Florida Department of Transportation

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STRUCTURES DESIGN BULLETIN C10-05

DATE: July 12, 2010

TO: District Directors of Production, District Design Engineers, District Structures Design Engineers, District Construction Engineers, District Prestress Engineers, Ghulam Mujtaba, David Sadler

FROM: Robert Robertson, P.E., State Structures Design Engineer

COPIES: Brian Blanchard, Lora Hollingsworth, Steve Plotkin, Jeffrey Ger (FHWA)

SUBJECT: Implementation of Squaring the Ends of Florida-I Beams, Reorientation of Bearing Pads and the Elimination of Permanent End Diaphragms in Concrete Girder Bridges

This Structures Design Bulletin (SDB) is a follow-up to SDB C10-04 released in May 2010. This SDB implements the squaring of the ends of Florida-I Beams, reorientation of Bearing Pads, and the elimination of permanent end diaphragms in Florida-I Beam pretensioned simple span bridges. The plan for these improvements was included in SDB C10-04; included here are the effects of the implementation.

REQUIREMENTS

1. Design Standards

The Florida-I Beam and related Design Standards Index Sheets have been updated and Index No. 20512 has been released for implementation with the July 2010 Interim Design Standards. Copies of these sheets and their associated data tables are included with Attachment 'A' as listed below.

Attachment 'A', New and Released Design Standards:

a. Index No. 20010 (2 Sheets): Typical Florida-I Beam Details and Notes
b. Index No. 20036 (2 Sheets): Florida-I 36 Beam – Standard Details
c. Index No. 20045 (2 Sheets): Florida-I 45 Beam – Standard Details
d. Index No. 20054 (2 Sheets): Florida-I 54 Beam – Standard Details
e. Index No. 20063 (2 Sheets): Florida-I 63 Beam – Standard Details
f. Index No. 20072 (2 Sheets): Florida-I 72 Beam – Standard Details
g. Index No. 20078 (2 Sheets): Florida-I 78 Beam – Standard Details
h. Index No. 20510 (1 Sheet): Bearing Pad Details for Florida-I Beams
i. Index No. 20512 (2 Sheets): Bearing Plate Details for Florida-I Beams

2. Structures Manual Volume 1: Structures Design Guidelines

Revise the Structures Design Guidelines as follows:

a. Section 4.2.10: Skewed Decks – Revise the last sentence of Paragraph B as follows:

~~In addition~~ For all bridges, except those with a thickened slab end as used with Florida-I beam simple span structures, three No. 5 Bars at 6-inch spacing, full-width, must be placed parallel to the end skew in the top mat of each end of the slab.

b. Section 4.2.13: Thickened Slab End Requirements – Add the following section:

For pretensioned simple span Florida-I Beam bridges, design thickened slab end at locations of slab discontinuity not supported by full depth diaphragms. See ***SDM*** Chapter 15 for thickened slab end details.

c. Section 4.3.1: General – Replace Paragraph F, add Paragraph G, H and I and add Commentary:

F. ~~Click to view Standard Prestressed Beam Section Properties.~~ Standard prestressed beam properties are included in Volume 3 of the Structures Manual.

G. For pretensioned simple span Florida-I Beam bridges, eliminating the permanent end diaphragms is the preferred option. However, in cases where there are significant lateral loads, partial depth, permanent end diaphragms may be used. See ***SDM*** Chapter 15 for partial depth diaphragm details. For spans requiring end diaphragms, determine if diaphragms are necessary for every bay.

Commentary: For spliced post-tensioned girder bridges, diaphragms at the splice and anchorage locations are required.

H. Analyze spans subject to significant lateral loads to determine if diaphragms are needed.

Commentary: When investigating the effect of significant lateral loads such as vessel collision or wave loads, check the stresses at the interface of the beam top flange and the beam web, from each end of the beam to a longitudinal distance approximately equivalent to the beam height.

I. When precast pretensioned I-beam ends are not encased in concrete diaphragms, coat the ends of beams with two layers of type F-1 epoxy compound within seven days of detensioning. Prepare concrete surface and apply in accordance with the manufacturer's recommendations. The finish thickness of the epoxy coating must be a minimum 1/16 inch.

d. Section 6.5.2: Maintainability – Revise Paragraph A.3 and Paragraph B and add Commentary:

3. Design and detail provisions for the removal of bearings, such as jacking locations, jacking sequence, jack load, etc. Verify that the substructure width is sized to accommodate the jacks and any other required provisions. Simple span pretensioned Florida-I beams are exempt from this requirement.

B. ~~The replacement of bearings for conventional girder structures, particularly concrete beams, is relatively simple, as jacking can be accomplished between the end diaphragms and substructure. For these bridges, a note describing the jacking procedure for replacing bearings will usually suffice.~~ Certain non-conventional structures, such as steel girders or segmental concrete box girders, require separate details and notes describing ~~the~~ jacking procedures. For steel I-girder bridges, design so that jacks are placed directly under girder lines. For steel box girder bridges, design so that jacks are placed directly under diaphragms. Always include a plan note stating that the jacking equipment is not part of the bridge contract.

Commentary: Few concrete I-beam bridges have required elastomeric bearing pad replacement. Occasional replacement of these pads does not justify requiring these provisions for every bridge.

e. Section 7.6: Widening Rules – Add Paragraph F and Paragraph G:

F. When widening with Florida-I beams, squaring Florida-I beam ends, placing bearing pads orthogonally and eliminating permanent end diaphragms are the preferred options. However, skewed beam ends, skewed bearing pads and end diaphragms may be used at the discretion of the DSDE.

G. Where the existing bridge uses end diaphragms and diaphragms are proposed for the widening, connect the new diaphragm to the existing diaphragm. Drill and epoxy rebar into the adjacent existing diaphragm. Do not drill into existing beams.

3. Structures Manual Volume 2: Structures Detailing Manual

Revise the Structures Detailing Manual as follows:

a. Section 15.2: Superstructure Drawings – Framing Plan – Revise Sentence 3 as follows:

3. Intermediate and end diaphragms

b. Section 15.5: Superstructure Drawings – Concrete Diaphragms – Delete this section.

c. Section 15.6: Superstructure Drawings – Details – Change section to 15.5, revise Paragraph D and add Paragraphs E through H:

D. Stay-in-place form details. See Figure 15.8-3, Figure 15.9-2, Figure 15.9-3, Figure 15.9-4 and Figure 15.9-5.

E. Thickened slab end detail. Show section and plan view. Use the standard dimension and reinforcement details shown in Figure 15.5-1 and Figure 15.5-2.

F. Sections through diaphragms at piers and end bents. Detail reinforcement, expansion joints, construction joints and control joints. Include compressible material if cast back-to-back (such as two or more layers of 30lb felt paper) between adjacent diaphragms at interior supports. Show dimension between adjacent diaphragms at expansion joints. Coordinate with expansion joint details.

G. Section through intermediate diaphragms. Detail reinforcement to avoid conflicts with slab steel.

H. Jacking locations. Show jacking service loads in tabular format.

d. Section 15.7: Deck Drains – Change section to 15.6

e. Section 15.8: Superstructure Design Considerations – General – Change section to 15.7

f. Section 15.9: Superstructure Design Considerations – Prestressed Beams – Change to Section 15.8, revise Paragraph A and B as follows and add Paragraph F:

A. Avoid conflicts between diaphragm reinforcement and slab reinforcement. Detail these areas in the plans ~~and on the bar list~~ to ensure that there are no conflicts. Include diaphragm reinforcement in the bar list.

B. ~~To facilitate jacking procedures, detail the bottom of end diaphragms as flat from corner to corner of adjacent beams, i.e. no steps or haunches. Generally, end diaphragms should be 12” thick. See Figure 15.9-1.~~ When end diaphragms are required on spans with a Florida-I beam superstructure, partial depth diaphragms may be used. Show one vertical row of #5 bars at a minimum in each diaphragm threaded into inserts cast into beam. Show insert layout in the framing plan. See applicable beam Design Standard for vertical spacing of inserts. See Figure 15.8-1 and Figure 15.8-2 for details. Details shown are minimum dimensions and reinforcing. Diaphragm dimensions and reinforcing can be increased when required by analysis.

F. Square all beam ends on simple spans utilizing Florida-I beam superstructures. See Figure 15.8-4 through Figure 15.8-6 for details related to the squaring of beam ends.

g. Section 15.10: Superstructure Design Considerations – Steel Girders – Change section to 15.9

Several figures included in Structures Manual Volume 2 were added due to the changes detailed herein. Copies of these figures are included with Attachment ‘B’ as listed below.

Attachment ‘B’, New Figures in the Structures Detailing Manual:
a. Added Figure 15.5-1: Thickened Slab End Details
b. Added Figure 15.5-2: Thickened Slab End at Interior Support
c. Added Figure 15.8-1: Concrete End Diaphragm Details
d. Added Figure 15.8-2: Concrete End Diaphragm Reinforcement Details
e. Added Figure 15.8-4: Squared Beam End Details – Exp. Joint at Int. Support
f. Added Figure 15.8-5: Squared Beam End Details – Continuous Deck at Int. Support

g. Added Figure 15.8-6: Squared Beam End Details – Expansion Joint at End Bent

4. Structures Manual Volume 3: Instructions for Structures Related Design Standards

Several sections of the Structures Manual Volume 3 were affected by the changes detailed herein. Copies of these sections are included with Attachment ‘C’ as listed below.

Attachment ‘C’, New and Revised Instructions for Structures Related Design Standards:

a. Index No. 20010: Prestressed Florida-I Beam Instructions
b. Index No. 20512: Bearing Plate Details for Florida-I Beams

5. FDOT Standard Specifications for Road and Bridge Construction

a. Section 932 NONMETALLIC ACCESSORY MATERIALS FOR CONCRETE PAVEMENT AND CONCRETE STRUCTURES – Tentative changes are as follows, to be implemented with the January 2011 Standard Specifications:

SECTION 932-1.4 changed to 932-1.3.5
SECTION 932-1.5 changed to 932-1.3.6
SECTION 932-1.6 changed to 932-1.3.7
SECTION 932-1.4 to 932-1.6 (Pages 882–883) are deleted and the following substituted:

932-1.4 Pre-cured Silicone Sealant:
932-1.4.1 General: Pre-cured silicone sealants are intended for sealing vertical joints on concrete surfaces. Type V1 sealant is intended for contraction joints or joints with movements less than 1/4 inch. Type V2 sealant is intended for expansion joints not exceeding 200% of the nominal joint opening. Type V2 sealant may be substituted for Type V1 sealant. The joint sealant must be listed on the Department’s Qualified Products List (QPL).
932-1.4.2 Physical Requirements: Sealant material shall be a nominal 1/16 inch thick, available in standard widths from 1 inch to 6 inches, colored to match the finish surface coating of the concrete, and meet the following minimum testing requirements:

TEST PROPERTY DESCRIPTION	TEST METHOD	TYPE V1	TYPE V2
Minimum Movement, Cohesion/Adhesion	ASTM C 1523	100%	200%
Dry/Room Temperature Loss of Adhesion/Cohesion	ASTM C 1523	None	None
Water Immersion Loss of Adhesion/Cohesion	ASTM C 1523	None	None
Frozen Loss of Adhesion/Cohesion	ASTM C 1523	None	None
Heat Loss of Adhesion/Cohesion	ASTM C 1523	None	None
Artificial Weathering Loss of Adhesion/Cohesion	ASTM C 1523	None	None

TEST PROPERTY DESCRIPTION	TEST METHOD	TYPE V1	TYPE V2
Artificial Weathering Loss of Adhesion/Cohesion	ASTM C 1523	None	None
Tear Propagation	ASTM C 1523	NT or PT (No Tear or Partial/Knotty Tear)	NT or PT (No Tear or Partial/Knotty Tear)
Ultimate Elongation	ASTM D 412	250%	500%

The Contractor must submit one 6 inch long sample to the Engineer for approval, prior to installation, for each different colored surface to be sealed on the project.

932-1.4.3 Qualified Products List: Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6. Applications must include test results, an IR scan and a product data sheet with the recommended adhesive and installation requirements.

COMMENTARY

The following attachments may be used to assist in preliminary design and cost estimating:

Attachment ‘A’ (New and Revised Design Standards)
Attachment ‘B’ (New Figures in the Structures Detailing Manual)
Attachment ‘C’ (New and Revised Instructions for Structures Related Design Standards)

BACKGROUND

The implementation plan for squaring the ends of prestressed concrete Florida-I Beams, reorienting bearing pads, and eliminating diaphragms was introduced in SDB C10-04, released in May, 2010. The rationale for these improvements was detailed in that bulletin. Provided herein is the background regarding the decisions that were made in the process of implementing these changes.

In the process of revising the Florida-I Beam Standards to correspond with the change to no end diaphragms, the Bars ‘4L’ were studied for their effectiveness in helping the Florida-I Beams (FIBs) meet the AASHTO ***LRFD*** 5.8.3.5 requirement for longitudinal steel. All cases of maximum and minimum FIB depths and spacing were checked using the FDOT Prestressed Beam Program V3.2. It was determined that Bars ‘4L’ are ineffective in helping meet AASHTO requirements for longitudinal steel in FIBs. Even with larger-than-practical spans and far less-than-practical strand patterns, Bars ‘4L’ were not required to meet longitudinal steel requirements in their effective distance from the end of the beams. For that reason, those bars were completely removed from the Florida-I Beam Standards.

It was suggested by prestressed beam manufacturers that the beveled bearing plate shown on Index 20511 be revised to be a parallelogram shape in order to eliminate the double bevel as a cost saving measure. This change was made, along with several revisions to the dimensions shown on the Standard to create more uniformity in steel plate overhang. In order to eliminate confusion between the revised and old

Standard, the revised Standard was given a new number of 20512. Standard 20511 will be retired at a later date.

Although end diaphragms will not be necessary for most projects, there may be some projects where significant lateral loads are present and end diaphragms will be necessary. The need for diaphragms in these areas will be evaluated as part of the design, and when diaphragms are necessary, designers are encouraged to use partial-depth diaphragms wherever possible. Partial depth diaphragm details are included in the ***Structures Detailing Manual*** to provide designers with minimum reinforcing and dimensions. There may be some cases such as widening projects or projects with large lateral loads for which diaphragms and/or skewed end beams are required. The use of these details for these projects is left to the District Structures Design Engineer.

For bridges without full depth end diaphragms, a transverse thickened slab will be necessary to support the free edges of slabs between girders at discontinuities such as bridge expansion joints. The thickened slab is to be cast monolithically with the slab and designed in accordance with the AASHTO LRFD Bridge Design Specifications, Section 4.6.2.1.4. As part of the development of these improvements, the forces and related effects at a slab discontinuity were examined and a thickened slab design was completed. Transverse thickened slab details are included in the ***Structures Detailing Manual*** to provide designers with minimum reinforcing and dimensions.

Without the presence of end diaphragms, an aesthetic treatment will be necessary so that girder ends are not visible at intermediate piers. The most economical aesthetic treatment was determined to be a pre-cured silicone sealant which will be adhered to the exterior face of the concrete girders and will span the horizontal gap between beams. Pre-cured sealant systems consist of approximately 1/16 inch thick silicone membrane that is bonded to the surface of the concrete with a compatible silicone based adhesive to create a weatherproof or visual seal. The sealant systems have been successfully utilized in building applications for many years, providing relatively inexpensive, durable, and easily replaceable sealant systems for vertical applications. The silicone sealant is available in a variety of colors and widths for sealing both fixed and expansion joints, and the low profile height creates an almost seamless finish on concrete surfaces with Class 5 applied coatings. Proposed specification language has been developed for approval of this new type of sealant system under Section 932 for implementation with the January 2011 Specifications Workbook.

At intermediate bents, where the beam crosses the joint between subsequent spans, a bond breaker will be required between the top flange of the beam and the bottom of the bridge deck so that the beam is not inhibited from rotating, expanding or contracting. The material selected as a bond breaker was Expanded Polystyrene (EPS). EPS is a very stable, lightweight and inexpensive joint filler that provides minimum resistance to compression and shear forces resulting from thermal movements and live load rotation of the bridge girders. This product has been successfully used for eliminating concrete spalling on retaining wall and approach slab copings for many years (see Index Nos. 20900 & 20910). The compressive stiffness is adequate to support the wet concrete during installation with negligible deformation, but allows for deformation under in-service conditions.

IMPLEMENTATION

The changes detailed in this bulletin will be used on all Design-Bid-Build projects having a design start date on or after May 19, 2010, the date of implementation of Structures Design Bulletin SDB C10-04.

The changes detailed in this bulletin could be used on design-build projects having a Technical Proposal due date on or after May 19, 2010. Design-build projects which have already submitted Technical Proposals as of the date of this bulletin may incorporate this bulletin as a cost saving proposal at the discretion of the District Structures Design Engineer.

No redesign of on-going projects is required as a result of this bulletin, but districts may elect to revise present or completed designs at their discretion. Any bridge designed prior to the issuance of the revised Design Standards will require the Engineer of Record to complete the design.

CONTACT

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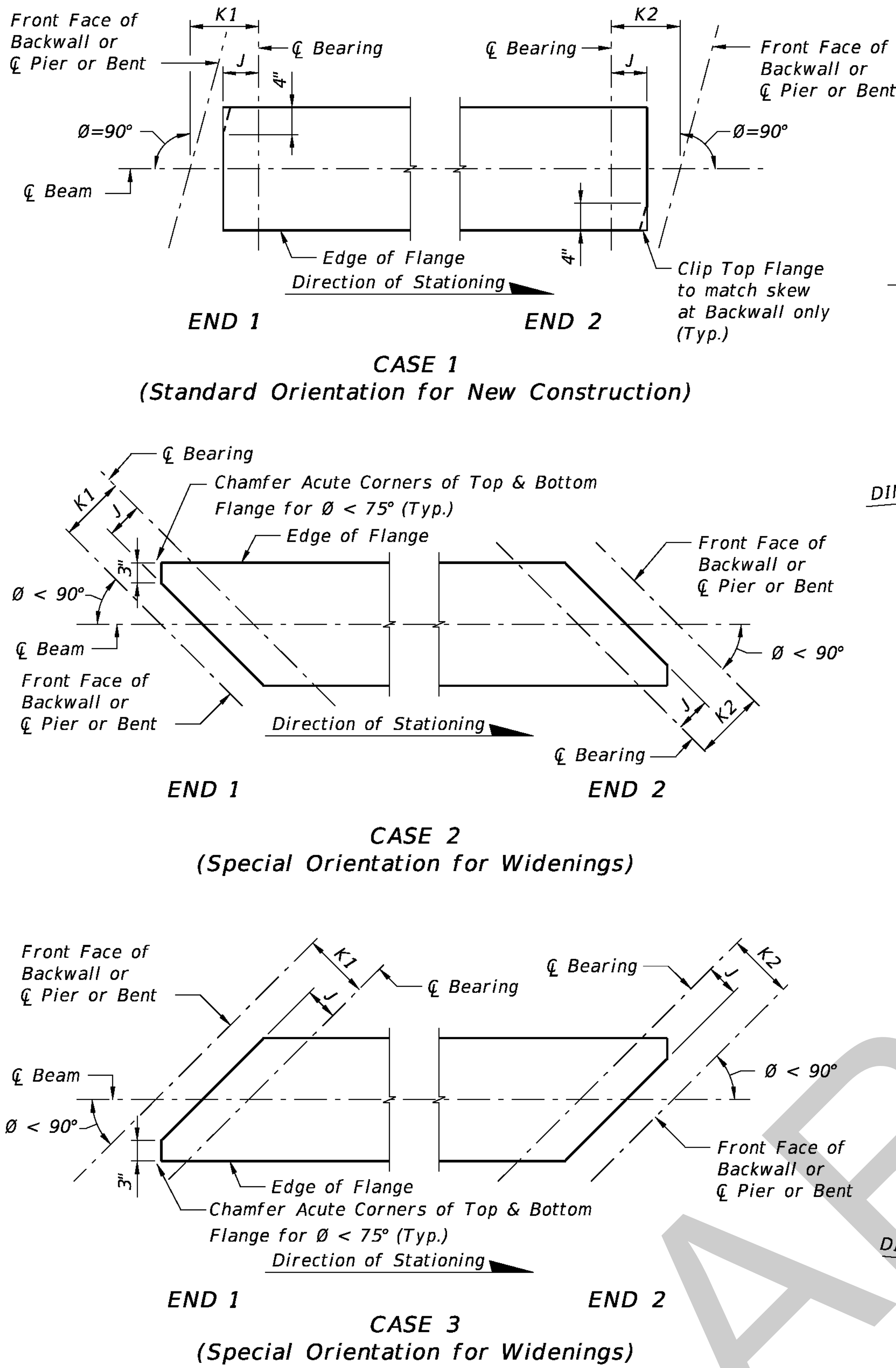
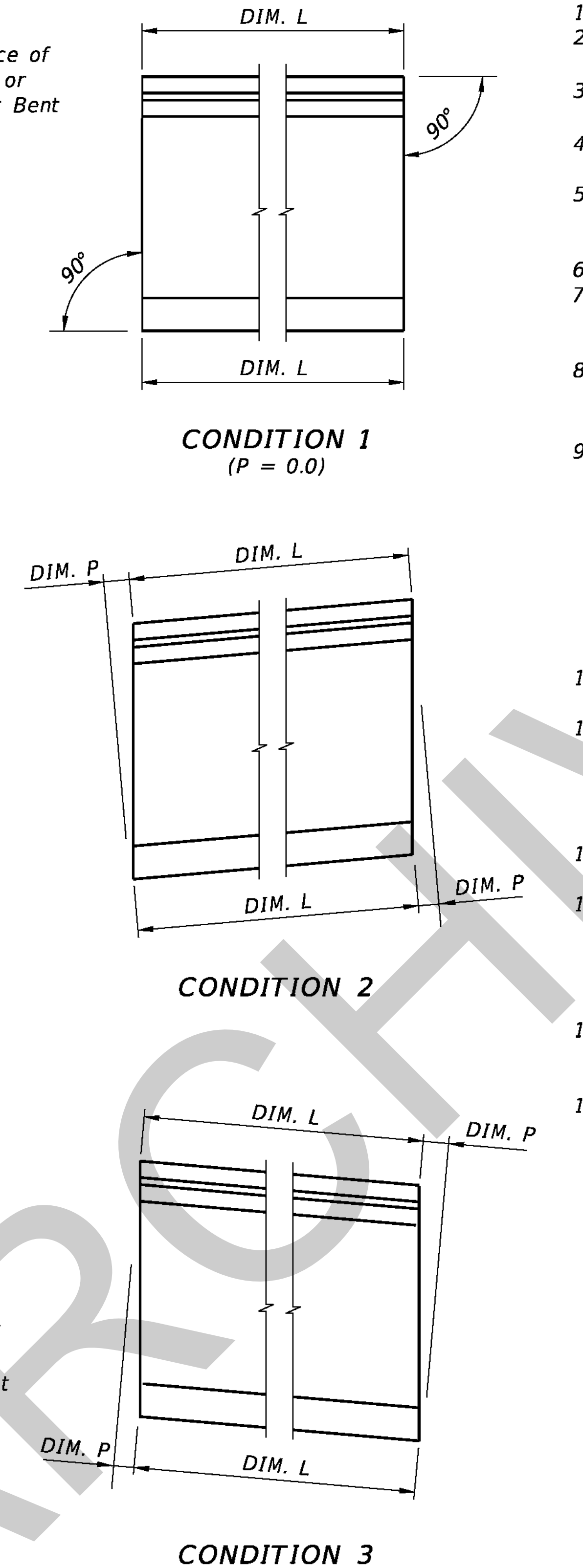
ATTACHMENT A



SCHEMATIC PLAN VIEWS AT BEAM ENDS



SCHEMATIC END ELEVATIONS OF BEAMS

(Showing Vertical Bevel of Beam End)

BEAM NOTES

1. All bar dimensions are out-to-out.
2. Place one (1) Bar 5K or 5Z at each location as detailed alternating the direction of the ends for each bar (see "ELEVATION AT END OF BEAM", Index Nos. 20036, 20045, 20054, 20063, 20072 and 20078).
3. Strands N shall be either ASTM A416, Grade 250 or Grade 270, seven-wire strands ⅜" Ø or larger, stressed to 10,000 lbs. each.
4. Cut all Prestressing Strands flush with the end of the beam after detensioning and remove recessed strand grommets without damaging the surrounding concrete.
5. Epoxy coat ends of beams, including clipped and chamfer surfaces, with two layers of Type F-1 epoxy compound within 7 days of detensioning. Prepare concrete surface and apply in accordance with the manufacturer's recommendations. The finish thickness of the epoxy coating must be a minimum 1⁄16".
6. Unless otherwise noted, the minimum concrete cover for reinforcing steel shall be 2".
7. At the Contractor's option, welded deformed wire reinforcement may be used in lieu of Bars 3D, 5K, 4M, and 5Z as shown on the Standard Details for each beam size. Welded deformed wire reinforcement shall conform to AASHTO M221, with a minimum yield strength of 75 ksi.
8. Install Safety Sleeves approximately 2'-0" from ends of beam and spaced on 8'-0" (Max.) centers. Safety Sleeves shall be 2½" NPS x 5" Sch. 40 PVC Pipe with Cap. 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 3C1, 3C2, 3D1, 3D2, 5K, 4M1, 4M2, 5Y and 5Z placed within the limits of the spacing for Bars 3C in "ELEVATION AT END OF BEAM", shall be placed parallel to the skewed end of the beam. Bars 3D3, 5K and 4M3 located beyond the limits of Bars 3C shall be placed perpendicular to the longitudinal axis of the beam. Fan Bars as needed to avoid overlapping bars at the transition to Bars 3D3 and 4M3, and field cut to maintain minimum cover. Provide additional Bars 4M1, 4M2, 3D1 and 3D2 as required; additional bars are not included in the Number Required on the "BILL OF REINFORCING STEEL". For placement locations, see "SKEWED BEAM END DETAILS". Adjust the dimensions of Bars 3C1, 3C2, 3D1, 3D2, 4M1 and 4M2 as shown on the "BENDING DIAGRAM" for skewed end conditions.
10. Placement of Bars 3C1, 3D1 and 4M1 correspond to END 1, and Bars 3C2, 3D2 and 4M2 correspond to END 2. END 1 and END 2 are shown on the beam "ELEVATION".
11. For Beams with vertically beveled end conditions, place first row of Bars 3C1, 3C2, 3D1, 3D2, 5K, 5Y and 5Z parallel to the end of the beam. Progressively rotate remaining bars within the limits of Bars 5Z until vertical by adjusting the spacing at the top of beam up to a maximum of 1". For welded deformed wire reinforcement, cut top cross wire and rotate bars as required or reduce end cover at top of the beam to minimum 1".
12. For beams with skewed end conditions, welded deformed wire reinforcement shall not be used for end reinforcement (Bars 3D1, 3D2, 4M1 and 4M2) .
13. Bars 5K and 5Z shall be placed and tied to the fully bonded strands in the bottom or center row (see "STRAND PATTERN" on the Table of Beam Variables in Structures Plans). At the Contractor's option the length of the bottom legs of Bars 5K and 5Z may be extended to facilitate tying to the exterior strands. For welded deformed wire reinforcement, supplemental transverse #4 bars are permitted to support Pieces K & S under the cross wires on the bottom row of strands.
14. At the Contractor's option, Bars 3D1, 3D2 and 3D3 may be fabricated as a single bar with a 1'-0" minimum lap splice of the top legs, or the length of the bottom legs may be extended to facilitate tying to the exterior strands.
15. For referenced Dimensions, Angles and Case Numbers, see the Table of Beam Variables in Structures Plans.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	New Design Standard			
07/01/10	SJN	Changed SCHEMATIC PLAN VIEWS AT BEAM ENDS, Notes 3, 4, and 5. Deleted INSTRUCTIONS TO DESIGNER.			

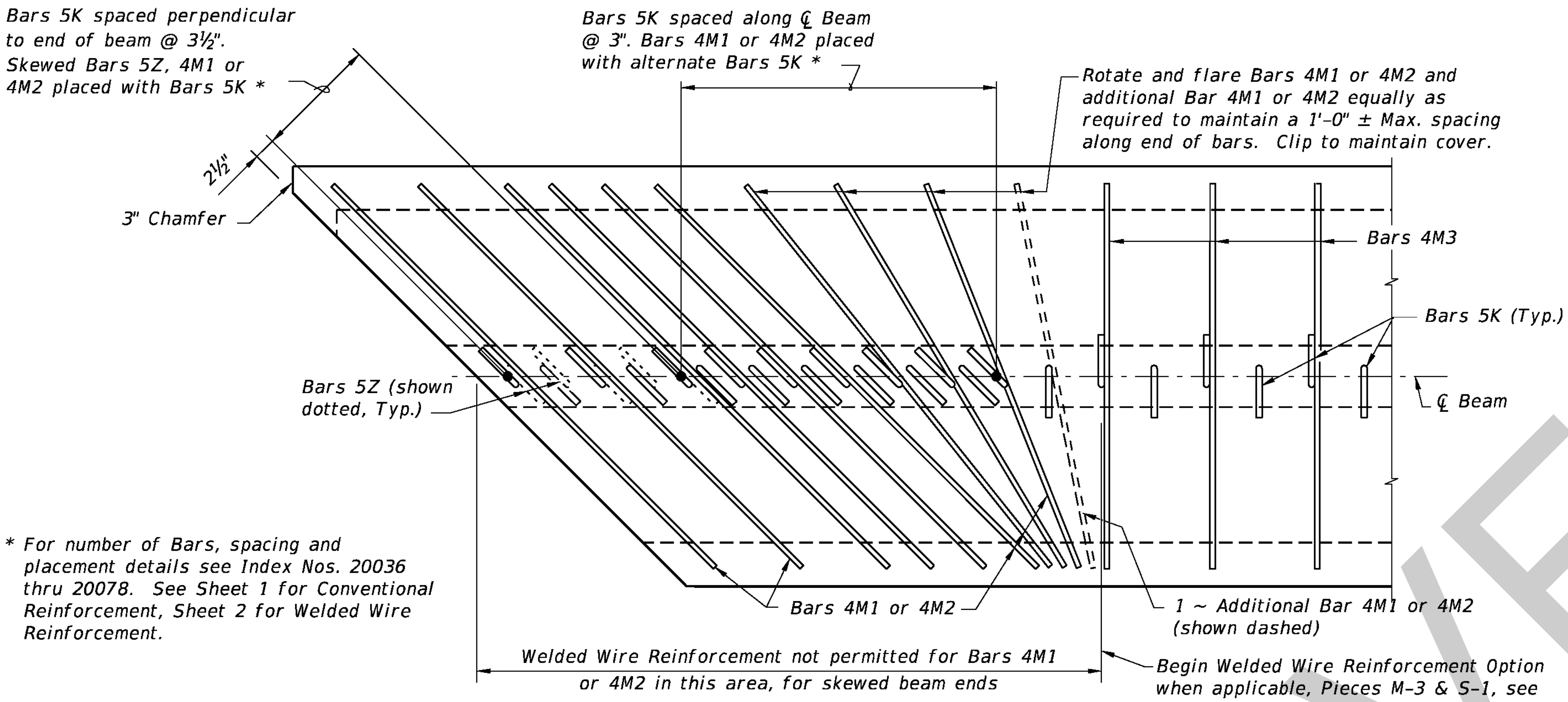
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

TYPICAL FLORIDA-I BEAM DETAILS AND NOTES

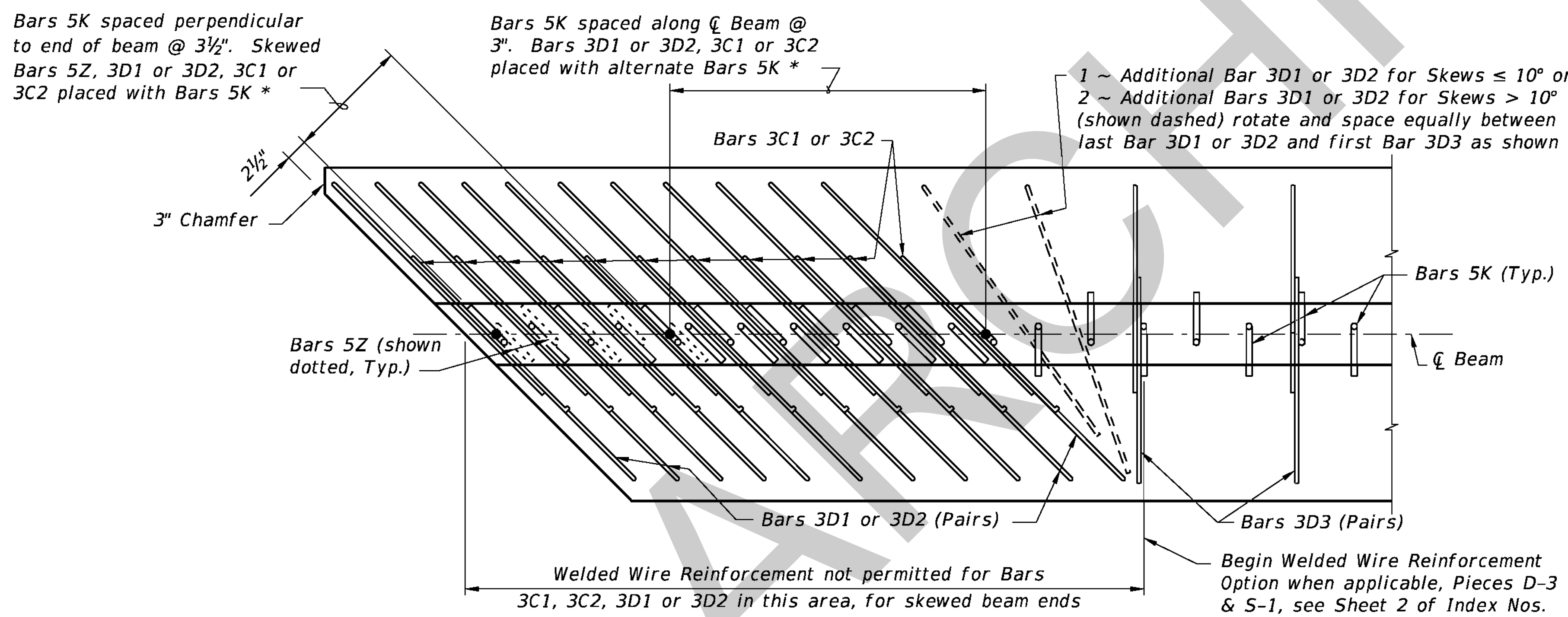
Interim Date 07/01/10

Index No. 20010



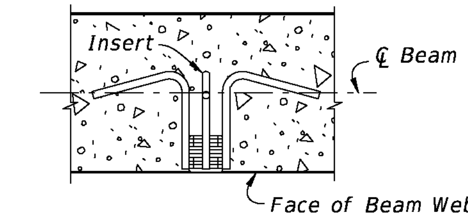
* For number of Bars, spacing and placement details see Index Nos. 20036 thru 20078. See Sheet 1 for Conventional Reinforcement, Sheet 2 for Welded Wire Reinforcement.

