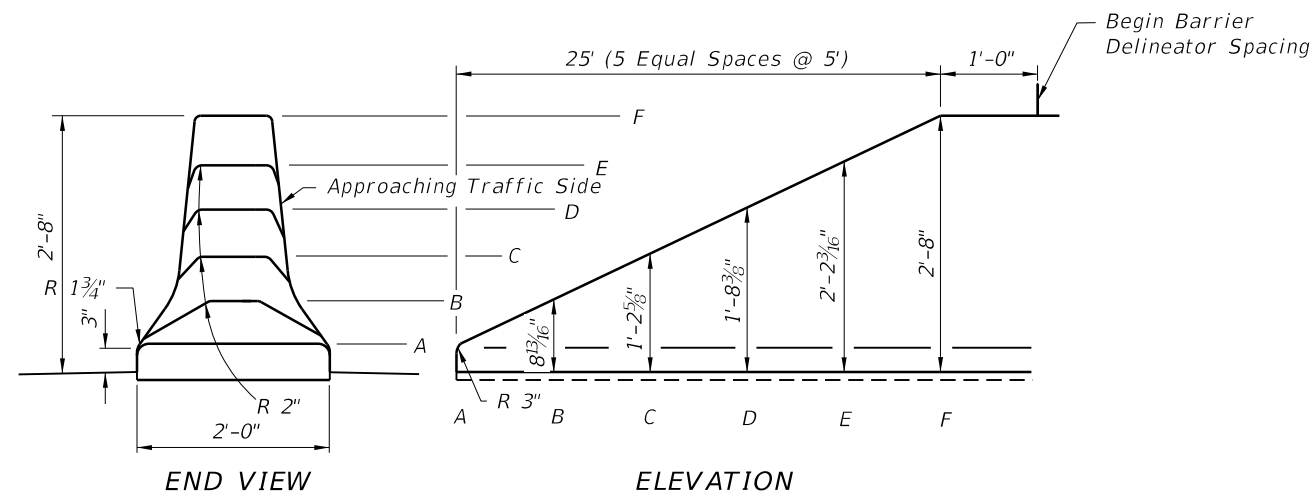
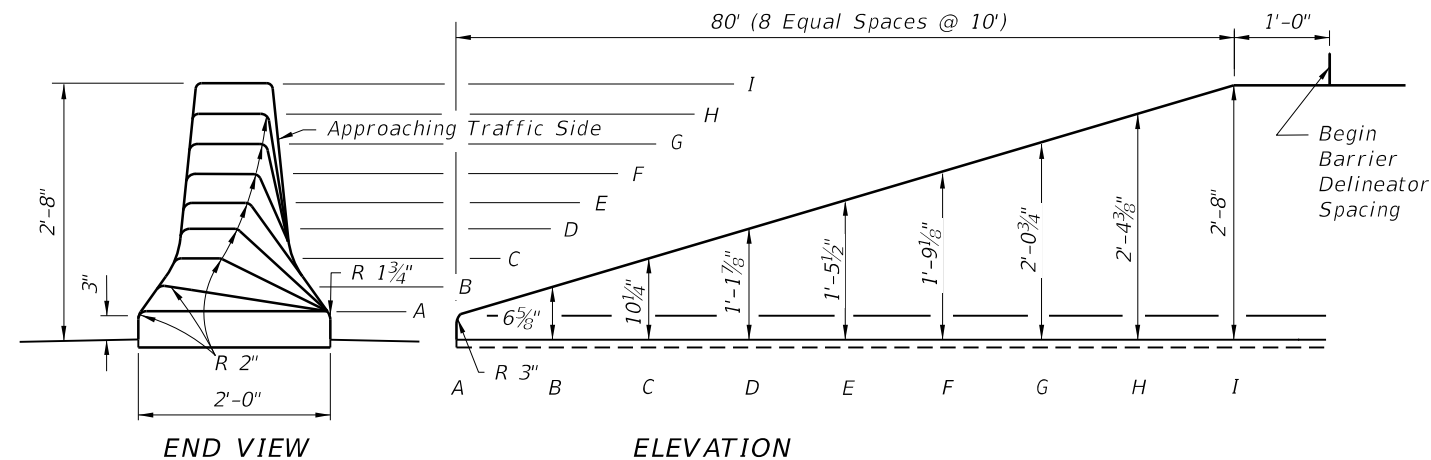


STANDARD BARRIER WALL SECTIONS  
DETAIL I



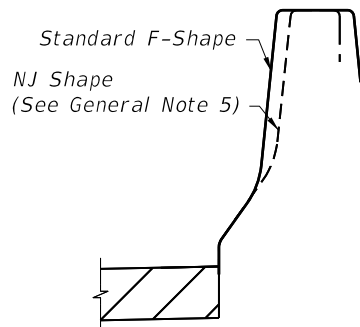
CONCRETE BARRIER WALL TERMINAL  
DETAIL II



DESIGN SPEED 45 MPH OR LESS  
CONCRETE BARRIER WALL TERMINAL FOR NARROW MEDIANS  
DETAIL III

BARRIER DELINEATOR SPACING FOR CONCRETE BARRIER WALLS		
LOCATION		REMARKS
OFFSET	SPACING	
< 4'	40'	1. Install barrier delineators for use on Concrete Barrier Walls in accordance with Specification Section 993.
4' to 8'	80'	2. Retroreflective sheeting shall be yellow or white and conform to the color of the near Edge of Travel Way, Lane Line.
> 8'	None Required	

Note: Location Offset is measured from the Edge of Travel Way, Lane Line to the Concrete Barrier Wall, Gutter Line.



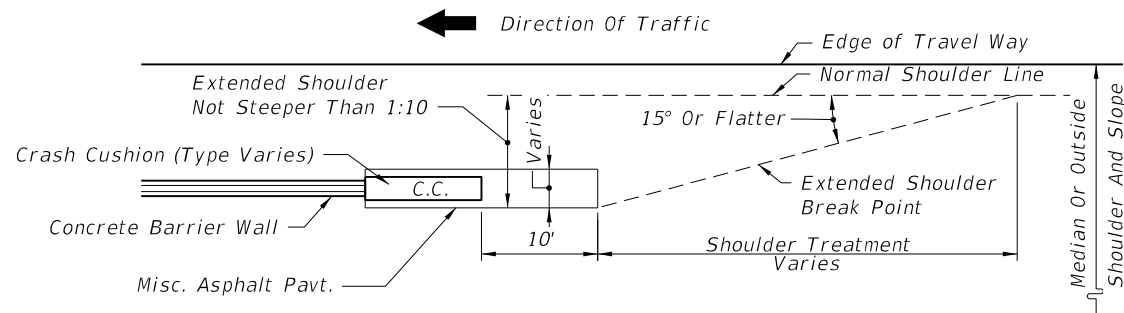
WALL FACE SAFETY SHAPES

GENERAL NOTES

- Class II concrete shall be used for the construction of Concrete Barrier Walls; except, in moderately and extremely aggressive environments, Class IV concrete shall be used. All nondesignated size reinforcing steel shall be No. 5 bars. Exposed concrete surfaces shall have a Class 3 surface finish in accordance with Specification Section 521 or as required in the plans.
- Concrete barrier wall terminal notes for design speeds  $\geq 50$  mph.
  - Terminated outside clear zone of the approach traffic, use DETAIL II end treatment.
  - Terminated within a shielded location.
  - Terminal protection by the use of a crash cushion system.
  - Terminated in conjunction with a suitably designed transition to another barrier.
- Expansion joints are required at bridge ends and/or at locations where the wall is an integral part of an existing or proposed concrete slab. Construct required joints to match existing or proposed expansion joints.
- When the barrier is installed adjacent to the pavement, compact the top 12" subgrade at least 98% of the maximum density determined by FM 1-T 180, Method D.
- Where standard F-Shape walls abut existing New Jersey (NJ) Shape walls, face transitions of not less than 5' in length shall be constructed at the adjoining end of the F-Shape wall.
- Shoulder concrete barrier wall has been structurally evaluated to be equivalent or greater in strength to other safety shapes which have been crash tested to NCHRP Report 350, TL-4 requirements.
- For wall segments constructed with the slip form method, score 3/8" deep crack control V-Grooves while the concrete is still plastic and mold them when walls are constructed with the stationary form method. V-Grooves shall be spaced at 20' intervals, the end of the side face grooves shall be in line with the ends of the top face groove and the long dimension of all grooves shall align at 90 degrees to the longitudinal axis of the wall. When wall segments are less than 40' in length, space the V-Groove equally between open joints. Dowel transverse construction joints for abutting segments less than 40' (See DETAIL B).
- Minimum length of cast-in-place or precast segments is 20 feet.
- Precast construction is allowed as an alternate to cast-in-place construction.
  - Wall segments < 40' in length shall be joined by a transverse joint in accordance with DETAIL C. The minimum segment length is 20'.
  - Bedding of the precast sections shall be facilitated by the use of sand-cement grout or equal method to assure uniform bearing.
  - Reinforcement may be required for handling stresses.
- On roadways designated for reverse laning, all downstream ends that are not shielded or outside the clear zone shall be marked by Type 3 Object Markers.
- For BARRIER WALL INLET details see Index Nos. 218 and 219. For MEDIAN BARRIER INLETS see Index No. 217.
- Concrete barrier wall with NJ Safety Shape may not be substituted for the Standard F Shape Barrier.

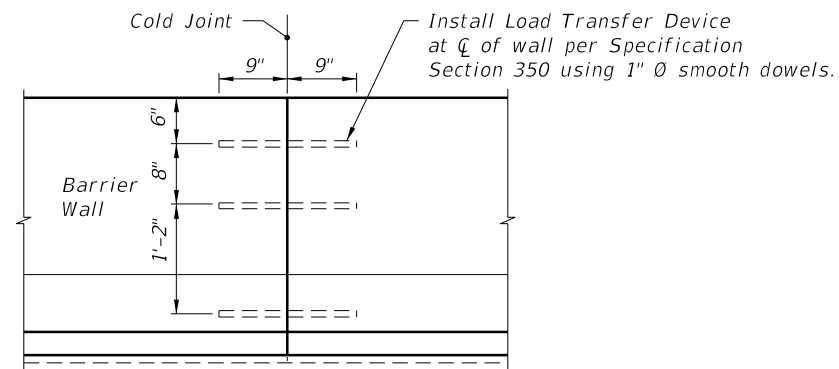
CONCRETE BARRIER WALL TERMINALS

LAST REVISION 07/01/14	DESCRIPTION:	2015 FDOT DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 1 of 25
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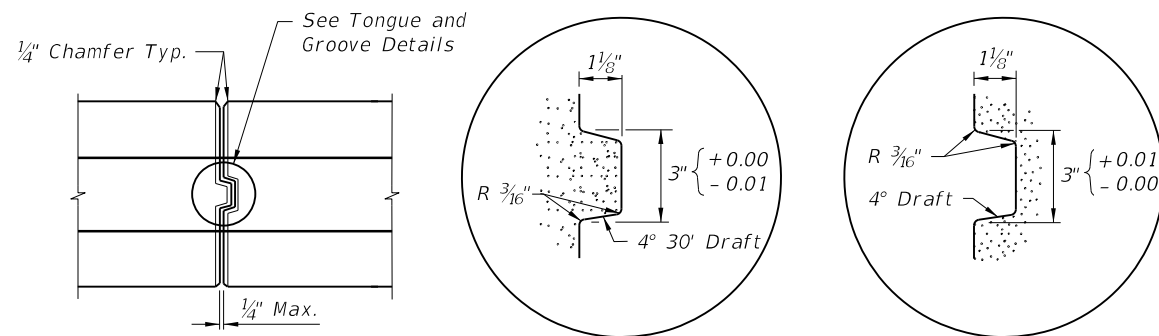
SHOULDER TREATMENT WHEN CRASH CUSHIONS SHIELD CONCRETE BARRIER WALL ENDS LOCATED INSIDE APPROACH CLEAR ZONE OR LATERAL OFFSET

DETAIL A



DOWELED TRANSVERSE CONSTRUCTION JOINT WHERE ABUTTING SEGMENT(S) LESS THAN 40' IN LENGTH (Required on abutting ends of Segments < 40' long)

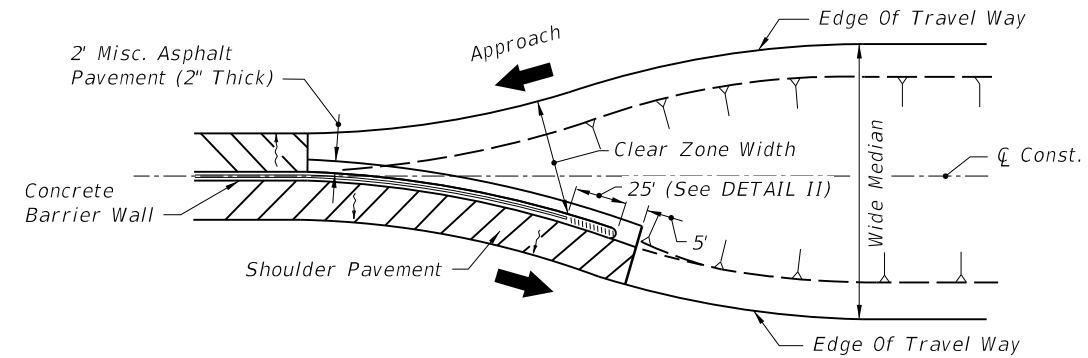
DETAIL B



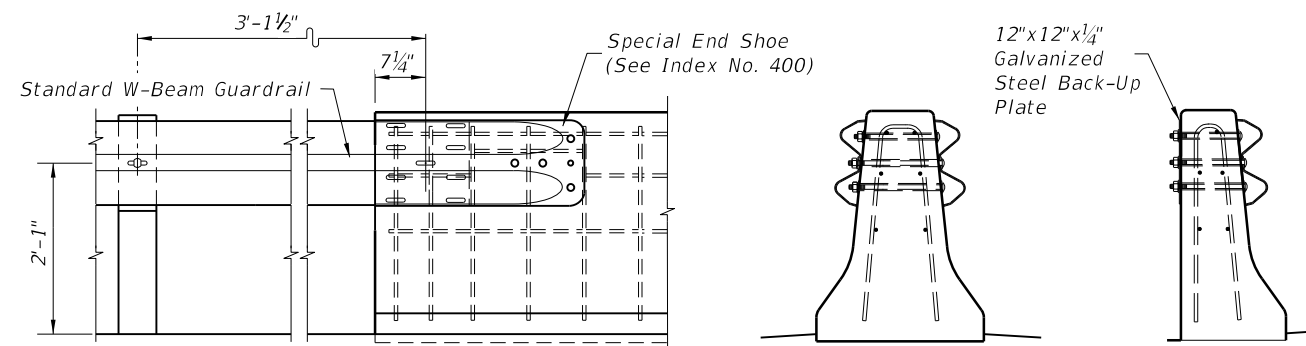
PRECAST TONGUE AND GROOVE TRANSVERSE JOINT (Required on abutting ends of Precast Segments ≥ 40' long)

DETAIL C

CONCRETE BARRIER WALL SPECIAL DETAILS



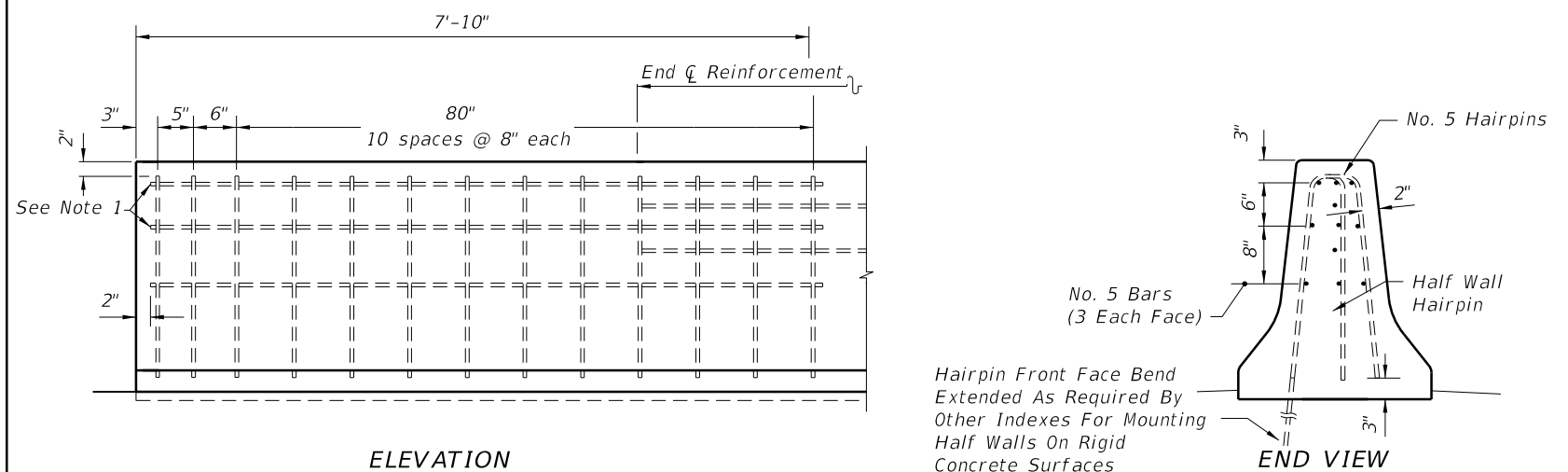
TRANSITION BETWEEN NARROW AND WIDE MEDIANS WHERE END OF BARRIER WALL IS LOCATED OUTSIDE THE APPROACH CLEAR ZONE OR LATERAL OFFSET



NOTES:

- End of wall flush mounted connections are not applicable to two-lane two-way facilities. For trailing end connections on two-lane two-way facilities, see SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS WHEN GUARDRAIL OFFSET FROM HAZARD < 3'.
- Trailing guardrail connections to double face safety shaped walls will be under one of the following traffic conditions and mounting methods:
  - One-way traffic trailing condition one side only - flush mount with flat steel back-up plate on back side.
  - One-way traffic trailing condition both sides - flush mount both sides.
  - For trailing condition one side and approach traffic condition opposite side - see MEDIAN BARRIER WALL.

W-BEAM GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL TRAILING ENDS



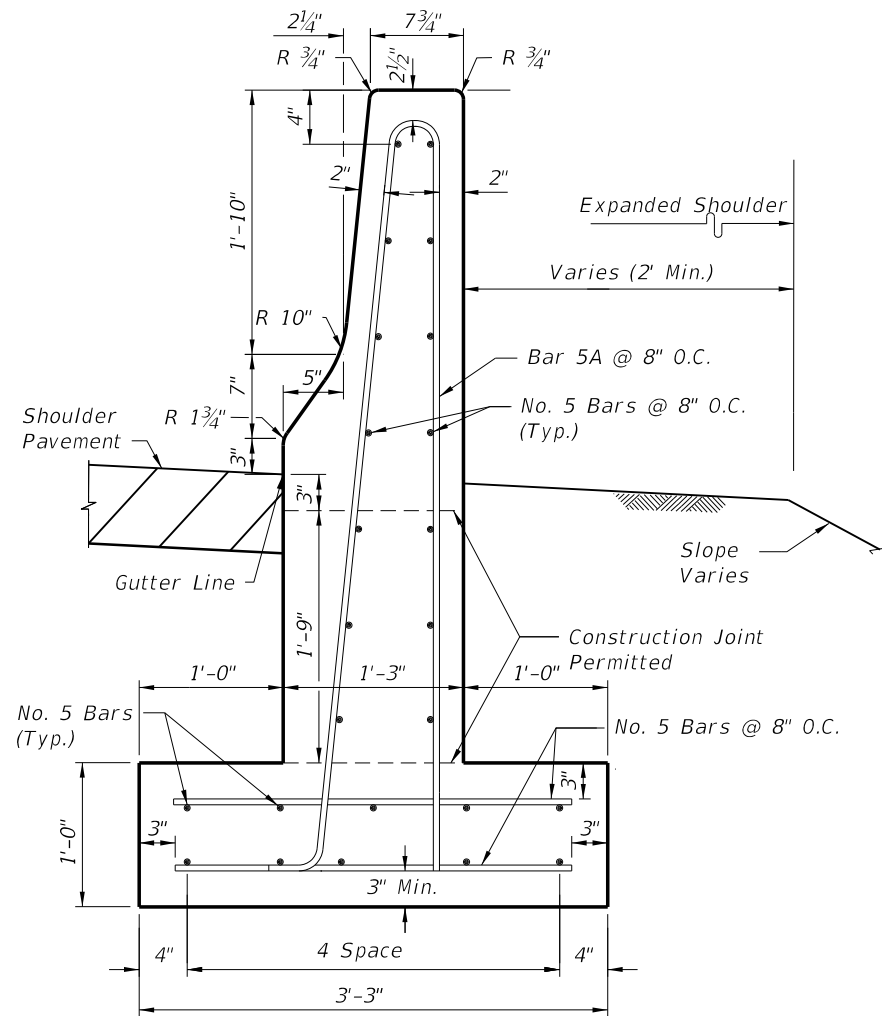
NOTE:

- Free end reinforcement required for nonreinforced walls at the following locations: All exposed ends; abutting ends of precast segments ≥ 40'; ends with guardrail connections; ends with redirective crash cushion connections; and, ends connecting to bridge traffic rails or other rigid barriers.

FREE END REINFORCEMENT

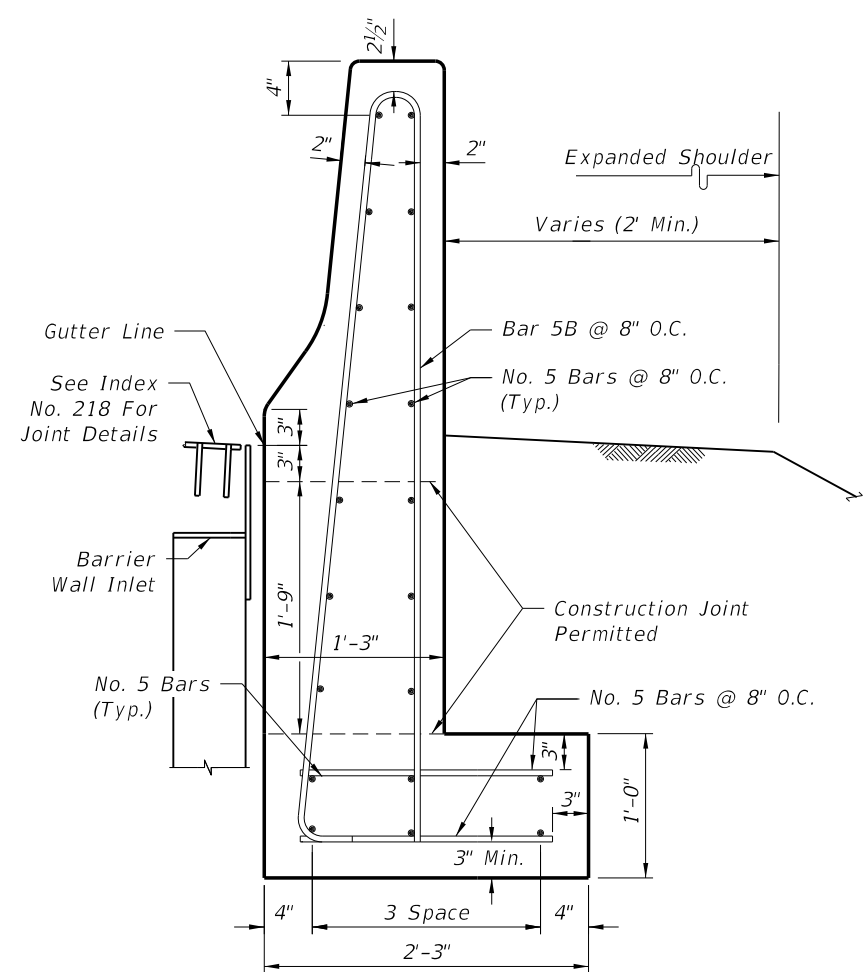
5/29/2014 1:11:41 PM

LAST REVISION	REVISION	DESCRIPTION:	2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 2 of 25
07/01/14						



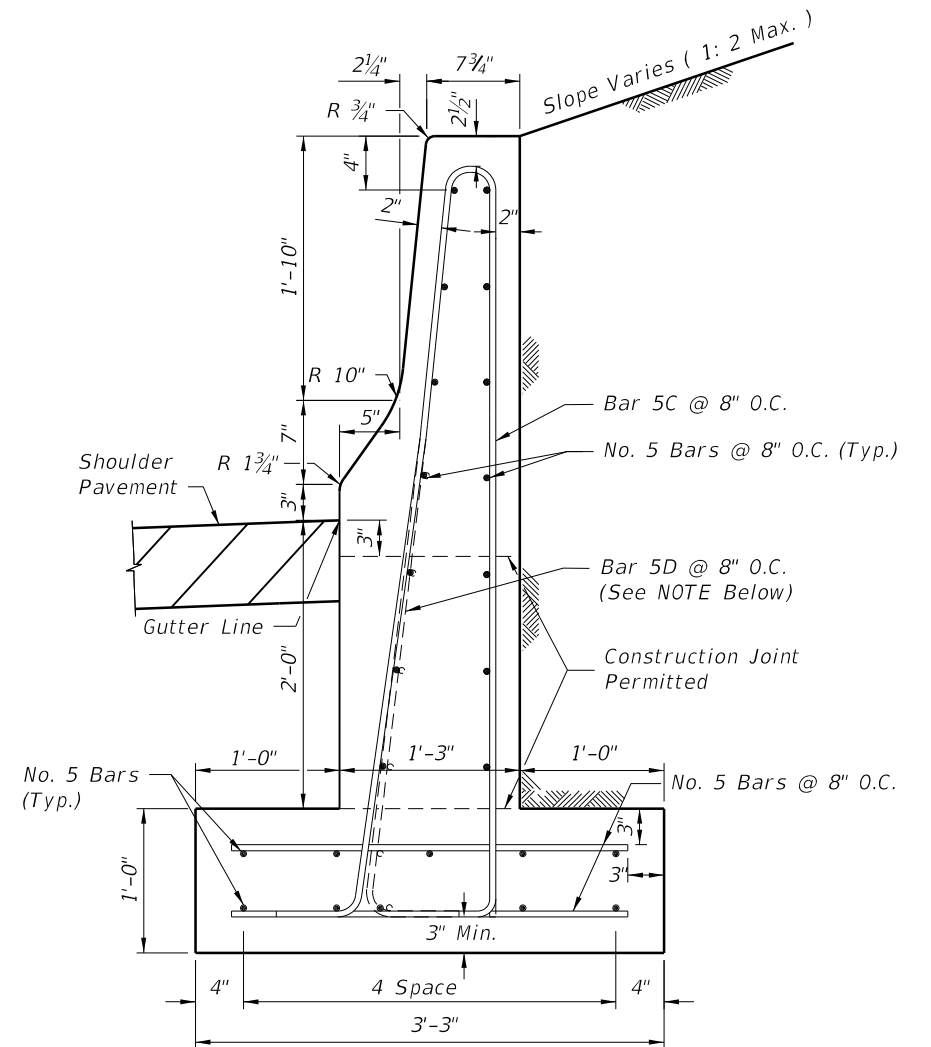
QUANTITIES: Concrete 0.30 CY/LF  
Reinforcing Steel 32 LBS/LF

**SHOULDER WALL (TYPICAL)**



QUANTITIES: Concrete 0.26 CY/LF  
Reinforcing Steel 28 LBS/LF

**SHOULDER WALL (MODIFIED)**



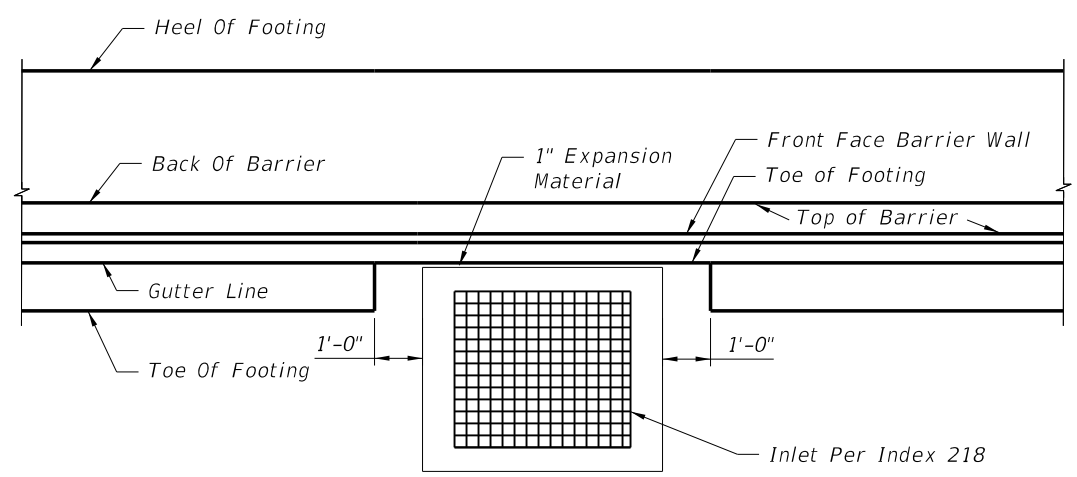
NOTE: Bar 5D Shall Be Used In Lieu of Bar 5C In Areas Where Obstructions Require Localized Omission Of Toe

QUANTITIES:  
With Reinforcing Steel (Bar 5C) 27 LBS/LF; Concrete 0.27 CY/LF

With Reinforcing Steel (Bar 5D) 23 LBS/LF; Concrete 0.23 CY/LF

**SHOULDER WALL (RETAINING)**

- NOTES:
1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet for each side of all cold or expansion joints.
  2. Unless otherwise noted, Minimum Segment Wall Length is 20 LF.
  3. All walls may be made up of segments 20' or more in length provided the segments are joined by a transverse joint in accordance with the CONCRETE BARRIER WALL SPECIAL DETAILS, DETAIL B.
  4. Quantities shown are for information only. Barrier wall inlets (Index 218) shall be isolated from the barrier wall stem and footing by 1" expansion material.
  5. All longitudinal reinforcement are No. 5 bars.
  6. For additional information on Bars 5A, 5B, 5C and 5D, see BAR BENDING DIAGRAMS.

