

# **DIVISION 3**

## **DESIGN AIDS**

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**DIVISION 3**  
**DESIGN AIDS**  
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Safety Shape Transition for Beam Rail Attachment

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**SECTION 11 – Sign Supports (VACANT)**

**BRIDGE PLATES 1.1.1 AND 1.1.2 DELETED, 04/19**

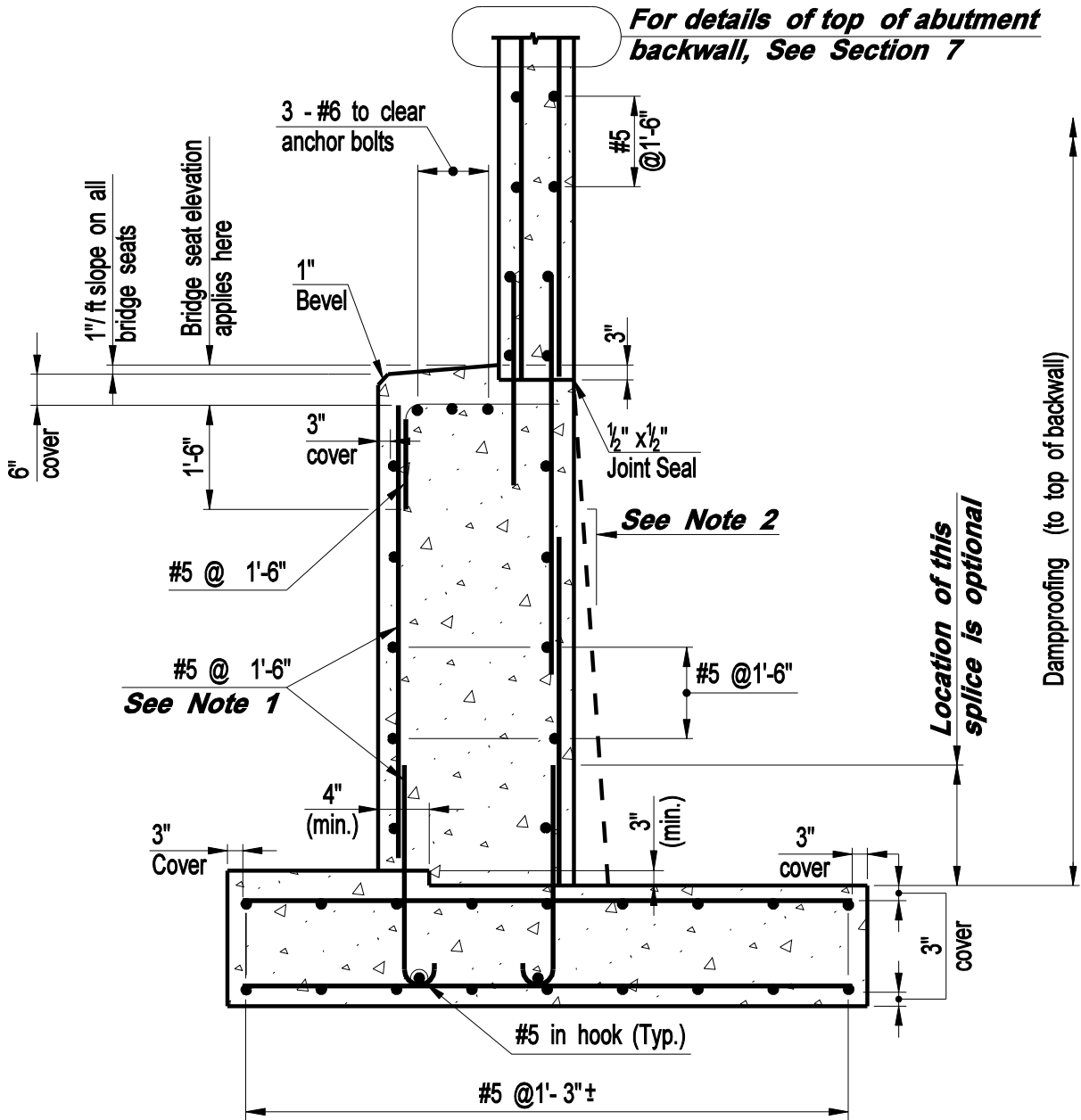
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BRIDGE DESIGN  
MANUAL**

DESIGN OPERATING  
VEHICLES

Issue Date: 10/03

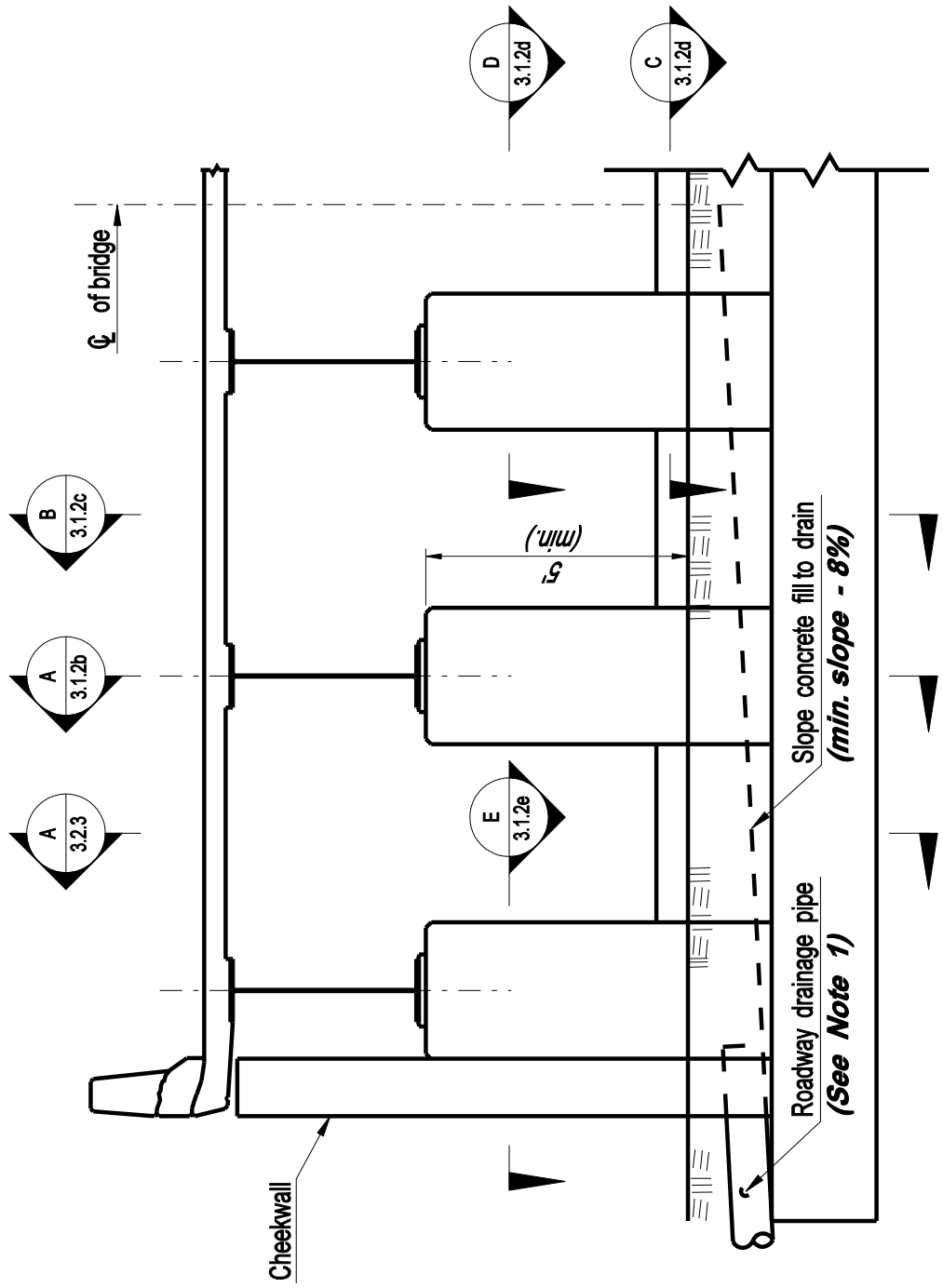
Revision Date: 04/19

Plate Number:  
1.1.1



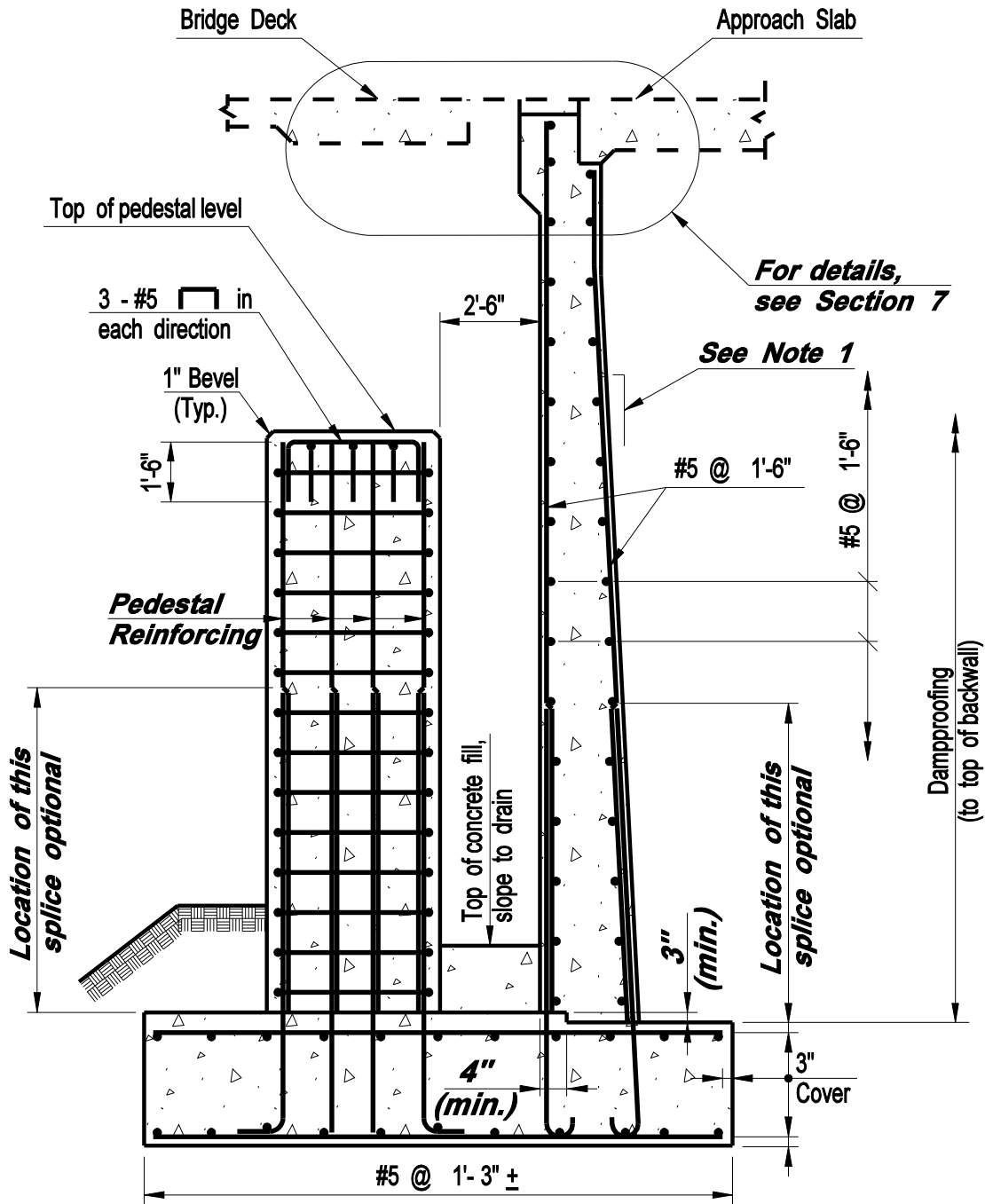
**NOTES:**

- 1. This reinforcement shall be designed for seismic forces.**
- 2. The rear face of the stem shall be battered if additional width at the base of the stem is required. The minimum batter shall be 1H:12V. Maintain a uniform top of batter elevation.**



**DESIGN INFORMATION**

**1. Designer shall determine the size of the outlet pipe and shall connect it to the roadway drainage system. Minimum size shall be 12".**



SECTION A  
3.1.2a

**DESIGN INFORMATION**

1. The rear face of the stem shall be battered if additional width at the base of the stem is required. The minimum batter shall be 1H:12V. Maintain a uniform top of batter elevation.

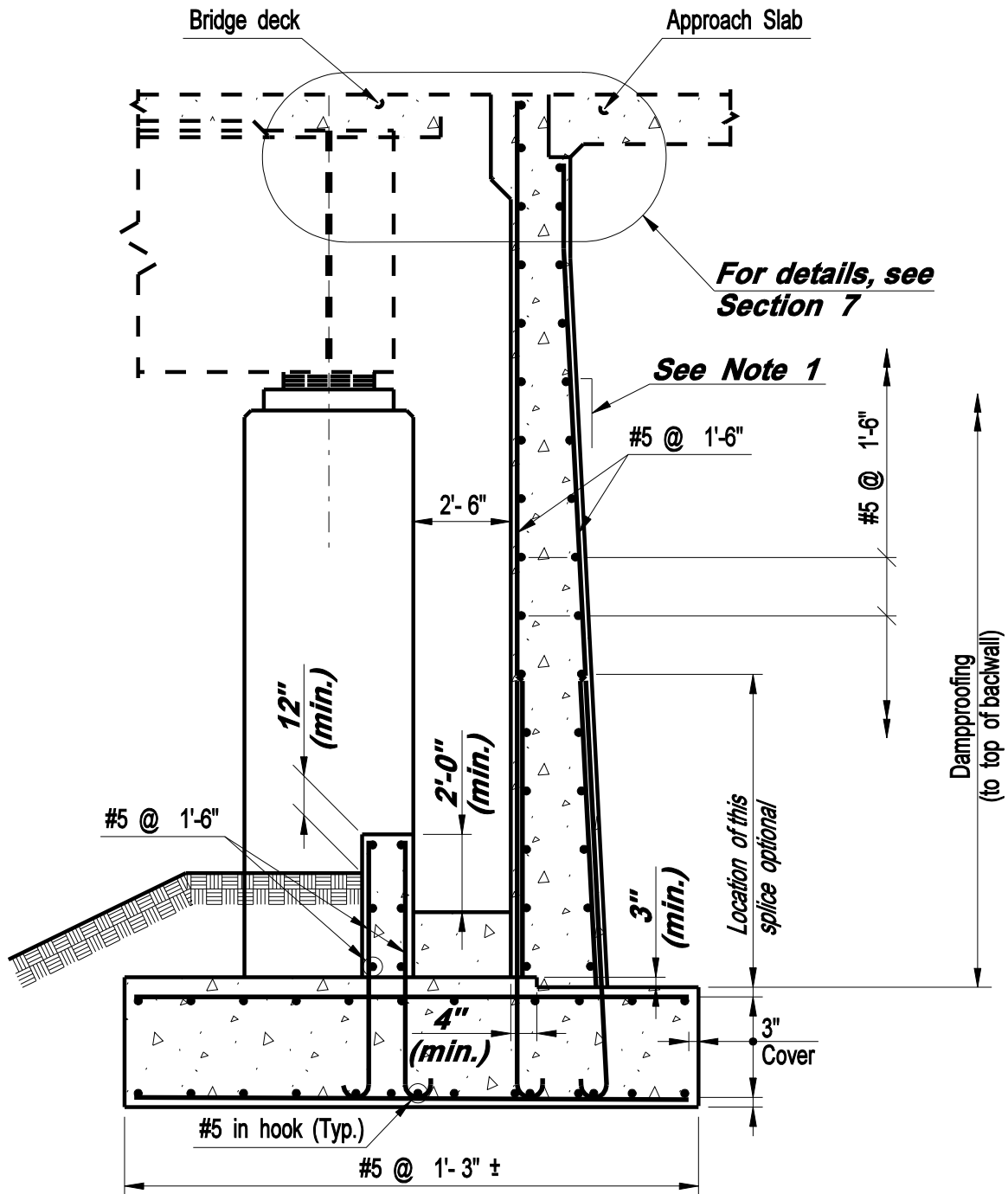
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PEDESTAL TYPE ABUTMENT  
SECTION A

Issue Date: 10/03

Revision Date:

Plate Number:  
3.1.2b



SECTION B  
3.1.2a

**DESIGN INFORMATION**

**1. The rear face of the stem shall be battered if additional width at the base of the stem is required. The minimum batter shall be 1H:12V. Maintain a uniform top of batter elevation.**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

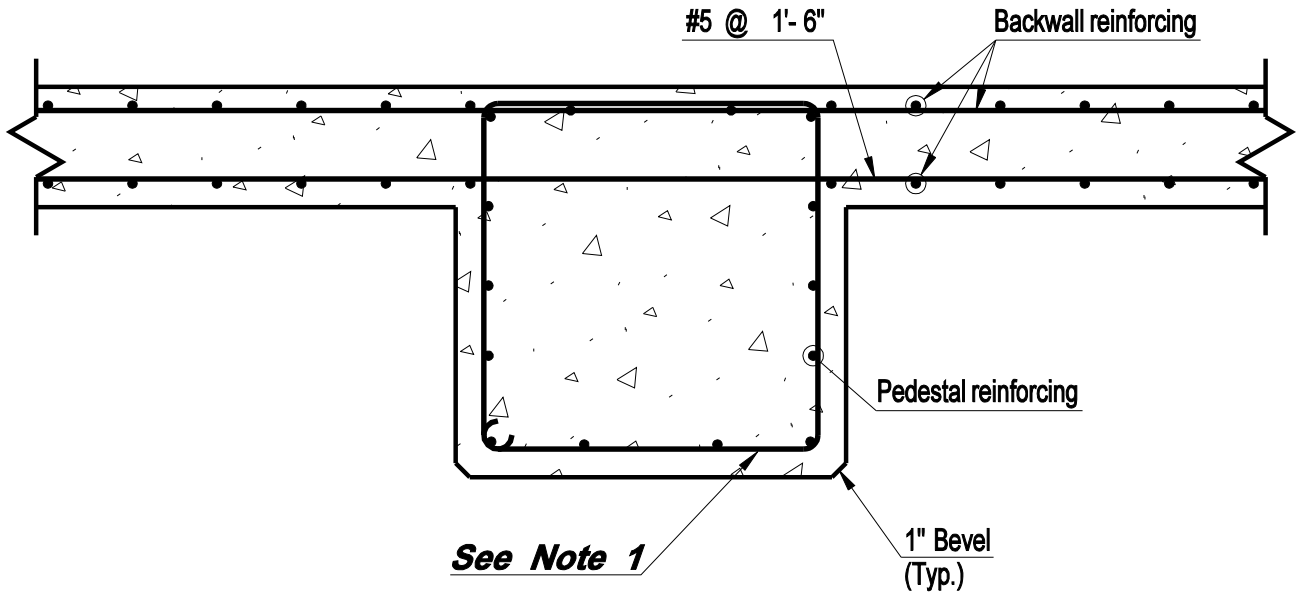
PEDESTAL TYPE ABUTMENT  
SECTION B

Issue Date: 10/03

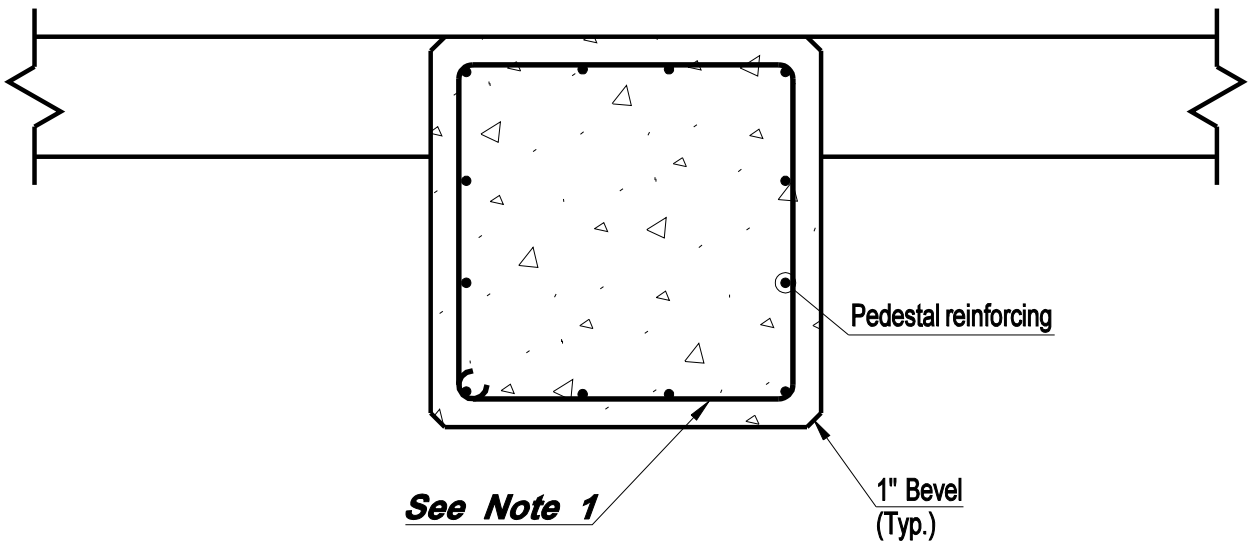
Revision Date:

Plate Number:

3.1.2c



SECTION C  
3.1.2a



SECTION D  
3.1.2a

DESIGN INFORMATION

*1. Ties to be designed in accordance with AASHTO requirements.*

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

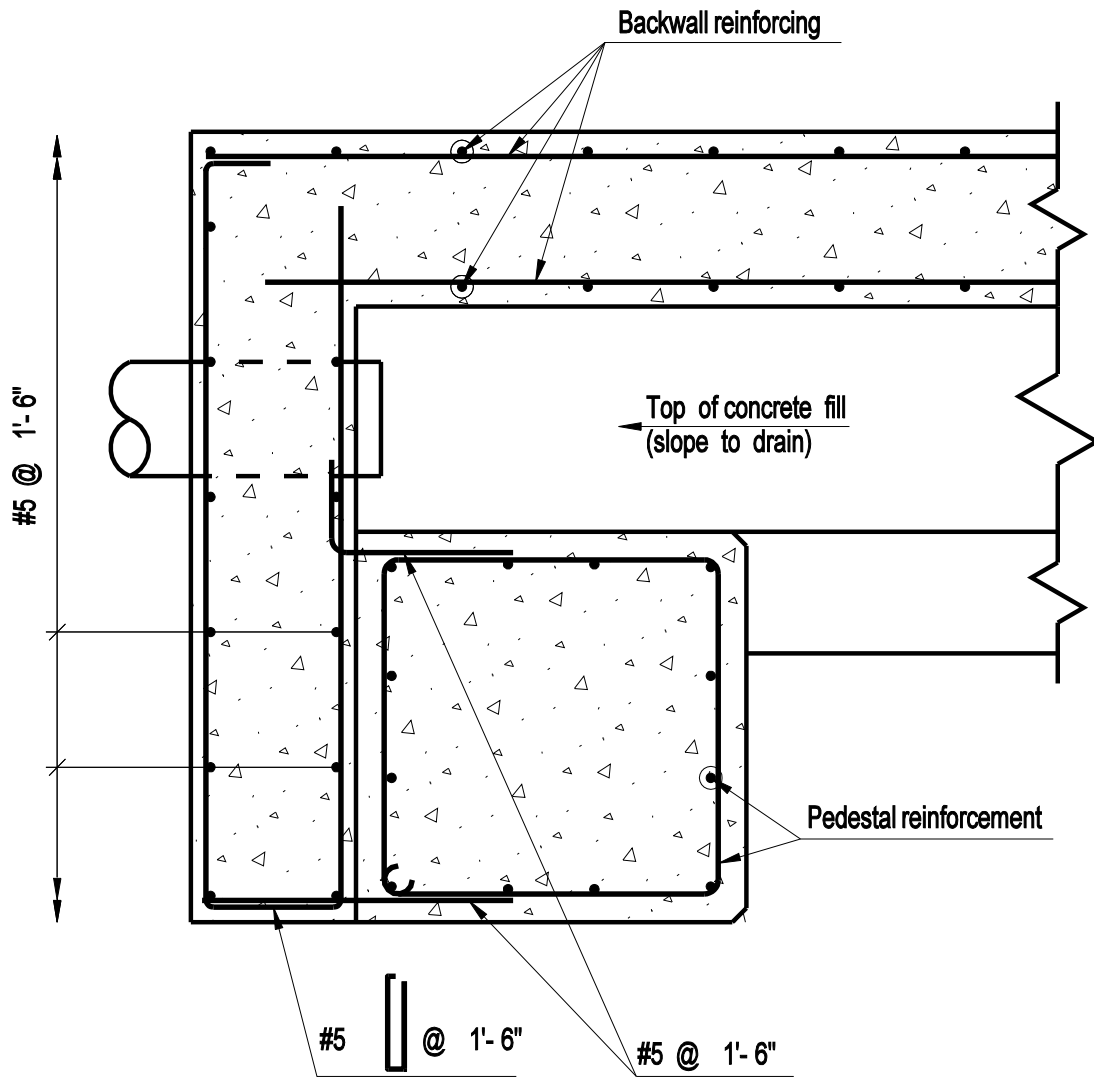
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PEDESTAL REINFORCEMENT

Issue Date: 10/03

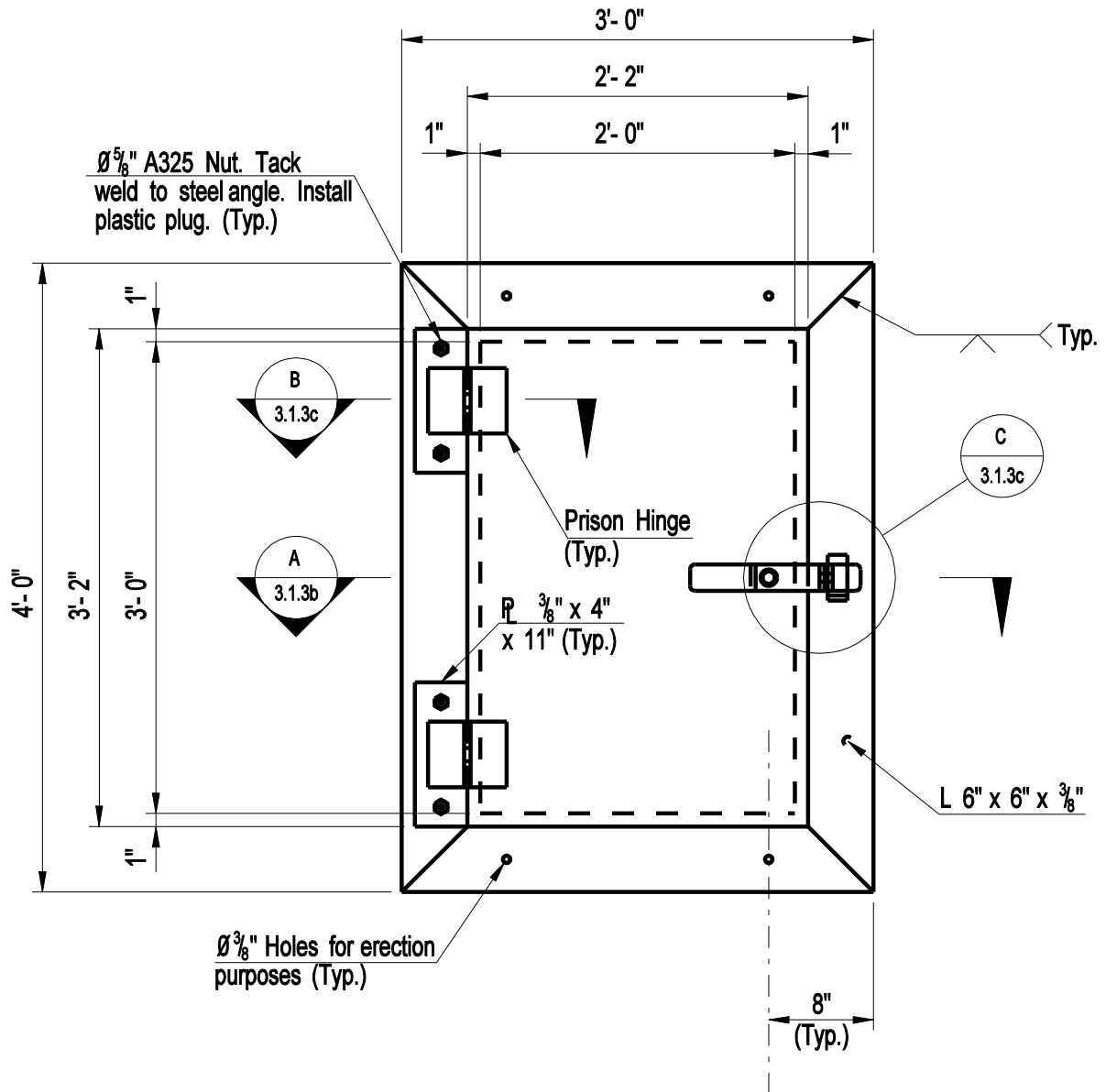
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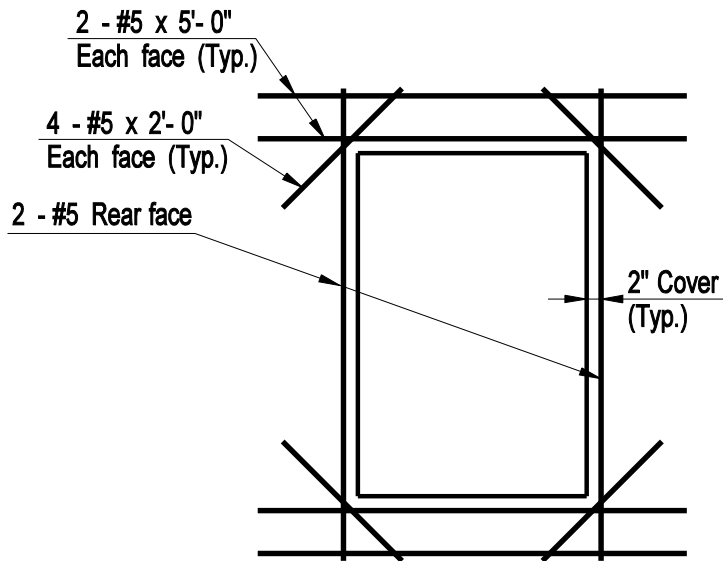


SECTION E  
3.1.2a

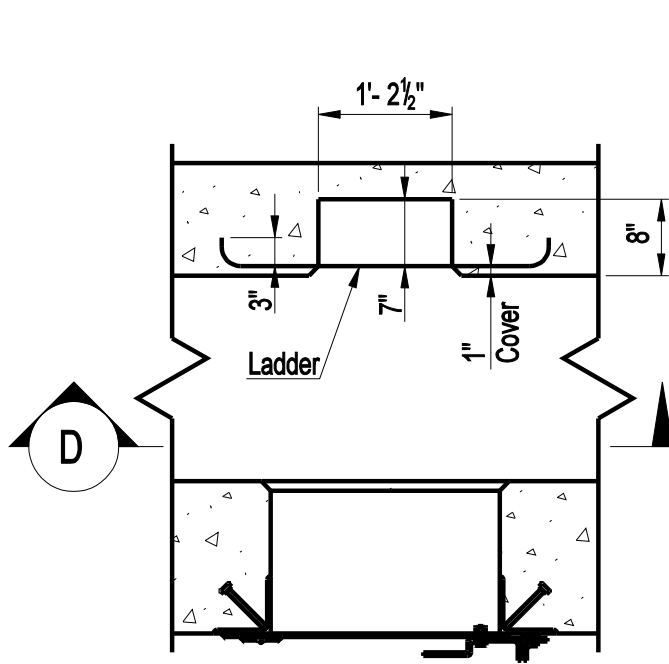


**NOTES:**

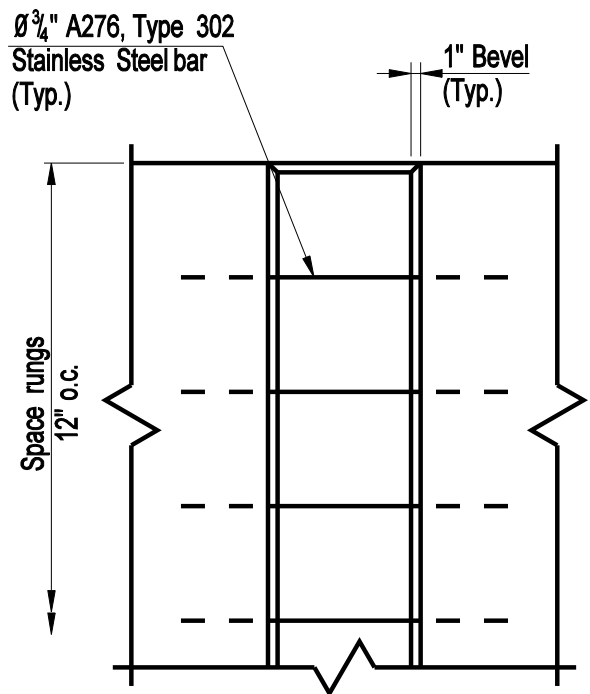
1. Material for access door and frame shall conform to the requirements of AASHTO M270 Grade 50.
2. Frame and door assembly shall be galvanized in accordance with ASTM A123 after fabrication.



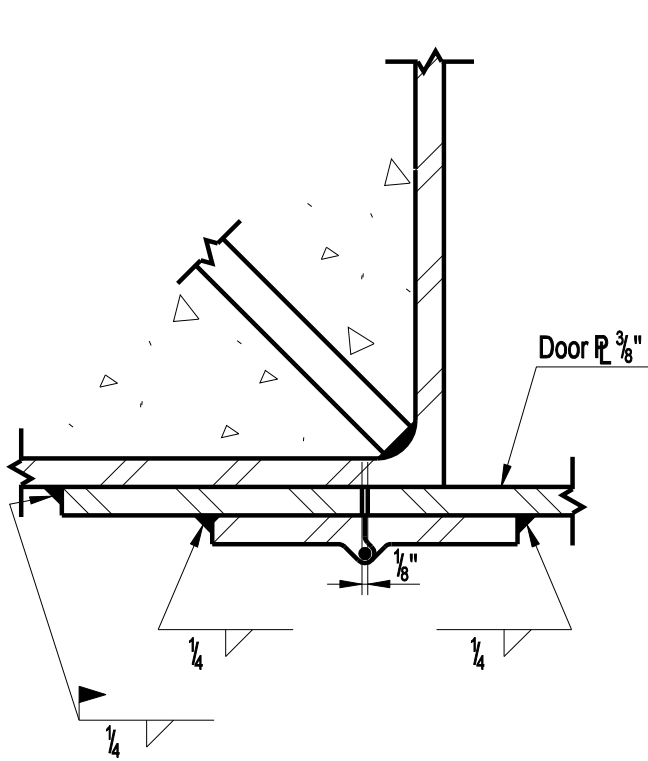
**ADDITIONAL REINFORCING  
AT ACCESS DOOR**



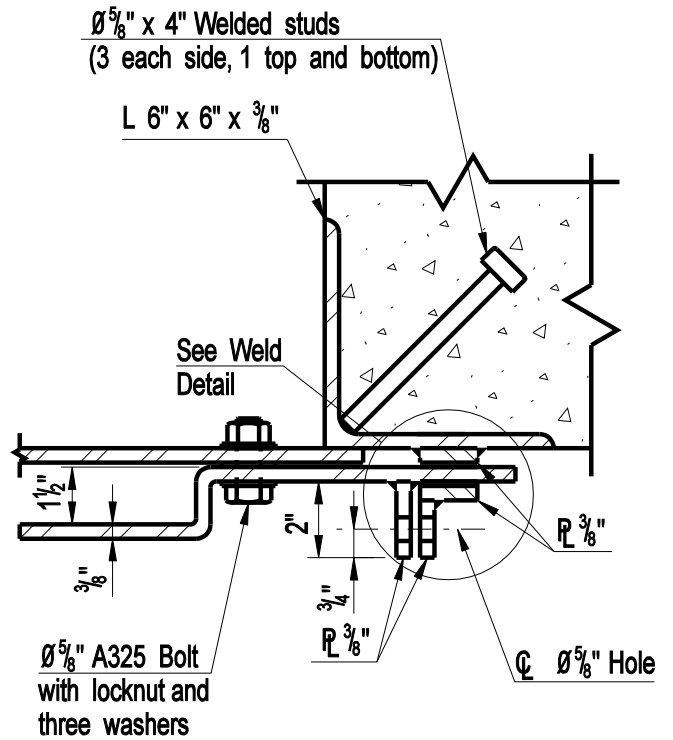
SECTION A  
3.1.3a



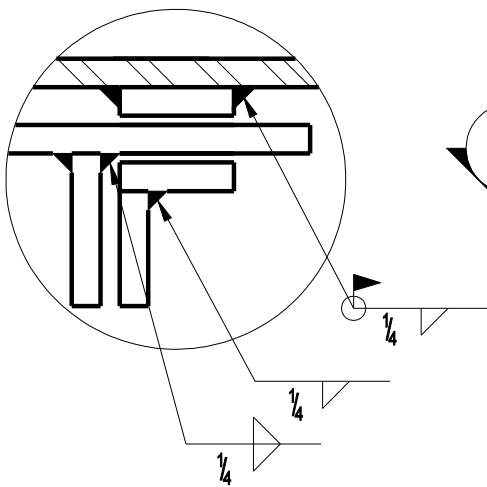
VIEW D



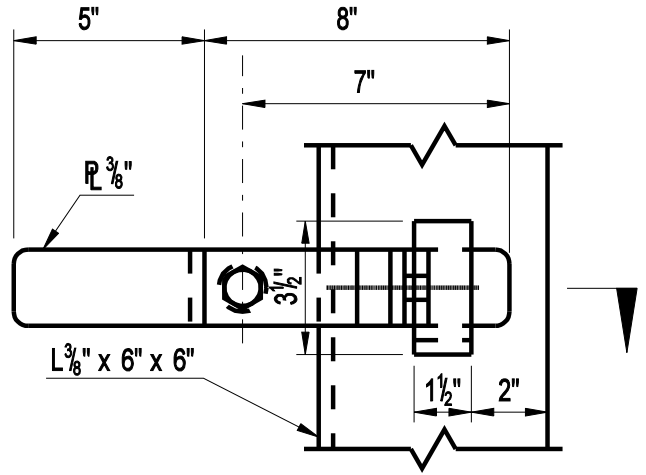
SECTION B



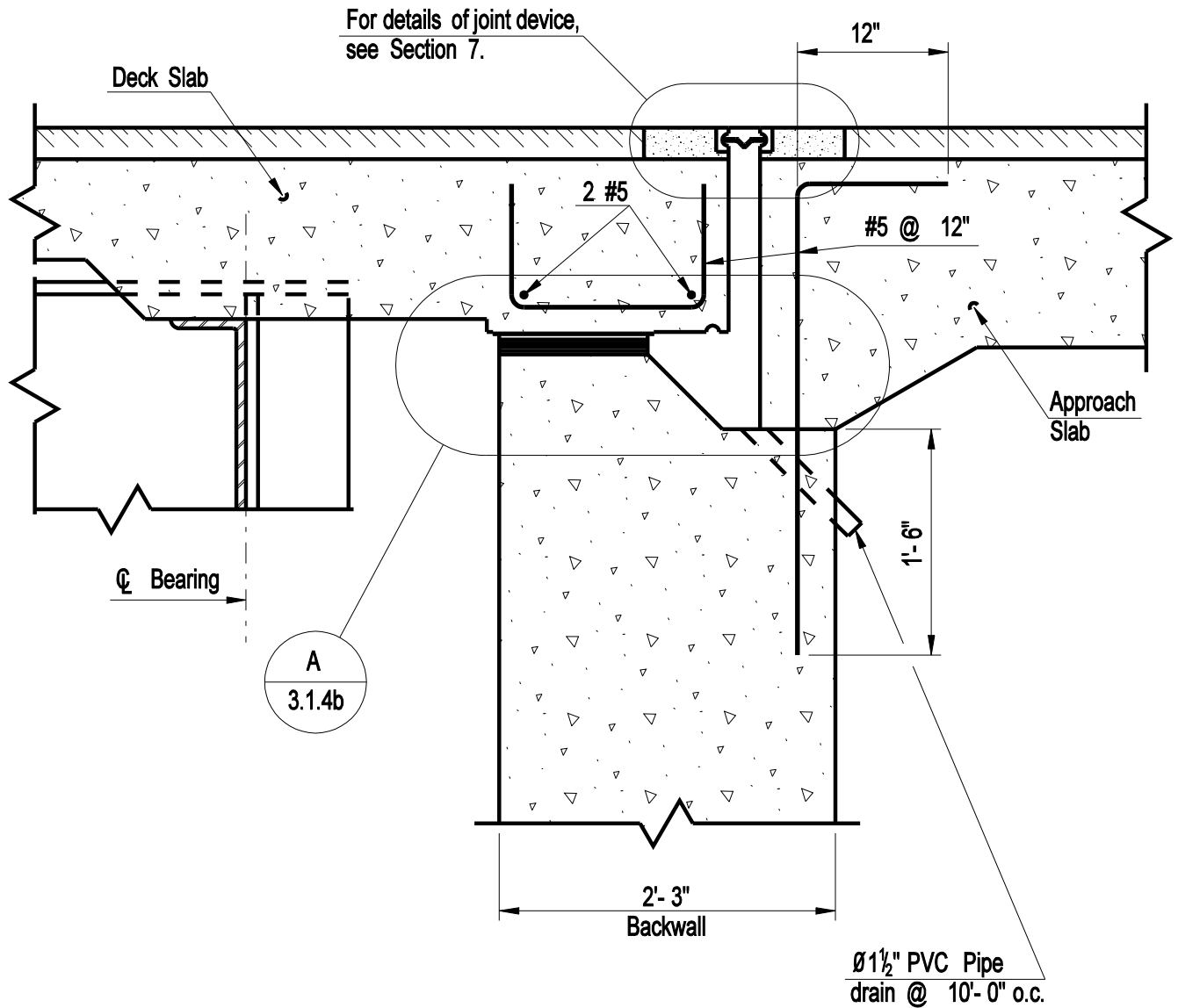
SECTION E



WELD DETAIL

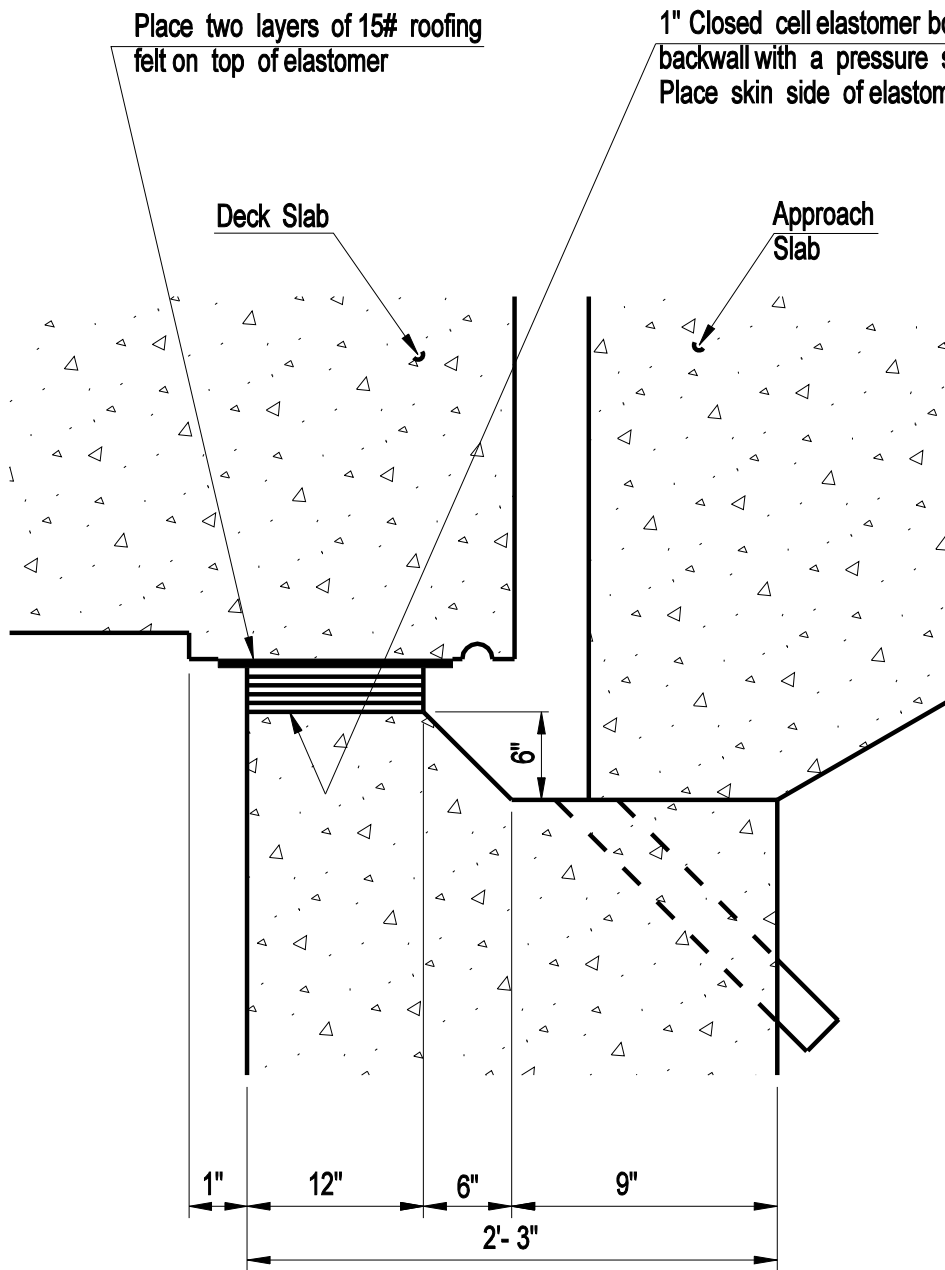


LATCH DETAIL C

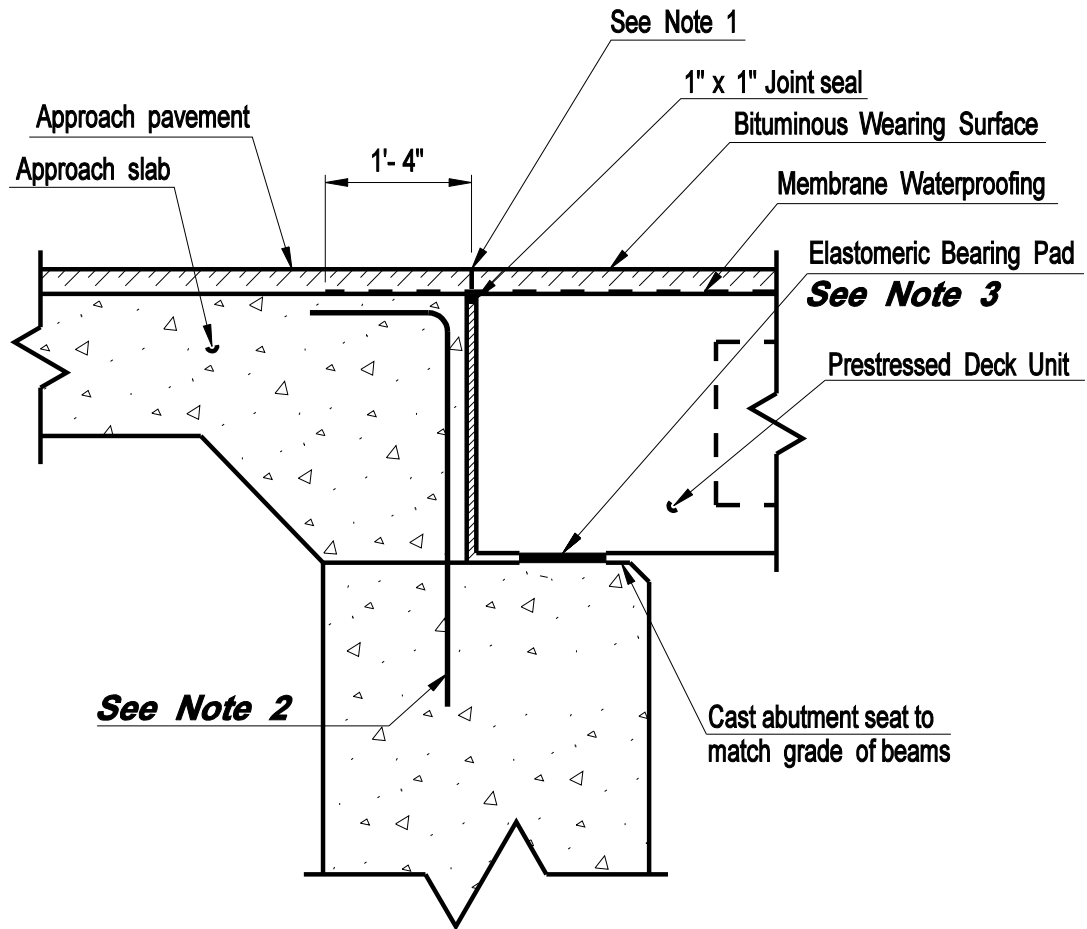


**NOTES:**

1. For slab information not shown, see Section 6.
2. For approach slab details, see Section 6.



DETAIL A



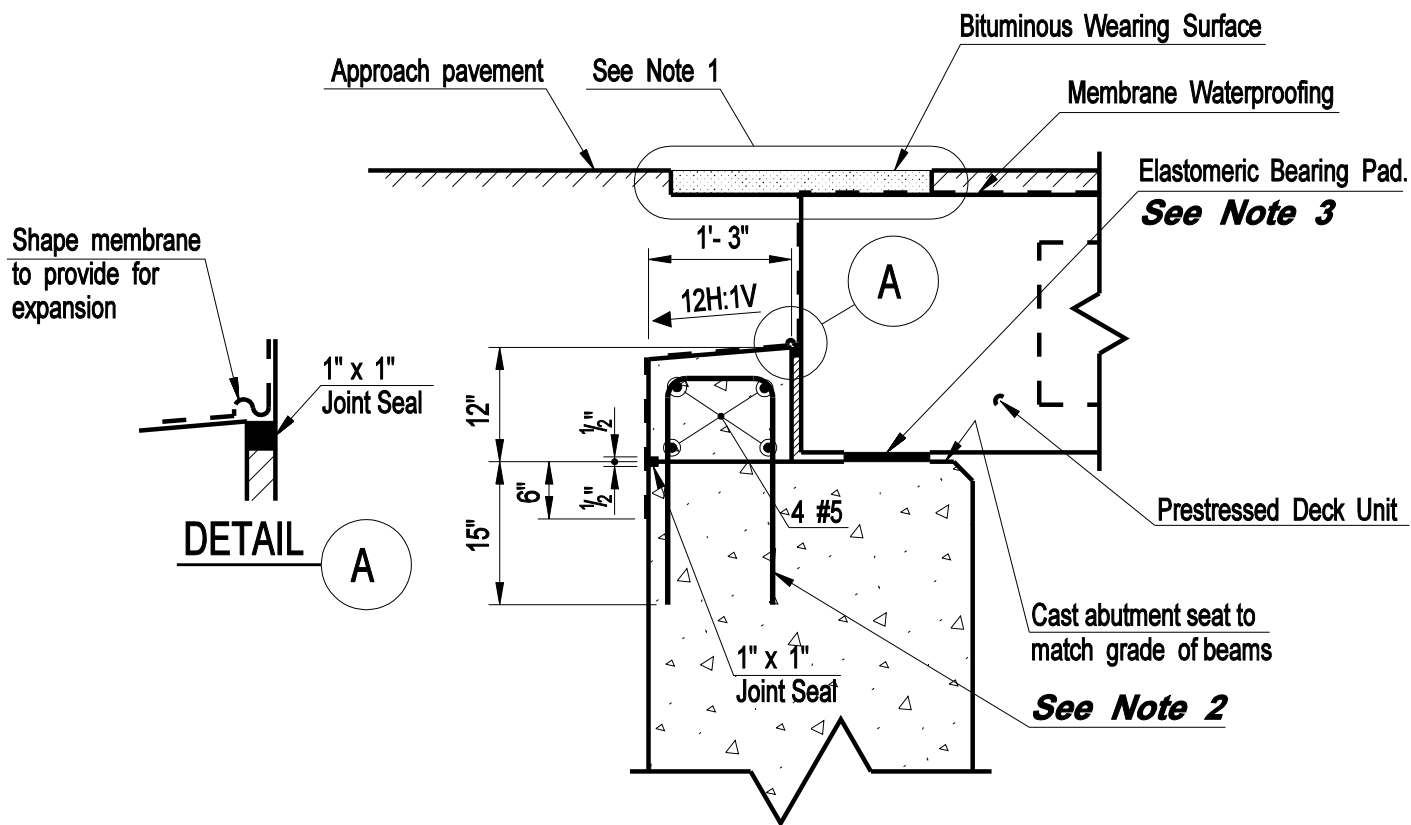
**TYPICAL SECTION THROUGH ABUTMENT AT BEARING**

**NOTES:**

1. Cut bituminous overlay with  $\frac{3}{8}$ " wide by  $1\frac{3}{4}$ " deep kerf and fill with pourable sealant.  
To be paid for under the item "Sawing and Sealing Joints in Bituminous Pavement".

**DESIGN INFORMATION:**

- 2. *The approach slab and cheekwall reinforcement shall be designed to resist longitudinal and transverse seismic forces.*
- 3. *Elastomeric Bearing shall be designed according to Section 14 of the AASHTO specifications.*



**TYPICAL SECTION THROUGH ABUTMENT AT BEARING**

**NOTES:**

1. For details of joint device, see Section 7

**DESIGN INFORMATION:**

- 2. The backwall and cheekwall shall be designed to resist longitudinal and transverse seismic forces.**
- 3. Elastomeric Bearing shall be designed according to Section 14 of the AASHTO specifications.**
- 4. This detail should be used only with the express permission of the Department. In most cases, approach slabs shall be used as detailed on Plate 3.1.5. See Article 5.8, Section I for warrants for use.**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

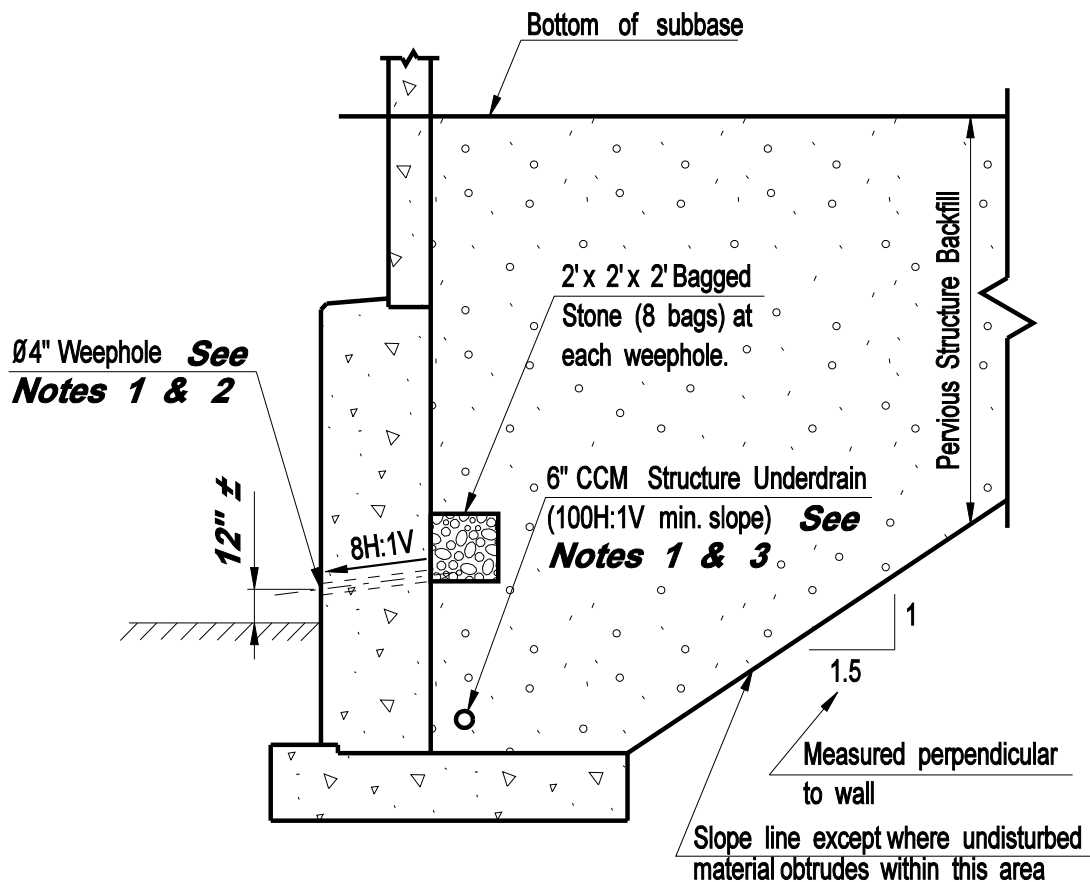
**ABUTMENT DETAILS FOR  
PRECAST CONCRETE  
DECK UNITS WITHOUT  
APPROACH SLAB**

Issue Date: 10/03

Revision Date: 01/05

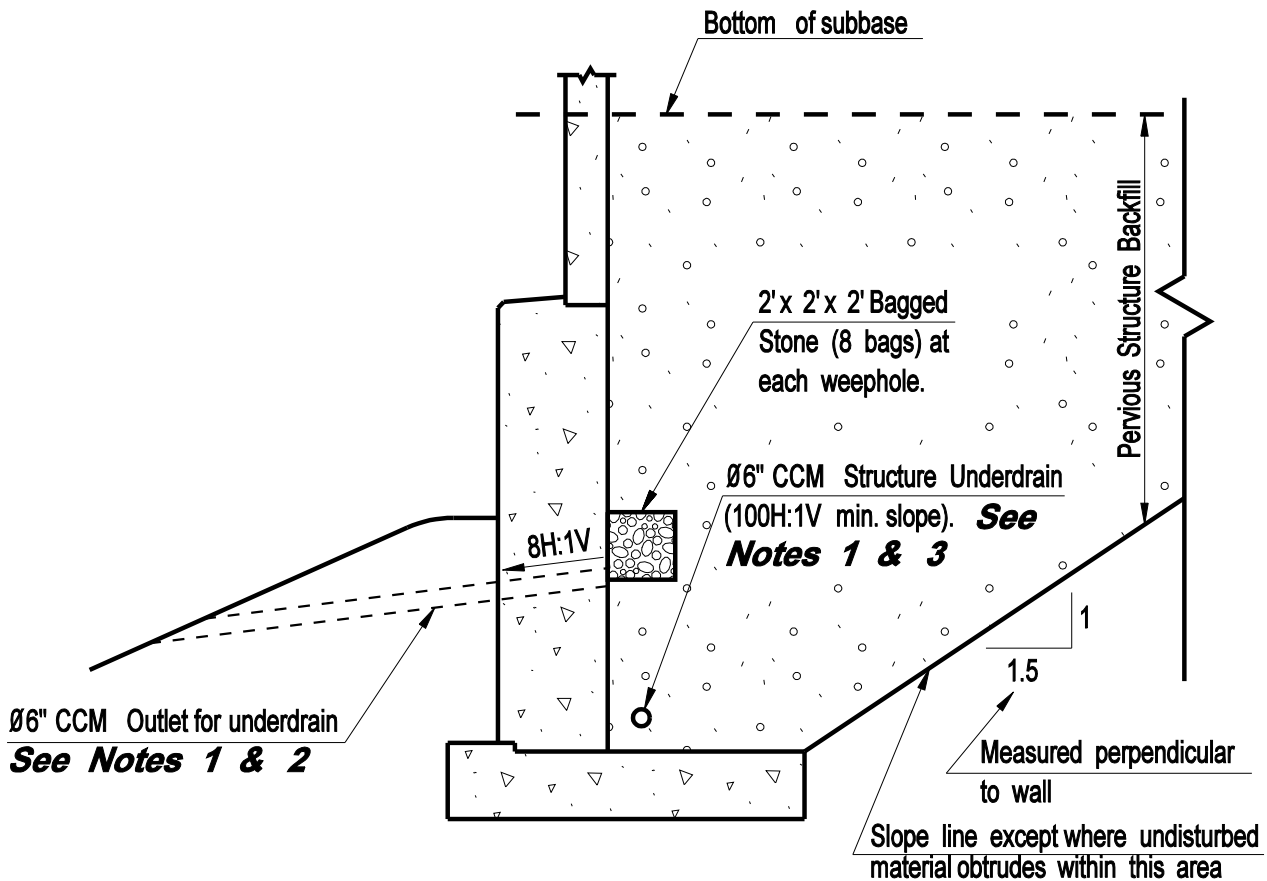
Plate Number:  
**3.1.6**





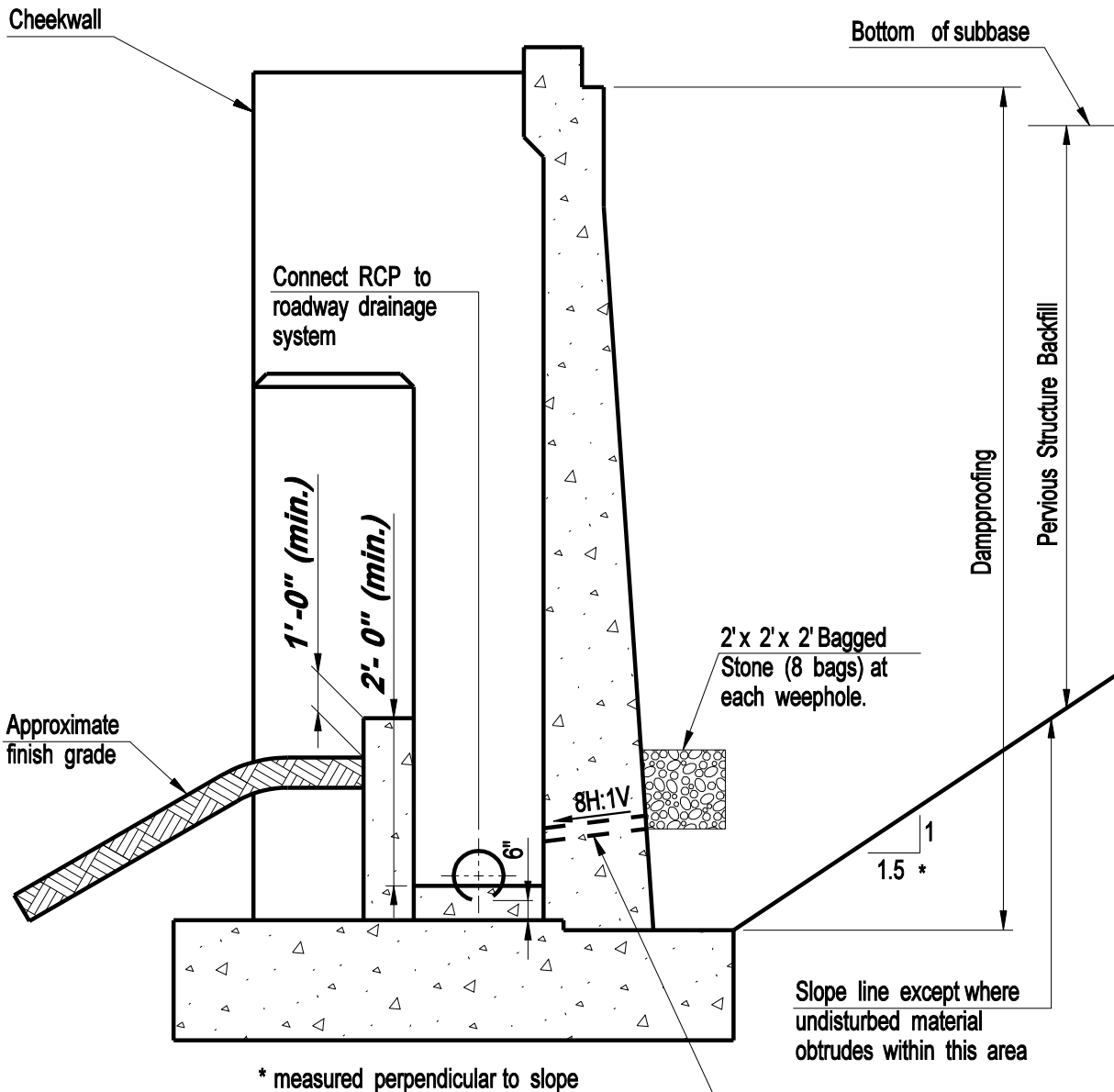
**DESIGN INFORMATION**

- 1. Plans should show either 4" weepholes or 6" structure underdrain. See Division I.**
- 2. Horizontal spacing and invert elevations of weepholes at the front face of abutment shall be shown on the abutment elevation views on the plans.**
- 3. 6" CCM Structure Underdrain and 6" CCM Outlet for Underdrain shall be included as Bridge Pay Items.**



**DESIGN INFORMATION**

- 1. Plans should show either 4" weepholes or 6" structure underdrain. See Division I.**
- 2. Horizontal spacing and invert elevations of extended weepholes at the front face of abutment shall be shown on the abutment elevation views on the plans.**
- 3. 6" CCM Structure Underdrain and 6" CCM Outlet for Underdrain shall be included as Bridge Pay Items.**



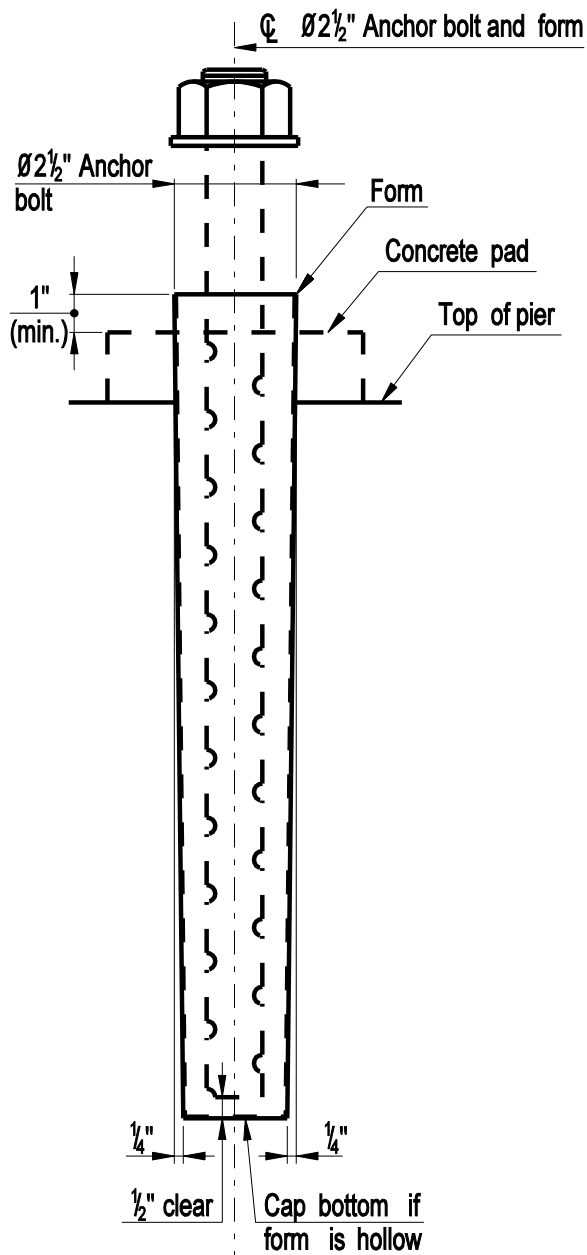
SECTION A  
3.1.2a

Ø4" Weepholes *See Notes 1 & 2*

**DESIGN INFORMATION**

- 1. Plan should show either 4" weep hole or 6" structure underdrain. See Section I.**
- 2. Horizontal spacing and invert locations of weepholes shall be shown on the abutment elevation views on the plans.**

<b>CONNECTICUT BRIDGE DESIGN MANUAL</b>	<b>PEDESTAL TYPE ABUTMENT DRAINAGE AND BACKFILL REQUIREMENTS</b>	Issue Date: 10/03
		Revision Date:
		Plate Number: <b>3.2.3</b>

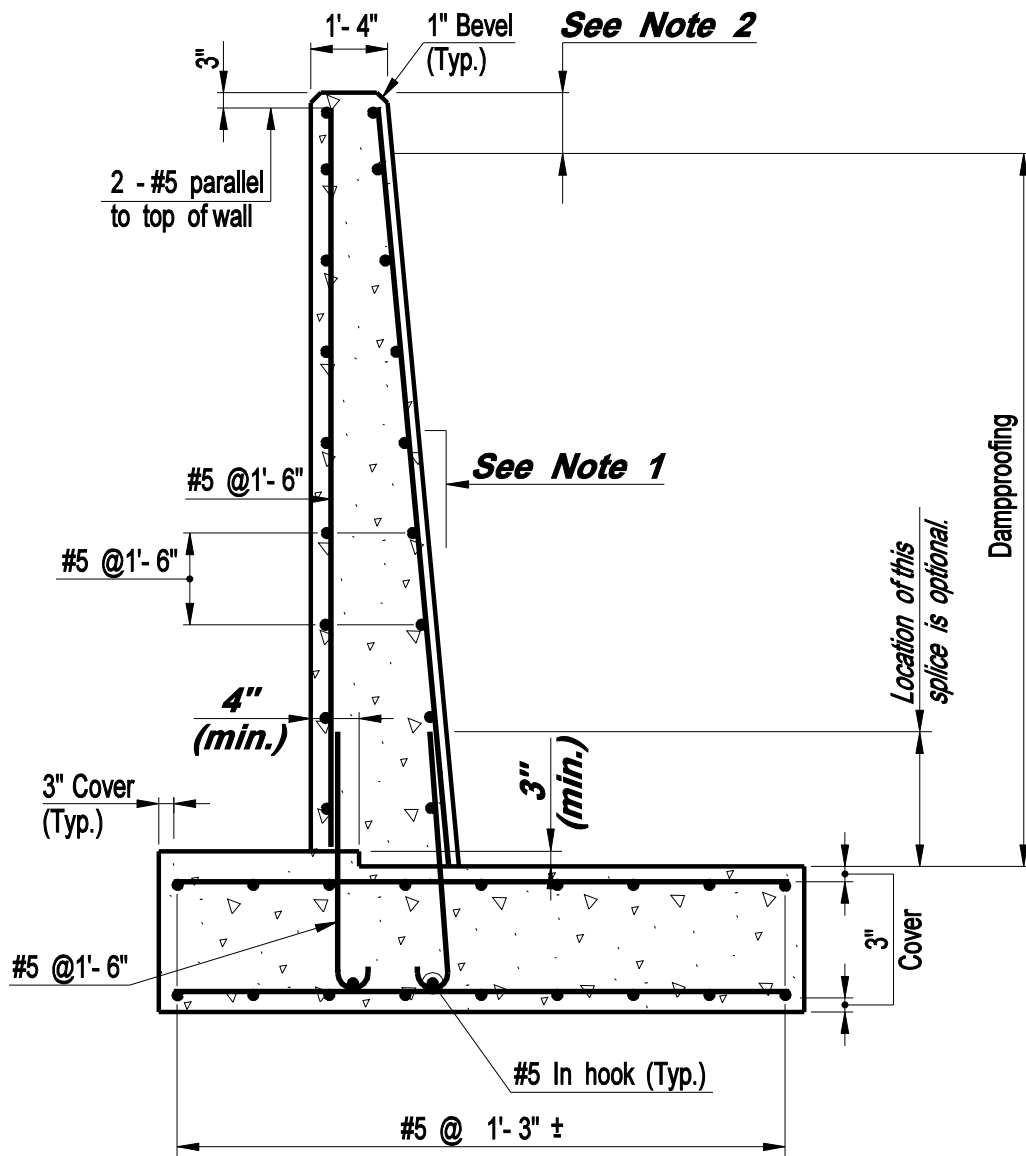


**NOTES:**

Forms shall be unoled, held in place accurately by template, and removed after concrete has hardened. Anchor bolts shall be set accurately and grouted with non-shrink grout. The cost of furnishing and installing forms to be included in the item "Class F Concrete".

