

Index 430-001 Miscellaneous Drainage Details

ORIGINATION

Date: August 1, 2020

Name: Cheryl Hudson

Phone: (850) 414-5332

Email: cheryl.Hudson@dot.stat.fl.us

COMMENTARY

Sheet 1: Update the Table of Contents; Renumbered Sheet.

Sheet 2: Updated Table Title; Renumbered Sheet.

Sheet 3: Renumbered Sheet.

Sheet 4: Renumbered Sheet.

Sheet 5 Updated Sheet to show Single Pipe End Guard; Renumbered Sheet.

Sheet 6: New Sheet - Double Pipe End Guard

Sheet 7: Renumbered Sheet.

COMMENTS AND RESPONSES

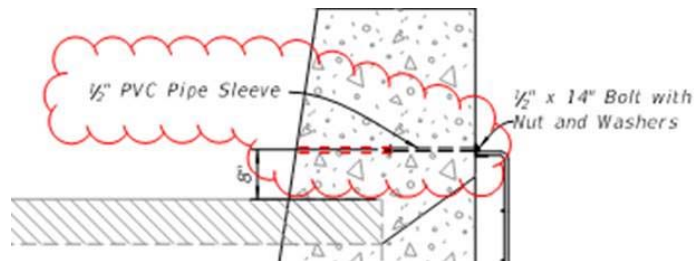
BLACK = Industry Review Comments **RED** = Standard Plans Response

Name: Robert Butterfield

Date: September 4, 2020

COMMENT:

1. Should the notes for the pipe end guards include reference to Index 430-030 for the Straight Concrete Endwalls?
2. Is the double guard appropriate for use on 60" pipe which does not follow Index 430-030?
3. On the double guard, the ½" PVC Pipe Sleeve should continue all the way through the concrete endwall (see image).



4. Upon reviewing the dimensions for standard reinforced concrete pipe (RCP) and those given in Indices 430-001 and 430-030, it appears the 8" offset dimension for the ½" PVC Pipe Sleeve above the top of the pipe would place it within 2" of the top of the endwall for 48" pipe, and 1.5" for 54" pipe. Also, I noticed the PVC Pipe Sleeve appears to conflict or be within 1" of the horizontal #4 Bars at the top of the endwall for the 24", 30", 36", 42" and 48" pipe sizes when using RCP.

- Does extending the horizontal guard bars 3" beyond the end vertical bars create a safety hazard? Should a note be added to remove any pointed edges for the ends of the horizontal guard bars?

RESPONSE:

- These guards can be on special end walls in addition to the walls shown in Index 430-030 and 430-031.
- Yes the 60" has an option for a double guard which would cover Index 430-031. These guards are meant to be used in other situations including special end walls, etc.
- Agree. **Will update Index** to show pvc through wall.
- The PVC pipe sleeve should be okay as the PVC material will not create a corrosion hazard.
- This was considered during the index preparation. It was our thoughts that the location of the bars would not result in a safety hazard.

Date: 9-15-20

Name: Rodolfo Garcia

Date: September 9, 2020

COMMENT: See my comments attached... blue color:

END ELEVATION

SINGLE GUARD

add 48", 54, 60", 66, 72, 78", 84"

SIDE ELEVATION

TABLE 2 - SINGLE GUARD

Pipe Dia. (in)	Top Steel Bracket	Bottom Steel Plate	Number of Holes	Number of Vert. Bars	Vertical Bars Size	Number of Horiz. Bar	Horizontal Bars Size	Weight lbs.
18	2'-4"	3'-6"	4	4	1/2"	4	1/2"	48
24	3'-0"	4'-0"	5	5	1/2"	5	1/2"	58
30	3'-0"	4'-6"	5	5	3/8"	5	3/8"	74
36	3'-8"	5'-0"	6	6	3/8"	6	3/8"	90
42	4'-4"	5'-6"	7	7	3/8"	7	3/8"	111

NOTES:

- Construct guards only at locations specifically called for in Plans.
- Anchor Bolts (Galvanized): Use C-I-P Hex Head bolts or fully threaded adhesive anchors, installed in accordance with Specification 416.

SINGLE PIPE END GUARD

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TABLE 3 - DOUBLE GUARD

Pipe Dia (in)	Top Steel Bracket Grate 1	Top Steel Bracket Grate 2	Bottom Steel Plate	Number of Total Holes	Number of Vert. Bars Grate 1	Number of Vert. Bars Grate 2	Vertical Bars Size	Number of Horiz. Bars (each grate)	Horizontal Bars Size	Weight lbs.
48	2'-4"	2'-4"	6'-0"	8	4	4	3/8"	5	3/8"	127
54	2'-4"	2'-4"	6'-0"	8	4	4	1/2"	6	3/8"	157
60	2'-4"	2'-4"	7'-0"	8	4	4	5/8"	7	3/8"	172

DOUBLE PIPE END GUARD

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GUTTER AND DRAINS

TITLE:	FY 2021-22 STANDARD PLANS	RETAINING WALL CONCRETE GUTTER AND DRAINS MISCELLANEOUS DRAINAGE DETAILS	INDEX 430-001	SHEET 7 of 7
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RESPONSE: Agree with the markup to Table 2 regarding horizontal bars on Sheet 5. Table 2 is for single guards only so will not add pipes larger than 42". Pipes 48" through 60" are included in Table 3 on sheet 6. Agree with the PVC pipe callouts on Sheet 7.

Changes made to Index: Updated horizontal bars in Table 2 on Sheet 5. Added Retaining Wall callout and 4" PVC Pipe (Schedule 40) to Sheet 7.

Date: 9-10-20

Name: Ananth Prasad / FTBA

Date: September 15, 2020

COMMENT:

I have comments on the new sheet 7 of 7 related to the drain pipe(s) behind the retaining wall.

1. What is the material type for the pipe?
2. FDOT should consider re-wording the detail to note use of a “sweep” instead of a simple 90 degree elbow. The potential for these to clog increases the tighter the bend.
3. The slope should be changed to “match sidewalk”. The reason being is that sidewalks cannot exceed 2% but can be less. The detail notes that the pipe can exceed 2%. No contractor will form sidewalk for the maximum allowable slope and take the chance of having to remove it. In the end, the pipe has to properly tie into the curb anyway and there will be slope. Actually, the pipe could even be flat and there would still be sufficient head pressure for any water to flow.

RESPONSE:

1. The pipe material is PVC. It will be added to the detail.
2. Agree. **The index will be updated to call for a 90-degree sweep elbow or quarter bend.**
3. Agree. **The 0.02 min slope will be removed from the index, and a note will be added that states “Grade sidewalk slope toward gutter. Match PVC pipe slope under sidewalk with sidewalk slope. “**

Date: 9-17-20

Name: Nick Benedico / Tetra Tech

Date: September 18, 2020

COMMENT: 430-001 sheets 5 and 6: This is more of a comment for future consideration. Field reviews often reveal that cross drains become silted up beyond what the MRP allows. The guard as detailed appears to unnecessarily hinder the cleaning out of this vital infrastructure. Would not a better detail have the top of the guard hinged and secured at the bottom by cotter pins?

