Index 411
Pier Protection Barrier

ORIGINATION

Date: September 5, 2017
Name: Richard Stepp
Phone: (850) 414-4313
Email: richerd.stepp@dot.state.fl.us

COMMENTARY

Redesign all Pier Protection Barrier sections and reinforcing details for Single-Slope Barriers as part of the MASH Implementation Plan. Reorganize and redevelop all Index Sheets as required, including the redrawing of all details to scale and the rewriting of most notes as needed. Move all Length-of-Need layouts and designer information to the Standard Plans Instructions (SPIs). The PPB Footing and Crash Wall designs are reorganized, but unchanged.

COMMENTS AND RESPONSES

BLACK = Industry Review Comments **RED** = Standard Plans Response

Name: Karina Fuentes, P.E.
Date: Friday, October 6, 2017 5:21 PM

COMMENT:

Sheet 1 of 8 (General Notes): Note 3 indicates the compaction (density) requirement for the top 12-in. of sub-grade. For consistency with the Specifications, it appears that the note should read "…..98% of the Modified Proctor maximum density……."

> The compaction (density) requirement (98% of the Modified Proctor maximum density per FM 1-T180, Method D) is the same as given in the Specifications for STABILIZING (see Specs. 160-4.2.3.1 and 160-4.3.2.3). For consistency with the standard Roadway pavement stabilizing requirement shown in the Plans, please consider modifying the general note by indicating "Type B Stabilization, LBR 40 (12-in.)", rather than indicating the Specifications requirement. This should be specified at least for the standard median barrier (2-ft. wide at bottom) where the Type B Stabilization would be extended below the barrier from the adjacent roadways.

RESPONSE:
Date: 10/13/2017

Agreed. Change made.

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Pier Protection Barrier

Name: Jimmy Greeson, P.E.
Date: Friday, October 6, 2017 5:21 PM

COMMENT:

Longitudinal V-Grove – We are asking that the ½" V-Grove be removed from the standard. This is going to cause a lot of headache for both slip-form and hand form barrier.

a. In slip-form, any jump, or knock, or movement in the machine what-so-ever will show up in the face of the wall. By adding this V-Grove, this will be magnified. It will be an "eye sore".
b. The Concrete Finishers will have a very difficult task of trying to finish around the V-Grove. As you know, behind the slip-form machine, finishers have to quickly wipe the walls using trowels, darbies, and brooms. Trying to keep from filling in this ½" grove while working 1"-2" above finished grade is going to add in labor costs.
c. Any type of material that runs down the wall is subject to fill in the grove.
d. When forming by hand, it will be almost impossible to match up the V-Grove between sections.
e. Asphalt folks are going to have a time with this, too. If the asphalt roller drum gets too close to the V-Grove, they run the risk of the barrier cracking along this longitudinal grove. The ½" grove creates a weak plane. If the roller does not roll the asphalt down even at the edge against the wall (as they are subject to do), the asphalt can cover / fill in the V-Grove.
f. General Note #9 gives a tolerance of ½" to the finish grade pavement. This will result in the pavement fluctuating up and down, which WILL NOT be visually smooth and even. The V-Grove will be creating a line that shows every little fluctuation in finished grade. At this point, what will you do? What will be done?
g. How will the V-Grove be handled when transitioning to a bridge? Will the transition have the grove, or will it play out along the transition, or just abruptly stop at the beginning of the transition?

RESPONSE:
Date: 10/13/2017

Agreed. Longitudinal V-Grooves will be removed to lessen potential for construction complications and delays. Change made.

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Pier Protection Barrier

Name: Stephanie Sharp, P.E. (TPE compiled comments)
Date: Friday, October 6, 2017 5:21 PM

COMMENT:

1. Index does not have language or details to account for RRR projects where we often times need to raise the roadway elevation. In the past, we've been allowed to use up the 3" reveal. With the reveal gone, is 3" (or more) of the barrier still available to designer for overlays? How will this information be communicated to the designers; FDM or Standard Plans?

2. Does not contain transition details for single slope pier protection barriers to existing Non-Single Pier Protection barriers.
   i. Please confirm that the intent is not to have transitions from single slope to existing non-single slope pier protection barriers.
   ii. Without transition details, is it is the Department's intent to install/replace all pier protection barrier with the new single slope pier protection barrier and not allow existing pier protection barriers to remain when otherwise being touched/modified? Consider communicating the Department's intent to the designer in the FDM or Standard Plans.

RESPONSE:
Date: 10/13/2017

1. There is currently no existing policy for additional pavement; District variations will be evaluated on a case-by-case basis. The previous F-Shape did have a built-in 3" additional height above NCHRP350 compliance, and the new Single-Slope barrier has a built-in 2" additional height above MASH compliance. Okay as-is.
2. We are not standardizing a shape transition for Pier Protection Barriers. It's not expected that it'd be a frequent need to extend an existing Pier Protection Barrier run, and Pier Protection Barrier requires extensive continuous reinforcing for TL-5 impacts. Pier Protection Barrier, with their relatively short segments, will be handled as department decisions on a case-by-case basis. Okay as-is.

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1	Index Contents; General Notes
2	Example Layouts – Footing Placement and Connections
3	Barrier Plan and Elevation – Connection to Concrete Barrier – Connection to Guardrail
4	Barrier Details – Connection to Concrete Barrier
5	Barrier Details – Connection to Guardrail
6	Barrier Footing Options
7	Crash Wall Details
8	Reinforcing Bar Bending Diagrams

GENERAL NOTES:

1. CONCRETE: Use Class III or IV concrete unless otherwise called for in the Plans.

2. CONSTRUCTION JOINTS: Maintain continuity of reinforcement steel across Construction Joints; reinforcement lap splices are permitted immediately adjacent to joints. Construct all Pier Protection Barrier continuously, with no expansion or contraction joints. Construction Joints are classified herein as Transverse Joints or Longitudinal Joints.

   Transverse Joints are permitted at 40 foot or greater intervals along the barrier.

   Longitudinal Joints may only be installed where indicated in the following details and notes, with a location tolerance of ± 1" from the locations shown.

3. SUBGRADE: When the Pier Protection Barrier is installed adjacent to Roadway or Shoulder pavement, compact the top 12" of the subgrade to at least 98% of the maximum density determined by FM 1-T 180, Method D.

4. DRAINAGE INLETS: See Index 425-001 for Shoulder Barrier Inlets, and isolate these structures from Pier Protection Barriers and Footings with 1" Preformed Joint Filler.

