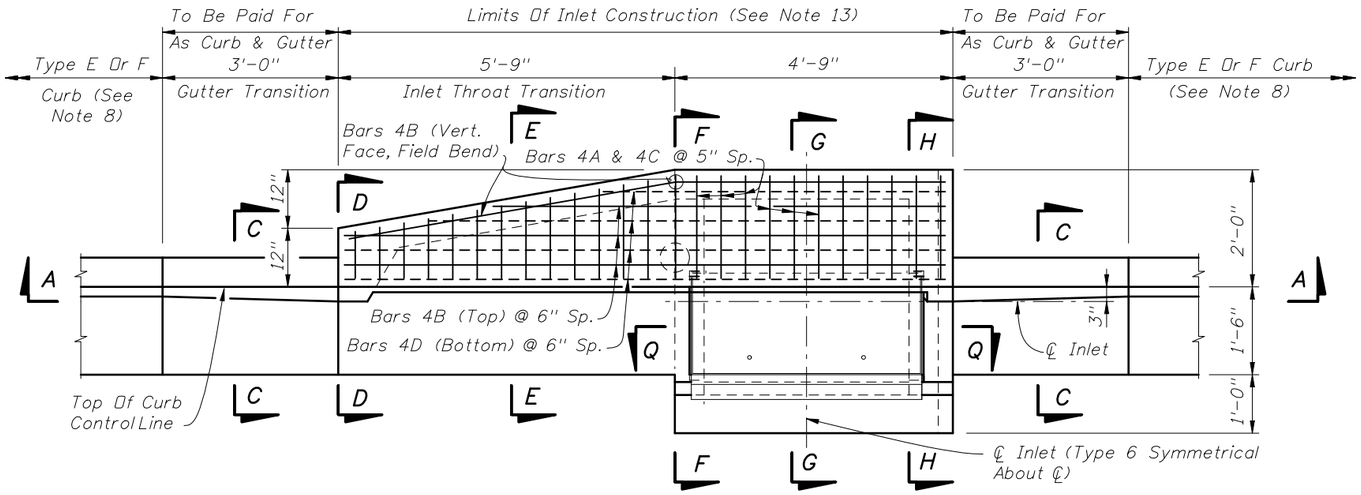
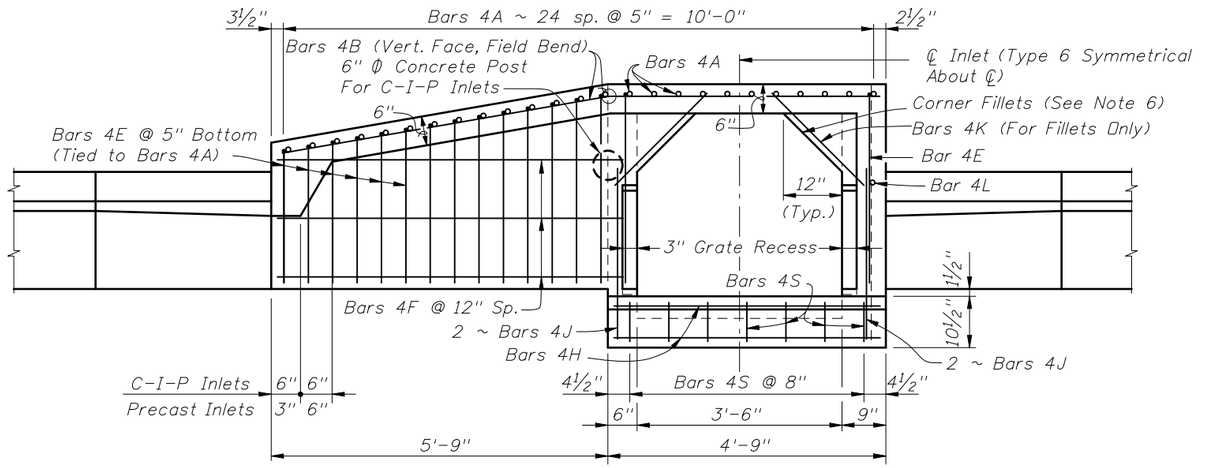
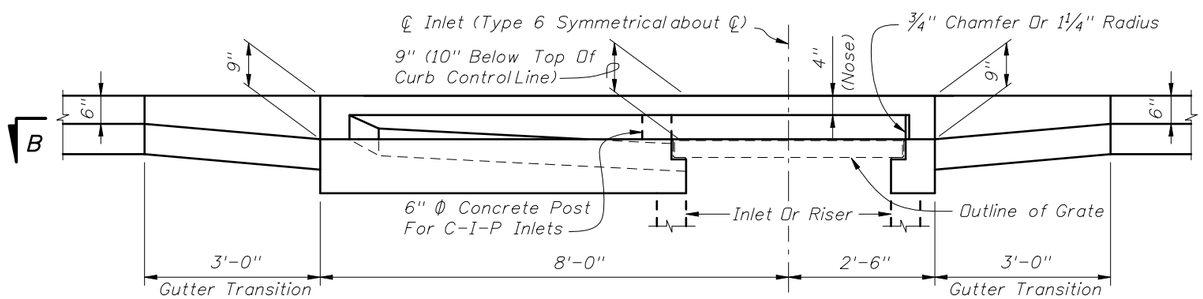


TOP VIEW



SECTION BB

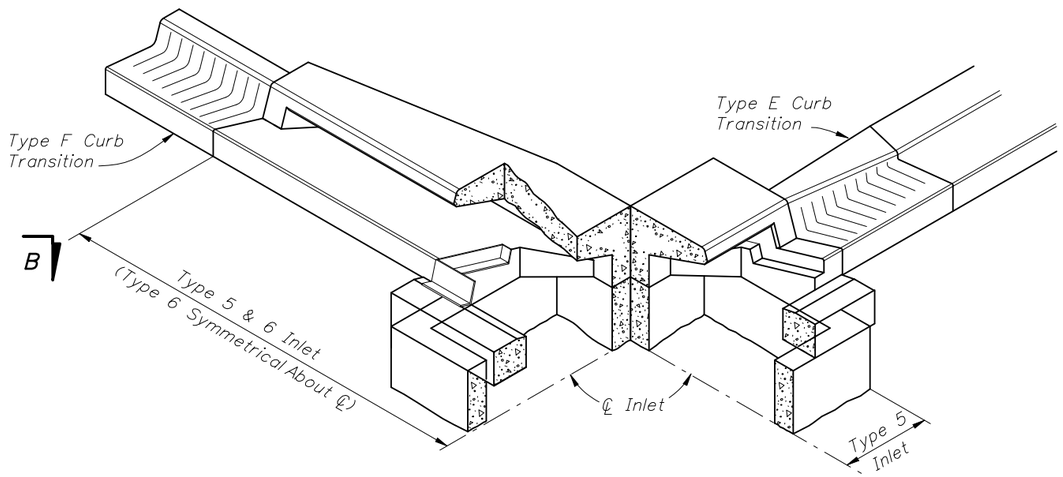


SECTION AA
(At ℄ Inlet)

INLET TYPE 5
(Curb Inlet Type 6 Symmetrical With Left Half)

GENERAL NOTES

1. The finished grade and slope of the inlet tops are to conform with the finished cross slope and grade of the proposed sidewalk and/or border.
2. For inlets constructed on a curve, refer to the plans to determine the radius, and modify the inlet details accordingly. Bend steel when necessary.
3. All reinforcing steel to be Grade 60 bars with 1¼" minimum cover unless otherwise shown, see Sheet 4 for equivalent area Welded Wire Reinforcement details.
4. Inlet tops shall be either cast-in-place or precast concrete. Precast units shall conform to the dimensions shown or in accordance with approved shop drawing's. Request for shop drawing approval shall be directed to the State Drainage Engineer.
5. Concrete meeting the requirements of ASTM C478 (4,000 psi) may be used in lieu of Class II concrete for precast units, manufactured in plants which meet the requirements of Section 449 of the Specifications.
6. Corner fillets are required at inlet opening for precast units or C-I-P units used in conjunction with circular inlet bottoms or skewed rectangular inlet boxes. Finish top of fillets flush with drain throat bottom and match slope.
7. For inlet bottoms see Index No. 200. Inlet bottoms 4' and larger are to be used with 3'-6" riser.
8. These inlet tops are designed for use with standard curb and gutter Type E and Type F. Locate inlet outside of pedestrian crosswalks. For Type E curb, transition the shape of the curb over the gutter transition length to match the face of the inlet (Type F).
9. See Index No. 201 for supplemental details.
10. All steel used for frame and grate shall meet the requirements of ASTM A36/A36M.
11. Either cast iron grates or steel grates may be used.
12. When Alternate "G" grate is specified in the plans either the cast iron grate and galvanized steel frame or the the galvanized steel grate and frame must be used. Grates are to be grouted in accordance with the grouting detail shown on Sheet 5, in lieu of tack welding.
13. Inlet to be paid for under the contract unit price for Inlets (Curb) (Type _), Each.



SKETCH SHOWING FRAME SEAT AND THROAT RECESS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Added Grade 60 to Note 3 Section BB & 6" Ø Concrete Post for C-I-P Inlets. Changed Note 5 to Class II Concrete, Notes 6 & 8, Bars A, C and E to #4's, and End Wall thickness. Deleted Top Modification for Type E Curb.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

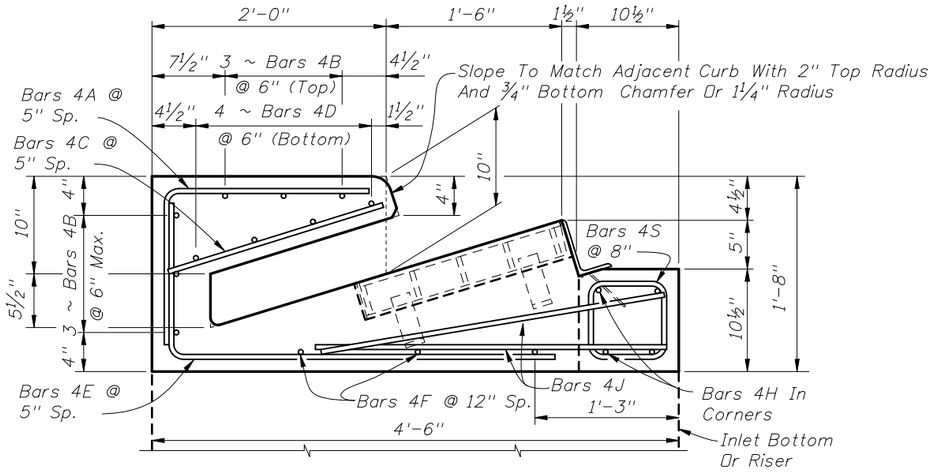
2008 Interim Design Standard

CURB INLET TOPS
TYPES 5 & 6

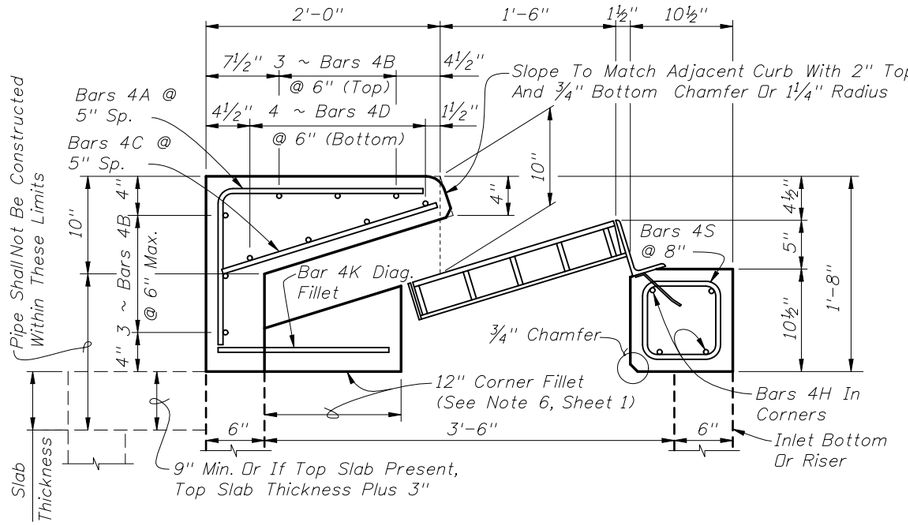
Interim Date 01/01/08

Sheet No. 1 of 5

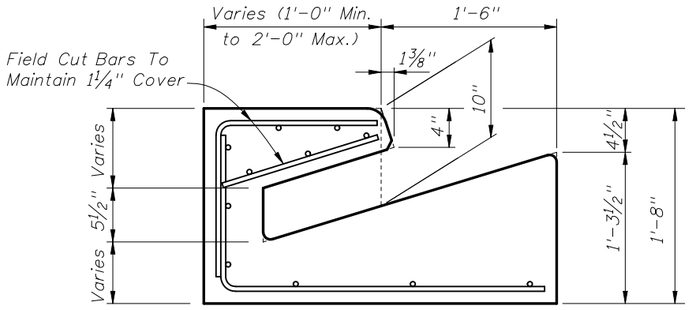
Index No. 211



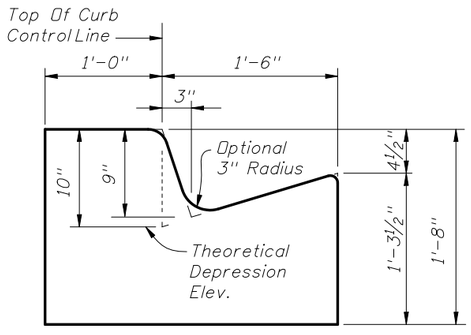
SECTION FF



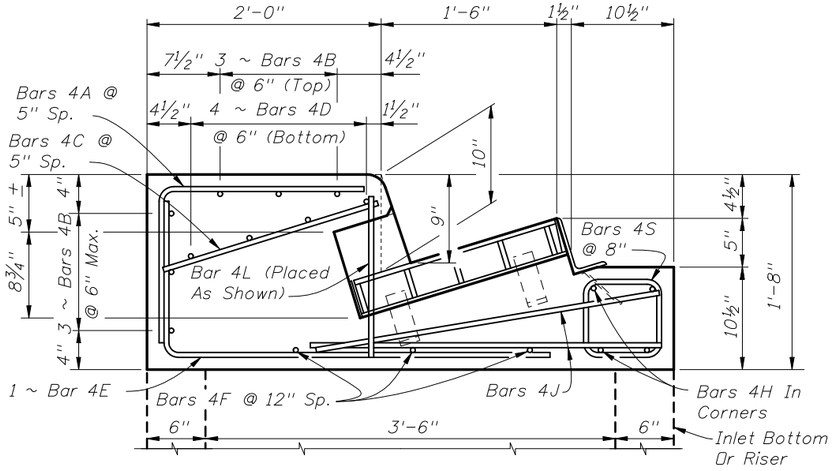
SECTION GG



SECTION EE



SECTION DD
(End View Of Inlet)

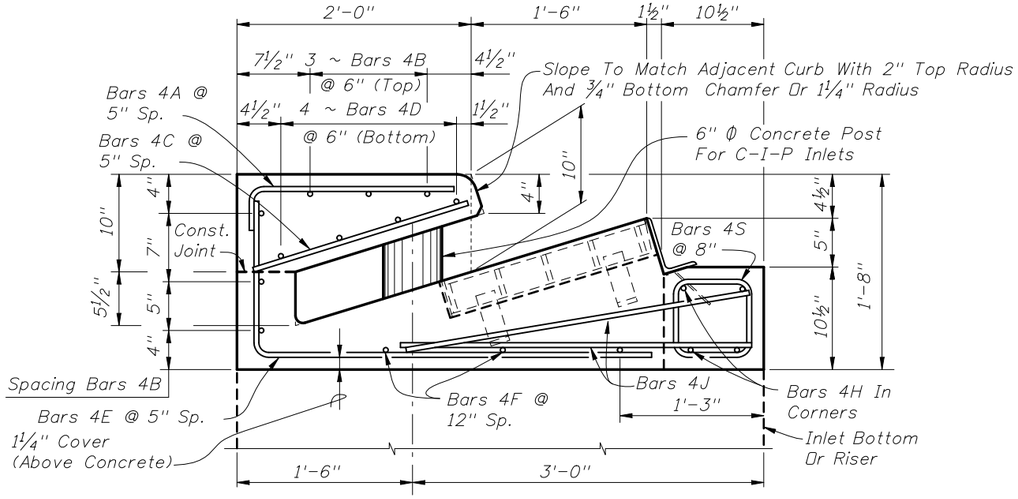


SECTION HH
(Type 5 Inlet Only)

CROSS REFRENCES:
For General Notes See Sheet 1.
For Location Of Sections DD Thru HH See Sheet 1.

PRECAST DETAILS

REVISIONS						2008 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	CURB INLETS TOPS TYPES 5 & 6	01/01/08	2 of 5
01/01/08	SJN	Added Sheet for Precast Details. Changed Reinforcing Layout.					Index No. 211	



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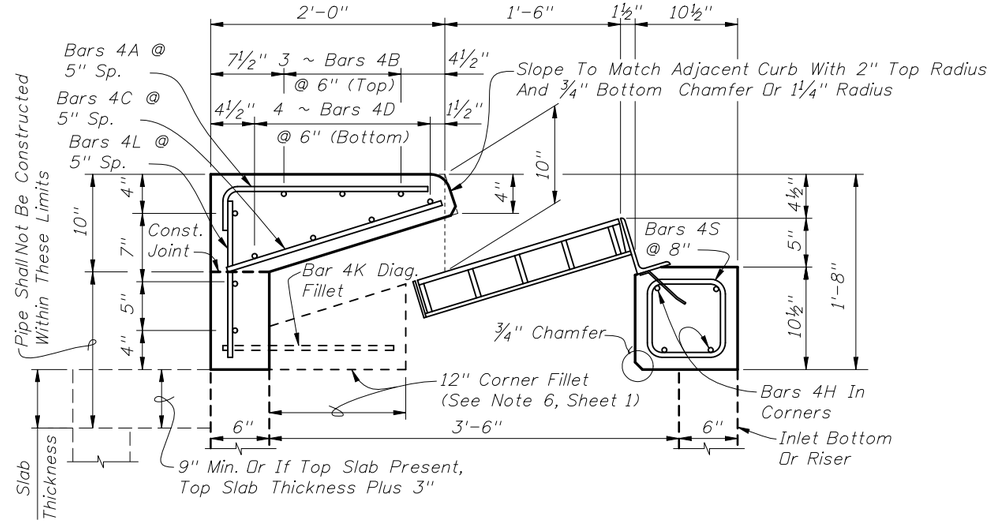
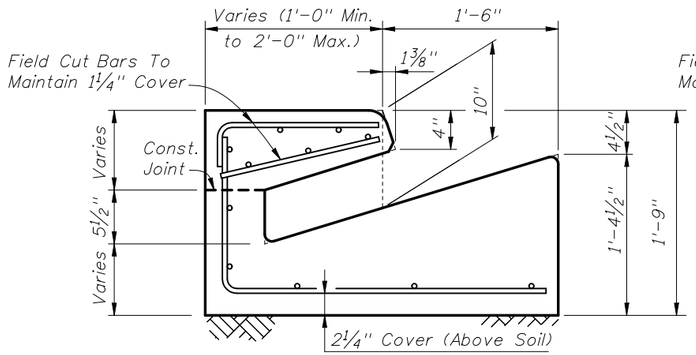
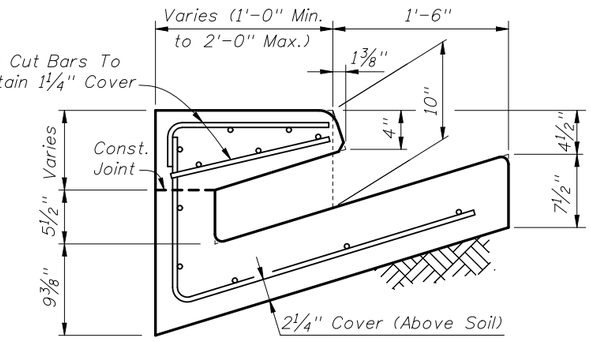


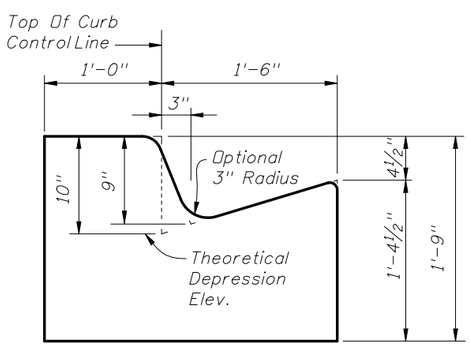
SECTION GG



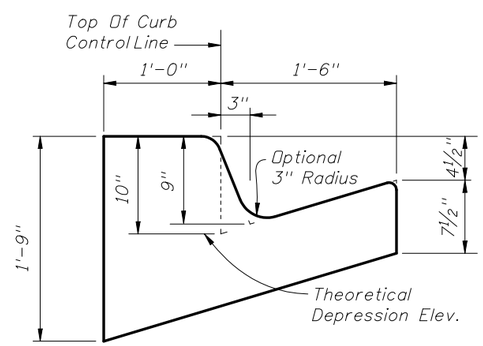
SECTION EE (OPTION A)



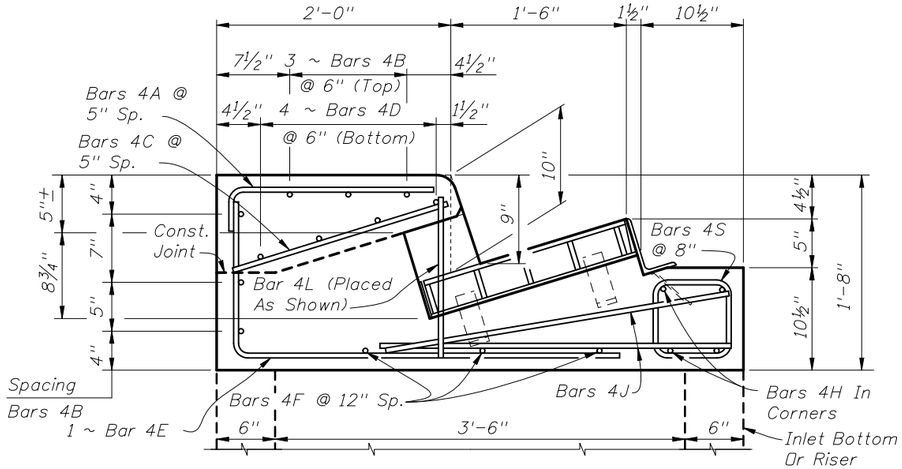
SECTION EE (OPTION B)



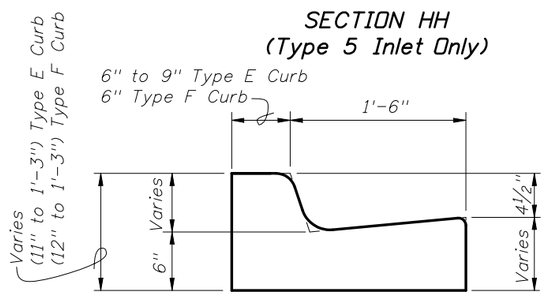
SECTION DD (OPTION A)
(End View Of Inlet)



SECTION DD (OPTION B)
(End View Of Inlet)



SECTION HH
(Type 5 Inlet Only)



SECTION CC
(Gutter Transition
Type F Shown, Type E Similar)

CROSS REFRENCES:
For General Notes See Sheet 1.
For Location Of Sections CC Thru HH See Sheet 1.

CAST-IN-PLACE DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Added Sheet for C-I-P Details, including 6" Ø Concrete Post. Changed reinforcing layout.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

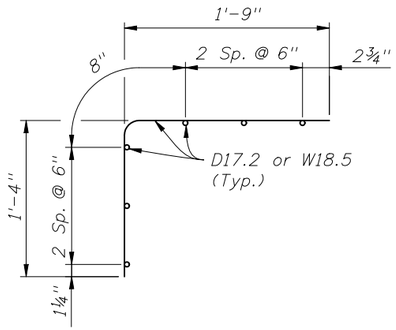
CURB INLETS TOPS TYPES 5 & 6

Interim Date: 01/01/08

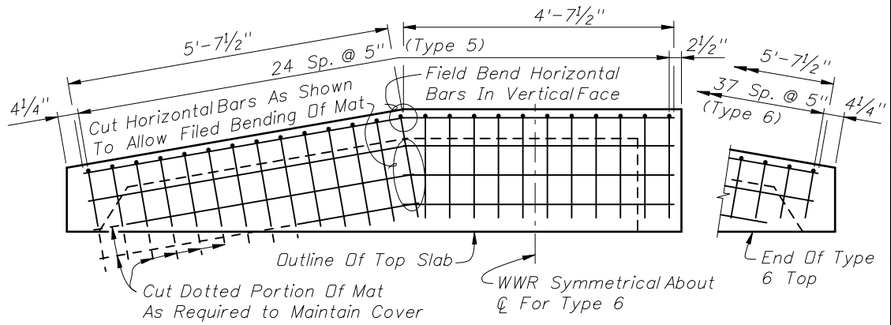
Sheet No.: 3 of 5

Index No.: 211

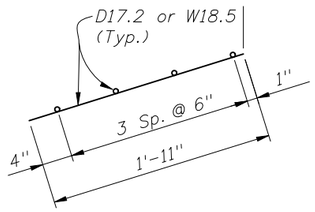
ALTERNATE REINFORCING STEEL DETAILS FOR WELDED WIRE REINFORCEMENT (WWR)



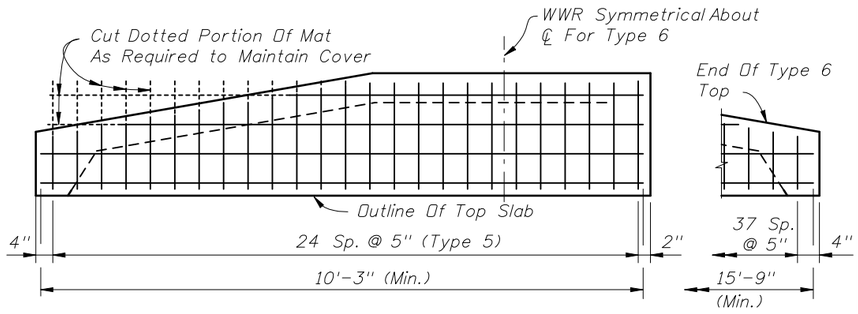
WELDED WIRE REINFORCEMENT
PIECE NO. 1



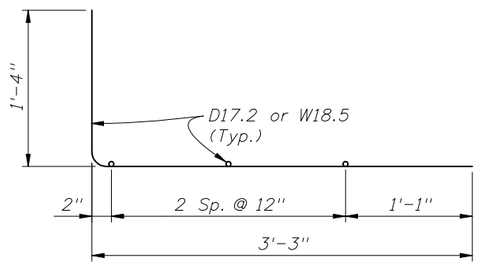
PLACEMENT SCHEMATIC FOR WELDED WIRE
REINFORCEMENT PIECE NO. 1



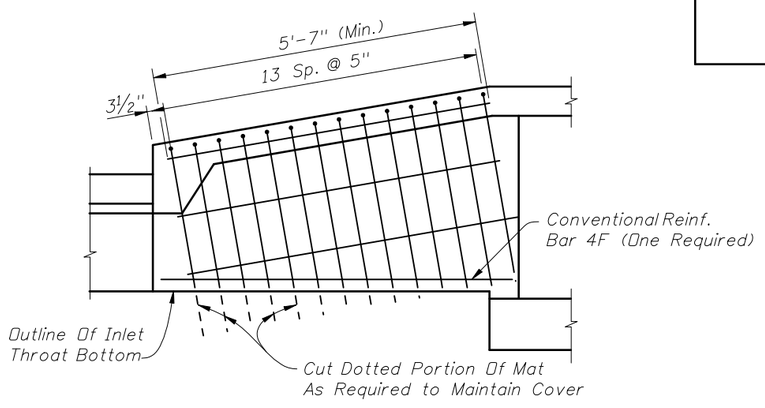
WELDED WIRE REINFORCEMENT
PIECE NO. 2



PLACEMENT SCHEMATIC FOR WELDED WIRE
REINFORCEMENT PIECE NO. 2



WELDED WIRE REINFORCEMENT
PIECE NO. 3



PLACEMENT SCHEMATIC FOR WELDED WIRE
REINFORCEMENT PIECE NO. 3

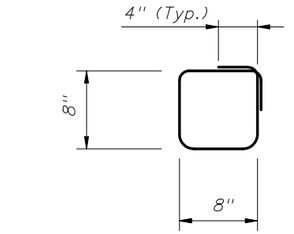
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

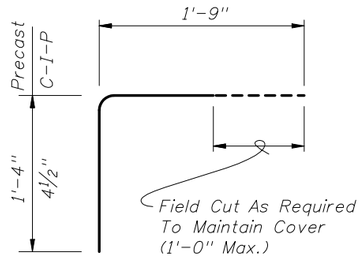
MARK	SIZE	TYPE 5 INLET		TYPE 6 INLET	
		NO.	LENGTH	NO.	LENGTH
A (Precast)	4	25	3'-1"	38	3'-1"
A (C-I-P)	4	25	2'-1½"	38	2'-1½"
B	4	6	10'-3"	6	15'-9"
C	4	25	11" to 1'-11"	38	11" to 1'-11"
D	4	4	10'-3"	4	15'-9"
E	4	16	4'-7"	30	4'-7"
F	4	3	6'-0"	6	6'-0"
H	4	4	4'-6"	4	4'-6"
J	4	4	3'-0"	4	3'-0"
K (Fillet)	4	2	2'-3"	2	2'-3"
L(Precast)	4	1	1'-4"	0	---
L (C-I-P)	4	10	1'-4"	9	1'-4"
S	4	7	3'-2"	7	3'-2"

REINFORCING STEEL NOTES:

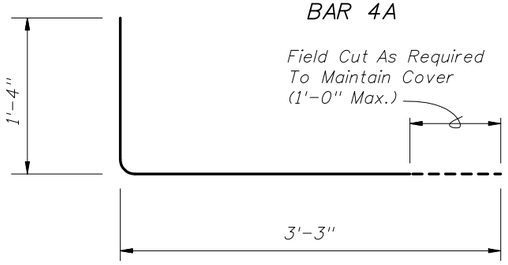
1. All bar dimensions in the bending diagrams are out to out.
2. Bars 4A and 4E may be combined into a single bar.
3. Welded Wire Reinforcement shall comply with ASTM A185 or ASTM A497.



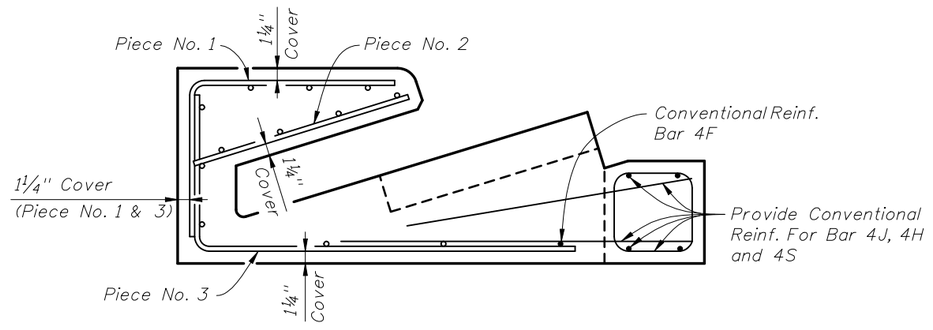
BAR 4S



BAR 4A



BAR 4E



TYPICAL SECTION SHOWING
WELDED WIRE REINFORCEMENT

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Added Sheet			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

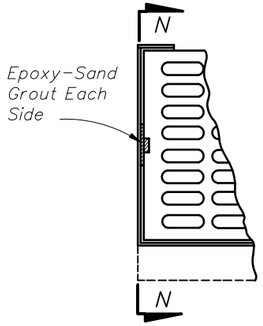
2008 Interim Design Standard

CURB INLETS TOPS
TYPES 5 & 6

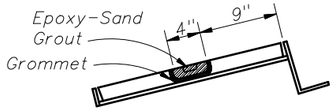
Interim Date 01/01/08

Sheet No. 4 of 5

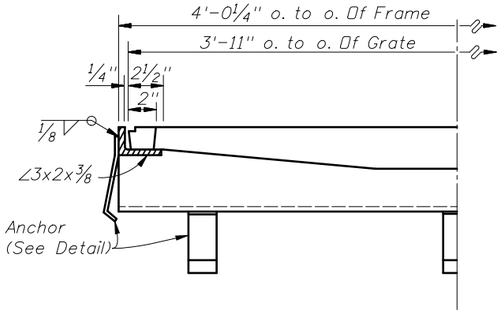
Index No. 211



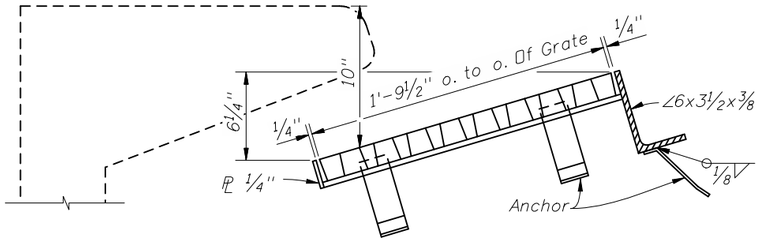
TOP VIEW
CAST IRON GRATE



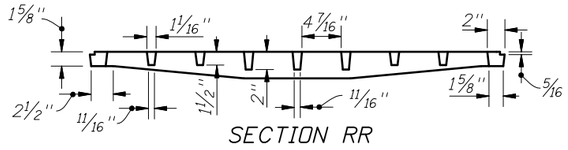
SECTION NN



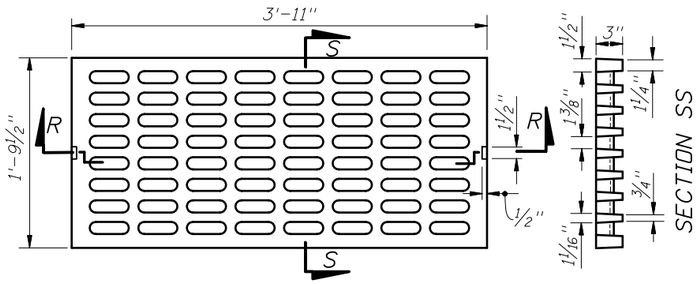
HALF SECTION QQ



SECTION GG

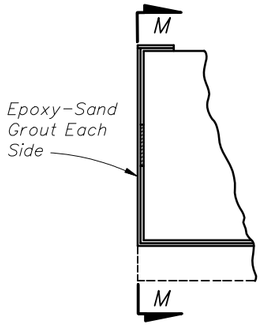


SECTION RR

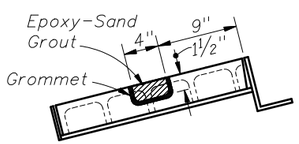


TOP VIEW

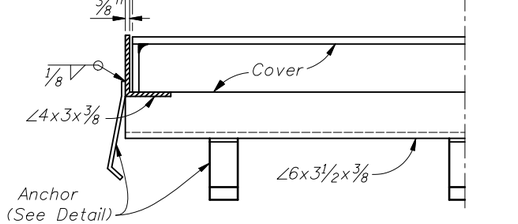
CAST IRON GRATE



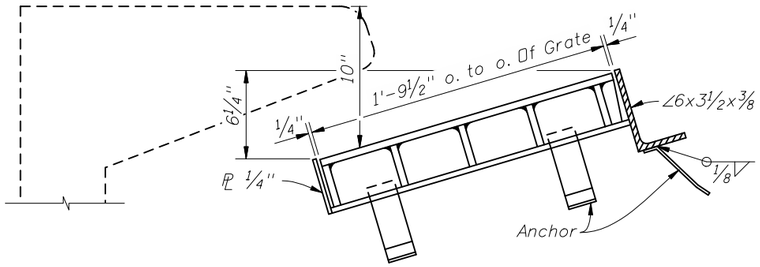
TOP VIEW
STEEL GRATE



SECTION MM



HALF SECTION QQ



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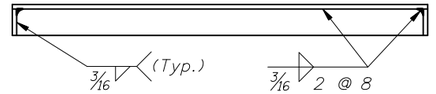
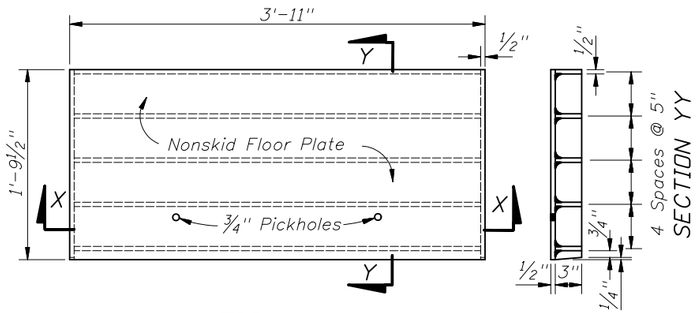


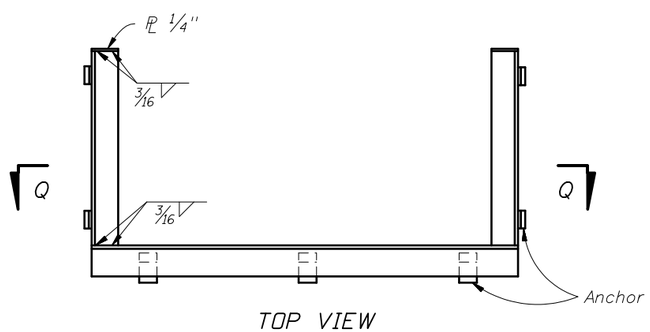
SECTION XX



TOP VIEW

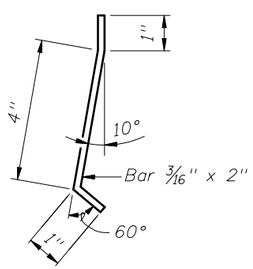
STEEL GRATE

GROUTING DETAILS



TOP VIEW

FRAME DETAIL



ANCHOR DETAIL

CROSS REFERENCES:
For Location Of Section GG and QQ
See Sheet 1.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed Section Numbering and Sheet Numbering to 5 of 5.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

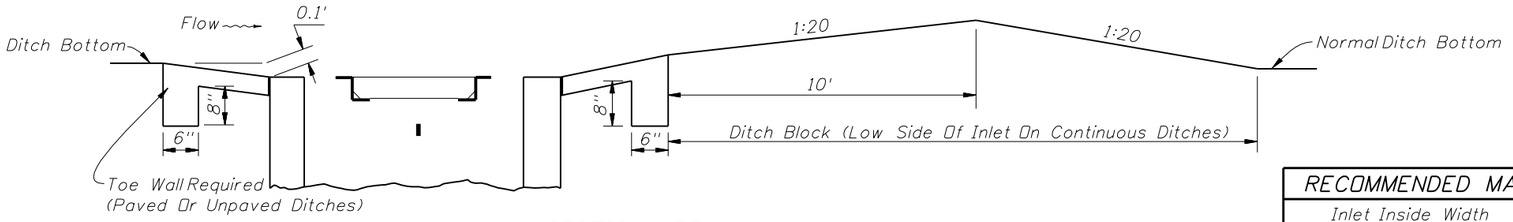
2008 Interim Design Standard

CURB INLET TOPS TYPES 5 & 6

Interim Date: 01/01/08

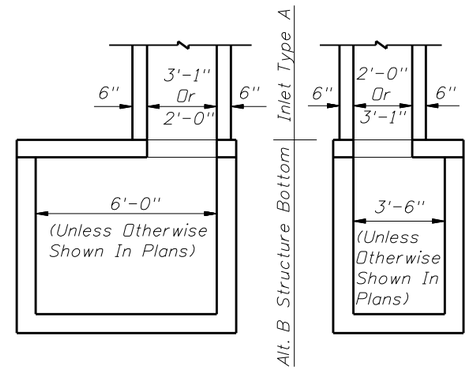
Sheet No.: 5 of 5

Index No.: 211



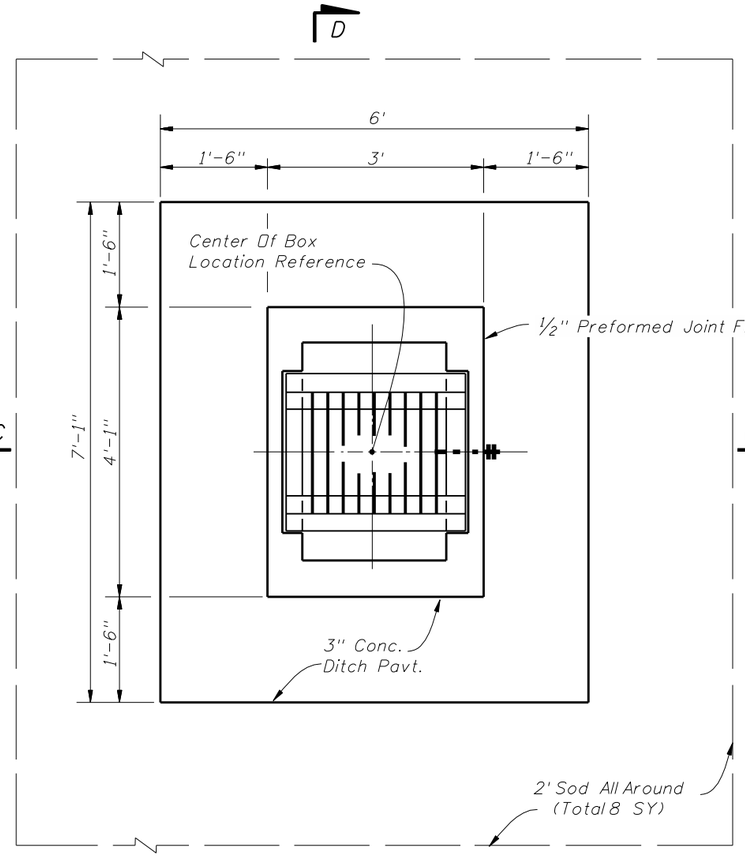
SECTION DD

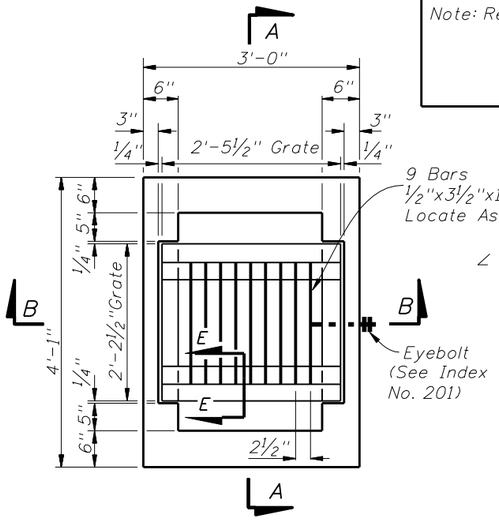
RECOMMENDED MAXIMUM PIPE SIZES	
Inlet Inside Width	Pipe Size
2'-0"	18"
3'-1"	24" 18" Where An 18" pipe Enters A 2'-0" Wall
Note: Recommended sizes are for concrete pipe. Sizes for other types of pipe must be verified for fit in accordance with Index No. 201. For larger pipe see bottom detail right and Index No. 200.	



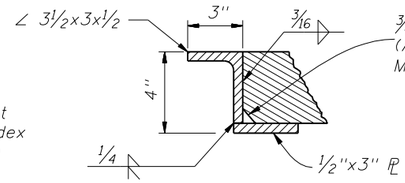
NOTE: Alt. B Structure Bottom Only. See Index No. 200 for Structure Bottom Details And Hole Reinforcement.

INLET WITH STRUCTURE BOTTOM





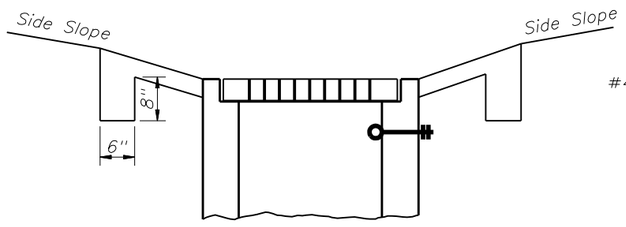
PLAN



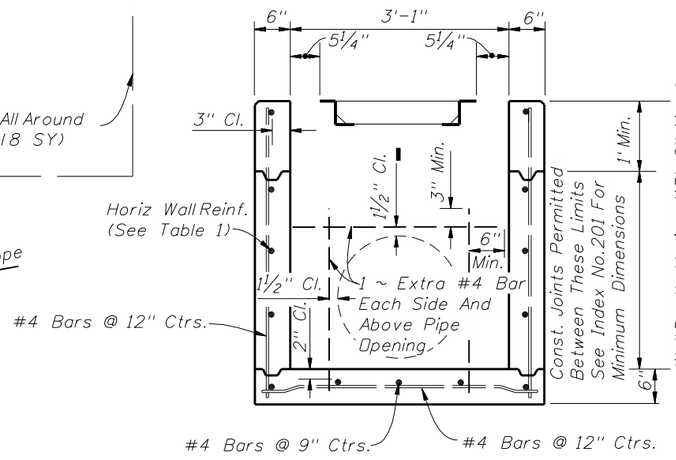
SECTION EE

GENERAL NOTES

1. This inlet is designed for ditches, medians, or other area subject to heavy wheel loads on limited access facilities where debris may be a problem. This inlet is not for use in areas subject to pedestrian and/or bicycle traffic.
2. All reinforcing is Grade 60 bars with 2" min. cover unless otherwise noted. Cut or bend bars out of way of pipe to clear pipe by 1 1/2". See Index 201 for equivalent area of welded wire fabric.
3. All exposed edges and corners shall be 3/4" chamfer or tooled to 1/4" radius.
4. When alternate "G" grate is specified in plans, the grate is to be hot-dip galvanized after fabrication.
5. Cost of ditch paving to be included in the cost of Inlet. Sodding to be paid for under contract unit price for Performance Turf, SY.
6. For supplemental details see Index No. 201.
7. All dimensions are for both precast and cast-in-place inlets unless otherwise noted.
8. Inlet to be paid for under the contract unit price for inlets (Dt Bot Type A), EA.

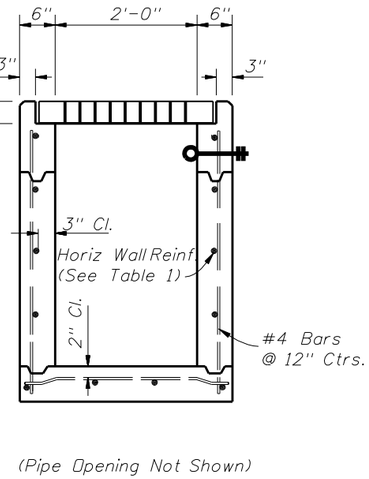


SECTION CC



(Pipe Opening Shown)

SECTION AA



(Pipe Opening Not Shown)

SECTION BB

HORIZONTAL WALL REINFORCING SCHEDULE (TABLE 1)

WALL DEPTH	SCHEDULE	AREA (in.²/ft.)	MAX. SPACING	
			BARS	WWF
0' - 10'	A12	0.20	12"	8"
10' - 15'	A6	0.20	6"	5"

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	RJK	Changed "4 Z 15.9" to a built-up section in SECTION EE grate detail.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

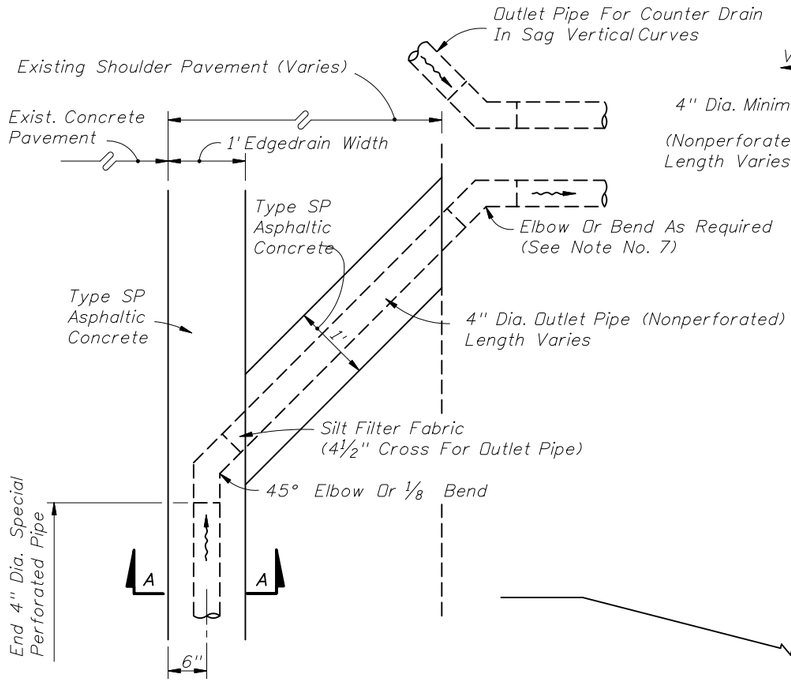
2008 Interim Design Standard

DITCH BOTTOM INLET TYPE A

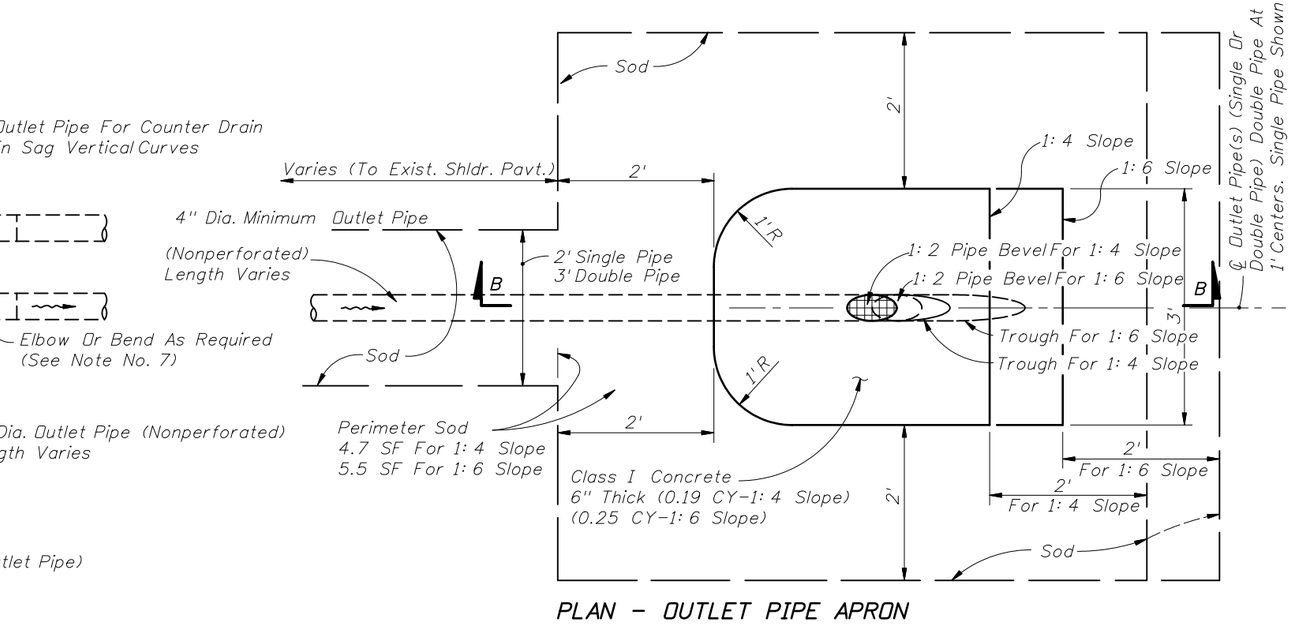
Interim Date 07/01/08

Sheet No. 1 of 2

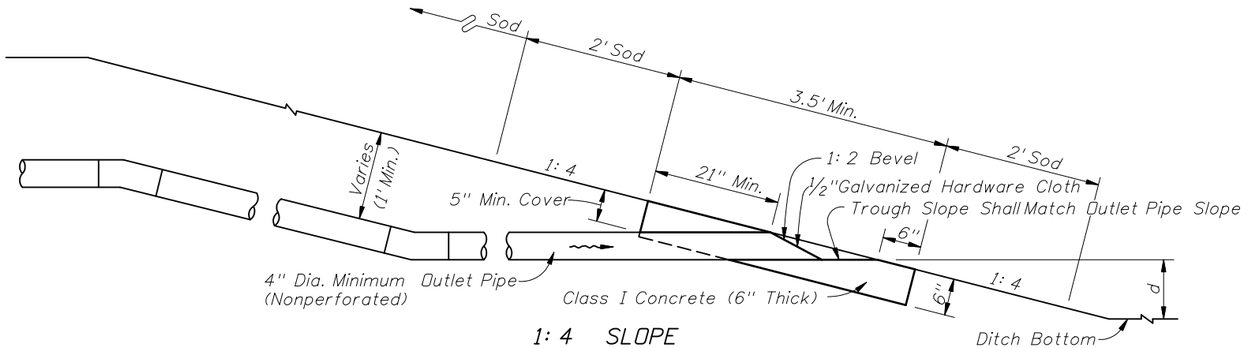
Index No. 230



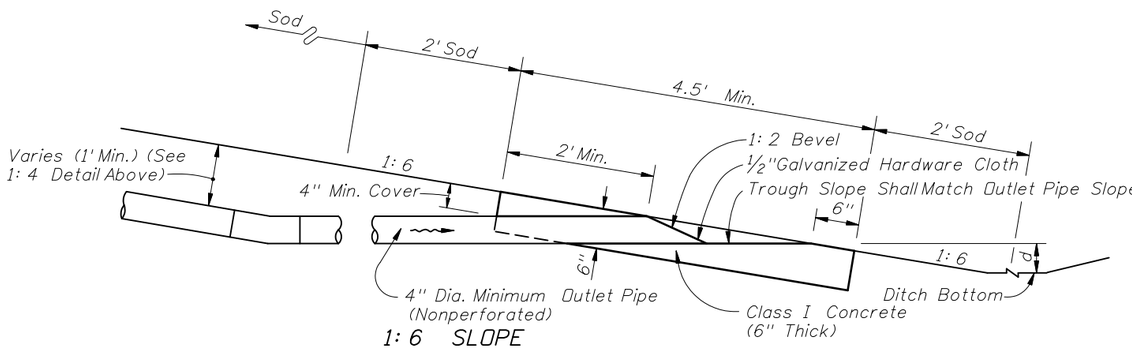
ALIGNMENT OF OUTLET PIPE



PLAN - OUTLET PIPE APRON



1:4 SLOPE

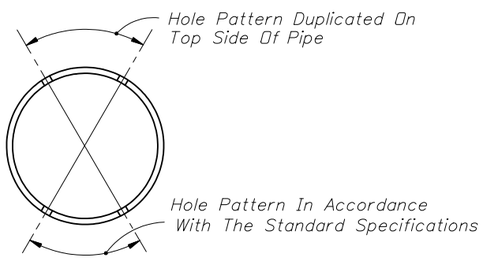


1:6 SLOPE

SECTIONS BB

4" EDGEDRAIN

EDGEDRAIN OUTLET



SUBDRAINAGE PIPE
HOLE PATTERN

d= 1.75' std. for grassed ditches [less is acceptable to provide
0.5' std. for paved ditches [minimum 0.1% outlet pipe slope]

GENERAL NOTES FOR CONCRETE PAVEMENT SUBDRAINAGE

1. No trench greater than 2' in depth will be allowed overnight. Trenches shall be barricaded at all times.

2. Concrete pavement subdrainage shall be constructed adjacent to the low edge of the roadway pavement and under travel lanes, auxiliary pavement and shoulders, as called for in the plans. When the low edge shifts between outside and inside edges of pavement the concrete pavement subdrainage shall extend 50' beyond and begin 50' before the flat point (100' overlap).

   Concrete pavement subdrainage shall be placed on the low side of ramps of crossroad terminals.

3. Concrete pavement subdrainage shall be constructed on a grade parallel with the edge of pavement profile, except on profiles flatter than one-tenth percent (0.10%) the concrete pavement subdrainage shall be constructed on a grade of one-tenth percent (0.10%).

4. Immediately prior to placing the filter fabric the entire vertical face of the concrete pavement shall be cleaned to remove adhering base material and soil.

5. The Contractor shall devise a procedure for holding the filter fabric in position on the vertical face of the trench. The procedure must be approved by the Engineer prior to placement of the draincrete.

6. The upper end of each separate run of the concrete pavement subdrainage pipe shall be capped.

7. Outlet pipes shall be constructed at a maximum of 500' intervals. Elbows or ⅛ bends shall be used to connect the outlet pipe to the concrete pavement subdrain pipe. The elbows or bends shall be of the same material as the outlet pipe but compatible with the pipe.

   When directed by the Engineer, outlet pipes shall be stubbed into existing inlets or into existing ditch pavements at an elevation 6" above the inlet flowline or ditch bottom. Concrete apron and bordering sod are not required for stubbed outlets, but replacement sodding will be required at trenches for pipes stubbed into paved ditches.

   In sag vertical curves separate outlet pipes for concrete pavement subdrains from opposite directions shall use a single apron unless otherwise shown in the plans or otherwise directed by the Engineer.

   Backfill around outlet pipes shall be of cohesive soils, draincrete will not be permitted.

8. Existing paved shoulder that is removed for the construction of outlet pipes shall be replaced with Type SP asphaltic concrete at the rate of 500 LB per SY.

9. The conract unit price for Edgedrain Outlet Pipe (4") LF, shall be full compensation for removal of existing shoulder pavement, trench excavation, pipe and fitting, concrete apron, hardware cloth, sod, stubbing into existing inlets and paved ditches, restoration of ditch pavement, backfill in place, and disposal of excess materials.

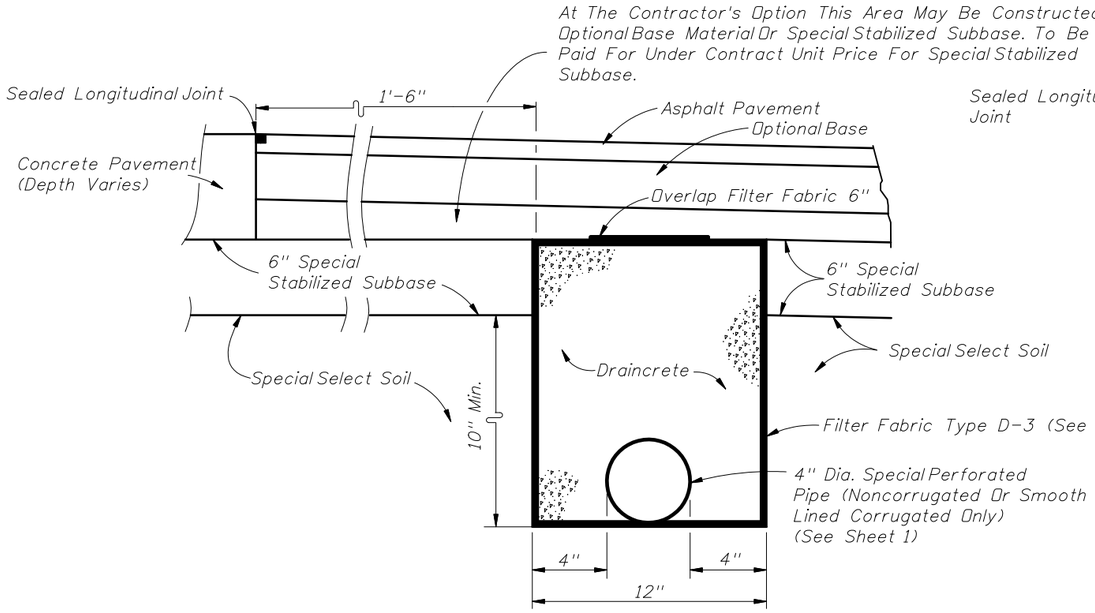
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	MTP	Changed sheet number.			

2008 Interim Design Standard

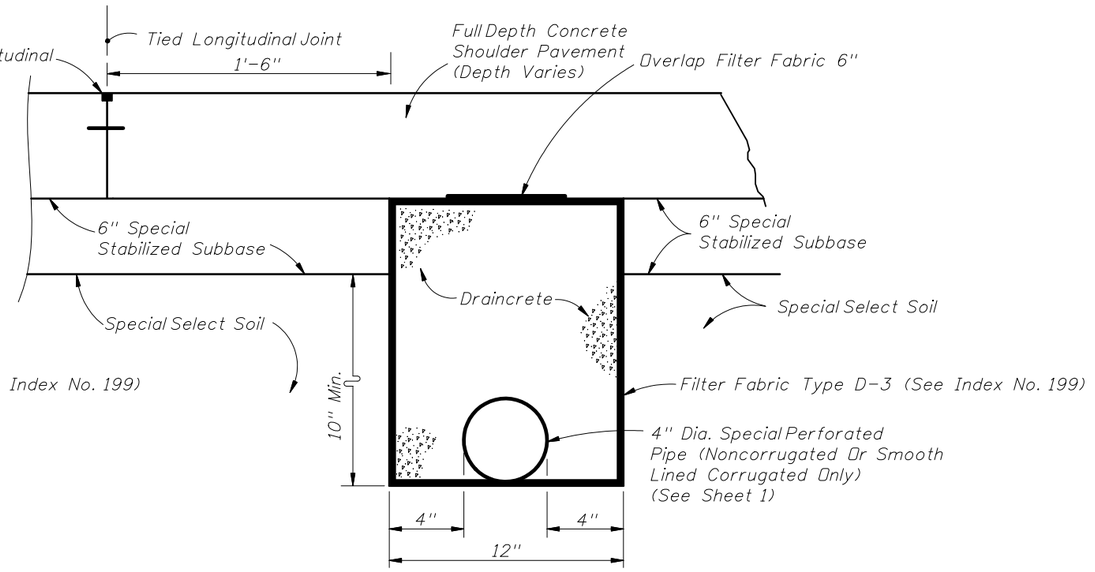
CONCRETE PAVEMENT SUBDRAINAGE

Interim Date 01/01/08 | Sheet No. 1 of 4

Index No. 287

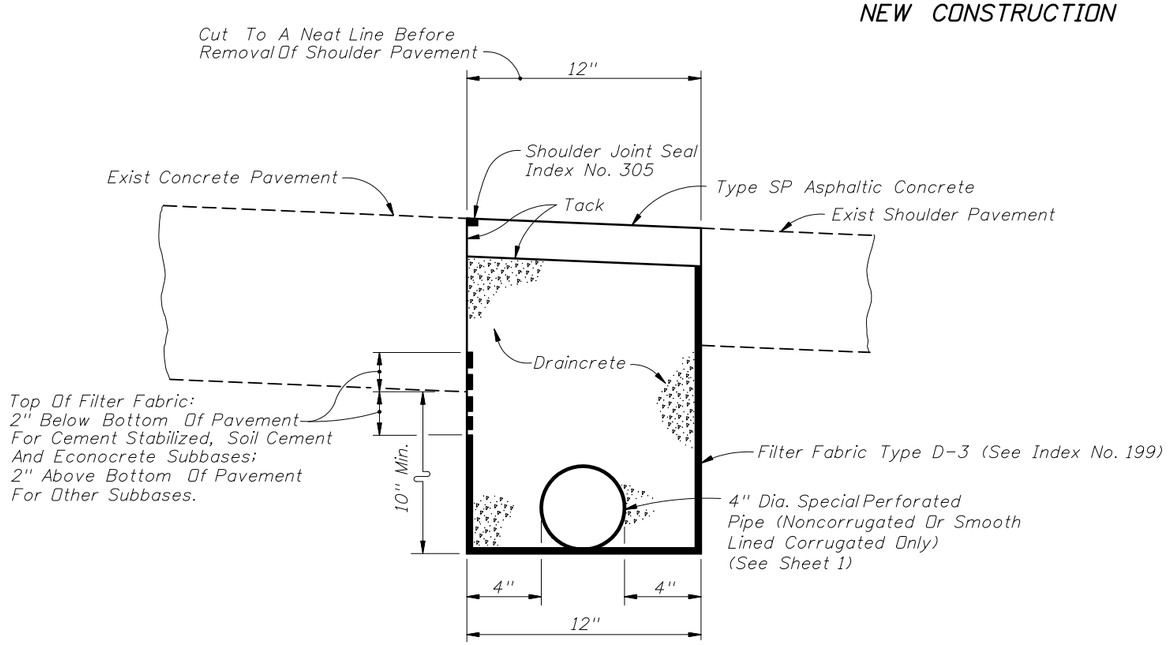


ASPHALT SHOULDERS



CONCRETE TRAVEL LANES, SHOULDERS, AND AUXILIARY PAVEMENT

NEW CONSTRUCTION



REHABILITATION

DRAINCRETE SUBDRAINAGE

NOTES FOR DRAINCRETE PAVEMENT SUBDRAINAGE

1. The edgedrain sections for DRAINCRETE SUBDRAINAGE are appliacble to pavement construction identified as RIGID PAVEMENT on Index No. 505, Sheet 2 and 4.

2. The contractor shall confine the construction of draincrete edgedrain to an area in which the entire operation can be carried out in five (5) work days, unless another construction period is called for in the plans, with sufficient time allowed for the draincrete to set before placement of pavement.

METHOD OF PAYMENT

NEW CONSTRUCTION:

1. The contract unit price for Edgedrain (Draincrete) LF shall be full compensation for trench excavation, disposal of excess material, filter fabric, draincrete edgedrain pipe and fittings and draincrete.

   Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 4.

FOR REHABILITATION:

1. The contract unit price for Edgedrain (Draincrete) LF, shall be full compensation for removal of existing shoulder pavement, trench excavation, disposal of excess materials, filter fabric, draincrete edgedrain pipe and fittings, and draincrete, necessary for edgedrain construction.

   Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 4.

   Shoulder pavement shall be paid for under the contract unit price for Type SP, Asphaltic Concrete.

   Shoulder joint seal shall be paid for under the contract unit price for Pavement Joint , LF.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	MTP	Changed notes.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

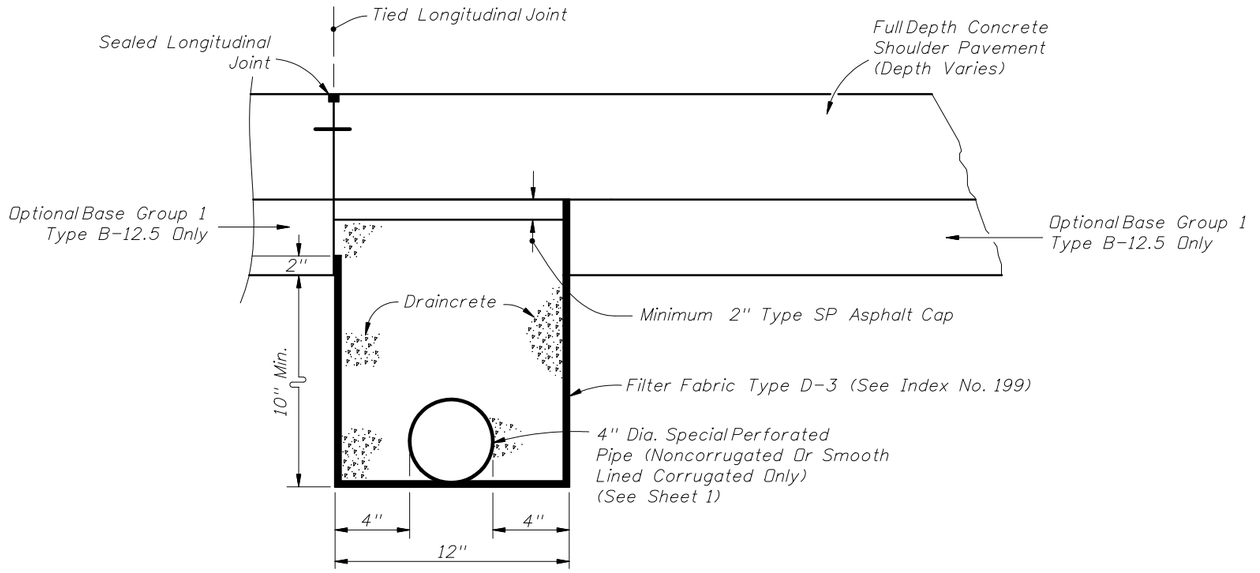
2008 Interim Design Standard

CONCRETE PAVEMENT SUBDRAINAGE

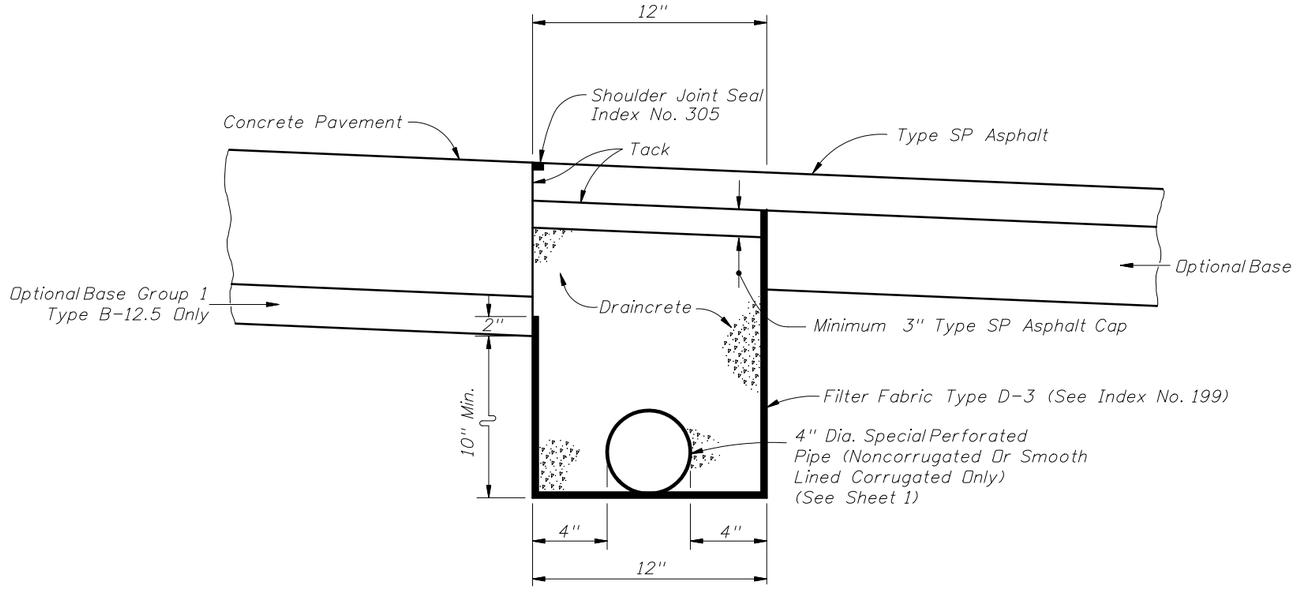
Interim Date 01/01/08

Sheet No. 2 of 4

Index No. 287



CONCRETE TRAVEL LANES, SHOULDERS, AND AUXILIARY PAVEMENT



ASPHALT SHOULDERS

ASPHALT BASE SUBDRAINAGE

NOTES FOR DRAINCRETE PAVEMENT SUBDRAINAGE

1. The edgedrain sections for DRAINCRETE SUBDRAINAGE are appliacble to pavement construction identified as RIGID PAVEMENT on Index No. 505, Sheet 2 and 3.

2. The contractor shall confine the construction of draincrete edgedrain to an area in which the entire operation can be carried out in five (5) work days, unless another construction period is called for in the plans, with sufficient time allowed for the draincrete to set before placement of pavement.

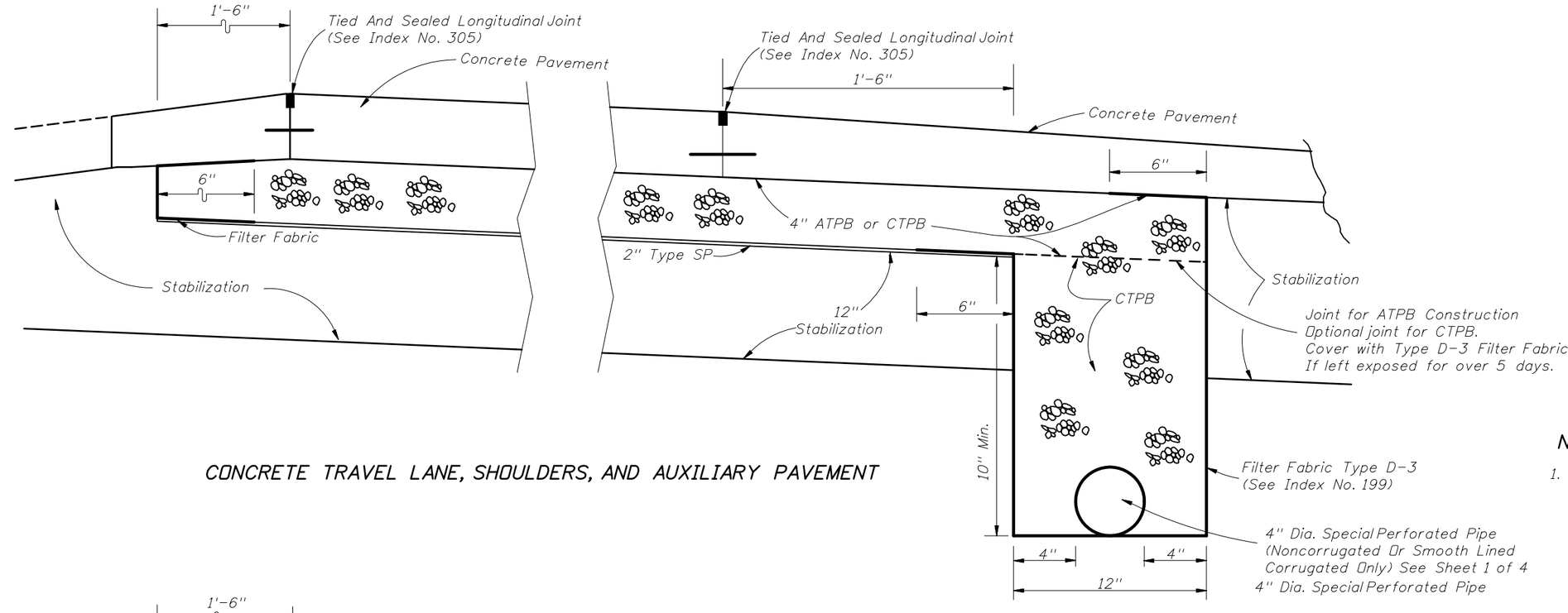
METHOD OF PAYMENT

NEW CONSTRUCTION:

1. The contract unit price for Edgedrain (Draincrete) LF shall be full compensation for trench excavation, disposal of excess material, filter fabric, draincrete edgedrain pipe and fittings and draincrete.

   Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 4.

REVISIONS						2008 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	CONCRETE PAVEMENT SUBDRAINAGE	01/01/08	3 of 4
01/01/08	MTP	New Sheet.					Index No.	287

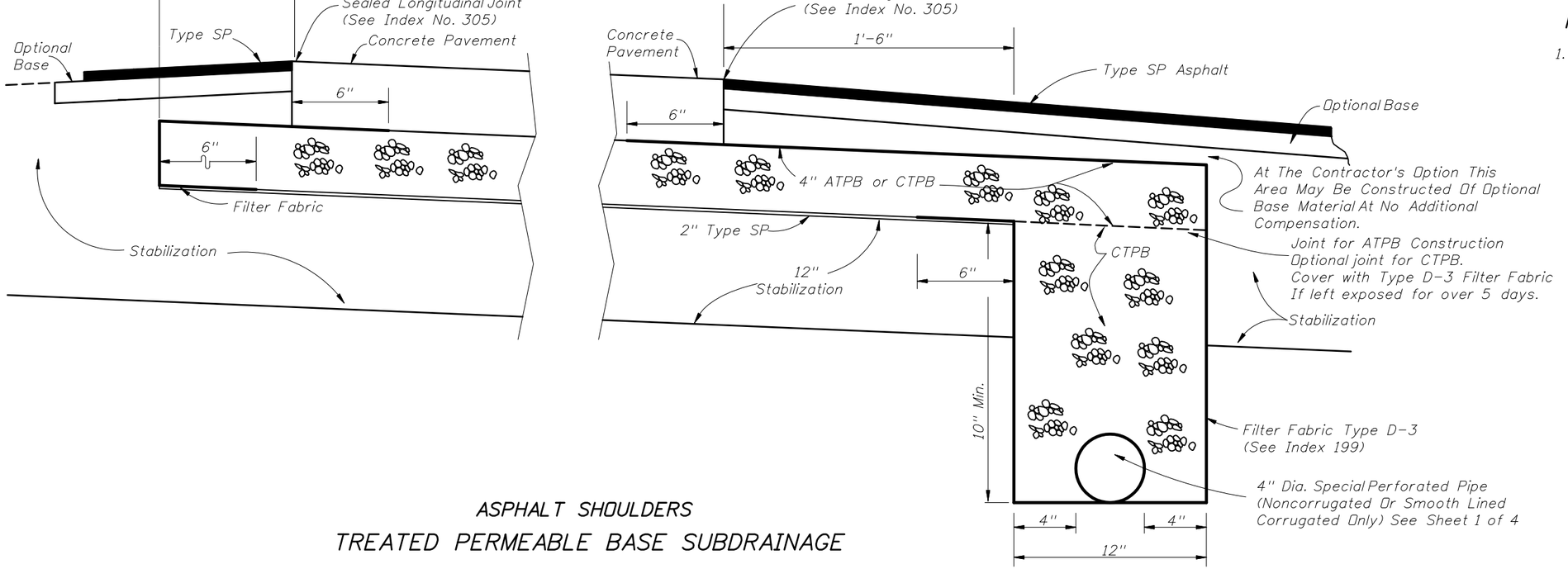


CONCRETE TRAVEL LANE, SHOULDERS, AND AUXILIARY PAVEMENT

GENERAL NOTES FOR TREATED PERMEABLE BASE EDGEDRAIN

NEW CONSTRUCTION

1. The contractor shall confine the construction of edgedrain to an area in which the entire operation can be carried out in (5) work days, unless another construction period is called for the plans.



ASPHALT SHOULDERS

TREATED PERMEABLE BASE SUBDRAINAGE

METHOD OF PAYMENT

NEW CONSTRUCTION

1. Payment shall be full compensation for trench excavation, disposal of excess materials, filter fabric, pipe and fittings, necessary for concrete pavement subdrainage construction. Payment shall be included in the cost for Asphalt Treated Permeable Base, CY or Cement Treated Permeable Base, CY.

   Payment for outlet pipe shall be in accordance with General Note 9, Sheet 1 of 4.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	MTP	Changed: 1" Type SP to 2" Type SP. Changed sheet number.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

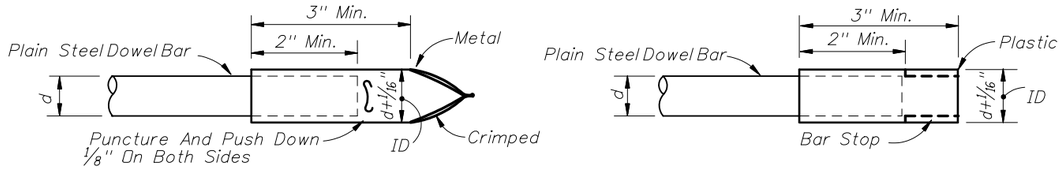
2008 Interim Design Standard

CONCRETE PAVEMENT SUBDRAINAGE

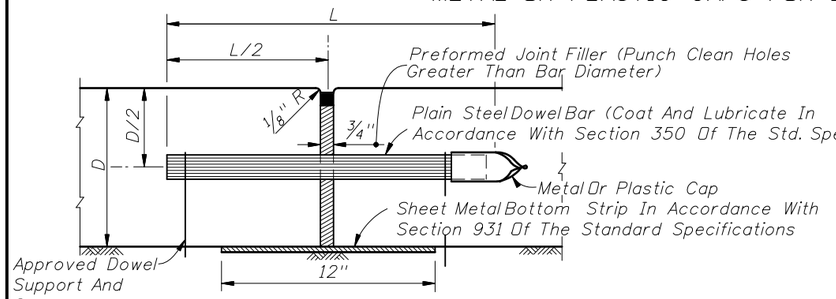
Interim Date 01/01/08

Sheet No. 4 of 4

Index No. 287

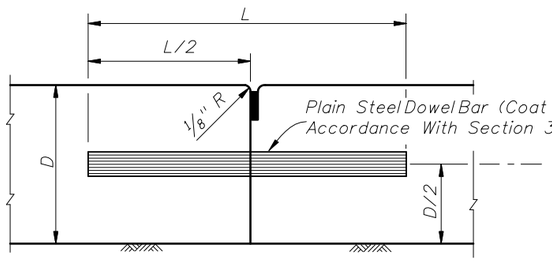


METAL OR PLASTIC CAPS FOR DOWEL BARS

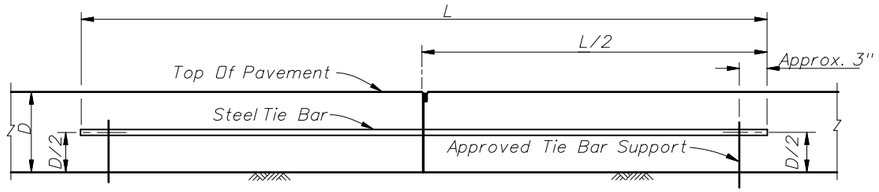


Note: Expansion joints to be placed on approaches to bridges, at street intersections and other locations indicated in detail plans.

TRANSVERSE EXPANSION JOINT

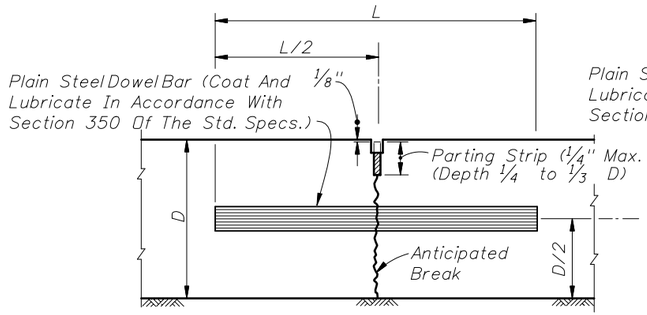


BUTT CONSTRUCTION JOINT TO BE USED AT DISCONTINUANCES OF WORK

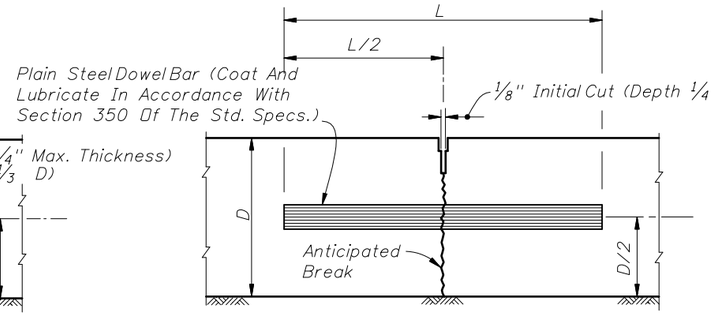


Note: Tie bar spacing shall not exceed 24" at these joints.

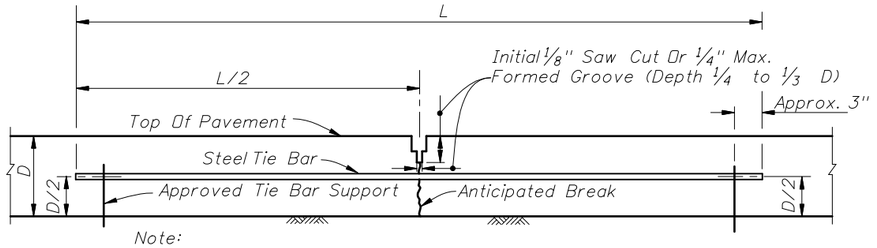
LONGITUDINAL BUTT CONSTRUCTION JOINT



TRANSVERSE CONTRACTION JOINT, VIBRO CAST METHOD



TRANSVERSE CONTRACTION JOINT, SAWED METHOD



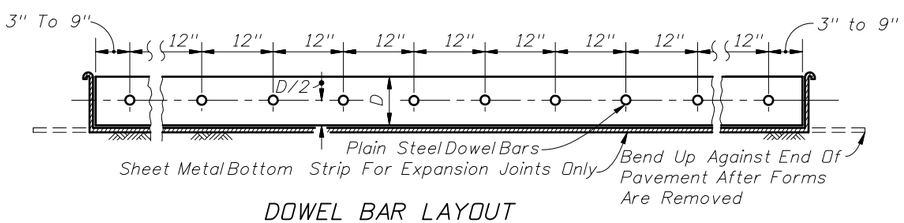
Note:
Slabs poured simultaneously. Tie bars may be inserted in the plastic concrete by means approved by the Engineer.

LONGITUDINAL LANE-TIE JOINT

Tie bars are deformed #4 or #5 reinforcing steel bars meeting the requirements of Section 931 of the Standard Specifications.

Provide a standard load transfer tied joint with #4 bars 25" in length at 24" or #5 bars 30" in length at 38" spacing.

LONGITUDINAL JOINTS



DOWEL BAR LAYOUT

DOWELS (LENGTH 18")	
Pavement Thickness "D"	Diameter
6"–6½"	¾"
7"–8½"	1"
9"–10½"	1¼"
≥11"	1½"

TRANSVERSE JOINTS ARE TO BE SPACED AT A MAXIMUM OF 15'. DOWELS ARE REQUIRED AT ALL TRANSVERSE JOINTS UNLESS OTHERWISE NOTED IN PLANS.

TRANSVERSE JOINTS

Note: For joint seal dimensions see Sheet 2.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/14/07	HSD	Deleted tie bar spacing table and revised notes.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

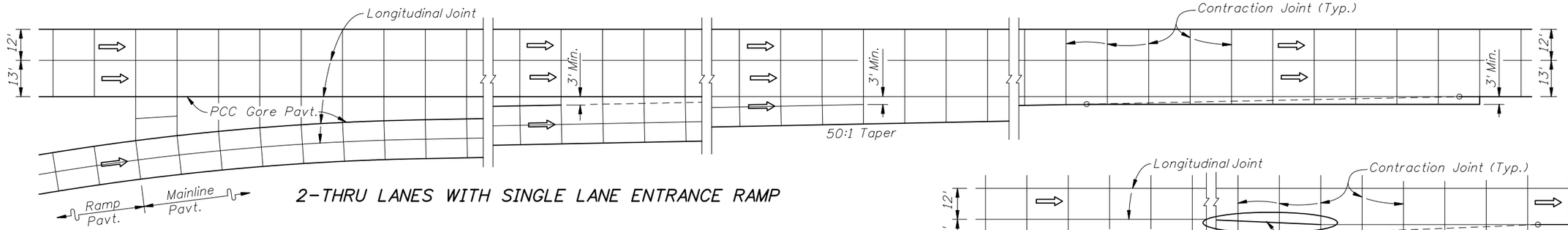
2008 Interim Design Standard

CONCRETE PAVEMENT JOINTS

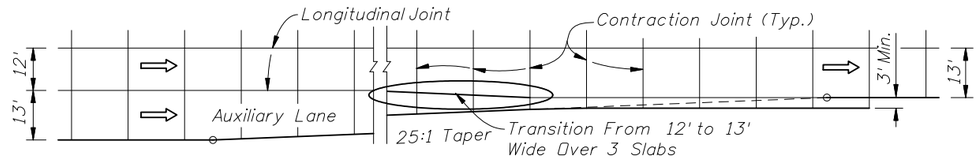
Interim Date 01/01/08

Sheet No. 1 of 4

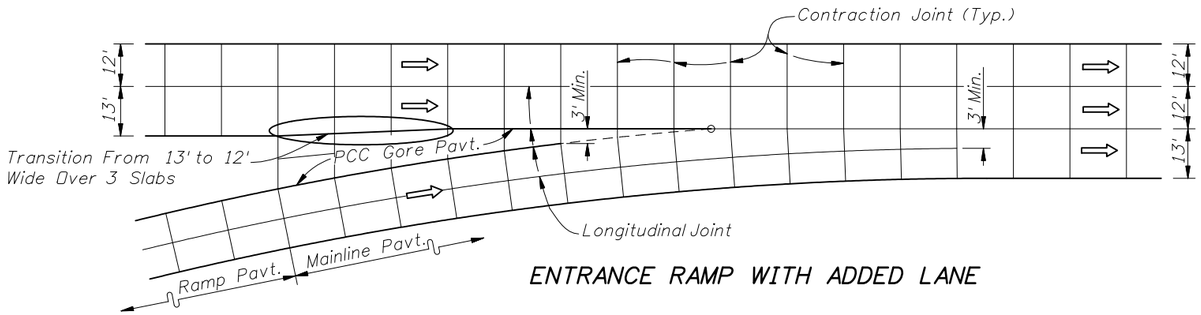
Index No. 305



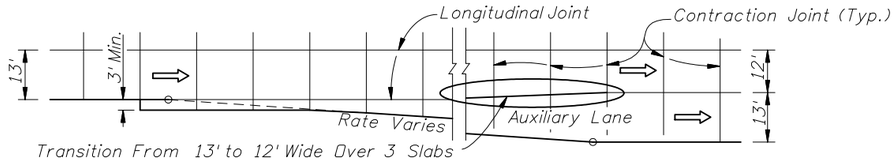
2-THRU LANES WITH SINGLE LANE ENTRANCE RAMP



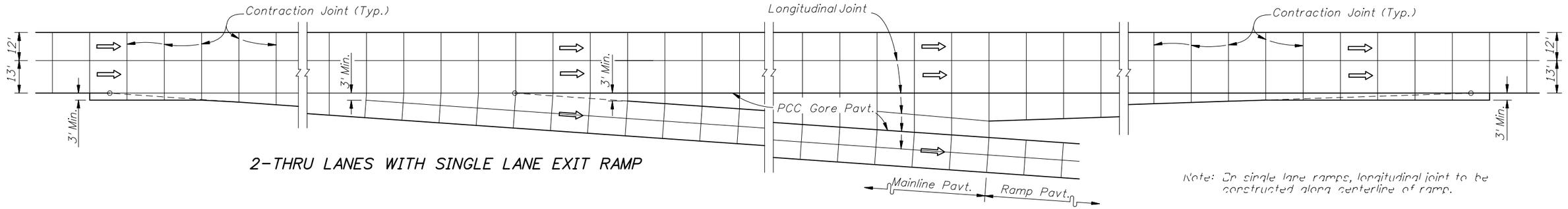
ENTRANCE TAPER WITH AUXILIARY LANE



ENTRANCE RAMP WITH ADDED LANE

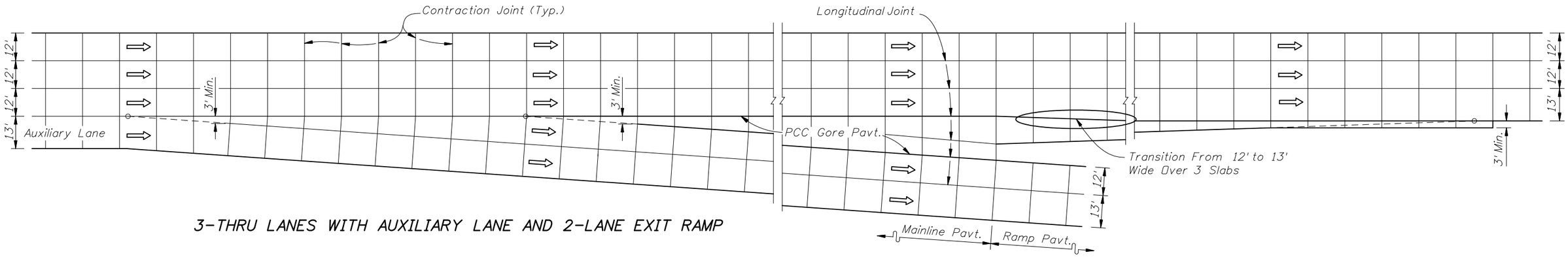


EXIT TAPER WITH AUXILIARY LANE



2-THRU LANES WITH SINGLE LANE EXIT RAMP

Note: On single lane ramps, longitudinal joint to be constructed along centerline of ramp.



3-THRU LANES WITH AUXILIARY LANE AND 2-LANE EXIT RAMP

JOINT LAYOUT AT ENTRANCE AND EXIT RAMP TERMINALS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/14/07	HSD	Changed width of outside lane from 14' to 13'.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

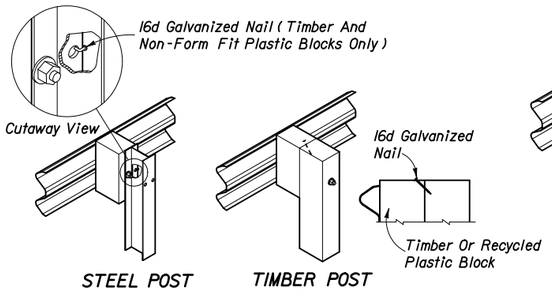
2008 Interim Design Standard

CONCRETE PAVEMENT JOINTS

Interim Date 01/01/08

Sheet No. 4 of 4

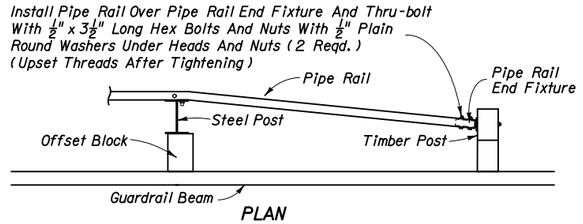
Index No. 305



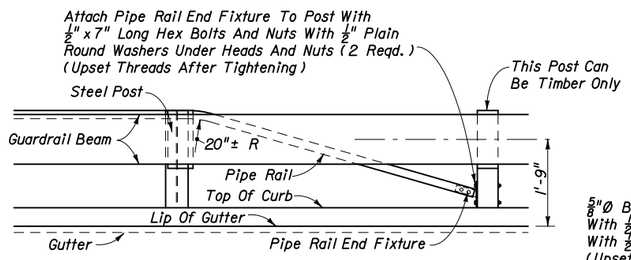
STEEL POST TIMBER POST

16d Galvanized Nail Driven After Post Bolt Pull-Up, Single And Double Face Guardrail, Single Face Guardrail Shown (16d Nail Between Blocks For Multiple Offset Blocks).

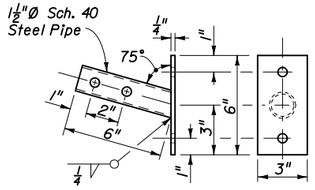
16d NAIL FOR PREVENTION OF OFFSET BLOCK ROTATION



PLAN

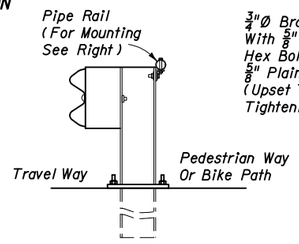


ELEVATION



All Holes Shall Be ⅝" Ø Galvanize After Drilling And Welding

PIPE RAIL END FIXTURE



STEEL POST SECTION

NOTES

1. Pipe Rail required on steel guardrail posts when pedestrian ways and bikeways are located 4' or less from back of the posts. Begin and end the pipe rail in accordance with this detail.

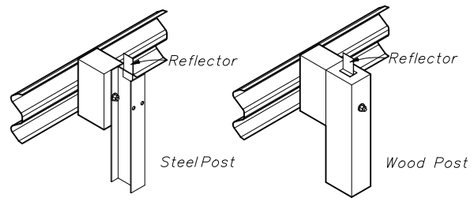
   Refer to Sheet 1, Note 6 for end treatment requirements.

2. When guardrails with timber posts are located with the back of posts 4' or less from the near edge of the pedestrian way or bikeway, the bolt ends will require one of the following treatments:
   (a) Trimming back flush with the face of nut and metalizing or
   (b) Use of post bolts 15" in length with the washers and nuts counter sunk into sinks 1" to 1½" deep or
   (c) Use of post bolts 15" in length with sleeve nuts and washers.

3. The cost for Pipe Rail, mounting components and installation shall be included in the contract unit price for guardrail. Bolt end treatment for timber post shall be included in the contract unit price for guardrail.

DESIGNATION TITLE

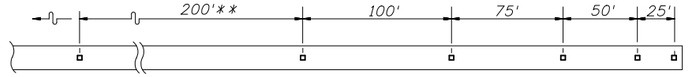
FOR LOCATIONS USED BY PEDESTRIANS OR CYCLISTS
PEDESTRIAN SAFETY TREATMENTS



PICTORIAL VIEW
REFLECTOR MOUNTING

REFLECTOR NOTES

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

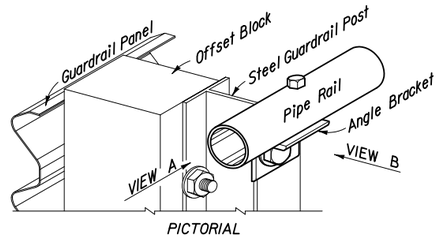


Note: Adjustment in spacing may be required to fit exact guardrail lengths as directed by the Engineer. For minimum installations (length 62.5') provide one reflector at each end and one at the approximate center.

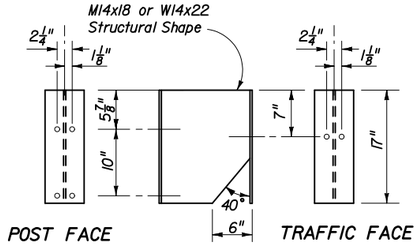
**For curves greater than 2° the spacing shall be reduced to 100' through the curve.

REFLECTOR SPACING

REFLECTORS-DETAIL M



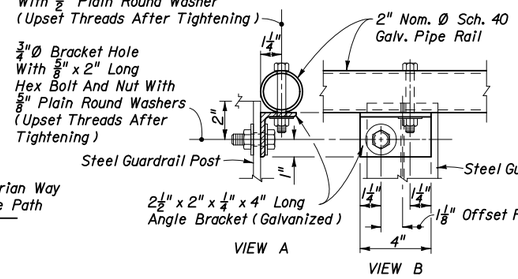
PICTORIAL



POST FACE TRAFFIC FACE

SIDE VIEW
All Holes Are 13/16"Ø

STEEL MODIFIED THRIE-BEAM OFFSET BLOCK



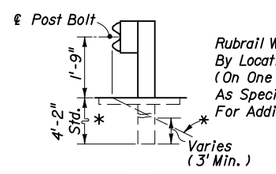
PIPE RAIL MOUNTING

POSTS	OFFSET BLOCKS	REMARKS
Timber	Timber 6" x 8" x 14" (Nominal) For W-Beam And 6" x 8" x 22" (Nominal) For Thrie-Beam Recycled Plastic (See Notes)	Post bolt hole in timber and plastic blocks to be centered (±¼"). All timber offset blocks shall be dressed on all four sides (S4S). One 16d galvanized nail per block is to be used to prevent rotation of block (see detail left).
Steel W6x8.5, W6 x 9 Or 6" C	Timber 6" x 8" x 14" (Nominal) For W-Beam And 6" x 8" x 22" (Nominal) For Thrie-Beam Recycled Plastic (See Notes)	Same as above for timber and plastic blocks except that form fit plastic block holes align with holes in steel posts and do not require nails.
Steel W6x8.5, W6 x 9 Or 6" C	WI4 x 22 x 17" (MI4 x 18 x 17") (Steel Modified Thrie-Beam)	⅝"Ø x 1½" long hex head bolts with full length thread and nuts (2 Reqd.) and ⅝" plain round washers (4 Reqd.) for mounting steel block to post. Bolts are to be installed in opposite holes, top and bottom.

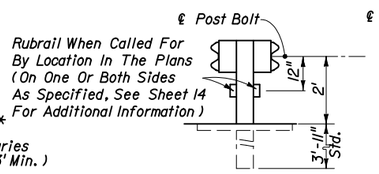
Notes: 1. Timber and recycled plastic offset blocks of identical size and shape can be intermixed within a run of rail.

2. Recycled plastic offset blocks shall meet the passing evaluation criteria for Test Level 3 of NCHRP 350. The blocks shall be tested as a component in a semi-rigid guardrail test article under full scale crash test conditions. The blocks shall be in conformance with Sections 536 and 972 of the Specifications and be included on the Qualified Products List. W-Beam blocks shall be 14" in height and thrie-beam blocks shall be 22" in height. The blocks shall be capable of providing a 7½" (Min.) offset.

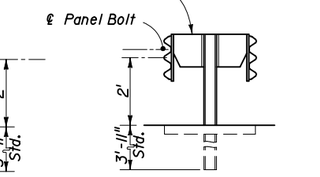
PERMISSIBLE POST AND OFFSET BLOCK COMBINATIONS



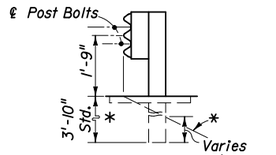
W-BEAM



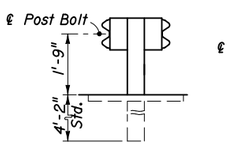
W-BEAM WITH RUBRAIL



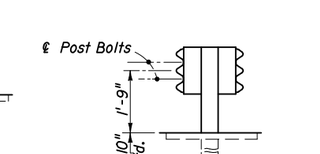
MODIFIED THRIE-BEAM



THRIE-BEAM



For Narrow Medians With No Median Swale **
W-BEAM



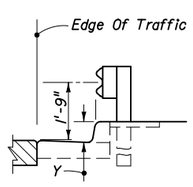
THRIE-BEAM

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

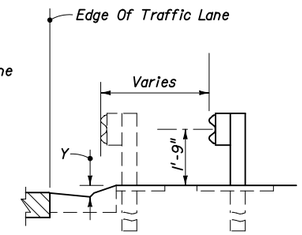
SINGLE FACED GUARDRAIL

DOUBLE FACED GUARDRAIL

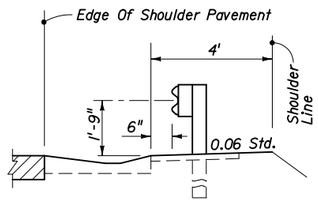
MOUNTING HEIGHTS ON SHOULDERS AND IN MEDIANS



Y=6" Or Greater



Y=Less Than 6"



Shoulder Gutter

** See Sheet 24 for Median with Swale.

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

LOCATION AT CURB & GUTTER SECTIONS-DETAIL L

REVISIONS

DATE	BY	DESCRIPTION			BY	DESCRIPTION
HSD	11/14/07	Revised reflector details and notes.				

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

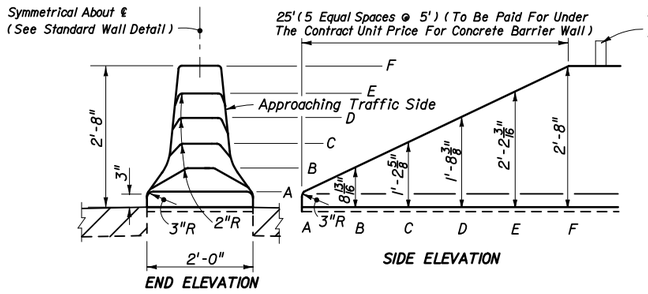
2008 Interim Design Standard

GUARDRAIL

Interim Date 01/01/08

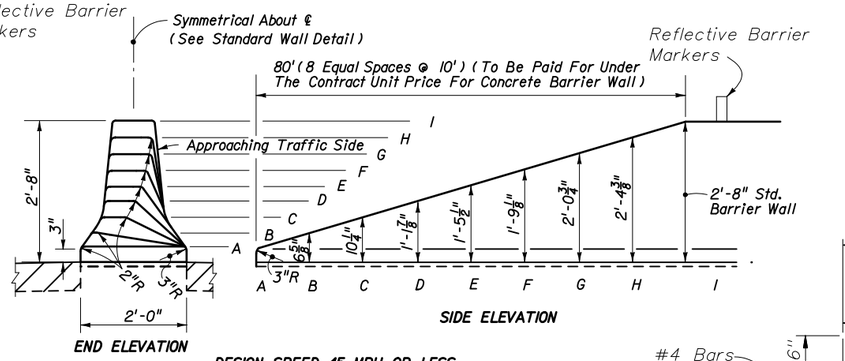
Sheet No. 15 of 24

Index No. 400



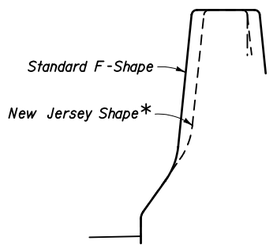
TO BE USED ONLY WHERE TERMINAL LOCATED CLEAR ZONE WIDTH FROM EDGE OF THE NEAR APPROACH TRAFFIC LANE.

CONCRETE BARRIER WALL TERMINAL
DETAIL II



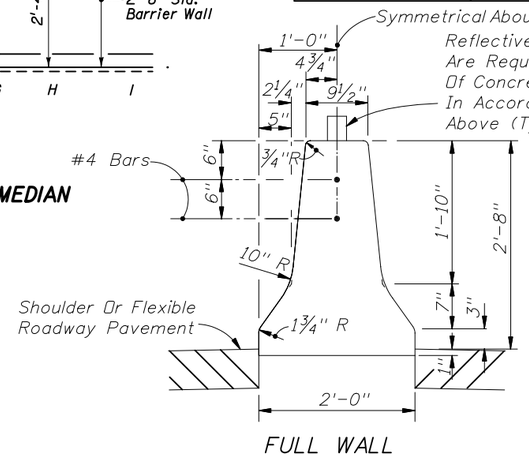
DESIGN SPEED 45 MPH OR LESS

CONCRETE BARRIER WALL TERMINAL FOR NARROW MEDIAN
DETAIL III

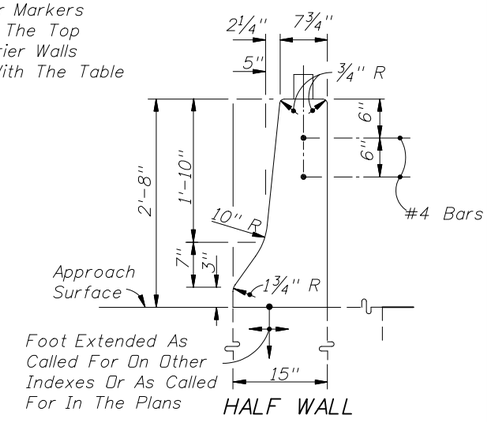


* Where standard F-Shape walls abut existing NJ Shape walls, face transitions of not less than 5' in length shall be constructed at the adjoining end of the F-Shape wall.

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

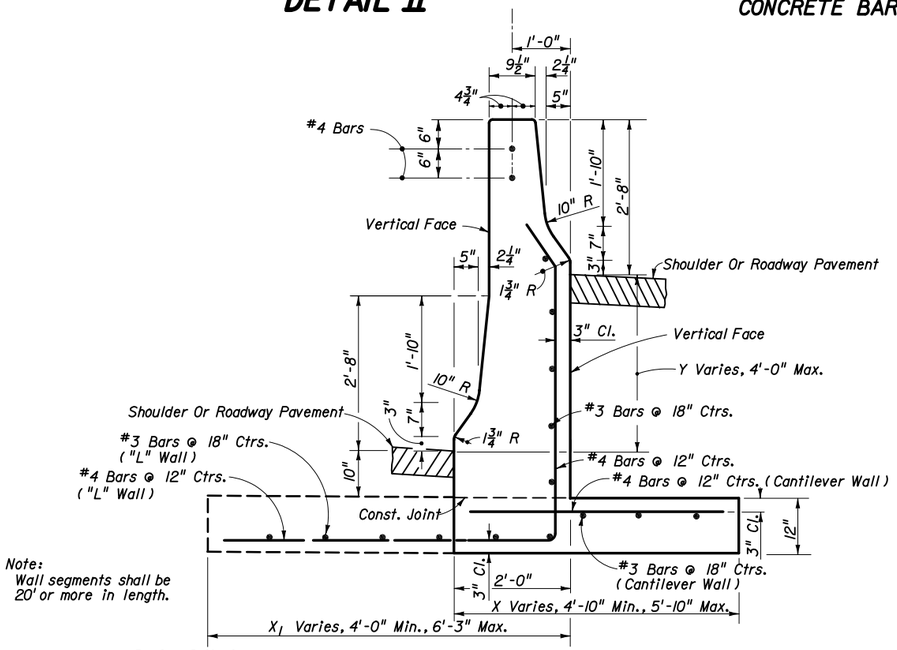


FULL WALL



HALF WALL

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



Note:
Wall segments shall be 20' or more in length.

Design Criteria:

Vehicle: 4000 lbs., 60 mph, 25°, Avg. Lat. Impact Deceleration Force- 7G's (28 kips)
Vehicle Force Applications: 1000 lbs. Vert. At Top of Toe; 28 kips Horiz. At 5½" Above Pavt.

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

Steel not required in walls of heights Y=0' To 0'-6" when footing and stem cast as one unit. When footing and stem cast separately by construction joint, the footing joint surface shall be roughened and #4 dowels 24" long installed at the centerline of the stem on 24" centers with 9" embedment in the footing.

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

	Height Y	0'-0"	0'-6"	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
Cantilever Wall	Width X	4'-10"	5'-0"	5'-2"	5'-3"	5'-5"	5'-6"	5'-7"	5'-9"	5'-10"
"L" Wall	Width X_1	4'-0"	4'-4"	4'-8"	5'-0"	5'-3"	5'-6"	5'-9"	6'-0"	6'-3"

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

WALL FACE SAFETY SHAPES

STANDARD BARRIER WALL SECTIONS

GENERAL NOTES

1. Class II concrete shall be used for all reinforced and plain (nonreinforced) concrete barrier walls; except, in moderately and extremely aggressive environments, Class IV concrete shall be used. All reinforcing steel with undesignated size shall be #4 bars. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Section 521 of the Standard Specifications, unless other finish called for in plans. The surfaces shall have a Class 5 Applied Finished Coating in accordance with Section 400 only when called for in the plans.

2. Concrete barrier wall terminal notes for design speeds ≥50 mph.
   a. Terminated outside clear zone of the approach traffic with 'Detail II' end treatment.
   b. Terminated within a shielded location.
   c. Terminal protection by the use of a crash cushion system.
   d. Terminated in conjunction with a suitably designed transition to another barrier.

3. Expansion joints in wall required only at bridge ends and/or at locations where wall is an integral part of existing or proposed concrete slab; wall joints are to match an existing or proposed expansion joint.

4. When the barrier is installed adjacent to the pavement the top 12" of the subgrade shall be compacted to at least 100% of the density as defined in the AASHTO T-99 specifications.

5. Cast-in place barrier wall normally will be a continuous pour without transverse contraction joints. Cast-in-place segments with a length <40' shall be joined to adjacent sections by doweling. See Detail B.

6. Precast construction is allowed as an alternate to cast-in-place construction.
   a. Wall segments <40' in length shall be joined by a transverse joint in accordance with Details C & D. The minimum segment length is 20'.
   b. Bedding of the precast sections shall be facilitated by the use of sand-cement grout or equal method to assure uniform bearing.
   c. Reinforcement may be required for handling stresses.

7 On roadways designated for reverse laning all downstream, ends that are not shielded or outside the clear zone shall be marked by Type 3 Object Markers.

8. Cost of reinforcing steel and reflective barrier markers shall be included in the contract unit price for concrete barrier wall. See individual details for pay item information.

9. For barrier wall inlet details see Indexes Nos. 217, 218 and 219.

10. Concrete barrier wall with New Jersey Safety Shape may not be substituted for the Standard F Shape Barrier.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
12/11/07	CAH	Modified the reflector location on the barrier wall.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

CONCRETE BARRIER WALL

Interim Date 01/01/08

Sheet No. 1 of 22

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

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

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

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

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

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

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

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

ALTERNATE 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, 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

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed Specification Section 971 to 975 in REINFORCING STEEL note. Added steel barrier option to ALTERNATE DESIGN note.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

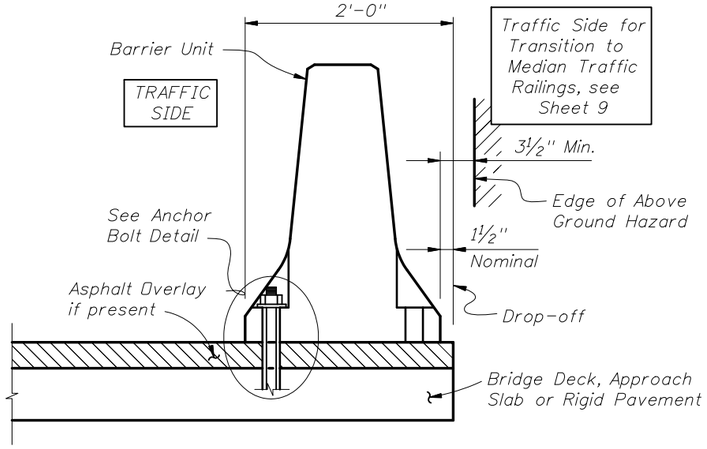
2008 Interim Design Standard

TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

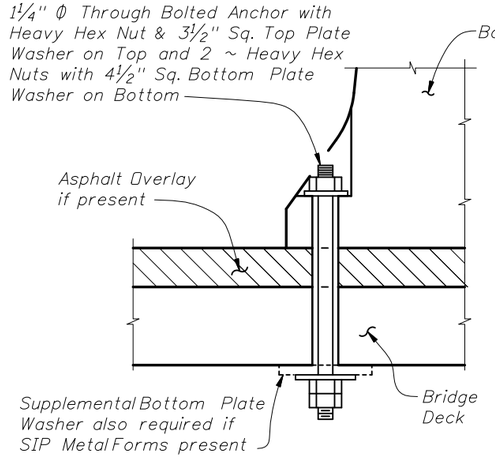
Interim Date 01/01/08

Sheet No. 1 of 15

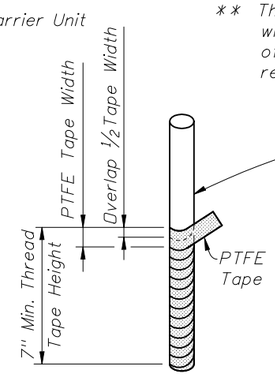
Index No. 414



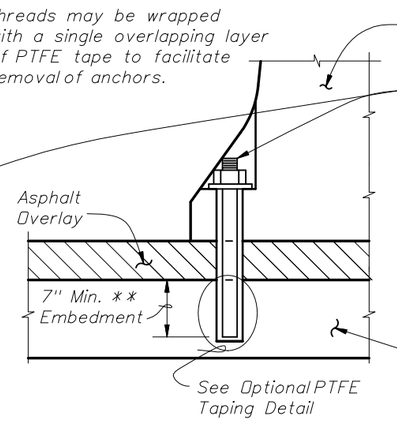
TYPICAL SECTION (BRIDGE DECK SHOWN, APPROACH SLAB OR RIGID PAVEMENT SIMILAR; INSTALLATION ADJACENT TO DROP-OFF SHOWN, MEDIAN TRANSITION INSTALLATION SIMILAR)



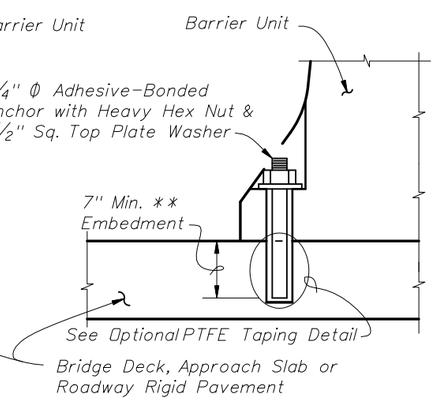
THROUGH BOLTED ANCHOR INSTALLATION ON BRIDGE DECK



OPTIONAL PTFE TAPING DETAIL



WITH ASPHALT OVERLAY



WITHOUT ASPHALT OVERLAY

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

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

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

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

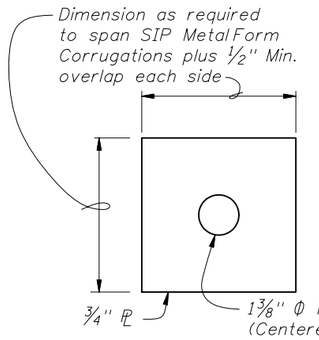
Install three (3) Anchor Bolts per Barrier Unit on the traffic side of the Barrier Units as shown, except for Transition Installations. For the number and positions of Anchor Bolts required in Transition Installations see Sheets 8 and 9 and Index No. 415. Drilling through deck reinforcing steel to install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

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

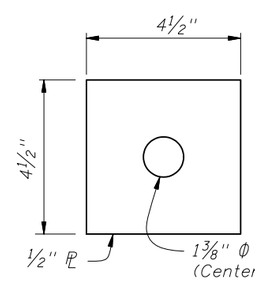
Omit one (1) Anchor Bolt within a single Barrier Unit as shown in the Treatment at Bridge Deck Expansion Joint Schematic if the Barrier Unit straddles a bridge deck expansion joint. The adjacent Barrier Units must each be installed with the standard three (3) Anchor Bolts.

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

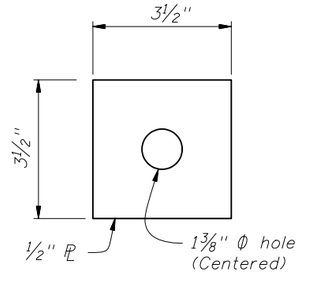
REMOVAL OF ANCHOR BOLTS: Upon removal or relocation of Barrier Units, remove all Anchor Bolts and completely fill the remaining holes in bridge decks, approach slabs and roadway rigid pavements that are to remain with Magnesium Ammonium Phosphate Concrete in accordance with Specification Section 930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



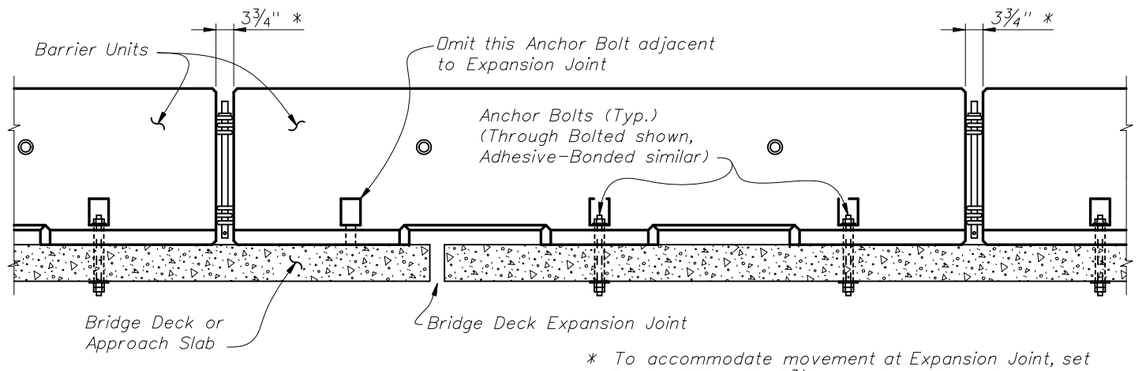
SUPPLEMENTAL BOTTOM PLATE WASHER DETAIL



BOTTOM PLATE WASHER DETAIL



TOP PLATE WASHER DETAIL



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

TREATMENT AT BRIDGE DECK EXPANSION JOINT SCHEMATIC

BOLTED DOWN BRIDGE, APPROACH SLAB, ROADWAY AND TRANSITION INSTALLATIONS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Added OPTIONAL PTFE TAPING DETAIL. Change anchor embedment to 7" Min.			

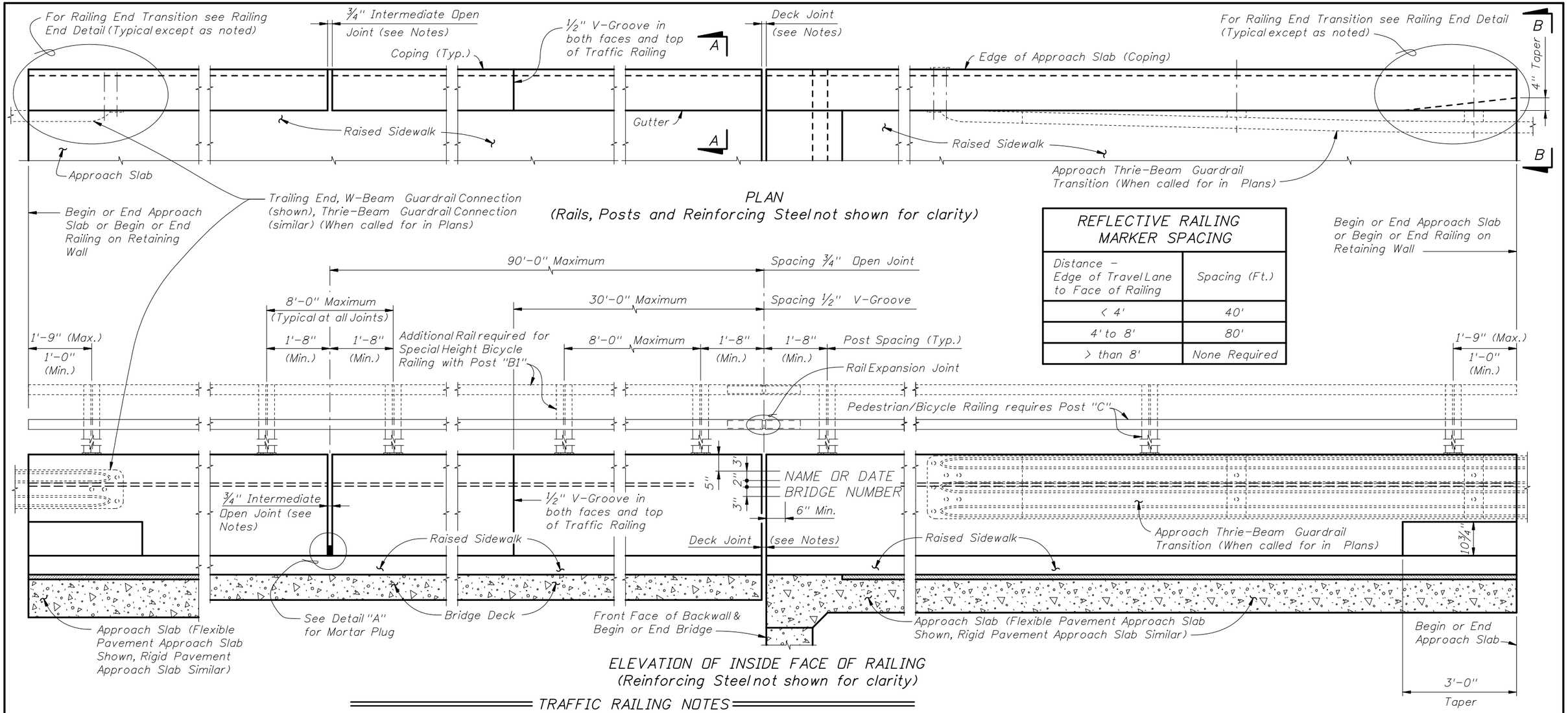
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

TYPE K TEMPORARY CONCRETE BARRIER SYSTEM

Interim Date 01/01/08

Index No. 414



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.

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

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

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

REFLECTIVE RAILING MARKERS : Reflective Railing Markers shall conform to Section 993 of the Specifications. Install markers 6" below the top of the Traffic Railing at the spacings shown in the table above. Reflector color (white or yellow) shall conform to the color of the near edgeline.

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

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

OPEN JOINTS : See Structures Plans, Superstructure, Approach Slab Sheets and Retaining Walls for actual dimensions and joint orientation. Open Railing Joints at Deck Expansion Joint locations shall match the dimensions of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin or End Bridge Shown. Deck Joint at ℄ Pier or Intermediate Bent Similar.