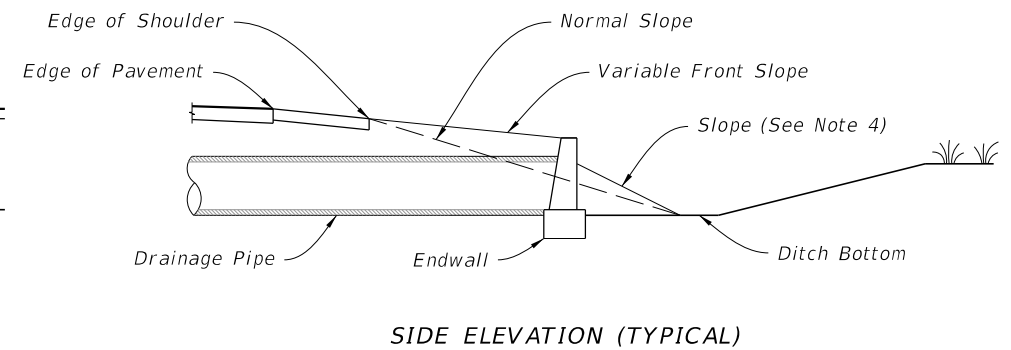
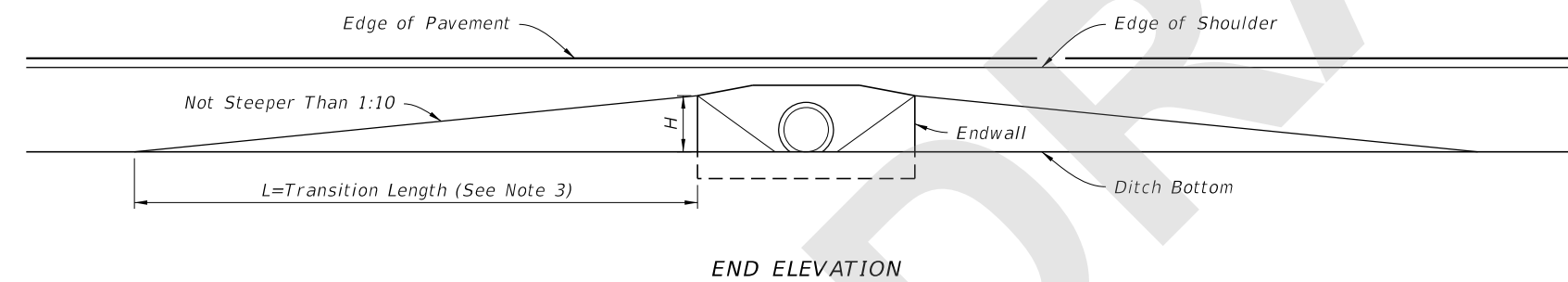
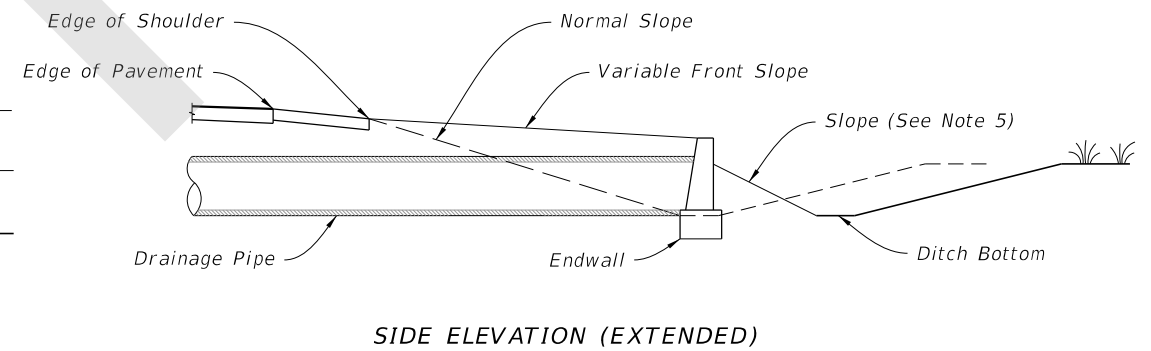
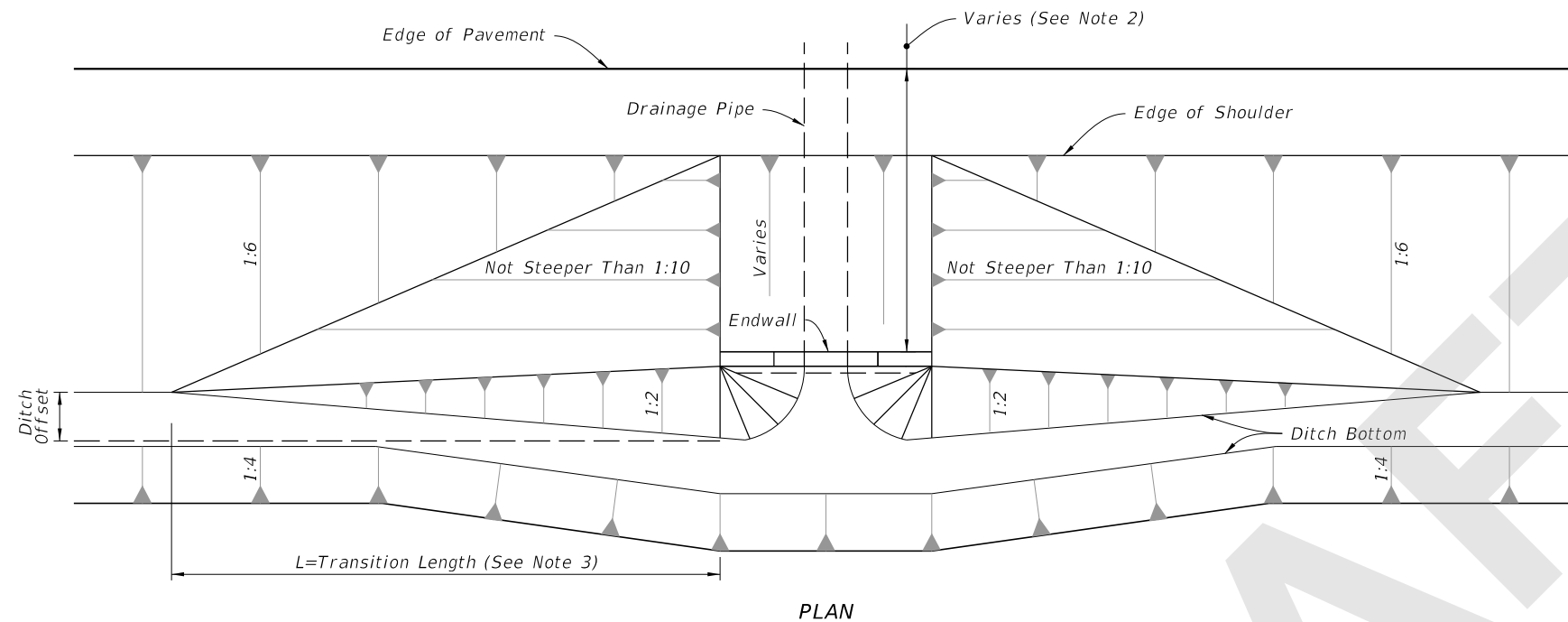
RESPONSE: Thank you for the response. This is outside of the scope of changes proposed with this index. We will discuss this with the Drainage staff and consider in the future.

No change to index

Date: 9-21-20

NOTES:

1. Fill or excavate variable slopes during normal grading operations.
2. Minimum distance as required to comply with safety criteria.
3. Use Larger Value Of Either:
 $L=10 \times H$ (No Maximum)
 $L=10 \times \text{Ditch Offset}$ (Maximum $L=100'$)
4. Slope to normal slope if possible. Slope not to be steeper than 1:2. See side elevation (extended) below if 1:2 slope must go beyond toe of normal slope.
5. 1:2 slope if necessary to go beyond normal toe of slope and maintain ditch width by moving out back slope.



FRONT SLOPES AT DRAINAGE STRUCTURES

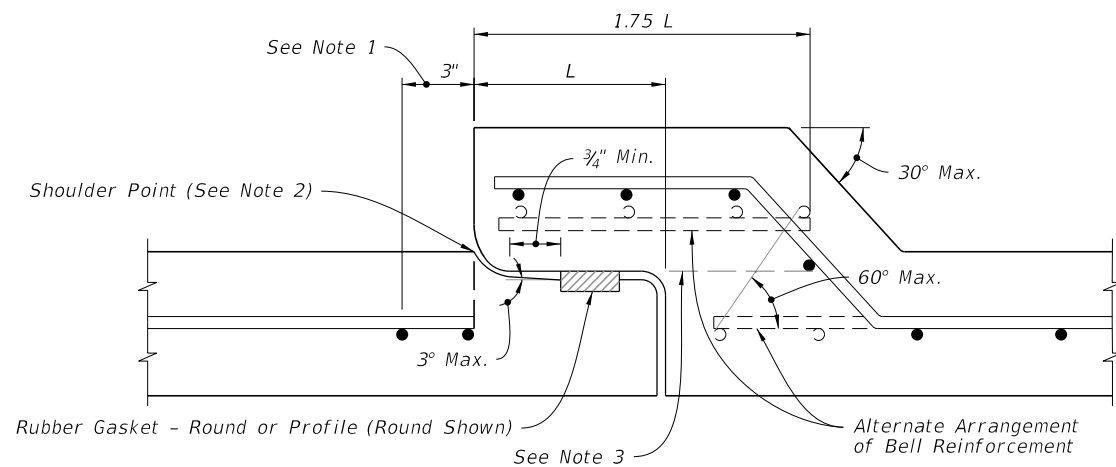
TABLE OF CONTENTS:

Sheet	Description
1	Limits of Variable Front Slopes at Drainage Structures
2	Round and Elliptical Concrete Pipe Joint
3	Filter Fabric Jacket, Concrete Jacket, and Pipe Plug
4	Concrete Collars
5	Single Pipe End Guard
6	Double Pipe End Guard
7	Retaining Wall Concrete Gutter and Drains

LIMITS OF VARIABLE FRONT SLOPES AT DRAINAGE STRUCTURES

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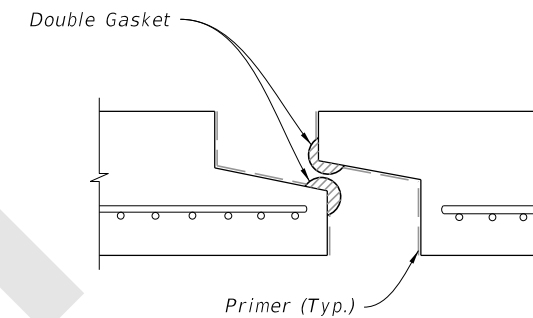
**TABLE 1
SCHEDULE OF BELL REINFORCEMENT
Classes II,III,IV,V; Wall A,B,C**

Nominal Pipe Diameter	Design Bell Reinforcement	Maximum Reinforcement Under Tolerance
	in ² per foot	in ² per foot
15"	0.07	0.010
18"	0.07	0.010
24"	0.09	0.010
30"	0.12	0.010
36"	0.14	0.010
42"	0.16	0.010
48"	0.19	0.011
54"	0.21	0.012
60"	0.23	0.0135
66"	0.26	0.015
72"	0.28	0.0165
78"	0.30	0.018
84"	0.33	0.0195
90"	0.35	0.021
96"	0.37	0.0225
102"	0.40	0.024
108"	0.42	0.0255

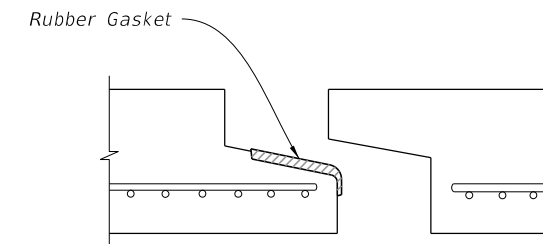
NOTES:

1. Allowable Tolerance for the last full wrap of reinforcing when using single elliptical cage.
2. Extend the last full wrap of reinforcing to the shoulder point and meet ASTM C-76 requirements.
3. All circumferential steel located above this line and within the 1.75 L is defined as bell reinforcement.

===== ROUND CONCRETE PIPE JOINT DETAIL =====



PREFORMED PLASTIC JOINT



PROFILE RUBBER GASKET

NOTES:

1. Filter Fabric Jacket is required on both type of joints.
2. Details shown before pull-up.

===== ELLIPTICAL CONCRETE PIPE JOINT DETAIL =====

ROUND AND ELLIPTICAL CONCRETE PIPE JOINT

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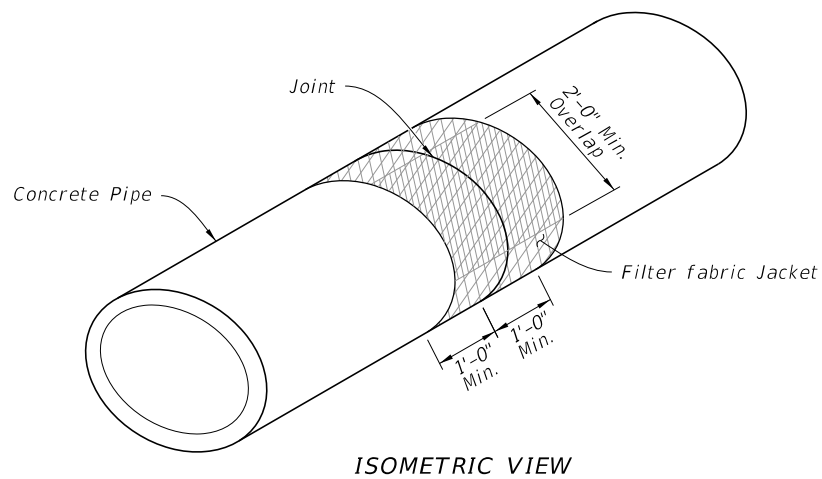
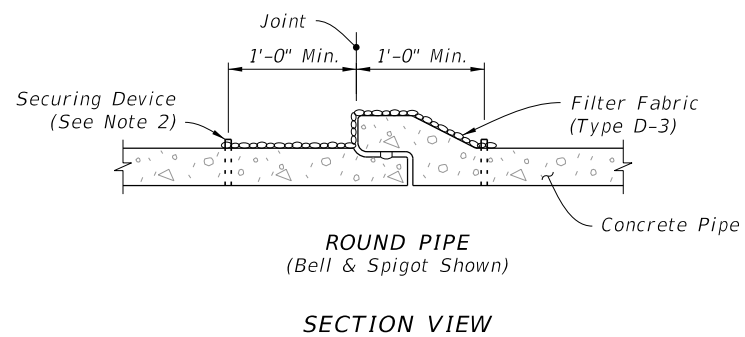
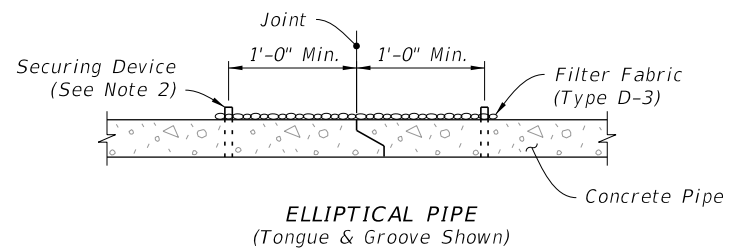


