

**GENERAL NOTES**

Expansion joint material shall meet AASHTO Specification M-213.

No field welding of any kind shall be permitted on the flanges of steel girders, unless specifically called for on the plans.

Grade 60 reinforcing steel is required.

All reinforcing steel shall be epoxy-coated, unless otherwise noted.

The following table gives the minimum lap splice length for reinforcing bars:

Bar Size: #4 #5 #6 #7 #8 #9 #10 #11

Splice length for Concrete Class D 1'-3" 1'-6" 1'-10" 2'-2" 2'-10" 3'-7" 4'-7" 5'-7"

The Contractor shall be responsible for the stability of the structure during the construction.

Permanent deck forms are not allowed.

Stations, elevations, and dimensions contained in these plans are calculated from the "As Constructed" plans. Those stations, elevations, and dimensions may be adjusted to meet the existing structure. The Contractor shall verify all dependent dimensions in the field before ordering or fabricating any material.

The existing steel girders, bearings and diaphragms shall be painted in accordance with the Special Provision 509, Paint Existing Structure. The color shall be Dark Brown equivalent to Federal Standard 595B color No. 30108, and is to be selected from 10' x 10' test panels provided by the contractor.

A colored structural concrete coating finish will be required as shown in the plans. The color shall be Light Brown equivalent to Federal Standard 595B color No. 33531, and is to be selected from 10' x 10' test panels provided by the contractor.

**DESIGN DATA**

AASHTO, 15<sup>th</sup> Edition with 1994 Interims.

Design Method: Allowable Stress Design.

Live Load: AASHTO HS-20-44 and Alternate Military Loading.  
 Dead Load: Assumes 48 lbs. per sq. ft. for bituminous pavement.

Reinforced Concrete:

Class D Concrete:  $f_c = 1,800$  psi,  $n = 8$ ,  $f'_c = 4,500$  psi.

Reinforcing Steel:  $f_u = 24,000$  psi,  $f_y = 60,000$  psi.

Structural Steel:

AASHTO M-183 (ASTM A-36)  $f_u = 20,000$ ,  $f_y = 36,000$ .

**SUMMARY OF QUANTITIES**

ITEM NO.	DESCRIPTION	UNIT	SUPER STRUCT	ABUT 1	PIER 2	PIER 3	PIER 4	PIER 5	ABUT 6	TOTAL	AS CONCT'D
202	Removal of Portions of Present Structure	LS.		0.50					0.50	1	1
202	Removal of Bridge Rail	LF.	654							654	653
202	Removal and Disposal of Paint	LS.	1							1	1
210	Rebuild Portions of Present Structure	LS.	1							1	1
403	Hot Bituminous Pavement (Patching)(Asphalt)	Ton	51.2	17.3					16.0	84.5	82.85
509	Paint Existing Structure	Ea.	1							1	1
518	Bridge Expansion Device (0-2 Inch)	LF.	362							362	366
519	Epoxy Resin (Injection)	LF.		41	126	185	330	227	52	961	1041
601	Structural Concrete Coating	Sq.Ft.	990	1,030	2065	1980	1825	1855	905	10650	11,913
601	Concrete Anchor	Ea.		155					155	310	333
601	Concrete Class D (Bridge)	Cu.Yd.		46					39	85	85
601	Concrete (Patching)	Cu.Yd.			0.5	0.5	0.5	0.5		2.0	1.24
602	Reinforcing Steel (Epoxy-Coated)	Lb.		3,314					3,173	6,487	6,487
606	Bridge Rail Type 10R	Ln.Ft.	436							436	436

● For breakdown and location per each substructure unit, see project plan quantity calculation package.

**INDEX OF DRAWINGS**

- Dwg. No. B 1 General Information - Summary of Quantities
- Dwg. No. B 2 General Layout
- Dwg. No. B 3 Abutment Details
- Dwg. No. B 4 Pier Details - Expansion Device Details
- Dwg. No. B 5 Bridge Rail Type 10R
- Dwg. No. B 6 Bridge Rail Type 10R
- Dwg. No. B 7 Bridge Rail Type 10R
- Dwg. No. B 8 Bridge Rail Type 10R
- Dwg. No. B 9 Median Barrier Details
- Dwg. No. B10 Bar List

**BRIDGE DESCRIPTION**

5 Span (37'-0", 46'-0", 46'-0", 54'-0", 31'-6")

Welded Girder Continuous. (Original Structure)

Concrete on Rolled I Beam. Continuous Composite. (Median Closure and Widened Portions of Structure).

Over Havana Street

68'-0" Roadway. Curb to Curb (W.B)  
 71'-0" Roadway. Curb to Curb (E.B.)  
 Skew 83° 16'. 1'-3" and 2'-0" curbs.

**WORK THIS PROJECT**

Repairs to Abutments and Piers, Rail Replacement, Asphaltic Deck Joints, Painting of Superstructure Steel, Structural Concrete Coating of Abutments, Piers, Curbs, Deck Overhangs

COLORADO DEPARTMENT OF TRANSPORTATION			
GENERAL INFORMATION SUMMARY OF QUANTITIES			
Station 209+93.55 to Station 212+11.28			
Near Denver		S. 24	T. 3S R. 67W
Designer J. Deland	Structure	E-17-JP	
Detailer B. Lere	Numbers		
Drawing Number B 1 of 10 Drawings			

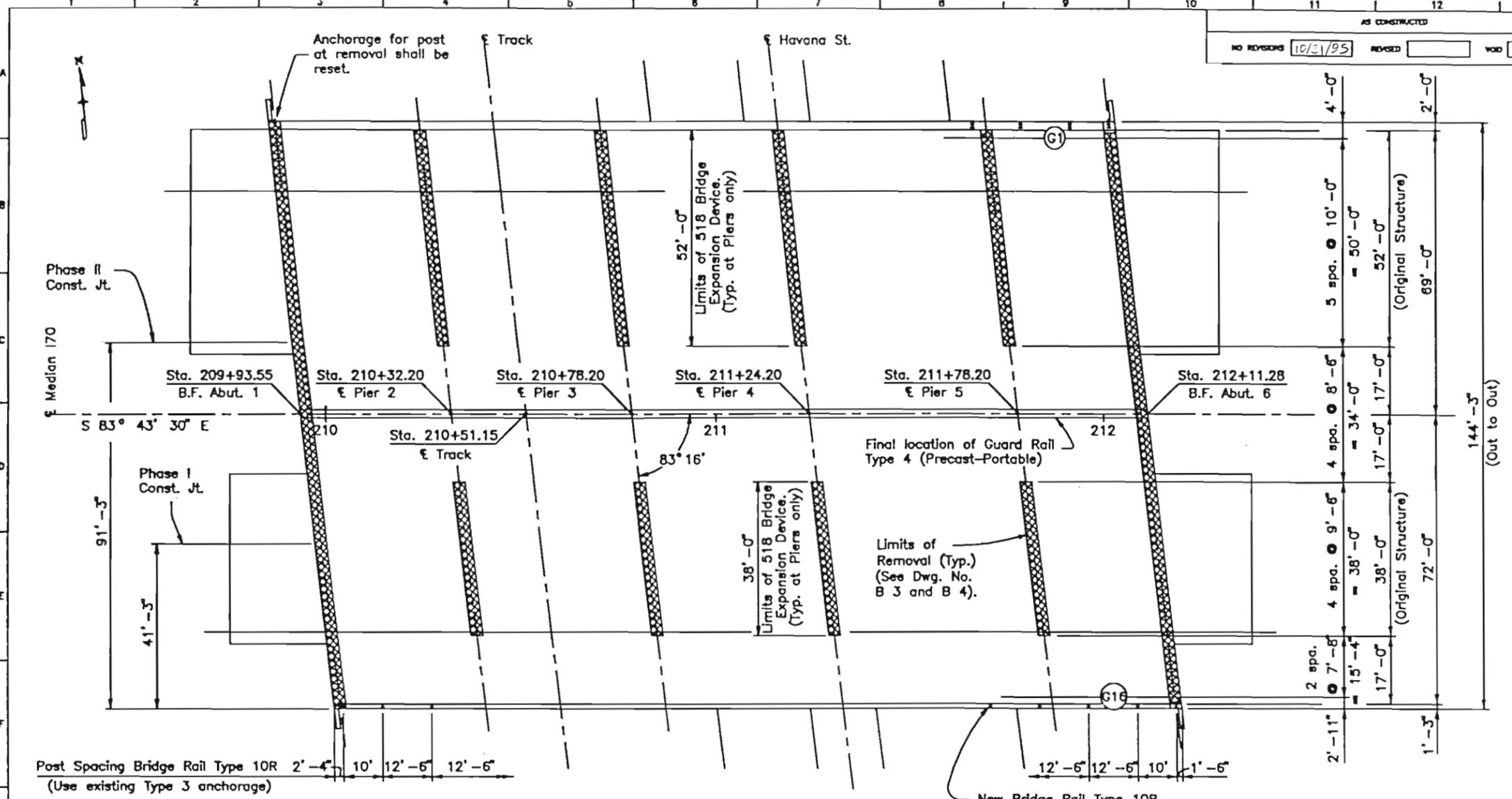
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JMO	11-92	JMO	11-92
BRL	12-92	BRL	12-92

