

BEAM LAYOUT

NOTES:

1. For the full plan set and additional structure information, see Br1-Precast and Cast Concrete-Iowa DOT.pdf.
2. FOR BEAM BTB65 DETAILS SEE SHEET L1-BR01-Girder01.
3. Modeling and export of reinforcing is optional for Level 2.

NOTES:

- MEASURED PERPENDICULAR TO LOCAL TANGENT OF E RAMP B.
- MEASURED PERPENDICULAR TO E BEAM.

Unit Test Instruction for the Design-to-Construction Data Exchange			BIM FOR BRIDGES AND STRUCTURES TPF-5(372)
No.	Date	Issue / Revision Notes	
1	12/14/23		HDR
Level 2 Prestressed Concrete Beams			jō consulting
Drawn By	Reviewed By	L2-Br01-Girders01 / 01	
AMN	.		

BTB BEAM DATA

BTB BEAM	SPAN LENGTH E-C BEARING	OVERALL BEAM LENGTH (L)	CONCRETE STRENGTH		STRAND SIZE DIA. (in)	NO. OF STRAND STRAIGHT DEFLECTED	TOTAL INITIAL PRESTRESS ③ Kips	HOLD DOWN FORCE-KIPS	CAMBER (in)		DEFLECTION (in) Δ_0 IMMEDIATE ① (ELASTIC) Δ_i	TIME ② (PLASTIC) Δ_t	PERMISSIBLE MAXIMUM SPACING HL-93 LOADING	WEIGHT (TONS)	CONCRETE (CU YD.)	REINFORCING STEEL (WEIGHT-LBS)	
			f'ci (ksi)	f'c (ksi)					AT RELEASE	AFTER LOSSES							
			STEEL DIAPHRAGM	STEEL DIAPHRAGM					STEEL DIAPHRAGM	STEEL DIAPHRAGM							
BTB65	65'-0	66'-4	4.5	5.0	0.60	18	2	851	8.0	1.13	2.01	0.83	0.21	8'-2	21.8	10.8	1586
BTB70	70'-0	71'-4	5.0	5.5	0.60	20	2	936	7.4	1.32	2.35	1.06	0.26	8'-2	23.5	11.6	1674
BTB75	75'-0	76'-4	5.5	6.5	0.60	22	4	1106	13.0	1.65	2.92	1.28	0.32	8'-2	25.1	12.4	1764

① DEFLECTIONS AT MID-SPAN DUE TO WEIGHT OF SLAB AND DIAPHRAGM. THE DEFLECTIONS SHOWN ARE FOR A SLAB (8.5 in) AND HAUNCH (1.5 in) WEIGHT OF:

0.92 Kips/ft FOR 8'-2 BEAM SPACING
AND ONE STEEL DIAPHRAGM (0.500 Kips) AT $\frac{1}{4}$ OF SPAN.
FOR DIFFERENT SLAB AND DIAPHRAGM WEIGHTS, DEFLECTIONS WILL BE DIRECTLY PROPORTIONAL.

② DEFLECTIONS DUE TO THE COMBINED EFFECT OF CREEP DUE TO WEIGHT OF SLAB AND SHRINKAGE OF SLAB.

TOTAL BEAM DEFLECTIONS AT $\frac{1}{4}$ OF SPAN, Δ_0 , DUE TO WEIGHT OF SLAB AND DIAPHRAGMS FOR DETAILING PURPOSE:

- (A) $\Delta_0 = \Delta_i + \Delta_t$ FOR SIMPLE SPAN.
- (B) $\Delta_0 = \Delta_i + \frac{3}{4} \Delta_t$ FOR END SPANS OF CONTINUOUS BRIDGE.
- (C) $\Delta_0 = \Delta_i + \frac{1}{2} \Delta_t$ FOR INTERIOR SPANS OF CONTINUOUS BRIDGE.

③ TOTAL INITIAL PRESTRESS IS BASED ON 72.6% f's, f's. = 270 ksi, AND As = 0.217 in².

CALCULATED DESIGN CAMBERS HAVE BEEN REDUCED FROM THEIR THEORETICAL VALUES BY 15% TO AID CONSTRUCTABILITY.

