1. 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 non-designated size reinforcing steel shall be No. 5 bars.

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.

4. Expansion joints are required at bridge ends and/or at locations where the wall is an integral part of an existing or design standards.

5. When the barrier is installed adjacent to the pavement, compact the top 12" of the subgrade to at least 98% of the proposed concrete slab. Construct required joints to match existing or proposed expansion joints.

6. Where standard F-Shape walls abut existing New Jersey (NJ) Shape walls, face transitions of not less than 5' in length determined by FM 1-T 180, Method D.

7. 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.

8. 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).

9. Minimum length of cast-in-place or precast segments is 20 feet.

10. Precast construction is allowed as an alternate to cast-in-place construction.

11. 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.

12. For BARRIER WALL INLET details see Index 218 and Index 219. For MEDIAN BARRIER INLETS see Index 217.

13. Concrete barrier wall with NJ Safety Shape may not be substituted for the Standard F Shape Barrier.
**SHOULDER TREATMENT WHEN CRASH CUSIONS SHIELD CONCRETE BARRIER WALL ENDS LOCATED INSIDE APPROACH CLEAR ZONE OR LATERAL OFFSET**

**DETAIL A**

- Cold Joint
- Install Load Transfer Device at 1/4 of wall per Specification Section 350 using 1" Ø smooth dowels.

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

**DETAIL B**

- Doweled Transverse Construction Joint
- Where abutting Segment(s) less than 40' in length
- (Required on abutting ends of Segments < 40' long)

**CONCRETE BARRIER WALL SPECIAL DETAILS**

**DETAIL C**

- Top View
- Tongue Detail
- Groove Detail

**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.

REINFORCED CONCRETE SHOULDER WALL

SHOULDER WALL (TYPICAL)

Quantities:
Concrete 0.20 CY/LF
Reinforcing Steel 44 LBS/LF

SHOULDER WALL (MODIFIED)

Quantities:
Concrete 0.26 CY/LF
Reinforcing Steel 52 LBS/LF

SHOULDER WALL (RETAINING)

Quantities:
Concrete 0.27 CY/LF
Reinforcing Steel 55 LBS/LF

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 SC) 58 LBS/LF, Concrete 0.27 CY/LF
With Reinforcing Steel (Bar SD) 52 LBS/LF, Concrete 0.23 CY/LF

PLAN VIEW

SHOULDER WALL FOOTING

TRANSITION AT INLETS

INDEX NO. SHEET NO.
410 3 of 25
F-SHAPE MEDIAN BARRIER
WHEN Y IS LESS THAN OR EQUAL TO 6 INCHES

CANTILEVER WALL
SUPERELEVATED SECTION

L-WALL
SUPERELEVATED SECTION

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

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

* See Plans for additional project specific reinforcement for sign support foundation.
**Design Standards Index 410**

**Vehicles (Typ.)**

Varies (15'-0" Min.)

* Transition from 32" to 54" Barrier Height

Varies

* 54" High Vertical Face Barrier

Varies (15'-0" Min.)

* Transition from 32" to 54" Barrier Height

**Design Standards Index 410**

32" F-Shape Median Barrier

**ELEVATION**

**SECTION A-A**

2" Cover (Min.)

5# Stirrup Bars

**SECTION B-B**

2" Cover (Min.)

**SECTION C-C**

2" Cover

3'-0"

5# Stirrup Bars

**SECTION D-D**

Overhead Sign Support (Project Specific Design)

0" Setback

Distance (Min.)

Varies

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

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

Foundation (Spread Footing shown, Drilled Shaft similar)

Field Bend #5 Bar To Maintain Cover

Symmetric About ¥

$\frac{1}{2}$ V-Groove Joint

$\frac{1}{2}$ V-Groove

Max. Shift To Clear Project Specific

#5 Stirrup Bars @ 1'-0" Spacing

Extend Index 410 Reinforcing (Typ.)

Overhead Sign Support Foundation

Max. Shift To Clear Project Specific

#5 Stirrup Bars @ 1'-0" Spacing

Extend Index 410 Reinforcing (Typ.)

Overhead Sign Support Foundation
**Description:**

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

**Design Standards Index 410**

- **32” F-Shape Median Barrier**
  - Varies (18'-0" Min.)
  - Design Standards Index 410
  - *Transition from 32" to 54" Barrier Height
  - Varies
  - *54" High Vertical Face Barrier
  - Varies (19'-0" Min.)

**Foundation**

- Spread Footing shown
- Drilled Shaft similar
- 2" Cover (Min.)
- 5" Stirrup Bars @ 1'-0" Spacing
- To Maintain Cover
- Field Bend #5 Bar
  - Const. It.
  - 6" Max.
  - Z-0" (Typ.)

**Varies**

- Equal Spaces @ 3'-0" Max.
- Spacing of #5 Stirrup Bars

**Varies (15'-0" Min.)**

- Transition from 32" to 54" Barrier Height

**Varies (15'-0" Min.)**

- Transition from 32" to 54" Barrier Height

**Design Standards Index 410**

- 32” F-Shape Median Barrier

**ELEVATION**

- 2" Cover (Min.)
- 6 - #5 Bars

**SECTION A-A**

- 2’ Cover (Min.)
- 6 - #5 Bars

**SECTION B-B**

- 2’ Cover (Min.)