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AS CONSTRUCTED		FEDERAL ROAD DISTRICT NO.	DIVISION	PROJECT NUMBER	SHEET NUMBER
NO REVISIONS	10/21/95	REVISED	COLORADO	IM 0704-173	26

REVISIONS	

Design	DATE	Checked By	Checked By
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**PLAN**

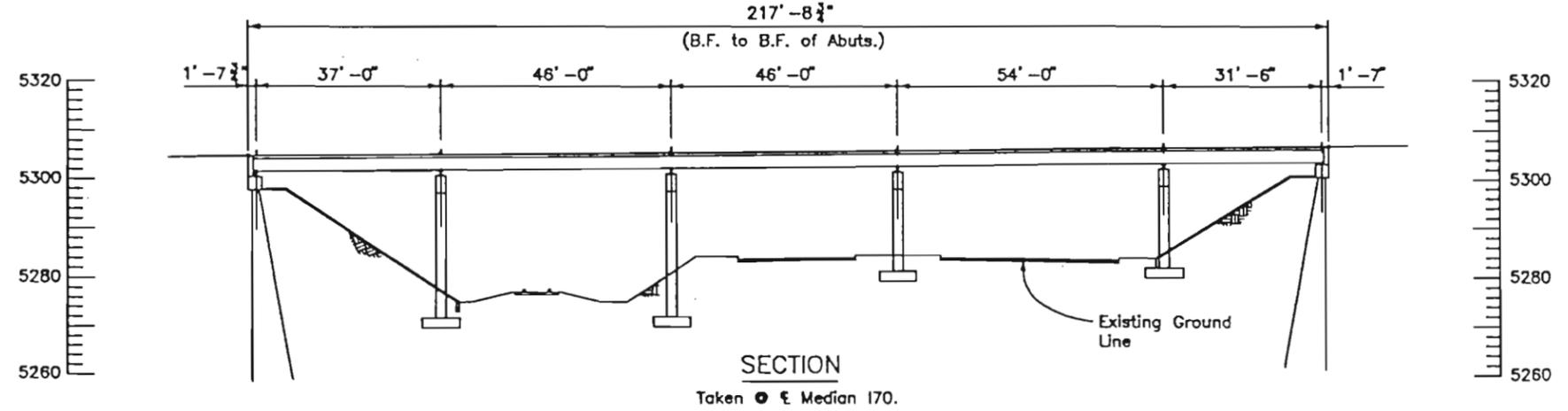
See Roadway Plans for construction phasing.

New Bridge Rail Type 10R (Use existing Type 3 anchorages) (Existing Bridge Rail Type 3 to be removed shall become the property of the Contractor.)

The original structures were built under Project 170-4(33)288 sheets 17-31A.

The median closure and widening was built under Project 170-4(71)280, sheets 14-33.

These plans are on file and available for inspection at CDOT Headquarters



**SECTION**

Taken @ Median 170.

COLORADO DEPARTMENT OF TRANSPORTATION

GENERAL LAYOUT

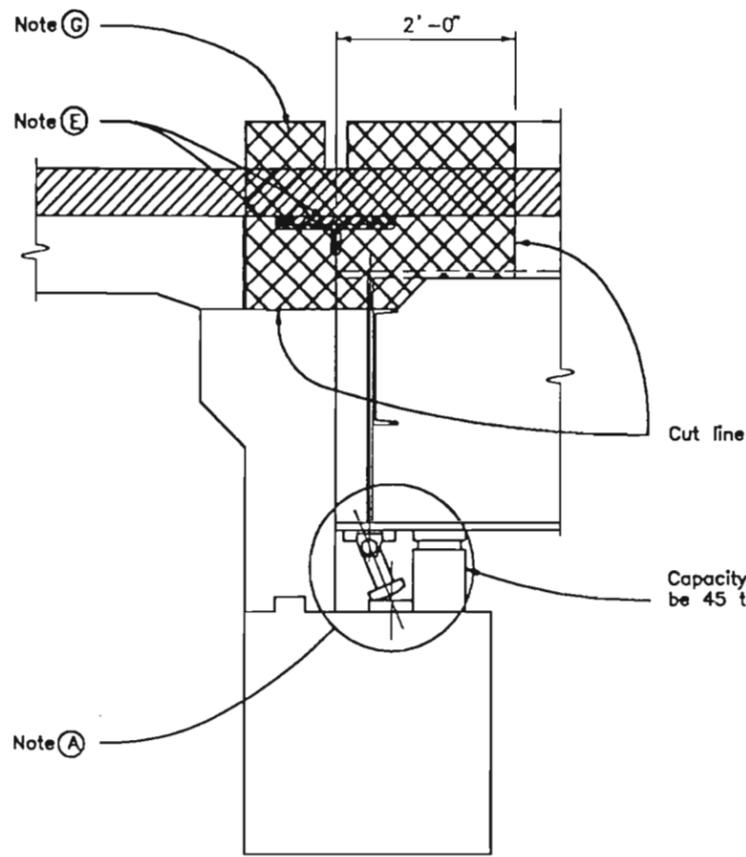
Designer J. DeLand	Structure E-17-JP
Detailer B. Lere	Numbers
Drawing Number B 2	of 10 Drawings

Revision	Date	(Preliminary Stage Only)

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AS CONSTRUCTED		FEDERAL ROAD REGION NO.	DIVISION	PROJECT NUMBER	SHEET NUMBER
NO REVISIONS	10/31/93	REVISED	VOID	IM 0704-173	27

