

Unless specified otherwise, the contractor has the option to either install a precast circular structure or construct 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 $\frac{1}{4}$ " below Form Grade Elevation. Bolt intake frames together on both sides with four $\frac{1}{2}$ " x 4" bolts.

For joint details, refer to PV-101.

Maximum pipe size for the rectangular option is 60 inches. Refer to the table below for maximum pipe size information related to the circular option.

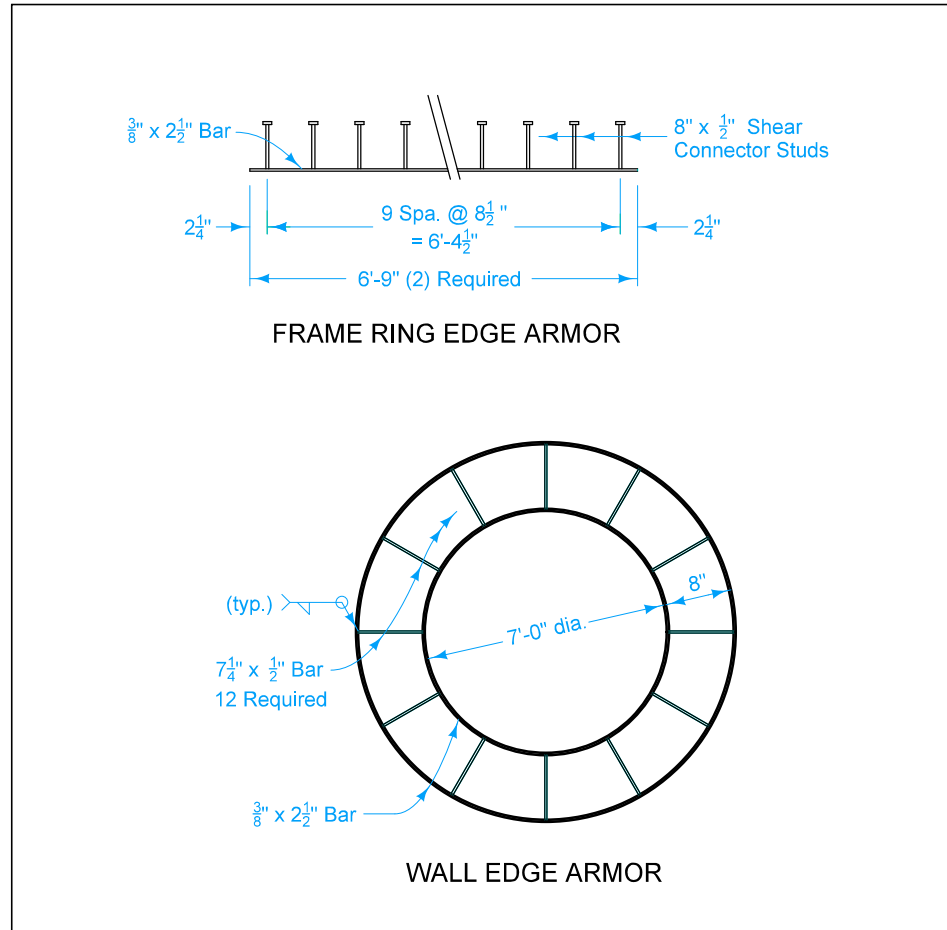
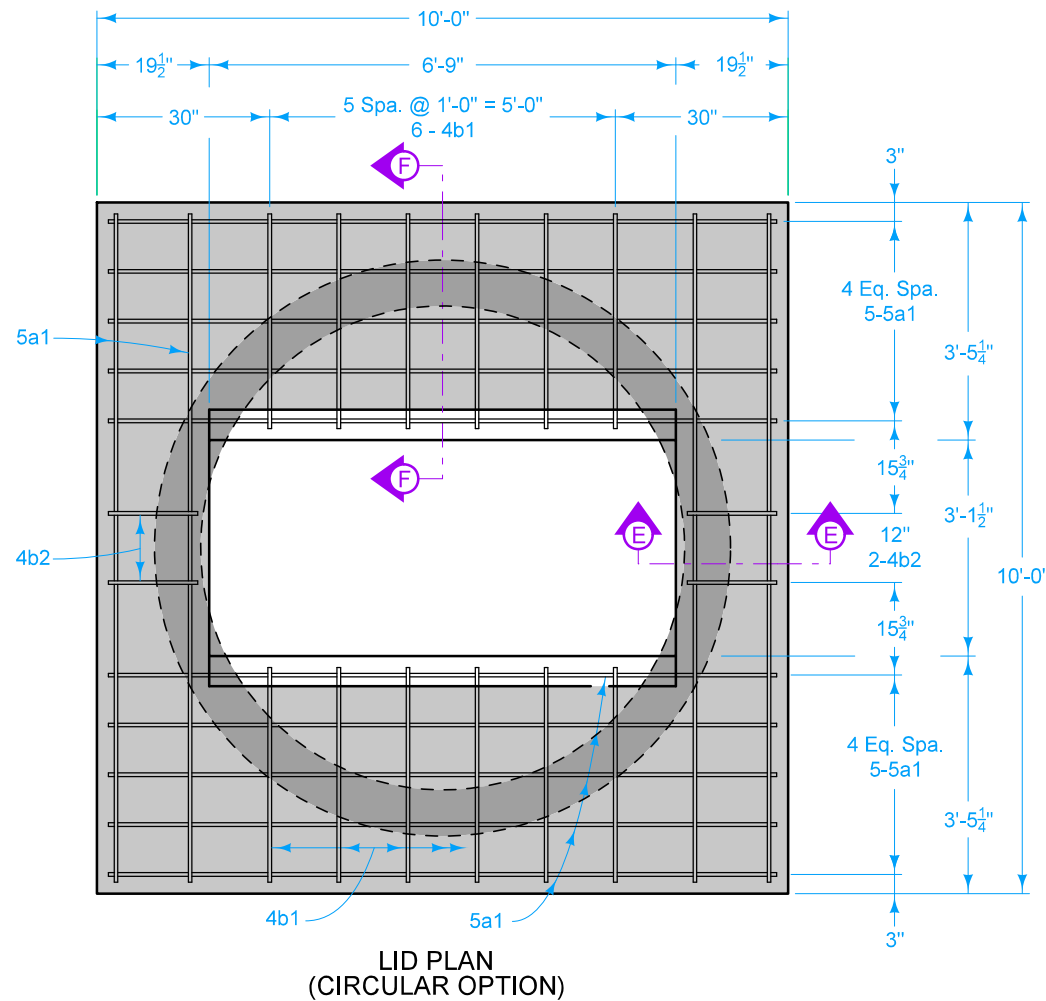
MAXIMUM PIPE DIAMETER FOR 2 PIPES	
at 180° Separation	At 90° Separation
48 inches	36 inches

- 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 Match slope of top and grate to adjacent pavement.
- ④ 12 inch minimum wall height above all pipes.

