ORIGINATION FORM

Proposed Revisions to a Standard Plans Index

(Please provide all information – Incomplete forms will be returned)

Contact Information:

Date: September 5, 2017
Originator: **Richard Stepp**
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Standard Plans:

Index Number: **410**
Sheet Number (s): All
Index Title: Concrete Barriers

Summary of the changes:

Redesign all concrete sections and reinforcing details for Single-Slope Barriers as part of the MASH Implementation Plan. Reorganize and redevelop all Index Sheets to improve quality, including the redrawing of all details to scale and the rewriting of all notes for added clarity.

Commentary / Background:

The FDOT is adopting Single-Slope Concrete Barriers and Pier Protection Barriers per the Design Bulletins Below:
http://www.fdot.gov/design/bulletins/RDB16-02.pdf
http://www.fdot.gov/design/bulletins/RDB16-04.pdf

Other Affected Offices / Documents: (Provide name of responsible personnel)

Yes	No		
☑	☐	Other Standard Plans –	Richard Stepp
☐	☑	FDOT Design Manual –	
☑	☐	Basis of Estimates Manual –	Richard Stepp, Melissa Hollis
☑	☐	Standard Specifications –	Richard Stepp, Rebecca Frimmel
☐	☑	Approved Product List –	
☐	☑	Construction –	
☐	☑	Maintenance –	

Origination Package Includes: (Email or hand deliver package to Derwood Sheppard)

Yes	N/A	
☐	☑	Redline Mark-ups
☐	☑	Proposed Standard Plan Instructions (SPI)
☐	☑	Revised SPI
☐	☑	Other Support Documents

Implementation:

☐ Design Bulletin (Interim) ☐ DCE Memo ☐ Program Mgmt. Bulletin ☑ FY-Standard Plans (Next Release)

Contact the Roadway Design Office for assistance in completing this form

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3	Median Barrier – Reinforcing Details
4	Median Barrier – Sloped End Treatment
5	Median Barrier – Grade Separated
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8	Median Barrier – 38" Height Split Section for Stand-Alone Sign Support Shielding
9	Median Barrier – 44" Height Split Section for Pier Shielding
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19	Curb and Gutter Barrier
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GENERAL NOTES:

1. CONCRETE: Use Class II concrete for all barriers constructed in slightly aggressive environments, and use Class IV Concrete for all barriers constructed in moderately or extremely aggressive environments. On all exposed surfaces, apply a Class 3 surface finish in accordance with Specification 400.

2. STEEL BAR REINFORCEMENT: Where required to maintain continuity, provide lap splices of at least 18 inches for No. 4 bars and 20 inches for No. 5 bars, unless otherwise shown herein (including shorter splices as provided by the default bar bending diagrams).

   The default reinforcing details shown herein, including bar shapes and lap splice positions, are intended to show required steel locations and provide for a constructible design. However, with the approval of the Engineer, alternate steel configurations may be used in the same locations shown herein, given that the equivalent strength reinforcing is provided and the cover, maximum spacing, and continuity requirements are maintained.

3. OPTIONAL WELDED WIRE REINFORCEMENT: With the approval of the Engineer, steel welded wire reinforcement in accordance with Specification 415 may be substituted for the steel bars shown herein. Place the welded wire in the same locations specified for the steel bars, and maintain the equivalent strength, cover, maximum spacing, and continuity requirements.

4. TOP FACE LONGITUDINAL REINFORCEMENT: Unless otherwise specified, the longitudinal reinforcement shown closest to the top face of the barrier has a maximum cover of 4½", measured from the top face of the barrier.

5. MINIMUM BARRIER LENGTH: Unless otherwise shown in the Plans, the minimum Concrete Barrier length is 40 feet.

6. CONSTRUCTION JOINTS: Install Construction Joints only as needed for discontinuous concrete casting or cold joints. There are no joint requirements specifically to accommodate concrete expansion or contraction. Maintain continuity of steel reinforcement across Construction Joints; reinforcement lap splices are permitted immediately adjacent to joints. Construction Joints are classified herein as Transverse Joints or Longitudinal Joints.

   Transverse Joints are permitted at 20 foot or greater intervals along the barrier. For Tall Grade-Separated Sections, see Sheet 5 for additional Transverse Joint requirements.

   Longitudinal Joints are only permitted where indicated in the following details and notes, with a vertical position tolerance of ± 1½" from the locations shown.

7. DOWELED JOINTS: If Transverse Joints lack continuity of steel reinforcement across the joint, substitute a ½" Doweled Joint as shown per the Dowel Details on Sheets 2 & 12. Doweled Joints are also required for Concrete Barrier connections to Pier Protection Barrier and Traffic Railings as shown. Doweled Joints are not permitted between Tall Grade-Separated Barrier segments.

8. SUBGRADE: Compact the top 12 inches of subgrade to a minimum of 98% of the maximum density per FM 1-T 180, Method D.

9. FINISH GRADE ELEVATION: At the barrier face location, the finish grade pavement has a vertical position tolerance of ± ½" from the locations shown herein, relative to the barrier elevation. Maintain visually smooth and even pavement at the barrier face, per the approval of the Engineer.

10. DRAINAGE INLETS: Where called for in the Plans, install corresponding inlets per Indexes 425-030 thru 425-032.

11. LIGHT POLE MOUNTING: Where called for in the Plans, install aluminum light poles per Index 715-002.

12. SUPPLEMENTAL GLARE SCREENS: Where called for in the Plans, install Glare Screens per Index 521-010.

13. BARRIER END MARKERS: For all free ends of concrete barriers that are not shielded with an end treatment or connection to another barrier or traffic railing type, install a Type 3 Object Marker on the end face per Specification 705.

14. BARRIER DELINEATORS: Install Barrier Delineators in accordance with Specification 705. For median barriers, mount the delineator on the top of the barrier, at the centerline of barrier, with reflective sheeting facing traffic on both approaches. For shoulder barriers and split sections, mount the delineators on the top of the barrier, with the roadway side of the delineator located 2" from the front face of the barrier and the reflective sheeting facing traffic of the nearest approach.

15. LONGITUDINAL V-GROOVE: Where depicted herein, place a ½" V-Groove running longitudinally on the barrier face(s). Locate the top of the V-Groove at a point measured from the top of the barrier, at a vertical distance of the nominal barrier height minus 2".

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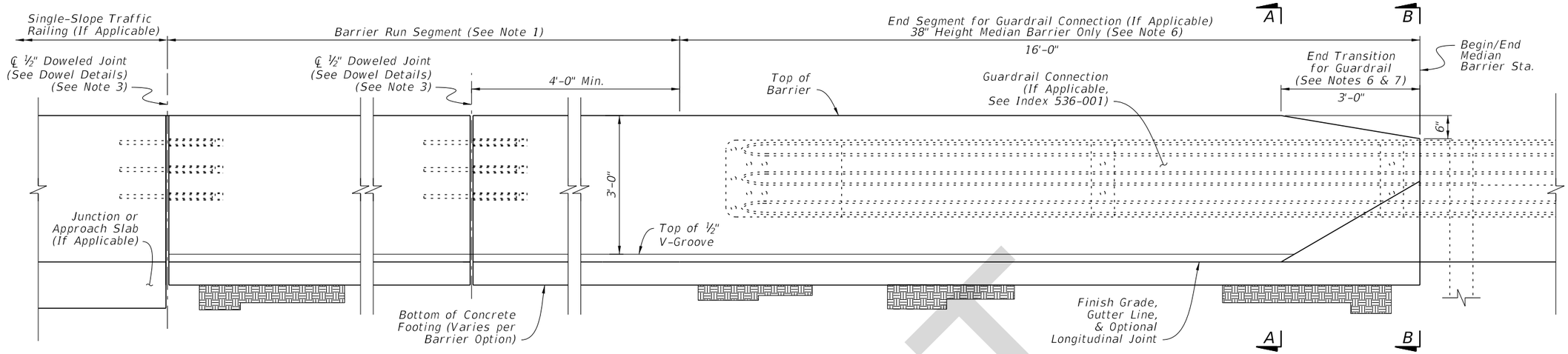
LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2018-19 STANDARD PLANS	CONCRETE BARRIER	INDEX	SHEET
11/01/17						521-001	1 of 21



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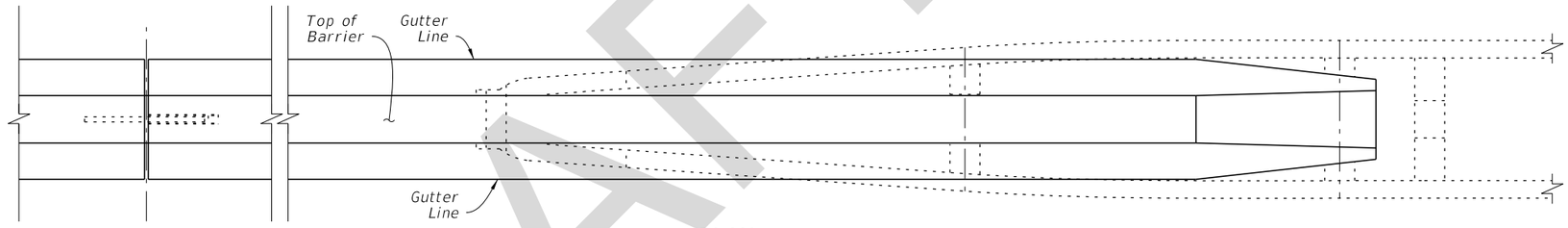
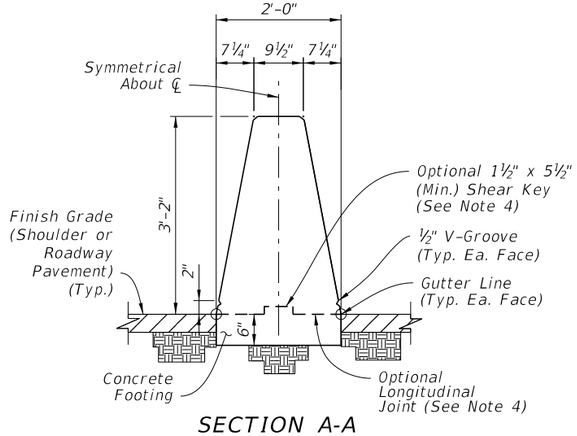
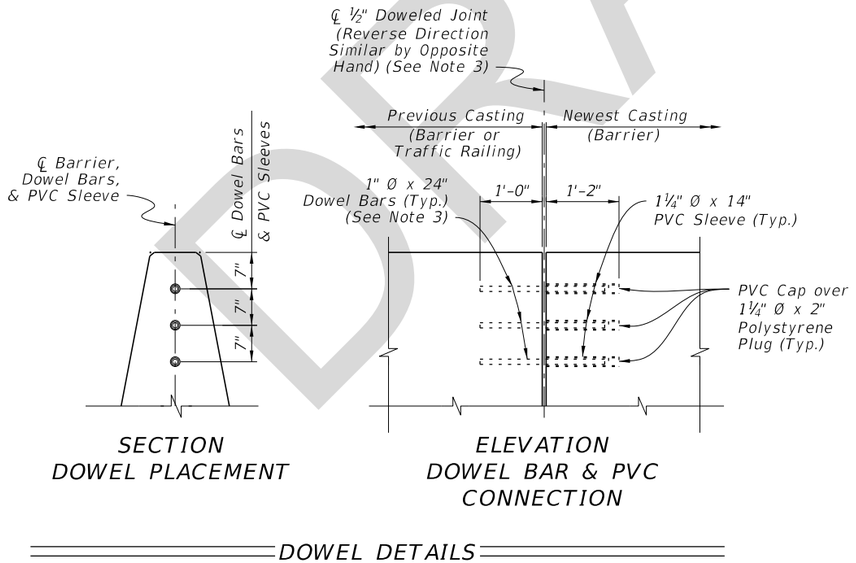


PLAN



SECTION A-A
38" HEIGHT MEDIAN BARRIER
(See Sheet 3 for Steel Reinforcing Details)



SECTION
DOWEL PLACEMENT

ELEVATION
DOWEL BAR & PVC
CONNECTION

DOWEL DETAILS

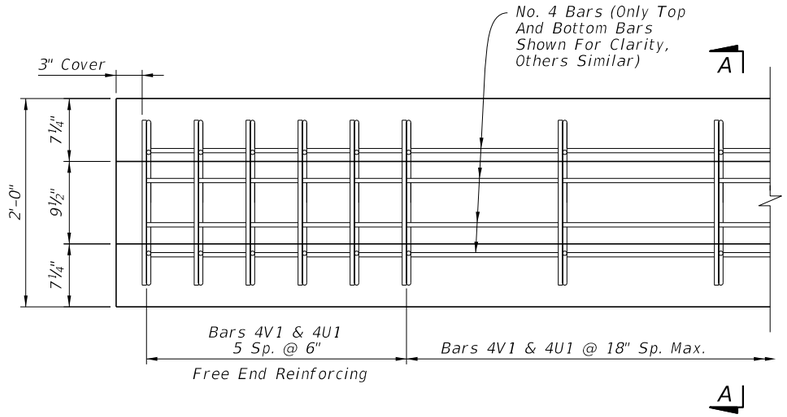
NOTES:

1. BARRIER RUN SEGMENT: Within the Barrier Run Segment, either the 38" Height Median Barrier or the differing Median Barrier sections shown throughout the Index may be placed as required per the Plans.
2. SECTION VIEWS: For additional Views A–A and B–B, see Sheet 3.
3. DOWELED JOINTS: See General Notes 6 & 7 on Sheet 1 for usage of joint types.

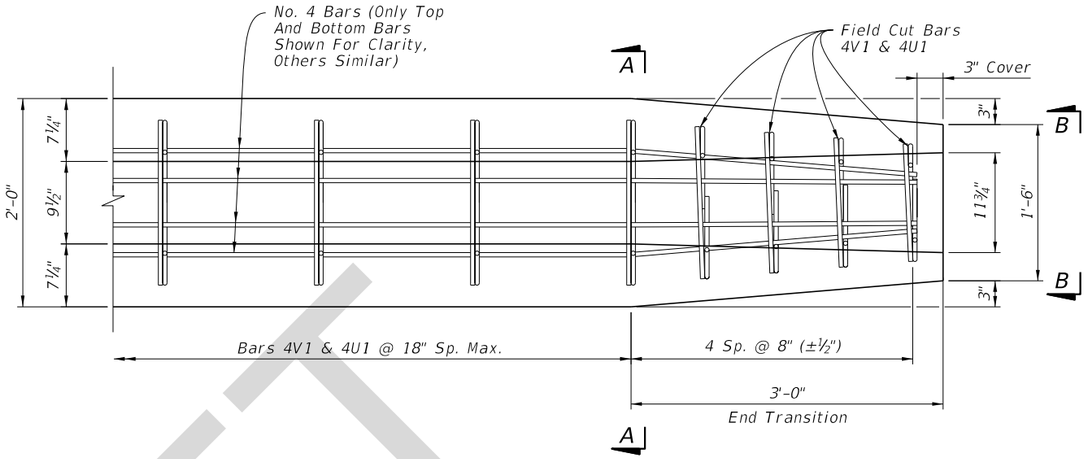
   Use ASTM A36 smooth round bars with hot-dip galvanization. For installation into existing structures, use adhesive bonded dowels in accordance with Specification Section 416. No load testing is required.

   Use 1¼" NPS Schedule 80 PVC pipe with a sealed cap as shown.
4. OPTIONAL LONGITUDINAL JOINT: When a longitudinal joint is placed above the footing, use the Optional 1½" x 5½" Shear Key shown. As a substitute for the Shear Key, the concrete footing's top surface may be raked to provide additional shear friction. Rake the fresh concrete surface so that about half of the surface area consists of approximately ¼" depth longitudinal grooves, distributed evenly and approved by the Engineer.
5. TRAFFIC RAILING CONNECTIONS: Align the barrier and Traffic Railing faces and connect with the ½" Doweled Joint.
6. GUARDRAIL CONNECTIONS: Connect Guardrail using the Transition Connections to Rigid Barrier per Index 536-001 in conjunction with the 16'-0" End Segment for Guardrail shown herein.
7. CRASH CUSHION CONNECTIONS: Connect Crash Cushions per Index 544-001 in conjunction with the 3'-0" End Transition for Guardrail as shown herein.
8. FREE ENDS: When the barrier end does not terminate with a Traffic Railing Connection, Guardrail Connection, Crash Cushion Connection, or Sloped End Treatment as called for in the Plans, terminate in accordance with the Free End Reinforcing detail on Sheet 3.

