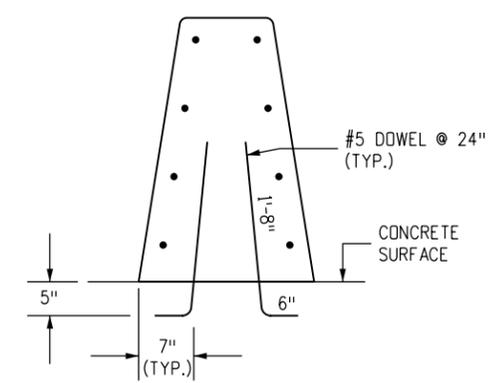
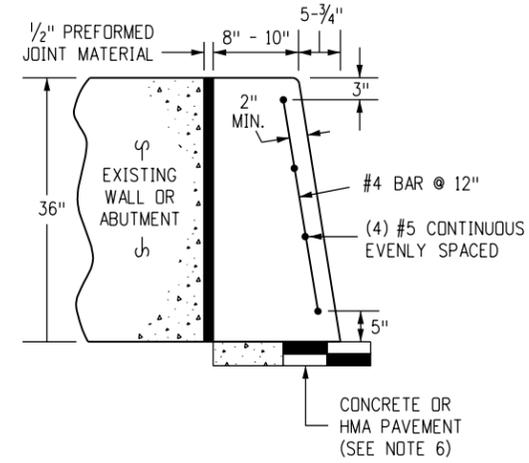


**CONCRETE BARRIER STYLE CA**



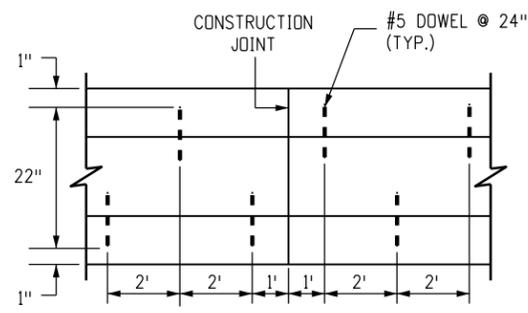
**CONCRETE BARRIER STYLE CC**  
 DETAILS SIMILAR TO STYLE CA EXCEPT AS NOTED.  
 BARRIER DOWELLED TO CONCRETE SURFACES.



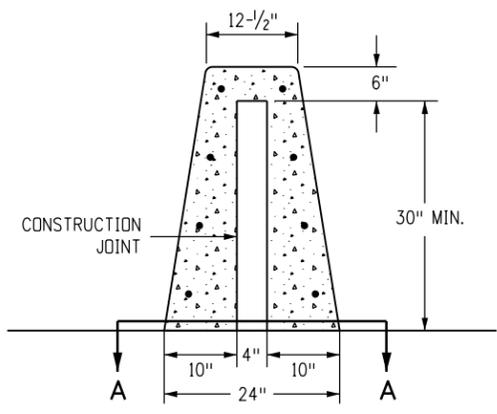
**CONCRETE BARRIER STYLE CD**  
 BARRIER AGAINST WALLS.

**GENERAL NOTES**

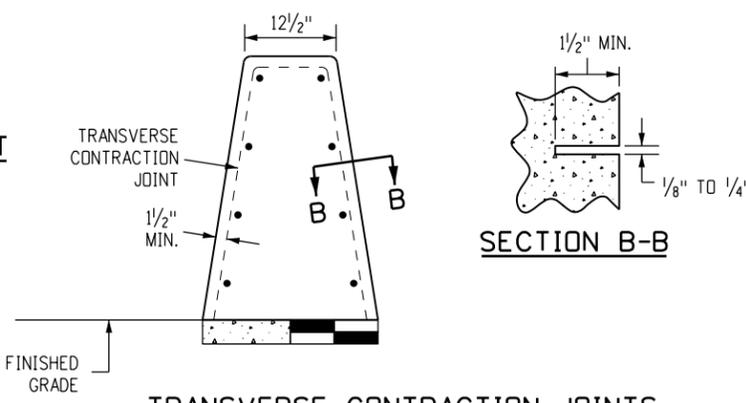
- SEE SHEET 2 FOR DETAILS OF CONCRETE BARRIER STYLE CA END ANCHOR CONNECTIONS TO STRUCTURES OR TRANSITION TO GUARDRAIL TYPE 7.
- SEE SHEET 6 FOR CONCRETE BARRIER STYLE CA TRANSITIONS AT BRIDGE COLUMNS AND SIGN PEDESTALS IN MEDIANS.
- WHERE GLARE SCREENS ARE REQUIRED, USE CONCRETE BARRIER STYLE CG ON SHEET 4.
- WHERE ROADBED OFFSET IS GREATER THAN 1 1/2 INCH, SEE CONCRETE BARRIER STYLE CE
- BARRIER MAY BE CAST-IN-PLACE OR SLIP FORMED.
- BARRIER FOUNDATION SHALL BE PAVEMENT, OR COMPACTED AGGREGATE BASE, OR COMPACTED EMBANKMENT MATERIAL.
- NO ANCHORAGE IS REQUIRED (TYP.) EXCEPT FOR THE 10 FOOT ANCHORAGE. SEE SHEETS 2 AND 3 FOR DETAILS.
- CONSTRUCTION JOINTS SHALL BE USED ON ALL BARRIER TYPES SHOWN, AT THE END OF THE DAY'S POUR OR AFTER ANY INTERRUPTION LONGER THAN 30 MINUTES. ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY CLEANED BEFORE FRESH CONCRETE IS POURED.
- ALL REINFORCING STEEL SHALL BE GRADE 60 EPOXY COATED DEFORMED BARS AND SHALL BE A MINIMUM OF 2 INCHES IN FROM THE NEAREST CONCRETE SURFACE, UNLESS OTHERWISE NOTED.
- CONTINUOUS LONGITUDINAL REINFORCEMENT SHALL BE EITHER GRADE 60 EPOXY COATED DEFORMED BARS OR WIRE STRAND WITH MINIMUM ULTIMATE TENSILE STRENGTH OF 28,000 LBS. AND CLASS C GALVANIZING ACCORDING TO ASTM A 603.
- TRANSITION TO EXISTING CONCRETE BARRIER INSTALLATIONS OF DISSIMILAR SHAPE SHALL BE ACCOMPLISHED IN ONE 15 FOOT LONG SEGMENT OF BARRIER. CONCRETE SHALL BE CLASS D.
- ADDITIONAL MATERIAL FOR BARRIER EMBEDMENT GREATER THAN 1 INCH WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
- EPOXY COATED LONGITUDINAL REBAR SHALL HAVE A MINIMUM LAP SPLICE OF 38 INCHES. WIRE STRAND LONGITUDINAL REINFORCEMENT SHALL BE BUTT WELDED OR MECHANICALLY SPLICED TO MAINTAIN 100 PERCENT OF THE MINIMUM REQUIRED TENSILE STRENGTH.
- ALL INCIDENTAL WORK AND MATERIAL SUCH AS DOWELS, GROUT, ANCHORS, BOLTS, PINS, JOINT MATERIAL, EXCAVATION FOR BASES, CONTINUOUS LONGITUDINAL REINFORCEMENT, SHALL BE INCLUDED IN THE COST OF GUARDRAIL.
- RETROREFLECTORIZATION IS REQUIRED ON ALL BARRIER TYPES. SEE BARRIER RETROREFLECTOR NOTES ON STANDARD PLAN S-612-1.



**DOWEL PLACEMENT LAYOUT**

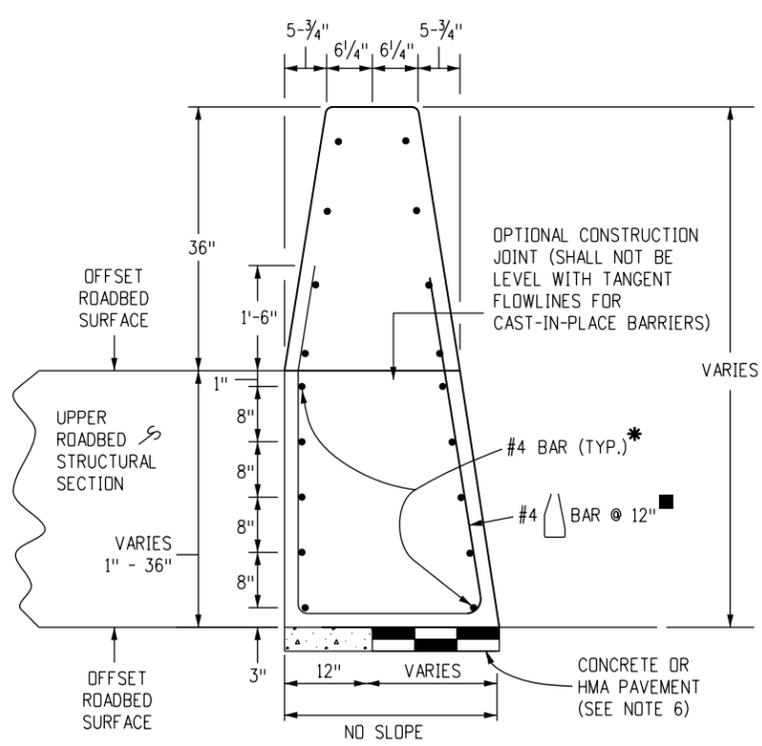


**SECTION A-A**  
 CONSTRUCTION JOINT  
 SEE NOTE 15.



**TRANSVERSE CONTRACTION JOINTS**

FORMED OR SAWED TRANSVERSE CONTRACTION JOINTS ARE REQUIRED AT 20 FT. INTERVALS OR THE INTERVALS SHALL MATCH THE CONCRETE PAVEMENT JOINTS FOR INSTALLATIONS THAT ARE ON TOP OF THE CONCRETE ROADWAY PAVEMENT. SEE CONCRETE BARRIER STYLE CA FOR TYPICAL DIMENSIONS.



**CONCRETE BARRIER STYLE CE**

DETAILS SIMILAR TO STYLE CA EXCEPT AS NOTED.  
 USE CONCRETE BARRIER END ANCHOR WHEN NECESSARY.  
 SHOWN 36 INCH ROADBED SURFACES OFFSET.

\* FOR SURFACES OFFSETS LESS THAN OR EQUAL TO 3 INCHES, NO ADDITIONAL REINFORCEMENT IS REQUIRED.  
 SURFACE OFFSETS GREATER THAN 3 INCHES WILL REQUIRE ADDITIONAL REINFORCEMENT AS SHOWN.

THE LOWEST LAYER OF TWO #4 SHALL BE 3 INCHES ABOVE THE BOTTOM OF THE BARRIER. EACH VERTICAL INCREMENT OF 8 INCHES MEASURED FROM THE LOWEST LAYER OF REINFORCEMENT SHALL INCLUDE AN ADDITIONAL TWO #4.

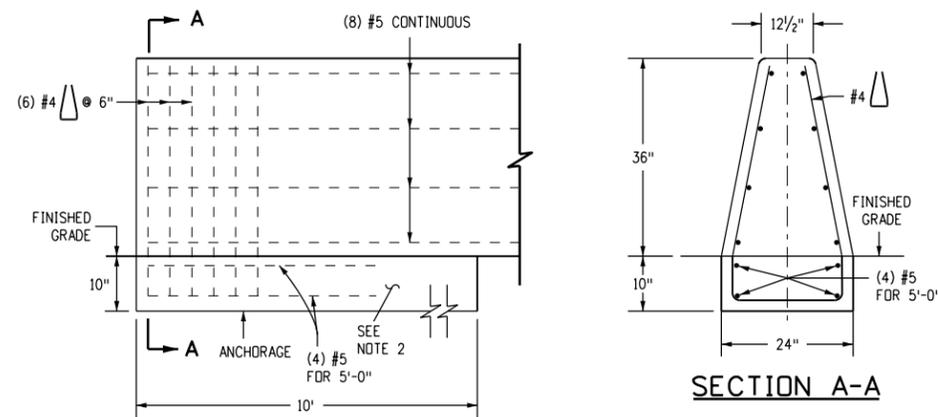
FOR BARRIER TRANSITIONING IN HEIGHT MAINTAIN THE BOTTOM REINFORCEMENT LAYER COVER AND DISCONTINUE/ADD INCREMENTAL REINFORCING PARALLEL TO THE BARRIER AS HEIGHT REQUIRES.

■ REINFORCING STIRRUP NOT REQUIRED FOR ROADBED OFFSETS LESS THAN 1 FOOT.