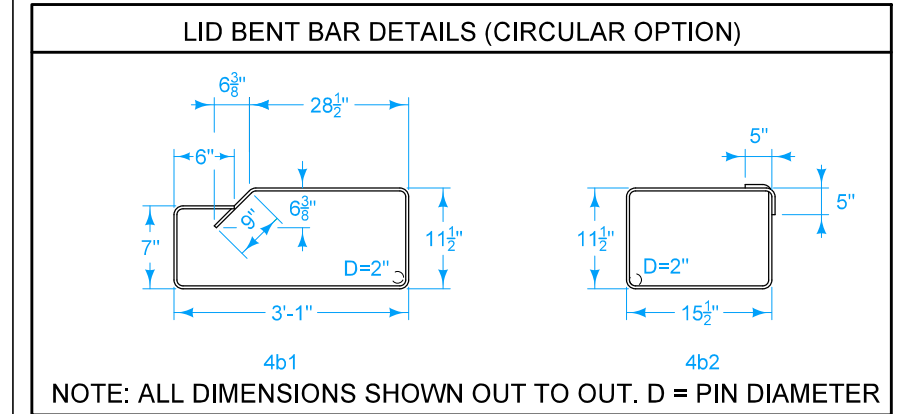
Possible Contract Item:
Barrier Intake, SW-547

Possible Tabulation:
104-5B

IOWA DOT	REVISION	
	5	04-17-18
STANDARD ROAD PLAN		SW-547
		SHEET 1 of 7
REVISIONS: Changed 'Invert' callout to 'Concrete Fillet'. Added maximum pipe size information.		
<i>Shawn Miller</i> APPROVED BY DESIGN METHODS ENGINEER		
TRIPLE-GRATE BARRIER INTAKE		

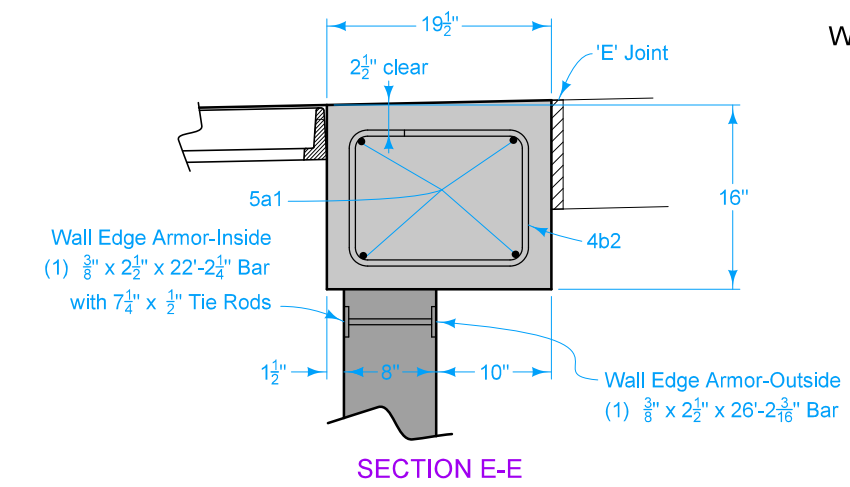
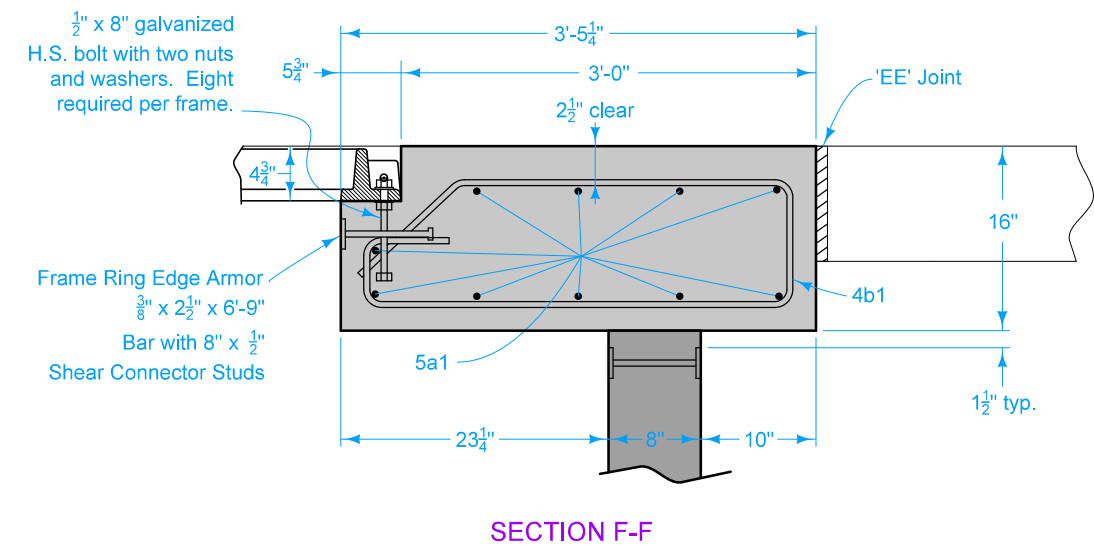
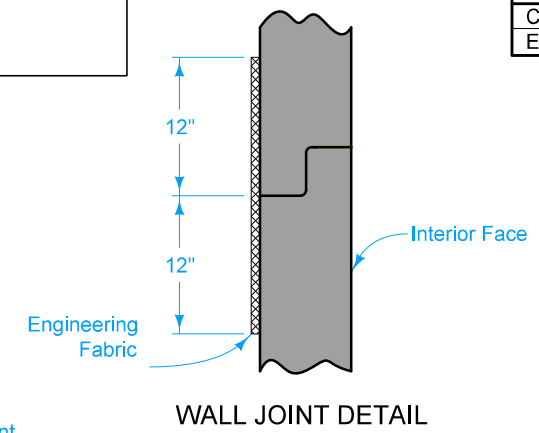


LID REINFORCING BAR LIST - EPOXY COATED					
(CIRCULAR OPTION)					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5a1	Lid, Longitudinal & Transverse	—	28	9'-8"	282
4b1	Lid Hoop	⊔	12	8'-3"	66
4b2	Lid Hoop	⊔	4	5'-4"	14
EPOXY COATED REINFORCING STEEL - TOTAL					362



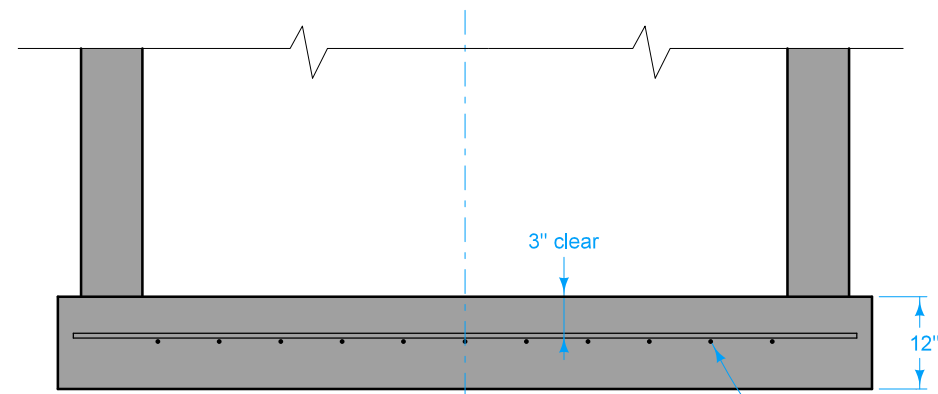
LID QUANTITY SUMMARY (CIRCULAR OPTION)	
Concrete	3.8 CY*
Epoxy Coated Reinforcing Steel	362 LB

