CONCRETE BARRIER WALL TERMINALS

1. Standard F-Shape NJ Shape (See General Note 5).

2. Longitudinal reinforcement to be continuous or spliced No. 5 Bars. Lap splices a minimum of 2'-0".

3. Concrete barrier wall terminal notes for design speeds ≥ 50 mph.
   a. Terminated outside clear zone of the approach traffic, use DETAIL II end treatment.
   b. Terminated within a shielded location.
   c. Terminal protection by the use of a crash cushion system.

4. 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.

5. When the barrier is installed adjacent to the pavement, compact the top 12" of the subgrade to at least 98% of the maximum density determined by FM 1-T 180, Method D.

6. 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.

GENERAL NOTES

1. Class I1 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.

2. Longitudinal reinforcement to be continuous or spliced No. 5 Bars. Lap splices a minimum of 2'-0".

3. Concrete barrier wall terminal notes for design speeds ≥ 50 mph.
   a. Terminated outside clear zone of the approach traffic, use DETAIL II end treatment.
   b. Terminated within a shielded location.
   c. Terminal protection by the use of a crash cushion system.

4. 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.

5. When the barrier is installed adjacent to the pavement, compact the top 12" of the subgrade to at least 98% of the maximum density determined by FM 1-T 180, Method D.

6. 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.

CONTACT: 2016 DESIGN STANDARDS

REVISION DATE: 07/01/15

INDEX NO.: 410

SHEET NO.: 1 of 25
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

TOP VIEW
TONGUE DETAIL
GROOVE DETAIL

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

DETAIL C

CONCRETE BARRIER WALL SPECIAL DETAILS

FREE END REINFORCEMENT

NOTE:
1. 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.
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 to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".
6. For additional information on Bars 5A, 5B, 5C and 5D, see BAR BENDING DIAGRAMS.
F-SHAPE MEDIAN BARRIER
WHEN Y IS LESS THAN OR EQUAL TO 6 INCHES

CANTILEVER WALL
SUPERELEVATED SECTION

L-WALL
SUPERELEVATED SECTION

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. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet for each side of all cold or expansion joints.
3. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".
4. For additional information on Bars 5E, 5F, 5G, 5H and 5J, see BAR BENDING DIAGRAMS.
5. No. 4 dowel may be extended to provide steel stake. Omit dowel bars when construction joint is not used.

REPORT ERRORS TO: CustService@Caltrans.ca.gov

MEDIAN BARRIER WALL FOR SUPERELEVATED SECTIONS WITH VARIABLE ROADWAY PROFILE GRADE LINES
* See Plans For Additional Project Specific Reinforcement
  For Sign Support Foundation.

32" F-Shape Median Barrier Transition from 32" to 54" Barrier Height

* 54" High Vertical Face Barrier Transition from 32" to 54" Barrier Height

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

**SECTION A-A**
- 2" Cover (Min.)
- #5 Stirrup Bars
- 2" Cover (Min.)

**SECTION B-B**
- 2" Cover (Min.)
- #5 Stirrup Bars
- 2" Cover (Min.)

**SECTION C-C**
- 2" Cover (Min.)
- #5 Stirrup Bars
- 2" Cover (Min.)

**SECTION D-D**
- Overhead Sign Support
- Distance (Min.)

**ELEVATION**
- Design Standards Index 410
- 15'-0" Distance (Min.)
- 32" F-Shape Median Barrier
- Medium Shoulder
- Large Shoulder

**PLAN**
- Symmetric About Q
- Extend index 410
- Reinforcing (Typ.)

**SECTION A-A**
- 2" Cover (Min.)
- #5 Stirrup Bars
- 2" Cover (Min.)

**SECTION B-B**
- 2" Cover (Min.)
- #5 Stirrup Bars
- 2" Cover (Min.)

**SECTION C-C**
- 2" Cover (Min.)
- #5 Stirrup Bars
- 2" Cover (Min.)

**SECTION D-D**
- Overhead Sign Support
- Distance (Min.)

**VARIABLES**
- Spacing of #5 Stirrup Bars
- #5 Bars (Typ.)
- 1'-0" Spacing
- To Maintain Cover
- Field Bend #5 Bar
- Const. Jl.
- Const. Fl.
- 6" Max.
- 32" F-Shape Median Barrier
- Transition from 32" to 54" Barrier Height

**DESIGN STANDARDS INDEX 410**
- Project Specific Design
- Overhead Sign Support
- Foundation (Drilled Shaft shown, Spread Footing similar)
- #5 Stirrup Bars @ 1'-0" Spacing
- Max. Shift To Clear Project Specific Sign Support Foundation
- Spread Footing similar
- 2" Cover (Min.)
- #5 Stirrup Bars
- 2" Cover (Min.)

