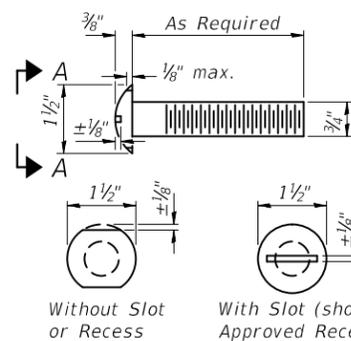
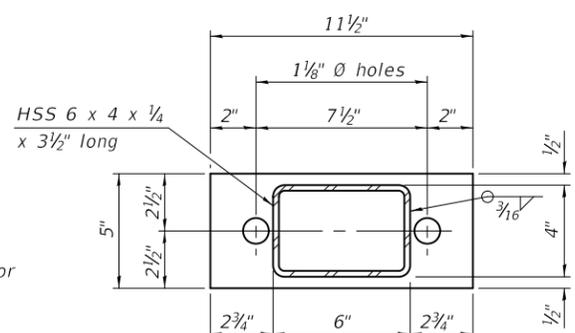


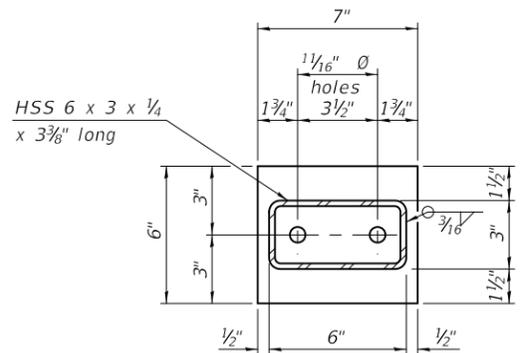
CELL / MODEL NAME	DESCRIPTION	DATE
R-20	Aluminum Railing, Type L	2/17/2017
R-23A	Steel Railing, Type S-1	2/17/2017
R-24A	Steel Railing, Type T-1	2/17/2017
R-25	Steel Railing (Temporary)	2/17/2017
R-26	Steel Railing, Type TP-1	2/17/2017
R-27	Temporary concrete barrier for stage construction	2/17/2017
R-28	Bridge Fence Railing(Parapet Mounted)	2/17/2017
R-29	Bicycle Railing	2/17/2017
R-30	Steel Railing, Type WT	2/17/2017
R-31	Steel Railing, Type 2399	2/17/2017
R-32	Bridge Fence Railing (Parapet Mounted)	2/17/2017
R-33	Bridge Fence Railing (Sidewalk Mounted)	2/17/2017
R-34CWS	Steel Railing, Type SM with concrete wearing surface	2/17/2017
R-34CWSC	Steel Railing, Type SM with concrete wearing surface and curb	2/17/2017
R-34HMAWS	Steel Railing, Type SM with hot-mix asphalt wearing surface	2/17/2017
R-38 (1 of 2)	Concrete Bridge Railing, TL-4	2/17/2017
R-38 (2 of 2)	Concrete Bridge Railing, TL-4	2/17/2017
R-39 (1 of 2)	Bicycle Railing (Parapet Mounted)	2/17/2017
R-39 (2 of 2)	Bicycle Railing (Parapet Mounted)	2/17/2017



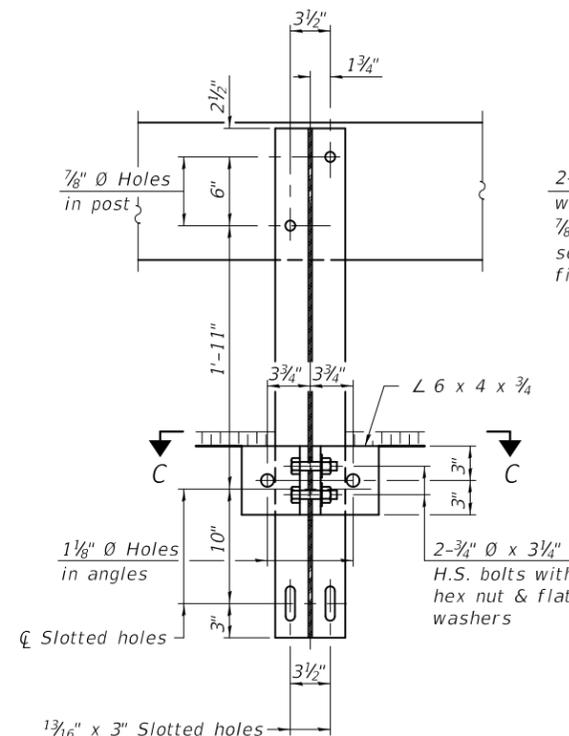
VIEW A-A
ROUND HEAD BOLT



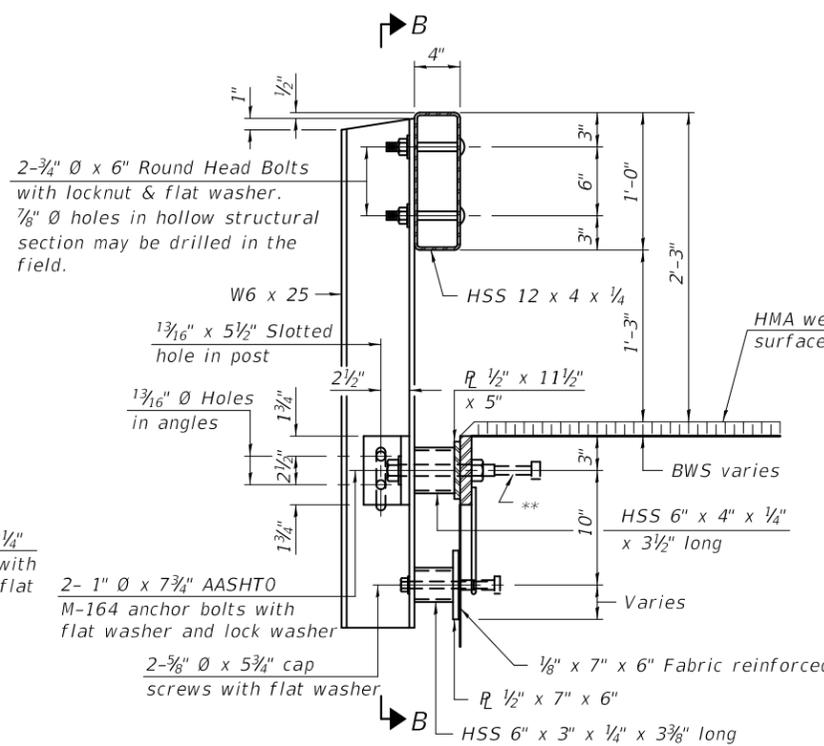
\angle 1/2" x 11 1/2" x 5"



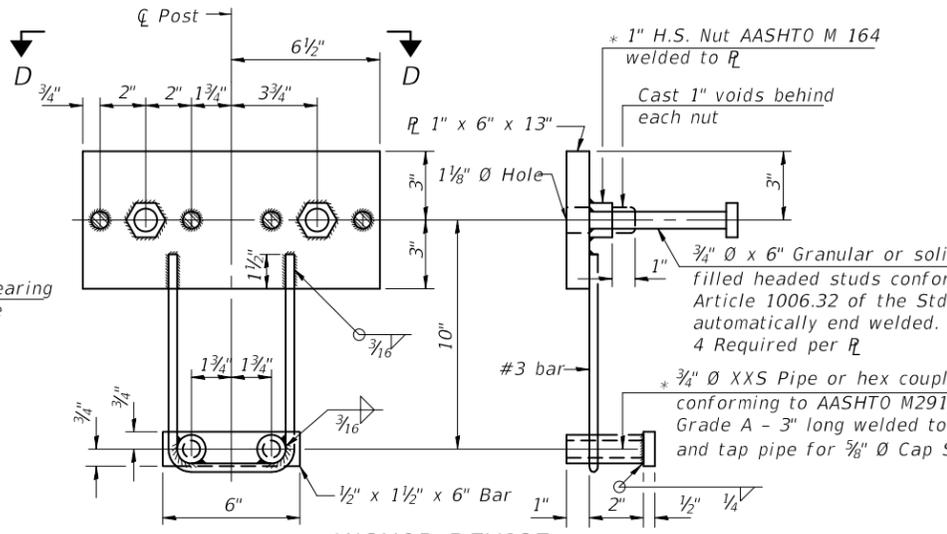
\angle 1/2" x 7" x 6"



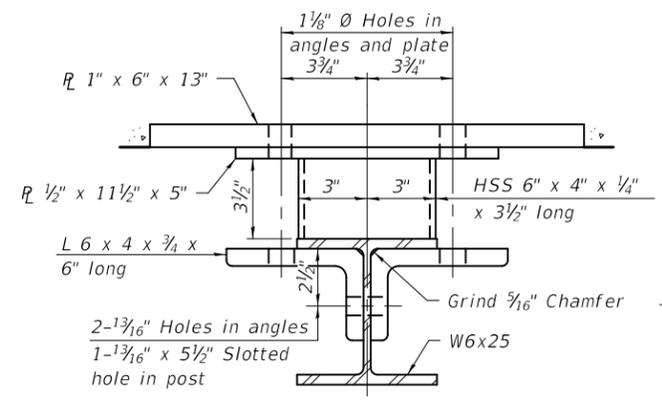
SECTION B-B



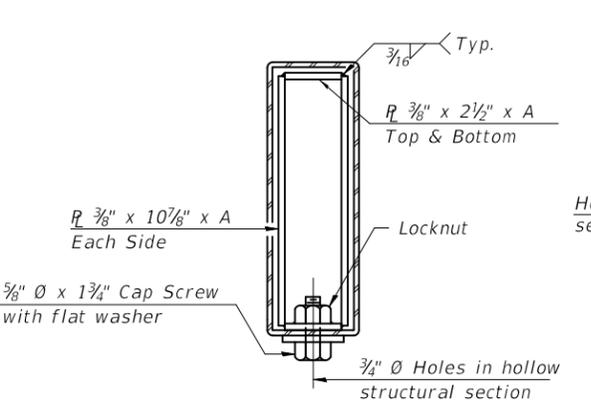
SECTION AT RAILING POST



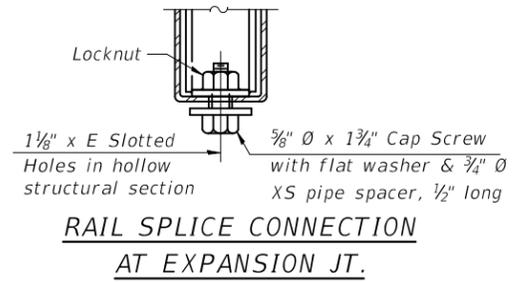
ANCHOR DEVICE
* Threaded areas shall be plugged or blocked off during casting of beam.



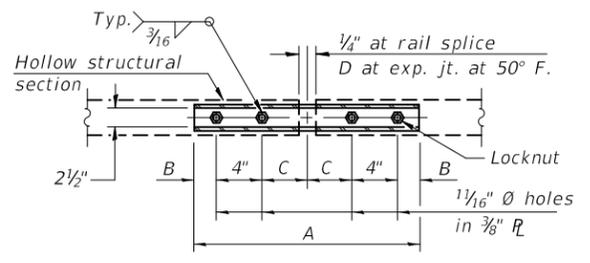
SECTION C-C



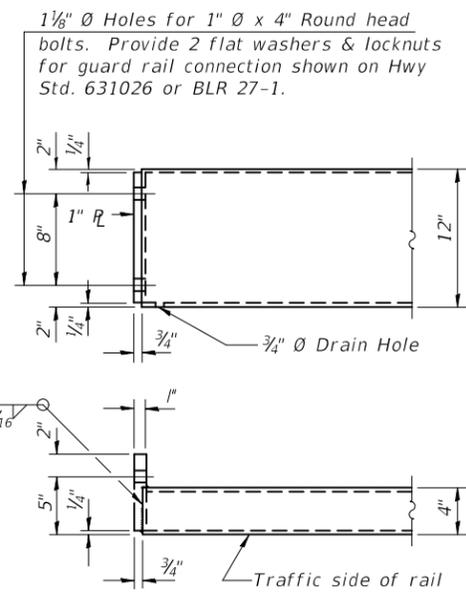
SECTIONS AT RAIL SPLICE



RAIL SPLICE CONNECTION AT EXPANSION JT.



PLAN-BOTT. SPLICE R TYPICAL



END OF RAIL DETAILS

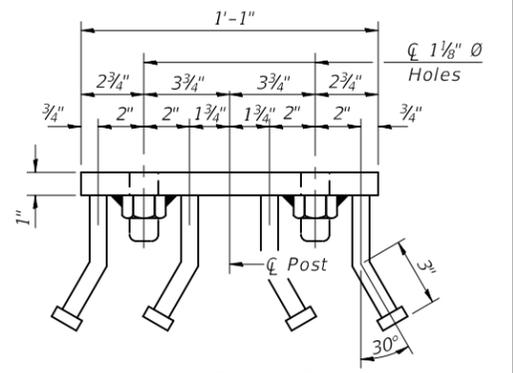
SPLICE DIMENSIONS

T	D	A	B	C	E
≤ 4"	2 1/2"	1'-8"	2"	4"	2 1/2"
> 4" ≤ 6 1/2"	3 3/4"	2'-0"	2 1/2"	5 1/2"	3 1/2"
> 6 1/2" ≤ 9"	5"	2'-4"	3 1/2"	6 1/2"	9"
> 9" ≤ 13"	7"	2'-10"	4 1/2"	8 1/2"	11"
Rail Splice	1/4"	1'-8"	2"	4"	—

T = Total movement at expansion joint as shown on the design plans.

Notes:
For multi-span bridges, sufficient 1/4 inch x 6 inch x 1-2 inch galvanized steel shims shall be provided to align rail between adjacent spans. Cost included with Steel Railing, Type S-1.
All steel rail elements shall be galvanized according to Article 509.05 of the Standard Specifications.

**The studs of the anchor devices shall be placed below the top reinforcement bars and the outermost longitudinal reinforcement bar shall be placed directly above the studs of the rail post anchor device. The anchorage studs may be bent down 1/2 inch to accommodate the top reinforcement bar placement.



VIEW D-D

BILL OF MATERIAL

Item	Unit	Quantity
Steel Railing, Type S-1	Foot	

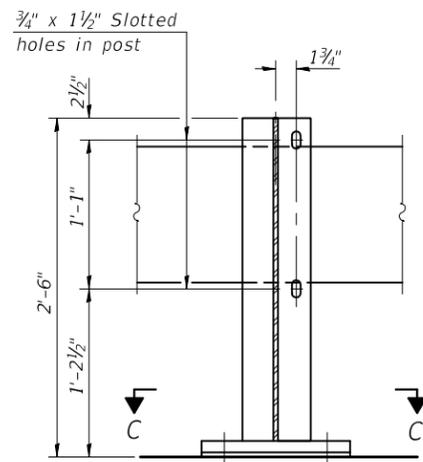
R-23A 2-17-2017 (10'-9" Maximum Post Spacing)

FILE NAME =	USER NAME =	DESIGNED -	REVISED -
		CHECKED -	REVISED -
	PLOT SCALE =	DRAWN -	REVISED -
	PLOT DATE =	CHECKED -	REVISED -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

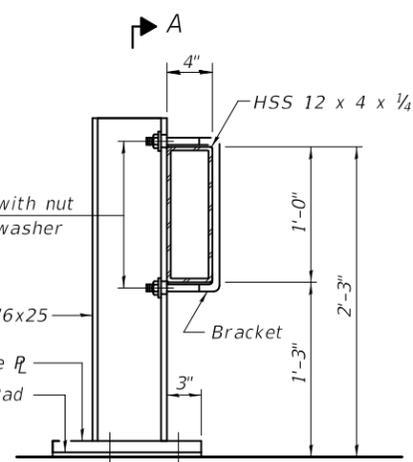
STEEL RAILING, TYPE S-1
STRUCTURE NO.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				

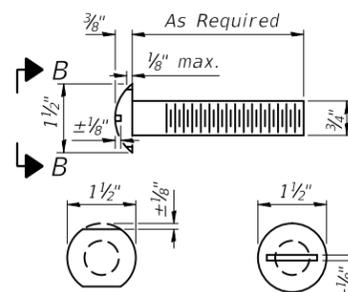


SECTION A-A

2-5/8" Ø H.S. Studs with nut and flat hardened washer

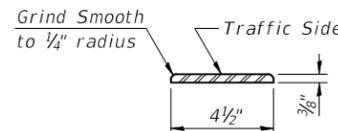


SECTION AT RAIL POST

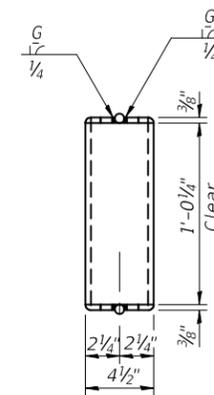


Without Slot or Recess With Slot (shown) or Approved Recess

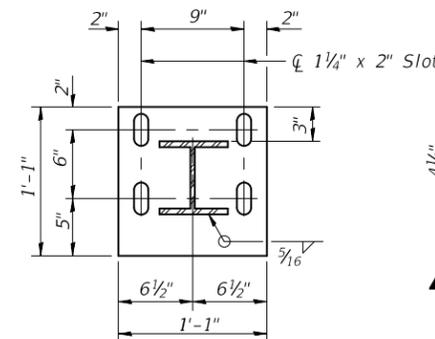
VIEW B-B ROUND HEAD BOLT



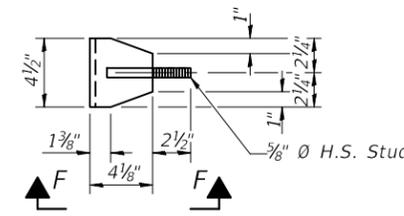
DETAIL A



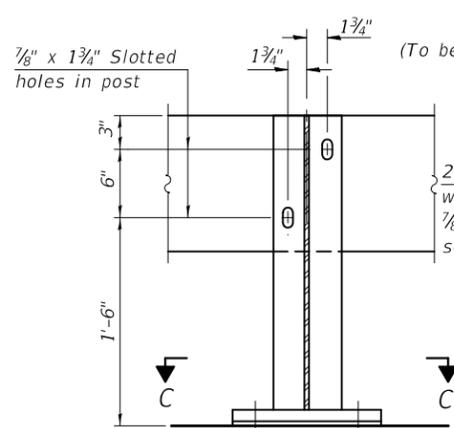
VIEW E-E



SECTION C-C

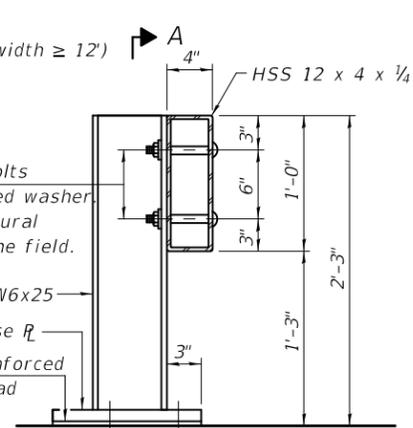


VIEW D-D

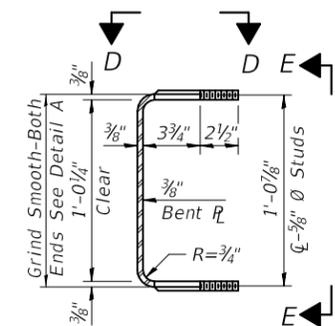


SECTION A-A

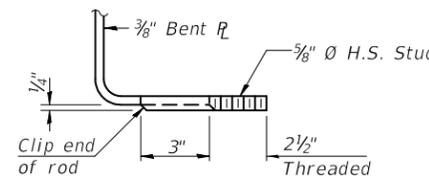
ALTERNATE I (To be used only for Roadway width ≥ 12')



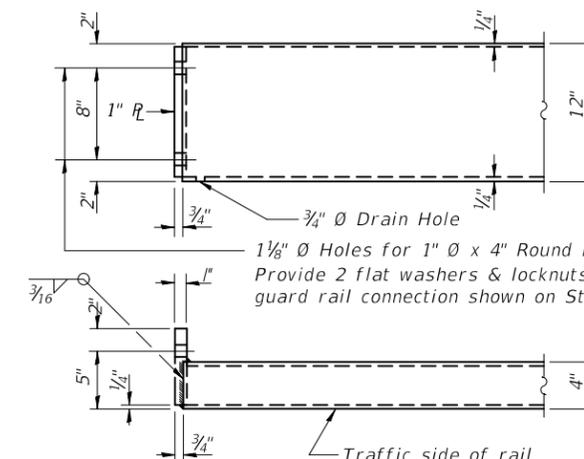
SECTION AT RAIL POST



SECTION THRU BRACKET



VIEW F-F

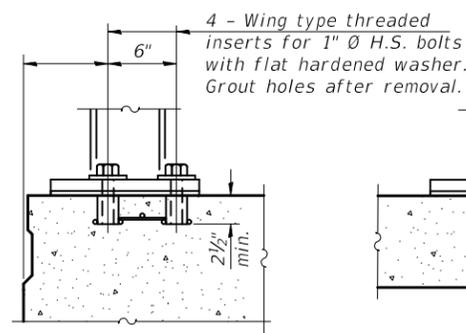


END OF RAIL DETAILS

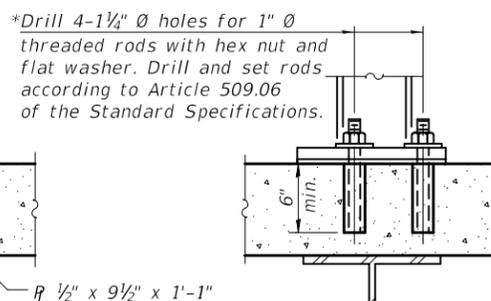
SPLICE DIMENSIONS

T	D	A	B	C	E
≤ 4"	2 1/2"	1'-8"	2"	4"	2 1/2"
> 4" ≤ 6 1/2"	3 3/4"	2'-0"	2 1/2"	5 1/2"	3 1/2"
> 6 1/2" ≤ 9"	5"	2'-4"	3 1/2"	6 1/2"	9"
> 9" ≤ 13"	7"	2'-10"	4 1/2"	8 1/2"	11"
Rail Splice	1/4"	1'-8"	2"	4"	

T = Total movement at expansion joint as shown on the design plans.



