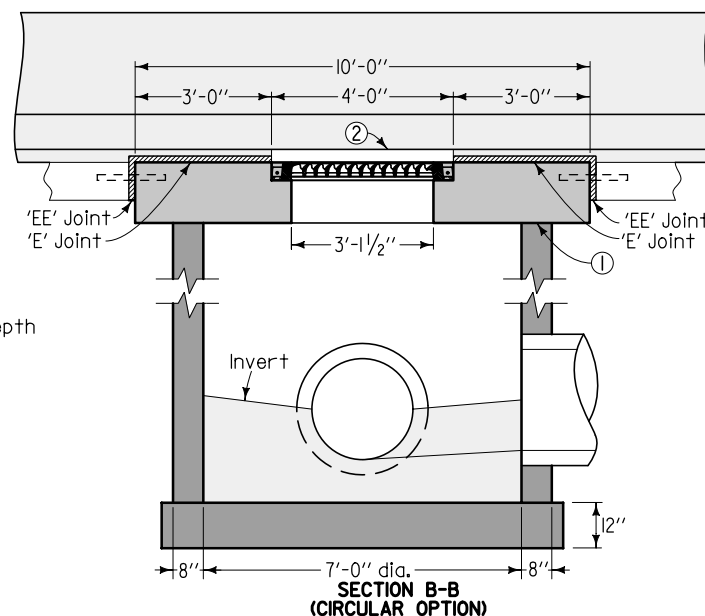
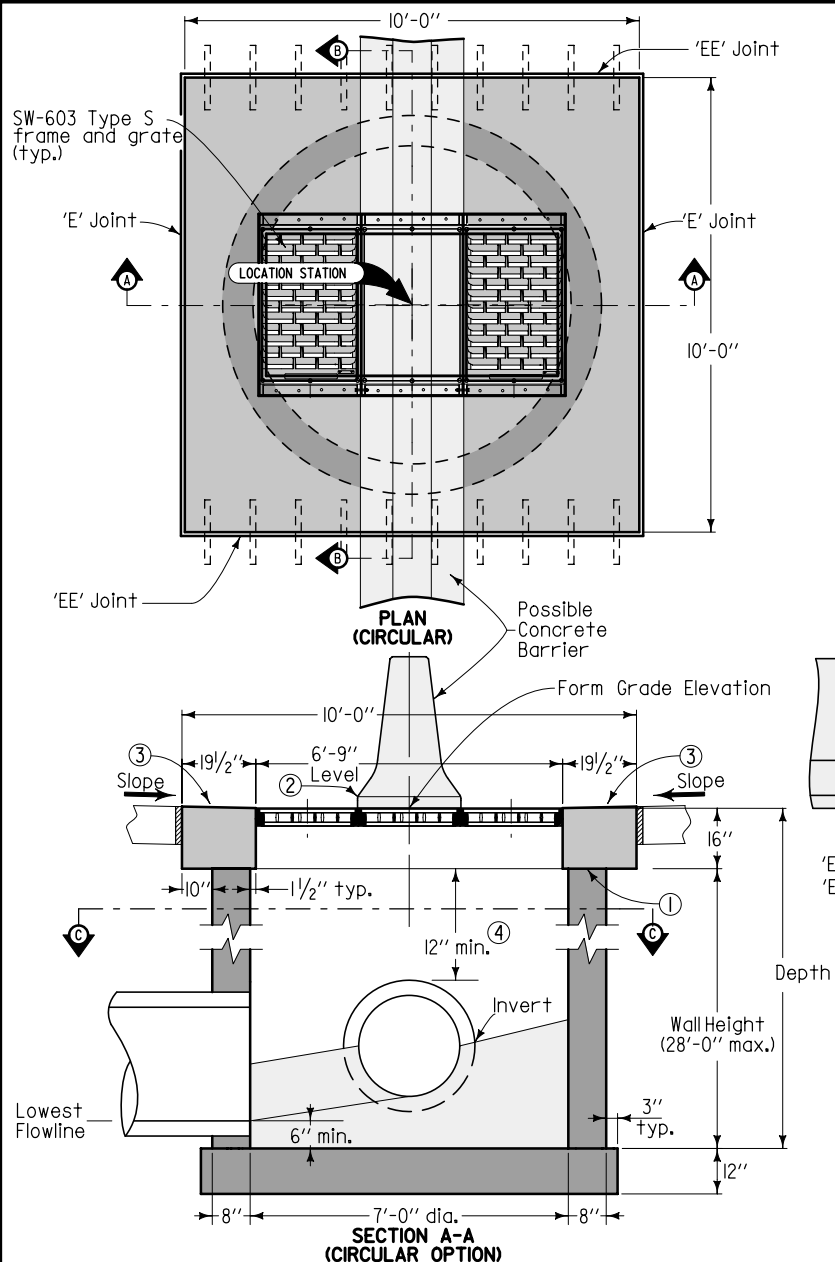




Unless otherwise specified, the contractor may construct either a circular structure or a rectangular structure.

All plate and edge armor steel to be ASTM A 36, galvanized after fabrication.

Remove center grate before constructing concrete barrier.

Cast frames into intake top so tops of grates are 1/4" below Form Grade Elevation. Bolt intake frames together on both sides with four 1/2" x 4" bolts.

For joint details, refer to PV-101.

- ① Trowel smooth and place two layers of 30-pound roofing felt to prevent bond.
- ② Leave 3-inch opening through barrier over the intake.
- ③ Vary slope of top to match elevation of adjacent pavement.
- ④ 12-inch minimum wall height above all pipes.

