
ORIGINATION FORM

Proposed Revisions to a Standard Plans Index (Please provide all information — Incomplete forms will be returned)

Contact Information:

Date: November 1, 2019

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Standard Plans:

Index Number: 425-010

Sheet Number (s): ALL

Index Title: Structure Bottoms Type J and P

Summary of the changes:

Reorganized Index, Added additional Sheet.

Sheet 1: General and Reinforcing Notes

Sheet 2: Reinforcing Details

Sheet 3: Structures and Wall Reinforcing Tables

Sheet 4: Slab Reinforcing Tables

Commentary / Background:

Reorganized Details and Sheets to declutter Index. Moved information from detail callouts to Notes in order to decrease clutter of the drawing. Slab to Wall details moved to 425-001. Design notes moved to SPI. Moved old Sheet 3 of 5 to 425-001.

Other Affected Offices / Documents: (Provide name of person contacted)

Yes	No	
☒	☐	Other Standard Plans –
☐	☐	FDOT Design Manual –
☐	☐	Basis of Estimates Manual –
☐	☐	Standard Specifications –
☐	☐	Approved Product List –
☐	☐	Construction –
☐	☐	Maintenance –

Origination Package Includes:

(Email or hand deliver package to Rick Jenkins)

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

Implementation:

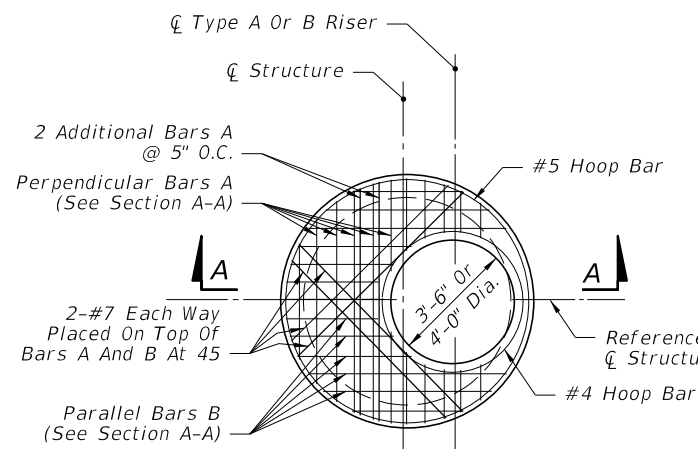
- ☐ Design Bulletin (Interim)
- ☐ DCE Memo
- ☐ Program Mgmt. Bulletin
- ☒ FY-Standard Plans (Next Release)

Contact the Roadway Design Office for assistance in completing this form

NEW SHEET

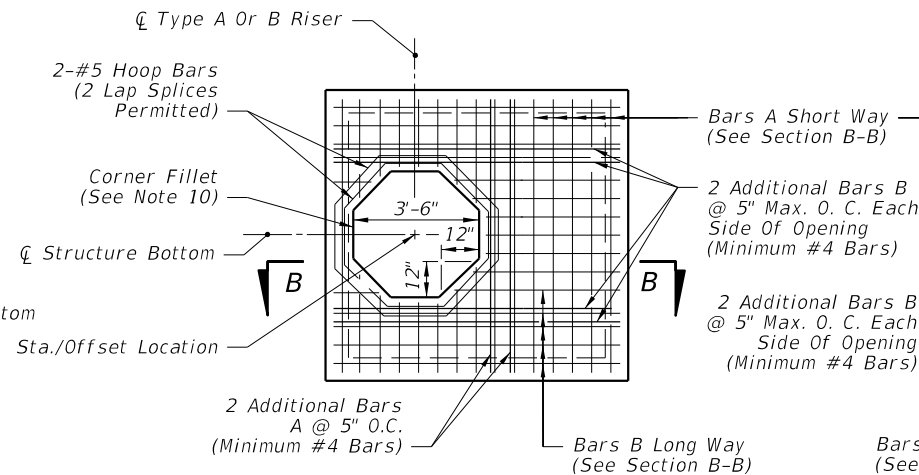
GENERAL NOTES AND OVERVIEW

Moved to Left side of Sheet



NOTE:
Not Applicable For Type A, B, C, D & E Ditch Bottom Inlets Or Type S & V Gutter Inlets.
See Indexes 425-040, 425-050, 425-051, and 425-052.