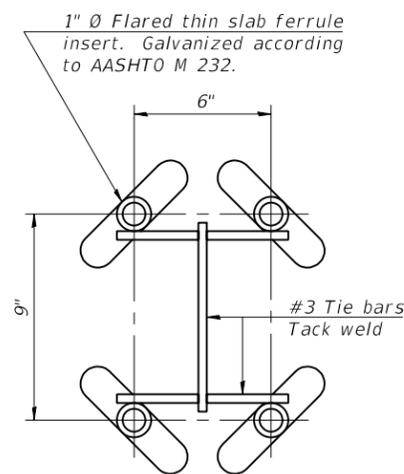
P.P.C. DECK BEAMS



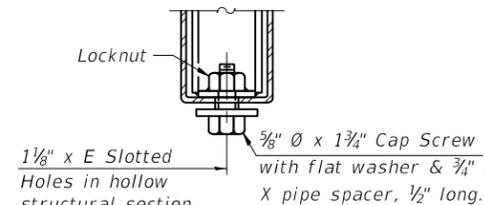
NEW & EXISTING DECKS

ANCHORAGE DETAILS

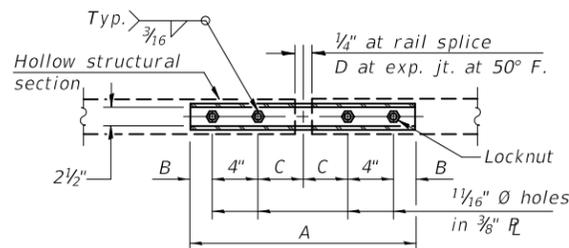
*Drilled holes for existing deck.



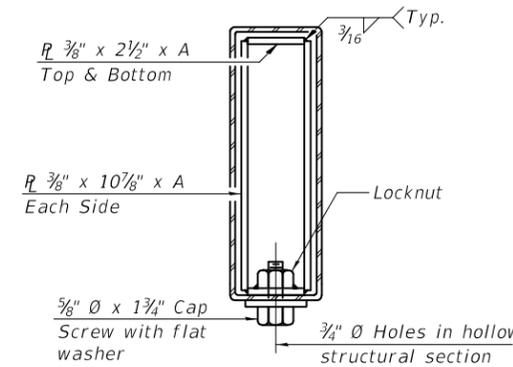
INSERT DETAIL



RAIL SPLICE CONNECTION AT EXPANSION JT.



PLAN-BOTT. SPLICE R TYPICAL



SECTION AT RAIL SPLICE

TEMPORARY BRIDGE RAIL POST SPACING

BILL OF MATERIAL

Item	Unit	Quantity
Steel Railing (Temporary)	Foot	

Notes:
The contact surfaces between post flange, rail and inside face of bracket for Alternate I shall be free of all lubricants.
The nut for 5/8 inch high strength studs used in Alternate I to connect bracket to post shall be tightened to a snug fit and given an additional one half turn.

R-25

2-17-2017

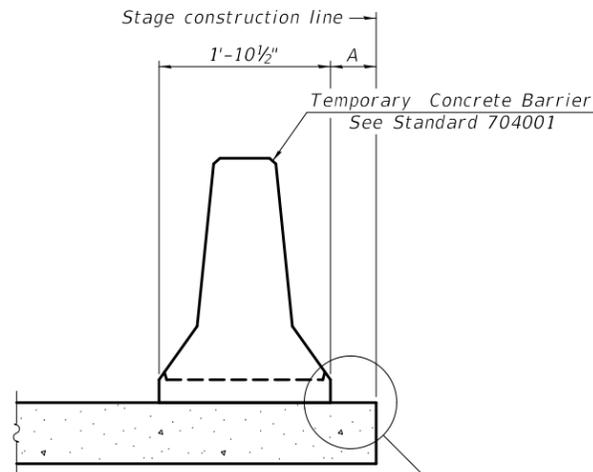
(10'-9" Maximum Post Spacing)

FILE NAME =	USER NAME =	DESIGNED -	REVISD -
		CHECKED -	REVISD -
		DRAWN -	REVISD -
		CHECKED -	REVISD -

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

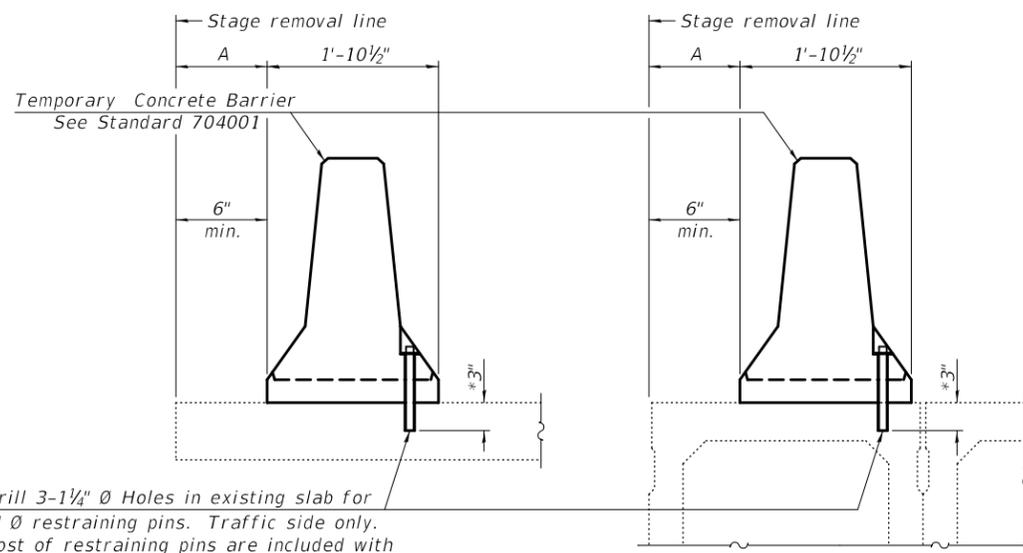
STEEL RAILING (TEMPORARY)
STRUCTURE NO.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				



When "A" is 3'-1" or less, the temporary concrete barrier shall be restrained to the new slab according to Detail I, II or III. No restraint is required when "A" is greater than 3'-1".

NEW SLAB OR NEW DECK BEAM

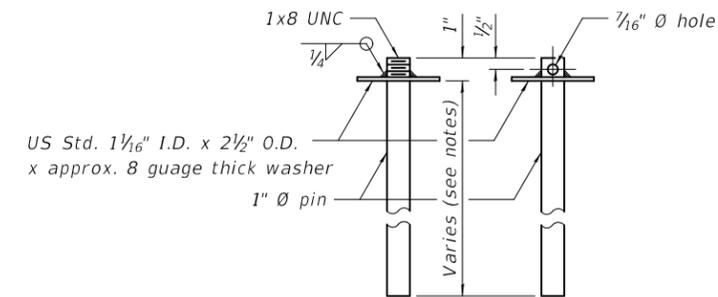


Drill 3-1/4" Ø Holes in existing slab for 1" Ø restraining pins. Traffic side only. Cost of restraining pins are included with Temporary Concrete Barrier. No restraint is required when "A" is greater than 3'-1".

EXISTING SLAB

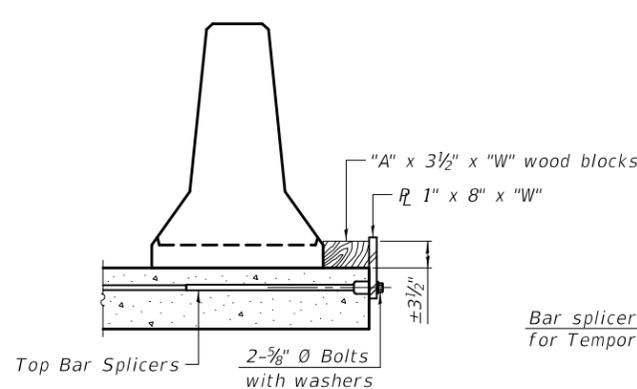
* When hot-mix asphalt wearing surface is present, embedment shall be 3" plus the wearing surface depth.

EXISTING DECK BEAM

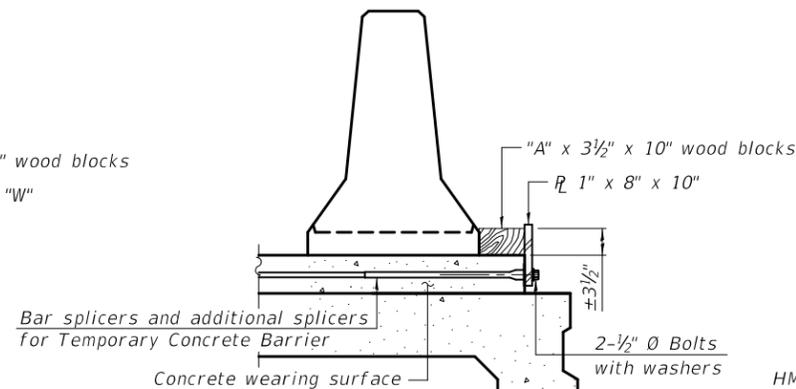


RESTRAINING PIN

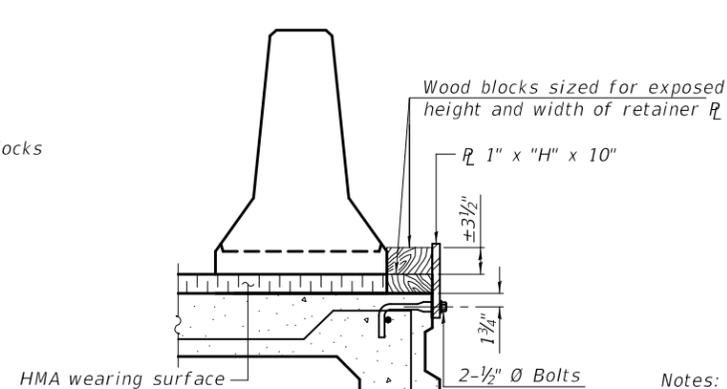
SECTIONS THRU SLAB OR DECK BEAM



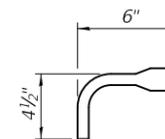
DETAIL I



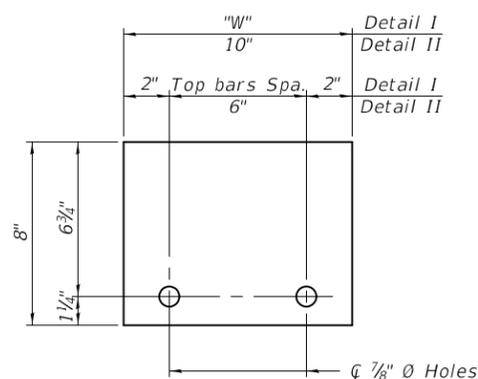
DETAIL II



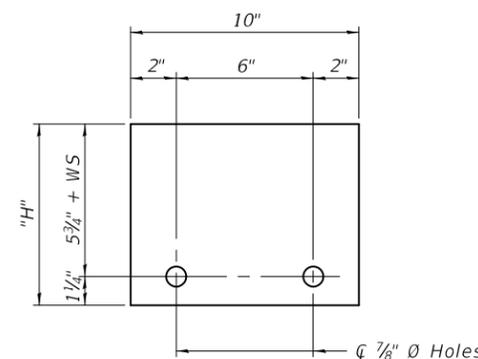
DETAIL III



BAR SPLICER FOR #4 BAR - DETAIL III



STEEL RETAINER R 1" x 8" x "W"
(Detail I and II)



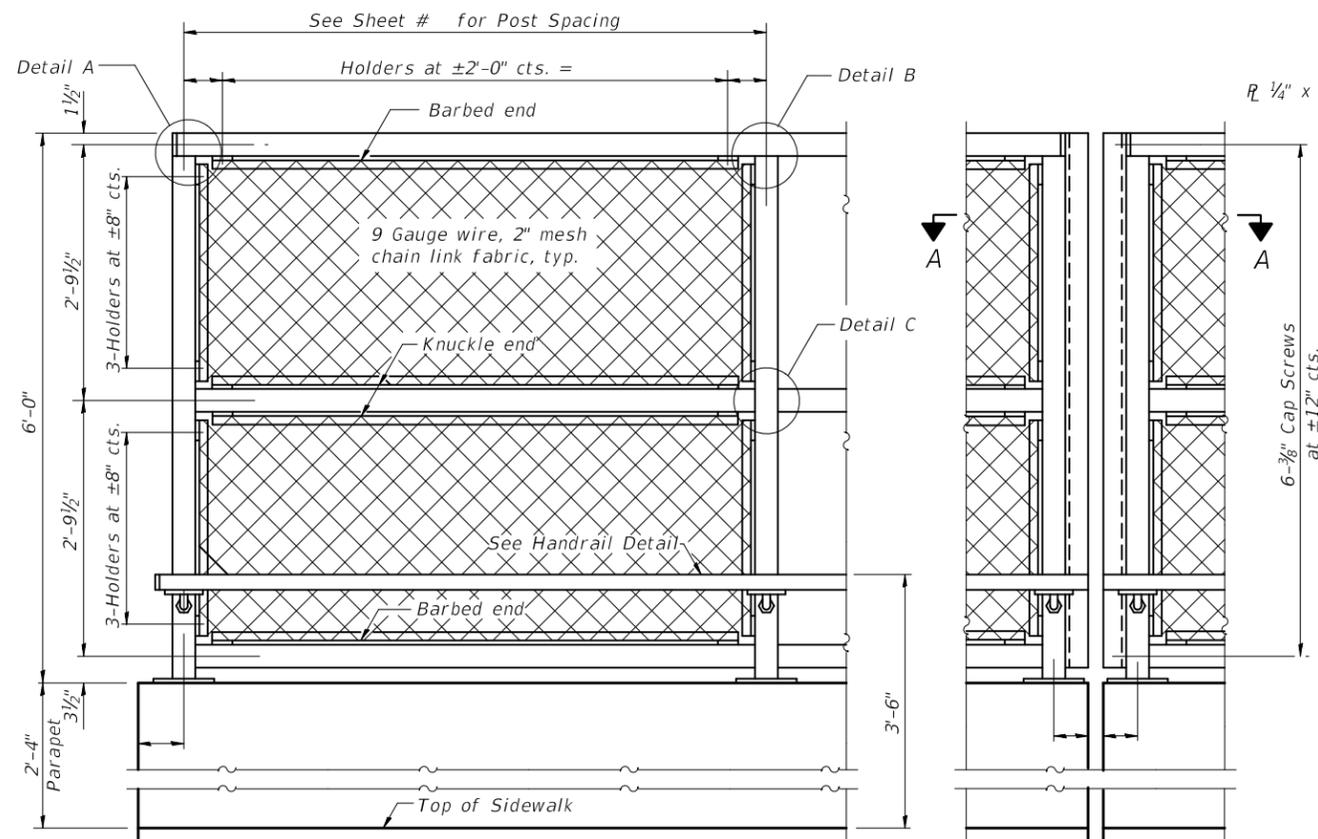
STEEL RETAINER R 1" x "H" x 10"
(Detail III)

Notes:
 Cost of retainer assembly is included with Temporary Concrete Barrier.
 A retainer assembly shall be located at the approximate center of each temporary concrete barrier.
 The retainer plate shall not be removed until the concrete on the adjacent stage is ready to be poured. For Detail III applications the retainer plate shall not be removed until just prior to placing the adjacent beam.
 When the 'A' dimension is less than 1 1/2', the wood block shall be omitted and the barrier shall be placed in direct contact with the steel retainer plate. For deck beam applications the minimum required 'A' distance is 6" to accommodate the shear key clamping device.

Detail I - Installation for a new bridge deck or bridge slab.
 Detail II - Installation for a new deck beam with an initial concrete wearing surface. Additional bar splicers shall be provided at 6'-0" centers and paired with the bar splicers of the concrete wearing surface reinforcement to accommodate the installation of the retainer assemblies. The cost of the additional bar splicers is included with the concrete wearing surface.
 Detail III - Installation for a new deck beam with no initial wearing surface or with an initial hot-mix asphalt (HMA) wearing surface present. The deck beam directly beneath the temporary concrete barrier shall be fabricated with bar splicer inserts in the side of the beam, as detailed, to accommodate the installation of the retainer assemblies. A pair of bar splicers, 6" apart, shall be placed at 6'-0" centers along the length of the beam. The cost of the bar splicers is included with the deck beam.

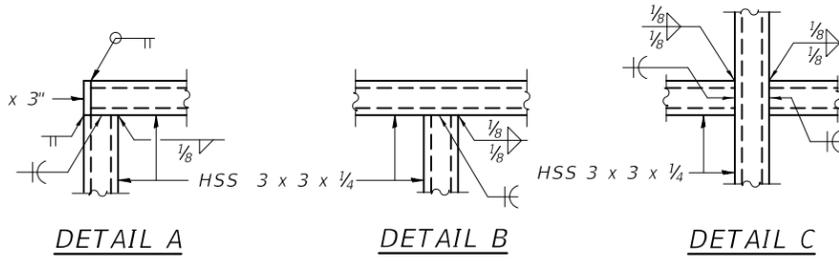
R-27 2-17-2017

FILE NAME =	USER NAME =	DESIGNED -	REVISD -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	TEMPORARY CONCRETE BARRIER FOR STAGE CONSTRUCTION STRUCTURE NO.	F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.	
		CHECKED -	REVISD -			CONTRACT NO.					
		DRAWN -	REVISD -			ILLINOIS FED. AID PROJECT					
		CHECKED -	REVISD -								



ELEVATION
(Inside Face)

ELEVATION
(At Expansion Joint)

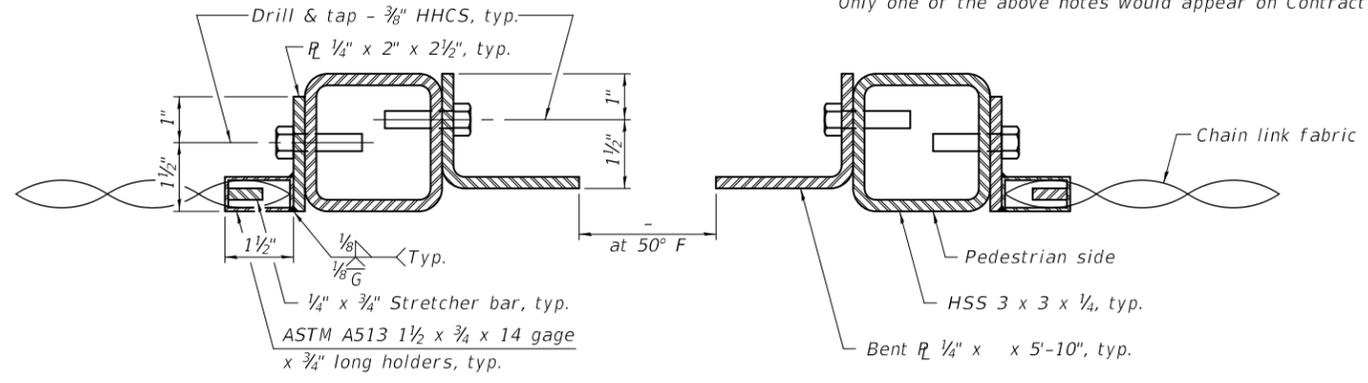


DETAIL A

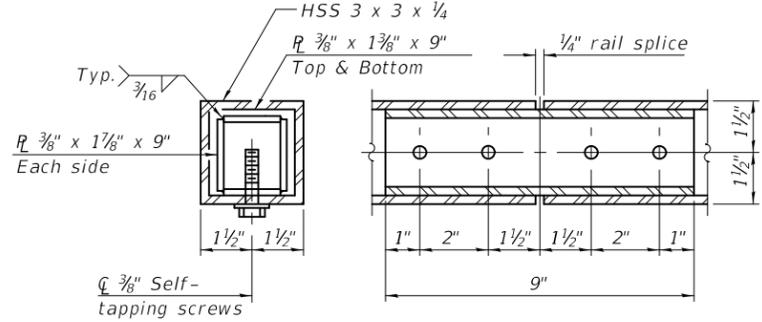
DETAIL B

DETAIL C

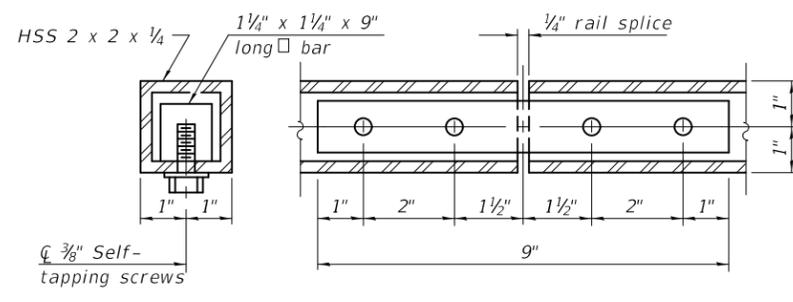
The designer should add the appropriate note as applicable.
A. When railing is galvanized:
 All steel rail elements shall be galvanized according to Article 509.05 of the Standard Specifications.
B. When railing is painted:
 All post, railing, splices, anchor devices, and bent plates shall be painted using the (List the appropriate paint system for Structural Steel).
 Only one of the above notes would appear on Contract Plans.