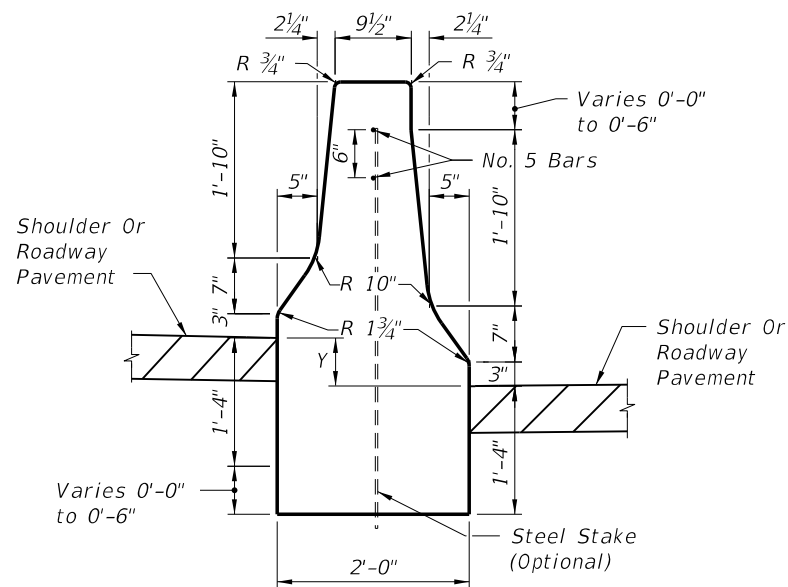


PLAN VIEW  
SHOULDER WALL FOOTING  
TRANSITION AT INLETS

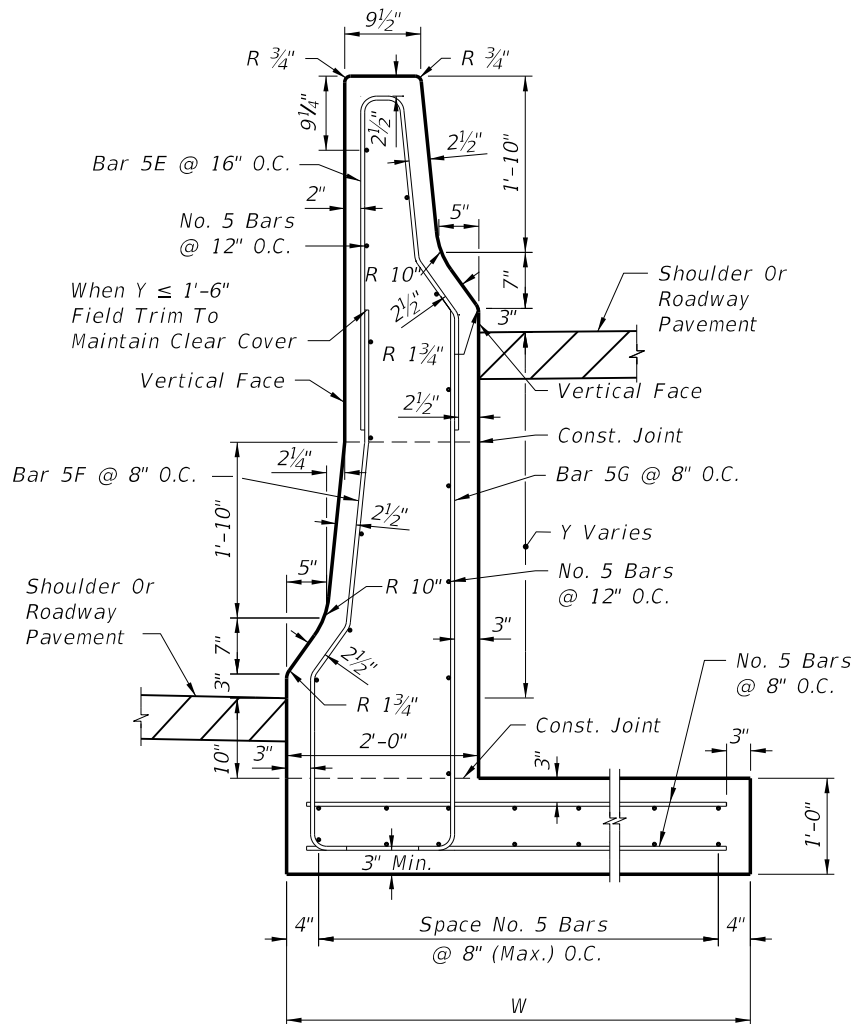
**REINFORCED CONCRETE SHOULDER WALL**

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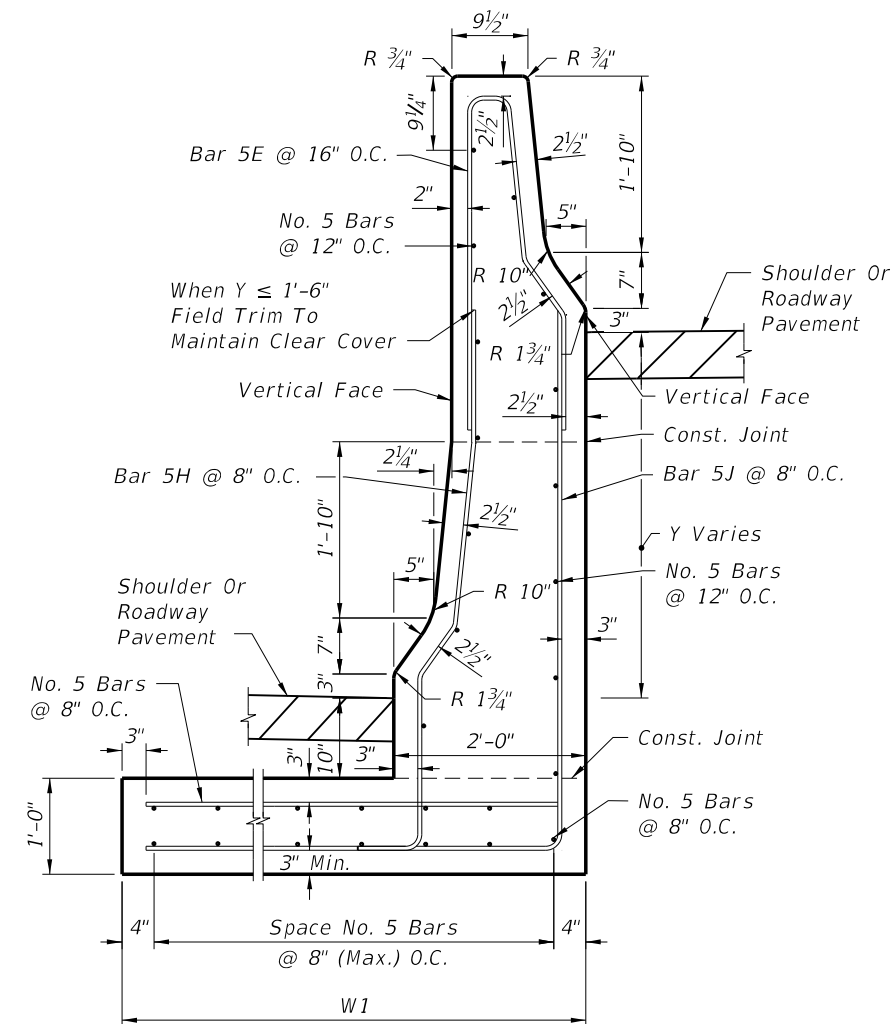
LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 3 of 25
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F-SHAPE MEDIAN BARRIER  
WHEN Y IS LESS THAN OR EQUAL TO 6 INCHES



CANTILEVER WALL  
SUPERELEVATED SECTION



L-WALL  
SUPERELEVATED SECTION

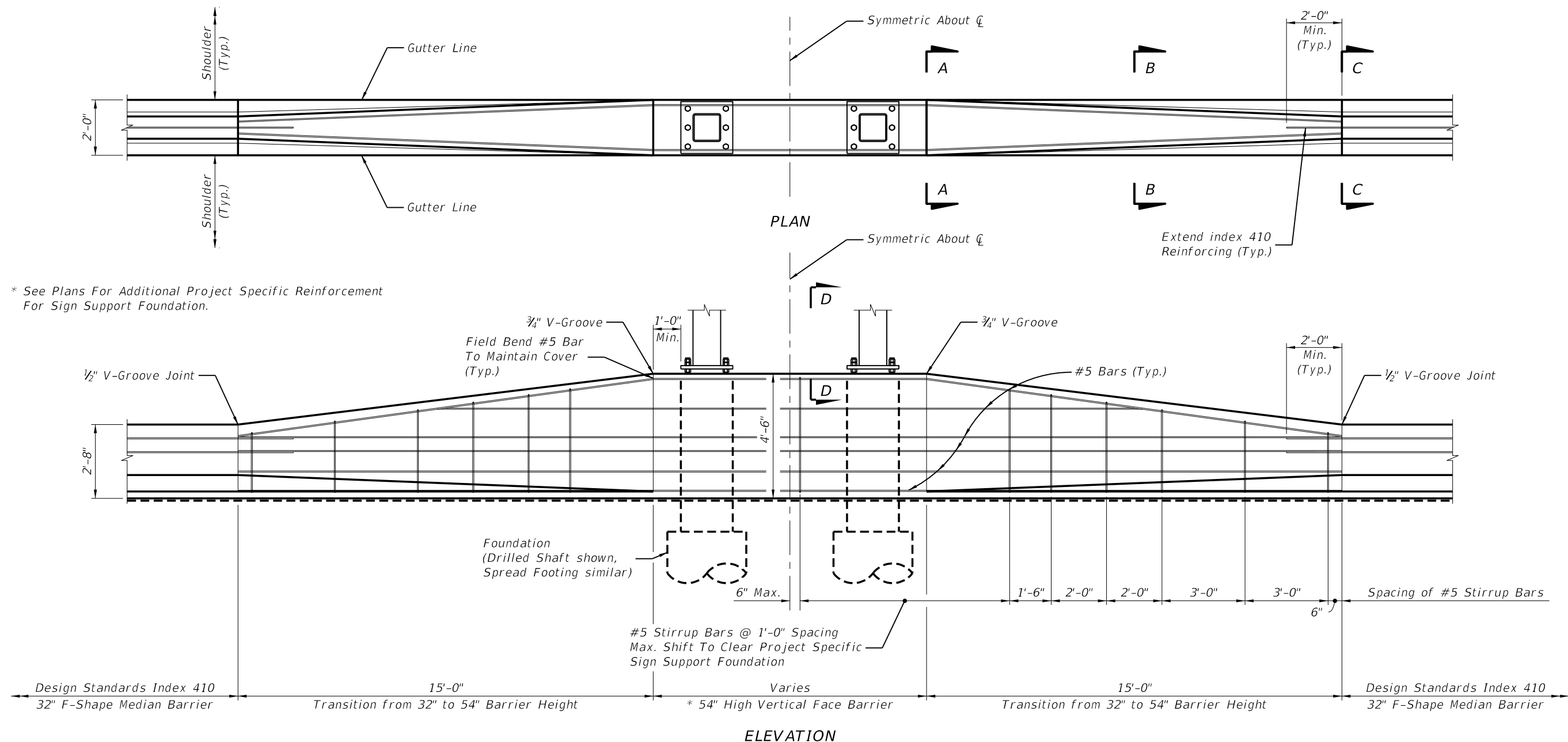
DIMENSIONS TABLE								
Cantilever Wall	Height Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
	Width W	2'-6"	2'-9"	3'-0"	3'-3"	3'-3"	3'-6"	3'-6"
Min. Segment Wall Length		29'	27'	25'	23'	24'	22'	24'
L-Wall	Height Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
	Width W1	2'-6"	2'-9"	3'-0"	3'-3"	3'-3"	3'-6"	3'-6"
Min. Segment Wall Length		26'	24'	22'	21'	22'	21'	24'

NOTES:

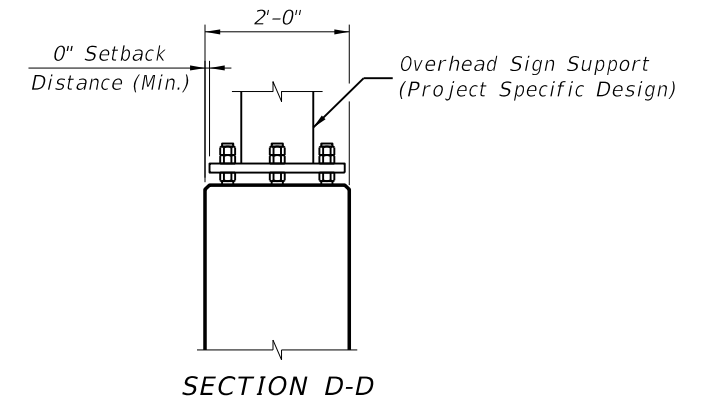
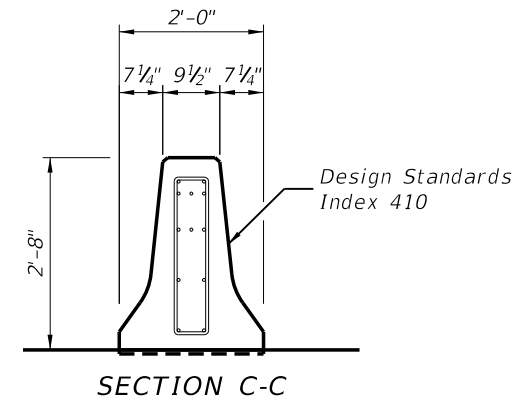
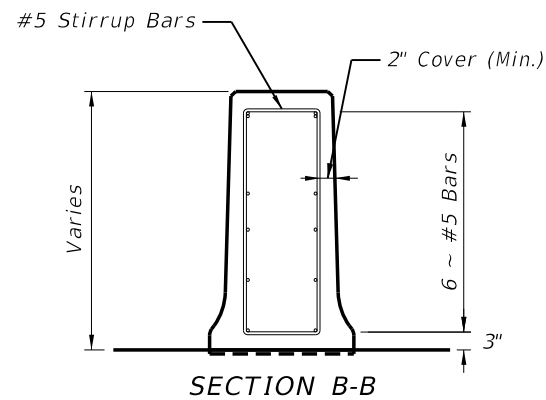
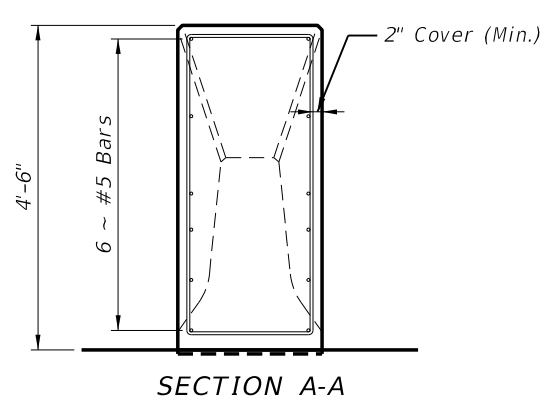
1. Unless the plans stipulate a specific wall type, either the Cantilever Wall or the L-Wall may be constructed at the Contractor's option.
2. For additional information on Bars 5E, 5F, 5G, 5H and 5J, see BAR BENDING DIAGRAMS.

MEDIAN BARRIER WALL FOR SUPERELEVATED SECTIONS WITH VARIABLE ROADWAY PROFILE GRADE LINES

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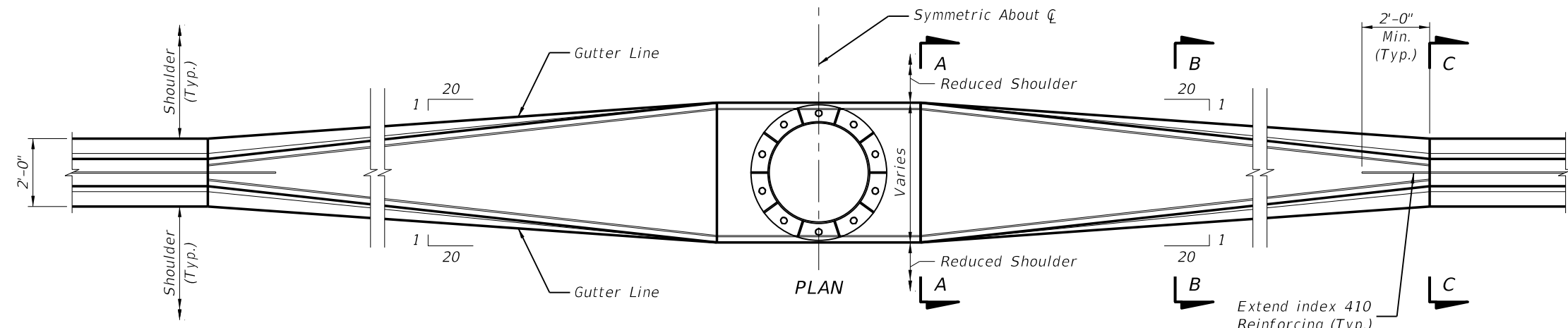
\* See Plans For Additional Project Specific Reinforcement For Sign Support Foundation.



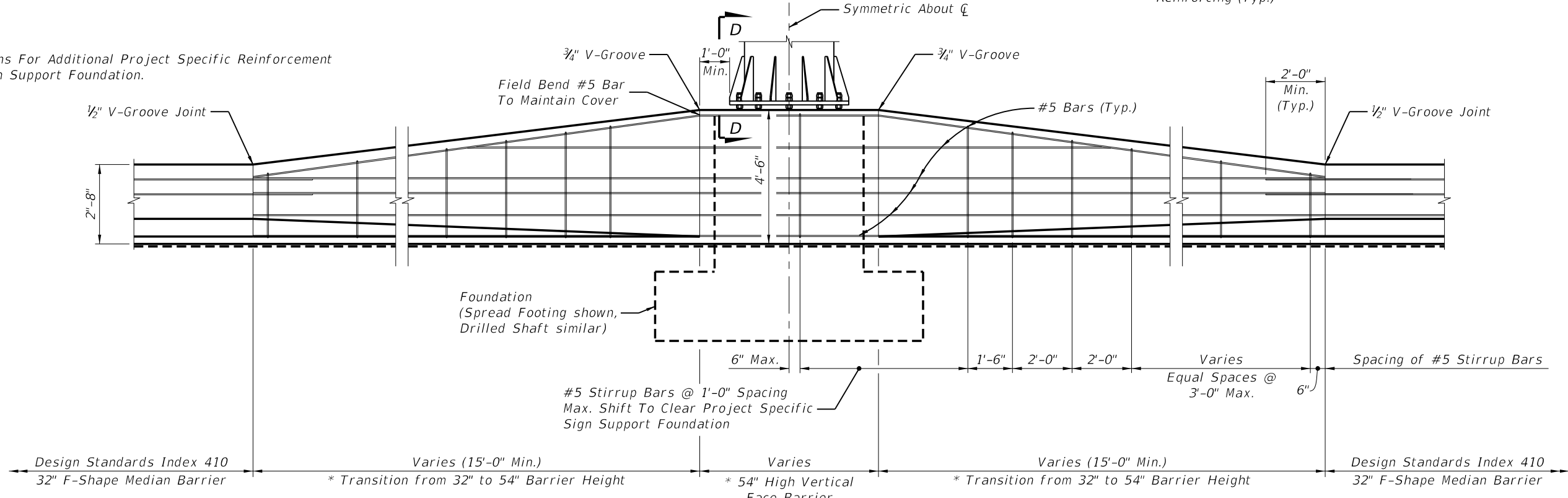
LARGE SIGN MEDIAN BARRIER MOUNTED SIGN SUPPORT TRANSITION (OPTION 1)

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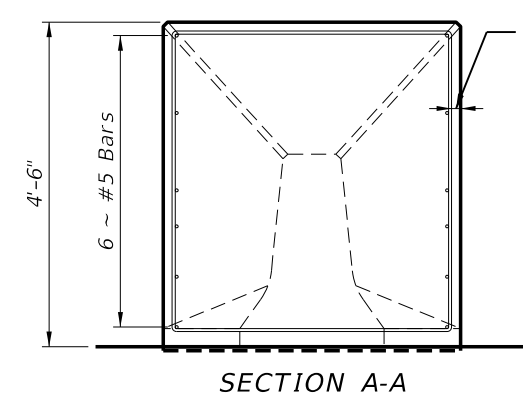
LAST REVISION 07/01/14	DESCRIPTION:	 2015 <b>DESIGN STANDARDS</b>	CONCRETE BARRIER WALL	INDEX NO. <b>410</b>	SHEET NO. <b>5 of 25</b>
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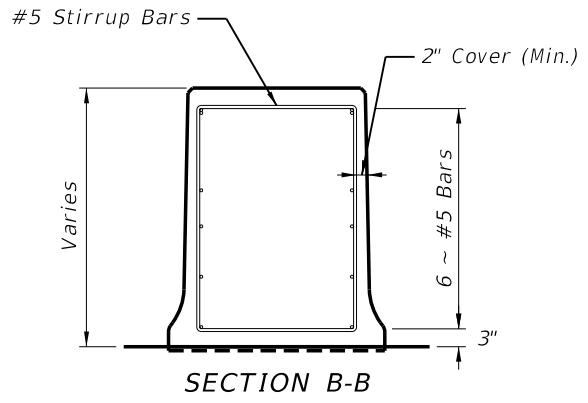
\* See Plans For Additional Project Specific Reinforcement For Sign Support Foundation.