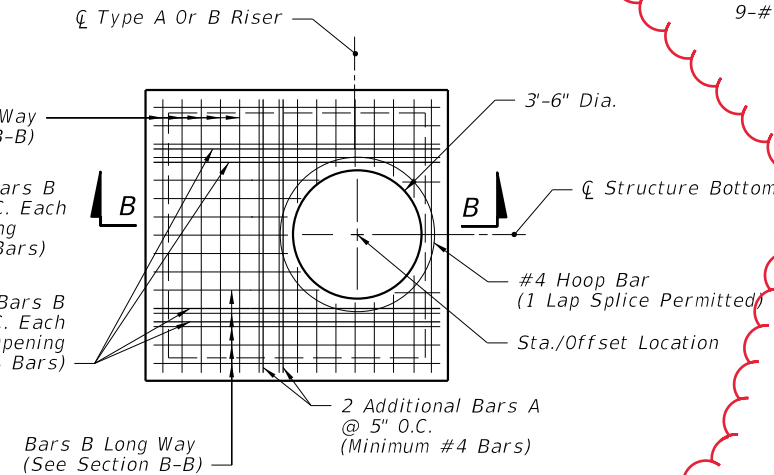
TOP SLAB REINFORCING STEEL DIAGRAM
(ALTERNATE A)



SQUARE OPENING WITH CORNER FILLETS

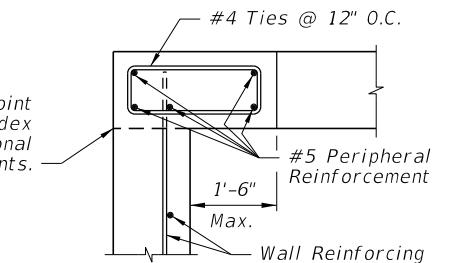
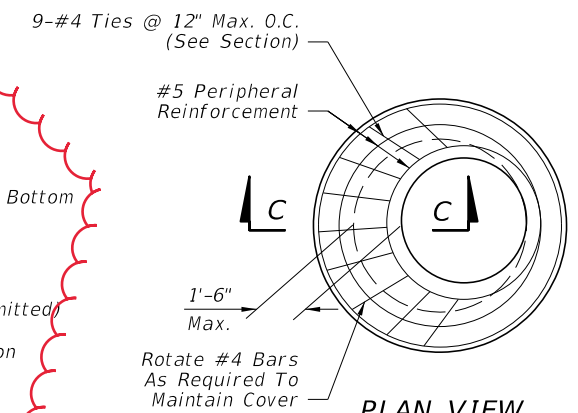
Type - B

TOP SLAB REINFORCING STEEL DIAGRAM
(ALTERNATE B)

