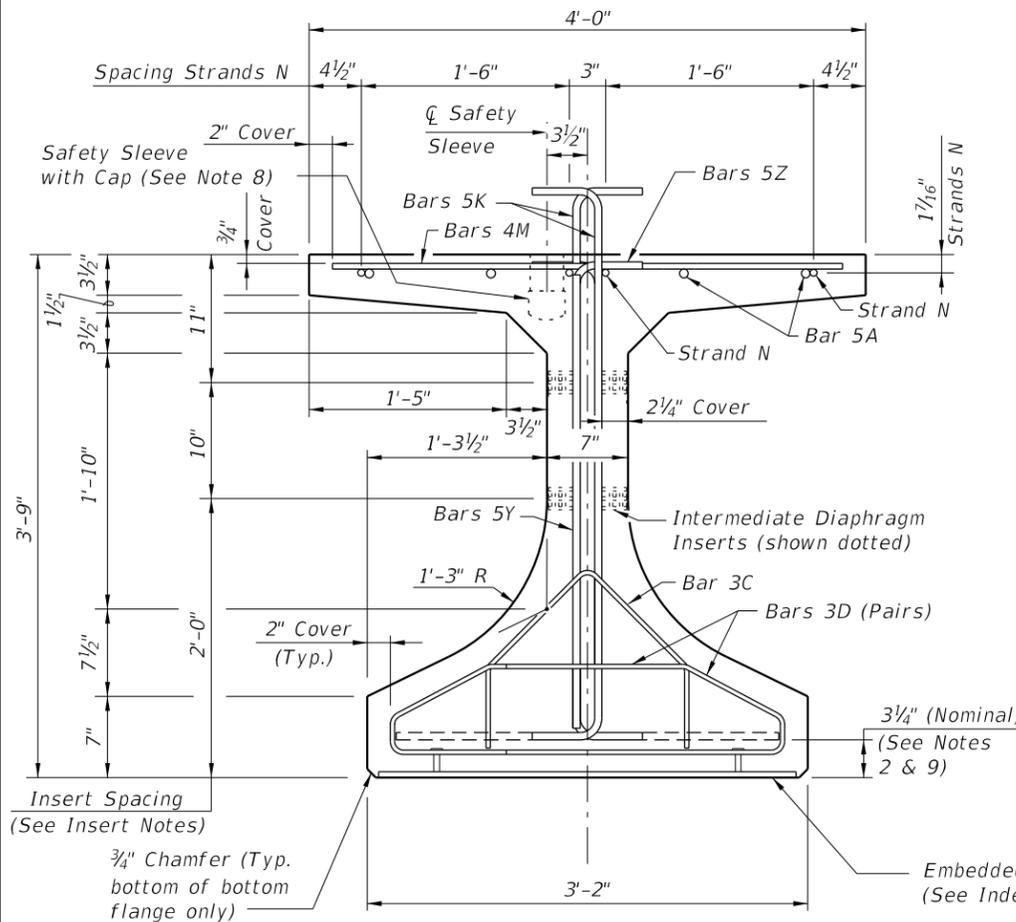
FLORIDA-I 36 BEAM - STANDARD DETAILS

Interim Date  
07/01/10

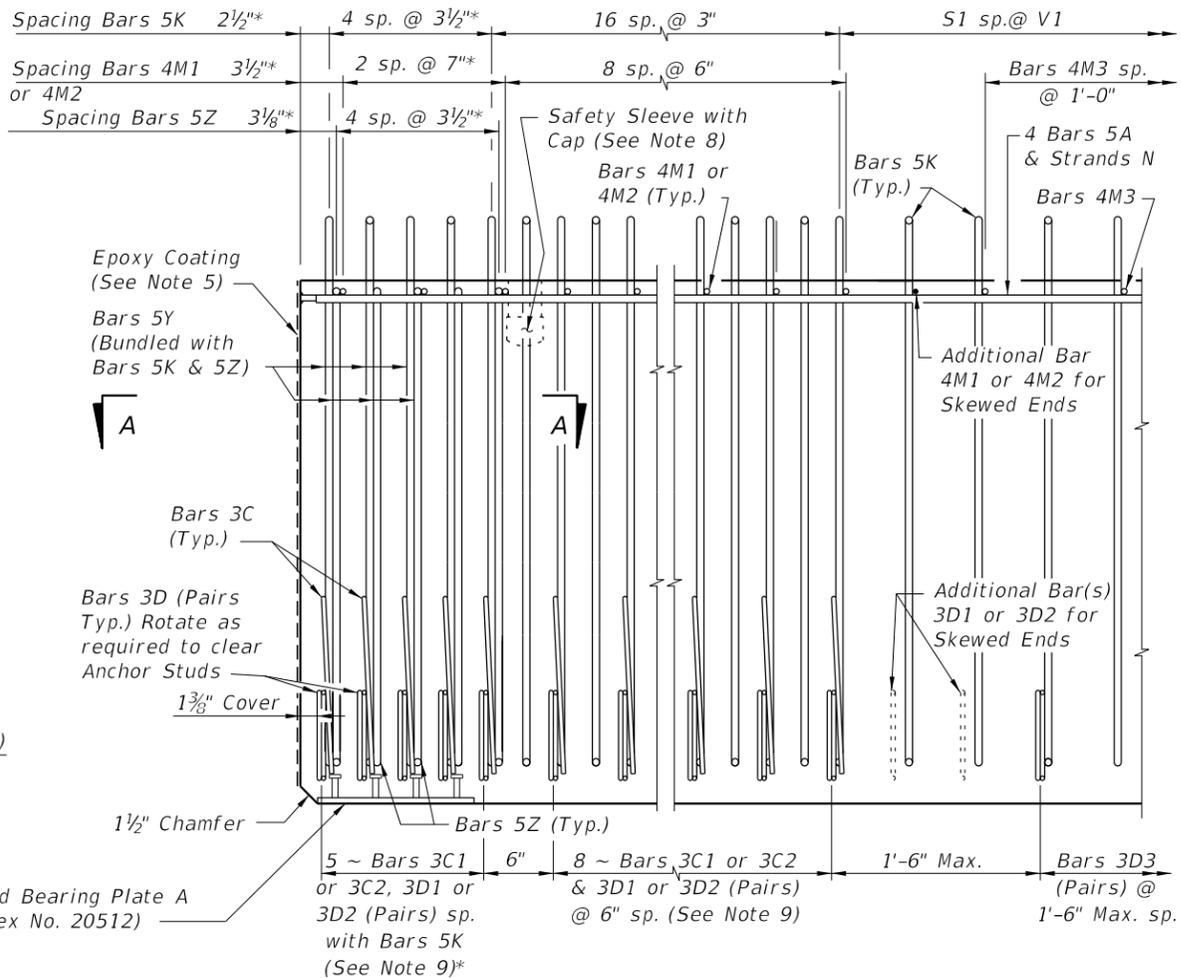
Sheet No.  
2 of 2

Index No.  
**20036**

\* These dimensions are measured perpendicular to the end of beam



END VIEW

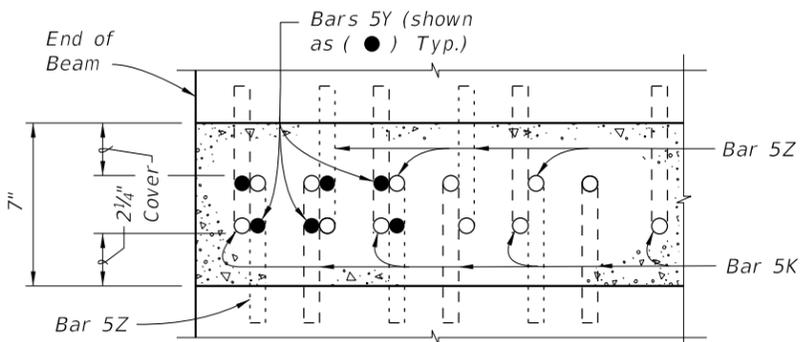
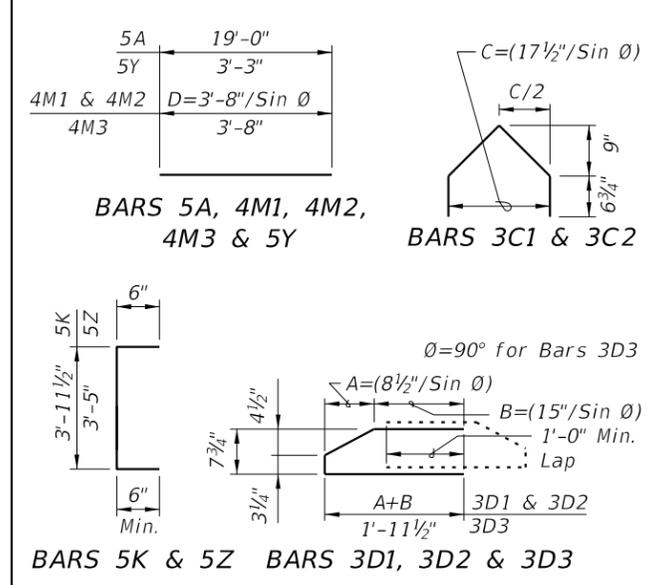


ELEVATION AT END OF BEAM  
(Flanges Not Shown For Clarity)  
(End 1 Shown, End 2 Similar)

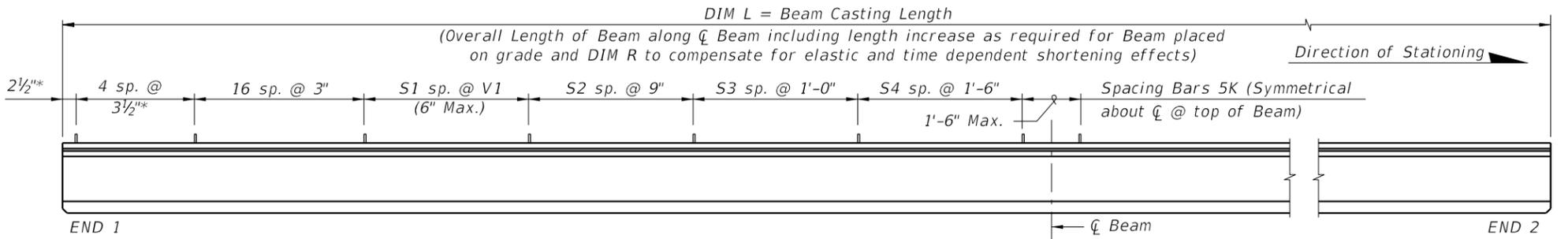
CONVENTIONAL REINFORCING BAR BENDING DETAILS

BILL OF REINFORCING STEEL				
MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	8	19'-0"
C1	9, 10 & 11	3	13 (End 1)	Varies
C2	9, 10 & 11	3	13 (End 2)	Varies
D1	9, 10, 11 & 14	3	26 (End 1)	Varies
D2	9, 10, 11 & 14	3	26 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	4'-11"
M1	9 & 10	4	11 (End 1)	Varies
M2	9 & 10	4	11 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	3/8" Ø Strand	4	DIM L
Y	9 & 11	5	12	3'-3"
Z	2, 9, 11 & 13	5	10	4'-5"

BENDING DIAGRAMS (See Note 1)



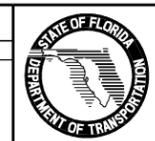
SECTION A-A FOR CONVENTIONAL REINFORCING  
(Showing Bars 5K, 5Y & 5Z Only)



ELEVATION

NOTES:  
 A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.  
 B. For referenced notes, see Index No. 20010.  
 C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.

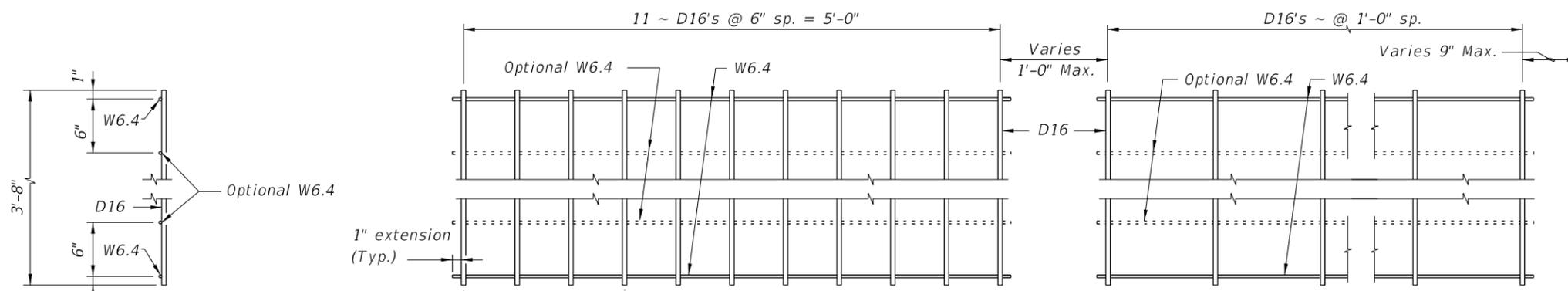
REVISIONS			
DATE	BY	DESCRIPTION	
01/01/10	RMS	New Design Standard	
07/01/10	SJN	Deleted Bars 4L; Changed NOTE NUMBERS for Strand N; and Embedded Bearing Plate A to Index No. 20512; Added Epoxy Coating to end of beam.	



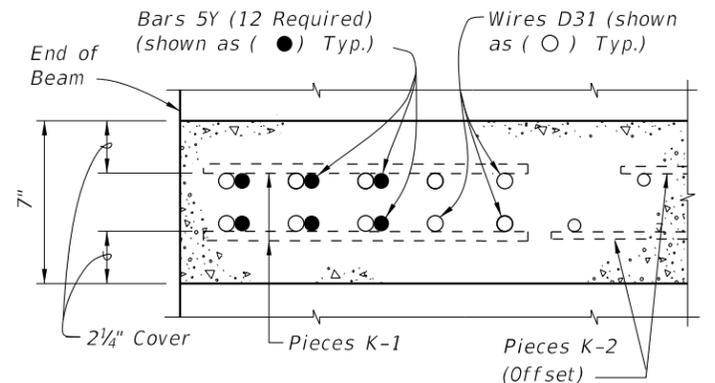
2010 Interim Design Standard  
**FLORIDA-I 45 BEAM - STANDARD DETAILS**

Interim Date: 07/01/10  
 Sheet No.: 1 of 2  
 Index No.: **20045**

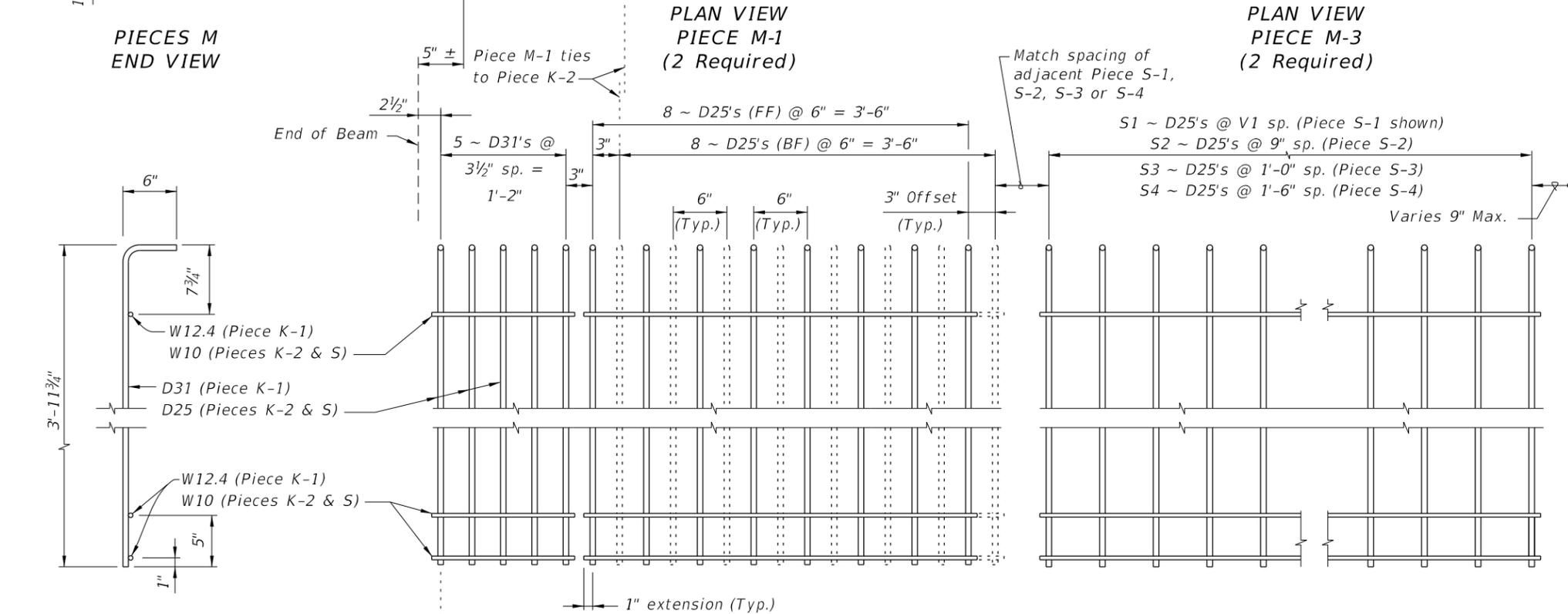
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



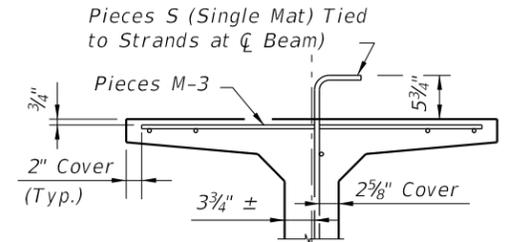
PLAN VIEW PIECE M-1 (2 Required)  
PLAN VIEW PIECE M-3 (2 Required)



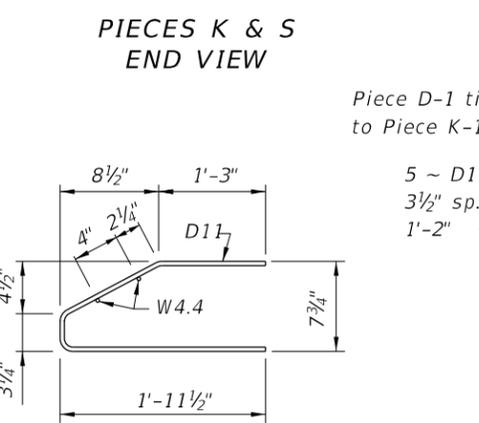
SECTION A-A FOR WELDED WIRE REINFORCEMENT



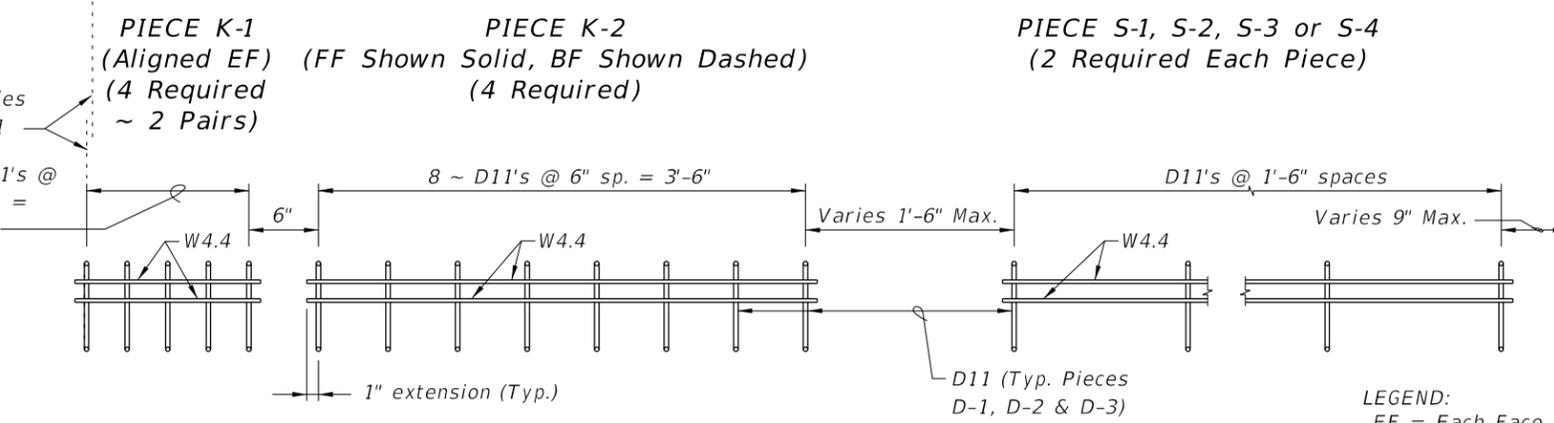
PIECE K-1 (Aligned EF) (FF Shown Solid, BF Shown Dashed) (4 Required ~ 2 Pairs)  
PIECE K-2 (4 Required) (4 Required)  
PIECE S-1, S-2, S-3 or S-4 (2 Required Each Piece)



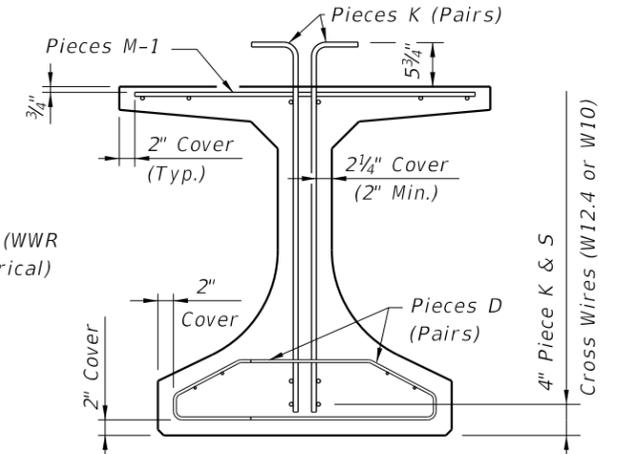
PARTIAL SECTION AT CENTER BEAM



PIECES D END VIEW



PIECE D-1 (4 Required ~ 2 Pairs)  
PIECE D-2 (4 Required ~ 2 Pairs)  
PIECE D-3 (4 Required ~ 2 Pairs)

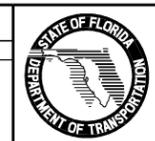


PARTIAL BEAM END VIEW (Conventional Reinforcing Bars A, C, Y and Strands not Shown for Clarity)

NOTES:  
a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.  
b. Place Conventional Reinforcing Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.  
c. Pieces may be fabricated in multiple length sections.  
d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

LEGEND:  
EF = Each Face  
FF = Front Face  
BF = Back Face

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars L references; Changed interior W6.4 wires to "Optional" for PIECES M.			



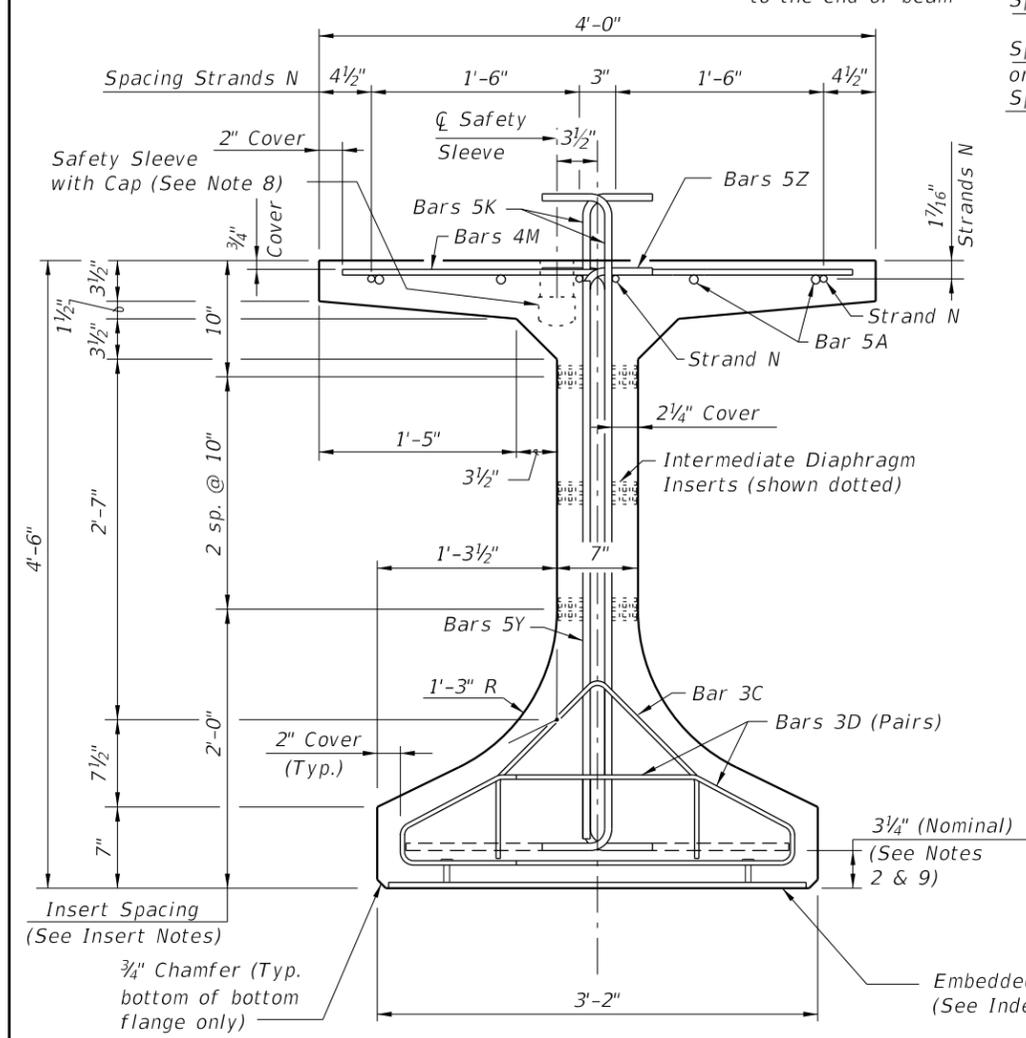
2010 Interim Design Standard

Interim Date 07/01/10  
Sheet No. 2 of 2

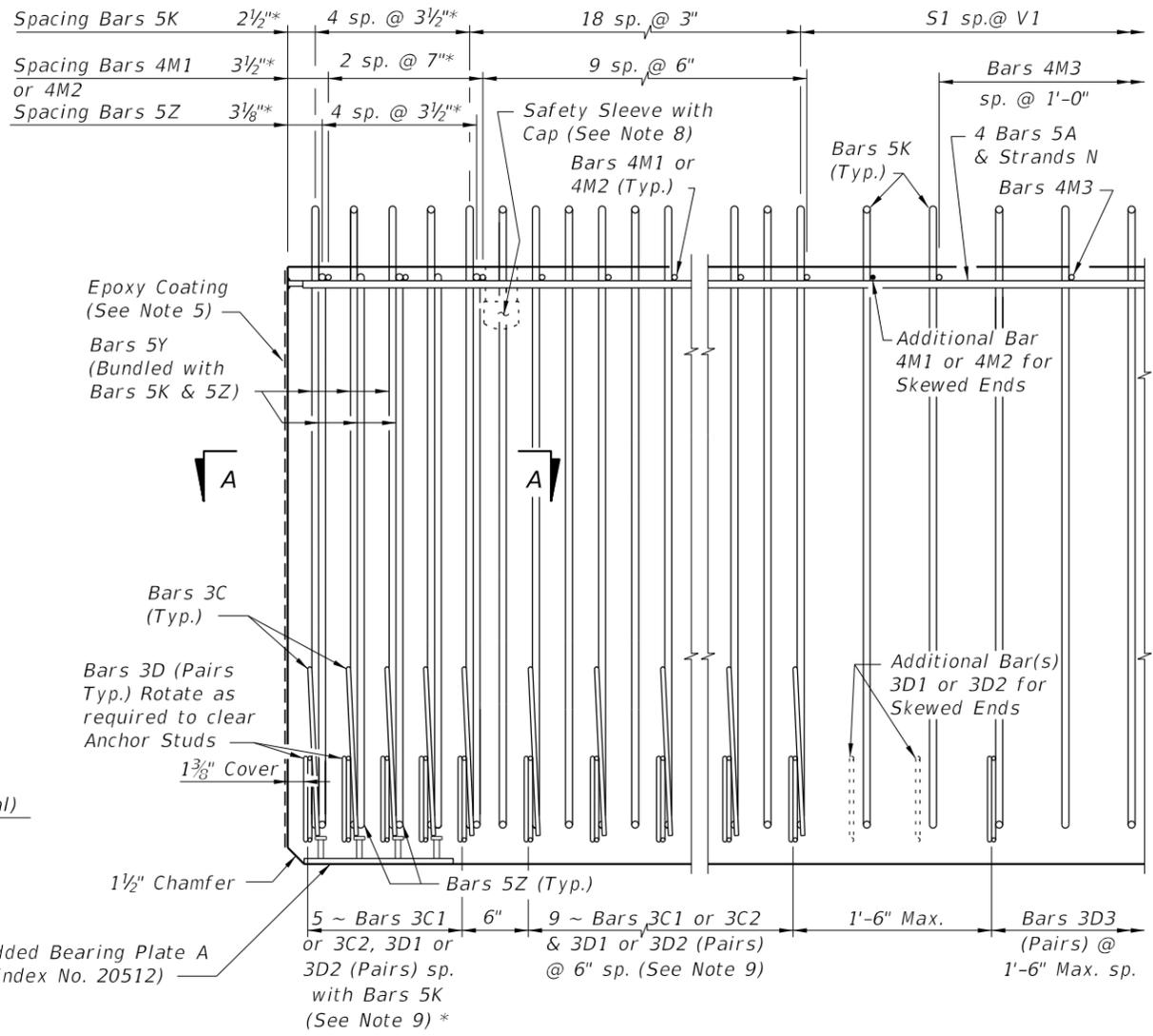
FLORIDA-I 45 BEAM - STANDARD DETAILS

Index No. 20045

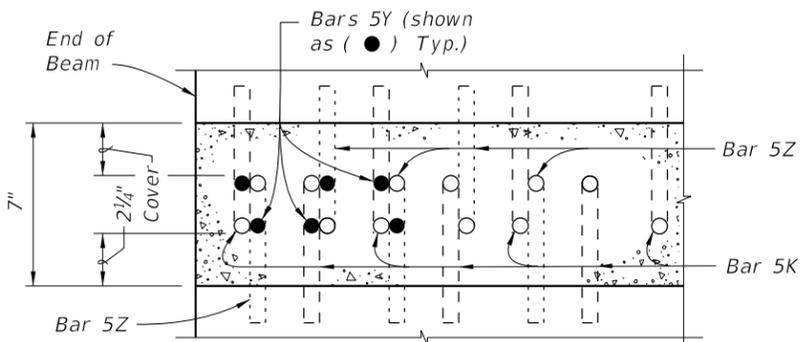
\* These dimensions are measured perpendicular to the end of beam