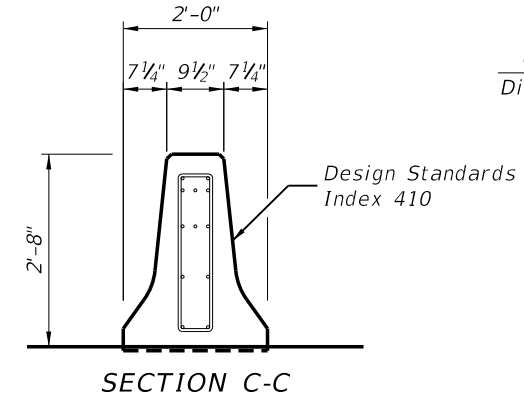
ELEVATION



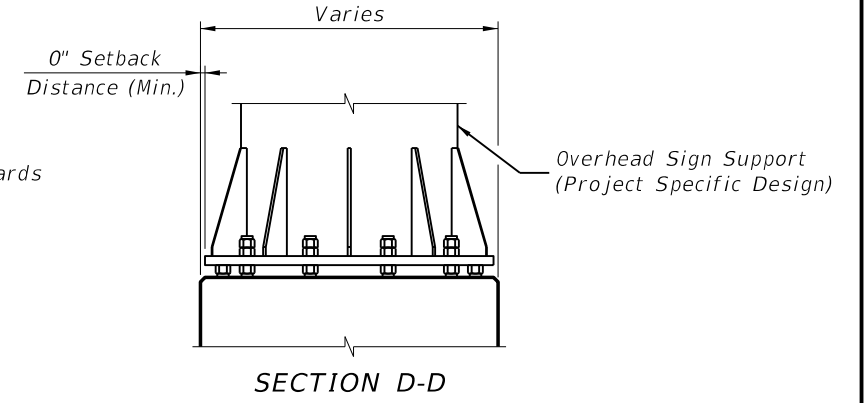
SECTION A-A



SECTION B-B



SECTION C-C

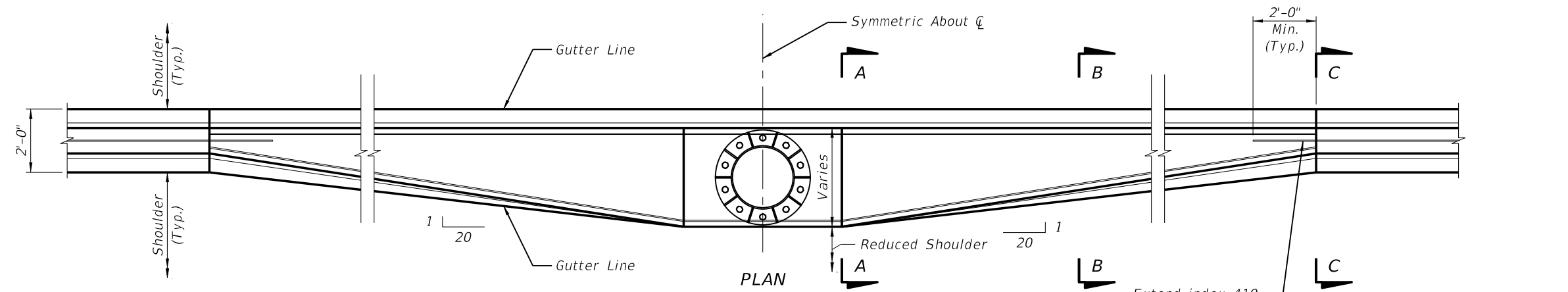


SECTION D-D

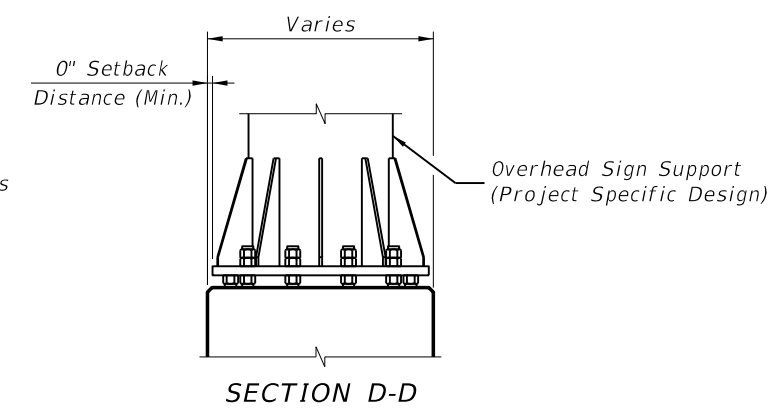
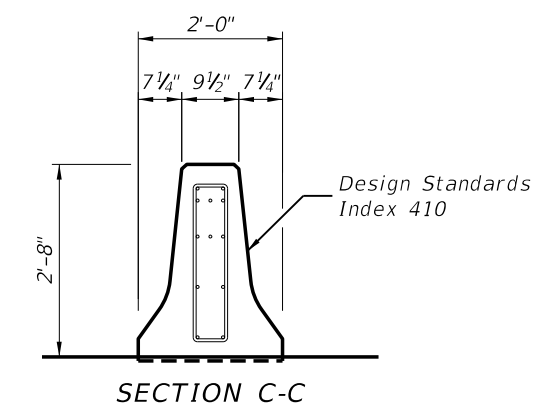
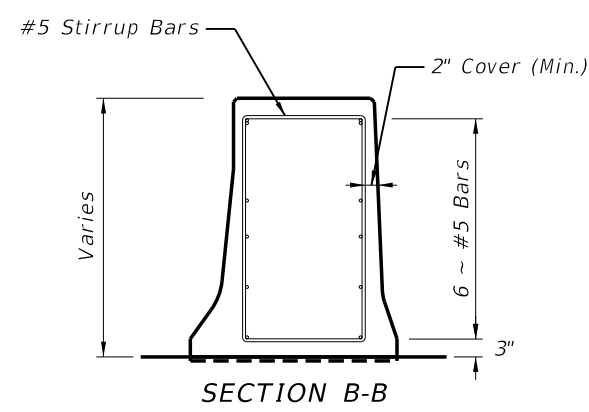
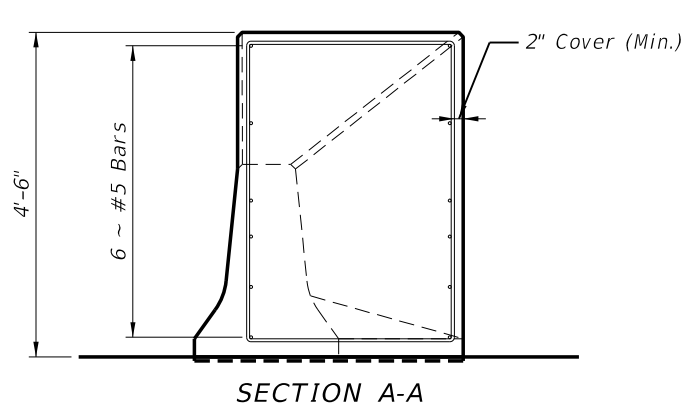
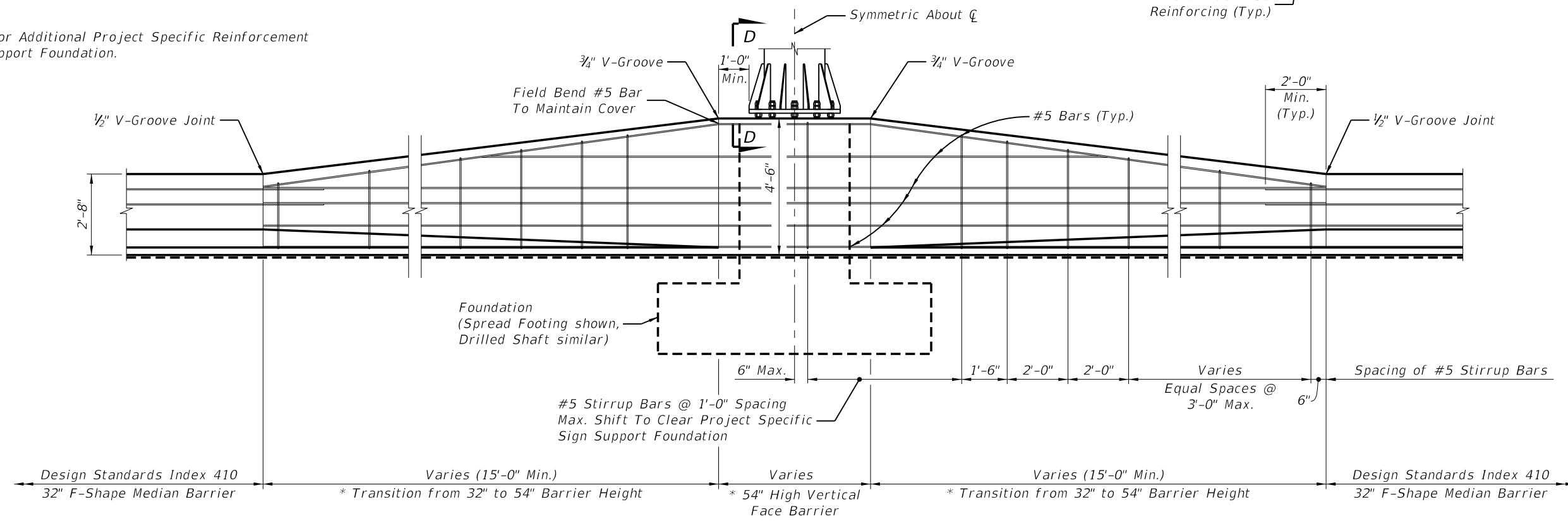
LARGE SIGN MEDIAN BARRIER MOUNTED SIGN SUPPORT TRANSITION (OPTION 2)

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LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 <b>DESIGN STANDARDS</b>	<b>CONCRETE BARRIER WALL</b>	INDEX NO. <b>410</b>	SHEET NO. <b>6 of 25</b>
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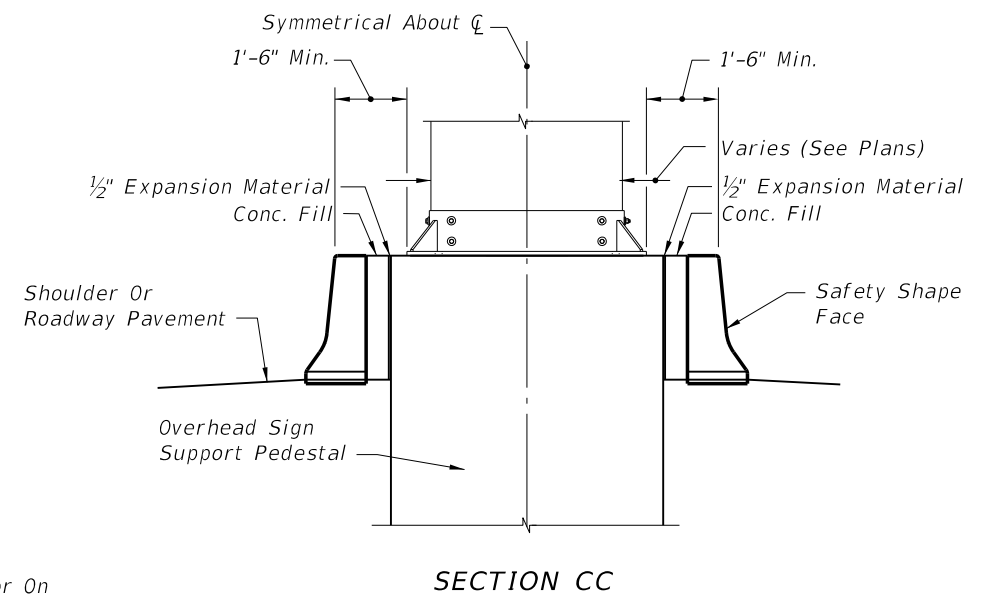
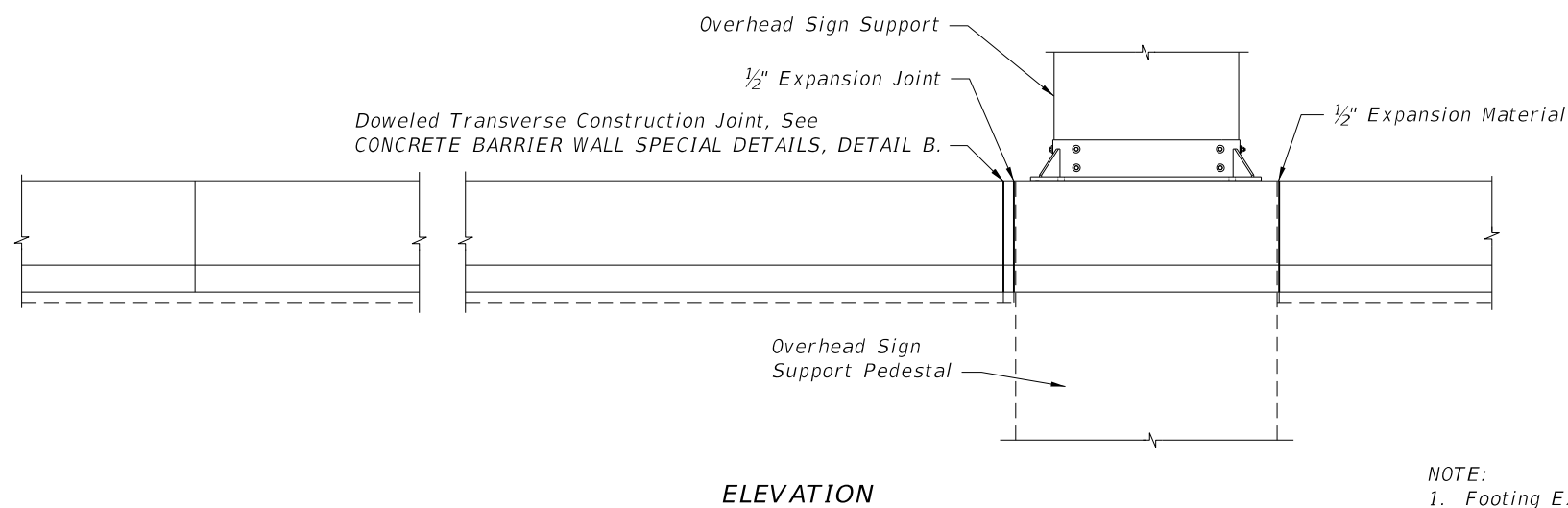
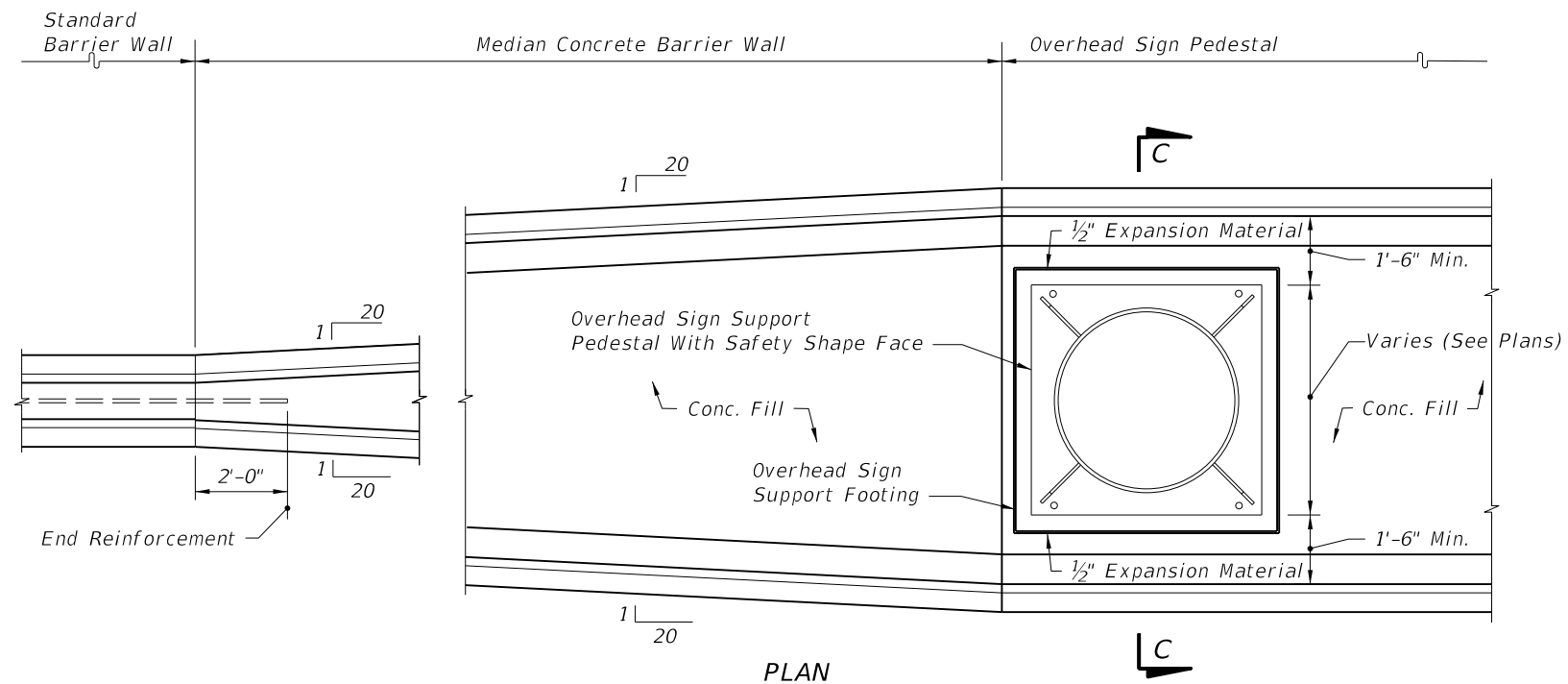
\* See Plans For Additional Project Specific Reinforcement For Sign Support Foundation.



LARGE SIGN MEDIAN BARRIER MOUNTED SIGN SUPPORT TRANSITION (OPTION 3)

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LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 7 of 25
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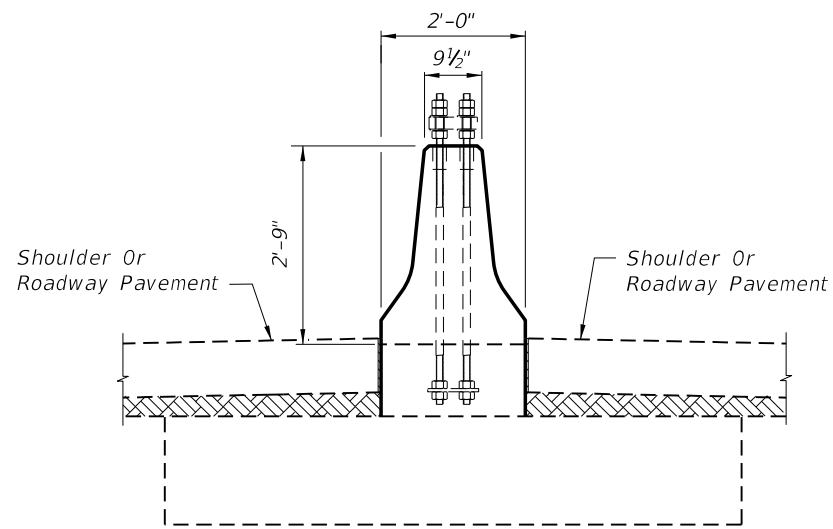
NOTE:  
 1. Footing Extended As Called For On  
 Other Indexes Or As Called For In  
 The Plans

CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT OVERHEAD SIGN SUPPORTS

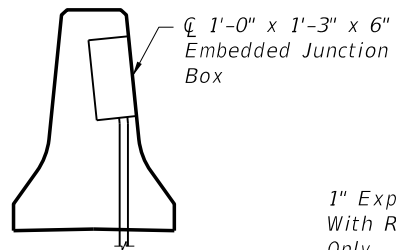
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LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 8 of 25
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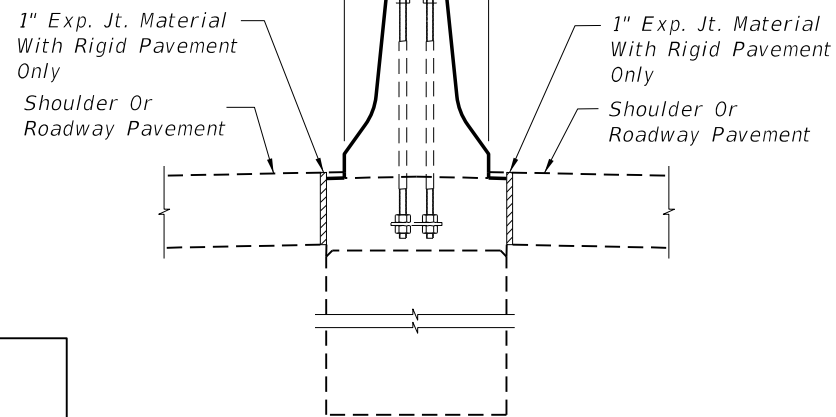


END VIEW  
SPREAD FOOTING OPTION

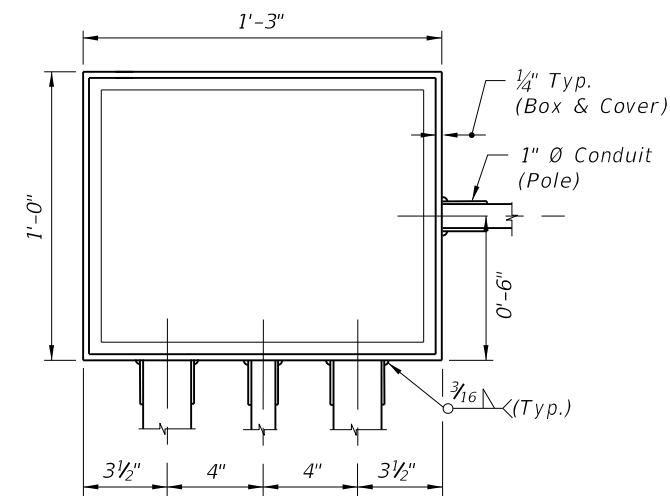


TRANSVERSE SECTION  
INSTALLATION

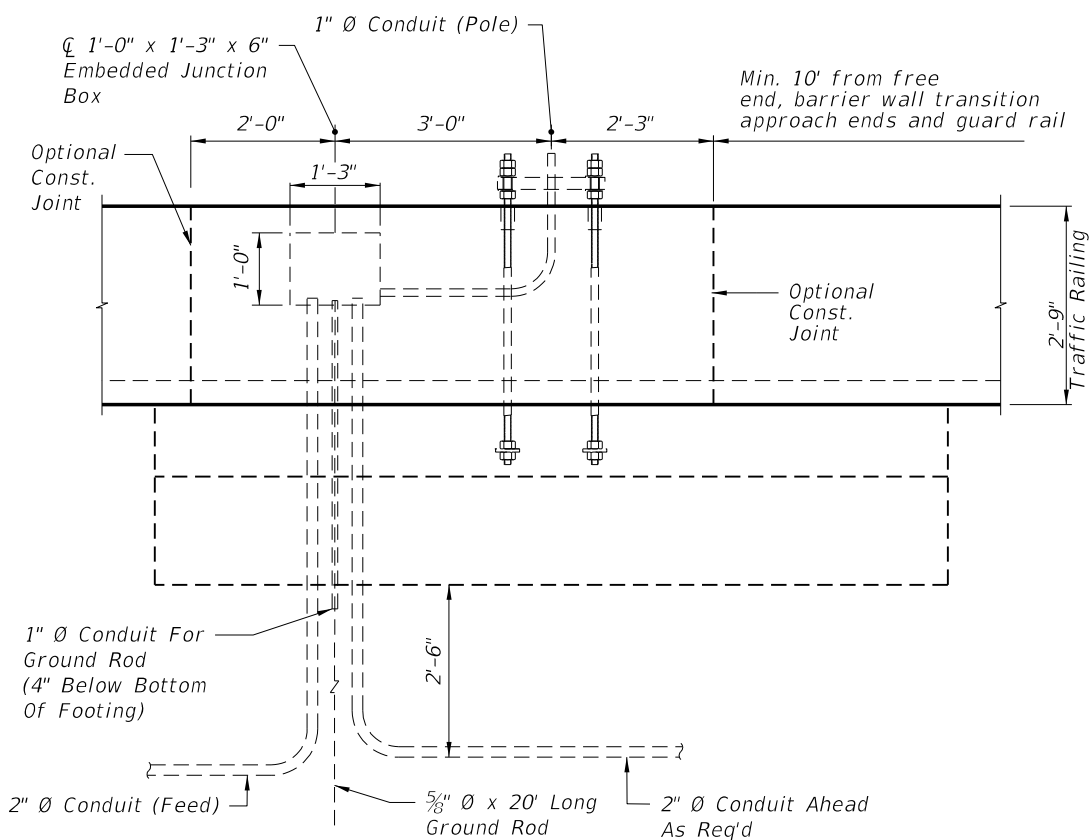
**SPREAD FOOTING AND  
CYLINDRICAL NOTES**  
The Reinforcement Details And  
Dimensions For Both The Spread  
Footing And Cylindrical Foundations  
Can Be Found In Index 17515.



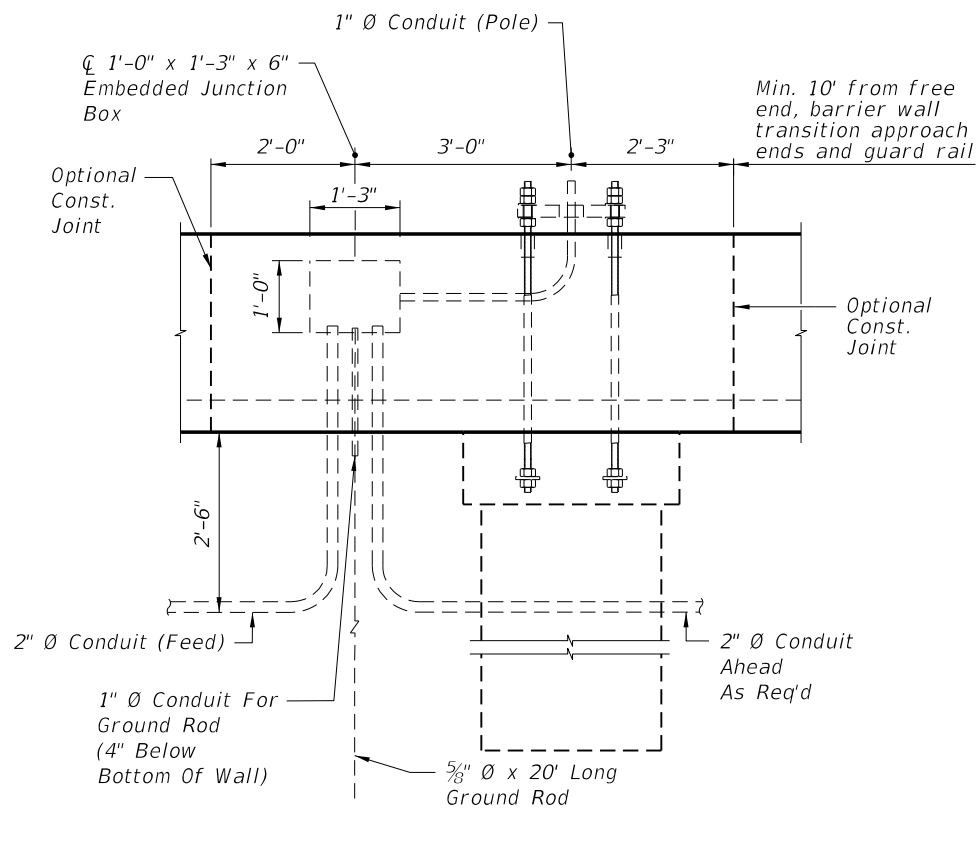
END VIEW  
CYLINDRICAL OPTION



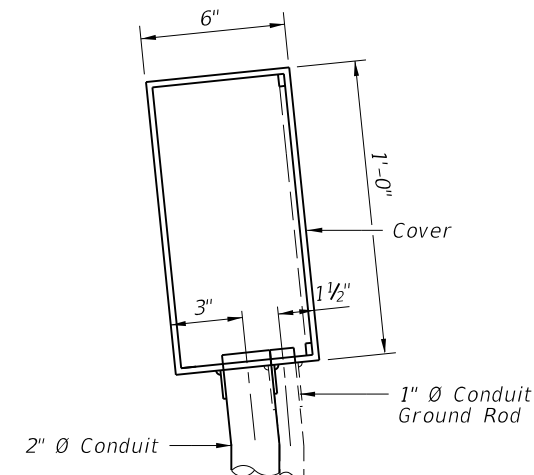
FRONT VIEW  
EMBEDDED JUNCTION BOX



ELEVATION  
SPREAD FOOTING OPTION



ELEVATION  
CYLINDRICAL OPTION



SIDE VIEW  
EMBEDDED JUNCTION BOX

**NOTES:**

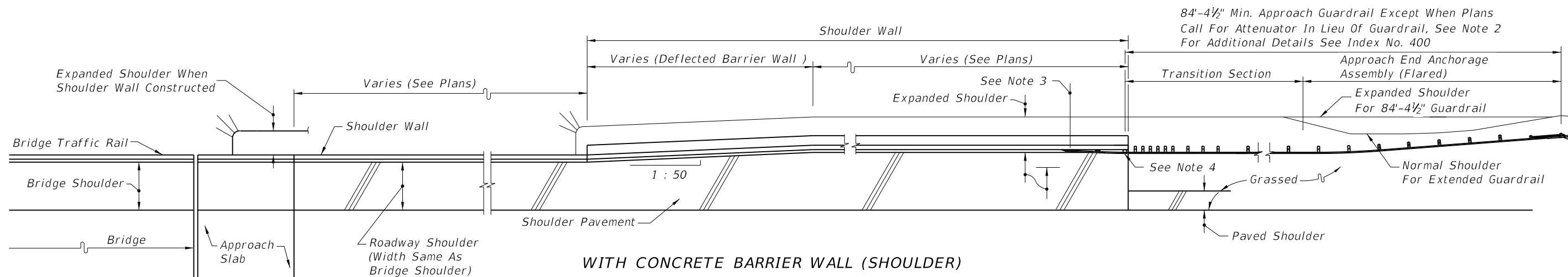
1. Embedded junction boxes are to be fabricated from steel conforming to ASTM A36 and be hot-dip galvanized after fabrication. All seams shall be continuously welded and ground smooth. A neoprene gasket shall be attached to the box to provide a watertight cover. The cover screws shall be fully galvanized.
2. Remove excess concrete while green and hand form chamfers.
3. Embedded junction box complete and conduit risers are incidental to the construction and cost of the barrier wall; there is to be no separate compensation for the box, risers or installation unless specifically called for in the plans.