* Based on Minimum thickness = 16"

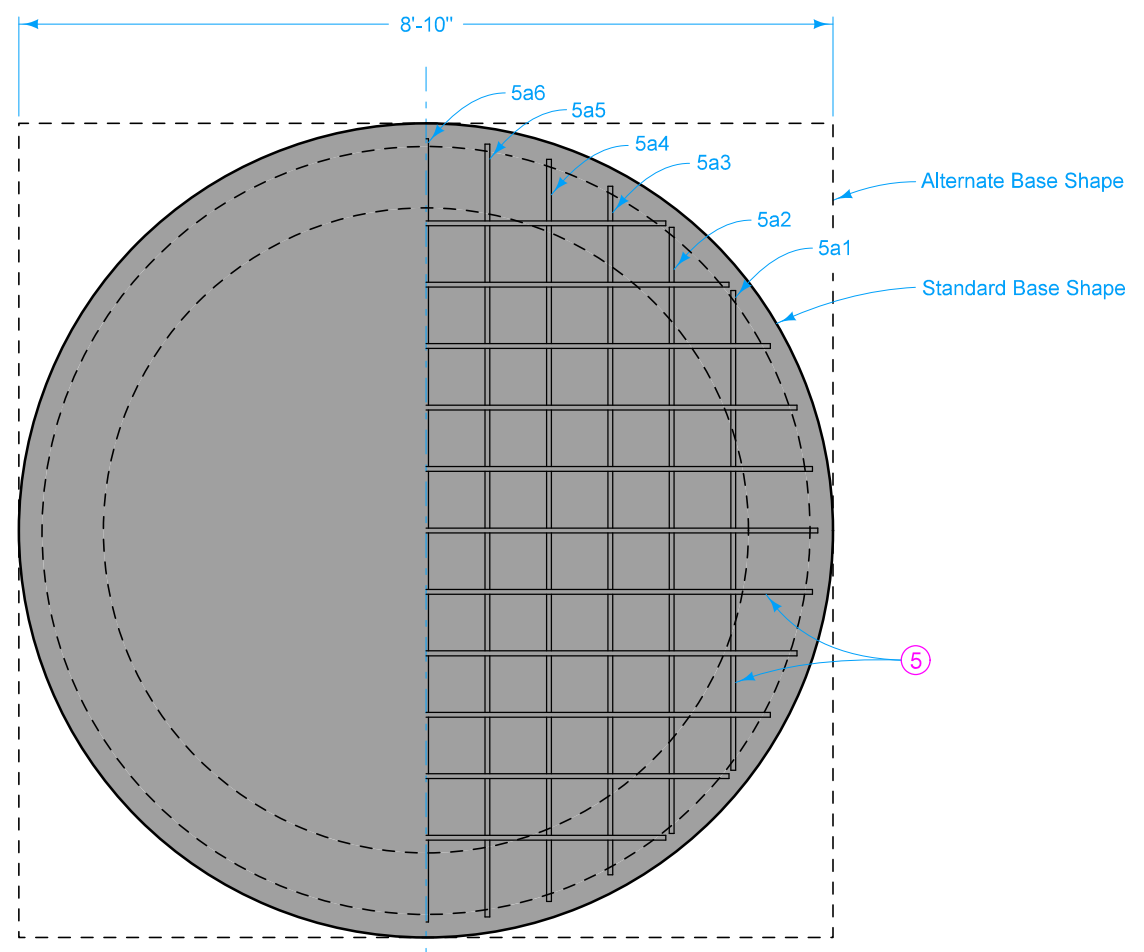


LID (CIRCULAR OPTION)

	REVISION
	5 04-17-18
	SW-547
SHEET 2 of 7	
REVISIONS:	Changed 'Invert' callout to 'Concrete Fillet'. Added maximum pipe size information.
 APPROVED BY DESIGN METHODS ENGINEER	
TRIPLE-GRATE BARRIER INTAKE	



PART SECTION A-A



BASE PLAN (CIRCULAR OPTION)

BASE (CIRCULAR OPTION)

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

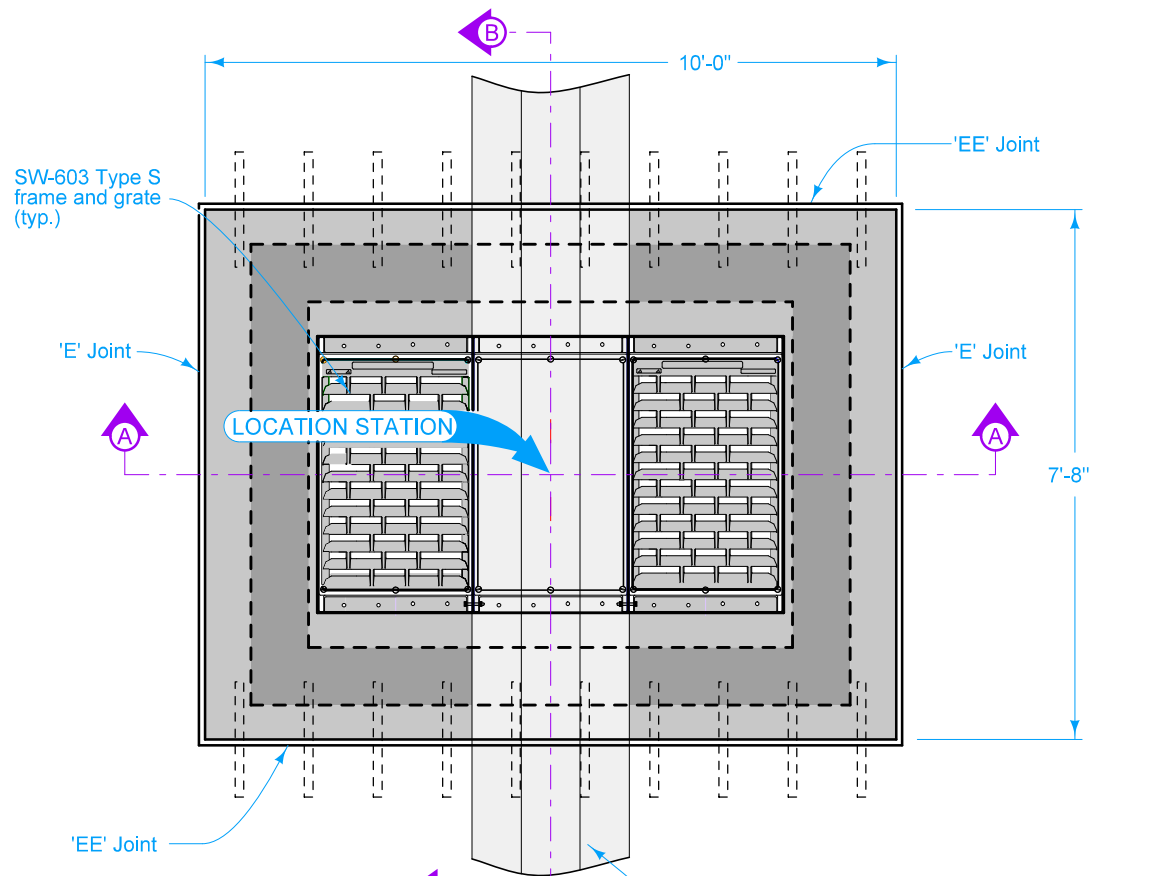
⑤ #5 at 8 inch centers each direction or equivalent welded wire fabric.