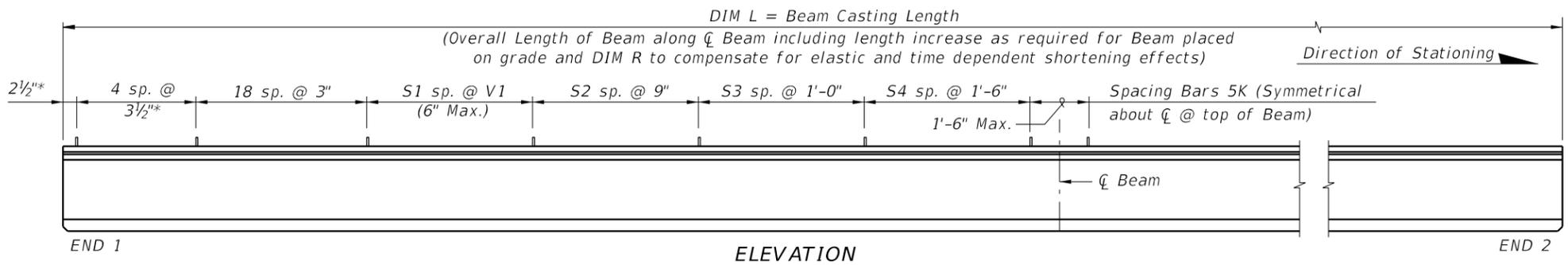
END VIEW



ELEVATION AT END OF BEAM  
(Flanges Not Shown For Clarity)  
(End 1 Shown, End 2 Similar)



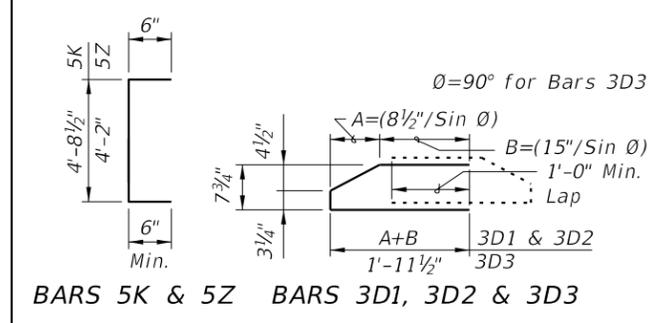
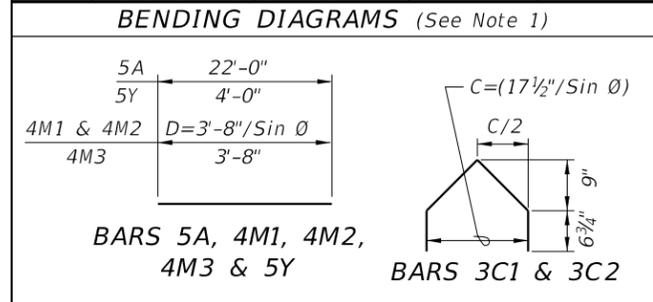
SECTION A-A FOR CONVENTIONAL REINFORCING  
(Showing Bars 5K, 5Y & 5Z Only)



ELEVATION

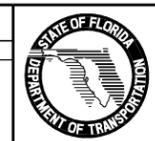
CONVENTIONAL REINFORCING BAR BENDING DETAILS

BILL OF REINFORCING STEEL				
MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	8	22'-0"
C1	9, 10 & 11	3	14 (End 1)	Varies
C2	9, 10 & 11	3	14 (End 2)	Varies
D1	9, 10, 11 & 14	3	28 (End 1)	Varies
D2	9, 10, 11 & 14	3	28 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	5'-8"
M1	9 & 10	4	12 (End 1)	Varies
M2	9 & 10	4	12 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	3/8" Ø Strand	4	DIM L
Y	9 & 11	5	12	4'-0"
Z	2, 9, 11 & 13	5	10	5'-2"

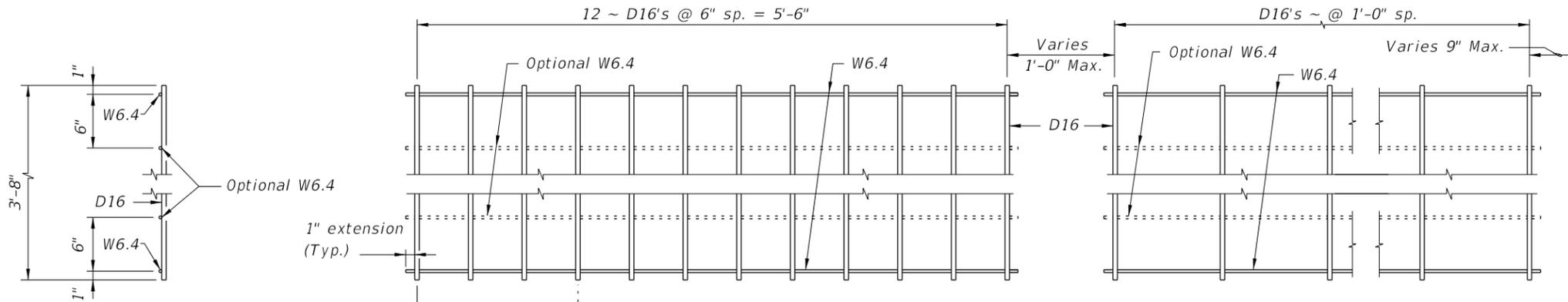


- NOTES:
- A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.
  - B. For referenced notes, see Index No. 20010.
  - C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars 4L; Changed NOTE NUMBERS for Strand N; and Embedded Bearing Plate A to Index No. 20512; Added Epoxy Coating to end of beam.			

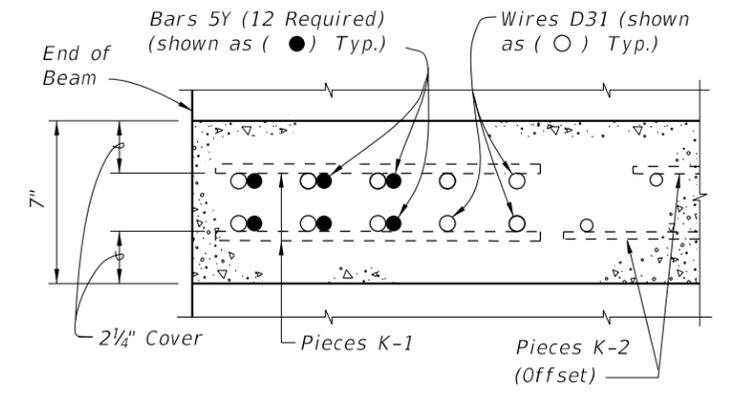


ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS

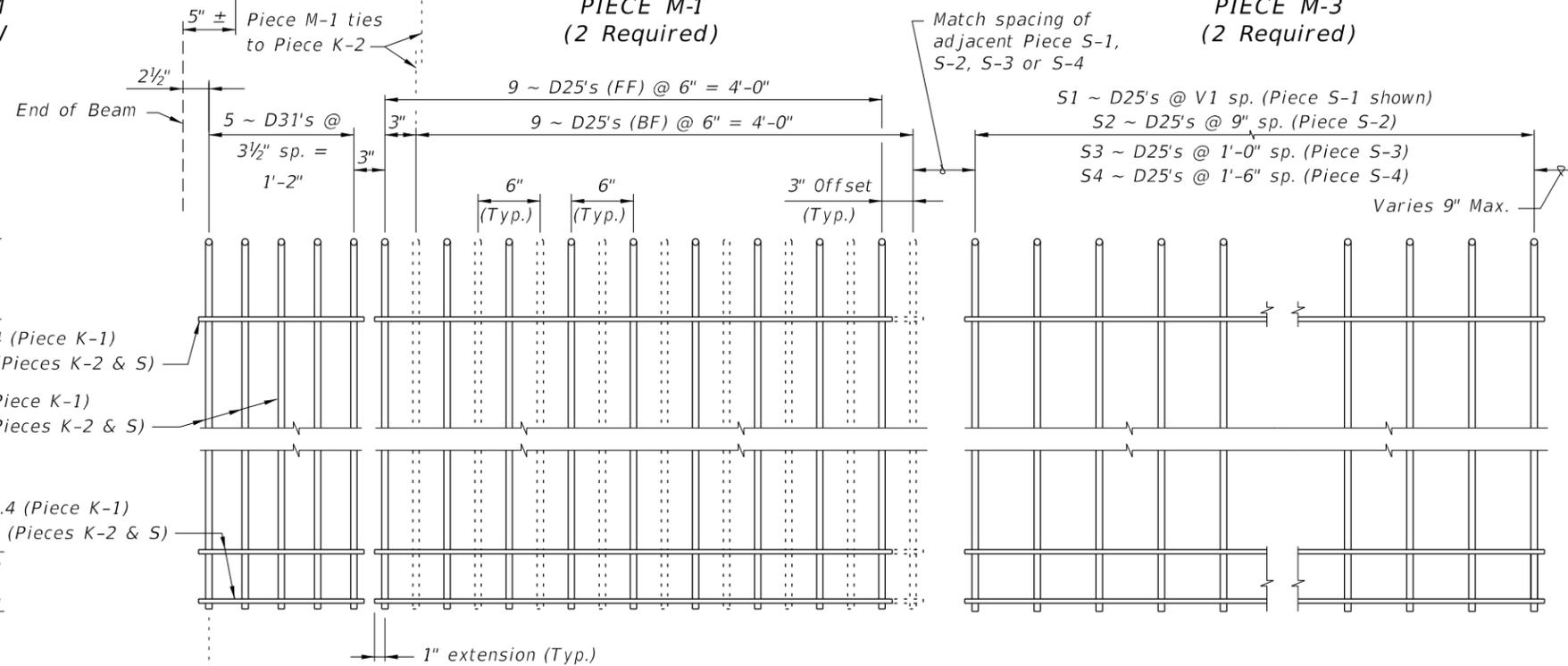


PLAN VIEW  
PIECE M-1  
(2 Required)

PLAN VIEW  
PIECE M-3  
(2 Required)



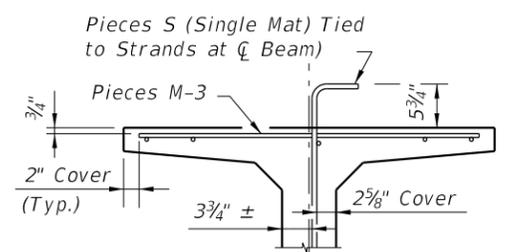
SECTION A-A  
FOR WELDED WIRE REINFORCEMENT



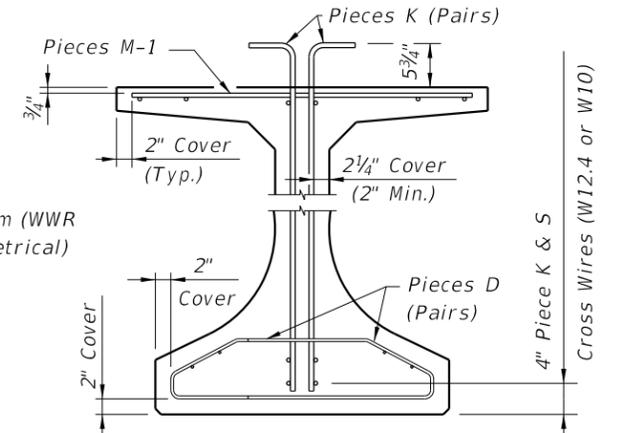
PIECE K-1  
(Aligned EF)  
(4 Required ~ 2 Pairs)

PIECE K-2  
(FF Shown Solid, BF Shown Dashed)  
(4 Required)

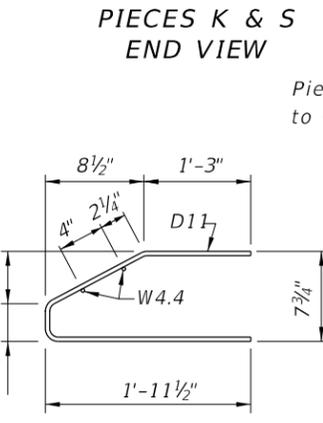
PIECE S-1, S-2, S-3 or S-4  
(2 Required Each Piece)



PARTIAL SECTION AT CENTER BEAM



PARTIAL BEAM END VIEW  
(Conventional Reinforcing Bars A, C, Y and Strands not Shown for Clarity)



PIECES D  
END VIEW

PIECE D-1  
(4 Required) ~ 2 Pairs

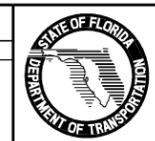
PIECE D-2  
(4 Required) ~ 2 Pairs

PIECE D-3  
(4 Required) ~ 2 Pairs

- NOTES:
- See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
  - Place Conventional Reinforcing Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
  - Pieces may be fabricated in multiple length sections.
  - For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcing Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

LEGEND:  
EF = Each Face  
FF = Front Face  
BF = Back Face

REVISIONS			
DATE	BY	DESCRIPTION	
01/01/10	RMS	New Design Standard	
07/01/10	SJN	Deleted Bars L references; Changed interior W6.4 wires to "Optional" for PIECES M.	

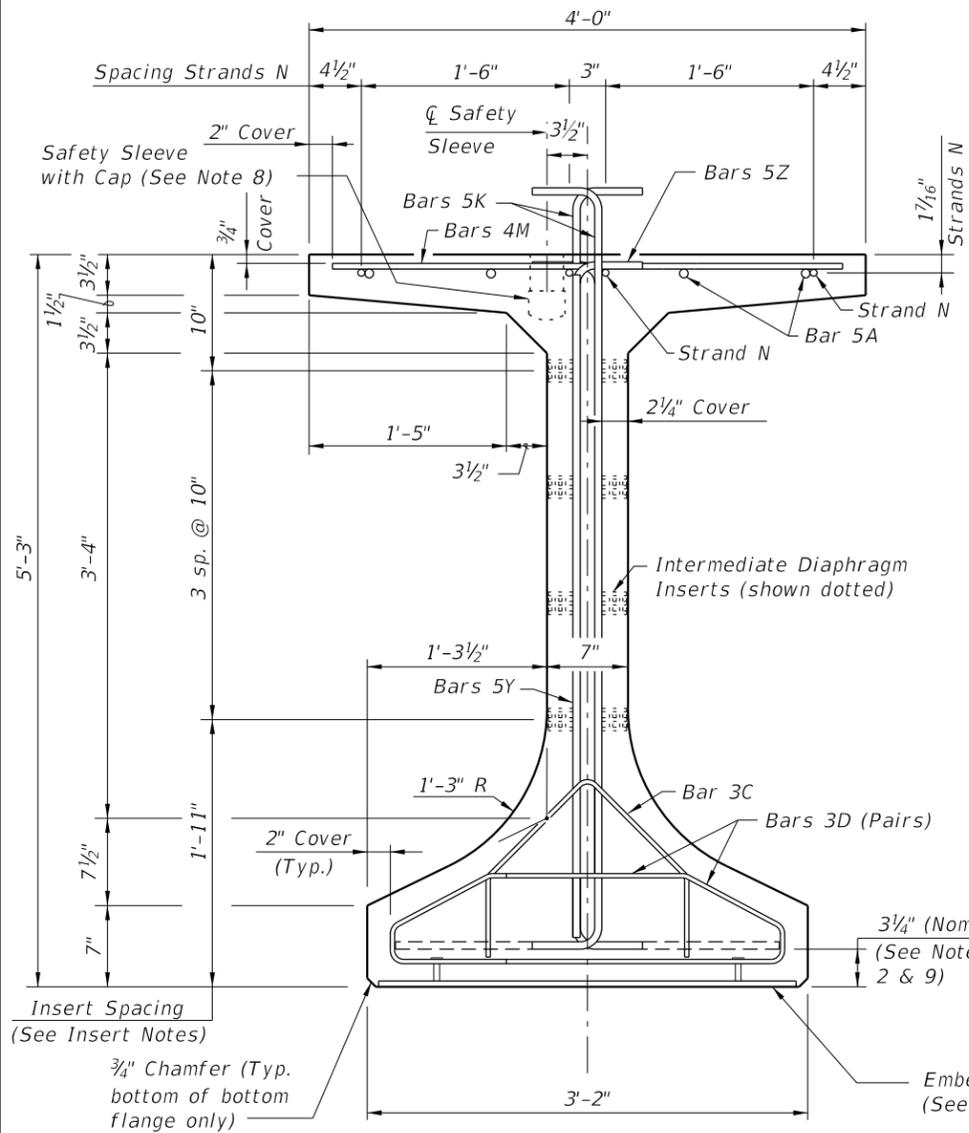


2010 Interim Design Standard

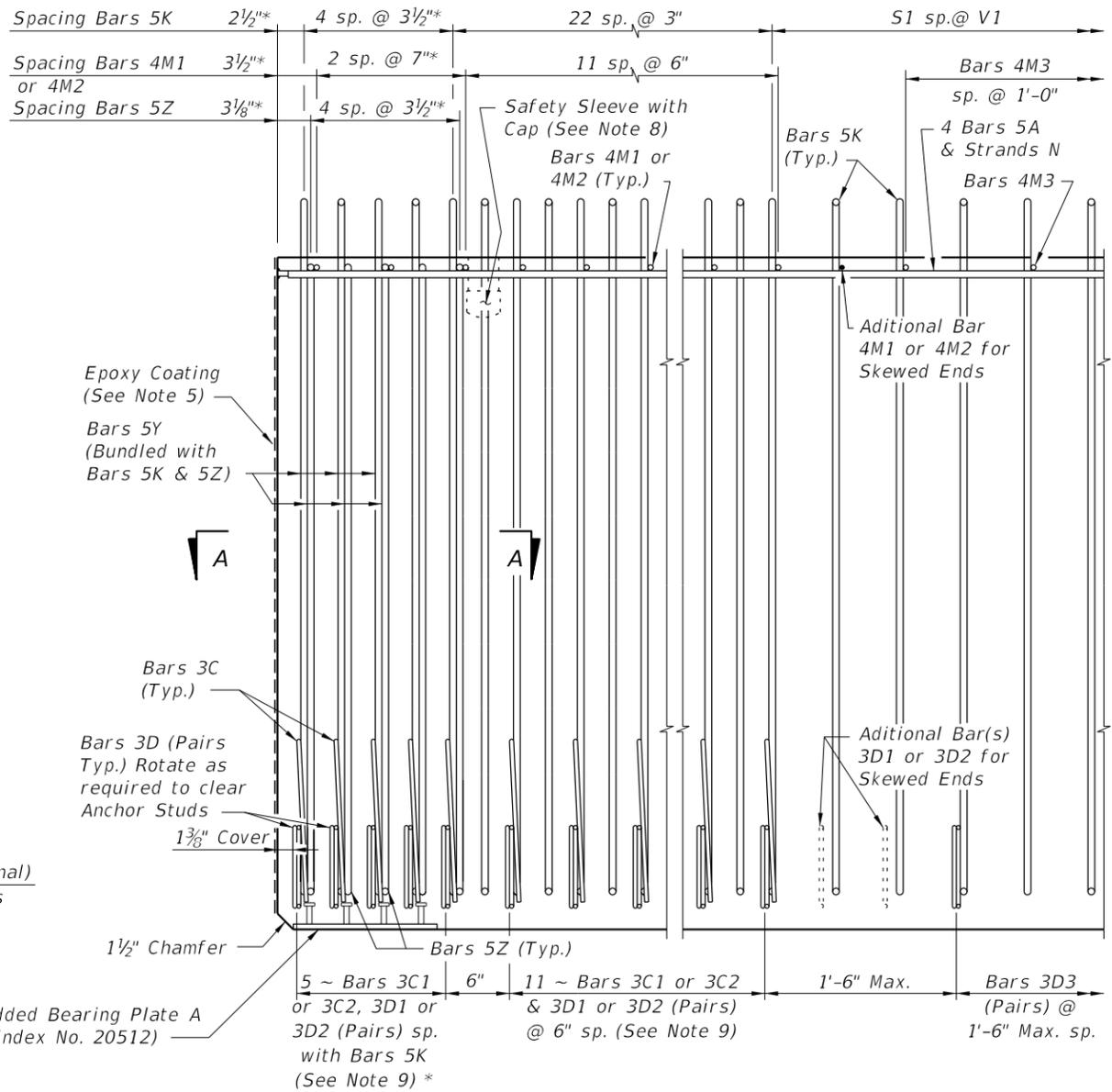
FLORIDA-I 54 BEAM - STANDARD DETAILS

Interim Date: 07/01/10  
Sheet No.: 2 of 2  
Index No.: 20054

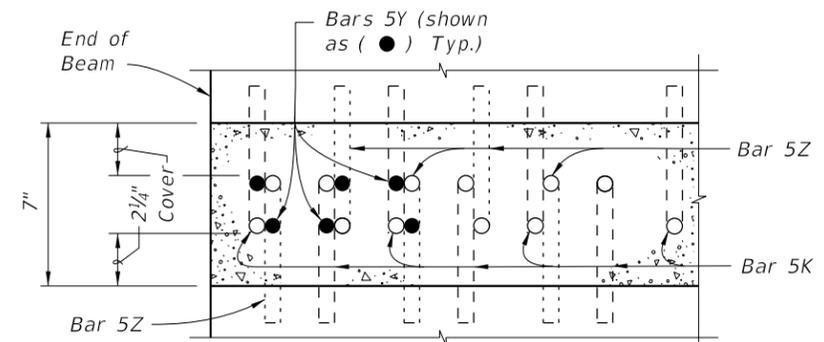
\* These dimensions are measured perpendicular to the end of beam



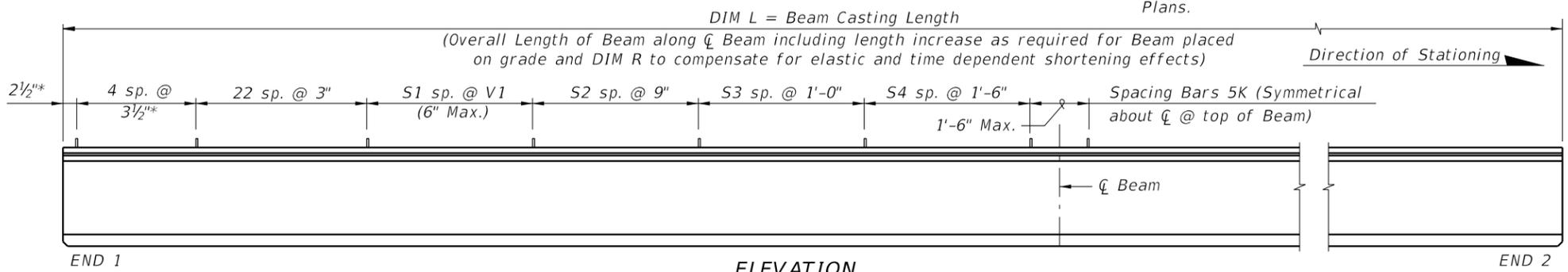
END VIEW



ELEVATION AT END OF BEAM  
(Flanges Not Shown For Clarity)  
(End 1 Shown, End 2 Similar)



SECTION A-A FOR CONVENTIONAL REINFORCING  
(Showing Bars 5K, 5Y & 5Z Only)

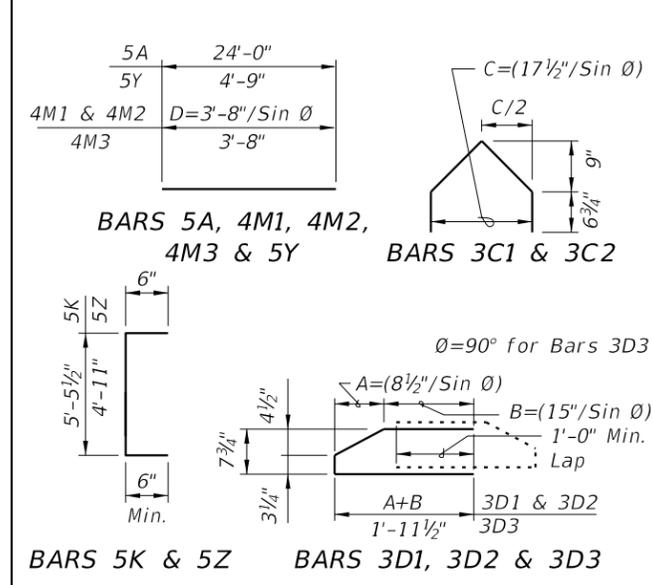


ELEVATION

CONVENTIONAL REINFORCING BAR BENDING DETAILS

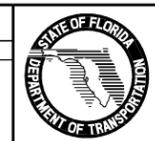
BILL OF REINFORCING STEEL				
MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	8	24'-0"
C1	9, 10 & 11	3	16 (End 1)	Varies
C2	9, 10 & 11	3	16 (End 2)	Varies
D1	9, 10, 11 & 14	3	32 (End 1)	Varies
D2	9, 10, 11 & 14	3	32 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	6'-5"
M1	9 & 10	4	14 (End 1)	Varies
M2	9 & 10	4	14 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	3/8" Ø Strand	4	DIM L
Y	9 & 11	5	12	4'-9"
Z	2, 9, 11 & 13	5	10	5'-11"

BENDING DIAGRAMS (See Note 1)

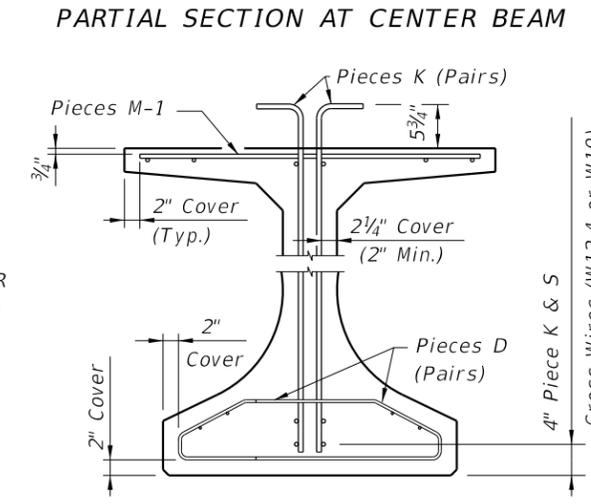
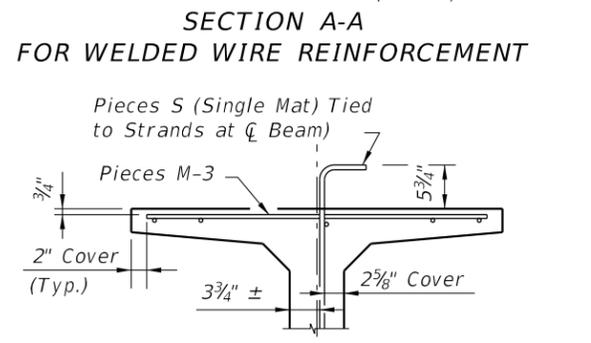
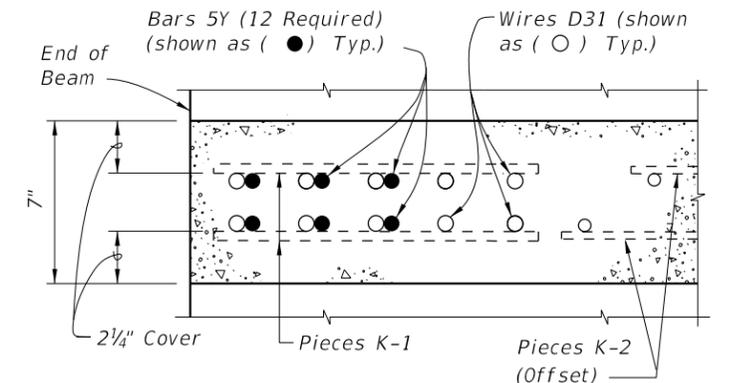
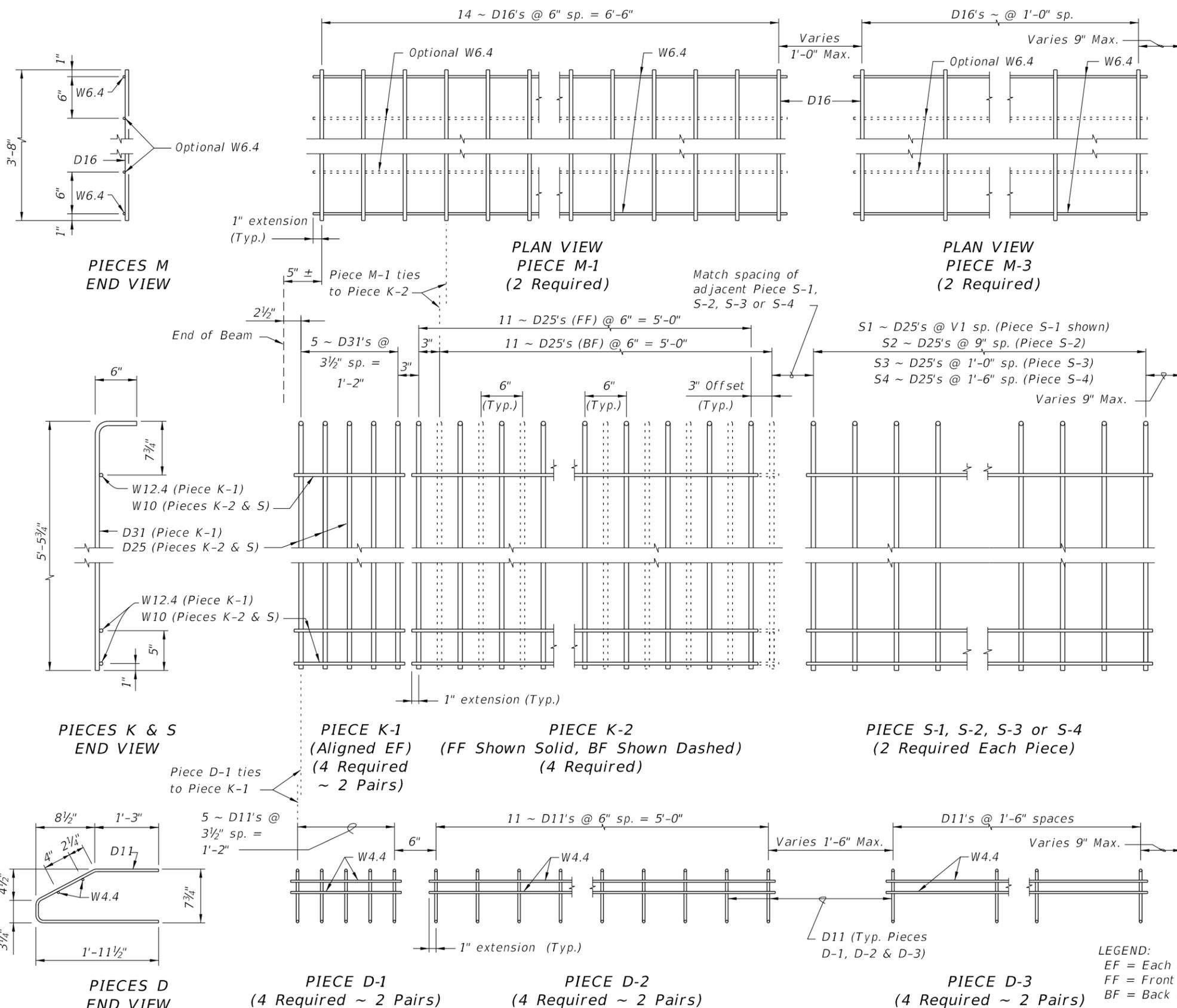


NOTES:  
 A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.  
 B. For referenced notes, see Index No. 20010.  
 C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars 4L; Changed NOTE NUMBERS for Strand N; and Embedded Bearing Plate A to Index No. 20512; Added Epoxy Coating to end of beam.			



ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS

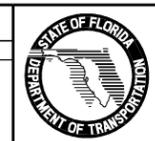


**NOTES:**

- See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
- Place Conventional Reinforcement Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
- Pieces may be fabricated in multiple length sections.
- For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

**LEGEND:**  
 EF = Each Face  
 FF = Front Face  
 BF = Back Face

REVISIONS			
DATE	BY	DESCRIPTION	
01/01/10	RMS	New Design Standard	
07/01/10	SJN	Deleted Bars L references; Changed interior W6.4 wires to "Optional" for PIECES M.	

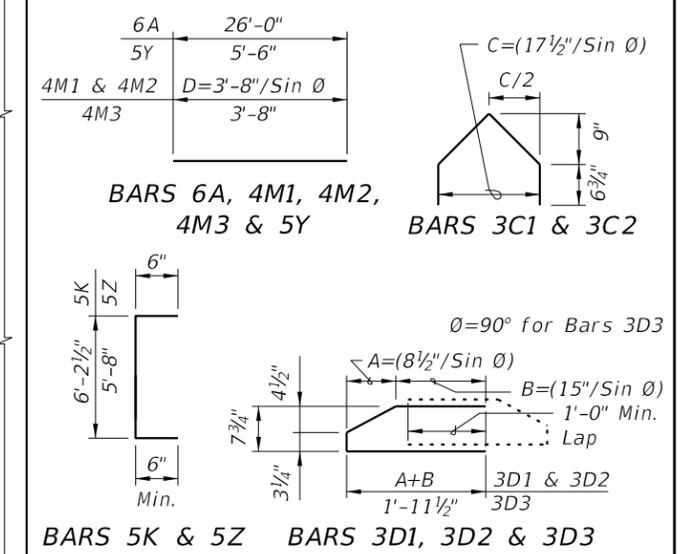


**CONVENTIONAL REINFORCING  
BAR BENDING DETAILS**

**BILL OF REINFORCING STEEL**

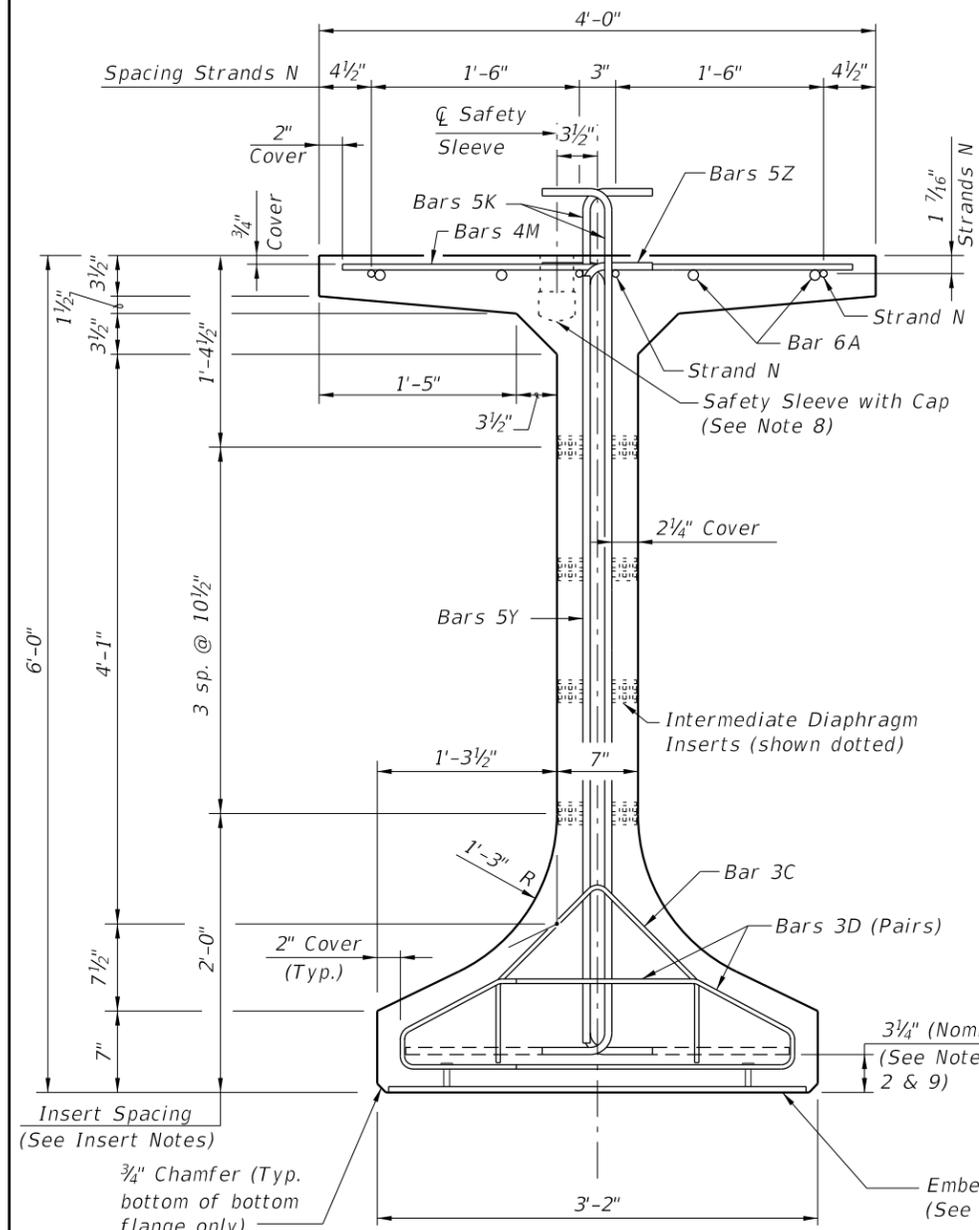
MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	6	8	26'-0"
C1	9, 10 & 11	3	19 (End 1)	Varies
C2	9, 10 & 11	3	19 (End 2)	Varies
D1	9, 10, 11 & 14	3	38 (End 1)	Varies
D2	9, 10, 11 & 14	3	38 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	7'-2"
M1	9 & 10	4	17 (End 1)	Varies
M2	9 & 10	4	17 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	3/8" Ø Strand	4	DIM L
Y	9 & 11	5	16	5'-6"
Z	2, 9, 11 & 13	5	12	6'-8"

**BENDING DIAGRAMS (See Note 1)**

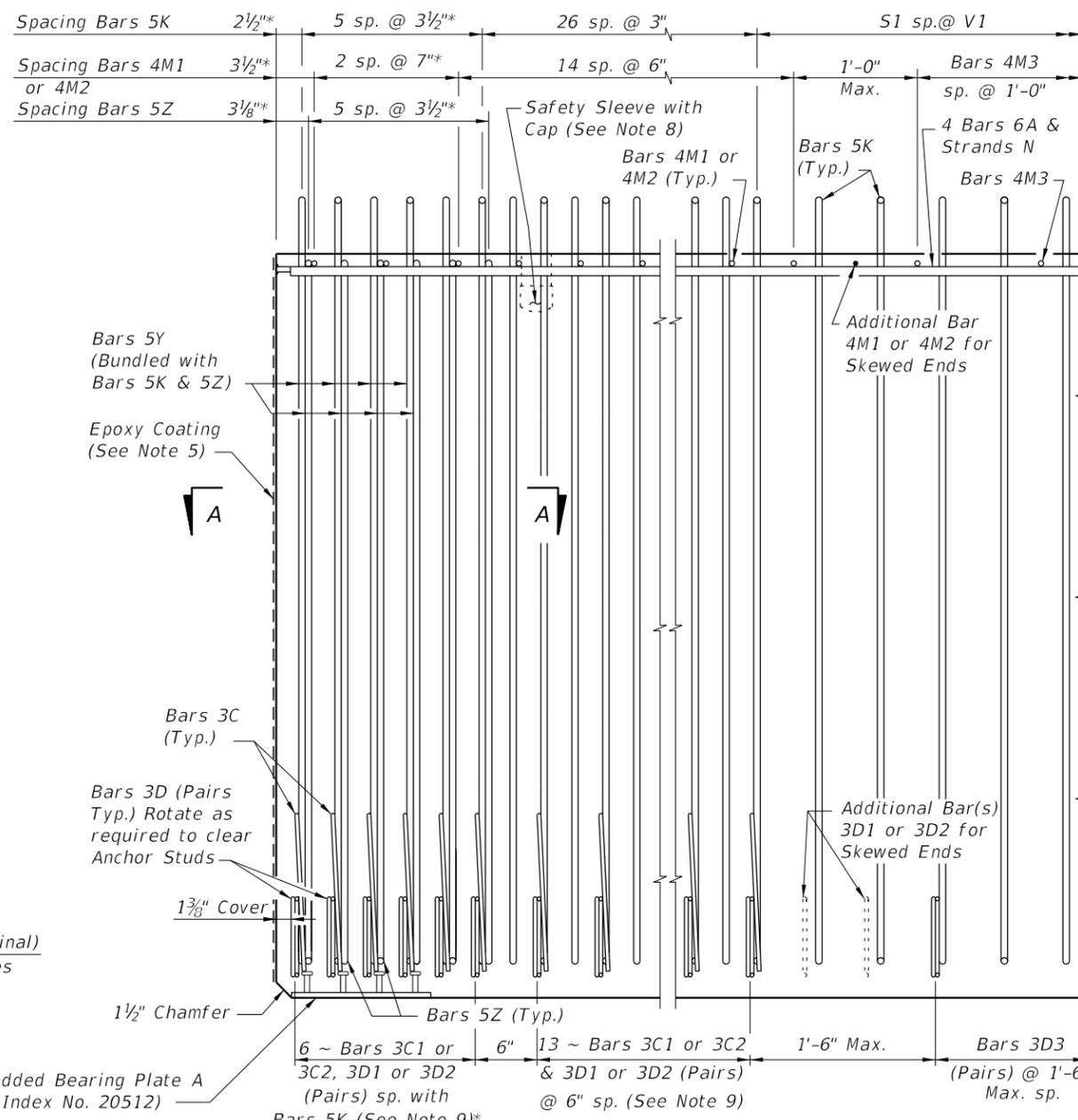


**NOTES:**  
 A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.  
 B. For referenced notes, see Index No. 20010.  
 C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.

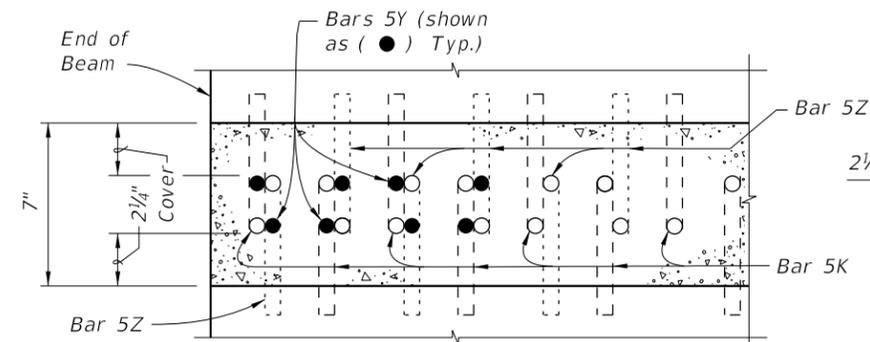
\* These dimensions are measured perpendicular to the end of beam



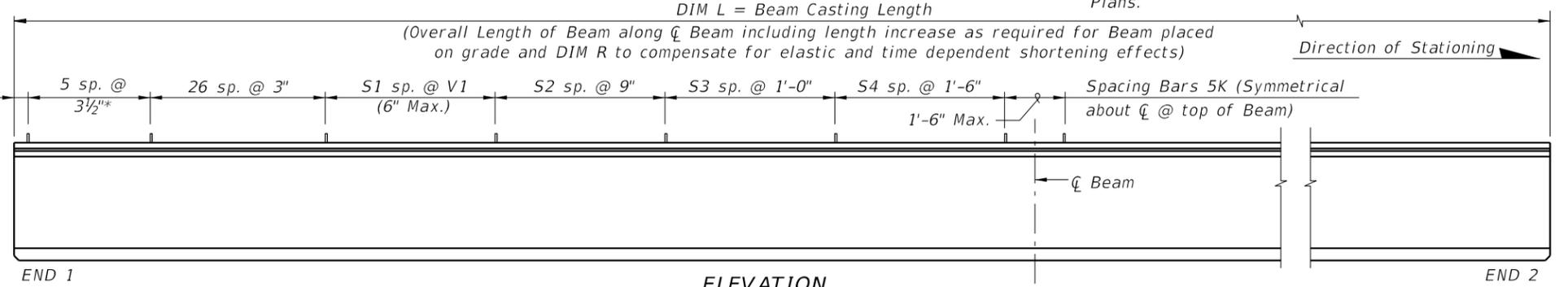
**END VIEW**



**ELEVATION AT END OF BEAM  
(Flanges Not Shown For Clarity)  
(End 1 Shown, End 2 Similar)**



**SECTION A-A FOR CONVENTIONAL REINFORCING  
(Showing Bars 5K, 5Y & 5Z Only)**



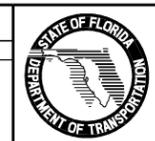
**END 1**

**ELEVATION**

**END 2**

**REVISIONS**

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars 4L; Changed NOTE NUMBERS for Strand N; and Embedded Bearing Plate A to Index No. 20512; Added Epoxy Coating to end of beam.			

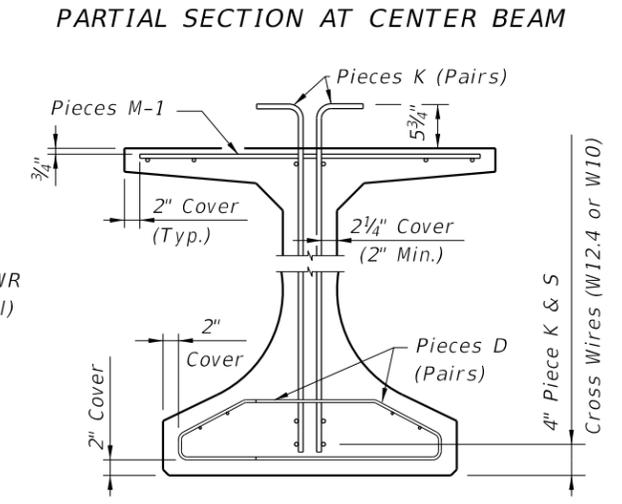
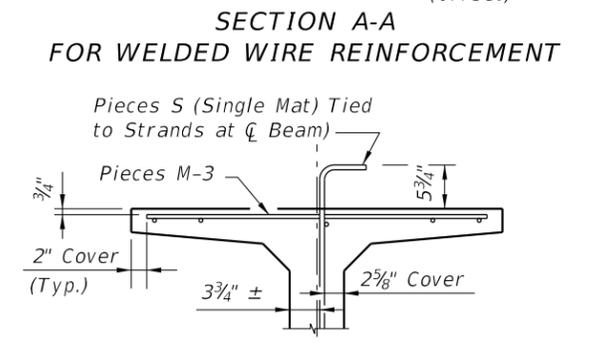
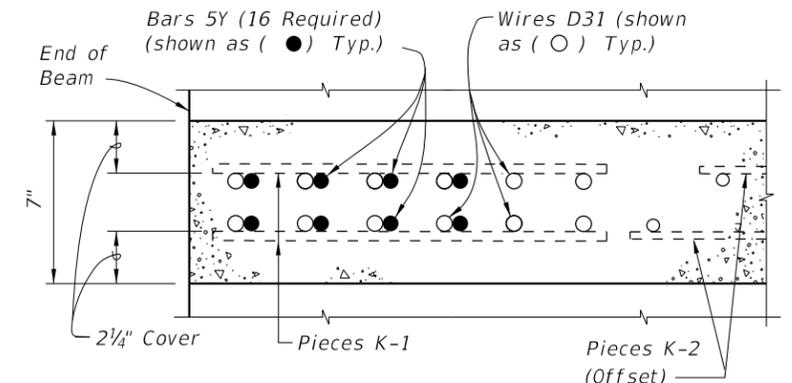
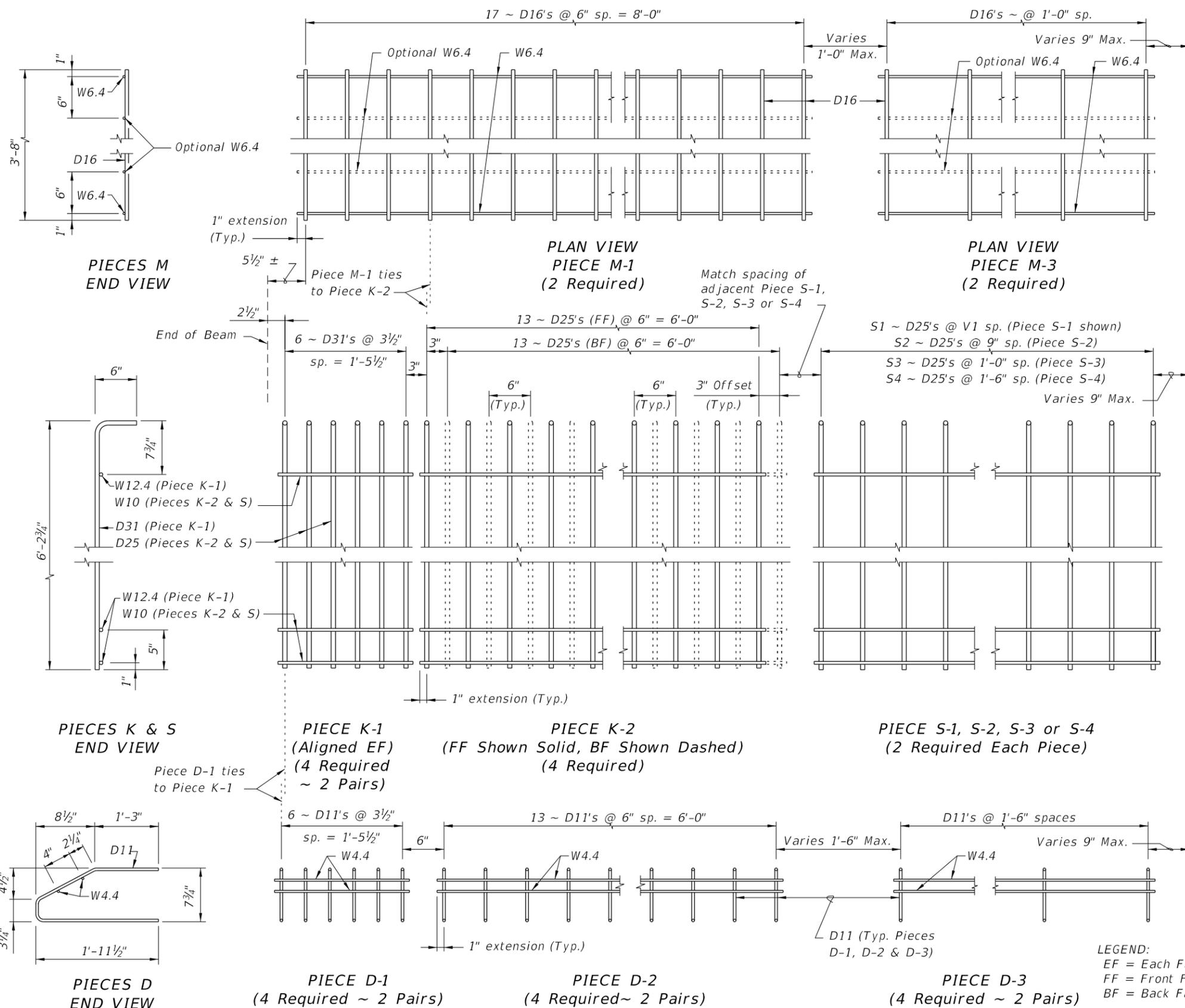


2010 Interim Design Standard

**FLORIDA-I 72 BEAM - STANDARD DETAILS**

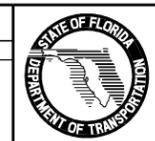
Interim Date: 07/01/10  
 Sheet No.: 1 of 2  
 Index No.: 20072

ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



- NOTES:**
- See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
  - Place Conventional Reinforcement Bars 6A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
  - Pieces may be fabricated in multiple length sections.
  - For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

REVISIONS			
DATE	BY	DESCRIPTION	
01/01/10	RMS	New Design Standard	
07/01/10	SJN	Deleted Bars L references; Changed interior W6.4 wires to "Optional" for PIECES M.	

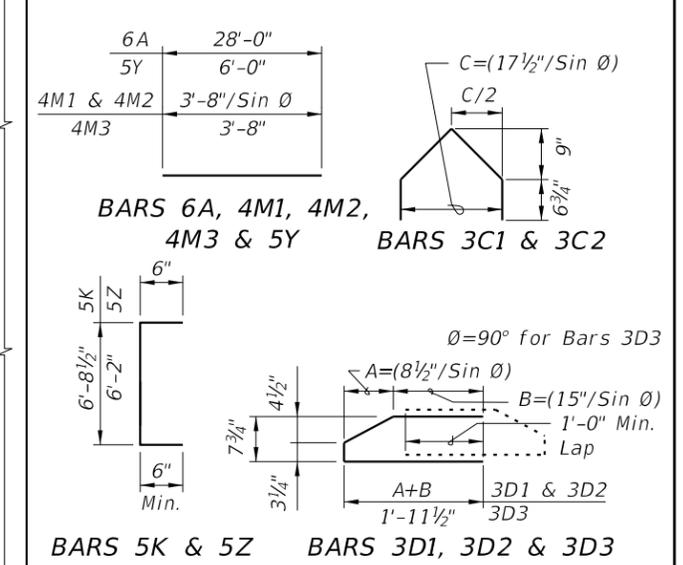


**CONVENTIONAL REINFORCING BAR BENDING DETAILS**

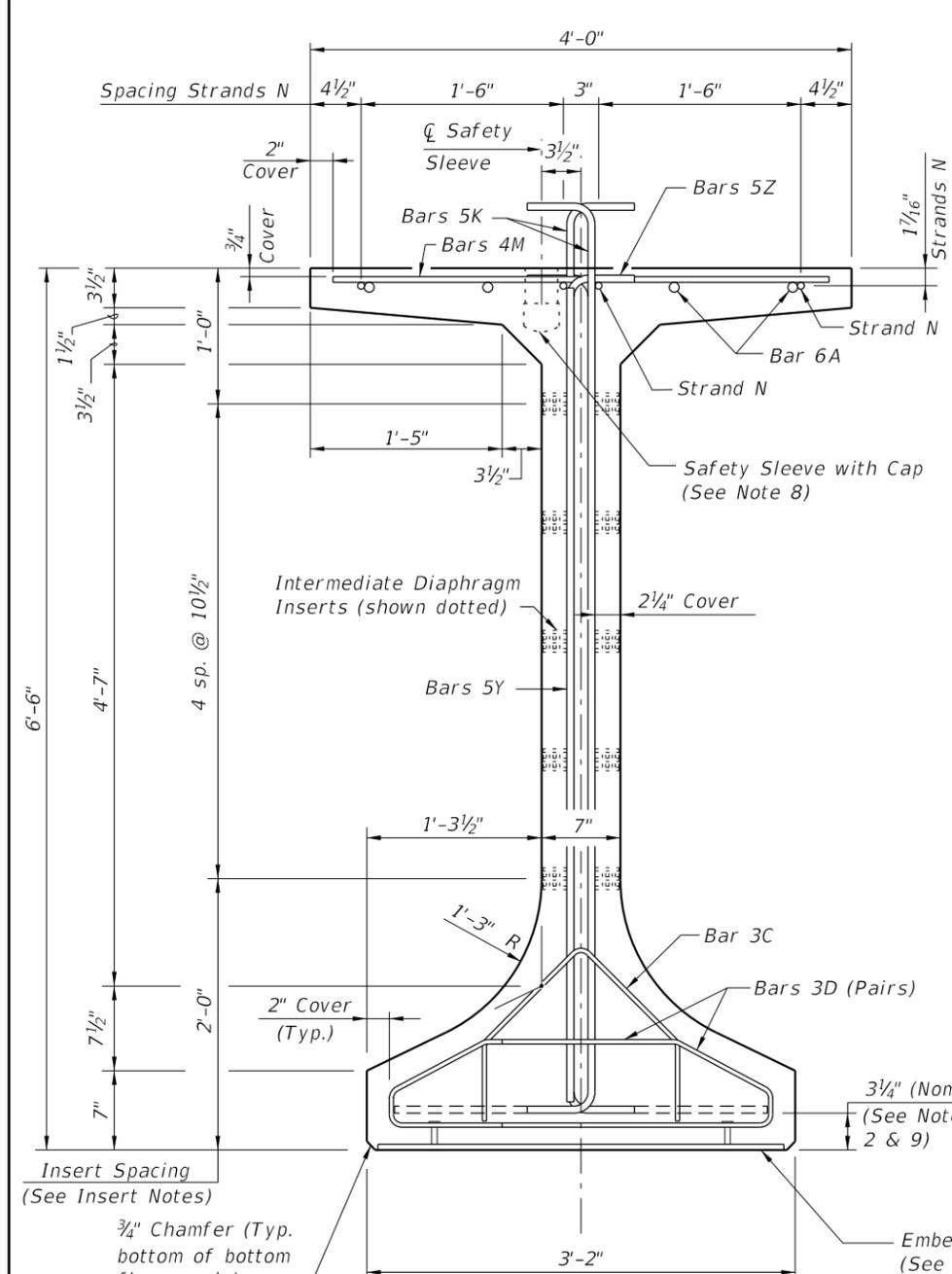
**BILL OF REINFORCING STEEL**

MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	6	8	28'-0"
C1	9, 10 & 11	3	20 (End 1)	Varies
C2	9, 10 & 11	3	20 (End 2)	Varies
D1	9, 10, 11 & 14	3	40 (End 1)	Varies
D2	9, 10, 11 & 14	3	40 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	7'-8"
M1	9 & 10	4	18 (End 1)	Varies
M2	9 & 10	4	18 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	$\frac{3}{8}$ " $\emptyset$ Strand	4	DIM L
Y	9 & 11	5	16	6'-0"
Z	2, 9, 11 & 13	5	12	7'-2"