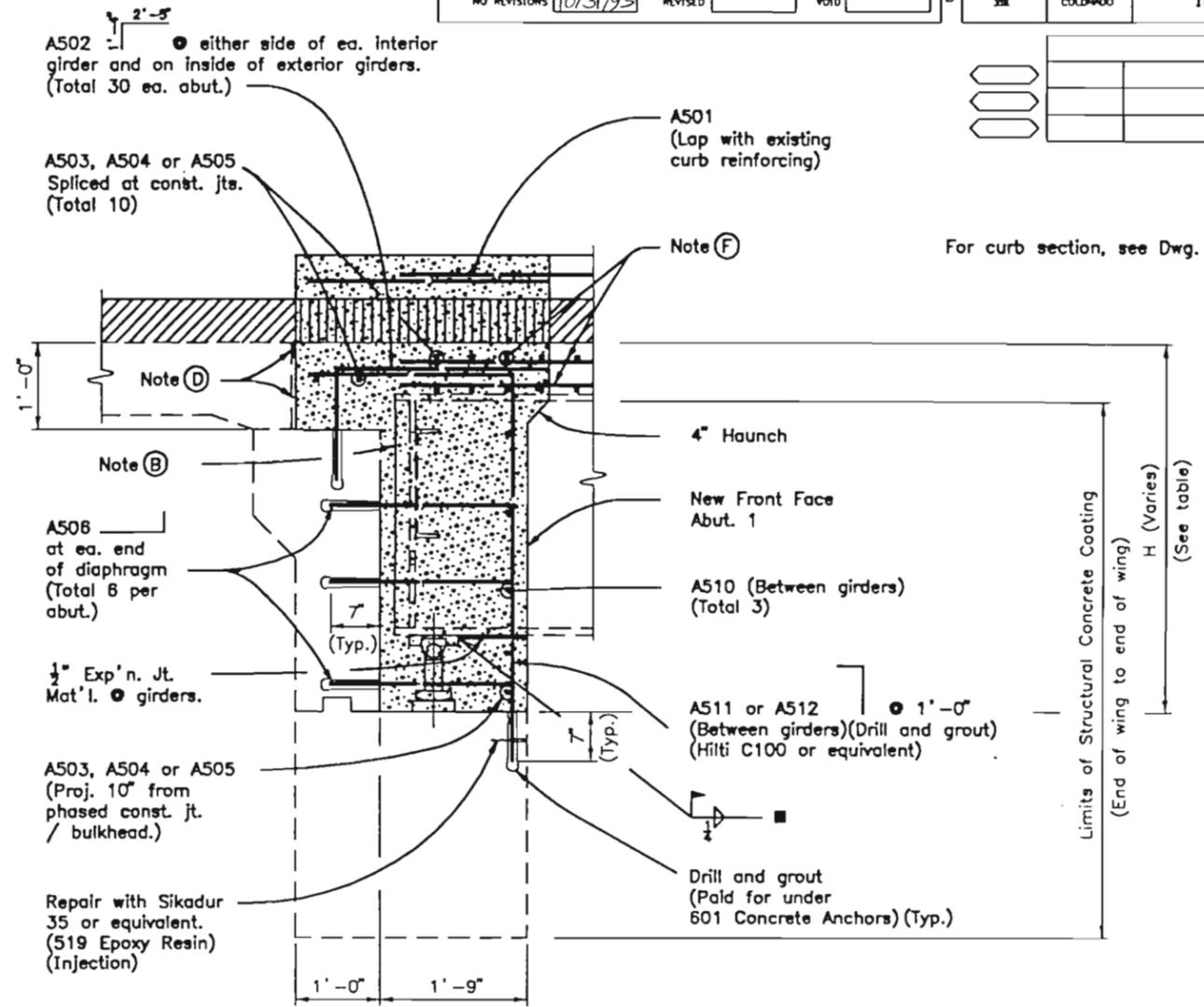
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**EXISTING ABUTMENT 1**

(Abut. 6 similar except fixed bearing.)

- Removal of Portions of Present Structure
- Existing Asphalt Mat. (Varies—Average 4")



**REPAIRED ABUTMENT 1**

(Abut. 6 similar except fixed bearing. Work under notes A, B, E, applies to Abut. 1 only.)

- New Concrete Class D (Bridge)
- Hot Bituminous Pavement (Patching)(Asphalt)(Average thickness 4")
- Paid for under Item 210 Rebuild Portions of Present Structure

For curb section, see Dwg. No. B 4.

Limits of Structural Concrete Coating  
(End of wing to end of wing)  
H (Varies)  
(See table)

Dimension H (● € brg. and € girder)			
Abut. 1		Abut. 6	
G1-G6	G7-G9	G1-G6	G7-G9
G10-G14	G15-G18	G10-G14	G15-G18
4'-3 1/2"	4'-5 7/8"	3'-7 1/2"	3'-4 3/4"
4'-3 1/2"	4'-5 7/8"	3'-7 1/2"	3'-4 3/4"

**NOTES:**

- (A) Cut weld at bottom flange and sole plate or remove flange to sole plate bolts. Straighten anchor bolts. Plumb rocker. ■
- (B) Cut 2" off end of all girders bearing against parapet, as directed by the Engineer. ■
- (C) Existing curb reinforcing to remain. (Clean and straighten)
- (D) 2" deep poured joint filler (Top). 1/2" exp'n. jt. mat'l. (Bottom).
- (E) Remove expansion device and end dam.
- (F) Existing longitudinal deck steel shall proj. from cut line. (Clean and straighten) Existing transverse deck steel shall be replaced.

Diaphragm is placed from end of abutment seat to end of abutment seat and shall be phased according to the construction phasing details shown on phasing sheets and const. jt. location shown on Dwg. No. B 1.

Abutment diaphragm shall cure at least 2 days before any epoxy resin injection work on the abutment is started.

A phase of construction shall not be opened to the traffic until the concrete has attained the Field Compressive Strength.

**COLORADO  
DEPARTMENT OF TRANSPORTATION**

**ABUTMENT DETAILS**

Designer J. Deland	Structure	E-17-JP
Detailer B. Lore	Numbers	
Drawing Number B 3 of 10		Drawings

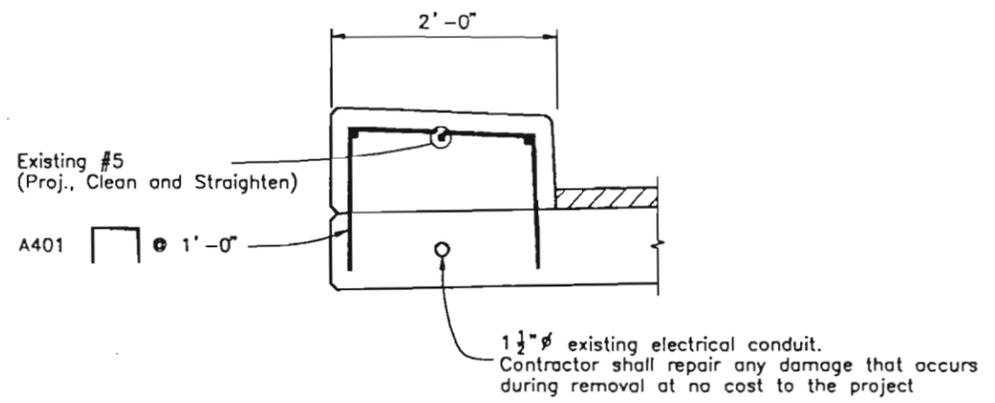
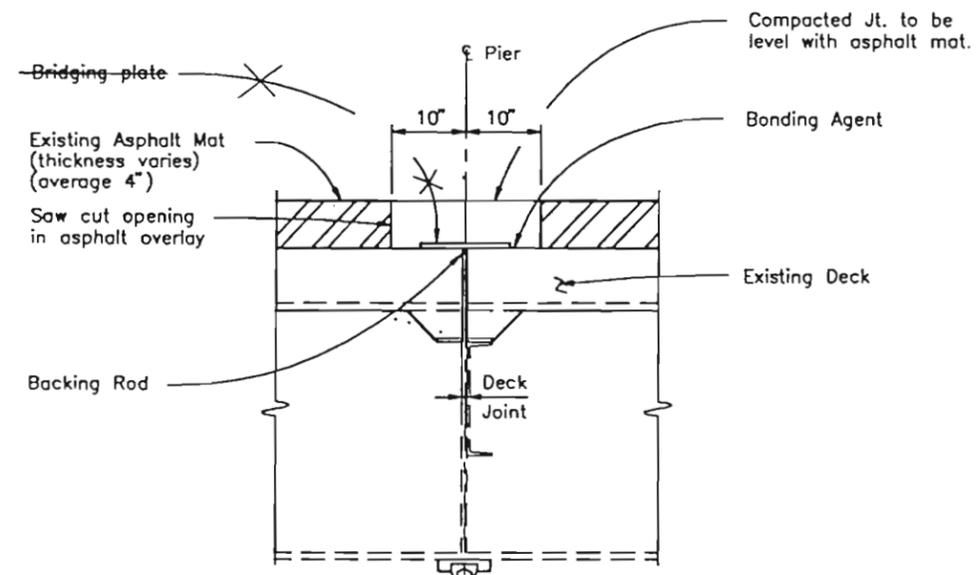
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JMD	11-82	JMD	12-92
Designed By		Checked By	
Detailed By		Checked By	
Quantity By		Checked By	