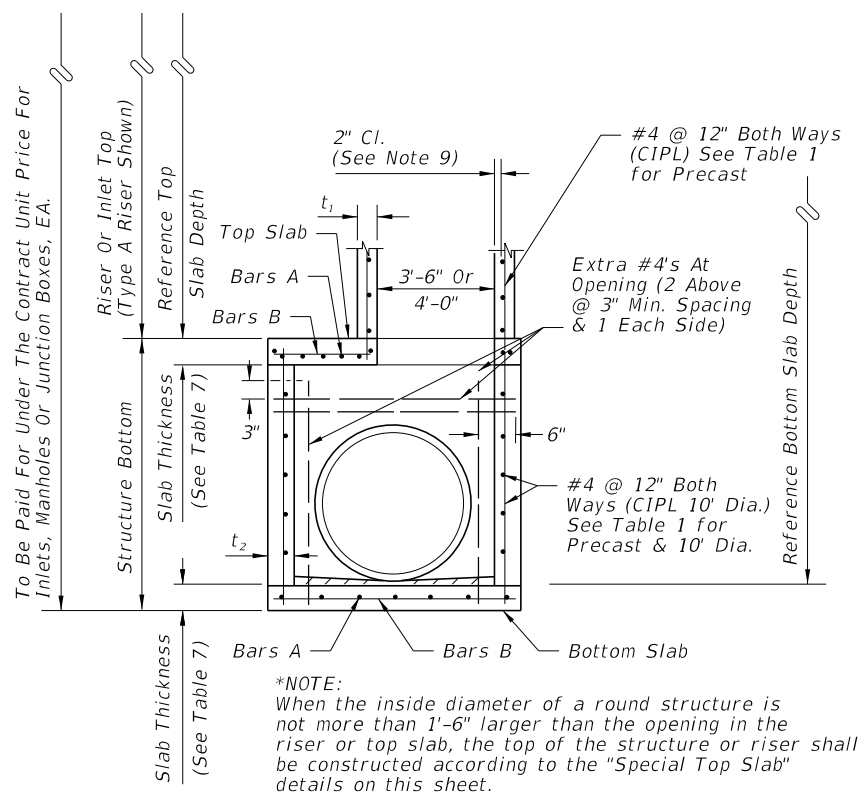


ROUND RISER OPENING

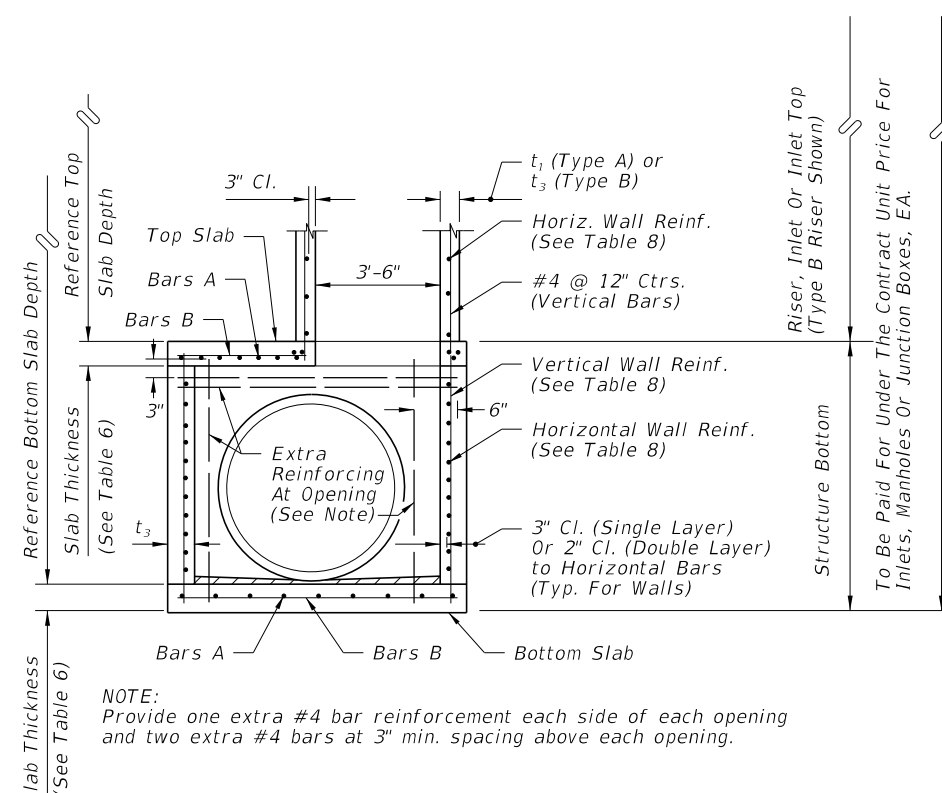
Type - A



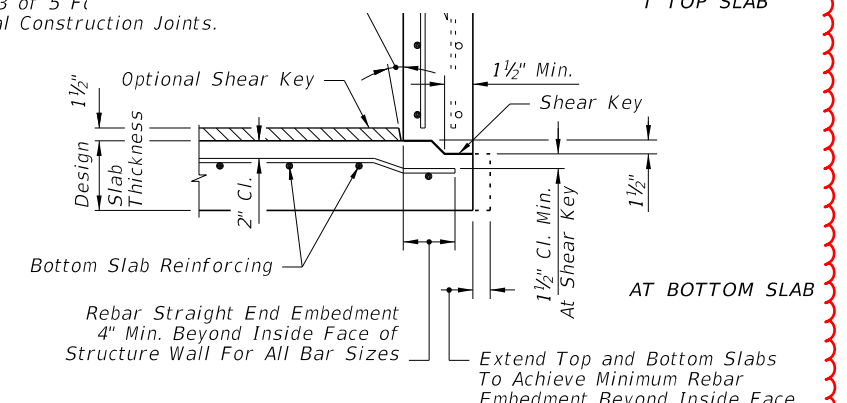
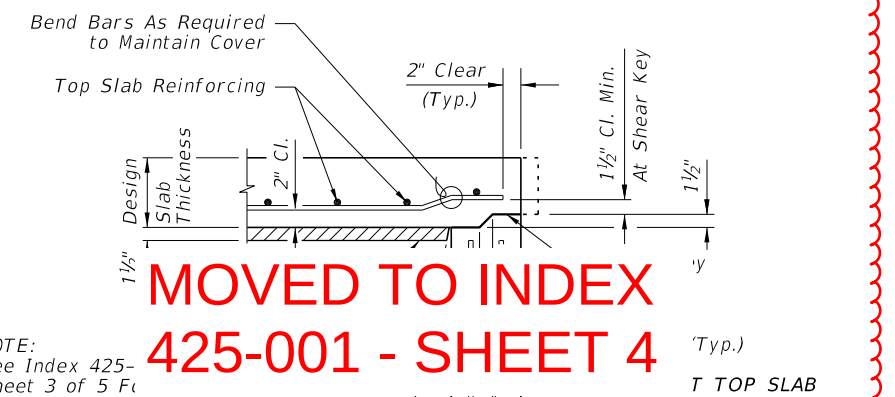
SECTION C-C
SPECIAL TOP SLAB*