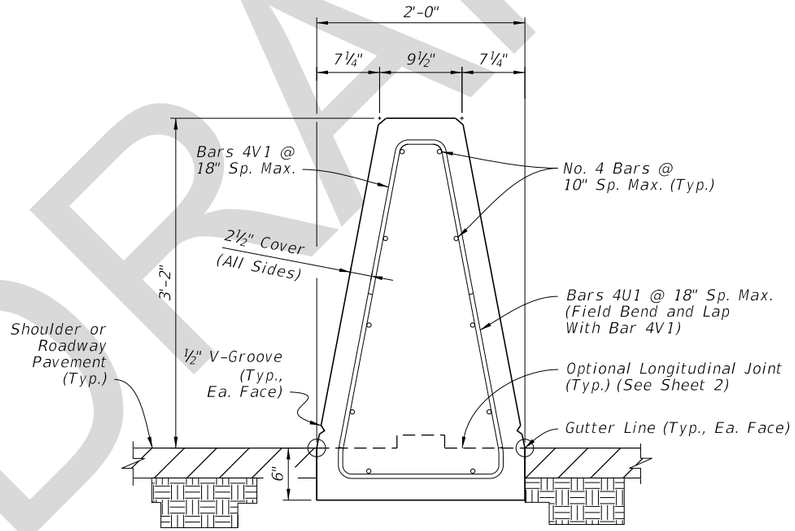
MEDIAN BARRIER



PLAN VIEW - 38" HEIGHT MEDIAN BARRIER
FREE END REINFORCING (See Note 3)

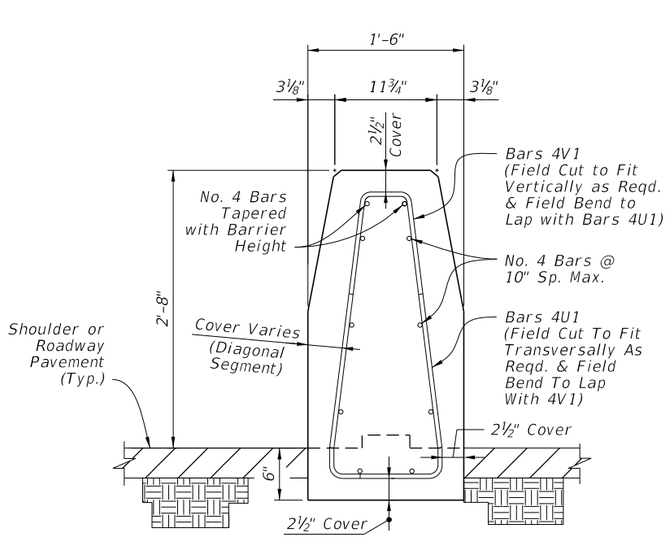


PLAN VIEW - END SEGMENT FOR
GUARDRAIL CONNECTION (See Note 3)



SECTION A-A
38" HEIGHT
MEDIAN BARRIER

Concrete Qty. = 0.20 CY/FT
Steel Qty. = 11.8 LB/FT



VIEW B-B
REDUCED SECTION
OF END TRANSITION

NOTES:

1. GENERAL: Work with the Plan and Elevation Views on Sheet 2.
2. BAR BENDING DIAGRAMS: For additional information on Bars 4V1 and 4U1, see the details on Sheet 21.
3. PLAN VIEWS: Only top and bottom longitudinal reinforcing is shown for clarity. For all longitudinal steel locations, see the section views.

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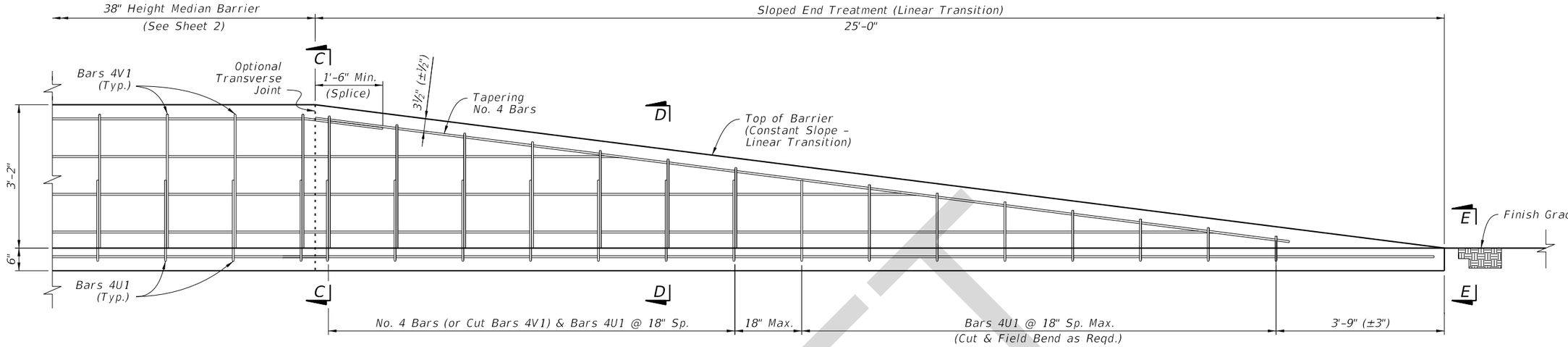
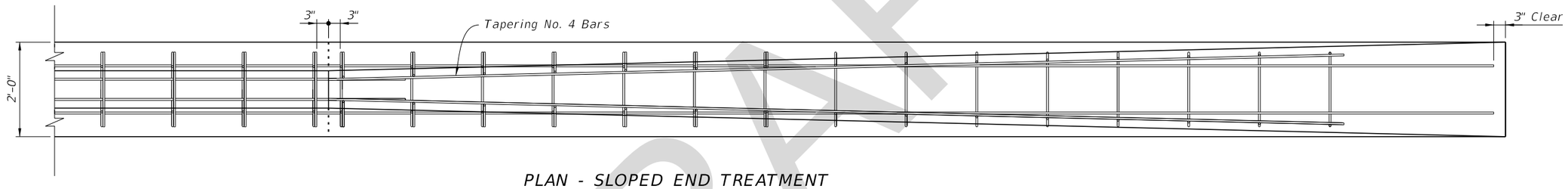
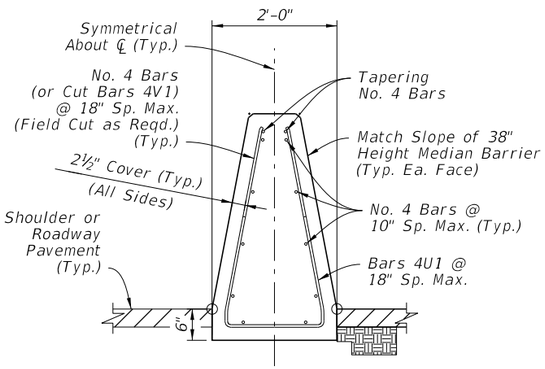
MEDIAN BARRIER - REINFORCING DETAILS



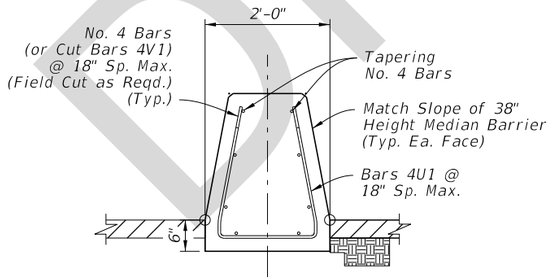
ELEVATION - SLOPED END TREATMENT



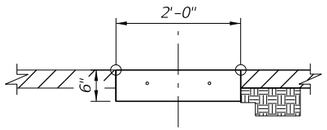
PLAN - SLOPED END TREATMENT
(Only Top & Bottom Longitudinal Bars Shown for Clarity,
See Section Views for All Longitudinal Steel Locations)



SECTION C-C
BEGIN TRANSITION
REINFORCING
(Height Varies Linearly
per Elevation View)



SECTION D-D
INTERMEDIATE TRANSITION
REINFORCING
(Height Varies Linearly
per Elevation View)



VIEW E-E
END TRANSITION

NOTES:

1. GENERAL: Install Sloped End Treatment only where called for in the plans.
2. JOINTS: Construction or Doweled Joints are not permitted within the Sloped End Treatment segment.

MEDIAN BARRIER -
SLOPED END TREATMENT

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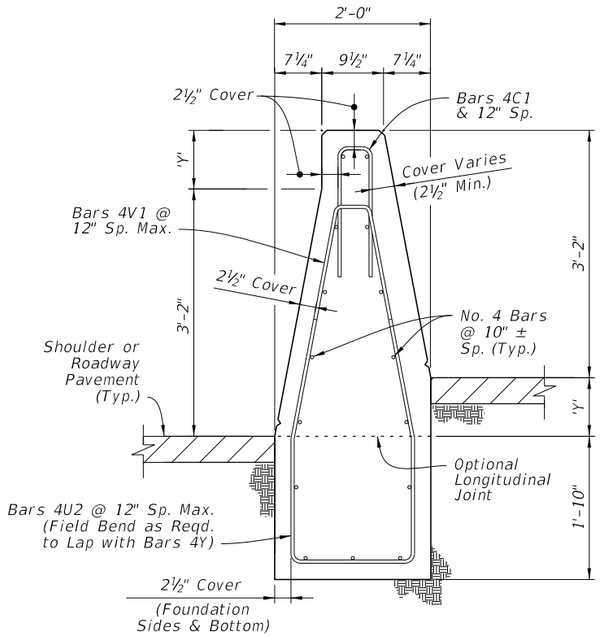
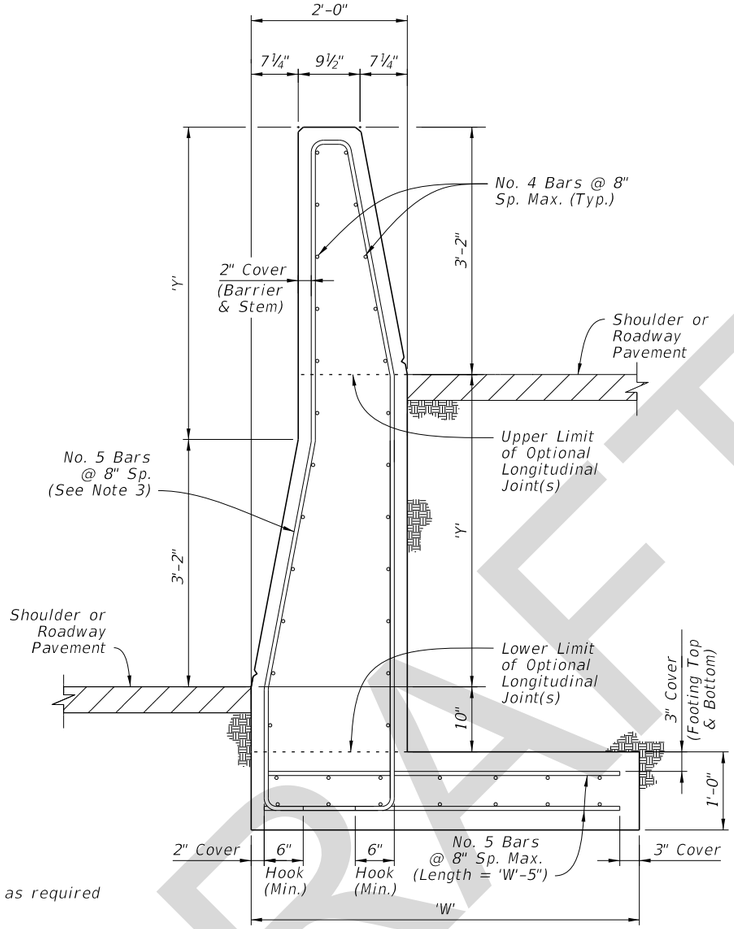
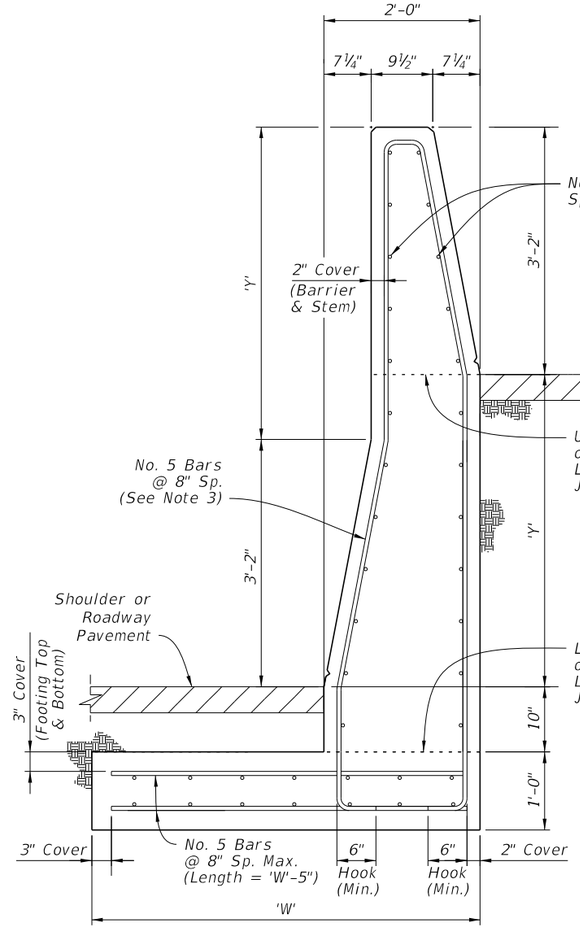


SHORT GRADE-SEPARATED SECTION FOR Y ≤ 9"



TALL GRADE-SEPARATED HEEL FOOTING SECTION FOR Y ≤ 4'-0"



TALL GRADE-SEPARATED TOE FOOTING SECTION FOR Y ≤ 4'-0"

NOTES:

1. GENERAL: Install the Grade-Separated sections where shown in the Plans and as required to accommodate vertical offsets in pavement of Height Y.

2. CONNECTIONS BETWEEN DIFFERENT SECTIONS: Connect differing 38" Height, Short Grade-Separated, and Tall Grade-Separated Median Barrier sections using a continuous pour or Transverse Joint, where longitudinal steel that aligns within the adjacent section is maintained continuously between sections. Alternatively, a Doweled Joint may be used as shown on Sheet 2.

3. TALL GRADE-SEPARATED SECTIONS: For the vertical and transverse steel reinforcement shown in the Tall Grade-Separated Sections, bar bending diagrams are not provided due to varying section dimensions and Longitudinal Joint locations. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.

   Longitudinal Joints are permitted between the vertical limits shown, and must remain level and at a consistent height per each continuous casting of concrete. Longitudinal Joints may change elevations at Transverse Joint locations. Field bending of bars is permitted at Longitudinal Joint locations.

   Transverse Joints between Tall Grade-Separated Sections do not require continuous steel across the joint if the following conditions are met:
   - i. The barrier length on both sides is at least 40 feet, where each segment has continuous steel reinforcement.
   - ii. The barrier's vertical steel spacing is reduced to 4" O.C. for a total of 12 spaces on both sides of the joint.

   Doweled Joints are not permitted between Tall Grade-Separated Sections.

   Grade separation Heights of Y ≤ 9" are permitted on a limited basis using the Tall Grade-Separated section; this is to accommodate cases where maintaining the spread footing through lower height segments is more practical than changing to the Short Grade-Separated section.

TALL GRADE-SEPARATED SECTIONS DIMENSION TABLE

Height, Y	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"
Width, W	3'-3"	3'-6"	3'-9"	4'-0"	4'-3"	4'-6"	4'-6"

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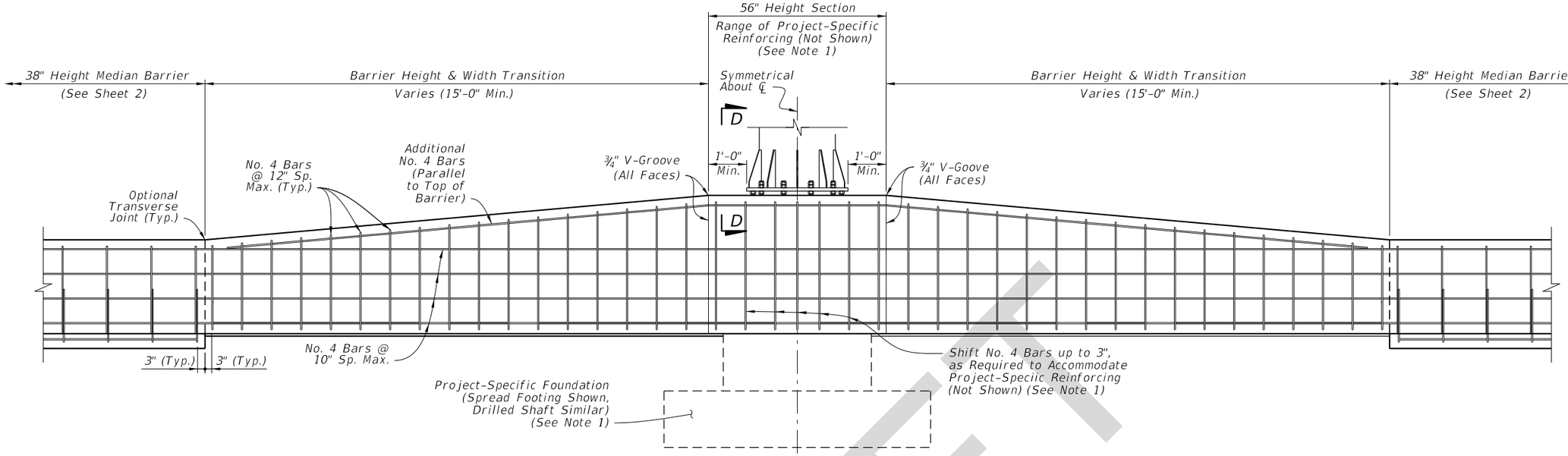
MEDIAN BARRIER - GRADE-SEPARATED



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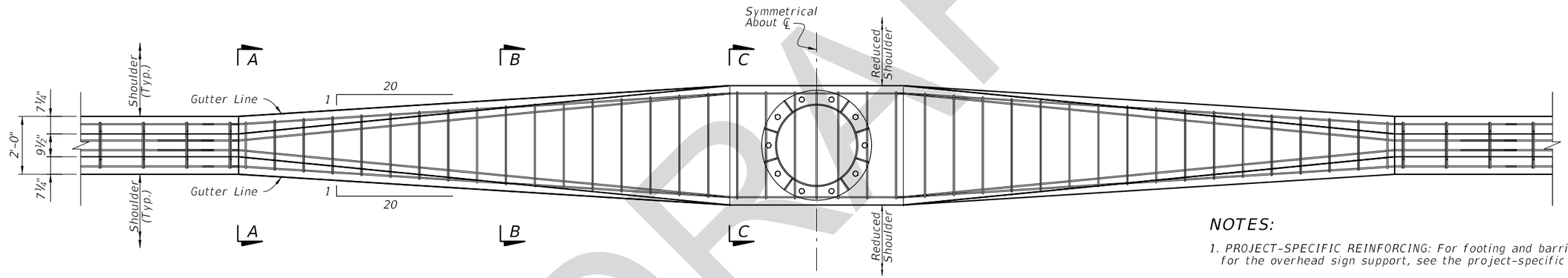
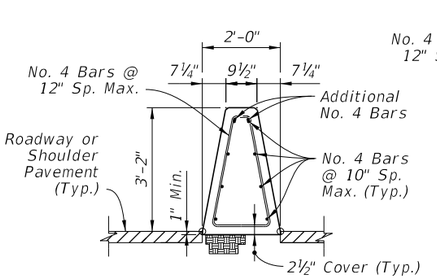
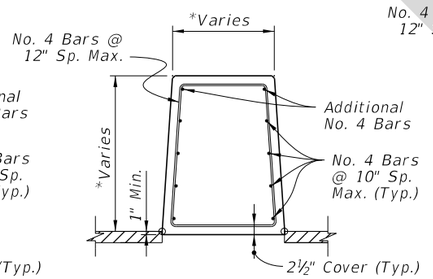


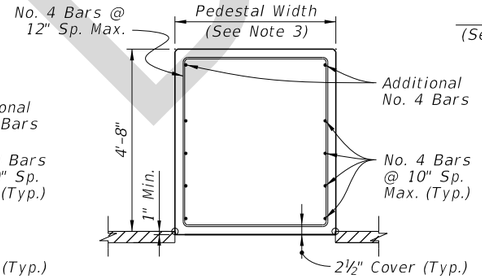
PLAN
(See Note 4)



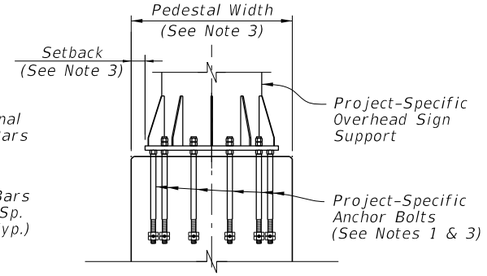
SECTION A-A
BEGIN TRANSITION



SECTION B-B
*Dimension Varies Linearly Between Section A-A and C-C



SECTION C-C
END TRANSITION
(56" Height Section)



SECTION D-D
(Reinforcing Steel Not Shown for Clarity)

NOTES:

1. PROJECT-SPECIFIC REINFORCING: For footing and barrier reinforcing required for the overhead sign support, see the project-specific design in the Plans.