Provide ¾" Intermediate Open Joints at :

(1) – Substructure supports where superstructure slab is continuous.
(2) – Midspan where span length exceeds 90 ft.
(3) – Intermediate locations (equally spaced) between midspan and substructure supports where span length exceeds 180 ft.
(4) – At 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	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed Bicycle Railing to "Special Height Bicycle Railing" and Pedestrian Railing to "Pedestrian/Bicycle Railing" and added new Post "B1" designation in Elevation View and TRAFFIC RAILING NOTES. --- Continued ---			Changed NAME, DATE AND BRIDGE NUMBER note to include reference to GENERAL NOTES in the Structures Plans for "NAME".

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

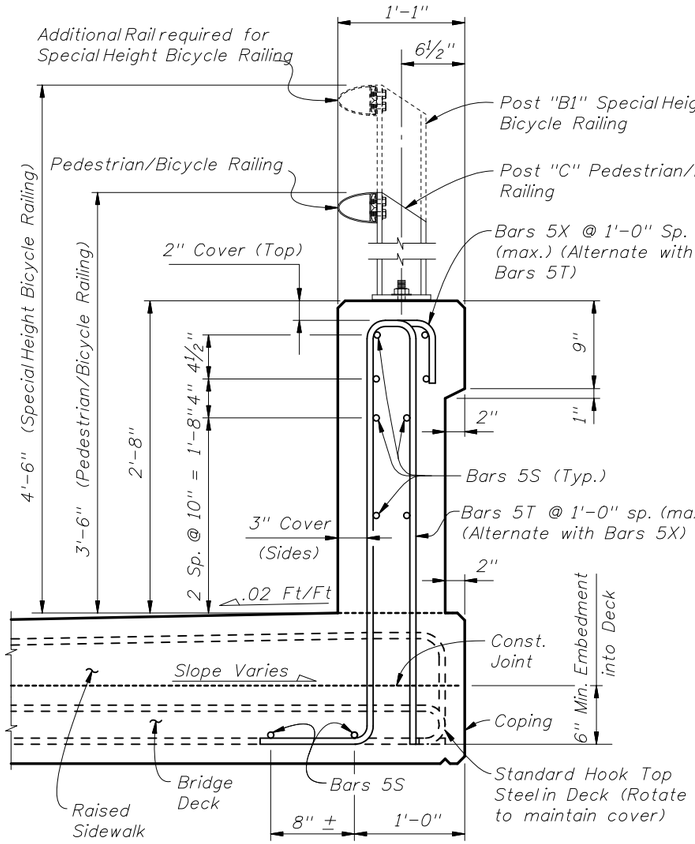
2008 Interim Design Standard

TRAFFIC RAILING - (32" VERTICAL SHAPE)

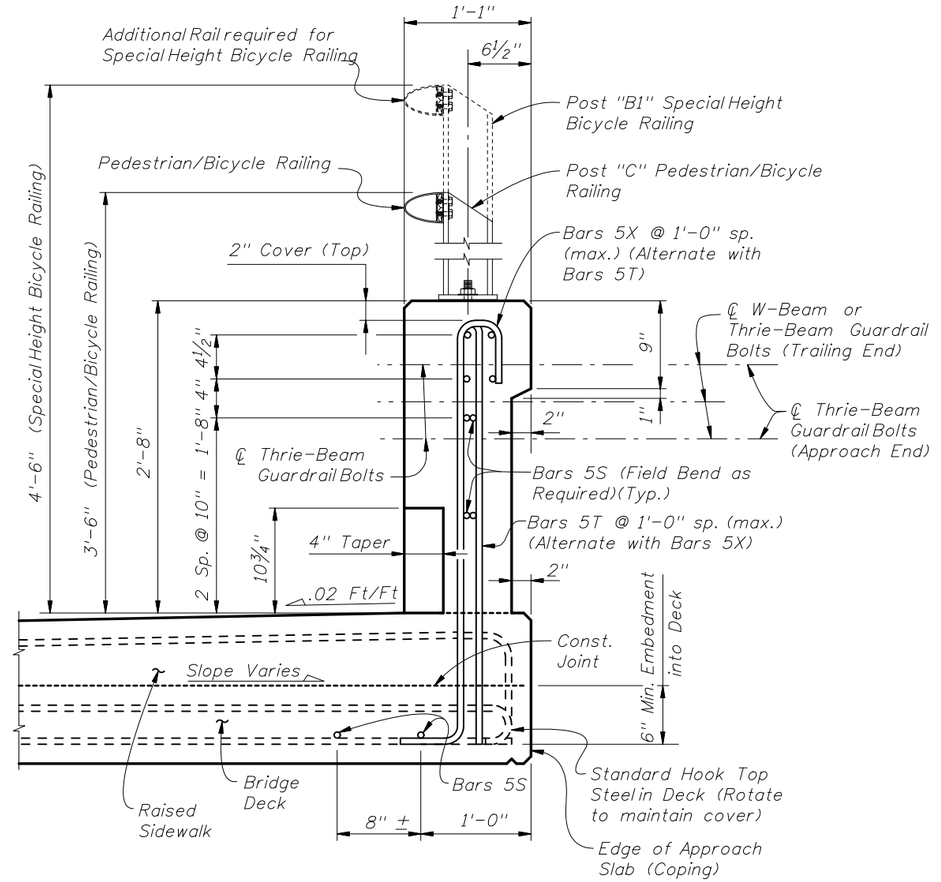
Interim Date 01/01/08

Sheet No. 1 of 3

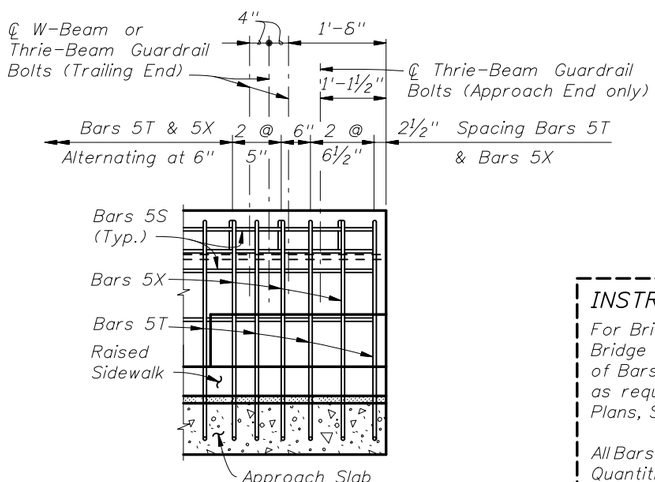
Index No. 423



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



VIEW B-B
APPROACH SLAB END VIEW
OF TRAFFIC RAILING



RAILING END DETAIL

NOTES:

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

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

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

INSTRUCTIONS TO DESIGNER:

For Bridge Decks up to a maximum thickness of 9", the two Bars 5S placed in the Bridge Deck may substitute for the longitudinal deck steel located within the limits of Bars 5T, provided that the total area of longitudinal steel beneath the railing, as required by calculation, is not reduced. Show these bars on the Structures Plans, Superstructure Sheets with the deck steel.

All Bars 5S, 5T and 5X as shown are included in the Estimated Traffic Railing Quantities. Do not include Bars 5S, 5T and 5X in the reinforcing bar lists and estimated quantities for supporting bridge decks, approach slabs or retaining walls.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed Bicycle Railing to "Special Height Bicycle Railing" and Pedestrian Railing to "Pedestrian/Bicycle Railing" and Post "B" to Post "B1".			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

TRAFFIC RAILING - (32" VERTICAL SHAPE)

Interim Date 01/01/08

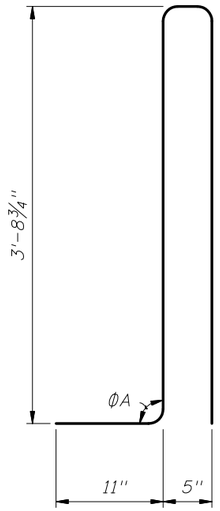
Sheet No. 2 of 3

Index No. 423

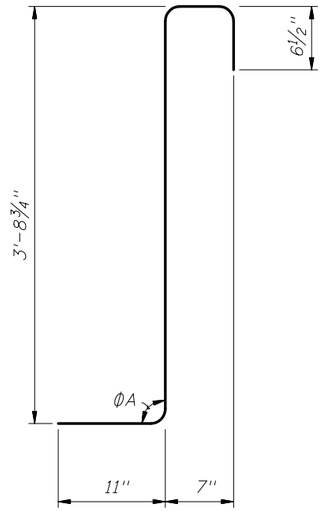
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

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

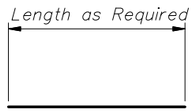
ROADWAY CROSS-SLOPE	ØA	
	LOW GUTTER	HIGH GUTTER
0% to 2%	90°	90°
2% to 6%	87°	93°
6% to 10%	84°	96°



STIRRUP BAR 5T



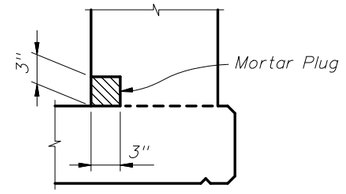
STIRRUP BAR 5X



BAR 5S

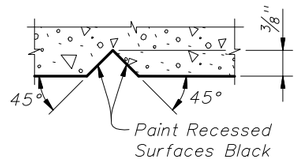
REINFORCING STEEL NOTES:

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



DETAIL "A" - SECTION
AT INTERMEDIATE OPEN JOINT

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.



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

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

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

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed High Gutter Angle from "83°" to "93°" in Bending Diagram table.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

TRAFFIC RAILING - (32" VERTICAL SHAPE)

Interim Date 01/01/08

Sheet No. 3 of 3

Index No. 423

TRAFFIC RAILING NOTES

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

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

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

THRIE-BEAM GUARDRAIL: Steel Thrie-Beam Elements shall meet the requirements for Class B (10 Gauge) Guardrail of AASHTO M 180, Type II (Zinc coated). The minimum panel length for Thrie-Beam Elements shall be 12'-6". Field drilled holes for Post connections shall be ¾" by 2½" slotted holes.

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

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

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

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

ADHESIVE-BONDED ANCHORS AND DOWELS: Adhesive Bonding Material Systems for Anchors and Dowels shall comply with Specification Section 937 and be installed in accordance with Specification Section 416. The field testing proof loads required by Specification Section 416 shall be 15,000 lbs. for ⅞" Ø anchor bolts; 55,000 lbs. for the 1¼" anchor bolts with 13" embedment; and 30,500 lbs. for the 1¼" Ø anchor bolts with 5" embedment.

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

POST SPACING: Posts shall be located along the length of the bridge at typical 6'-3" or 3'-1 ½" spaces. Utilize the Modified Post Spacing at Intermediate Deck Joints Details as required to clear deck joints. Establish post spacing along the bridge and Roadway Guardrail Transition beginning with the Key Post. The variable post spacings located near begin and end bridge may be utilized to optimize the typical post spacing. Variable lengths of guardrail overlap are also permitted to optimize the typical post spacing. Symmetry of post spacing is not necessary.

THRIE-BEAM EXPANSION SECTION: Thrie-Beam Expansion Sections shall be installed at locations shown in the Plans. Install nuts for splice bolts finger-tight at 2½" slots in thrie beam expansion sections. Nuts shall fully engage bolts with a minimum of one bolt thread extending beyond the nuts. Distort the first thread on the outside of the nut to prevent loosening. Tighten guardrail bolts in 3¾" slots at guardrail post(s) that lie between the slotted expansion splice and bridge deck joint so that the bolt heads are in full contact with thrie-beam elements, but not so tight as to impede movement due to expansion.

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.

REFLECTIVE RAILING MARKERS: Reflective Railing Markers shall conform to Section 993 of the Specifications. Install markers in the upper groove of the Thrie Beam Guardrail 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 a Bridge Name Plate shall be furnished and installed on an adjacent, separate ground mounted post as directed by the Engineer. The Bridge Name Plate shall include the information on the existing Traffic Railing that has been removed or obscured, e.g., Bridge Number, Bridge Name or Date. The Bridge Name Plate shall be approximately 1/16" thick aluminum plate in accordance with Specification Section 700. The Bridge Name Plate shall be white background, with 3" tall black letters, ¾" black border and sized appropriately to contain the information required.

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.

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

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Added field testing proof loads to ADHESIVE BONDED ANCHORS AND DOWELS note.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

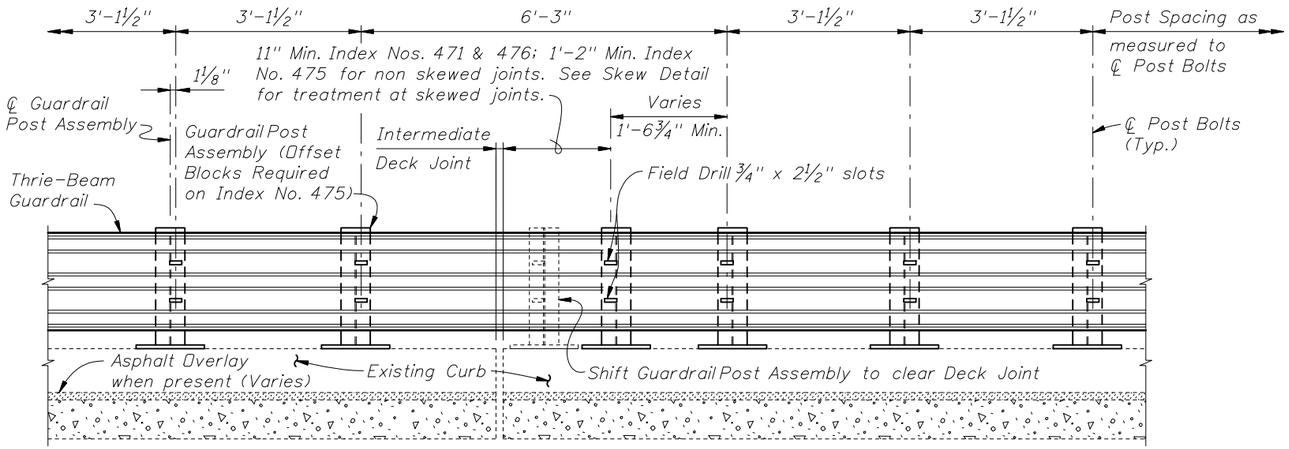
2008 Interim Design Standard

TRAFFIC-RAILING (THRIE-BEAM RETROFIT) GENERAL NOTES & DETAILS

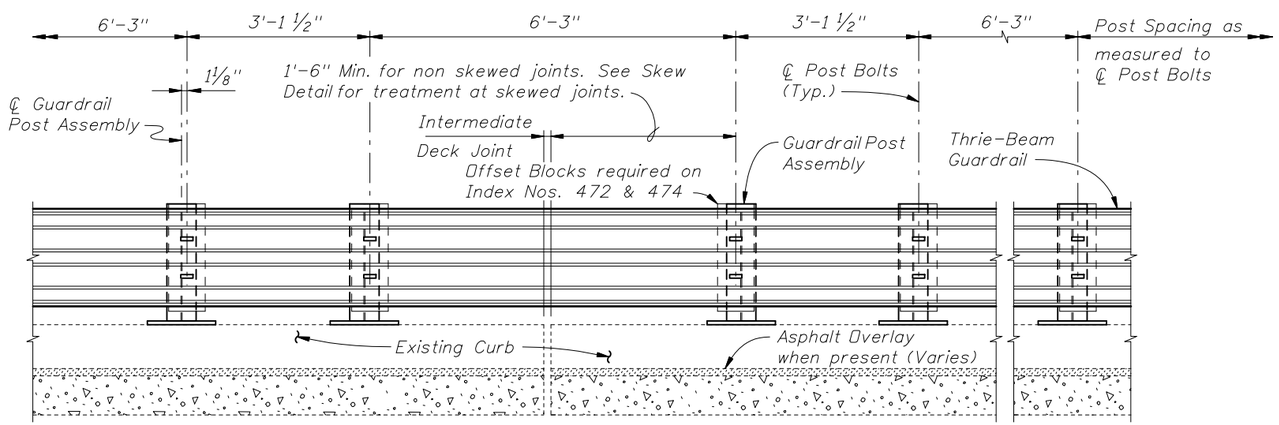
Interim Date 01/01/08

Sheet No. 1 of 3

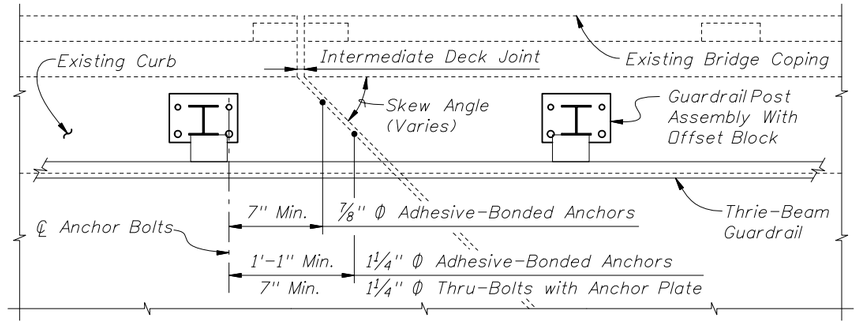
Index No. 470



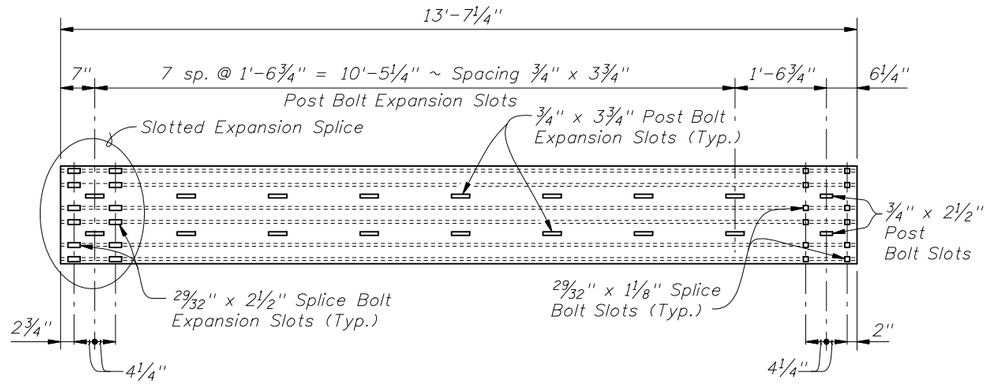
PARTIAL ELEVATION OF INSIDE FACE OF RAILING
MODIFIED POST SPACING AT INTERMEDIATE DECK JOINTS DETAIL FOR INDEX NOS. 471, 475 & 476



PARTIAL ELEVATION OF INSIDE FACE OF RAILING
MODIFIED POST SPACING AT INTERMEDIATE DECK JOINTS DETAIL FOR INDEX NOS. 472, 473 & 474



PARTIAL PLAN
INTERMEDIATE JOINT SKEW DETAIL



THRIE-BEAM EXPANSION SECTION

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed offset to back anchor bolts in post base plate.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

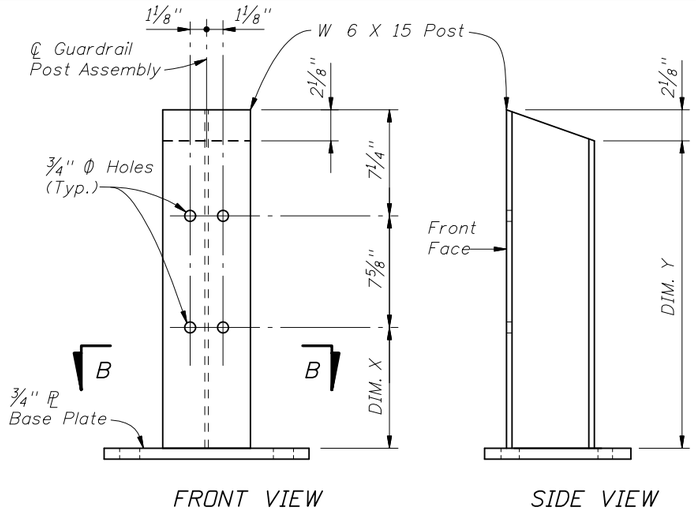
2008 Interim Design Standard

TRAFFIC RAILING - (THRIE-BEAM RETROFIT) GENERAL NOTES & DETAILS

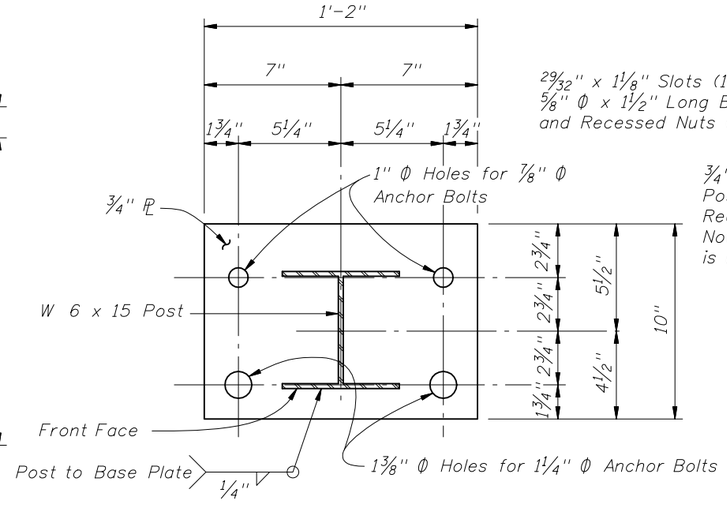
Interim Date 01/01/08

Sheet No. 2 of 3

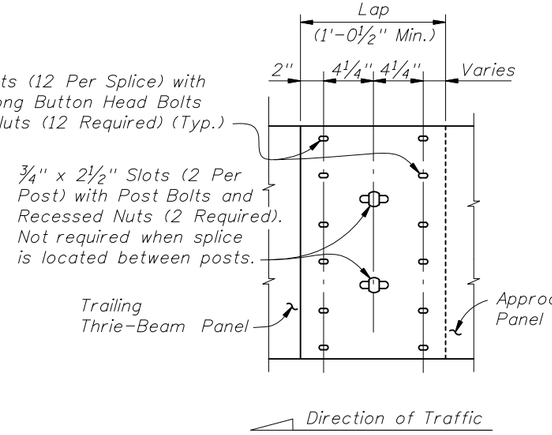
Index No. 470



FRONT VIEW SIDE VIEW

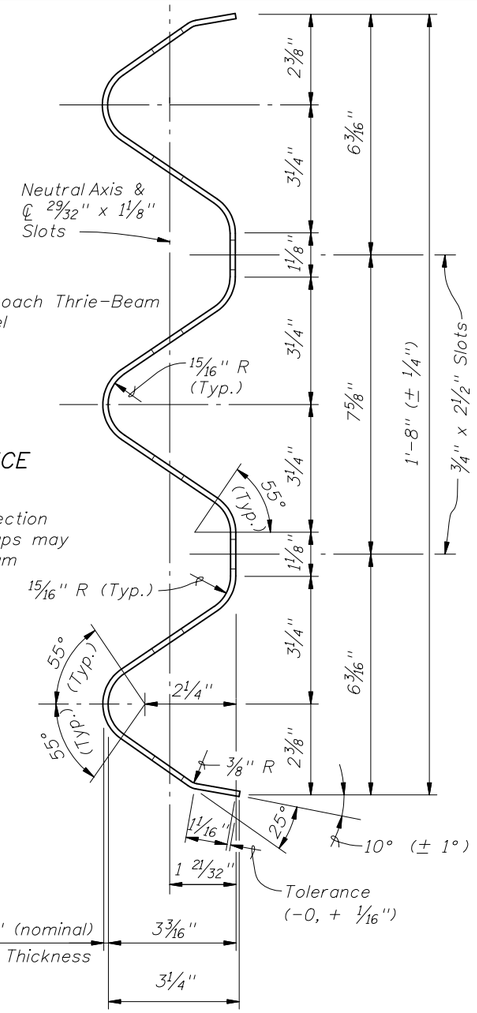


SECTION B-B



THRIE-BEAM GUARDRAIL SPLICE

Note: All Thrie Beam Panels shall be lapped in the direction of adjacent traffic. At the Contractor's option, laps may be extended. Field drill holes in Trailing Thrie Beam Guardrail Panel as required.

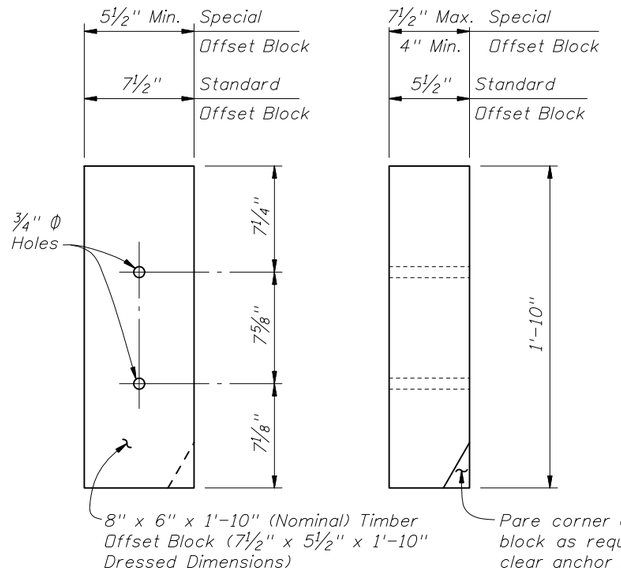


TYPICAL SECTION THRU THRIE-BEAM GUARDRAIL (EXPANSION SECTION SIMILAR)

POST DIMENSION TABLE			
POST	CURB HEIGHT (DIM. A)	DIM. X	DIM. Y
Post "A"	5" to 7"	11¼"	2'-0"
Post "B"	> 7" to 10"	9¼"	1'-10"
Post "C"	> 10" to 1'-0"	7¼"	1'-8"

Note: DIM. A is equal to the exposed curb height. For location of DIM. A see Index Nos. 471 thru 476, Sheet 1.

GUARDRAIL POST ASSEMBLY DETAIL

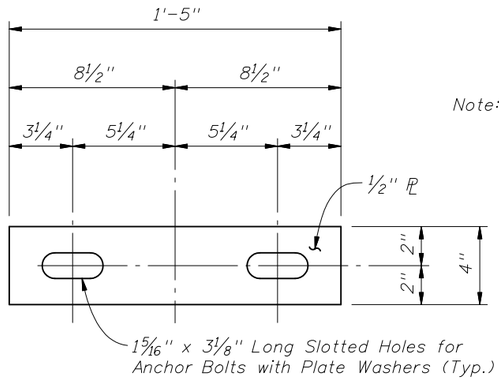


FRONT VIEW SIDE VIEW

OFFSET BLOCK NOTES:

1. Offset blocks shall be timber or Approved Alternate. Uniformity of block size and alignment of guardrail shall be maintained along length of retrofit.
2. Post bolt holes in offset blocks to be centered (± ¼").
3. Timber offset blocks shall be dressed on all four sides (S4S).
4. Block assemblies for Special Offset Blocks can be made up of 2 or 3 Special or Standard Offset Blocks, field dressed as required.

OFFSET BLOCK DETAIL



ANCHOR PLATE DETAIL

Note: The Anchor Plate and Plate Washer are applicable only to 1¼" Ø Anchor Bolts that are to be thru-bolted for Index Nos. 471 & 476.

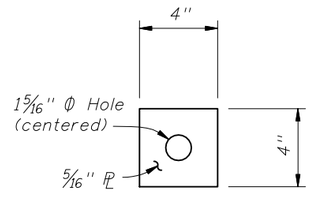
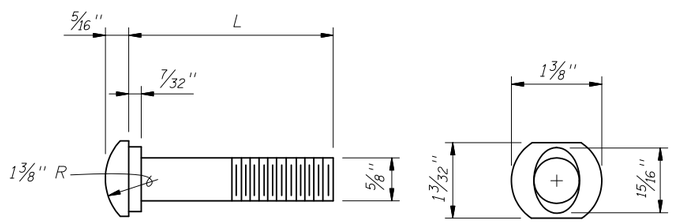
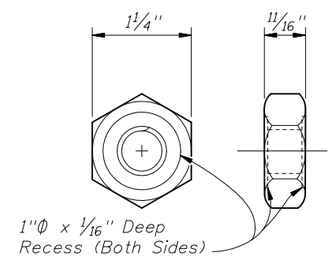


PLATE WASHER DETAIL



⅝" OVAL SHOULDER BUTTON HEAD BOLT

L	THREAD LENGTH	APPLICATION
1½"	Full Length	Rail Splice Bolt, Post Bolt for Index Nos. 471, 473 & 476
Varies (8" Min.)	4" Min.	Post Bolt for Index Nos. 472, 473, 474, 475 & 476



⅝" MODIFIED HEAVY HEX NUT (RECESSED NUT)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed offset to back anchor bolts in post base plate.			

2008 Interim Design Standard

TRAFFIC RAILING - (THRIE-BEAM RETROFIT) GENERAL NOTES & DETAILS

Interim Date 01/01/08

Sheet No. 3 of 3

Index No. 470

TABLE OF WOVEN GEOTEXTILE VALUES

PROPERTY		REQUIRED TEST METHOD	MIRAFI GEOLON HP 370	MIRAFI GEOLON HP 570	MIRAFI GEOLON HP 665	MIRAFI GEOLON HP 770	MIRAFI GEOLON HS 400	MIRAFI GEOLON HS 600	MIRAFI GEOLON HS 800	MIRAFI GEOLON HS 1150	MIRAFI MIRAMESH GR
Permittivity (0.05 sec^{-1} Min.)		ASTM D 4491	0.52	0.40	0.26	0.23	0.1	0.32	0.20	0.32	———
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	50%	50%	50%	50%	90%
Burst Strength (psi)		ASTM D 6241	800	1,200	1,200	1,200	———	———	———	———	———
Grab Strength (lb.)		ASTM D 4632	400 x 250	475 x 440	600 X 700	550 x 450	———	———	———	———	———
A.O.S. (in.)		ASTM D 4751	0.0236	0.0236	0.0167	0.0236	0.0167	0.0335	0.0335	0.0236	0.120 x 0.120
Tensile Strength (lb./ft.)		ASTM D 4595									
Machine Direction	Ultimate (T_{ult})		3,240	4,800	4,800	7,200	4,800	7,200	9,600	13,800	1,440
	2% Strain		540	960	———	780	———	———	———	———	———
	5% Strain		1,356	2,400	1,200	3,600	1,080	2,400	3,600	4,800	———
Cross Direction	Ultimate		2,700	4,800	6,600	4,800	4,800	3,600	3,600	3,600	1,733
	2% Strain		540	1,320	———	1,320	———	———	———	———	———
	5% Strain		1,560	2,604	4,200	3,600	2,400	———	———	———	———
Strain @ Ultimate Tensile Strength		ASTM D 4595	14%	10%	12%	12%	15%	15%	10%	12%	6%
Secant Modulus @ (lb./ft.)	2% Strain		27,000	48,000	———	39,000	———	———	———	———	———
	5% Strain		27,120	48,000	24,000	72,000	21,600	48,000	72,000	96,000	———
	10% Strain		24,000	48,000	30,000	66,000	33,600	57,600	96,000	120,000	———
Seam Breaking Strength (lb./ft.)		ASTM D 4884	1,688	3,000	3,600	3,000	2,400	2,400	2,400	2,400	———
Puncture Resistance (lb.)		ASTM D 4833	180	195	280	160	———	———	———	———	———
Tear Strength (lb.)	Machine Direction	ASTM D 4833	170	180	180	250	———	———	———	———	———
	Cross Direction	ASTM D 4833	110	180	275	300	———	———	———	———	———
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Creep Resistance-T_{creep}(lb./ft.)		ASTM D 5262	———	———	———	———	2,880	4,320	5,760	8,280	471 x 566
Creep Reduction Factor (T_{ult} / T_{creep})			3.5	3.5	3.5	3.5	1.67	1.67	1.67	1.67	3.0
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.15	1.15	1.10	1.10	1.05
	Limestone		1.25	1.25	1.25	1.25	1.25	1.25	1.20	1.20	1.10
Durability (RF_d)	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.10
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Joint Strength (RF_j)	Mechanical	ASTM D 4595, GRI : GG4 & GT7	———	———	———	———	———	———	———	———	———
	Overlap *	ASTM D 6706	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Approved Application Usage			3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	3, 4	1,4

Approved Application Usage: 1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient

* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS (WOVEN GEOGRID) APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	LJ	Changed Required Test Method for Burst Strength, Soil-Geosynthetic Friction, Creep Reduction Factor, and Overlap Joint Strength.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

##STANDARD YEAR##

GEOSYNTHETIC REINFORCED SOILS

#Label1# #Label2# 07/01/08

Sheet No. 3 of 9

Index No. 501

TABLE OF WOVEN GEOTEXTILE VALUES

PROPERTY		REQUIRED TEST METHOD	MIRAFI BXG11	MIRAFI BXG12	MIRAFI GEOLON HS 2400	MIRAFI GEOLON HS 3000	MIRAFI GEOLON HS 3600	AMOCO 2006	AMOCO 2016	AMOCO 2044	COMTRAC 70.70
Permittivity (0.05 sec^{-1} Min.)		ASTM D 4491	———	———	0.02	0.02	0.02	0.05	0.70	0.15	0.20
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%
Burst Strength (psi)		ASTM D 6241	———	———	———	———	———	1,000	1,100	1,500	———
Grab Strength (lb.)		ASTM D 4632	———	———	———	———	———	315	315	600/500	———
A.O.S. (in.)		ASTM D 4751	1.0 x 1.0	1.0 x 1.0	0.0118	0.0118	0.0118	0.0167	0.0167	0.0236	0.0181
Tensile Strength (lb./ft.)		ASTM D 4595									
Machine Direction	Ultimate (T_{ult})		2,000	2,000	28,800	36,000	43,200	2,100	2,400	4,800	4,800
	2% Strain		500	500	———	———	———	156	276	456	———
	5% Strain		920	920	14,400	18,000	21,600	564	744	1,452	2,196
Cross Direction	Ultimate		2,000	4,000	3,600	3,600	3,600	2,100	2,400	4,800	3,600
	2% Strain		500	750	———	———	———	576	660	1,380	———
	5% Strain		920	1,350	———	———	———	1,104	1,404	2,604	———
Strain @ Ultimate Tensile Strength		ASTM D 4595	12%	12%	10%	10%	10%	8%	8%	8%	9%
Secant Modulus @ (lb./ft.)	2% Strain		25,000	25,000	———	———	———	7,800	13,800	22,800	———
	5% Strain		18,400	18,400	288,000	360,000	432,000	11,280	14,880	29,040	24,400
	10% Strain		———	———	288,000	360,000	432,000	10,440	12,480	31,200	24,400
Seam Breaking Strength (lb./ft.)		ASTM D 4884			3,600	3,600	3,600	———	———	———	2,400
Puncture Resistance (lb.)		ASTM D 4833	———	———	———	———	———	120	120	170	———
Tear Strength (lb.)	Machine Direction	ASTM D 4833	———	———	———	———	———	120	120	250	———
	Cross Direction	ASTM D 4833	———	———	———	———	———	120	120	250	———
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.8	0.65	0.65	0.65	0.9
Creep Resistance-T_{creep}(lb./ft.)		ASTM D 5262	———	———	17,280	21,600	21,600	600	685	1,371	———
Creep Reduction Factor (T_{ult} / T_{creep})			1.6	1.6	1.67	1.67	1.67	3.5	3.5	3.5	1.67
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.05	1.05	1.1	1.1	1.1	1.10	1.05	1.05	1.2
	Limestone		1.10	1.10	1.20	1.20	1.20	1.20	1.20	1.10	1.5
Durability (RF_d)	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0				1.0
Joint Strength (RF_j)	Mechanical	ASTM D 4595, GRI : GG4 & GT7	———	———	———	———	———	———	———	———	———
	Overlap *	ASTM D 6706	1.0	1.0	1.0	1.0	1.0	1.2	1.2	1.2	1.0
Approved Application Usage			3, 4	3, 4	3, 4	3, 4	3, 4	3	3	3	3

Approved Application Usage: 1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient

* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS (WOVEN GEOGRID) APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	LJ	Changed Required Test Method for Burst Strength, Soil-Geosynthetic Friction, Creep Reduction Factor, and Overlap Joint Strength. Changed Properties for Comtrac 70.70.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

##STANDARD YEAR##

GEOSYNTHETIC REINFORCED SOILS

#Label1# #Label2# 07/01/08

Sheet No. 4 of 9

Index No. 501

TABLE OF WOVEN GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	MARAFI MG 2XT	MARAFI MG 3XT	MARAFI MG 5XT (Matrex 30)	MARAFI MG 7XT	MARAFI MG 8XT	MARAFI MG 10XT (Matrex 60)	MARAFI MG 18XT (Matrex 90)	MARAFI MG 20XT (Matrex 120)	MARAFI MG 22XT (Matrex 180)	MARAFI MG 24XT (Matrex 240)
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Tensile Strength (lb./ft.)		ASTM D 6637										
Machine Direction	Ultimate (T_{ult})		2,000	3,150	4,300	5,700	7,000	9,500	9,360	12,420	17,760	25,380
	2% Strain		———	———	———	———	———	———	———	———	———	———
	5% Strain		1,000	1,056	1,740	2,160	2,520	3,120	3,250	5,340	6,700	7,000
Cross Direction	Ultimate		2,000	———	———	———	———	———	———	———	———	———
	2% Strain		———	———	———	———	———	———	———	———	———	———
	5% Strain		———	———	———	———	———	———	———	———	———	———
Strain @ Ultimate Tensile Strength		ASTM D 6637	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Secant Modulus @ (lb./ft.)	2% Strain		———	———	———	———	———	———	———	———	———	———
	5% Strain		20,000	21,120	34,800	43,200	50,400	62,400	65,000	106,800	134,000	140,000
	10% Strain		———	———	———	———	———	———	———	———	———	———
Junction Strength (lb./ft.)		GRI : GG2	———	———	———	———	———	———	———	———	———	———
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Creep Resistance-T_{creep} (lb./ft.)		ASTM D 5262	1,250	1,969	2,688	3,563	4,375	5,938	5,850	7,221	10,326	14,756
Creep Reduction Factor (T_{ult}/T_{creep})			1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.72	1.72	1.72
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	Limestone		1.5	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Durability (RF_d)	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Joint Strength (RF_j)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	———	———	———	———	———	———	———	———	———	———
	Overlap *	ASTM D 6706	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Approved Application Usage			3	3	3	3	3	3	3	3	3	3

Approved Application Usage:
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient

* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEOGRID)
APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	LJ	Changed Required Test Method for Burst Strength, Soil-Geosynthetic Friction, Creep Reduction Factor, and Overlap Joint Strength.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

##STANDARD YEAR##

GEOSYNTHETIC REINFORCED SOILS

#Label1# #Label2# 07/01/08

Sheet No. 5 of 9

Index No. 501

TABLE OF WOVEN GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	SYNTEEN SF 11	SYNTEEN SF 12	SYNTEEN SF 20	SYNTEEN SF 35	SYNTEEN SF 40	SYNTEEN SF 50	SYNTEEN SF 55	SYNTEEN SF 80	SYNTEEN SF 110
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	70%	70%	70%	70%	70%	70%	70%	70%	70%
Tensile Strength (lb./ft.)		ASTM D 6637									
Machine Direction	Ultimate (T_{ult})		2,388	2,388	1,672	2,627	3,050	3,731	3,774	5,583	7,462
	2% Strain		526	526	370	462	488	791	736	1,016	1,186
	5% Strain		990	1,042	670	725	970	922	1,159	1,273	1,684
Cross Direction	Ultimate		3,870	5,268	1,630	2,556	3,050	3,933	2,499	2,206	2,179
	2% Strain		578	797	370	399	430	630	604	882	1,274
	5% Strain		792	1,129	670	583	765	815	796	1,563	1,581
Strain @ Ultimate Tensile Strength		ASTM D 6637	12.6%	13.0%	9.4%	14.1%	9.9%	14.2%	11.5%	13.9%	18.8%
Secant Modulus @ (lb./ft.)	2% Strain		26,300	26,300	18,494	23,114	24,408	39,551	36,799	50,807	59,298
	5% Strain		15,840	20,840	13,397	14,499	19,404	18,432	23,174	25,459	33,712
	10% Strain		———	———	15,206	15,234	22,089	18,432	27,137	37,910	27,380
Junction Strength (lb./ft.)		GRI : GG2	354	320	———	———	———	———	———	———	———
Soil-Geosynthetic Friction		ASTM D 6706	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Creep Resistance-T_{creep} (lb./ft.)		ASTM D 5262	———	———	1,005	1,523	1,525	2,201	2,265	3,182	4,029
Creep Reduction Factor (T_{ult}/T_{creep})			———	———	1.66	1.73	2.00	1.70	1.67	1.75	2.02
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.18	1.06	1.05	1.15	1.15	1.08	1.08	1.08	1.08
	Limestone		1.31	1.20	1.75	1.70	1.60	1.55	1.55	1.55	1.35
Durability (RF_d)	Chemical	ASTM D 5322	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
	Biological	ASTM D1987, D3083, G21 & G22	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Joint Strength (RF_j)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	———	———	———	———	———	———	———	———	———
	Overlap *	ASTM D 6706	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10
Approved Application Usage			3, 4, 5	3, 4, 5	3	3	3	3	3	3	3

Approved Application Usage:
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient
* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(WOVEN GEOGRID)
APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	LJ	Changed Required Test Method for Burst Strength, Soil-Geosynthetic Friction, Creep Reduction Factor, and Overlap Joint Strength.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

##STANDARD YEAR##

GEOSYNTHETIC REINFORCED SOILS

#Label1# #Label2# 07/01/08

Sheet No. 6 of 9

Index No. 501

TABLE OF WOVEN GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	RAUGRID 3/3	RAUGRID 4/2	RAUGRID 6/3	RAUGRID 8/3	RAUGRID 10/3
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	95%	95%	95%	95%	95%
Tensile Strength (lb./ft.)		ASTM D 6637					
Machine Direction	Ultimate (T_{ult})		2,233	2,843	4,350	5,288	6,590
	2% Strain		———	———	———	———	———
	5% Strain		712	767	1,144	1,165	1,582
Cross Direction	Ultimate		2,213	1,459	1,959	2,089	2,192
	2% Strain		———	———	———	———	———
	5% Strain		541	356	452	507	521
Strain @ Ultimate Tensile Strength		ASTM D 6637	10.8%	11.8%	13.1%	12.2%	11.5%
Secant Modulus @ (lb./ft.)	2% Strain		———	———	———	———	———
	5% Strain		———	———	———	———	———
	10% Strain		———	———	———	———	———
Junction Strength (lb./ft.)		GRI : GG2	N/A	100%	100%	100%	100%
Soil-Geosynthetic Friction		ASTM D 6706	0.8	0.8	0.8	0.8	0.8
Creep Resistance-T_{creep} (lb./ft.)		ASTM D 5262	1,466	1,870	2,862	3,479	4,335
Creep Reduction Factor (T_{ult} / T_{creep})			1.52	1.52	1.52	1.52	1.52
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.10
	Limestone		1.17	1.17	1.17	1.17	1.17
Durability (RF_d)	Chemical	ASTM D 5322	1.15	1.15	1.15	1.15	1.15
	Biological	ASTM D1987, D3083, G21 & G22	1.15	1.15	1.15	1.15	1.15
Joint Strength (RF_j)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	———	———	———	———	———
	Overlap *	ASTM D 6706	———	———	———	———	———
Approved Application Usage			2, 5	2, 5	2, 5	2, 5	2, 5

Approved Application Usage:
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient
* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS (WOVEN GEOGRID) APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	LJ	Changed Required Test Method for Burst Strength, Soil-Geosynthetic Friction, Creep Reduction Factor, and Overlap Joint Strength.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

##STANDARD YEAR##

GEOSYNTHETIC REINFORCED SOILS

#Label1# #Label2# 07/01/08

Sheet No. 7 of 9

Index No. 501

TABLE OF EXTRUDED GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	TENSAR BX 4100	TENSAR BX 4200	TENSAR BX 1100	TENSAR BX 1120	TENSAR BX 1200	TENSAR BX 1220	TENSAR BX 1500
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	90%	90%	90%	100%	90%	100%	90%
Tensile Strength (lb./ft.)		ASTM D 6637							
Machine Direction	Ultimate (T_{ult})		860	1,270	850	850	1,315	1,315	1,790
	2% Strain		240	370	280	280	410	410	580
	5% Strain		480	705	580	580	810	810	1,200
Cross Direction	Ultimate		875	1,370	1,300	1,300	1,975	1,975	2,055
	2% Strain		300	500	450	450	670	670	685
	5% Strain		635	960	920	920	1,360	1,360	1,370
Strain @ Ultimate Tensile Strength		ASTM D 6637	10%	10%	10%	10%	10%	10%	10%
Secant Modulus @ (lb./ft.)	2% Strain		11,995	18,506	14,000	14,000	20,500	20,500	29,000
	5% Strain		9,596	14,092	11,600	11,600	16,200	16,200	27,400
	10% Strain		———	———	———	———	———	———	———
Junction Strength (lb./ft.)		GRI : GG2	90%	90%	93%	93%	93%	93%	93%
Soil-Geosynthetic Friction		ASTM D 6706	———	0.95	0.90	0.90	0.90	0.90	0.90
Creep Resistance-T_{creep} (lb./ft.)		ASTM D 5262	250	420	180/280	180/280	255/555	255/555	470/575
Creep Reduction Factor (T_{ult} / T_{creep})			3.5	3.27	2.07	2.07	1.61	1.61	2.09
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.10	1.10	1.10
	Limestone		1.43	1.35	1.35	1.35	1.35	1.35	1.35
Durability (RF_d)	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1	1.1
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Joint Strength (RF_j)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	———	———	———	———	———	———	———
	Overlap *	ASTM D 6706	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Approved Application Usage			3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5	3, 4, 5

Approved Application Usage:
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient
* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS (EXTRUDED GEOGRID) APPLICATION AND PROPERTIES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	LJ	Changed Required Test Method for Burst Strength, Soil-Geosynthetic Friction, Creep Reduction Factor, and Overlap Joint Strength.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

##STANDARD YEAR##

GEOSYNTHETIC REINFORCED SOILS

#Label1# #Label2# 07/01/08

Sheet No. 8 of 9

Index No. 501

TABLE OF EXTRUDED GEOGRID VALUES

PROPERTY		REQUIRED TEST METHOD	TENSAR UX 1400 HS UX 1400 MSE UX MESA 3	TENSAR UX 1500 HS UX 1500 MSE UX MESA 4	TENSAR UX 1600 HS UX 1600 MSE UX MESA 5	TENSAR UX 1700 HS UX 1700 MSE UX MESA 6	TENAX MS 220	TENAX MS 330
UV Stability (Min. Retained Strength @ 500 hr.)		ASTM D 4355	90%	90%	90%	90%	85%	85%
Tensile Strength (lb./ft.)		ASTM D 6637						
Machine Direction	Ultimate (T_{ult})		4,790	7810	9,860	11,980	925	1,370
	2% Strain		1,100	1,850	2,330	2,740	300	418
	5% Strain		2,130	3,560	3,980	5,140	615	925
Cross Direction	Ultimate		———	———	———	———	1,400	2,100
	2% Strain		———	———	———	———	445	616
	5% Strain		———	———	———	———	890	1,340
Strain @ Ultimate Tensile Strength		ASTM D 6637	10%	10%	10%	10%	12%	12%
Secant Modulus @ (lb./ft.)	2% Strain		55,000	92,500	116,500	137,000	15,000	20,900
	5% Strain		42,600	71,200	79,600	102,800	12,330	18,500
	10% Strain		———	———	———	———	———	———
Junction Strength (lb./ft.)		GRI : GG2	90%	90%	90%	90%	835	1,230
Soil-Geosynthetic Friction		ASTM D 6706	0.462	0.462	0.462	0.462	———	———
Creep Resistance-T_{creep} (lb./ft.)		ASTM D 5262	1,970	3,000	3,960	4,975	———	———
Creep Reduction Factor (T_{ult}/T_{creep})			2.43	2.60	2.49	2.41	3.5	3.5
Installation Damage (RF_c)	Sand	GRI : GG4 & GT7	1.10	1.10	1.10	1.10	1.1	1.1
	Limestone		1.20	1.20	1.20	1.20	1.1	1.1
Durability (RF_d)	Chemical	ASTM D 5322	1.1	1.1	1.1	1.1	1.1	1.1
	Biological	ASTM D1987, D3083, G21 & G22	1.0	1.0	1.0	1.0	1.0	1.0
Joint Strength (RF_j)	Mechanical	ASTM D 6637, GRI : GG4 & GT7	1.0	1.0	1.0	1.0	1.0	1.0
	Overlap *	ASTM D 6706	1.0	1.0	1.0	1.0	1.0	1.0
Approved Application Usage			3	3	3	3	2, 5	2, 5

Approved Application Usage:
1 = Steepened Slopes
2 = Reinforcement of Foundations over Soft Soils
3 = Both Steepened Slopes & Reinforcement of Foundations over Soft Soils
4 = Reinforced Embankment
5 = Construction Expedient
* Minimum 3' Overlap

APPROVED GEOSYNTHETIC PRODUCTS
(EXTRUDED GEOGRID)
APPLICATION AND PROPERTIES

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	LJ	Changed Required Test Method for Burst Strength, Soil-Geosynthetic Friction, Creep Reduction Factor, and Overlap Joint Strength. Changed Properties for MS220 & TENAX MS 330.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

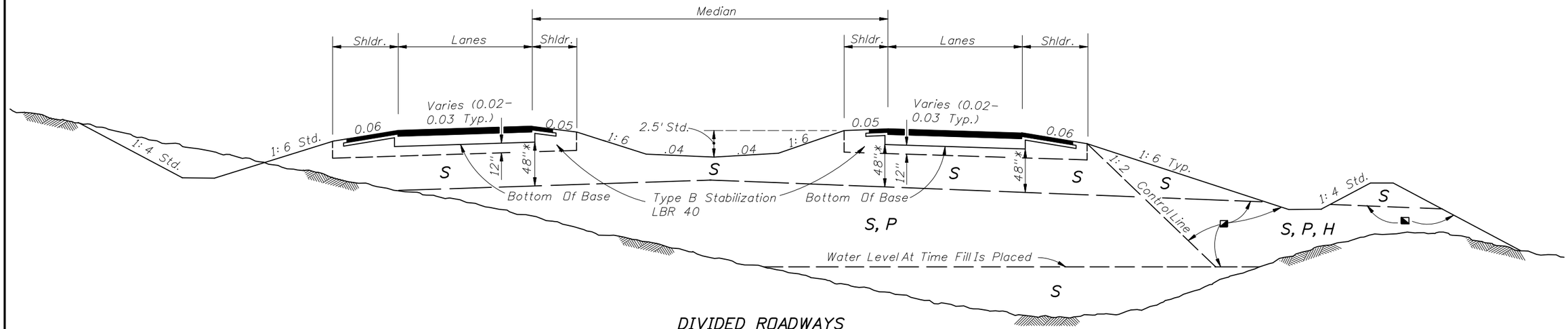
##STANDARD YEAR##

GEOSYNTHETIC REINFORCED SOILS

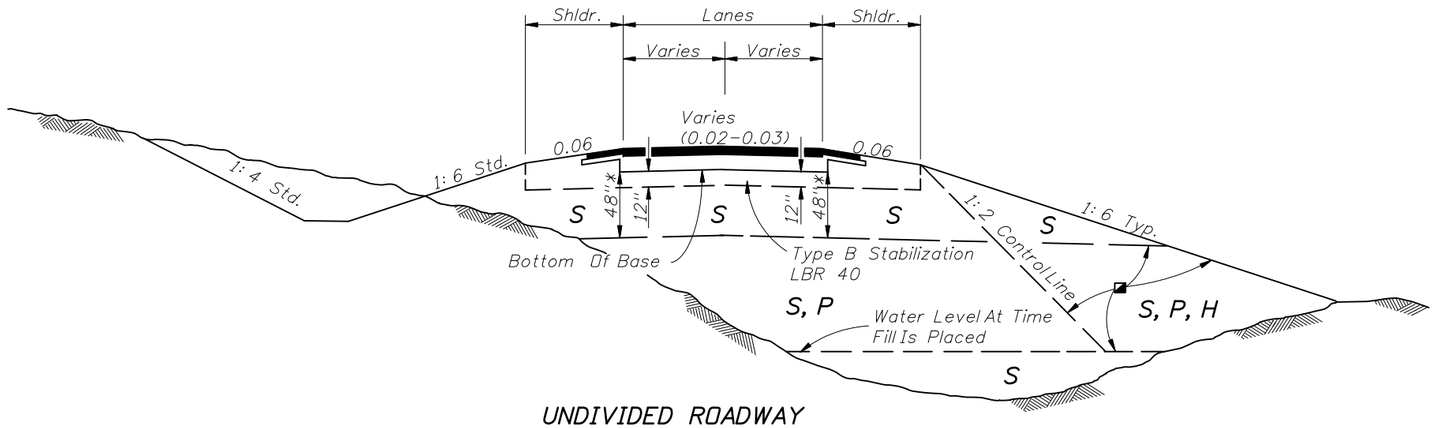
#Label1#
#Label2#
07/01/08

Sheet No. 9 of 9

Index No. 501



DIVIDED ROADWAYS



UNDIVIDED ROADWAY

SYMBOL	SOIL	CLASSIFICATION (AASHTO M 145)
S	Select	A-1, A-3, A-2-4**
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (ALL WITH LL < 50)
H	High Plastic	A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL > 50)
M	Muck	A-8

Classification listed left to right in order of preference.

■ See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.

** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadbed when approved by the District Materials Engineer. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.

* For cut sections this dimension may be reduced to 24"; see Index No. 500.
For minor collectors and local facilities this dimension may be reduced to 18".

FLEXIBLE PAVEMENT

GENERAL NOTES

1. Roadway dimensions are representative. Subgrade dimensions and control lines are standard. The details shown on this Index do not supersede the details shown in the plans or on Index Nos. 500 or 506.

2. Plastic (P) soils may be placed above the existing water level (at the time of construction) to within 4 feet of the proposed base. It should be placed uniformly in the lower portion of the embankment for some distance along the project rather than full depth for short distances.

3. High Plastic (H) soils excavated within the project limits may be used in embankment construction as indicated on this index. High Plastic soils are not to be used for embankment construction when obtained from outside the project limits.

4. Select (S) soils having an average organic content of more than two and one-half (2.5) percent, or having an individual test value which exceeds four (4) percent, shall not be used in the subgrade portion of the roadbed.
Select (S), Plastic (P), or High Plastic (H) soils having an average organic content of more than five (5) percent, or an organic content individual test result which exceeds seven (7) percent, shall not be used in the portion of embankment inside the control line, unless written authorization is provided by the District Geotechnical Engineer; these soils may be used for embankment construction outside the control line, unless restricted by the plans or otherwise specified in the plans, provided they can be compacted sufficiently to sustain a drivable surface for operational vehicles as approved by the Engineer. Average organic content shall be determined from the test results from a minimum of three randomly selected samples from each stratum or stockpile of a particular material. Tests shall be performed in accordance with AASHTO T 267 on the portion of a sample passing the No. 4 sieve.

5. Highly organic soils, composed primarily of partially decayed organic matter, often dark brown or black in color with an odor of decay, and sometimes fibrous, shall be designated as muck. Further, any stratum or stockpile of soil which contains pockets of highly organic material may be designated as Muck (M). Highly organic soils shall not be used within the subgrade or embankment portion of the roadbed, with the exception of muck used as a supplement to construct a finish soil layer as described in Section 162 of the FDOT Standard Specifications.

DESIGN NOTES

1. The designer shall take into consideration the expectancy of roadway widening to the outside, and where widening is anticipated, specify in the plans the location of the future widening control line for utilization of High Plastic (H) soils and/or soils classified as organic material in the embankment.

2. The designer shall take into consideration the position of the drainage swales in the portion of the embankment where Plastic (P) soils, High Plastic (H) soils, or soils classified as organic material would be allowed. The designer shall limit the use of Plastic (P) soils, High Plastic (H) soils, and/or soils classified as organic material to locations that will not inhibit the infiltration of stormwater from the swales.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	MPT	Change sheet number.			

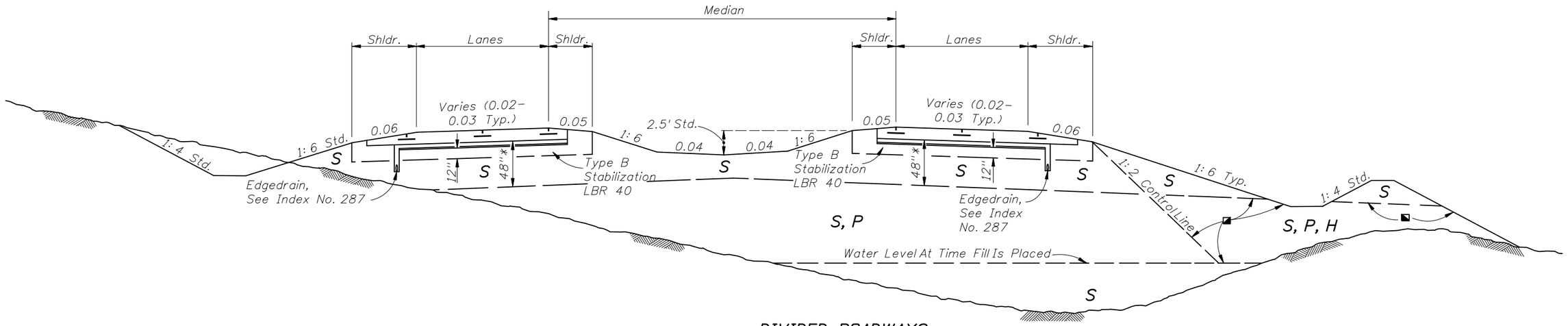
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

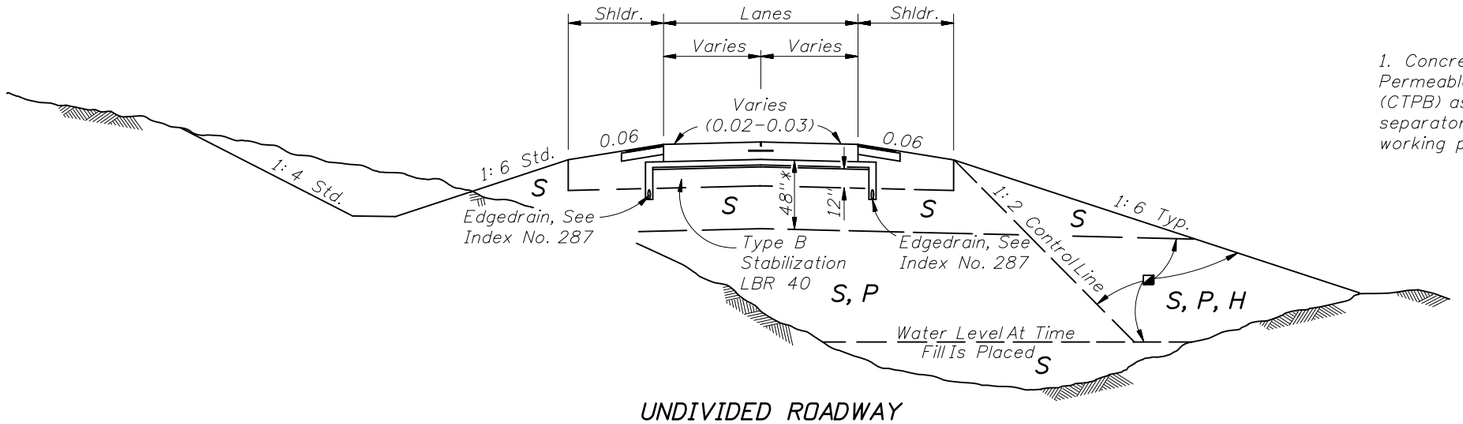
EMBANKMENT UTILIZATION

Interim Date 01/01/08

Index No. 505



DIVIDED ROADWAYS



UNDIVIDED ROADWAY

DESIGN NOTE

1. Concrete pavement is to be placed over 4" of Asphalt Treated Permeable Base (ATPB) or Cement Treated Permeable Base (CTPB) as identified in the plans. This will be placed on a separator layer using 2" Type SP. This will be placed on a working platform using 12" of Type B Stabilization.

SYMBOL	SOIL	CLASSIFICATION (AASHTO M 145)
S	Select	A-1, A-3, A-2-4**
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (ALL WITH LL < 50)
H	High Plastic	A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL > 50)
M	Muck	A-8

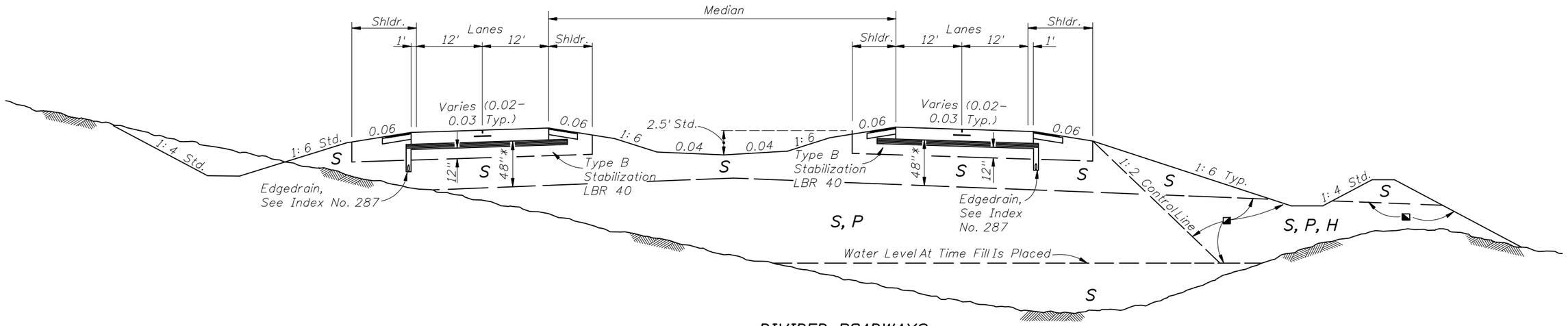
Classification listed left to right in order of preference.

■ See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.

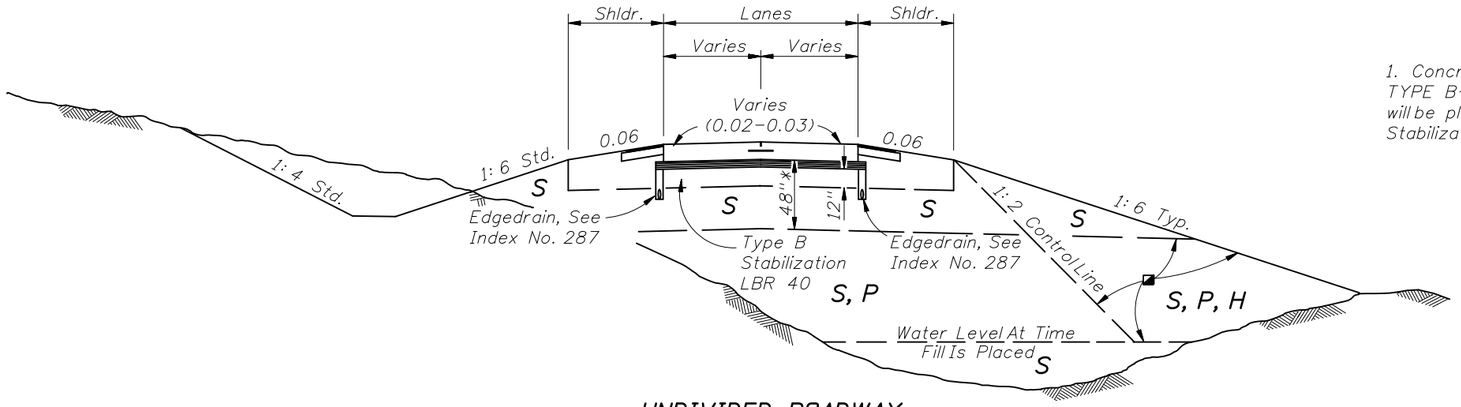
** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadbed when approved by the District Materials Engineer. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.

* For cut sections this dimension may be reduced to 24"; see Index No. 500.
For minor collectors and local facilities this dimension may be reduced to 18".

RIGID PAVEMENT - TREATED PERMEABLE BASE OPTION



DIVIDED ROADWAYS



UNDIVIDED ROADWAY

DESIGN NOTE

1. Concrete pavement is to be placed over Optional Base Group 1 TYPE B-12.5 Only Asphalt Base as identified in the plans. This will be placed on a working platform using 12" of Type B Stabilization.

SYMBOL	SOIL	CLASSIFICATION (AASHTO M 145)
S	Select	A-1, A-3, A-2-4**
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (ALL WITH LL < 50)
H	High Plastic	A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL > 50)
M	Muck	A-8

Classification listed left to right in order of preference.

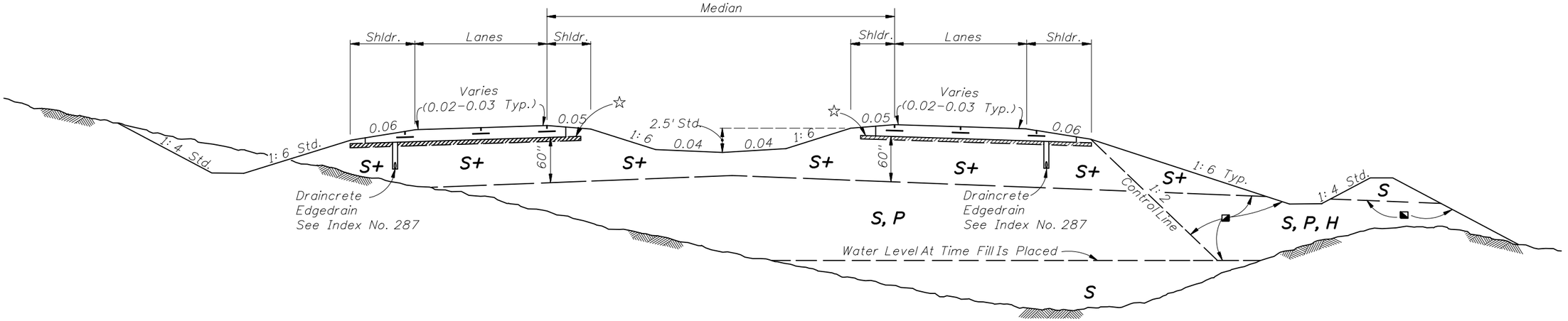
■ See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.

** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. They may be used in the subgrade portion of the roadbed when approved by the District Materials Engineer. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.

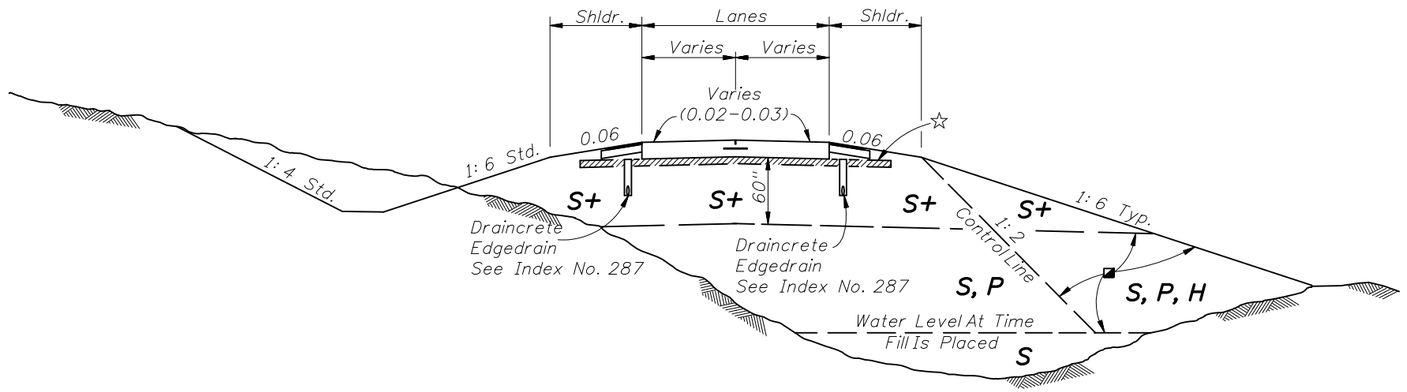
* For cut sections this dimension may be reduced to 24"; see Index No. 500. For minor collectors and local facilities this dimension may be reduced to 18".

RIGID PAVEMENT - ASPHALT BASE OPTION

REVISIONS						2008 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	EMBANKMENT UTILIZATION	01/01/08	3 of 4
01/01/08	MTP	New Sheet.					Index No. 505	



DIVIDED ROADWAYS



UNDIVIDED ROADWAY

SYMBOL	SOIL	CLASSIFICATION (AASHTO M 145)
S	Select	A-1, A-3, A-2-4**
S+	Special Select	A-3 *** With Minimum Average Lab Permeability of 5x10 $^{-5}$cm/sec. (0.14 ft./day) as per FM 1-T215
P	Plastic	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7 (ALL WITH LL<50)
H	High Plastic	A-2-5, A-2-7, A-5 Or A-7 (ALL WITH LL>50)
M	Muck	A-8

Classification listed left to right in order of preference.

◪ See General Notes Nos. 4 & 5 for utilization of soils classified as organic material or muck.

*** When allowed by the plans, some types of A-2-4 material may be approved in writing by the District Materials Engineer. This material must meet the minimum lab permeability requirement, be nonplastic, and not exceed 12% passing the No. 200 U.S. Standard sieve.

** Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and compact. They should be used in the embankment above the water level existing at time of construction. A-2-4 material placed below the existing water level must be nonplastic and contain less than 15% passing the No. 200 U.S. Standard sieve.

☆ 3" of #57 or #89 Coarse Aggregate Mixed Into Top 6".

Note: SPECIAL SELECT SOIL OPTION may be used only when approved in writing by the District Materials Engineer and shown in the plans.

RIGID PAVEMENT - SPECIAL SELECT SOIL OPTION

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	MTP	Changed sheet number.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

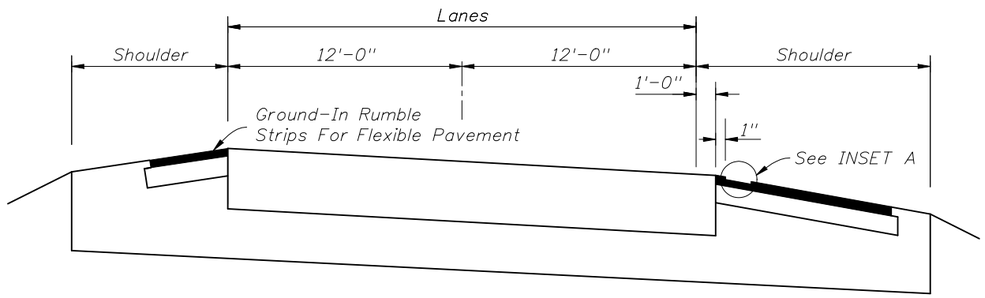
2008 Interim Design Standard

EMBANKMENT UTILIZATION

Interim Date 01/01/08

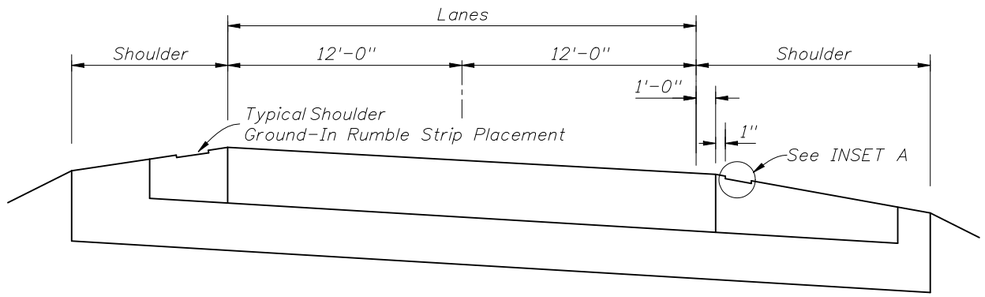
Sheet No. 4 of 4

Index No. 505



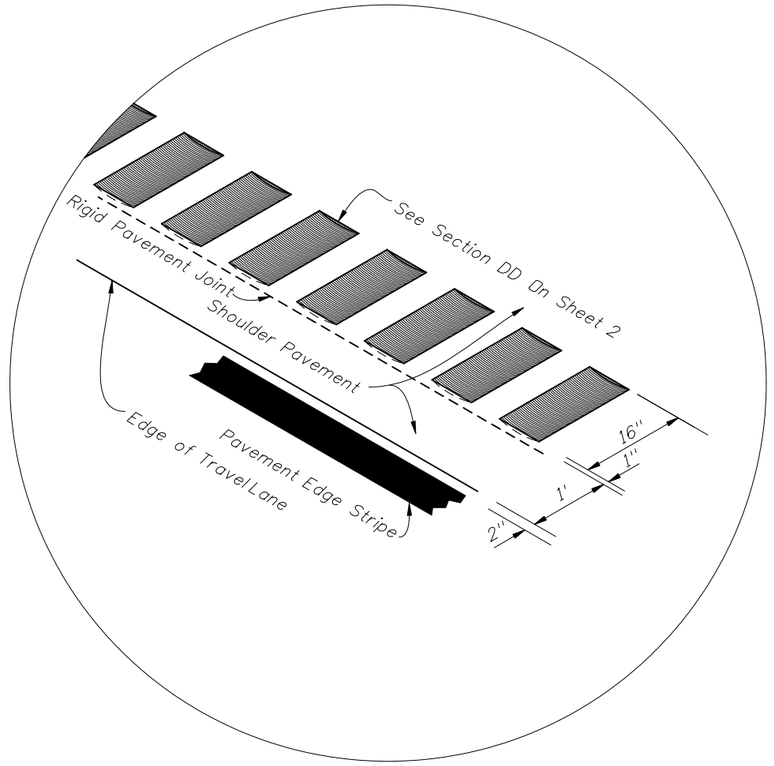
NTS

RIGID PAVEMENT WITH FLEXIBLE PAVEMENT SHOULDER



NTS

RIGID PAVEMENT WITH RIGID PAVEMENT SHOULDER



ISOMETRIC - LONGITUDINAL CUT

INSET A

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/19/07	HSD	Revised width of rigid pavement outside travellane and changed location of rumble strip.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

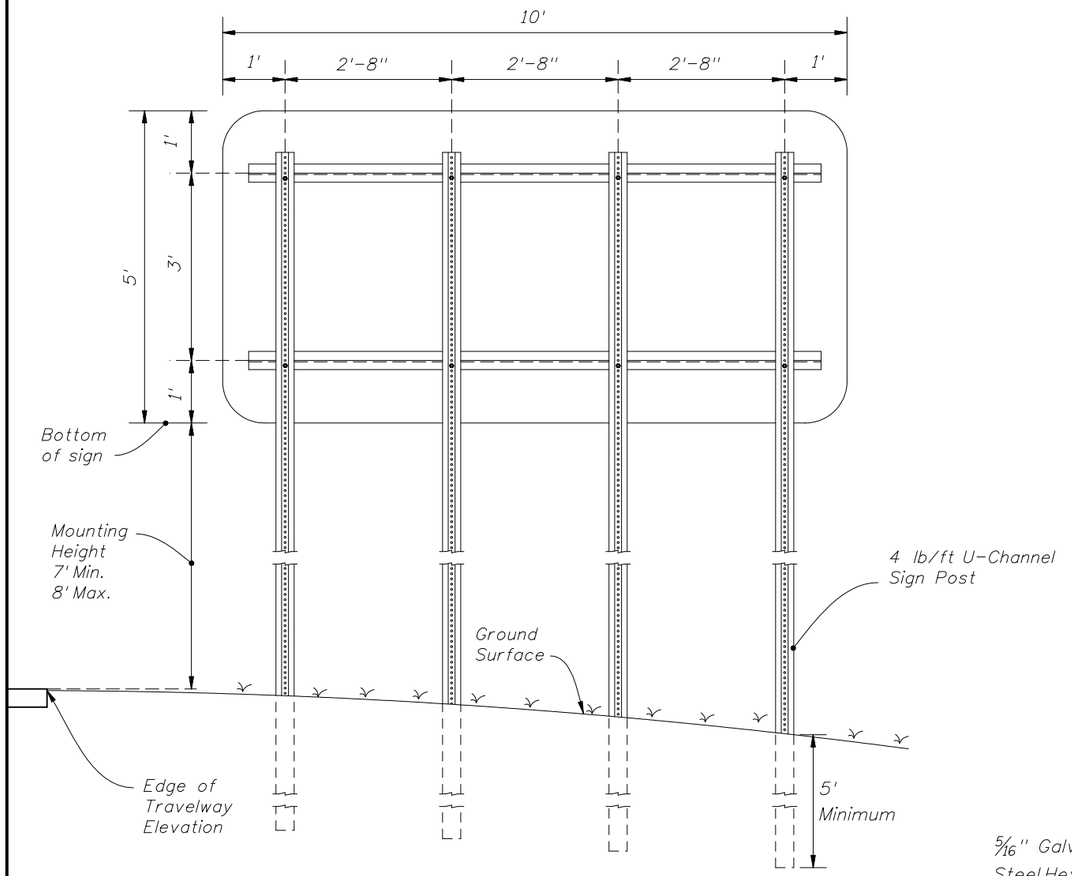
2008 Interim Design Standard

RUMBLE STRIPS

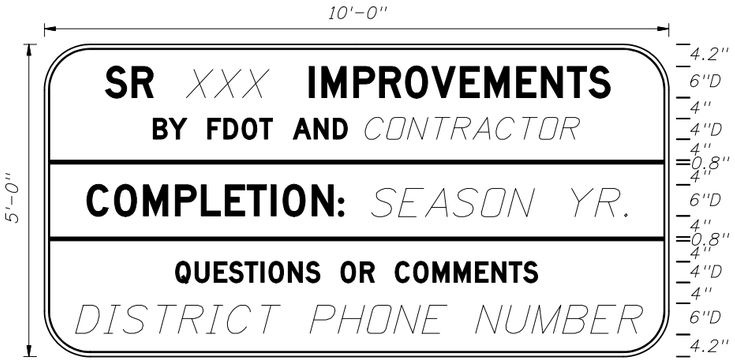
Interim Date 01/01/08

Sheet No. 3 of 3

Index No. 518

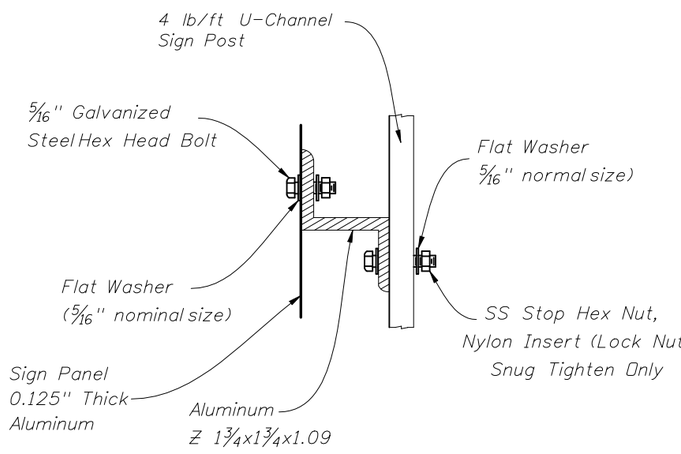


4 POST SIGN SUPPORT MOUNTING DETAIL

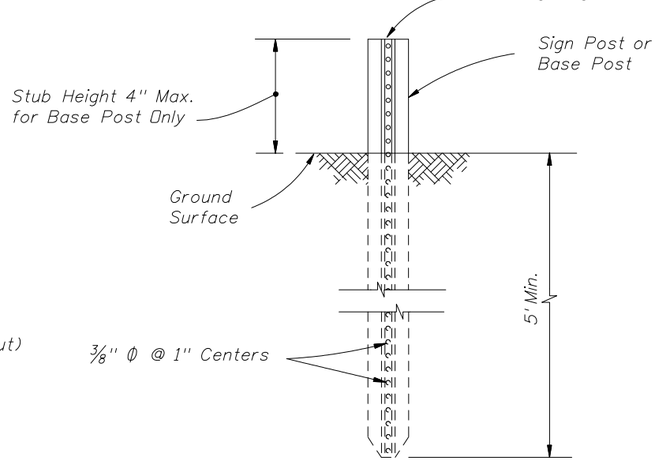


	10'-0"X 5'-0"
BORDER	8" Radii
R=8"	4" and 6" series D Legend
TH=0.25"	Blue Background
IN=0.75"	White Legend and Border

PROJECT INFORMATION SIGN DETAIL

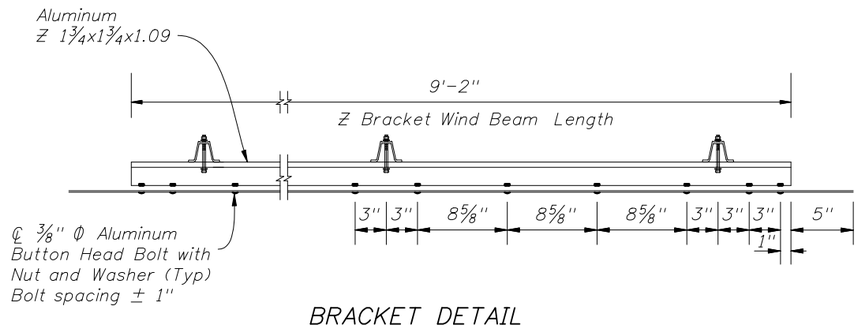


SIGN ATTACHMENT DETAIL



TYPICAL FOUNDATION DETAIL

See QPL for post, splice and connection details.
No bolts installed closer than 1" to cutting edge.



BRACKET DETAIL

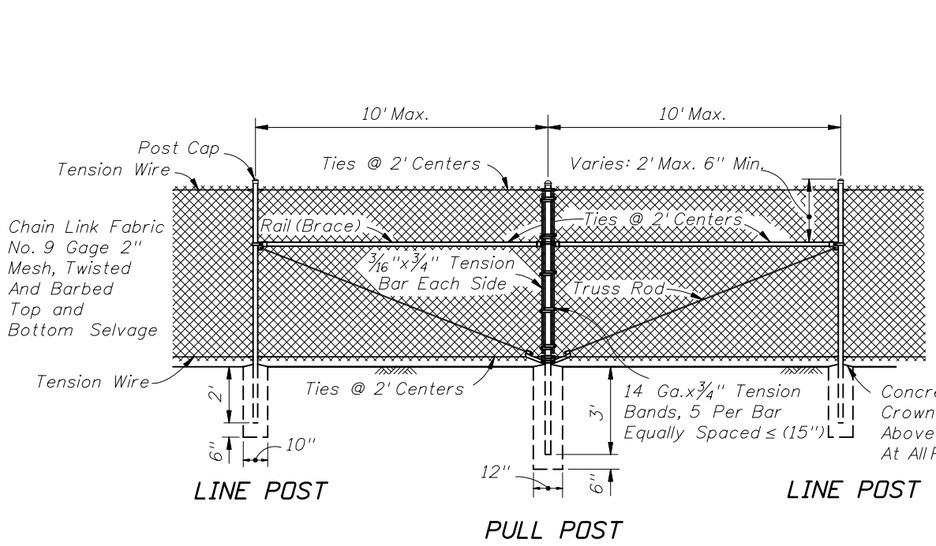
PROJECT INFORMATION SIGN

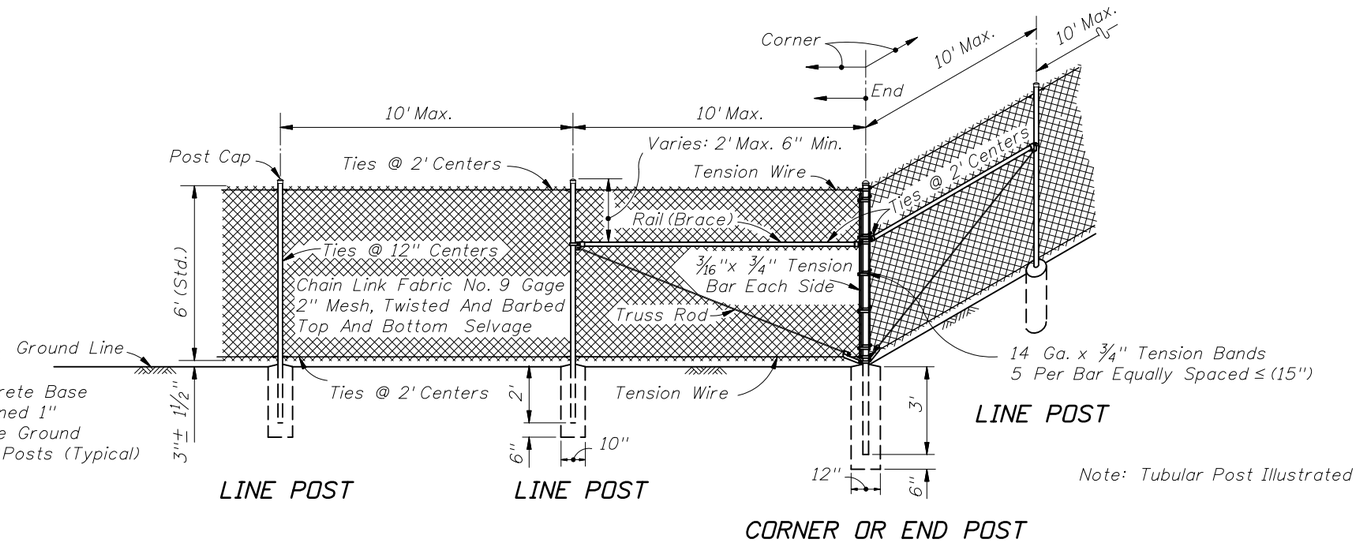
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/07/07	L.W.	New sheet Index 600 13 Of 13 PROJECT INFORMATION SIGN.			

2008 Interim Design Standard

GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

Interim Date	Sheet No.
01/01/08	13 of 13
Index No.	
600	





GENERAL NOTES

1. This fence to be used generally in urban areas.

2. For supplemental information refer to Section 550 of FDOT Standard Specifications.

3. Chain link fabric,post, truss rods, tension wires, tie wires, stretcher bars, gates and all miscellaneous fittings and hardware shall meet the requirements of AASHTO and ASTM signify current reference.

4. Fence Component Options:

A. Line post options:

(1) Galvanized steel pipe, Schedule 40–1½" nominal dia.zinc galvanized at the rate of 1.8 oz./ft².: ASTM A53 Table X 2, ASTM F1083, and AASHTO M111.
(2) Aluminum coated steel pipe: ASTM A53, X 2 Tables Schedule 40; 1½" nominal dia., 1.90" OD; coated at the rate 0.40 oz./ft.: AASHTO M111.
(3) Aluminum alloy pipe– 2" nominal dia.: ASTM B241 or B221, Alloy 6063, T6.
(4) Steel H–Beam– 1⅞"x 1⅝": Zinc Galv. 1.8 oz./ft.: AASHTO M111 and Detail.
(5) Aluminum alloy H–Beam– 1⅞"X 1⅝" Detail.
(6) Steel C– 1⅞"X 1⅝": Galv.: 1.8 oz/ft. zinc: AASHTO M111; OR , 0.9 oz./ft². zinc–5% aluminum–mischmetal: ASTM F1043 and Detail.
(7) Resistance welded steel pipe; 50,000 psi min. yeild strength ASTM A569/A569M, A653/A653M or undepleted stock of discontinued A446/A446M base materials; ASTM F669 Group IV (Alternative Design); fence industry 2" OD, 1½" NPS, 1.900" dec. equiv., 0.120" min. wall thick. and min. wt. 228 lb./ft.; with ASTM F1043 metric equivalent internal coating Types A, B, C or D and external coating Types A, B, or C; the chromate conversion coating of external Type B shall have a thickness of 15μg/in². min. and the polymer film topcoat shall have a thickness of 0.0003" min.; internal and external coatings are not restricted to the combinations of Table 2, ASTM F1043.

B.Corner, end, and pull post options:

(1) Galvanized steel pipe, Schedule 40– 2" nominal dia. zinc galvanized at the rate of 1.8 oz./ft².: ASTM A53 Table X 2, ASTM F1083, and AASHTO M111.
(2) Aluminum coated steel pipe; ASTM A53 steel, X 2 Tables Schedule 40; 2" nominal dia., 2.375" OD; coated at the rate 0.40 oz./ft.: AASHTO M111.
(3) Aluminum alloy pipe– 2½" nominal dia.: ASTM B241 or B221, Alloy 6063,T6.
(4) Resistance welded steel pipe; 50,000 psi min. yield strength ASTM A569/A569M, A653/A653M or undepleted stock of discontinued A446/A446M base materials; ASTM F669 Group IV (Alternative Design); fence industry 2½" OD, 2" NPS, 2.375" dec. equiv., 0.130"min. wall thick. and min. wt. 3.117 lb./ft.; with ASTM F1043 metric equivalent internal coating Types A, B, C or D and external coating Types A, B, or C; the chromate conversion coating of external Type B shall have a thickness of 15μg/in². min. and the polymer film topcoat shall have a thickness of 0.0003" min.; internal and external coatings are not restricted to the combinations of Table 2, ASTM F1043.

C. Rail options:

(1) Galvanized steel pipe, Schedule 40– 1¼" nominal dia. zinc galvanized at the rate of 1.8 oz./ft².: ASTM A53 Table X 2, ASTM F1083, and AASHTO M111.
(2) Aluminum coated steel pipe; ASTM A53 steel, X 2 Tables Schedule 40; 1¼" nominal dia., 1.660" OD; coated at the rate 0.40 oz./ft.: AASHTO M111.
(3) Aluminum alloy pipe– 1¼" nominal dia.: ASTM B241 or B221, Alloy 6063, T6.
(4) Resistance welded steel pipe; 50,000 psi min. yeild strength ASTM A569/A569M, A653/A653M or undepleted stock of discontinued A446/A446M base materials; ASTM F669 Group IV (Alternative Design); fence industry 1⅝" OD, 1¼" NPS, 1.660" dec. equiv., 0.111" min. wall thick. and min. wt. 1.836 lb./ft.; with ASTM F1043 metric equivalent internal coating Types A, B, C or D and external coating Types A, B, or C; the chromate conversion coating of external Type B shall have a thickness of 15μg/in². min. and the polymer film topcoat shall have a thickness of 0.0003" min.; internal and external coatings are not restricted to the combinations of Table 2, ASTM F1043.

D. Chain link fabric options (2" mesh with twisted and barbed selvage top and bottom for all options except as described in Note No. 10):

(1) AASHTO M181 Type I – Zinc Coated Steel, No. 9 gage (coated wire diameter), coated at the rate of 1.8 oz/ft². (M181 Class D 2.0 oz./ft². modified to 1.8 oz./ft².).
(2) AASHTO M181 Type II –Aluminum Coated Steel, No. 9 gage (coated wire diameter), coated at the rate of 0.40 oz./ft².
(3) AASHTO M181 TypeIV– Polyvinyl Chloride (PVC) Coated Steel, No. 9 guage (coated core wire diameter), core wire–zinc coated steel. PVC coating: M181 Class A (either extruded or extruded and bonded) or Class B (bonded). See table right. Unless the plans call for M181 standard colors medium green, dark green or black the coating color shall be soft gray matching that of No. 36622 of Federal Standard 595a.

E. Tension wire options:

(1) Steel wire No. 7 gage zinc galvanized at the rate of 1.2 oz./ft².: AASHTO M181.
(2) Aluminum alloy wire with a diameter of 0.1875" or larger conforming to the requirements of ASTM B211, Alloy 5056 Temper H38, or, Alclad Alloy 5056 Temper H192.
(3) Aluminum coated steel wire No.7 gage coated at the rate of 0.040 oz./ft².: AASHTO M181.

F. Tie wire and hog ring operations:

(1) Street wire No.9 gage zinc galvanized at the rate of 1.2 oz./ft².
(2) Aluminum alloy wire with a diameter of 0.1443" or larger conforming to the requirements of ASTM B211, Alloy 5056 Temper H38, or, Alclad Alloy 5056 Temper H192.
(3) Aluminum coated steel wire No. 7 gage coated at the rate of 0.040 oz./ft².

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
05/24/07	L.W.	Changed 3" dimension at bottom of fence to 3"± 1½". Note 7 and 7b were revised. Sheet notes rearranged.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

FENCE TYPE B

Interim Date 01/01/08

Sheet No. 1 of 3

Index No. 802

GENERAL NOTES CONTINUED

5. Unless a specific material is called for in the plans the Contractor may elect to use either a single type of material or a combination of material types from the component options listed in note 4. Combinations of optional materials are restricted as follows:
   (a) Only one fabric optional material will be permitted betweencorner and/or end post assemblies.
   (b) Only one line post optional material will be permitted between corner and/or end post assemblies.
   (c) Pull post assemblies shall be optional materials identical to either the linepost optional material or the corner and end post assembly optional material; but, pull post assemblies shall be the same optional material between any set of corner and/or end post assemblies.

6. Concrete for bases shall be Class I concrete as specified in Section 347 of the Standard Specifications or a packaged, dry material meeting the requirements of a concrete under ASTM C-387. Materials for Class I concrete may be proportioned by volume and/or by weight.

7. Line post shall be 8'-6" long (Standard). Line post are to be set in concrete as described above or by the following methods:
   (a) In accordance with special details and/or as specifically described in the contract plans and specifications.
   (b) In accordance with ASTM F567 Subsections 5.4 through 5.10 as approved by the Engineer. Line post installed in accordance with Section 5.8 shall be 9'-6" long.
   (c) Post mounted on concrete structure or solid rock shall be mounted in accordance with the base plate detail "Fence Mounting On Concrete Endwalls And Retaining Wall", Sheet 3; or, by embedment in accordance with ASTM F567 Subsection 5.5.

   End, pull and corner post assemblies shall be in concrete as detailed above for all soil conditions other than solid rock. Post within assemblies that are located on concrete structures or solid rock shall be set by base plate or by embedment as prescribed under (b) above for line post.

   Line and assembly post set in concrete bases shall be set an additional 3" in depth for each 1' of fence height greater than 6'.

8. Pull post shall be used at breaks in vertical grades of 15° or more, or at approximately 350' centers except that this maximum interval may be reduced by the Engineer on curves where the curve is greater than 3°.

9. Corner post are to be installed at all horizontal breaks in fence at 15° or more and as required at vertical breaks over 15° as determined by the Engineer.

10. When fence has an installed top of fabric height less than 6' knuckled top and bottom selvages shall be used unless the plans specifically identify locations for twisted selvage fabrics.

11. Unless sliding gates or special gates are called for in the plans, all gates shall be chain link swing gates meeting the material requirements described and as approved by the Engineer. Payment shall include the gates, single or double, all necessary hardware for installation and any additional length and/or size for posts at the opening. Gates shall be paid for under the contract unit price for Fence Gates, EA.

12. For construction purposes corner post assemblies shall consist of one corner post, two braces, two truss rods, and all necessary fittings and hardware as detailed. End post assemblies shall consist of one end post, one brace, one truss rod and all necessary fittings and hardware as detailed.

13. All post, tension wires, chain link fabric, tie wires, Class I concrete, and all miscellaneous fittings and hardware to be included in the cost for Fencing, LF.

TYPE IV VINYL COATED FABRIC								
AASHTO M181 Table 4 Redefined As Follows								
Specified Diameter Of Metallic Coated Core Wire			Minimum Weight Of Zinc Coating		PVC Thickness Range			
					M181 Class A (Extruded Or Extruded And Bonded Coating)		M181 Class B (Bonded Coating)	
in.	mm	gage	oz./ft².	g/m²	in.	mm	in.	mm
0.148	3.77	9	0.30	92	0.015 to 0.025	0.38 to 0.64	0.006 to 0.010	0.15 to 0.25

DESIGN NOTE

This index details fencing that is constructed with chain link fabric 6' (nominal) in height and with specific ground clearance.
For fencing of different height or installation details, the fence shall be fully detailed in the Contract plans.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
05/24/07	L.W.	Index expanded new sheet added.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

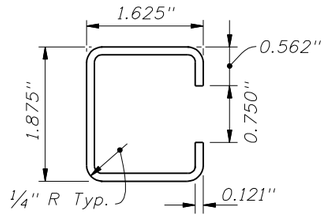
2008 Interim Design Standard

FENCE TYPE B

Interim Date 01/01/08

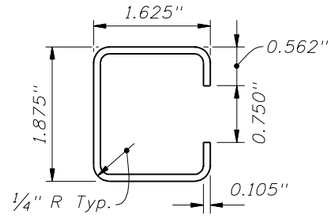
Sheet No. 2 of 3

Index No. 802



Galv. Wt. Per. Ft.= 2.34# ±5%
Yield PSI (Min.) 45,000

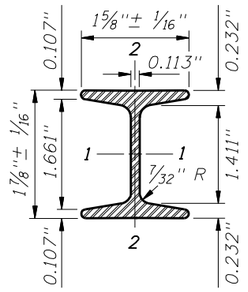
STANDARD WALL



Galv. Wt. Per. Ft.= 1.85# ±5%
Yield PSI (Min.) 45,000

THINWALL

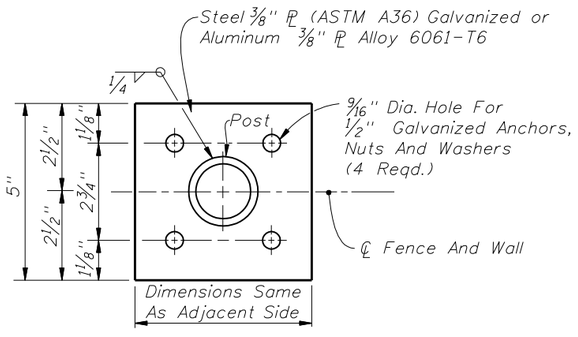
OPTIONAL "C" LINE POST



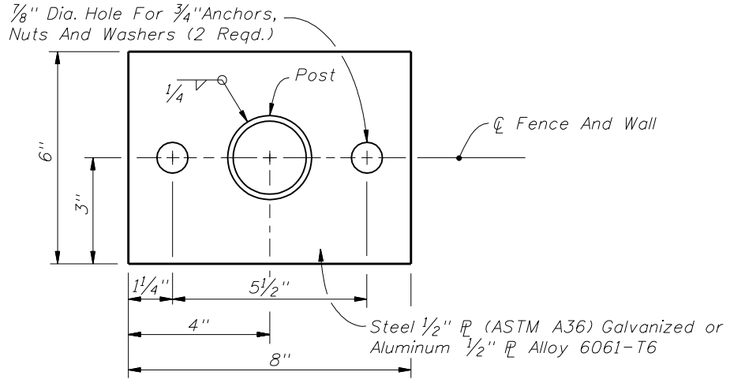
	STEEL	ALUMINUM
Area (Sq. In.)	724	724
Weight (Lb./Ft.)	2.72 ± 5% (Galv.)	0.91 ± 5%
Surface Area (SF/Ft.)	0.776	0.776
Tensile Strength (psi Min.)	80,000	30,000
Yielding Point (psi Min.)	48,000	25,000

	Axes 1-1	Axes 2-2	Axes 1-1	Axes 2-2
Moment Of Inertia	0.428	0.101	0.428	0.101
Section Modulus	0.456	0.124	0.456	0.124
Rad. Of Gyration	0.779	0.373	0.779	0.373

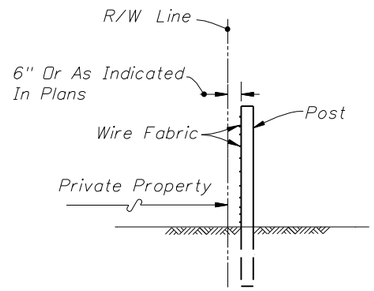
OPTIONAL 1⅞"x 1⅝" H-BEAM LINE POST



TOP VIEW
FOUR ANCHOR PLATE OPTION

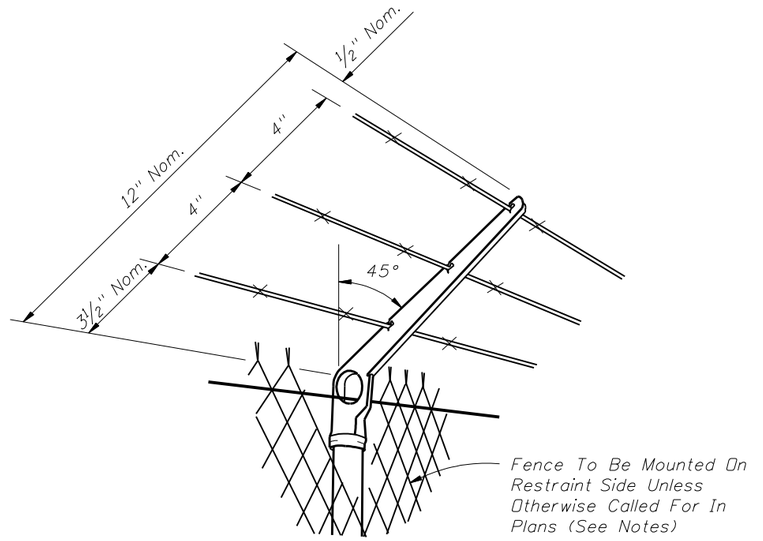


TOP VIEW
TWO ANCHOR PLATE OPTION



FENCE POSITION AT LOCATIONS WITHOUT FRONTAGE ROADS

(REFER TO DETAIL PLANS FOR FENCE POSITION AT LOCATIONS WITH FRONTAGE ROADS)



NOTES

Attachments to be used only when called for in the plans. Attachments to extend in direction of restraint. Unless otherwise called for in plans, direction of restraint will be as follows:

(a.) Outward on limited access right of way line.
(b.) Outward on controlled access right of way line.
(c.) Outward from utilities and hazardous facilities located within highway right of way.
(d.) Outward from lateral ditches, outfalls, retention basins, canals, borrow areas and similar support facilities.
(e.) Inward on pedestrian ways.

The cap-arm shall be designed to provide a drive fit over the top of posts and to exclude moisture in posts with tubular sections.

BARB WIRE ATTACHMENT

BASE PLATE AND ANCHOR NOTES:

1. Base plate identical for line, pull, end and corner posts and shall be considered an integral part of the respective posts for basis of payment.

2. Post to be plumbed by grout shim under base plate.

3. Anchors (Galvanized Steel):
   12" Cast In Place, 10½" Embedment:
   Headed Bolts, U-Bolts or Cluster Plates.
   8" Adhesive Anchors, 6" Min. Embedment.*
   *Adhesive anchors shall be headless anchor bolts set in drilled holes with an Adhesive Material System in accordance with Specification Sections 416 and 937: drilled holes shall be ⅛" larger in diameter than the anchor bolt.
   Expansion Bolts Not Permitted.

FENCE MOUNTING ON CONCRETE ENDWALL AND RETAINING WALLS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
05/24/07	L.W.	Index expanded sheet 3 added.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

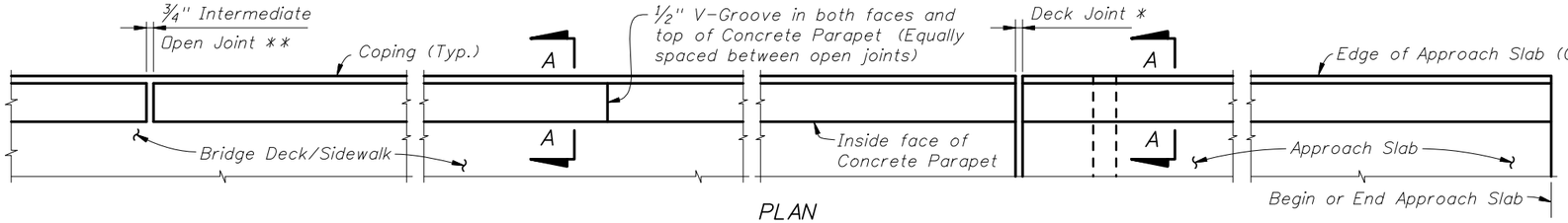
2008 Interim Design Standard

FENCE TYPE B

Interim Date 01/01/08

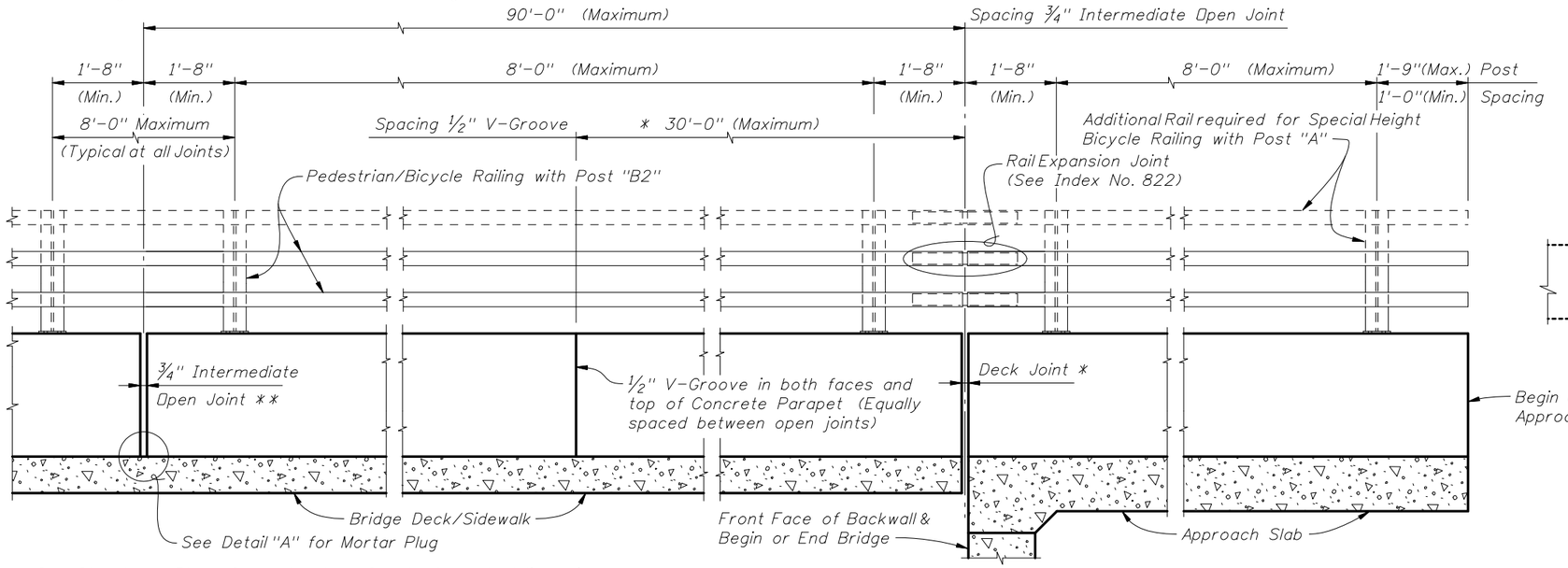
Sheet No. 3 of 3

Index No. 802



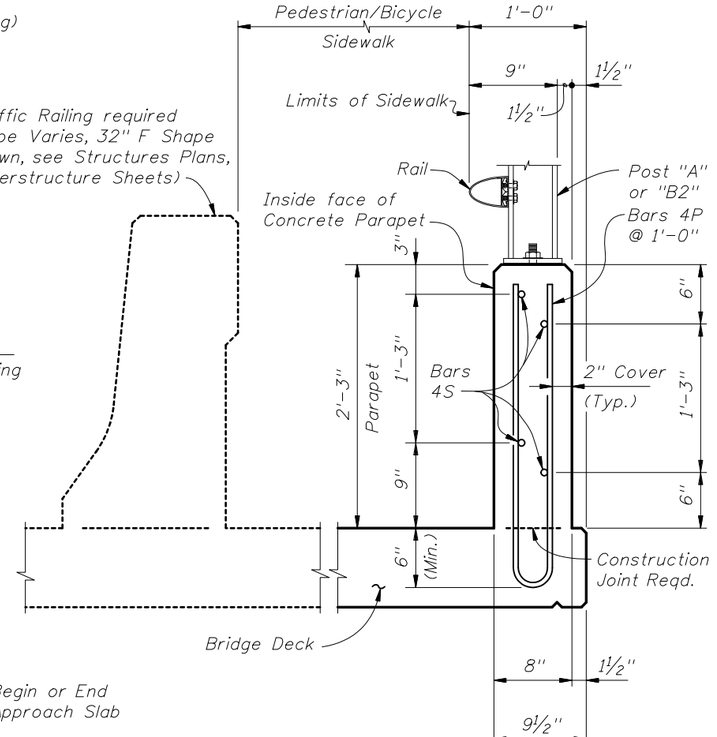
PLAN
(Rails, Posts & Reinforcing Steel not shown for clarity)

** ¾" Intermediate Open Joints shall be provided at locations coinciding with ¾" Joints for the Traffic Railing.



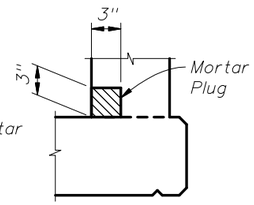
* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Parapet Joints at Deck Expansion Joint locations shall match the dimension of the Deck Joint. For treatment of Railings on skewed bridges see Index No. 490. Deck Joint at Begin Bridge or End Bridge shown.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

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)



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)

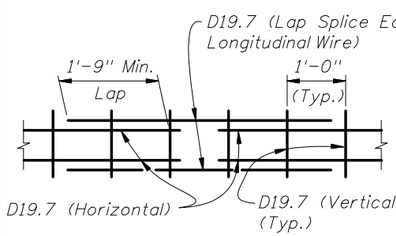
NOTE:
At Intermediate Open Joints, the lower 3" portion of the open joint shall be plugged by filling it with mortar in accordance with Section 400 of the Specifications.



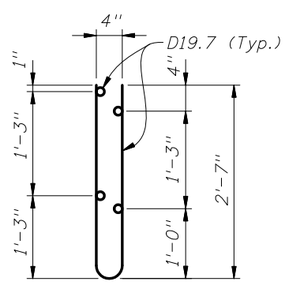
DETAIL "A" - SECTION
AT INTERMEDIATE OPEN JOINT

ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS

NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4¾" are not permitted.



SPLICE DETAIL
(Between WWR Sections)

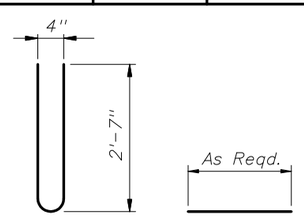


WELDED WIRE REINFORCEMENT
(WWR)

CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

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



BAR 4P BAR 4S

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:

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 may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
5. 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.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed Top Rail to Special Height Bicycle Railing and added new Post "B2" designation in Elevation and Section A-A.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

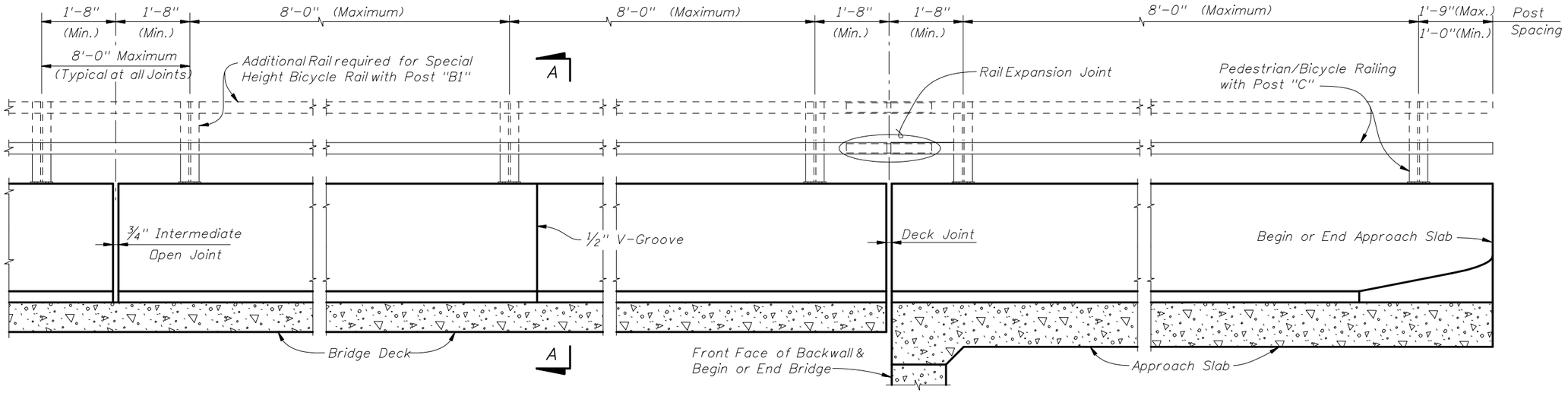
2008 Interim Design Standard

PEDESTRIAN/BICYCLE RAILING

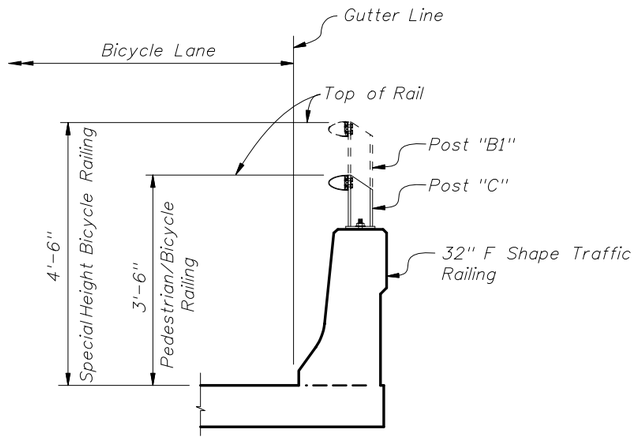
Interim Date 01/01/08

Sheet No. 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.

INSTRUCTIONS TO DESIGNER:
This railing is intended for use when a Bicycle Lane is required and a raised pedestrian sidewalk is not provided. See Index No. 422 and 423 for railings on a raised pedestrian sidewalk.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed Top Rail to Special Height Bicycle Railing and added new Post "B1" and "C" designation in Elevation and Section A-A and NOTES. Added dimension to Section A-A and INSTRUCTIONS TO DESIGNER.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

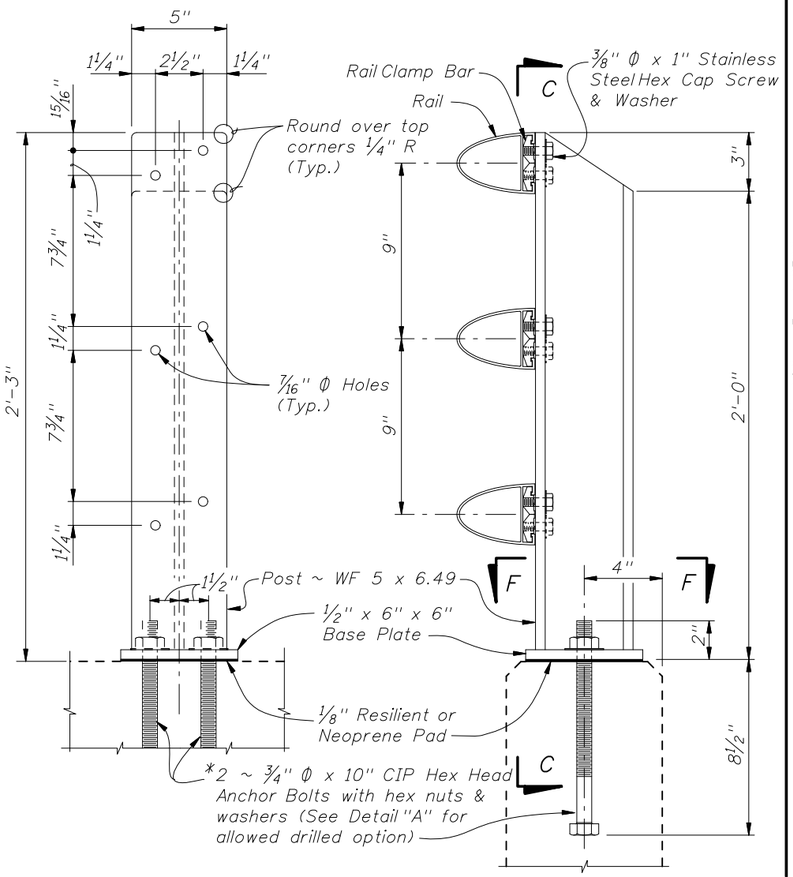
2008 Interim Design Standard

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

Interim Date: 01/01/08

Sheet No.: 1 of 1

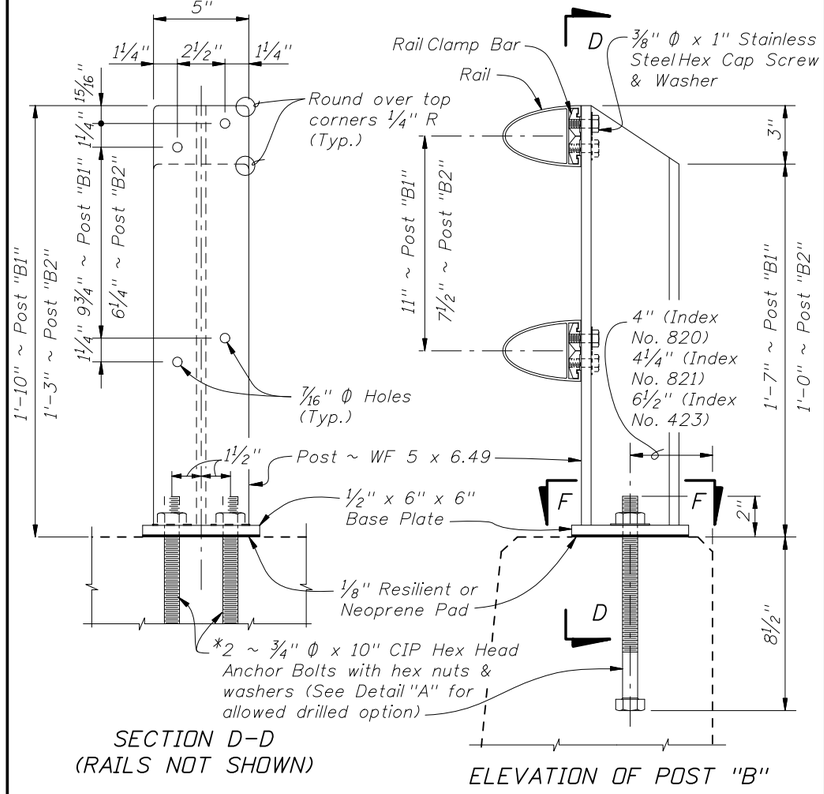
Index No.: 821



SECTION C-C
(RAILS NOT SHOWN)

ELEVATION
OF POST "A"

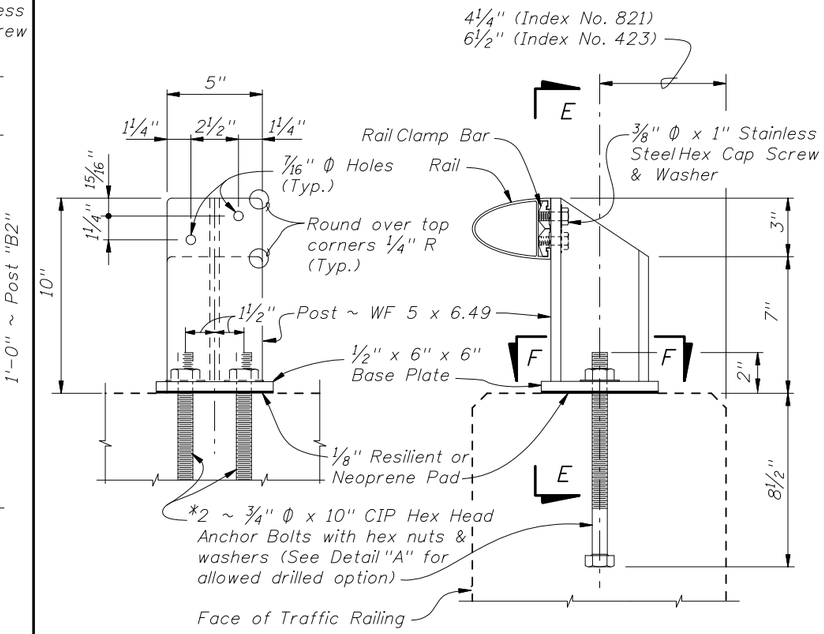
POST "A" DETAILS FOR SPECIAL HEIGHT BICYCLE RAILING ON CONCRETE PARAPET (INDEX NO. 820)



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)

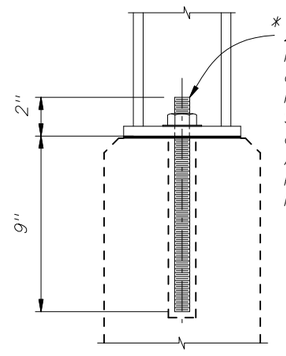


SECTION E-E
(RAIL NOT SHOWN)

ELEVATION
OF POST "C"

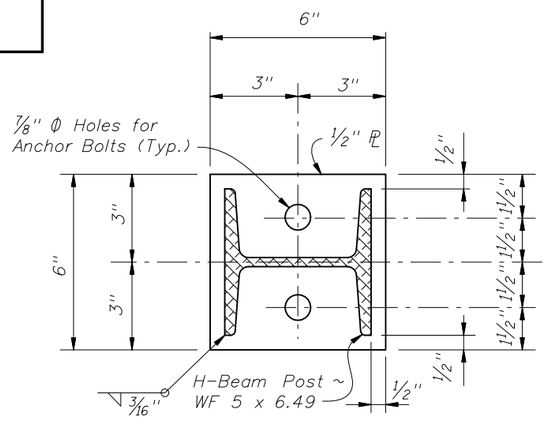
POST "C" DETAILS FOR PEDESTRIAN/BICYCLE RAILING ON TRAFFIC RAILINGS (INDEX NO. 423 AND 821)

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.

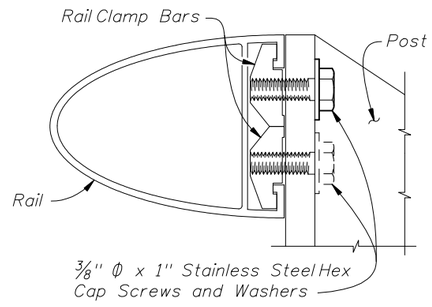


* 2 ~ ¾" Ø x 11" Anchor Bolts threaded full length with hex nuts and washers set in drilled holes (diameter per manufacturer's recommendation) with an Adhesive Bonding System in accordance with Sections 416 and 937 of the Specifications. Expansion Anchors are not permitted. Cutting of reinforcing steel is permitted for drilled hole installation.

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 and Notes see Index No. 822, Sheet 2.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Added Post "B1" and "B2" dimensions to POST "B" DETAILS. Changed Cross References and Title for POST "A" DETAILS, POST "B" DETAILS and POST "C" DETAILS.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

ALUMINUM PEDESTRIAN/BICYCLE BULLET RAILING DETAILS

Interim Date	Sheet No.
01/01/08	1 of 2
Index No.	
822	

NOTES

DESIGN SPECIFICATIONS:

American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Third Edition, 2004, including 75 year Design Life

Florida Department of Transportation (FDOT) "Structures Design Guidelines for Load and Resistance Factor Design", January 2006.

Florida Building Commission "Florida Building Code", 2004 Edition, except for Handrail diameter.

U.S. Access Board "ADA Accessibility Guidelines" July 2004 as adopted with amendments by the USDOT under 49CFR Part 37.

National Fire Protection Association (NFPA) 101, "Life Safety Code", 2003 Edition.

DESIGN LIVE LOADS:

Post and Base Plate: Equivalent point load = 200 lb. load + (50 lb./ft. x Post Spacing (ft.)) applied transversely at top rail connection.

Top & Bottom Rails: 50 lb./ft. uniform load applied simultaneously vertically and transversely + 200 lb. concentrated point load applied at midspan in the directions for both maximum stress and deflection.