PARTIAL PLAN VIEW (SHOWING TOP FLANGE)
(End 1 Shown, End 2 Similar)
(Bars 5A, 4L, 5Y & Strands N not shown for clarity)



PARTIAL SECTION THRU WEB (SHOWING BOTTOM FLANGE)
(End 1 Shown, End 2 Similar)
(Bars 4L, Bars 5Y & Strands not shown for clarity)

SKEWED BEAM END DETAILS FOR WIDENING EXISTING BRIDGES
(Florida-I 36 Beam shown, others similar)

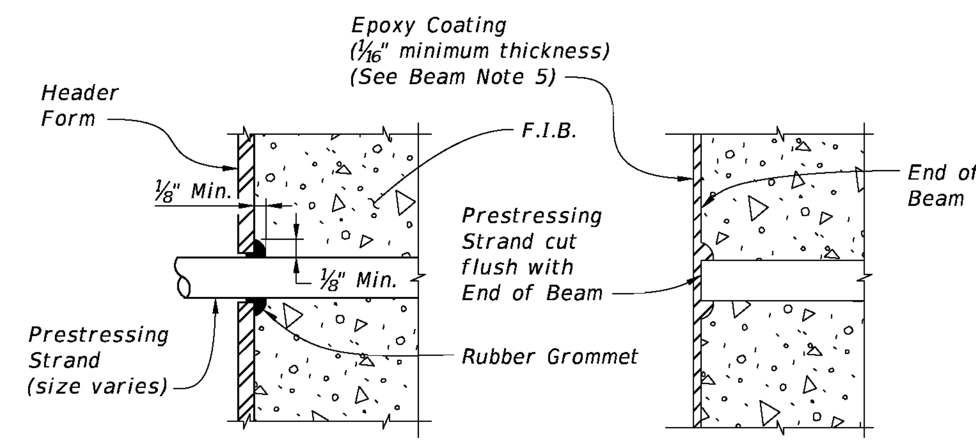


PLAN SECTION THRU BEAM WEB AT INSERT FOR DIAPHRAGM REINFORCING
(When Intermediate Diaphragms are Required by Design)

INSERT NOTES

1. Provide 1" Ø, zinc-electroplated, ferrule wing nut or coil inserts, UNC threads, 1/0 minimum gage wire, not more than 4" in depth with a minimum ultimate tensile strength of 11,400 lbs. in 4,000 p.s.i. concrete.
2. If inserts are needed on both sides (faces) of beam webs, an assembly as long as the thickness of the beam web, consisting of two (2) ferrule or coil inserts attached by two (2) or more struts may be utilized. The connecting struts shall have a minimum ultimate tensile strength of 11,400 lbs.
3. Inserts for diaphragm reinforcing are required at each end of each intermediate diaphragm shown on the Beam Framing Plan and may be required at the end of the beams when end diaphragms are shown. See Superstructure and Beam Framing Plans for longitudinal location of inserts for each face of beam.

INSERT DETAIL



TYPICAL SECTION DURING BEAM CASTING

TYPICAL SECTION AFTER EPOXY COATING

STRAND GROMMET NOTES

1. Grommet shall be natural rubber or polychloroprene (neoprene).
2. Grommets shall be sized to fit snuggly around strands. Split grommets are permitted if they fit snuggly into the form header holes and prevent mortar leakage.
3. Remove grommets prior to epoxy coating the ends of the beams.

RECESSED STRAND GROMMET DETAILS AT BEAM ENDS

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	New Design Standard			
07/01/10	SJN	Added RECESSED STRAND GROMMET DETAIL AT BEAMS ENDS. Changed first sentence of INSERT NOTE 3.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

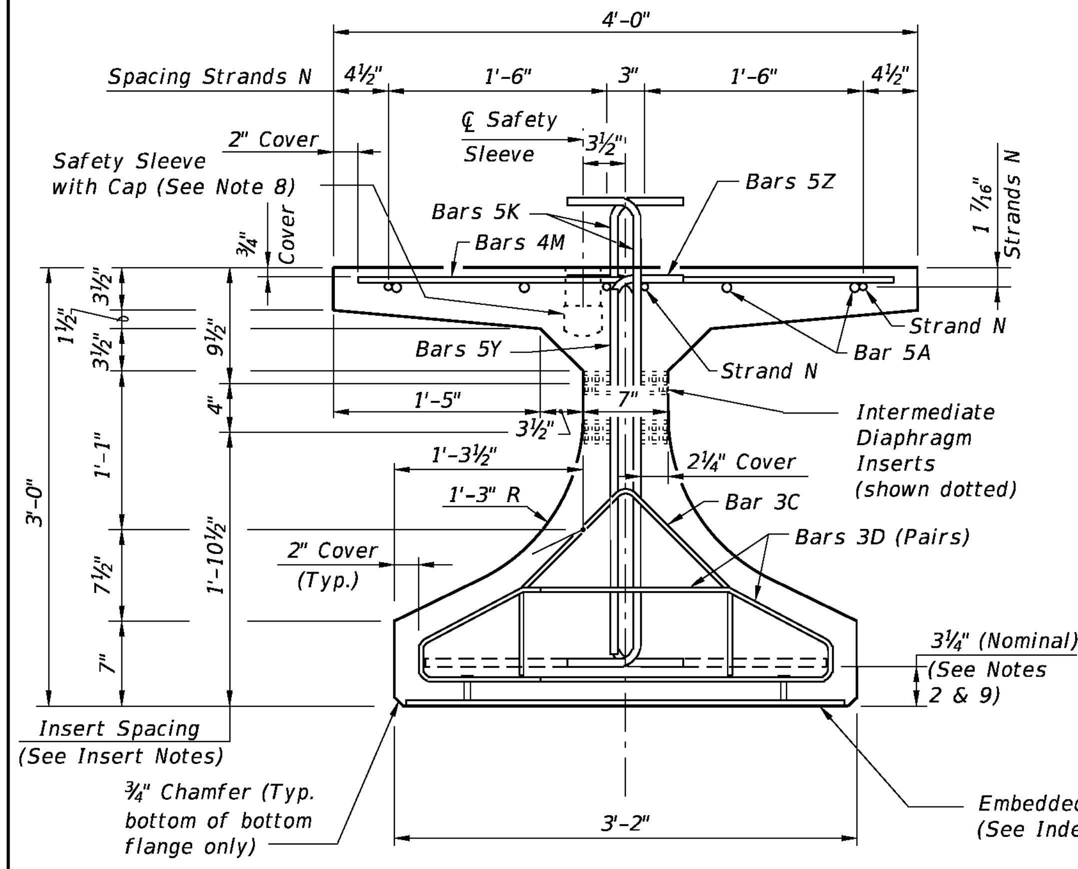
2010 Interim Design Standard

TYPICAL FLORIDA-I BEAM DETAILS AND NOTES

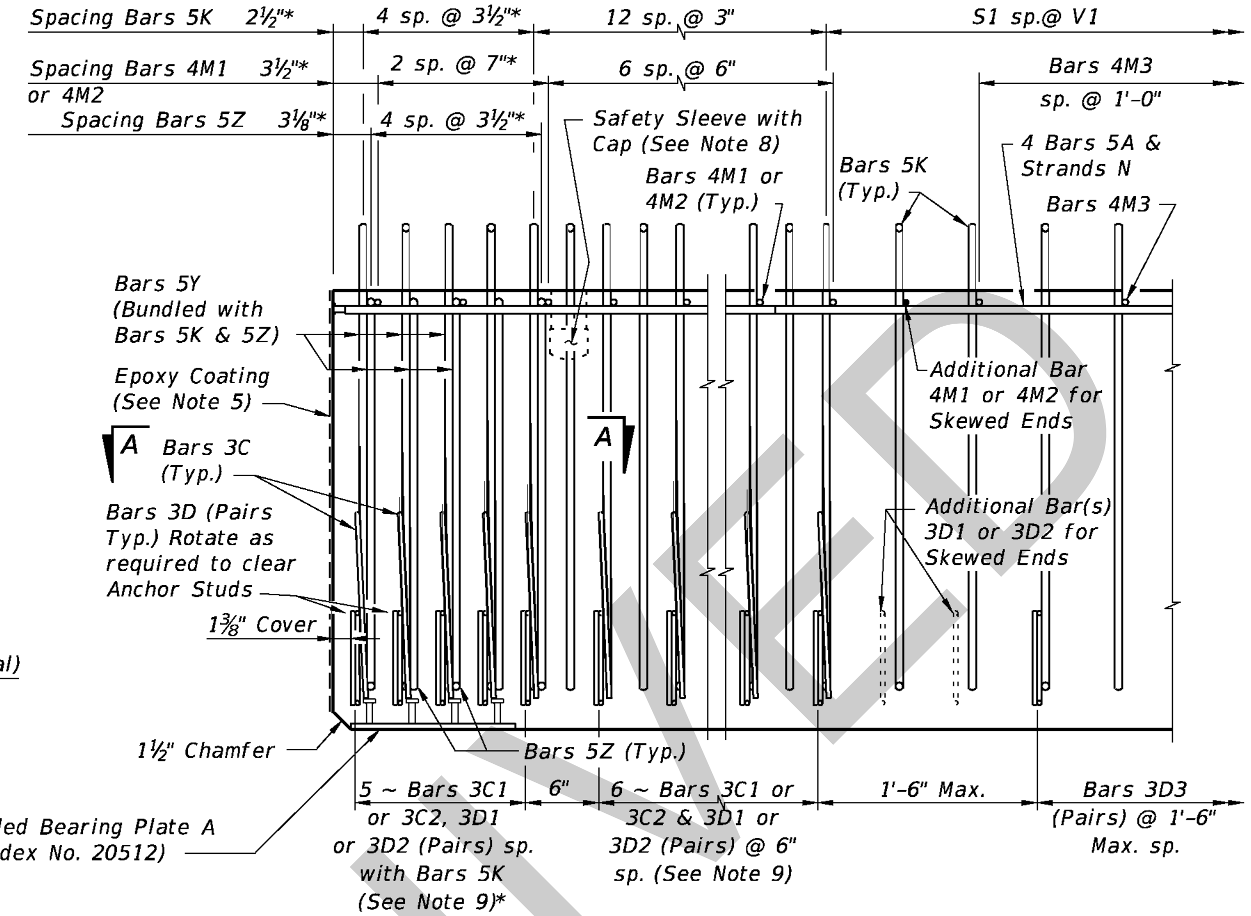
Interim Date 07/01/10

Index No. 20010

* These dimensions are measured perpendicular to the end of beam



END VIEW



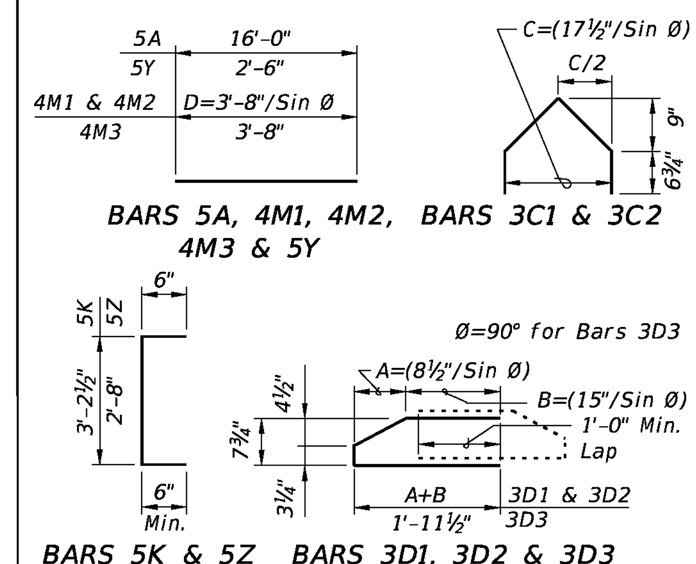
ELEVATION AT END OF BEAM
(Flanges Not Shown For Clarity)
(End 1 Shown, End 2 Similar)

CONVENTIONAL REINFORCING BAR BENDING DETAILS

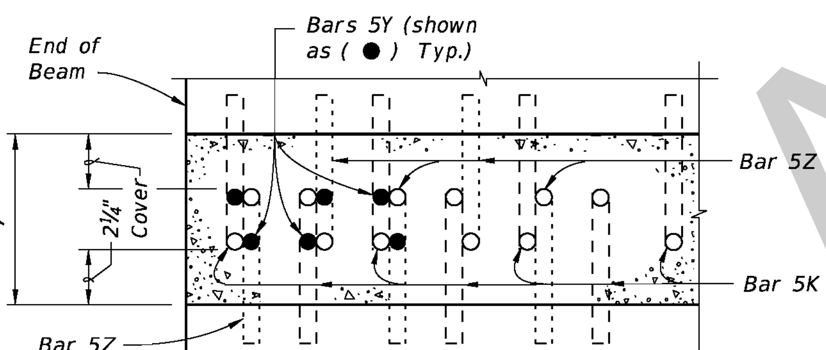
BILL OF REINFORCING STEEL

MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	8	16'-0"
C1	9, 10 & 11	3	11 (End 1)	Varies
C2	9, 10 & 11	3	11 (End 2)	Varies
D1	9, 10, 11 & 14	3	22 (End 1)	Varies
D2	9, 10, 11 & 14	3	22 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	4'-2"
M1	9 & 10	4	9 (End 1)	Varies
M2	9 & 10	4	9 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	⅜" Ø Strand	4	DIM L
Y	9 & 11	5	12	2'-6"
Z	2, 9, 11 & 13	5	10	3'-8"

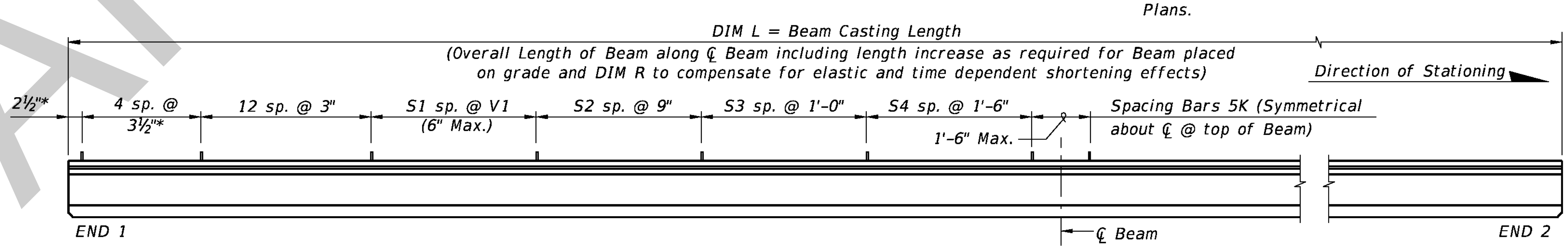
BENDING DIAGRAMS (See Note 1)



NOTES:
A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.
B. For referenced notes, see Index No. 20010.
C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.



SECTION A-A FOR CONVENTIONAL REINFORCING
(Showing Bars 5K, 5Y & 5Z Only)



ELEVATION

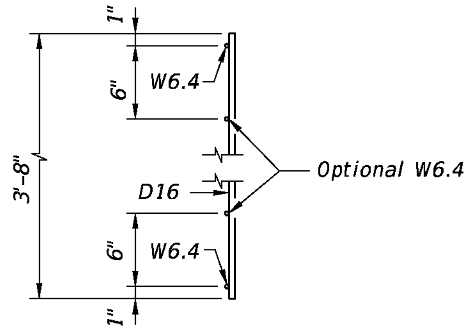
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars 4L; Changed NOTE NUMBERS for Strand N; and Embedded Bearing Plate A to Index No. 20512; Added Epoxy Coating to end of beam.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

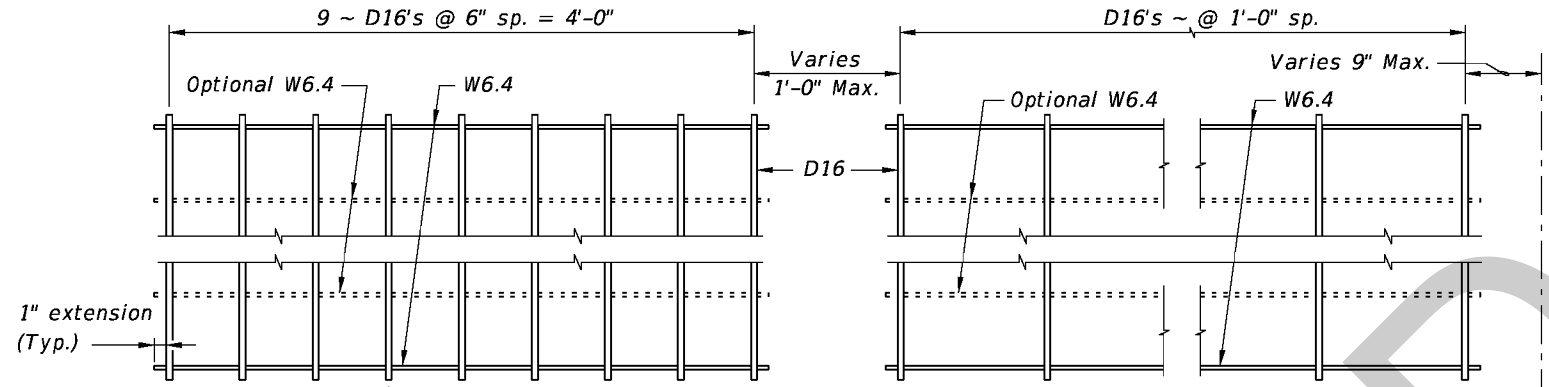
2010 Interim Design Standard

FLORIDA-I 36 BEAM - STANDARD DETAILS

Interim Date 07/01/10
Sheet No. 1 of 2
Index No. 20036

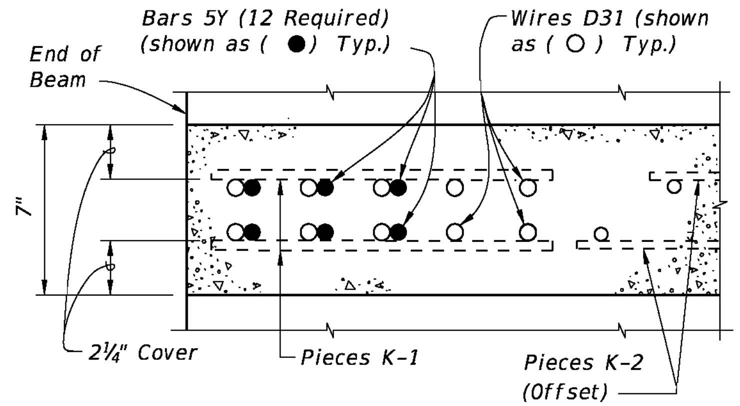


PIECES M
END VIEW

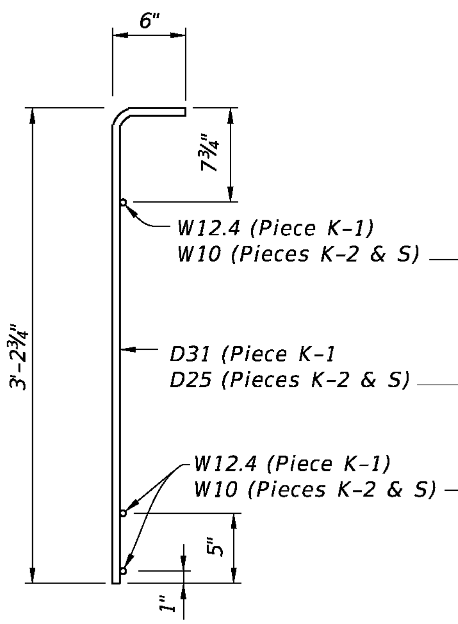


PLAN VIEW
PIECE M-1
(2 Required)

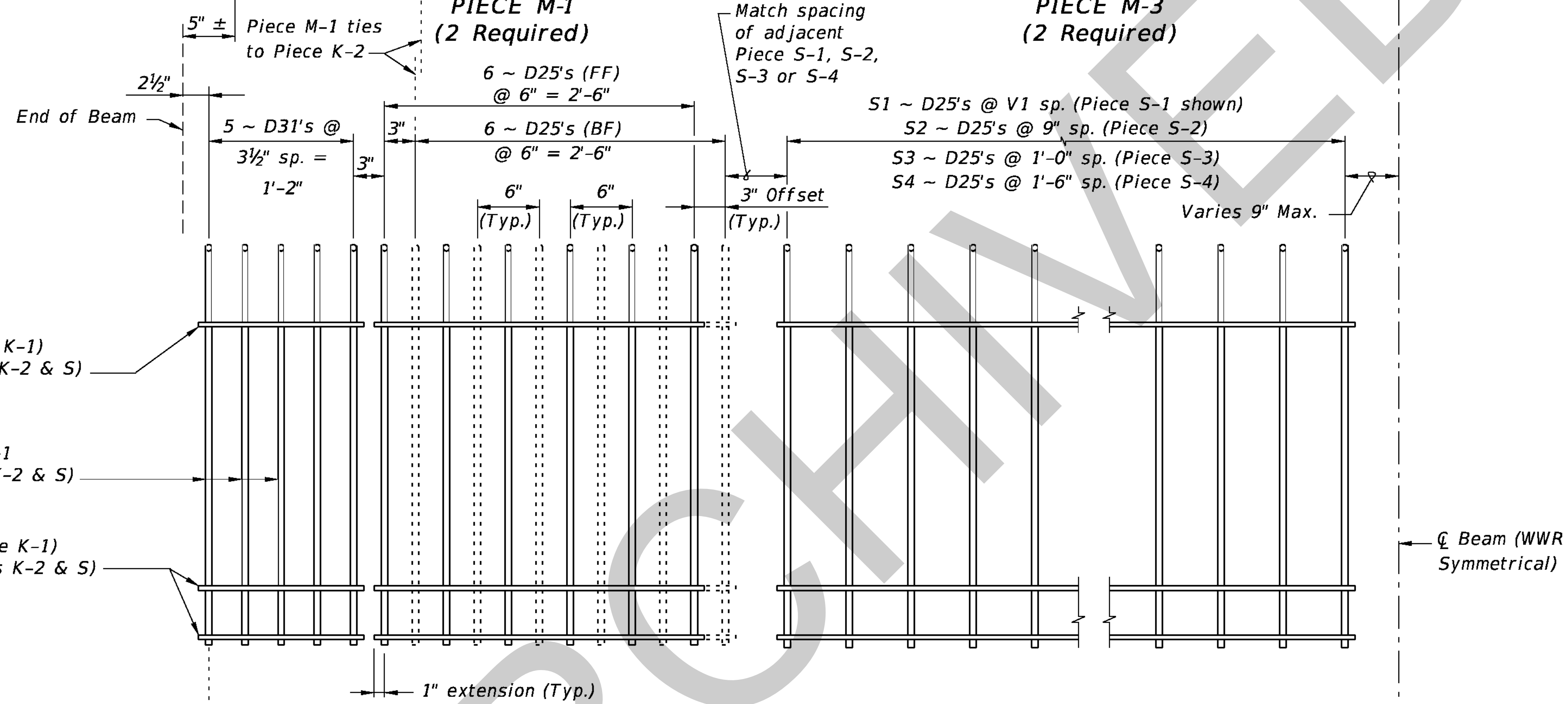
PLAN VIEW
PIECE M-3
(2 Required)



SECTION A-A
FOR WELDED WIRE REINFORCEMENT



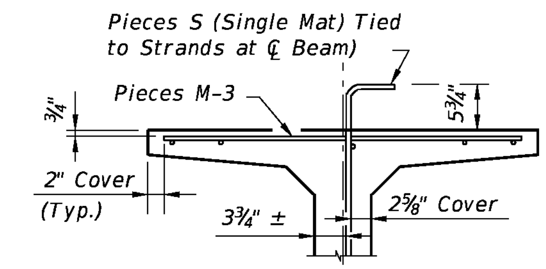
PIECES K & S
END VIEW



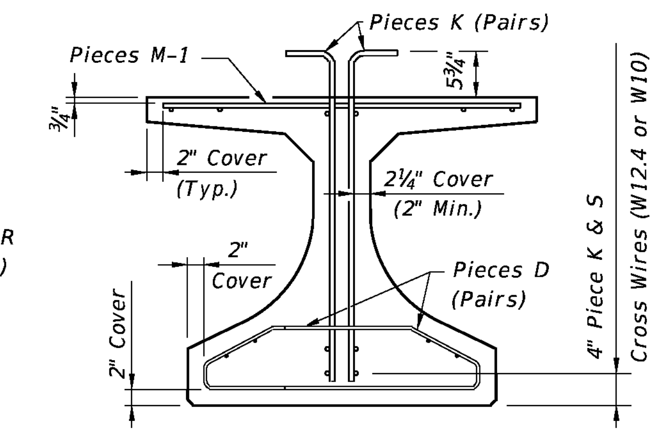
PIECE K-1
(Aligned EF)
(4 Required ~
2 Pairs)

PIECE K-2
(FF Shown Solid,
BF Shown Dashed)
(4 Required)

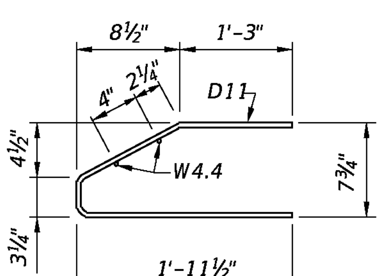
PIECE S-1, S-2, S-3 or S-4
(2 Required Each Piece)



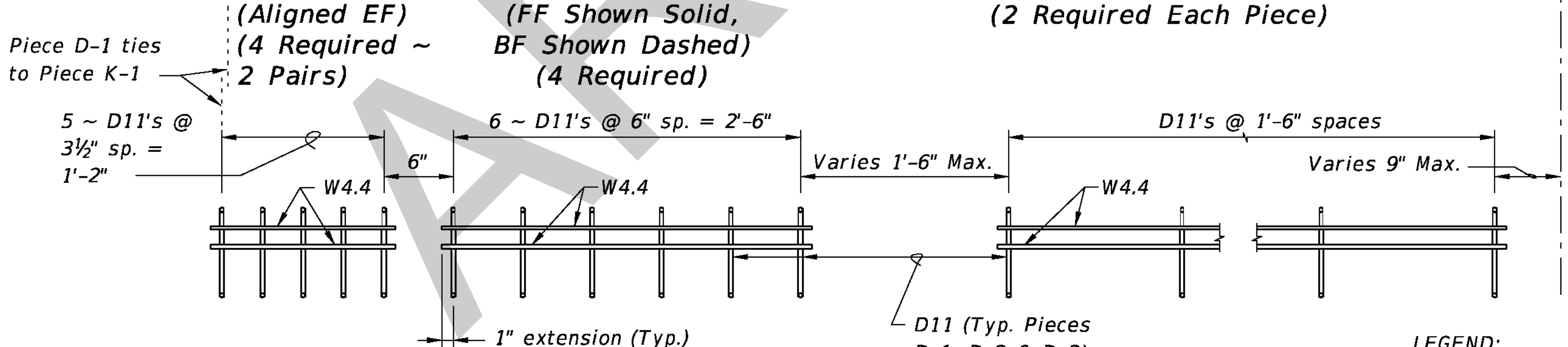
PARTIAL SECTION AT CENTER BEAM



PARTIAL BEAM END VIEW
(Conventional Reinforcing Bars A, C, Y
and Strands not Shown for Clarity)



PIECES D
END VIEW



PIECE D-1
(4 Required ~ 2 Pairs)

PIECE D-2
(4 Required ~ 2 Pairs)

PIECE D-3
(4 Required ~ 2 Pairs)

LEGEND:
EF = Each Face
FF = Front Face
BF = Back Face

NOTES:
a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
b. Place Conventional Reinforcement Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
c. Pieces may be fabricated in multiple length sections.
d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