5. BARRIER END MARKERS: For all free ends of barriers that are not connected to guardrail or concrete barrier, install a Type 3 Object Marker on the end face per Specification 705.

6. BARRIER DELINEATORS: Install Barrier Delineators in accordance with Specification Section 705. Mount the delineators on the top face 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.

7. CRACK CONTROL: Provide ½" depth crack control V-Grooves at 15' to 30' spacing. Locate V-Grooves above any joint or discontinuity in the barrier footing. Align V-Grooves perpendicular to the longitudinal axis of the Pier Protection Barrier and make continuous across the top surface and both side faces. For slip formed barriers, score ½" V-Grooves while the concrete is still plastic, otherwise pre-form the joints when stationary forms are utilized.

~~8. LONGITUDINAL V-GROOVE: Where depicted herein, place a ½" V-Groove running longitudinally on the barrier face. 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".~~

Updated to instead reference equivalent "Type B Stabilization"

Removed longitudinal V-grooves throughout (all Index Sheets)

Changed Doweled Joint to 3/4" width throughout (all Index Sheets)

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GENERAL NOTES:

1. CONCRETE: Use Class III or IV concrete unless otherwise called for in the Plans.

2. CONSTRUCTION JOINTS: Maintain continuity of reinforcement steel across Construction Joints; reinforcement lap splices are permitted immediately adjacent to joints. Construct all Pier Protection Barrier continuously, with no expansion or contraction joints. Construction Joints are classified herein as Transverse Joints or Longitudinal Joints.

   Transverse Joints are permitted at 40 foot or greater intervals along the barrier.

   Longitudinal Joints may only be installed where indicated in the following details and notes, with a location tolerance of ± 1" from the locations shown.

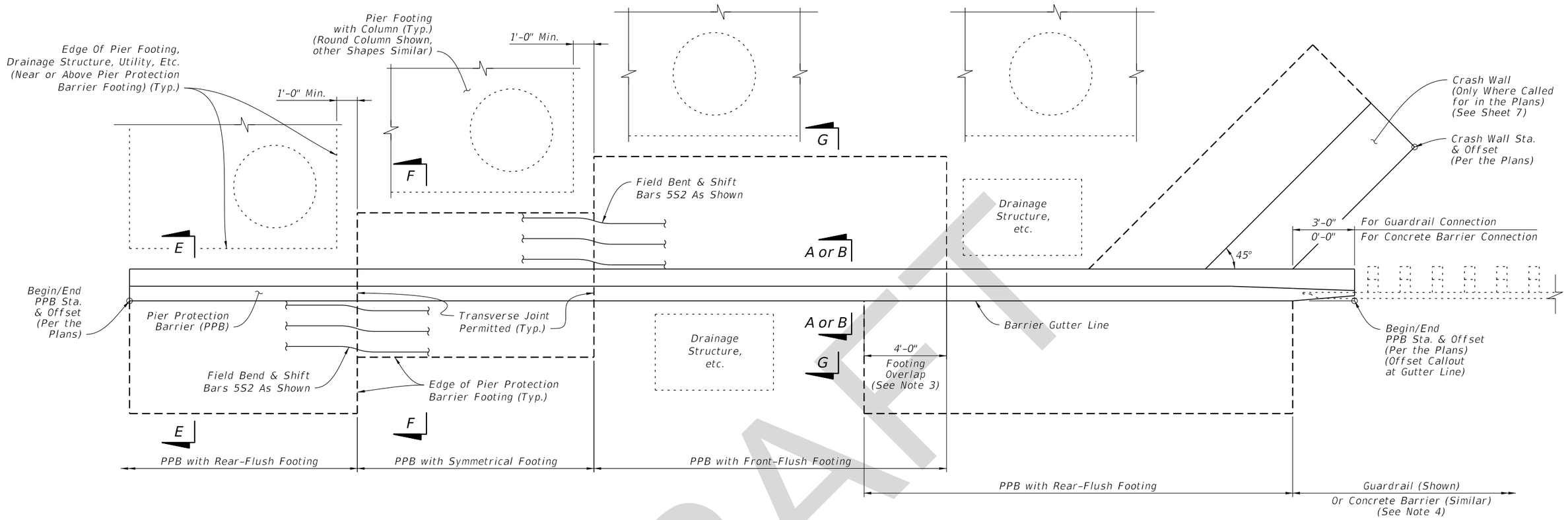
3. SUBGRADE: Compact the top layer of subgrade with Type B Stabilization, LBR 40 (12 in.).

4. DRAINAGE INLETS: See Index 425-001 for Shoulder Barrier Inlets, and isolate these structures from Pier Protection Barriers and Footings with 1" Preformed Joint Filler.

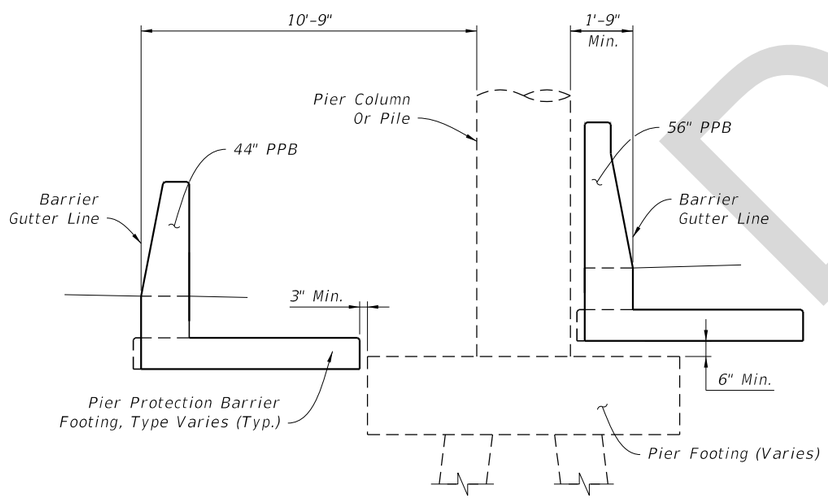
5. BARRIER END MARKERS: For all free ends of barriers that are not connected to guardrail or concrete barrier, install a Type 3 Object Marker on the end face per Specification 705.

6. BARRIER DELINEATORS: Install Barrier Delineators in accordance with Specification Section 705. Mount the delineators on the top face 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.

7. CRACK CONTROL: Provide ½" depth crack control V-Grooves at 15' to 30' spacing. Locate V-Grooves above any joint or discontinuity in the barrier footing. Align V-Grooves perpendicular to the longitudinal axis of the Pier Protection Barrier and make continuous across the top surface and both side faces. For slip formed barriers, score ½" V-Grooves while the concrete is still plastic, otherwise pre-form the joints when stationary forms are utilized.



