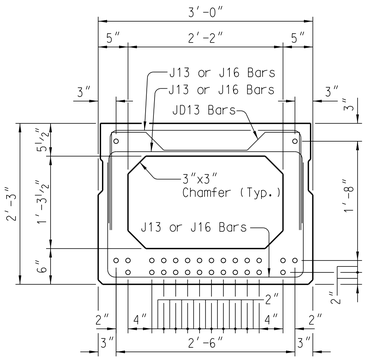
STRAND DATA

DIAMETER	AREA (in²)	TENSIONING LOAD
1/2"	0.153	31.0 kips
1/2" Special	0.167	33.8 kips

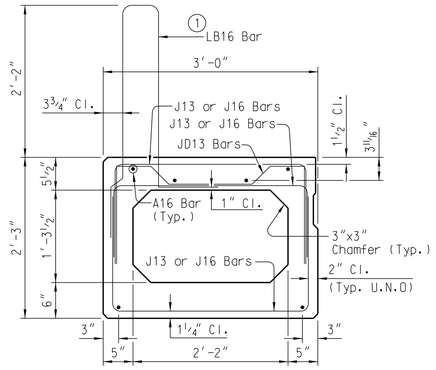
DIAMETER	AREA (in²)	TENSIONING LOAD
9/16"	0.192	38.9 kips
0.6"	0.217	43.9 kips

(5) Design Beams using strands in the table below.

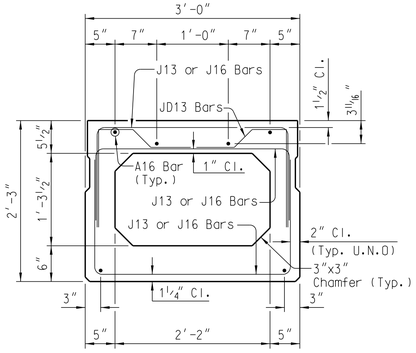


AASHTO BI-36 BOX BEAM SECTION AND STRAND TEMPLATE (3)

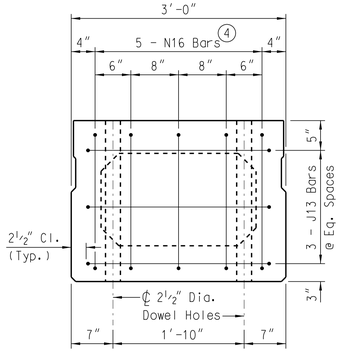
o : Allowable 0.6" Dia. strand location



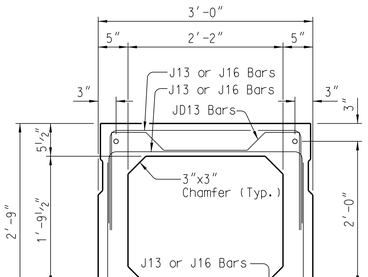
AASHTO BI-36 EXTERIOR BOX BEAM SECTION (2)



AASHTO BI-36 INTERIOR BOX BEAM SECTION (2)

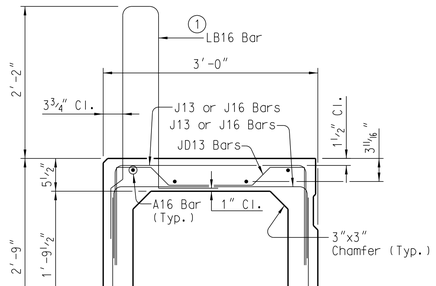


AASHTO BI-36 END ELEVATION (2)(3)

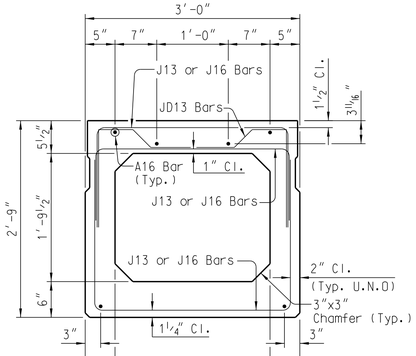


AASHTO BII-36 BOX BEAM SECTION AND STRAND TEMPLATE (3)

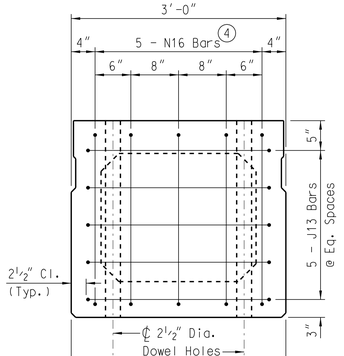
o : Allowable 0.6" Dia. strand location



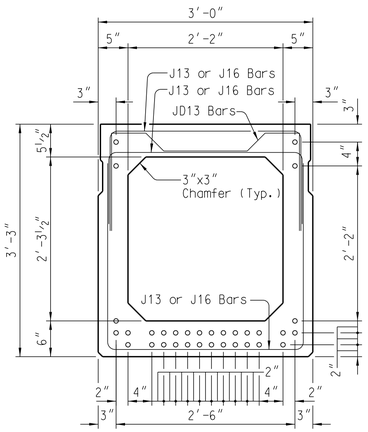
AASHTO BII-36 EXTERIOR BOX BEAM SECTION (2)



AASHTO BII-36 INTERIOR BOX BEAM SECTION (2)

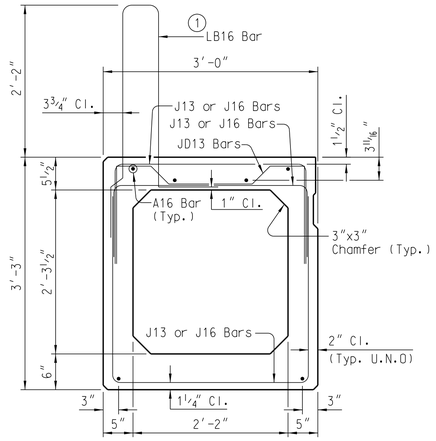


AASHTO BII-36 END ELEVATION (2)(3)