NOTE:
THE EXTERIOR SURFACES OF THE EXTERIOR (FASCIA) BEAM ENDS OVER THE PIER SHALL NOT BE ROUGHEND.

NOTE:
FOR MODIFIED STIRRUP EXTENSIONS, SEE "BENT BAR DETAILS" AND BEAM DETAILS SHEET FOR DIMENSIONS AND LOCATIONS.

BEAM NOTES:

THESE BEAMS ARE DESIGNED FOR AASHTO LIVE LOADS AS INDICATED IN ABOVE TABLE WITH AN ALLOWANCE OF 20 LBS PER SQUARE FOOT OF ROADWAY FOR FUTURE WEARING SURFACE.

ALL PPC BEAMS SHALL USE HIGH PERFORMANCE CONCRETE (HPC) IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS. HOLD DOWN POINTS FOR DEFLECTED STRANDS MAY BE MOVED TOWARD ENDS OF BEAM A DISTANCE OF 0.05 L MAXIMUM AT PRODUCER'S OPTION.

ALL PRESTRESSING STRANDS EXCEPT LIFTING LOOP STRANDS SHALL BE 0.60 in. NOMINAL DIAMETER (NOMINAL STEEL AREA = 0.217 in²) AND CONFORM TO ASTM A416 GRADE 270 LOW RELAXATION STRANDS. MINIMUM STRAND BREAKING STRENGTH SHALL BE 58.6 kips.

TOPS OF BEAMS ARE TO BE STRUCK OFF LEVEL AND FINISHED AS PER MATERIALS IM570.

BEARINGS SHALL BE AS DETAILED ON OTHER DESIGN SHEETS. BEAMS TO BE USED IN BRIDGES MADE CONTINUOUS BY THE POURED IN PLACE FLOOR, ARE TO BE AT LEAST 28 DAYS OLD BEFORE THE FLOOR IS PLACED UNLESS A SHORTER CURING TIME IS APPROVED BY THE BRIDGE ENGINEER.

THE PORTIONS OF THE PRESTRESSED BEAMS THAT ARE TO BE EMBEDDED IN THE ABUTMENT AND PIER DIAPHRAGMS SHALL BE ROUGHENED FOR A DISTANCE OF 10" FROM THE BEAM END BY SANDBLASTING OR OTHER APPROVED METHODS TO PROVIDE SUITABLE BOND BETWEEN THE BEAM AND THE DIAPHRAGM IN ACCORDANCE WITH ARTICLE 2403.03, I, OF THE STANDARD SPECIFICATIONS.

ALL BEAMS ARE TO BE INCREASED IN LENGTH TO COMPENSATE FOR ELASTIC SHORTENING, CREEP AND SHRINKAGE.

FOR TRANSPORTING, THE ALLOWABLE OVERHANG IS SHOWN IN THE LIFTING LOOP AND OVERHANG TABLE.

HOLLES MUST BE CAST IN THE WEB TO ACCOMMODATE THE STEEL DIAPHRAGM ATTACHMENTS AS DETAILED ON THE STEEL DIAPHRAGM DETAIL SHEET.

MINIMUM CONCRETE f'c (AT 28 DAYS) AND MINIMUM f'ci AT RELEASE ARE LOCATED IN THE BTB BEAM DATA TABLE ABOVE.

FOUR 0.60 IN. DIAMETER STRANDS STRESSED TO NOT MORE THAN 5000 lbs EACH MAY BE USED IN LIEU OF BARS 5a1 AND 5a2 IN THE TOP FLANGE.

NOTES:

1. Modeling and export of reinforcing is optional for Level 2.

Unit Test Instruction for the Design-to-Construction Data Exchange

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1	12/14/23	.