EXAMPLE PLAN VIEW



EXAMPLE SECTION VIEW

NOTES:

1. GENERAL: The views shown herein are schematic only, showing example layouts for Pier Protection Barrier (PPB) footings and Crash Wall placement in relation to adjacent miscellaneous structures (including bridge piers, footings, drainage structures, etc.). The actual PPB footing placement depends on the project-specific configuration of adjacent structures and obstacles. For project-specific locations of PPB and adjacent features, see the Plans.

2. MINIMUM FOOTING LENGTH: The minimum length of a single footing option (i.e. Symmetrical Footing, Rear-Flush Footing, Front-Flush Footing), is 8'-0", measured longitudinally. See Sheet 6 for the footing option details.

3. FOOTING OVERLAP: When a Front-Flush Footing section connects to a Rear-Flush Footing section, a 4'-0" footing overlap is required as shown. In footing overlap segments, place all lateral steel reinforcement continuously for the entire width of the combined footing while maintaining the cover requirements per Sheet 6.

4. CONNECTING GUARDRAIL OR CONCRETE BARRIER: Connect the PPB to either Guardrail or Concrete Barrier as specified in the Plans. For additional Guardrail Details, see Sheet 3 and Index 536-001. For additional Concrete Barrier Details, see Sheet 3 and Index 521-001.

EXAMPLE LAYOUTS - FOOTING PLACEMENT AND CONNECTIONS

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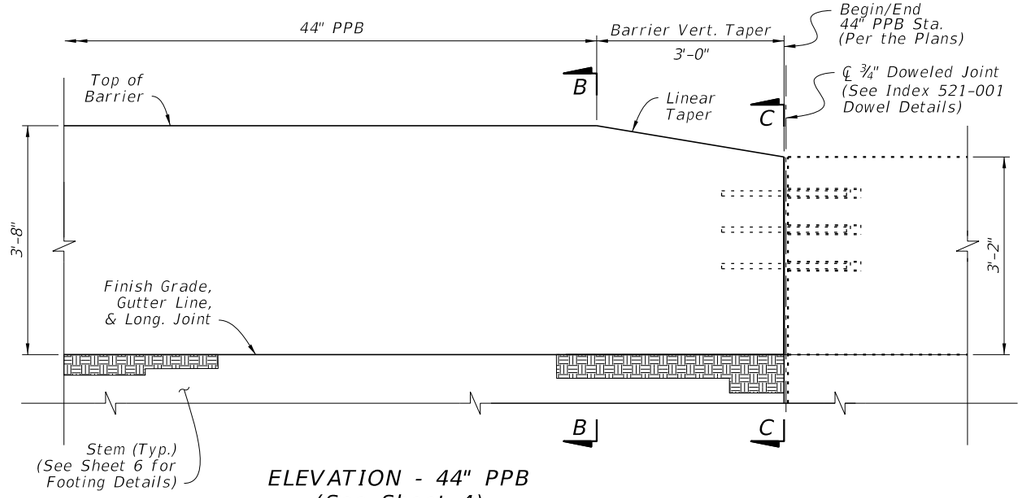
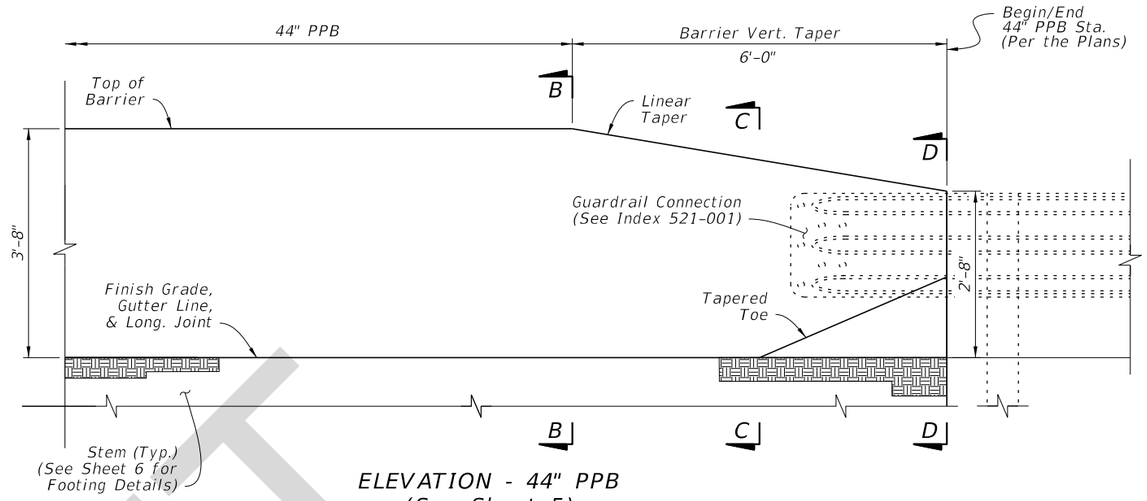
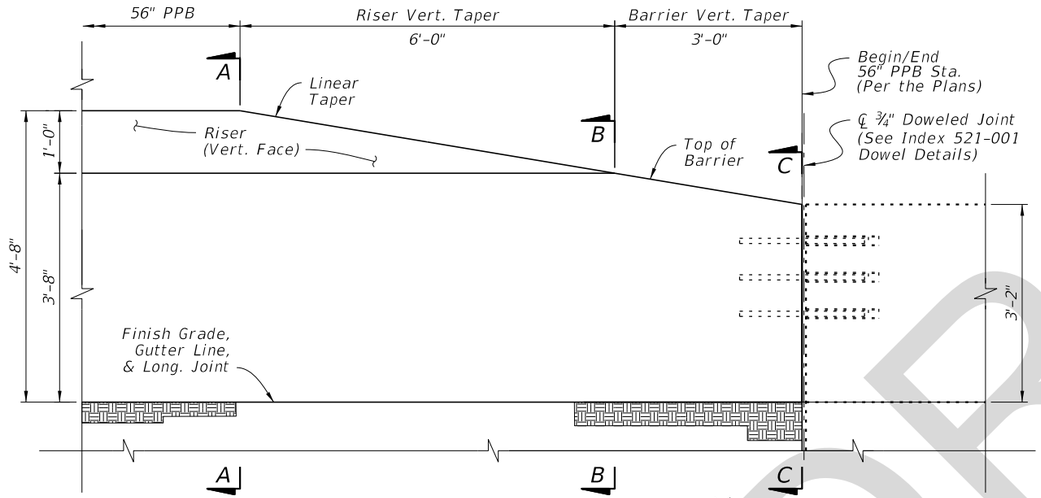
LAST REVISION	REVISION	DESCRIPTION:	FDOT	FY 2018-19 STANDARD PLANS	PIER PROTECTION BARRIER	INDEX	SHEET
11/01/17						521-002	2 of 8