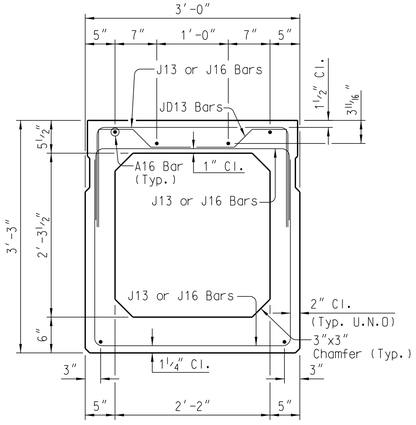


AASHTO BIII-36 BOX BEAM SECTION AND STRAND TEMPLATE (3)

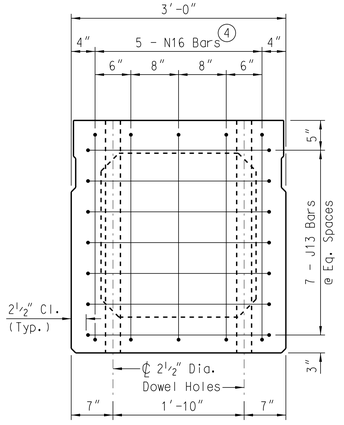
o : Allowable 0.6" Dia. strand location



AASHTO BIII-36 EXTERIOR BOX BEAM SECTION (2)



AASHTO BIII-36 INTERIOR BOX BEAM SECTION (2)



AASHTO BIII-36 END ELEVATION (2)(3)

AASHTO BOX BEAM SECTION DETAILS

Notes to Designer:

These drawings provide details to be selected and arranged as applicable on the Box Beam Details Sheets. Also provide a sheet for each span showing Plan of Span, Elevation view, and quantity tables as required.

Maximum Span Length for AASHTO BI-36 (27" Deep) = 75'-0"

Maximum Span Length for AASHTO BII-36 (33" Deep) = 90'-0"

Maximum Span Length for AASHTO BIII-36 (39" Deep) = 100'-0"

(1) Adjust LB16 Bar as necessary for super-elevated cross sections, to provide minimum clearances.

(2) Strand layout not shown.

(3) Interior Box Beam shown. Exterior Box Beam Section similar except shear key location.

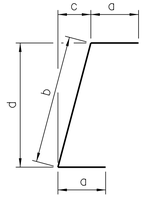
(4) Long leg at top of unit.

(5) 0.6" Dia. strands are most common currently used in SC and anticipated to be needed to meet load rating requirements as box beams approach the maximum lengths shown. For shorter box beam lengths, the other strand types available on the SCDOT Bridge Drawings and Details are acceptable but availability should be verified with fabricator prior to use.

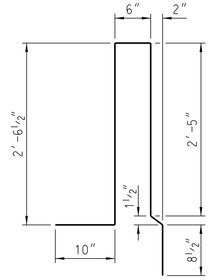
Debonding is permitted (including bottom row) in accordance with AASHTO LRFD Bridge Design Specifications.

In lieu of rebar stirrup bend diameters in accordance with the latest edition of C.R.S.I. Manual of Standard Practice, specify the following pin diameters to ensure fit and cover is met: #13 bars = 2" Dia. bend, #16 bars = 2½" Dia. bend.

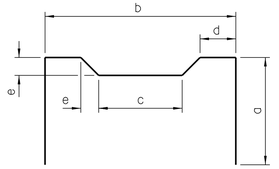
Add the following bar types to the Reinforcing Bending Details plan sheet used for the bridge. These bars are not currently included on Bridge Drawing No. 703-01. "JC" bars are for use at ends of skewed box beams.



BARS JC



(1) BARS LB



BARS JD

This drawing is furnished for information only. All dimensions shown are sheet specific. Any use of this design and drawing, including dimensions, must be checked by the User's Engineer to ensure design is adequate for the intended use. All drawings must be signed and sealed by a South Carolina Registered Professional Engineer.

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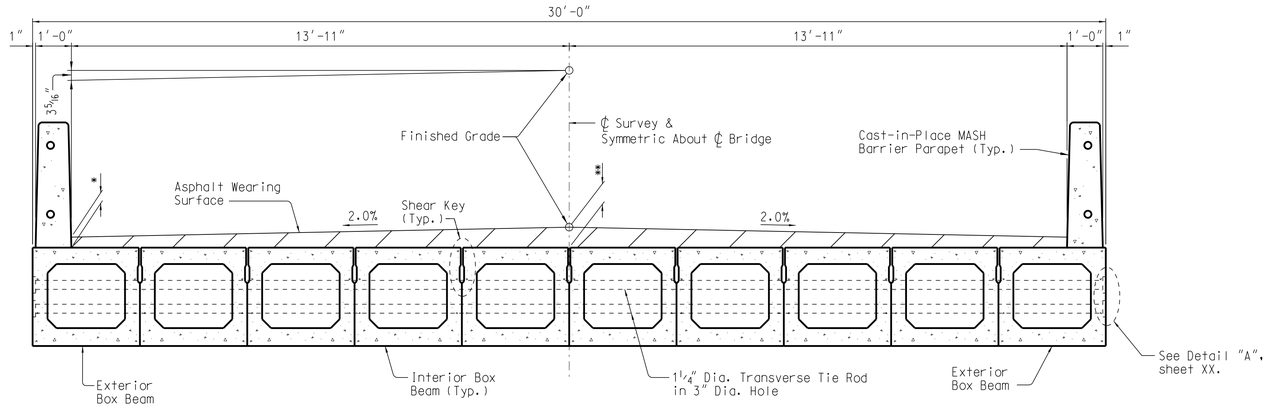
REVIEWED			
QUAN.			
DR.			
DES.			
	BY	CHK.	DATE

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

PRESTRESSED CONCRETE BOX BEAM DETAILS (1 OF X)

COUNTY | ROUTE

BRIDGE PLANS ID	SHEET NO.



