Appendix B: Example.

The example below discusses use of the plans provided. However, note that the plans do not represent a complete set of construction drawings and additional detail beyond that given in this example is required.

A simple span, steel girder bridge with length of 50 ft (from back to back of abutments), zero skew, and clear deck width of 34 ft is to be designed. The bridge will have concrete approach slabs. The bridge deck is 7.5" thick with an additional 1.5" integral wearing surface. The bridge construction centerline aligns with the center of the bridge.

Referring to Table 2, the following sheets are needed for a steel girder bridge design:

Sheet Name	Number
Deck plan & haunch detail	DECK 001
Abutment back wall	DECK 002
Approach slab	DECK 003
Barrier & end walls	DECK 004
Bridge section	DECK 008
Erection diagram	STEEL 001
Shear reinforcement	STEEL 002
Deflection diagram	STEEL 004
Diaphragms	STEEL 003
Bearings	BRG 003
Expansion joint	EXPJT 001

See the attached Example sheets. Items highlighted in yellow are to be filled in with a specific value, while items in red are to be deleted. Numbers in boldface **(1)** refer to the label referenced on the example.

DECK 001: Deck Plan

Input:

L (bridge span length) = 50' **(1)**
a (out-to-out bridge width) = 36'-6" (see beam dimension table, DECK 008) **(3)**
Angle of crossing = 90˚ **(4)**

Select:

Haunch detail for steel beams and deck plan corresponding to 90˚ angle of crossing.

Notes:

Remove reinforcement notes, deck plan, and haunch detail for bridge types other than steel **(2)**

Redraw deck plan corresponding to the left side diagram, with 90 degree angle of crossing.
F (fascia depth) will vary along the beam length as with beam haunch, as determined by the screed values. **(5)**

DECK 002: Abutment Backwall

Input:

D (backwall width) = max(1'-8", bearing dimension + ½ of bearing width). See BRG 003 for steel beam bearing dimensions = max(1'-8", (14" + 15"/2 = 21.5")), say 22". **(1)**

Select:

Abutment backwall for rolled steel beam and both back wall sections.

Notes:

Since span exceeds 25' (see notes on DECK 002 and DECK 003 instructions), one backwall is chosen as a fixed type, while the other is chosen as an expansion type.
Delete abutment backwall details for other bridge types. **(2)**
Bearing dimensions are obtained from BRG 003.

DECK 003: Approach Slab

Input:

a (out to out width) = 36'-6" (see Beam Dimension Table, DECK 008) **(1)**
Angle of crossing = 90˚ **(2)**

Select:

Concrete approach slab plan and section.

Notes:

Delete HMA approach plan and section. **(3)**
The approach plan is to be redrawn to match a 90 ˚ angle of crossing.

DECK 004: Barrier and End Wall

Input:

L_B (barrier length) = distance between reference lines = bridge length = 50' **(1)**

Select:

The left side of the barrier plan, corresponding to 90 ˚ angle of crossing.

Notes:

The right side of the barrier plan is deleted, as is the end wall elevation corresponding to side by side box beams. **(2)**
Bearing dimensions are obtained from BRG 003.

DECK 008: Bridge Section for Steel Beams

Input:

a (out-to-out bridge width) **(1)** = 36'-6"
b (clear roadway width) **(1)** = 34'
c (half of roadway clear width) **(2)** = 17'
d (number of beam bays) **(3)** = 5
e (beam spacing) **(3)** = 6'-3"
f (bridge width center-to-center of edge beams) **(3)** =31'-3"
g (beam size) **(3)** = W30x173
h (center of edge beam to bridge fascia) **(4)** = 2'-7.5"

Select:

Beam span (say 50'), bridge width (34' clear). **(5)**

Notes:

Based on a bridge span and width selection, the Beam Dimension Table **(5)** can be consulted to select an applicable beam size and beam spacing; variables a-h are specified in the selection table. Note that beam span on the Beam Dimension Table is measured center-to-center of bearings, which is: bridge span – 2 x (distance from back of abutments to center-to-center of bearings). The distance from the back of the abutment to the center of the bearing is approximately: [distance from back of abutment to end of girder] + [1/2 of bearing length + 1.5"] = [D – (D - 11.25" + 2.5")] + [1/2(14") + 1.5"] = 17.25" (see Backwall Section DECK 002, and BRG 003; recall D = backwall width = 22"). Beam span is then 50' – 2(17.25") = 47'-1.5". A conservative estimate of beam size would correspond to a 50' beam span center-to-center of bearings; this assumption is used in this example.

STEEL 001: Erection Diagram

Input:

These values are obtained from the Beam Dimension Table on DECK 008.

L (bridge span) = 50' **(1)**
Diaphragm spacing = 1 at midspan (S/2) = (47'-1.5")/2 = 23'-6.75" **(2)**

d (number of beam bays) = 5 **(3)**
e (beam spacing) = 6'-3" **(3)**
f (bridge width center-to-center of fascia beams) = 31'-3" **(3)**
g (beam size) = W30x173 **(3)**
X (center of bearing to reference line) = 17.25" **(4)**
A, B (distance from center of nearest beams to bridge construction centerline = 6'-3" **(3)**

Select:

Left side of diagram, corresponding to a 90˚ angle of crossing.

Notes:

Delete note for non-applicable diaphragm spacing **(2)** and right side of diagram **(5)**. Erection plan should be redrawn to appropriately match the number of beams (6), 90˚ angle of crossing, and number of diaphragms (1) and placement.

STEEL 002: Shear Reinforcement

Input:

W (beam length) = beam span (ctc bearings) + 2 x (1/2 of bearing length + 1.5") = beam span + 2f = 47'-1.5" + 2(8.5") = 48'-6.5" (see BRG 003 for beam length relationship to bearings).
b (total length of region with studs) = beam length – 12" = 48'-6.5" – 12" = 47'-6.5" **(1)**
a (number of shear studs) = b/2' spacing (round up) + 1 = 47'-6.5" / 2' + 1 = 25 **(1)**
c (number of spacings of beam end holes) = 2 **(3)**
d (spacing of beam end holds) = 12" **(3)**
e (total length of end holes) = 2' **(3)**
f (distance from beam end to center of bearing) = 8.5" **(2)**

Select:

Shear stud developer detail for 90˚ angle of crossing.

Notes:

Delete shear stud detail for angle of crossing < 90˚. **(5)**
Applicable input parameter values are obtained from the accompanying Beam Dimension Table **(4).** Note some parameters (a, b, W) cannot be directly read from the table as beam span is given as 47'-1.5" in this example and does not correspond to an increment given. Thus these parameters were calculated as shown above.
Redraw beam elevation to correspond to actual diaphragm/stiffener number and placement and end holes.

STEEL 004: Deflection Diagram

Input:

a (number of ordinates) = 10 **(1)**
b (ordinate spacing) = beam span / 10 = 47'-1.5" / 10 = 4.71'
c (span of beam) = 47'-1.5" **(1)**

Select: --

Notes:

Ordinate location and camber values are read from the Ordinate Dimension and Theoretical Camber Tables. Note that these values are only applicable for the exact beam lengths given on the tables **(2)**

STEEL 003: Diaphragms

Input:

a (beam spacing) = 6'-3" **(1)**
b (number of spaces between holes) = 4 **(2)**
c (vertical hole spacing) = 3" **(2)**
d (total distance between fastener holes) = 12" **(2)**
e (diaphragm depth) = 18" **(4)**
θ (angle of crossing) = 90˚ **(3)**

Select:

It is assumed that either diaphragm detail is acceptable (channel or built-up alternate), so both are provided and left to the contractor to choose. **(4)**

Notes:

Parameters b, c, d, e are read from the Diaphragm Dimension Table. **(6)**
Section A-A should be redrawn to match the 90˚ angle of crossing specified.
Delete Top Flange Clip Detail, since angle of crossing is 90˚. **(5)**

BRG 003: Bearings

Input:

B (width of bearing pad) = 15" **(1), (4)**
D (sole plate width) =17" **(1), (3), (4)**
E (distance from retainer bolt to center of beam) = 10-3/4" **(1)**
G (length of bearing pad) = 14" **(2), (4)**

H (length of sole plate) = 15” **(2), (3)**
J (bearing pad thickness) = 2-3/8” **(4)**
s (number of shim plates) = 3 **(4), (5)**
n (number of interior elastomer layers = 2 **(4), (5)**
t (interior elastomer layer thickness) = ¾” **(4), (5)**
L (height of side retainer) = 4-7/8” **(5)**
N (thickness of sole plate) = 2” **(3)**

Select:

Bearing type (expansion or fixed).

Notes:

Bearing pad parameters are read from the Bearing pad dimension table **(6)**. Fixed and expansion bearing details are to be used for the corresponding back wall types.

EXPJT 001: Expansion Joints

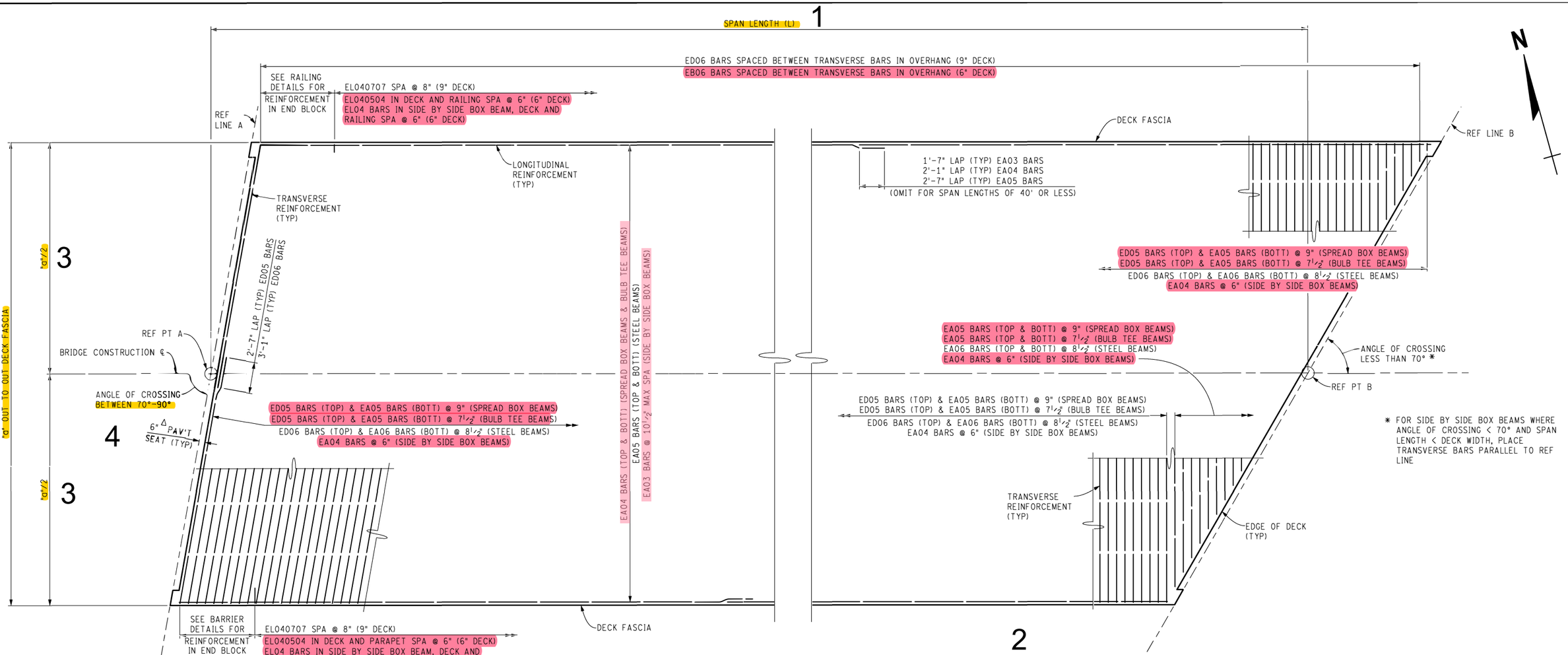
Input:

The table in the Notes section **(1)** is project dependent and is to be filled out by the designer.

Select: --

Notes:

The designer must select an appropriate expansion joint type to accommodate the total bridge movement. These selections are not provided on this sheet.

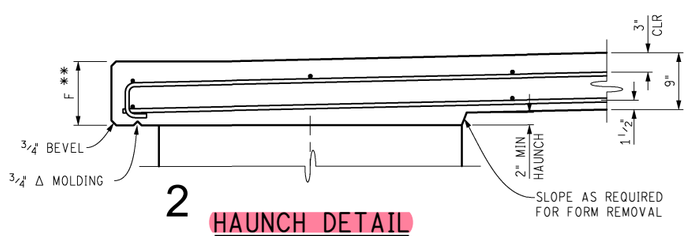


PLAN OF DECK

(ANGLE OF CROSSING 70° OR GREATER)

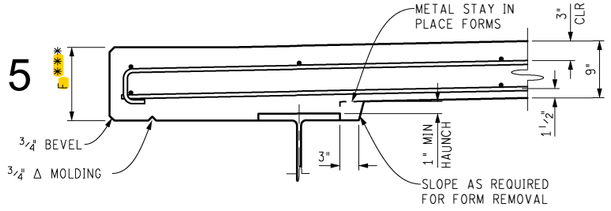
PLAN OF DECK

(ANGLE OF CROSSING LESS THAN 70°)



2 HAUNCH DETAIL

CONCRETE SPREAD BOX BEAMS & BULB TEE BEAMS



HAUNCH DETAIL

STEEL BEAMS

FOR INFORMATION ONLY:

** FASCIA THICKNESS (F) = 9" + HAUNCH + ½" + AMOUNT OF FASCIA BEAM DROP REQUIRED TO MAINTAIN MINIMUM SLAB THICKNESS AT CURB LINE.

*** FASCIA THICKNESS (F) = 9" + HAUNCH + THICKEST FASCIA BEAM FLANGE + ½" + AMOUNT OF FASCIA BEAM DROP REQUIRED TO MAINTAIN MINIMUM SLAB THICKNESS AT CURB LINE.

IF "F" BECOMES GREATER THAN 12" USE A HAUNCH DETAIL ON THE FASCIA SIDE OF THE BEAM SIMILAR TO THE HAUNCH DETAIL ON THE INTERIOR SIDE. ADDITIONAL REINFORCEMENT MAY BE REQUIRED IN THE AREA OVER THE BEAM FLANGE IF THE HAUNCH BECOMES EXCESSIVE.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

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NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

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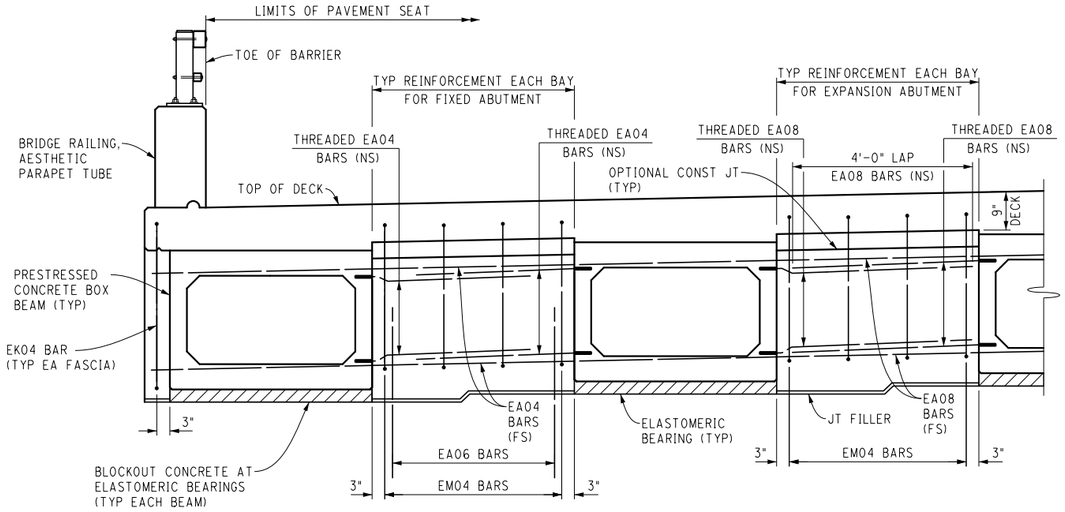
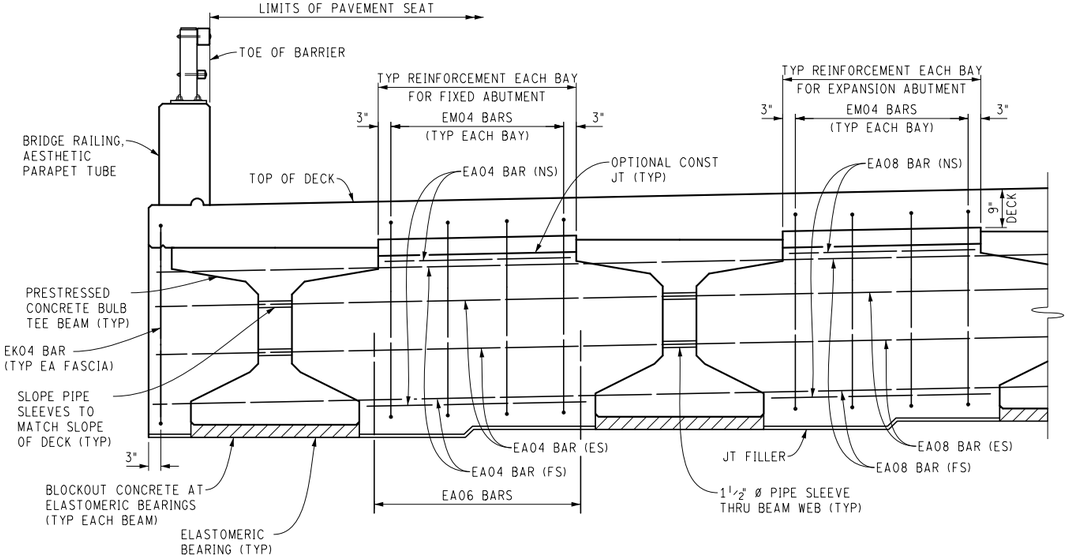
		DESIGN UNIT:	JN:		DECK / SECT
	FILE: Deck_001.dgn	TSC:			001



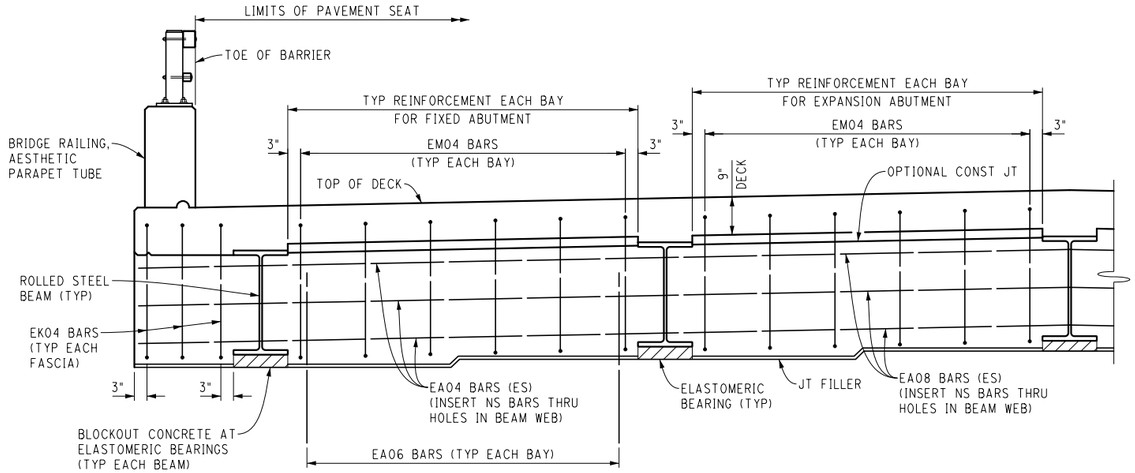
TYPICAL ABUTMENT BACKWALL - SPREAD BOX BEAM

2

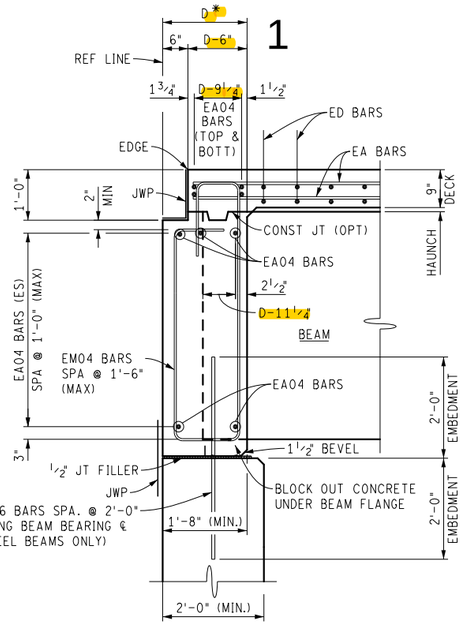


TYPICAL ABUTMENT BACKWALL - BULB TEE BEAM

2



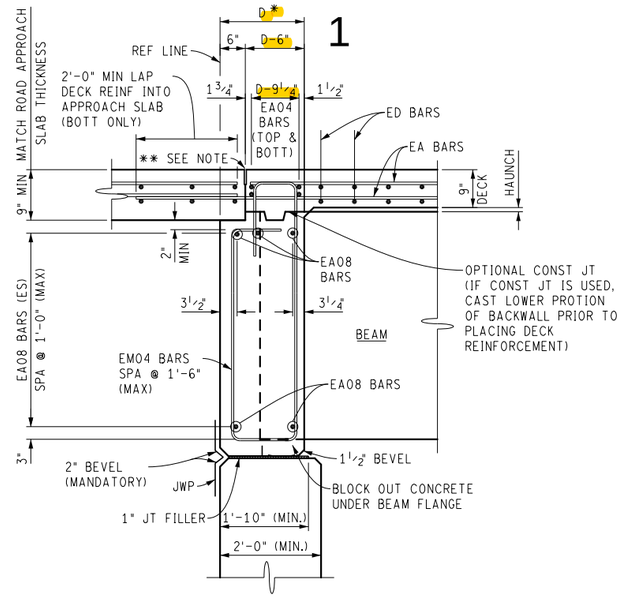
TYPICAL ABUTMENT BACKWALL - ROLLED STEEL BEAM



TYPICAL BACKWALL SECTION (FIXED)

CAST LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT. (USE WITH MANDITORY JOINT)

IF A CONSTRUCTION JOINT IS USED, CAST THE LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT.



TYPICAL BACKWALL SECTION (EXPANSION)

CAST LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT. (USE WITH MANDITORY JOINT)

IF A CONSTRUCTION JOINT IS USED, CAST THE LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT.

FOR INFORMATION ONLY:

* THE BACKWALL THICKNESS "D" IS THE GREATER OF:

1) 1'-8" OR THE BEARING DIMENSION PLUS 1/2 THE BEARING WIDTH - (FOR 90° CROSSINGS)

2) 1'-8" OR THE BEARING DIMENSION PLUS THE PRODUCT OF 1/2 FLANGE WIDTH AND COSINE ANGLE OF CROSSING - (FOR SKEWED CROSSINGS)

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

NOTES:

** IF A CONSTRUCTION JOINT IS NOT USED, THE CONTRACTOR IS TO PROVIDE A SAWED JOINT (1/3 DECK SLAB THICKNESS)" DEEP BY 1/4" WIDE (MINIMUM) IN THE TOP OF SLAB AT TRANSVERSE CONSTRUCTION JOINTS OVER THE BACKWALL. IF A CONSTRUCTION JOINT IS NOT USED, THE JOINT IS TO BE SAWED WITHIN 24 HOURS OF PLACING THE CURING AND IS TO BE FILLED TO 1/2" BELOW TOP OF CONCRETE WITH POLYURETHANE OR POLYURETHANE HYBRID SEALANT.

NS DENOTES NEAR SIDE.

FS DENOTES FAR SIDE.

ES DENOTES EACH SIDE.

JWP DENOTES JOINT WATERPROOFING.

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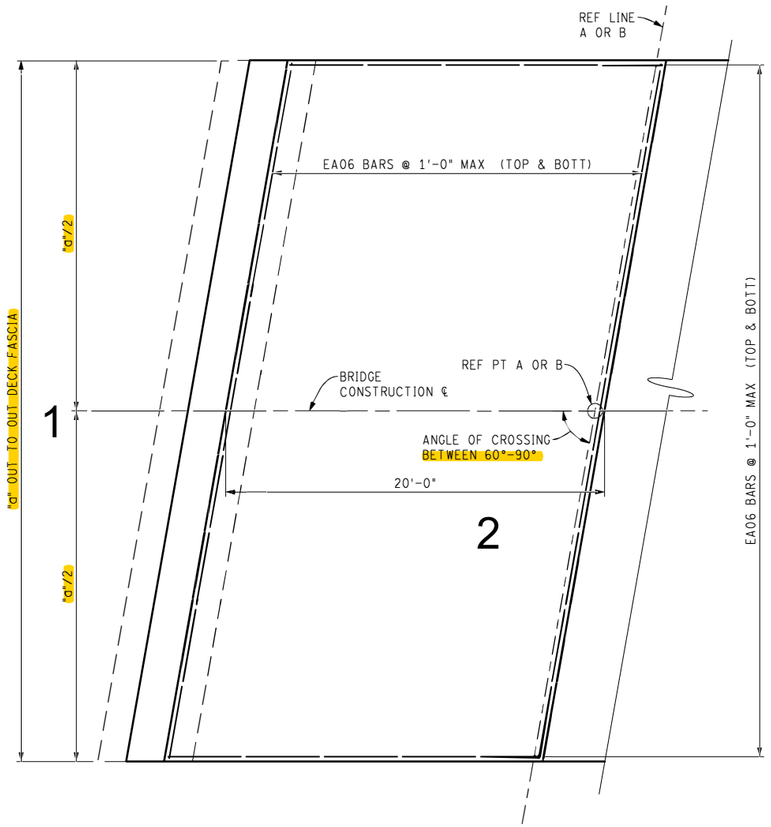
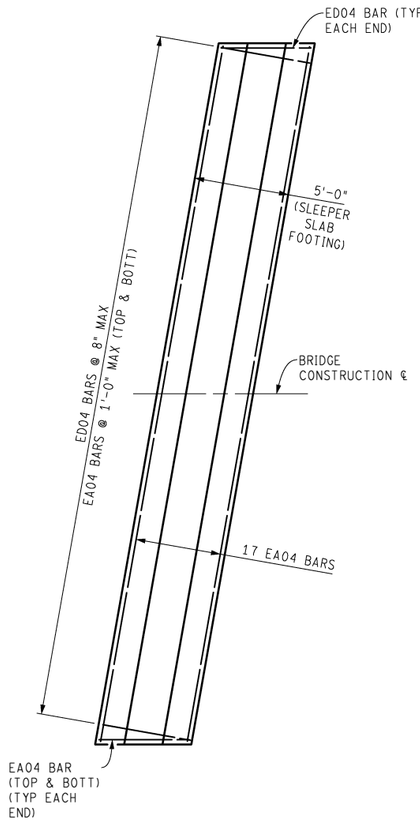


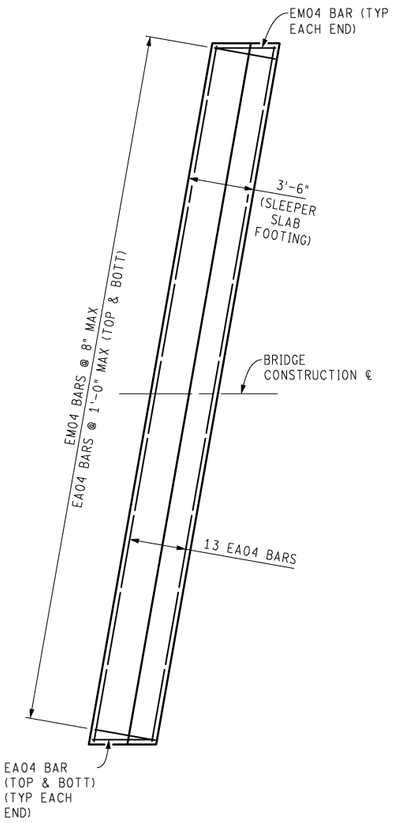
PLAN OF APPROACH SLAB (EXPANSION SIDE)

(ANGLE OF CROSSING 60° OR GREATER)
(SLEEPER SLAB FOR CONCRETE APPROACH SHOWN)



PLAN OF SLEEPER SLAB

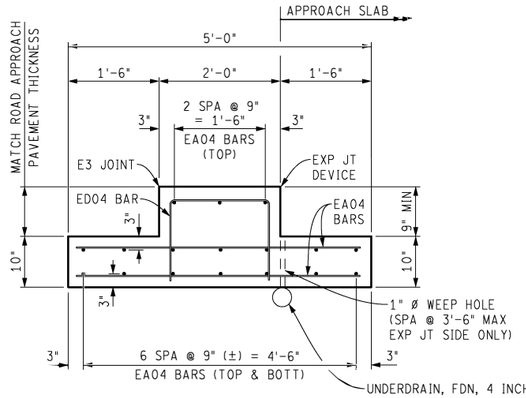
(ANGLE OF CROSSING 60° OR GREATER)
(CONCRETE APPROACH)



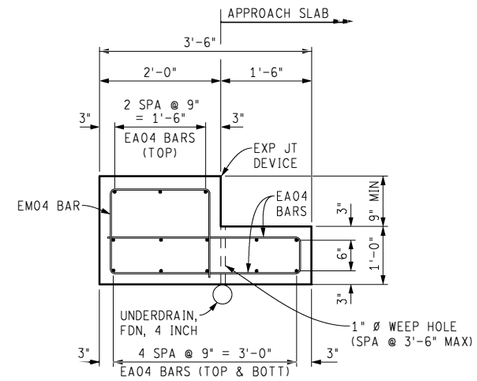
PLAN OF SLEEPER SLAB

(ANGLE OF CROSSING 60° OR GREATER)
(HMA APPROACH)

3

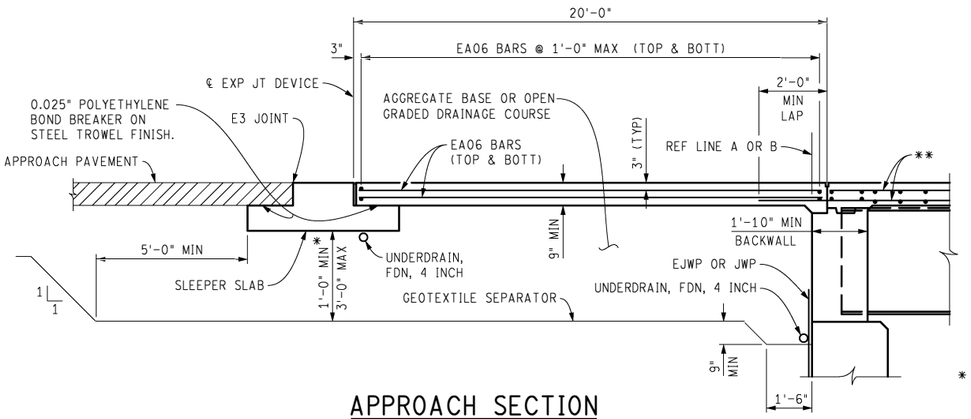


SECTION THRU SLEEPER SLAB WITH CONCRETE APPROACH



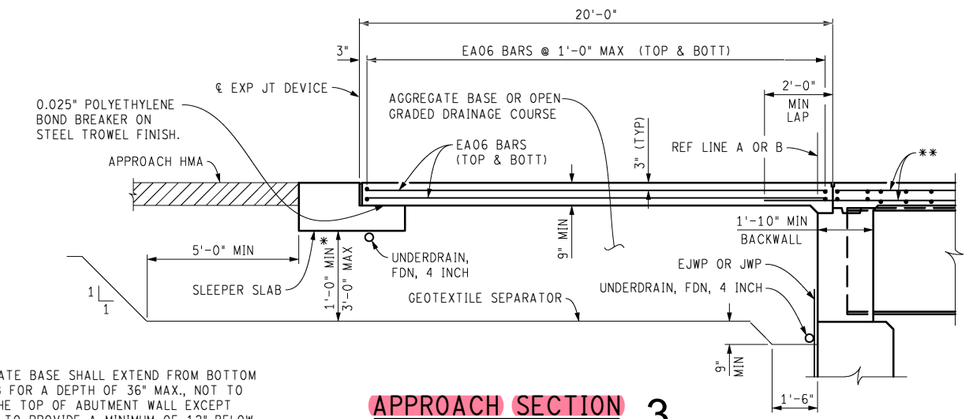
SECTION THRU SLEEPER SLAB WITH HMA APPROACH

3



APPROACH SECTION

(CONCRETE APPROACH)



APPROACH SECTION

(HMA APPROACH)

3

* OGDC OR AGGREGATE BASE SHALL EXTEND FROM BOTTOM OF SLEEPER SLAB FOR A DEPTH OF 36" MAX., NOT TO EXTEND BELOW THE TOP OF ABUTMENT WALL EXCEPT WHEN NECESSARY TO PROVIDE A MINIMUM OF 12" BELOW SLEEPER SLAB.

NOTE:

USE APPROACH SLAB DETAILS ON STANDARD PLAN R-45 SERIES WHEN LENGTH OF BRIDGE CONTRIBUTING TO EXPANSION AT AN ABUTMENT IS LESS THAN 50 FEET FOR CONCRETE BEAM BRIDGES, AND LESS THAN 25 FEET FOR ROLLED STEEL BRIDGES.

THE ABOVE NOTE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

** EA04 BARS (TOP & BOTT)
(FOR SPREAD BOX BEAM)
EA05 BARS (TOP & BOTT)
(FOR STEEL BEAMS)
EA03 BARS (SINGLE LAYER)
(FOR SIDE BY SIDE BOX BEAMS)

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											DESIGN UNIT:	JN:
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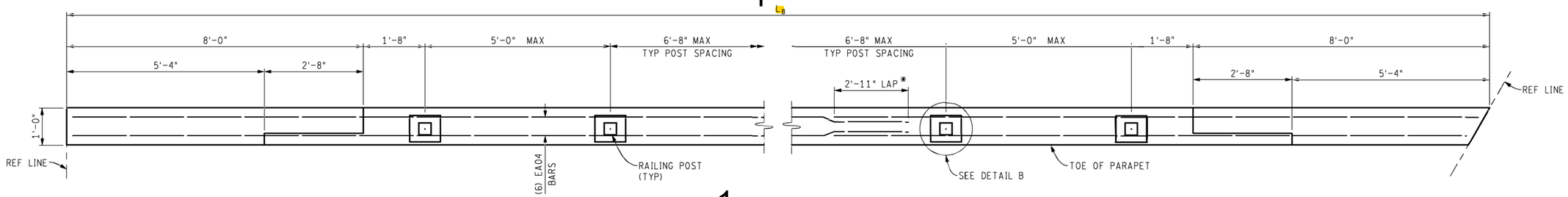
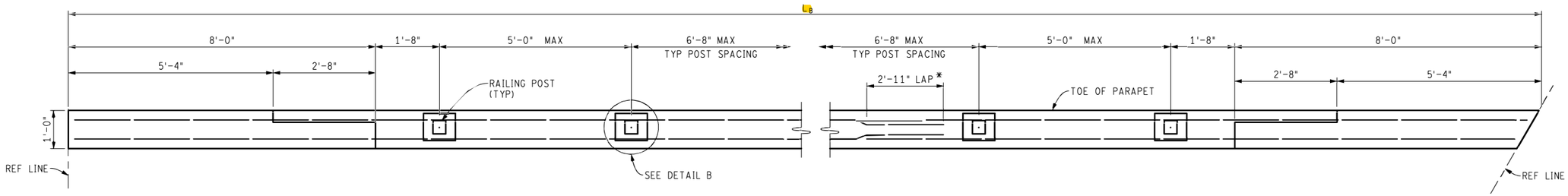
SUPERSTRUCTURE DETAILS	DRAWING	SHEET
	DECK	SECT
	003	

1



1



PLAN OF BARRIER

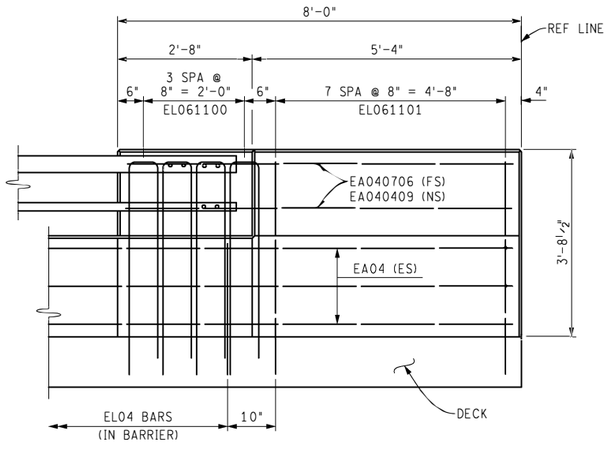
(ANGLE OF CROSSING 90°)
(AESTHETIC PARAPET TUBE)

PLAN OF BARRIER

(ANGLE OF CROSSING LESS THAN 90°)
(AESTHETIC PARAPET TUBE)

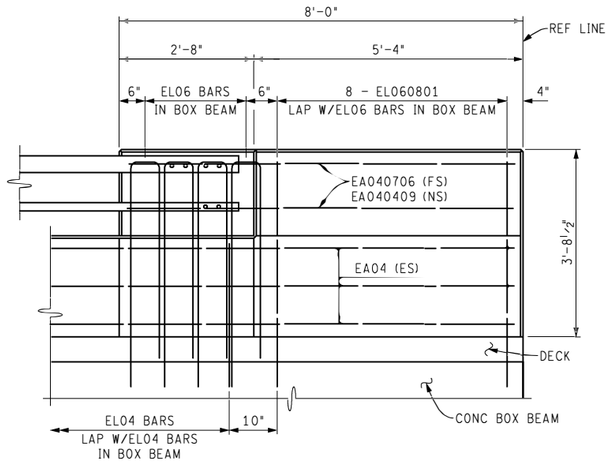
2

* OMIT LAP FOR SPANS 40'-0" OR UNDER



END WALL ELEVATION

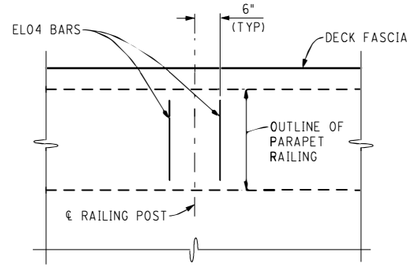
(SPREAD BOX BEAM, BULB T BEAM, ROLLED STEEL BEAM)



2

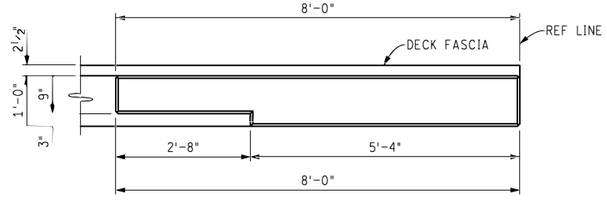
END WALL ELEVATION

(SIDE BY SIDE BOX BEAM)



DETAIL B

PLACE 2 ADDITIONAL EL04 BARS AT EACH RAILING POST AS SHOWN.
ADJUST SPACING OF ADJACENT REINFORCEMENT IF NECESSARY.