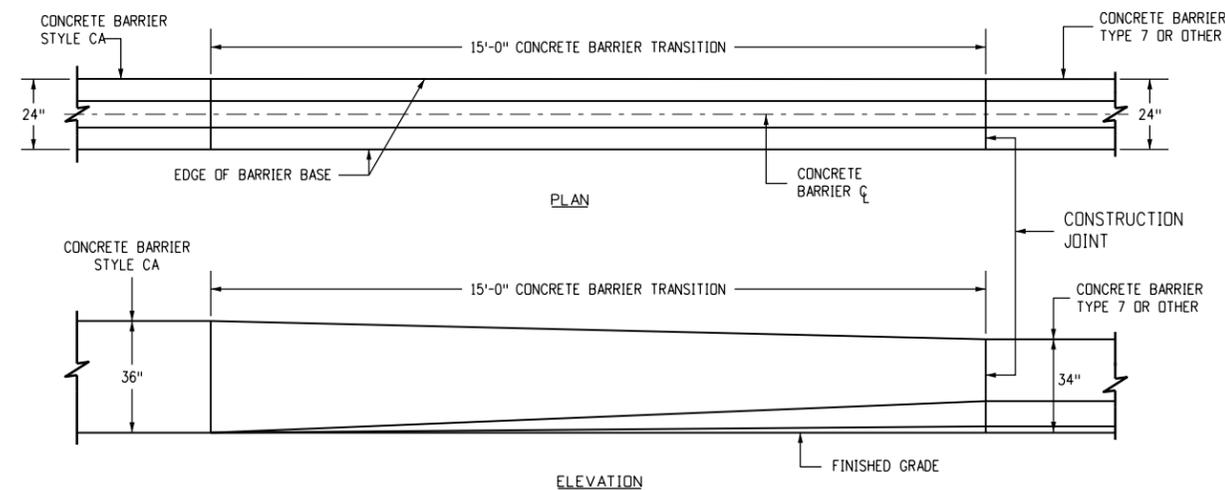
<b>Computer File Information</b>		<b>Sheet Revisions</b>		Colorado Department of Transportation 2829 West Howard Place CDDT HQ, 3rd Floor Denver, CO 80204 Phone: 303-757-9021 FAX: 303-757-9868 <b>Construction Engineering Services JBK</b>	<b>GUARDRAIL TYPE 9</b> <b>SINGLE SLOPE BARRIER</b>	<b>STANDARD PLAN NO.</b>	
Creation Date: 07/31/19		Date:	Comments:			M-606-15	
Designer Initials: JBK	(R-X)					Standard Sheet No. 1 of 11	
Last Modification Date: 02/17/23	(R-X)					Project Sheet Number:	
Detailer Initials: LTA	(R-X)						
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English		(R-X)		Issued by the Project Development Branch: July 31, 2019			

**NOTES**

1. SEE SHEET 3 FOR END ANCHORAGE REQUIREMENTS. AT A MINIMUM, THE BARRIER SHALL BE ANCHORED AT THE ENDS AND AT INTERRUPTIONS WITH THE A 10 FOOT ANCHORAGE. THE ANCHORAGE SHALL BE MONOLITHIC OR DOWELED WITH 2-#8 X 8" @ 2'-0 BARS.
2. SEE SHEET 1 FOR CONCRETE BARRIER STYLE CA AND STYLE CC.
3. TRANSITION TO EXISTING CONCRETE BARRIER INSTALLATIONS OF DISSIMILAR SHAPE SHALL BE ACCOMPLISHED IN ONE 15 FOOT LONG SEGMENT OF BARRIER.
4. SEE SHEET 6 FOR CONCRETE BARRIER STYLE CA TRANSITIONS AT BRIDGE COLUMNS AND SIGN PEDESTALS IN MEDIANS.
5. FOR STYLE CA CONNECTIONS TO STRUCTURES, SEE THE BRIDGE PLANS.



**END ANCHORAGE**

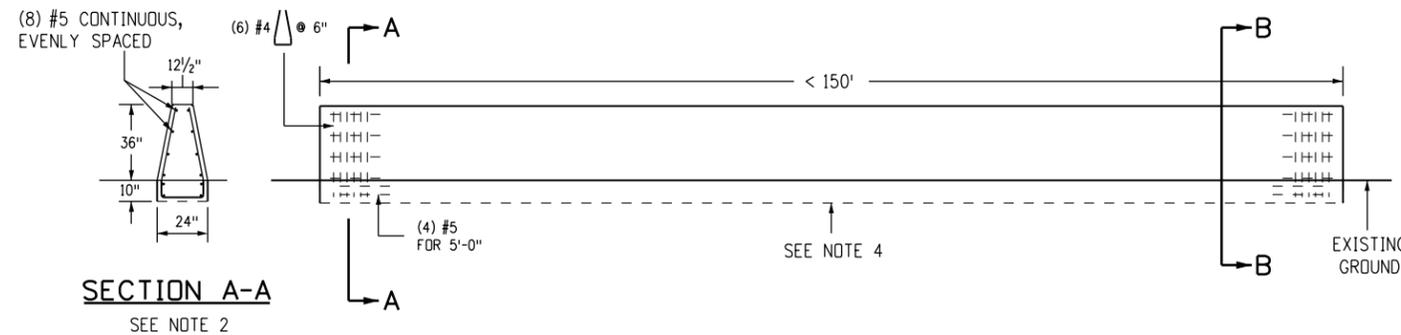


**TRANSITION CONCRETE BARRIER TYPE 9 TO CONCRETE BARRIER TYPE 7 OR EXISTING**

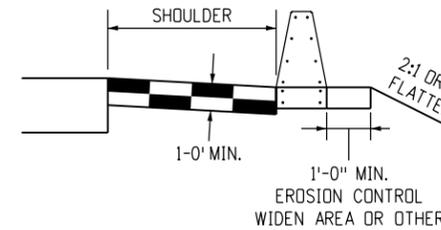
<b>Computer File Information</b>		<b>Sheet Revisions</b>		<b>Colorado Department of Transportation</b>		<b>GUARDRAIL TYPE 9 SINGLE SLOPE BARRIER</b>		<b>STANDARD PLAN NO. M-606-15</b>	
Creation Date: 07/31/19		Date:	Comments	 2829 West Howard Place CDDT HQ, 3rd Floor Denver, CO 80204 Phone: 303-757-9021 FAX: 303-757-9868		Issued by the Project Development Branch: July 31, 2019		Standard Sheet No. 2 of 11	
Designer Initials: JBK		(R-X)							
Last Modification Date: 02/17/23		(R-X)							
Detailer Initials: LTA		(R-X)							
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English		(R-X)		<b>Construction Engineering Services JBK</b>				Project Sheet Number:	

**NOTES**

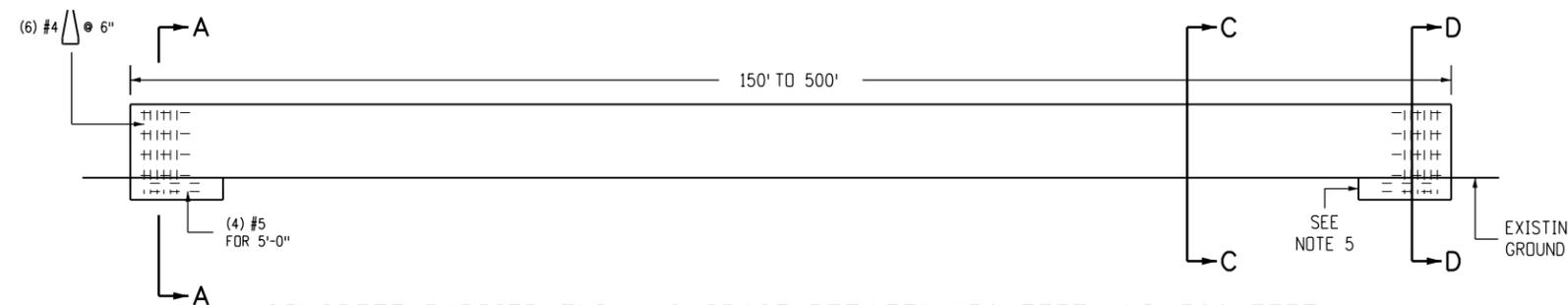
1. SEE PLANS FOR CONCRETE BARRIER LENGTHS LESS THAN 150 FEET AND/OR HINGE WIDTHS EQUAL TO OR LESS THAN 1 FOOT BEHIND THE CONCRETE BARRIER.
2. SEE SHEET 2 FOR REINFORCING BAR DETAILS.
3. NEW CONCRETE BARRIERS UNDER 150 FEET SHALL BE DOWELED INTO EXISTING CONCRETE BRIDGE BARRIERS OR WINGWALLS TO MINIMIZE ROTATIONS TO ANY OF THEM. SEE SHEET 1 FOR DOWEL PLACEMENT LAYOUT.
4. FOR END ANCHORAGES UNDER 150 FEET, CONSTRUCT THE ANCHORAGE FOR THE ENTIRE LENGTH OF THE CONCRETE BARRIER.
5. FOR CONCRETE BARRIER RUNS GREATER THAN 150 FEET BUT LESS THAN 500 FEET, THE RUN SHALL BE ANCHORED AT THE ENDS AND AT GAPS, SUCH AS AN EMERGENCY ACCESS.
6. FOR END ANCHORAGES OVER 500 FEET, CONSTRUCT ANCHORAGES EVERY 250 FEET.
7. REINFORCING STEEL IN ANCHORAGE SHALL BE GRADE 60 EPOXY COATED DEFORMED BARS.
8. CONCRETE SHALL BE CLASS D.
9. ALL INCIDENTAL WORK AND ADDITIONAL MATERIALS SHALL BE INCLUDED IN THE COST OF THE CONCRETE BARRIER.



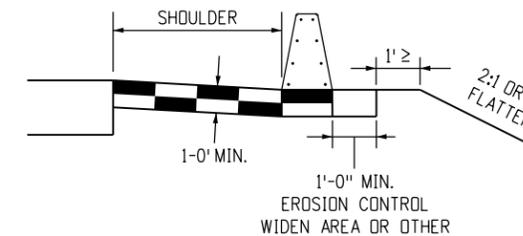
**CONCRETE BARRIER END ANCHORAGE UNDER 150 FEET**



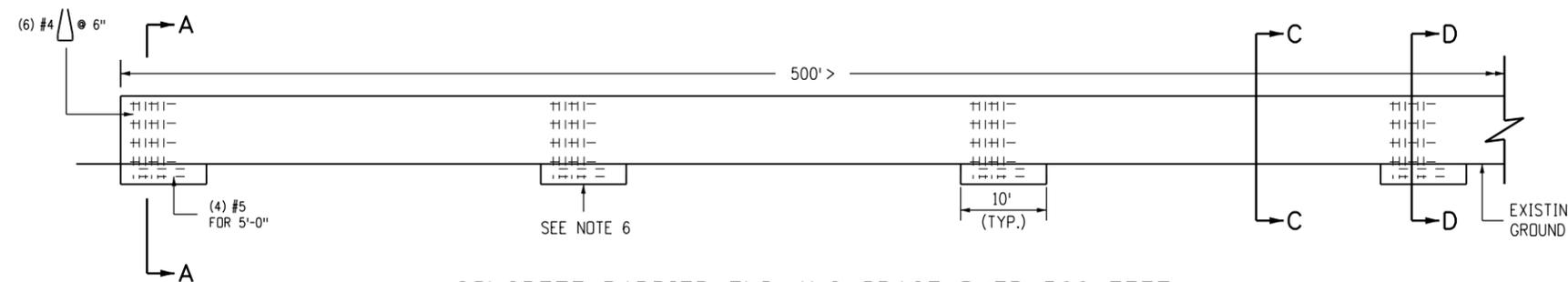
**SECTION B-B**



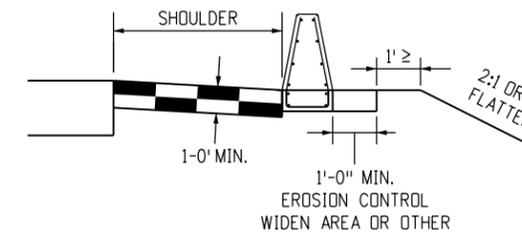
**CONCRETE BARRIER END ANCHORAGE BETWEEN 150 FEET AND 500 FEET**



**SECTION C-C**



**CONCRETE BARRIER END ANCHORAGE OVER 500 FEET**

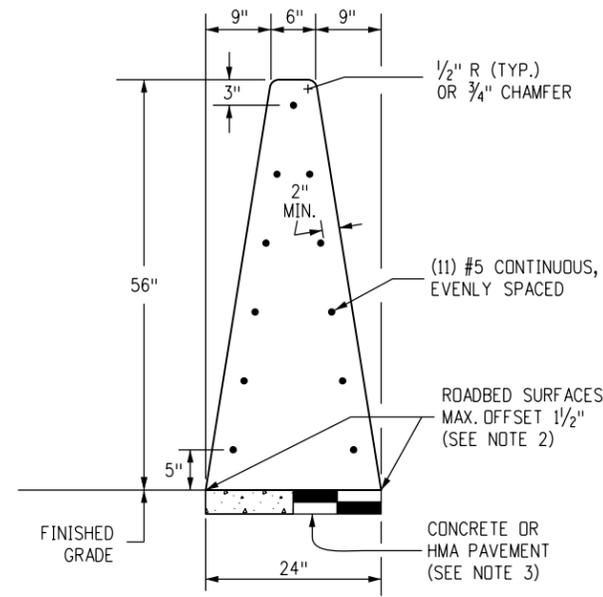


**SECTION D-D**

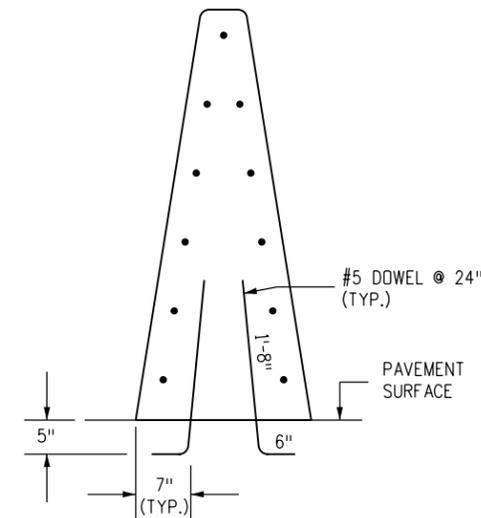
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Creation Date: 07/31/19		Date: _____		2829 West Howard Place		Issued by the Project Development Branch: July 31, 2019		Standard Sheet No. 3 of 11	
Designer Initials: JBK		Comments: _____		CDDT HQ, 3rd Floor					
Last Modification Date: 02/17/23		_____		Denver, CO 80204		Project Sheet Number: _____			
Detailer Initials: LTA		_____		Phone: 303-757-9021 FAX: 303-757-9868					
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English		_____		<b>Construction Engineering Services</b> JBK					