DECK SECTION

Note: Deck Drains not shown

(2) *2" min. at midspan
xx" min. at centerline of bearing

(2) **xx" min. at midspan
xx" min. at centerline of bearing

Notes to Designer:

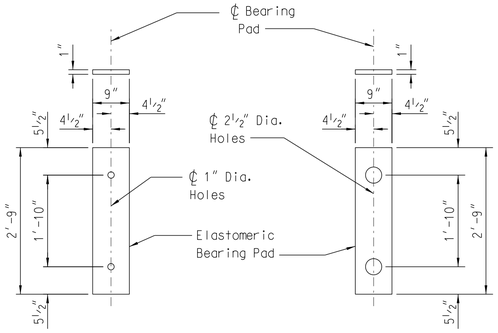
Detailing shown is for a normal-crown bridge in a tangent section where 10' lanes and 4' shoulders are specified roadway design criteria. Provide minimum bridge width in accordance with memo DM0120. Modifications to the DECK SECTION are required for: typical sections with additional roadway width, super-elevated bridges, and curving roadway geometry. Bridge width may be increased by one additional box beam to accomodate curving roadway geometry.

MASH barrier parapet shown is for the slip-forming option described in Bridge Memo DM0119. Modifications are required for the 12" constant-width vertical parapet (hand-formed option). The minimum MASH barrier parapet height above top of wearing surface (traffic face) is 36".

(1) Adjust if other strand type is used. See Note 5 on Box Beam Details Sheet 1 of X.

(2) Provide 2" minimum overlay thickness at the controlling location (typically midspan along gutterline). Designer to determine overlay thicknesses elsewhere taking into account design camber and vertical curve ordinate (if applicable). Denote overlay thicknesses at centerline of bearing along gutterline and along centerline of bridge, as well as at midspan along centerline of bridge.

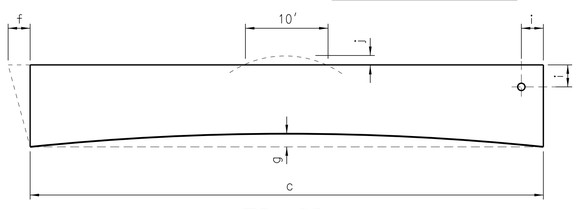
This drawing is furnished for information only. All dimensions shown are sheet specific. Any use of this design and drawing, including dimensions, must be checked by the User's Engineer to ensure design is adequate for the intended use. All drawings must be signed and sealed by a South Carolina Registered Professional Engineer when used for construction.



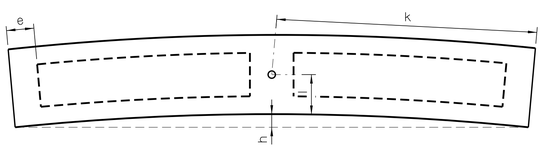
ELASTOMERIC BEARING DETAILS

(60 Durometer)

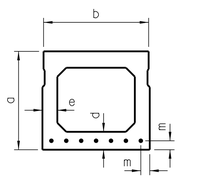
TOLERANCES



PLAN



ELEVATION



CROSS SECTION

a	Depth	+3/8" to -1/8"
b	Width	± 1/4"
c	Length (Length of adjacent box beam units must be within ± 1/4".)	± 1/8" per 10'
d	Position of Voids: Vertical	± 3/8"
e	Position of Voids: Horizontal	± 3/8"
	Position of Void Ends: Longitudinal	± 1"
f	Square Ends: Deviation from square (horizontal or vertical) or designated skew	± 1/4"
g	Horizontal Alignment: Deviation from a straight line parallel to the center line of member	± 1/2"
h	Camber: Differential between adjacent units	1/4" in 10', 3/4" max.
h	Camber: Differential between high and low members of the same span	3/4" max.
i	Position of Dowel Holes: Deviation from plan position	± 1/4"
	Width: Differential of adjacent spans in the same structure	± 3/4"
	Bearing Area: Deviation from plan surface	± 1/16"
j	Local Smoothness	1/4" in 10'
k	Horizontal Position of holes for Transverse Tie Rods	± 1/2"
l	Vertical Position of holes for Transverse Tie Rods	± 3/8"
m	Position of Strands	± 1/4"

Notes:

See Section 704 of the Standard Specifications for additional requirements and information regarding prestressed concrete box beam units. The Supplemental Specification "Grout for Post-Tensioning and Prestressed Cored Slabs" also applies to box beams. Special Provisions for Prestressed Cored Slabs (including Transverse Tie Rod requirements) also apply to box beams.

Submit shop drawings in accordance with the Standard Specifications and the RFP.

Use prestressing strands that conform to the latest AASHTO M 203 for grade 270 (low relaxation).

Use reinforcing steel that conforms to AASHTO M 31, Type W Grade 60.

(1) The tensioning load in all 0.6" Dia. low relaxation strands is 43.9 kips. Do not release the strands until the compressive strength of the concrete has reached the value shown for f'ci.

When casting the box beams, use a positive hold-down system to prevent the voids from rising or moving sideways. Use a noncorrosive hold-down system that is designed to remain in place until the concrete attains the specified release strength. Include details of the hold-down system in the shop plan submittal.

Always maintain box beam units in an upright position. Use lifting devices located within 2'-6" of the ends to lift or handle the box beam units. Provide a 1" deep recess at the lifting devices. Grout the recesses prior to waterproofing the top surface of the box beam units. Do not permit the box beam units to be placed or stored on interior supports causing negative moments.

Apply an epoxy protective coating to the ends of box beam units after strand recesses are patched with mortar. Use a coating system in accordance with ASTM C-881, Type VII, Grade 2, Class D-F.

Tie rod assemblies include a 1¼" Dia. rod, two heavy hex nuts, two lock washers, and two 5" x 5" x 5/8" plate washers. Thread 8" on each end of the tie rods. Provide tie rods and plate washers meeting the requirements of AASHTO M 270, Grade 36. Provide nuts meeting the requirements of ASTM A 563, Grade A. Galvanize tie rods and all hardware in accordance with ASTM A 123, ASTM A 153, or ASTM F 2329 as applicable. Tie rods are to be installed for test fit during fit up of span in casting yard.