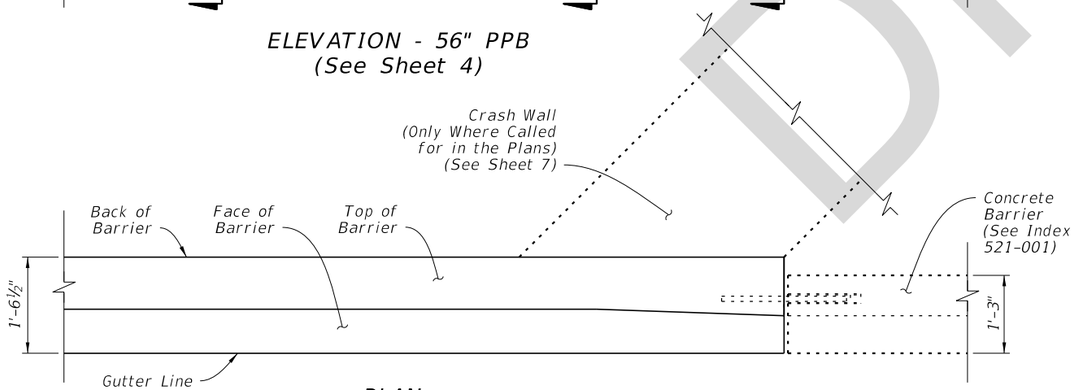
ELEVATION - 44" PPB
(See Sheet 4)



ELEVATION - 44" PPB
(See Sheet 5)

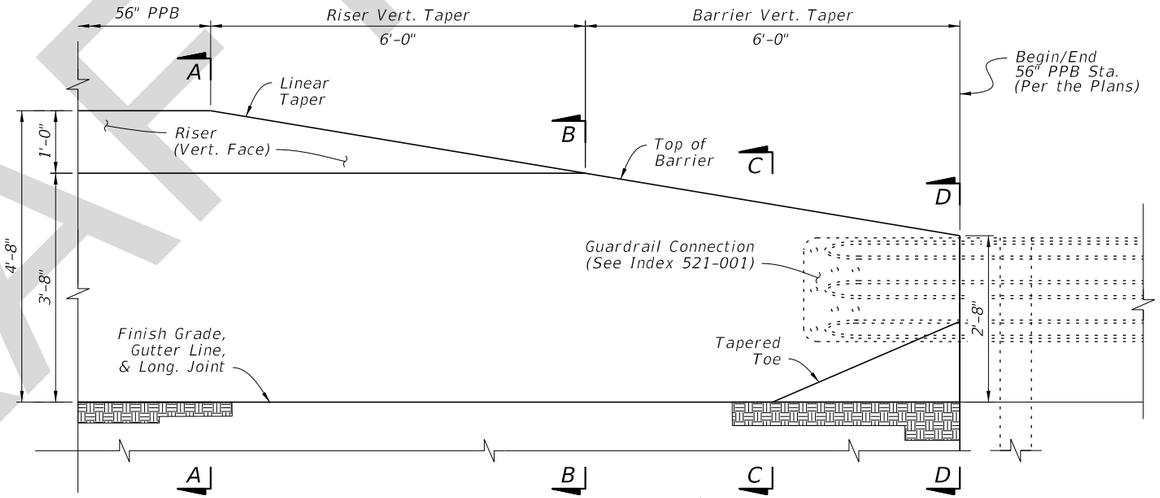


ELEVATION - 56" PPB
(See Sheet 4)

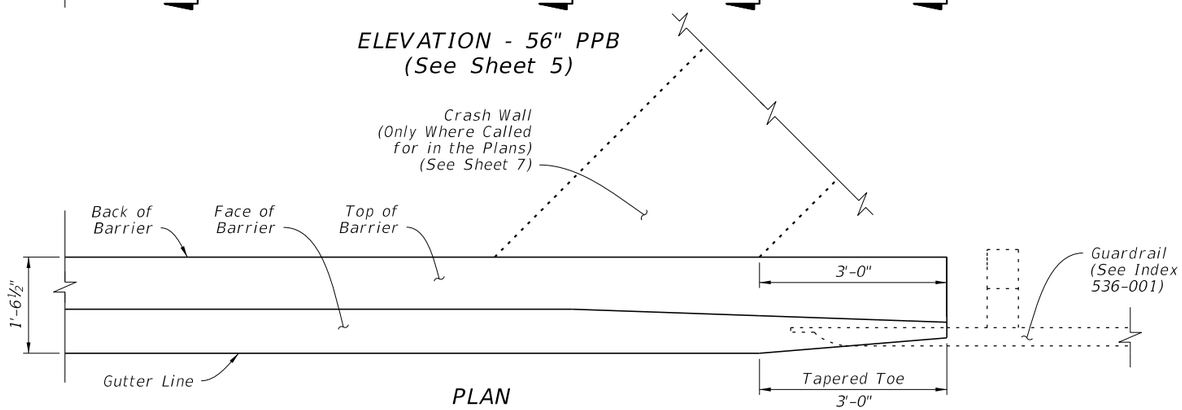


PLAN
(Footing Not Shown,
See Sheet 6 for Options)

CONNECTION TO
CONCRETE BARRIER



ELEVATION - 56" PPB
(See Sheet 5)



PLAN
(Footing Not Shown,
See Sheet 6 for Options)