**NOTES**

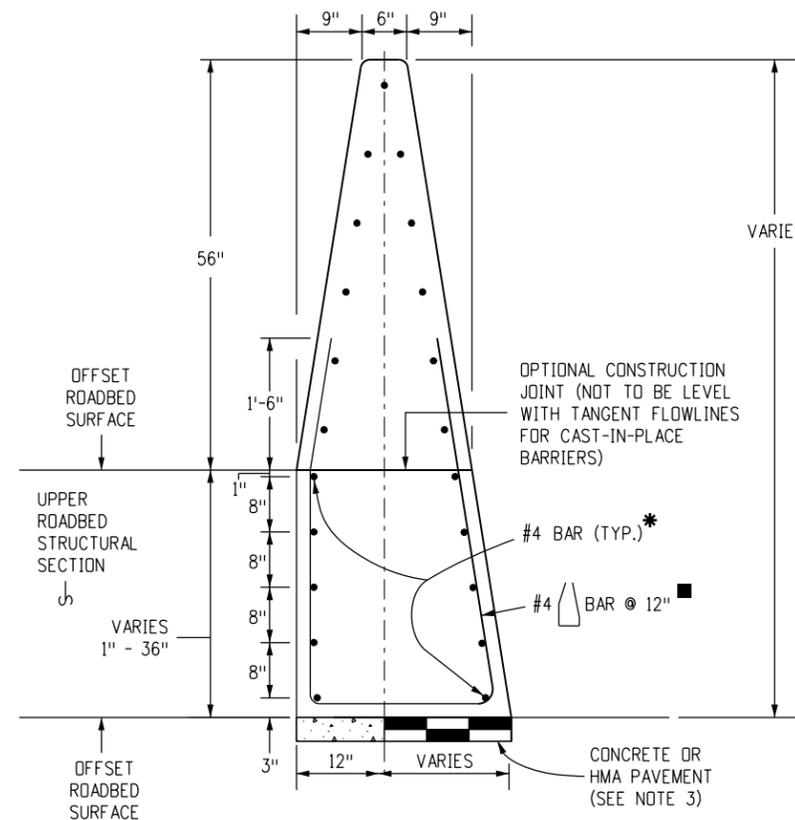
1. SEE SHEET 5 FOR DETAILS OF CONCRETE BARRIER STYLE CGE/CG END ANCHORS CONNECTIONS TO STRUCTURES AND TRANSITIONS TO GUARDRAIL TYPE 7.
2. WHERE ROADBED OFFSET IS GREATER THAN 1/2 INCH, SEE CONCRETE BARRIER TYPE CGE.
3. BARRIER FOUNDATION SHALL BE PAVEMENT, OR COMPACTED AGGREGATE BASE, OR COMPACTED EMBANKMENT MATERIAL.
4. RETROREFLECTORIZATION IS REQUIRED ON ALL BARRIER TYPES. SEE THE BARRIER RETROREFLECTOR NOTES ON STANDARD PLAN S-612-1.



**CONCRETE BARRIER STYLE CG (56")**  
MONOLITHIC CONCRETE GLARE SCREEN/BARRIER

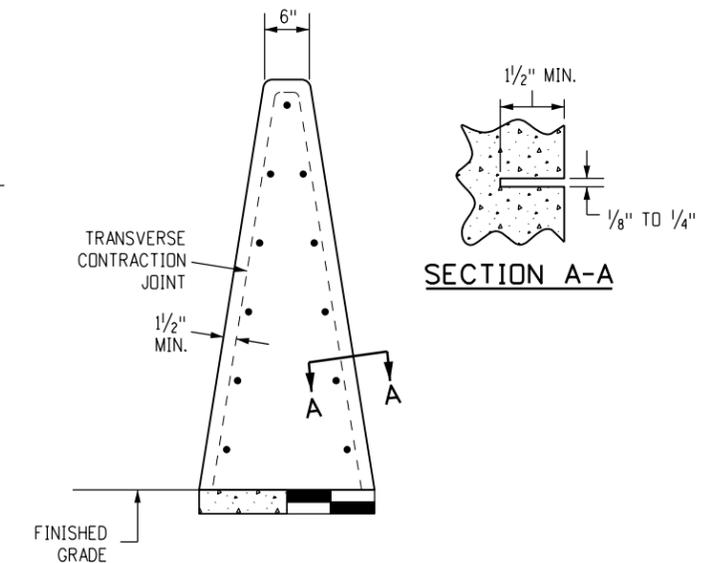


**CONCRETE BARRIER STYLE CGC**  
DETAILS SIMILAR TO STYLE CG EXCEPT AS NOTED. BARRIER DOWELLED TO CONCRETE SURFACES.



**CONCRETE BARRIER STYLE CGE**  
DETAILS SIMILAR TO STYLE CG EXCEPT AS NOTED. USE CONCRETE BARRIER END ANCHOR WHEN NECESSARY. SHOWN WITH A 36 INCH ROADBED SURFACES OFFSET. BARRIER FOR OFFSET ROADWAYS.

- \* FOR SURFACES OFFSETS LESS THAN OR EQUAL TO 3 INCHES, NO ADDITIONAL REINFORCEMENT IS REQUIRED. SURFACE OFFSETS GREATER THAN 3 INCHES WILL REQUIRE ADDITIONAL REINFORCEMENT AS SHOWN.
- THE LOWEST LAYER OF TWO #4 SHALL BE 3 INCHES ABOVE THE BOTTOM OF THE BARRIER. EACH VERTICAL INCREMENT OF 8 INCHES MEASURED FROM THE LOWEST LAYER OF REINFORCEMENT SHALL INCLUDE AN ADDITIONAL TWO #4.
- REINFORCING STIRRUP NOT REQUIRED FOR ROADBED OFFSETS LESS THAN 1 FOOT.

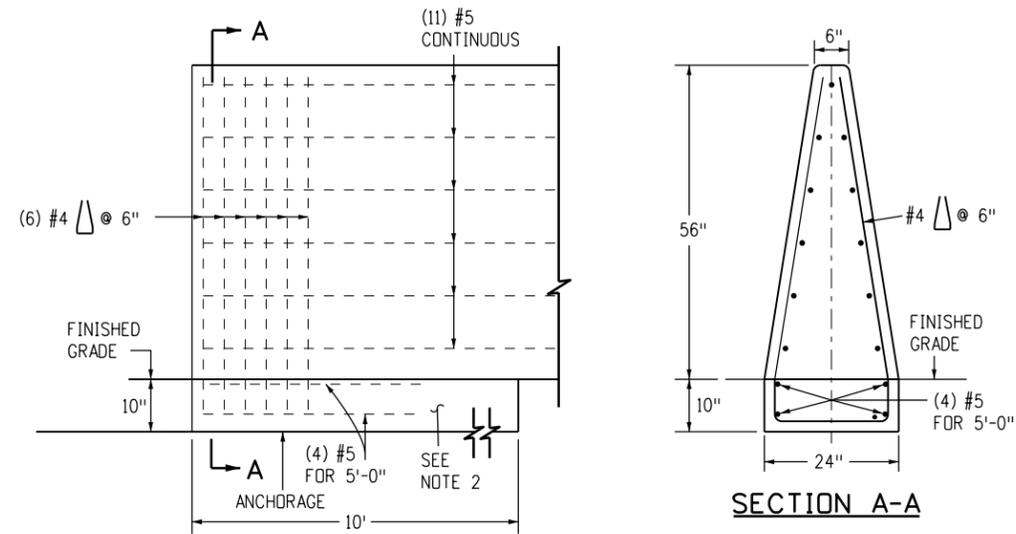


**TRANSVERSE CONTRACTION JOINTS**  
FORMED OR SAWED TRANSVERSE CONTRACTION JOINTS ARE REQUIRED AT 20 FT. INTERVALS OR THE INTERVALS SHALL MATCH THE CONCRETE PAVEMENT JOINTS FOR INSTALLATIONS THAT ARE ON TOP OF THE CONCRETE ROADWAY PAVEMENT. SEE CONCRETE BARRIER STYLE CG FOR TYPICAL DIMENSIONS.

<b>Computer File Information</b>		<b>Sheet Revisions</b>		<b>Colorado Department of Transportation</b>  2829 West Howard Place CDDT HQ, 3rd Floor Denver, CO 80204 Phone: 303-757-9021 FAX: 303-757-9868 <b>Construction Engineering Services JBK</b>	<b>GUARDRAIL TYPE 9</b> <b>SINGLE SLOPE BARRIER</b>	<b>STANDARD PLAN NO.</b>	
Creation Date: 07/31/19		Date:	Comments			M-606-15	
Designer Initials: JBK						Standard Sheet No. 4 of 11	
Last Modification Date: 02/17/23						Project Sheet Number:	
Detailer Initials: LTA							
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English				Issued by the Project Development Branch: July 31, 2019			

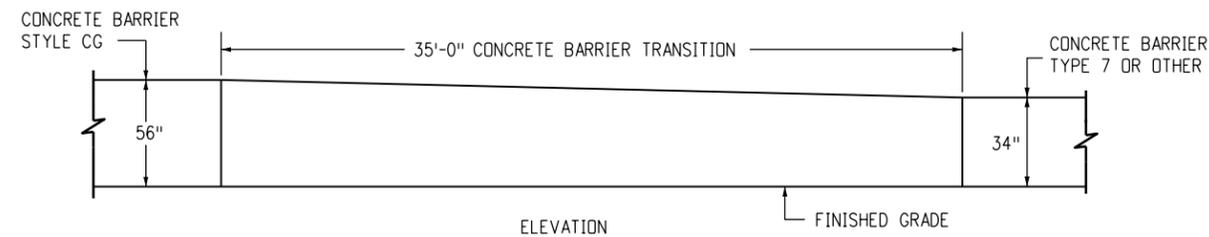
**NOTES**

1. SEE SHEET 3 FOR END ANCHORAGE REQUIREMENTS. AT A MINIMUM, THE BARRIER SHALL BE ANCHORED AT THE ENDS AND AT INTERRUPTIONS WITH THE 10 FOOT ANCHORAGE. ANCHORAGE SHALL BE MONOLITHIC OR DOWELED WITH 2-#8 X 8" @ 2'-0 BARS.
2. SEE SHEET 4 FOR CONCRETE BARRIER STYLE CG AND STYLE CGC.
3. SEE SHEET 9 FOR TRANSITION TO THRIE BEAMS.
4. TRANSITION TO EXISTING CONCRETE BARRIER INSTALLATIONS OF DISSIMILAR SHAPE SHALL BE ACCOMPLISHED IN ONE 15 FOOT LONG SEGMENT OF BARRIER.
5. SEE SHEET 6 FOR CONCRETE BARRIER STYLE CA TRANSITIONS AT BRIDGE COLUMNS AND SIGN PEDESTALS IN MEDIANS.
6. FOR STYLE CG CONNECTIONS TO STRUCTURES, SEE THE BRIDGE PLANS.



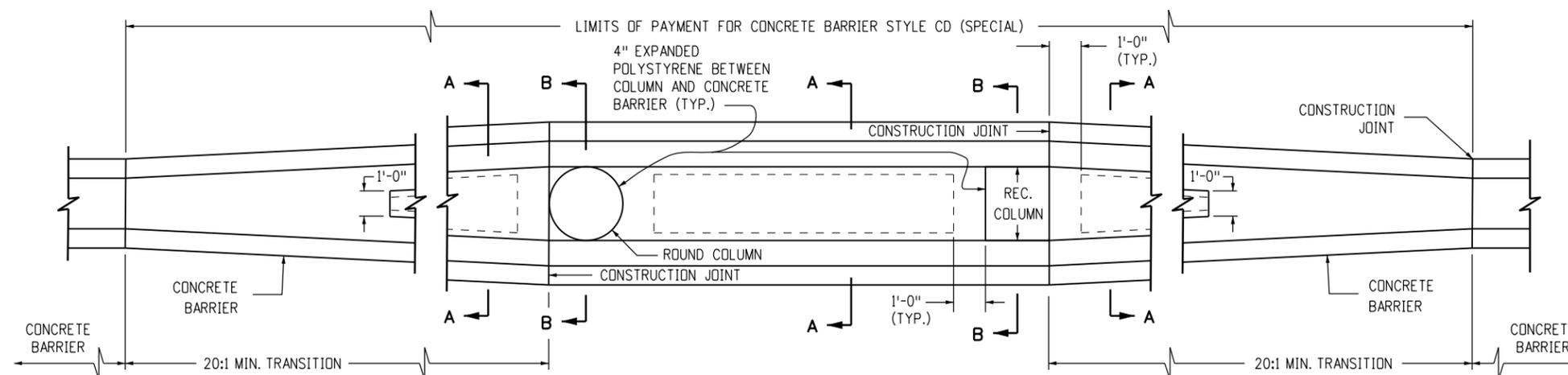
**ANCHORAGE**

BARRIER ELEVATION VIEW INCLUDING REINFORCED ANCHORAGE AT END.