Place box beam units so that the maximum transverse joint width at any location along the bent does not exceed 1 7/8".

For location of fixed and expansion bearings, see "Bridge Plan & Profile".

For locations of deck drains, see Sh. XX.

Grout all shear keys, dowel holes, and recesses for transverse tie rods after tightening the transverse tie rods. At expansion ends of slab units, fill the dowel holes with cold applied elastic filler to 1½" above the top of dowels and fill the remaining portion with grout. After the grout has cured for a minimum of three days, and has attained the required strength, place the barrier parapet.

Construct deck drains with a 7" wide by 6" high drain block-out in the barrier parapet concrete. Locate drains in barrier parapet regions with 12" minimum spacing of vertical reinforcing only. Do not locate drains within 10-feet from end of barrier or open joint in the barrier parapet. Center drains in between vertical reinforcing and shift longitudinal reinforcing to provide 2" clearance to block-out. Apply epoxy protective coating to exterior face of the exterior Box Beam units with drains in the barrier rail. Use a coating system in accordance with ASTM C-881, Type VII, Grade 2, Class D-F.

Prior to placement of the asphalt wearing surface, apply one of the following two bridge deck waterproofing systems to the top of the box beam units, or submit an equivalent system for approval: Pitchmastic PmB by Prime Resins, or Bridge-Tech by R.J. Watson. Both systems consist of a prime coat, a membrane layer, and a topcoat/tackcoat. Follow manufacturer recommendations. Bridge all longitudinal joints between units and transverse joints with reinforcing tape approved by the waterproofing manufacturer.

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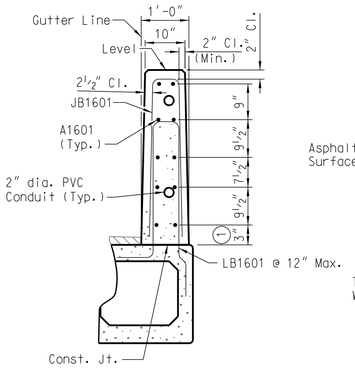
PRESTRESSED CONCRETE BOX BEAM DETAILS (2 OF X)

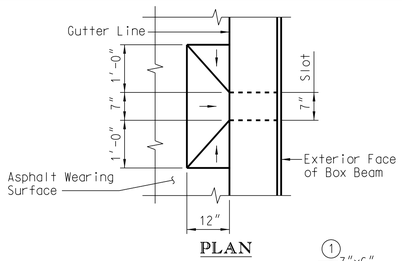
COUNTY | ROUTE

12-JUL-2023

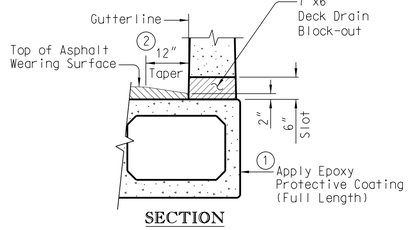


SECTION THRU
BARRIER PARAPET

(Deck Drains not shown)

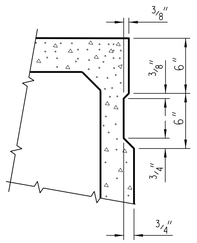


PLAN



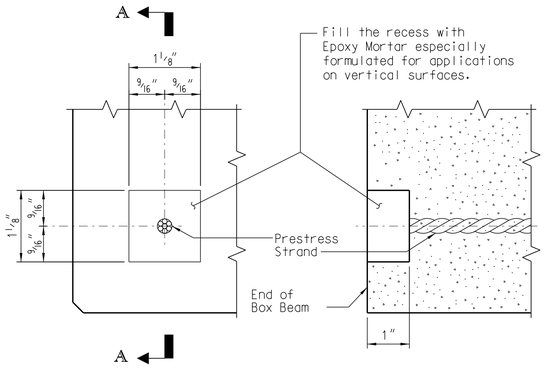
SECTION

DRAIN DETAIL



SHEAR KEY DETAIL

Note:
Omit Shear Key on Outside Face
of Exterior Box Beams.



PART ELEVATION AT
END OF BOX BEAM

SECTION A-A

GROUTED RECESS AT END OF
PRETENSIONED STRAND

Notes:

For additional notes and details see sheet XX.

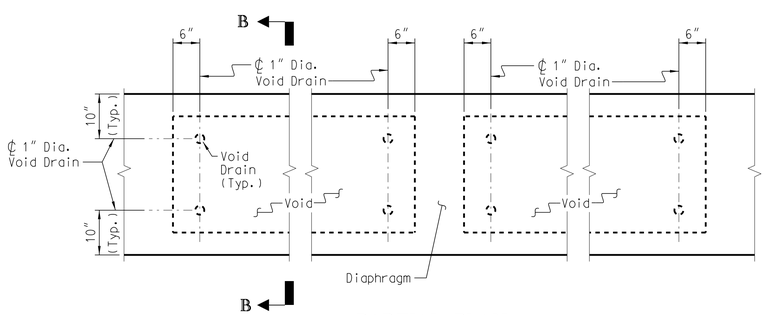
1 For deck drain and epoxy protective coating notes, see sheet XX .

2 Also taper asphalt 12" along gutter from each end of slot as shown in Plan.

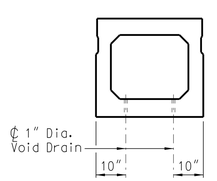
2

STRAND DATA (0.6" Dia. Low Relaxation Grade 270)	
Area	0.217 in^2
Tensioning Load	43.9 kips

DEAD LOAD DEFLECTION & CAMBER	
Camber at Erection (Slab alone in place)	X" ↑
Deflection due to Barrier Parapet and Asphalt Wearing Surface	X" ↓
Final Camber	X" ↑



PARTIAL PLAN



SECTION B-B

VOID DRAIN DETAILS

Notes to Designer:

Detailing shown is for a normal-crown bridge. Modifications are required for a super-elevated bridge. MASH barrier parapet shown is for the slip-forming option described in Bridge Memo DM0119. Modifications are required for the 12" constant-width vertical parapet (hand-formed option). See DM0119 for MASH barrier design requirements. Design shall account for reduced embedment depth on front leg of LB1601 bar.