END WALL PLAN

NOTES:

ES DENOTES EACH SIDE.

FS DENOTES FAR SIDE.

NS DENOTES NEAR SIDE.

SEE STANDARD PLAN B-25 SERIES FOR ADDITIONAL RAILING DETAILS.

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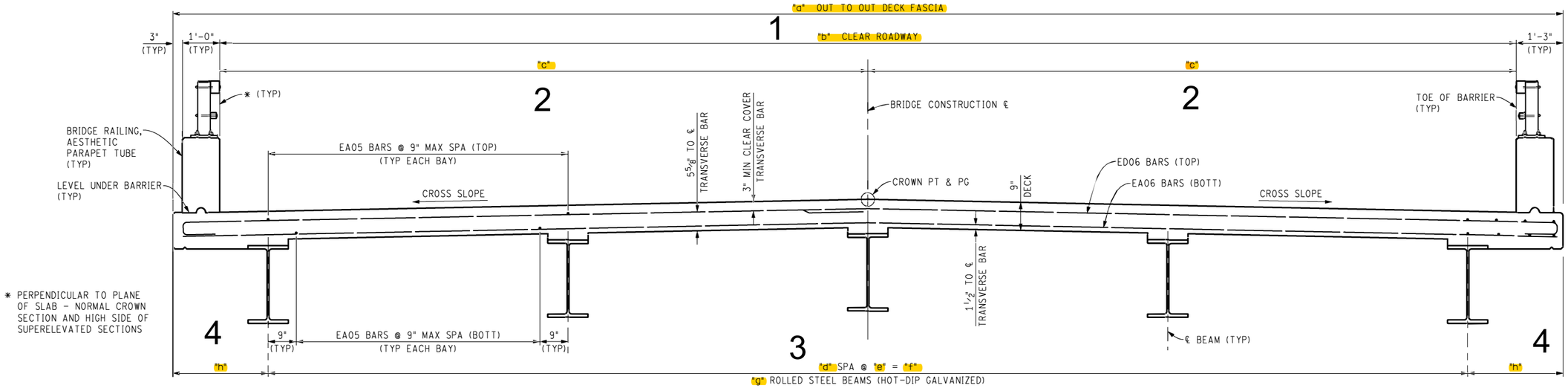
NO SCALE

	DATE: 05/09/18	CS:	SUPERSTRUCTURE DETAILS
	DESIGN UNIT:	JN:	
FILE: Deck_004.dgn	TSC:		

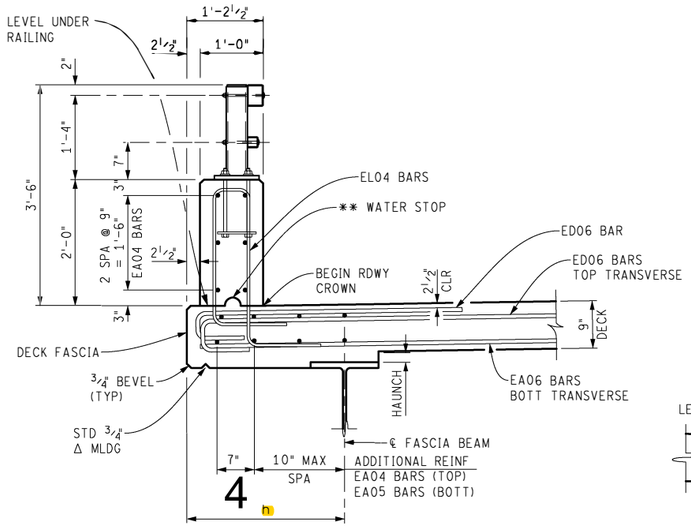
DRAWING	SHEET
DECK	SECT
004	



DECK SECTION

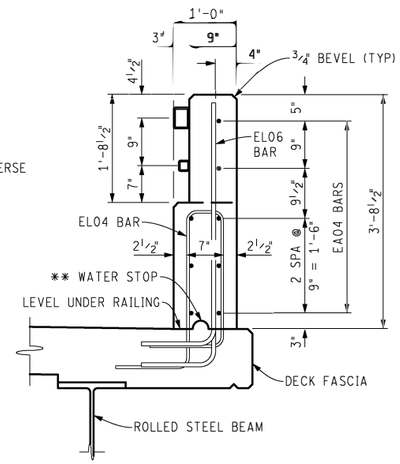
(AESTHETIC PARAPET TUBE RAILING SHOWN)

DIMENSION TABLE								
BEAM SPAN (℄ BRG-℄ BRG) (FT)	DIMENSION							
	OUT-TO-OUT "a"	CLR RDWY "b"	"c"	BEAM SPACING			BEAM SIZE "g"	"h"
				"d"	"e"	"f"		
20	32'-6"	30'-0"	15'-0"	4	6'-4½"	25'-6"	W21 x 93	3'-6"
	36'-6"	34'-0"	17'-0"	5	6'-3"	31'-3"	W21 x 93	2'-7½"
	42'-6"	40'-0"	20'-0"	6	6'-3"	37'-6"	W21 x 93	2'-6"
30	32'-6"	30'-0"	15'-0"	4	6'-4½"	25'-6"	W21 x 93	3'-6"
	36'-6"	34'-0"	17'-0"	5	6'-3"	31'-3"	W21 x 93	2'-7½"
	42'-6"	40'-0"	20'-0"	6	6'-3"	37'-6"	W21 x 93	2'-6"
40	32'-6"	30'-0"	15'-0"	4	6'-4½"	25'-6"	W24 x 117	3'-6"
	36'-6"	34'-0"	17'-0"	5	6'-3"	31'-3"	W24 x 117	2'-7½"
	42'-6"	40'-0"	20'-0"	6	6'-3"	37'-6"	W24 x 117	2'-6"
50	32'-6"	30'-0"	15'-0"	4	6'-4½"	25'-6"	W30 x 173	3'-6"
	36'-6"	34'-0"	17'-0"	5	6'-3"	31'-3"	W30 x 173	2'-7½"
	42'-6"	40'-0"	20'-0"	6	6'-3"	37'-6"	W30 x 173	2'-6"
60	32'-6"	30'-0"	15'-0"	4	6'-4½"	25'-6"	W36 x 170	3'-6"
	36'-6"	34'-0"	17'-0"	5	6'-3"	31'-3"	W36 x 170	2'-7½"
	42'-6"	40'-0"	20'-0"	6	6'-3"	37'-6"	W36 x 170	2'-6"



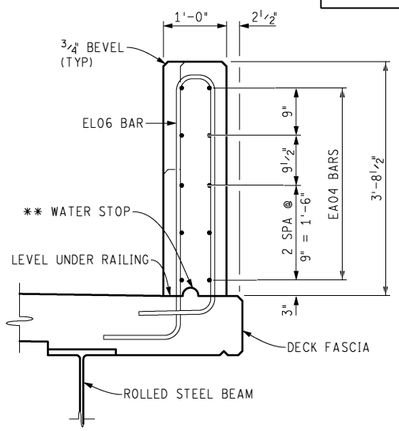
TYPICAL RAILING SECTION

(AESTHETIC PARAPET TUBE RAILING SHOWN)



SECTION AT END WALL

(TUBE CONNECTION AREA)



SECTION AT END WALL

(FULL CONCRETE AREA)

** 2" HIGH x 4" LONG (±), FORMING NOT REQUIRED

FOR INFORMATION ONLY:

DECK CROSS SECTION IS SHOWN WITH BRIDGE RAILING AESTHETIC PARAPET TUBE. OTHER RAILINGS ARE AVAILABLE. SEE MDOT BRIDGE DESIGN GUIDE.

THE ABOVE NOTE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

NOTES:

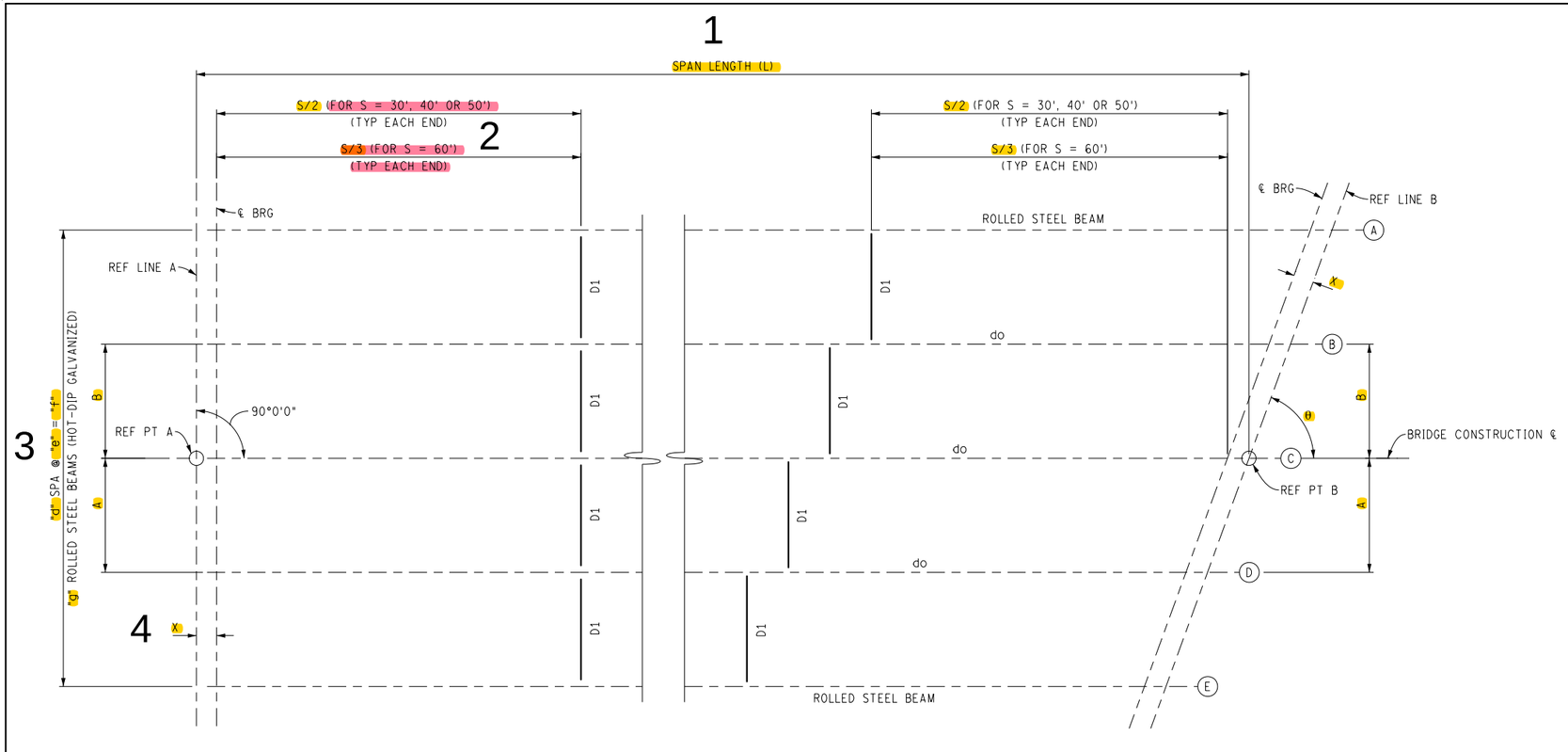
FOR SUPERELEVATED SECTIONS REFER TO MDOT DESIGN GUIDES FOR DETERMINING THE CROSS SLOPE.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	SUPERSTRUCTURE DETAILS
	DESIGN UNIT:	JN:	ROLLED STEEL BEAM
FILE: Deck_RSB_002.dgn	TSC:		

DRAWING	SHEET
DECK	SECT
008	



ERECTION DIAGRAM

FOR θ = 70° TO 90°

ERECTION DIAGRAM

FOR θ < 70°

5

SERVICE BEAM REACTIONS (KIPS)			
BEAM SPAN (℄ BRG–℄ BRG) (FT)	DC	DW	LL+I
20	13	2	103
30	19	3	107
40	25	3	111
50	31	4	115
60	37	4	120

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS

DC DENOTES SERVICE DEAD LOADS DUE TO BEAM SELF WEIGHT, DECK WEIGHT, & DIAPHRAGMS

DW DENOTES SERVICE BEAM REACTION DUE TO FUTURE WEARING SURFACE

LL+I DENOTES SERVICE LIVE LOAD PLUS IMPACT REACTION PER LANE

"S" = BEAM SPAN (℄ BRG – ℄ BRG)

FOR INFORMATION ONLY:

THE DESIGN OF THESE STRUCTURES IS BASED ON 1.2 TIMES THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATION HL-93 LOADING WITH THE EXCEPTION THAT THE DESIGN TANDEM PORTION OF THE HL-93 LOAD DEFINITION SHALL BE REPLACED BY A SINGLE 60 KIP AXLE LOAD BEFORE APPLICATION OF THIS 1.2 FACTOR. THE RESULTING LOAD IS DESIGNATED HL-93 MOD. LIVE LOAD PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH.

PLACE DIAPHRAGMS PARALLEL TO REF LINES.

NO INTERMEDIATE DIAPHRAGMS REQUIRED FOR 20' SPANS.

"A" & "B" ARE MEASURED FROM BRIDGE CONST ℄ TO ADJACENT BEAM ℄.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

NOTES:

FIELD CONNECTIONS SHALL BE BOLTED WITH $^{3}/_{4}$" Ø HIGH STRENGTH BOLTS (EXCEPT AS NOTED).

ALL HOLES SHALL BE $^{13}/_{16}$" Ø FOR $^{3}/_{4}$" Ø H.S. BOLTS.

SHEAR DEVELOPERS SHALL BE $^{3}/_{4}$" DIAMETER STUDS.

THE BEAMS SHALL BE CAMBERED WITH ORDINATES AS SHOWN ON THE CAMBER DIAGRAM. HEATING IS TO BE USED, IF NECESSARY, TO PROVIDE THE CAMBER WITHIN THE TOLERANCE SPECIFIED IN THE AWS SPECIFICATIONS. THE CAMBER SHOWN IS TO BE MEASURED WITH THE BEAM LYING ON IT'S SIDE.

ALL STRUCTURAL STEEL SHALL BE HOT-DIPPED GALVANIZED ACCORDING TO THE STANDARD SPECIFICATIONS.

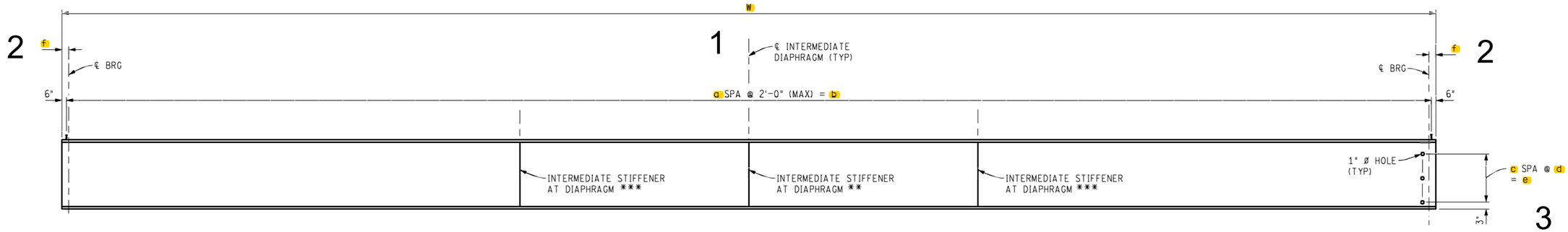
STRUCTURAL STEEL SHALL CONFORM TO AASHTO M270, GRADE 50, OR AASHTO M270, GRADE 50W. AASHTO M270, GRADE 36, STEEL MAY BE USED IN LIEU OF THESE STEELS FOR THE DIAPHRAGMS (EXCEPT CONNECTION PLATES).

FIELD CONNECTIONS SHALL BE BOLTED WITH $^{3}/_{4}$" HIGH-STRENGTH BOLTS (EXCEPT AS NOTED).

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	STRUCTURAL STEEL DETAILS	DRAWING / SHEET
	DESIGN UNIT:	JN:	ROLLED STEEL BEAM	STEEL / SECT
FILE: steel_001.dgn	TSC:			001



BEAM ELEVATION

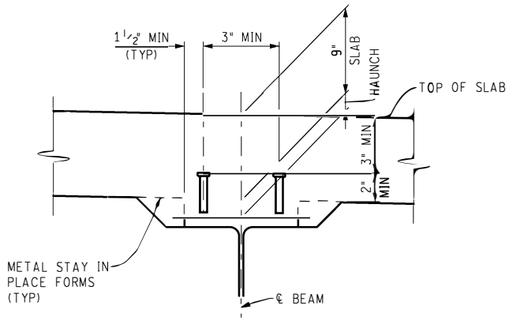
** FOR 30', 40' OR 50' SPANS

*** FOR 60' SPAN

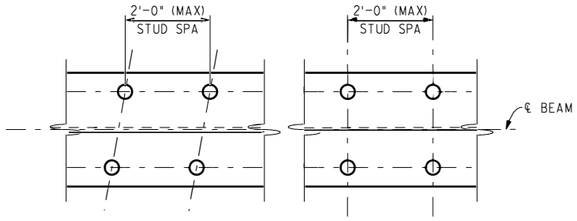
4

BEAM DIMENSION TABLE								
BEAM SPAN (℄ BRG–℄ BRG)	BEAM TYPE	a	b	c	d	e	f	W
20′	W21 x 93	11	20′-2″	2	7 1/2″	1′-3″	7″	21′-2″
30′	W21 x 93	16	30′-2″	2	7 1/2″	1′-3″	7″	31′-2″
40′	W24 x 117	21	40′-3″	2	9″	1′-6″	7 1/2″	41′-3″
50′	W30 x 173	26	50′-5″	2	12″	2′-0″	8 1/2″	51′-5″
60′	W36 x 170	31	60′-5″	3	10″	2′-6″	8 1/2″	61′-5″

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS



SECTION

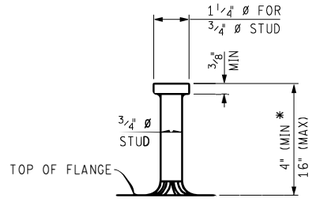


5 (ANGLE OF CROSSING < 90°) (ANGLE OF CROSSING = 90°)

PLAN

ROWS OF STUDS SHALL BE SET PARALLEL TO TRANSVERSE REINFORCEMENT.

SHEAR STUD DEVELOPER DETAILS



DETAIL OF STUD

* INCREASE LENGTH OF STUD AS NEEDED TO MAINTAIN 2" MINIMUM PENETRATION OF STUD INTO DECK SLAB. (1" INCREMENTS)

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	STRUCTURAL STEEL DETAILS	DRAWING	SHEET
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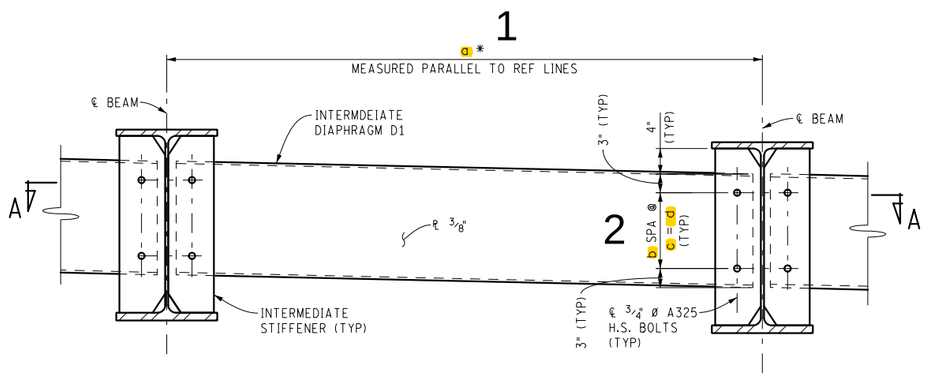
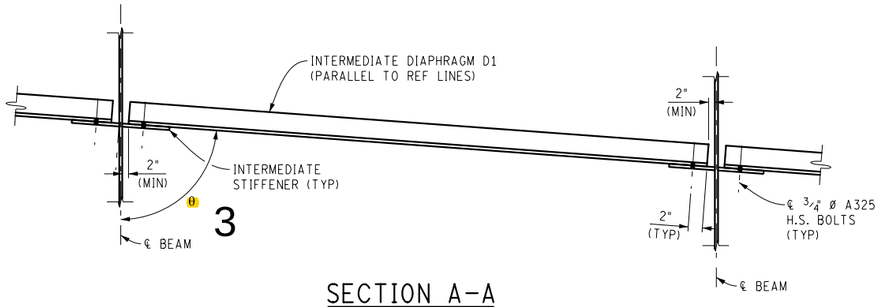


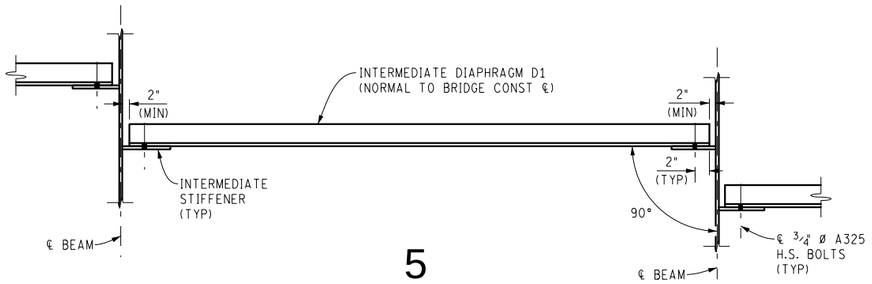
INTERMEDIATE DIAPHRAGM D1 ELEVATION

* "a" SHALL BE DETERMINED BASED ON ACTUAL BRIDGE SKEW



SECTION A-A

FOR ANGLE OF CROSSING 70° TO 90°



5

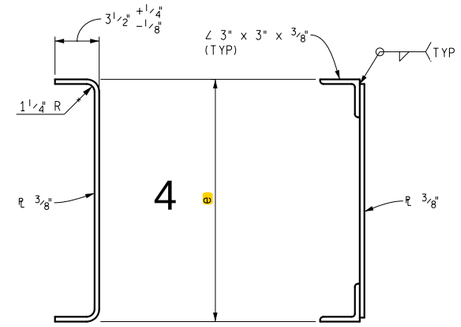
SECTION A-A

FOR ANGLE OF CROSSING < 70°

6

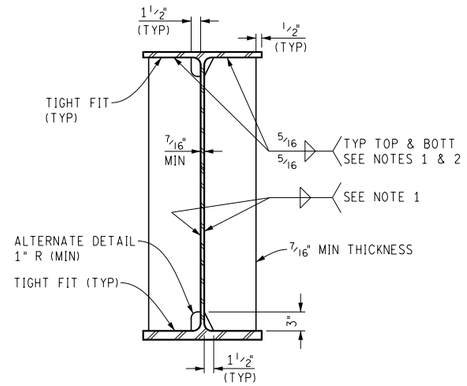
DIAPHRAGM DIMENSION TABLE					
BEAM SPAN (℄ BRG TO ℄ BRG) (FT)	BEAM TYPE	b	c	d	e
20	W21 x 93	-	-	-	-
30	W21 x 93	2	2"	4"	10"
40	W24 x 117	3	2"	6"	12"
50	W30 x 173	4	3"	12"	18"
60	W36 x 170	6	3"	18"	24"

THIS TABLE IS FOR INFORMATION ONLY
AND SHOULD NOT BE INCLUDED ON THE
FINAL DESIGN DRAWINGS



ALTERNATE

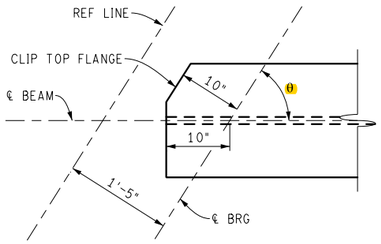
TYPICAL INTERMEDIATE DIAPHRAGM



INTERMEDIATE TRANSVERSE STIFFENER DETAIL @ CROSSFRAME

BOLT HOLES NOT SHOWN FOR CLARITY

NOTE 1: STOP WELD 1/4" SHORT OF CORNER CLIPS
NOTE 2: WRAP WELD AROUND OUTSIDE EDGE



TOP FLANGE CLIP DETAIL

BASED ON ABUTMENT AND BEARING GEOMETRY

5

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	STRUCTURAL STEEL DETAILS	DRAWING	SHEET
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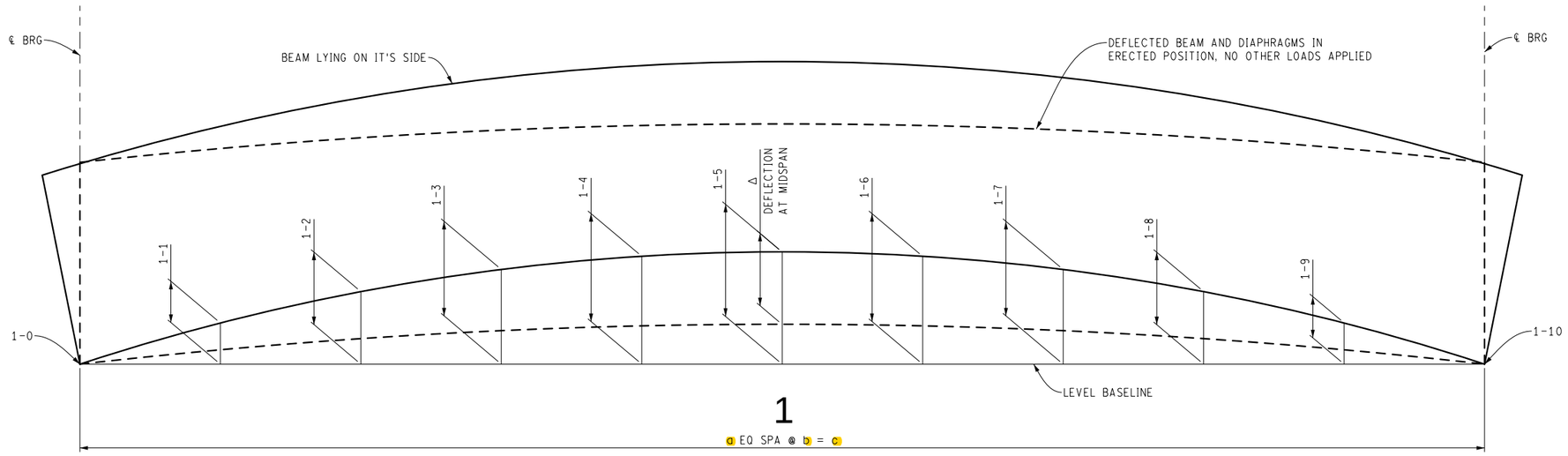

CAMBER DIAGRAM

2

ORDINATE DIMENSION TABLE

BEAM SPAN (℄ BRG-℄ BRG)	BEAM TYPE	a	b	c
20′	W21 x 93	10	2′	20′
30′	W21 x 93	10	3′	30′
40′	W24 x 117	10	4′	40′
50′	W30 x 173	10	5′	50′
60′	W36 x 170	10	6′	60′

2

THEORETICAL CAMBER TABLE *

BEAM	BEAM SPAN (℄ BRG-℄ BRG)	CAMBER ORDINATES (in)										
		1-0	1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	1-9	1-10
W21 x 93	20′	0	0	0	0	0	0	0	0	0	0	0
W21 x 93	30′	0	0.08	0.15	0.20	0.24	0.25	0.24	0.20	0.15	0.08	0
W24 x 117	40′	0	0.15	0.28	0.39	0.46	0.48	0.46	0.39	0.28	0.15	0
W30 x 173	50′	0	0.17	0.33	0.45	0.52	0.55	0.52	0.45	0.33	0.17	0
W36 x 170	60′	0	0.30	0.56	0.76	0.90	0.94	0.90	0.76	0.56	0.30	0

* CAMBER TABLE VALUES ONLY ACCOUNT FOR BEAM DEFLECTION DUE TO BEAM SELF WEIGHT, DECK & HAUNCH WEIGHT, DIAPHRAGMS AND BARRIERS. ADJUSTMENTS TO THE VALUES SHALL BE MADE TO ACCOUNT FOR THE ROADWAY PROFILE.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	STRUCTURAL STEEL DETAILS	DRAWING / SHEET
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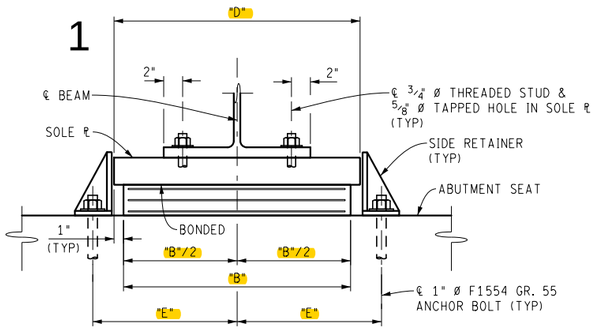
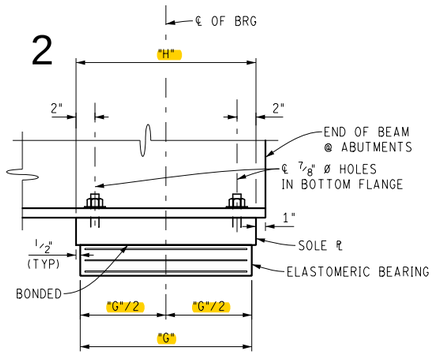


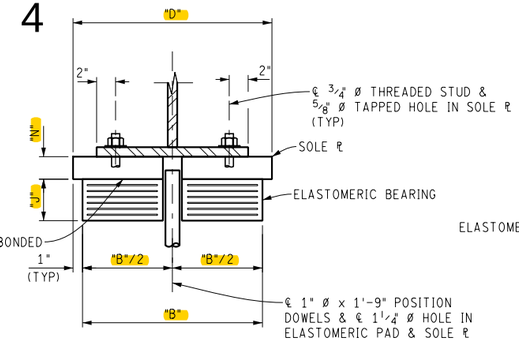
ELASTOMERIC EXPANSION BEARING

END VIEW

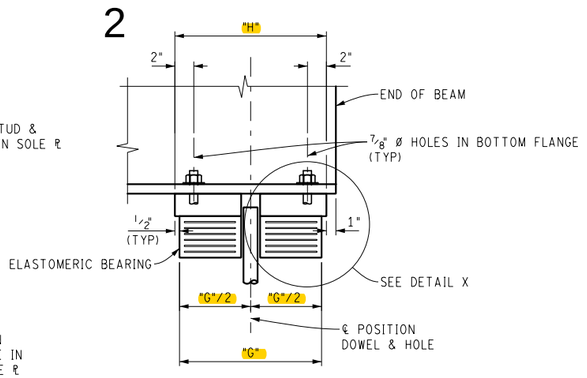


ELASTOMERIC EXPANSION BEARING

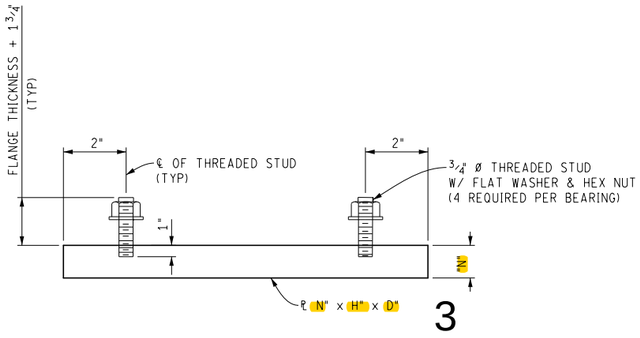
SIDE VIEW



END VIEW



SIDE VIEW



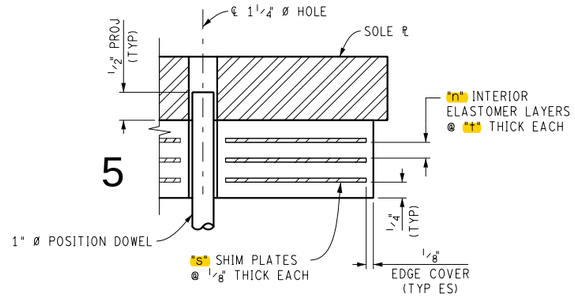
SOLE PLATE DETAILS

SIDE VIEW

6

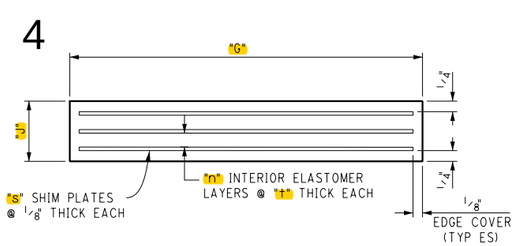
BEARING ASSEMBLY DIMENSIONS												
BEAM SPAN (℄ BRG-℄ BRG) (FT)	BEAM SIZE	B	D	E	G	H	J	s	n	t	L	N
20	W21 x 93	8"	10"	7 1/4"	11"	12"	1"	0	0	0"	3"	1 1/2"
30	W21 x 93	8"	10"	7 1/4"	11"	12"	1"	0	0	0"	3"	1 1/2"
40	W24 x 117	15"	17"	10 3/4"	12"	13"	2 3/8"	3	2	3/4	4 7/8"	2"
50	W30 x 173	15"	17"	10 3/4"	14"	15"	2 3/8"	3	2	3/4"	4 7/8"	2"
60	W36 x 170	15"	17"	10 3/4"	14"	15"	2 3/8"	3	2	3/4	4 7/8"	2"

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS



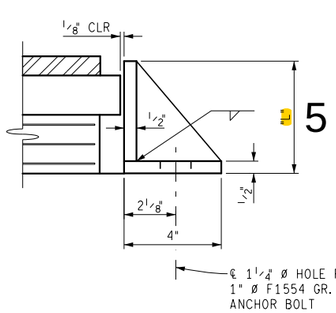
DETAIL X

ELASTOMERIC BEARING DETAILS - FIXED

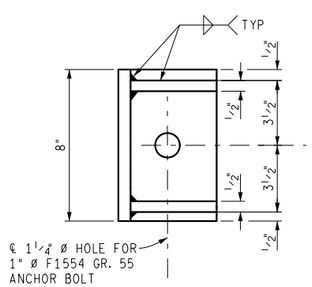


ELASTOMERIC BEARING DETAILS

SIDE VIEW

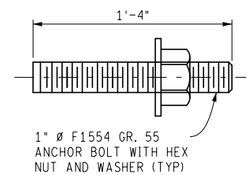


ELEVATION

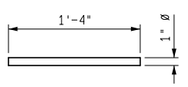


PLAN

SIDE RETAINER



ANCHOR BOLT DETAIL



POSITION DOWEL DETAIL

FOR INFORMATION ONLY:

FOR SINGLE SPAN STRUCTURES 25'-0" OR LESS IN LENGTH, ALLOWANCE FOR EXPANSION IS NOT REQUIRED IN THE DESIGN OF THE ELASTOMERIC BEARING PADS.

ELASTOMERIC BEARINGS FOR BEAM SPANS 20' AND 30' ARE PLAIN PADS WITH NO SHIMS PLATES.

SOLE PLATES ARE TO BE BEVELED WHEN THE CALCULATED BEVEL IS GREATER THAN 0.5%.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

NOTES:

ES DENOTES EACH SIDE.

USE NON-DEFORMED STEEL RODS IN ACCORDANCE WITH AASHTO M 270 GRADE 36 AND HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M 111, AS POSITION DOWELS FOR PRECAST BEAMS.

STEEL FOR SOLE PLATES AND OTHER BEARING COMPONENTS SHALL MEET THE REQUIREMENTS OF AASHTO M 270 GRADE 36.

ANCHOR BOLT LENGTHS SHOWN ARE MINIMUM. BOLTS LONGER THAN THAT SHOWN MAY BE FURNISHED AT NO ADDITIONAL COST. ANCHOR BOLTS AND POSITION DOWELS SHALL BE GALVANIZED ACCORDING TO MDOT STANDARD SPECIFICATION 707.03.C.16.

ANCHOR BOLTS SHALL CONFORM TO SECTION 908.15.