ARCHIVED

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars L references Changed interior W6.4 wires to "Optional" for PIECES M.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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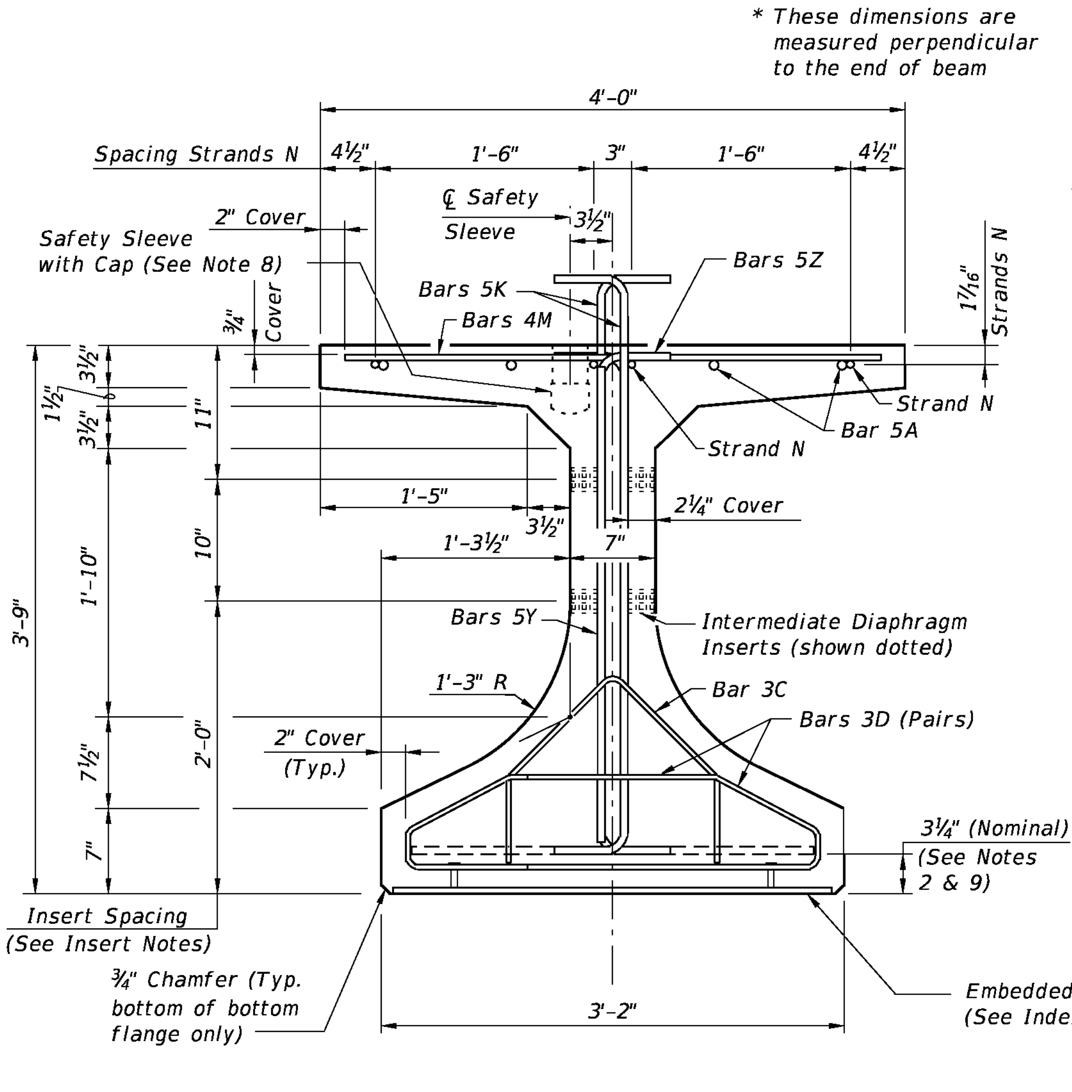
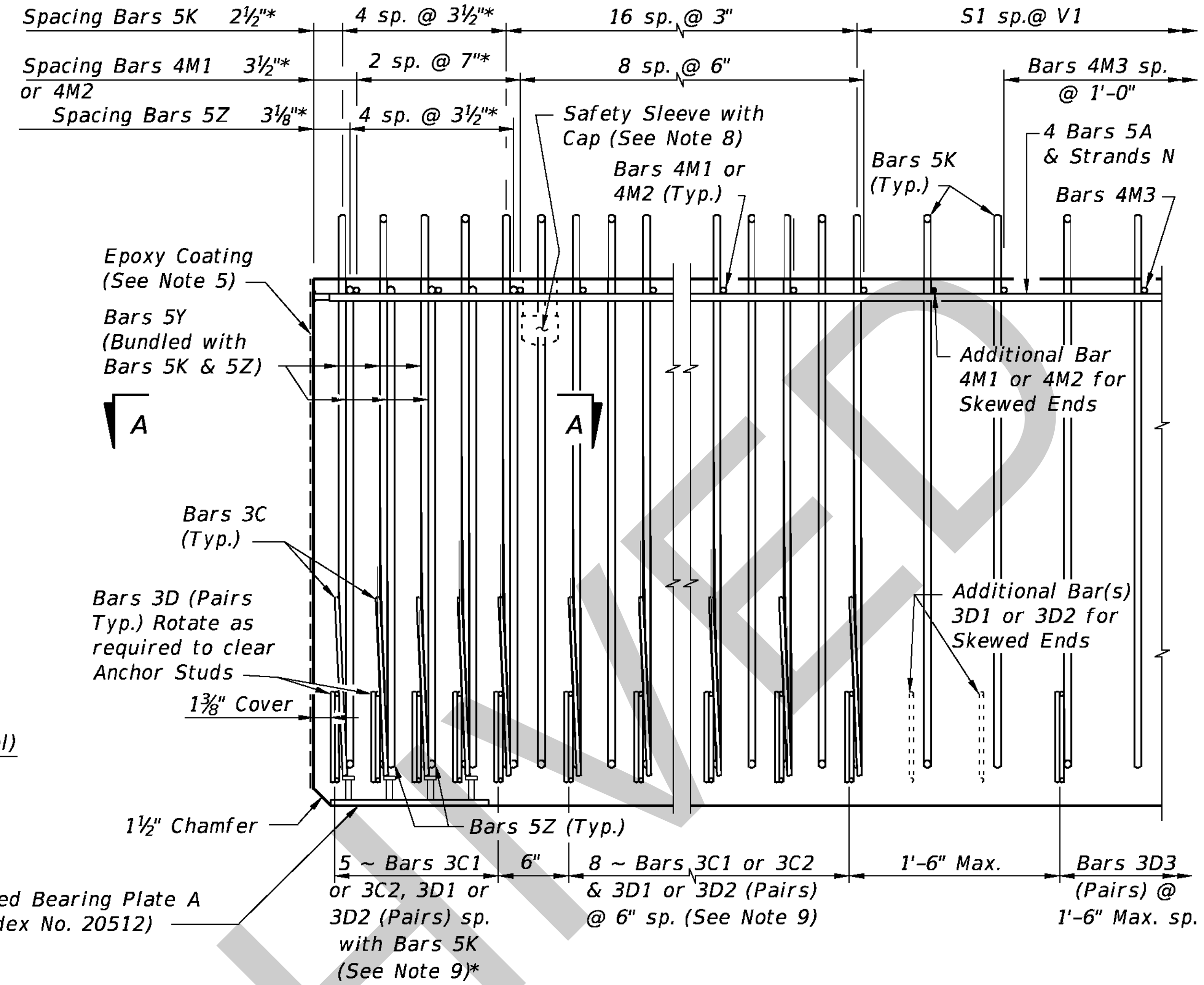
FLORIDA-I 36 BEAM - STANDARD DETAILS

Interim Date 07/01/10

Index No. 20036



END VIEW



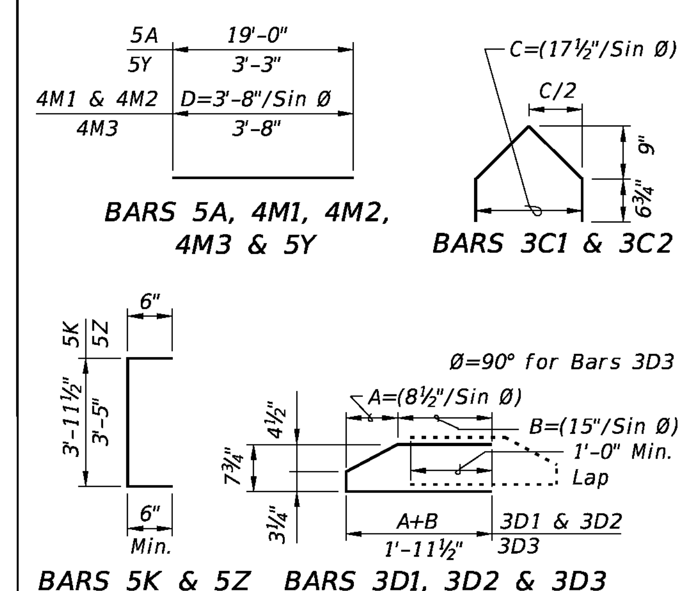
ELEVATION AT END OF BEAM
(Flanges Not Shown For Clarity)
(End 1 Shown, End 2 Similar)

CONVENTIONAL REINFORCING BAR BENDING DETAILS

BILL OF REINFORCING STEEL

MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	8	19'-0"
C1	9, 10 & 11	3	13 (End 1)	Varies
C2	9, 10 & 11	3	13 (End 2)	Varies
D1	9, 10, 11 & 14	3	26 (End 1)	Varies
D2	9, 10, 11 & 14	3	26 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	4'-11"
M1	9 & 10	4	11 (End 1)	Varies
M2	9 & 10	4	11 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	⅜" Ø Strand	4	DIM L
Y	9 & 11	5	12	3'-3"
Z	2, 9, 11 & 13	5	10	4'-5"

BENDING DIAGRAMS (See Note 1)

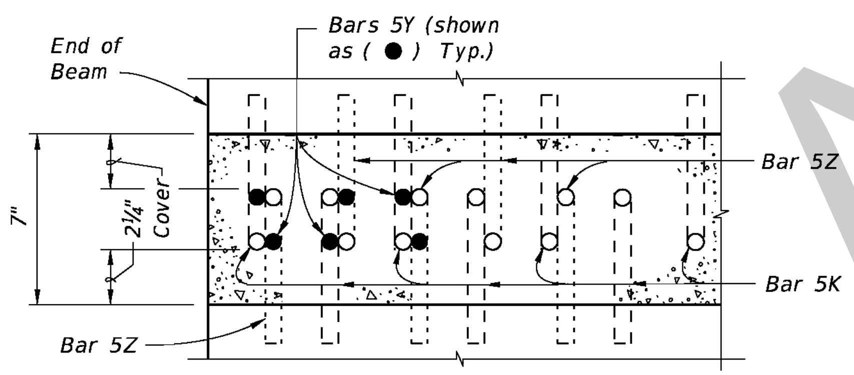


NOTES:

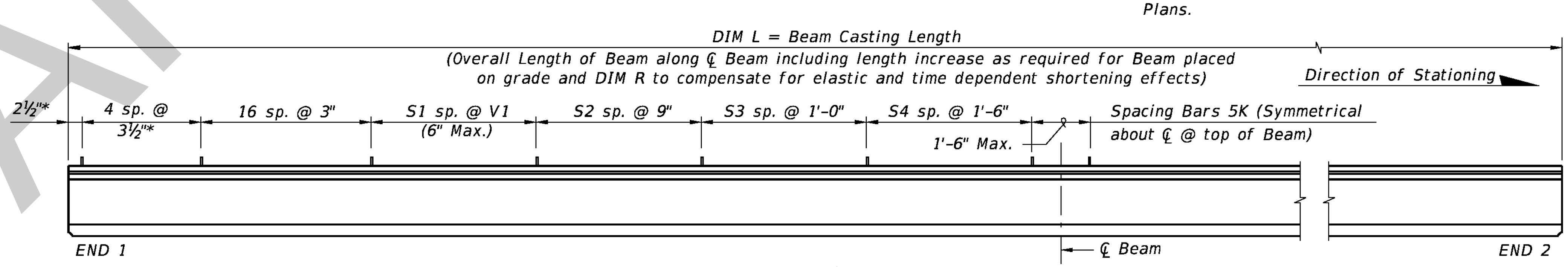
A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.

B. For referenced notes, see Index No. 20010.

C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.



SECTION A-A FOR CONVENTIONAL REINFORCING
(Showing Bars 5K, 5Y & 5Z Only)



ELEVATION

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars 4L; Changed NOTE NUMBERS for Strand N; and Embedded Bearing Plate A to Index No. 20512; Added Epoxy Coating to end of beam.			

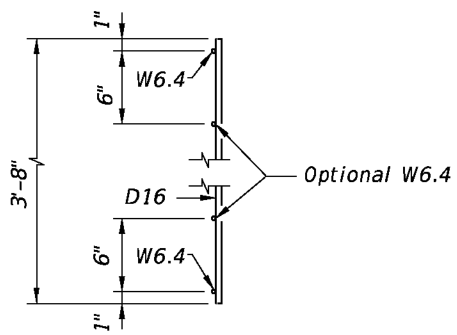
2010 Interim Design Standard

FLORIDA-I 45 BEAM - STANDARD DETAILS

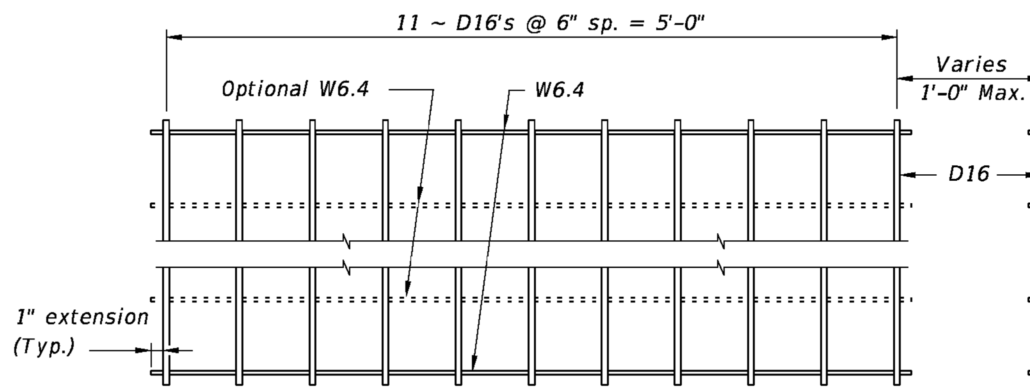
Interim Date 07/01/10

Sheet No. 1 of 2

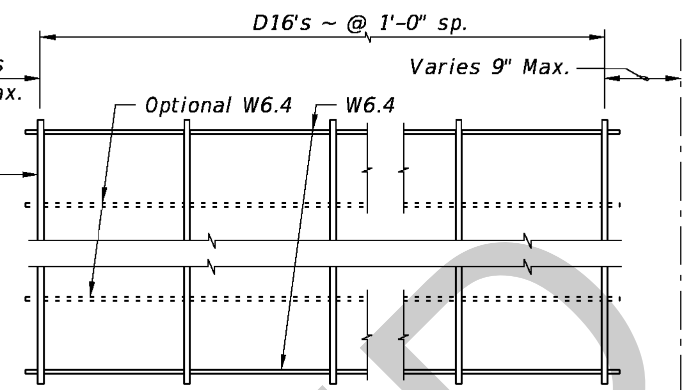
Index No. 20045



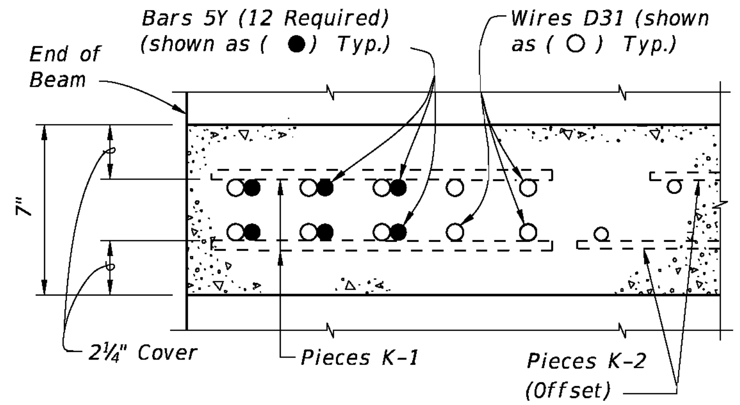
PIECES M
END VIEW



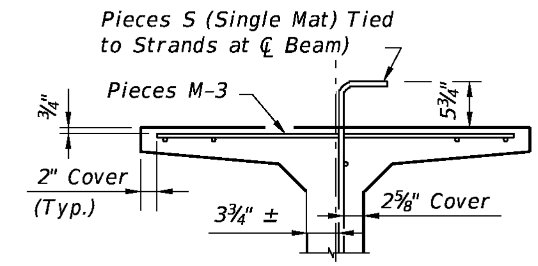
PLAN VIEW
PIECE M-1
(2 Required)



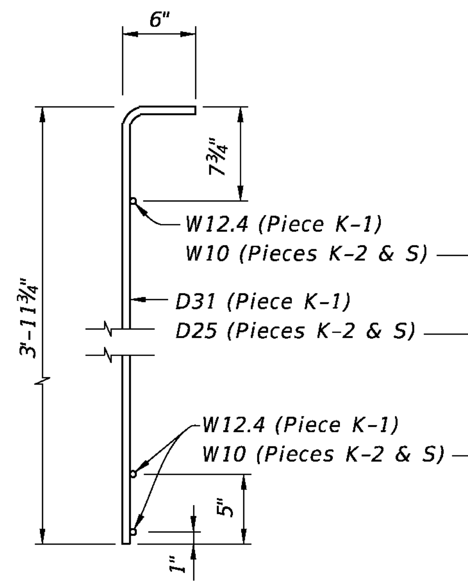
PLAN VIEW
PIECE M-3
(2 Required)



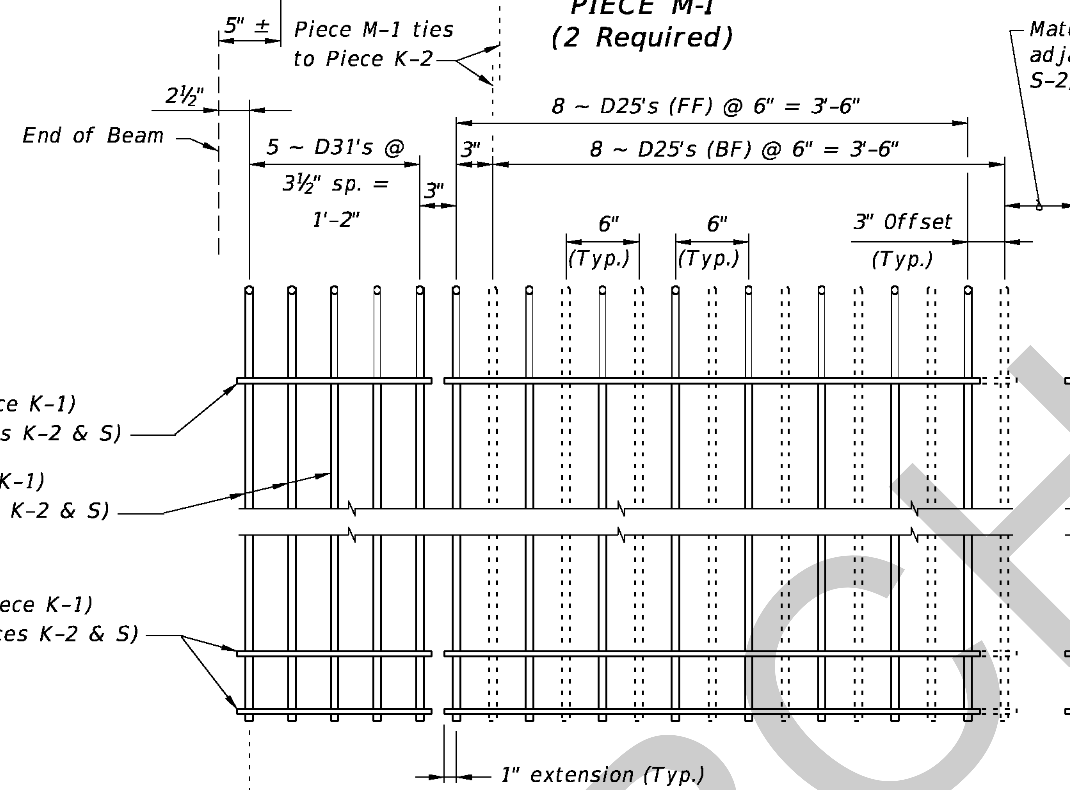
SECTION A-A
FOR WELDED WIRE REINFORCEMENT



PARTIAL SECTION AT CENTER BEAM

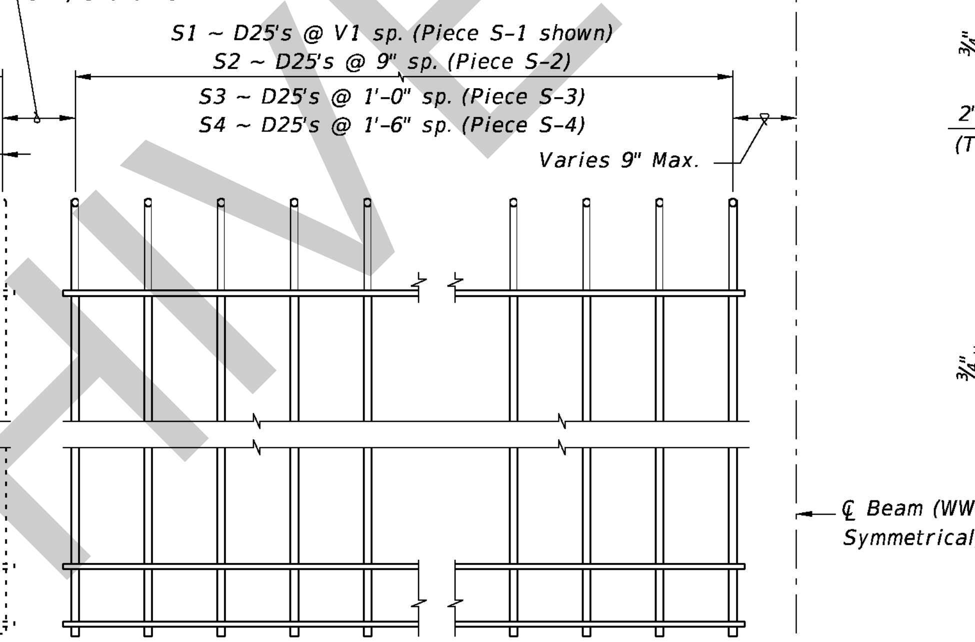


PIECES K & S
END VIEW

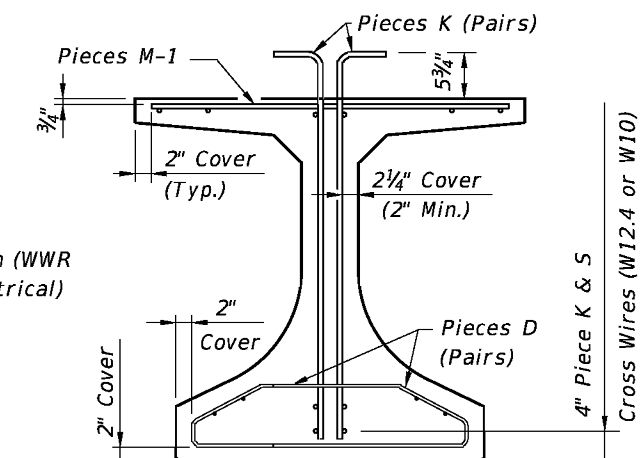


PIECE K-1
(Aligned EF)
(4 Required ~ 2 Pairs)

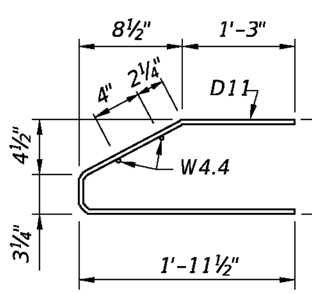
PIECE K-2
(FF Shown Solid, BF Shown Dashed)
(4 Required)



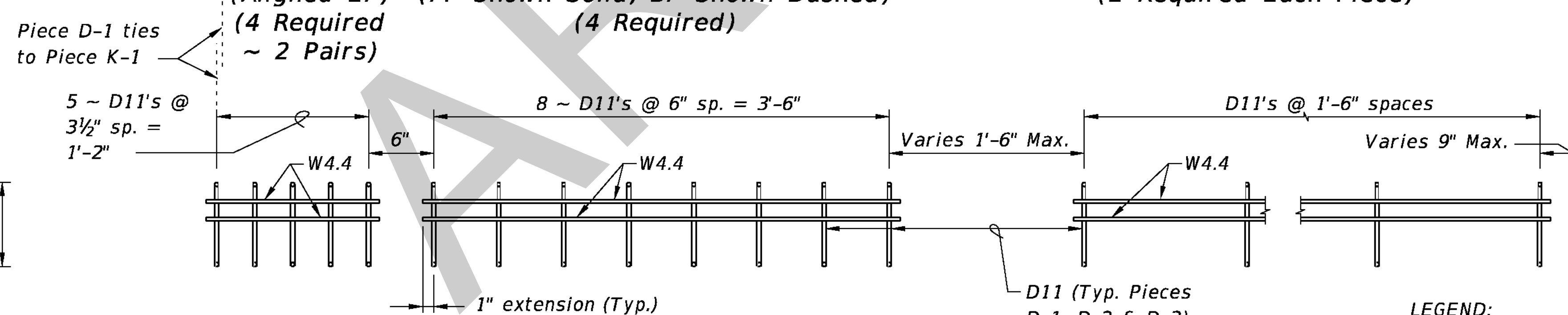
PIECE S-1, S-2, S-3 or S-4
(2 Required Each Piece)



PARTIAL BEAM END VIEW
(Conventional Reinforcing Bars A, C, Y and Strands not Shown for Clarity)



PIECES D
END VIEW



PIECE D-1
(4 Required ~ 2 Pairs)

PIECE D-2
(4 Required ~ 2 Pairs)

PIECE D-3
(4 Required ~ 2 Pairs)

LEGEND:
EF = Each Face
FF = Front Face
BF = Back Face

NOTES:
a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
b. Place Conventional Reinforcement Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
c. Pieces may be fabricated in multiple length sections.
d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

REVISIONS

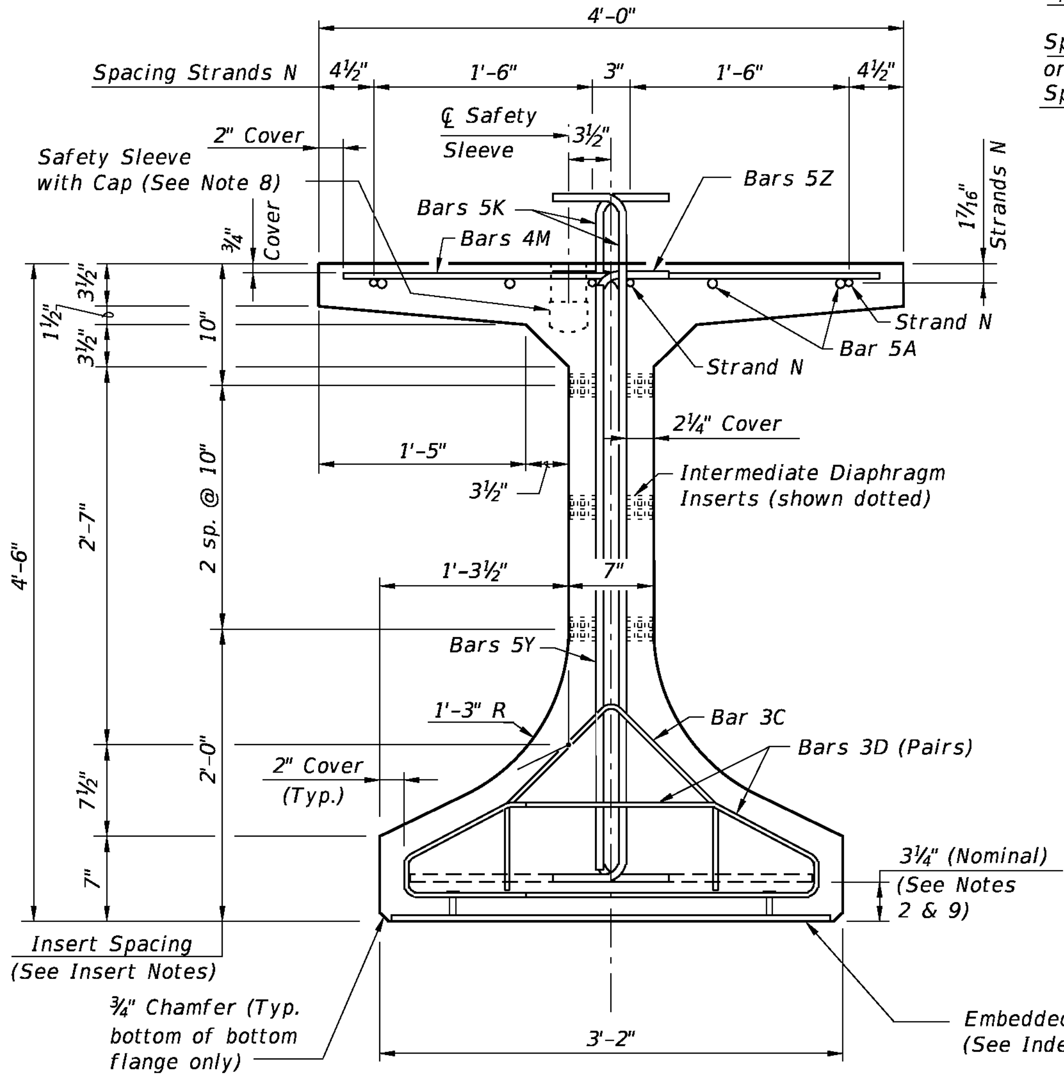
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars L references; Changed interior W6.4 wires to "Optional" for PIECES M.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