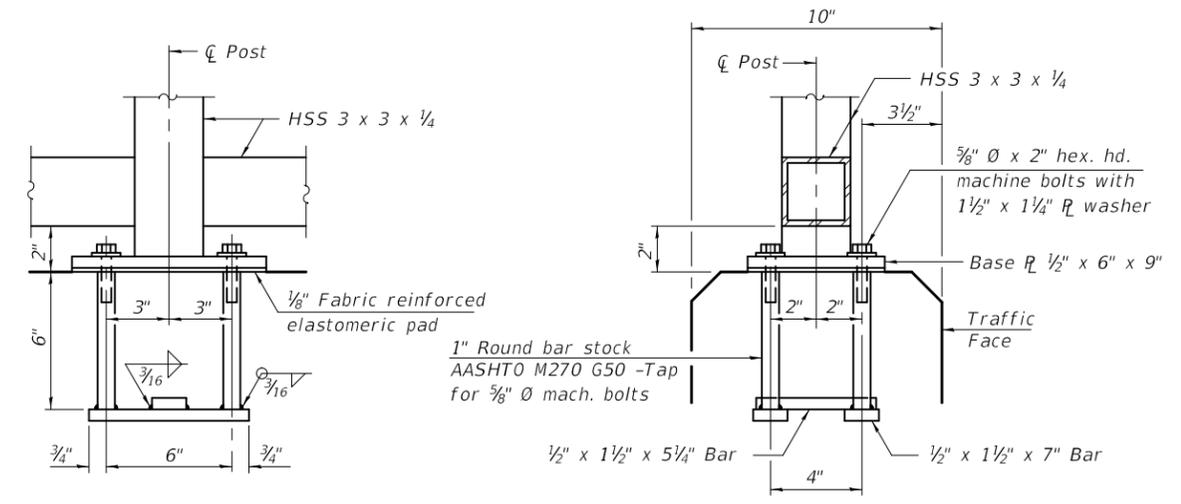
SECTION A-A



RAIL SPLICE



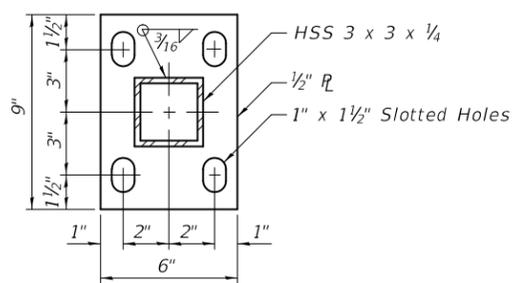
HANDRAIL SPLICE



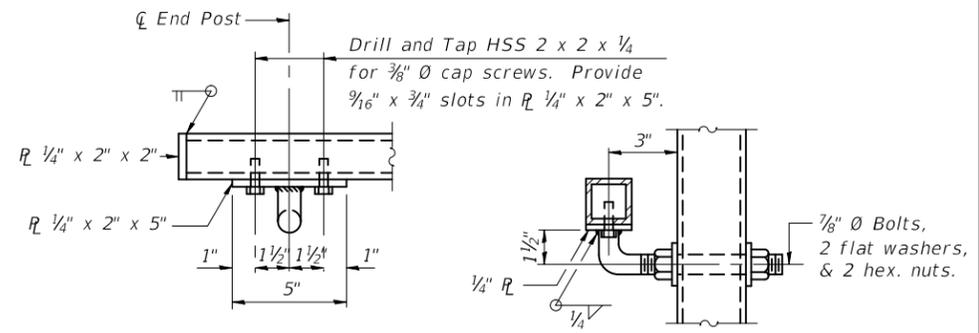
ANCHOR BOLT DETAILS

In lieu of the cast-in-place anchor device shown, the Contractor has the option of drilling and setting 5/8" Ø anchor rods according to Article 509.06 of the Standard Specifications. Embedment shall be according to the manufacturer's specifications.

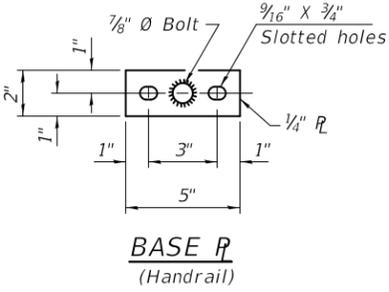
Note:
CVN testing may be omitted for the railing.



BASE R



HANDRAIL DETAIL



BASE R
(Handrail)

BILL OF MATERIAL

Item	Unit	Quantity
Bridge Fence Railing	Foot	

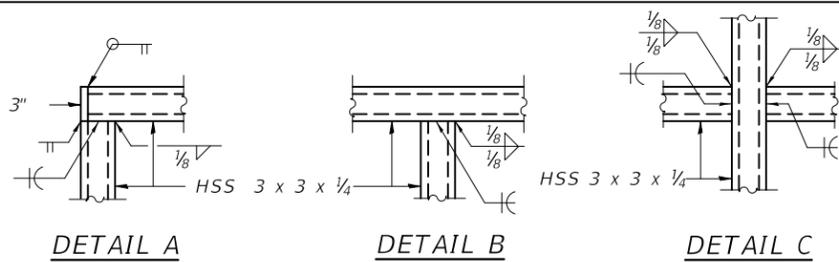
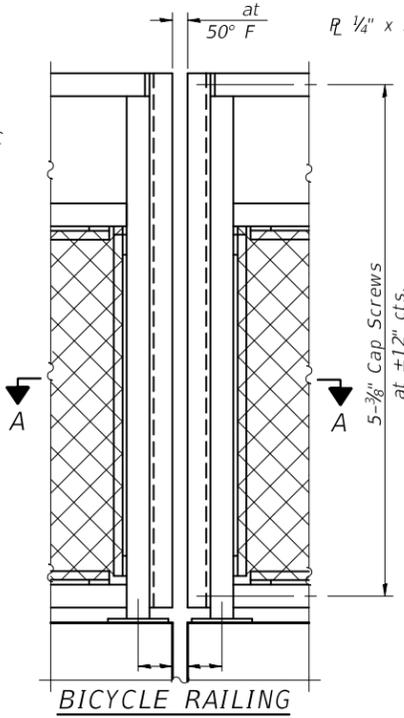
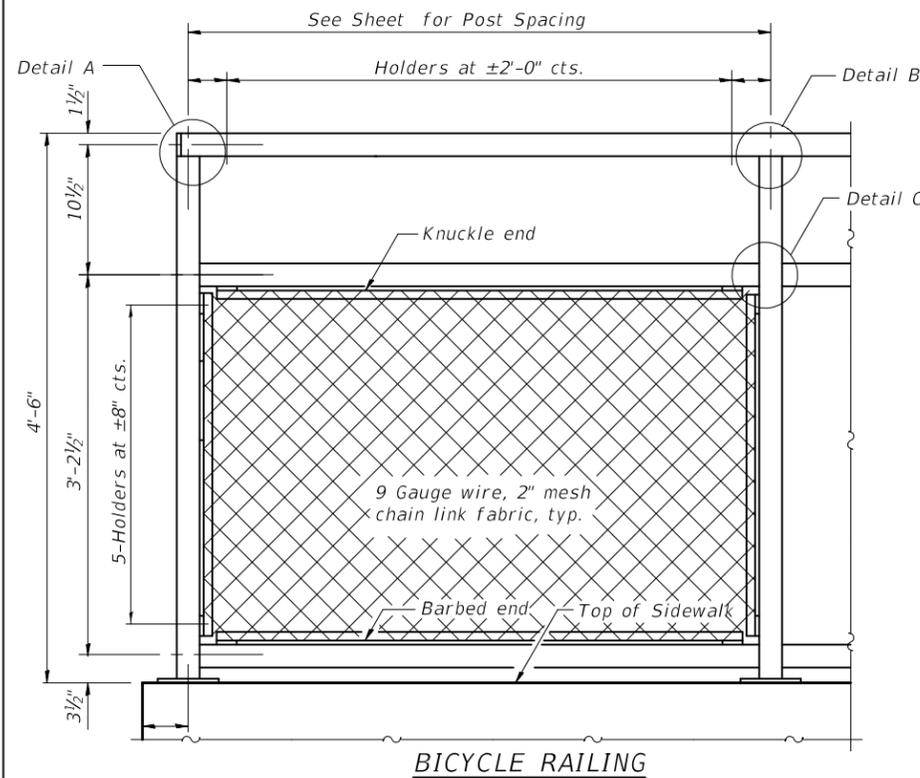
R-28 2-17-2017 (10'-0" Maximum Post Spacing)

FILE NAME =	USER NAME =	DESIGNED -	REVISD -
		CHECKED -	REVISD -
	PLOT SCALE =	DRAWN -	REVISD -
	PLOT DATE =	CHECKED -	REVISD -

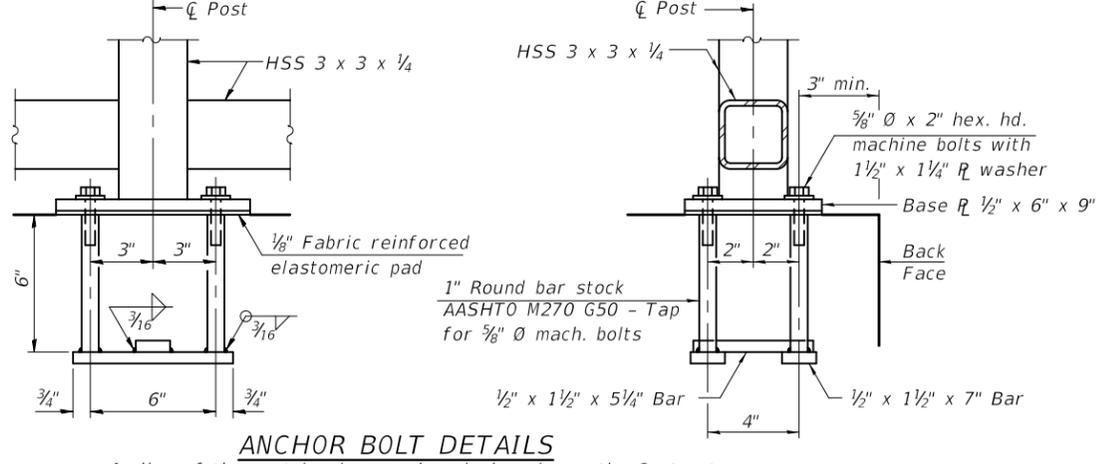
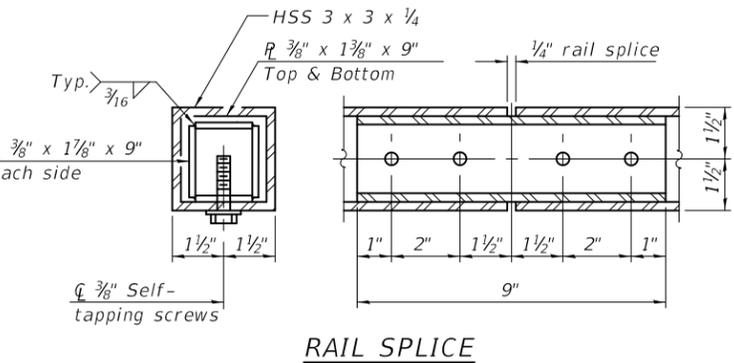
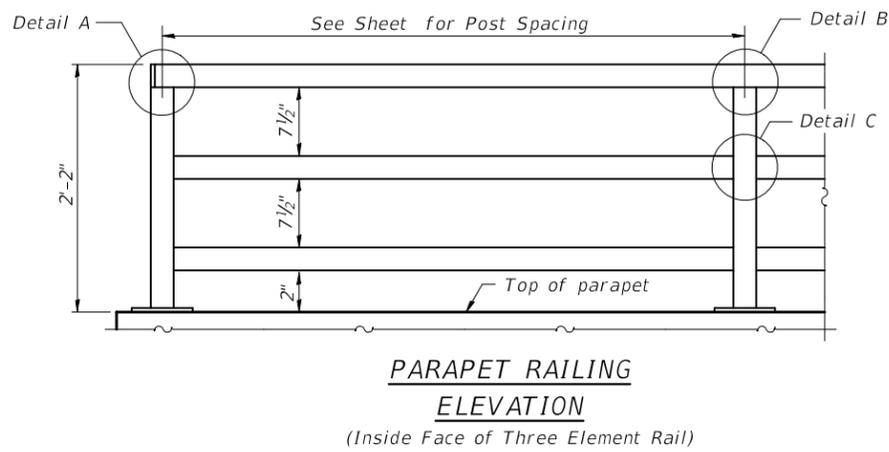
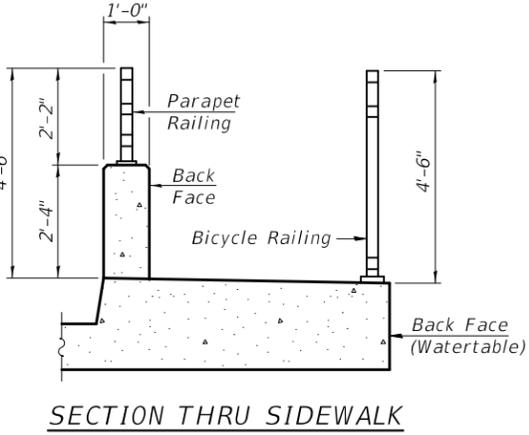
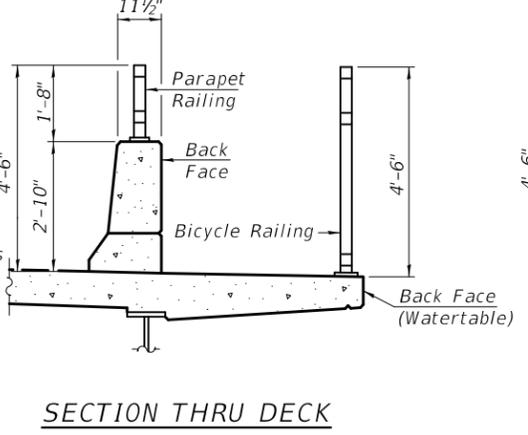
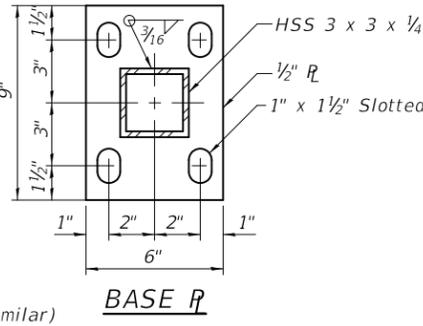
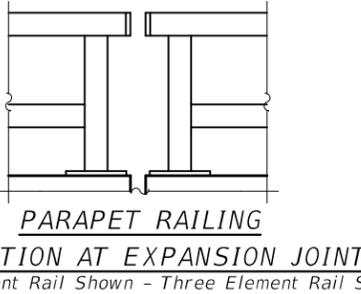
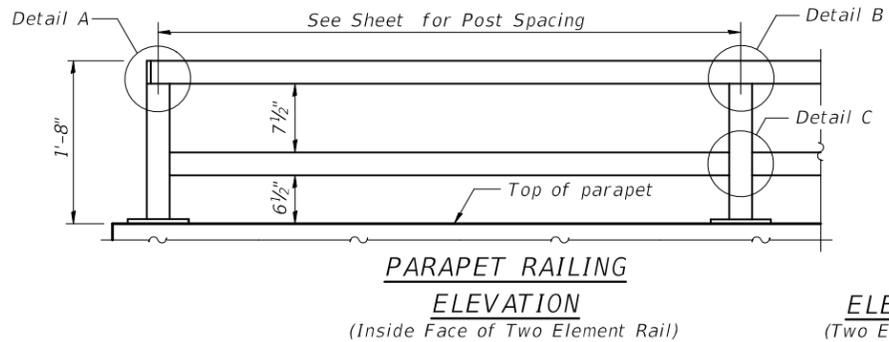
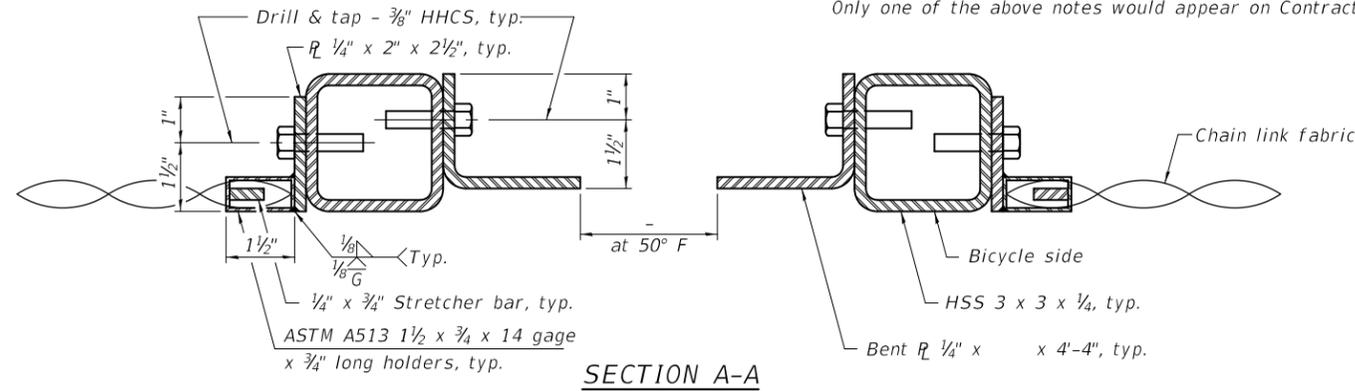
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BRIDGE FENCE RAILING, PARAPET MOUNTED
STRUCTURE NO.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				



The designer should add the appropriate note as applicable.
 A. When railing is galvanized:
 All steel rail elements shall be galvanized according to Article 509.05 of the Standard Specifications.
 B. When railing is painted:
 All post, railing, splices, anchor devices, and bent plates shall be painted using the (List the appropriate paint system for Structural Steel).
 Only one of the above notes would appear on Contract Plans.



In lieu of the cast-in-place anchor device shown, the Contractor has the option of drilling and setting 5/8" Ø anchor rods according to Article 509.06 of the Standard Specifications. Embedment shall be according to the manufacturer's specifications.

BILL OF MATERIAL

Item	Unit	Quantity
Bicycle Railing	Foot	
Parapet Railing	Foot	

Notes:
 All structural steel tubing, post and railing, for parapet railing shall be CVN tested according to 1006.34(b) of the Standard Specifications.
 CVN testing may be omitted for the Bicycle Railing.