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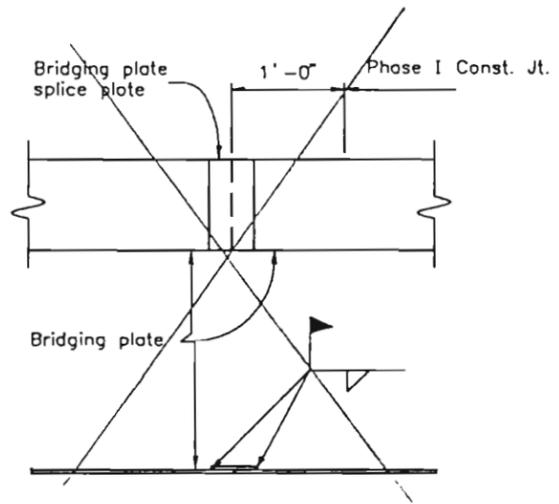
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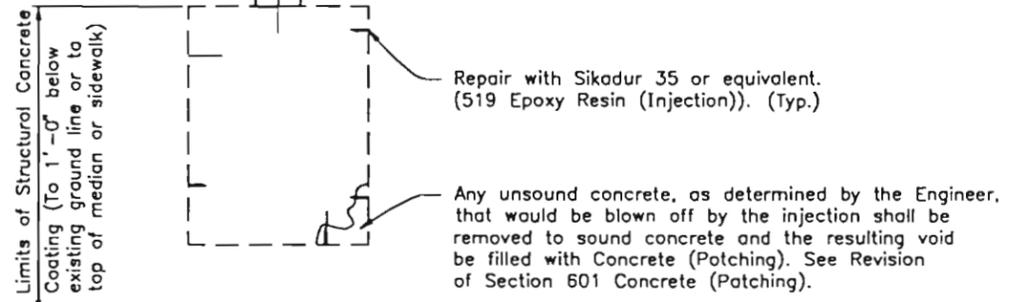
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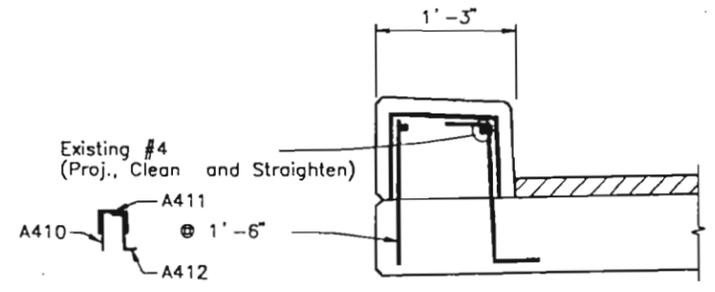
2'-0" CURB at ABUTMENT 1



BRIDGING PLATE SPLICE



REPAIRED PIER



1'-3" CURB at ABUTMENT 1

**NOTES:**

The expansion joint system shall include all labor and material to install the expansion joint according to the manufacturer's direction and according to these plans.

The backer rod shall be secured and sealed according to the manufacturer's directions.

The plate shall be the size and type recommended by the manufacturer and installed in accordance with the manufacturer's direction.

The joint bonding agent shall be the type recommended by the manufacturer for the joint system being installed. It shall be applied according to the manufacturer's recommendations.

All surfaces in the joint opening shall be cleaned according manufacturer's directions.

The joint shall be installed and compacted according to the manufacturer's procedures.

The finished joint after compacting shall be flush with the top of the adjacent asphalt surface.

A representative of the manufacturer shall be on site prior to installing the expansion joints and shall approve the methods and material before work commences.

Bridge Expansion Device shall be phased according to the construction phasing details shown on Construction phasing sheets and the construction joint locations shown on Dwg. No. B 1.

The following Expansion Joint Systems have been approved and ~~may~~ be used on this project:  
w.d.s.  
Koch B J S System  
~~Linear Dynamics Thorma-Joint~~  
~~Watson-Bowman Acme Expandex~~

Design		Detail		Quantities	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
JMD	11-92	BRL	12-92	JMD	12-92
Designed By		Detailed By		Quantities By	
Checked By		Checked By		Checked By	

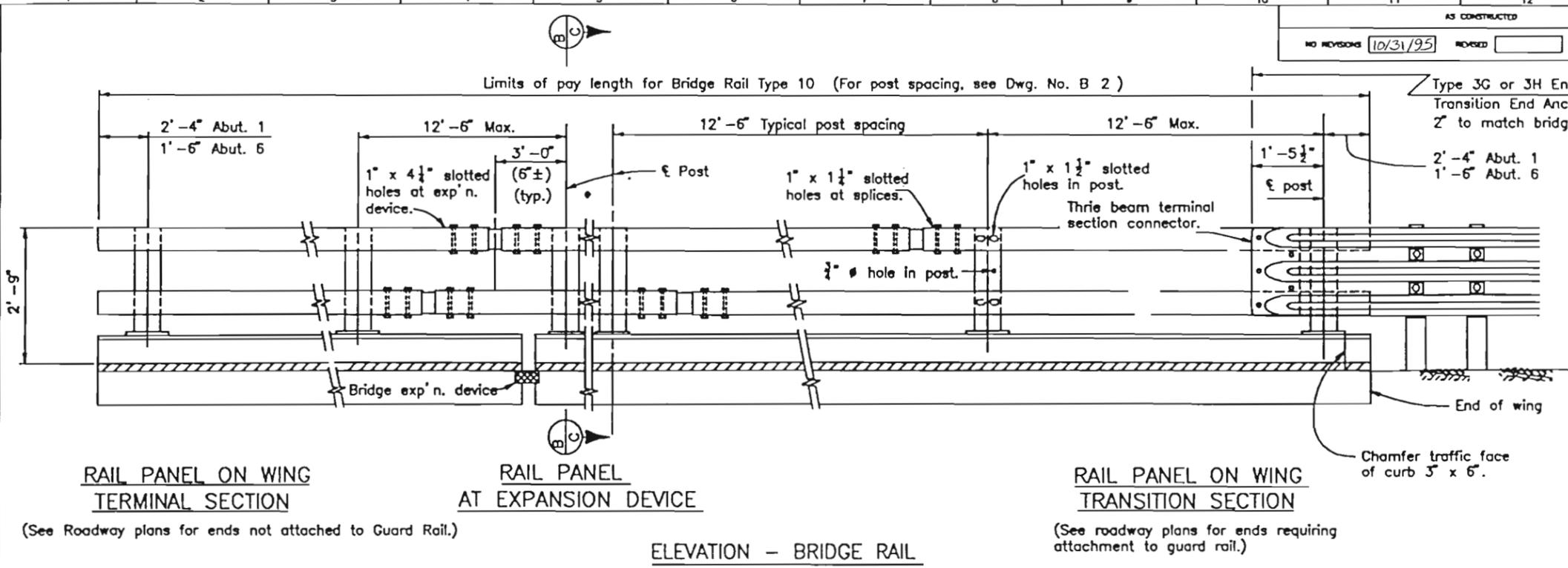
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COLORADO DEPARTMENT OF TRANSPORTATION		
PIER DETAILS EXPANSION DEVICE DETAILS		
Designer J. Deland	Structure	E-17-JP
Detailer B. Lere	Numbers	
Drawing Number B 4 of 10 Drawings		
Revision Dates (Preliminary Stage Only)		