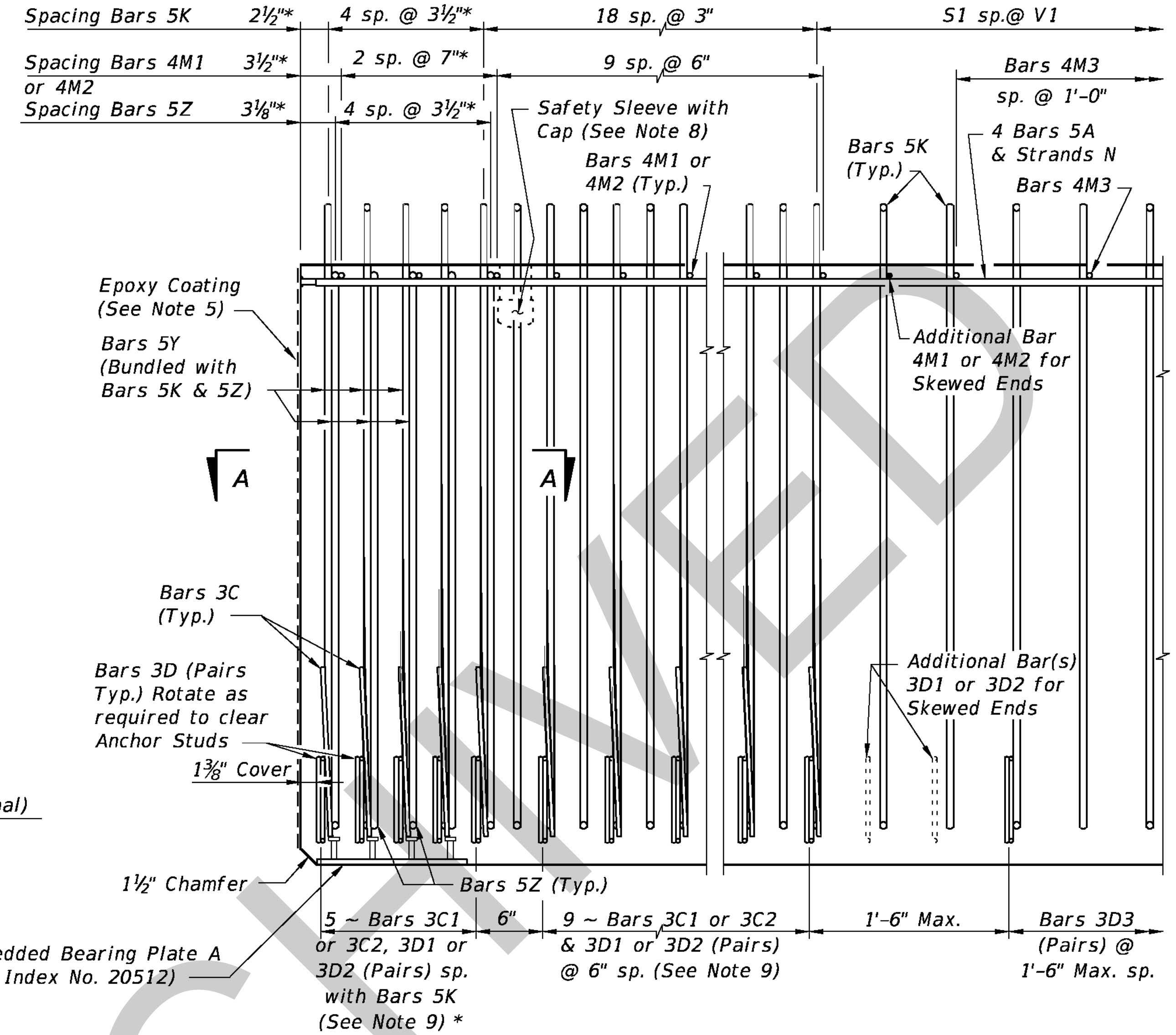
2010 Interim Design Standard

FLORIDA-I 45 BEAM - STANDARD DETAILS

Interim Date	Sheet No.
07/01/10	2 of 2
Index No. 20045	



END VIEW



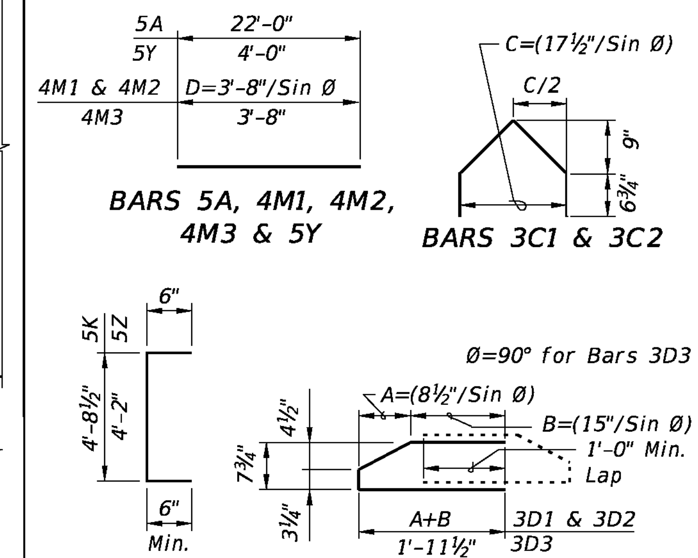
ELEVATION AT END OF BEAM
(Flanges Not Shown For Clarity)
(End 1 Shown, End 2 Similar)

CONVENTIONAL REINFORCING BAR BENDING DETAILS

BILL OF REINFORCING STEEL

MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	8	22'-0"
C1	9, 10 & 11	3	14 (End 1)	Varies
C2	9, 10 & 11	3	14 (End 2)	Varies
D1	9, 10, 11 & 14	3	28 (End 1)	Varies
D2	9, 10, 11 & 14	3	28 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	5'-8"
M1	9 & 10	4	12 (End 1)	Varies
M2	9 & 10	4	12 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	⅜" Ø Strand	4	DIM L
Y	9 & 11	5	12	4'-0"
Z	2, 9, 11 & 13	5	10	5'-2"

BENDING DIAGRAMS (See Note 1)



BARS 5A, 4M1, 4M2, 4M3 & 5Y

BARS 3C1 & 3C2

BARS 5K & 5Z

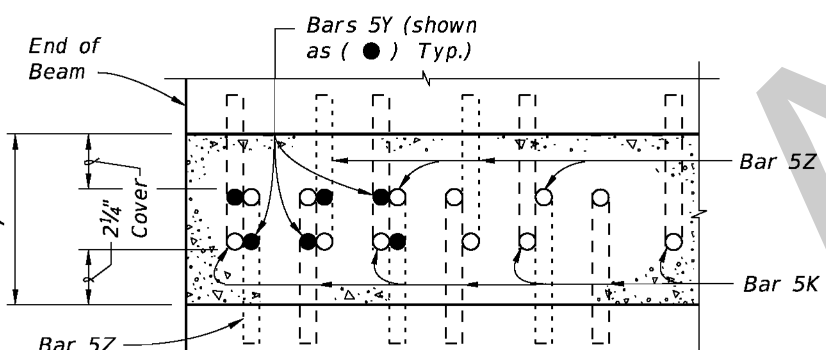
BARS 3D1, 3D2 & 3D3

NOTES:

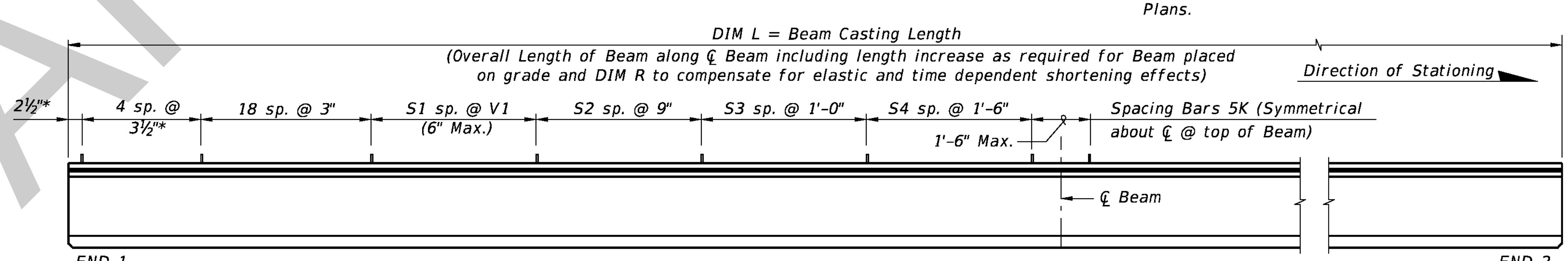
A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.

B. For referenced notes, see Index No. 20010.

C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.



SECTION A-A FOR CONVENTIONAL REINFORCING
(Showing Bars 5K, 5Y & 5Z Only)



ELEVATION

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars 4L; Changed NOTE NUMBERS for Strand N; and Embedded Bearing Plate A to Index No. 20512; Added Epoxy Coating to end of beam.			

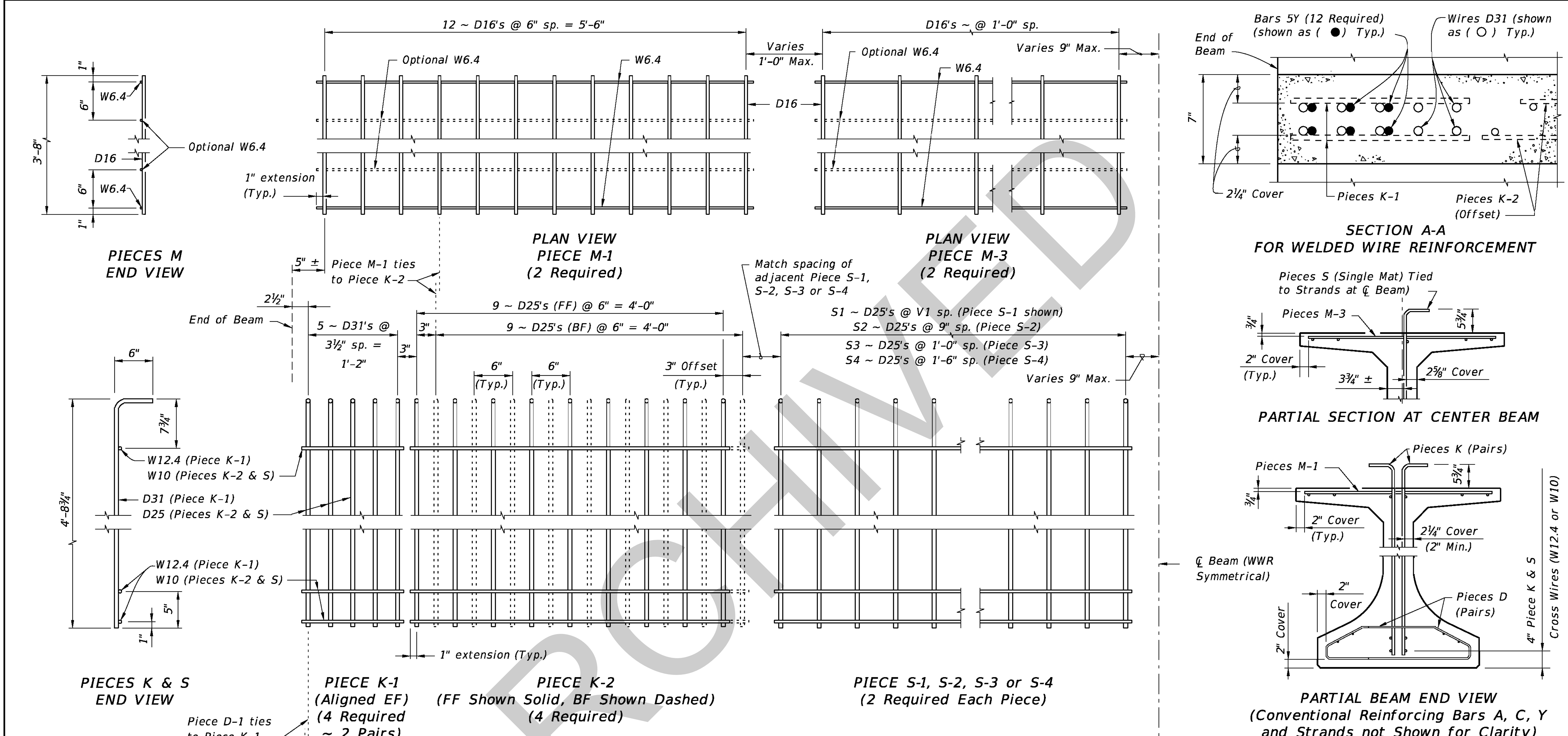
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

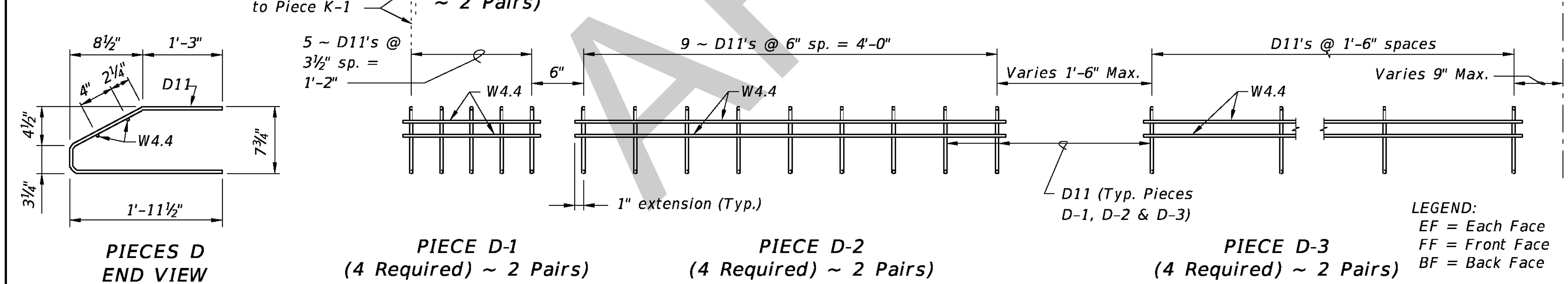
2010 Interim Design Standard

FLORIDA-I 54 BEAM - STANDARD DETAILS

Interim Date 07/01/10

Index No. 20054





NOTES:
a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
b. Place Conventional Reinforcement Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
c. Pieces may be fabricated in multiple length sections.
d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

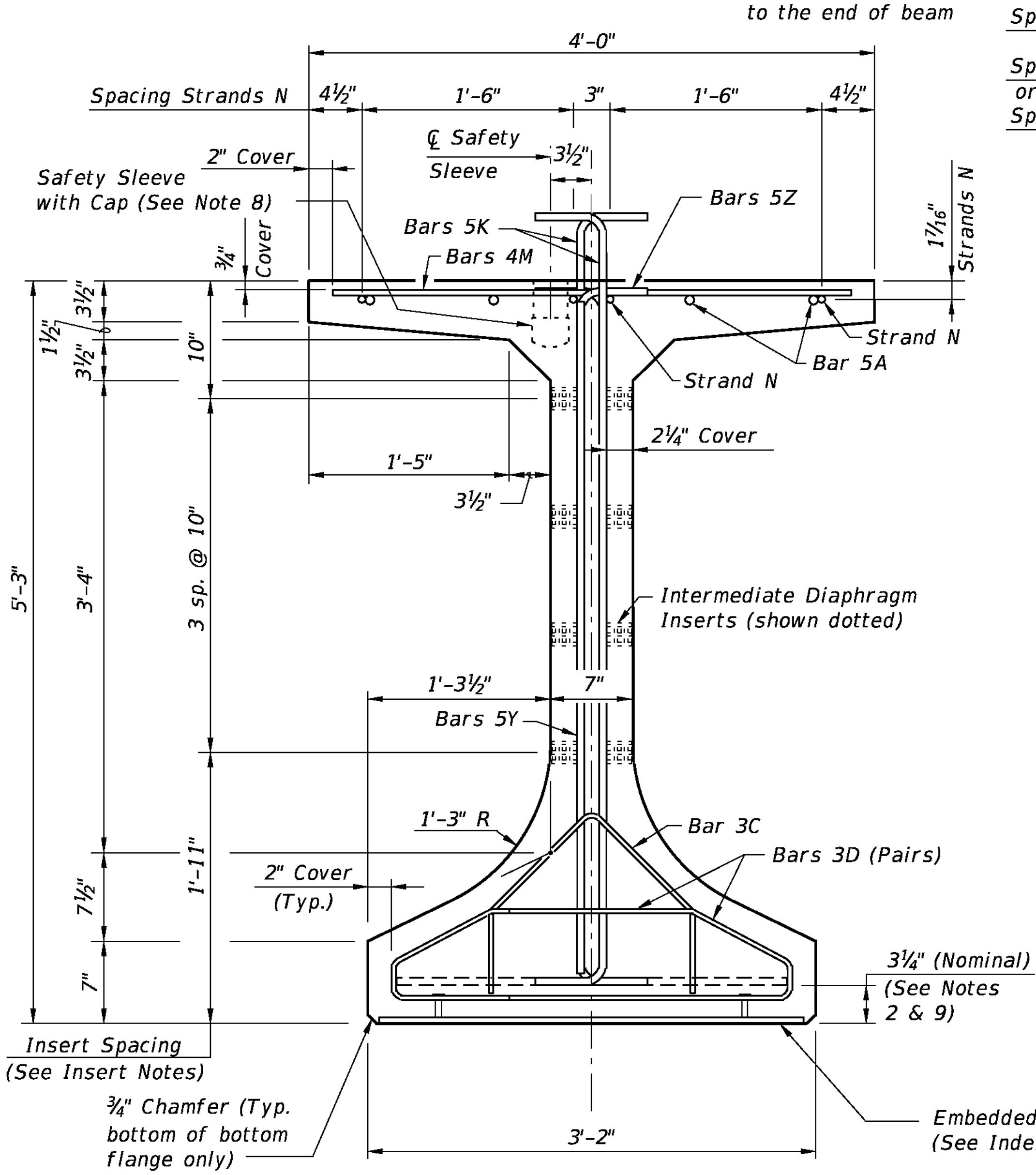
REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars L references; Changed interior W6.4 wires to "Optional" for PIECES M.			

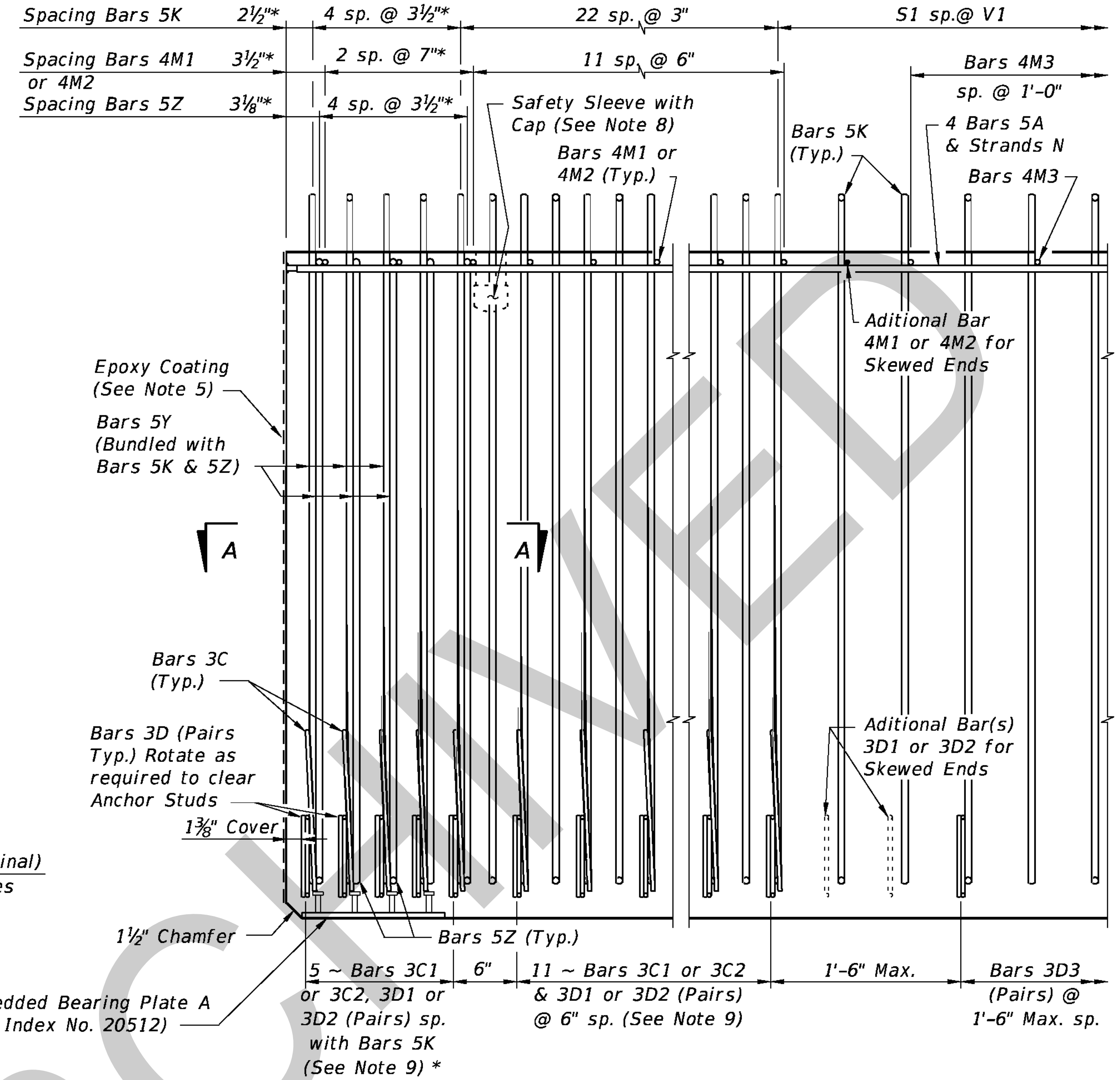
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

FLORIDA-I 54 BEAM - STANDARD DETAILS



END VIEW



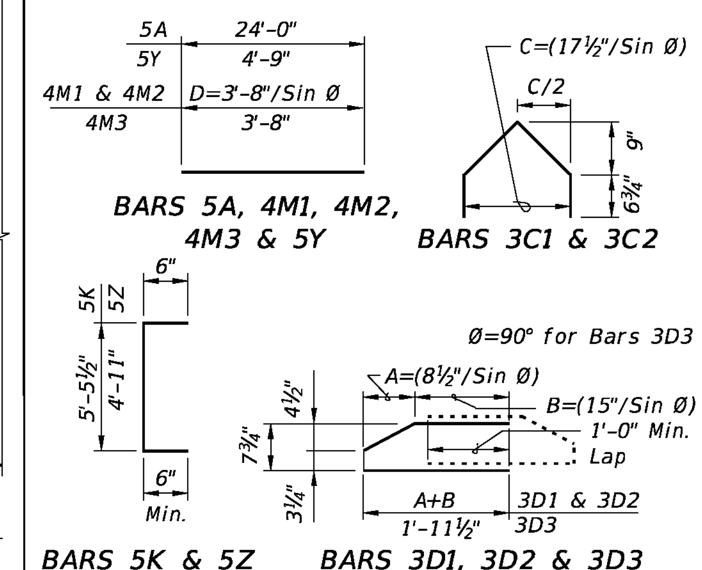
ELEVATION AT END OF BEAM
(Flanges Not Shown For Clarity)
(End 1 Shown, End 2 Similar)

CONVENTIONAL REINFORCING BAR BENDING DETAILS

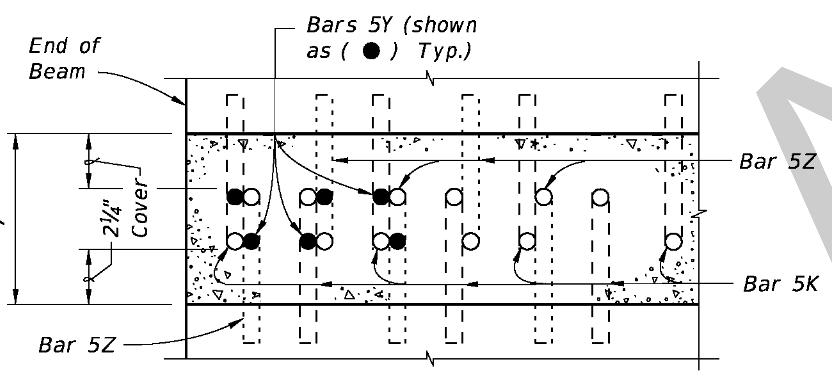
BILL OF REINFORCING STEEL

MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	5	8	24'-0"
C1	9, 10 & 11	3	16 (End 1)	Varies
C2	9, 10 & 11	3	16 (End 2)	Varies
D1	9, 10, 11 & 14	3	32 (End 1)	Varies
D2	9, 10, 11 & 14	3	32 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	6'-5"
M1	9 & 10	4	14 (End 1)	Varies
M2	9 & 10	4	14 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	⅜" Ø Strand	4	DIM L
Y	9 & 11	5	12	4'-9"
Z	2, 9, 11 & 13	5	10	5'-11"

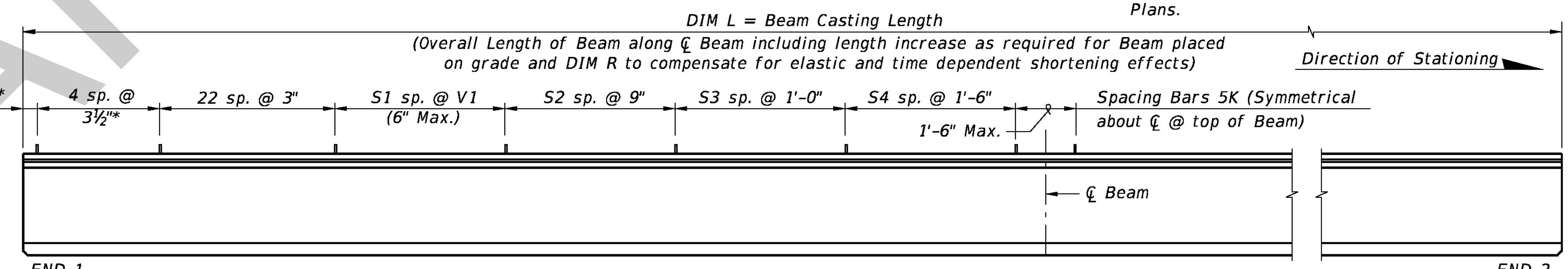
BENDING DIAGRAMS (See Note 1)



NOTES:
A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.
B. For referenced notes, see Index No. 20010.
C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.



SECTION A-A FOR CONVENTIONAL REINFORCING
(Showing Bars 5K, 5Y & 5Z Only)



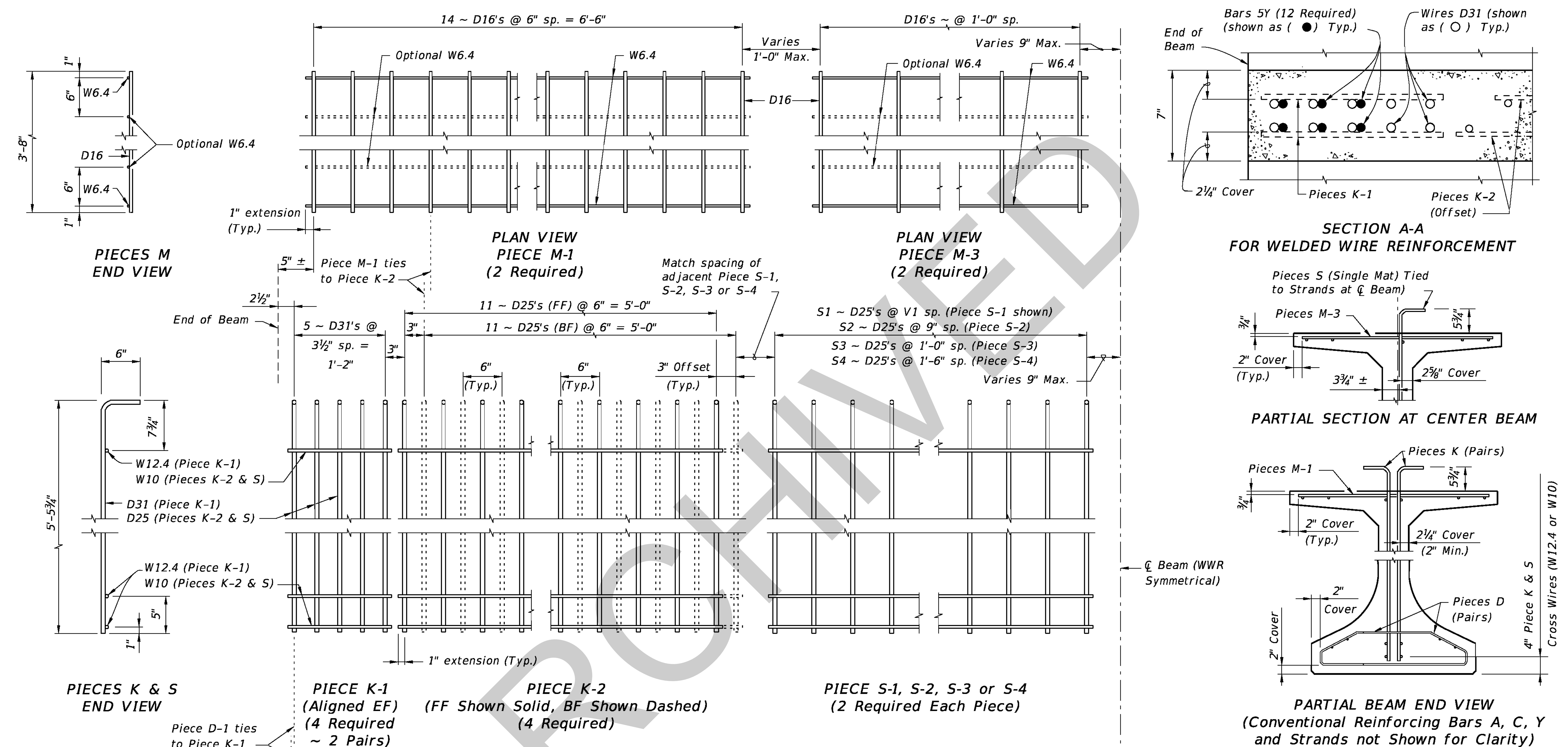
ELEVATION

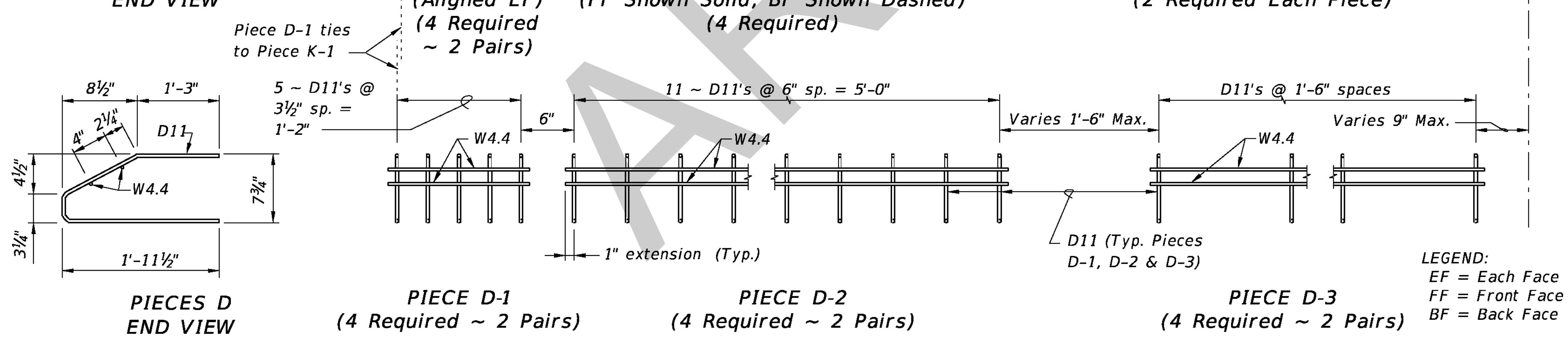
REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars 4L; Changed NOTE NUMBERS for Strand N; and Embedded Bearing Plate A to Index No. 20512; Added Epoxy Coating to end of beam.			