**MEDIAN BARRIER MOUNTED LIGHT POLE DETAILS**

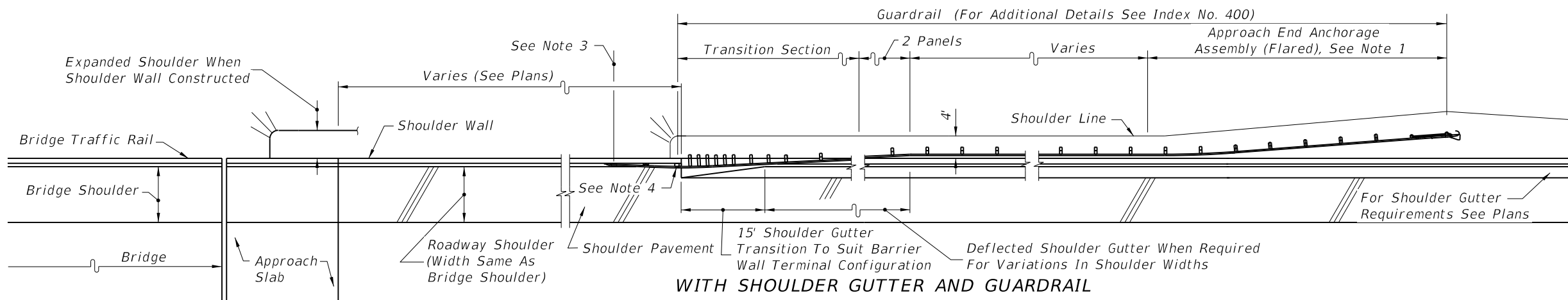
**EMBEDDED JUNCTION BOX - ELECTRICAL**

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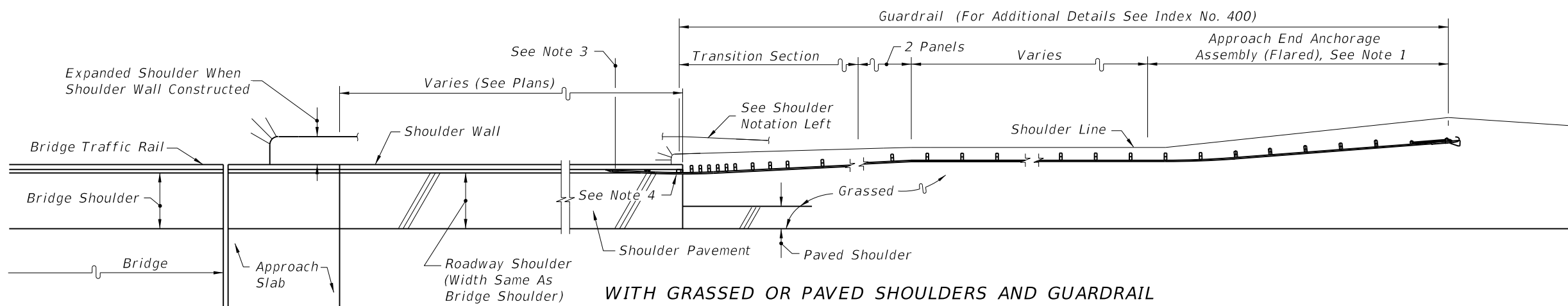
LAST REVISION 07/01/14	REVISION	DESCRIPTION:	<b>2015 DESIGN STANDARDS</b>	<b>CONCRETE BARRIER WALL</b>	INDEX NO. <b>410</b>	SHEET NO. <b>9 of 25</b>
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WITH CONCRETE BARRIER WALL (SHOULDER)



WITH SHOULDER GUTTER AND GUARDRAIL




WITH GRASSED OR PAVED SHOULDERS AND GUARDRAIL

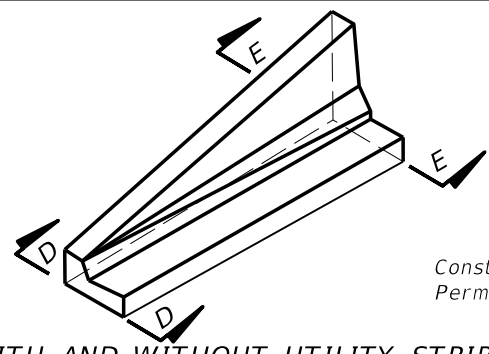
NOTES:

- To be deleted on trailing ends except for 2-lane 2-way facilities. The tangent guardrail shall be anchored by End Anchorage Type II, Index No. 400.
- To be deleted on trailing ends except for 2-lane 2-way facilities.
- End measurement for guardrail payment when guardrail connected to shoulder barrier walls. See Index No. 400, Detail J for end measurement when guardrail connected to concrete traffic rails constructed with approach slab or on retaining walls.
- Guardrail connection to concrete traffic railings or retaining walls shall be in accordance with the Design Standards, Index 400 Series and the plans.
- Views show approach roadside barriers when length of need exceeds the length of either retaining walls with concrete traffic railings or Shoulder Wall. When either of these rigid barriers alone satisfies the approach length of need, the wall ends shall be shielded by crash cushions, or by guardrail the same as for bridge traffic rails, as detailed in Index No. 400. See other flagged notes for trailing end treatments. Miscellaneous asphalt paving under guardrail not shown.

EITHER REINFORCED CONCRETE BARRIER WALL (SHOULDER) OR RETAINING WALL WITH CONCRETE TRAFFIC RAILING  
CONCRETE BARRIER WALLS ON BRIDGE APPROACHES

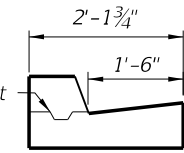
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LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 10 of 25
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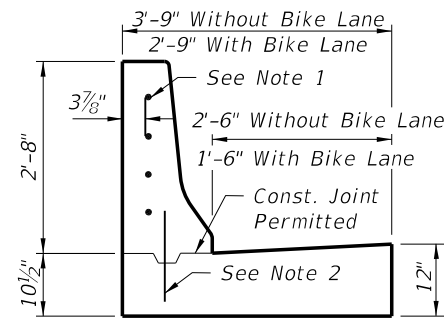


WITH AND WITHOUT UTILITY STRIP  
PICTORIAL VIEW

Const. Joint Permitted



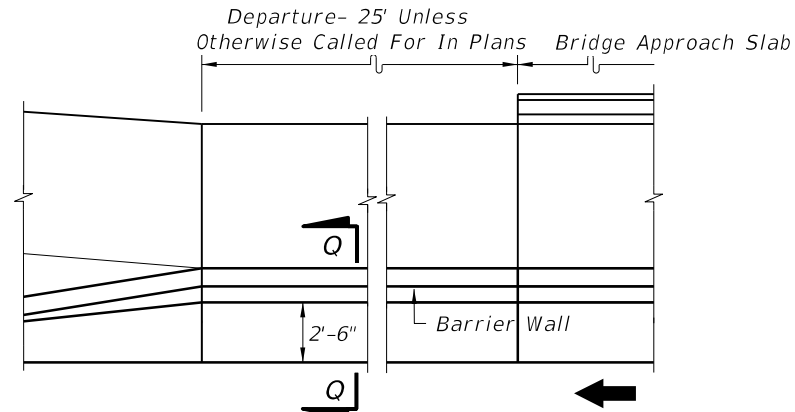
SECTION DD



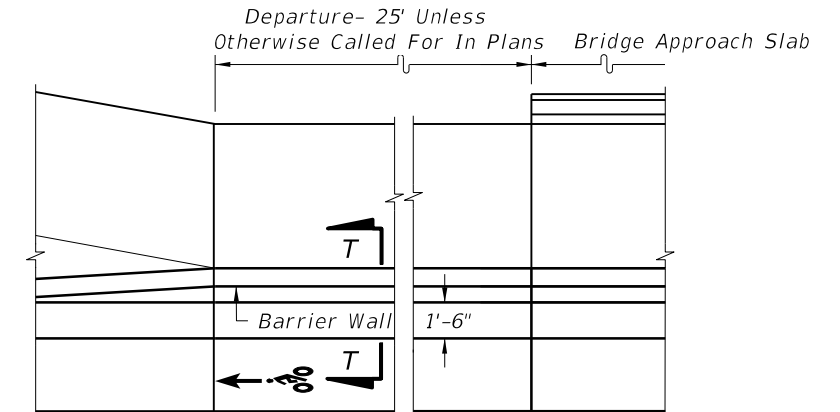
SECTION EE

NOTES:

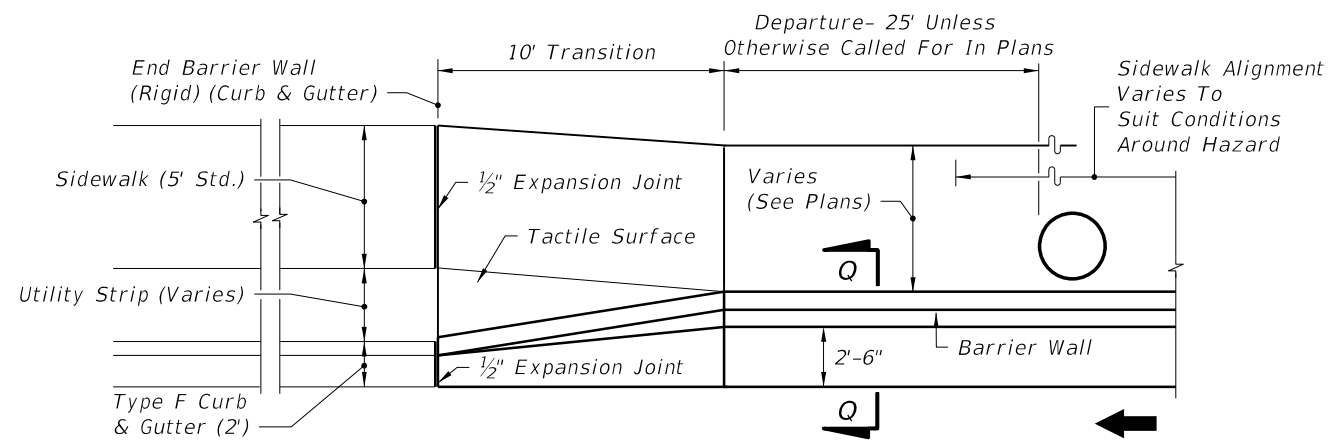
1. Transition Segments Shall Be Doweled Into The End Of The Barrier Wall In The Following Manner: Four 1" diameter holes 6" deep on 6" centers shall be drilled in the end of the barrier and No. 6 bars 15" long set in an Adhesive Bonded Material System per Standard Specification Section 416. The ends of the dowels extending into the transition segment shall be wrapped with one layer of 15 lb. Type I Asphalt-saturated roofing felt with the ends crimped.
2. When Construction Joints Are Utilized For Transition Segment Construction The Stem Shall Be Doweled To The Footing In The Following Manner: Five No. 5 bars 15" long shall be embedded 7" into the footing. The dowels shall be spaced 15" on centers with the first dowel located 12" from the barrier wall. Dowels may be placed within or adjacent to the keyway.
3. The detail BRIDGE WITH BIKE LANE can be superimposed over the details: WITH UTILITY STRIPS AND WITH BIKE LANE and WITHOUT UTILITY STRIPS AND WITH BIKE LANE. The detail BRIDGE WITHOUT BIKE LANE can be superimposed over the details: WITH UTILITY STRIPS AND WITHOUT BIKE LANE and WITHOUT UTILITY STRIPS AND WITHOUT BIKE LANE.
4. For SECTION QQ, see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE. For SECTION TT, see CURB AND GUTTER WITH ADJACENT BICYCLE LANE.



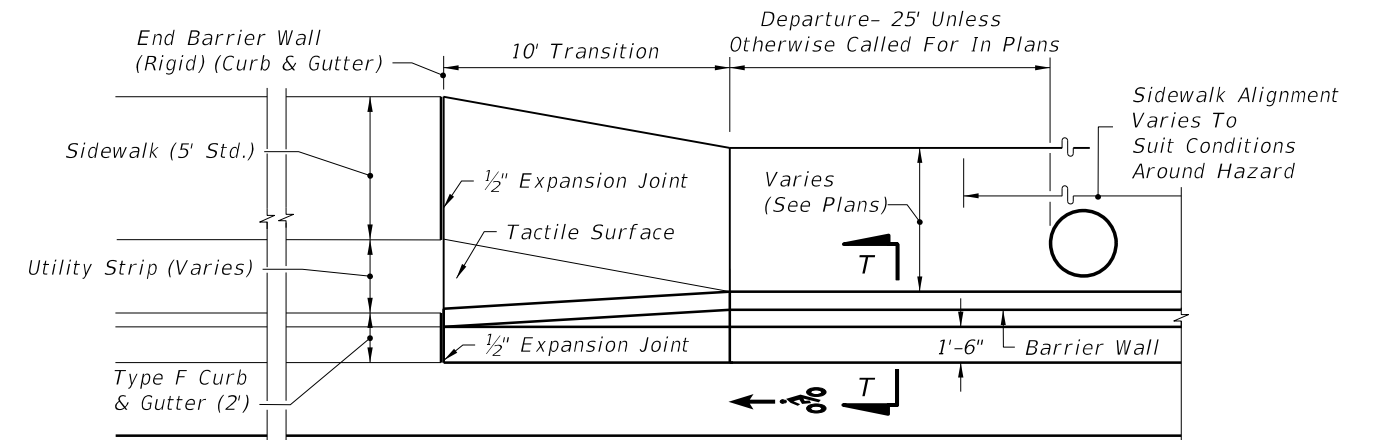
BRIDGE WITHOUT BIKE LANE



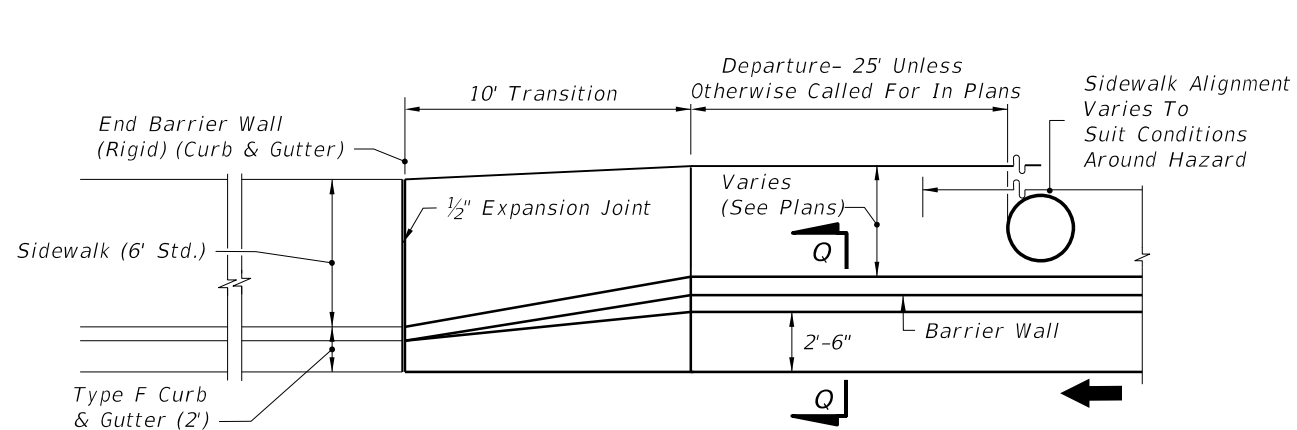
BRIDGE WITH BIKE LANE



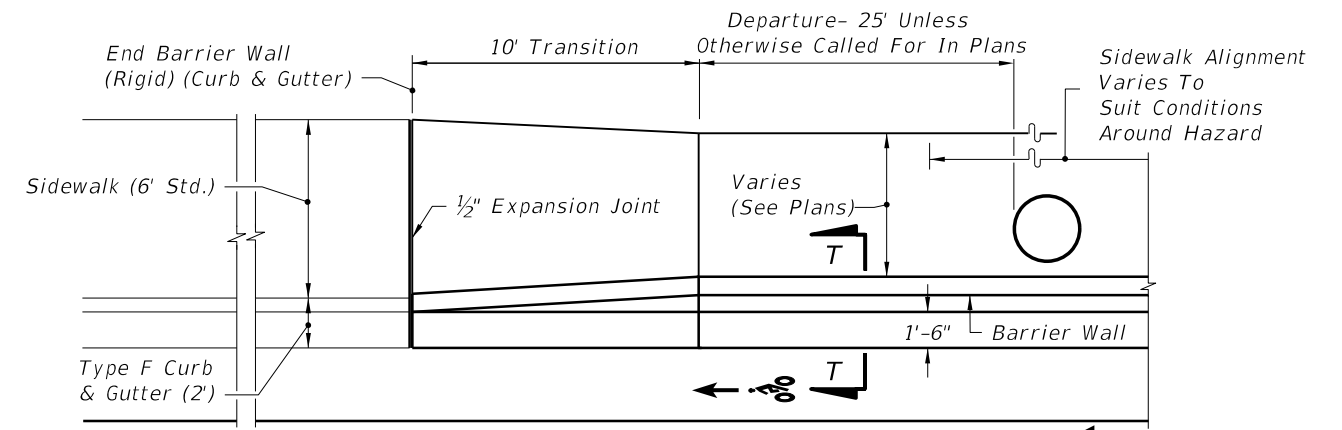
WITH UTILITY STRIP AND WITHOUT BIKE LANE



WITH UTILITY STRIP AND WITH BIKE LANE



WITHOUT UTILITY STRIPS AND WITHOUT BIKE LANE

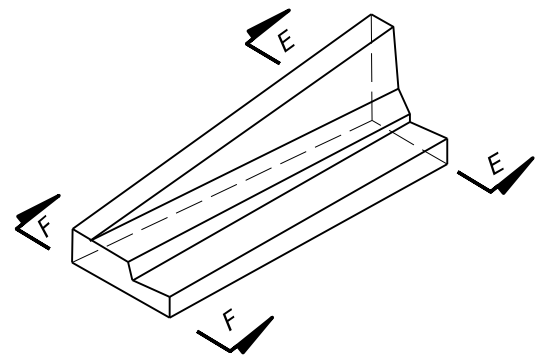


WITHOUT UTILITY STRIP AND WITH BIKE LANE

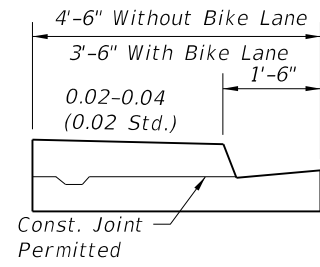
HAZARD 4' OR LESS FROM FACE OF CURB  
ONE-WAY CURB AND GUTTER DEPARTURES

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LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 11 of 25
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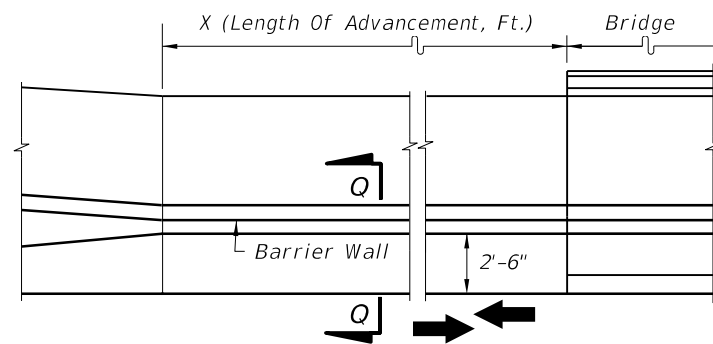
WITH AND WITHOUT UTILITY STRIP  
PICTORIAL VIEW



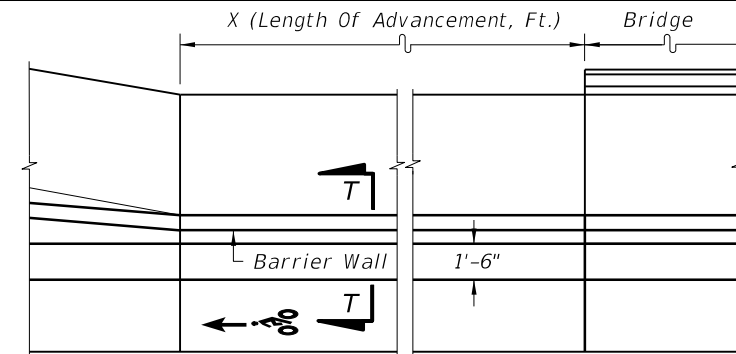
SECTION FF

NOTES:

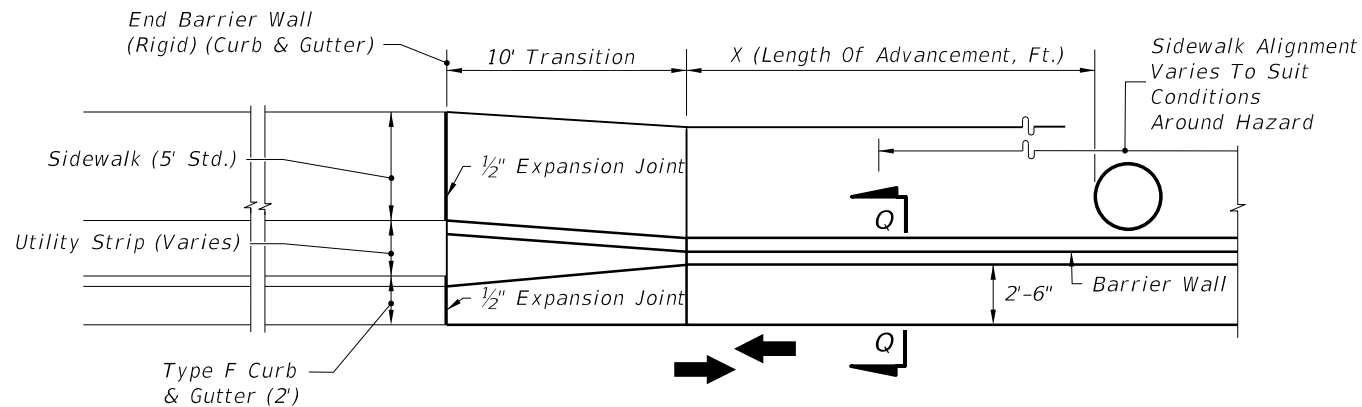
1. For X=Length of advancement in feet for near and opposing lanes and for sectional details see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE.
2. The 1'-6" and 2'-6" offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the stem of the wall may be accommodated by the details on HAZARD PENETRATION INTO STEM OF RIGID CONCRETE BARRIER WALLS; AND SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH.
3. The detail BRIDGE WITH BIKE LANE can be superimposed over the details: WITH UTILITY STRIPS AND WITH BIKE LANE and WITHOUT UTILITY STRIPS AND WITH BIKE LANE. The detail BRIDGE WITHOUT BIKE LANE can be superimposed over the details: WITH UTILITY STRIPS AND WITHOUT BIKE LANE and WITHOUT UTILITY STRIPS AND WITHOUT BIKE LANE.
4. For SECTION EE, see ONE-WAY CURB AND GUTTER DEPARTURES.
5. For SECTION QQ, see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE.  
For Section TT, see CURB AND GUTTER WITH ADJACENT BICYCLE LANE.



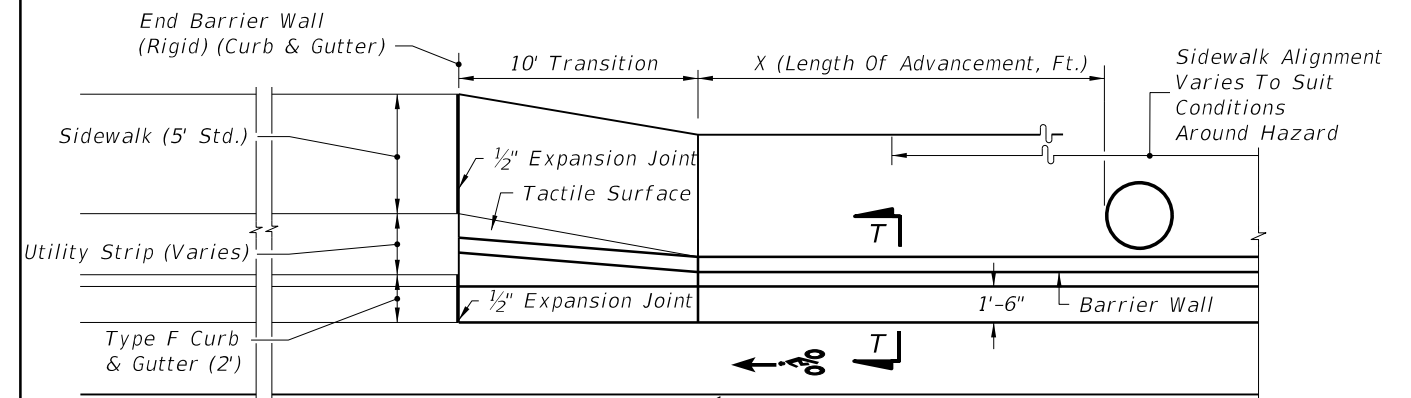
BRIDGE WITHOUT BIKE LANE



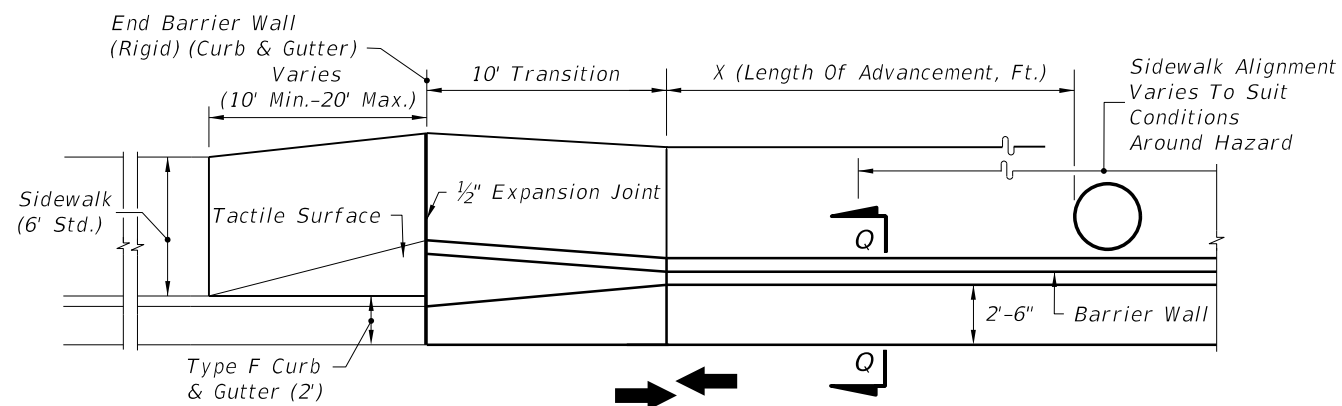
BRIDGE WITH BIKE LANE



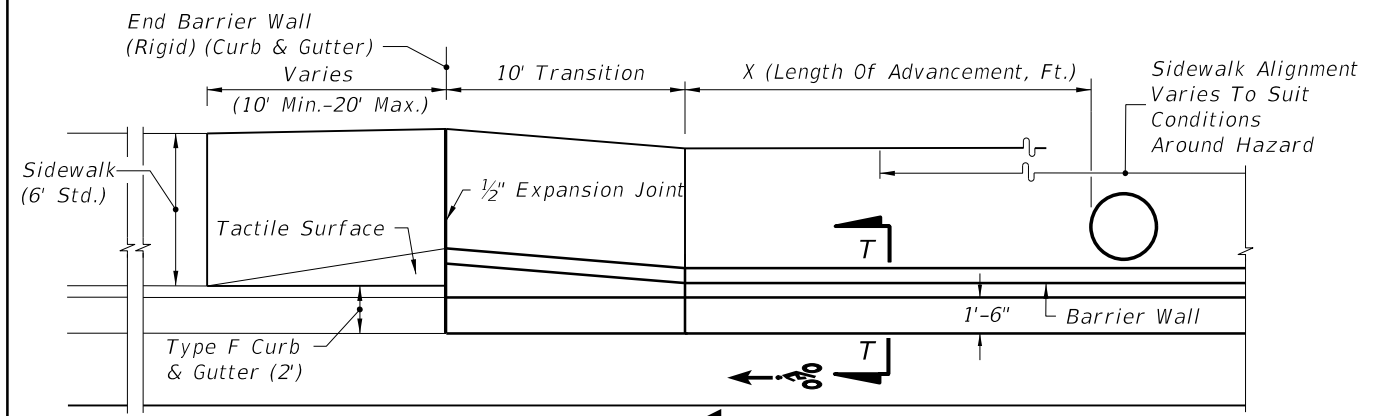
WITH UTILITY STRIP AND WITHOUT BIKE LANE