2. BARRIER REINFORCING: Maintain the 38" Height Median Barrier's longitudinal steel reinforcing continuously through the barrier height transition and pedestal. Provide the Additional No. 4 Bars and taper as required to maintain a 4½" maximum cover from the top of the barrier.

   For the vertical and transverse reinforcement requirements shown in Sections A-A through C-C, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.

3. PROJECT-SPECIFIC PEDESTAL WIDTH & SETBACK: The pedestal width is governed by the size requirements of the overhead sign support, as detailed in the Plans. Likewise, the setback distance from the sign support base to the barrier face is governed by the anchor bolt cover requirements, as defined per the Plans. The minimum pedestal width is 2'-0", where a complete removal of the gutter line taper is permitted.

4. PLAN VIEW: Only top and bottom longitudinal reinforcing is shown for clarity. For all longitudinal reinforcing locations, see the Section Views.

MEDIAN BARRIER - 56" HEIGHT SECTION FOR BARRIER-MOUNTED SIGN SUPPORT SHIELDING - SYMMETRICAL

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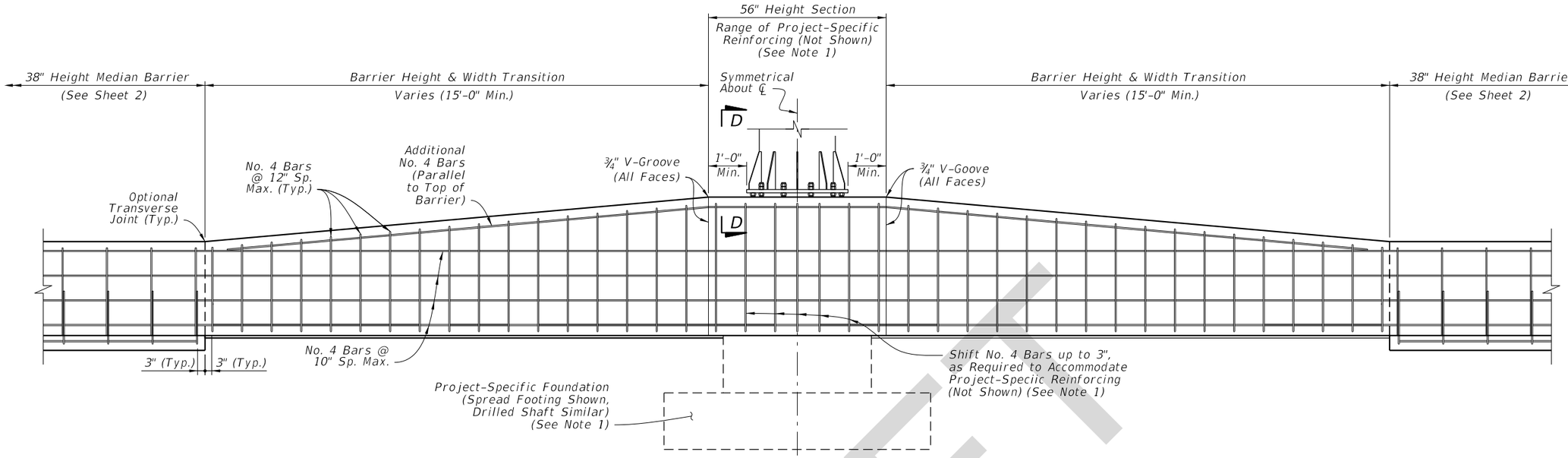
LAST REVISION	REVISION	DESCRIPTION:	FY 2018-19 STANDARD PLANS	CONCRETE BARRIER	INDEX	SHEET
11/01/17					521-001	6 of 21



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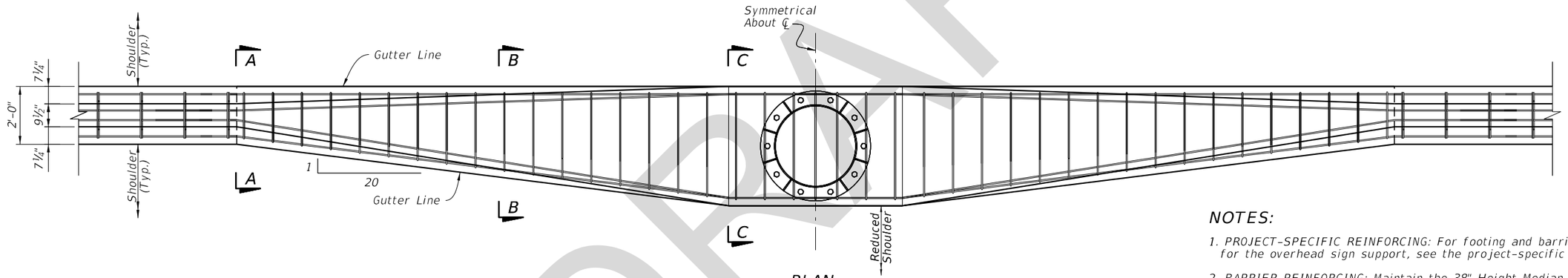
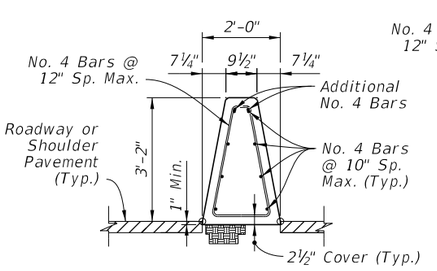
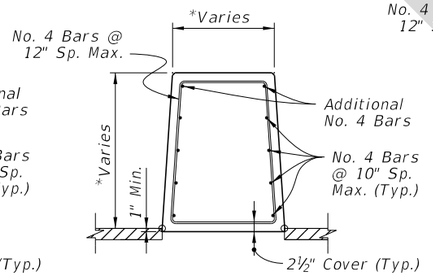


PLAN
(See Note 4)



SECTION A-A
BEGIN TRANSITION



SECTION B-B
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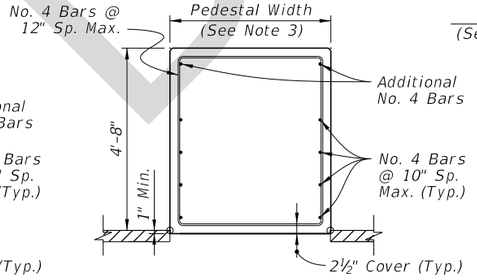
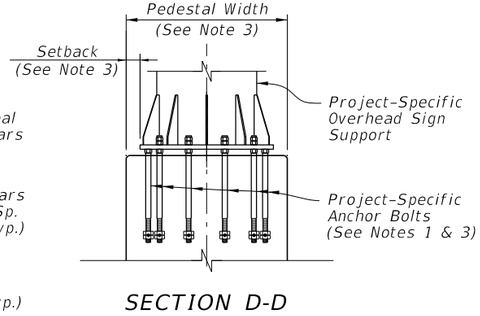


SECTION C-C
END TRANSITION
(56" Height Section)



SECTION D-D
(Reinforcing Steel Not Shown for Clarity)

NOTES:

1. PROJECT-SPECIFIC REINFORCING: For footing and barrier reinforcing required for the overhead sign support, see the project-specific design in the Plans.

2. BARRIER REINFORCING: Maintain the 38" Height Median Barrier's longitudinal steel reinforcing continuously through the barrier height transition and pedestal. Provide the Additional No. 4 Bars and taper as required to maintain a 4½" maximum cover from the top of the barrier.

   For the vertical and transverse reinforcement requirements shown in Sections A-A through C-C, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.

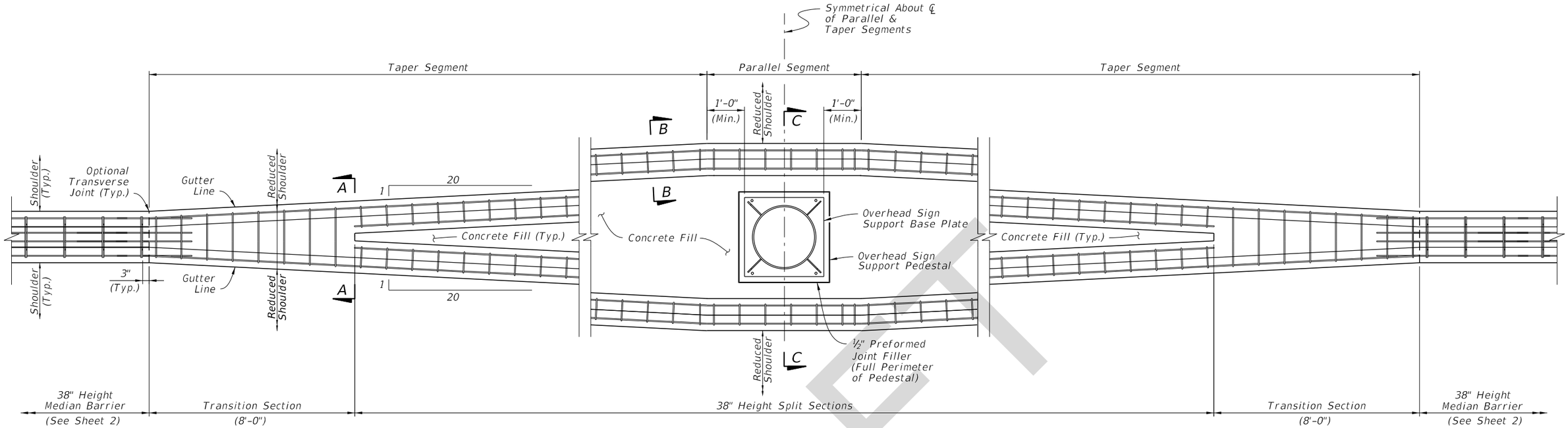
3. PROJECT-SPECIFIC PEDESTAL WIDTH & SETBACK: The pedestal width is governed by the size requirements of the overhead sign support, as detailed in the Plans. Likewise, the setback distance from the sign support base to the barrier face is governed by the anchor bolt cover requirements, as defined per the Plans. The minimum pedestal width is 2'-0", where a complete removal of the gutter line taper is permitted.

4. PLAN VIEW: Only top and bottom longitudinal reinforcing is shown for clarity. For all longitudinal reinforcing locations, see the Section Views.

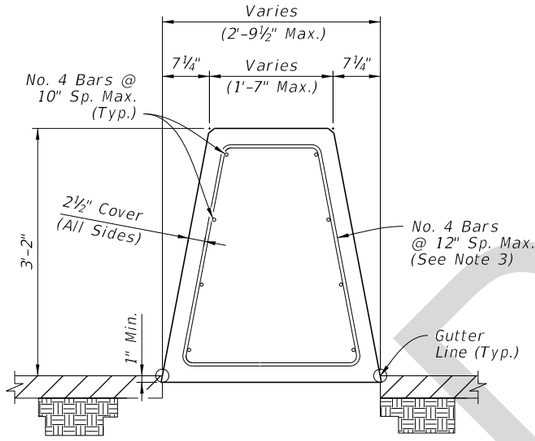
MEDIAN BARRIER - 56" HEIGHT SECTION FOR BARRIER-MOUNTED SIGN SUPPORT SHIELDING - ASYMMETRICAL

9/26/2017 12:32:18 PM

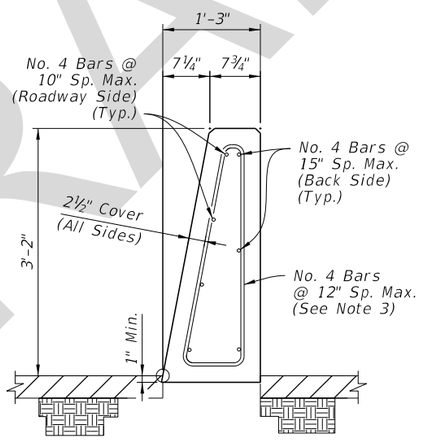
LAST REVISION	REVISION	DESCRIPTION:	FY 2018-19 STANDARD PLANS	CONCRETE BARRIER	INDEX	SHEET
11/01/17					521-001	7 of 21



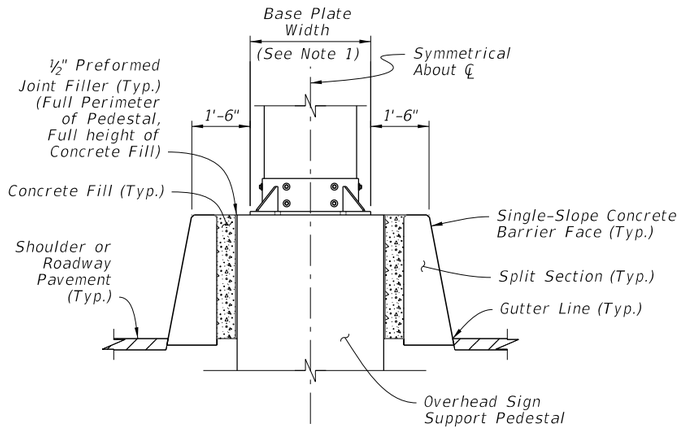
PLAN
(See Note 4)



SECTION A-A
TRANSITION SECTION
(AT BEGIN
SPLIT SECTIONS)



SECTION B-B
38" HEIGHT SPLIT SECTION
(OPPOSITE SIDE SIMILAR
BY OPPOSITE HAND)



SECTION C-C

NOTES:

1. OVERHEAD SIGN SUPPORT: The overhead sign support shown is an example only; see the Plans for the actual shape dimensions and requirements. The overall length and width of the split barrier system is governed by the project-specific overhead sign support dimensions, as defined in the Plans.

2. MULTIPLE SIGN SUPPORTS: The parallel segment may be lengthened to accommodate multiple sign supports, with the approach and trailing tapers located 1 foot, measured longitudinally, upstream and downstream from the first and last sign support bases, respectively.

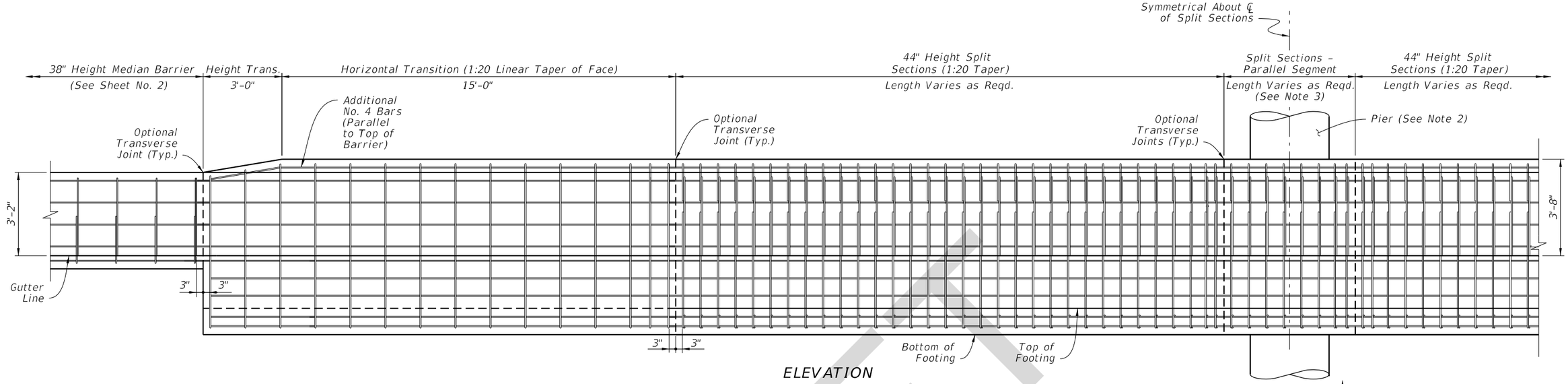
3. STIRRUP BARS: For the vertical and transverse reinforcement requirements shown in Sections A-A and B-B, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.

4. PLAN VIEW: Only outermost longitudinal reinforcing is shown for clarity. For all longitudinal reinforcing locations, see the Section Views.