R-29 2-17-2017 (10'-0" Maximum Post Spacing)

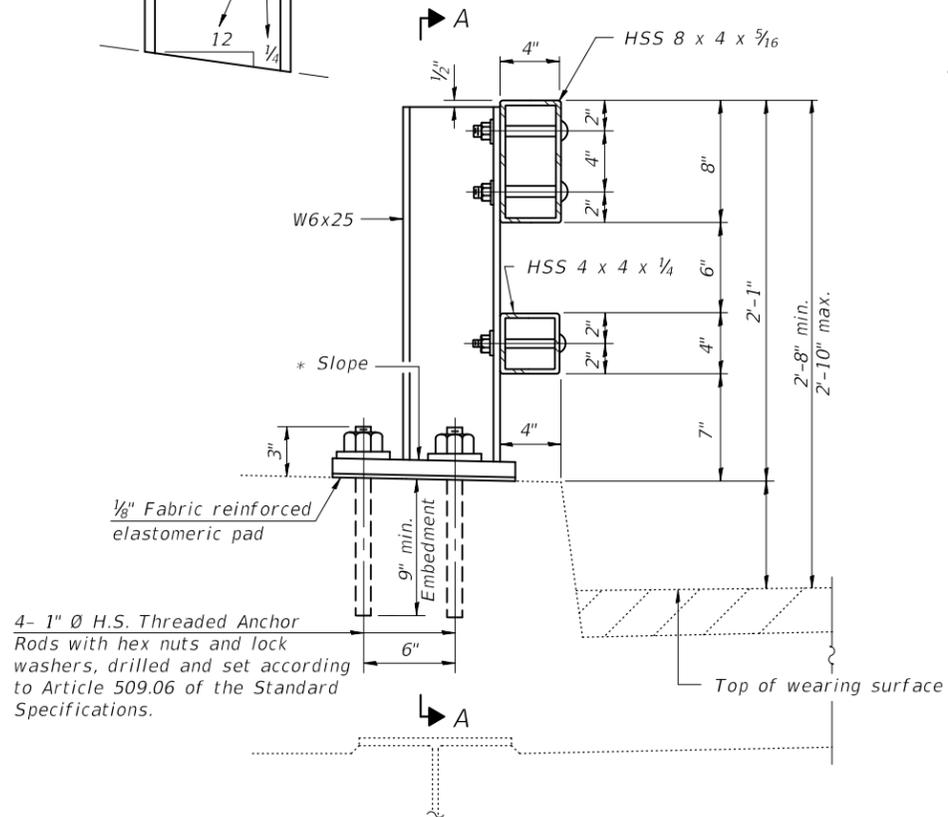
FILE NAME =	USER NAME =	DESIGNED -	REVISD -
		CHECKED -	REVISD -
		DRAWN -	REVISD -
		CHECKED -	REVISD -

**STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION**

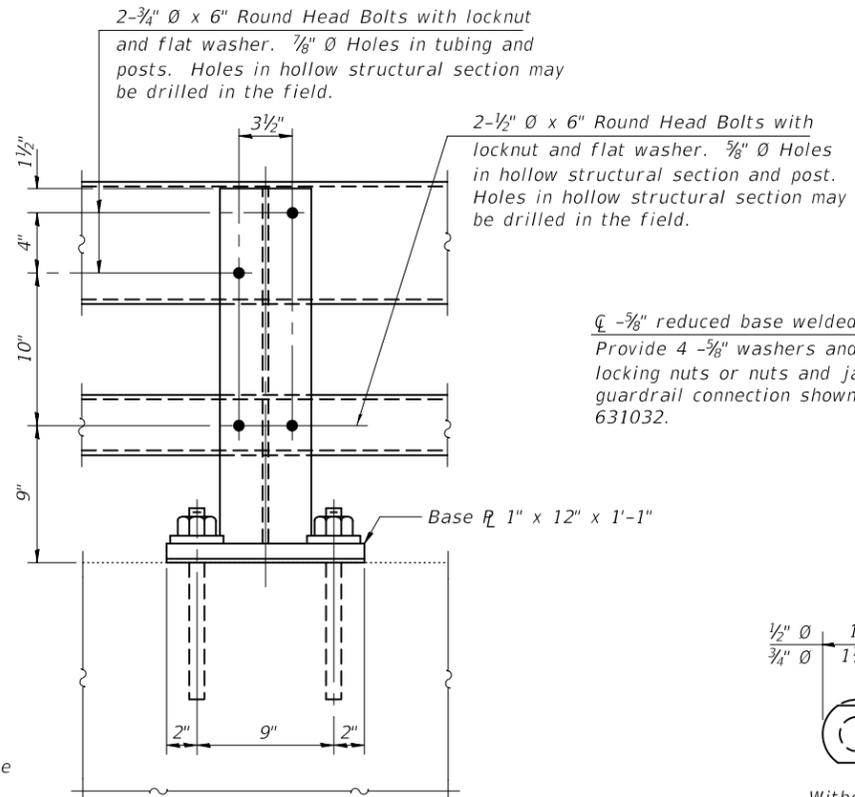
**BICYCLE RAILING
 STRUCTURE NO.**

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				

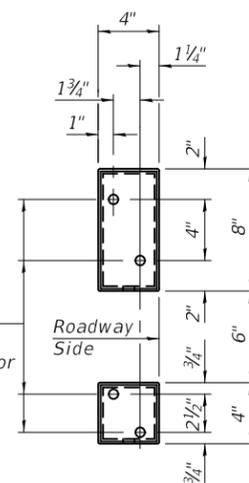
* Cut bottom end of post to curb slope.



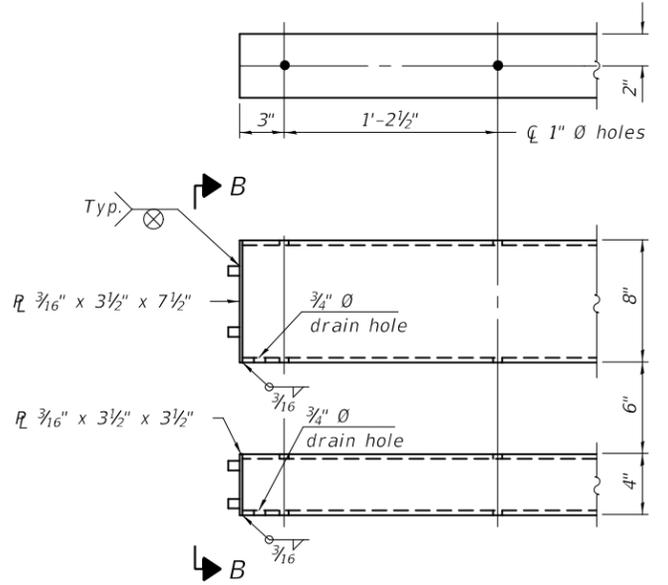
SECTION AT RAIL POST



SECTION A-A



VIEW B-B



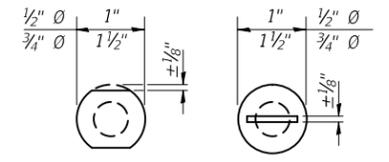
END OF RAIL DETAILS

4- 1" Ø H.S. Threaded Anchor Rods with hex nuts and lock washers, drilled and set according to Article 509.06 of the Standard Specifications.

2- 3/4" Ø x 6" Round Head Bolts with locknut and flat washer. 7/8" Ø Holes in tubing and posts. Holes in hollow structural section may be drilled in the field.

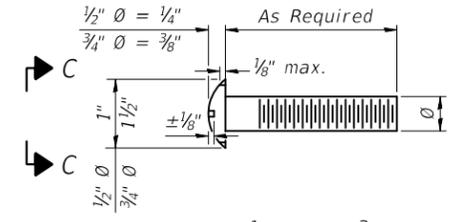
2- 1/2" Ø x 6" Round Head Bolts with locknut and flat washer. 5/8" Ø Holes in hollow structural section and post. Holes in hollow structural section may be drilled in the field.

4- 5/8" reduced base welded studs. Provide 4- 5/8" washers and self-locking nuts or nuts and jam nuts for guardrail connection shown on Std. 631032.



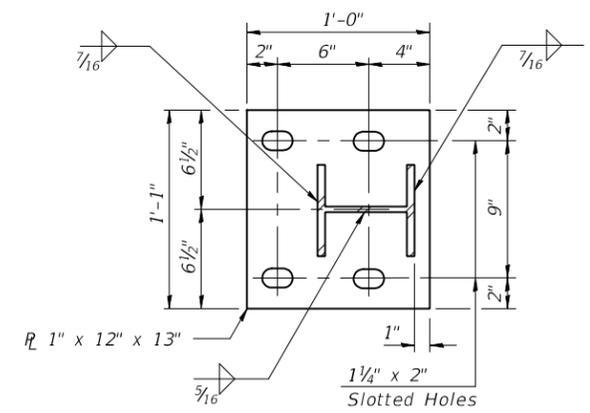
Without Slot or Recess With Slot (shown) or Approved Recess

VIEW C-C

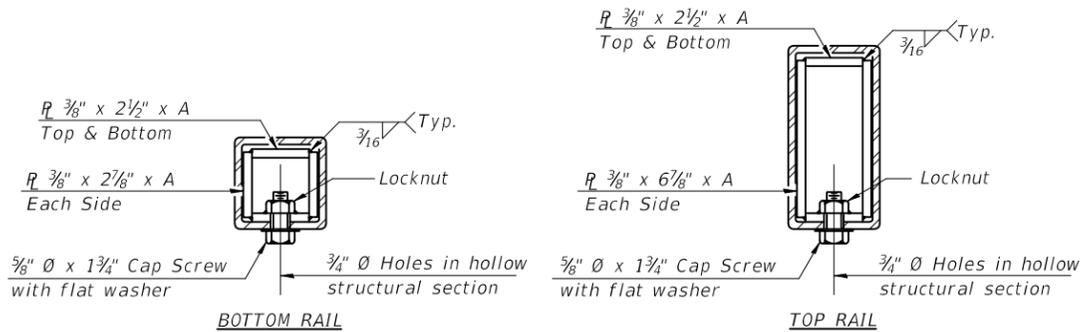


DETAIL OF 1/2" Ø & 3/4" Ø ROUND HEAD BOLTS

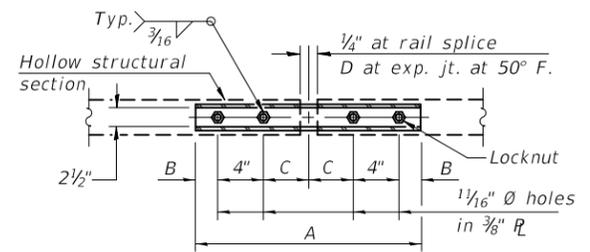
Notes:
 Posts shall not be located closer than 1'-3" to an existing bridge expansion joint or end of bridge.
 Steel Bridge Rail expansion joint shall be provided between any two (2) posts which span a bridge expansion joint. Bolts located at expansion joint shall be provided with locknuts and shall be tightened only to a point that will allow railing movement.
 Provide one 1/8" and two 1/16" steel shims for 25% of the posts. Shims shall be similar to base plates in size and holes.
 All steel rail elements shall be galvanized according to Article 509.05 of the Standard Specifications.



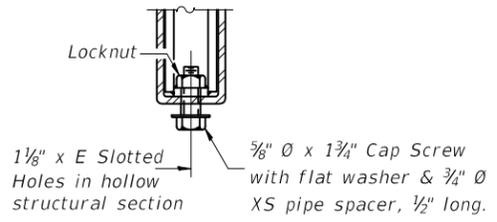
BASE PLATE DETAIL



SECTIONS AT RAIL SPLICE



PLAN-BOTT. SPLICE R TYPICAL



RAIL SPLICE CONNECTION AT EXPANSION JT.

SPLICE DIMENSIONS

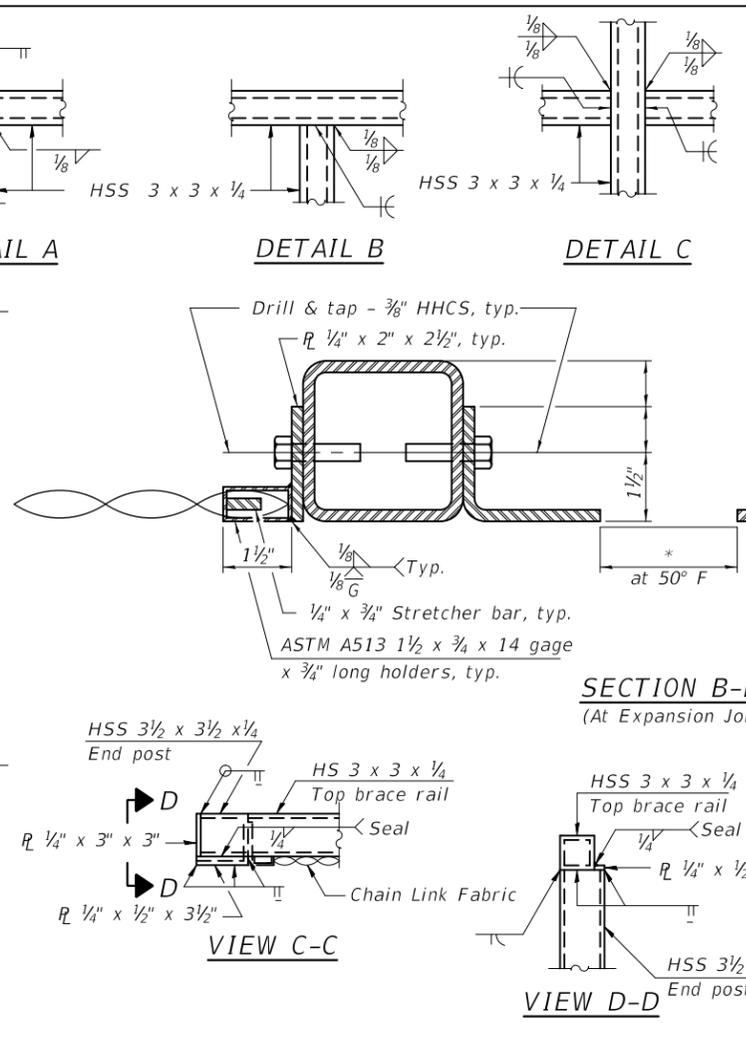
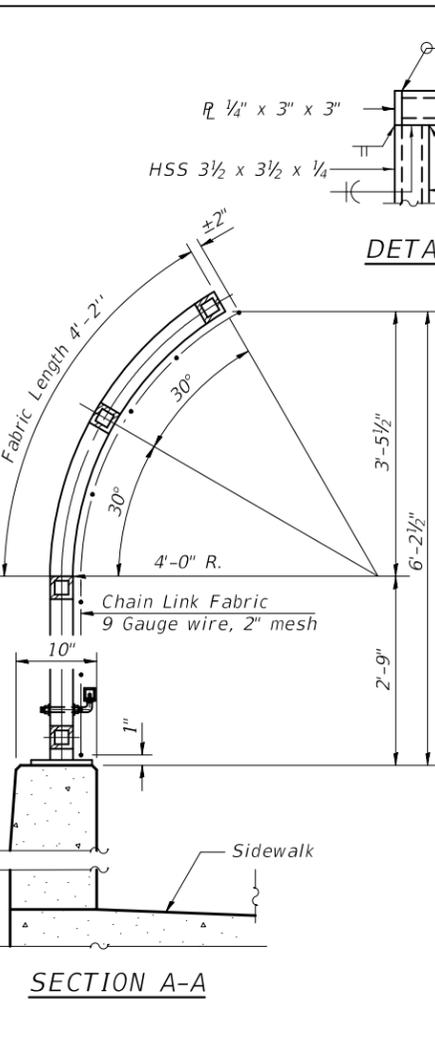
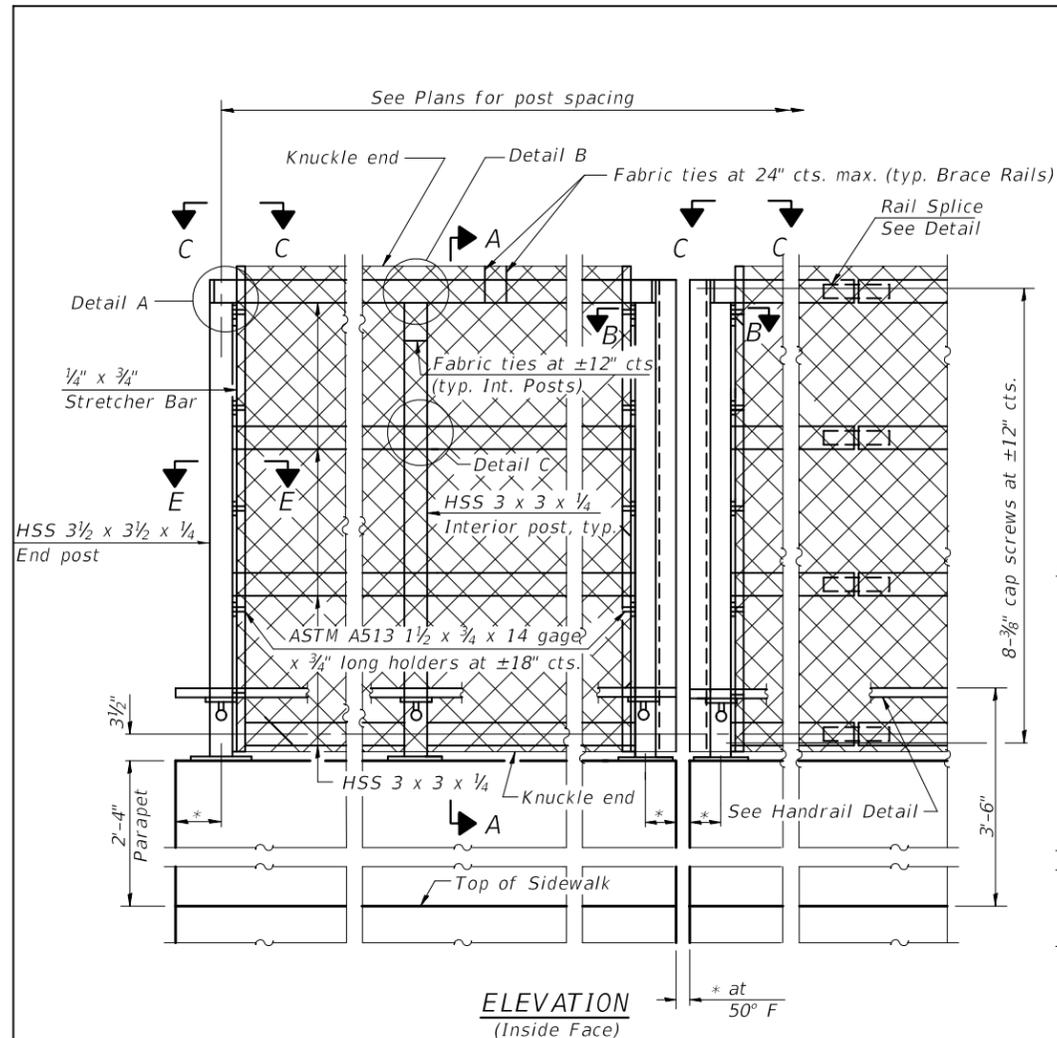
T	D	A	B	C	E
≤ 4"	2 1/2"	1'-8"	2"	4"	2 1/2"
> 4" ≤ 6 1/2"	3 3/4"	2'-0"	2 1/2"	5 1/2"	3 1/2"
> 6 1/2" ≤ 9"	5"	2'-4"	3 1/2"	6 1/2"	9"
> 9" ≤ 13"	7"	2'-10"	4 1/2"	8 1/2"	11"
Rail Splice	1/2"	1'-8"	2"	4"	—

T = Total movement at expansion joint as shown on the design plans.