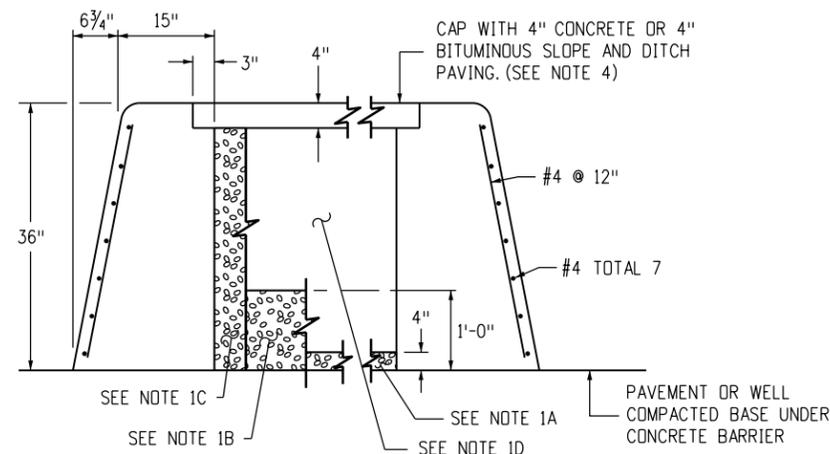


**TRANSITION CONCRETE BARRIER STYLE CGE/CG TO CONCRETE BARRIER TYPE 7 OR EXISTING**

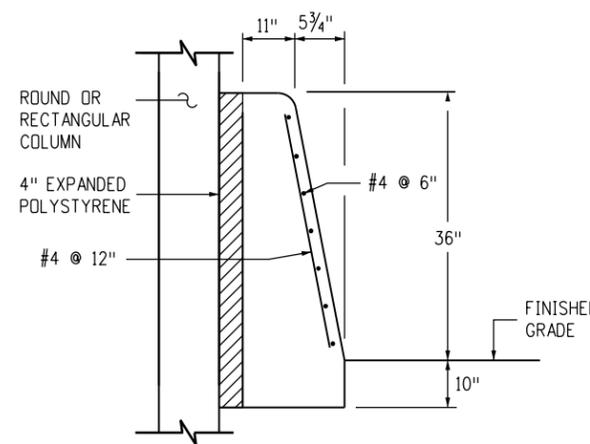
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Creation Date: 07/31/19		Date:                      Comments		 2829 West Howard Place CDDT HQ, 3rd Floor Denver, CO 80204 Phone: 303-757-9021 FAX: 303-757-9868		Issued by the Project Development Branch: July 31, 2019		Standard Sheet No. 5 of 11	
Designer Initials: JBK		<input type="checkbox"/> (R-X)							
Last Modification Date: 02/17/23		<input type="checkbox"/> (R-X)							
Detailer Initials: LTA		<input type="checkbox"/> (R-X)							
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English		<input type="checkbox"/> (R-X)		<b>Construction Engineering Services    JBK</b>		Project Sheet Number:			



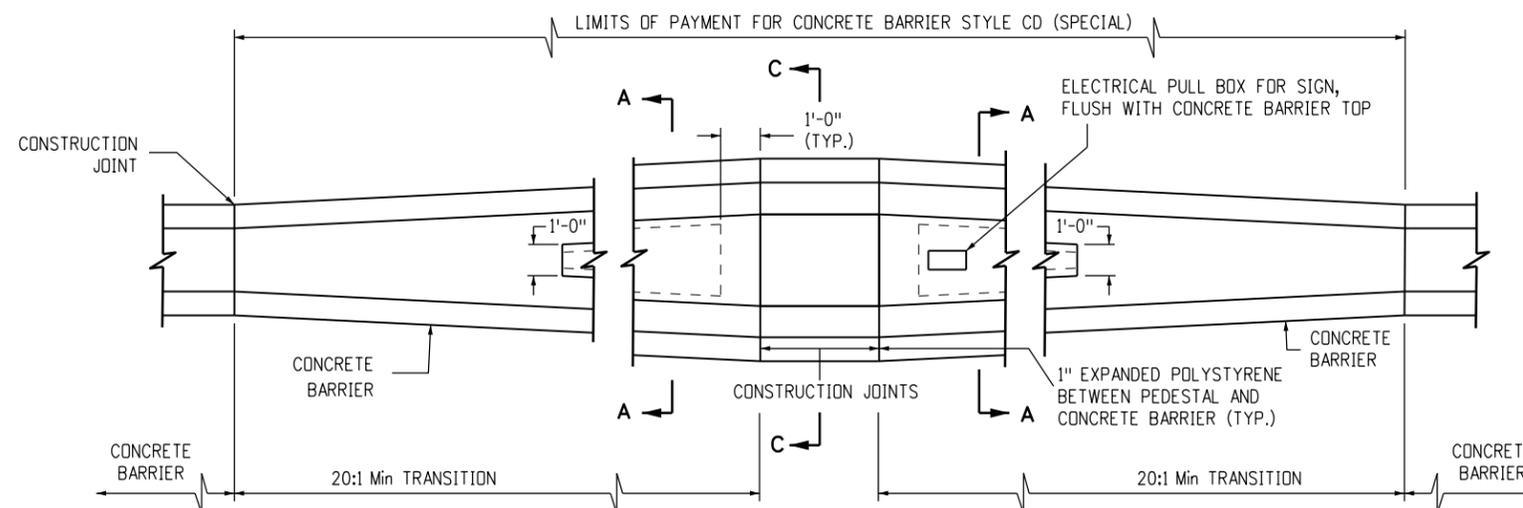
**CONCRETE BARRIER TRANSITION AT BRIDGE COLUMNS**



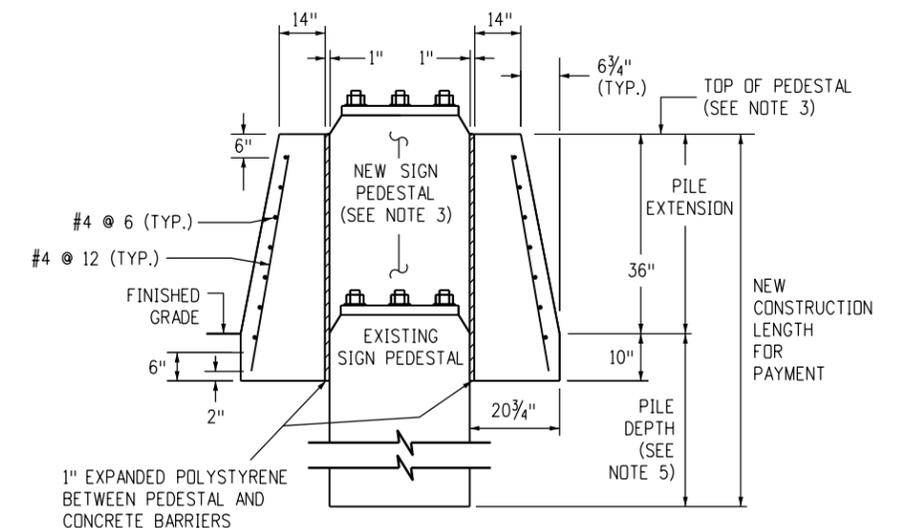
**SECTION A-A**



**SECTION B-B**



**CONCRETE BARRIER TRANSITION AT SIGN PEDESTAL**



**SECTION C-C**

**NOTES**

1. THE CONTRACTOR'S OPTIONS FOR FILL BETWEEN CONCRETE BARRIER WALLS:
  - A. PLACE 4 INCHES OF POLYSTYRENE AT BASE BETWEEN CONCRETE BARRIER WALLS.
  - B. PLACE 1 FOOT OF GRANULAR MATERIAL AT BASE BETWEEN WALLS.
  - C. PLACE GRANULAR MATERIAL FROM BASE TO BOTTOM OF 4 INCH CAP.
  - D. MONOLITHIC CONCRETE WITH FOAM BLOCKOUTS IS NOT PERMITTED.
2. REINFORCING STEEL SHALL EXTEND CONTINUOUS THROUGH CONSTRUCTION JOINTS.
3. SEE OVERHEAD SIGN PLANS FOR SIGN PEDESTAL ELEVATIONS FOR NEW CONSTRUCTION.
4. ADJUST HEIGHT OF CONCRETE BARRIER WALL ON LOW SIDE OF OFFSET OR SUPERELEVATED ROADWAYS TO PROVIDE LEVEL GRADE ACROSS TOP OF CONCRETE BARRIER CAP.
5. FOR OVERHEAD SIGNS, SEE STANDARD PLAN S-614-60.
6. TYPE 9 IS A MASH TEST LEVEL 3 (TL-3) APPROVED CONCRETE BARRIER DESIGNED FOR REDIRECTION AND PROTECTION FROM MOST STANDARD ROADSIDE OBSTACLES. TO PROTECT PIERS AND OTHER STRUCTURAL BRIDGE SUPPORTS, A MASH TL-5 DESIGN MAY BE REQUIRED.

Computer File Information	
Creation Date: 07/31/19	
Designer Initials: JBK	(R-X)
Last Modification Date: 02/17/23	(R-X)
Detailer Initials: LTA	(R-X)
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)

Sheet Revisions	
Date:	Comments
03/05/20	Added General Note 6.

Colorado Department of Transportation

2829 West Howard Place  
 CDDT HQ, 3rd Floor  
 Denver, CO 80204  
 Phone: 303-757-9021 FAX: 303-757-9868

**Construction Engineering Services JBK**

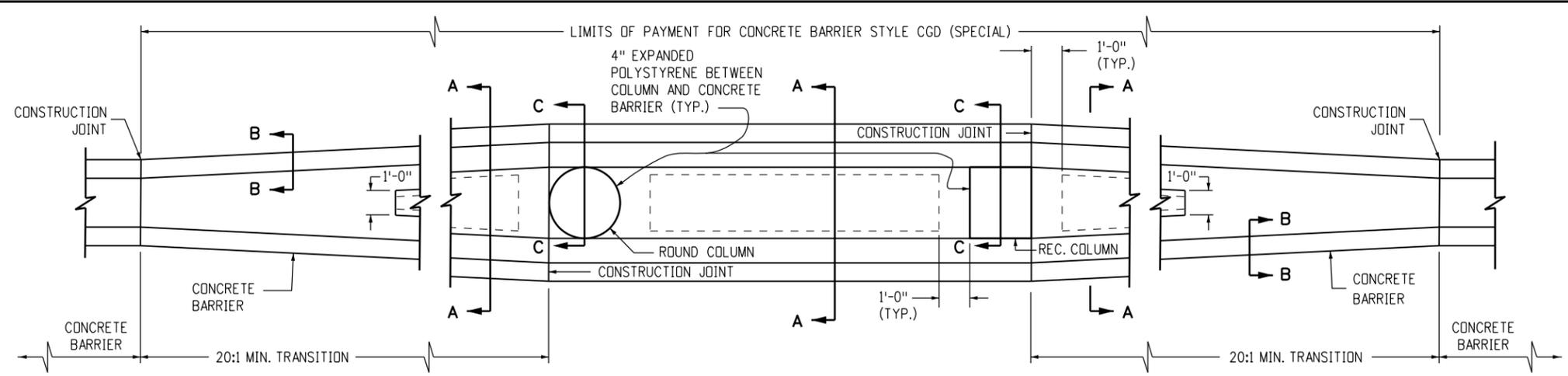
**GUARDRAIL TYPE 9  
 SINGLE SLOPE BARRIER**

Issued by the Project Development Branch: July 31, 2019

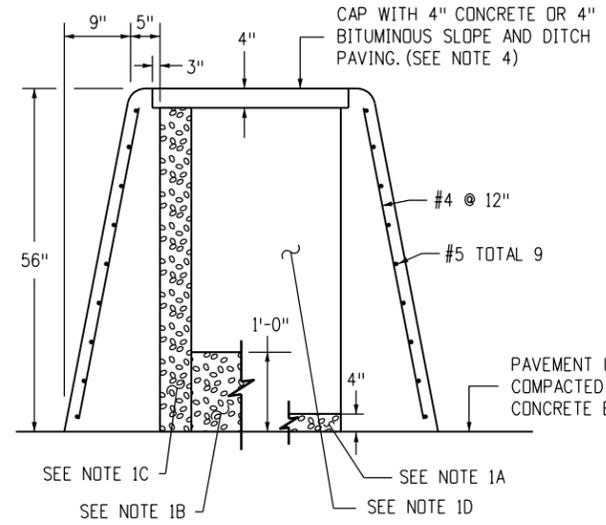
**STANDARD PLAN NO.  
 M-606-15**

Standard Sheet No. 6 of 11

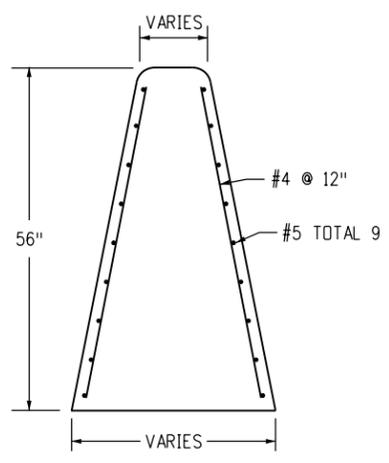
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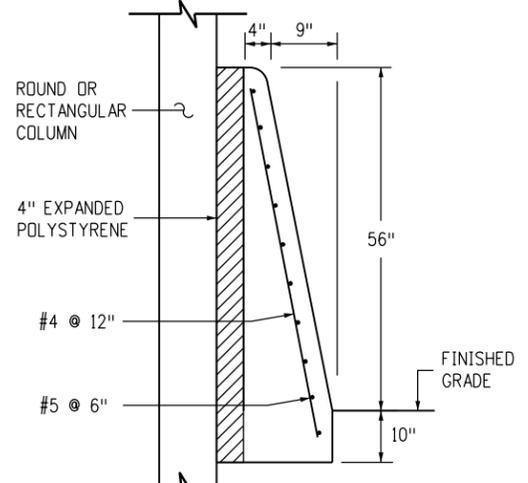
**CONCRETE BARRIER TRANSITION AT BRIDGE COLUMNS**