	REVISION	
	5	04-17-18
STANDARD ROAD PLAN		SW-547
		SHEET 3 of 7

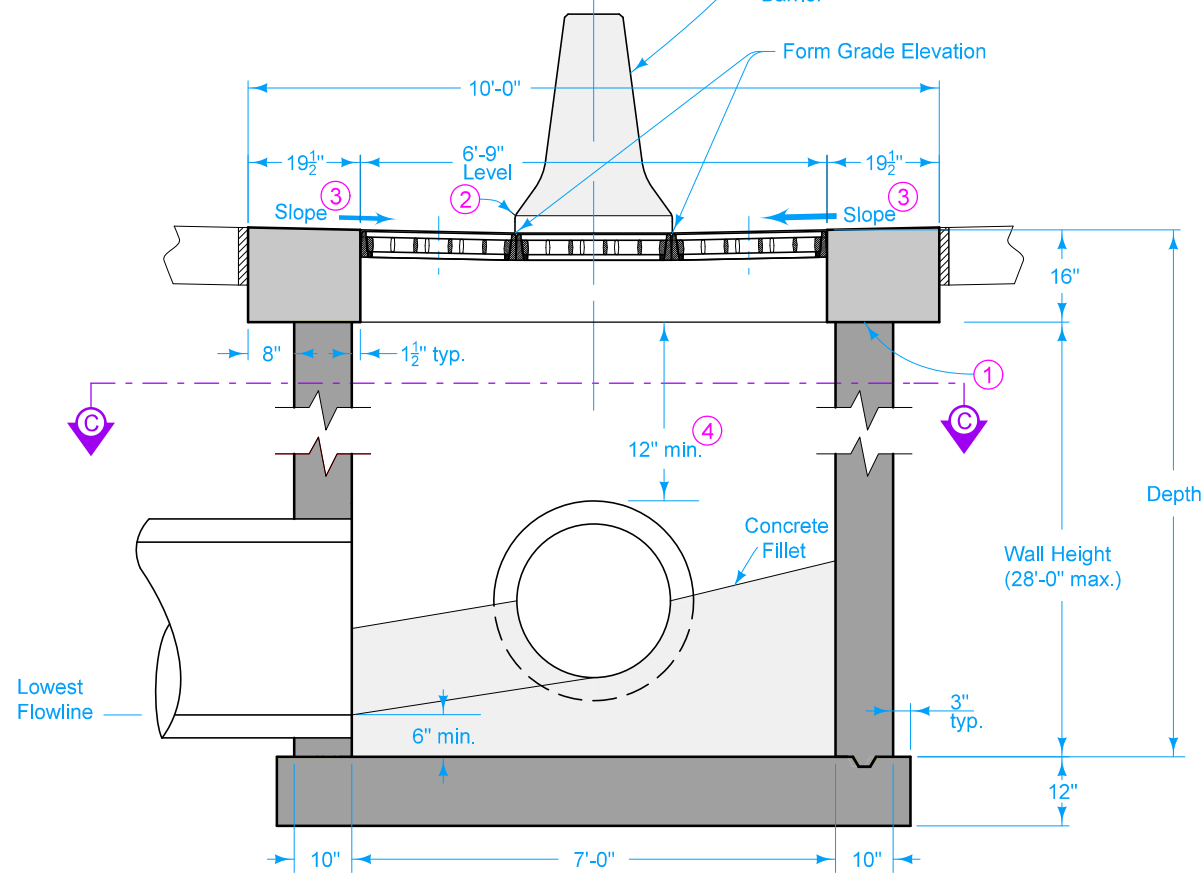
REVISIONS: Changed 'Invert' callout to 'Concrete Fillet'. Added maximum pipe size information.

Shawn Miller
APPROVED BY DESIGN METHODS ENGINEER

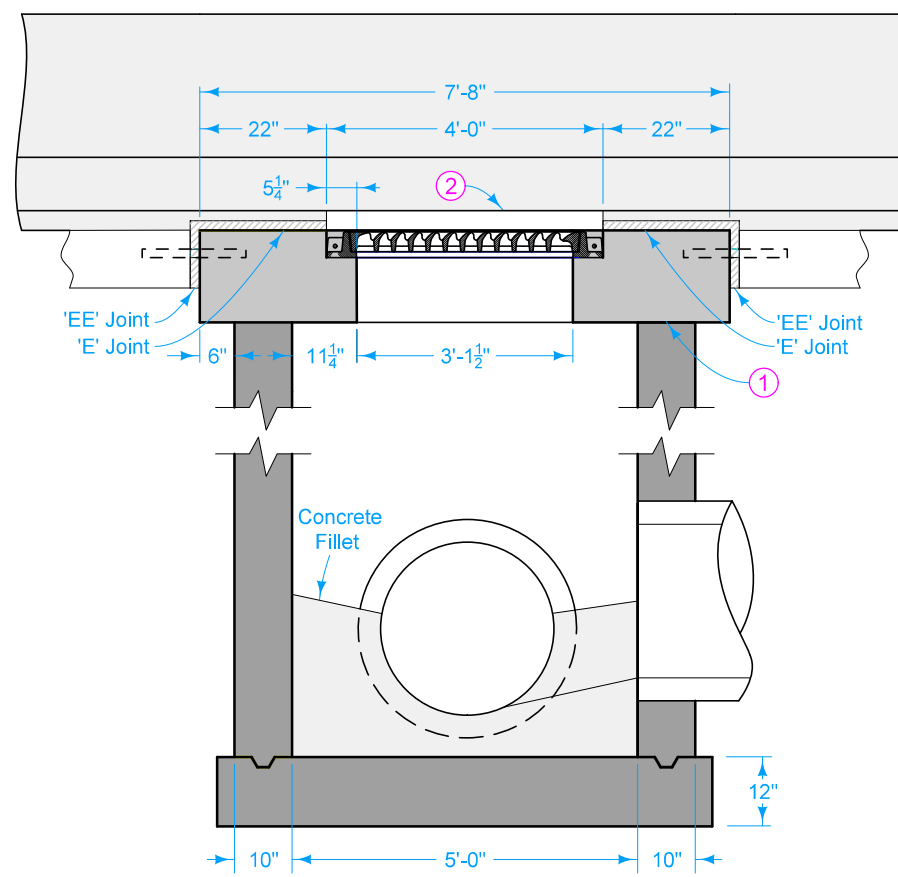
TRIPLE-GRATE BARRIER INTAKE



PLAN
(RECTANGULAR)



SECTION A-A
(RECTANGULAR OPTION)