CONNECTION TO
GUARDRAIL

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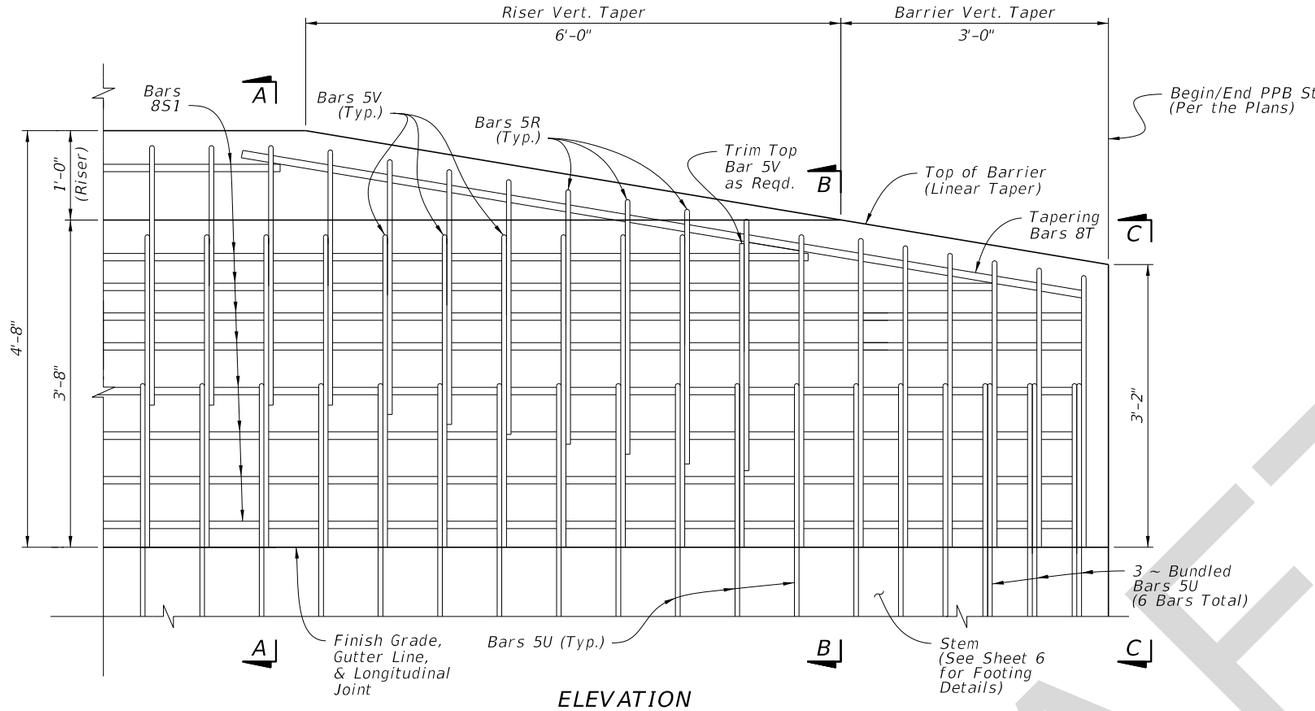
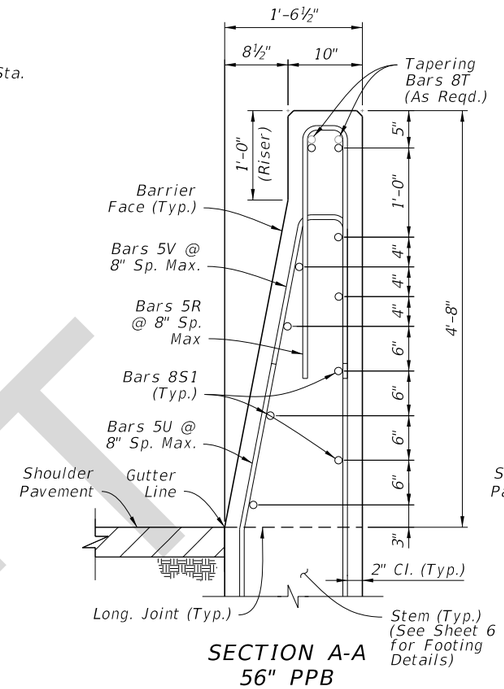
LAST REVISION	REVISION	DESCRIPTION:			
11/01/17			FY 2018-19 STANDARD PLANS	PIER PROTECTION BARRIER	INDEX 521-002 / SHEET 3 of 8

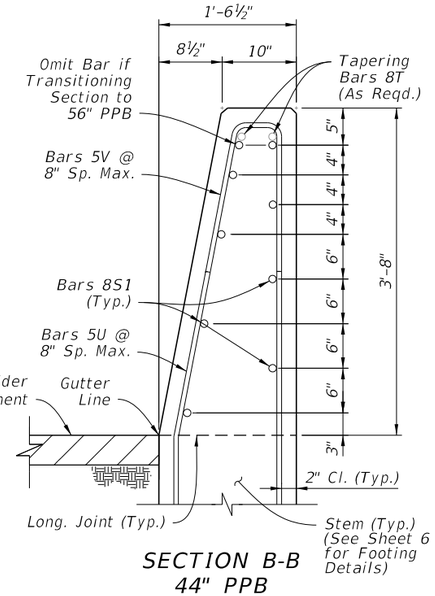


ELEVATION
(56" PPB Shown, 44" PPB Similar with 1'-0" Riser and Related Reinforcing Removed)



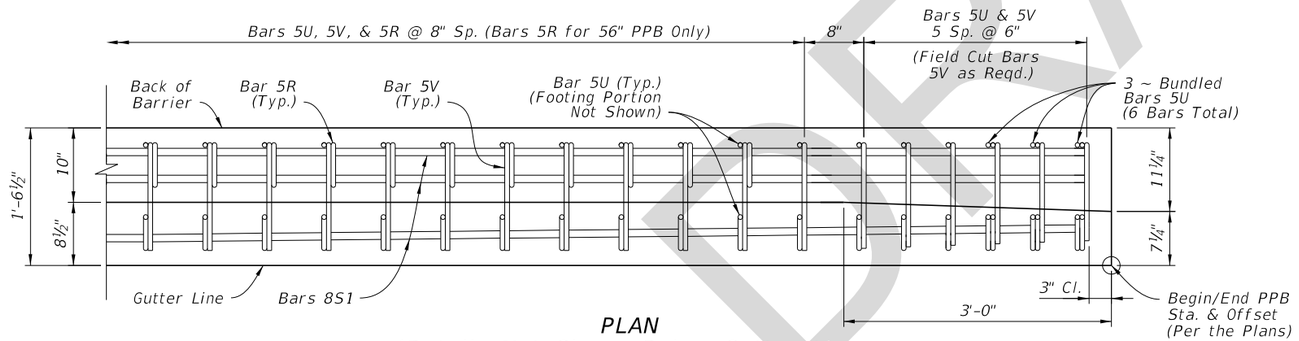
SECTION A-A
56" PPB

Concrete Qty. = 0.19 CY/FT (Above Gutter Line)
Steel Qty. = 47.6 LB/FT (Excluding Bars 5U & 8T)