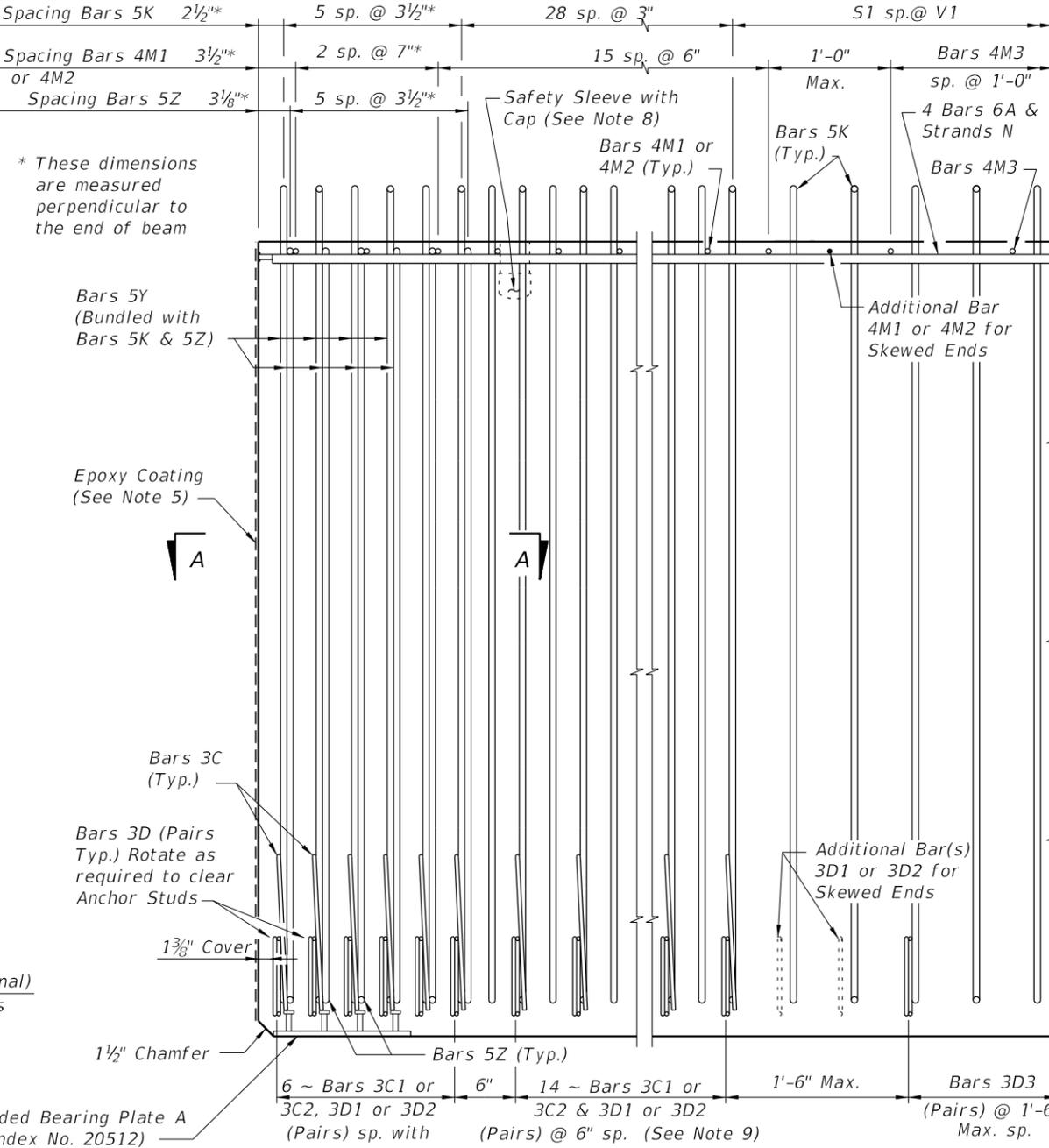
**BENDING DIAGRAMS (See Note 1)**



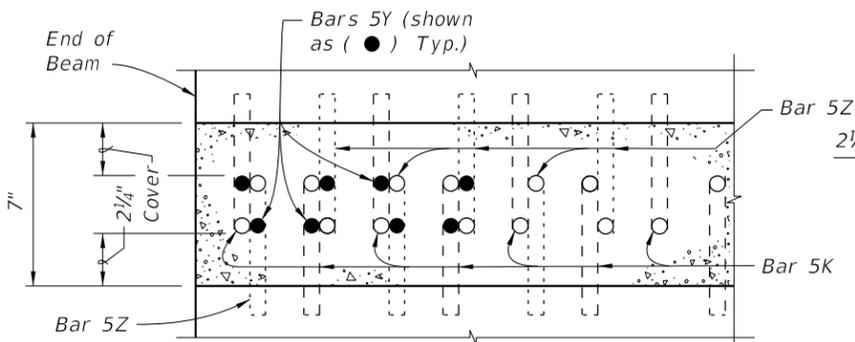
**NOTES:**  
 A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.  
 B. For referenced notes, see Index No. 20010.  
 C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.



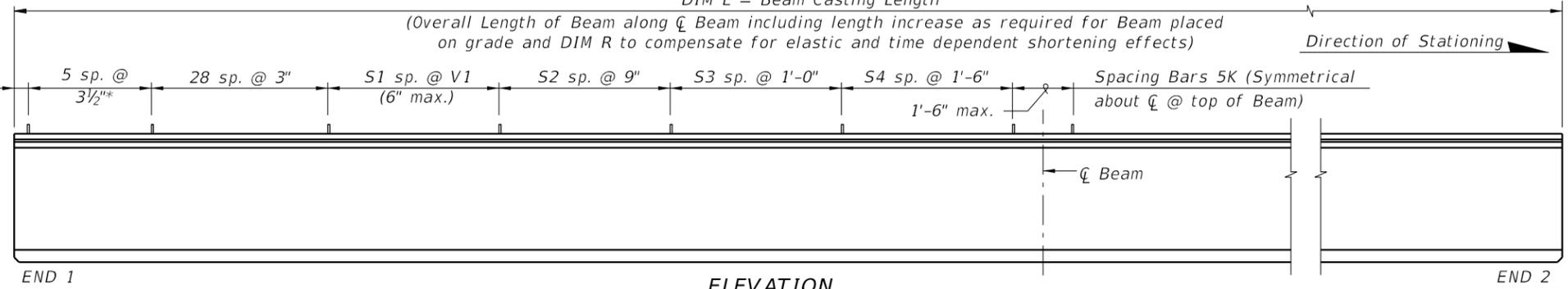
**END VIEW**



**ELEVATION AT END OF BEAM (Flanges Not Shown For Clarity) (End 1 Shown, End 2 Similar)**



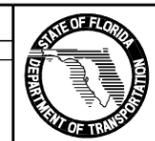
**SECTION A-A FOR CONVENTIONAL REINFORCING (Showing Bars 5K, 5Y & 5Z Only)**



**ELEVATION**

**REVISIONS**

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars 4L; Changed NOTE NUMBERS for Strand N; and Embedded Bearing Plate A to Index No. 20512; Added Epoxy Coating to end of beam.			

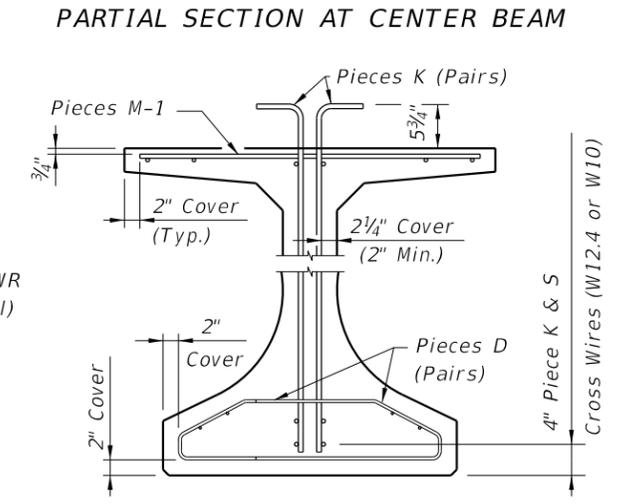
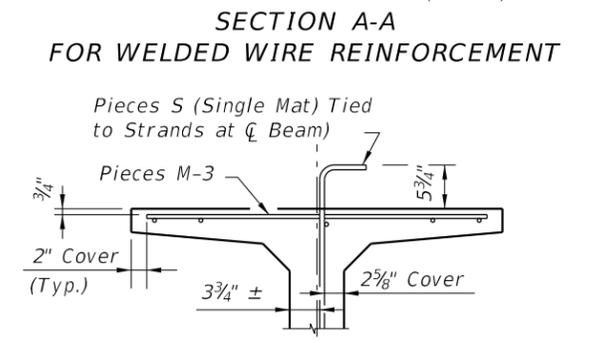
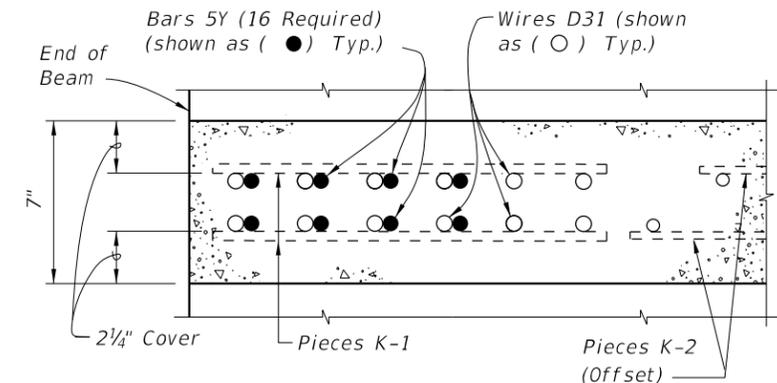
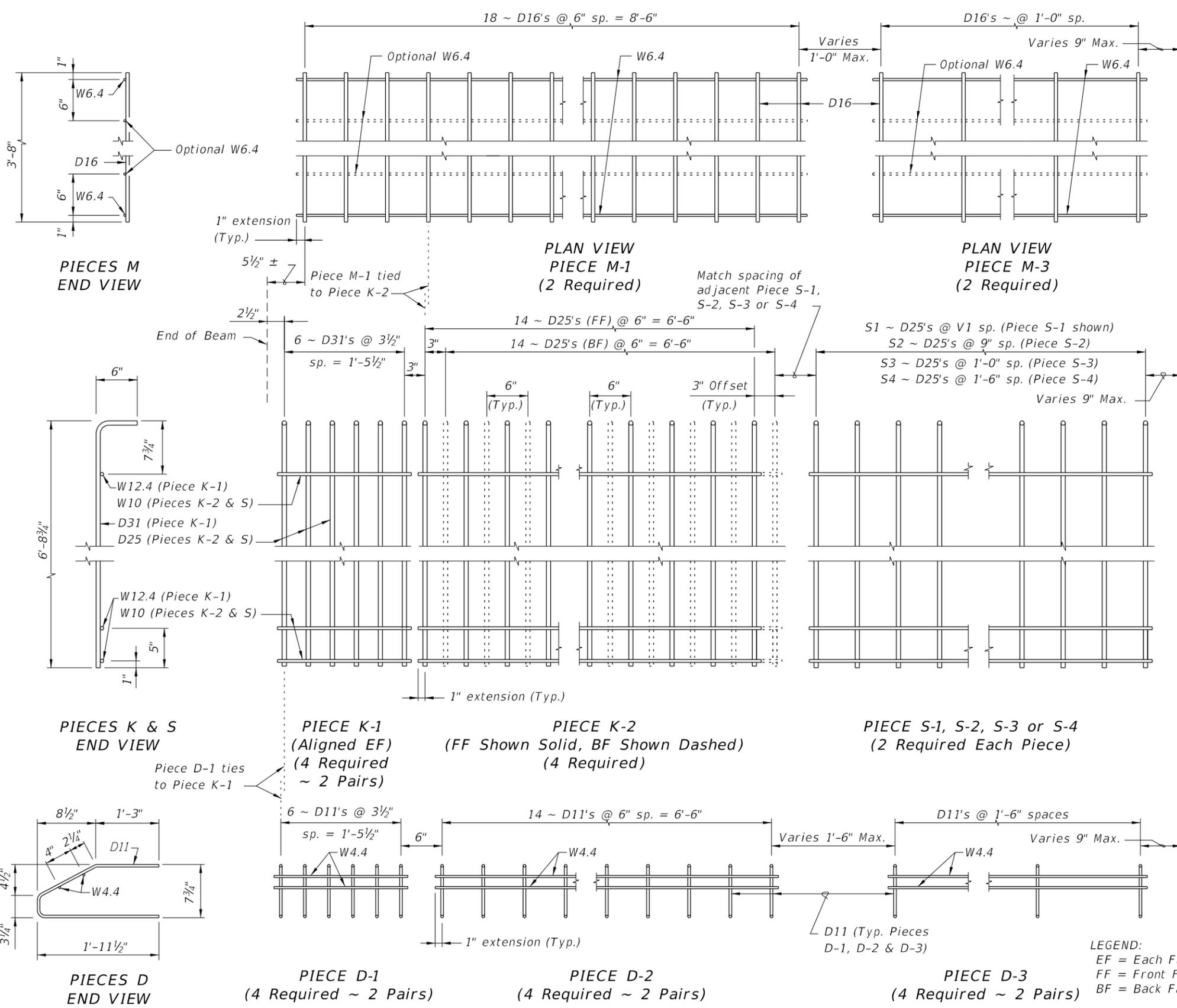


2010 Interim Design Standard

**FLORIDA-I 78 BEAM - STANDARD DETAILS**

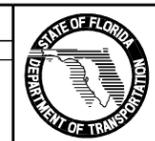
Interim Date: 07/01/10  
 Sheet No.: 1 of 2  
 Index No.: 20078

ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



**NOTES:**  
 a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.  
 b. Place Conventional Reinforcement Bars 6A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.  
 c. Pieces may be fabricated in multiple length sections.  
 d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

REVISIONS				2010 Interim Design Standard				Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION				
01/01/10	RMS	New Design Standard					07/01/10	2 of 2	
07/01/10	SJN	Deleted Bars L references; Changed interior W6.4 wires to "Optional" for PIECES M.							



FLORIDA-I 78 BEAM - STANDARD DETAILS

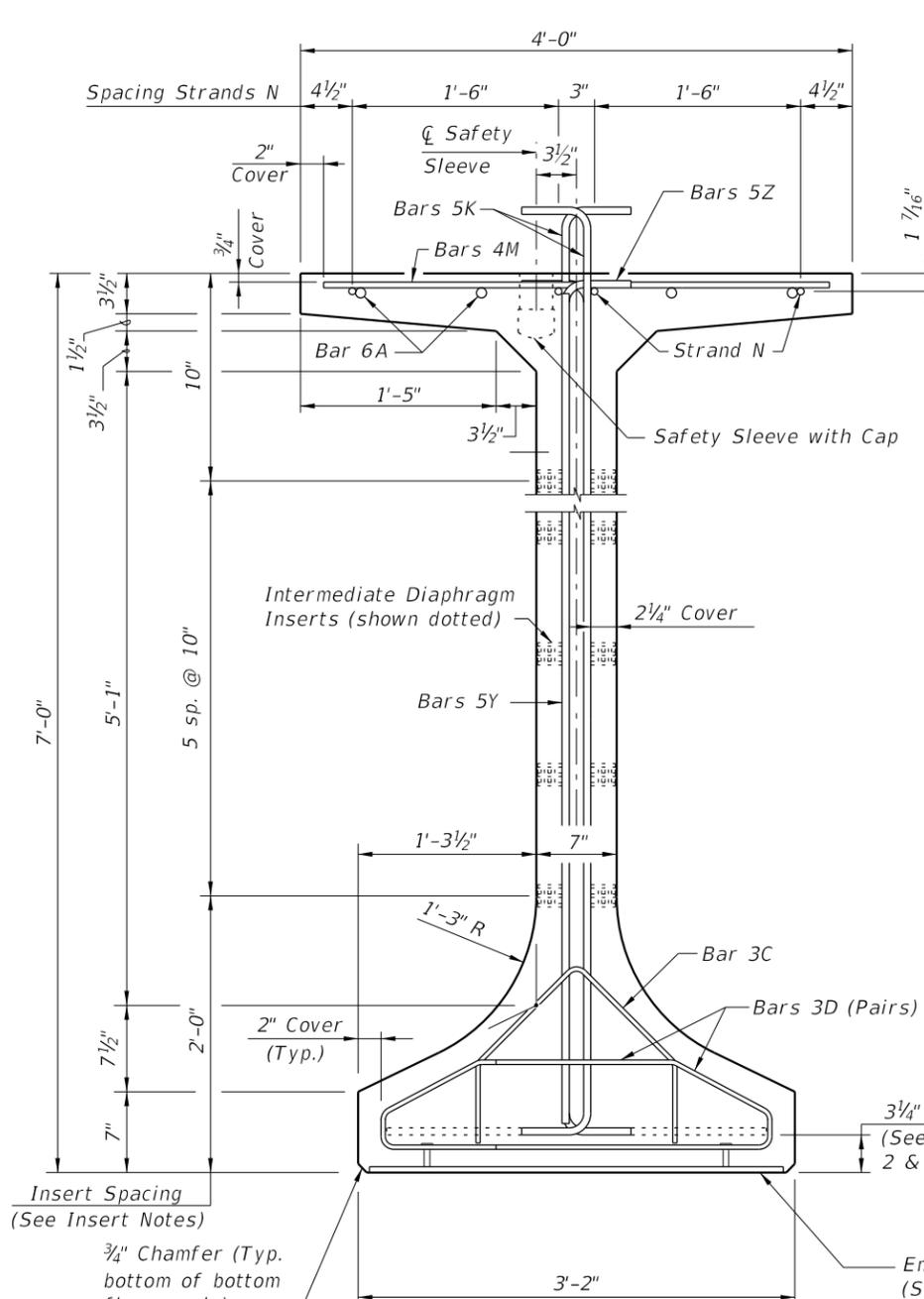
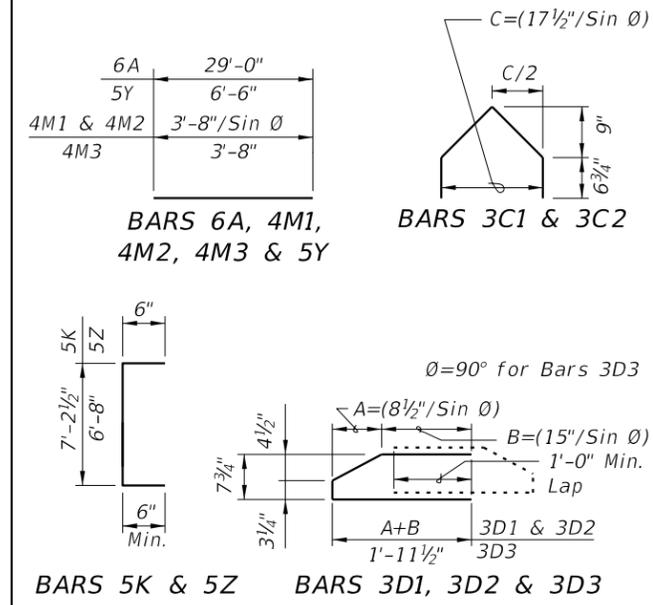
Index No. 20078

**CONVENTIONAL REINFORCING BAR BENDING DETAILS**

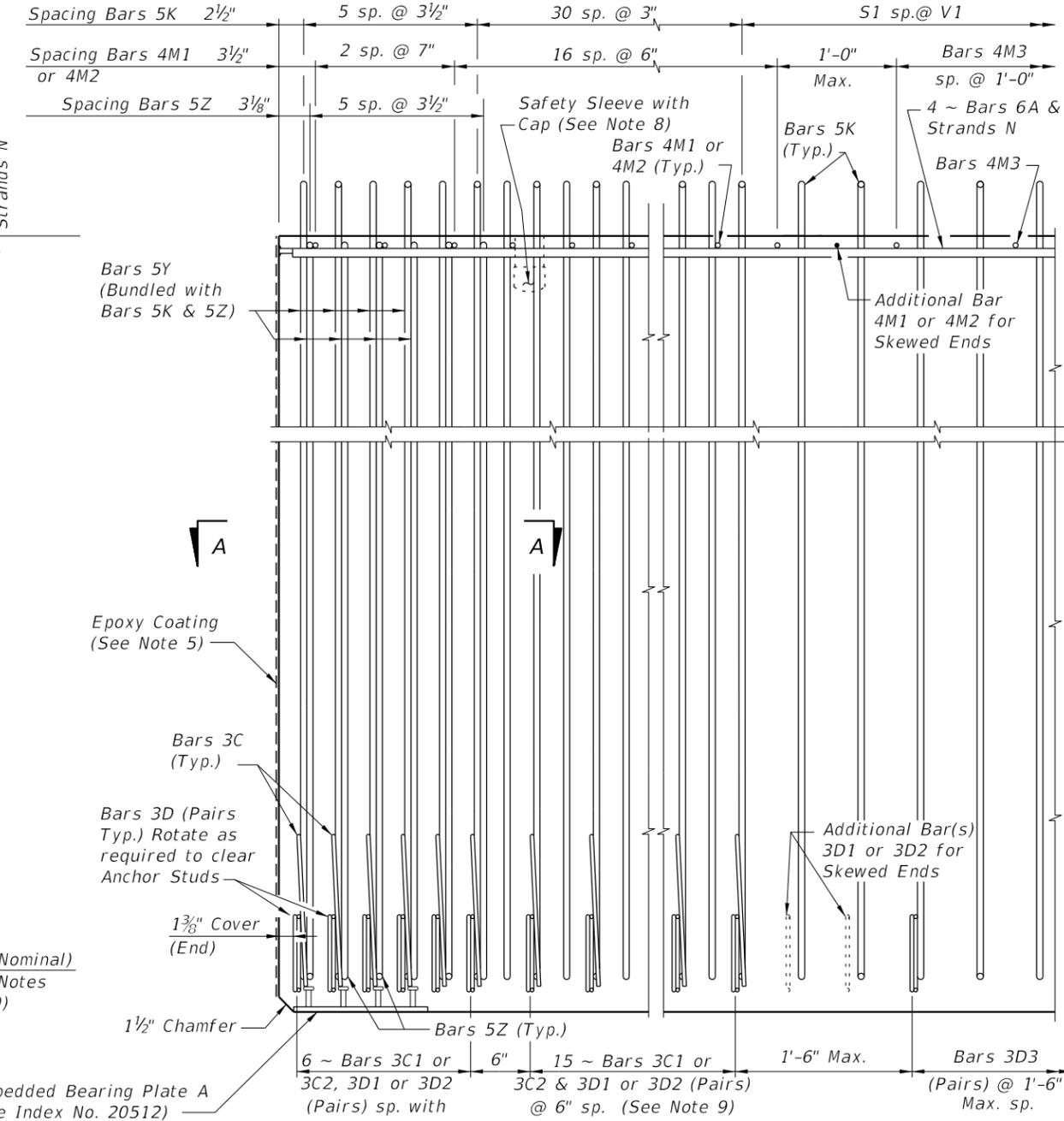
**BILL OF REINFORCING STEEL**

MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	6	8	29'-0"
C1	9, 10 & 11	3	21 (End 1)	Varies
C2	9, 10 & 11	3	21 (End 2)	Varies
D1	9, 10, 11 & 14	3	42 (End 1)	Varies
D2	9, 10, 11 & 14	3	42 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	8'-2"
M1	9 & 10	4	19 (End 1)	Varies
M2	9 & 10	4	19 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	1/2" Ø Strand	4	DIM L
Y	9 & 11	5	16	6'-6"
Z	2, 9, 11 & 13	5	12	7'-8"