ANCHOR BOLTS SHALL BE INSTALLED AFTER BEAMS ARE ERECTED IN PLACE.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	ROLLED STEEL BEAM BEARING DETAILS	DRAWING / SHEET
	DESIGN UNIT:	JN:		BRG / SECT
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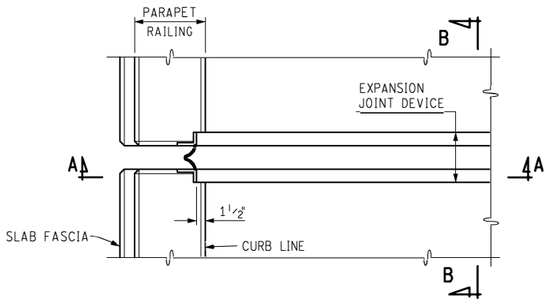
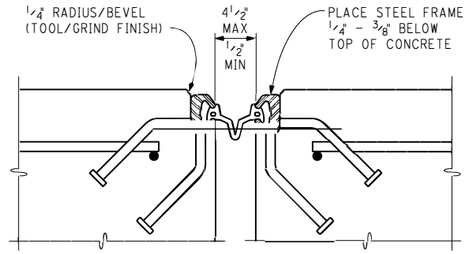
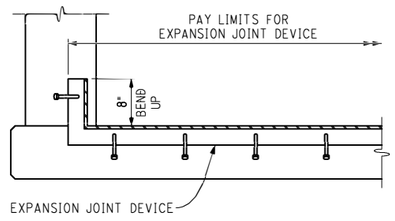


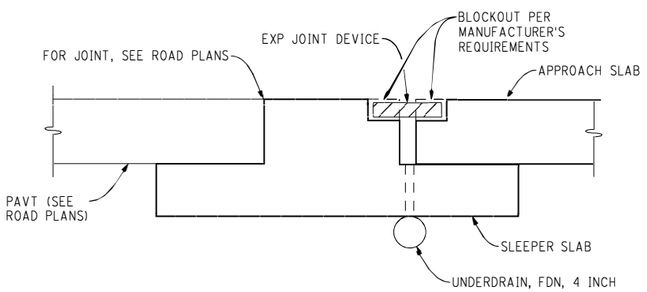
PLAN AT FLUSH MOUNT PARAPET RAILING



SECTION THROUGH EXPANSION JOINT



SECTION A–A



SECTION B–B

NOTES:

JOINT TYPES

THE EXPANSION JOINT DEVICE SHALL BE OF A TYPE THAT INCLUDES A CONTINUOUS NEOPRENE (OR EQUIVALENT) SEAL ACROSS THE DECK. UNLESS OTHERWISE NOTED ON THE PLANS, THE CONTRACTOR HAS THE OPTION OF USING ANY OF THE DEVICES LISTED BELOW:

DEVICE	MANUFACTURER
WABO STRIP SEAL – TYPE M	WATSON-BOWMAN & ACME, INC.
WABO STRIP SEAL – TYPE A	WATSON-BOWMAN & ACME, INC.
STEELFLEX-SSA2	D.S. BROWN
STEELFLEX-SSCM	D.S. BROWN
ONFLEX 40 SS	STRUCTURAL RUBBER PRODUCTS CO.
ONFLEX 40 SSA	STRUCTURAL RUBBER PRODUCTS CO.

THE MODEL OF THE JOINT TYPE SELECTED SHALL BE SUITABLE TO ACCOMMODATE THE TOTAL MOVEMENT NOTED ON THE PLANS.

COMPLETE WORKING DRAWINGS OF ALL DETAILS OF FABRICATION OF THE EXPANSION JOINT DEVICE SHALL BE SUBMITTED FOR REVIEW IN ACCORDANCE WITH STANDARD SPECIFICATION 104.02. THIS REQUIREMENT IS WAIVED FOR EXPANSION JOINT DEVICES FOR WHICH A SET OF STANDARD INSTALLATION DETAILS HAS BEEN APPROVED. STANDARD INSTALLATION DETAILS CAN BE OBTAINED FROM THE DESIGN DIVISION.

FABRICATION AND INSTALLATION

REMOVE SHIPPING BOLTS PRIOR TO PLACEMENT OF CONCRETE.

THE EXPANSION JOINT SHALL BE SHOP FABRICATED TO CONFORM TO THE CONTOUR OF THE BRIDGE DECK, BARRIERS, ETC. IT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS SUBJECT TO NOTES HEREIN AND THE APPROVAL OF THE ENGINEER.

TIE DECK REINFORCING STEEL TO STEEL FRAME ANCHORS TO MAXIMUM EXTENT PRACTICABLE WITHOUT DAMAGING GALVANIZED OR EPOXY COATINGS.

THE TOP OF THE EXPANSION JOINT DEVICE SHALL BE SET ¼" – ⅜" BELOW THE CONCRETE SLAB (PAVEMENT).

THE STEEL ANCHORAGE FOR STRIP SEAL GLANDS SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH SUBSECTION 707.03C.17 OF THE STANDARD SPECIFICATIONS.

THE AREA OF THE STEEL ANCHORAGE AND SEALING GLAND WHICH WILL BE IN CONTACT WITH A SEALANT, OR LUBRICANT-ADHESIVE SHALL BE CLEANED WITH TOLUENE OR OTHER APPROVED SOLVENT.

IN THE EVENT THAT SPLICING IS REQUIRED OF THE SEALING GLAND, IT SHALL BE SPLICED BY AN APPROVED METHOD (SUCH AS COLD VULCANIZATION) BY A TRAINED REPRESENTATIVE OF THE MANUFACTURER.

DETAILS AT CURBS OR BARRIERS

THE DETAILS ON THIS SHEET SHOW AN APPROVED MEANS OF TERMINATING THE EXPANSION JOINT DEVICE AT CURBS OR BARRIERS. VARIATIONS OR ALTERNATIVE SCHEMES WILL BE CONSIDERED AND MAY BE USED IF APPROVED BY THE ENGINEER.

MATERIALS

THE COST OF ALL MATERIALS AND LABOR REQUIRED FOR PROPER INSTALLATION OF THE EXPANSION JOINT AND THE TERMINAL ASSEMBLIES AT THE CURBS, SIDEWALKS, OR BARRIERS IS INCLUDED IN THE PAYMENT FOR THE EXPANSION JOINT DEVICE.

1

STRUCTURE NUMBER	ANGLE OF CROSSING TO NEAREST 10°	LOCATION OF JOINT	MIN. TOT. TRAVEL ALONG CENTERLINE OF BRIDGE	REQUIRED LENGTH OF EXPANSION JOINT DEVICE
		SLEEPER SLAB AT ABUT A OR B		

FOR INFORMATION ONLY:

EXPANSION JOINTS ARE NOT REQUIRED WHEN LENGTH OF BRIDGE CONTRIBUTING TO EXPANSION AT AN ABUTMENT IS LESS THAN 50 FEET FOR CONCRETE BEAM BRIDGES AND LESS THAN 25 FEET FOR ROLLED STEEL BRIDGES.

THE ABOVE NOTE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

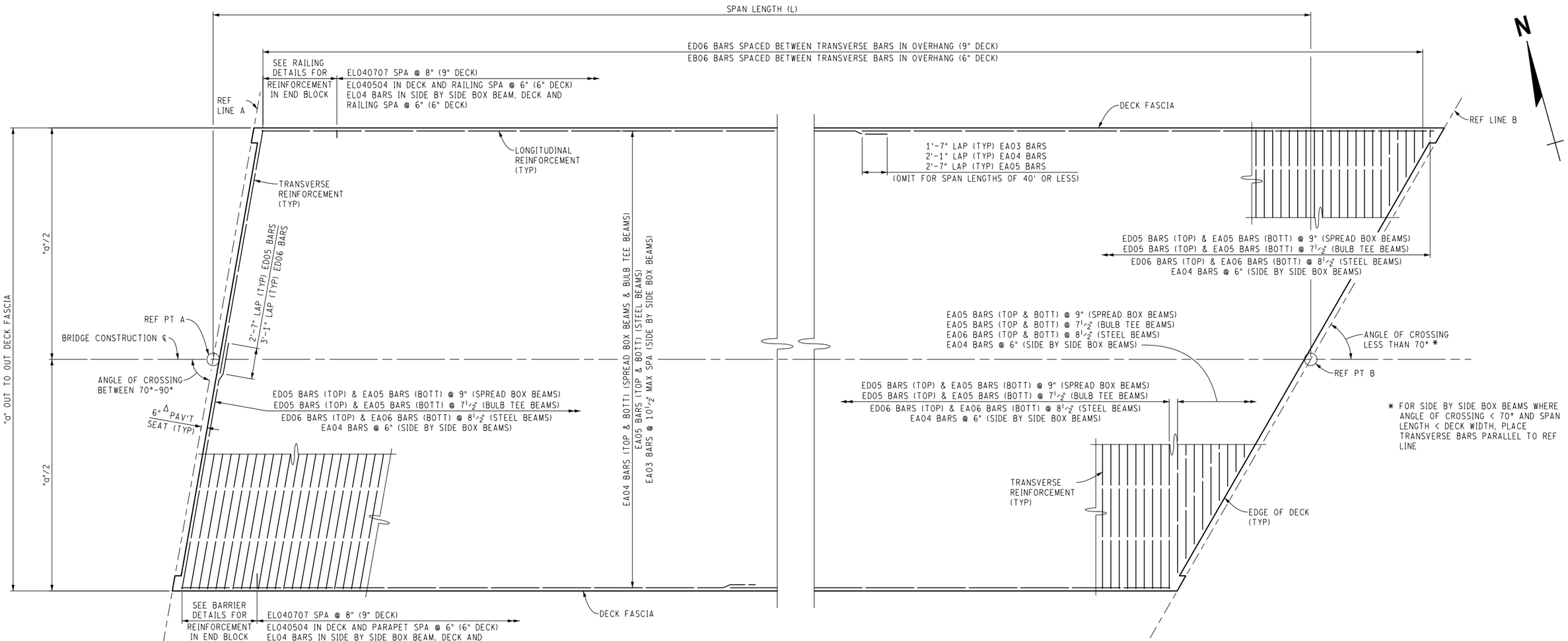
FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	EXPANSION JOINT DETAILS	DRAWING / SHEET
	DESIGN UNIT:	JN:		EXPJT / SECT
FILE: expjt_001.dgn	TSC:			001

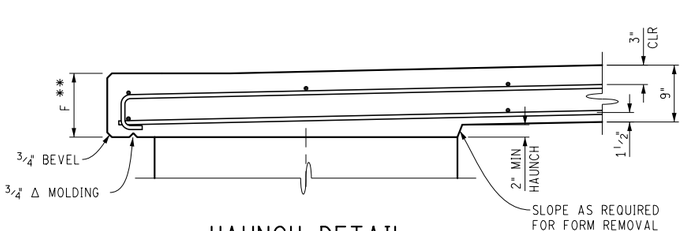
APPENDIX L. RECOMMENDED BRIDGE PLANS

The following sheets are given here in PDF format. However, they are available from MDOT in high-resolution Microstation and Autocad form for use.

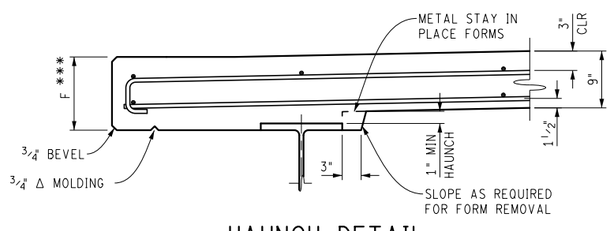


PLAN OF DECK
(ANGLE OF CROSSING 70° OR GREATER)

PLAN OF DECK
(ANGLE OF CROSSING LESS THAN 70°)



HAUNCH DETAIL
CONCRETE SPREAD BOX BEAMS & BULB TEE BEAMS



HAUNCH DETAIL
STEEL BEAMS

FOR INFORMATION ONLY:

** FASCIA THICKNESS (F) = 9" + HAUNCH + 1/2" + AMOUNT OF FASCIA BEAM DROP REQUIRED TO MAINTAIN MINIMUM SLAB THICKNESS AT CURB LINE.

*** FASCIA THICKNESS (F) = 9" + HAUNCH + THICKEST FASCIA BEAM FLANGE + 1/2" + AMOUNT OF FASCIA BEAM DROP REQUIRED TO MAINTAIN MINIMUM SLAB THICKNESS AT CURB LINE.

IF "F" BECOMES GREATER THAN 12" USE A HAUNCH DETAIL ON THE FASCIA SIDE OF THE BEAM SIMILAR TO THE HAUNCH DETAIL ON THE INTERIOR SIDE. ADDITIONAL REINFORCEMENT MAY BE REQUIRED IN THE AREA OVER THE BEAM FLANGE IF THE HAUNCH BECOMES EXCESSIVE.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

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	DESIGN UNIT:	JN:	
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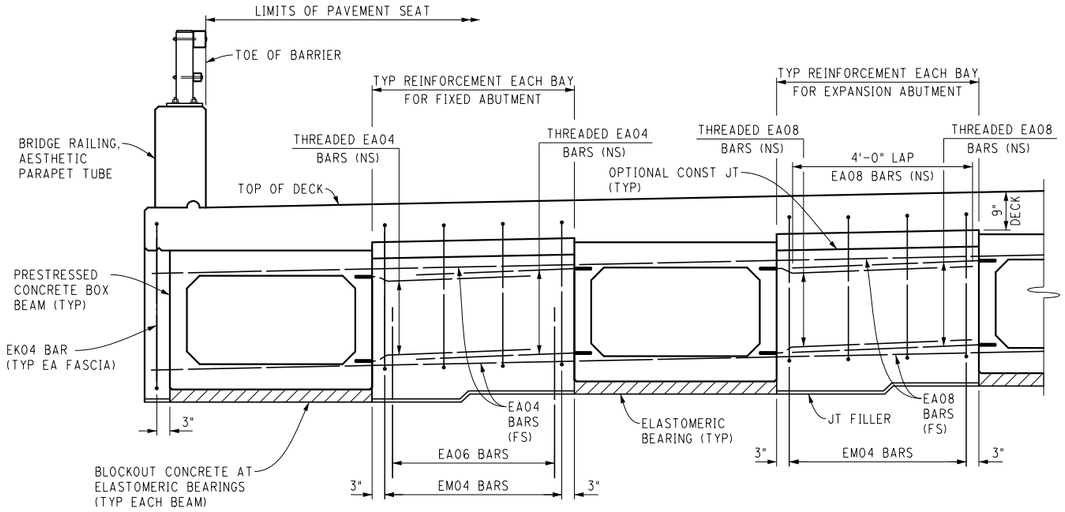
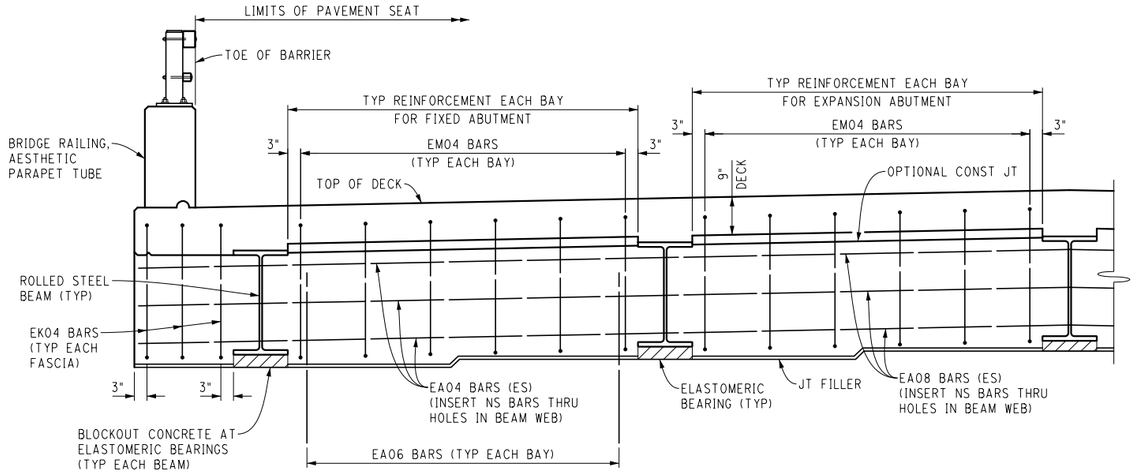
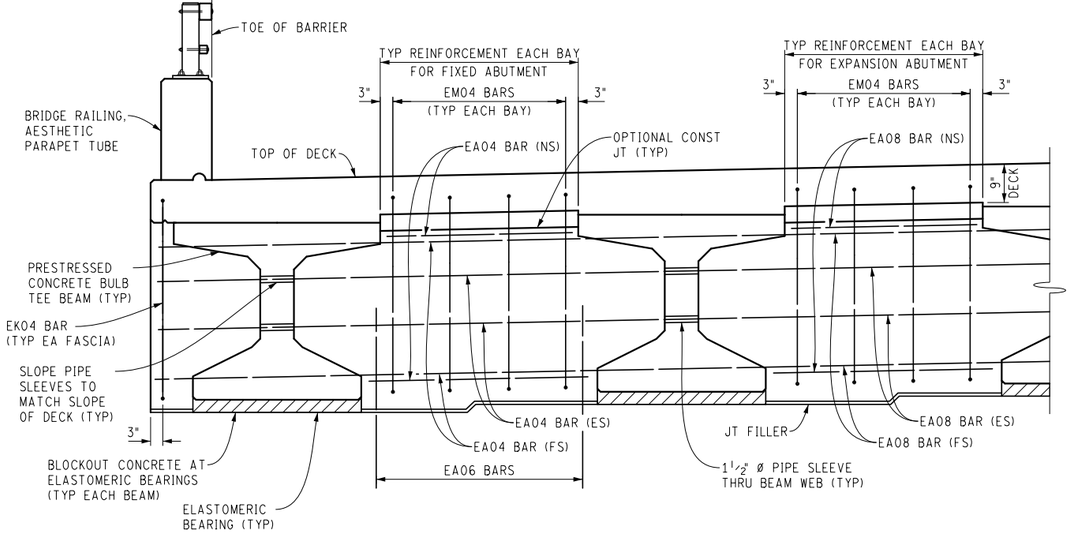


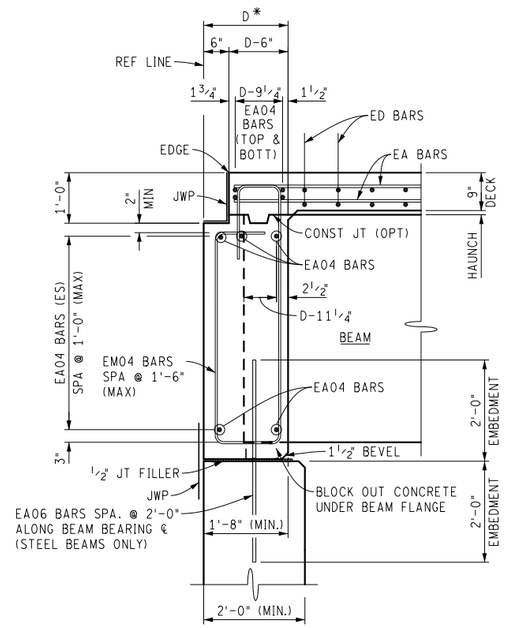
TYPICAL ABUTMENT BACKWALL - SPREAD BOX BEAM



TYPICAL ABUTMENT BACKWALL - ROLLED STEEL BEAM



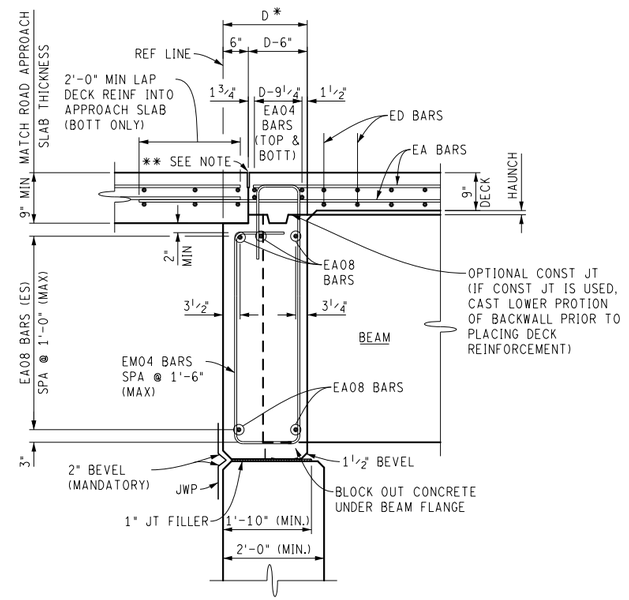
TYPICAL ABUTMENT BACKWALL - BULB TEE BEAM



TYPICAL BACKWALL SECTION (FIXED)

CAST LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT. (USE WITH MANDITORY JOINT)

IF A CONSTRUCTION JOINT IS USED, CAST THE LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT.



TYPICAL BACKWALL SECTION (EXPANSION)

CAST LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT. (USE WITH MANDITORY JOINT)

IF A CONSTRUCTION JOINT IS USED, CAST THE LOWER PORTION OF THE BACKWALL PRIOR TO PLACING DECK REINFORCEMENT.

FOR INFORMATION ONLY:

* THE BACKWALL THICKNESS "D" IS THE GREATER OF:

1) 1'-8" OR THE BEARING DIMENSION PLUS ½ THE BEARING WIDTH - (FOR 90° CROSSINGS)

2) 1'-8" OR THE BEARING DIMENSION PLUS THE PRODUCT OF ½ FLANGE WIDTH AND COSINE ANGLE OF CROSSING - (FOR SKEWED CROSSINGS)

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

NOTES:

** IF A CONSTRUCTION JOINT IS NOT USED, THE CONTRACTOR IS TO PROVIDE A SAWED JOINT (⅓ DECK SLAB THICKNESS)" DEEP BY ¼" WIDE (MINIMUM) IN THE TOP OF SLAB AT TRANSVERSE CONSTRUCTION JOINTS OVER THE BACKWALL. IF A CONSTRUCTION JOINT IS NOT USED, THE JOINT IS TO BE SAWED WITHIN 24 HOURS OF PLACING THE CURING AND IS TO BE FILLED TO ½" BELOW TOP OF CONCRETE WITH POLYURETHANE OR POLYURETHANE HYBRID SEALANT.

NS DENOTES NEAR SIDE.

FS DENOTES FAR SIDE.

ES DENOTES EACH SIDE.

JWP DENOTES JOINT WATERPROOFING.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
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NO SCALE

	DATE: 05/09/18	CS:	SUPERSTRUCTURE DETAILS	DRAWING / SHEET
	DESIGN UNIT:	JN:		DECK / SECT
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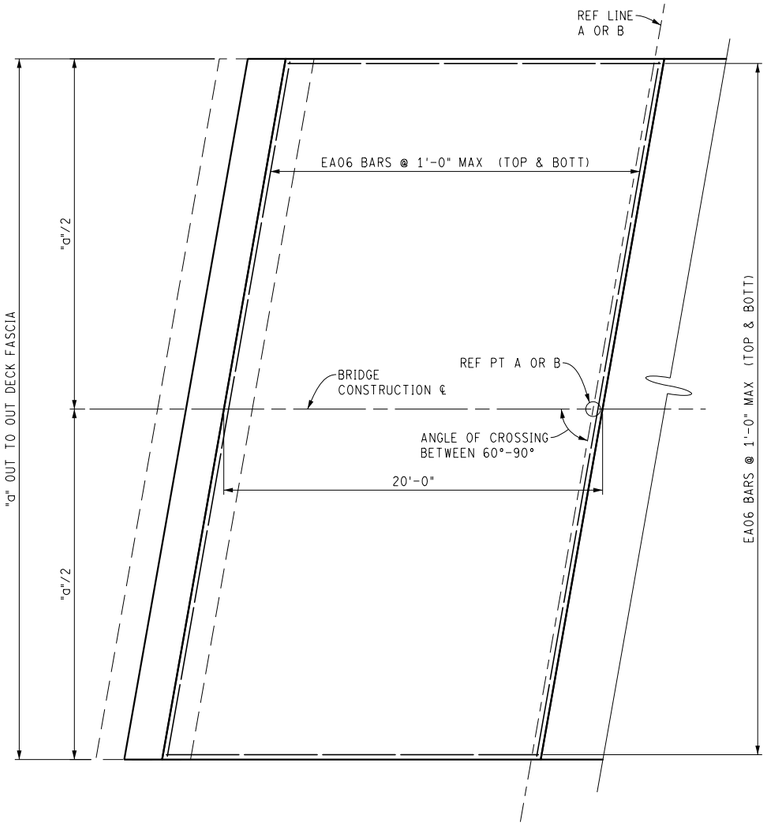
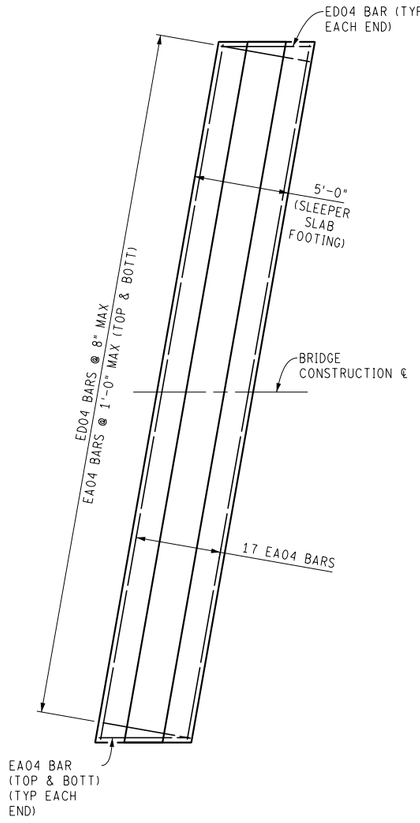


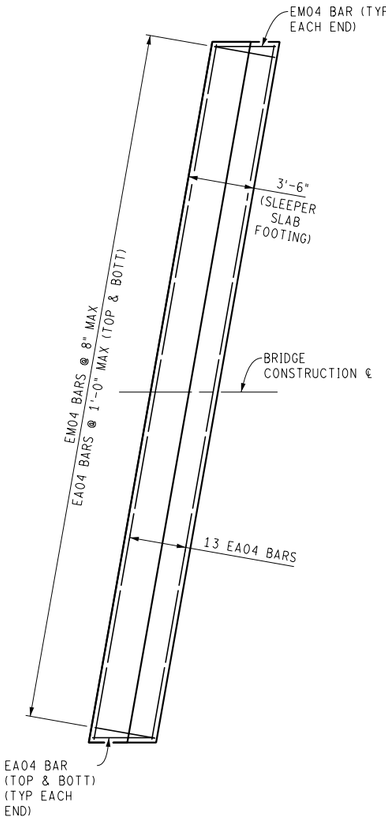
PLAN OF APPROACH SLAB (EXPANSION SIDE)

(ANGLE OF CROSSING 60° OR GREATER)
(SLEEPER SLAB FOR CONCRETE APPROACH SHOWN)



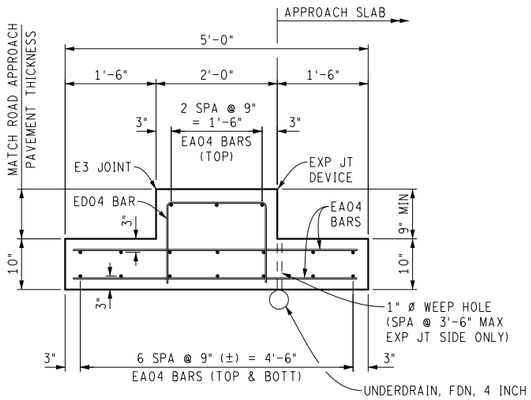
PLAN OF SLEEPER SLAB

(ANGLE OF CROSSING 60° OR GREATER)
(CONCRETE APPROACH)

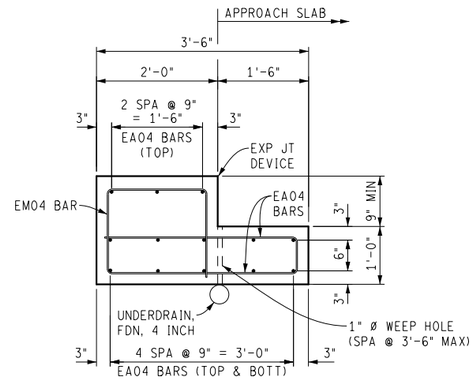


PLAN OF SLEEPER SLAB

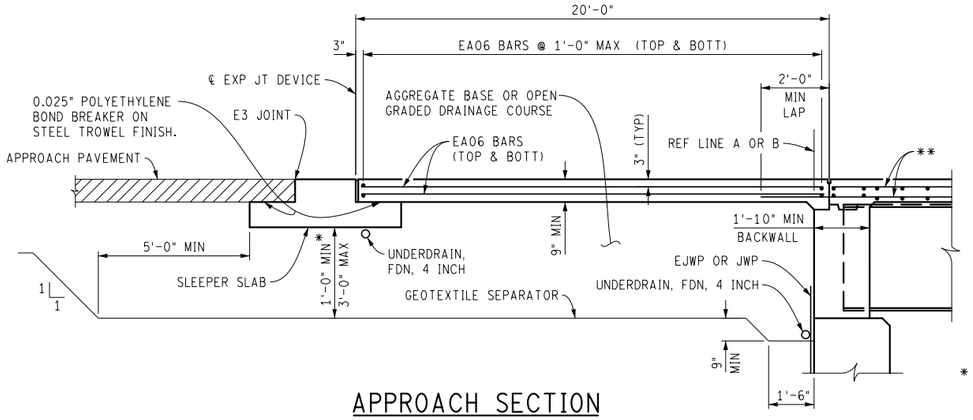
(ANGLE OF CROSSING 60° OR GREATER)
(HMA APPROACH)



SECTION THRU SLEEPER SLAB WITH CONCRETE APPROACH

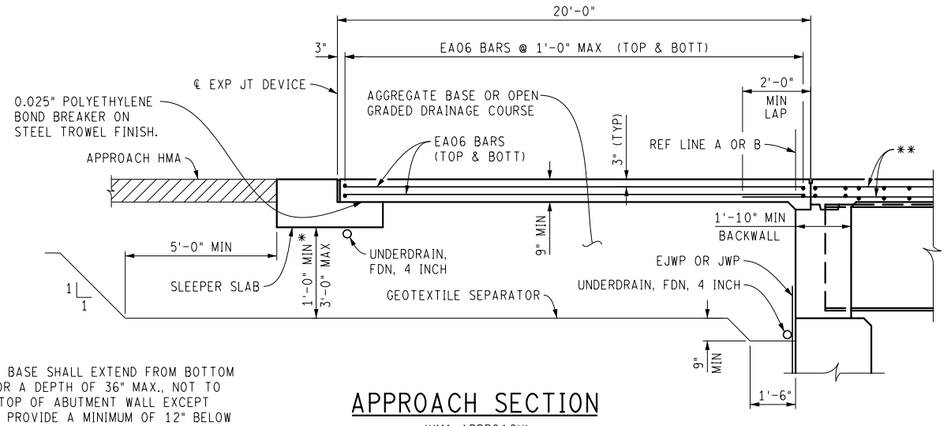


SECTION THRU SLEEPER SLAB WITH HMA APPROACH



APPROACH SECTION

(CONCRETE APPROACH)



* OGDC OR AGGREGATE BASE SHALL EXTEND FROM BOTTOM OF SLEEPER SLAB FOR A DEPTH OF 36" MAX., NOT TO EXTEND BELOW THE TOP OF ABUTMENT WALL EXCEPT WHEN NECESSARY TO PROVIDE A MINIMUM OF 12" BELOW SLEEPER SLAB.

APPROACH SECTION

(HMA APPROACH)

NOTE:

USE APPROACH SLAB DETAILS ON STANDARD PLAN R-45 SERIES WHEN LENGTH OF BRIDGE CONTRIBUTING TO EXPANSION AT AN ABUTMENT IS LESS THAN 50 FEET FOR CONCRETE BEAM BRIDGES. AND LESS THAN 25 FEET FOR ROLLED STEEL BRIDGES.

THE ABOVE NOTE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

** EA04 BARS (TOP & BOTT)
(FOR SPREAD BOX BEAM)
EA05 BARS (TOP & BOTT)
(FOR STEEL BEAMS)
EA03 BARS (SINGLE LAYER)
(FOR SIDE BY SIDE BOX BEAMS)

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)											
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION		NO SCALE	DATE: 05/09/18	CS:
										DESIGN UNIT:	JN:
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SUPERSTRUCTURE DETAILS	DRAWING	SHEET
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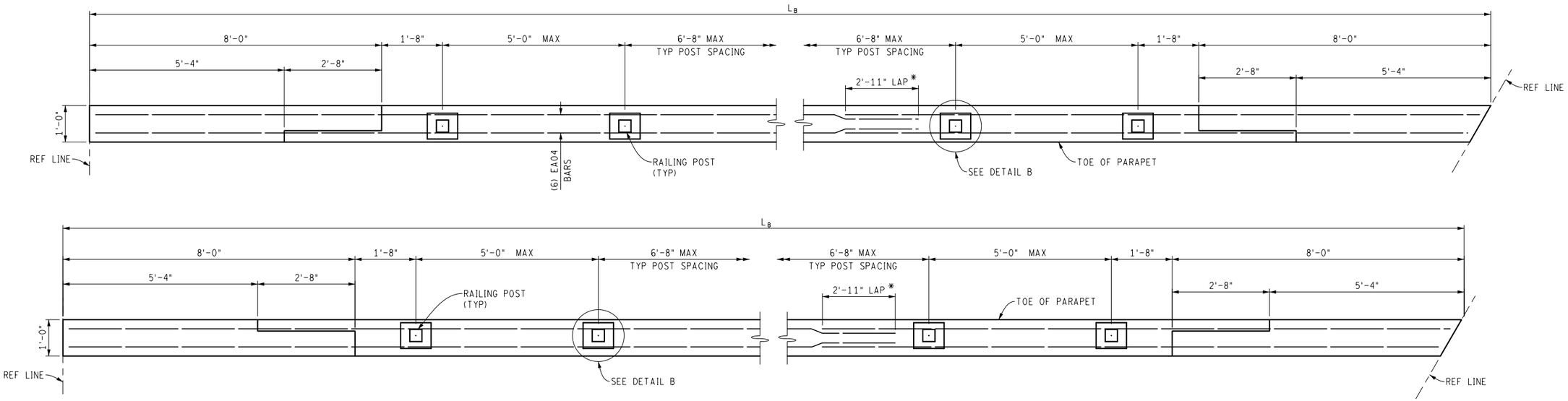


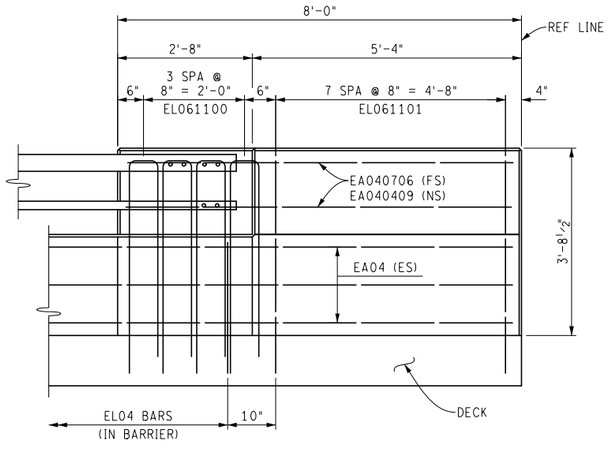
PLAN OF BARRIER

(ANGLE OF CROSSING 90°)
(AESTHETIC PARAPET TUBE)

PLAN OF BARRIER

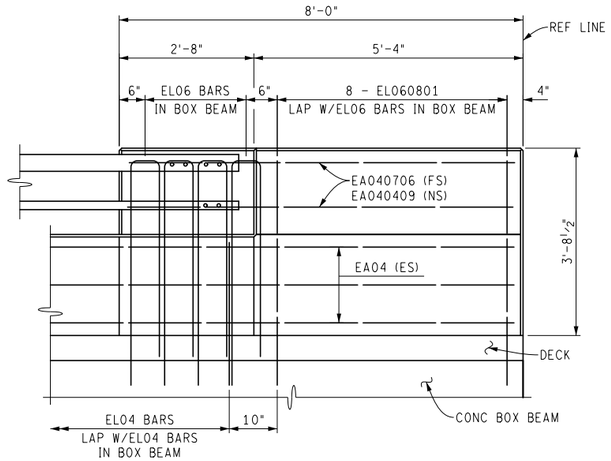
(ANGLE OF CROSSING LESS THAN 90°)
(AESTHETIC PARAPET TUBE)

* OMIT LAP FOR SPANS 40'-0" OR UNDER



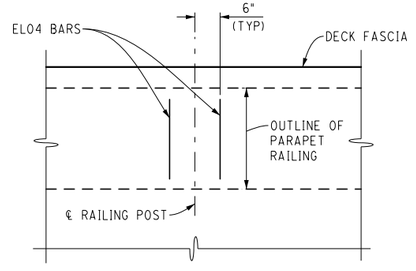
END WALL ELEVATION

(SPREAD BOX BEAM, BULB T BEAM, ROLLED STEEL BEAM)



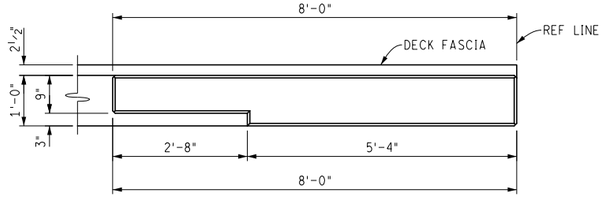
END WALL ELEVATION

(SIDE BY SIDE BOX BEAM)



DETAIL B

PLACE 2 ADDITIONAL EL04 BARS AT EACH RAILING POST AS SHOWN.
ADJUST SPACING OF ADJACENT REINFORCEMENT IF NECESSARY.



END WALL PLAN

NOTES:

ES DENOTES EACH SIDE.

FS DENOTES FAR SIDE.

NS DENOTES NEAR SIDE.