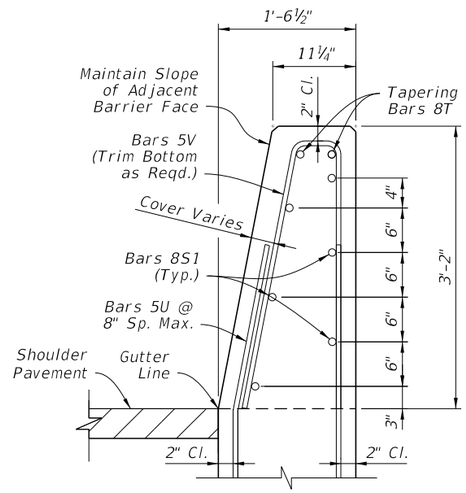


SECTION B-B
44" PPB

Concrete Qty. = 0.19 CY/FT (Above Gutter Line)
Steel Qty. = 35.7 LB/FT (Excluding Bars 5U & 8T)



PLAN
(Details Not Shown Below Gutter Line, See Sheet 6 for Footing and Stem Details)
(Only Top & Bottom Longitudinal Steel Shown, See Section Views for All Steel Locations)



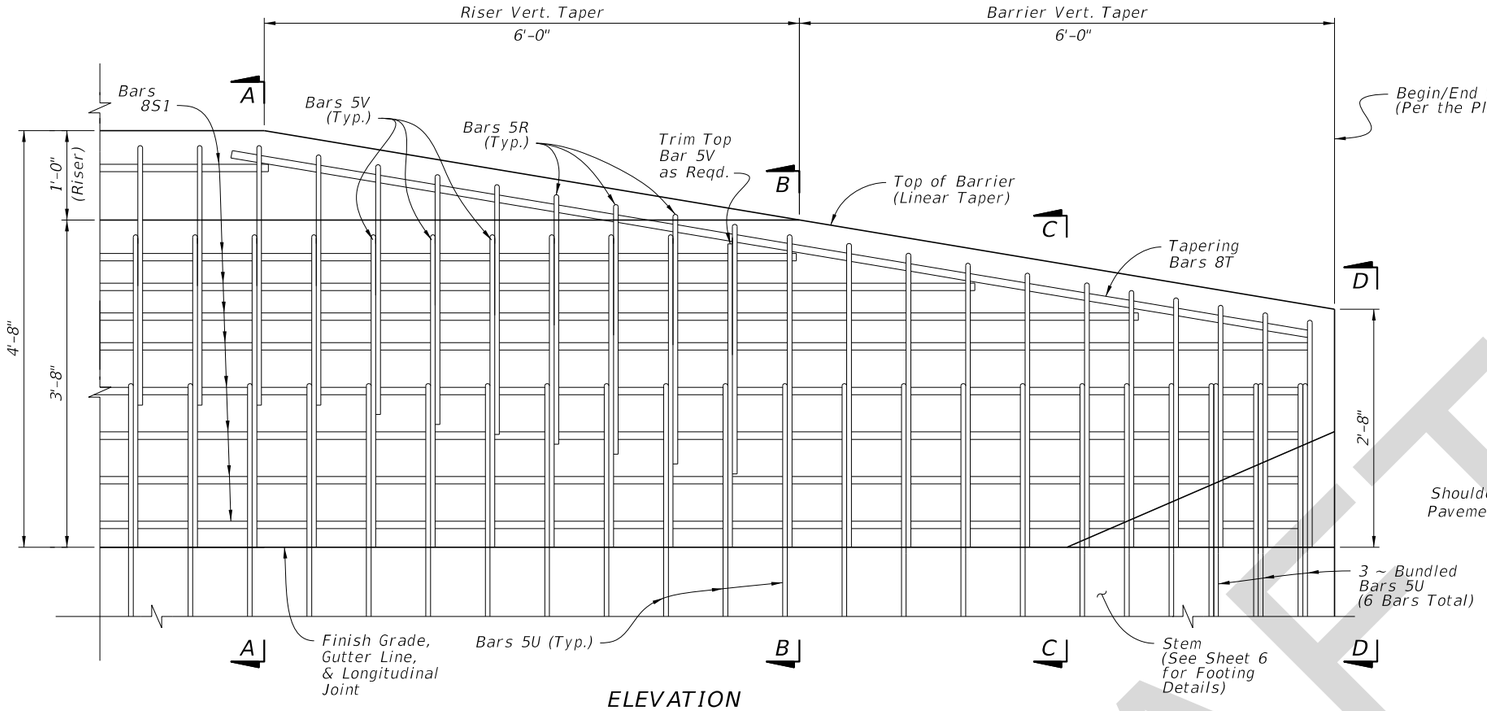
END VIEW C-C
(Connects to Adjacent Concrete Barrier, Aligned at Gutter Line)

NOTES:

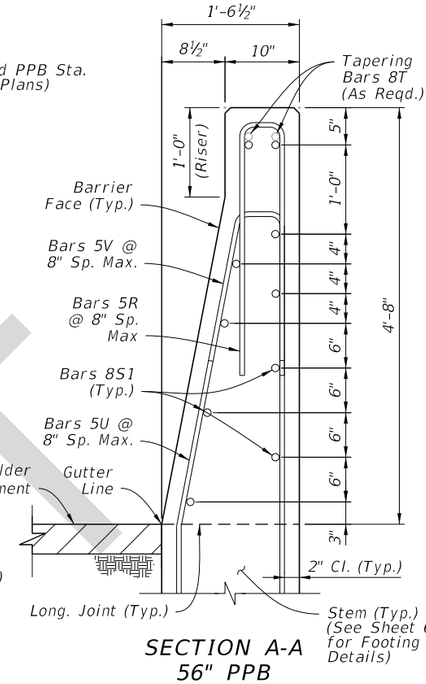
1. *GENERAL: Construct either the 56" PPB or the 44" PPB height as called for in the Plans. See Sheets 2 & 3 for additional plan and elevation details.*