2010 Interim Design Standard

FLORIDA-I 63 BEAM - STANDARD DETAILS





LEGEND:
EF = Each Face
FF = Front Face
BF = Back Face

NOTES:
a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
b. Place Conventional Reinforcement Bars 5A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
c. Pieces may be fabricated in multiple length sections.
d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars L references; Changed interior W6.4 wires to "Optional" for PIECES M.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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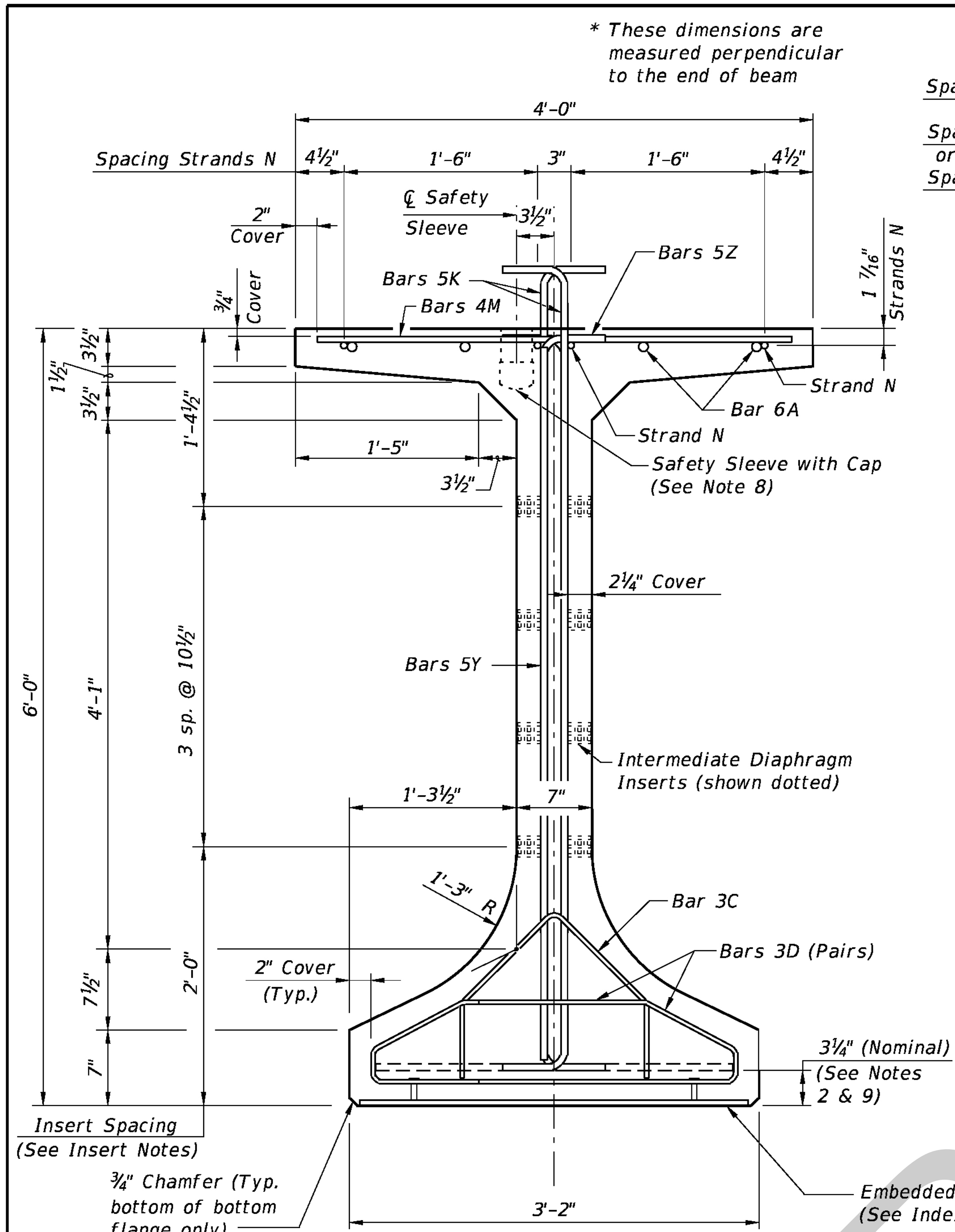
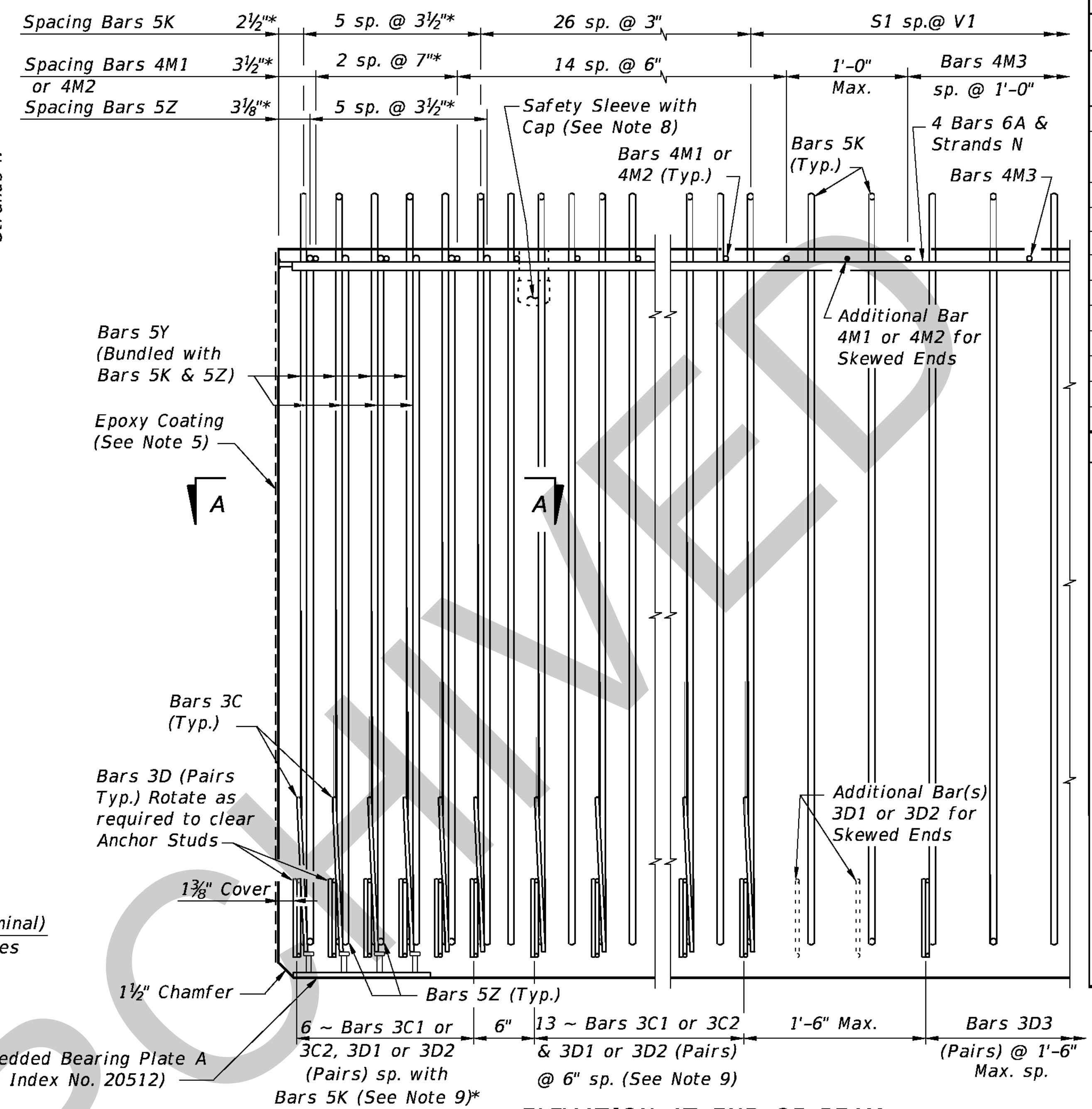
FLORIDA-I 63 BEAM - STANDARD DETAILS

Interim Date 07/01/10 | Sheet No. 2 of 2 | Index No. 20063



END VIEW



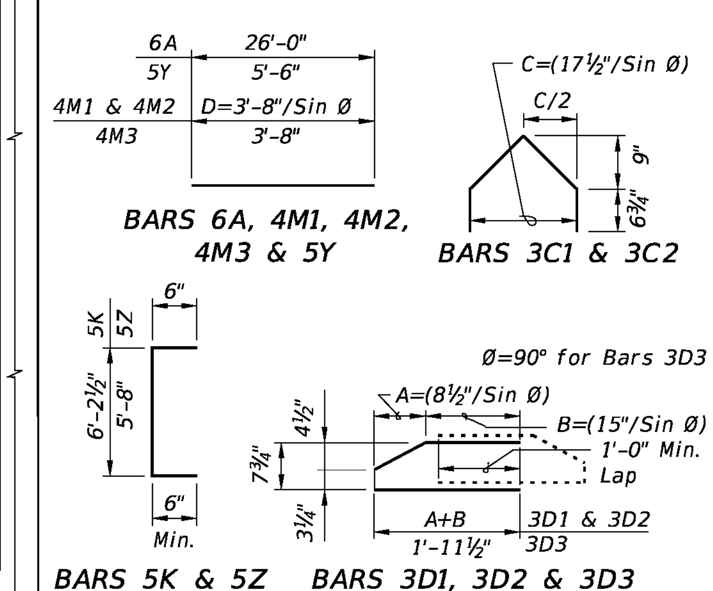
ELEVATION AT END OF BEAM
(Flanges Not Shown For Clarity)
(End 1 Shown, End 2 Similar)

CONVENTIONAL REINFORCING BAR BENDING DETAILS

BILL OF REINFORCING STEEL

MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	6	8	26'-0"
C1	9, 10 & 11	3	19 (End 1)	Varies
C2	9, 10 & 11	3	19 (End 2)	Varies
D1	9, 10, 11 & 14	3	38 (End 1)	Varies
D2	9, 10, 11 & 14	3	38 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	7'-2"
M1	9 & 10	4	17 (End 1)	Varies
M2	9 & 10	4	17 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	⅜" Ø Strand	4	DIM L
Y	9 & 11	5	16	5'-6"
Z	2, 9, 11 & 13	5	12	6'-8"

BENDING DIAGRAMS (See Note 1)

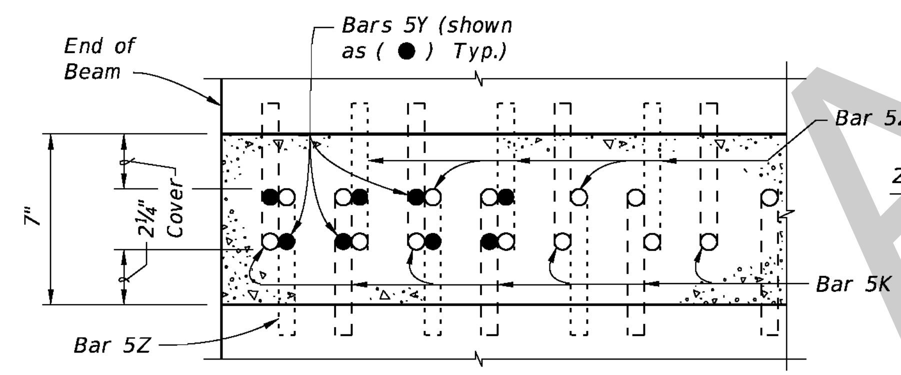


NOTES:

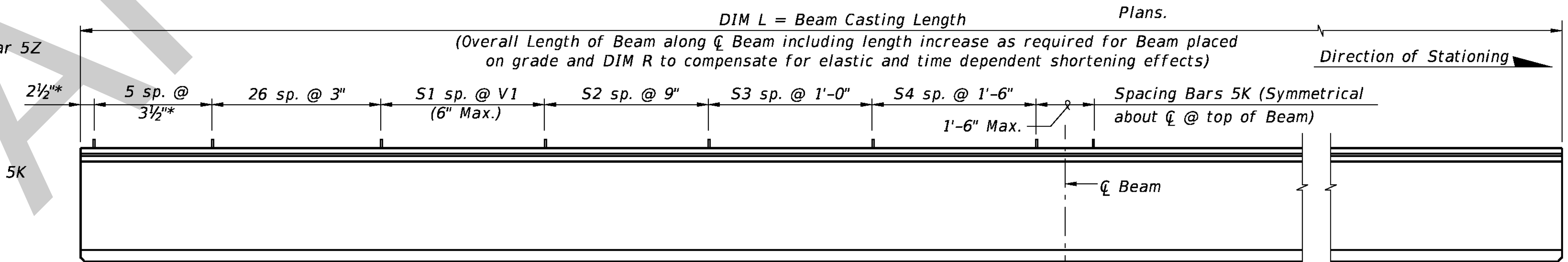
A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.

B. For referenced notes, see Index No. 20010.

C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.



SECTION A-A FOR CONVENTIONAL REINFORCING
(Showing Bars 5K, 5Y & 5Z Only)



ELEVATION

ARCHIVED

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars 4L; Changed NOTE NUMBERS for Strand N; and Embedded Bearing Plate A to Index No. 20512; Added Epoxy Coating to end of beam.			

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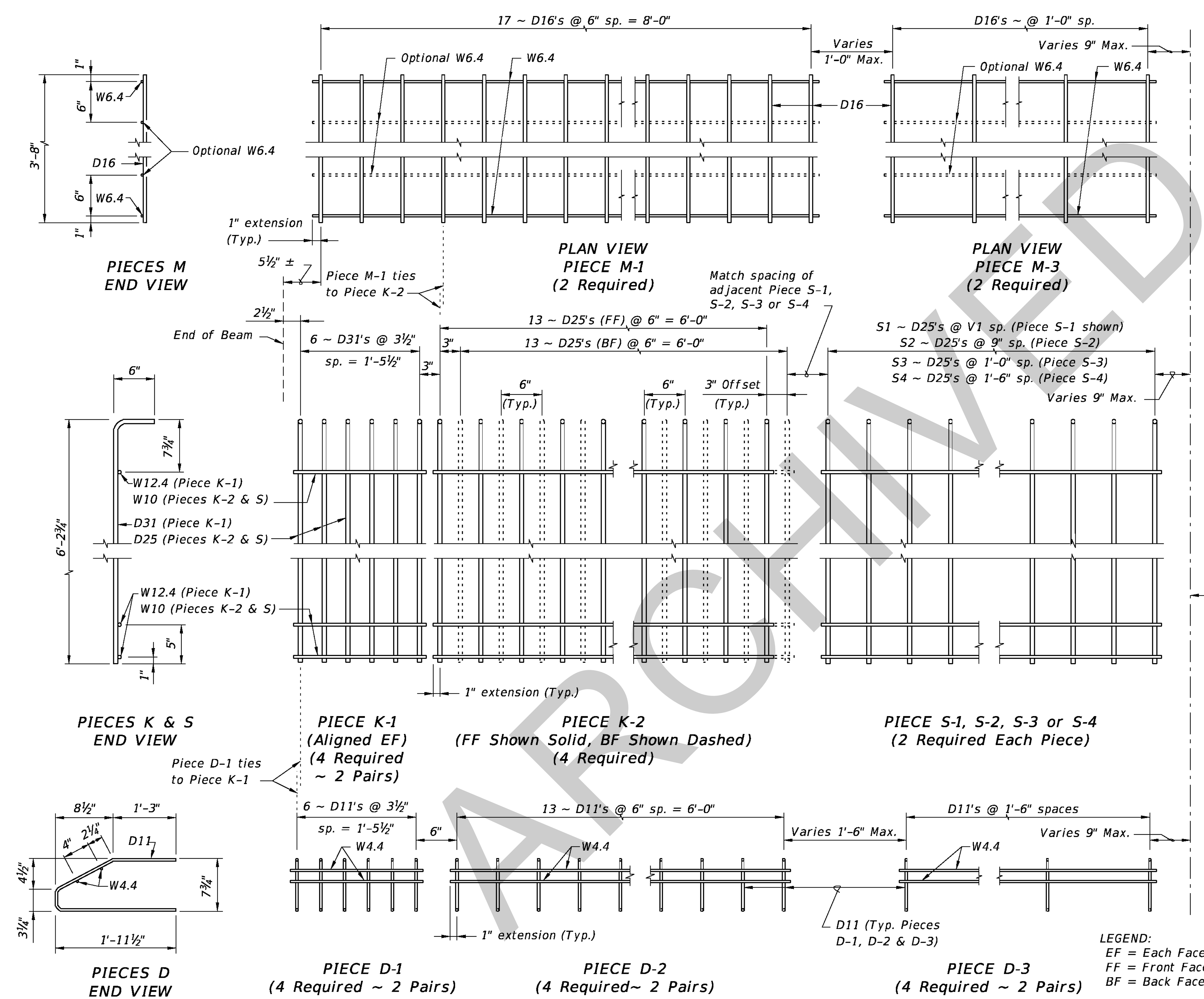
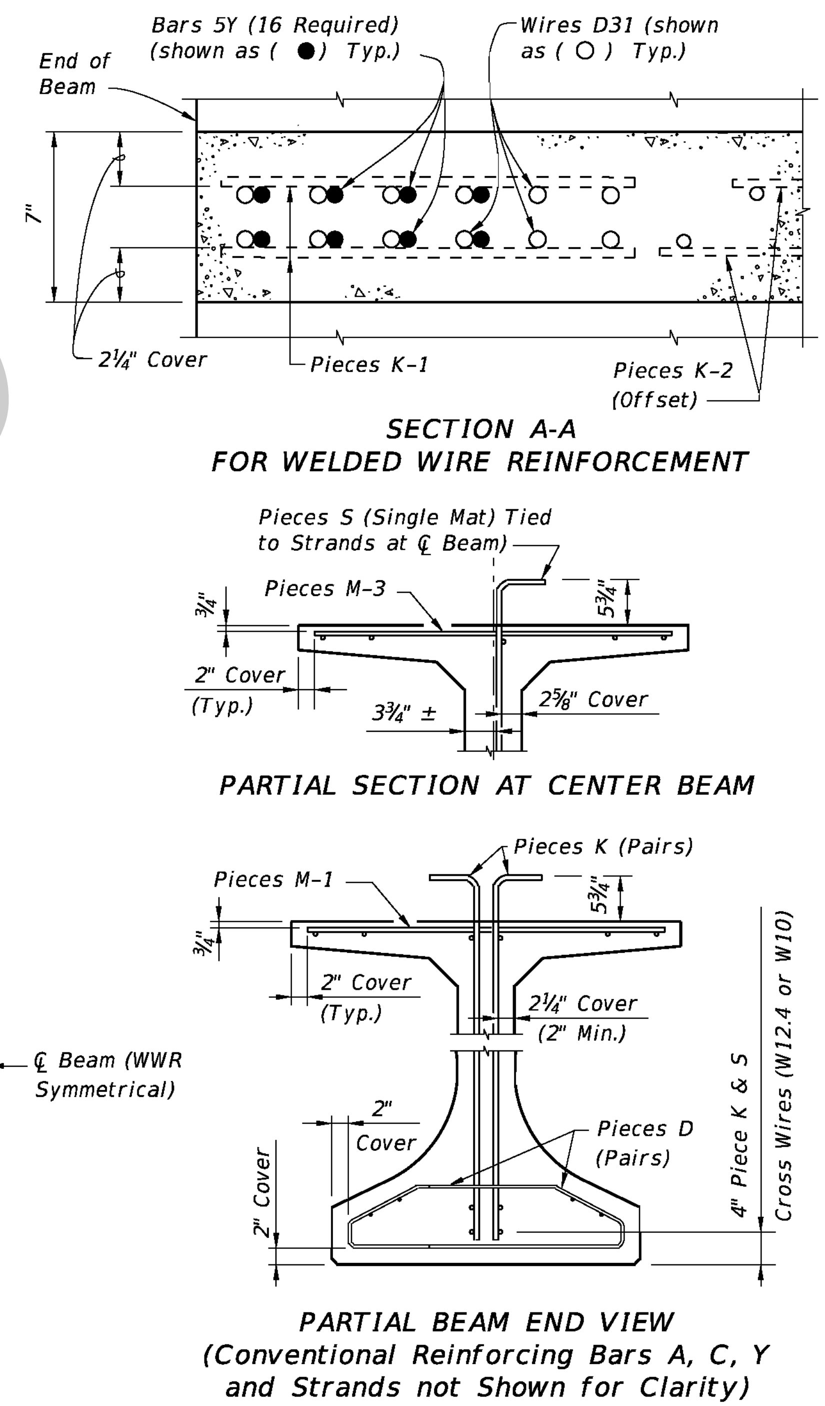
FLORIDA-I 72 BEAM - STANDARD DETAILS

Interim Date 07/01/10

Sheet No. 1 of 2

Index No. 20072





NOTES:
a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
b. Place Conventional Reinforcement Bars 6A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
c. Pieces may be fabricated in multiple length sections.
d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars L references; Changed interior W6.4 wires to "Optional" for PIECES M.			

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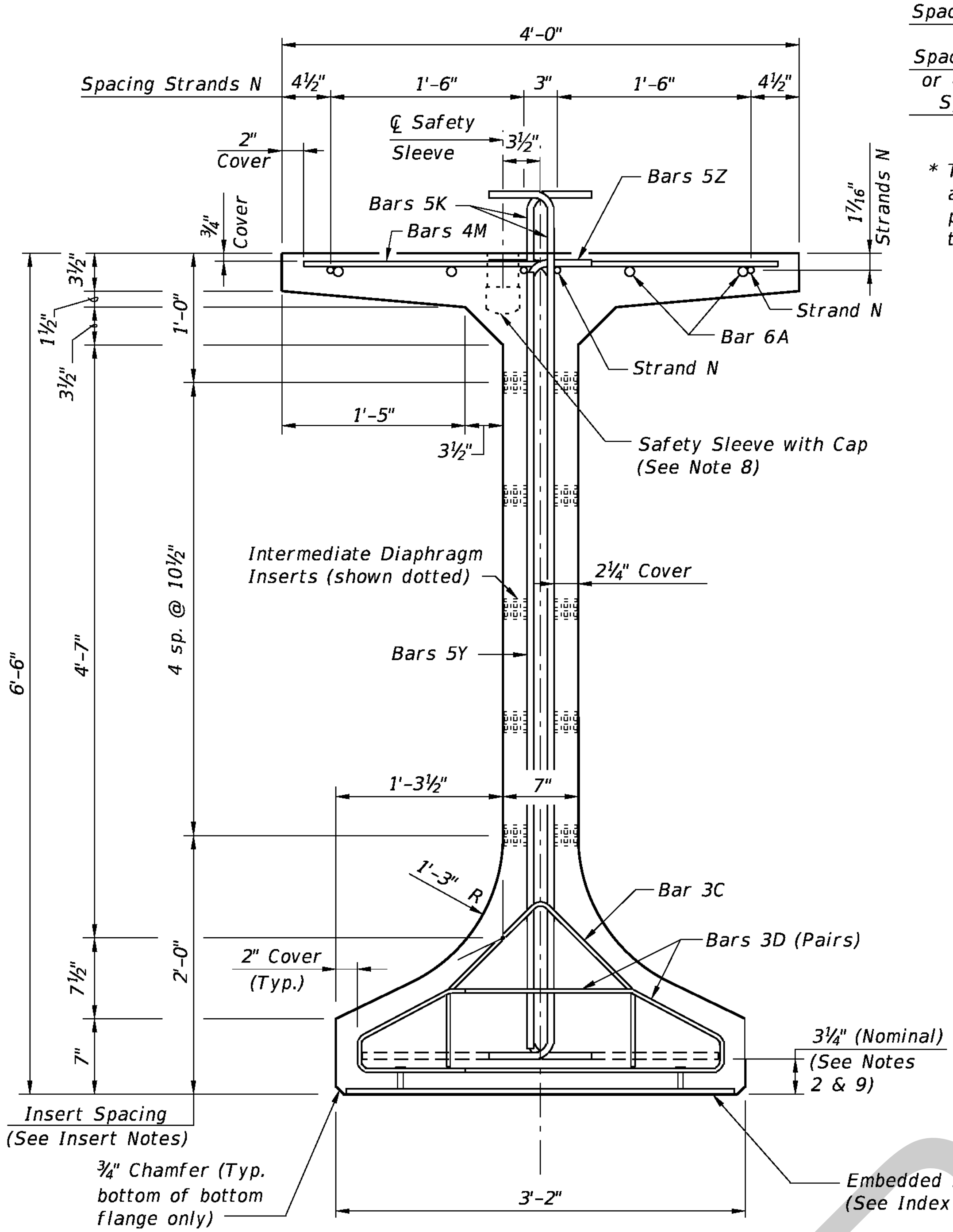
2010 Interim Design Standard

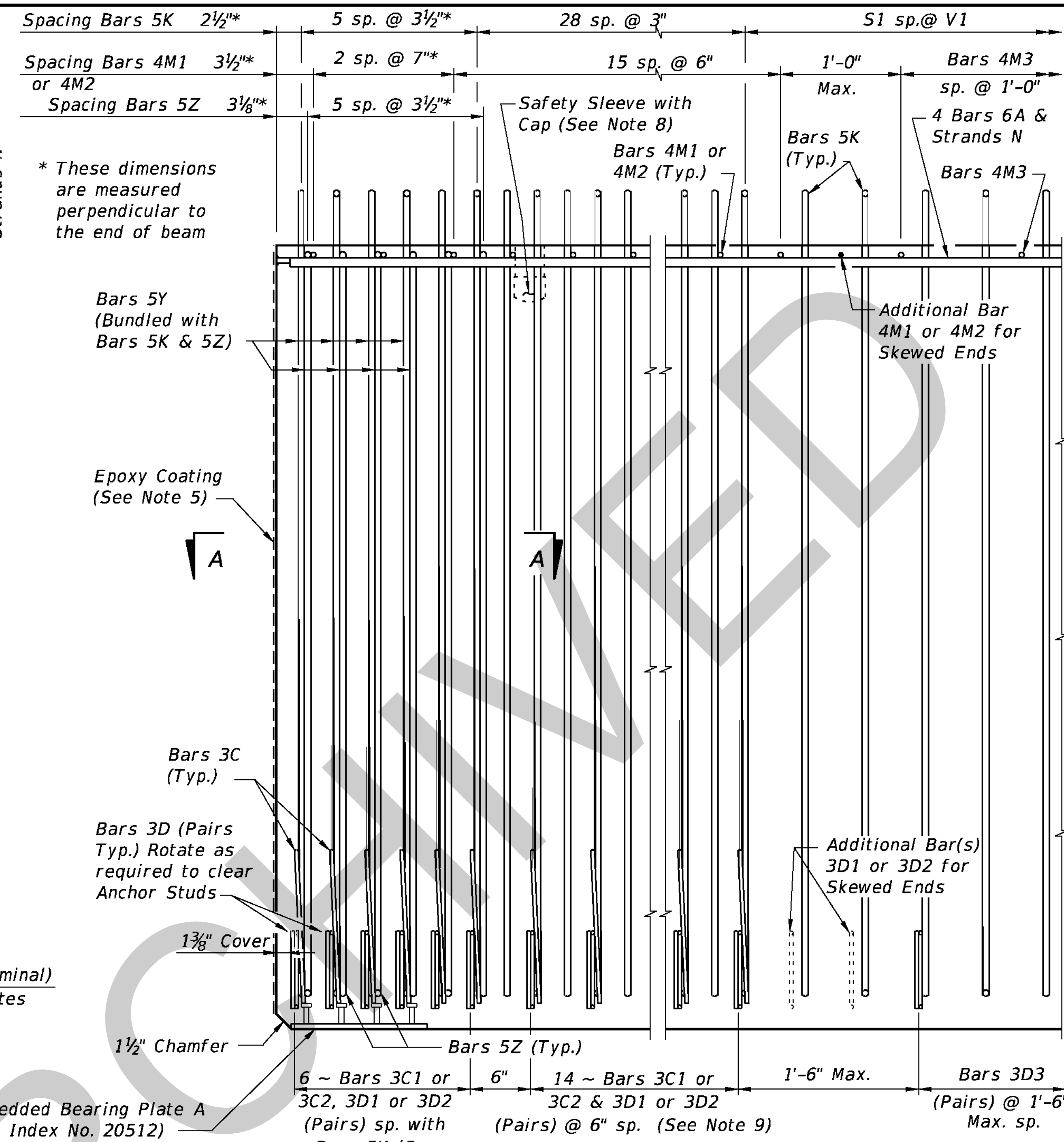
FLORIDA-I 72 BEAM - STANDARD DETAILS

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

Index No. 20072



END VIEW



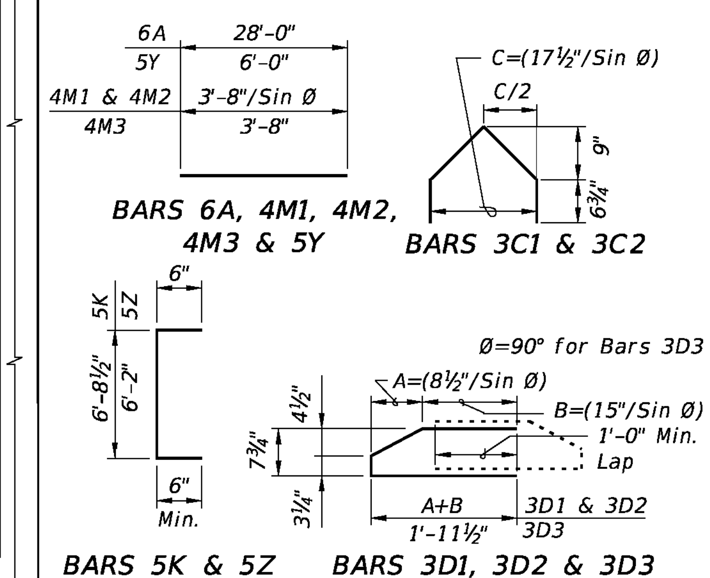
ELEVATION AT END OF BEAM
(Flanges Not Shown For Clarity)
(End 1 Shown, End 2 Similar)

CONVENTIONAL REINFORCING BAR BENDING DETAILS

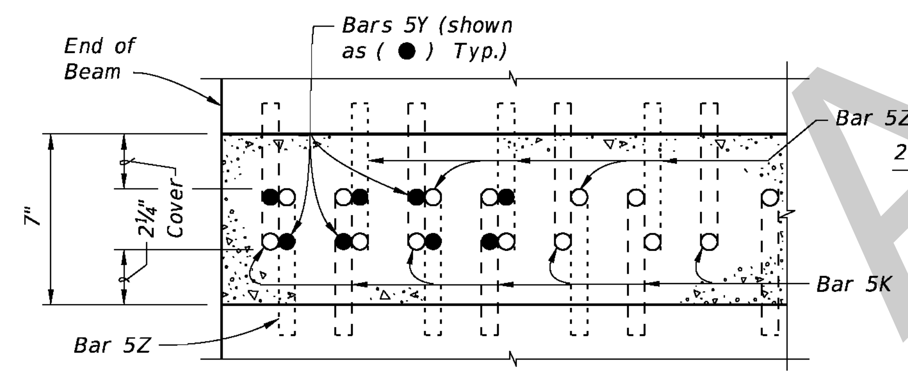
BILL OF REINFORCING STEEL

MARK	NOTE NUMBERS	SIZE	NUMBER REQUIRED	LENGTH (NOTE 1)
A	—	6	8	28'-0"
C1	9, 10 & 11	3	20 (End 1)	Varies
C2	9, 10 & 11	3	20 (End 2)	Varies
D1	9, 10, 11 & 14	3	40 (End 1)	Varies
D2	9, 10, 11 & 14	3	40 (End 2)	Varies
D3	9 & 14	3	See Table	4'-3"
K	2, 9, 11 & 13	5	See Table	7'-8"
M1	9 & 10	4	18 (End 1)	Varies
M2	9 & 10	4	18 (End 2)	Varies
M3	9	4	See Table	3'-8"
N	3 & 4	⅜" Ø Strand	4	DIM L
Y	9 & 11	5	16	6'-0"
Z	2, 9, 11 & 13	5	12	7'-2"

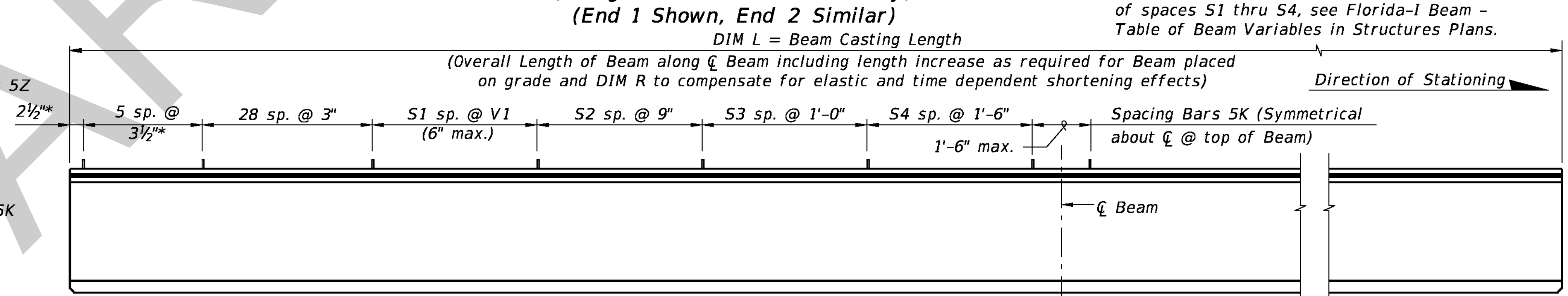
BENDING DIAGRAMS (See Note 1)



NOTES:
A. Work this Index with Index No. 20010 - Typical Florida-I Beam Details and Notes and the Florida-I Beam - Table of Beam Variables in Structures Plans.
B. For referenced notes, see Index No. 20010.
C. For Dimensions A, B, C, D, L, R & V1 and number of spaces S1 thru S4, see Florida-I Beam - Table of Beam Variables in Structures Plans.