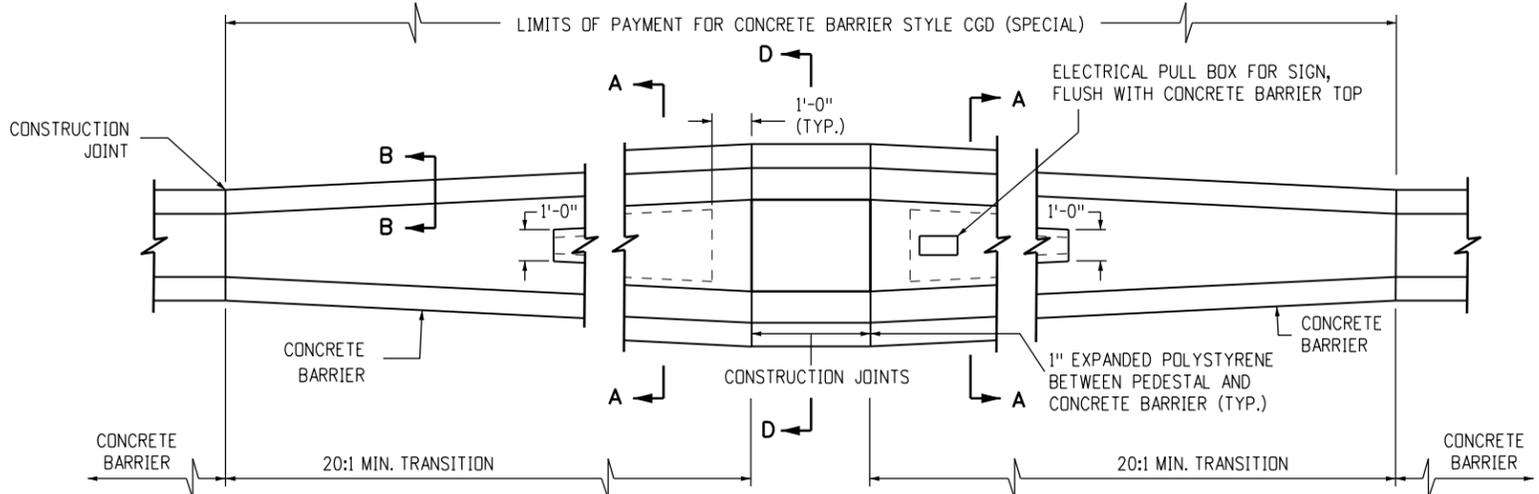
**SECTION A-A**



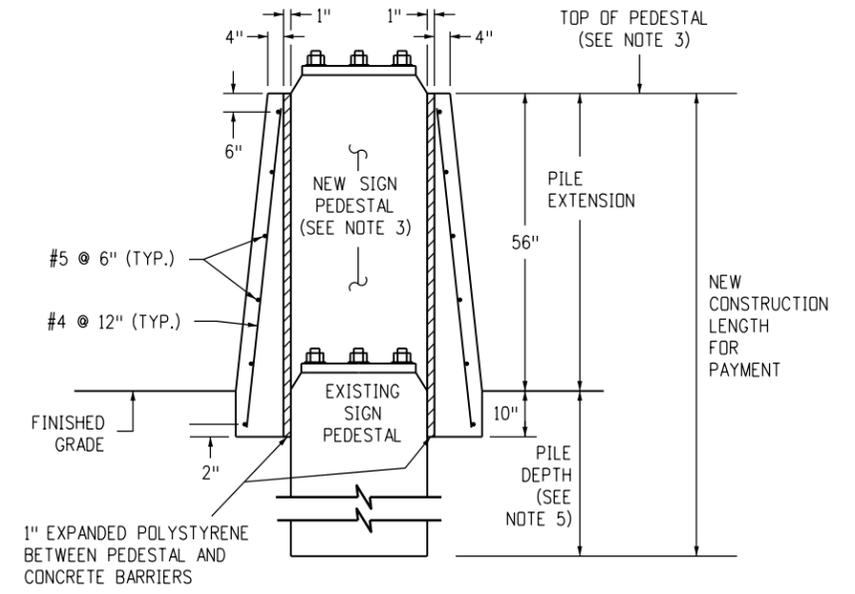
**SECTION B-B**



**SECTION C-C**



**CONCRETE BARRIER TRANSITION AT SIGN PEDESTAL**



**SECTION D-D**

**NOTES**

1. THE CONTRACTOR'S OPTIONS FOR FILL BETWEEN CONCRETE BARRIER WALLS:  
 A. PLACE 4 INCHES OF POLYSTYRENE AT BASE BETWEEN CONCRETE BARRIER WALLS.  
 B. PLACE 1 FOOT OF GRANULAR MATERIAL AT BASE BETWEEN WALLS.  
 C. PLACE GRANULAR MATERIAL FROM BASE TO BOTTOM OF 4 INCH CAP.  
 D. MONOLITHIC CONCRETE WITH FOAM BLOCKOUTS IS NOT PERMITTED.
2. REINFORCING STEEL SHALL EXTEND CONTINUOUS THROUGH CONSTRUCTION JOINTS.
3. SEE OVERHEAD SIGN PLANS FOR SIGN PEDESTAL ELEVATIONS FOR NEW CONSTRUCTION.
4. ADJUST HEIGHT OF CONCRETE BARRIER WALL ON LOW SIDE OF OFFSET OR SUPERELEVATED ROADWAYS TO PROVIDE LEVEL GRADE ACROSS TOP OF CONCRETE BARRIER CAP.
5. FOR OVERHEAD SIGNS, SEE STANDARD PLAN S-614-60.
6. TYPE 9 IS A MASH TEST LEVEL 3 (TL-3) APPROVED CONCRETE BARRIER DESIGNED FOR REDIRECTION AND PROTECTION FROM MOST STANDARD ROADSIDE OBSTACLES. TO PROTECT PIERS AND OTHER STRUCTURAL BRIDGE SUPPORTS, A MASH TL-5 DESIGN MAY BE REQUIRED.

Computer File Information	
Creation Date: 07/31/19	
Designer Initials: JBK	(R-X)
Last Modification Date: 02/17/23	(R-X)
Detailer Initials: LTA	(R-X)
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)

Sheet Revisions	
Date:	Comments
03/05/20	Added General Note 6.

Colorado Department of Transportation  
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 Phone: 303-757-9021 FAX: 303-757-9868

**Construction Engineering Services** JBK

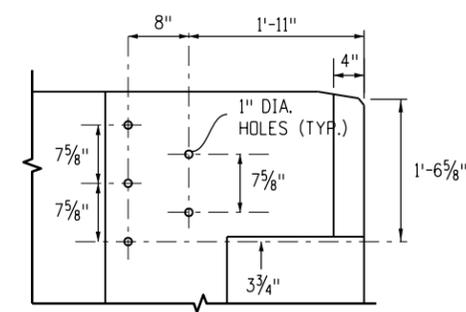
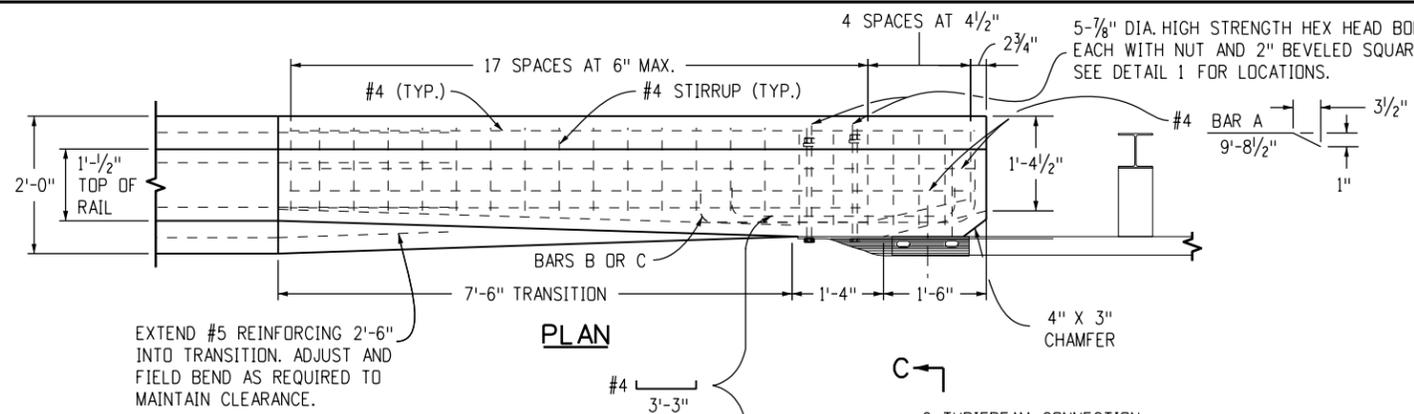
**GUARDRAIL TYPE 9  
 SINGLE SLOPE BARRIER**

Issued by the Project Development Branch: July 31, 2019

**STANDARD PLAN NO.  
 M-606-15**

**Standard Sheet No. 7 of 11**

Project Sheet Number:



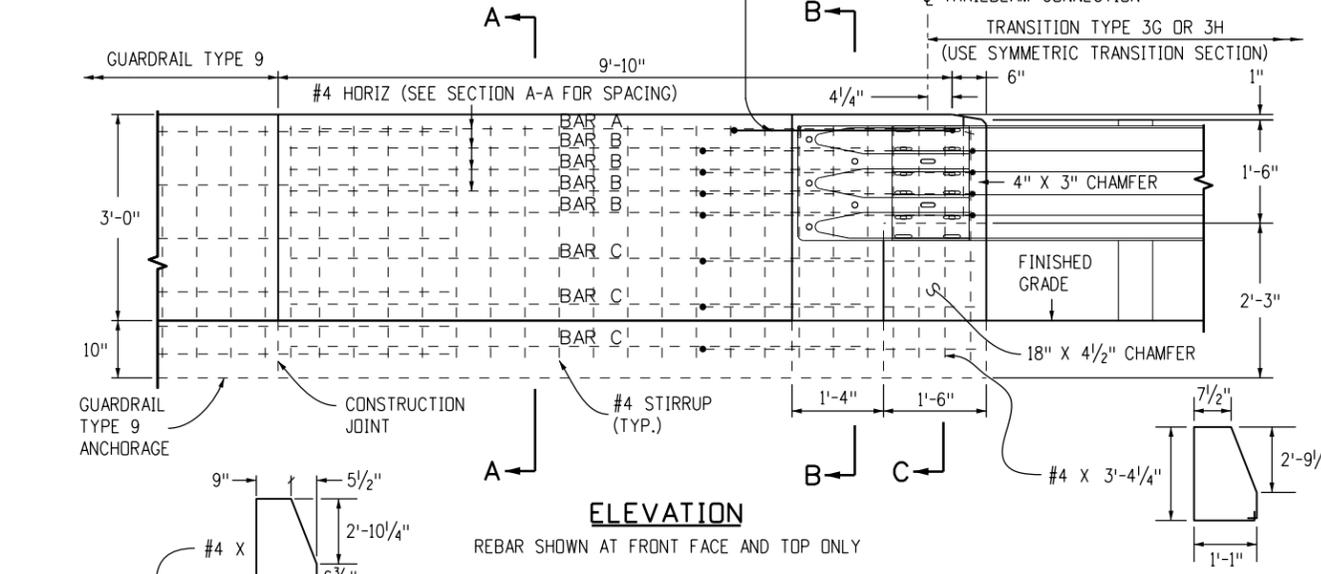
NOTE: HOLES SHALL BE CORED THROUGH CONCRETE OR 1\"/>

**NOTES**

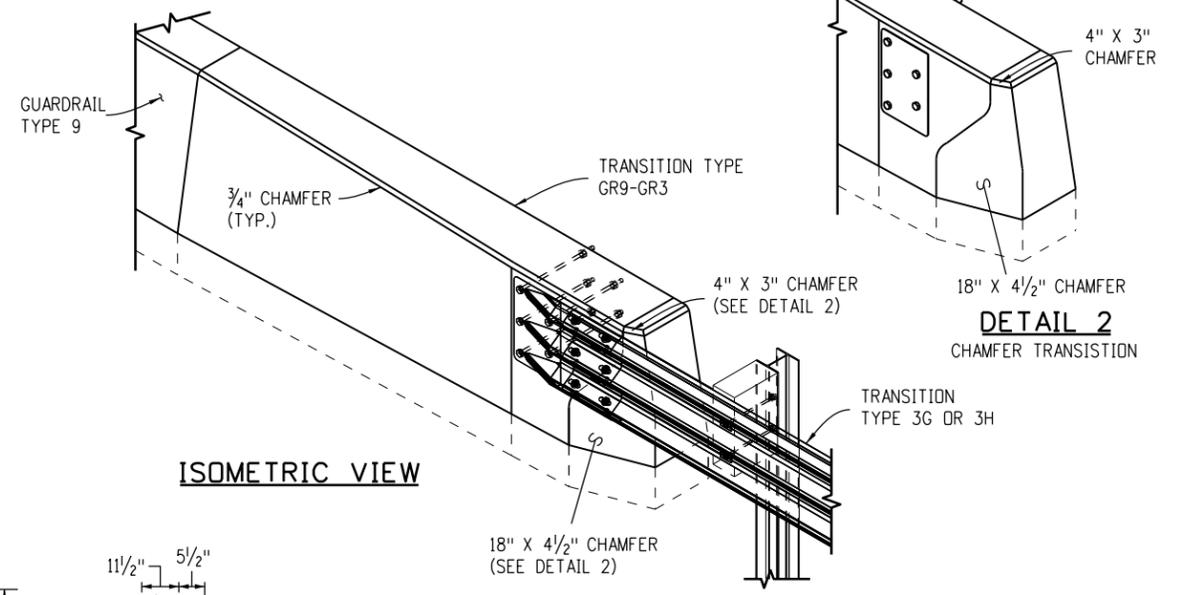
1. PAYMENT WILL BE MADE UNDER ITEM 606, TRANSITION TYPE GR9-GR3, CONSISTING OF CONCRETE (CLASS D), REINFORCING STEEL AND OTHER ITEMS SHOWN, INCLUDING ANY EXCAVATION AND BACKFILL REQUIRED.
2. TRANSITIONS MAY BE CONSTRUCTED PERPENDICULAR TO ROADWAY CROSS SLOPE. VERTICAL DIMENSIONS ARE PERPENDICULAR TO THE LONGITUDINAL ROADWAY GRADE.
3. CONCRETE AND REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF SECTIONS 601 & 606 AND 602 RESPECTIVELY UNLESS OTHERWISE NOTED.
4. ALL REINFORCEMENTS SHALL BE LOCATED A MINIMUM OF 2 INCHES AWAY FROM THE OUTER EDGE OF THE CONCRETE.