**CONCRETE BARRIER WALL**
- 2016 Design Standards
- Large Sign Median Barrier
- Mounted Sign Support Transition (Option 1)
**Design Standards Index 410**

32" F-Shape Median Barrier

* Variance from 32" to 54" Barrier Height
* High Vertical Face Barrier

**Spacing of #5 Stirrup Bars**

* Equal Spacing @ 3'-0" Max.
* 6'-0" Max.

**#5 Stirrup Bars @ 1'-0" Spacing**

Max. Shift To Clear Project Specific Sign Support Foundation

**Foundation (Spread Footing shown, Drilled Shaft similar)**

2" Cover (Min.)

**Varies (19'-0" Min.)**

**Varies (19'-0" Min.)**

**3'-0" Max.**

**6" Max.**

**Varies**

**ELEVATION**

**SECTION A-A**

6'-0" - #5 Bars

2" Cover (Min.)

**SECTION B-B**

6'-0" - #5 Bars

2" Cover (Min.)

**SECTION C-C**

2'-0"

7'-0" 9'-0" 11'-0"

3"

**SECTION D-D**

8' Setback

Overhead Sign Support (Project Specific Design)

**LARGE SIGN MEDIAN BARRIER MOUNTED SIGN SUPPORT TRANSITION (OPTION 3)**
CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT OVERHEAD SIGN SUPPORTS

NOTE:
1. Footing Extended As Called For On Other Indexes Or As Called For In The Plans
MEDIAN BARRIER MOUNTED LIGHT POLE DETAILS

EMBEDDED JUNCTION BOX - ELECTRICAL

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. They shall be considered separate for the box, risers or installation unless specifically called for in the plans.

EMBEDDED JUNCTION BOX - ELECTRICAL

CONCRETE BARRIER WALL

INDEX NO.
410

SHEET NO.
9 of 25
NOTES:

1. 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.

2. To be deleted on trailing ends except for 2-lane 2-way facilities.

3. End measurement for guardrail payment when guardrail connected to shoulder barrier walls. See Index No. 400, Detail 1 for end measurement when guardrail connected to concrete traffic rails constructed with approach slab or on retaining walls.

4. Guardrail connection to concrete traffic railings or retaining walls shall be in accordance with the Design Standards, Index 400 Series and the plans.

5. 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 barrier traffic rails, as detailed in Index No. 400. See other flagged notes for trail end treatments. Resilient 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
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 18" 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 DD, see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE. For SECTION TT, see CURB AND GUTTER WITH ADJACENT BICYCLE LANE.

---

SECTION DD

**WITH AND WITHOUT UTILITY STRIP**

**PICTORIAL VIEW**

**SECTION EE**

---

**BRIDGE WITHOUT BIKE LANE**

**WITH UTILITY STRIP AND WITHOUT BIKE LANE**

**WITHOUT UTILITY STRIPS AND WITHOUT BIKE LANE**

**HAZARD 4' OR LESS FROM FACE OF CURB**

**ONE-WAY CURB AND GUTTER DEPARTURES**

**CONCRETE BARRIER WALL**
**SECTION FF**

**BRIDGE WITHOUT BIKE LANE**

- End Barrier Wall (Rigid) (Curb & Gutter)
- Sidewalk Alignment Varies To Suit Conditions Around Hazard

**WITH UTILITY STRIP AND WITHOUT BIKE LANE**

- End Barrier Wall (Rigid) (Curb & Gutter)
- Sidewalk Alignment Varies To Suit Conditions Around Hazard

**WITHOUT UTILITY STRIP AND WITHOUT BIKE LANE**

- End Barrier Wall (Rigid) (Curb & Gutter)
- Sidewalk Alignment Varies To Suit Conditions Around Hazard

**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 WITHOUT 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.

**PICTORIAL VIEW**

- Bridge
- 3'-6" Without Barrier Wall
- 4'-6" Without Barrier Wall
- 3'-0" With Barrier Wall
- With Utility Strip
- 0.02-0.04
- (0.02 Std.)
- Const. Joint Permitted