AS CONSTRUCTED		FEDERAL ROAD DISTRICT NO.	DIVISION	PROJECT NUMBER	SHEET NUMBER
NO REVISIONS	10/31/95	REVISED	VOID	IM 0704-173	29

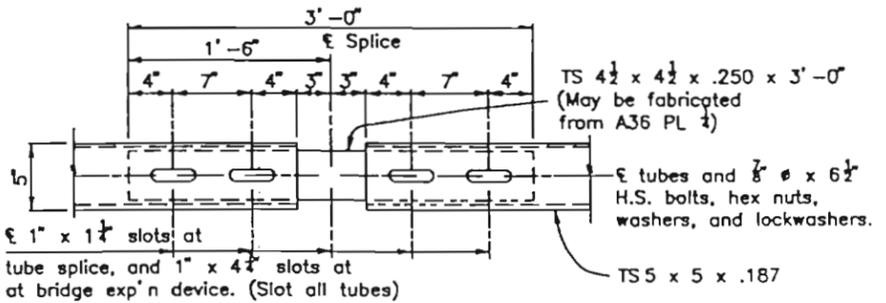
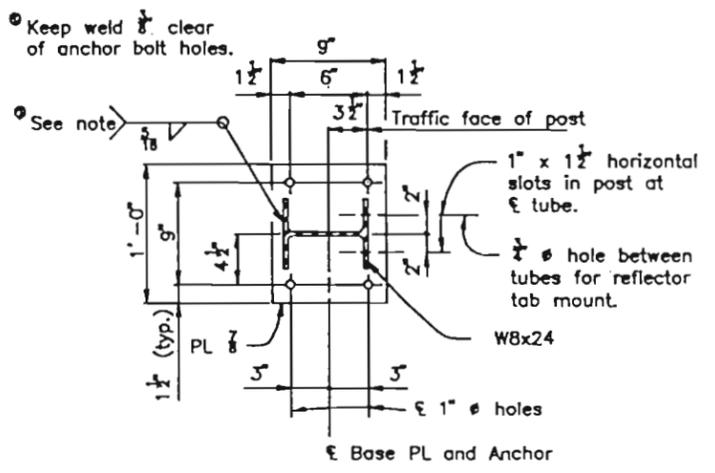
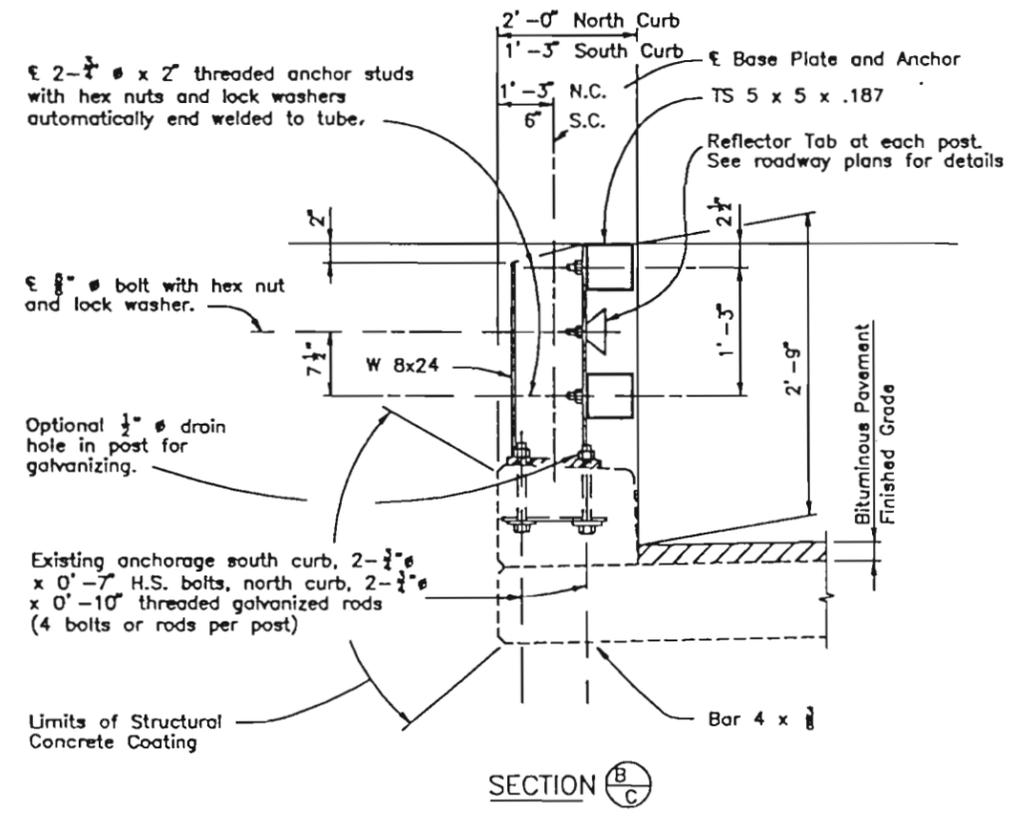
REVISIONS	

**Notes:**  
 All tubes shall be fabricated from ASTM A-500 Grade B.  
 All posts shall be fabricated from ASTM A-36 steel.  
 The above material and all anchor bolts and miscellaneous bolts, nuts, and washers shall be galvanized after fabrication in accordance with the specifications.  
 The tubes shall be shop bent or fabricated to fit horizontal curve when radius is less than 1,500 feet.  
 Tubes shall be continuous over not less than two posts.  
 The centerline of the posts at the bridge expansion device shall be a minimum of 3'-0" from the centerline of the bridge expansion device, measured along the centerline of posts.  
 All bolts that have lock washers shall be tightened to snug only.  
 Posts shall be perpendicular to the grade of the deck.  
 One or more 12'-6" post spacings may be reduced (8'-4" min.) in order to maintain dimensions from the end of the wings and expansion joints.  
 Optional drain hole for galvanizing may be drilled, punched, or clipped leaving smooth surfaces and transitions. No flame cutting or air carbon arc gouging is allowed.  
 Posts, post anchors, base plates, backing plates, anchor bolts, miscellaneous bolts, nuts, washers, tubes, tube expansion devices, tube splices, end plates, curb concrete (Class D), curb reinforcing steel, and reflector tabs shall be included in Item 606 - Bridge Rail Type 10.  
 Prior to fabrication of this item, two sets of shop drawings which comply with the requirements of Section 105, shall be submitted to the Division for information only. One set shall be sent to the Colorado Division of Highways, Staff Materials Branch Inspection Unit, 4340 E. Louisiana Avenue, Denver, Colorado 80222. One set shall be sent to the Engineer. The shop drawings will not be approved or returned.  
**Structural Steel:**  
 AASHTO M-183 (ASTM A-36)  $f_y = 36,000$  psi  
 Cold formed ASTM A-500 Grade B  $f_y = 46,000$  psi  
 For additional details see next rail sheets.



Quantity	INITIAL	DATE
Quantity	INITIAL	DATE

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Stagger top and bottom splices into different post spacings except at expansion joint, place at opposite ends of same post space. (Range of motion = 1'-0" at bridge expansion device.)