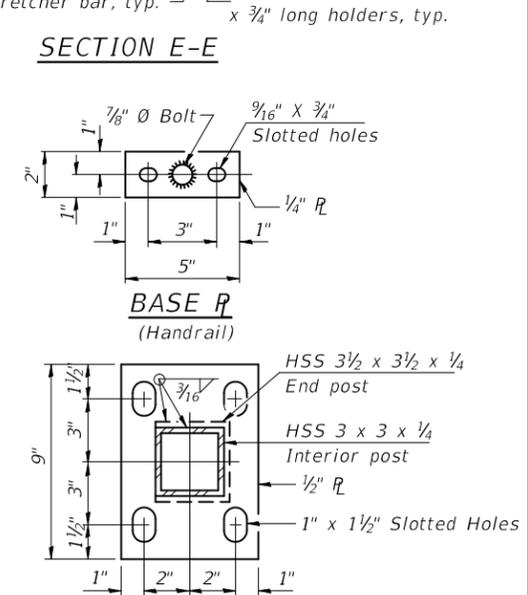
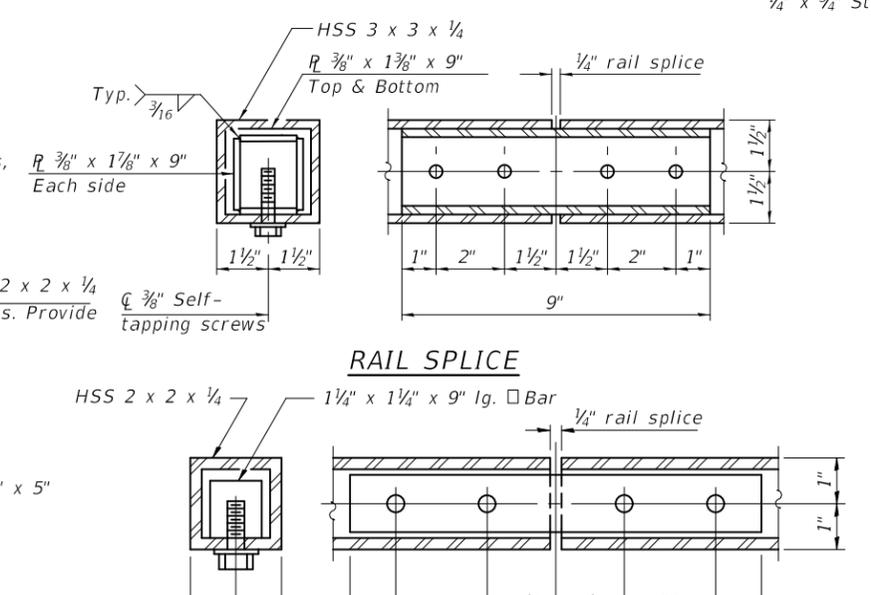
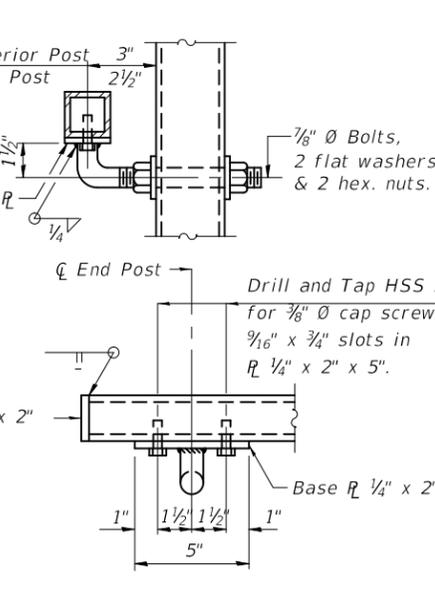
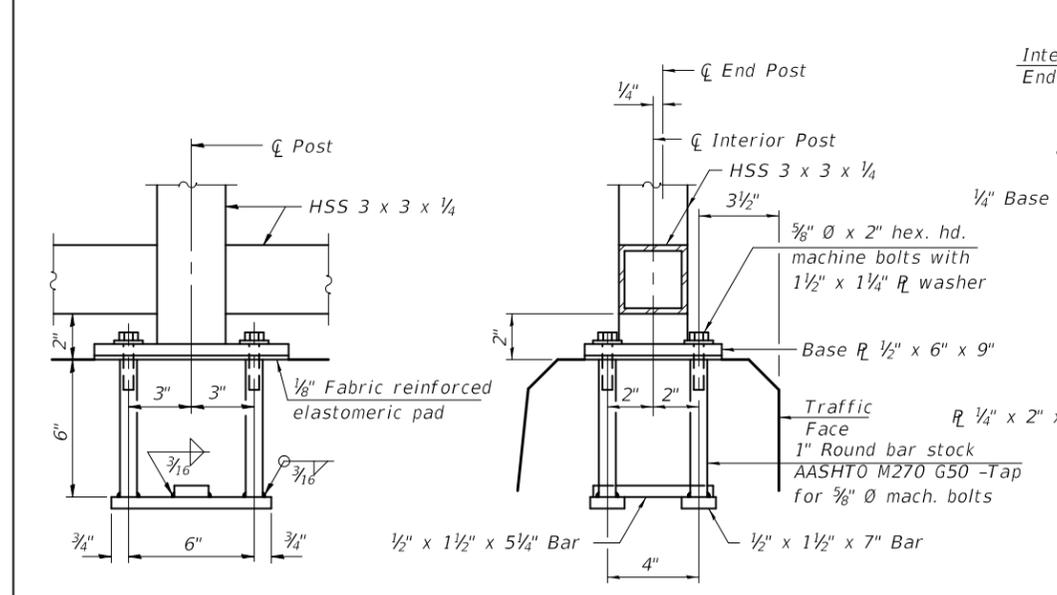
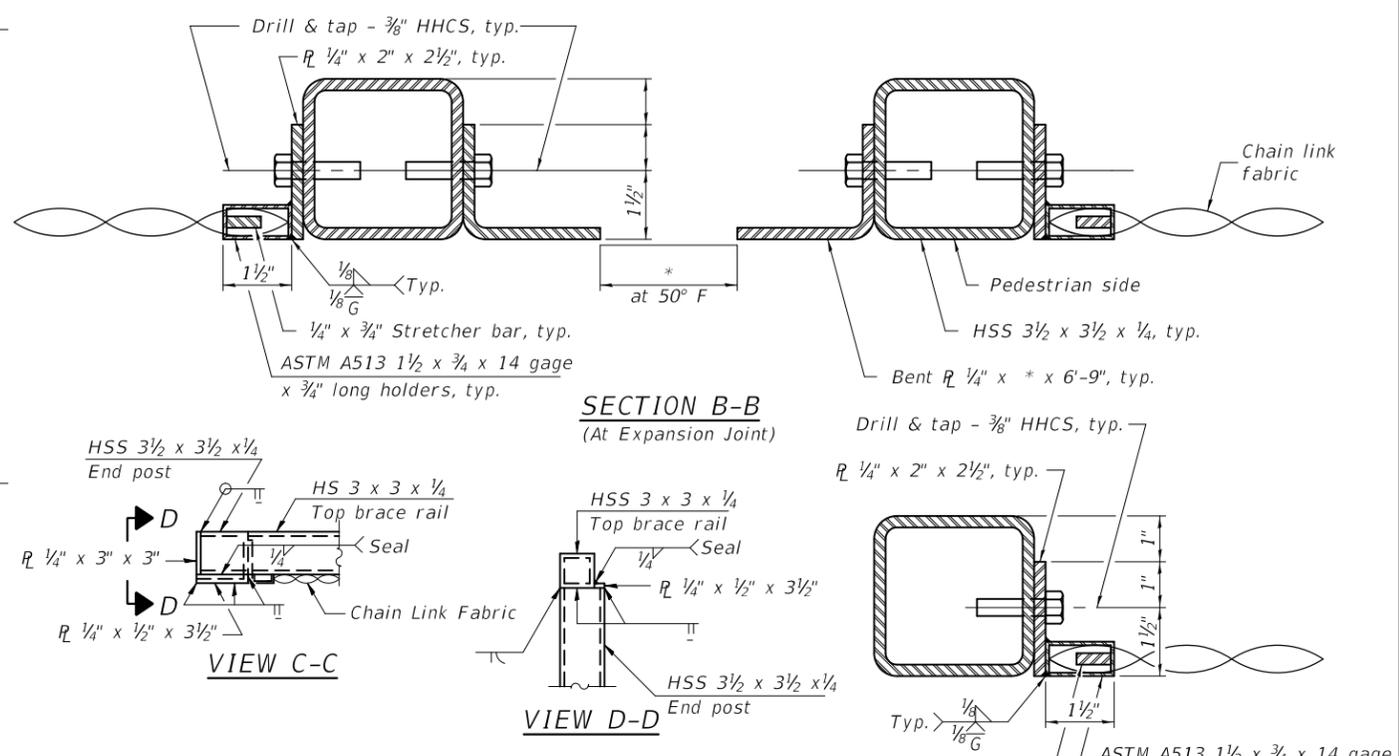
BILL OF MATERIAL

Item	Unit	Quantity
Steel Railing, Type 2399	Foot	

R-31 2-17-2017 (6'-3" Maximum Post Spacing)



The designer should add the appropriate note as applicable.
 A. When railing is galvanized:
 All steel rail elements shall be galvanized according to Article 509.05 of the Standard Specifications.
 B. When railing is painted:
 All post, railing, splices, anchor devices, and plates shall be painted using the (List the appropriate paint system for Structural Steel).
 Only one of the above notes would appear on Contract Plans.



ANCHOR BOLT DETAILS
 In lieu of the cast-in-place anchor device shown, the Contractor has the option of drilling and setting 5/8" anchor rods according to Article 509.06 of the Standard Specifications. Embedment shall be according to the manufacturer's specifications.

Note:
 CVN testing may be omitted for the railing.

BILL OF MATERIAL

Item	Unit	Quantity
Bridge Fence Railing	Foot	

R-32

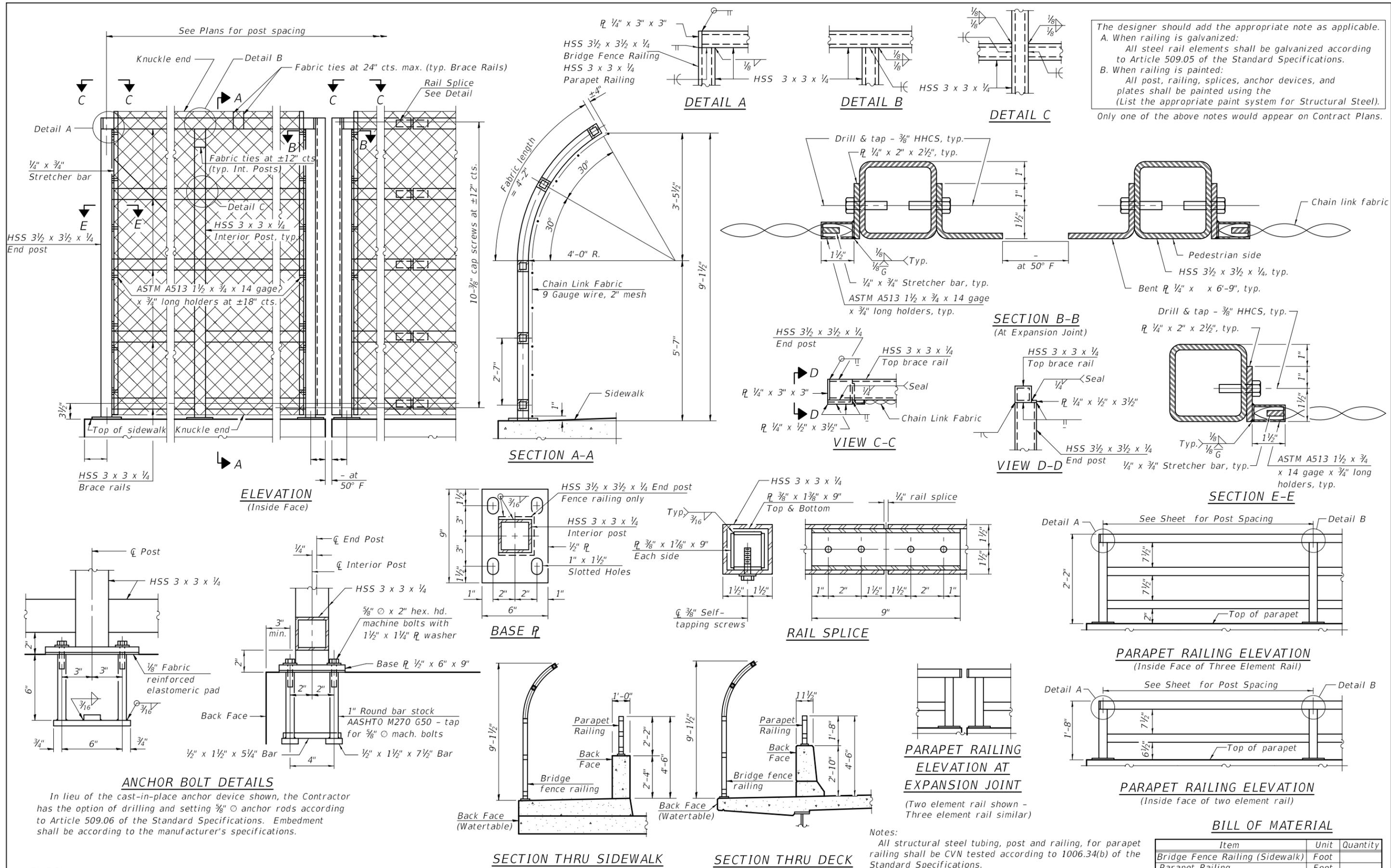
2-17-2017
 *Variable - See Plans
 (10'-0" Maximum Post Spacing)

FILE NAME =	USER NAME =	DESIGNED -	REVISD -
		CHECKED -	REVISD -
		DRAWN -	REVISD -
		CHECKED -	REVISD -

**STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION**

**BRIDGE FENCE RAILING, PARAPET MOUNTED
 STRUCTURE NO.**

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				



The designer should add the appropriate note as applicable.
 A. When railing is galvanized:
 All steel rail elements shall be galvanized according to Article 509.05 of the Standard Specifications.
 B. When railing is painted:
 All post, railing, splices, anchor devices, and plates shall be painted using the (List the appropriate paint system for Structural Steel).
 Only one of the above notes would appear on Contract Plans.

R-33 2-17-2017 (10'-0" Maximum Post Spacing)

FILE NAME =	USER NAME =	DESIGNED -	REVISED -
		CHECKED -	REVISED -
		DRAWN -	REVISED -
		CHECKED -	REVISED -

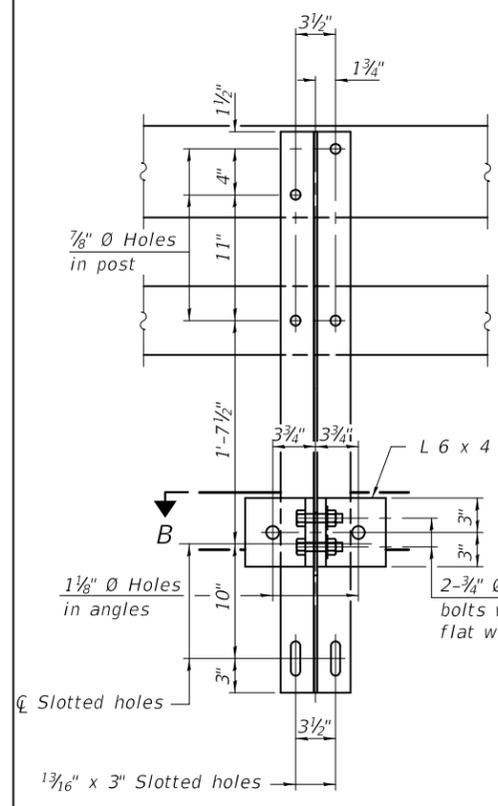
**STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION**

**BRIDGE FENCE RAILING, SIDEWALK MOUNTED
STRUCTURE NO.**

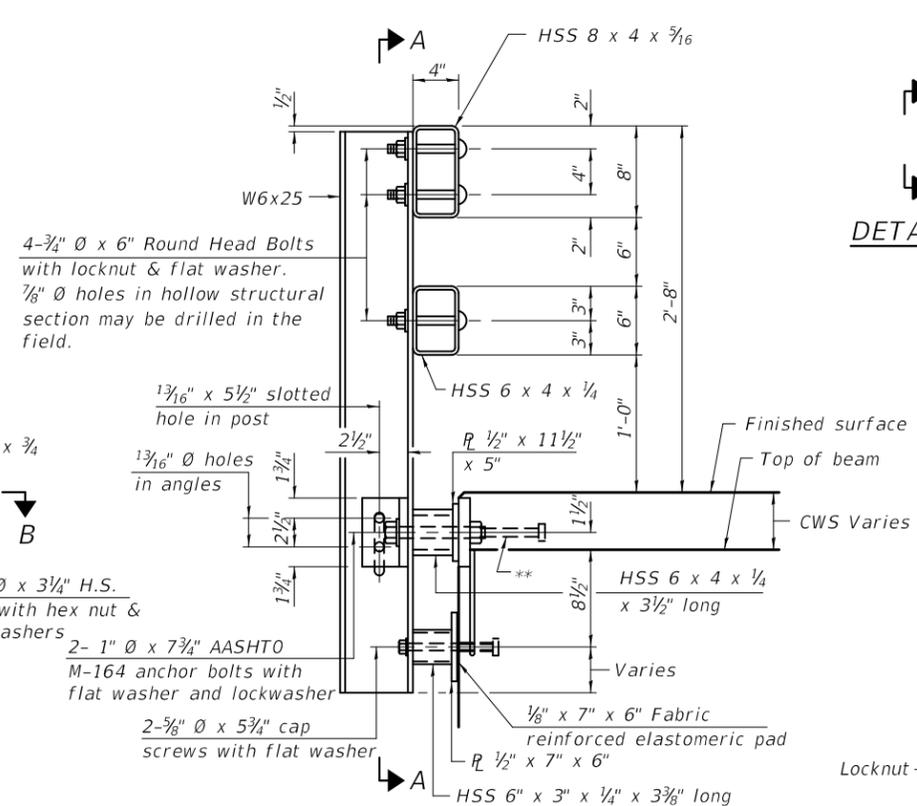
Item	Unit	Quantity
Bridge Fence Railing (Sidewalk)	Foot	
Parapet Railing	Foot	

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
CONTRACT NO.				
ILLINOIS FED. AID PROJECT				

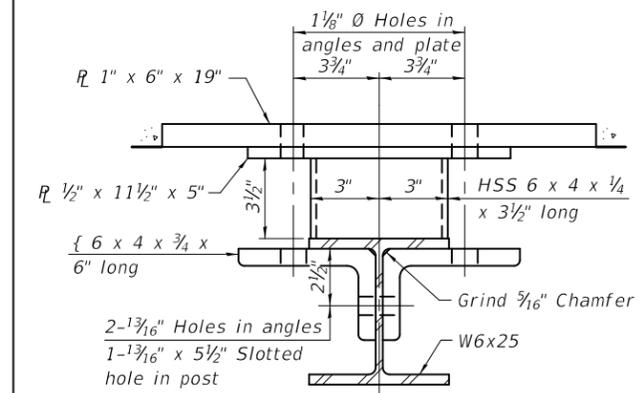
Notes:
 All structural steel tubing, post and railing, for parapet railing shall be CVN tested according to 1006.34(b) of the Standard Specifications.
 CVN testing may be omitted for the Bridge Fence Railing.



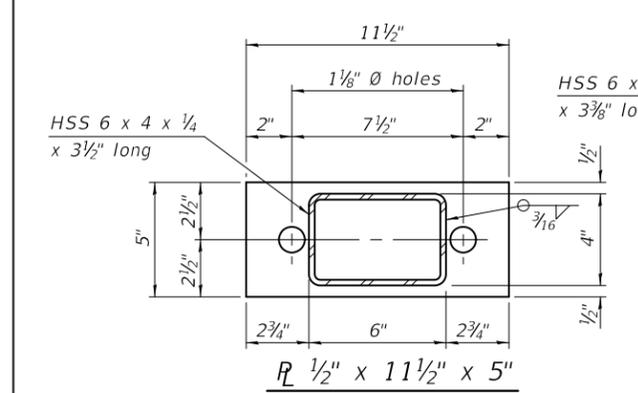
SECTION A-A



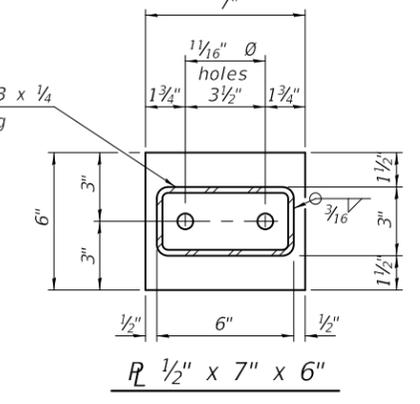
SECTION AT RAIL POST



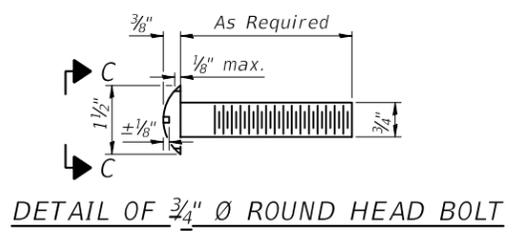
SECTION B-B



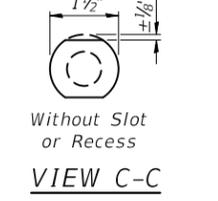
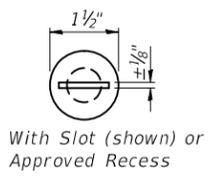
SECTION C-C



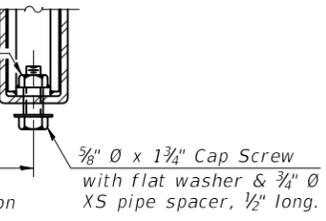
SECTION D-D



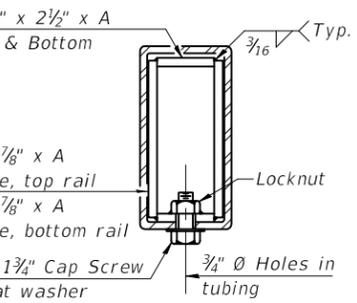
DETAIL OF 3/4" Ø ROUND HEAD BOLT



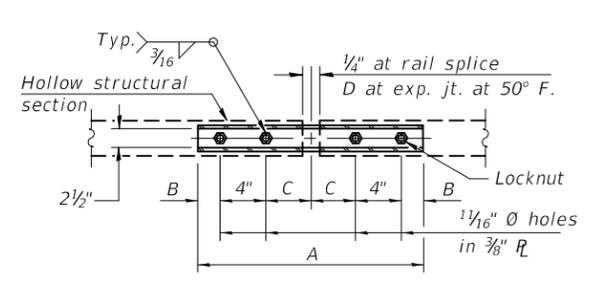
VIEW C-C



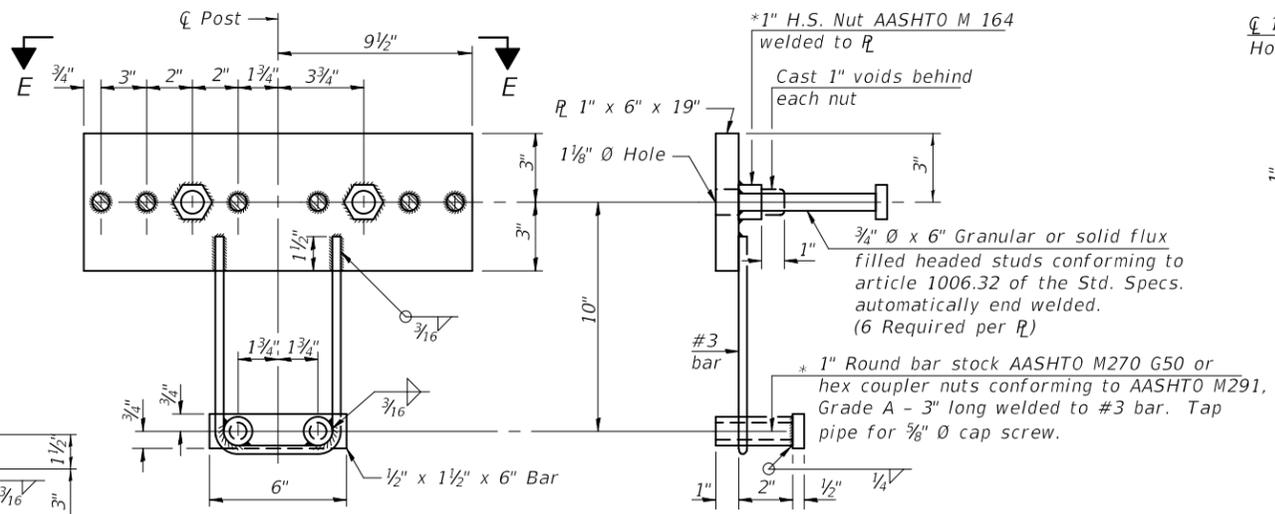
RAIL SPLICE CONNECTION AT EXPANSION JT.