SEE STANDARD PLAN B-25 SERIES FOR ADDITIONAL RAILING DETAILS.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
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	DATE: 05/09/18	CS:	SUPERSTRUCTURE DETAILS	DRAWING	SHEET
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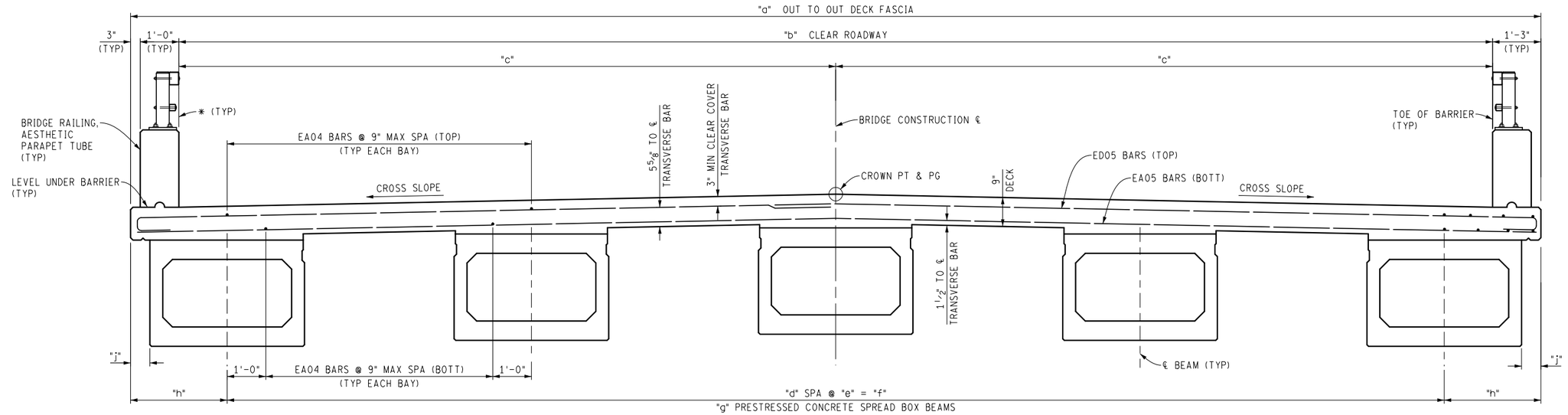
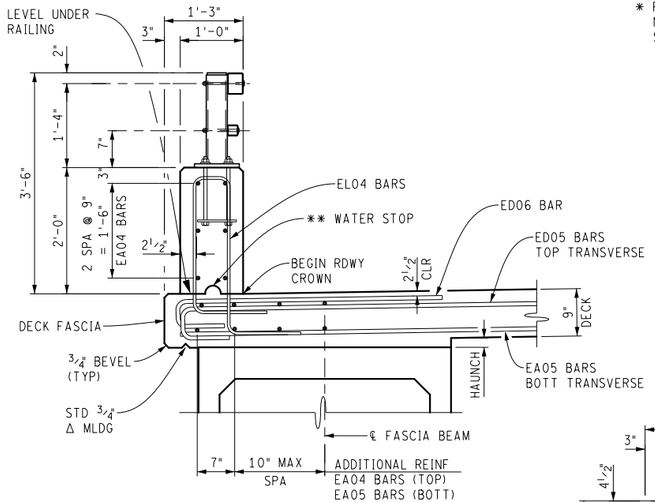




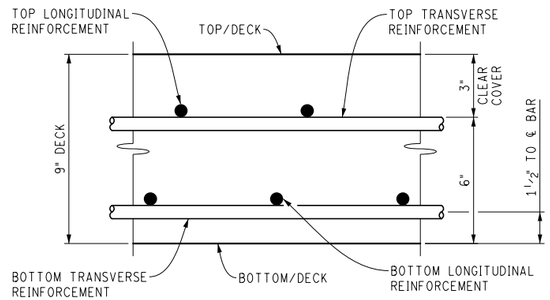
TYPICAL RAILING SECTION

(AESTHETIC PARAPET TUBE RAILING SHOWN)

* PERPENDICULAR TO PLANE OF SLAB - NORMAL CROWN SECTION AND HIGH SIDE OF SUPERELEVATED SECTIONS

DECK SECTION

(AESTHETIC PARAPET TUBE RAILING SHOWN)



PARTIAL DECK SECTION

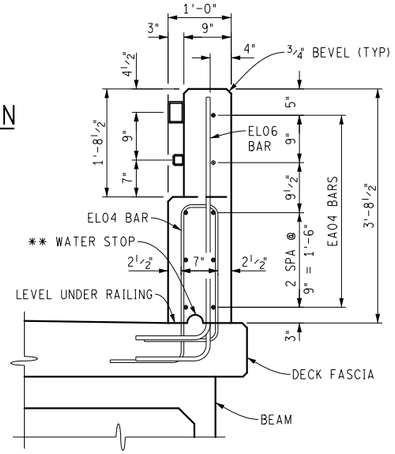
(LOOKING ALONG BRIDGE CONST ℄)

FOR INFORMATION ONLY:

DECK CROSS SECTION IS SHOWN WITH BRIDGE RAILING AESTHETIC PARAPET TUBE. OTHER RAILINGS ARE AVAILABLE. SEE MDOT BRIDGE DESIGN GUIDE.

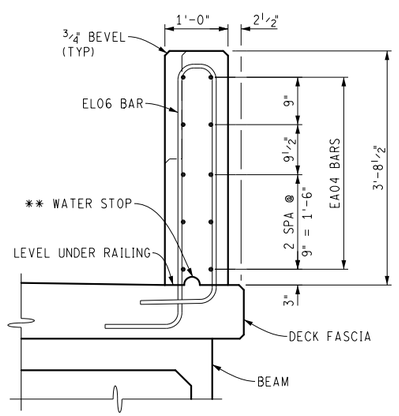
THE ABOVE NOTE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

** 2" HIGH x 4" LONG (±), FORMING NOT REQUIRED



SECTION AT END WALL

(TUBE CONNECTION AREA)



SECTION AT END WALL

(FULL CONCRETE AREA)

DIMENSION TABLE - 36" WIDE BEAMS									
BEAM SPAN (℄ BRG-℄ BRG) (FT)	DIMENSION								
	OUT-TO-OUT "a"	CLR RDWY "b"	"c"	BEAM SPACING "d"	BEAM SPACING "e"	BEAM SPACING "f"	BEAM SIZE "g"	"h"	"j"
20	32'-6"	30'-0"	15'-0"	3	9'-2"	27'-6"	17" x 36"	2'-6"	1'-0"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	17" x 36"	2'-6"	1'-0"
	42'-6"	40'-0"	20'-0"	4	9'-4½"	37'-6"	17" x 36"	2'-6"	1'-0"
30	32'-6"	30'-0"	15'-0"	3	9'-2"	27'-6"	21" x 36"	2'-6"	1'-0"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	21" x 36"	2'-6"	1'-0"
	42'-6"	40'-0"	20'-0"	4	9'-4½"	37'-6"	21" x 36"	2'-6"	1'-0"
40	32'-6"	30'-0"	15'-0"	3	9'-2"	27'-6"	21" x 36"	2'-6"	1'-0"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	21" x 36"	2'-6"	1'-0"
	42'-6"	40'-0"	20'-0"	4	9'-4½"	37'-6"	21" x 36"	2'-6"	1'-0"

DIMENSION TABLE - 48" WIDE BEAMS									
BEAM SPAN (℄ BRG-℄ BRG) (FT)	DIMENSION								
	OUT-TO-OUT "a"	CLR RDWY "b"	"c"	BEAM SPACING "d"	BEAM SPACING "e"	BEAM SPACING "f"	BEAM SIZE "g"	"h"	"j"
50	32'-6"	30'-0"	15'-0"	3	9'-2"	27'-6"	21" x 48"	2'-6"	6"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	21" x 48"	2'-6"	6"
	42'-6"	40'-0"	20'-0"	4	9'-4½"	37'-6"	21" x 48"	2'-6'	6"
60	32'-6"	30'-0"	15'-0"	4	6'-10½"	27'-6"	21" x 48"	2'-6"	6"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	21" x 48"	2'-6"	6"
	42'-6"	40'-0"	20'-0"	5	7'-6"	37'-6"	21" x 48"	2'-6'	6"
70	32'-6"	30'-0"	15'-0"	4	6'-10½"	27'-6"	27" x 48"	2'-6"	6"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	27" x 48"	2'-6"	6"
	42'-6"	40'-0"	20'-0"	5	7'-6"	37'-6"	27" x 48"	2'-6'	6"
80	32'-6"	30'-0"	15'-0"	4	6'-10½"	27'-6"	33" x 48"	2'-6"	6"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	33" x 48"	2'-6"	6"
	42'-6"	40'-0"	20'-0"	5	7'-6"	37'-6"	33" x 48"	2'-6'	6"
90	32'-6"	30'-0"	15'-0"	4	6'-10½"	27'-6"	39" x 48"	2'-6"	6"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	39" x 48"	2'-6"	6"
	42'-6"	40'-0"	20'-0"	5	7'-6"	37'-6"	39" x 48"	2'-6'	6"
100	32'-6"	30'-0"	15'-0"	4	6'-10½"	27'-6"	39" x 48"	2'-6"	6"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	39" x 48"	2'-6"	6"
	42'-6"	40'-0"	20'-0"	5	7'-6"	37'-6"	39" x 48"	2'-6'	6"
110	32'-6"	30'-0"	15'-0"	4	6'-10½"	27'-6"	48" x 48"	2'-6"	6"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	48" x 48"	2'-6"	6"
	42'-6"	40'-0"	20'-0"	5	7'-6"	37'-6"	48" x 48"	2'-6'	6"

NOTES:

DISTRIBUTION STEEL FOR SPREAD BOX BEAMS SHALL BE EQUALLY SPACED SUCH THAT THE DISTANCE BETWEEN THE END BARS AND THE BEAM ℄ DOES NOT EXCEED 1'-0".

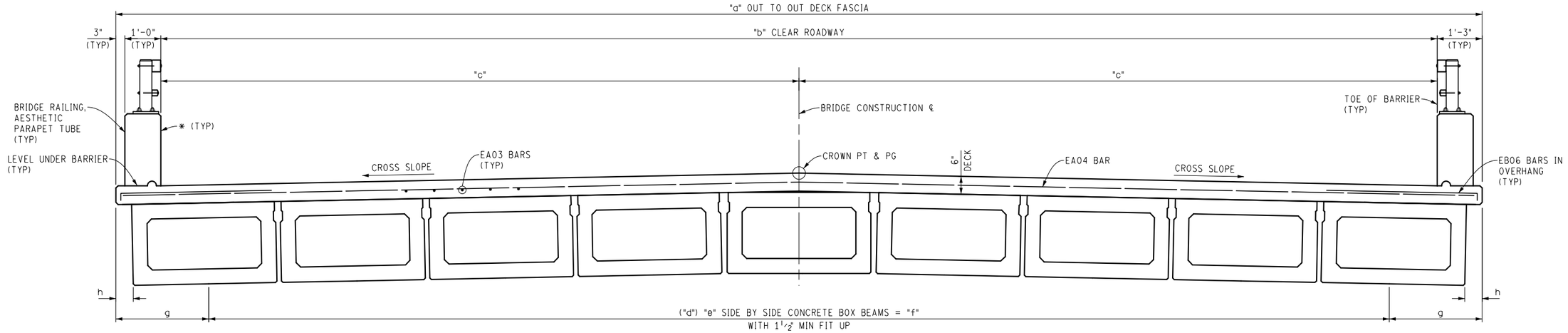
FOR SUPERELEVATED SECTIONS REFER TO MDOT DESIGN GUIDES FOR DETERMINING THE CROSS SLOPE.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	SUPERSTRUCTURE DETAILS
	DESIGN UNIT:	JN:	SPREAD BOX BEAM
FILE: Deck_SBB_002.dgn	TSC:		

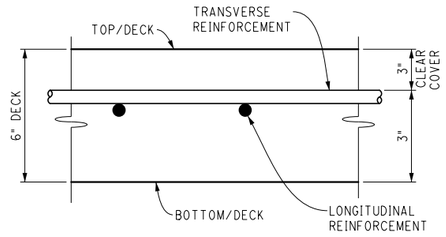
DRAWING	SHEET
DECK	SECT
005	



* PERPENDICULAR TO PLANE OF SLAB - NORMAL CROWN SECTION AND HIGH SIDE OF SUPERELEVATED SECTIONS

DECK SECTION

(AESTHETIC PARAPET TUBE RAILING SHOWN)



PARTIAL DECK SECTION

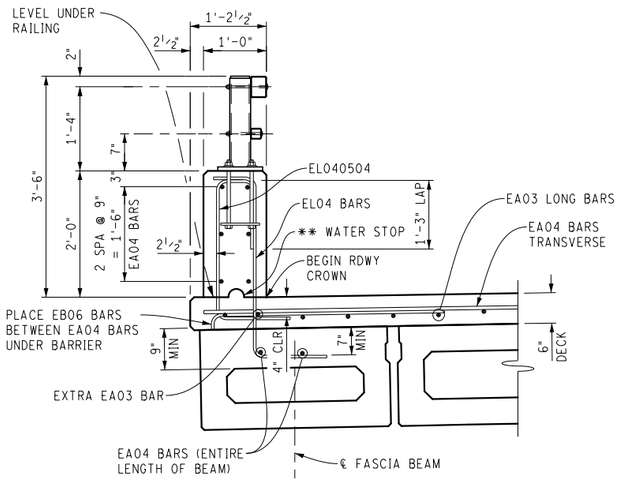
(LOOKING ALONG BRIDGE CONST ℄)

DIMENSION TABLE - 36" WIDE BEAMS

BEAM SPAN (℄ BRG-℄ BRG) (FT)	DIMENSION							
	OUT-TO-OUT "a"	CLR RDWY "b"	"c"	# OF BEAMS "d"	BEAM SIZE "e"	"f"	"g"	"h"
20	32'-6"	30'-0"	15'-0"	9	17 x 36	28'-0"	2'-3"	9"
	36'-6 1/2"	34'-0 1/2"	17'-0 1/4"	10	17 x 36	31'-1 1/2"	2'-8 1/2"	1'-2 1/2"
	42'-6"	40'-0"	20'-0"	12	17 x 36	37'-4 1/2"	2'-6 3/4"	1'-0 3/4"
30	32'-6"	30'-0"	15'-0"	9	17 x 36	28'-0"	2'-3"	9"
	36'-6 1/2"	34'-0 1/2"	17'-0 1/4"	10	17 x 36	31'-1 1/2"	2'-8 1/2"	1'-2 1/2"
	42'-6"	40'-0"	20'-0"	12	17 x 36	37'-4 1/2"	2'-6 3/4"	1'-0 3/4"
40	32'-6"	30'-0"	15'-0"	9	17 x 36	28'-0"	2'-3"	9"
	36'-6 1/2"	34'-0 1/2"	17'-0 1/4"	10	17 x 36	31'-1 1/2"	2'-8 1/2"	1'-2 1/2"
	42'-6"	40'-0"	20'-0"	12	17 x 36	37'-4 1/2"	2'-6 3/4"	1'-0 3/4"
50	32'-6"	30'-0"	15'-0"	9	17 x 36	28'-0"	2'-3"	9"
	36'-6 1/2"	34'-0 1/2"	17'-0 1/4"	10	17 x 36	31'-1 1/2"	2'-8 1/2"	1'-2 1/2"
	42'-6"	40'-0"	20'-0"	12	17 x 36	37'-4 1/2"	2'-6 3/4"	1'-0 3/4"

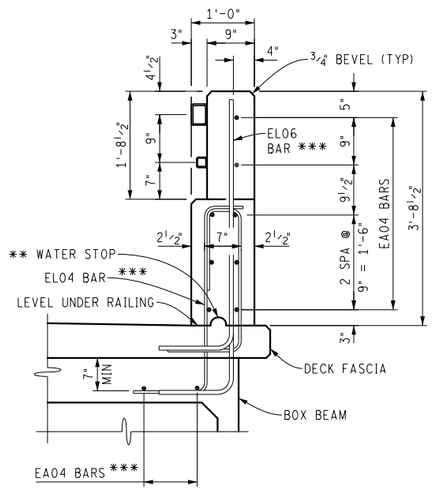
DIMENSION TABLE - 48" WIDE BEAMS

BEAM SPAN (℄ BRG-℄ BRG) (FT)	DIMENSION							
	OUT-TO-OUT "a"	CLR RDWY "b"	"c"	# OF BEAMS "d"	BEAM SIZE "e"	"f"	"g"	"h"
60	33'-9"	31'-3"	15'-7 1/2"	7	21 x 48	28'-9"	2'-6"	1'-0"
	37'-10 1/2"	35'-4 1/2""	17'-8 1/4"	8	21 x 48	32'-10 1/2"	2'-6"	1'-0"
	42'-6"	40'-0"	20'-0"	9	21 x 48	37'-0"	2'-9"	1'-3"
70	33'-9"	31'-3"	15'-7 1/2"	7	21 x 48	28'-9"	2'-6"	1'-0"
	37'-10 1/2"	35'-4 1/2""	17'-8 1/4"	8	21 x 48	32'-10 1/2"	2'-6"	1'-0"
	42'-6"	40'-0"	20'-0"	9	21 x 48	37'-0"	2'-9"	1'-3"
80	33'-9"	31'-3"	15'-7 1/2"	7	27 X 48	28'-9"	2'-6"	1'-0"
	37'-10 1/2"	35'-4 1/2""	17'-8 1/4"	8	27 X 48	32'-10 1/2"	2'-6"	1'-0"
	42'-6"	40'-0"	20'-0"	9	27 X 48	37'-0"	2'-9"	1'-3"
90	33'-9"	31'-3"	15'-7 1/2"	7	27 X 48	28'-9"	2'-6"	1'-0"
	37'-10 1/2"	35'-4 1/2""	17'-8 1/4"	8	27 X 48	32'-10 1/2"	2'-6"	1'-0"
	42'-6"	40'-0"	20'-0"	9	27 X 48	37'-0"	2'-9"	1'-3"
100	33'-9"	31'-3"	15'-7 1/2"	7	33 X 48	28'-9"	2'-6"	1'-0"
	37'-10 1/2"	35'-4 1/2""	17'-8 1/4"	8	33 X 48	32'-10 1/2"	2'-6"	1'-0"
	42'-6"	40'-0"	20'-0"	9	33 X 48	37'-0"	2'-9"	1'-3"
110	33'-9"	31'-3"	15'-7 1/2"	7	39 x 48	28'-9"	2'-6"	1'-0"
	37'-10 1/2"	35'-4 1/2""	17'-8 1/4"	8	39 x 48	32'-10 1/2"	2'-6"	1'-0"
	42'-6"	40'-0"	20'-0"	9	39 x 48	37'-0"	2'-9"	1'-3"



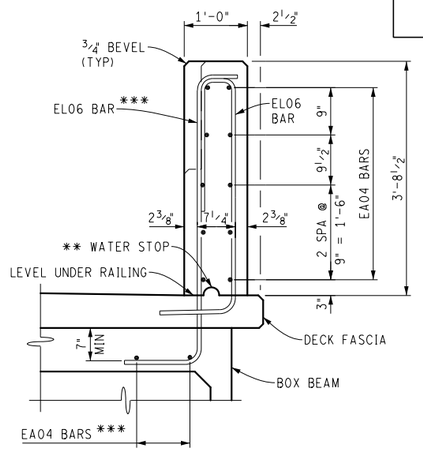
TYPICAL RAILING SECTION

(AESTHETIC PARAPET TUBE RAILING SHOWN)



SECTION AT END WALL

(TUBE CONNECTION AREA)



SECTION AT END WALL

(FULL CONCRETE AREA)

** 2" HIGH x 4" LONG (±), FORMING NOT REQUIRED

*** REINFORCEMENT EMBEDDED AND CAST IN PRESTRESSED CONC BOX BEAM (SEE CONC BOX BEAM DETAIL SHEET)

FOR INFORMATION ONLY:

DECK CROSS SECTION IS SHOWN WITH BRIDGE RAILING AESTHETIC PARAPET TUBE. OTHER RAILINGS ARE AVAILABLE. SEE MDOT BRIDGE DESIGN GUIDE.

THE ABOVE NOTE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

NOTES:

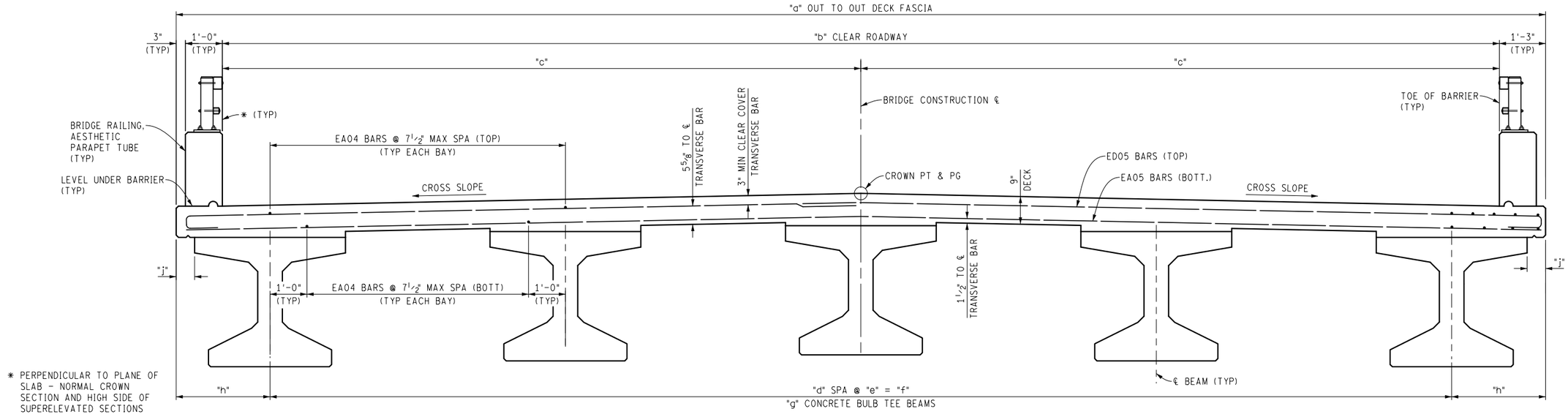
FOR SUPERELEVATED SECTIONS REFER TO MDOT DESIGN GUIDES FOR DETERMINING THE CROSS SLOPE.

CAMBER FOR FASCIA BEAMS WITH THICKER TOP FLANGE SHALL BE DESIGNED TO MATCH TYPICAL INTERIOR BEAMS AS CLOSE AS POSSIBLE. PRELOADING OF FASCIA OR TYPICAL INTERIOR BEAMS MAY BE REQUIRED IF CHAMBER FROM FINISHED BEAMS VARIES SIGNIFICANTLY.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

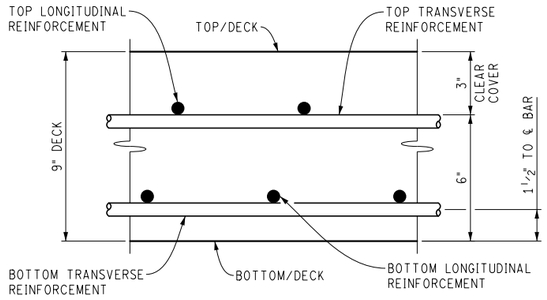
NO SCALE

	DATE: 05/09/18	CS:	SUPERSTRUCTURE DETAILS	DRAWING	SHEET
	DESIGN UNIT:	JN:	SIDE BY SIDE BOX BEAM	DECK	SECT
FILE: Deck_SBS_002.dgn	TSC:			006	



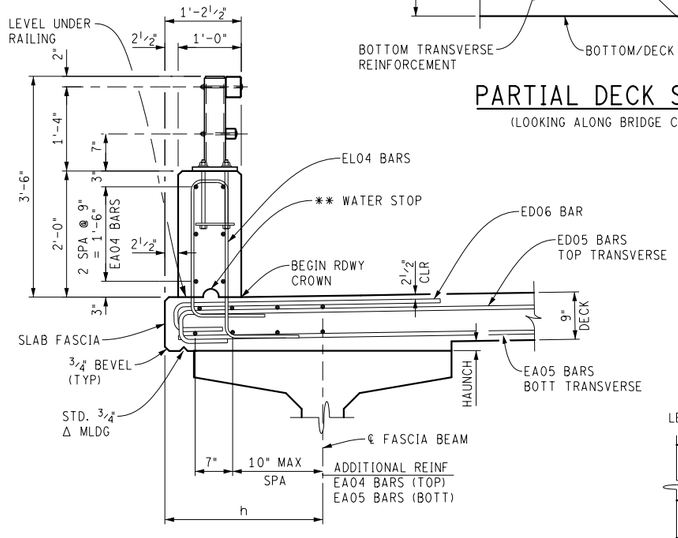
DECK SECTION

(AESTHETIC PARAPET TUBE RAILING SHOWN)



PARTIAL DECK SECTION

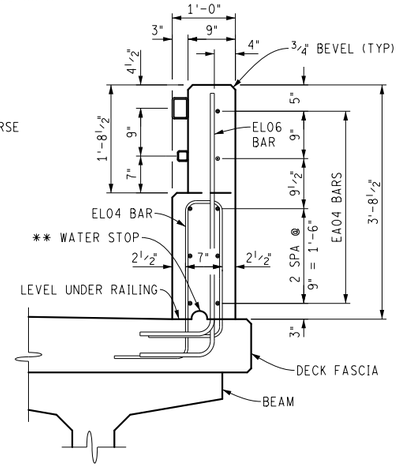
(LOOKING ALONG BRIDGE CONST ℄)



TYPICAL RAILING SECTION

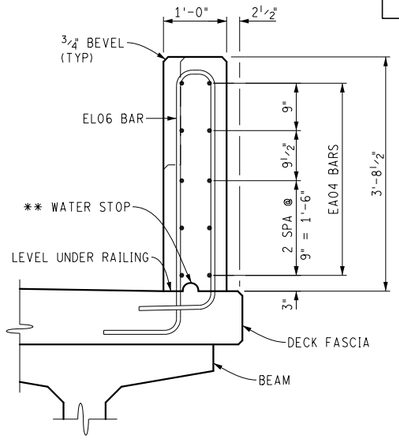
(AESTHETIC PARAPET TUBE RAILING SHOWN)

** 2" HIGH x 4" LONG (±), FORMING NOT REQUIRED



SECTION AT END WALL

(TUBE CONNECTION AREA)



SECTION AT END WALL

(FULL CONCRETE AREA)

DIMENSION TABLE

BEAM SPAN (℄ BRG-℄ BRG) (FT)	DIMENSION								
	OUT-TO-OUT "a"	CLR RDWY "b"	"c"	BEAM SPACING "d"	BEAM SPACING "e"	BEAM SPACING "f"	BEAM SIZE "g"	"h"	"j"
70	32'-6"	30'-0"	15'-0"	4	6'-10½"	27'-6"	36" x 49"	2'-6"	5½"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	36" x 49"	2'-6"	5½"
	42'-6"	40'-0"	20'-0"	4	9'-4½"	37'-6"	36" x 49"	2'-6'	5½"
80	32'-6"	30'-0"	15'-0"	4	6'-10½"	27'-6"	36" x 49"	2'-6"	5½"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	36" x 49"	2'-6"	5½"
	42'-6"	40'-0"	20'-0"	4	9'-4½"	37'-6"	36" x 49"	2'-6'	5½"
90	32'-6"	30'-0"	15'-0"	4	6'-10½"	27'-6"	42" x 49"	2'-6"	5½"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	42" x 49"	2'-6"	5½"
	42'-6"	40'-0"	20'-0"	4	9'-4½"	37'-6"	42" x 49"	2'-6'	5½"
100	32'-6"	30'-0"	15'-0"	4	6'-10½"	27'-6"	48" x 49"	2'-6"	5½"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	48" x 49"	2'-6"	5½"
	42'-6"	40'-0"	20'-0"	4	9'-4½"	37'-6"	48" x 49"	2'-6'	5½"
110	32'-6"	30'-0"	15'-0"	4	6'-10½"	27'-6"	48" x 49"	2'-6"	5½"
	36'-6"	34'-0"	17'-0"	4	7'-10½"	31'-6"	48" x 49"	2'-6"	5½"
	42'-6"	40'-0"	20'-0"	4	8'-10½"	35'-6"	48" x 49"	3'-6'	1'-5½"

FOR INFORMATION ONLY:

DECK CROSS SECTION IS SHOWN WITH BRIDGE RAILING AESTHETIC PARAPET TUBE. OTHER RAILINGS ARE AVAILABLE. SEE MDOT BRIDGE DESIGN GUIDE.

THE ABOVE NOTE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

NOTES:

DISTRIBUTION STEEL FOR BULB TEE BEAMS SHALL BE EQUALLY SPACED SUCH THAT THE DISTANCE BETWEEN THE END BARS AND THE BEAM ℄ DOES NOT EXCEED 1'-0".

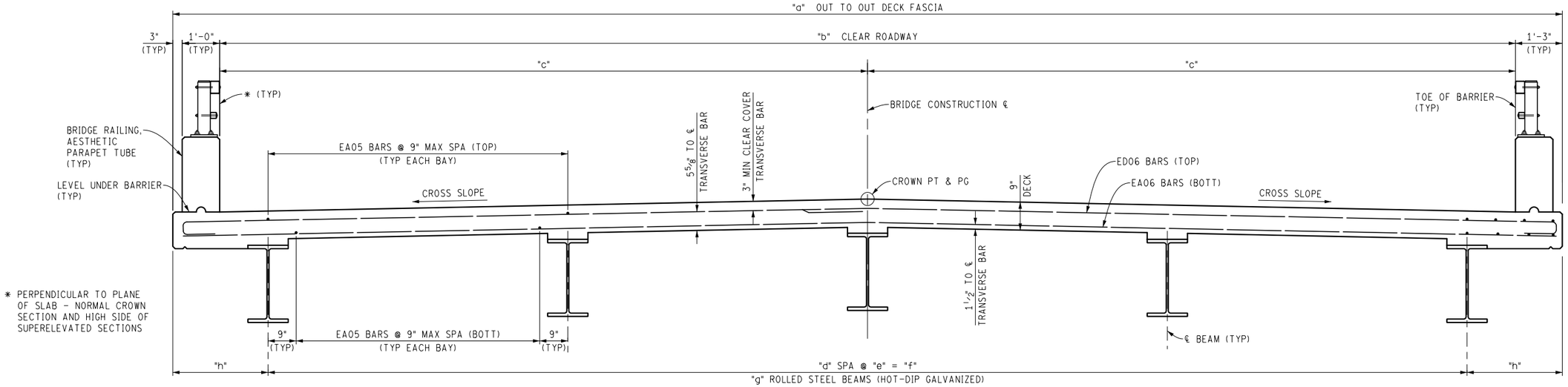
FOR SUPERELEVATED SECTIONS REFER TO MDOT DESIGN GUIDES FOR DETERMINING THE CROSS SLOPE.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	SUPERSTRUCTURE DETAILS
	DESIGN UNIT:	JN:	BULB-TEE BEAM
FILE: Deck_BT_002.dgn	TSC:		

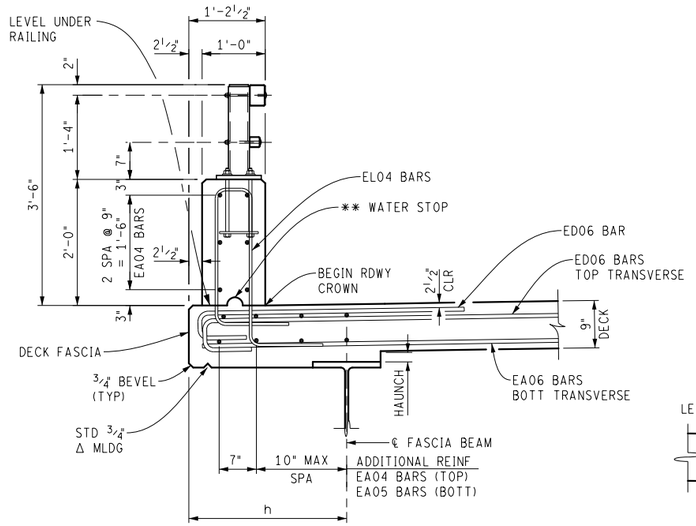
DRAWING	SHEET
DECK	SECT
007	



DECK SECTION

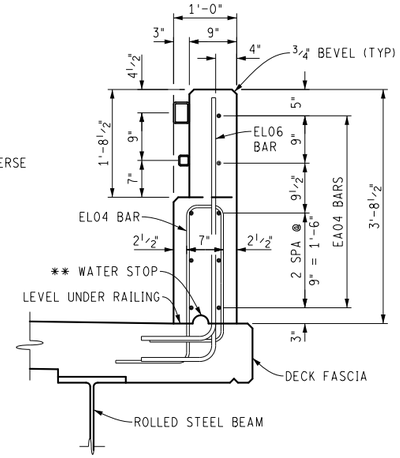
(AESTHETIC PARAPET TUBE RAILING SHOWN)

DIMENSION TABLE								
BEAM SPAN (℄ BRG-℄ BRG) (FT)	DIMENSION							
	OUT-TO-OUT "a"	CLR RDWY "b"	"c"	BEAM SPACING "d"	BEAM SPACING "e"	BEAM SPACING "f"	BEAM SIZE "g"	"h"
20	32'-6"	30'-0"	15'-0"	4	6'-4½"	25'-6"	W21 x 93	3'-6"
	36'-6"	34'-0"	17'-0"	5	6'-3"	31'-3"	W21 x 93	2'-7½"
	42'-6"	40'-0"	20'-0"	6	6'-3"	37'-6"	W21 x 93	2'-6"
30	32'-6"	30'-0"	15'-0"	4	6'-4½"	25'-6"	W21 x 93	3'-6"
	36'-6"	34'-0"	17'-0"	5	6'-3"	31'-3"	W21 x 93	2'-7½"
	42'-6"	40'-0"	20'-0"	6	6'-3"	37'-6"	W21 x 93	2'-6"
40	32'-6"	30'-0"	15'-0"	4	6'-4½"	25'-6"	W24 x 117	3'-6"
	36'-6"	34'-0"	17'-0"	5	6'-3"	31'-3"	W24 x 117	2'-7½"
	42'-6"	40'-0"	20'-0"	6	6'-3"	37'-6"	W24 x 117	2'-6"
50	32'-6"	30'-0"	15'-0"	4	6'-4½"	25'-6"	W30 x 173	3'-6"
	36'-6"	34'-0"	17'-0"	5	6'-3"	31'-3"	W30 x 173	2'-7½"
	42'-6"	40'-0"	20'-0"	6	6'-3"	37'-6"	W30 x 173	2'-6"
60	32'-6"	30'-0"	15'-0"	4	6'-4½"	25'-6"	W36 x 170	3'-6"
	36'-6"	34'-0"	17'-0"	5	6'-3"	31'-3"	W36 x 170	2'-7½"
	42'-6"	40'-0"	20'-0"	6	6'-3"	37'-6"	W36 x 170	2'-6"



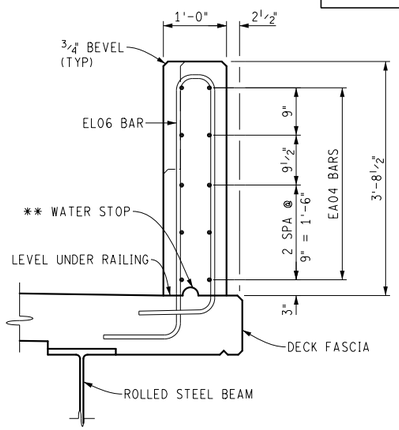
TYPICAL RAILING SECTION

(AESTHETIC PARAPET TUBE RAILING SHOWN)



SECTION AT END WALL

(TUBE CONNECTION AREA)



SECTION AT END WALL

(FULL CONCRETE AREA)

** 2" HIGH x 4" LONG (±), FORMING NOT REQUIRED

FOR INFORMATION ONLY:

DECK CROSS SECTION IS SHOWN WITH BRIDGE RAILING AESTHETIC PARAPET TUBE. OTHER RAILINGS ARE AVAILABLE. SEE MDOT BRIDGE DESIGN GUIDE.

THE ABOVE NOTE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

NOTES:

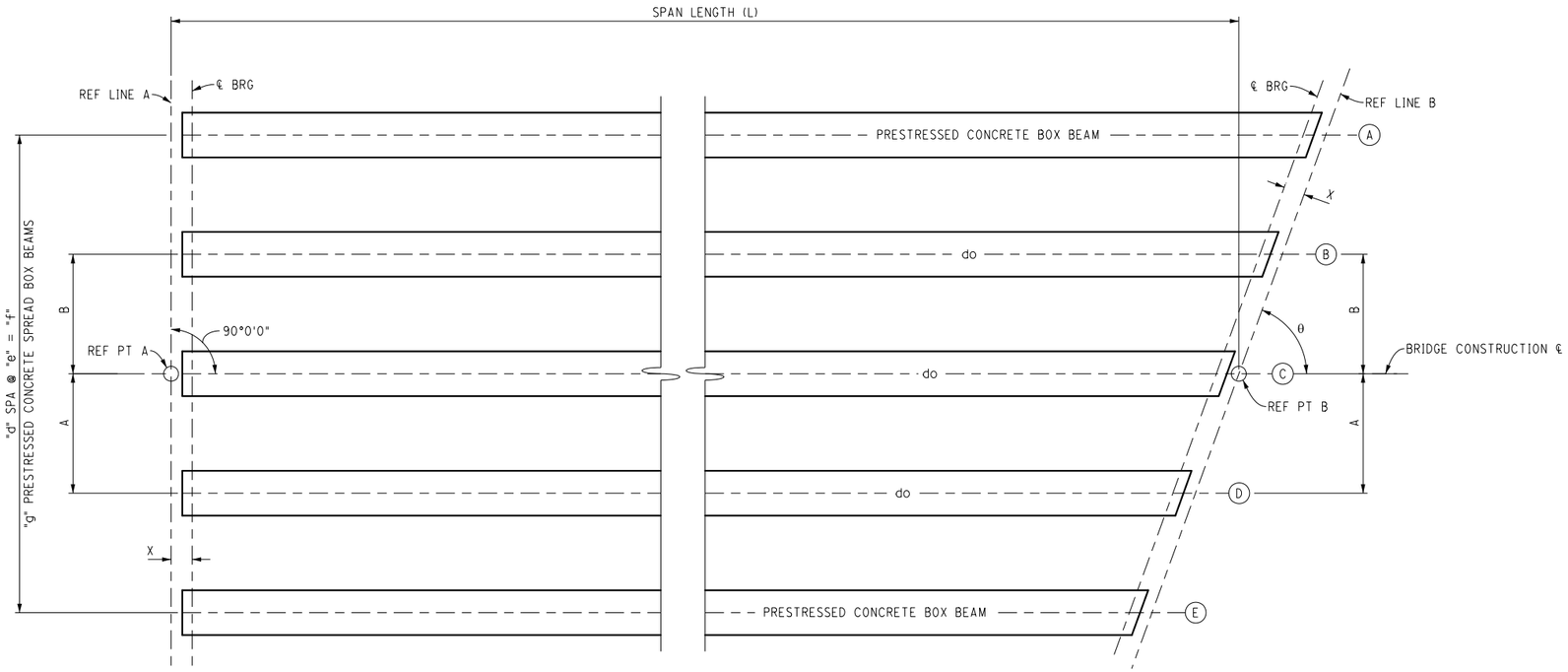
FOR SUPERELEVATED SECTIONS REFER TO MDOT DESIGN GUIDES FOR DETERMINING THE CROSS SLOPE.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

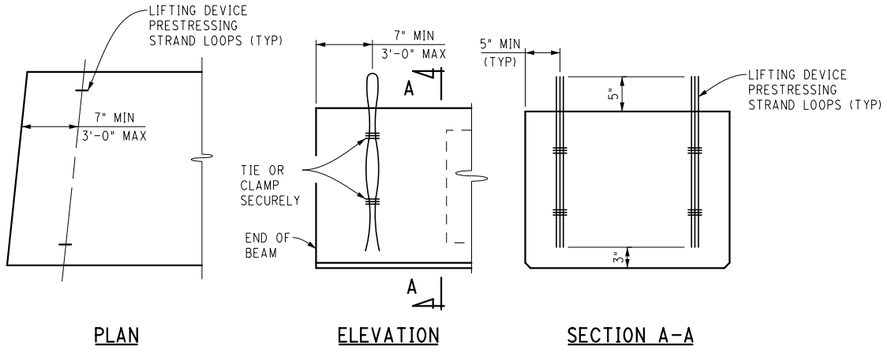
NO SCALE

	DATE: 05/09/18	CS:	SUPERSTRUCTURE DETAILS
	DESIGN UNIT:	JN:	ROLLED STEEL BEAM
FILE: Deck_RSB_002.dgn	TSC:		

DRAWING	SHEET
DECK	SECT
008	



ERECTION DIAGRAM



DETAILS OF LIFTING DEVICE

LIFTING OF BEAM SHALL BE BY EQUAL LOADS TO EACH PAIR OF LIFTING DEVICES.