Handrails: Maximum of either 50 lb./ft. uniform load applied in any direction or 250 lb. concentrated load applied in any direction at any point along the top.

Pickets: Concentrated 200 lb. load applied transversely over an area of 1.0 square foot.

GEOMETRY:

Clear Opening between Pickets: Shall reject the passage of a 4" diameter sphere below 42" height, and a 8" diameter sphere above 42" height.

Clear Opening under Bottom Rail: Shall reject the passage of a 2" diameter sphere.

ADA Handrail Height: 34"

Standard Pedestrian/Bicycle Railing Height: 42" minimum.

Special Height Bicycle Railing Height: 54" minimum.

DEFLECTION:

Total combined deflection of the railing system including the resilient or neoprene pads, due to the top rail design live loads, shall not exceed 1½" when measured at midspan of the top rail.

APPLICABILITY NOTE TO DESIGNER:

This railing is not applicable for shielding drop-off hazards for vehicular traffic. This railing is applicable for all cases where a pedestrian or bicyclist drop-off hazard exceeds 2'-6" or when a drop-off hazard is less than 2'-6" and is required by design. 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 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

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed Pedestrian and Bicycle designations in GEOMETRY note and RAILS, PICKETS AND POSTS note. Added anchor bolt requirements to SHOP DRAWINGS note.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

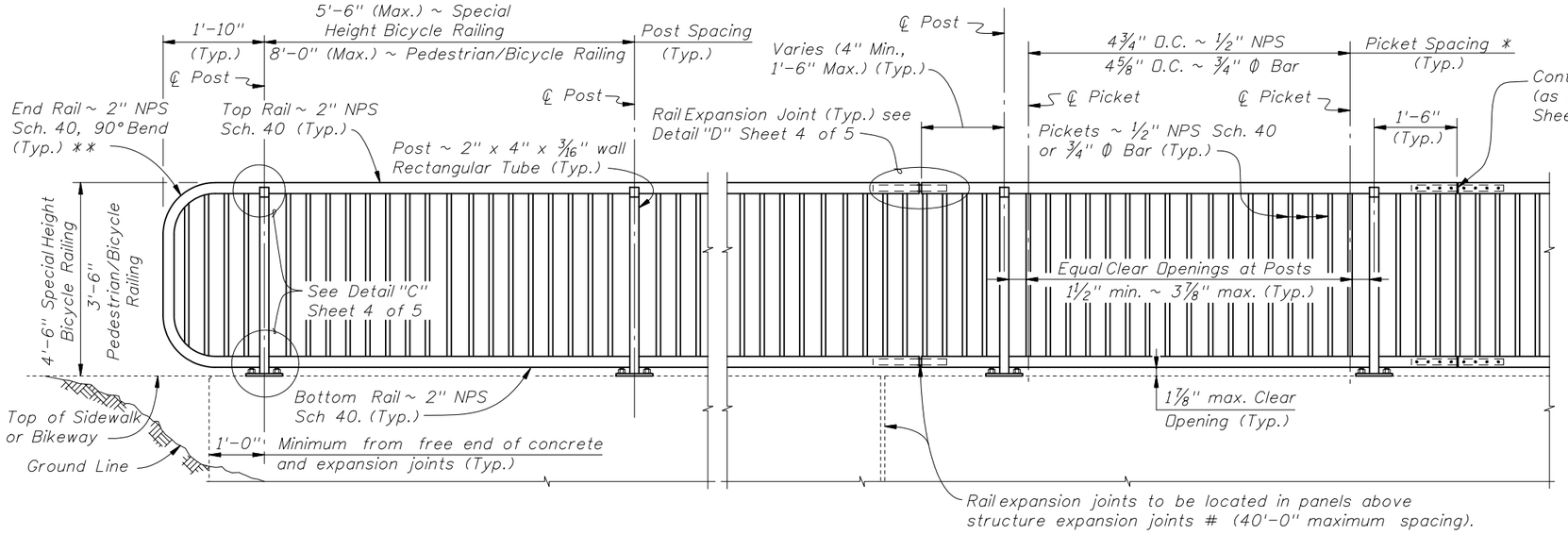
2008 Interim Design Standard

STEEL PEDESTRIAN/BICYCLE PICKET RAILING

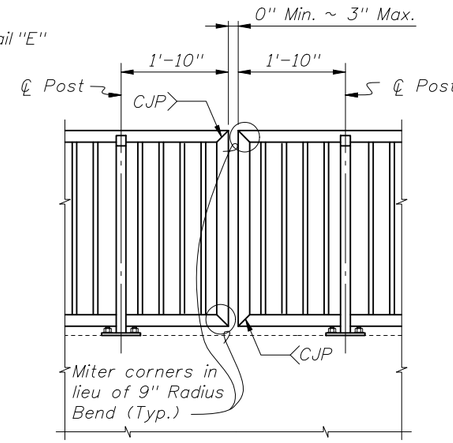
Interim Date 01/01/08

Sheet No. 1 of 5

Index No. 850



ELEVATION
(Showing Outside Face of Railing)



Note: Non-continuous corners are permitted when handrails are not required.

EXPANDED ELEVATION AT CORNERS

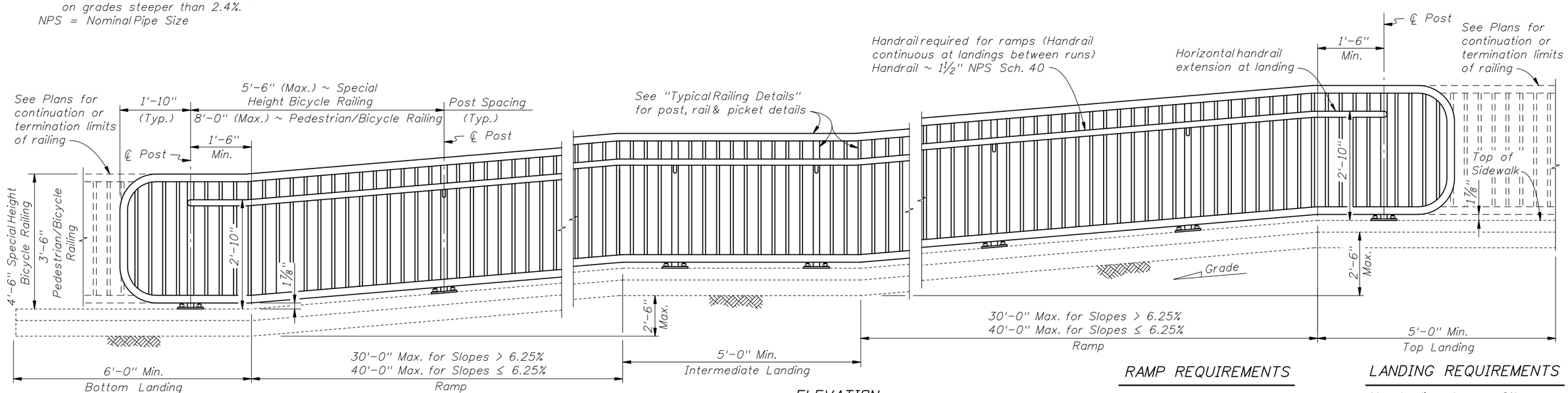
TYPICAL RAILING DETAILS & RAILINGS ON GRADES 0% TO 5%

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.

DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS

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



ELEVATION
(Showing Inside Face of Railing)

RAMP REQUIREMENTS

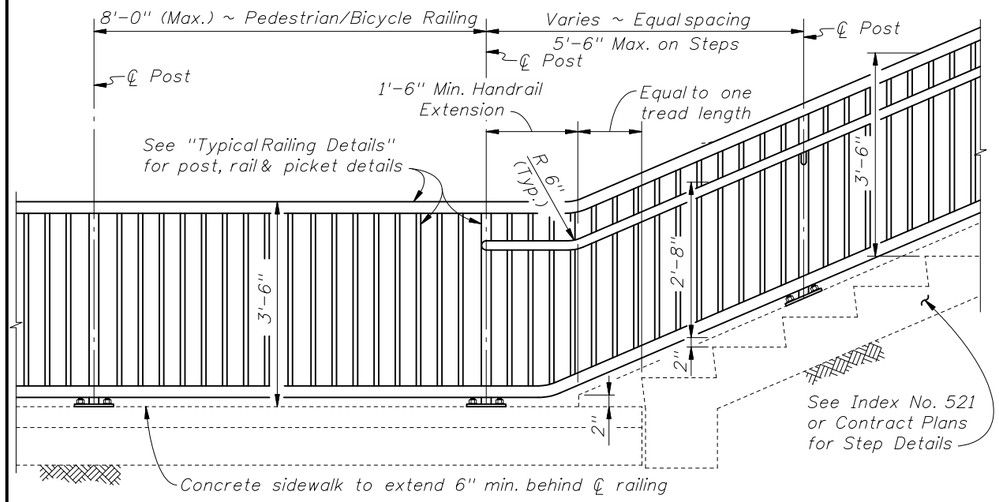
For slopes greater than 5%:
Max. ramp slope = 8.33%
Max. ramp cross-slope = 2.0%

LANDING REQUIREMENTS

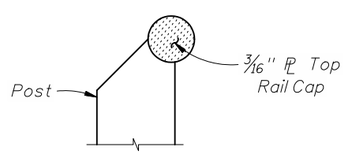
Max. landing slope = 2%
Max. landing cross-slope = 2%

RAILINGS ON GRADES STEEPER THAN 5% TO 8.33%

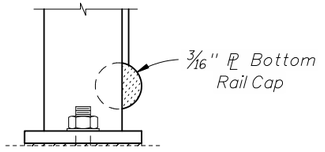
REVISIONS						2008 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	STEEL PEDESTRIAN/BICYCLE PICKET RAILING	01/01/08	2 of 5
01/01/08	SJN	Added "DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS" detail. Changed Pedestrian and Bicycle Railing designations, and maximum ramp lengths.					Index No. 850	



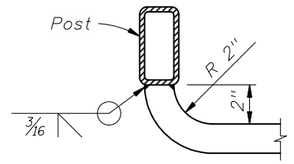
RAILING CONTINUATION BEYOND STEPS OR STAIRS
(Bottom shown, Top similar)



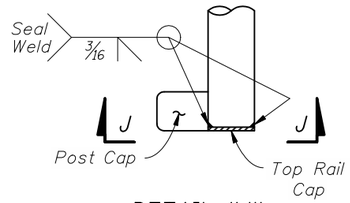
VIEW J-J



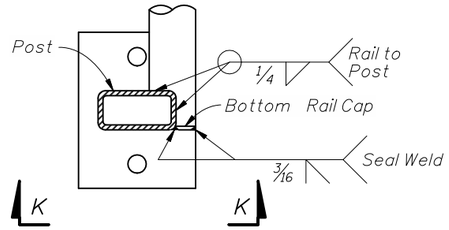
VIEW K-K



DETAIL "L" - PLAN VIEW
HANDRAIL TERMINATION

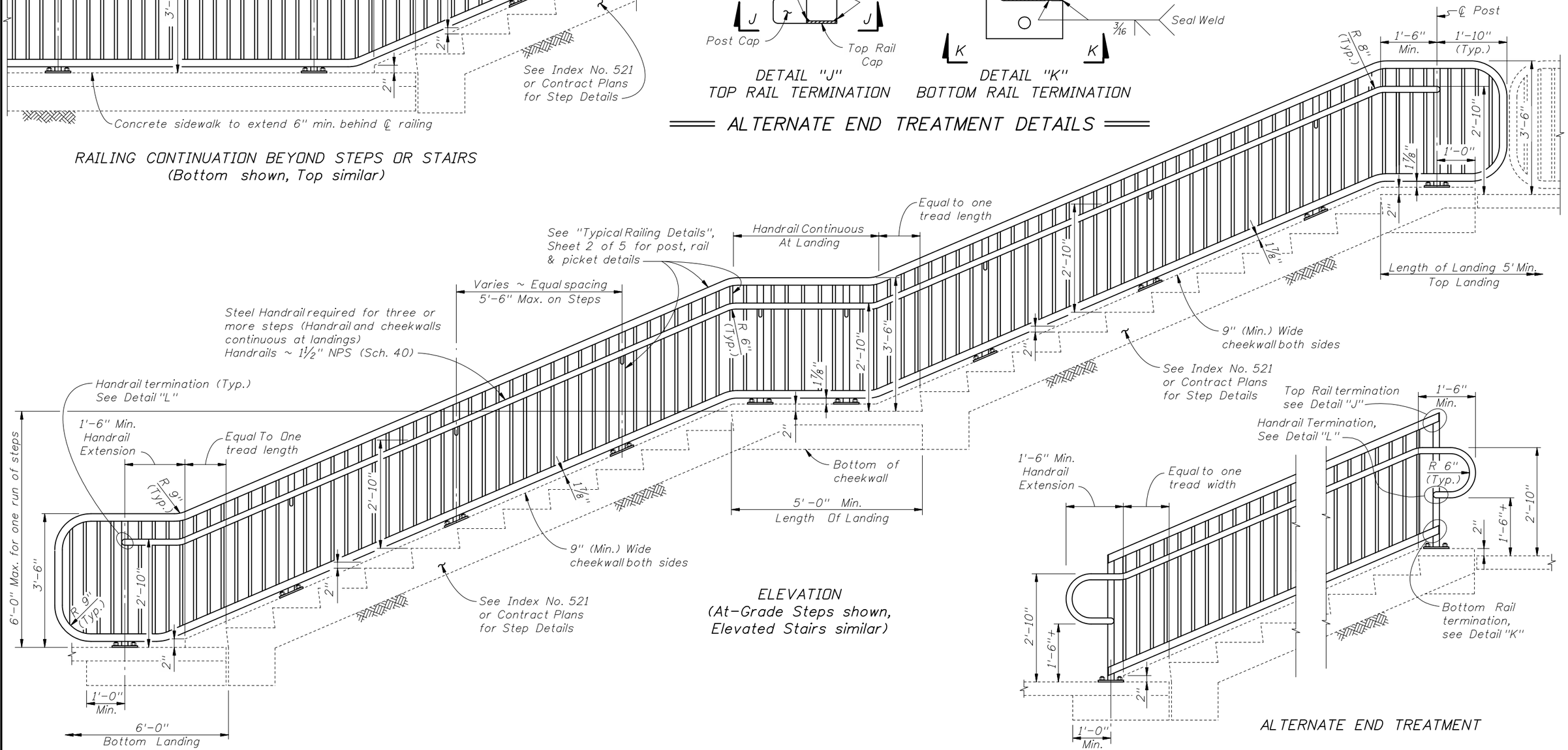


DETAIL "J"
TOP RAIL TERMINATION



DETAIL "K"
BOTTOM RAIL TERMINATION

ALTERNATE END TREATMENT DETAILS



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

ALTERNATE END TREATMENT

RAILINGS ON STEPS & STAIRS

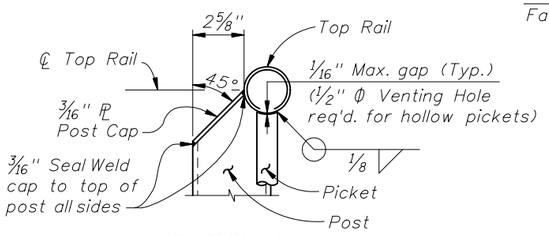
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed Pedestrian and Bicycle designations.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

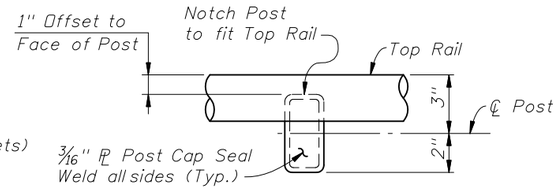
2008 Interim Design Standard

STEEL PEDESTRIAN/BICYCLE PICKET RAILING

Interim Date	Sheet No.
01/01/08	3 of 5
Index No.	
850	

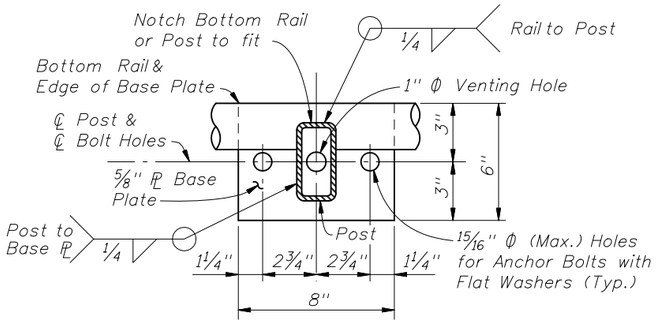


SECTION A-A
(Top of Picket Connection)

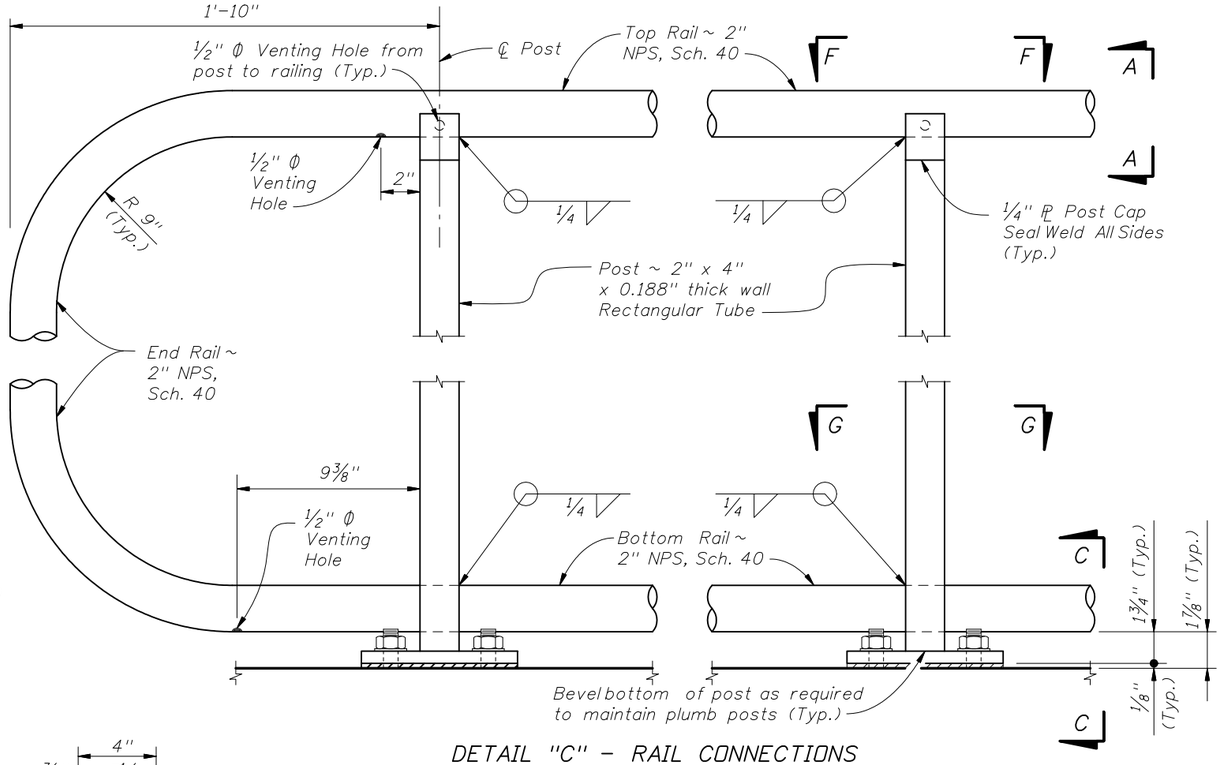


VIEW F-F
TOP RAIL CONNECTION
(Base Plate Not Shown for Clarity)

SECTION B-B
(Handrail Connection)

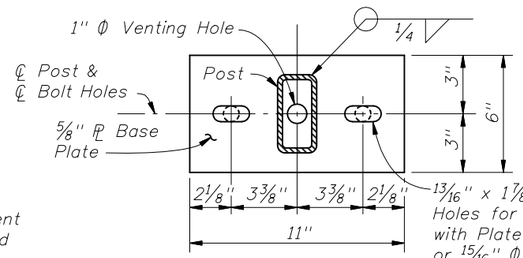


SECTION G-G
BASE PLATE & BOTTOM RAIL CONNECTION

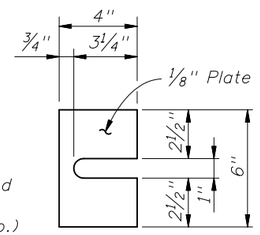


DETAIL "C" - RAIL CONNECTIONS
(Showing Outside Face of Structure and Railing, Pickets and Handrail Not Shown for Clarity)

SECTION C-C
(Bottom of Picket connection)

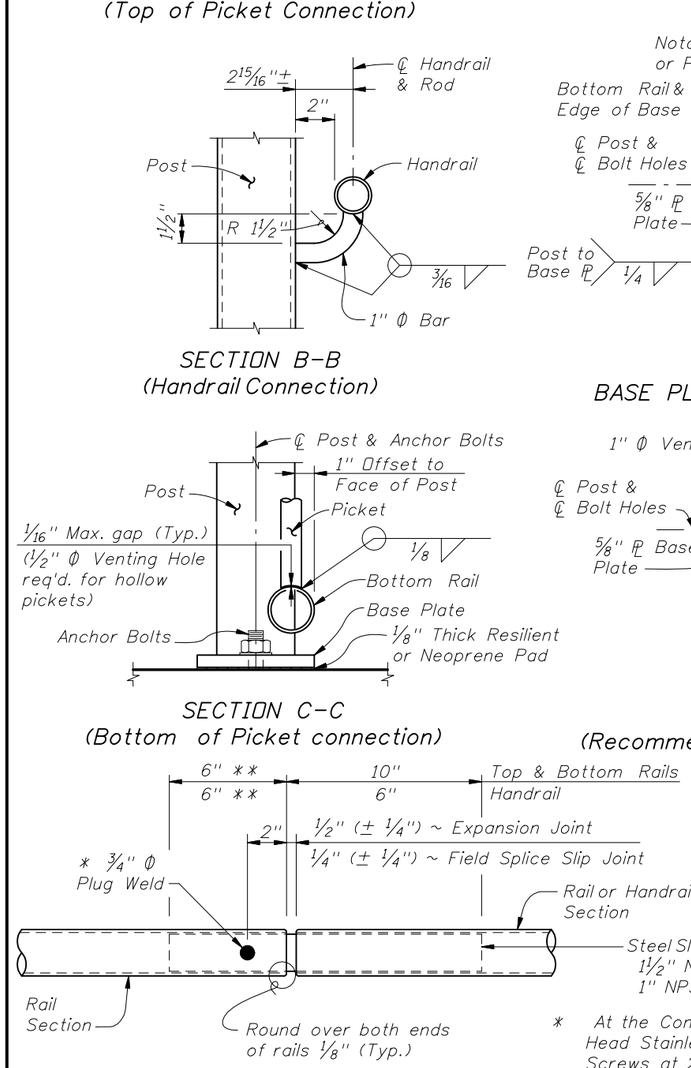


ALTERNATE
BASE PLATE DETAIL
(Recommended for Top of Step Cheekwalls)



SHIM PLATE
DETAIL

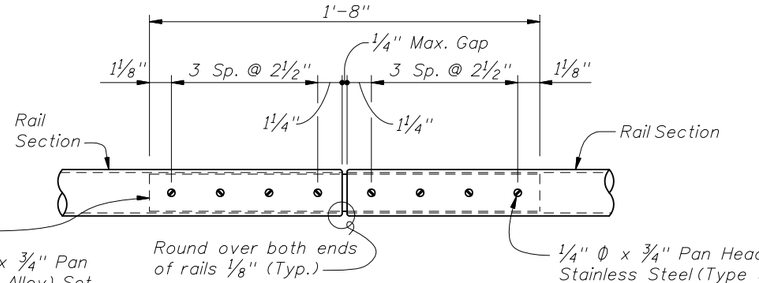
PLATE WASHER
DETAIL



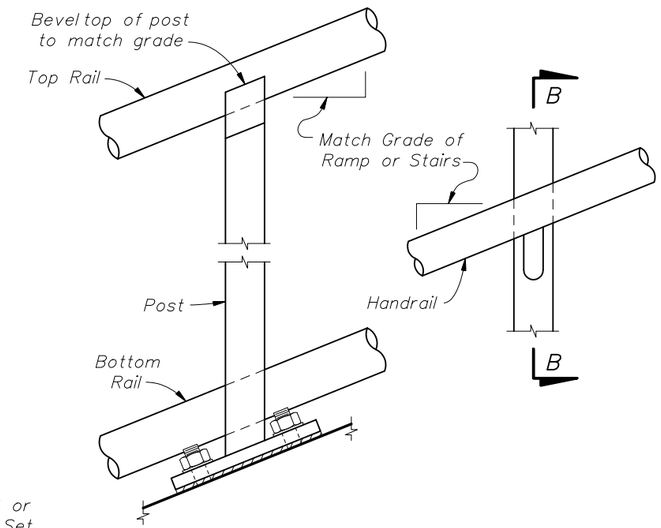
DETAIL "D" - EXPANSION JOINT
(FIELD SPLICE SLIP JOINT SIMILAR)

* At the Contractor's option 2 ~ ¼" Ø x ¾" Pan Head Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2" spacing may be substituted for the ¾" 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.



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.

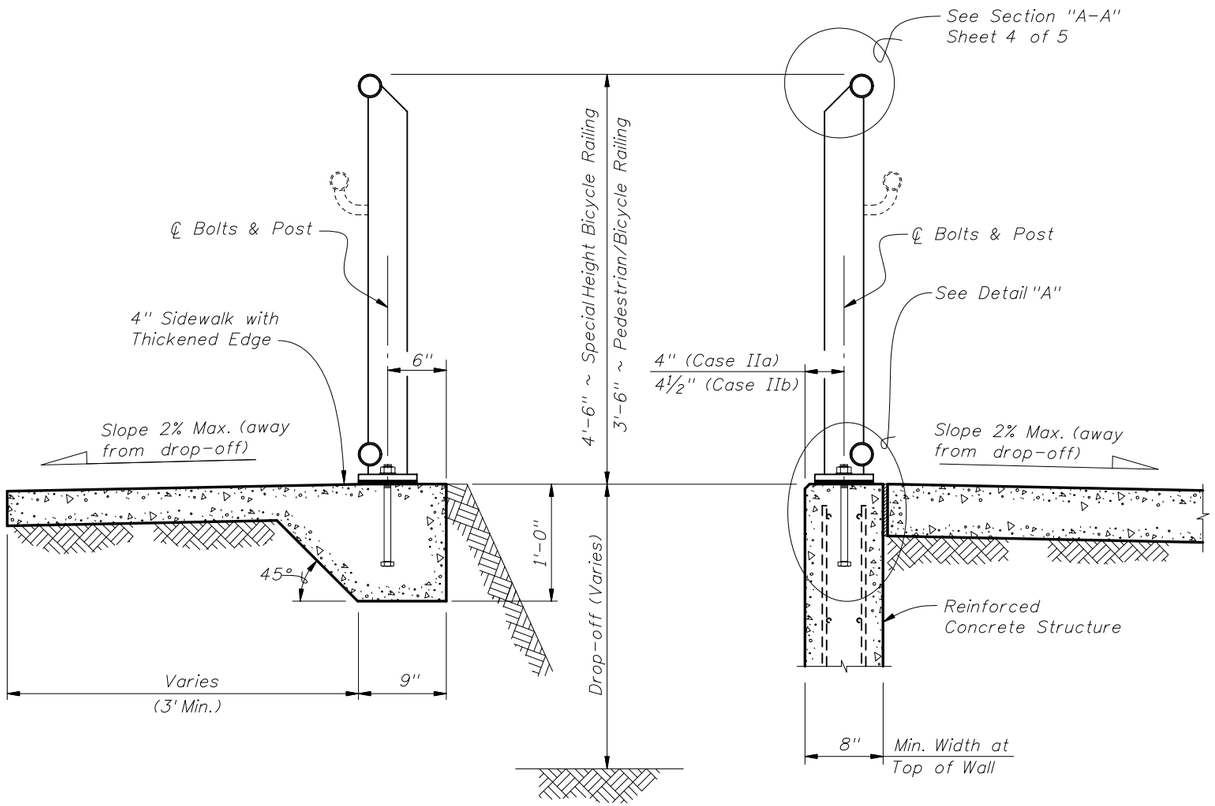
REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAILS "D" & "E", option to notch post in Section G-G, and ¼" joint tolerance in Detail "D".			

2008 Interim Design Standard

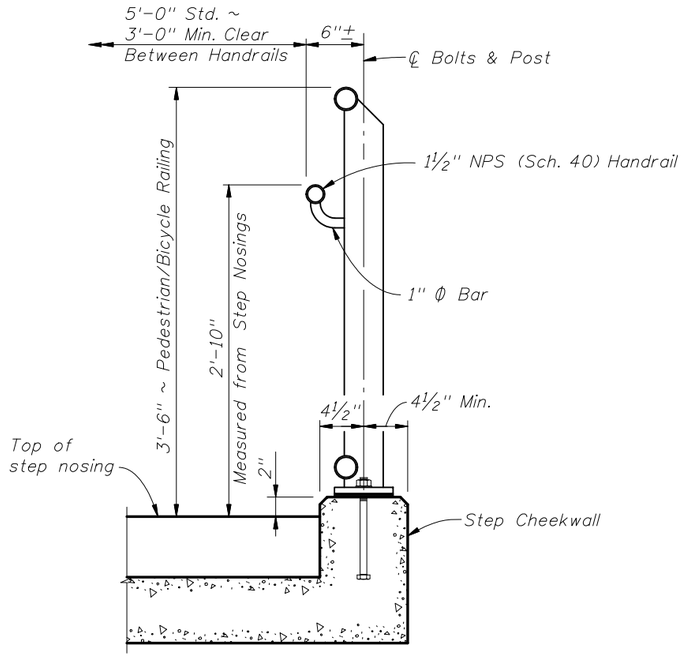
STEEL PEDESTRIAN/BICYCLE PICKET RAILING

Interim Date: 01/01/08
Sheet No.: 4 of 5
Index No.: 850

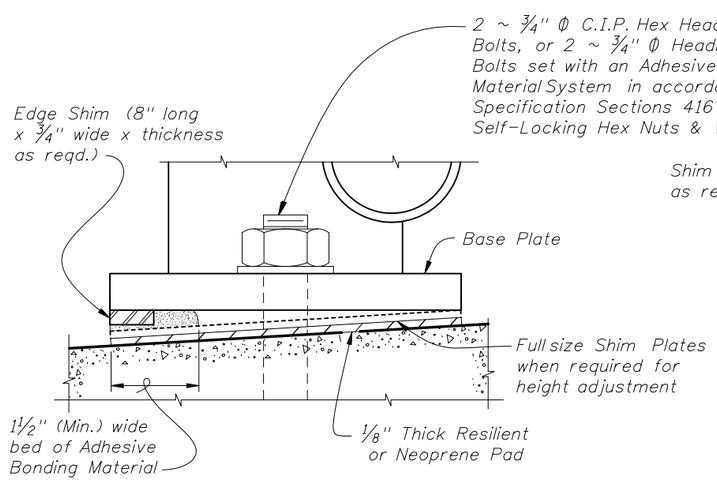


TYPICAL SECTION ON CONCRETE SIDEWALK
(Case I)

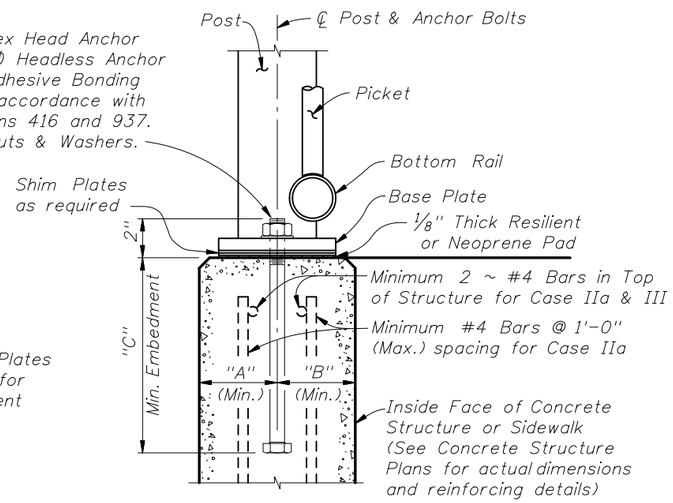
TYPICAL SECTION ON RETAINING WALL
(Case II)



TYPICAL SECTION ON STEPS & STAIRS
(Case III)



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



DETAIL "A"
(Cast-In-Place Anchor Bolts shown,
Adhesive Anchors similar)

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"	10½"	11"	¾" ϕ
IIa	Reinforced Concrete	4"	4"	9"	10½"	11"	¾" ϕ
IIb	Gravity Wall Index No. 520	4½"	3½" @ top	1'-0" *	1'-1½"	1'-2"	¾" ϕ
III	Step Cheekwall	4½"	4½"	9"	10½"	11"	¾" ϕ

* 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
01/01/08	SJN	Added "DETAIL "F" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION)", and note (*) to ANCHOR BOLT TABLE. Changed Pedestrian and Bicycle Railing designations. Corrected height on steps to top of nosing.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

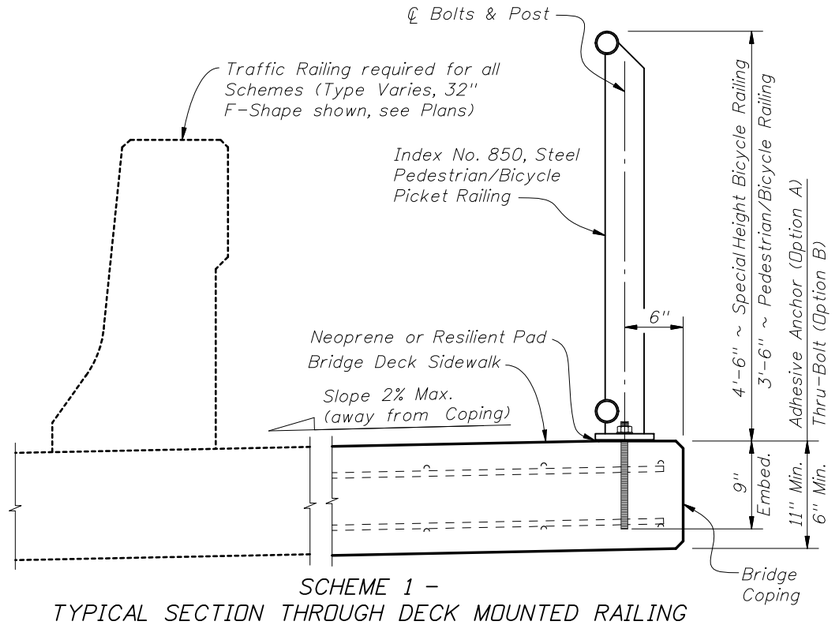
2008 Interim Design Standard

STEEL PEDESTRIAN/BICYCLE PICKET RAILING

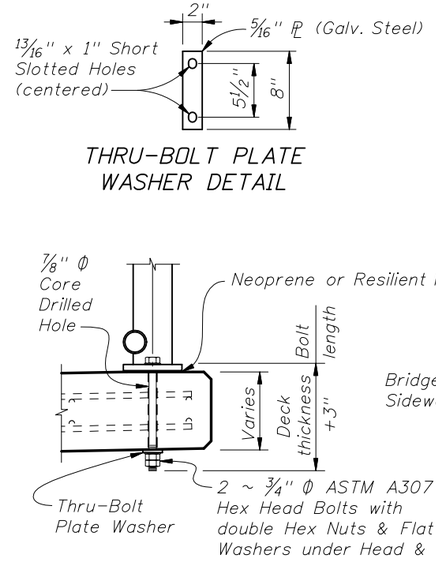
Interim Date 01/01/08

Sheet No. 5 of 5

Index No. 850

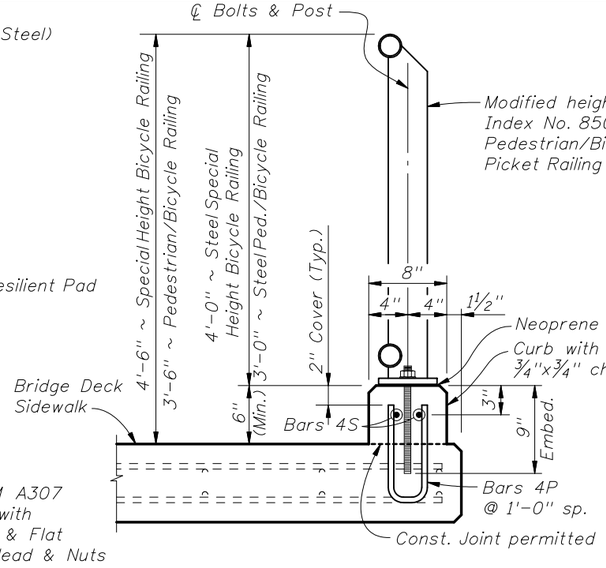


SCHEME 1 -
TYPICAL SECTION THROUGH DECK MOUNTED RAILING
(Adhesive Anchor Option shown - SCHEME 1A)

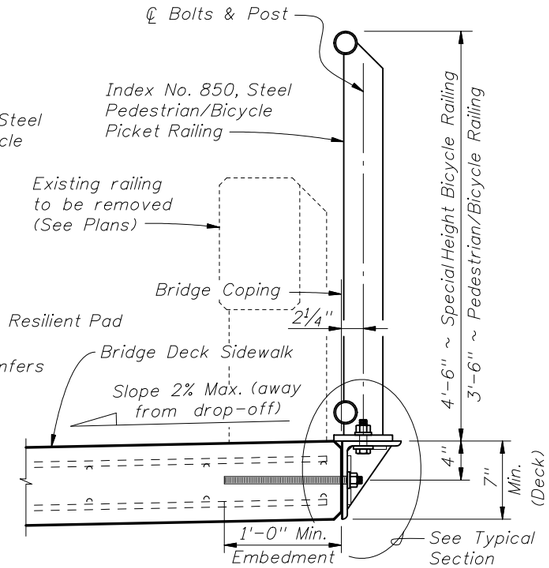


THRU-BOLT PLATE WASHER DETAIL

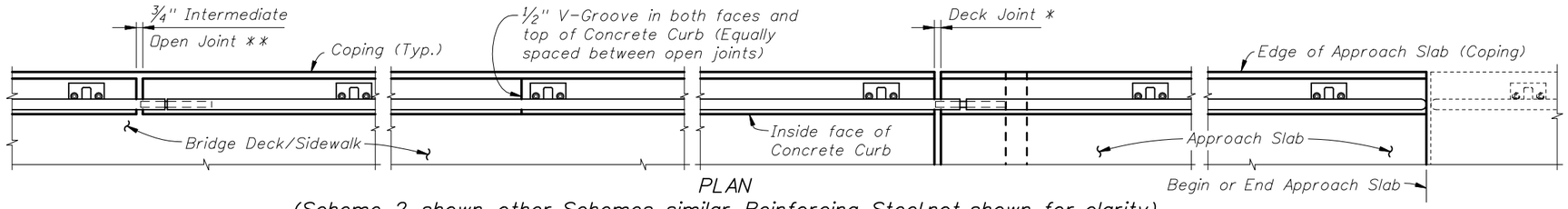
SCHEME 1B - DETAILS
(Thru-Bolt Option)



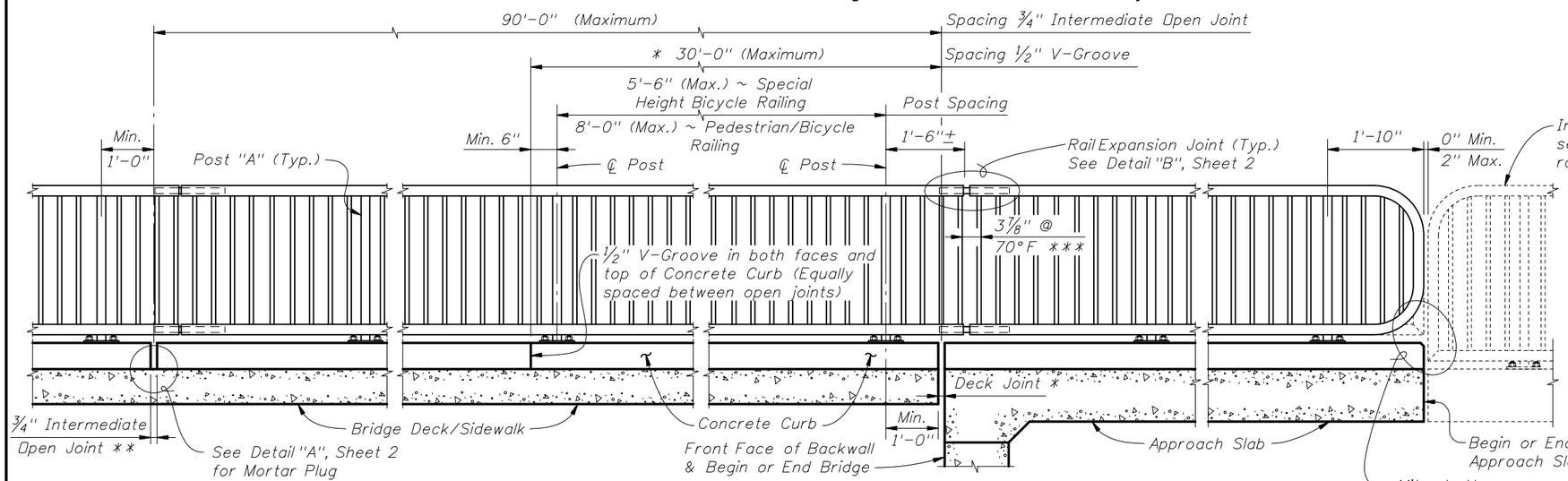
SCHEME 2 -
TYPICAL SECTION THROUGH
CURB MOUNTED RAILING



SCHEME 3 -
TYPICAL SECTION THROUGH
SIDE MOUNTED RAILING (RETROFIT)



PLAN
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)



ELEVATION OF INSIDE FACE OF RAILING
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)

INSTRUCTIONS TO DESIGNER:

1. Provide railing layout Control Drawings in the Plans to show post spacing, curb joint, V-groove, deck joint, expansion joint locations and Scheme number.
2. For existing bridge retrofits special end treatment details may be required for perpendicular or flared wingwalls at Begin and End Bridge. Provide existing railing removal details when required.

* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Curb 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 ℄ Pier or Intermediate Bent similar.

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

*** Clear opening between adjacent pickets at Rail Expansion Joints, above Deck Expansion Joints with a total thermal movement greater than 4", must be reduced to 3 1/2".

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed Pedestrian and Bicycle Railing designations			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

BRIDGE PEDESTRIAN/BICYCLE PICKET RAILING (STEEL)

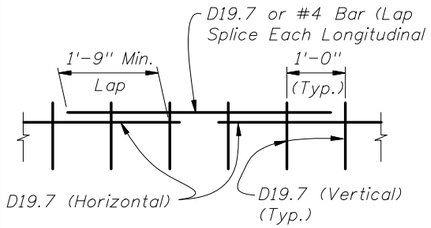
Interim Date: 01/01/08

Sheet No.: 1 of 2

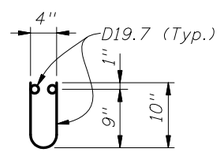
Index No.: 851

ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS

NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4¾" are not permitted.



SPLICE DETAIL
(Between WWR Sections)

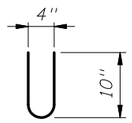


WELDED WIRE REINFORCEMENT (WWR)

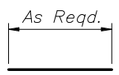
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
P	4	2'-0"
S	4	As Reqd.



BAR 4P

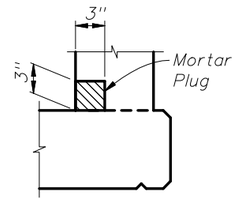


BAR 4S

CURB REINFORCING STEEL NOTES:

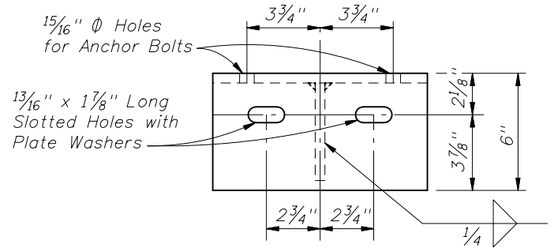
1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the curb on a retaining wall shall be the same as detailed for an 8" deck.
3. All reinforcing steel at the open joints shall have a 2" minimum cover.
4. Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
5. 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.

ESTIMATED CONCRETE CURB QUANTITIES (SCHEME 2)		
ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.0124
Reinforcing Steel	LB/LF	4.01



DETAIL "A" – SECTION
AT INTERMEDIATE OPEN JOINT

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.



PLAN VIEW

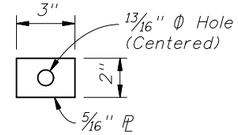
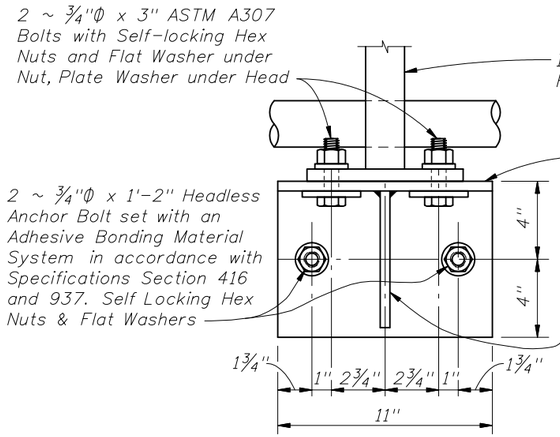
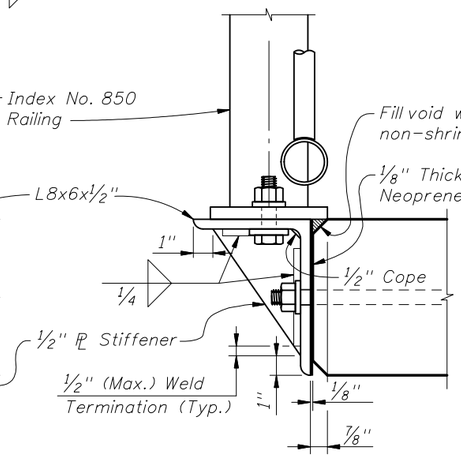


PLATE WASHER DETAIL

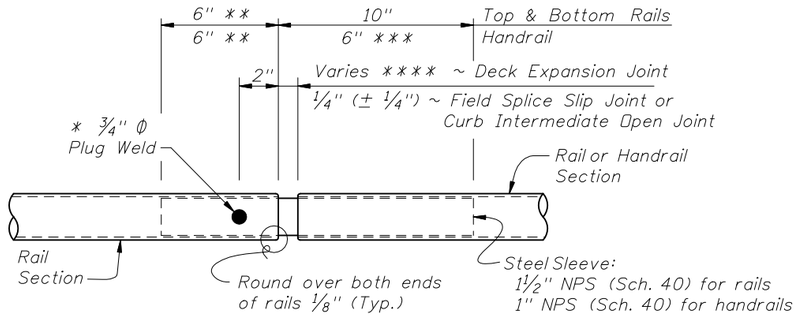


ELEVATION VIEW



TYPICAL SECTION

SCHEME 2 – CONCRETE CURB DETAILS



DETAIL "B" – EXPANSION JOINT
(FIELD SPLICE SLIP JOINT SIMILAR)

* At the Contractor's option 2 ~ ¼" Ø x ¾" Pan Head Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2" spacing along outside face of railing may be substituted for the ¾" Ø plug weld. Set screws must be set flush against the outside face of rail.

** Embedded length may be 4" for plug welded connection. Maintain venting of ends of pickets during galvanizing.

*** Increase handrail sleeve embedment to 8" for Expansion Joint openings greater than 2".

**** Expansion Joint opening shall match the clear opening in the deck joint but not greater than 3".

SCHEME 3 – SIDE MOUNTED SUPPORT BRACKET DETAILS

BRIDGE PICKET RAILING NOTES:

APPLICABILITY NOTE: Bridge Picket Railing is limited to use on bridges with an expansion joint thermal movements not exceeding 5". Scheme 3 is limited to bridge retrofit applications where additional sidewalk width is required.

RAILING DETAILS: For Railing fabrication and installation details and notes see Index No. 850, except that railing shall be fabricated and installed normal to the Profile Grade longitudinally and vertical transversely.

CONCRETE CURB (Scheme 2): Construct concrete curb vertical with the top surface finished level transversely. Concrete class shall be the same as the bridge deck.

SIDE MOUNTED SUPPORT BRACKET (Scheme 3): L-Shape and Stiffener Plate shall be in accordance with ASTM A36. Welding shall be in accordance with the American Society of Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Weld metal shall be E60XX or E70XX. Nondestructive testing of welds is not required. The bracket shall be hot-dip galvanized after fabrication in accordance with Section 962 of the Specifications.

PAYMENT: Railing shall be paid per linear foot (Item No. 515-2-abb) for the steel railing and include the cost of support brackets (Scheme 3). Concrete and reinforcing steel quantities for the concrete curb (Scheme 2), will be included in the bridge deck plan quantity pay items. 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

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option, in DETAILS "B". Changed field splice joint tolerance to ± ¼" in Detail "B".			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

BRIDGE PEDESTRIAN/BICYCLE PICKET RAILING (STEEL)

Interim Date 01/01/08

Index No. 851

NOTES

DESIGN SPECIFICATIONS:

American Association of State Highway and Transportation Officials (AASHTO) "LRFD Bridge Design Specifications", Third Edition, 2004, including 75 year Design Life

Florida Department of Transportation (FDOT) "Structures Design Guidelines for Load and Resistance Factor Design", January 2006.

Florida Building Commission "Florida Building Code", 2004 Edition, except for Handrail diameter.

U.S. Access Board "ADA Accessibility Guidelines", July 2004 as adopted with amendments by the USDOT under 49CFR Part 37.

National Fire Protection Association (NFPA) 101, "Life Safety Code", 2003 Edition.

DESIGN LIVE LOADS:

Post and Base Plate: Equivalent point load = 200 lb. load + (50 lb./ft. x Post Spacing (ft.)) applied transversely at top rail connection.

Top & Bottom Rails: 50 lb./ft. uniform load applied simultaneously vertically and transversely + 200 lb. concentrated point load applied at midspan in the directions for both maximum stress and deflection.

Handrails: Maximum of either 50 lb./ft. uniform load applied in any direction or 250 lb. concentrated load applied in any direction at any point along the top.

Pickets: Concentrated 200 lb. load applied transversely over an area of 1.0 square foot.

GEOMETRY:

Clear Opening between Pickets: Shall reject the passage of a 4" diameter sphere below 42" height, and a 8" diameter sphere above 42" height.

Clear Opening under Bottom Rail: Shall reject the passage of a 2" diameter sphere.

ADA Handrail Height: 34"

Standard Pedestrian/Bicycle Railing Height: 42" minimum.

Special Height Bicycle Railing Height: 54" minimum.

DEFLECTION:

Total combined deflection of the railing system including the resilient or neoprene pads, due to the top rail design live loads, shall not exceed 1½" when measured at midspan of the top rail.

APPLICABILITY NOTE TO DESIGNER:

This railing is not applicable for shielding drop-off hazards for vehicular traffic. This railing is applicable for all cases where a pedestrian or bicyclist drop-off hazard exceeds 2'-6" or when a drop-off hazard is less than 2'-6" and is required by design. 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.

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

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed Pedestrian and Bicycle designations in GEOMETRY note and RAILS, PICKETS & POSTS note. Added anchor bolt requirements to SHOP DRAWINGS note.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

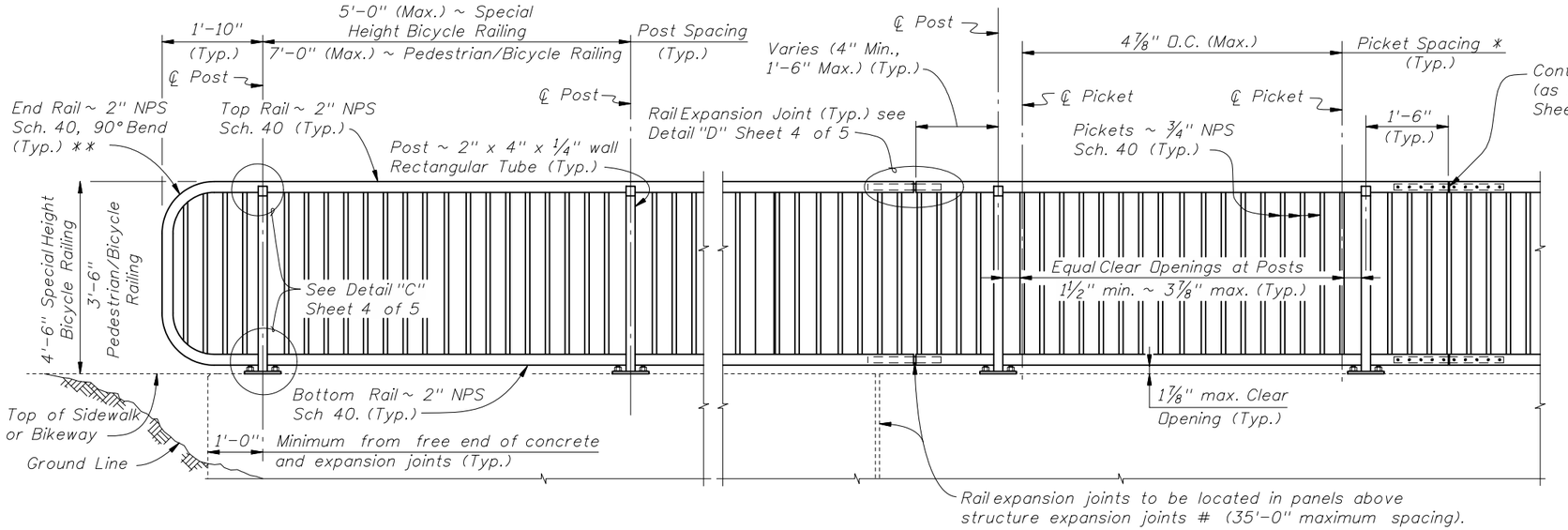
2008 Interim Design Standard

ALUMINUM PEDESTRIAN/BICYCLE PICKET RAILING

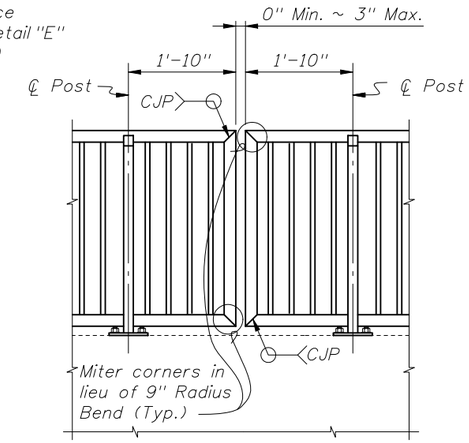
Interim Date 01/01/08

Sheet No. 1 of 5

Index No. 860



ELEVATION
(Showing Outside Face of Railing)



Note: Non-continuous corners are permitted when handrails are not required.

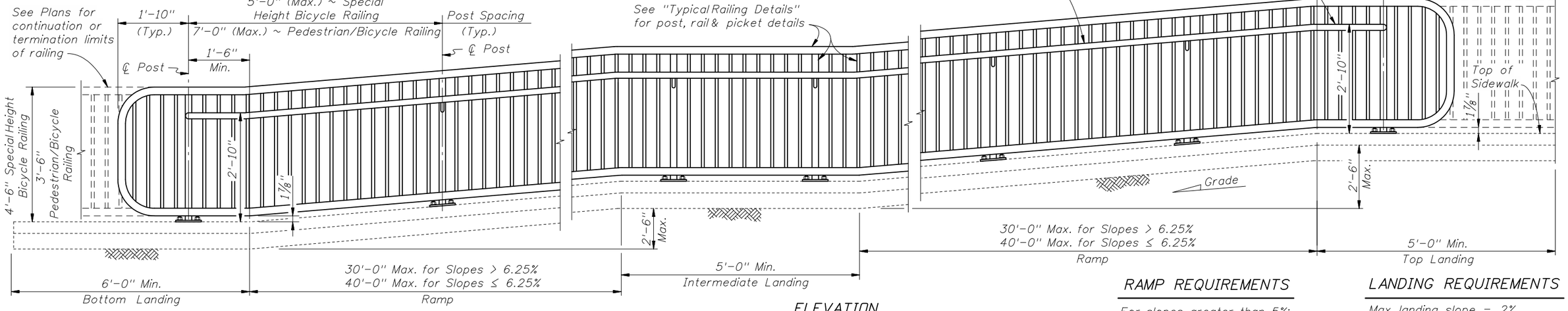
EXPANDED ELEVATION AT CORNERS

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

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

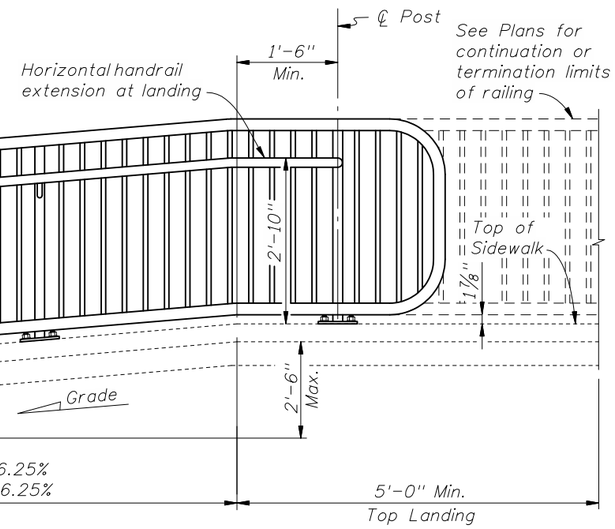
STRUCTURES EXPANSION JOINTS NOTE:
Keyed construction joints in Index No. 520 Gravity Wall are not considered to be expansion joints.

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



ELEVATION
(Showing Inside Face of Railing)

DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS



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
01/01/08	SJN	Added "DETAIL FOR NON-CONTINUOUS RAILING AT CORNERS" detail. Changed Pedestrian and Bicycle Railing designations, and maximum ramp lengths.			

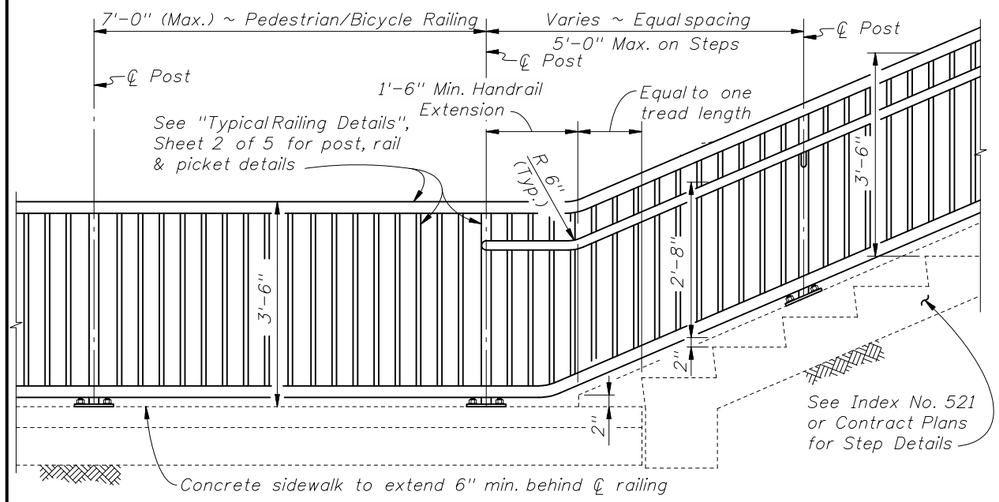
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

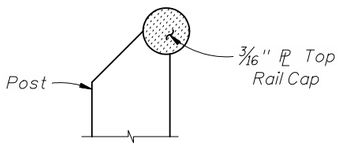
ALUMINUM PEDESTRIAN/BICYCLE PICKET RAILING

Interim Date 01/01/08 | Sheet No. 2 of 5

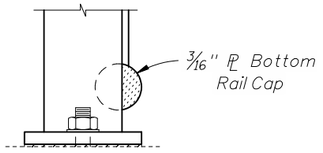
Index No. 860



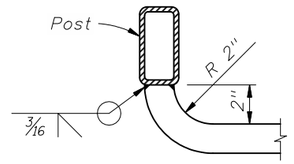
RAILING CONTINUATION BEYOND STEPS OR STAIRS
(Bottom shown, Top similar)



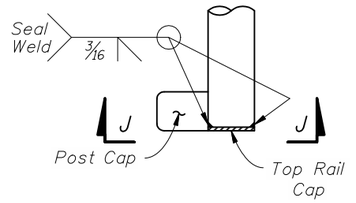
VIEW J-J



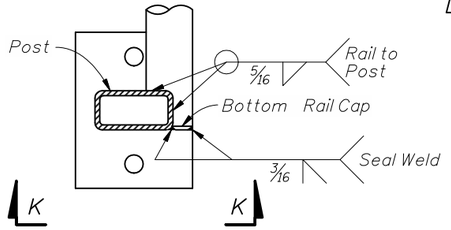
VIEW K-K



DETAIL "L" - PLAN VIEW
HANDRAIL TERMINATION

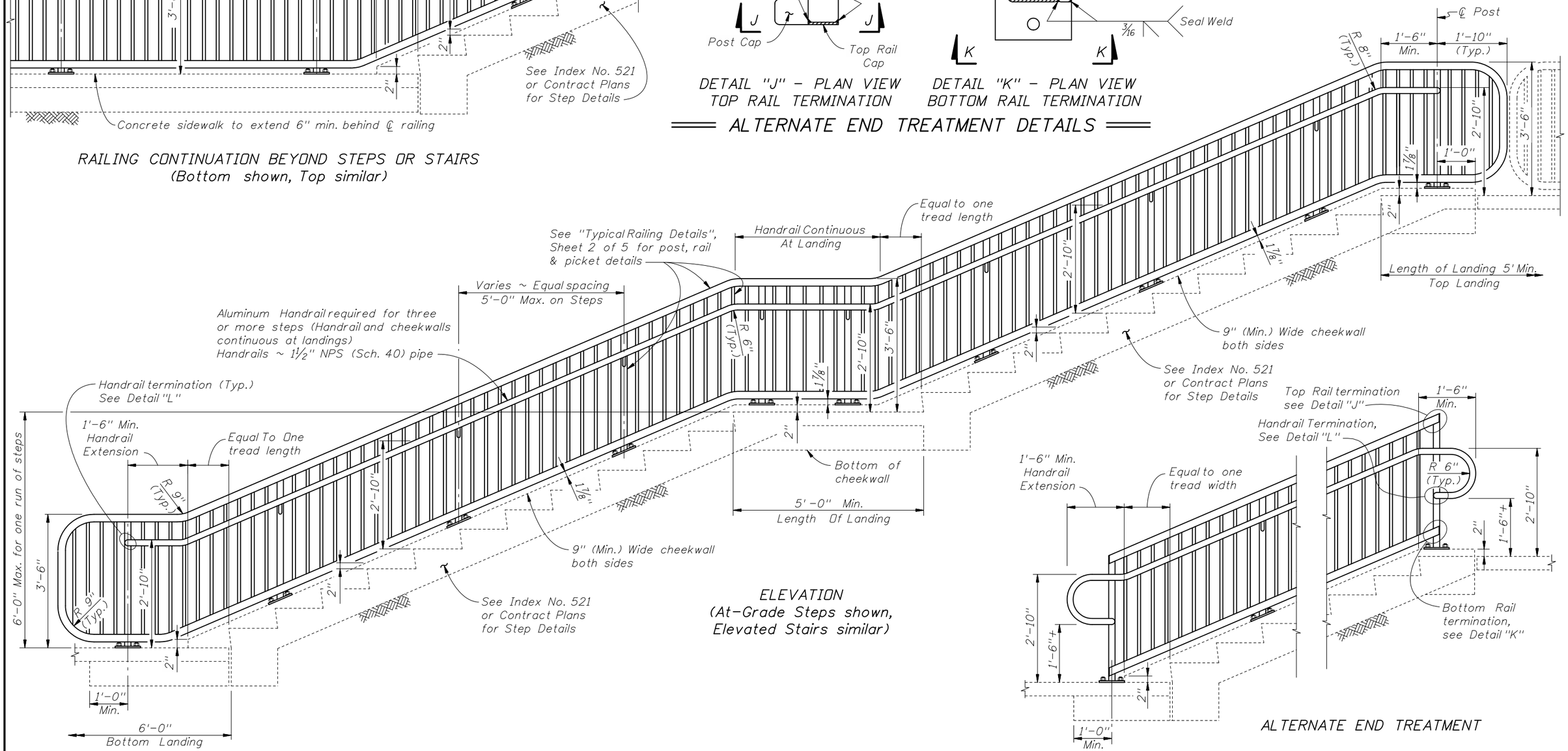


DETAIL "J" - PLAN VIEW
TOP RAIL TERMINATION



DETAIL "K" - PLAN VIEW
BOTTOM RAIL TERMINATION

ALTERNATE END TREATMENT DETAILS



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

ALTERNATE END TREATMENT

RAILINGS ON STEPS & STAIRS

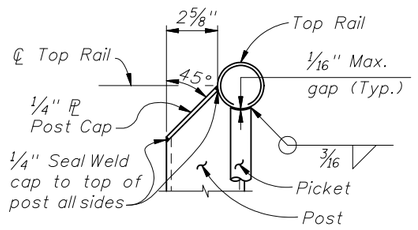
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed Pedestrian and Bicycle designations.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

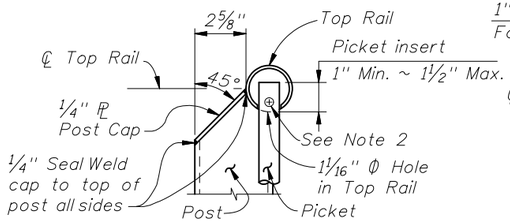
2008 Interim Design Standard

ALUMINUM PEDESTRIAN/BICYCLE PICKET RAILING

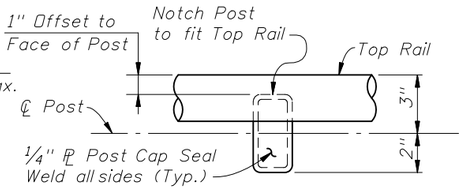
Interim Date	Sheet No.
01/01/08	3 of 5
Index No.	
860	



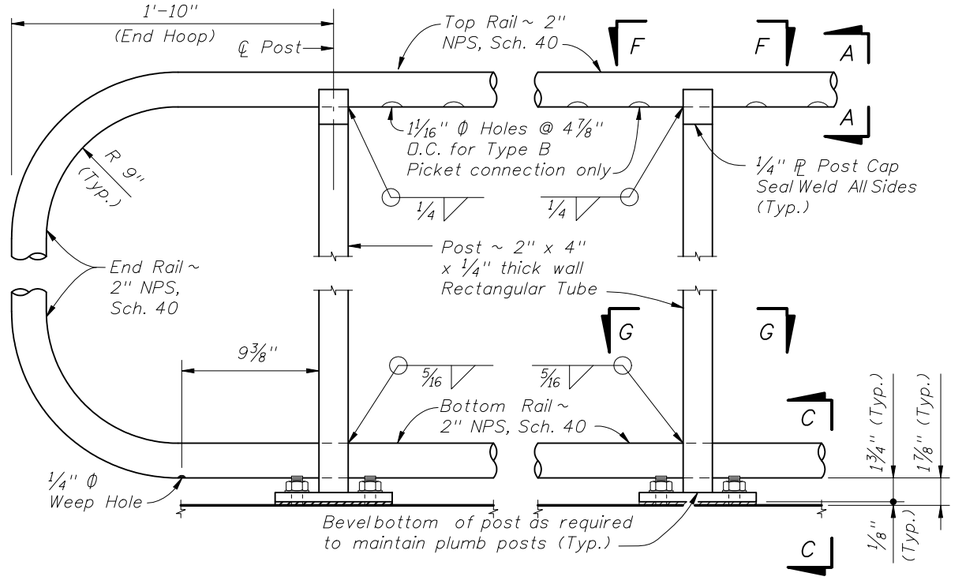
TYPE A (WELDED)



TYPE B (NONWELDED)

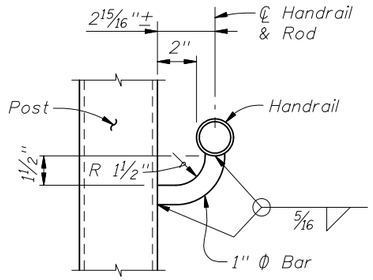


VIEW F-F
TOP RAIL CONNECTION
(Base Plate Not Shown for Clarity)

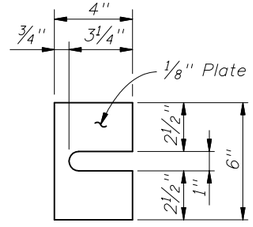


DETAIL "C" - RAIL CONNECTIONS
(Showing Outside Face of Structure and Railing,
Pickets and Handrail Not Shown for Clarity)

SECTION A-A
(Top of Picket Connection)



SECTION B-B
(Handrail Connection)



SHIM PLATE
DETAIL

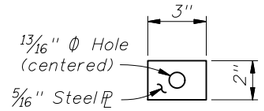


PLATE WASHER
DETAIL

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.
2. Provide #10 x ½" 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 C-C
(Bottom of Picket connection)

SECTION G-G
BASE PLATE & BOTTOM RAIL CONNECTION

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

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 ~ ¼" Ø x ¾" 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 ¾" Ø 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

¼" Ø x ¾" Pan Head Aluminum (Alloy 2024-T4 or 7075-T73) or Stainless Steel (Type 316 or 18-8 Alloy) Set Screws. Set Screws must penetrate the full wall thickness of the inner sleeve and be set flush against the outside face of rail. (Typ.)

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
01/01/08	SJN	Added requirement for set screw to be set flush against outside face of rail, 18-8 Alloy option in DETAILS "D" & "E" and TYPE B (NONWELDED) Detail, and ¼" joint tolerance in Detail "D". --- Continued ---			Changed 1'-0" embedment of Rail Expansion Joint Sleeve to 10".

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

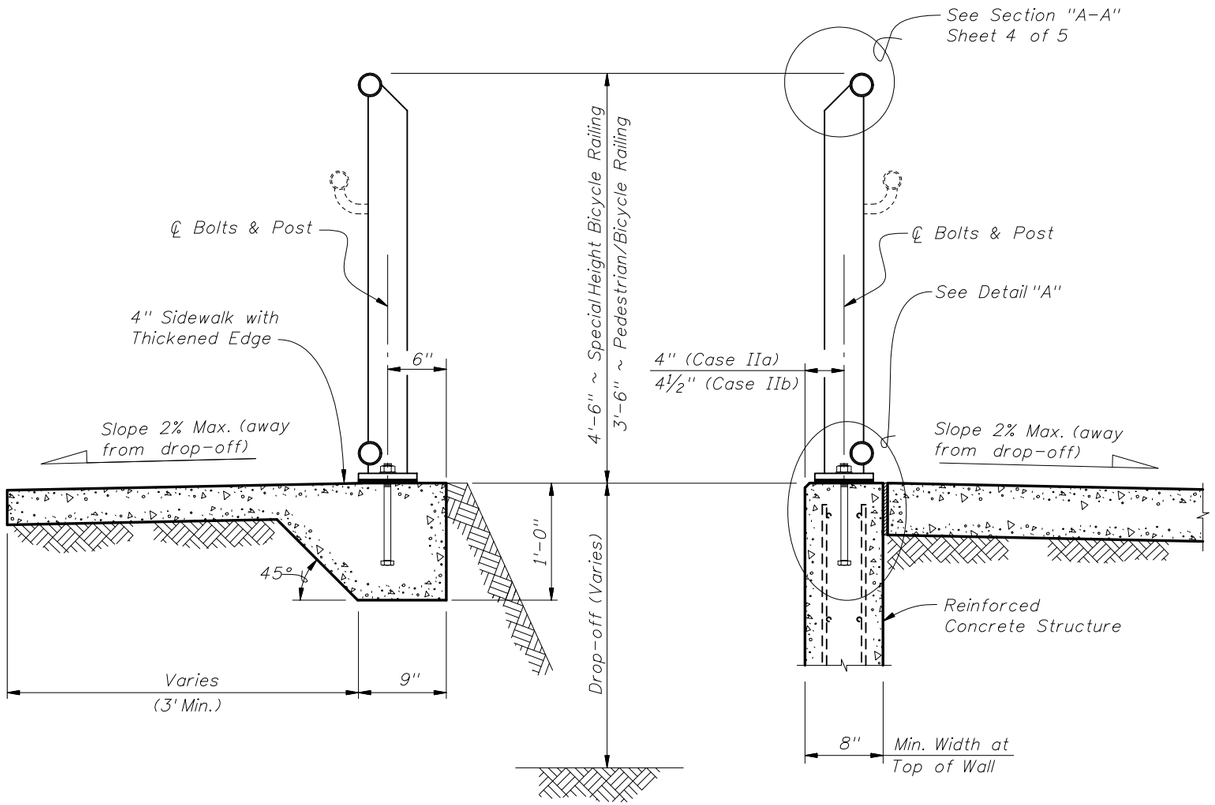
2008 Interim Design Standard

ALUMINUM PEDESTRIAN/BICYCLE PICKET RAILING

Interim Date: 01/01/08

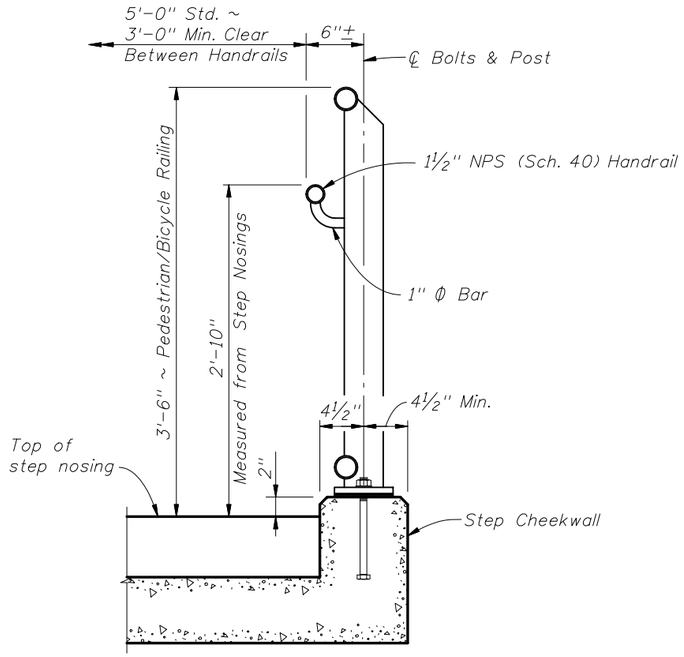
Sheet No. 4 of 5

Index No. 860

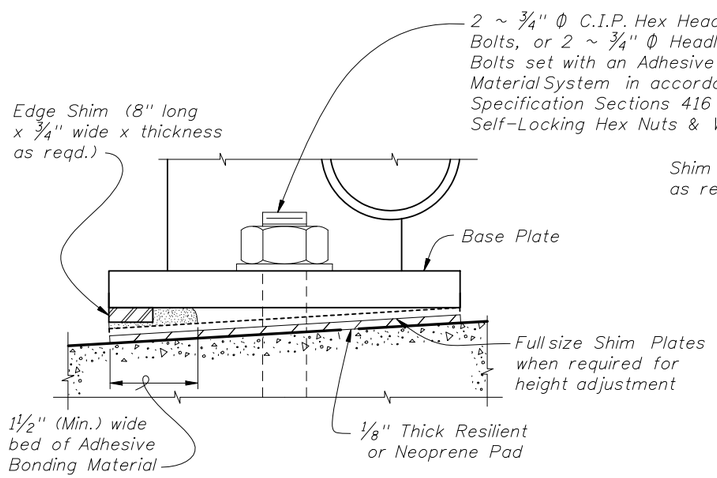


TYPICAL SECTION ON CONCRETE SIDEWALK
(Case I)

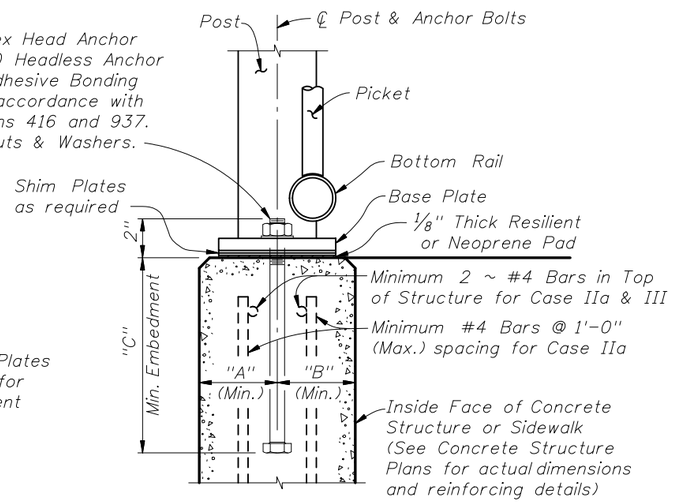
TYPICAL SECTION ON RETAINING WALL
(Case II)



TYPICAL SECTION ON STEPS & STAIRS
(Case III)



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



DETAIL "A"
(Cast-In-Place Anchor Bolts shown,
Adhesive Anchors similar)

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"	10½"	11"	¾" ϕ
IIa	Reinforced Concrete	4"	4"	9"	10½"	11"	¾" ϕ
IIb	Gravity Wall Index No. 520	4½"	3½" @ top	1'-0" *	1'-1½"	1'-2"	¾" ϕ
III	Step Cheekwall	4½"	4½"	9"	10½"	11"	¾" ϕ

* 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
01/01/08	SJN	Added "DETAIL "F" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION)", and note (*) to ANCHOR BOLT TABLE. Changed Pedestrian and Bicycle Railing designations. Corrected height on step to top of nosing.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

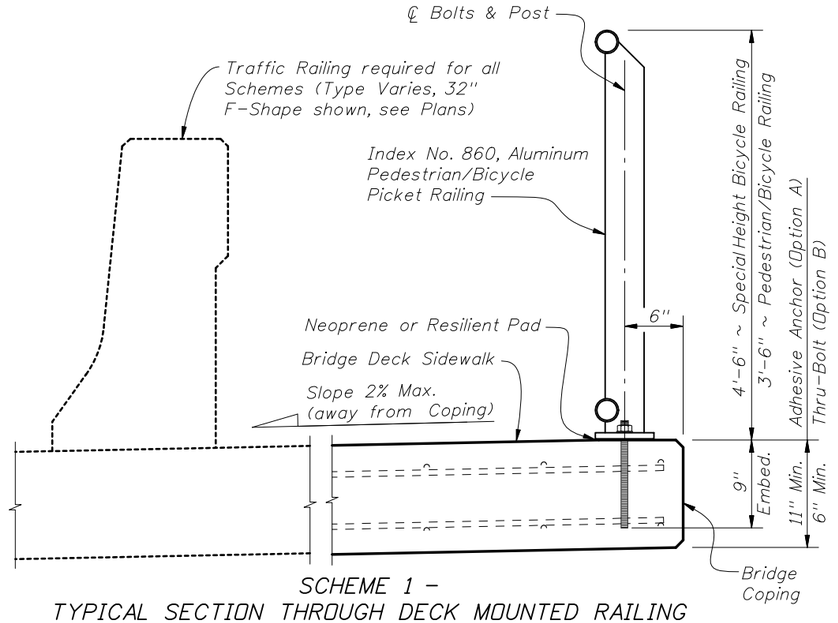
2008 Interim Design Standard

ALUMINUM PEDESTRIAN/BICYCLE PICKET RAILING

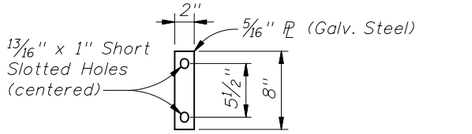
Interim Date 01/01/08

Sheet No. 5 of 5

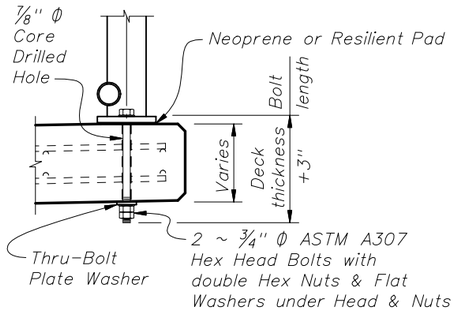
Index No. 860



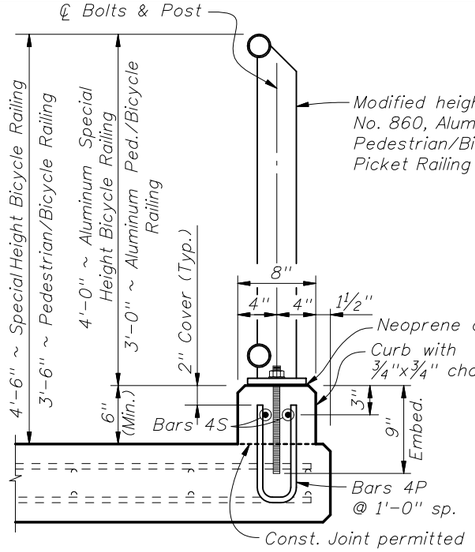
SCHEME 1 -
TYPICAL SECTION THROUGH DECK MOUNTED RAILING
(Adhesive Anchor Option shown - SCHEME 1A)



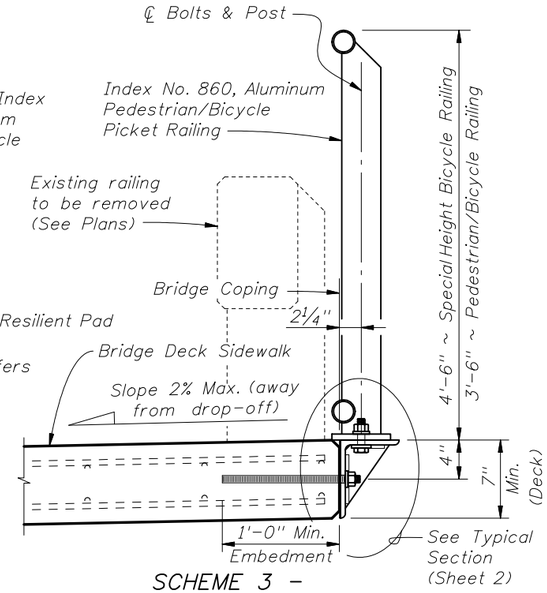
THRU-BOLT PLATE WASHER DETAIL



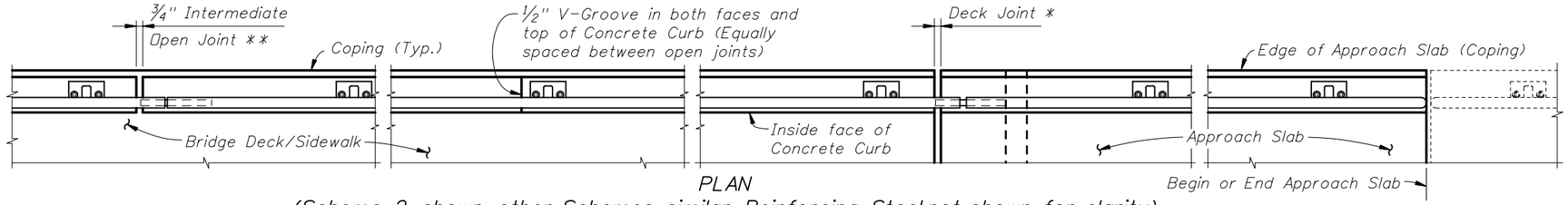
SCHEME 1B - DETAILS
(Thru-Bolt Option)



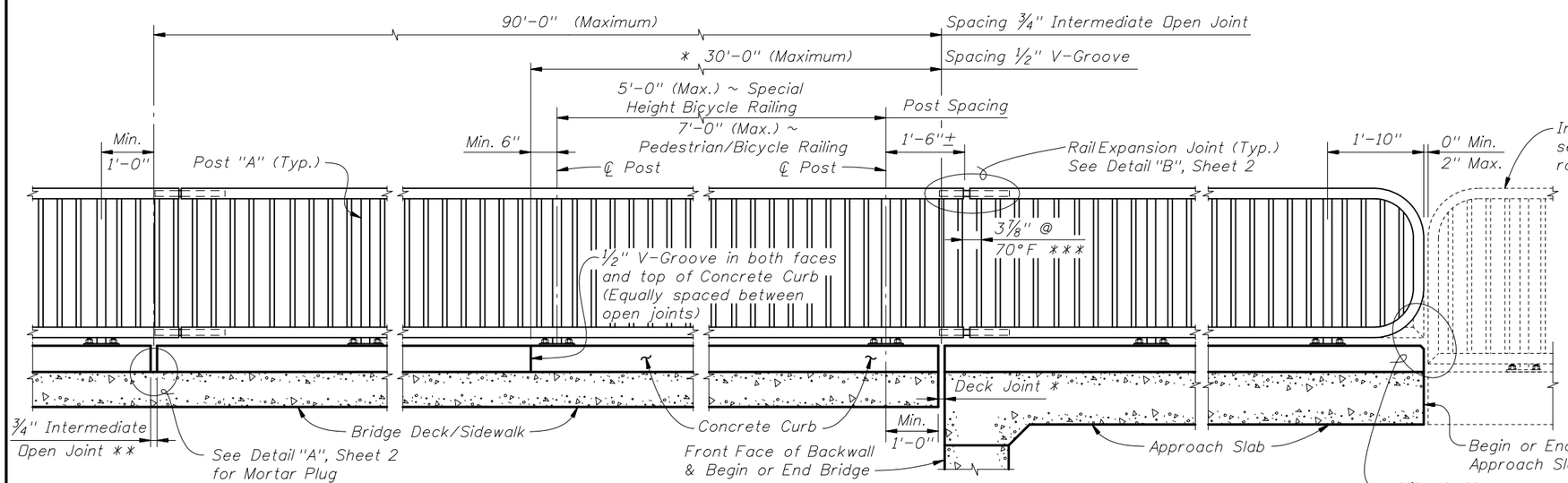
SCHEME 2 -
TYPICAL SECTION THROUGH
CURB MOUNTED RAILING



SCHEME 3 -
TYPICAL SECTION THROUGH
SIDE MOUNTED RAILING (RETROFIT)



PLAN
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)



ELEVATION OF INSIDE FACE OF RAILING
(Scheme 2 shown, other Schemes similar, Reinforcing Steel not shown for clarity)

INSTRUCTIONS TO DESIGNER:

1. Provide railing layout Control Drawings in the Plans to show post spacing, curb joint, V-groove, deck joint, expansion joint locations and Scheme number.
2. For existing bridge retrofits special end treatment details may be required for perpendicular or flared wingwalls at Begin and End Bridge. Provide existing railing removal details when required.

* See Structures Plans, Superstructure Sheets for actual dimensions and joint orientation. Open Curb 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 ℄ Pier or Intermediate Bent similar.

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

*** Clear opening between adjacent pickets at Rail Expansion Joints, above Deck Expansion Joints with a total thermal movement greater than 4", must be reduced to 3 1/2".

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed Pedestrian and Bicycle Railing designations			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

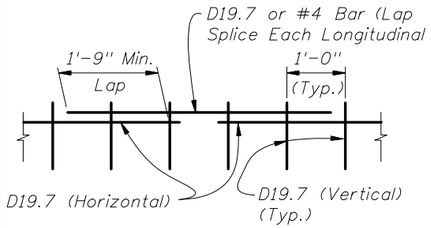
BRIDGE PEDESTRIAN/BICYCLE PICKET RAILING (ALUMINUM)

Interim Date 01/01/08 | Sheet No. 1 of 2

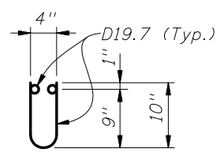
Index No. 861

ALTERNATE REINFORCING (WELDED WIRE REINF.) DETAILS

NOTE: Place wire panels to minimize the end overhang. End Overhangs greater than 4¾" are not permitted.



SPLICE DETAIL
(Between WWR Sections)

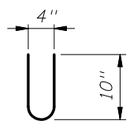


WELDED WIRE REINFORCEMENT (WWR)

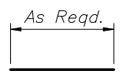
CONVENTIONAL REINFORCING STEEL BENDING DIAGRAMS

BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH
P	4	2'-0"
S	4	As Reqd.



BAR 4P



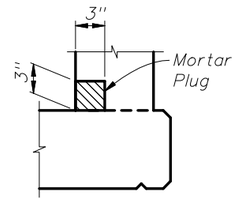
BAR 4S

CURB REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. The reinforcement for the curb on a retaining wall shall be the same as detailed for an 8" deck.
3. All reinforcing steel at the open joints shall have a 2" minimum cover.
4. Bars 4S may be continuous or spliced at the construction joints. Bar splices for Bars 4S shall be a minimum of 1'-9".
5. 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.

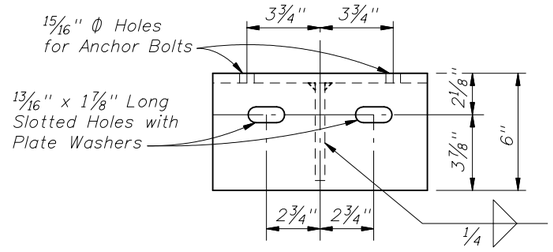
ESTIMATED CONCRETE CURB QUANTITIES (SCHEME 2)

ITEM	UNIT	QUANTITY
Concrete	CY/LF	0.0124
Reinforcing Steel	LB/LF	4.01



DETAIL "A" – SECTION
AT INTERMEDIATE OPEN JOINT

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.



PLAN VIEW

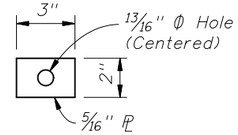
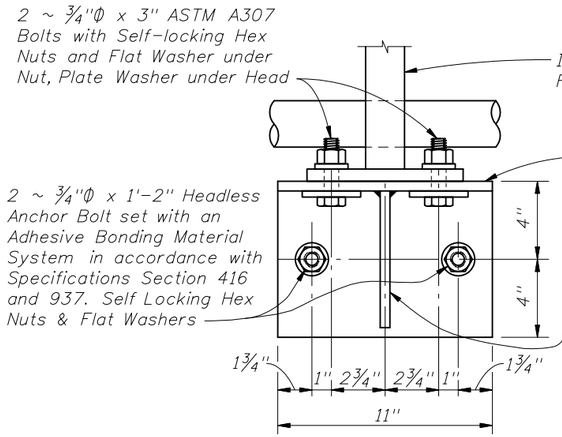
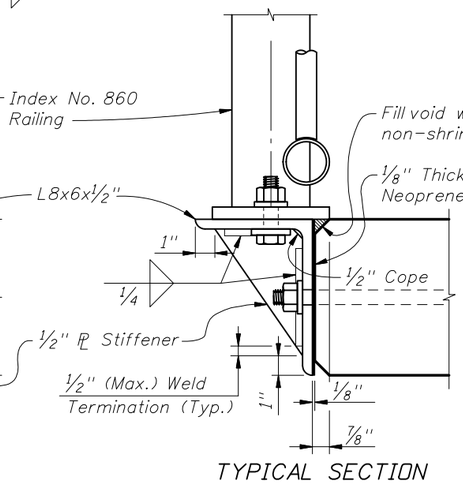


PLATE WASHER DETAIL

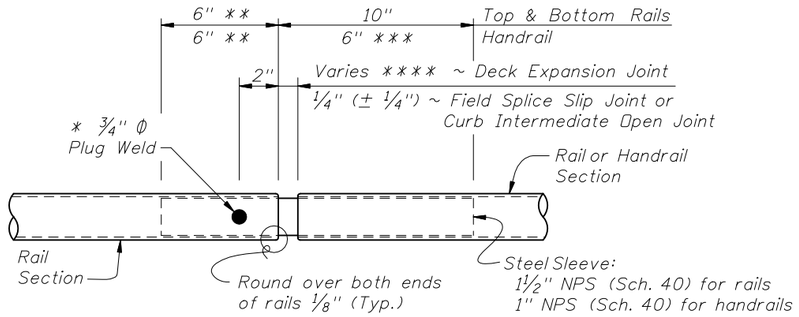


ELEVATION VIEW



TYPICAL SECTION

SCHEME 2 – CONCRETE CURB DETAILS



DETAIL "B" – EXPANSION JOINT
(FIELD SPLICE SLIP JOINT SIMILAR)

* At the Contractor's option 2 ~ ¼" Ø x ¾" Pan Head Aluminum (Alloy 2024-T4 or 7075-T73) or Stainless Steel (Type 316 or 18-8 Alloy) Set Screws at 2" spacing along outside face of railing may be substituted for the ¾" Ø plug weld. Set screws must be set flush against the outside face of rail.

** Embedded length may be 4" for plug welded connection.

*** Increase handrail sleeve embedment to 8" for Expansion Joint openings greater than 2".

**** Expansion Joint opening shall match the clear opening in the deck joint but not greater than 3".

SCHEME 3 – SIDE MOUNTED SUPPORT BRACKET DETAILS

BRIDGE PICKET RAILING NOTES:

APPLICABILITY NOTE: Bridge Picket Railing is limited to use on bridges with an expansion joint thermal movements not exceeding 5". Scheme 3 is limited to bridge retrofit applications where additional sidewalk width is required.

RAILING DETAILS: For Railing fabrication and installation details and notes see Index No. 860, except that railing shall be fabricated and installed normal to the Profile Grade longitudinally and vertical transversely.

CONCRETE CURB (Scheme 2): Construct concrete curb vertical with the top surface finished level transversely. Concrete class shall be the same as the bridge deck.

SIDE MOUNTED SUPPORT BRACKET (Scheme 3): L-Shape and Stiffener Plate shall be in accordance with ASTM B209, Alloy 6061-T6. Welding shall be in accordance with the American Society of 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.

PAYMENT: Railing shall be paid per linear foot (Item No. 515-2-abb) for the aluminum railing and include the cost of support brackets (Scheme 3). Concrete and reinforcing steel quantities for the concrete curb (Scheme 2), will be included in the bridge deck plan quantity pay items. 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

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Added requirement for set screw to be set flush against outside face of rail and 18-8 Alloy option, in DETAILS "B". Changed field splice joint tolerance to ± ¼" in Detail "B".			

2008 Interim Design Standard

BRIDGE PEDESTRIAN/BICYCLE PICKET RAILING (ALUMINUM)

Interim Date 01/01/08

Sheet No. 2 of 2

Index No. 861

NOTES

DESIGN SPECIFICATIONS:

U.S. Access Board "ADA Accessibility Guidelines", July 2004 as adopted with amendments by the USDOT under 49CFR Part 37.

DESIGN LIVE LOADS:

This Guiderail was tested by the FDOT Structural Research Center and found to resist an equivalent Service Loading of 50 lbs./ft. acting simultaneously in the transverse and vertical direction when applied at the height of the Top Rail.

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. 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

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Deleted Pedestrian and Bicycle designations from DESIGN LIVE LOADS and ALTERNATE DESIGN notes.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

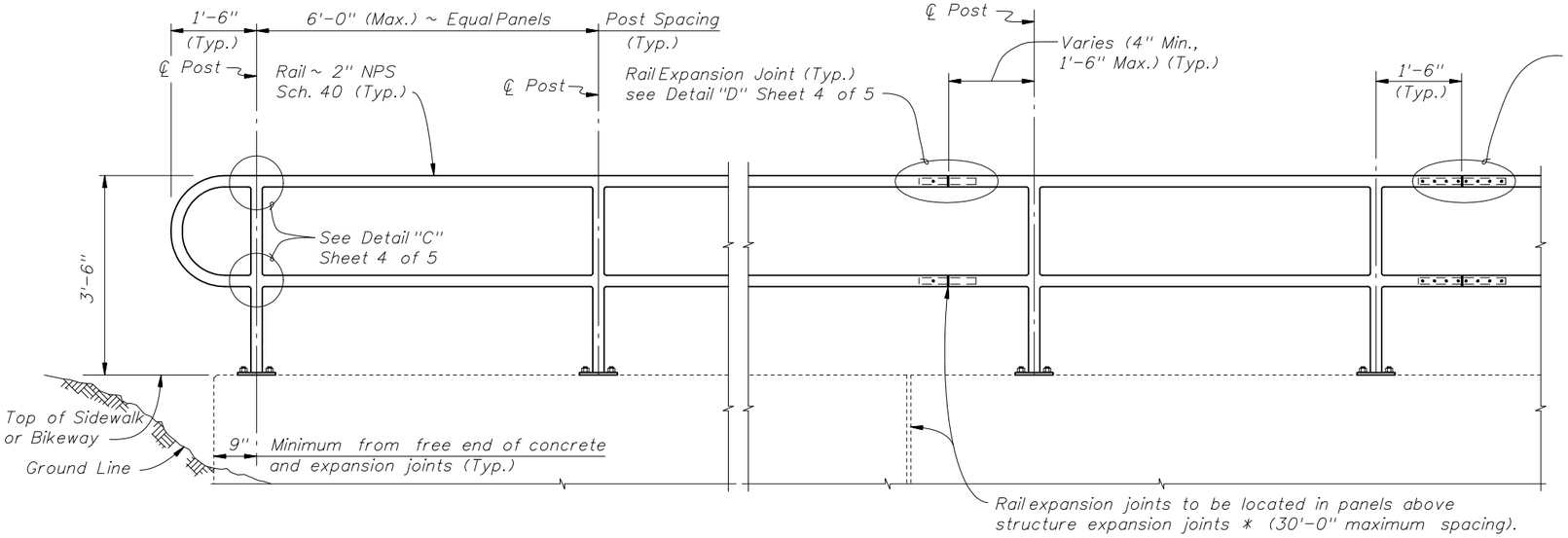
2008 Interim Design Standard

ALUMINUM PIPE GUIDERAIL

Interim Date 01/01/08

Sheet No. 1 of 5

Index No. 870



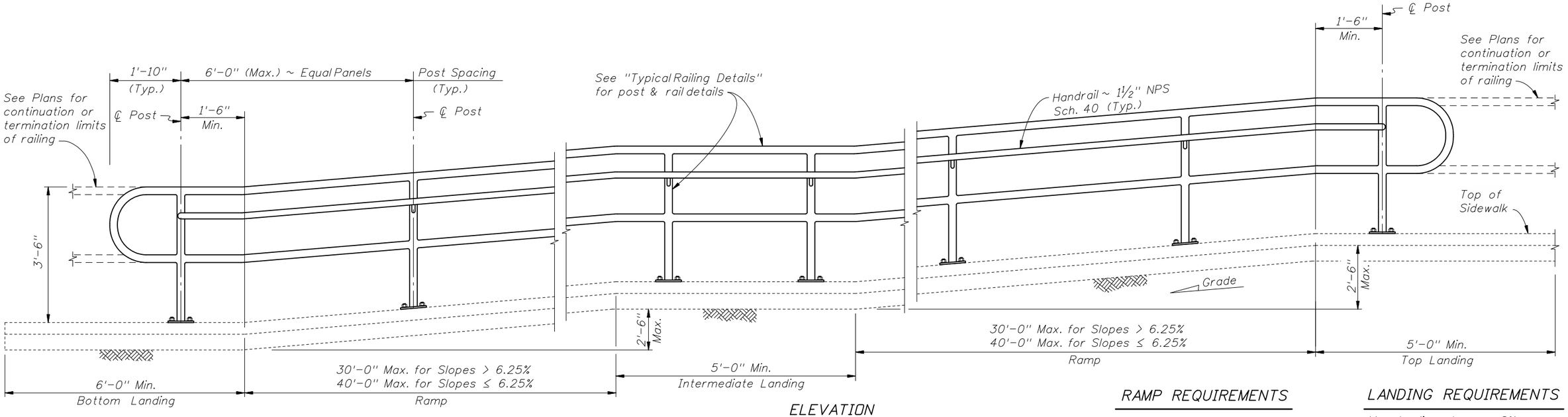
ELEVATION

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.

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
01/01/08	SJN	Deleted Bicycle Railing option and ** note. Changed maximum ramp lengths.			

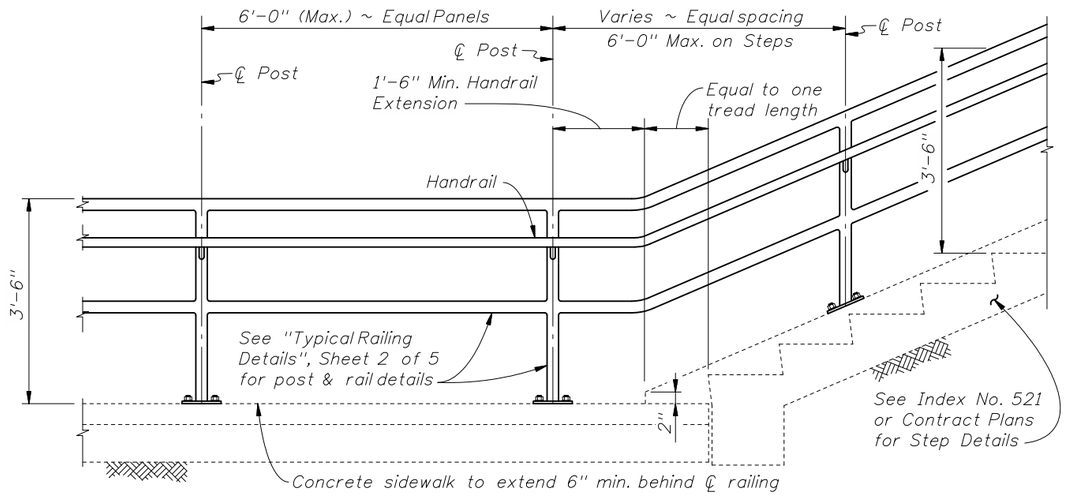
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

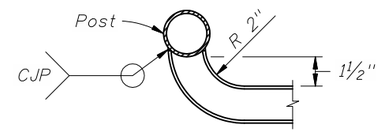
ALUMINUM PIPE GUIDERAIL

Interim Date 01/01/08

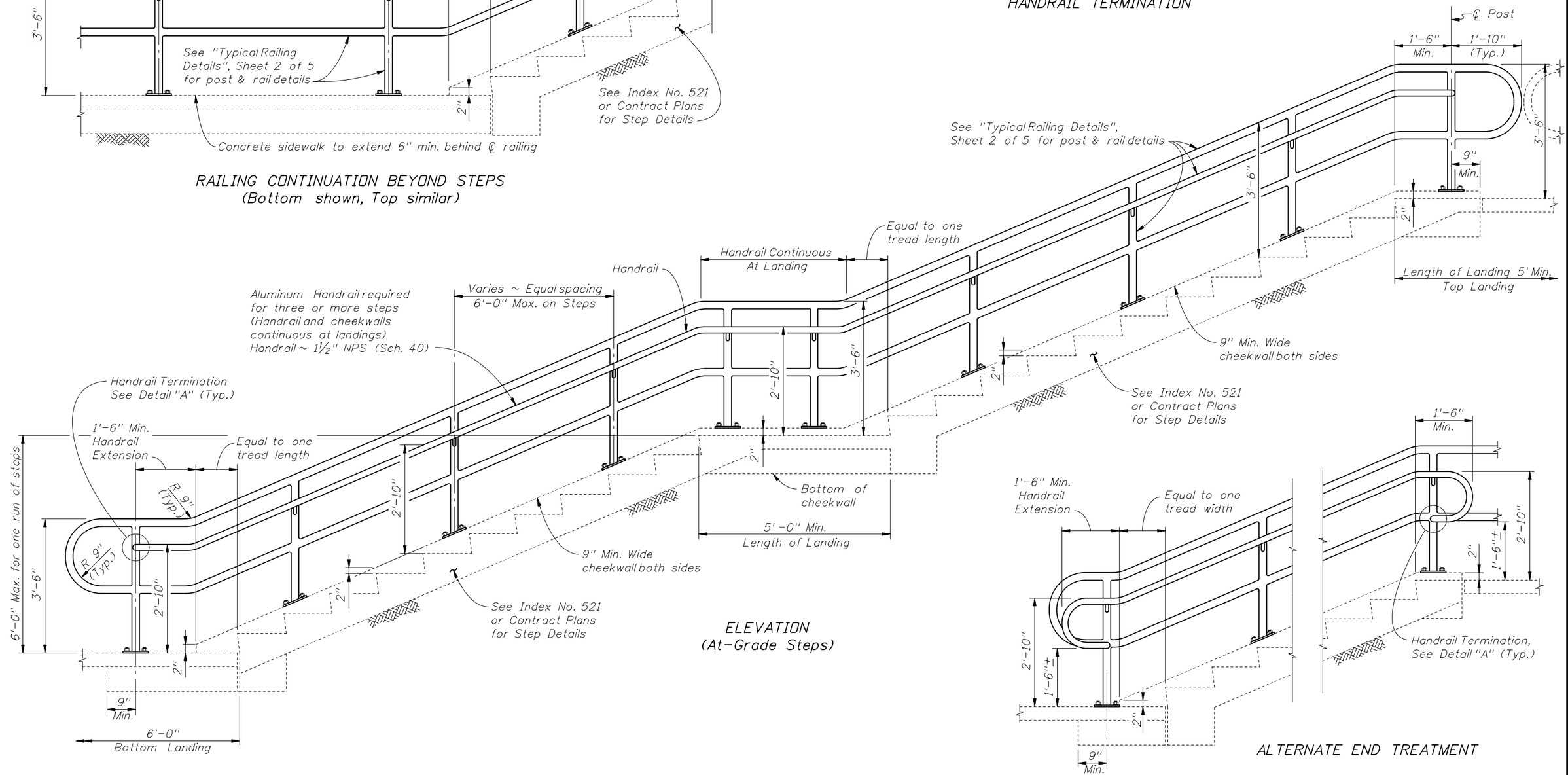
Index No. 870



RAILING CONTINUATION BEYOND STEPS
(Bottom shown, Top similar)



DETAIL "A" - PLAN VIEW
HANDRAIL TERMINATION



ELEVATION
(At-Grade Steps)

ALTERNATE END TREATMENT

RAILINGS ON STEPS & STAIRS

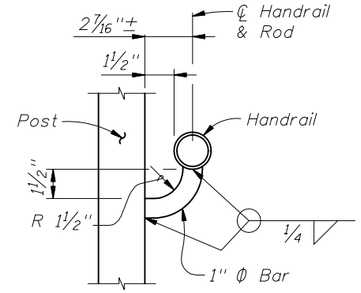
REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Deleted Bicycle Railing option.			

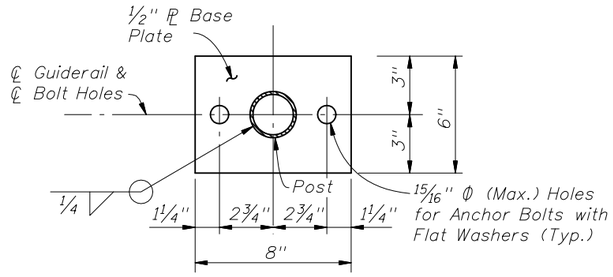
2008 Interim Design Standard

ALUMINUM PIPE GUIDERAIL

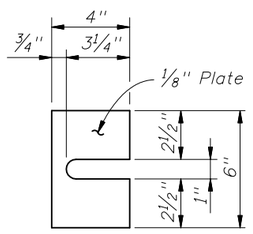
Interim Date	Sheet No.
01/01/08	3 of 5
Index No.	
870	



SECTION B-B
(Handrail Connection)



SECTION C-C
BASE PLATE DETAIL



SHIM PLATE
DETAIL

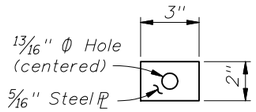
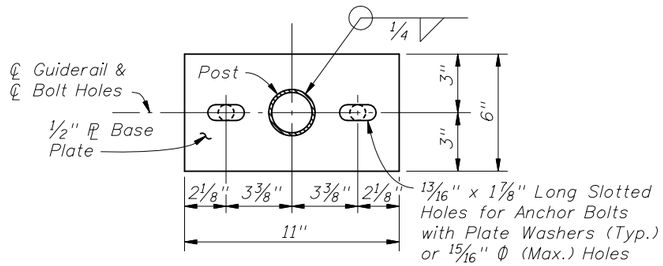
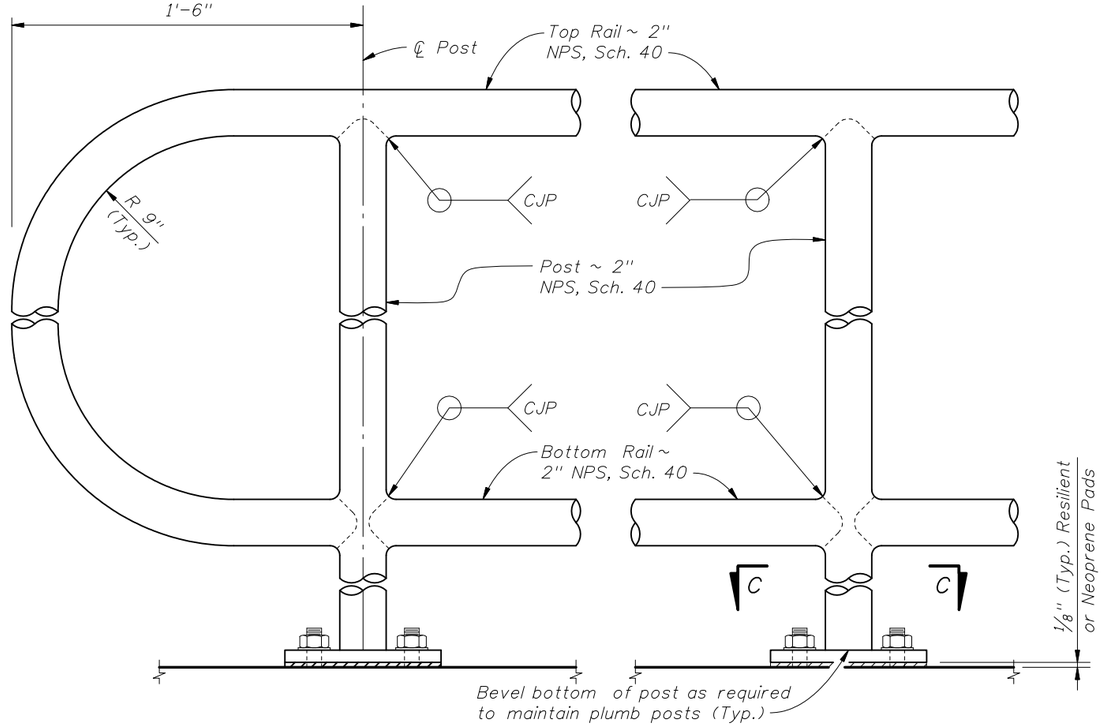


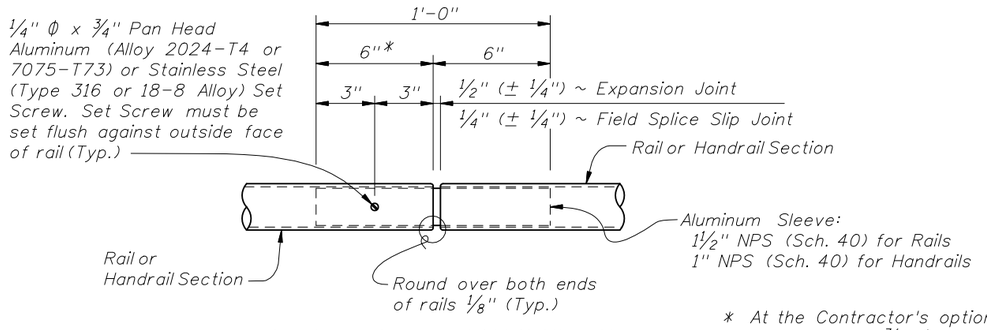
PLATE WASHER
DETAIL



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

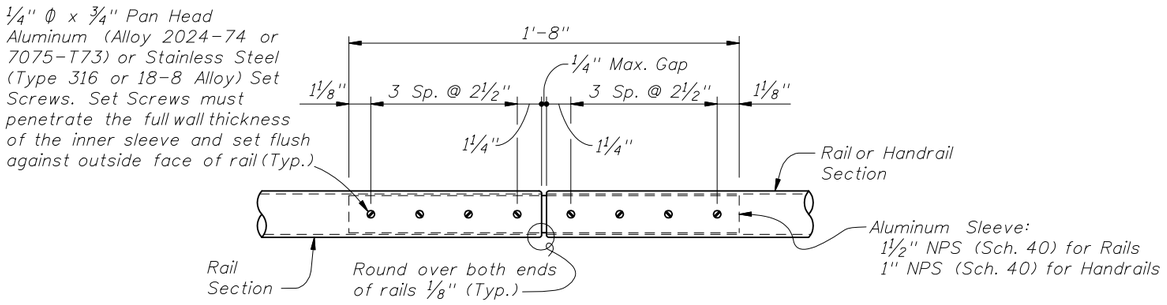


DETAIL "C" - RAIL CONNECTIONS
(Handrail Not Shown)

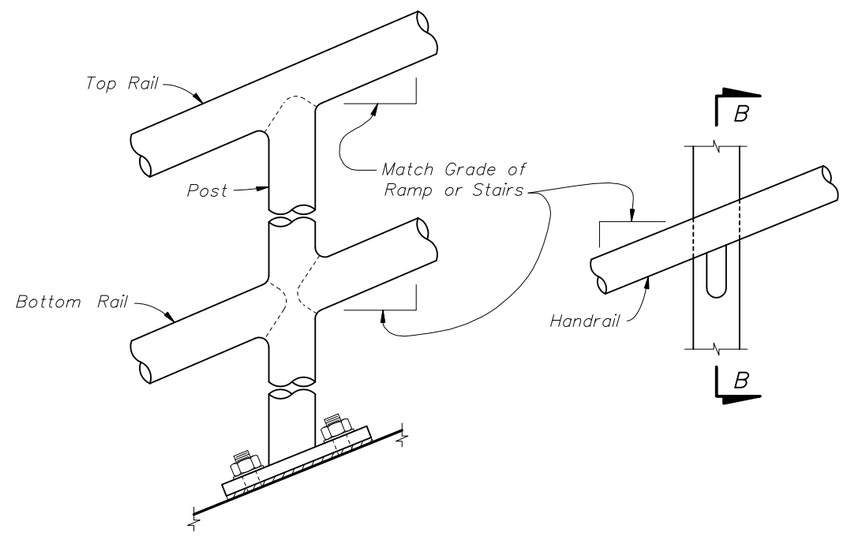


DETAIL "D" - EXPANSION JOINT
(FIELD SPLICE SLIP JOINT SIMILAR)

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

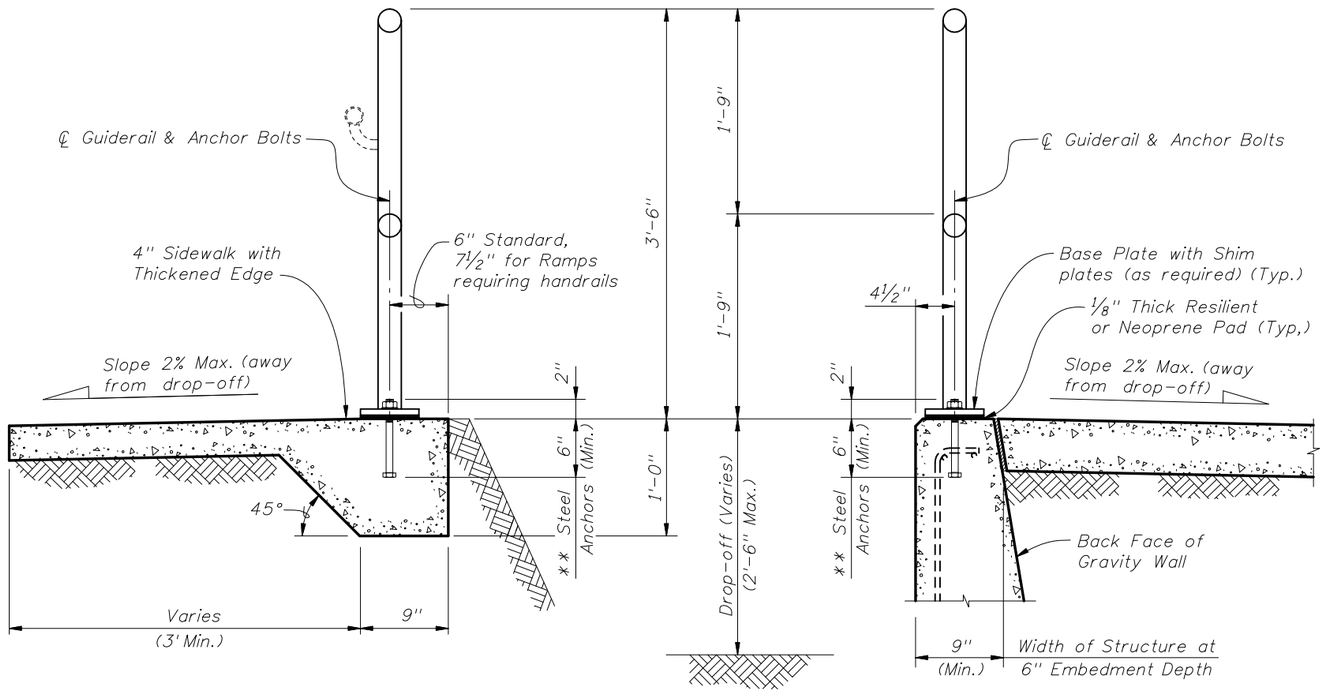
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Added requirements for set screw to be set flush against outside face of rail and 18-8 Alloy option in DETAILS "D" & "E", and 1/4" joint tolerance to Detail "D". Deleted Intermediate Rails from DETAILS "B" & "C".			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

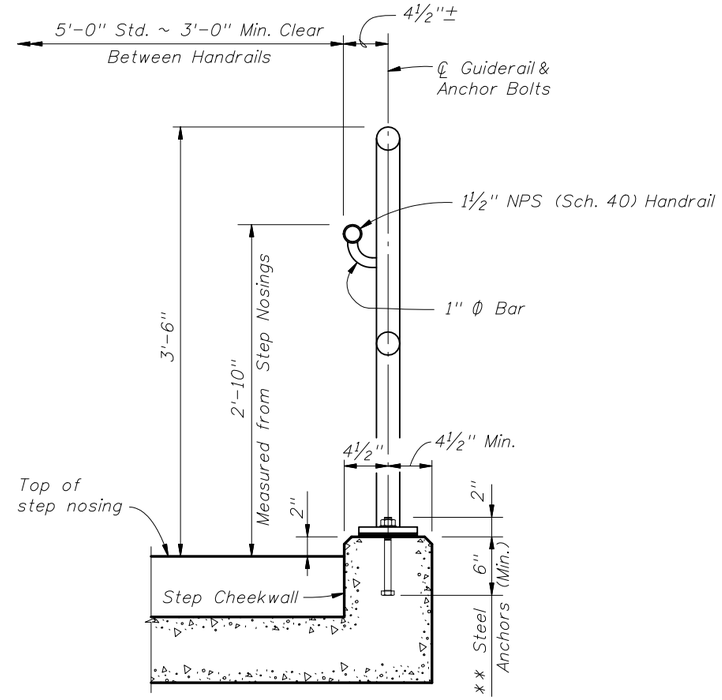
ALUMINUM PIPE GUIDERAIL

Interim Date: 01/01/08
Sheet No.: 4 of 5
Index No.: 870

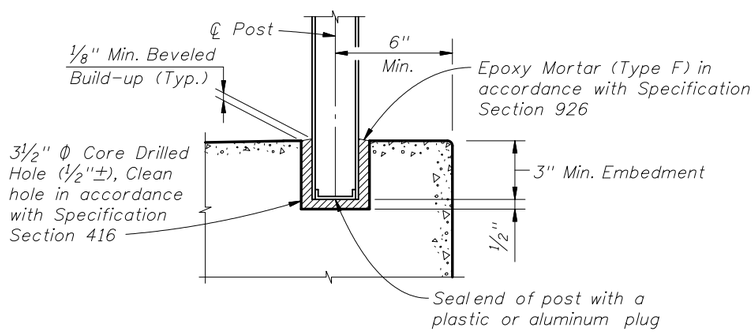


TYPICAL SECTION ON CONCRETE SIDEWALK

TYPICAL SECTION ON GRAVITY WALL
(Other Retaining Walls Similar)



TYPICAL SECTION ON STEPS & STAIRS



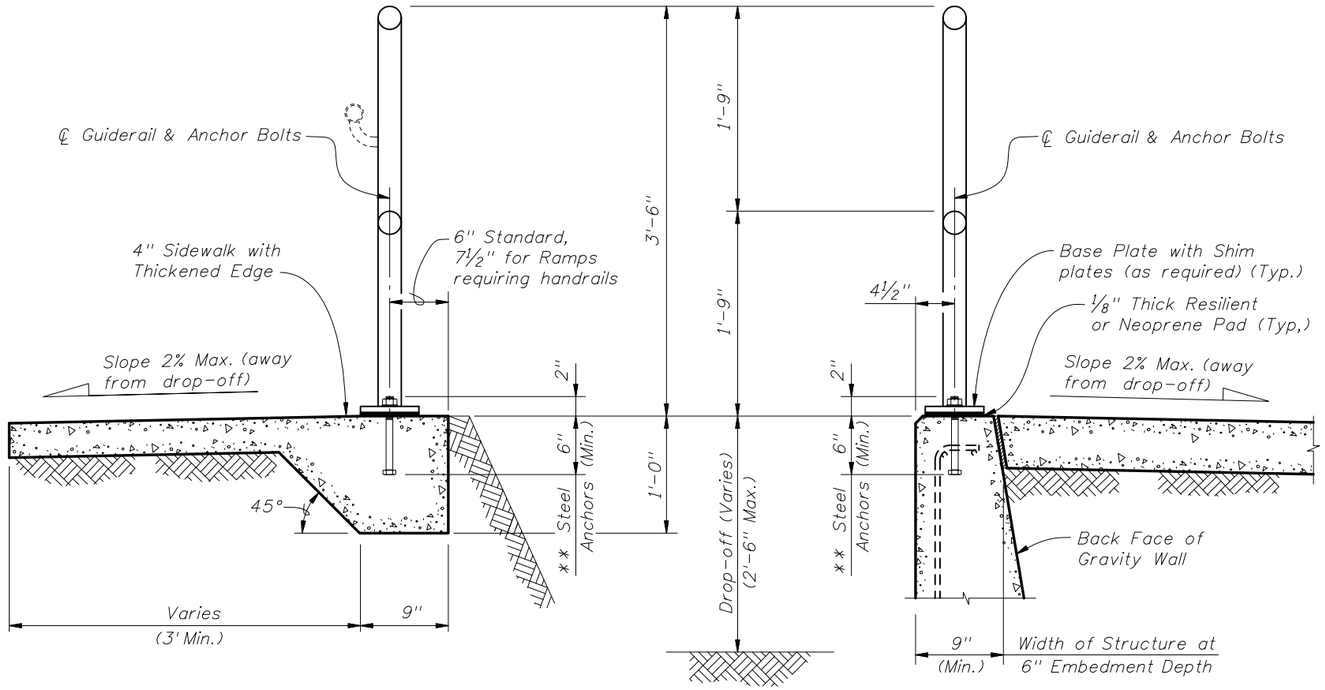
OPTIONAL SIDEWALK ANCHORAGE DETAIL

NOTES:

** 2 ~ ¾" Ø 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.

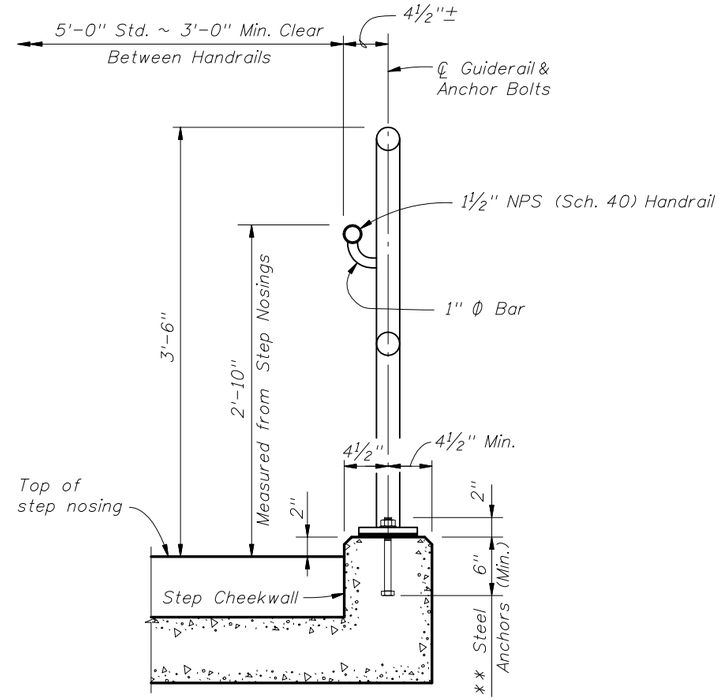
*** Adhesive anchors shall be fully threaded headless anchor bolts set in drilled holes (manufacturer recommended diameter) with an Adhesive Bonding Material System in accordance with Specification Section 937 and installed in accordance with Specification Section 416. The minimum embedment is 6".