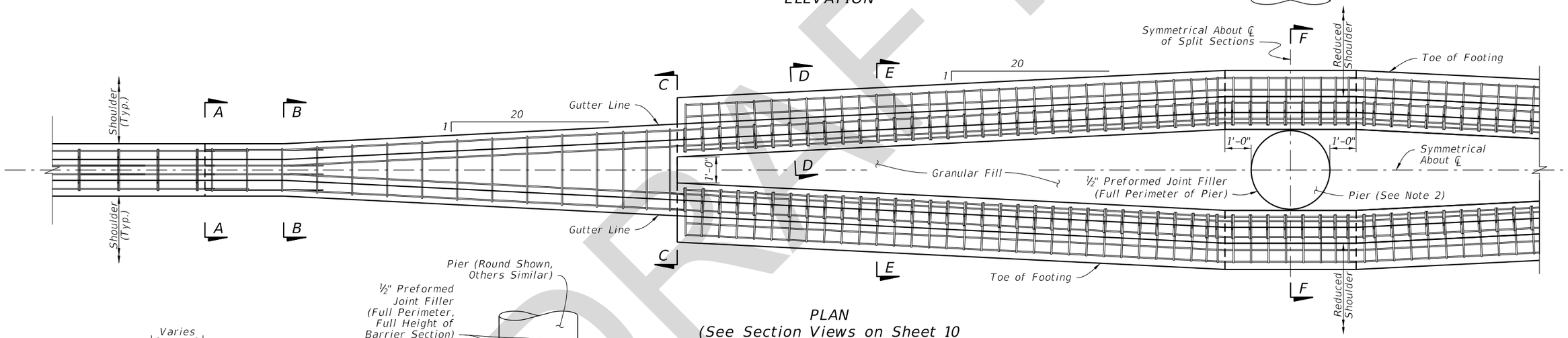
MEDIAN BARRIER - 38" HEIGHT SPLIT SECTION FOR STAND-ALONE SIGN SUPPORT SHIELDING

9/26/2017 12:32:19 PM

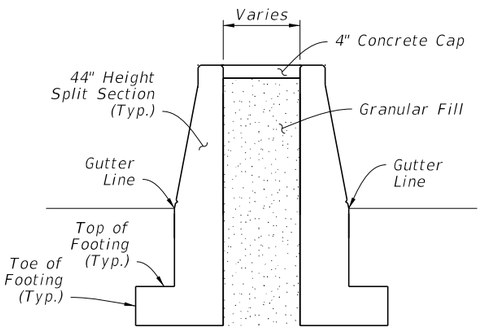
LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2018-19 STANDARD PLANS	CONCRETE BARRIER	INDEX	SHEET
11/01/17						521-001	8 of 21



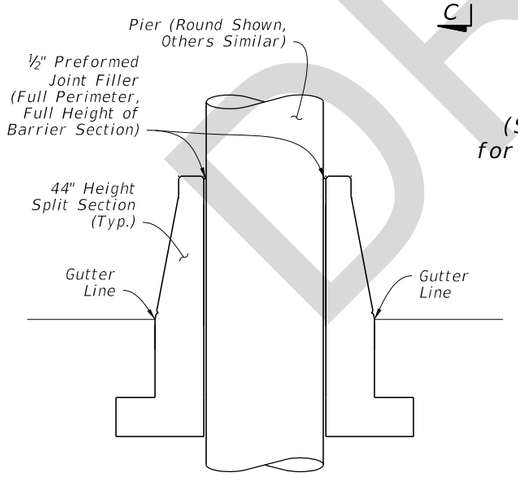
ELEVATION



PLAN
(See Section Views on Sheet 10 for All Longitudinal Steel Locations)



SECTION E-E
SPLIT SECTIONS



SECTION F-F
SPLIT SECTIONS AT PIER

NOTES:

1. SECTION VIEWS: See Sheet 10 for Section Views A-A through D-D and corresponding reinforcing steel details.
2. PIER: The round pier shown is an example only, and project-specific pier shapes may vary. For actual dimensions and requirements, see the Plans. The overall length and width of the split barrier system is governed by the project-specific pier dimensions, as defined in the Plans.
3. MULTIPLE PIERS: The parallel segment may be lengthened to accommodate multiple consecutive piers, with the approach and trailing tapers located 1 foot, measured longitudinally, upstream and downstream from the first and last piers, respectively.

MEDIAN BARRIER - 44 INCH HEIGHT SPLIT SECTION FOR PIER SHIELDING

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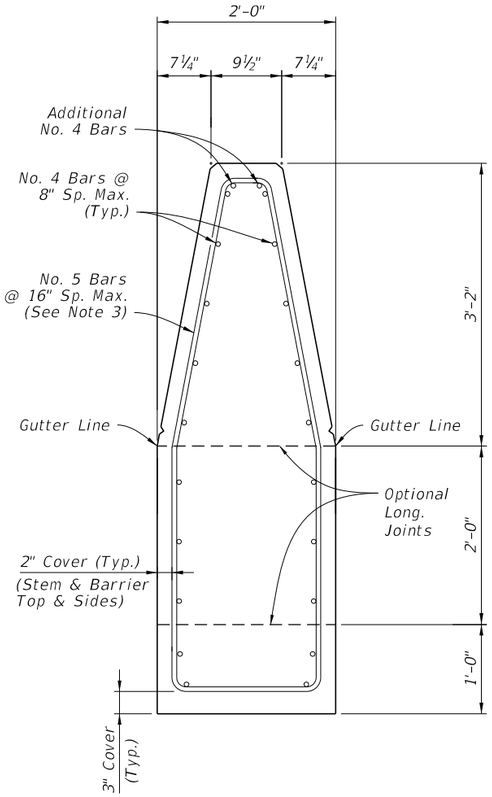
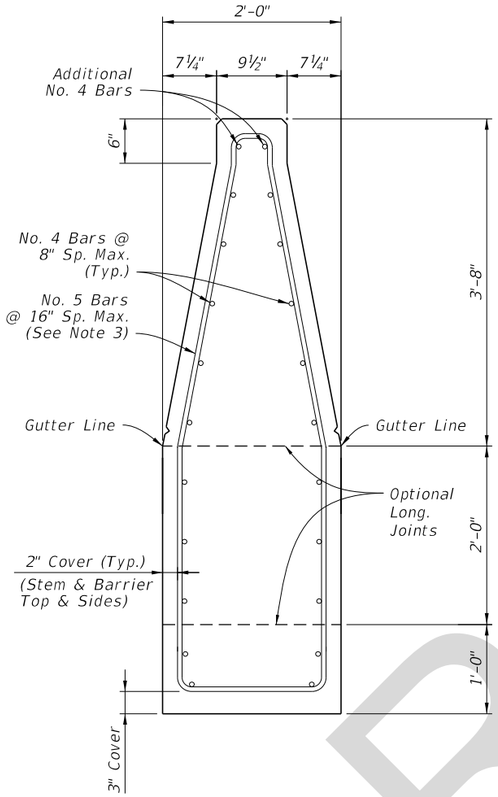
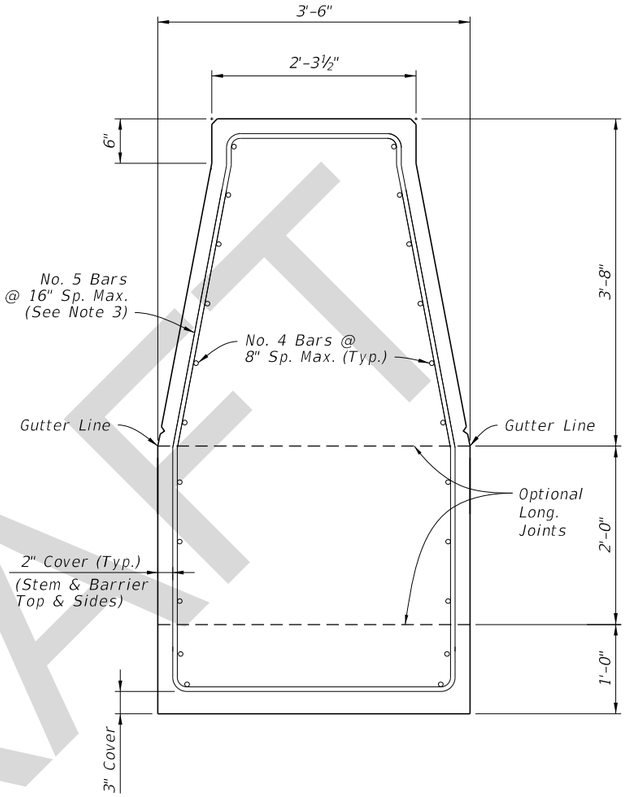
LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2018-19 STANDARD PLANS	CONCRETE BARRIER	INDEX	SHEET
11/01/17						521-001	9 of 21



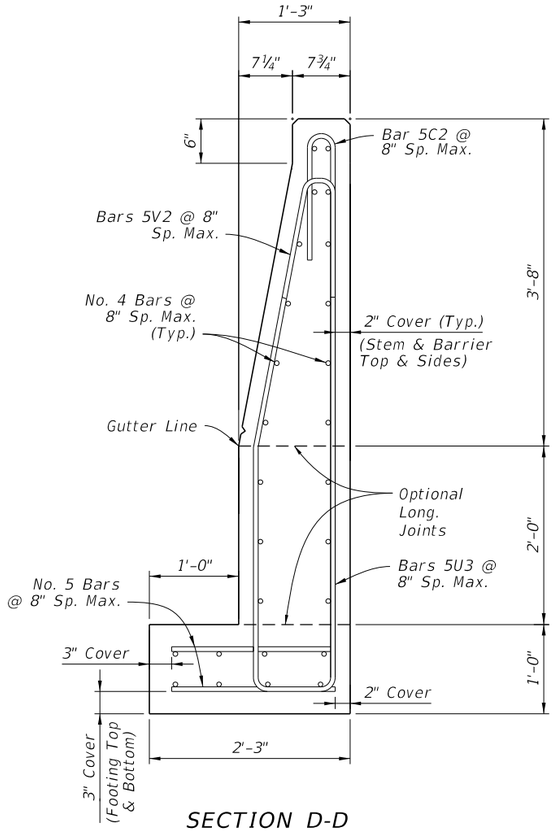
SECTION A-A
BEGIN HEIGHT TRANSITION
(show spliced bars)



SECTION B-B
END HEIGHT TRANSITION
BEGIN WIDTH TRANSITION



SECTION C-C
END WIDTH TRANSITION
BEGIN SPLIT SECTIONS



SECTION D-D
44" HEIGHT SPLIT SECTION
(Opposite Side of Median
Similar by Opposite Hand)

Concrete Qty. = 0.30 CY/FT
Steel Qty. = 52.7 LB/FT

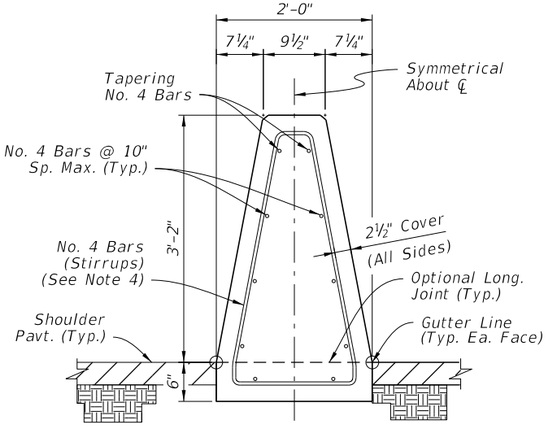
NOTES:

1. GENERAL: Work with the Plan and Elevation views on Sheet 9.
2. LONGITUDINAL REINFORCING CONTINUITY: Maintain all longitudinal steel reinforcing shown in Section C–C continuously into Section D–D (spliced where required). The additional longitudinal reinforcing shown in Section D–D does not require continuity into Section C–C, and it starts 3" from the construction joint or edge of concrete per the details on Sheet 9.
3. STIRRUP BARS: For the vertical and transverse reinforcement requirement shown, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.

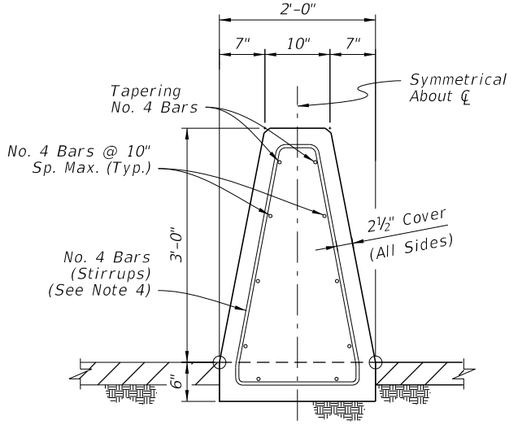
MEDIAN BARRIER - 44 INCH HEIGHT
SPLIT SECTION PIER SHIELDING - DETAILS

9/26/2017 12:32:21 PM

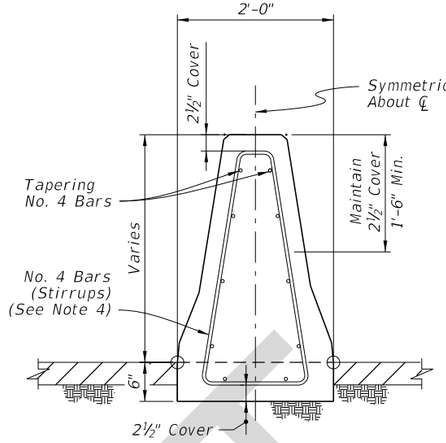
LAST REVISION	REVISION	DESCRIPTION:	FDOT FY 2018-19 STANDARD PLANS	CONCRETE BARRIER	INDEX	SHEET
11/01/17					521-001	10 of 21



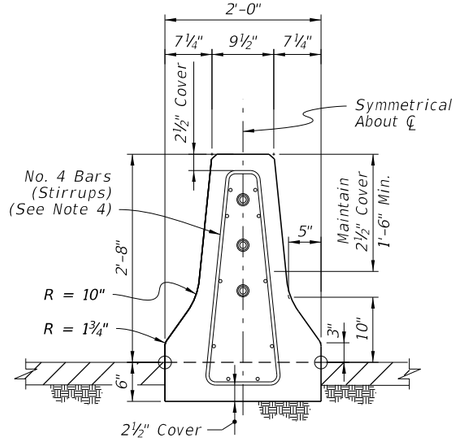
SECTION A-A
BEGIN TRANSITION - OPTION 'A'
MATCH SINGLE-SLOPE
38" HEIGHT MEDIAN BARRIER



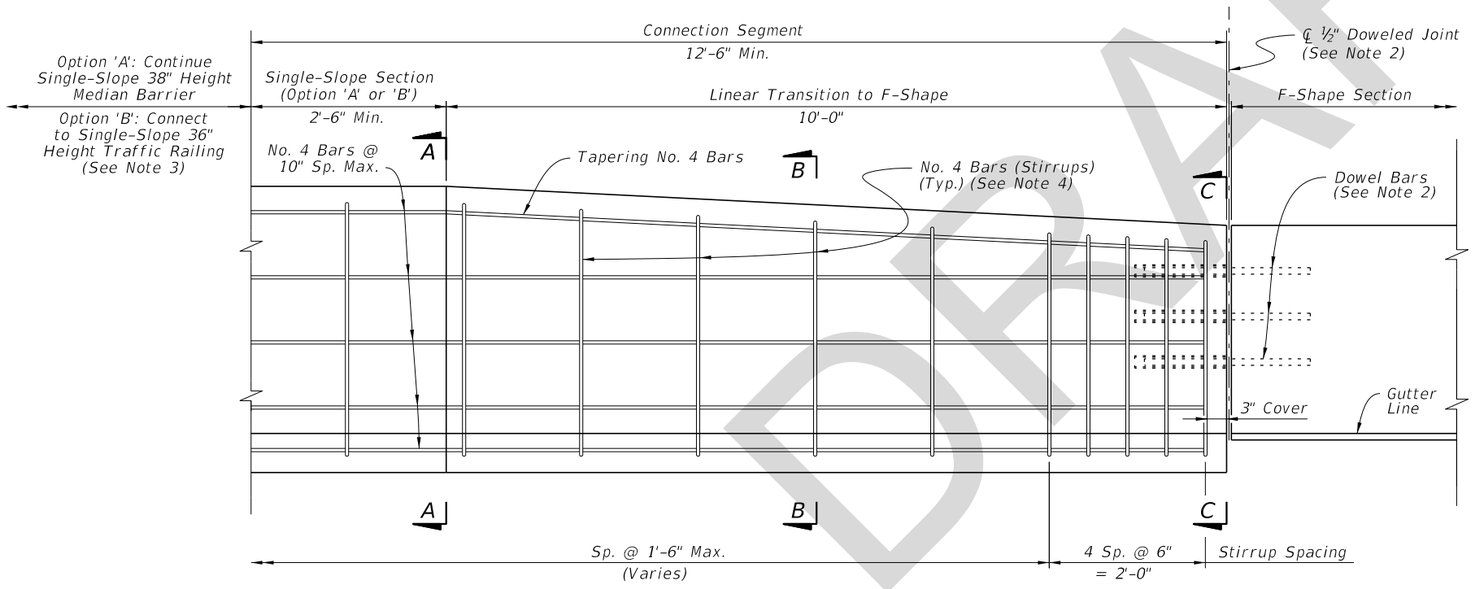
SECTION A-A
BEGIN TRANSITION - OPTION 'B'
MATCH SINGLE-SLOPE
36" HEIGHT TRAFFIC RAILING
(Bridge Applications)



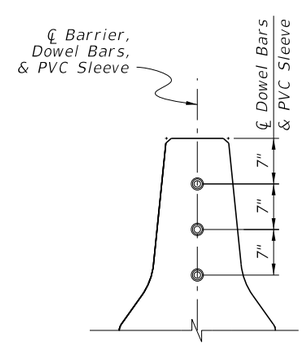
SECTION B-B
INTERMEDIATE SECTION
OF LINEAR TRANSITION