**INFORMATION ONLY**

Description	Unit	Per Lin. Ft.
Structural Steel (Galvanized)	Lb.	33.1

**COLORADO DEPARTMENT OF TRANSPORTATION**

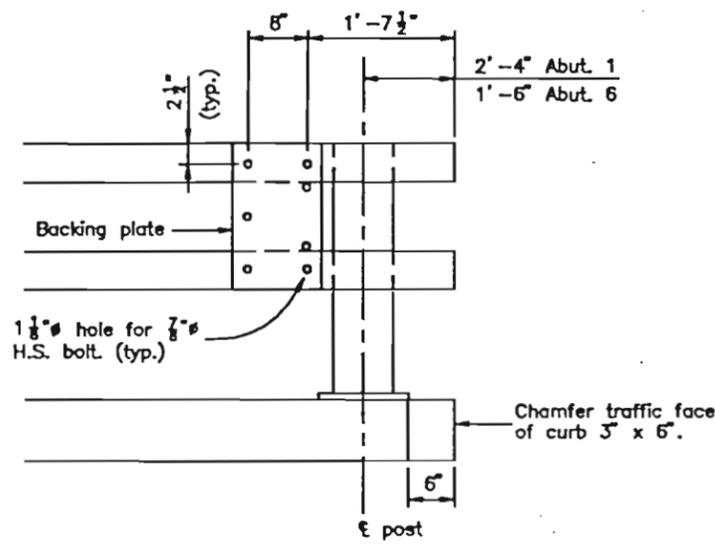
**BRIDGE RAIL TYPE 10R**

Designer J. DeLand	Structure	E-17-JP
Detailer B. Lere	Numbers	
Drawing Number B 5 of 10		Drawings

Revision Dates	(Preliminary Stage Only)
8-90 11-90 11-91 03-92	

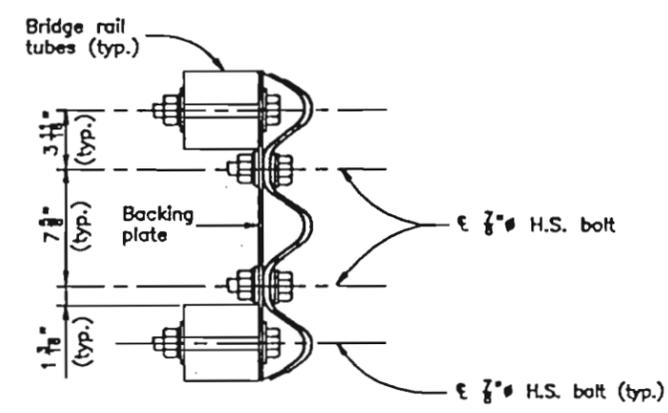
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Design		Detail		Quantity	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE
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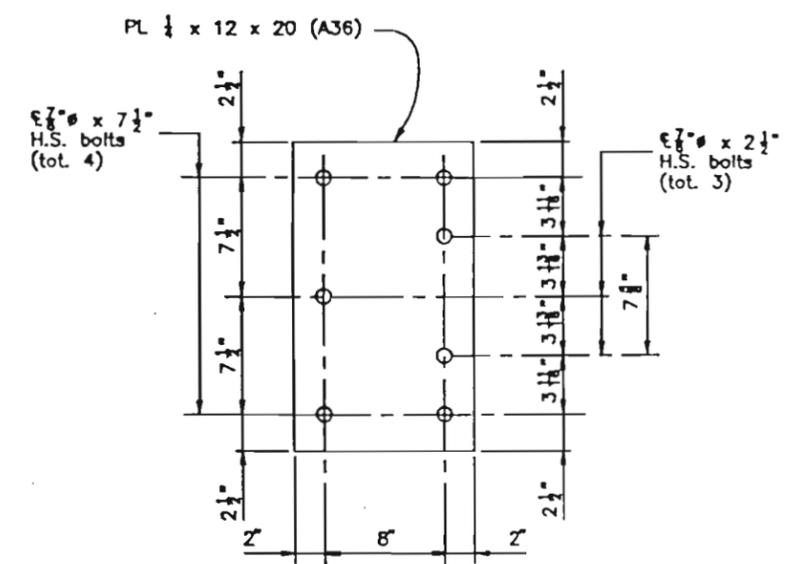


**RAIL TUBE DETAILS**

Three beam not shown.

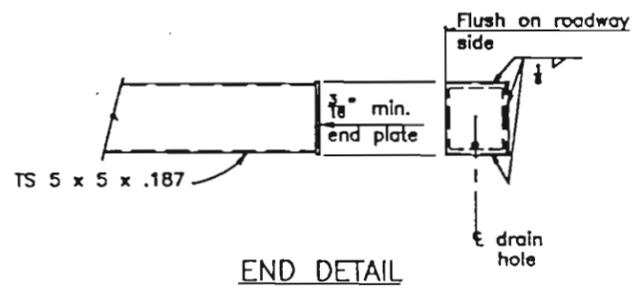


**SECTION THRU BACKING PLATE**



**BACKING PLATE**

Holes are 1 1/8" for 7/8" H.S. bolts with hex nuts, 2 PL washers, and 1 lock washer.



**END DETAIL**

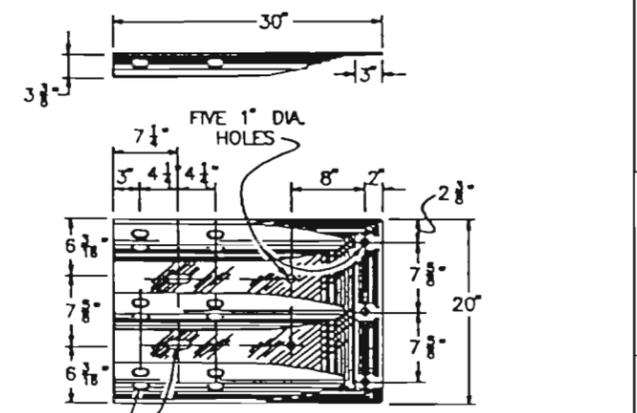
COLORADO DEPARTMENT OF TRANSPORTATION		
BRIDGE RAIL TYPE 10R		
Designer J. DeLand	Structure	E-17-JP
Detailer B. Lere	Numbers	
Drawing Number B 6	of 10	Drawings

Revision Date	(Preliminary Stage Only)
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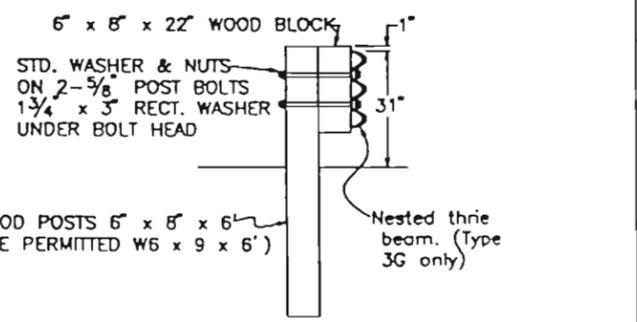
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FEDERAL ROAD DISTRICT NO.	DIVISION	PROJECT NUMBER	SHEET NUMBER
308	COLORADO	IM 0704-173	31

NOTES  
 TYPE 3G END ANCHORAGE IS FOR USE AT BOTH ENDS OF BRIDGES ON TWO-WAY ROADS AND AT THE APPROACH END OF BRIDGES ON ONE-WAY ROADS.  
 TYPE 3H END ANCHORAGE IS FOR USE AT THE TRAILING END OF BRIDGES ON ONE-WAY ROADS.  
 THIS SHOWS RECTANGULAR WASHER IS REQUIRED UNDER POST BOLT HEAD.  
 SEE STD. M-606-12 FOR END ANCHORAGE CONNECTION TO TYPE 4 GUARDRAIL



3/4" x 2 1/2" POST BOLT SLOT (OPTIONAL)  
 TWELVE 29/32" x 1 1/8" SLOTS. MUST MATCH RAIL SPLICE SLOTS.  
 RE-63 (CLASS B, TYPE 1 OR 2)-76 (GALV.)  
 RE-63 (CLASS B, TYPE 4)-76 (CORR. RESIST.)