REVISIONS						2008 Interim Design Standard	Interim Date 01/01/08	Sheet No. 5 of 5
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			
01/01/08	SJN	Deleted 4'-6" Bicycle Railing option. Corrected Guiderail height on step to top of nosing.				ALUMINUM PIPE GUIDERAIL	Index No. 870	

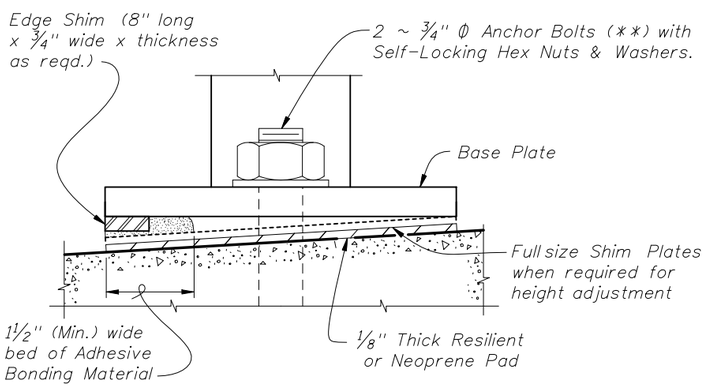


TYPICAL SECTION ON CONCRETE SIDEWALK

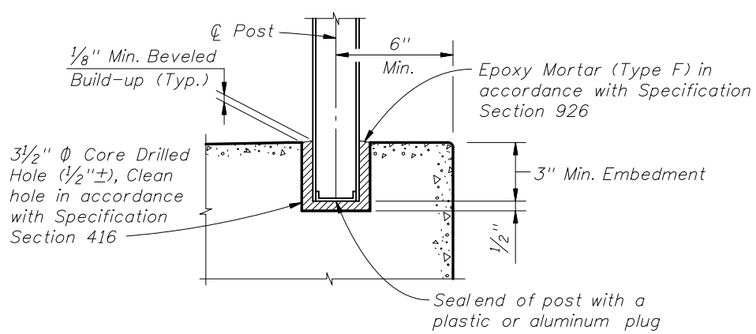
TYPICAL SECTION ON GRAVITY WALL
(Other Retaining Walls Similar)



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 ~ ¾" Ø 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
01/01/08	SJN	Deleted 4'-6" Bicycle Railing option. Corrected Guiderail height on step to top of nosing.			
07/01/08	SJN	Added DETAIL "F" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION).			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

ALUMINUM PIPE GUIDERAIL

Interim Date 07/01/08

Sheet No. 5 of 5

Index No. 870

NOTES

DESIGN SPECIFICATIONS:

U.S. Access Board "ADA Accessibility Guidelines", July 2004 as adopted with amendments by the USDOT under 49CFR Part 37.

DESIGN LIVE LOADS:

The Guiderail shall resist an equivalent Service Loading of 50 lbs./ft. acting simultaneously in the transverse and vertical direction when applied at the height of the top rail.

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. 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

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Deleted Pedestrian and Bicycle designations from DESIGN LIVE LOADS and ALTERNATE DESIGN notes.			

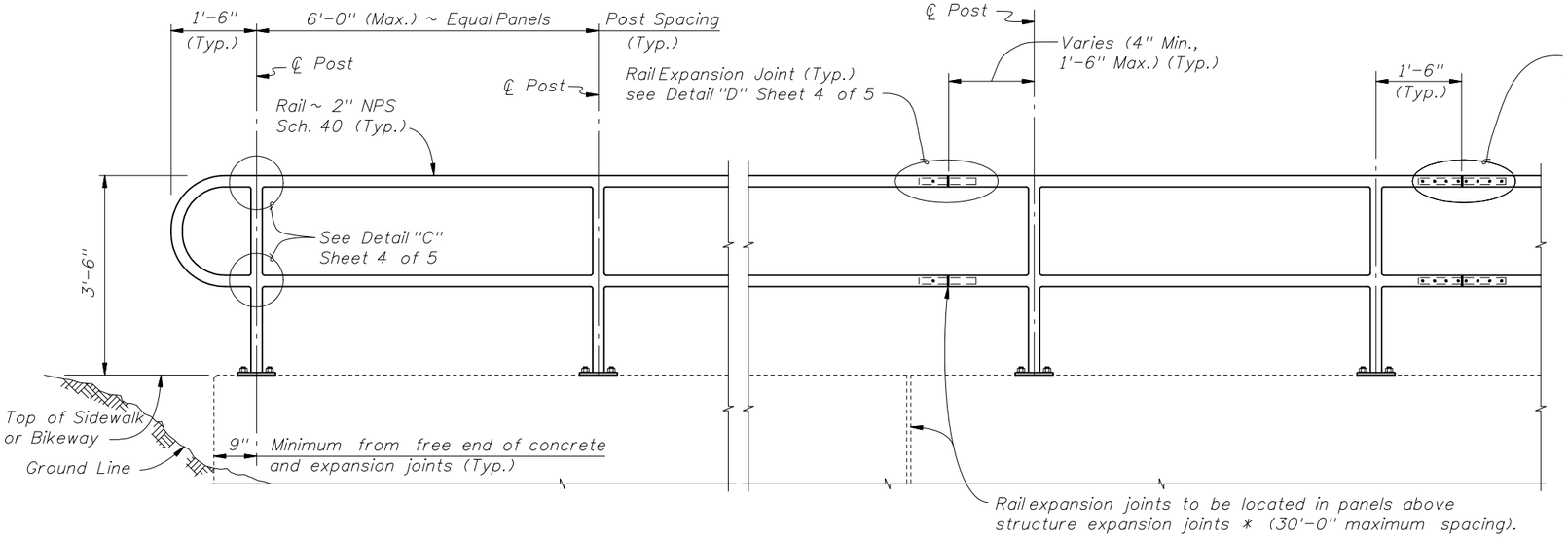
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

STEEL PIPE GUIDERAIL

Interim Date 01/01/08

Index No. 880



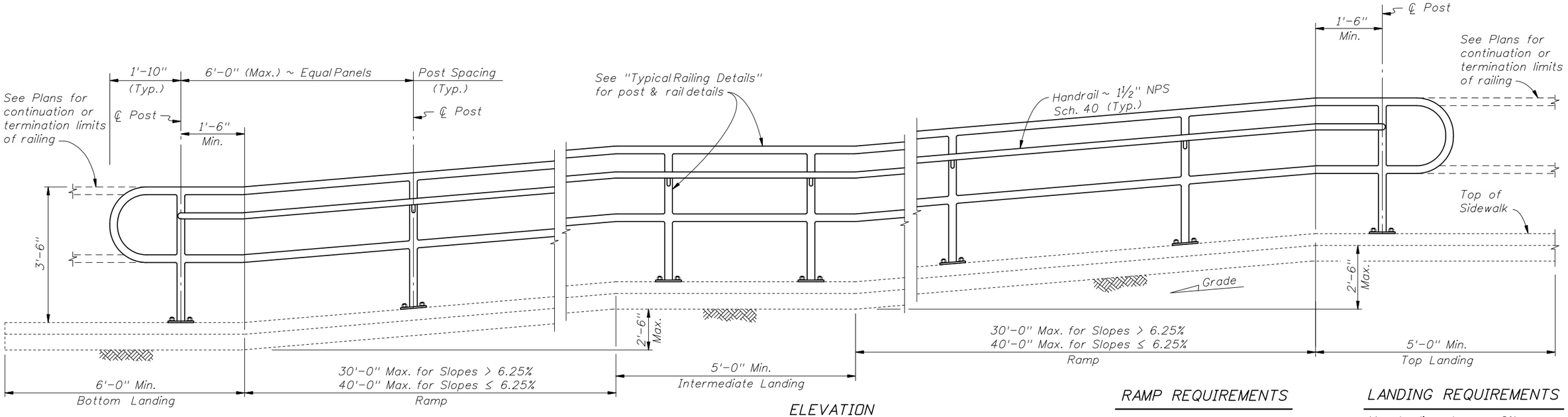
ELEVATION

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.

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%

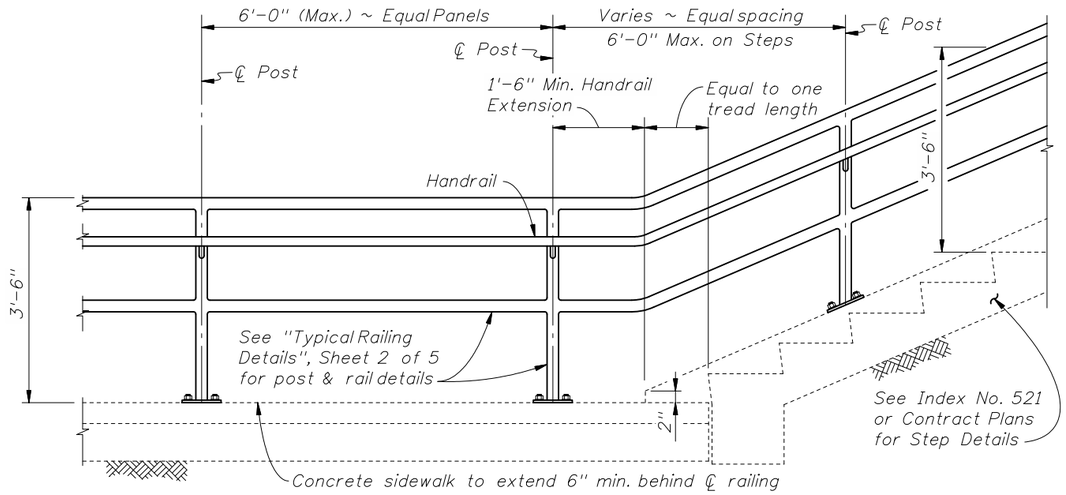
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Deleted Bicycle Railing option and ** note. Changed maximum ramp lengths.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

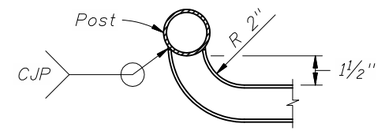
2008 Interim Design Standard

STEEL PIPE GUIDERAIL

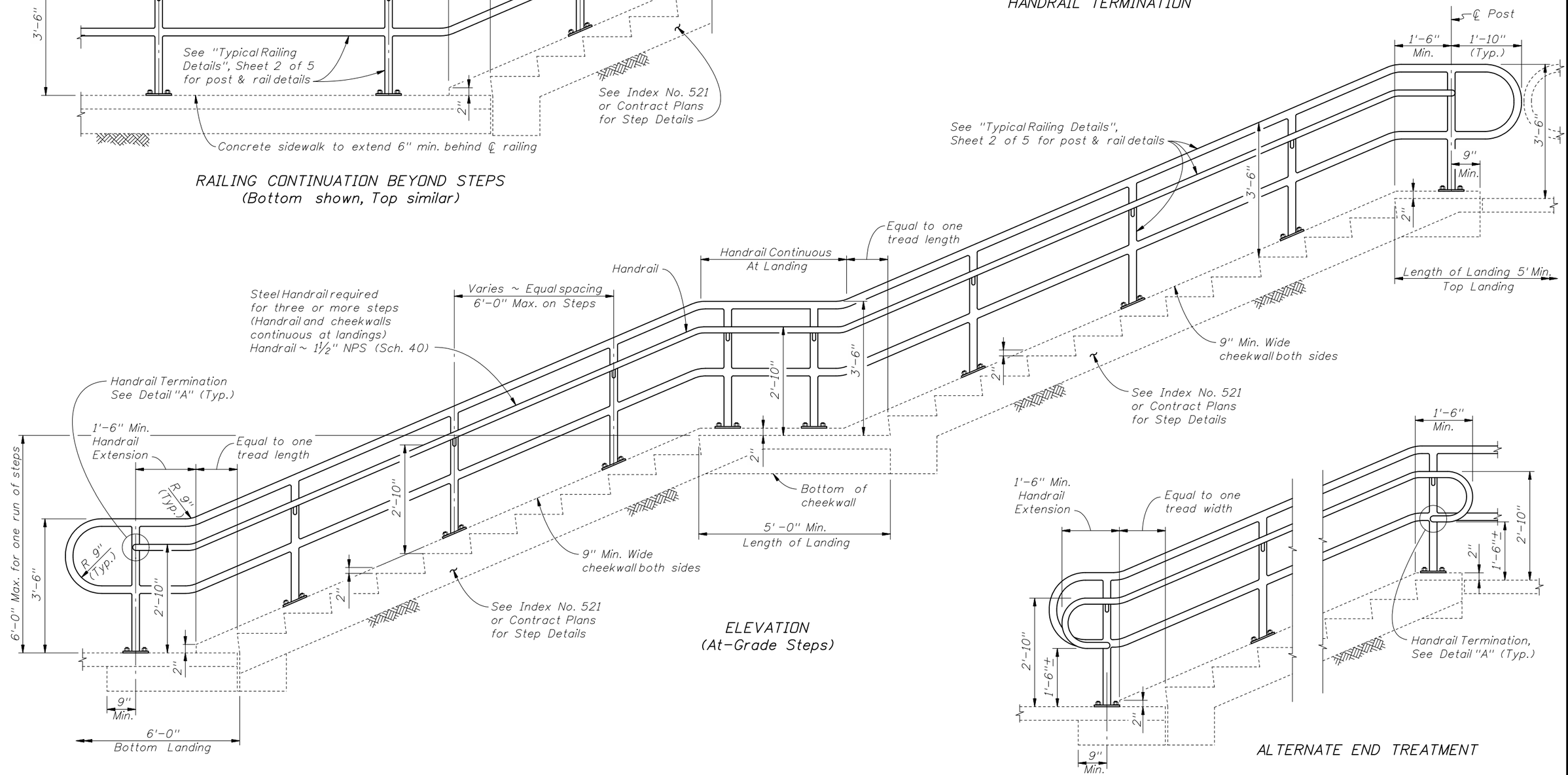
Interim Date: 01/01/08
Sheet No.: 2 of 5
Index No.: 880



RAILING CONTINUATION BEYOND STEPS
(Bottom shown, Top similar)



DETAIL "A" - PLAN VIEW
HANDRAIL TERMINATION



ELEVATION
(At-Grade Steps)

ALTERNATE END TREATMENT

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Deleted Bicycle Railing option.			

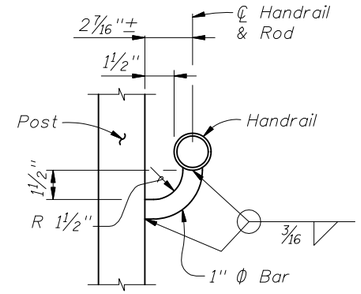
2008 Interim Design Standard

STEEL PIPE GUIDERAIL

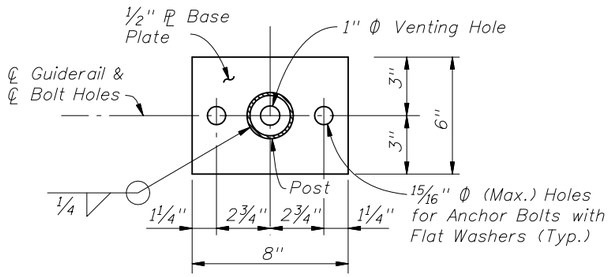
Interim Date 01/01/08

Sheet No. 3 of 5

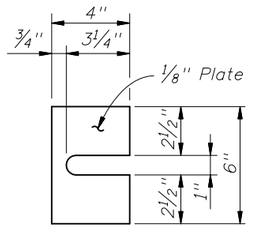
Index No. 880



SECTION B-B
(Handrail Connection)



SECTION C-C
BASE PLATE DETAIL



SHIM PLATE
DETAIL

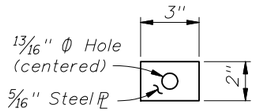
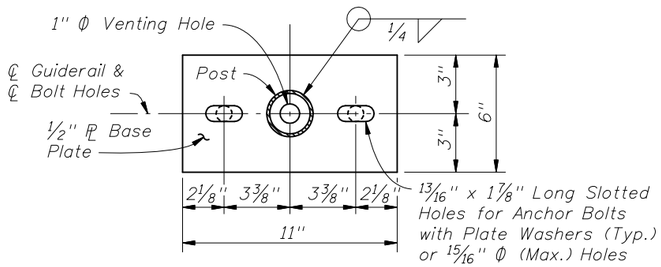
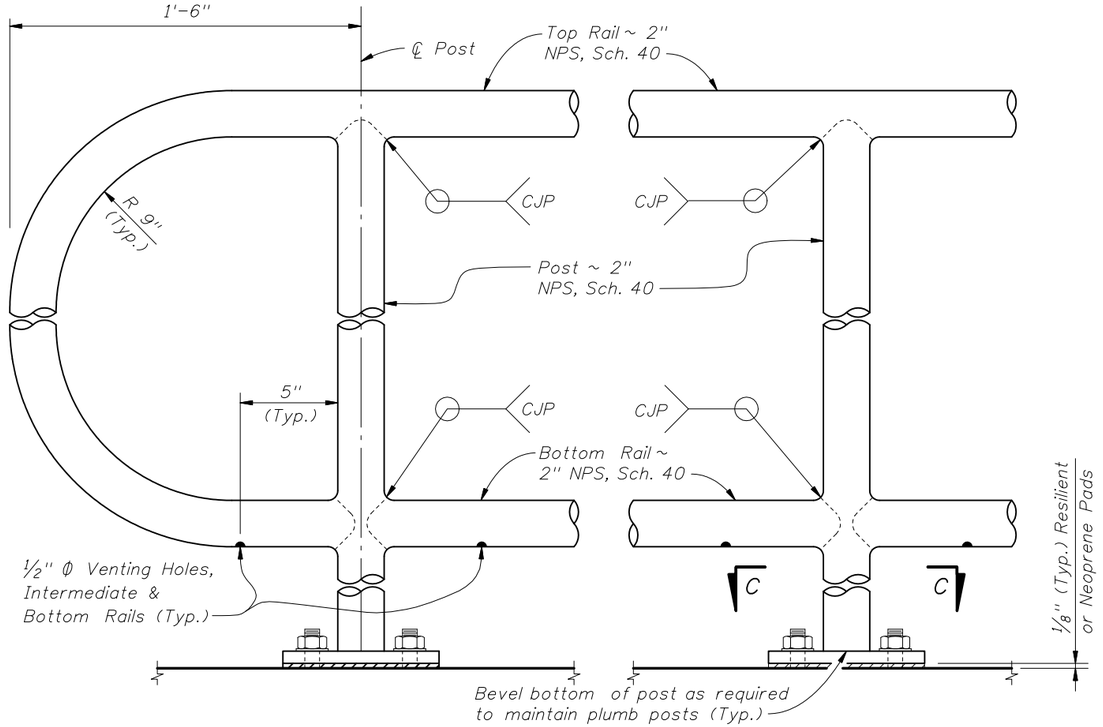


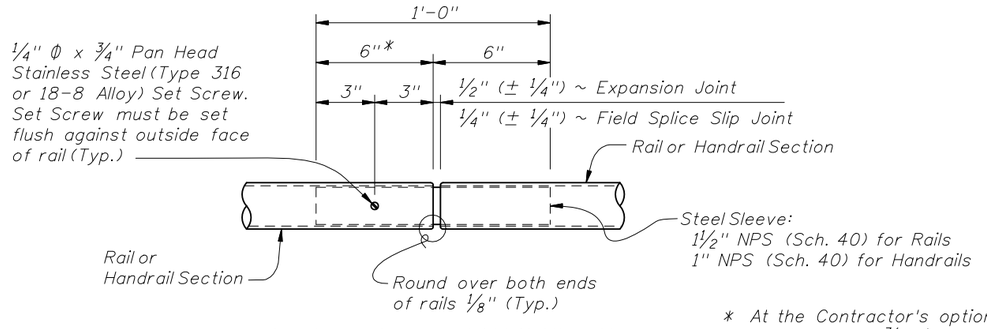
PLATE WASHER
DETAIL



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

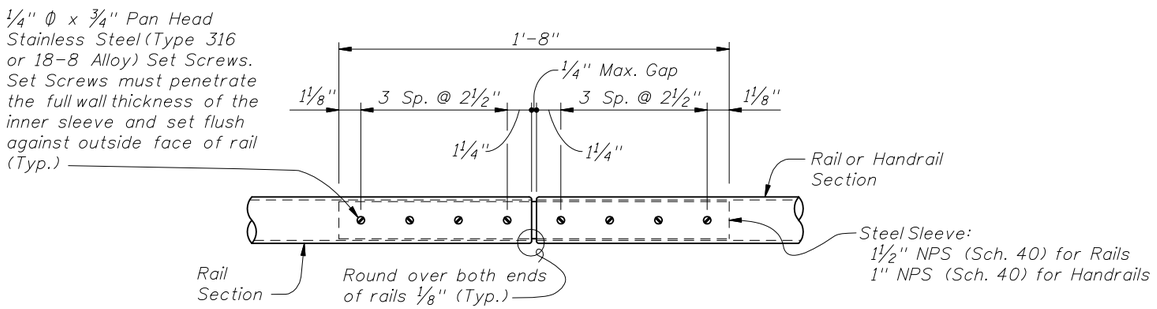


DETAIL "C" - RAIL CONNECTIONS
(Handrail Not Shown)

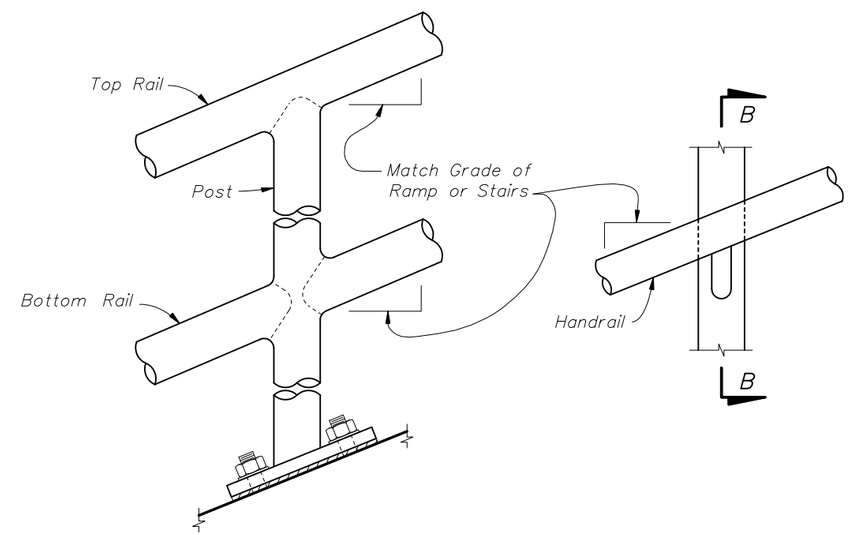


DETAIL "D" - EXPANSION JOINT
(FIELD SPLICE SLIP JOINT SIMILAR)

* At the Contractor's option, embedded length may be 4" when a 3/4" Ø plug weld is substituted for the 1/4" Ø 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
01/01/08	SJN	Added requirements for set screw to be set flush against outside face of rail and "18-8 Alloy" option in DETAILS "D" & "E", and 1/4" joint tolerance to Detail "D". Deleted Intermediate Rails from DETAILS "B" & "C".			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

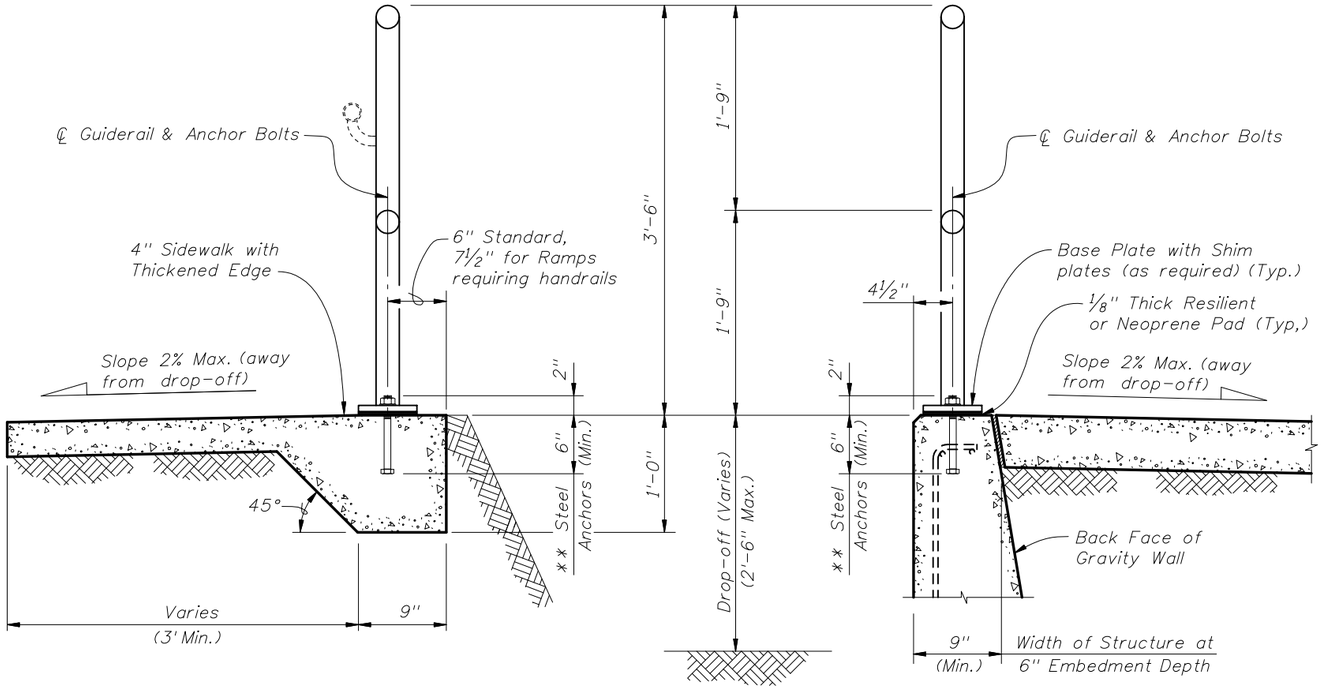
2008 Interim Design Standard

STEEL PIPE GUIDERAIL

Interim Date 01/01/08

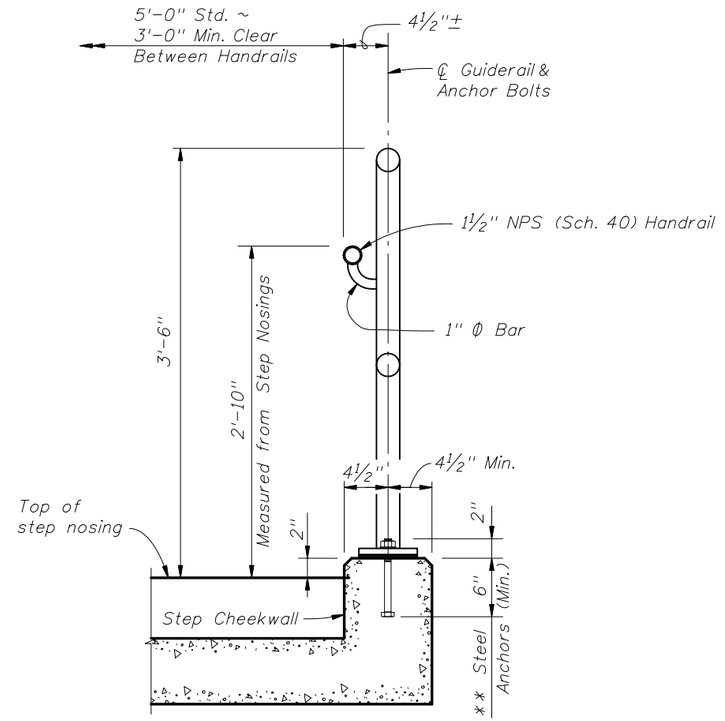
Sheet No. 4 of 5

Index No. 880

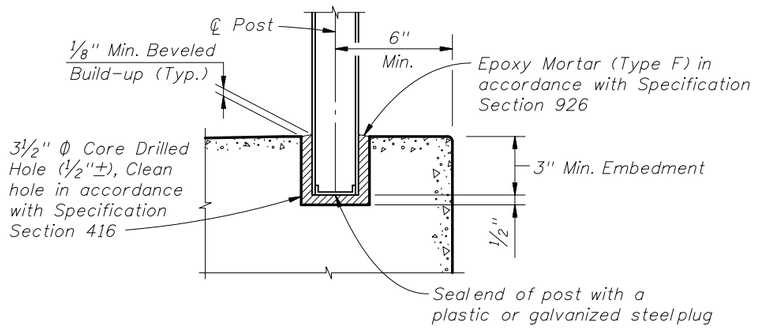


TYPICAL SECTION ON CONCRETE SIDEWALK

TYPICAL SECTION ON GRAVITY WALL
(Other Retaining Walls Similar)



TYPICAL SECTION ON STEPS & STAIRS



OPTIONAL SIDEWALK ANCHORAGE DETAIL

NOTES:
** 2 ~ ¾" Ø 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
01/01/08	SJN	Deleted 4'-6" Bicycle railing option. Corrected Guiderail height on step to top of nosing.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

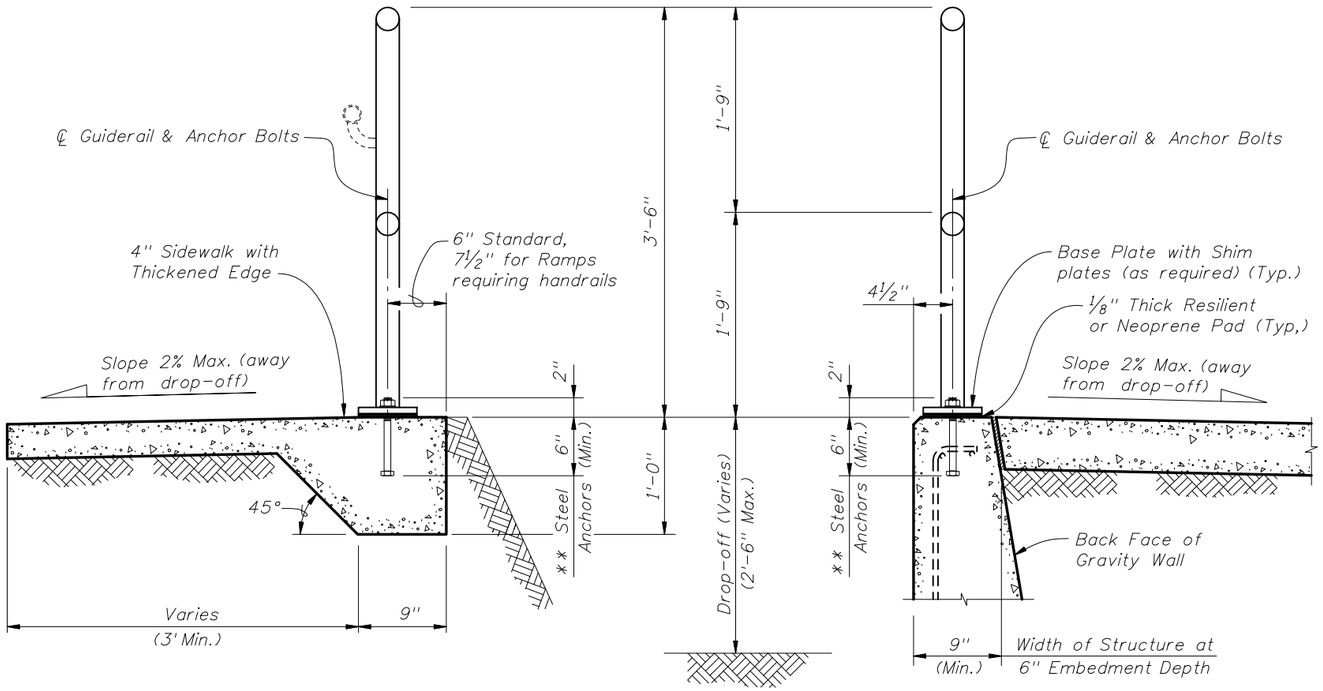
2008 Interim Design Standard

STEEL PIPE GUIDERAIL

Interim Date 01/01/08

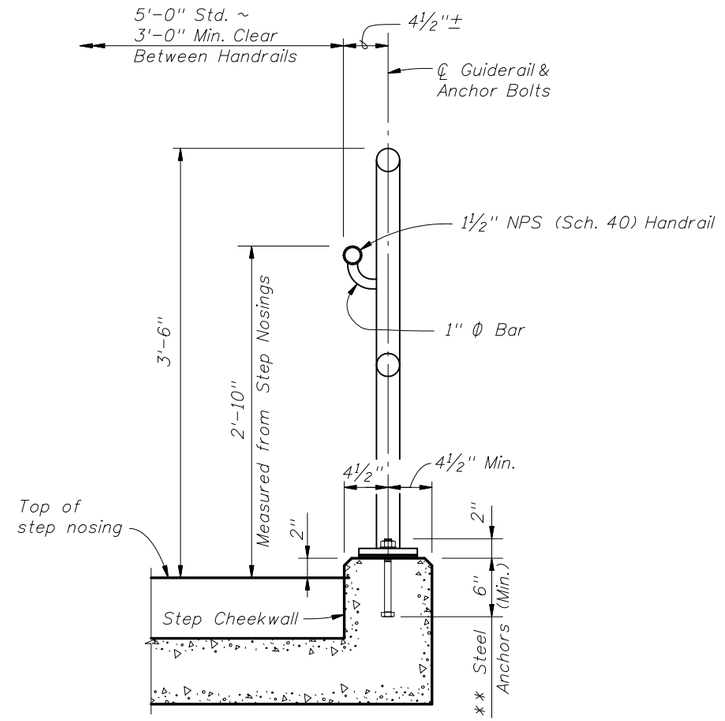
Sheet No. 5 of 5

Index No. 880

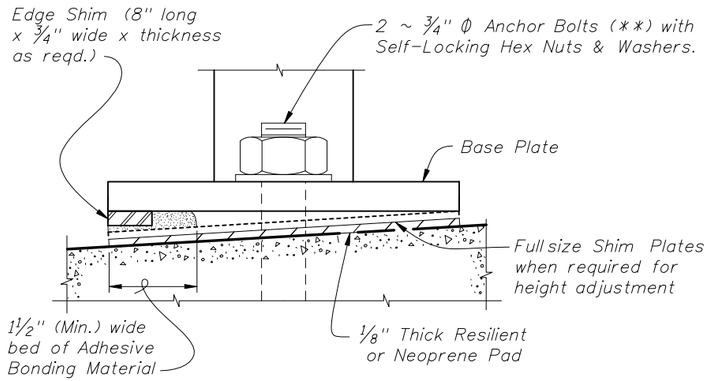


TYPICAL SECTION ON CONCRETE SIDEWALK

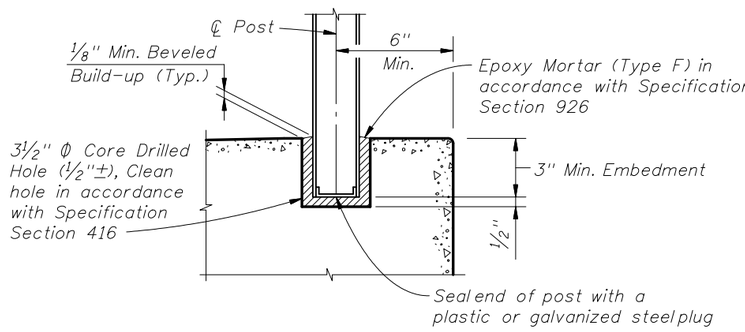
TYPICAL SECTION ON GRAVITY WALL
(Other Retaining Walls Similar)



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 ~ ¾" Ø 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
01/01/08	SJN	Deleted 4'-6" Bicycle railing option. Corrected Guiderail height on step to top of nosing.			
07/01/08	SJN	Added DETAIL "F" (OPTIONAL SHIMMING DETAIL FOR CROSS SLOPE CORRECTION).			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

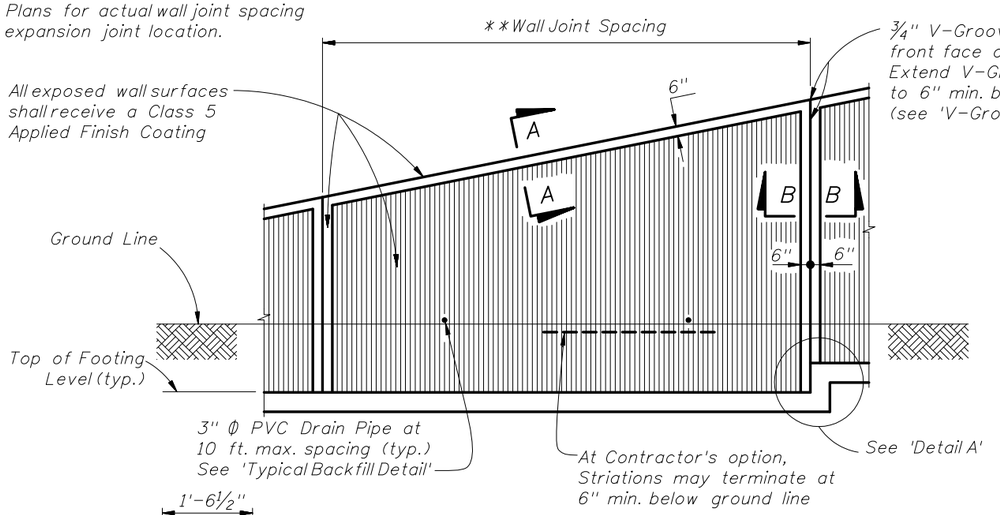
STEEL PIPE GUIDERAIL

Interim Date 07/01/08

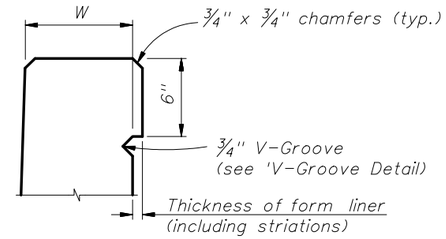
Sheet No. 5 of 5

Index No. 880

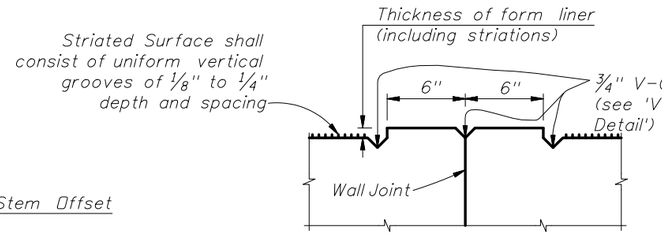
**Wall joint spacing 25 ft. maximum.
At minimum, every fourth wall joint to be an expansion joint.
See Plans for actual wall joint spacing and expansion joint location.



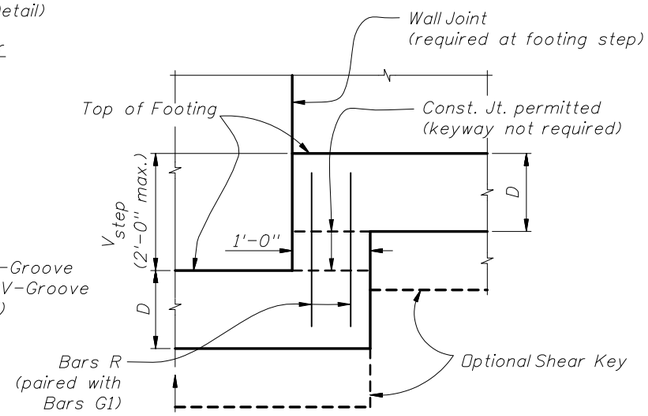
FRONT ELEVATION



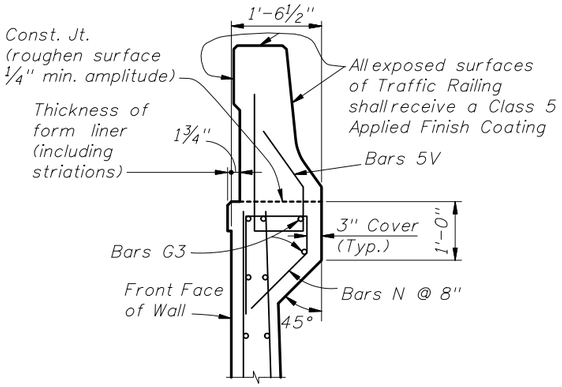
SECTION A-A



SECTION B-B

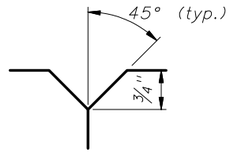


DETAIL A

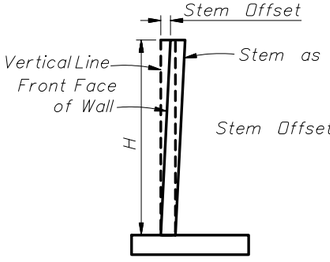


TRAFFIC RAILING ON WALL DETAIL

(for Traffic Railing details see Index No. 420)



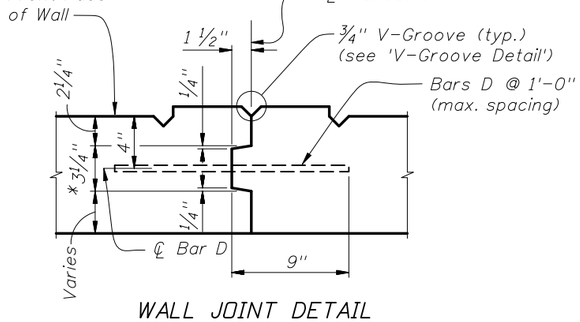
V-GROOVE DETAIL



Stem Offset (in.) = H(ft.)/16

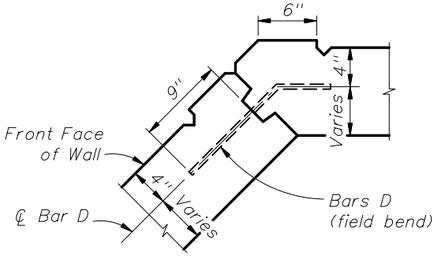
STEM OFFSET VALUES

(for H < 20 ft.)

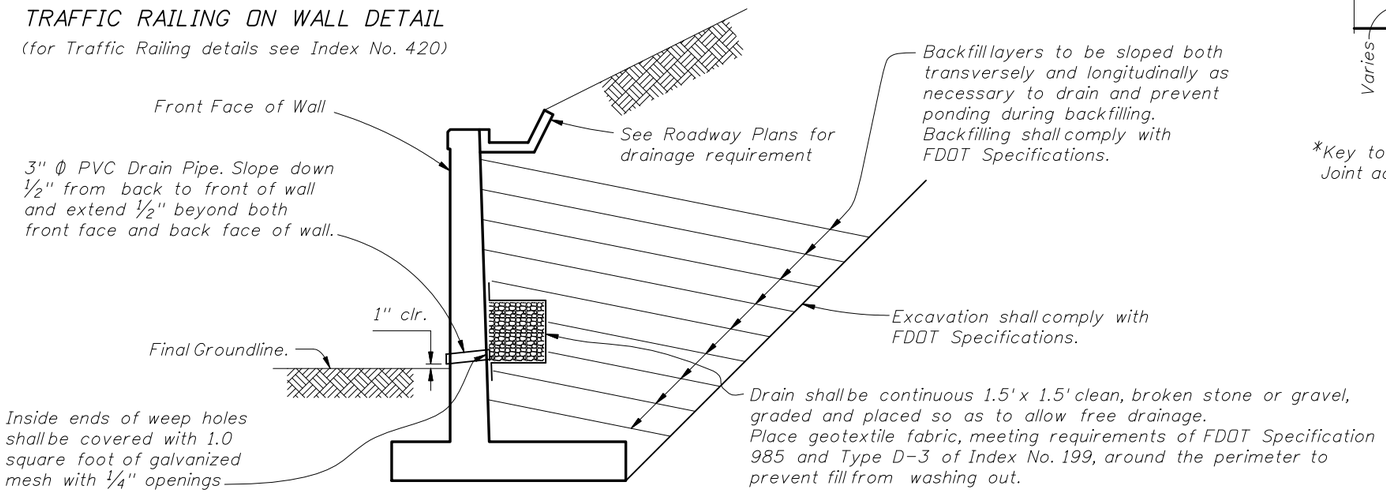


WALL JOINT DETAIL

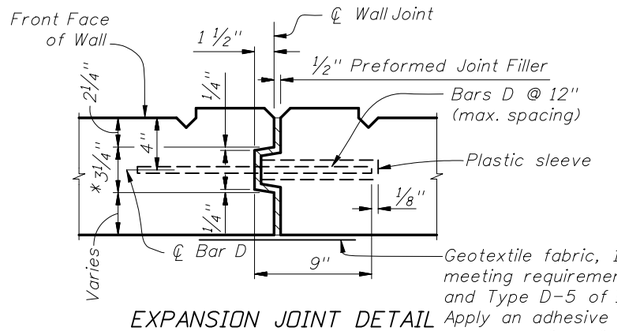
*Key to stop 6" from top of wall.
Joint across top of wall to be straight line.



TYPICAL CORNER JOINT DETAIL



TYPICAL BACKFILL DETAIL



EXPANSION JOINT DETAIL

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	CBH	Changed to plastic sleeve expansion joint.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

RETAINING WALL - CAST IN PLACE

Interim Date 07/01/08

Sheet No. 2 of 2

Index No. 5100

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 and the following soil conditions: Sites with soil SPT N values between 10 and 40.

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: 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, Grade 50, 60 or 70 durometer hardness 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 ½" Plain Pads, Grade 50 durometer hardness.
   b. 20' post spacing and < 18' wall height: 4" x 4" x ½" Plain Pads, Grade 50 durometer hardness.
   c. 20' post spacing and ≥ 18' wall height: 4" x 5" x ½" Plain Pads, Grade 50 durometer hardness.

J. CASTING TOLERANCES:
1. Overall Height & Width: +/- ¼"
2. Thickness: +/- ¼"
3. Plane of side mold: +/- 1/16"
4. Openings: +/- ½"
5. Out of Square: ⅛" per 6 ft., but not more than ⅜" 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.

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 stacked panels (upper and lower), each less than 12 ft. in height, and with the height of the lower panel not less than one third of the height of the upper panel. Walls equal to or less than 12 ft. in height shall consist of a single 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. Panels shall not be installed until auger cast piles and C.I.P. collars have reached their 28 day design strength.
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.
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 1½" 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 ~ ¼" shims;
    b. For shimming heights greater than 1", use a minimum ¾" thick single shim and up to 3 ~ ¼" 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.

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.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Added note K. 11. Changed note H. 1, H. 2 and O. 2. Deleted General Specifications and note H. 3.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

PRECAST SOUND BARRIERS - GENERAL NOTES

Interim Date: 01/01/08

Sheet No.: 1 of 1

Index No.: 5200

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 and the following soil conditions: Sites with soil SPT N values between 10 and 40.

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, Grade 50, 60 or 70 durometer hardness 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 ½" Plain Pads, Grade 50 durometer hardness.
   b. 20' post spacing and < 18' wall height: 4" x 4" x ½" Plain Pads, Grade 50 durometer hardness.
   c. 20' post spacing and ≥ 18' wall height: 4" x 5" x ½" Plain Pads, Grade 50 durometer hardness.

J. CASTING TOLERANCES:
1. Overall Height & Width: +/- ¼"
2. Thickness: +/- ¼"
3. Plane of side mold: +/- 1/16"
4. Openings: +/- ½"
5. Out of Square: ⅛" per 6 ft., but not more than ⅜" 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.

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 accomodate 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. Panels shall not be installed until auger cast piles and C.I.P. collars have reached their 28 day design strength.
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.
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 1½" 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 ~ ¼" shims;
    b. For shimming heights greater than 1", use a minimum ¾" thick single shim and up to 3 ~ ¼" 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.

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.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Added note K. 11. Changed note H. 1, H. 2 and O. 2. Deleted General Specifications and note H. 3.			
07/01/08	SJN	Added "and Post Caps" to note C.1.b. Changed note K. 2.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

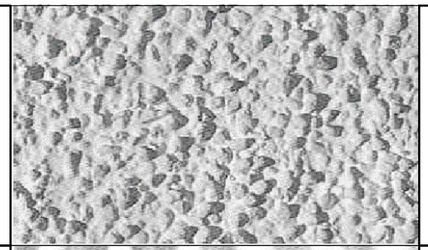
PRECAST SOUND BARRIERS - GENERAL NOTES

Interim Date 07/01/08

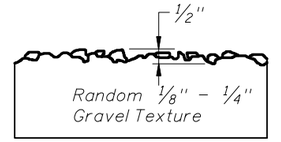
Sheet No. 1 of 1

Index No. 5200

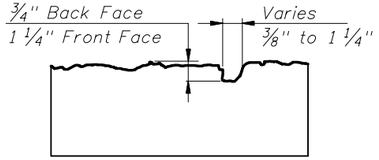
Type "A"
SMOOTH

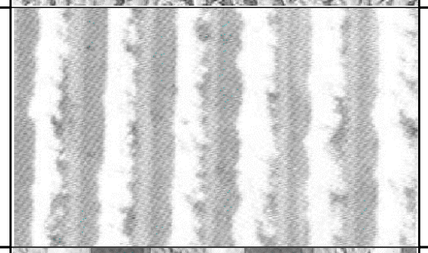


Type "F"
PEA GRAVEL

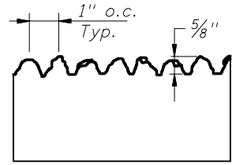


Type "B"
ASHLAR STONE

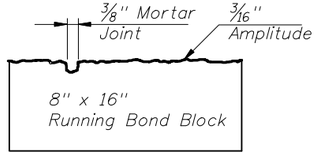


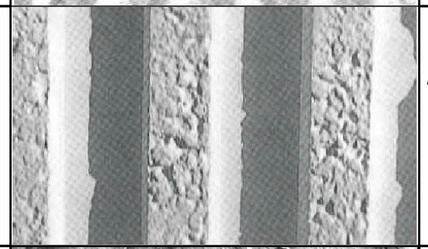


Type "G"
VERTICAL FRACTURED FIN

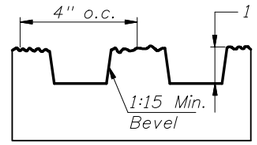


Type "C"
SPLIT FACE RUNNING BOND BLOCK

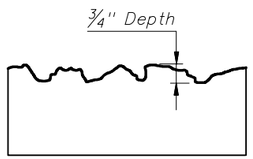


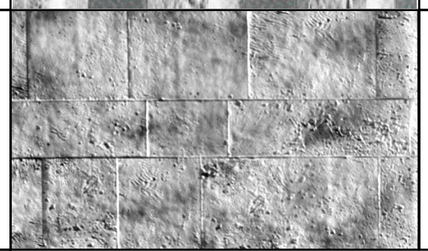


Type "H"
TRAPEZOID VERTICAL FINS W/ FRACTURED FACE (COLORADO DRAG AGGREGATE)

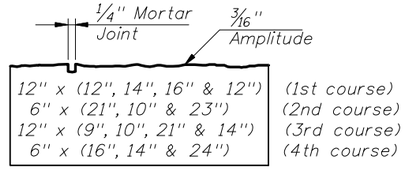


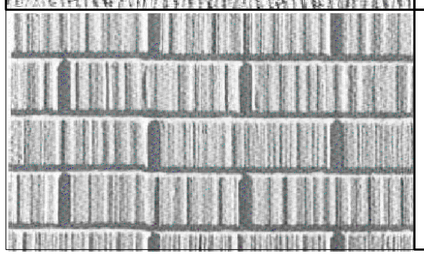
Type "D"
FRACTURED GRANITE



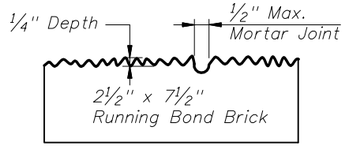


Type "I"
CUT CORAL BLOCK (RUNNING BOND)





Type "E"
WIRE-CUT BRICK



NOTES:

1. Surfaces shall be formed, rolled, or pressed using form liners in accordance with the Plans and Specifications (Class 3 Surface Finish).

2. See Wall Control Drawings for project aesthetic requirements.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	SJN	Added Type "I" texture option.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

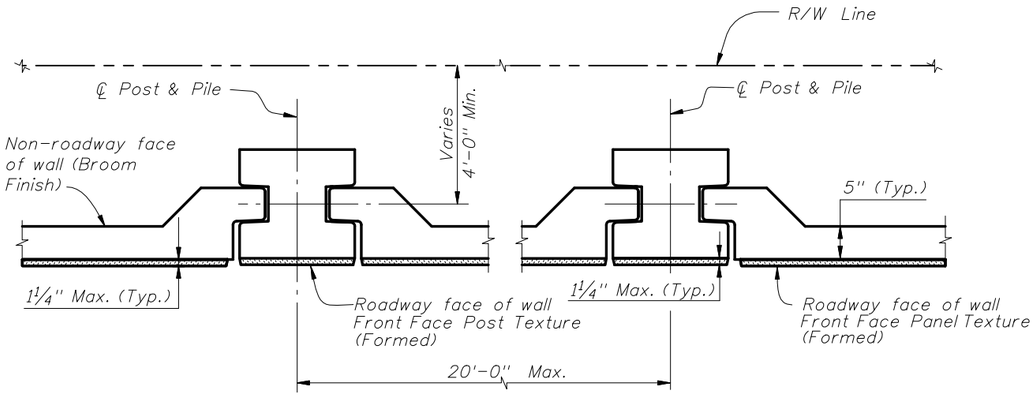
2008 Interim Design Standard

PRECAST SOUND BARRIERS - TEXTURE OPTIONS

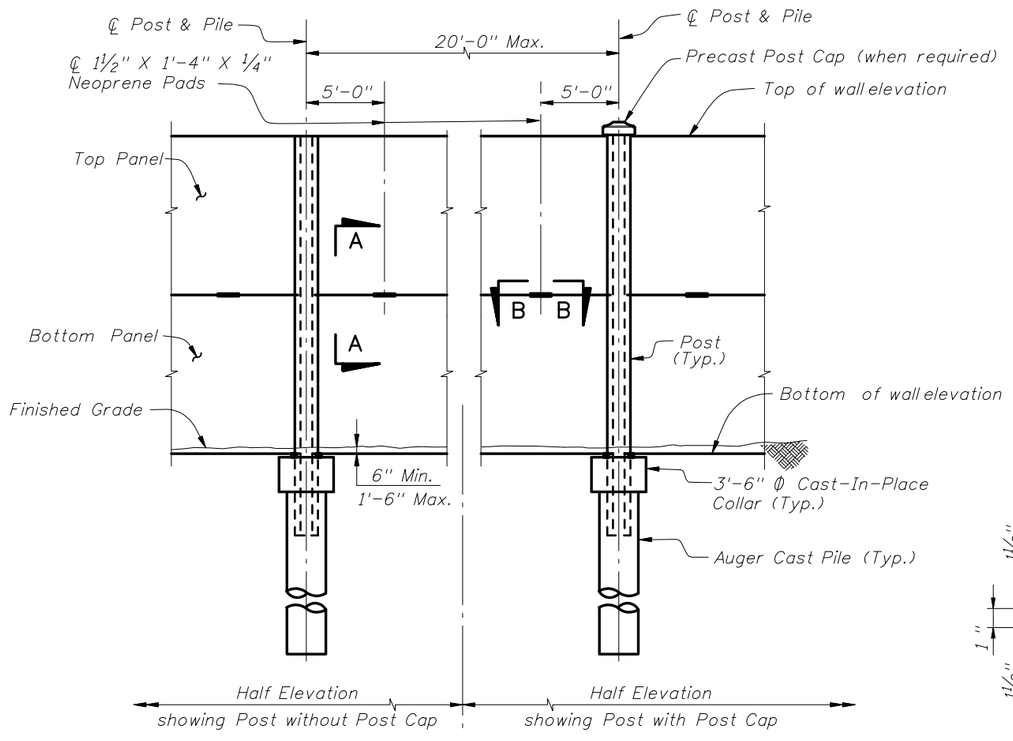
Interim Date 07/01/08

Sheet No. 1 of 1

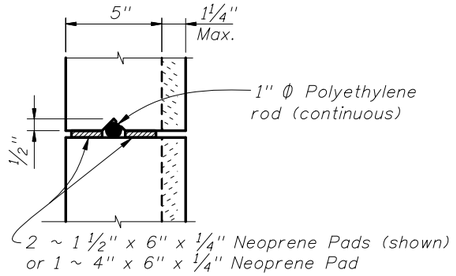
Index No. 5201



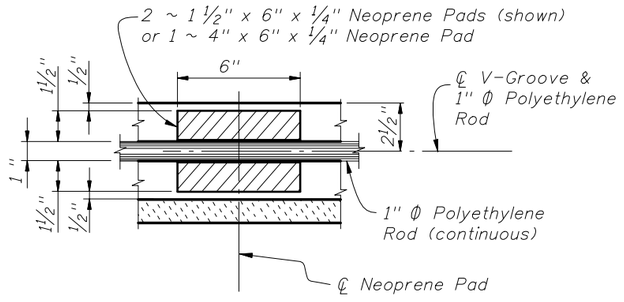
PLAN



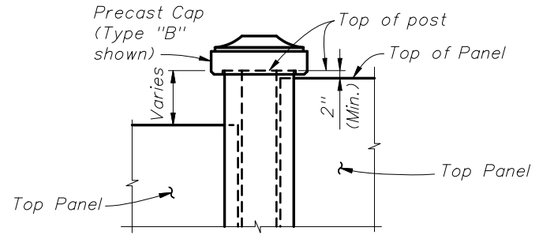
TYPICAL ELEVATION
(Pile/Post Connection Option A Shown)



SECTION A-A

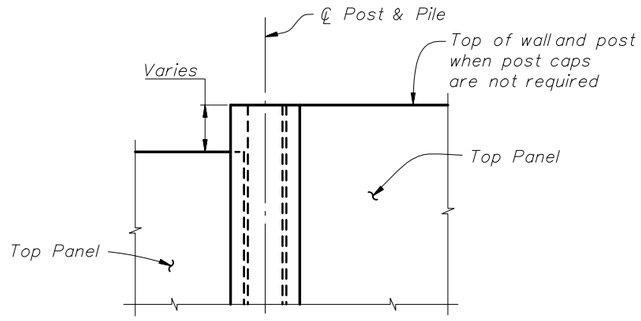


SECTION B-B

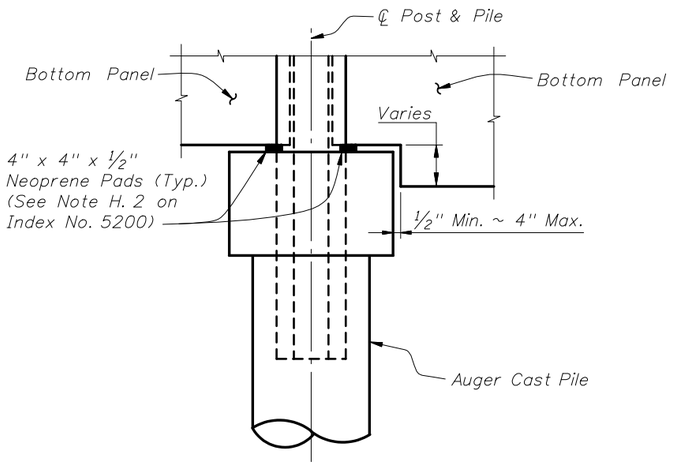


PRECAST POST CAP DETAIL

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



ELEVATION STEP AT TOP OF WALL



ELEVATION STEP AT BOTTOM OF WALL
(Pile/Post Connection Option A Shown)

TYPICAL PANELS AND POSTS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	SJN	Added Precast Post Cap Detail. Changed Step Panel At Bottom of Wall clearance to ½" Min. ~ 4" Max.; and Neoprene Pads in Section A-A & B-B.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

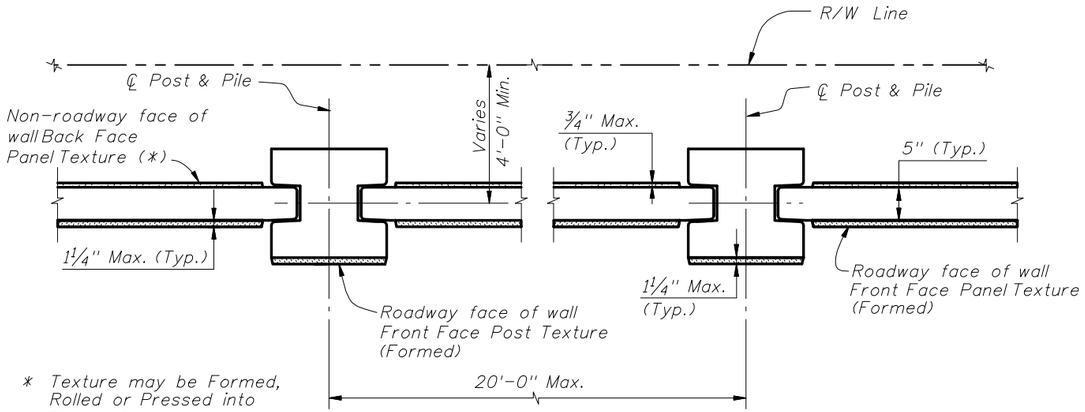
2008 Interim Design Standard

PRECAST SOUND BARRIERS - FLUSH PANEL OPTION

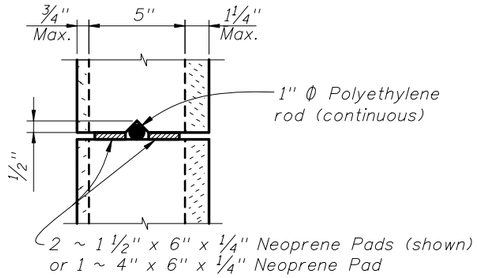
Interim Date: 07/01/08

Sheet No.: 1 of 4

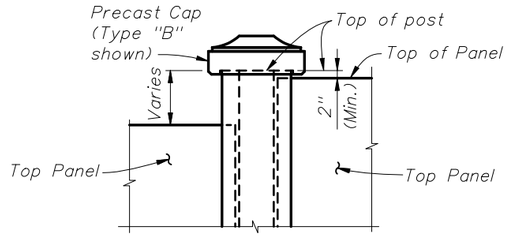
Index No.: 5202



PLAN

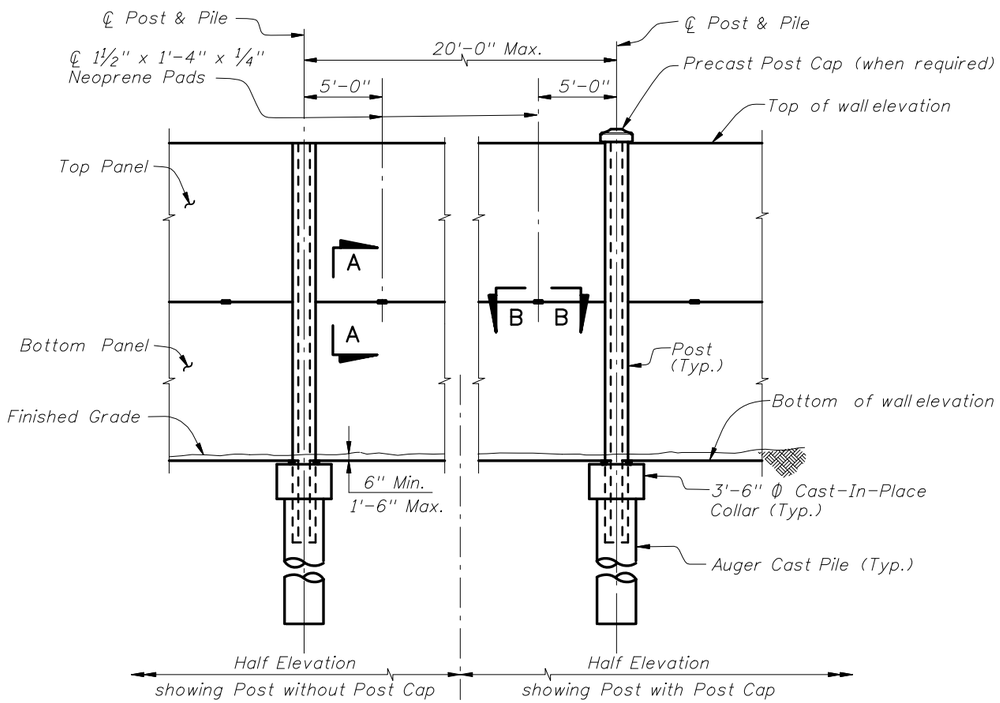


SECTION A-A

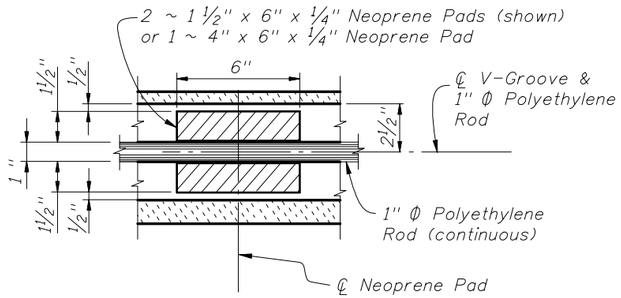


PRECAST POST CAP DETAIL

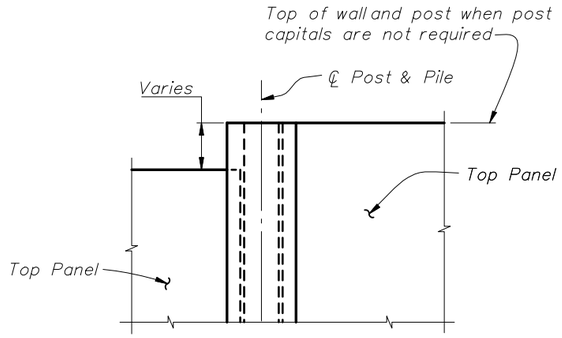
Note: See plans for Post Cap requirements.
See Index No. 5207 For Post Cap details.



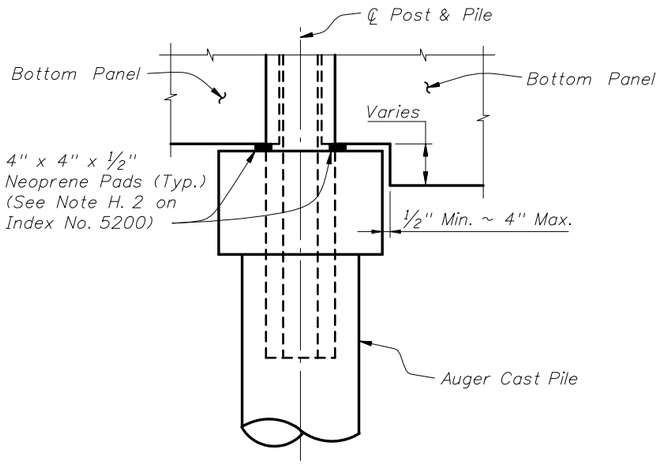
TYPICAL ELEVATION
(Textured Finish not Shown for Clarity)
(Pile/Post Connection Option A Shown)



SECTION B-B



ELEVATION STEP AT TOP OF WALL



ELEVATION STEP AT BOTTOM OF WALL
(Pile/Post Connection Option A Shown)

TYPICAL PANELS AND POSTS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	SJN	Added Precast Post Cap Detail. Changed Step Panel At Bottom of Wall clearance to ½" Min. ~ 4" Max.; and Neoprene Pads in Section A-A & B-B.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

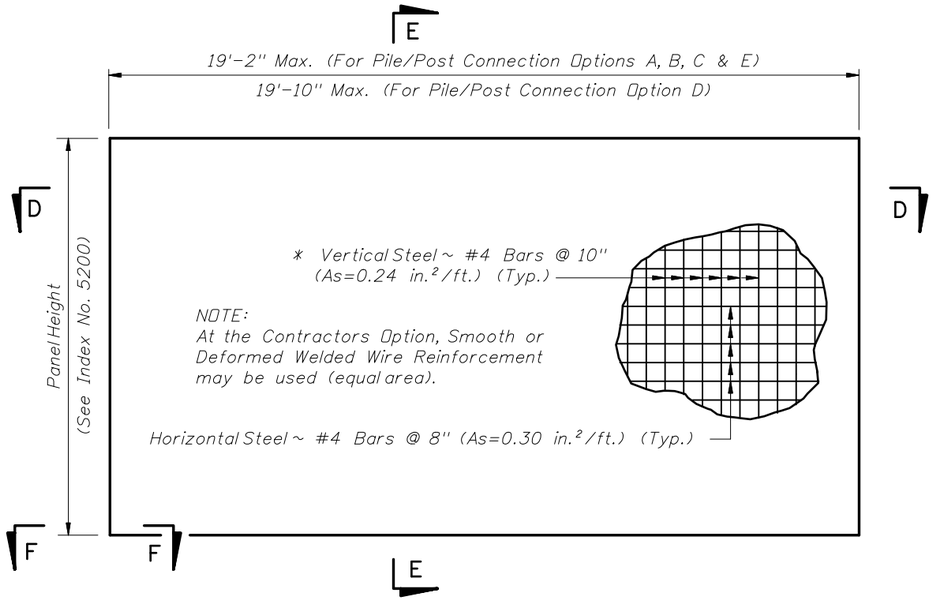
2008 Interim Design Standard

PRECAST SOUND BARRIERS - RECESSED PANEL OPTION

Interim Date 07/01/08

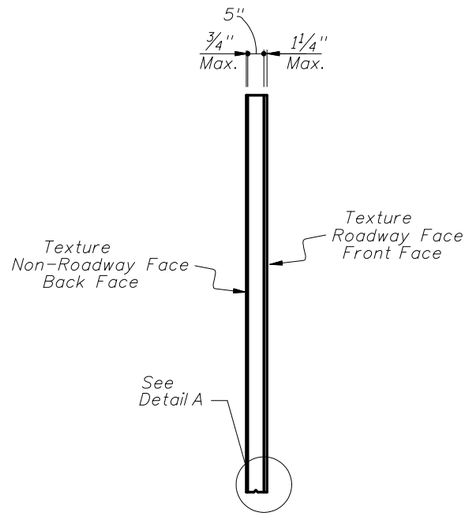
Sheet No. 1 of 5

Index No. 5203

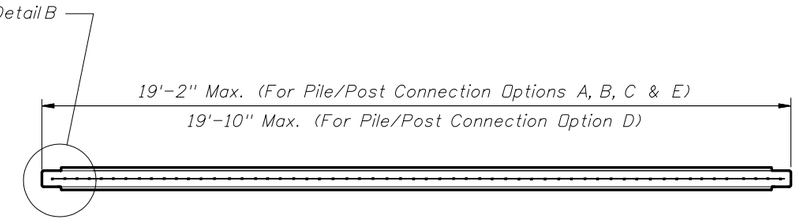


TYPICAL PANEL ELEVATION

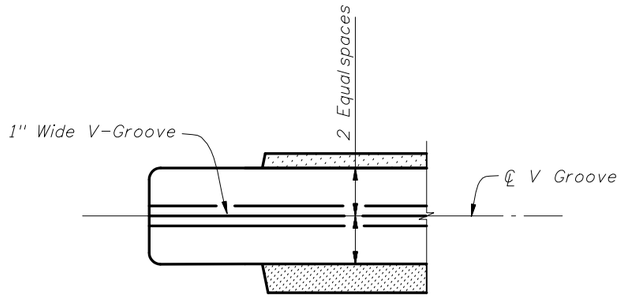
* In lieu of utilizing the pick up points below, panels may be cast vertically or cast horizontally then tilted upright using tilt-tables prior to lifting from form. In this case, the vertical steel may be reduced to #4 Bars @ 1'-3" (As=0.15 in.²/ft.).



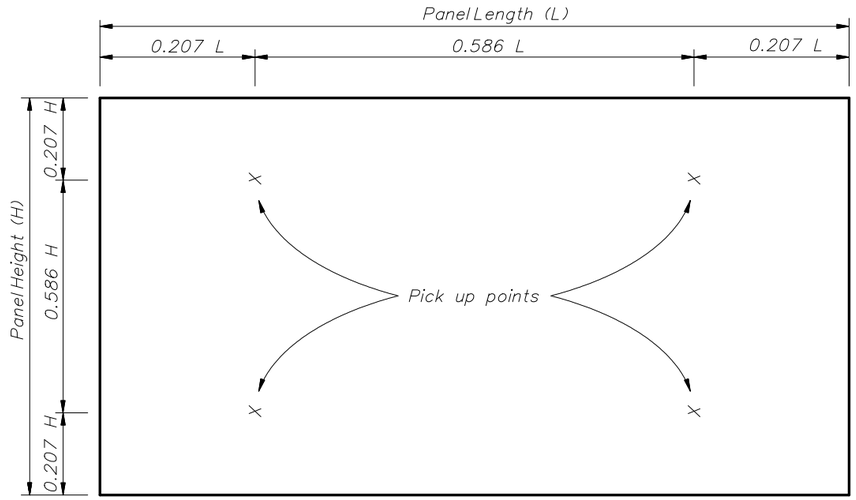
SECTION E-E



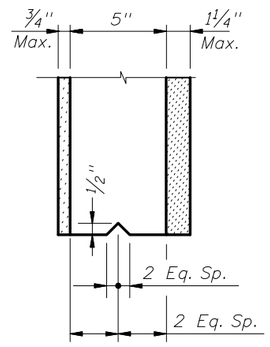
SECTION D-D



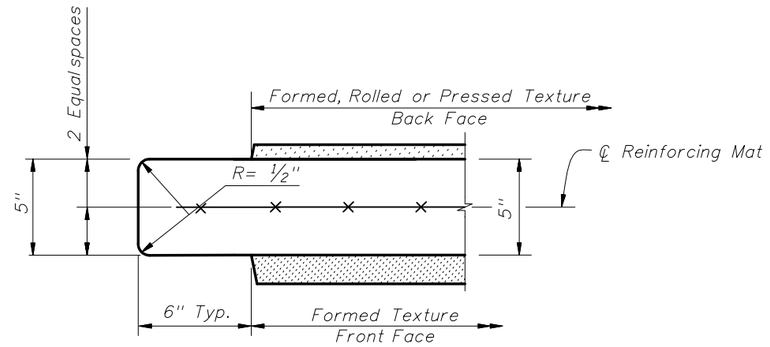
SECTION F-F



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



DETAIL A



DETAIL B
(Typical both ends)

TYPICAL PANELS AND POSTS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	SJN	Sheet renumbered.			

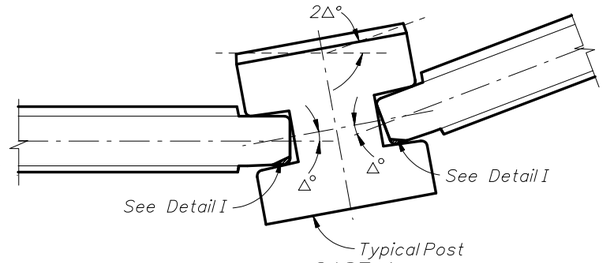
2008 Interim Design Standard

PRECAST SOUND BARRIERS - RECESSED PANEL OPTION

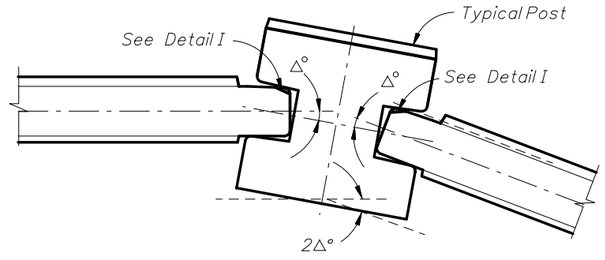
Interim Date 07/01/08

Sheet No. 2 of 5

Index No. 5203

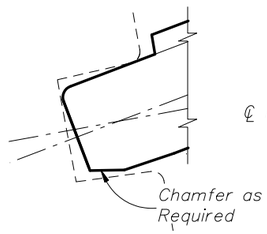


CASE 1
(Interior Angle)

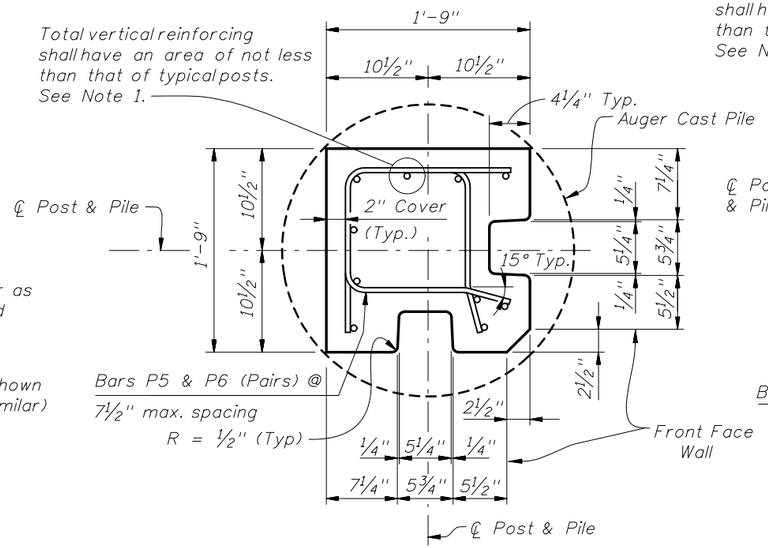


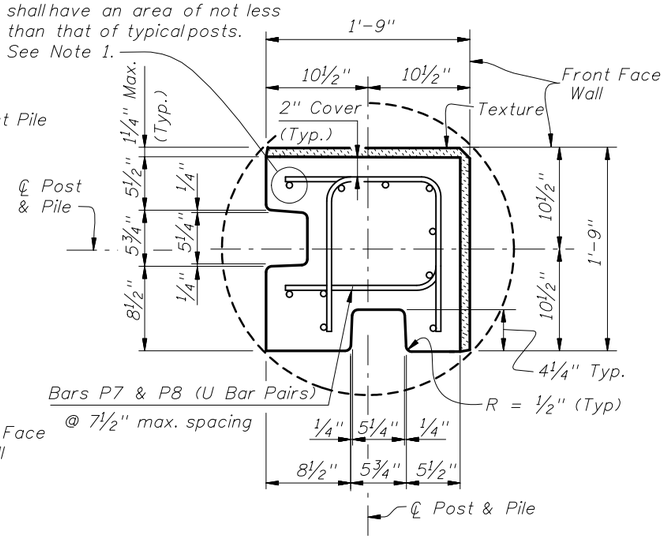
CASE 2
(Exterior Angle)
PIVOTING POINT DETAILS

NOTE: The shop drawings shall include specific pivoting point details of panel ends at locations where the deflection angle (2△) between panels exceeds 20°.

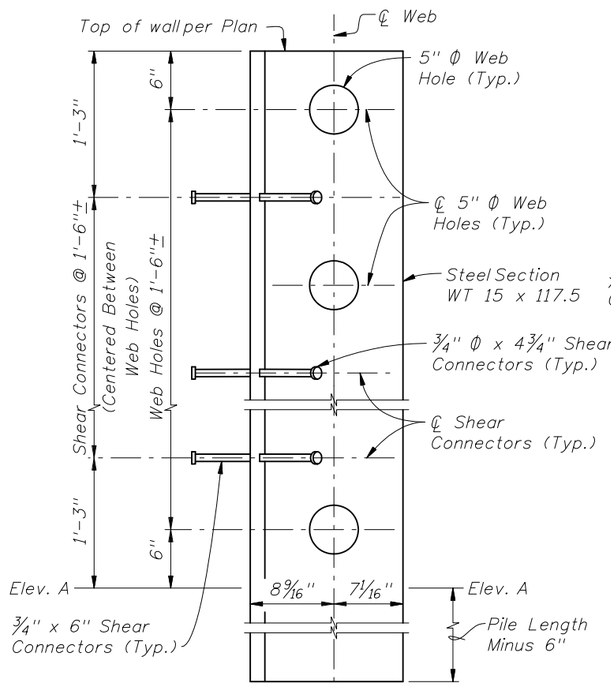


DETAIL I
(Back Face Chamfer Shown
Front Face Chamfer Similar)

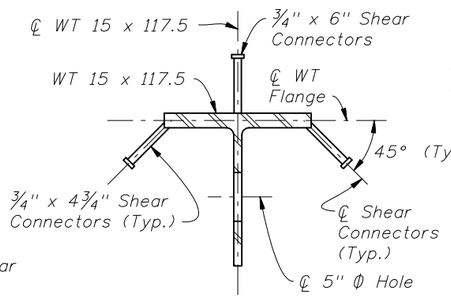




SPECIAL POSTS FOR 90° CORNERS FOR
PILE/POST CONNECTION OPTIONS A, B & E
Collars for Corner Posts shall be 3'-6" ∅

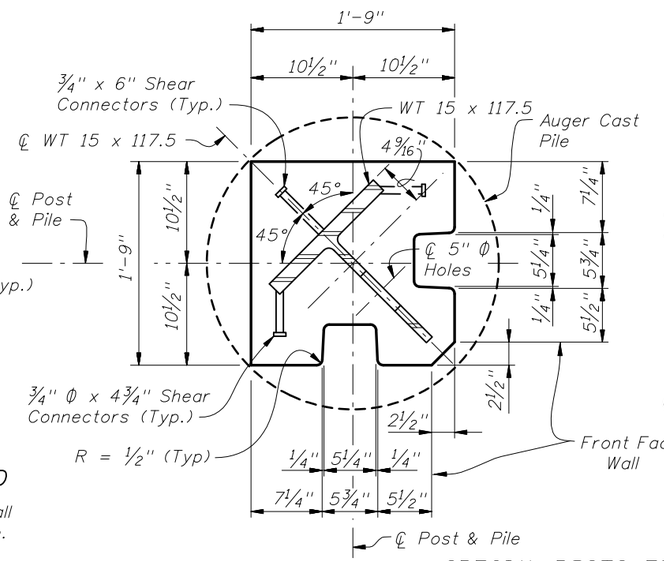


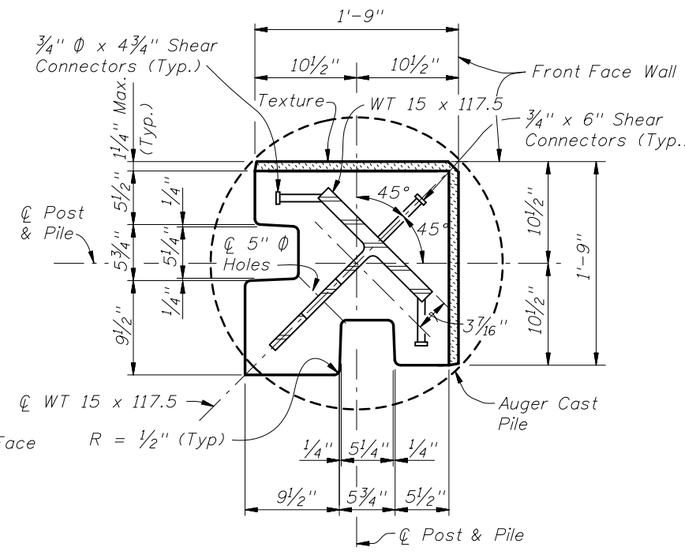
WEB HOLE & SHEAR CONNECTOR SPACING DETAIL
(Concrete not shown for clarity. For limits of concrete see Index No. 5205, Sheet No. 4 of 7.)



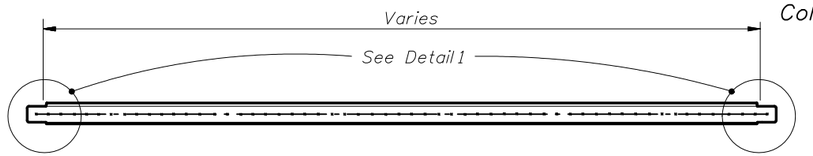
WT 15 x 117.5 Post Detail For
Pile/Post Connection Options C & D

NOTE: The WT 15 x 117.5 Section shall extend into the Auger Cast Pile.





SPECIAL POSTS FOR 90° CORNERS FOR
PILE/POST CONNECTION OPTIONS C & D
Collars for Corner Posts shall be 3'-6" ∅



PANEL PLAN

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.

SPECIAL PANELS AND 90° CORNER POSTS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	SJN	Changed #4 Bar Mark to Bars P5, P6, P7 & P8 for Pile/Post Options A, B & E; Texture thickness to 1¼" Max. and sheet number to Sheet No. 3 of 5.			

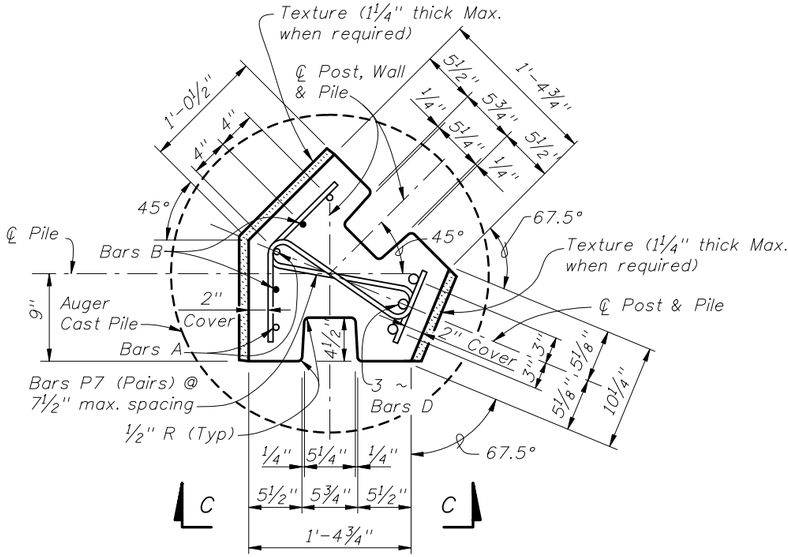
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

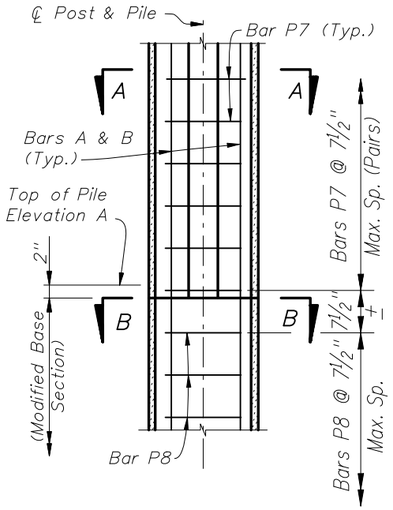
PRECAST SOUND BARRIERS - RECESSED PANEL OPTION

Interim Date 07/01/08 | Sheet No. 3 of 5

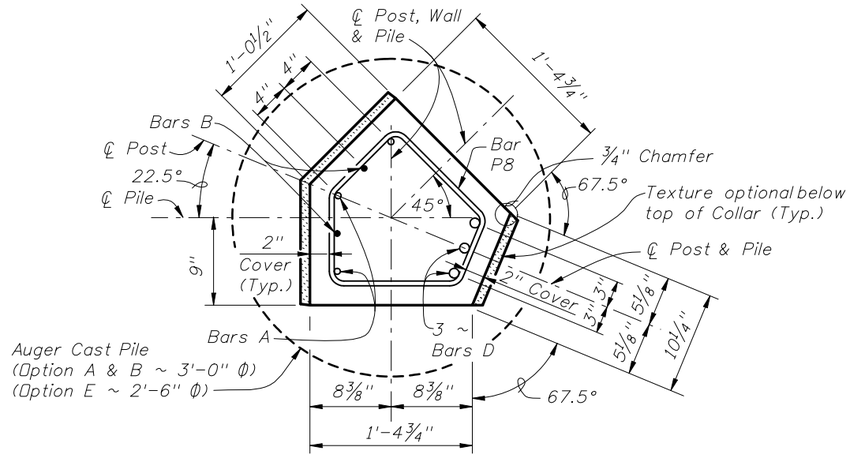
Index No. 5203



SECTION A-A
TYPICAL SECTION ABOVE PILE

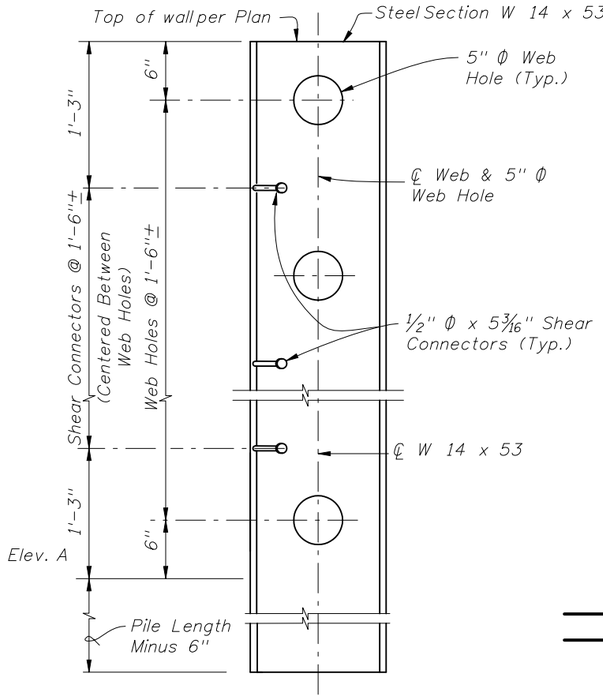


VIEW C-C (PARTIAL ELEVATION)
(Only Front Faces Shown for Clarity)

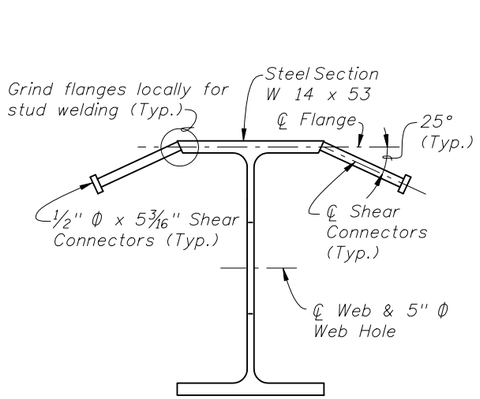


SECTION B-B
PRECAST COLLAR SECTION

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

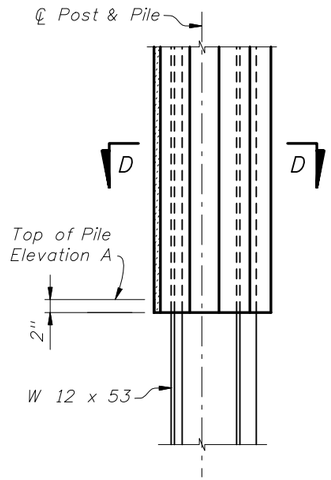


WEB HOLE AND SHEAR CONNECTOR SPACING DETAIL
(Concrete not shown for clarity)

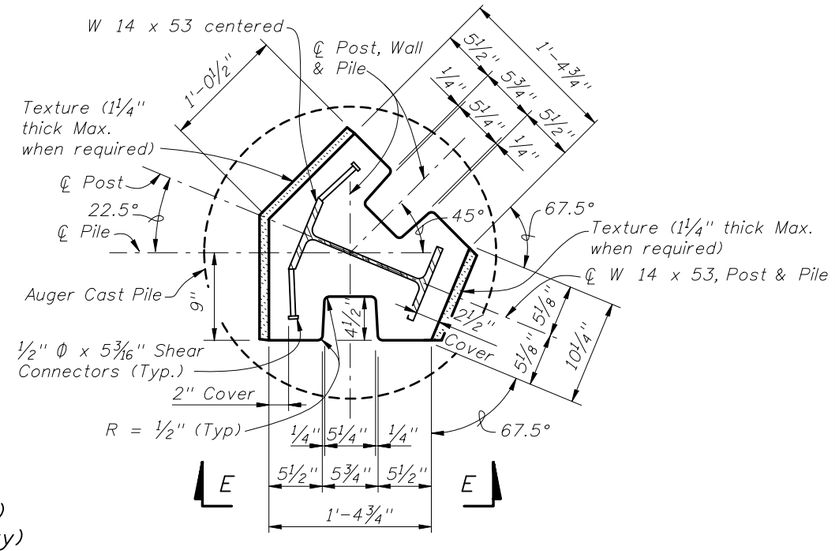


W 14 x 53 POST DETAIL

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	DATE	BY	DESCRIPTION
07/01/08	SJN	New Sheet			

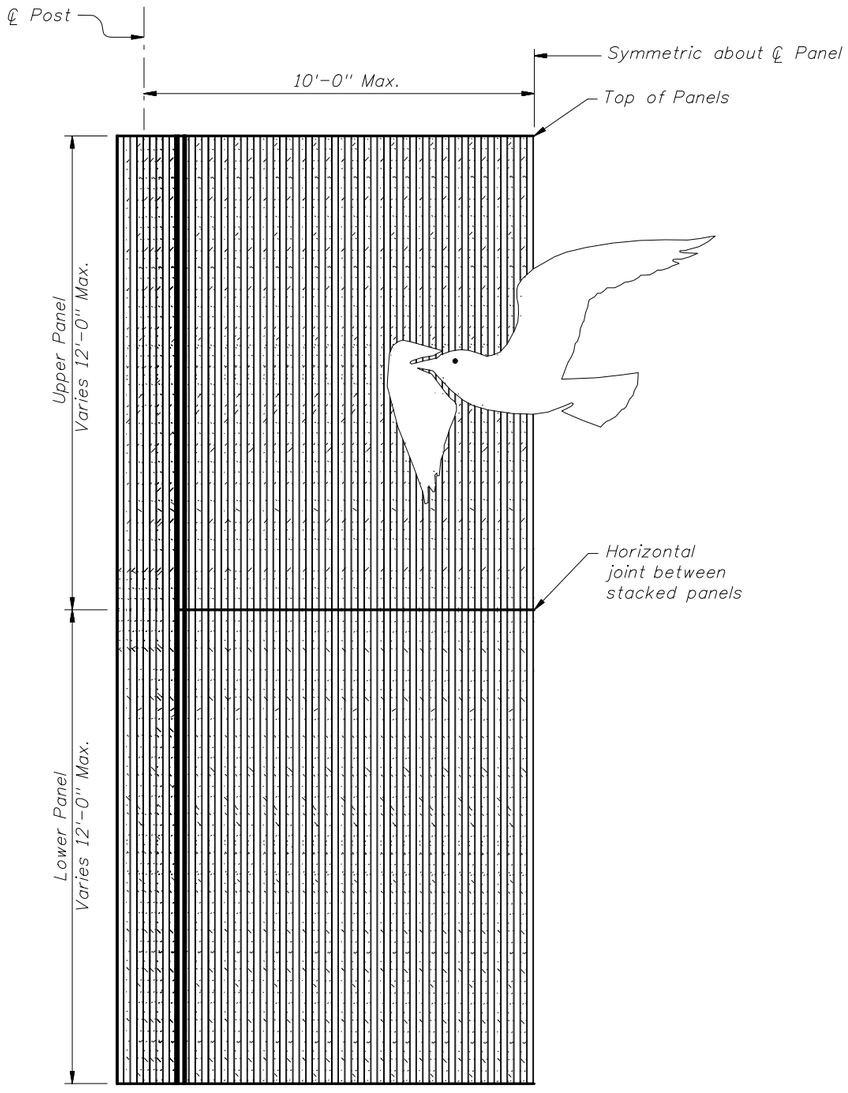
2008 Interim Design Standard

PRECAST SOUND BARRIERS - RECESSED PANEL OPTION

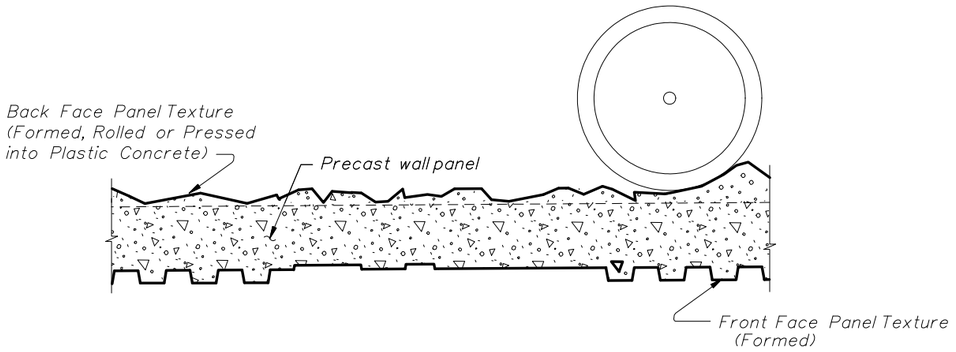
Interim Date 07/01/08

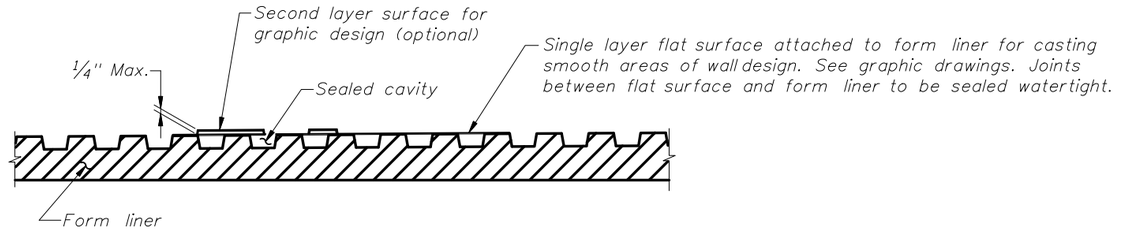
Sheet No. 4 of 5

Index No. 5203



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 LG-3 Shown.)





TYPICAL FORMING DETAIL
(Front Face Panel Texture Type "H" Shown.)
(Back Face Panel Texture Type "D" Shown.)

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.

GRAPHICS AND TEXTURE DETAILS

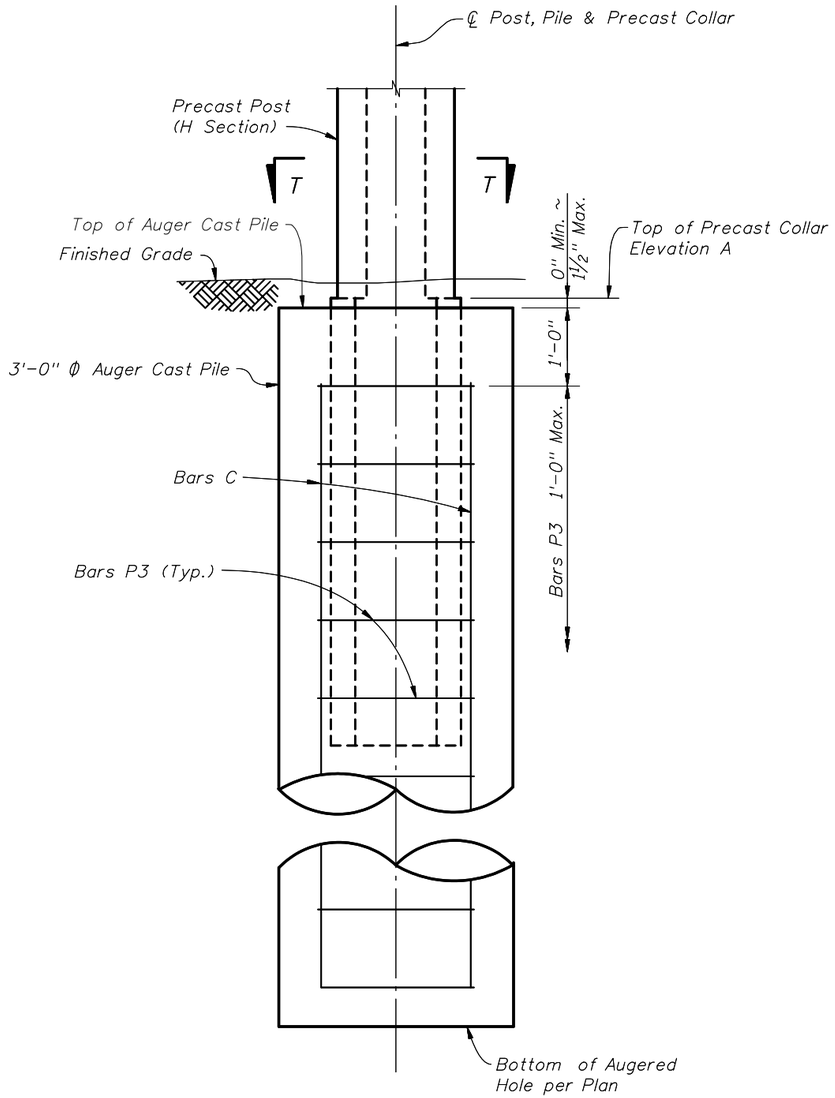
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	SJN	Sheet renumbered.			

2008 Interim Design Standard

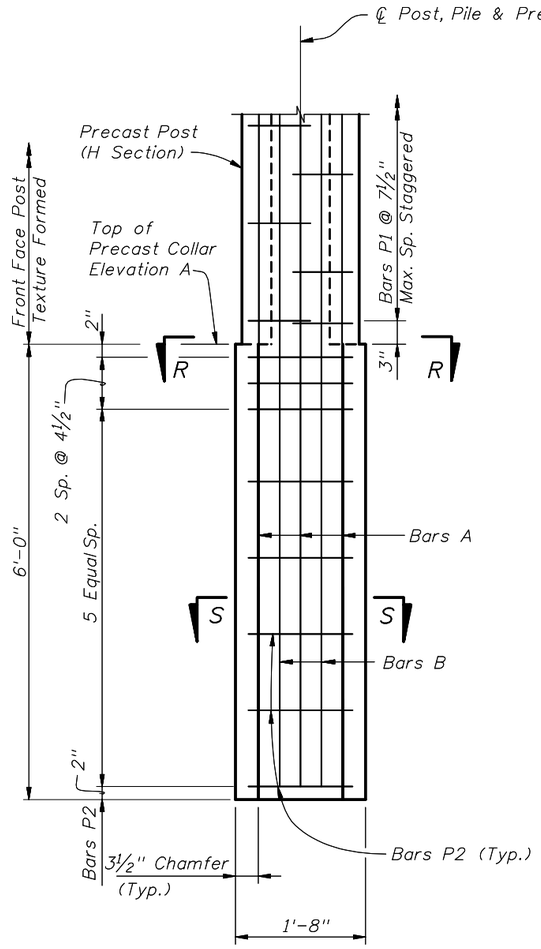
PRECAST SOUND BARRIERS - RECESSED PANEL OPTION

Interim Date	Sheet No.
07/01/08	5 of 5

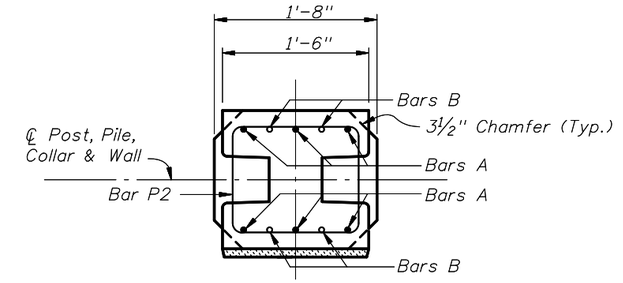
Index No. 5203



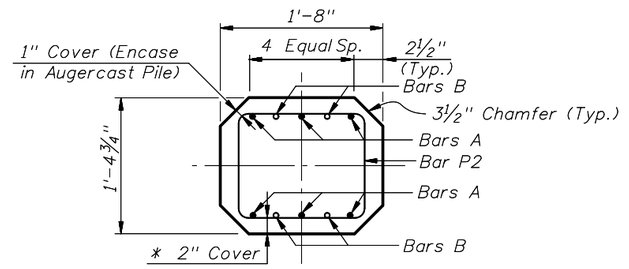
PRECAST COLLAR IN AUGER CAST PILE



PRECAST COLLAR DETAIL

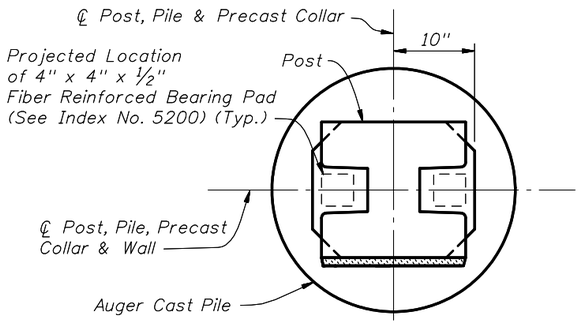


SECTION R-R



SECTION S-S

* - Unless Otherwise Noted.



SECTION T-T

NOTES:

1. For Post and Pile Lengths, see Index No. 5206.
2. For Reinforcing Steel Sizes, see Index No. 5206.
3. For Pile/Post Connection Option A, see Sheet No. 1 of 7.

PRECAST COLLAR FOR PILE/POST CONNECTION OPTION A

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	SJN	Changed "Composite" to "Fiber Reinforced" in Section T-T. Added Tolerance for distance between Top of Precast Collar and Auger Cast Pile.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

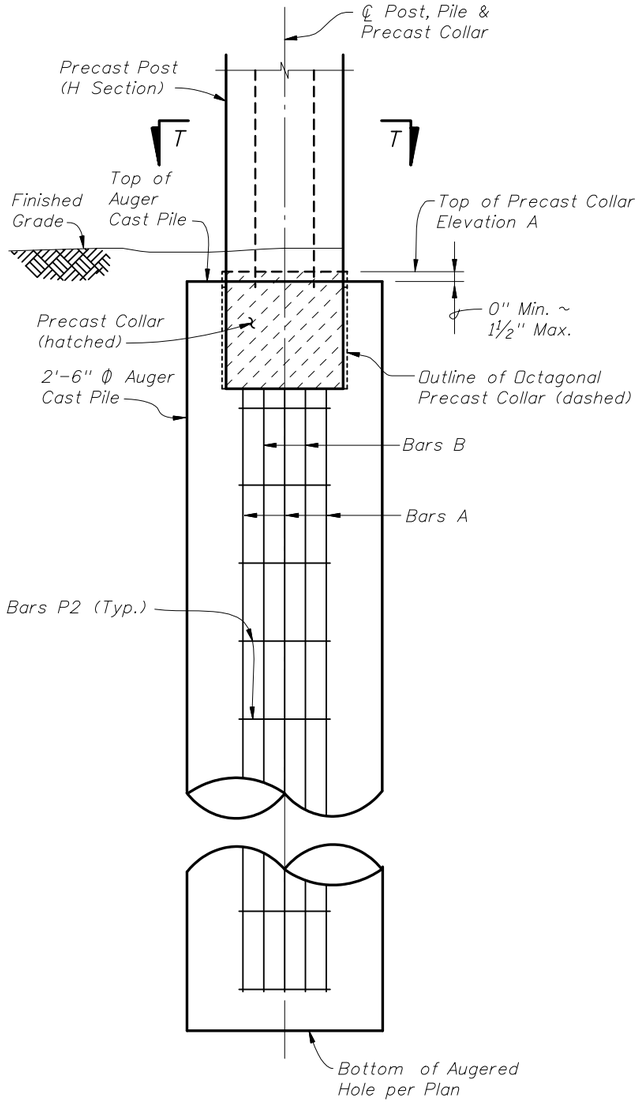
2008 Interim Design Standard

PRECAST SOUND BARRIERS - PILE AND POST REINFORCING STEEL

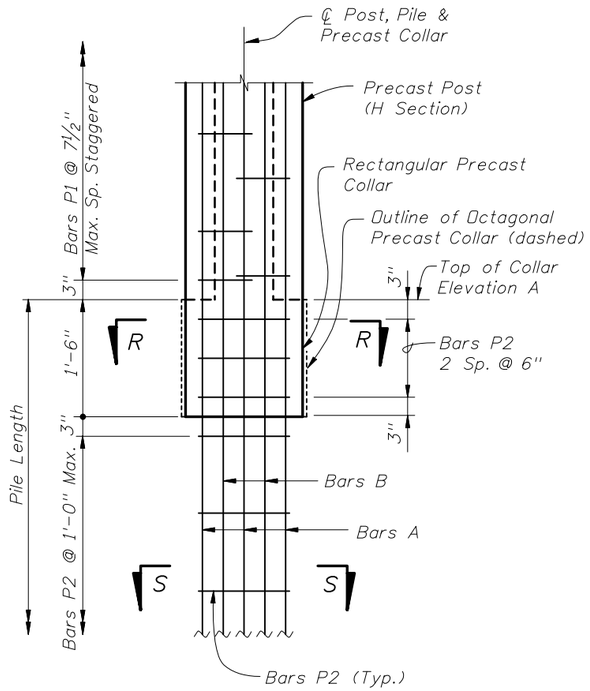
Interim Date 07/01/08

Sheet No. 2 of 7

Index No. 5205



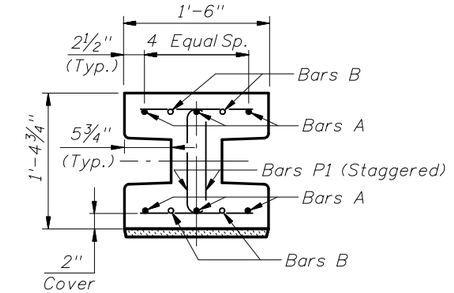
PRECAST COLLAR IN AUGER CAST PILE



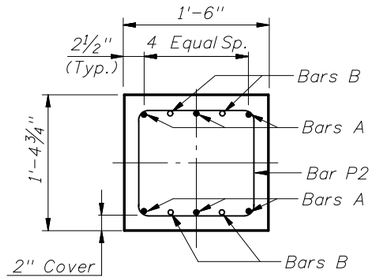
PRECAST COLLAR DETAIL

NOTES:

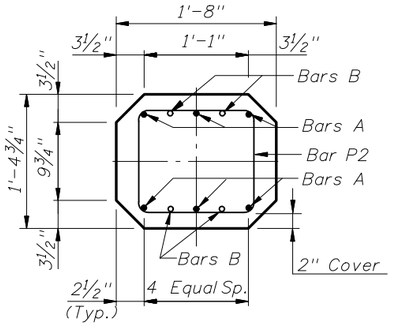
1. For Post and Pile Lengths, see Index No. 5206.
2. For Reinforcing Steel Sizes, see Index No. 5206.
3. For Pile/Post Connection Option E, see Sheet No. 6 of 7.



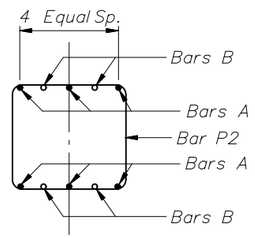
SECTION T-T
(H Section)



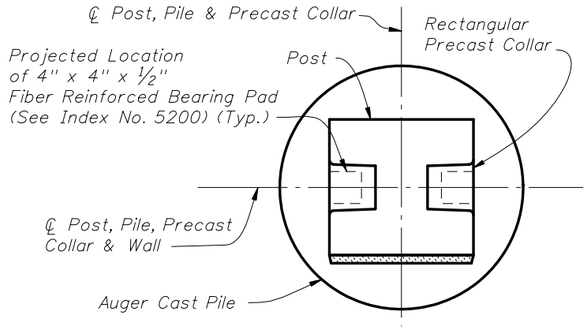
SECTION R-R
(Rectangular Precast Collar)



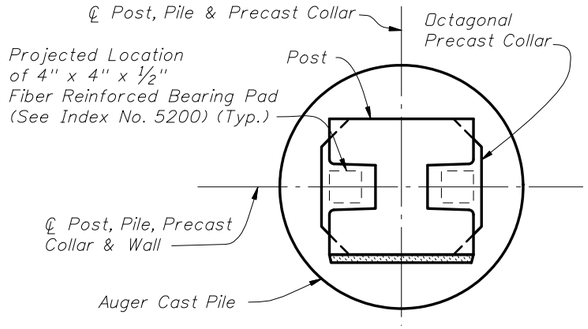
SECTION R-R
(Octagonal Precast Collar)



SECTION S-S



SECTION T-T
(Showing Rectangular Precast Collar and Auger Cast Pile)



SECTION T-T
(Showing Octagonal Precast Collar and Auger Cast Pile)

KEITH and SCHNARS, P.A.
ENGINEERS • PLANNERS • SURVEYORS
6500 NORTH ANDREWS AVENUE
FORT LAUDERDALE, FL. 33309-2132
CERTIFICATE OF AUTHORIZATION NO. 1337

State Contracting & Engineering Corp.

STATE CONTRACTING & ENGINEERING CORP.
PRECAST COLLAR FOR PILE/POST CONNECTION OPTION E

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	SJN	Added "Octagonal Precast Collar" details and tolerance between Top of Precast Collar and Auger Cast Pile. Changed section and details to accommodate Octagonal Precast Collar; "Composite" to "Fiber Reinforced" in Section T-T.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

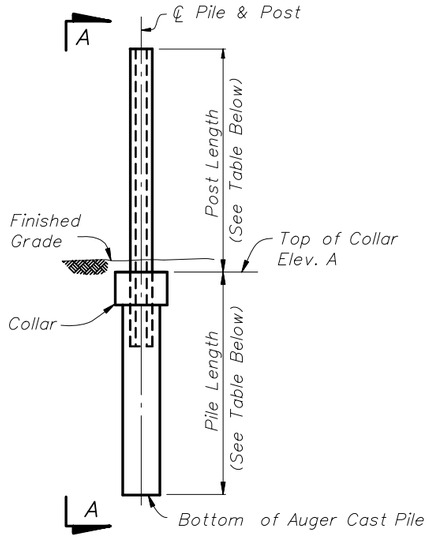
2008 Interim Design Standard

PRECAST SOUND BARRIERS - PILE AND POST REINFORCING STEEL

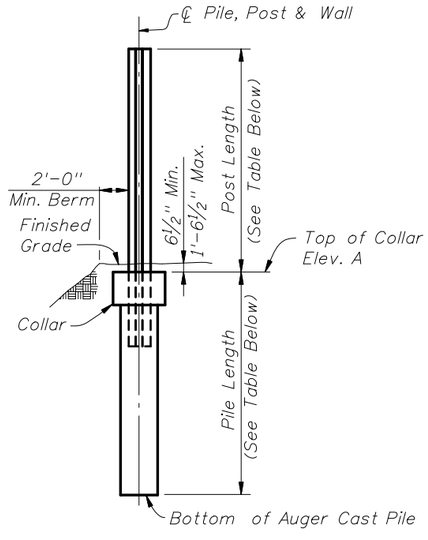
Interim Date 07/01/08

Sheet No. 7 of 7

Index No. 5205



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

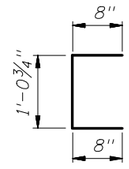


VIEW A-A
(Pile/Post Connection Option A Shown)

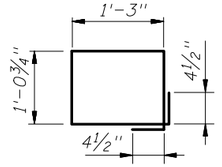
BAR BENDING DETAILS

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

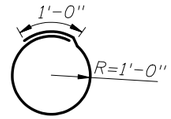
POST & PILE



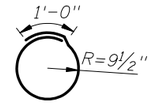
BAR P1
Bar Length = 2'-5"



BAR P2
Bar Length = 5'-5"

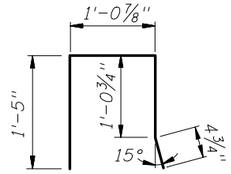


BAR P3
Bar Length = 7'-4"

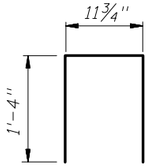


BAR P4
Bar Length = 6'-0"

90° CORNER POST & PILE

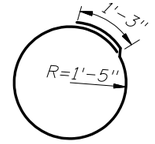


BAR P5
Bar Length = 3'-9¼"

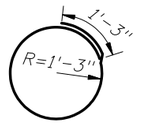


BAR P6
Bar Length = 3'-5½"

CAST-IN-PLACE COLLAR

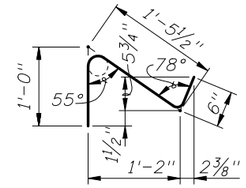


BAR P9
Bar Length = 10'-2"

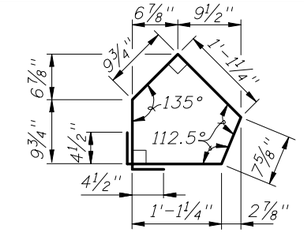


BAR P10
Bar Length = 9'-2"

45° CORNER POST & PILE



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



BAR P8 (PILE)
Bar Length = 5'-0¼"

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.