SECTION A-A FOR CONVENTIONAL REINFORCING
(Showing Bars 5K, 5Y & 5Z Only)



ELEVATION

ARCHIVED

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars 4L; Changed NOTE NUMBERS for Strand N; and Embedded Bearing Plate A to Index No. 20512; Added Epoxy Coating to end of beam.			

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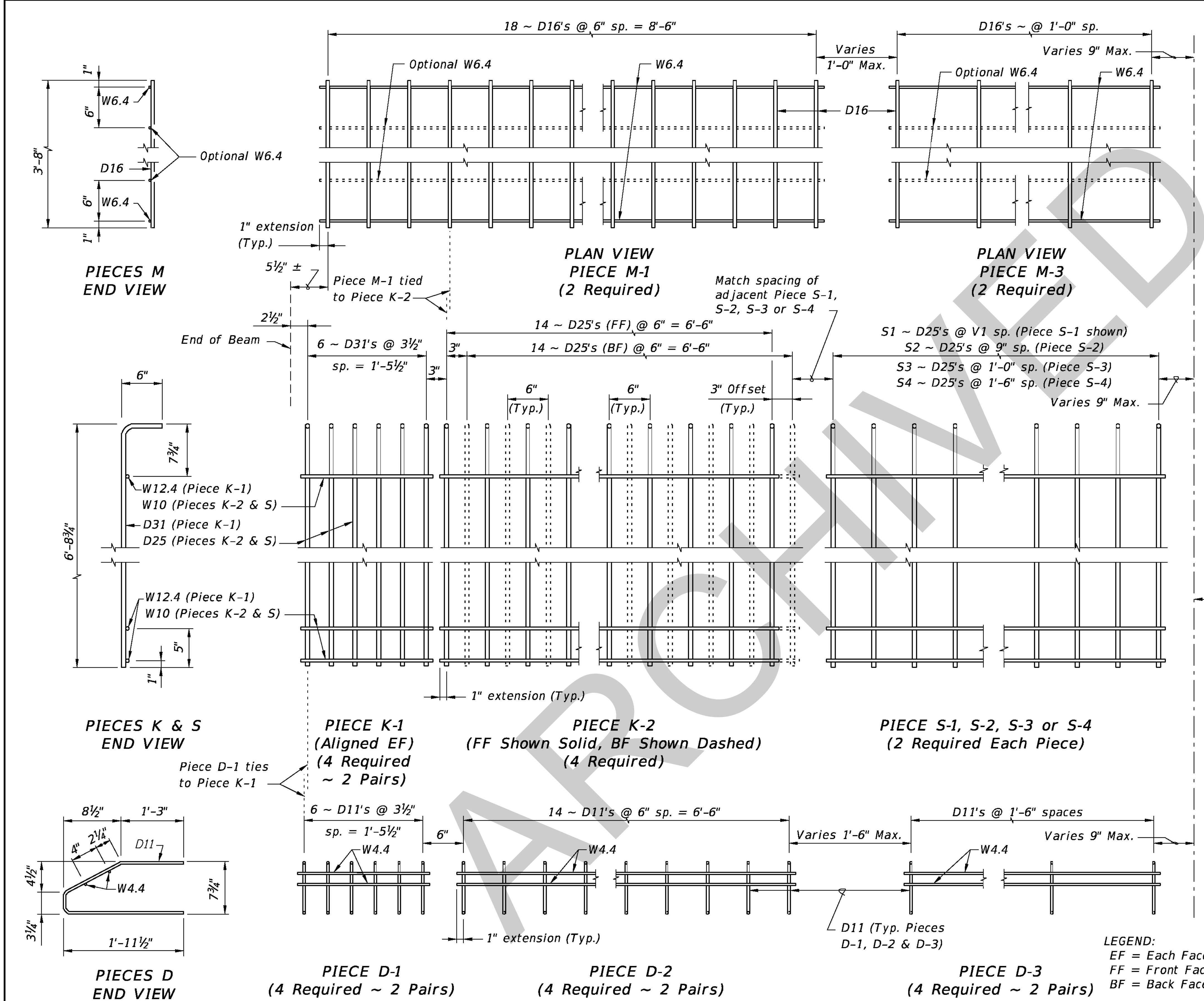
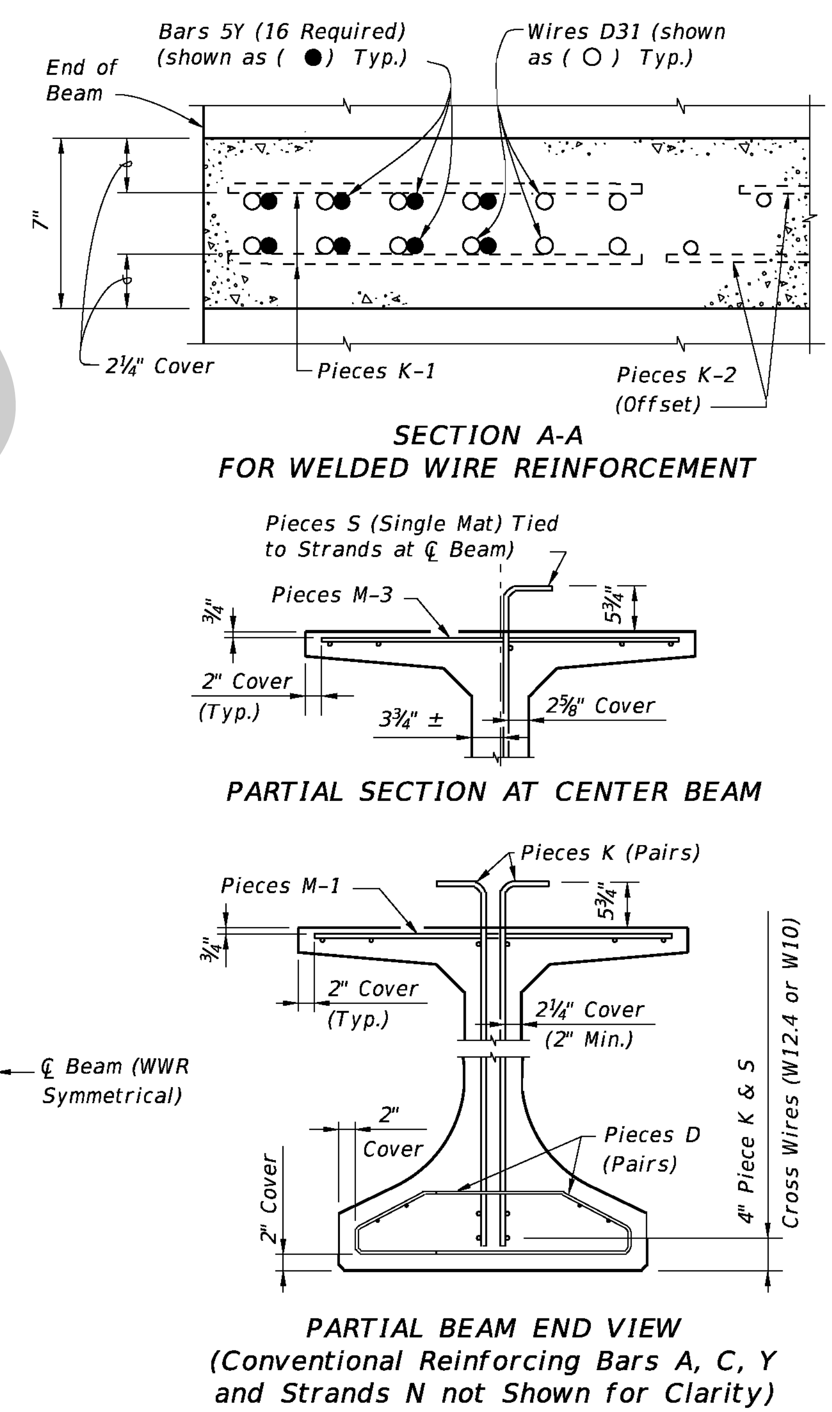
FLORIDA-I 78 BEAM - STANDARD DETAILS

Interim Date 07/01/10

Sheet No. 1 of 2

Index No. 20078



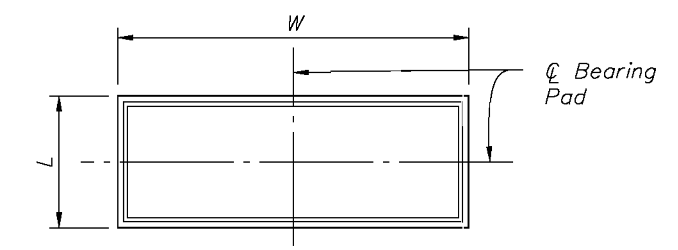


LEGEND:
EF = Each Face
FF = Front Face
BF = Back Face

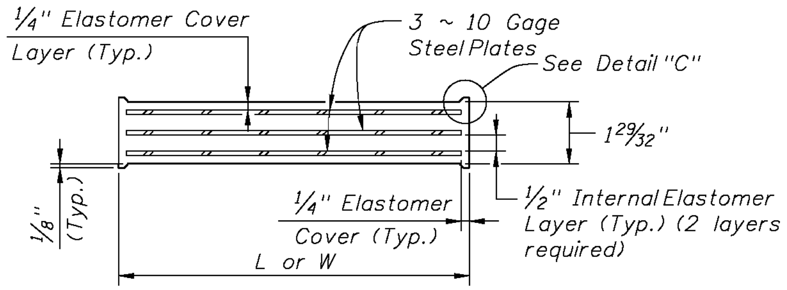
NOTES:
a. See Sheet 1 for placement details & Table of Beam Variables in Structures Plans for variables S1, S2, S3, S4 & V1.
b. Place Conventional Reinforcement Bars 6A & 3C as shown on Sheet 1. Place additional Bars 5Y as shown in Section A-A for Welded Wire Reinforcement. Bars 5Z will not be used with the WWR Option.
c. Pieces may be fabricated in multiple length sections.
d. For beams with skewed end conditions, Pieces D-1, D-2 & M-1 shall not be used; Conventional Reinforcement Bars D1, D2, C1, C2, M1 & M2 shall be used. See Index No. 20010 Skew Details and Note 9 for placement details. Shift Pieces K & Bars 5Y to accommodate skewed end conditions and align with Bars C and D.

REVISIONS

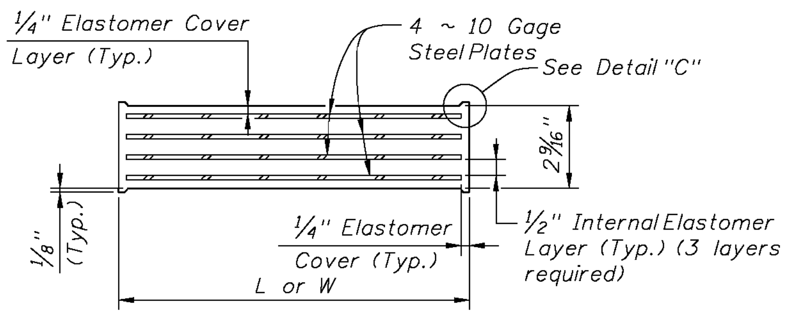
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	RMS	New Design Standard			
07/01/10	SJN	Deleted Bars L references; Changed interior W6.4 wires to "Optional" for PIECES M.			



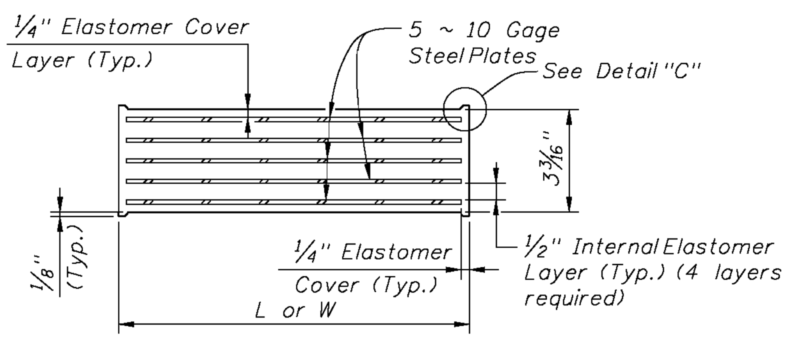
PLAN



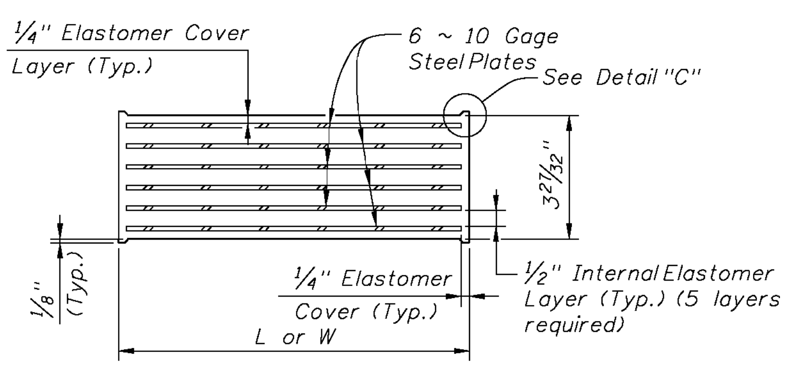
TYPICAL SECTION TYPE D & E PAD



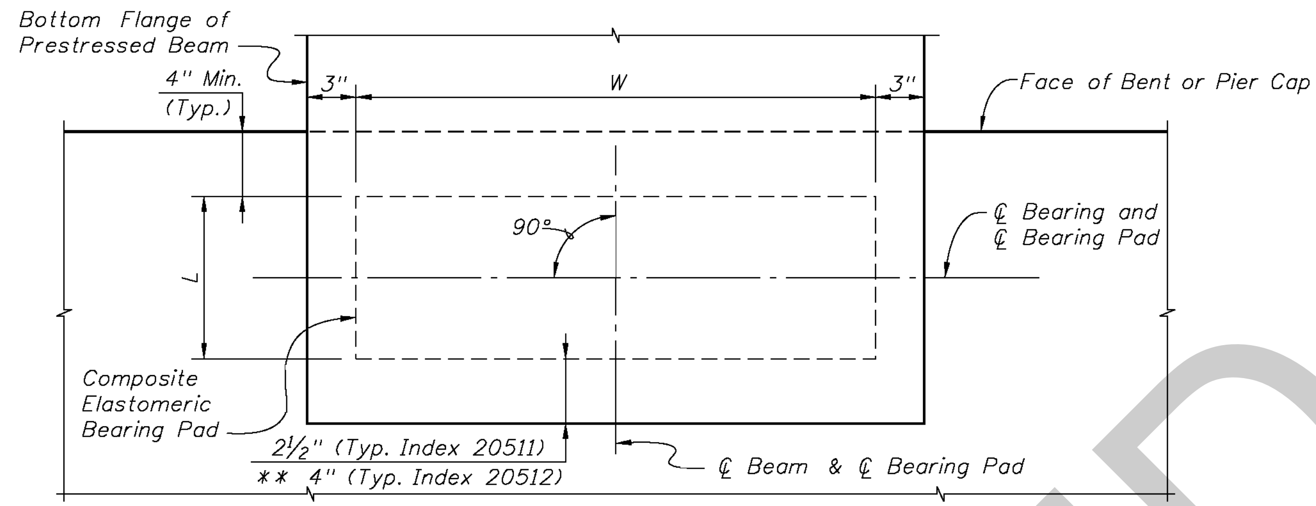
TYPICAL SECTION TYPE F & G PAD



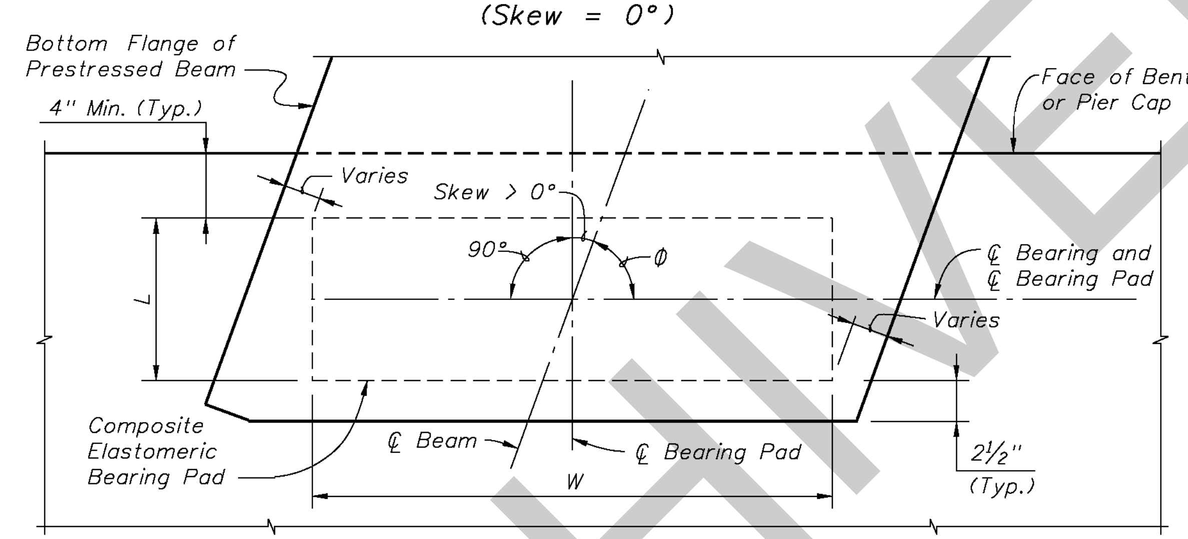
TYPICAL SECTION TYPE H PAD



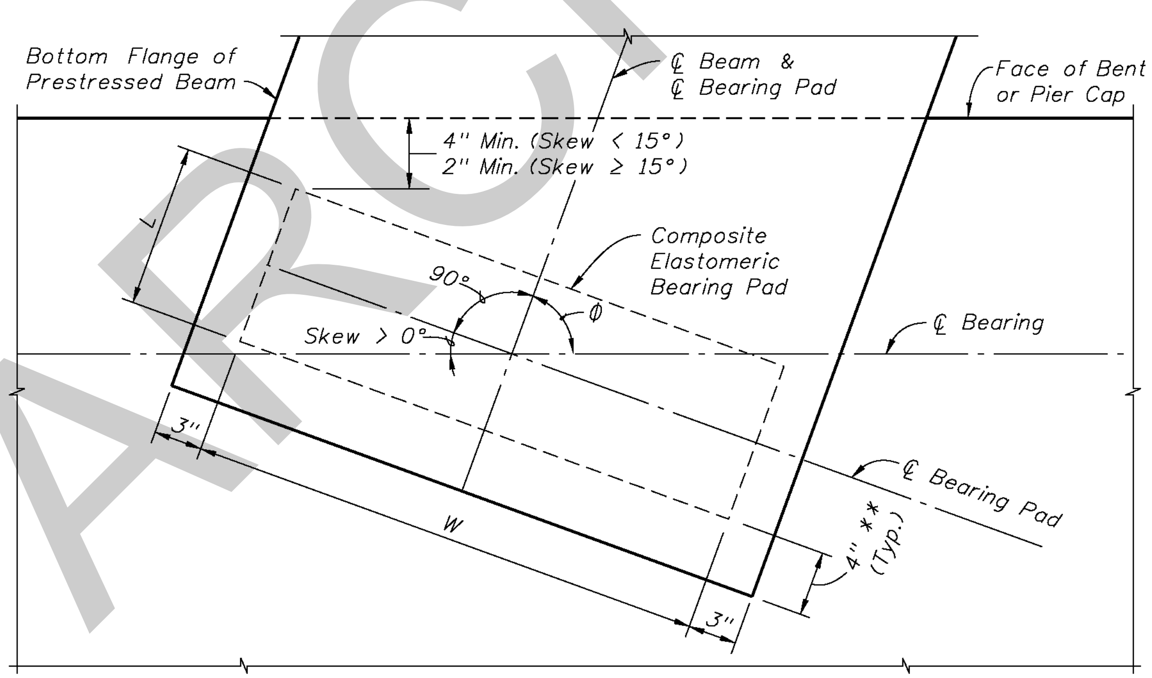
TYPICAL SECTION TYPE J & K PAD



PARTIAL PLAN (Skew = 0°)



PARTIAL PLAN WITH END DIAPHRAGM (Skew > 0°)

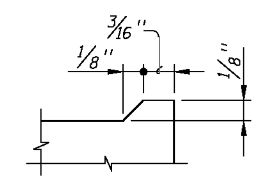


PARTIAL PLAN WITHOUT END DIAPHRAGM (Skew > 0°)

	BEARING PAD DIMENSIONS		*BEVELED BEARING PLATE DIMENSIONS	
PAD TYPE (See Note 1)	L	W	C	D
D (G=110psi)	8"	32"	12"	36"
E (G=110psi)	10"	32"	12"	36"
F (G=110psi)	10"	32"	12"	36"
G (G=150psi)	10"	32"	12"	36"
H (G=150psi)	10"	32"	12"	36"
J (G=150psi)	10"	32"	12"	36"
K (G=150psi)	12"	32"	13½"	36"

* Work this sheet with Index No. 20511 or 20512 - Bearing Plate Details and BEARING PAD DATA TABLE in the Structures Plans. See TABLE OF BEAM VARIABLES and BEARING PLATE DATA TABLE in the Structures Plans for locations where beveled bearing plates are required.

** Offset to End of Beam is reduced to 2" for Type K Pad using Index No. 20512.



DETAIL "C"

BEARING PAD NOTES:

1. Neoprene in Type D, E & F bearing pads shall have a shear modulus (G) of 110 psi. Neoprene in Type G, H, J & K bearing pads shall have a shear modulus (G) of 150 psi.

2. Steel Plates in bearing pads shall conform to ASTM A1011 Grade 36, Type 1.

3. Unless otherwise shown in the Structures Plans:
   (a) For beam grades less than 0.5%, finish the Beam Seat level.
   (b) For beam grades between 0.5% and 2%, finish the Beam Seat parallel to the bottom of the beam in both transverse and longitudinal directions.
   (c) For beam grades greater than 2% finish the Beam Seat level and provide Beveled Bearing Plates.

4. See Bearing Pad Data Table in Structures Plans for quantities of Type D, E, F, G, H, J and/or K Bearing Pads.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
01/01/10	SJN	New Design Standard.			
07/01/10	CJF	Added offsets & references to Index No. 20512; deleted PARTIAL SIDE ELEVATION detail; changed dimension 'C' for Type K Pad.			

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

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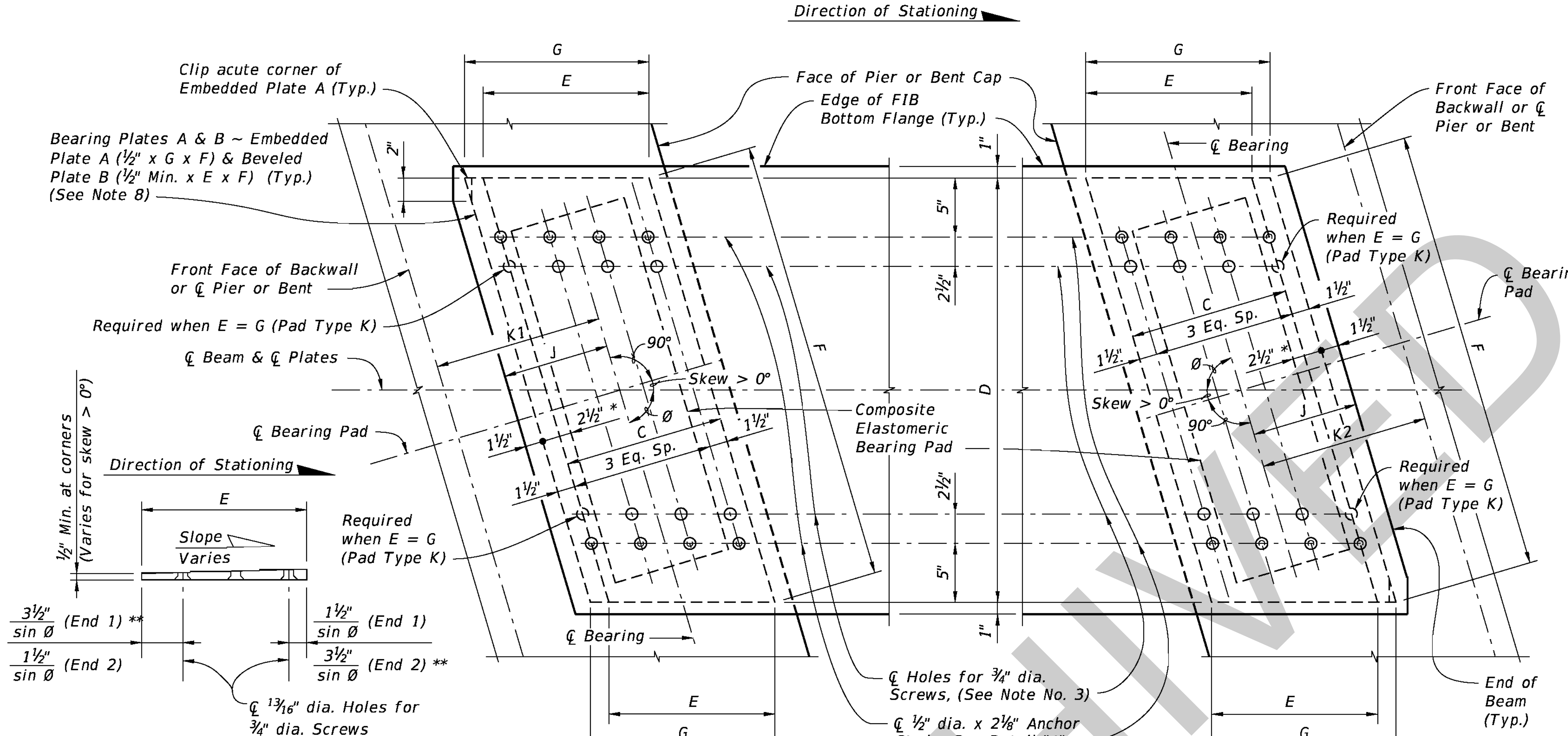
COMPOSITE ELASTOMERIC BEARING PADS - PRESTRESSED FLORIDA-I BEAMS



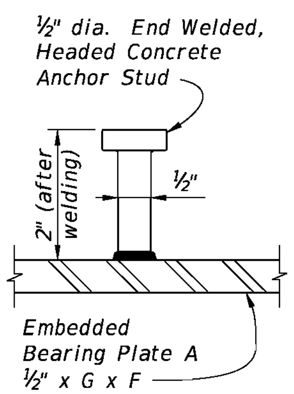
BEVELED BEARING PLATE B
(Along ℄ Beam)
(Positive Slope shown; Negative Slope similar)

PLAN
(0° < Skew ≤ 45° shown, Skew = 0° Similar)

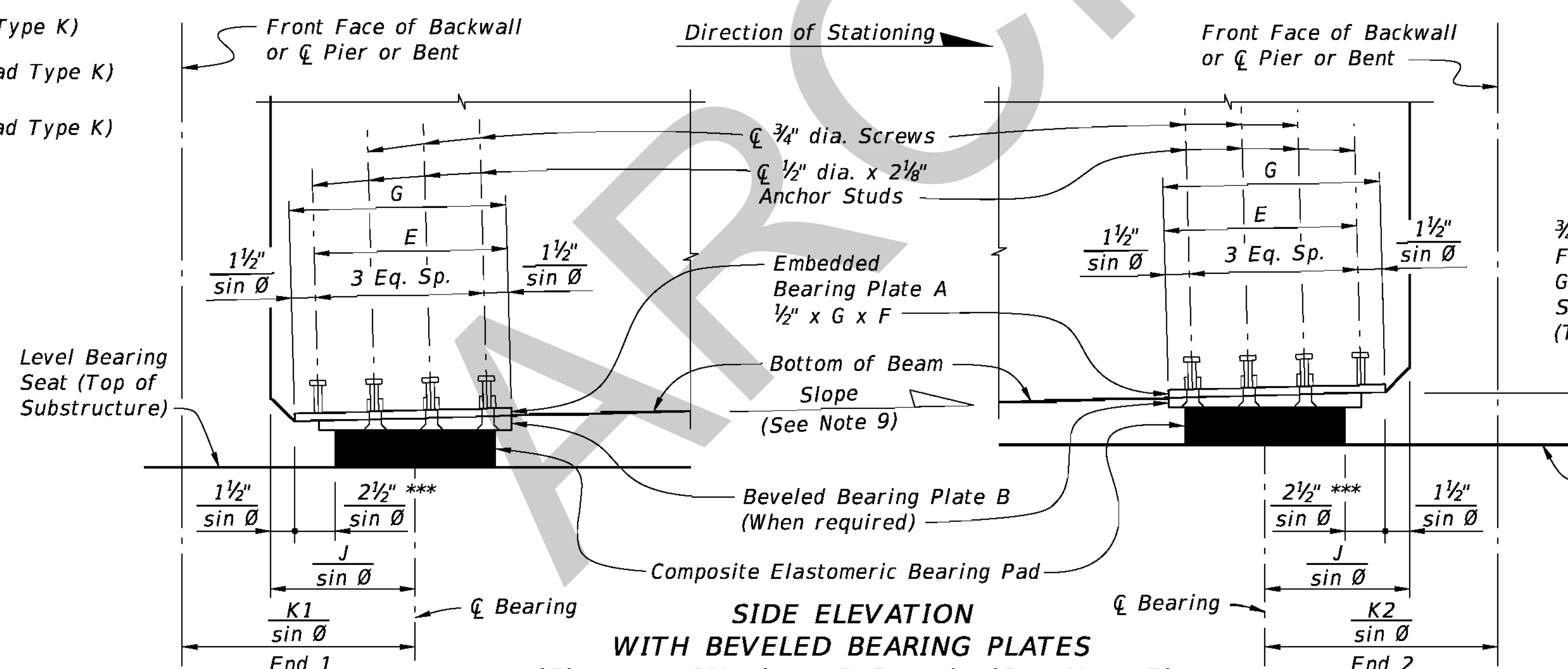
* ½" when E = G (Pad Type K)

** $\frac{1\frac{1}{2}"}{\sin Ø}$ when E = G (Pad Type K)

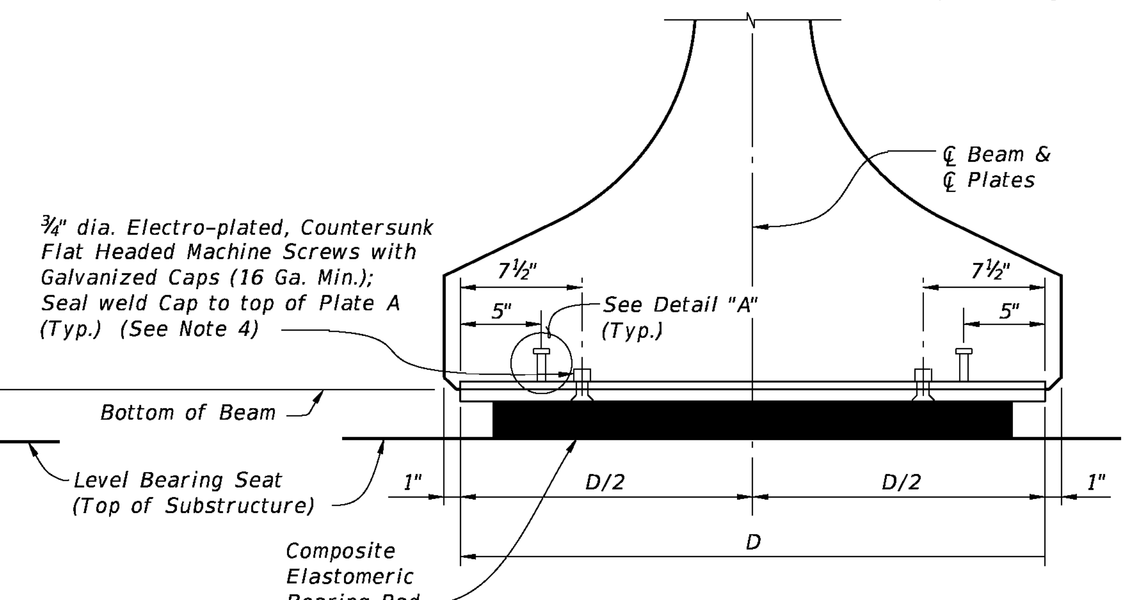
*** $\frac{\frac{1}{2}"}{\sin Ø}$ when E = G (Pad Type K)



DETAIL "A"



SIDE ELEVATION
WITH BEVELED BEARING PLATES
(Slopes > 2% along ℄ Beam) (See Note 7)



END ELEVATION
WITH BEVELED BEARING PLATE

NOTES:

1. Work this sheet with Index No. 20510 - Composite Elastomeric Bearing Pads, and 'BEARING PLATE DATA TABLE' in the Structures Plans.