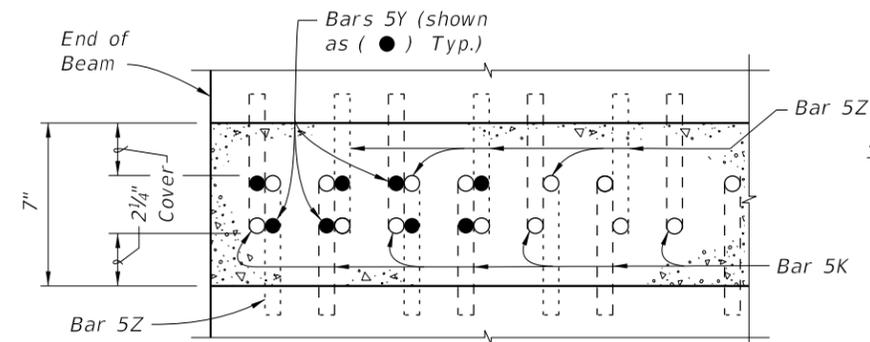
**BENDING DIAGRAMS (See Note 1)**



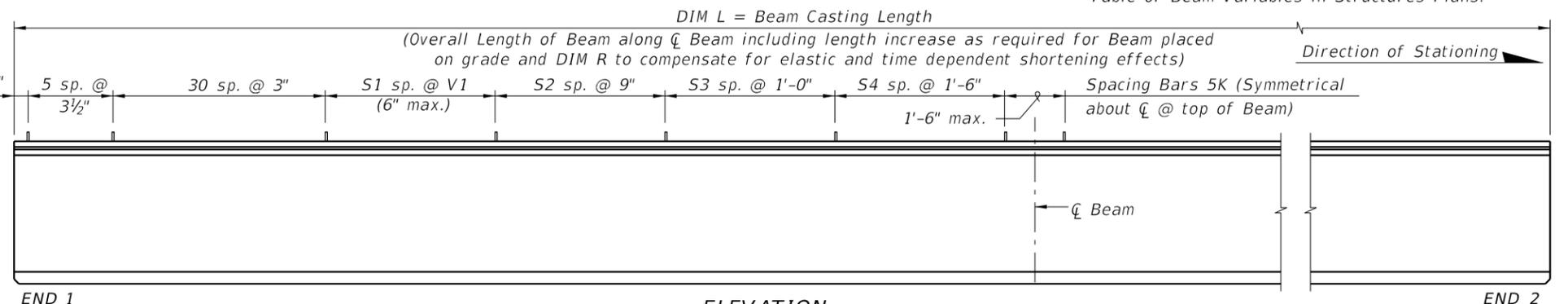
**END VIEW**



**ELEVATION AT END OF BEAM (Flanges Not Shown For Clarity) (End 1 Shown, End 2 Similar)**



**SECTION A-A FOR CONVENTIONAL REINFORCING (Showing Bars 5K, 5Y & 5Z Only)**

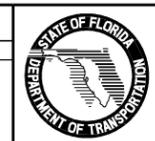


**ELEVATION**

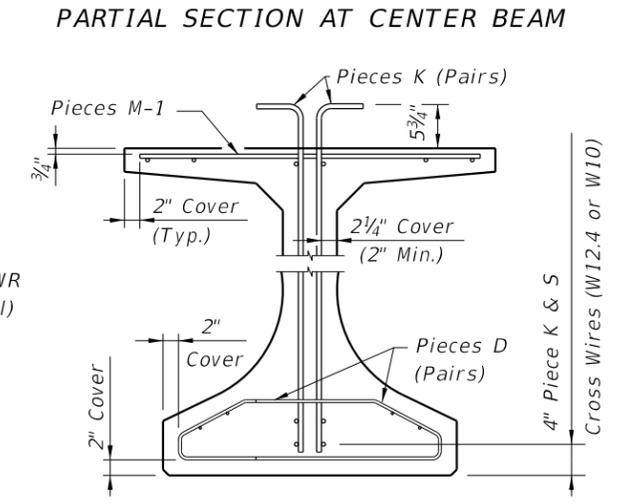
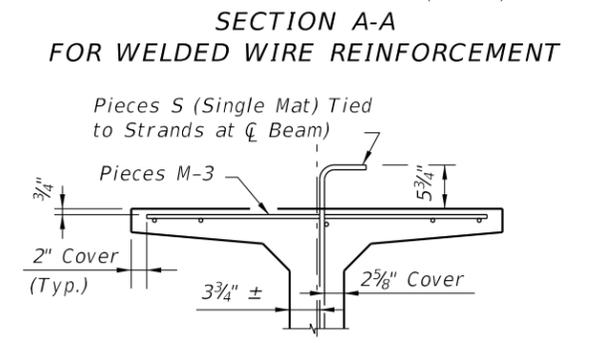
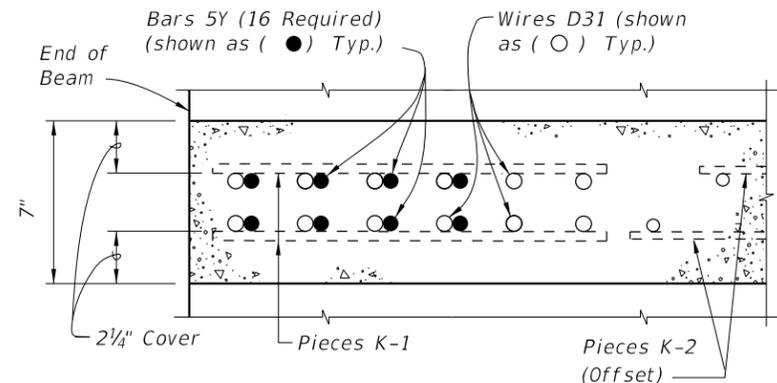
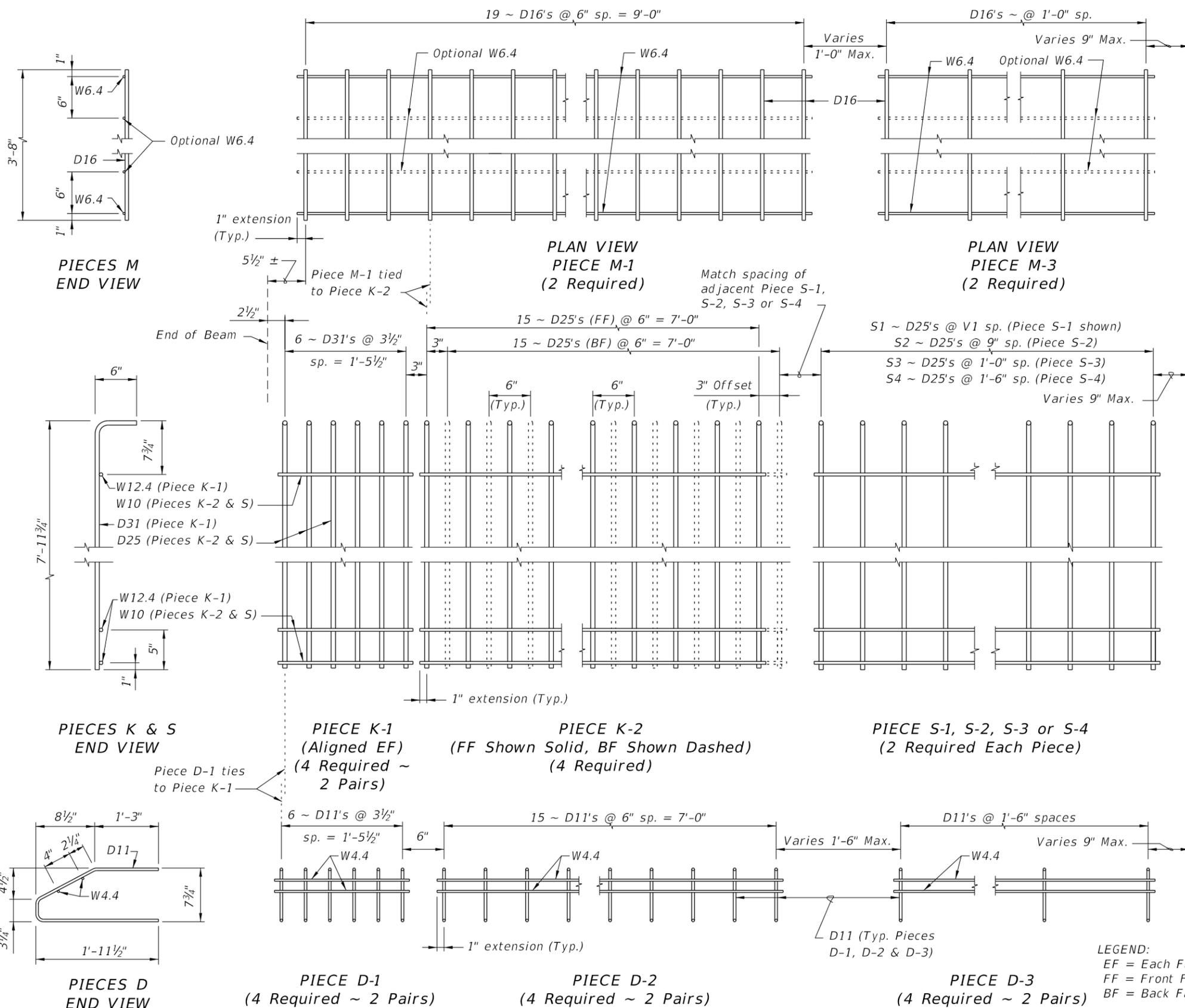
- NOTES:**
- A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.
  - B. For referenced notes, see Index No. 20010.
  - C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.

**REVISIONS**

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	New Design Standard			



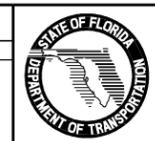
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



**NOTES:**  
 a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.  
 b. Place Conventional Reinforcement Bars 6A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.  
 c. Pieces may be fabricated in multiple length sections.  
 d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

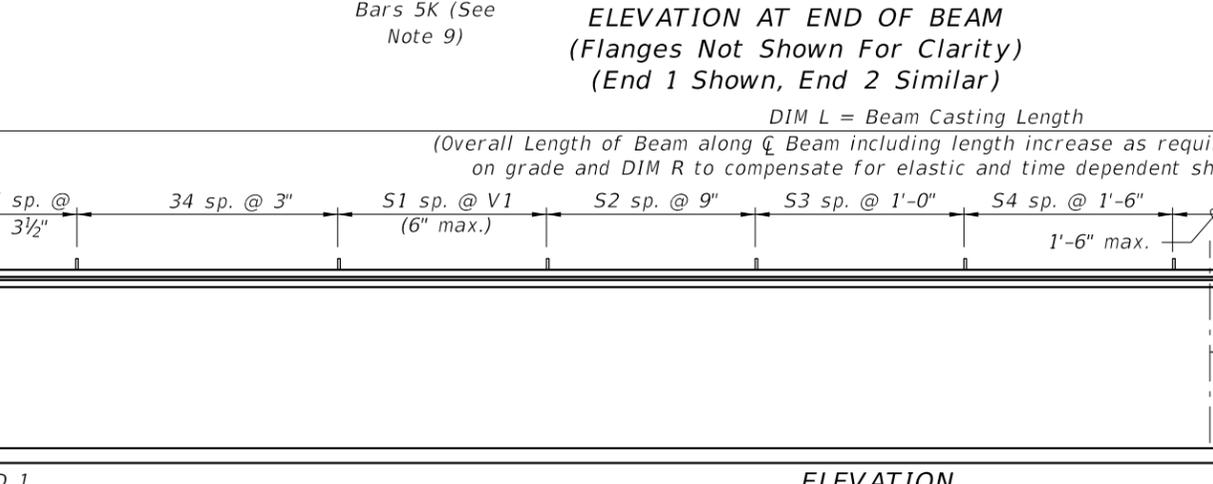
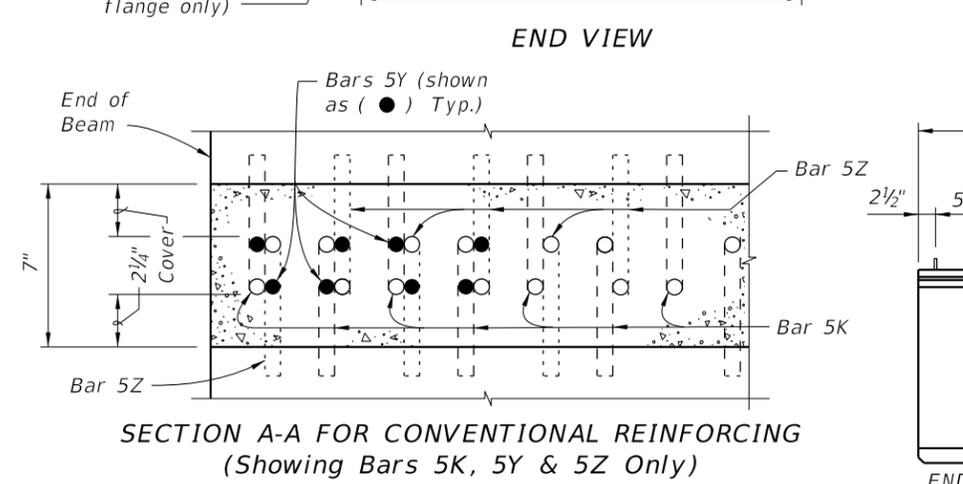
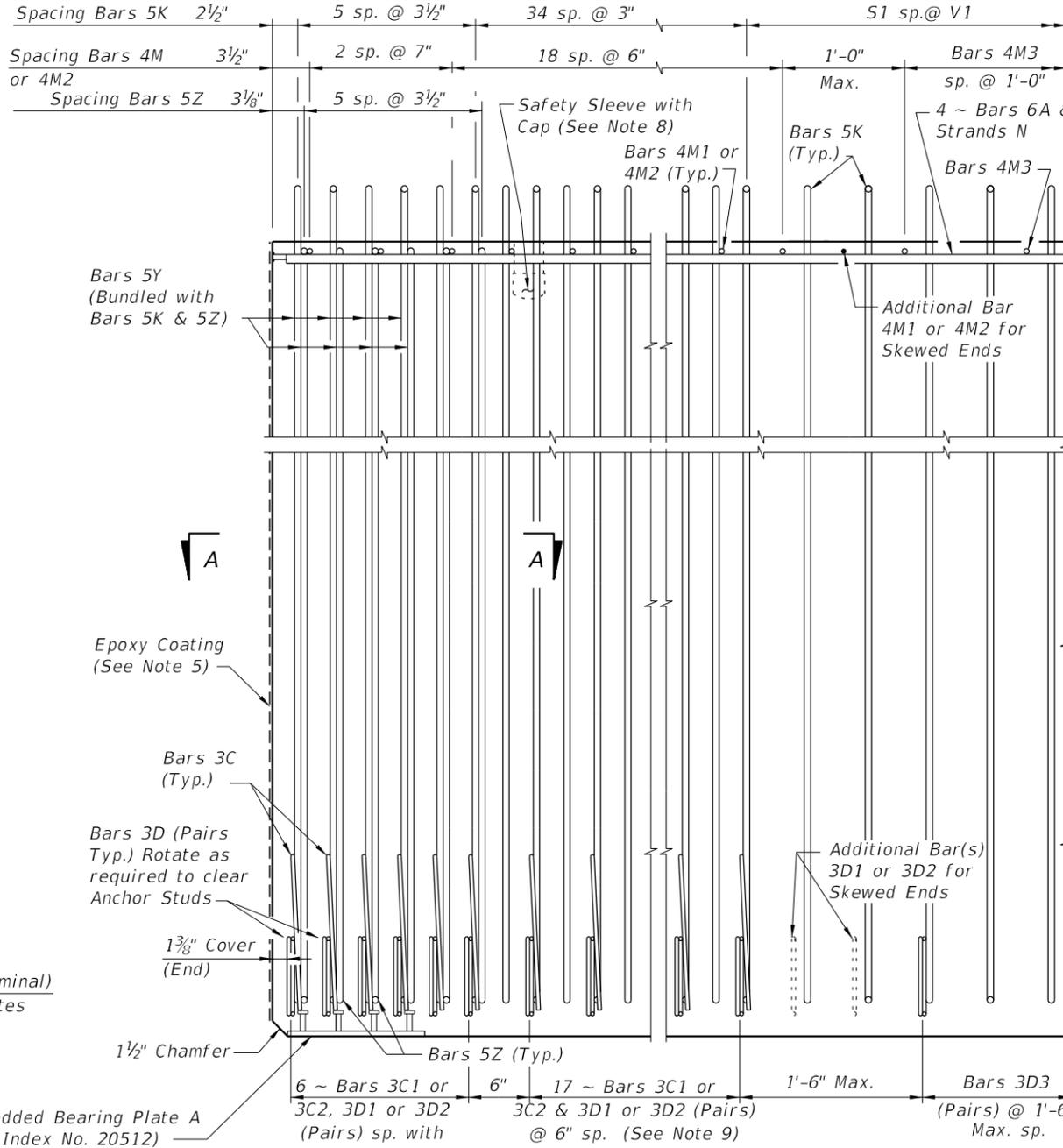
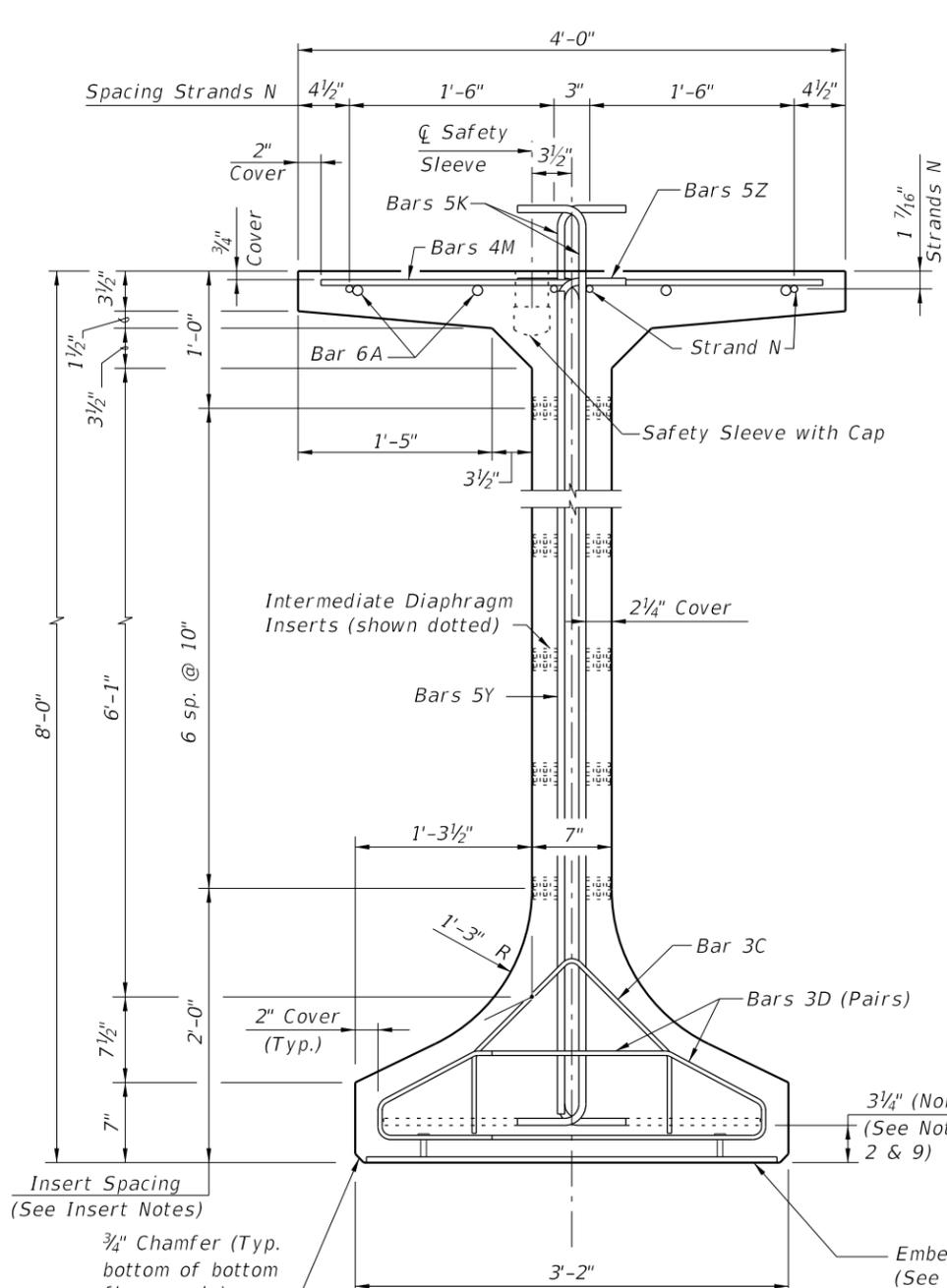
**LEGEND:**  
 EF = Each Face  
 FF = Front Face  
 BF = Back Face

REVISIONS				REVISIONS				2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	DATE	BY	07/01/10	2 of 2		
07/01/10	SJN	New Design Standard									



FLORIDA-I 84 BEAM - STANDARD DETAILS

Index No. 20084



**CONVENTIONAL REINFORCING BAR BENDING DETAILS**

**BILL OF REINFORCING STEEL**

MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	6	8	30'-0"
C1	9, 10 & 11	3	23 (End 1)	Varies
C2	9, 10 & 11	3	23 (End 2)	Varies
D1	9, 10, 11 & 14	3	46 (End 1)	Varies
D2	9, 10, 11 & 14	3	46 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	9'-2"
M1	9 & 10	4	21 (End 1)	Varies
M2	9 & 10	4	21 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	1/2" Ø Strand	4	DIM L
Y	9 & 11	5	16	
Z	2, 9, 11 & 13	5	12	

**BENDING DIAGRAMS (See Note 1)**

**BARS 6A, 4M1, 4M2, 4M3 & 5Y**

**BARS 3C1 & 3C2**

**BARS 5K & 5Z**

**BARS 3D1, 3D2 & 3D3**

**NOTES:**

A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.

B. For referenced notes, see Index No. 20010.

C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.

**REVISIONS**

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	New Design Standard			

2010 Interim Design Standard

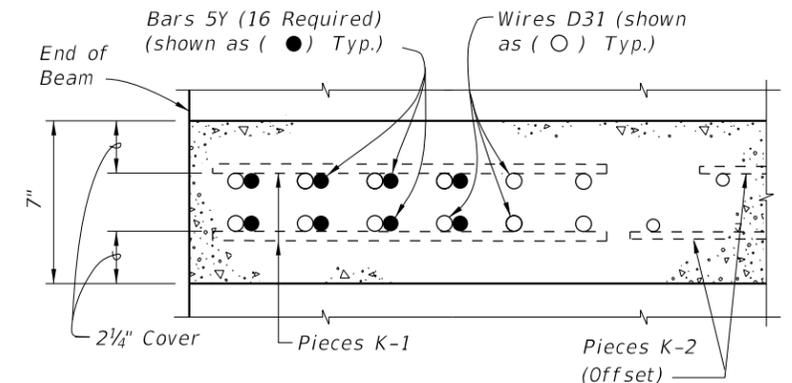
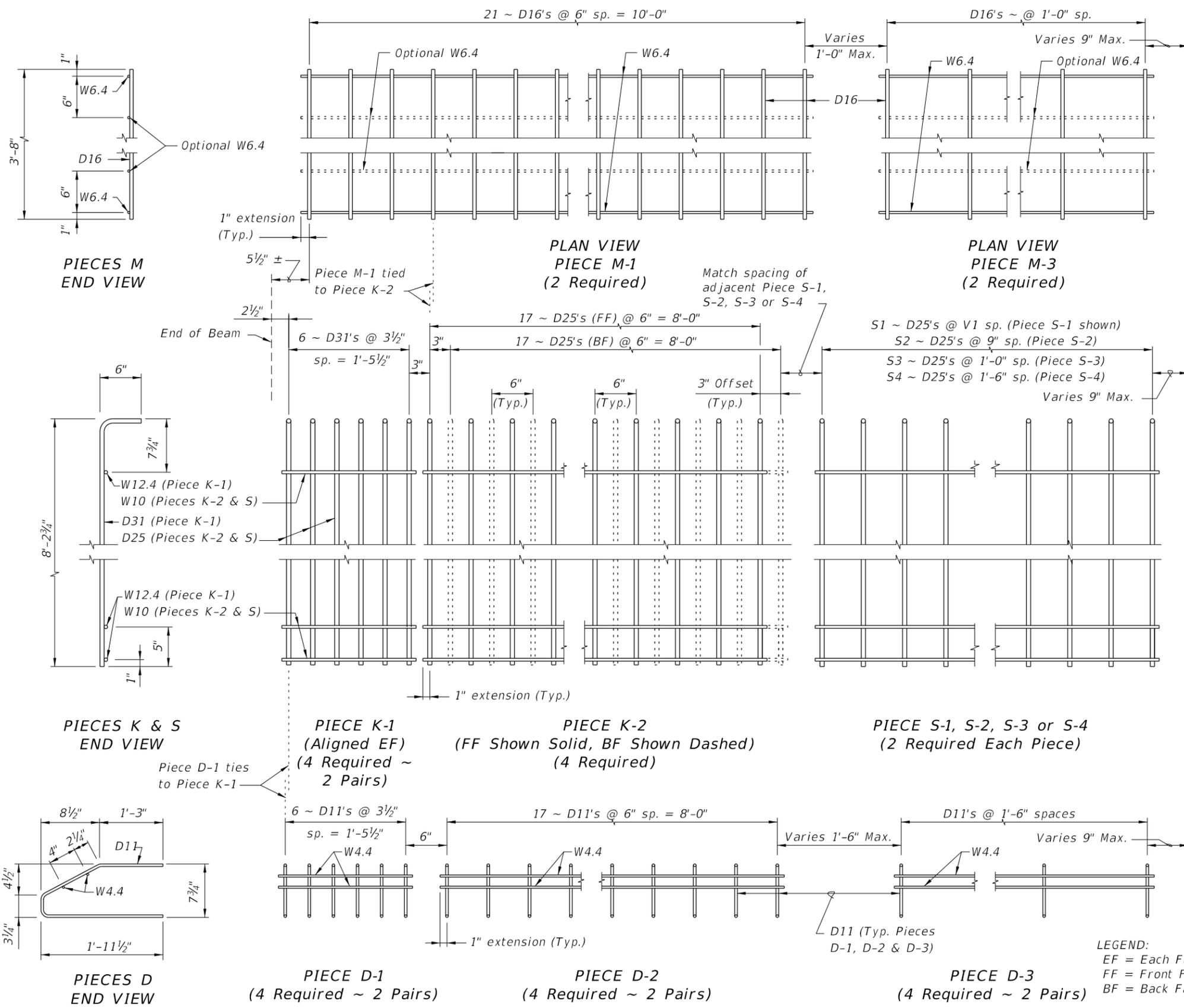
Interim Date: 07/01/10

Sheet No. 1 of 2

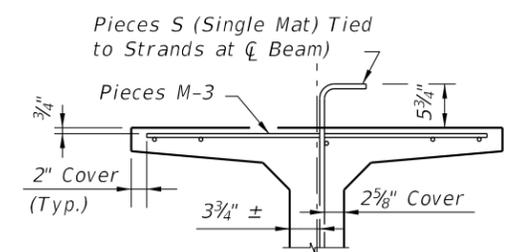
Index No. 20096

**FLORIDA-I 96 BEAM - STANDARD DETAILS**

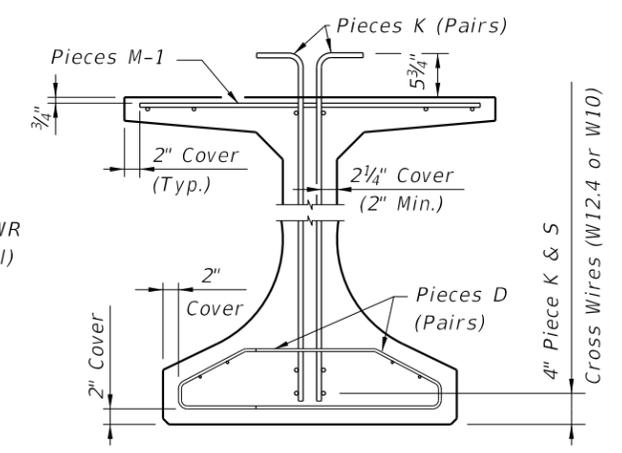
ALTERNATE REINFORCING STEEL (WELDED WIRE REINFORCEMENT) DETAILS



SECTION A-A FOR WELDED WIRE REINFORCEMENT



PARTIAL SECTION AT CENTER BEAM

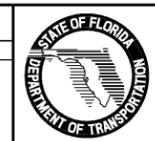


PARTIAL BEAM END VIEW (Conventional Reinforcing Bars A, C, Y and Strands N not Shown for Clarity)

- NOTES:
- See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
  - Place Conventional Reinforcement Bars 6A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
  - Pieces may be fabricated in multiple length sections.
  - For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

LEGEND:  
 EF = Each Face  
 FF = Front Face  
 BF = Back Face

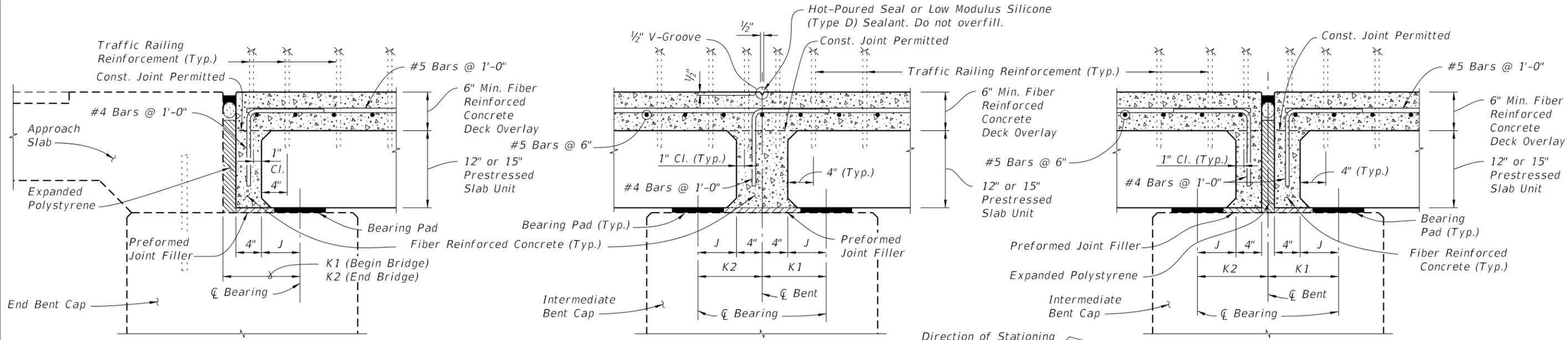
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	New Design Standard			



2010 Interim Design Standard

FLORIDA-I 96 BEAM - STANDARD DETAILS

Interim Date: 07/01/10  
 Sheet No.: 2 of 2  
 Index No.: 20096

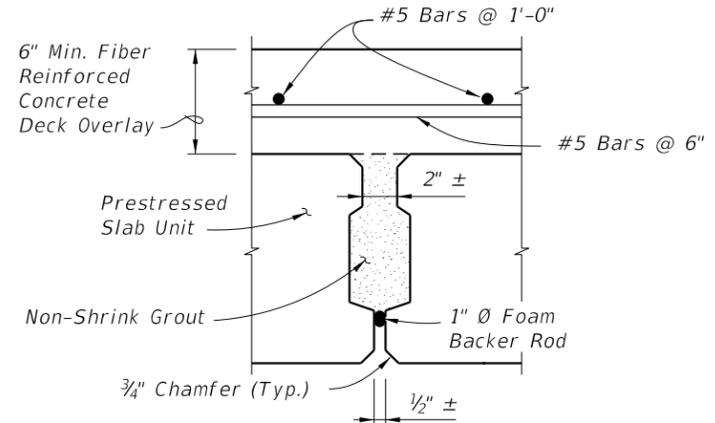


**JOINT DETAIL AT BEGIN/END BRIDGE**

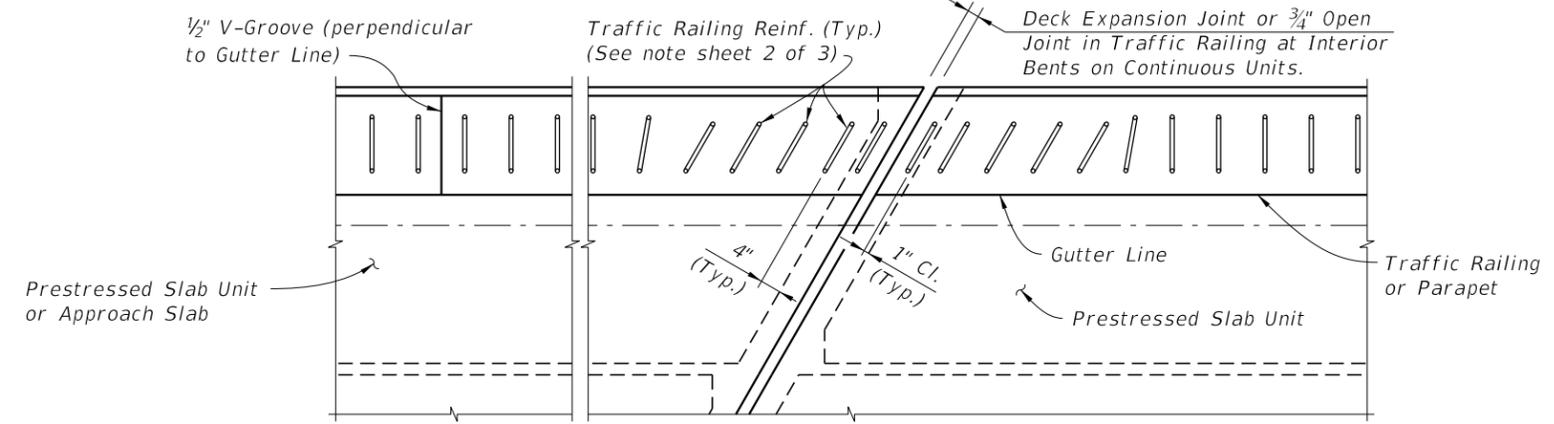
**JOINT DETAIL AT INTERMEDIATE BENTS ON CONTINUOUS UNITS**

**JOINT DETAIL AT EXPANSION INTERMEDIATE BENTS**

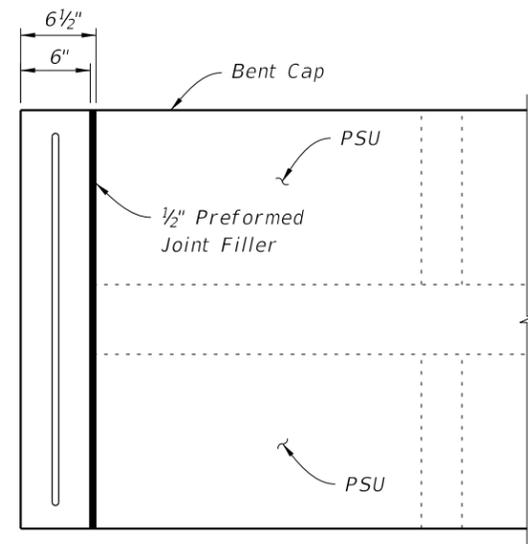
**NOTE:**  
Deck overlay reinforcing is shown at nominal spacing. See Structures Plans for actual spacing and orientation on skewed bridges.