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	SIZE	SIZE	SIZE	SIZE	SIZE
A	12'-0½"	12'-2½"	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'-0½"	13'-2½"	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'-0½"	14'-2½"	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'-0½"	15'-2½"	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'-0½"	16'-2½"	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'-0½"	17'-2½"	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'-0½"	18'-2½"	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'-0½"	19'-2½"	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'-0½"	20'-2½"	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'-0½"	21'-2½"	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'-0½"	22'-2½"	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
07/01/08	SJN	Added "POST LENGTH WITH CAP" column, Bars D & Bars P5 thru P8 in Post and Pile Dimension table, and added Bars P5 thru P8 in Bar Bending Details.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

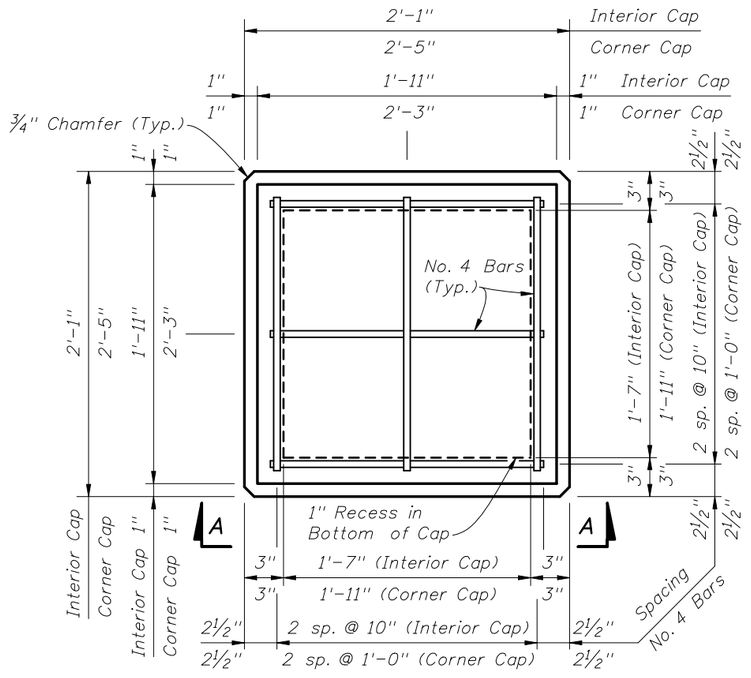
2008 Interim Design Standard

PRECAST SOUND BARRIERS - PILE DEPTH AND REINFORCING SUMMARY

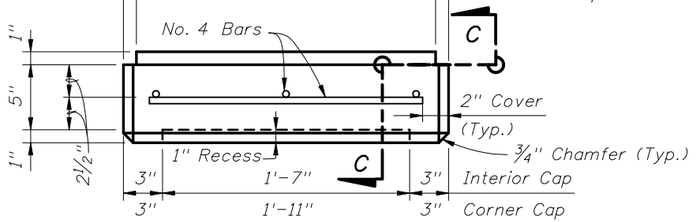
Interim Date 07/01/08

Sheet No. 1 of 1

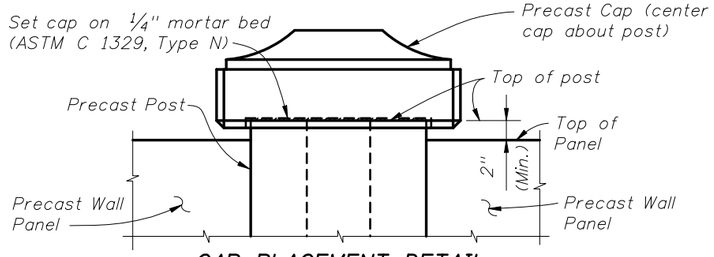
Index No. 5206



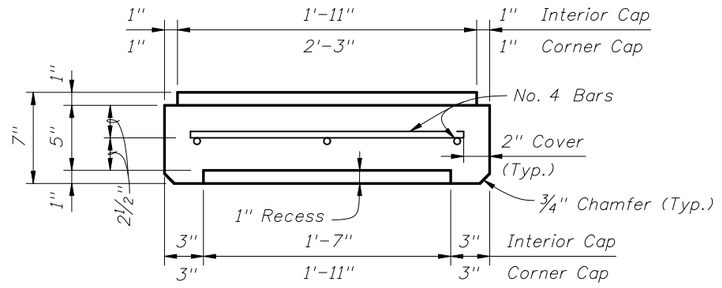
PLAN VIEW
(Type "A" Cap Shown, Type "B" & "C" Caps Similar)



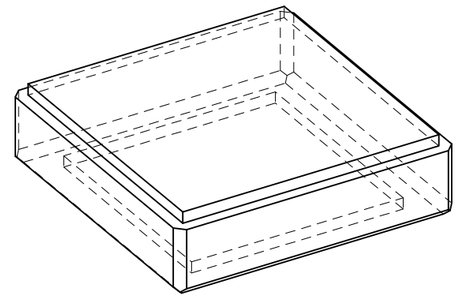
VIEW A-A SHOWN, VIEW B-B SIMILAR
(Type "A" Cap Shown, Type "B" & "C" Caps Similar)



CAP PLACEMENT DETAIL
(Type "B" Cap Shown, Type "A" & "C" Caps Similar)

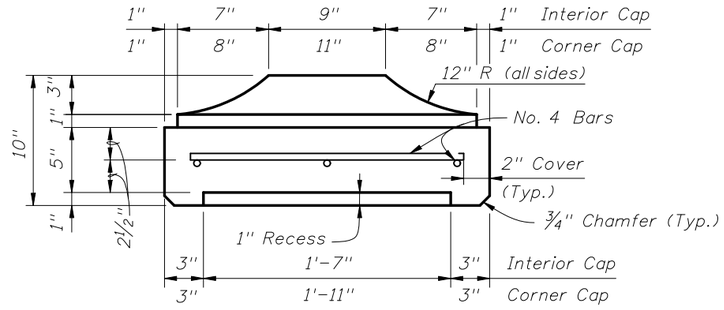


SECTION C-C

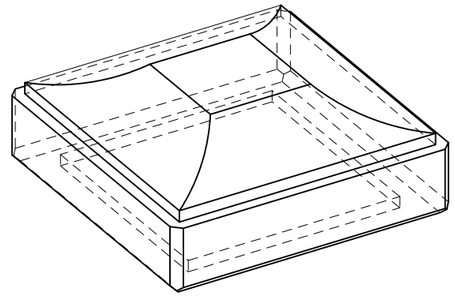


PICTORIAL VIEW

TYPE "A" CAP DETAILS

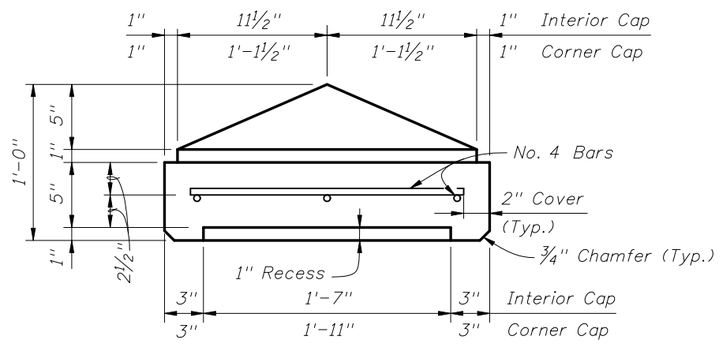


SECTION C-C

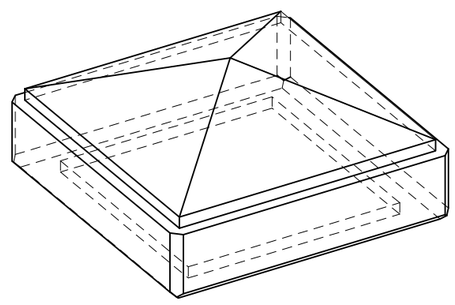


PICTORIAL VIEW

TYPE "B" CAP DETAILS



SECTION C-C



PICTORIAL VIEW

TYPE "C" CAP DETAILS

NOTE: See Index No. 5200 for concrete and reinforcing notes.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	SJN	New Design Standard			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

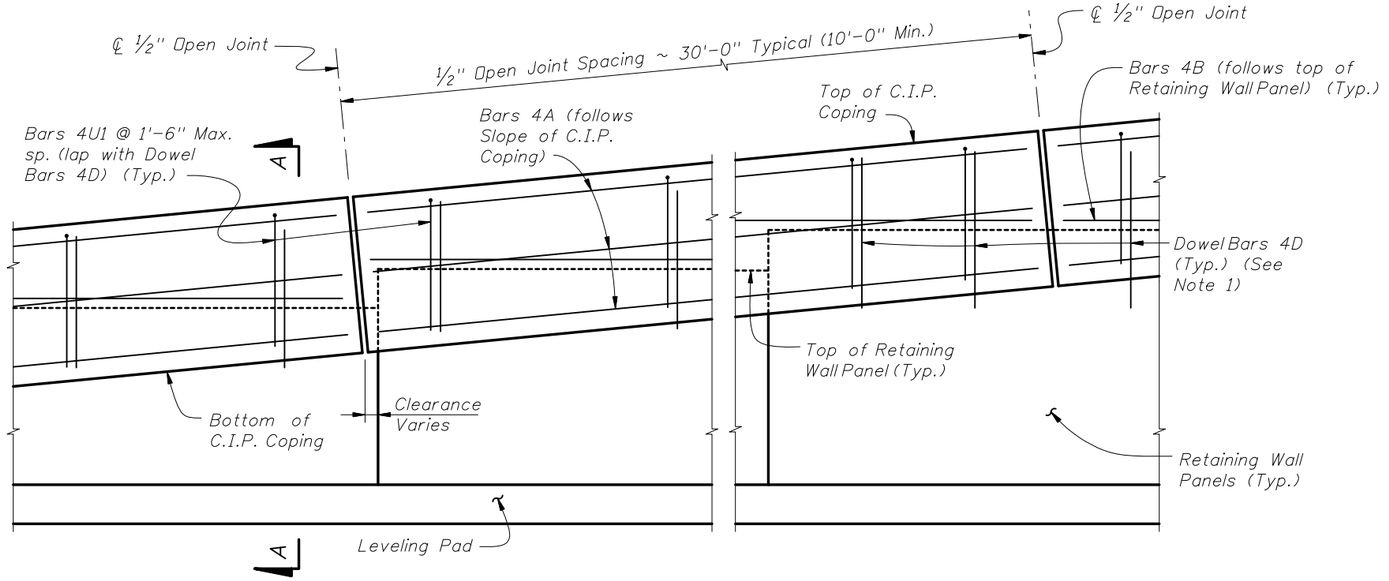
2008 Interim Design Standard

PRECAST SOUND BARRIERS - PRECAST POST CAPITAL

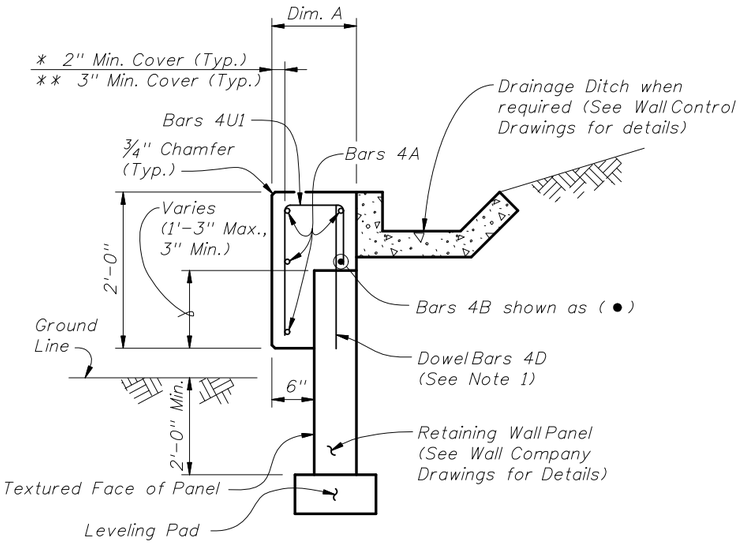
Interim Date: 07/01/08

Sheet No.: 1 of 1

Index No.: 5207



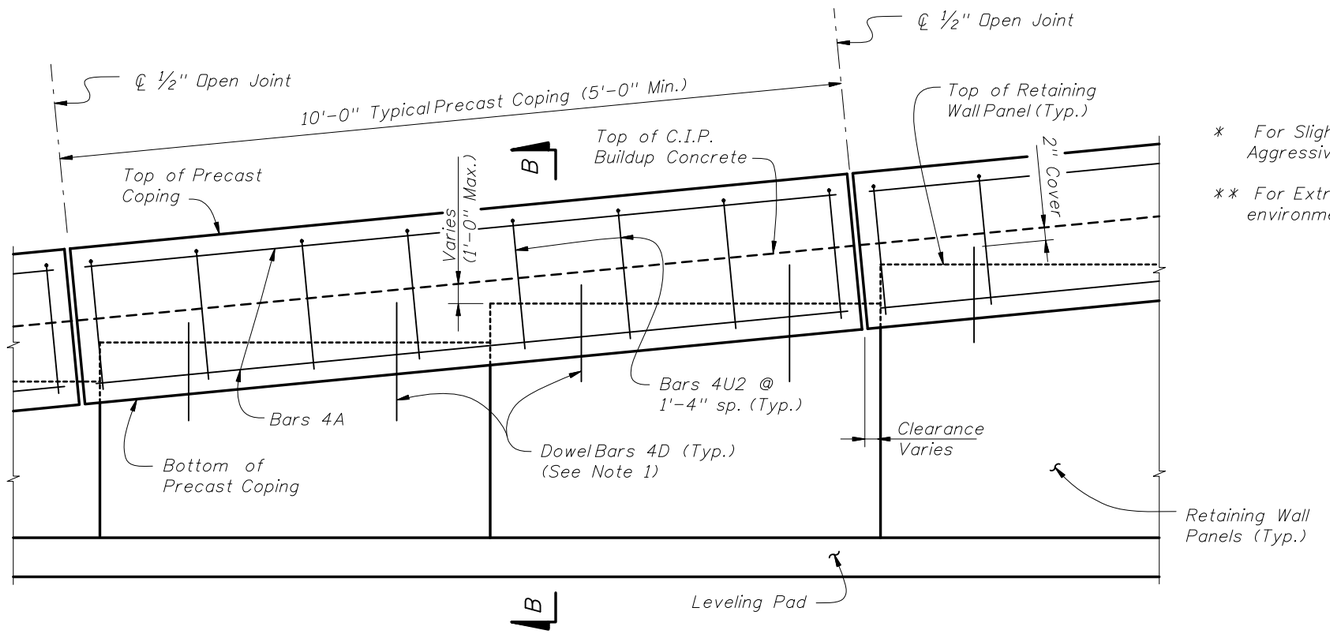
C.I.P. COPING - PARTIAL ELEVATION VIEW



SECTION A-A
C.I.P. COPING

PRECAST AND C.I.P. COPING NOTES:
1. Dowel Bars 4D extend 1'-0" above the top of retaining wall panel. Field cut as necessary to maintain 2" minimum cover. See Wall Company Drawings for number and spacing of Dowel Bars 4D.

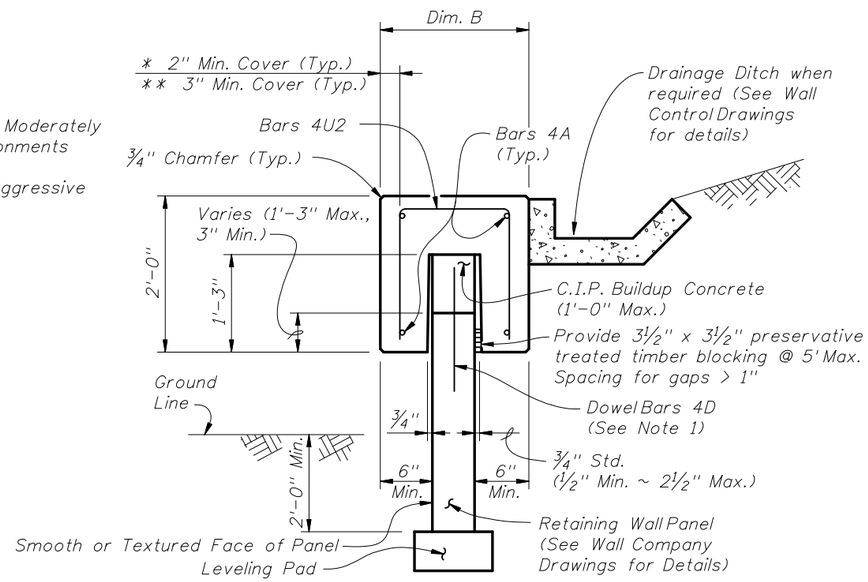
Dim. A	Panel width + 6"
Dim. B	Panel width + 1'-0" Min.



PRECAST COPING - PARTIAL ELEVATION VIEW

* For Slightly and Moderately Aggressive environments

** For Extremely Aggressive environments.



SECTION B-B
PRECAST COPING

PRECAST AND C.I.P. COPING DETAILS

REVISIONS

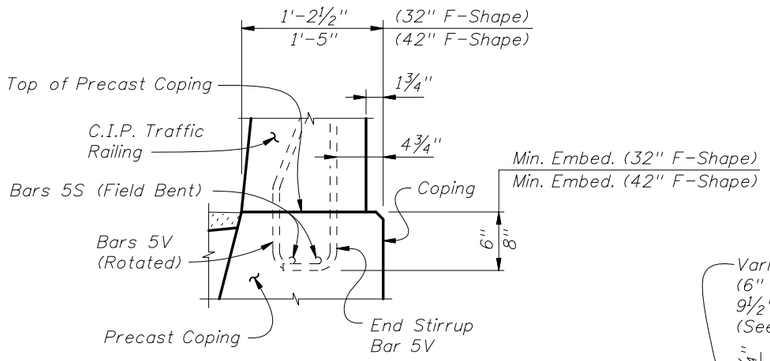
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	TJB SJN	Changed "6"" to "6" Min." and "¾" Std. (½" Min. ~ 1¼" Max.)" to "¾" Std. (½" Min. ~ 2½" Max.)" in SECTION B-B. Added timber blocking note in SECTION B-B.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

PERMANENT RETAINING WALL SYSTEMS

Interim Date	Sheet No.
01/01/08	3 of 19
Index No.	
5300	

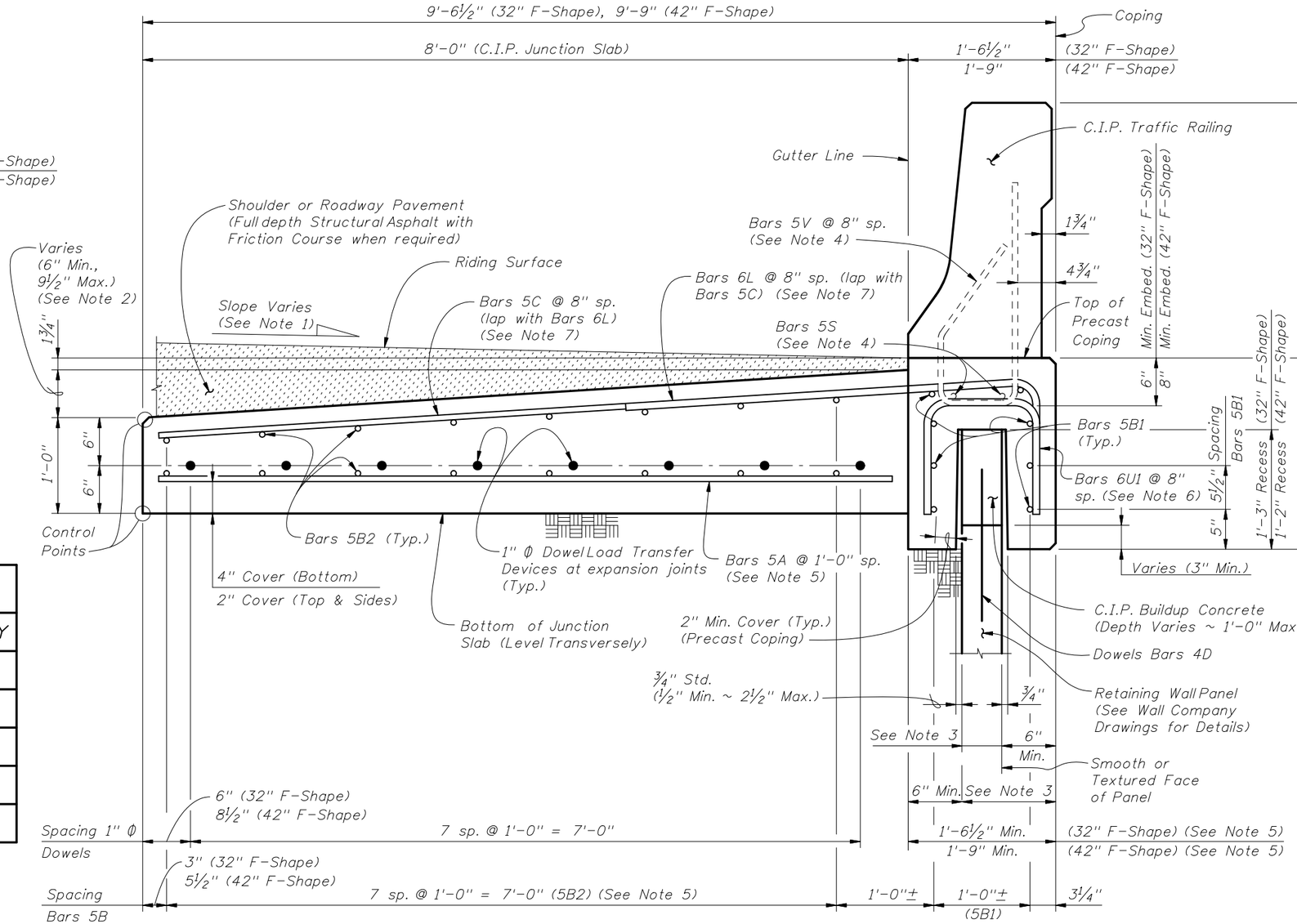


PARTIAL END VIEW OF TRAFFIC RAILING END TRANSITION FOR GUARDRAIL ATTACHMENT (Showing Bars 5V and Bars 5S) (Precast Coping Shown, C.I.P. Coping Similar)

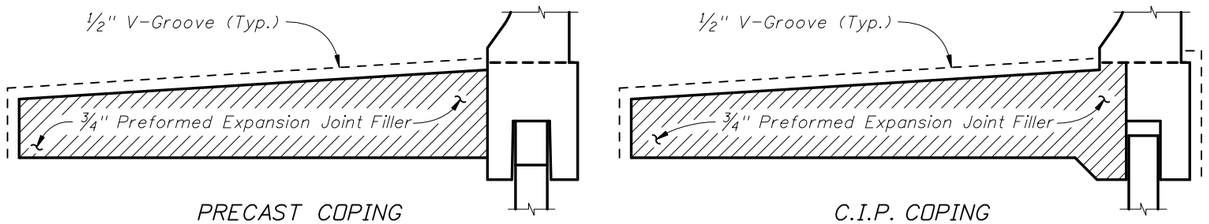
NOTE: See Index No. 420 and Index No. 425, Detail "A" for details.

ESTIMATED QUANTITIES FOR PRECAST COPING		
ITEM	UNIT	QUANTITY
Concrete (Precast Coping)	CY	0.921
Concrete (C.I.P. Junction Slab)	CY/FT	0.370
Reinforcing Steel (Precast Coping) excluding Bars 5V and 5S (Typ.)	LB	282.04
Reinforcing Steel (C.I.P. Junction Slab) (Typ.)	LB/FT	36.68
Additional Reinf. @ Expansion Joints	LB	42.72

(The above concrete quantities are based on a superelevation of 6.25% and a 5" wide retaining wall panel, beneath a 32" F-Shape Traffic Railing. The above Precast Coping quantities are based on one 10'-0" Precast Coping segment.)



TYPICAL SECTION THRU PRECAST COPING WITH C.I.P. JUNCTION SLAB AND RETAINING WALL AT EXPANSION JOINTS



DETAIL "A"

(Showing Locations of ½" V-Grooves and ¾" Preformed Expansion Joint Filler)

JUNCTION SLAB NOTES:

1. Match Cross Slope of Travel Lane or Shoulder.
2. The minimum dimension of 6" corresponds to a superelevation of 6.25%. For superelevations exceeding 6.25%, increase this dimension (i.e., shift control points down) as required to match roadway superelevation.
3. Actual width varies depending on type of Retaining Wall used.
4. See Index No. 420 and Index No. 425 for Bars 5S and 5V.
5. The Precast Coping width is based on a maximum 6½" wide Retaining Wall Panel. If the Retaining Wall Panel is wider than 6½", increase the width by the difference between the two Retaining Wall Panel widths. Increase the length of Bars 6L and decrease the length of Bars 5A & 5C as required when the coping width is increased and adjust spacing of Bars 5B2 as required to maintain 2" minimum cover.
6. Increase the width (1'-2½") of Bars 6U1 as required to maintain 2" minimum cover when recess width exceeds 8".
7. At the Contractor's option, mechanical couplers may be used to splice reinforcing. Complete details, including reinforcement lengths are required in the Shop Drawings. Mechanical couplers shall develop 125% of the bar yield strength.

PRECAST OR C.I.P. COPING WITH C.I.P. JUNCTION SLAB DETAILS (F-SHAPE TRAFFIC RAILINGS)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed "Shoulder or Roadway Pavement" note; and "6"" to "6" Min."; and "¾" Std. (½" Min. ~ 1¼" Max.)" to "¾" Std. (½" Min. ~ 2½" Max.)" in TYPICAL SECTION detail.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

PERMANENT RETAINING WALL SYSTEMS

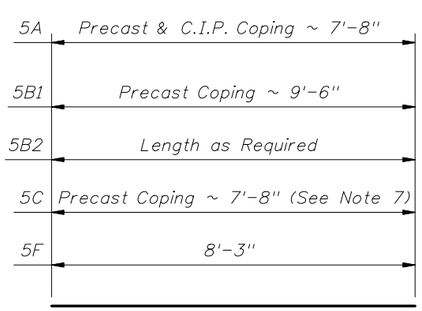
Interim Date 01/01/08

Index No. 5300

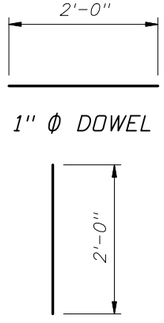
REINFORCING STEEL BENDING DIAGRAMS - JUNCTION SLAB

BILL OF REINFORCING STEEL

MARK	SIZE	LENGTH		
		PRECAST COPING		C.I.P. COPING
		(32" F-SHAPE)	(42" F-SHAPE)	
A	5	7'-8"	7'-8"	7'-8"
B1	5	9'-6"	9'-6"	N/A
B2	5	AS REQD.	AS REQD.	AS REQD.
C	5	7'-8"	7'-8"	N/A
D	4	2'-0"	2'-0"	N/A
F	5	8'-3"	8'-3"	8'-3"
L	6	5'-4"	5'-7"	10'-2"
U1	6	3'-8"	3'-8"	3'-8"
1" ϕ Dowel	Smooth Steel Bar	2'-0"	2'-0"	2'-0"

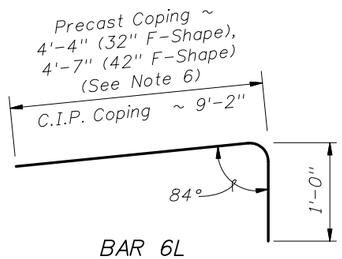


BARS 5A, 5B1, 5B2, 5C & F

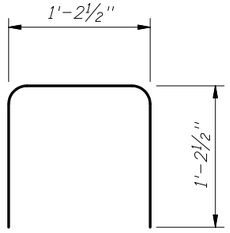


1" ϕ DOWEL

DOWEL BAR 4D



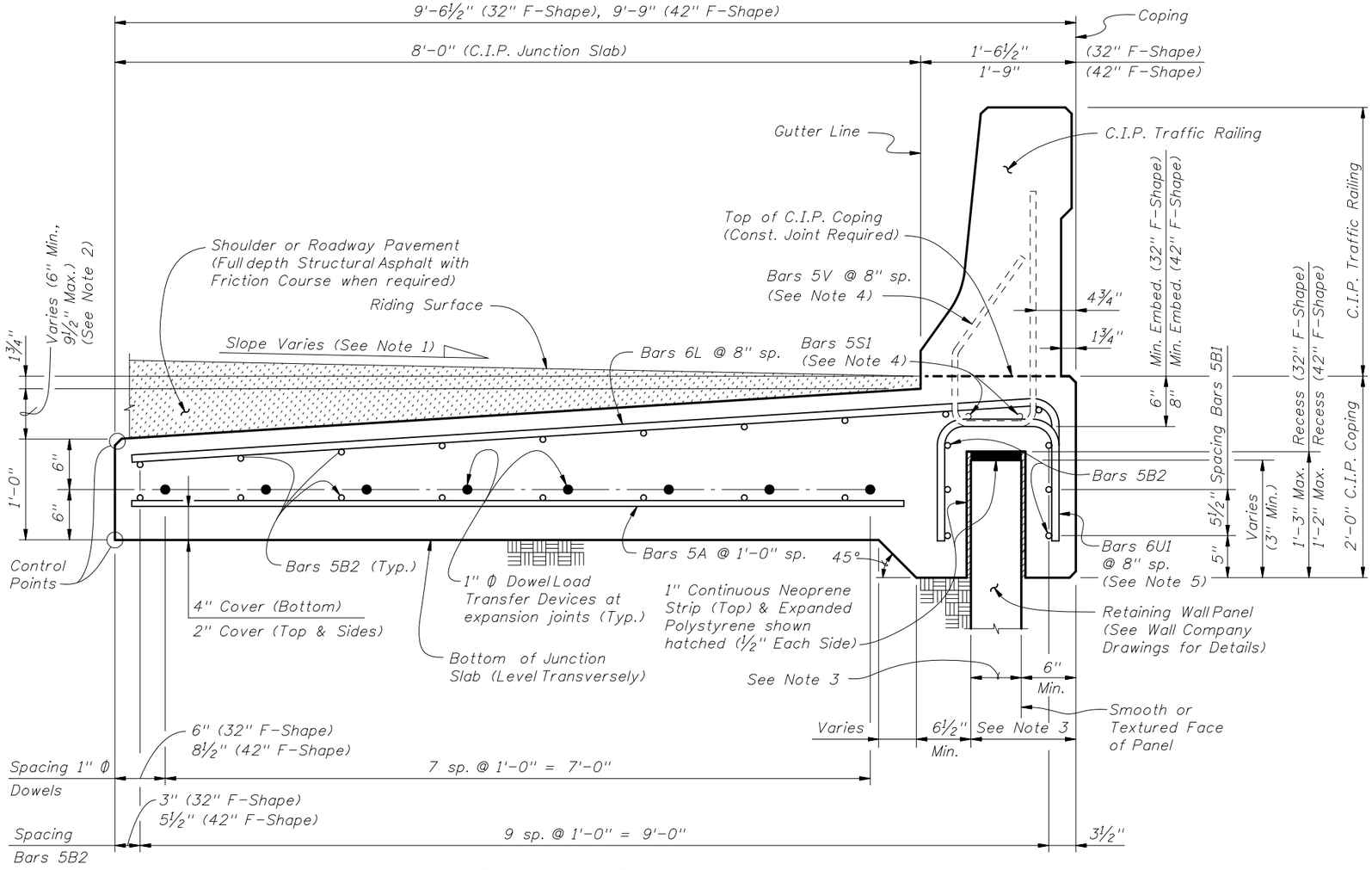
BAR 6L



BAR 6U1

REINFORCING STEEL NOTES:

1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at expansion joints will have a 2" minimum cover.
3. Lap splices for Bars 5B2 will be a minimum of 2'-2".
4. For Precast Coping only, lap splice Bars 6L with Bars 5C. Lap splices will be a minimum of 2'-9".
5. See Index No. 420 and Index No. 425 for Bars 5S and 5V.
6. Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 1'-4½" (32" F-Shape) or 1'-7" (42" F-Shape).
7. Dimension shown is for lap splice option. For mechanical coupler option, this dimension is 7'-9".
8. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.



TYPICAL SECTION THRU C.I.P. COPING AND JUNCTION SLAB AND RETAINING WALL AT EXPANSION JOINTS

ESTIMATED QUANTITIES FOR C.I.P. COPING

ITEM	UNIT	QUANTITY
Concrete	CY/Ft.	0.468
Reinforcing Steel (Typical) excluding Bars 5V and 5S (Typ.)	Lb./Ft.	64.20
Additional Reinf. @ Expansion Joint	Lb./Ft.	42.72

(The above concrete quantities are based on a superelevation of 6.25% and a 5" wide retaining wall panel, beneath a 32" F-Shape Traffic Railing).

JUNCTION SLAB NOTES:

1. Match Cross Slope of Travel Lane or Shoulder.
2. The minimum dimension of 6" corresponds to a superelevation of 6.25%. For superelevations exceeding 6.25%, increase this dimension (i.e., shift control points down) as required to match roadway superelevation.
3. Actual width varies depending on type of Retaining Wall used.
4. See Index No. 420 and Index No. 425 for Bars 5S and 5V.
5. Increase the width (1'-2½") of Bars 6U1 as required to maintain 2" minimum cover when recess width exceeds 8".

PRECAST OR C.I.P. COPING WITH C.I.P. JUNCTION SLAB DETAILS (F-SHAPE TRAFFIC RAILINGS)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed "Shoulder or Roadway Pavement" note; and "6"" to "6" Min." in TYPICAL SECTION detail.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

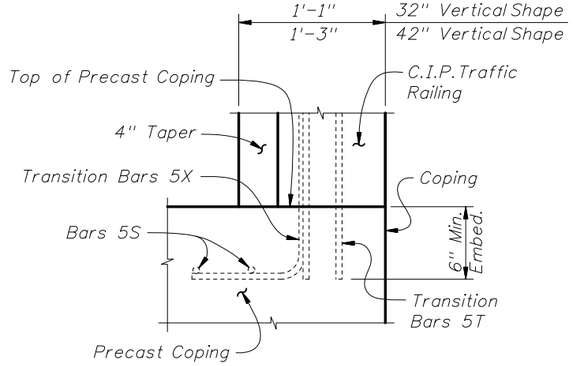
2008 Interim Design Standard

PERMANENT RETAINING WALL SYSTEMS

Interim Date 01/01/08

Sheet No. 7 of 19

Index No. 5300

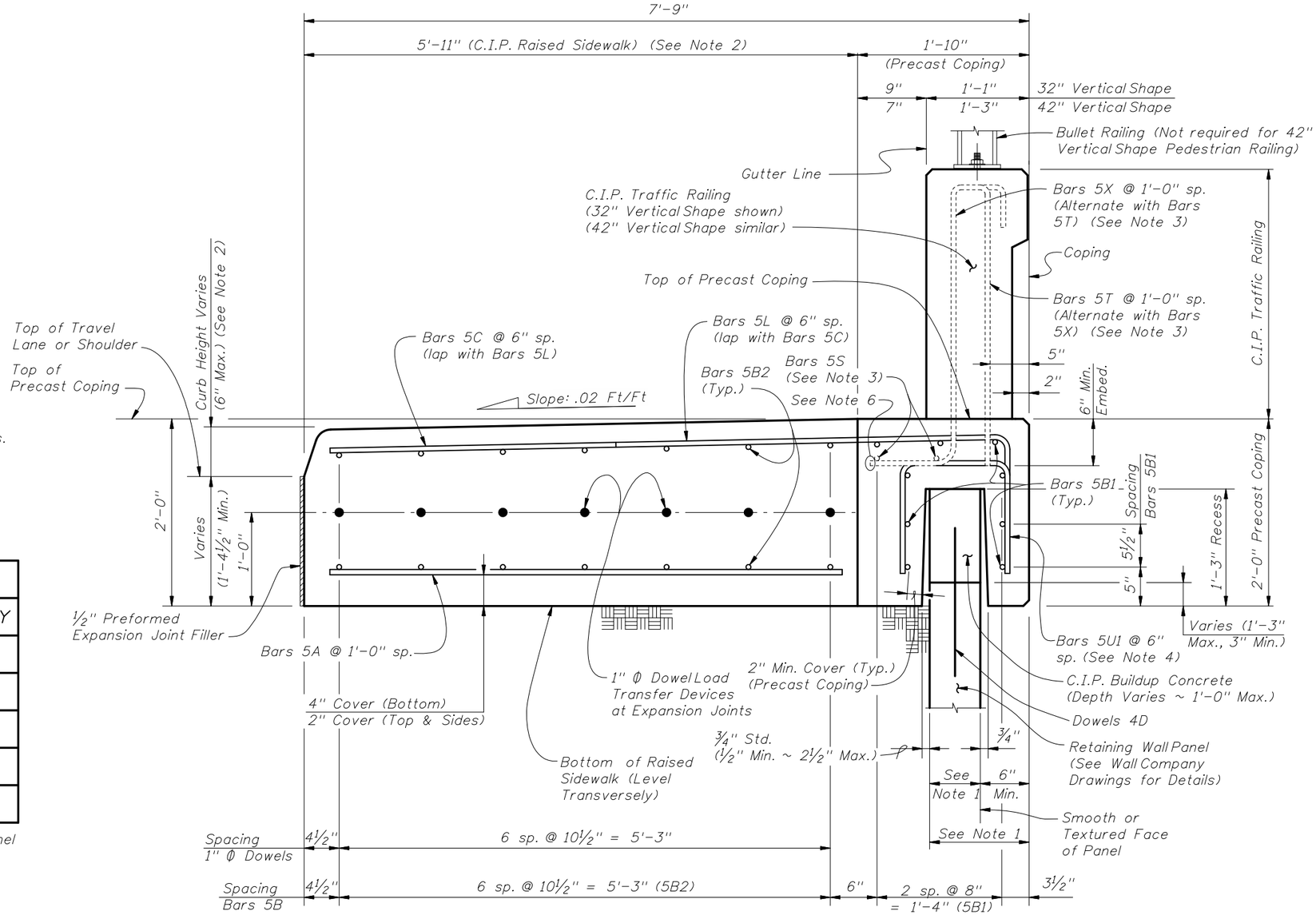


PARTIAL END VIEW OF TRAFFIC RAILING END TRANSITION FOR GUARDRAIL ATTACHMENT (Showing Bars 5S, Bars 5T and Bars 5X) (Precast Coping Shown, C.I.P. Coping Similar)

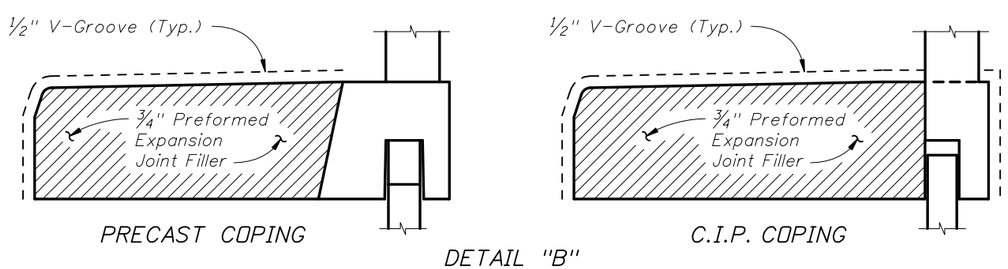
NOTE: See Index No. 422 and Index No. 423, Railing End Detail for details.

ESTIMATED QUANTITIES FOR PRECAST COPING		
ITEM	UNIT	QUANTITY
Concrete (Precast Coping)	CY	1.136
Concrete (C.I.P. Raised Sidewalk)	CY/Ft.	0.424
Reinforcing Steel (Precast Coping) excluding Bars 5T, 5X and 5S (Typ.)	Lb.	269.96
Reinforcing Steel (C.I.P. Raised Sidewalk) (Typ.)	Lb./Ft.	31.73
Additional Reinf. @ Expansion Joints	Lb.	37.38

(The above concrete quantities are based on a 5" wide retaining wall panel and a Type D Concrete Curb (See Note 2). The above Precast Coping quantities are based on one 10'-0" Precast Coping segment.)



TYPICAL SECTION THRU PRECAST COPING WITH C.I.P. RAISED SIDEWALK AND RETAINING WALL AT EXPANSION JOINTS



DETAIL "B"

(Showing Locations of ½" V-Grooves and ¾" Preformed Expansion Joint Filler)

RAISED SIDEWALK NOTES:

1. Actual width varies depending on type of Retaining Wall used.
2. Match roadway curb shape (Type) and height. See Roadway Plans and Index No. 300. 5'-11" dimension is based on a 32" Vertical Shape Traffic Railing with a Type D curb adjacent to a 6'-0" wide sidewalk. Adjust this dimension as required for other curb types or transitions at Begin or End Retaining Wall.
3. See Index No. 422 and Index No. 423 for Bars 5S, 5T & 5X and Bullet Railing details. Adjust vertical dimension of Bars 5T and 5X, see Reinforcing Steel Note 5.
4. Increase the width (1'-2½") of Bars 5U1 as required to maintain 2" minimum cover when recess width exceeds 8".
5. At the Contractor's option, mechanical couplers may be used to splice reinforcing. Complete details, including reinforcement lengths are required in the Shop Drawings. Mechanical couplers shall develop 125% of the bar yield strength.
6. Trim end of Bars 5T and 5X to clear construction joint for 42" Vertical Shape Traffic Railing.

PRECAST OR C.I.P. COPING WITH C.I.P. RAISED SIDEWALK DETAILS (VERTICAL SHAPE TRAFFIC RAILINGS)

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	TJB	Changed "6"" to "6" Min." and "¾" Std. (½" Min. ~ 1¼" Max.)" to "¾" Std. (½" Min. ~ 2½" Max.)" in TYPICAL SECTION detail.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

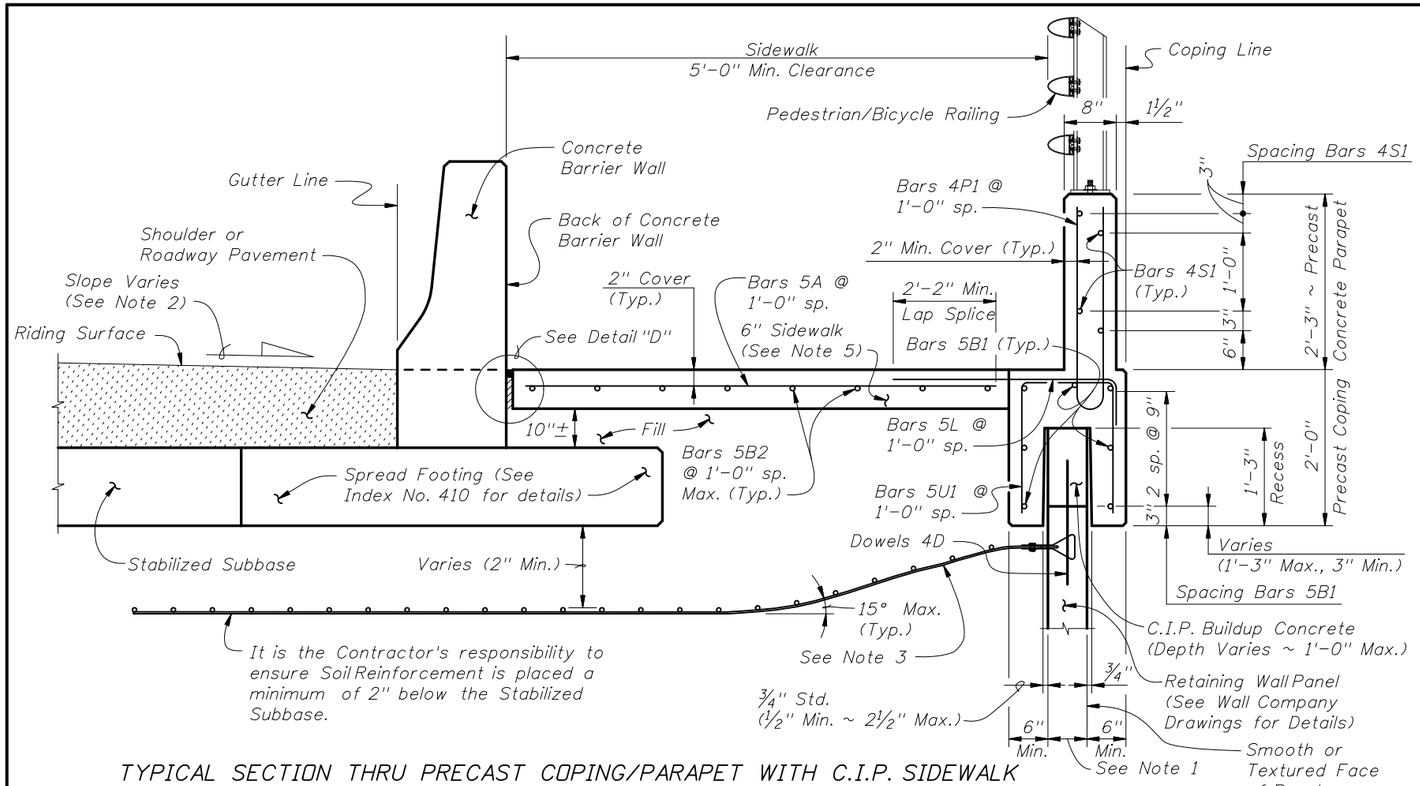
2008 Interim Design Standard

PERMANENT RETAINING WALL SYSTEMS

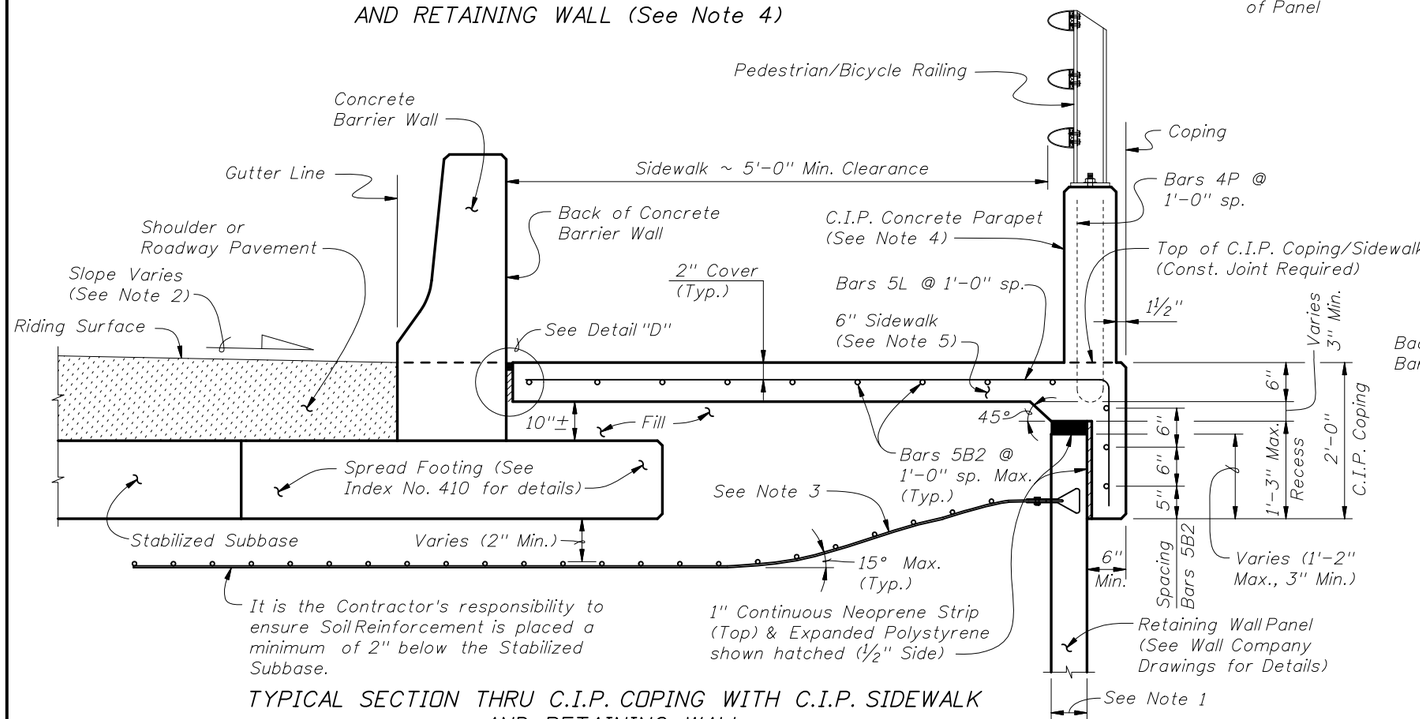
Interim Date 01/01/08

Sheet No. 12 of 19

Index No. 5300



TYPICAL SECTION THRU PRECAST COPING/PARAPET WITH C.I.P. SIDEWALK AND RETAINING WALL (See Note 4)

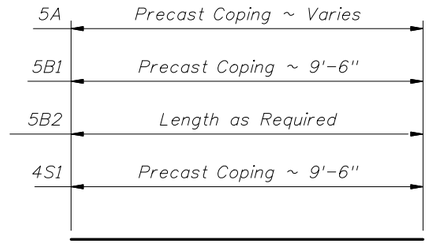


TYPICAL SECTION THRU C.I.P. COPING WITH C.I.P. SIDEWALK AND RETAINING WALL

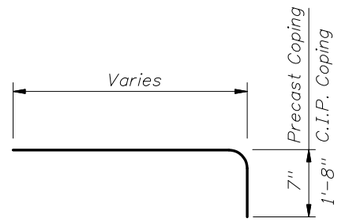
REINFORCING STEEL BENDING DIAGRAMS - COPING/PARAPET AND SIDEWALK

BILL OF REINFORCING STEEL

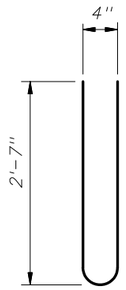
MARK	SIZE	LENGTH	
		PRECAST COPING	C.I.P. COPING
A	5	VARIES	N/A
B1	5	9'-6"	N/A
B2	5	AS REQD.	AS REQD.
D	4	2'-0"	N/A
L	5	VARIES	VARIES
P1	4	5'-5"	N/A
S1	4	9'-6"	N/A
U1	6	VARIES	N/A



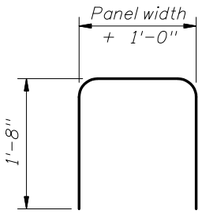
BARS 5A, 5B1, 5B2 & 4S1



BAR 5L

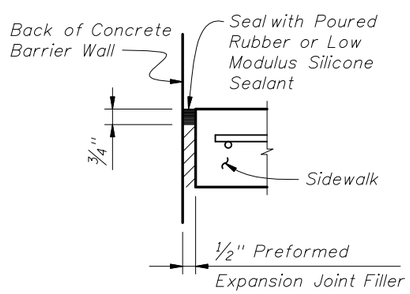


BAR 4P1



BAR 5U1

REINFORCING STEEL NOTES:
1. All bar dimensions in the bending diagrams are out to out.
2. All reinforcing steel at expansion joints will have a 2" minimum cover.
3. Lap splices for Bars 5B2 will be a minimum of 2'-2".
4. For Precast Coping only, lap splice Bars 5L with Bars 5A. Lap splices will be a minimum of 2'-2".
5. For C.I.P. only, see Index No. 820 for Bars 4P and 4S.
6. The Contractor may use Welded Wire Reinforcement when approved by the Engineer. Welded Wire Reinforcement will conform to ASTM A 497.



DETAIL "D"

PRECAST COPING/PARAPET AND SIDEWALK NOTES:
1. Actual width varies depending on type of Retaining Wall used.
2. Match Cross Slope of Travel Lane or Shoulder.
3. Gradually deflect/displace Soil Reinforcement downward as required. Soil Reinforcement is shown deflected downward for illustrative purposes only and is not to scale. See Wall Company Drawings for details.
4. C.I.P. Concrete Parapet shown, Vertical Shape Traffic Railing similar. Complete details and dimensions of Vertical Traffic Railings are required in the Shop Drawings.
5. Match cross slope of connecting sidewalk or as shown in the Wall Control Drawings.

PRECAST COPING/PARAPET OR C.I.P. COPING WITH C.I.P. SIDEWALK DETAILS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	TJB	Changed "6"" to "6" Min." and "¾" Std. (½" Min. ~ 1¼" Max.)" to "¾" Std. (½" Min. ~ 2½" Max.)" in TYPICAL SECTION details.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

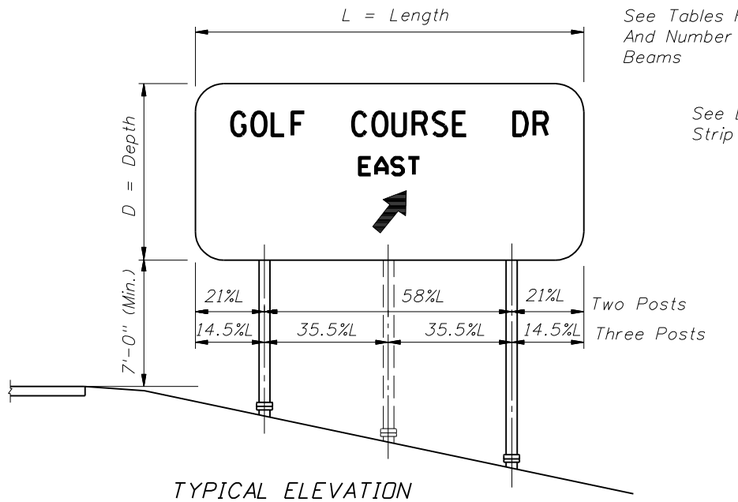
2008 Interim Design Standard

PERMANENT RETAINING WALL SYSTEMS

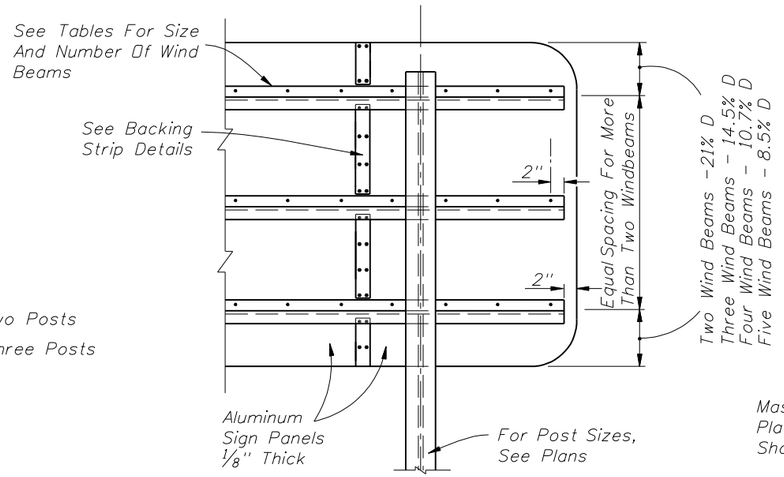
Interim Date 01/01/08

Sheet No. 15 of 19

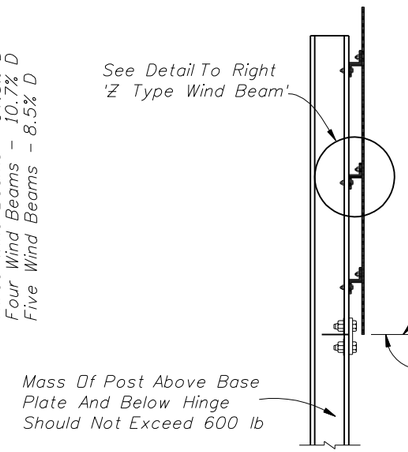
Index No. 5300



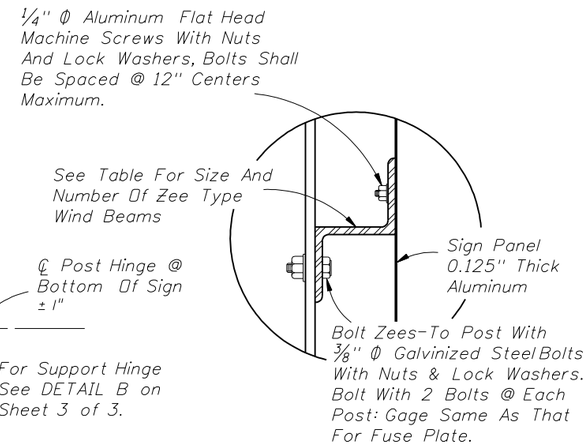
TYPICAL ELEVATION



PARTIAL REAR ELEVATION



SIDE VIEW

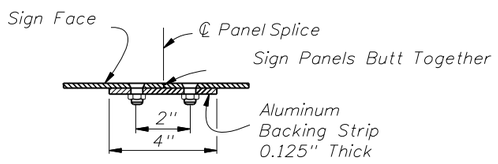


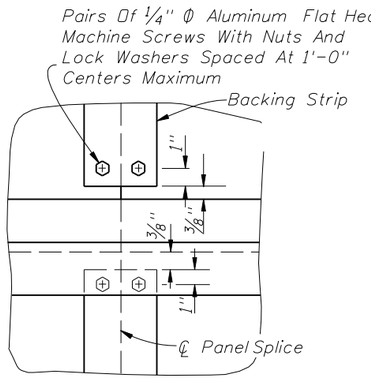
Z TYPE WIND BEAM

(For Notes And Dimensions Not Shown, See Plans)

Note: It shall be the contractors responsibility to determine the length of the column supports in the field prior to fabrication.

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





BACKING STRIP DETAIL

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: Zees Are Aluminum - No Steel Equivalent Available
Designation Gives (Member Depth) x (Flange=Width) x (lb/ft)

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.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/07	L.W.	Deleted High Strength Bolt Table A-325. Note revised to 10' instead of 12' in BACKING STRIP DETAIL.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

MULTI-COLUMN GROUND SIGN

Interim Date 01/01/08

Sheet No. 1 of 3

Index No. 11200

GENERAL NOTES

DESIGN SPECIFICATION

Design according to FDOT Structures Manual (current edition).
Standard Specification for Structural Supports for Highway Signs, Luminaries and Traffic Signals, AASHTO 2001.
For welding refer to the latest editions of the AWS Structural Welding Codes for Steel and Aluminum, the AASHTO Standard Specifications for Welding Structural Steel Highway Bridges.

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. Sheets are to be degreased, etched, neutralized and treated with Alodine 1200, Iridite 14-2, Bonderite 721, or equal. No stenciling permitted on sheets. Aluminum welding rods shall meet the requirements of Aluminum Association Alloy No. 5556 filler wire.

STRUCTURAL STEEL

All structural steel shall meet the requirements of ASTM A36.

ALUMINUM BOLTS, NUTS, & LOCKWASHERS

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.

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.

TOLERANCES

All above materials shall be in accordance with the governing ASTM specifications.

GALVANIZING

All steel shapes, angles, tees, plates, bolts, nuts and washers shall be galvanized in accordance with Standard Specifications 962-7.

BASE CONNECTION

High strength bolts L_2 in the base connection shall be tightened only to the torque shown in the table on sheets 3 of 3. Overtightened base connections will not be accepted.

FUSE PLATES

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 ground. Metal projecting beyond the plane of the plate face will not be tolerated.

SIGN FACE

All sign face corners shall be rounded. See Sign Layout Sheet.

SHOP DRAWINGS

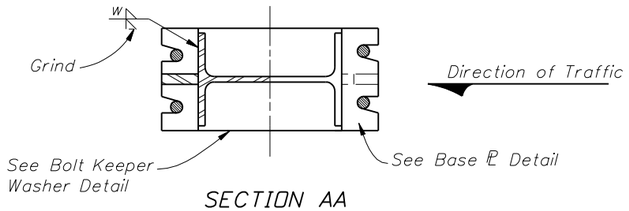
When ground sign supports are fabricated in accordance with these plans no shop drawings are required. Shop drawings will be required for approval when the column length exceeds the length shown in the plans by more than 2'-0". However, shop drawings for sign panels, messages, lettering and quantities shall be submitted to the Engineer of Record for approval.

FABRICATOR NOTE

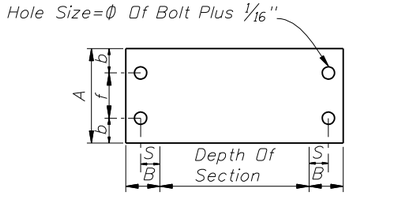
All bolts shall be high strength bolts. All bolts, except L2 bolts and zee to post bolts, shall be tightened in the shop following a method approved by the engineer. Tightening shall be to such a degree so as to attain in each bolt the residual tension specified in the tabulation on sheet 1 of 3.

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 clear 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.

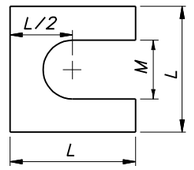


SECTION AA



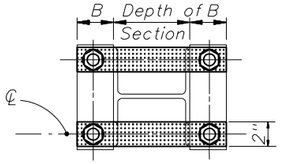
(0.0149" Thick Aluminum 6061-T6)

BOLT KEEPER WASHER



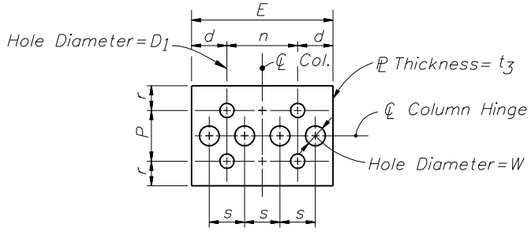
Provide 2 - 0.0149" Thick and 2 - 0.0329" Thick Shims Per Post

SHIM DETAIL

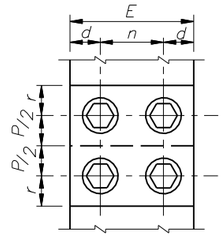


0.0149" Thick Aluminum (6061 -T6) Strips

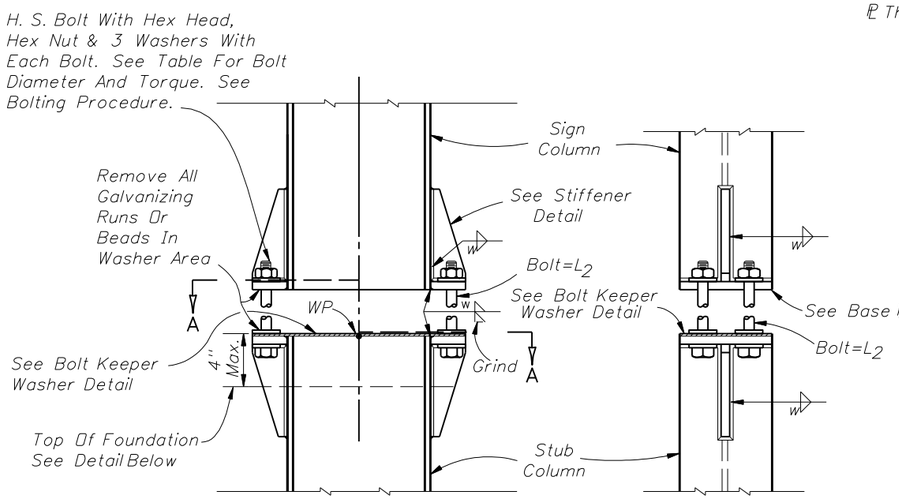
ALTERNATE BOLT KEEPER WASHER



FUSE PLATE

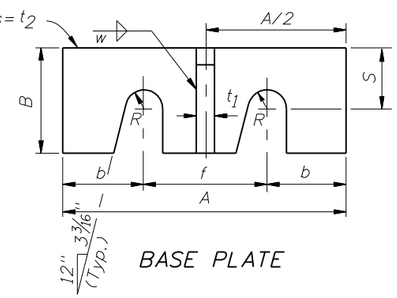


HINGE PLATE
(Match Post Flange Thickness)

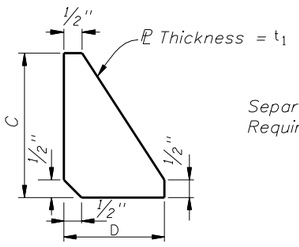


SIGN COLUMN & STUB COLUMN ELEVATION

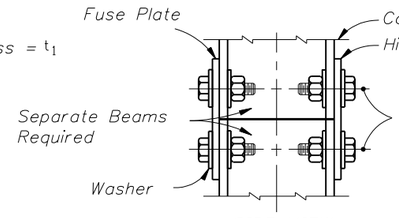
BASE CONNECTION



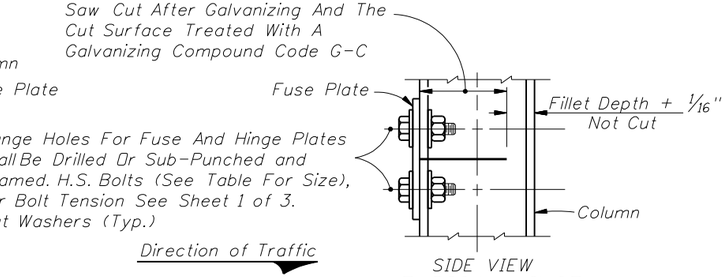
BASE PLATE



STIFFENER PLATE



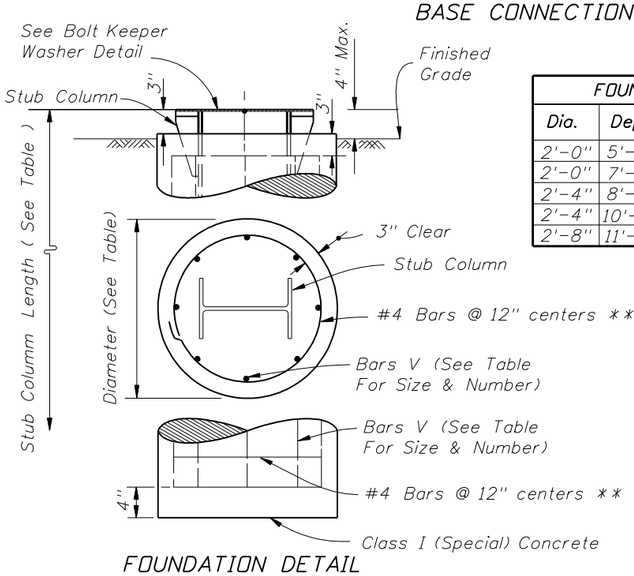
SIDE VIEW
OPTIONAL HINGE



(See Fabricator Note On Sheet 2 of 3)

FUSE & HINGE PLATES
DETAIL B

SIDE VIEW
TYPICAL HINGE



FOUNDATION DETAIL

NOTE; All Reinforcing To Be Grade 60.

FOUNDATION DATA				SHIM	
Dia.	Depth	Stub Length	Reinf. Bars V	L	M
2'-0"	5'-6"	2'-4"	10-#6	1 3/8"	11/16"
2'-0"	7'-6"	2'-10"	10-#6	1 3/4"	13/16"
2'-4"	8'-6"	3'-4"	8-#8	2"	15/16"
2'-4"	10'-3"	4'-0"	8-#8	2 3/8"	1 3/16"
2'-8"	11'-3"	4'-8"	10-#8	2 3/8"	1 3/16"

** 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 preformed on shop-welded specimens and the test results are available, upon request, to the Engineer.

BASE CONNECTION DATA													FUSE (HINGE) PLATE DATA									
Section *	A	B	C	D	Bolt Size(L_2) & Torque(in-lb)	R	b	f	S	t_1	t_2	w	Bolt Size	E	P	D_1	d	n	r	s	t_3	W
W 6x12	4 3/4"	2"	5 1/8"	2"	5/8" Ø 345	3/8"	1 1/8"	2 1/2"	1 3/16"	1/2"	1/2"	1/4"	5/8"	4 1/4"	3"	11/16"	1 1/8"	2"	1 3/16"	1"	1/4"	13/16"
W 8x18	5 3/4"	2 3/16"	6 1/4"	2 3/16"	3/4" Ø 550	7/16"	1 1/2"	2 3/4"	1 3/8"	1/2"	5/8"	1/4"	7/8"	5 1/2"	3 3/4"	15/16"	1 1/2"	2 1/2"	1 3/8"	1 5/16"	3/8"	1 1/16"
W 10x22	6 1/8"	2 3/8"	8"	2 3/8"	7/8" Ø 640	1/2"	1 9/16"	3"	1 3/8"	1/2"	3/4"	5/16"	1"	6 3/8"	4 5/16"	1 1/16"	1 3/4"	2 7/8"	1 3/4"	1 1/2"	3/8"	1 3/16"
W 10x33	8"	2 3/4"	8"	2 3/4"	1 1/8" Ø 780	5/8"	2"	4"	1 9/16"	1/2"	3/4"	5/16"	1 1/8"	7 7/8"	5 5/16"	1 3/16"	2 1/4"	3 3/8"	2"	1 7/8"	1/2"	1 9/16"
W 12x40	8"	3"	8"	3"	1 1/8" Ø 780	5/8"	2"	4"	1 9/16"	1/2"	3/4"	5/16"	1 1/4"	8 3/8"	5 3/4"	1 5/16"	2 1/4"	3 7/8"	2 3/16"	2"	1/2"	1 11/16"

* Designations Give (Nominal Depth) x (lb/ft)

PROCEDURE FOR ASSEMBLY OF BASE CONNECTION

1. Assemble post to stub with bolts and with one flat washer on each end bolt between plates.
2. Shim as required to plumb post (see shim detail).
3. Tighten all bolts the maximum possible with 1'-0" to 1'-3" wrench to bed washers and shims and to clean bolt threads then loosen each bolt in turn and retighten in a systematic order to the prescribed torque (see table).
4. Burr threads at junction with nut using a center punch to prevent nut loosening.
5. Sections shown are for installation on right shoulder. For left shoulder plate slot bevels are opposite hand from that shown.

STEEL POST, BASE, FOUNDATION & FUSE PLATE DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/27/07	L.W.	Notes added to FOUNDATION DETAIL.			

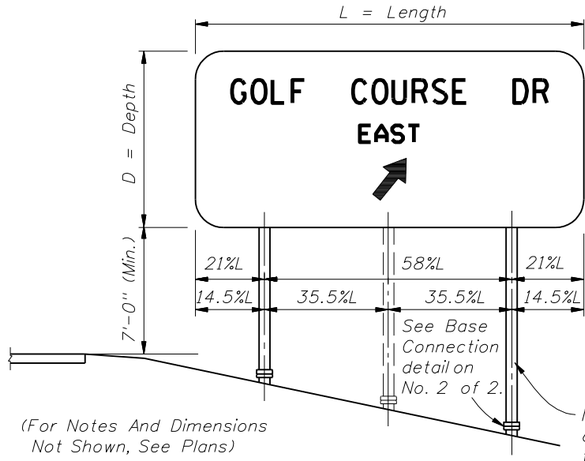
2008 Interim Design Standard

MULTI-COLUMN GROUND SIGN

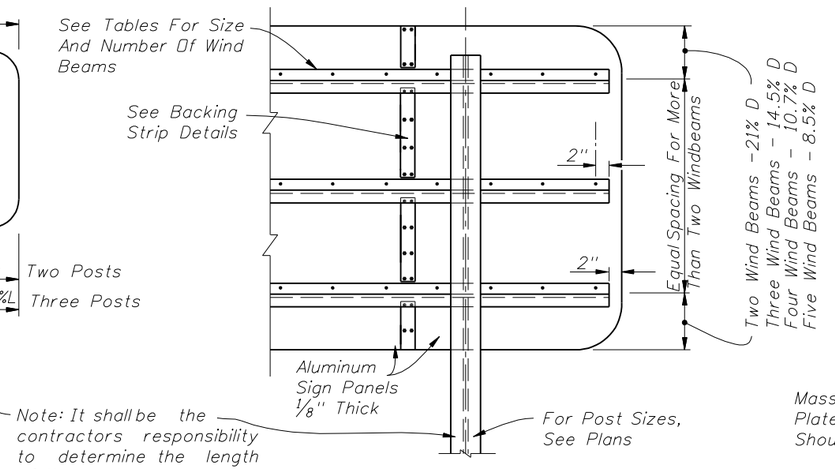
Interim Date 01/01/08

Sheet No. 3 of 3

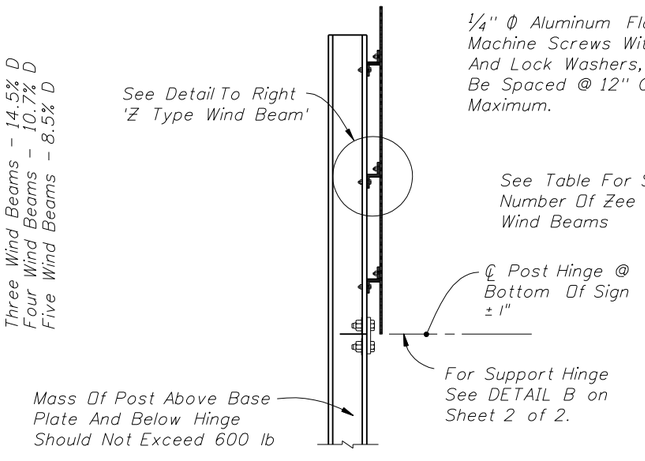
Index No. 11200



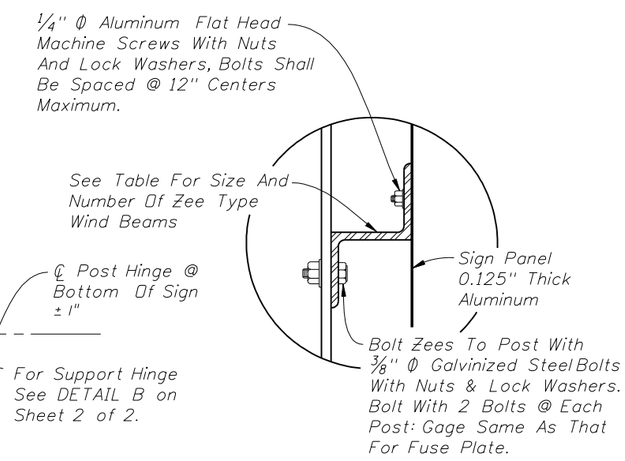
TYPICAL ELEVATION



PARTIAL REAR ELEVATION

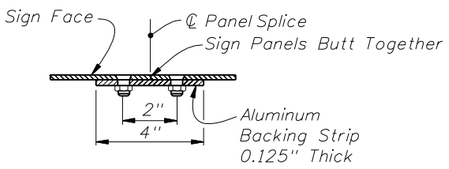


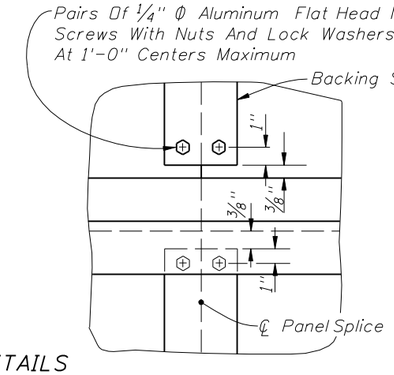
SIDE VIEW



Z TYPE WIND BEAM

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





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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: Zees Are Aluminum - No Steel Equivalent Available
Designation Gives (Member Depth) x (Flange=Width) x (lb/ft)

DESIGN WIND SPEEDS BY COUNTY

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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.

GENERAL NOTES

DESIGN SPECIFICATIONS: Design according to FDOT Structures Manual (current edition). Standard Specification for Structural Supports for Highway Signs, Luminaries and Traffic Signals, AASHTO 2001.
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STRUCTURAL STEEL: All structural steel shall meet the requirements of ASTM A36.
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.
TOLERANCES: All above materials shall be in accordance with the governing ASTM specifications.
GALVANIZED: All steel shapes, angles, tees, plates, bolts, nuts and washers shall be galvanized in accordance with Standard Specifications 962-7.
BASE CONNECTION: High strength bolts L_2 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 accepted.
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 allowed.
SIGN FACE: All sign face corners shall be rounded.
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". However, shop drawings for sign panels, messages, lettering and quantities shall be submitted to the Engineer of Record for approval.
FABRICATOR NOTE: All bolts, except L_2 bolts and zee 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 clear 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.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/07	L.W.	Deleted High Strength Bolt Table A-325. Note revised to 10' instead of 12' in BACKING STRIP DETAIL.	07/01/08	DYW	Provided Specifications reference for bolt tightening. Changed bolt keeper plate, base connection and shim details. Index Completely revised changed from three sheets to two sheets.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

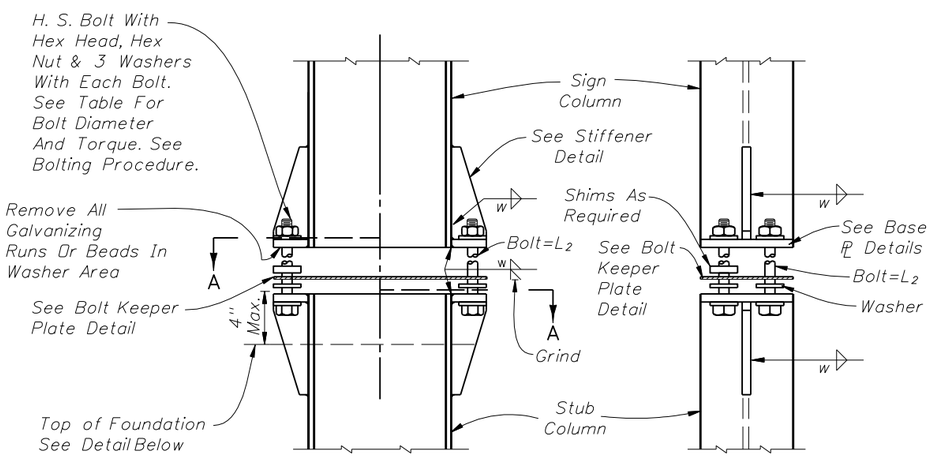
2008 Interim Design Standard

MULTI-COLUMN GROUND SIGN

Interim Date 07/01/08

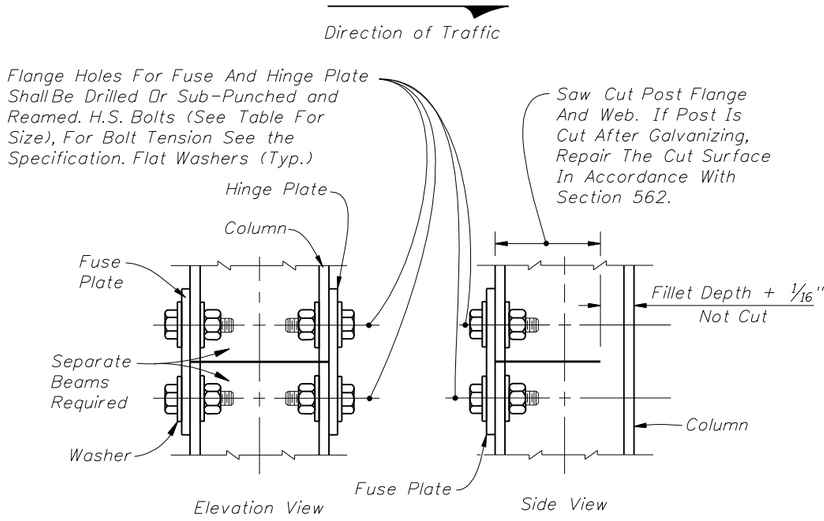
Sheet No. 1 of 2

Index No. 11200



SIGN COLUMN & STUB COLUMN ELEVATION

BASE CONNECTION

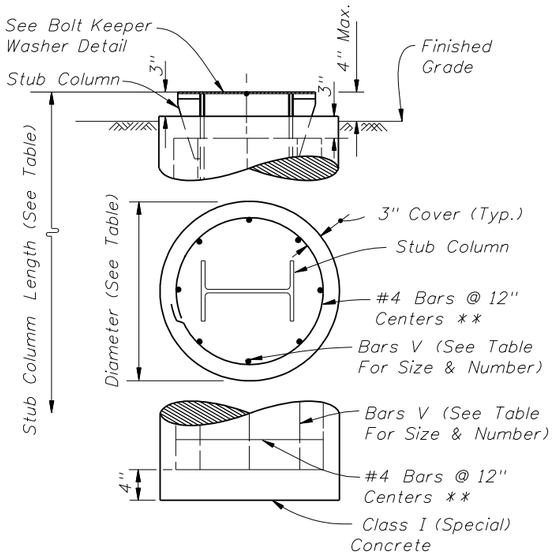


OPTIONAL HINGE TYPICAL HINGE

FUSE & HINGE PLATES

(See Fabricator Note on Sheet 1 of 2)

DETAIL B



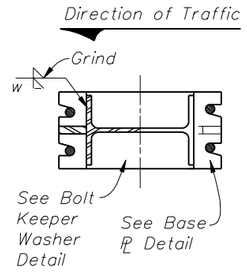
FOUNDATION ELEVATION

NOTE: All Reinforcing To Be Grade 60.

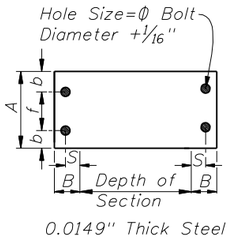
** At the Option of the Contractor, D10 Spiral Wire @ 6" Pitch, Three Flat Turns Top and One Flat Turn Bottom may be Utilized in Lieu of Specified.

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 preformed on shop-welded specimens and the test results are available, upon request, to the Engineer.

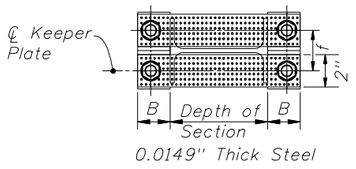


SECTION A-A



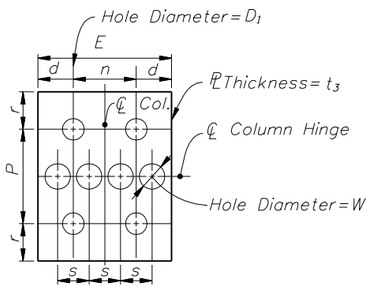
0.0149" Thick Steel

BOLT KEEPER PLATE

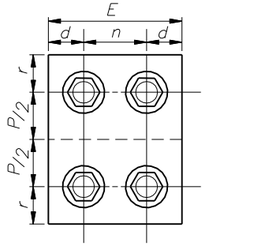


0.0149" Thick Steel

ALTERNATE BOLT KEEPER PLATE

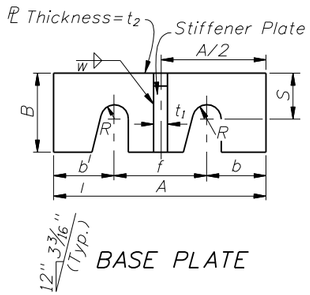


FUSE PLATE

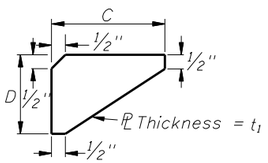


(Match Post Flange Thickness)

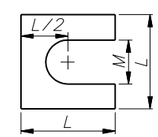
HINGE PLATE



BASE PLATE



STIFFENER PLATE



Provide 2 - 0.0149" Thick and 2 - 0.0329" Thick Brass Shims (ASTM B36) Per Post

SHIM DETAIL

PROCEDURE FOR ASSEMBLY OF BASE CONNECTION

1. Assemble post to stub with bolts and with one flat washer on each bolt between plates.
2. Shim as required to plumb post (see shim detail).
3. Tighten all L_2 bolts the maximum possible with 1'-0" to 1'-3" wrench to bed washers and shims and to clean bolt threads. Then loosen each bolt in turn and retighten in a systematic order to the torque specified in the table.
4. Burr threads at junction with nut using a center punch to prevent nut loosening.
5. Sections shown are for installation on right shoulder. For left shoulder plate slot bevels are opposite hand from that shown.

BASE CONNECTION DATA													SHIM		FUSE (HINGE) PLATE DATA										FOUNDATION DATA			
Section *	A	B	C	D	Bolt Size(L_2) & Torque(in-lb)	R	b	f	S	t_1	t_2	w	L	M	Bolt Size	E	P	D_1	d	n	r	s	t_3	W	Dia.	Depth	Stub Length	Reinf. Bars V
W 6x12	4¾"	2"	5⅛"	2"	⅝" Ø 345	⅜"	1⅛"	2½"	1 3/16"	½"	½"	¼"	1⅜"	11/16"	⅝"	4¼"	3"	11/16"	1⅛"	2"	1 3/16"	1"	¼"	13/16"	2'-0"	5'-6"	2'-4"	10-#6
W 8x18	5¾"	2 3/16"	6¼"	2 3/16"	¾" Ø 550	7/16"	1½"	2¾"	1⅜"	½"	⅝"	¼"	1¾"	13/16"	⅞"	5½"	3¾"	15/16"	1½"	2½"	1⅜"	1 5/16"	⅜"	1 1/16"	2'-0"	7'-6"	2'-10"	10-#6
W 10x22	6⅛"	2⅜"	8"	2⅜"	⅛" Ø 640	½"	1 3/16"	3"	1⅜"	½"	¾"	5/16"	2"	15/16"	1"	6⅜"	4 5/16"	1⅛"	1¾"	2⅛"	1¾"	1½"	⅜"	1⅜"	2'-4"	8'-6"	3'-4"	8-#8
W 10x33	8"	2¾"	8"	2¾"	1⅛" Ø 780	⅝"	2"	4"	1 3/16"	½"	¾"	5/16"	2⅜"	1 3/16"	1⅛"	7⅞"	5 5/16"	1 3/16"	2¼"	3⅜"	2"	1⅞"	½"	1 9/16"	2'-4"	10'-3"	4'-0"	8-#8
W 12x40	8"	3"	8"	3"	1⅛" Ø 780	⅝"	2"	4"	1 3/16"	½"	¾"	5/16"	2⅜"	1 3/16"	1¼"	8⅜"	5¾"	1 5/16"	2¼"	3⅜"	2 3/16"	2"	½"	1 11/16"	2'-8"	11'-3"	4'-8"	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
11/27/07	L.W.	Notes added to FOUNDATION DETAIL.			
7/1/08	D.Y.W.	Provided Specification reference for bolt tightening. Changed bolt keeper plate, base connection and shims detail. Index Completely revised changed from three sheets to two sheets			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

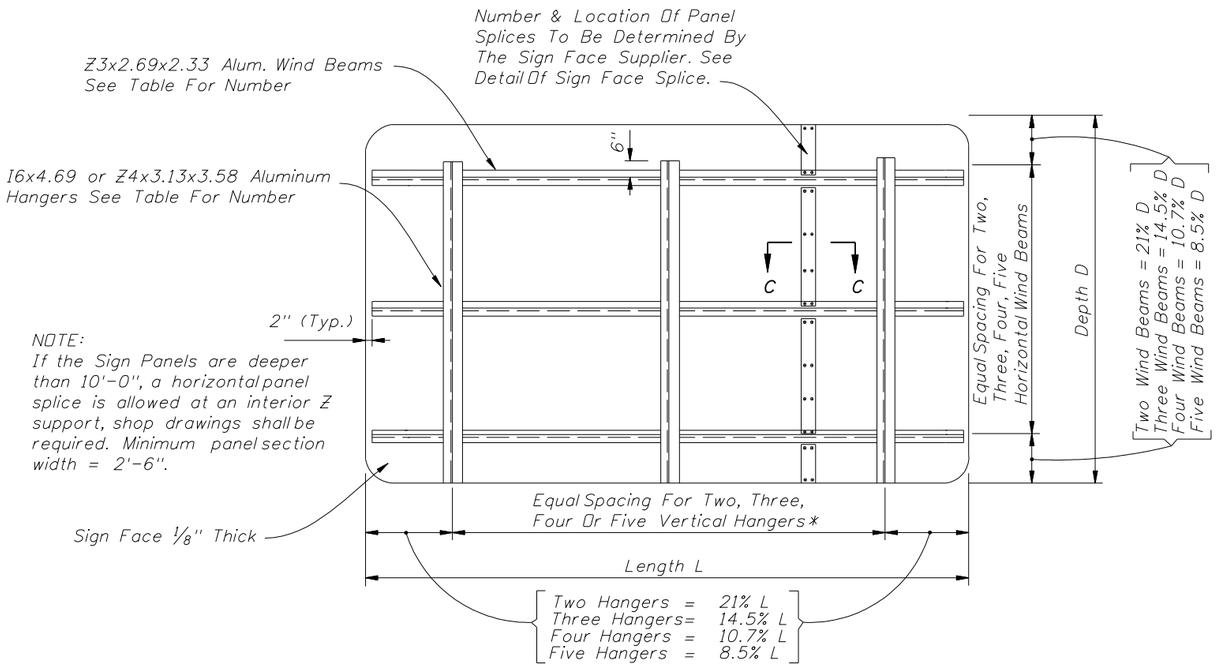
2008 Interim Design Standard

MULTI-COLUMN GROUND SIGN

Interim Date 07/01/08

Sheet No. 2 of 2

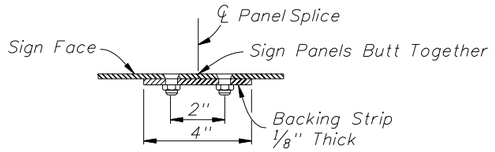
Index No. 11200



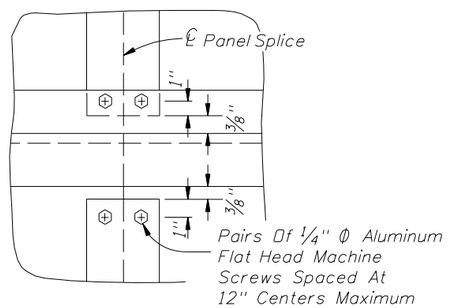
Number Of Z3x2.69x2.33 Horiz. Wind Beams For Sign Depth And Wind			Number Of I6x4.69 or Z4x3.13x3.58 Vertical Hanger Beams For Sign Length			
Wind M.P.H.	No. Beams	Max. Depth	2 Hangers	3 Hangers	4 Hangers	5 Hangers
			Sign Length	Sign Length	Sign Length	Sign Length
150	2	5'-0"	0 to 15'-0"	15'-1" to 30'-0"	30'-1" to 45'-0"	
150	3	8'-6"	0 to 15'-0"	15'-1" to 30'-0"	30'-1" to 45'-0"	
150	4	11'-6"	0 to 13'-0"	13'-1" to 18'-3"	18'-4" to 24'-9"	24'-10" to 31'-4"
150	5	14'-0"	0 to 13'-0"	13'-1" to 18'-3"	18'-4" to 24'-9"	24'-10" to 31'-4"
130	2	5'-3"	0 to 15'-0"	15'-1" to 30'-0"	30'-1" to 45'-0"	
130	3	8'-10"	0 to 15'-0"	15'-1" to 22'-3"	22'-4" to 30'-0"	30'-1" to 45'-0"
130	4	12'-0"	0 to 15'-0"	15'-1" to 22'-3"	22'-4" to 30'-0"	30'-1" to 38'-0"
130	5	15'-0"	0 to 11'-7"	11'-8" to 16'-4"	16'-5" to 22'-2"	22'-3" to 28'-0"
110	2	5'-6"	0 to 15'-0"	15'-1" to 30'-0"	30'-1" to 45'-0"	
110	3	9'-6"	0 to 15'-0"	15'-1" to 27'-3"	27'-4" to 37'-0"	37'-1" to 45'-0"
110	4	12'-9"	0 to 15'-0"	15'-1" to 27'-3"	27'-4" to 37'-0"	37'-1" to 45'-0"
110	5	16'-0"	0 to 14'-3"	14'-4" to 20'-0"	20'-1" to 27'-0"	27'-1" to 34'-3"

*Note: Spacing of vertical hangers may be varied slightly or as necessary to clear the truss struts and diagonals at panel points.

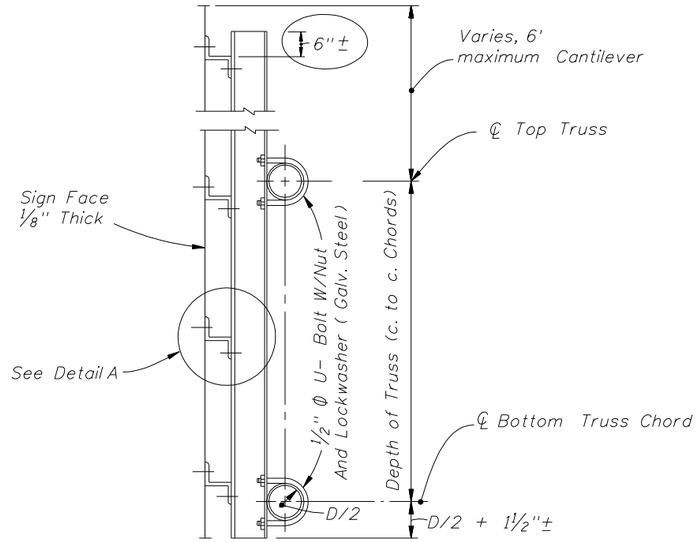
TYPICAL SIGN FACE ELEVATION FOR OVERHEAD TRUSS



SECTION C-C

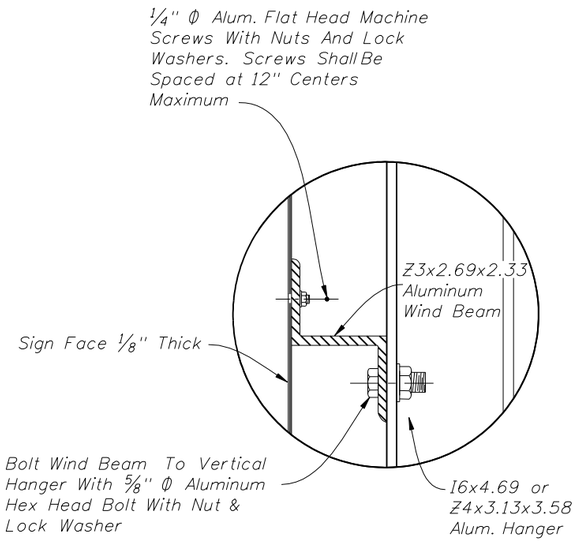


BACKING STRIP DETAIL



(LIGHTING NOT SHOWN)

TYPICAL DETAIL OF SIGN & TRUSS CONNECTION



(SHOWING ATTACHMENT OF SIGN FACE PANEL TO VERTICAL HANGER SUPPORTS, VERTICAL I SHAPE HANGER AS SHOWN, Z SHAPE OPTIONAL)

DETAIL A

GENERAL NOTES
(1) For "General Notes" covering Material Specifications see Index 11200.
(2) Design based on 32 ft. maximum height to centroid of sign panel.
(3) The Design Wind Speed shall conform to Wind Speed by County shown on Index 11200, Sheet 1 of 3.

DETAILS OF SIGN FACE & TRUSS CONNECTION

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/14/07	L.W.	130mph-3 beams-5 hangers table values change max value from 38'-0" to 45'-0" Detail A change wind beam to Vertical Hanger aluminum hex head connection bolt from 3/8" to 5/8".	11/14/07	L.W.	If the Sign Panels are deeper than 12' has been changed to deeper than 10'.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

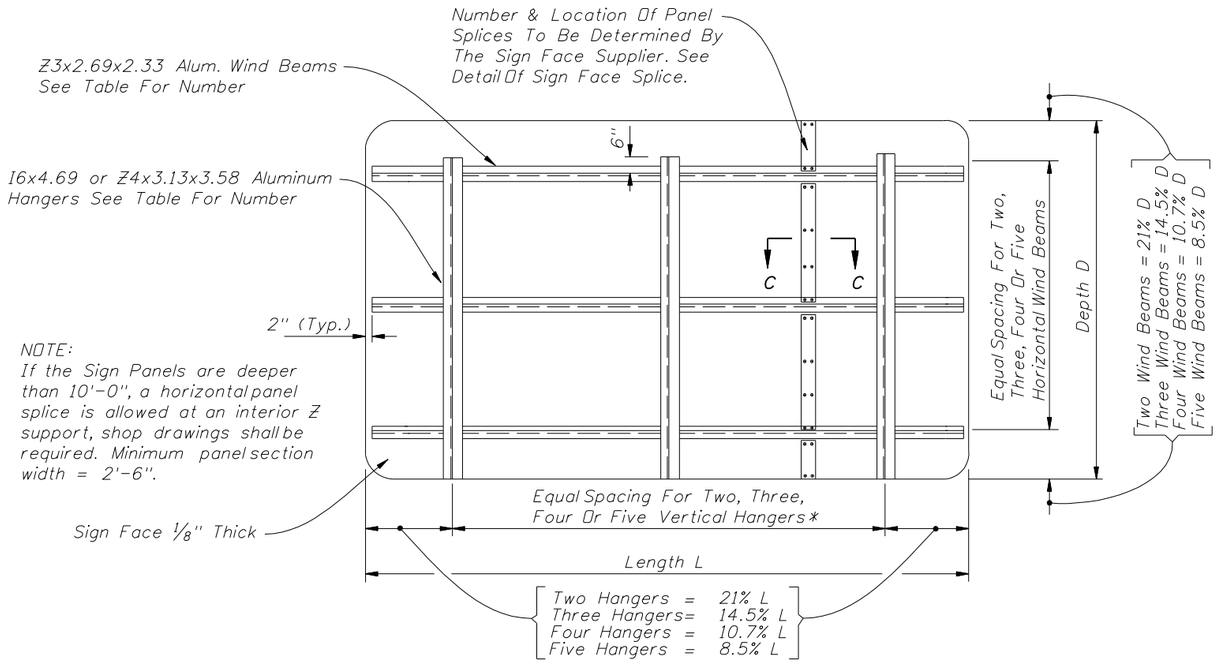
2008 Interim Design Standard

OVERHEAD SIGN STRUCTURES

Interim Date 01/01/08

Sheet No. 1 of 1

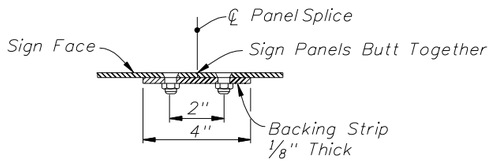
Index No. 11300



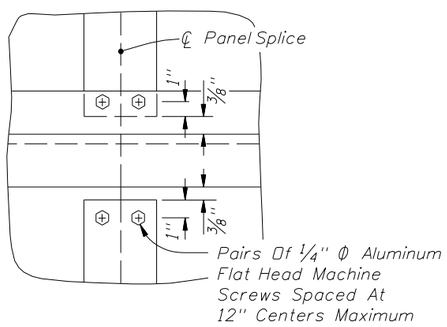
*Note: Spacing of vertical hangers may be varied slightly or as necessary to clear the truss struts and diagonals at panel points.

TYPICAL SIGN FACE ELEVATION FOR OVERHEAD TRUSS

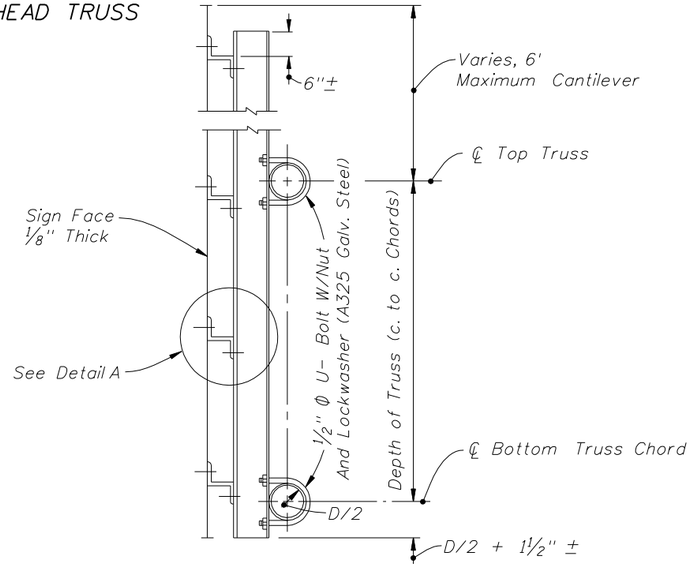
Number Of Z3x2.69x2.33 Horiz. Wind Beams For Sign Depth And Wind			Number Of I6x4.69 or Z4x3.13x3.58 Vertical Hanger Beams For Sign Length			
Wind M.P.H.	No. Beams	Max. Depth	2 Hangers	3 Hangers	4 Hangers	5 Hangers
			Sign Length	Sign Length	Sign Length	Sign Length
150	2	5'-0"	0 to 15'-0"	15'-1" to 30'-0"	30'-1" to 45'-0"	
150	3	8'-6"	0 to 15'-0"	15'-1" to 30'-0"	30'-1" to 45'-0"	
150	4	11'-6"	0 to 13'-0"	13'-1" to 18'-3"	18'-4" to 24'-9"	24'-10" to 31'-4"
150	5	14'-0"	0 to 13'-0"	13'-1" to 18'-3"	18'-4" to 24'-9"	24'-10" to 31'-4"
130	2	5'-3"	0 to 15'-0"	15'-1" to 30'-0"	30'-1" to 45'-0"	
130	3	8'-10"	0 to 15'-0"	15'-1" to 22'-3"	22'-4" to 30'-0"	30'-1" to 45'-0"
130	4	12'-0"	0 to 15'-0"	15'-1" to 22'-3"	22'-4" to 30'-0"	30'-1" to 38'-0"
130	5	15'-0"	0 to 11'-7"	11'-8" to 16'-4"	16'-5" to 22'-2"	22'-3" to 28'-0"
110	2	5'-6"	0 to 15'-0"	15'-1" to 30'-0"	30'-1" to 45'-0"	
110	3	9'-6"	0 to 15'-0"	15'-1" to 27'-3"	27'-4" to 37'-0"	37'-1" to 45'-0"
110	4	12'-9"	0 to 15'-0"	15'-1" to 27'-3"	27'-4" to 37'-0"	37'-1" to 45'-0"
110	5	16'-0"	0 to 14'-3"	14'-4" to 20'-0"	20'-1" to 27'-0"	27'-1" to 34'-3"



SECTION C-C

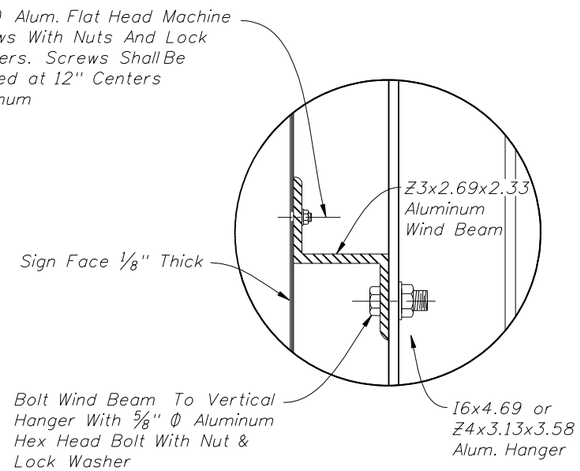


BACKING STRIP DETAIL



(LIGHTING NOT SHOWN)

TYPICAL DETAIL OF SIGN & TRUSS CONNECTION



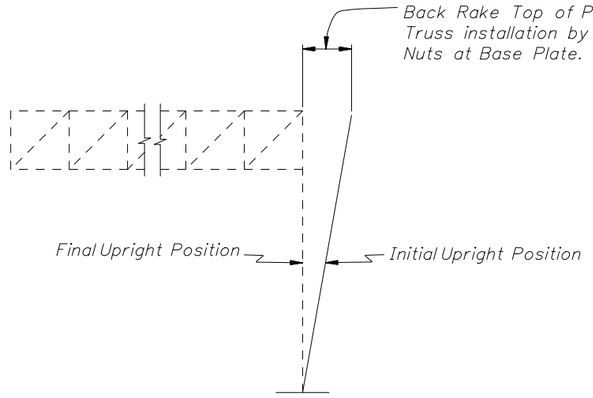
(Showing Attachment Of Sign Face Panel To Vertical Hanger Supports, Vertical I Shape Hanger As Shown, Z Shape Optional)

DETAIL A

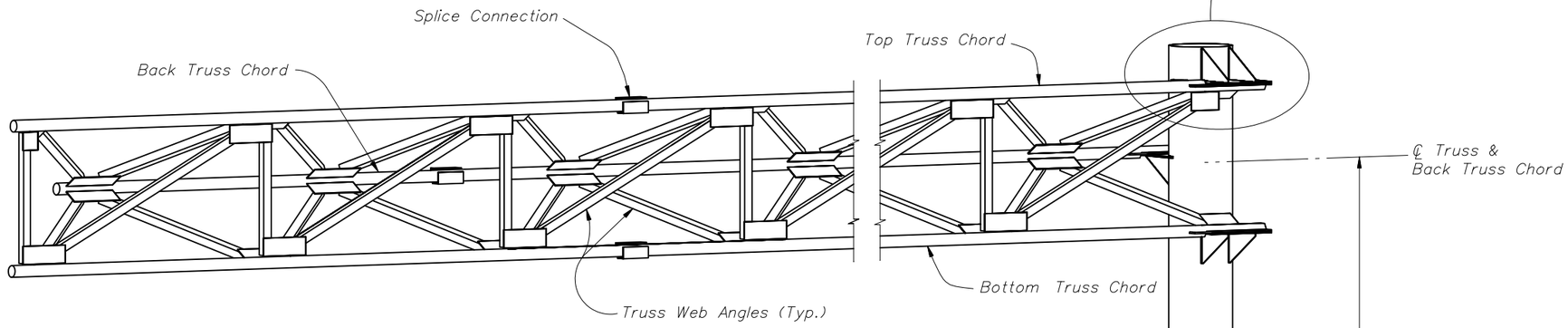
GENERAL NOTES
(1) For "General Notes" covering Material Specifications see Index 11200.
(2) Design based on 32 ft. maximum height to centroid of sign panel.
(3) The Design Wind Speed shall conform to Wind Speed by County shown on Index 11200, Sheet 1 of 2.

DETAILS OF SIGN FACE & TRUSS CONNECTION

REVISIONS						2008 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	OVERHEAD SIGN STRUCTURES	07/01/08	1 of 1
11/14/07	L.W.	130mph-3 b3ams-5 hangers table values change max value from 38'-0" to 45'-0" Detail A Changed wind beam to Vertical Hanger aluminum hex head connection bolt from 3/8" to 5/8".	11/14/07 6/1/08	L.W. C.H..	If the Sign Panels are deeper than 12' has been changed to deeper than 10'. Added U-Bolt material spec.		Index No. 11300	

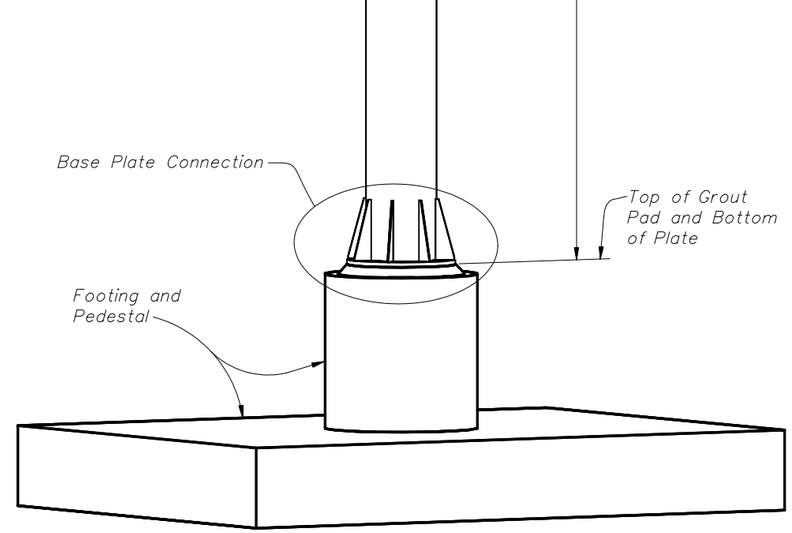


CAMBER DIAGRAM



CANTILEVER SIGN STRUCTURE NOTES

1) Design according to FDOT 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 closet 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 or regular nuts with a galvanized, locking TRW "Palnut."
   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 1/16".
   i. Anchor bolt hole diameters: equal to the bolt diameter plus 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.
   c. Grout: Minimum 5.0 ksi compressive strength at 28-days. Conform to Specification Section 934 using procedures outlined in Section 649-6.
8) Construct the Sign Structure foundation in accordance with FDOT Specification Section 455.
9) If a grout pad is not installed, place wire cloth screen vertically between the base plate and top of foundation, wrap horizontally around the base plate with a 3" min. lap. Use standard grade, plain weave, 1/2"x1/2" mesh, galvanized steel wire-cloth with 0.063" dia. wire. Attach the screen to the base plate with stainless steel self-tapping 1/4" screws with stainless steel washers spaced at 9" centers.
10) Prior to erection, record the as-built anchor locations and provide to the Engineer.
11) 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.
12) 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.
13) Install sign panels as shown on the Elevation drawing.
14) Payment: All costs associated with the Sign Structure, Sign Panels, Foundation and all incidental items will be paid for under the Sign Structure pay item.



ISOMETRIC VIEW

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

NOTE: See Plans for Cantilever Sign Structure Data Table.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed Notes 4e, 7b and 9.			

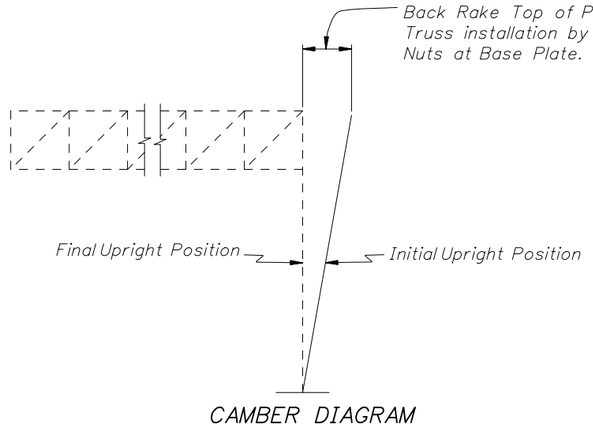
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

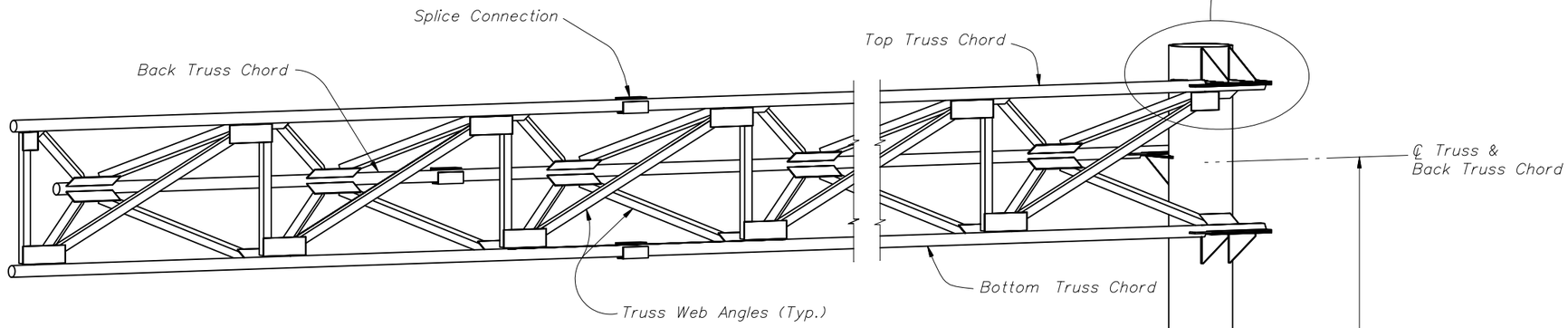
CANTILEVER SIGN STRUCTURE

Interim Date 01/01/08

Index No. 11310

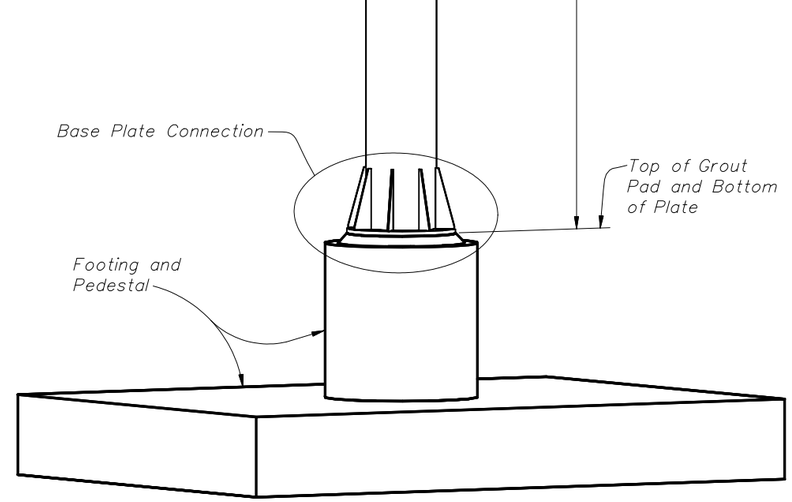


CAMBER DIAGRAM



CANTILEVER SIGN STRUCTURE NOTES

1) Design according to FDOT 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 closet 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 1/16".
   i. Anchor bolt hole diameters: equal to the bolt diameter plus 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.
   c. Grout: Minimum 5.0 ksi compressive strength at 28-days. Conform to Specification Section 934 using procedures outlined in Section 649-6.
8) Construct the Sign Structure foundation in accordance with FDOT Specification Section 455.
9) If a grout pad is not installed, place wire cloth screen vertically between the base plate and top of foundation, wrap horizontally around the base plate with a 3" min. lap. Use standard grade, plain weave, 1/2"x1/2" mesh, galvanized steel wire-cloth with 0.063" dia. wire. Attach the screen to the base plate with stainless steel self-tapping 1/4" screws with stainless steel washers spaced at 9" centers.
10) Prior to erection, record the as-built anchor locations and provide to the Engineer.
11) 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.
12) 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.
13) Install sign panels as shown on the Elevation drawing.
14) Payment: All costs associated with the Sign Structure, Sign Panels, Foundation and all incidental items will be paid for under the Sign Structure pay item.



ISOMETRIC VIEW

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

NOTE: See Plans for Cantilever Sign Structure Data Table.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed Notes 4e, 7b & 9.			
07/01/08	CBH	Changed Note 4e.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

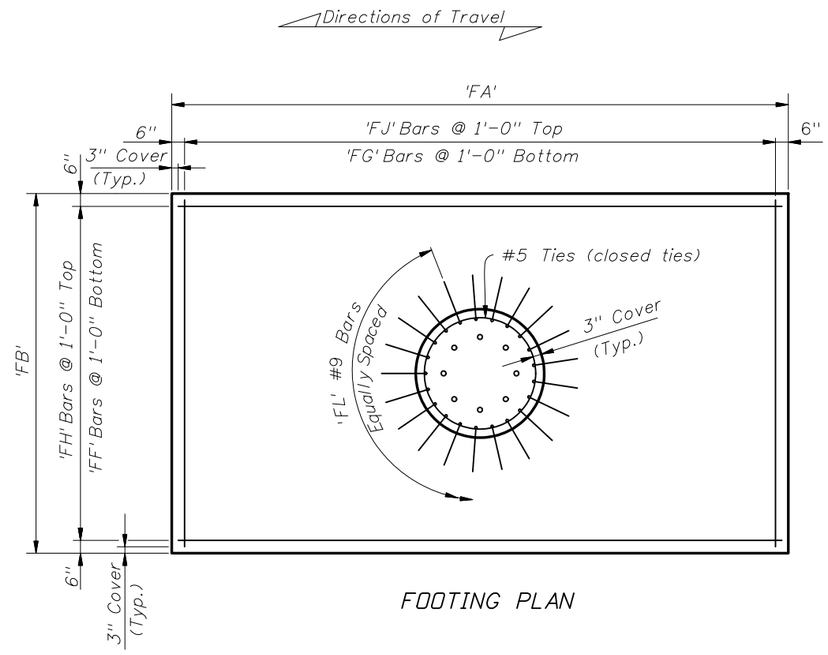
2008 Interim Design Standard

CANTILEVER SIGN STRUCTURE

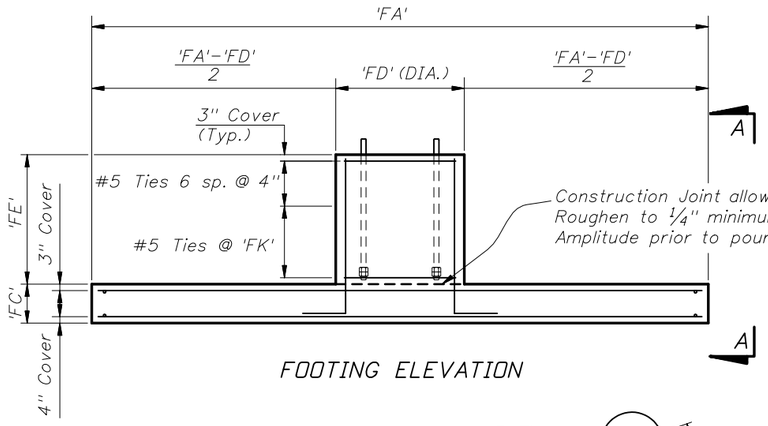
Interim Date 07/01/08

Sheet No. 1 of 5

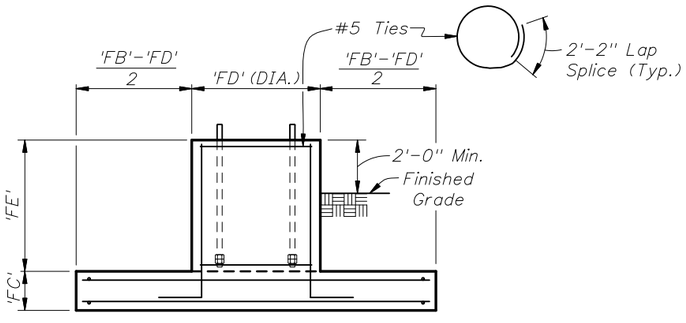
Index No. 11310



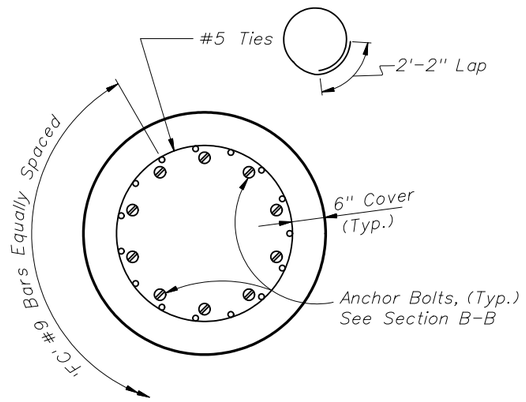
FOOTING PLAN



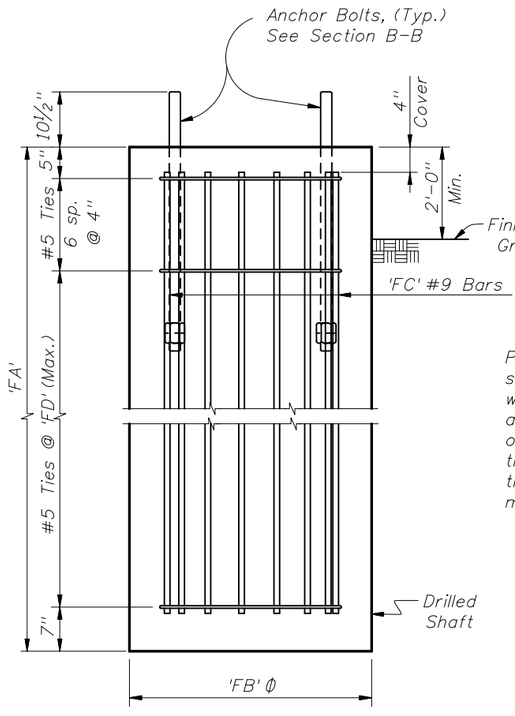
FOOTING ELEVATION



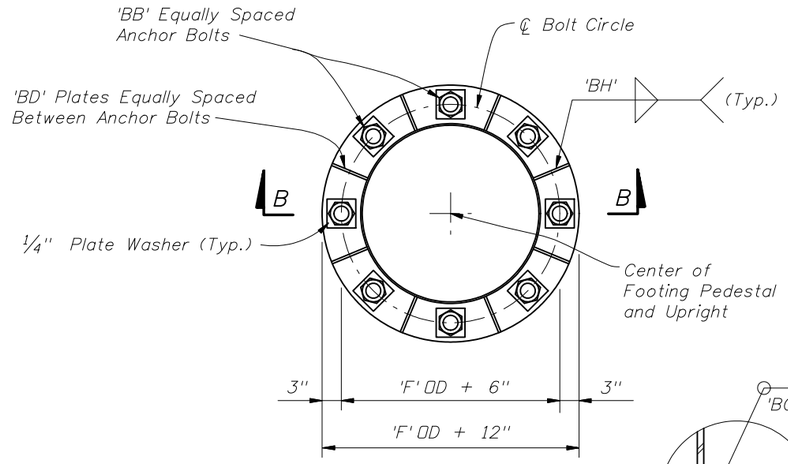
VIEW A-A



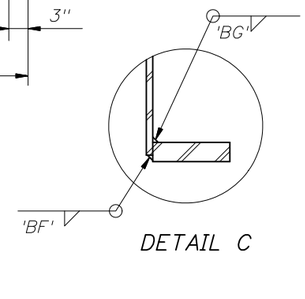
PLAN VIEW
DRILLED SHAFT



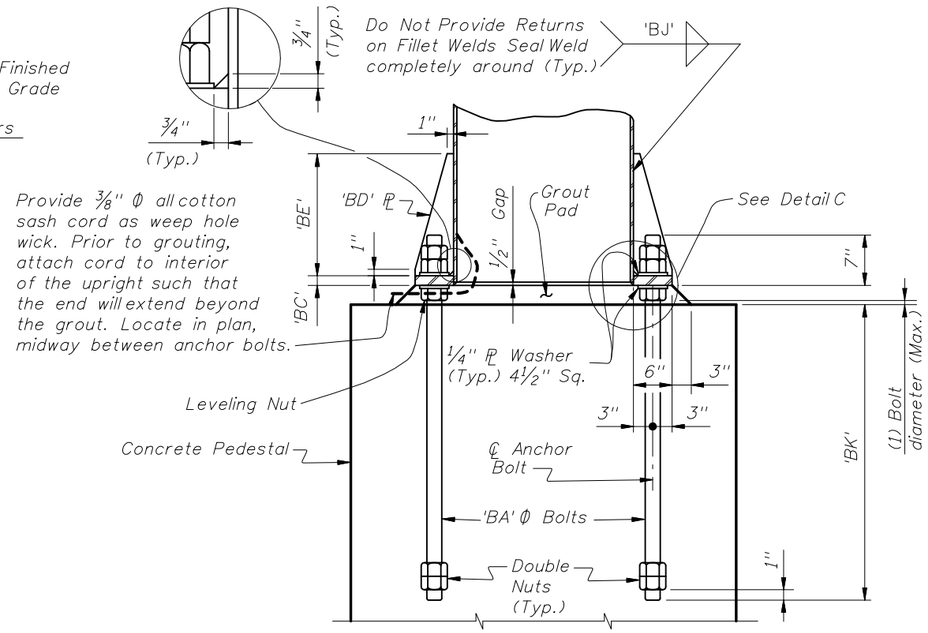
ELEVATION
DRILLED SHAFT
(Alternate Foundation)



PLAN VIEW
(Base Plate)



DETAIL C



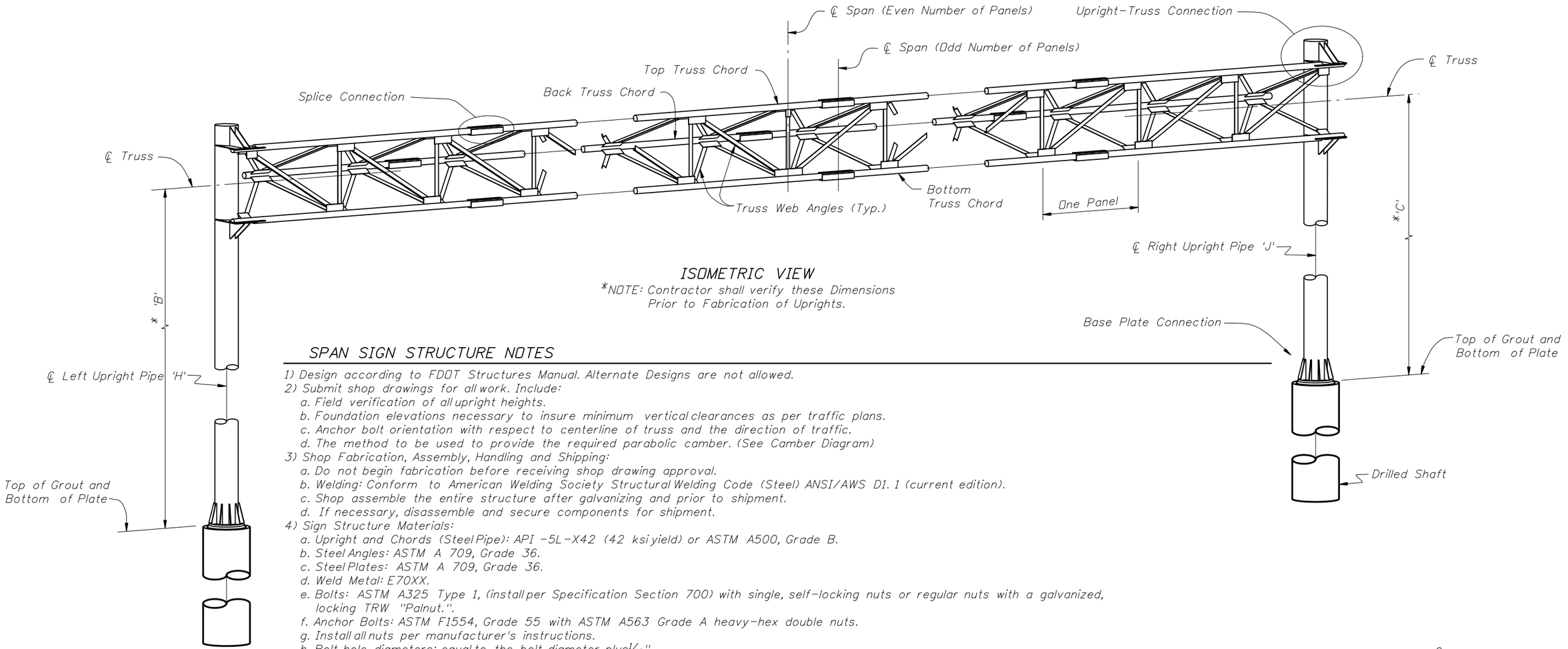
SECTION B-B

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	CBH	Changed foundation standoff distance. Changed drilled shaft detail.			

2008 Interim Design Standard

CANTILEVER SIGN STRUCTURE

Interim Date	Sheet No.
07/01/08	2 of 5
Index No.	
11310	



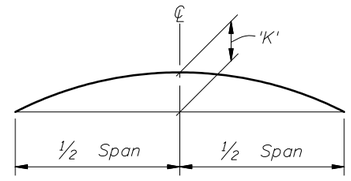
ISOMETRIC VIEW

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

NOTE: See Plans for Span Sign Structure Data Table.

SPAN SIGN STRUCTURE NOTES

1) Design according to FDOT 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 or regular nuts with a galvanized, locking TRW "Palnut.".
   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.
   c. Grout: Minimum 5.0 ksi compressive strength at 28-days. Conform to Specification Section 934 using procedures outlined in Section 649-6.
8) Construct the Sign Structure foundation in accordance with FDOT Specification Section 455.
9) If a grout pad is not installed, place wire cloth screen vertically between the base plate and top of foundation, wrap horizontally around the base plate with a 3" min. lap. Use standard grade, plain weave, $\frac{1}{2}$"x$\frac{1}{2}$" mesh, galvanized steel wire-cloth with 0.063" dia. wire. Attach the screen to the base plate with stainless steel self-tapping $\frac{1}{4}$" screws with stainless steel washers spaced at 9" centers.
10) Prior to erection, record the as-built anchor locations and provide to the Engineer.
11) Provide a parabolic camber with the maximum upward deflection as shown on the Camber Diagram.
12) 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.
13) Install sign panels as shown on the Elevation drawing.
14) Payment: All costs associated with the Sign Structure, Sign Panels, Foundation and all incidental items will be paid for under the Sign Structure pay item.