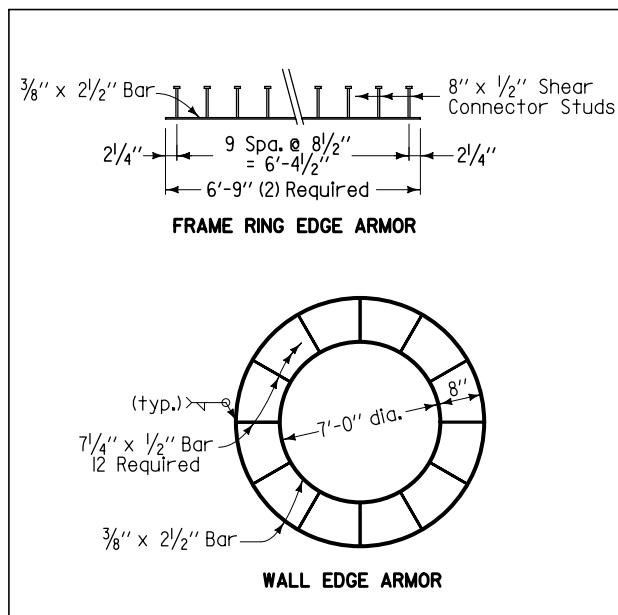
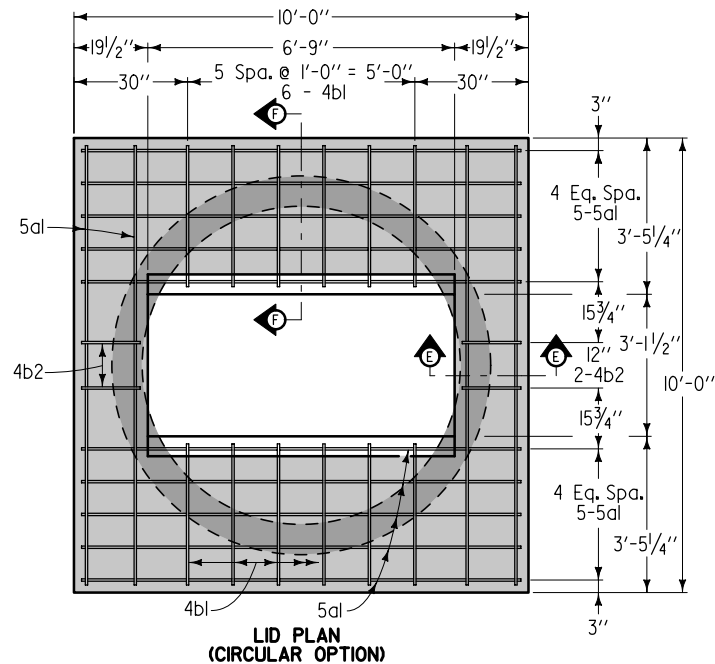
Possible Contract Item:

Barrier Intake, SW-547

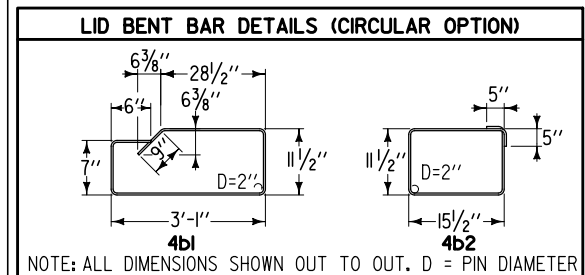
Possible Tabulation:

104-5B

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<i>Deanna Mifflin</i>		
APPROVED BY DESIGN METHODS ENGINEER		
TRIPLE-GRATE BARRIER INTAKE		



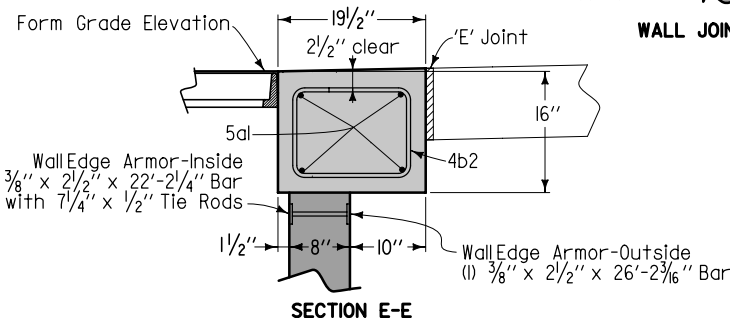
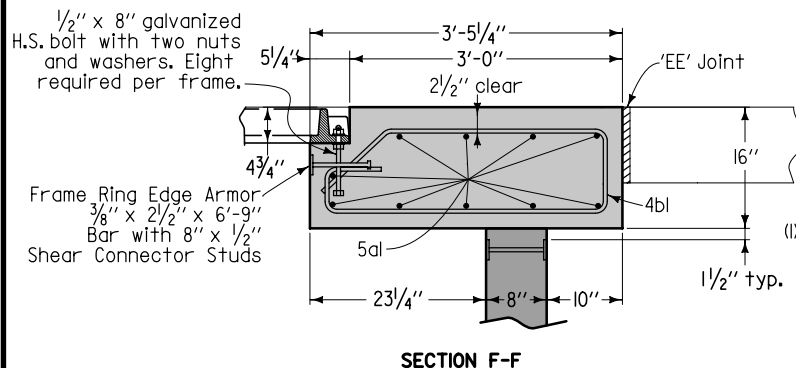
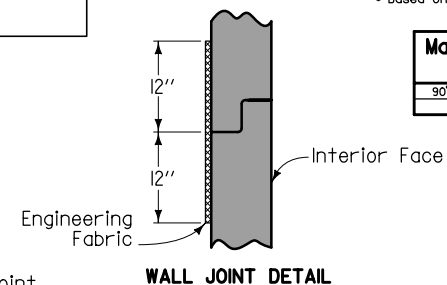
LID REINFORCING BAR LIST - EPOXY-COATED						
(CIRCULAR OPTION)						
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	
5al	Lid, Longit. & Transverse	—	28	9'-8	282	
4bl	Lid Hoop	□	12	8'-3	66	
4b2	Lid Hoop	□	4	5'-4	14	
EPOXY COATED REINFORCING STEEL - TOTAL					362	