**DESIGN INFORMATION**

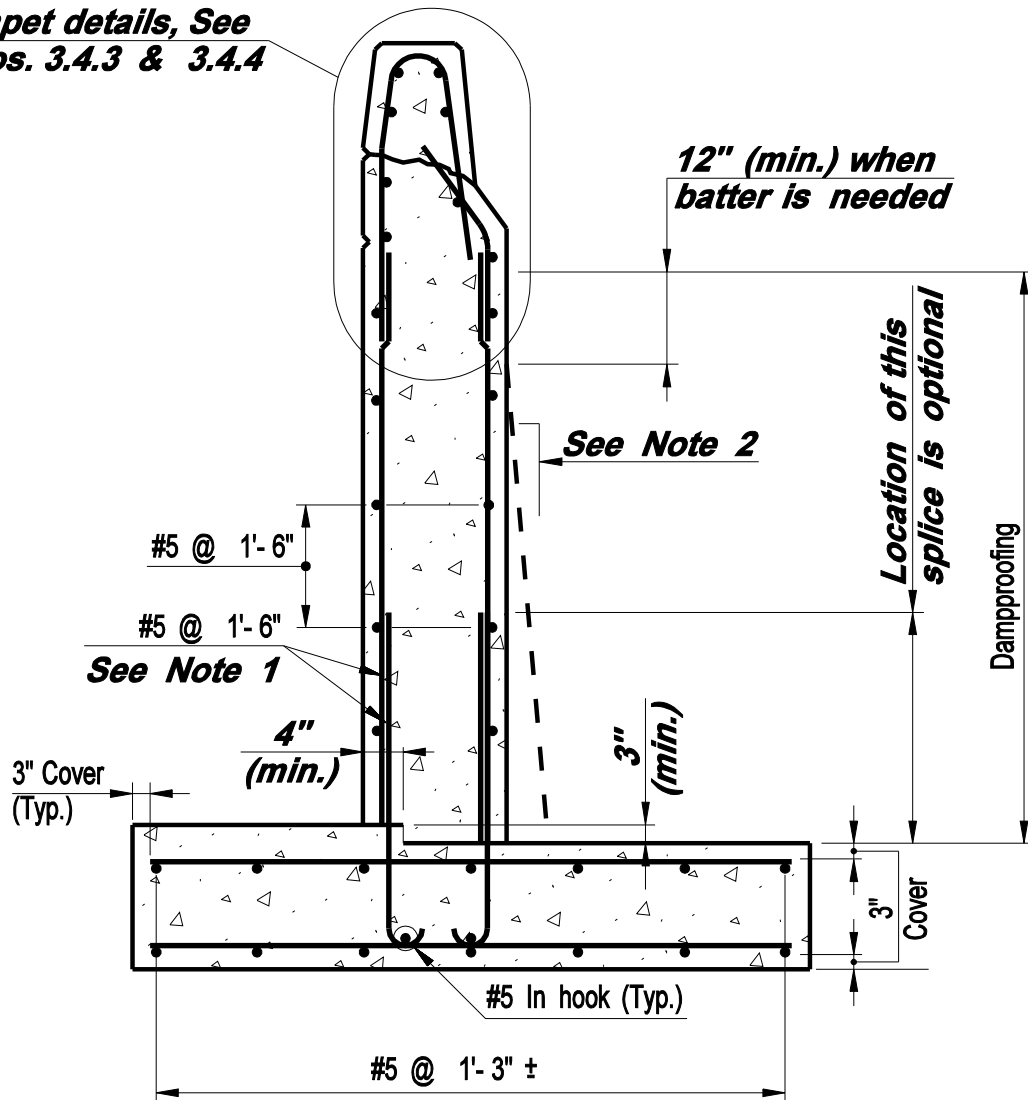
*Designer to determine the exact location of forms in relation to reinforcement and, if necessary, respace or add extra rows of reinforcing. Forms are to be used primarily at piers but may also be used elsewhere at the discretion of the designer.*



**DESIGN INFORMATION**

- 1. The rear face of the stem shall be battered if additional width at the base of the stem is required. The minimum batter shall be 1H:12V. Maintain a uniform top of batter elevation.**
- 2. This dimension may be increased to follow finished grade.**

*For parapet details, See Plate Nos. 3.4.3 & 3.4.4*



**DESIGN INFORMATION**

1. *This reinforcement shall be designed for seismic forces.*
2. *The rear face of the stem shall be battered if additional width at the base of the stem is required. The minimum batter shall be 1H:12V. Maintain a uniform top of batter elevation.*

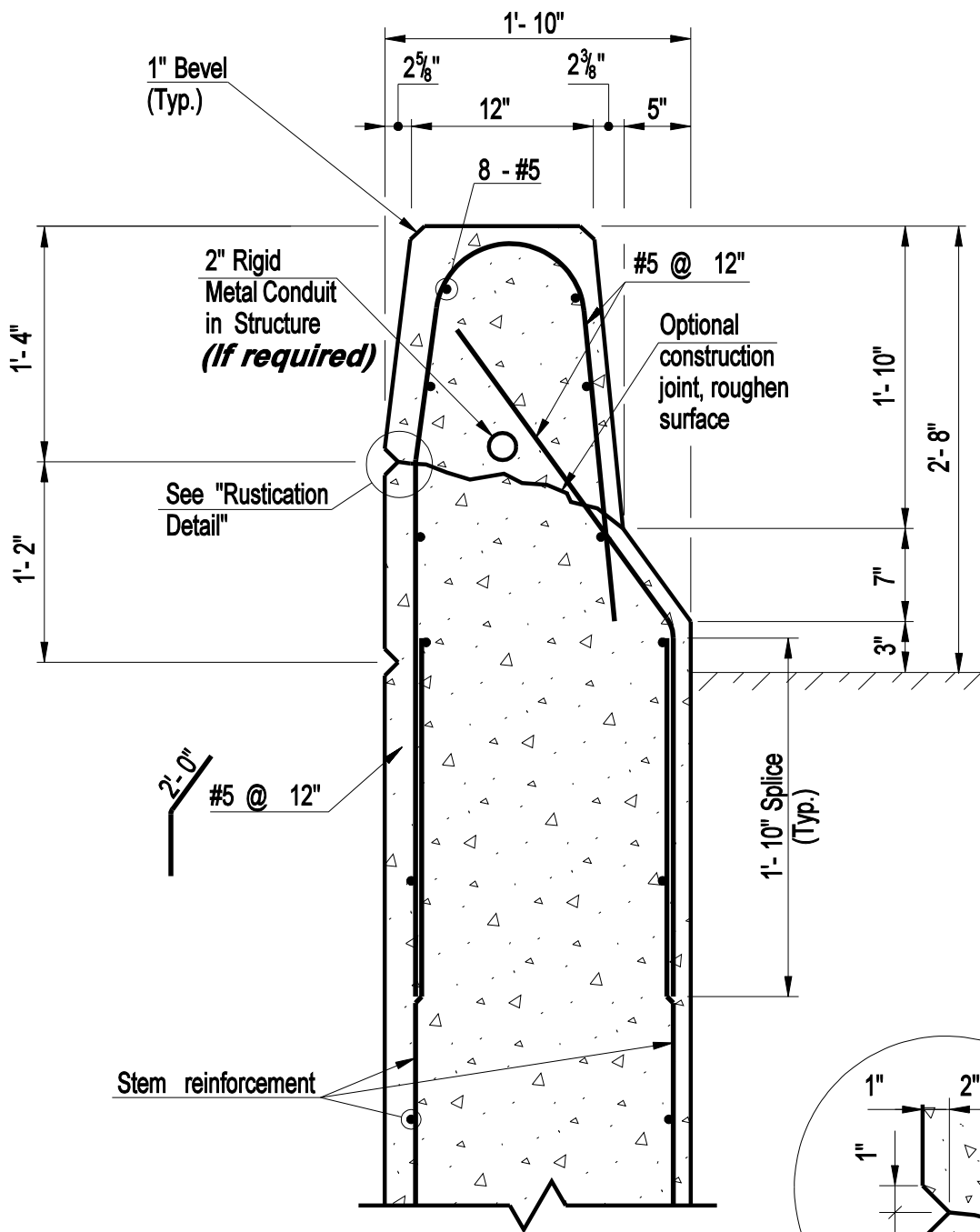
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**U - TYPE WINGWALL OR  
RETAINING  
WALL WITH SLOPED CURB**

Issue Date: 10/03

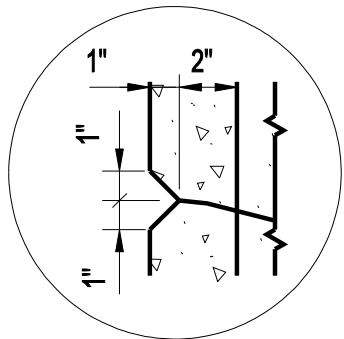
Revision Date:

Plate Number:  
**3.4.2**



2'-0"  
#5 @ 12"

1'-10" Splice  
(Typ.)



Rustication Detail

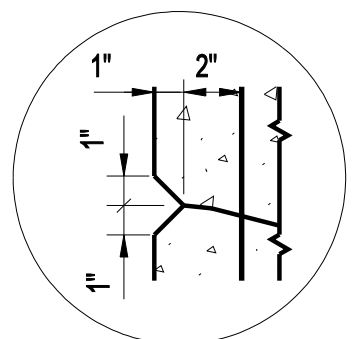
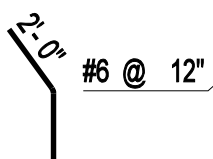
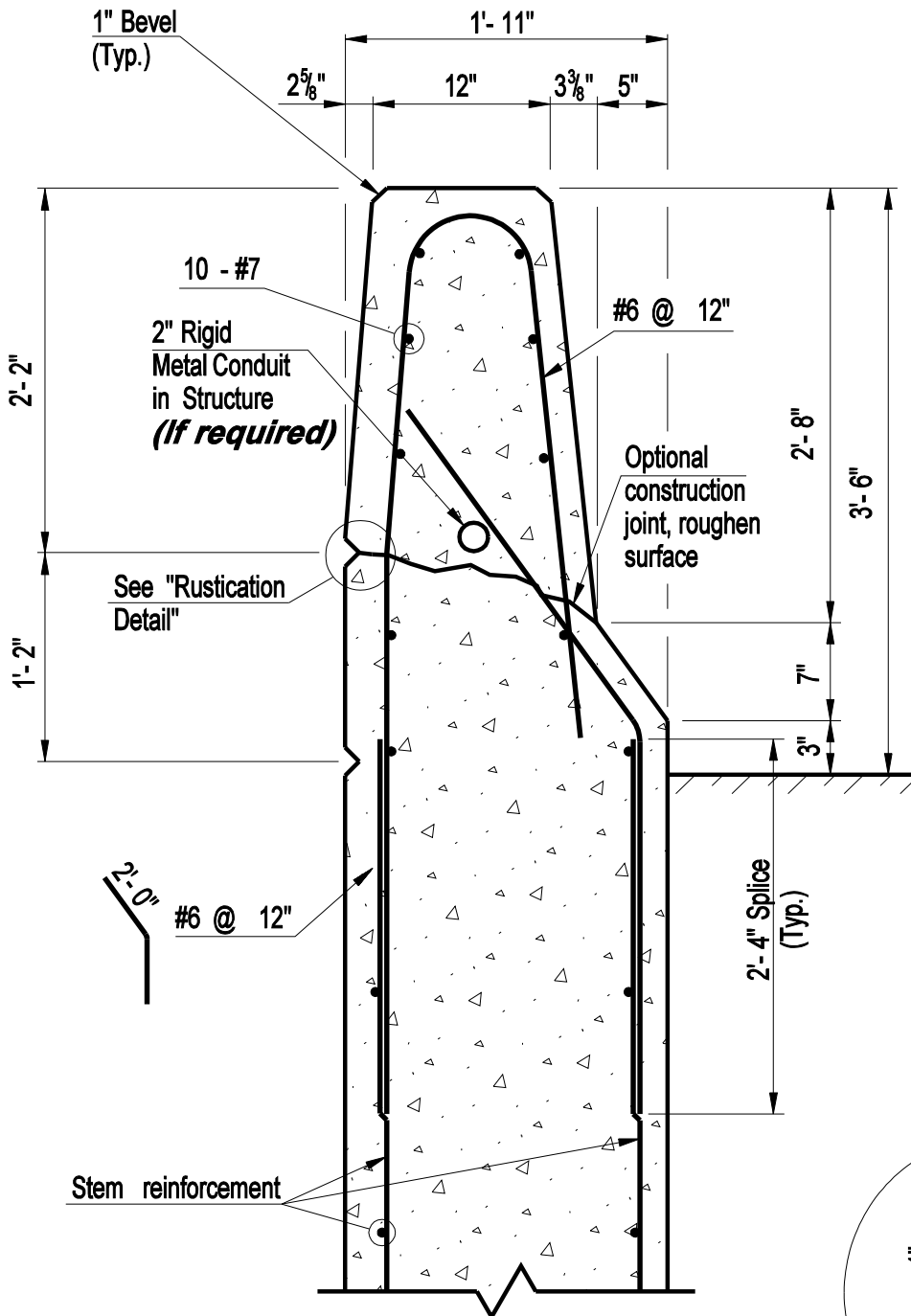
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**STANDARD WINGWALL PARAPET  
(32" HIGH)**

Issue Date: 10/03

Revision Date:

Plate Number:  
**3.4.3**



Rustication Detail

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**STANDARD WINGWALL PARAPET  
(42" HIGH)**

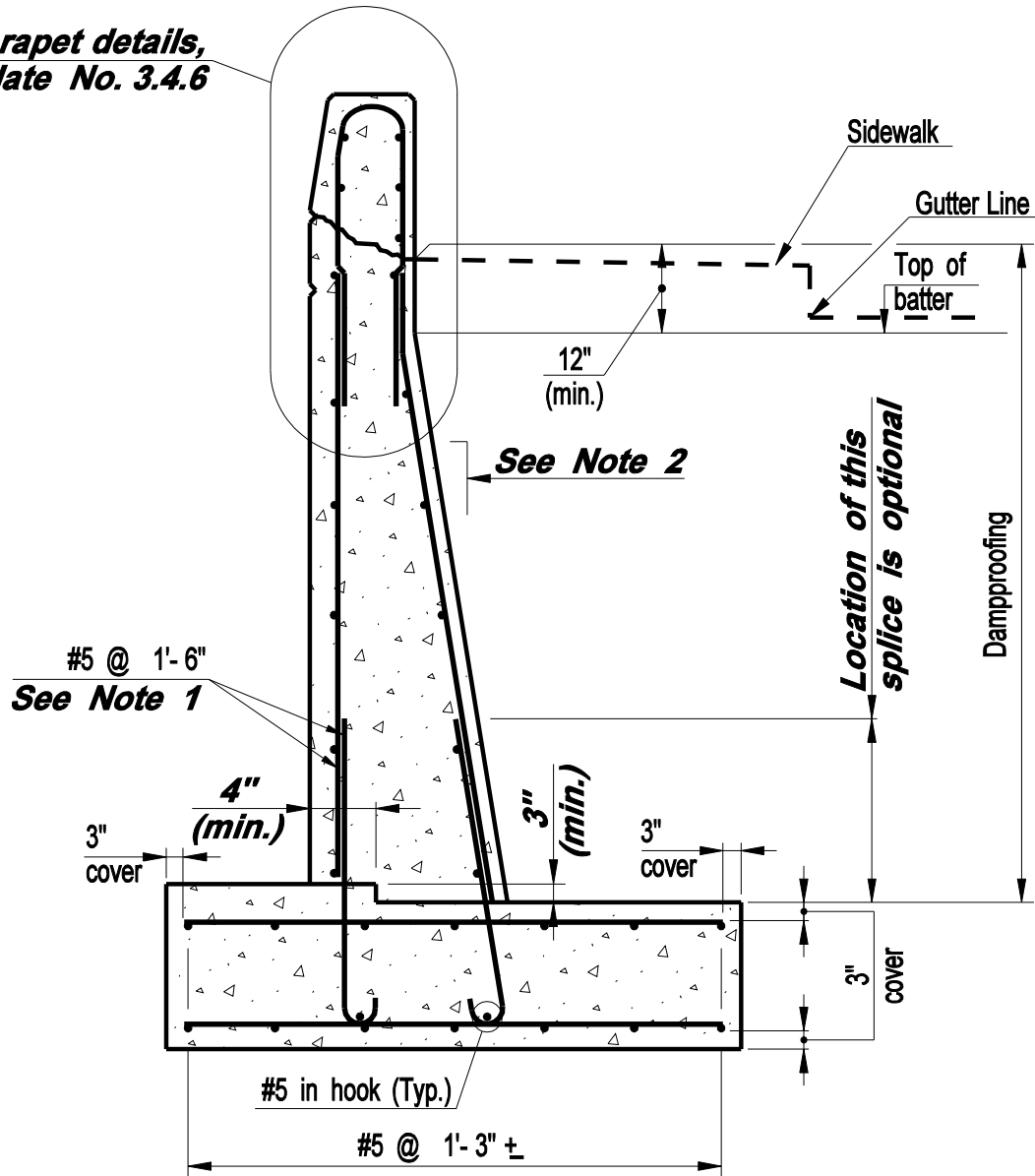
Issue Date: 10/03

Revision Date:

Plate Number:  
**3.4.4**



***For parapet details,  
See Plate No. 3.4.6***



**DESIGN INFORMATION**

1. *This reinforcement shall be designed for seismic forces.*
2. *The rear face of the stem shall be battered if additional width at the base of the stem is required. The minimum batter shall be 1H:12V. Maintain a uniform top of batter elevation.*

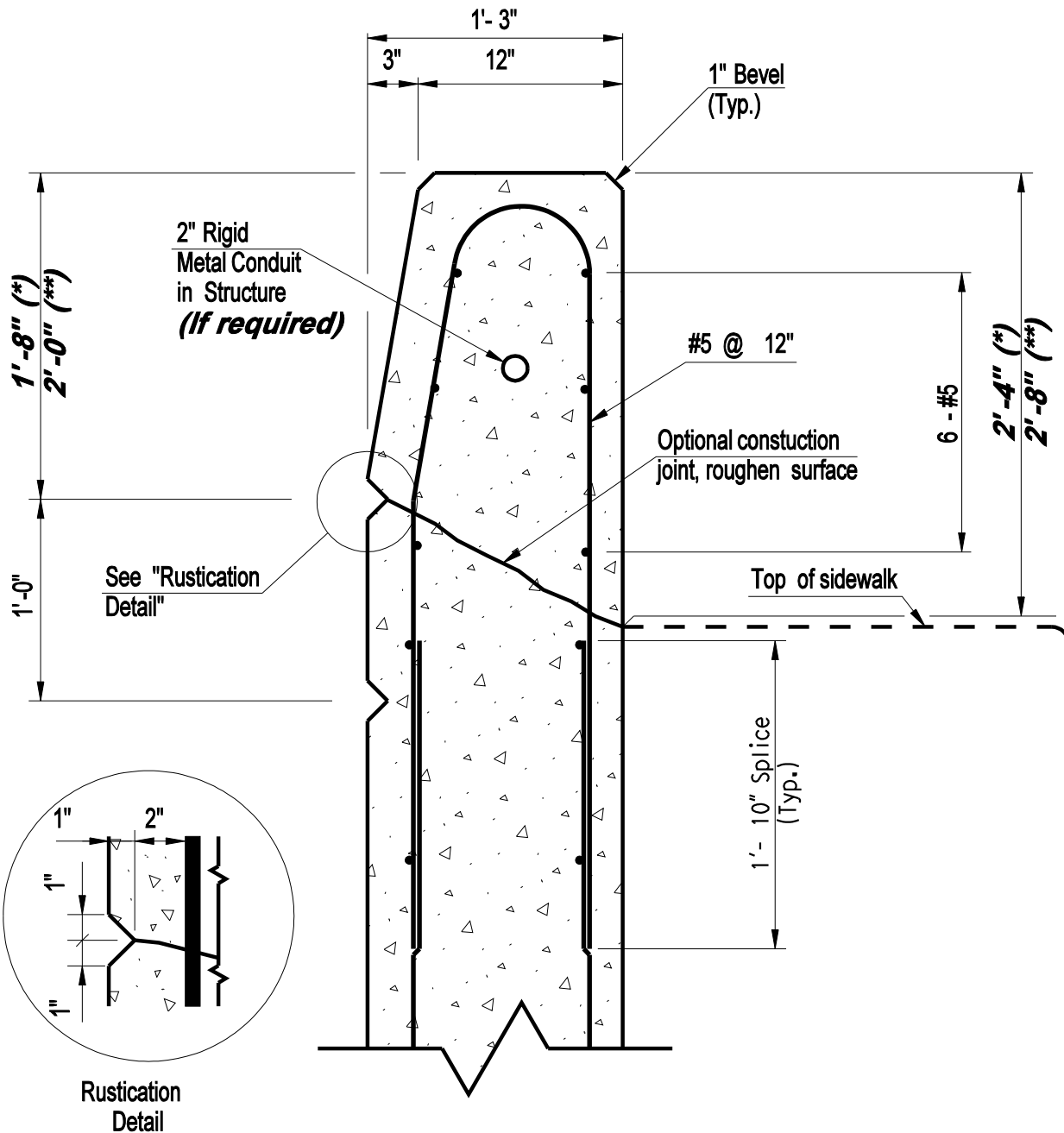
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**U-TYPE WINGWALL  
OR RETAINING  
WALL WITH SIDEWALK**

Issue Date: 10/03

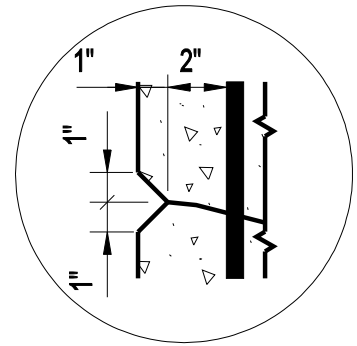
Revision Date: 01/05

Plate Number:  
**3.4.5**

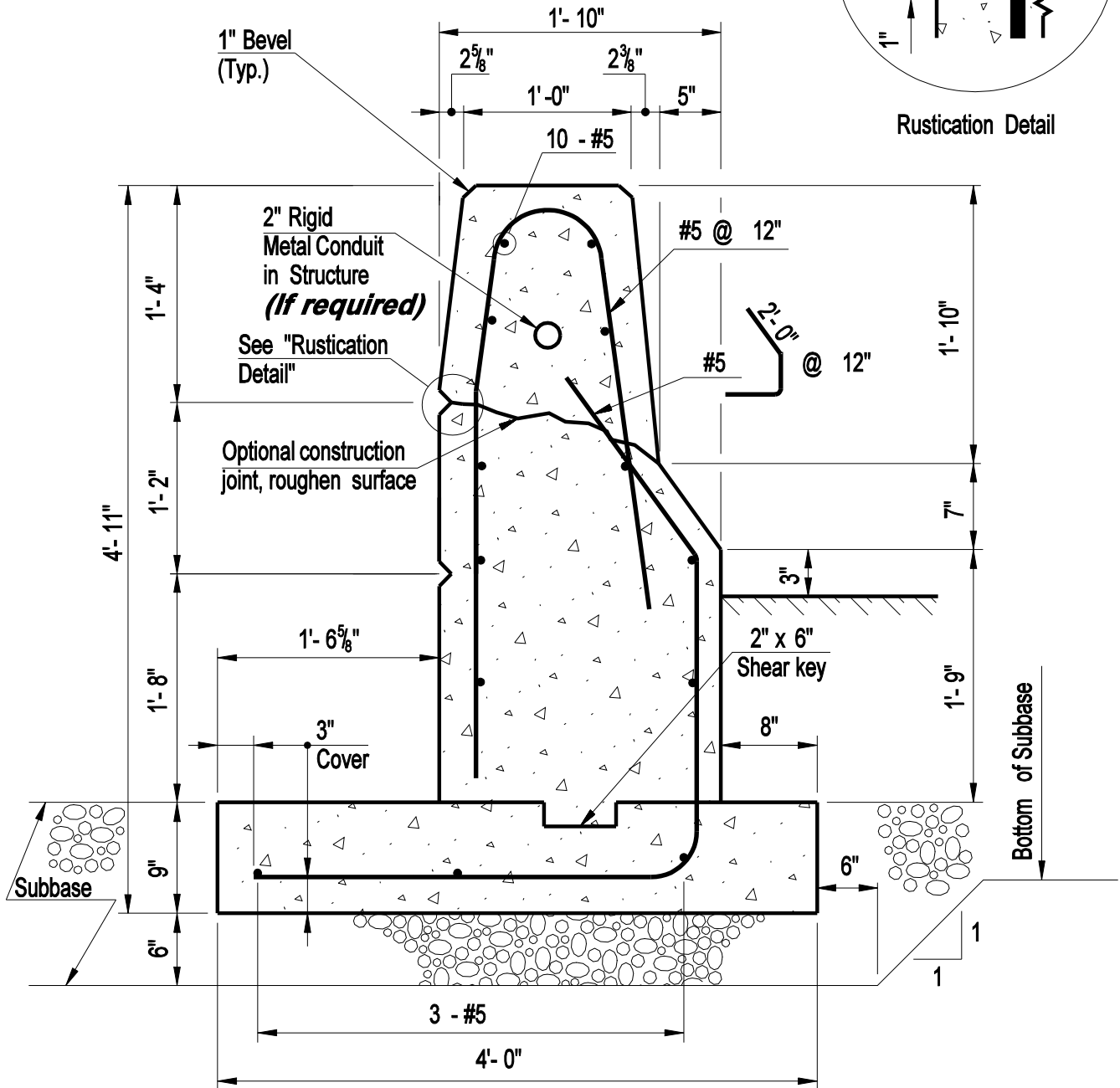


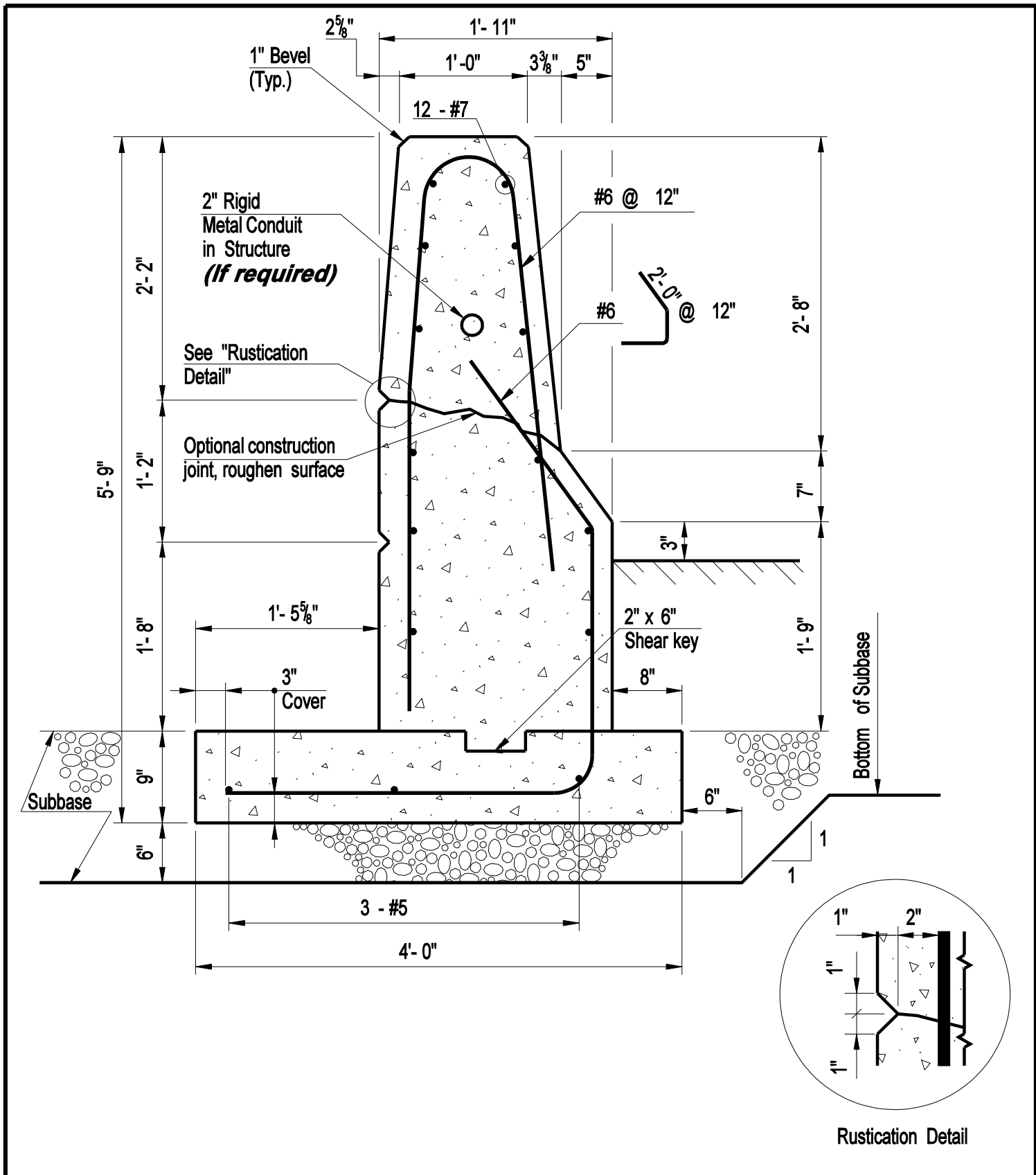
**DESIGN INFORMATION**

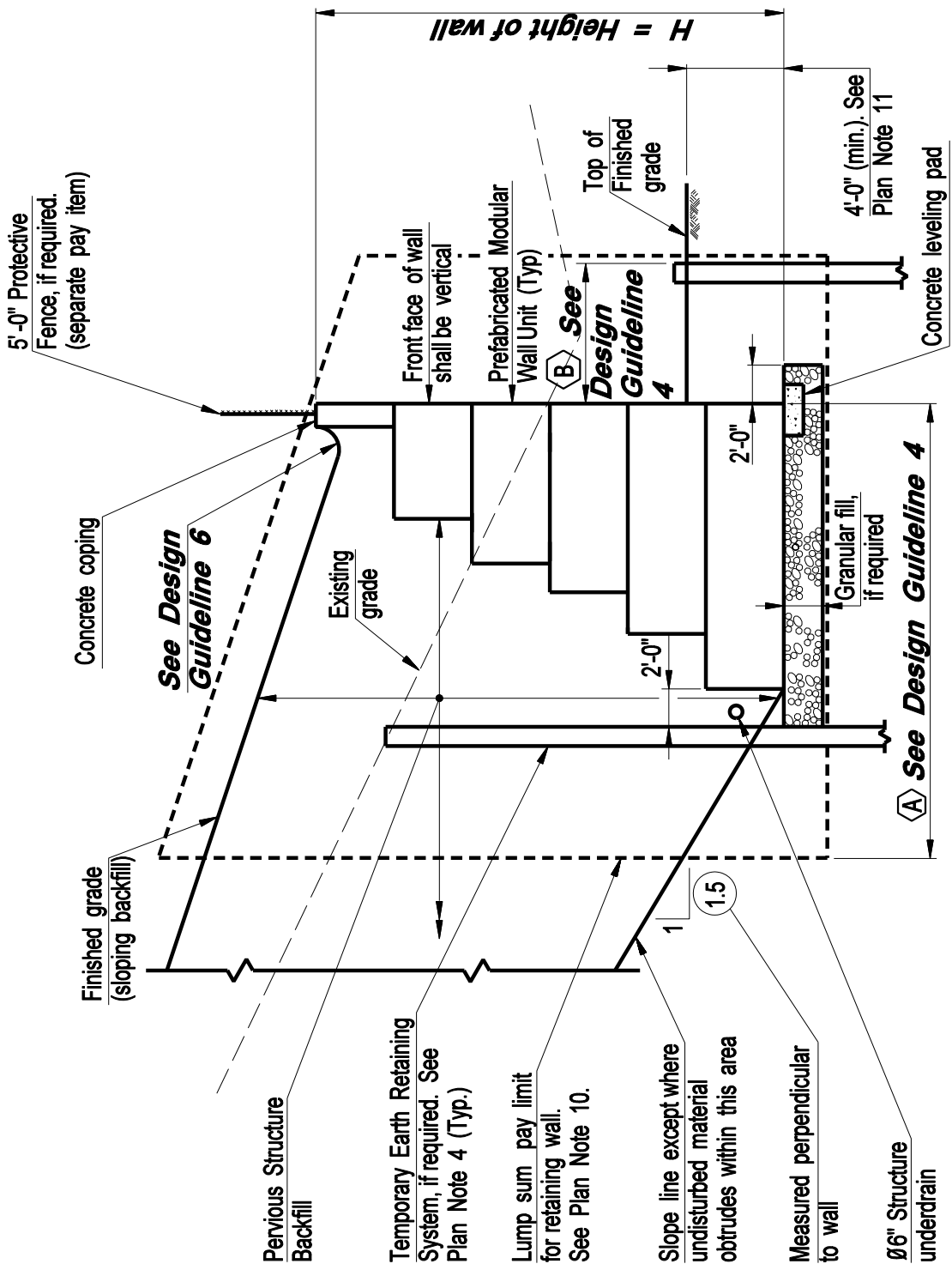
- \* with protective fence
- \*\* with pedestrian railing



Rustication Detail

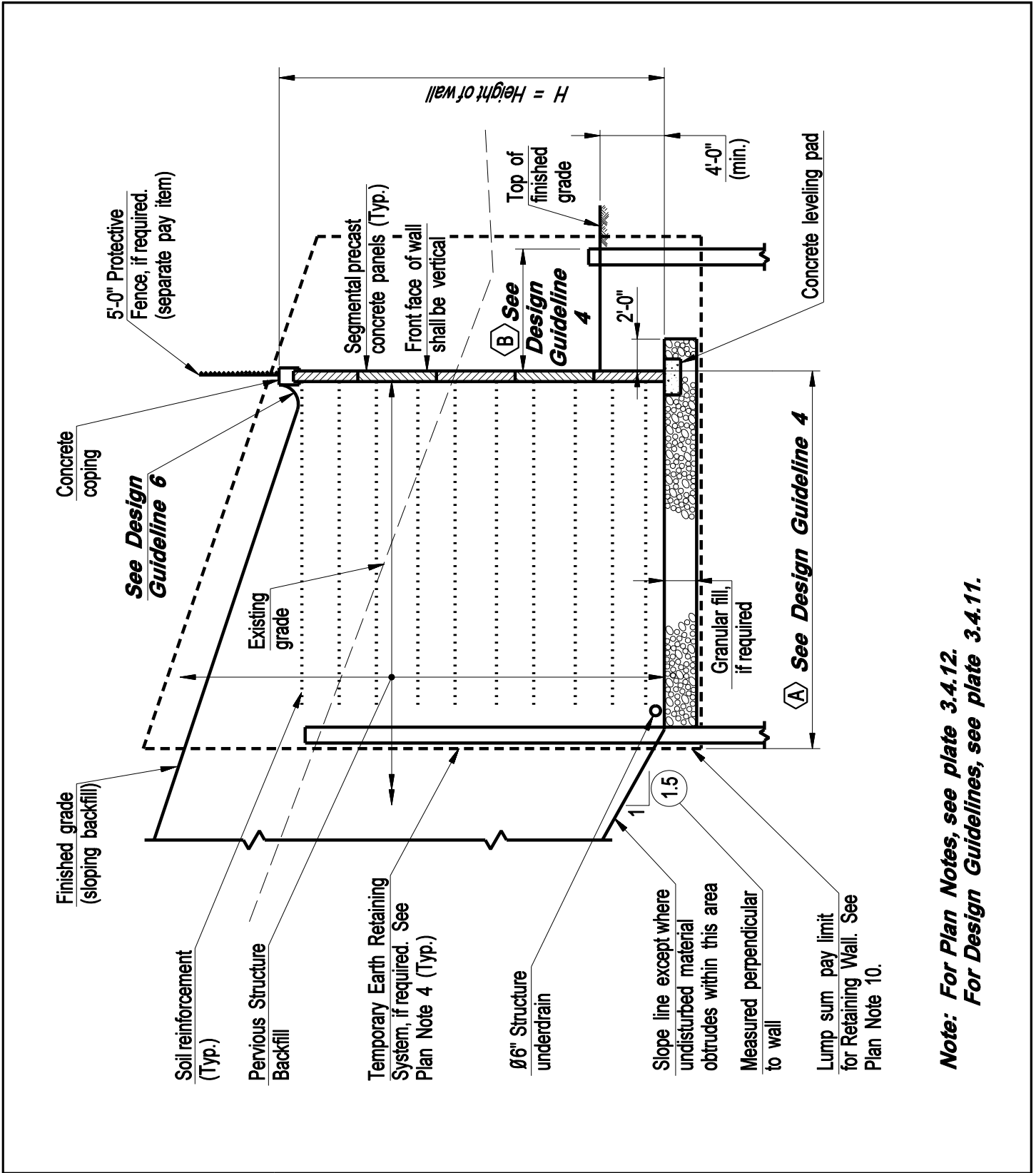






**Note: For Plan Notes, see plate 3.4.12.  
For Design Guidelines, see plate 3.4.11.**

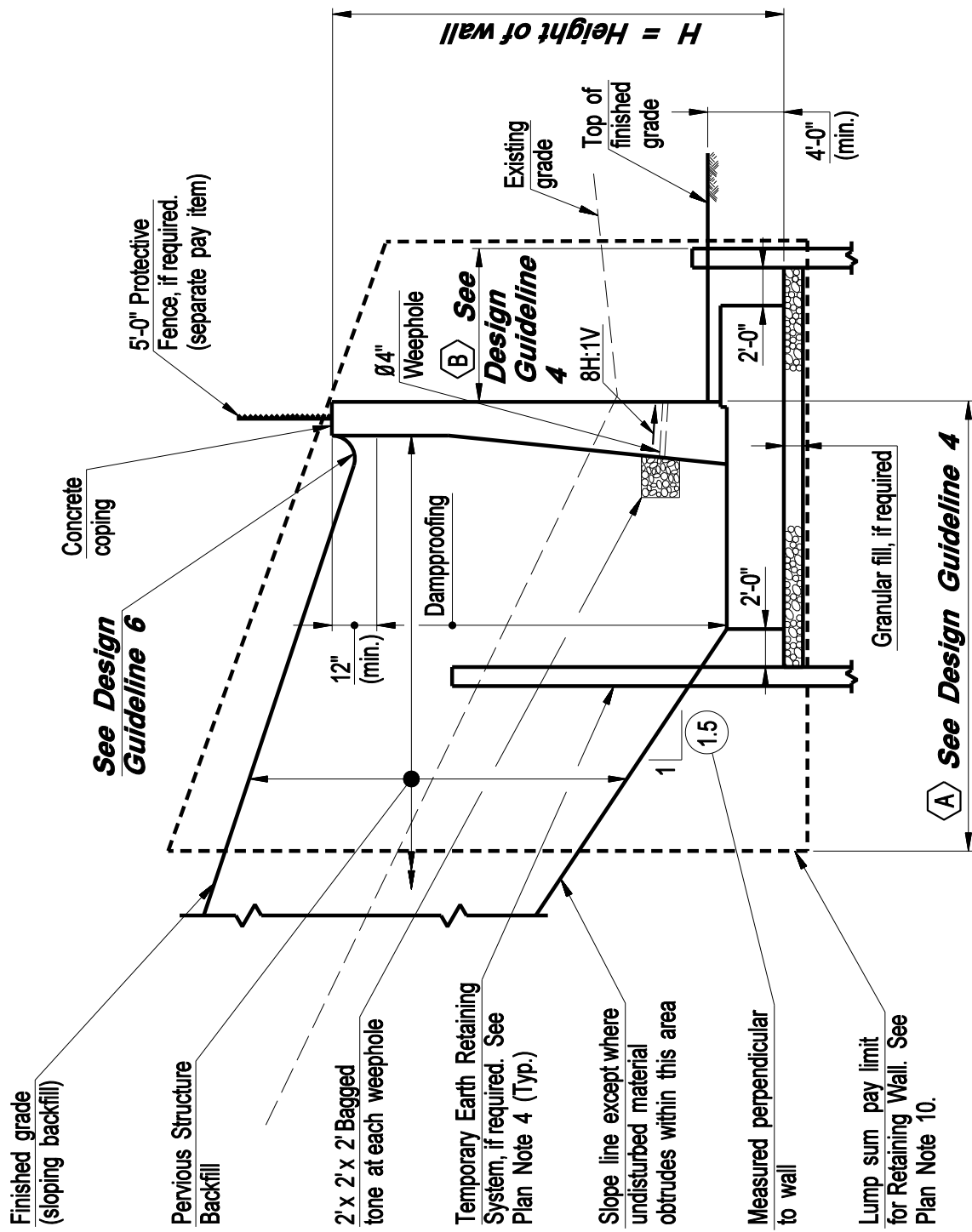
<b>CONNECTICUT BRIDGE DESIGN MANUAL</b>	<b>TYPICAL SECTION PREFABRICATED MODULAR WALL (SLOPING BACKFILL)</b>	Issue Date: 10/03
		Revision Date: 3/09
		Plate Number: <b>3.4.9a</b>



**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**TYPICAL SECTION  
MECHANICALLY STABILIZED  
EARTH WALL (SLOPING BACKFILL)**

Issue Date:	10/03
Revision Date:	3/09
Plate Number:	3.4.9b

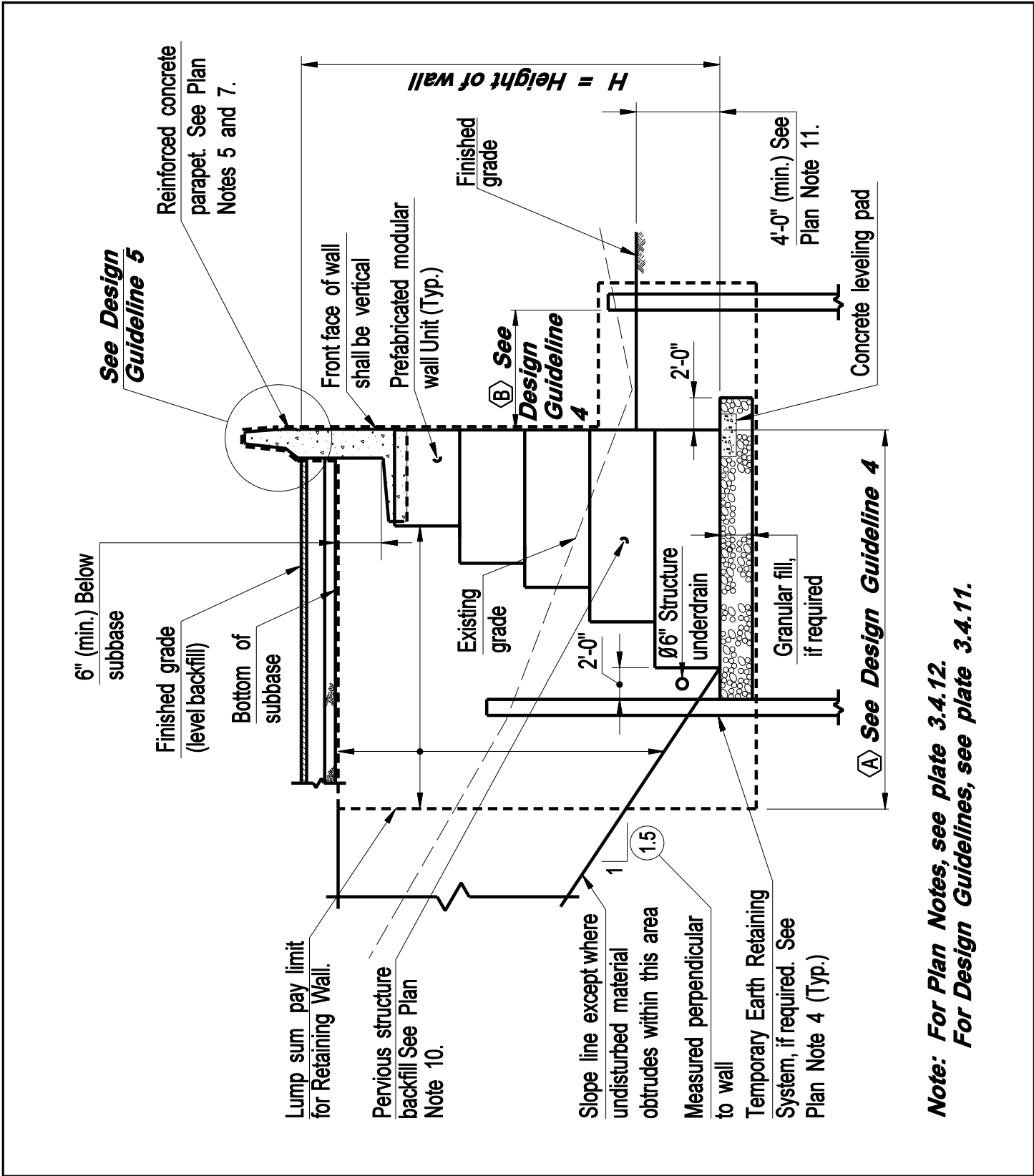


**Note: For Plan Notes, see plate 3.4.12.  
For Design Guidelines, see plate 3.4.11.**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**TYPICAL SECTION  
CAST-IN-PLACE  
REINFORCED CONCRETE  
(SLOPING BACKFILL)**

Issue Date:	10/03
Revision Date:	3/09
Plate Number:	3.4.9c



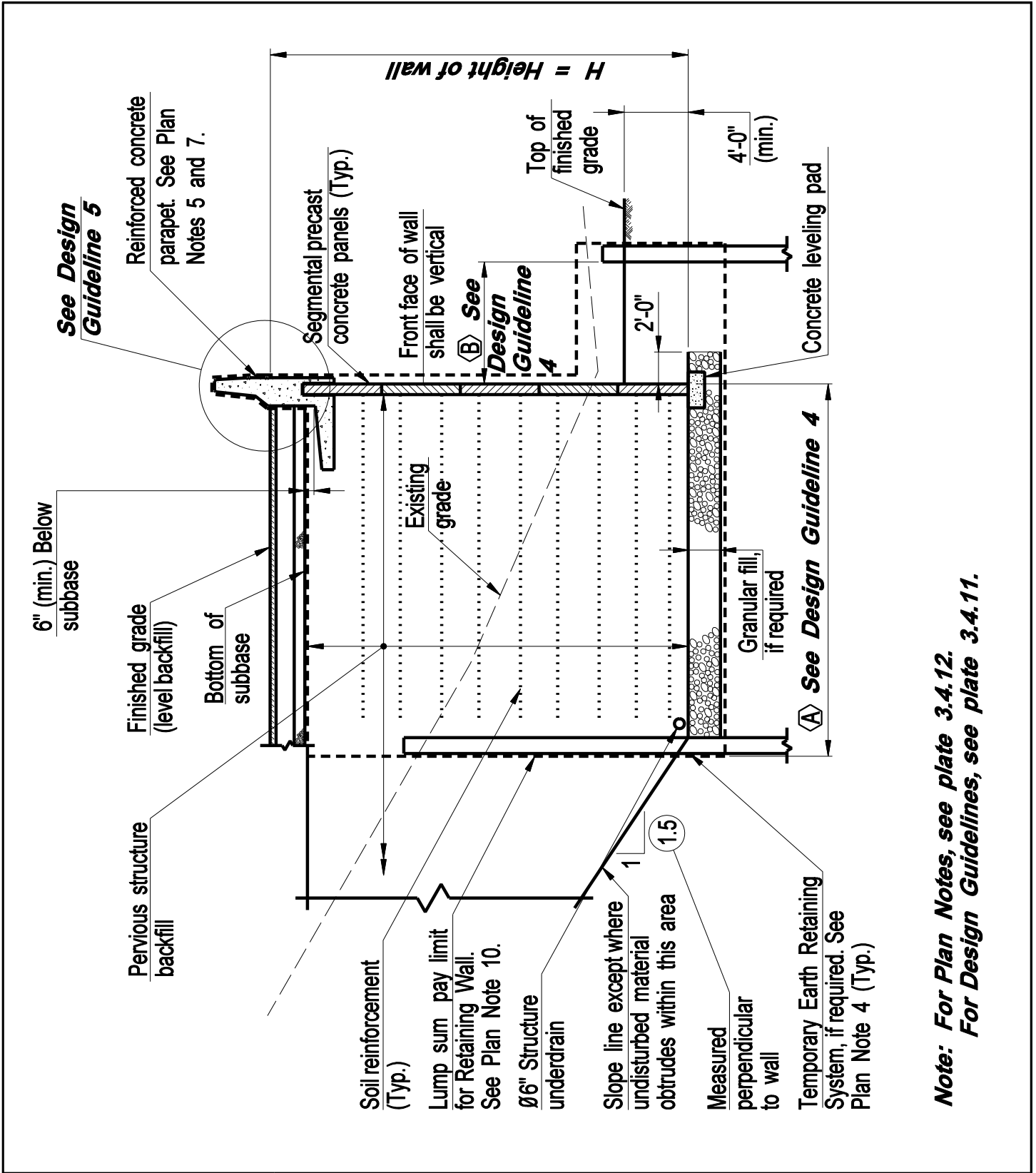
**Note:** For Plan Notes, see plate 3.4.12.  
 For Design Guidelines, see plate 3.4.11.

**CONNECTICUT  
 BRIDGE DESIGN  
 MANUAL**

**TYPICAL SECTION  
 PREFABRICATED MODULAR  
 WALL (LEVEL BACKFILL)**

Issue Date:	10/03
Revision Date:	3/09
Plate Number:	3.4.10a

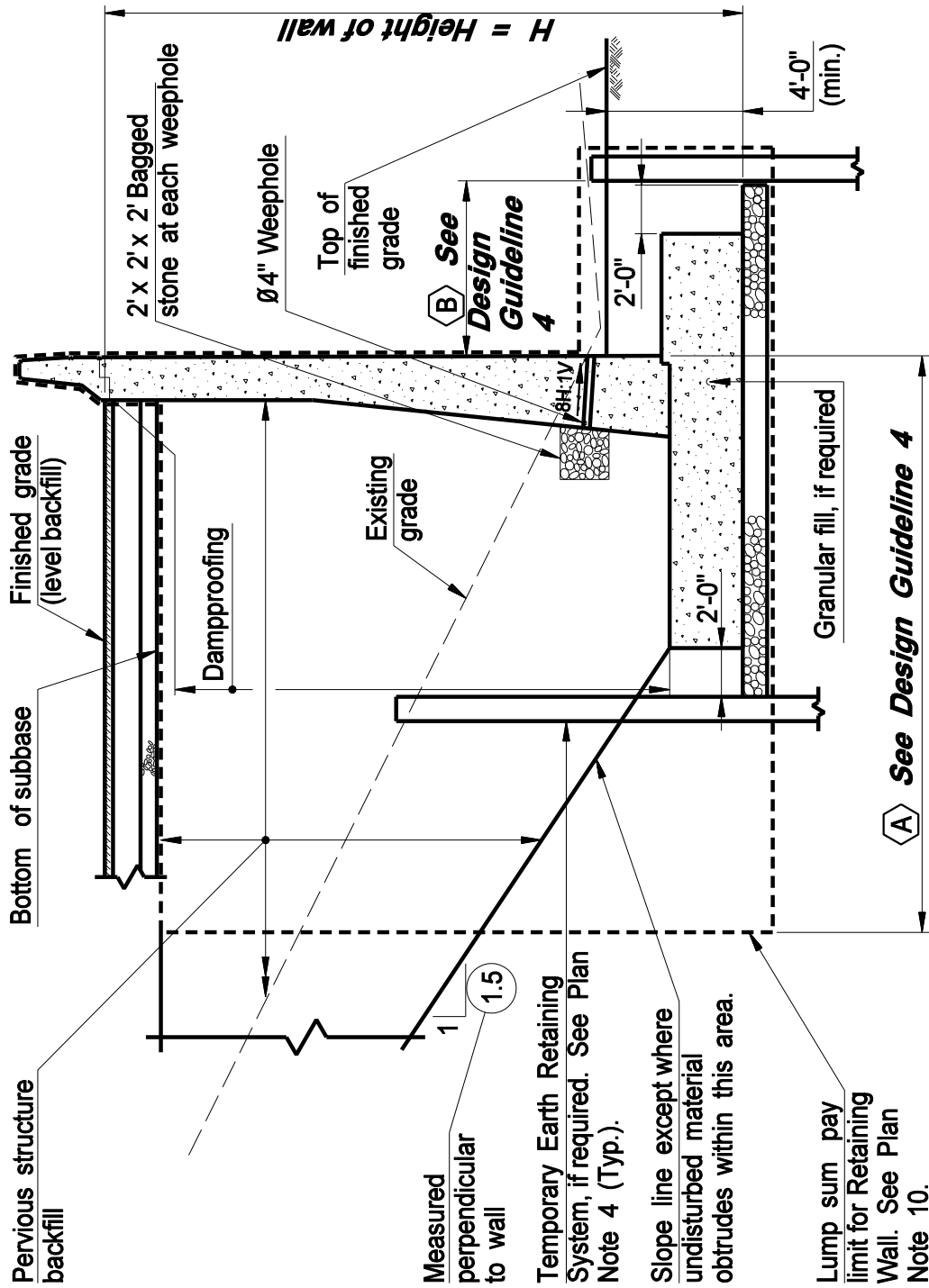




**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**TYPICAL SECTION  
MECHANICALLY STABILIZED  
EARTH WALL (LEVEL BACKFILL)**

Issue Date:	10/03
Revision Date:	3/09
Plate Number:	3.4.10b



**Note: For Plan Notes see plate 3.4.12.  
For Design Guidelines, see plate 3.4.11.**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**TYPICAL SECTION CAST-IN-PLACE  
REINFORCED CONCRETE  
(LEVEL BACKFILL)**

Issue Date: 10/03

Revision Date: 3/09

Plate Number:  
**3.4.10c**

DESIGN GUIDELINES:

- 1. The Proprietary Walls shall be designed, detailed, and constructed in accordance with the special provision "Retaining Wall (Site No.\_)".**
- 2. Proprietary walls shall not be designed for seismic forces.**
- 3. Wall height (H) for Mechanically Stabilized Earth Wall and Prefabricated Modular Wall sections shall be the same as for the Cast-in-Place Reinforced Concrete Wall type sections. Wall height (H) is equal to the distance measured from the bottom footing elevation to the finished grade.**
- 4. Pay limits for Mechanically Stabilized Earth Wall and Prefabricated Modular Wall sections shall be the same as for the Cast-in-Place Reinforced Concrete Wall Type section. The Designer shall determine all dimensions associated with the pay limits and show these dimensions on the plans. All horizontal pay limits are measured from the front face of the Cast-In-Place Concrete Wall.**
  - ⓑ Dimension shall be equal to 2'-0" plus the toe length.**
  - ⓐ Dimension ,as a minimum, shall be equal to (0.8)H plus 2'-0".**
- 5. If a Cast-in-place Reinforced Concrete wall alternate is not provided, the Engineer shall provide detailing and reinforcement of the parapet section above the gutter lines.**
- 6. Provide for surface drainage if necessary. Extent and details of ditch to be determined by the highway Engineer.**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

DESIGN INFORMATION  
FOR ALTERNATE WALLS

Issue Date: 10/03

Revision Date: 3/09

Plate Number:  
3.4.11

PLAN NOTES:

1. The Contractor shall select, design, (for proprietary walls only) and construct one of the following wall options in accordance with the special provision "Retaining Wall (Site No. \_)".  

(List of appropriate wall manufacturers)
2. The maximum factored bearing resistance = (       )
3. VACANT
4. Temporary Earth Retaining System below pay limits and any tiebacks and bracing associated with same shall be included in the lump sum cost of the wall.
5. Details shown on this sheet are not specific. The Contractor's Designer shall modify each section for each specific site.
6. Light standard anchorages, junction boxes, and rigid metal conduit shall be included in the lump sum pay item "Retaining Wall (Site No. \_\_\_\_ )".
7. The detailing and reinforcement of the parapet section above the gutter line shall be as shown for the Cast-In-Place Reinforced Concrete Wall section or as detailed elsewhere on the plans.
8. Reinforcing to have 2" cover except where shown otherwise.
9. All dimensions are specified with the applicable units of measurement.
10. Any additional pervious structure backfill required outside this limit shall also be included in the lump sum price.