CAMBER DIAGRAM

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed Notes 4e, 7b and 9.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

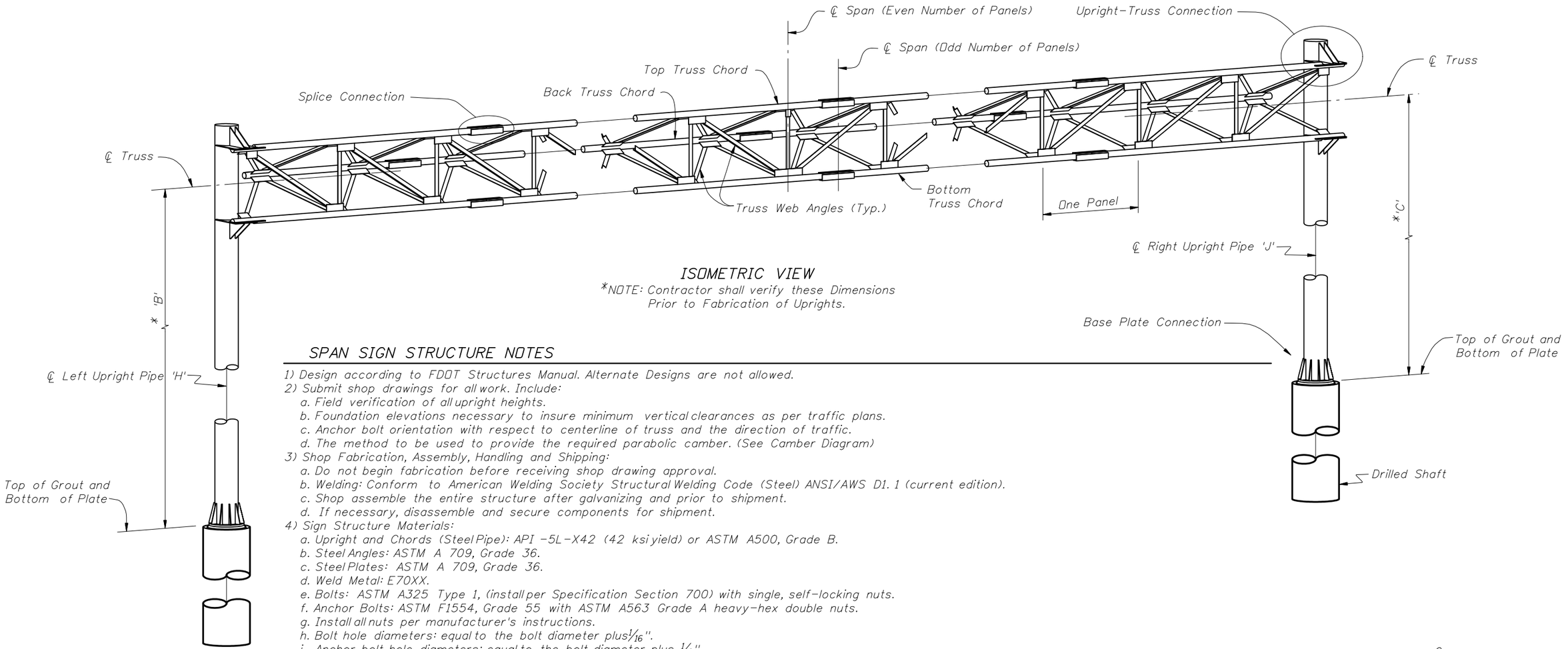
2008 Interim Design Standard

SPAN SIGN STRUCTURE

Interim Date 01/01/08

Sheet No. 1 of 5

Index No. 11320



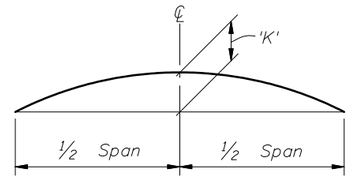
ISOMETRIC VIEW

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

NOTE: See Plans for Span Sign Structure Data Table.

SPAN SIGN STRUCTURE NOTES

1) Design according to FDOT 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.
   c. Grout: Minimum 5.0 ksi compressive strength at 28-days. Conform to Specification Section 934 using procedures outlined in Section 649-6.
8) Construct the Sign Structure foundation in accordance with FDOT Specification Section 455.
9) If a grout pad is not installed, place wire cloth screen vertically between the base plate and top of foundation, wrap horizontally around the base plate with a 3" min. lap. Use standard grade, plain weave, $\frac{1}{2}$"x$\frac{1}{2}$" mesh, galvanized steel wire-cloth with 0.063" dia. wire. Attach the screen to the base plate with stainless steel self-tapping $\frac{1}{4}$" screws with stainless steel washers spaced at 9" centers.
10) Prior to erection, record the as-built anchor locations and provide to the Engineer.
11) Provide a parabolic camber with the maximum upward deflection as shown on the Camber Diagram.
12) 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.
13) Install sign panels as shown on the Elevation drawing.
14) Payment: All costs associated with the Sign Structure, Sign Panels, Foundation and all incidental items will be paid for under the Sign Structure pay item.



CAMBER DIAGRAM

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed Notes 4e, 7b & 9.			
07/01/08	CBH	Changed Note 4e.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

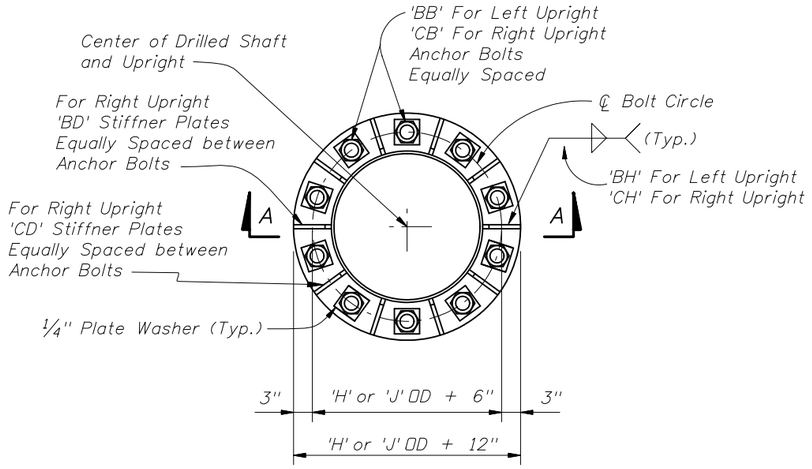
2008 Interim Design Standard

SPAN SIGN STRUCTURE

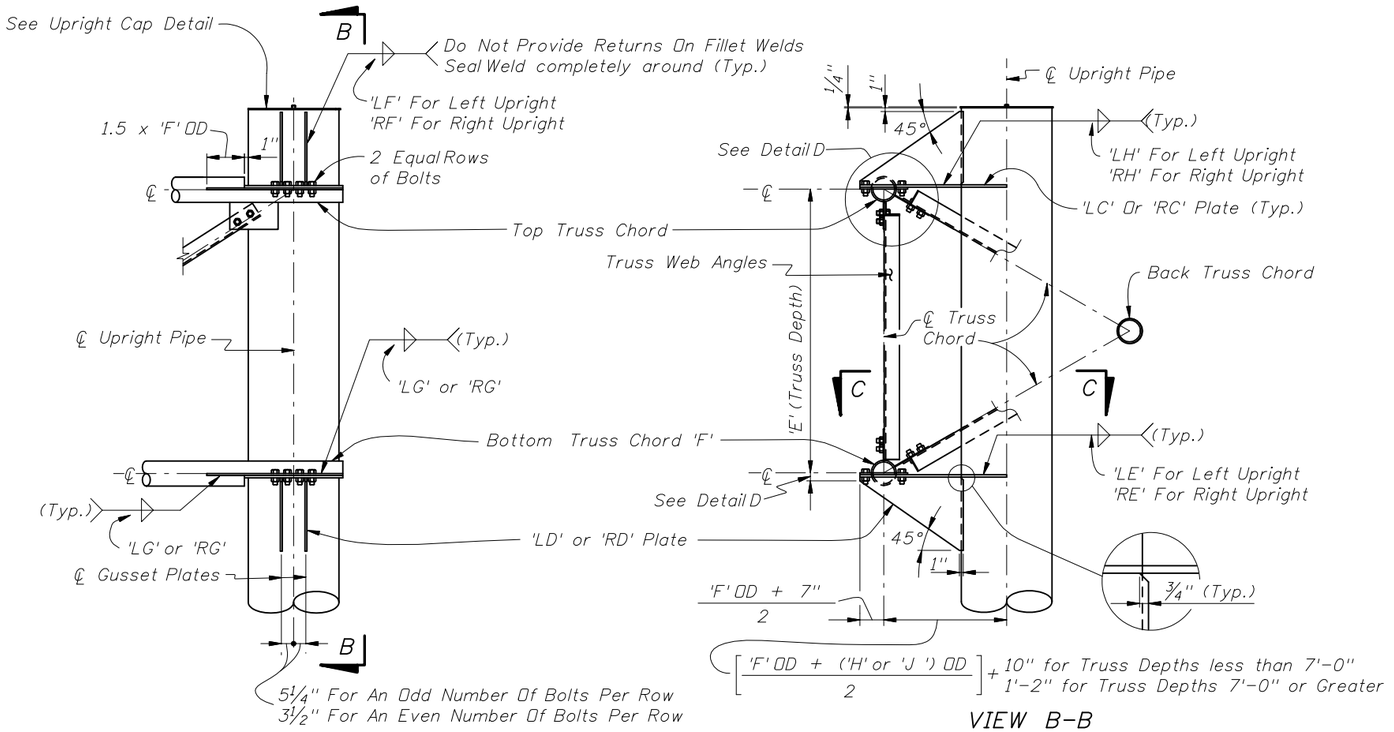
Interim Date 07/01/08

Sheet No. 1 of 5

Index No. 11320



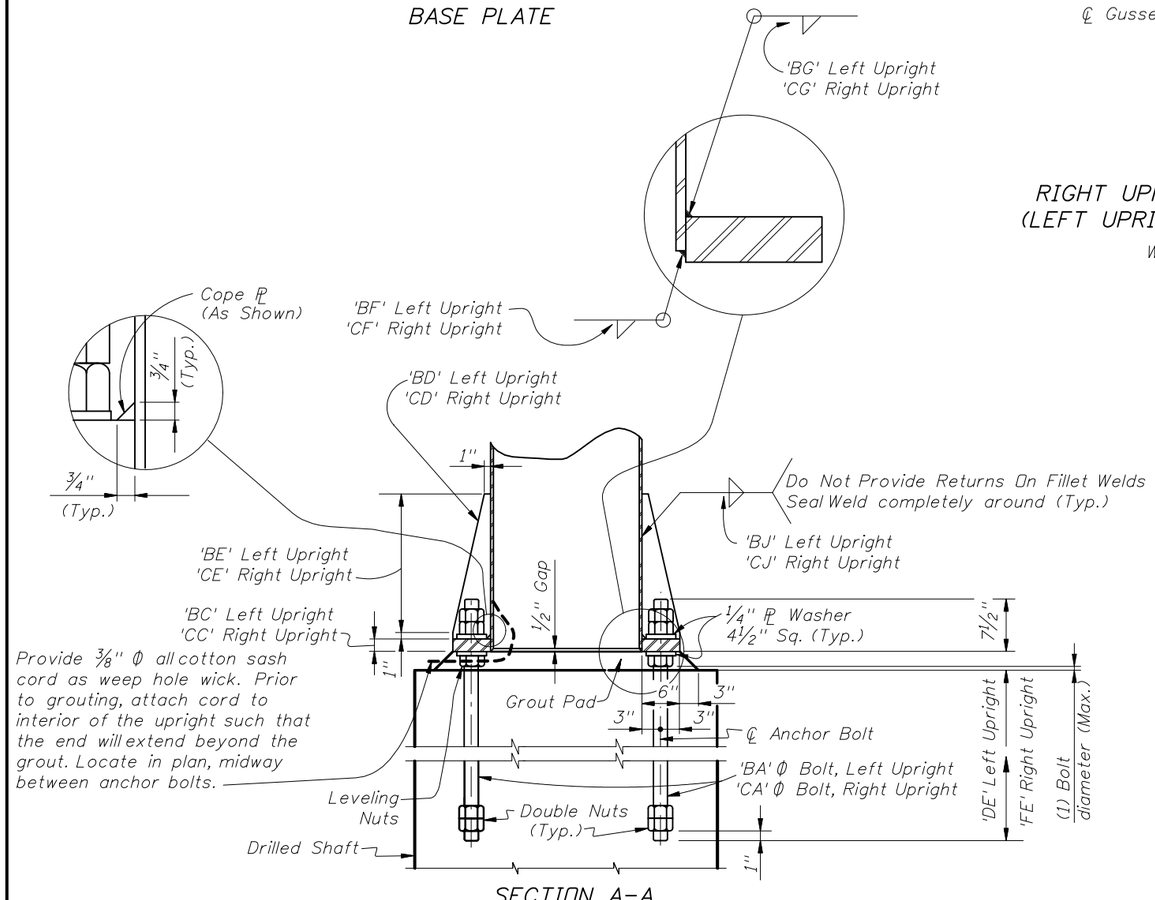
PLAN VIEW
BASE PLATE



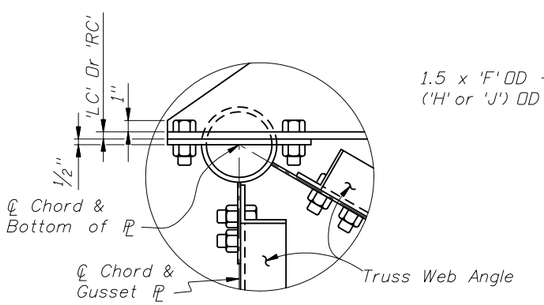
RIGHT UPRIGHT-TRUSS CONNECTION DETAIL
(LEFT UPRIGHT -TRUSS CONNECTION SIMILAR)

Web Members From Back Truss
Chord Omitted For Clarity

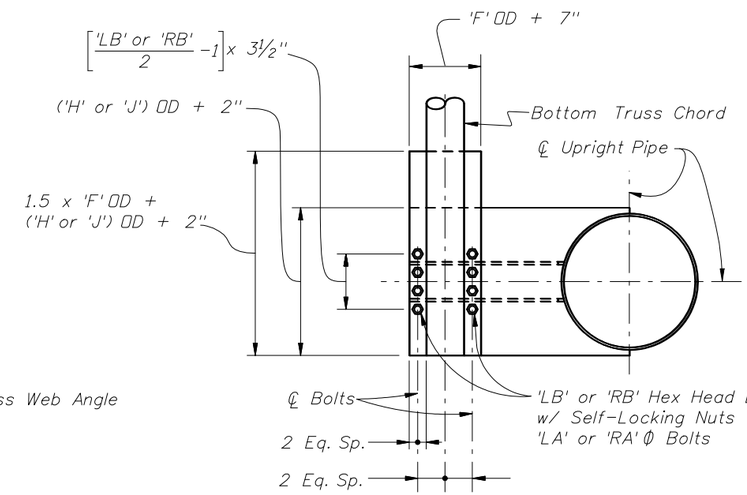
VIEW B-B



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	DATE	BY	DESCRIPTION
07/01/08	CBH	Changed foundation standoff distance.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

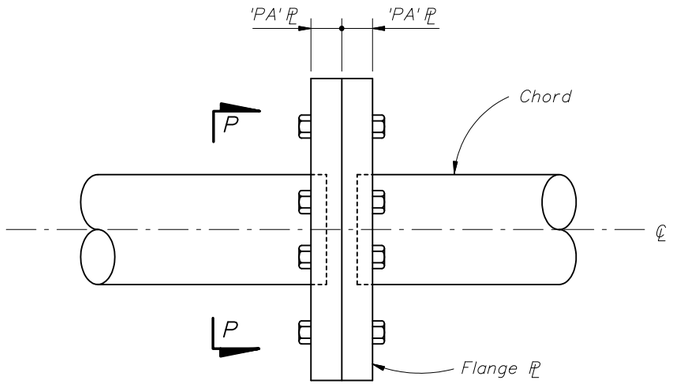
2008 Interim Design Standard

SPAN SIGN STRUCTURE

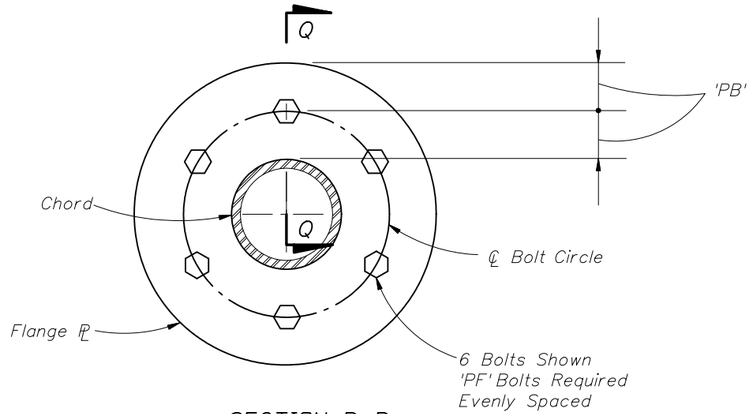
Interim Date 07/01/08

Sheet No. 2 of 5

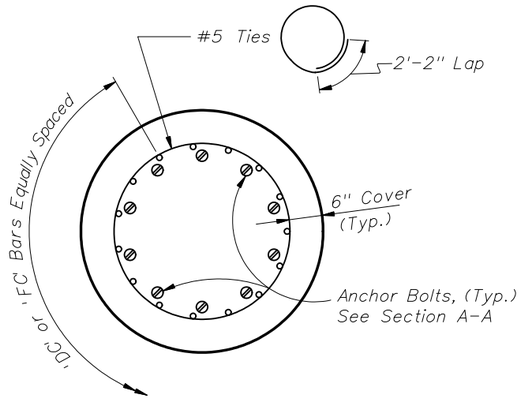
Index No. 11320



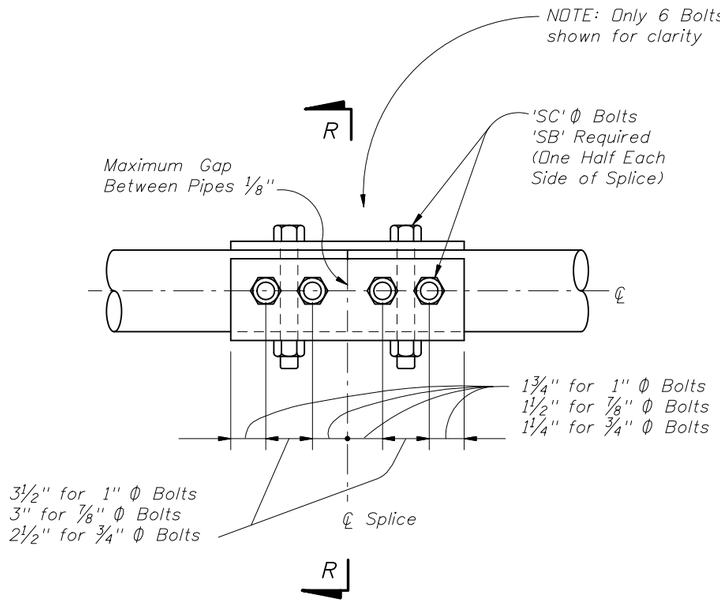
ELEVATION
ALTERNATE SPLICE CONNECTION



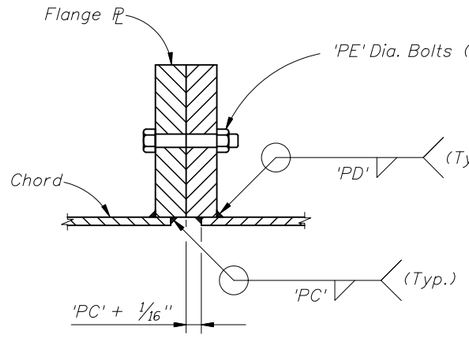
SECTION P-P



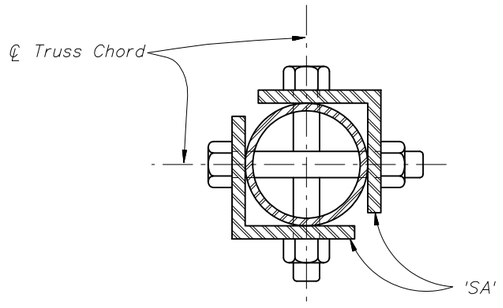
PLAN VIEW
DRILLED SHAFT



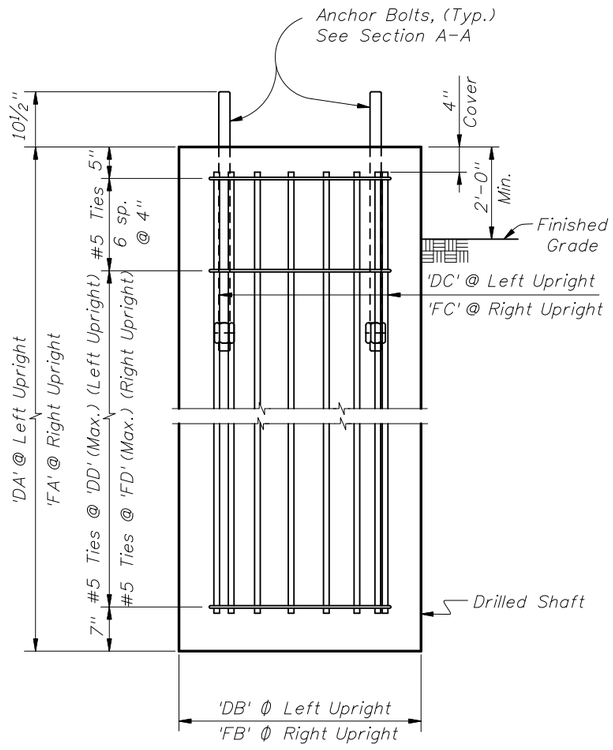
ELEVATION
SPLICE CONNECTION



SECTION Q-Q



SECTION R-R



ELEVATION
DRILLED SHAFT

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	CBH	Changed drilled shaft detail.			

2008 Interim Design Standard

SPAN SIGN STRUCTURE

Interim Date	Sheet No.
07/01/08	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 (Special).

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) INSTALLING FRANGIBLE COLUMN SUPPORTS:
   Columns (posts) may be installed by driving the columns in accordance with this Index, or as an alternate method, the columns (posts) may be set to the depth indicated in preformed holes backfilled with suitable material tamped in layers not thicker than 6" to provide adequate compaction or filled with flowable fill or bagged concrete.

11) BREAKAWAY SUPPORTS REQUIREMENTS: Install non-frangible aluminum column (post) (larger than 3½") with breakaway supports as shown on Sheet 5 of 8. Signs shielded by barrier wall or guardrail do not require breakaway support.

12) QPL: Manufacturers seeking approval of alternate aluminum round tube, steel U-channel and steel square tube single post ground sign assemblies for inclusion on the Qualified Products List (QPL), must submit a QPL application, design calculations, and detailed drawings showing the product meets all the requirements of this index, including the design table, and Specification 700.
   Additional Steel Post Specifications are:
   a. U-channel: ASTM A 499 Grade 60, or ASTM A576 Grade 1080 (with a minimum yield strength of 60 ksi).
   b. Square Tube: ASTM A 653 Grade 50, or ASTM A 1011 Grade 50.

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.

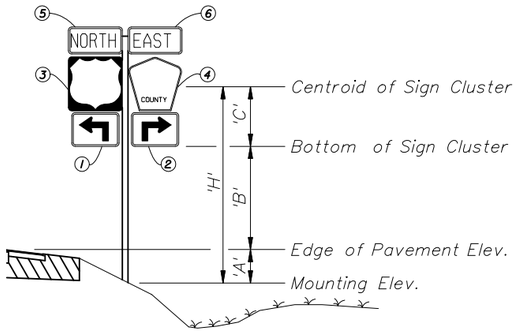
130 MPH
Bay, Brevard, Calhoun, Charlotte, Citrus, De Soto, Dixie, Duval, Flagler, Franklin, Glades, Gulf, Hendry, Hernando, Highlands, Hillsborough, Holmes, Lee, Levy, Liberty, Manatee, Nassau, Okaloosa, Okeechobee, Orange, Osceola, Pasco, Pinellas, Sarasota, Seminole, St Johns, Taylor, Volusia, Wakulla, 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 th post requirements.

EXAMPLE:



	Size H x V	Centroid: local $'Y_n'$	Centroid: global $'X_n'$	Centroid: global $'Y_n'$	$'A_n'$	$'X_n' \times 'A'_n$	$'Y_n' \times 'A'_n$	
	(IN x IN)	(IN)	(IN)	(IN)	(IN^2)	(IN^3)	(IN^3)	
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	
					2,218	-1,890	60,133	TOTALS

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

$'X'_c = \frac{\Sigma('X'_n \times 'A'_n)}{\Sigma 'A'_n} = -0.1\ FT$ $\quad 'Y'_c = \frac{\Sigma('Y'_n \times 'A'_n)}{\Sigma 'A'_n} = 2.26\ FT$

Assume: Bay County, 'A' = 1 FT, 'B' = 7 FT
Calculated: $'X'_c = -0.1$ FT 'C' = $'Y'_c = 2.26$ FT
Since $'X'_c < 6''$, 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 $\quad \Sigma('A_n') = 15.4\ FT^2$ ==> USE 16 FT^2

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

TOTAL PANEL AREA (SF) \ 'H' (FT)	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	
		[0]				[1]			[2]					
3														
4														
5														3
6														
7			▨											
8		▨												
9								▨						
10							▨							4
11														
12														
13														
14														5
15														
16				X										
17		▨						▨						
18														6
19														
20	▨													7

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

For WIND SPEED = 130 MPH,
'H' = 11 FT, Area = 16 FT^2

- Refer to the 130 mph Column (Post) Selection Table, as copied from Sheet 3 of 8 and shown here.
- Using the 16 ft^2 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.

NOTES AND EXAMPLE

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed SINGLE COLUMN GROUND SIGN NOTES Note 11 and GUIDE TO USE THIS STANDARD Note 4. Changed '5.0"' to '4.0"'.			

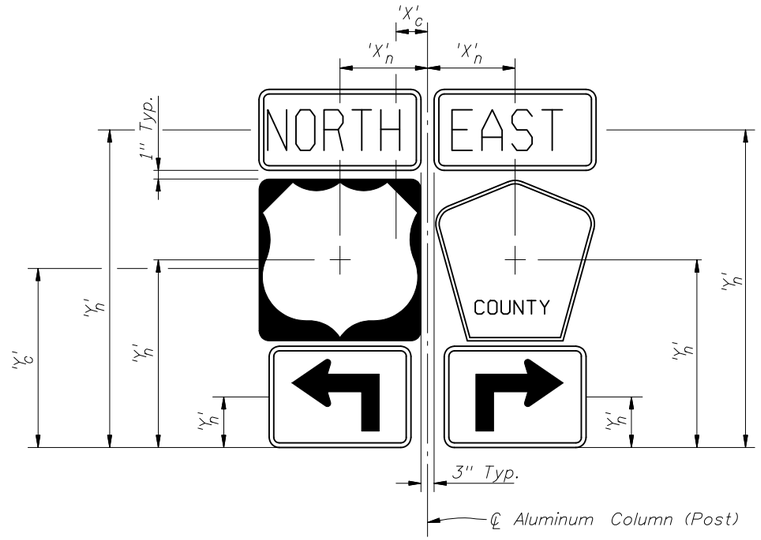
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

SINGLE COLUMN GROUND SIGNS

Interim Date 01/01/08 | Sheet No. 1 of 8

Index No. 11860



SIGN CLUSTER

CALCULATION OF SIGN CLUSTER CENTROID:

$$'X'_c = \frac{\Sigma('X'_n \times 'A'_n)}{\Sigma'A'_n}$$

$$'C' = 'Y'_c = \frac{\Sigma('Y'_n \times 'A'_n)}{\Sigma'A'_n}$$

'X'_c = Centroid horizontal location of sign or cluster from ℄ Column (post)

'Y'_c = Centroid height of sign or cluster from bottommost edge

'H' = Height of sign or cluster centroid from groundline

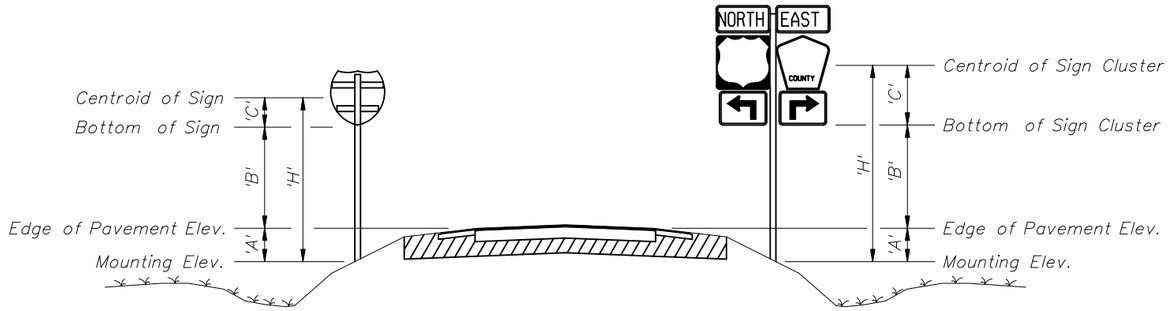
'X'_n = Individual sign centroid horizontal location from ℄ Column (post)

'Y'_n = Individual sign centroid height from bottommost edge

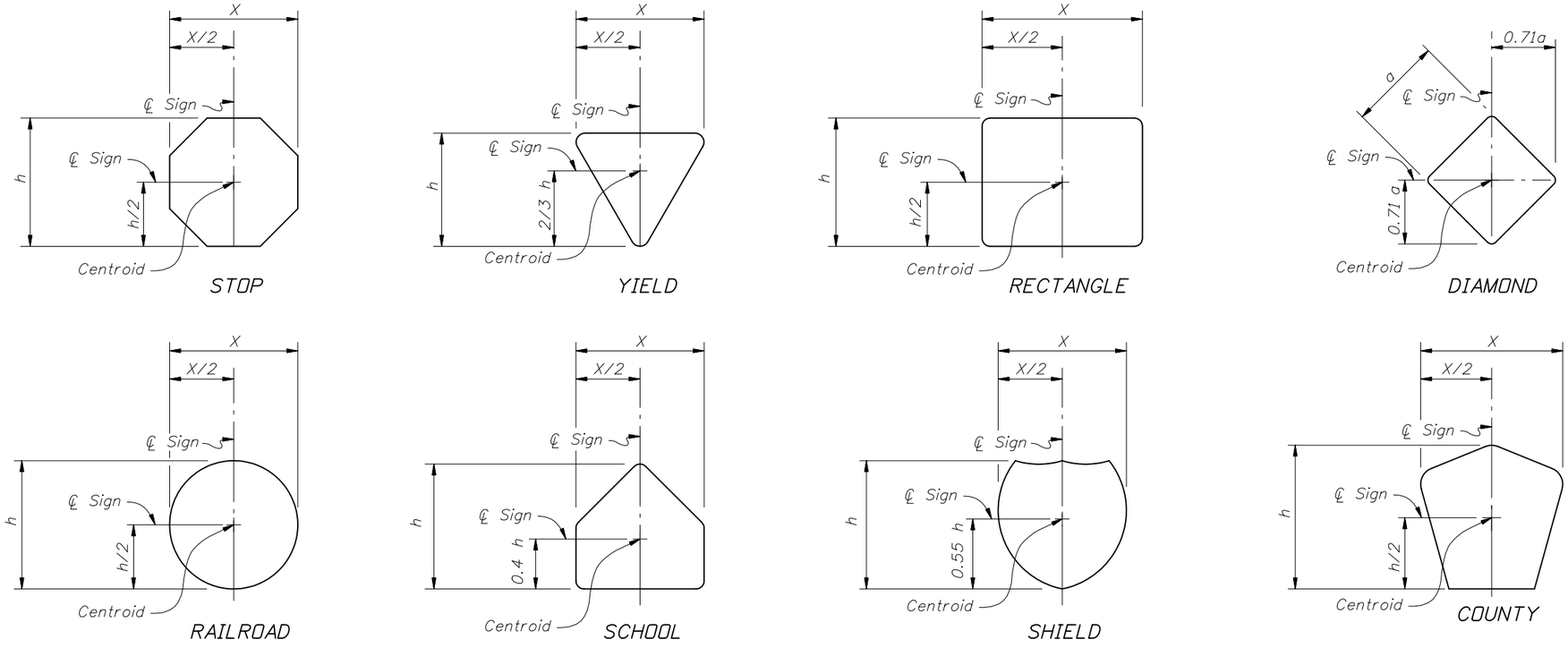
'A'_n = Area of individual sign

For 'A' & 'B' see Index No. 17302 and Roadway Plans.

NOTE:
No sign or sign cluster area shall exceed 20 SF nor shall any sign have a size dimension exceeding 48 inches.



TYPICAL SECTION



CENTROID AND HEIGHT

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed "horizontal" to "size" in NOTE.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

SINGLE COLUMN GROUND SIGNS

Interim Date: 01/01/08

Index No. 11860

ALUMINUM COLUMN (POST) SELECTION TABLE (WIND SPEED = 110 MPH)

TOTAL PANEL AREA (SF) \ 'H' (FT)	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0
3				[0]				[1]			[2]		
4													
5	▨												
6													
7		▨											[3]
8												▨	
9													
10													
11									▨				
12	▨												
13													
14													[4]
15													
16													
17													
18				▨									[5]
19													
20			▨										[6]

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

TOTAL PANEL AREA (SF) \ 'H' (FT)	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0
3		[0]				[1]			[2]				
4													
5													[3]
6													
7			▨										
8		▨											
9								▨					
10							▨						[4]
11													
12													
13													
14													▨ [5]
15													
16													
17		▨						▨					
18													▨ [6]
19													
20	▨												[7]

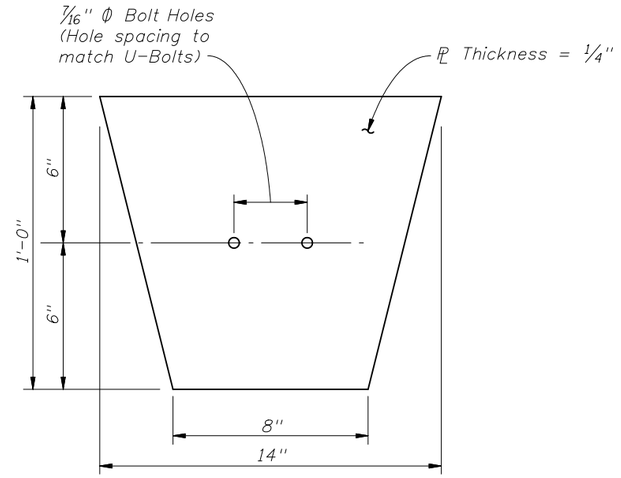
ALUMINUM COLUMN (POST) SELECTION TABLE (WIND SPEED = 150 MPH)

TOTAL PANEL AREA (SF) \ 'H' (FT)	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0
3			[1]			[2]							[3]
4													
5			▨							▨			
6													
7													[4]
8						▨							
9					▨								
10				▨									▨ [5]
11													
12													
13		▨											[6]
14													
15						▨							
16											▨		
17													
18													
19									▨				
20													[7]

POST AND FOUNDATION TABLE

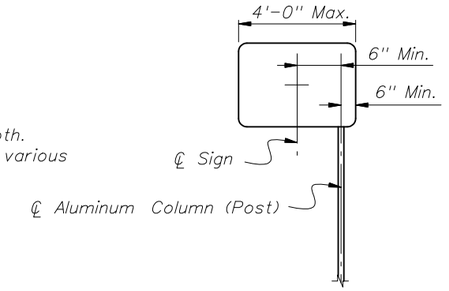
	Foundation Alternatives					
	Post Size		Driven Post		Concrete*	
			Depth (FT)			
	Diameter (IN)	Wall (IN)	without Soil Plate	with Soil Plate	Diameter (FT)	Depth (FT)
[0]	2.0	1/8	4.5	2.5	2.0	2.0
[1]	2.5	1/8	5	3	2.0	2.0
[2]	3.0	1/8	5	3.5	2.0	2.5
[3]	3.5	3/16	6	4.5	2.0	3.0
[4]	4.0	1/4	---	---	2.0	4.0
[5]	4.5	1/4	---	---	2.0	4.0
[6]	5.0	1/4	---	---	2.0	4.5
[7]	6.0	1/4	---	---	2.0	5.0

* See Note on Sheet 1 of 8.



ALUMINUM SOIL PLATE DETAILS

NOTES: 1. Align Soil Plate bottom at 2/3 of foundation depth.
2. Slot up to 15/16" long is allowed to accommodate various post sizes.



CANTILEVER SIGN

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

NOTE:
All cantilever sign installations shall comply with Standard Index 17302. Column (post) size shall reference to the shaded area in the Column (Post) Selection Table as instructed. Foundation design shall be based on the chosen column (post) size.

POST AND FOUNDATION TABLES

REVISIONS

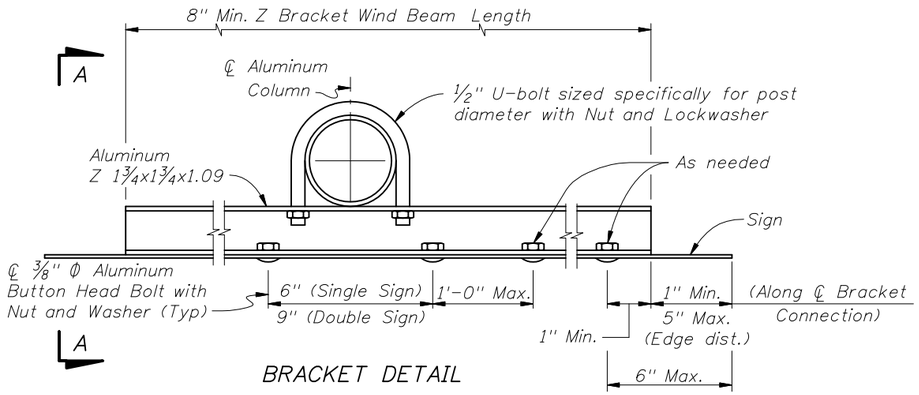
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed plate dimensions and notes.			

2008 Interim Design Standard

SINGLE COLUMN GROUND SIGNS

Interim Date 01/01/08 | Sheet No. 3 of 8

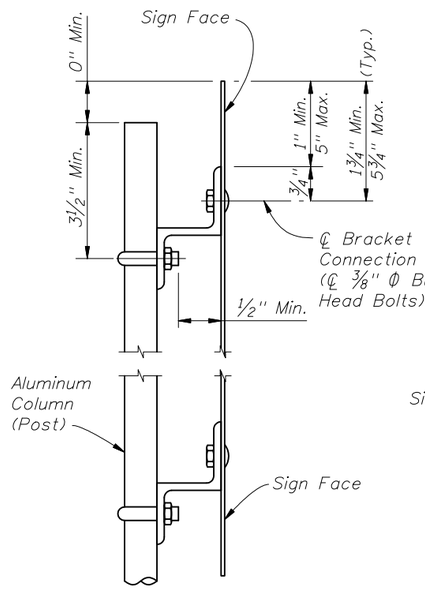
Index No. 11860



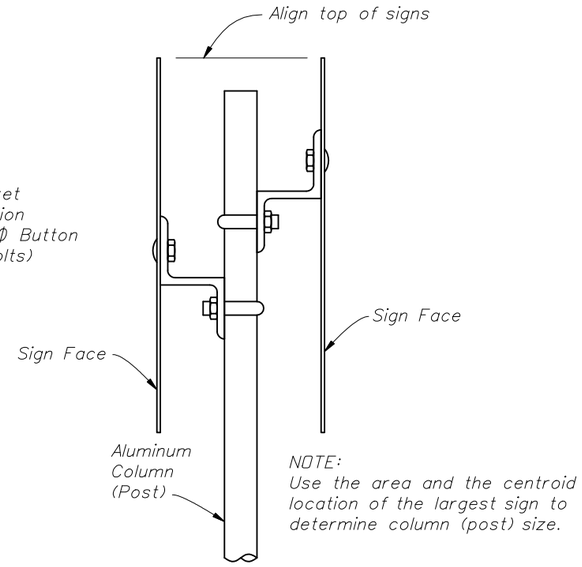
BRACKET DETAIL

NOTES:
1. ⅝" Ø Stainless Steel Hex Head Bolts with Flat Washer under Head and Lockwasher under Nut may be used in lieu of ⅜" Ø Aluminum Button Head Bolts.
2. Nylon washers provided by the sheeting supplier shall be used on all ground mounted signs. The washers shall be installed under the sign bolt head to protect the sheeting.
3. Vertical spacing of brackets shall not exceed 2'-6". Use additional brackets, spaced evenly, to maintain maximum spacing.

*For signs with either dimension of sign size greater than 30". (See Sheet No. 6 thru 8 of 8 for sign size)

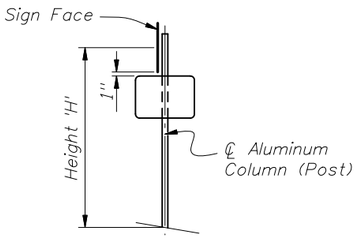


VIEW A-A

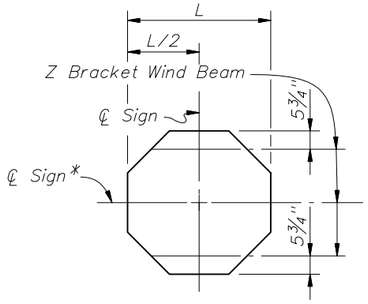


NOTE:
Use the area and the centroid location of the largest sign to determine column (post) size.

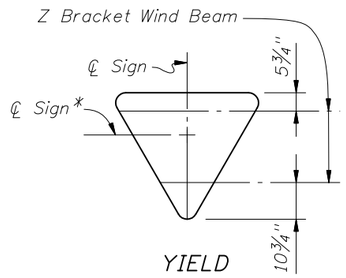
SIGNS BACK-TO-BACK



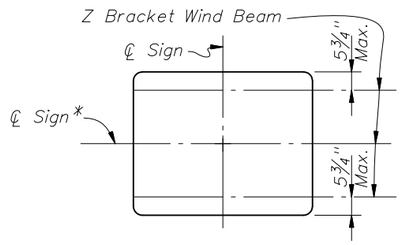
SIGNS AT 90°



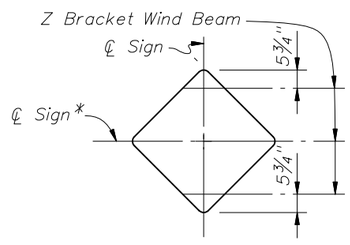
STOP



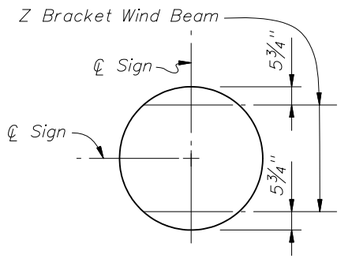
YIELD



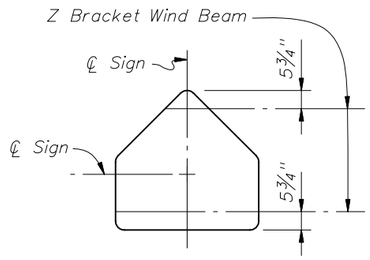
RECTANGLE
(Use only one Wind Beam at ℄ Sign for sign height up to 12")



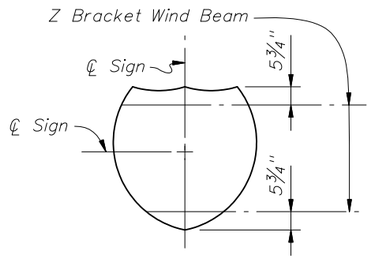
DIAMOND



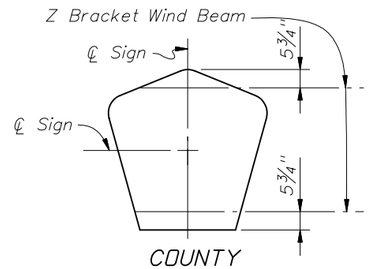
RAILROAD



SCHOOL



SHIELD



COUNTY

CONNECTION AND WIND BEAM

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Deleted SIGNS AT 90° note. Changed STOP, YIELD, RECTANGLE and DIAMOND details. Added "*For...." note. Changed '1" Min.' to '0" Min.' in VIEW A-A.			

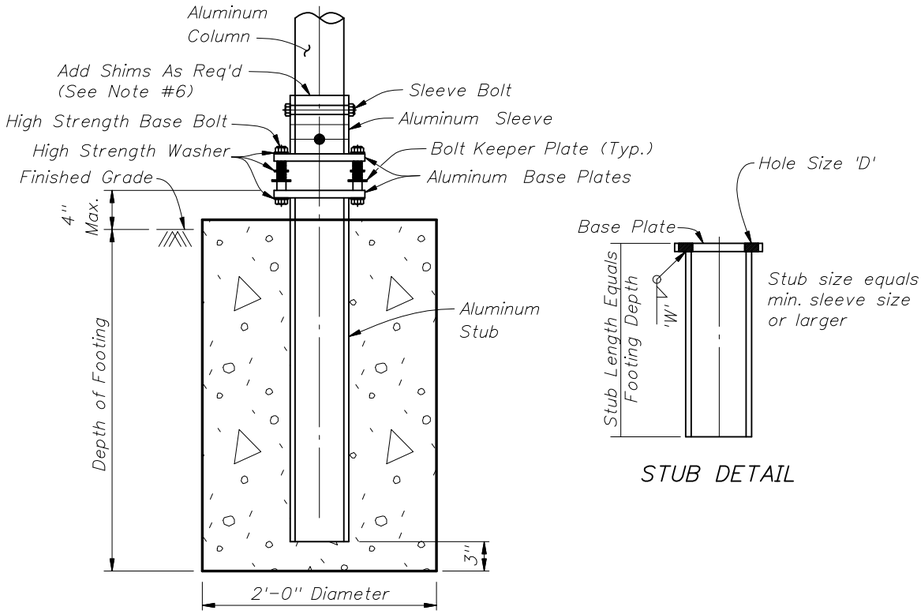
2008 Interim Design Standard

SINGLE COLUMN GROUND SIGNS

Interim Date 01/01/08

Sheet No. 4 of 8

Index No. 11860

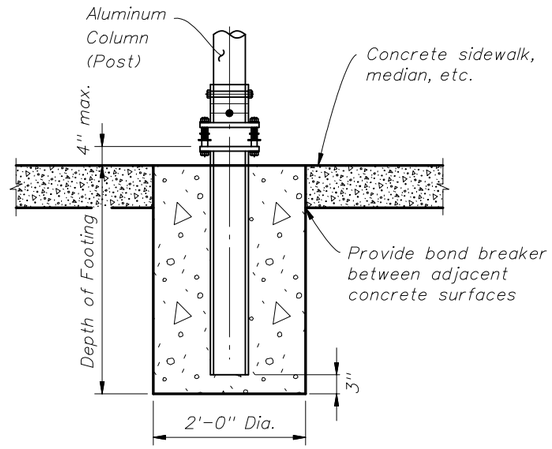


SLIP BASE AND FOOTING DETAIL
(non-frangible post)

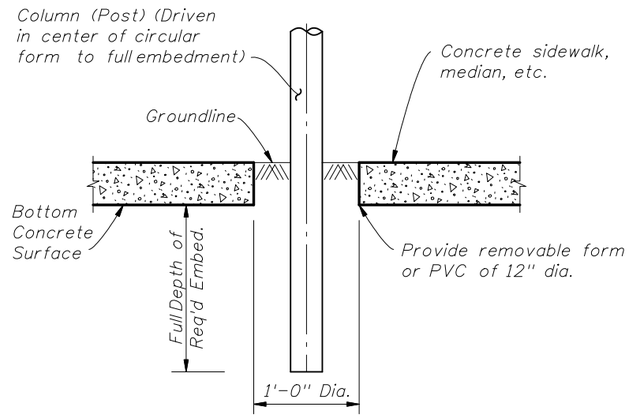
STUB DETAIL

SLIP BASE NOTES:

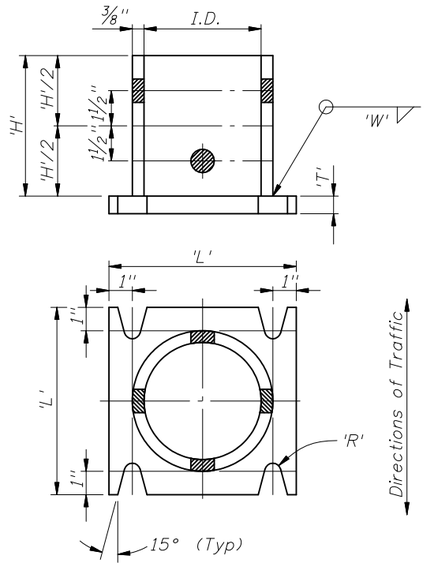
1. Use sleeves with an inside diameter (I.D.) no more than 1/16" larger than the outside diameter (O.D.) of the column.
2. Sleeve Bolts: ASTM A-307, 1/2" Ø galvanized steel bolt (with lock nuts) or Alloy 2024-T4 or 6061-T6 (ASTM B-211).
3. Base bolts, Nuts, and Washers: high strength ASTM A-325 with 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 1/2" Ø 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.
   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 steel shims to obtain a tight fit between the column face and the sleeve. Place shims in all quadrants between the 1/2" Ø 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.



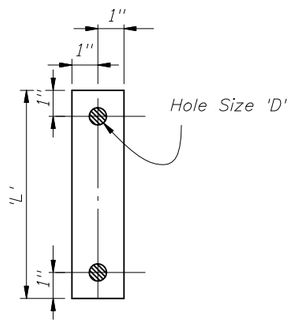
SLIP BASE AND FOOTING DETAIL IN CONCRETE
(non-frangible post in crossovers, medians, & sidewalks)



DRIVEN POST DETAIL IN CONCRETE
(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

SLIP BASE DETAILS

Column Size	Sleeve I.D. (Max)	Sleeve Height 'H'	Weld 'W'	Base Plate 'L'	Base Plate 'T'	Radius 'R'	Base Bolt Size	Base Bolt Length	Base Plate Torque Ft-lbs	Base Plate Torque In-lbs	Hole Size 'D'
4 x 1/4	4 1/16	6	5/8	8	3/4	11/32	5/8	3	29	345	11/16
4 1/2 x 1/4	4 9/16	6	5/8	8	7/8	11/32	5/8	3 1/4	29	345	11/16
5 x 1/4	5 1/16	7	5/8	8	7/8	11/32	5/8	3 1/4	29	345	11/16
6 x 1/4	6 1/16	8	11/16	9	1	13/32	3/4	3 1/2	46	554	13/16

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

BASE AND FOUNDATION DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/07	DYW	Deleted single bevel base plate detail.			

2008 Interim Design Standard

SINGLE COLUMN GROUND SIGNS

Interim Date 01/01/08

Sheet No. 5 of 8

Index No. 11860

ALUMINUM COLUMN (POST) SELECTION TABLE (WIND SPEED = 110 MPH)

TOTAL PANEL AREA (SF) \ 'H' (FT)	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	
				[0]				[1]			[2]			
3														
4														
5	▨													
6														
7		▨												3
8												▨		
9														
10														
11									▨					
12	▨													
13														
14														4
15														
16														
17														
18				▨										5
19														
20			▨											6

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

TOTAL PANEL AREA (SF) \ 'H' (FT)	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	
		[0]				[1]			[2]					
3														
4														
5														3
6														
7			▨											
8		▨												
9								▨						
10							▨							4
11														
12														
13														
14													▨	5
15														
16														
17		▨						▨						
18													▨	6
19														
20	▨													7

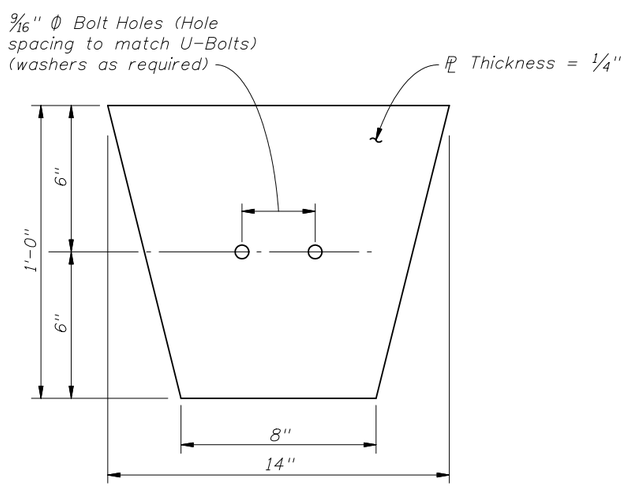
ALUMINUM COLUMN (POST) SELECTION TABLE (WIND SPEED = 150 MPH)

TOTAL PANEL AREA (SF) \ 'H' (FT)	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0	20.0	
			[1]			[2]								
3														3
4														
5			▨							▨				
6														
7														4
8						▨								
9					▨									
10				▨									▨	5
11														
12														
13		▨												6
14														
15						▨								
16											▨			
17														
18														
19									▨					
20														7

POST AND FOUNDATION TABLE

	Foundation Alternatives					
	Post Size		Driven Post		Concrete*	
	Diameter (IN)	Wall (IN)	Depth (FT) without Soil Plate	Depth (FT) with Soil Plate	Diameter (FT)	Depth (FT)
[0]	2.0	1/8	4.5	2.5	2.0	2.0
[1]	2.5	1/8	5	3	2.0	2.0
[2]	3.0	1/8	5	3.5	2.0	2.5
[3]	3.5	3/16	6	4.5	2.0	3.0
[4]	4.0	1/4	---	---	2.0	4.0
[5]	4.5	1/4	---	---	2.0	4.0
[6]	5.0	1/4	---	---	2.0	4.5
[7]	6.0	1/4	---	---	2.0	5.0

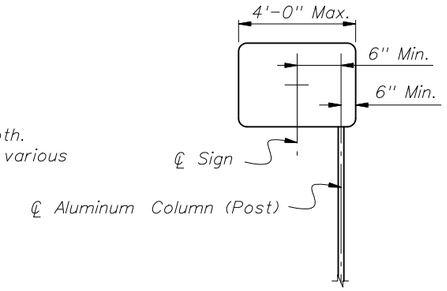
* See Note on Sheet 1 of 8.



ALUMINUM SOIL PLATE DETAILS

NOTES: 1. Align Soil Plate bottom at 2/3 of foundation depth.
2. Slot up to 15/16" long is allowed to accommodate various post sizes.

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



CANTILEVER SIGN

NOTE:
All cantilever sign installations shall comply with Standard Index 17302. Column (post) size shall reference to the shaded area in the Column (Post) Selection Table as instructed. Foundation design shall be based on the chosen column (post) size.

POST AND FOUNDATION TABLES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed plate dimensions and notes.			
07/01/08	DYW	Changed soil plate details.			

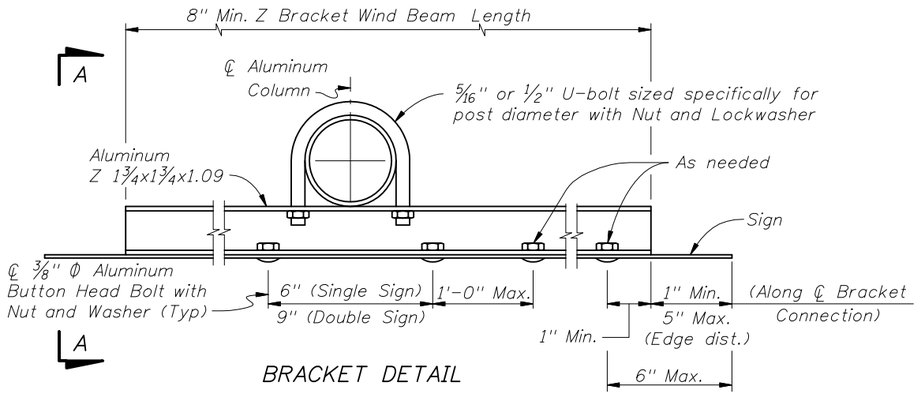
2008 Interim Design Standard

SINGLE COLUMN GROUND SIGNS

Interim Date 07/01/08

Sheet No. 3 of 8

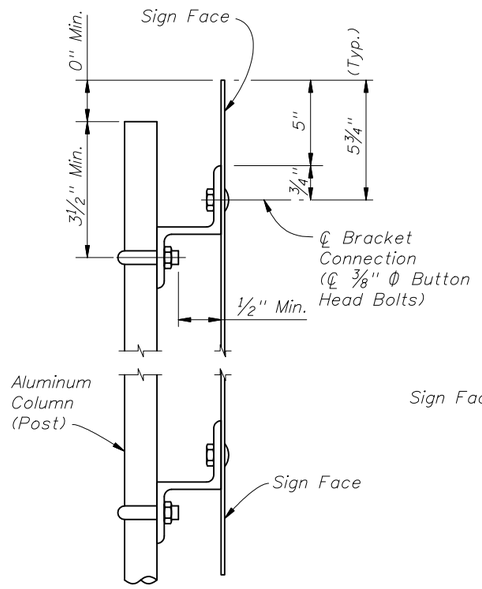
Index No. 11860



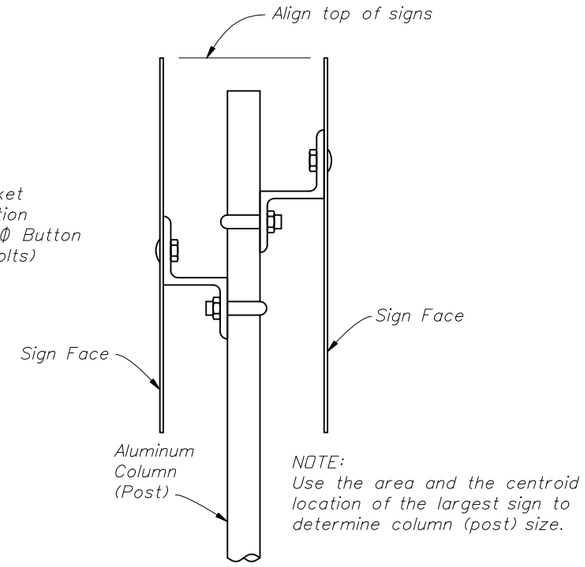
BRACKET DETAIL

NOTES:
1. 5/16" Ø Stainless Steel Hex Head Bolts with Flat Washer under Head and Lockwasher under Nut may be used in lieu of ⅜" Ø Aluminum Button Head Bolts.
2. Nylon washers provided by the sheeting supplier shall be used on all ground mounted signs. The washers shall be installed under the sign bolt head to protect the sheeting.
3. Vertical spacing of brackets shall not exceed 2'-6". Use additional brackets, spaced evenly, to maintain maximum spacing.

*For signs with either dimension of sign size greater than 30". (See Sheet No. 6 thru 8 of 8 for sign size)

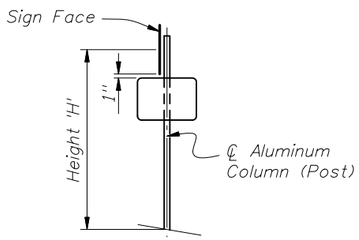


VIEW A-A

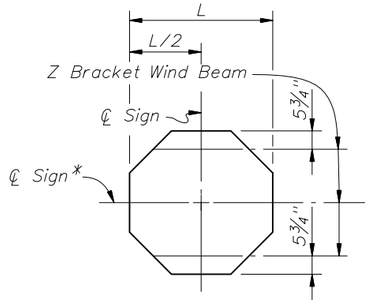


NOTE:
Use the area and the centroid location of the largest sign to determine column (post) size.

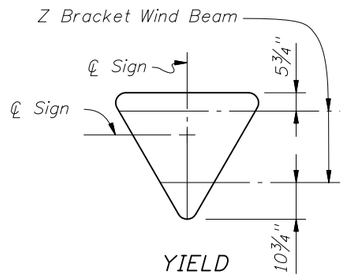
SIGNS BACK-TO-BACK



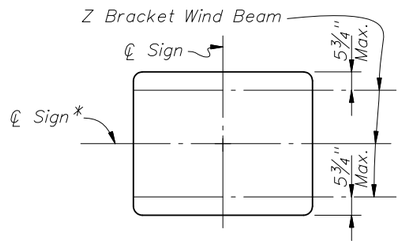
SIGNS AT 90°



STOP

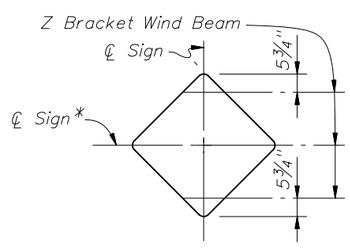


YIELD

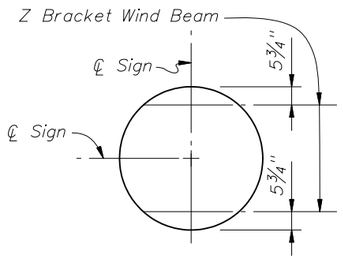


RECTANGLE

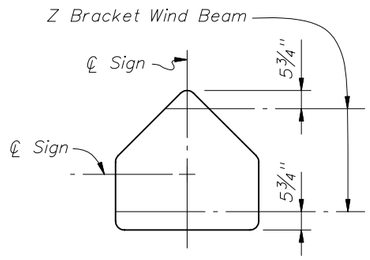
(Use only one Wind Beam at ℄ Sign for sign height up to 12")



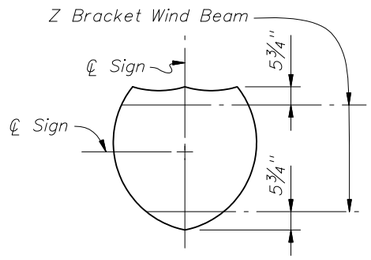
DIAMOND



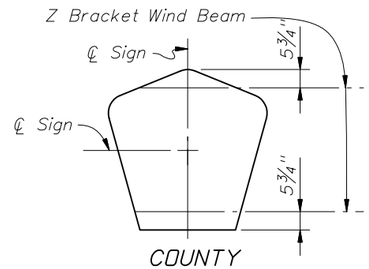
RAILROAD



SCHOOL



SHIELD



COUNTY

CONNECTION AND WIND BEAM

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Deleted SIGNS AT 90° note. Changed STOP, YIELD, RECTANGLE and DIAMOND details. Added "*For...." note. Changed '1" Min.' to '0" Min.' in VIEW A-A.			
07/01/08	DYW	Modified U-bolt size and sign panel edge distance.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

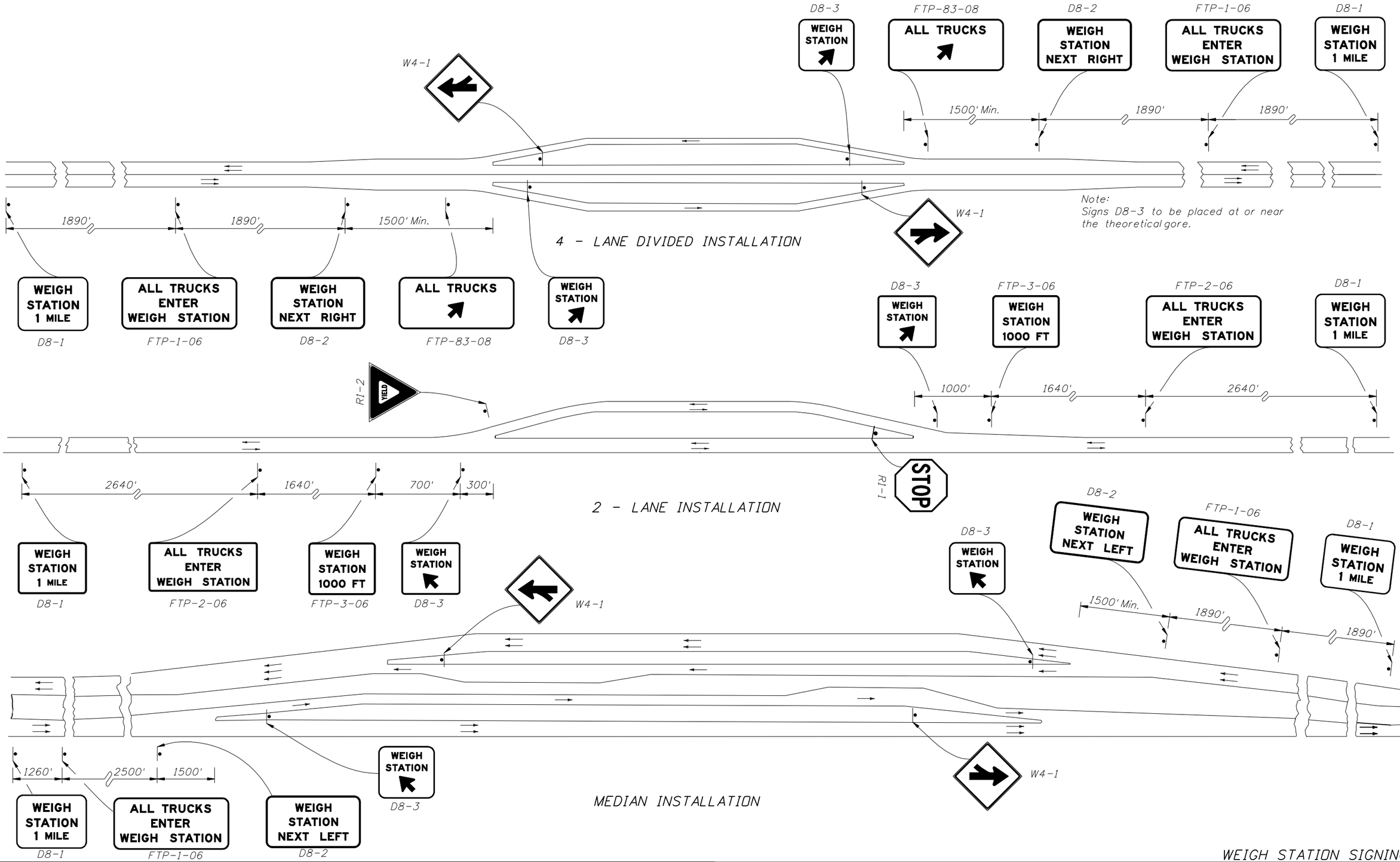
2008 Interim Design Standard

SINGLE COLUMN GROUND SIGNS

Interim Date 07/01/08

Sheet No. 4 of 8

Index No. 11860



WEIGH STATION SIGNING

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
06/18/08	L.W.	Removed Inspection Station Signing from this sheet.			

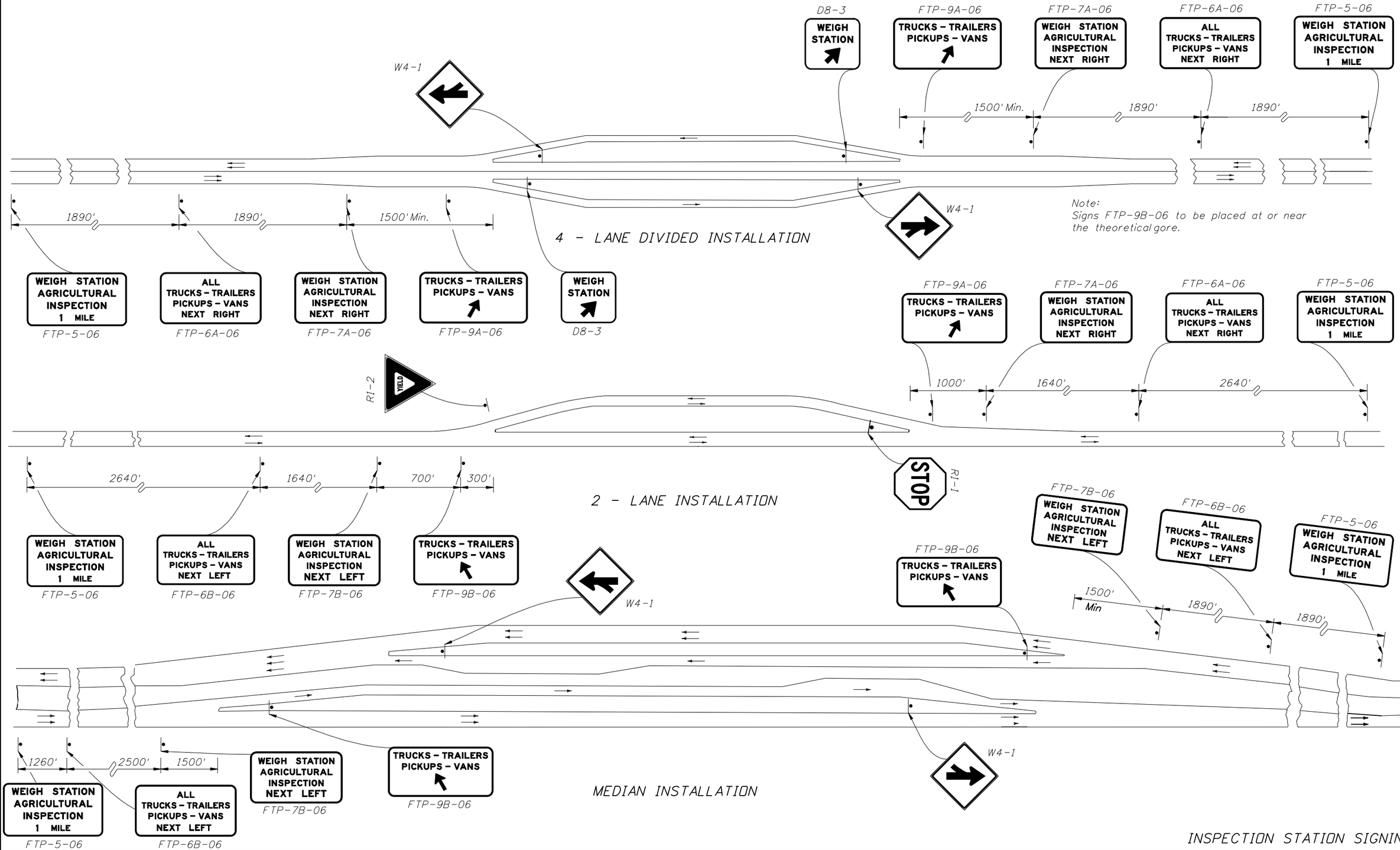
2008 Interim Design Standard

TYPICAL SIGNING FOR TRUCK WEIGH AND INSPECTION STATIONS

Interim Date: 07/01/08

Sheet No.: 1 of 2

Index No.: 17328



INSPECTION STATION SIGNING

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
06/18/08	L.W.	New sheet INSPECTION STATION SIGNING.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

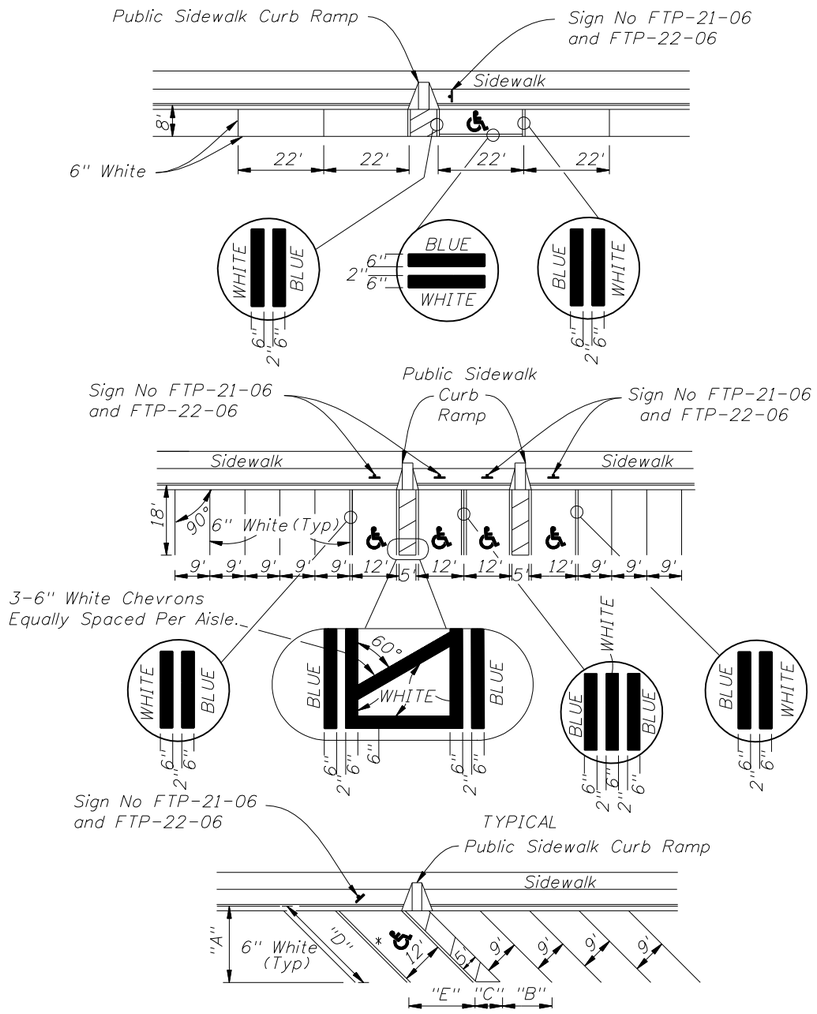
2008 Interim Design Standard

TYPICAL SIGNING FOR TRUCK WEIGH AND INSPECTION STATIONS

Interim Date 07/01/08

Sheet No. 2 of 2

Index No. 17328

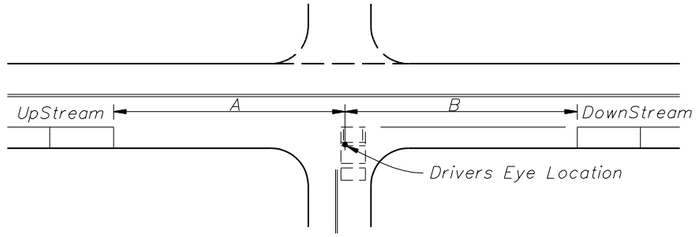


* FOR ACCESSIBLE MARKINGS - SEE ABOVE

	"DIMENSIONS"				
△°	"A"	"B"	"C"	"D"	"E"
45°	19'-1"	12'-9"	7'-0"	27'-0"	17'-0"
60°	20'-1"	10'-5"	5'-9"	23'-2"	13'-10"

NOTES:
1. Dimensions are to the centerline of markings.
2. An Access Aisle is required for each accessible space when angle parking is used.
3. Criteria for pavement markings only, not public sidewalk curb ramp locations. For ramp locations refer to plans.
4. Blue pavement markings shall be tinted to match shade 15180 of Federal Standards 595a.
5. The FTP-22-06 panel shall be mounted below the FTP-21-06 sign.

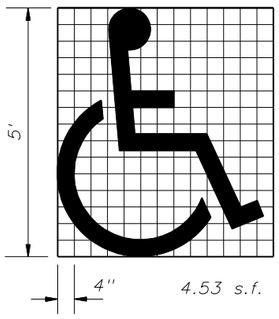
PAVEMENT MARKING FOR PUBLIC SIDEWALK CURB RAMPS IN REST AREAS

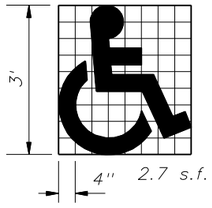


SPEED MPH	UP STREAM (A)	DOWN STREAM (B)	
		2 LANE	4 LANE
0-30	85'	60'	45'
35	100'	70'	50'

NOTES
1. Distances measured longitudinally along the street from driver location of entering vehicle to end of parking restriction.
2. Distances applicable to intersecting street, major driveways and other driveways to the extent practical.
3. For nonsignalized intersections, the values above shall be compared with the values for signalized intersections and the maximum restrictions implemented. These restrictions apply to both accessible and nonaccessible parking.

MINIMUM PARKING RESTRICTION FOR NONSIGNALIZED INTERSECTIONS



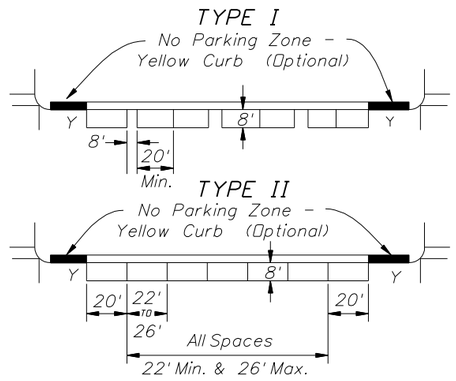


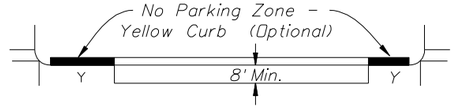
Use of pavement symbol in accessible parking spaces is optional, when used the symbol shall be 3' or 5' high and white in color.

UNIVERSAL SYMBOL OF ACCESSIBILITY

GENERAL NOTES (Signalized & Nonsignalized)

1. For entrances to a one-way street, the downstream restriction may be reduced to 20'.
2. Parking shall not be allowed within 20' of a crosswalk.
3. All parking lane markings shall be 6" white.
4. Parking lane lines shall be broken at driveways.
5. Refer to Chapter 316, Fla. Statutes, for laws governing parking spaces.
6. Where curb and gutter is used, the gutter pan width may be included as part of the minimum width of parking lane, but desirably the lane width should be in addition to that of the gutter pan.





SPEED LIMIT MPH	SIGNALIZED INTERSECTIONS
0-30	30'
35	50'

DISTANCE FROM CURB RADIUS (Y)

PARKING RESTRICTION (FT.) FOR SIGNALIZED INTERSECTION

NOTES:
1. Parking restrictions measured from curb radius point.
2. Restrictions for accessible parking are the same as those applied to nonsignalized intersections.

MINIMUM PARKING RESTRICTION FOR SIGNALIZED INTERSECTION

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
04/15/07	L.W.	Striping revised new detail added to clarify markings.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

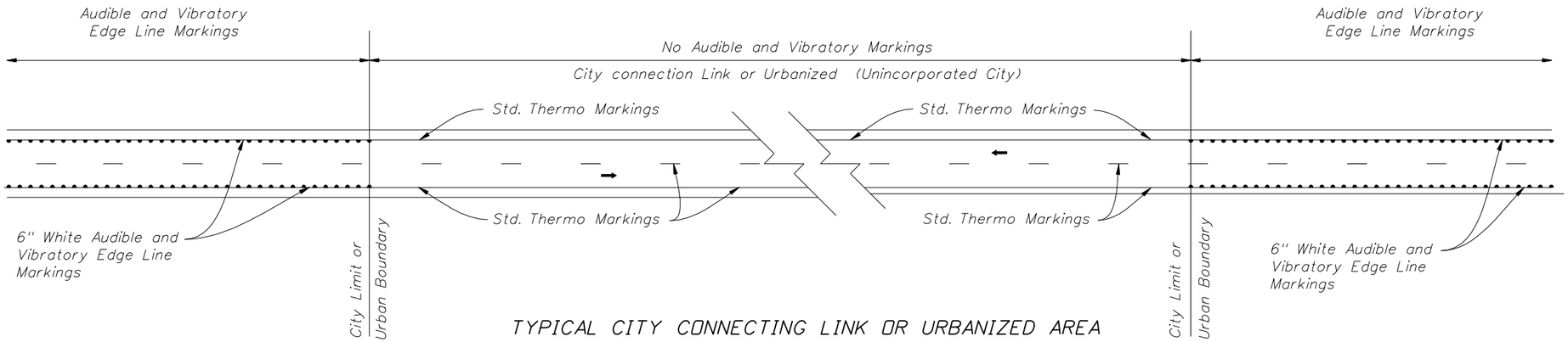
2008 Interim Design Standard

SPECIAL MARKING AREAS (PARKING)

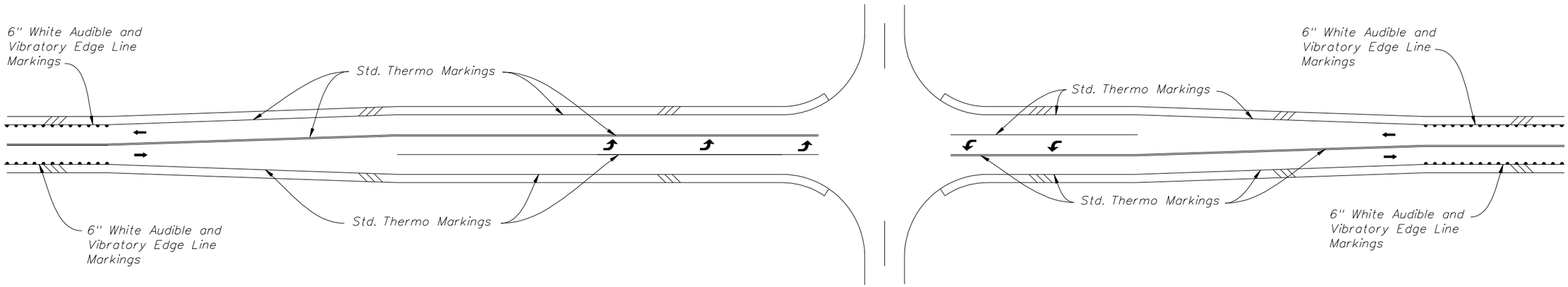
Interim Date 01/01/08

Sheet No. 11 of 14

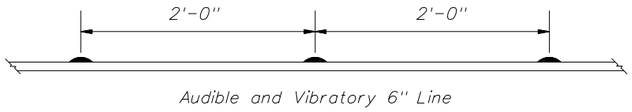
Index No. 17346

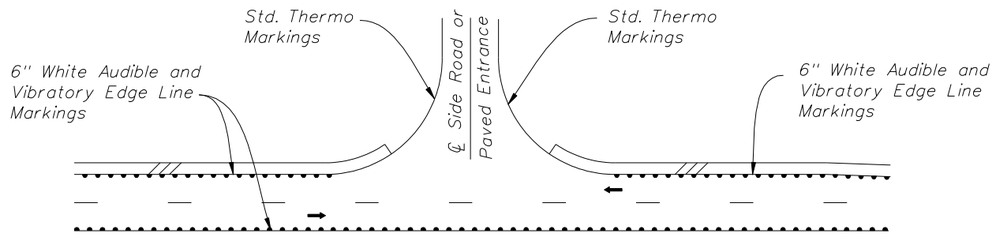


TYPICAL CITY CONNECTING LINK OR URBANIZED AREA



TYPICAL RURAL INTERSECTION WITH TURN LANES





TYPICAL RURAL INTERSECTION WITHOUT TURN LANES

AUDIBLE AND VIBRATORY MARKINGS — 2 LANE ROADWAYS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
06/27/08	L.W.	New Index Audible And Vibratory Markings			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

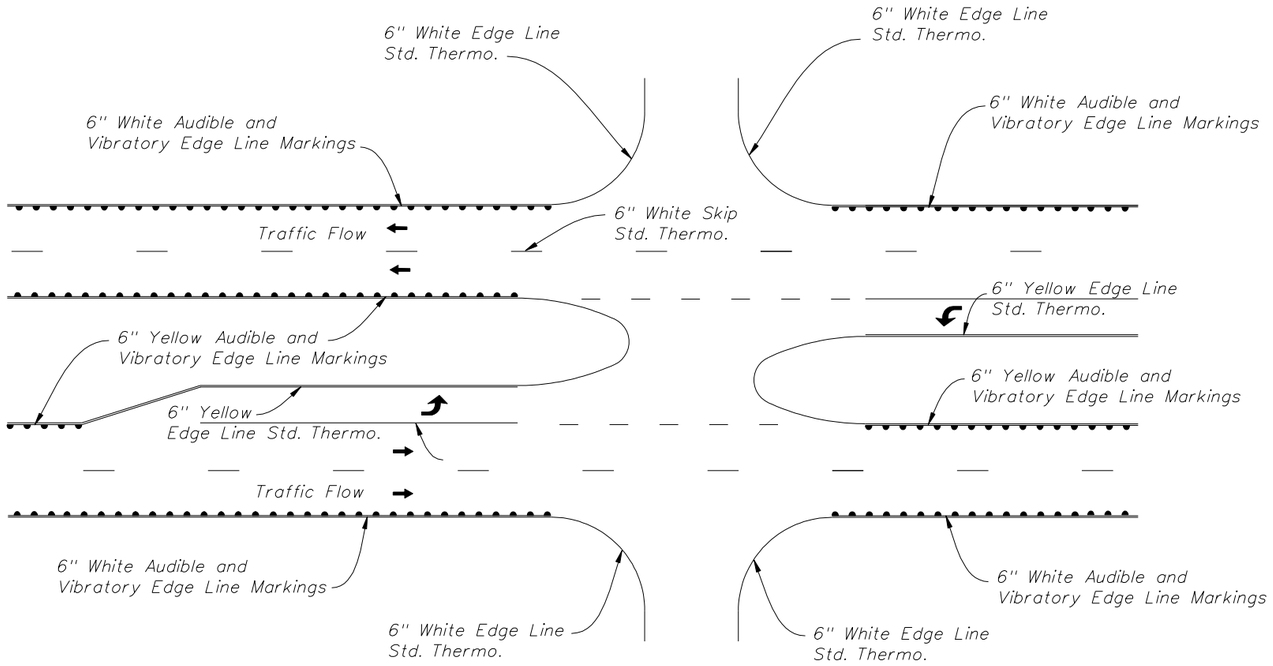
2008 Interim Design Standard

SPECIAL MARKING AREAS

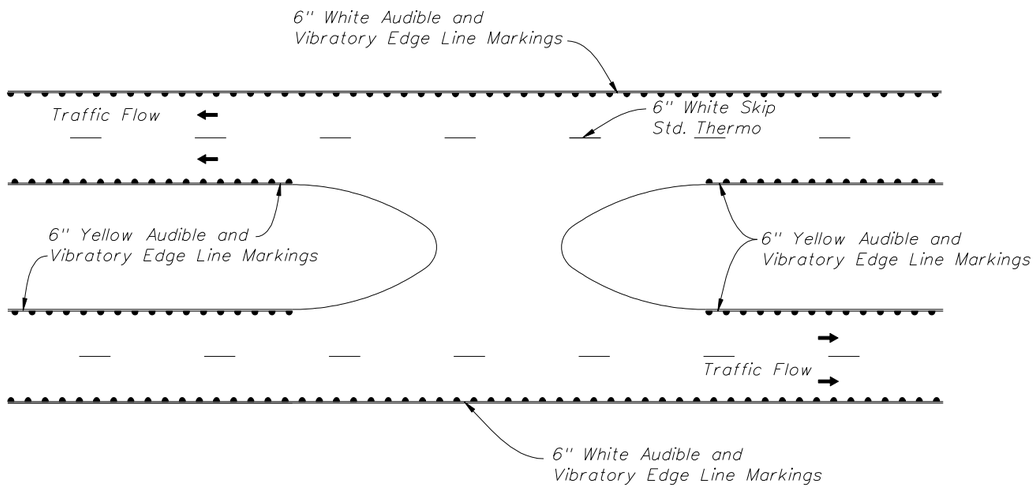
Interim Date 07/01/08

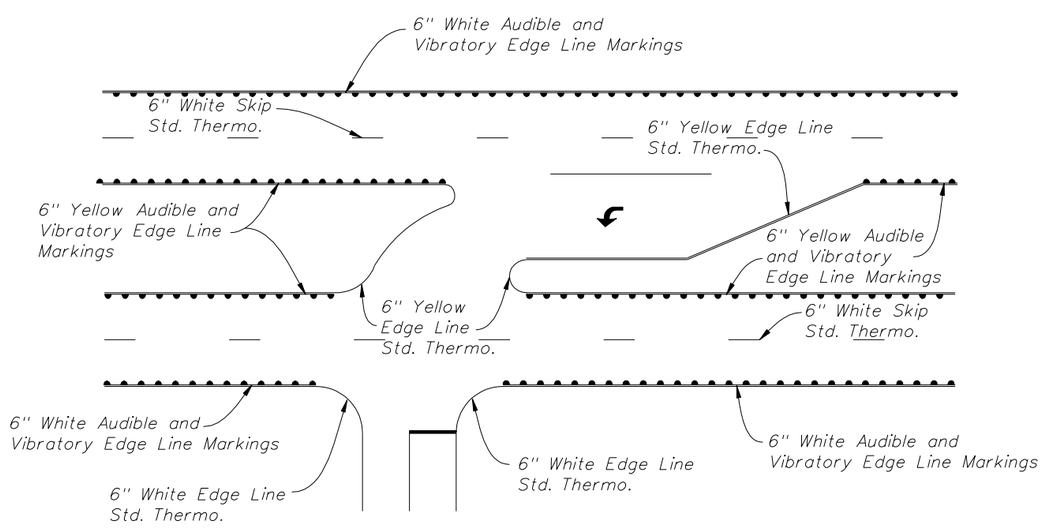
Sheet No. 15 of 16

Index No. 17346



1. The Contractor Shall Adjust The Maintenance Of Traffic During Installation To Provide Sufficient Time For The Markings To Bear Traffic.
2. The Height Of The Transverse Bar For Edge Line Markings Shall Be 0.60 To 0.70 Inches Above The Pavement Surface At The Edge Of The Marking.
3. Transverse Bars Shall Be Evenly Space In The Marking At Intervals Of 24 Inches Center To Center.
4. The Transverse Bar May Have A Drainage Channel On Each Bar. The Width Of The Drainage Channel May Not Exceed 0.25 Inches At The Bottom Of The Channel.
5. Audible And Vibratory Markings Shall Only Be Installed On Centerline Markings Of Two Lane Roads When Shown In The Plans. Transverse Markings For Centerline Markings Shall Be 0.40 To 0.50 Inches Above The Pavement Surface At The Edge Of The Marking.
6. When Raised Pavement Markers Conflict With The Installation Of The Centerline Markings, The Contractor Shall Be Responsible For Removing And Replaceing The Raised Pavement Markings. The Additional Expenses Associated With The Raised Pavement Markings Shall Be Included In The Cost Of The Marking.





AUDIBLE AND VIBRATORY MARKINGS

MULTI-LANE ROADWAYS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
06/27/08	L.W.	New Index Audible And Vibratory Markings			

2008 Interim Design Standard

SPECIAL MARKING AREAS

Interim Date: 07/01/08

Sheet No.: 16 of 16

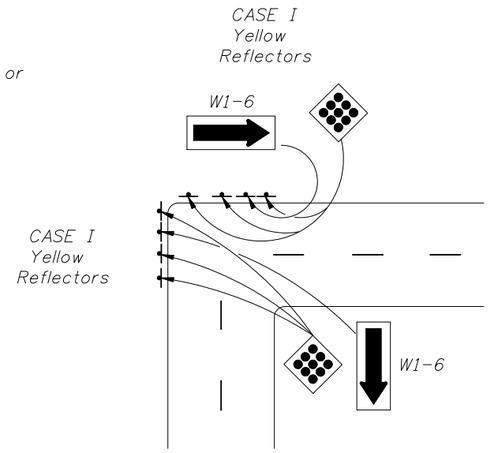
Index No.: 17346

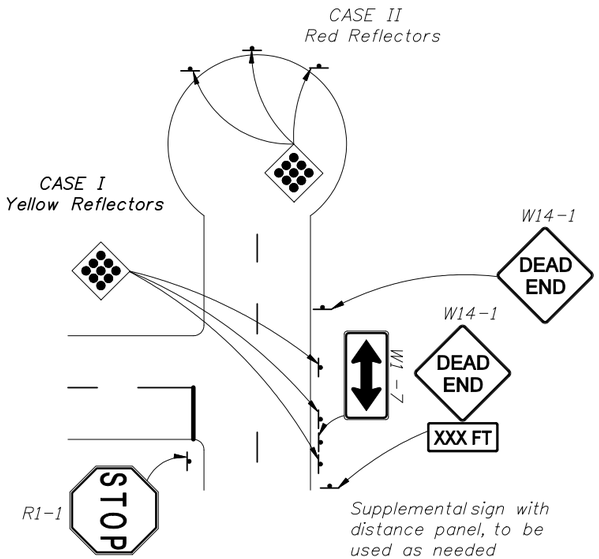
CASE I Type 1 Object Markers shall consist of nine yellow reflectors mounted on a yellow reflective background or consist of a retroreflective panel of the same size.

CASE II End of Road Markers shall consist of nine red reflectors mounted on a red reflective background or consist of a retroreflective panel of the same size.

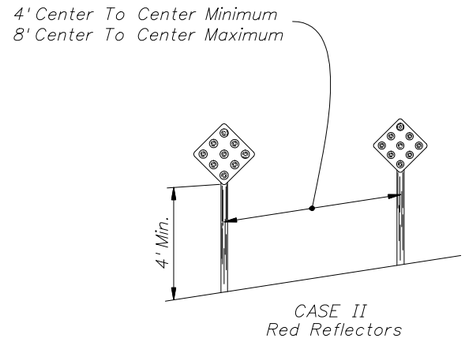
NOTES:

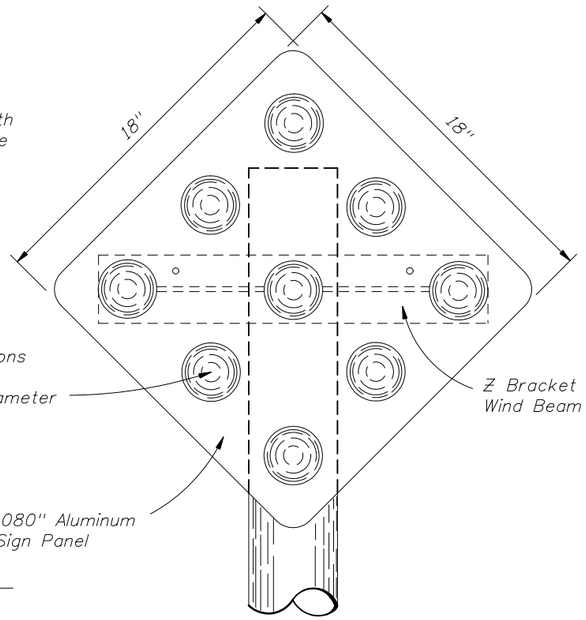
1. This index applicable to residential and minor streets only. Major streets to be evaluated on a case by case basis.
2. "T"-intersection-Two-Way arrows and reflectors are optional. The need should be based on a review of each location.
3. For additional details on aluminum round post, sign panel material and bolts, nuts and washers see Index Nos. 11860.
4. Case I Installation - The arrow panels and object markers shall be located approximately 20', but not less than 12' from the edge of the travel lane.
5. Dead end sign shall be posted a sufficient advance distance to permit the vehicle operator to avoid the dead end by turning off, if possible, at the nearest intersecting street.
6. For pavement marking see index no. 17346
7. No guardrail is required unless special field conditions require its use.

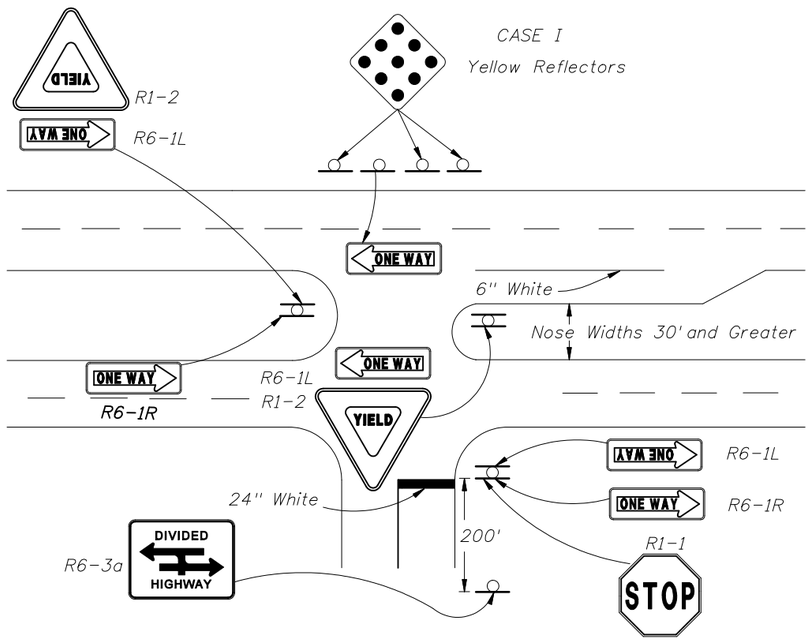


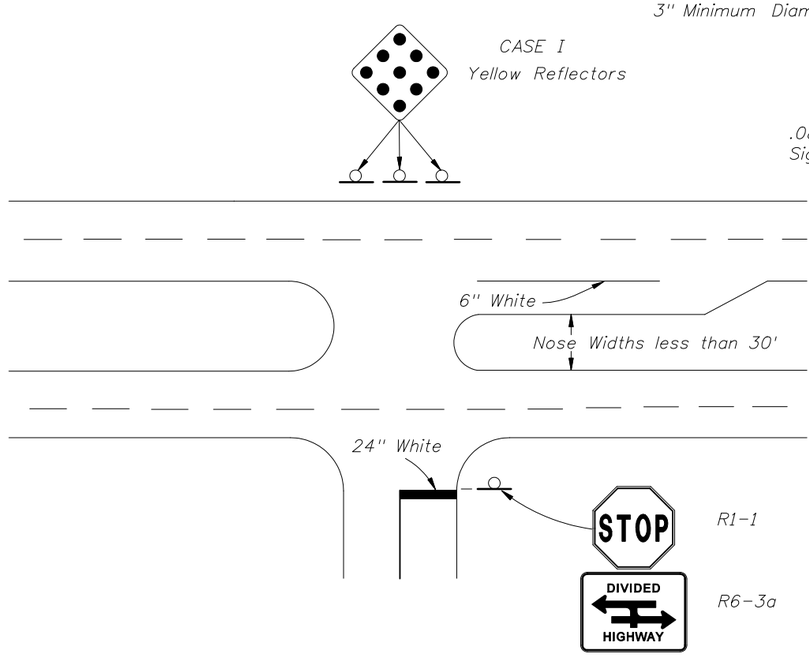


Supplemental sign with distance panel, to be used as needed









Object markers shall be installed on 2" Φ x 1/8" Aluminum Round Post.
3/8" Φ Aluminum Button Head Bolt with Nut and Lockwasher or 15/16" Φ Stainless Steel Hex Head Bolt with Flat Washer under Head and Lockwasher under Nut. Post foundation shall be installed in accordance with Index No. 11860.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/03/07	L.W.	Case I and Case II revised. 18"x18" Marker detail revised. Notes at bottom right revised.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

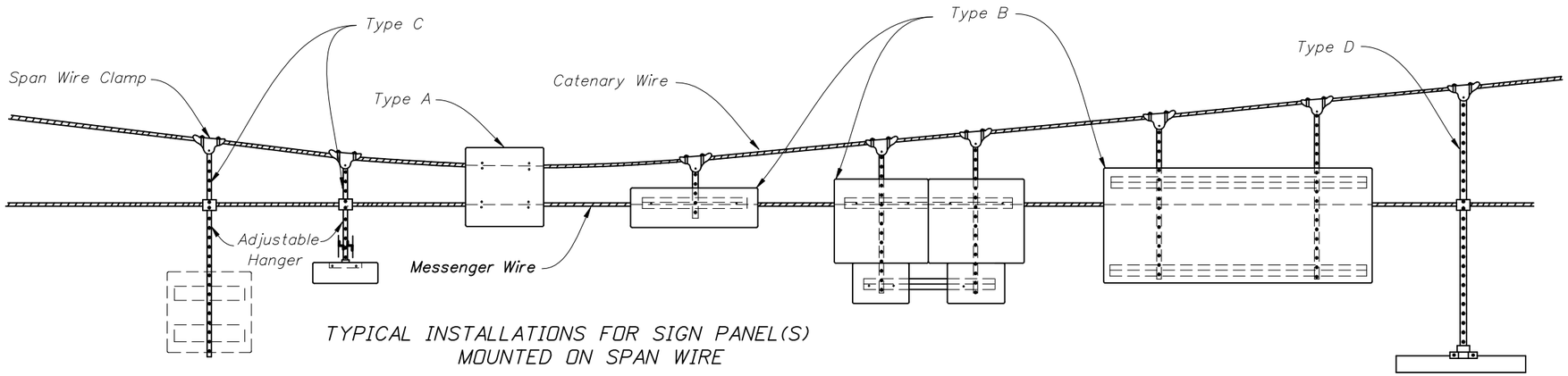
2008 Interim Design Standard

TRAFFIC CONTROLS FOR STREET TERMINATIONS

Interim Date 01/01/08

Sheet No. 1 of 1

Index No. 17349



TYPICAL INSTALLATIONS FOR SIGN PANEL(S) MOUNTED ON SPAN WIRE

Notes :

1. Bottom edge of signs shall be approximately at the same elevation.

2. Type B & C attachments with one hanger shall have wind beams for signs wider than 3½'. The beams shall extend to within 6" of the sign edge.

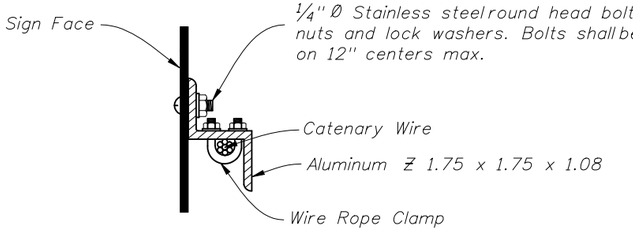
3. Type B & C attachments for signs 4' and wider shall have 2 hangers. Signs 7' and wider shall have wind beams that extend to within 6" of the sign edge.

4. Type D attachments shall be for signs 3½' wide or less.

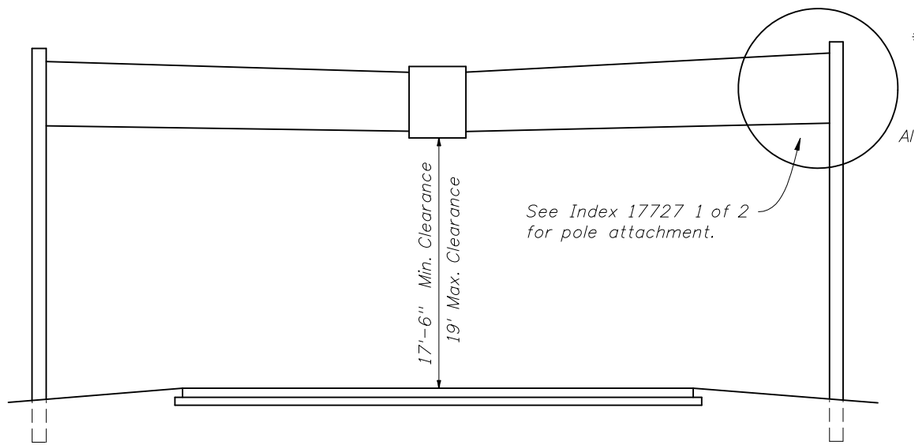
5. Sign panels shall meet the requirements of Index 11200.

6. Refer to section 634 of the Standard Specifications For Road And Bridge Construction.

7. All bolts, nuts, and washers shall be passivated stainless steel, AISI 300 series, commercial grade, type 316.



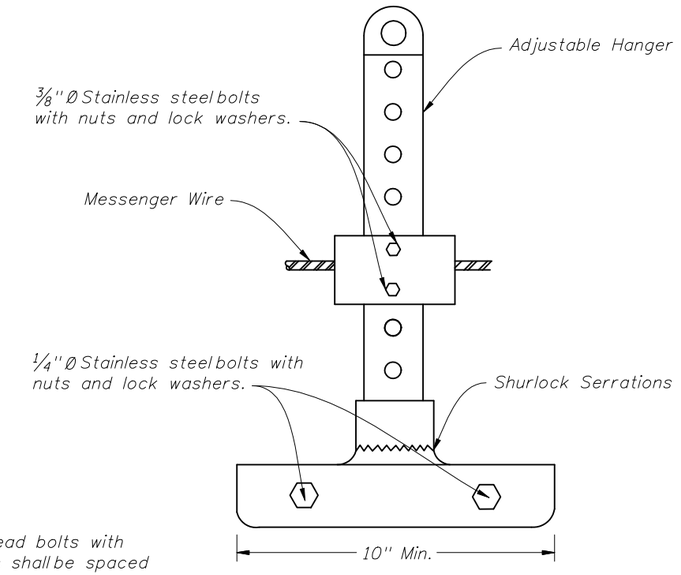
SIGN MOUNTING DETAIL



TYPICAL SPAN WIRE INSTALLATION

The overlapped connection of adjustable hangers shall use a minimum of 2 bolts with a minimum spaceing between bolts of 2".

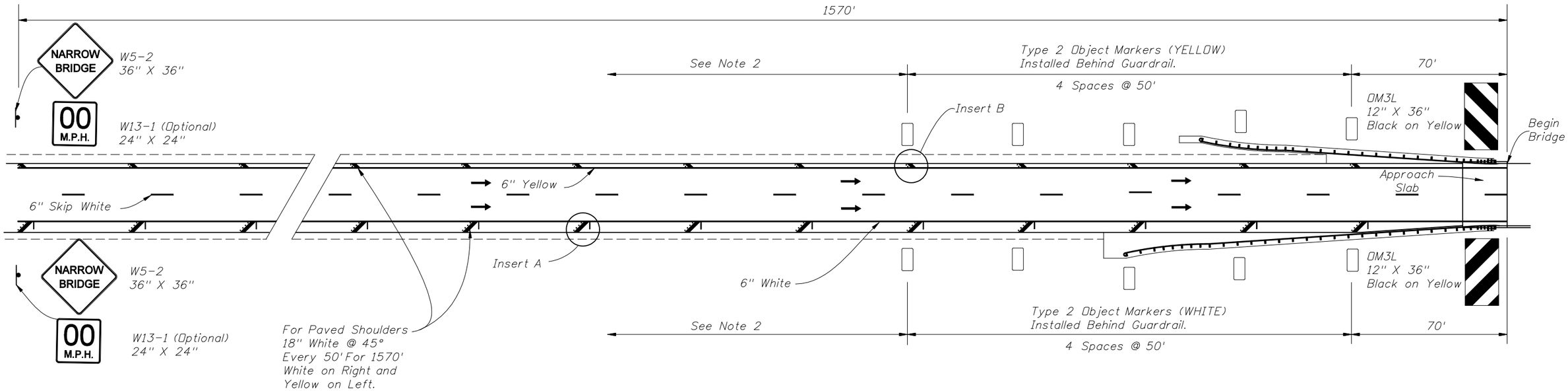
DETAIL OF OPPOSING SIGNS SPAN WIRE MOUNTED



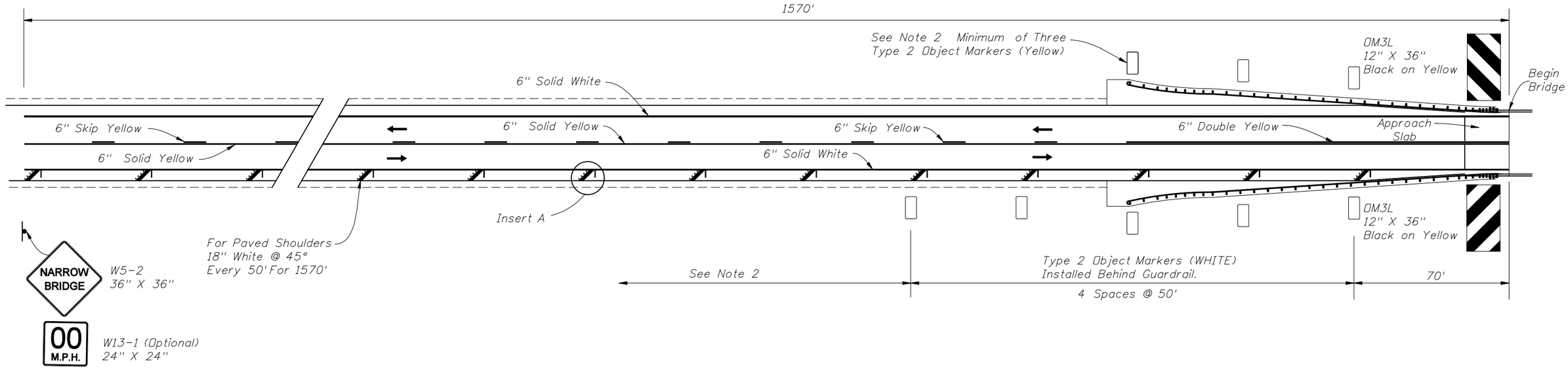
ADJUSTABLE HANGER FOR SIGN MOUNTING

TWO POINT ATTACHMENT

REVISIONS						2008 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			
11/22/07	L.W.	Removed signal head from detail. Single Point Attachment details sheet 1 will be deleted. Sheet 2of 2 will be renumbered to 1 of 1.				SPAN WIRE MOUNTED SIGN DETAILS	01/01/08	1 of 1
							Index No.	17356



One-Way Traffic



2-Way Traffic

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
08/31/07	LW	Removed delineators and changed to Object Markers and revised reference notes. Sign W13-1 made "optional".			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

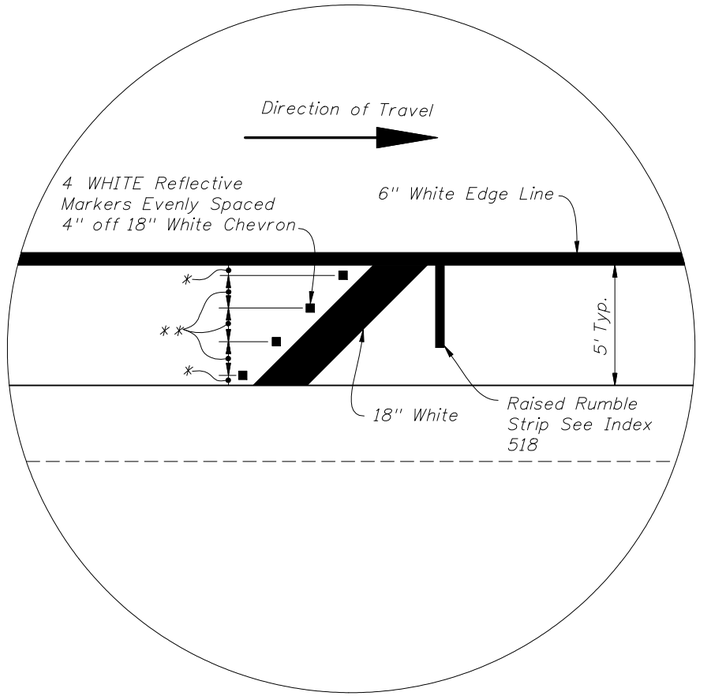
2008 Interim Design Standard

RURAL NARROW BRIDGE TREATMENT

Interim Date: 01/01/08

Sheet No.: 1 of 2

Index No.: 17359



* 1/8 Length (4' and 5' shoulder)
1/4 Length (2' shoulder)

** 1/4 Length (4' and 5' shoulder)
1/2 Length (2' shoulder)

INSERT A

NOTES:

1. Bridges should be marked as narrow bridges under the following conditions:
   (1) For approach roadways with paved shoulders when the bridge width including shoulders is less than the width of the approach roadway including paved shoulders.
   (2) For approach roadways without paved shoulders when the bridge shoulder width is less than 2'.

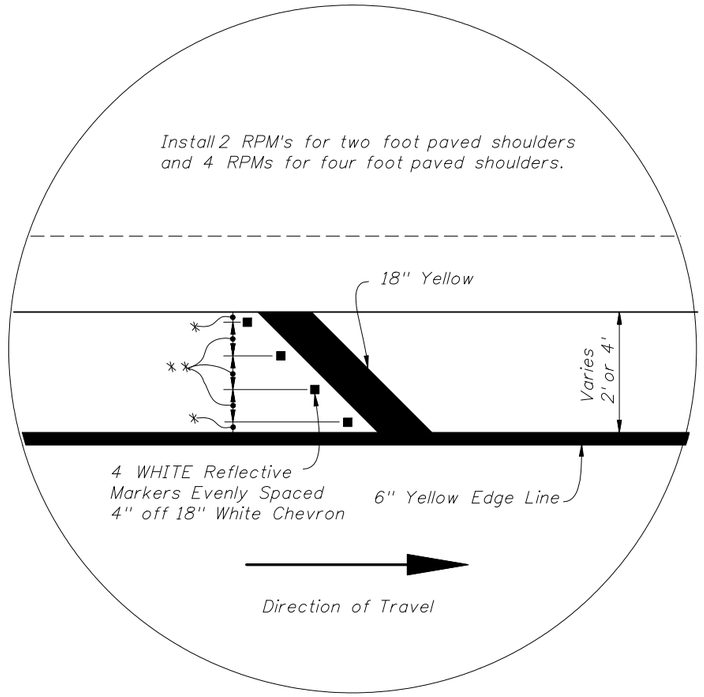
2. Roadways with Two-Way Traffic:
   (1) No passing zone should be extended 1570' in advance of narrow bridge.
   (2) The Type 2 object markers shall be installed on both sides of the roadway (WHITE on RIGHT / YELLOW on LEFT). (If the bridge or the approach is on a curve, the object markers shall be installed for a distance of 1570' in advance of narrow bridge on the outside portion of the roadway). Spacing shall be 100' between object markers.

3. Object markers on both sides of roadway shall face traffic approaching bridge.

4. Object markers to be placed not less than 2' or not more than 8' outside the outer edge of pavement.

5. The OM-3R & OM-3L object markers shall be installed 4' above the roadway edge. The panels may be post mounted at the bridges.

6. Object Markers consist of a rerlector,or reflective sheeting. Install markers listed of qualified products list.



* 1/8 Length (4' and 5' shoulder)
1/4 Length (2' shoulder)

** 1/4 Length (4' and 5' shoulder)
1/2 Length (2' shoulder)

INSERT B

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
08/31/07	LW	"Notes:" revised. Reorganized Inserts A & B.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

RURAL NARROW BRIDGE TREATMENT

Interim Date 01/01/08

Sheet No. 2 of 2

Index No. 17359

HIGHMAST LIGHTING NOTES:

1) High Mast materials:
   a. Pole: ASTM A1011 Grade 50, 55, 60 or 65 (Less than ¼") or ASTM A572 Grade 50, 55, 60, or 65 (¼" 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 ASTM F436 Type 1 washers.

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) Grout: minimum 5,000 psi compressive strength at 28-days and meeting the requirements of Section 934.

5) Welding: American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (Current edition).

6) Galvanization:

   a. Nuts, Bolts, Washers and Threaded Bars/Studs: ASTM F2329.

   b. Other items (Including Pole): ASTM A123

7) Hole diameters for anchor bolts: not greater than the bolt diameter plus ½".

8) 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.

9) If a grout pad is not installed, place wire cloth screen vertically between the base plate and top of foundation, wrap horizontally around the base plate with a 3" min. lap. Use standard grade, plain weave, ½"x½" mesh, galvanized steel wire-cloth with 0.063" dia. wire. Attach the screen to the base plate with stainless steel self-tapping ¼" screws with stainless steel washers spaced at 9" centers.

10) 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.

11) 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 Height, Manufacturer's Name, Certification Number and QPL Number.

12) Manufacturers seeking approval of a Highmast Lighting assembly 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.

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

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed Note 9, Renumbered Notes 10 thru 12. Added Notes 10 & 11.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

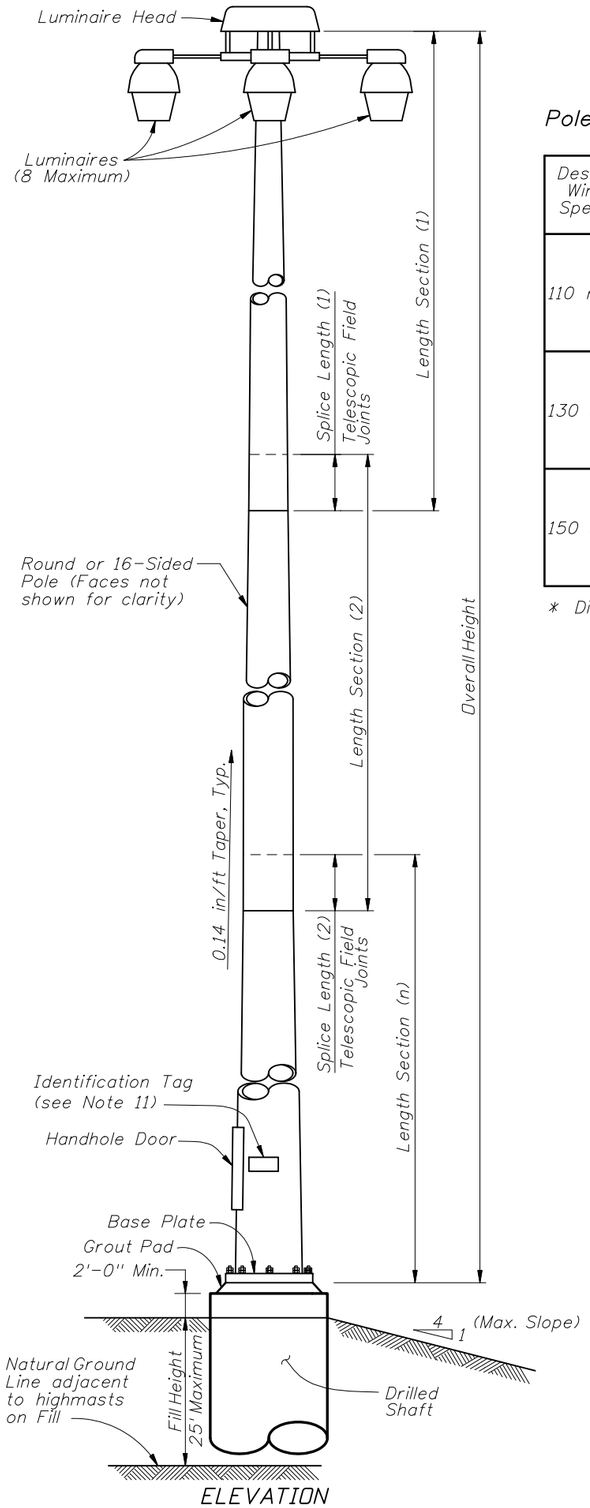
2008 Interim Design Standard

HIGHMAST LIGHTING

Interim Date 01/01/08

Sheet No. 3 of 7

Index No. 17502



ELEVATION

Pole Design Table*

Design Wind Speed	Pole Overall Height	Section 1 (Top)					Section 2					Section 3				
		Length.	Wall Th.	Minimum Splice L.	Tip Dia.	Base Dia.	Length.	Wall Th.	Minimum Splice L.	Tip Dia.	Base Dia.	Length.	Wall Th.	Minimum Splice L.	Tip Dia.	Base Dia.
110 mph	80 ft	42'-0"	0.250"	2'-0"	5.313"	11.219"	40'-0"	0.250"	---	10.375"	16.000"	---	---	---	---	---
	100 ft	24'-6"	0.179"	2'-0"	6.406"	9.844"	40'-0"	0.250"	2'-6"	9.188"	14.781"	40'-0"	0.250"	---	13.875"	19.500"
	120 ft	44'-9"	0.250"	2'-0"	6.250"	12.531"	40'-0"	0.250"	2'-9"	11.688"	17.313"	40'-0"	0.313"	---	16.375"	22.000"
130 mph	80 ft	42'-0"	0.250"	2'-0"	5.281"	11.188"	40'-0"	0.313"	---	10.375"	16.000"	---	---	---	---	---
	100 ft	24'-6"	0.179"	2'-0"	6.906"	10.344"	40'-0"	0.250"	2'-6"	9.656"	15.281"	40'-0"	0.313"	---	14.375"	20.000"
	120 ft	45'-6"	0.250"	2'-6"	9.250"	15.625"	40'-0"	0.250"	3'-0"	14.719"	20.344"	40'-0"	0.313"	---	19.375"	25.000"
150 mph	80 ft	42'-3"	0.250"	2'-3"	7.281"	13.219"	40'-0"	0.313"	---	12.375"	18.000"	---	---	---	---	---
	100 ft	24'-6"	0.250"	2'-0"	8.188"	11.625"	40'-0"	0.313"	2'-6"	10.781"	16.406"	40'-0"	0.375"	---	15.375"	21.000"
	120 ft	46'-6"	0.250"	3'-0"	12.406"	18.938"	40'-0"	0.313"	3'-6"	17.938"	23.563"	40'-0"	0.375"	---	22.375"	28.000"

* Diameter Measured Flat to Flat

Base Plate and Bolts Design Table

Design Wind Speed.	Pole Overall Height	Base Plate Diameter	Base Plate Thickness	"TW"	"BW"	Bolt Circle	No. Bolts	Bolt Diameter	Bolt Embedment
110 mph	80 ft	30.0"	2.500"	0.375"	0.188"	23.0"	8	1.75"	38"
	100 ft	33.5"	2.500"	0.375"	0.188"	26.5"	8	1.75"	42"
	120 ft	36.0"	2.750"	0.375"	0.250"	29.0"	8	1.75"	45"
130 mph	80 ft	30.0"	2.500"	0.438"	0.250"	23.0"	8	1.75"	43"
	100 ft	34.0"	2.750"	0.438"	0.250"	27.0"	8	1.75"	50"
	120 ft	41.0"	3.250"	0.500"	0.250"	33.0"	8	2.00"	52"
150 mph	80 ft	32.0"	2.750"	0.500"	0.250"	25.0"	8	1.75"	49"
	100 ft	37.0"	3.000"	0.563"	0.313"	29.0"	8	2.00"	53"
	120 ft	46.0"	3.250"	0.563"	0.313"	37.0"	10	2.25"	57"

Shaft Design Table

Design Wind Speed.	Pole Overall Height	Shaft Diameter	Shaft Length	Longitudinal Reinforcement
110 mph	80 ft	4'-0"	13'-0"	16 - # 10
	100 ft	4'-0"	15'-0"	16 - # 10
	120 ft	4'-6"	16'-0"	20 - # 10
130 mph	80 ft	4'-0"	14'-0"	16 - # 10
	100 ft	4'-0"	16'-0"	16 - # 10
	120 ft	4'-6"	18'-0"	20 - # 10
150 mph	80 ft	4'-0"	16'-0"	16 - # 10
	100 ft	4'-6"	17'-0"	20 - # 10
	120 ft	5'-0"	20'-0"	24 - # 10

POLE DESIGN TABLES

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Added ID Plate to ELEVATION, Changed dimensions in 'Base Plate Thickness' column.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

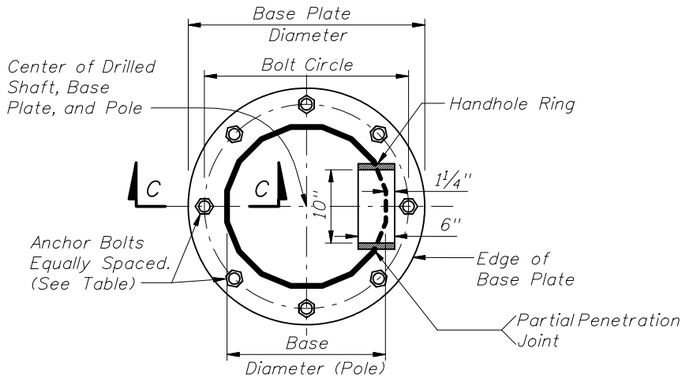
2008 Interim Design Standard

HIGHMAST LIGHTING

Interim Date 01/01/08

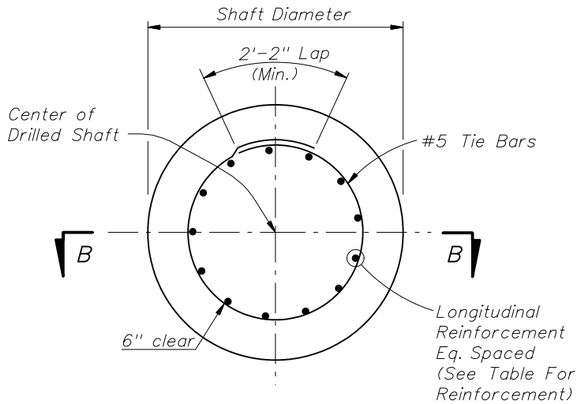
Sheet No. 4 of 7

Index No. 17502



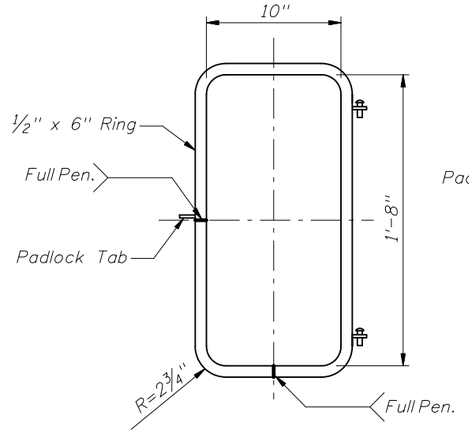
SECTION A-A

(T = Wall Thickness)

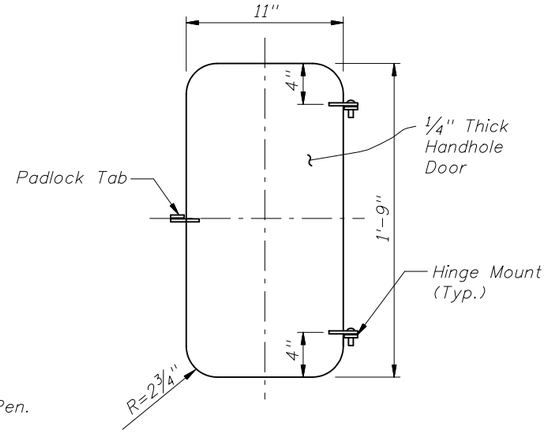


FOUNDATION PLAN

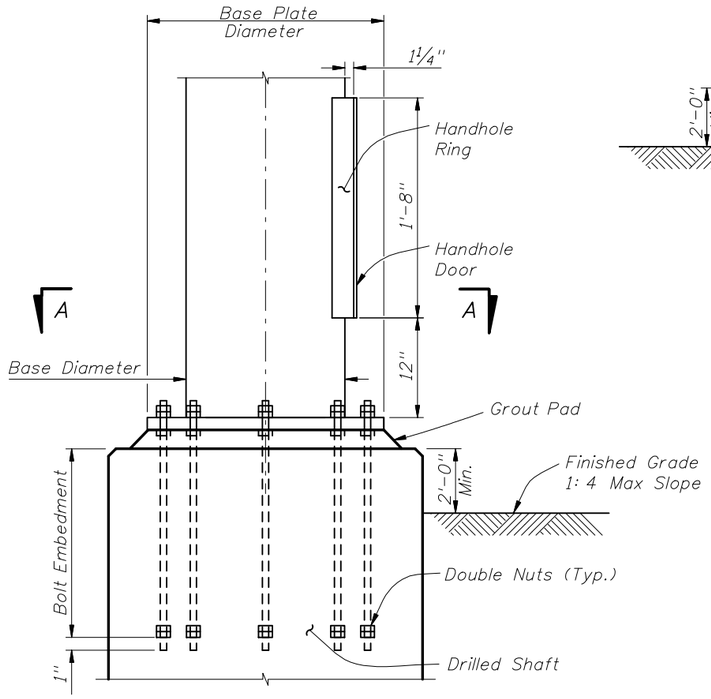
(Anchor Bolts and Conduits Not Shown)



HANDHOLE RING

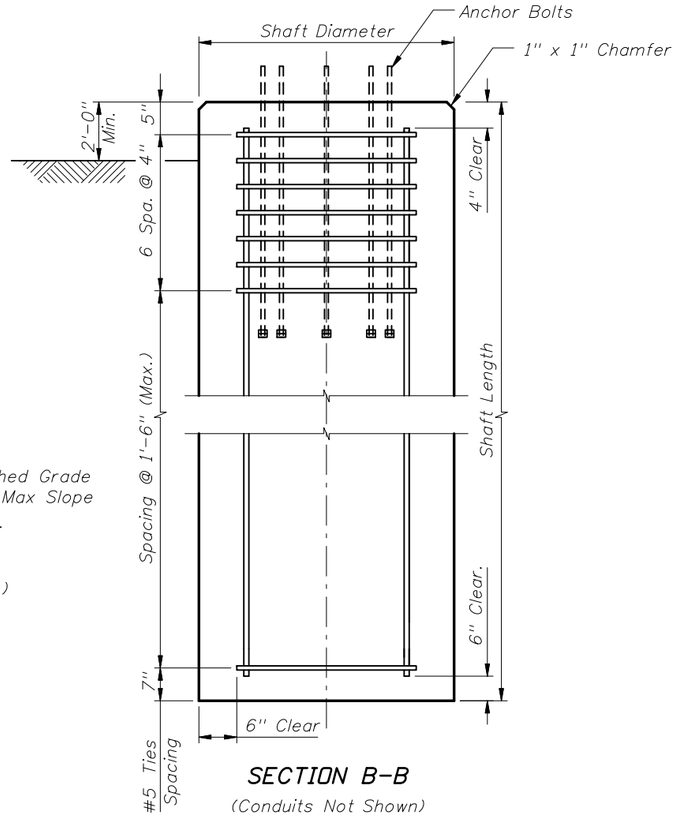


HANDHOLE DOOR



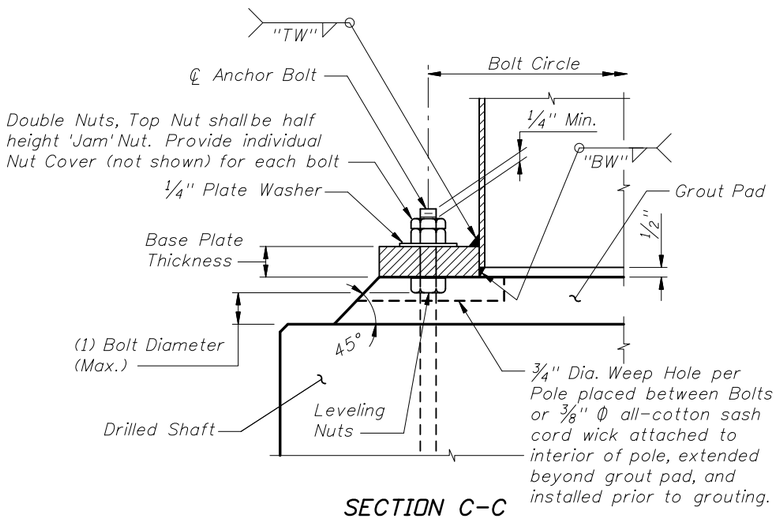
BASE PLATE AND ANCHORAGE ELEVATION

(Conduits Not Shown)



SECTION B-B

(Conduits Not Shown)



SECTION C-C

POLE FOUNDATION

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed Weld symbol in SECTION A-A, Added Padlock Tab to HANDHOLE RING.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

HIGHMAST LIGHTING

Interim Date 01/01/08

Sheet No. 5 of 7

Index No. 17502

HIGHMAST LIGHTING NOTES:

1) High Mast materials:
   a. Pole: ASTM A1011 Grade 50, 55, 60 or 65 (Less than ¼") or ASTM A572 Grade 50, 55, 60, or 65 (¼" 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 ASTM F436 Type 1 washers.