LID QUANTITY SUMMARY (CIRCULAR OPTION)		
Concrete	3.8	CY
Epoxy Coated Reinforcing Steel	362	LB

• Based on Minimum thickness = 16"

Maximum Pipe Diameter for Pipes at:		
90° Separation	180° Separation	
36	48	



LID (CIRCULAR OPTION)

Iowa Department of Transportation

STANDARD ROAD PLAN

REVISIONS: Updated references to renamed standards.

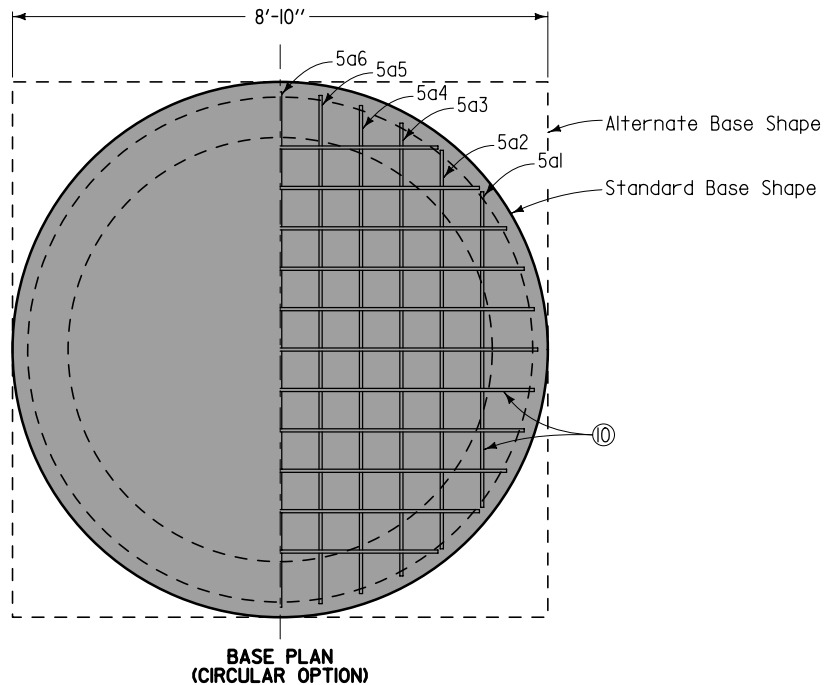
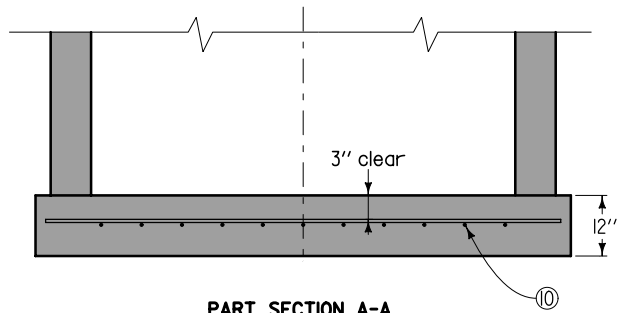
Deanna Mifflin
APPROVED BY DESIGN METHODS ENGINEER