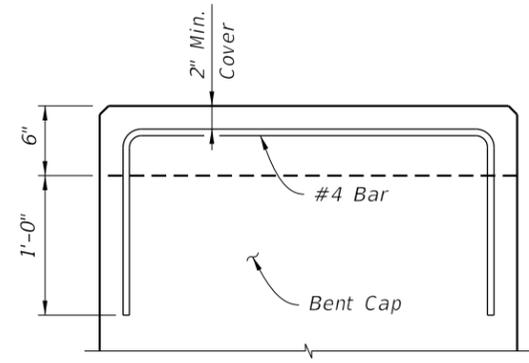
**KEYWAY DETAIL**



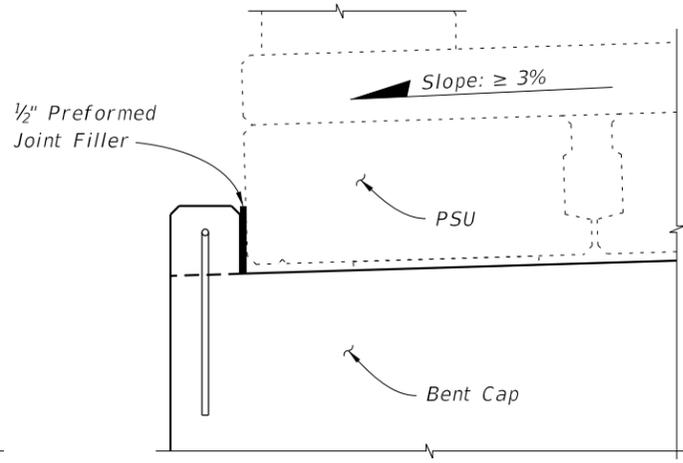
**PARTIAL PLAN VIEW OF JOINTS ON SKEWED BRIDGES (EXPANSION JOINT SHOWN, INTERMEDIATE JOINT SIMILAR)**



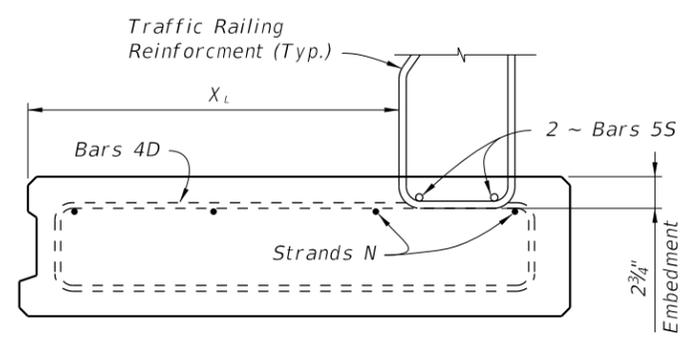
**PARTIAL PLAN**



**END VIEW**



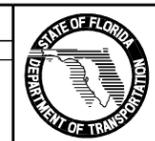
**PARTIAL ELEVATION**



**TRAFFIC RAILING REINFORCEMENT EMBEDMENT DETAIL (Bars 5V Shown, Bars 5T, 5X & 5W Similar)**

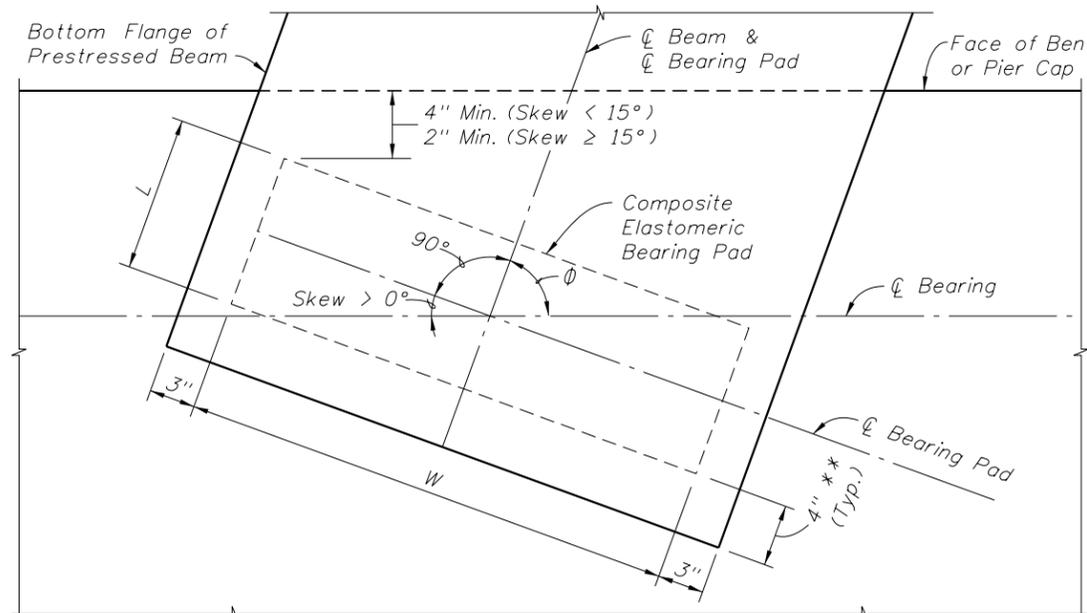
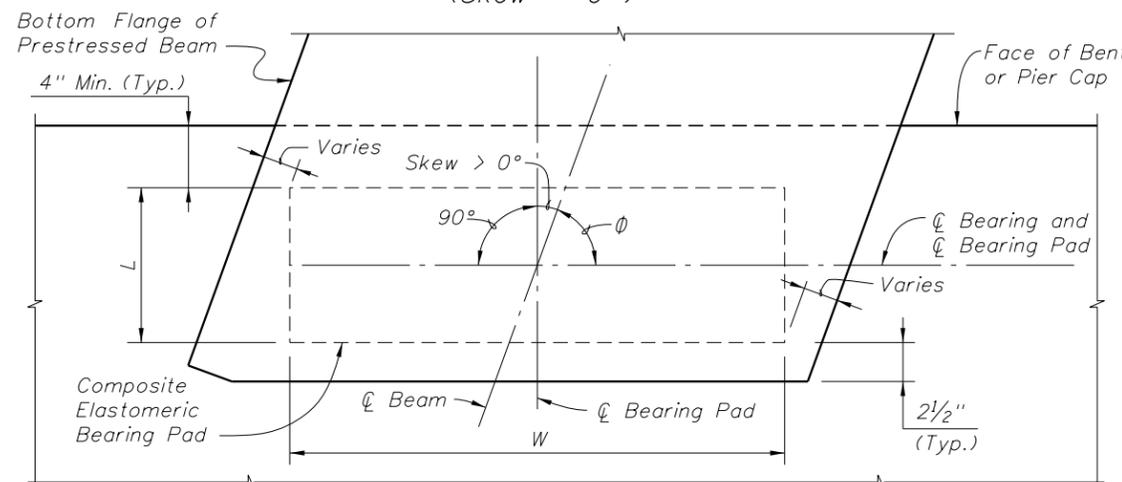
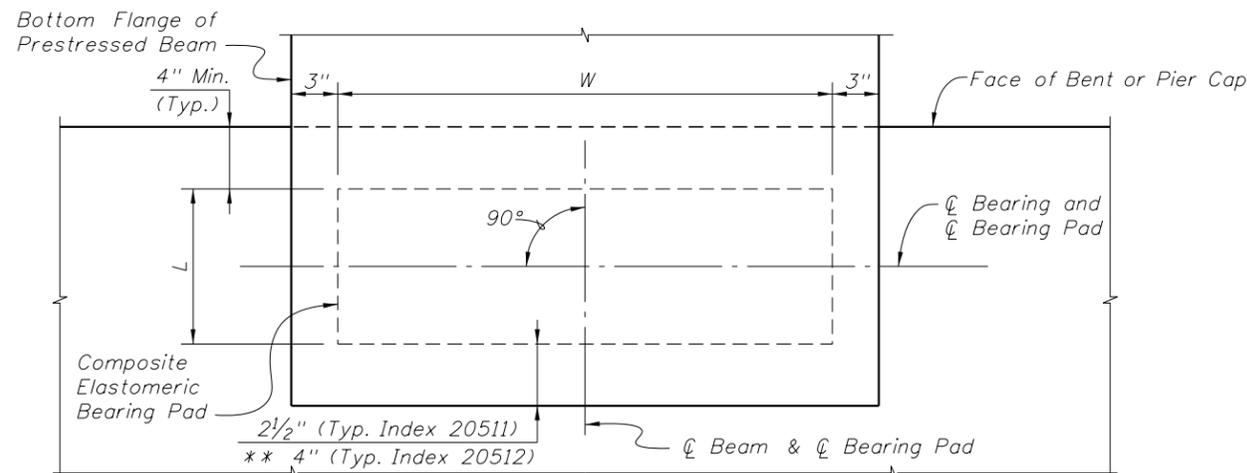
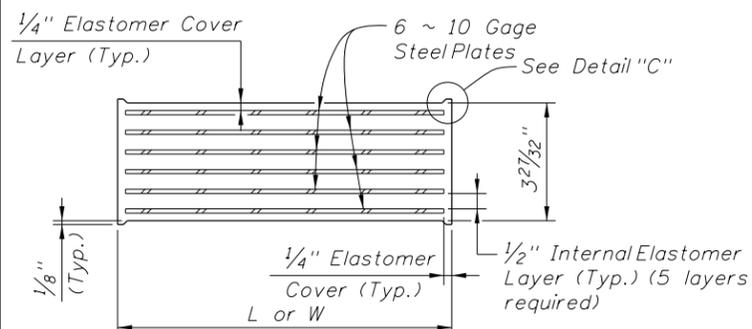
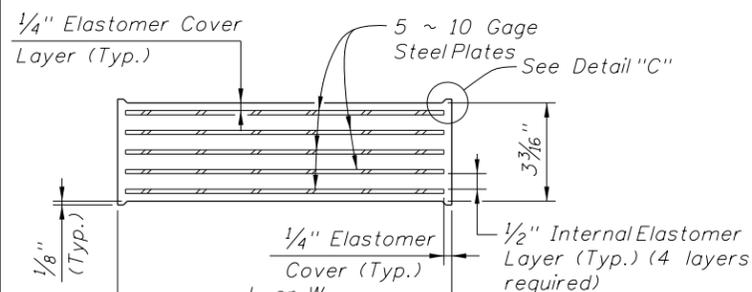
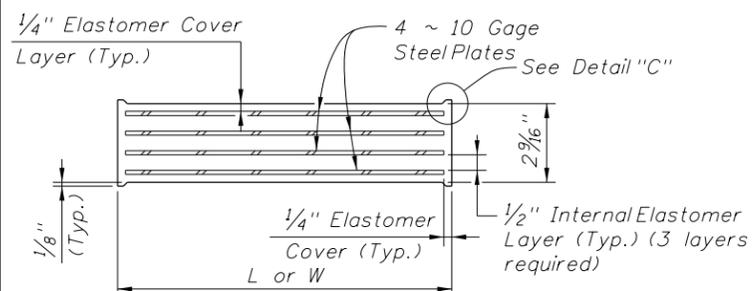
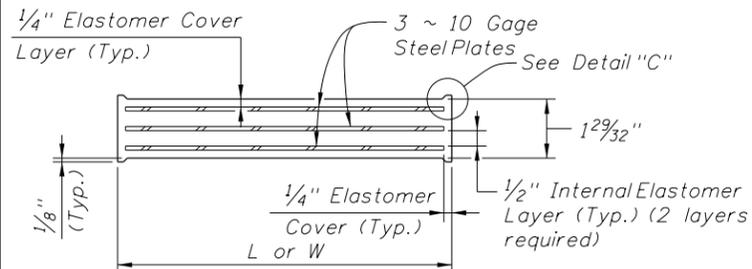
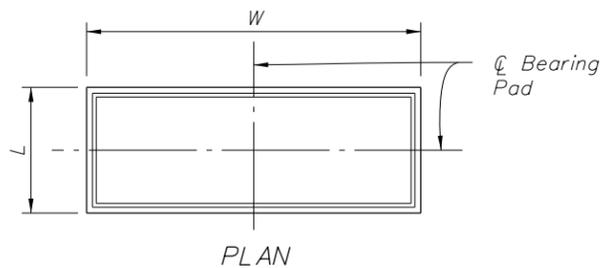
**KEEPER BLOCK DETAILS**  
Use keeper blocks on low end of bent caps when cross slope is  $\geq 3\%$ .

REVISIONS			
DATE	BY	DESCRIPTION	
01/01/10	TJB	New Design Standard	
07/01/10	SJN	Added "Fiber Reinforced Concrete" to Deck Overlay.	



2010 Interim Design Standard  
**PRESTRESSED SLAB UNITS  
DETAILS AND NOTES**

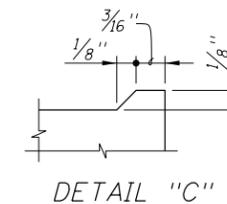
Interim Date: 07/01/10  
Sheet No.: 3 of 3  
Index No.: **20350**



PAD TYPE (See Note 1)	BEARING PAD DIMENSIONS		*BEVELED BEARING PLATE DIMENSIONS	
	L	W	C	D
D (G=110psi)	8"	32"	12"	36"
E (G=110psi)	10"	32"	12"	36"
F (G=110psi)	10"	32"	12"	36"
G (G=150psi)	10"	32"	12"	36"
H (G=150psi)	10"	32"	12"	36"
J (G=150psi)	10"	32"	12"	36"
K (G=150psi)	12"	32"	13 1/2"	36"

\* Work this sheet with Index No. 20511 or 20512 - Bearing Plate Details and BEARING PAD DATA TABLE in the Structures Plans. See TABLE OF BEAM VARIABLES and BEARING PLATE DATA TABLE in the Structures Plans for locations where beveled bearing plates are required.

\*\* Offset to End of Beam is reduced to 2" for Type K Pad using Index No. 20512.

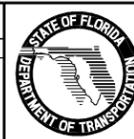


BEARING PAD NOTES:

- Neoprene in Type D, E & F bearing pads shall have a shear modulus (G) of 110 psi. Neoprene in Type G, H, J & K bearing pads shall have a shear modulus (G) of 150 psi.
- Steel Plates in bearing pads shall conform to ASTM A1011 Grade 36, Type 1.
- Unless otherwise shown in the Structures Plans:
  - For beam grades less than 0.5%, finish the Beam Seat level.
  - For beam grades between 0.5% and 2%, finish the Beam Seat parallel to the bottom of the beam in both transverse and longitudinal directions.
  - For beam grades greater than 2% finish the Beam Seat level and provide Beveled Bearing Plates.
- See Bearing Pad Data Table in Structures Plans for quantities of Type D, E, F, G, H, J and/or K Bearing Pads.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	New Design Standard.			
07/01/10	CJF	Added offsets & references to Index No. 20512; deleted PARTIAL SIDE ELEVATION detail; changed dimension 'C' for Type K Pad.			



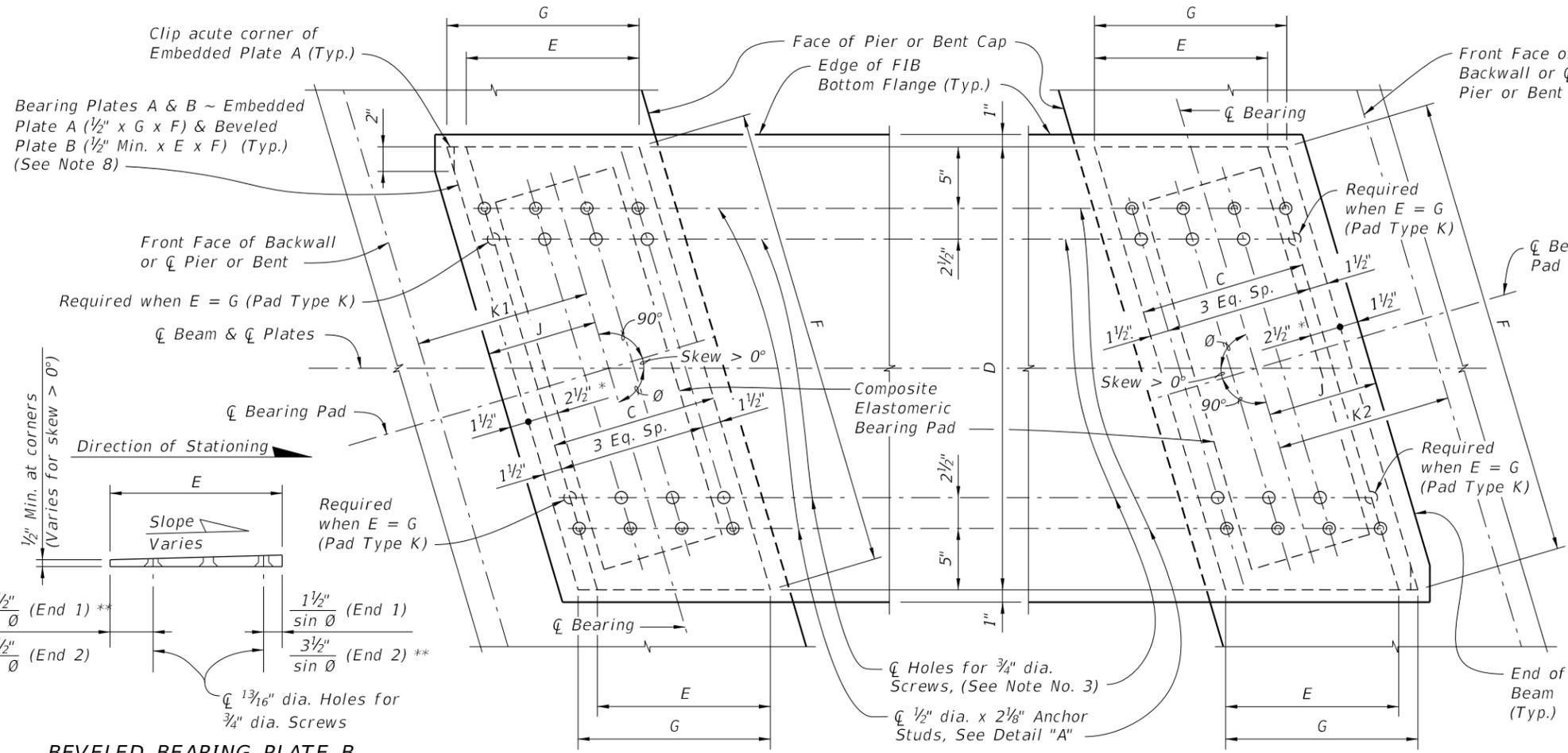
2010 Interim Design Standard

COMPOSITE ELASTOMERIC BEARING PADS - PRESTRESSED FLORIDA-I BEAMS

Interim Date	Sheet No.
07/01/10	1 of 1
Index No.	
20510	

Direction of Stationing

NOTES:

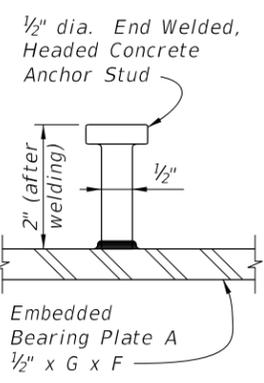


1. Work this sheet with Index No. 20510 - Composite Elastomeric Bearing Pads, and 'BEARING PLATE DATA TABLE' in the Structures Plans.
2. Embedded Bearing Plates A are required for all Florida-I beams. Beveled Bearing Plates B with Embedded Bearing Plates A are required for beams as scheduled in the 'BEARING PLATE DATA TABLE' in the Structures Plans.
3. Bearing plate material shall conform to ASTM A36 or ASTM A709 (Grade 36 or 50). Headed Concrete Anchor Studs shall conform to Specification Section 502. Hot-dip galvanize Bearing Plates A & B after fabrication except that Galvanized Caps may be welded in place after hot-dip galvanizing. Drill Bearing Plates A and B as an assembled unit, thread Bearing Plate A only. Holes are not required in Plate A when Plate B is not required. Drill and thread holes perpendicular to the bottom of Plate B and prior to plates being galvanized (ASTM A 123).
4. Provide Electroplated, Flat Countersunk Head Cap Screws in accordance with ASTM F 835. Electroplating shall be ASTM B633, SC 2, Type 1. Provide screws long enough to maintain a 3/4" minimum embedment into Embedded Bearing Plate A and Galvanized Cap. Provide steel Galvanized Caps with 1/2" min. to 1 1/2" max. height and nominal 1" inside diameter.
5. Include the cost of Bearing Plates in the pay item for Prestressed Beams.
6. For Dimensions C, D, E, F and G, see 'BEARING PLATE DIMENSIONS' on Index No. 20510 and the 'BEARING PLATE DATA TABLE' in the Structures Plans. For Dimensions J, K1 and K2, see 'TABLE OF BEAM VARIABLES' in the Structures Plans.
7. All details and dimensions shown are along  $\bar{C}$  Beam, except for dimensions to 3/4" dia. Screws and 1/2" dia. x 2 1/8" Anchor Studs, which are along  $\bar{C}$  Screws or  $\bar{C}$  Anchor Studs. Positive Slope shown, Negative Slope similar.
8. When Skew = 0°, dimensions for Embedded Bearing Plate A are 1/2" x G x D and for Beveled Plate B are 1/2" Min. x C x D.
9. Slope is determined along  $\bar{C}$  Beam at  $\bar{C}$  Bearing. See 'BEARING PLATE DATA TABLE' in the Structures Plans for Slope and Angle  $\theta$ .

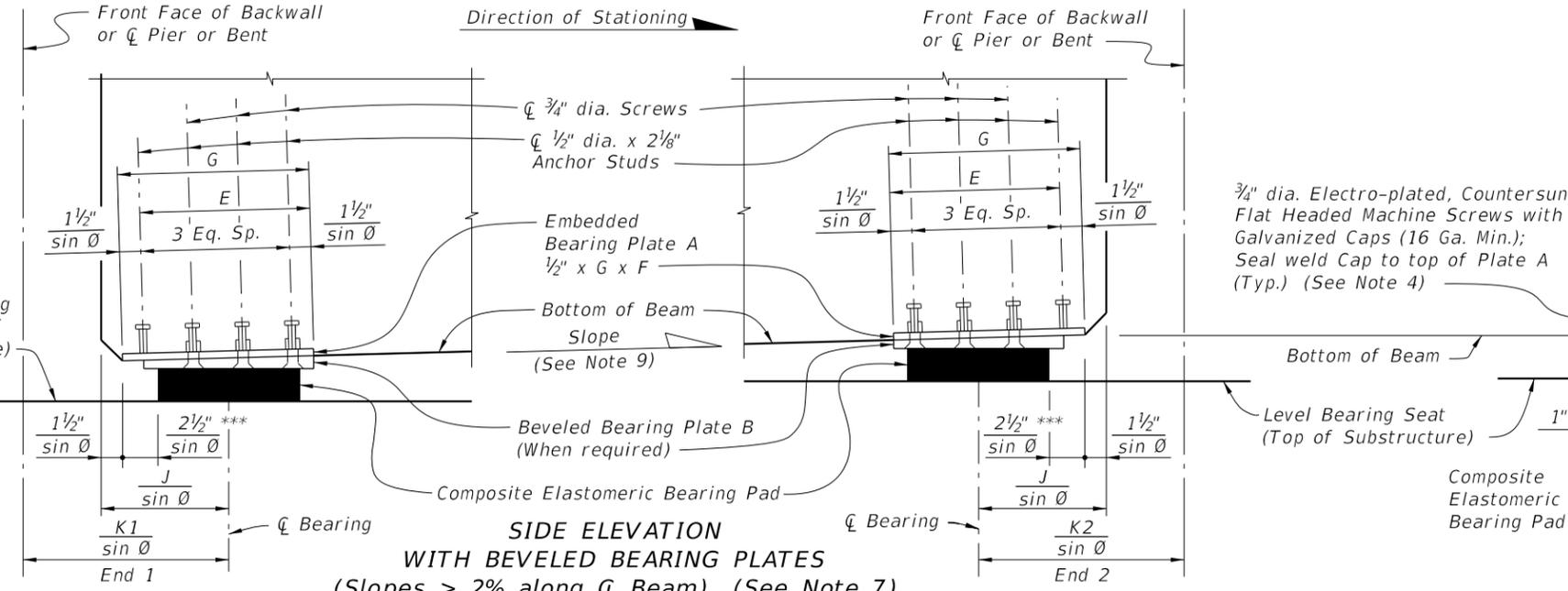
PLAN  
(0° < Skew ≤ 45° shown, Skew = 0° Similar)

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

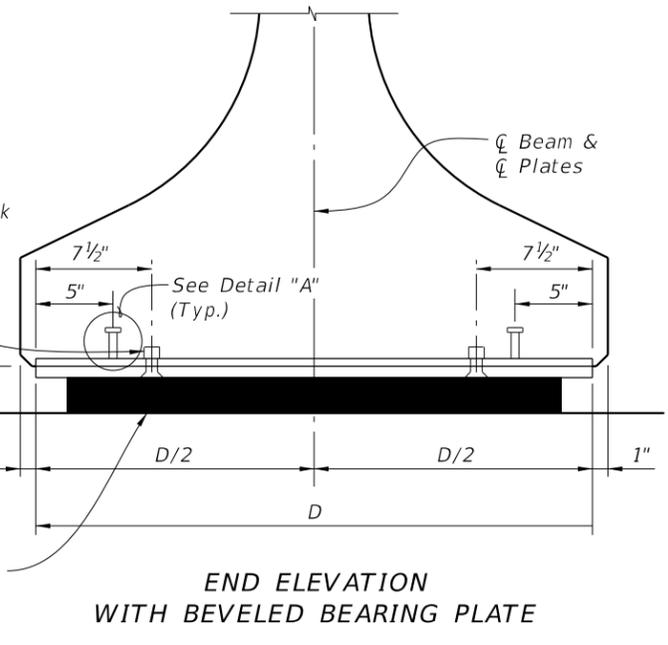
\* 1/2" when E = G (Pad Type K)  
\*\* 1 1/2" / sin  $\theta$  when E = G (Pad Type K)  
\*\*\* 1/2" / sin  $\theta$  when E = G (Pad Type K)



DETAIL "A"

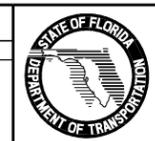


SIDE ELEVATION  
WITH BEVELED BEARING PLATES  
(Slopes > 2% along  $\bar{C}$  Beam) (See Note 7)



END ELEVATION  
WITH BEVELED BEARING PLATE

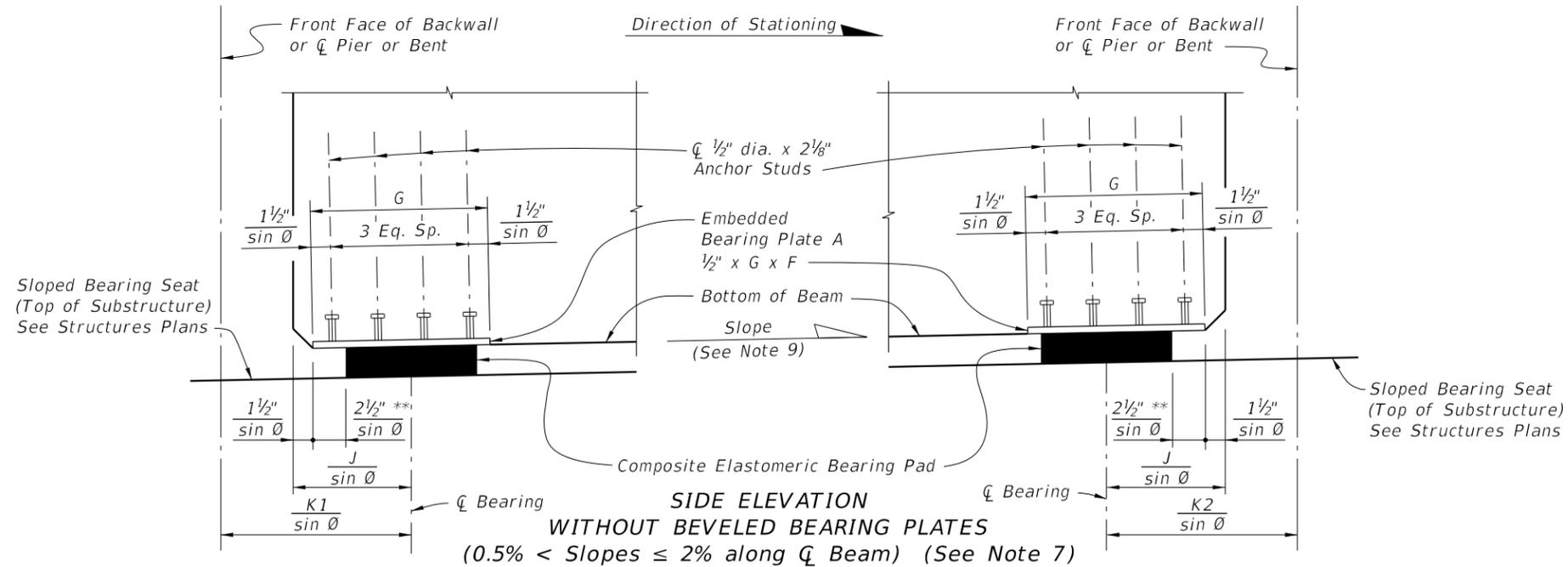
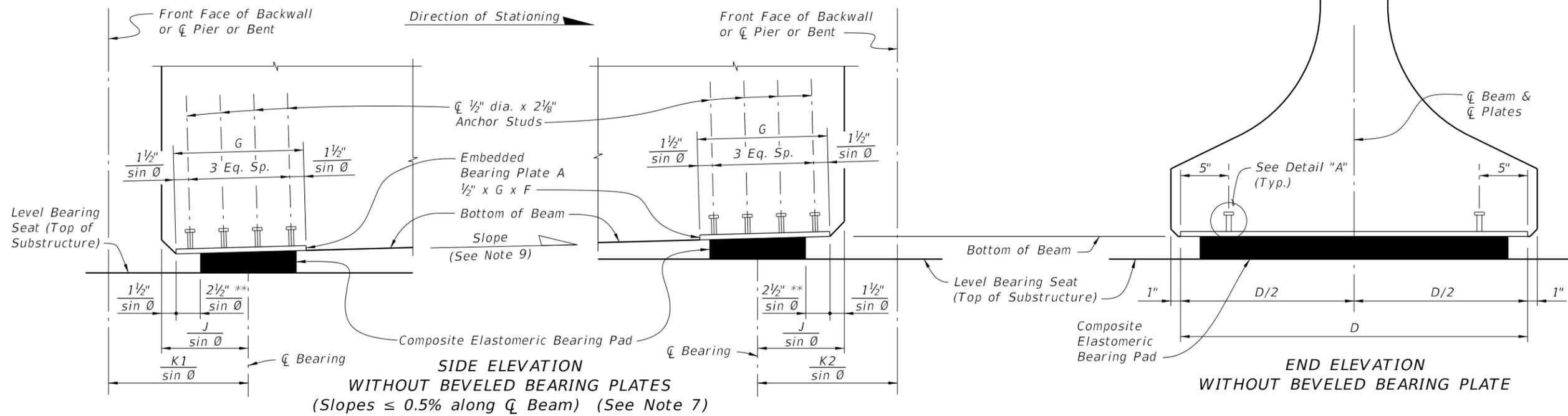
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	New Design Standard.			