LIFTING DEVICES SHALL BE REMOVED

FOR INFORMATION ONLY:

THE DESIGN OF THESE STRUCTURES IS BASED ON 1.2 TIMES THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATION HL-93 LOADING WITH THE EXCEPTION THAT THE DESIGN TANDEM PORTION OF THE HL-93 LOAD DEFINITION SHALL BE REPLACED BY A SINGLE 60 KIP AXLE LOAD BEFORE APPLICATION OF THIS 1.2 FACTOR. THE RESULTING LOAD IS DESIGNATED HL-93 MOD. LIVE LOAD PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH.

A 4" HAUNCH SECTION WAS USED FOR THE LOADING ON ALL BEAMS. THE HAUNCH SECTION WAS NOT INCLUDED IN THE COMPOSITE SECTION PROPERTIES FOR THE DESIGN OF THE BEAMS.

A 9" DECK SECTION WAS USED FOR THE LOADING ON ALL BEAMS. THE EFFECTIVE DECK SECTION IS $7\frac{1}{2}$" AND THE SACRIFICIAL DECK SECTION IS $1\frac{1}{2}$".

THE LONGITUDINAL "EA" BARS IN THE TOP AND BOTTOM FLANGES OF THE BEAMS ARE NOT INCLUDED TO PROVIDE ADDITIONAL CAPACITY.

BEAM DESIGNS DO NOT INCLUDE PRESTRESSING STRANDS IN THE TOP FLANGES.

ALL VERTICAL "ED" STIRRUP BARS SHALL BE GRADE 40 KSI FOR 17" & 21" DEEP BOX BEAMS AND GRADE 60 KSI FOR ALL OTHER BEAM DEPTHS.

"A" & "B" ARE MEASURED FROM BRIDGE CONST ℄ TO ADJACENT BEAM ℄.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

SERVICE BEAM REACTIONS (KIPS)			
BEAM SPAN (℄ BRG–℄ BRG) (FT)	DC	DW	LL+I
20	19	3	103
30	30	4	107
40	40	5	111
50	55	7	115
60	55	5	120
70	74	6	126
80	87	7	132
90	99	8	137
100	111	9	142
110	125	10	147

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS

DC DENOTES SERVICE DEAD LOADS DUE TO BEAM SELF WEIGHT, DECK WEIGHT, & DIAPHRAGMS.

DW DENOTES SERVICE BEAM REACTION DUE TO FUTURE WEARING SURFACE.

LL+I DENOTES SERVICE LIVE LOAD PLUS IMPACT REACTION PER LANE.

PRESTRESSING STRAND LIFTING DEVICES		
ESTIMATED BEAM WEIGHT (TONS)	STRAND SIZE	NO. OF STRANDS PER BEAM END
20	$\frac{3}{8}$"	2
27	$\frac{7}{16}$"	2
36	$\frac{1}{2}$"	2
30	$\frac{3}{8}$"	3
40.5	$\frac{7}{16}$"	3
54	$\frac{1}{2}$"	3

THIS TABLE SHOULD INCLUDE ONLY APPLICABLE INFORMATION ON THE FINAL DESIGN DRAWINGS

NOTES:

THE TOP SURFACE OF THE BEAMS SHALL BE INTENTIONALLY ROUGHENED.

THE ESTIMATED BEAM CAMBER AT RELEASE IS [XX".] THIS CAMBER IS DUE TO PRESTRESS AND DEAD LOAD OF THE BEAM ONLY AND IS MEASURED IN THE ERECTED POSITION.

TOTAL ESTIMATED CHANGE OF LENGTH OF BOTTOM FLANGE AT TRANSFER OF PRESTRESS FORCE IS [X".]

PRESTRESSING STRANDS SHALL BE GIVEN AN INITIAL PRESTRESS AS FOLLOWS:
0.6" DIA. – 44,000 lbs. PRESTRESS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

THREADING OF REINFORCEMENT AND INSTALLATION INTO CONCRETE INSERTS IS INCLUDED IN THE BID ITEM "PREST CONC BOX BEAM, FURN, [XX]INCH"

LIFTING DEVICES SHALL BE REMOVED AFTER BEAMS ARE ERECTED. REMOVAL IS INCLUDED IN THE BID ITEM "PREST CONC BOX BEAM, ERECT, [XX]INCH"

POSITION DOWELS SHALL BE HOT-DIP GALVANIZED ACCORDING TO AASHTO M 232. POSITION DOWELS ARE INCLUDED IN PAYMENT FOR PRESTRESSED CONCRETE BEAMS.

ITEMS CAST INTO THE BEAMS TO FACILITATE BRIDGE CONSTRUCTION (FORMING, FINISHING, ETC.) SHALL BE GALVANIZED OR EPOXY COATED.

PRESTRESSING STRAND SHALL BE 0.6" NOMINAL DIAMETER MEETING THE REQUIREMENTS OF AASHTO M203 (ASTM A416), GRADE 270, LOW RELAXATION STRAND.

COAT THE ENTIRE OUTSIDE AND BOTTOM OF THE FASCIA BEAM USING A MATERIAL SELECTED FROM THE SPECIAL PROVISION FOR CONCRETE SURFACE COATINGS. APPLY THE COATING ACCORDING TO THE SPECIAL PROVISION.

STEEL FOR SOLE PLATES AND OTHER BEARING COMPONENTS SHALL MEET THE REQUIREMENTS OF AASHTO M 270 GRADE 36.

BEAM STIRRUPS, SHALL BE GRADE [XX](ksi).

FIELD DRILLING SHALL BE ALLOWED FOR SIGN SUPPORT ANCHORS ONLY. LOCATION OF ANCHORS SHALL BE AS DETAILED ON TRAFFIC & SAFETY SIGN SUPPORT SPECIAL DETAILS. ANY DAMAGE TO THE BEAMS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AND APPROVED BY THE ENGINEER.

ALL LONGITUDINAL "EA" BARS IN THE TOP AND BOTTOM FLANGES SHALL BE GRADE 60 KSI.

CONCRETE INSERTS FOR BACKWALLS SHALL BE 1" DIAMETER (AT EXPANSION ABUTMENT) & $1\frac{1}{2}$" DIAMETER (AT FIXED ABUTMENT): DAYTON SUPERIOR, TYPE B-1 HEAVY OR TYPE B-18: WILLIAMS FORM, TYPE C 12 OR TYPE C -19: MEADOW BURKE, TYPE CT-2 OR TYPE CX-4: OR EQUAL. INSERTS (COIL OR FERRULE) MUST BE ELECTROPLATE GALVANIZED IN ACCORDANCE WITH ASTM B633, SERVICE CONDITION 4. INSERTS SHALL BE CAST WITH THE BEAMS. FIELD INSTALLATION OF INSERTS IS NOT ALLOWED.

ADHESIVE ANCHORS SHALL USE A NON-SHRINK GROUT (WHICH IS CEMENTIOUS) LISTED IN MDOT'S QUALIFIED PRODUCTS LIST.

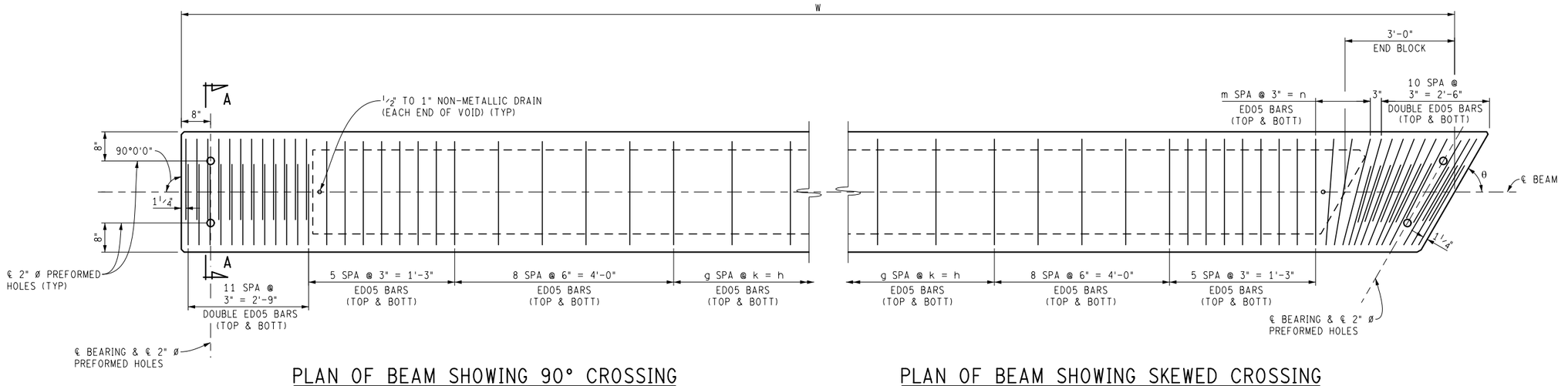
ITEMS CAST INTO STRUCTURAL PRECAST CONCRETE TO FACILITATE BRIDGE CONSTRUCTION (FORMING, FINISHING, ETC.) SHALL BE GALVANIZED OR EPOXY COATED.

[ ] VALUES TO BE DETERMINED BY DESIGNER

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

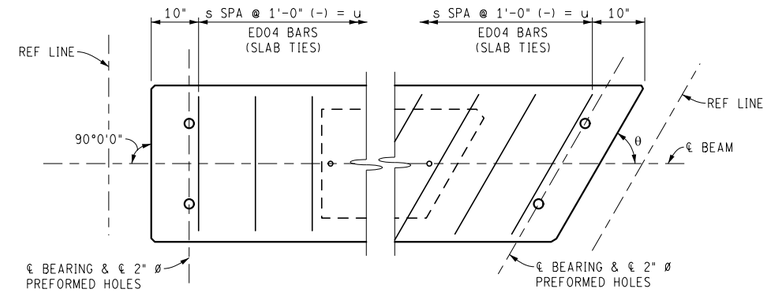
NO SCALE

	DATE: 05/09/18	CS:	PRESTRESSED BEAM DETAILS	DRAWING	SHEET
	DESIGN UNIT:	JN:	SPREAD BOX BEAM	SBB	SECT
FILE: prest_SBB_001.dgn	TSC:			001	



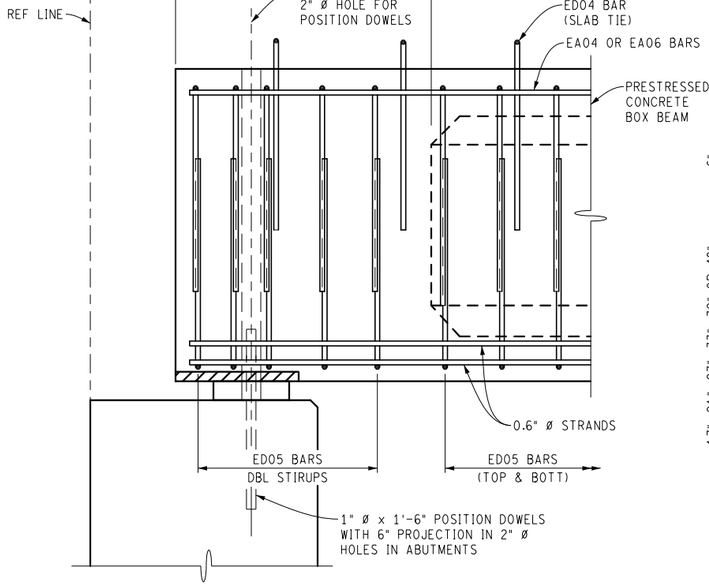
PLAN OF BEAM SHOWING 90° CROSSING

PLAN OF BEAM SHOWING SKEWED CROSSING

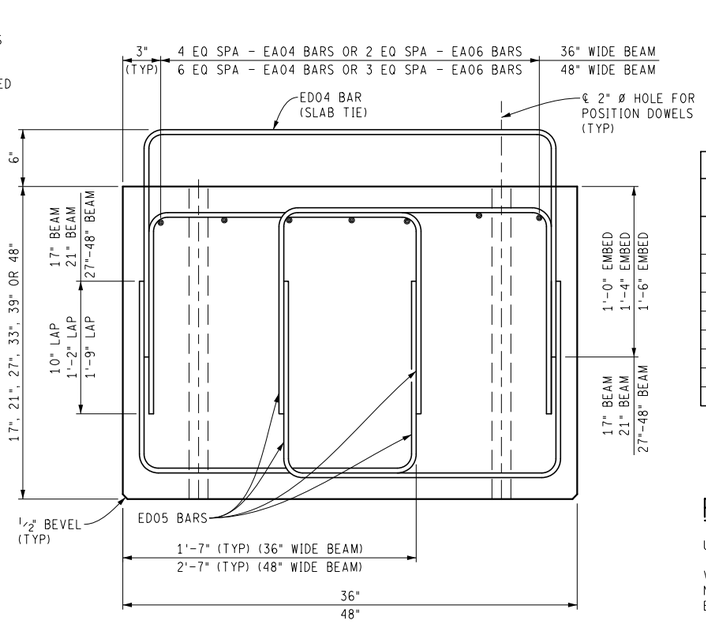


90° CROSSING SKEWED CROSSING

PLAN OF SLAB TIES



SECTION THRU END BLOCK



SECTION A-A

BEAM DIMENSIONS

	BEAM SIZE									
	17 x 36	21 x 36		21 x 48		27 x 48	33 x 48	39 x 48		48 x 48
	20' BEAM SPAN	30' BEAM SPAN	40' BEAM SPAN	50' BEAM SPAN	60' BEAM SPAN	70' BEAM SPAN	80' BEAM SPAN	90' BEAM SPAN	100' BEAM SPAN	110' BEAM SPAN
g	7	20	34	47	60	74	87	100	114	95
k	9" (-)	9" (+)	9" (-)	9" (-)	9" (+)	9" (-)	9" (-)	9" (+)	9" (-)	1'-0" (+)
h	5'-1½"	15'-1½"	25'-1½"	35'-1½"	45'-1½"	55'-1½"	65'-1½"	75'-1½"	85'-1½"	95'-1½"
m	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
n	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
s	20	30	40	50	60	70	80	90	100	110
u	19'-8"	29'-8"	39'-8"	49'-8"	59'-8"	69'-8"	79'-8"	89'-8"	99'-8"	109'-8"
W	21'-4"	31'-4"	41'-4"	51'-4"	61'-4"	71'-4"	81'-4"	91'-4"	101'-4"	111'-4"

REPLACE VARIABLES IN BEAM DIMENSIONS WITH VALUES FROM THIS TABLE. THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS.

FOR INFORMATION ONLY:

USE HAUNCH REINFORCEMENT WHEN BEAM HAUNCH > 4".

VARIABLES IN BEAM DIMENSIONS TABLE WITH VALUES NOTED "TBD" SHALL BE DETERMINED BY THE DESIGNER BASED ON BEAM END SKEW.

"g" & "h" VALUES SHOWN IN THE BEAM DIMENSIONS TABLE ARE BASED ON 90° CROSSING AND SHALL BE ADJUSTED FOR SKEWED CROSSING.

THE ENDS OF THE BOX BEAMS SHALL BE SKEWED TO BE PARALLEL TO THE REFERENCE LINE.

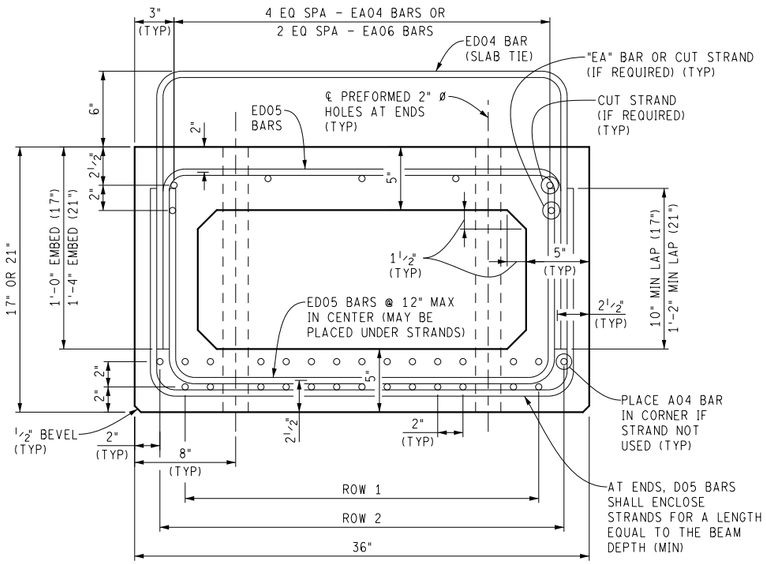
THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

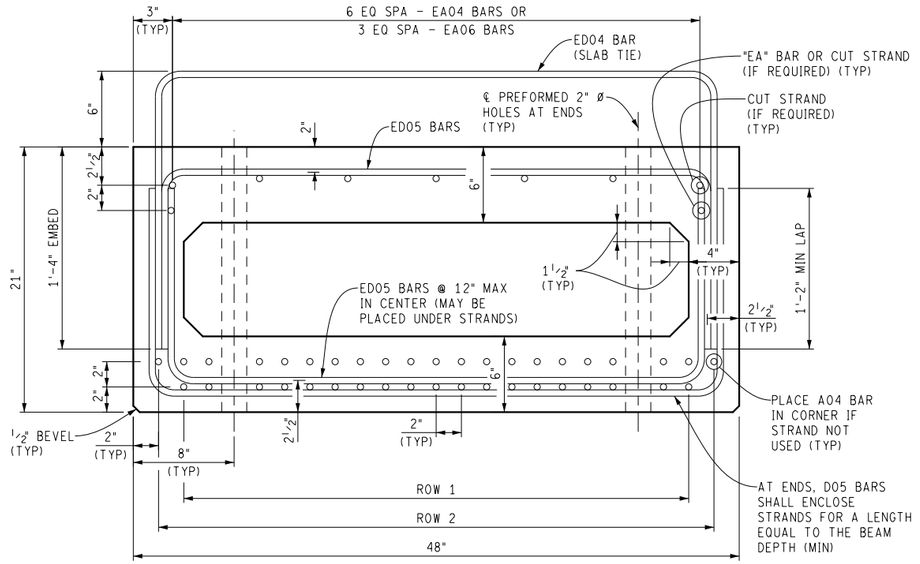
NO SCALE

	DATE: 05/09/18	CS:	PRESTRESSED BEAM DETAILS	DRAWING
	DESIGN UNIT:	JN:	SPREAD BOX BEAM	SBB
FILE: prest_SBB_002.dgn	TSC:			002

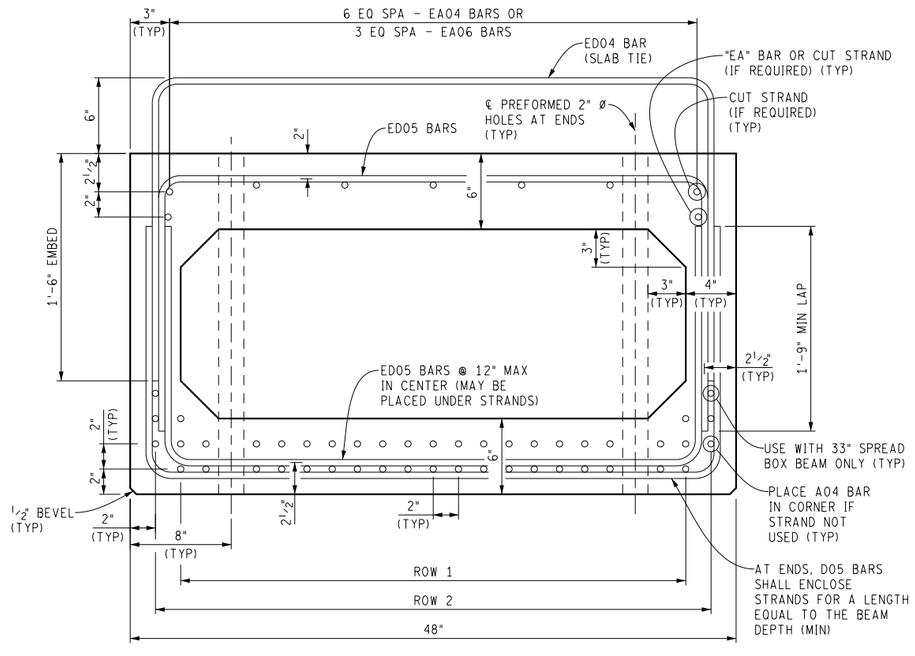
SHEET SECT



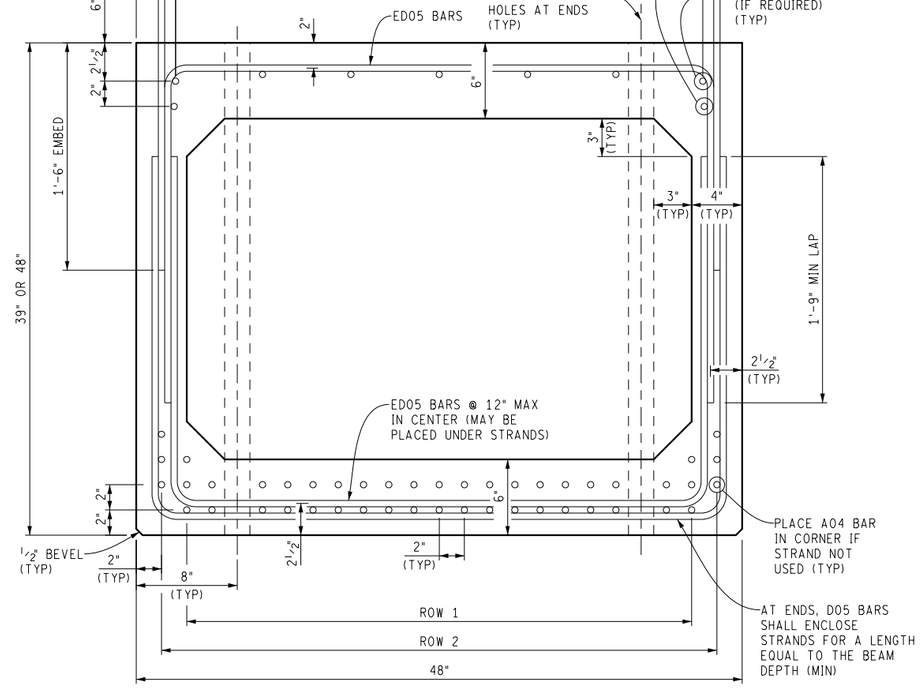
17" X 36" OR 21" X 36" BEAM



21" X 48" BEAM



27" X 48" OR 33" X 48" BEAM



39" X 48" OR 48" X 48" BEAM

NOTES:

SEE DEBONDING TABLE ON DWG "SBB 004" FOR STRAND INFORMATION.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)											
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION		NO SCALE	DATE: 05/09/18	CS:
										DESIGN UNIT:	JN:
									FILE: prest_SBB_003.dgn	TSC:	

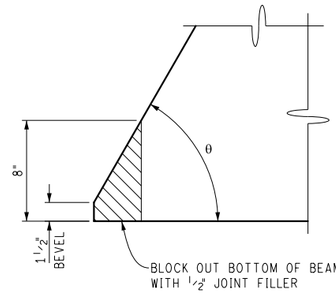
PRESTRESSED BEAM DETAILS	DRAWING	SHEET
SPREAD BOX BEAM	SBB 003	SECT

STRAND/DEBONDING LAYOUT TABLE

BEAM SPAN (℄ BRG-℄ BRG) (FT)	BEAM DIMENSIONS		NO. OF STRANDS					
	H (in)	W (in)	1ST LAYER, 2" FROM BOTTOM	2ND LAYER, 4" FROM BOTTOM	3RD LAYER, 6" FROM BOTTOM	TOTAL NO. OF STRANDS	NO. OF DEBONDING STRANDS	NO. OF DEBONDING STRANDS-(1st LAYER)-[2nd LAYER] DEBONDING LENGTHS (ft)
20	17	36	9	-	-	9	N/A	N/A
30	21	36	11	-	-	11	N/A	N/A
40	21	36	13	5	-	18	4	(2)2, (2)4
50	21	48	19	7	-	26	6	(2)2, (4)4
60	21	48	19	15	-	34	8	(2)2, (4)8, (2)12
70	27	48	19	15	-	34	6	(2)2, (2)4, (2)6
80	33	48	19	15	-	34	6	(2)2, (4)4
90	39	48	19	17	-	36	6	(2)2, (4)4
100	39	48	19	21	6	46	10	(2)12, (2)14, (2)30, [2]12, [2]20
110	48	48	19	21	4	44	10	(2)6, (2)10, (2)12, [2]2, [2]4

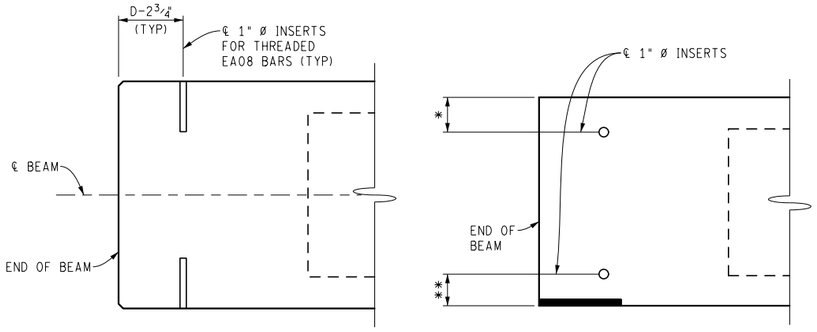
STRAND DEBONDING LENGTH IS MEASURED FROM EACH BEAM END

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS



CORNER BLOCKING DETAIL

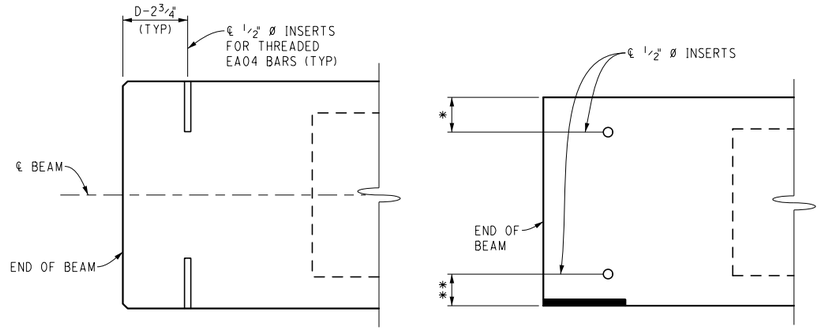
USE WHEN θ < 70°



PLAN ELEV

INSERT DETAIL @ BEAM END (EXPANSION ABUTMENT)

(SEE DECK 002 FOR BACKWALL DETAILS)



PLAN ELEV

INSERT DETAIL @ BEAM END (FIXED ABUTMENT)

(SEE DECK 002 FOR BACKWALL DETAILS)

FOR INFORMATION ONLY:

"D" DENOTES BACKWALL THICKNESS.

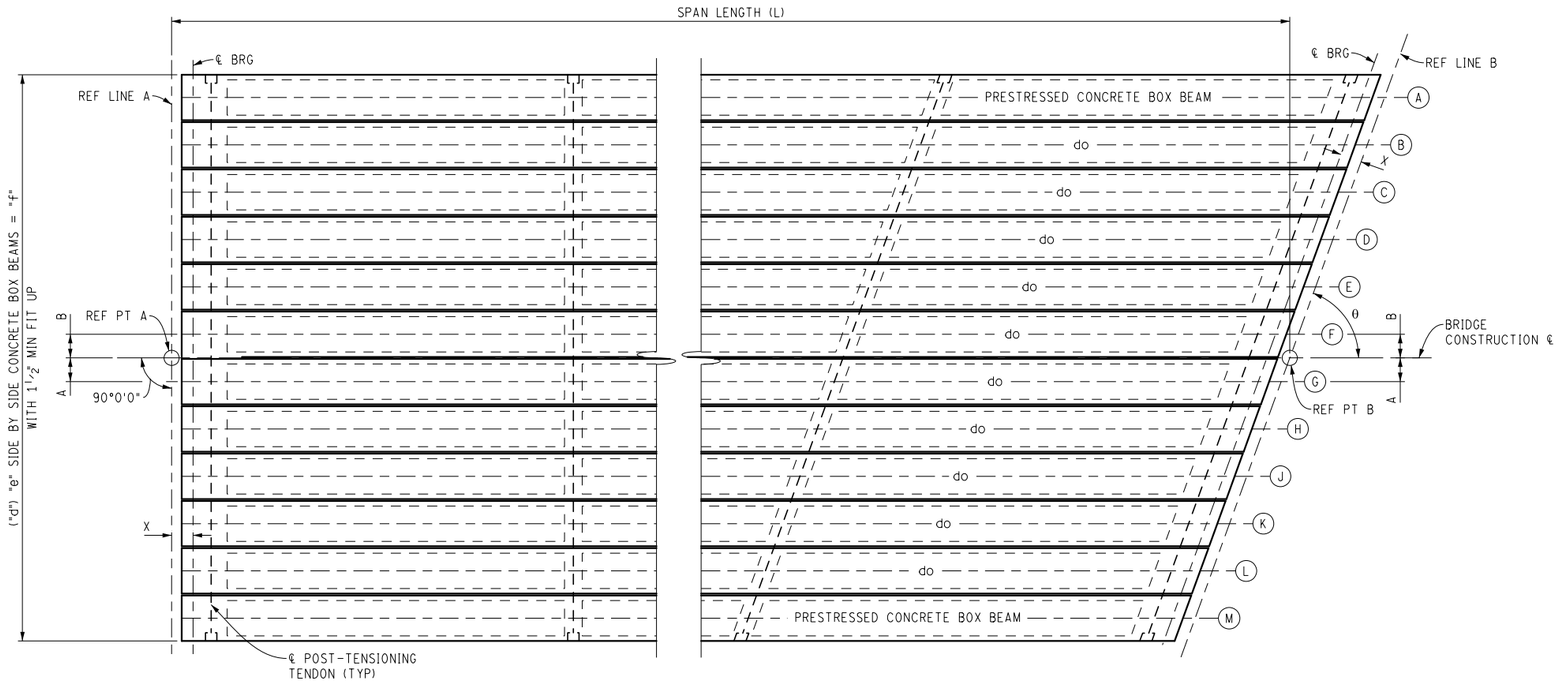
* PLACE SPREAD BOX BEAM BACKWALL INSERTS AT 3½" OR 5½" DOWN FROM TOP OF BEAM TO AVOID INTERFERENCE WITH STRANDS. (3½" FOR 21" BEAMS) (5½" FOR >21" BEAMS)

** PLACE SPREAD BOX BEAM BACKWALL INSERTS AT 5" OR 7" UP FROM BOTTOM OF BEAM TO AVOID INTERFERENCE WITH STRANDS. (5" FOR 21" BEAMS) (7" FOR >21" BEAMS)

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)											
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION		NO SCALE	DATE: 05/09/18	CS:
										DESIGN UNIT:	JN:
										FILE: prest_SBB_004.dgn	TSC:

PRESTRESSED BEAM DETAILS	DRAWING	SHEET
SPREAD BOX BEAM	SBB 004	SECT



POST TENSIONING TENDON LOCATIONS

BEAM SPAN (℄ BRG-℄ BRG)	LOCATIONS	TOTAL
UP TO 50'	1 AT EACH END OF BEAM WITH 2 AT CENTER OF SPAN (11' APART)	4
OVER 50' TO 62'	1 AT EACH END OF BEAM WITH 1 AT CENTER OF SPAN AND 1 AT EACH QUARTER POINT	5
OVER 62' TO 100'	1 AT EACH END OF BEAM WITH 2 AT CENTER OF SPAN (11' APART) AND 1 AT EACH QUARTER POINT	6
OVER 100'	1 AT EACH END OF BEAM WITH 5 EQUALLY SPACED BETWEEN	7
	END OF BEAM LOCATIONS USUALLY 10"± PERPENDICULAR FROM ℄ OF BEARING	

POST TENSIONING FORCE PER DIAPHRAGM / END BLOCK

	FORCE (ALL SITUATIONS)	
	120 KIPS	

THESE TABLES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS

VERTICAL POST TENSIONING TENDON LOCATIONS

BEAM DEPTH	AT EACH LOCATION	TOTAL
17", 21", 27"	1 TENDON AT MID-DEPTH OF BEAM	1
33", 39"	1 AT EACH ⅓ POINT OF BEAM DEPTH	2

SERVICE BEAM REACTIONS (KIPS)

BEAM SPAN (℄ BRG-℄ BRG) (FT)	DC	DW	LL+I
20	11	1	103
30	17	2	107
40	23	2	111
50	37	3	115
60	46	4	120
70	52	5	126
80	63	5	132
90	71	6	137
100	81	7	142
110	95	7	147

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS

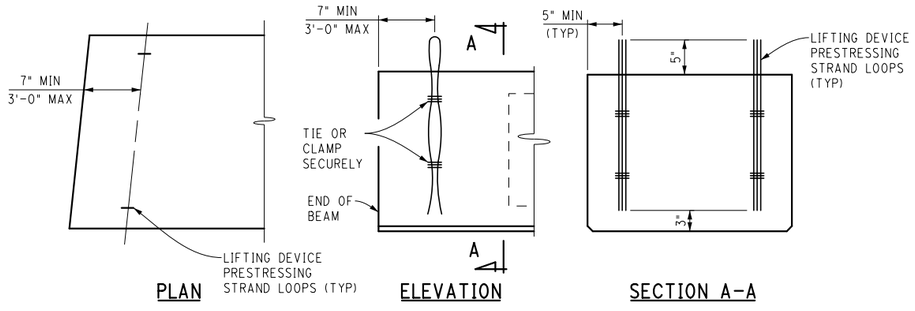
DC DENOTES SERVICE DEAD LOADS DUE TO BEAM SELF WEIGHT, DECK WEIGHT, & DIAPHRAGMS

DW DENOTES SERVICE BEAM REACTION DUE TO FUTURE WEARING SURFACE

LL+I DENOTES SERVICE LIVE LOAD PLUS IMPACT REACTION PER LANE

ERECTION DIAGRAM

SEE POST TENSIONING TENDON LOCATION TABLE FOR NUMBER AND LOCATION OF DUCTS



DETAILS OF LIFTING DEVICE

LIFTING OF BEAM SHALL BE BY EQUAL LOADS TO EACH PAIR OF LIFTING DEVICES.

LIFTING DEVICES SHALL BE REMOVED.

PRESTRESSING STRAND LIFTING DEVICES

ESTIMATED BEAM WEIGHT (TONS)	STRAND SIZE	NO. OF STRANDS PER BEAM END
20	3/8"	2
27	7/16"	2
36	1/2"	2
30	3/8"	3
40.5	7/16"	3
54	1/2"	3

THIS TABLE SHOULD INCLUDE ONLY APPLICABLE INFORMATION ON THE FINAL DESIGN DRAWINGS

FOR INFORMATION ONLY:

THE DESIGN OF THESE STRUCTURES IS BASED ON 1.2 TIMES THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATION HL-93 LOADING WITH THE EXCEPTION THAT THE DESIGN TANDEM PORTION OF THE HL-93 LOAD DEFINITION SHALL BE REPLACED BY A SINGLE 60 KIP AXLE LOAD BEFORE APPLICATION OF THIS 1.2 FACTOR. THE RESULTING LOAD IS DESIGNATED HL-93 MOD. LIVE LOAD PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH.

A 6" DECK SECTION WAS USED FOR THE LOADING ON ALL BEAMS. THE EFFECTIVE DECK SECTION IS 4½" AND THE SACRIFICIAL DECK SECTION IS 1½".

THE LONGITUDINAL "EA" BARS IN THE TOP AND BOTTOM FLANGES OF THE BEAMS ARE NOT INCLUDED TO PROVIDE ADDITIONAL CAPACITY.

BEAM DESIGNS DO NOT INCLUDE PRESTRESSING STRANDS IN THE TOP FLANGES.

ALL VERTICAL "ED" STIRRUP BARS SHALL BE GRADE 40 KSI FOR 17" & 21" DEEP BOX BEAMS AND GRADE 60 KSI FOR ALL OTHER BEAM DEPTHS.

"A" & "B" ARE MEASURED FROM BRIDGE CONST ℄ TO ADJACENT BEAM ℄.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

☐ VALUES TO BE DETERMINED BY DESIGNER

NOTES:

THE TOP SURFACE OF THE BEAMS SHALL BE INTENTIONALLY ROUGHENED.