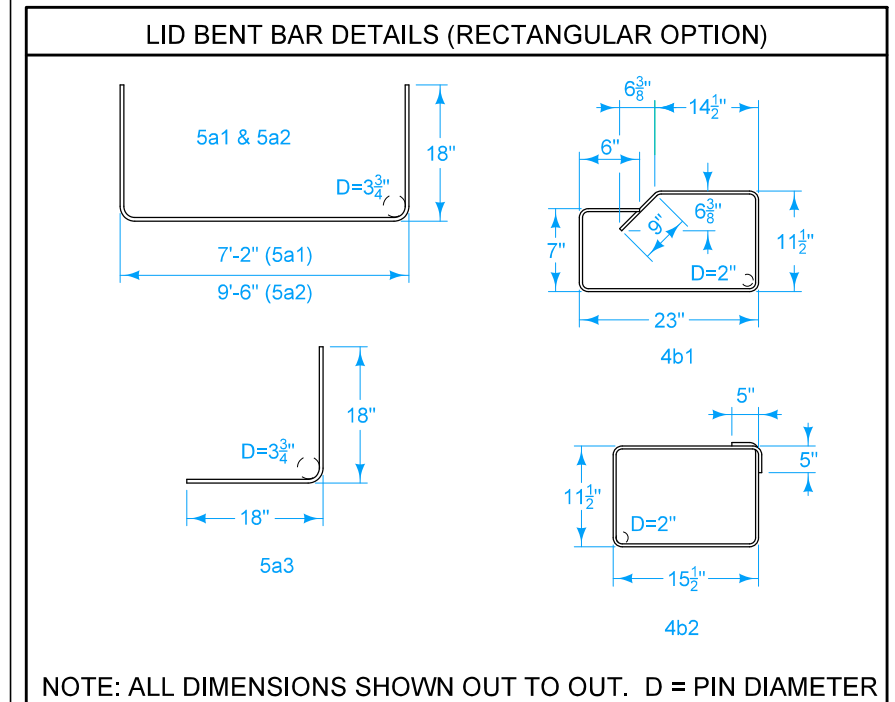
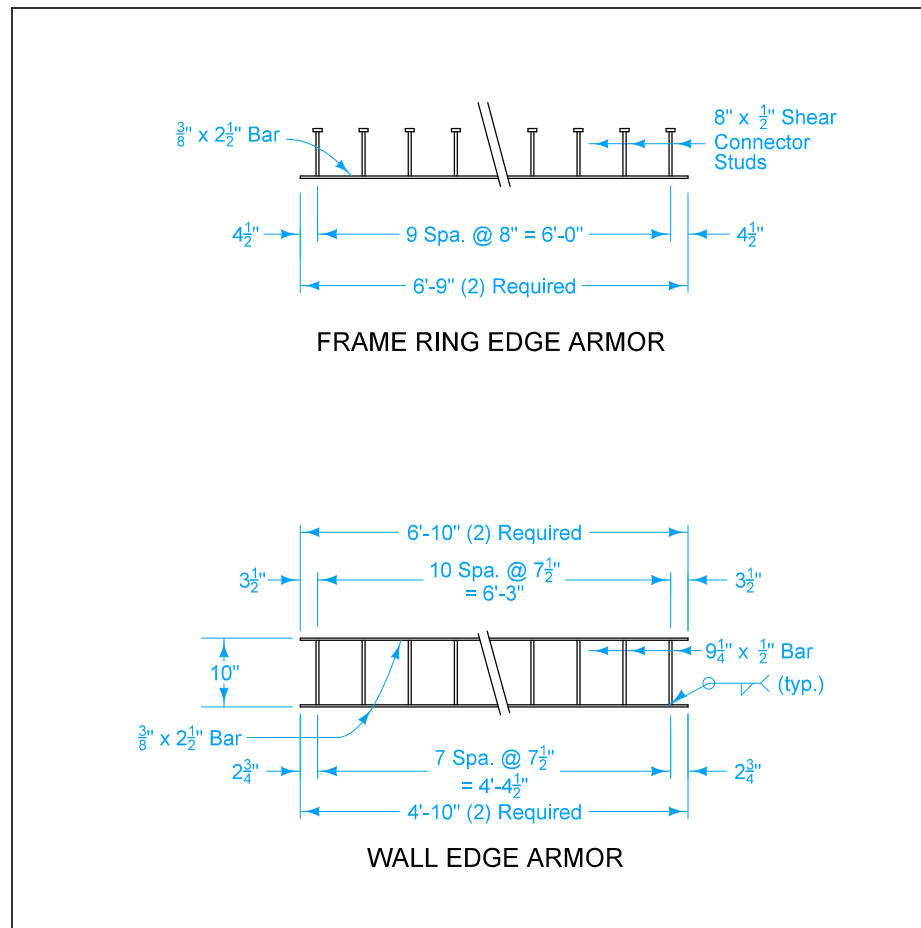
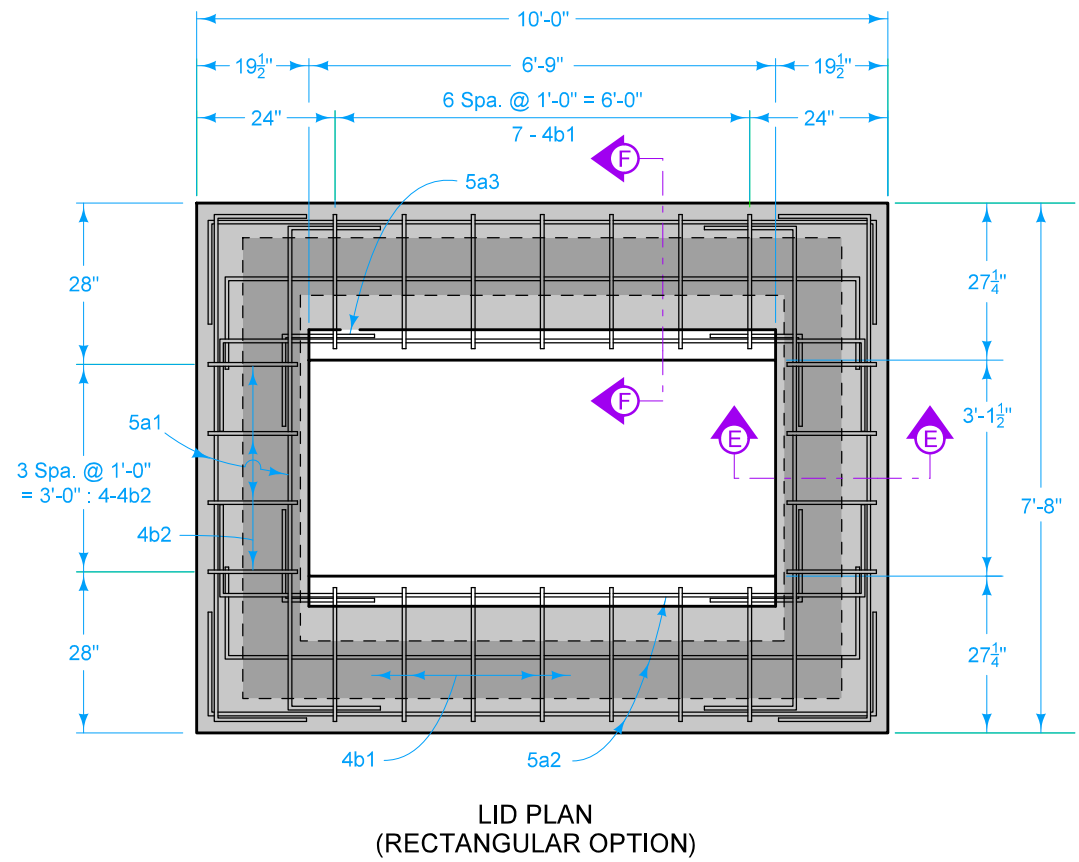


SECTION B-B
(RECTANGULAR OPTION)