### Table

<table>
<thead>
<tr>
<th>Type F Curb &amp; Gutter (2')</th>
<th>3'-0&quot; With Barrier Wall</th>
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<tbody>
<tr>
<td>Sidewalk (5' Std.)</td>
<td>4'-6&quot; Without Barrier Wall</td>
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<tr>
<td>Utility Strip (Varies)</td>
<td>3'-0&quot; With Barrier Wall</td>
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<tr>
<td>Sidewalk (6' Std.)</td>
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<tr>
<td>Tactile Surface</td>
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</tr>
</tbody>
</table>

### Observations

- For X=Length of advancement in feet for near and opposing lanes and for sectional details see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE.
- 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.
- The detail BRIDGE WITH BIKE LANE can be superimposed over the details: WITH UTILITY STRIPS AND WITH BIKE LANE and WITHOUT UTILITY STRIPS AND WITHOUT 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.
- For SECTION EE, see ONE-WAY CURB AND GUTTER DEPARTURES.
- For SECTION QQ, see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE.
- For SECTION TT, see CURB AND GUTTER WITH ADJACENT BICYCLE LANE.
SECTION GG

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

NOTES:
1. For SECTION EE, see ONE-WAY CURB AND GUTTER DEPARTURES.
2. For SECTION QQ, see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE.
3. For SECTION TT, see CURB AND GUTTER WITH ADJACENT BICYCLE LANE.
4. 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 X (Length Of Advancement, Ft.)

Sidewalk Alignment
Variations To Suit Conditions Around Hazard

10' Transition

Begin Barrier Wall (Rigid) (Curb & Gutter)

Sidewalk (5' Std.)

Sidewalk (6' Std.)

Utility Strip (Varies)

Type F Curb & Gutter (2')

Barrier Wall

2'-6" Expansion Joint

BRIDGE WITH BIKE LANE

Bridge X (Length Of Advancement, Ft.)

Sidewalk Alignment
Variations To Suit Conditions Around Hazard

10' Transition

Begin Barrier Wall (Rigid) (Curb & Gutter)

Sidewalk (5' Std.)

Sidewalk (6' Std.)

Utility Strip (Varies)

Type F Curb & Gutter (2')

Barrier Wall

2'-6" Expansion Joint

WITH UTILITY STRIP AND WITHOUT BIKE LANE

Begin Barrier Wall (Rigid) (Curb & Gutter)

Sidewalk Alignment
Variations To Suit Conditions Around Hazard

10' Transition

(10 Min.-20 Max.)

Tactile Surface

Type F Curb & Gutter (2')

Barrier Wall

2'-6" Expansion Joint

WITH UTILITY STRIP AND WITH BIKE LANE

Begin Barrier Wall (Rigid) (Curb & Gutter)

Sidewalk Alignment
Variations To Suit Conditions Around Hazard

10' Transition

(10 Min.-20 Max.)

Tactile Surface

Type F Curb & Gutter (2')

Barrier Wall

2'-6" Expansion Joint
END OF BRIDGE RAIL OR OTHER HAZARD THAT REQUIRES SHIELDING

BEGIN CONCRETE BARRIER WALL

OFFSET CONTROL POINT

FACE OF BARREL WALL

DEPARTURE LINE

POINT OF DEPARTURE

RIGHT SIDE APPROACH SHOWN - LEFT SIDE OPPOSITE HAND

NEAR LANE APPROACH

OPPONING 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

LENGTH OF ADVANCEMENT

CURB AND GUTTER WITHOUT ADJACENT BIKE LANE

EQUATION VARIABLES:

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

LENGTH OF ADVANCEMENT

CURB AND GUTTER WITHOUT ADJACENT BIKE LANE

Design Speed mph Length Of Advancement, Ft. (X)
60 = 16 (D-d)

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

SECTION QQ
(LOW SIDE)

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

SECTION QQ
(HIGH SIDE)

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

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. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".

3. 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'.

4. For Concrete Barrier Wall Inlet details with Rigid Curb and Gutter applications, see Index No. 219.

5. Minimum Segment Wall Length = 20 LF.

6. For additional information on Bar 5K, see BAR BENDING DIAGRAM.
Begin Concrete Barrier Wall (Rigid) (Curb & Gutter)

Section TT

FOR HIGH SIDE

Section TT

FOR LOW SIDE

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. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".

3. 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'.

4. For Concrete Barrier Wall Inlet details with Rigid Curb and Gutter applications, see Index No. 219.

5. Minimum Segment Wall Length = 20 LF.

6. For additional information on Bar SK, see BAR BENDING DIAGRAM.

7. 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' 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.