**DESIGN DATA:**

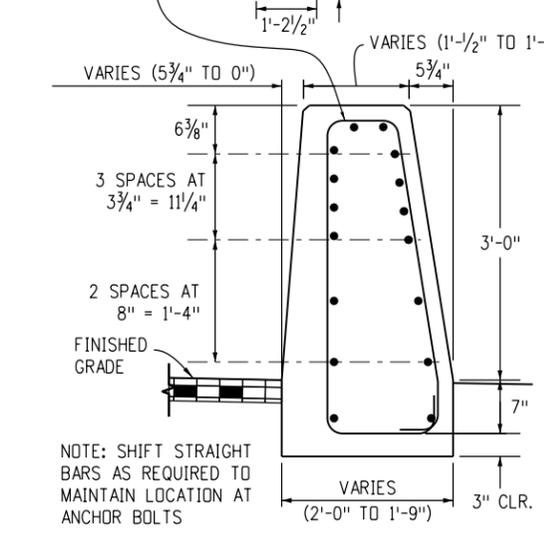
REINFORCING STEEL: F<sub>y</sub> = 60 KSI  
 CONCRETE: CLASS D: F'<sub>c</sub> = 4.5 KSI



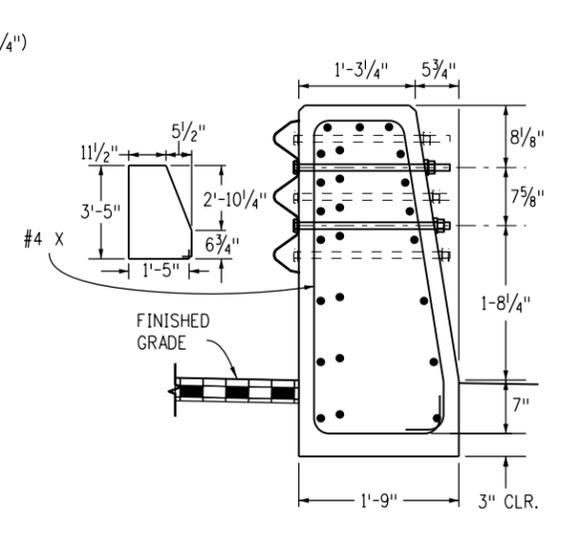
**DETAIL 1**



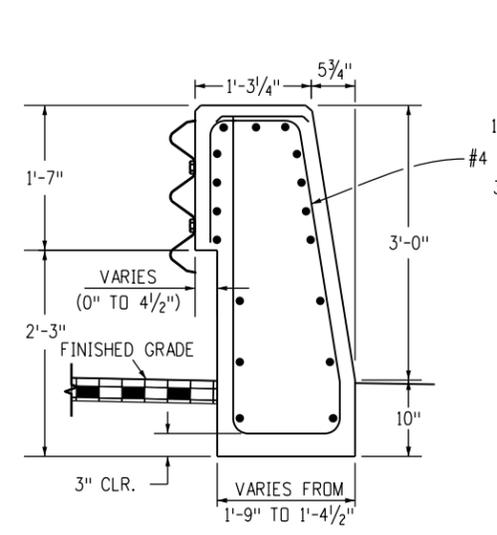
**DETAIL 2**  
CHAMFER TRANSITION



**SECTION A-A**



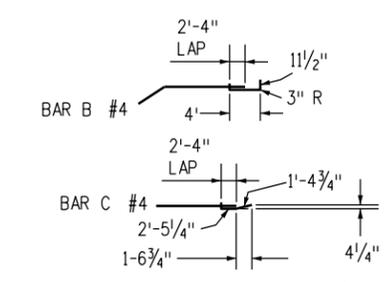
SEE SECTION A-A FOR REINFORCING SPACING



SEE SECTION A-A FOR REINFORCING SPACING

**INFORMATION ONLY**

DESCRIPTION	UNIT	EACH
STRUCTURAL STEEL (GALVANIZED)	LB	22
CONCRETE CLASS D	CY	2.4
REINFORCING STEEL (EPOXY COATED)	LB	301



**REINFORCING DIMENSIONS (FRONT BARS)**

**Computer File Information**

Creation Date: 07/31/19  
 Designer Initials: JBK  
 Last Modification Date: 02/17/23  
 Detailer Initials: LTA  
 CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English

**Sheet Revisions**

Date:	Comments
(R-X) 03/05/20	Completely revised this sheet for the new roadway transition type GR9-GR3.
(R-X) 12/14/21	Deleted macro fiber Concrete Class D in urban areas note under Design Data.
(R-X) 02/17/23	Simplified Steel Reinforcing Details

**Colorado Department of Transportation**

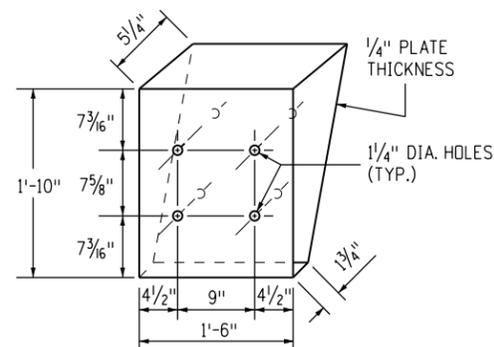
2829 West Howard Place  
 CDDT HQ, 3rd Floor  
 Denver, CO 80204  
 Phone: 303-757-9021 FAX: 303-757-9868  
**Construction Engineering Services JBK**

**GUARDRAIL TYPE 9  
SINGLE SLOPE BARRIER**

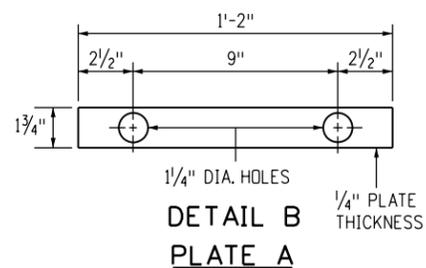
Issued by the Project Development Branch: July 31, 2019

**STANDARD PLAN NO.**

**M-606-15**  
**Standard Sheet No. 8 of 11**  
 Project Sheet Number:



**DETAIL A**  
**BEVELED METAL BOX SPACE**  
(SEE NOTE 1)



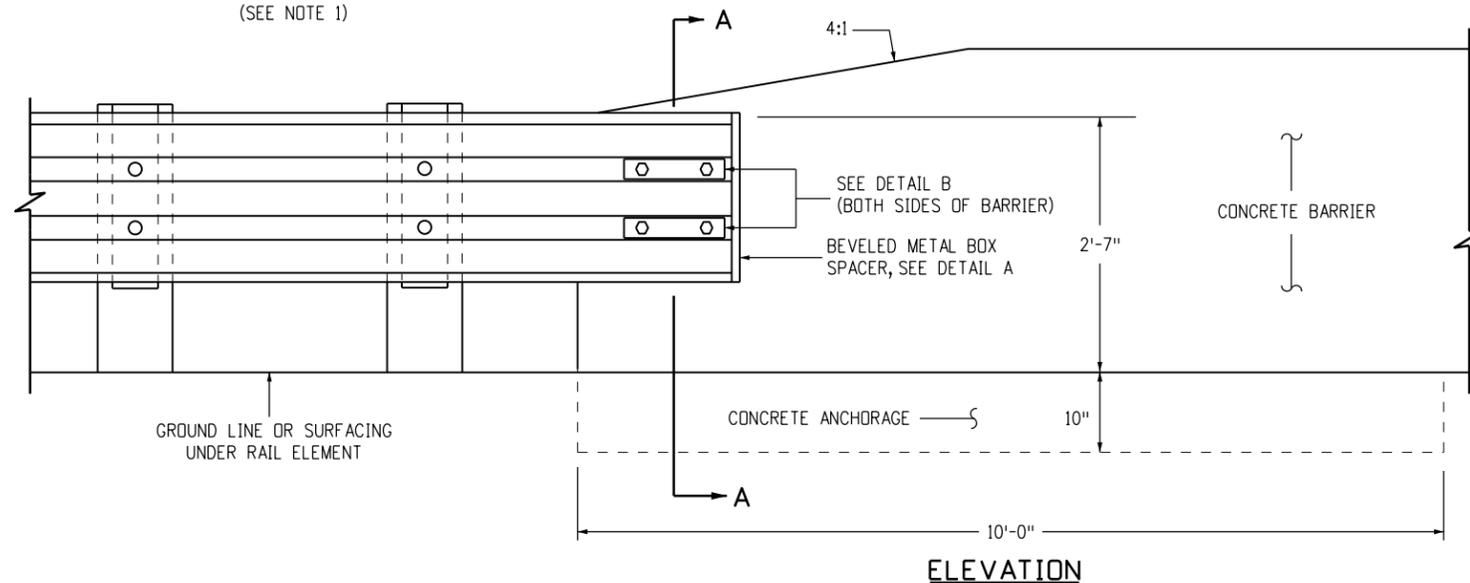
**DETAIL B**  
**PLATE A**

**LEGEND**

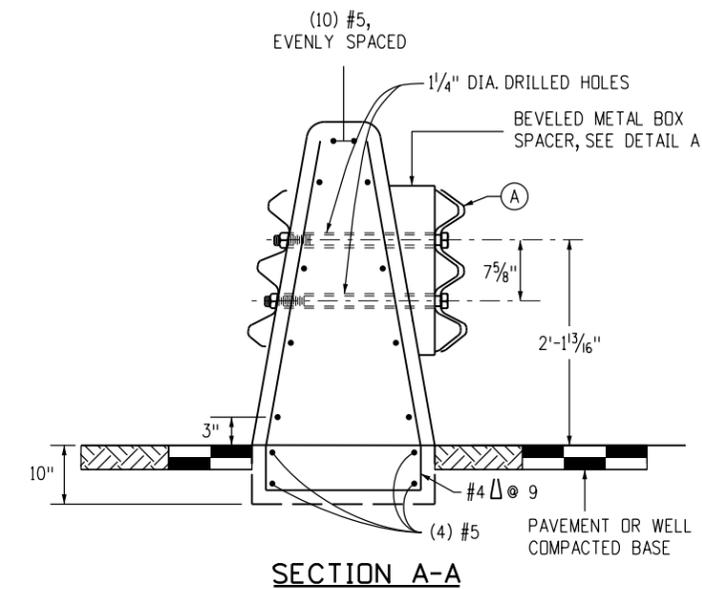
- (A) NESTED THRIE BEAM ELEMENTS (ONE 12 GAUGE ELEMENT NESTED OVER ONE 10 GAUGE ELEMENT).
  - (B) ONE 10 GAUGE THRIE BEAM ELEMENT.
  - (C) ONE 12 GAUGE THRIE BEAM ELEMENT.
- 10 GAUGE = 0.135" THICK  
12 GAUGE = 0.108" THICK

**NOTES**

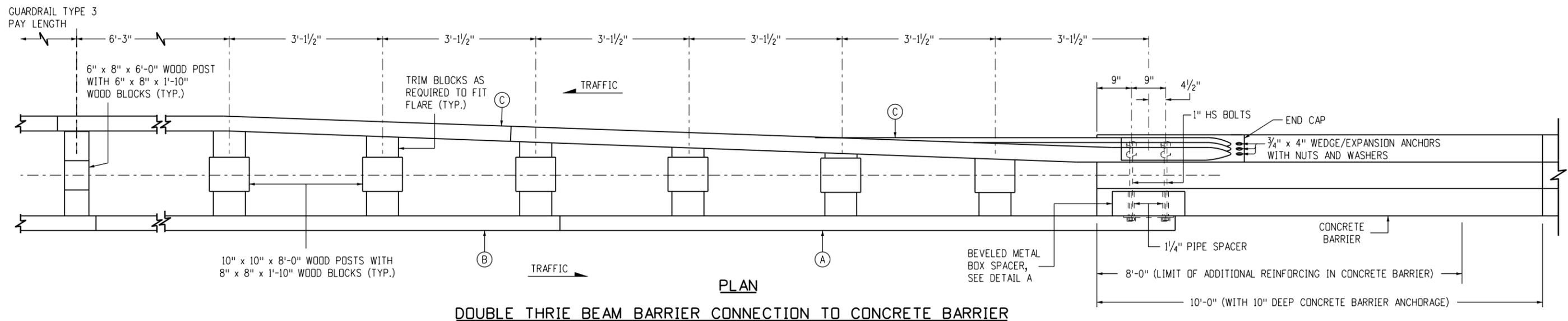
1. WHERE BEVELED METAL BOX SPACERS ARE INSTALLED, PLACE A 1 1/4 INCH X 3/4 INCH AND A 1/4 INCH X 2 INCH PIPE SPACERS ON 1 INCH HS BOLTS PASSING THROUGH THE INTERIOR OF BOX.
2. ALL METAL BOXES SHALL BE GALVANIZED.