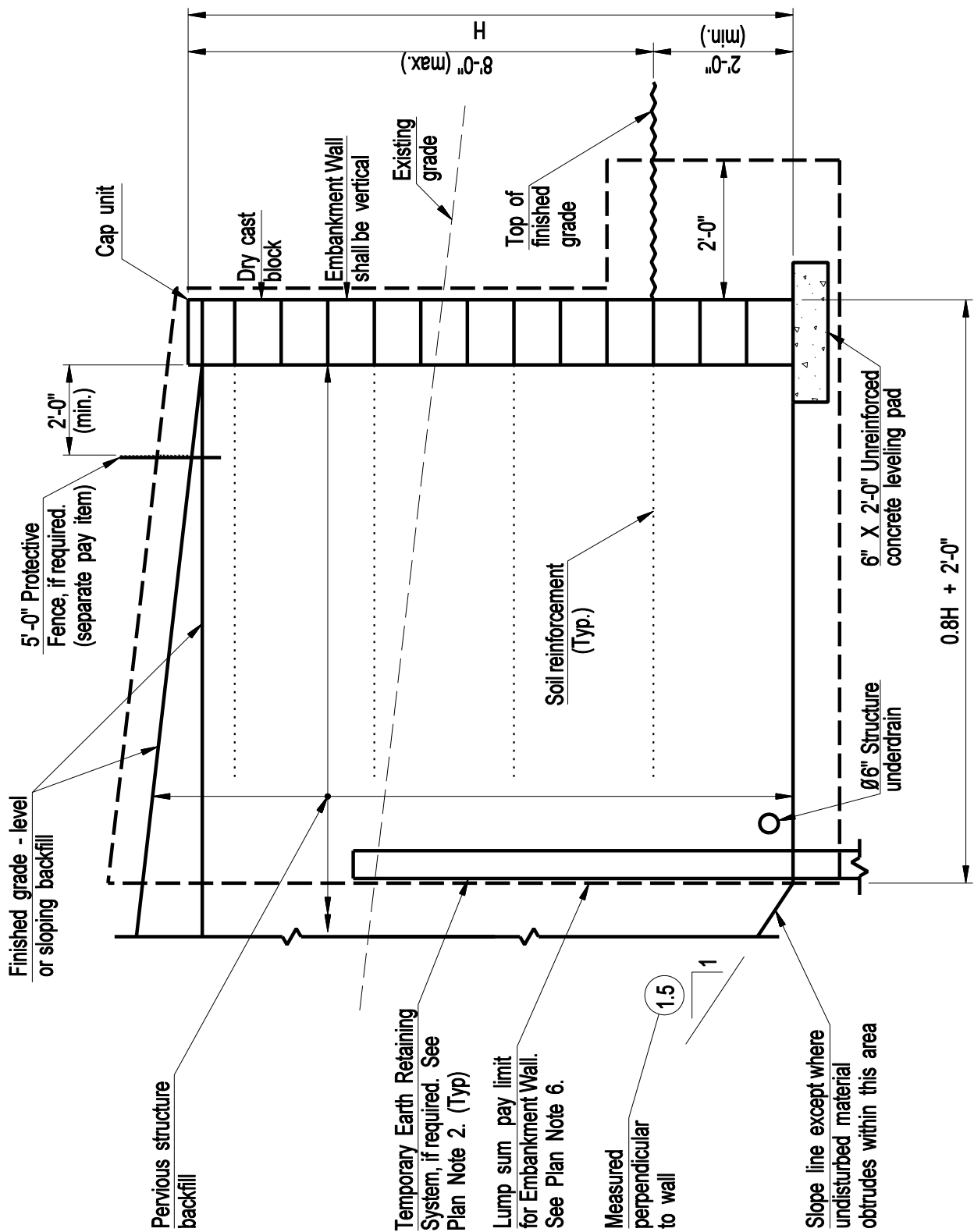
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**PLAN NOTES  
FOR ALTERNATE WALLS**

Issue Date: 10/03

Revision Date: 12/19

Plate Number:  
**3.4.12**



**Note: For Plan Notes, see plate No. 3.4.14.**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**TYPICAL SECTION  
EMBANKMENT WALL**

Issue Date: 10/03

Revision Date: 3/09

Plate Number:  
**3.4.13**

PLAN NOTES:

1. The Embankment Wall shall be designed, detailed and constructed in accordance with the special provision "Embankment Wall (Site No. )".
2. Temporary Earth Retaining System below pay limits and any tiebacks and bracing associated with the sheet piling shall be included in the lump sum cost of the wall.
3. Details shown on this sheet are not specific. The Contractor's Designer should modify the section for each specific site.
4. The Contractor shall select, design (for proprietary walls only) and construct one of the wall options as listed in the special provision "Embankment Wall (Site No. )".
5. The color of the dry cast block shall be (        )
6. Any additional pervious structure backfill required outside this limit shall also be included in the lump sum price.

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

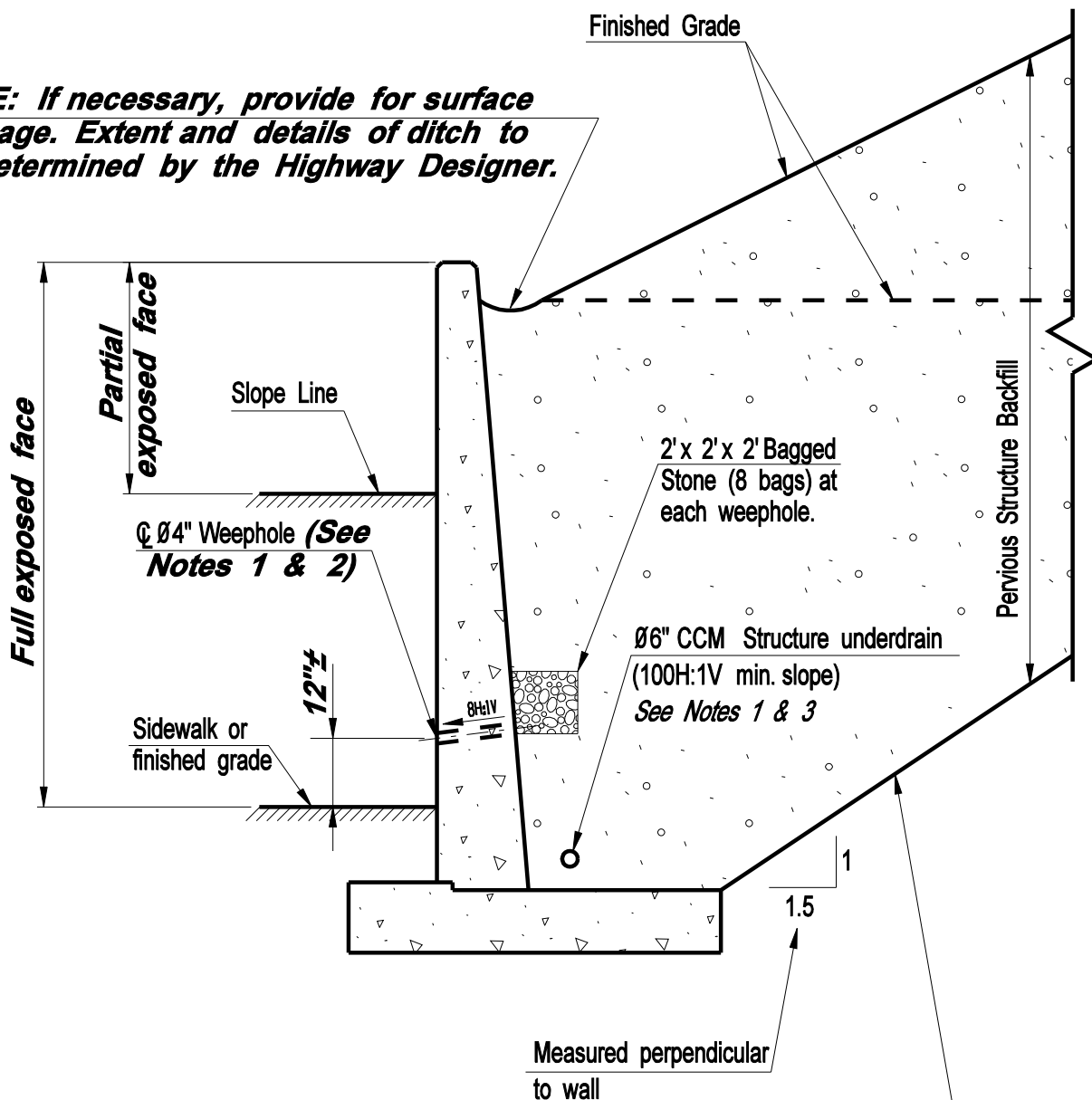
**PLAN NOTES  
FOR EMBANKMENT WALLS**

Issue Date: 10/03

Revision Date: 3/09

Plate Number:  
**3.4.14**

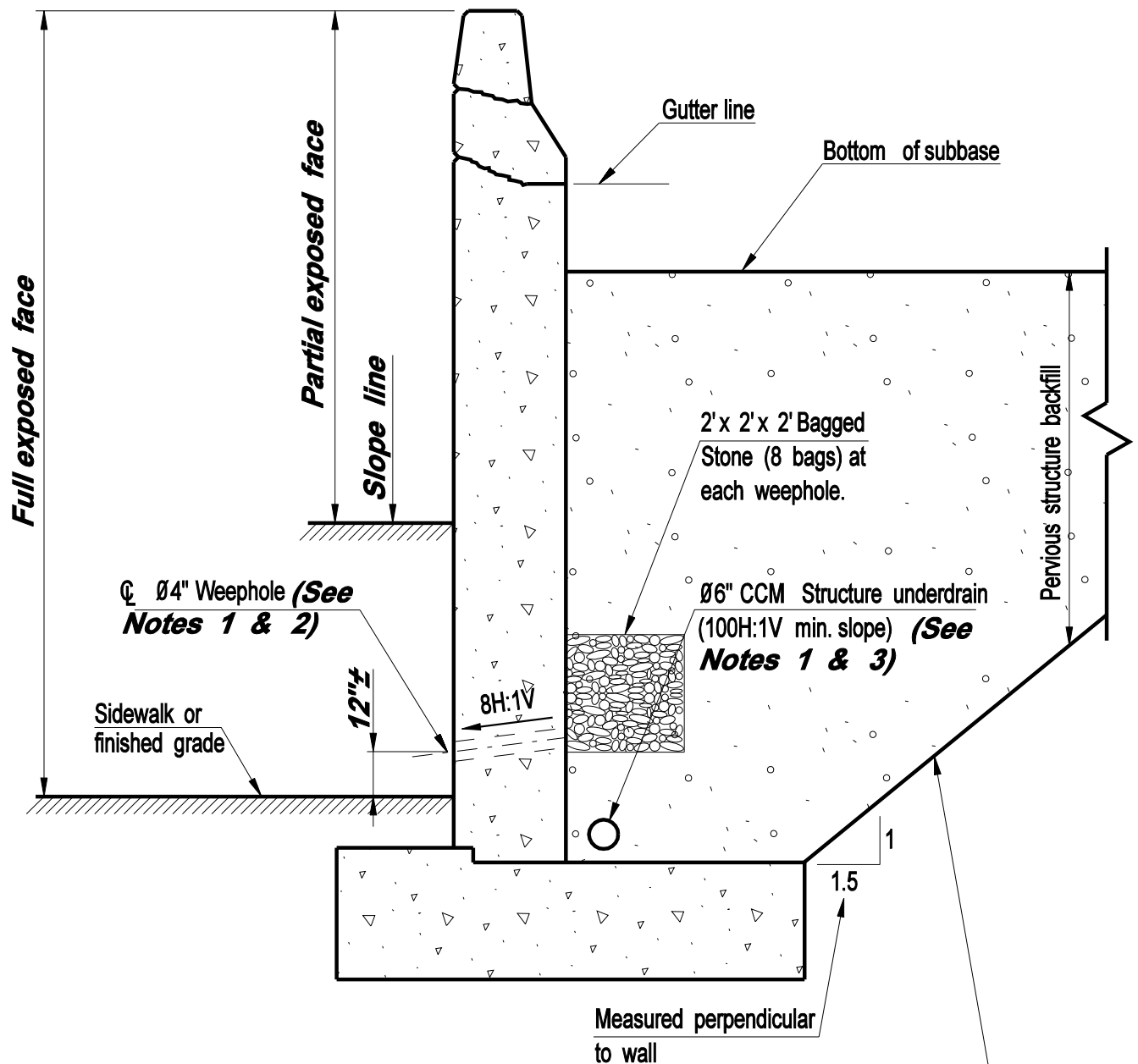
**NOTE: If necessary, provide for surface drainage. Extent and details of ditch to be determined by the Highway Designer.**



Slope line except where undisturbed material protrudes within this area.

**DESIGN INFORMATION**

1. Plan should show either 4" weep hole or Ø6" structure underdrain. See Division 1.
2. Horizontal spacing and invert locations of weep holes shall be shown on the wingwall elevation views on the plans.
3. Ø6" CCM Structure Underdrain and Ø 6" CCM Outlet for Underdrain shall be included as Bridge Pay Items.

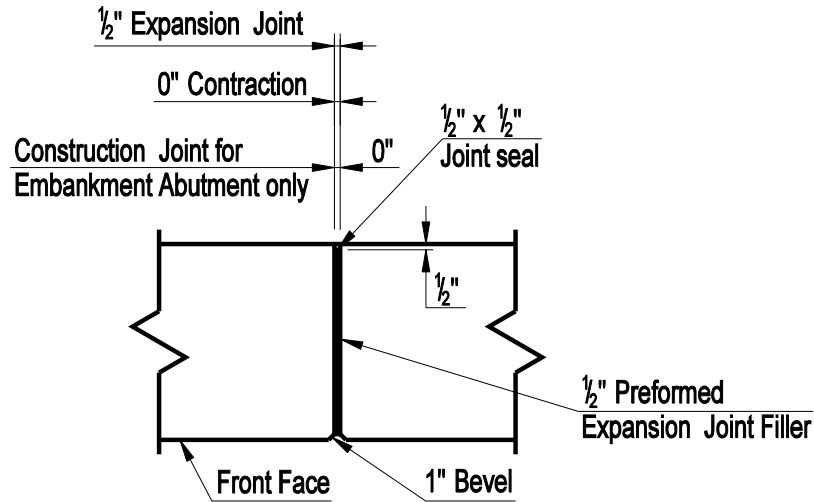


**DESIGN INFORMATION**

1. Plan should show either 4" weephole or Ø6" structure underdrain. See Division I.
2. Horizontal spacing and invert locations of weepholes shall be shown on the wingwall elevation views on the plans.
3. Ø6" CCM Structure Underdrain and Ø 6" CCM Outlet for Underdrain shall be included as Bridge Pay Items.

Slope line except where undisturbed material obtrudes within this area





**DESIGN INFORMATION:**

1. Expansion joints shall be provided at intervals not exceeding 90'.
2. Contraction joints shall be provided at intervals not exceeding 30'.
3. All joints in abutments shall be located approximately midway between members.
4. At embankment abutments, contraction joints shall be changed to construction joints.

**NOTES:**

**JOINTS:** The Designer shall include the following notes as appropriate:

Joint seal to extend from top of footing to top of backwall and horizontally along top of backwall. (**Abutments**)

Joint seal to extend from top of footing to top of parapet and horizontally along this joint to outside face of parapet and horizontally along this joint to the outside face of wall. (**U - Type wings or Retaining walls with parapets**)

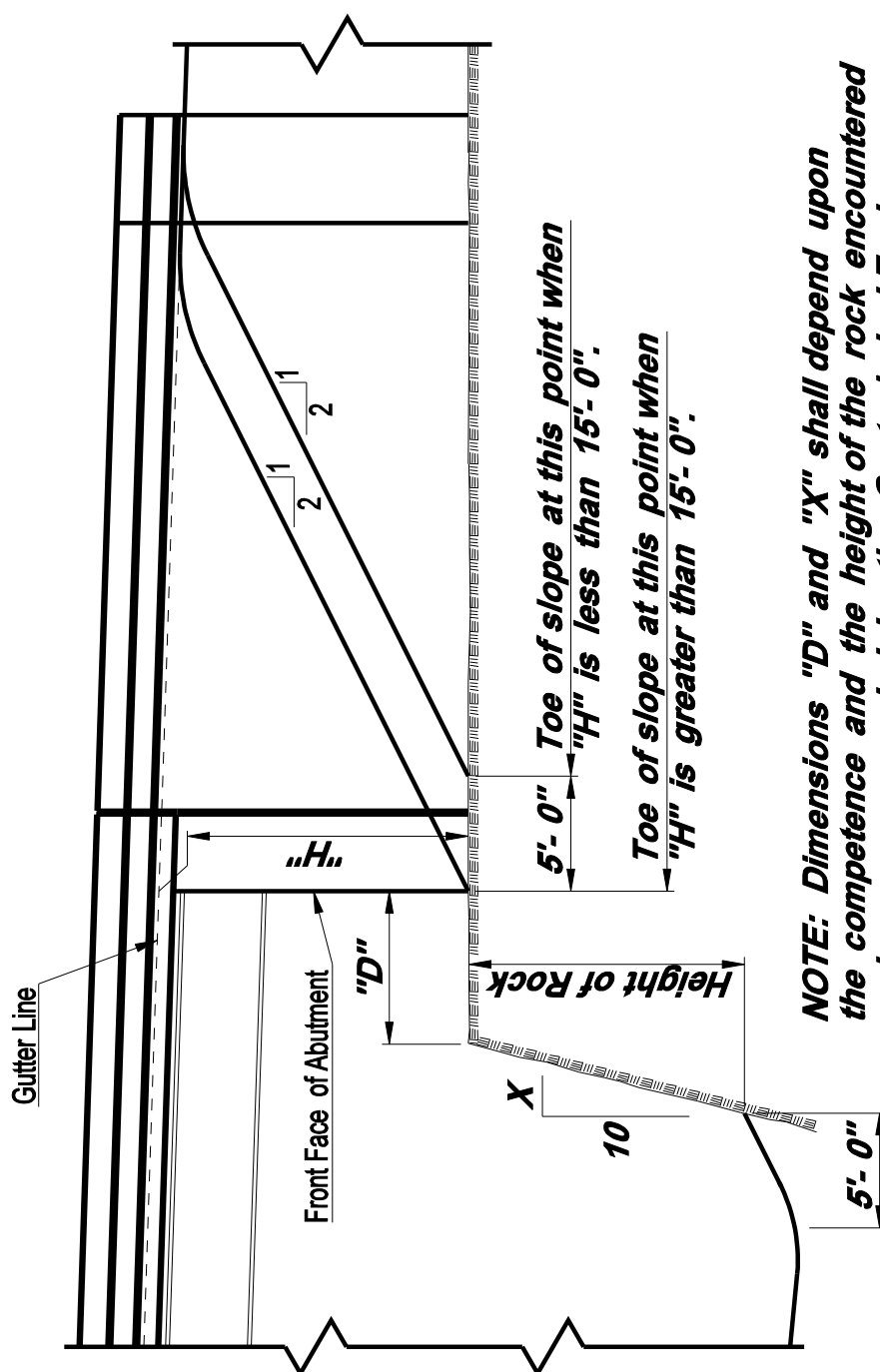
Joint seal to extend from top of footing to top of wall. (**Retaining Walls**)

Joint seal to extend from top of footing to top of wall. For the joints between the flared wings and superstructure, the joint seal shall extend from top of abutment backwall to top of wing. (**Flared wingwall**)

**REINFORCEMENT:**

No reinforcement shall pass through expansion or contraction joints.

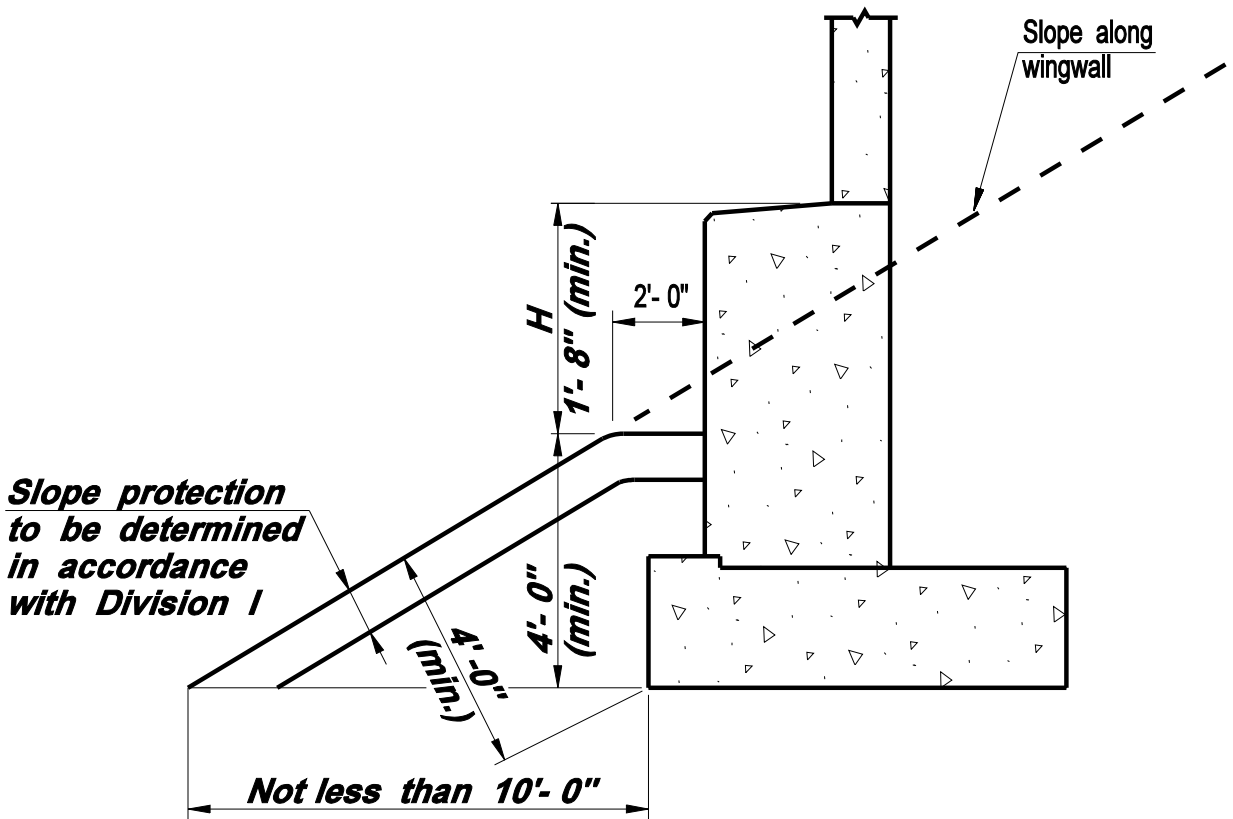
Reinforcement shall pass through construction joints.



5'-0" Toe of slope at this point when "H" is less than 15'-0".

Toe of slope at this point when "H" is greater than 15'-0".

**NOTE:** Dimensions "D" and "X" shall depend upon the competence and the height of the rock encountered and as recommended by the Geotechnical Engineer.



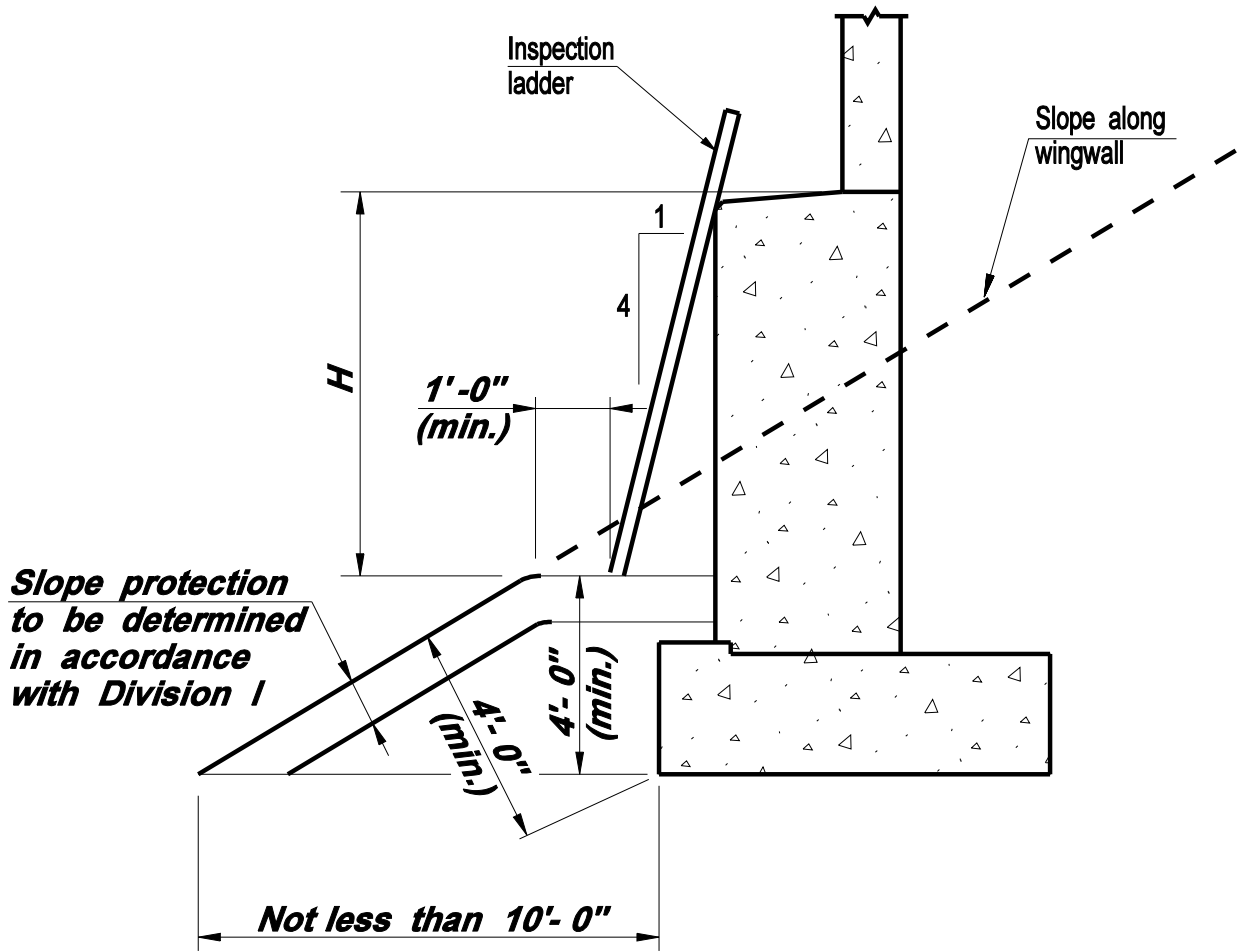
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

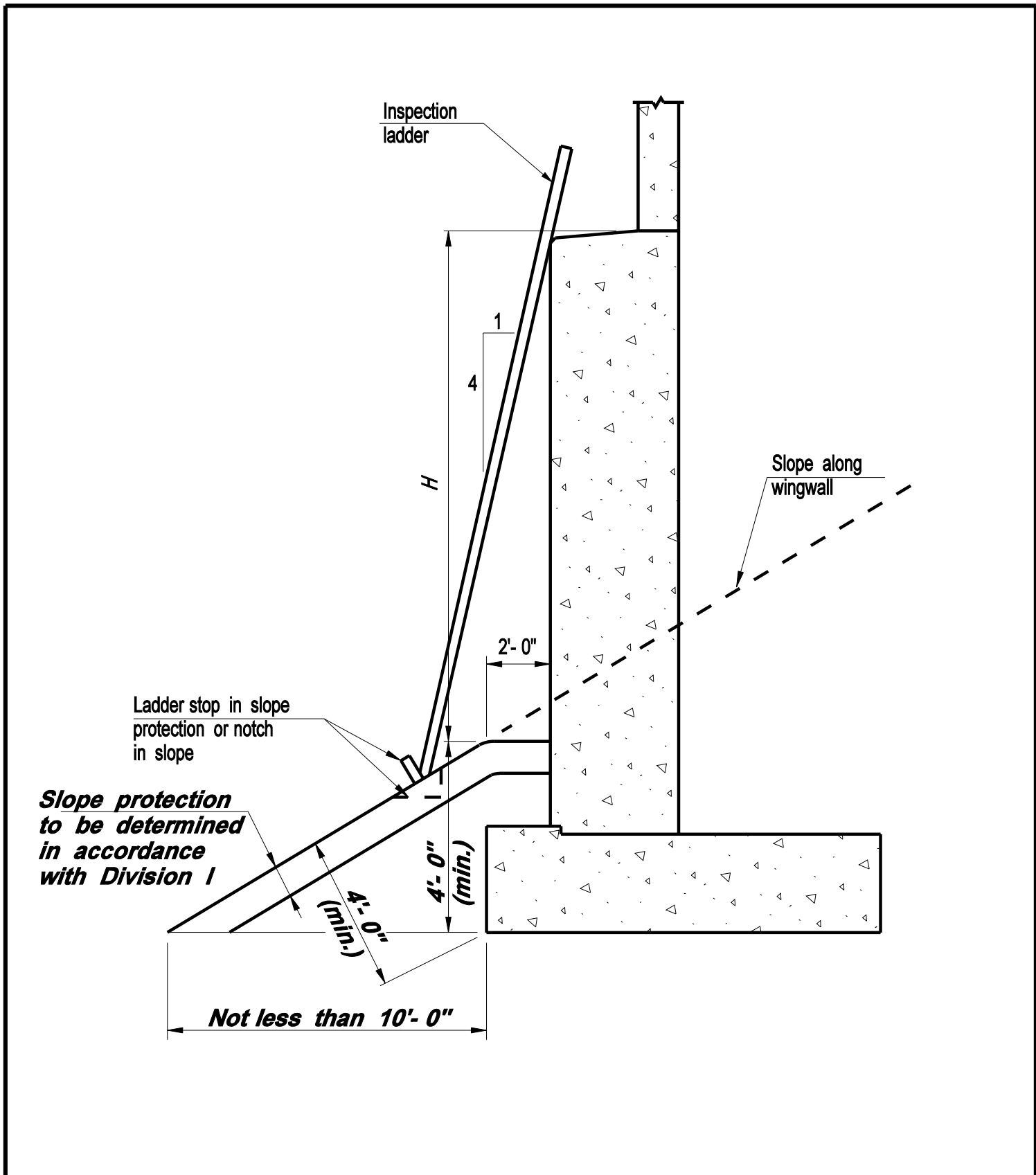
TYPICAL EMBANKMENT  
ABUTMENT NORMAL SECTION  
( $H \leq 5'-0''$ )

Issue Date: 10/03

Revision Date:

Plate Number:  
3.6.3

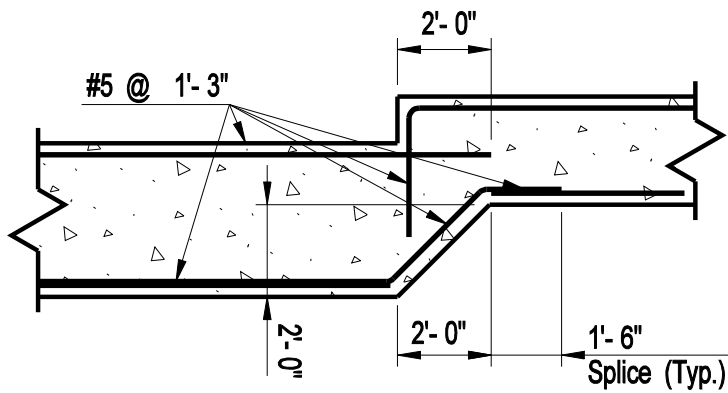




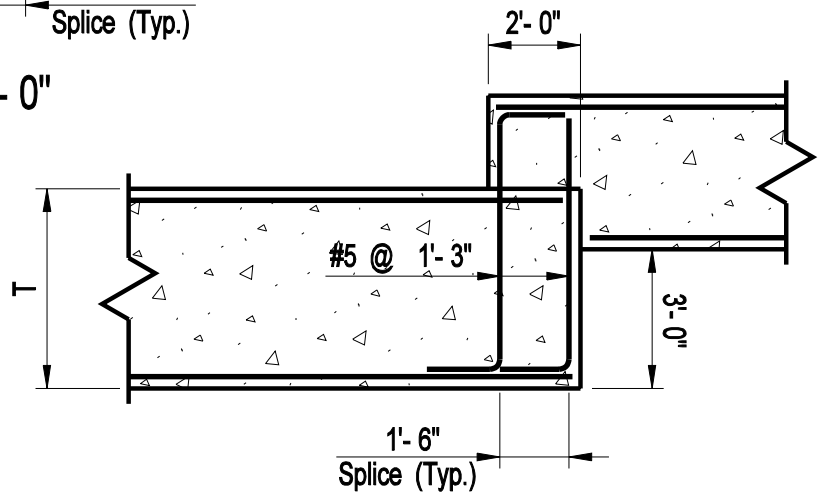
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**TYPICAL EMBANKMENT  
ABUTMENT NORMAL SECTION  
(H > 8'-0")**

Issue Date:	10/03
Revision Date:	
Plate Number:	3.6.5



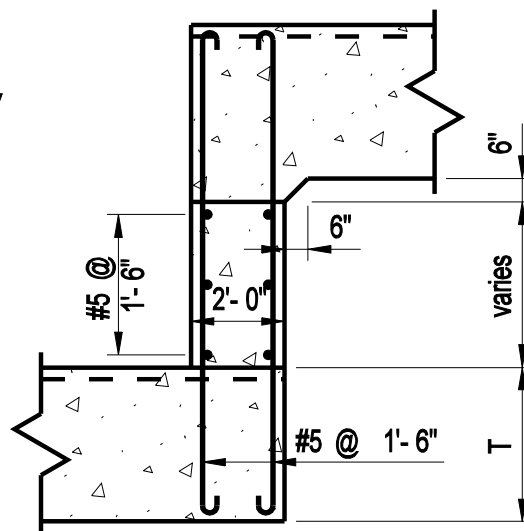
STEPPED FOOTING - 2'-0"



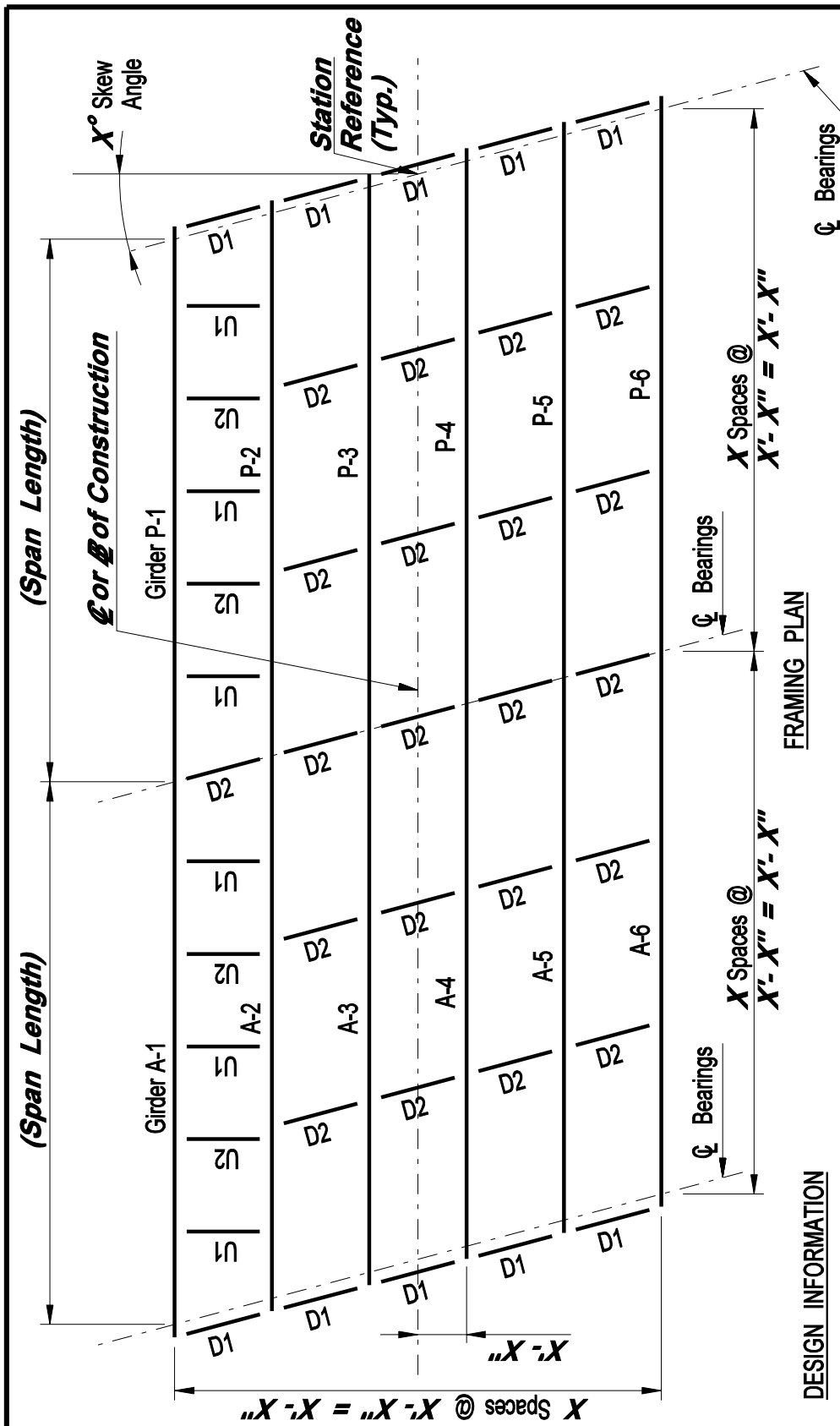
STEPPED FOOTING - 3'-0" to (T + 6")

DESIGN INFORMATION:

1. *The minimum step considered should be 2'-0".*
2. *Steps should be increased in 1'-0" increments.*



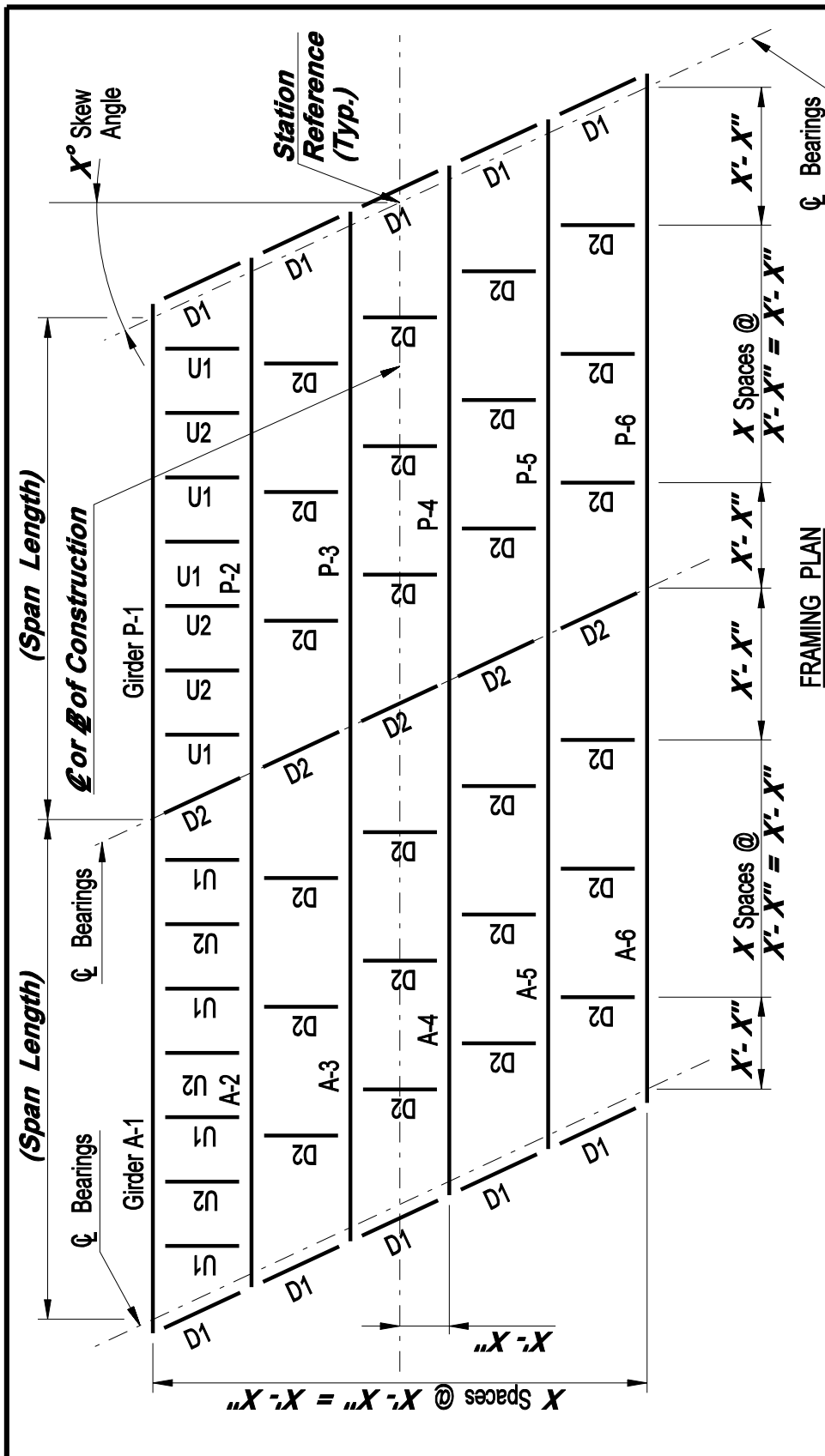
STEPPED FOOTING > (T + 6")



1. The framing plan shall be drawn full length without breaks and to scale on the plans. Include all relevant survey data and North arrow.

2. Continuous two-span bridge shown, simple and multiple continuous span bridges are similar.

3. Where utilities interfere with the typical end diaphragm, provide an alternative end diaphragm detail.

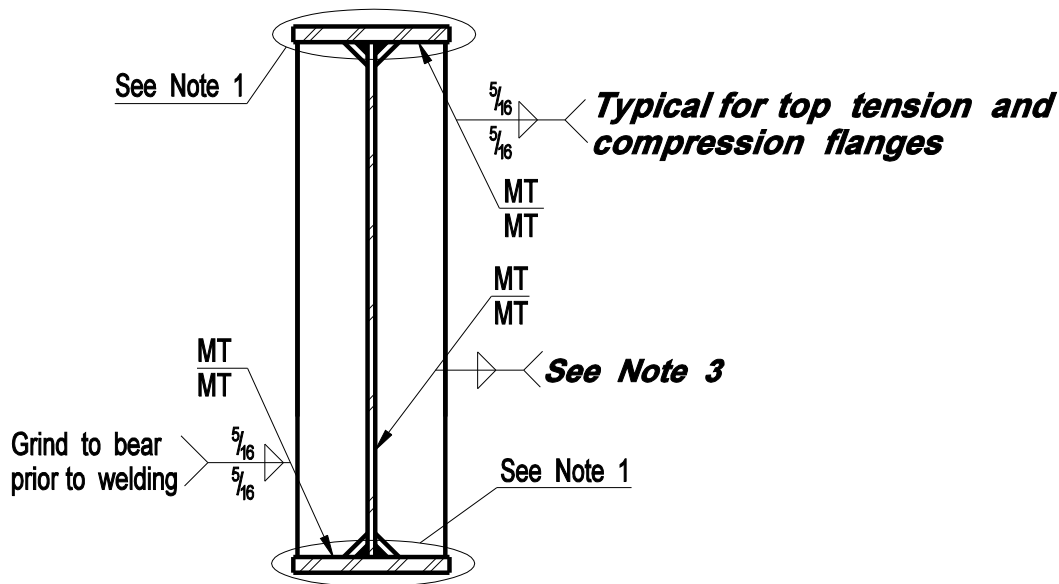


**DESIGN INFORMATION**

- D1 = End Bearing Diaphragm, see Plates 4.2.1 & 4.2.3
- D2 = Intermediate Diaphragm, see Plates 4.2.2 & 4.2.4
- U1 = Utility Support between diaphragms.
- U2 = Utility Support Diaphragm.

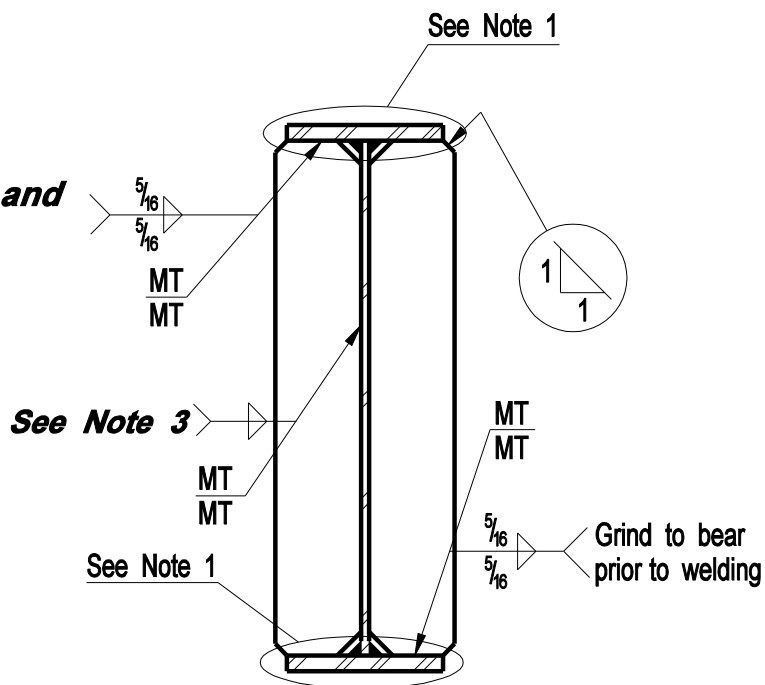
1. The framing plan shall be drawn full length without breaks and to scale on the plans. Include all relevant survey data and North arrow.
2. Continuous two-span bridge shown, simple and multiple continuous span bridges are similar.
3. Where utilities interfere with the typical end diaphragm, provide an alternative end diaphragm detail.





**STIFFENERS NARROWER THAN FLANGE**

*Typical for top tension and compression flanges*



**STIFFENERS WIDER THAN FLANGE**

**NOTES:**

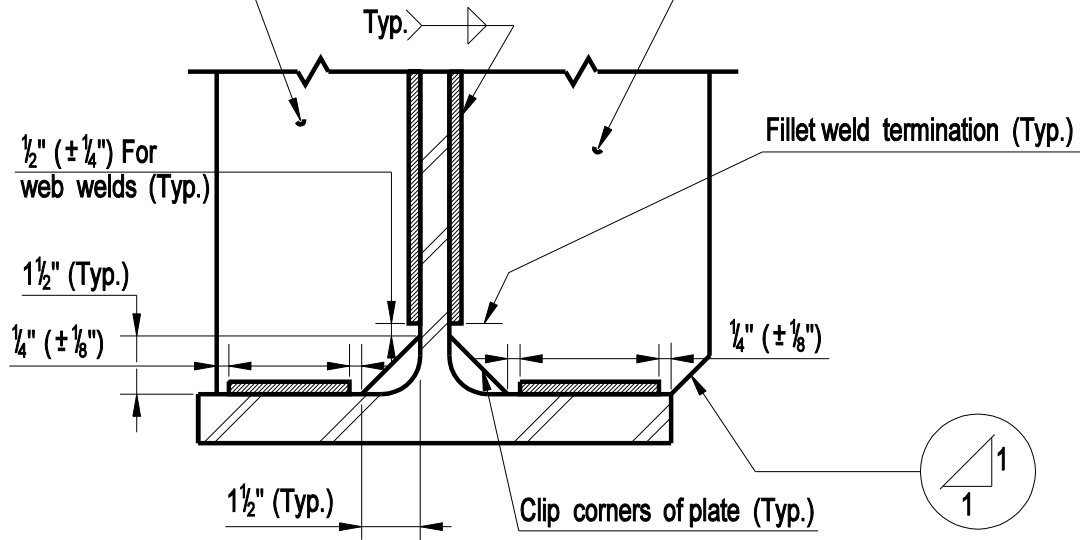
1. For clip and weld termination details, see Plate No. 4.2.2
2. For additional bearing stiffener details, see Plate No. 4.2.5

**DESIGN INFORMATION**

***3. Weld shall be designed, see Division I, Section 7***

*Plate narrower than flange*

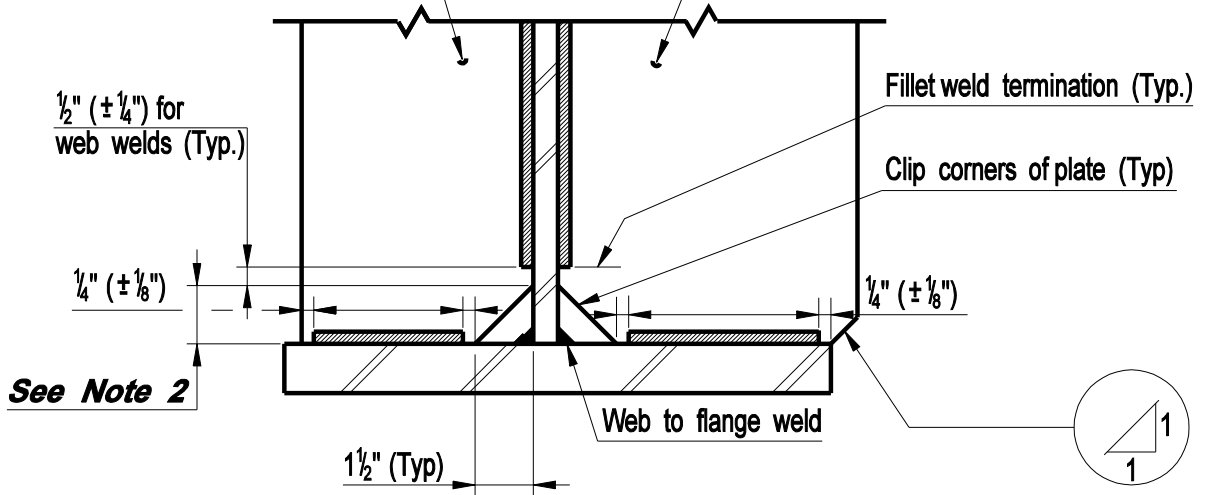
*Plate wider than flange*



### TYPICAL SECTION - ROLLED BEAMS

*Plate narrower than flange*

*Plate wider than flange*



### TYPICAL SECTION - PLATE GIRDERS

#### NOTES:

1. Details are shown for bottom flange, top flange is similar.
2. Designer shall determine this dimension.

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

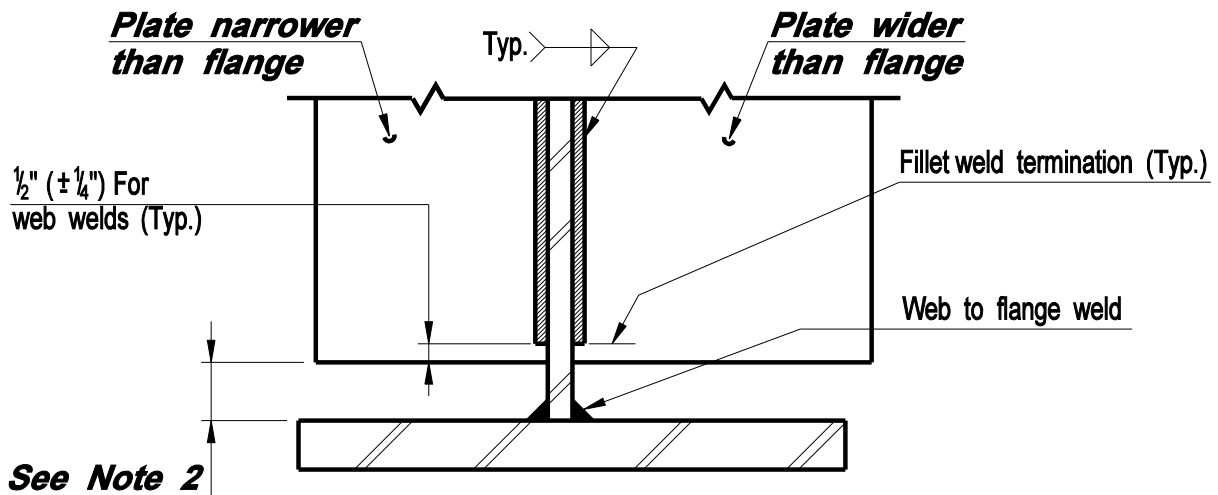
**CLIP AND WELD TERMINATION  
FOR CONNECTION PLATES  
AND BEARING STIFFENERS**

Issue Date: 10/03

Revision Date:

Plate Number:

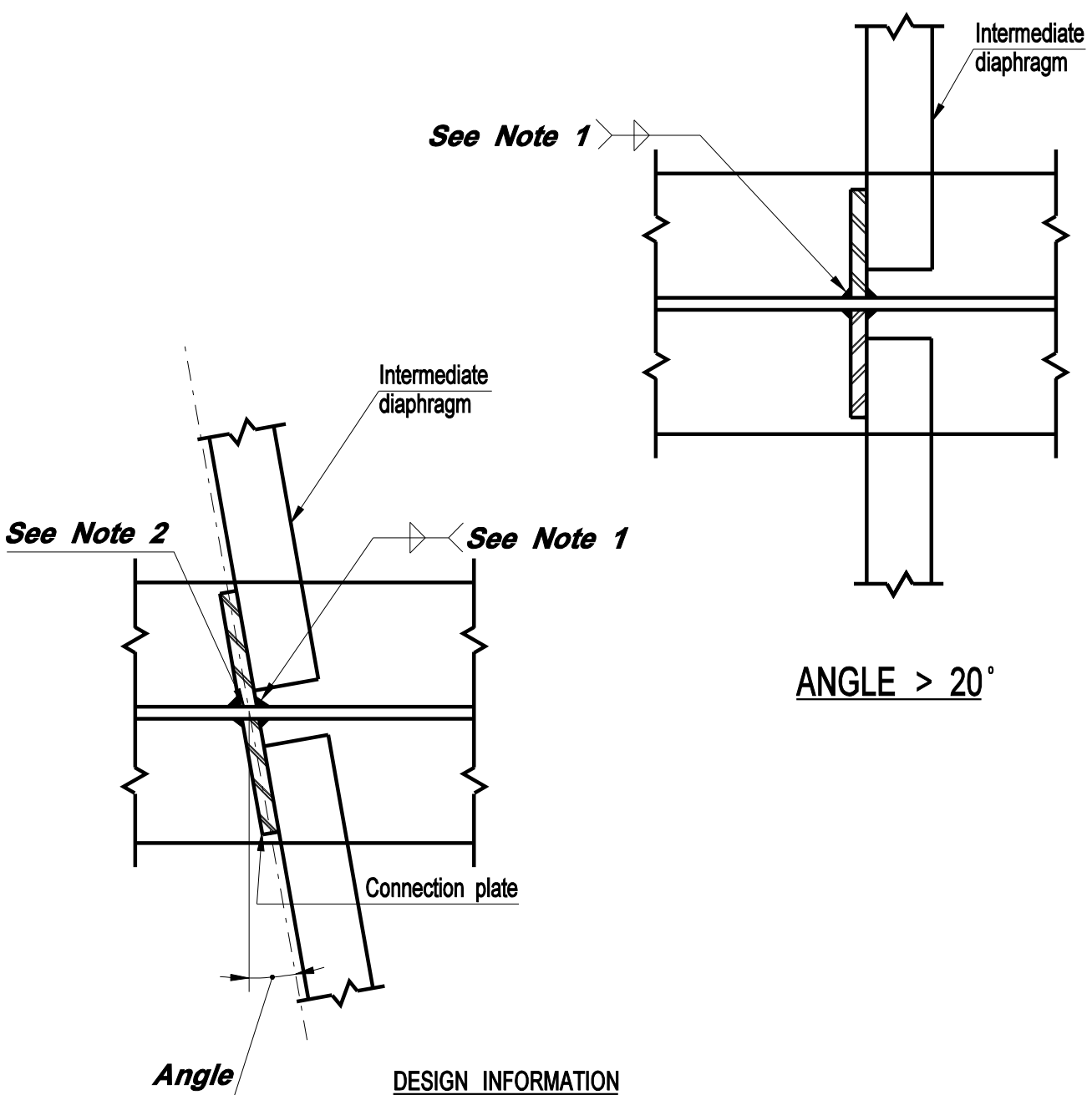
4.2.2



TYPICAL SECTION - PLATE GIRDERS

DESIGN INFORMATION:

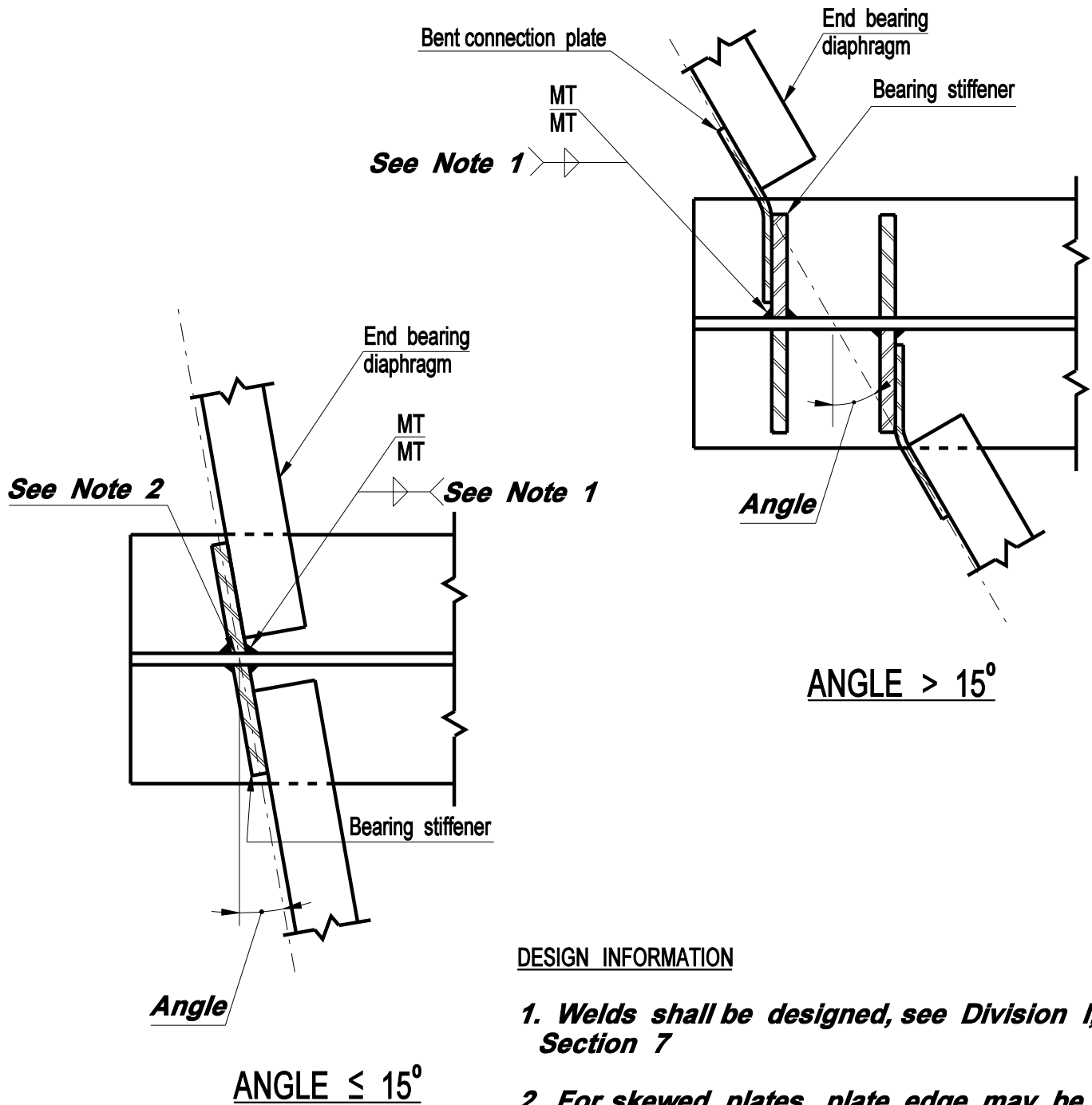
- 1. Details are shown for bottom flange, top flange is similar.*
- 2. Design shall determine this dimension.*



DESIGN INFORMATION

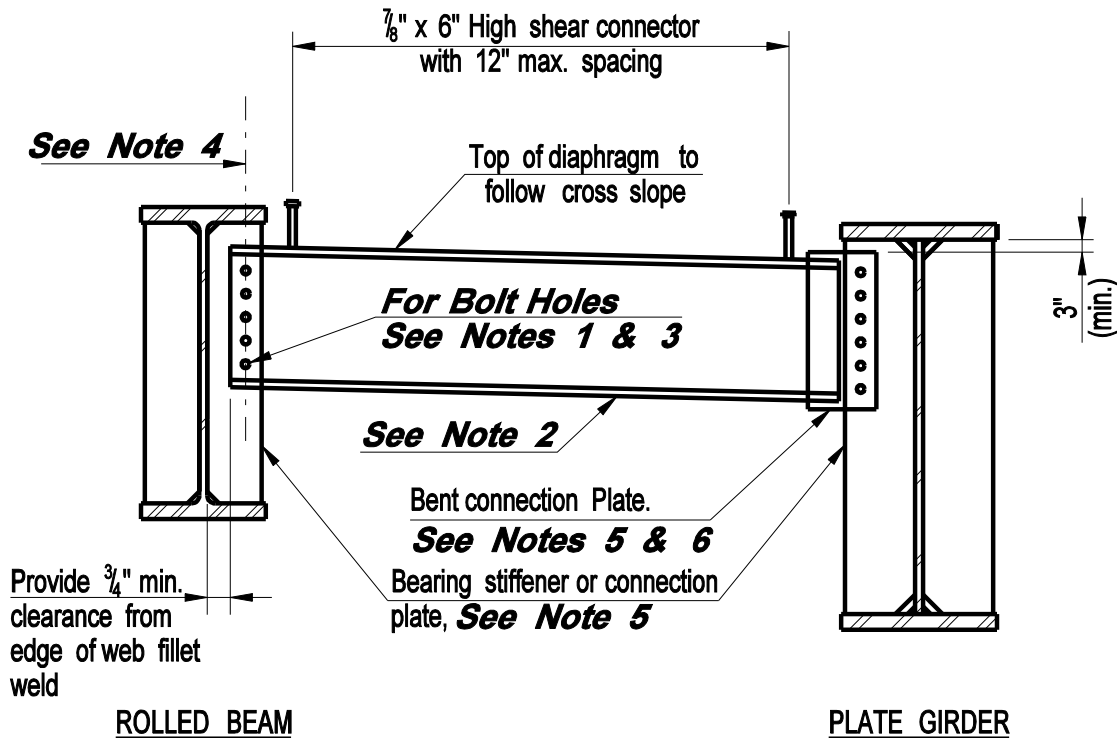
ANGLE ≤ 20°

1. Welds shall be designed, see Division I, Section 7
2. For skewed plates, plate edge may be beveled or square.



**DESIGN INFORMATION**

1. Welds shall be designed, see Division I, Section 7
2. For skewed plates, plate edge may be beveled or square.



**NOTES:**

1. Bolt holes in channels shall be  $\varnothing^{15/16}$ " (standard) for  $\varnothing^{7/8}$ " bolts. Bolt holes in connection or stiffener plates shall be  $\varnothing^{1 1/16}$ " (oversized).