THE ESTIMATED BEAM CAMBER AT RELEASE IS [XX". THIS CAMBER IS DUE TO PRESTRESS AND DEAD LOAD OF THE BEAM ONLY AND IS MEASURED IN THE ERECTED POSITION.

THE INITIAL FORCE IN THE TRANSVERSE POST-TENSIONING TENDONS SHALL BE [XX] LBS EACH.

TOTAL ESTIMATED CHANGE OF LENGTH OF BOTTOM FLANGE AT TRANSFER OF PRESTRESS FORCE IS [X".

PRESTRESSING STRANDS SHALL BE GIVEN AN INITIAL PRESTRESS AS FOLLOWS:
0.6" DIA. - 44,000 lbs. PRESTRESS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

LIFTING DEVICES SHALL BE REMOVED AFTER BEAMS ARE ERECTED. REMOVAL IS INCLUDED IN THE BID ITEM "PREST CONC BOX BEAM, ERECT, [XX] INCH"

POSITION DOWELS SHALL BE HOT-DIP GALVANIZED ACCORDING TO AASHTO M 232. POSITION DOWELS ARE INCLUDED IN PAYMENT FOR PRESTRESSED CONCRETE BEAMS.

ITEMS CAST INTO THE BEAMS TO FACILITATE BRIDGE CONSTRUCTION (FORMING, FINISHING, ETC.) SHALL BE GALVANIZED OR EPOXY COATED.

PRESTRESSING STRAND SHALL BE 0.6" NOMINAL DIAMETER MEETING THE REQUIREMENTS OF AASHTO M203 (ASTM A416), GRADE 270, LOW RELAXATION STRAND.

COAT THE ENTIRE OUTSIDE AND BOTTOM OF THE FASCIA BEAM USING A MATERIAL SELECTED FROM THE SPECIAL PROVISION FOR CONCRETE SURFACE COATINGS. APPLY THE COATING ACCORDING TO THE SPECIAL PROVISION.

STEEL FOR SOLE PLATES AND OTHER BEARING COMPONENTS SHALL MEET THE REQUIREMENTS OF AASHTO M 270 GRADE 36.

BEAM STIRRUPS, SHALL BE GRADE [XX] (ksi).

FIELD DRILLING SHALL BE ALLOWED FOR SIGN SUPPORT ANCHORS ONLY. LOCATION OF ANCHORS SHALL BE AS DETAILED ON TRAFFIC & SAFETY SIGN SUPPORT SPECIAL DETAILS. ANY DAMAGE TO THE BEAMS SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE AND APPROVED BY THE ENGINEER.

ALL LONGITUDINAL "EA" BARS IN THE TOP AND BOTTOM FLANGES SHALL BE GRADE 60 KSI.

ADHESIVE ANCHORS SHALL USE A NON-SHRINK GROUT (WHICH IS CEMENTIOUS) LISTED IN MDOT'S QUALIFIED PRODUCTS LIST.

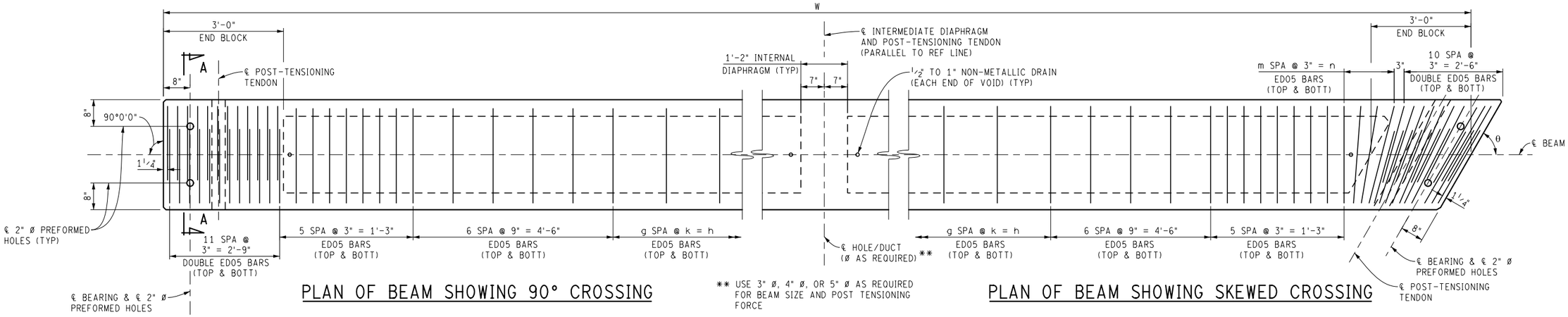
ITEMS CAST INTO STRUCTURAL PRECAST CONCRETE TO FACILITATE BRIDGE CONSTRUCTION (FORMING, FINISHING, ETC.) SHALL BE GALVANIZED OR EPOXY COATED.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	PRESTRESSED BEAM DETAILS
	DESIGN UNIT:	JN:	SIDE BY SIDE BOX BEAM
FILE: prest_SBS_001.dgn	TSC:		

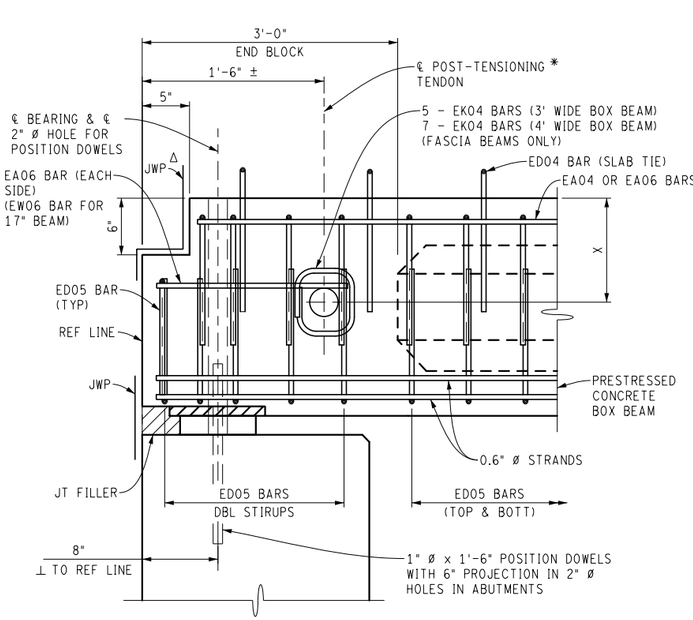
DRAWING	SHEET
SSBB 001	SECT



PLAN OF BEAM SHOWING 90° CROSSING

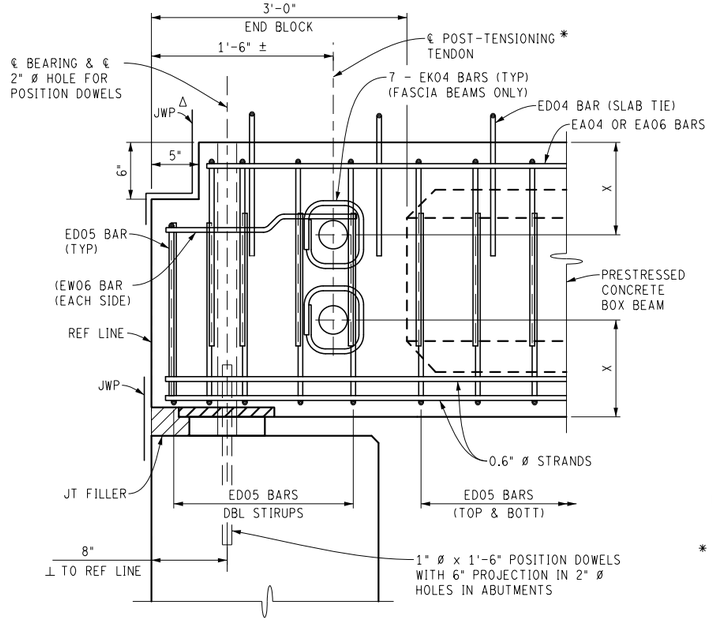
PLAN OF BEAM SHOWING SKEWED CROSSING

** USE 3" Ø, 4" Ø, OR 5" Ø AS REQUIRED FOR BEAM SIZE AND POST TENSIONING FORCE



SECTION THRU END BLOCK

FOR 17", 21" & 27" BOX BEAMS



SECTION THRU END BLOCK

FOR 33" & 39" BOX BEAMS

Δ AT FIXED ABUTMENT ONLY

FOR "X", SEE DIMENSION TABLE DWG SSBB 005

* SEE POST TENSIONING TENDON LOCATIONS TABLE ON DWG SSBB 001

BEAM DIMENSIONS

	BEAM SIZE									
	17 x 36				21 x 48		27 x 48		33 x 48	39 x 48
	20' BEAM SPAN	30' BEAM SPAN	40' BEAM SPAN	50' BEAM SPAN	60' BEAM SPAN	70' BEAM SPAN	80' BEAM SPAN	90' BEAM SPAN	100' BEAM SPAN	110' BEAM SPAN
g	5	14	24	34	44	54	64	74	84	94
k	10" (-)	1'-0" (+)	1'-0" (+)	1'-0" (+)	1'-0" (+)	1'-0" (+)	1'-0" (+)	1'-0" (+)	1'-0" (+)	1'-0" (+)
h	4'-1 1/2"	14'-1 1/2"	24'-1 1/2"	34'-1 1/2"	44'-1 1/2"	54'-1 1/2"	64'-1 1/2"	74'-1 1/2"	84'-1 1/2"	94'-1 1/2"
m	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
n	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
s	20	30	40	50	60	70	80	90	100	110
u	19'-8"	29'-8"	39'-8"	49'-8"	59'-8"	69'-8"	79'-8"	89'-8"	99'-8"	109'-8"
W	21'-4"	31'-4"	41'-4"	51'-4"	61'-4"	71'-4"	81'-4"	91'-4"	101'-4"	111'-4"

REPLACE VARIABLES IN BEAM DIMENSIONS WITH VALUES FROM THIS TABLE. THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS.

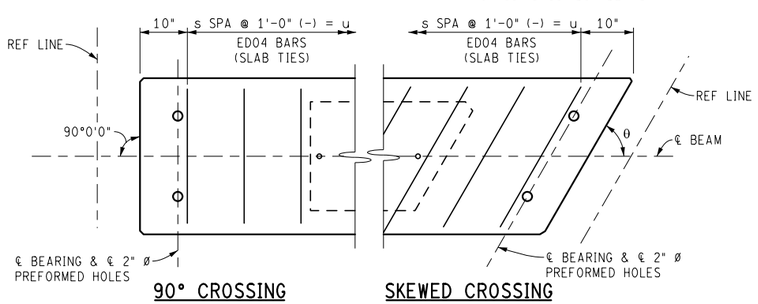
FOR INFORMATION ONLY:

VARIABLES IN BEAM DIMENSIONS TABLE WITH VALUES NOTED "TBD" SHALL BE DETERMINED BY THE DESIGNER BASED ON BEAM END SKEW.

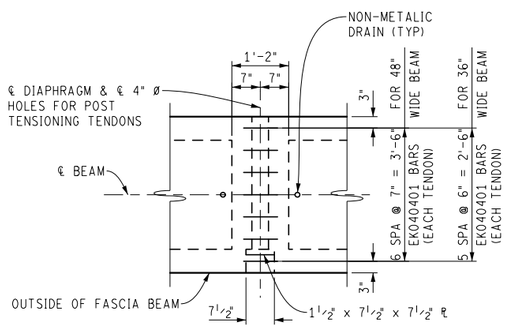
"g" & "h" VALUES SHOWN IN THE BEAM DIMENSIONS TABLE ARE BASED ON 90° CROSSING AND SHALL BE ADJUSTED FOR SKEWED CROSSING.

THE ENDS OF THE BOX BEAMS SHALL BE SKEWED TO BE PARALLEL TO THE REFERENCE LINE.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

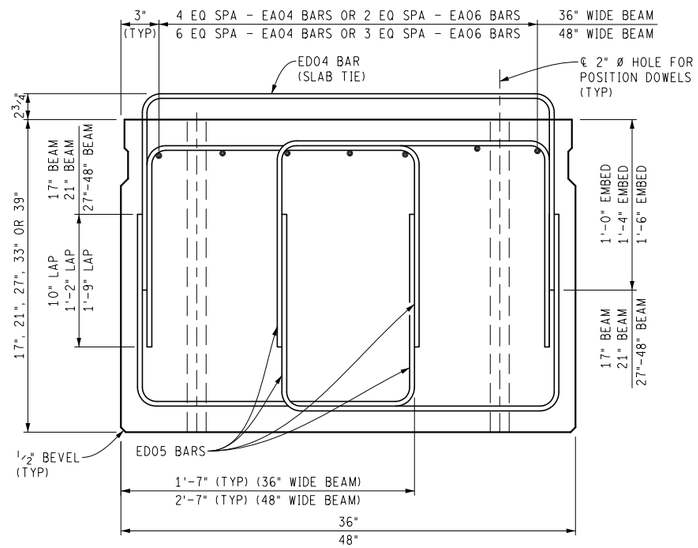


PLAN OF SLAB TIES



FASCIA BEAM DIAPHRAGM DETAIL

END BLOCK DETAIL SIMILAR

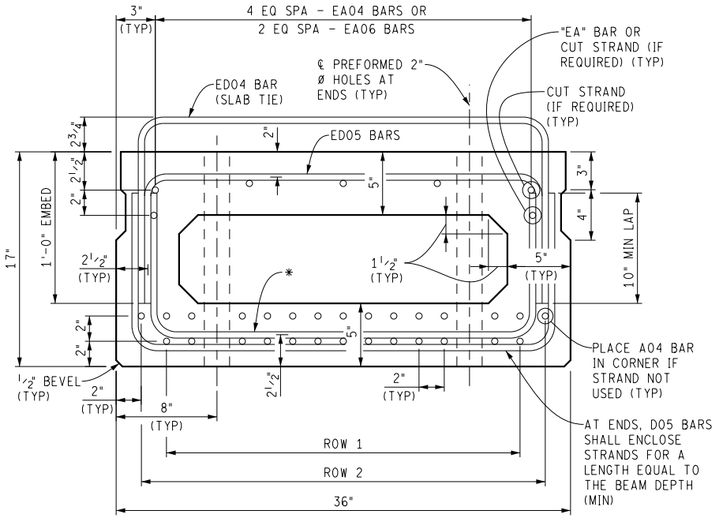


SECTION A-A

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

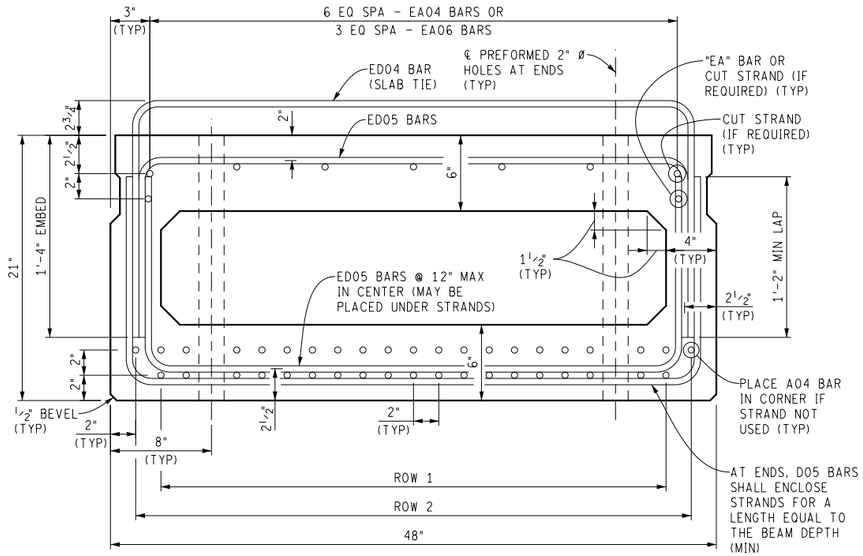
NO SCALE

	DATE: 05/09/18	CS:	PRESTRESSED BEAM DETAILS	DRAWING	SHEET
	DESIGN UNIT:	JN:	SIDE BY SIDE BOX BEAM	SSBB	SECT
FILE: prest_SBS_002.dgn	TSC:			002	

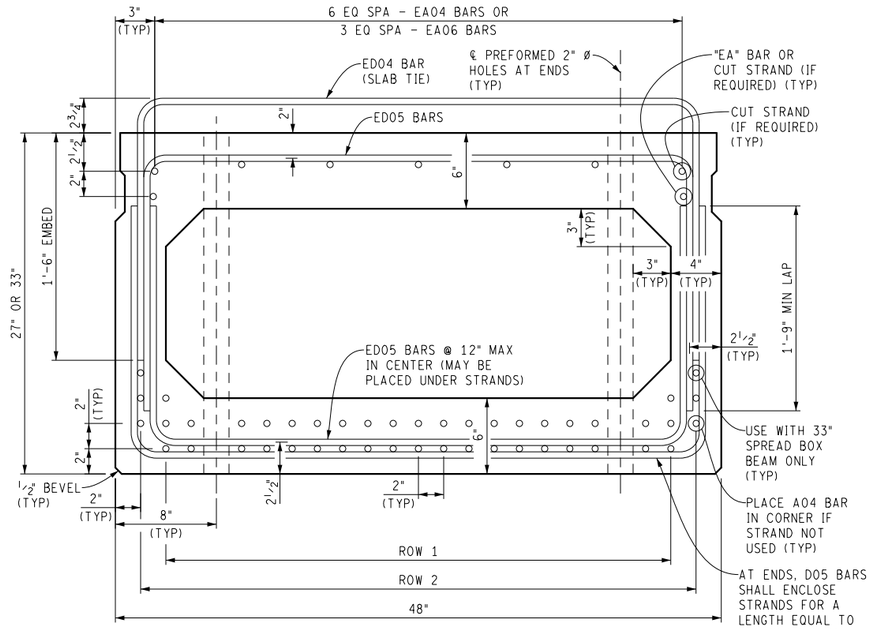


17" X 36" BEAM (INTERIOR)

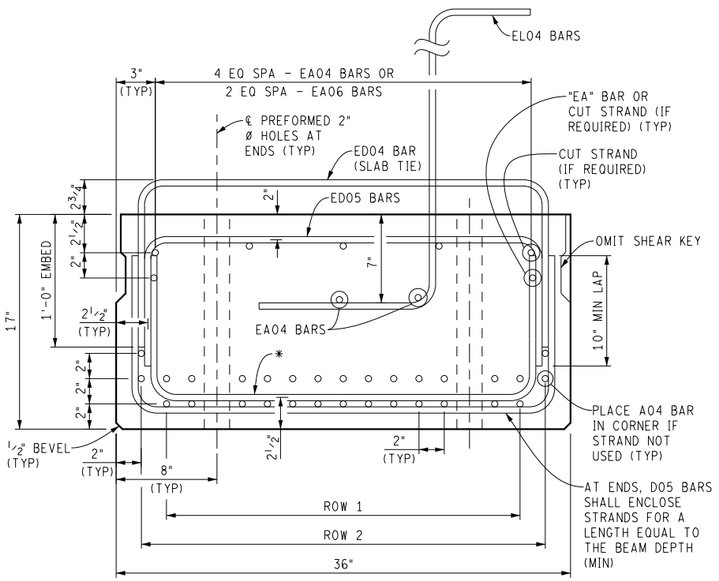
* EDO5 BARS @ 12" MAX IN CENTER (MAY BE PLACED UNDER STRANDS)



21" X 48" BEAM (INTERIOR)

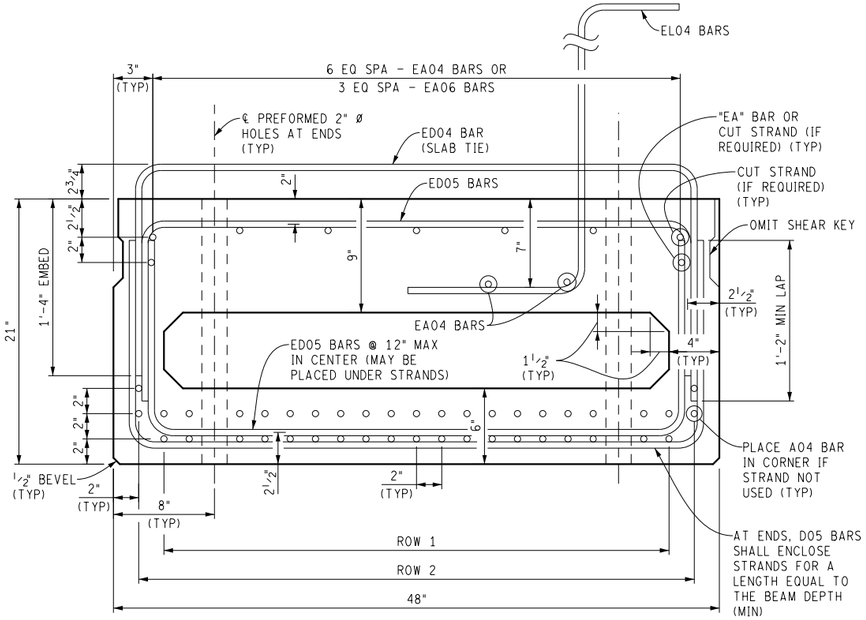


27" X 48" OR 33" X 48" BEAM (INTERIOR)

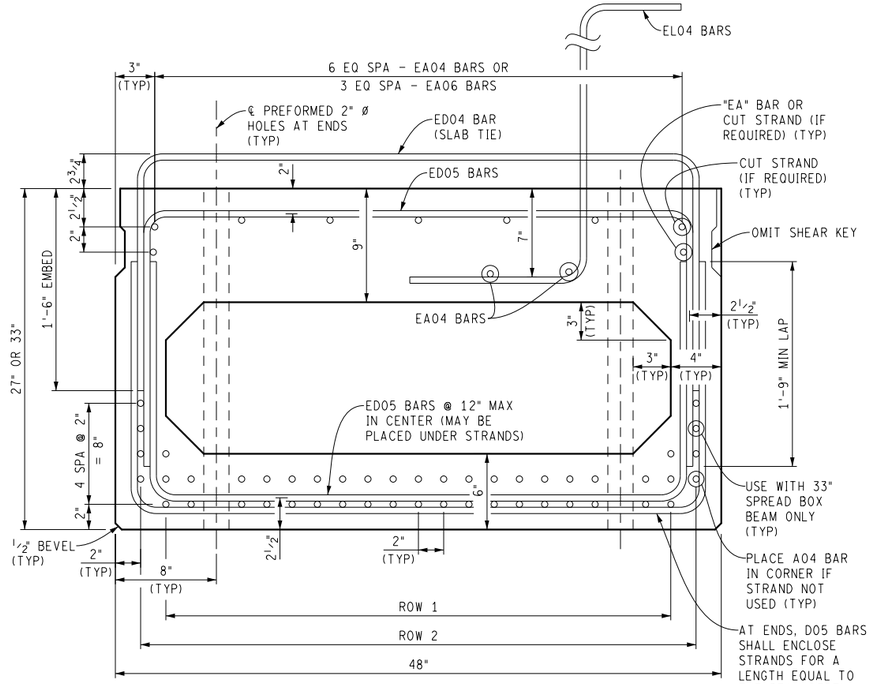


17" X 36" BEAM (FASCIA)

* EDO5 BARS @ 12" MAX IN CENTER (MAY BE PLACED UNDER STRANDS)



21" X 48" BEAM (FASCIA)



27" X 48" OR 33" X 48" BEAM (FASCIA)

NOTES:

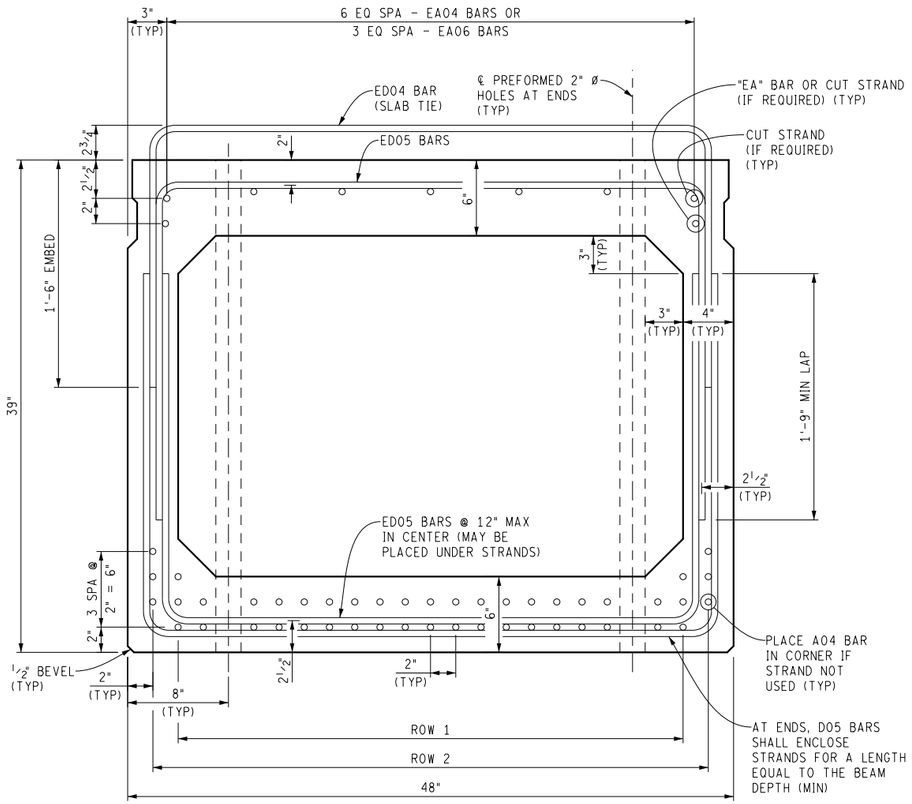
SEE DEBONDING TABLE ON DWG "SSBB 005" FOR STRAND INFORMATION.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

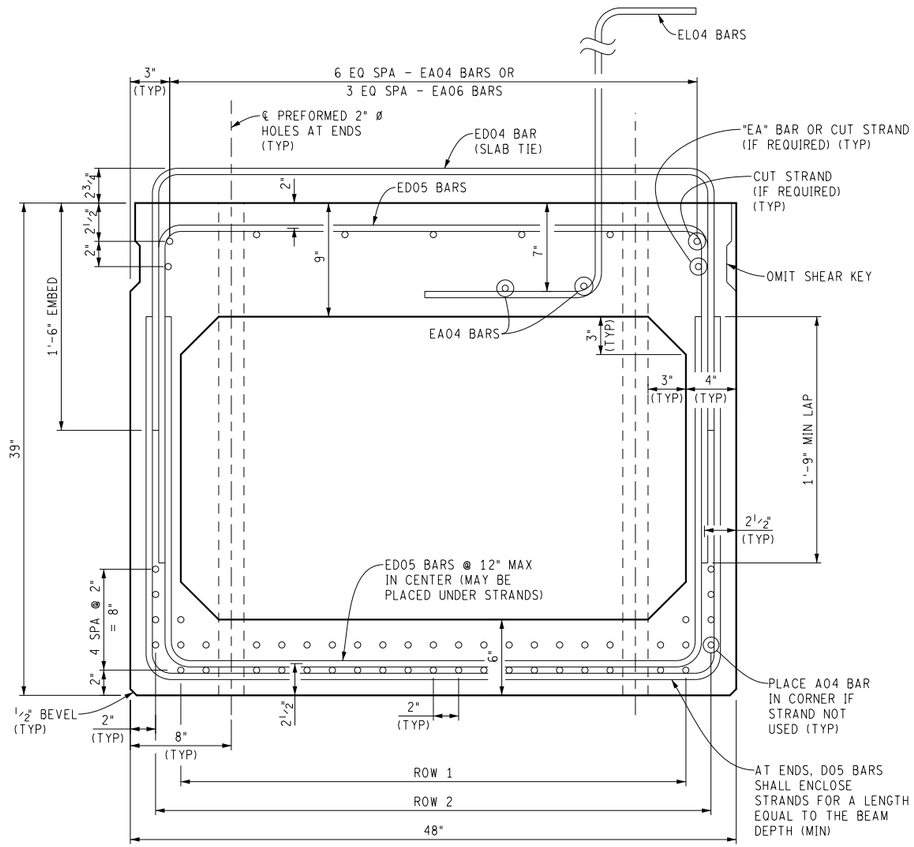
NO SCALE

	DATE: 05/09/18	CS:	PRESTRESSED BEAM DETAILS
	DESIGN UNIT:	JN:	SIDE BY SIDE BOX BEAM
FILE: prest_SBS_003.dgn	TSC:		

DRAWING	SHEET
SSBB	SECT
003	



39" X 48" BEAM (INTERIOR)



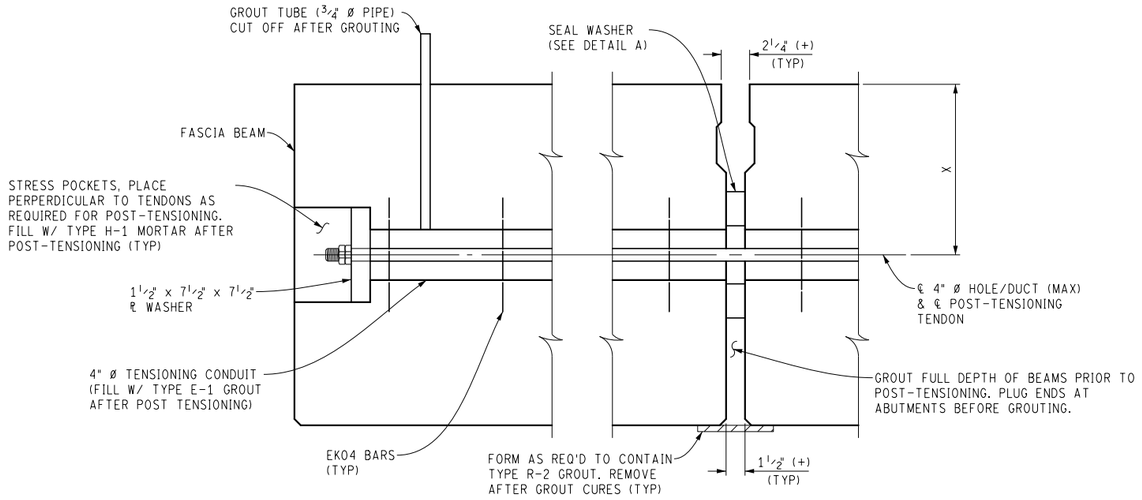
39" X 48" BEAM (FASCIA)

NOTES:

SEE DEBONDING TABLE ON DWG "SSBB 005" FOR STRAND INFORMATION.

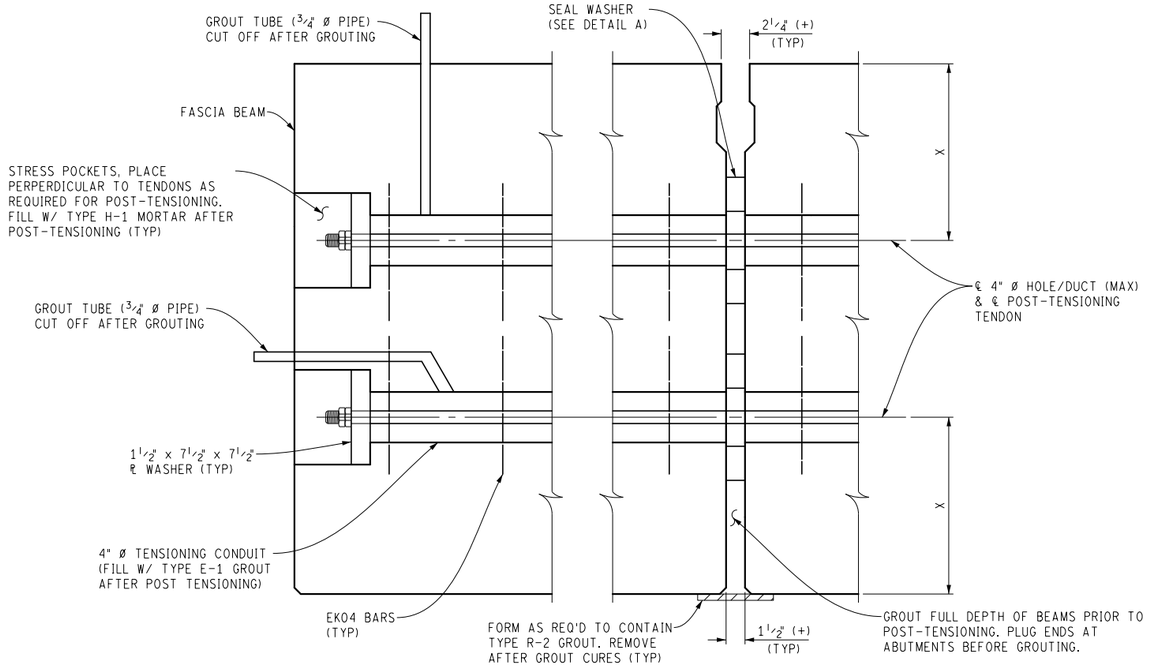
FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)												
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION		**NO SCALE**		DATE: 05/09/18	CS:
											DESIGN UNIT:	JN:
										FILE: prest_SBS_004.dgn	TSC:	

PRESTRESSED BEAM DETAILS	DRAWING	SHEET
SIDE BY SIDE BOX BEAM	SSBB	SECT
	004	



POST-TENSIONING DETAIL

NOTE: STRESS POCKETS, ANCHOR PLATES AND TENDON COUPLERS SHALL BE AS REQUIRED FOR THE POST-TENSIONING SYSTEM PROVIDED. (USE FOR 17", 21" & 27" DEEP BEAMS)



POST-TENSIONING DETAIL

NOTE: STRESS POCKETS, ANCHOR PLATES AND TENDON COUPLERS SHALL BE AS REQUIRED FOR THE POST-TENSIONING SYSTEM PROVIDED. (USE FOR 33" & 39" DEEP BEAMS)

STRAND/DEBONDING LAYOUT TABLE

BEAM SPAN (℄ BRG-℄ BRG) (FT)	BEAM DIMENSIONS		NO. OF STRANDS					
	D (in)	W (in)	1ST LAYER, 2" FROM BOTTOM	2ND LAYER, 4" FROM BOTTOM	3RD LAYER, 6" FROM BOTTOM	TOTAL NO. OF STRANDS	NO. OF DEBONDING STRANDS	NO. OF DEBONDING STRANDS-(1st LAYER) DEBONDING LENGTHS (ft)
20	17	36	7	–	–	7	–	–
30	17	36	7	–	–	7	–	–
40	17	36	9	–	–	9	–	–
50	17	36	13	3	–	16	2	(2)2
60	21	48	20	–	–	20	2	(2)2
70	21	48	19	11	–	30	6	(2)2, (4)4
80	27	48	19	9	–	28	2	(2)2
90	27	48	19	17	–	36	6	(2)2, (2)4, (2)10
100	33	48	19	15	–	34	4	(2)2, (2)4
110	39	48	19	15	–	34	2	(2)4

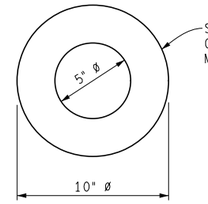
THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS

STRAND DEBONDING LENGTH IS MEASURED FROM EACH BEAM END

DIMENSION TABLE

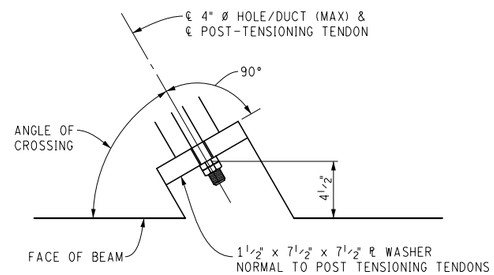
BEAM DEPTH (in)	"X"
17	8 1/2"
21	10 1/2"
27	1'-1 1/2"
33	11"
39	1'-1"

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS

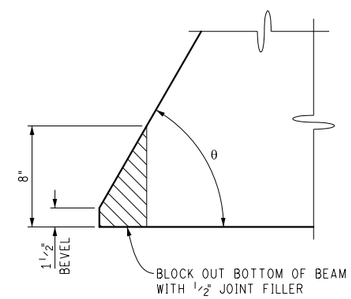


DETAIL A

2 1/2" THICK SEAL WASHER



TOP VIEW STRESS POCKET



CORNER BLOCKING DETAIL

USE WHEN θ < 70°

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	PRESTRESSED BEAM DETAILS	DRAWING / SHEET
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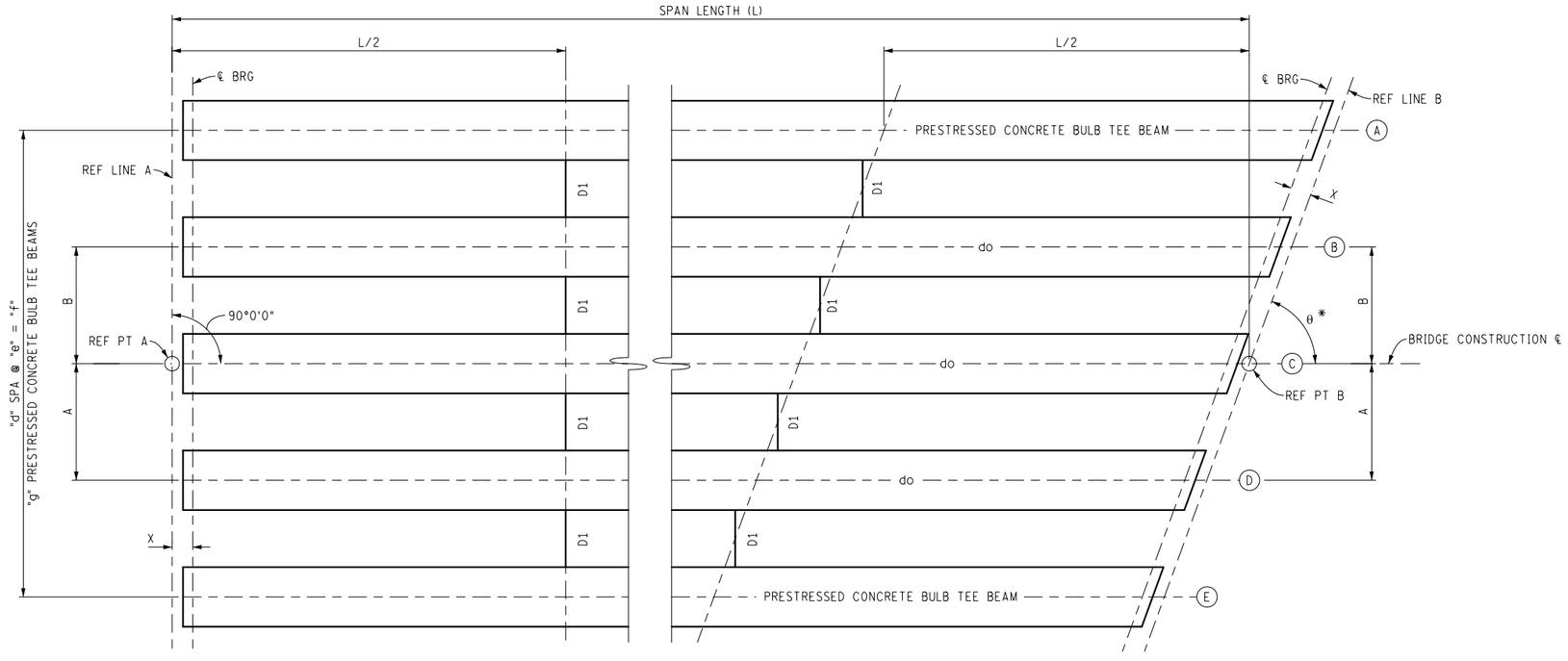
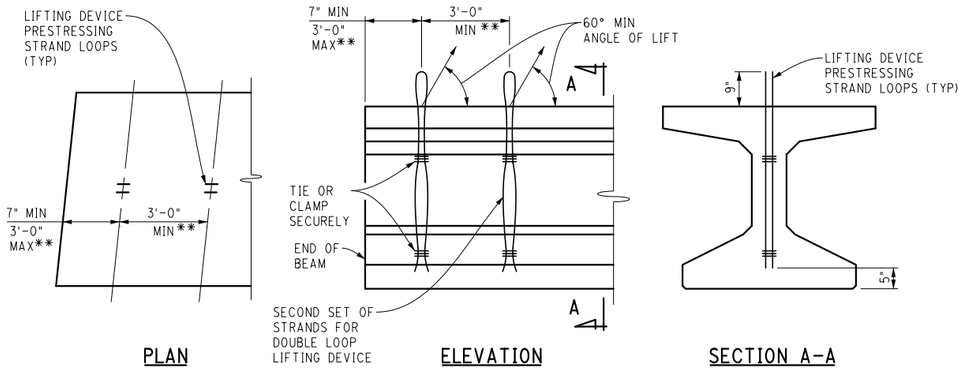
FILE: prest_SBS_005.dgn	TSC:			005



ERECTION DIAGRAM

* FOR ANGLE OF CROSSING ≥ 80°, DIAPHRAGMS SHALL BE INLINE. FOR ANGLE OF CROSSING < 80°, DIAPHRAGMS SHALL BE STAGGERED.