TRIPLE-GRATE BARRIER INTAKE

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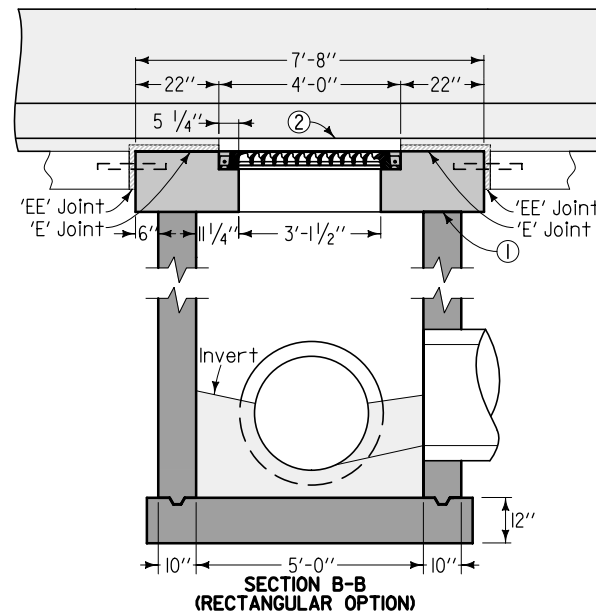
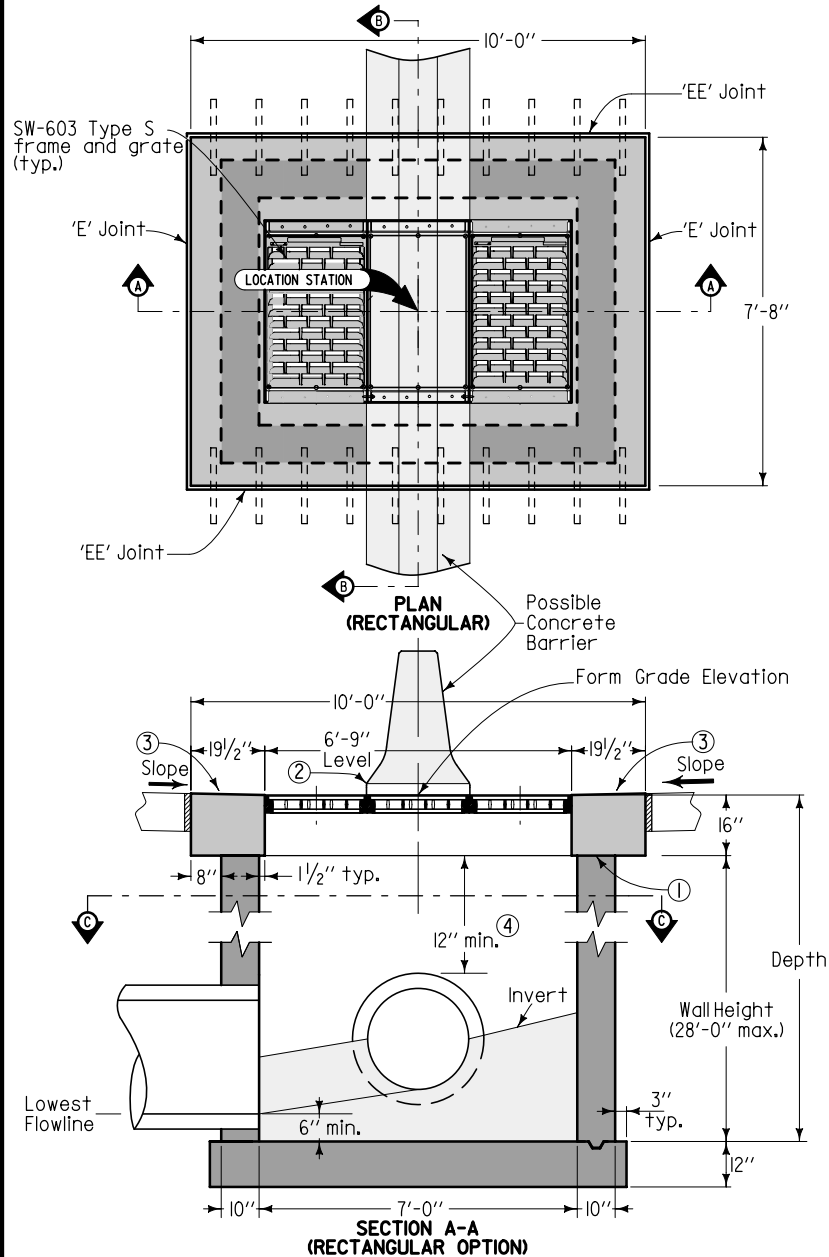
BASE (CIRCULAR OPTION)

BASE REINFORCING BAR LIST - EPOXY-COATED						
(CIRCULAR OPTION)						
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT	
5a1	Base, Longlt. & Transverse	—	4	5'-3"	22	
5a2	Base, Longlt. & Transverse	—	4	6'-7"	27	
5a3	Base, Longlt. & Transverse	—	4	7'-6"	31	
5a4	Base, Longlt. & Transverse	—	4	8'-0"	33	
5a5	Base, Longlt. & Transverse	—	4	8'-4"	35	
5a6	Base, Longlt. & Transverse	—	2	8'-6"	18	
EPOXY COATED REINFORCING STEEL - TOTAL					166	

BASE QUANTITY SUMMARY (CIRCULAR OPTION)		
Concrete		2.3 CY *
Epoxy Coated Reinforcing Steel		166 LB *
* Based on Standard Base Shape		

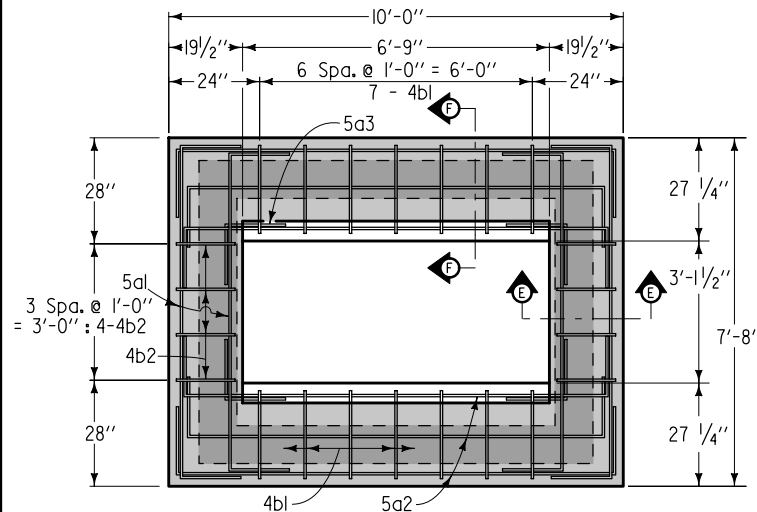
⑩ #5 at 8-inch centers each direction or equivalent welded wire fabric.