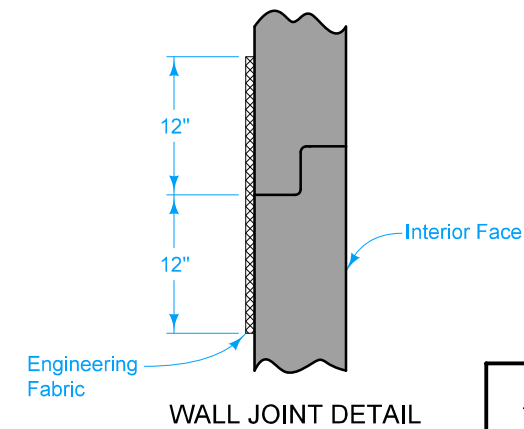
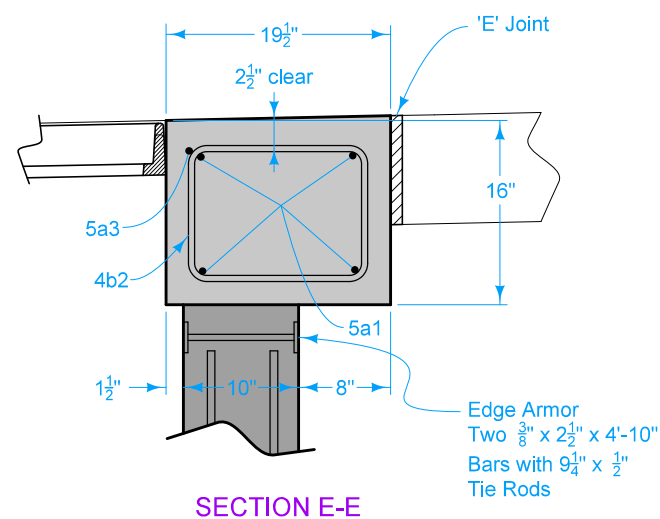
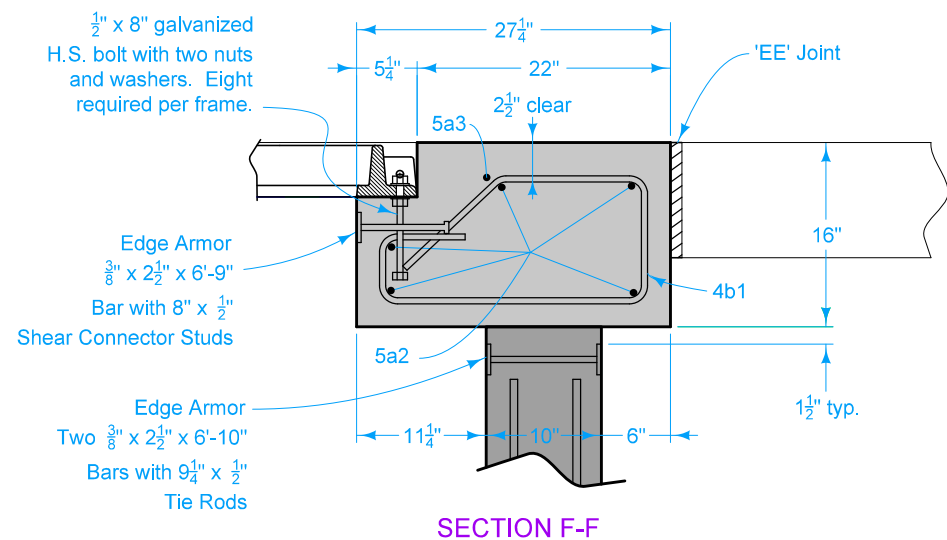
- ① Trowel smooth and place two layers of 30 pound roofing felt to prevent bond.
- ② Leave 3 inch opening through barrier over the intake.
- ③ Match slope of top and grate to adjacent pavement.
- ④ 12 inch minimum wall height above all pipes.

	REVISION	
	5	04-17-18
STANDARD ROAD PLAN		SW-547
		SHEET 4 of 7
REVISIONS: Changed 'Invert' callout to 'Concrete Fillet'. Added maximum pipe size information.		
APPROVED BY DESIGN METHODS ENGINEER		
TRIPLE-GRATE BARRIER INTAKE		

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 QUANTITY SUMMARY (RECTANGULAR OPTION)	
Concrete	2.7 CY
Epoxy Coated Reinforcing Steel	312 LB

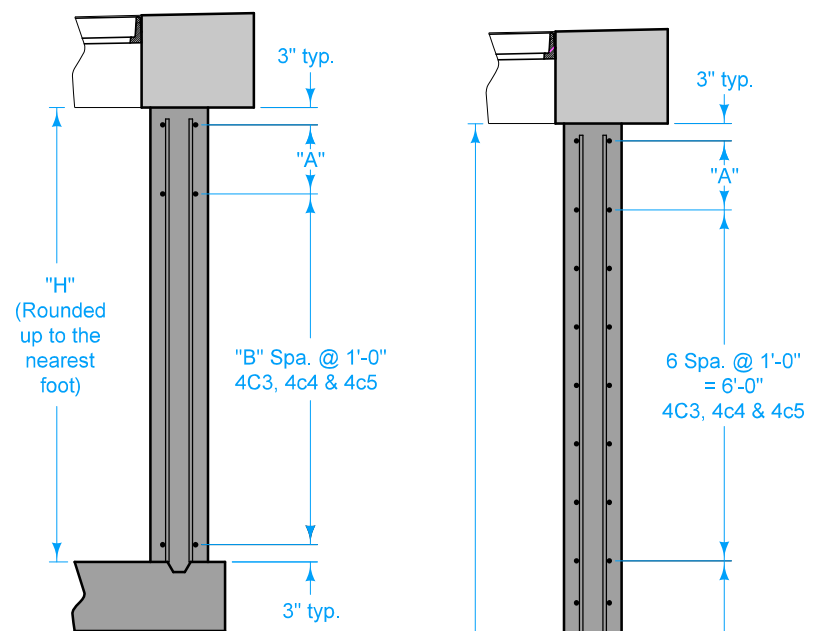


 STANDARD ROAD PLAN	REVISION
	5 04-17-18
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SHEET 5 of 7	