**DESIGN INFORMATION**

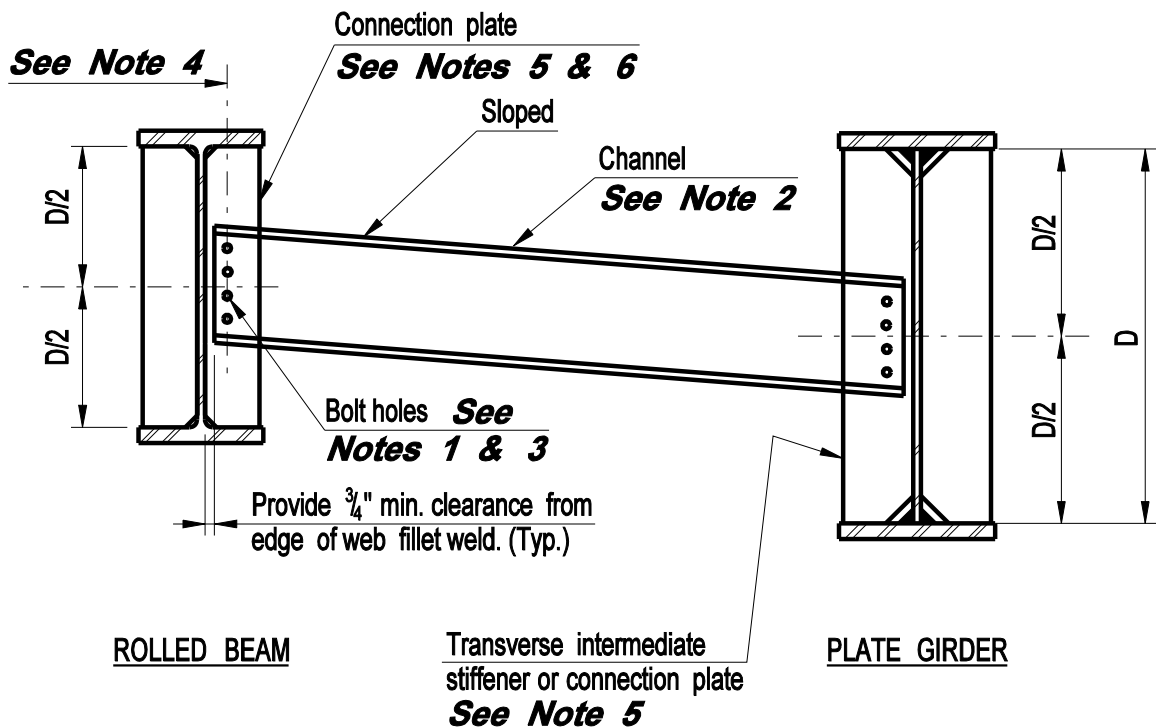
**2. Channel members shall be used for "I" shaped members. Size as determined by designer. C15 x 33.9 minimum.**

**3. Number of bolts shall be determined by the designer.**

**4. Centerline of bolt holes shall be vertical.**

**5. For connection and stiffener plate details, see Plate Nos. 4.2.1, 4.2.2 and 4.2.5.**

**6. Bent connection plate to be used for rolled beams or plate girders where skew angle > 15°. See Plate 4.2.5.**



<i>Member Depth *</i>	<i>Diaphragm</i>	<i>H.S. Bolts</i>
<b>33" - 48"</b>	<b>MC18 x 42.7</b>	<b>10</b>
<b>27" - 30"</b>	<b>C15 x 33.9</b>	<b>8</b>
<b>21" - 24"</b>	<b>C12 x 20.7</b>	<b>6</b>

**\* See Note 7**

**NOTES:**

1. Bolt holes in channels shall be  $\varnothing \frac{15}{16}$ " (standard) for  $\varnothing \frac{7}{8}$ " bolts. Bolt holes in connection or stiffener plates shall be  $\varnothing 1 \frac{1}{16}$ " (oversized).

**DESIGN INFORMATION**

- 2. Channel members shall be used for "I" shaped members.**
- 3. Number of bolts shall be determined by the designer.**
- 4. Centerline of bolt holes shall be vertical.**
- 5. For connection and stiffener plate details, see Plates 4.2.2 - 4.2.4.**
- 6. Connection plates shall be placed on skew for skew angle  $< 20^\circ$ .**
- 7. Member depth is nominal depth for rolled beams, actual web depth for plate girders.**

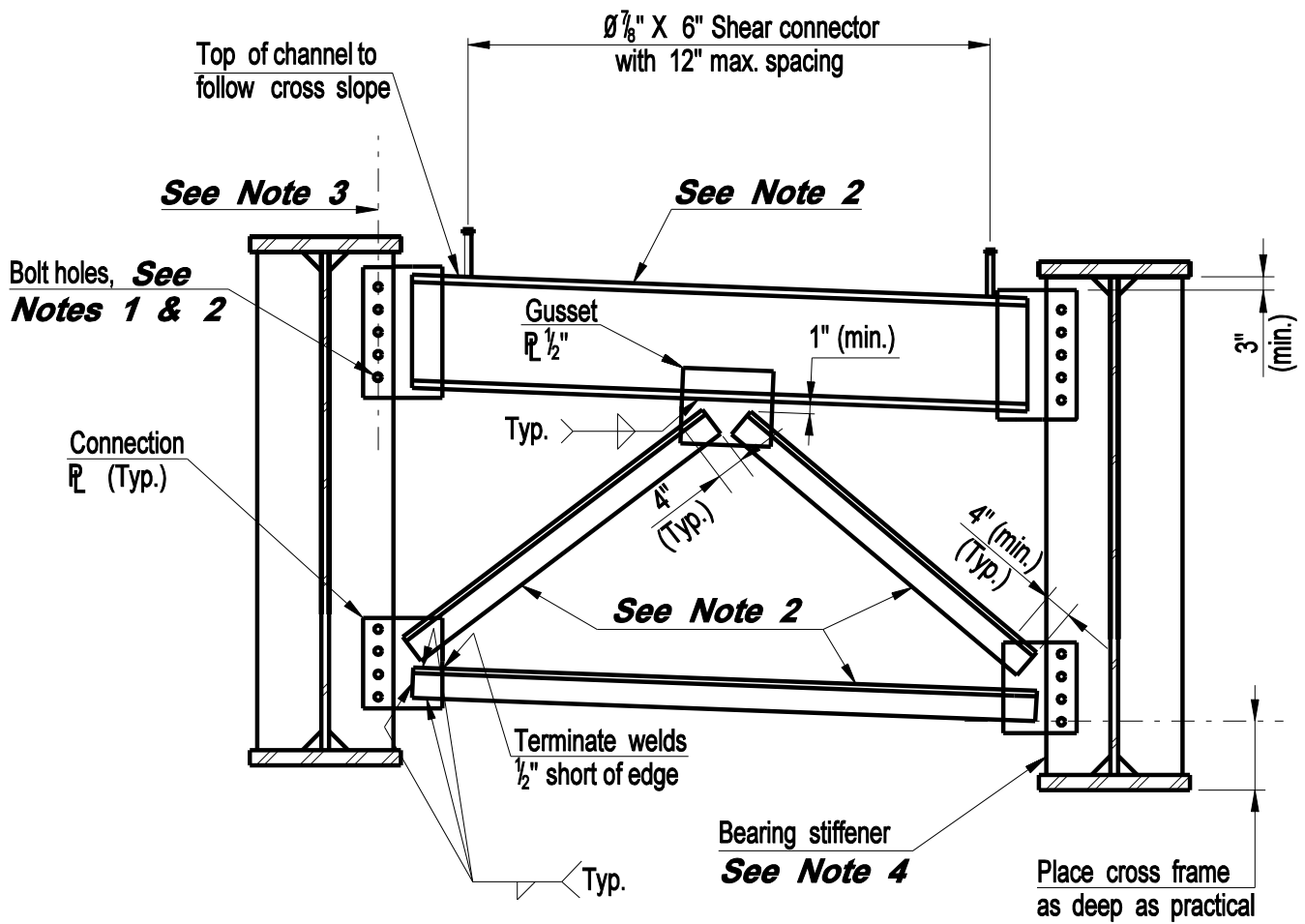
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**INTERMEDIATE DIAPHRAGM  
WEB DEPTH  $\leq 4'-0"$**

Issue Date: 10/03

Revision Date: 01/05

Plate Number:  
**4.3.2**



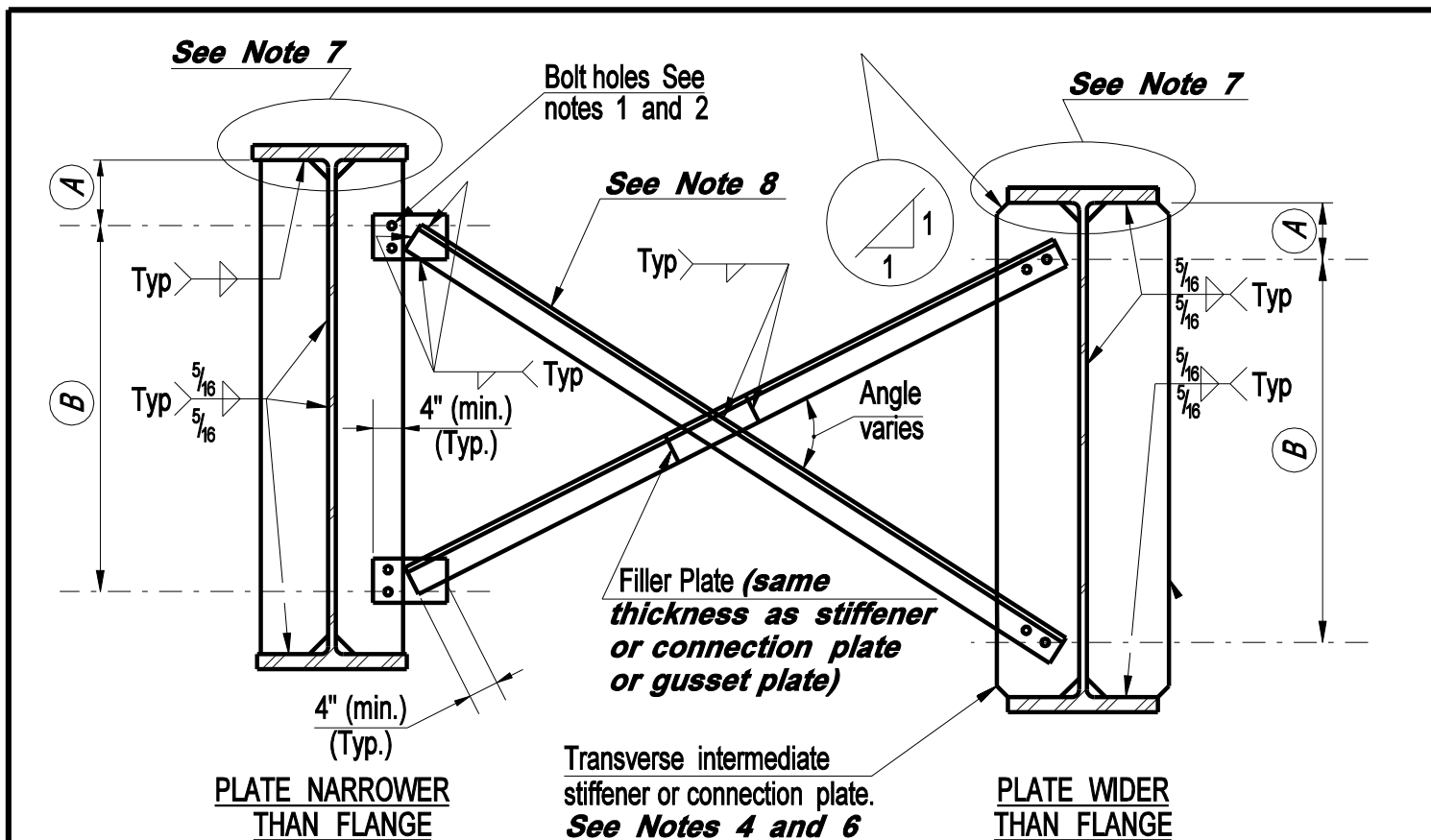
**NOTES:**

1. Bolt holes in channels shall be  $\varnothing 15/16$ " (standard) for  $\varnothing 7/8$ " bolts.  
Bolt holes in bearing stiffener shall be  $\varnothing 1 1/16$ " (oversized).

**DESIGN INFORMATION**

2. Channel and angle sizes along with the number of bolts shall be determined by the designer. Minimum angle size shall be L4" x 4" x 5/16".
3. Centerline of bolt holes shall be vertical.
4. For bearing stiffener details, see Plate Nos. 4.2.1, 4.2.2 and 4.2.5.



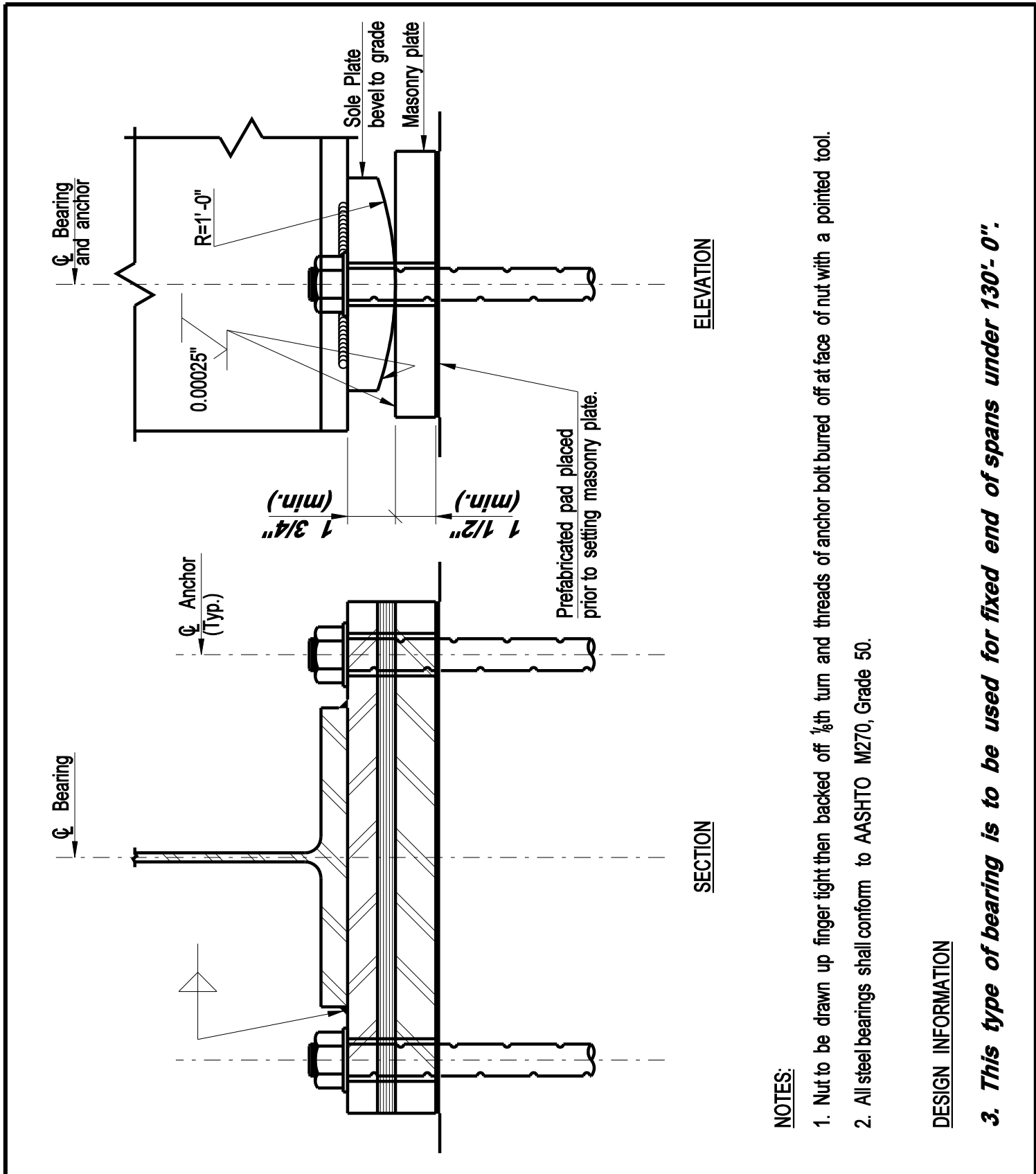


**NOTES:**

1. Bolt holes in angles and gusset plates shall be  $\varnothing 1\frac{5}{16}$ " (standard) for  $\varnothing 7/8$ " bolts. Bolt holes in transverse intermediate stiffener or connection plates shall be  $\varnothing 1\frac{1}{16}$ " (oversized).
2. Two bolts per connection shall be used.
3. Gusset plates shall be square or rectangular.

**DESIGN INFORMATION**

4. Designer may detail narrower stiffeners or connection plates with gusset plates, wider stiffeners or connection plates with angles connected directly thereto.
5. Dimensions A and B shall be the same for each girder. Cross frames shall be as deep as practical
6. For connection and stiffener plate details, see Plate Nos. 4.2.2, and 4.2.4.
7. For clip and weld termination details, see Plate No. 4.2.2.
8. Angles to be sized by designer.



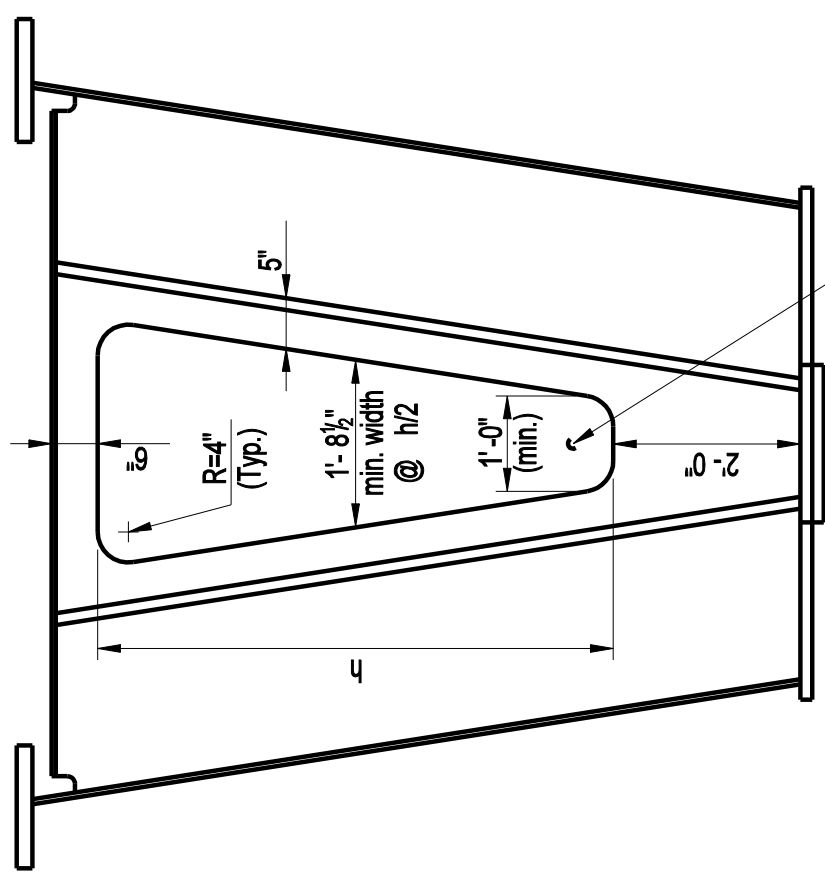
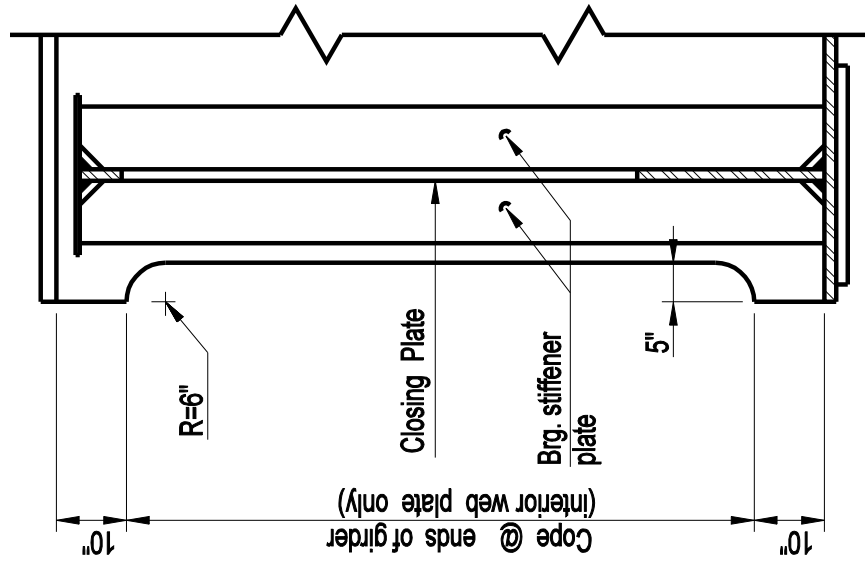
**NOTES:**

1. Nut to be drawn up finger tight then backed off 1/8th turn and threads of anchor bolt burred off at face of nut with a pointed tool.
2. All steel bearings shall conform to AASHTO M270, Grade 50.

**DESIGN INFORMATION**

***3. This type of bearing is to be used for fixed end of spans under 130'- 0".***

Issue Date:	10/03
Revision Date:	
Plate Number:	4.4.1



**END ELEVATION**

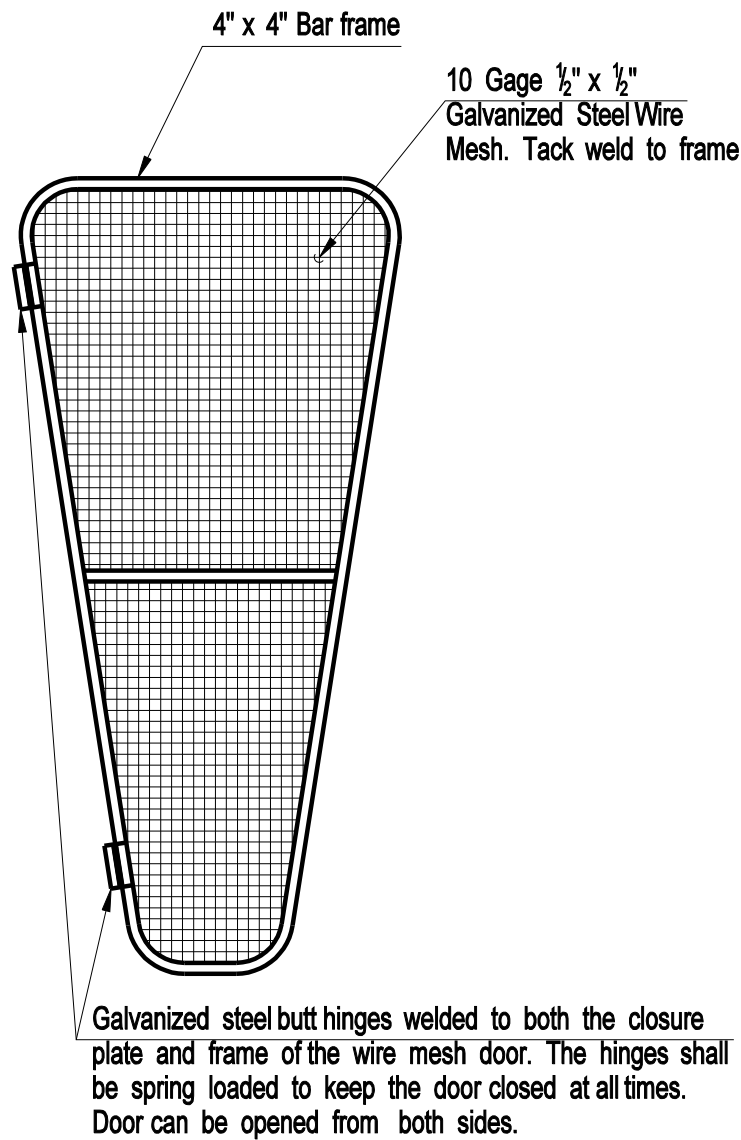
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**STEEL BOX GIRDER END DIAPHRAGM  
ACCESS DETAILS**

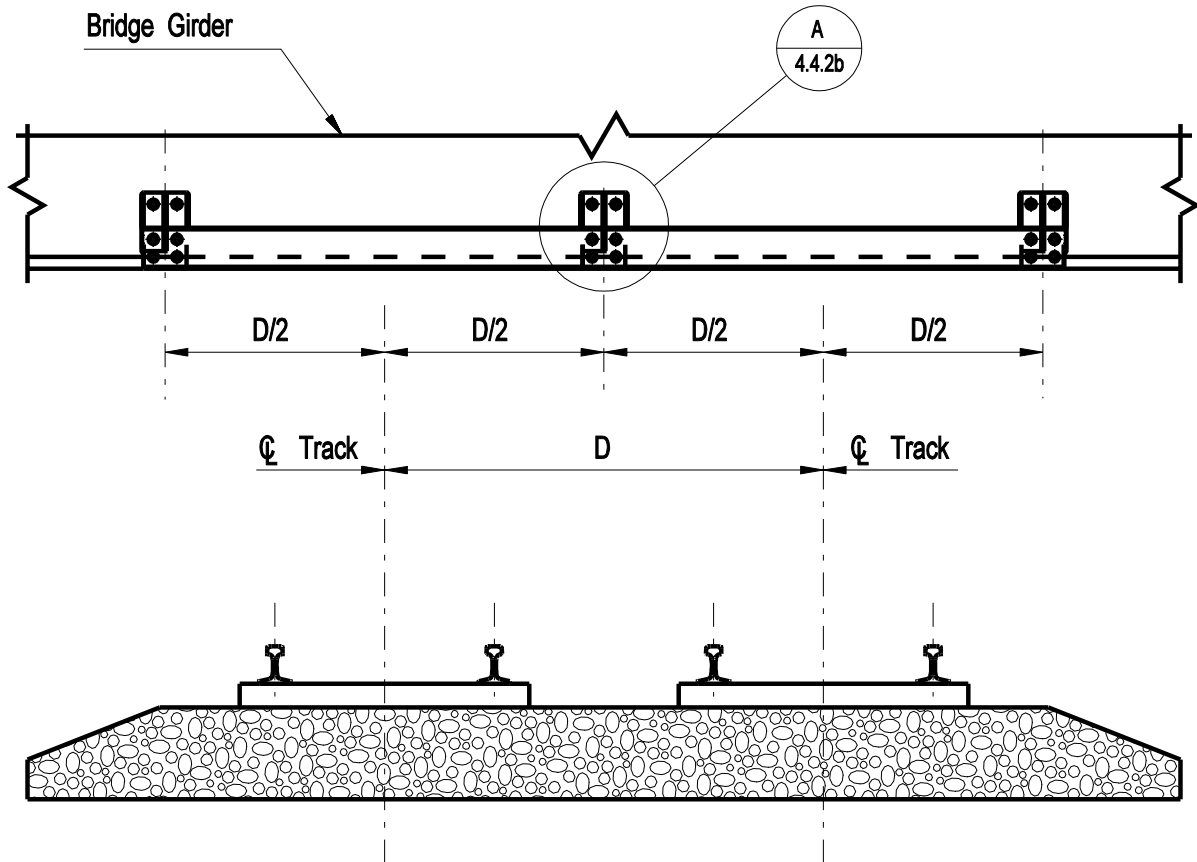
Issue Date: 10/03

Revision Date:

Plate Number:  
**4.5.1a**



### WIRE MESH CLOSURE



DESIGN INFORMATION

1. *The information shown should be used only as a guide and must be reviewed by the Railroad prior to its use.*
2. *The bottom elevation of the channel is to be at the same elevation as the bottom of the girder.*
3. *All steel shall be ASTM A709 Grade 50 unless the bridge is to be made of weathering steel. In this case all steel shall be ASTM A709 Grade 50W.*
4. *All bolts used with ASTM A709 Grade 50 steel shall be  $\emptyset 7/8$ " ASTM A325. Bolts used with ASTM A709 Grade 50W steel shall be  $\emptyset 7/8$ " ASTM A325 Type 3.*

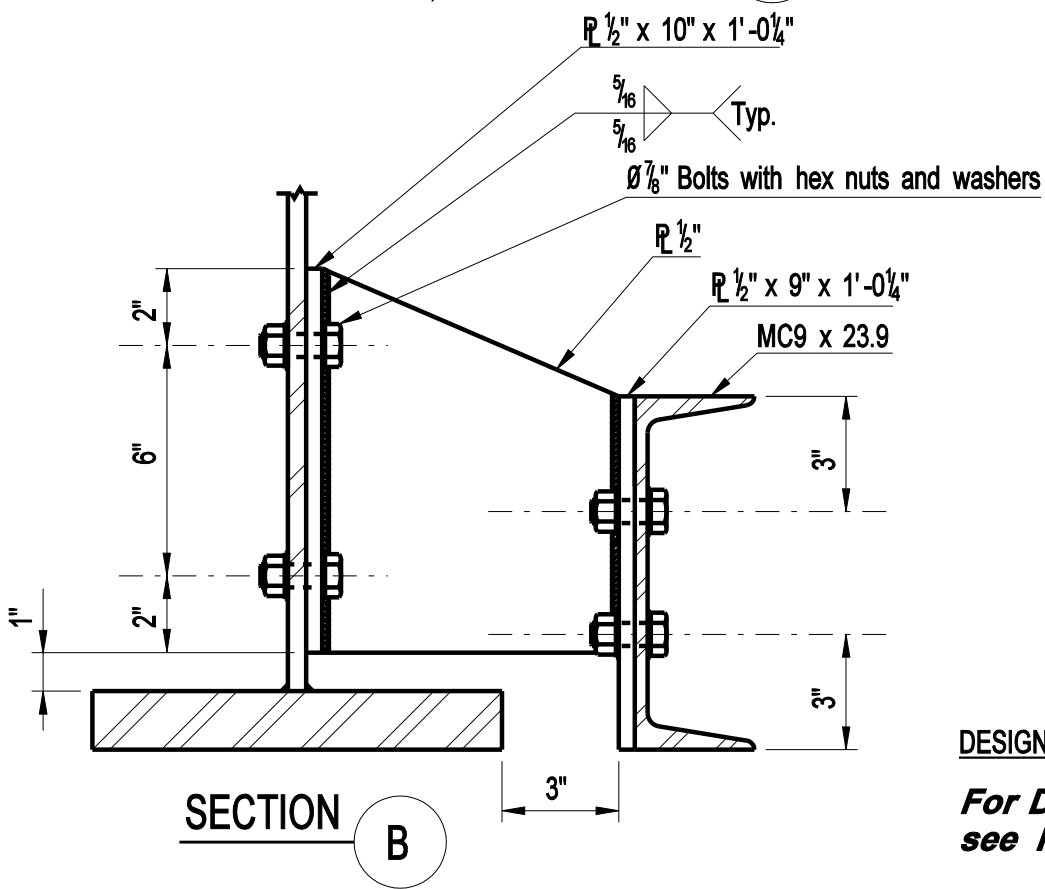
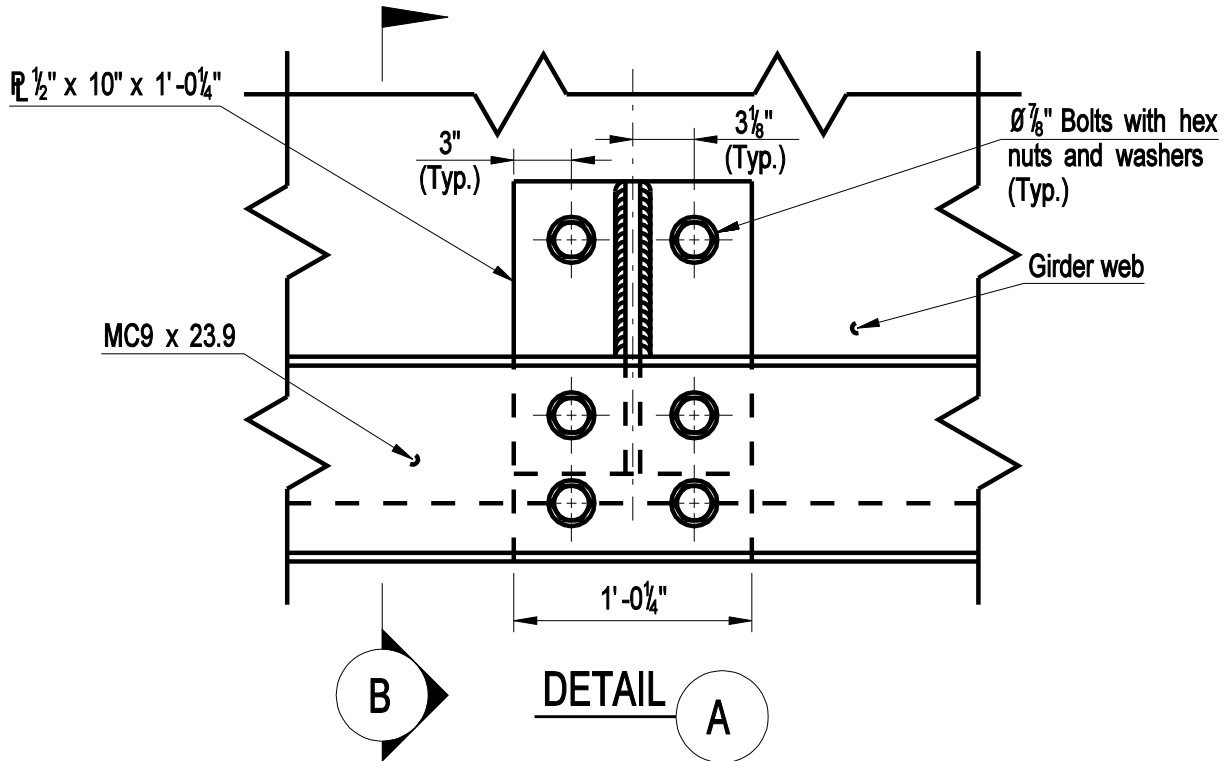
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

CATENARY CONNECTION  
DETAIL FOR BRIDGES  
OVER ELECTRIFIED RAILROADS

Issue Date: 10/03

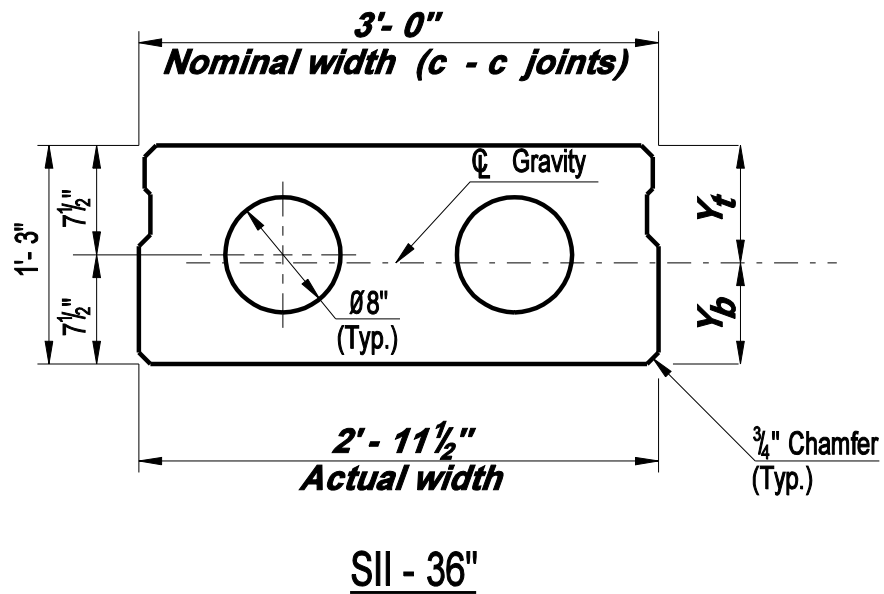
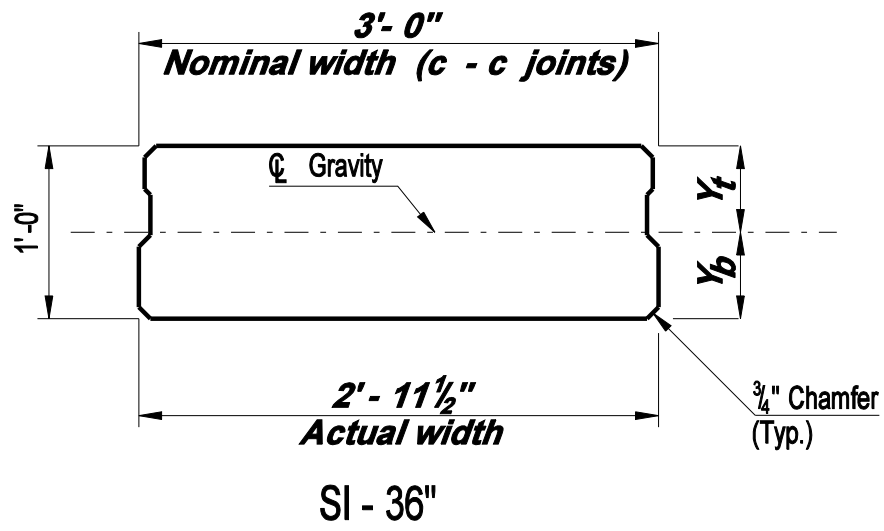
Revision Date:

Plate Number:  
4.5.2a



**DESIGN INFORMATION**

*For Design information, see Plate 4.5.2a*



DESIGN INFORMATION

*For Design information, see Plate 5.1.1c*

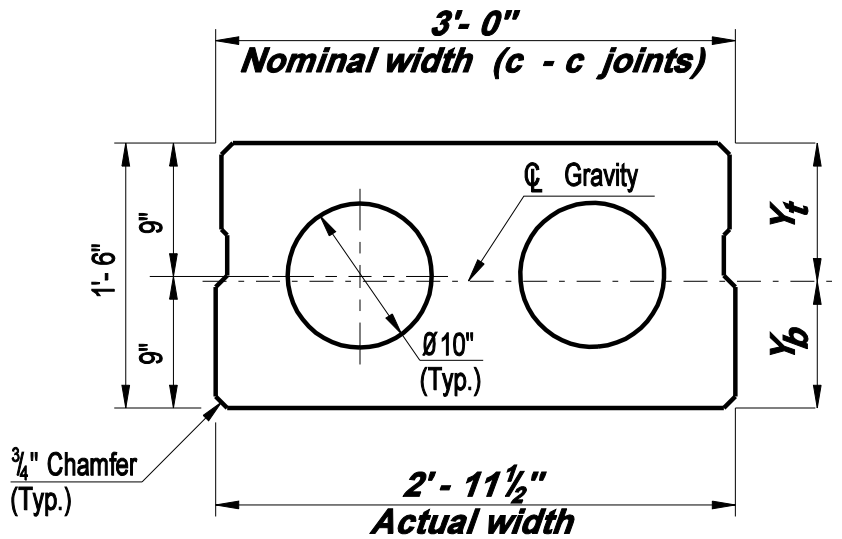
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

SECTION PROPERTIES  
AASHTO CONCRETE  
SLABS - 3'- 0" WIDE

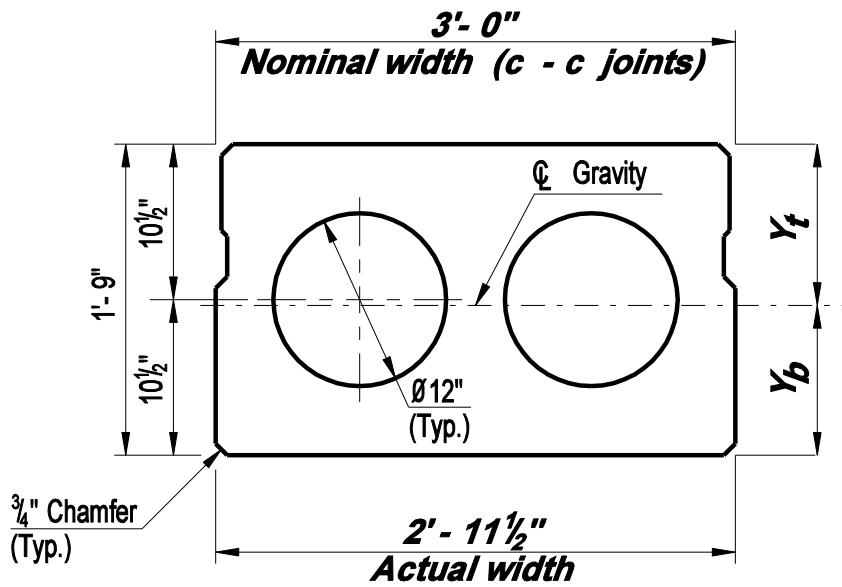
Issue Date: 10/03

Revision Date:

Plate Number:  
5.1.1a



**SIII - 36"**



**SIV - 36"**

**DESIGN INFORMATION**

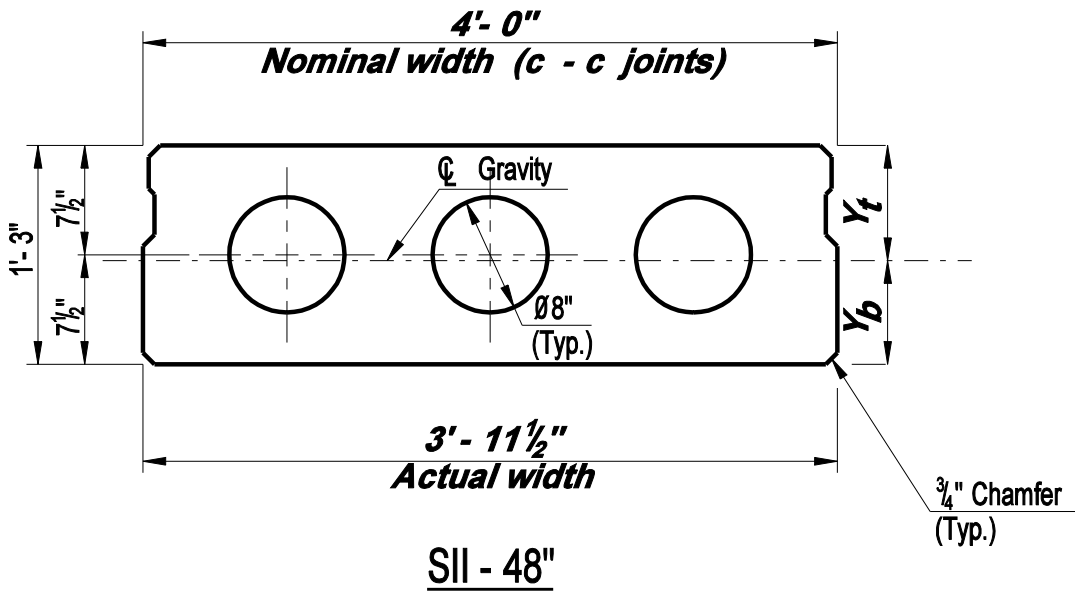
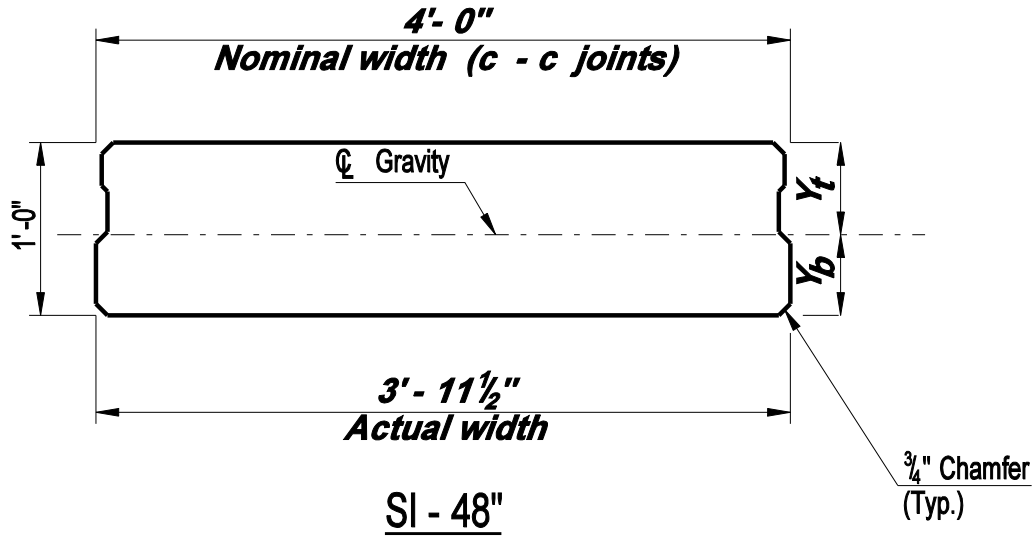
*For Design information, see Plate 5.1.1c*



BEAM TYPE	Width		Depth (inch)	A (inch <sup>2</sup> )	I (inch <sup>4</sup> )	Y <sub>b</sub> (in.)	Y <sub>t</sub> (in.)	S <sub>b</sub> (inch <sup>3</sup> )	S <sub>t</sub> (inch <sup>3</sup> )	Wt. (lb/ft)
	Nom. (inch)	Act. (inch)								
	SI-36	36.0								
SII-36	36.0	35.5	15.0	438	9728	7.44	7.56	1309	1287	457
SIII-36	36.0	35.5	18.0	473	16034	8.92	9.08	1798	1766	493
SIV-36	36.0	35.5	21.0	511	24987	10.40	10.60	2403	2358	532

DESIGN INFORMATION

1. *Weight of beam does not include weight of solid sections at transverse ties. Use the total weight (including solid sections) for design.*
2. *Voids may be eliminated to develop sidewalk/parapet reinforcement. See Section 5.6. The designer shall calculate and use the Modified Properties in this case.*
3. *For design details, see Plate 5.1.1a & 5.1.1b*
4. *If anchors must be drilled-in directly above a void for the purpose of anchoring Temporary Precast Concrete Barrier Curb, the size of the void should be adjusted to provide at least eight inches of thickness at the anchor locations.*



DESIGN INFORMATION

*For design information, see Plate 5.1.2c*

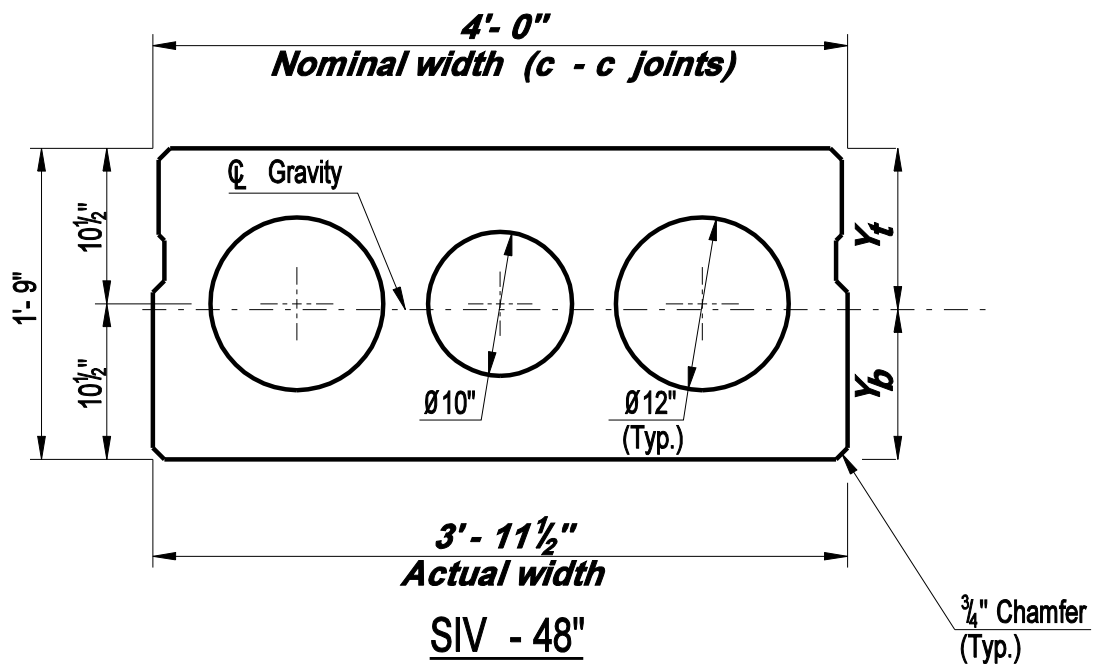
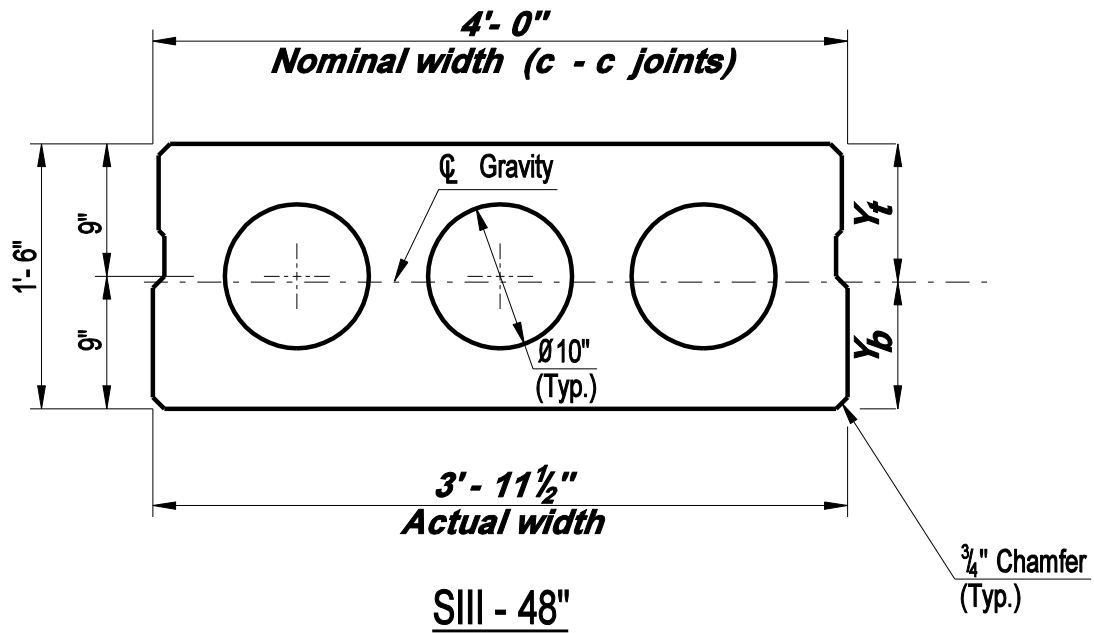
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**SECTION PROPERTIES  
AASHTO CONCRETE  
SLABS - 4'- 0" WIDE**

Issue Date: 10/03

Revision Date: 01/05

Plate Number:  
**5.1.2a**



**DESIGN INFORMATION**

*For design information, see Plate 5.1.2c*

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**SECTION PROPERTIES  
AASHTO CONCRETE  
SLABS - 4'- 0" WIDE**

Issue Date: 10/03

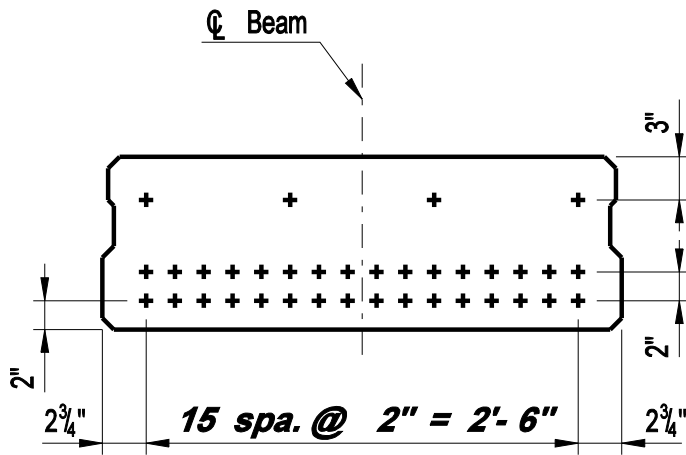
Revision Date:

Plate Number:  
**5.1.2b**

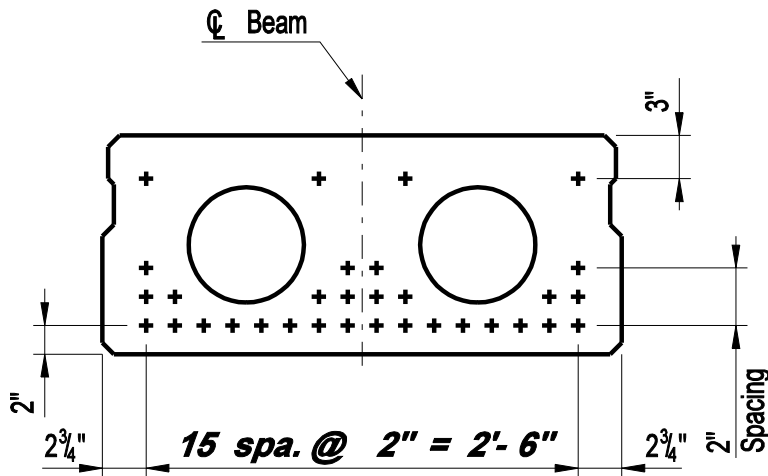
BEAM TYPE	Width		Depth	A	I	Y <sub>b</sub>	Y <sub>t</sub>	S <sub>b</sub>	S <sub>t</sub>	Wt.
	Nom. (inch)	Act. (inch)								
SI-48	48.0	47.5	12.0	561	6773	5.97	6.03	1135	1124	585
SII-48	48.0	47.5	15.0	553	12622	7.45	7.55	1695	1672	576
SIII-48	48.0	47.5	18.0	611	21376	8.94	9.06	2393	2359	636
SIV-48	48.0	47.5	21.0	684	33759	10.43	10.57	3238	3193	713

DESIGN INFORMATION

1. Weight of beam does not include weight of solid sections at transverse ties. Use the total weight (including solid sections) for design.
2. Voids may be eliminated to develop sidewalk/parapet reinforcement. See Section 5.6. The designer shall calculate and use the Modified Properties in this case.
3. For design details, see Plates 5.1.2a & 5.1.2b



SI - 36"



SII - 36"

DESIGN INFORMATION

*For Design Information, see Plate 5.1.7*

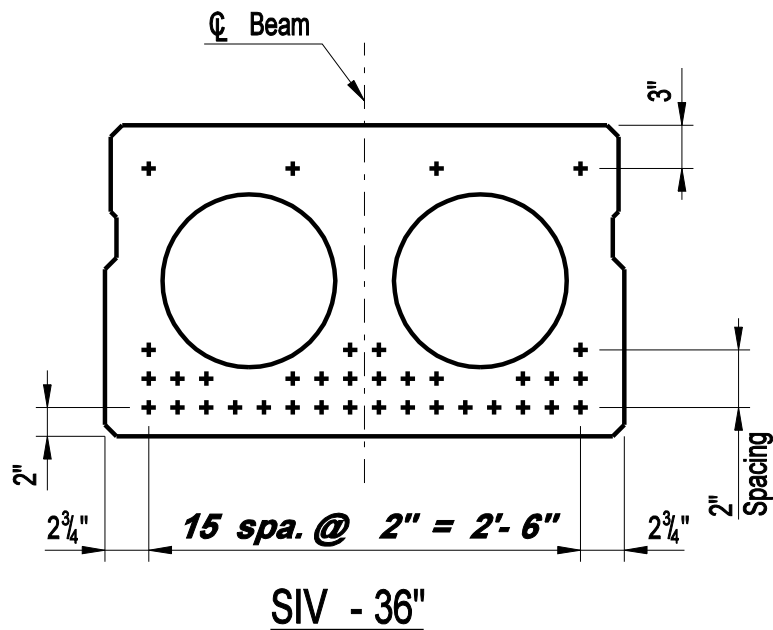
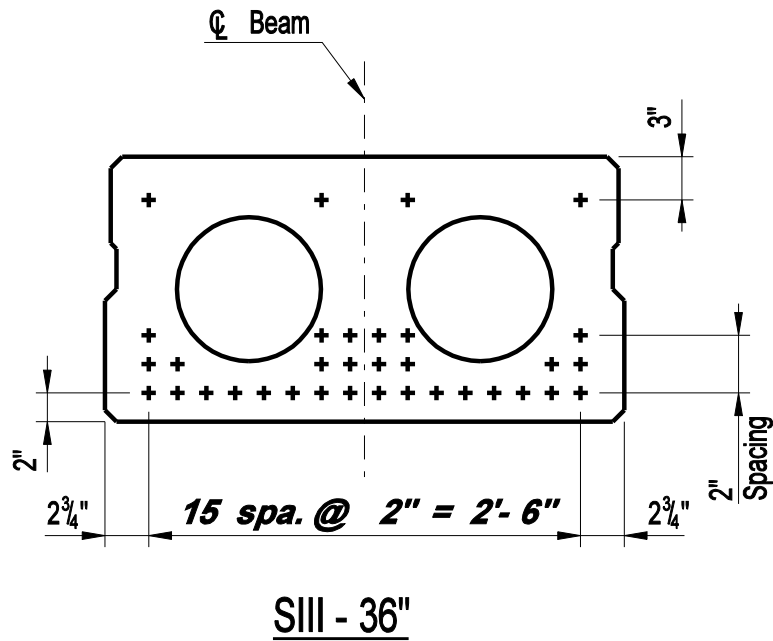
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

STRAND LOCATIONS  
AASHTO CONCRETE SLABS  
(S I & S II - 3'- 0" WIDE)

Issue Date: 10/03

Revision Date:

Plate Number:  
5.1.3



DESIGN INFORMATION

*Design Information, see Plate 5.1.7*

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

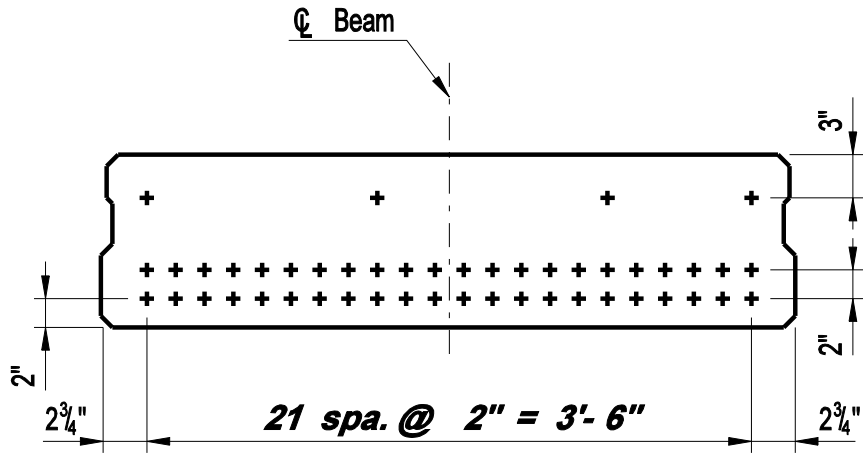
STRAND LOCATIONS  
AASHTO CONCRETE SLABS  
(S III & S IV - 3'-0" WIDE)

Issue Date: 10/03

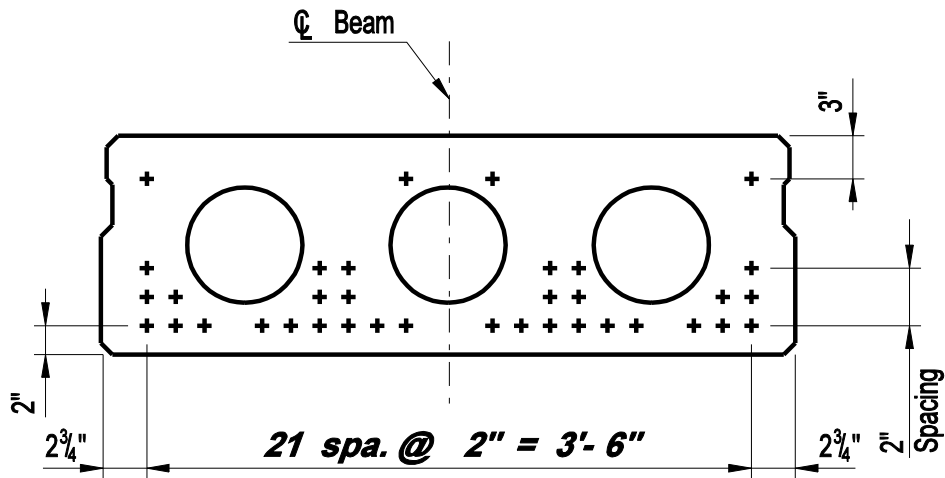
Revision Date:

Plate Number:

5.1.4



**SI - 48"**



**SII - 48"**

**DESIGN INFORMATION**

*Design Information, see Plate 5.1.7*

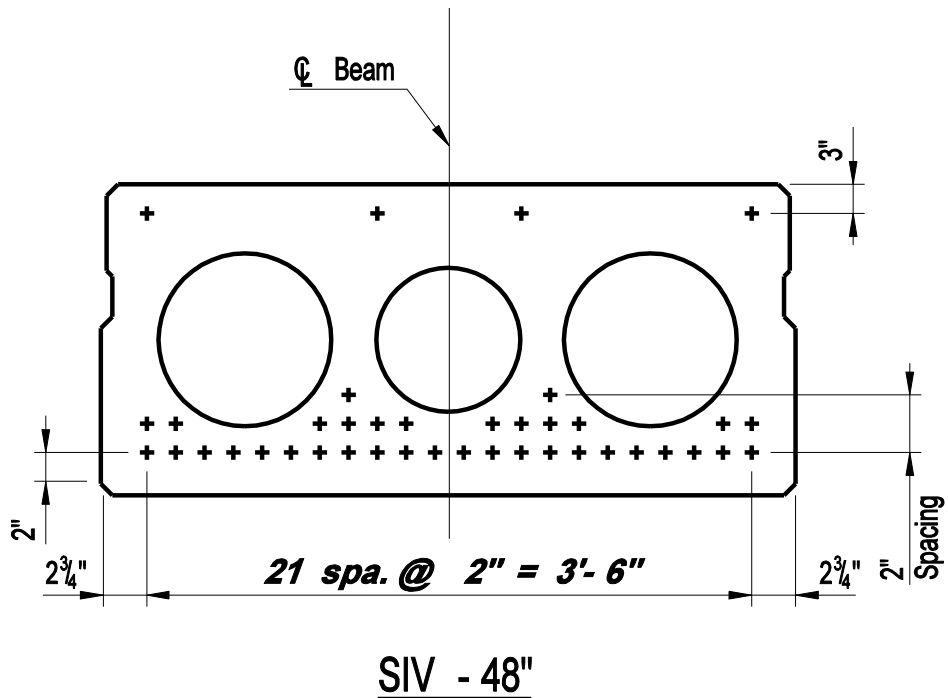
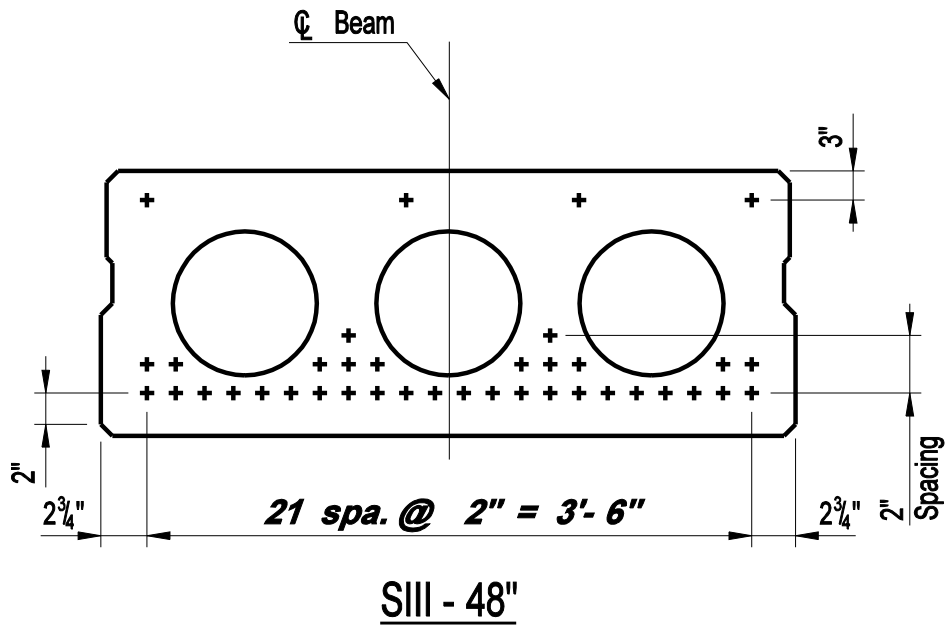
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**STRAND LOCATIONS  
AASHTO CONCRETE SLABS  
(S I & S II - 4'- 0" WIDE)**

Issue Date: 10/03

Revision Date:

Plate Number:  
**5.1.5**



DESIGN INFORMATION

*For Design Information, see Plate 5.1.7*

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

STRAND LOCATIONS  
AASHTO CONCRETE SLABS  
(S III & S IV - 4'-0" WIDE)

Issue Date: 10/03

Revision Date:

Plate Number:

5.1.6



DESIGN INFORMATION

- 1. The standard strand pattern shown above depicts the maximum number of strands possible that can be located in a given beam while still meeting applicable fabrication clearances and tolerances. For most beam designs, strands shall be placed in as many locations within the pattern as required.***
- 2. + Denotes Prestressing strands***
- 3. Strand locations shown for design purposes only. Final plans shall only show number of strands and center of gravity.***
- 4. For design details, see Plates 5.1.3 - 5.1.6***

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**STRAND LOCATIONS  
AASHTO CONCRETE SLABS  
(DESIGN INFORMATION)**

Issue Date: 10/03

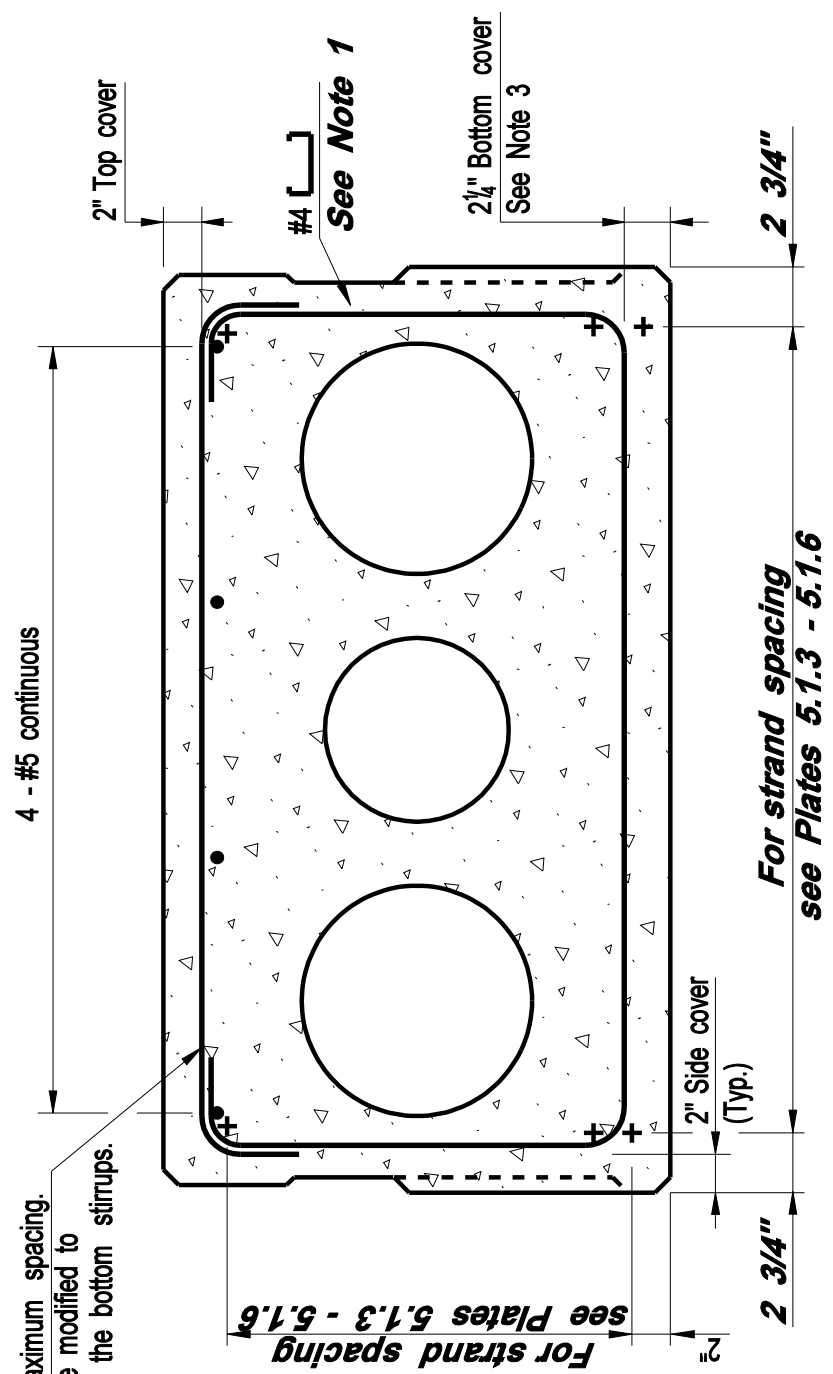
Revision Date:

Plate Number:  
5.1.7

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**TYPICAL MIDSPAN SECTION  
AASHTO CONCRETE SLABS**

Issue Date:	10/03
Revision Date:	
Plate Number:	5.1.8



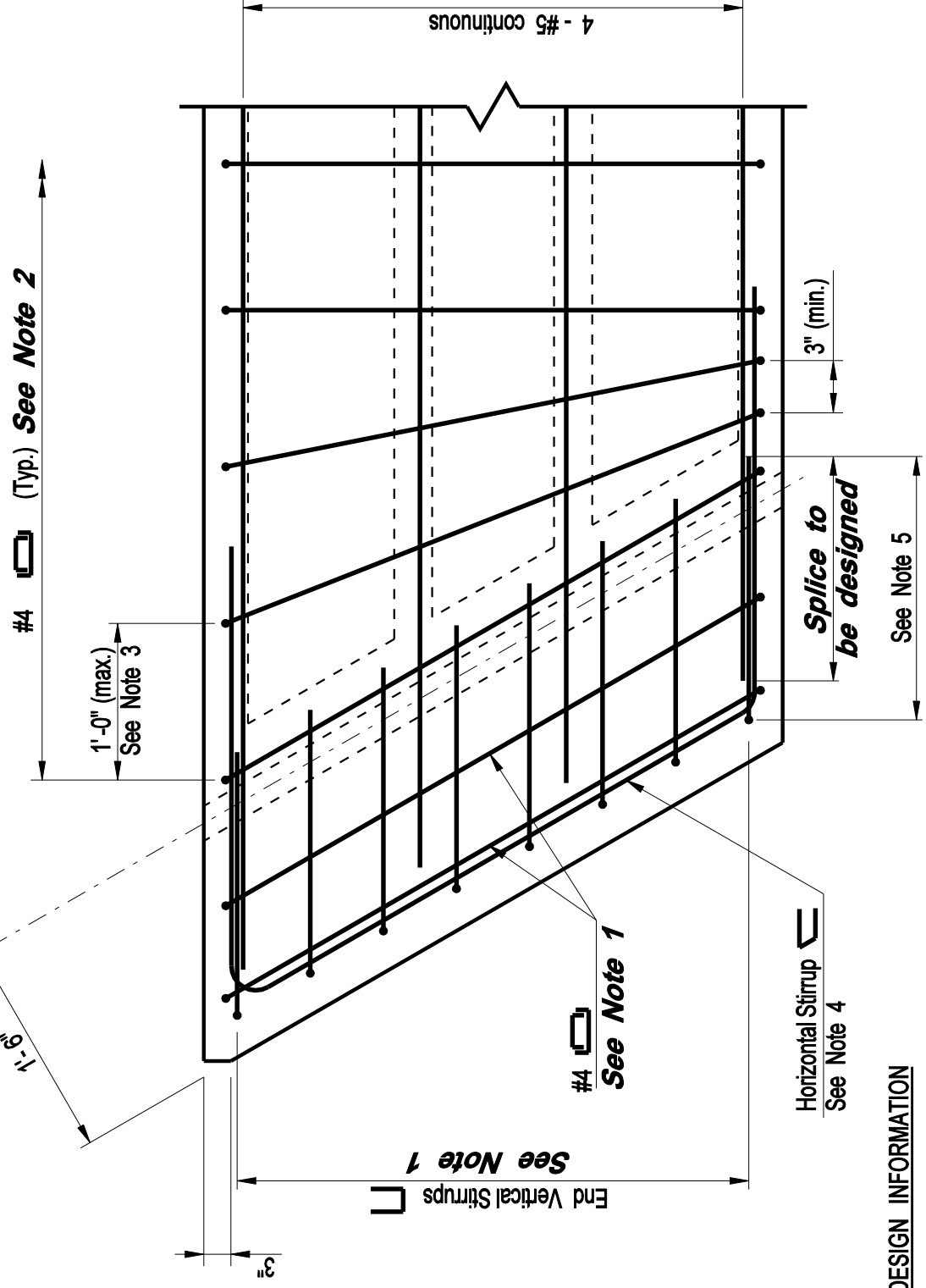
**NOTES:**

1. This cover is required to facilitate the placement of the bottom prestressing strands. The fabricator may modify cover (1 1/2" min.) if no conflicts exist with the prestressing strands.