WITH UTILITY STRIP AND WITH BIKE LANE



WITHOUT UTILITY STRIP AND WITHOUT BIKE LANE

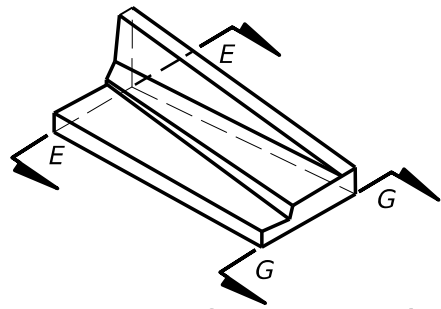


WITHOUT UTILITY STRIP AND WITH BIKE LANE

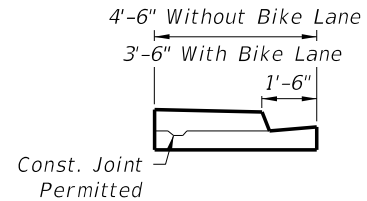
HAZARD 4' OR LESS FROM FACE OF CURB  
TWO-WAY CURB AND GUTTER TRAFFIC DEPARTURE

5/29/2014 1:11:46 PM

LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 12 of 25
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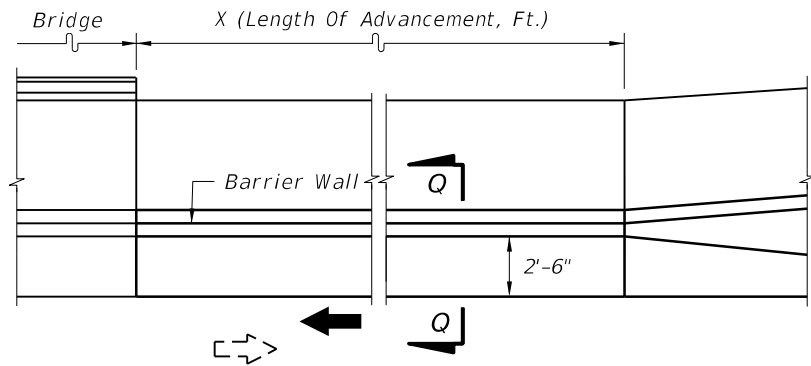
WITH AND WITHOUT UTILITY STRIP  
PICTORIAL VIEW



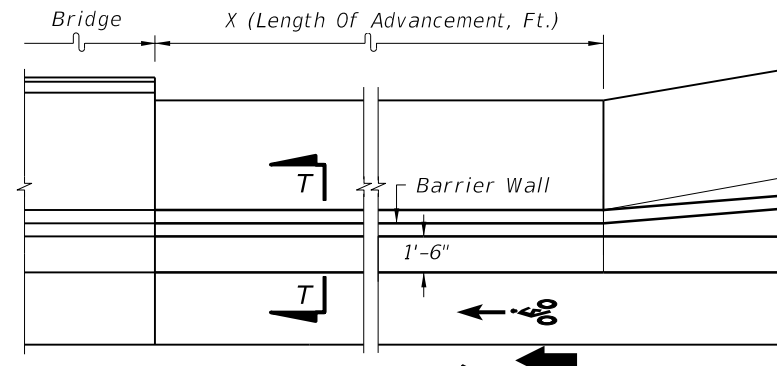
SECTION GG

NOTES:

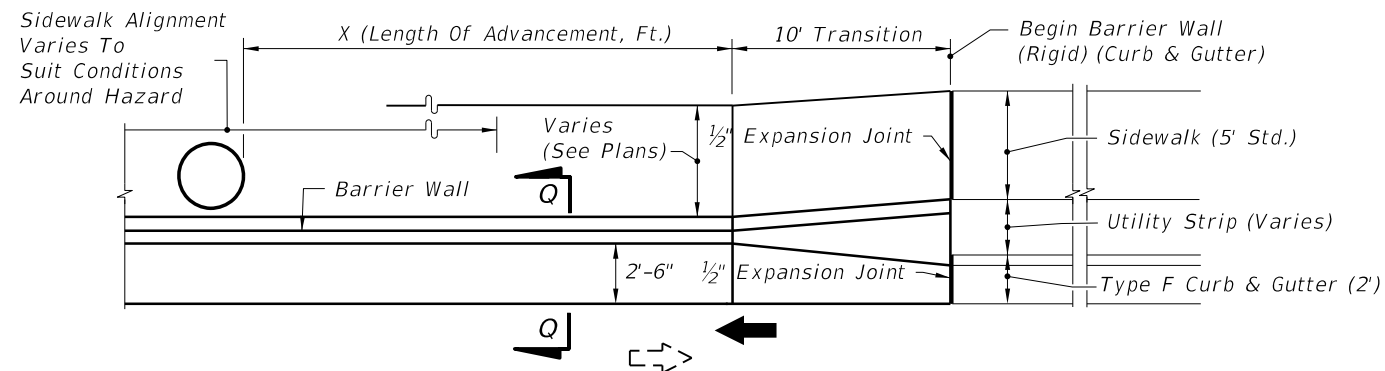
1. For SECTION EE, see ONE-WAY CURB AND GUTTER DEPARTURES.
2. For SECTION QQ, see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE. For SECTION TT, see CURB AND GUTTER WITH ADJACENT BICYCLE LANE.
3. The detail BRIDGE WITH BIKE LANE can be superimposed over the details: WITH UTILITY STRIPS AND WITH BIKE LANE and WITHOUT UTILITY STRIPS AND WITH BIKE LANE. The detail BRIDGE WITHOUT BIKE LANE can be superimposed over the details: WITH UTILITY STRIPS AND WITHOUT BIKE LANE and WITHOUT UTILITY STRIPS AND WITHOUT BIKE LANE.



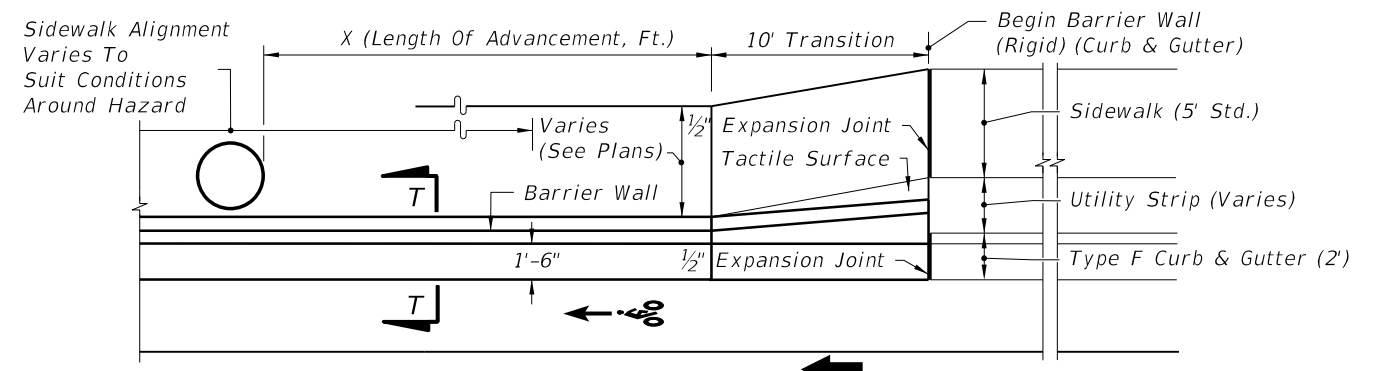
BRIDGE WITHOUT BIKE LANE



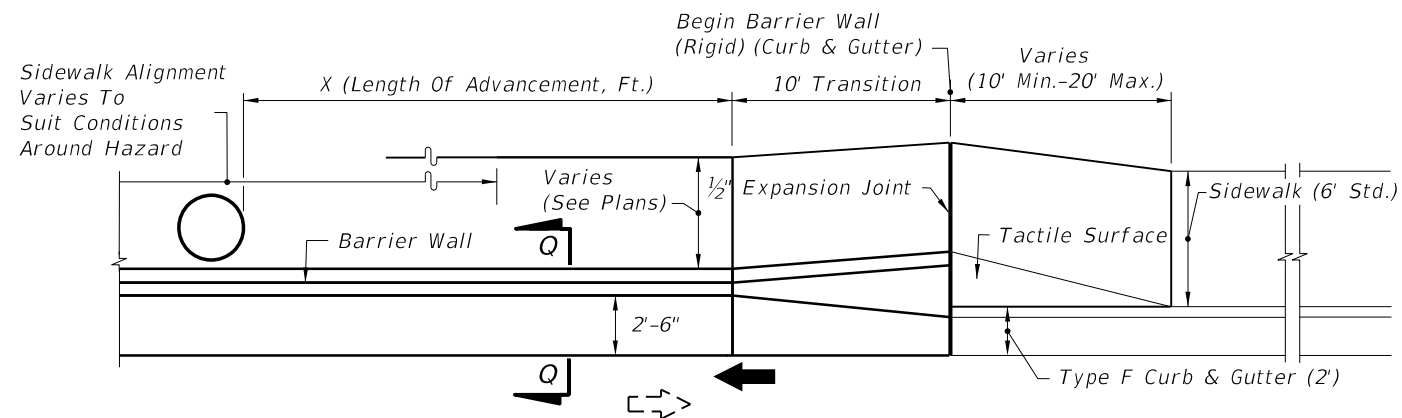
BRIDGE WITH BIKE LANE



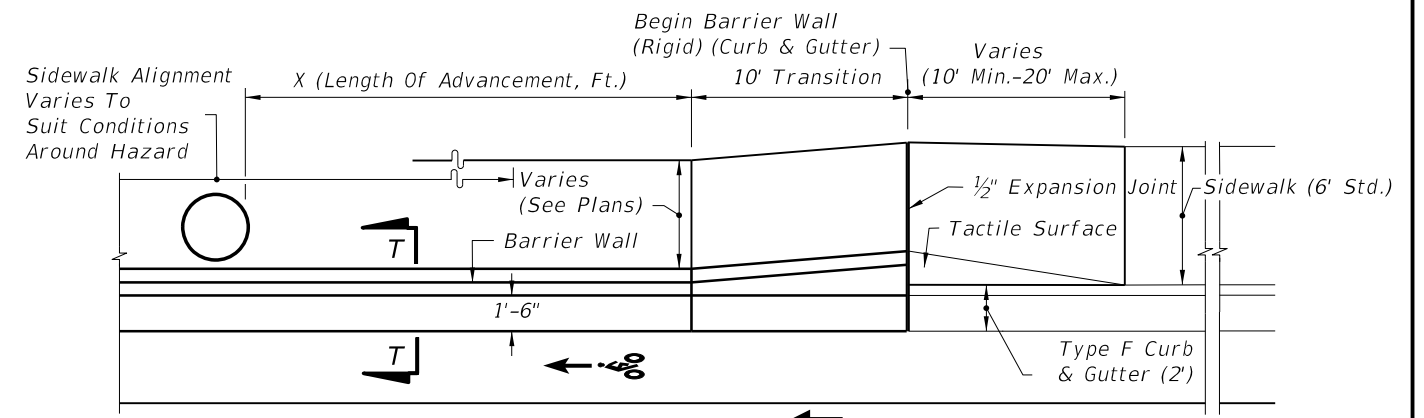
WITH UTILITY STRIP AND WITHOUT BIKE LANE



WITH UTILITY STRIP AND WITH BIKE LANE



WITHOUT UTILITY STRIP AND WITHOUT BIKE LANE

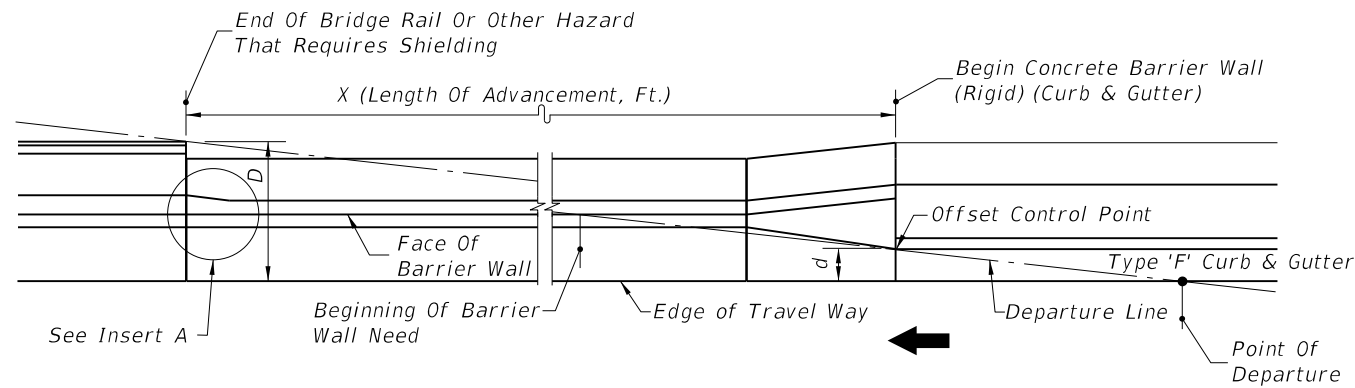


WITHOUT UTILITY STRIP AND WITH BIKE LANE

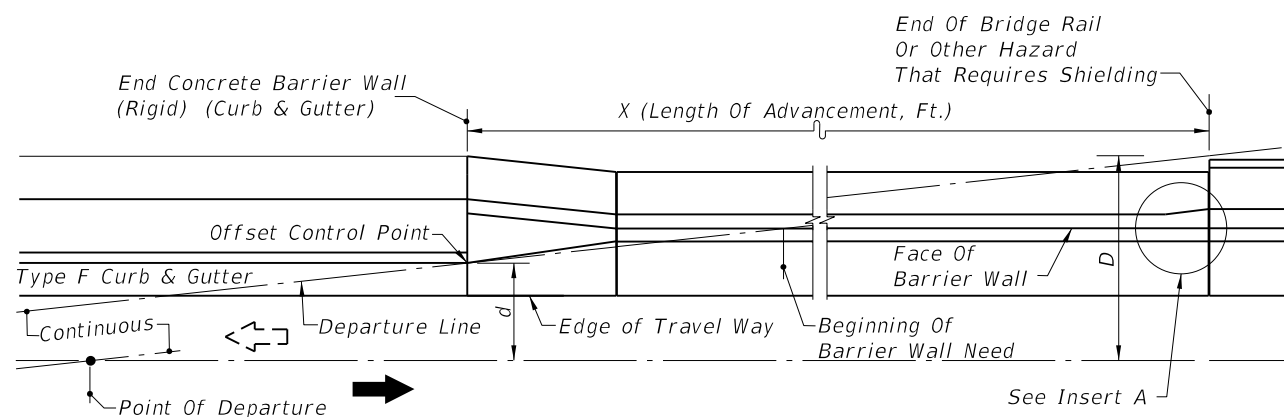
HAZARD 4' OR LESS FROM FACE OF CURB  
ONE-WAY AND TWO-WAY CURB AND GUTTER NEAR LANE APPROACHES TRAFFIC (UNDIVIDED)

5/29/2014 1:11:47 PM

LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 13 of 25
---------------------------	----------	--------------	------------------------------	-----------------------	------------------	-----------------------



RIGHT SIDE APPROACH SHOWN - LEFT SIDE OPPOSITE HAND  
NEAR LANE APPROACH



OPPOSING LANE APPROACH  
WITH OR WITHOUT UTILITY STRIP - UTILITY STRIP SHOWN  
For Applications, see CURB AND GUTTER (WITH AND WITHOUT) UTILITY STRIP AND WITHOUT ADJACENT BIKE LANE

Design Speed mph	Length Of Advancement, Ft. (X)
≤45	= 16 (D-d)

Note: The minimum length of advancement for both near and opposing lane approaches is 40'.

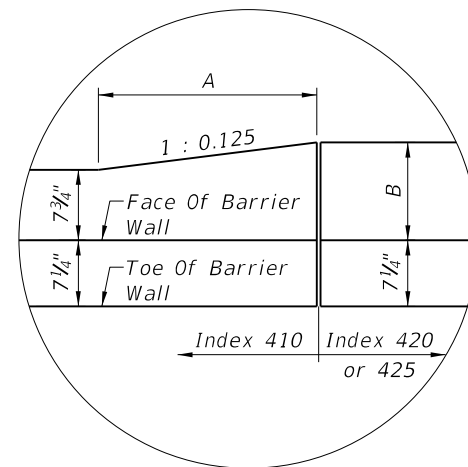
EQUATION VARIABLES:

D= Distance in feet from near edge of the near approach traffic lane to back of hazard or clear zone width whichever is lesser. For left side hazards and clear zones on two-way undivided facilities D is measured from the inside edge of the near approach traffic lane.

d= Distance in feet from near edge of the near approach traffic lane to the face of barrier (at offset control point). For left side hazards on two-way undivided facilities d is measured from the inside edge of the nearest opposing traffic lane.

LENGTH OF ADVANCEMENT

CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE

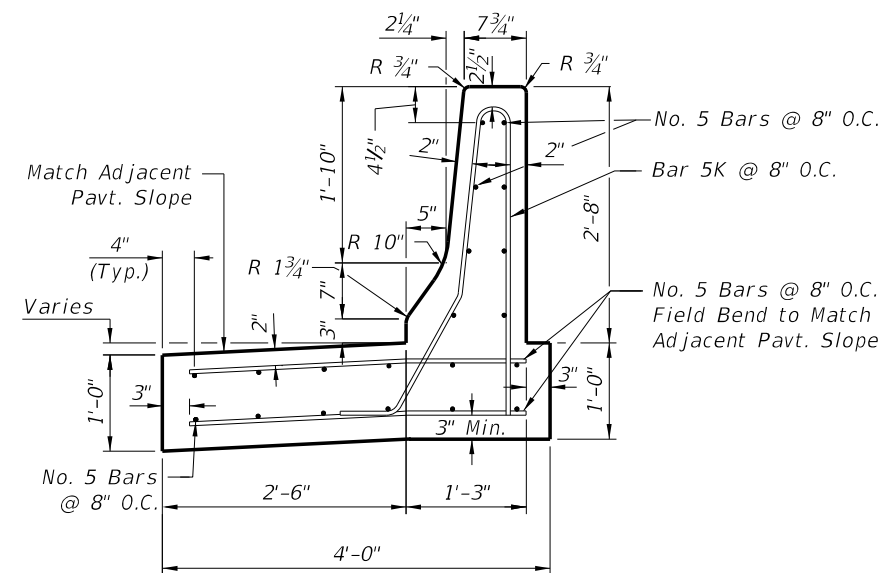


INSERT A

Transition Concrete Barrier Wall (Index 410) to Mate With Back Side of F Shape Bridge Traffic Railing (Index 420/425).

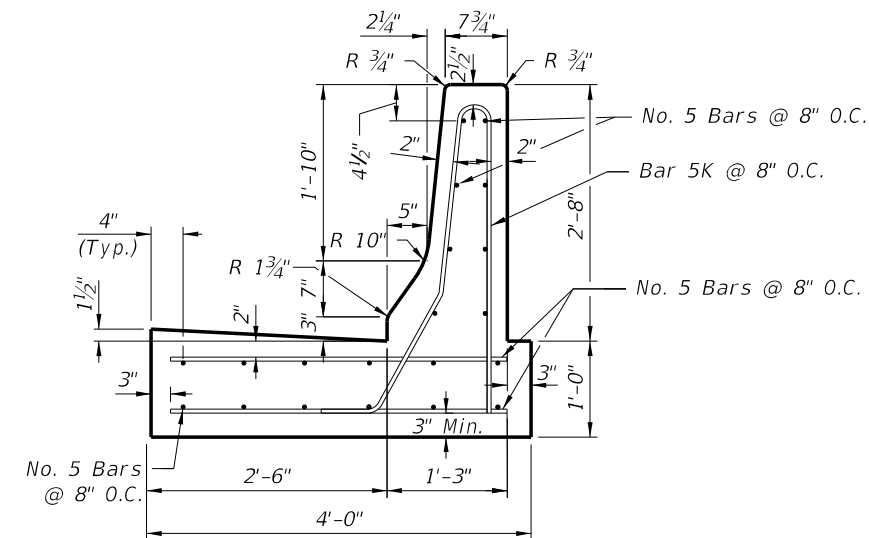
For Opposing Lane Approach (Near Lane Approach Opposite Hand)

Index	A	B
420	2'-0"	10 3/4"
425	3'-0"	1'-0 1/4"



QUANTITIES:  
Concrete: 0.24 CY/LF; Reinforcing Steel: 26 LBS/LF

SECTION QQ  
(FOR HIGH SIDE)



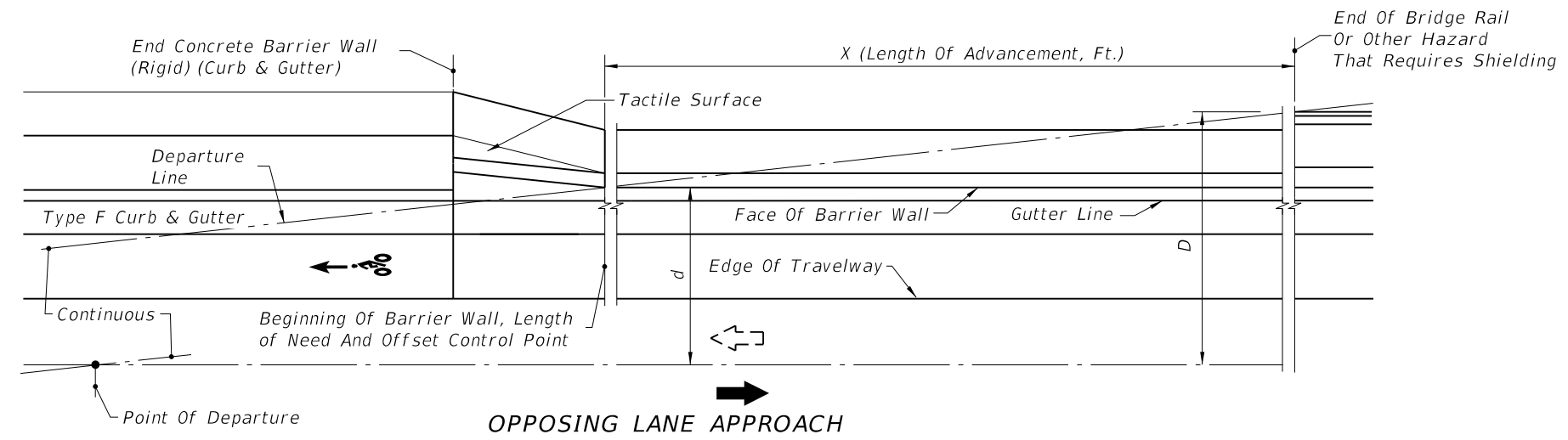
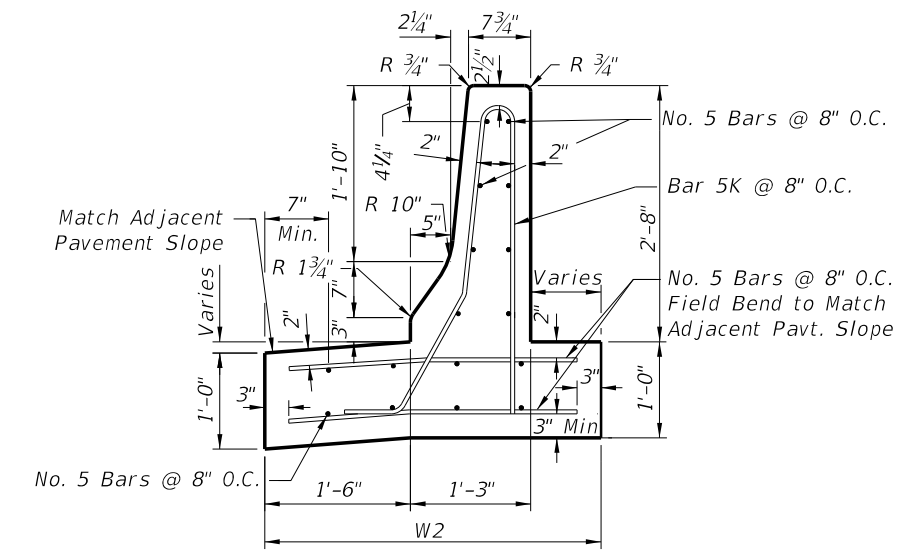
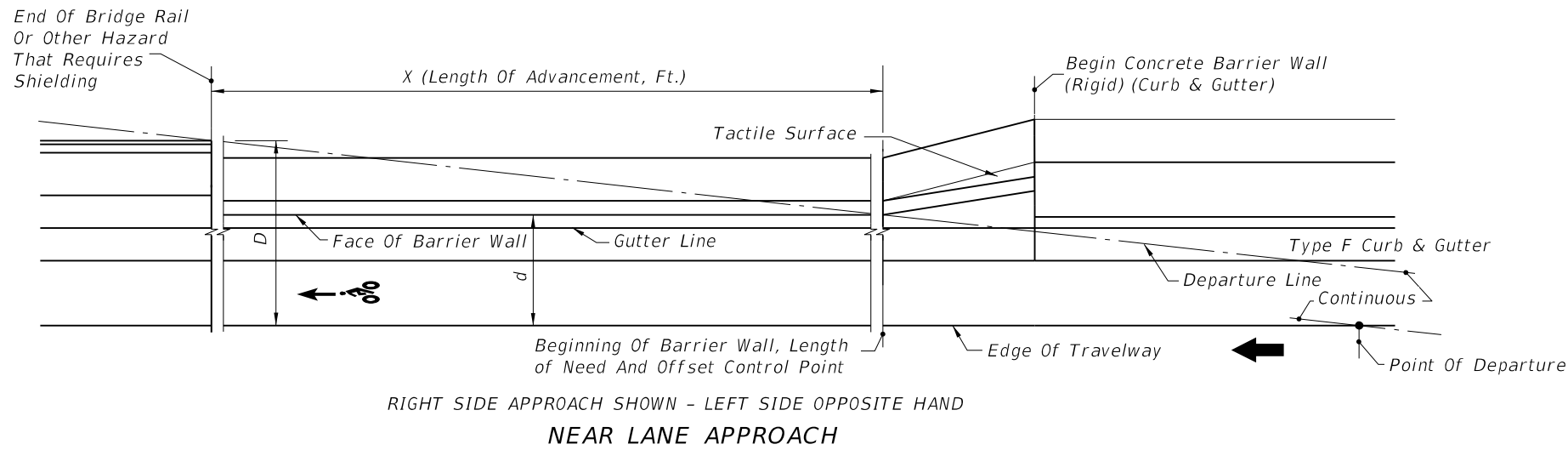
QUANTITIES:  
Concrete: 0.24 CY/LF; Reinforcing Steel: 26 LBS/LF

SECTION QQ  
(FOR LOW SIDE)

NOTES:

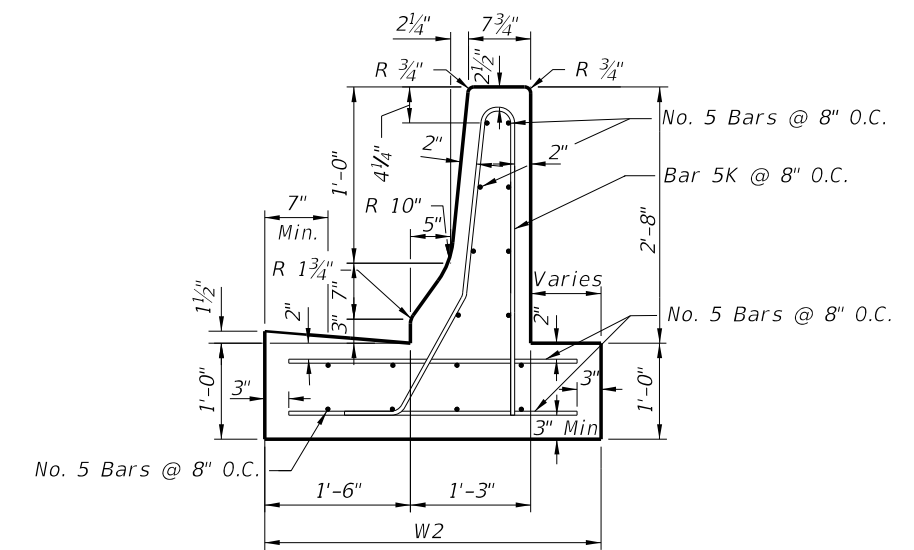
- All longitudinal reinforcement No. 5 bars. Shorter segments due to construction or expansion joint shall be doweled in the manner described on SECTION EE, ONE-WAY CURB AND GUTTER DEPARTURES.
- Transverse expansion joints are to be constructed at the juncture of wall transitions and curb and gutter, and at intervals so that spacing will not exceed 100'.
- For Concrete Barrier Wall Inlet details with Rigid Curb and Gutter applications, see Index No. 219.
- Minimum Segment Wall Length = 20 LF
- For additional information on Bar 5K, see BAR BENDING DIAGRAM.