No. Date Issue / Revision Notes

Unit Test Description

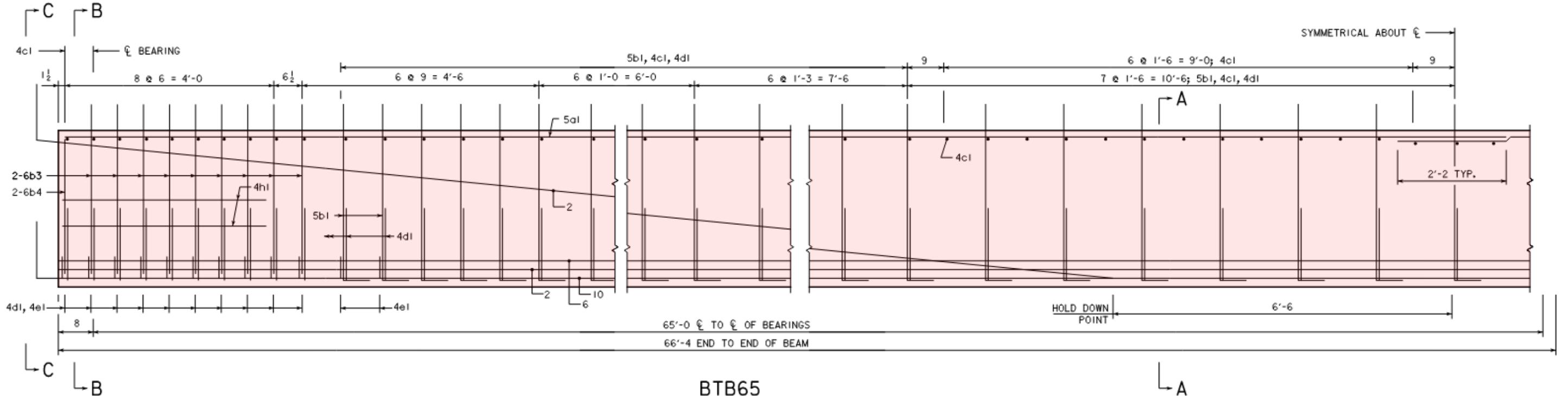
Level 2 Prestressed Concrete Beams

Drawn By

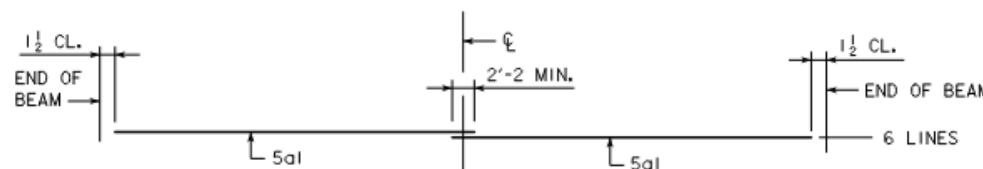
Reviewed By



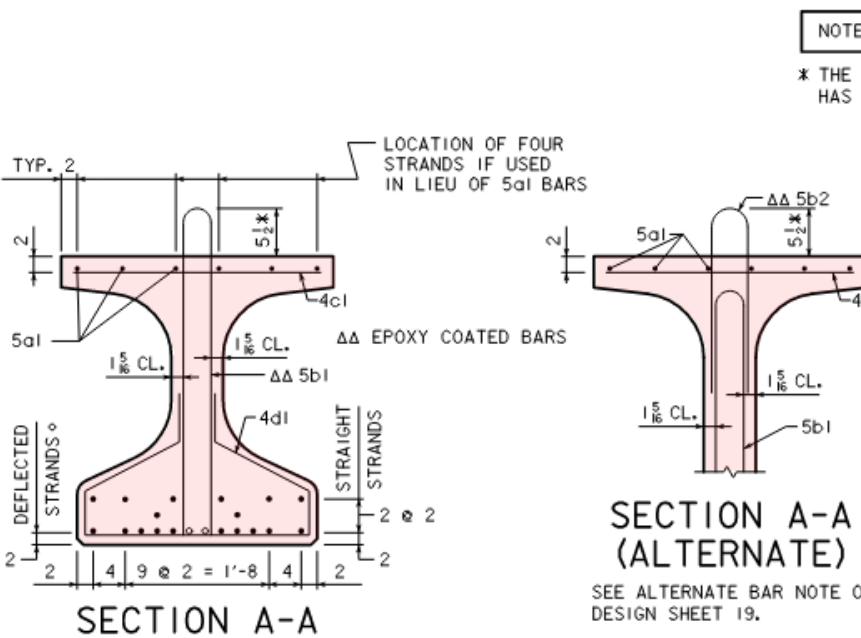
L2-Br01-Girders01 / 02



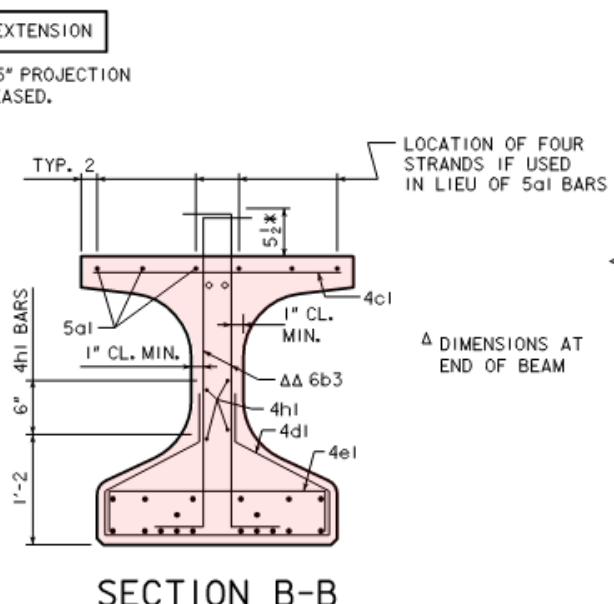