**THRIE BEAM TERMINAL SECTION (CONNECTOR)**



ALL WOOD POSTS 6" x 8" x 6"  
 (ALTERNATIVE PERMITTED W6 x 9 x 6')  
 Nested thrie beam. (Type 3G only)  
 BACKUP PLATE NOT REQUIRED AT GUARDRAIL POSTS ON TYPE 3G AND 3H.

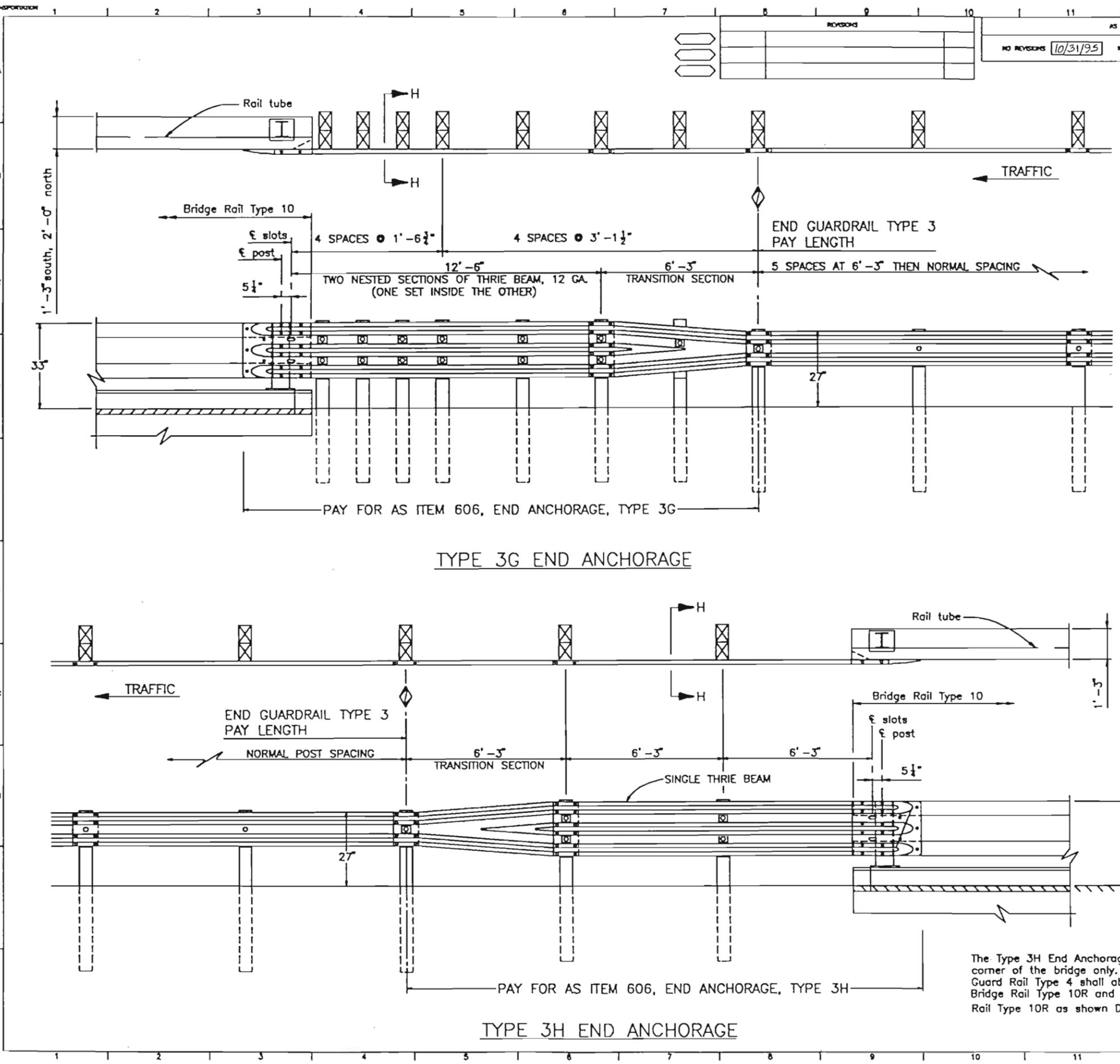
COLORADO  
DEPARTMENT OF TRANSPORTATION

BRIDGE RAIL TYPE 10 R

Designer	J. DeLand	Structure	E-17-JP
Detailer	B. Lere	Numbers	
Drawing Number	B 7	of	10 Drawings

The Type 3H End Anchorage shown is for the northwest corner of the bridge only. For the southeast corner the Guard Rail Type 4 shall abut up against the end of the Bridge Rail Type 10R and be connected to the Bridge Rail Type 10R as shown Dwg. B8.

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DATE	11-92	
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**TYPE 3G END ANCHORAGE**

**TYPE 3H END ANCHORAGE**

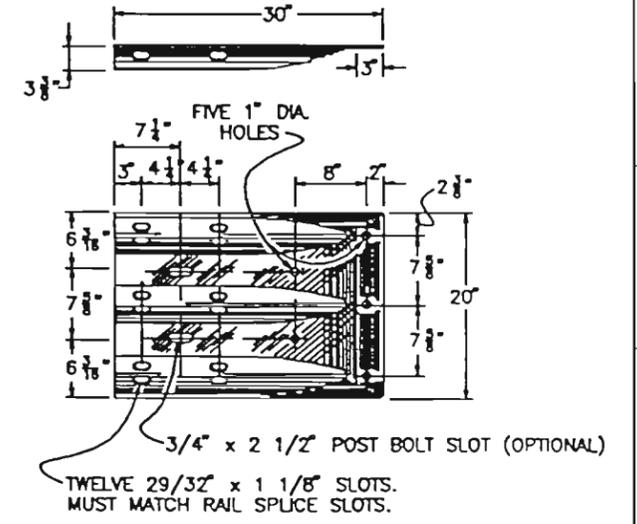
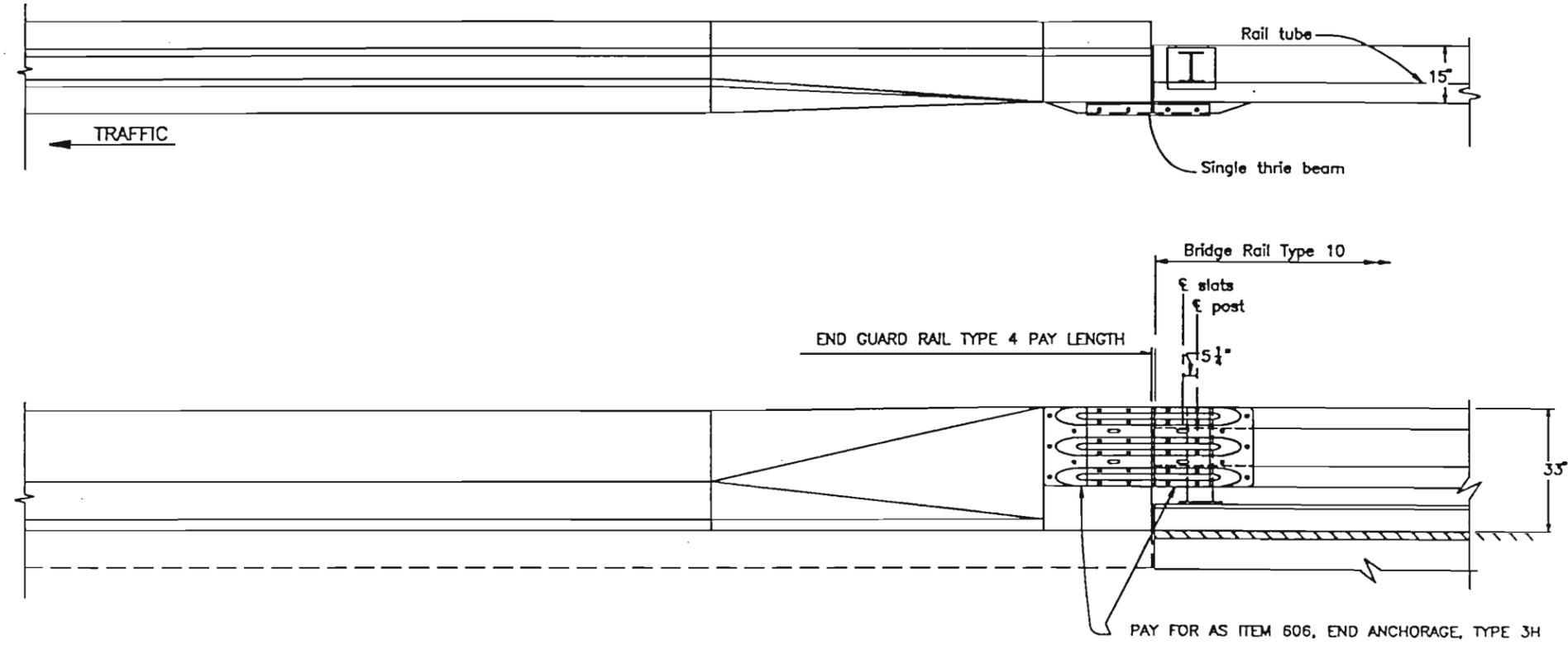
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Revision Dates	(Preliminary Stage Only)
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REVISIONS	