**SECTION C-C**

- 2’-0"
- Design Standards Index 410

**SECTION D-D**

- 3’
- 0’ Setback
- 1’-6"
- #5 Stirrup Bars
- Overhead Sign Support (Project Specific Design)

**Note:**

- See Plans For Additional Project Specific Reinforcement
- For Sign Support Foundation.

**Additional Notes:**

- V-Groove Joint
- Symmetric About ø

**Project Specific Design**

- Extend index 410
- Reinforcing (Typ.)

**Foundation Details:**

- #5 Stirrup Bars @ 1'-0" Spacing
- To Maintain Cover
- Field Bend #5 Bar
- Const. It.
- 6" Max.

**Sign Support Foundation:**

- Spread Footing shown
- Drilled Shaft similar
- 2" Cover (Min.)
- #5 Stirrup Bars
- To Maintain Cover
- Field Bend #5 Bar
- Const. It.
- 6" Max.
- Z-0" (Typ.)

**Varies**

- Equal Spaces @ 3'-0" Max.
- Spacing of #5 Stirrup Bars

**Varies (15'-0" Min.)**

- Transition from 32" to 54" Barrier Height

**Varies (15'-0" Min.)**

- Transition from 32" to 54" Barrier Height
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**

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.

**NOTES:**

- MIN. 10' from free end, barrier wall approach ends and guardrail
- MIN. 10' from free end, barrier wall transition approach ends and guardrail

**EMBEDDED JUNCTION BOX**

**EMBEDDING JUNCTION BOX - ELECTRICAL**

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.

**NOTES:**

- MIN. 10' from free end, barrier wall approach ends and guardrail
- MIN. 10' from free end, barrier wall transition approach ends and guardrail

**EMBEDDED JUNCTION BOX**

**SPREAD FOOTING AND CYLINDRICAL NOTES**

- The Reinforcement Details And Dimensions For Both The Spread Footing And Cylindrical Foundations Can Be Found In Index 17515.
One-Way Curb and Gutter Departures

**Design Standards FY 2017-18**

**Concrete Barrier Wall**

**Description:**

- **SECTION DD:**
  - **2'-6" Around Hazard Suit Conditions:**
    - Sidewalk Alignment Varies to Suit Conditions Around Hazard
    - Tactile Surface
    - Utility Strip (Varies)
    - Type F Curb & Gutter (2')
    - Expansion Joint

- **SECTION EE:**
  - **2'-6" Around Hazard Suit Conditions:**
    - Sidewalk Alignment Varies to Suit Conditions Around Hazard
    - Tactile Surface
    - Utility Strip (Varies)
    - Type F Curb & Gutter (2')
    - Expansion Joint

**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 ASTM D226, Type I (15 lb.) asphalt-saturated organic 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 WITHOUT BIKE LANE. The detail BRIDGE WITHOUT BIKE LANE can be superimposed over the details: WITH UTILITY STRIPS AND AND WITHOUT BIKE LANE.

4. For SECTION DD, see CURB AND GUTTER WITHOUT ADJACENT BICYCLE LANE. For SECTION EE, see CURB AND GUTTER WITH ADJACENT BICYCLE LANE.
REVISION NO.  SHEET NO.  INDEX

DESCRIPTION:

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 WITHOUT BIKE LANE can be superimposed over the details: WITH UTILITY STRIPS AND WITH BIKE LANE; WITH 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.
   For Section TT, see CURB AND GUTTER WITH ADJACENT BICYCLE LANE.
   For Section EE, see ONE-WAY CURB AND GUTTER DEPARTURES.

WITH AND WITHOUT UTILITY STRIP

PICTORIAL VIEW

SECTION FF

NOTES:

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

HAZARD 4' OR LESS FROM FACE OF CURB

TWO-WAY CURB AND GUTTER TRAFFIC DEPARTURE

CONCRETE BARRIER WALL
<table>
<thead>
<tr>
<th>Description</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONE-WAY AND TWO-WAY CURB AND GUTTER NEAR LANE APPROACHES TRAFFIC (UNDIVIDED)</td>
<td>GG</td>
</tr>
</tbody>
</table>

### Bridge without Bike Lane

- Sidewalk Alignment: Varies to suit conditions around hazard.
- Bridge: X (Length of Advancement, Ft.)
- Barrier Wall: Q
- Expansion Joint: ½
- Utility Strip: Varies
- Type F Curb & Gutter (2')

### Bridge with Bike Lane

- Sidewalk Alignment: Varies to suit conditions around hazard.
- Bridge: X (Length of Advancement, Ft.)
- Barrier Wall: Q
- Expansion Joint: ½
- Utility Strip: Varies
- Type F Curb & Gutter (2')