SECTION AT RAIL SPLICE



PLAN-BOTTOM VIEW OF TYPICAL SPLICE



ANCHOR DEVICE

SPLICE DIMENSIONS

T	D	A	B	C	E
≤ 4"	2 1/2"	1'-8"	2"	4"	2 1/2"
> 4" ≤ 6 1/2"	3 3/4"	2'-0"	2 1/2"	5 1/2"	3 1/2"
> 6 1/2" ≤ 9"	5"	2'-4"	3 1/2"	6 1/2"	9"
> 9" ≤ 13"	7"	2'-10"	4 1/2"	8 1/2"	11"
Rail Splice	1/4"	1'-8"	2"	4"	

T = Total movement at expansion joint as shown on the design plans.

Notes:
 For multi-span bridges, sufficient 1/4" x 6" x 1'-2" galvanized steel shims shall be provided to align rail between adjacent spans.
 Cost included with Steel Railing, Type SM.
 Steel rail elements shall be galvanized according to Article 509.05 of the Standard Specifications.
 ** The studs of the anchor devices shall be placed below the top reinforcement bars and the outermost longitudinal reinforcement bar shall be placed directly above the studs of the rail post anchor device.

BILL OF MATERIAL

Item	Unit	Quantity
Steel Railing, Type SM	Foot	

R-34CWS 2-17-2017 (6'-3" Maximum Post Spacing) (5" minimum to 7 1/8" maximum CWS thickness)

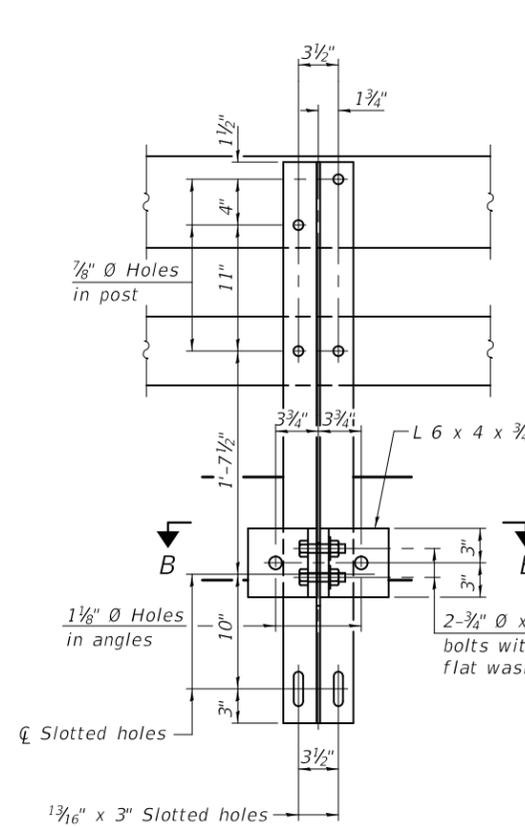
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		CHECKED -	REVISD -
		PLOT SCALE =	REVISD -
		PLOT DATE =	REVISD -

STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

STEEL RAILING, TYPE SM WITH CONCRETE WEARING SURFACE
 STRUCTURE NO.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

ILLINOIS FED. AID PROJECT

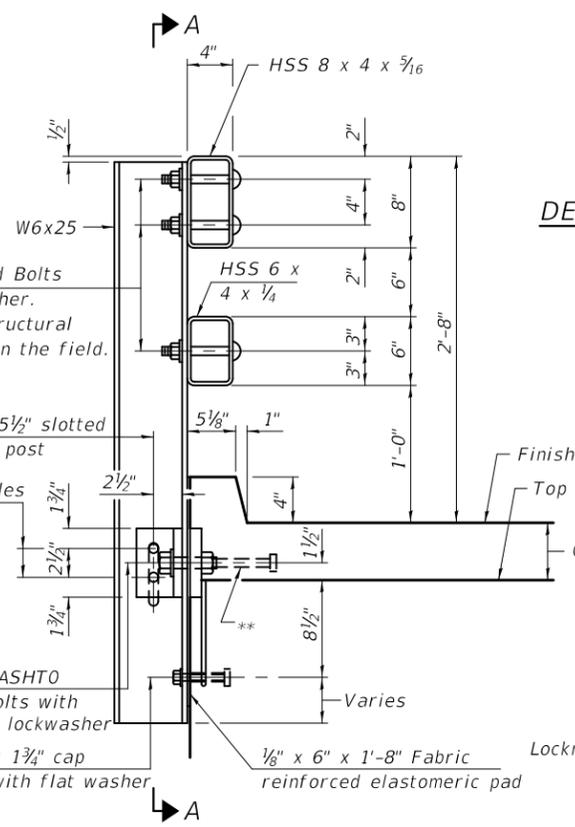


4- $\frac{3}{4}$ " \varnothing x 6" Round Head Bolts with locknut & flat washer.
 $\frac{7}{8}$ " \varnothing holes in hollow structural section may be drilled in the field.

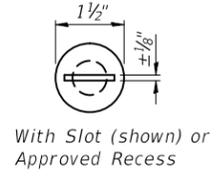
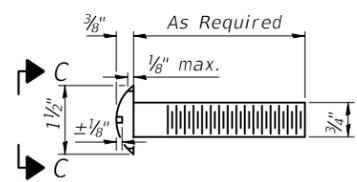
2- $\frac{3}{4}$ " \varnothing x $3\frac{1}{4}$ " H.S. bolts with hex nut & flat washers

2- 1" \varnothing x $3\frac{3}{4}$ " AASHTO M-164 anchor bolts with flat washer and lockwasher

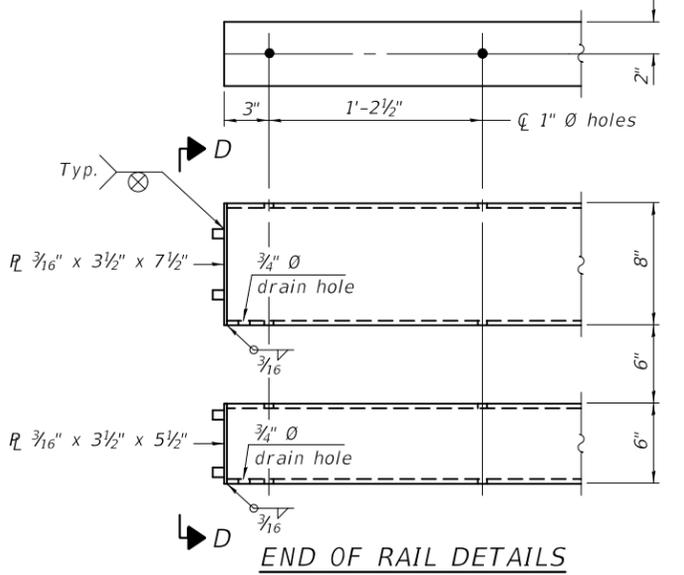
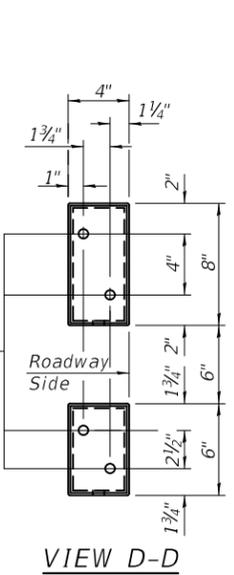
2- $\frac{3}{8}$ " \varnothing x $1\frac{3}{4}$ " cap screws with flat washer



DETAIL OF $\frac{3}{4}$ " \varnothing ROUND HEAD BOLT



\varnothing $\frac{5}{8}$ " reduced base welded studs. Provide 4- $\frac{3}{8}$ " washers and self-locking nuts or nuts and jam nuts for guardrail connection shown on Std. 631032.



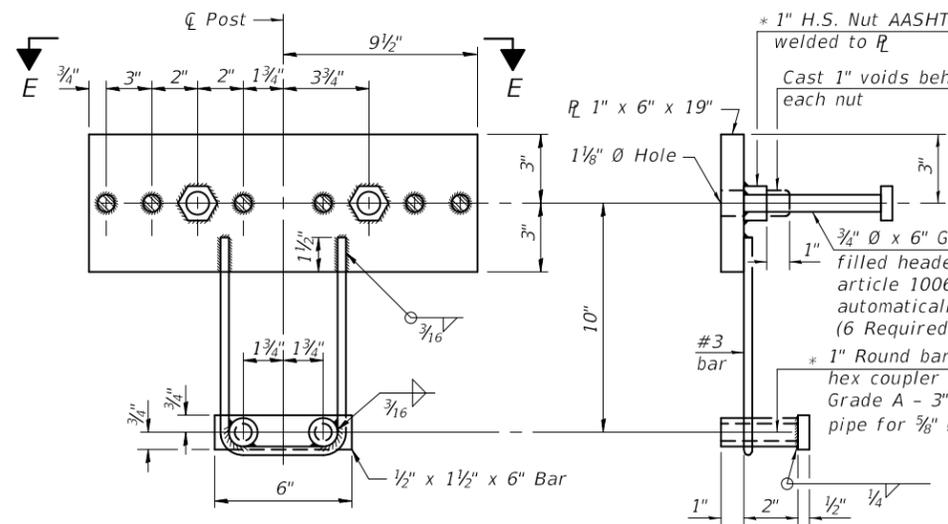
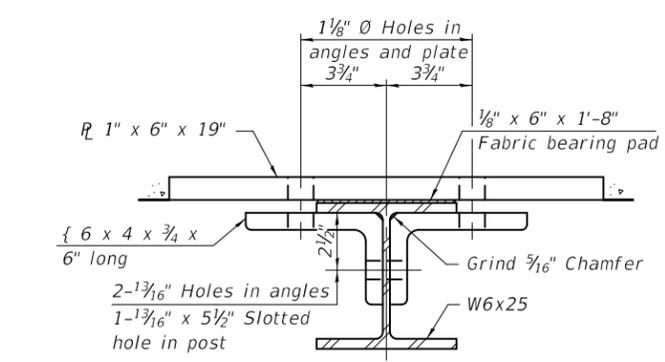
SECTION A-A

SECTION AT RAIL POST

RAIL SPLICE CONNECTION AT EXPANSION JT.

SECTION AT RAIL SPLICE

PLAN-BOTT. SPLICE R TYPICAL

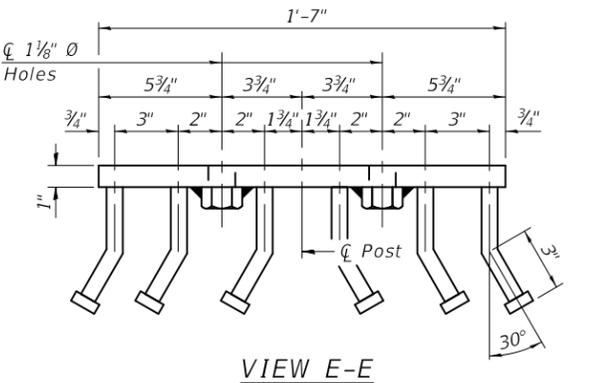
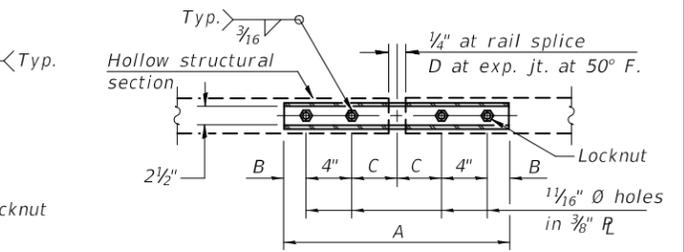


* Threaded areas shall be plugged or blocked off during casting of beam. Galvanized after fabrication.

SPLICE DIMENSIONS

T	D	A	B	C	E
$\leq 4"$	$2\frac{1}{2}"$	1'-8"	2"	4"	$2\frac{1}{2}"$
$> 4" \leq 6\frac{1}{2}"$	$3\frac{3}{4}"$	2'-0"	$2\frac{1}{2}"$	$5\frac{1}{2}"$	$3\frac{1}{2}"$
$> 6\frac{1}{2}" \leq 9"$	5"	2'-4"	$3\frac{1}{2}"$	$6\frac{1}{2}"$	9"
$> 9" \leq 13"$	7"	2'-10"	$4\frac{1}{2}"$	$8\frac{1}{2}"$	11"
Rail Splice	$\frac{1}{4}"$	1'-8"	2"	4"	

T = Total movement at expansion joint as shown on the design plans.



Notes:
 For multi-span bridges, sufficient $\frac{1}{4}$ " x 6" x 1'-2" galvanized steel shims shall be provided to align rail between adjacent spans. Cost included with Steel Railing, Type SM.
 All steel railing elements shall be galvanized according to Article 509.05 of the Standard Specifications.
 ** The studs of the anchor devices shall be placed below the top reinforcement bars and the outermost longitudinal reinforcement bar shall be placed directly above the studs of the rail post anchor device.

BILL OF MATERIAL

Item	Unit	Quantity
Steel Railing, Type SM	Foot	

R-34CWSC 2-17-2017 (6'-3" Maximum Post Spacing) (5" minimum to 7 $\frac{1}{8}$ " maximum CWS thickness)

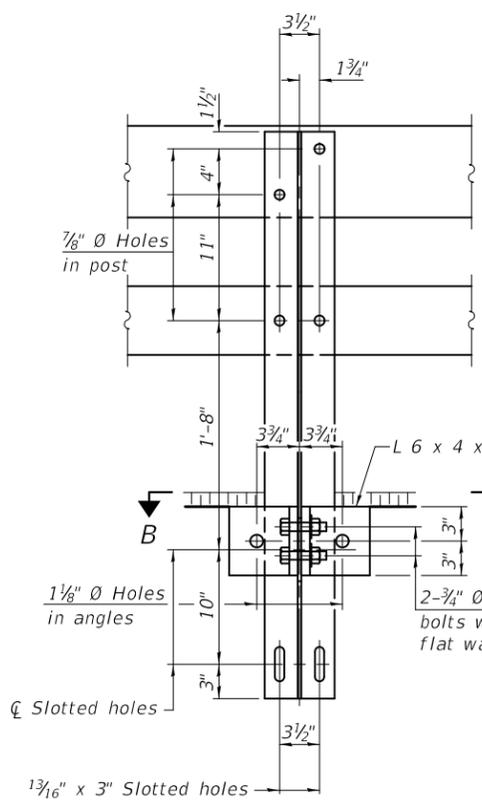
FILE NAME =	USER NAME =	DESIGNED -	REVISIONS -
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		DRAWN -	REVISIONS -
		CHECKED -	REVISIONS -

STATE OF ILLINOIS
 DEPARTMENT OF TRANSPORTATION

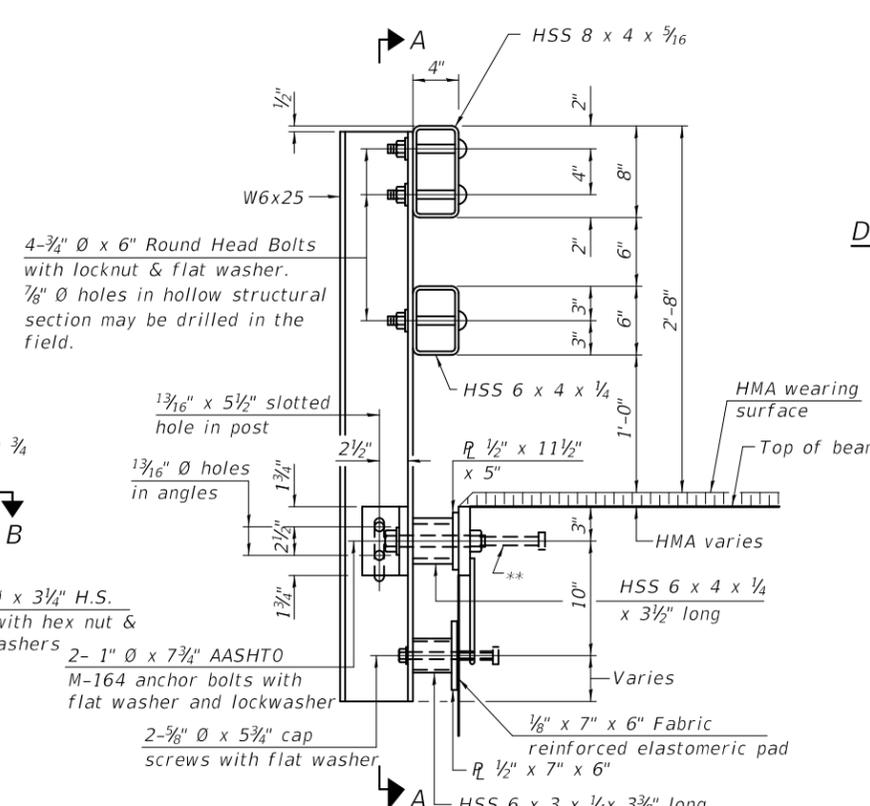
STEEL RAILING, TYPE SM WITH CONCRETE WEARING SURFACE & CURB
 STRUCTURE NO.

F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

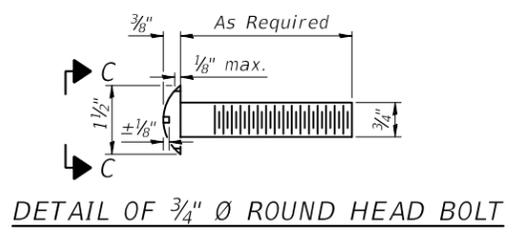
ILLINOIS FED. AID PROJECT



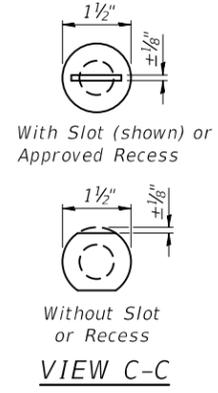
SECTION A-A



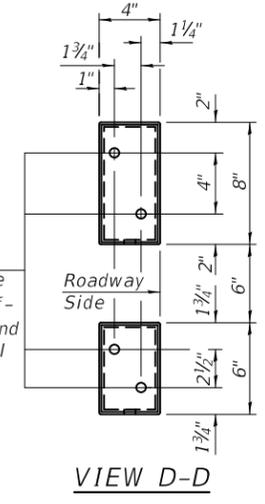
SECTION AT RAIL POST



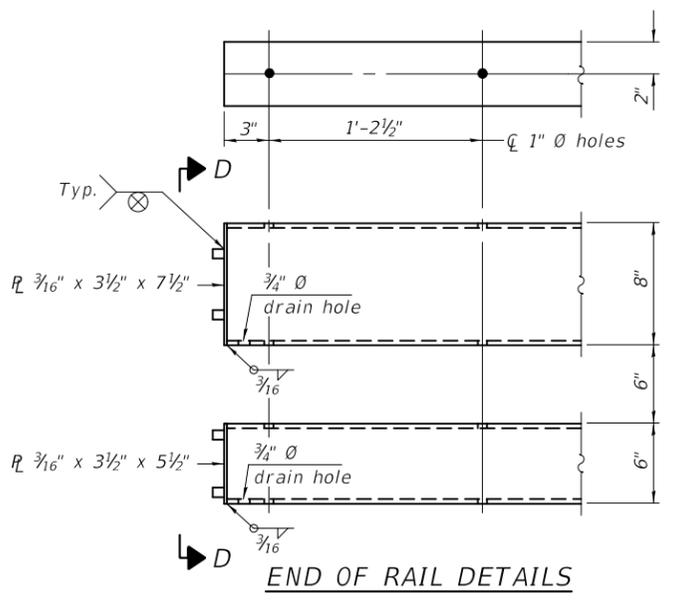
DETAIL OF 3/4" Ø ROUND HEAD BOLT



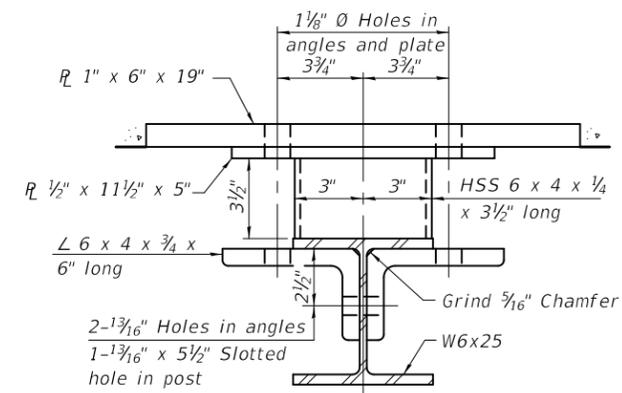
VIEW C-C



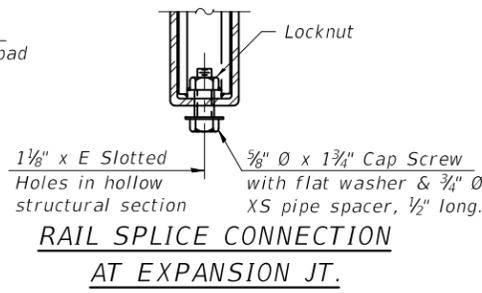
VIEW D-D



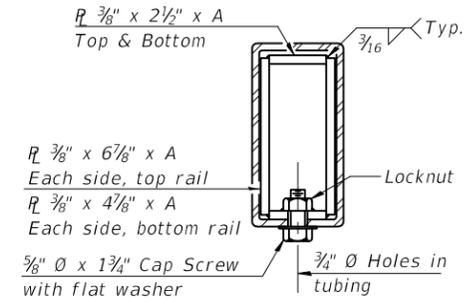
END OF RAIL DETAILS



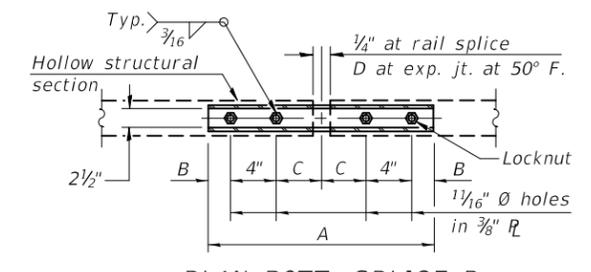
SECTION B-B



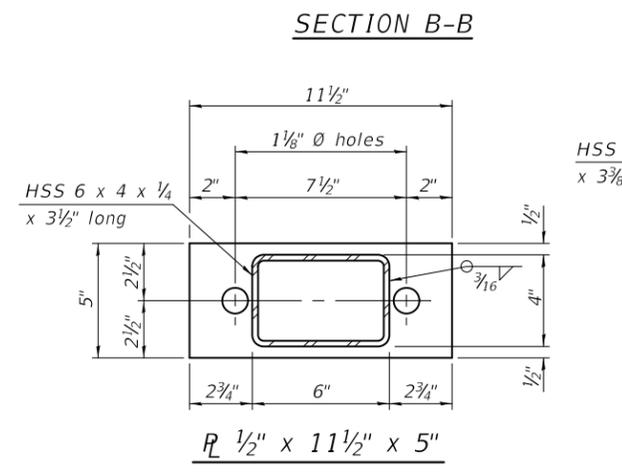
RAIL SPLICE CONNECTION AT EXPANSION JT.