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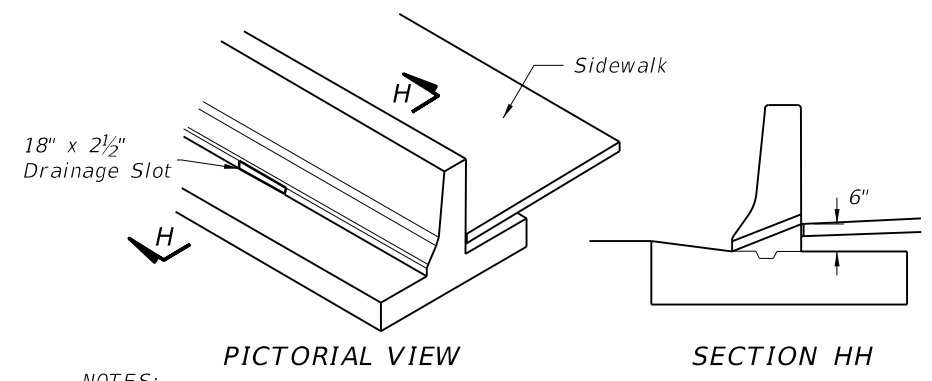


**SECTION TT (FOR HIGH SIDE)**

QUANTITIES			
Length Of Barrier Wall (LF)	W2	Concrete CY/LF	Reinforcing Steel LBS/LF
≥ 30'	3'-3"	0.21	24
26' to 29'	3'-6"	0.22	24



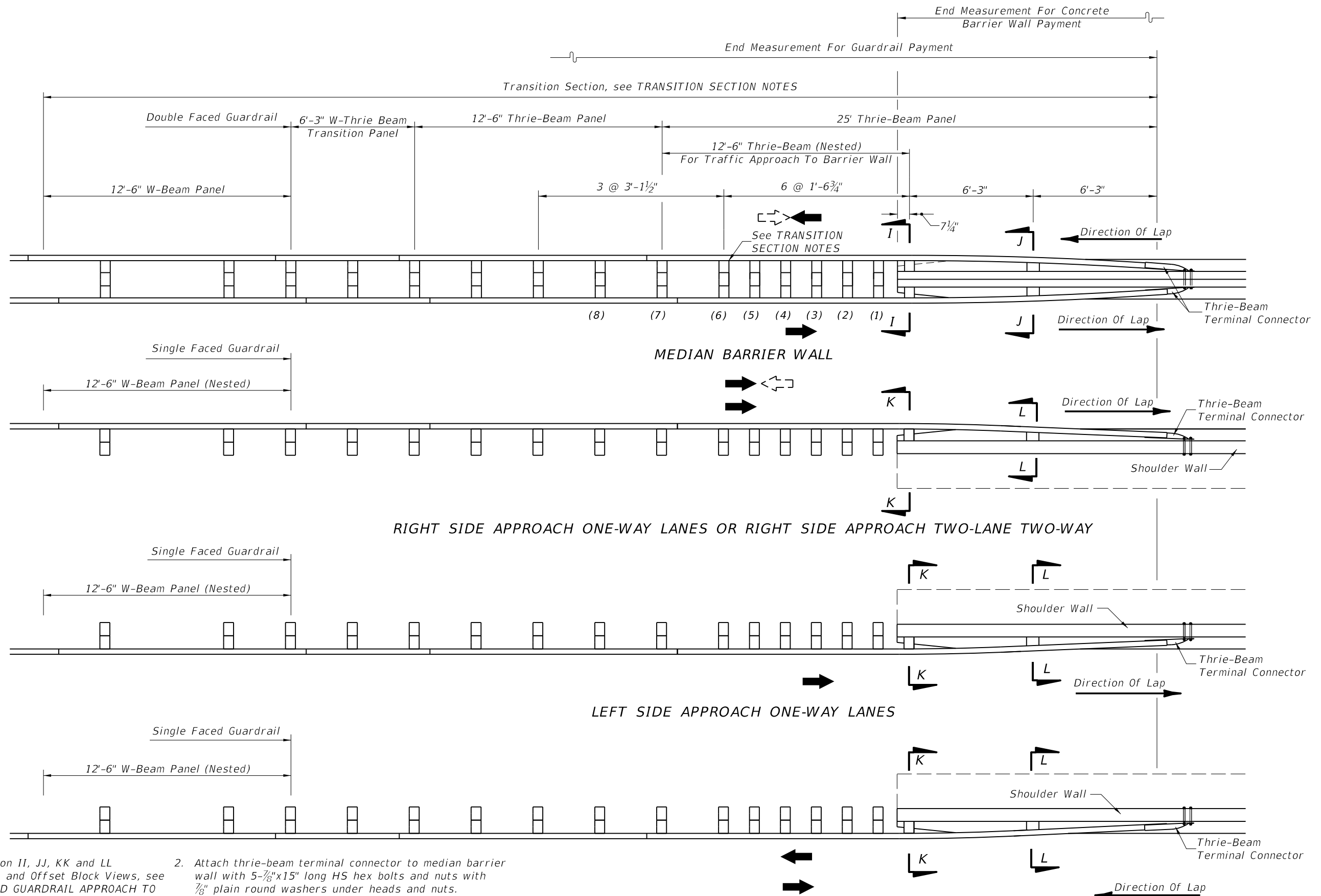
**SECTION TT (FOR LOW SIDE)**



- NOTES:**
1. Drainage slots shall be located at all low points along the sidewalk, and, unless otherwise shown in the plans, slots shall be spaced at intervals not exceeding 50' in fill sections and 20' in cut sections. Slots shall be located such that only two bars are cut away or deleted in front and back lines of vertical reinforcement. On each side of Drainage slots, vertical and horizontal bars shall be placed to provide 2" concrete cover.
  2. For additional information on Bar 5K, see BAR BENDING DIAGRAMS.

**SIDEWALK DRAINAGE SLOT FOR BARRIER WALL (RIGID) (CURB & GUTTER) CURB AND GUTTER WITH ADJACENT BICYCLE LANE**


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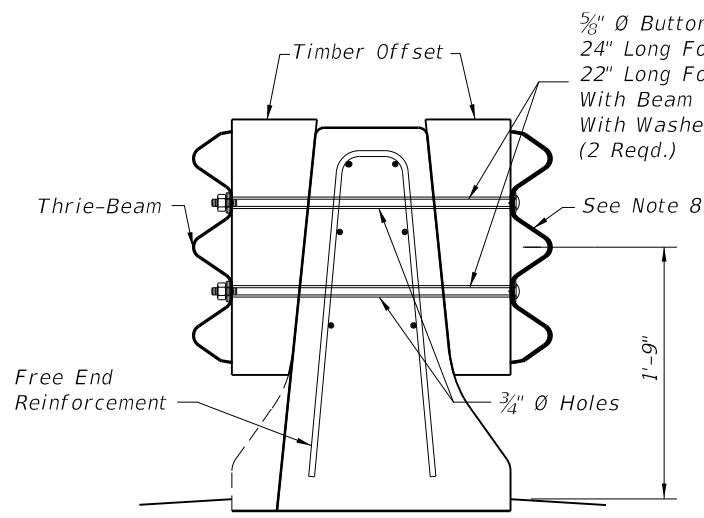
- NOTES:
1. For Section II, JJ, KK and LL Guardrail and Offset Block Views, see STANDARD GUARDRAIL APPROACH TO SHOULDER BARRIER.
  2. Attach thrie-beam terminal connector to median barrier wall with 5-7/8"x15" long HS hex bolts and nuts with 7/8" plain round washers under heads and nuts. Attach to shoulder barrier wall with a 21"x12"x5/8" thrie-beam terminal connector plate and 5-7/8"x12" long HS hex bolts and nuts with 7/8" plain round washers under heads and nuts.

**GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS**

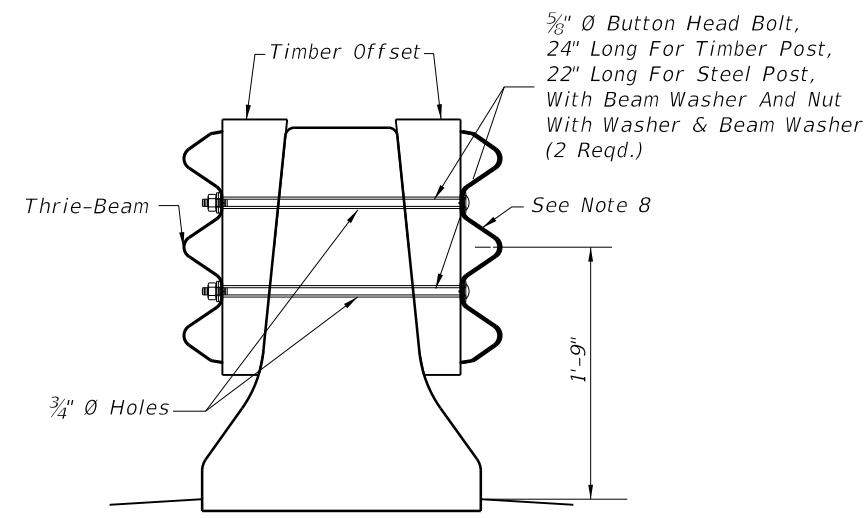
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LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 <b>2015 DESIGN STANDARDS</b>	<b>CONCRETE BARRIER WALL</b>	INDEX NO. 410	SHEET NO. 16 of 25
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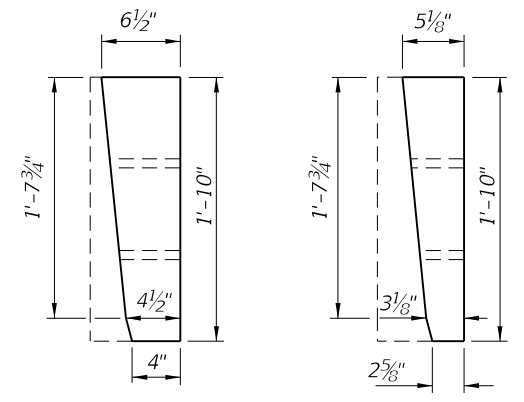




SECTION II

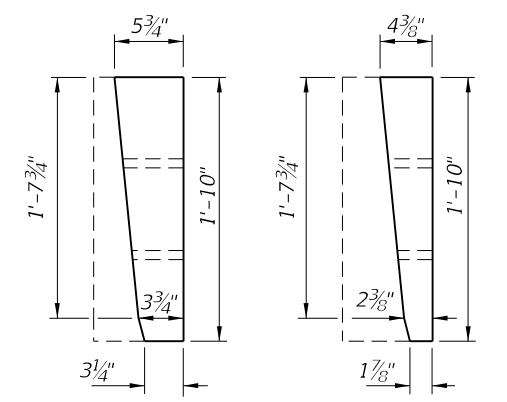


SECTION JJ



II & KK

JJ & LL



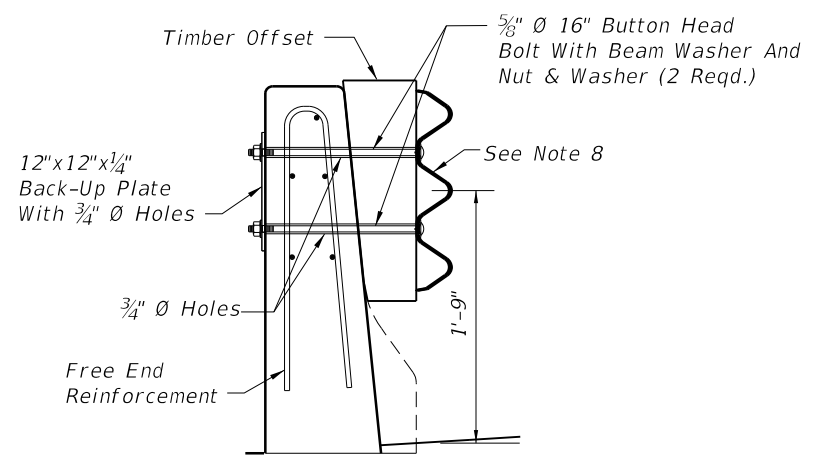
II

JJ

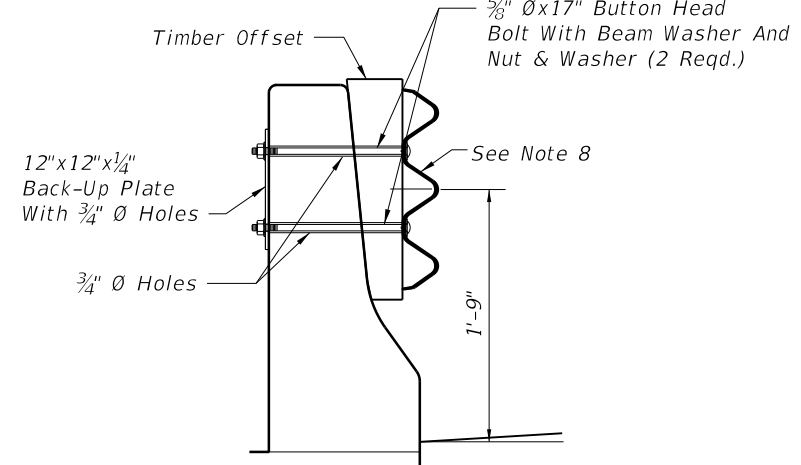
FOR DOUBLE FACED GUARDRAIL USING TIMBER POSTS AND FOR SINGLE FACED GUARDRAIL USING EITHER TIMBER OR STEEL POSTS

FOR DOUBLE FACED GUARDRAIL USING STEEL POSTS

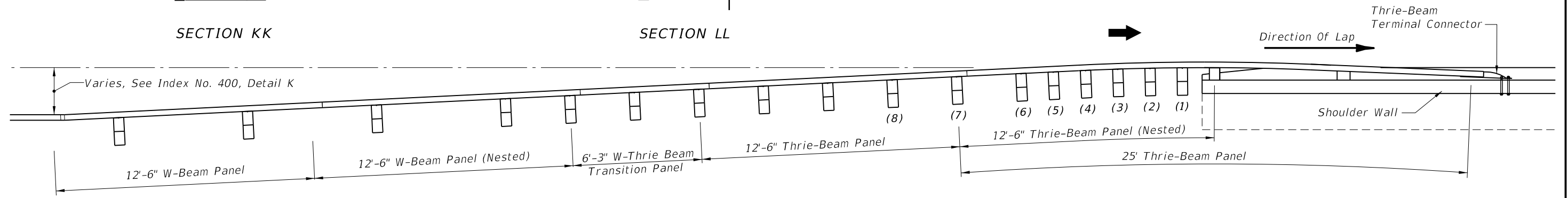
STANDARD TIMBER OR PLASTIC OFFSET BLOCKS FIELD TRIMMED FOR USE AT SECTIONS II, JJ, KK & LL



SECTION KK



SECTION LL



STANDARD GUARDRAIL APPROACH TO SHOULDER BARRIER

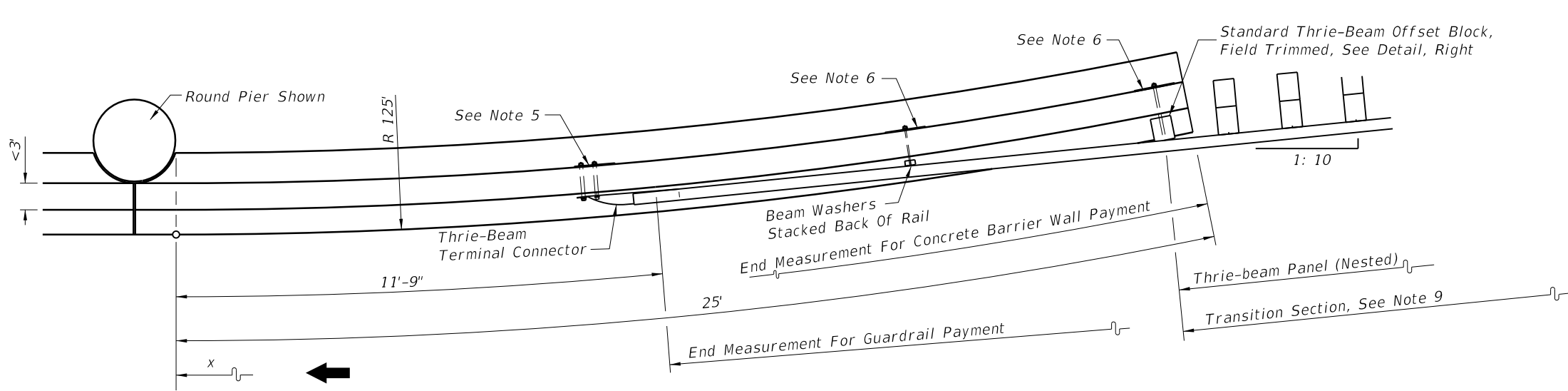
TRANSITION SECTION NOTES:

1. The longitudinal dimensions and payment limits shown for median concrete barrier wall also apply to shoulder concrete barrier walls.
2. W-beam elements do not apply to these transition schemes. For barrier wall trailing end guardrail connections for one-way lanes, see FREE END REINFORCEMENT.
3. Where reaming is necessary to fit nested beams, the reamed surfaces shall be metalized in accordance with Section 562 of the Standard Specifications.
4. Either steel or timber guardrail post may be used, timber posts shown.
5. The nested beams shall not be bolted to blocks and posts at posts numbers (1), (3) and (5).
6. On the trailing side of MEDIAN BARRIER WALL, offset blocks may be omitted at posts numbers (1), (2), (3), (5), (6), and (8).
7. For additional guardrail information refer to Index No. 400.
8. Single Thrie-Beam on trailing ends of barrier wall; Nested Thrie-Beams on approach ends of barrier wall.

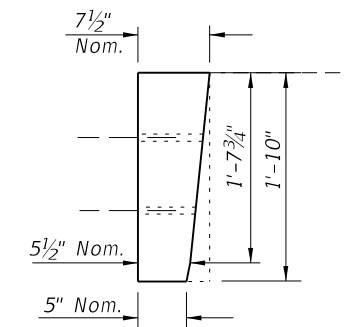
GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS

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LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 17 of 25
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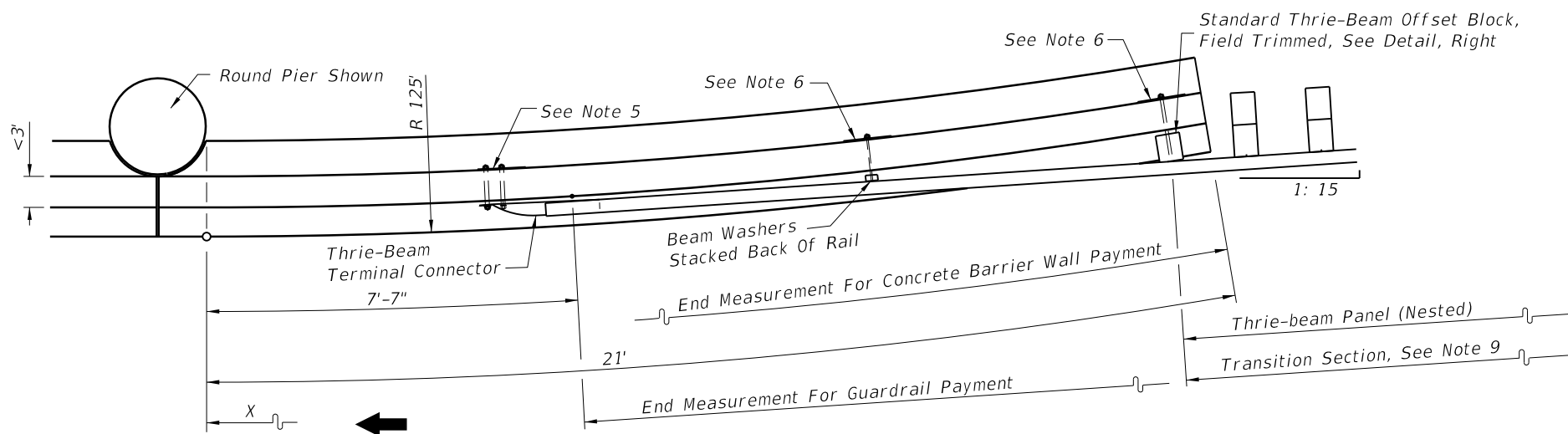


PLAN FOR DESIGN SPEED ≤ 45 MPH



FOR USE WITH EITHER  
1: 10 OR 1: 15  
GUARDRAIL TRANSITIONS

STANDARD THRIE-BEAM OFFSET BLOCK  
(FIELD TRIMMED)



PLAN FOR DESIGN SPEED ≥ 50 MPH

NOTES:

1. The affected segments between bent supports or pier columns shall be constructed in accordance with the detail for REINFORCED CONCRETE SHOULDER WALL, Section QQ, or Section TT. In cases where the barrier wall and slope pavement or other structure would occupy the same location, the wall and structure are to be modified as detailed in the plans.

2. The barrier wall radial segments are intended for use on approach and trailing ends of both one-way and two-way facilities. The guardrail connections shown on this sheet apply to one-way approaches and to the approaching and trailing ends of two-lane two-way facilities. For details on trailing ends of two-way multilane and one-way facilities, the end connection on W-Beam guardrail connection to concrete barrier wall trailing ends may be used.

For walls with normal offsets from hazards and their guardrail connections, see GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS.

3. Refer to Index No. 400 for additional guardrail information.

4. Attach thrie-beam terminal connector to shoulder barrier wall with a 21"x12"x5/8" thrie beam terminal connector plate and 5-7/8"x12" long HS hex bolts and nuts with 7/8" plain round washers under heads and nuts.

5. 12"x12"x1/4" galvanized steel back-up plate with 5/8" post bolts (either 14" or 18" long) and nuts with 5/8" plain round washers under nuts.

6. For details at Rigid Hazard, see HAZARD PENETRATION INTO STEM OF RIGID CONCRETE BARRIER WALLS.

7. For additional information on PLAN FOR DESIGN SPEED ≤ 45 MPH, see SHOULDER BARRIER WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH.

8. For additional information on PLAN FOR DESIGN SPEED ≥ 50 MPH, see SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≥ 50 MPH.

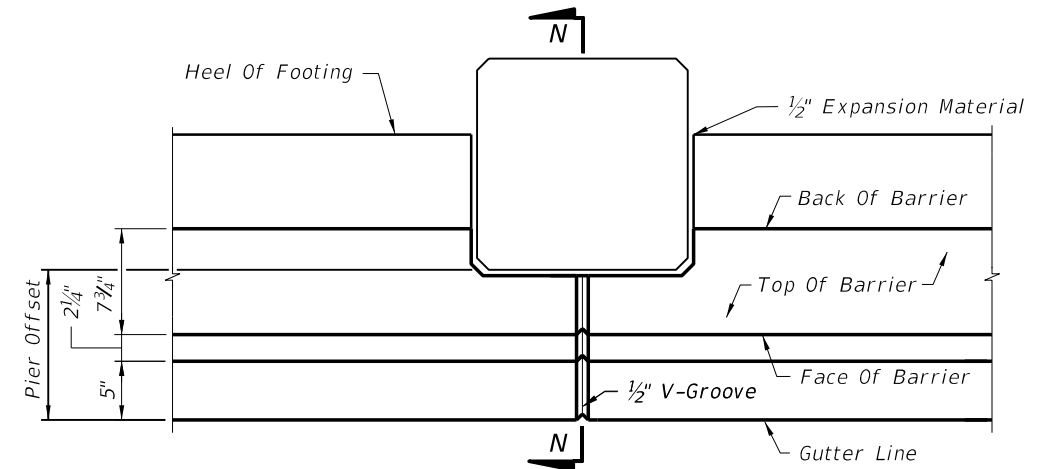
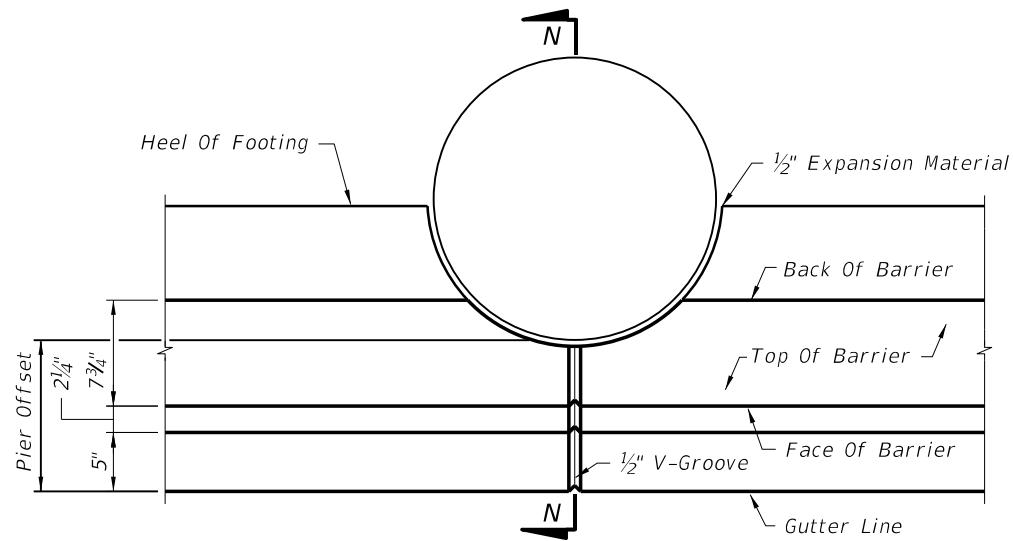
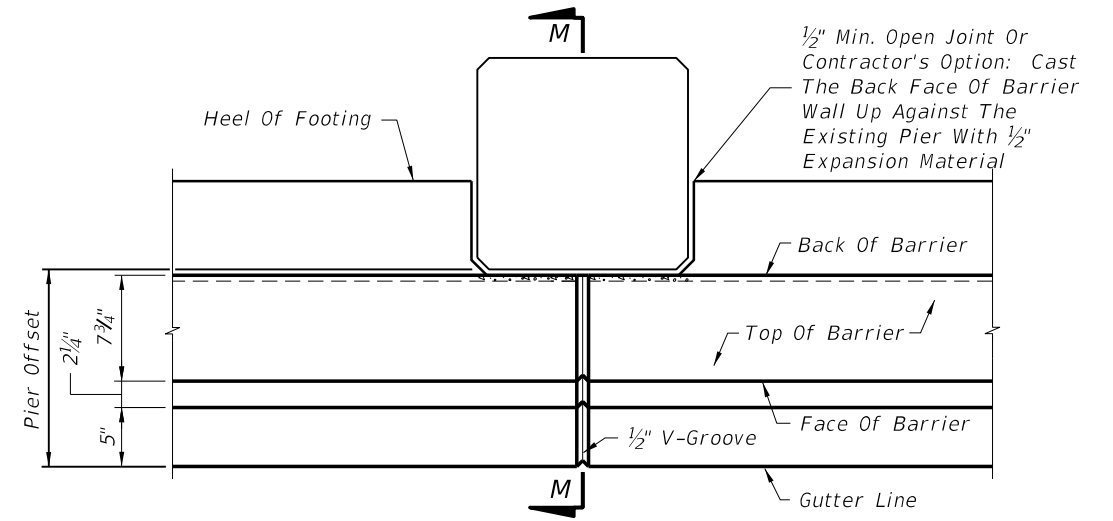
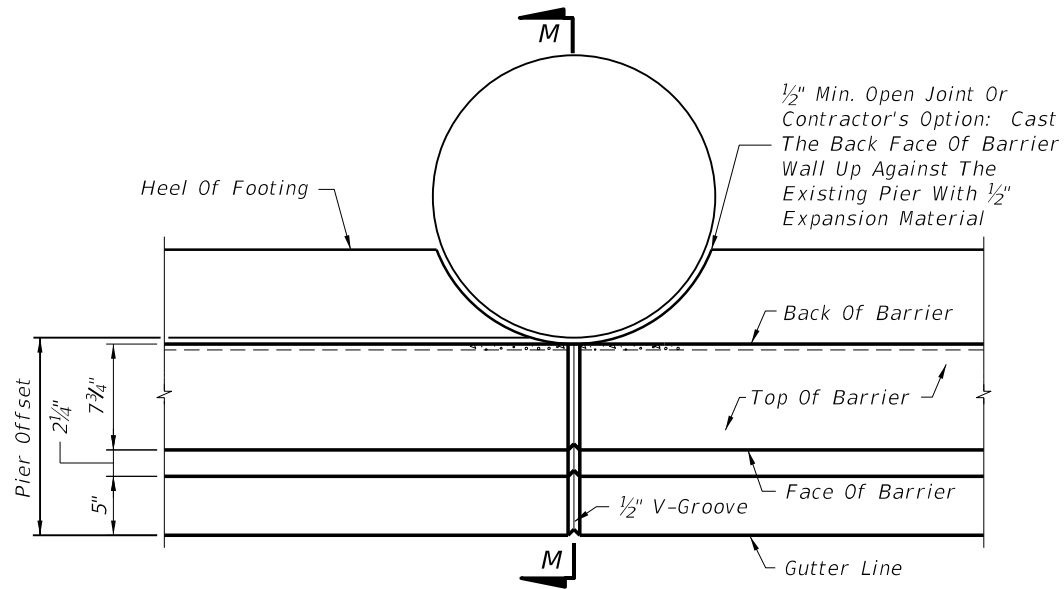
9. See GUARDRAIL CONNECTION TO CONCRETE BARRIER WALL APPROACH ENDS For Post Spacing And Bolt Connections, Steel Or Timber Posts Are Applicable.