**ELEVATION**



**SECTION A-A**



**DOUBLE THRIE BEAM BARRIER CONNECTION TO CONCRETE BARRIER**

Computer File Information	
Creation Date: 07/31/19	
Designer Initials: JBK	(R-X)
Last Modification Date: 02/17/23	(R-X)
Detailer Initials: LTA	(R-X)
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)

Sheet Revisions	
Date:	Comments

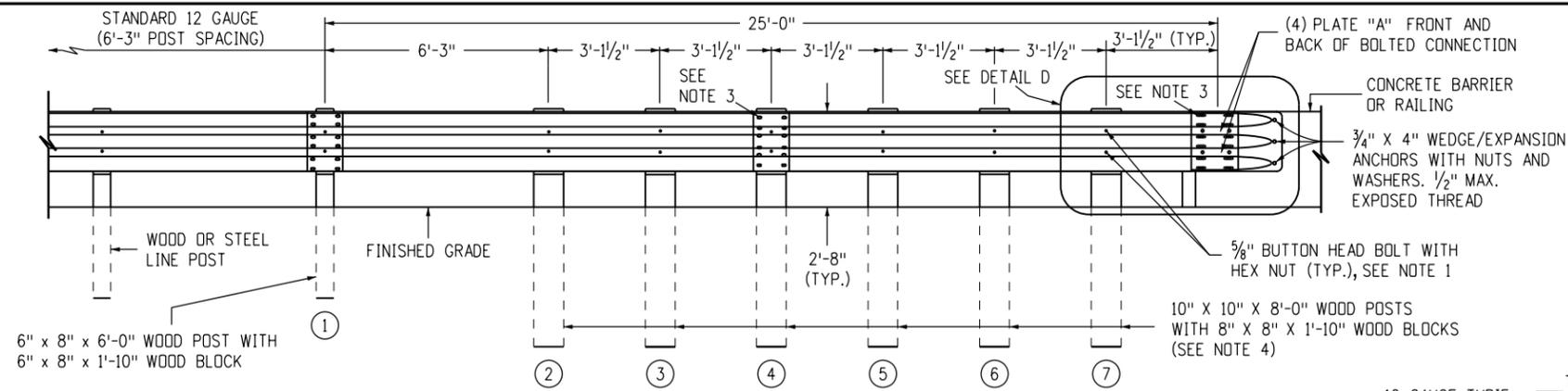
Colorado Department of Transportation  
2829 West Howard Place  
CDDT HQ, 3rd Floor  
Denver, CO 80204  
Phone: 303-757-9021 FAX: 303-757-9868

**Construction Engineering Services JBK**

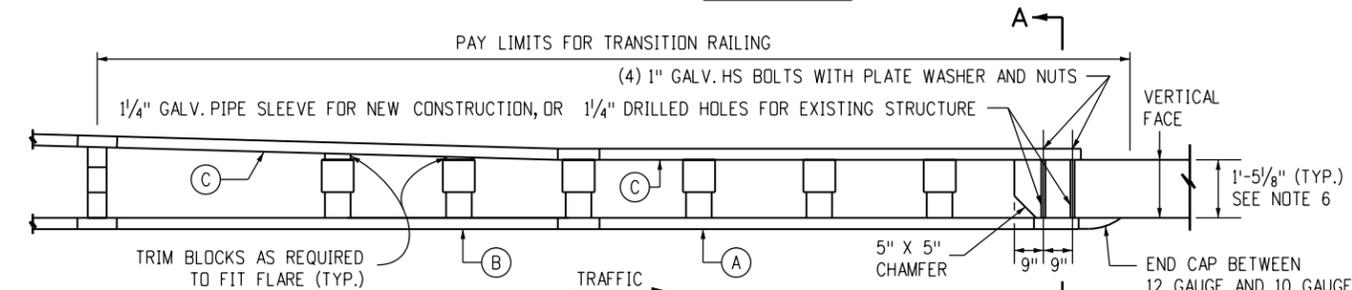
**GUARDRAIL TYPE 9  
SINGLE SLOPE BARRIER**

Issued by the Project Development Branch: July 31, 2019

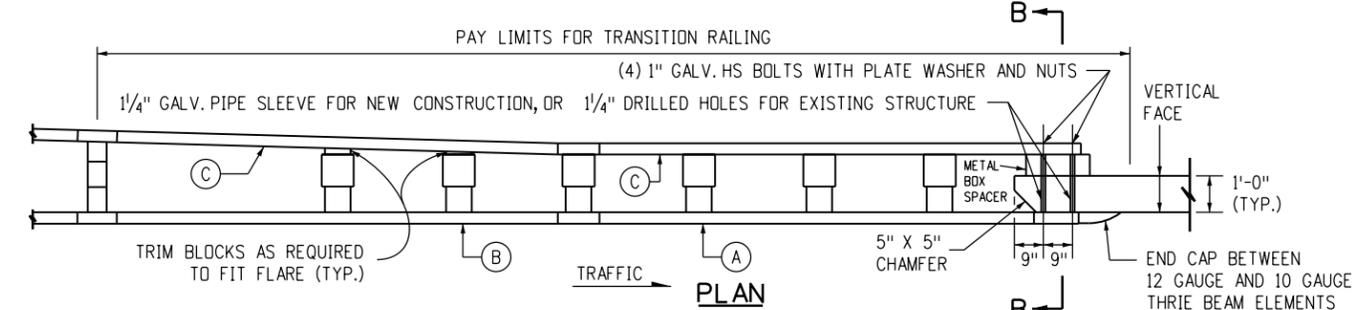
STANDARD PLAN NO.	
M-606-15	
Standard Sheet No. 9 of 11	
Project Sheet Number:	



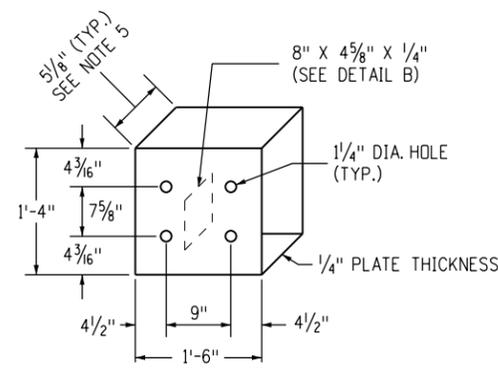
**ELEVATION**



**PLAN  
TRANSITION RAILING  
WITHOUT BLOCKOUT ATTACHMENT**

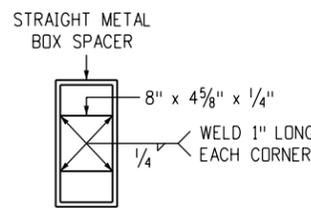


**PLAN  
TRANSITION RAILING  
WITH BLOCKOUT ATTACHMENT**

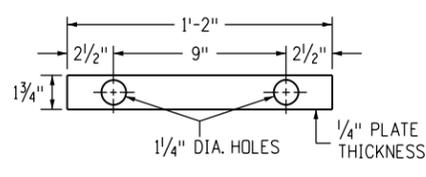


**DETAIL A**

PLACEMENT OF HOLES FOR FRONT AND BACK PANELS

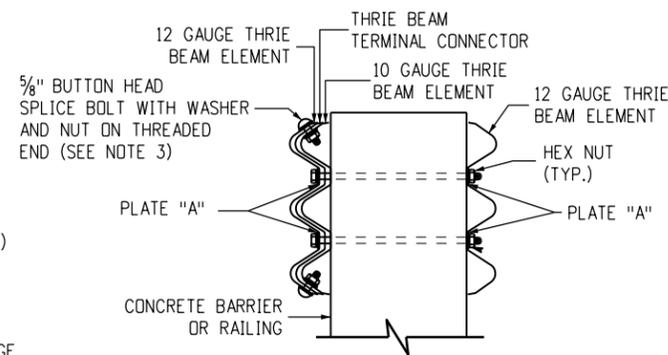


**DETAIL B**

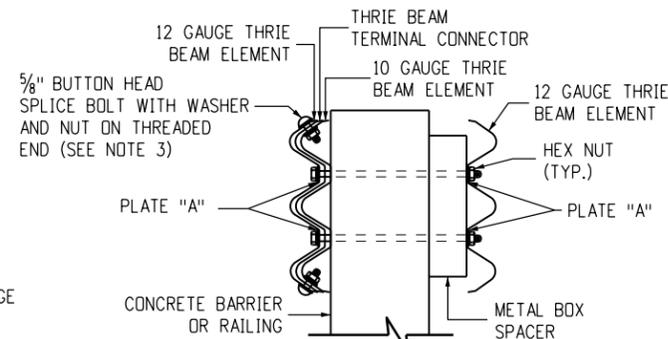


**PLATE "A"  
DETAIL C**

**STRAIGHT METAL BOX SPACER**



**SECTION A-A**



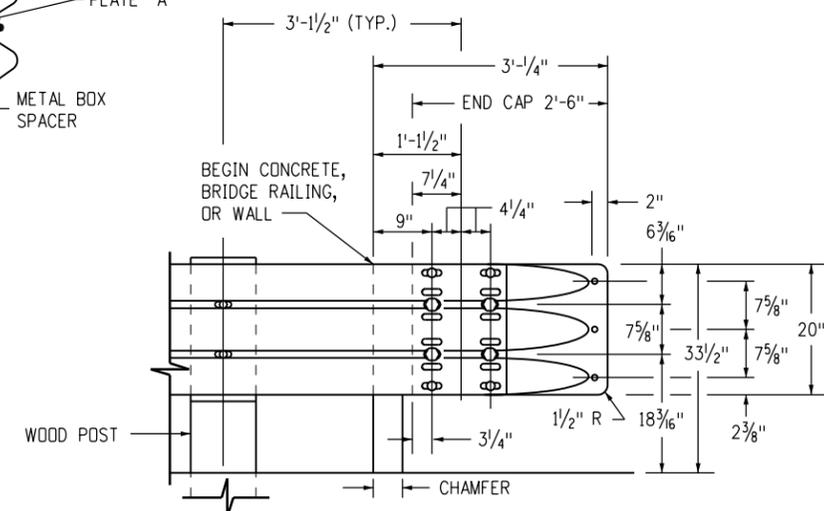
**SECTION B-B**

**LEGEND**

- (A) NESTED THRIE BEAM ELEMENTS (ONE 12 GAUGE ELEMENT NESTED OVER ONE 10 GAUGE ELEMENT)
- (B) ONE 10 GAUGE THRIE BEAM ELEMENT
- (C) ONE 12 GAUGE THRIE BEAM ELEMENT  
10 GAUGE = 0.135" THICK  
12 GAUGE = 0.108" THICK

**NOTES**

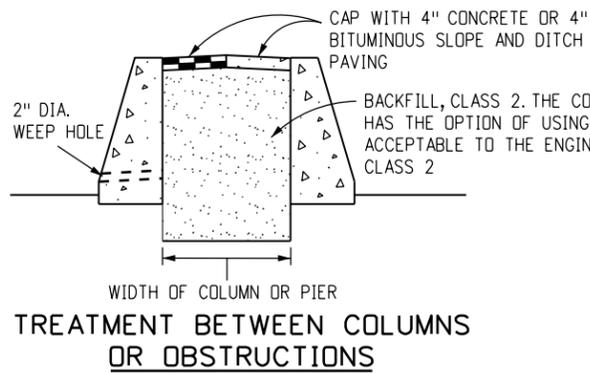
1. USE 5/8" BUTTON HEAD BOLTS AND HEX NUTS FOR CONNECTIONS TO POSTS. NO WASHER ON RAIL FACE FOR BOLTED CONNECTIONS TO POST.
2. THE NESTED RAIL ELEMENTS, END CAP AND SINGLE 10 GAUGE THRIE BEAM ELEMENT, MAY BE SPLICED TOGETHER PRIOR TO BOLTING THE ELEMENTS TO THE WOOD POST AND CONCRETE BARRIER OR RAILING.
3. EXTERIOR SPLICE BOLT HOLES FOR RAIL ELEMENT SPLICES AT POST (4) AND THE CONNECTION TO THE CONCRETE BARRIER OR RAILING SHALL BE THE STANDARD 2 9/32" X 1 1/8" SLOT SIZE. INTERIOR SPLICE BOLT HOLES AT THESE LOCATIONS MAY BE INCREASED UP TO 1 1/4". ONLY THE TOP TWO AND THE BOTTOM TWO SPLICE BOLTS WITH WASHERS AND NUTS ARE REQUIRED FOR RAIL SPLICES AT POST (4) AND THE CONNECTION TO THE CONCRETE BARRIER OR RAILING.
4. THE TOP ELEVATION OF POSTS (1) THROUGH (7) SHALL NOT PROJECT MORE THAN 1 INCH ABOVE THE TOP ELEVATION OF THE RAIL ELEMENT.
5. THE DEPTH OF THE METAL BOX SPACER VARIES FROM THE 5/8" TO 1 1/2" AND IS DEPENDENT ON THE WIDTH OF THE CONCRETE RAILING OR WALL. THE COMBINED DIMENSION FOR THE DEPTH OF THE METAL BOX SPACER PLUS THE WIDTH OF RAILING OR WALL IS TYPICALLY 17 1/8". WHERE THE SPACE BETWEEN THE BACKSIDE OF THE CONCRETE RAILING OR WALL AND THE REAR THRIE BEAM ELEMENT IS LESS THAN 1 1/2", METAL PLATES SIMILAR TO PLATE "A" ARE BE USED AS SPACERS.
6. WHERE THE WIDTH OF THE CONCRETE RAILING OR WALL IS GREATER THAN 17 1/8", WOOD BLOCKS ARE TO BE USED TO FILL THE SPACE CREATED BETWEEN THE BACKSIDE OF POST (4) THROUGH NO. (7) AND THE REAR THRIE BEAM ELEMENT. THESE WOOD BLOCKS SHALL BE 8 INCHES IN WIDTH AND ONE FOOT-TWO INCHES IN LENGTH. THE DIMENSION BETWEEN THE FRONT THRIE BEAM ELEMENT AND THE REAR THRIE BEAM ELEMENT IS TO MATCH THE WIDTH OF THE CONCRETE RAILING OR WALL.