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) Grout: minimum 5,000 psi compressive strength at 28-days and meeting the requirements of Section 934.

5) Welding: American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (Current edition).

6) Galvanization:

   a. Nuts, Bolts, Washers and Threaded Bars/Studs: ASTM F2329.

   b. Other items (Including Pole): ASTM A123

7) Hole diameters for anchor bolts: not greater than the bolt diameter plus ½".

8) 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.

9) If a grout pad is not installed, place wire cloth screen vertically between the base plate and top of foundation, wrap horizontally around the base plate with a 3" min. lap. Use standard grade, plain weave, ½"x½" mesh, galvanized steel wire-cloth with 0.063" dia. wire. Attach the screen to the base plate with stainless steel self-tapping ¼" screws with stainless steel washers spaced at 9" centers.

10) 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.

11) 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.

12) 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.

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.

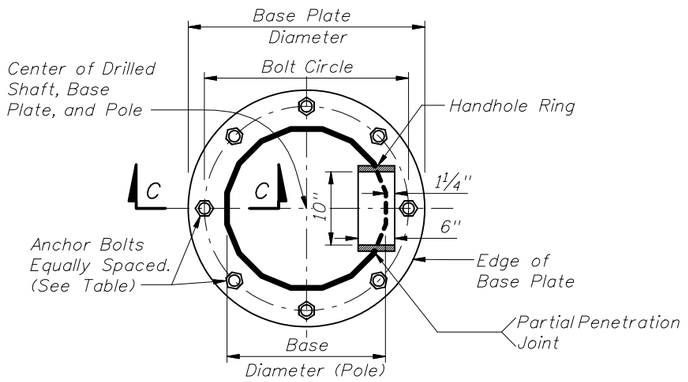
3). Foundation design based upon the following soil criteria:
   Classification = Cohesionless (Fine Sand)
   Friction Angle = 30 Degrees (30°)
   Unit Weight = 50 lbs./cu. Ft. (assumed saturated)

   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.

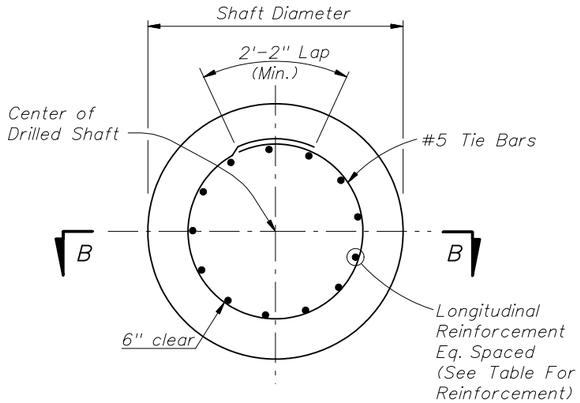
5) Poles are designed for 6 mil galvanization thickness.

STANDARD POLE DESIGN NOTES



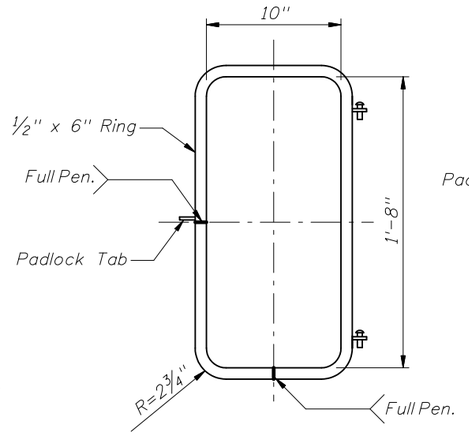
SECTION A-A

(T = Wall Thickness)

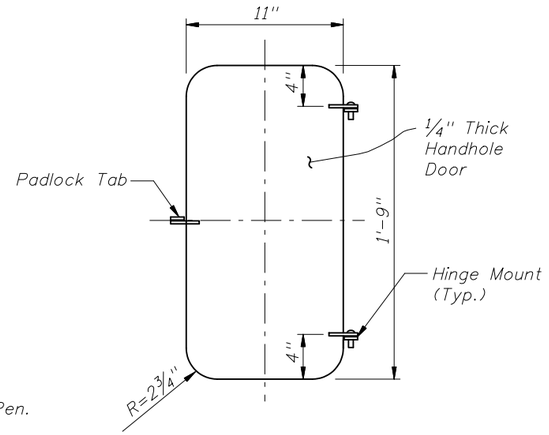


FOUNDATION PLAN

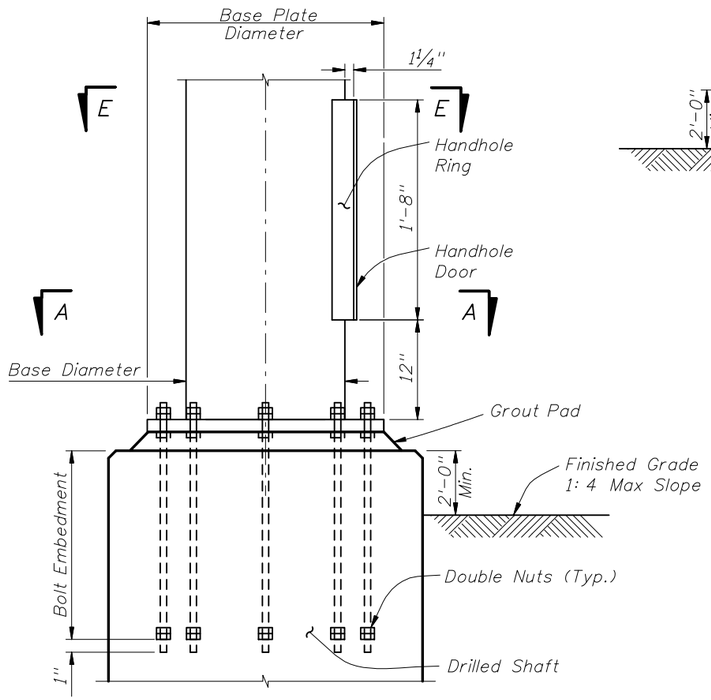
(Anchor Bolts and Conduits Not Shown)



HANDHOLE RING

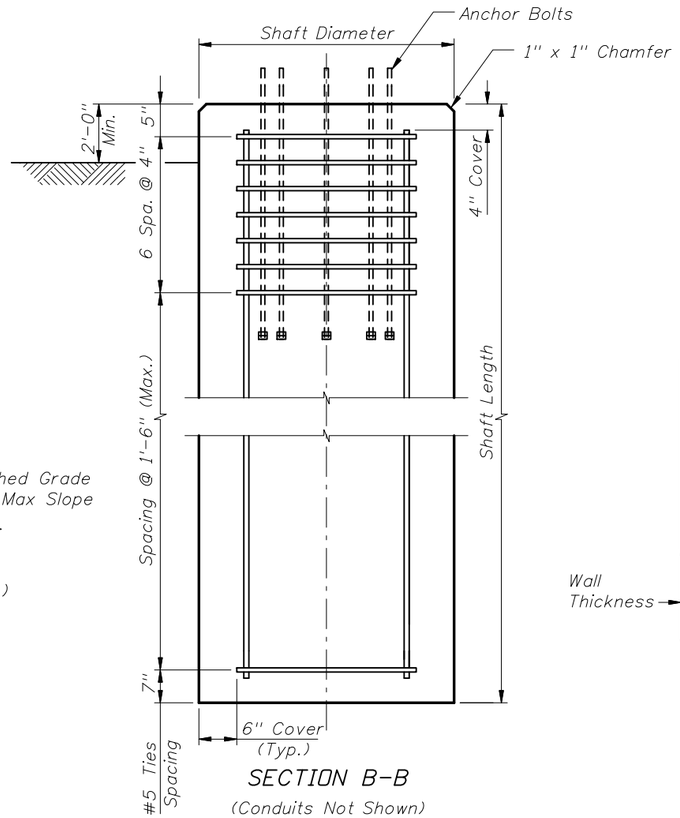


HANDHOLE DOOR



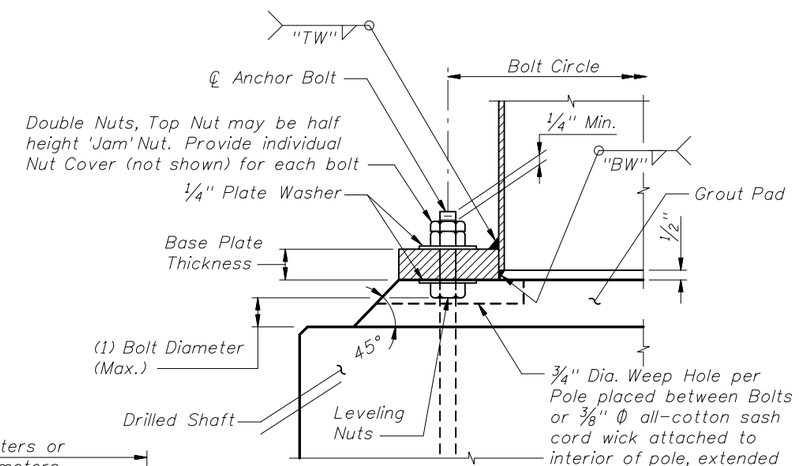
BASE PLATE AND ANCHORAGE ELEVATION

(Conduits Not Shown)

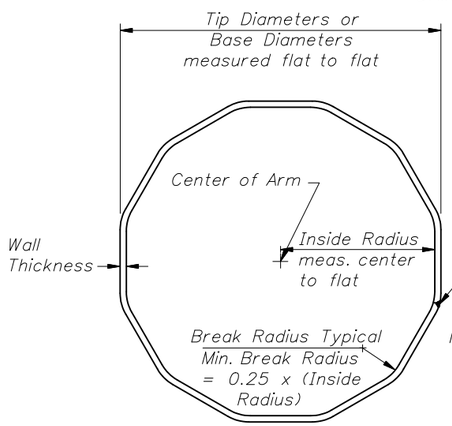


SECTION B-B

(Conduits Not Shown)



SECTION C-C



SECTION E-E

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.
For tubes greater than 70" in circumference, two longitudinal seam welds are allowed.

POLE FOUNDATION

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed Weld symbol in SECTION A-A, Added Padlock Tab to HANDHOLE RING.			
07/01/08	DYW	Added SECTION E-E, washer for Base Plate.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

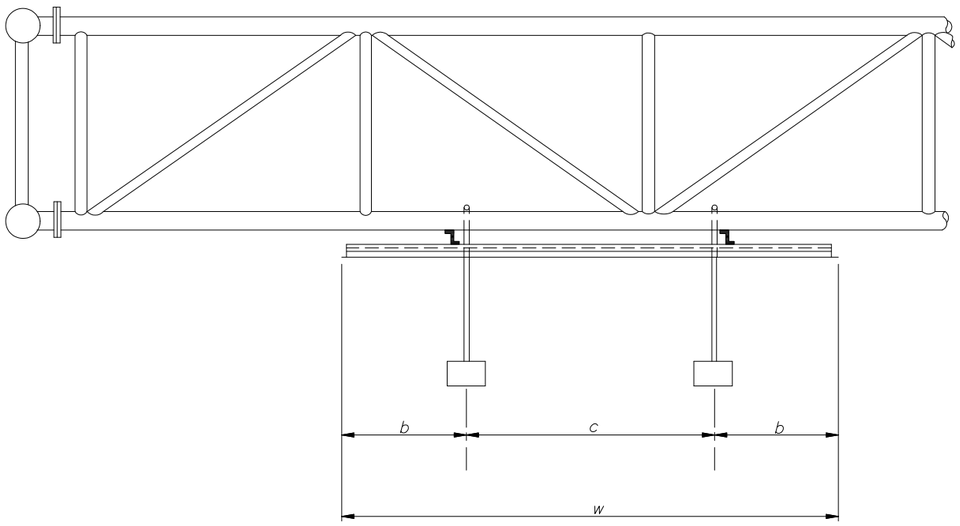
HIGHMAST LIGHTING

Interim Date 07/01/08

Sheet No. 5 of 7

Index No. 17502

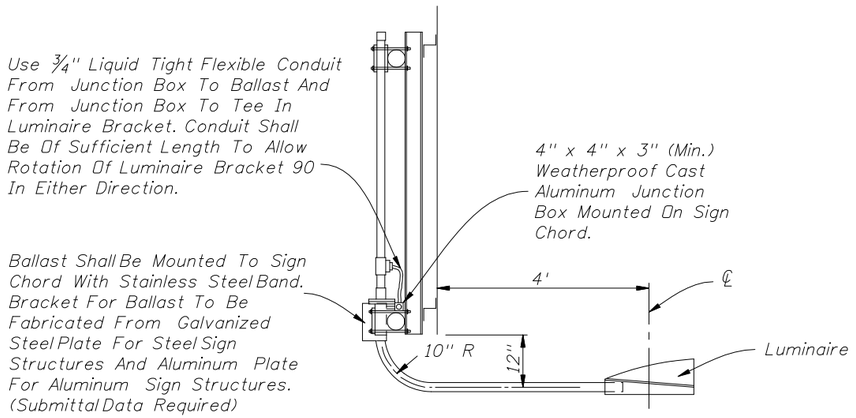
SIGN LIGHTING INSTALLATION



WIDTH OF SIGN FACE	To 10'	To 21'-6"	To 32'-6"	To 43'-4"
NUMBER OF FIXTURES	ONE	TWO	THREE	FOUR
EQUATIONS FOR PLACING FIXTURES ALONG SIGN WIDTH	W = 2b	W = 2b+c	W = 2b+2c	W = 2b+3c
	c = 0	c = 2.2b	c = 2.2b	c = 2.2b

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.



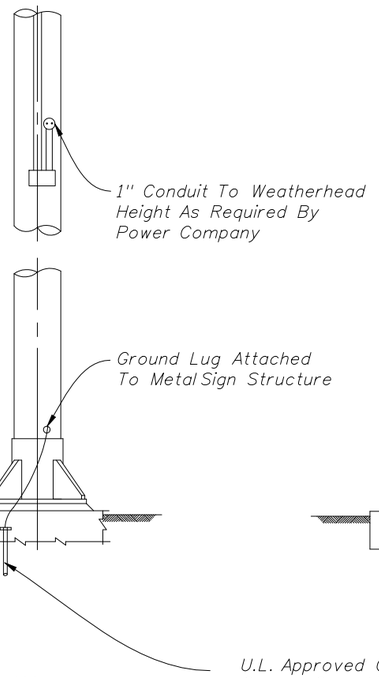
Roadway Lighting included in contract:

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

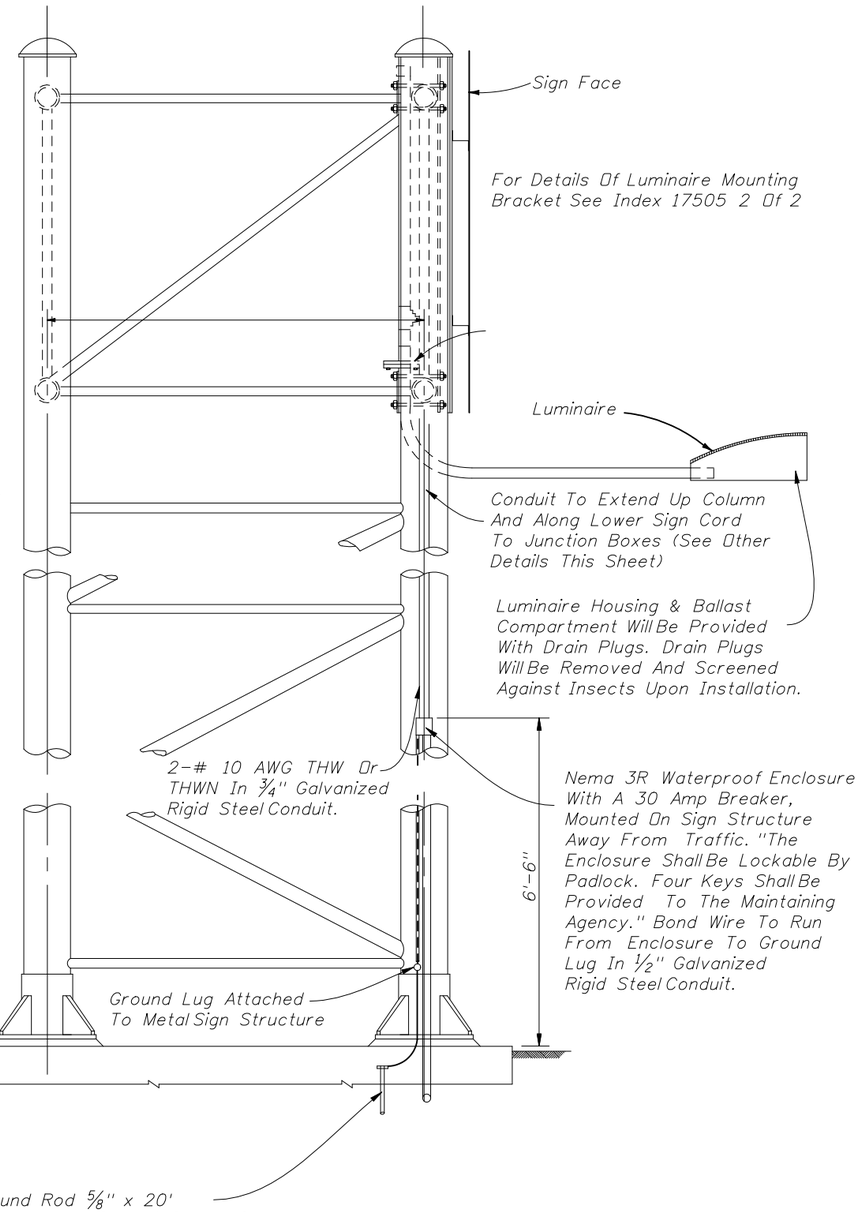
Roadway Lighting not included in contract:

The signing plans shall include pay item numbers to furnish and install conduit, conductors, ground rods, pull boxes 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.



PLAN

OVERHEAD POWER SUPPLY



REVISIONS

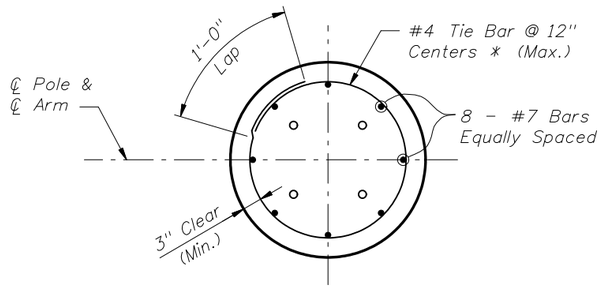
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
12/14/07	LW	Mercury Vapor removed from note 4 and Induction added under PLACEMENT OF SIGN LIGHTS.			

2008 Interim Design Standard

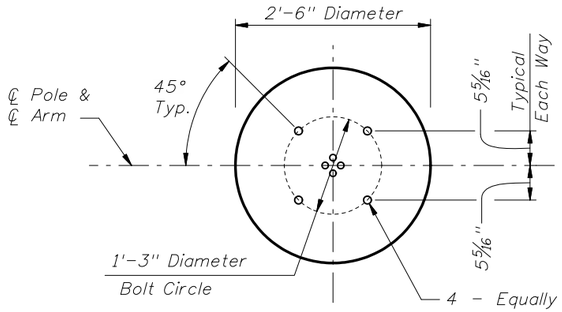
EXTERNAL LIGHTING FOR SIGNS

Interim Date 01/01/08

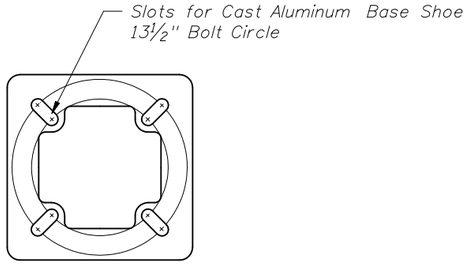
Index No. 17505



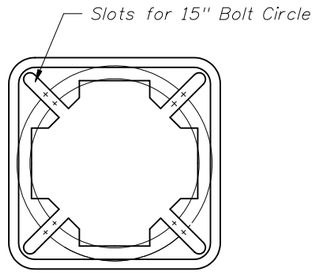
SECTION C-C



VIEW B-B



TOP VIEW
TRANSFORMER BASE



BOTTOM VIEW
TRANSFORMER BASE

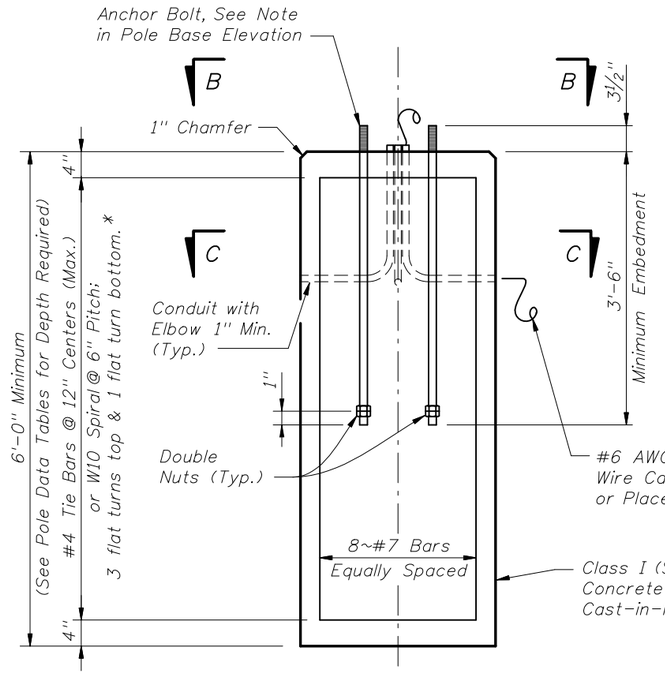
FOUNDATION NOTES:
The foundations for Standard Roadway Aluminum Lighting Poles are pre-designed and are based upon the following conservative soil criteria which covers the great majority of soil types found in Florida:

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

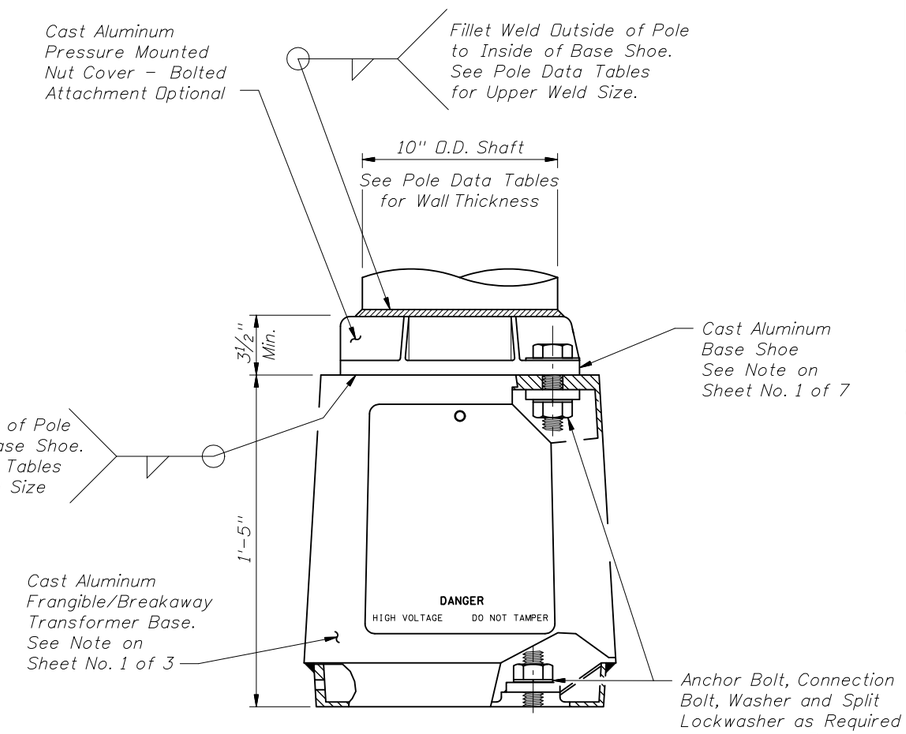
Only in cases where the Designer considers the soil types at the specific site location to be of lesser strength properties should an analysis be required. Auger borings, SPT borings or CPT soundings may be utilized as needed to verify the assumed soil properties, and at relatively uniform sites, a single 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.

POLE TABLE					
WIND SPEED (MPH)	ARM LENGTH (FT)	DESIGN MOUNTING HEIGHT (FT)	POLE WALL (IN)	UPPER WELD (IN)	LOWER WELD (IN)
110	8, 10, 12 & 15	40 & 45	0.156	0.156	0.156
110	8, 10, 12 & 15	50	0.188	0.188	0.188
130	8, 10 & 12	40	0.156	0.156	0.156
130	15	40	0.188	0.188	0.188
130	8, 10, & 12	45	0.188	0.188	0.188
130	15	45	0.250	0.250	0.250
130	8, 10, 12 & 15	50	0.250	0.250	0.250
150	8, 10, & 12	40	0.188	0.188	0.188
150	15	40	0.250	0.250	0.250
150	8, 10, 12 & 15	45	0.250	0.250	0.250
150	8, 10, 12 & 15	50	0.313	0.313	0.313

NOTE:
Pole wall thicknesses shown in the POLE TABLE are nominals and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.



FOUNDATION



POLE BASE ELEVATION

FOUNDATION TABLE		
WIND SPEED (MPH)	DESIGN MOUNTING HEIGHT (FT)	TOTAL DEPTH (FT) *
110	40	7
110	45 & 50	8
130	40 & 45	8
130	50	9
150	40 & 45	9
150	50	10

* Depths shown in table are for grades flatter than 1:4, for grades up to 1:2 add 2'-6" to foundation depths shown in table.

* 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 tests are performed on shop-welded specimens and the test results are available, upon request, to the Engineer.

BASE DETAILS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Added 1" dimension to FOUNDATION detail. Changed 'Class I ...' note on FOUNDATION detail.			

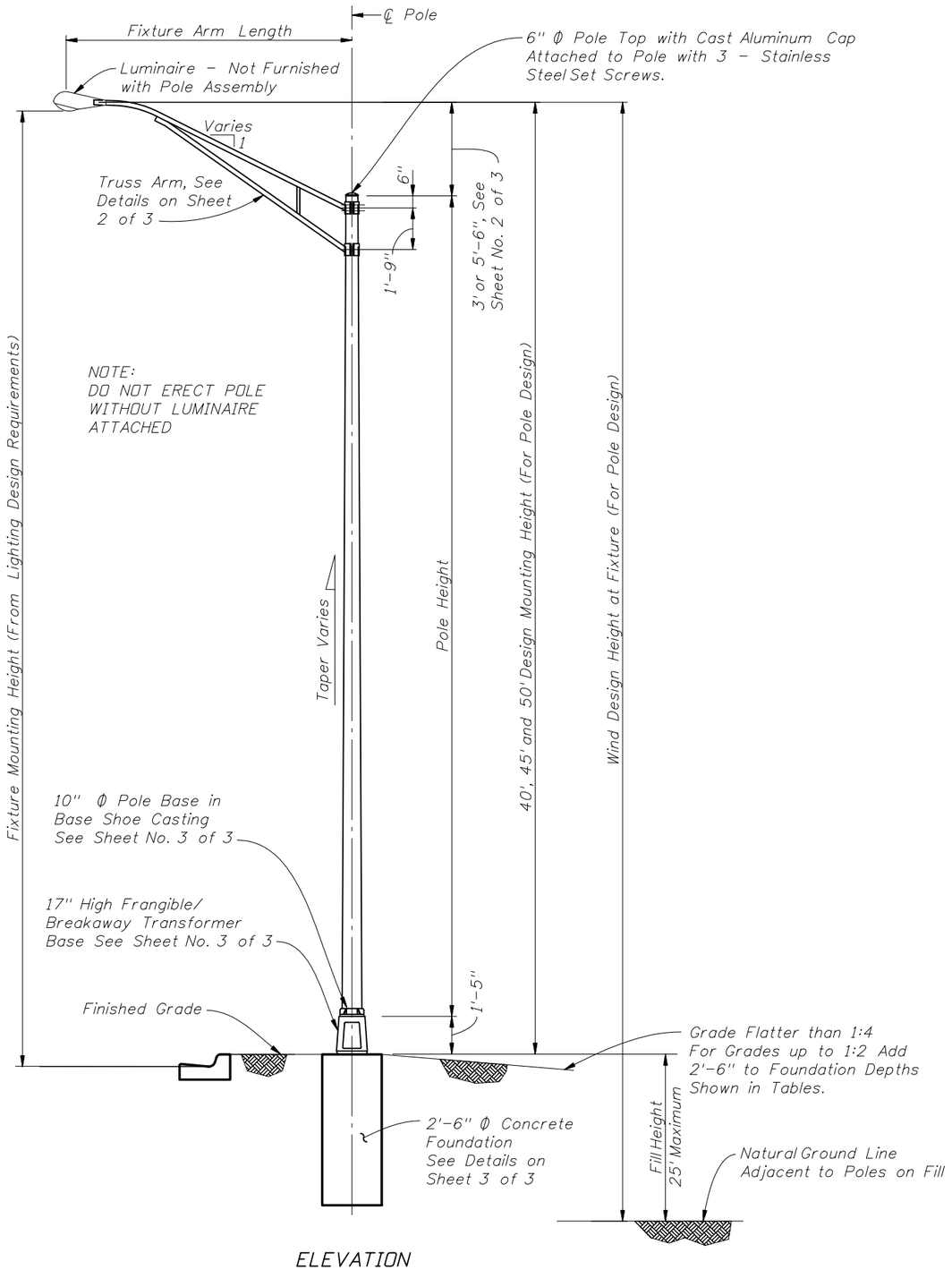
2008 Interim Design Standard

STANDARD ROADWAY ALUMINUM LIGHTING

Interim Date 01/01/08

Sheet No. 3 of 3

Index No. 17515



ELEVATION

ROADWAY ALUMINUM LIGHTING POLE NOTES

1) Designed in accordance with FDOT Structures Manual (current edition).

2) All tables were developed assuming the following Luminaire properties: Effective Projected Area of 1.55 ft (includes wind drag coefficient) and 75 pounds (max.)

3) Perform all welding in accordance with the American Welding Society Structural Welding Code Aluminum) ANSI/AWS D1.2 (current edition).

4) See Standard Index No. 17500 for grounding and wiring details.

5) Foundation Materials:
   a. Reinforcing Steel: ASTM A615 Grade 60.
   b. Concrete: Class I (Special).
   c. Anchor Bolts: ASTM F1554 Grade 55 with ASTM A563 Grade DH nuts and ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329-05.)

6) Light Pole Specifications:
   a. Poles: ASTM B221, Alloy 6063-T6.
   b. Arm Tube Extrusions: ASTM B221 - Alloy 6063-T6.
   c. Finish: For pole and arms; 50 grit satin rubbed finish.
   d. Pole Connection Extrusions, Bars and Plates: ASTM B221 - Alloy 6063-T6.
   e. Shoe Base Casting: ASTM B26 - Alloy 356-T6 or ASTM B108 - Alloy 356-T6.
   f. Aluminum Caps and Covers: ASTM B-26(319-F).
   g. Frangible/Breakaway Transformer Base Casting: ASTM B26 - Alloy 356-T6 or ASTM B108 - Alloy 356-T6.
   h. Weld Metal: ER4043.
   i. Shoe Base Connection Bolts: ASTM A325 Type 1 with ASTM A563 Grade DH nuts and ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329).
   j. Stainless Steel Fasteners and Hardware: AISI Grade 304.
   k. Aluminum alloy 6063: T4 condition and heat treated in accordance with ASTM B597 to T6.

7) Pole Notes:
   a. Tapered as required to provide a top outside diameter (O.D.) of 6" with a base O.D. of 10". Portions of the shaft near the base shoe and at the arm connections may be held constant at 10" and 6" respectively to simplify fabrication.
   b. Transverse welds are allowed only at the base.
   c. Poles constructed out of two or more sections with overlapping splices are not permitted.
   d. Equip poles with a damping device if the pole location is within 5 miles of the coastline.

8) Furnish each pole with a 2"x4" (max) aluminum identification tag. Submit details for approval. Secure to Transformer Base with 0.125" stainless steel rivets or screws. Locate Identification Tag on the inside of base and visible from the door opening. Include the following information: Financial Project ID, Pole Design Designation (ie. Pole Pay Item number), Manufacturer's Name & Certification number, Pay Item number.

9) Manufacturers seeking approval of a Standard Roadway Aluminum Lighting Pole 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.
   a. For Clamp and Frangible Transformer Base Design, provide design calculation and/or test results indicating that the components are capable of providing the required capacity. Certify that the frangible Transformer Base conforms to the current FHWA required AASHTO Frangibility Requirements, tested under NCHRP Report 350 Guideline.
   b. For Alternate foundations: Include design calculations and drawings showing that the product meets the requirements of this index, FDOT Structures Manual and Specification 715.

NOTE:
STANDARD ROADWAY ALUMINUM LIGHTING NOT TO BE USED ON BRIDGES OR WALLS.

ELEVATION AND NOTES

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	DYW	Modified QPL Criteria.			

2008 Interim Design Standard

STANDARD ROADWAY ALUMINUM LIGHTING

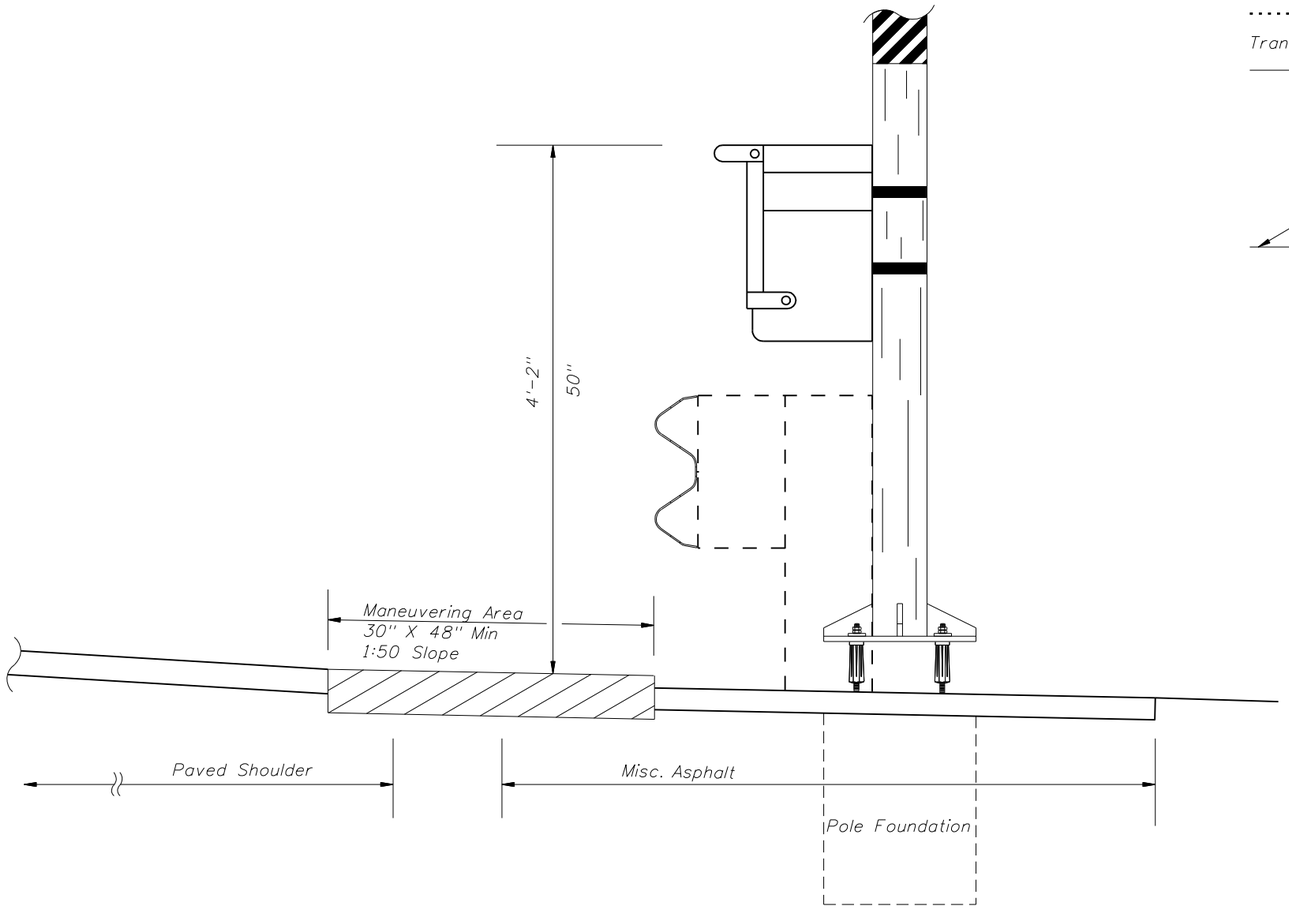
Interim Date 07/01/08

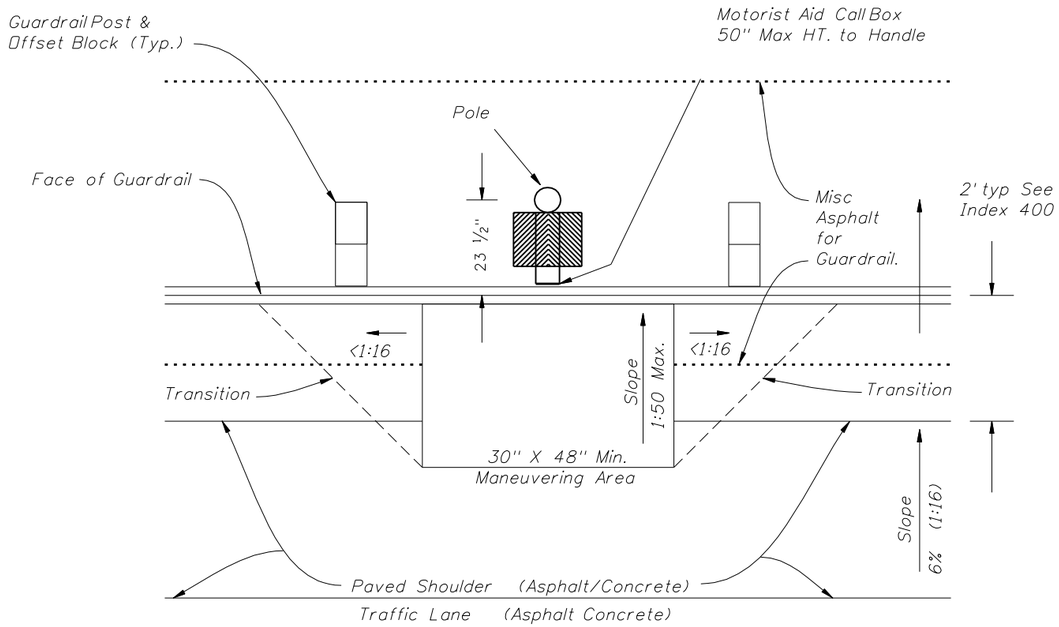
Sheet No. 1 of 3

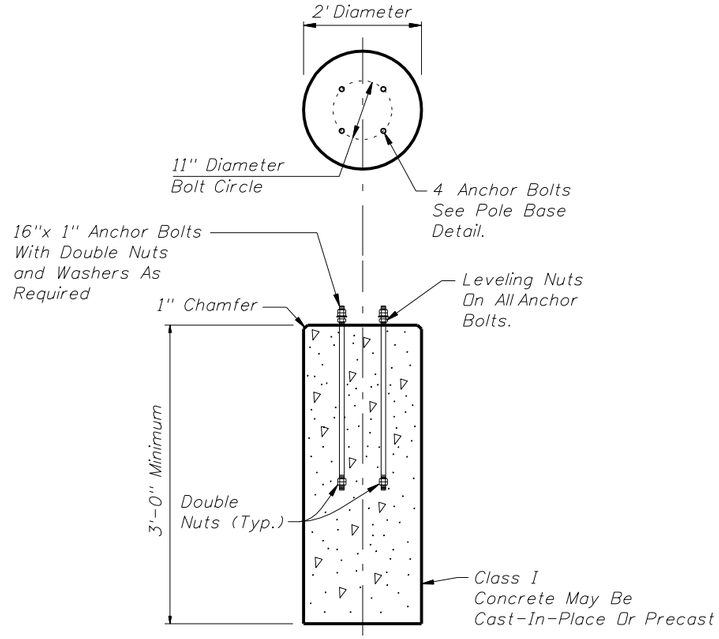
Index No. 17515

EXISTING PAVEMENT INSTALLATION
Remove existing pavement minimum 1" depth throughout transition and maneuvering area, replace with misc asphalt.

NEW CONSTRUCTION
Hand work final shoulder pavement lift to plan dimensions.







MOTORIST AID CALL BOX POLE FOUNDATION
TO BE USED ONLY BEHIND GUARDRAIL

CALL BOX BEHIND GUARDRAIL

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
06/02/08	L.W.	MOTORIST AID CALL BOX POLE FOUNDATION TO BE USED ONLY BEHIND GUARDRAIL.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

MOTORIST AID CALL BOX

Interim Date 07/01/08

Sheet No. 2 of 3

Index No. 17600

STEEL STRAIN POLE NOTES

1) Designed in accordance with FDOT Structures Manual and the 2001 (4th) Edition AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and Interims.

2) Perform all welding in accordance with the American Welding Society Structural Welding Code (Aluminum) ANSI/AWS D1.2 (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 ASTM F436 Type 1 washers (all galvanized in accordance with ASTM F2329)
   d. Grout: 5,000 psi compressive strength at 28-days and meeting the requirements of Section 934.

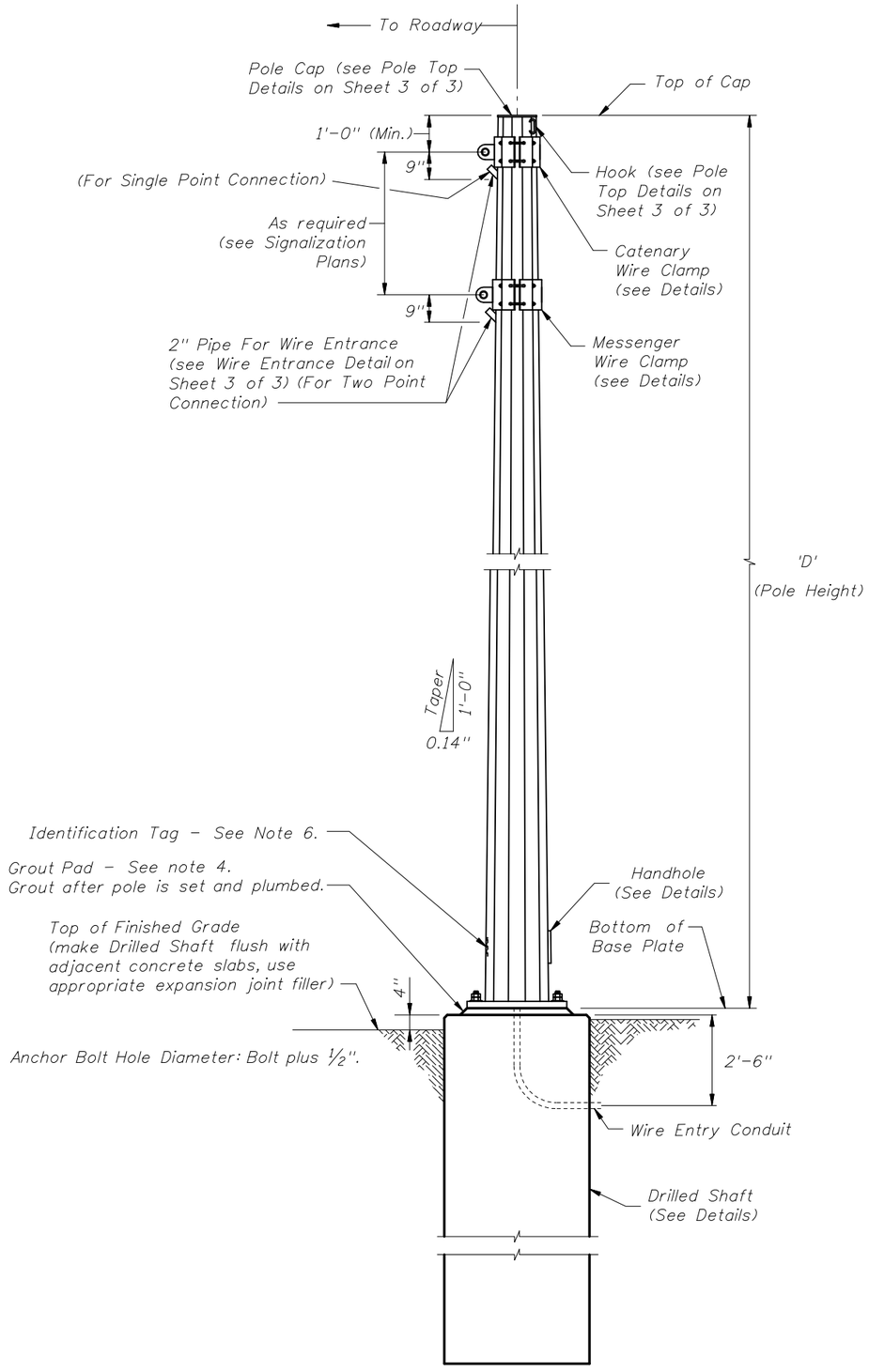
5) Strain Pole Specifications:
   a. Poles: ASTM A1011 Grade 50, 55, 60 or 65 (less than 1/4") or ASTM A572 Grade 50, 60, or 65 (1/4" and over) or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield).
   b. Steel Plates: ASTM A36.
   c. Weld Metal: E70XX.
   d. Bolts: A325, Type 1. Hole Diameter: 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) If a grout pad is not installed, place wire cloth screen vertically between the base plate and top of foundation, wrap horizontally around the base plate with a 3" min. lap. Use standard grade, plain weave, 1/2"x1/2" mesh, galvanized steel wire-cloth with 0.063" dia. wire. Attach the screen to the base plate with stainless steel self-tapping 1/4" screws and washers (spaced at 9" centers).

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) 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.



ELEVATION

ELEVATION AND NOTES

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed Note 5i, 6f and 7. Renumbered Note 8 & 9. Added Note 8.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

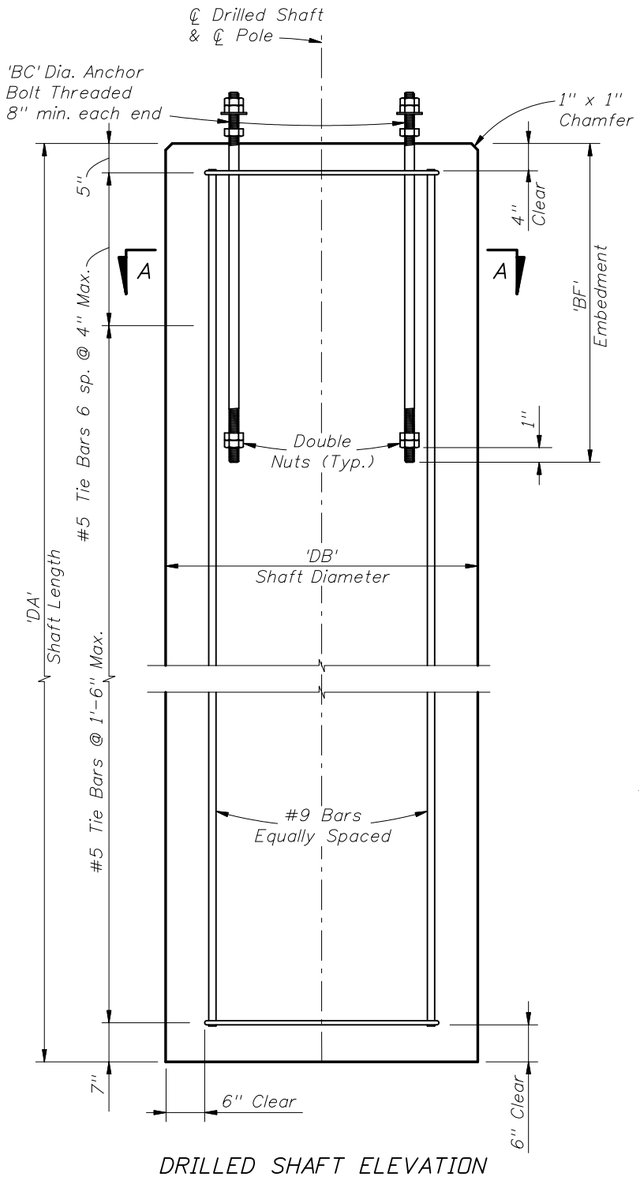
2008 Interim Design Standard

STEEL STRAIN POLE

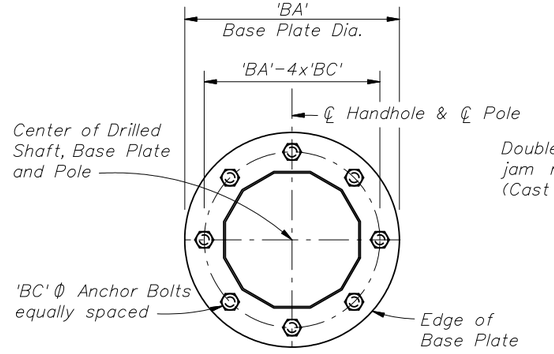
Interim Date 01/01/08

Sheet No. 1 of 3

Index No. 17723

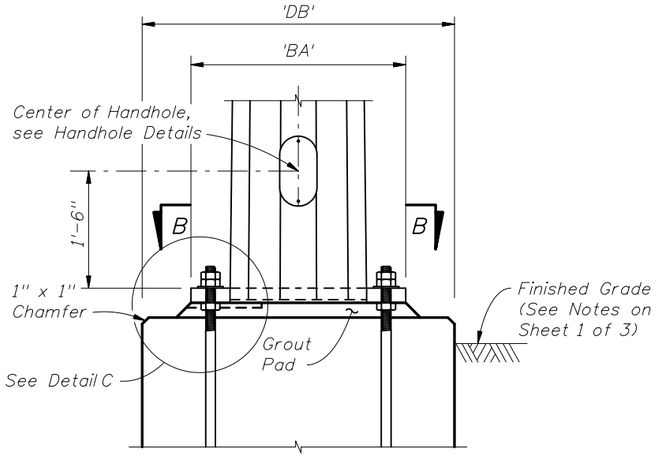


DRILLED SHAFT ELEVATION

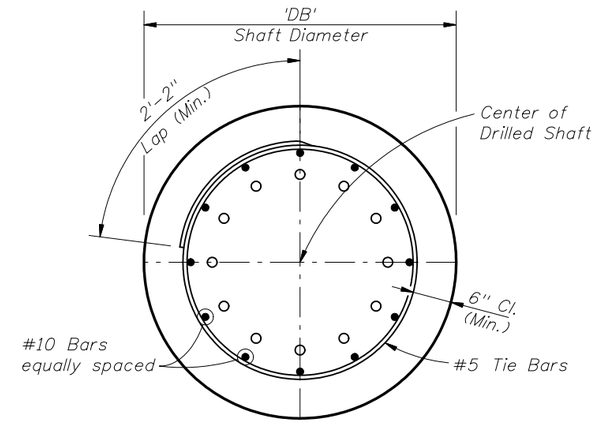


VIEW B-B

NOTE: Number of bolts shown for illustration purposes only.

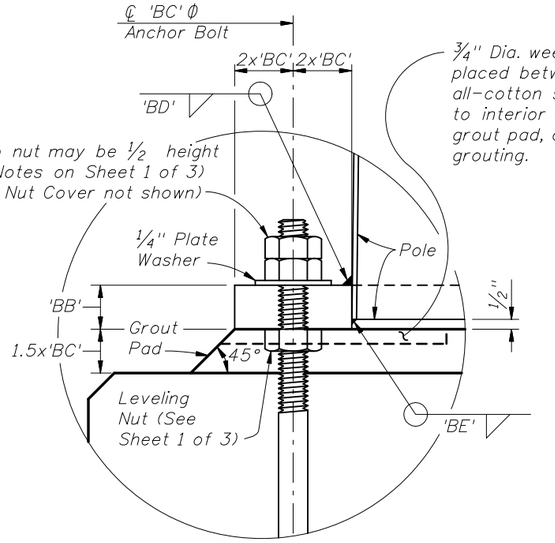


PARTIAL ELEVATION
(Showing Base Plate, Anchor bolts and Handhole)

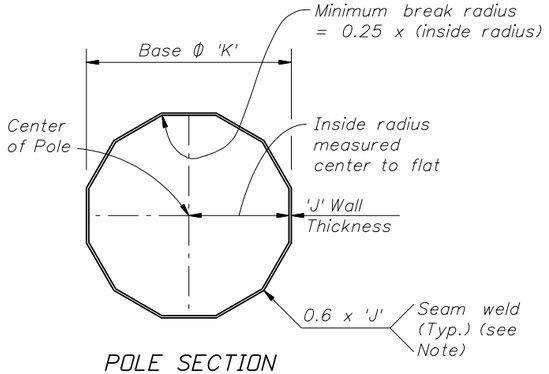


SECTION A-A

(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.

TABLE OF STRAIN POLE VARIABLES

POLE TYPE	MAXIMUM ALLOWABLE MOMENT (kip-ft)	POLE		BASE CONNECTION							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 #10 bars
PS-IV	95.4	0.250	14	8	25	2.25	1⅜	7/16	3/16	57	15.0	3.5	12
PS-V	158.9	0.313	16	10	28	2.50	1½	½	¼	56	16.5	3.5	12
PS-VI	203.6	0.313	18	12	30	2.50	1½	½	¼	55	17.0	3.5	12
PS-VII	280.3	0.313	21	14	33	2.50	1½	9/16	¼	56	17.0	4.0	16
PS-VIII	338.0	0.313	23	16	35	2.50	1½	9/16	¼	55	18.0	4.0	16
PS-IX	400.9	0.313	25	12	39	2.75	1¾	9/16	¼	57	17.5	4.5	20
PS-X	469.1	0.313	27	14	41	2.75	1¾	9/16	¼	56	18.5	4.5	20

FOUNDATION NOTES:
The foundations for Steel Strain 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	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed number of bolts in VIEW B-B, number of rebar in SECTION A-A & note in DETAIL C. Changed '#9..' to '#10...' in SECTION A-A. Changed TABLE OF STRAIN POLE VARIABLES (removed 6 lines).			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

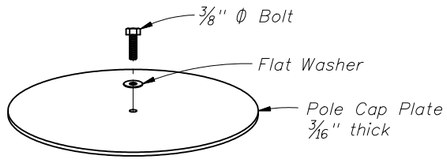
2008 Interim Design Standard

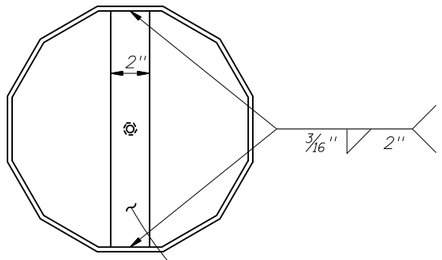
STEEL STRAIN POLE

Interim Date 01/01/08

Sheet No. 2 of 3

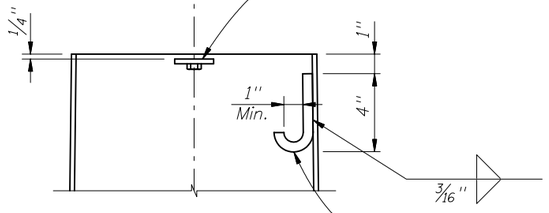
Index No. 17723





TOP VIEW

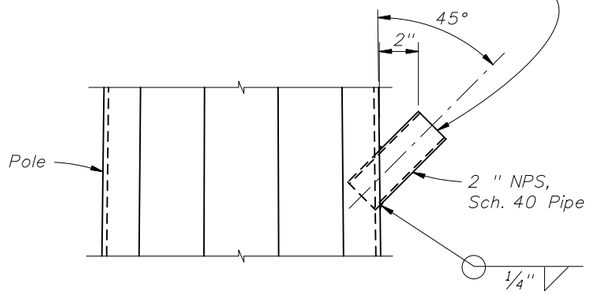
1/4" x 2" Lifting Bar with 5/16" Ø hole and 3/8" Nut tack welded to underside of bar



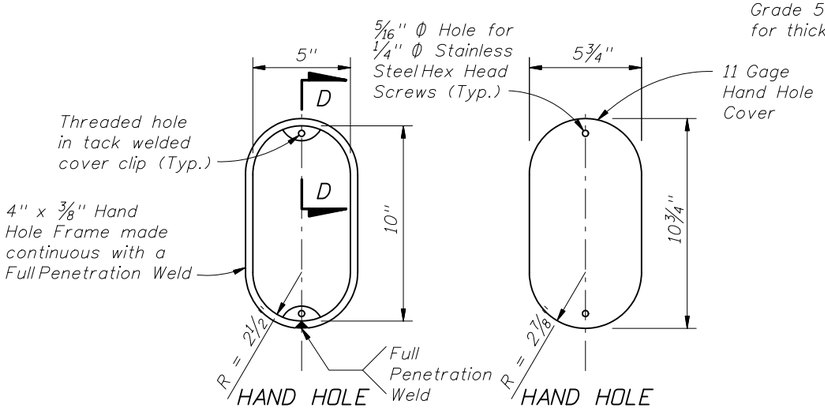
POLE TOP CUT-AWAY
(Option 'a')

'J' Hook for wiring, 1/2" Ø commercial grade hot rolled bar welded to inside of pole.

NOTE: A properly sized Service Head (Weather Head), shall be installed and fastened securely on to the standard pipe for each pole location. At locations other than service entrance, the service head face is to be left closed to outside atmosphere. Service entrance installation per Index No. 17727.

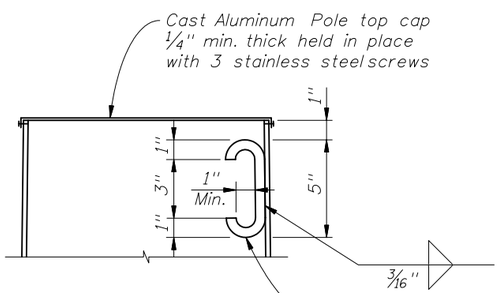


WIRE ENTRANCE DETAILS



HAND HOLE FRAME

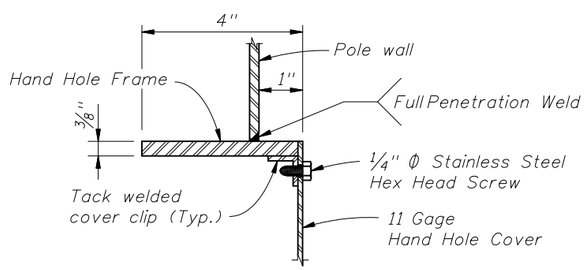
HAND HOLE COVER



POLE TOP CUT-AWAY
(Option 'b')

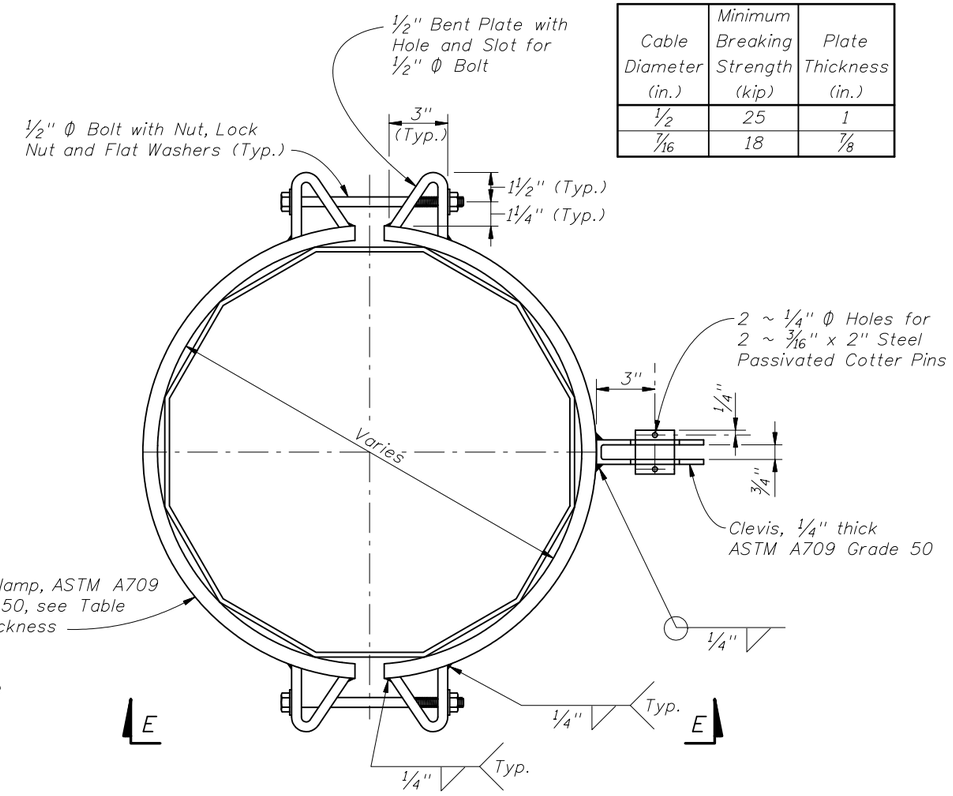
'C' Hook for wiring and lifting, 1/2" Ø commercial grade hot rolled bar welded to inside of pole.

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



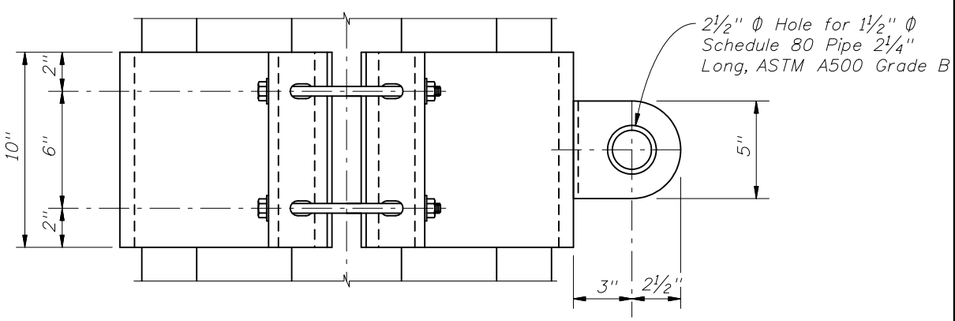
SECTION D-D
(thru Hand Hole)

Cable Diameter (in.)	Minimum Breaking Strength (kip)	Plate Thickness (in.)
1/2	25	1
7/16	18	7/8



CATENARY AND MESSENGER WIRE CLAMPS

NOTE: Clamps have been sized for Design Cable Loads shown in the Table, and a Maximum Pole Diameter at the Clamp location of 2'-1".



VIEW E-E

ATTACHMENT DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed note in VIEW E-E.			

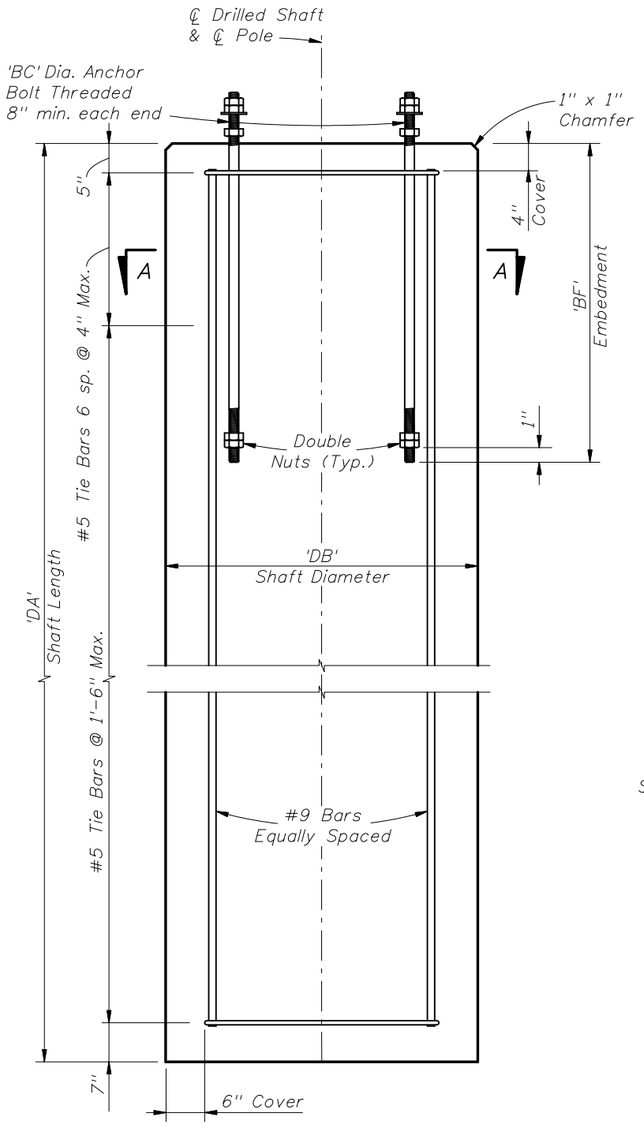
2008 Interim Design Standard

STEEL STRAIN POLE

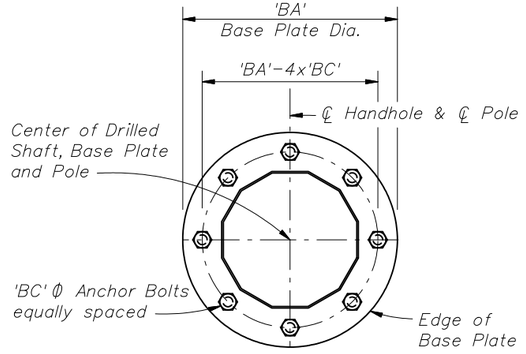
Interim Date 01/01/08

Sheet No. 3 of 3

Index No. 17723

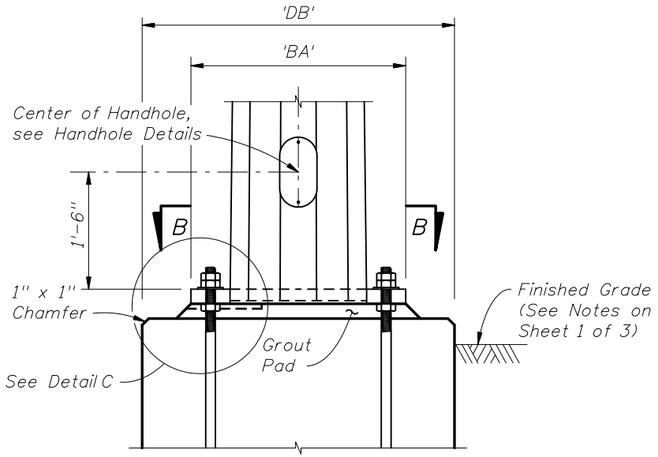


DRILLED SHAFT ELEVATION

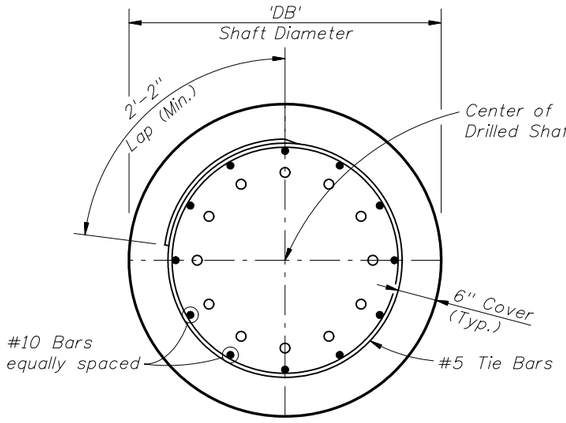


VIEW B-B

NOTE: Number of bolts shown for illustration purposes only.

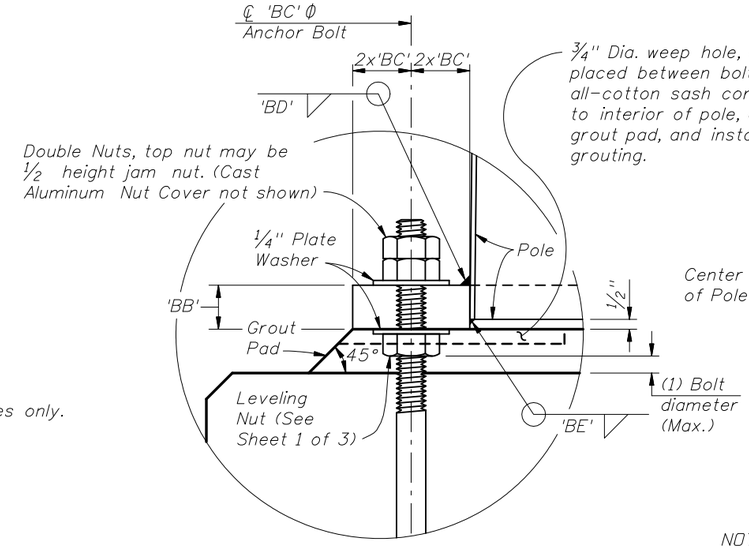


PARTIAL ELEVATION
(Showing Base Plate, Anchor bolts and Handhole)

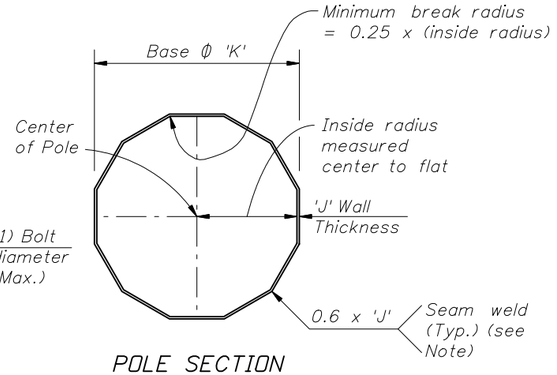


SECTION A-A

(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.

TABLE OF STRAIN POLE VARIABLES

POLE TYPE	MAXIMUM ALLOWABLE MOMENT (kip-ft)	POLE		BASE CONNECTION							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 #10 bars
PS-IV	95.4	0.250	14	8	25	2.25	1⅜	7/16	3/16	57	15.0	3.5	12
PS-V	158.9	0.313	16	10	28	2.50	1½	½	¼	56	16.5	3.5	12
PS-VI	203.6	0.313	18	12	30	2.50	1½	½	¼	55	17.0	3.5	12
PS-VII	280.3	0.313	21	14	33	2.50	1½	9/16	¼	56	17.0	4.0	16
PS-VIII	338.0	0.313	23	16	35	2.50	1½	9/16	¼	55	18.0	4.0	16
PS-IX	400.9	0.313	25	12	39	2.75	1¾	9/16	¼	57	17.5	4.5	20
PS-X	469.1	0.313	27	14	41	2.75	1¾	9/16	¼	56	18.5	4.5	20

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

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BASE AND FOUNDATION DETAILS AND TABLE OF VARIABLES

REVISIONS

DATE	BY	DESCRIPTION
01/01/08	DYW	Changed number of bolts in VIEW B-B, number of rebar in SECTION A-A & note in DETAIL C. Changed '#9..' to '#10...' in SECTION A-A. Changed TABLE OF STRAIN POLE VARIABLES (removed 6 lines).
07/01/08	DYW	Changed foundation standoff distance and added washer for base plate.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

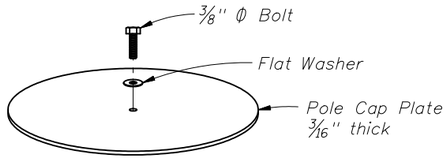
2008 Interim Design Standard

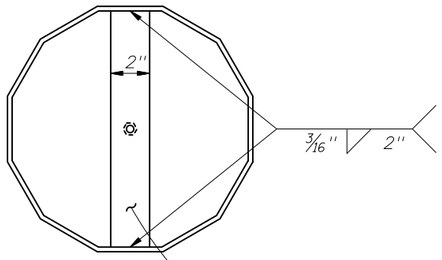
STEEL STRAIN POLE

Interim Date 07/01/08

Sheet No. 2 of 3

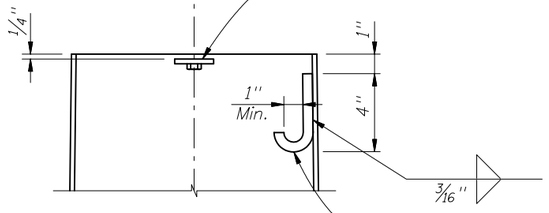
Index No. 17723





TOP VIEW

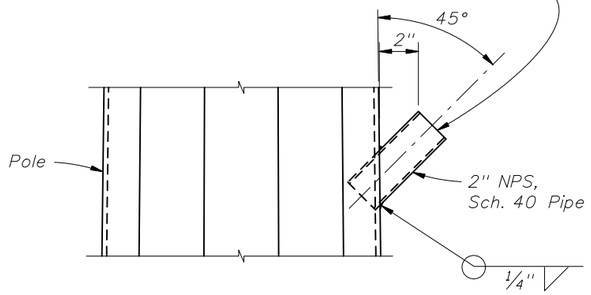
1/4" x 2" Lifting Bar with 5/16" Ø hole and 3/8" Nut tack welded to underside of bar



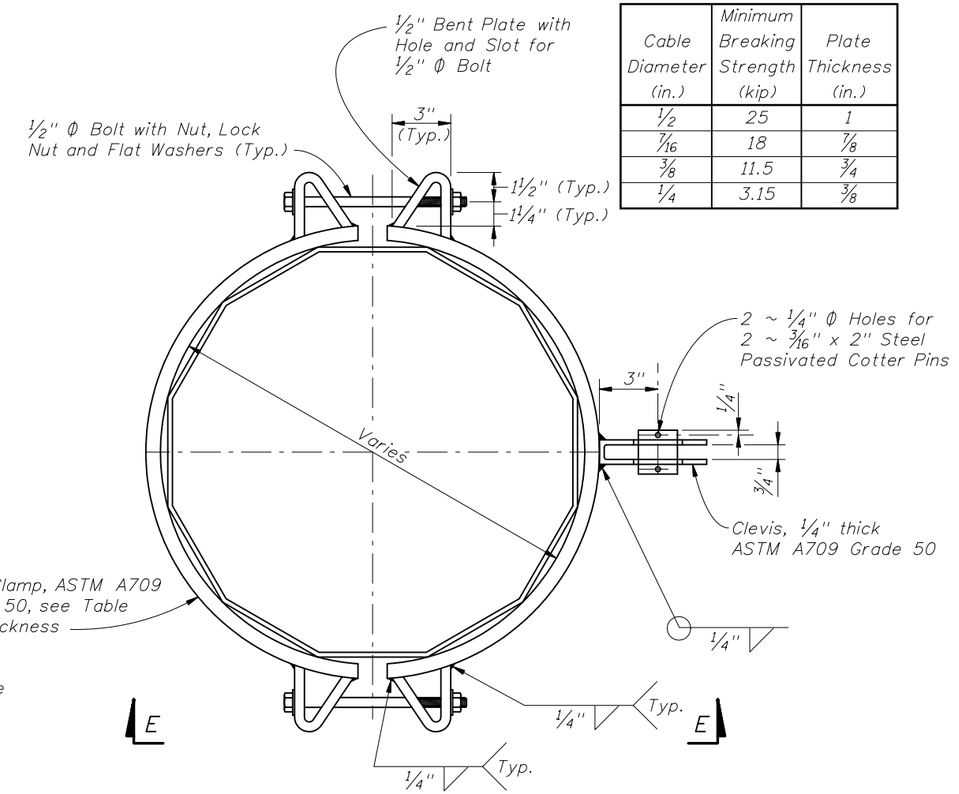
POLE TOP CUT-AWAY
(Option 'a')

'J' Hook for wiring, 1/2" Ø commercial grade hot rolled bar welded to inside of pole.

NOTE: A properly sized Service Head (Weather Head), shall be installed and fastened securely on to the standard pipe for each pole location. At locations other than service entrance, the service head face is to be left closed to outside atmosphere. Service entrance installation per Index No. 17727.



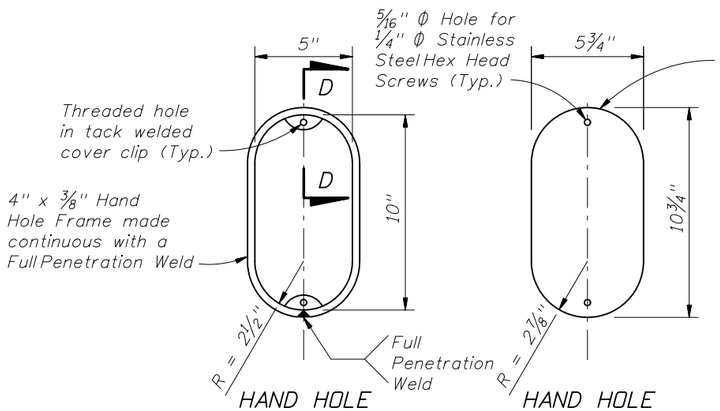
WIRE ENTRANCE DETAILS



Cable Diameter (in.)	Minimum Breaking Strength (kip)	Plate Thickness (in.)
1/2	25	1
7/16	18	7/8
3/8	11.5	3/4
1/4	3.15	3/8

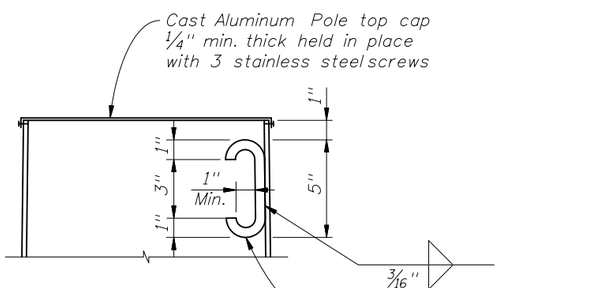
CATENARY AND MESSENGER WIRE CLAMPS

NOTE: Clamps have been sized for Design Cable Loads shown in the Table, and a Maximum Pole Diameter at the Clamp location of 2'-1".



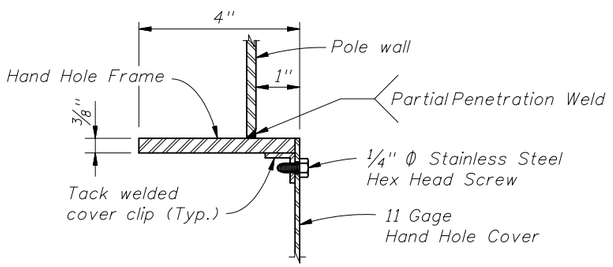
HAND HOLE FRAME

HAND HOLE COVER

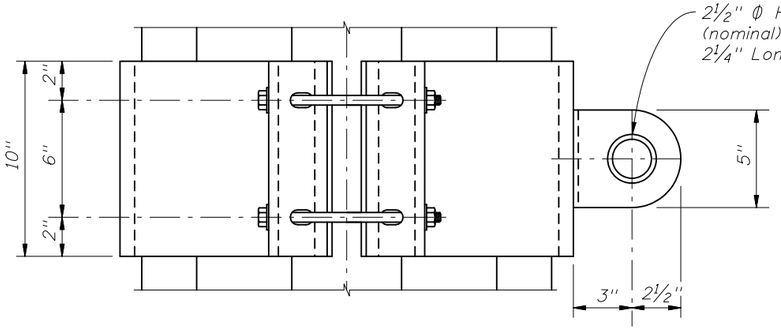


POLE TOP CUT-AWAY
(Option 'b')

'C' Hook for wiring and lifting, 1/2" Ø commercial grade hot rolled bar welded to inside of pole.



SECTION D-D
(thru Hand Hole)



VIEW E-E

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

ATTACHMENT DETAILS

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Changed note in VIEW E-E.			
07/01/08	DYW	Added Cable Clamp thickness and changed weld criteria.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

STEEL STRAIN POLE

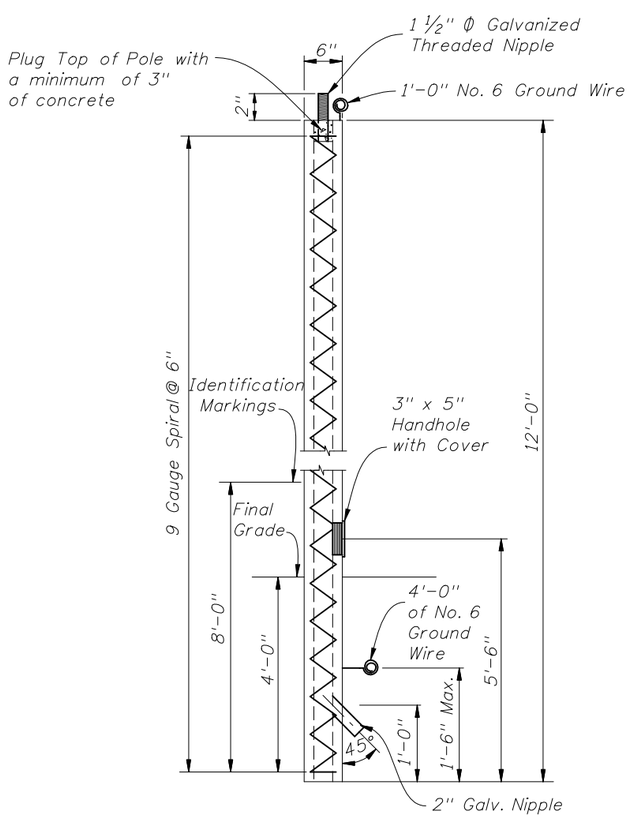
Interim Date 07/01/08

Sheet No. 3 of 3

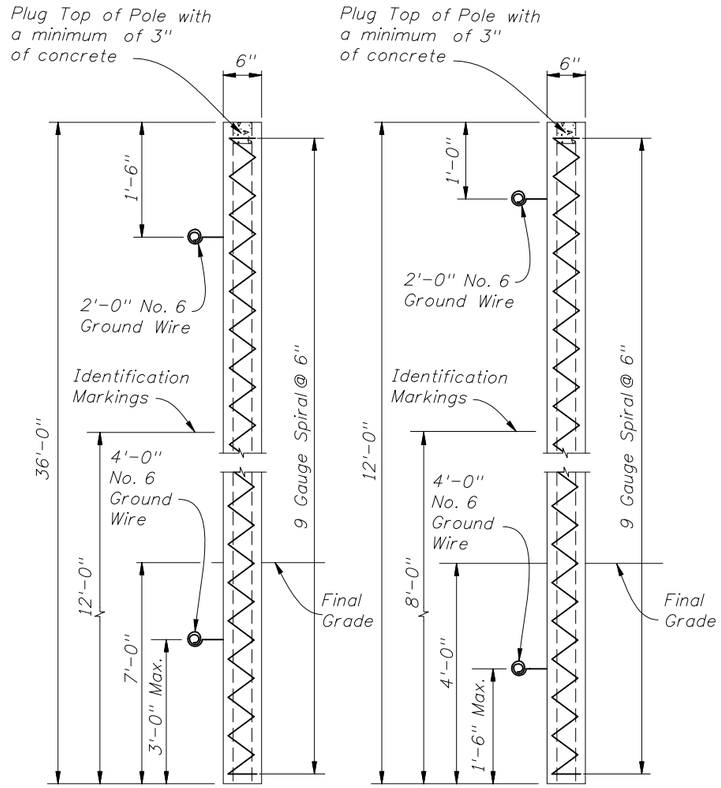
Index No. 17723

TYPE OF POLE	CONCRETE POLE **	
	SIZE AT TOP (T)	SHEAR REINFORCING
Type P-II	6" x 6"	9 Gauge Spiral @ 6"
Type P-III	6" x 6"	6 Gauge Spiral @ 6"
Type P-IV	8" x 8"	5 Gauge Spiral @ 6"
Type P-V	10" x 10"	5 Gauge Spiral @ 6"
Type P-VI	12" x 12"	5 Gauge Spiral @ 6"
Type P-VII	14" x 14"	5 Gauge Spiral @ 6"
Type P-VIII	16" x 16"	5 Gauge Spiral @ 6"

** Round poles require the same taper as square poles and top diameter not less than 1.4 times the top width (dimension "T") of a square pole.

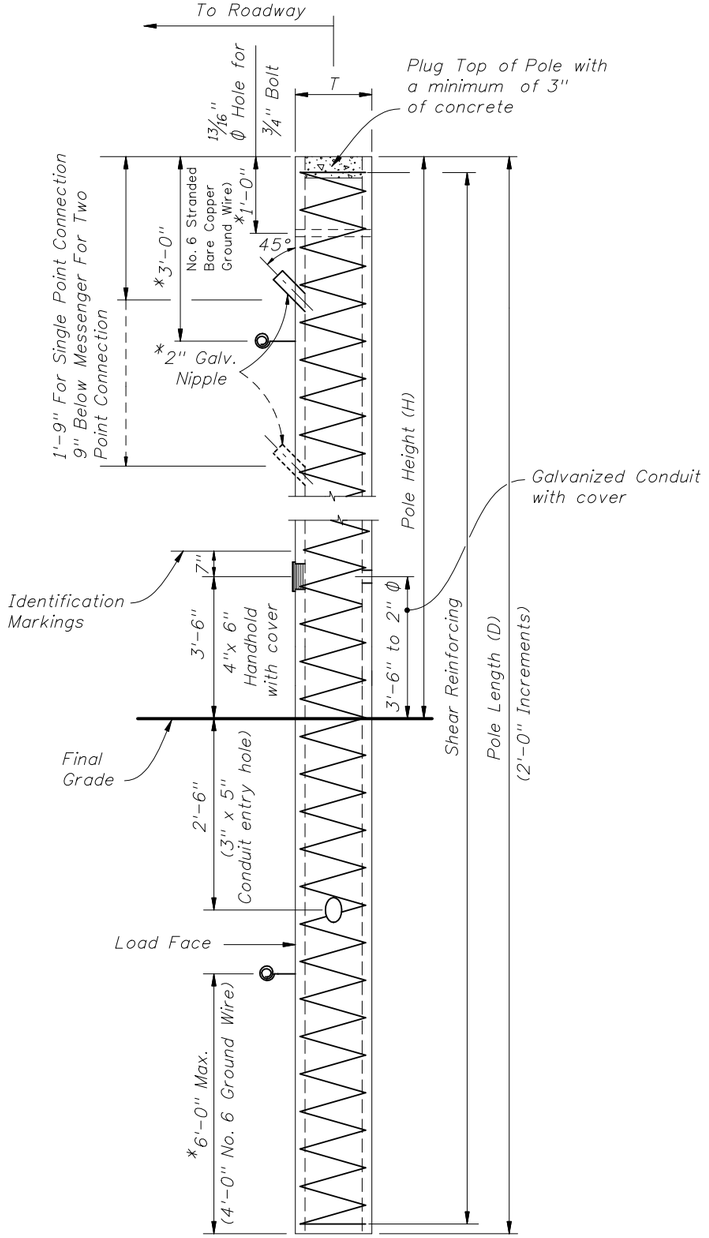


TYPE P-II POLE ON CONCRETE PEDESTAL



SERVICE POLES - TYPE P-II

(For Installation, refer to Roadway and TrafficDesign Standard. Index No. 17504)



POLE TYPES P-III THROUGH P-VIII

* Do not apply these items to Type P-III Establish bolt hole locations, ground wire location and conduit location as shown in the plans.

Ref. Index 17900 and Sec. 744 for modifications to Type P-III poles used at traffic monitoring sites.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/21/07	L.W.	Note **Round Poles note under Pole size chart revised. Pole height (H) dimension added to pole types P-III through P-VIII.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

CONCRETE POLES

Interim Date 01/01/08

Sheet No. 1 of 2

Index No. 17725

NOTES:

Design according to FDOT Structures Manual (current edition) and the 2001 edition of the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" and Supplement thereto.

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. Supply a sufficient amount of prestressing to provide a calculated compressive stress of 2.2 ksi for Type P-II and 3 ksi for Type P-III at the top of pole after all losses.

Concrete shall be 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.

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.

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.

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 400-15.2.4.

Provide a minimum cover of 1".

Provide all poles with total taper of 0.152 IN/FT.

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 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 >= MDL, where MDL = moment due to dead load only

TABLE II
MINIMUM REQUIRED ULTIMATE MOMENT CAPACITY (ϕMn)

H (feet)	TYPE OF 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 (Mn) multiplied by Strength Reduction factor (ϕ = 0.9)
ϕ Mn >= Mu = 1.3 (MDL+MWL), where MDL = moment due to dead load, and MWL = moment due to wind load.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/21/07	L.W.	D (feet) designation in both TABLES changed to H (feet).			

2008 Interim Design Standard

CONCRETE POLES

Interim Date 01/01/08

Index No. 17725

TYPE OF POLE	CONCRETE POLE **	
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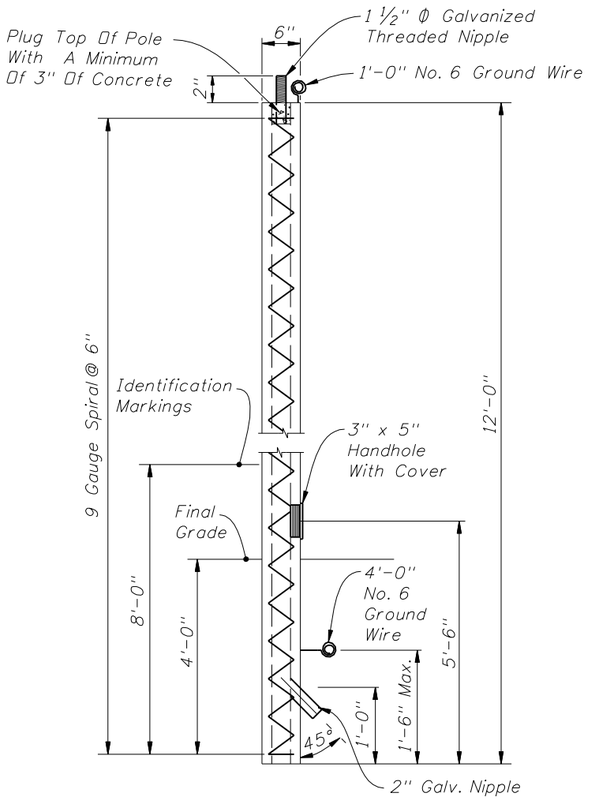
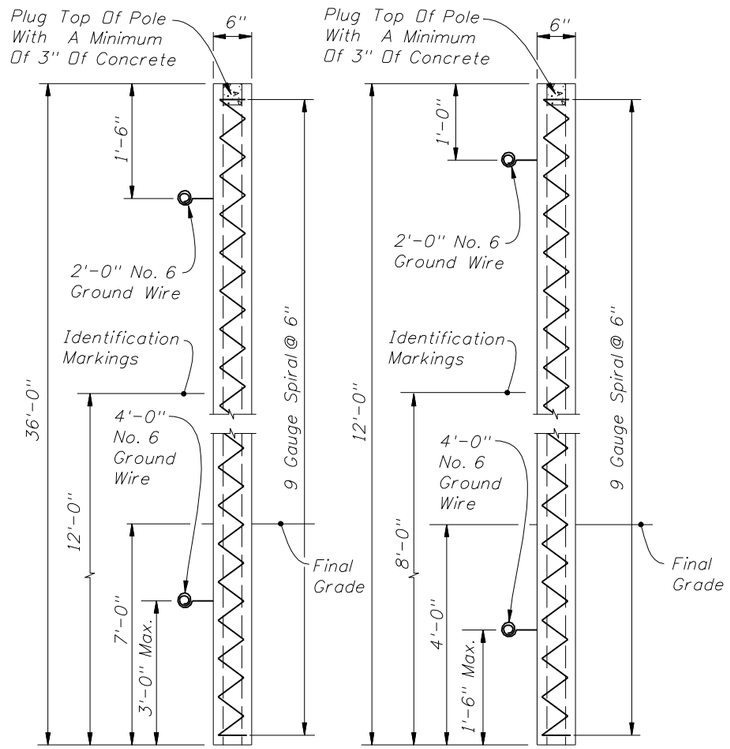
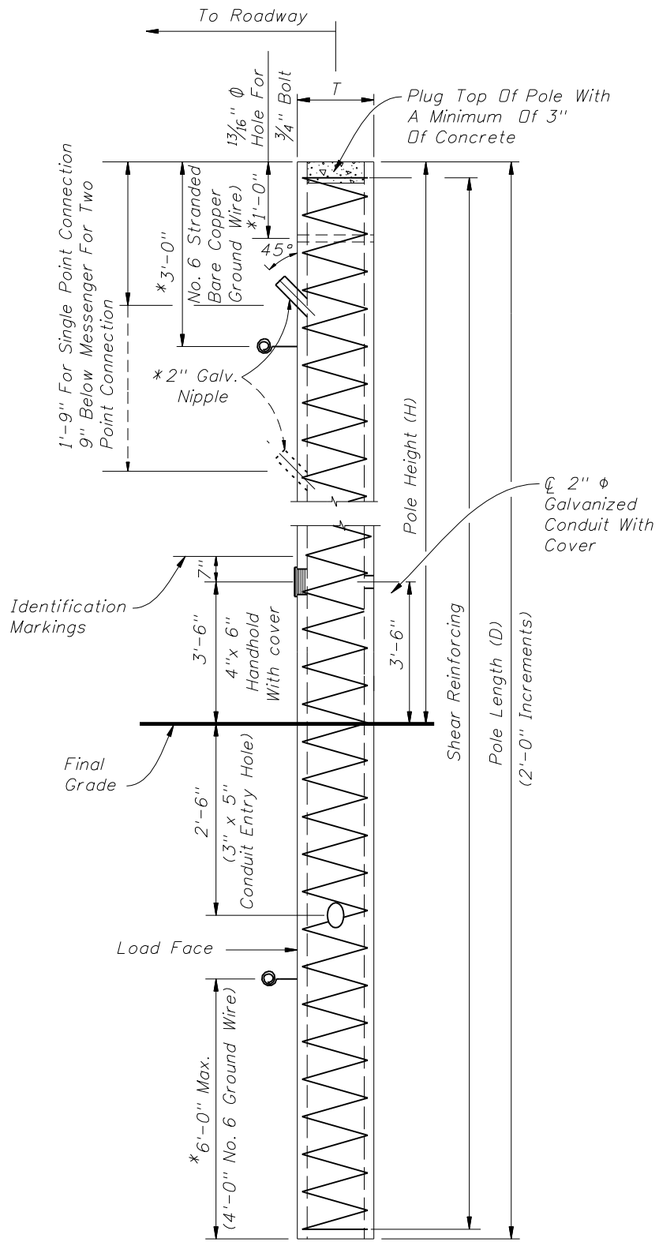


TYPE P-II PEDESTAL POLE



TYPE P-II SERVICE POLE

(For Installation, refer to Roadway and Traffic Design Standard. Index No. 17504)



TYPE P-III LIGHTING AND ITS POLES
TYPES P-IV THROUGH P-VIII STRAIN POLES

* Do not apply these items to Type P-III Lighting and ITS Poles. Establish bolt hole locations, ground wire location and conduit location as shown in the plans.

Ref. Index 17900 and Sec. 744 for modifications to Type P-III poles used at traffic monitoring sites.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/12/07	L.W.	Note **Round Poles note under Pole size chart revised. Pole heighr(H) dimension added to pole types P-III through P-VIII.			
07/01/08	C.H.	Revised "Type" Labels.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

CONCRETE POLES

Interim Date 07/01/08

Sheet No. 1 of 2

Index No. 17725

DESIGN NOTES:
Design according to FDOT Structures Manual (current edition) and the 2001 edition of the AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals" with Interim.

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 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 ½ ± ¼ 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 ≥ MDL, where MDL = moment due to dead load only.

TABLE II
MINIMUM REQUIRED ULTIMATE MOMENT CAPACITY (Ø Mn)

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 (Mn) multiplied by Strength Reduction factor (Ø = 0.9) Ø Mn ≥ Mu = 1.3 (MDL+MWL), where MDL = moment due to dead load, and MWL = moment due to wind load.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/21/07	L.W.	D (feet) designation in both tables changed to H (feet).			
06/02/08	C.H.	Revised Notes.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

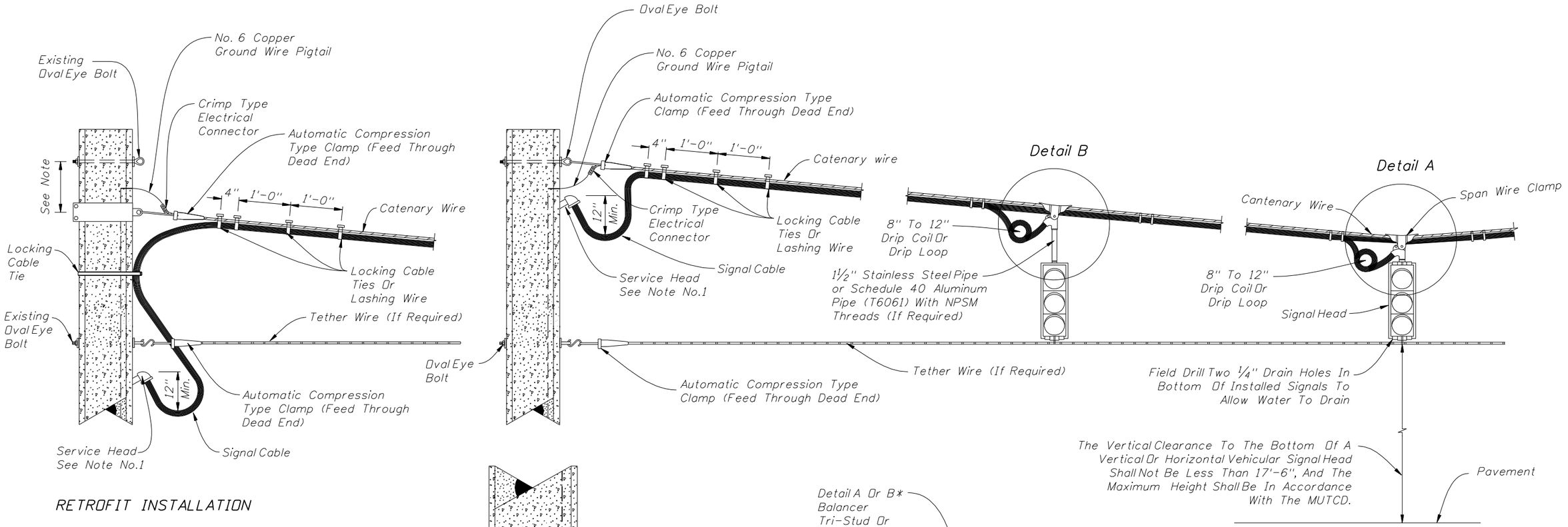
2008 Interim Design Standard

CONCRETE POLES

Interim Date 07/01/08

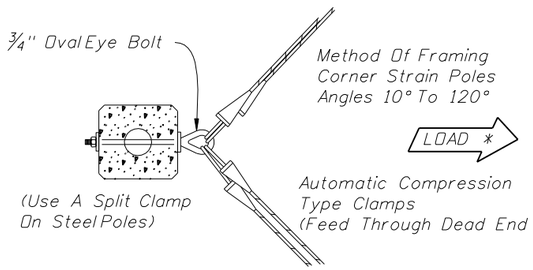
Sheet No. 2 of 2

Index No. 17725

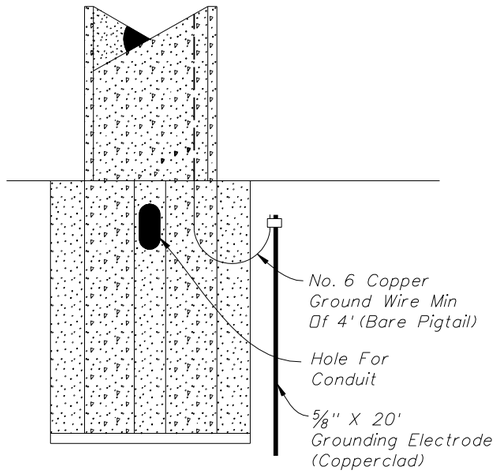


RETROFIT INSTALLATION

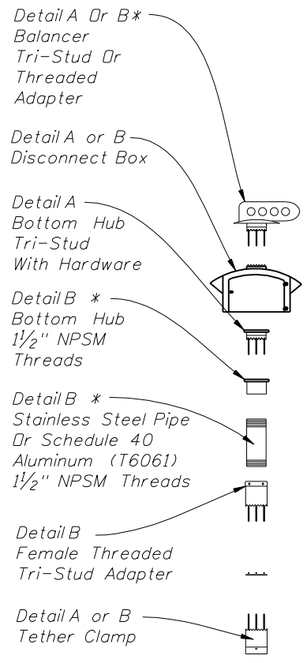
Note:
Clamp location shall be adjusted to compensate for reduced sag and vertical clearance to bottom of signal head.

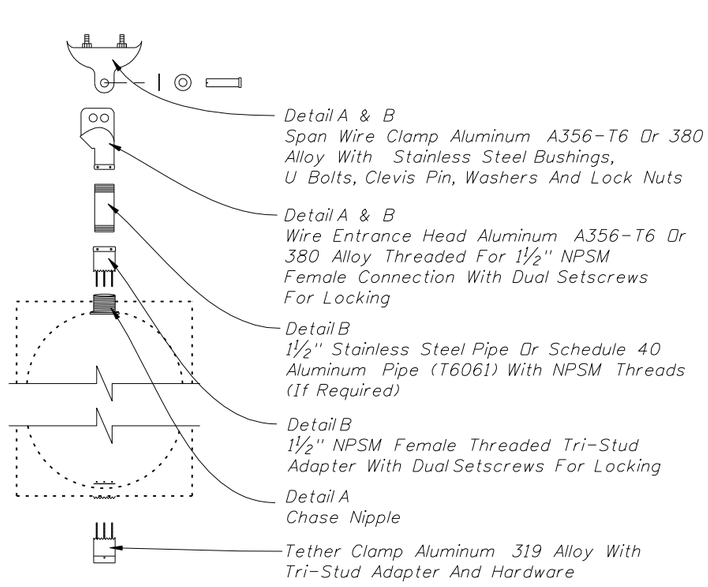


* The load face of pole shall be perpendicular to load.



PRESTRESSED CONCRETE POLE NEW CONSTRUCTION





* 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

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.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	L.W.	Schedule 40 Aluminum Pipe (T6061) Added As Alternate To Stainless Steel Pipe On Signal Head Detail Notes.			