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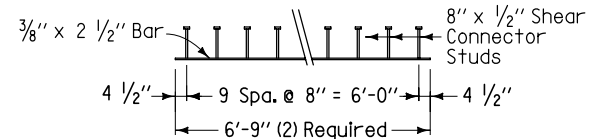


- ① Trowel smooth and place two layers of 30-pound roofing felt to prevent bond.
- ② Leave 3-inch opening through barrier over the intake.
- ③ Vary slope of top to match elevation of adjacent pavement.
- ④ 12-inch minimum wall height above all pipes.

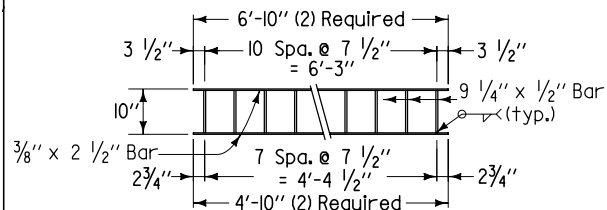
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**LID PLAN
(RECTANGULAR OPTION)**



FRAME RING EDGE ARMOR

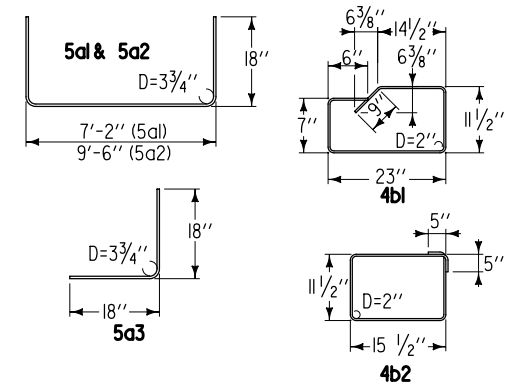


WALL EDGE ARMOR

**LID REINFORCING BAR LIST - EPOXY-COATED
(RECTANGULAR OPTION)**

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5a1	Lid, Longitudinal		8	10'-2	85
5a2	Lid, Transverse		10	12'-6	130
5a3	Lid, Interior, Corners		4	3'-0	13
4b1	Lid Hoop		14	5'-11	55
4b2	Lid Hoop		8	5'-4	29
EPOXY COATED REINFORCING STEEL - TOTAL					312

LID BENT BAR DETAILS (RECTANGULAR OPTION)

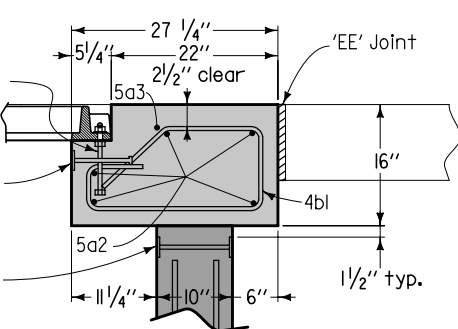


NOTE: ALL DIMENSIONS SHOWN OUT TO OUT. D = PIN DIAMETER

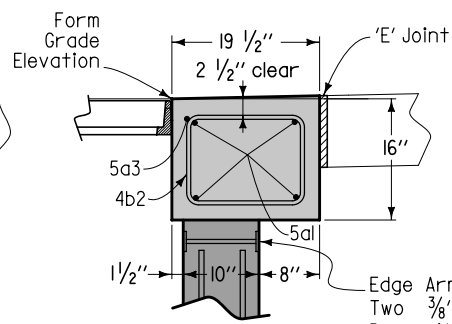
1/2" x 8" galvanized
H.S. bolt with two nuts
and washers. Eight
required per frame.

Edge Armor
3/8" x 2 1/2" x 6'-9"
Bar with 8" x 1/2"
Shear Connector Studs

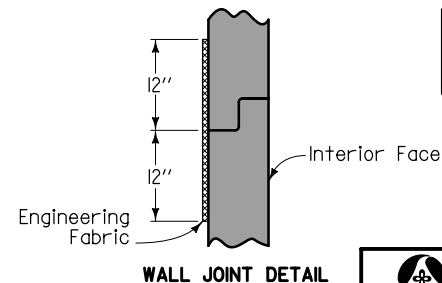
Edge Armor
Two 3/8" x 2 1/2" x 6'-10"
Bars with 9 1/4" x 1/2"
Tie Rods