**DESIGN INFORMATION**

1. *Stirrups shall be designed to conform to the requirements of AASHTO. The stirrups shall be #4 bars with a maximum spacing of 12".*
2. *+ Denotes prestressing strands*

∅ 02½" Transverse tie strand hole



DESIGN INFORMATION

For Notes 1 - 5, See Plate 5.1.9b

PLAN

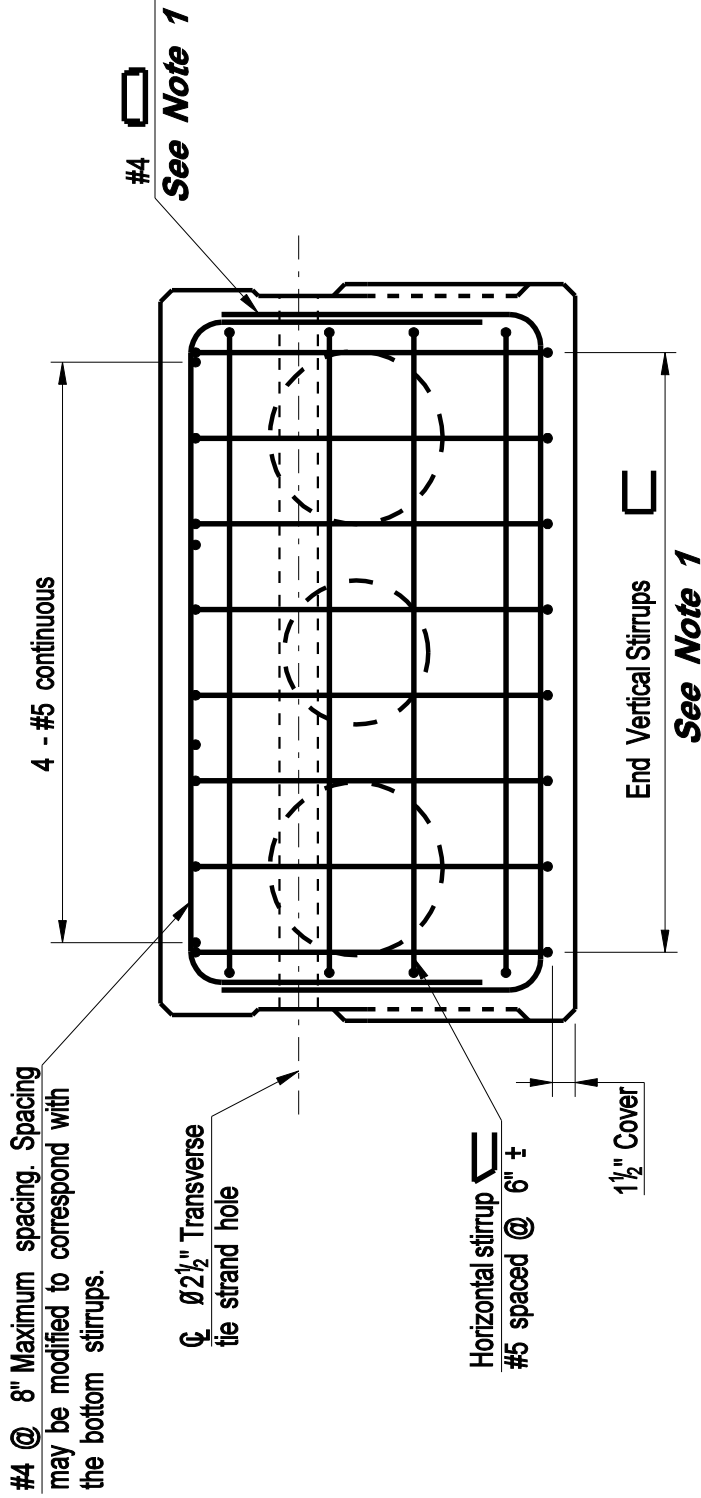
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

END BLOCK REINFORCING  
AASHTO CONCRETE SLABS

Issue Date: 10/03

Revision Date:

Plate Number:  
5.1.9a



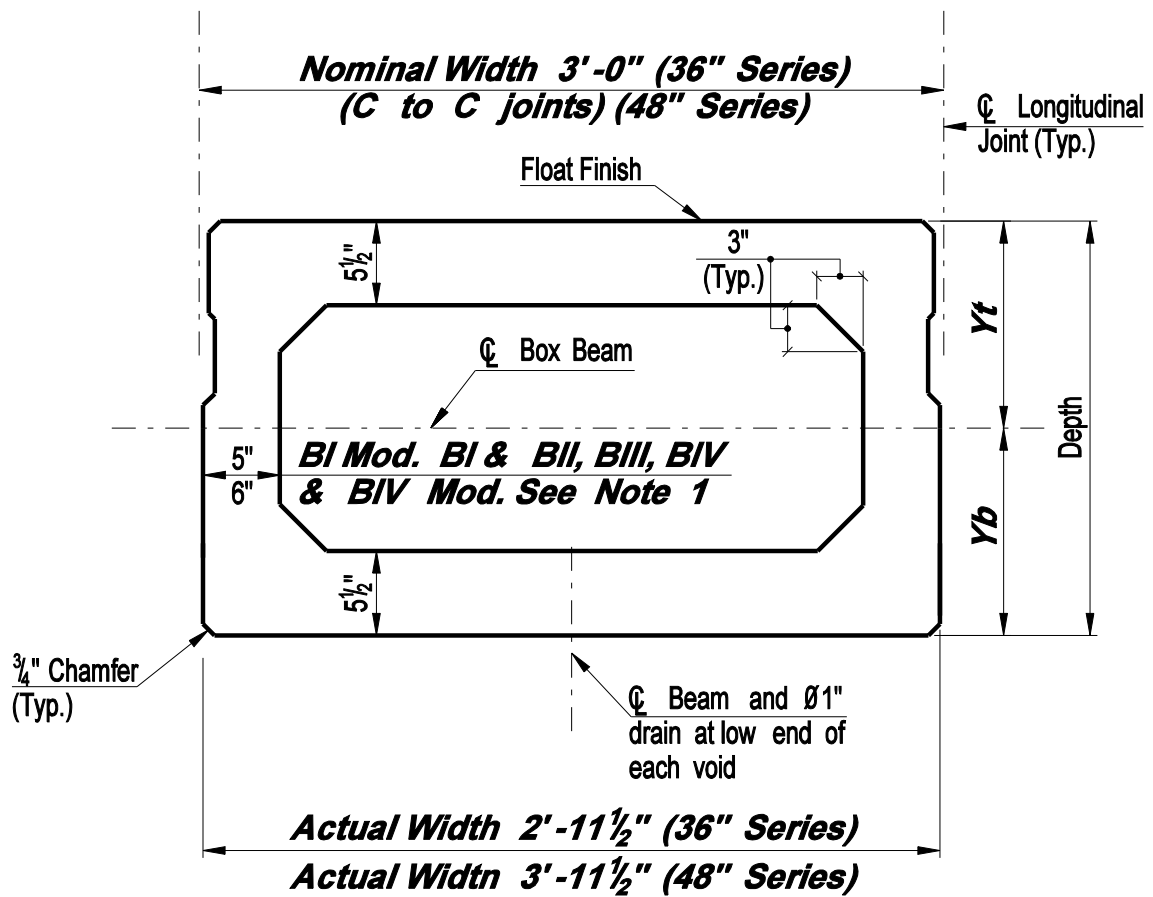
**END VIEW**

DESIGN INFORMATION

1. The Engineer shall design the vertical legs of the last transverse stirrup and the end vertical stirrups to satisfy the requirements of AASHTO.
2. Stirrups shall be designed to conform to the requirements of AASHTO. The stirrups shall be #4 bars.

NOTES:

3. Splay stirrups to avoid conflicts with transverse tie strand holes.
4. Extend longitudinal legs a minimum distance equal to the depth of the beam or 12" into the web of the voided section, whichever is larger.
5. Horizontal legs of the vertical stirrups are equal to the depth of the beam.



DESIGN INFORMATION

**5" Web is to accommodate 1 column of draped strands.**

**6" Web is to accommodate 2 columns of draped strands.**  
**For typical strand locations, see Plates 5.2.2 & 5.2.3.**

**7. Top slab thickness shall be increased to eight inches where necessary to accommodate drilled-in anchors for Temporary Precast Concrete Barrier Curb.**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**SECTION PROPERTIES  
AASHTO CONCRETE  
BOX BEAMS**

Issue Date: 10/03

Revision Date:

Plate Number:

**5.2.1a**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**SECTION PROPERTIES  
AASHTO CONCRETE  
BOX BEAMS**

BEAM TYPE	Width		Depth	A ( <i>inch</i> <sup>2</sup> )	I ( <i>inch</i> <sup>4</sup> )	Y <sub>b</sub> ( <i>in.</i> )	Y <sub>t</sub> ( <i>in.</i> )	S <sub>b</sub> ( <i>inch</i> <sup>3</sup> )	S <sub>t</sub> ( <i>inch</i> <sup>3</sup> )	Wt. ( <i>lb/ft</i> )
	Nom. ( <i>inch</i> )	Act. ( <i>inch</i> )								
<i>BI-36 Mod.</i>	36.0	35.5	24.0	524.6	36136	11.87	12.13	3043	2980	546
<i>BI-48 Mod.</i>	48.0	47.5	24.0	656.6	47764	11.90	12.10	4014	3947	684
<i>BI-36</i>	36.0	35.5	27.0	554.6	49495	13.35	13.65	3709	3625	578
<i>BI-48</i>	48.0	47.5	27.0	686.6	65085	13.38	13.62	4886	4777	715
<i>BIII-36</i>	36.0	35.5	33.0	614.6	83834	16.30	16.70	5144	5019	640
<i>BIII-48</i>	48.0	47.5	33.0	746.6	109127	16.33	16.67	6681	6548	778
<i>BIIII-36</i>	36.0	35.5	39.0	730.6	132895	19.28	19.72	6894	6738	761
<i>BIIII-48</i>	48.0	47.5	39.0	862.6	170267	19.31	19.69	8817	8648	899
<i>BIV-36</i>	36.0	35.5	42.0	766.6	161387	20.76	21.24	7773	7599	799
<i>BIV-48</i>	48.0	47.5	42.0	898.6	205690	20.80	21.20	9890	9701	936
<i>BIV-36 Mod.</i>	36.0	35.5	45.0	802.6	193328	22.25	22.75	8689	8498	836
<i>BIV-48 Mod.</i>	48.0	47.5	45.0	834.6	245156	22.29	22.72	11001	10793	974

DESIGN INFORMATION

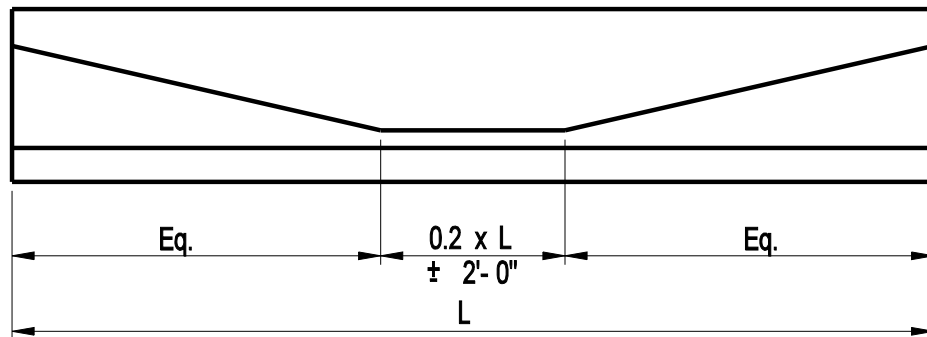
1. Weight of beam does not include weight of solid sections at transverse ties. Use the total weight (including solid sections) for design.
2. Thickness of top flange may have to be increased to develop sidewalk/parapet reinforcement. See Section 5.6. The designer shall calculate and use the Modified Properties in this case.

Issue Date: 10/03

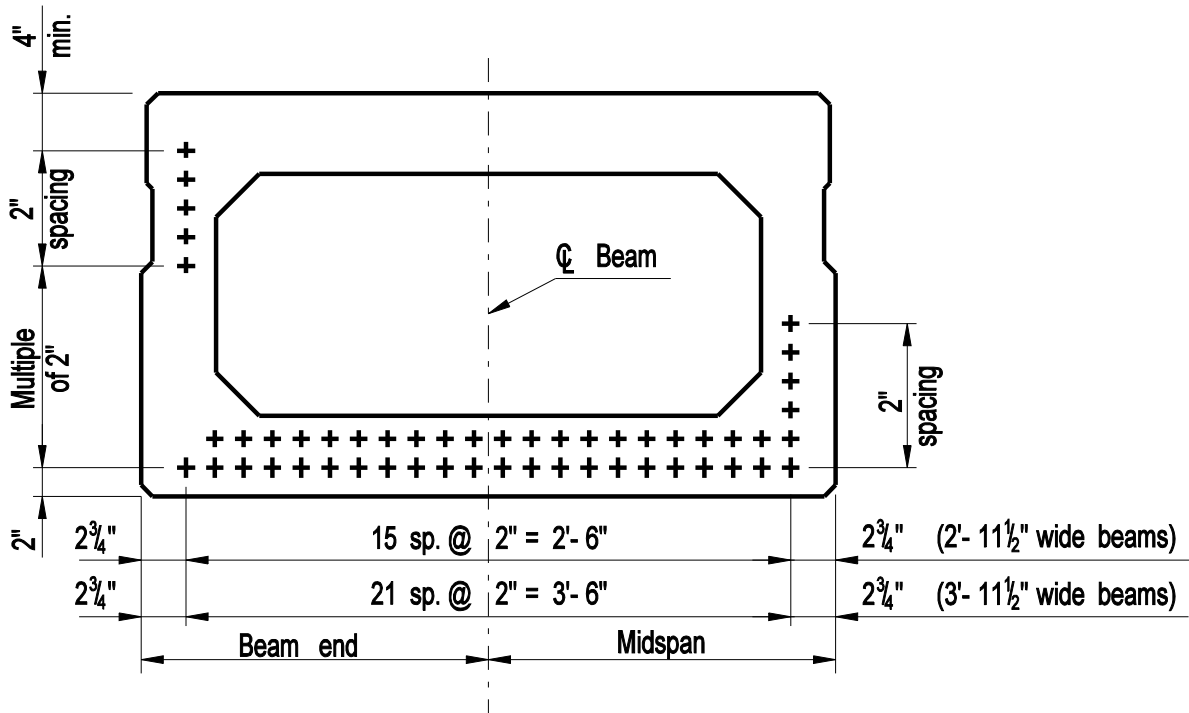
Revision Date:

Plate Number:

5.2.1b



HOLD DOWN POINTS FOR DRAPED STRANDS



STRAND LOCATIONS

DESIGN INFORMATION

1. *The standard strand pattern shown above depicts the maximum number of strands possible that can be located in a given beam while still meeting applicable fabrication clearances and tolerances. For most beam designs, strands shall be placed in as many locations within the pattern as required.*
2. *+ Denotes Prestressing strands*
3. *Strand locations shown for design purposes only. Final plans shall only show number of strands and center of gravity.*

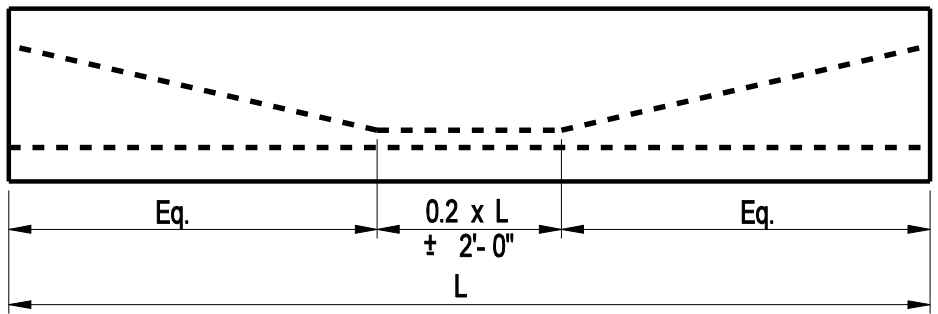
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**STRAND LOCATIONS  
AASHTO BOX BEAMS  
(TYPE B I, B I MODIFIED & B II)**

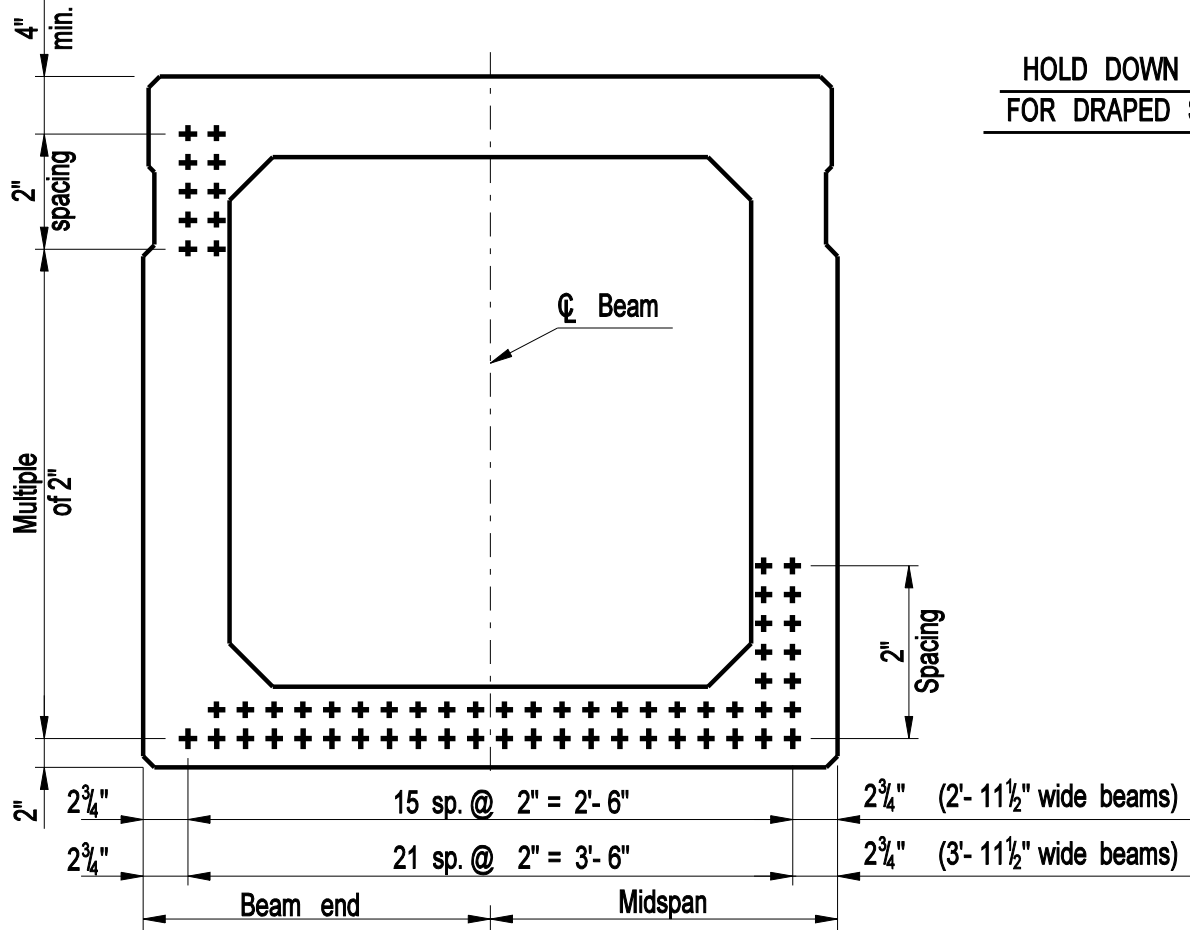
Issue Date: 10/03

Revision Date:

Plate Number:  
5.2.2



HOLD DOWN POINTS  
FOR DRAPED STRANDS



STRAND LOCATION

DESIGN INFORMATION

1. *The standard strand pattern shown above depicts the maximum number of strands possible that can be located in a given beam while still meeting applicable fabrication clearances and tolerances. For most beam designs, strands shall be placed in as many locations within the pattern as required.*
2. *+ Denotes Prestressing strands*
3. *Strand locations shown for design purposes only. Final plans shall only show number of strands and center of gravity.*

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**STRAND LOCATIONS  
AASHTO BOX BEAMS  
(TYPE B III, B IV & B IV MODIFIED)**

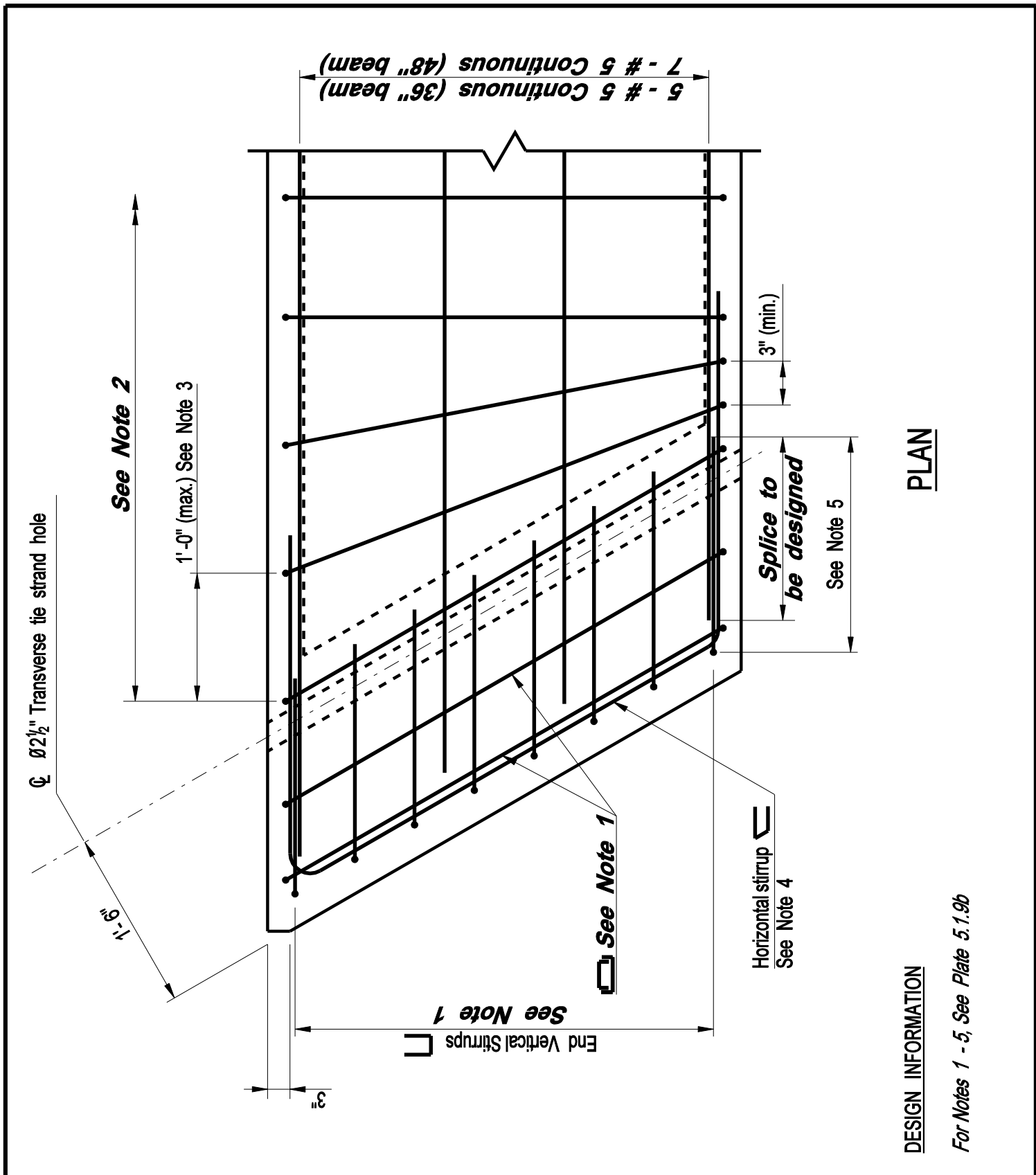
Issue Date: 10/03

Revision Date:

Plate Number:  
**5.23**







**PLAN**

**DESIGN INFORMATION**

For Notes 1 - 5, See Plate 5.1.9b

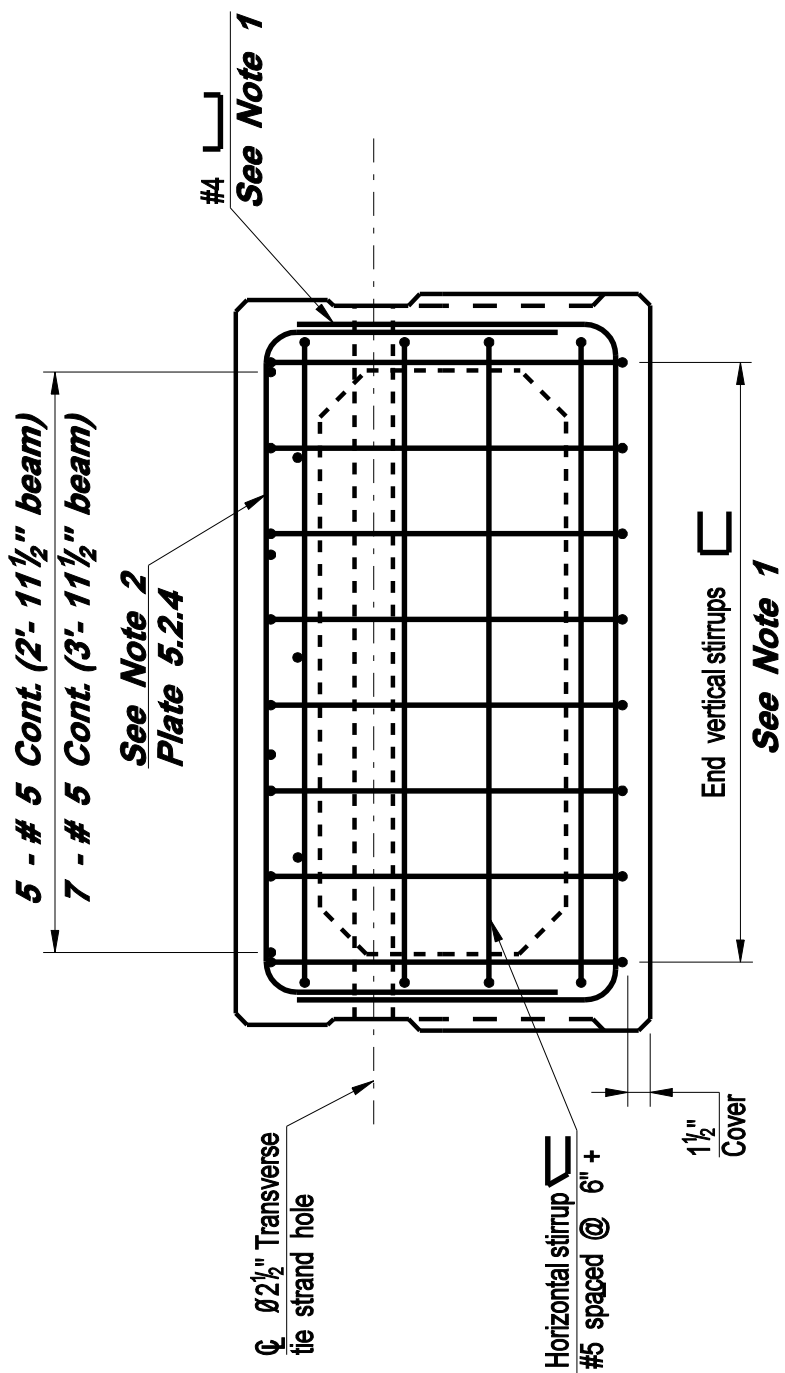
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**END BLOCK REINFORCING  
AASHTO BOX BEAMS**

Issue Date: 10/03

Revision Date:

Plate Number:  
**5.2.5a**



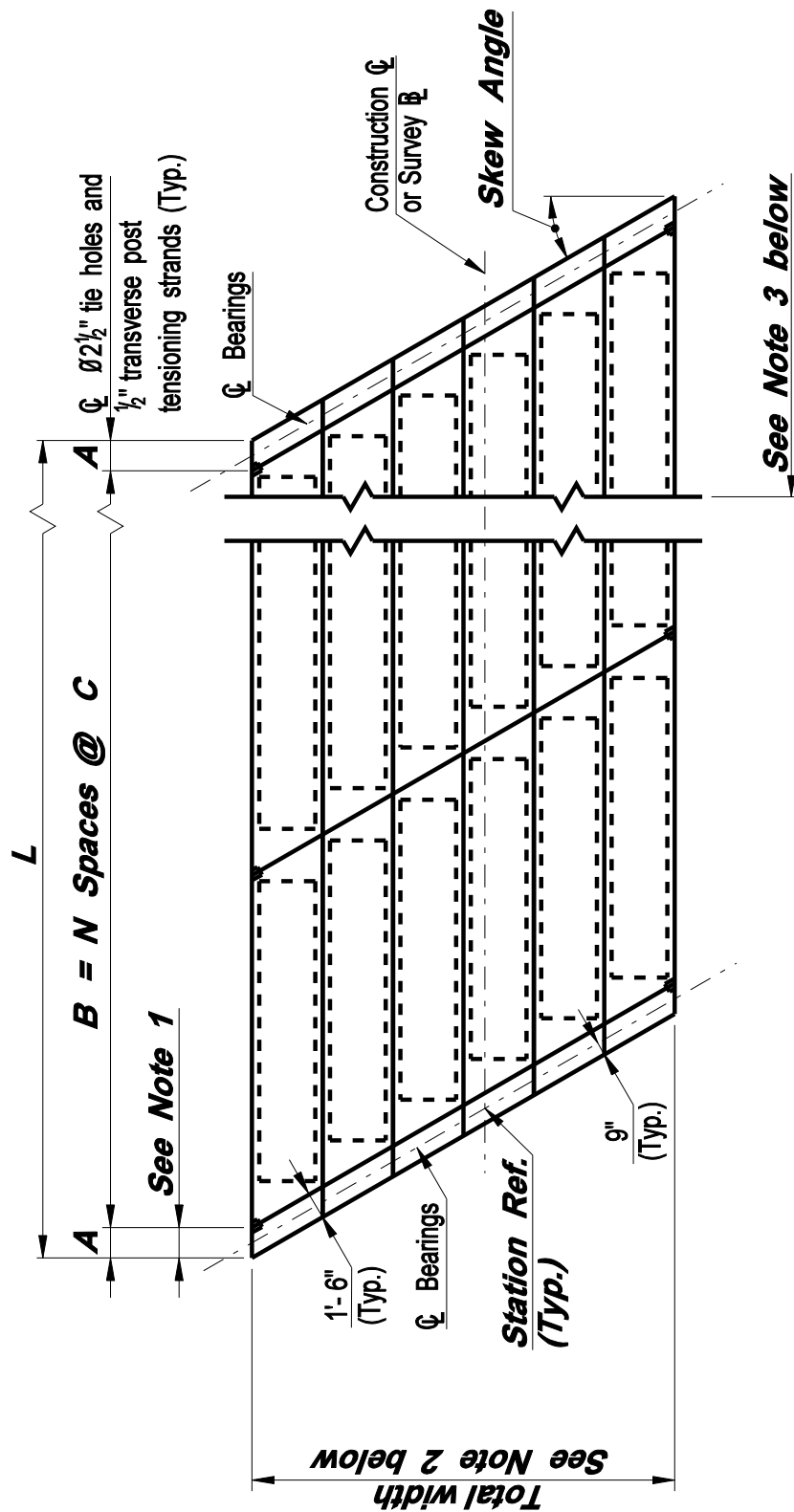
**END VIEW**

DESIGN INFORMATION

1. *The Engineer shall design the vertical legs of the last transverse stirrup and the end vertical stirrups to satisfy the requirements of AASHTO.*
2. *Stirrups shall be designed to conform to the requirements of AASHTO.*

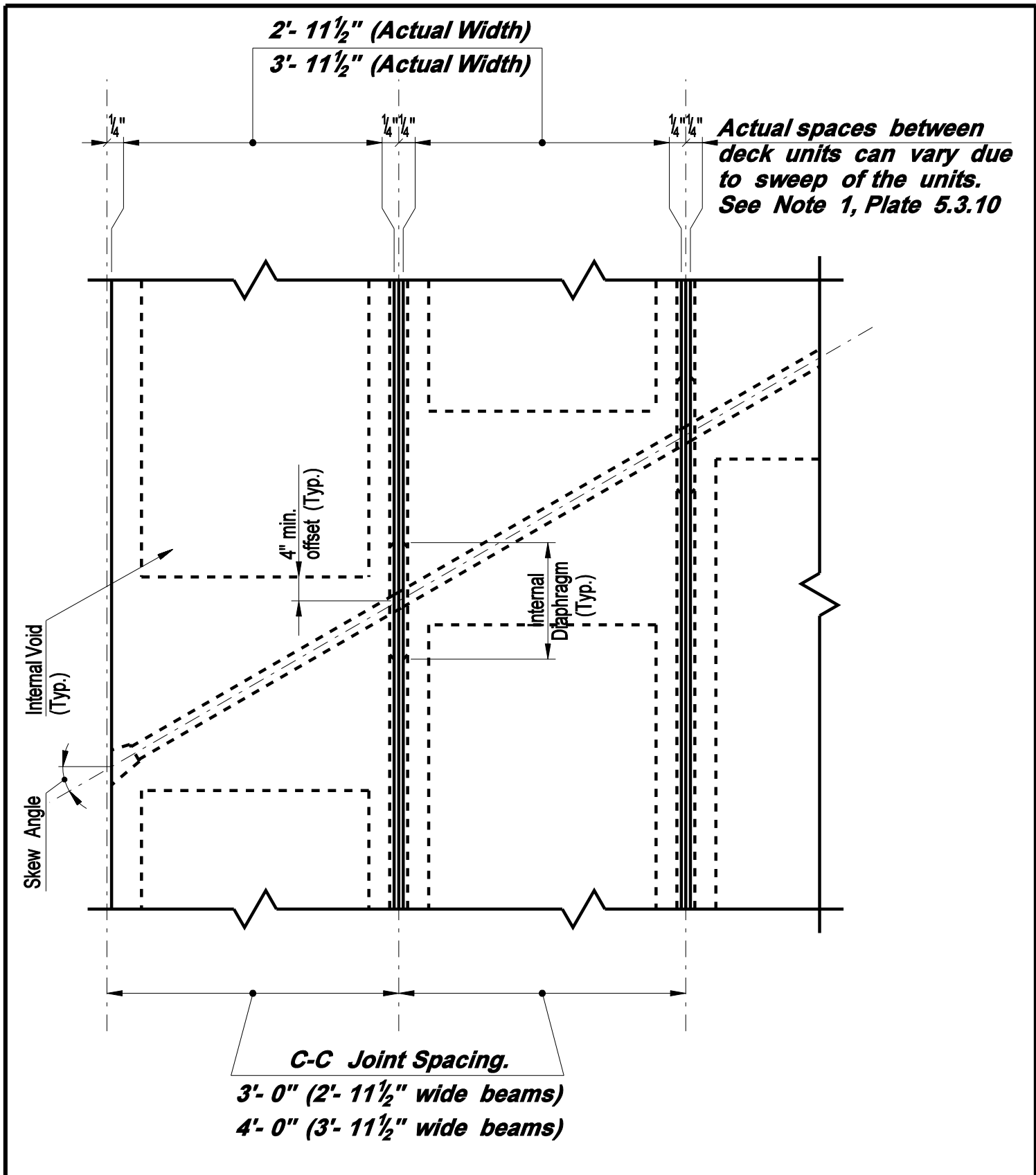
NOTES:

3. Splay stirrups to avoid conflicts with transverse tie strand holes.
4. Extend longitudinal legs a minimum distance equal to the depth of the beam or 12" into the web of the voided section, whichever is larger.
5. Horizontal legs of the vertical stirrups are equal to the depth of the beam.



**DESIGN INFORMATION**

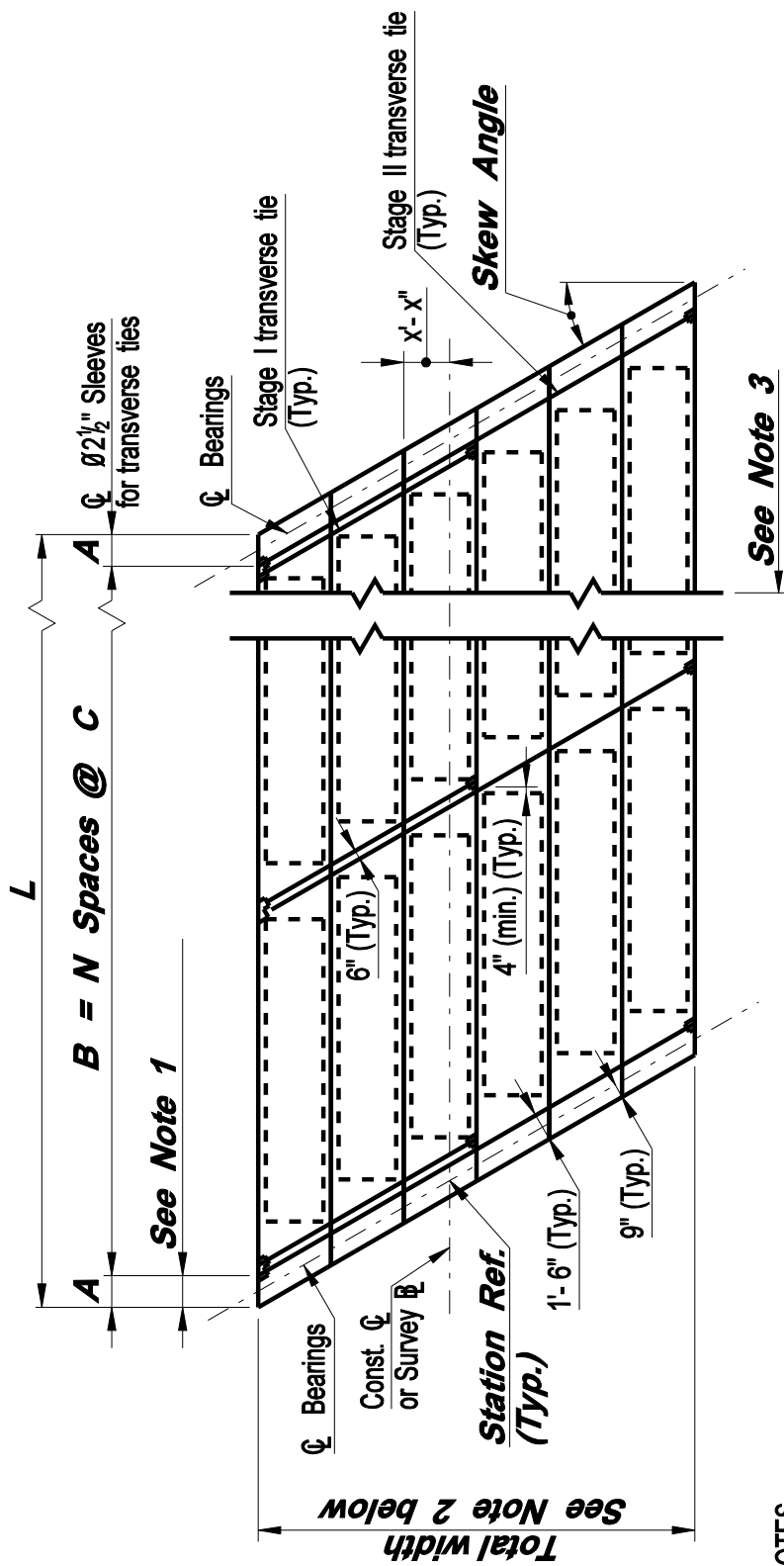
1.  $A = 18" / \cos(\text{Skew angle})$   
 $B = L - (2xA)$   
 $C = B/N$  where  $N = \text{Number of Internal voids. (See Plate No. 5.3.7 for the required number of transverse ties.)}$
2. Total width shall be calculated using 4'-0" for 48" series nominal units and 3'-0" for 36" series nominal units.
3. Framing plan shall be drawn full length without breaks and to scale on the construction plans. Show all internal voids, transverse ties and include North arrow.



**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

TRANSVERSE TIE STRAND  
ARRANGEMENT FOR PRECAST  
CONCRETE DECK UNITS  
(SKEW ≤ 35°)

Issue Date:	10/03
Revision Date:	
Plate Number:	5.3.2



**NOTES**

Stage I: After erecting Stage I beams, install and tension transverse ties in Stage I sleeves.

Stage II: After erecting Stage II beams, install and tension transverse ties in Stage II sleeves full width of bridge.

**DESIGN INFORMATION**

1.  $A = 18'' / \cos$  skew angle

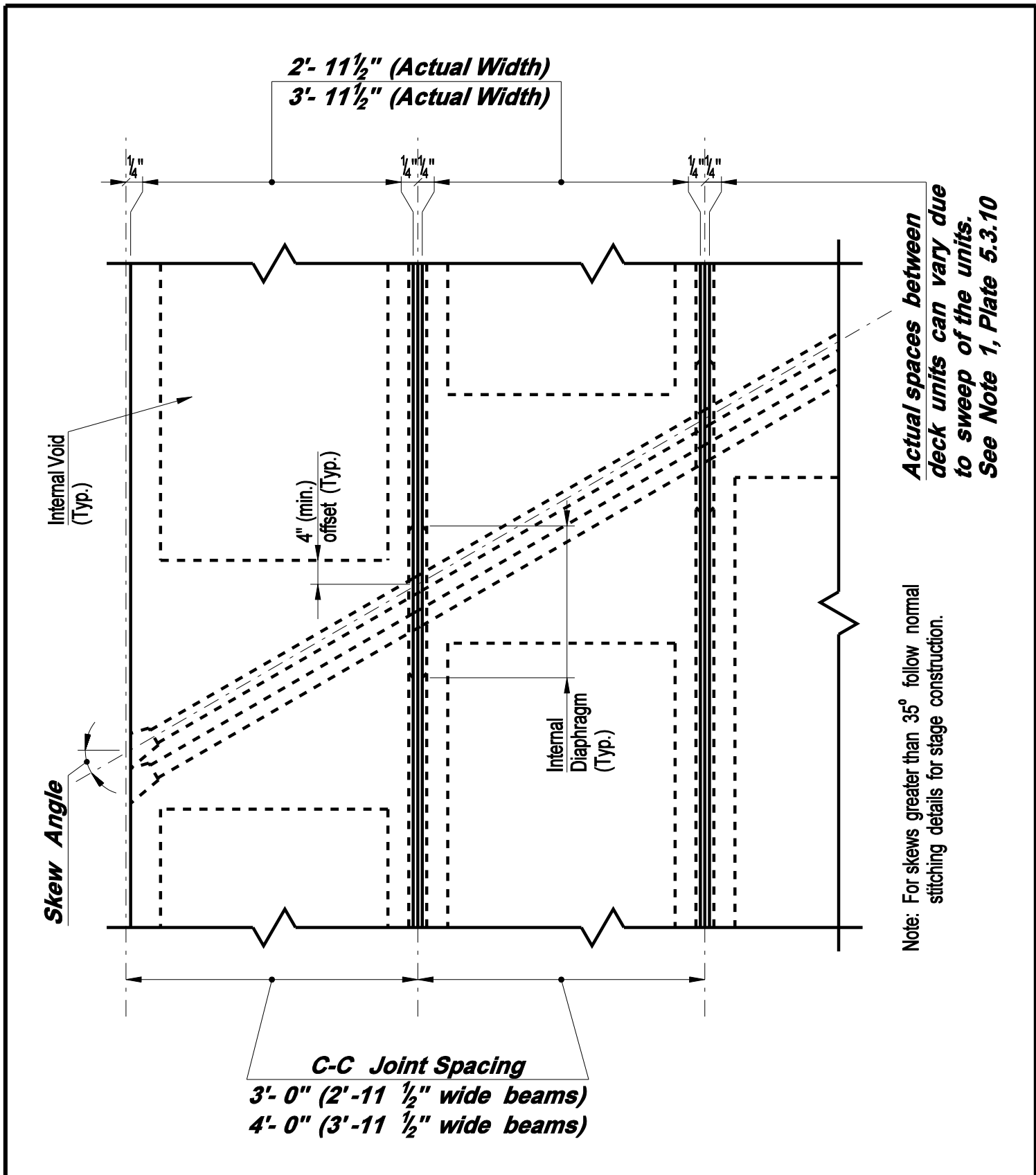
$B = L - (2xA)$

$C = B/N$  where  $N =$  Number of Internal voids. (See Plate No. 5.3.7 for the required number of transverse ties.)

$L =$  Span Length +  $A$

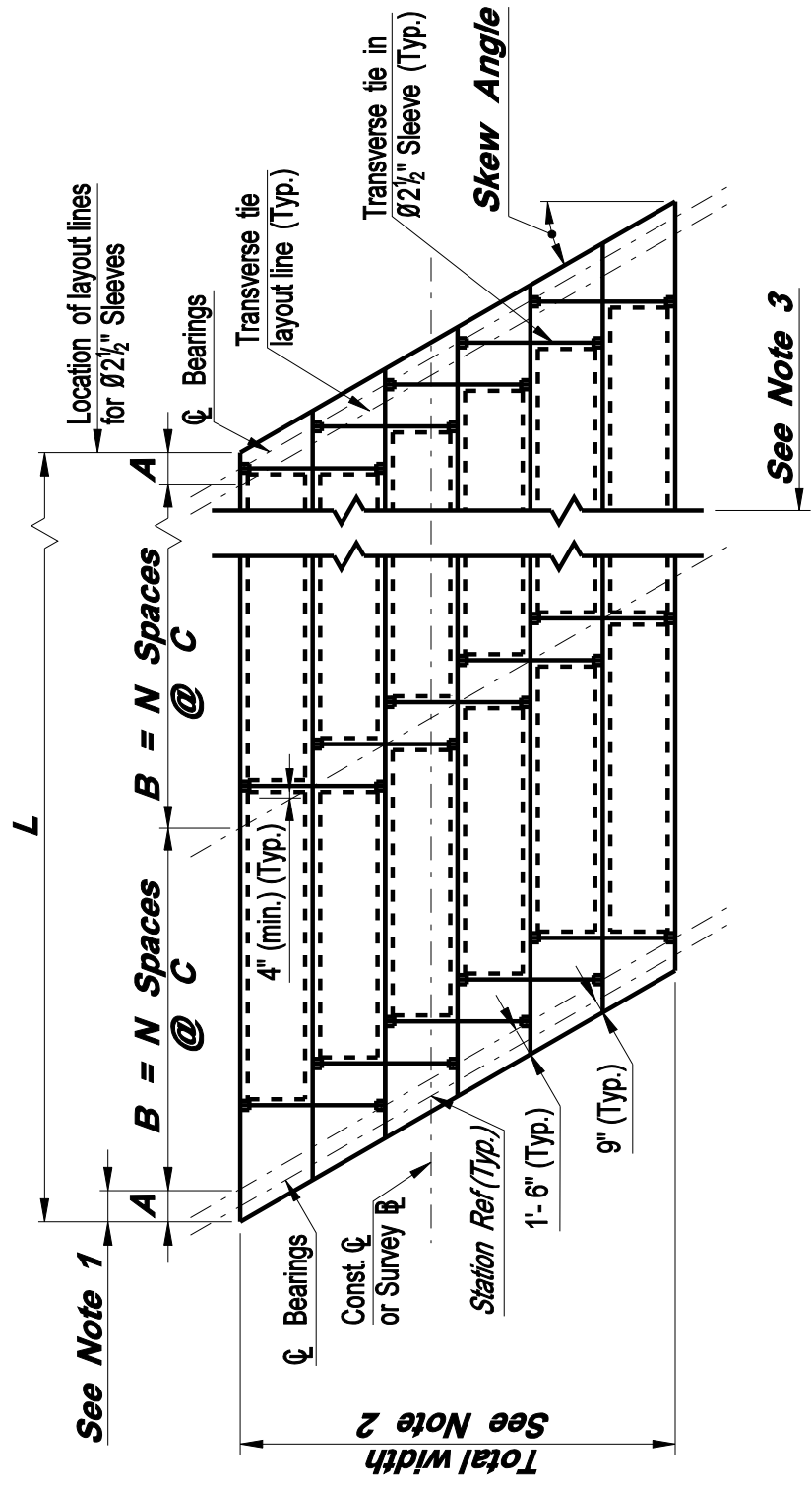
2. Total width shall be calculated using 4'-0" for 48" series nominal units and 3'-0" for 36" series nominal units.

3. Framing plan shall be drawn full length without breaks and to scale on the construction plans. Show all internal voids, transverse ties and include North arrow.



**FRAMING PLAN - PRECAST  
CONCRETE DECK UNITS  
(SKEW > 35°)**

Issue Date:	10/03
Revision Date:	
Plate Number:	5.3.5



**DESIGN INFORMATION**

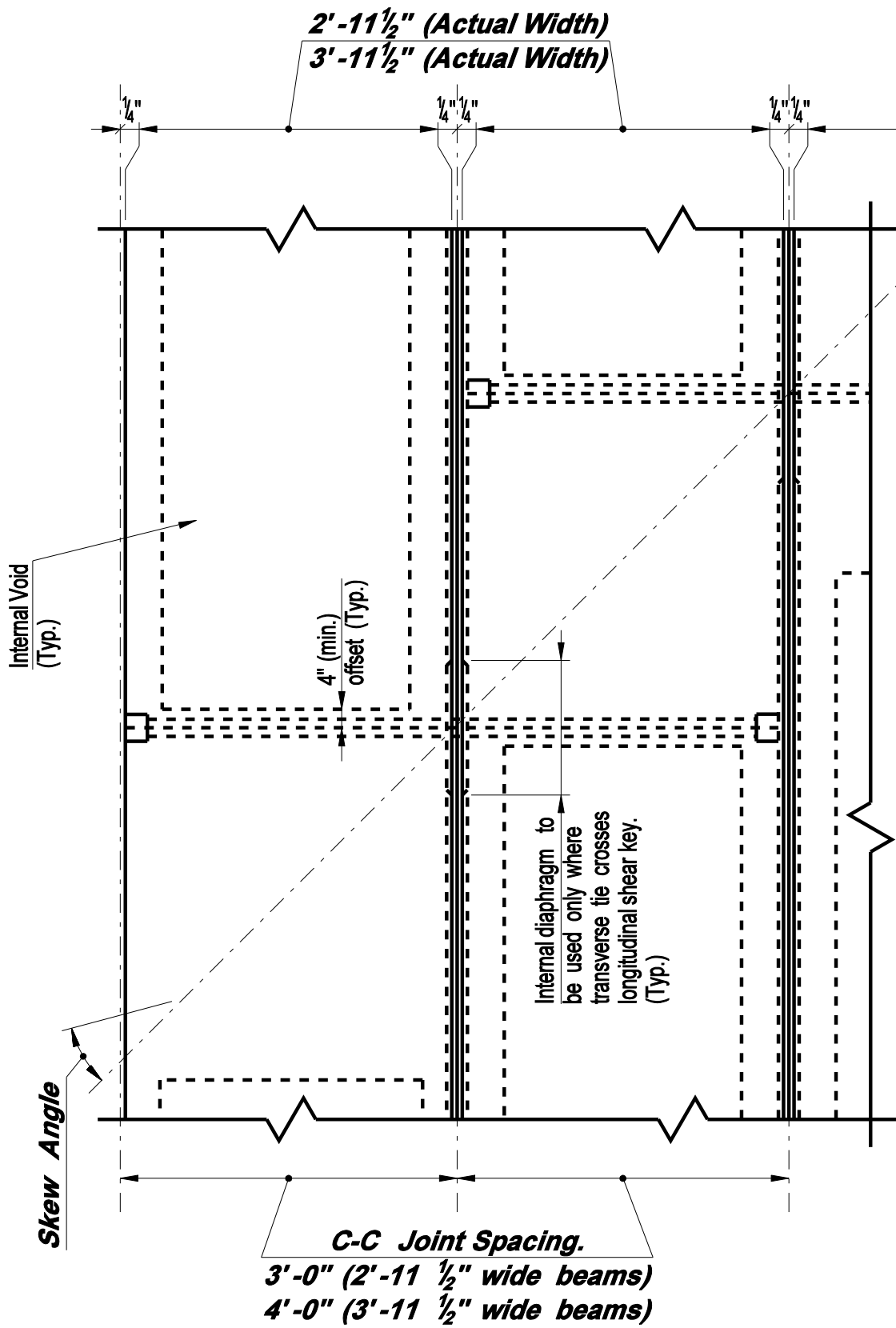
1.  $A = 18'' / \cos \text{skew angle}$   
 $B = L - (2xA)$   
 $C = B/N$  where  $N = \text{Number of Internal Voids.}$  (See Plate No. 5.3.7 for the required number of transverse ties.)  
 $L = \text{Span Length} + A$
2. Total width shall be calculated using 4'-0" for 48" series nominal units and 3'-0" for 36" series nominal units.
3. Framing plan shall be drawn full length without breaks and to scale on the construction plans. Show all internal voids, transverse ties and include North arrow.