DETAILS OF LIFTING DEVICE

LIFTING OF BEAM SHALL BE BY EQUAL LOADS TO EACH PAIR OF LIFTING DEVICES.

LIFTING DEVICES SHALL BE REMOVED.

** INCREASE AS REQUIRED TO MAKE BEAM LATERALLY STABLE DURING HANDLING.

FOR INFORMATION ONLY:

THE DESIGN OF THESE STRUCTURES IS BASED ON 1.2 TIMES THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATION HL-93 LOADING WITH THE EXCEPTION THAT THE DESIGN TANDEM PORTION OF THE HL-93 LOAD DEFINITION SHALL BE REPLACED BY A SINGLE 60 KIP AXLE LOAD BEFORE APPLICATION OF THIS 1.2 FACTOR. THE RESULTING LOAD IS DESIGNATED HL-93 MOD. LIVE LOAD PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH.

A 4" HAUNCH SECTION WAS USED FOR THE LOADING ON ALL BEAMS. THE HAUNCH SECTION WAS NOT INCLUDED IN THE COMPOSITE SECTION PROPERTIES FOR THE DESIGN OF THE BEAMS.

A 9" DECK SECTION WAS USED FOR THE LOADING ON ALL BEAMS. THE EFFECTIVE DECK SECTION IS 7 1/2" AND THE SACRIFICIAL DECK SECTION IS 1 1/2".

THE LONGITUDINAL "EA" BARS IN THE TOP AND BOTTOM FLANGES OF THE BEAMS ARE NOT INCLUDED TO PROVIDE ADDITIONAL CAPACITY.

BEAM DESIGNS DO NOT INCLUDE PRESTRESSING STRANDS IN THE TOP FLANGES.

"A" & "B" ARE MEASURED FROM BRIDGE CONST ℄ TO ADJACENT BEAM ℄.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

☐ VALUES TO BE DETERMINED BY DESIGNER

SERVICE BEAM REACTIONS (KIPS)			
BEAM SPAN (℄ BRG-℄ BRG) (FT)	DC	DW	LL+I
70	86	9	126
80	98	10	132
90	115	11	137
100	130	13	142
110	140	14	147

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS

DC DENOTES SERVICE DEAD LOADS DUE TO BEAM SELF WEIGHT, DECK WEIGHT, & DIAPHRAGMS

DW DENOTES SERVICE BEAM REACTION DUE TO FUTURE WEARING SURFACE

LL+I DENOTES SERVICE LIVE LOAD PLUS IMPACT REACTION PER LANE

PRESTRESSING STRAND LIFTING DEVICES						
BEAM DEPTH (INCHES)	NUMBER OF STRANDS AND SIZE					
	3 - 1/2"	3 - 0.6"	4 - 1/2"	4 - 0.6"	6 - 1/2" Δ	6 - 0.6" Δ
	BEAM WEIGHT (TONS)					
36	32	39	41	49	64	78
42	39	47	49	60	78	94
48	45	54	57	68	90	108

Δ DOUBLE LOOPS WITH 3 STRANDS EACH

THIS TABLE SHOULD INCLUDE ONLY APPLICABLE INFORMATION ON THE FINAL DESIGN DRAWINGS

NOTES:

CONCRETE INSERTS FOR INTERMEDIATE DIAPHRAGMS SHALL BE 7/8" DIAMETER: DAYTON SUPERIOR, TYPE B-1 HEAVY OR TYPE B-18: WILLIAMS FORM, TYPE C 12 OR TYPE C -19: MEADOW BURKE, TYPE CT-2 OR TYPE CX-4: OR EQUAL. INSERTS (COIL OR FERRULE) MUST BE ELECTROPLATE GALVANIZED IN ACCORDANCE WITH ASTM B633, SERVICE CONDITION 4. INSERTS SHALL BE CAST WITH THE BEAMS. FIELD INSTALLATION OF INSERTS IS NOT ALLOWED.

CONCRETE INSERTS FOR BACKWALLS SHALL BE 1" DIAMETER (AT EXPANSION ABUTMENT) & 1/2" DIAMETER (AT FIXED ABUTMENT): DAYTON SUPERIOR, TYPE B-1 HEAVY OR TYPE B-18: WILLIAMS FORM, TYPE C 12 OR TYPE C -19: MEADOW BURKE, TYPE CT-2 OR TYPE CX-4: OR EQUAL. INSERTS (COIL OR FERRULE) MUST BE ELECTROPLATE GALVANIZED IN ACCORDANCE WITH ASTM B633, SERVICE CONDITION 4. INSERTS SHALL BE CAST WITH THE BEAMS. FIELD INSTALLATION OF INSERTS IS NOT ALLOWED.

ALL STEEL FOR DIAPHRAGMS SHALL BE COATED ACCORDING TO SUBSECTION 716 OF THE STANDARD SPECIFICATIONS AND SHALL BE HOT-DIPPED GALVANIZED.

THE ESTIMATED BEAM CAMBER AT RELEASE IS [XX". THIS CAMBER IS DUE TO PRESTRESS AND DEAD LOAD OF THE BEAM ONLY AND IS MEASURED IN THE ERECTED POSITION.

THE ESTIMATED CHANGE OF LENGTH OF BOTTOM FLANGE AT TRANSFER OF PRESTRESS FORCE IS [XX".

PRESTRESSING STRANDS SHALL BE GIVEN AN INITIAL PRESTRESS AS FOLLOWS:
0.6" DIA. - 44,000 lbs. PRESTRESS.

TOTAL ESTIMATED CHANGE OF LENGTH OF BOTTOM FLANGE AT TRANSFER OF PRESTRESS FORCE IS [X".

LIFTING DEVICES SHALL BE REMOVED AFTER BEAMS ARE ERECTED. REMOVAL IS INCLUDED IN THE BID ITEM "PREST CONC BULB-TEE BEAM, ERECT, [XX] INCH BY [XX] INCH".

USE NON-DEFORMED STEEL RODS IN ACCORDANCE WITH AASHTO M 270 GRADE 36 AND HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M 111, AS POSITION DOWELS FOR PRECAST BEAMS.

THE COMPRESSIVE STRENGTH OF THE CONCRETE AT THE TIME OF PRESTRESSING FORCE RELEASE SHALL NOT BE LESS THAN 7000 psi.

THE COMPRESSIVE STRENGTH OF THE CONCRETE SHALL BE NOT LESS THAN 8000 psi AT 28 DAYS.

ITEMS CAST INTO THE BEAMS TO FACILITATE BRIDGE CONSTRUCTION (FORMING, FINISHING, ETC.) SHALL BE GALVANIZED OR EPOXY COATED.

PRESTRESSING STRAND SHALL BE 0.6" NOMINAL DIAMETER MEETING THE REQUIREMENTS OF AASHTO M203 (ASTM A416), GRADE 270, LOW RELAXATION STRAND.

BEAM STEEL REINFORCEMENT, INCLUDING STIRRUPS, SHALL BE GRADE 60 (KSI).

ANY HOLES CAST OR FORMED IN THE BEAM SHALL BE FILLED WITH NON-SHRINKING GROUT.

THE OUTER 6" OF THE TOP SURFACE OF THE BEAM SHALL BE FABRICATED TO A SMOOTH TROWEL FINISH, AND THEN COATED WITH A BOND BREAKER AS SPECIFIED IN SECTION 708 OF THE STANDARD SPECIFICATIONS.

COAT ALL BEAMS EXCEPT BEAM TOPS USING A MATERIAL SELECTED FROM THE SPECIAL PROVISION FOR CONCRETE SURFACE COATINGS. APPLY THE COATING ACCORDING TO THE SPECIAL PROVISION. SEE AESTHETIC DETAILS FOR ADDITIONAL DETAILS.

STEEL FOR DIAPHRAGMS, SOLE PLATES, AND OTHER BEARING COMPONENTS SHALL MEET THE REQUIREMENTS OF AASHTO M270 GRADE 36.

COST OF PIPE SLEEVES IS INCLUDED IN THE BID ITEM "PREST CONC BULB-TEE BEAM, FURN, [XX] INCH BY [XX] INCH".

ITEMS CAST INTO STRUCTURAL PRECAST CONCRETE TO FACILITATE BRIDGE CONSTRUCTION (FORMING, FINISHING, ETC.) SHALL BE GALVANIZED OR EPOXY COATED.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	PRESTRESSED BEAM DETAILS	DRAWING	SHEET
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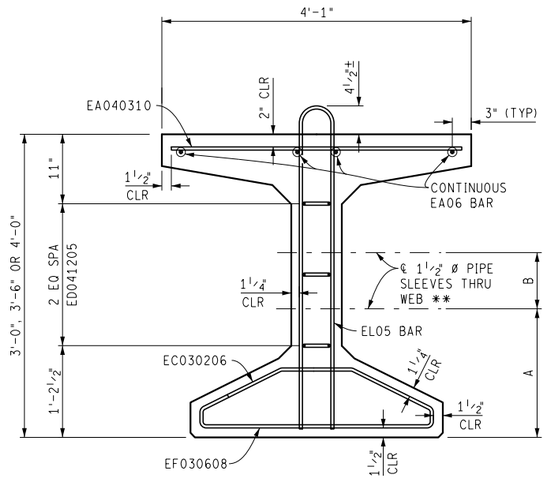
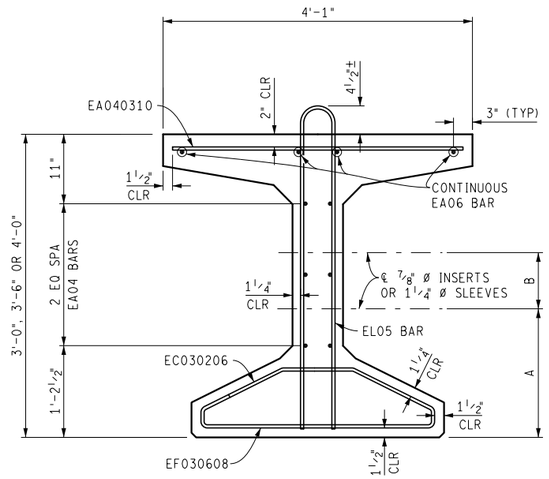


SECTION A-A

SHOWING REINFORCEMENT LAYOUT AT END SECTION

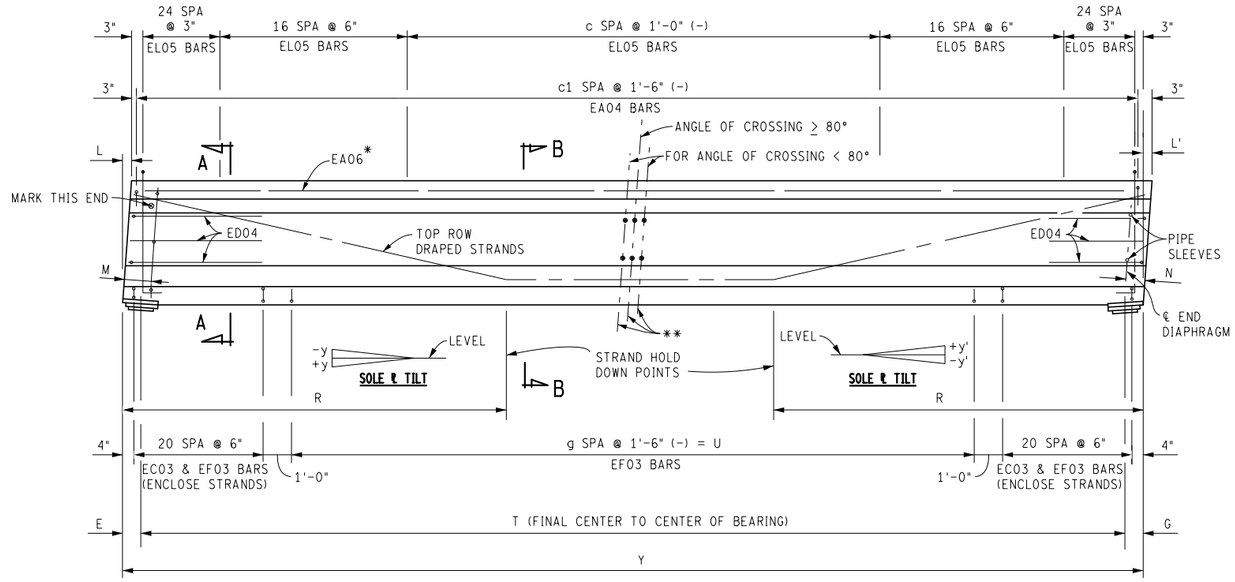
* REMOVE BLOCKOUT IN FORM IF REQUIRED FOR COMPRESSION FORCES OR BEAM STABILITY

** SLOPE PIPE SLEEVES TO MATCH SLOPE OF REINFORCEMENT IN BACKWALL



SECTION B-B

SHOWING REINFORCEMENT LAYOUT AT MIDSPAN

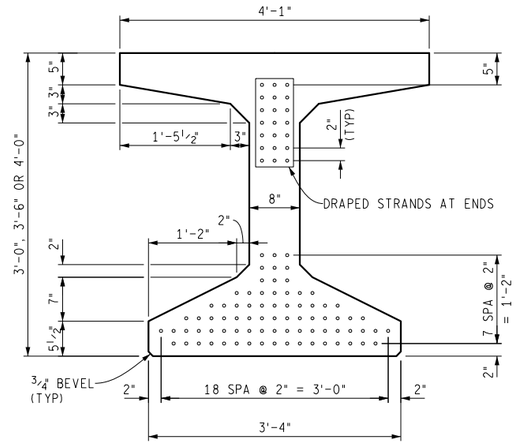


ELEVATION

* BAR LENGTH = Y-3"

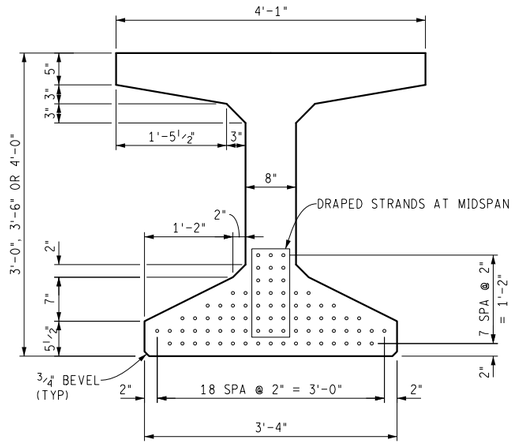
** ℄ INTERMEDIATE DIAPHRAGM & ℄ INSERTS (EXTERIOR BEAM) & ℄ PIPE SLEEVES (INTERIOR BEAM) OMIT FERRULE LOOP INSERTS ON OUTSIDE OF FASCIA BEAMS

SOLE ℄ TILT TABLE		
BEAM LINE	SPAN 1	
	ABUT A	ABUT B
	y	y'
BEAMS A-E		



SECTION A-A

SHOWING STRAND ARRANGEMENT AT END SECTION



SECTION B-B

SHOWING STRAND ARRANGEMENT AT MIDSPAN

BEAM DIMENSIONS					
BEAM SPAN (℄ BRG-℄ BRG)	70'	80'	90'	100'	110'
BEAM DEPTH	36"	36"	42"	48"	48"
c	42	52	62	72	82
c1	47	53	60	67	73
E	7"	7½"	8"	8"	8½"
g	32	39	45	52	59
G	7"	7½"	8"	8"	8½"
L ***	TBD	TBD	TBD	TBD	TBD
L' ***	TBD	TBD	TBD	TBD	TBD
M *	TBD	TBD	TBD	TBD	TBD
N *	TBD	TBD	TBD	TBD	TBD
R	28	32	36	40	44
T	70'-0"	80'-0"	90'-0"	100'-0"	110'-0"
U	47'-4"	57'-4"	67'-4"	77'-4"	87'-4"
Y	71'-2"	81'-3"	91'-4"	101'-4"	111'-5"
APPROX WEIGHT (TONS)	32	36.6	43.4	50.8	55.8

*** FORMING DIMENSION. IF L OR L' IS COMPUTED TO BE BETWEEN -1/2" & +1/2" USE L=0 OR L'=0.

* MEASURED ALONG BEAM ℄.

FOR INFORMATION ONLY:

TILT SOLE PLATE AS REQUIRED WHEN THE CALCULATED BEVEL EXCEEDS 1%.

SOLE PLATE TILT TO BE DETERMINED BY THE DESIGNER TAKING INTO CONSIDERATION BEAM CAMBER AND BRIDGE PROFILE.

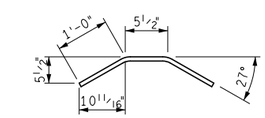
USE HAUNCH REINFORCEMENT WHEN BEAM HAUNCH > 3".

FOR DIMENSIONS "A" & "B", SEE DWG "BTB 003".

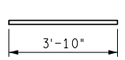
VARIABLES IN BEAM DIMENSIONS TABLE WITH VALUES NOTED "TBD" SHALL BE DETERMINED BY THE DESIGNER BASED ON THE ACTUCAL BEAM LENGTH.

"L" & "L'" IN BEAM DIMENSIONS TABLE ARE DETERMINED BASED ON BEAM PROFILE AND BEAM CAMBER.

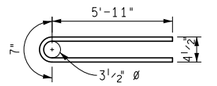
THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.



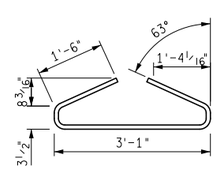
EC030206 BAR



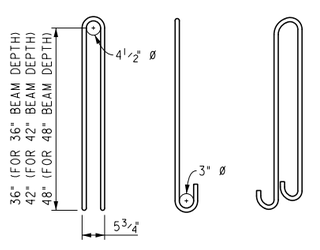
EA040310 BAR



ED041205 BAR



EF030608 BAR



EL05 BAR

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

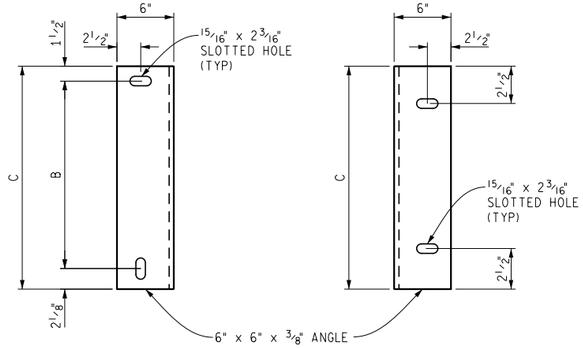
	DATE: 05/09/18	CS:	PRESTRESSED BEAM DETAILS
	DESIGN UNIT:	JN:	BULB-TEE BEAM
FILE: prest_BT_002.dgn	TSC:		

DRAWING	SHEET
BTB	SECT
002	

STRAND/DEBONDING LAYOUT TABLE

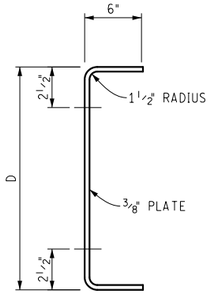
BEAM SPAN (℄ BRG–℄ BRG) (FT)	BEAM DIMENSIONS		NO. OF STRANDS						
	D (in)	W (in)	1ST LAYER, 2" FROM BOTTOM	2ND LAYER, 4" FROM BOTTOM	3RD LAYER, 6" FROM BOTTOM	4TH LAYER, 8" FROM BOTTOM	TOTAL NO. OF STRANDS	NO. OF DRAPED STRANDS	NO. OF DRAPED STRANDS– (HEIGHT AT MIDSPAN) – [HEIGHT AT END] (IN) **
70	36	49	17	11	–	–	28	3	3,(4),[31]
80	36	49	17	19	3	–	39	6	3,(4),[29]: 3,(6),[31]
90	42	49	17	19	3	2	41	8	3,(4),[25]: 3,(6),[35]: 2,(8),[37]
100	48	49	17	19	7	–	43	6	3,(4),[41]: 3,(6),[43]
110	48	49	17	19	15	3	54	12	3,(2),[31]: 3,(4),[39]: 3,(6),[41]: 3,(8),[43]

** MEASURED FROM BOTTOM OF BEAM



ALONG BEAM ALONG DIAPHRAGM

DIAPHRAGM SUPPORT

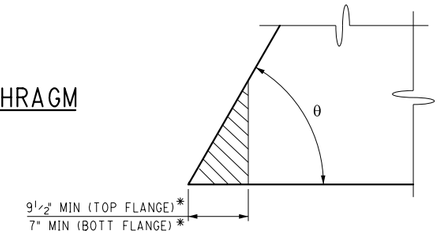


ALTERNATE DIAPHRAGM

DIMENSION TABLE

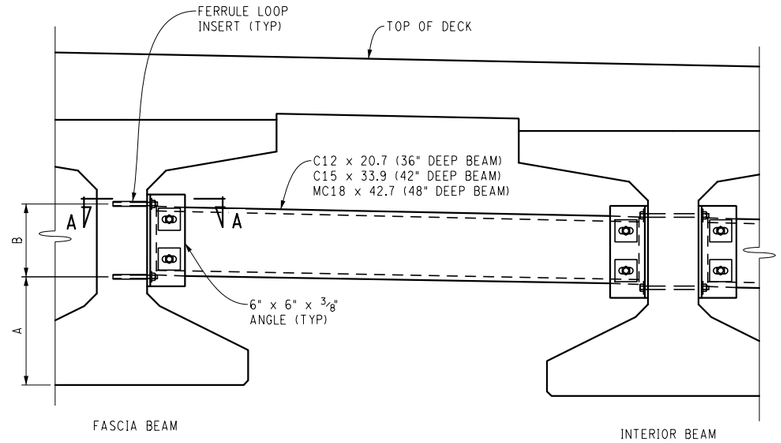
BEAM HEIGHT	A	B	C	D
36"	1'-5 1/16"	5 3/8"	9"	12"
42"	1'-5 1/16"	11 3/8"	1'-3"	15"
48"	1'-5 1/16"	1'-5 3/8"	1'-9"	18"

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS

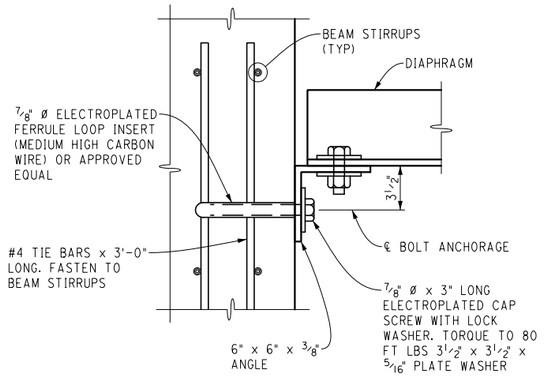


FLANGE CLIP DETAIL

USE WHEN θ < 60°
* CLIP CAN BE INCREASED TO ℄ OF BEAM

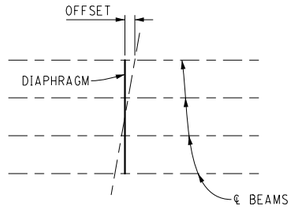


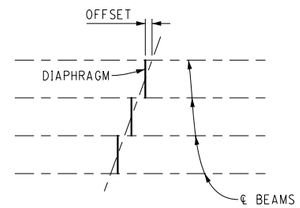
INTERMEDIATE DIAPHRAGM (D1) ELEVATION



SECTION A–A

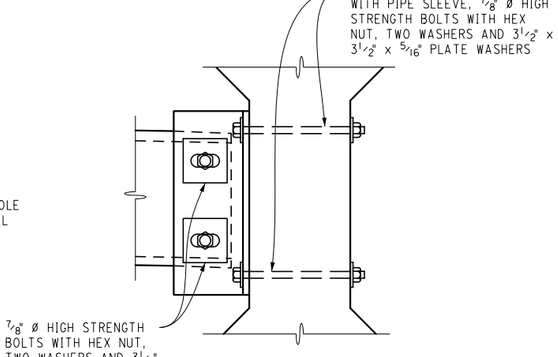
(FASCIA BEAMS)





PLAN FOR SKEW ANGLE ≤ 10°

PLAN FOR SKEW ANGLE > 10°

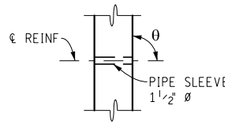


CONNECTION DETAIL

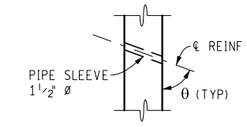
(INTERIOR BEAMS)
(FOR A CONTINUOUS LINE OF DIAPHRAGMS)

CONNECTION DETAIL

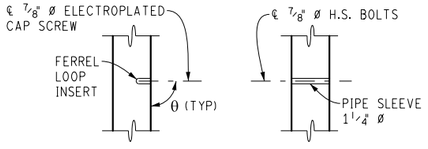
(INTERIOR BEAMS)
(FOR DIAPHRAGMS WITH SKEW ANGLES >10°)



AT ABUTMENT BEAM ENDS



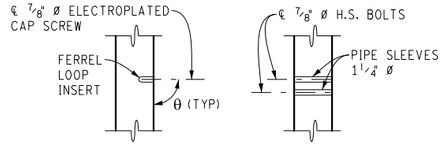
AT ABUTMENT BEAM ENDS



TYP FASCIA BEAM AT DIAPHRAGM — TYP INTERIOR BEAM AT DIAPHRAGM

SKEW ANGLE ≤ 10°

(FOR A CONTINUOUS LINE OF DIAPHRAGMS)



TYP FASCIA BEAM AT DIAPHRAGM — TYP INTERIOR BEAM AT DIAPHRAGM

SKEW ANGLE > 10°

(FOR STAGGERED DIAPHRAGMS)

CONCRETE INSERT DETAILS

CONTINUOUS HOLES IN BEAM WEB SHALL BE AS SHOWN ABOVE.

OMIT INSERTS ON OUTSIDE OF FASCIA BEAMS.

SLOPE INSERTS AND HOLES IN BEAM WEBS TO MATCH SLOPE OF DECK.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)

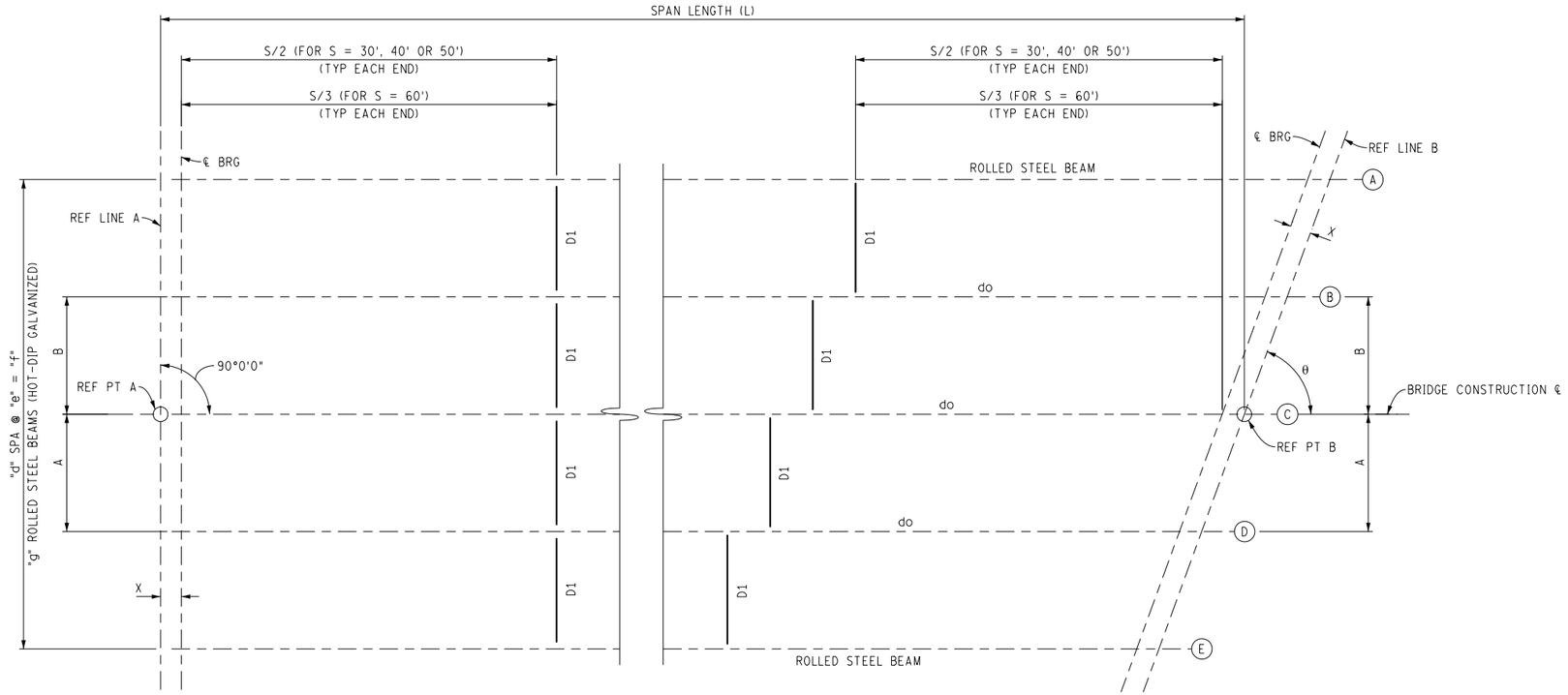
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

DATE: 05/09/18
DESIGN UNIT:
FILE: prest_BT_003.dgn
TSC:
CS:
JN:

PRESTRESSED BEAM DETAILS
BULB-TEE BEAM

DRAWING: BTB 003
SHEET: SECT



ERECTION DIAGRAM

FOR θ = 70° TO 90°

ERECTION DIAGRAM

FOR θ < 70°

SERVICE BEAM REACTIONS (KIPS)			
BEAM SPAN (℄ BRG–℄ BRG) (FT)	DC	DW	LL+I
20	13	2	103
30	19	3	107
40	25	3	111
50	31	4	115
60	37	4	120

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS

DC DENOTES SERVICE DEAD LOADS DUE TO BEAM SELF WEIGHT, DECK WEIGHT, & DIAPHRAGMS

DW DENOTES SERVICE BEAM REACTION DUE TO FUTURE WEARING SURFACE

LL+I DENOTES SERVICE LIVE LOAD PLUS IMPACT REACTION PER LANE

"S" = BEAM SPAN (℄ BRG – ℄ BRG)

FOR INFORMATION ONLY:

THE DESIGN OF THESE STRUCTURES IS BASED ON 1.2 TIMES THE CURRENT AASHTO LRFD BRIDGE DESIGN SPECIFICATION HL-93 LOADING WITH THE EXCEPTION THAT THE DESIGN TANDEM PORTION OF THE HL-93 LOAD DEFINITION SHALL BE REPLACED BY A SINGLE 60 KIP AXLE LOAD BEFORE APPLICATION OF THIS 1.2 FACTOR. THE RESULTING LOAD IS DESIGNATED HL-93 MOD. LIVE LOAD PLUS DYNAMIC LOAD ALLOWANCE DEFLECTION DOES NOT EXCEED 1/800 OF SPAN LENGTH.

PLACE DIAPHRAGMS PARALLEL TO REF LINES.

NO INTERMEDIATE DIAPHRAGMS REQUIRED FOR 20' SPANS.

"A" & "B" ARE MEASURED FROM BRIDGE CONST ℄ TO ADJACENT BEAM ℄.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

NOTES:

FIELD CONNECTIONS SHALL BE BOLTED WITH $^{3}/_{4}$" Ø HIGH STRENGTH BOLTS (EXCEPT AS NOTED).

ALL HOLES SHALL BE $^{13}/_{16}$" Ø FOR $^{3}/_{4}$" Ø H.S. BOLTS.

SHEAR DEVELOPERS SHALL BE $^{3}/_{4}$" DIAMETER STUDS.

THE BEAMS SHALL BE CAMBERED WITH ORDINATES AS SHOWN ON THE CAMBER DIAGRAM. HEATING IS TO BE USED, IF NECESSARY, TO PROVIDE THE CAMBER WITHIN THE TOLERANCE SPECIFIED IN THE AWS SPECIFICATIONS. THE CAMBER SHOWN IS TO BE MEASURED WITH THE BEAM LYING ON IT'S SIDE.

ALL STRUCTURAL STEEL SHALL BE HOT-DIPPED GALVANIZED ACCORDING TO THE STANDARD SPECIFICATIONS.

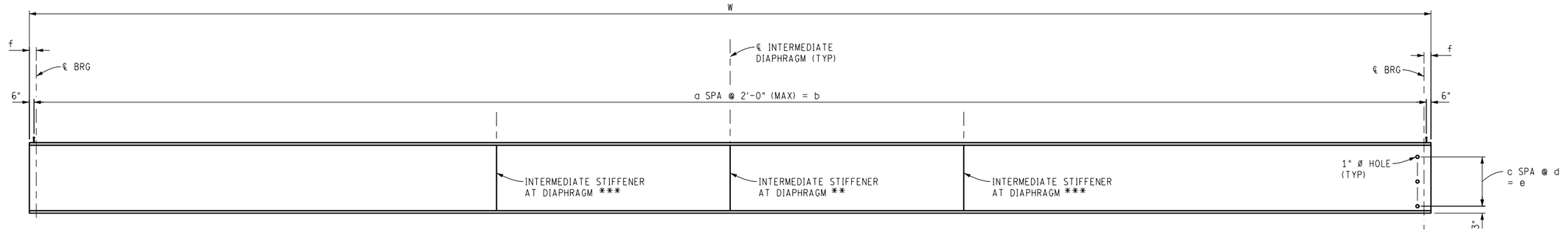
STRUCTURAL STEEL SHALL CONFORM TO AASHTO M270, GRADE 50, OR AASHTO M270, GRADE 50W. AASHTO M270, GRADE 36, STEEL MAY BE USED IN LIEU OF THESE STEELS FOR THE DIAPHRAGMS (EXCEPT CONNECTION PLATES).

FIELD CONNECTIONS SHALL BE BOLTED WITH $^{3}/_{4}$" HIGH-STRENGTH BOLTS (EXCEPT AS NOTED).

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	STRUCTURAL STEEL DETAILS	DRAWING / SHEET
	DESIGN UNIT:	JN:	ROLLED STEEL BEAM	STEEL / SECT
FILE: steel_001.dgn	TSC:			001



BEAM ELEVATION

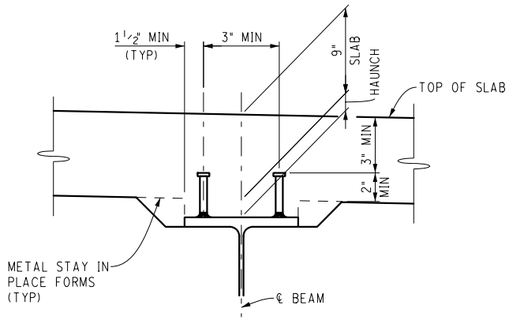
** FOR 30', 40' OR 50' SPANS

*** FOR 60' SPAN

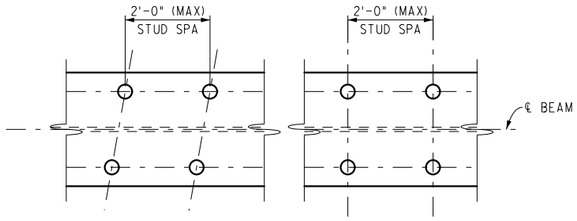
BEAM DIMENSION TABLE

BEAM SPAN (℄ BRG-℄ BRG)	BEAM TYPE	a	b	c	d	e	f	W
20′	W21 x 93	11	20′-2″	2	7 1/2″	1′-3″	7″	21′-2″
30′	W21 x 93	16	30′-2″	2	7 1/2″	1′-3″	7″	31′-2″
40′	W24 x 117	21	40′-3″	2	9″	1′-6″	7 1/2″	41′-3″
50′	W30 x 173	26	50′-5″	2	12″	2′-0″	8 1/2″	51′-5″
60′	W36 x 170	31	60′-5″	3	10″	2′-6″	8 1/2″	61′-5″

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS



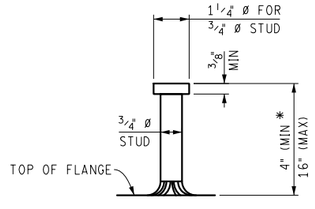
SECTION



PLAN

ROWS OF STUDS SHALL BE SET PARALLEL TO TRANSVERSE REINFORCEMENT.