BTB65



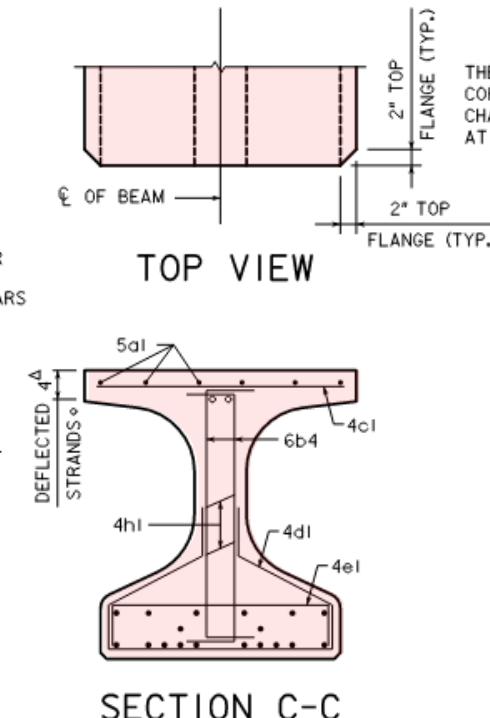
TOP FLANGE LONGITUDINAL BAR LAYOUT



SEE ALTERNATE BAR NOTE ON
DESIGN SHEET 19.

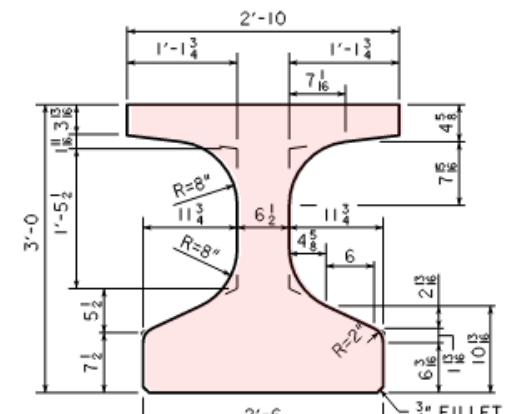


SECTION B-I



THE TOP FLANGE BEAM
CORNERS ARE TO BE
CHAMFERED 2" AS SHOWN
AT BOTH ENDS OF THE BEAM.