See Note 1

See Note 2

See Note 3





**Actual spaces between deck units can vary due to sweep of the units. See Note 1, Plate 5.3.10**

**NOTES:**  
For skews greater than 35° follow normal stitching details for stage construction.

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**TRANSVERSE TIE STRAND  
ARRANGEMENT FOR PRECAST  
CONCRETE DECK UNITS  
(SKEW > 35°)**

Issue Date: 10/03

Revision Date:

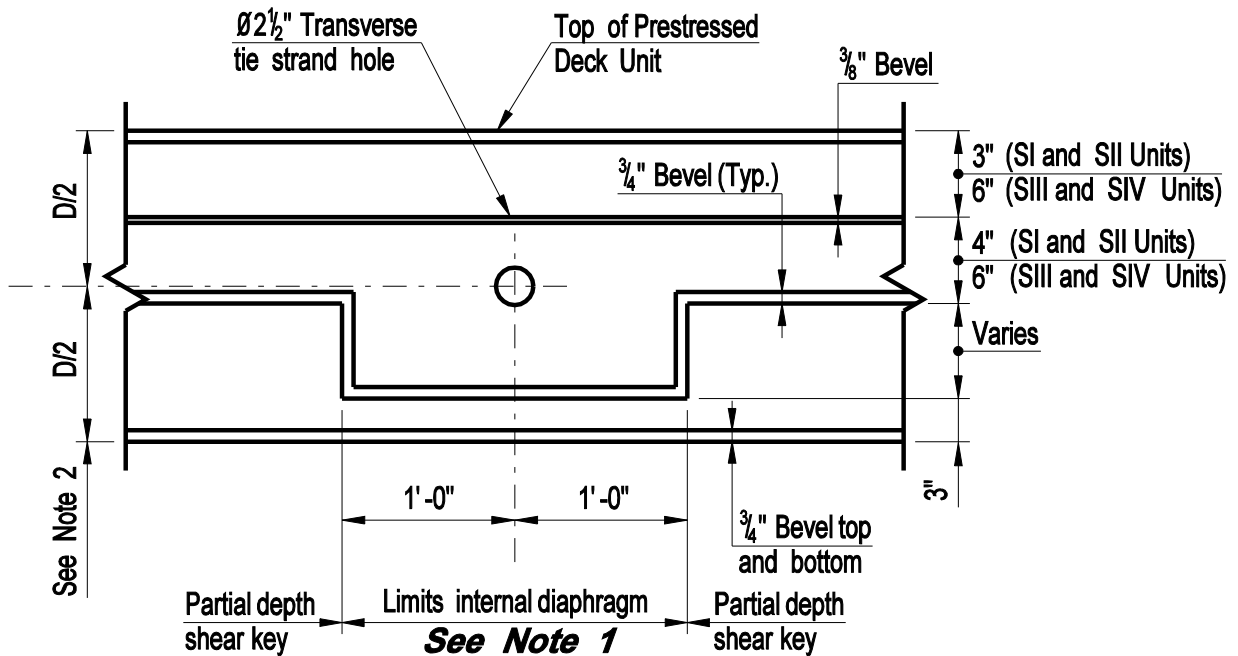
Plate Number:  
**5.3.6**

PRECAST CONCRETE VOIDED SLABS							
BEAM	SPANS	TIE LOCATIONS			TOP	BOTTOM	
		ENDS	1/3 POINTS	MIDSPAN		SKEW $\geq 25^\circ$ or STITCHED BEAMS	SKEW $\geq 25^\circ$
<i>SI Thru SIV</i>	$\leq 40'-0''$	X		X	X		X
	$> 40'-0''$	X	X		X		X

PRECAST CONCRETE BOX BEAMS								
BEAM	SPANS	TIE LOCATIONS				TOP	BOTTOM	
		ENDS	1/4 POINTS	1/3 POINTS	MIDSPAN		SKEW $\leq 25^\circ$ or STITCHED BEAMS	SKEW $\geq 25^\circ$
<i>BI &amp; BI Mod.</i>	$\leq 50'-0''$	X			X	X		X
	$> 50'-0''$	X		X		X		X
<i>BII</i>	$\leq 75'-0''$	X		X		X		X
	$> 75'-0''$	X	X			X		X
<i>BIII</i>	$\leq 75'-0''$	X				X	X	X
	$> 75'-0''$	X	X			X	X	X
<i>BIV &amp; BIV Mod.</i>	ALL	X	X		X	X	X	X

**NOTE:**

*The designer shall investigate the fascia beam for torsional load due to parapet overhang or utilities. Consideration shall be given to increasing the number of lateral tie strands, the amount of post-tensioning and/or providing additional internal diaphragms.*

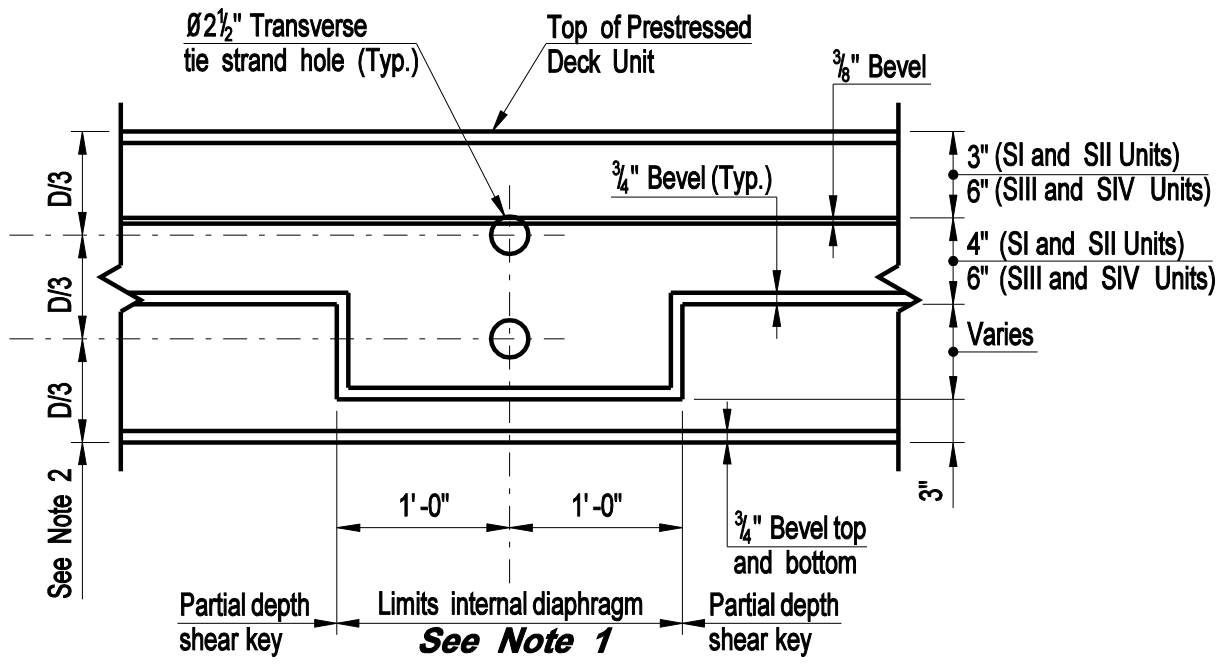


**DESIGN INFORMATION**

**1. If two sets of post-tensioning strands are used for stage construction, the width of the internal diaphragm shall be increased to 2'- 0" plus the longitudinal spacing of the two tie strand holes.**

**NOTES:**

2. The vertical location of the transverse tie strands must be coordinated with the location of the prestressed strands and adjusted as necessary by the fabricator.

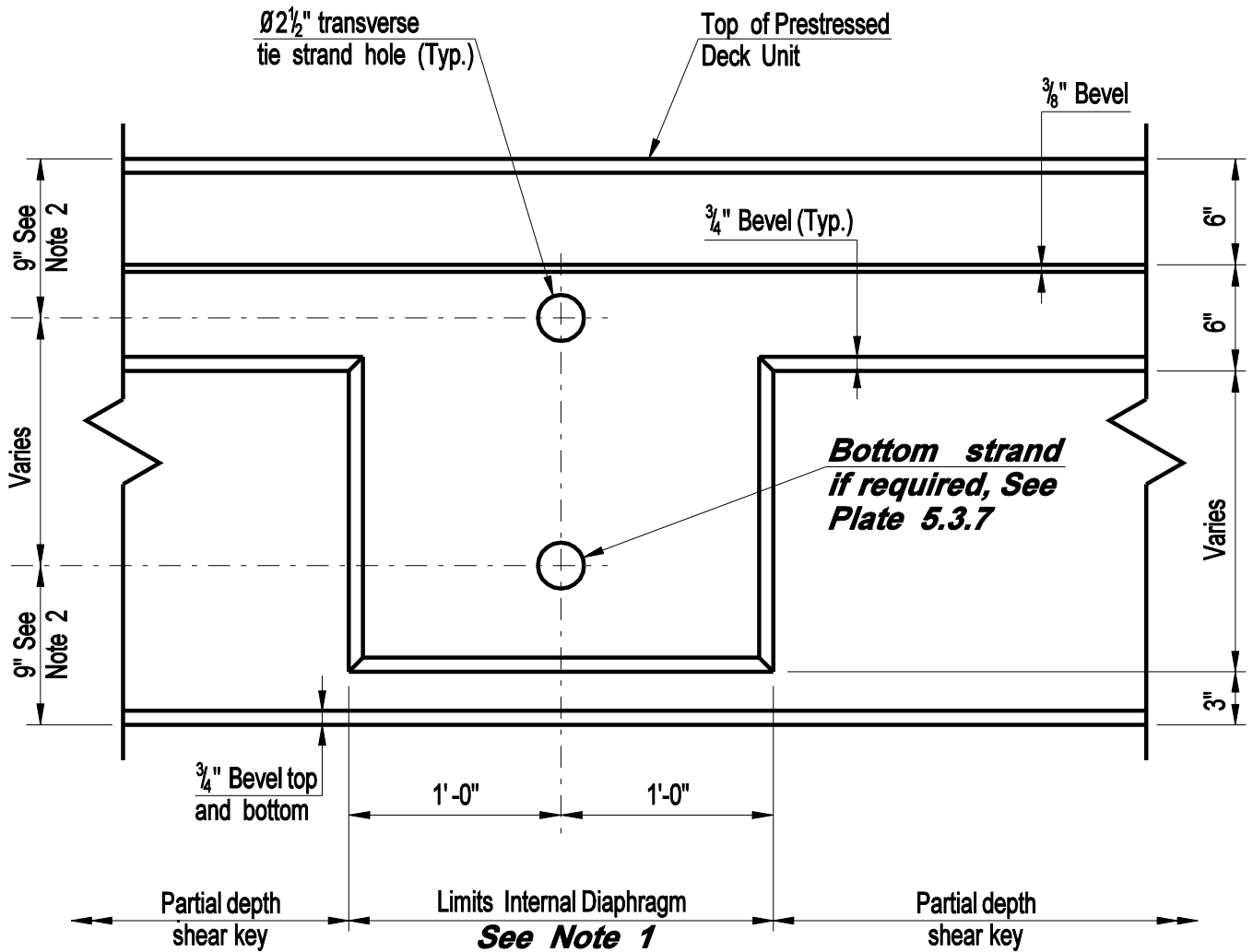


**DESIGN INFORMATION**

**1. If two sets of post-tensioning strands are used for stage construction, the width of the internal diaphragm shall be increased to 2'- 0" plus the longitudinal spacing of the two tie strand holes.**

**NOTES:**

2. The vertical location of the transverse tie strands must be coordinated with the location of the prestressed strands and adjusted as necessary by the fabricator.



**DESIGN INFORMATION**

- 1. If two sets of post-tensioning strands are used for stage construction, the width of the internal diaphragm shall be increased to 2'- 0" plus the longitudinal spacing of the two tie strand holes.***

**NOTES:**

- 2. The vertical location of the transverse tie strands must be co-ordinated with the location of the prestressed strands and adjusted as necessary by the fabricator.**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**INTERNAL DIAPHRAGMS  
PRECAST CONCRETE  
BOX BEAMS**

Issue Date: 10/03

Revision Date:

Plate Number:

**5.3.10**



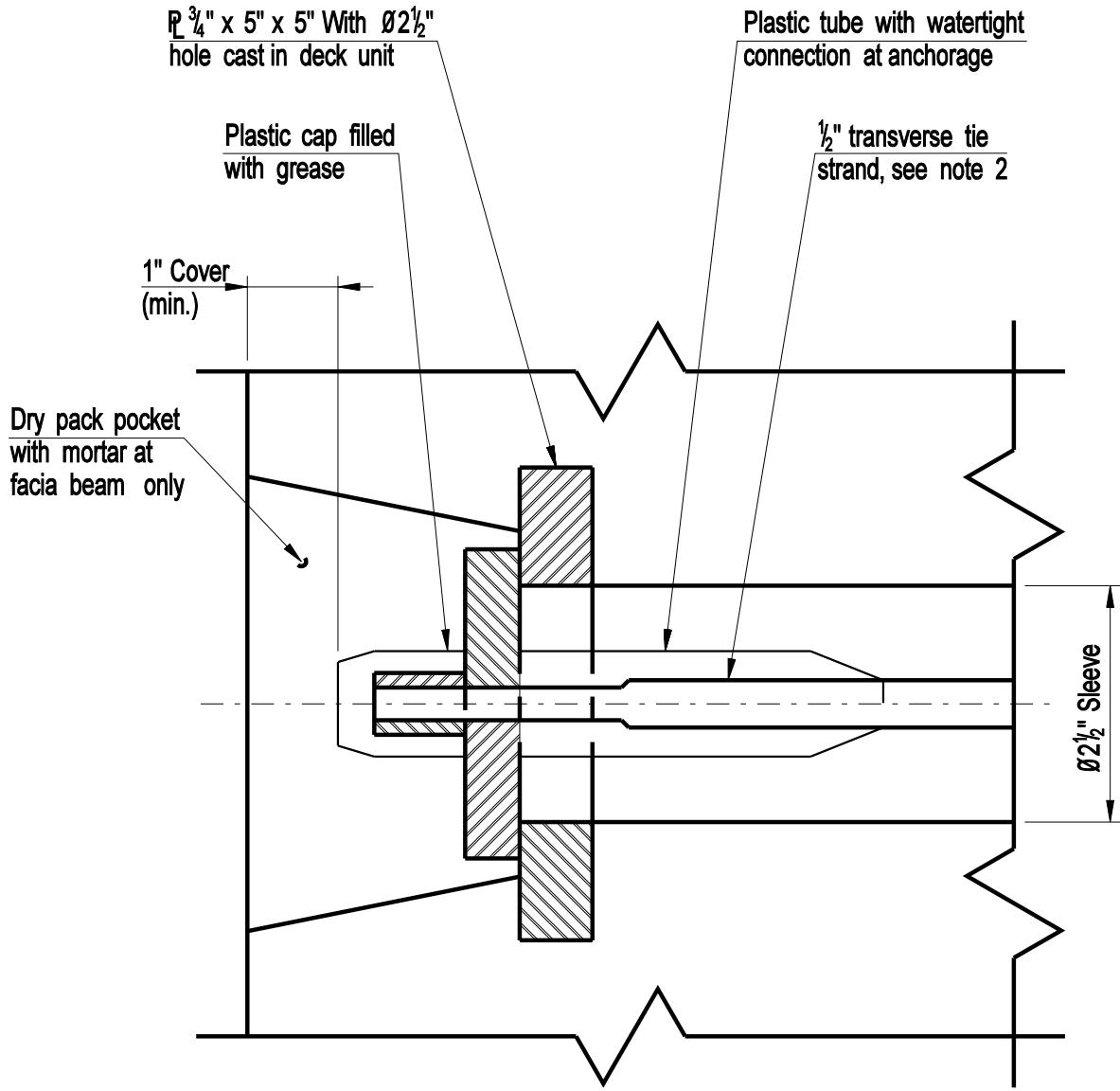
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

VACANT

Issue Date: 10/03

Revision Date:

Plate Number:  
5.3.12



**TRANSVERSE TIE POCKET DETAIL**

**NOTES:**

1. Other anchorage systems may be substituted with the approval of the Engineer. Alternate anchorage systems shall be watertight and corrosion proof.
2. Transverse ties shall be covered by a seamless polypropylene sheath, with corrosion inhibiting grease between the strand and sheath, for the full length of the strand except at the anchorage location.

<b>CONNECTICUT BRIDGE DESIGN MANUAL</b>	<b>TRANSVERSE TIE ANCHORAGE PRECAST CONCRETE DECK UNITS</b>	Issue Date: 10/03
		Revision Date:
		Plate Number: <b>5.3.13</b>



FOR SKEWS  $\leq 35^\circ$ :

TRANSVERSE TIE TENSIONING NOTES:

1. After all beams have been erected, tension each transverse tie to 5 kips.
2. Fill all keyways with non-shrink grout. The contractor shall cover and protect the keyways from the weather and debris until they are filled.
3. After the grout has attained a strength of 1500 psi (based on the manufacturers directions) tension each transverse tie to 30 kips. No traffic or heavy equipment will be permitted on the beams until all ties have been fully tensioned.

***(The above note applies to units with single transverse ties. See Plate 5.3.7)***

After the grout has attained a strength of 1500 psi (based on the manufacturers directions) at each transverse tie location, tension the bottom tie to 15 kips, then the top tie to 15 kips. Repeat the sequence once more so that each strand has 30 kips of tension. No traffic or heavy equipment will be permitted on the beams until all ties have been fully tensioned.

***(The above note applies to units with double transverse ties. See Plate 5.3.7)***

4. Concrete for sidewalk, curb and/or barrier sections shall not be placed until the transverse ties have been fully tensioned.

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

TRANSVERSE TIE TENSIONING  
NOTES - PRECAST CONCRETE  
BOX BEAMS (SKEWS  $\leq 35^\circ$ )

Issue Date: 10/03

Revision Date:

Plate Number:  
5.3.14

FOR SKEWS > 35°:  
TRANSVERSE TIE TENSIONING NOTES:

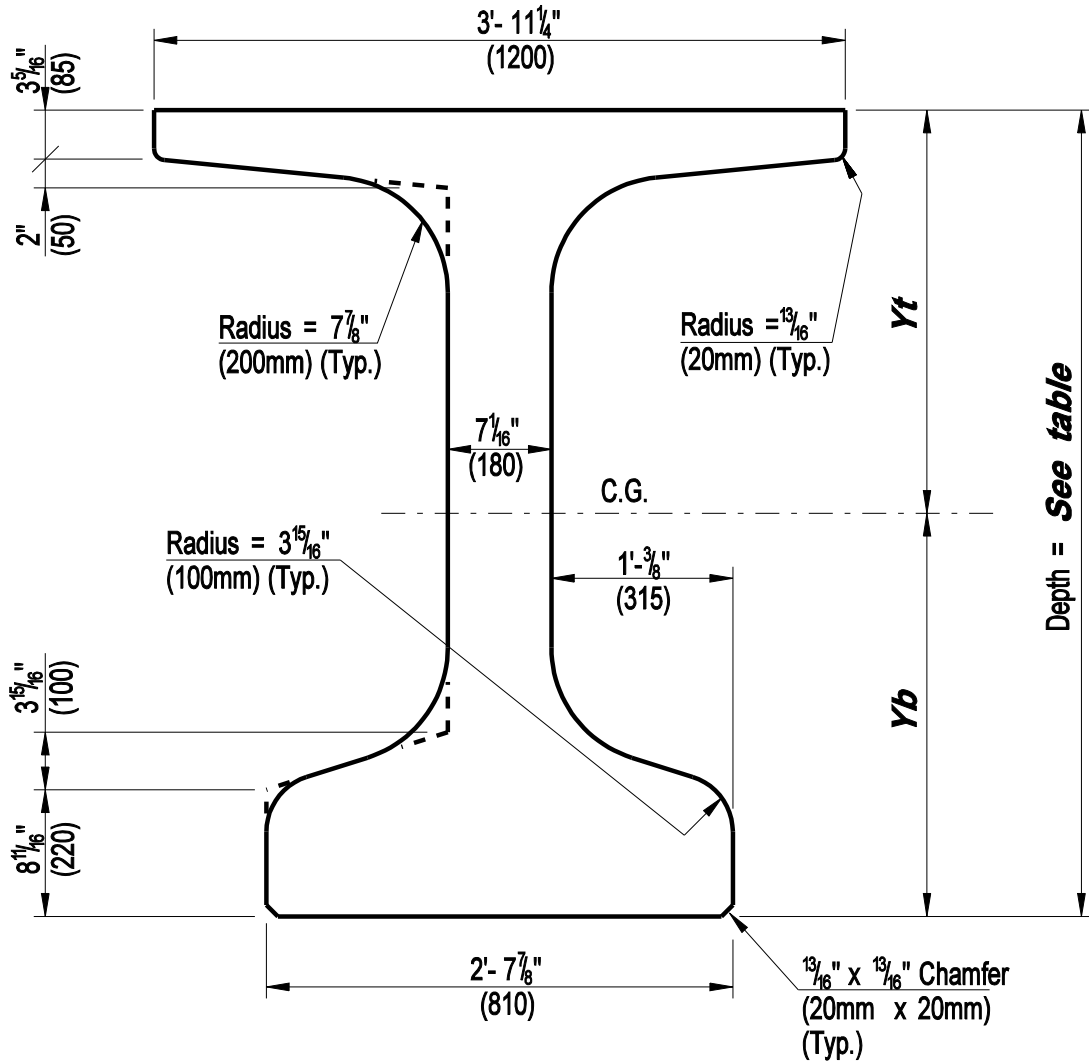
1. As each beam is being erected, install the transverse ties with hardwood wedges between the beams at each transverse tie location at the top and bottom of the beam.
2. Secure each beam to the preceding beam by tensioning each transverse tie to 30 kips before erecting the next beam.

***(The above note applies to units with single transverse ties.  
See Plate 5.3.7)***

Secure each beam to the preceding beam by first tensioning the bottom tie at each transverse tie location to 15 kips, then the top tie to 15 kips. Repeat the sequence once more so that each tie has 30 kips of tension before erecting the next beam.

***(The above note applies to units with double transverse ties.  
See Plate 5.3.7)***

3. Fill all keyways with non-shrinking grout after transverse ties have been tensioned. The contractor shall cover and protect the keyways from the weather and debris until they are filled. No traffic or heavy equipment will be permitted on the beams until all keyways have been filled and the grout has cured.
4. When the grout has attained a strength of 1500 psi (based on grout manufacturers directions) the wedges shall be removed and voids left by the top wedges shall be filled with grout.
5. Concrete for sidewalk, curb and/or barrier sections shall not be placed until grout has attained a strength of 1500 psi.



Beam Type	Depth (in)	Weight (lbs/ft)	Area (in <sup>2</sup> )	I <sub>x</sub> c.g. (in <sup>4</sup> )	I <sub>y</sub> c.g. (in <sup>4</sup> )	Y <sub>t</sub> (in)	Y <sub>b</sub> (in)	S <sub>t</sub> (in <sup>3</sup> )	S <sub>b</sub> (in <sup>3</sup> )
NEBT 1000	39.37	777.47	745.55	149,196	61,744	20.35	19.02	7323	7872
NEBT 1200	47.24	835.26	801.35	238,089	61,985	24.61	22.64	9703	10,496
NEBT 1400	55.12	893.72	857.15	353,169	62,225	28.86	26.26	12,205	13,425
NEBT 1600	62.99	951.51	912.95	492,514	62,465	33.03	29.96	14,890	16,415
NEBT 1800	70.87	1009.97	968.75	666,690	62,706	37.20	33.66	17,758	19,589

**DESIGN INFORMATION**

- $f'_c = 6500$  psi (precast)  
 $f'_c = 4500$  psi (deck)  
 Max. Beam spacing = 6'- 6"  
 Allowable Tension = 0.0

2. Metric dimensions are given ( ) for correlation to standard NEBT metric forms.

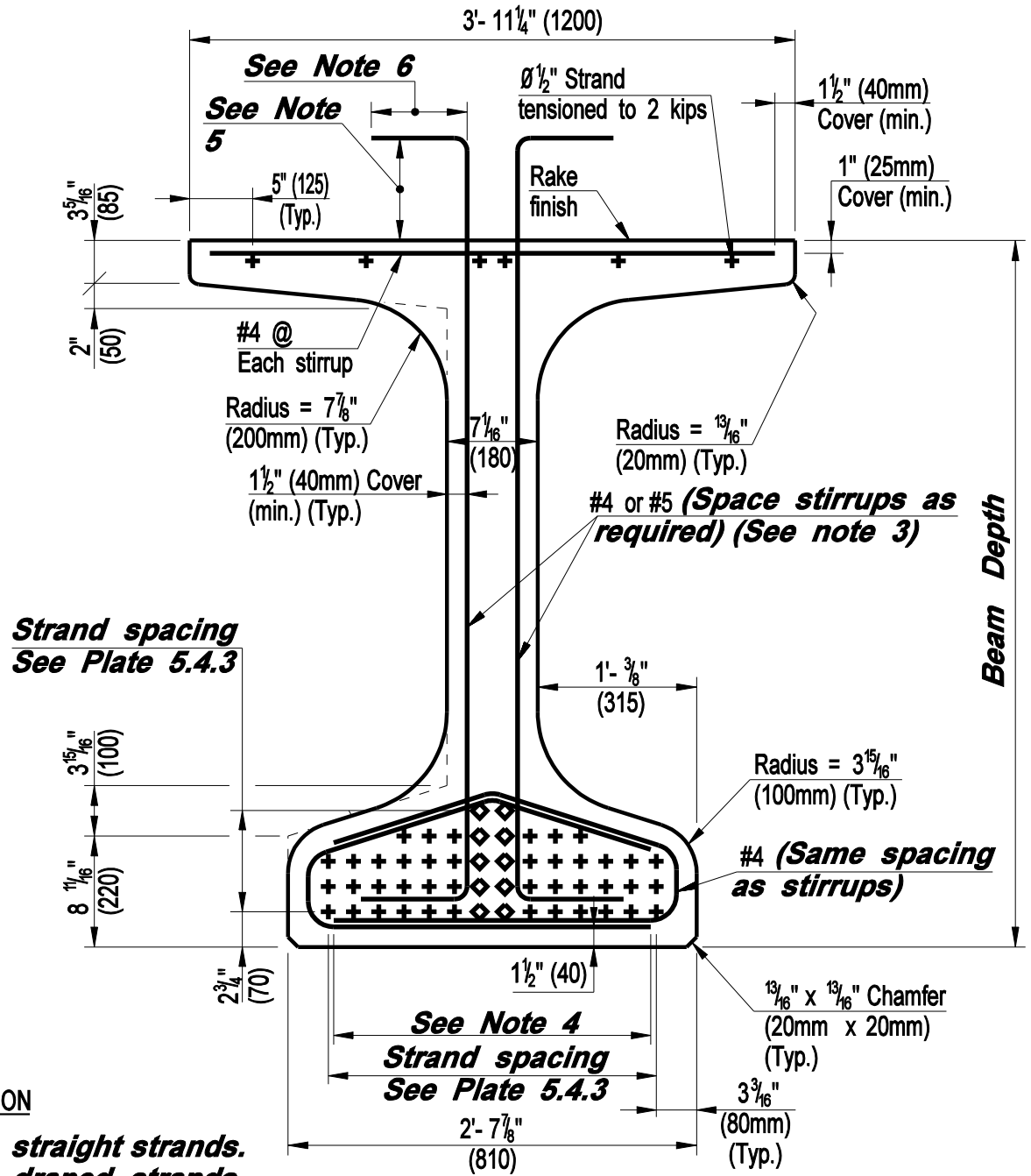
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

SECTION PROPERTIES  
NEW ENGLAND BULB TEES  
(TYPE NEBT 40 - 72)

Issue Date: 10/03

Revision Date:

Plate Number:  
5.4.1



**DESIGN INFORMATION**

1. + Denotes straight strands.
2. ◇ Denotes draped strands.
3. Stirrups to be designed in accordance with AASHTO shear reinforcement requirements.
4. Lap splices in accordance with AASHTO requirements
5. Stirrups shall be checked for horizontal shear at the interface with the deck. Provide 6" (150mm) minimum embedment and 2" (50mm) minimum cover at top of deck.
6. Top of stirrups to constitute a standard hook in accordance with AASHTO.
7. Metric dimensions are given ( ) for correlation to standard NEBT metric forms.

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

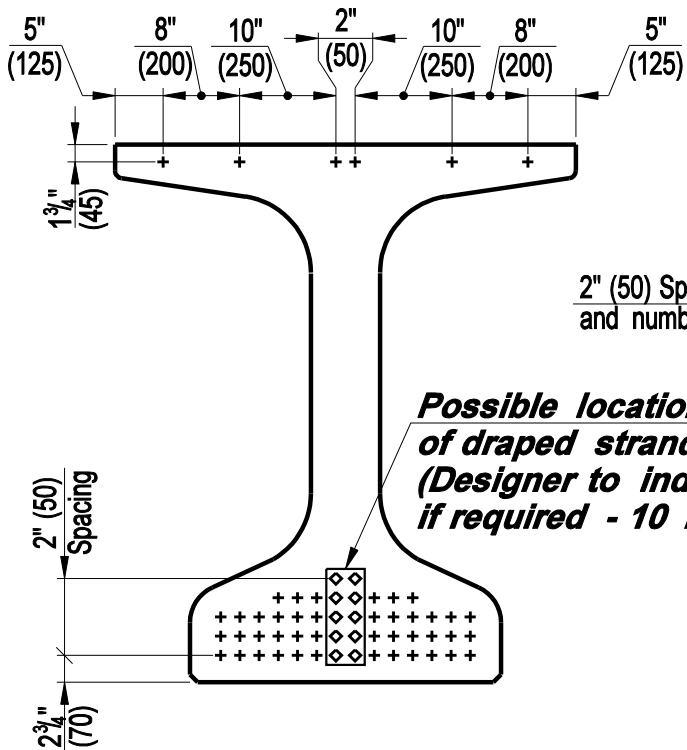
**TYPICAL MIDSPAN SECTION  
NEW ENGLAND  
BULB TEE BEAMS**

Issue Date: 10/03

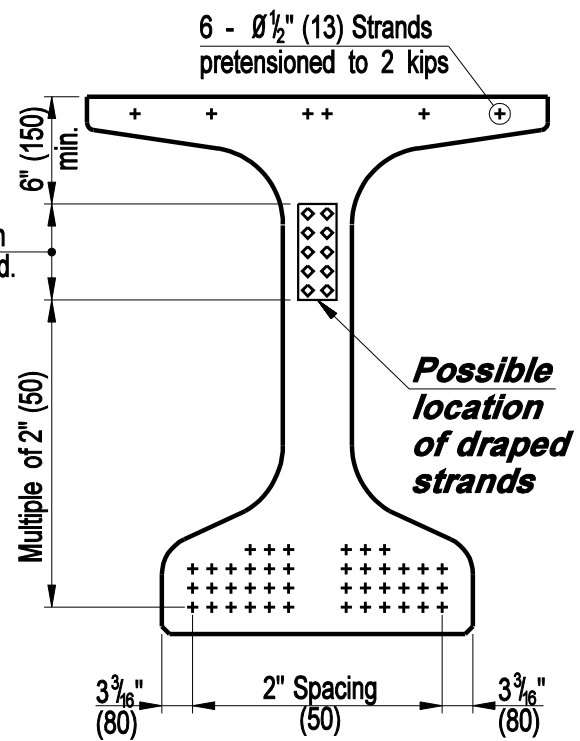
Revision Date:

Plate Number:

**5.4.2**



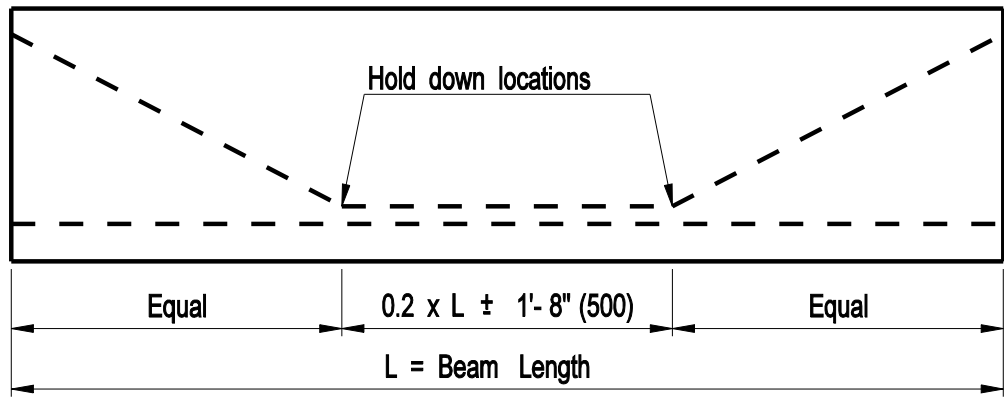
**STRAND LOCATION MIDSPAN**



**STRAND LOCATION BEAM END**

**DESIGN INFORMATION**

1. + Denotes straight strands.
2. ◇ Denotes draped strands.
3. Strands in top flange are for fabrication purposes only and are not considered in the design.
4. Strands shall be placed within a 2" x 2" (50mm x 50mm) grid. The number and location of the strands shall be as required by design.
5. Metric dimensions are given ( ) for correlation to standard NEBT metric forms.



**HOLD DOWN POINTS FOR DRAPED STRANDS**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

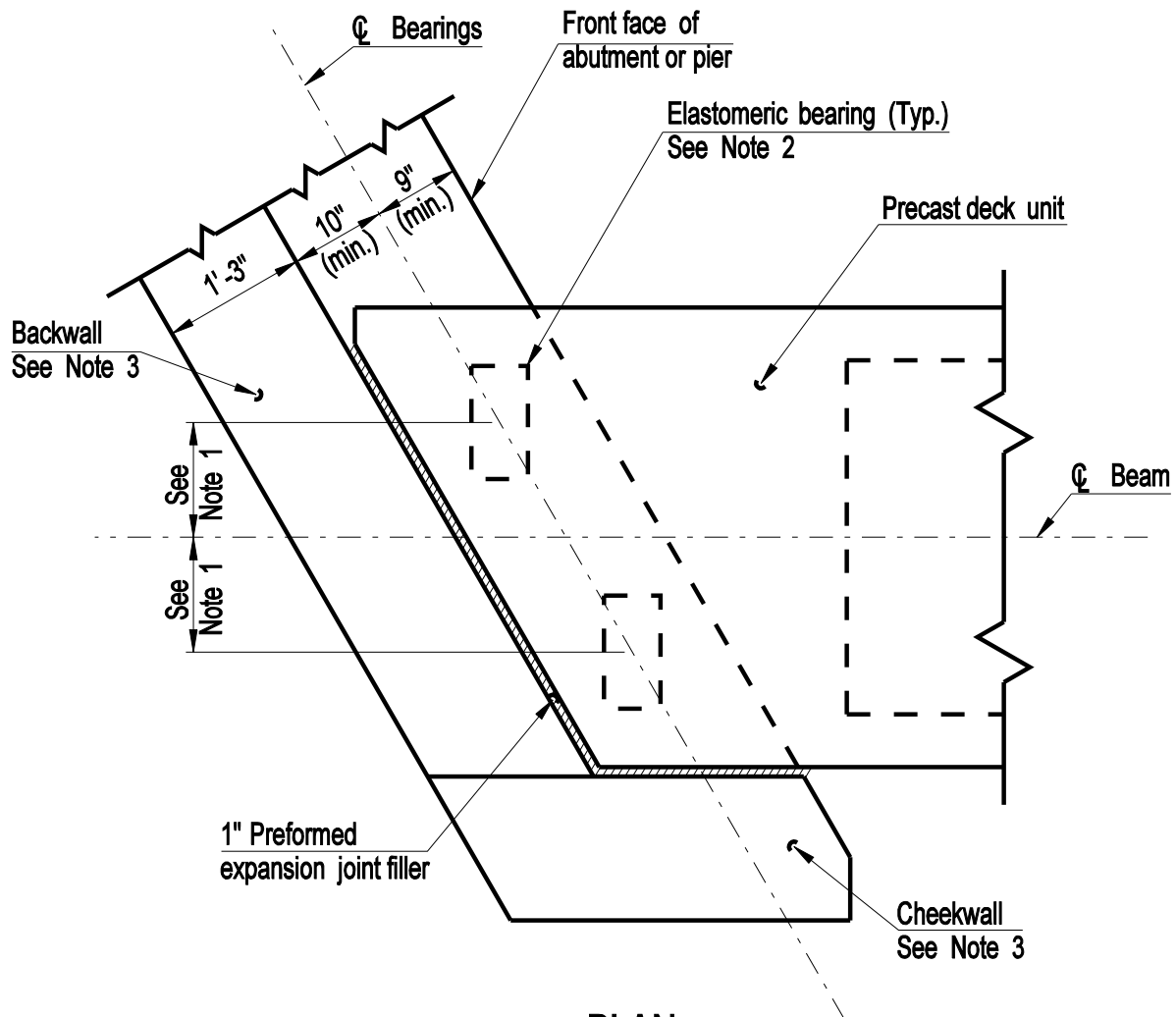
**STRAND LOCATIONS AND  
HOLD DOWN DETAIL NEW  
ENGLAND BULB TEE BEAMS**

Issue Date: 10/03

Revision Date:

Plate Number:

**5.4.3**



**PLAN**  
**ELASTOMERIC BEARING LAYOUT**

**NOTES:**

1. This dimension shall be the nominal beam spacing divided by four.
2. Elastomeric bearing shall be designed according to Section 14 of the AASHTO specifications. Neoprene shims may be used to provide uniform bearing on pads offset by beam skew.
3. The backwall and cheekwall shall be designed to resist longitudinal and transverse seismic forces.



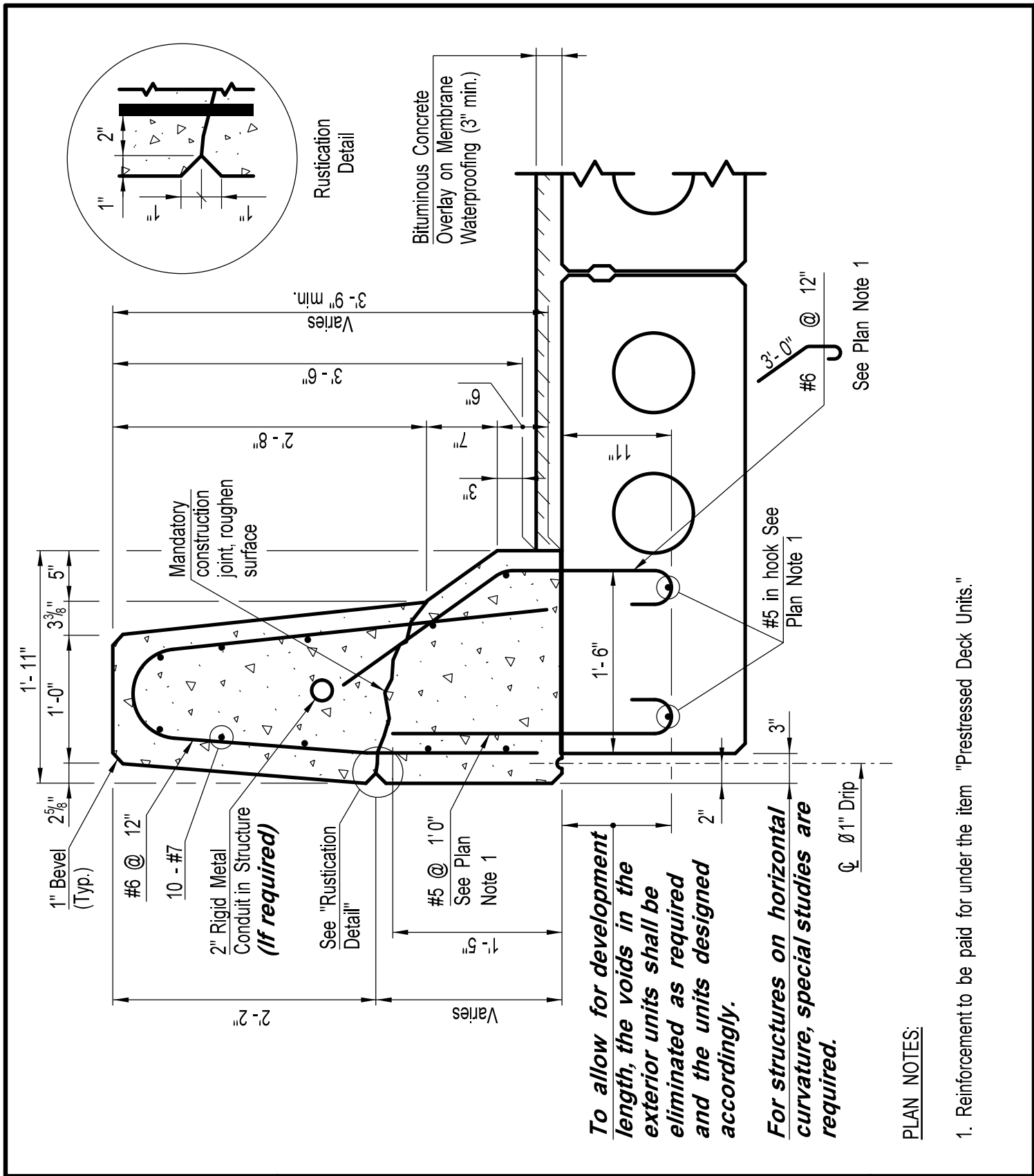


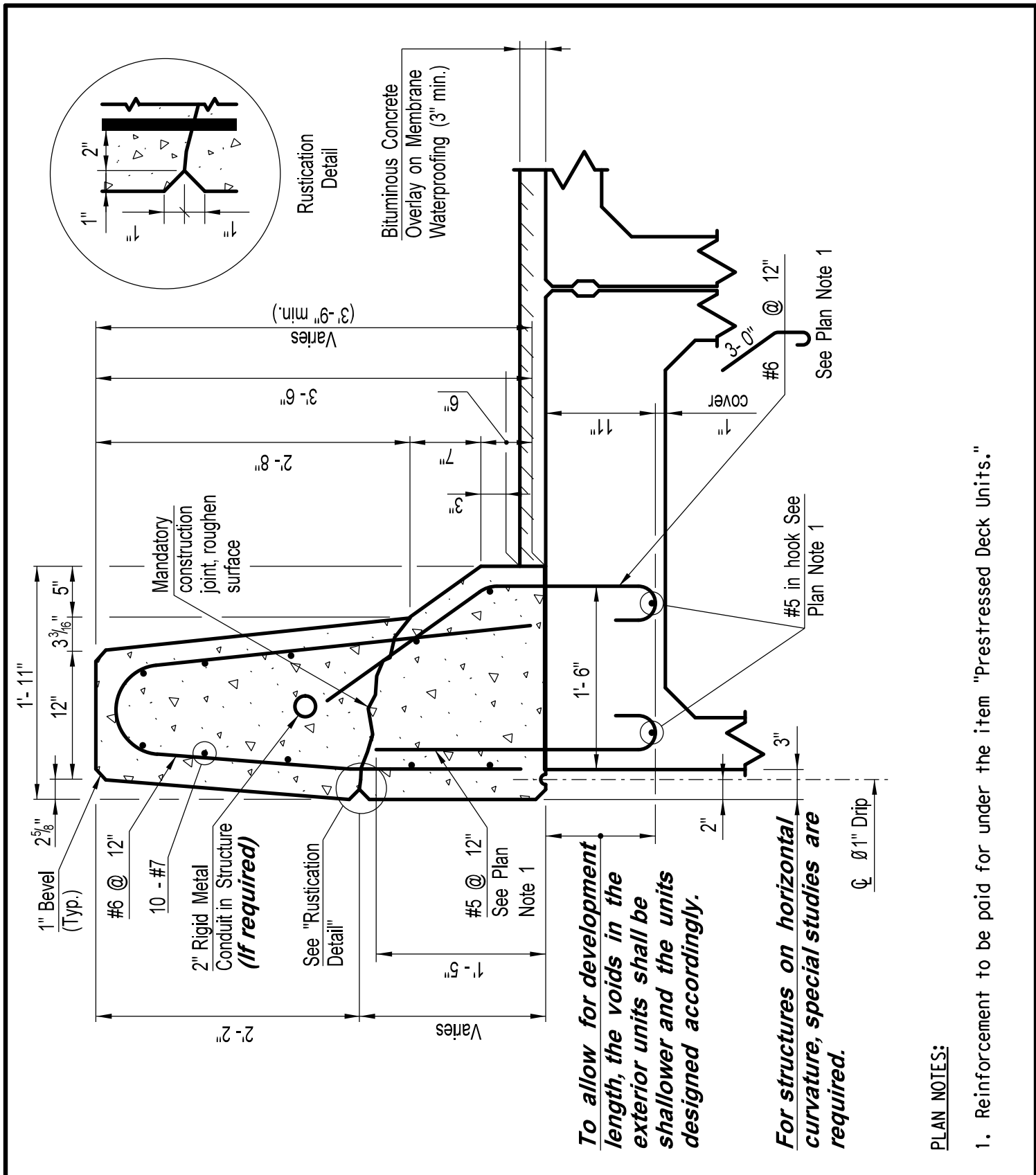


**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**STANDARD PARAPET  
42" HIGH  
(ON VOIDED SLAB)**

Issue Date: 10/03  
Revision Date: 2/11  
Plate Number:  
**5.6.3**

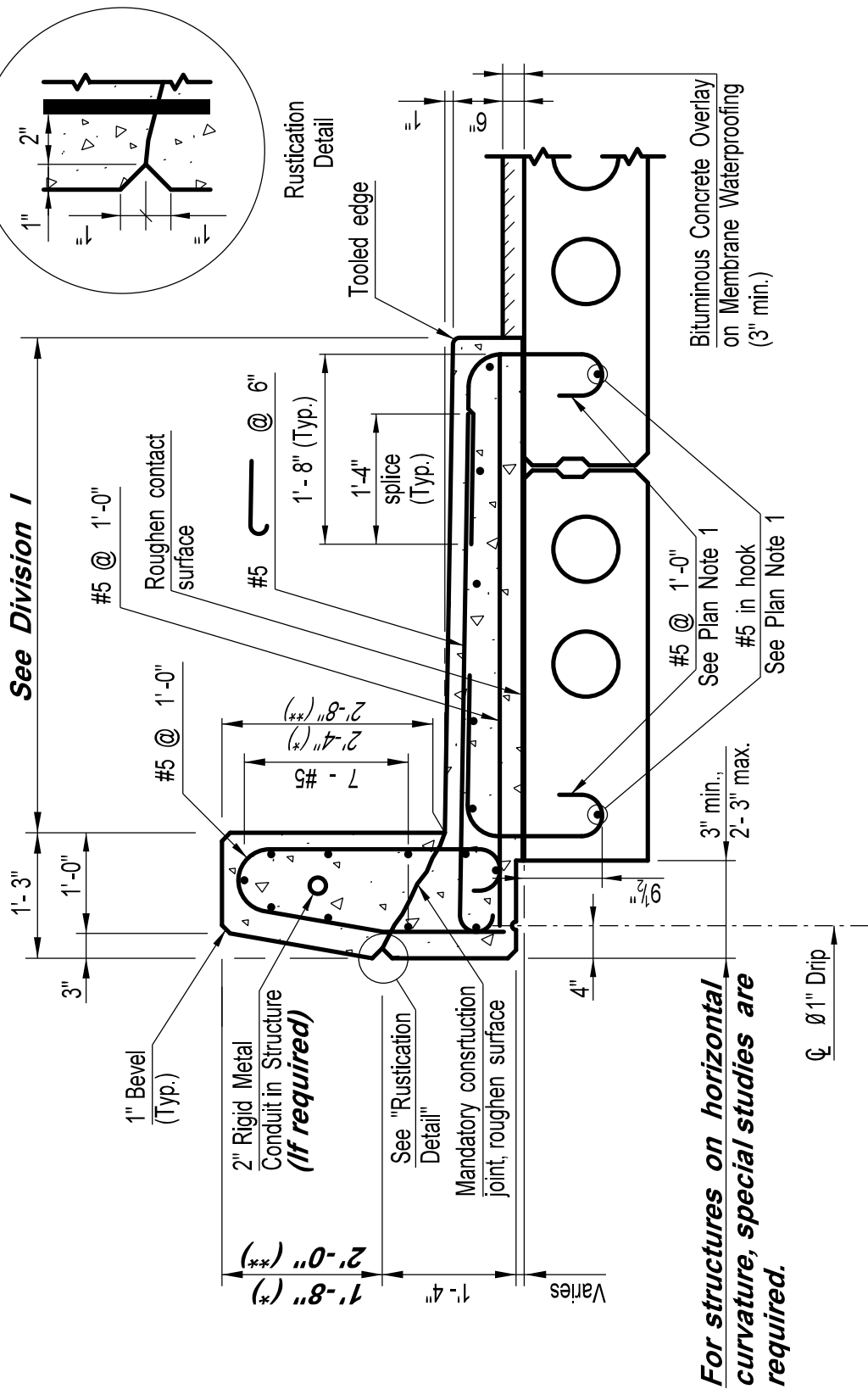




**PLAN NOTES:**

1. Reinforcement to be paid for under the item "Prestressed Deck Units."

<b>CONNECTICUT BRIDGE DESIGN MANUAL</b>	<b>STANDARD PARAPET 42" HIGH (ON BUTTED BOX BEAMS)</b>	
	Issue Date:	10/03
	Revision Date:	2/11
Plate Number:		5.6.4

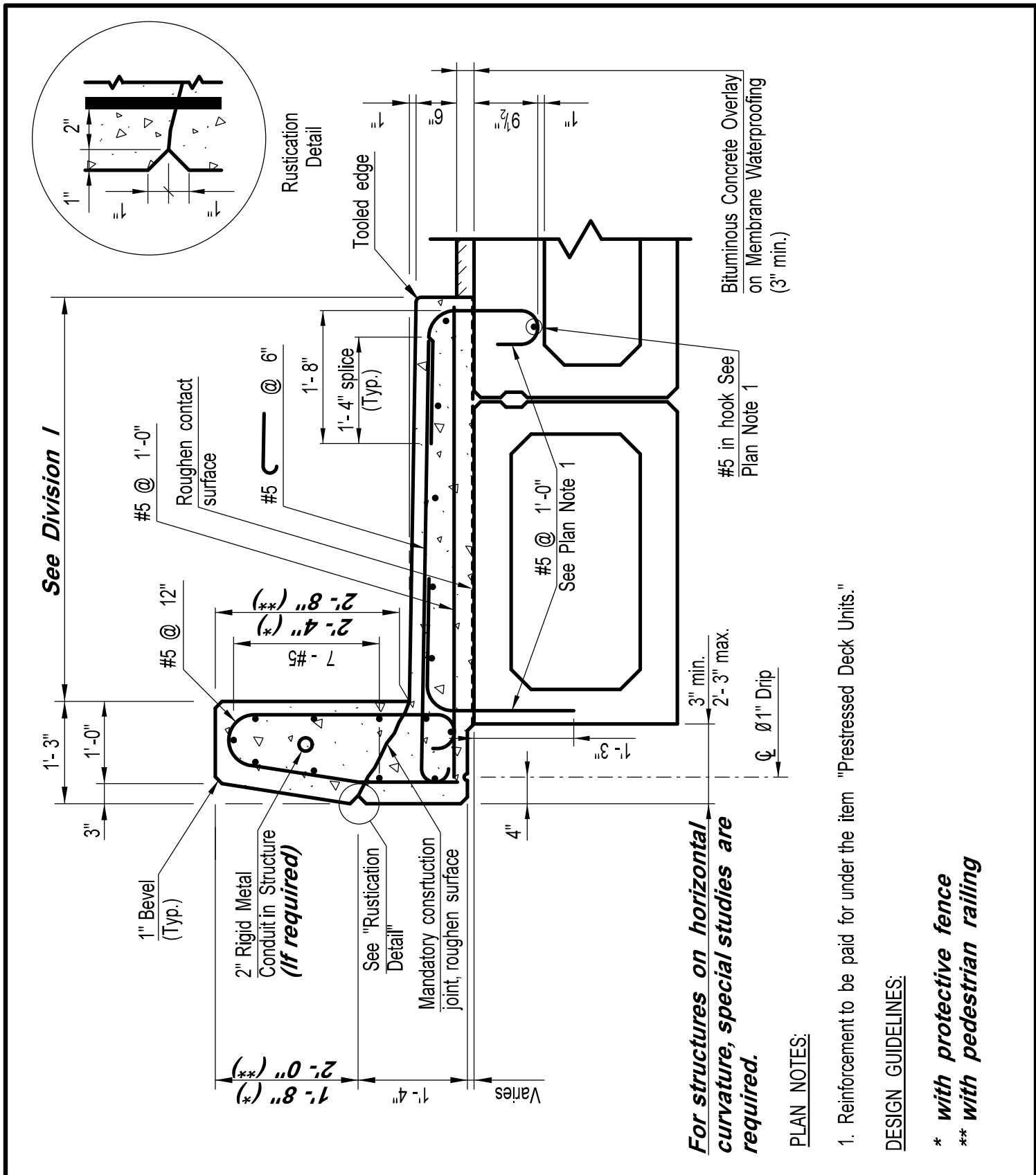


Plan Notes:

1. Reinforcement to be paid for under the item "Prestressed Deck Units."

DESIGN GUIDELINES:

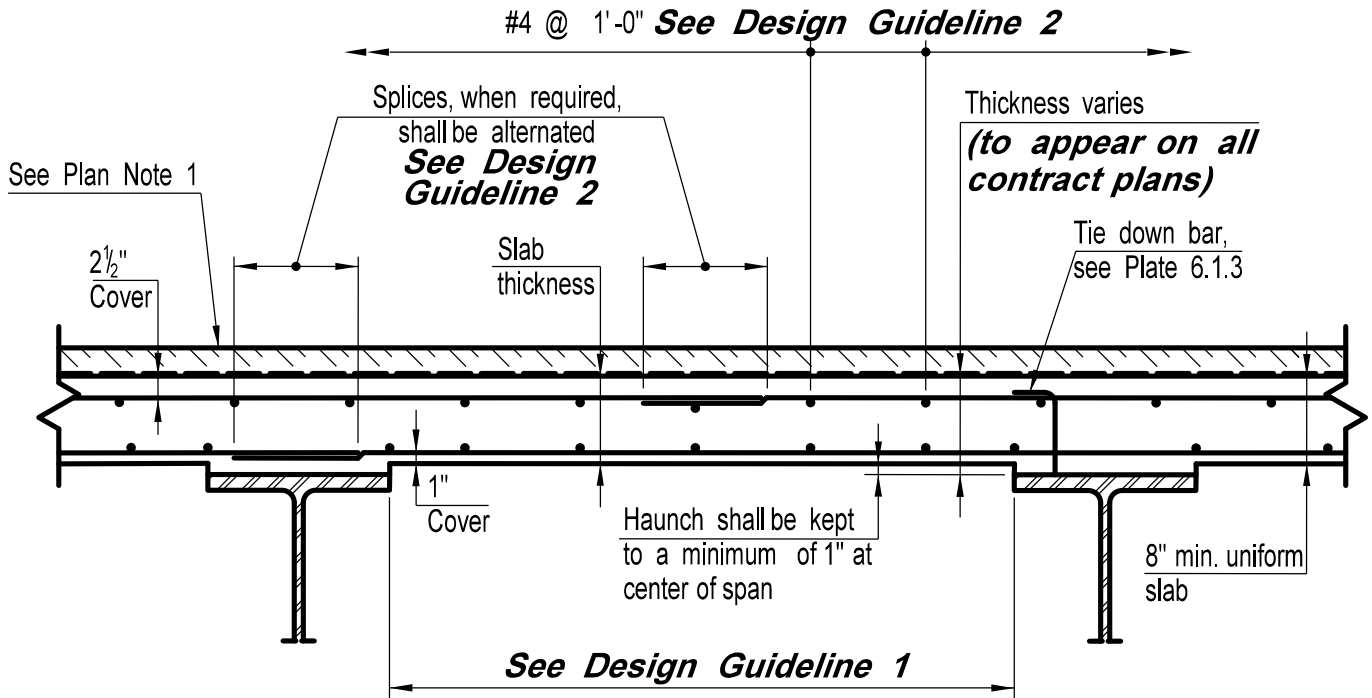
- \* with protective fence
- \*\* with pedestrian railing



**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**PARAPET  
WITH SIDEWALK  
(ON BUTTED BOX BEAMS)**

Issue Date:	10/03
Revision Date:	2/11
Plate Number:	5.6.6



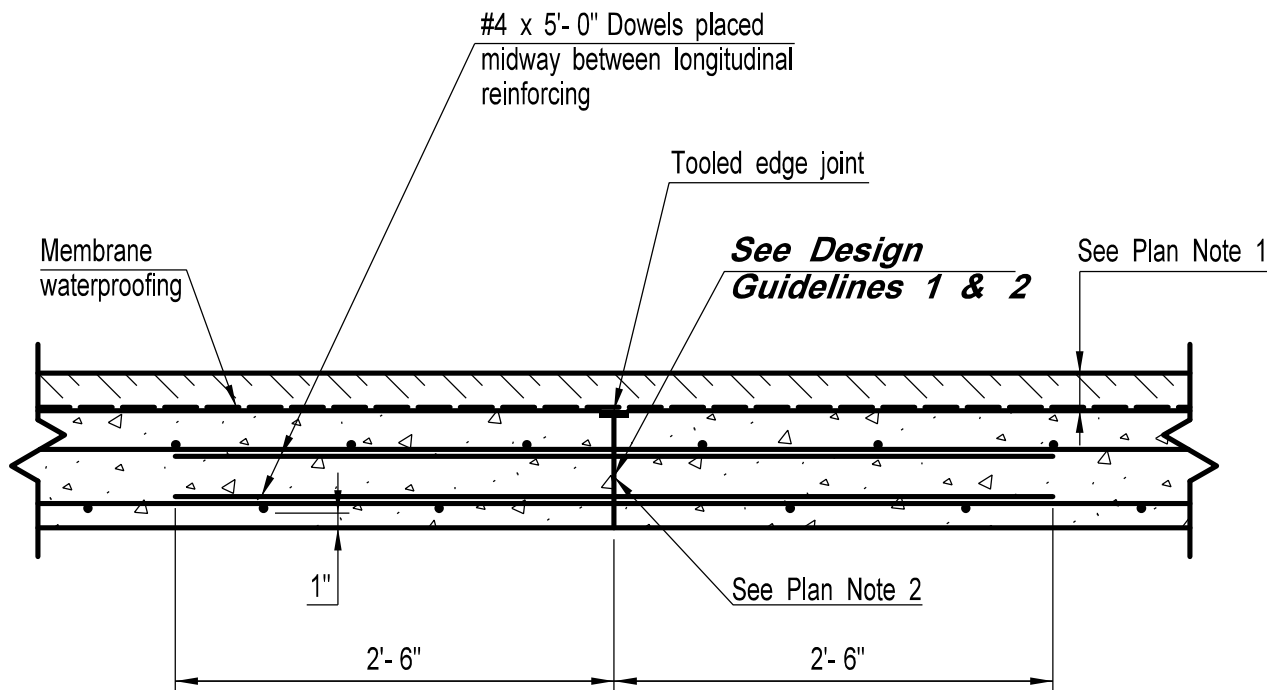
PLAN NOTES:

- 1. Bituminous concrete overlay on membrane waterproofing

DESIGN GUIDELINES:

- 1. Bars shall be designed in accordance with current AASHTO specifications. For additional longitudinal slab reinforcement at ends of slab, see Plate 6.1.4. For additional slab reinforcement at acute corners, (skew angle greater than 20°), see Plate 6.1.5a.
- 2. Splices and development lengths shall be determined by the designer in accordance with the latest AASHTO design criteria.

<b>CONNECTICUT BRIDGE DESIGN MANUAL</b>	TYPICAL SLAB SECTION	Issue Date: 10/03
		Revision Date: 2/11
		Plate Number: 6.1.1



PLAN NOTES:

1. Bituminous concrete overlay on membrane waterproofing.
2. Roughen surface, blast clean then apply a neat cement grout or other suitable bonding material immediately prior to placing adjacent pour. **See Note 3.**

DESIGN GUIDELINES:

1. ***Transverse reinforcement placed on a skew to this joint shall be continuous through this joint.***
2. ***This joint shall be allowed and shown on the plans only when sequence of pour is required.***

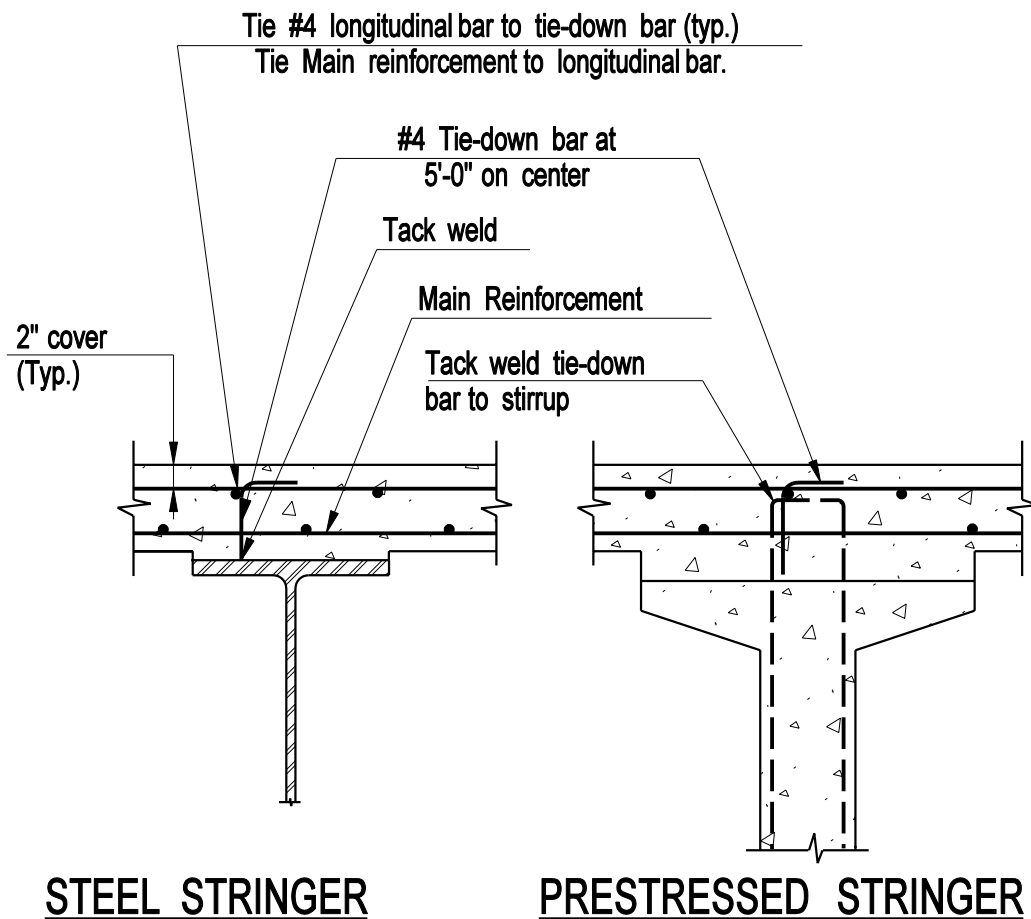
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

TYPICAL SECTION AT  
TRANSVERSE CONSTRUCTION  
JOINT IN SLAB

Issue Date: 10/03

Revision Date: 2/11

Plate Number:  
6.1.2

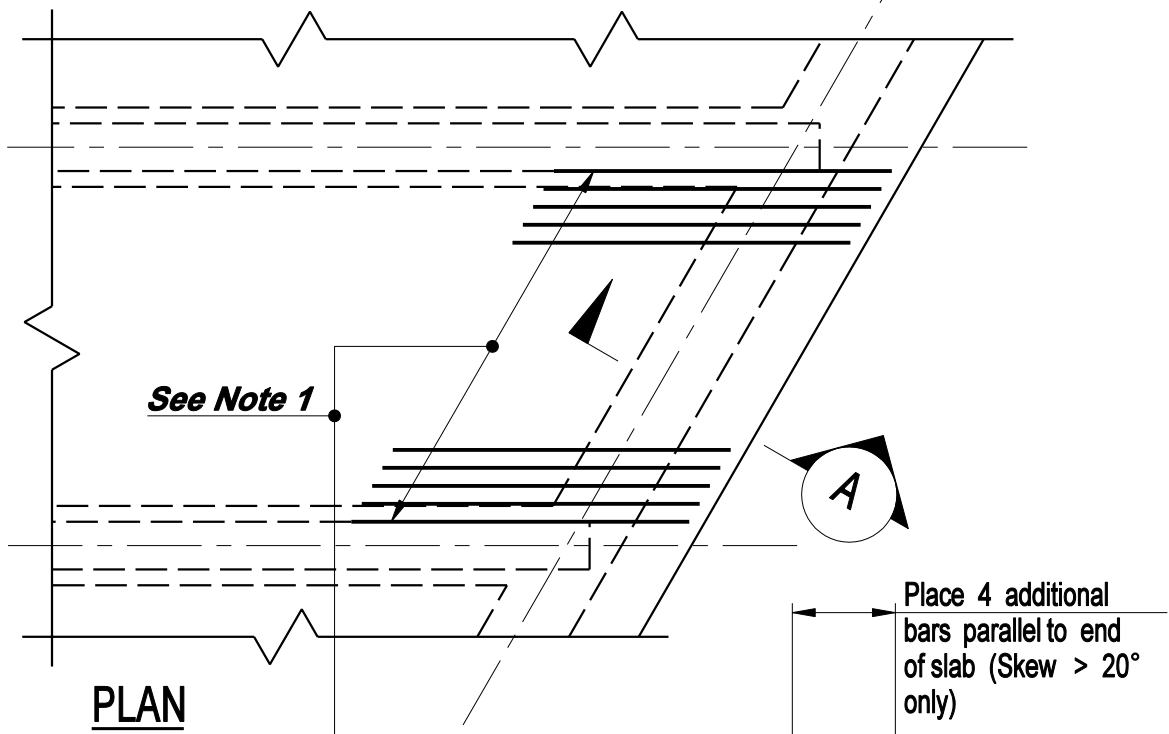


**PLAN NOTES**

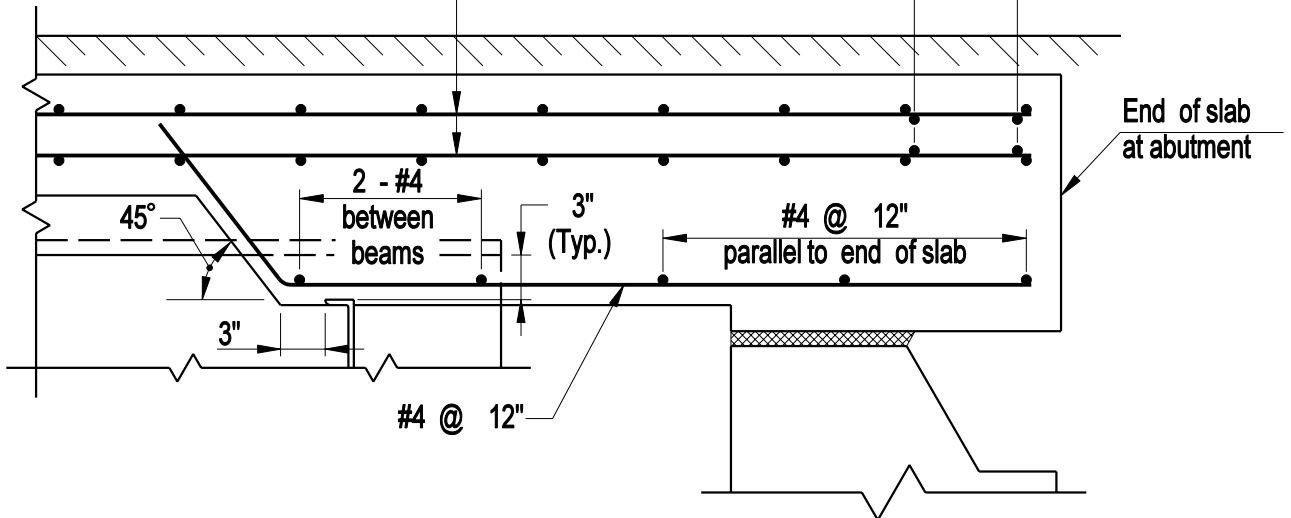
1. Tie-down bars do not exclude the use of chairs for supporting the reinforcement mat.
2. The cost of furnishing and placing tie-down bars to be included in the contract item "Deformed Steel Bars".
3. Tie-down bars and longitudinal bars shall clear shear connectors.