SECTION C-C
END TRANSITION
MATCH 32" HEIGHT
F-SHAPE SECTION



ELEVATION
(Reverse Direction Similar
by Opposite Hand)



SECTION - F-SHAPE
DOWEL PLACEMENT
(See Note 2)

NOTES:

1. *GENERAL: Construct the Connection Segment as required per the Plans to connect existing F-Shape sections to Single-Slope Median Barrier or Traffic Railing sections. Construct Option 'A' or 'B' as required to match the heights of the connecting sections.*
2. *DOWELED JOINT: Install Dowel Bars per the Dowel Details on Sheet 2.*
3. *TRAFFIC RAILING CONNECTION: For the Option 'B' connection, use a Doweled Joint per Sheet 2 and the additional Free End Reinforcing with reduced bar spacing per Sheet 3.*
4. *STIRRUP BARS: For the vertical and transverse reinforcement requirements shown, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.*

MEDIAN BARRIER - CONNECTION TO F-SHAPE

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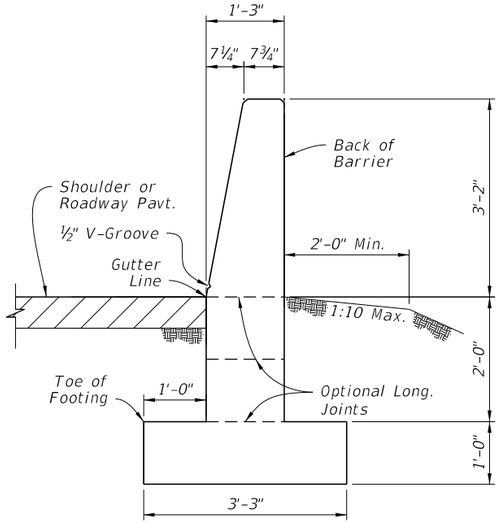
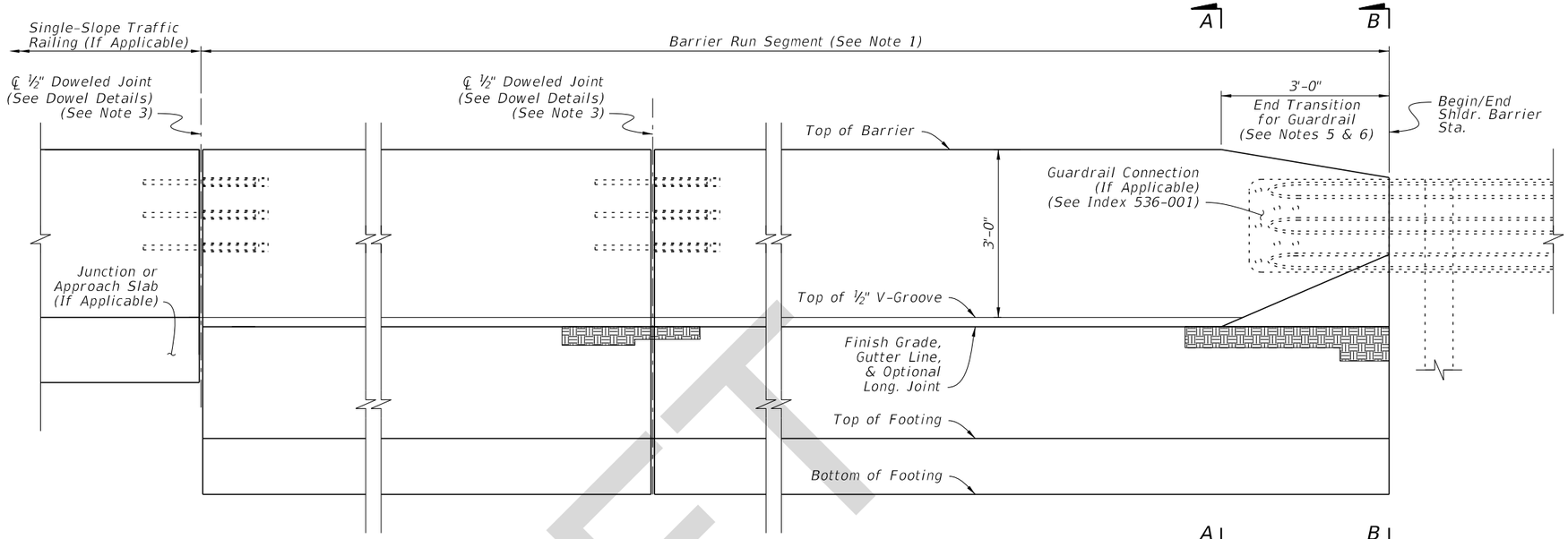
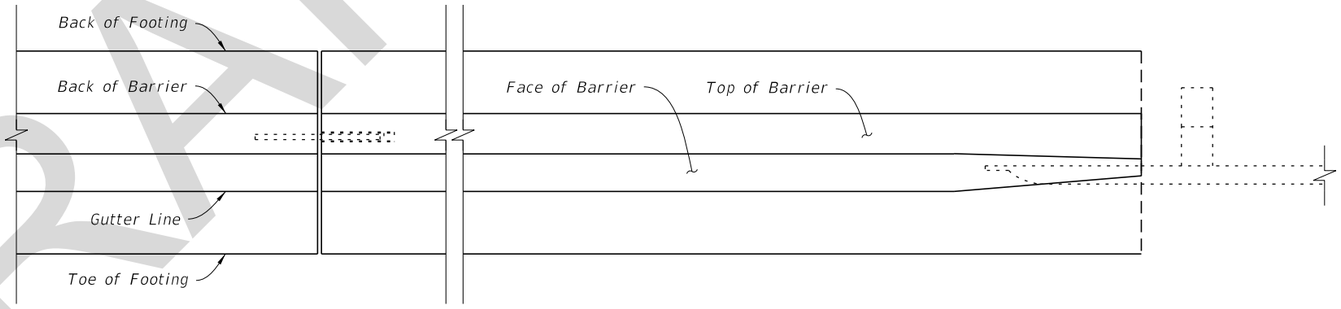


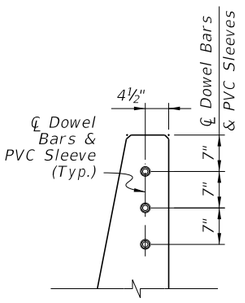
SECTION A-A
38" HEIGHT SHOULDER BARRIER
(See Sheet 13 for Reinforcing Steel Details)



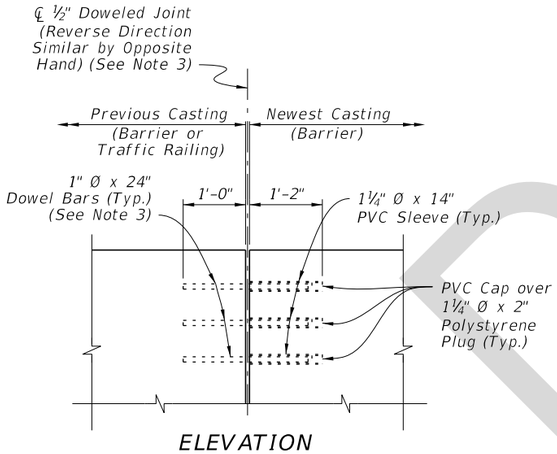
ELEVATION



PLAN



SECTION
DOWEL PLACEMENT



ELEVATION
DOWEL BAR & PVC CONNECTION

DOWEL DETAILS

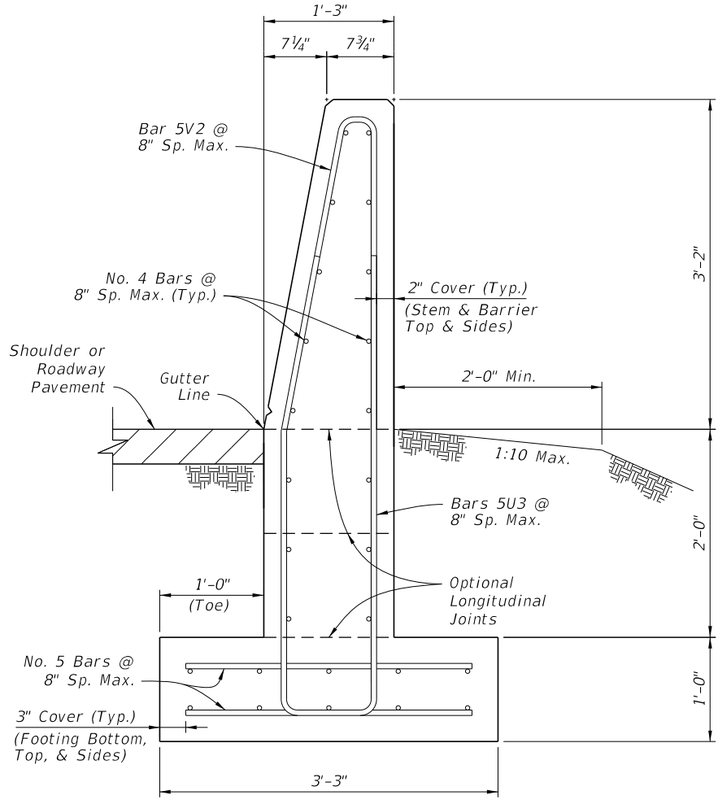
NOTES:

1. *BARRIER RUN SEGMENT: Either the 38" Height Shoulder Barrier or the differing Shoulder Barrier sections shown throughout the Index may be placed within this segment as required per the Plans.*
2. *SECTION VIEWS: For additional Views A-A and B-B, see Sheet 13.*
3. *DOWELED JOINTS: See General Notes 6 & 7 on Sheet 1 for usage of joint types.*

   Use ASTM A36 smooth round bars with hot-dip galvanization. For installation into existing structures, use adhesive bonded dowels in accordance with Specification Section 416. No load testing is required.

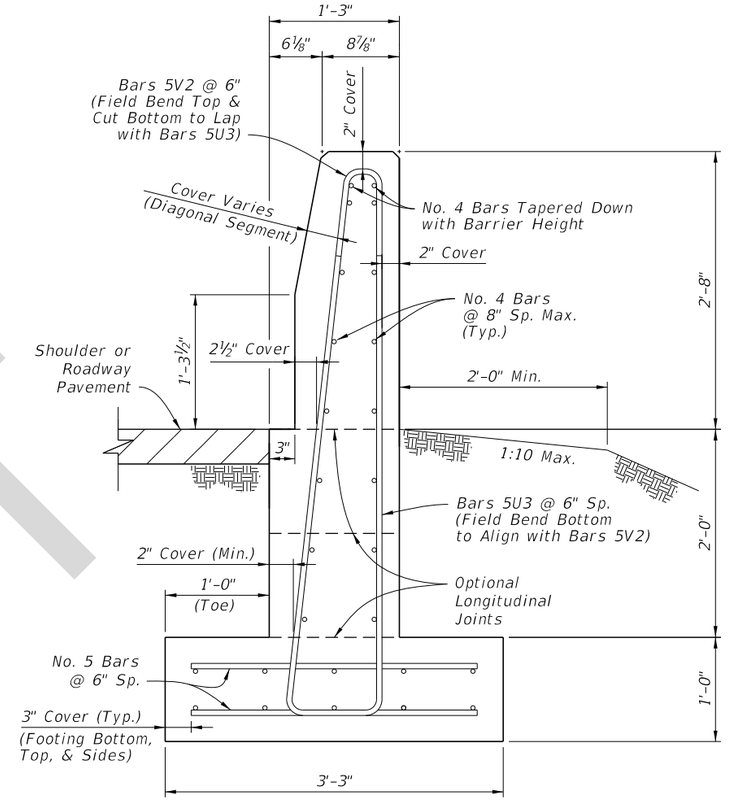
   Use 1¼" NPS Schedule 80 PVC pipe with a sealed cap as shown.
4. *TRAFFIC RAILING CONNECTIONS: Align the barrier and Traffic Railing faces and connect with the ½" Doweled Joint.*
5. *GUARDRAIL CONNECTIONS: Connect Guardrail using the Transition Connections to Rigid Barrier per Index 536-001 in conjunction with the 16'-0" End Segment for Guardrail shown herein.*
6. *CRASH CUSHION CONNECTIONS: Connect Crash Cushions per Index 544-001 in conjunction with the 3'-0" End Transition for Guardrail as shown herein.*
7. *FREE ENDS: When the barrier end does not terminate with a Traffic Railing Connection, Guardrail Connection, or Crash Cushion Connection as called for in the Plans, terminate in accordance with the Free End Reinforcing Note on Sheet 13.*

SHOULDER BARRIER



SECTION A-A
38" HEIGHT SHOULDER BARRIER

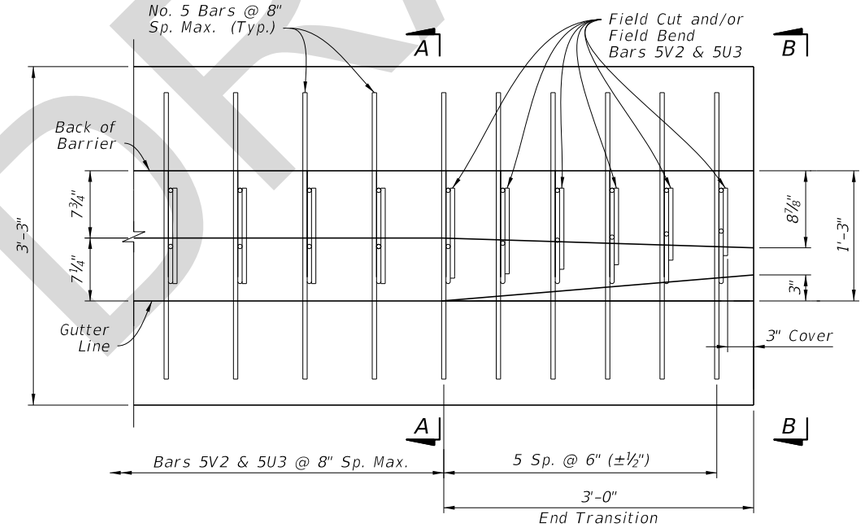
Concrete Qty. = 0.32 CY/FT
Steel Qty. = 50.9 LB/FT



VIEW B-B
END OF TRANSITION
FOR GUARDRAIL
(End of Barrier,
(Full Cutback)

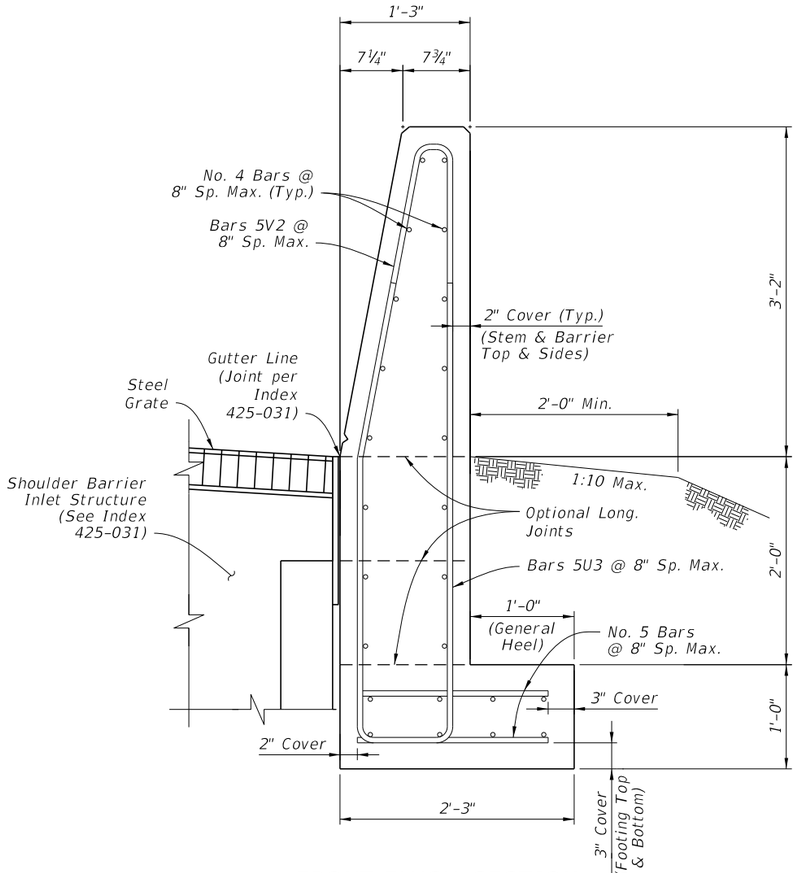
NOTES:

1. GENERAL: Work with the Plan and Elevation Views on Sheet 12. The Section Option footings shown on Sheet 14 may be substituted where called for in the Plans.
2. FREE END REINFORCING: Where shown in the Plans, terminate the 38" Height Barrier section with a transverse vertical end face. Reduce the spacing of Bars 5V2 and 5U3 to 6" for 5 Spaces, placed with 3" cover from the barrier's end face.
3. BAR BENDING DIAGRAMS: For additional details for bars 5V2 and 5U3, see the Bar Bending Diagrams on Sheet 21.