(2) Adjust if other strand type is used. See Note 5 on Box Beam Details Sheet 1 of X.

This drawing is furnished for information only. All dimensions shown are sheet specific. Any use of this design and drawing, including dimensions, must be checked by the User's Engineer to ensure design is adequate for the intended use. All drawings must be signed and sealed by a South Carolina Registered Professional Engineer when used for construction.

BRIDGE PLANS ID	SHEET NO.

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
	BY	CHK.	DATE

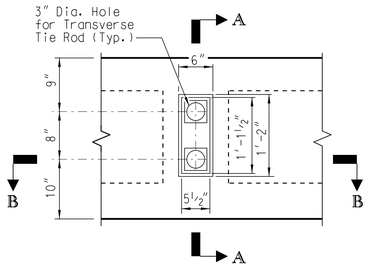
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PRESTRESSED CONCRETE BOX BEAM DETAILS (3 OF X)

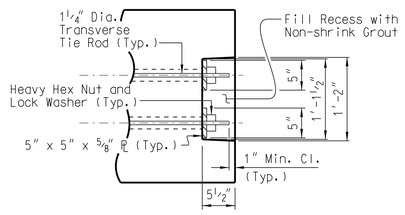
COUNTY	ROUTE

12-JUL-2023

BRIDGE PLANS ID	SHEET NO.



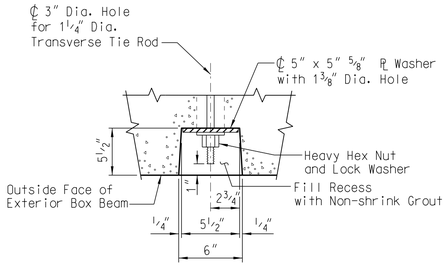
ELEVATION VIEW



SECTION A-A

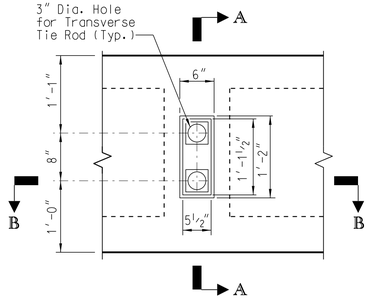
DETAIL "A" (AASHTO BI-36)

(See Deck Section on Sheet XX)
Grouted Recess at end of
Tie Rods of Exterior Box Beam

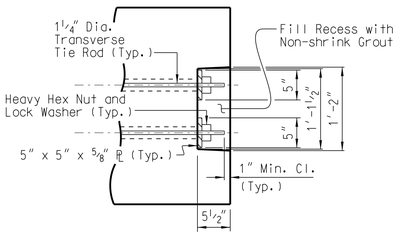


SECTION B-B

(Common to all three AASHTO shapes)



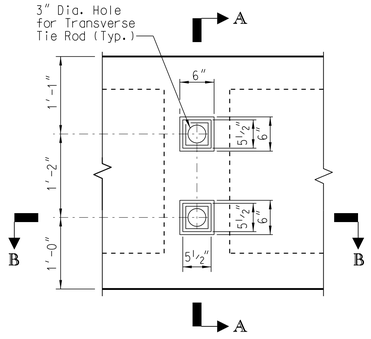
ELEVATION VIEW



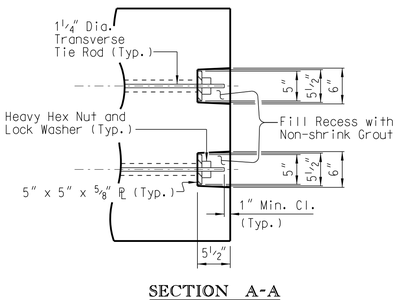
SECTION A-A

DETAIL "A" (AASHTO BII-36)

(See Deck Section on Sheet XX)
Grouted Recess at end of
Tie Rods of Exterior Box Beam



ELEVATION VIEW



SECTION A-A

DETAIL "A" (AASHTO BIII-36)

(See Deck Section on Sheet XX)
Grouted Recess at end of
Tie Rods of Exterior Box Beam

Notes to Designer:

Select the appropriate "Detail 'A'" for the box beam size(s) used.

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DES.			
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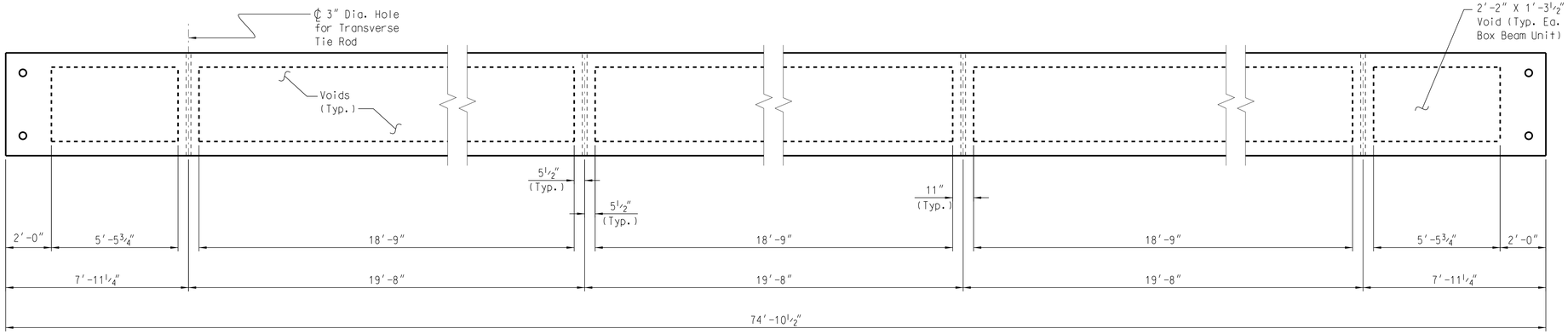
SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PRESTRESSED CONCRETE BOX BEAM DETAILS (4 OF X)

COUNTY	ROUTE

07-JUL-2022

BRIDGE PLANS ID	SHEET NO.