TOP VIEW



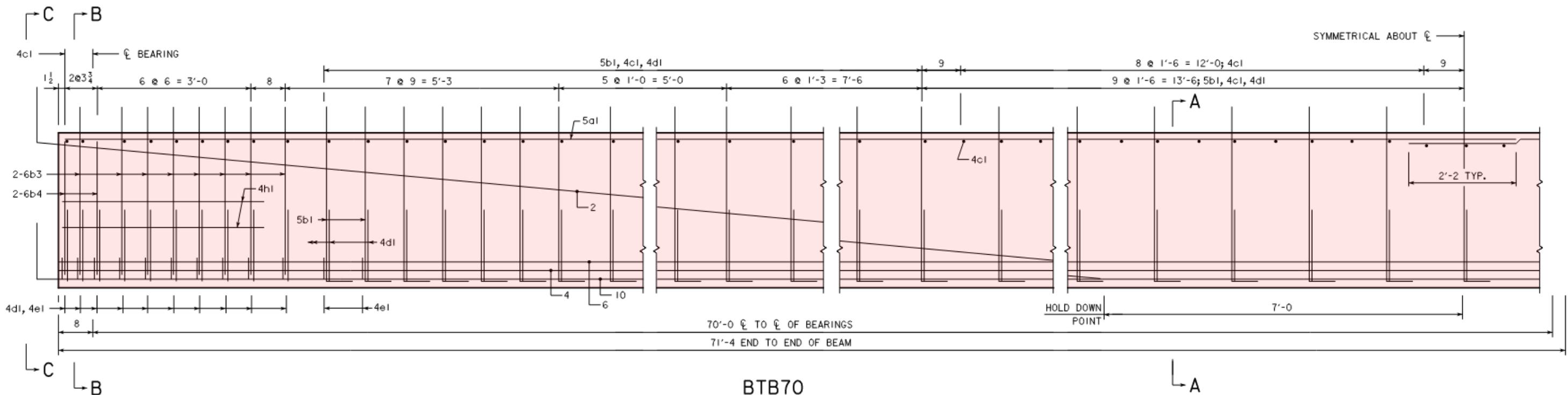
BTB BEAM CROSS SECTION

BTB65 BEAM DETAILS

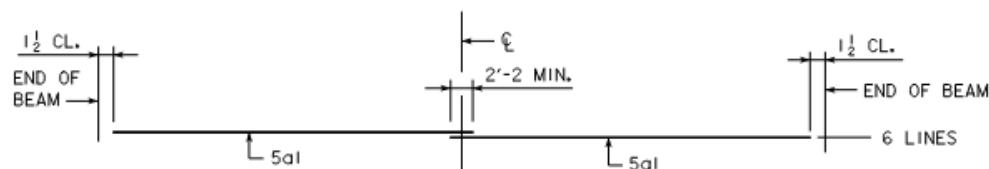
NOTES:

1. Modeling and export of reinforcing is optional for Level 2.

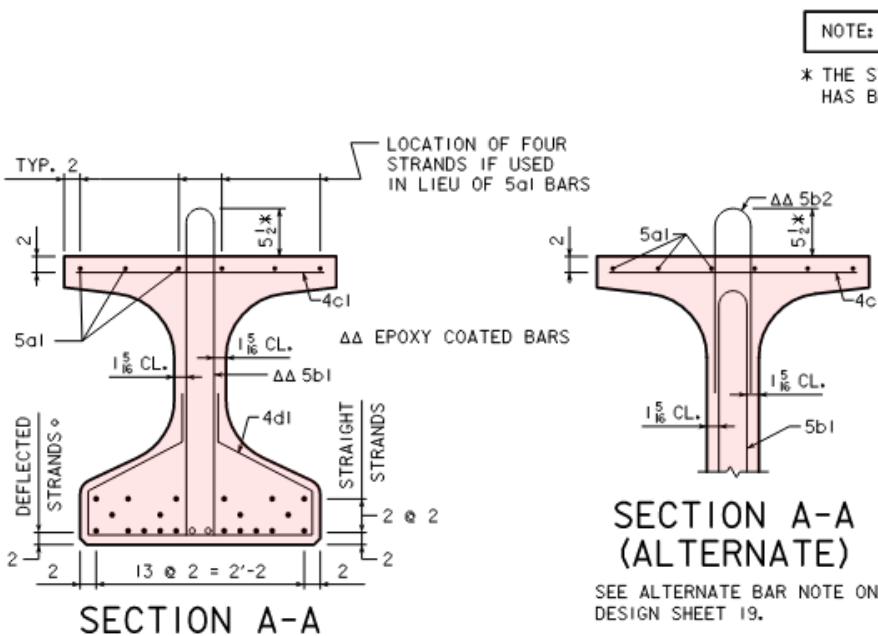
Unit Test Instruction for the Design-to-Construction Data Exchange			 <small>TPF-5(372)</small>
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1	12/13/23	.	
No.	Date	Issue / Revision Notes	
Unit Test Description			
Level 1 Prestressed Concrete Beam			
Drawn By AMN	Reviewed By .	Unit Test / Sheet No.	
L2-Br01-Girders01 / 03			