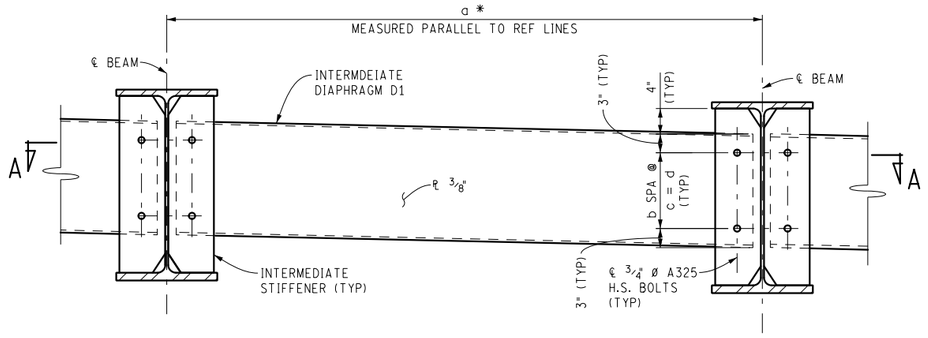
SHEAR STUD DEVELOPER DETAILS



DETAIL OF STUD

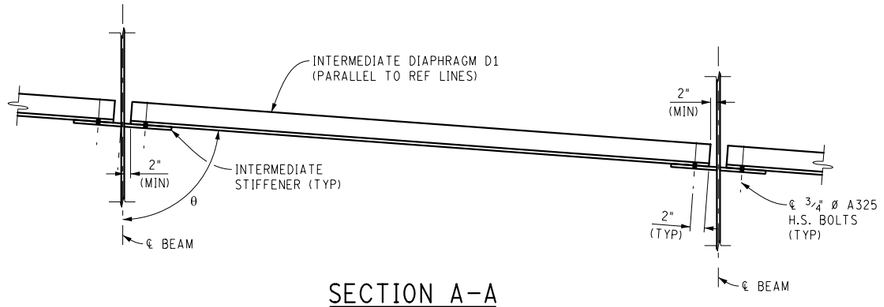
* INCREASE LENGTH OF STUD AS NEEDED TO MAINTAIN 2" MINIMUM PENETRATION OF STUD INTO DECK SLAB. (1" INCREMENTS)

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)													
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION		NO SCALE		DATE: 05/09/18	CS:	STRUCTURAL STEEL DETAILS	DRAWING	SHEET
											DESIGN UNIT:	JN:	ROLLED STEEL BEAM	STEEL	SECT
										FILE: steel_002.dgn	TSC:			002	



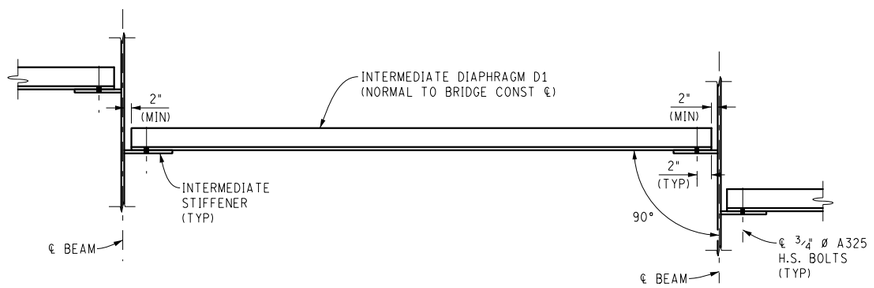
INTERMEDIATE DIAPHRAGM D1 ELEVATION

* "a" SHALL BE DETERMINED BASED ON ACTUAL BRIDGE SKEW



SECTION A-A

FOR ANGLE OF CROSSING 70° TO 90°

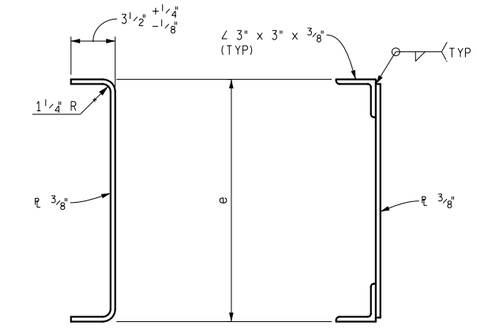


SECTION A-A

FOR ANGLE OF CROSSING < 70°

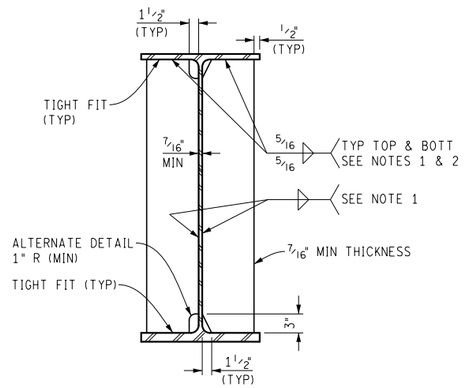
DIAPHRAGM DIMENSION TABLE					
BEAM SPAN (℄ BRG TO ℄ BRG) (FT)	BEAM TYPE	b	c	d	e
20	W21 x 93	-	-	-	-
30	W21 x 93	2	2"	4"	10"
40	W24 x 117	3	2"	6"	12"
50	W30 x 173	4	3"	12"	18"
60	W36 x 170	6	3"	18"	24"

THIS TABLE IS FOR INFORMATION ONLY
AND SHOULD NOT BE INCLUDED ON THE
FINAL DESIGN DRAWINGS



ALTERNATE

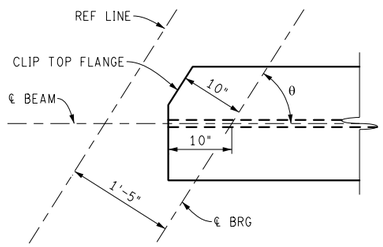
TYPICAL INTERMEDIATE DIAPHRAGM



INTERMEDIATE TRANSVERSE STIFFENER DETAIL @ CROSSFRAME

BOLT HOLES NOT SHOWN FOR CLARITY

NOTE 1: STOP WELD 1/4" SHORT OF CORNER CLIPS
NOTE 2: WRAP WELD AROUND OUTSIDE EDGE



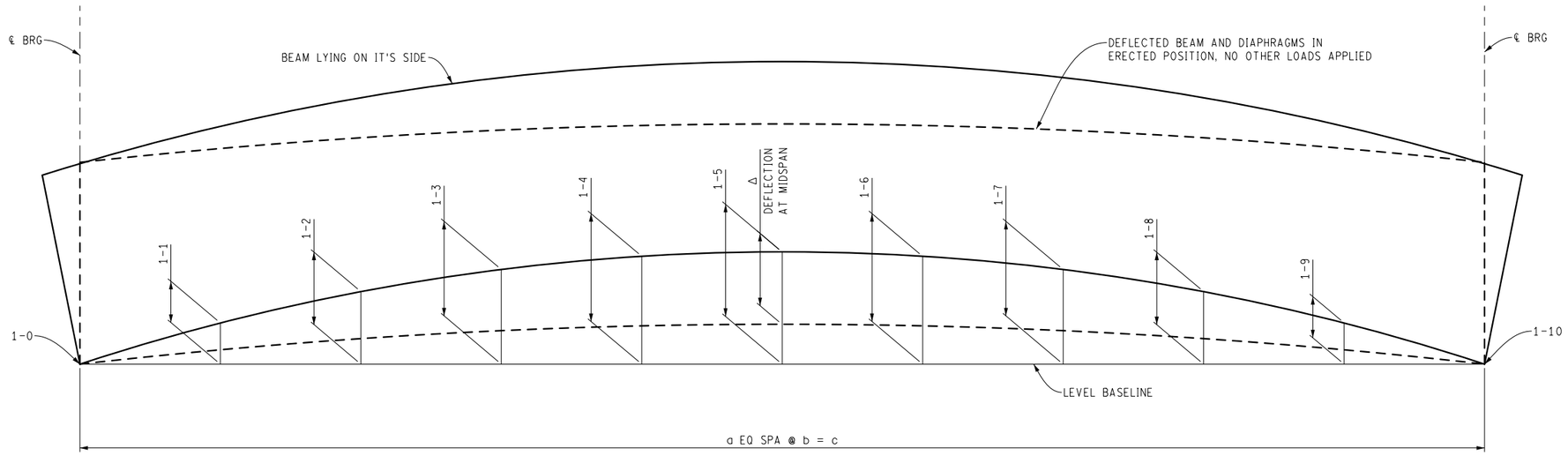
TOP FLANGE CLIP DETAIL

BASED ON ABUTMENT AND BEARING GEOMETRY

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	STRUCTURAL STEEL DETAILS	DRAWING	SHEET
	DESIGN UNIT:	JN:	ROLLED STEEL BEAM	STEEL	SECT
FILE: steel_003.dgn	TSC:			003	



CAMBER DIAGRAM

ORDINATE DIMENSION TABLE

BEAM SPAN (℄ BRG-℄ BRG)	BEAM TYPE	a	b	c
20′	W21 x 93	10	2′	20′
30′	W21 x 93	10	3′	30′
40′	W24 x 117	10	4′	40′
50′	W30 x 173	10	5′	50′
60′	W36 x 170	10	6′	60′

THEORETICAL CAMBER TABLE *

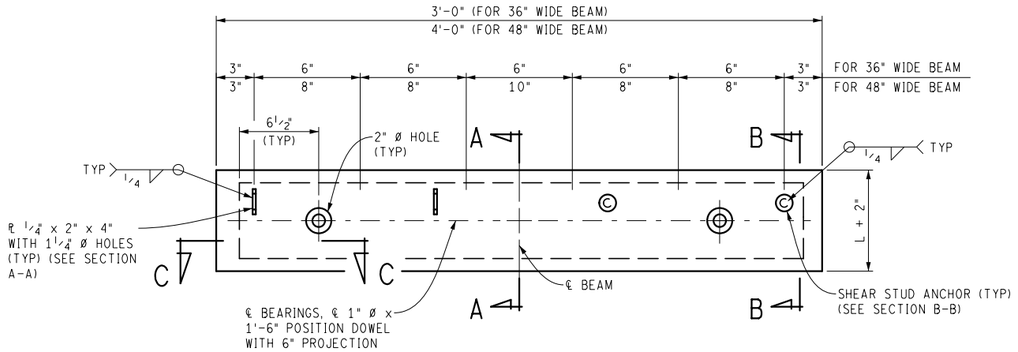
BEAM	BEAM SPAN (℄ BRG-℄ BRG)	CAMBER ORDINATES (in)										
		1-0	1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8	1-9	1-10
W21 x 93	20′	0	0	0	0	0	0	0	0	0	0	0
W21 x 93	30′	0	0.08	0.15	0.20	0.24	0.25	0.24	0.20	0.15	0.08	0
W24 x 117	40′	0	0.15	0.28	0.39	0.46	0.48	0.46	0.39	0.28	0.15	0
W30 x 173	50′	0	0.17	0.33	0.45	0.52	0.55	0.52	0.45	0.33	0.17	0
W36 x 170	60′	0	0.30	0.56	0.76	0.90	0.94	0.90	0.76	0.56	0.30	0

* CAMBER TABLE VALUES ONLY ACCOUNT FOR BEAM DEFLECTION DUE TO BEAM SELF WEIGHT, DECK & HAUNCH WEIGHT, DIAPHRAGMS AND BARRIERS. ADJUSTMENTS TO THE VALUES SHALL BE MADE TO ACCOUNT FOR THE ROADWAY PROFILE.

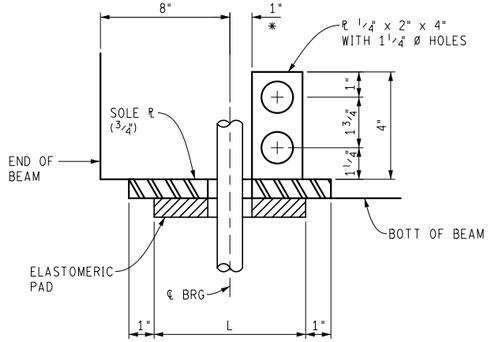
FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	STRUCTURAL STEEL DETAILS	DRAWING / SHEET
	DESIGN UNIT:	JN:	ROLLED STEEL BEAM	STEEL / SECT
FILE: steel_004.dgn	TSC:			004

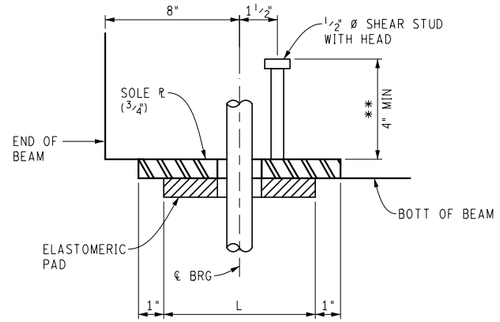


PLAN OF SOLE PLATE



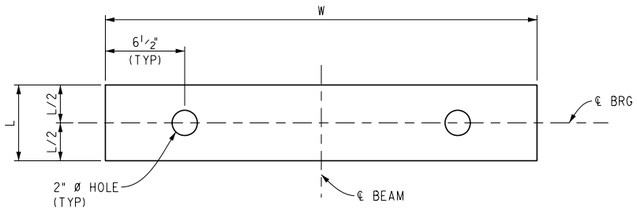
SECTION A-A

* 0" FOR L = 4"

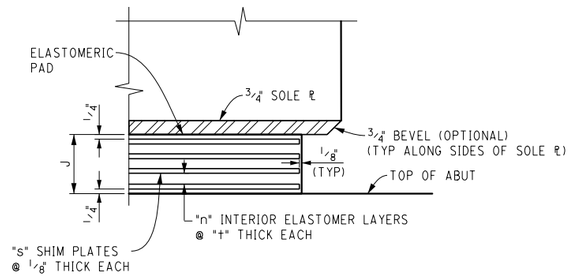


SECTION B-B

** EXTEND SHEAR STUDS ABOVE HIGHEST ROW OF STRANDS WITHOUT INTERFERENCE TO REINFORCEMENT



PLAN OF ELASTOMERIC PAD



SECTION C-C

SPREAD BOX BEAM BEARING DIMENSION TABLE						
BEAM SPAN (℄ BRG-℄ BRG) (FT)	W	L	J	s	n	t
20	2'-9"	4"	1"	0	0	0"
30	2'-9"	4"	1"	0	0	0"
40	2'-9"	6"	1 1/4"	2	1	1/2"
50	3'-9"	7"	1 1/2"	2	1	3/4"
60	3'-9"	7"	1 1/2"	2	1	3/4"
70	3'-9"	7"	1 7/8"	3	2	1/2"
80	3'-9"	7"	2 1/8"	3	2	5/8"
90	3'-9"	8"	2 1/8"	3	2	5/8"
100	3'-9"	9"	2 3/8"	3	2	3/4"
110	3'-9"	9"	2 3/8"	3	2	3/4"

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS

SIDE BY SIDE BOX BEAM BEARING DIMENSION TABLE						
BEAM SPAN (℄ BRG-℄ BRG) (FT)	W	L	J	s	n	t
20	2'-9"	4"	1"	0	0	0"
30	2'-9"	4"	1"	0	0	0"
40	2'-9"	6"	1 1/2"	2	1	3/4"
50	2'-9"	6"	1 1/2"	2	1	3/4"
60	3'-9"	7"	1 1/2"	2	1	3/4"
70	3'-9"	7"	2 1/8"	3	2	5/8"
80	3'-9"	7"	2 1/8"	3	2	5/8"
90	3'-9"	8"	2 1/8"	3	2	5/8"
100	3'-9"	9"	2 3/8"	3	2	3/4"
110	3'-9"	9"	2 3/8"	3	2	3/4"

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS

FOR INFORMATION ONLY:

ELASTOMERIC BEARINGS FOR BEAM SPANS 20' AND 30' ARE PLAIN PADS WITH NO SHIMS PLATES.

TILT SOLE PLATE AS REQUIRED WHEN THE CALCULATED BEVEL EXCEEDS 1%.

SOLE PLATE TILT TO BE DETERMINED BY THE DESIGNER TAKING INTO CONSIDERATION BEAM CAMBER AND BRIDGE PROFILE.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

NOTES:

BLOCK OUT CONCRETE AT ELASTOMERIC BEARINGS.

TILT SOLE PLATE AS REQUIRED WHEN THE CALCULATED BEVEL EXCEEDS 1%.

POSITION DOWELS SHALL BE HOT-DIP GALVANIZED ACCORDING TO AASHTO M 232. POSITION DOWELS ARE INCLUDED IN PAYMENT FOR PRESTRESSED CONCRETE BEAMS.

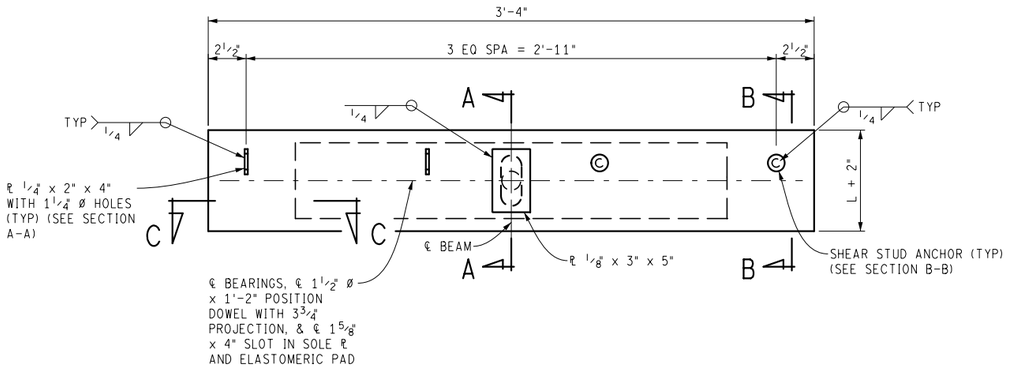
STEEL FOR SOLE PLATES AND OTHER BEARING COMPONENTS SHALL MEET THE REQUIREMENTS OF AASHTO M 270 GRADE 36. SOLE PLATES ARE REQUIRED IN ALL BEAM ENDS.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

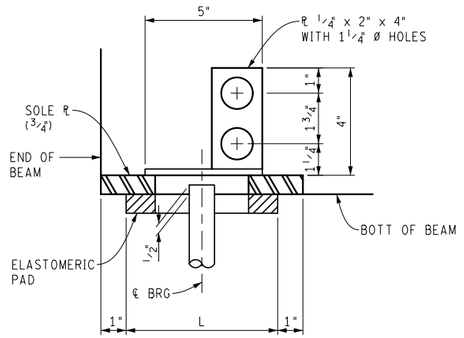
NO SCALE

	DATE: 05/09/18	CS:	PRESTRESSED BOX BEAM BEARING DETAILS
	DESIGN UNIT:	JN:	
FILE: prest_SBB_005.dgn	TSC:		

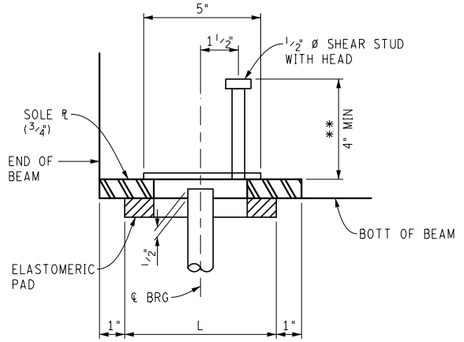
DRAWING	SHEET
BRG	SECT
001	



PLAN OF SOLE PLATE

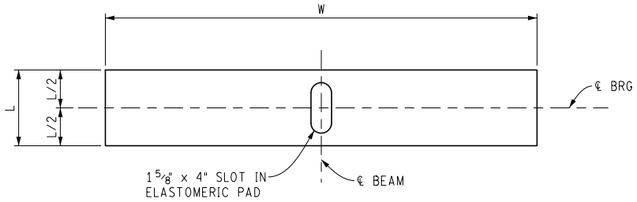


SECTION A-A

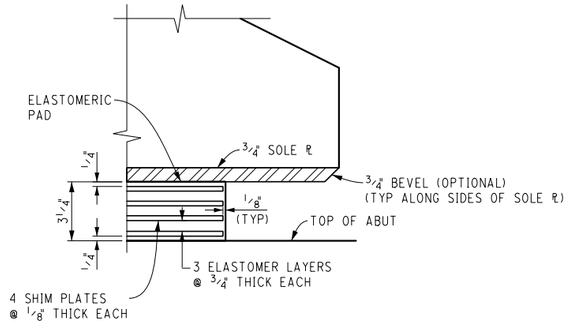


SECTION B-B

** EXTEND SHEAR STUDS ABOVE HIGHEST ROW OF STRANDS WITHOUT INTERFERENCE TO REINFORCEMENT



PLAN OF ELASTOMERIC PAD



SECTION C-C

DIMENSION TABLE		
BEAM SPAN (℄ BRG-℄ BRG) (FT)	W	L
70	2'-0"	1'-0"
80	2'-0"	1'-1"
90	2'-0"	1'-2"
100	2'-1"	1'-2"
110	2'-0"	1'-3"

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS

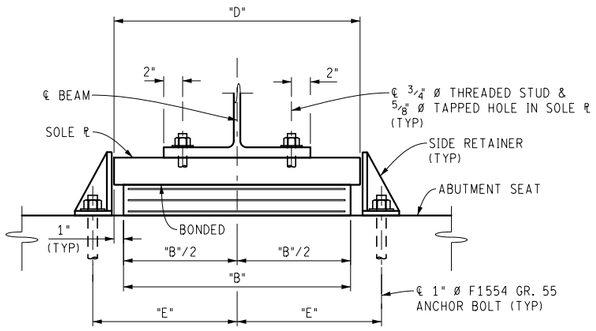
NOTES:

BLOCK OUT CONCRETE AT ELASTOMERIC BEARINGS.

POSITION DOWELS SHALL BE HOT-DIP GALVANIZED ACCORDING TO AASHTO M 232. POSITION DOWELS ARE INCLUDED IN PAYMENT FOR PRESTRESSED CONCRETE BEAMS.

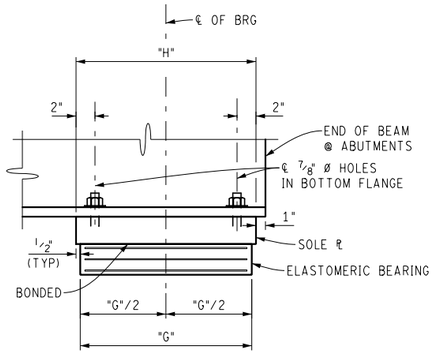
STEEL FOR SOLE PLATES AND OTHER BEARING COMPONENTS SHALL MEET THE REQUIREMENTS OF AASHTO M 270 GRADE 36. SOLE PLATES ARE REQUIRED IN ALL BEAM ENDS.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)													
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION		NO SCALE		DATE: 05/09/18	CS:	PRESTRESSED BULB-TEE BEAM BEARING DETAILS	DRAWING	SHEET
											DESIGN UNIT:	JN:		BRG	SECT
										FILE: prest_BT_004.dgn	TSC:			002	



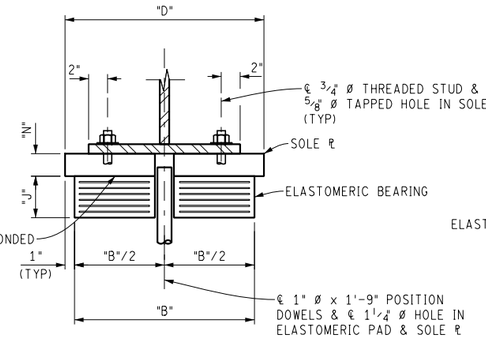
ELASTOMERIC EXPANSION BEARING

END VIEW

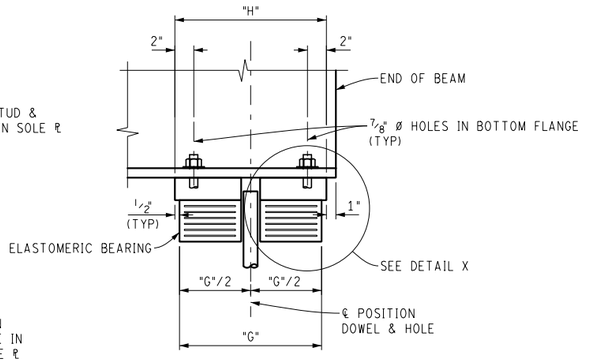


ELASTOMERIC EXPANSION BEARING

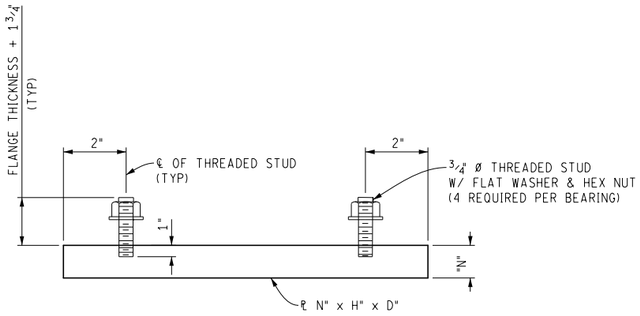
SIDE VIEW



END VIEW



SIDE VIEW

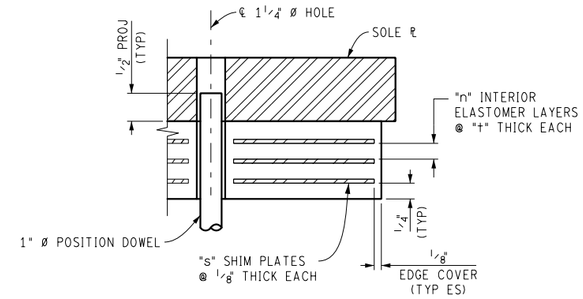


SOLE PLATE DETAILS

SIDE VIEW

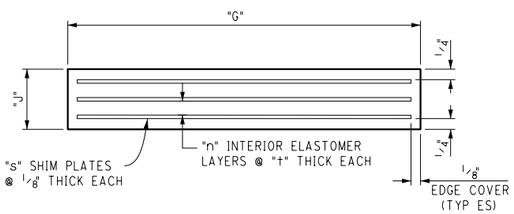
BEARING ASSEMBLY DIMENSIONS												
BEAM SPAN (℄ BRG-℄ BRG) (FT)	BEAM SIZE	B	D	E	G	H	J	s	n	t	L	N
20	W21 x 93	8"	10"	7 1/4"	11"	12"	1"	0	0	0"	3"	1 1/2"
30	W21 x 93	8"	10"	7 1/4"	11"	12"	1"	0	0	0"	3"	1 1/2"
40	W24 x 117	15"	17"	10 3/4"	12"	13"	2 3/8"	3	2	3/4	4 7/8"	2"
50	W30 x 173	15"	17"	10 3/4"	14"	15"	2 3/8"	3	2	3/4"	4 7/8"	2"
60	W36 x 170	15"	17"	10 3/4"	14"	15"	2 3/8"	3	2	3/4	4 7/8"	2"

THIS TABLE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THE FINAL DESIGN DRAWINGS



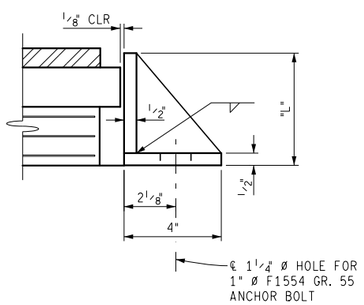
DETAIL X

ELASTOMERIC BEARING DETAILS - FIXED

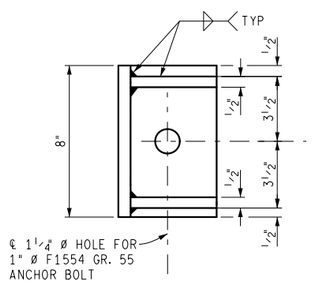


ELASTOMERIC BEARING DETAILS

SIDE VIEW

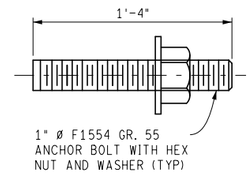


ELEVATION

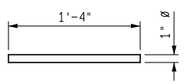


PLAN

SIDE RETAINER



ANCHOR BOLT DETAIL



POSITION DOWEL DETAIL

FOR INFORMATION ONLY:

FOR SINGLE SPAN STRUCTURES 25'-0" OR LESS IN LENGTH, ALLOWANCE FOR EXPANSION IS NOT REQUIRED IN THE DESIGN OF THE ELASTOMERIC BEARING PADS.

ELASTOMERIC BEARINGS FOR BEAM SPANS 20' AND 30' ARE PLAIN PADS WITH NO SHIMS PLATES.

SOLE PLATES ARE TO BE BEVELED WHEN THE CALCULATED BEVEL IS GREATER THAN 0.5%.

THE ABOVE NOTES ARE FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

NOTES:

ES DENOTES EACH SIDE.

USE NON-DEFORMED STEEL RODS IN ACCORDANCE WITH AASHTO M 270 GRADE 36 AND HOT-DIP GALVANIZED IN ACCORDANCE WITH AASHTO M 111, AS POSITION DOWELS FOR PRECAST BEAMS.

STEEL FOR SOLE PLATES AND OTHER BEARING COMPONENTS SHALL MEET THE REQUIREMENTS OF AASHTO M 270 GRADE 36.

ANCHOR BOLT LENGTHS SHOWN ARE MINIMUM. BOLTS LONGER THAN THAT SHOWN MAY BE FURNISHED AT NO ADDITIONAL COST. ANCHOR BOLTS AND POSITION DOWELS SHALL BE GALVANIZED ACCORDING TO MDOT STANDARD SPECIFICATION 707.03.C.16.

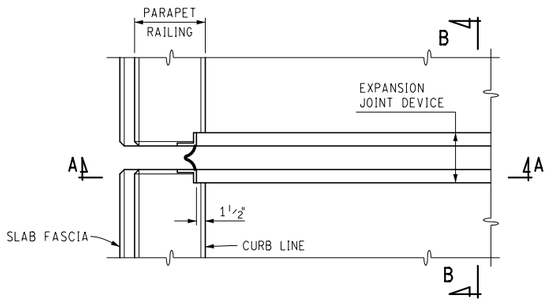
ANCHOR BOLTS SHALL CONFORM TO SECTION 908.15.

ANCHOR BOLTS SHALL BE INSTALLED AFTER BEAMS ARE ERECTED IN PLACE.

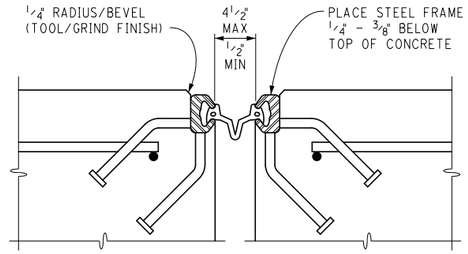
FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

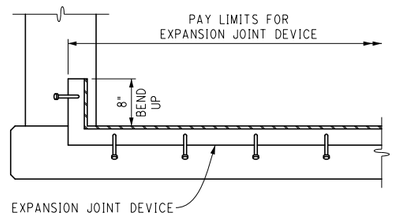
	DATE: 05/09/18	CS:	ROLLED STEEL BEAM BEARING DETAILS	DRAWING / SHEET
	DESIGN UNIT:	JN:		BRG / SECT
FILE: steel_005.dgn	TSC:			003



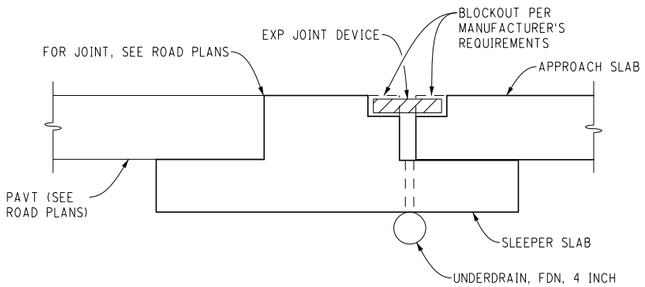
PLAN AT FLUSH MOUNT PARAPET RAILING



SECTION THROUGH EXPANSION JOINT



SECTION A-A



SECTION B-B

NOTES:

JOINT TYPES

THE EXPANSION JOINT DEVICE SHALL BE OF A TYPE THAT INCLUDES A CONTINUOUS NEOPRENE (OR EQUIVALENT) SEAL ACROSS THE DECK. UNLESS OTHERWISE NOTED ON THE PLANS, THE CONTRACTOR HAS THE OPTION OF USING ANY OF THE DEVICES LISTED BELOW:

DEVICE	MANUFACTURER
WABO STRIP SEAL - TYPE M	WATSON-BOWMAN & ACME, INC.
WABO STRIP SEAL - TYPE A	WATSON-BOWMAN & ACME, INC.
STEELFLEX-SSA2	D.S. BROWN
STEELFLEX-SSCM	D.S. BROWN
ONFLEX 40 SS	STRUCTURAL RUBBER PRODUCTS CO.
ONFLEX 40 SSA	STRUCTURAL RUBBER PRODUCTS CO.

THE MODEL OF THE JOINT TYPE SELECTED SHALL BE SUITABLE TO ACCOMMODATE THE TOTAL MOVEMENT NOTED ON THE PLANS.

COMPLETE WORKING DRAWINGS OF ALL DETAILS OF FABRICATION OF THE EXPANSION JOINT DEVICE SHALL BE SUBMITTED FOR REVIEW IN ACCORDANCE WITH STANDARD SPECIFICATION 104.02. THIS REQUIREMENT IS WAIVED FOR EXPANSION JOINT DEVICES FOR WHICH A SET OF STANDARD INSTALLATION DETAILS HAS BEEN APPROVED. STANDARD INSTALLATION DETAILS CAN BE OBTAINED FROM THE DESIGN DIVISION.

FABRICATION AND INSTALLATION

REMOVE SHIPPING BOLTS PRIOR TO PLACEMENT OF CONCRETE.

THE EXPANSION JOINT SHALL BE SHOP FABRICATED TO CONFORM TO THE CONTOUR OF THE BRIDGE DECK, BARRIERS, ETC. IT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS SUBJECT TO NOTES HEREIN AND THE APPROVAL OF THE ENGINEER.

TIE DECK REINFORCING STEEL TO STEEL FRAME ANCHORS TO MAXIMUM EXTENT PRACTICABLE WITHOUT DAMAGING GALVANIZED OR EPOXY COATINGS.

THE TOP OF THE EXPANSION JOINT DEVICE SHALL BE SET 1/4" - 3/8" BELOW THE CONCRETE SLAB (PAVEMENT).

THE STEEL ANCHORAGE FOR STRIP SEAL GLANDS SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH SUBSECTION 707.03C.17 OF THE STANDARD SPECIFICATIONS.

THE AREA OF THE STEEL ANCHORAGE AND SEALING GLAND WHICH WILL BE IN CONTACT WITH A SEALANT, OR LUBRICANT-ADHESIVE SHALL BE CLEANED WITH TOLUENE OR OTHER APPROVED SOLVENT.

IN THE EVENT THAT SPLICING IS REQUIRED OF THE SEALING GLAND, IT SHALL BE SPLICED BY AN APPROVED METHOD (SUCH AS COLD VULCANIZATION) BY A TRAINED REPRESENTATIVE OF THE MANUFACTURER.

DETAILS AT CURBS OR BARRIERS

THE DETAILS ON THIS SHEET SHOW AN APPROVED MEANS OF TERMINATING THE EXPANSION JOINT DEVICE AT CURBS OR BARRIERS. VARIATIONS OR ALTERNATIVE SCHEMES WILL BE CONSIDERED AND MAY BE USED IF APPROVED BY THE ENGINEER.

MATERIALS

THE COST OF ALL MATERIALS AND LABOR REQUIRED FOR PROPER INSTALLATION OF THE EXPANSION JOINT AND THE TERMINAL ASSEMBLIES AT THE CURBS, SIDEWALKS, OR BARRIERS IS INCLUDED IN THE PAYMENT FOR THE EXPANSION JOINT DEVICE.

STRUCTURE NUMBER	ANGLE OF CROSSING TO NEAREST 10°	LOCATION OF JOINT	MIN. TOT. TRAVEL ALONG CENTERLINE OF BRIDGE	REQUIRED LENGTH OF EXPANSION JOINT DEVICE
		SLEEPER SLAB AT ABUT A OR B		

FOR INFORMATION ONLY:

EXPANSION JOINTS ARE NOT REQUIRED WHEN LENGTH OF BRIDGE CONTRIBUTING TO EXPANSION AT AN ABUTMENT IS LESS THAN 50 FEET FOR CONCRETE BEAM BRIDGES AND LESS THAN 25 FEET FOR ROLLED STEEL BRIDGES.

THE ABOVE NOTE IS FOR INFORMATION ONLY AND SHOULD NOT BE INCLUDED ON THIS SHEET.

FINAL ROW PLAN REVISIONS (SUBMITTAL DATE:)							
NO.	DATE	AUTH	DESCRIPTION	NO.	DATE	AUTH	DESCRIPTION

NO SCALE

	DATE: 05/09/18	CS:	EXPANSION JOINT DETAILS	DRAWING: EXPJT / SHEET: SECT
	DESIGN UNIT:	JN:		
FILE: expjt_001.dgn	TSC:			001