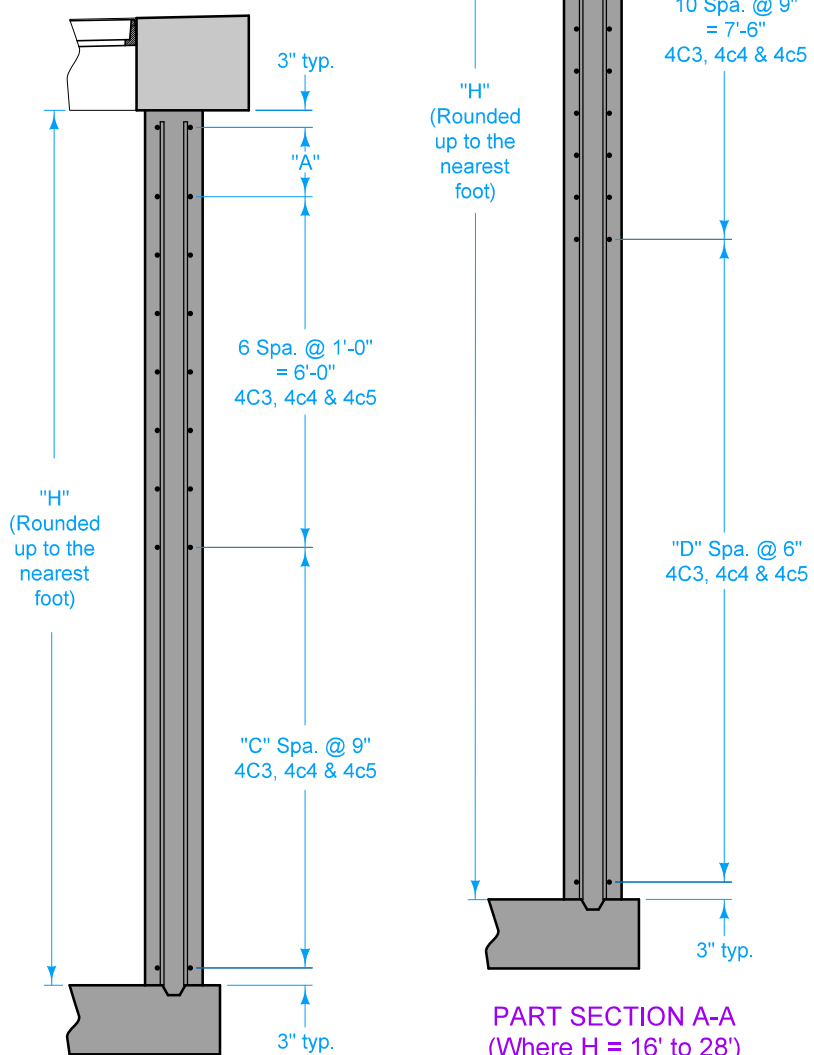
REVISIONS: Changed 'Invert' callout to 'Concrete Fillet'. Added maximum pipe size information.

Steve Miller
 APPROVED BY DESIGN METHODS ENGINEER

TRIPLE-GRATE BARRIER INTAKE

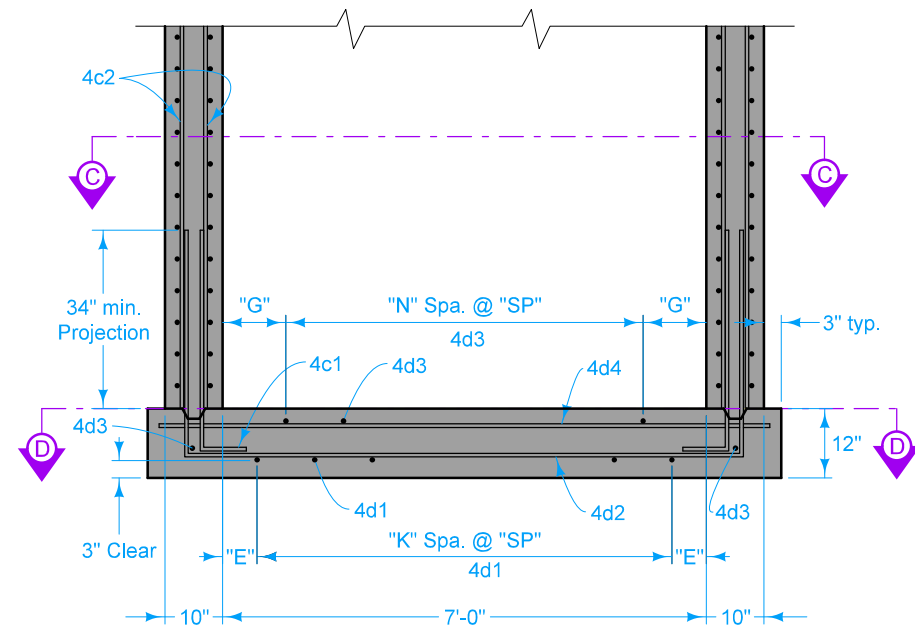


PART SECTION A-A
(Where H = 3' to 7')

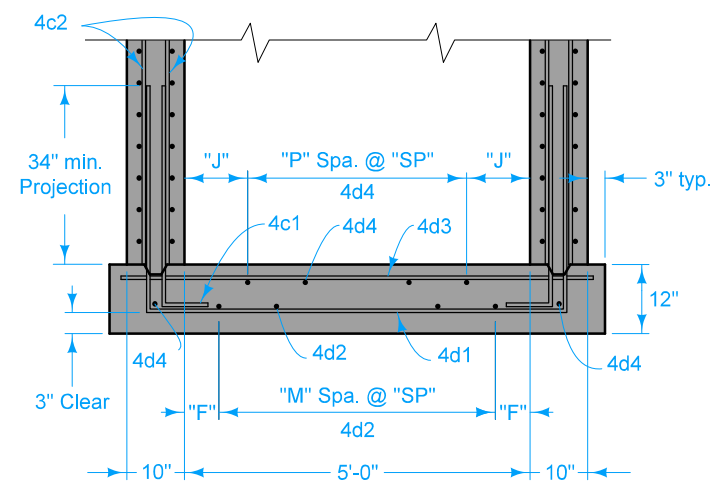


PART SECTION A-A
(Where H = 16' to 28')

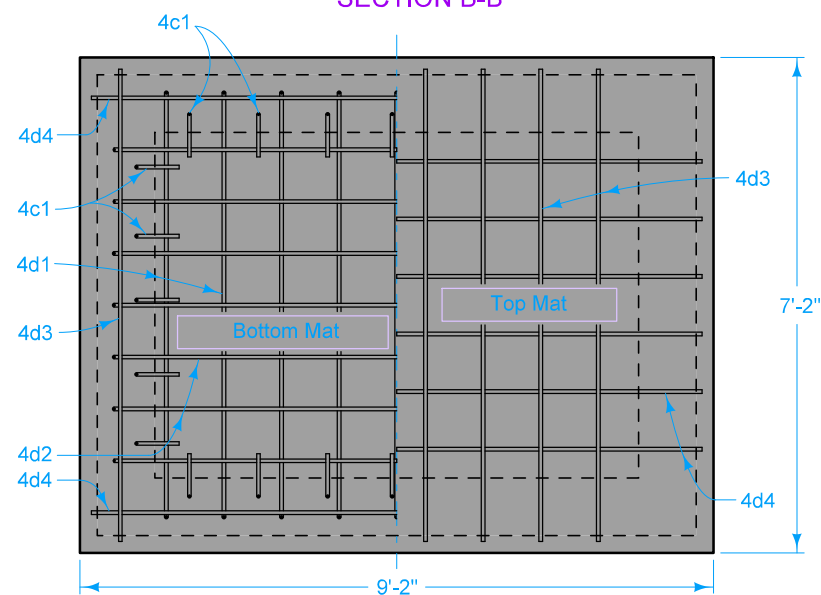
PART SECTION A-A
(Where H = 8' to 15')