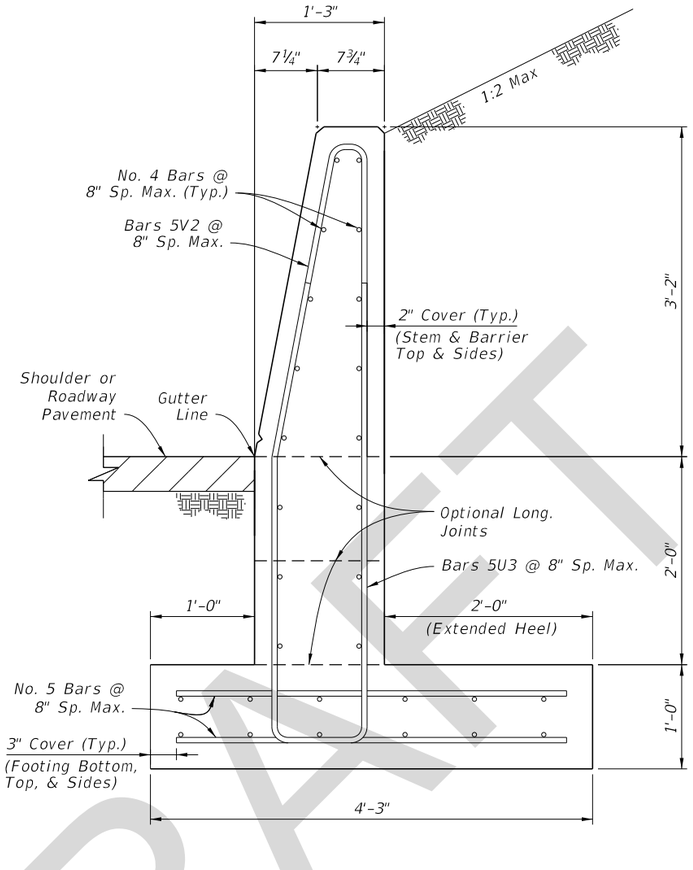
PLAN VIEW - BARRIER END TRANSITION FOR GUARDRAIL
(Longitudinal Steel Not Shown for Clarity)

SHOULDER BARRIER - REINFORCING DETAILS



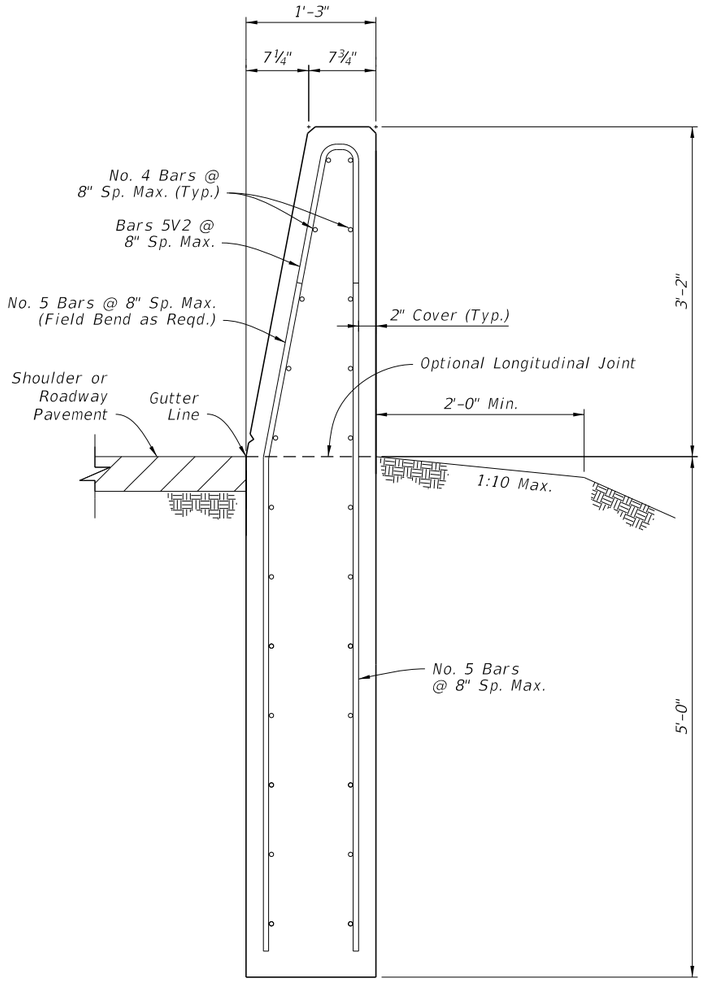
FRONT-FLUSH SECTION
(Where Required For Barrier Inlet Locations)

Concrete Qty. = 0.29 CY/FT
Steel Qty. = 46.7 LB/FT



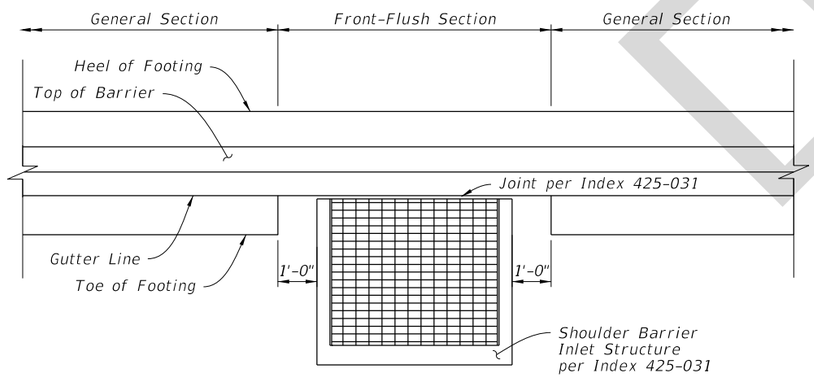
RETAINING SECTION

Concrete Qty. = 0.36 CY/FT
Steel Qty. = 56.9 LB/FT



TRENCH FOOTING SECTION

Concrete Qty. = 0.35 CY/FT
Steel Qty. = 48.4 LB/FT

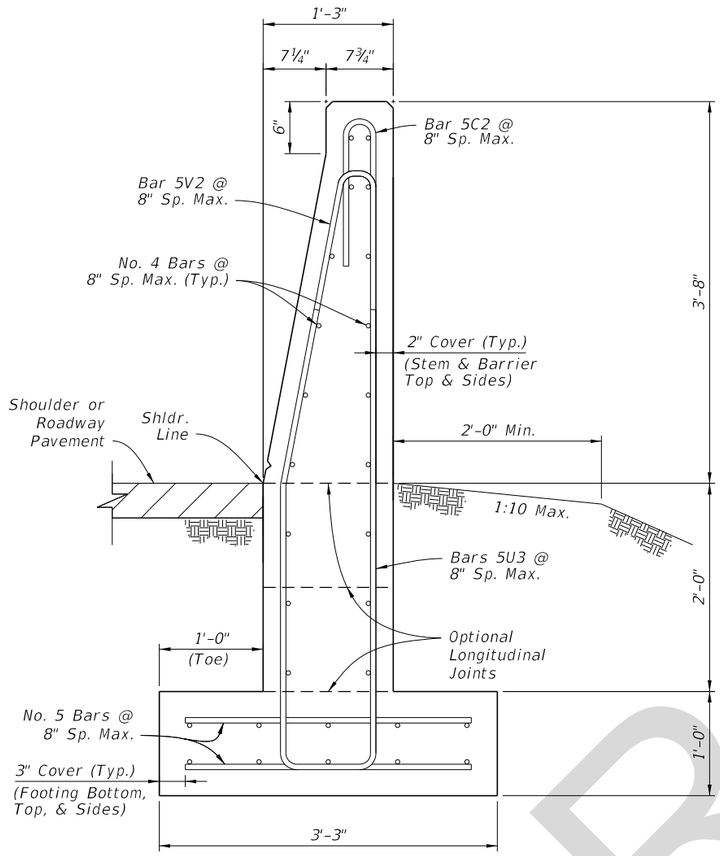


FRONT-FLUSH SECTION - PLAN VIEW
(Not Applicable for Trench Footing Sections)

NOTES:

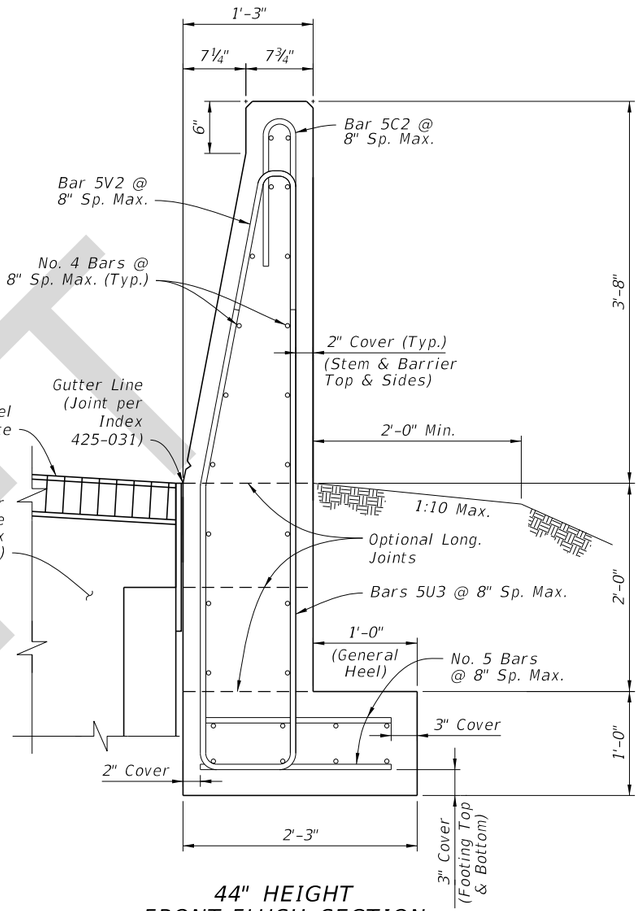
1. GENERAL: Install the differing Section Options as required per the Plans.
2. CONNECTIONS BETWEEN DIFFERENT SECTIONS: Connect differing Median Barrier sections using a continuous pour or Transverse Joint, where longitudinal steel that aligns within the adjacent section is maintained continuously between sections. Alternatively, a Doweled Joint may be used as shown on Sheet 12.
3. FLUSH RETAINING SECTION COMBINATION: Where Barrier Inlets are required in retaining segments, install the Flush Section, except replace the 1'-0" General Heel with the 2'-0" Extended Heel as shown in the Retaining Section. Use longer lateral reinforcing bars of 2'-10" length to maintain the cover shown.

SHOULDER BARRIER - SECTION OPTIONS



44" HEIGHT SECTION
(For Use Adjacent to Rear-Flush Section on Sheet 17)

Concrete Qty. = 0.34 CY/FT
Steel Qty. = 57.1 LB/FT



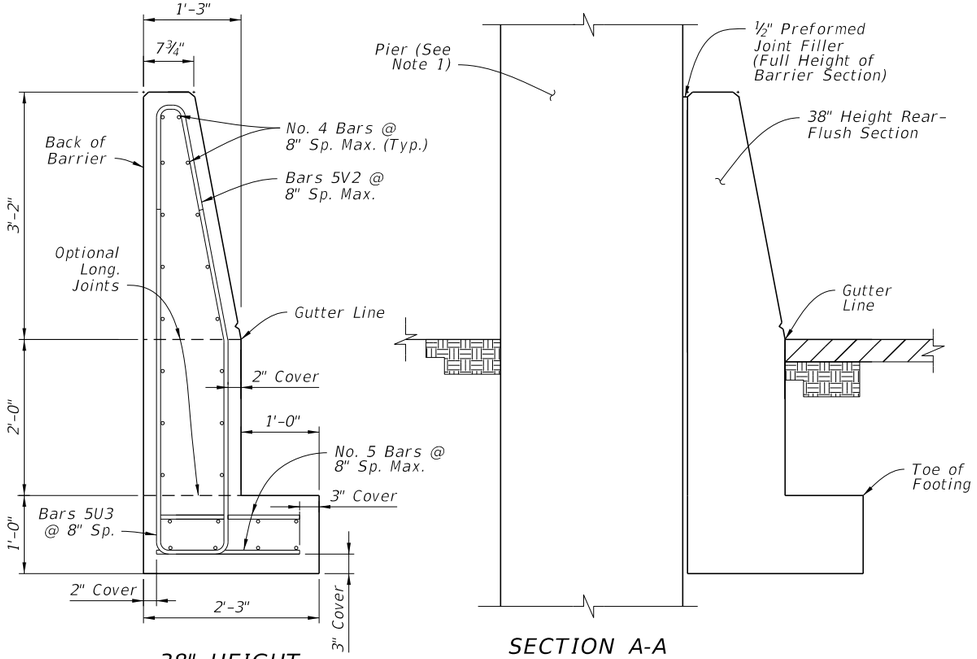
44" HEIGHT
FRONT-FLUSH SECTION
(For Use Adjacent to Rear-Flush Section on Sheet 17, as Required for Barrier Inlets)

Concrete Qty. = 0.30 CY/FT
Steel Qty. = 52.6 LB/FT

NOTE:

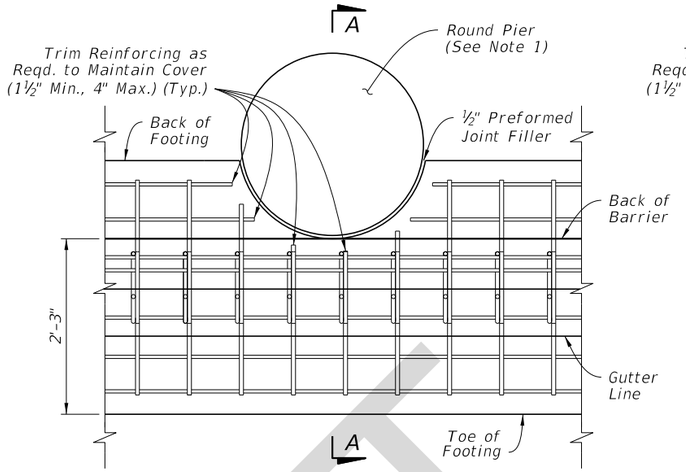
1. GENERAL: See the applicable Notes on Sheet 14.

SHOULDER BARRIER - SECTION OPTIONS (CONTINUED)

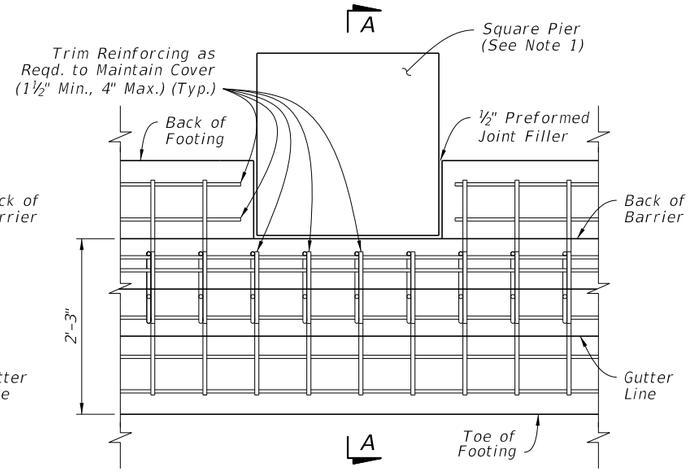


38" HEIGHT
REAR-FLUSH SECTION

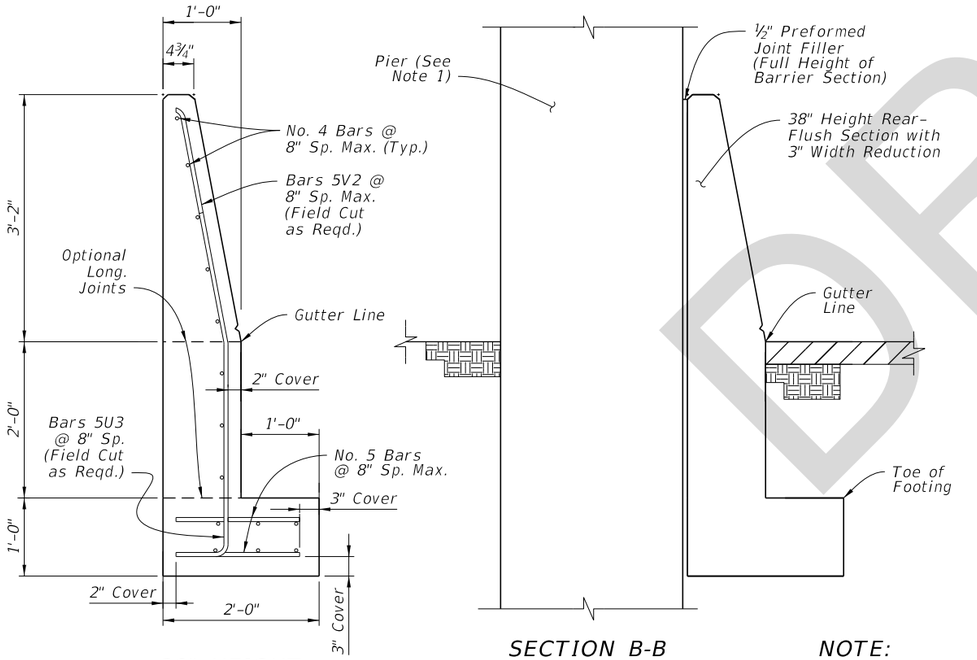
SECTION A-A
ABOVE-GROUND HAZARD
EMBEDDED IN FOOTING



PLAN - ROUND PIER EXAMPLE
REAR-FLUSH SECTION
(See Section View for All
Longitudinal Steel Locations)

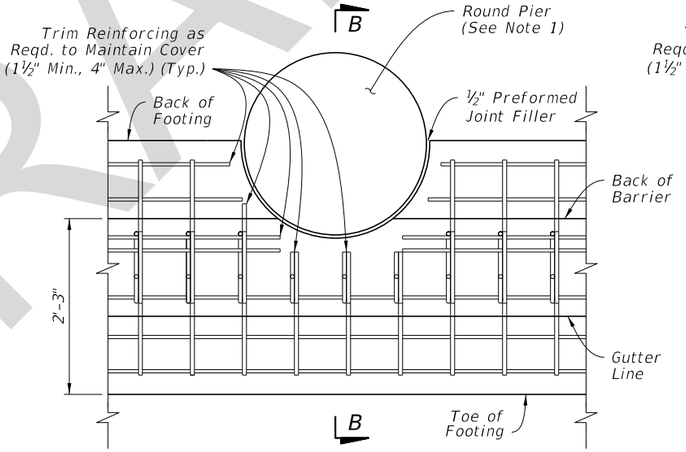


PLAN - SQUARE PIER EXAMPLE
REAR-FLUSH SECTION
(See Section View for All
Longitudinal Steel Locations)

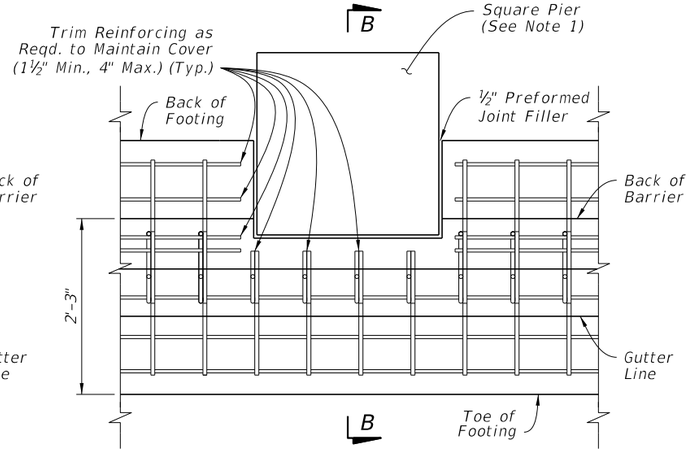


38" HEIGHT
REAR-FLUSH SECTION
WITH 3" WIDTH REDUCTION

SECTION B-B
ABOVE-GROUND HAZARD
EMBEDDED IN FOOTING
& BARRIER



PLAN - ROUND PIER EXAMPLE
REAR-FLUSH SECTION
WITH 3" WIDTH REDUCTION
(See Section View for All
Longitudinal Steel Locations)



PLAN - SQUARE PIER EXAMPLE
REAR-FLUSH SECTION
WITH 3" WIDTH REDUCTION
(See Section View for All
Longitudinal Steel Locations)

NOTE:

1. PIERS: The piers shown herein are example shapes only; see the Plans for the project-specific dimensions. The details shown herein are only for use when piers do not require protection per the AASHTO LRFD requirements. For piers requiring protection, see Index 521-002.