### With Utility Strip and Without Bike Lane

- Sidewalk Alignment: Varies to suit conditions around hazard.
- Bridge: X (Length of Advancement, Ft.)
- Barrier Wall: Q
- Expansion Joint: ½
- Utility Strip: Varies
- Type F Curb & Gutter (2')

### Without Utility Strip and Without Bike Lane

- Sidewalk Alignment: Varies to suit conditions around hazard.
- Bridge: X (Length of Advancement, Ft.)
- Barrier Wall: Q
- Expansion Joint: ½
- Sidewalk (6' Std.)
- Tactile Surface: Type F Curb & Gutter (2')

### Without Utility Strip and With Bike Lane

- Sidewalk Alignment: Varies to suit conditions around hazard.
- Bridge: X (Length of Advancement, Ft.)
- Barrier Wall: Q
- Expansion Joint: ½
- Utility Strip: Varies
- Type F Curb & Gutter (2')

### 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.
**LENGTH OF ADVANCEMENT**

**CURB AND GUTTER WITHOUT ADJACENT BIKE LANE**

**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.

**SECTION QQ**

**FOR HIGH SIDE**

**SECTION QQ**

**FOR LOW 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.

**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 wall (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 BIKE LANE**

**INDEX NO.**

410

**DESIGN STANDARDS**

FY 2017-18

**CONCRETE BARRIER WALL**

INDEX NO. 410

SHEET No. 14 of 25
Rigid Curb & Gutter

Start Concrete Barrier Wall

Shielding That Requires

End Of Bridge Rail
That Requires Shielding

End Of Bridge Rail

10/24/2016 10:44:19 AM

Revision No.
Sheet No.
Index No.

Description:

Concrete Barrier Wall

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.

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. Slits 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

FY 2017-18 Design Standards

Concrete Barrier Wall

Quantities

<table>
<thead>
<tr>
<th>Length of Barrier Wall (ft)</th>
<th>W2</th>
<th>Concrete (CY/LF)</th>
<th>Reinforcing Steel (LBS/LF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30'</td>
<td>24</td>
<td>0.21</td>
<td>24</td>
</tr>
<tr>
<td>29' to 26'</td>
<td>26</td>
<td>0.22</td>
<td>24</td>
</tr>
</tbody>
</table>

NOTES:

- Provide 2" concrete cover.
- Drainage slots, vertical and horizontal bars shall be placed to
- 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.
GUARDRAIL CONNECTING PANELS AND POST SPACING

NOTES:
1. For additional connection details for guardrail to barrier wall, work with Sheet 18 and Index 411.
2. For component details including Standard Posts and barrier wall, work with Sheet 18 and Index 411.
3. For connecting General Guardrail and Approach Terminal details, see Index 400.

GUARDRAIL APPROACH TRANSITION TO CURVED SHOULDER BARRIER WALL
SHOULDER BARRIER WALL AT ABOVE GROUND RIGID HAZARDS WHEN OFFSET FROM HAZARD < 3'

PLAN FOR DESIGN SPEED ≤ 45 MPH

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 approach and trailing ends of two-way two-way facilities. For details on trailing ends of two-way multilane and one-way facilities, the trailing connection in Index 400 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"x3/8" thrie beam terminal connector plate and 5-9/16" long 5/8" hex bolts and nuts with 5/8" plain round washers under heads and nuts.

5. 12"x12"x1/4" galvanized steel back-up plate with 3/8" post bolts (either 14" or 18" long) and nuts with 3/8" 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 APPROACH TRANSITION TO CURVED SHOULDER BARRIER WALL on Sheet 17 for Guardrail Panel and Post Spacing information.
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 NW, 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
42" SHOULDER WALL
SECTION NN
WHEN 12¾" ≤ PIER OFFSET < 16¾"

NOTES:
1. Reduce the vertical steel spacing to 4 inches O.C. a distance of 4 feet each side at 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. \( \frac{1}{2} \)" 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 ≥ 50 MPH

QUANTITIES:
Concrete 0.31 CY/LF
Reinforcing Steel 39 LBS/LF

42" SHOULDER WALL (MODIFIED)
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
END TRANSITION DETAILS - 42" SHOULDER WALL WITH GUARDRAIL OR SHOULDER WALL CONTINUATION FOR DESIGN SPEED ≥ 50 MPH

ELEVATION VIEW
42" SHOULDER WALL END TRANSITION

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 SA, SM, SN and SR, see BAR BENDING DIAGRAMS.

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.

ELEVATION

PLAN

SECTION AA (42" BARRIER)
SECTION BB (42" BARRIER)
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
BAR 5I
BAR 5J
CANTILEVER WALL & L-WALL
BAR 5K
CANTILEVER WALL
BAR 5L
CANTILEVER WALL
BAR 5M
BAR 5N
CANTILEVER WALL
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

CONCRETE BARRIER WALL

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No. 410
SHEET No. 25 of 25

FY 2017-18
DESIGN STANDARDS

REVISED
01/01/16

DESCRIPTION:

LAST REVISION
01/01/16

REVISION
NO.

SHEET
NO.