ARC LENGTH (FT)	DISTANCE "X" (FT)	OFFSETS "Y" (FT)
4	4.00	0.06
8	7.99	0.26
12	11.98	0.58
16	15.96	1.02
20	19.91	1.60
21	20.91	1.76
24	23.85	2.30
25	24.83	2.49

Note:  
Wall may be constructed in chords having lengths ≤ 4 feet.

SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS WHEN OFFSET FROM HAZARD < 3'

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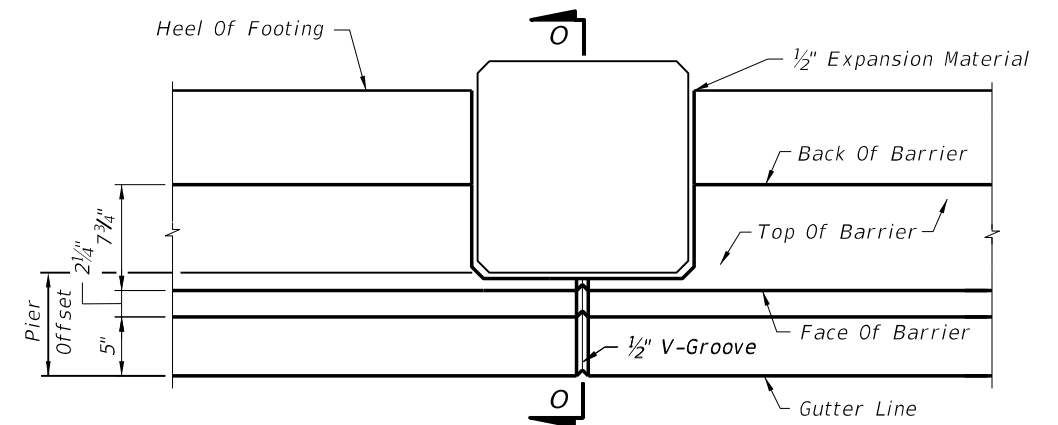
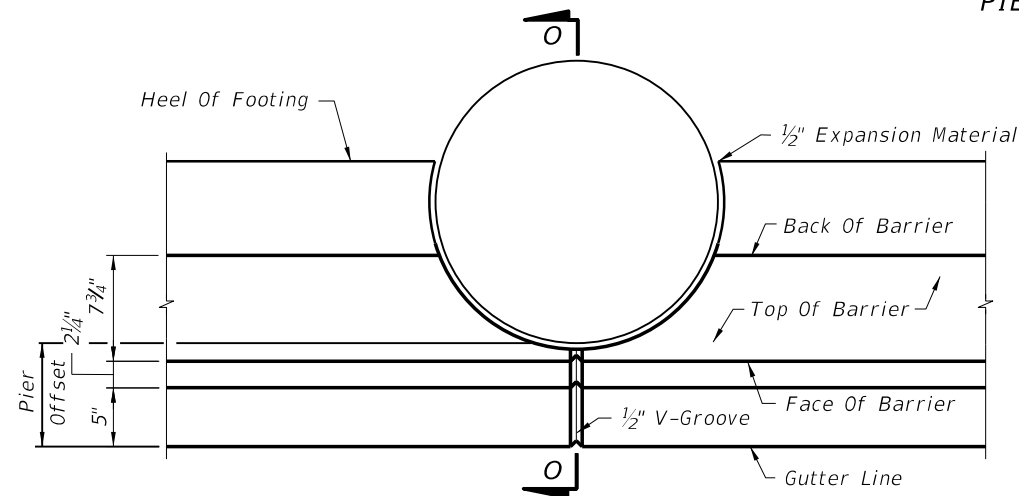


**PIER AT BACK OF CONCRETE BARRIER WALL**

**NOTES:**

1. These treatments are not applicable to hazards that cannot provide lateral support to resist the LRF lateral equivalent static force. See the plans for limits of wall sections and other associated wall treatments.
2. For Low Speed SECTIONS MM, NN and OO, see **SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH.**
3. For High Speed SECTIONS MM and NN, see **SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≥ 50 MPH.**
4. The details on this sheet are treatments to the F-shape concrete barrier walls, where site conditions impose reduced clearances between above ground hazards and the walls. Bridge bent supports and piers are shown.
5. When thru drainage is required, a 3"x 12" Drain Slot shall be provided at one of the following locations:
  - a. 4' upstream of pier edge for a declining approach.
  - b. 4' downstream of pier edge for an inclining approach.

**PIER PENETRATION INTO TOP OF CONCRETE BARRIER WALL**

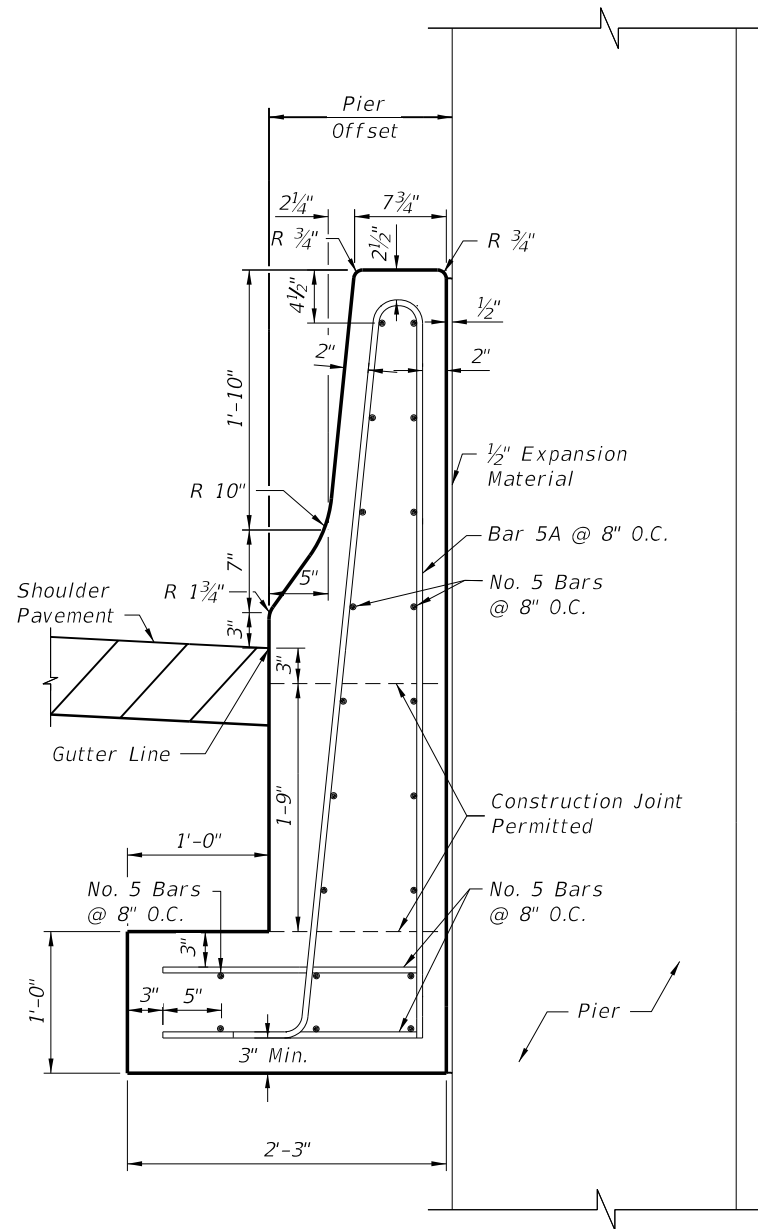


**PIER AT FACE OF CONCRETE BARRIER WALL**

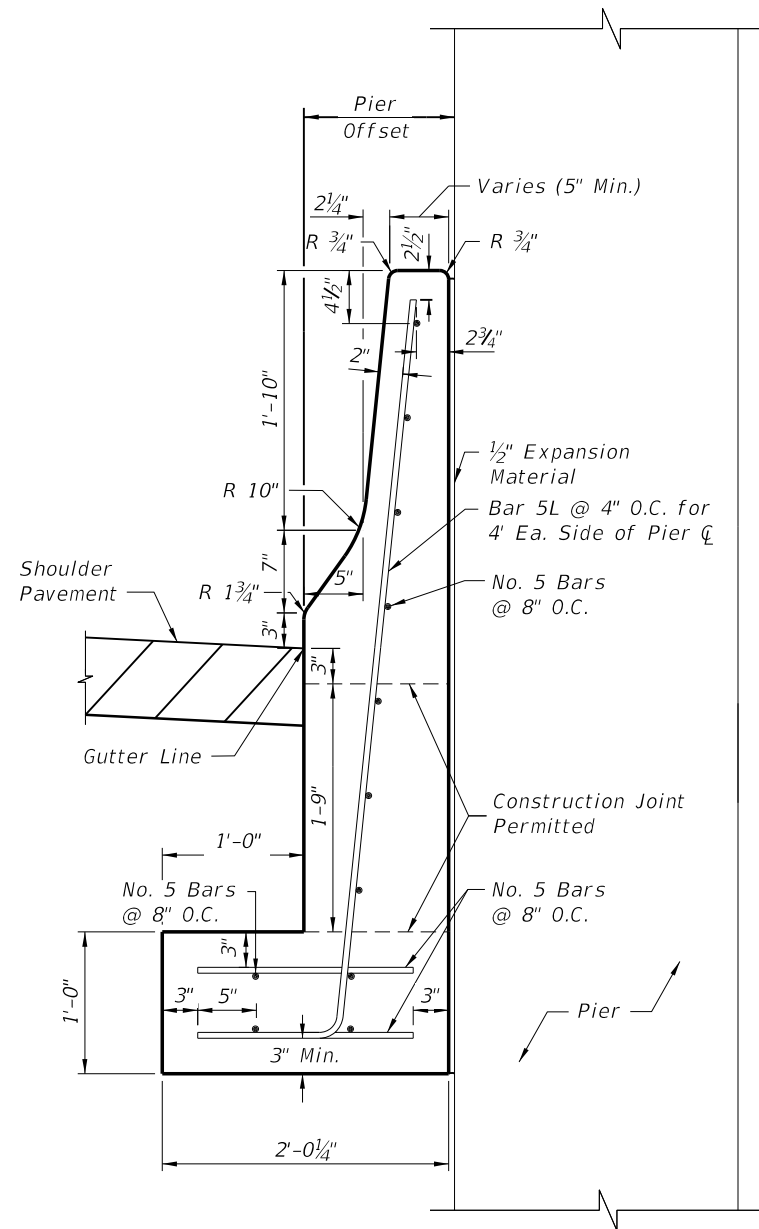
**RIGID HAZARD PENETRATION INTO STEM OF CONCRETE BARRIER WALL**

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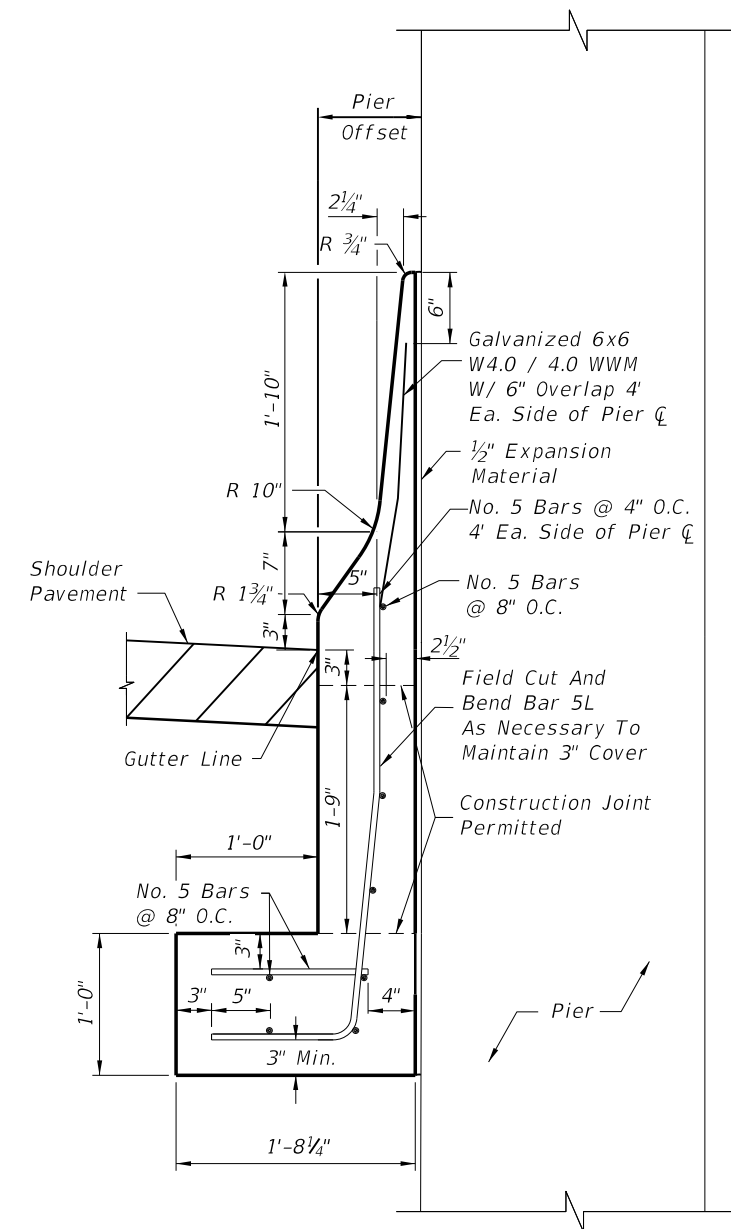
LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 <b>2015</b> <b>DESIGN STANDARDS</b>	<b>CONCRETE BARRIER WALL</b>	INDEX NO. <b>410</b>	SHEET NO. <b>19 of 25</b>
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32" SHOULDER WALL  
SECTION MM  
WHEN PIER OFFSET  $\geq 15\frac{1}{2}$ "



32" SHOULDER WALL  
SECTION NN  
WHEN  $12\frac{3}{4} \leq$  PIER OFFSET  $< 15\frac{1}{2}$ "



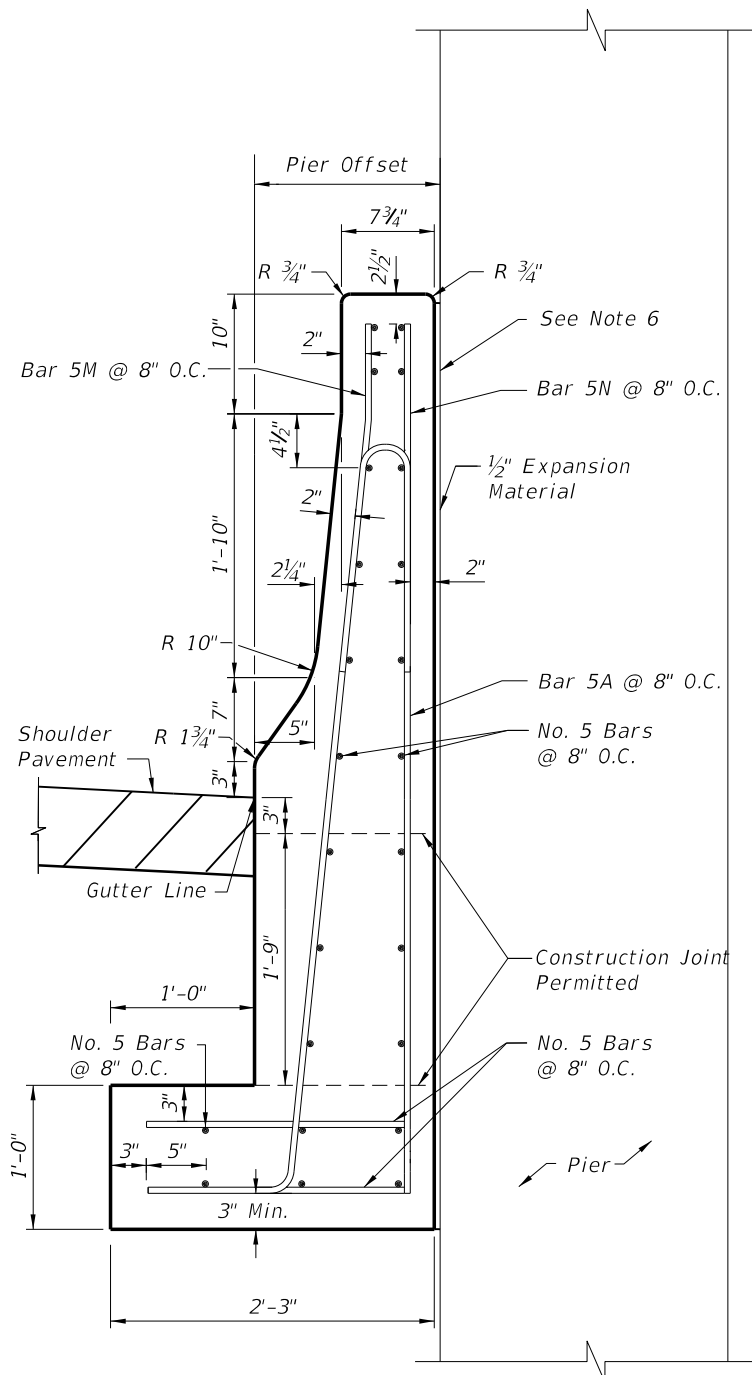
32" OR 42" SHOULDER WALL  
SECTION OO  
WHEN  $8\frac{3}{4} \leq$  PIER OFFSET  $< 12\frac{3}{4}$ "

- NOTES:
1. All longitudinal reinforcement No. 5 bars.
  2. For additional information on Bars 5A and 5L, see BAR BENDING DIAGRAMS.

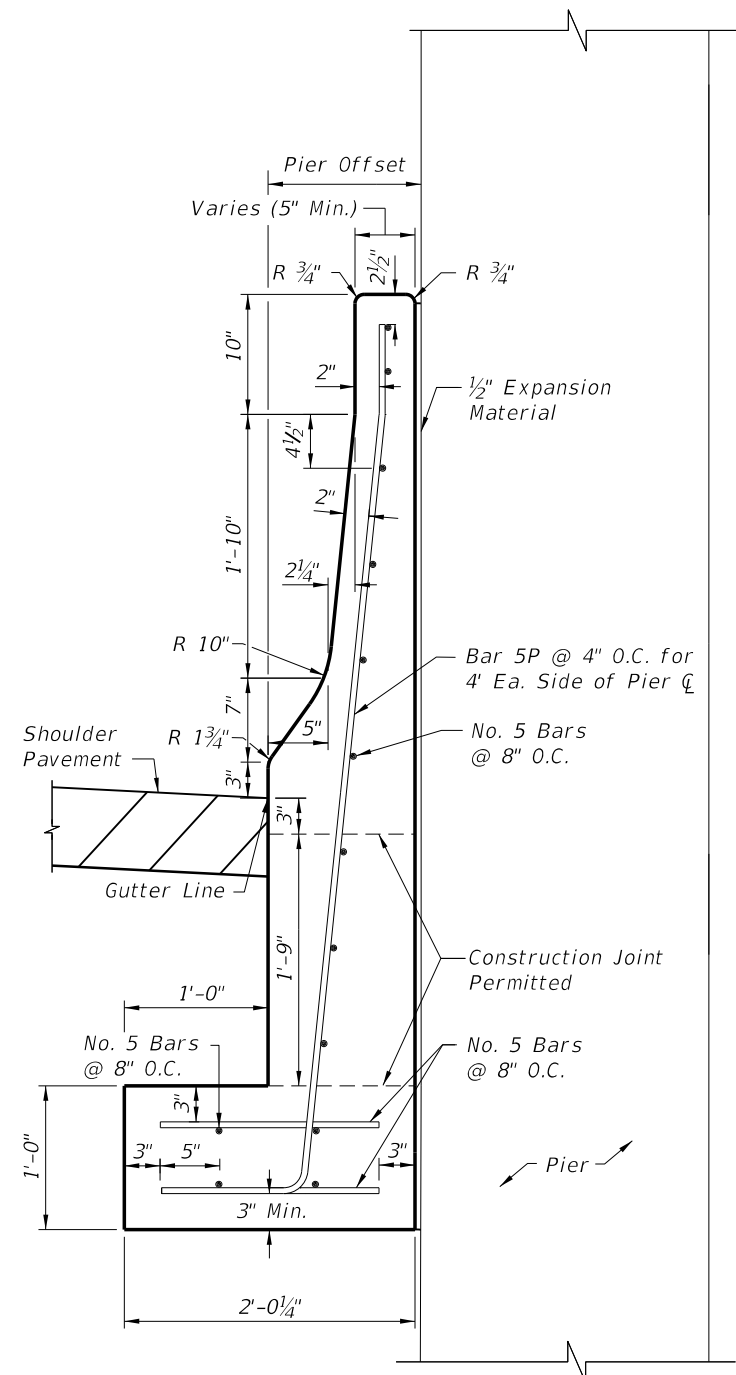
SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD  $< 1'-6"$  AND THE DESIGN SPEED  $\leq 45$  MPH

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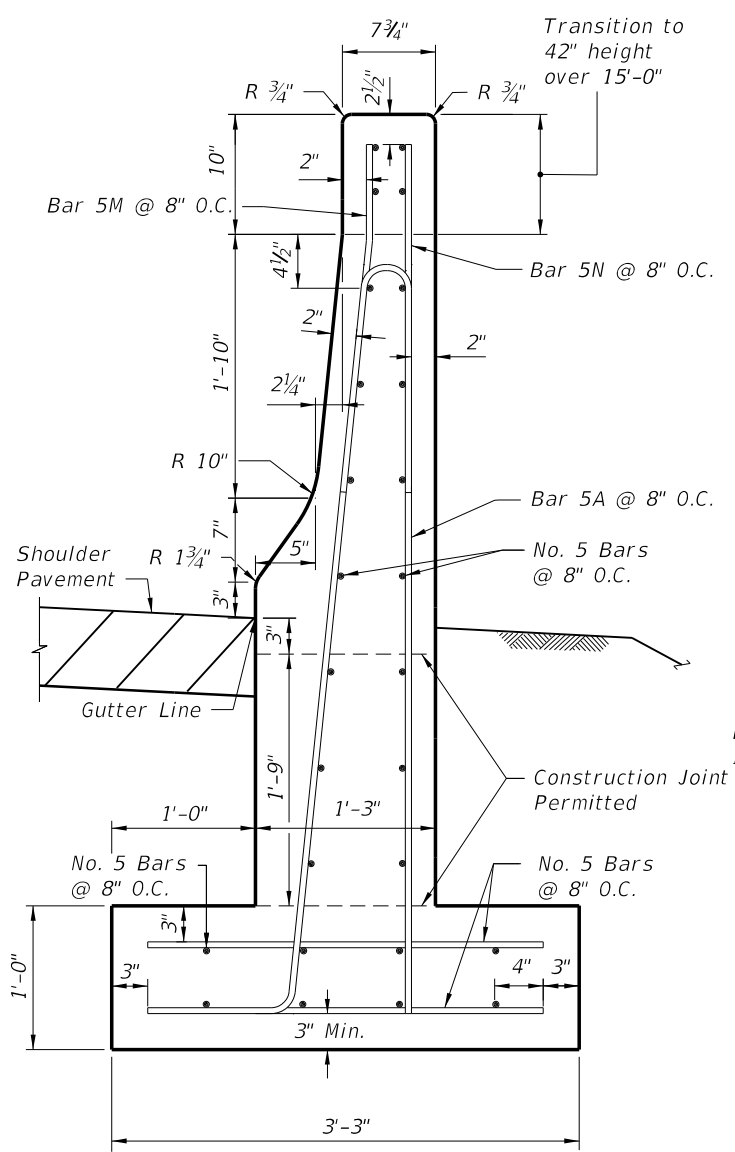
LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 20 of 25
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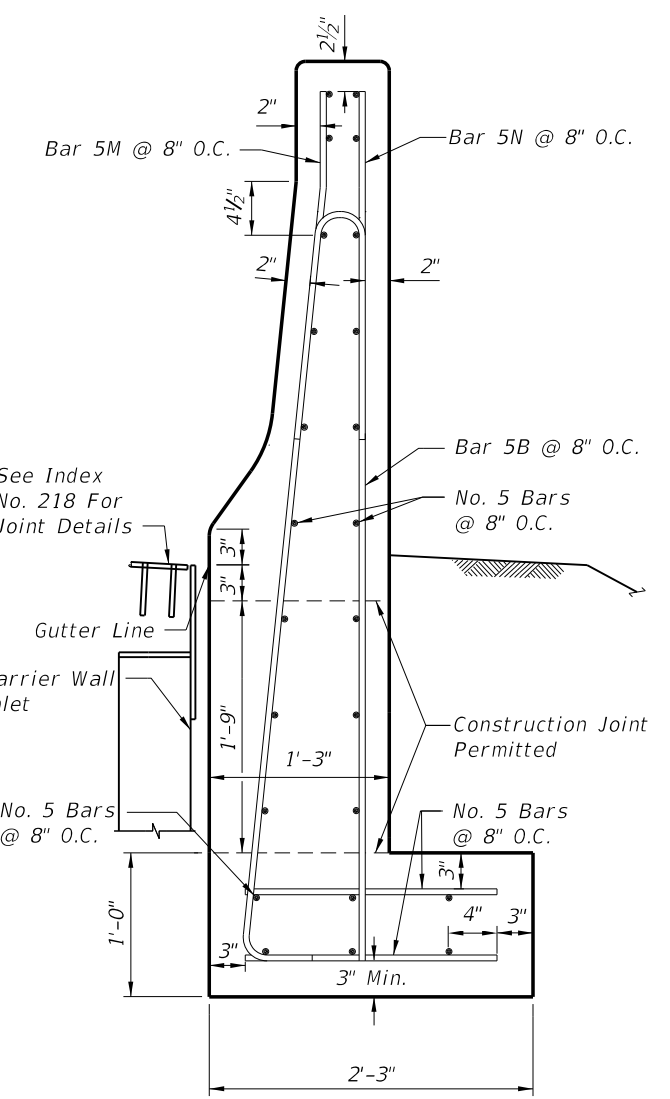
**42" SHOULDER WALL SECTION MM**  
WHEN PIER OFFSET  $\geq 16\frac{3}{4}"$



**42" SHOULDER WALL SECTION NN**  
WHEN  $12\frac{3}{4}" \leq \text{PIER OFFSET} < 16\frac{3}{4}"$



**42" SHOULDER WALL (TYPICAL)**  
QUANTITIES:  
Concrete 0.35 CY/LF  
Reinforcing Steel 43 LBS/LF




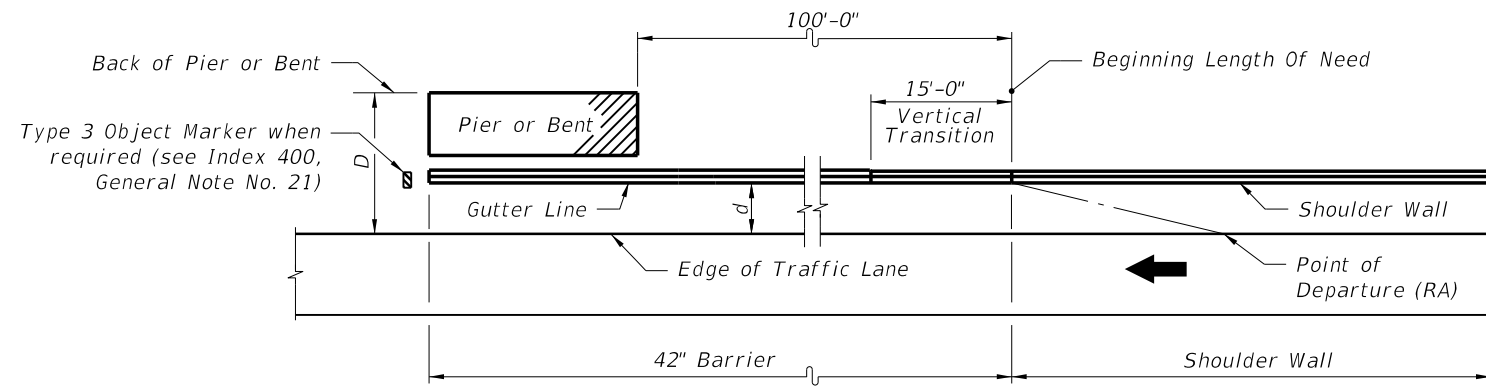
**42" SHOULDER WALL (MODIFIED)**  
QUANTITIES:  
Concrete 0.31 CY/LF  
Reinforcing Steel 39 LBS/LF

- NOTES:
1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet each side of all cold joints.
  2. For additional information on Bars 5A, 5B, 5M, 5N and 5P, see BAR BENDING DIAGRAMS.
  3. For Section 00, see SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED  $\leq 45$  MPH.
  4. Where the 42" SHOULDER WALL does not abut the pier, use the TYPICAL or MODIFIED sections.
  5.  $\frac{1}{2}"$  Min. Expansion Joint or at the contractor's option: Back face of barrier wall may be cast against Pier with  $\frac{1}{2}"$  Expansion Material.