2010 Interim Design Standard

BEARING PLATE DETAILS -  
PRESTRESSED FLORIDA-I BEAMS

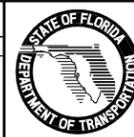
Interim Date: 07/01/10  
Sheet No.: 1 of 2  
Index No.: 20512



\*\*  $\frac{1/2"}{\sin \theta}$  for Pad Type K

**REVISIONS**

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	SJN	New Design Standard.			



2010 Interim Design Standard

**BEARING PLATE DETAILS -  
PRESTRESSED FLORIDA-I BEAMS**

Interim Date	Sheet No.
07/01/10	2 of 2
Index No.	
<b>20512</b>	

**PRESTRESSED CONCRETE PILE NOTES:**

**DESIGN SPECIFICATIONS:**

Florida Department of Transportation (FDOT) "Structures Design Guidelines", current edition.

American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", current edition.

**DESIGN PARAMETERS:**

Square Prestressed Concrete Section: Designed for 1,000 psi uniform compression after prestress losses without loads.

Pick-up, Storage, and Transportation: 0.0 psi tension using a factor of 1.5 times pile self weight.

**SPIRAL TIES:**

Each wrap of spirals shall be tied to at least two corner strands. One turn required for spiral splices.

**CONCRETE CLASS:**

Concrete for all piles shall be Class V (Special) except designated High Capacity Piles shall be Class VI.

Concrete for the High Capacity Collar Splice shall be Class V (Special).

See "GENERAL NOTES" in Structures Plans for any specific locations where the use of Silica Fume is required.

**CONCRETE STRENGTH:**

The pile cylinder strength shall be 6,000 psi minimum at 28 days and 4,000 psi minimum at time of transfer of the Prestressing Force. The cylinder strength for designated High Capacity Piles shall be 8,500 psi minimum at 28 days and 6,500 psi minimum at time of transfer of the Prestressing Force.

**SPLICE BONDING MATERIAL:**

The material to fill dowel holes and form the joint between pile sections shall be a Type B Epoxy Compound in accordance with Section 926 of the Specifications and shall be contained on the Qualified Products List (QPL). Use Epoxy Bonding Compound or Epoxy Mortar as recommended by the Manufacturer. For Epoxy Mortar only use sand or other filler material supplied by the manufacturer and in the proportions recommended.

**PICK-UP POINTS:**

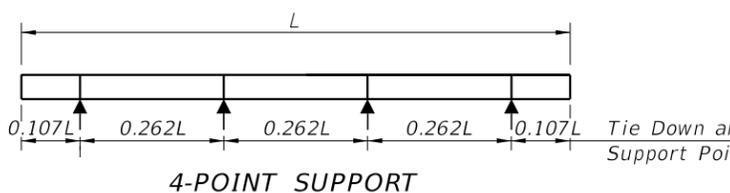
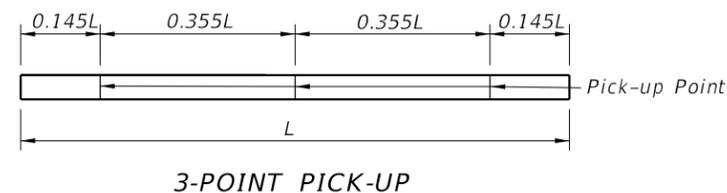
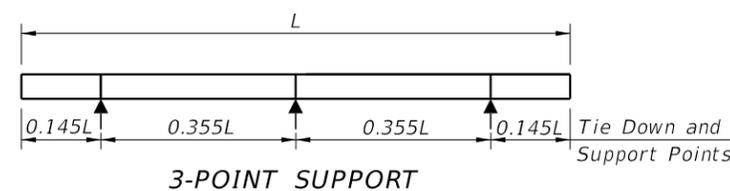
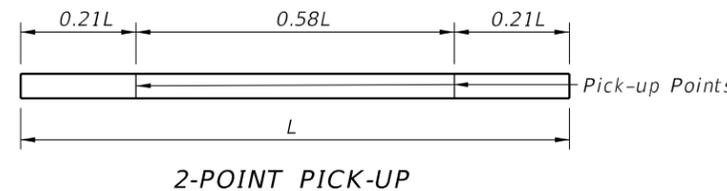
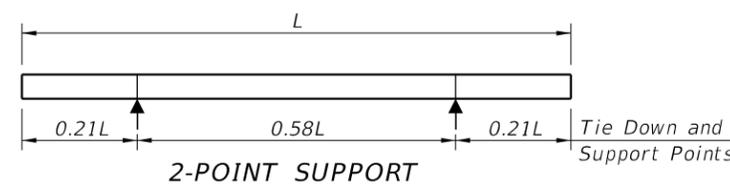
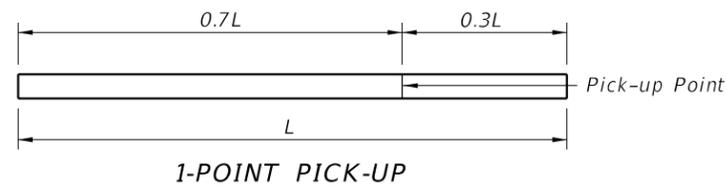
Piles shall be marked at the pick-up points to indicate proper points for attaching handling lines.

**REINFORCING STEEL:**

All reinforcing steel shall be Grade 60, except that spiral ties shall be manufactured from cold-drawn steel wire meeting the requirements of ASTM A82.

**PRESTRESSING STEEL:**

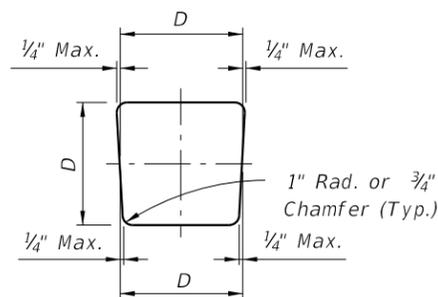
Prestressing steel shall be seven-wire strand, Grade 270, Low-Relaxation Strand (LRS).



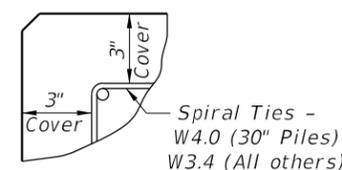
**PILE PICK-UP DETAILS**

**STORAGE AND TRANSPORTATION SUPPORT DETAILS**

TABLE OF MAXIMUM PILE PICK-UP AND SUPPORT LENGTHS								
	D = Square Pile Size (inches)						Required Storage and Transportation Detail	Pick-Up Detail
	12	14	18	20	24	30		
Maximum Pile Length (Feet)	48	52	59	62	68	87	2, 3, or 4 point	1 Point
	69	75	85	89	98	124	2, 3, or 4 point	2 Point
	99	107	121	128	140	178	3 or 4 point	3 Point

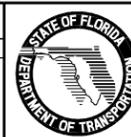


**TYPICAL PILE SHAPE FOR MOLD FORMS**



**DETAIL SHOWING TYPICAL COVER**

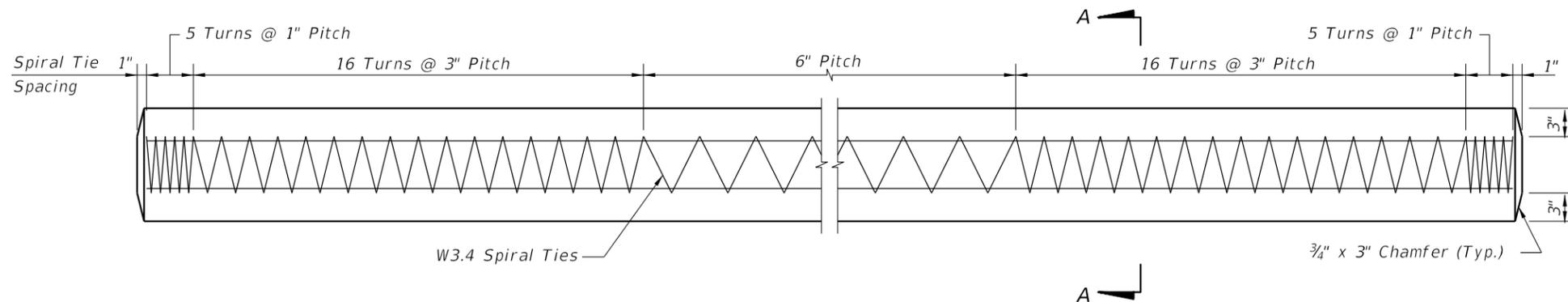
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Deleted: ", or 250 as noted," and "SR = Stress Relieved Strand" from PRESTRESSING STEEL note.			



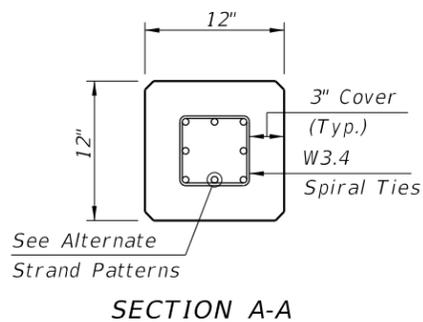
2010 Interim Design Standard

**NOTES AND DETAILS FOR SQUARE PRESTRESSED CONCRETE PILES**

Interim Date	Sheet No.
07/01/10	1 of 1
Index No.	
20600	



ELEVATION

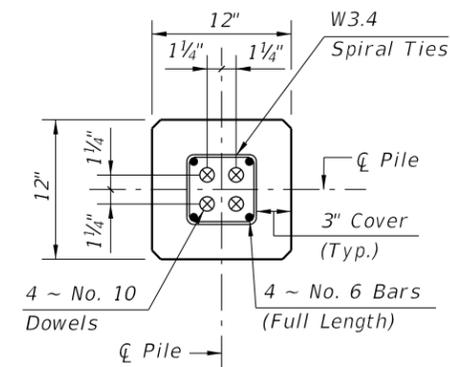


SECTION A-A

**ALTERNATE STRAND PATTERNS**

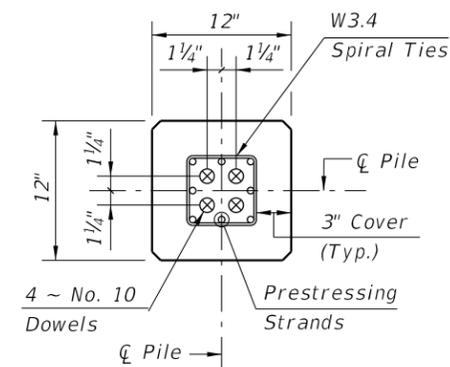
- 4 ~ 0.6" Ø, Grade 270 LRS, at 44 kips
- 8 ~ 1/2" Ø (Spec), Grade 270 LRS, at 25 kips
- 8 ~ 1/2" Ø, Grade 270 LRS, at 24 kips
- 8 ~ 7/16" Ø, Grade 270 LRS, at 23 kips
- 12 ~ 3/8" Ø, Grade 270 LRS, at 16 kips

NOTE:  
 Any of the given Alternate Strand Patterns may be utilized.  
 The strands shall be located as follows:  
 Place one strand at each corner and place the remaining strands equally spaced between the corner strands.  
 The total strand pattern shall be concentric with the nominal concrete section of the pile.



SECTION D-D

(See Non-drivable Unforeseen Reinforced Precast Pile Splice Detail)



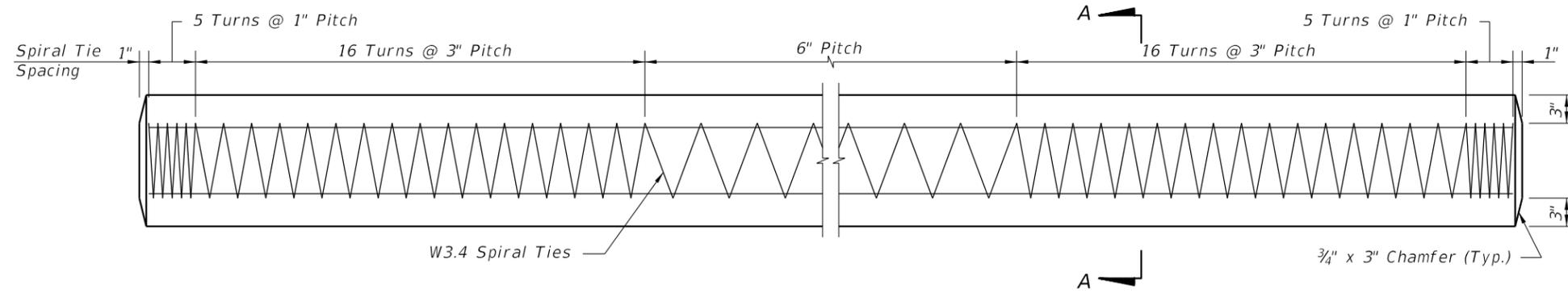
SECTION E-E

(See Drivable Unforeseen Prestressed Precast Pile Splice Detail)

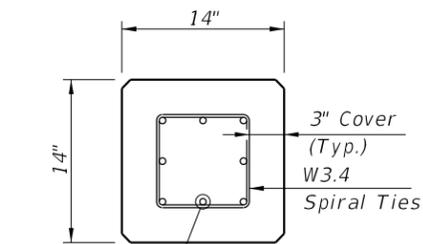
**PILE SPLICE REINFORCEMENT DETAILS**

NOTE:  
 Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.

REVISIONS						2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			07/01/10	1 of 1
07/01/10	GJM	"ALTERNATE STRAND PATTERNS" Added: "8 ~ 1/2" Ø (Spec), Grade 270 LRS, at 25 kips"; "8 ~ 1/2" Ø, Grade 270 LRS, at 24 kips"; Changed: 8 ~ 7/16" Ø, Grade 270 LRS, to "23 kips"; 12 ~ 3/8" Ø, Grade 270 LRS, to "16 kips". Deleted: "SR" strand pattern options.						<b>12" SQUARE PRESTRESSED CONCRETE PILE</b> Index No. <b>20612</b>	



ELEVATION

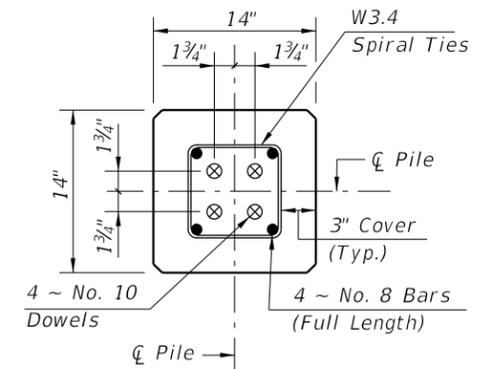


SECTION A-A

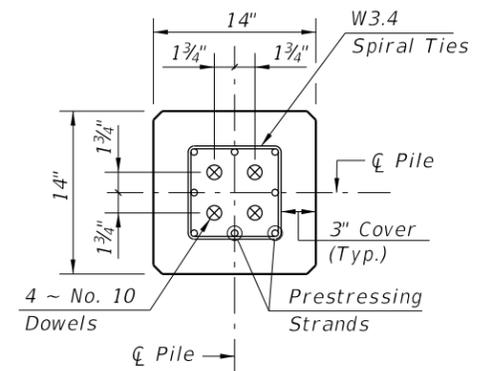
**ALTERNATE STRAND PATTERNS**

- 8 ~ 0.6" Ø, Grade 270 LRS, at 33 kips
- 8 ~ 1/2" Ø (Spec), Grade 270 LRS, at 31 kips
- 8 ~ 1/2" Ø, Grade 270 LRS, at 31 kips
- 12 ~ 7/16" Ø, Grade 270 LRS, at 21 kips
- 16 ~ 3/8" Ø, Grade 270 LRS, at 16 kips

NOTE:  
 Any of the given Alternate Strand Patterns may be utilized.  
 The strands shall be located as follows:  
 Place one strand at each corner and place the remaining strands equally spaced between the corner strands.  
 The total strand pattern shall be concentric with the nominal concrete section of the pile.



SECTION D-D  
 (See Nondrivable Unforeseen Reinforced Precast Splice Detail)

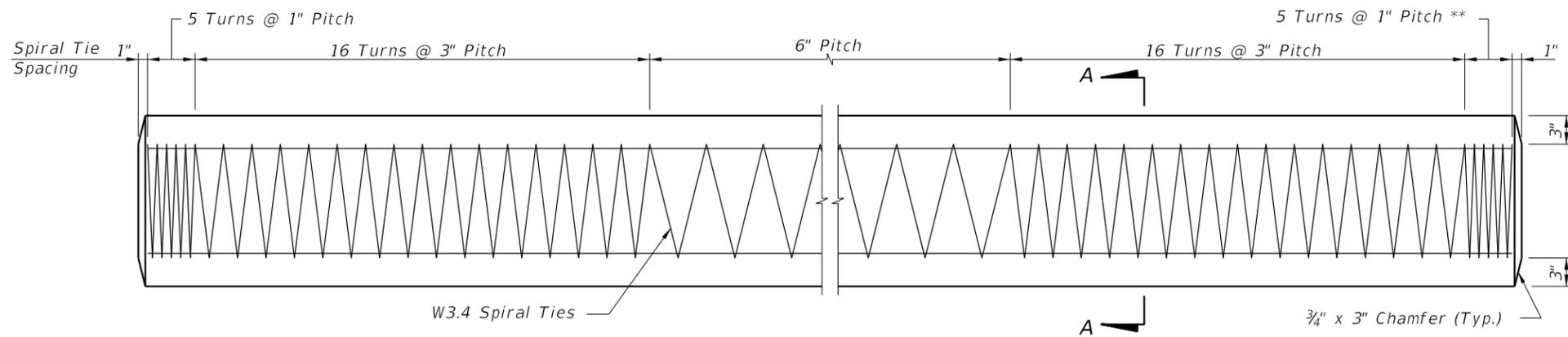


SECTION E-E  
 (See Drivable Unforeseen Prestressed Precast Splice Detail)

**PILE SPLICE REINFORCEMENT DETAILS**

NOTE:  
 Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.

REVISIONS						2010 Interim Design Standard		Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			07/01/10	1 of 1
07/01/10	GJM	"ALTERNATE STRAND PATTERNS" Added: "12 ~ 7/16" Ø, Grade 270 LRS, at 21 kips" and "16 ~ 3/8" Ø, Grade 270 LRS, at 16 kips"; Changed: 8 ~ 0.6" Ø, Grade 270 LRS, to "33 kips", 8 ~ 1/2" Ø (Spec) Grade 270 LRS, to "31 kips". Deleted: "SR" strand pattern options.						<b>14" SQUARE PRESTRESSED CONCRETE PILE</b> Index No. <b>20614</b>	



ELEVATION

\*\* See Note No. 4 on Index No. 20601

**ALTERNATE STRAND PATTERNS**

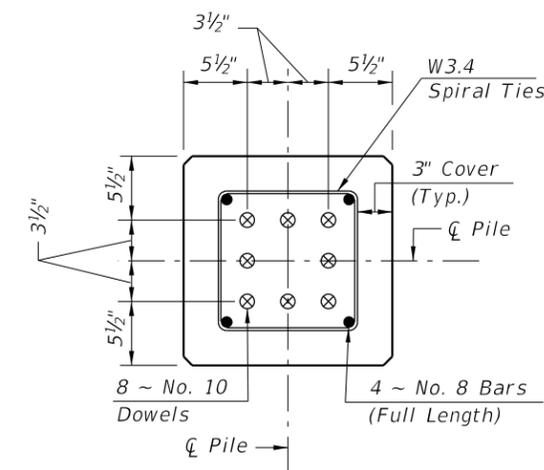
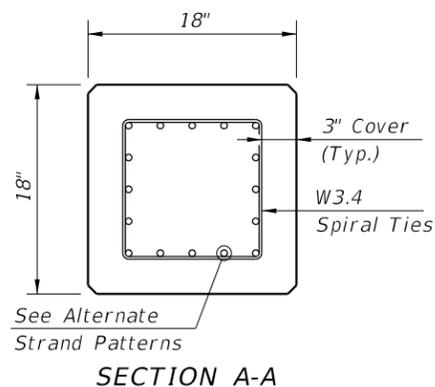
- 12 ~ 0.6" Ø, Grade 270 LRS, at 35 kips
- 12 ~ 1/2" Ø (Spec), Grade 270 LRS, at 34 kips
- 16 ~ 1/2" Ø, Grade 270 LRS, at 26 kips
- 20 ~ 7/16" Ø, Grade 270 LRS, at 21 kips
- 24 ~ 3/8" Ø, Grade 270 LRS, at 17 kips

**NOTE:**

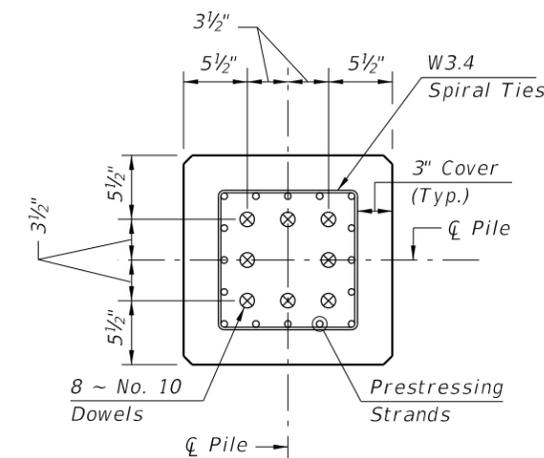
Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows: Place one strand at each corner and place the remaining strands equally spaced between the corner strands. The total strand pattern shall be concentric with the nominal concrete section of the pile.

**NOTE:**

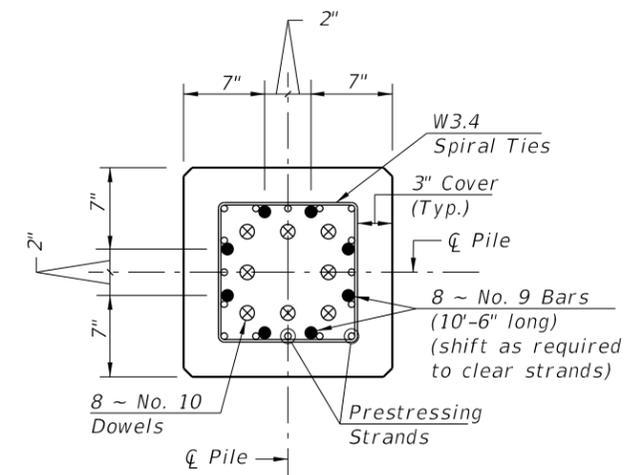
Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.



SECTION D-D  
(See Non-drivable Unforeseen Reinforced Precast Splice Detail)



SECTION E-E  
(See Drivable Prestressed Precast Splice Detail)

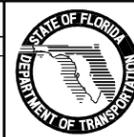


SECTION F-F  
(See Drivable Preplanned Splice Detail)

**PILE SPLICE REINFORCEMENT DETAILS**

**REVISIONS**

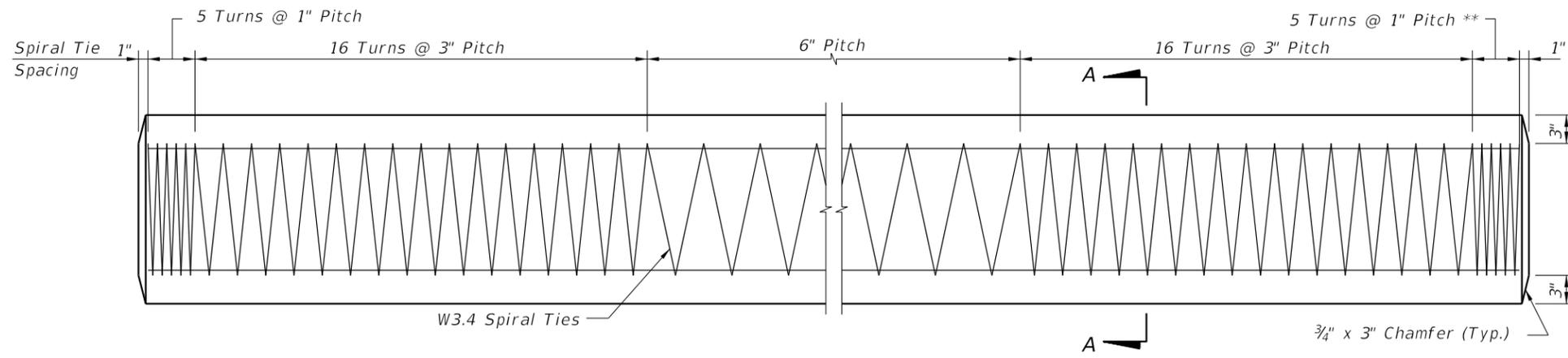
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	"ALTERNATE STRAND PATTERNS" Added: "16 ~ 1/2" Ø, Grade 270 LRS, at 26 kips". Changed: 12 ~ 0.6" Ø, Grade 270 LRS, to "35 kips"; 20 ~ 7/16" Ø, Grade 270 LRS, to "21 kips" and 24 ~ 3/8" Ø, Grade 270 LRS, to "17 kips". Deleted: "SR" strand pattern options.			