BTB70

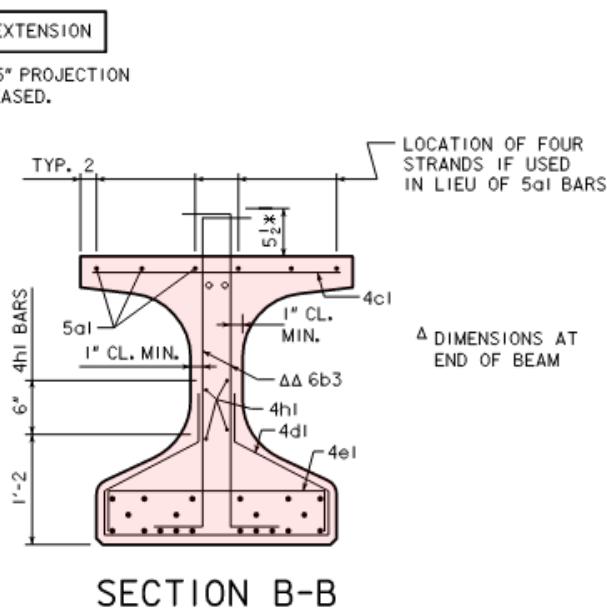


TOP FLANGE LONGITUDINAL BAR LAYOUT

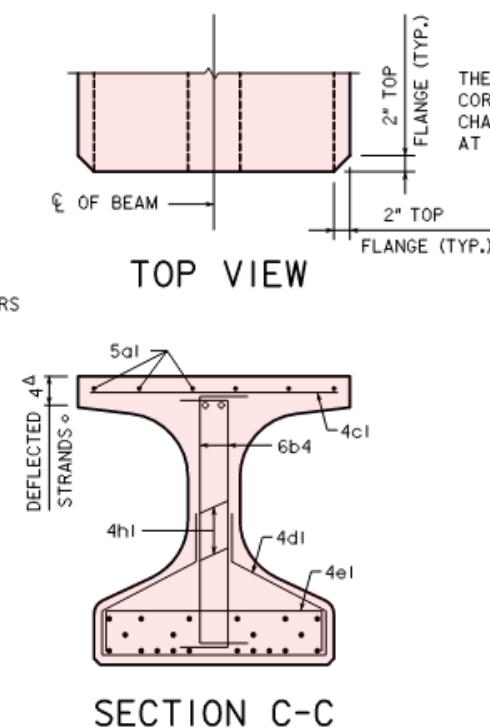


SECTION A-A

SEE ALTERNATE BAR NOTE ON
DESIGN SHEET 19.

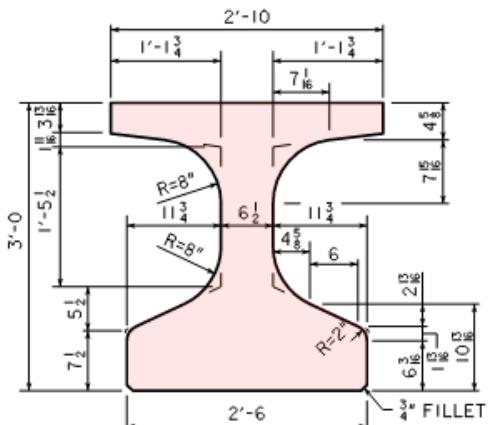


SECTION B-B



BEAM SECTION PROPERTIES

THE TOP FLANGE BEAM
CORNERS ARE TO BE
CHAMFERED 2" AS SHOWN
AT BOTH ENDS OF THE BEAM.