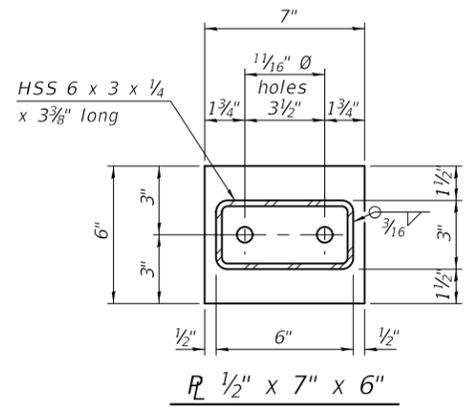
SECTION AT RAIL SPLICE



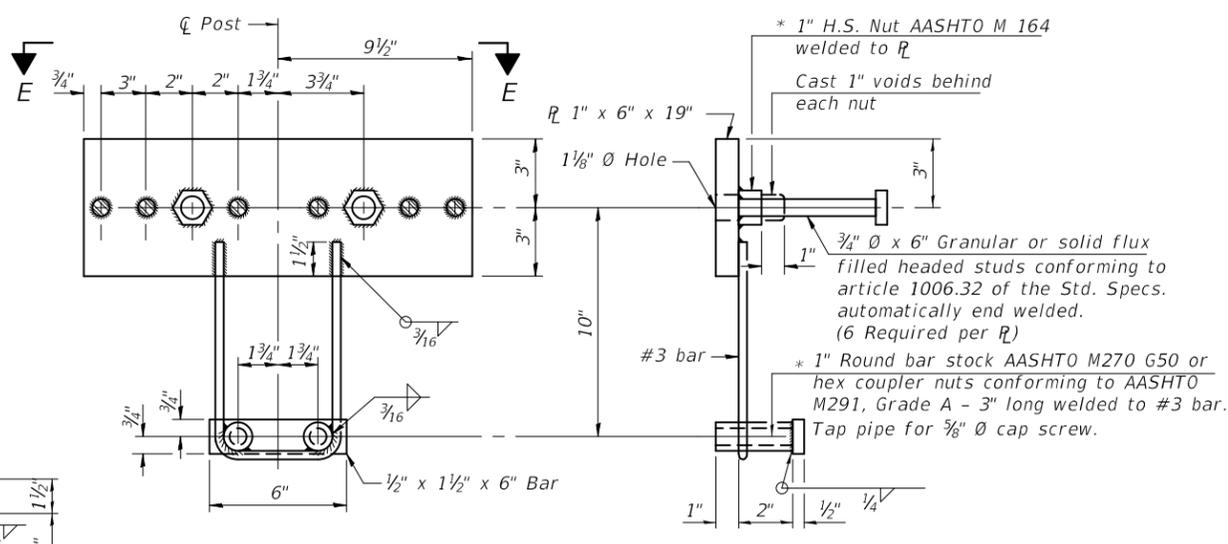
PLAN-BOTT. SPLICE R TYPICAL



R 1/2" x 11 1/2" x 5"



R 1/2" x 7" x 6"



ANCHOR DEVICE

SPLICE DIMENSIONS

T	D	A	B	C	E
≤ 4"	2 1/2"	1'-8"	2"	4"	2 1/2"
> 4" ≤ 6 1/2"	3 3/4"	2'-0"	2 1/2"	5 1/2"	3 1/2"
> 6 1/2" ≤ 9"	5"	2'-4"	3 1/2"	6 1/2"	9"
> 9" ≤ 13"	7"	2'-10"	4 1/2"	8 1/2"	11"
Rail Splice	1/4"	1'-8"	2"	4"	—

T = Total movement at expansion joint as shown on the design plans.

Notes:
 For multi-span bridges, sufficient 1/4" x 6" x 1'-2" galvanized steel shims shall be provided to align rail between adjacent spans. Cost included with Steel Railing, Type SM.
 All steel rail members shall be galvanized according to Article 509.05 of the Standard Specifications.
 ** The studs of the anchor devices shall be placed below the top reinforcement bars and the outermost longitudinal reinforcement bar shall be placed directly above the studs of the rail post anchor device. The anchorage studs may be bent down 1/2" to accommodate the top reinforcement bar placement.

BILL OF MATERIAL

Item	Unit	Quantity
Steel Railing, Type SM	Foot	

R-34HMAWS 2-17-2017 (6'-3" Maximum Post Spacing) (1 1/4" minimum to 3 3/8" maximum HMA thickness)

FILE NAME =	USER NAME =	DESIGNED -	REVISED -
		CHECKED -	REVISED -
		DRAWN -	REVISED -
		CHECKED -	REVISED -

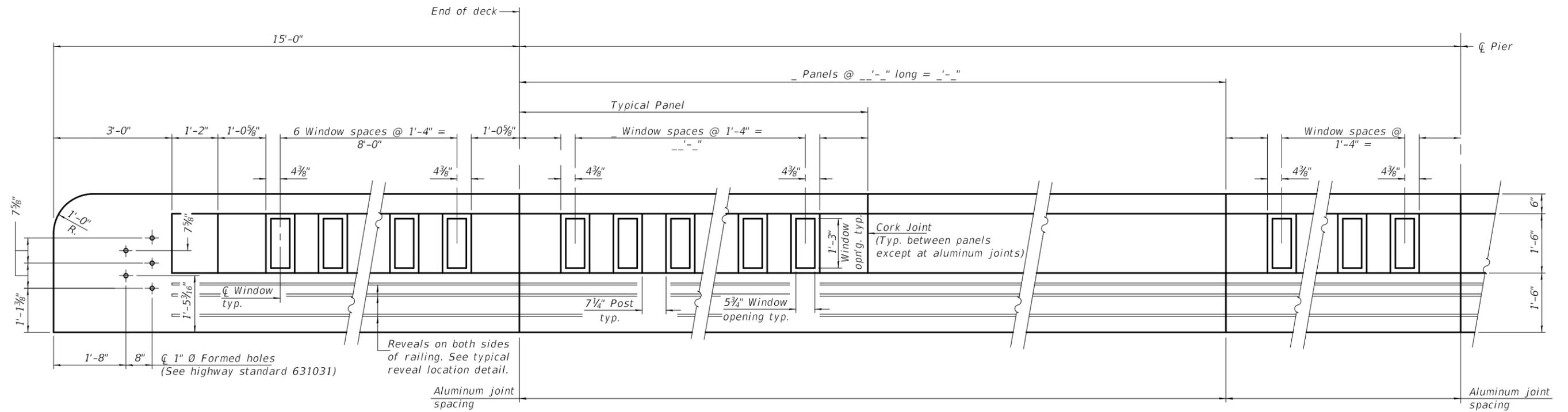
STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

STEEL RAILING, TYPE SM WITH HOT-MIX ASPHALT WEARING SURFACE
STRUCTURE NO.

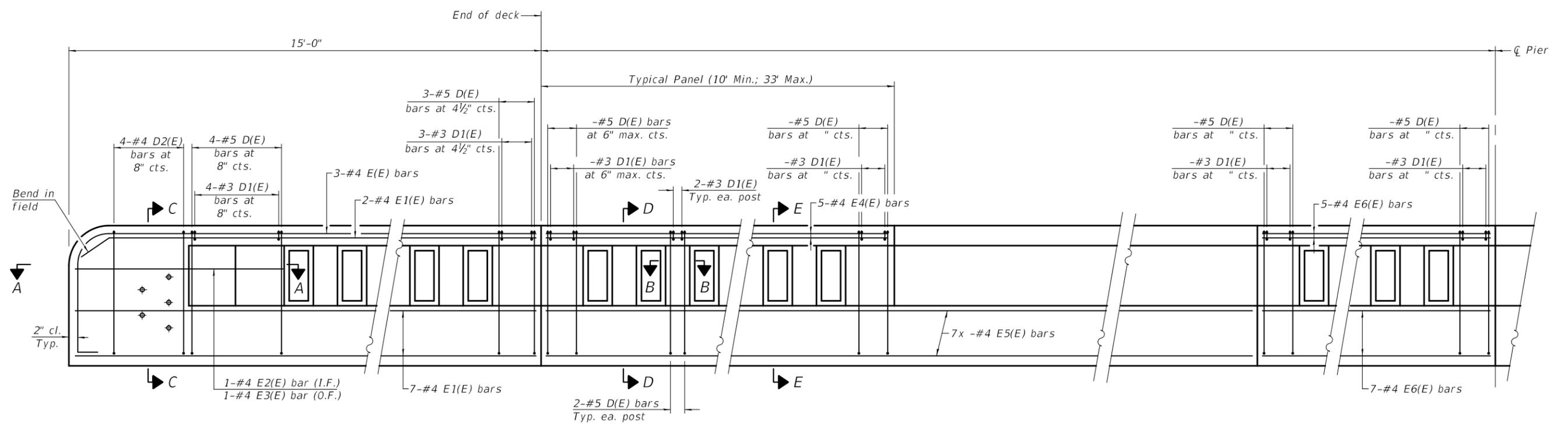
F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.

CONTRACT NO.

ILLINOIS FED. AID PROJECT



INSIDE ELEVATION OF RAILING
(Showing Dimensions)



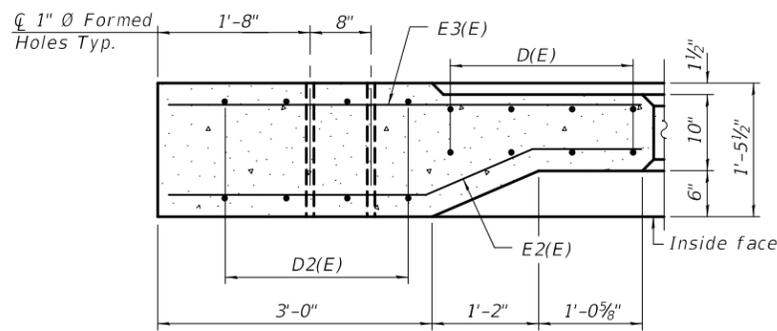
INSIDE ELEVATION OF RAILING
(Showing Reinforcement)

Notes: Adjust reinforcement spacings as required to miss 1" Ø formed holes.
Bars indicated thus 7 x _-#4 etc. indicates 7 line of bars with _ lengths per line.
The average weight of railing is 560 plf.

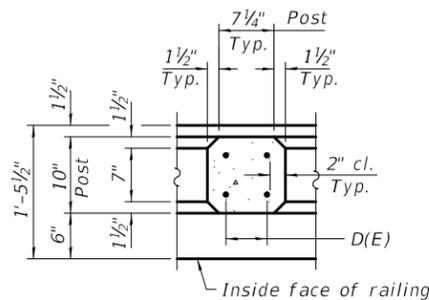
R-38 2-17-2017

(Sheet 1 of 2)

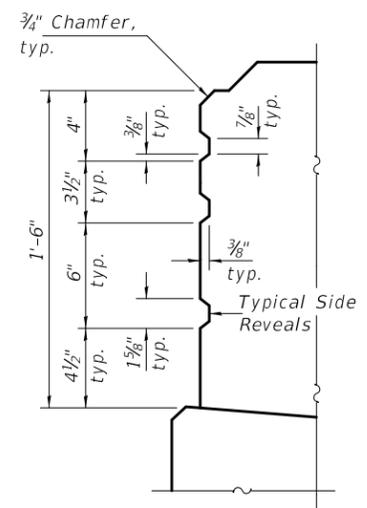
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PLOT DATE =	CHECKED -	REVISOR -								



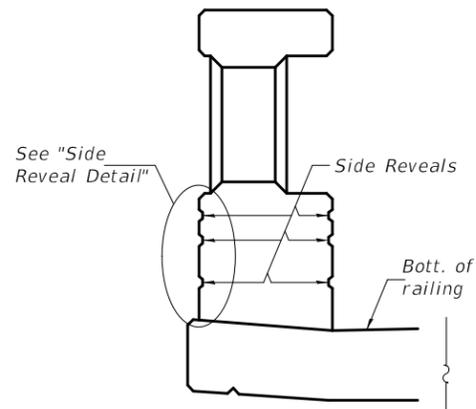
SECTION A-A



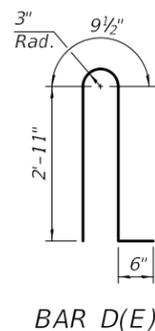
SECTION B-B



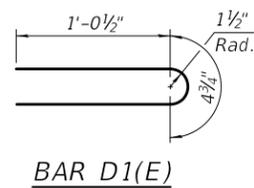
SIDE REVEAL DETAIL



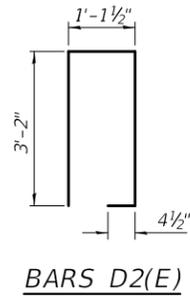
TYPICAL REVEAL LOCATION DETAIL



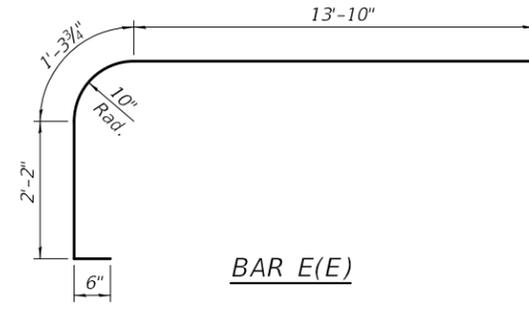
BAR D(E)



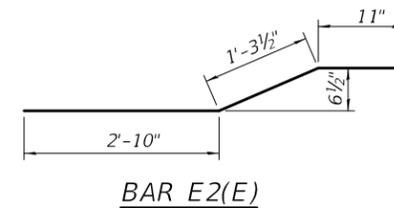
BAR D1(E)



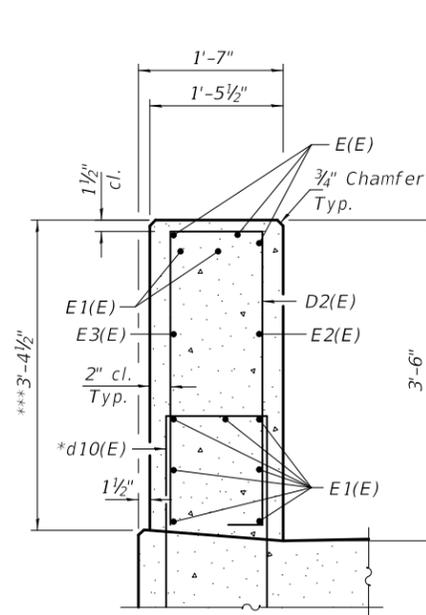
BARS D2(E)



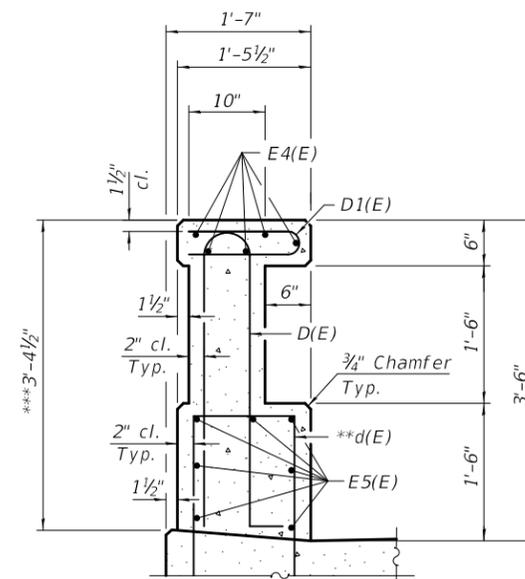
BAR E(E)



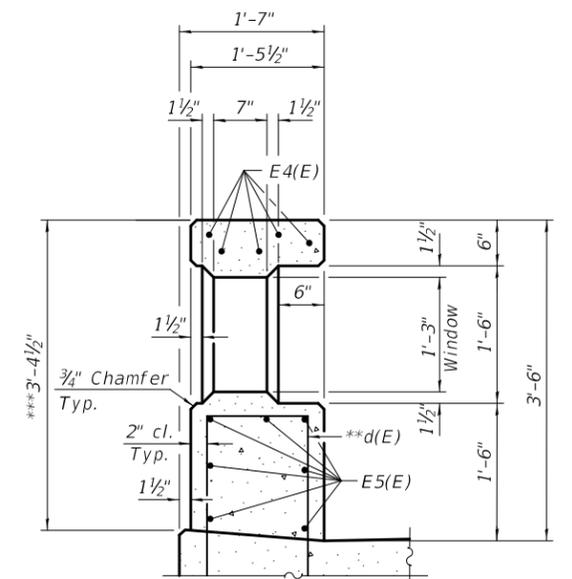
BAR E2(E)



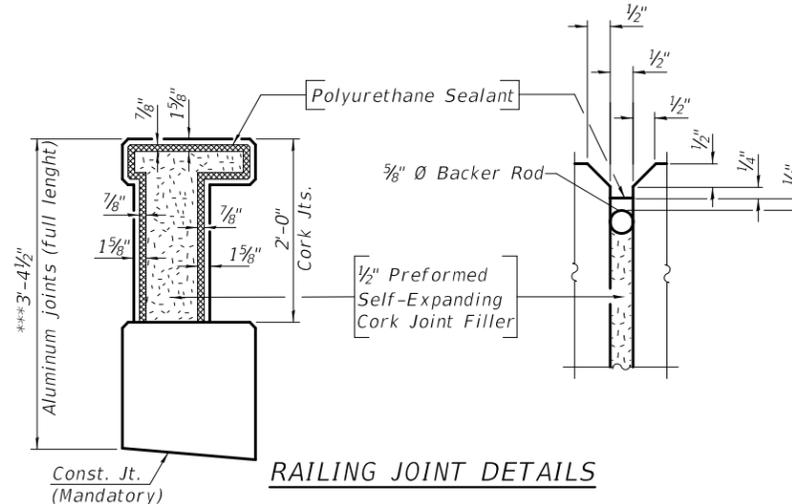
SECTION C-C



SECTION D-D



SECTION E-E



RAILING JOINT DETAILS

Notes:

- The 1/8" Aluminum sheet shall be ASTM B 209 alloy 3003-H14 and coated to minimize reaction with wet concrete. Cost included with Concrete Bridge Railing, TL-4.
- The Polyurethane Sealant shall be non-staining gray one component non-sag elastomeric gun grade meeting the requirements of ASTM C-920, Type S, Grade NS, Class 25. Use T with a 5/8" backer rod.
- The 1/2" Preformed Self-Expanding Cork Joint Filler shall be according to Article 1051.07 of the Std. Spec. Cost included with Concrete Bridge Railing, TL-4.
- All concrete for railing wall shall be Class BS according to Art. 1020.04 of the Standard Specifications. Surface of railing shall receive a rubbed finish according to Art. 503.15(b) of the Standard Specifications.
- All parts of the railing including concrete and reinforcing will be paid for at the contract unit price per foot for Concrete Bridge Railing, TL-4. Holes and recesses must be formed or cored. Drilling is not permitted.

- * d10(E) bars included in Approach Bill of Material.
- ** d(E) bars included in Superstructure Bill of Material.
- *** 3'-6" when placed on sidewalk.