CURB AND GUTTER WITH ADJACENT BICYCLE LANE
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

DESCRIPTION:
2016 DESIGN STANDARDS

CONCRETE BARRIER WALL

INDEX NO. 410

SHEET NO. 17 of 25
SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS WHEN OFFSET FROM HAZARD < 3'

Plan for Design Speed ≤ 45 MPH

- Round Pier Shown
- Standard Thrie-Beam Offset Block, Field Trimmed, See Detail, Right
- Beam Washers, Stacked Back of Rail
- End Measurement For Concrete Barrier Wall Payment
- Transition Section, See Note 9
- Plan for Design Speed ≥ 50 MPH

Plan for Design Speed ≥ 50 MPH

- Round Pier Shown
- Standard Thrie-Beam Offset Block, Field Trimmed, See Detail, Right
- Beam Washers, Stacked Back of Rail
- End Measurement For Guardrail Payment
- Transition Section, See Note 9

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 multiline and one-way facilities, the end connection on W-Beam guardrail connection to concrete barrier wall trailing ends may be used.

3. For walls with normal offsets from hazards and their guardrail connections, see Guardrail Connection to Concrete Barrier Wall Approach Ends.

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

5. Attach thrie-beam terminal connector to shoulder barrier wall with a 21"x12"x1/2" thrie beam terminal connector plate and 5-5/8"x12" long HS hex bolts and nuts with 5/8" plain round washers under heads and 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 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.
PIER AT BACK OF CONCRETE BARRIER WALL

NOTES:
1. These treatments are not applicable to hazards that cannot provide lateral support to resist the LRFD 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
SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH

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. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".
3. For additional information on Bars 5A and 5L, see BAR BENDING DIAGRAMS.
4. ½" Min. Expansion Joint or at the contractor's option: Back face of barrier wall may be cast against Pier with ½" Expansion Material.
42" SHOULDER WALL
SECTION MM
WHEN PIER OFFSET ≥ 16¾"

NOTES:
1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet each side of all cold joints.
2. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".
3. For additional information on Bars 5A, 5B, 5M, 5N and 5P, see BAR BENDING DIAGRAMS.
4. For Section OO, see SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND THE DESIGN SPEED ≤ 45 MPH.
5. Where the 42" SHOULDER WALL does not abut the pier, use the TYPICAL or MODIFIED sections.
6. ½" Min. Expansion Joint or at the contractor's option: Back face of barrier wall may be cast against Pier with ½" Expansion Material.

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

QUANTITIES:
Concrete 0.35 CY/LF
Reinforcing Steel 43 LBS/LF
SHOULDER BARRIER WALL WHEN OFFSET FROM ABOVE GROUND HAZARD < 1'-6" AND DESIGN SPEED ≥ 50 MPH
END TRANSITION DETAILS - 42" SHOULDER WALL WITH GUARDRAIL OR SHOULDER WALL CONTINUATION FOR DESIGN SPEED ≥ 50 MPH

NOTES:
For additional information on Bars 5A, 5M and 5N see BAR BENDING DIAGRAMS.
CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT BRIDGE PIERS FOR DESIGN SPEEDS ≥ 50 MPH

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. All longitudinal reinforcement to be continuous or spliced No. 5 bars. Lap splices a minimum of 2'-0".
4. For additional information on Bars 5A, 5M, 5N and 5R, see BAR BENDING DIAGRAMS.

End Measurement for Median Barrier Transition
L(Total Transition) = 100'-0" (Symmetrical At Pier Approaches)
M = [(P+1)/12] - 1, where M is in feet and P is in inches.
Varies = L - 30 - 2M; when Varies, L and M are in feet.

SECTION AA (42" BARRIER)
SECTION BB (42" BARRIER)

42" MEDIAN WALL
42" HALF WALL

PLANNING
ELEVATION

CONCRETE MEDIAN BARRIER WALL TRANSITIONS AT BRIDGE PIERS FOR DESIGN SPEEDS ≥ 50 MPH

DESIGN STANDARDS 2016

LAST REVISION 07/01/15
DESCRIPTION:

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2. For Bar 5G, Bar 5J, and Dimensions (W, W1 and Y), see CANTILEVER WALL DIMENSIONS TABLE.

1. For Additional Information on "STANDARD BAR BENDING DETAILS," See Index 21300.