BTB BEAM CROSS SECTION

BTB70 BEAM DETAILS

NOTES:

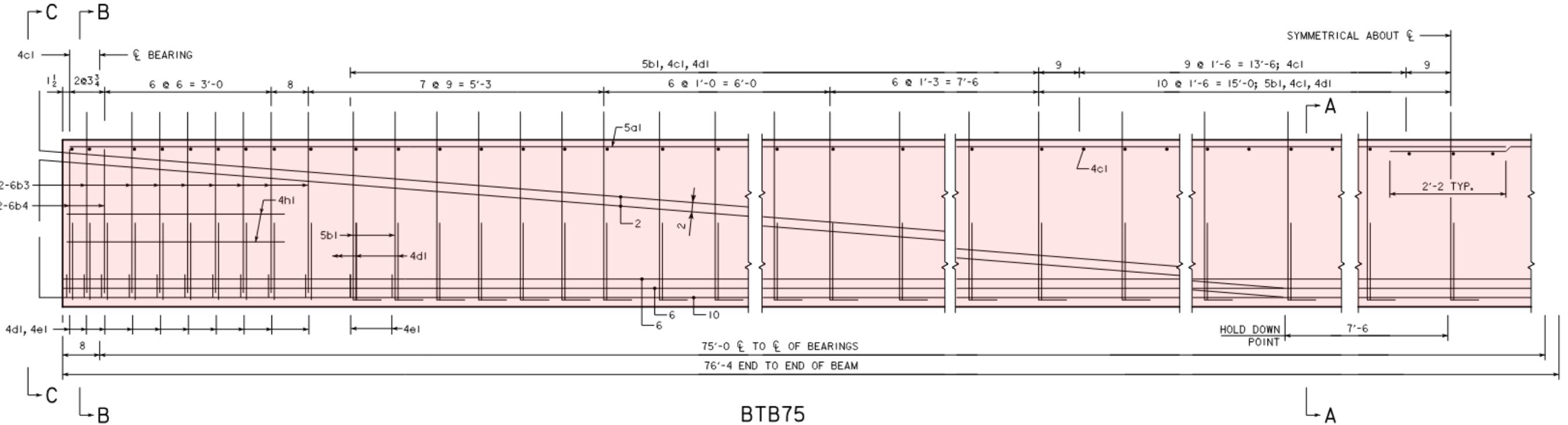
1. Modeling and export of reinforcing is optional for Level 2.

Unit Test Instruction for the Design-to-Construction Data Exchange		
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1	12/14/23	.
No.	Date	Issue / Revision Notes
Unit Test Description		
Level 2 Prestressed Concrete Beams		
Drawn By AMN	Reviewed By	Unit Test / Sheet No. L2-Br01-Girders01 / 04

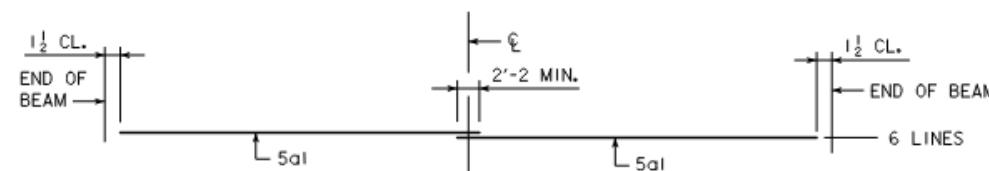
BIM FOR BRIDGES AND STRUCTURES TPF-5(372)

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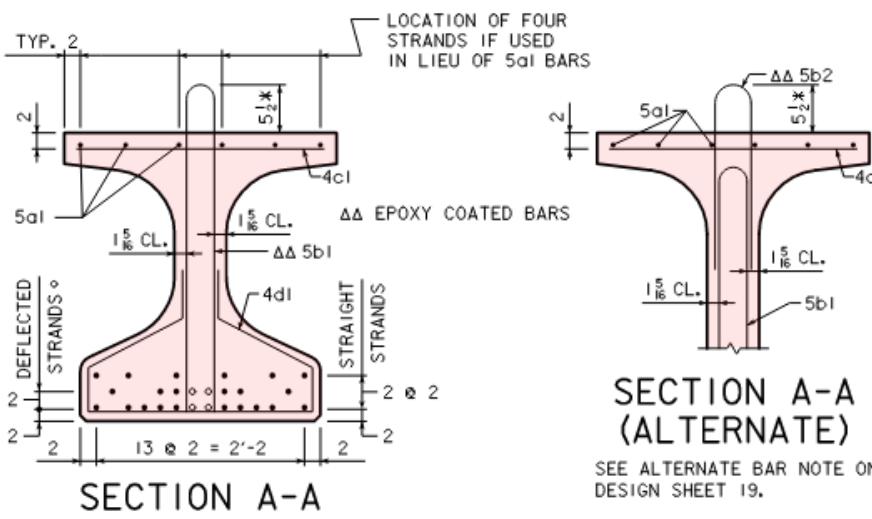