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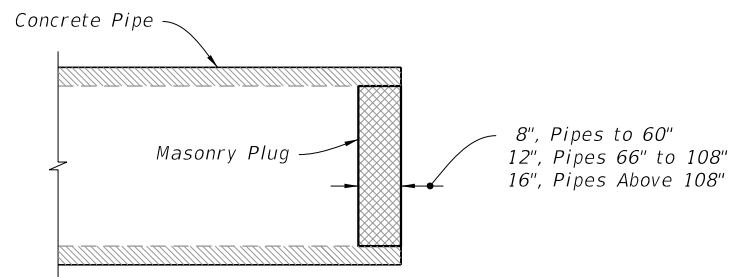
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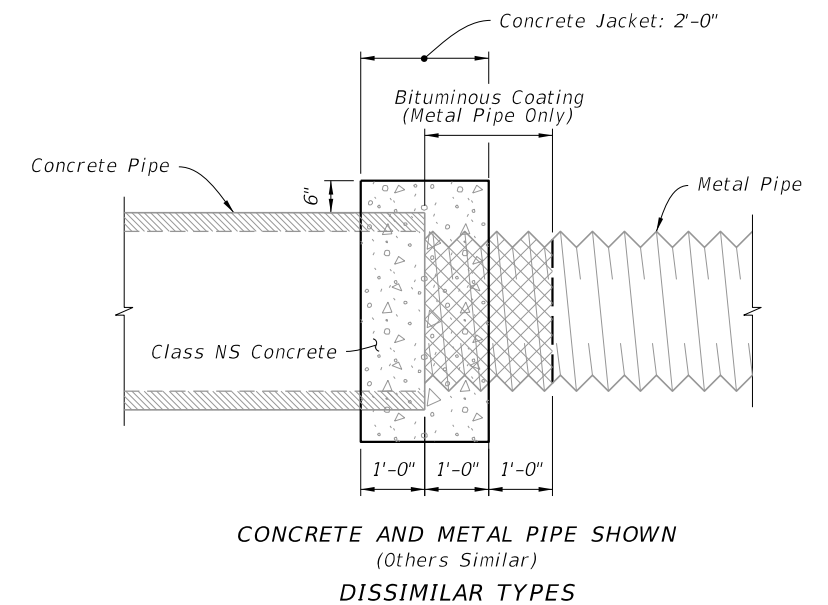
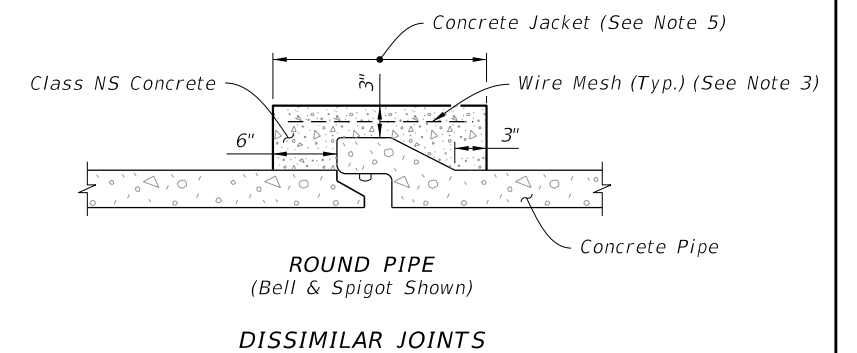
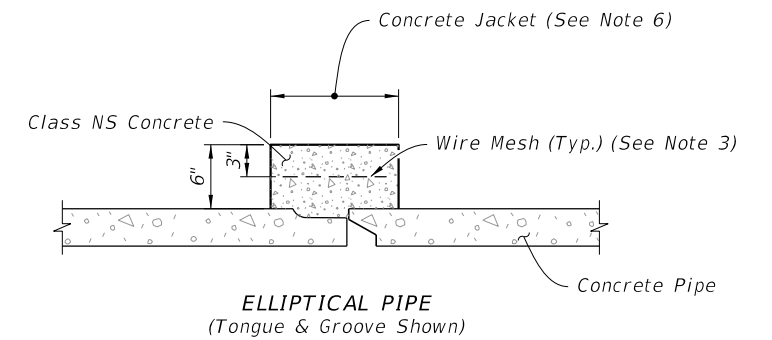
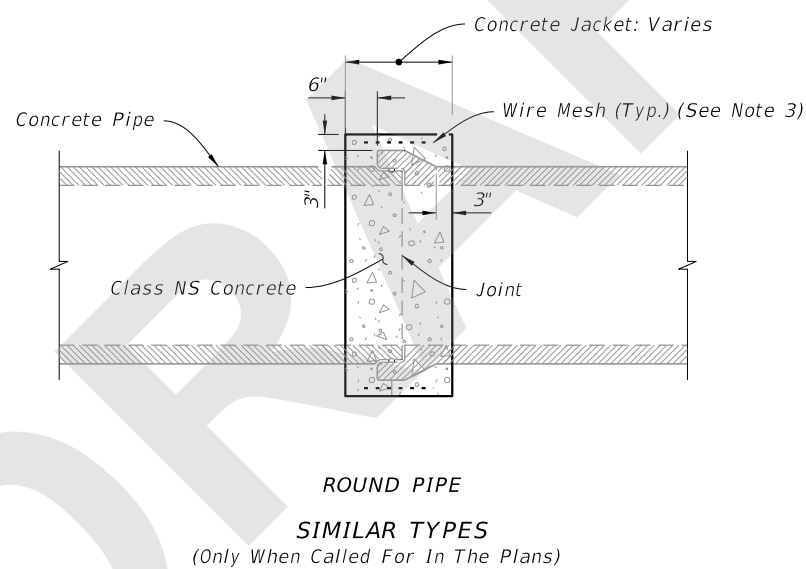
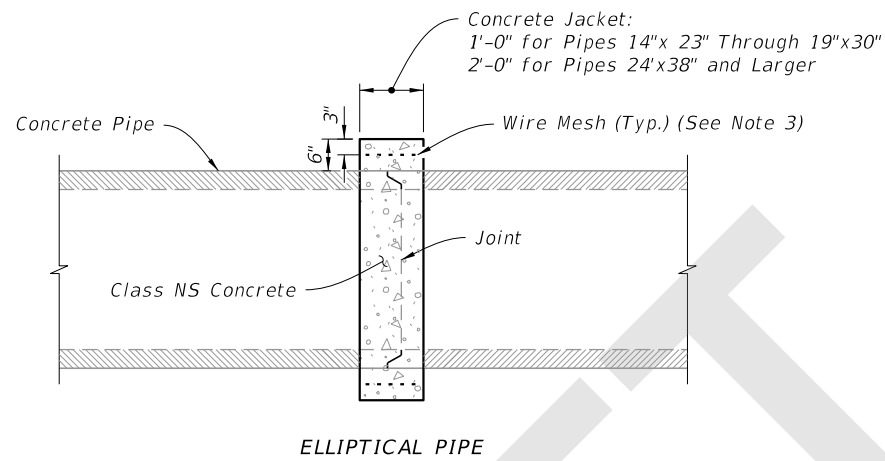


FILTER FABRIC JACKET

(For All Pipe Types - Concrete Elliptical Pipe Shown)



PIPE PLUG



CONCRETE JACKET

NOTES:

1. Alternate connection must be approved by the Engineer.
2. Install securing device in accordance with Specification 985.
3. Any wire mesh arrangement which provides 0.126 square inches of steel area per linear foot both ways may be used, provided the wires are spaced a minimum of 2" and/or a maximum of 6" on centers.
4. Do not use a concrete jacket to join dissimilar metal pipes.
5. 12" for pipes 15" through 24"; 24" for pipes 30" and larger.
6. 12" for pipes 14" x 23" through 19" x 30"; 24" for pipes 24" x 38" and larger.

FILTER FABRIC JACKET, CONCRETE JACKET, AND PIPE PLUG

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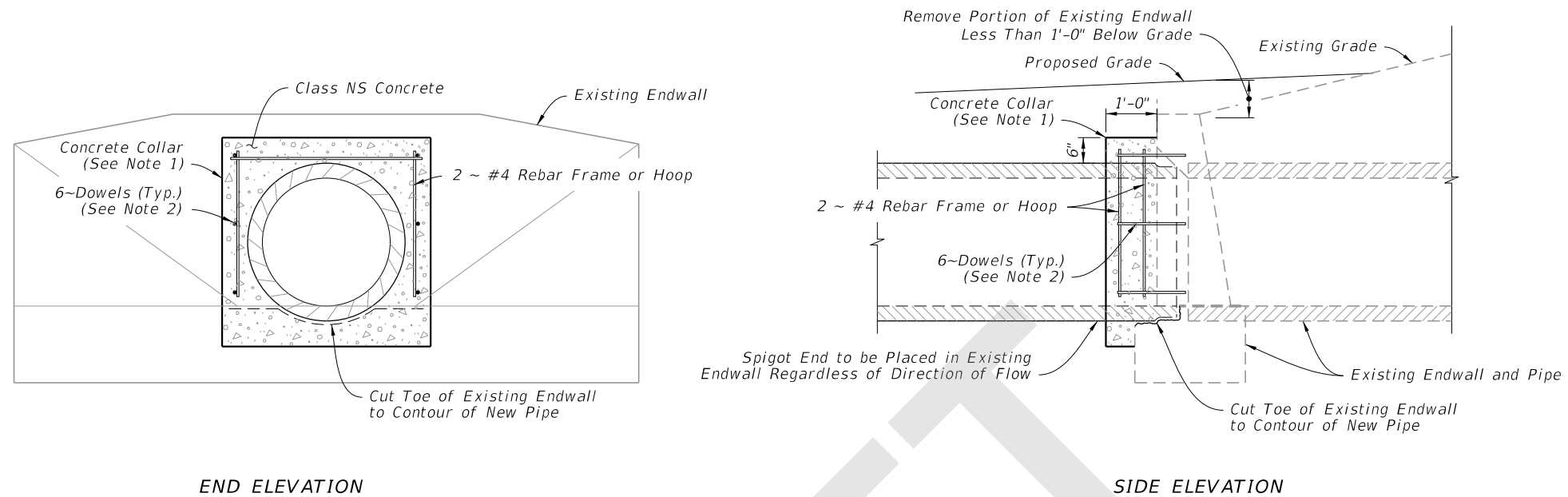