2. *FOOTING OPTIONS: See Sheet 6 for the supporting stem and footing details.*

BARRIER DETAILS - CONNECTION TO CONCRETE BARRIER

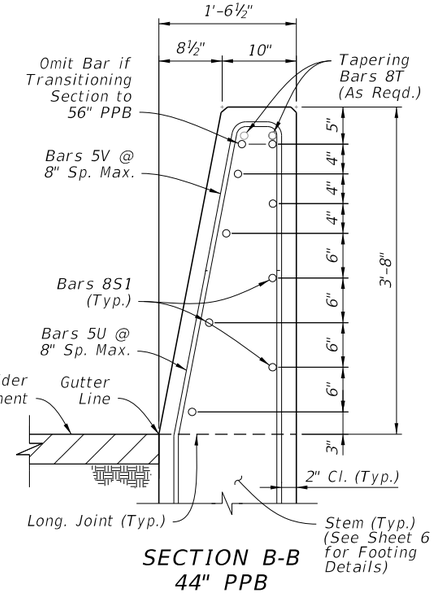


ELEVATION
(56" PPB Shown, 44" PPB Similar with 1'-0" Riser and Related Reinforcing Removed)



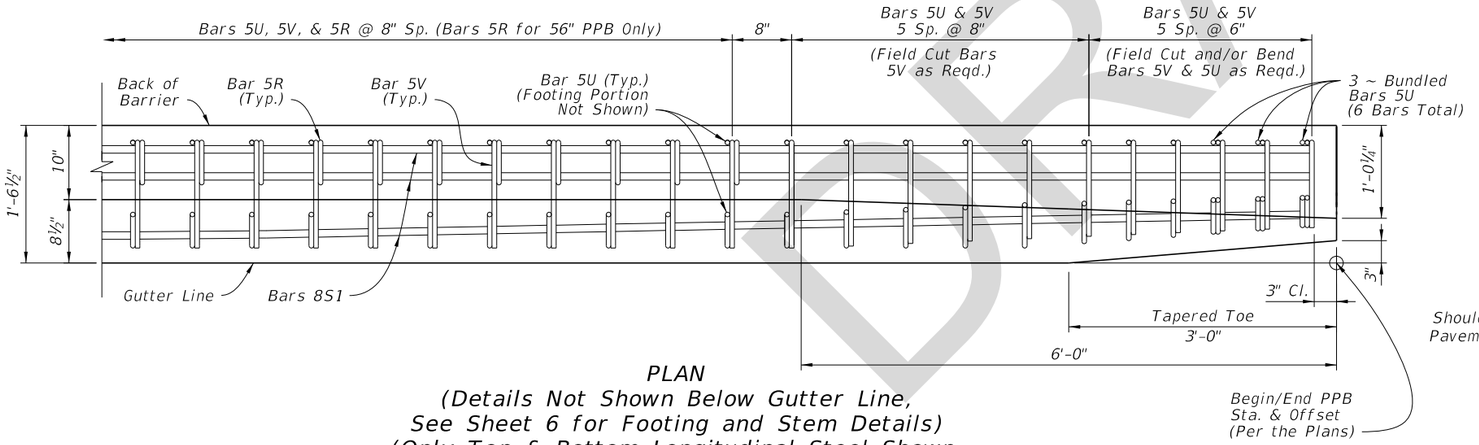
SECTION A-A
56" PPB

Concrete Qty. = 0.19 CY/FT (Above Gutter Line)
Steel Qty. = 47.6 LB/FT (Excluding Bars 5U & 8T)

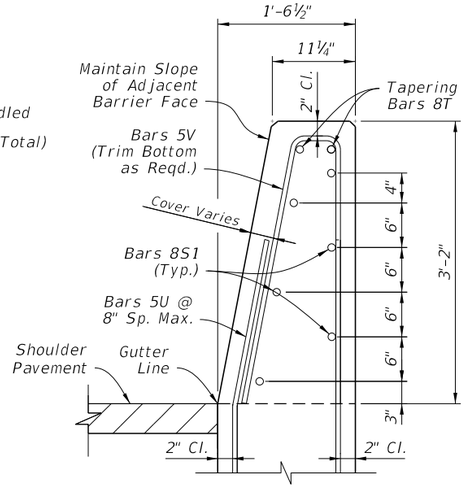


SECTION B-B
44" PPB

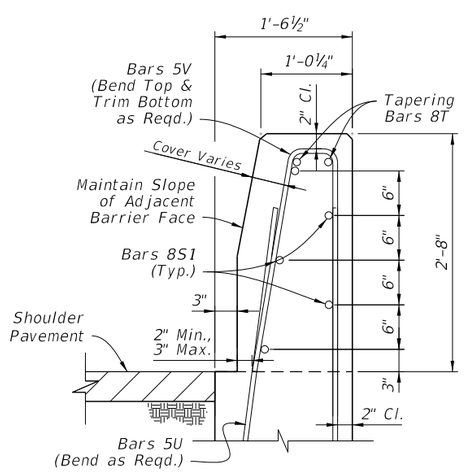
Concrete Qty. = 0.19 CY/FT (Above Gutter Line)
Steel Qty. = 35.7 LB/FT (Excluding Bars 5U & 8T)



PLAN
(Details Not Shown Below Gutter Line, See Sheet 6 for Footing and Stem Details)
(Only Top & Bottom Longitudinal Steel Shown, See Section Views for All Steel Locations)



END VIEW C-C
(Begin Tapered Toe for Guardrail)



END VIEW D-D
(End Tapered Toe for Guardrail)

NOTES:

1. *GENERAL: Construct either the 56" PPB or the 44" PPB height as called for in the Plans. See Sheets 2 & 3 for additional plan and elevation details.*
2. *FOOTING OPTIONS: See Sheet 6 for the supporting stem and footing details.*