BTB75

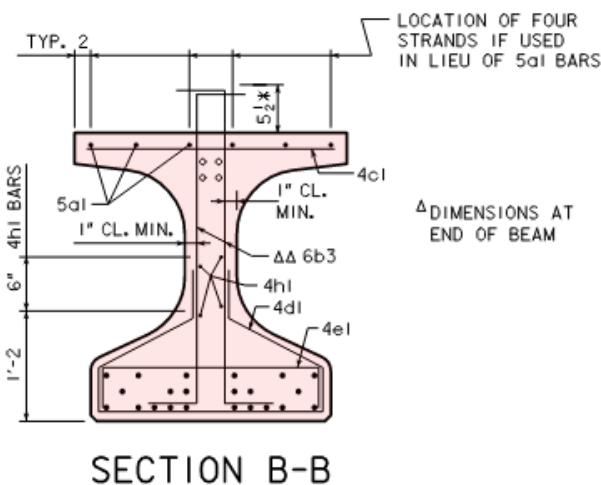


TOP FLANGE LONGITUDINAL BAR LAYOUT

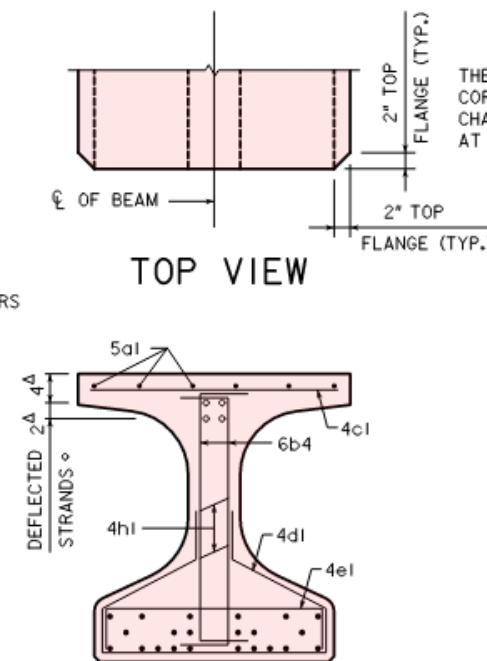
NOTE: STIRRUP EXTENSION



SEE ALTERNATE BAR NOTE ON
DESIGN SHEET 19.



SECTION B-B



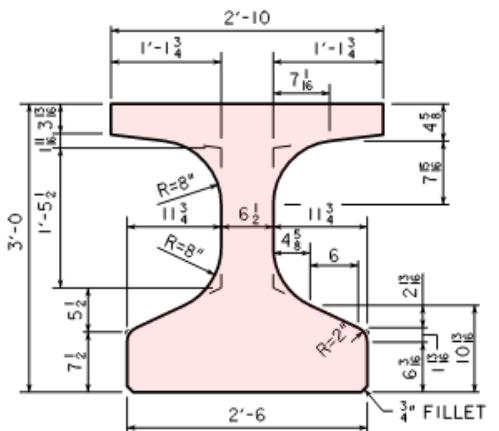
TOP VIEW

THE TOP FLANGE BEAM
CORNERS ARE TO BE
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AT BOTH ENDS OF THE BEAM.

$$\text{AREA} = 631.7 \text{ in}^2$$

$$\bar{y}_b = 17.14 \text{ in.}$$

$$I = 99,980 \text{ in}^4$$



BTB BEAM CROSS
SECTION

BTB75 BEAM DETAILS

NOTES:

1. Modeling and export of reinforcing is optional for Level 2.

Unit Test Instruction for the Design-to-Construction Data Exchange