SECTION F-F



SECTION E-E

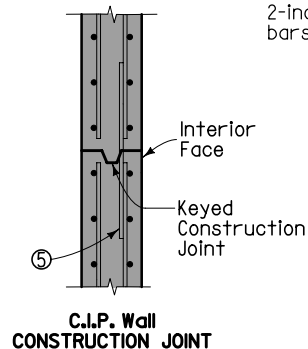
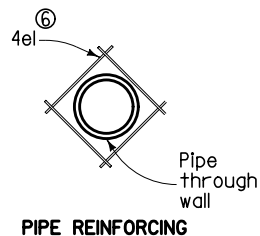
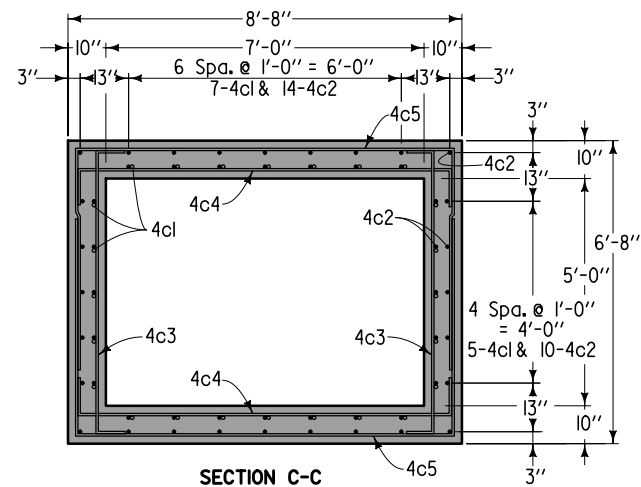
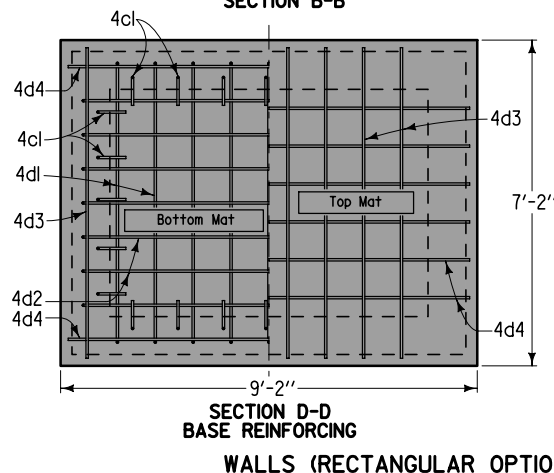
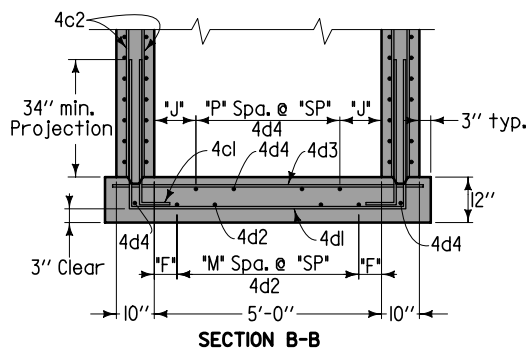
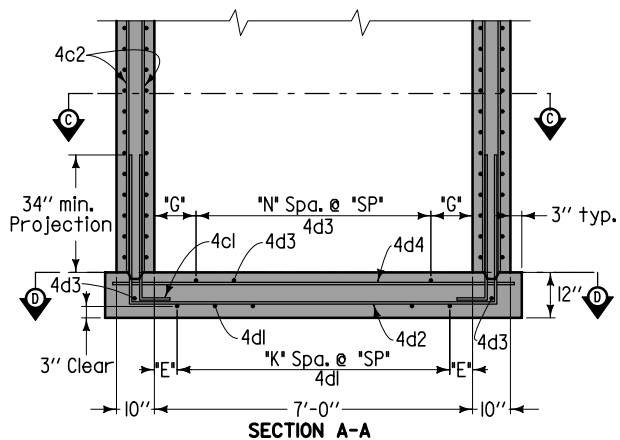
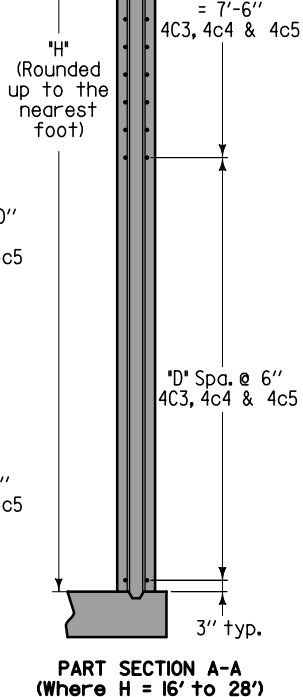
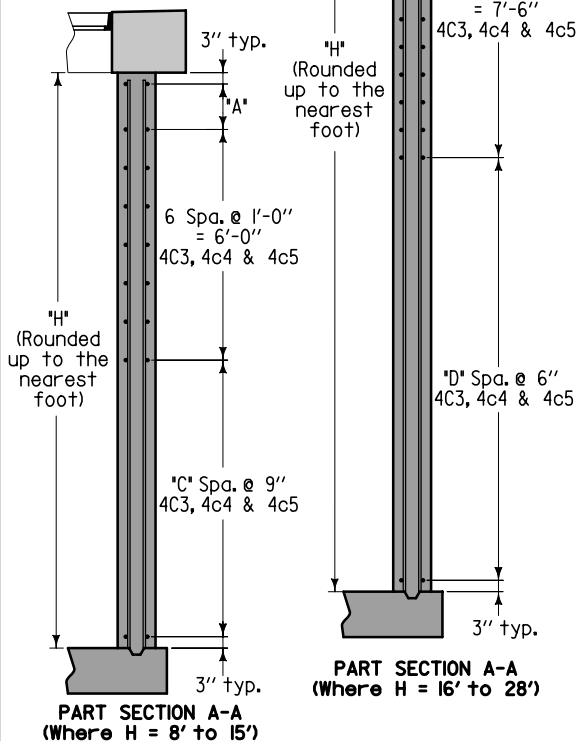
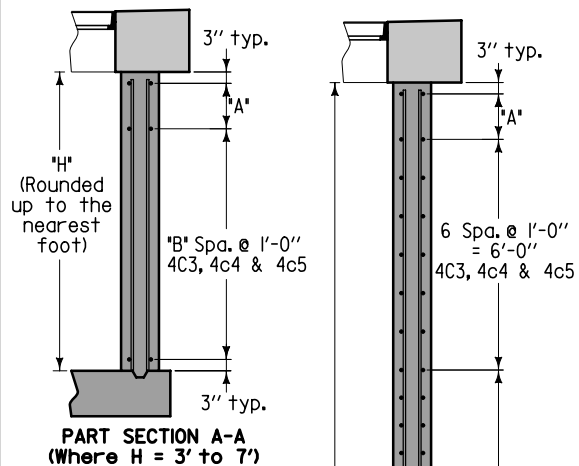