SHOULDER BARRIER - 38" HEIGHT REAR-FLUSH SECTION FOR REDUCED SETBACK PIER SHIELDING (DESIGN SPEED ≤ 45 MPH)

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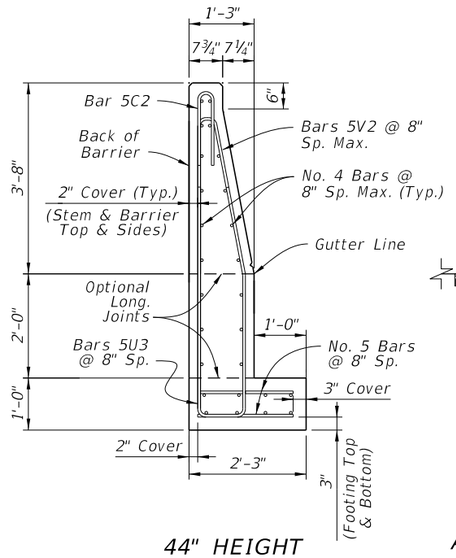
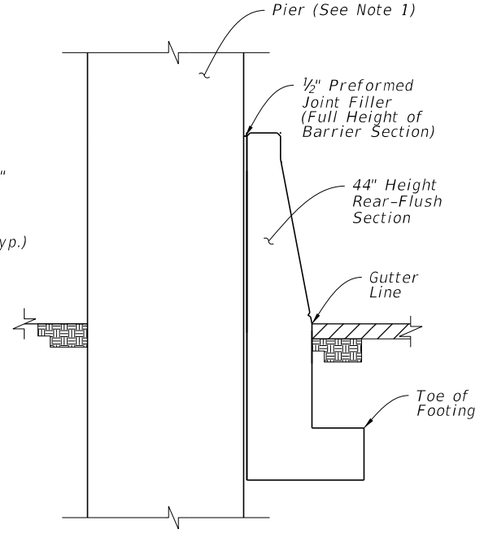
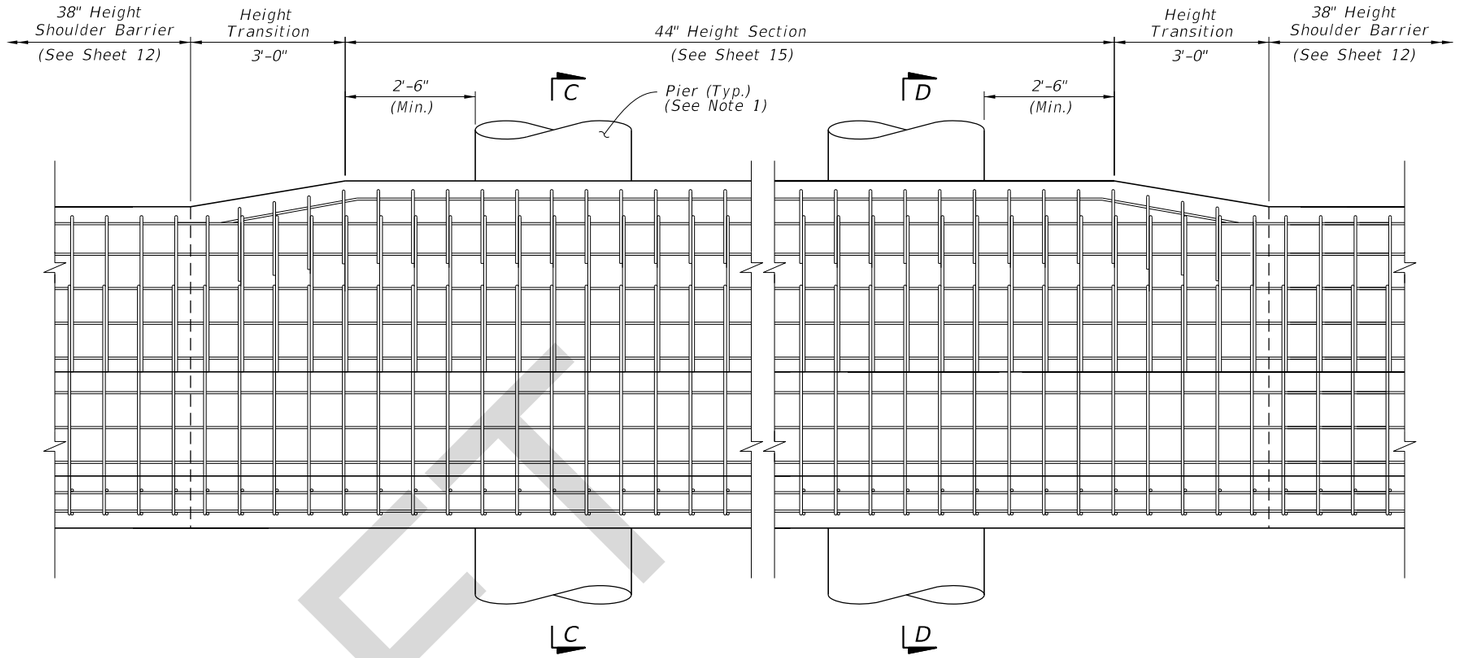
LAST REVISION	REVISION	DESCRIPTION:			
11/01/17			FY 2018-19 STANDARD PLANS	CONCRETE BARRIER	INDEX 521-001 / SHEET 16 of 21



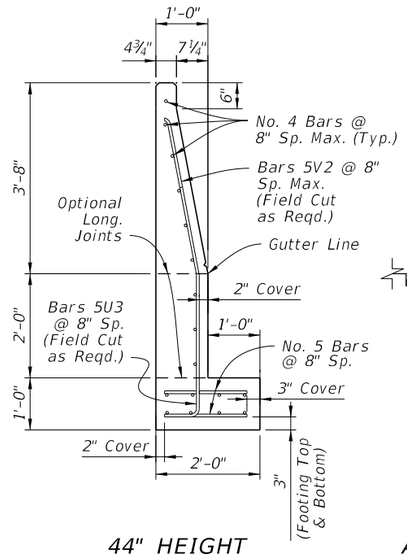
44" HEIGHT
REAR-FLUSH SECTION



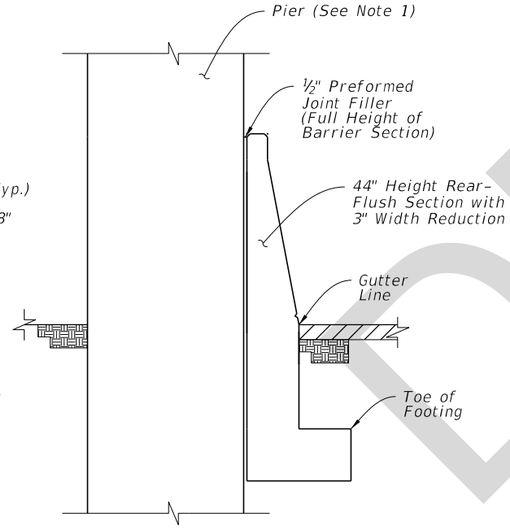
SECTION C-C
ABOVE-GROUND HAZARD
EMBEDDED IN FOOTING



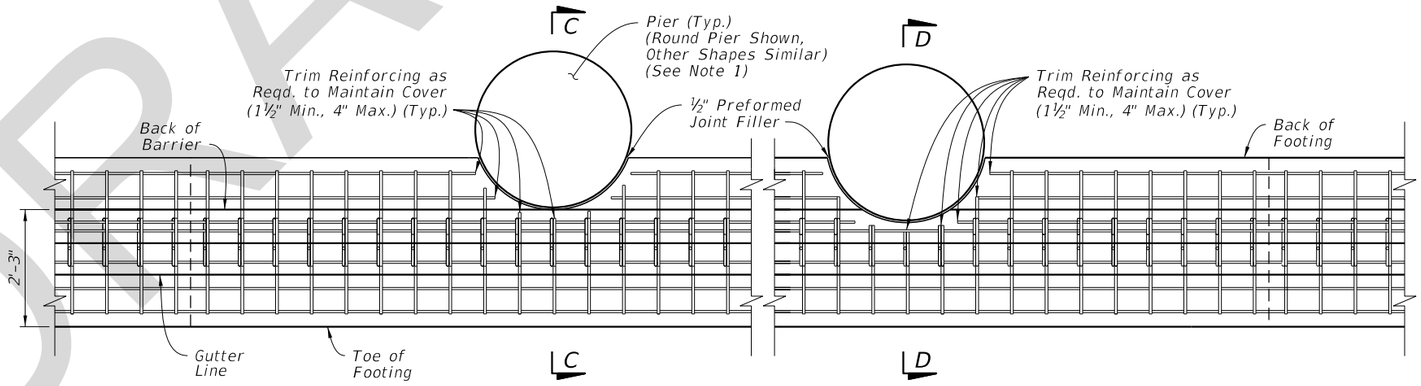
ELEVATION - ROUND PIERS EXAMPLE
(SQUARE PIERS SIMILAR)



44" HEIGHT
REAR-FLUSH SECTION
WITH 3" WIDTH REDUCTION



SECTION D-D
ABOVE-GROUND HAZARD
EMBEDDED IN FOOTING
& BARRIER

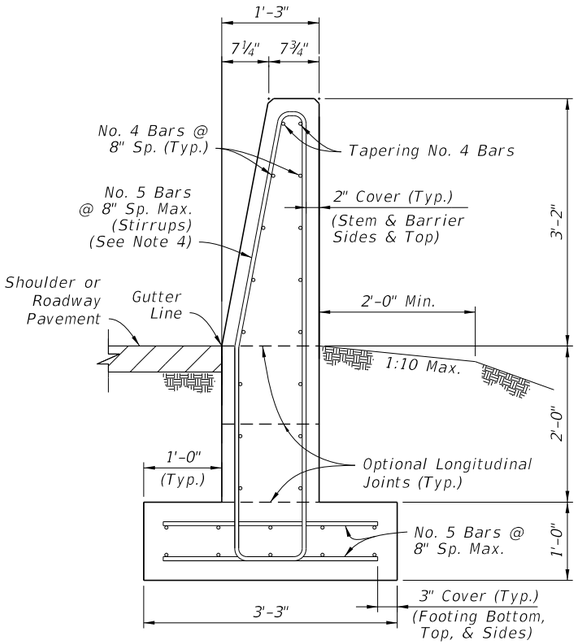


PLAN - ROUND PIERS EXAMPLE
(SQUARE PIERS SIMILAR)
(For All Longitudinal Steel Locations,
See the Section Views)

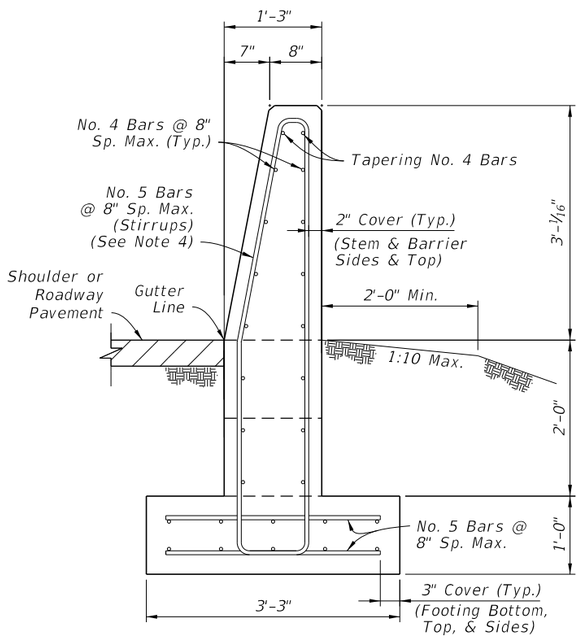
NOTE:

1. PIERS: The piers shown herein are example shapes only; see the Plans for the project-specific dimensions. The details shown herein are only for use when piers do not require protection per the AASHTO LRFD requirements. For piers requiring protection, see Index 521-002.

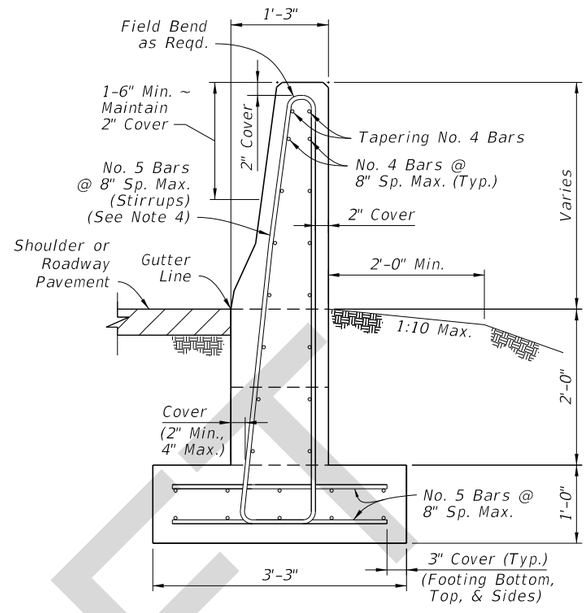
SHOULDER BARRIER - 44" HEIGHT REAR-FLUSH SECTION FOR REDUCED SETBACK PIER SHIELDING



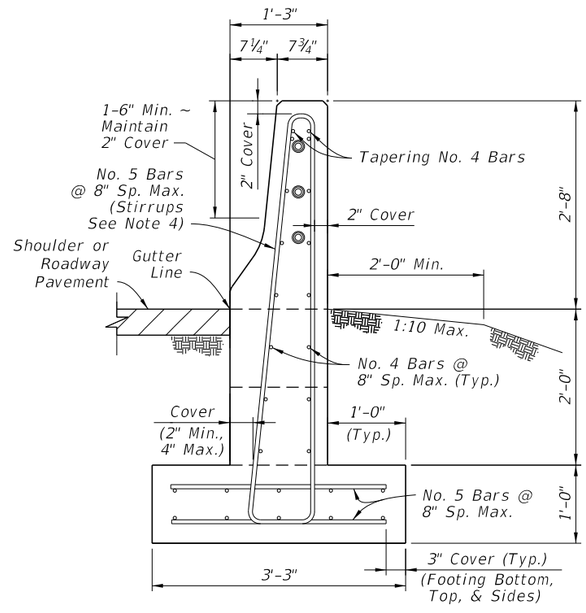
SECTION A-A
BEGIN TRANSITION - OPTION 'A'
MATCH SINGLE-SLOPE
38" HEIGHT SHOULDER BARRIER