**DESIGN INFORMATION:**

***Tie-downs for reinforcement shall not be welded to steel members or parts subjected to tensile stress unless the range of stress at the point of attachment does not exceed the allowable range as stated in the current AASHTO specifications. Hence the plans shall indicate the locations where this attachment shall not be tack welded to the tension flanges with the following note: "No attachment shall be fillet welded, plug welded or tack welded to the tension flange within these limits."***



**PLAN**



**SECTION** A

**DESIGN INFORMATION**

**1. Place additional #5 bars midway between longitudinal bars on both fixed and expansion ends, at piers and abutments.**

*Spans < 50'- 0"*

*Spans > 50'- 0" to 80'- 0"*

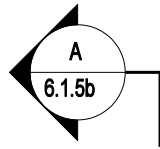
*Spans > 80'- 0"*

*Use #4 x 5'- 0"*

*Use #4 x 8'- 0"*

*Use #4 x 10'- 0"*

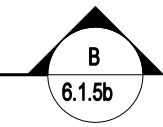




*Place additional reinforcement (top only) in this area. (#5 @ 9")*

*Reinforcement designed for slab continuous over 3 or more supports*

Limits of thickened slab

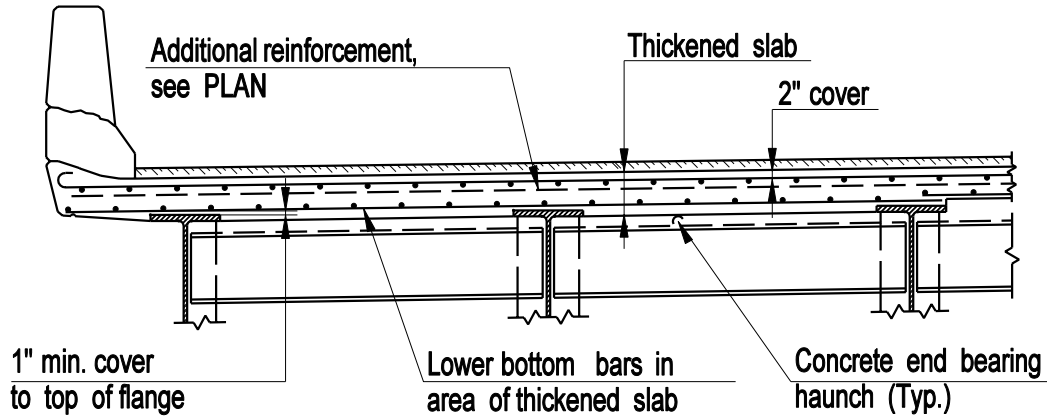


*Reinforcement designed for slab simply supported using increased depth*

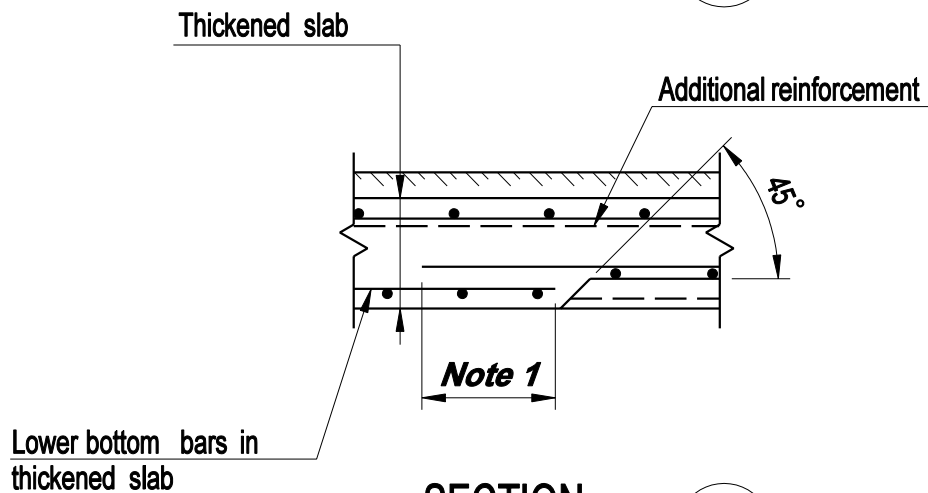
PLAN

DESIGN INFORMATION

*For design information, see Plate 6.1.5b*



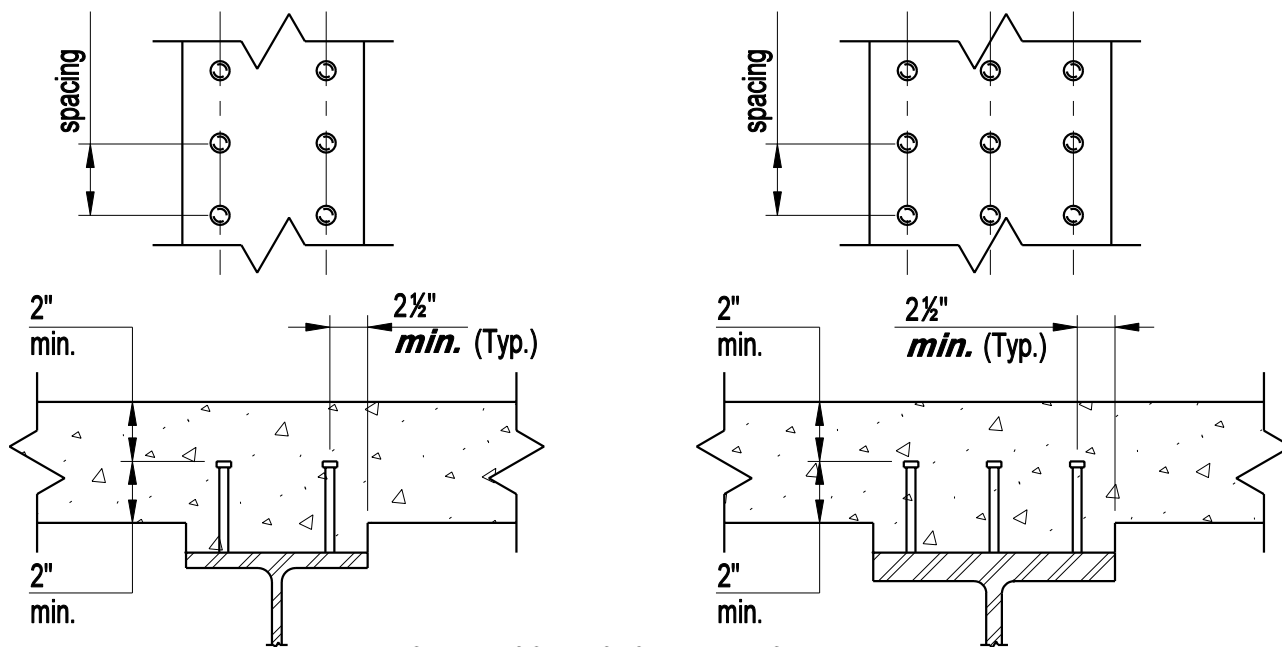
SECTION A



SECTION B

**DESIGN INFORMATION**

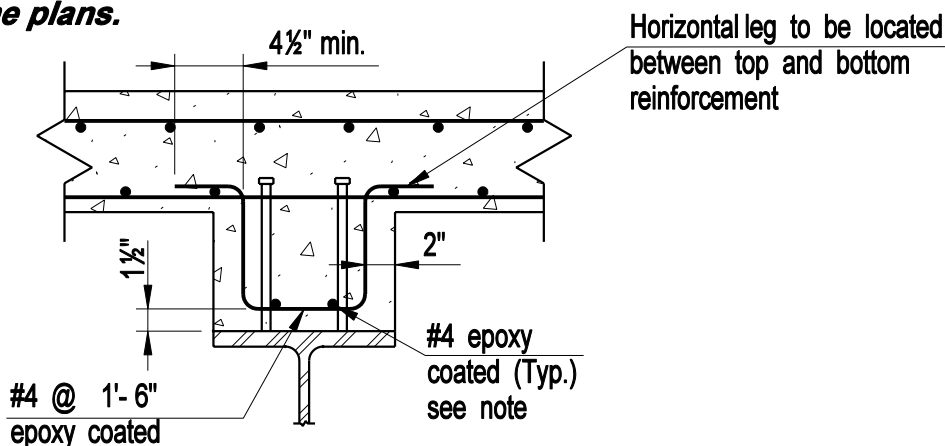
1. *Splice length shall be determined by the designer in accordance with the latest AASHTO design criteria.*
2. *Longitudinal reinforcement not indicated in "PLAN", detail shown at abutment, detail at pier similar.*



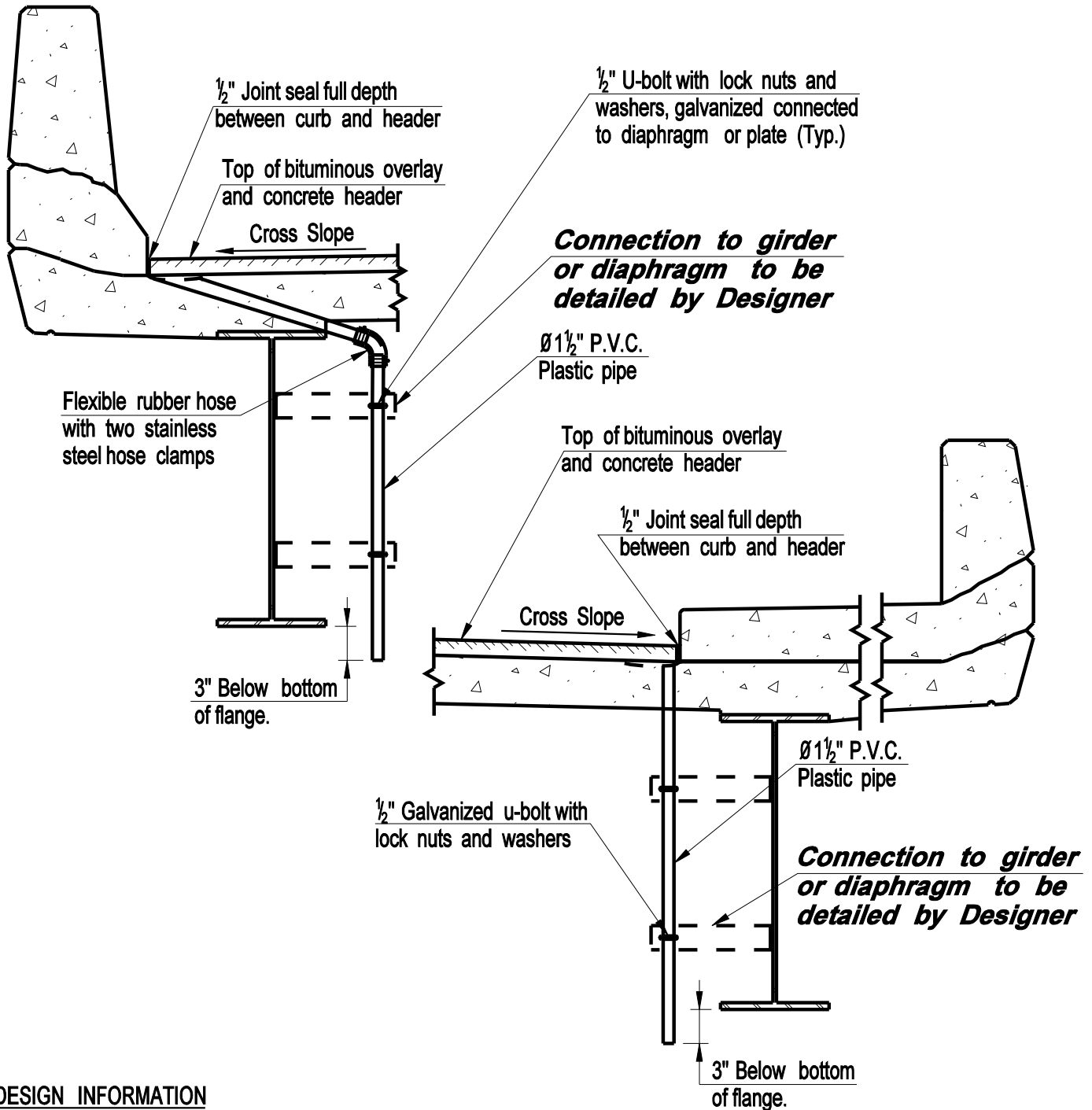
**SHEAR CONNECTOR DETAILS**

**DESIGN INFORMATION**

- 1. Preference shall be given to the use of 7/8" Ø studs. Lengths of studs shall be in increments of 1". Maximum permissible length of studs is 8". If the stud length required is in excess of 8", the required length may be obtained by stacking. Stacking of studs is provided for use in the specifications.**
- 2. Actual lengths or quantities of studs will not be given on the plans but shall be determined by the Contractor in accordance with the requirements shown in the details.**
- 3. Where the maximum depth of the haunch is excessive and studs are to be stacked, the haunch shall be reinforced as shown below.**
- 4. Haunch reinforcement shown is for haunch depth of 4" to 6". Reinforcement is not required for haunch depth less than 4". Reinforcement shall be designed for haunch depth greater than 6". If haunch depth in excess of 4" is anticipated, this detail shall be shown on the plans.**



**HAUNCH REINFORCEMENT DETAIL  
(SEE NOTE 4)**



**DESIGN INFORMATION**

- 1. In no case shall weepholes on bridges with welded steel girders or rolled beams outlet on the outside of fascia girder. Omit weepholes in cases where outletting on the inside is not feasible.**
- 2. For additional notes and design information, see Plate 6.1.9.**

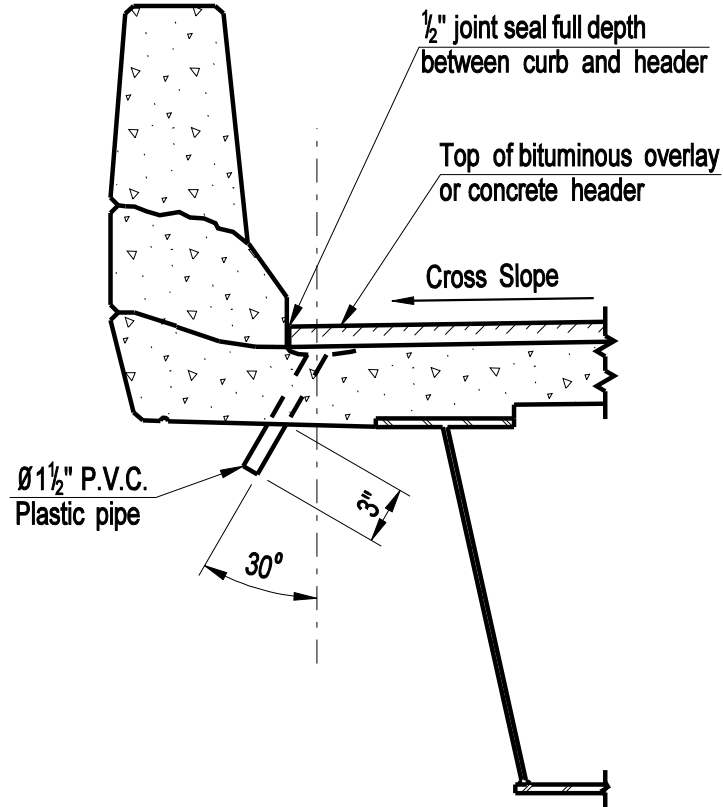
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**DECK WEEPHOLE DETAILS  
(WELDED GIRDERS AND  
ROLLED BEAMS)**

Issue Date: 01/05

Revision Date:

Plate Number:  
**6.1.7**



DESIGN INFORMATION

1. *Similar details may be used for bridges with concrete beams.*
2. *In no case shall weepholes which outlet on the outside of fascia girder extend more than 3" below the bottom of slab. Omit weepholes in cases where steel flanges or bearings are exposed to leakage.*
3. *For additional notes and design information, see Plate 6.1.9.*

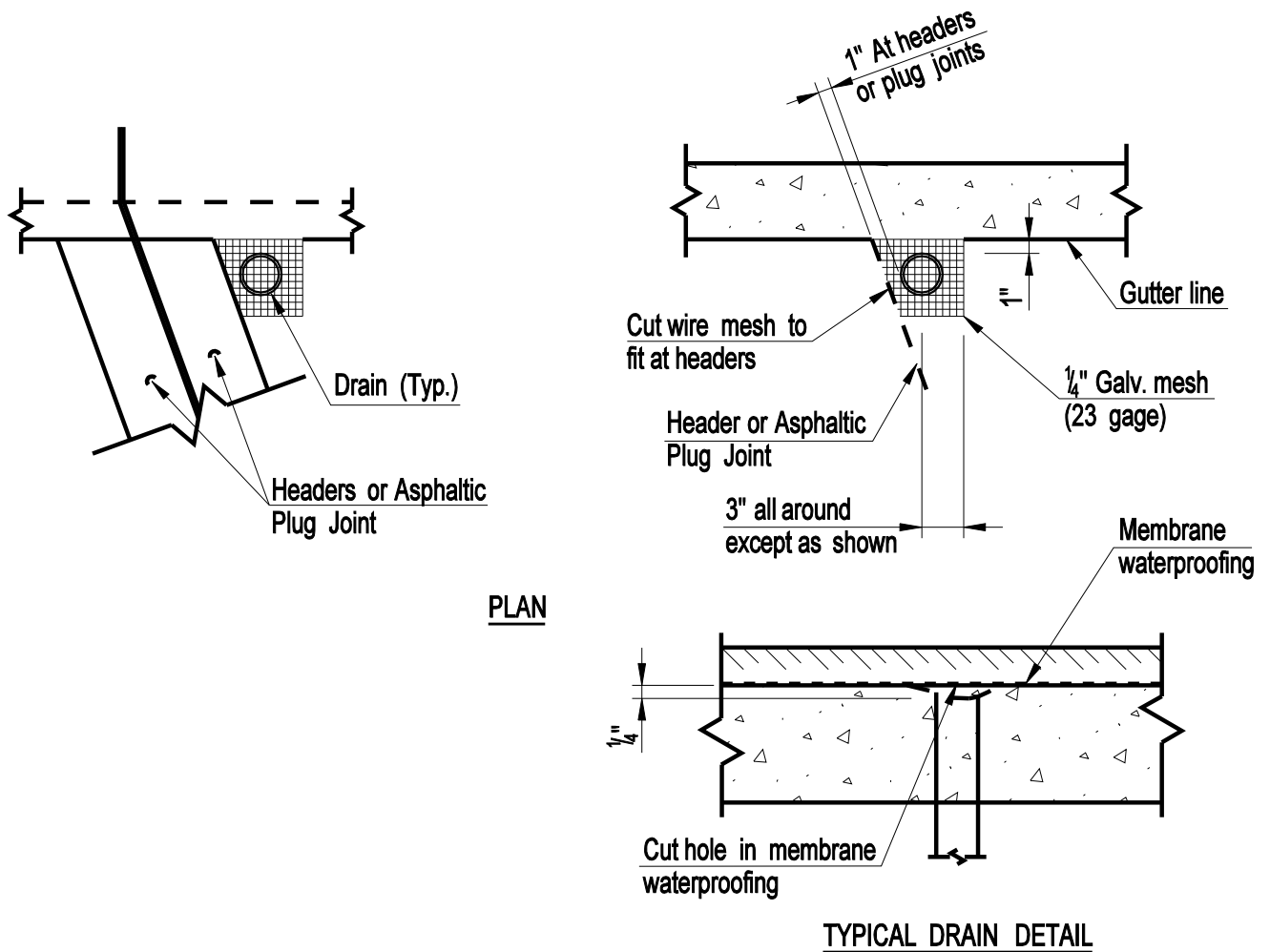
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**DECK WEEPHOLE DETAILS  
(STEEL BOX GIRDERS)**

Issue Date: 01/05

Revision Date:

Plate Number:  
6.1.8



NOTES:

The cost of furnishing and installing  $\frac{1}{4}$ " square galvanized wire mesh shall be included in the contract bid price for "Superpave 0.25".

DESIGN INFORMATION

**1. Weepholes to be located by the designer as follows:**

***Weepholes shall be placed along gutter line on the low end of cross slopes adjacent to headers and joints at the low end of span only. No weepholes shall be placed where they will drain onto travelways, shoulders, sidewalks or parking areas. Omit weepholes where these conditions cannot be met. On structures over railroads, the weepholes shall generally not be located in spans over tracks. However, for long span structures the pipes may be located in spans over tracks but shall not be located closer than 25 ft. from the center line of the outside tracks.***

**BRIDGE PLATES 6.2.1 THROUGH 6.2.4 DELETED, 12/19**

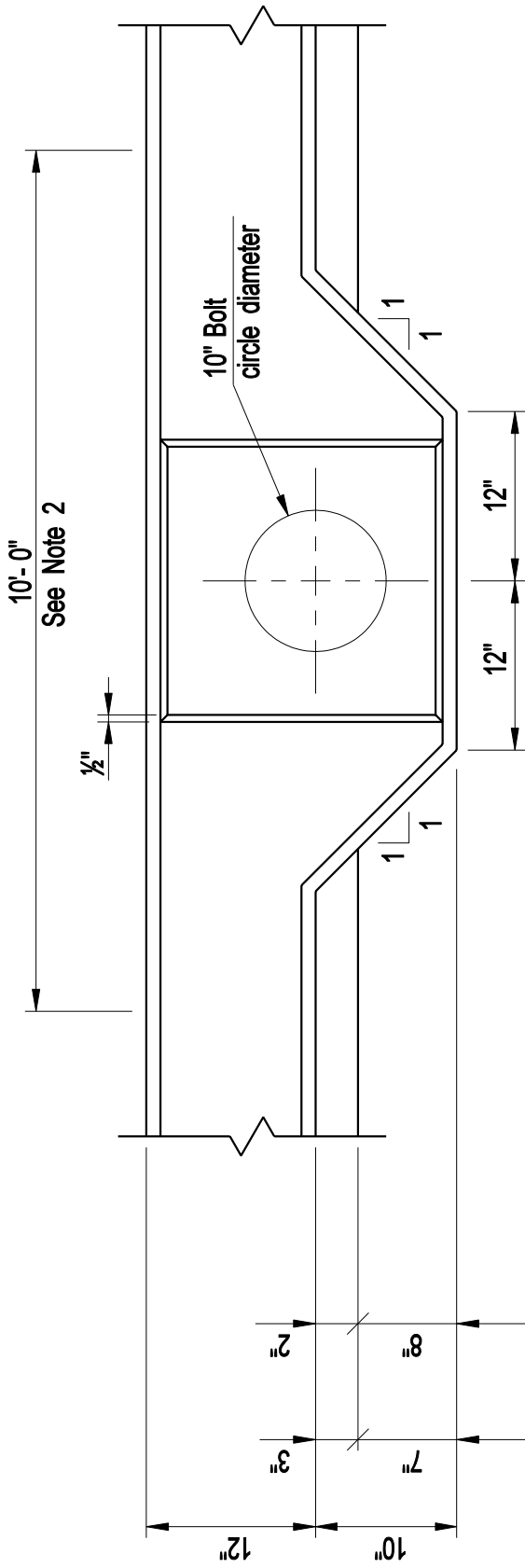
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

STANDARD PARAPET  
32" HIGH

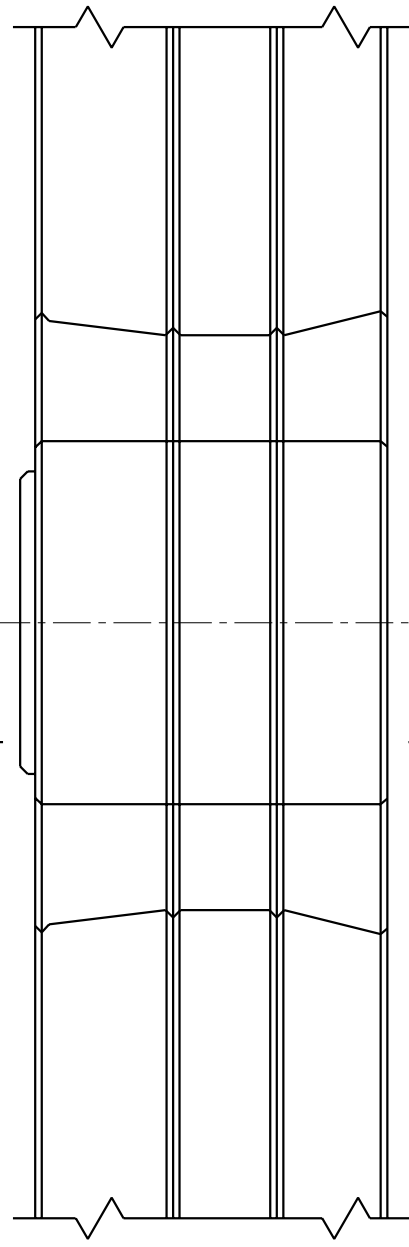
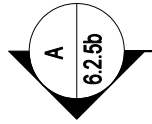
Issue Date: 10/03

Revision Date: 12/19

Plate Number:  
6.2.1



PLAN

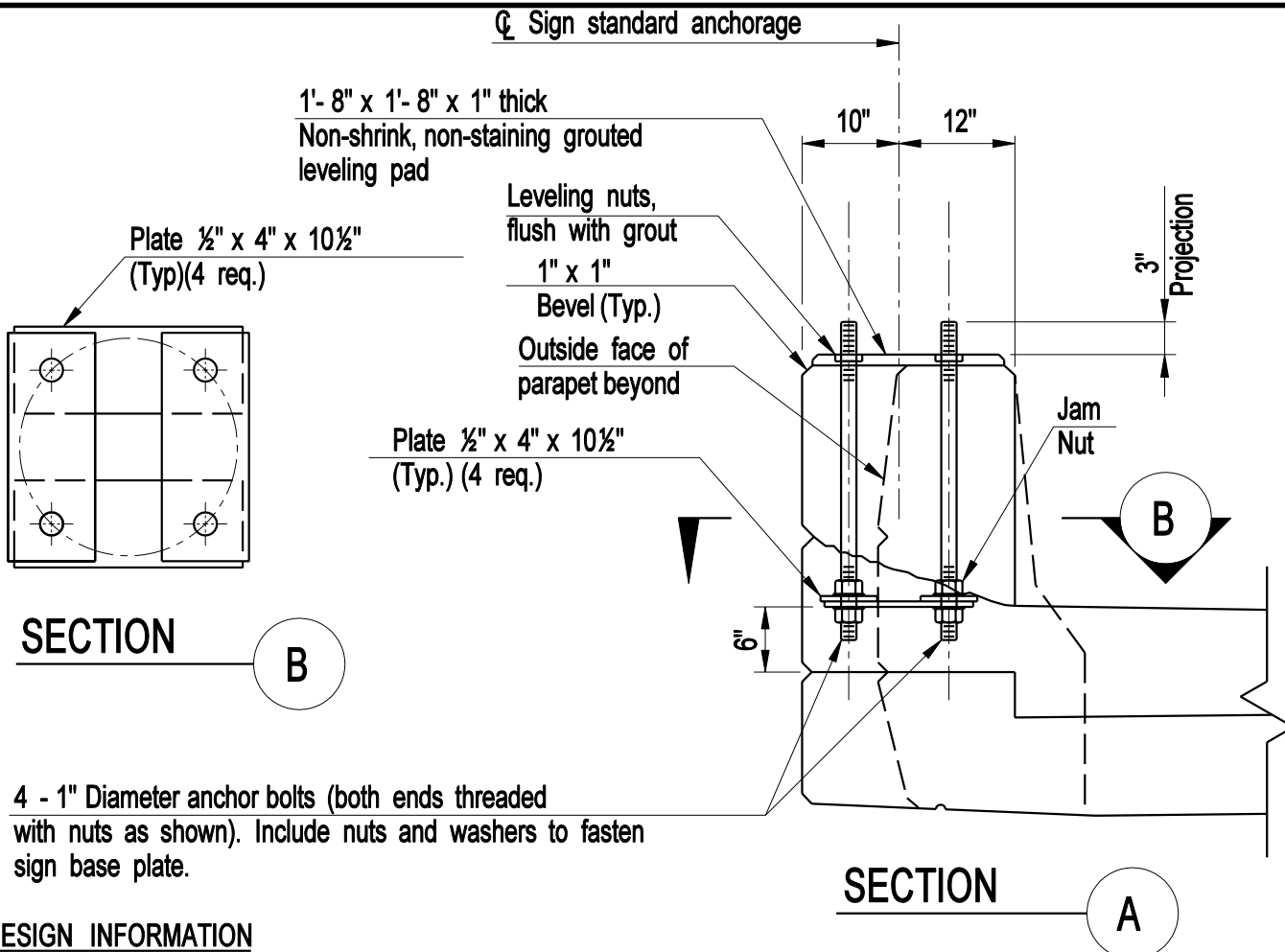


ELEVATION

DESIGN INFORMATION:

1. For design information, see Plate 6.2.5b
2. For parapet reinforcement within these limits, see Plate 6.2.7c





4 - 1" Diameter anchor bolts (both ends threaded with nuts as shown). Include nuts and washers to fasten sign base plate.

**DESIGN INFORMATION**

1. **Structural design for slab and details required, including reinforcement, shall be determined by the designer.**
2. **Maximum sign size is 4'- 0" x 8'- 6" at 8'- 2" above gutter line.**
3. **Dimensions shown will provide for continuity of "Metal Bridge Rail (Traffic)". These dimensions shall be reviewed for other railings as required to provide for continuity of rail.**

**Notes:**

4. Anchor bolts and nuts shall be manufactured of steel conforming to the following requirements:  
 Square leveling nuts may be low carbon steel.  
 Bolts - ASTM A-449  
 Hex Nuts - ASTM A-563 Grade DH  
 Anchor bolts and nuts shall be galvanized in accordance with ASTM A-153.  
 Structural steel plates shall conform to ASTM A-36.
5. Cost of furnishing and installing anchor bolts, nuts and steel plates to be paid for at the contract unit price per pound for "Deformed Steel Bars".

**BRIDGE PLATES 6.2.6a THROUGH 6.2.8c DELETED, 12/19**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**ANCHORAGE FOR  
BOX TRUSS SIGN SUPPORT**

Issue Date: 10/03

Revision Date: 12/19

Plate Number:  
6.2.6a

**BRIDGE PLATE 6.3.1 DELETED, 04/19**

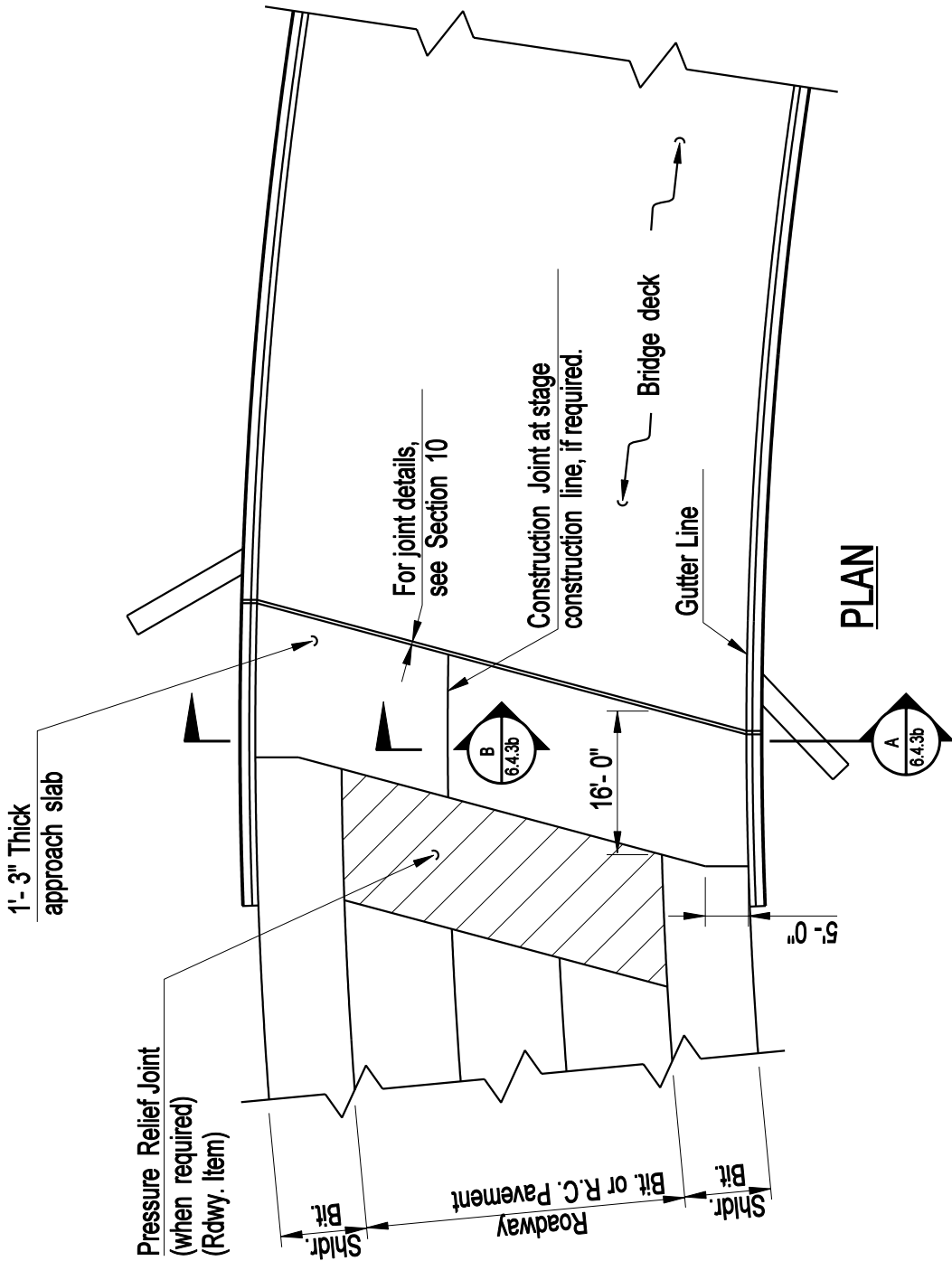
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

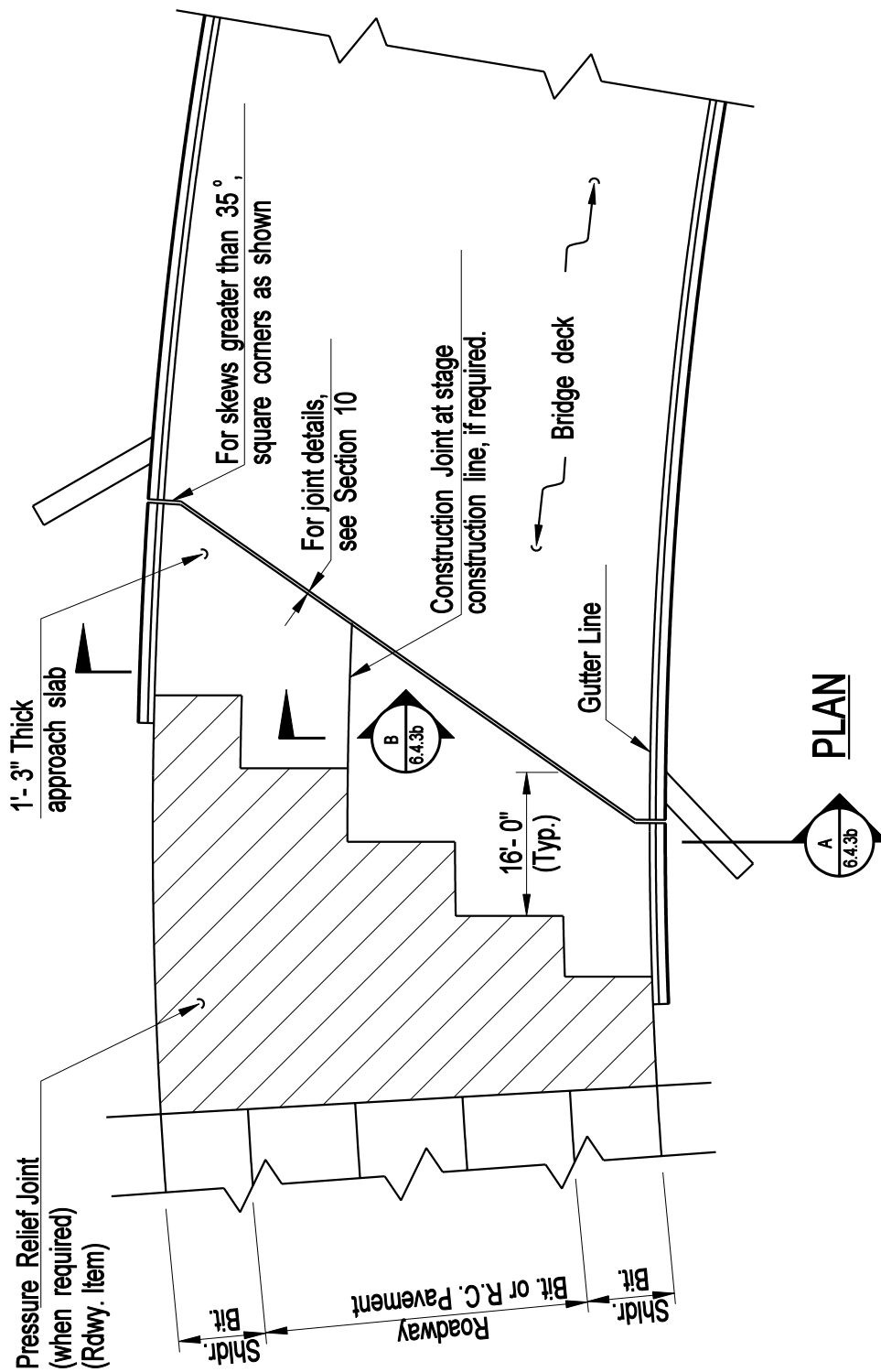
**STANDARD SPLIT MEDIAN  
BARRIER CURB (4'-9" HIGH)**

Issue Date: 10/03

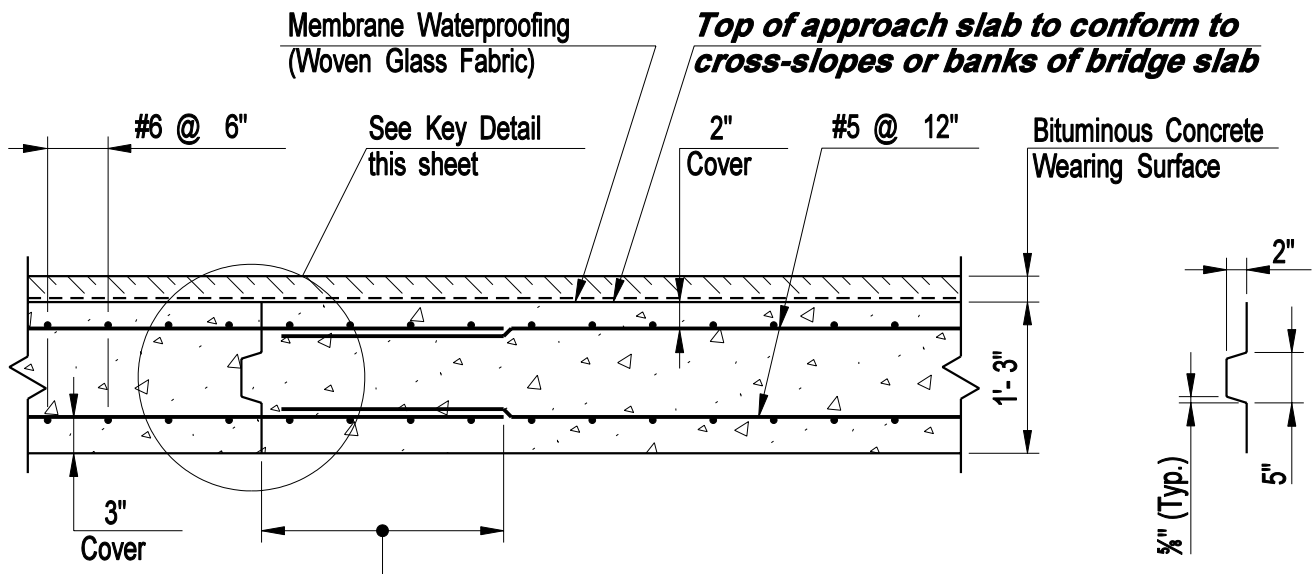
Revision Date: 04/19

Plate Number:  
**6.3.1**





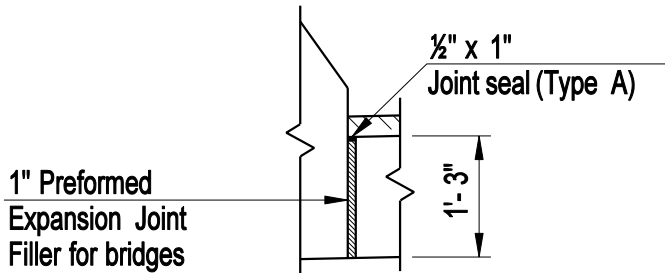




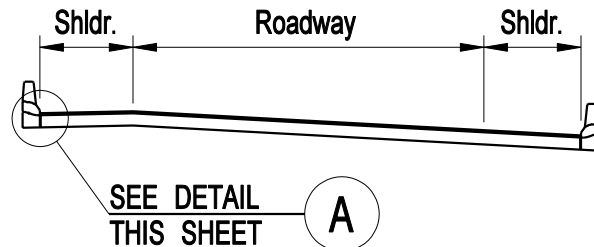
**2'- 0". At acute corners, eliminate splice and vary this length up to 12'- 0" to omit short bars in the adjacent slab.**

**KEY DETAIL**

**SECTION B**



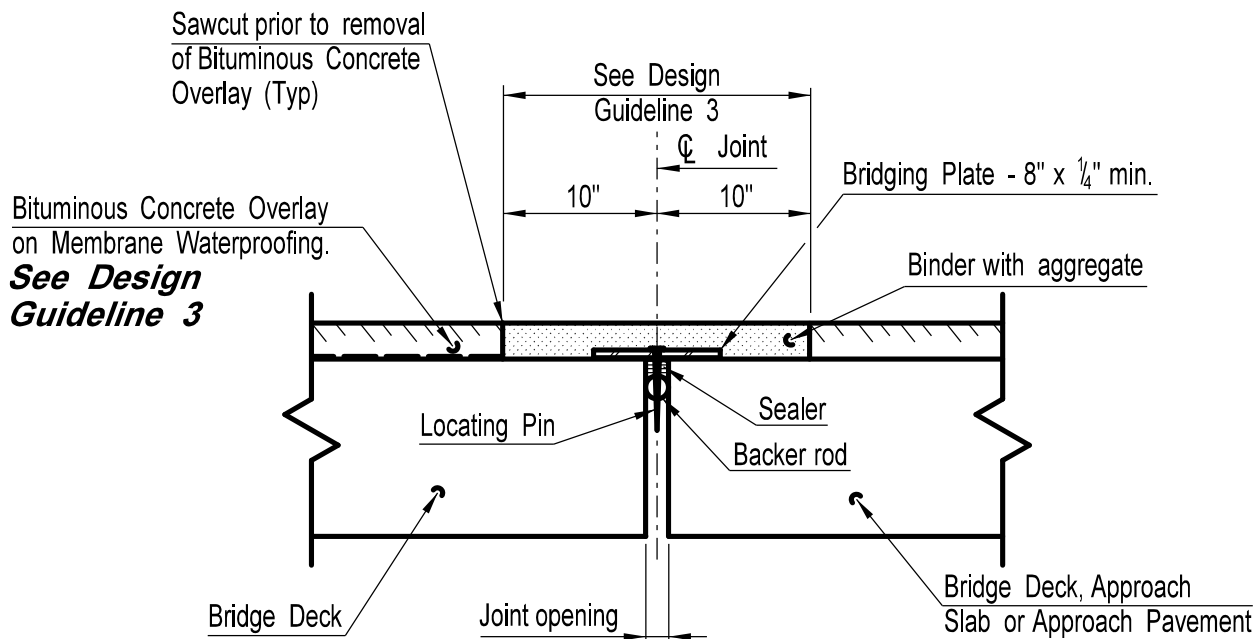
**DETAIL A**



**SECTION A**

**DESIGN INFORMATION**

- 1. Reinforcing steel to be included in the item "Deformed Steel Bars (Epoxy Coated)."**
- 2. Concrete to be included in the item "Class "F" Concrete."**
- 3. This plate shall be used in conjunction with Plates 6.4.1 and 6.4.2.**



PLAN NOTES:

1. Remove new bituminous concrete overlay and membrane waterproofing. Replace with Asphaltic Plug Expansion Joint System. To be paid for under the item "Asphaltic Plug Expansion Joint System". (See Special Provision)

DESIGN GUIDELINES:

1. *Asphaltic Plug Expansion System shall be used at fixed and expansion joints with computed movements from 0" to 1½" based on a moderate climate in accordance with AASHTO.*
2. *Asphaltic Plug Expansion joints shall be installed when the ambient air temperature is between 40° F and 80° F.*
3. *Bituminous Concrete Overlay depth shall be indicated.*

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

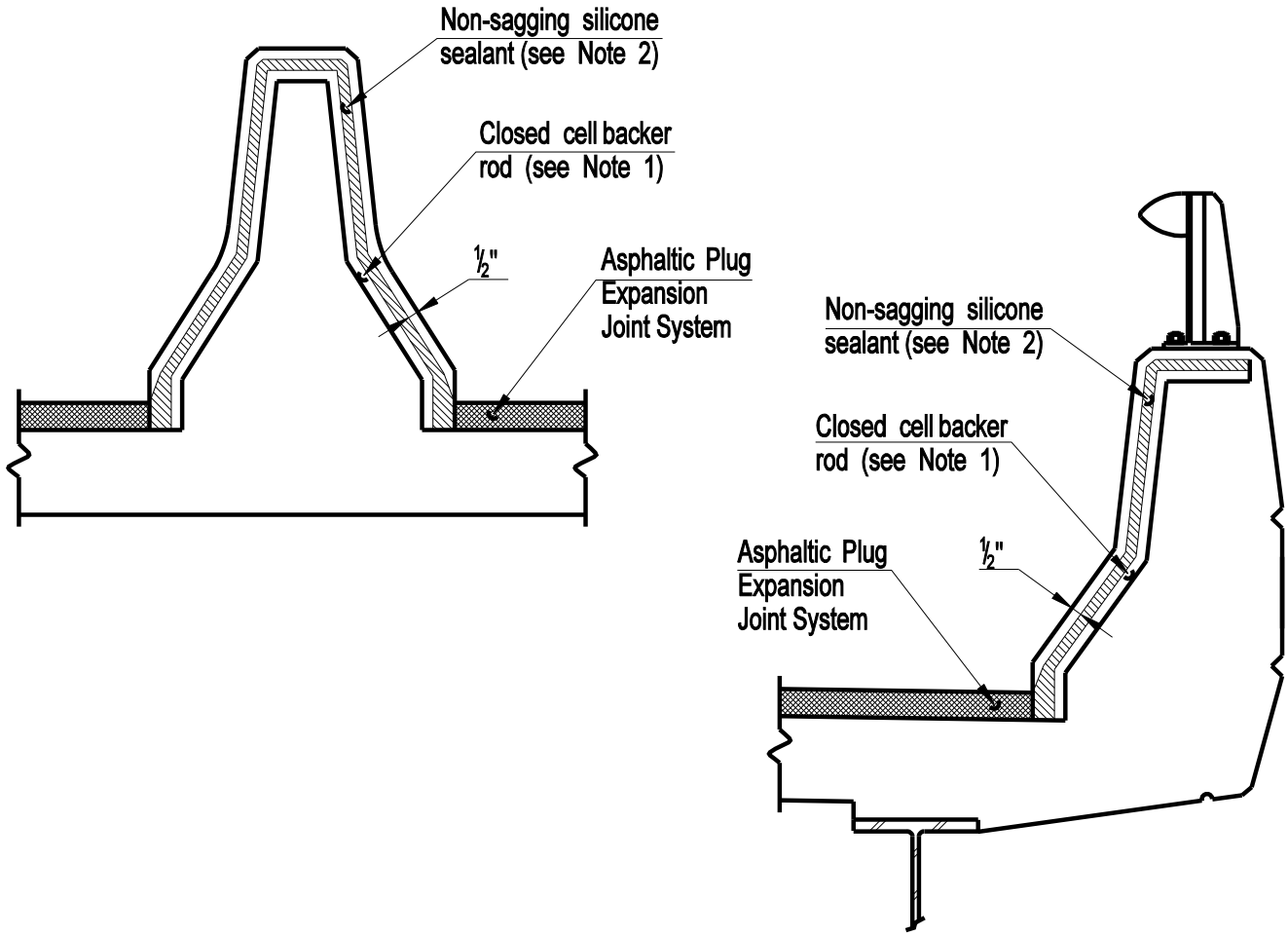
ASPHALTIC PLUG  
EXPANSION JOINT SYSTEM

Issue Date: 10/05

Revision Date: 2/11

Plate Number:  
7.1.1a





**ASPHALTIC PLUG EXPANSION JOINT TREATMENT  
AT PARAPETS AND MEDIAN BARRIER**

**NOTES:**

- 1: The Closed Cell Backer Rod shall be placed a minimum of 2" from the outside face of parapets and median barriers.
- 2: The non-sagging silicone sealant shall be placed on the backer rod 1/2" thick. At the gutter, the silicone sealant shall be placed flush with the outside face of concrete.
- 3: Prior to installing the silicone sealant, clean joint sides by sandblasting. Dust shall be removed by the method approved by the Engineer. This work shall be paid for under the item "Asphaltic Plug Expansion Joint System". (see special provisions)

**BRIDGE PLATES 7.2.1a THROUGH 7.2.1e DELETED, 04/19**

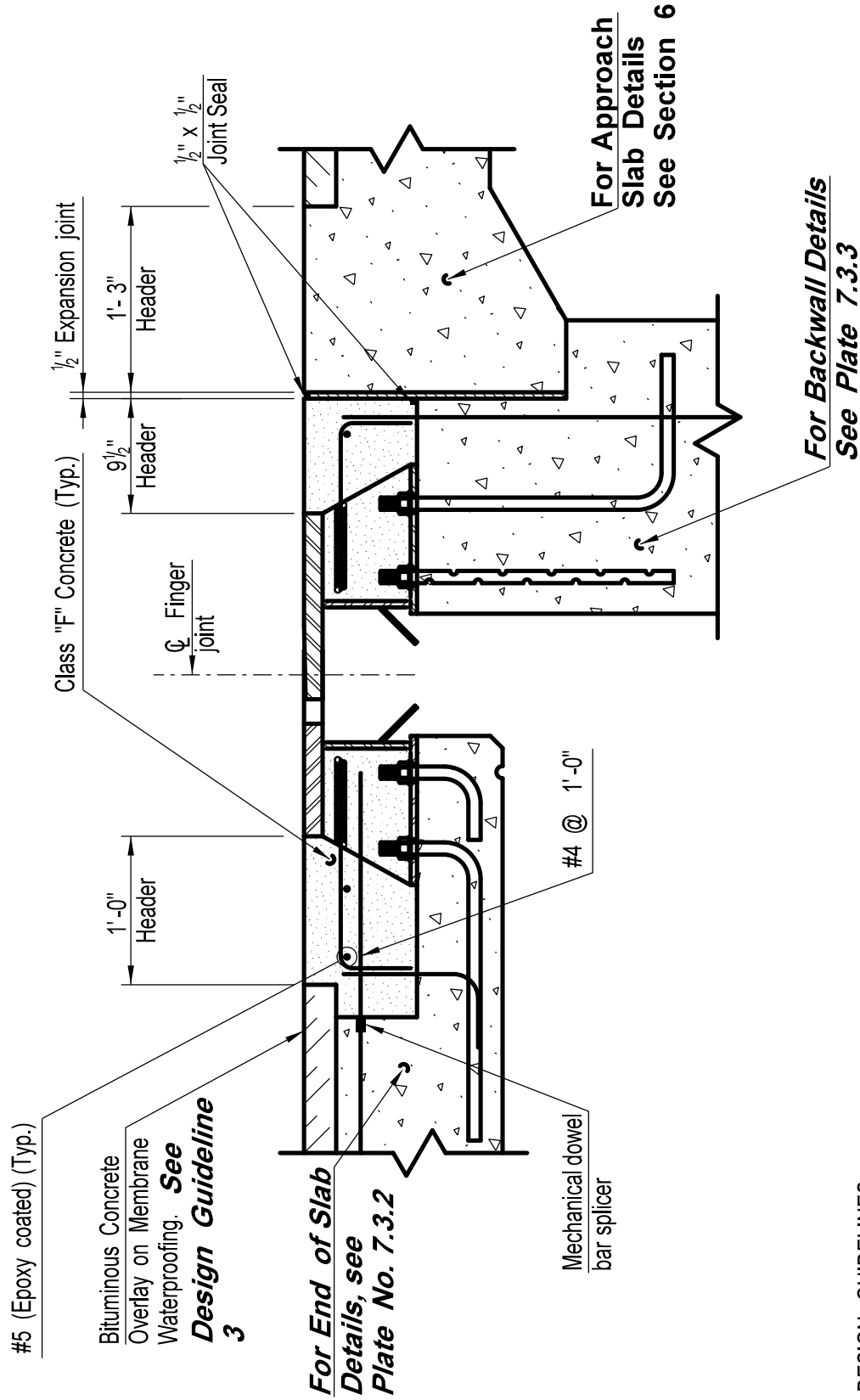
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**ELASTOMERIC CONCRETE  
EXPANSION SYSTEM**

Issue Date: 10/03

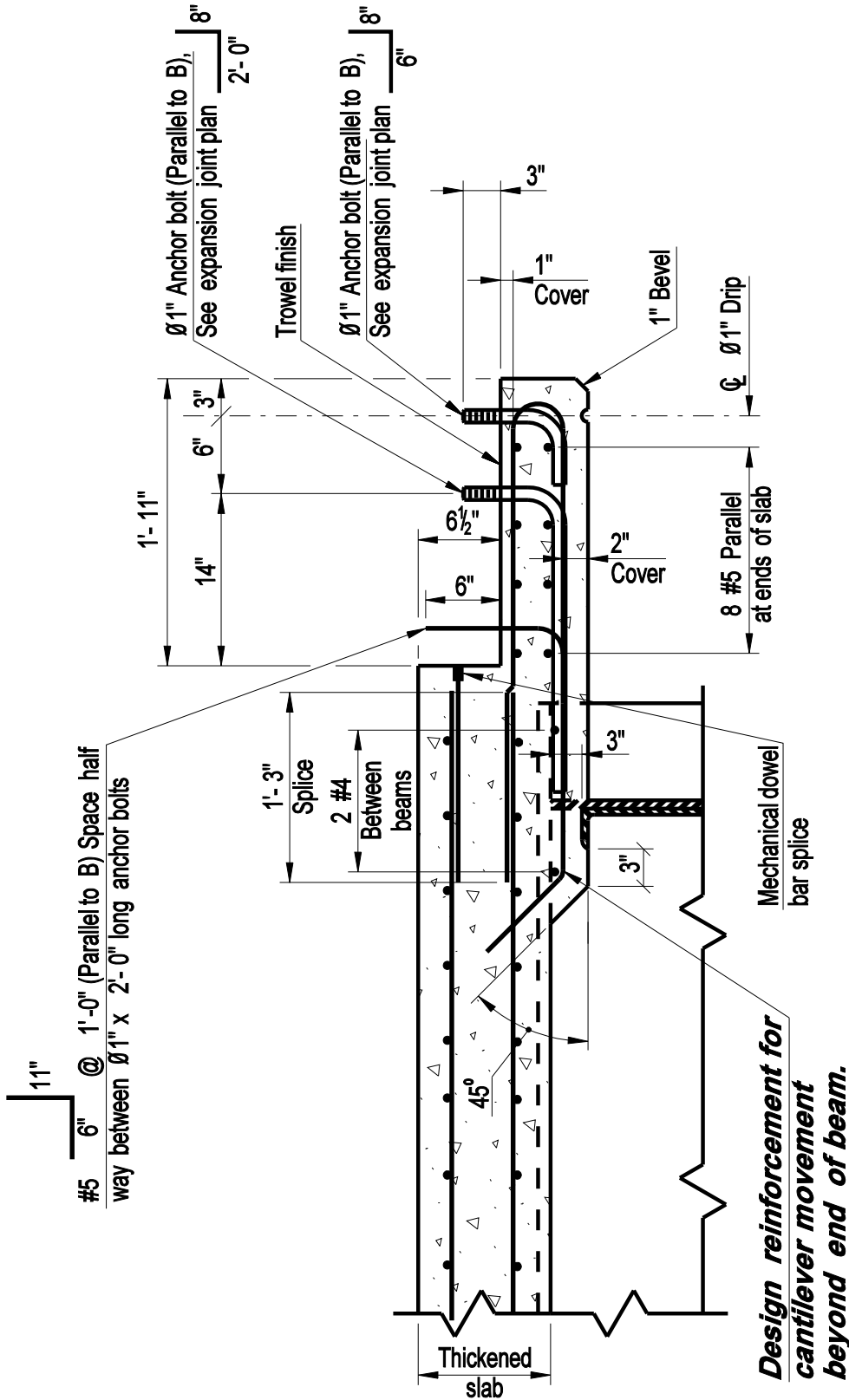
Revision Date: 04/19

Plate Number:  
7.2.1a

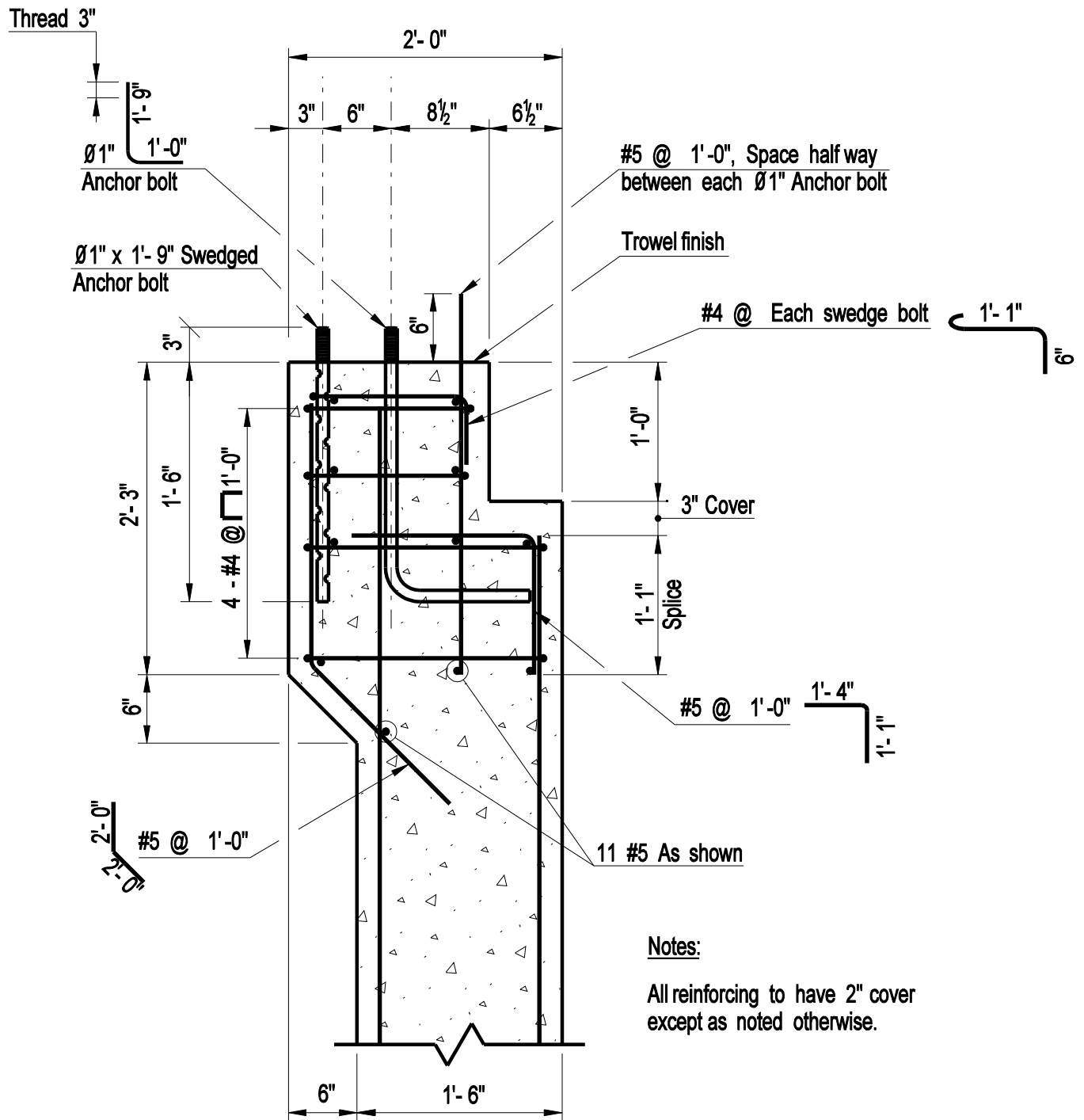


**DESIGN GUIDELINES:**

1. Finger joints to be used for joint movement greater than 4" at pedestal type abutments only, (See Plates 3.1.2a thru 3.1.2e)
2. All structural steel, weldable bars and anchor bolts shall be included in the pay item for "Finger Joint".
3. Depth of Bituminous Overlay shall be indicated.