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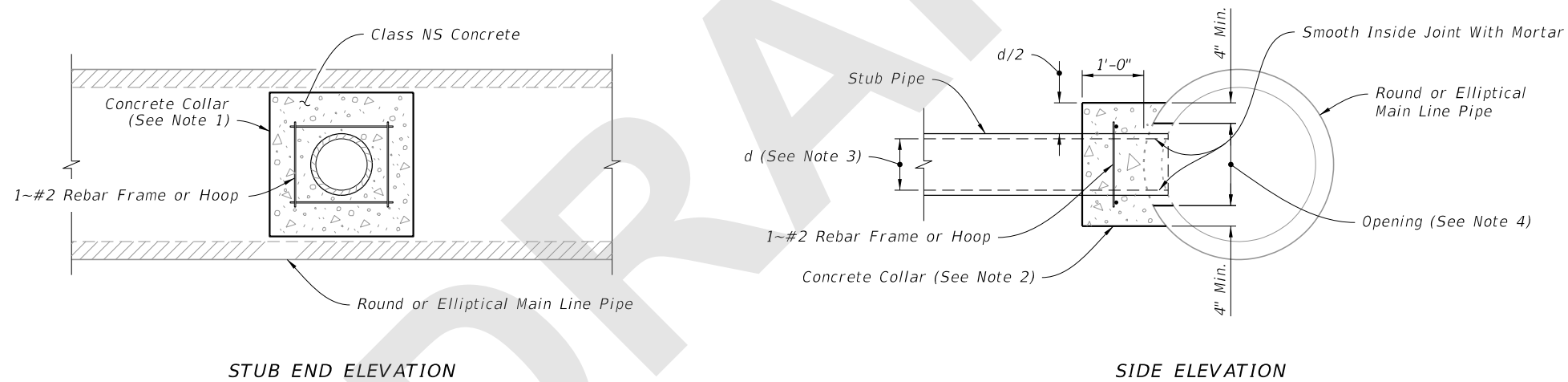
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END ELEVATION

SIDE ELEVATION

EXTENSION OF EXISTING PIPE CULVERTS



STUB END ELEVATION

SIDE ELEVATION

JOINING MAINLINE PIPE TO STUB PIPE

NOTES:

1. The collar may be formed by any method approved by the Engineer.
2. Install 1/2"x16" dowels in adhesive bond material.
3. Stub Pipes maximum diameter: 1/2 of a round main line pipe diameter, or 1/2 the height of elliptical main line pipes.
4. Opening by Pipe Manufacturer.
5. Install riser reinforcement using #5 Bars @ 18" centers vertically and 6" centers horizontally. Bend pipe steel to riser.
6. Reinforced concrete top required when inlet: manhole or junction box riser is less than 4 feet in diameter; or when 3'-6", alt. b inlet, manhole or junction box riser is used; or when rectangular inlet is used.
7. See Index 425-001 for optional construction joints.

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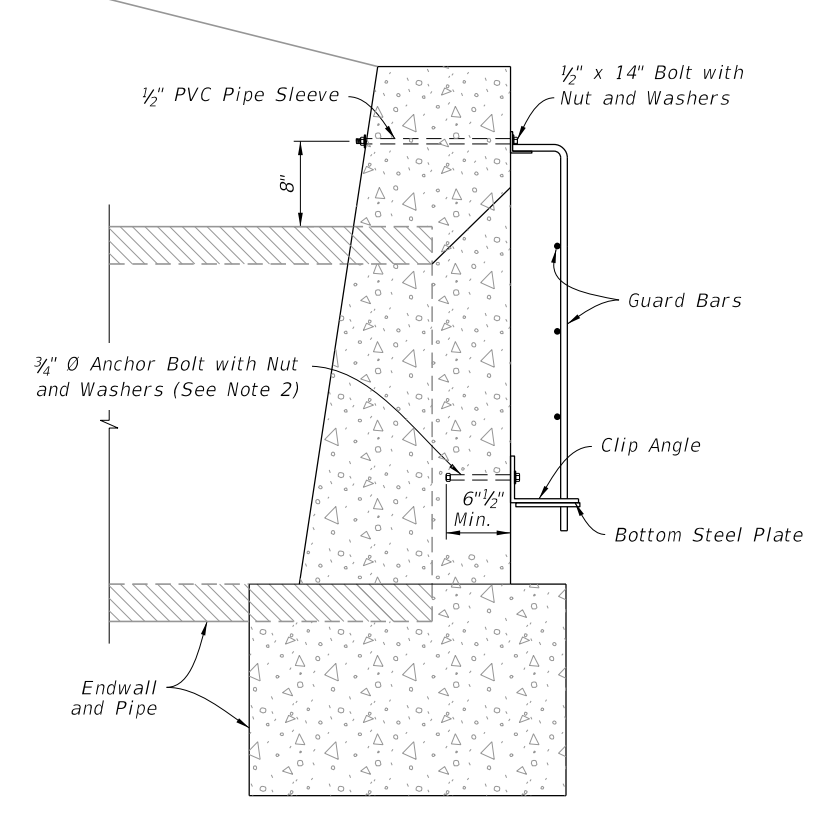
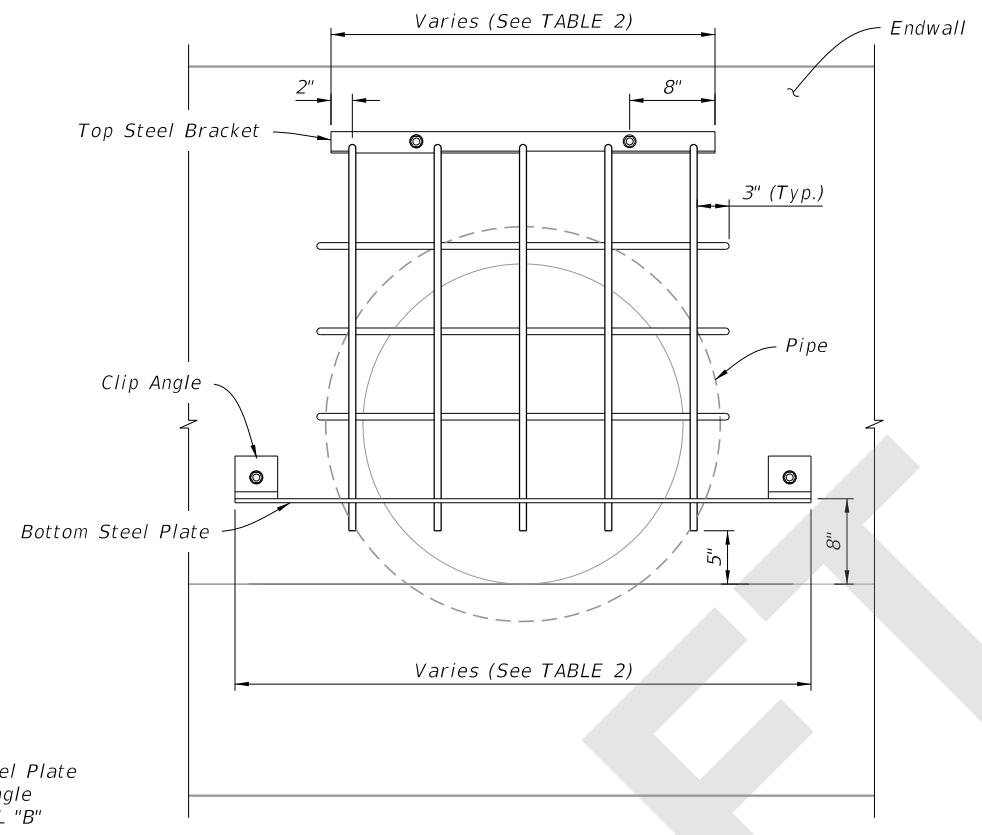
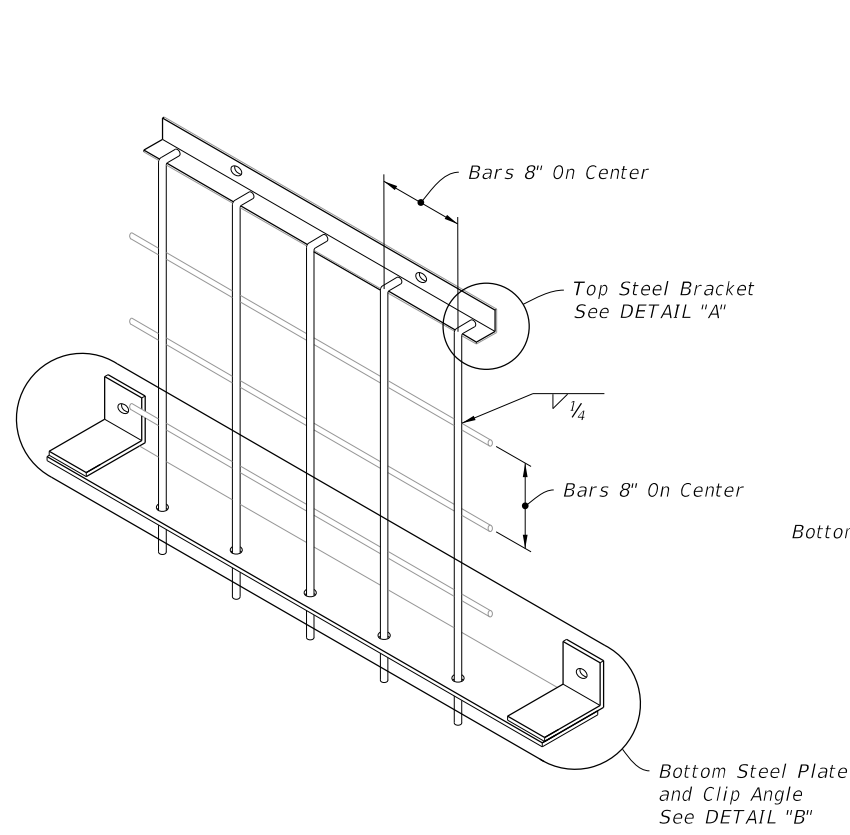
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CONCRETE COLLARS