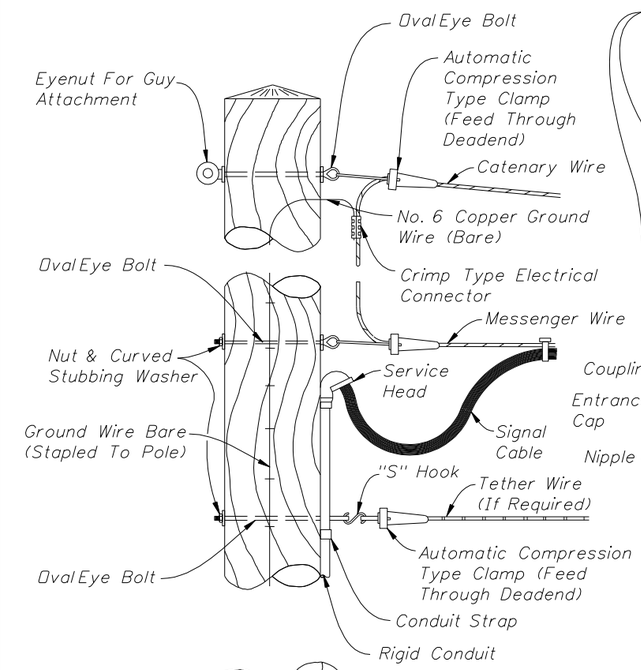
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

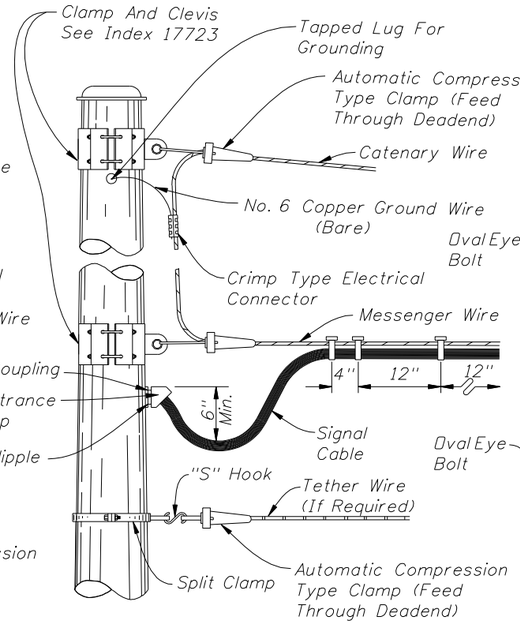
2008 Interim Design Standard

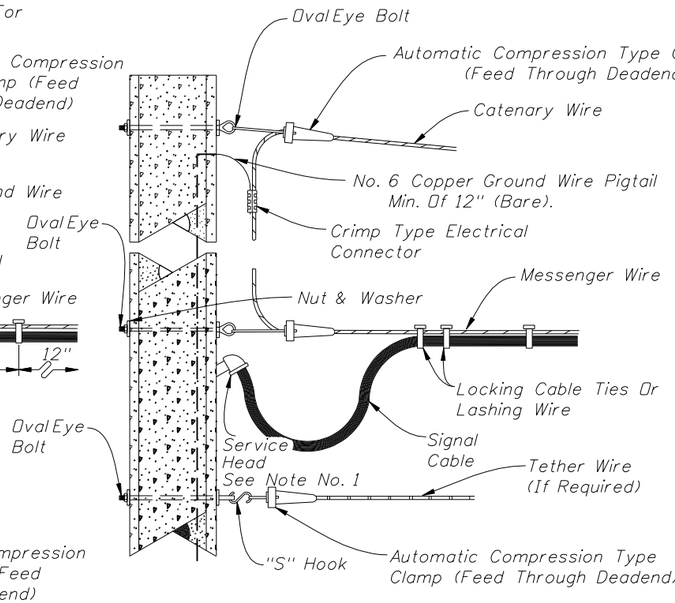
SIGNAL CABLE & SPAN WIRE INSTALLATION DETAILS

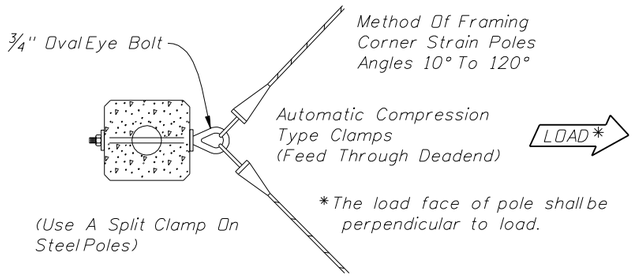
Interim Date 07/01/08

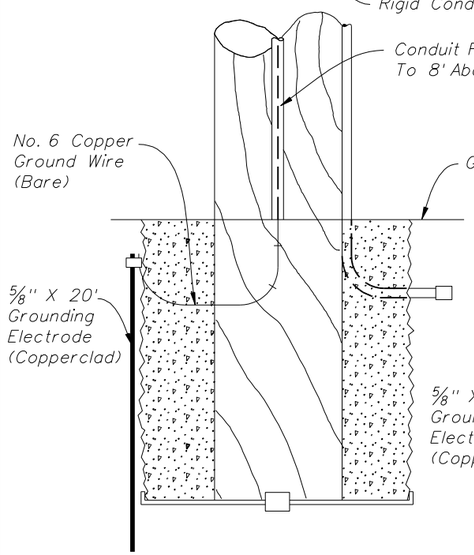
Index No. 17727

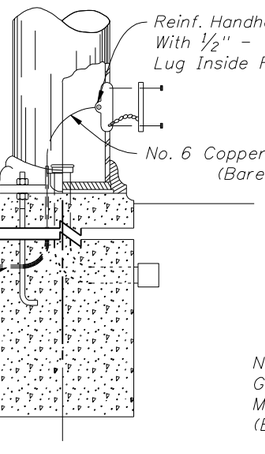


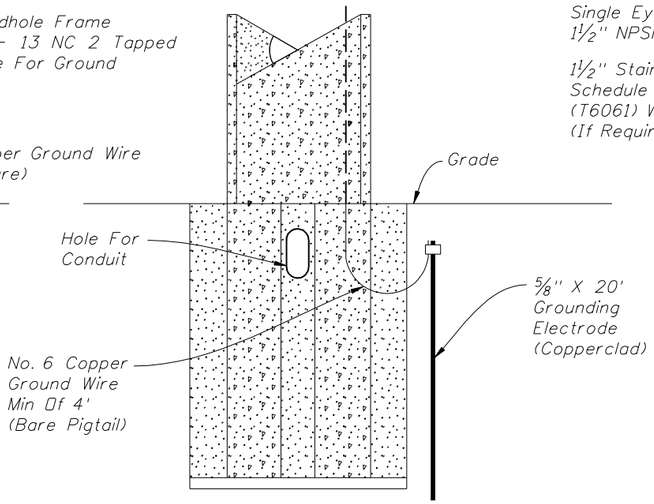


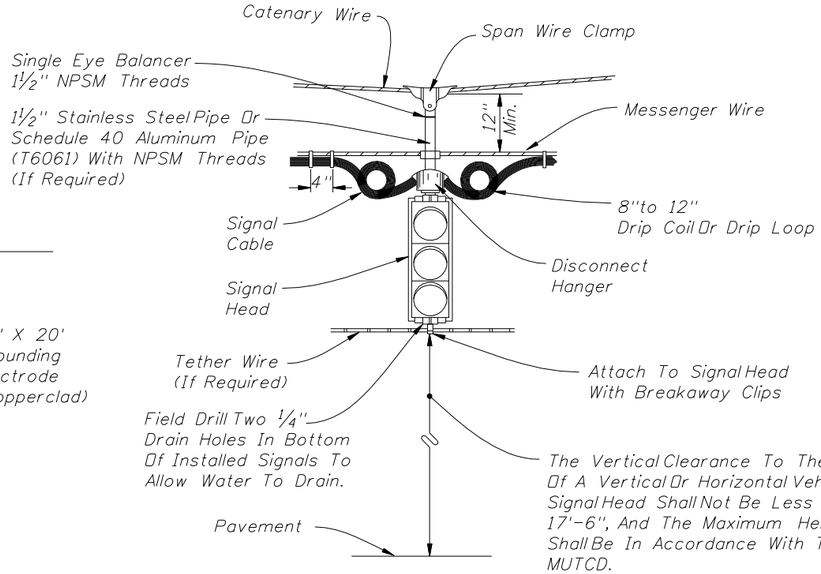












WOOD POLE STEEL POLE PRESTRESSED CONCRETE POLE

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
06/20/08	L.W.	Schedule 40 Aluminum Pipe (T6061) Added AS Alternate To Stainless Steel Pipe On Signal Head Dertail Notes.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

SIGNAL CABLE & SPAN WIRE INSTALLATION DETAILS

Interim Date 07/01/08

Sheet No. 2 of 2

Index No. 17727

POLE SELECTION TABLE - SINGLE ARM - WITH & WITHOUT LUMINAIRE					
Arm Type	D1	D3	D5	D6	D7
Pole Type	S1 & S21 Lum	S2 & S22 Lum	S3 & S23 Lum	S4 & S24 Lum	S6

POLE SELECTION TABLE - DOUBLE ARM - WITHOUT LUMINAIRE										
Arm Type	D1 - D1	D3 - D1	D5 - D2	D6 - D2	D4 - D4	D5 - D4	D6 - D4	D5 - D5	D6 - D5	D6 - D6
Pole Type	S1	S2	S3	S4	S3	S4	S4	S4	S4	S5

Arm 1 is listed first

ARM DESIGN TABLE - ALL CASES														
ARM TYPE	ARM LENGTH	MAST ARM				ARM EXTENSION				ARM CONNECTION & WELDS				
		FA/SA (ft)	FB/SB (in)	FC/SC (in)	FD/SD (in)	FE/SE (ft)	FF/SF (in)	FG/SG (in)	FH/SH (in)	HT (in)	FJ/SJ (in)	FK/SK (in)	FM/SM (in)	FQ/SQ (in)
D1	36'-0"	36	8.96	14	0.1793	-	-	-	-	20	25	2.5	0.125	0.313
D2	36'-0"	36	8.96	14	0.1793	-	-	-	-	30	36	3	0.125	0.313
D3	46'-0"	36.3	8.92	14	0.1793	11.7	13.36	15	0.313	20	25	2.5	0.25	0.375
D4	46'-0"	36.3	8.92	14	0.1793	11.7	13.36	15	0.313	30	36	3	0.25	0.375
D5	60'-0"	36	7.96	13	0.1793	26	12.36	16	0.375	30	36	3	0.313	0.563
D6	70'-6"	39.4	9.49	15	0.1793	33.1	14.37	19	0.375	30	36	3	0.313	0.563
D7	78'-0"	40	8.44	14	0.1793	40.0	13.40	19	0.375	30	34	3	0.313	0.625

Arm Camber Angle = 2 degrees

POLE, CONNECTION AND SHAFT DESIGN TABLE - SINGLE & DOUBLE ARM																							
POLE TYPE	UA(ft)	UC(in)	UD(in)	UE(in)	UG(ft)	UPRIGHT BASE CONNECTION							CONNECTION PLATE DATA									DRILLED SHAFT DATA			
						No. Bolts	BA (in)	BB (in)	BC (in)	BD (in)	BE (in)	BF (in)	HT (in)	FJ/SJ (in)	FL/SL (in)	FN/SN (in)	FO/SO (in)	FP/SP (in)	FR/SR (in)	FS/SS (in)	FT/ST (in)	DA (ft)	DB (ft)	RA	RB
S1	24	12.64	16	0.375	-	6	30	1.75	1.75	0.375	0.313	36	20	25	0.75	0.438	15.5	1	2	8	0.438	13	3.5	10	12
S2	24	14.64	18	0.375	-	6	32	1.75	1.75	0.375	0.313	36	20	25	0.75	0.438	15.5	1	2	8	0.438	13	4	10	16
S3	24	17.64	21	0.375	-	6	37	1.75	2	0.375	0.313	40	30	36	0.75	0.438	22	1.25	2.5	12.5	0.438	15	4	10	16
S4	24	22.64	26	0.375	-	6	42	1.75	2	0.375	0.313	40	30	36	0.75	0.438	22	1.25	2	12.5	0.438	17	4.5	10	20
S5	24	23.64	27	0.375	-	6	45	1.75	2.25	0.375	0.313	45	30	36	0.75	0.438	22	1.25	2	12.5	0.438	19	4.5	10	20
S6	24	21.64	25	0.375	-	6	41	1.75	2	0.375	0.313	40	30	34	0.75	0.5	16.5	1.25	2	12.5	0.5	15	4.5	10	20
S21 Lum	39	10.54	16	0.375	37.5	6	30	1.75	1.75	0.375	0.313	40	20	25	0.75	0.438	11.5	1	2	8	0.438	13	3.5	10	12
S22 Lum	39	12.54	18	0.375	37.5	6	32	1.75	1.75	0.375	0.313	40	20	25	0.75	0.438	12.5	1	2	8	0.438	13	4	10	16
S23 Lum	39	15.54	21	0.375	37.5	6	37	1.75	2	0.375	0.313	40	30	36	0.75	0.438	15	1.25	2.5	12.5	0.438	14	4	10	16
S24 Lum	39	20.54	26	0.375	37.5	6	42	1.75	2	0.375	0.313	40	30	36	0.75	0.438	17	1.25	2	12.5	0.438	15	4.5	10	20

LUMINAIRE AND LUMINAIRE CONNECTION											
LA(ft)	LB(ft)	LC(in)	LD(in)	LE	LF(ft)	LG(in)	LH(in)	LJ(in)	LK(in)	LL(deg)	UG(ft)
40	10	3	0.125	0.5	8	0.5	0.75	0.25	0.25	0	37.5

NOTES:

1. Work this Index with Index No. 17745.
2. Standard Mast Arm "D" Assemblies are designed to Loading Trees as indicated in Plans Preparation Manual.
3. Design Speed = 150 mph with Signal Backplates

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Updated assembly dimensions.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

STANDARD MAST ARM "D" ASSEMBLIES

Interim Date 01/01/08

Index No. 17743

POLE SELECTION TABLE - SINGLE ARM - WITH & WITHOUT LUMINAIRE					
Arm Type	E1	E3	E5	E6	E7
Pole Type	T1 & T21 Lum	T2 & T22 Lum	T3 & T23 Lum	T4 & T24 Lum	T6

POLE SELECTION TABLE - DOUBLE ARM - WITHOUT LUMINAIRE										
Arm Type	E1 - E1	E3 - E1	E5 - E2	E6 - E2	E4 - E4	E5 - E4	E6 - E4	E5 - E5	E6 - E5	E6 - E6
Pole Type	T1	T2	T3	T4	T3	T4	T4	T4	T4	T5

Arm 1 is listed first

ARM DESIGN TABLE - ALL CASES														
ARM TYPE	ARM LENGTH	MAST ARM				ARM EXTENSION				ARM CONNECTION & WELDS				
		FA/SA (ft)	FB/SB (in)	FC/SC (in)	FD/SD (in)	FE/SE (ft)	FF/SF (in)	FG/SG (in)	FH/SH (in)	HT (in)	FJ/SJ (in)	FK/SK (in)	FM/SM (in)	FQ/SQ (in)
E1	36'-0"	36.0	5.96	11	0.25	-	-	-	-	22	22	2	0.187	0.313
E2	36'-0"	36.0	5.96	11	0.25	-	-	-	-	30	32	2.75	0.187	0.313
E3	46'-0"	36.3	6.95	12	0.25	11.7	11.36	13	0.313	22	22	2	0.25	0.375
E4	46'-0"	36.3	6.95	12	0.25	11.7	11.36	13	0.313	30	32	2.75	0.25	0.375
E5	60'-0"	36.0	5.99	11	0.25	26	10.36	14	0.375	30	32	2.75	0.313	0.5
E6	70'-6"	39.4	6.52	12	0.25	33.1	11.37	16	0.375	30	32	2.75	0.313	0.563
E7	78'-0"	40.0	7.47	13	0.1793	40	12.40	18	0.375	30	32	2.5	0.313	0.563

Arm Camber Angle = 2 degrees

POLE, CONNECTION AND SHAFT DESIGN TABLE - SINGLE & DOUBLE ARM																							
POLE TYPE	UA(ft)	UC(in)	UD(in)	UE(in)	UG(ft)	UPRIGHT BASE CONNECTION							CONNECTION PLATE DATA									DRILLED SHAFT DATA			
						No. Bolts	BA (in)	BB (in)	BC (in)	BD (in)	BE (in)	BF (in)	HT (in)	FJ/SJ (in)	FL/SL (in)	FN/SN (in)	FO/SO (in)	FP/SP (in)	FR/SR (in)	FS/SS (in)	FT/ST (in)	DA (ft)	DB (ft)	RA	RB
T1	24	10.64	14	0.375	-	6	26	1.75	1.5	0.375	0.313	36	22	22	0.5	0.375	14	0.75	2.0	9.5	0.375	12	3.5	10	12
T2	24	12.64	16	0.375	-	6	28	1.75	1.5	0.375	0.313	36	22	22	0.5	0.375	14	1	2.0	9	0.375	14	3.5	10	12
T3	24	15.64	19	0.375	-	6	33	1.75	2	0.375	0.313	36	30	32	0.75	0.375	19.5	1	2.0	13	0.375	15	4	10	16
T4	24	18.64	22	0.5	-	6	38	1.75	2	0.5	0.438	40	30	32	0.75	0.375	19.5	1.25	2.0	12.5	0.375	19	4	10	16
T5	24	18.64	22	0.5	-	6	38	1.75	2	0.5	0.438	40	30	32	0.75	0.375	19.5	1.25	2.0	12.5	0.375	21	4	10	16
T6	24	18.64	22	0.375	-	6	36	1.75	2	0.375	0.313	40	30	32	0.75	0.438	15	1.25	2.0	12.5	0.438	18	4	10	16
T21 Lum	39	8.54	14	0.375	37.5	6	26	1.75	1.5	0.375	0.313	40	22	22	0.5	0.375	10	0.75	2.0	9.5	0.375	12	3.5	10	12
T22 Lum	39	10.54	16	0.375	37.5	6	30	1.75	1.75	0.375	0.313	40	22	22	0.5	0.375	11	1	2.0	9	0.375	13	3.5	10	12
T23 Lum	39	13.54	19	0.375	37.5	6	33	1.75	2	0.375	0.313	40	30	32	0.75	0.375	13	1	2.25	13	0.375	14	4	10	16
T24 Lum	39	16.54	22	0.375	37.5	6	38	1.75	2	0.375	0.313	40	30	32	0.75	0.375	15	1.25	2.0	12.5	0.375	17	4	10	16

LUMINAIRE AND LUMINAIRE CONNECTION											
LA(ft)	LB(ft)	LC(in)	LD(in)	LE	LF(ft)	LG(in)	LH(in)	LJ(in)	LK(in)	LL(deg)	UG(ft)
40	10	3	0.125	0.5	8	0.5	0.75	0.25	0.25	0	37.5

NOTES:

1. Work this Index with Index No. 17745.
2. Standard Mast Arm "E" Assemblies are designed to Loading Trees as indicated in Plans Preparation Manual.
3. Design Speed = 130 mph with Signal Backplates or 150 mph without Signal Backplates

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Updated assembly dimensions.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

STANDARD MAST ARM "E" ASSEMBLIES

Interim Date 01/01/08

Index No. 17743

POLE SELECTION TABLE – SINGLE ARM – WITH & WITHOUT LUMINAIRE					
Arm Type	F1	F3	F5	F6	F7
Pole Type	W1 & W21 Lum	W2 & W22 Lum	W3 & W23 Lum	W4 & W24 Lum	W6

POLE SELECTION TABLE – DOUBLE ARM – WITHOUT LUMINAIRE										
Arm Type	F1 – F1	F3 – F1	F5 – F2	F6 – F2	F4 – F4	F5 – F4	F6 – F4	F5 – F5	F6 – F5	F6 – F6
Pole Type	W1	W2	W3	W4	W3	W4	W4	W4	W4	W5

Arm 1 is listed first

ARM DESIGN TABLE – ALL CASES														
ARM TYPE	ARM LENGTH	MAST ARM				ARM EXTENSION				ARM CONNECTION & WELDS				
		FA/SA (ft)	FB/SB (in)	FC/SC (in)	FD/SD (in)	FE/SE (ft)	FF/SF (in)	FG/SG (in)	FH/SH (in)	HT (in)	FJ/SJ (in)	FK/SK (in)	FM/SM (in)	FQ/SQ (in)
F1	36'-0"	36	5.96	11	0.1793	–	–	–	–	20	20	2	0.125	0.25
F2	36'-0"	36	5.96	11	0.1793	–	–	–	–	29	29	2.25	0.125	0.25
F3	46'-0"	36.3	5.92	11	0.1793	11.7	10.36	12	0.25	20	20	2	0.188	0.313
F4	46'-0"	36.3	5.92	11	0.1793	11.7	10.36	12	0.25	29	29	2.25	0.188	0.313
F5	60'-0"	36	5.96	11	0.1793	26.0	10.36	14	0.313	29	29	2.25	0.25	0.375
F6	70'-6"	39.4	5.49	11	0.1793	33.1	10.37	15	0.313	29	29	2.25	0.25	0.438
F7	78'-0"	40	6.43	12	0.1793	40.0	11.26	17	0.313	29	29	2.25	0.25	0.438

POLE, CONNECTION AND SHAFT DESIGN TABLE – SINGLE & DOUBLE ARM																							
POLE TYPE	UA(ft)	UC(in)	UD(in)	UE(in)	UG(ft)	UPRIGHT BASE CONNECTION							CONNECTION PLATE DATA									DRILLED SHAFT DATA			
						No. Bolts	BA (in)	BB (in)	BC (in)	BD (in)	BE (in)	BF (in)	HT (in)	FJ/SJ (in)	FL/SL (in)	FN/SN (in)	FO/SO (in)	FP/SP (in)	FR/SR (in)	FS/SS (in)	FT/ST (in)	DA (ft)	DB (ft)	RA	RB
W1	24.0	9.64	13	0.375	–	6	25	1.5	1.5	0.375	0.313	36	20	20	0.5	0.313	13	0.75	2.0	8.5	0.313	12	3.5	10	12
W2	24.0	11.64	15	0.375	–	6	27	1.5	1.5	0.375	0.313	36	20	20	0.5	0.313	14	0.75	2.0	8.5	0.313	14	3.5	10	12
W3	24.0	14.64	18	0.375	–	6	32	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	17.5	1	2.0	12.5	0.313	15	4	10	16
W4	24.0	17.64	21	0.375	–	6	35	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	17.5	1	2.0	12.5	0.313	19	4	10	16
W5	24.0	17.64	21	0.375	–	6	35	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	17.5	1	2.0	12.5	0.313	21	4	10	16
W6	24.0	17.64	21	0.375	–	6	35	1.5	1.75	0.375	0.313	36	30	30	0.5	0.375	14	1.25	2.0	12.5	0.375	18	4	10	16
W21 Lum	39.0	7.54	13	0.375	37.5	6	25	1.5	1.5	0.375	0.313	36	20	20	0.5	0.313	9	0.75	2.0	8.5	0.313	10	3.5	10	12
W22 Lum	39.0	9.54	15	0.375	37.5	6	27	1.5	1.5	0.375	0.313	36	20	20	0.5	0.313	10	0.75	2.0	8.5	0.313	13	3.5	10	12
W23 Lum	39.0	12.54	18	0.375	37.5	6	32	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	11.5	1	2.0	12.5	0.313	14	4	10	16
W24 Lum	39.0	15.54	21	0.375	37.5	6	35	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	13	1	2.0	12.5	0.313	17	4	10	16

LUMINAIRE AND LUMINAIRE CONNECTION											
LA(ft)	LB(ft)	LC(in)	LD(in)	LE	LF(ft)	LG(in)	LH(in)	LJ(in)	LK(in)	LL(deg)	UG(ft)
40	10	3	0.125	0.5	8	0.5	0.75	0.25	0.25	0	37.5

NOTES:

1. Work this Index with Index No. 17745.
2. Standard Mast Arm "F" Assemblies are designed to Loading Trees as indicated in Plans Preparation Manual.
3. Design Speed = 110 mph with Signal Backplates or 130 mph without Signal Backplates.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Updated assembly dimensions.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

STANDARD MAST ARM "F" ASSEMBLIES

Interim Date 01/01/08

Index No. 17743

POLE SELECTION TABLE - SINGLE ARM - WITH & WITHOUT LUMINAIRE					
Arm Type	E1	E3	E5	E6	E7
Pole Type	T1 & T21 Lum	T2 & T22 Lum	T3 & T23 Lum	T4 & T24 Lum	T6

POLE SELECTION TABLE - DOUBLE ARM - WITHOUT LUMINAIRE										
Arm Type	E1 - E1	E3 - E1	E5 - E2	E6 - E2	E4 - E4	E5 - E4	E6 - E4	E5 - E5	E6 - E5	E6 - E6
Pole Type	T1	T2	T3	T4	T3	T4	T4	T4	T4	T5

Arm 1 is listed first

ARM DESIGN TABLE - ALL CASES														
ARM TYPE	ARM LENGTH	MAST ARM				ARM EXTENSION				ARM CONNECTION & WELDS				
		FA/SA (ft)	FB/SB (in)	FC/SC (in)	FD/SD (in)	FE/SE (ft)	FF/SF (in)	FG/SG (in)	FH/SH (in)	HT (in)	FJ/SJ (in)	FK/SK (in)	FM/SM (in)	FQ/SQ (in)
E1	36'-0"	36.0	5.96	11	0.25	-	-	-	-	22	22	2	0.187	0.313
E2	36'-0"	36.0	5.96	11	0.25	-	-	-	-	30	32	2.75	0.187	0.313
E3	46'-0"	36.3	7.06	12.14	0.25	11.7	11.36	13	0.313	22	22	2	0.25	0.375
E4	46'-0"	36.3	7.06	12.14	0.25	11.7	11.36	13	0.313	30	32	2.75	0.25	0.375
E5	60'-0"	36.0	6.10	11.14	0.25	26	10.36	14	0.375	30	32	2.75	0.313	0.5
E6	70'-6"	39.4	6.63	12.15	0.25	33.1	11.37	16	0.375	30	32	2.75	0.313	0.563
E7	78'-0"	40.0	7.50	13.10	0.1793	40	12.40	18	0.375	30	32	2.5	0.313	0.563

Arm Camber Angle = 2 degrees

POLE, CONNECTION AND SHAFT DESIGN TABLE - SINGLE & DOUBLE ARM																							
POLE TYPE	UA(ft)	UC(in)	UD(in)	UE(in)	UG(ft)	UPRIGHT BASE CONNECTION							CONNECTION PLATE DATA									DRILLED SHAFT DATA			
						No. Bolts	BA (in)	BB (in)	BC (in)	BD (in)	BE (in)	BF (in)	HT (in)	FJ/SJ (in)	FL/SL (in)	FN/SN (in)	FO/SO (in)	FP/SP (in)	FR/SR (in)	FS/SS (in)	FT/ST (in)	DA (ft)	DB (ft)	RA	RB
T1	24	10.64	14	0.375	-	6	26	1.75	1.5	0.375	0.313	36	22	22	0.5	0.375	14	1	2.0	9	0.375	12	3.5	10	12
T2	24	12.64	16	0.375	-	6	28	1.75	1.5	0.375	0.313	36	22	22	0.5	0.375	14	1	2.0	9	0.375	14	3.5	10	12
T3	24	15.64	19	0.375	-	6	35	1.75	2	0.375	0.313	36	30	32	0.75	0.375	19.5	1.25	2.0	12.5	0.375	15	4	10	16
T4	24	18.64	22	0.5	-	6	38	1.75	2	0.5	0.438	40	30	32	0.75	0.375	19.5	1.25	2.0	12.5	0.375	19	4	10	16
T5	24	18.64	22	0.5	-	6	38	1.75	2	0.5	0.438	40	30	32	0.75	0.375	19.5	1.25	2.0	12.5	0.375	21	4	10	16
T6	24	18.64	22	0.375	-	6	38	1.75	2	0.375	0.313	40	30	32	0.75	0.438	15	1.25	2.0	12.5	0.438	18	4	10	16
T21 Lum	39	8.54	14	0.375	37.5	6	26	1.75	1.5	0.375	0.313	40	22	22	0.5	0.375	10	1	2.0	9	0.375	12	3.5	10	12
T22 Lum	39	10.54	16	0.375	37.5	6	30	1.75	1.75	0.375	0.313	40	22	22	0.5	0.375	11	1	2.0	9	0.375	13	3.5	10	12
T23 Lum	39	13.54	19	0.375	37.5	6	35	1.75	2	0.375	0.313	40	30	32	0.75	0.375	13	1.25	2.25	12.5	0.375	14	4	10	16
T24 Lum	39	16.54	22	0.375	37.5	6	38	1.75	2	0.375	0.313	40	30	32	0.75	0.375	15	1.25	2.0	12.5	0.375	17	4	10	16

LUMINAIRE AND LUMINAIRE CONNECTION											
LA(ft)	LB(ft)	LC(in)	LD(in)	LE	LF(ft)	LG(in)	LH(in)	LJ(in)	LK(in)	LL(deg)	UG(ft)
40	10	3	0.125	0.5	8	0.5	0.75	0.25	0.25	0	37.5

NOTES:

1. Work this Index with Index No. 17745.
2. Standard Mast Arm "E" Assemblies are designed to Loading Trees as indicated in Plans Preparation Manual.
3. Design Speed = 130 mph with Signal Backplates or 150 mph without Signal Backplates

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Updated assembly dimensions.			
07/01/08	DYW	Updated assembly dimensions.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

STANDARD MAST ARM "E" ASSEMBLIES

Interim Date 07/01/08

Index No. 17743

POLE SELECTION TABLE - SINGLE ARM - WITH & WITHOUT LUMINAIRE					
Arm Type	F1	F3	F5	F6	F7
Pole Type	W1 & W21 Lum	W2 & W22 Lum	W3 & W23 Lum	W4 & W24 Lum	W6

POLE SELECTION TABLE - DOUBLE ARM - WITHOUT LUMINAIRE										
Arm Type	F1 - F1	F3 - F1	F5 - F2	F6 - F2	F4 - F4	F5 - F4	F6 - F4	F5 - F5	F6 - F5	F6 - F6
Pole Type	W1	W2	W3	W4	W3	W4	W4	W4	W4	W5

Arm 1 is listed first

ARM DESIGN TABLE - ALL CASES														
ARM TYPE	ARM LENGTH	MAST ARM				ARM EXTENSION				ARM CONNECTION & WELDS				
		FA/SA (ft)	FB/SB (in)	FC/SC (in)	FD/SD (in)	FE/SE (ft)	FF/SF (in)	FG/SG (in)	FH/SH (in)	HT (in)	FJ/SJ (in)	FK/SK (in)	FM/SM (in)	FQ/SQ (in)
F1	36'-0"	36	5.96	11	0.1793	-	-	-	-	20	20	2	0.125	0.25
F2	36'-0"	36	5.96	11	0.1793	-	-	-	-	29	29	2.25	0.125	0.25
F3	46'-0"	36.3	5.92	11	0.1793	11.7	10.36	12	0.25	20	20	2	0.188	0.313
F4	46'-0"	36.3	5.92	11	0.1793	11.7	10.36	12	0.25	29	29	2.25	0.188	0.313
F5	60'-0"	36	5.96	11	0.1793	26.0	10.36	14	0.313	29	29	2.25	0.25	0.375
F6	70'-6"	39.4	5.49	11	0.1793	33.1	10.37	15	0.313	29	29	2.25	0.25	0.438
F7	78'-0"	40	6.43	12	0.1793	40.0	11.26	17	0.313	29	29	2.25	0.25	0.438

POLE, CONNECTION AND SHAFT DESIGN TABLE - SINGLE & DOUBLE ARM																							
POLE TYPE	UA(ft)	UC(in)	UD(in)	UE(in)	UG(ft)	UPRIGHT BASE CONNECTION							CONNECTION PLATE DATA									DRILLED SHAFT DATA			
						No. Bolts	BA (in)	BB (in)	BC (in)	BD (in)	BE (in)	BF (in)	HT (in)	FJ/SJ (in)	FL/SL (in)	FN/SN (in)	FO/SO (in)	FP/SP (in)	FR/SR (in)	FS/SS (in)	FT/ST (in)	DA (ft)	DB (ft)	RA	RB
W1	24.0	9.64	13	0.375	-	6	25	1.5	1.5	0.375	0.313	36	20	20	0.5	0.313	13	0.75	2.0	8.5	0.313	12	3.5	10	12
W2	24.0	11.64	15	0.375	-	6	27	1.5	1.5	0.375	0.313	36	20	20	0.5	0.313	14	0.75	2.0	8.5	0.313	14	3.5	10	12
W3	24.0	14.64	18	0.375	-	6	32	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	17.5	1	2.0	12.5	0.313	15	4	10	16
W4	24.0	17.64	21	0.375	-	6	35	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	17.5	1	2.0	12.5	0.313	19	4	10	16
W5	24.0	17.64	21	0.375	-	6	35	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	17.5	1	2.0	12.5	0.313	21	4	10	16
W6	24.0	17.64	21	0.375	-	6	35	1.5	1.75	0.375	0.313	36	29	29	0.5	0.375	14	1.25	2.0	12	0.375	18	4	10	16
W21 Lum	39.0	7.54	13	0.375	37.5	6	25	1.5	1.5	0.375	0.313	36	20	20	0.5	0.313	9	0.75	2.0	8.5	0.313	10	3.5	10	12
W22 Lum	39.0	9.54	15	0.375	37.5	6	27	1.5	1.5	0.375	0.313	36	20	20	0.5	0.313	10	0.75	2.0	8.5	0.313	13	3.5	10	12
W23 Lum	39.0	12.54	18	0.375	37.5	6	32	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	11.5	1	2.0	12.5	0.313	14	4	10	16
W24 Lum	39.0	15.54	21	0.375	37.5	6	35	1.5	1.75	0.375	0.313	36	29	29	0.5	0.313	13	1	2.0	12.5	0.313	17	4	10	16

LUMINAIRE AND LUMINAIRE CONNECTION											
LA(ft)	LB(ft)	LC(in)	LD(in)	LE	LF(ft)	LG(in)	LH(in)	LJ(in)	LK(in)	LL(deg)	UG(ft)
40	10	3	0.125	0.5	8	0.5	0.75	0.25	0.25	0	37.5

NOTES:

1. Work this Index with Index No. 17745.
2. Standard Mast Arm "F" Assemblies are designed to Loading Trees as indicated in Plans Preparation Manual.
3. Design Speed = 110 mph with Signal Backplates or 130 mph without Signal Backplates.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Updated assembly dimensions.			
07/01/08	DYW	Updated assembly dimensions.			

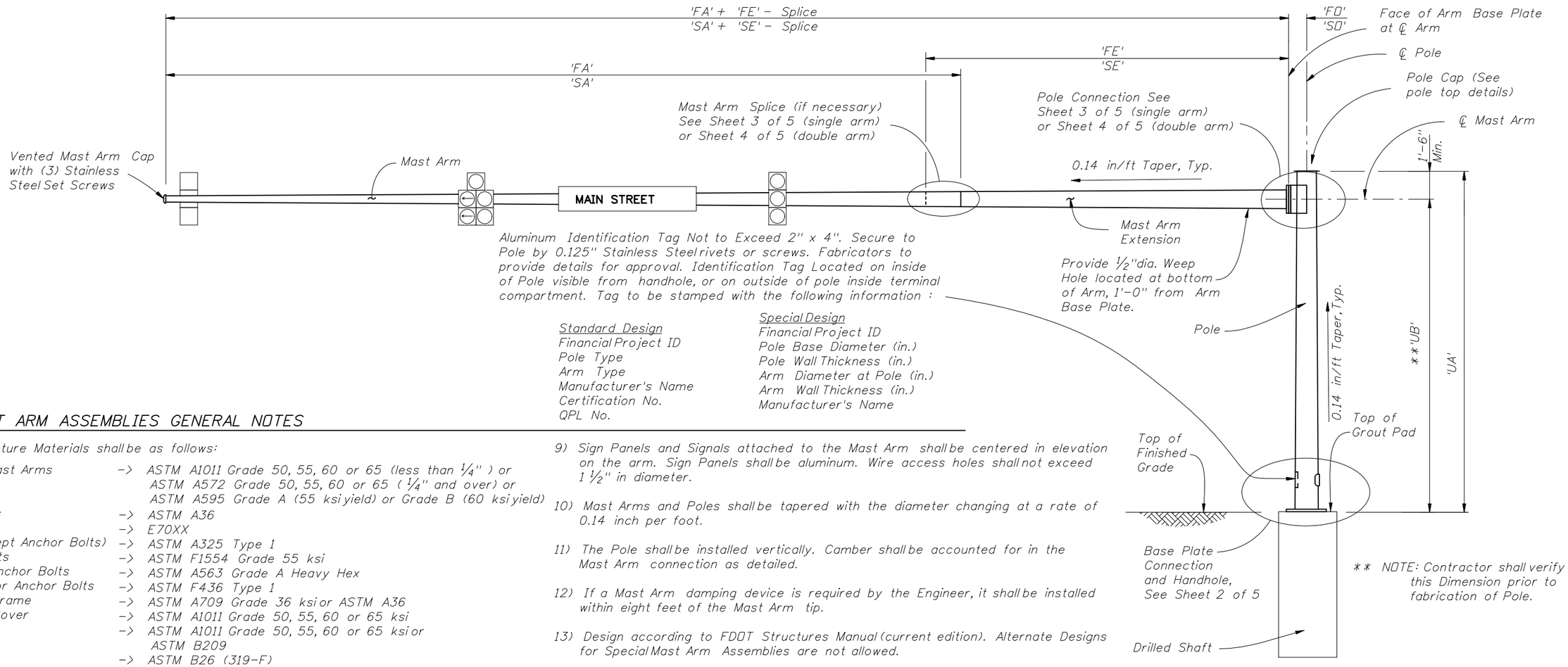
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

STANDARD MAST ARM "F" ASSEMBLIES

Interim Date 07/01/08

Index No. 17743



** NOTE: Contractor shall verify this Dimension prior to fabrication of Pole.

ELEVATION VIEW

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

Aluminum Identification Tag Not to Exceed 2" x 4". Secure to Pole by 0.125" Stainless Steel rivets or screws. Fabricators to provide details for approval. Identification Tag Located on inside of Pole visible from handhole, or on outside of pole inside terminal compartment. Tag to be stamped with the following information :

Standard Design	Special Design
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

MAST ARM ASSEMBLIES GENERAL NOTES

1) Signal Structure Materials shall be as follows:

Poles & Mast Arms	–>	ASTM A1011 Grade 50, 55, 60 or 65 (less than ¼") or ASTM A572 Grade 50, 55, 60 or 65 (¼" 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) Grout shall have a minimum 28–day compressive strength of 5,000 psi and shall meet the requirements of Section 934.

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

6) All steel Items shall be galvanized as follows:

All Nuts, Bolts, Washers and Threaded Bars/Studs	–>	F2329–05
All other steel items (including Pole & Mast Arm)	–>	ASTM A123

7) 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.

8) 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 ½".

9) Sign Panels and Signals attached to the Mast Arm shall be centered in elevation on the arm. Sign Panels shall be aluminum. Wire access holes shall not exceed 1 ½" in diameter.

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

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

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

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

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

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

16) Details for the Ground Rod, Signal and Sign Locations, Signal Head attachment, Sign Attachment, Pedestrian Head Attachment, and Foundation Conduit are not shown for clarity.

17) Weld Inspection note (see 17502).

18) Manufactuers 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.

19) If a grout pad is not installed, vertically place a wire cloth screen between the baseplate and the top of the foundation, wrap horizontally around the baseplate with a 3" min. lap. The wire cloth shall be galvanized steel standard grade plain weave ½" x ½" mesh 0.063" dia. wire. The screen shall be attached to the baseplate with stainless steel self–tapping ¼" screws with stainless steel washers spaced at 9" centers.

TYPICAL ELEVATION AND NOTES

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/21/07	L.W.	QPL added to Standard Design List. Note 14 and 19 revised. New Note 17 added. Notes renumbered.			

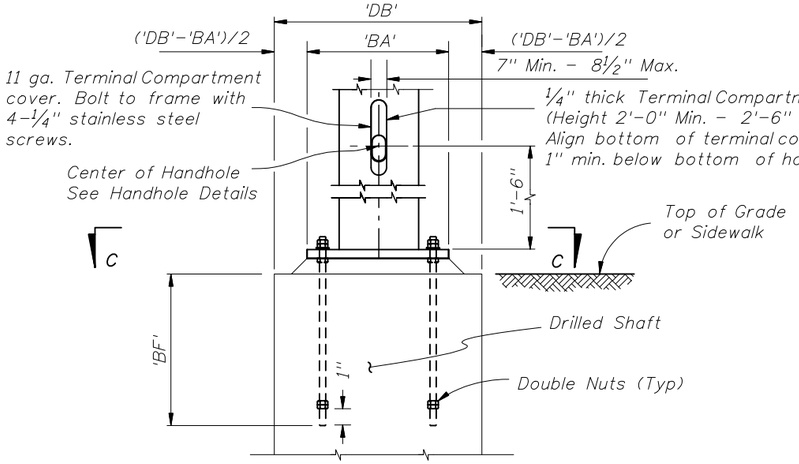
2008 Interim Design Standard

MAST ARM ASSEMBLIES

Interim Date 01/01/08

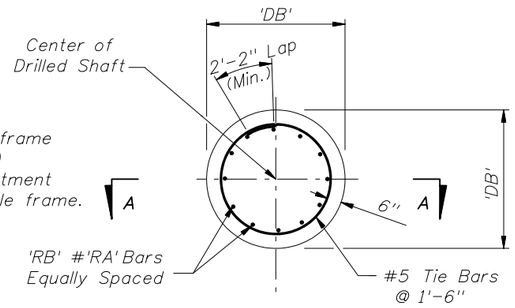
Sheet No. 1 of 5

Index No. 17745



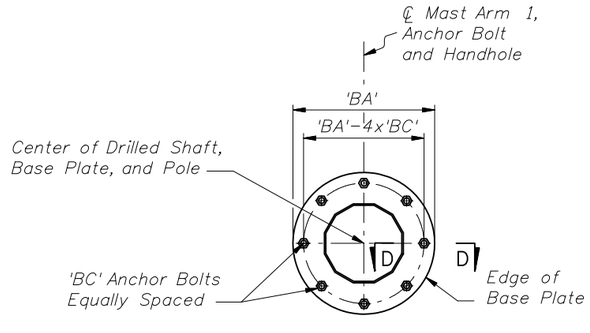
BASE PLATE AND ANCHORAGE ELEVATION

(Reinforcement Not Shown)



FOUNDATION PLAN

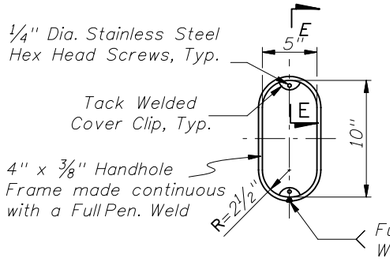
Note: 6" min. cover on Shaft Reinforcement



SECTION C-C

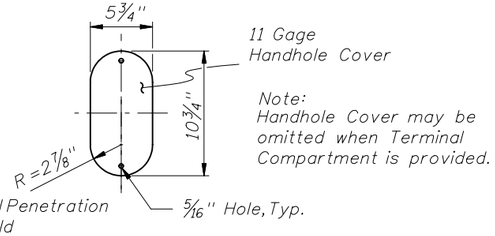
Alternate Detail

(8 Anchor Bolts)

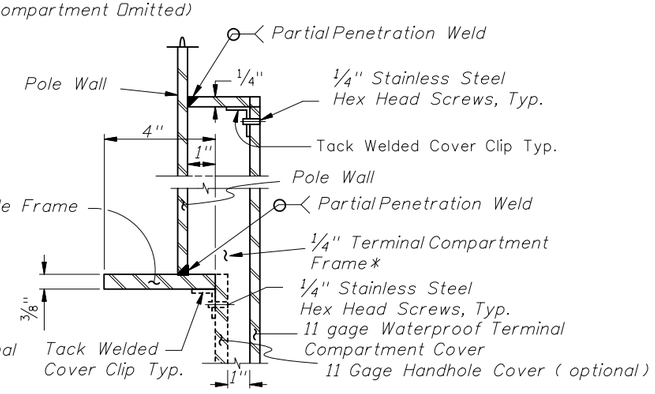


HANDHOLE FRAME

(w/Terminal Compartment Omitted)

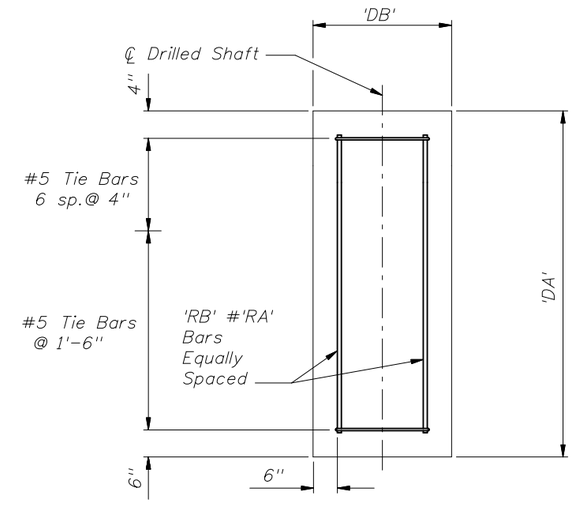


HANDHOLE COVER

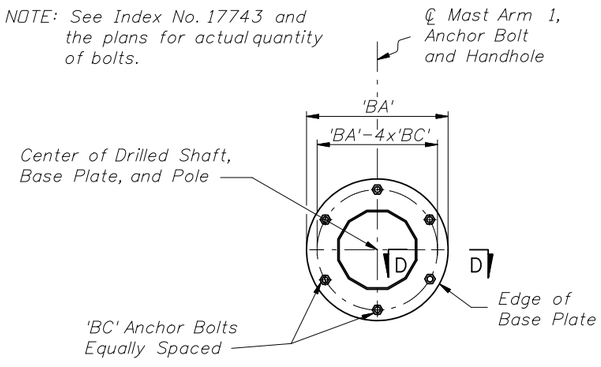


SECTION E-E

(Thru Handhole & Terminal Compartment)

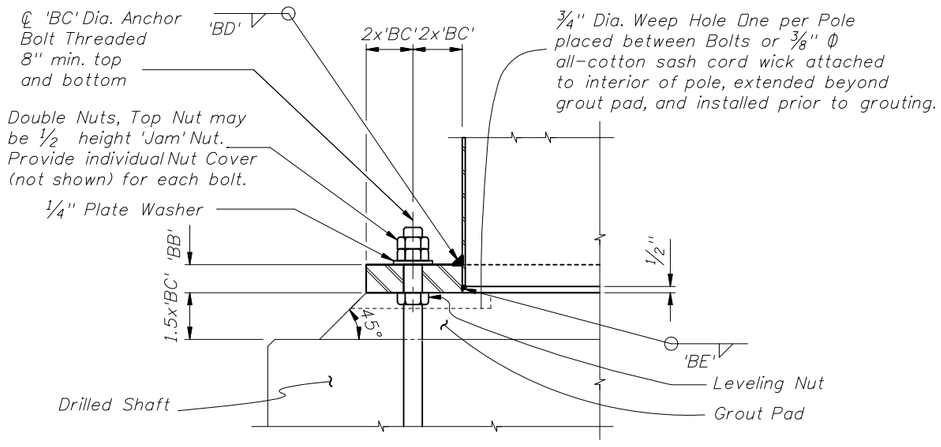


SECTION A-A



SECTION C-C

(6 Anchor Bolts)



SECTION D-D

TYPICAL FOUNDATION AND BASE PLATE DETAILS

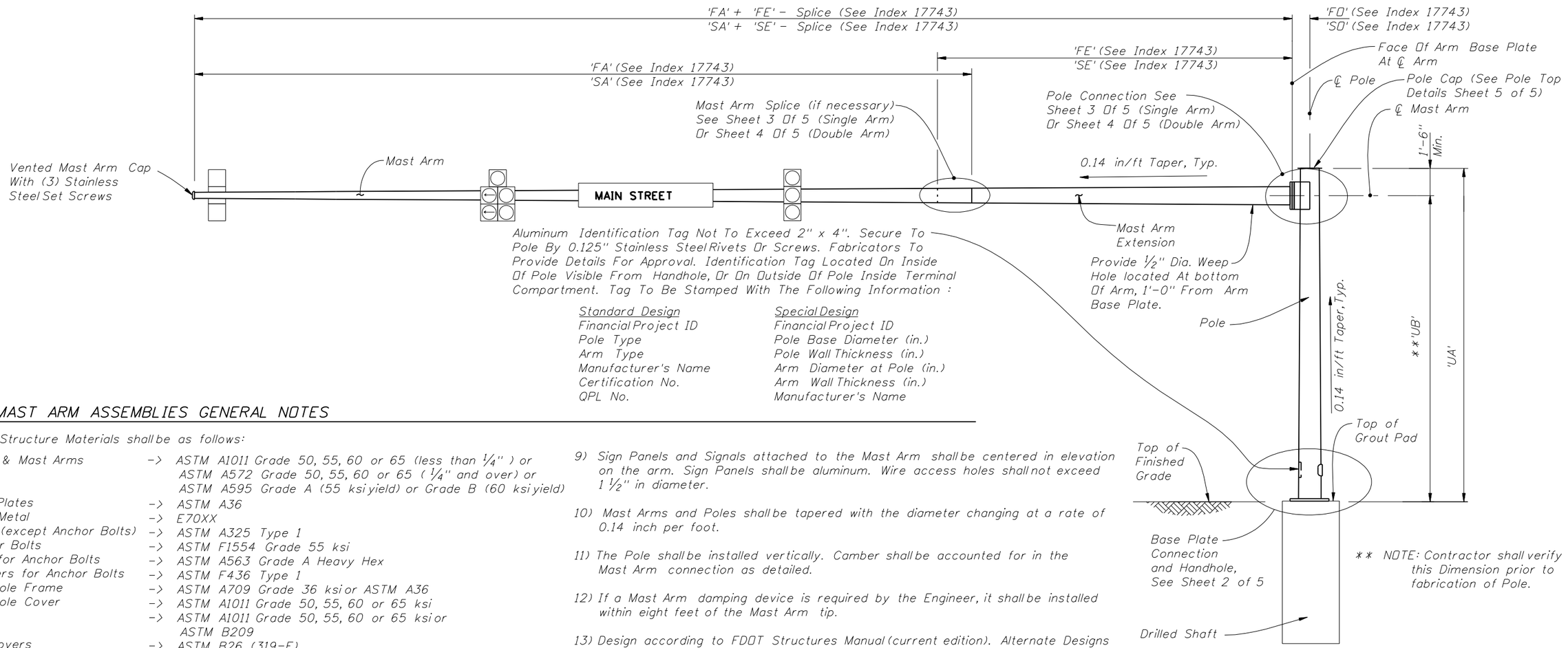
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/21/07	L.W.	Section A-A detail 3" dimension changed to 4". BASE PLATE AND ANCORAGE ELEVATION DETAIL DIMENSION 3Xbc CHANGED TO 1". Note added to detail SECTION E-E.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

MAST ARM ASSEMBLIES

Interim Date	Sheet No.
01/01/08	2 of 5
Index No.	
17745	



ELEVATION VIEW

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

Aluminum Identification Tag Not To Exceed 2" x 4". Secure To Pole By 0.125" Stainless Steel Rivets Or Screws. Fabricators To Provide Details For Approval. Identification Tag Located On Inside Of Pole Visible From Handhole, Or On Outside Of Pole Inside Terminal Compartment. Tag To Be Stamped With The Following Information :

Standard Design	Special Design
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

MAST ARM ASSEMBLIES GENERAL NOTES

1) Signal Structure Materials shall be as follows:

Poles & Mast Arms	–>	ASTM A1011 Grade 50, 55, 60 or 65 (less than ¼") or ASTM A572 Grade 50, 55, 60 or 65 (¼" 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) Grout shall have a minimum 28-day compressive strength of 5,000 psi and shall meet the requirements of Section 934.

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

6) All steel items shall be galvanized as follows:

All Nuts, Bolts, Washers and Threaded Bars/Studs	–>	F2329-05
All other steel items (including Pole & Mast Arm)	–>	ASTM A123

7) 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.

8) 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 ½".

9) Sign Panels and Signals attached to the Mast Arm shall be centered in elevation on the arm. Sign Panels shall be aluminum. Wire access holes shall not exceed 1 ½" in diameter.

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

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

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

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

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

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

16) Details for the Ground Rod, Signal and Sign Locations, Signal Head attachment, Sign Attachment, Pedestrian Head Attachment, and Foundation Conduit are not shown for clarity.

17) 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.

18) Manufactuers 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.

19) If a grout pad is not installed, vertically place a wire cloth screen between the baseplate and the top of the foundation, wrap horizontally around the baseplate with a 3" min. lap. The wire cloth shall be galvanized steel standard grade plain weave ½" x ½" mesh 0.063" dia. wire. The screen shall be attached to the baseplate with stainless steel self-tapping ¼" screws with stainless steel washers spaced at 9" centers.

TYPICAL ELEVATION AND NOTES

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
11/21/07	L.W.	QPL added to Standard Design List. Note 14 and 19 revised. New Note 17 added. Notes renumbered.			
6/2/08	C.H.	Revise Note 17.			

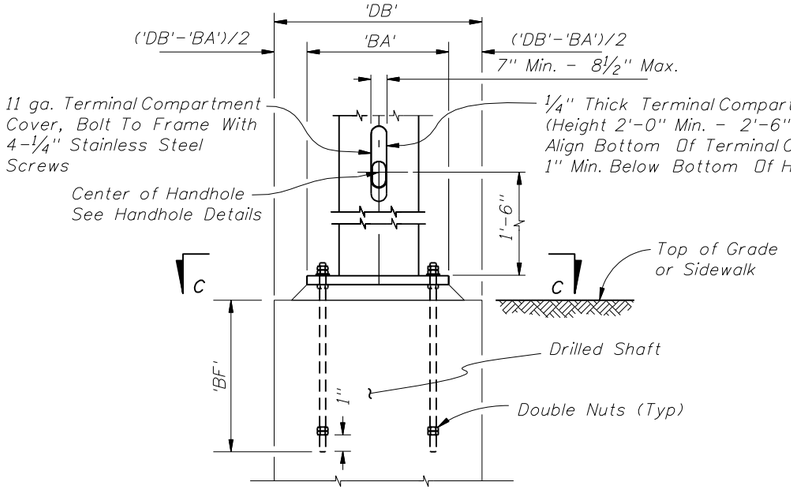
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

MAST ARM ASSEMBLIES

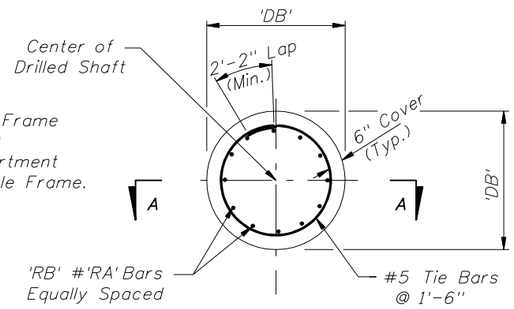
Interim Date 07/01/08

Index No. 17745



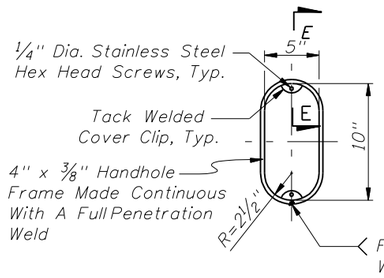
BASE PLATE AND ANCHORAGE ELEVATION

(Reinforcement Not Shown)



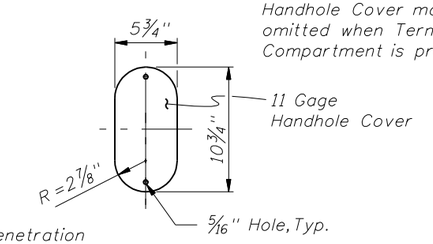
FOUNDATION PLAN

Note: 6" min. cover on Shaft Reinforcement



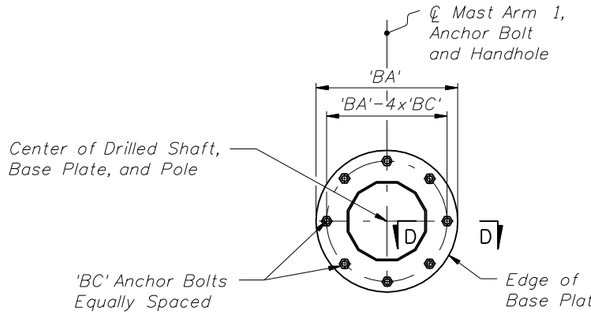
HANDHOLE FRAME

(w/Terminal Compartment Omitted)



HANDHOLE COVER

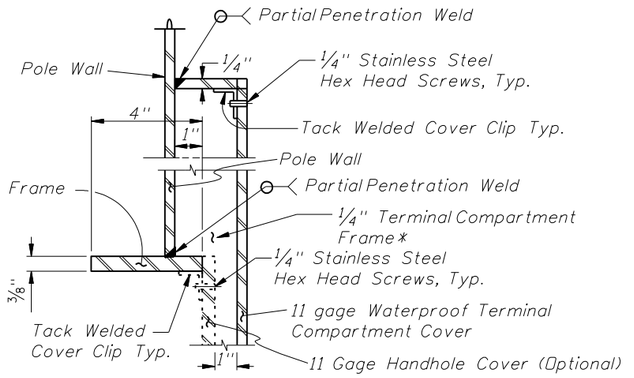
Note:
Handhole Cover may be omitted when Terminal Compartment is provided.



SECTION C-C

Alternate Detail

(8 Anchor Bolts)

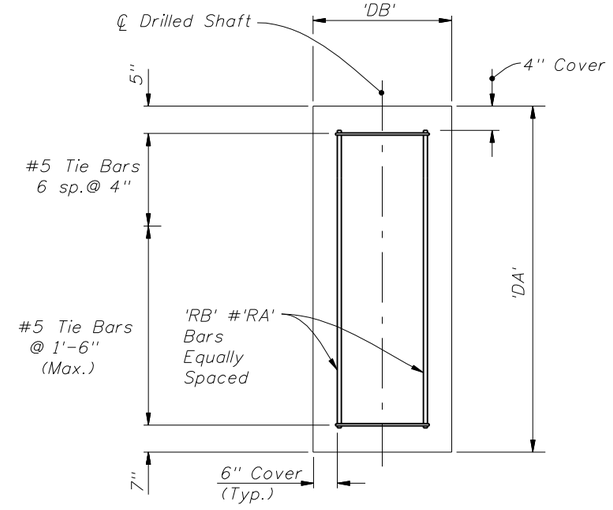


*Terminal Compartment is optional. See Mast Arm Tabulation for locations.

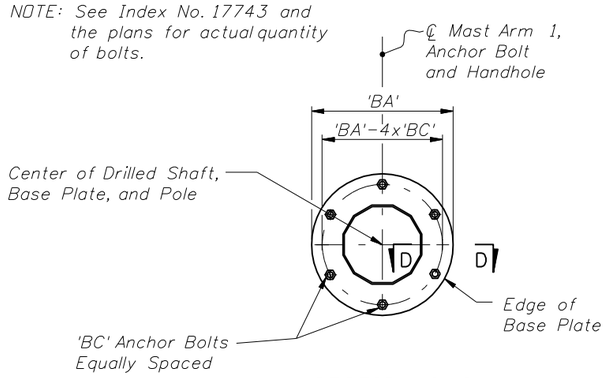
**Water proof all splices or use gasket with terminal compartment.

SECTION E-E

(Thru Handhole & Terminal Compartment)

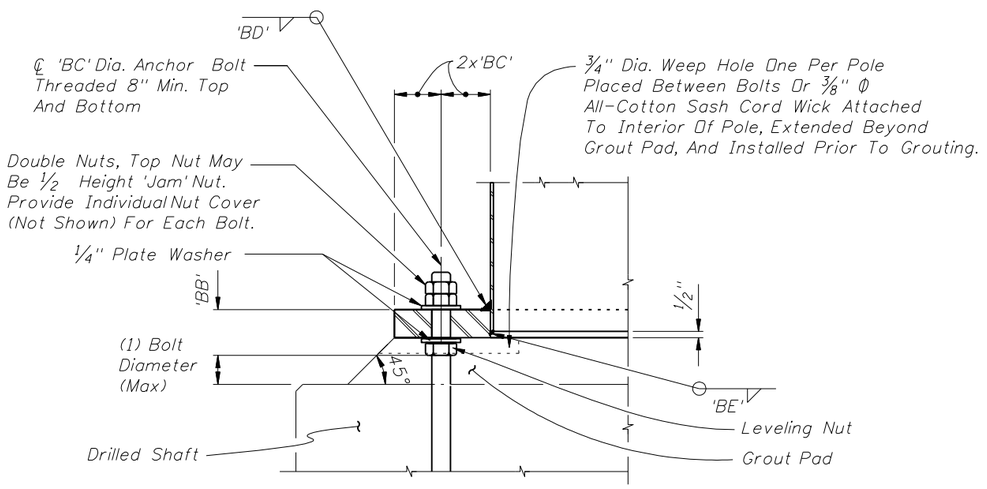


SECTION A-A



SECTION C-C

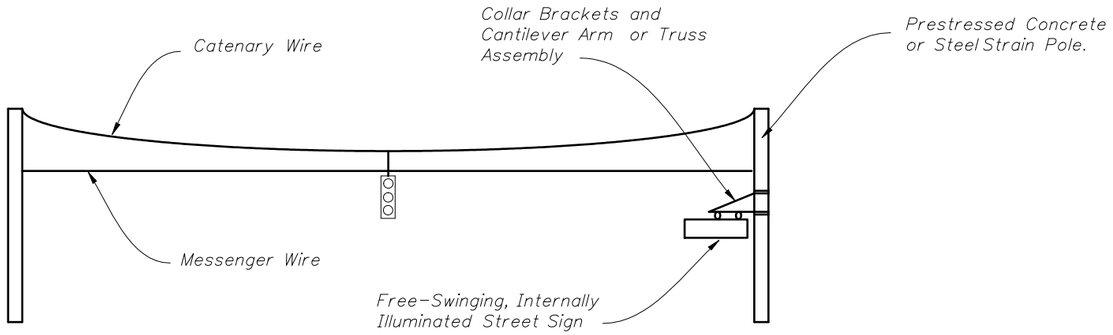
(6 Anchor Bolts)



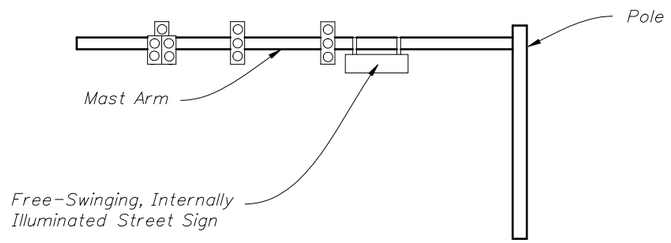
SECTION D-D

TYPICAL FOUNDATION AND BASE PLATE DETAILS

REVISIONS						2008 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION			
11/21/07	L.W.	Section A-A detail 3" dimension changed to 4". BASE PLATE AND ANCORAGE ELEVATION DETAIL DIMENSION 3bc CHANGED TO 1". Note added to detail SECTION E-E.	6/2/08	C.H.	Changed foundation Offset. Changed Drill Shaft Detail.	MAST ARM ASSEMBLIES	07/01/08	2 of 5
							Index No.	17745



OPTION 1
(For Span Wire Assembly)



OPTION 2
(For Mast Arm Assembly)

NOTES:

1. Free-swinging, internally-illuminated street signs shall only be installed on the signal pole for span wire assemblies. For mast arm assemblies the street sign may be installed on the arm or pole.

2. Free-swinging, internally-illuminated street signs shall meet the requirements of Section 699 of the Standard Specifications for Road and Bridge Construction.

3. Pole attachments and cantilever arm (or truss) assemblies may be accepted by Contractor certification provided the signs being supported meet the weight and area limitations included in Section 699 for "Acceptance by Certification".

4. Pole attachments and cantilever arm (or truss) assemblies supporting signs not meeting the weight or area limitations included in Section 699 for "Acceptance by Certification" require the submittal of structural calculations and Shop Drawings that have been prepared by and sealed by the Specialty Engineer.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/10/08	LW	Option 1 was deleted option 2 and 3 were renumbered to 1 and 2. Note 1. was completely revised.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

FREE - SWINGING, INTERNALLY - ILLUMINATED STREET SIGN ASSEMBLIES

Interim Date 01/01/08

Sheet No. 1 of 1

Index No. 17748

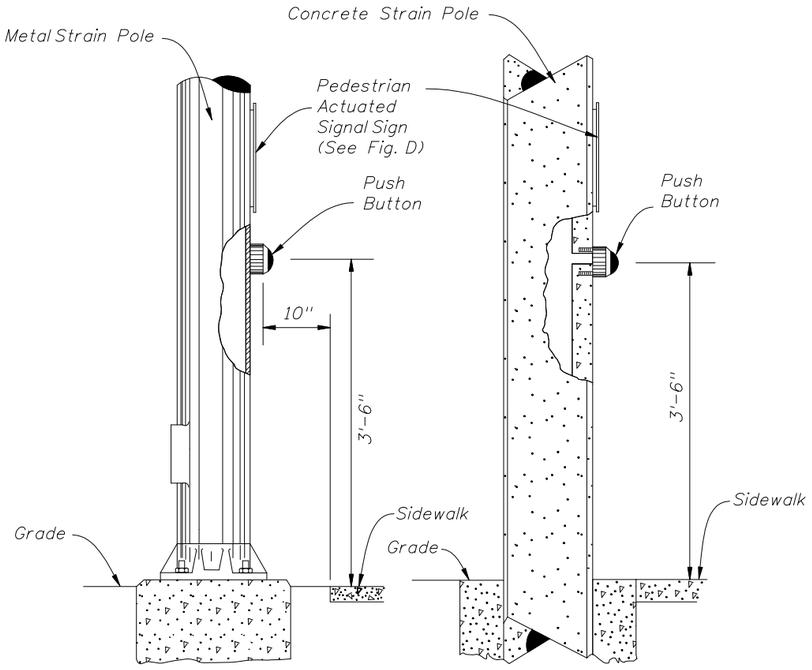
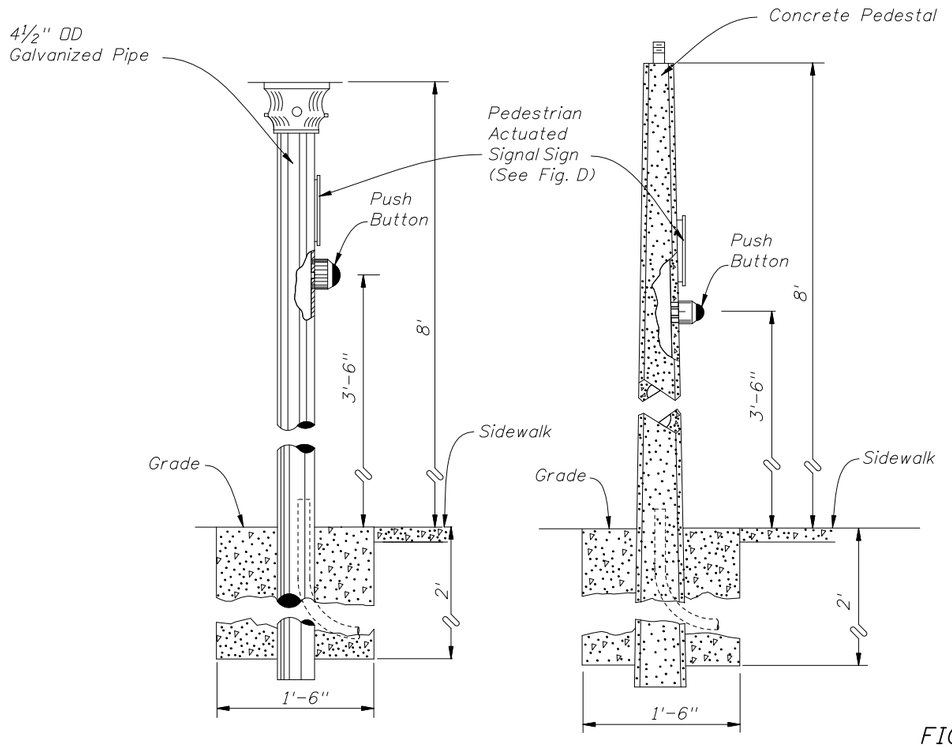


FIGURE A
POLE MOUNTED
DETECTOR STATION



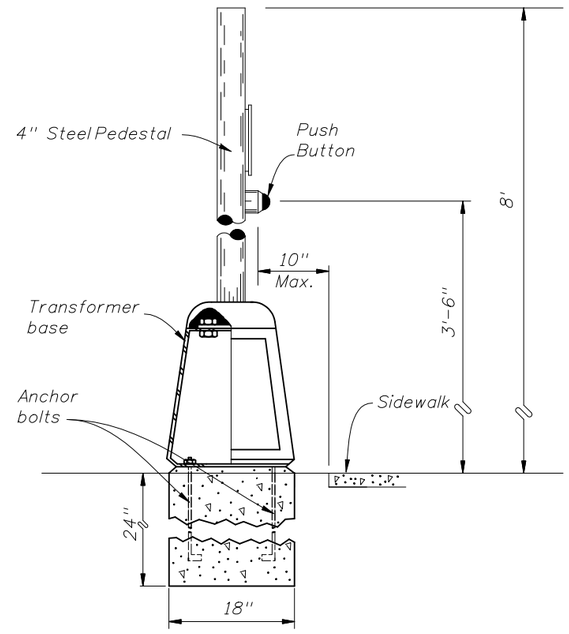


FIGURE B
PEDESTAL STATION
DETECTOR STATION

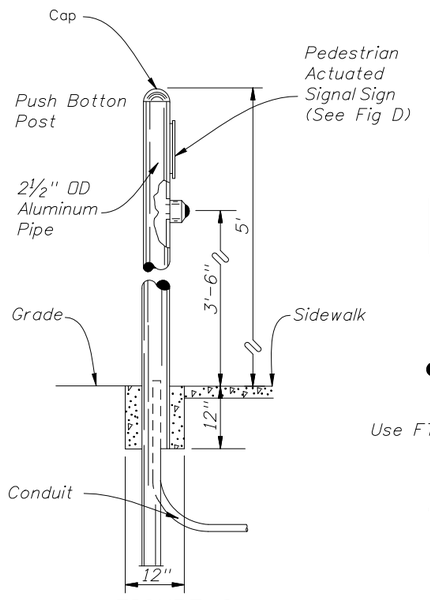


FIGURE C
POST DETECTOR STATION
DETECTOR STATION

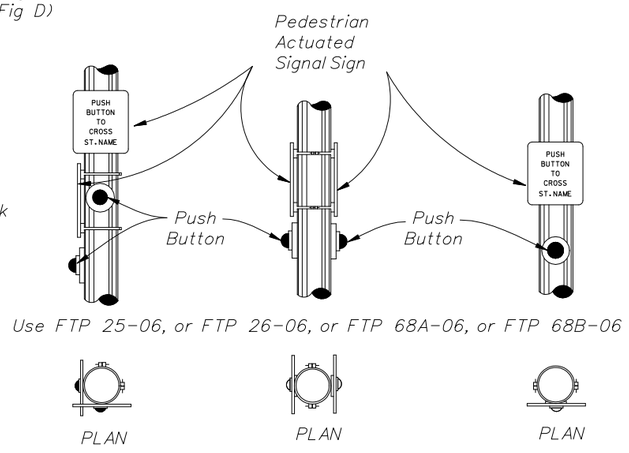


FIGURE D

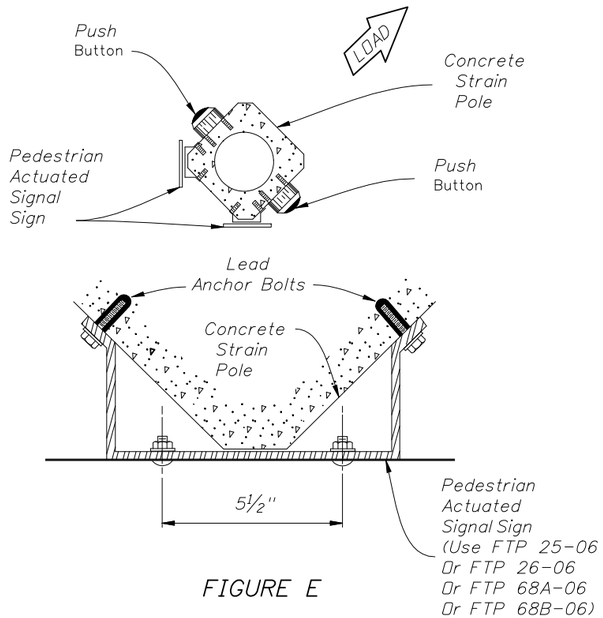


FIGURE E

Notes:

1. *Signs shall be mounted above detectors, explaining their purpose and use.*
2. *The positioning of pedestrian push button should clearly indicate which crosswalk signal is actuated by each push button.*
3. *Push buttons and signs are to be mounted in accordance with Standard Specifications, section 665.*
4. *Meet all grounding requirements of Section 620 of the Standard Specifications.*

Note To Designers:

The designer should ensure the 10" distance in Figure A & B is maintained. This distance can vary depending on post or pedestal type or whether a frangible base is used and sidewalk configuration.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
09/18/07	L.W.	Dimensions revised on FIGURE A and FIGURE B.			

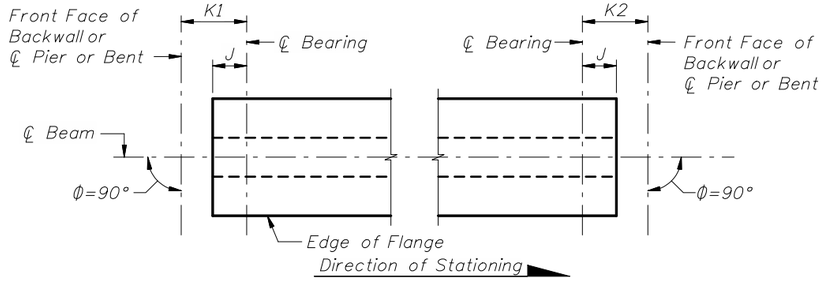
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

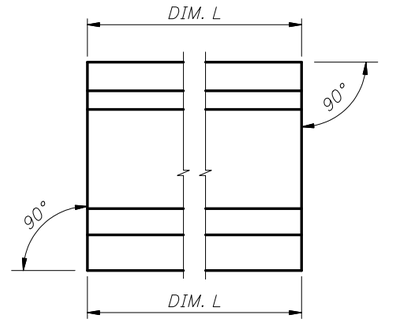
PEDESTRIAN DETECTOR ASSEMBLY INSTALLATION DETAILS

Interim Date	Sheet No.
01/01/08	1 of 2

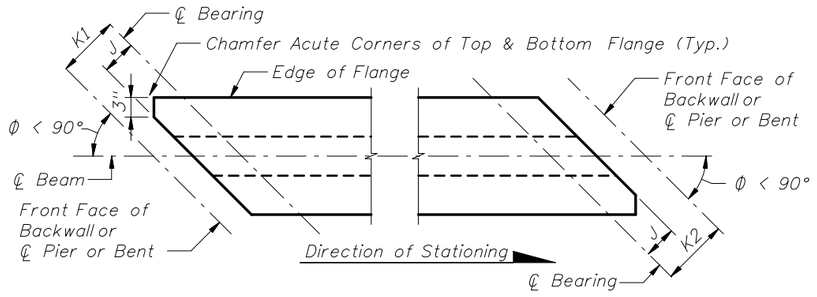
Index No.
17784



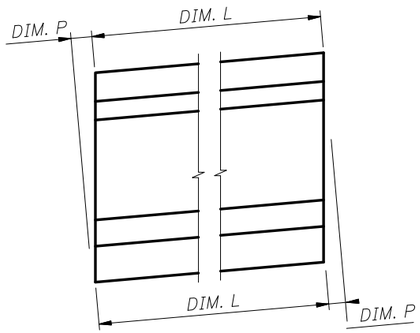
CASE 1



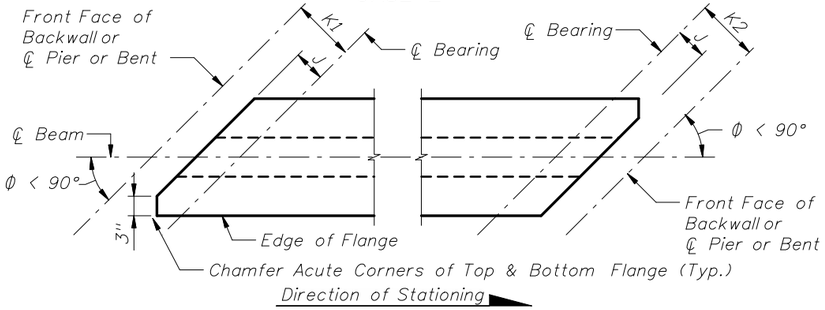
CONDITION 1
(P = 0.0)



CASE 2

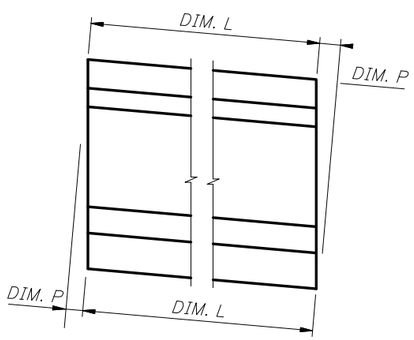


CONDITION 2



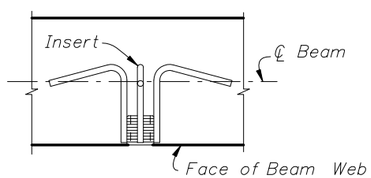
CASE 3

SCHEMATIC PLAN VIEWS AT BEAM ENDS



CONDITION 3

SCHEMATIC END ELEVATIONS OF BEAMS
(Showing Vertical Bevel of Beam End)



PLAN SECTION THRU BEAM WEB AT INSERT FOR DIAPHRAGM REINFORCING
(When Intermediate Diaphragms are Required by Design)

INSERT NOTES

1. Provide 1"ϕ, 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. See Superstructure and Beam Framing Plans for longitudinal location of inserts for each face of beam.

BEAM NOTES

1. All bar dimensions are out-to-out.
2. Place one (1) Bar 4K or 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. 20120, 20130, 20140, 20150, 20160, 20172 and 20178).
3. Bars 4L shall be bent prior to the beam leaving the prestressing yard. Bars 4L shall be bent parallel to the ends of the beams.
4. Caution should be used with Bars 4L in the ends of exterior beams to assure the bent portion of the bar is properly oriented so that the bar will be embedded in the diaphragm concrete.
5. Strands N shall be either ASTM A416, Grade 250 or Grade 270, seven-wire strands ⅜" ϕ or larger, stressed to 10,000 lbs. each.
6. Unless otherwise noted, the minimum concrete cover for reinforcing steel shall be 2".
7. At option of the Contractor, welded deformed wire reinforcement may be used in lieu of Bars 3D, 4K, 5K, 4L and 5Z except as noted below, provided the wire sizes and spacing match those shown on the Standard Beam Details sheet for these bars. In this event, Bars 4K or 5K and 5Z may be fabricated with the omission of the lower outstanding leg provided that two longitudinal wires are placed (welded) at the lower end of the bar. The first (lower) wire shall be located 1" from the end of Bars 4K or 5K and 5Z and the second wire 2" minimum from the first wire, but no less than ¼ of the beam depth from mid-depth of the beam. In addition, Bars 5Z may consist of pairs of bars with the cross sectional area of the pair equal to or greater than the shown conventional single bar. Welded wire reinforcement shall conform to ASTM A497.
8. Install Safety Sleeves 1'-10" from ends of beam and spaced on 8'-0" (Max.) centers. Shift Bars 4K or 5K locally to allow placement. Safety Sleeves shall be :
   2½" NPS x 5" Sch. 40 PVC Pipe with Cap for Type III, IV, V, VI, FBT 72 and FBT 78 Beams;
   1½" NPS x 5" Sch. 40 PVC Pipe with Cap for Type II Beams.
   Holes shall be free of debris and water prior to casting deck.
9. For beams with skewed end conditions, the end reinforcement, defined as Bars 3D1, 3D2, 4K, 5K, 4M1, 4M2, 4Y or 5Y and 5Z placed within the limits of the spacing for Bars 3D (approximately 1.5 times the overall beam depth) in "ELEVATION AT END OF BEAM", shall be placed parallel to the skewed end of the beam. Bars 4K or 5K and 4M3 located beyond the limits of Bars 3D shall be placed perpendicular to the longitudinal axis of the beam. Placement of Bars 3D1, 3D2, 4M1 and 4M2 correspond to END 1 and END 2 respectively, as shown in the beam "ELEVATION". For Bars 3D1 and 3D2, Dimension B and the overall length shall be adjusted to fit the width of the bottom flange measured parallel to the skew. For Bars 4M1 and 4M2 the overall length shall be adjusted to fit the width of the top flange as measured parallel to the skew. Fan Bars 4M1 and 4M2 as needed to maintain minimum clearance (1½") between the bars at the transition to Bars 4M3 and field cut to length to maintain minimum cover.
10. Bars 4M1, 4M2 and 4M3 are applicable to AASHTO Beam Types V and VI, and Florida Bulb-T's.
11. For Beams with vertically beveled end conditions when "DIM. P" exceeds 1", Bars 3D1, 3D2, 4K, 5K, 4Y or 5Y and 5Z shall be placed parallel to the end of the beam, within the limits of Bar 4L.
12. Welded deformed wire reinforcement shall not be used for the end reinforcement (Bars 3D1, 3D2, 4K or 5K and 5Z) for beams with skewed end conditions or vertically beveled end conditions when "DIM. P" exceeds 1".
13. Bars 4K or 5K and 5Z shall be placed and tied to the fully bonded strands in the bottom row (see "STRAND PATTERN").
14. At the Contractor's option Bars 3D1 and 3D2 may be fabricated as a two-piece bar with a 1'-2" lap splice of the bottom legs.
15. For referenced Dimensions, Angles and Case Numbers see Table of Beam Variables in Structures Plans.

INSTRUCTIONS TO DESIGNER:

To limit Bursting Forces the maximum prestress force at the beam ends from fully bonded strands must be limited to the following:

Beam Type	Max. Bonded Prestress Force	Index No.	Last Revision Date
AASHTO Type II	755 Kips	20120	7/1/05
AASHTO Type III	1100 Kips	20130	7/1/05
AASHTO Type IV	1470 Kips	20140	7/1/05
AASHTO Type V	1630 Kips	20150	7/1/05 or later
AASHTO Type VI	1815 Kips	20160	7/1/05 or later
Florida Bulb-T 72	1470 Kips	20172	7/1/05 or later
Florida Bulb-T 78	1730 Kips	20178	7/1/05 or later

No losses shall be applied when calculating the Bonded Prestress Force. The reinforcing in the ends of the beams must not be modified without the approval of the State Structures Design Engineer.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	SJN	Added "SUPPLEMENTAL INTERFACE SHEAR REINFORCING DETAIL" & note 16. Changed "fabric" to "reinforcement" and Insert Detail.	12/09/08	SJN	Deleted Note 16 and "SUPPLEMENTAL INTERFACE SHEAR REINFORCING DETAIL".

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

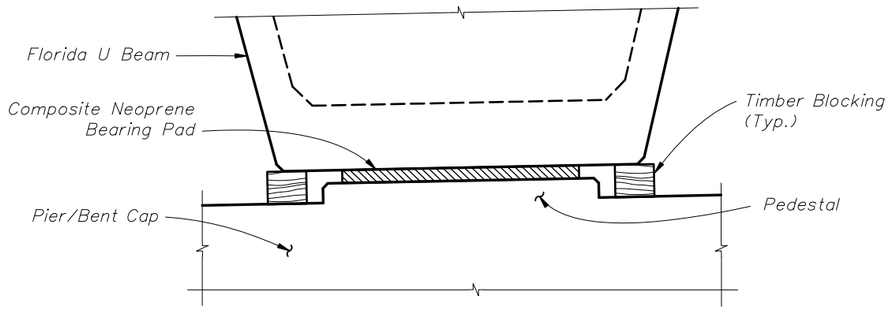
2008 Interim Design Standard

TYPICAL AASHTO AND BULB-T BEAM DETAILS AND NOTES

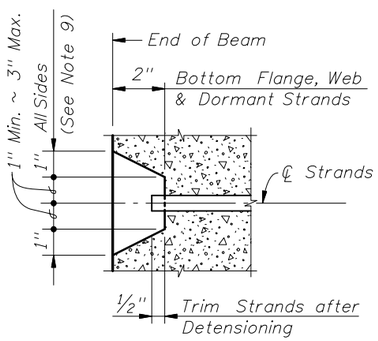
Interim Date 12/09/08

Sheet No. 1 of 1

Index No. 20110



TEMPORARY BLOCKING OF BEAM ENDS



TYPICAL STRAND BLOCKOUT DETAIL

BEAM NOTES

1. All bar dimensions are out-to-out.
2. Strands N (Dormant Strands) shall be either ASTM A416, Grade 250 or Grade 270, seven-wire strands ⅜" ϕ or larger, stressed to 10,000 lbs. each.
3. Unless otherwise noted in Structures Plans, the minimum concrete cover for reinforcing steel shall be 2".
4. At the option of the Contractor and with the Engineer's Approval, deformed welded wire reinforcement may be used in lieu of Bars 6A1, 4A2, 5B, 4C, 3D, 5E, 4F, 4G, 4H, 5K, 5L and 4M except as noted below in note 7, provided the wire sizes and spacing match those shown on the Standard Beam Detail sheets for these bars. Welded wire reinforcement shall conform to ASTM A497.
5. Place 2½" NPS x 5" PVC Sch. 40 Safety Sleeve with cap in both top flanges spaced on 8'-0" (Max.) centers. Shift Bars 5K & 4M locally to allow placement. Holes shall be free of debris and water prior to casting deck.
6. For Beams with vertically beveled end conditions when "DIM. P" exceeds 1", Bars 5E and the first Bars 4F and 5K shall be placed parallel to the end of the beam. The remaining Bars 4F and 5K within the limits of "DIM. B" shall be fanned at equal spaces.
7. Welded deformed wire reinforcement shall not be used for the end reinforcement (Bars 5B, 4C, 3D, 5E, 4F, 5K, and 5L) for beams with skewed end conditions or vertically beveled end conditions when "DIM. P" exceeds 1".
8. Bars 5K shall be placed and tied to the fully bonded strands in the bottom row (see "STRAND PATTERN" in Structures Plans).
9. Strand Protection at beam ends shall consist of a 2" deep recess formed around all strands (including dormant) or strand groups. Extend recess to face of web and bottom of flange for bottom row of strands. After detensioning, cut strands ½" from recessed surface and fill the recess with a Type F-2 or Q Epoxy Compound in accordance with Section 926 of the Specifications.
10. The Contractor shall use Size No. 67 maximum sized aggregate.
11. Stay-in-Place metal deck forms shall be used inside the beams.
12. The Contractor shall evaluate the need for temporary bracing between U Beams, based on the selected deck forming system and concrete placement sequence. In addition, timber blocking shall be placed beneath the exterior face of the webs at the both ends of all beams, prior to deck casting. Blocking shall be left in place for at least 4 days after deck casting and afterwards removed at the Contractor's convenience.
13. For referenced Dimensions, Angles and Case Numbers see Table of Beam Variables in Structures Plans.

INSTRUCTIONS TO DESIGNER:

To limit Bursting Forces, the maximum prestress force at beam ends from fully bonded strands must be limited to the following:

Beam Type	Max. Bonded Prestress Force	Index No.	Issue Date
Florida U48 & U54	2790 Kips	20248 & 20254	07/01/05
Florida U63 & U72	3070 Kips	20263 & 20272	07/01/05

No losses shall be applied when calculating the Bonded Prestress Force. The reinforcing in the ends of the beams must not be modified without the approval of the State Structures Design Engineer.

NOTE:
Work this Index with Florida U Beam - Table of Beam Variables in Structures Plans.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
07/01/08	SJN	Added "SUPPLEMENTAL INTERFACE SHEAR REINFORCING DETAIL" & Note 12, added "Type Q" epoxy compound to Note 9 and renumbered Note 12 & 13.	12/09/08	SJN	Deleted "SUPPLEMENTAL INTERFACE SHEAR REINFORCING DETAIL" and Note 12.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

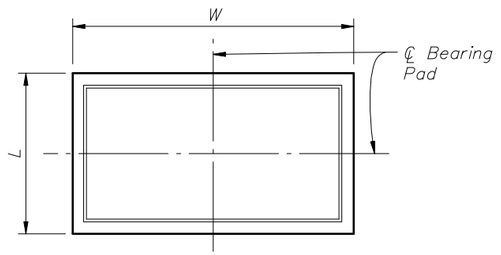
2008 Interim Design Standard

TYPICAL FLORIDA U BEAM DETAILS AND NOTES

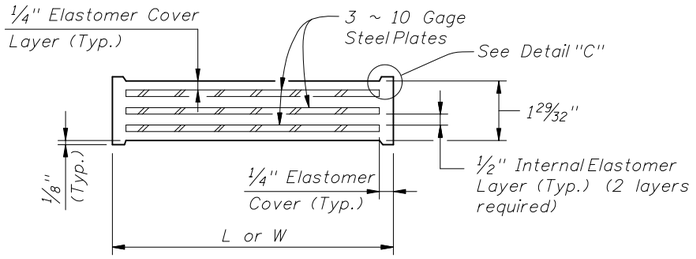
Interim Date 12/09/08

Sheet No. 2 of 2

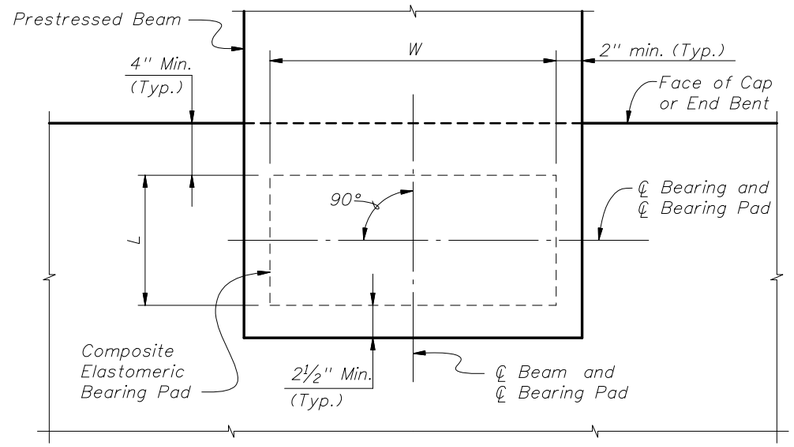
Index No. 20210



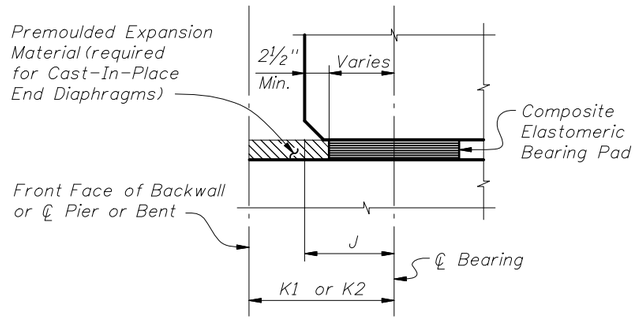
PLAN



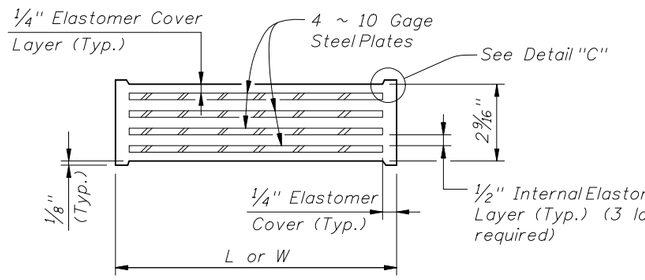
TYPICAL SECTION
TYPE A PAD



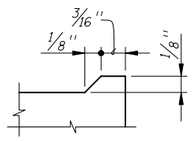
PARTIAL PLAN
(Skew = 0°)



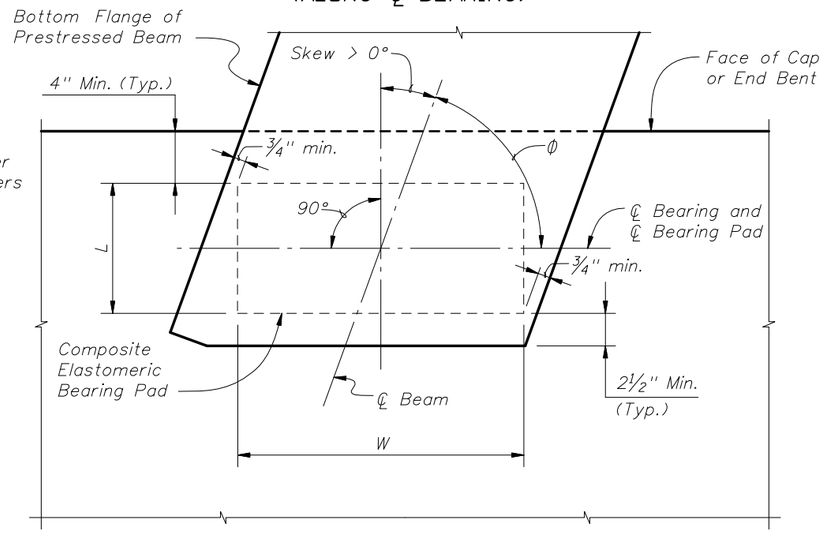
PARTIAL SIDE ELEVATION
(ALONG ℄ BEARING)



TYPICAL SECTION
TYPE B AND TYPE C PAD



DETAIL "C"



PARTIAL PLAN
(Skew > 0°)

		BEARING PAD DIMENSIONS		*BEARING PLATE DIMENSIONS	
PAD TYPE (See Note 1)	BEAM TYPE	L	W	C	D
A (G=110psi)	II (AASHTO)	1'-0"	1'-2"	1'-2"	1'-4"
	III (AASHTO)	10"	1'-6"	1'-0"	1'-8"
	IV AASHTO)	10"	1'-10"	1'-0"	2'-0"
	V & VI (AASHTO) & FLORIDA BULB-T 78	11"	2'-0"	1'-1"	2'-2"
	FLORIDA BULB-T 72			1'-1"	2'-4"
B (G=110psi)	II (AASHTO)	1'-4"	1'-2"	1'-6"	1'-4"
	III (AASHTO)	1'-2"	1'-6"	1'-4"	1'-8"
	IV AASHTO)	1'-0"	1'-10"	1'-2"	2'-0"
	V & VI (AASHTO) & FLORIDA BULB-T 78	1'-2"	2'-0"	1'-4"	2'-2"
	FLORIDA BULB-T 72			1'-4"	2'-4"
C (G=150psi)	II (AASHTO)	1'-0"	1'-0"	1'-2"	1'-4"
	III (AASHTO)	1'-0"	1'-4"	1'-2"	1'-8"
	IV AASHTO)	10"	1'-9"	1'-0"	2'-0"
	V & VI (AASHTO) & FLORIDA BULB-T 78	1'-0"	1'-11"	1'-2"	2'-2"
	FLORIDA BULB-T 72			1'-2"	2'-4"

* Work this sheet with Index No. 20501 - Bearing Plate Details when beveled or embedded bearing plates are required. See 'TABLE OF BEAM VARIABLES' on Beam Sheets for locations where bearing plates are required.

BEARING PAD NOTES:

1. Neoprene in Type A or B bearing pads shall have a shear modulus (G) of 110 psi. Neoprene in Type C bearing pads shall have a shear modulus (G) of 150 psi.
2. Steel Plates in bearing pads shall conform to ASTM A1011 Grade 36, Type 1.
3. Variations in pad dimensions will be allowed provided the revised pads meet the Specifications, meet the requirements of this index, and are approved by the Engineer.
4. For beam grades less than or equal to 2% finish the Beam Seat parallel to the bottom of the beam. For beam grades greater than 2% finish the Beam Seat level and provide Beveled Bearing Plates.
5. See Bid Item Notes for quantities of Type A, B, and/or C Bearing Pads.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	CMH	Added Type C pads, and new rows to table for Florida Bulb-T 72. Changed note 1 to include shear modulus.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

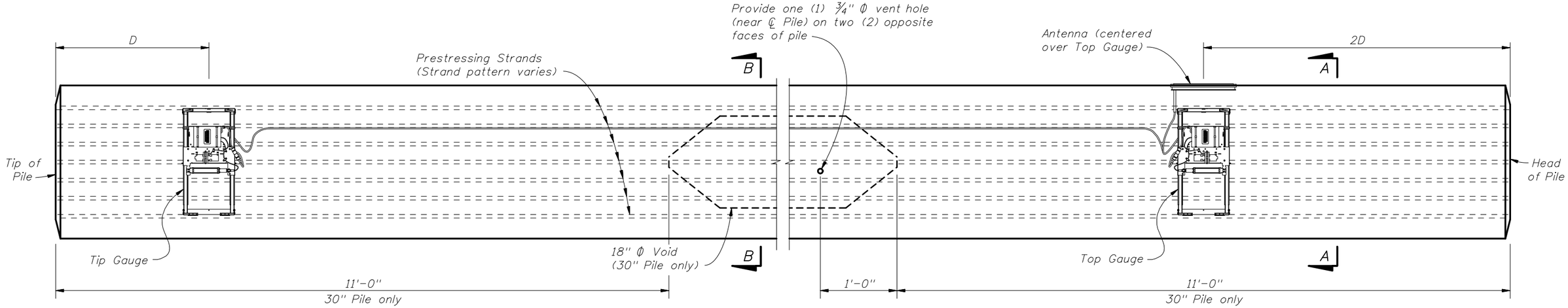
2008 Interim Design Standard

COMPOSITE ELASTOMERIC BEARING PADS

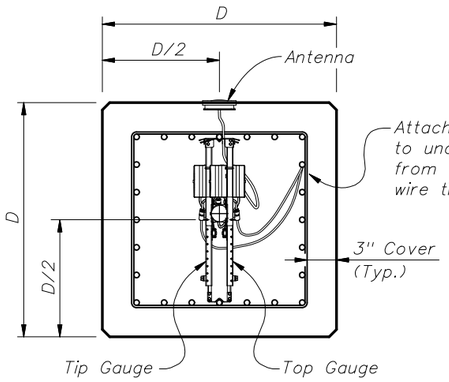
Interim Date 01/01/08

Sheet No. 1 of 1

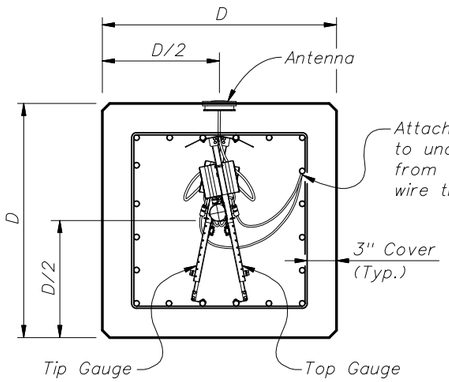
Index No. 20500



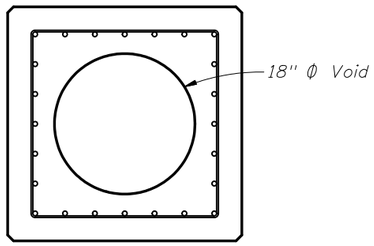
ELEVATION



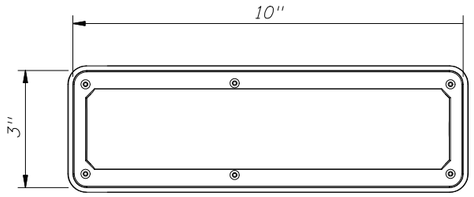
SECTION A-A
(Strand Pattern with odd number of strands per face)



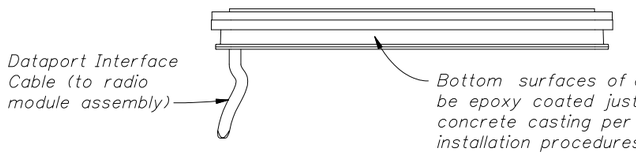
SECTION A-A
(Strand Pattern with even number of strands per face)



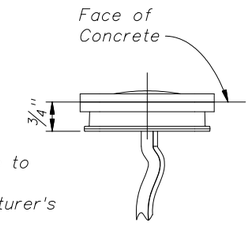
SECTION B-B
(30" Pile only)



ANTENNA TOP VIEW



ANTENNA SIDE VIEW



ANTENNA END VIEW

Work this sheet with
Index No. 20618 for 18" square piles,
Index No. 20624 for 24" square piles,
Index No. 20630 for 30" square piles.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Moved location of EDC tip Gauge to distance "D" from tip of pile.			

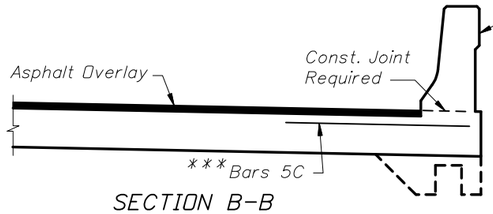
2008 Interim Design Standard

EDC INSTRUMENTATION FOR SQUARE PRESTRESSED CONCRETE PILES

Interim Date 01/01/08

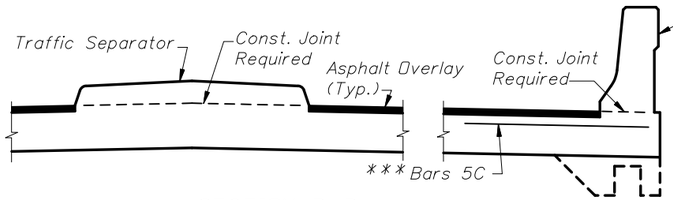
Sheet No. 1 of 1

Index No. 20602



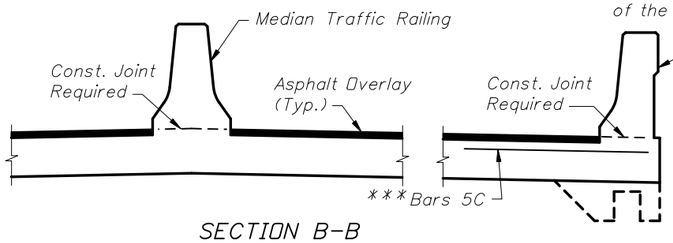
NOTE:
Geometry of Traffic Railings, Pedestrian/Bicycle Railings, Traffic Separators and Sidewalks to match those on adjoining bridge.

SECTION B-B
STANDARD APPROACH SLAB

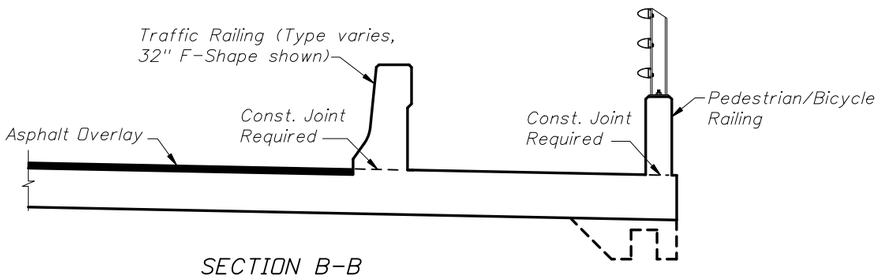


SECTION B-B
APPROACH SLAB WITH TRAFFIC SEPARATOR

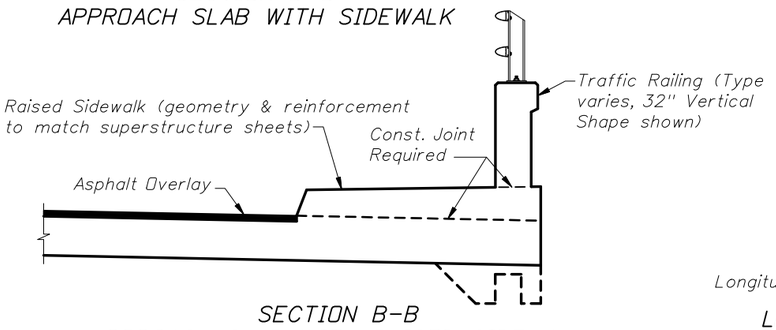
*** NOTE: Bars 5C are required as shown when either the 32" or 42" F-Shape Traffic Railing or the Traffic Railing/Sound Barrier are used at the edge of the Approach Slab.



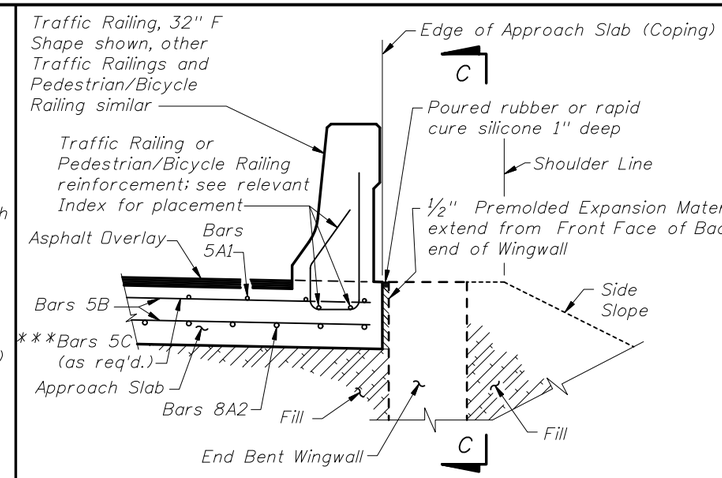
SECTION B-B
APPROACH SLAB WITH MEDIAN TRAFFIC RAILING



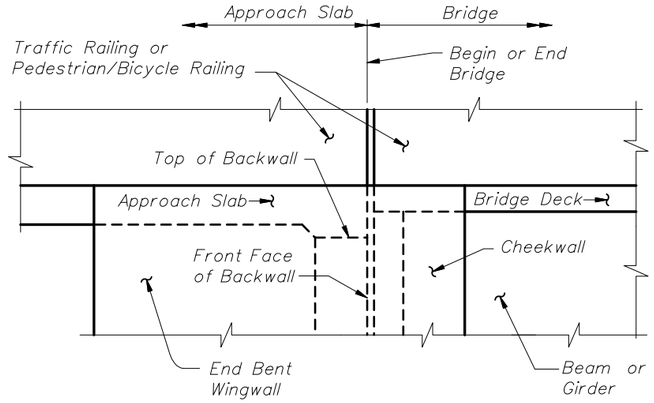
SECTION B-B
APPROACH SLAB WITH SIDEWALK



SECTION B-B
APPROACH SLAB WITH RAISED SIDEWALK

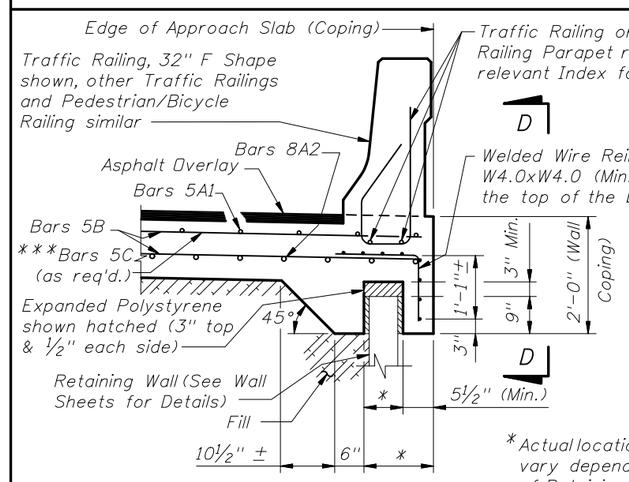


SECTION THRU APPROACH SLAB
AND END BENT WINGWALL



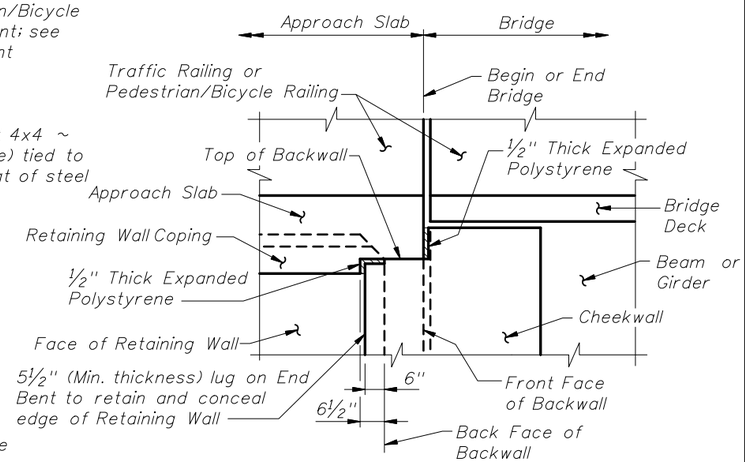
VIEW C-C AT BEGIN OR END BRIDGE (BEAM
BRIDGE SHOWN, FLAT SLAB BRIDGE SIMILAR)

APPROACH SLAB WITH WINGWALL DETAILS



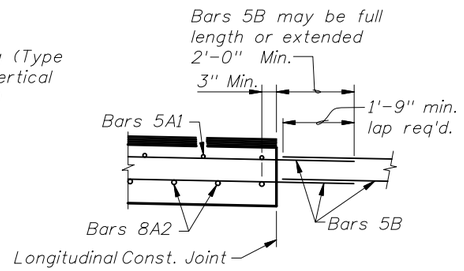
* Actual location & width vary depending on type of Retaining Wall used

SECTION THRU APPROACH SLAB
AND RETAINING WALL



VIEW D-D AT BEGIN OR END BRIDGE (BEAM
BRIDGE SHOWN, FLAT SLAB BRIDGE SIMILAR)

APPROACH SLAB WITH RETAINING WALL DETAILS



LONGITUDINAL CONSTRUCTION
JOINT DETAIL

CROSS REFERENCES:

For location of Section B-B and Longitudinal Construction Joint Detail see Index No. 20900, Sheet 1.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed 6" (Min.) coping and end bent lug dimensions to 5½" (Min.) on APPROACH SLAB WITH RETAINING WALL DETAILS.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

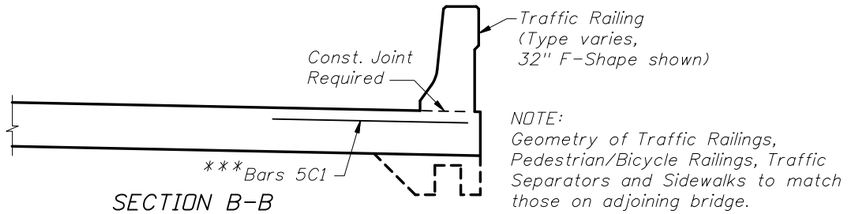
2008 Interim Design Standard

APPROACH SLABS
(FLEXIBLE PAVEMENT APPROACHES)

Interim Date 01/01/08

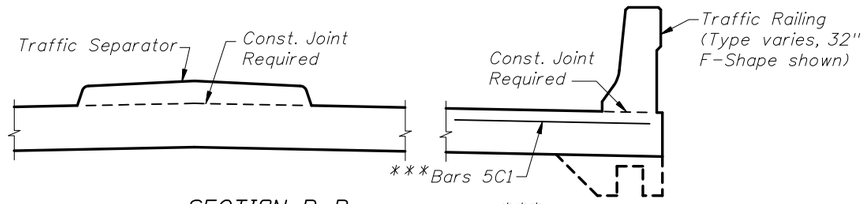
Sheet No. 2 of 2

Index No. 20900



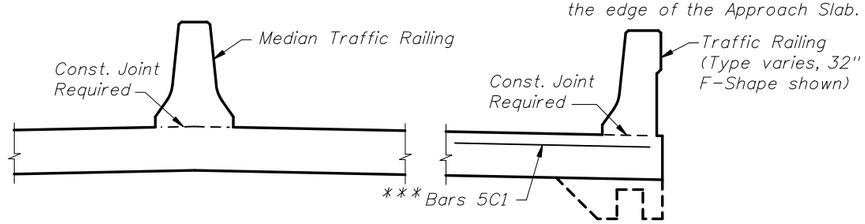
NOTE:
Geometry of Traffic Railings, Pedestrian/Bicycle Railings, Traffic Separators and Sidewalks to match those on adjoining bridge.

SECTION B-B
STANDARD APPROACH SLAB

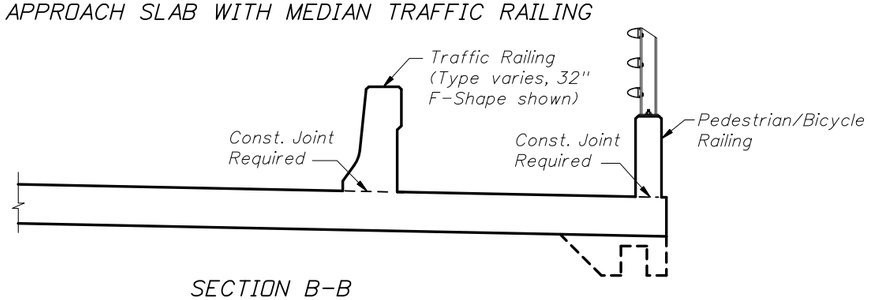


SECTION B-B
APPROACH SLAB WITH TRAFFIC SEPARATOR

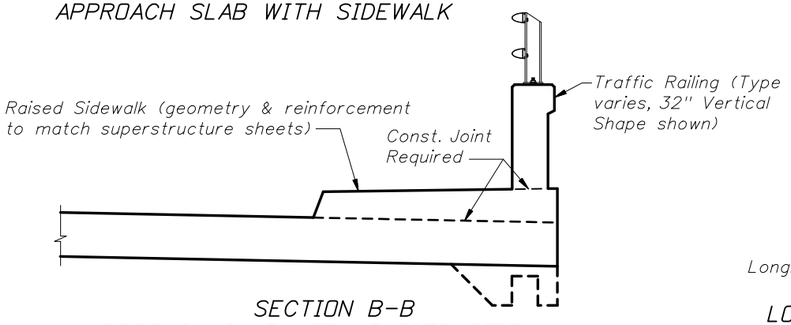
*** NOTE: Bars 5C are required as shown when either the 32" or 42" F-Shape Traffic Railing or the Traffic Railing/Sound Barrier are used at the edge of the Approach Slab.



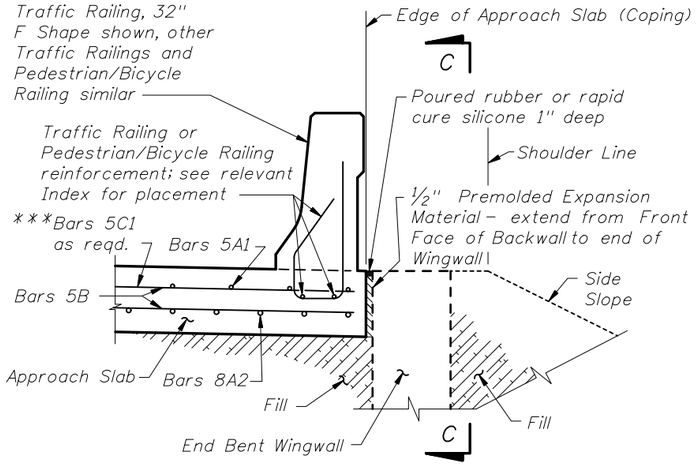
SECTION B-B
APPROACH SLAB WITH MEDIAN TRAFFIC RAILING



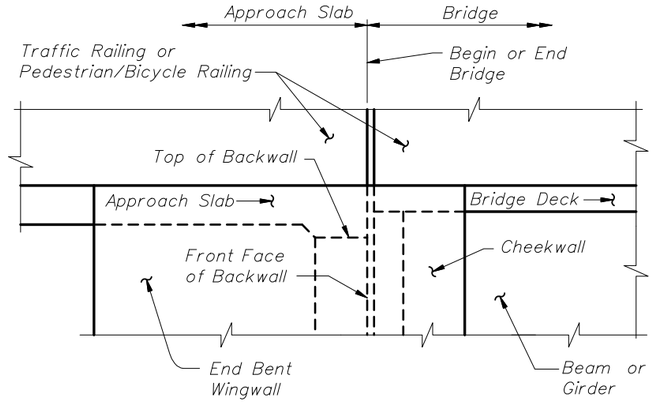
SECTION B-B
APPROACH SLAB WITH SIDEWALK



SECTION B-B
APPROACH SLAB WITH RAISED SIDEWALK

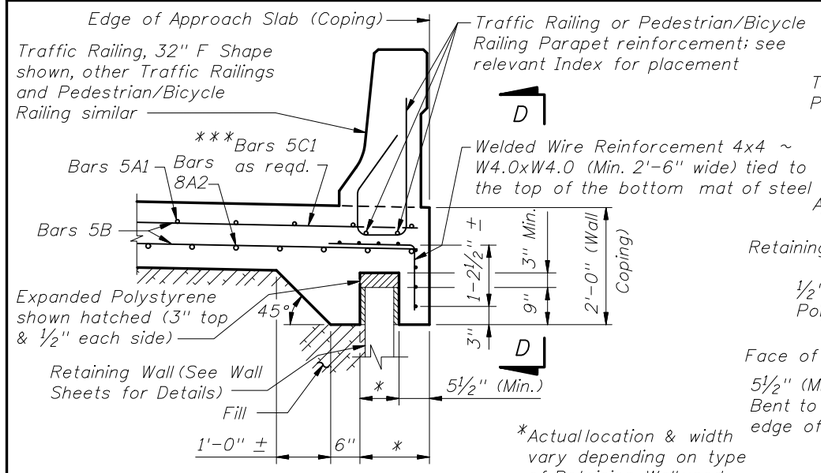


SECTION THRU APPROACH SLAB
AND END BENT WINGWALL

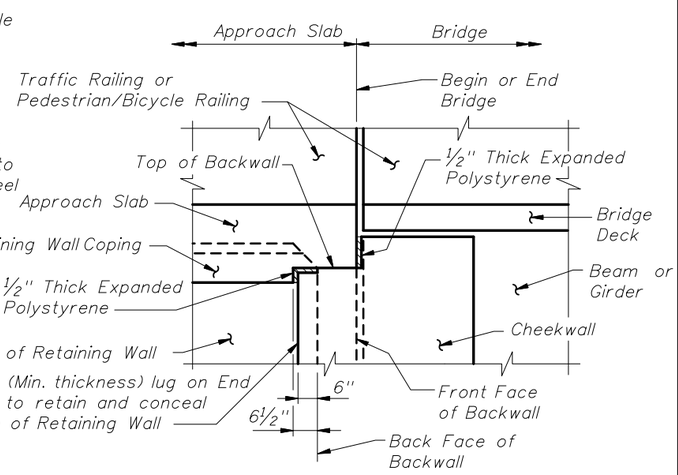


VIEW C-C AT BEGIN OR END BRIDGE (BEAM BRIDGE SHOWN, FLAT SLAB BRIDGE SIMILAR)

APPROACH SLAB WITH WINGWALL DETAILS

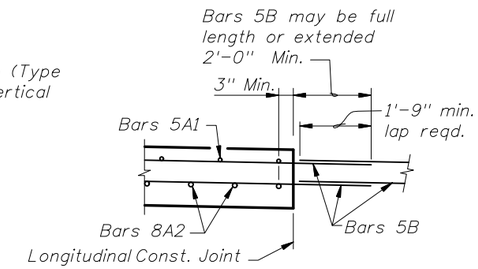


SECTION THRU APPROACH SLAB
AND RETAINING WALL



VIEW D-D AT BEGIN OR END BRIDGE (BEAM BRIDGE SHOWN, FLAT SLAB BRIDGE SIMILAR)

APPROACH SLAB WITH RETAINING WALL DETAILS



LONGITUDINAL CONSTRUCTION
JOINT DETAIL

CROSS REFERENCES:

For location of Section B-B and Longitudinal Construction Joint Detail see Index No. 20910, Sheet 1.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Changed 6" (Min.) coping and end bent lug dimensions to 5½" (Min.) on APPROACH SLAB WITH RETAINING WALL DETAILS.			

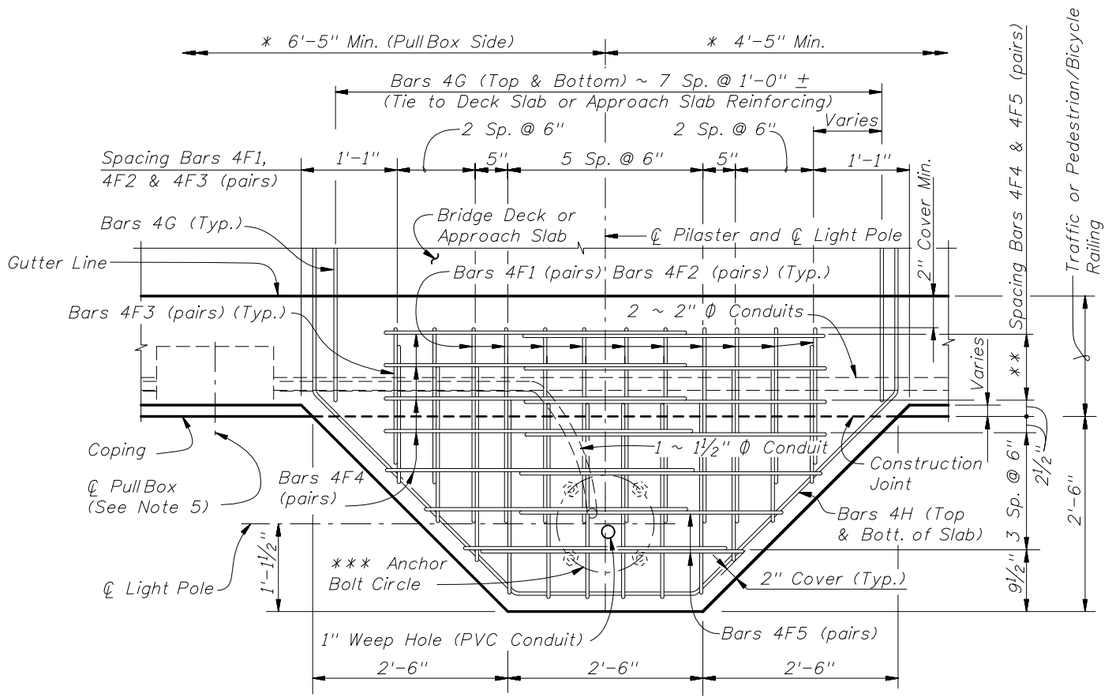
2008 Interim Design Standard

APPROACH SLABS
(RIGID PAVEMENT APPROACHES)

Interim Date 01/01/08

Sheet No. 2 of 2

Index No. 20910



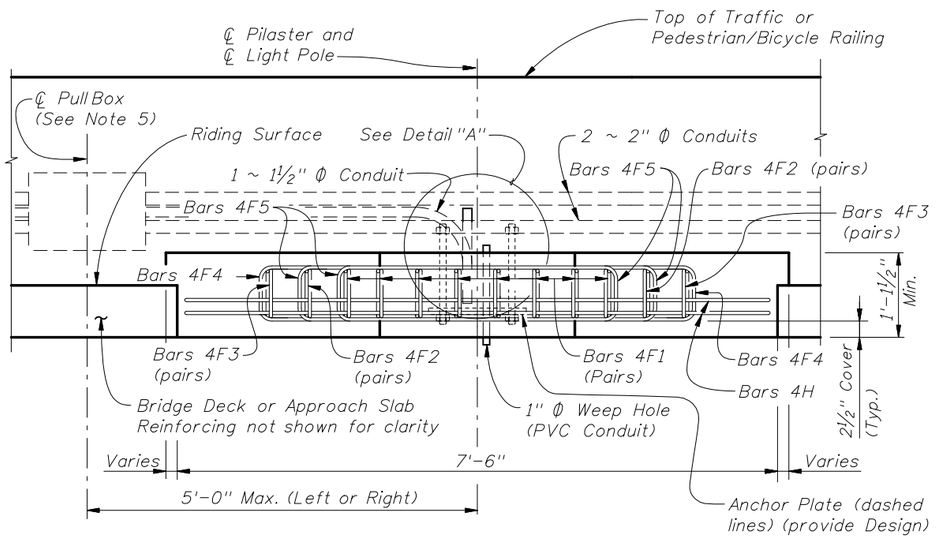
* Slip Forming Method of Construction is not allowed within the limits shown.

** For Index No. 820 – Pedestrian/Bicycle Railing, this dimension is 4½". For all other Railings, this dimension is 2 Eq. Sp. @ 6" Max.

*** Anchor Bolt pattern orientation shall be as shown.

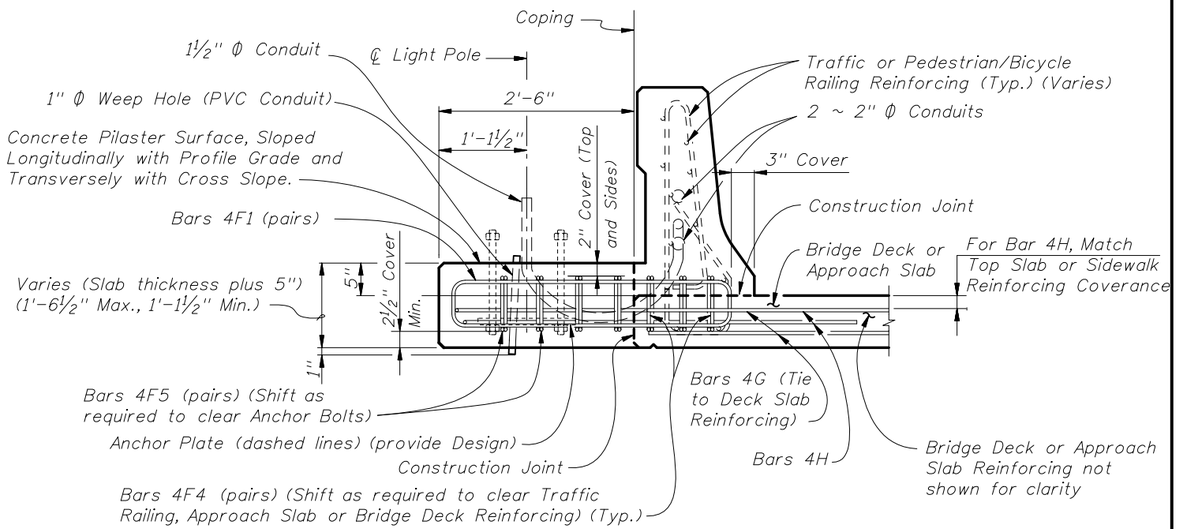
PLAN VIEW

(Anchor Plate not shown for clarity)

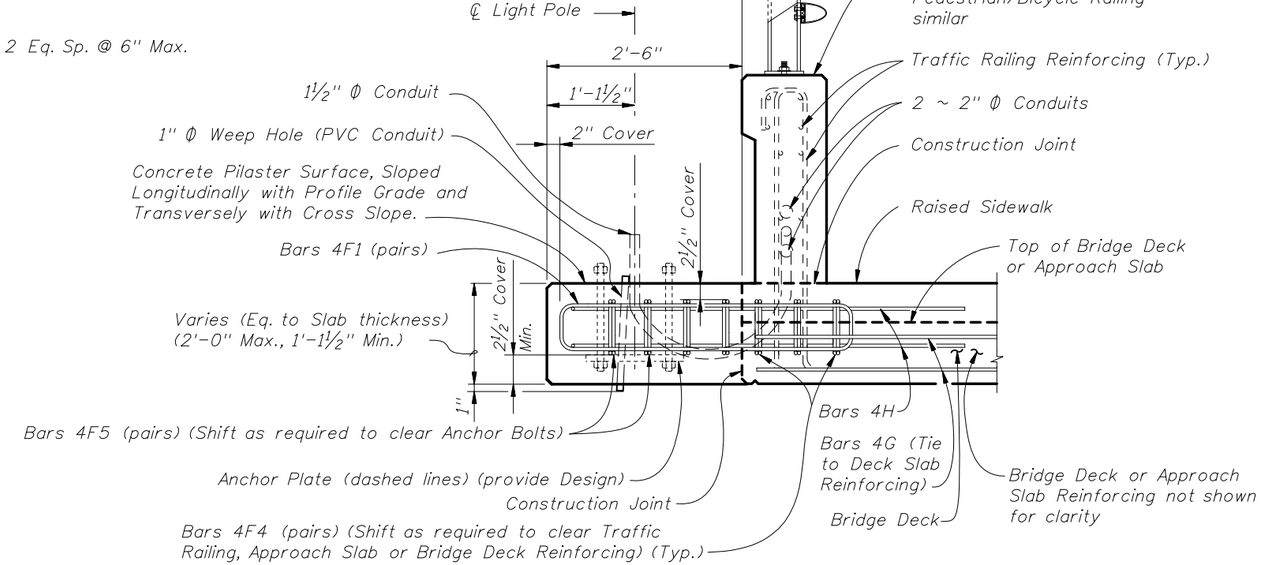


ELEVATION VIEW

(Bars 4G not shown for clarity)



TYPICAL SECTION AT LIGHT POLE PILASTER FOR APPROACH SLAB OR BRIDGE DECK THICKNESS LESS THAN 1'-1½".



TYPICAL SECTION AT LIGHT POLE PILASTER FOR APPROACH SLAB OR BRIDGE DECK THICKNESS 1'-1½" OR GREATER

CROSS REFERENCE:
For Detail "A" and Light Pole Pilaster Notes, see Sheet 2.

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	DYW	Added "Anchor Plate (dashed lines) (provide Design)" to ELEVATION VIEW and TYPICAL SECTION's.			

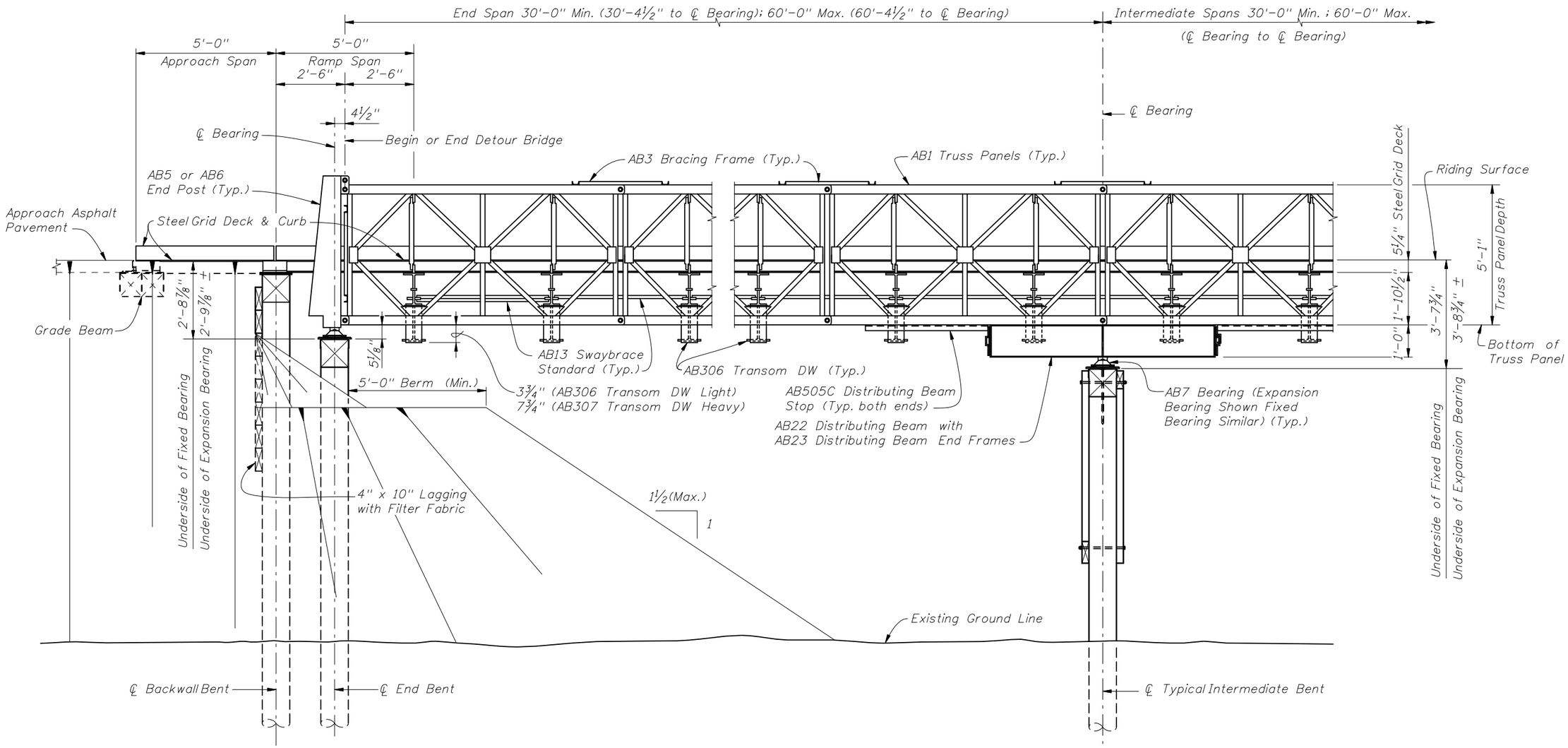
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

LIGHT POLE PILASTER

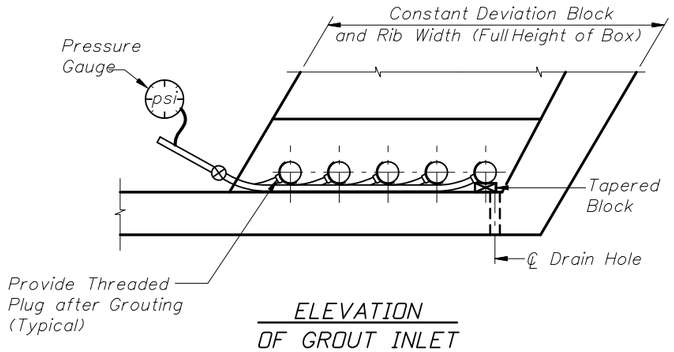
Interim Date 01/01/08

Index No. 21200



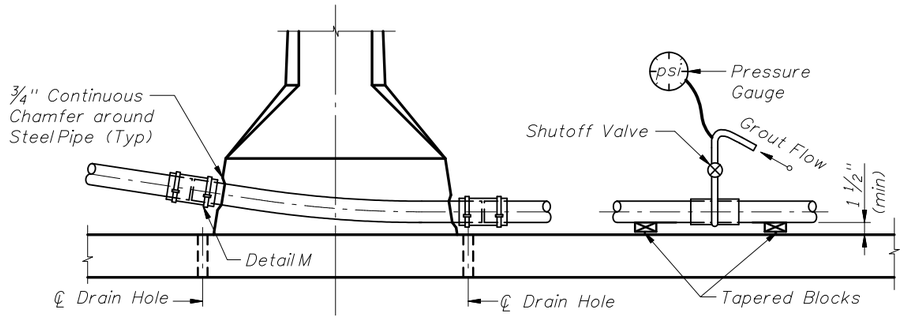
ELEVATION VIEW
(TIMBER PILES SHOWN, STEEL H PILES AND STEEL PIPE PILES SIMILAR)

REVISIONS						2008 Interim Design Standard	Interim Date	Sheet No.
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION	TEMPORARY DETOUR BRIDGE GENERAL NOTES AND DETAILS	01/01/08	3 of 7
01/01/08	SJN	Added dimensions between deck surface and underside of bearings, including depth of Truss Panel.					Index No. 21600	



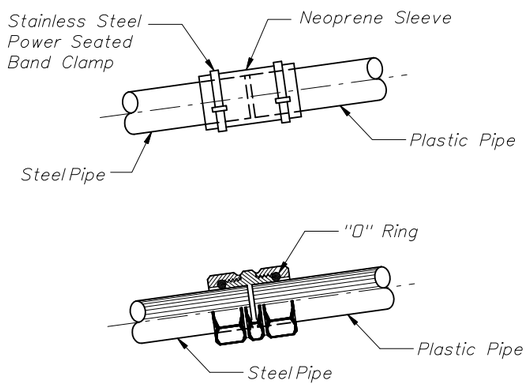
NOTES:
Place Tapered Blocks Under Each Tendon to be Grouted to Raise Duct off Tendon Strands. Center Strands within Duct before Grouting Blocks Shall be Removed after Grout has Set. Blocks Shall not Damage or Permanently Deform Duct.

ELEVATION
OF GROUT INLET

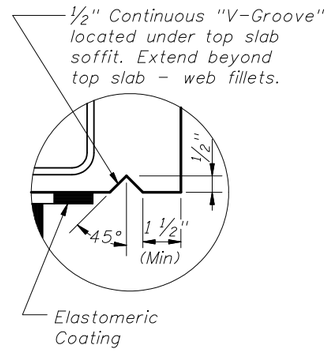


SECTION

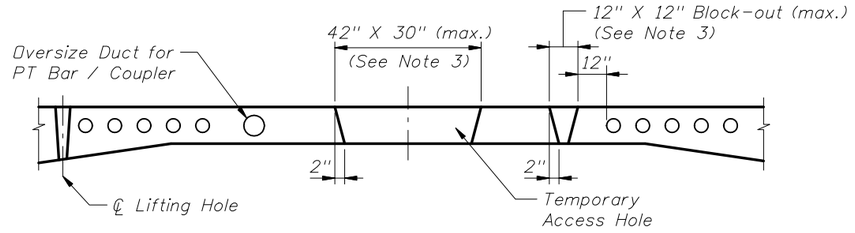
GROUTING FOR SPAN BY SPAN CONSTRUCTION



Use Approved Duct Couplers with Post-Tensioned System



DETAIL OF DRIP
LEDGE AT ABUTMENTS AND
EXPANSION JOINTS FOR SEGMENTAL
AND CAST-IN-PLACE BOX CONSTRUCTION



TEMPORARY ACCESS HOLES

Notes: Temporary Access Holes

1. Temporary access holes to facilitate access for erection, jacking and grouting operations inside the box during construction are allowed. The access holes shall be limited to a maximum size of 42" wide x 30" long and shall be limited to (1) per span.
2. Slab block-outs for temporary / permanent longitudinal post-tensioning bars are not allowed. Temporary / permanent PT bars in the top slab shall be placed in oversized ducts in the slab to accommodate both the bar and coupler.
3. In lieu of (1) 42" x 30" temporary access hole, a maximum of 2 top slab blockouts (12" x 12" (max.)) between the webs is allowed for construction per span. Block-outs shall be a minimum of 12" from the nearest duct or anchor and shall be located as to prevent direct drip onto bottom slab anchors.

Notes: Repair of Temporary Access Holes, Block-outs, and Lifting Holes

1. Form all large blockouts with tapered sides.
2. Immediately before casting the concrete, mechanically clean the mating concrete surfaces to remove any laitance and to expose small aggregate.
3. Repair all holes and blockouts with Magnesium Ammonium Phosphate Concrete within 24 hours of cleaning concrete.
4. After completion of the deck grooving, coat the repaired and surrounding concrete surfaces with Methyl Methacrylate.
5. Alternately, epoxy grout may be used to repair holes. Methyl Methacrylate is not required with epoxy grout.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/08	SJN	Deleted Shrink Wrap from Duct Coupler Detail with Neoprene Sleeve.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2008 Interim Design Standard

POST-TENSIONING ANCHORAGE AND GROUTING DETAILS

Interim Date 01/01/08

Sheet No. 3 of 3

Index No. 21803