**DETAIL D**

SEE MANUFACTURER'S DETAILS FOR EXACT DIMENSIONS

<b>Computer File Information</b>		<b>Sheet Revisions</b>		Colorado Department of Transportation 2829 West Howard Place CDDT HQ, 3rd Floor Denver, CO 80204 Phone: 303-757-9021 FAX: 303-757-9868 <b>Construction Engineering Services JBK</b>	<b>GUARDRAIL TYPE 9 SINGLE SLOPE BARRIER</b>	<b>STANDARD PLAN NO.</b>	
Creation Date: 07/31/19		Date:	Comments:			M-606-15	
Designer Initials: JBK		(R-X)				Standard Sheet No. 10 of 11	
Last Modification Date: 02/17/23		(R-X)				Project Sheet Number:	
Detailer Initials: LTA		(R-X)					
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English		(R-X)		Issued by the Project Development Branch: July 31, 2019			



TREATMENT BETWEEN COLUMNS OR OBSTRUCTIONS

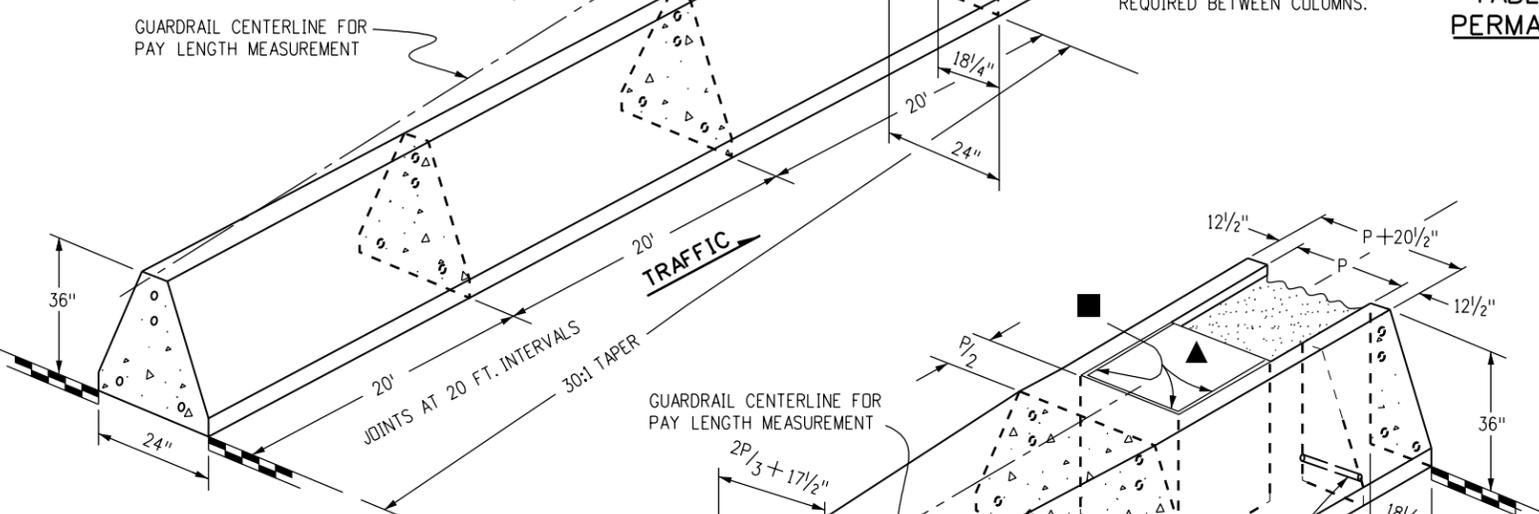
DESIGN SPEED (MPH)	SHY LINE OFFSET (FT.) *	FLARE RATE FOR BARRIER INSIDE SHY LINE	FLARE RATE FOR BARRIER OUTSIDE SHY LINE
80	12	30:1	20:1
75	10	30:1	20:1
70	9	30:1	20:1
60	8	26:1	18:1
55	7	24:1	16:1
50	6.5	21:1	14:1
45	6	18:1	12:1
40	5	16:1	10:1
30	4	13:1	8:1

\* THE SHY LINE OFFSET IS MEASURED FROM THE EDGE OF THE TRAVELED WAY.

TABLE OF FLARE RATES FOR PERMANENT CONCRETE BARRIER

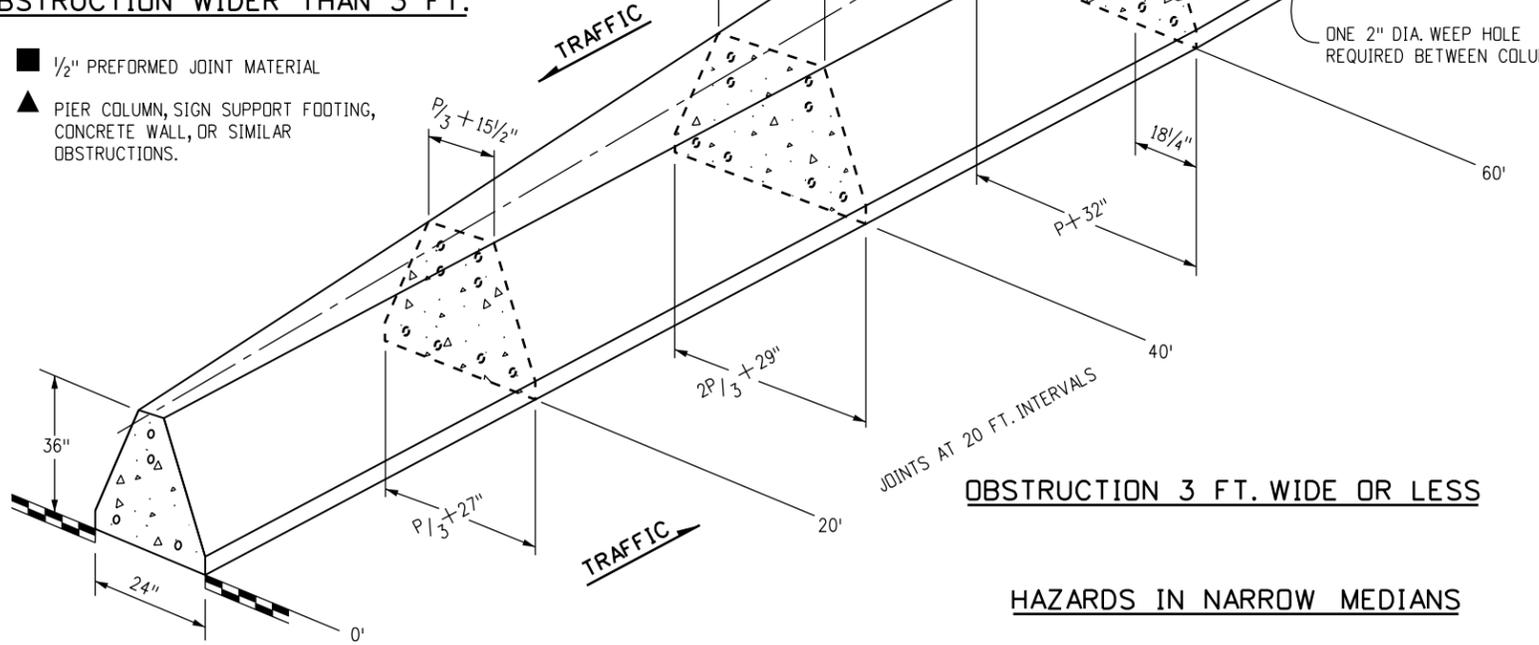
**NOTES**

1. THE MEDIAN IN THESE APPLICATIONS SHALL BE PAVED ON A SLOPE CONTINUED FROM THE ADJACENT PAVED SHOULDER OR A 10:1 OR FLATTER SLOPE.
2. THE PAY LENGTH FOR BARRIER ON BOTH SIDES OF AN OBSTRUCTION WILL BE DETERMINED BY ONE LINEAR MEASUREMENT ALONG THE GUARDRAIL CENTERLINE. THE BACKFILL AND CAP BETWEEN COLUMNS OR OBSTRUCTIONS WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.
3. GUARDRAIL BETWEEN COLUMNS OR OBSTRUCTIONS MAY BE STYLES CA OR CD AS SHOWN ON THE PLANS.
4. TYPE 9 IS A MASH TEST LEVEL 3 (TL-3) APPROVED CONCRETE BARRIER DESIGNED FOR REDIRECTION AND PROTECTION FROM MOST STANDARD ROADSIDE OBSTACLES. TO PROTECT PIERS AND OTHER STRUCTURAL BRIDGE SUPPORTS, A MASH TL-5 DESIGN MAY BE REQUIRED.



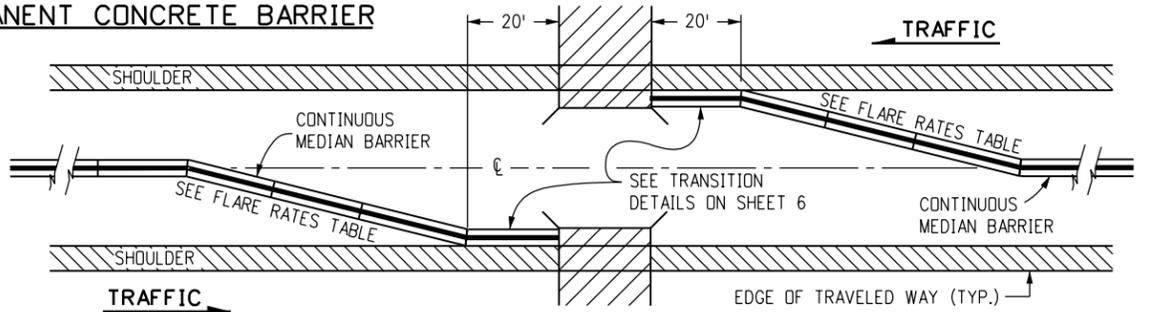
OBSTRUCTION WIDER THAN 3 FT.

- 1/2" PREFORMED JOINT MATERIAL
- ▲ PIER COLUMN, SIGN SUPPORT FOOTING, CONCRETE WALL, OR SIMILAR OBSTRUCTIONS.

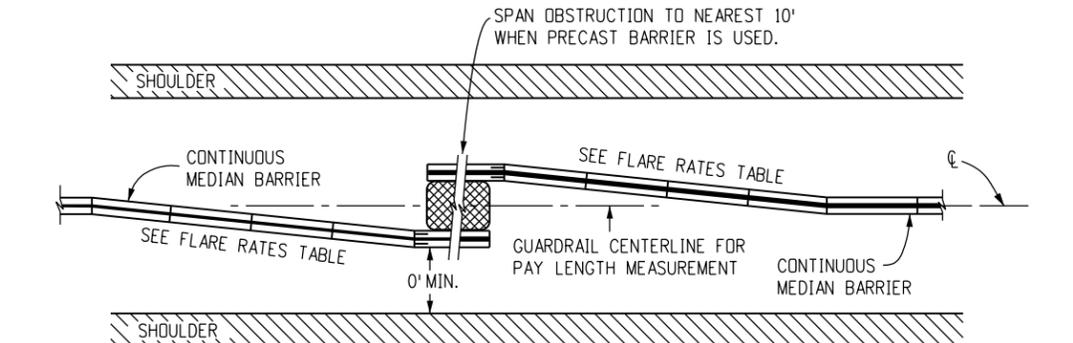


OBSTRUCTION 3 FT. WIDE OR LESS

HAZARDS IN NARROW MEDIANS

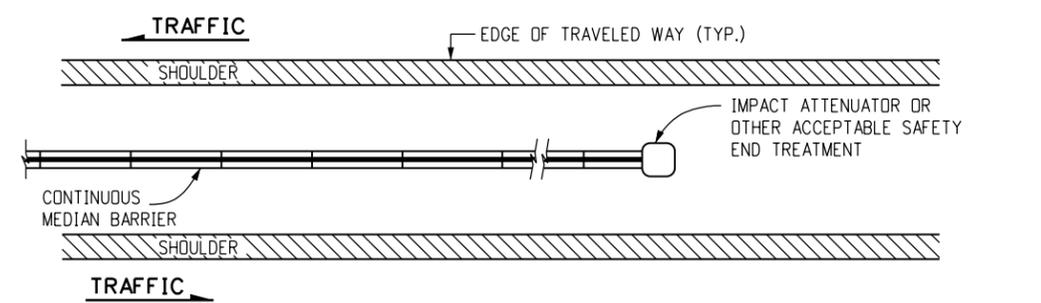


BRIDGE APPROACH



STYLE CA AT OBSTRUCTION

(OBSTRUCTION NOT SUITABLE FOR STYLE CD)



MEDIAN BARRIER END TREATMENT

<p><b>Computer File Information</b></p> <p>Creation Date: 07/31/19</p> <p>Designer Initials: JBK</p> <p>Last Modification Date: 02/17/23</p> <p>Detailer Initials: LTA</p> <p>CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English</p>	<p><b>Sheet Revisions</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Date:</th> <th>Comments</th> </tr> </thead> <tbody> <tr> <td>03/05/20</td> <td>Added General Note 4.</td> </tr> <tr> <td>(R-X)</td> <td></td> </tr> <tr> <td>(R-X)</td> <td></td> </tr> <tr> <td>(R-X)</td> <td></td> </tr> <tr> <td>(R-X)</td> <td></td> </tr> </tbody> </table>	Date:	Comments	03/05/20	Added General Note 4.	(R-X)		(R-X)		(R-X)		(R-X)		<p>Colorado Department of Transportation</p> <p>2829 West Howard Place          CDDT HQ, 3rd Floor          Denver, CO 80204          Phone: 303-757-9021 FAX: 303-757-9868</p> <p><b>Construction Engineering Services</b> JBK</p>	<p><b>GUARDRAIL TYPE 9          SINGLE SLOPE BARRIER</b></p> <p>Issued by the Project Development Branch: July 31, 2019</p>	<p><b>STANDARD PLAN NO.          M-606-15</b></p> <p>Standard Sheet No. 11 of 11</p> <p>Project Sheet Number:</p>
Date:	Comments															
03/05/20	Added General Note 4.															
(R-X)																
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(R-X)																