PLAN OF BOX BEAM - AASHTO BI-36

Showing Locations of Voids and Diaphragms

Notes to Designer:

Detailing shown is for no skew and specific span lengths:
75'-0" span for AASHTO BI-36
90'-0" span for AASHTO BII-36
100'-0" span for AASHTO BIII-36.

Adjust void dimensions for other span lengths or skew as necessary.

Four interior diaphragms are required for box beams less than or equal to 80'-0" in length (precast length). Five interior diaphragms are required for box beams greater than 80'-0" in length.

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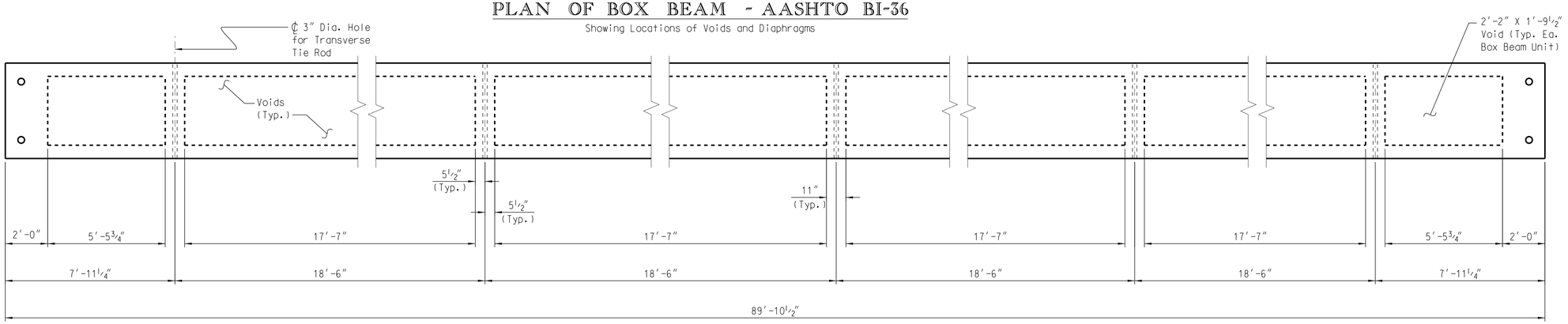
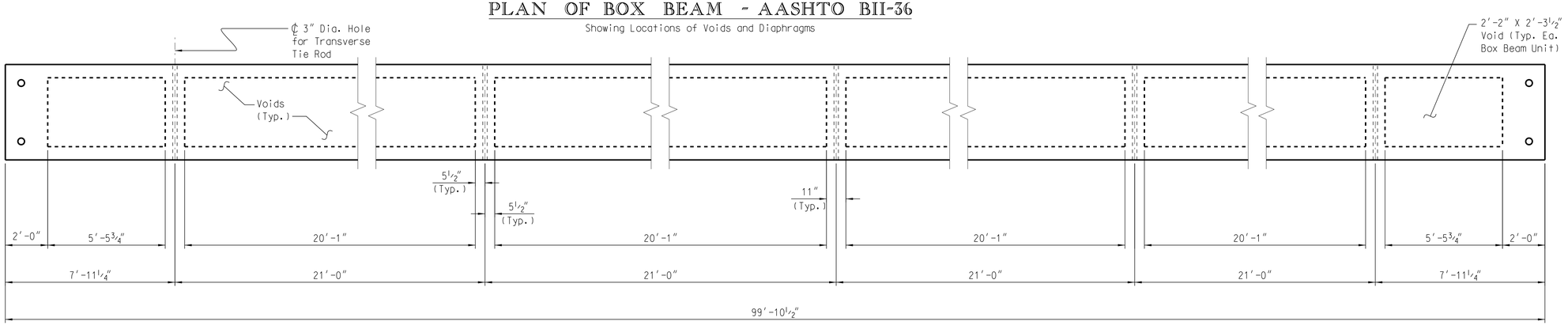


PLAN OF BOX BEAM - AASHTO BII-36

Showing Locations of Voids and Diaphragms



PLAN OF BOX BEAM - AASHTO BIII-36

Showing Locations of Voids and Diaphragms

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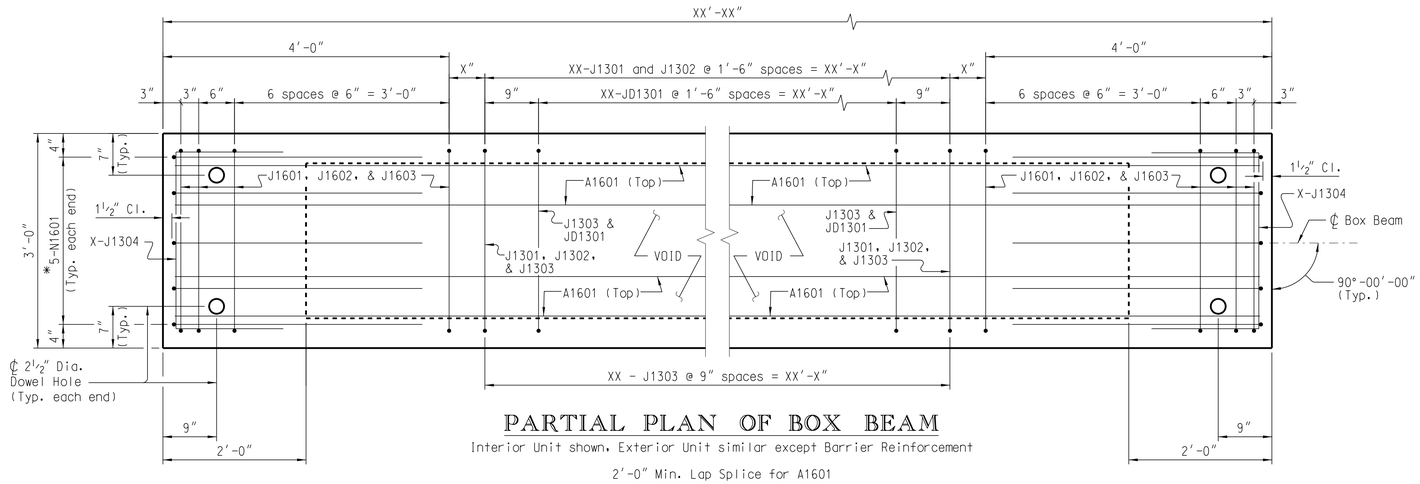
PRESTRESSED CONCRETE BOX BEAM DETAILS (5 OF X)