2. Embedded Bearing Plates A are required for all Florida-I beams. Beveled Bearing Plates B with Embedded Bearing Plates A are required for beams as scheduled in the 'BEARING PLATE DATA TABLE' in the Structures Plans.

3. Bearing plate material shall conform to ASTM A36 or ASTM A709 (Grade 36 or 50). Headed Concrete Anchor Studs shall conform to Specification Section 502. Hot-dip galvanize Bearing Plates A & B after fabrication except that Galvanized Caps may be welded in place after hot-dip galvanizing. Drill Bearing Plates A and B as an assembled unit, thread Bearing Plate A only. Holes are not required in Plate A when Plate B is not required. Drill and thread holes perpendicular to the bottom of Plate B and prior to plates being galvanized (ASTM A 123).

4. Provide Electroplated, Flat Countersunk Head Cap Screws in accordance with ASTM F 835. Electroplating shall be ASTM B633, SC 2, Type 1. Provide screws long enough to maintain a ¾" minimum embedment into Embedded Bearing Plate A and Galvanized Cap. Provide steel Galvanized Caps with ½" min. to 1½" max. height and nominal 1" inside diameter.

5. Include the cost of Bearing Plates in the pay item for Prestressed Beams.

6. For Dimensions C, D, E, F and G, see 'BEARING PLATE DIMENSIONS' on Index No. 20510 and the 'BEARING PLATE DATA TABLE' in the Structures Plans. For Dimensions J, K1 and K2, see 'TABLE OF BEAM VARIABLES' in the Structures Plans.

7. All details and dimensions shown are along ℄ Beam, except for dimensions to ¾" dia. Screws and ½" dia. x 2⅛" Anchor Studs, which are along ℄ Screws or ℄ Anchor Studs. Positive Slope shown, Negative Slope similar.

8. When Skew = 0°, dimensions for Embedded Bearing Plate A are ½" x G x D and for Beveled Plate B are ½" Min. x C x D.

9. Slope is determined along ℄ Beam at ℄ Bearing. See 'BEARING PLATE DATA TABLE' in the Structures Plans for Slope and Angle Ø.

REVISIONS

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

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

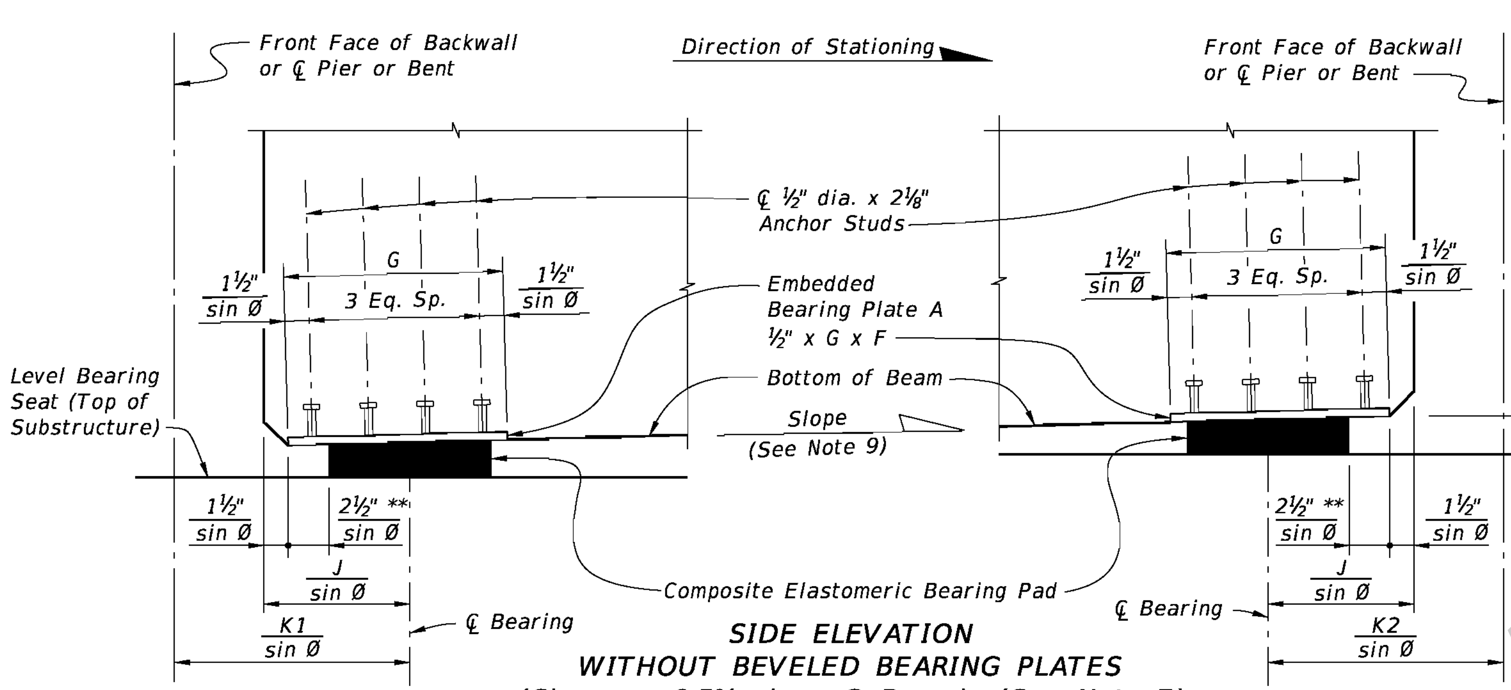
2010 Interim Design Standard

BEARING PLATE DETAILS - PRESTRESSED FLORIDA-I BEAMS

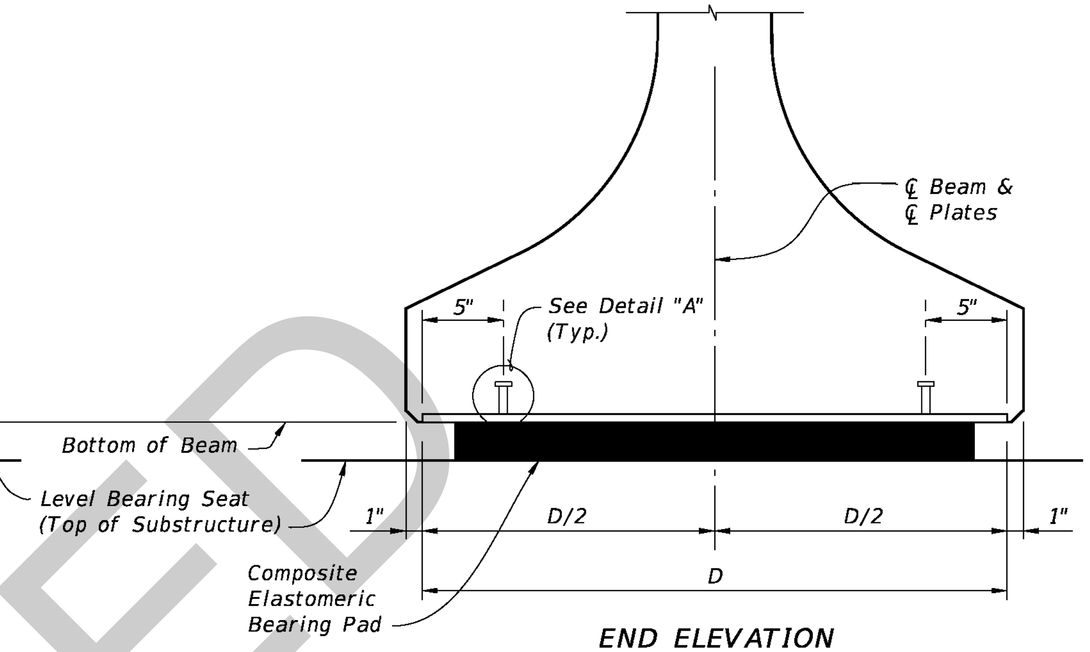
Interim Date 07/01/10

Sheet No. 1 of 2

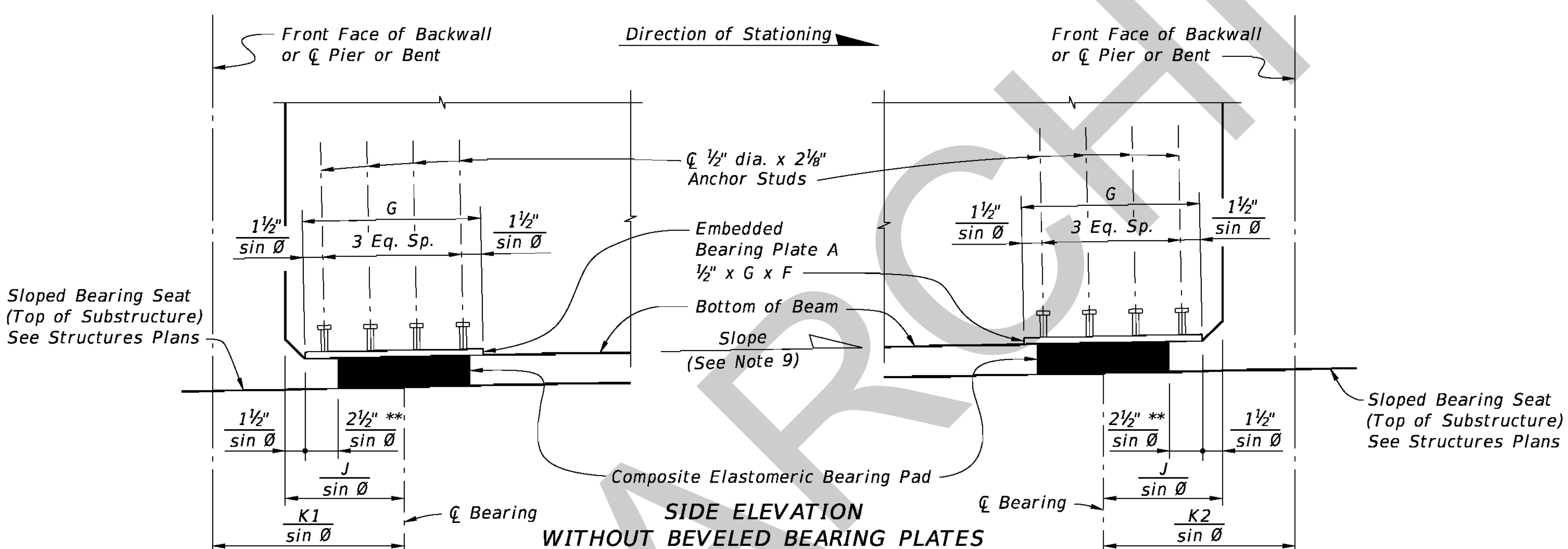
Index No. 20512



SIDE ELEVATION
WITHOUT BEVELED BEARING PLATES
(Slopes ≤ 0.5% along ℄ Beam) (See Note 7)



END ELEVATION
WITHOUT BEVELED BEARING PLATE



SIDE ELEVATION
WITHOUT BEVELED BEARING PLATES
(0.5% < Slopes ≤ 2% along ℄ Beam) (See Note 7)