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FEDERAL ROAD DISTRICT NO.	DIVISION	PROJECT NUMBER	SHEET NUMBER
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TWELVE 29/32 x 1 1/8 SLOTS. MUST MATCH RAIL SPLICE SLOTS.  
RE-63 (CLASS B, TYPE 1 OR 2)-76 (GALV.)  
RE-63 (CLASS B, TYPE 4)-76 (CORR. RESIST.)  
**THRIE BEAM  
TERMINAL SECTION (CONNECTOR)**

**TYPE 3H END ANCHORAGE**

SEE M-606-12 (SHEET 4), FOR GUARD RAIL TYPE 4 TRANSITIONAL SECTION, AND VIEW G-G FOR CONNECTION OF THRIE BEAM TERMINAL SECTION TO GUARD RAIL TYPE 4.  
THE COST OF THE BOLTS FOR THE CONNECTION OF THE THRIE BEAM TERMINAL SECTION TO GUARD RAIL TYPE 4 SHALL BE INCLUDED IN ITEM 606, END ANCHORAGE, TYPE 3H.

Design		Check		Quantity	
INITIAL	DATE	INITIAL	DATE	INITIAL	DATE

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COLORADO DEPARTMENT OF TRANSPORTATION		
BRIDGE RAIL TYPE 10 R		
Designer	J. DeLand	Structure
Detailer	J. DeLand	Numbers
Drawing Number B 8 of 10		Drawings

Revision Dates	(Preliminary Stage Only)
03-92	09-92



REVISIONS


BAR LIST - ABUTMENT NO. 1

Mark	No. Req'd	Length	Type	Dimensions		
				A	B	C
A401	4	4'-4"	VIII	1'-4"	1'-8"	
A410	3	1'-4"				
A411	3	2'-7"	VIII	10"	11"	
A412	3	2'-2"	III	1'-4"	5"	
A501	5	2'-11"				
A502	30	3'-9"	I	1'-4"	2'-5"	
A503	11	42'-2"				
A504	11	50'-8"				
A505	11	53'-2"				
A506	6	2'-11"	I	10"	2'-1"	
A510	45	11'-2"	X	5'-7"		
A511	132	7'-0"	I	2'-4"	4'-8"	

BAR LIST - ABUTMENT NO. 6

Mark	No. Req'd	Length	Type	Dimensions		
				A	B	C
A501	5	2'-11"				
A502	30	3'-9"	I	1'-4"	2'-5"	
A503	11	42'-2"				
A504	11	50'-8"				
A505	11	53'-2"				
A506	6	2'-11"	I	10"	2'-1"	
A510	45	11'-2"	X	5'-7"		
A512	132	6'-1"	I	2'-4"	3'-9"	

BAR SUMMARY

35.58 Lin. ft. #4 • 0.668 lb/ft = 24 lbs

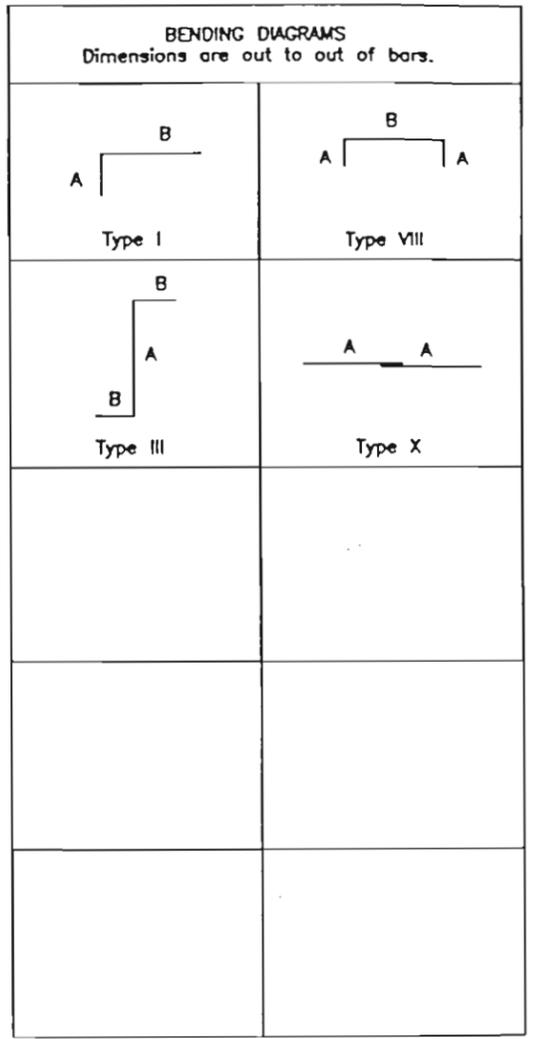
3154.83 Lin. ft. #5 • 1.043 lb/ft = 3290 lbs

Total = 3314 lbs

BAR SUMMARY

3042.18 Lin. ft. #5 • 1.043 lb/ft = 3173 lbs

Total = 3173 lbs



The "Mark" is intended to show location and size of the reinforcing.  
 (ex. In P4XXX, "P" means pier. The next one or two digits after the letter indicate size: 4-#4, 11-#11, etc.)

BE = By Equal Increments

COLORADO DEPARTMENT OF TRANSPORTATION

BAR LISTS

Designer J. DeLand Structure E-17-JP  
 Detailer B. Lere Numbers  
 Drawing Number B 10 of 10 Drawings

Design	INITIAL	DATE	11-92
Checked By	JMO	Checked By	
Detail	INITIAL	DATE	11-92
Checked By	BRL	Checked By	
Quantity	INITIAL	DATE	
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