COUNTY	ROUTE

11-JUL-2022

BRIDGE PLANS ID	SHEET NO.

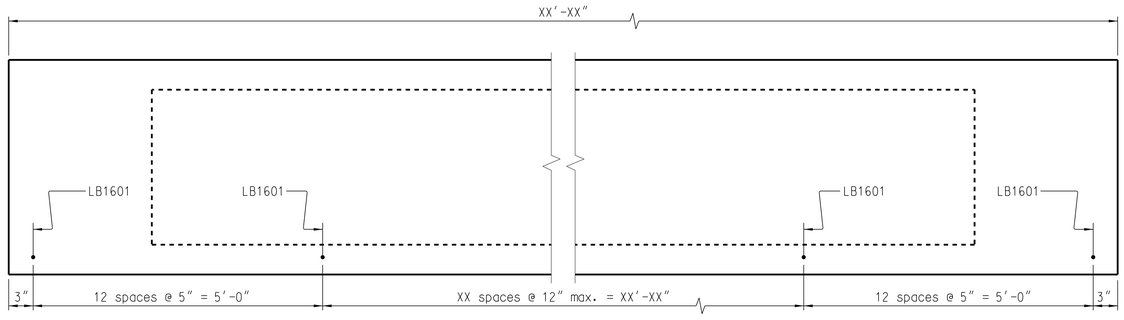


PARTIAL PLAN OF BOX BEAM

Interior Unit shown, Exterior Unit similar except Barrier Reinforcement

2'-0" Min. Lap Splice for A1601

*Long Leg of at top of unit



PARTIAL PLAN OF EXTERIOR BOX BEAM

Showing placement of LB1601 bars for MASH Barrier Parapet in Exterior Unit

Notes to Designer:

Adjust dimensions and reinforcing labels for each bridge as necessary.

Details are shown for bridge with no skew. Modifications are required for skewed ends.

Modifications to barrier parapet reinforcing are necessary if barrier transitions are located on the box beam span shown.

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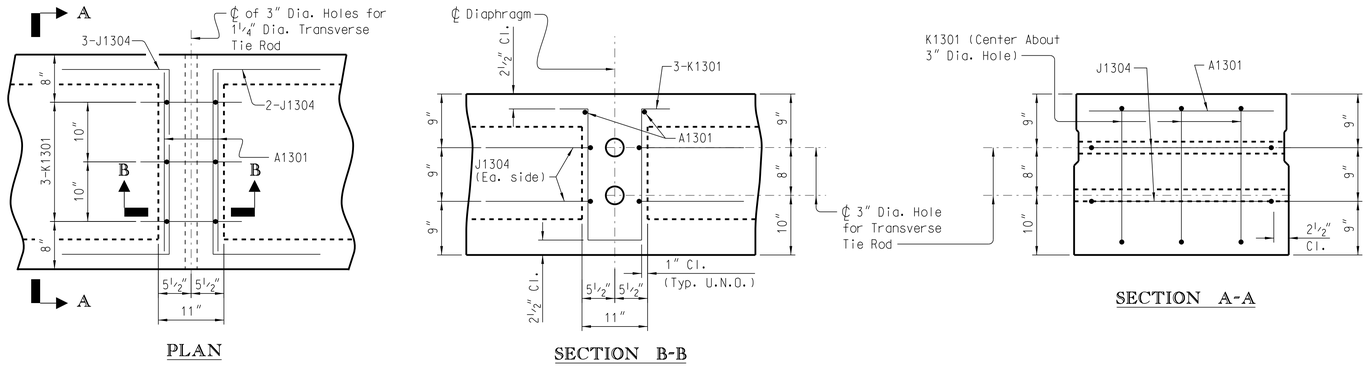
PRESTRESSED CONCRETE BOX BEAM DETAILS (6 OF X)