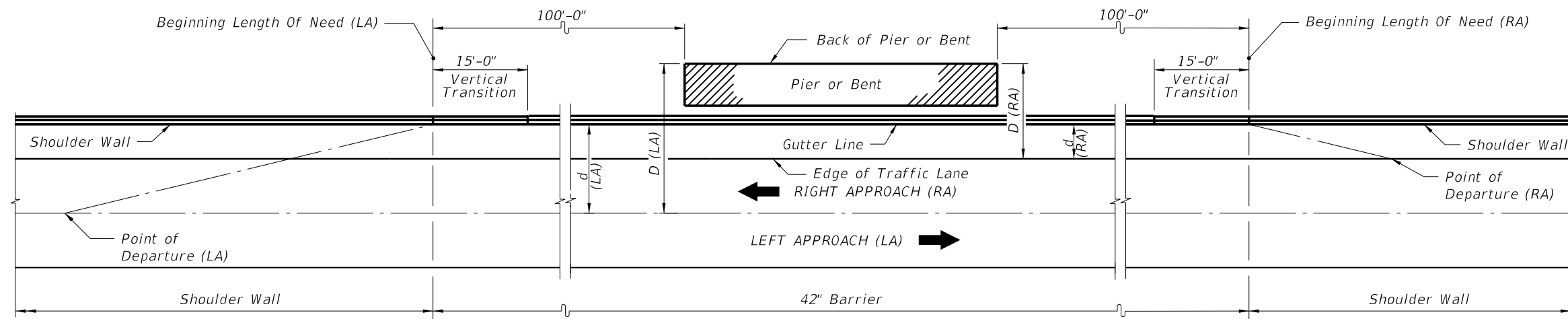
**SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND DESIGN SPEED  $\geq 50$  MPH**

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LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 <b>2015 DESIGN STANDARDS</b>	<b>CONCRETE BARRIER WALL</b>	INDEX NO. <b>410</b>	SHEET NO. <b>21 of 25</b>
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ONE-WAY TRAFFIC  
(LEFT SIDE OPPOSITE HAND)

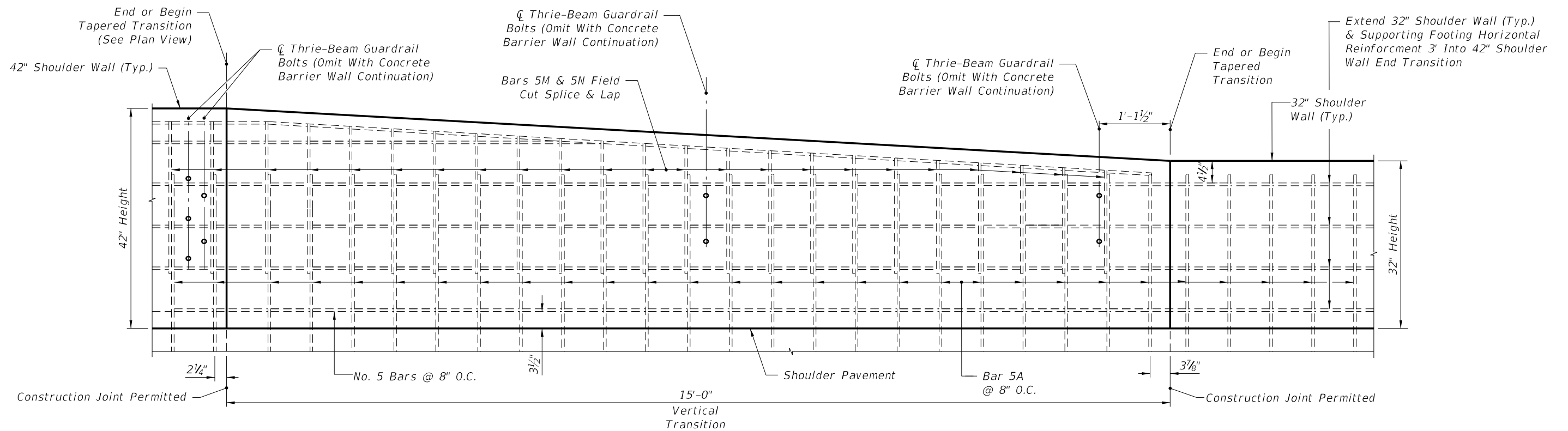


TWO-LANE TWO-WAY TRAFFIC

SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND DESIGN SPEED ≥ 50 MPH

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LAST REVISION 07/01/14	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 22 of 25
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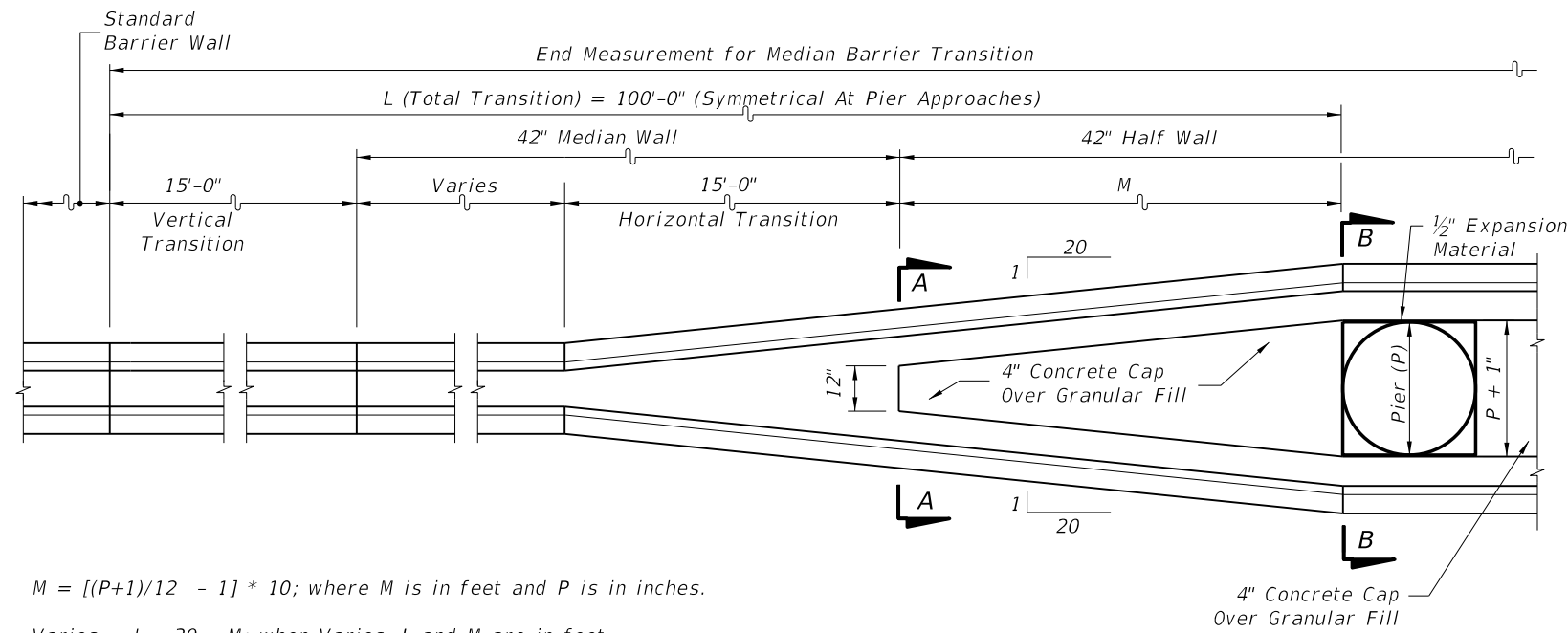
ELEVATION VIEW  
42" SHOULDER WALL END TRANSITION

NOTES:  
For additional information on Bars 5A, 5M and 5N see BAR BENDING DIAGRAMS.

END TRANSITION DETAILS - 42" SHOULDER WALL WITH GUARDRAIL OR SHOULDER WALL CONTINUATION FOR DESIGN SPEED  $\geq$  50 MPH

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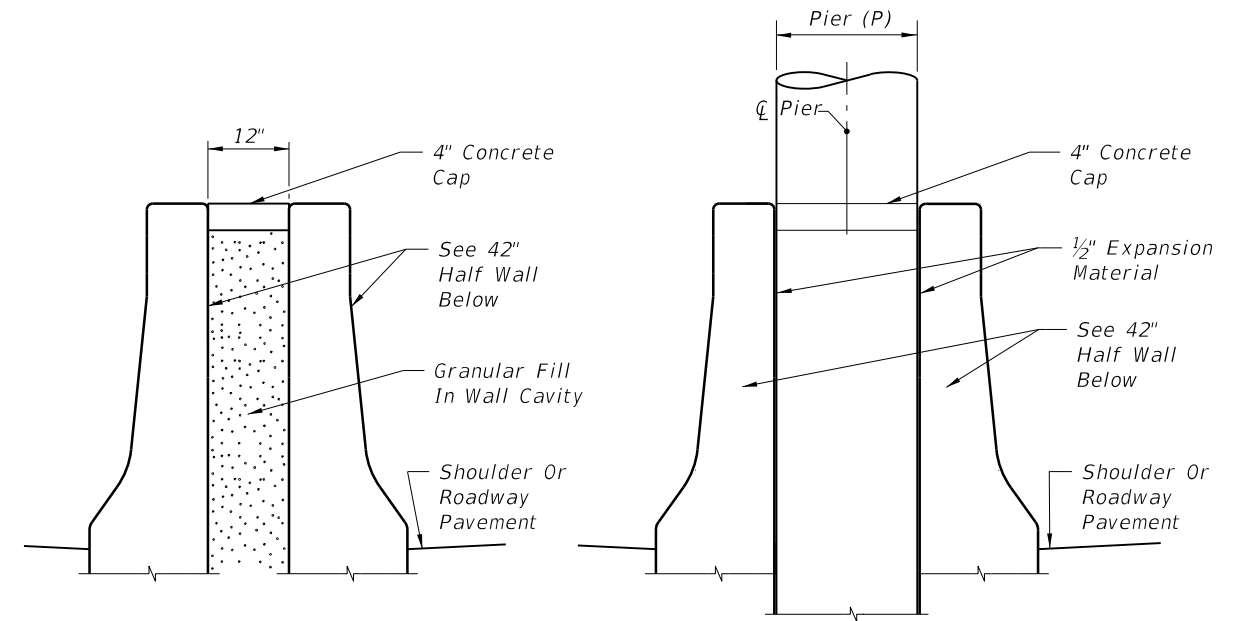
LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 23 of 25
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$M = [(P+1)/12 - 1] * 10$ ; where M is in feet and P is in inches.

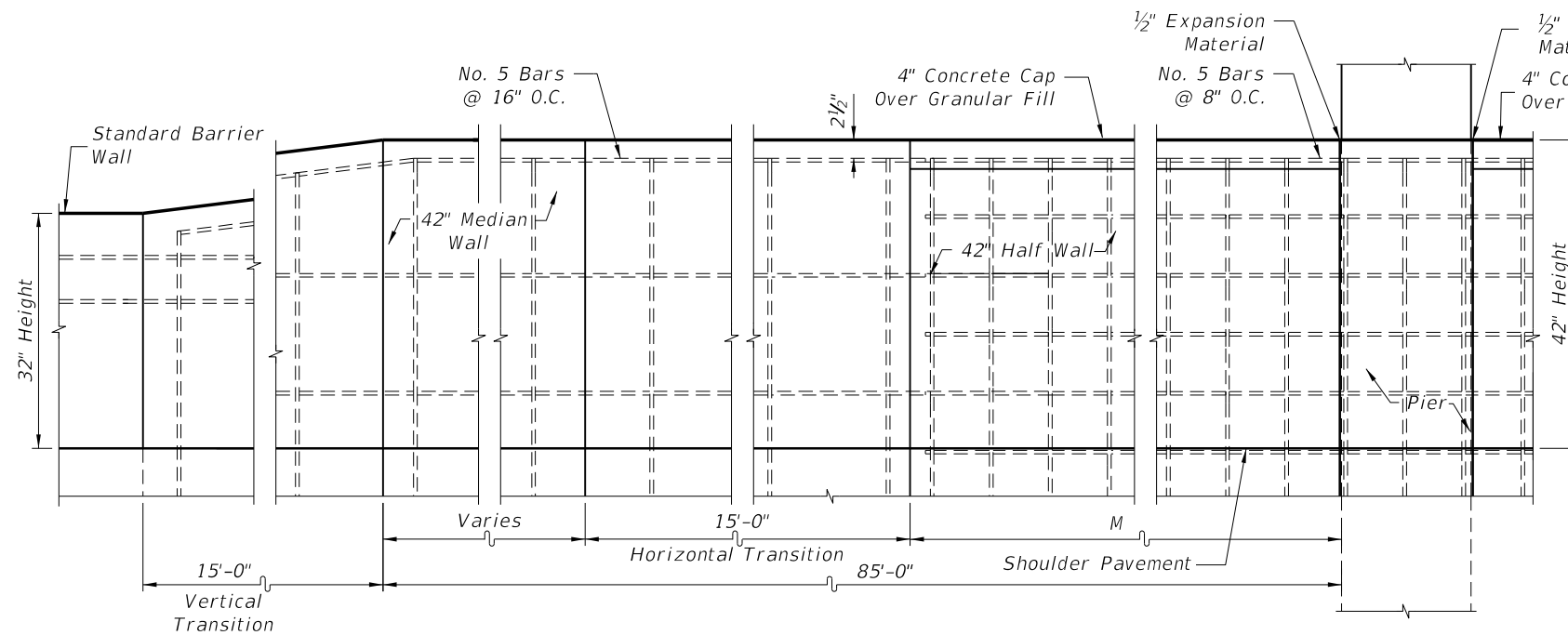
Varies =  $L - 30 - M$ ; when Varies, L and M are in feet.

PLAN



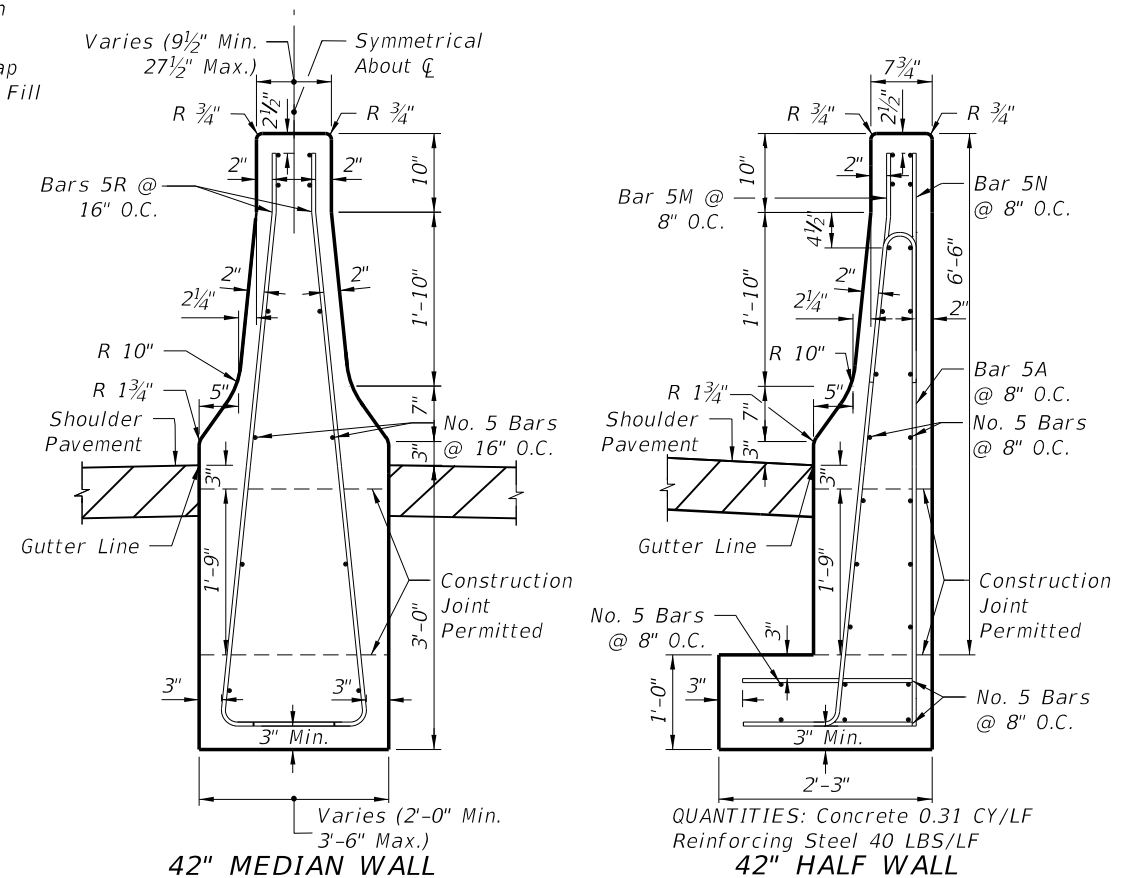
SECTION AA (42" BARRIER)

SECTION BB (42" BARRIER)



- NOTES:  
 1. Granular Fill To Be Free of Deleterious and Cementitious Material  
 2. For additional information on Bars 5A, 5M, 5N and 5R, see BAR BENDING DIAGRAMS.

ELEVATION  
 CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT BRIDGE PIERS FOR DESIGN SPEEDS  $\geq$  50 MPH



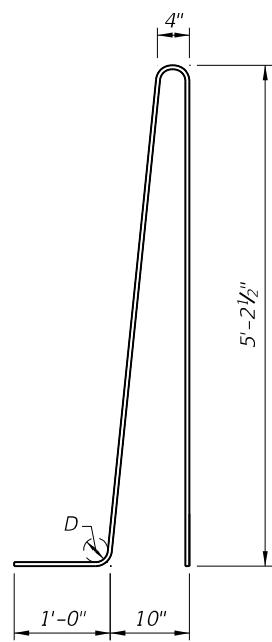
42" MEDIAN WALL

QUANTITIES: Concrete 0.31 CY/LF  
 Reinforcing Steel 40 LBS/LF

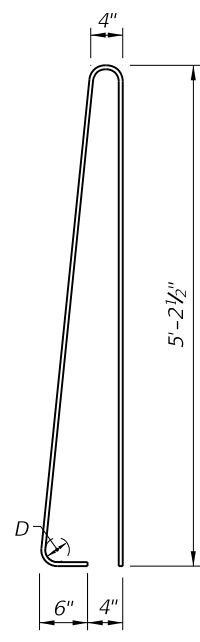
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LAST REVISION 07/01/14	REVISION	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL	INDEX NO. 410	SHEET NO. 24 of 25
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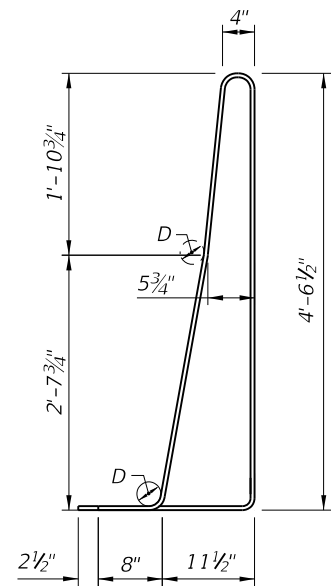




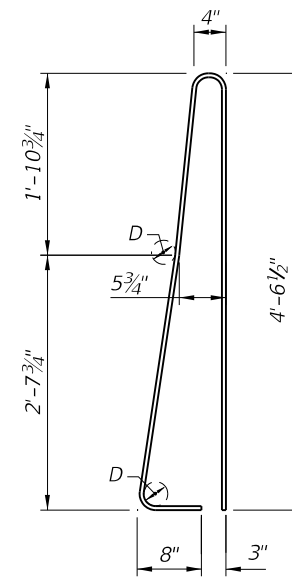
BAR 5A



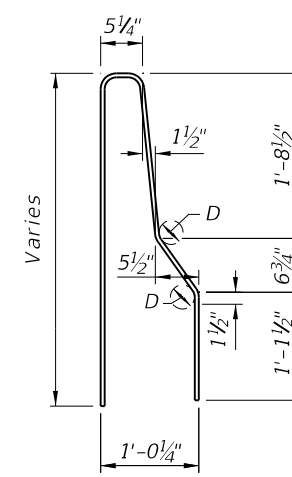
BAR 5B



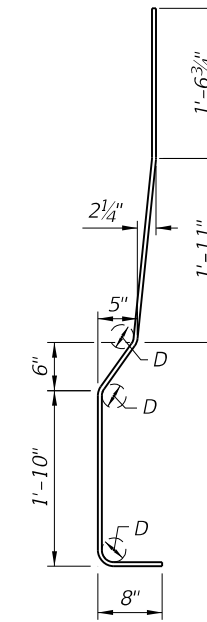
BAR 5C



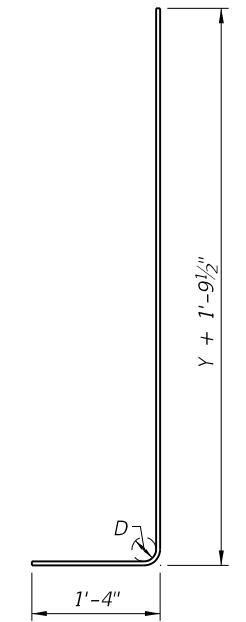
BAR 5D



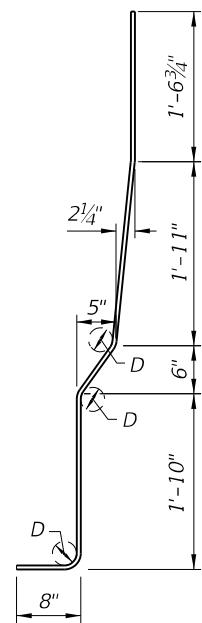
CANTILEVER WALL & L-WALL  
BAR 5E



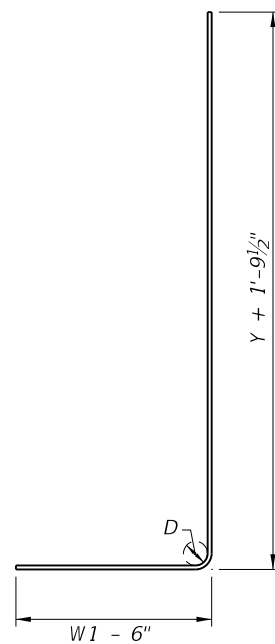
CANTILEVER WALL  
BAR 5F



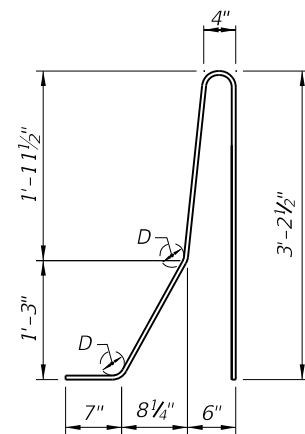
CANTILEVER WALL  
BAR 5G



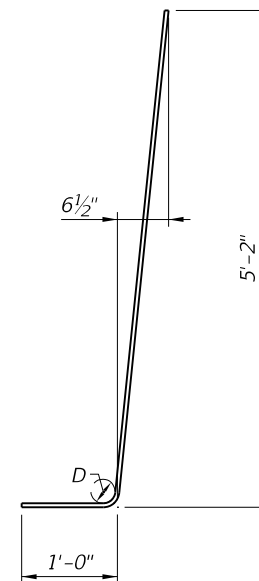
L-WALL  
BAR 5H



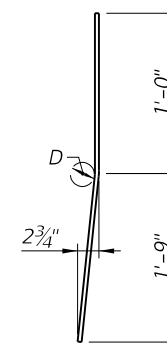
L-WALL  
BAR 5J



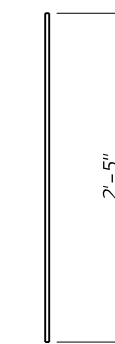
BAR 5K



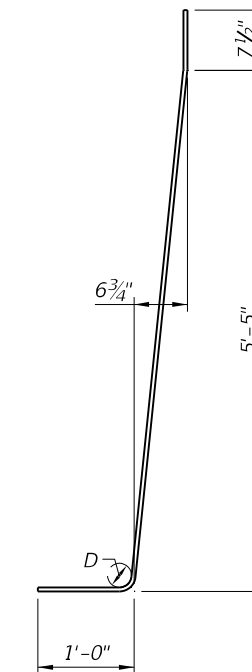
BAR 5L



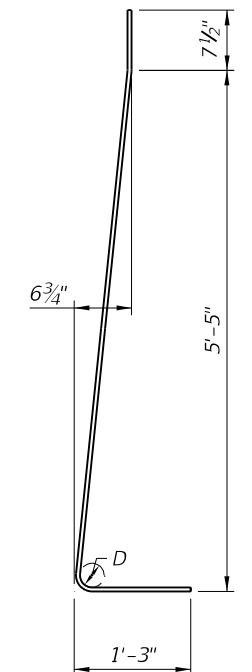
BAR 5M



BAR 5N



BAR 5P



BAR 5R

- NOTES:  
 1. For Additional Information on "STANDARD BAR BENDING DETAILS," See Index 21300.  
 2. For Bar 5G, Bar 5J, and Dimensions (W, W1 and Y), see CANTILEVER WALL DIMENSIONS TABLE.

BAR BENDING DIAGRAMS

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LAST REVISION 07/01/14	DESCRIPTION:	 2015 DESIGN STANDARDS	CONCRETE BARRIER WALL		INDEX NO. 410	SHEET NO. 25 of 25