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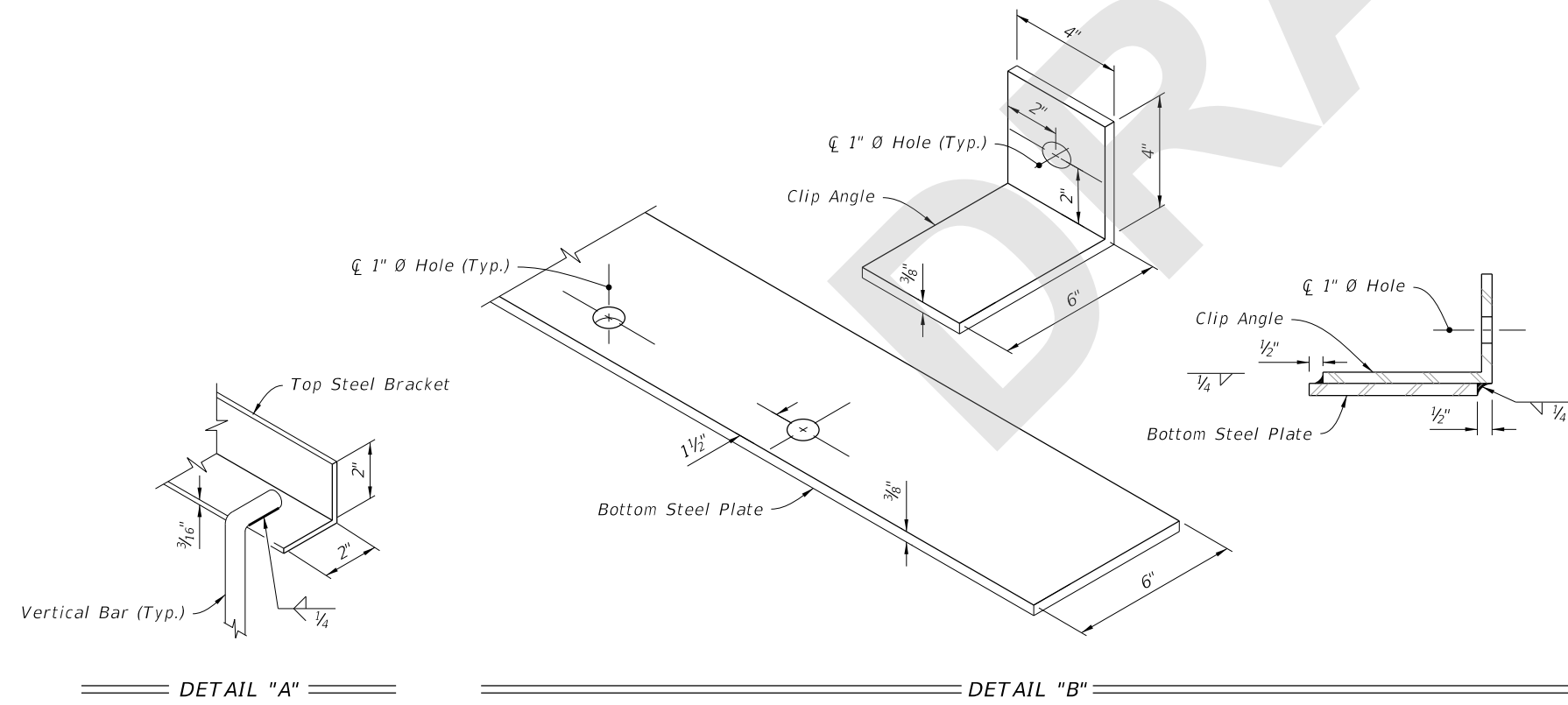
SINGLE GUARD
(30" Pipe Shown)

TABLE 2 - SINGLE GUARD

Pipe Dia. (in)	Top Steel Bracket	Bottom Steel Plate	Number of Holes	Number of Vert. Bars	Vertical Bars Size	Number of Horiz. Bars	Horizontal Bars Size	Weight lbs.
18	2'-4"	3'-6"	4	4	1/2"	1	1/2"	48
24	3'-0"	4'-0"	5	5	1/2"	2	1/2"	58
30	3'-0"	4'-6"	5	5	5/8"	3	5/8"	74
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NOTES:

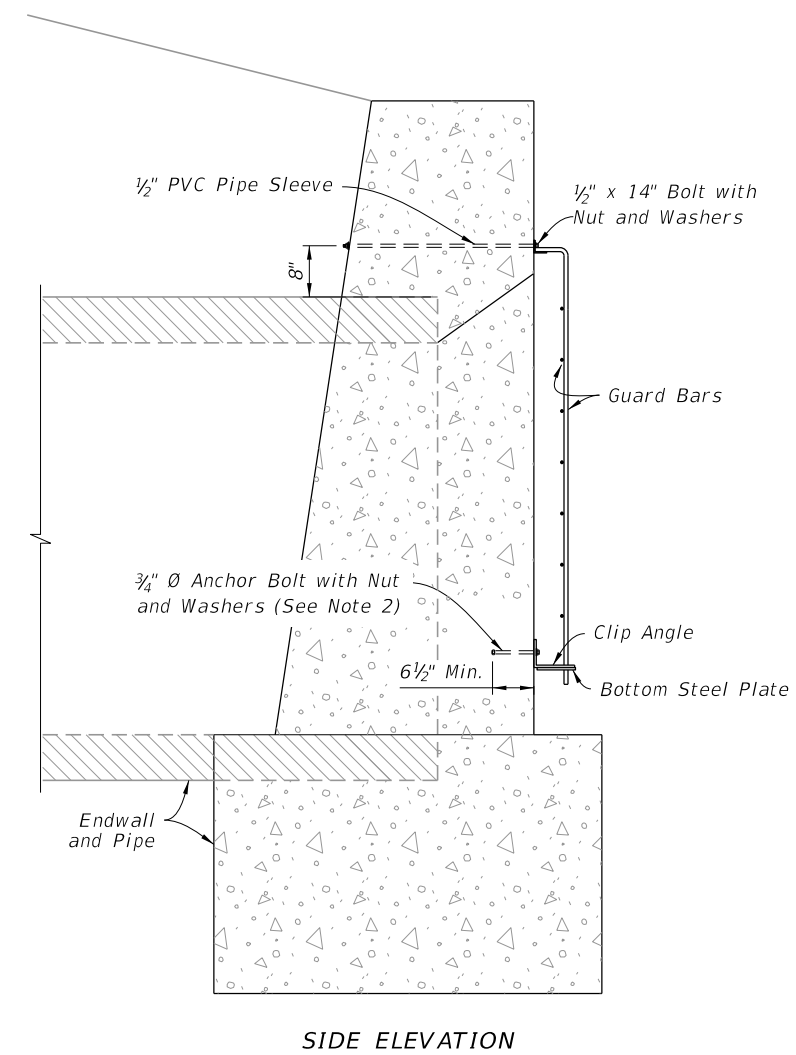
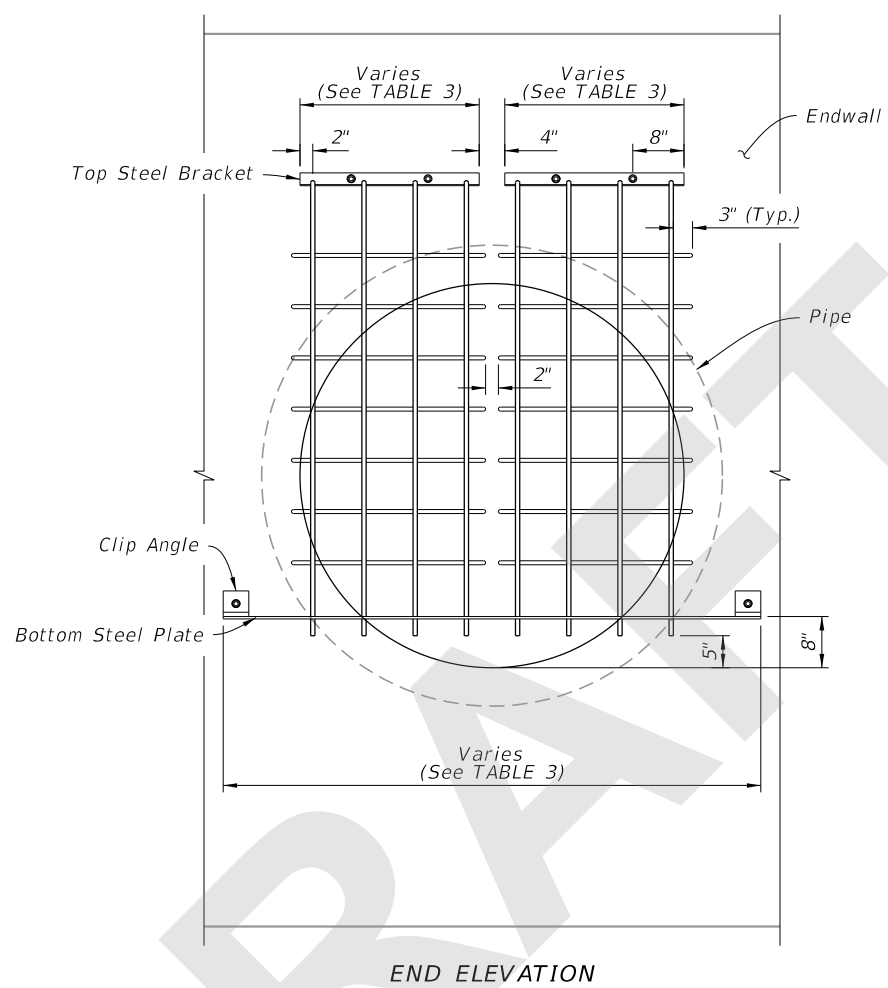
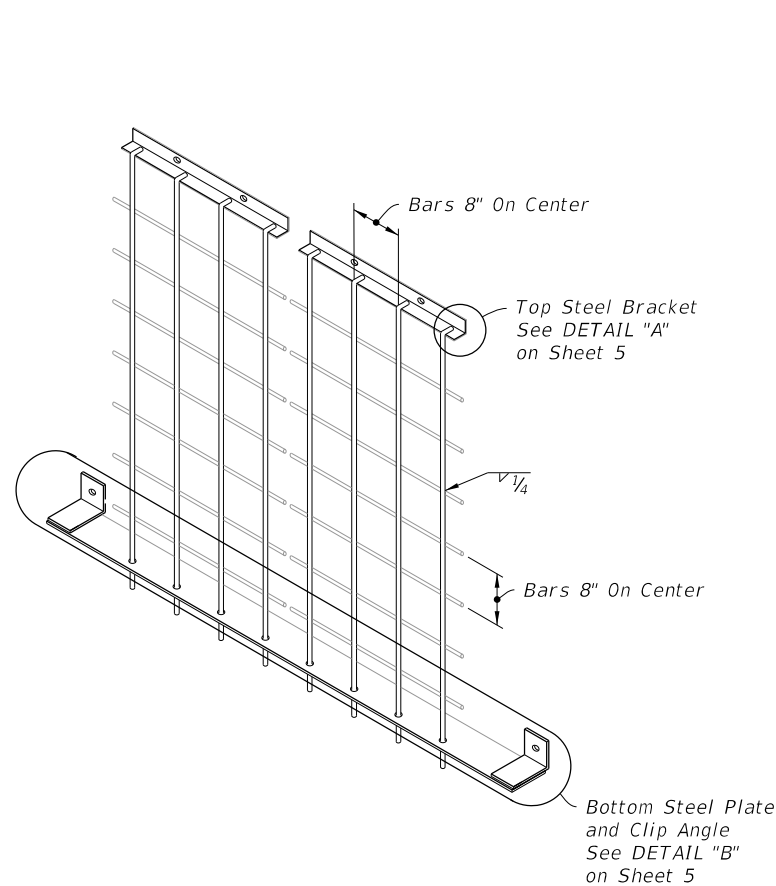
- Construct guards only at locations specifically called for in Plans.
- Anchor Bolts (Galvanized): Use C-I-P Hex Head bolts or fully threaded adhesive anchors, installed in accordance with Specification 416.



SINGLE PIPE END GUARD

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DOUBLE GUARD
(60" Pipe Shown)

NOTES:

1. Construct guards only at locations specifically called for in Plans.
2. Anchor Bolts (Galvanized): Use C-I-P Hex Head bolts or fully threaded adhesive anchors, installed in accordance with Specification 416.

TABLE 3 - DOUBLE GUARD

Pipe Dia. (in)	Top Steel Bracket Grate 1	Top Steel Bracket Grate 2	Bottom Steel Plate	Number of Total Holes	Number of Vert. Bars Grate 1	Number of Vert. Bars Grate 2	Vertical Bars Size	Number of Horiz. Bars (each grate)	Horizontal Bars Size	Weight lbs.
48	2'-4"	2'-4"	6'-0"	8	4	4	5/8"	5	5/8"	127
54	2'-4"	2'-4"	6'-6"	8	4	4	3/4"	6	5/8"	157
60	2'-4"	2'-4"	7'-0"	8	4	4	3/4"	7	5/8"	172