** ½" / sin Ø for Pad Type K

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

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

2010 Interim Design Standard

BEARING PLATE DETAILS - PRESTRESSED FLORIDA-I BEAMS

Interim Date 07/01/10

Sheet No. 2 of 2

Index No. 20512

ATTACHMENT B

Figure 15.5-1 Thickened Slab End Details

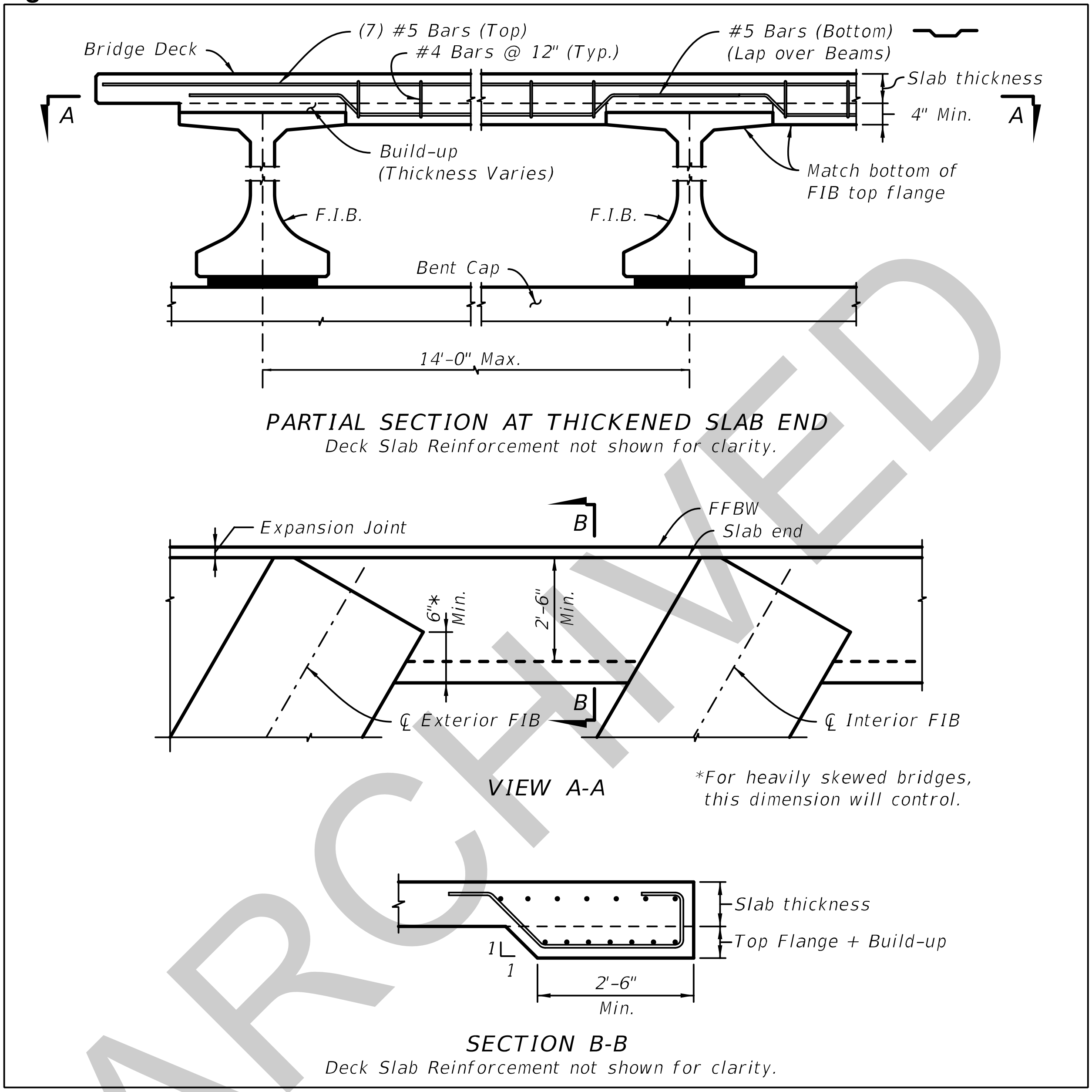


Figure 15.5-2 Thickened Slab End at Interior Support

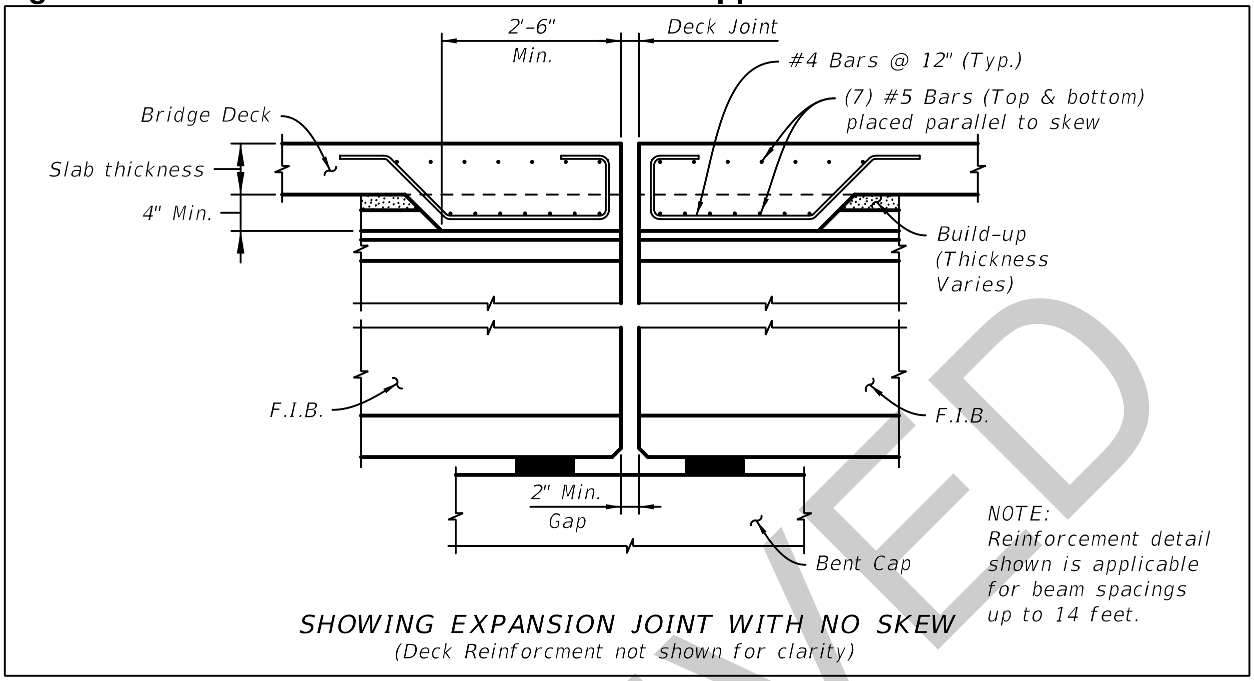


Figure 15.8-1 Concrete End Diaphragm Details

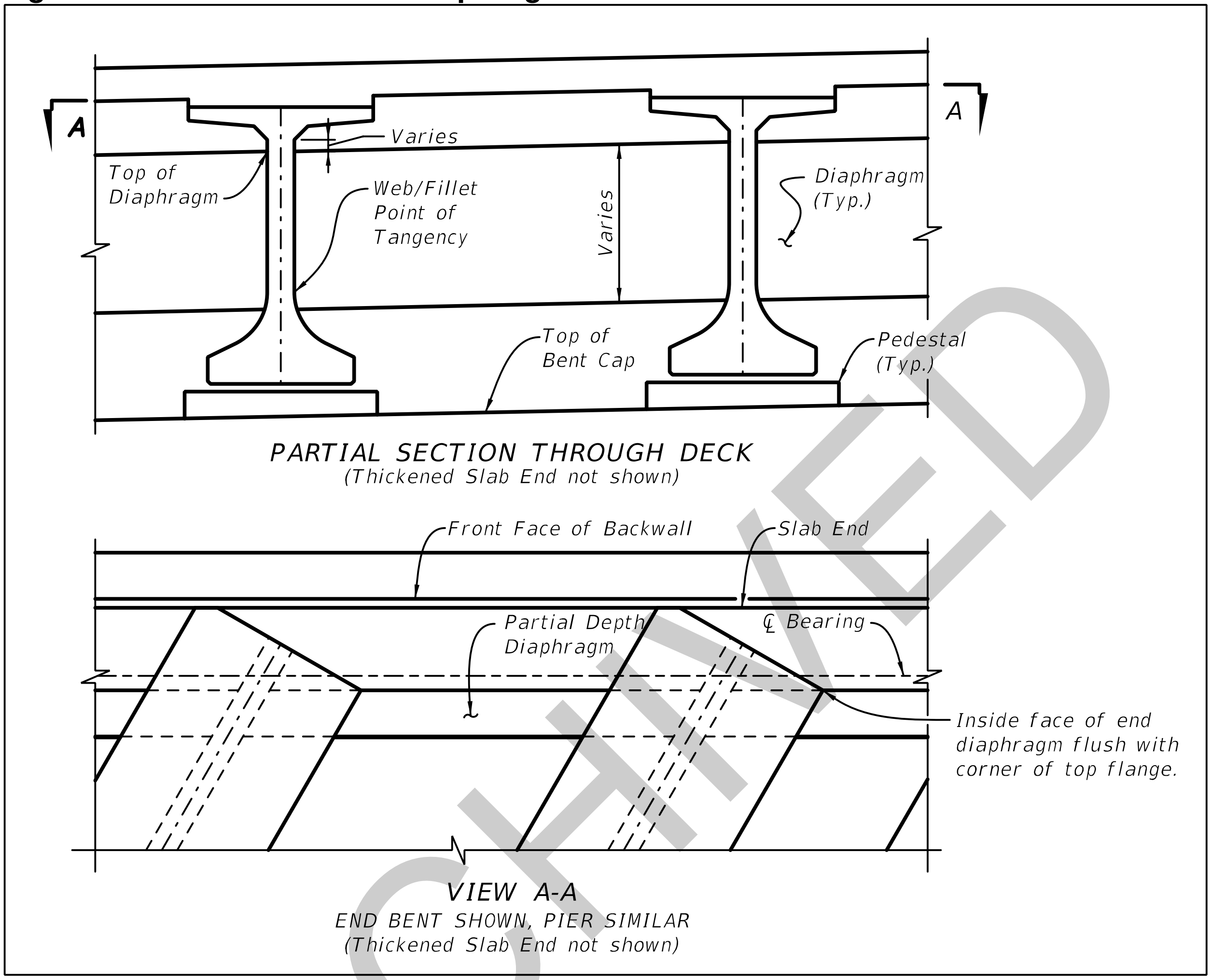


Figure 15.8-2 Concrete End Diaphragm Reinforcement Details

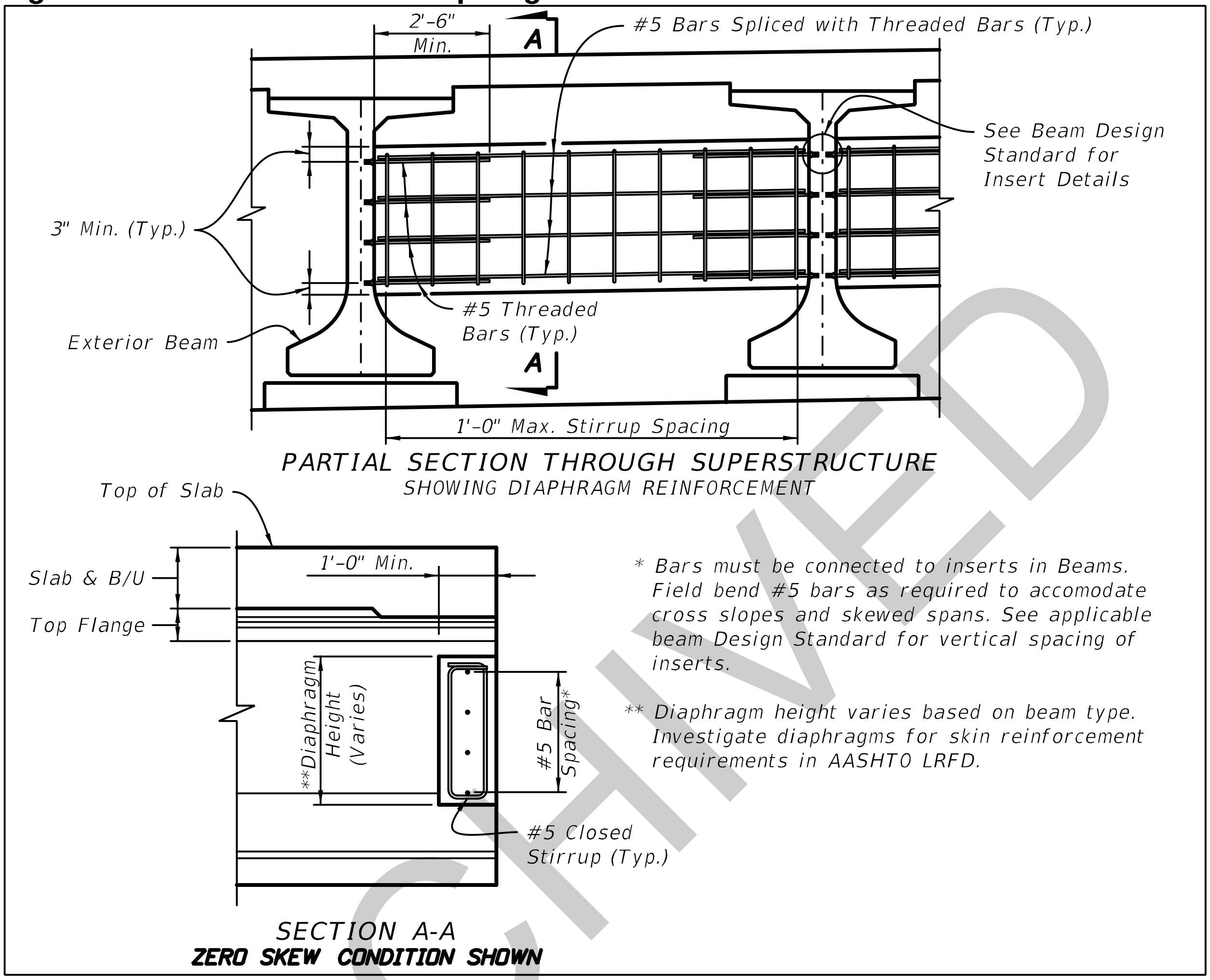


Figure 15.8-4 Squared Beam End Details – Expansion Joint at Interior Support

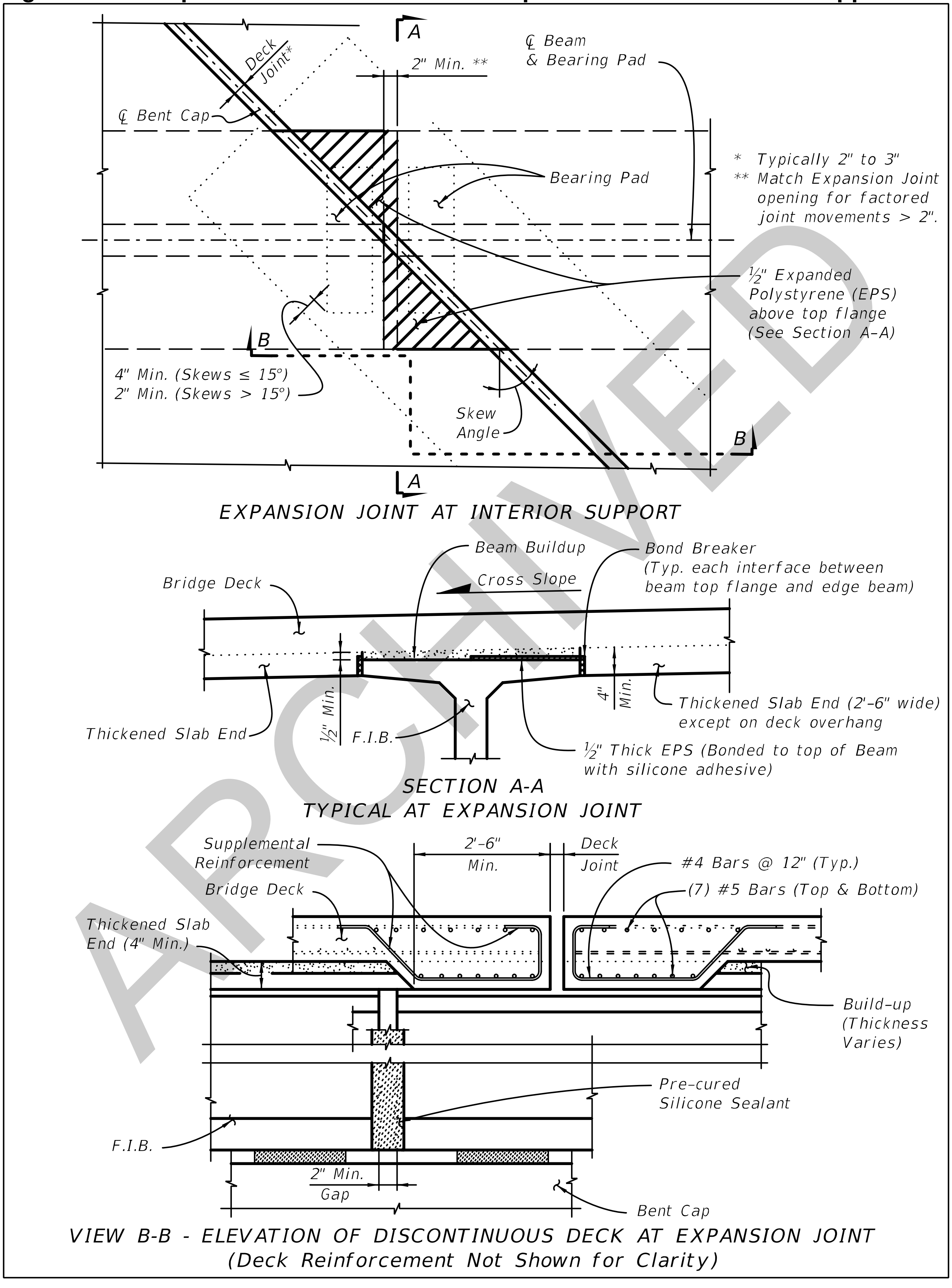


Figure 15.8-5 Squared Beam End Details – Continuous Deck at Interior Support

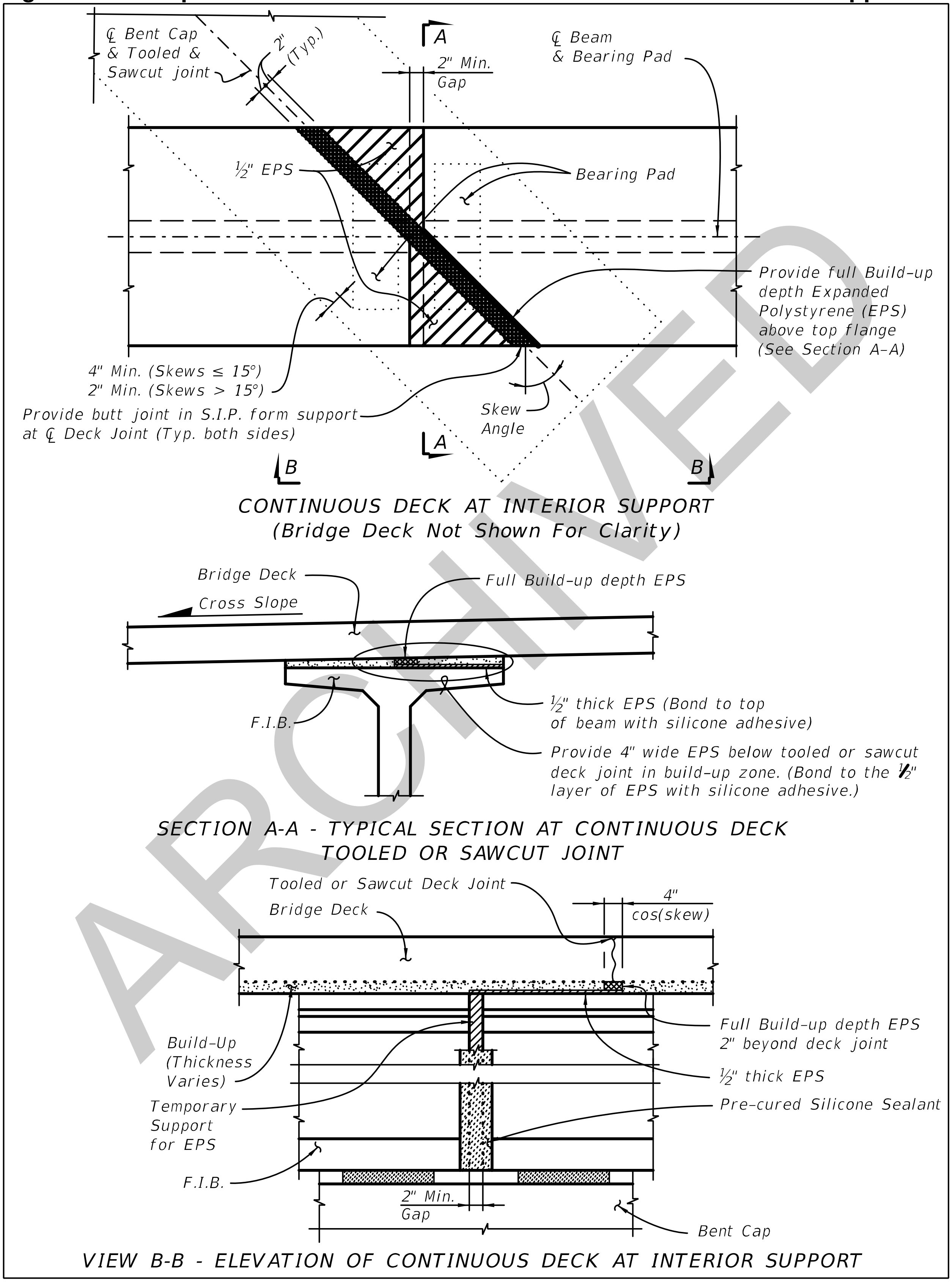
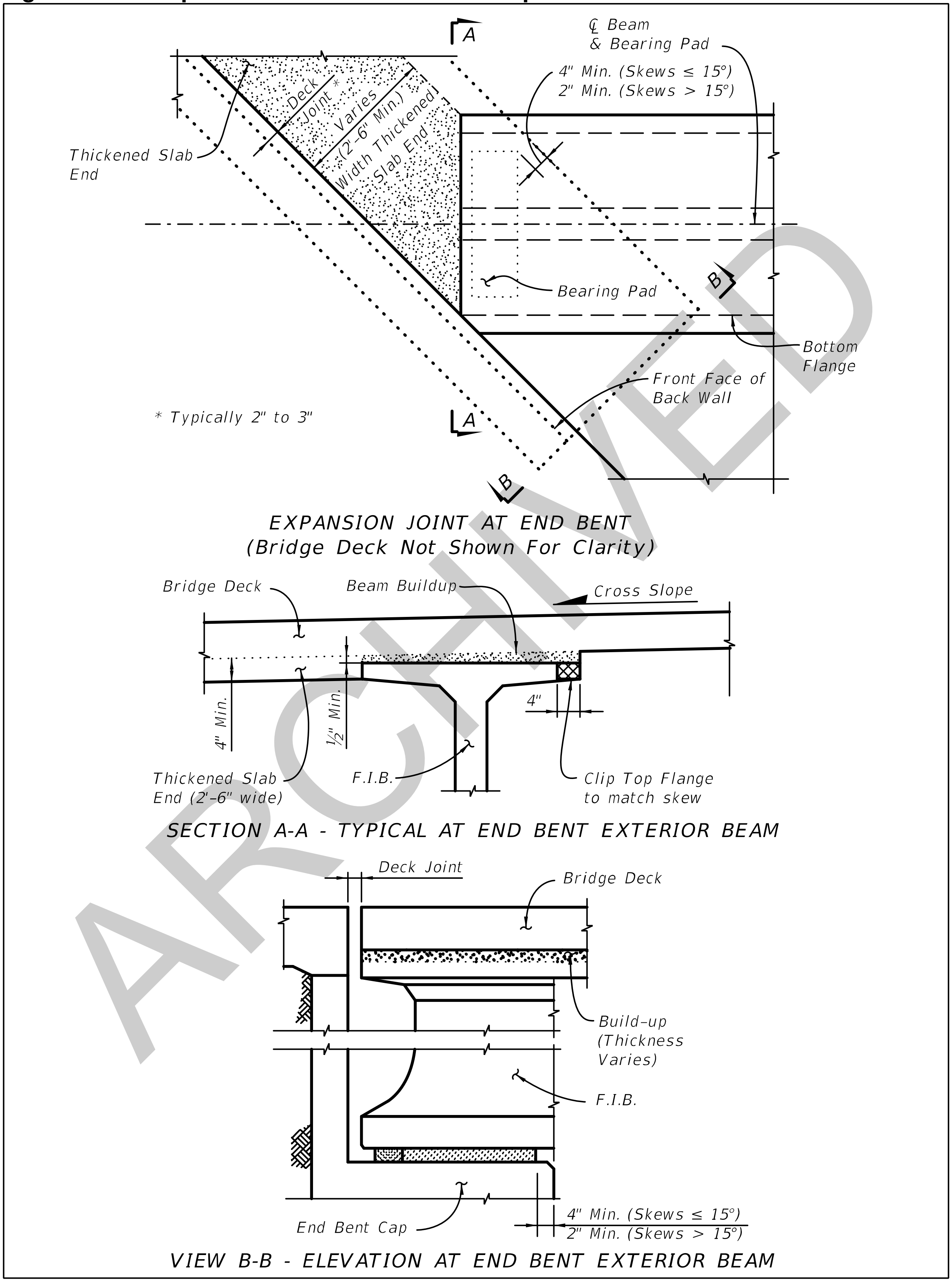


Figure 15.8-6 Squared Beam End Details – Expansion Joint at End Bent



ATTACHMENT C

Index 20010 Series Prestressed Florida-I Beams (Rev. 07/10)

Design Criteria

AASHTO LRFD Bridge Design Specifications, 4th Edition; ***Structures Detailing Manual (SDM)***; ***Structures Design Guidelines (SDG)***

Design Assumptions and Limitations

Index 20010 is the lead standard for the Prestressed Florida-I Beam standard series which includes Indexes 20010 through 20096. Use this standard with Indexes 20005, 20036, 20045, 20054, 20063, 20072, 20078, 20084, 20096, 20199, 20510 and 20511.

These standards must be supplemented with project specific information including a Table of Beam Variables, Strand Pattern Details and a Strand Debonding Legend which must be completed and included in the Structures Plans. These standards and the supplemental project specific information that is included in the plans provide sufficient information to permit beam fabrication without the submittal of shop drawings.

Data tables for associated Indexes 20005, 20199, 20510 and 20511 must also be completed and included in the plans.

A Framing Plan is required for bridges meeting the criteria stated in the ***SDM***.

The use of End Diaphragms is not preferred on simple span, pretensioned, Florida-I Beam structures. In lieu of End Diaphragms, the preferred detail is a Thickened Slab End at all locations of slab discontinuity. Where End Diaphragms are required by design or for widening projects, partial depth diaphragms are preferred. See ***Structures Design Bulletin C10-05*** for suggested details.

Except for widening projects where special details may be required, squared beam ends are preferred on all Florida-I Beam structures.

The prestressed beams in these Standard Drawings are generally assumed to act as simple spans under both Dead Load and Live Load even where the deck is detailed to be continuous across the intermediate supports or back-to-back diaphragms are present. For detailing purposes, Prestressed Florida-I Beams are assumed to be erected plumb.

When the total initial tensioning force of the fully bonded strands required by design exceeds the values shown below, shield additional strands at the end of the beam when possible. The end reinforcement may only be redesigned to accommodate an increased vertical splitting force when approved by the State Structures Design Office. If approval is granted, Index 20010 and the appropriate Standard Detail Drawings must then be modified for inclusion in the contract documents and signed and sealed by the EOR.

To limit vertical splitting forces in the webs of beams, the maximum prestress force at the beam ends from fully bonded strands must be limited to the following:

Index No.	Beam Type	Max. Bonded Prestress Force	Last Revision Date
20036	Florida-I 36	1450 Kips	07/01/09
20045	Florida-I 45	1670 Kips	07/01/09
20054	Florida-I 54	1740 Kips	07/01/09
20063	Florida-I 63	1740 Kips	07/01/09
20072	Florida-I 72	1980 Kips	07/01/09
20078	Florida-I 78	2230 Kips	07/01/09
20084	Florida-I 84	2375 Kips	07/01/10
20096	Florida-I 96	2375 Kips	07/01/10

Do not apply losses when calculating the Bonded Prestress Force.

Embedded Bearing Plates are required for all beams. If the beam grade exceeds 2%, provide Beveled Bearing Plates at each end of the beam as shown in Index 20511.

Prestressed Beam Suppliers typically utilize side forms for casting which are not easily or economically modified. If modifications to beam cross-sections are required for any reason other than haunched sections, maintain profile dimensions of the form. For example: To thicken the web, increase the spacing between side forms. To increase the beam height, increase the thickness of the top flange. In any case, do not reduce the standard thickness of either the top or bottom flange.

See additional instructions in the ***SDG***.

Plan Content Requirements

In the Structures Plans:

Complete the following "FLORIDA-I BEAM - TABLE OF BEAM VARIABLES" and include it in the plans. Use additional sheets when the actual number of beams or strand patterns exceeds the capacity of a single plan sheet using the standard table. Supplemental details and modifications are permitted if special conditions require dimensions, details or notes. However, the "FLORIDA-I BEAM - TABLE OF BEAM VARIABLES" itself should not be modified. See Introduction I.3 for more information regarding use of Data Tables.

Report elastic and time dependent shortening effects (DIM R) at mid-height of the beam @ 120 days. The average of the calculated values for the top and bottom of the beam may be used.

Show strands in the outermost positions of the two lowest rows to support Bars D.

Round Angle Φ up to the nearest degree.

Specify shear stirrup spacing V1 for Bars 5K to the nearest inch.

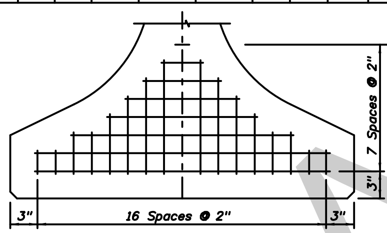
Prepare a Framing Plan for bridges meeting the criteria stated in the ***SDM***.

When diaphragms are required by design, show them on the Framing Plan. Tabulate insert locations with respect to the beam ends and beam faces. Include length adjustments for beams placed on grade and for elastic and time dependent shortening effects. See ***Structures Design Bulletin C10-05*** for diaphragm and reinforcing details.

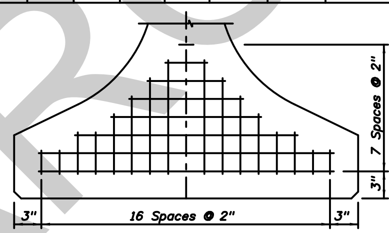
FLORIDA-I BEAM – TABLE OF BEAM VARIABLES

Table Date 7-01-09

LOCATION		BEAM TYPE	CONCRETE PROPERTIES			STND. PTRN. TYPE	END ELEV. COND.	PLAN VIEW CASE		BRG. PLATE MARK ***		END OF BEAM & BEARING DIMENSIONS **						BEAM DIMENSIONS *		REINFORCING STEEL															
SPAN NO.	BEAM NO.		CLASS	STRENGTHS (psi)								ANGLE ϕ		DIM P	DIM J	DIM K1	DIM K2			3C1	3C2	3D1		3D2		3D3	4M1	4M2	4M3	5K	NO. OF SPACES BARS 5K				SP. BARS 5K *
				28 Day	Release			END 1	END 2	END 1	END 2	END 1	END 2					DIM L	DIM R	C	C	A	B	A	B	NO.	D	D	NO.	NO.	S1	S2	S3	S4	V1



TYPE ① __ STRANDS



TYPE ② __ STRANDS

STRAND DESCRIPTION: Use ____ Diameter, Grade ___, ___ ___ Strands stressed at ___ kips each. Area per strand equals ___ sq. in.

STRAND PATTERNS

STRAND DEBONDING LEGEND

• – fully bonded strands.
⊙ – strands debonded _'-__" from end of beam.
⊡ – strands debonded _'-__" from end of beam.
△ – strands debonded _'-__" from end of beam.
◇ – strands debonded _'-__" from end of beam.

NOTE: On beams with skewed ends, the debonded length shall be measured along the shielded strand.

NOTE: Work this sheet with Design Standards Index Nos. 20010 and the applicable "Florida-I Beam Standard Details" Index.

DIMENSION NOTES

* All longitudinal beam dimensions shown on this sheet with a single asterisk (*) are measured along the centerline of beam. Dimension "R" is calculated at mid-height of the beam.

** End beam bearing dimensions "J" and "K" are measured perpendicular to ℄ Bearing along the bottom of the beam.

BEARING PLATES

*** See Index No. 20511 and the Bearing Plate Data Table for details.

Payment

Item number	Item description	Unit Measure
450-2-AAA	Prestressed Beams: Florida-IBeam	LF

Example Problem

The following example shows the data required for completion of a Florida-I Beam Table of Beam Variables. The example assumes a three span bridge with Florida-I 45 Beams designed for the following conditions:

Live Load: HL-93

No intermediate Diaphragms

Stay-in-Place Metal Forms:

Allowance of 20 PSF non-composite dead load over the projected plan area of the forms (this includes the unit weight of metal forms and the concrete required to fill the form flutes).

Environment (Superstructure): Moderately Aggressive

Bridge Characteristics:

Length: 276 ft.
Width: 51'-1" (out-to-out)
Clear Roadway: 48 ft.

Superstructure:

Three simple spans of prestressed concrete beams with 8-inch composite deck slab (plus ½" sacrificial deck thickness)

Span: 87'-0", 102'-0", 87'-0"

Sidewalk: None

Horizontal Alignment: Straight

Vertical Alignment: 0.00% Grade

Skew Angle: 15 degrees (Right)

Beam Design:

Beam: Florida-I 45 Beam

Spacing:

11'-3", 87' Span (5 Beams)
9'-0", 102' Span (6 Beams)

Design Span Length:

84'-6" (Spans 1 & 3)
99'-8" (Span 2)

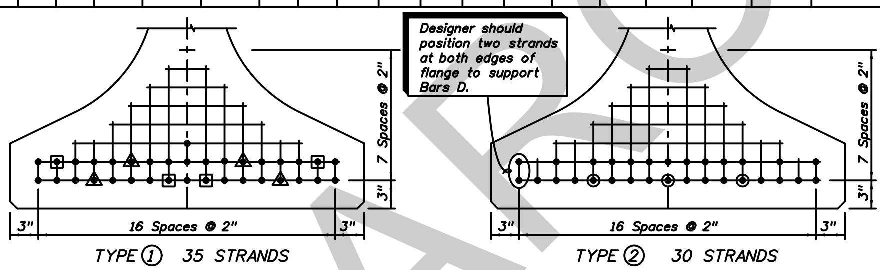
Sample Drawing

FLORIDA-I BEAM - TABLE OF BEAM VARIABLES

Table Date 7-01-09

LOCATION		BEAM TYPE	CONCRETE PROPERTIES			STND. PTRN. TYPE	END ELEV. COND.	PLAN VIEW CASE		BRG. PLATE MARK ***		END OF BEAM & BEARING DIMENSIONS **						BEAM DIMENSIONS *	
			CLASS	STRENGTHS (psi)								ANGLE ϕ		DIM P	DIM J	DIM K1	DIM K2		
SPAN NO.	BEAM NO.			28 Day	Release			END 1	END 2	END 1	END 2	END 1	END 2					DIM L	DIM R
1	1-5	45	V	6500	5000	2	1	2	2	1-1	1-2	75°	75°	-	7½"	1'-3½"	1'-1½"	85'-10½"	1"
2	1-6	45	V	6500	5000	1	1	2	2	2-1	2-2	75°	75°	-	7½"	1'-1½"	1'-1½"	101'-0¾"	1¼"
3	1-5	45	V	6500	5000	2	1	2	2	3-1	3-2	75°	75°	-	7½"	1'-1½"	1'-3½"	85'-10½"	1"

SPAN NO.	REINFORCING STEEL															
	3C1	3C2	3D1		3D2		3D3	4M1	4M2	4M3	5K	NO. OF SPACES BARS 5K				SP. BARS 5K *
	C	C	A	B	A	B	NO.	D	D	NO.	NO.	S1	S2	S3	S4	V1
1	1'-6¼"	1'-6¼"	8¾"	1'-3½"	8¾"	1'-3½"	50	3'-9½"	3'-9½"	73	148	16	35	-	2	6"
2	1'-6¼"	1'-6¼"	8¾"	1'-3½"	8¾"	1'-3½"	60	3'-9½"	3'-9½"	88	136	10	13	10	14	6"
3	1'-6¼"	1'-6¼"	8¾"	1'-3½"	8¾"	1'-3½"	50	3'-9½"	3'-9½"	73	148	16	35	-	2	6"



STRAND DESCRIPTION: Use 0.6 Diameter, Grade 270, Low Relaxation Strands stressed at 44 kips each. Area per strand equals 0.217 sq. in.

STRAND PATTERNS

STRAND DEBONDING LEGEND

- • - fully bonded strands.
- ⊙ - strands debonded 10'-0" from end of beam.
- ⊡ - strands debonded 20'-0" from end of beam.
- △ - strands debonded 25'-0" from end of beam.

NOTE: On beams with skewed ends, the debonded length shall be measured along the shielded strand.

NOTE: Work this sheet with Design Standards Index Nos. 20010 and the applicable "Florida-I Beam Standard Details" Index.

DIMENSION NOTES

* All longitudinal beam dimensions shown on this sheet with a single asterisk (*) are measured along the centerline of beam. Dimension "R" is calculated at mid-height of the beam.

** End beam bearing dimensions "J" and "K" are measured perpendicular to ℄ Bearing along the bottom of the beam.

BEARING PLATES

*** See Index No. 20511 and the Bearing Plate Data Table for details.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

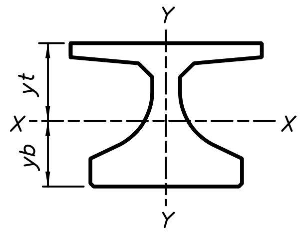
DRAWN BY: XXX MM-YY
CHECKED BY: XXX MM-YY
DESIGNED BY: XXX MM-YY
CHECKED BY: XXX MM-YY

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID

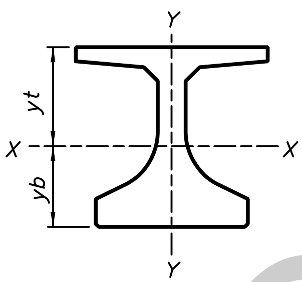
SHEET TITLE: SAMPLE
PROJECT NAME:
REF. DWG. NO.
SHEET NO.

Design Aids



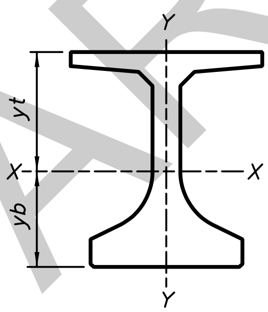
FIB-36
(INDEX 20036)

FIB-36 SECTION PROPERTIES	
Area (in.^{2})	806.58
Perimeter (in.)	206.57
Ixx (in.^{4})	127,545
Iyy (in.^{4})	81,070
yt (in.)	19.51
yb (in.)	16.49



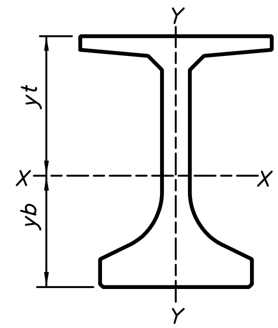
FIB-45
(INDEX 20045)

FIB-45 SECTION PROPERTIES	
Area (in.^{2})	869.58
Perimeter (in.)	224.57
Ixx (in.^{4})	226,581
Iyy (in.^{4})	81,327
yt (in.)	24.79
yb (in.)	20.21



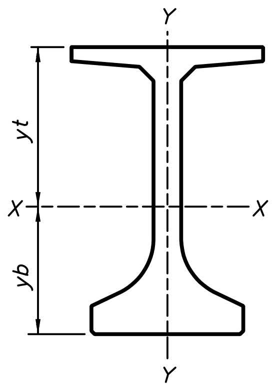
FIB-54
(INDEX 20054)

FIB-54 SECTION PROPERTIES	
Area (in.^{2})	932.58
Perimeter (in.)	242.57
Ixx (in.^{4})	359,929
Iyy (in.^{4})	81,584
yt (in.)	29.96
yb (in.)	24.04



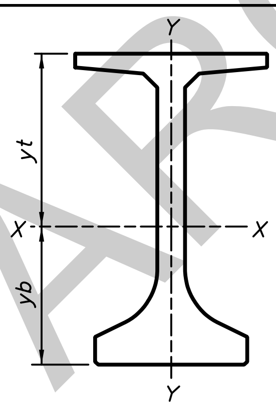
FIB-63
(INDEX 20063)

FIB-63 SECTION PROPERTIES	
Area (in.^{2})	995.58
Perimeter (in.)	260.57
Ixx (in.^{4})	530,313
Iyy (in.^{4})	81,842
yt (in.)	35.04
yb (in.)	27.96



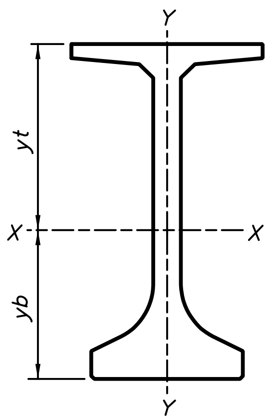
FIB-72
(INDEX 20072)

FIB-72 SECTION PROPERTIES	
Area (in.^{2})	1,058.58
Perimeter (in.)	278.57
Ixx (in.^{4})	740,416
Iyy (in.^{4})	82,099
yt (in.)	40.06
yb (in.)	31.94



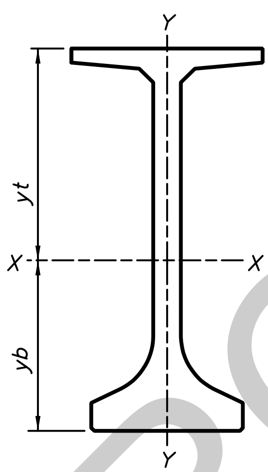
FIB-78
(INDEX 20078)

FIB-78 SECTION PROPERTIES	
Area (in.^{2})	1,100.58
Perimeter (in.)	290.57
Ixx (in.^{4})	903,861
Iyy (in.^{4})	82,270
yt (in.)	43.37
yb (in.)	34.63



FIB-84
(INDEX 20084)

FIB-84 SECTION PROPERTIES	
Area (in.^{2})	1,142.58
Perimeter (in.)	302.57
Ixx (in.^{4})	1.087 x 10^6
Iyy (in.^{4})	82,442
yt (in.)	46.66
yb (in.)	37.34



FIB-96
(INDEX 20096)

FIB-96 SECTION PROPERTIES	
Area (in.^{2})	1,226.58
Perimeter (in.)	326.57
Ixx (in.^{4})	1.515 x 10^6
Iyy (in.^{4})	82,785
yt (in.)	53.18
yb (in.)	42.82

Index 20512 Bearing Plate Details Prestressed Florida-I Beams (Rev. 07/10)

Design Criteria

AASHTO LRFD Bridge Design Specifications, 4th Edition; ***Structures Design Guidelines (SDG)***

Design Assumptions and Limitations

This Design Standard has been developed as a more economical option than Index 20511 and may be used at the designer's discretion.

This standard contains generic details and notes for beveled and embedded bearing plates for prestressed concrete Florida-I Beams with or without skewed end conditions.

Use this standard with Indexes 20010, 20036, 20045, 20054, 20063, 20072, 20078, 20084, 20096 and 20510.

Embedded Bearing Plates A are required for all Florida-I Beams. Embedded Bearing Plates A and Beveled Bearing Plates B are required for beams on grades greater than 2%.

Plan Content Requirements

In the Structures Plans:

Bearing seats (pedestals) may be finished level for beam grades less than 0.5%. Use Embedded Bearing Plates A but do not use Beveled Bearing Plates B.

For beam grades between 0.5% and 2%, show the bearing seats (pedestals) to be finished parallel to the beam grade with no allowance for beam camber or deflection. Use Embedded Bearing Plates A but do not use Beveled Bearing Plates B.

For beam grades greater than 2%, show the bearing seats (pedestals) to be finished level and use Bearing Plates A and B.

See also instructions for Index 20510.

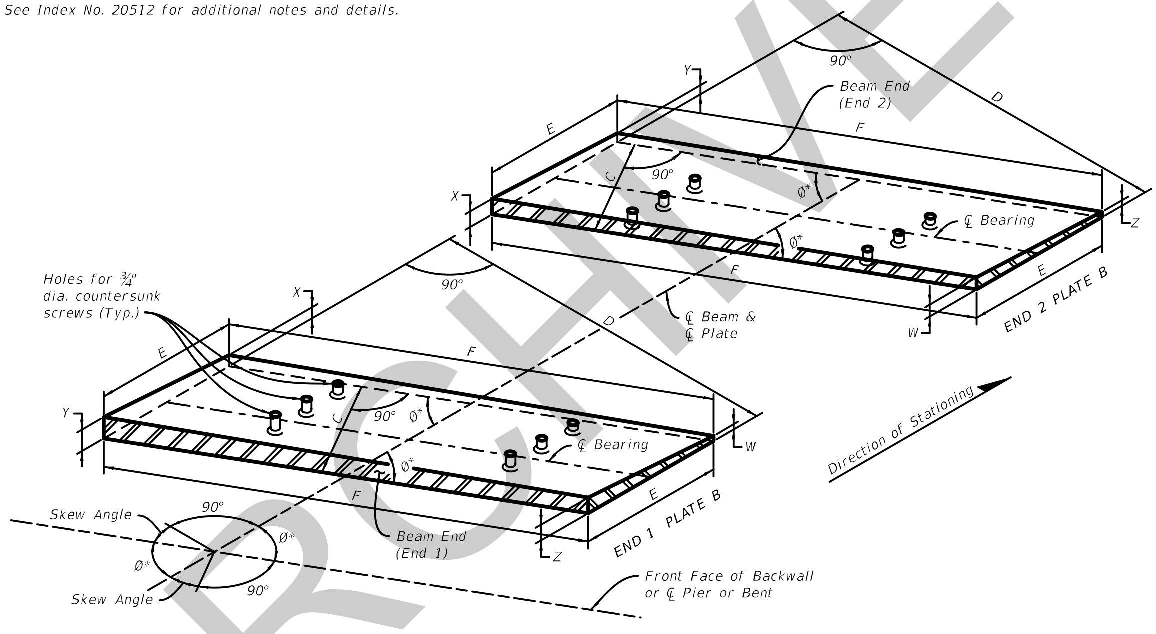
Complete the following "BEARING PLATE DATA TABLE" and include it in the plans. Fill in the table to correspond with data on the "FLORIDA-I BEAM TABLE OF BEAM VARIABLES" using inch units for Beveled Plate dimensions 'W', 'X', 'Y' & 'Z' rounded to 1/16th of an inch. If Beveled Bearing Plates B are not required, fill in the corresponding columns with "N/A". See Introduction I.3 for more information regarding use of Data Tables.

Use the following equations to determine the Beveled Bearing Plate B thicknesses for "PLAN VIEW CASES"' and "END ELEVATION CONDITIONS"' corresponding to those shown on Index 20010. The Slope parameter in these equations requires decimal units and correct sign convention:

END 1	END 2
(I) PLAN VIEW CASE 1:	
(a) END ELEVATION CONDITION 1 or 2 (Positive Slope)	
W = X = 0.5" + (C) x Slope	W = X = 0.5"
Y = Z = 0.5"	Y = Z = 0.5" + (C) x Slope
(b) END ELEVATION CONDITION 1 or 3 (Negative Slope)	
W = X = 0.5"	W = X = 0.5" - (C) x Slope
Y = Z = 0.5" - (C) x Slope	Y = Z = 0.5"
(II) PLAN VIEW CASE 2:	
(a) END ELEVATION CONDITION 1 or 2 (Positive Slope)	
W = 0.5" + (C / sin Φ + D / tan Φ) x Slope	W = 0.5" + (D / tan Φ) x Slope
X = 0.5" + (C / sin Φ) x Slope	X = 0.5"
Y = 0.5"	Y = 0.5" + (C / sin Φ) x Slope
Z = 0.5" + (D / tan Φ) x Slope	Z = 0.5" + (C / sin Φ + D / tan Φ) x Slope
(b) END ELEVATION CONDITION 1 or 3 (Negative Slope)	
W = 0.5"	W = 0.5" - (C / sin Φ) x Slope
X = 0.5" - (D / tan Φ) x Slope	X = 0.5" - (C / sin Φ + D / tan Φ) x Slope
Y = 0.5" - (C / sin Φ + D / tan Φ) x Slope	Y = 0.5" - (D / tan Φ) x Slope
Z = 0.5" - (C / sin Φ) x Slope	Z = 0.5"
(III) PLAN VIEW CASE 3:	
(a) END ELEVATION CONDITION 1 or 2 (Positive Slope)	
W = 0.5"+ (C / sin Φ) x Slope	W = 0.5"
X = 0.5" + (C / sin Φ + D / tan Φ) x Slope	X = 0.5" + (D / tan Φ) x Slope
Y = 0.5" + (D / tan Φ) x Slope	Y = 0.5" + (C / sin Φ + D / tan Φ) x Slope
Z = 0.5"	Z = 0.5" + (C / sin Φ) x Slope
(b) END ELEVATION CONDITION 1 or 3 (Negative Slope)	
W = 0.5" - (D / tan Φ) x Slope	W = 0.5" - (C / sin Φ + D / tan Φ) x Slope
X = 0.5"	X = 0.5" - (C / sin Φ) x Slope
Y = 0.5" - (C / sin Φ) x Slope	Y = 0.5"
Z = 0.5" - (C / sin Φ + D / tan Φ) x Slope	Z = 0.5" - (D / tan Φ) x Slope

BEARING PLATE DATA TABLE																		Table Date 7-01-10
GENERAL BEARING PLATE DATA								EMBEDDED PLATE DIMENSIONS (PLATE A) (inches)		BEVELED PLATE REQUIRED (Yes/No)	BEVELED PLATE DIMENSIONS (PLATE B) (inches)							
BRG. PLATE MARK ***	SPAN NO(s).	BEAM NO(s).	PAD TYPE	BEAM END	PLAN VIEW CASE	SLOPE (%) **	ANGLE Ø *	G	F		C	D	E	F	W	X	Y	Z

NOTES:
* Ø = Acute angle (≤ 90°) measured from left or right side of ℄ Beam as required.
** Slope measured along ℄ of Beam at ℄ of Bearing.
*** See "TABLE OF BEAM VARIABLES" and Index No. 20010.
See Index No. 20512 for additional notes and details.



ISOMETRIC VIEW OF BEVELED BEARING PLATES FOR FLORIDA I-BEAMS
(SKEWED PLATES SHOWN, NON-SKEWED PLATES SIMILAR)

Payment

The cost of beveled and embedded bearing plates is incidental to the cost of the prestressed beams they are used with. No separate payment is made.