TWO RAILINGS BAR LIST

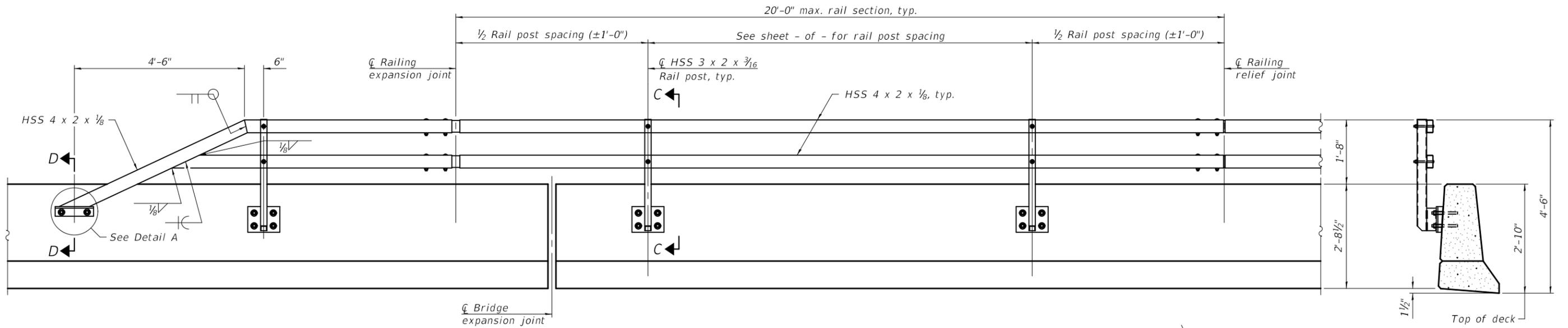
(For information only)

Bar	No.	Size	Length	Shape
D(E)		#5	7'-2"	U
D1(E)		#3	2'-6"	U
D2(E)	16	#4	7'-10"	U
E(E)	12	#4	17'-10"	U
E1(E)	36	#4	14'-8"	U
E2(E)	4	#4	5'-1"	U
E3(E)	4	#4	5'-0"	U
E4(E)		#4		U
E5(E)		#4		U
E6(E)		#4		U

BILL OF MATERIAL

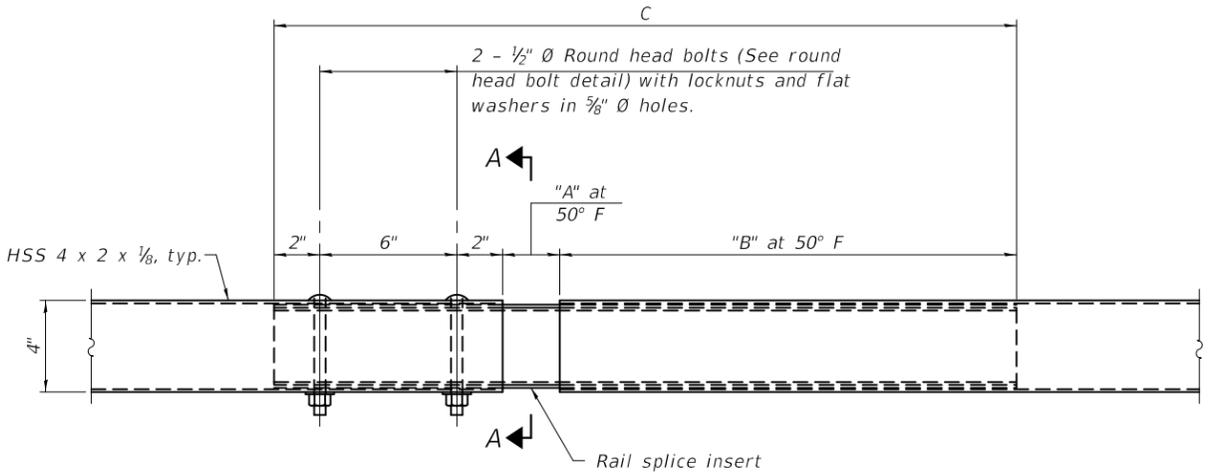
Item	Unit	Quantity
Concrete Bridge Railing, TL-4	Foot	

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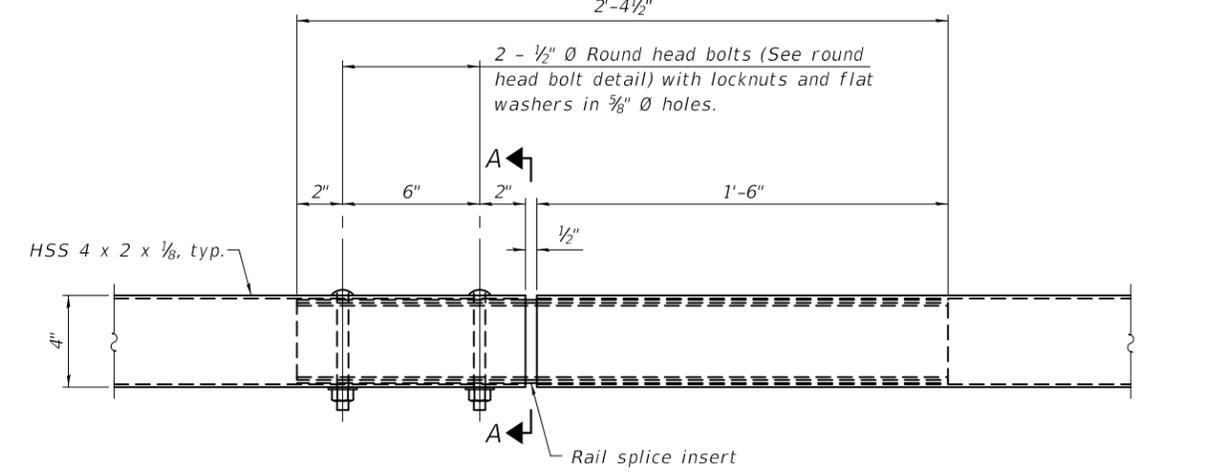


OUTSIDE ELEVATION OF PARAPET

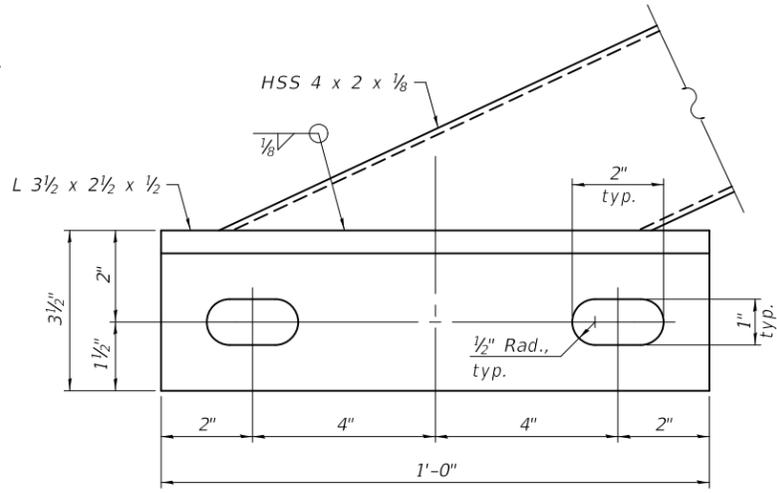
SECTION THRU PARAPET
(Taper backed parapet shown, straight backed parapet similar)



RAIL SPLICE ELEVATION
(At railing expansion joint)



RAIL SPLICE ELEVATION
(At railing relief joint)

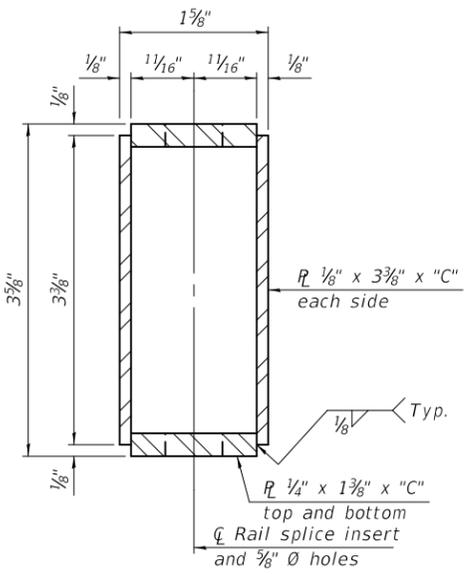


DETAIL A
(Bolts omitted for clarity)

SPLICE DIMENSIONS

*T	A	B	C
≤ 4"	2 1/2"	1'-8"	2'-8 1/2"
≤ 6 1/2"	3 3/4"	1'-9 1/4"	2'-11"
≤ 9"	5"	1'-10 1/2"	3'-1 1/2"
≤ 13"	7"	2'-0 1/2"	3'-5 1/2"

*T = Total movement at expansion joint (as shown on the design plans)



SECTION A-A

Notes:
 This work shall be according to Section 509 of the Standard Specifications except as noted.
 Rail posts shall not be located closer than 1'-3" to an existing bridge expansion joint or end of bridge.
 Railing expansion joints shall be provided between any two (2) posts which span a bridge expansion joint.
 Railing relief joints shall be placed between rail sections that do not span over an expansion joint.
 All structural steel tubing, post and railing shall be CVN tested according to 1006.34(b).
 Threaded rods shall be ASTM F1554, Grade 36 (or an Engineer-approved alternate material) of the grade(s) and diameter(s) specified. The corresponding specified grade of AASHTO M314 may be used in lieu of ASTM F1554.
 All structural steel plates shall be AASHTO M270, Grade 36.
 This work will be paid for at the contract unit price per foot for BICYCLE RAILING (PARAPET MOUNTED).

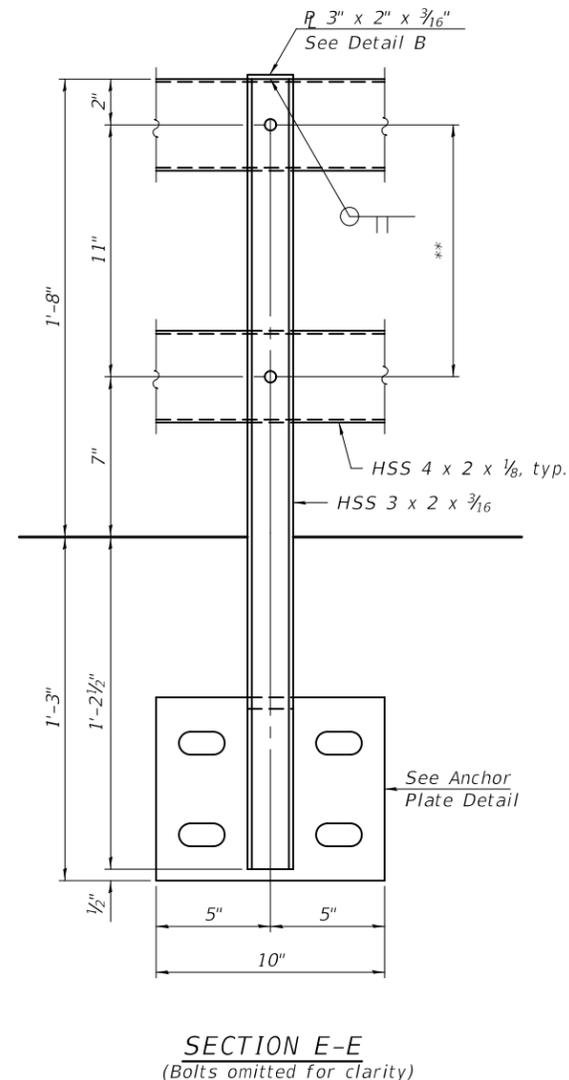
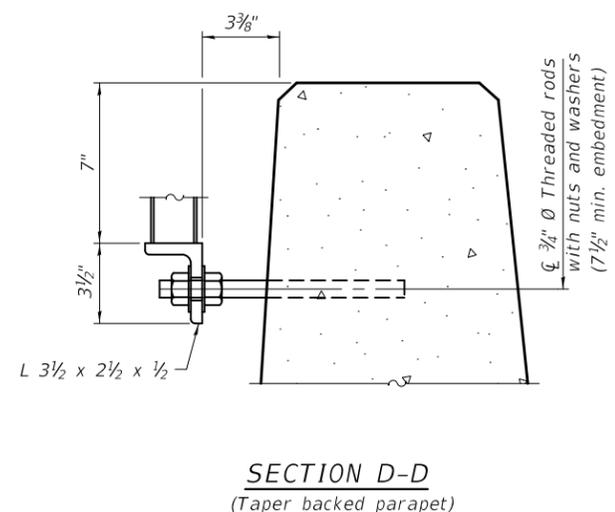
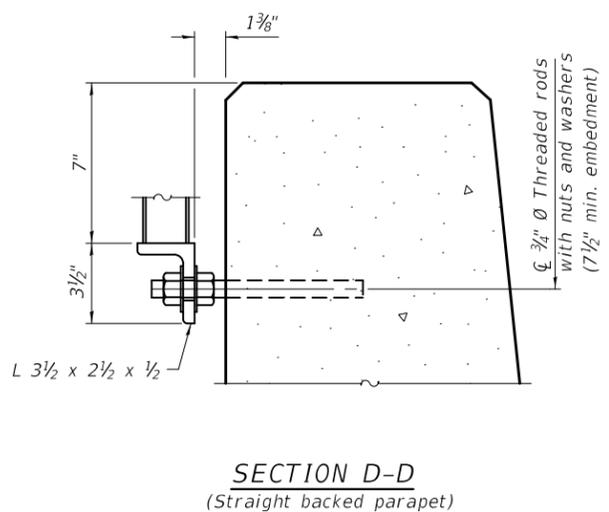
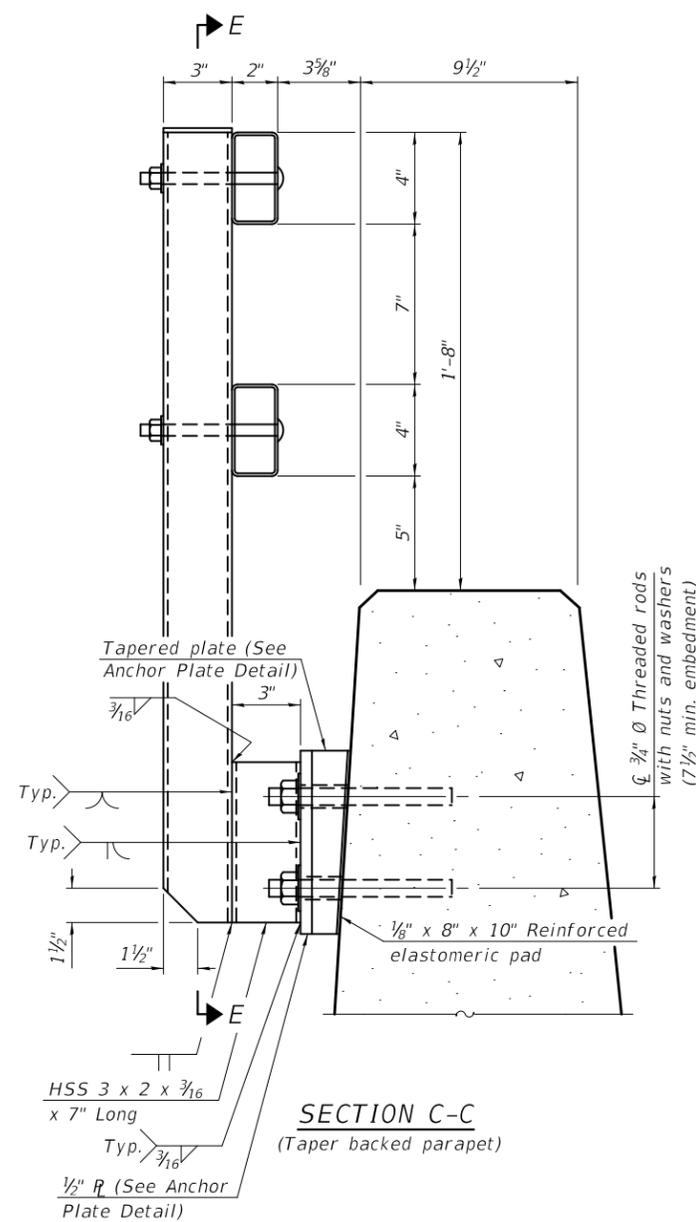
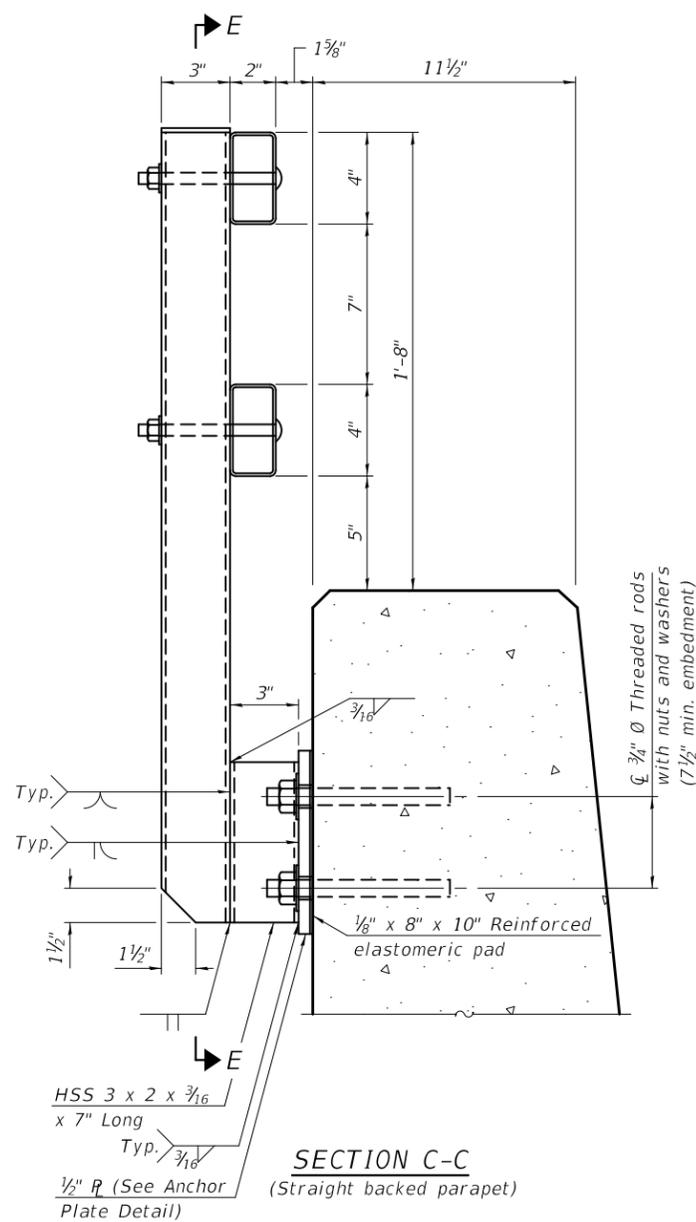
BILL OF MATERIAL

Item	Unit	Quantity
Bicycle Railing (Parapet Mounted)	Foot	-

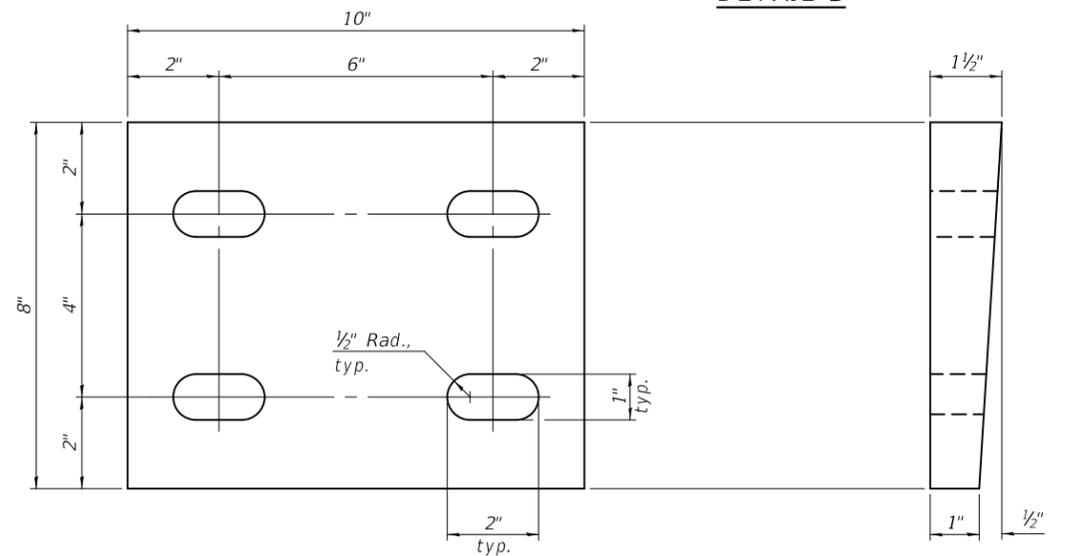
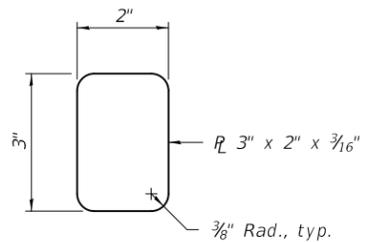
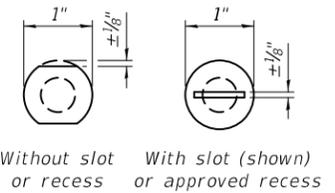
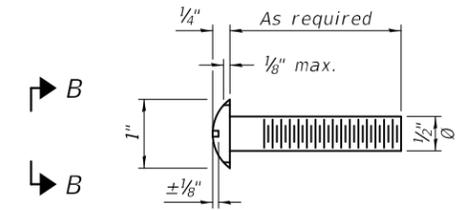
R-39

2-17-2017 (7'-0" to 10'-0" Post Spacing)

(Sheet 1 of 2)



** $\varnothing 1/2$ " Round head bolts with locknut and flat washer.
 $3/8$ " \varnothing holes in hollow structural section may be drilled in the field.



SECTION THRU TAPERED PLATE

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2-17-2017

(Sheet 2 of 2)

FILE NAME =	USER NAME =	DESIGNED -	REVISD -	STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION	BICYCLE RAILING (PARAPET MOUNTED) STRUCTURE NO.	F.A. RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.	
		CHECKED -	REVISD -			CONTRACT NO.					
		DRAWN -	REVISD -			ILLINOIS FED. AID PROJECT					
		PLOT SCALE =	REVISD -								
		PLOT DATE =	CHECKED -								