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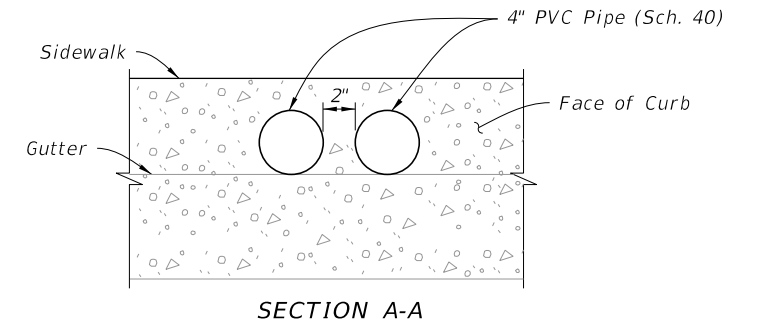
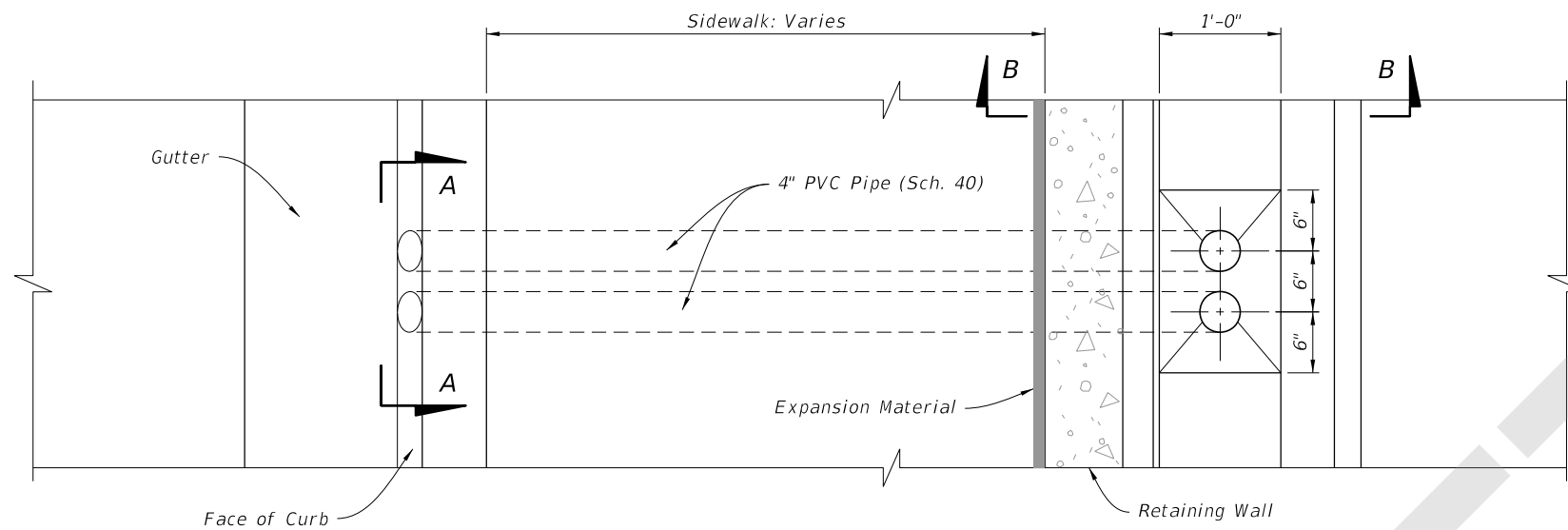
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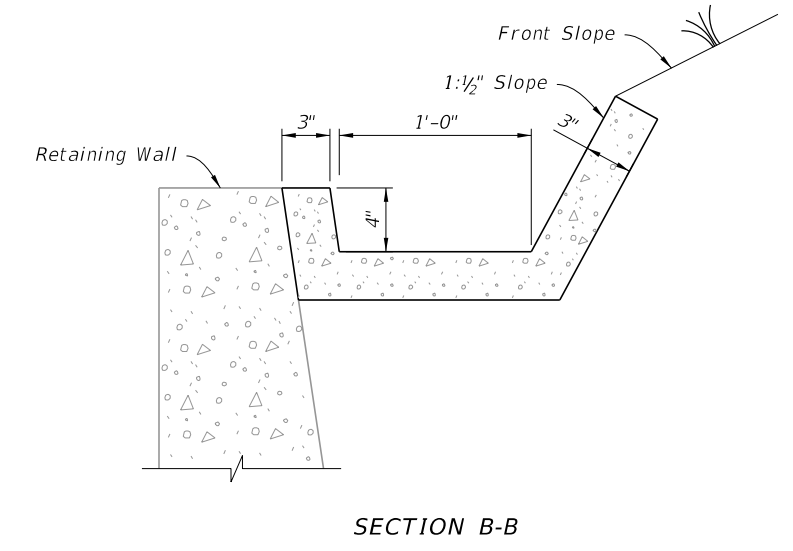
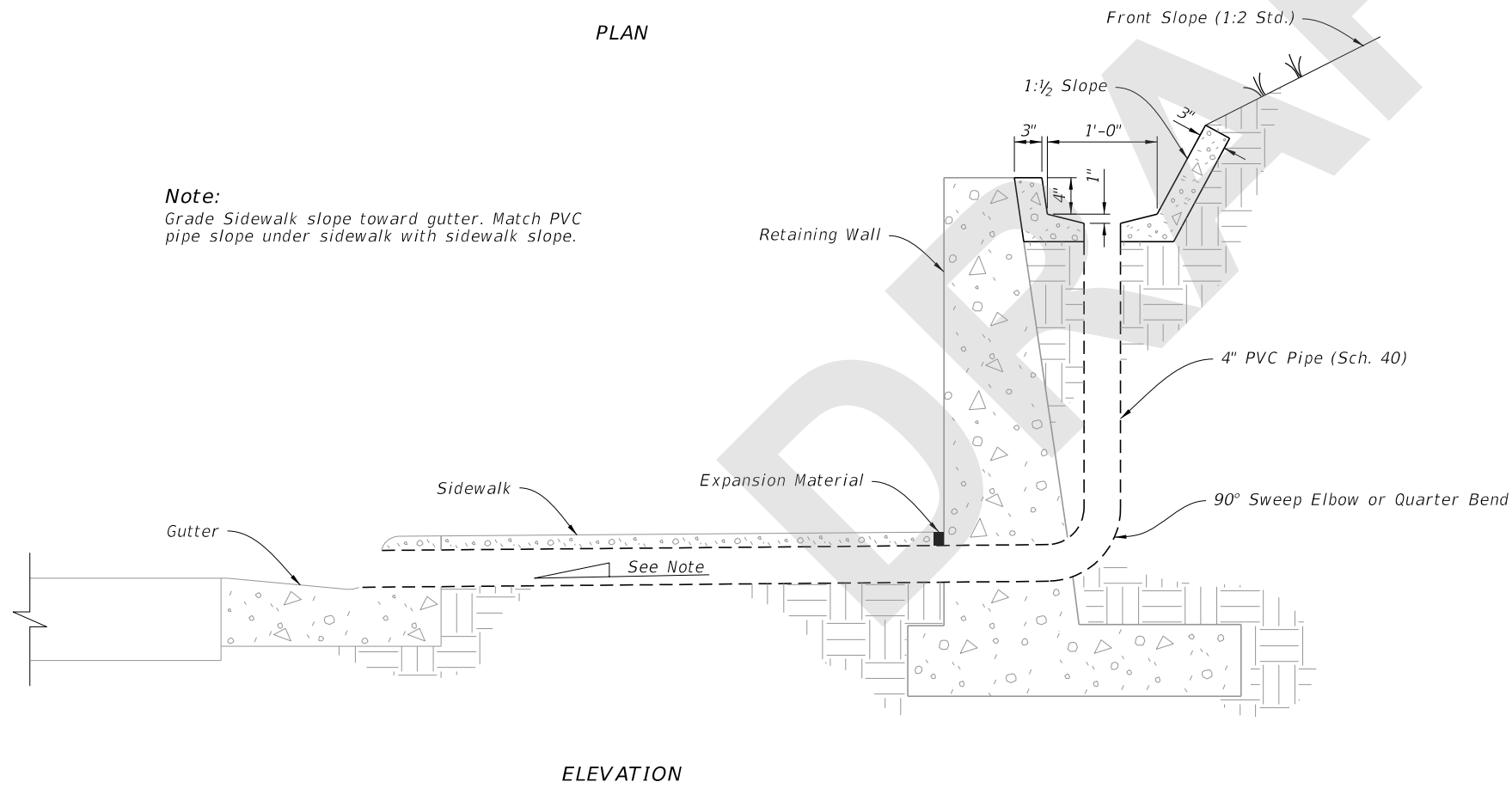
DOUBLE PIPE END GUARD

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Note:
Grade Sidewalk slope toward gutter. Match PVC pipe slope under sidewalk with sidewalk slope.



GUTTER AND DRAINS

RETAINING WALL CONCRETE GUTTER AND DRAINS

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