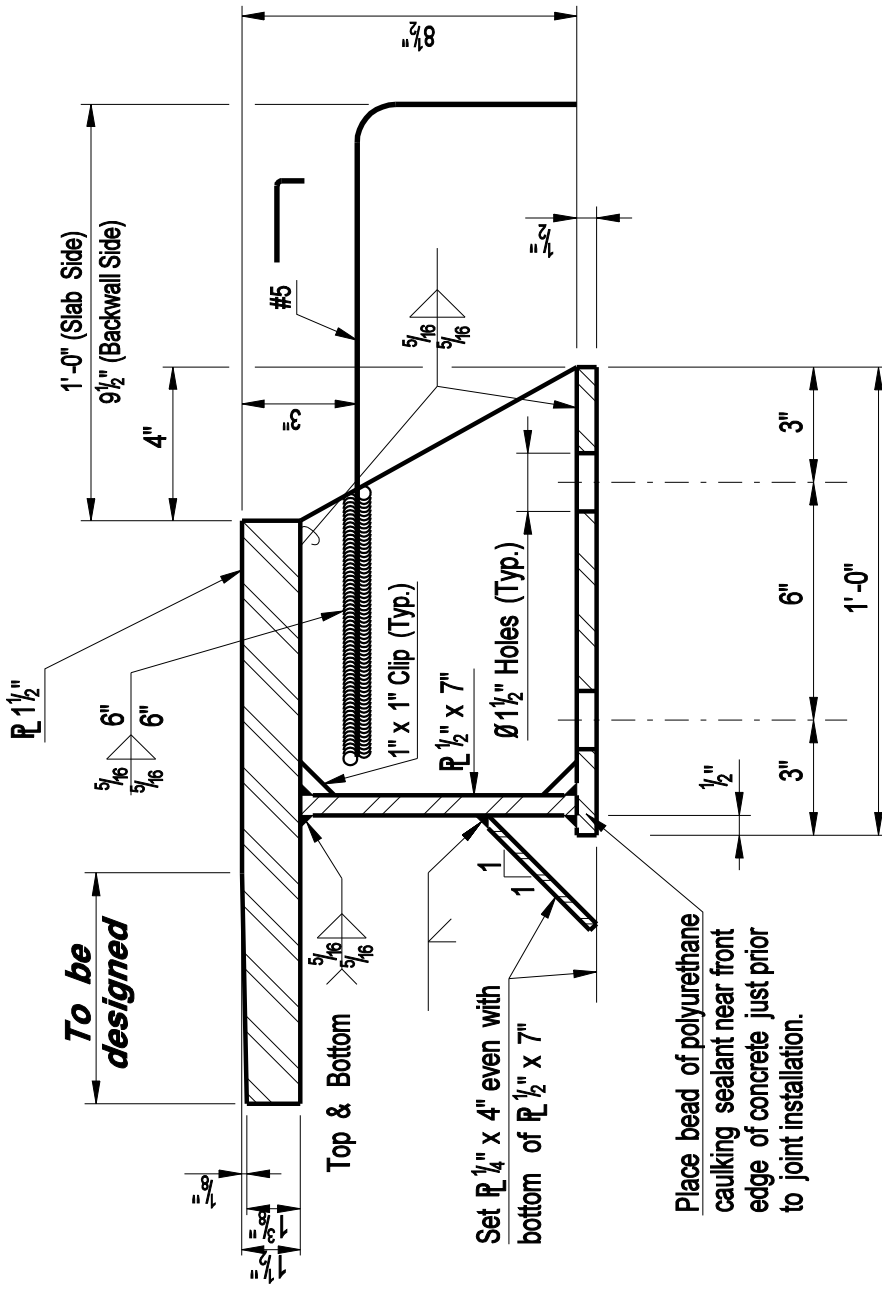


**SECTION AT END OF SLAB**

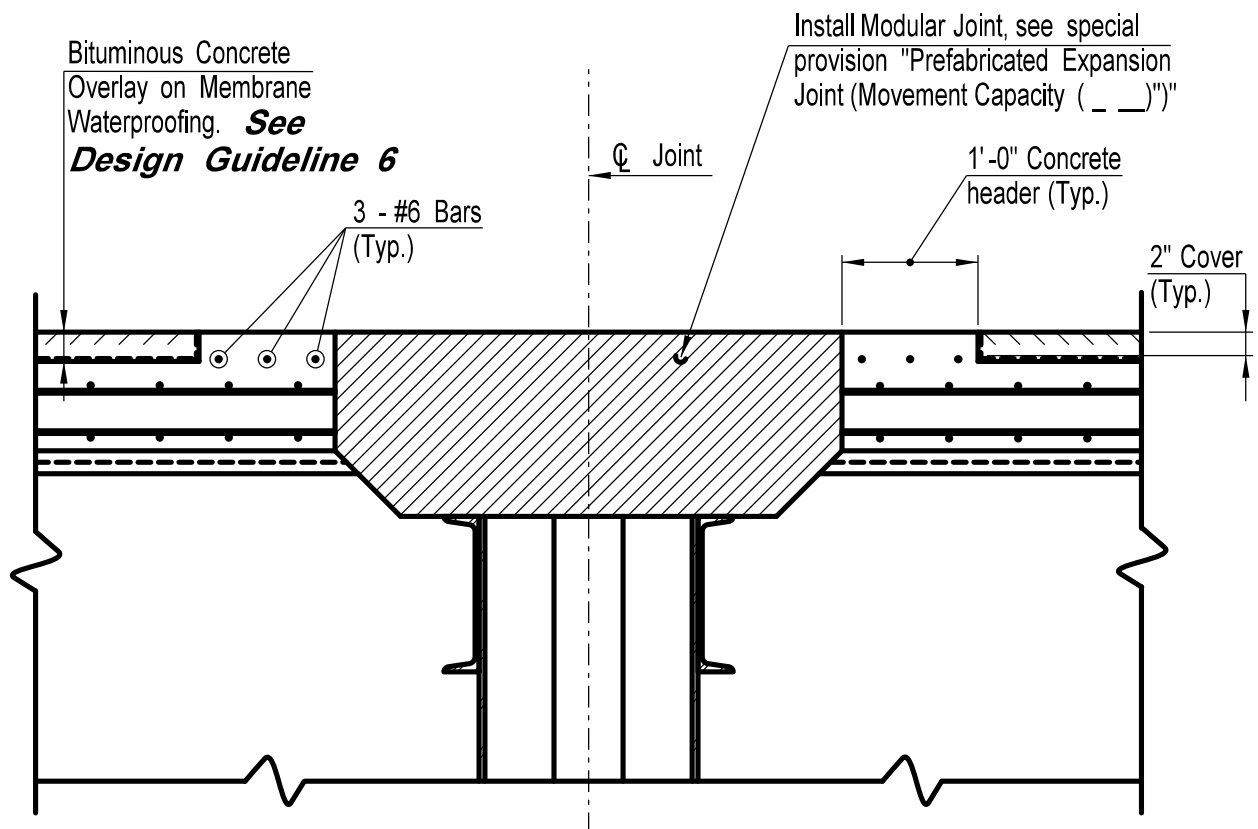


**Notes:**

All reinforcing to have 2" cover except as noted otherwise.



**SECTION AT FINGER JOINT**



TYPICAL SECTION

PLAN NOTES:

1. See special provision "Prefabricated Expansion Joint (Movement Capacity ( \_ ) )".

DESIGN GUIDELINES:

**1. The temperature range used for computation of movement shall be based on a moderate climate in accordance with AASHTO.**

**2. The required movement capacity of each joint shall be determined by the Designer and shown on the plans.**

**3. The contract plans shall show a blocked out area for the Modular Joint. The manufacturer will be responsible for the joint and anchorage details in accordance with the special provisions.**

**4. Modular joints should be used for joint movements greater than 4" at piers.**

**5. Depth of Bituminous Concrete overlay shall be indicated.**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

MODULAR EXPANSION  
JOINT SYSTEM

Issue Date: 10/03

Revision Date: 2/11

Plate Number:  
7.4.1

**BRIDGE PLATES 7.5.1a THROUGH 7.5.1e DELETED, 04/19**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

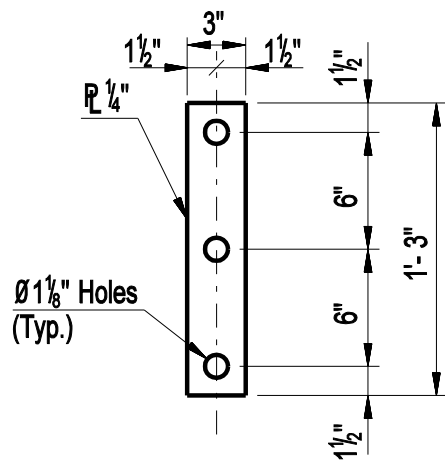
**SILICONE  
EXPANSION  
JOINT SYSTEM**

Issue Date: 10/03

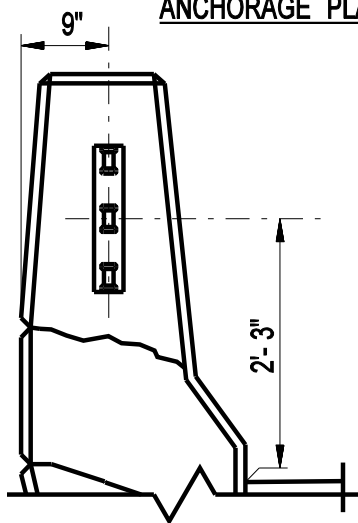
Revision Date: 04/19

Plate Number:  
7.5.1a

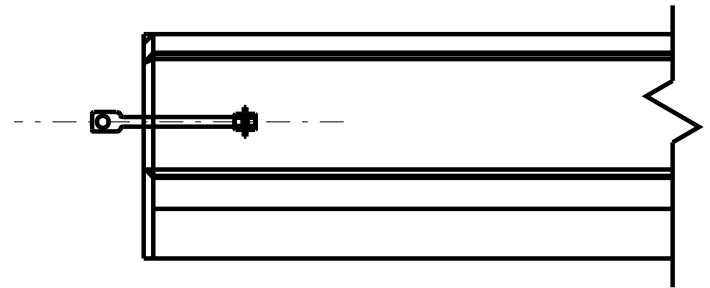




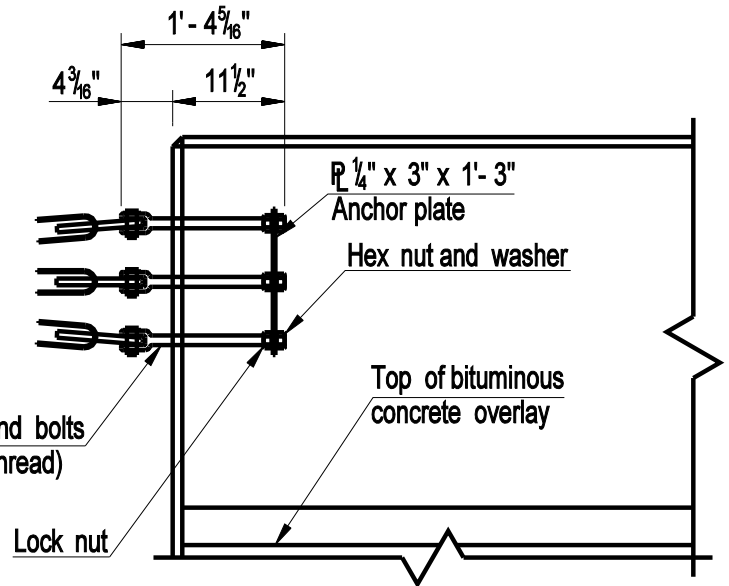
ANCHORAGE PLATE



END VIEW



PLAN



ELEVATION

Notes:

1. The shackle end bolts shall conform to the requirements of ASTM A688 Class E or AISI 1035 forged steel, galvanized in accordance with the requirements of ASTM A153.
2. The standard hex nuts, anchor plates and lock nuts shall conform to the requirements of ASTM A36.
3. Longitudinal reinforcement in parapet to clear anchor plate.
4. All anchorage material shall be paid for as part of the pay item "End Anchorage - Bridge Type" (Roadway Item).

DESIGN INFORMATION

*This detail to be used to anchor Three-Cable Guide Railing at trailing end of 3'-6" high parapets with sloped curb on one-way roads.*

**BRIDGE PLATES 8.3.2 THROUGH 8.3.3d DELETED, 12/19**

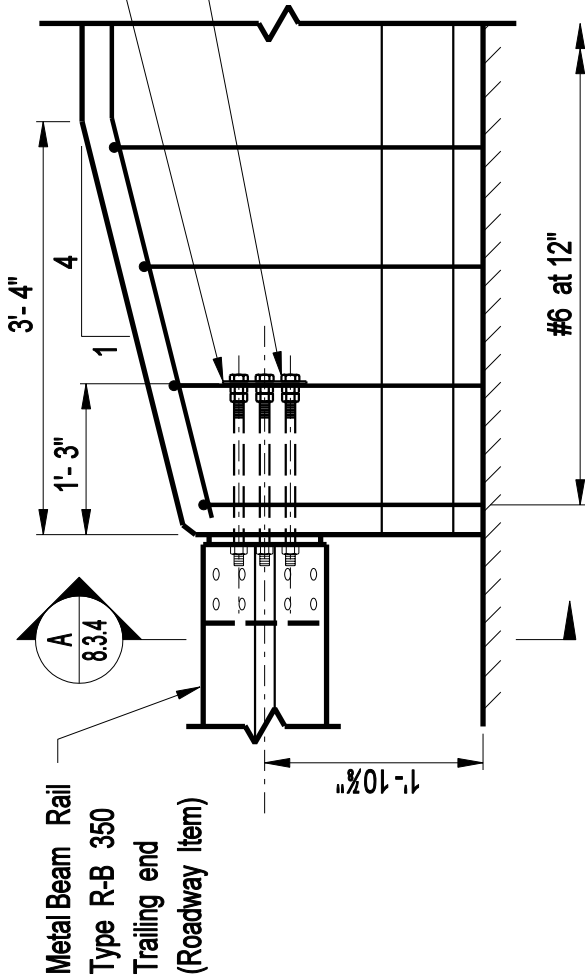
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

PARAPET ANCHORAGE  
THREE CABLE GUIDE  
RAILING (Type II)

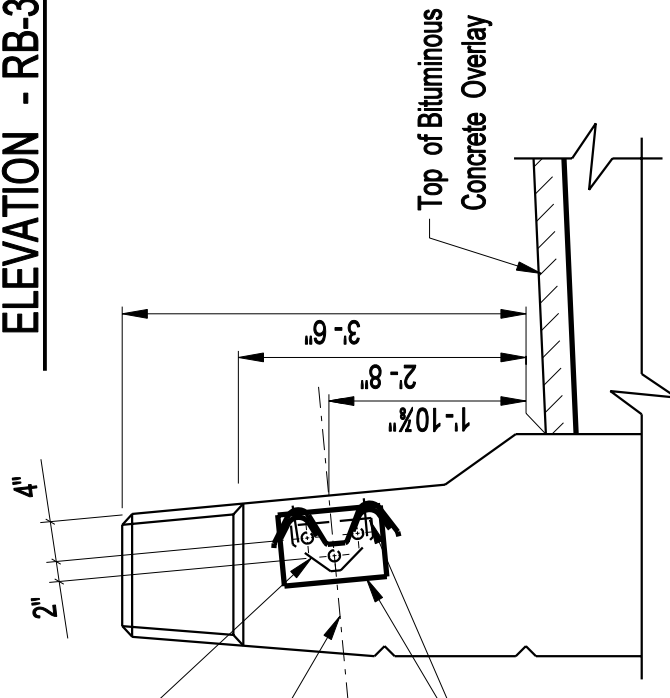
Issue Date: 10/03

Revision Date: 12/19

Plate Number:  
8.3.2



**ELEVATION - RB-350 RAIL**



**DETAIL  
ANCHORAGE PLATE**

1/2" anchorage plate. See Anchorage Plate Detail  
 Anchorage plate is to be set perpendicular to front parapet face.  
 Connection Plates See Roadway Dwg.

**DESIGN INFORMATION:**  
*This detail to be used at trailing ends on uni-directional roadways only.*

**TRAILING END R-B 350 RAIL ATTACHMENT**

**BRIDGE PLATES 8.3.5a THROUGH 8.3.8 DELETED, 12/19**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

**SAFETY SHAPE TRANSITION FOR  
BEAM RAIL ATTACHMENT  
STANDARD PARAPET 32" HIGH  
LEADING END**

Issue Date: 10/03

Revision Date: 12/19

Plate Number:  
**8.3.5a**

PLAN NOTES:

1. Steel plates shall conform to the requirements of ASTM A36. The steel plates shall be hot-dip galvanized in accordance with the requirements of ASTM A123.
2. Anchor bolts shall conform to the requirements of ASTM A325, mechanically galvanized.
3. 1"  $\phi$  pipe shall conform to ASTM A53 Grade B or ASTM A501 and shall be galvanized in accordance with the requirements of ASTM A123.
4. Railway elements shall be paid for under the applicable Roadway items.
5. All rail anchorage material required for end attachments shall be paid for under the applicable Roadway items.

DESIGN INFORMATION

- 1. Beam rail notes to be included on construction plans with all beam rail attachment details.***

**BRIDGE PLATES 8.3.9a THROUGH 8.3.9d DELETED, 12/19**

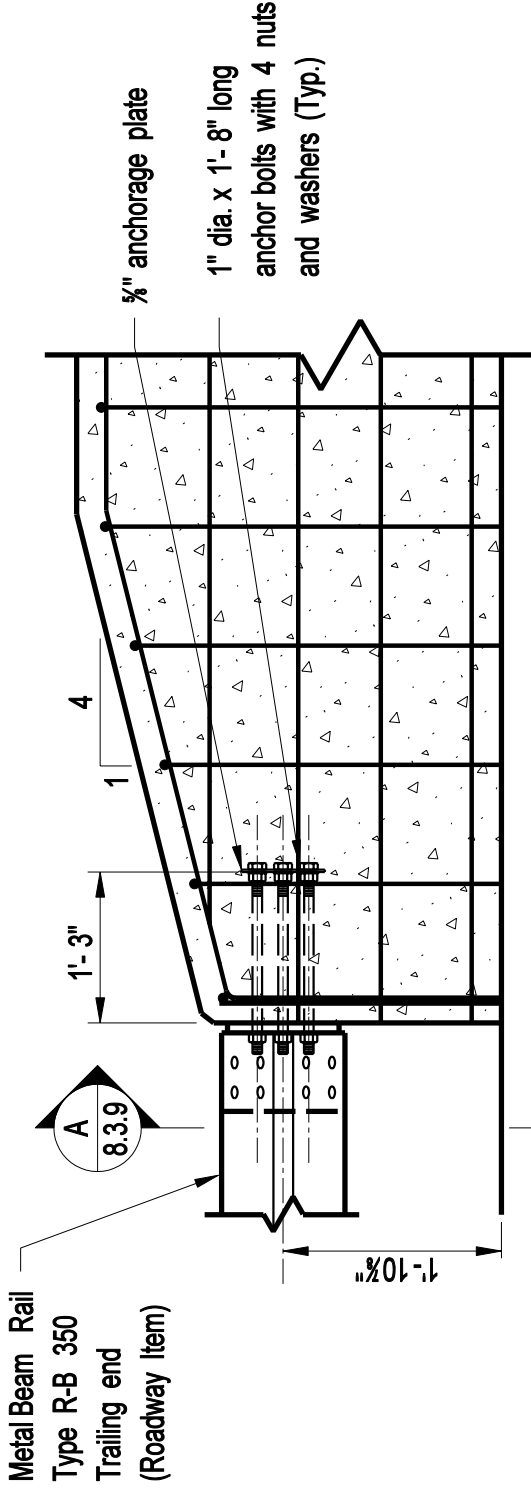
**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

BEAM RAIL ATTACHMENT FOR  
RECONSTRUCTED VERTICAL FACE  
PARAPET WITH SIDEWALK  
42" HIGH - LEADING END

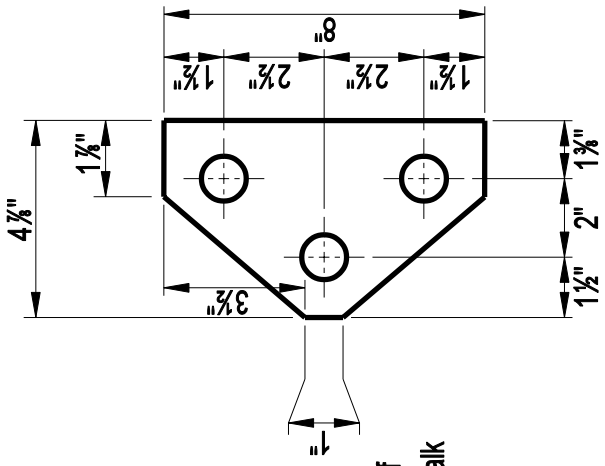
Issue Date: 10/03

Revision Date: 12/19

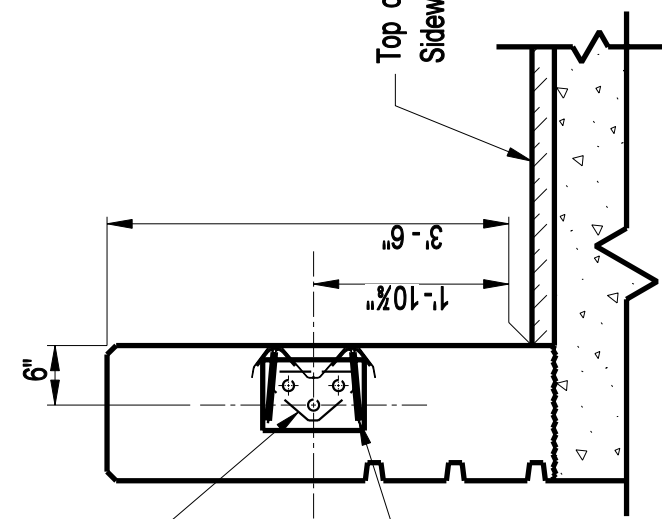
Plate Number:  
8.3.9a



**ELEVATION**



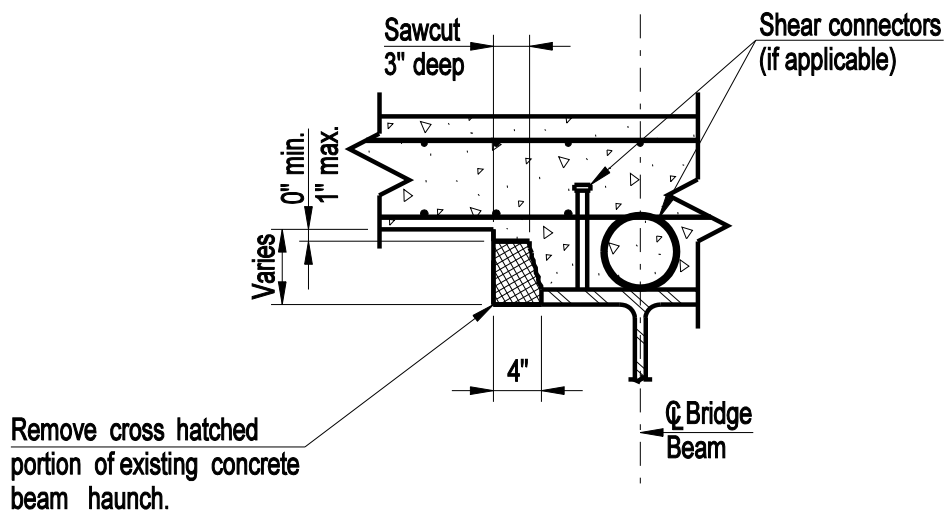
**ANCHORAGE PLATE  
DETAIL**



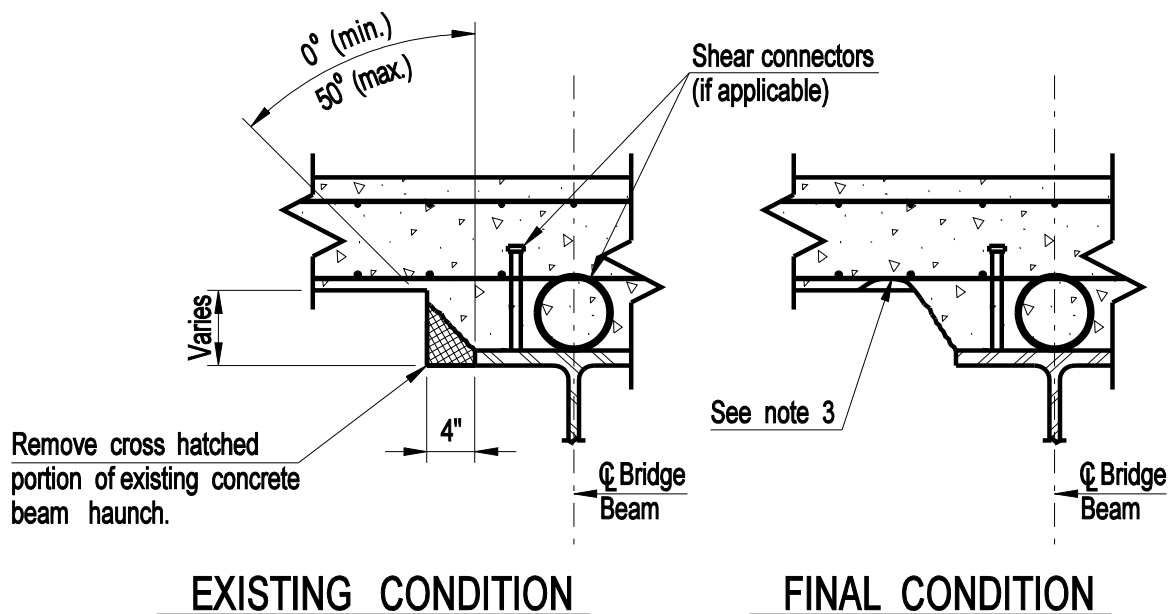
**SECTION**

- 3/8" anchorage plate. See Anchorage Plate Detail
- ⊥ Anchorage plate is to be set perpendicular to front parapet face.
- Connection Plates See Roadway Dwgs.

**DESIGN INFORMATION:**  
*This detail to be used at trailing ends on uni-directional roadways only.*



### DETAILS FOR CONCRETE HAUNCH REMOVAL



### DETAILS FOR CONCRETE HAUNCH REMOVAL - INACCESSIBLE LOCATIONS\*

\* See Note 2

For notes and design information, see Plate 9.1.2.

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

DETAILS FOR REMOVAL OF  
PORTION OF EXISTING  
CONCRETE HAUNCH

Issue Date: 01/05

Revision Date:

Plate Number:

9.1.1



NOTES:

1. The removal of the portion of the concrete haunch shown shall be paid for at the contract unit price per linear foot for "Concrete Haunch Removal"
2. This method to be used only in those areas having insufficient clearance for saw-cutting equipment such as above some diaphragms as ordered by the Engineer.
3. If over-removal results, apply two coats of epoxy resin to deck reinforcing steel exposed during haunch removal. All reasonable precautions shall be taken to avoid this condition.

DESIGN INFORMATION:

***This detail is to be included on contract plans for all existing bridges having this condition that pass over limited access highways within project limits. Other bridge applications such as limited access highway bridges over local roads and parking areas may be warranted but must be approved on a case-by-case basis.***

***The Designer shall indicate the limits of removal on the plans which will include all areas of haunches directly over travelways, shoulders and when approved, sidewalks and parking areas. Removal of haunches not over these areas will not be included regardless of their condition.***

***Quantities shall be computed separately for each beam edge.***

***Some fascia beams will require haunch removal on the inside face only, depending upon the design details of the existing conditions.***

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

DETAILS FOR REMOVAL OF PORTION  
OF EXISTING CONCRETE HAUNCH  
NOTES

Issue Date: 01/05

Revision Date:

Plate Number:

9.1.2

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

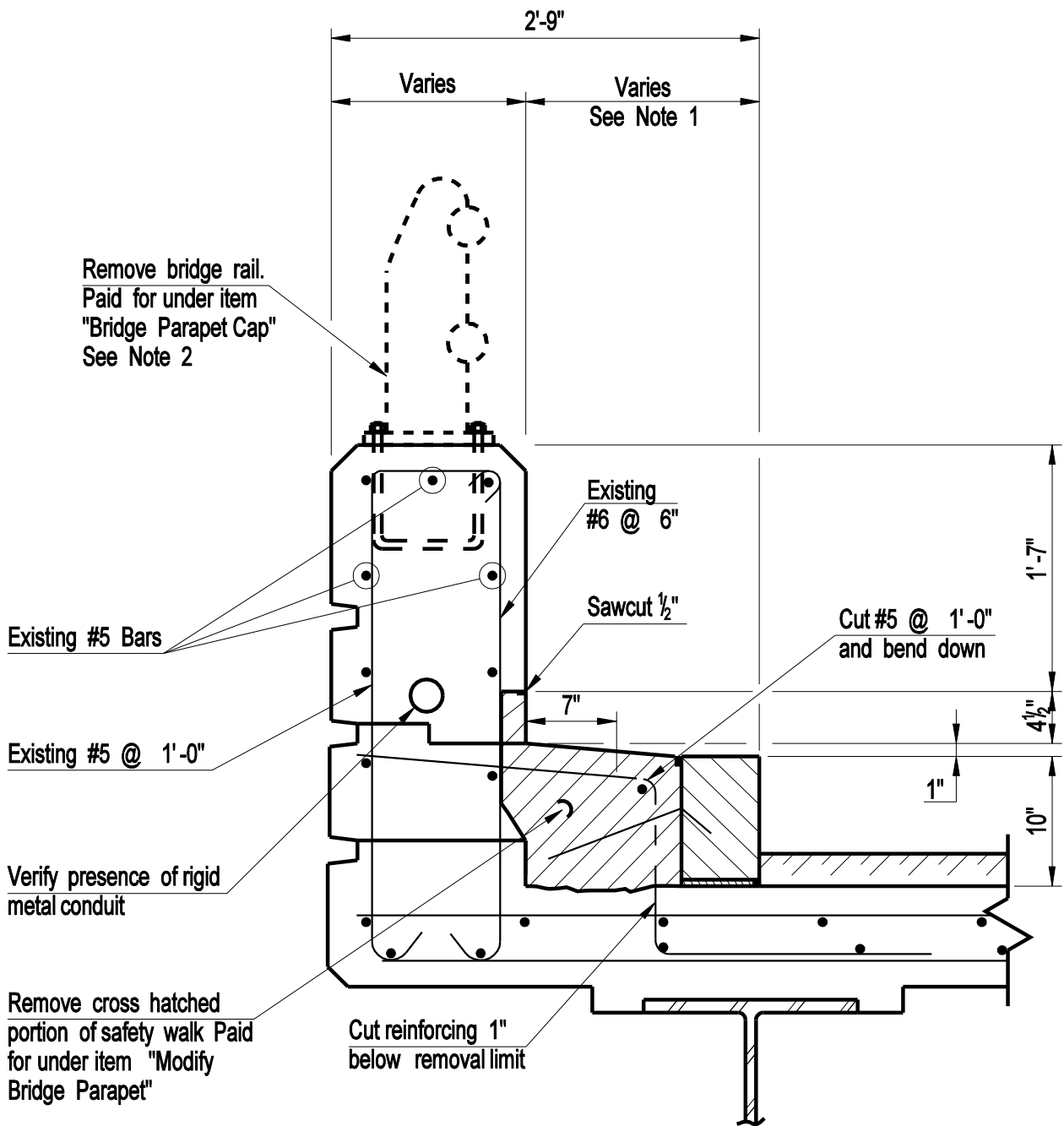
VACANT

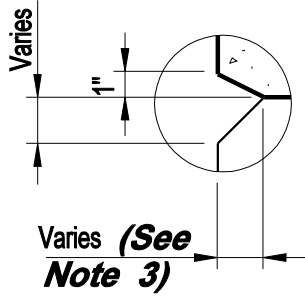
Issue Date:

Revision Date:

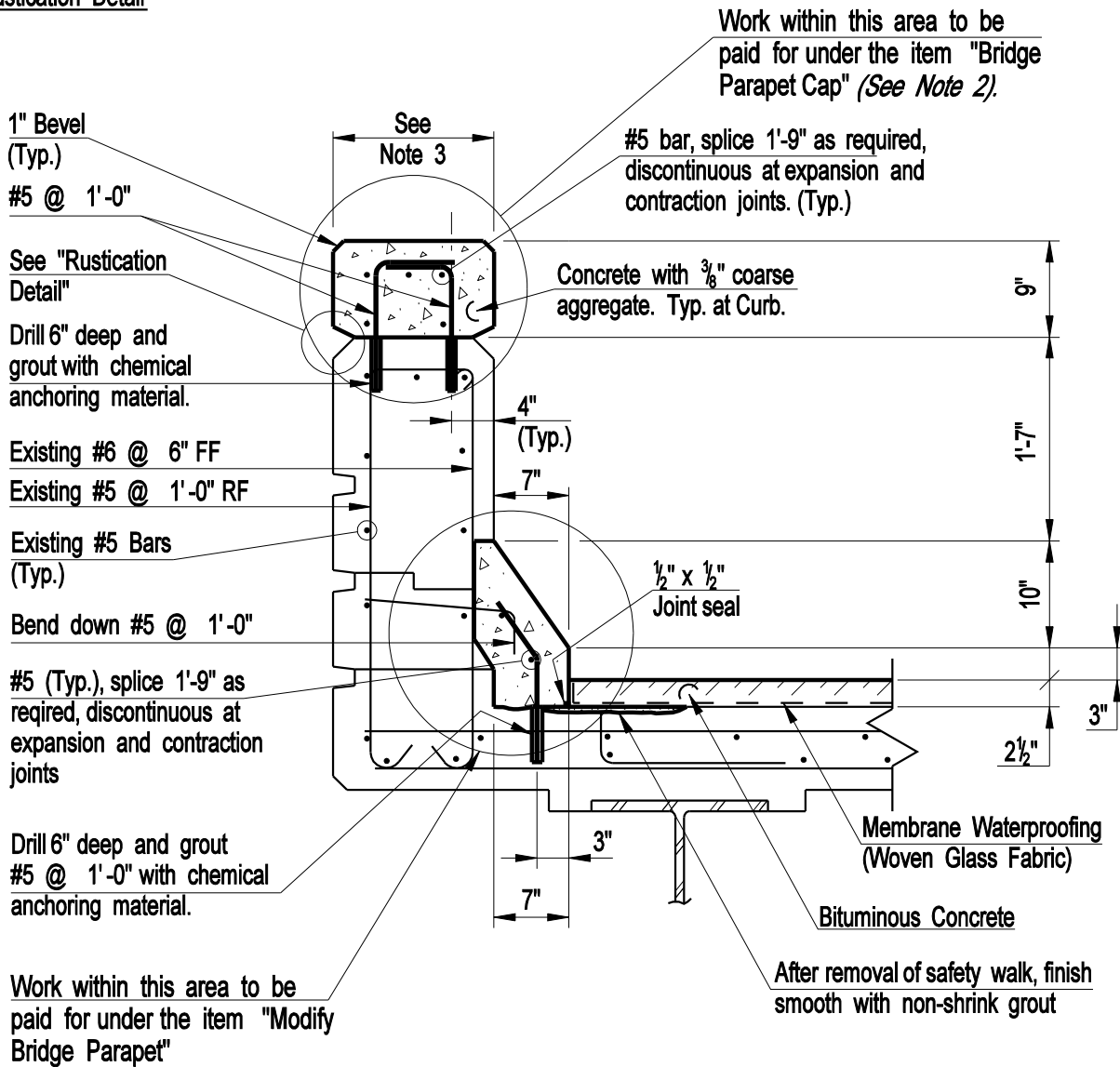
Plate Number:

9.2.1





Rustication Detail



PLAN NOTES:

1. The concrete for the parapet modifications shall be a portland cement concrete with a minimum  $f'_c = 4000$  psi, and shall be designed by the contractor
2. The reinforcement shall be uncoated and shall conform to ASTM A615, Grade 60.
3. Joints shall be formed in the sloped curb and the parapet cap at the joints between the bridge deck and wingwall parapets, at expansion joints in the bridge deck, at the expansion and contraction joints in the wingwalls. The joint width shall match that of the existing adjacent joint. No reinforcement shall pass through expansion or contraction joints.
4. The removal of the concrete safety curb, drilling and grouting dowels, furnishing and placing reinforcement and placing and finishing concrete for the reconstructed curbs shall be paid for under the item "Modify Bridge Parapet"
5. The removal and salvage of metal bridge rail (if specified for salvage), drilling and grouting dowels into the top of concrete parapets, furnishing and placing of reinforcement and placing concrete for the reconstructed parapet caps shall be paid for under the item "Bridge Parapet Cap".
6. Diameter of the drilled holes shall be per the chemical anchor manufacturer's instructions.
7. Removal of any existing curb plates in the safety walk shall be paid for under the item "Modify Bridge Parapet"

DESIGN INFORMATION:

- 1. Parapet curb modifications are to be done where safety walk or brush curb width exceeds 6". Brush curbs with width 6" or less shall not be modified.**
- 2. Metal bridge rails are to be replaced with concrete parapet caps on limited access highways only. On non-limited access roads, deteriorated metal bridge rails are to be replaced with appropriate new metal bridge rail.**
- 3. New "Bridge Parapet Cap" to match the width of existing parapet. Rustication depth is to match the dimension of existing chamfer at top of parapet.**

**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

VACANT

Issue Date:

Revision Date:

Plate Number:

10.1.1

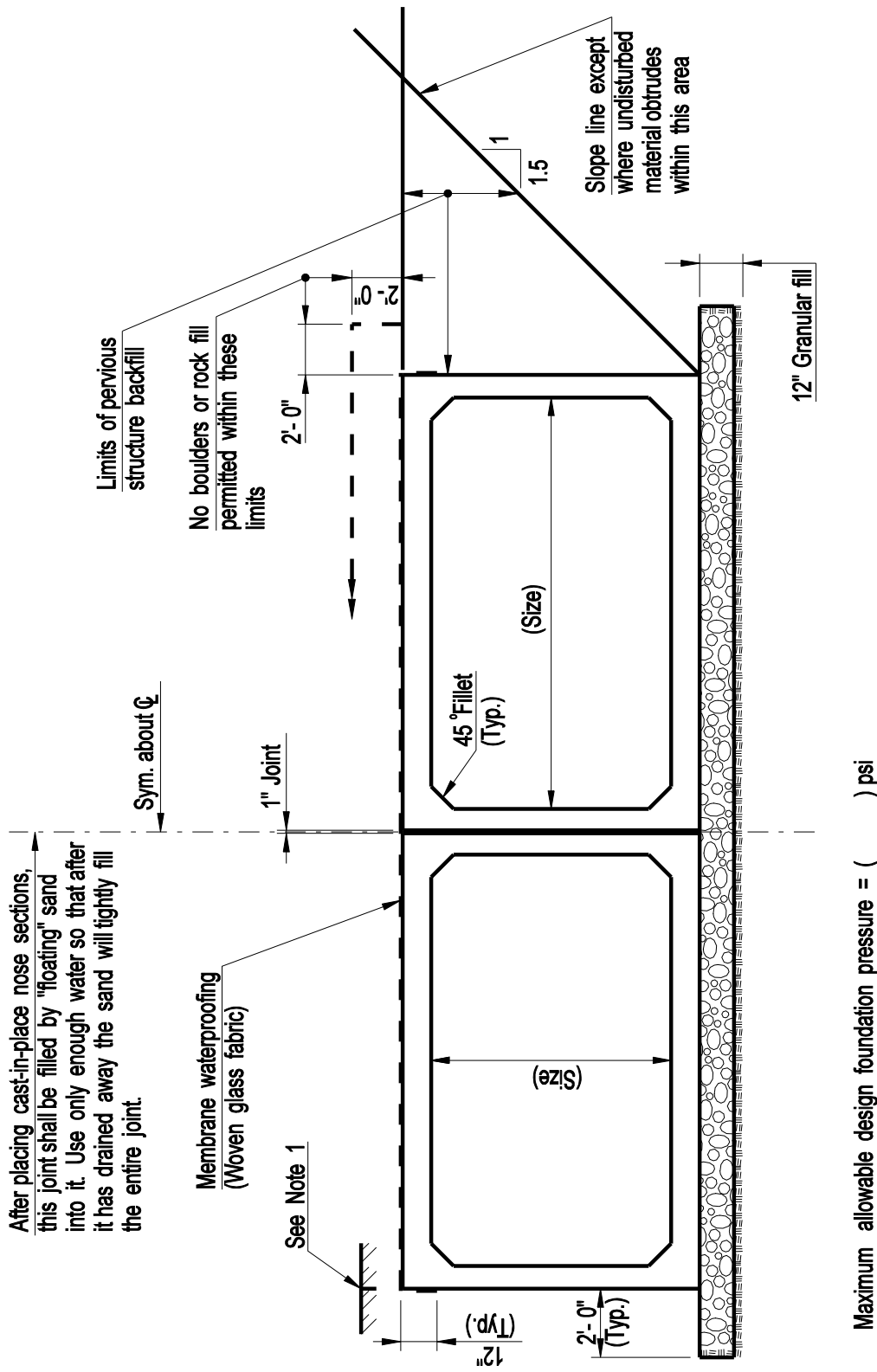
**PRECAST BOX CULVERT  
TYPICAL SECTION**

Issue Date: 10/03

Revision Date:

Plate Number:

10.1.2

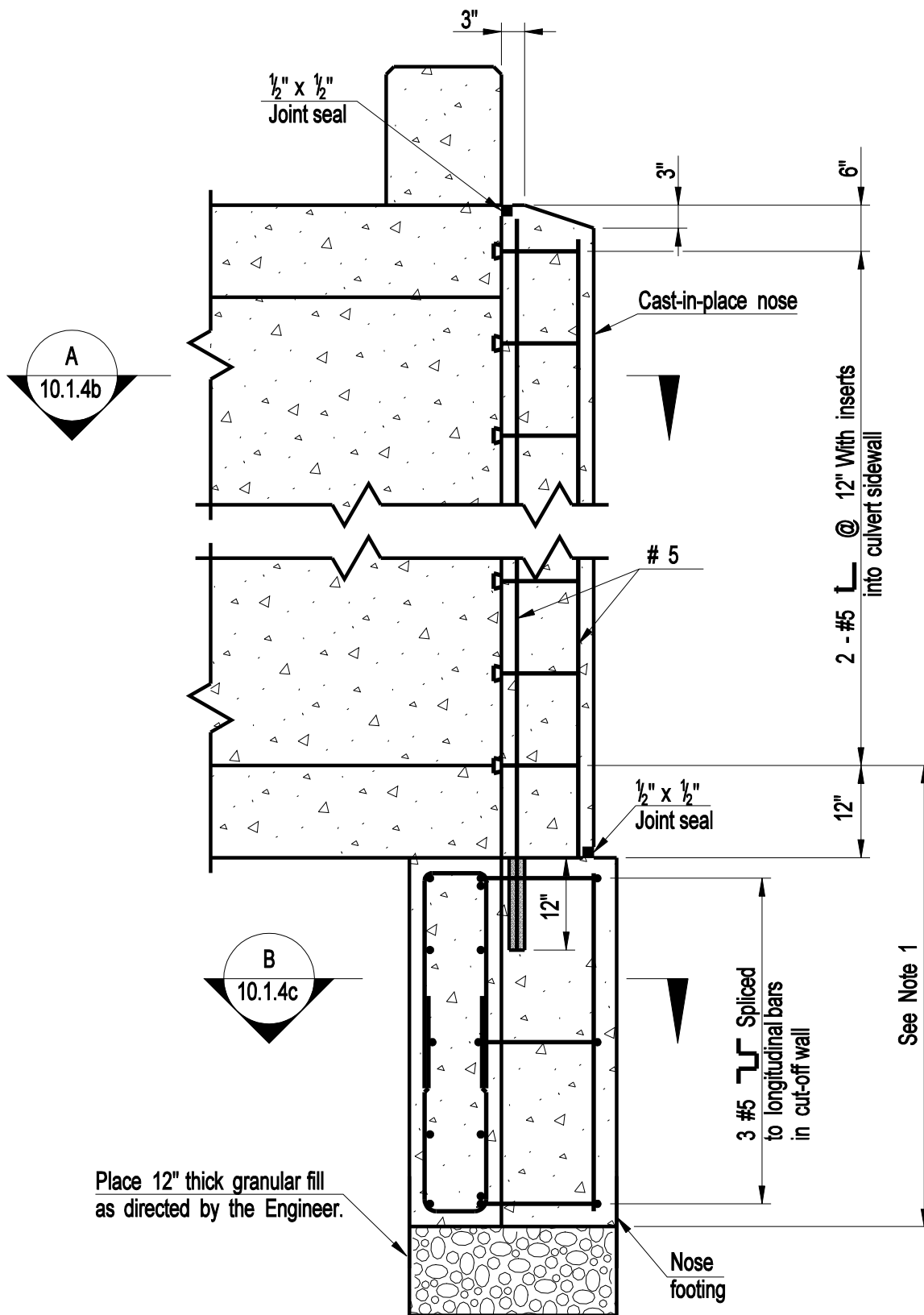


**NOTE:**

1. Cut overlay with a  $\frac{3}{8}$ " x  $1\frac{3}{4}$ " deep kerf and fill with a pourable sealant when cover is less than 2'-0" (from top of box to wearing surface). Cost of cutting and sealing to be paid for at the contact unit price for "Sawing and Sealing Joints".

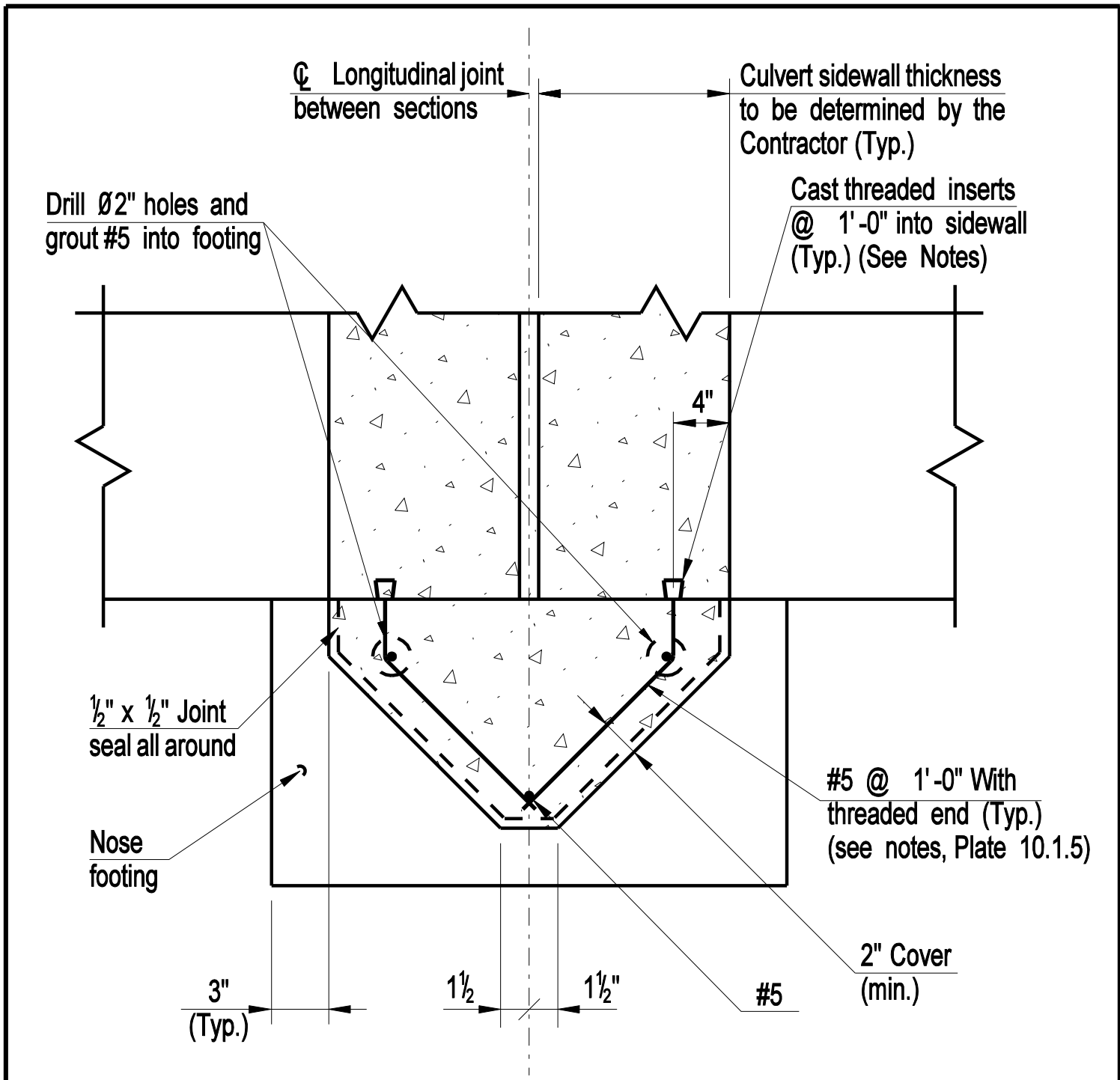




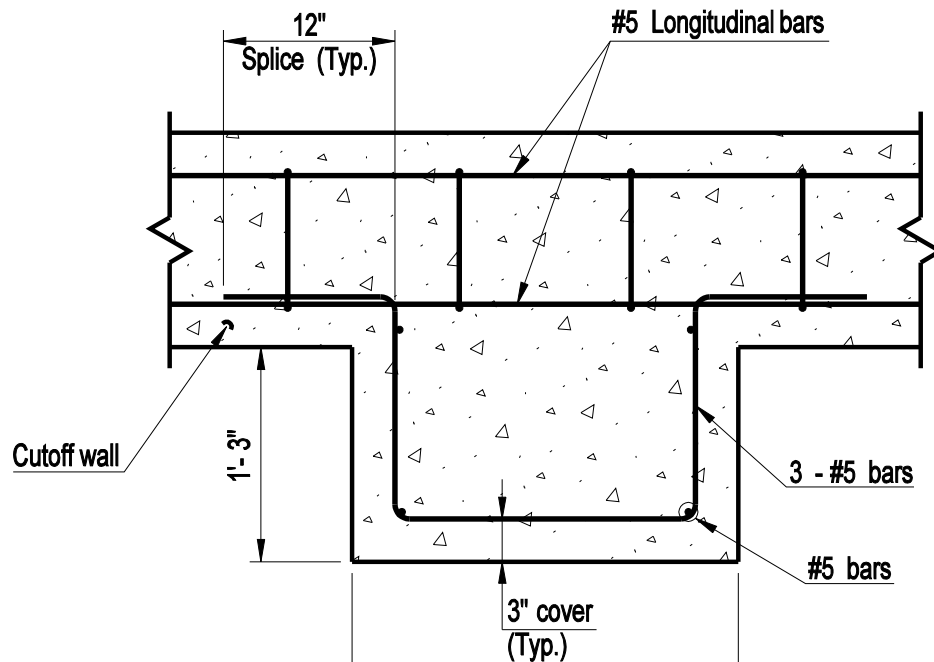


**NOTES:**

1. Bottom of cutoff wall and return walls shall be a minimum of 4'-0" below stream bed or 2'-0" below the bottom of culvert, whichever is greater.



SECTION A  
10.1.4a

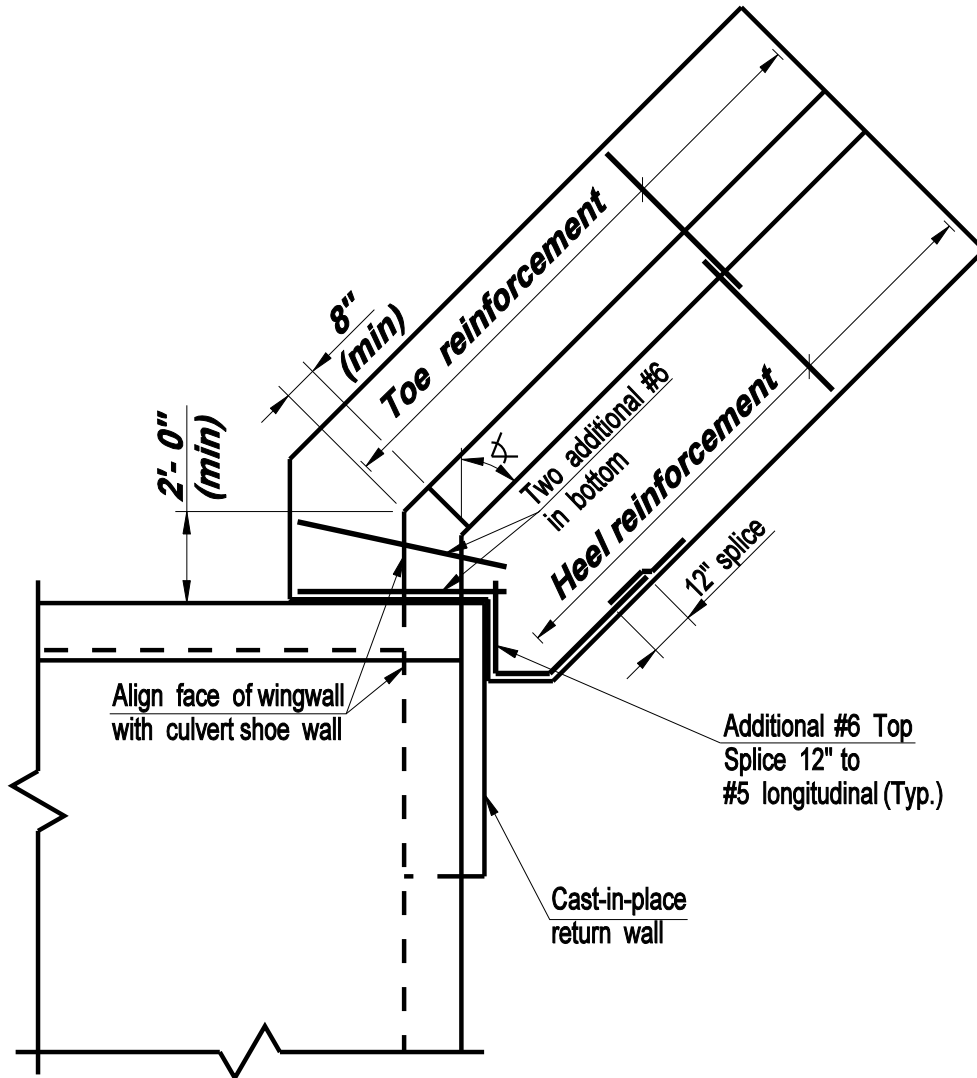


Build-out width to be determined by the Contractor. Provide dimensions for reinforcing on shop plans.

SECTION B  
10.1.4a

Notes:

1. The Contractor shall design, manufacture and construct Precast Box Culvert in accordance with the special provisions for "Precast Concrete Box Culvert" and the inside dimensions, length and details shown on these plans.
2. All inserts or holes cast into the culvert sections for the sole purpose of handling and setting the units shall be grouted over to a smooth finish upon completion of the work.
3. Non-shrink grout shall be used to grout the reinforcement.
4. The cost of furnishing and installing inserts shall be included in the item "11'- 0" x 9'- 0" Precast Concrete Box Culvert" and shall be one of the following:
  1. Star Expansion Industries Corp. Type P-35-T
  2. Richmond Screw Anchor Co. Type LF
  3. Dayton Superior Corp. Type F-57All inserts shall have a corrosive resistant coating.
5. The #5 bars with threaded end shall be compatible with the threaded inserts (see note 4). Threads shall be long enough to fully engage the inserts. The threaded bars shall conform to the requirements of ASTM A615, Grade 60.
6. All reinforcement to have 2" cover unless otherwise noted.



**CONNECTICUT  
BRIDGE DESIGN  
MANUAL**

VACANT

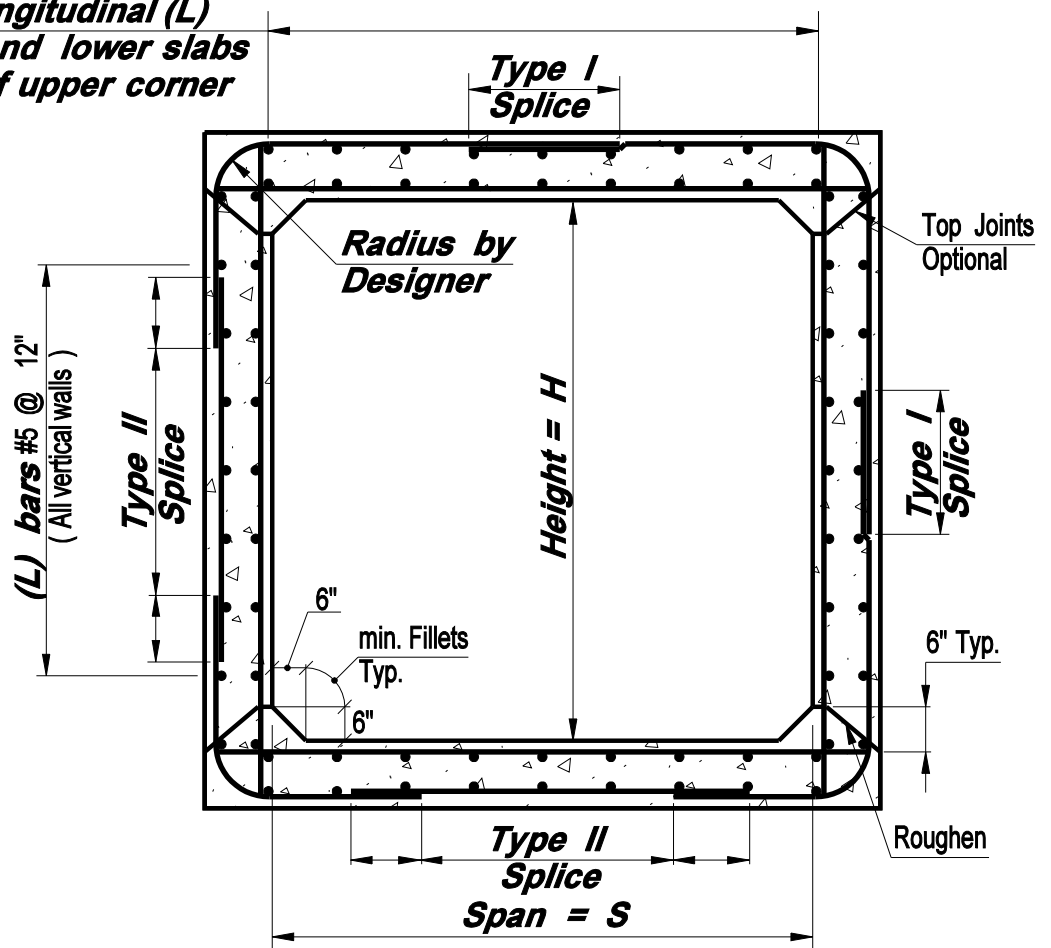
Issue Date:

Revision Date:

Plate Number:

10.1.7

**NOTE: Outer longitudinal (L) bars in upper and lower slabs shall be 35% of upper corner steel.**



**DESIGN INFORMATION:**

**Minimum thickness of top and bottom slab and sidewalls to be 12".**

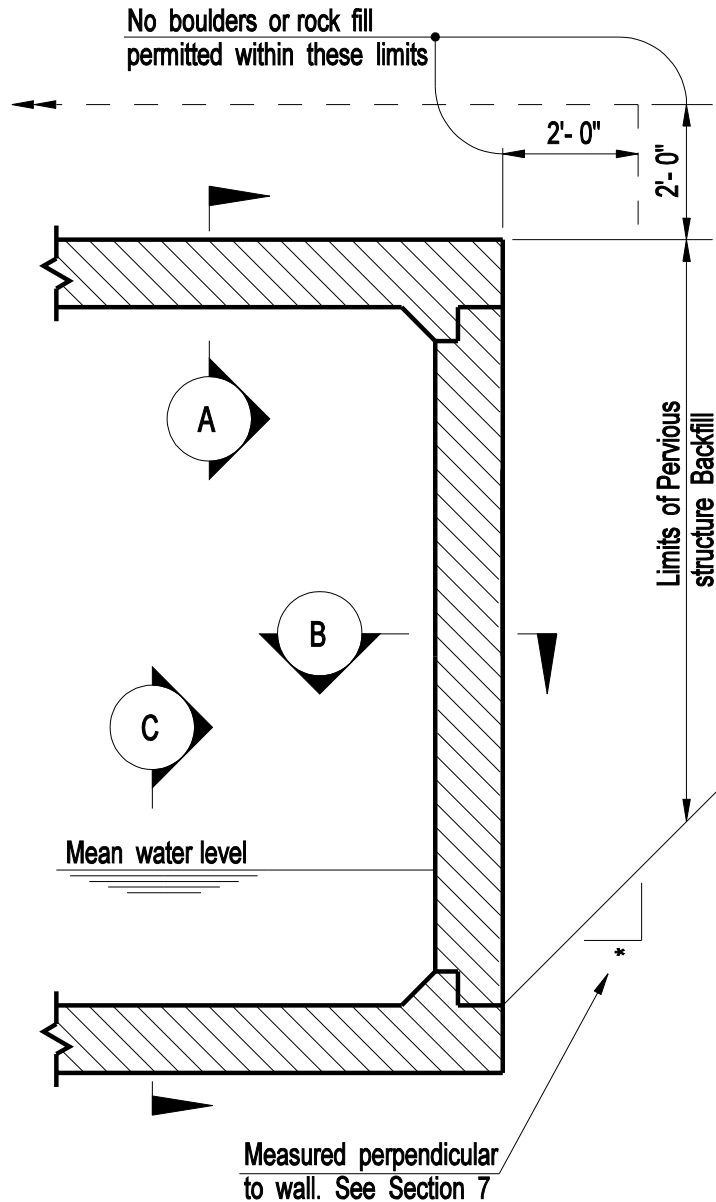
**All bars shall have 2" cover except at bottom of lower slab where cover shall be 3". Where structure is exposed to the action of salt water, all cover shall be 4".**

**Minimum bar requirements shall be #5 at 12".**

**Location of lap splices shall conform to either type (Type I or Type II) shown above. Lapped splices and development lengths shall be determined by the designer in accordance with latest AASHTO design criteria.**

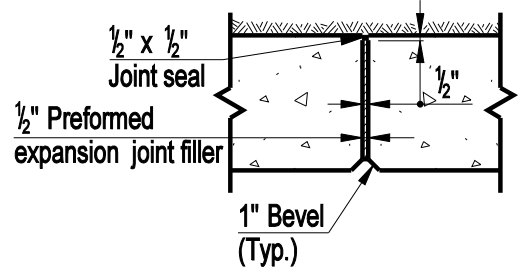
**When the fill on the box is less than 2'- 0", the longitudinal (L) bars in the lower face of the top slab shall be a percentage of the main reinforcing steel required for positive moments as given in the latest AASHTO design criteria.**

**Provisions for fishway may be required in bottom slab.**

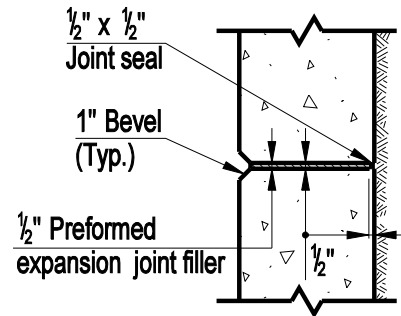


 = Indicates 1/2" preformed expansion joint filler

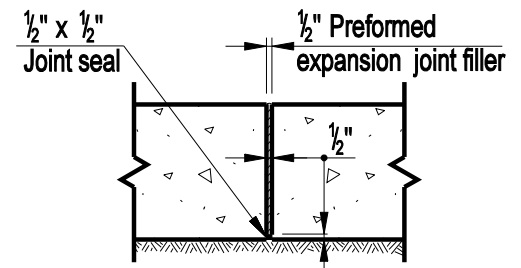
**PARTIAL SECTION THRU CULVERT AT EXPANSION JOINT**



**SECTION A**



**SECTION B**



**SECTION C**

**DESIGN INFORMATION:**

*The spacing of expansion joints in the culvert shall not exceed 30'- 0".*