BARRIER DETAILS - CONNECTION TO GUARDRAIL

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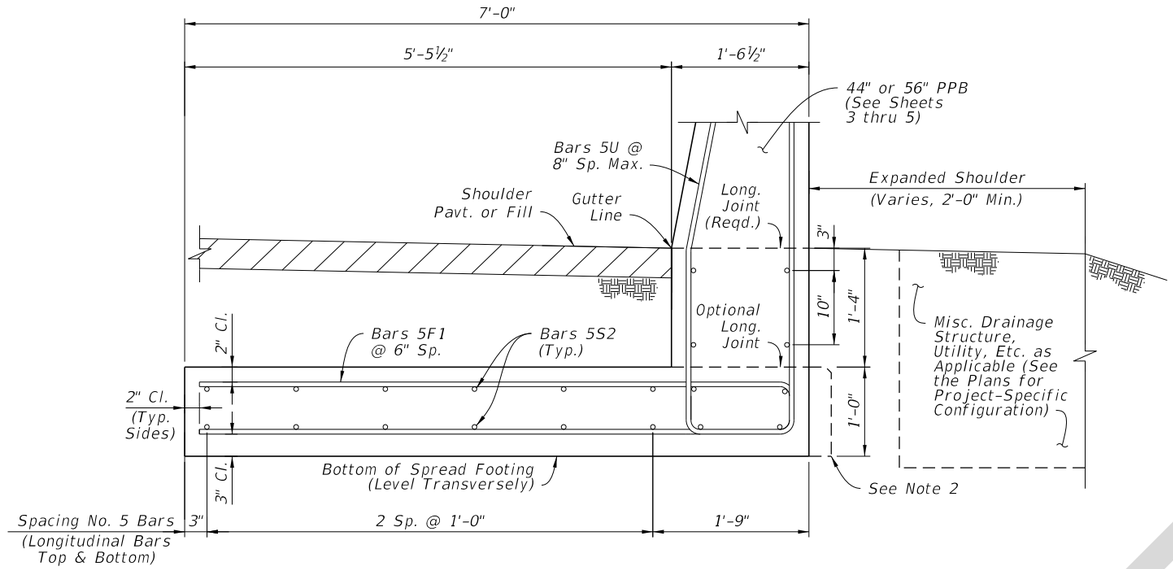
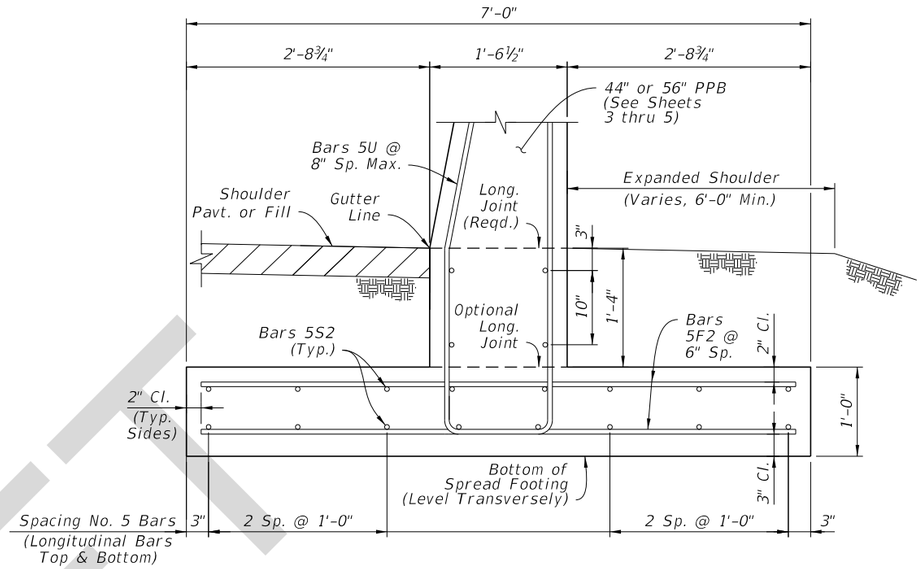
LAST REVISION	REVISION	DESCRIPTION:			INDEX	SHEET
11/01/17			FDOT DEVELOPMENTAL STANDARD PLANS	PIER PROTECTION BARRIER	521-002	5 of 8



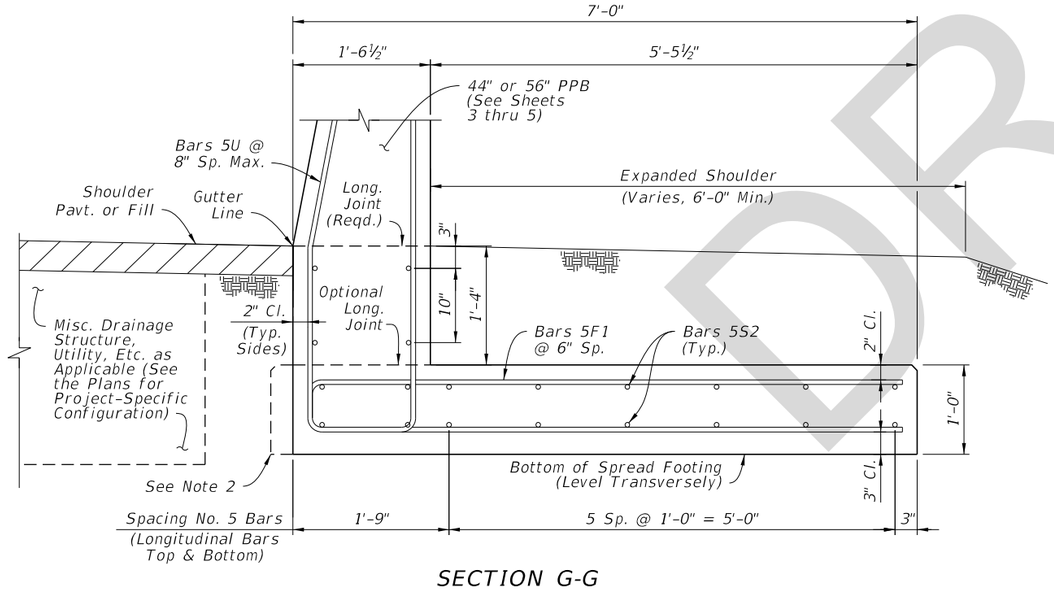
SECTION E-E
FRONT-FLUSH FOOTING OPTION

Concrete Qty. = 0.34 CY/FT (Below Gutter Line)
Steel Qty. = 63.0 LB/FT (Including Bars 5U)



SECTION F-F
SYMMETRICAL FOOTING OPTION

Concrete Qty. = 0.34 CY/FT (Below Gutter Line)
Steel Qty. = 62.3 LB/FT (Including Bars 5U)



SECTION G-G
REAR-FLUSH FOOTING OPTION

Concrete Qty. = 0.34 CY/FT (Below Gutter Line)
Steel Qty. = 63.0 LB/FT (Including Bars 5U)

NOTES:

1. *GENERAL: Install the footing options per project-specific requirements, as defined on Sheet 2 and specified per the Plans.*

   Work with the supported 44" PPB and 56" PPB as shown on Sheets 3, 4, & 5.

2. *OPTIONAL SLIP FORMING SUPPORT: The 1'-0" depth spread footing may be extended by 3" laterally beyond the face of the stem to provide support for a subsequent slip forming operation above. Do not adjust the steel reinforcement location for the additional concrete.*

3. *GUARDRAIL CONNECTION TAPERED TOE: For tapering the barrier as shown on Sheet 5, View D-D, bend Bars U away from the stem face as required. For this case, the cover requirement is variable for one side of the stem (only at the tapered toe locations).*

BARRIER FOOTING OPTIONS