WALL JOINT DETAIL

**LID QUANTITY SUMMARY
(RECTANGULAR OPTION)**

Concrete	2.7	CY
Epoxy Coated Reinforcing Steel	312	LB

Iowa Department of Transportation STANDARD ROAD PLAN REVISIONS: Updated references to renamed standards. <i>Deanna Mifflin</i> APPROVED BY DESIGN METHODS ENGINEER TRIPLE-GRATE BARRIER INTAKE	REVISION 2 04-19-11
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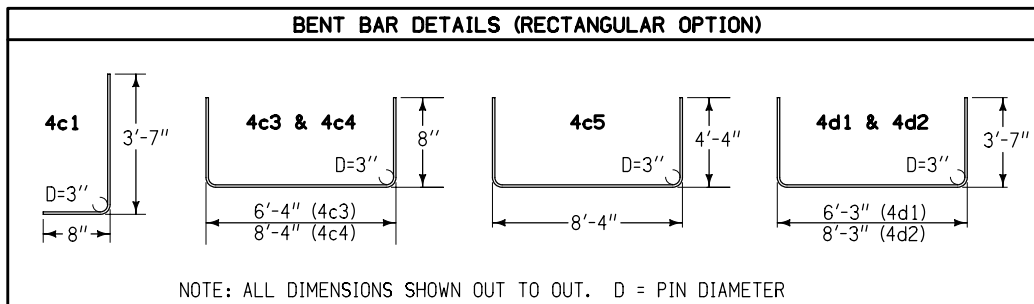


- ⑤ Install one set of 4rl x 3'-0" dowelbars @ 12-inch spacing at any wall joints. Twenty-eight 4rl bars required per joint, total weight = 56 lbs.
- ⑥ 4elbar length to be pipe diameter plus 12 inches. Place 4elbar inside of vertical reinforcing. Shift main reinforcing bars as required for pipe entrance. Field cut bars to maintain 3-inch clearance from bottom and 2-inch clearance from face of walls. Eight 4el bars required per pipe entrance.