SECTION A-A

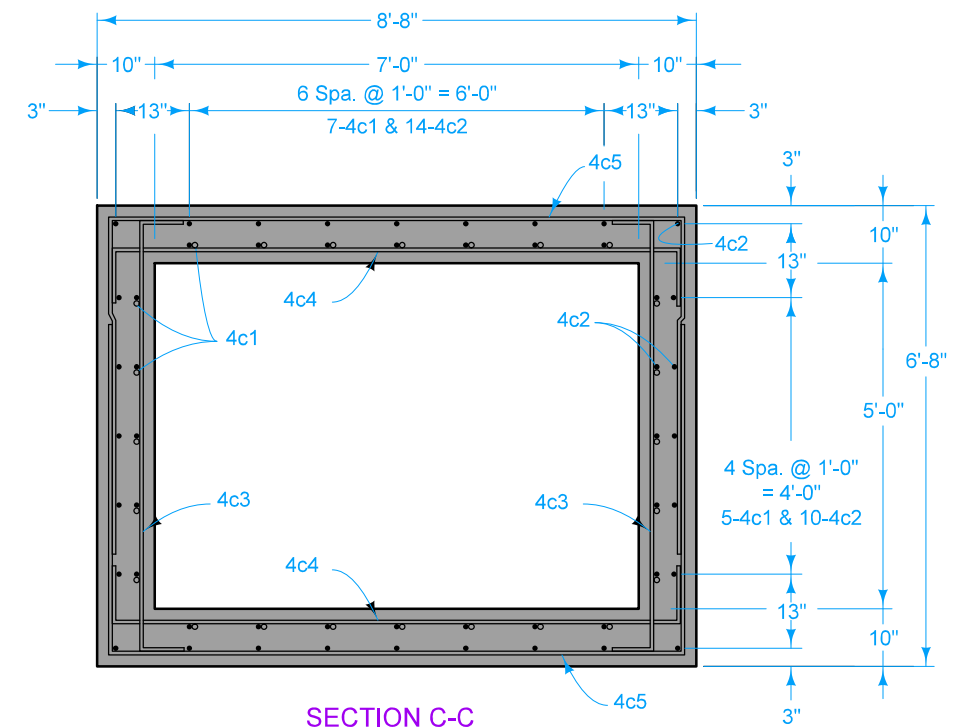


SECTION B-B

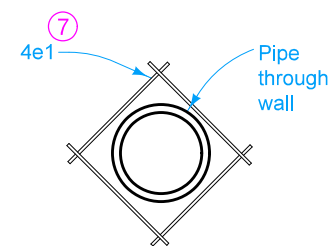


SECTION D-D
BASE REINFORCING

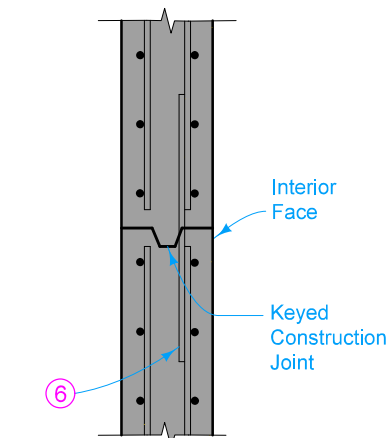
WALLS (RECTANGULAR OPTION)



SECTION C-C




PIPE REINFORCING



C.I.P. Wall
CONSTRUCTION JOINT

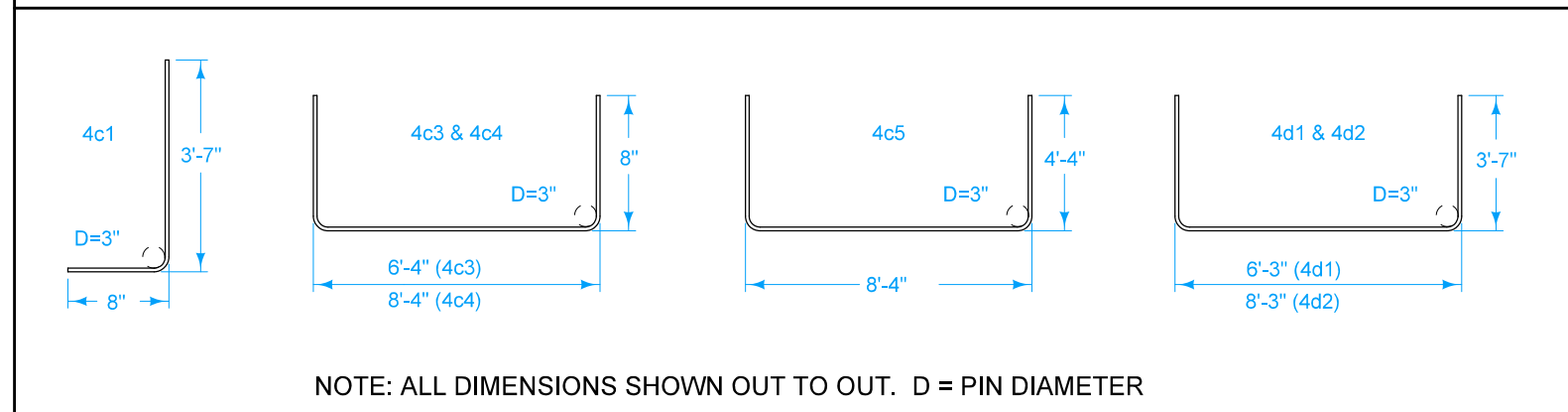
- ⑥ Install one set of 4r1 x 3'-0" dowel bars @ 12 inch spacing at any wall joints. Twenty-eight 4r1 bars required per joint, total weight = 56 lbs.
- ⑦ 4e1 bar length to be pipe diameter plus 12 inches. Place 4e1 bar inside of vertical reinforcing. Shift main reinforcing bars as required for pipe entrance. Field cut bars to maintain 3 inch clearance from bottom and 2 inch clearance from face of walls. Eight 4e1 bars required per pipe entrance.

IOWA DOT	REVISION	
	5	04-17-18
STANDARD ROAD PLAN		SW-547
		SHEET 6 of 7
REVISIONS: Changed 'Invert' callout to 'Concrete Fillet'. Added maximum pipe size information.		
 APPROVED BY DESIGN METHODS ENGINEER		
TRIPLE-GRATE BARRIER INTAKE		

VARIABLE DIMENSIONS AND QUANTITIES FOR RECTANGULAR OPTION

Dimensions							Bar List																				Quantities																		
"H" (Ft.)	"A" (In.)	"E" (In.)	"F" (In.)	"G" (In.)	"J" (In.)	4c1		4c2		4c3 (9)			4c4 (9)			4c5 (9)			4d1		4d2		4d3		4d4		Concrete - Cu. Yds.				Steel Total lbs. (10)														
						No.	L	No.	L	No. of Spaces			No. of Spaces			No. of Spaces			SP	"K"	No.	L	SP	"M"	No.	L	SP	"N"	No.	L		SP	"P"	No.	L	Base	Lid	Walls	Total						
										"B"	"C"	"D"	"B"	"C"	"D"	"B"	"C"	"D"																						"B"	"C"	"D"	"B"	"C"	"D"
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"	10"	8	10	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"	10"	8	10	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"	10"	8	10	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"	10"	8	10	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"	10"	8	10	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"	10"	8	10	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"	10"	8	10	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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"	10"	6	14	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

BENT BAR DETAILS (RECTANGULAR OPTION)



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

	REVISION	
	5	04-17-18
STANDARD ROAD PLAN		SW-547
		SHEET 7 of 7
REVISIONS: Changed 'Invert' callout to 'Concrete Fillet'. Added maximum pipe size information.		
APPROVED BY DESIGN METHODS ENGINEER		
TRIPLE-GRATE BARRIER INTAKE		

REINFORCEMENT (RECTANGULAR OPTION)