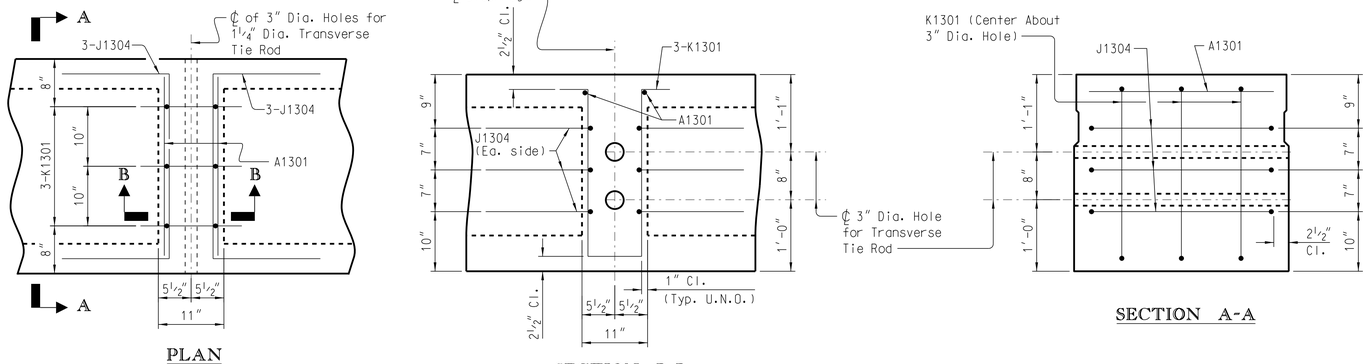
COUNTY	ROUTE

07-JUL-2022

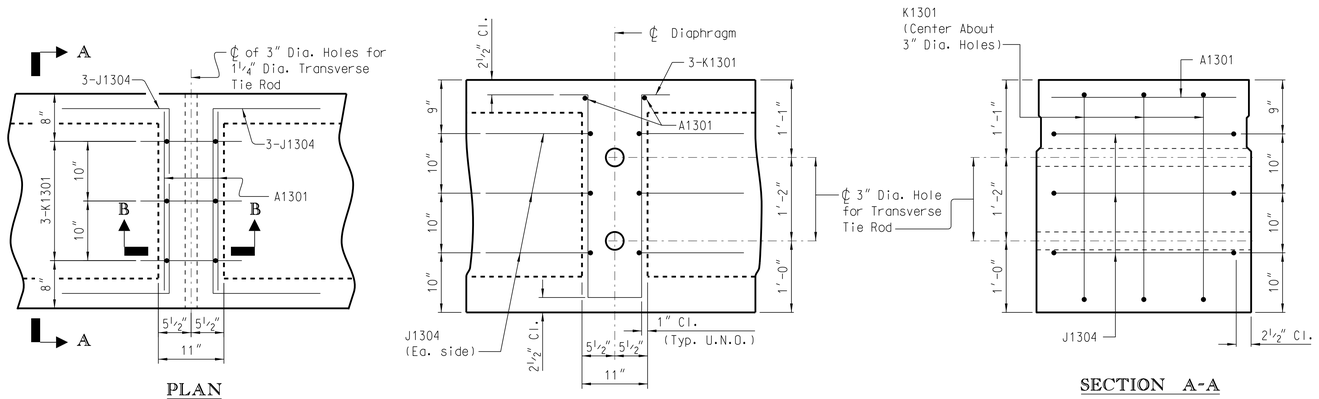
BRIDGE PLANS ID	SHEET NO.



DOUBLE DIAPHRAGM DETAILS - AASHTO BI-36



DOUBLE DIAPHRAGM DETAILS - AASHTO BII-36



DOUBLE DIAPHRAGM DETAILS - AASHTO BIII-36

Notes to Designer:

Select the appropriate "Double Diaphragm Details" for the box beam size(s) used.

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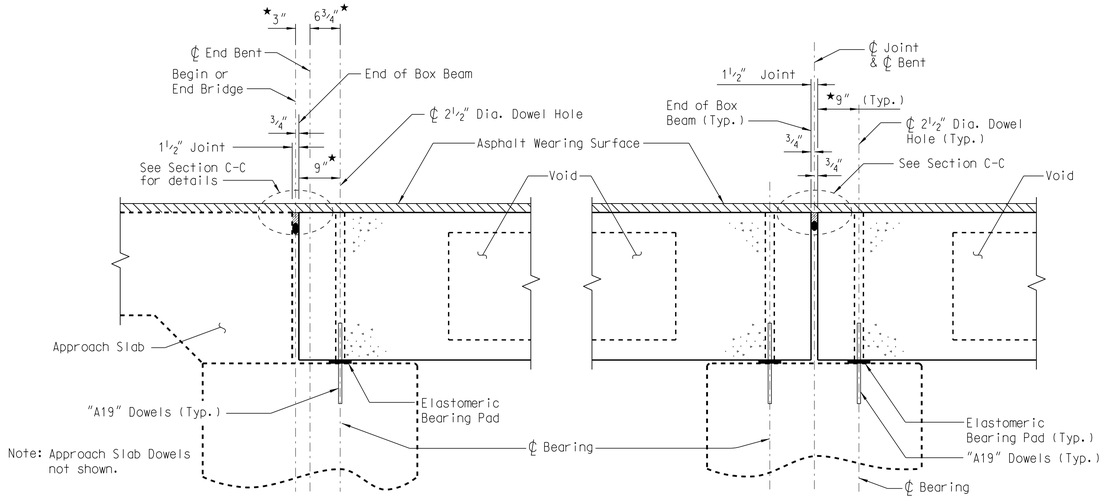
PRESTRESSED CONCRETE BOX BEAM DETAILS (7 OF X)

COUNTY	ROUTE

07-JUL-2022

BRIDGE PLANS ID	SHEET NO.



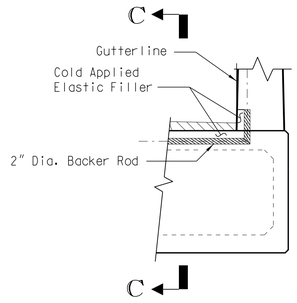
SECTION AT END BENT

(With Approach Slab)

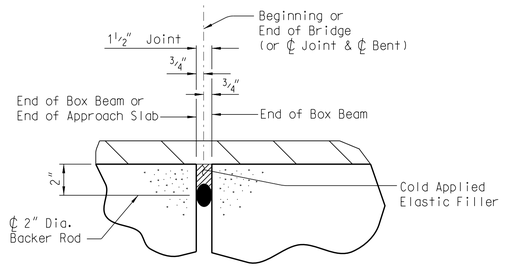
SECTION AT INTERIOR BENT

SECTION AT END BENT

(Without Approach Slab)



JOINT DETAIL



SECTION C-C

Notes to Designer:

Select the appropriate bent section details for the bridge.

★Verify. Dimensions shown are perpendicular to Bent and may need to be adjusted depending on skew and/or design details.

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PRESTRESSED CONCRETE BOX BEAM DETAILS (8 OF X)

COUNTY	ROUTE

07-JUL-2022