Iowa Department of Transportation STANDARD ROAD PLAN REVISIONS: Updated references to renamed standards. <i>Deanna Mifflin</i> APPROVED BY DESIGN METHODS ENGINEER TRIPLE-GRATE BARRIER INTAKE	REVISION 2 04-19-11
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VARIABLE DIMENSIONS AND QUANTITIES FOR RECTANGULAR OPTION																																													
Dimensions						Bar List																								Quantities															
⑦ "H" (Ft.)	"A" (In.)	"E" (In.)	"F" (In.)	"G" (In.)	"J" (In.)	4c1		4c2		4c3 ⑧				4c4 ⑧				4c5 ⑧				4d1		4d2		4d3		4d4		Concrete - Cu. Yds.				Steel Total ⑨											
						No.	L	No.	L	No. of Spaces			No.	L	No. of Spaces			No.	L	No. of Spaces			No.	L	No. of Spaces			No.	L	No.	L	No.	L		Base	Lid	Walls	Total							
										"B"	"C"	"D"			"B"	"C"	"D"			"B"	"C"	"D"			"B"	"C"	"D"												"B"	"C"	"D"	"B"	"C"	"D"	"B"
3	6	2"	0"	7"	5"	24	4'-3"	--	--	2	--	--	8	7'-8"	2	--	--	8	9'-8"	2	--	--	8	17'-0"	10"	8	9	13'-5"	10"	6	7	15'-5"	10"	7	10	6'-10"	10"	5	8	8'-10"	2.4	2.7	2.5	7.7	810
4	6	2"	0"	7"	5"	24	4'-3"	52	3'-10"	3	--	--	10	7'-8"	3	--	--	10	9'-8"	3	--	--	10	17'-0"	10"	8	9	13'-5"	10"	6	7	15'-5"	10"	7	10	6'-10"	10"	5	8	8'-10"	2.4	2.7	3.4	8.5	989
5	6	2"	0"	7"	5"	24	4'-3"	52	4'-10"	4	--	--	12	7'-8"	4	--	--	12	9'-8"	4	--	--	12	17'-0"	10"	8	9	13'-5"	10"	6	7	15'-5"	10"	7	10	6'-10"	10"	5	8	8'-10"	2.4	2.7	4.2	9.4	1,068
6	6	2"	0"	7"	5"	24	4'-3"	52	5'-10"	5	--	--	14	7'-8"	5	--	--	14	9'-8"	5	--	--	14	17'-0"	10"	8	9	13'-5"	10"	6	7	15'-5"	10"	7	10	6'-10"	10"	5	8	8'-10"	2.4	2.7	5.1	10.2	1,150
7	6	2"	2"	6"	6"	24	4'-3"	52	6'-10"	6	--	--	16	7'-8"	6	--	--	16	9'-8"	6	--	--	16	17'-0"	8"	10	11	13'-5"	8"	7	8	15'-5"	8"	9	12	6'-10"	8"	6	9	8'-10"	2.4	2.7	5.9	11.0	1,273
8	9	2"	2"	6"	6"	24	4'-3"	52	7'-10"	6	1	--	18	7'-8"	6	1	--	18	9'-8"	6	1	--	18	17'-0"	8"	10	11	13'-5"	8"	7	8	15'-5"	8"	9	12	6'-10"	8"	6	9	8'-10"	2.4	2.7	6.8	11.9	1,353
9	12	2"	2"	6"	6"	24	4'-3"	52	8'-10"	6	2	--	20	7'-8"	6	2	--	20	9'-8"	6	2	--	20	17'-0"	8"	10	11	13'-5"	8"	7	8	15'-5"	8"	9	12	6'-10"	8"	6	9	8'-10"	2.4	2.7	7.6	12.7	1,434
10	6	2"	2"	6"	6"	24	4'-3"	52	9'-10"	6	4	--	24	7'-8"	6	4	--	24	9'-8"	6	4	--	24	17'-0"	8"	10	11	13'-5"	8"	7	8	15'-5"	8"	9	12	6'-10"	8"	6	9	8'-10"	2.4	2.7	8.4	13.6	1,562
11	9	2"	2"	6"	6"	24	4'-3"	52	10'-10"	6	5	--	26	7'-8"	6	5	--	26	9'-8"	6	5	--	26	17'-0"	8"	10	11	13'-5"	8"	7	8	15'-5"	8"	9	12	6'-10"	8"	6	9	8'-10"	2.4	2.7	9.3	14.4	1,641
12	12	2"	2"	6"	6"	24	4'-3"	52	11'-10"	6	6	--	28	7'-8"	6	6	--	28	9'-8"	6	6	--	28	17'-0"	8"	10	11	13'-5"	8"	7	8	15'-5"	8"	9	12	6'-10"	8"	6	9	8'-10"	2.4	2.7	10.1	15.3	1,722
13	6	2"	2"	6"	6"	24	4'-3"	52	12'-10"	6	8	--	32	7'-8"	6	8	--	32	9'-8"	6	8	--	32	17'-0"	8"	10	11	13'-5"	8"	7	8	15'-5"	8"	9	12	6'-10"	8"	6	9	8'-10"	2.4	2.7	11.0	16.1	1,849
14	9	0"	0"	3"	3"	24	4'-3"	52	13'-10"	6	9	--	34	7'-8"	6	9	--	34	9'-8"	6	9	--	34	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	11.8	17.0	2,050
15	12	0"	0"	3"	3"	24	4'-3"	52	14'-10"	6	10	--	36	7'-8"	6	10	--	36	9'-8"	6	10	--	36	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	12.7	17.8	2,129
16	12	0"	0"	3"	3"	24	4'-3"	52	15'-10"	6	10	2	40	7'-8"	6	10	2	40	9'-8"	6	10	2	40	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	13.5	18.6	2,256
17	12	0"	0"	3"	3"	24	4'-3"	52	16'-10"	6	10	4	44	7'-8"	6	10	4	44	9'-8"	6	10	4	44	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	14.4	19.5	2,383
18	12	0"	0"	3"	3"	24	4'-3"	52	17'-10"	6	10	6	48	7'-8"	6	10	6	48	9'-8"	6	10	6	48	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	15.2	20.3	2,509
19	12	0"	0"	3"	3"	24	4'-3"	52	18'-10"	6	10	8	52	7'-8"	6	10	8	52	9'-8"	6	10	8	52	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	16.0	21.2	2,636
20	12	0"	0"	3"	3"	24	4'-3"	52	19'-10"	6	10	10	56	7'-8"	6	10	10	56	9'-8"	6	10	10	56	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	16.9	22.0	2,763
21	12	0"	0"	3"	3"	24	4'-3"	52	20'-10"	6	10	12	60	7'-8"	6	10	12	60	9'-8"	6	10	12	60	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	17.7	22.9	2,888
22	12	0"	0"	3"	3"	24	4'-3"	52	21'-10"	6	10	14	64	7'-8"	6	10	14	64	9'-8"	6	10	14	64	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	18.6	23.7	3,015
23	12	0"	0"	3"	3"	24	4'-3"	52	22'-10"	6	10	16	68	7'-8"	6	10	16	68	9'-8"	6	10	16	68	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	19.4	24.6	3,141
24	12	0"	0"	3"	3"	24	4'-3"	52	23'-10"	6	10	18	72	7'-8"	6	10	18	72	9'-8"	6	10	18	72	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	20.3	25.4	3,269
25	12	0"	0"	3"	3"	24	4'-3"	52	24'-10"	6	10	20	76	7'-8"	6	10	20	76	9'-8"	6	10	20	76	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	21.1	26.3	3,395
26	12	0"	0"	3"	3"	24	4'-3"	52	25'-10"	6	10	22	80	7'-8"	6	10	22	80	9'-8"	6	10	22	80	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	22.0	27.1	3,521
27	12	0"	0"	3"	3"	24	4'-3"	52	26'-10"	6	10	24	84	7'-8"	6	10	24	84	9'-8"	6	10	24	84	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	22.8	27.9	3,647
28	12	0"	0"	3"	3"	24	4'-3"	52	27'-10"	6	10	26	88	7'-8"	6	10	26	88	9'-8"	6	10	26	88	17'-0"	6"	14	15	13'-5"	6"	10	11	15'-5"	6"	13	16	6'-10"	6"	12	15	8'-10"	2.4	2.7	23.7	28.8	3,774

- ⑦ A = First bar spacing at top of wall.
Minimum spacing is 3 inches. Maximum spacing is 12 inches. Adjust as necessary.
- ⑧ See Section A-A on sheet 2 for spacing.
- ⑨ Quantity includes 312 lbs. for lid.



 Iowa Department of Transportation STANDARD ROAD PLAN REVISIONS: Updated references to renamed standards. <i>Deanna Mifflin</i> APPROVED BY DESIGN METHODS ENGINEER TRIPLE-GRATE BARRIER INTAKE	REVISION 2 04-19-11	
	SW-547	
	SHEET 7 of 7	

REINFORCEMENT (RECTANGULAR OPTION)