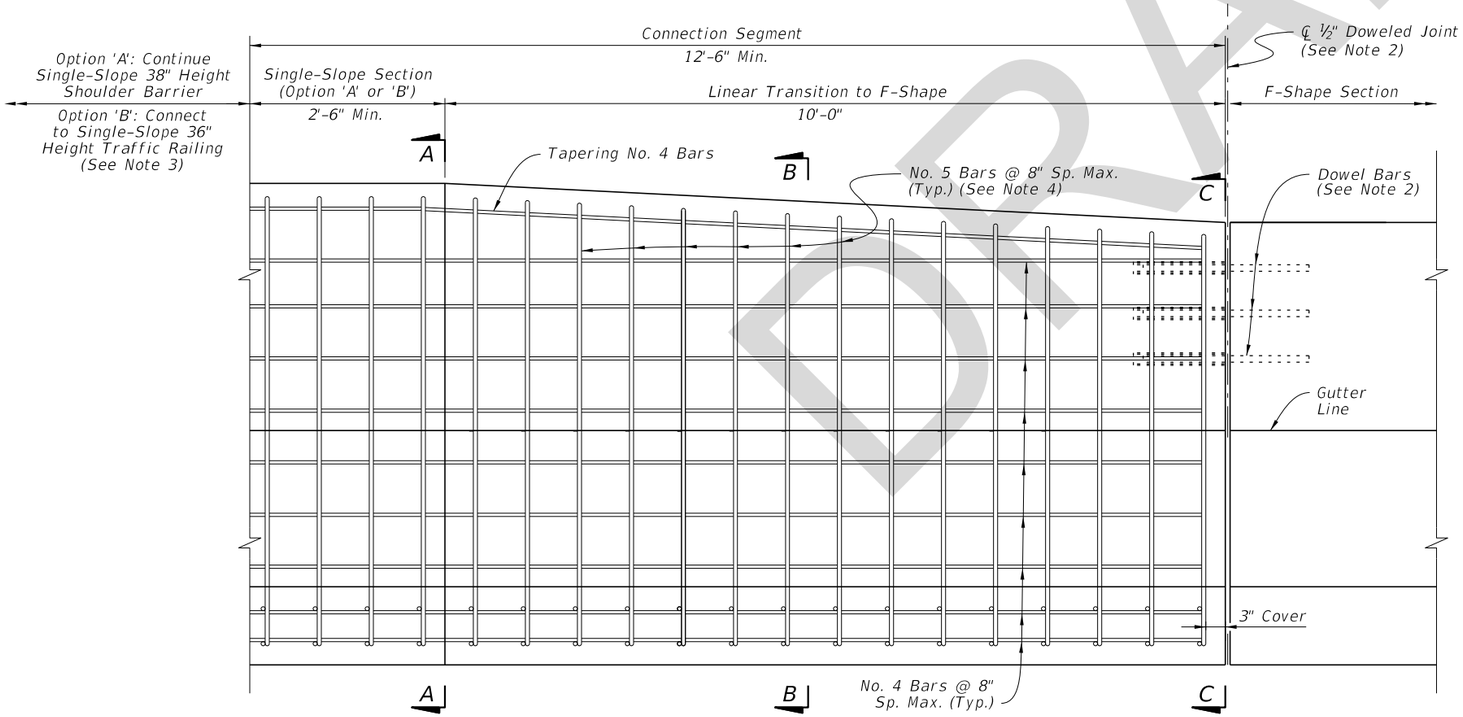
SECTION A-A
BEGIN TRANSITION - OPTION 'B'
MATCH SINGLE-SLOPE
36" HEIGHT TRAFFIC RAILING
(Bridge Applications)



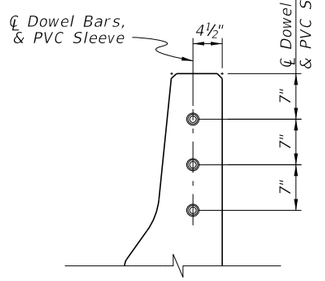
SECTION B-B
INTERMEDIATE SECTION
OF LINEAR TRANSITION



SECTION C-C
END TRANSITION
MATCH 32" HEIGHT
F-SHAPE BARRIER



ELEVATION



SECTION - F-SHAPE
DOWEL PLACEMENT
(See Note 2)

NOTES:

1. GENERAL: Construct the Connection Segment as required per the Plans to connect existing F-Shape sections to Single-Slope Shoulder Barrier or Traffic Railing sections. Construct Option 'A' or 'B' as required to match the heights of the connecting sections.
2. DOWELED JOINT: Install Dowel Bars per the Dowel Details on Sheet 12.
3. TRAFFIC RAILING CONNECTION: For the Option 'B' connection, use a Doweled Joint per Sheet 12 and the additional Free End Reinforcing with reduced bar spacing per Sheet 13.
4. STIRRUP BARS: For the vertical and transverse reinforcement requirements shown, bar bending diagrams are not provided due to varying section dimensions. Use any combination of spliced reinforcing steel to position the reinforcement with the same cover, spacing, continuity, and equivalent strength shown herein, as approved by the Engineer.

SHOULDER BARRIER - CONNECTION TO F-SHAPE

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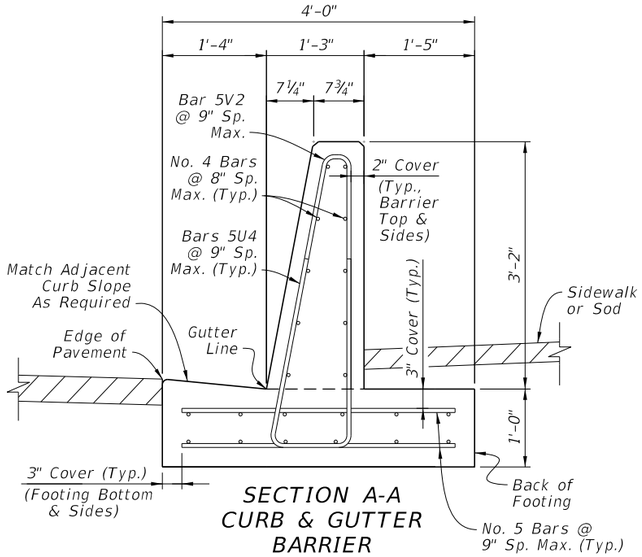
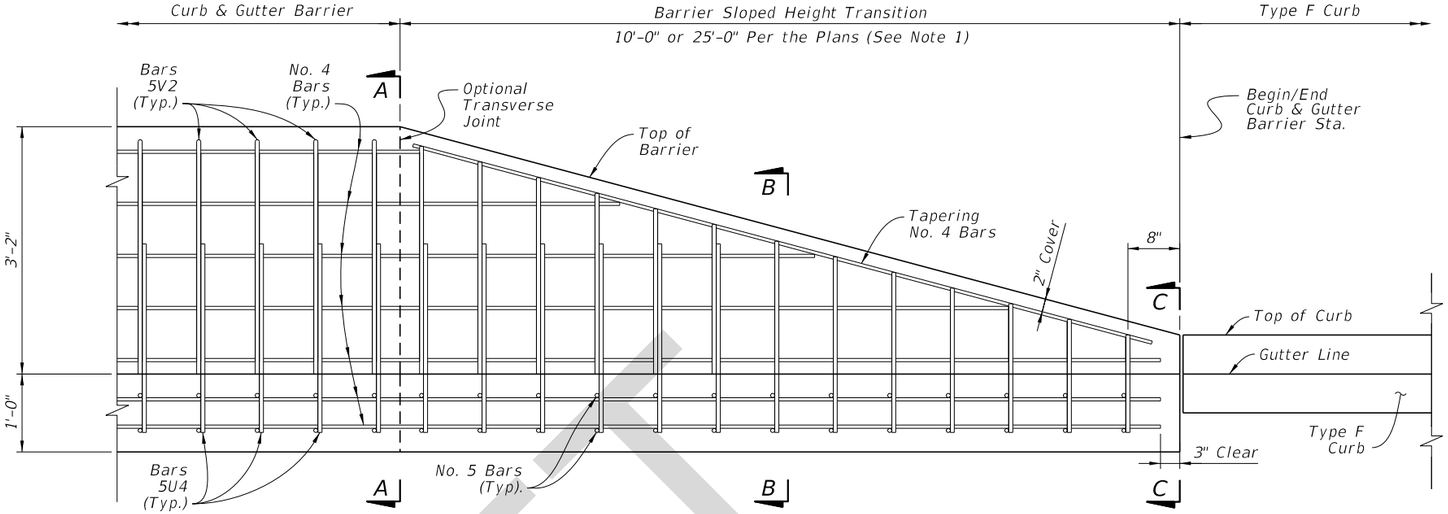
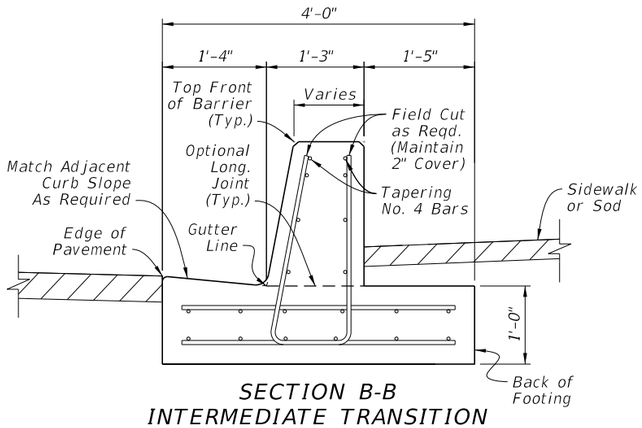


SECTION A-A
CURB & GUTTER BARRIER

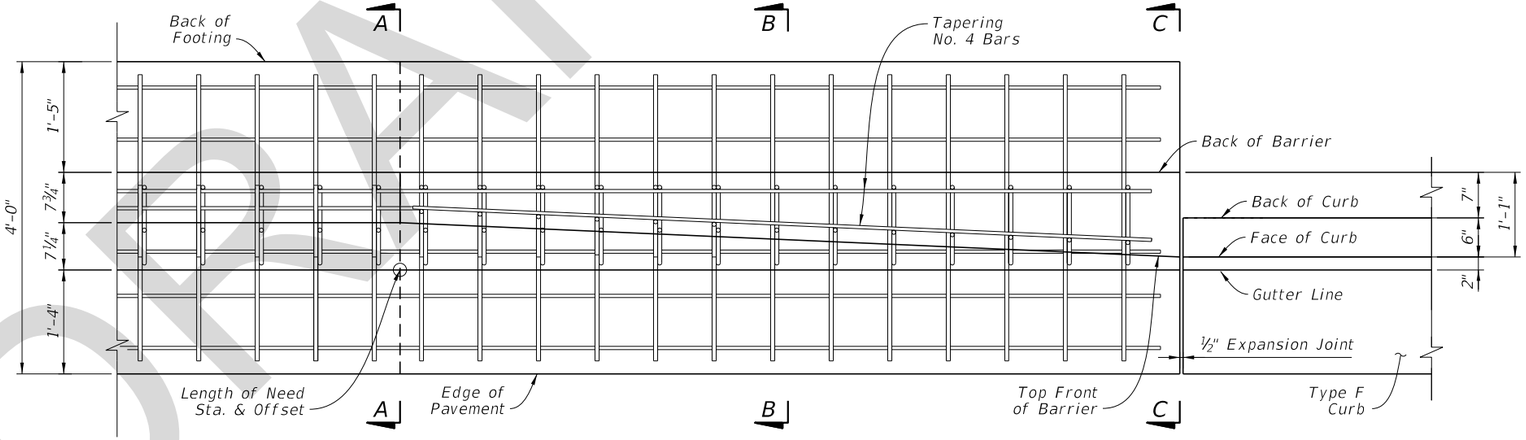
Concrete Qty. = 0.26 CY/FT
Steel Qty. = 41.2 LB/FT



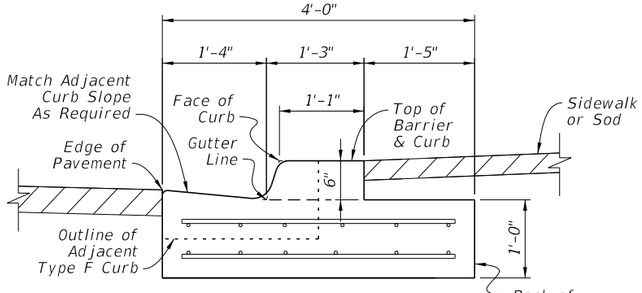
ELEVATION - CURB AND GUTTER BARRIER
SHOWING END HEIGHT TRANSITION
(Approach and Trailing
End Similar by Opposite Hand)



SECTION B-B
INTERMEDIATE TRANSITION
(Height Varies Linearly
Per Elevation View)



PLAN - CURB AND GUTTER BARRIER
SHOWING END HEIGHT TRANSITION
(Approach and Trailing End
Similar by Opposite Hand;
See Sections for All
Longitudinal Steel Locations)

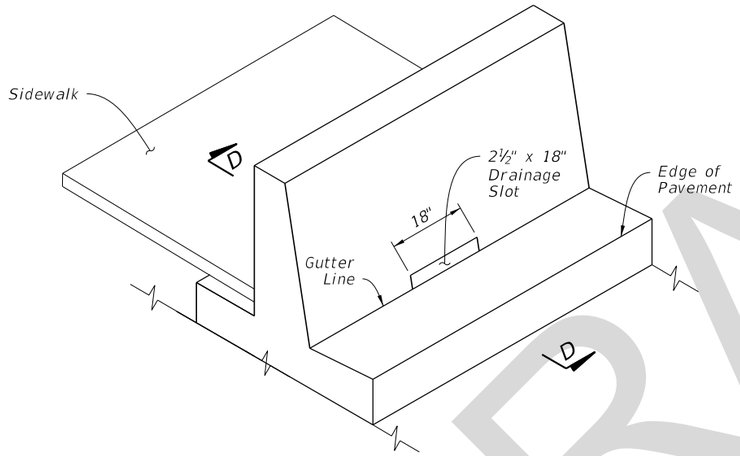


SECTION C-C
END TRANSITION
(Align with Type-F Curb)

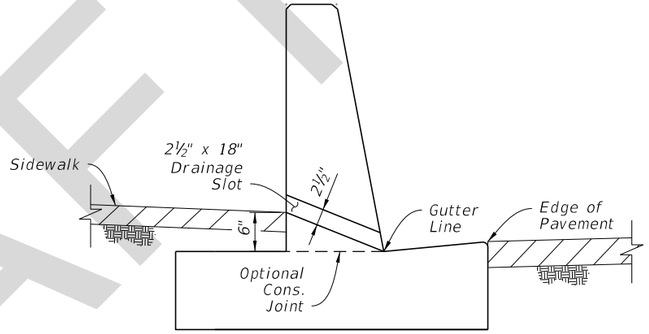
NOTES:

1. GENERAL: Install Curb and Gutter Barrier where called for in the Plans, using either a 10'-0" length or 25'-0" length Barrier Sloped Height Transition as called for in the Plans. The 10'-0" length option is shown herein, while the 25'-0" length option requires additional trimmed Bars 5U4 & 5V2 at the same longitudinal spacing.
2. BAR BENDING DIAGRAMS: For additional details on Bars 5V2 & 5U4, see the Bar Bending Diagrams on Sheet 21.
3. TRANSVERSE JOINTS: Where longitudinal reinforcing steel is not continuous across Transverse Joints, use a Doweled Joint per Sheet 12.
4. DRAINAGE: For Drainage Slot details and requirements, see Sheet 20.

CURB AND GUTTER BARRIER



ISOMETRIC VIEW
CURB GUTTER WITH
DRAINAGE SLOT



SECTION D-D
CURB GUTTER BARRIER
WITH DRAINAGE SLOT

NOTES:

1. GENERAL: Place 2½" x 18" Drainage Slots at locations and/or spacing called for in the Plans. Work with the Curb and Gutter Barrier details on Sheet 19.

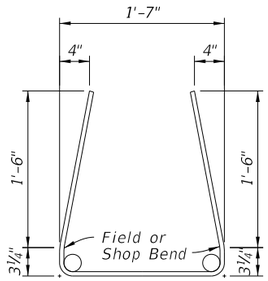
2. STEEL REINFORCEMENT CONFLICT: When the Drainage Slot encounters a conflict with reinforcing steel, shift or cut the reinforcing steel to provide 2½"(± ½") of concrete cover for the reinforcing around the Drainage Slot. If cutting the vertical bars, maintain 8" bar spacing. If shifting the vertical bars, move the bars from the standard 8" spacing location to the closest end of the drainage slot (distributing additional vertical reinforcement evenly on each side of the Drainage Slot).

CURB AND GUTTER BARRIER DETAILS

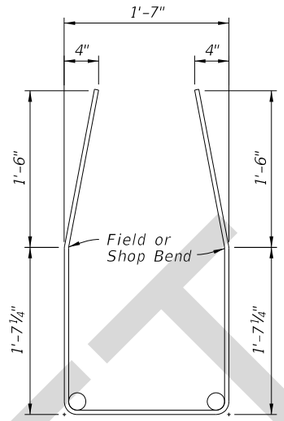
BILL OF REINFORCING STEEL		
MARK	SIZE	LENGTH
C1	4	3'-8"
C2	5	3'-0"
U1	4	5'-1"
U2	4	7'-9"
U3	5	9'-7"
U4	5	5'-9"
V1	4	6'-4"
V2	5	6'-3"

NOTES:

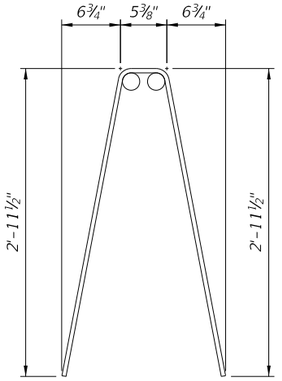
1. Work with the Standard Bar Bending Details per Index 415-001.
2. All bar dimensions in the bending diagrams are out to out.



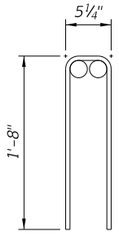
BARS 4U1



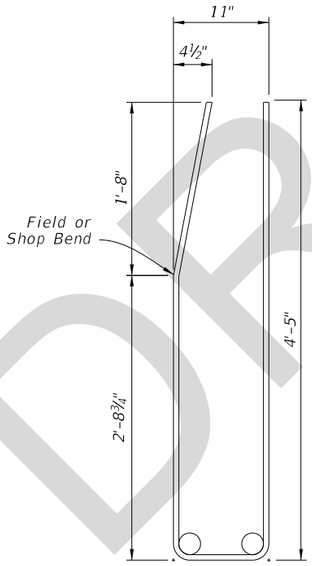
BAR 4U2



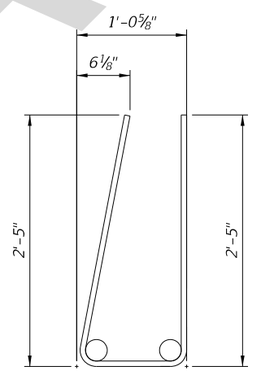
BAR 4V1



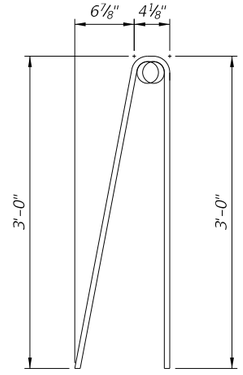
BAR 4C1



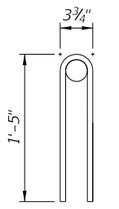
BAR 5U3



BAR 5U4



BAR 5V2



BAR 5C2

REINFORCING BAR BENDING DIAGRAMS

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