2010 Interim Design Standard

**18" SQUARE PRESTRESSED CONCRETE PILE**

Interim Date	Sheet No.
07/01/10	1 of 1
Index No.	
20618	

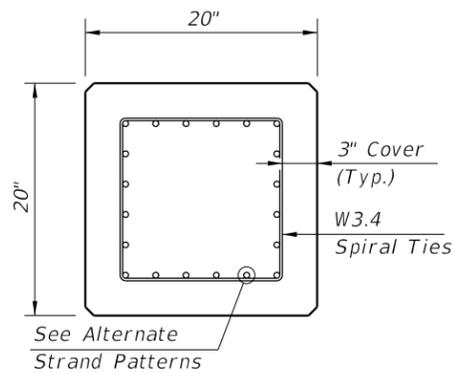


ELEVATION

\*\* See Note No. 4 on Index No. 20601

**ALTERNATE STRAND PATTERNS**

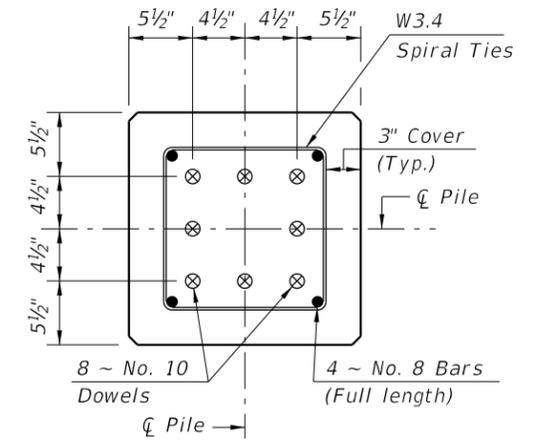
- 12 ~ 0.6" Ø, Grade 270 LRS, at 42 kips
- 16 ~ 1/2" Ø (Spec), Grade 270 LRS, at 31 kips
- 16 ~ 1/2" Ø, Grade 270 LRS, at 31 kips
- 24 ~ 7/16" Ø, Grade 270 LRS, at 21 kips



SECTION A-A

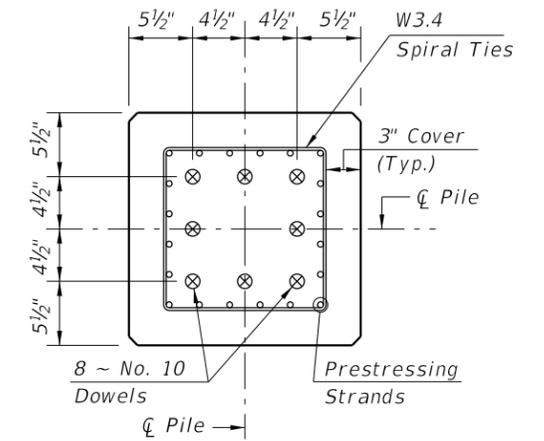
**NOTE:**  
Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows:  
Place one strand at each corner and place the remaining strands equally spaced between the corner strands.  
The total strand pattern shall be concentric with the nominal concrete section of the pile.

**NOTE:**  
Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.



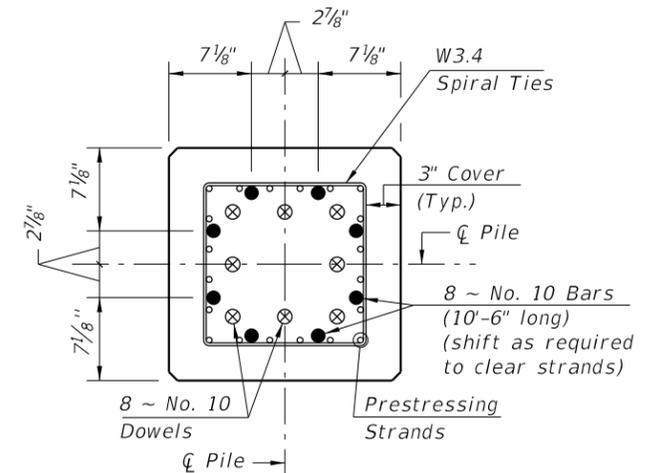
SECTION D-D

(See Nondrivable Unforeseen Reinforced Precast Pile Splice Detail)



SECTION E-E

(See Drivable Prestressed Precast Pile Splice Detail)

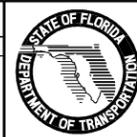


SECTION F-F

(See Drivable Preplanned Pile Splice Detail)

**PILE SPLICE REINFORCEMENT DETAILS**

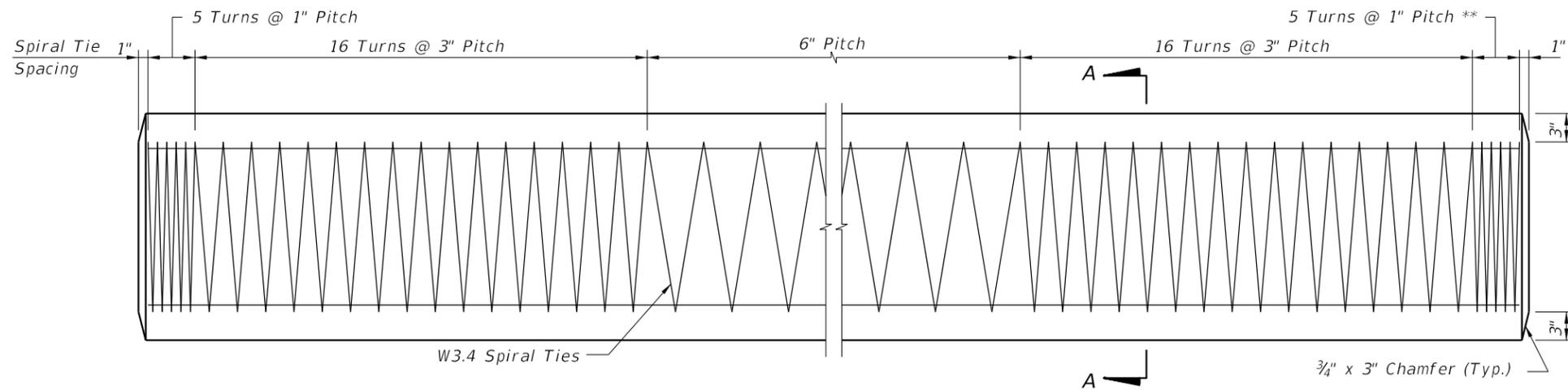
REVISIONS			
DATE	BY	DESCRIPTION	
07/01/10	GJM	"ALTERNATE STRAND PATTERNS" Added: "16 ~ 1/2" Ø (Spec), Grade 270 LRS, at 31 kips" Changed: 12 ~ 0.6" Ø, Grade 270 LRS, to "44 kips", and 24 ~ 7/16" Ø, Grade 270 LRS, to "21 kips". Deleted: "SR" strand pattern options.	



2010 Interim Design Standard

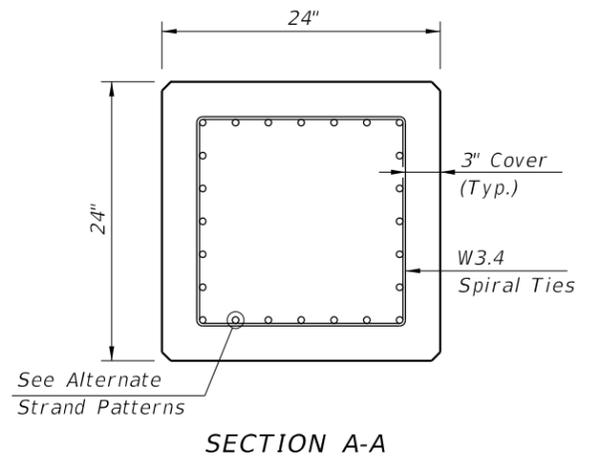
**20" SQUARE PRESTRESSED CONCRETE PILE**

Interim Date: 07/01/10  
Sheet No.: 1 of 1  
Index No.: 20620



ELEVATION

\*\* See Note No. 4 on Index No. 20601



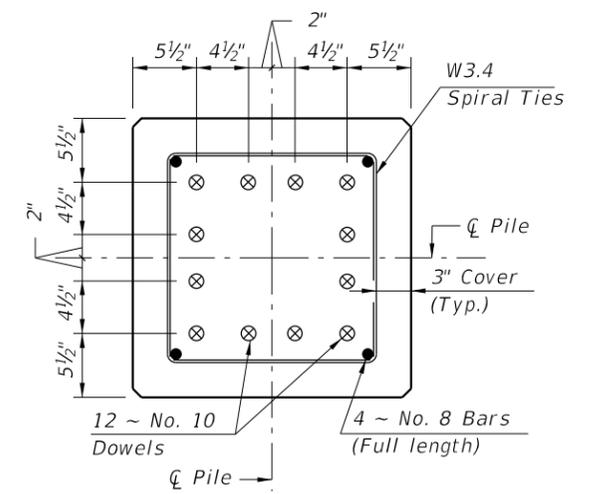
SECTION A-A

**ALTERNATE STRAND PATTERNS**

- 16 ~ 0.6" Ø, Grade 270 LRS, at 44 kips
- 20 ~ 1/2" Ø (Spec), Grade 270 LRS, at 34 kips
- 24 ~ 1/2" Ø, Grade 270 LRS, at 31 kips

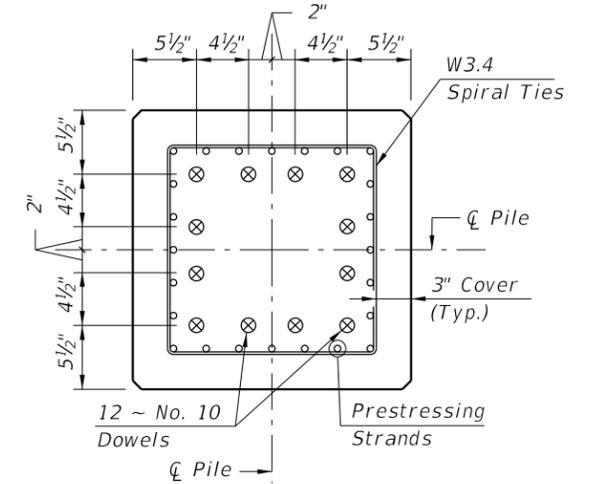
NOTE:  
Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows:  
Place one strand at each corner and place the remaining strands equally spaced between the corner strands.  
The total strand pattern shall be concentric with the nominal concrete section of the pile.

NOTE:  
Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.



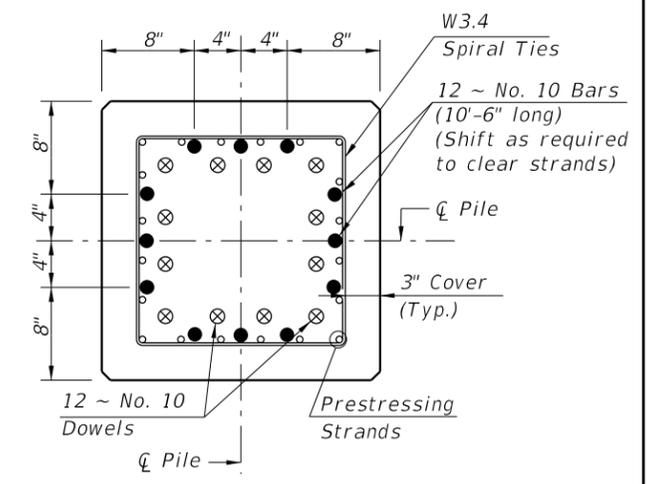
SECTION D-D

(See Nondrivable Unforesen Reinforced Precast Pile Splice Detail)



SECTION E-E

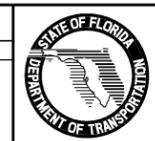
(See Drivable Prestressed Precast Pile Splice Detail)



SECTION F-F

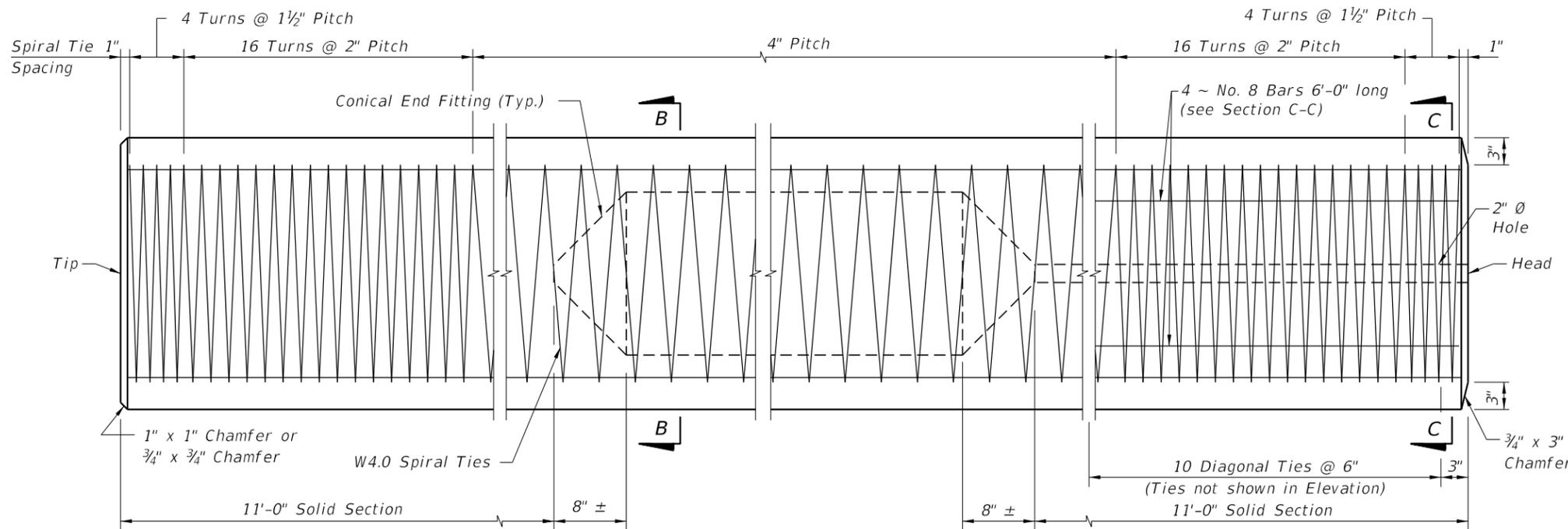
(See Drivable Preplanned Pile Splice Detail)

REVISIONS			
DATE	BY	DESCRIPTION	
07/01/10	GJM	"ALTERNATE STRAND PATTERNS" Deleted: "SR" strand pattern options.	



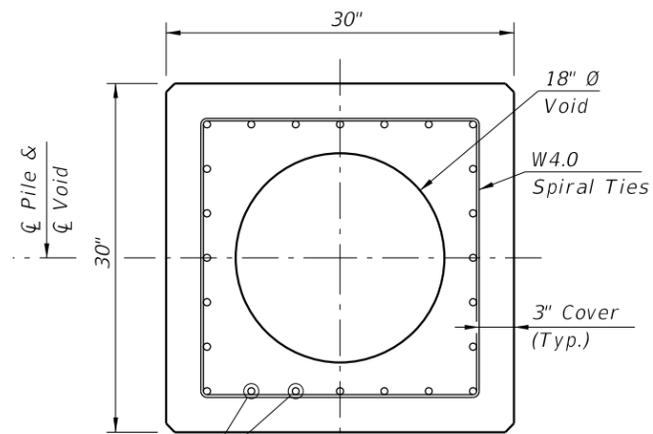
2010 Interim Design Standard  
**24" SQUARE PRESTRESSED CONCRETE PILE**

Interim Date: 07/01/10  
Sheet No.: 1 of 1  
Index No.: **20624**

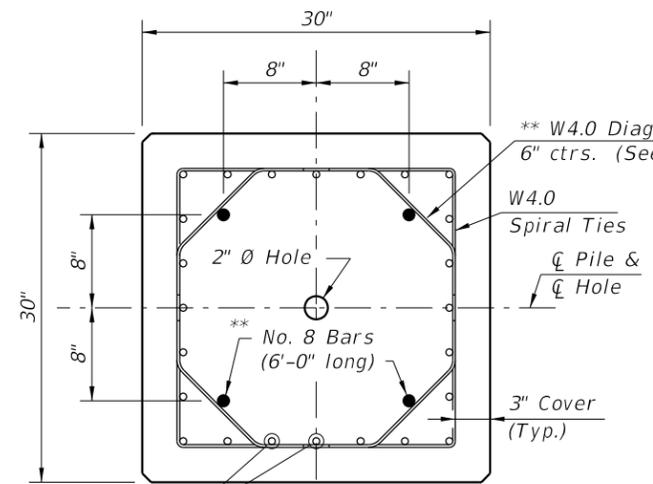


NOTE:  
Work this Index with Index No. 20600 - Notes and Details for Square Prestressed Concrete Piles and Index No. 20601 - Square Prestressed Concrete Pile Splices.

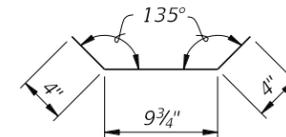
**ELEVATION**



**SECTION B-B**  
(See Pile Splice Reinforcement Details)



**SECTION C-C**  
(See Pile Splice Reinforcement Details)



**W4.0 DIAGONAL TIE DETAIL**

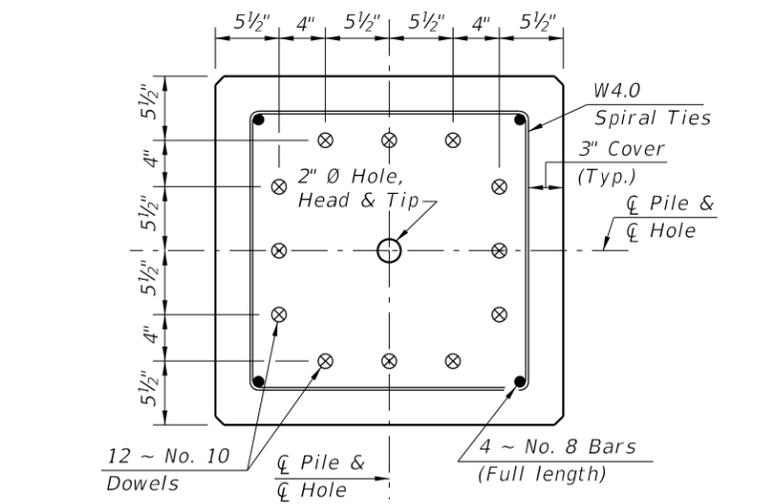
\*\* Omit 4 ~ No. 8 Bars and Diagonal Ties in pre-planned mechanical splice.

**ALTERNATE STRAND PATTERNS**

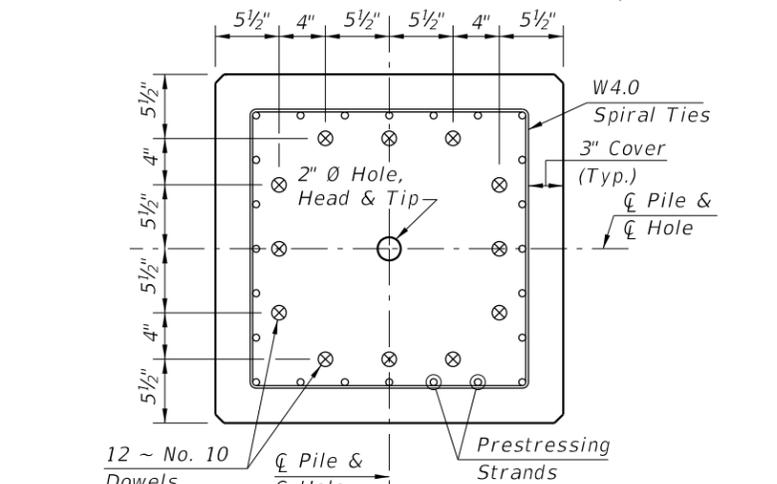
- 20 ~ 0.6" Ø, Grade 270 LRS, at 41 kips
- 24 ~ 1/2" Ø (Spec), Grade 270 LRS, at 34 kips
- 28 ~ 1/2" Ø, Grade 270 LRS, at 29 kips

**NOTES:**

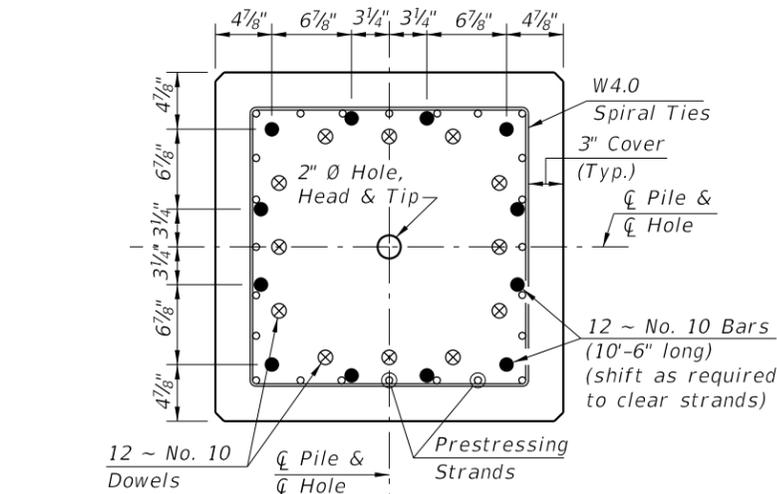
1. Venting shall be provided by the use of a 1" Ø PVC conduit through a substructure cap or column. Voids between segments of spliced piles shall be connected by 2" Ø hole(s).
2. Any of the given Alternate Strand Patterns may be utilized. The strands shall be located as follows: Place one strand at each corner and place the remaining strands equally spaced between the corner strands. The total strand pattern shall be concentric with the nominal concrete section of the pile.
3. **CONTRACTOR OPTION:** The 30" pile may be cast **SOLID** by omitting the 18" Ø void and the 2" Ø vent hole. In this event, the Contractor shall submit calculations for approval and a proposed strand configuration that provide net prestressing after losses equal to 1000 psi. Alternate configurations for the Diagonal Ties, to maintain the position of the 4 ~ No. 8 Bars, may be approved by the Engineer.



**SECTION D-D**  
(See Nondrivable Unforeseen Reinforced Precast Pile Splice Detail)



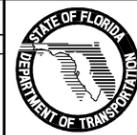
**SECTION E-E**  
(See Drivable Prestressed Precast Pile Splice Detail)



**SECTION F-F**  
(See Drivable Preplanned Pile Splice Detail)

**PILE SPLICE DETAILS**

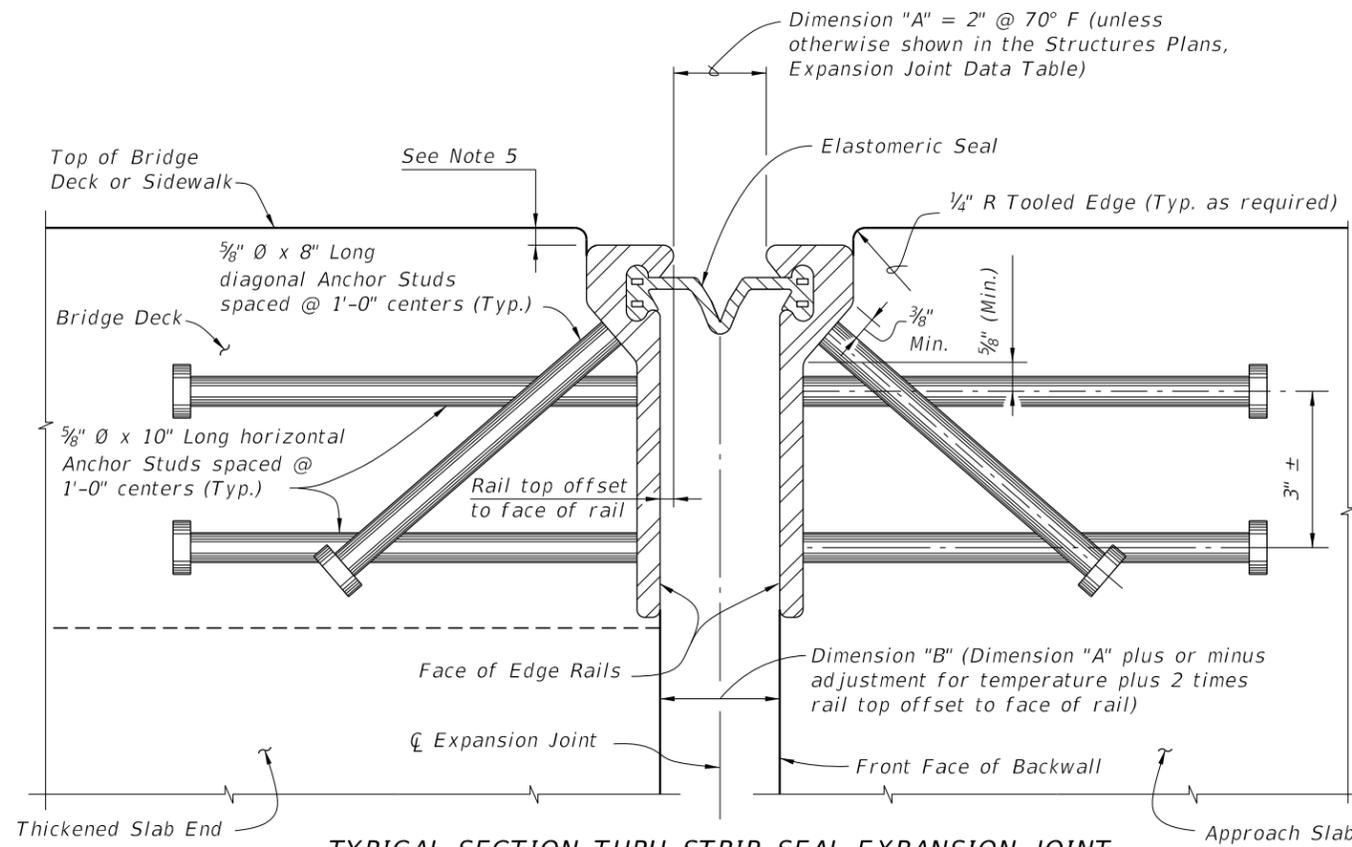
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/10	GJM	Deleted: 3/16" Ø and "SR" strand Pattern options.			



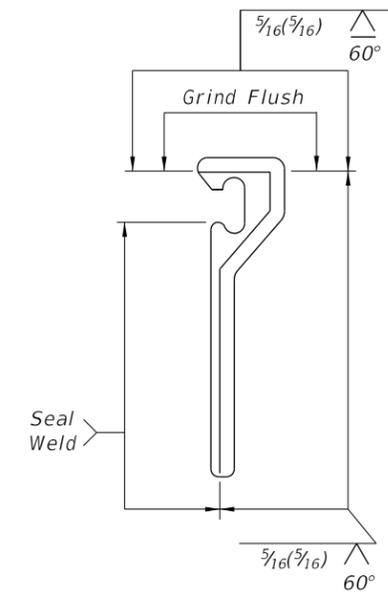
2010 Interim Design Standard

**30" SQUARE PRESTRESSED CONCRETE PILE**

Interim Date	Sheet No.
07/01/10	1 of 1
Index No.	
<b>20630</b>	



**TYPICAL SECTION THRU STRIP SEAL EXPANSION JOINT**  
 (Begin or End Concrete Girder Bridge shown, Intermediate Supports and Steel Girder Bridge similar. Reinforcing Steel and Girder details not shown for clarity.)



**SHOP SPLICE DETAIL**

**GENERAL NOTES:**

1. Furnish Strip Seal Expansion Joint Systems in accordance with Specification Section 458, ASTM D5973 and the AASHTO LRFD Bridge Design Specifications.
2. Furnish solid steel Edge Rails in accordance with ASTM A709, Grade 36, 50 or 50(W) that are extruded, hot rolled and or machined. Furnish Edge Rails with a minimum mass of 19.2 lb/ft excluding studs, a minimum height of 8", a minimum thickness of  $\frac{1}{2}$ " and a maximum top surface (riding surface) width of 2". Shape of Edge Rail shown is representative, minor variations depending on manufacturer are permitted. Edge Rails manufactured from bent plate or built up pieces are not acceptable.
3. Furnish Anchor Studs in accordance with ASTM A108. Electric arc end-weld Anchor Studs with complete fusion. Anchor Studs may be piggy backed to achieve required lengths.
4. When required, furnish  $\frac{1}{4}$ " thick slip resistant steel Sidewalk Cover Plates in accordance with ASTM A709, Grade 36 or 50, with a minimum coefficient of friction on the top surface of 0.8 in a dry condition as determined by ASTM F1677 or F1679 and 0.68 or 0.52 in a wet condition as determined by ASTM F1679 or ASTM F1677 (respectively); that incorporate an anti-slip steel surface consisting of a random hatch matrix or other suitable pattern. Do not use diamond plate or surface applied slip resistant tapes, films, nonmetallic coatings or other similar materials. Furnish flat head Stainless Steel Sleeve Anchors in accordance with ASTM F593 Group 1 Alloy 304 for attaching Sidewalk Cover Plates. Install Sleeve Anchors in accordance with manufacturer's recommendations.
5. Recess the Edge Rail below the concrete surface in accordance with Specification Section 458.
6. Refer to Specification 458 and the Expansion Joint Data Table in the Structures Plans for installation and fabrication requirements and adjustments to Dimension "A".
7. Manufacturers seeking approval of Strip Seal Expansion Joint Systems for inclusion on the Qualified Products List as pre-approved designs must submit application along with design documentation showing the expansion joint meets the specification, geometric and material requirements specified herein. Include installation details consisting of temporary or sacrificial support brackets, bolts, clamps, etc. that are compatible with decks constructed with or without blockouts.

REVISIONS			
DATE	BY	DESCRIPTION	
07/01/10	GJM	Deleted INSTRUCTIONS TO DESIGNER and Diaphragm related details.	



2010 Interim Design Standard

**STRIP SEAL EXPANSION JOINT**

Interim Date	Sheet No.
07/01/10	1 of 3
Index No.	
21100	