SECTION A-A
(ALTERNATE A)



SECTION B-B
(ALTERNATE B)



TYPICAL SLAB TO WALL DETAILS
FOR PRECAST STRUCTURES

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LAST REVISION	DESCRIPTION:	FY 2019-20 STANDARD PLANS	STRUCTURE BOTTOMS TYPE J AND P	INDEX	SHEET
11/01/17	11/01/20	FDOT		425-010	1 of 5

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ROUND STRUCTURE BOTTOMS (ALTERNATE A) & ROUND RISERS- TABLE 1									
Wall Thickness (t ₁ & t ₂) and Vertical & Horizontal Areas of Reinforcement (A _s)									
Type	Structure/Riser Diameter (ft)	Cast-In-Place Items Class II Concrete			Precast Items				
					Class II Concrete			ASTM C478	
		t ₁	t ₂	A _s	t ₁	t ₂	A _s	t ₁ or t ₂	A ₂ ***
		Riser (in.)	Bottom (in.)	(in. ² /ft.)	Riser (in.)	Bottom (in.)	(in. ² /ft.)	(in.)	(in. ² /ft.)
P	3'-6"	6	8	0.20	6	8	0.20	4**	0.105
P	4'-0"	6	8	0.20	6	8	0.20	5**	0.120
J	5'-0"	-	8	0.20	-	8	0.20	6**	0.150
J	6'-0"	-	8	0.20	-	8	0.20	6	0.180
J	7'-0"	-	8	0.20	-	8	0.20	7	0.210
J	8'-0"	-	8	0.20	-	8	0.20	8	0.240
J	10'-0"	-	10	0.40##	-	10	0.40##	10	0.300
J	12'-0"	-	10	0.40##	-	12	0.40##	12	0.360

TABLE 1 NOTES:

##Provide 0.20 eq. in.²/ft. at each face, 12" max. bar spacing.

**Modified minimum wall thickness.

***Min. total circumferential reinforcement for continuous steel hoops:

A₂ = 0.40 sq. in. for riser section height equal or less than 2'-0" (2 hoop min.)

A₂ = 0.60 sq. in. for riser section height more than 2'-0" up to 4'-0" (3 hoop min.)

Areas of reinforcing for precast items are based on Grade 60 reinforcing;

No reduction in the area of reinforcement is allowed for welded wire fabric in Table 1;

Area of vertical reinforcing may be reduced in accordance with ASTM C478.

SQUARE & RECTANGULAR STRUCTURES (ALTERNATE B) - TABLE 2				
Type	Wall Length (ft)	Max. Depth (ft)	Wall Thickness (t ₃)	
			CIP (in.)	Precast (in.)
P	≤ 3'-6"	40	6 Riser 8 Bottom	6
J	4'-0"	40	8	6
J	5'-0"	22	-	6
J	6'-0"	15	-	6
J	5'-0" to 9'-0"	40	8	8
J	10'-0"	26	8	8
J	10'-0" to 12'-0"	40	10	9
J	16'-0"	35	-	9
J	16'-0"	40	10	10
J	20'-0"	25	-	9
J	20'-0"	30	10	10

TABLE 2 NOTES:

See Table 8 for Reinforcing Schedule.

SHEET 1

GENERAL NOTES

UPDATED

- Standard structure bottoms 4'-0" diameter and smaller (Alt. A) and 3'-6" square (Alt. B) are designated Type P. Larger standard structure bottoms are designated Type J. Risers are permitted for all structures. Round risers are designated Type A, square risers are designated Type B.
- Walls of circular structures (Alt. A) constructed in place may be of brick or reinforced concrete. Precast and rectangular structures (Alt. B) shall be constructed of reinforced concrete only.
- Wall thickness and reinforcement are for either reinforced cast-in-place or precast concrete units except that precast circular units may be furnished with walls in accordance with ASTM C478 (see modified wall thicknesses in Table 1).
- Top and bottom slab thickness and reinforcement are for precast and cast-in-place construction. All concrete shall be of Class II concrete, except use Class IV concrete when shown in the Plans, for special applications of structures located in extremely aggressive environments. Concrete as specified in ASTM C478 (4000 psi) may be used in lieu of Class II concrete for precast items manufactured in accordance with Specifications Section 449.
- All reinforcement shown is Grade 60 steel, deformed bar. Equivalent area Grade 40 steel or equivalent area smooth or deformed welded wire reinforcement in accordance with Specification Section 931 may be substituted according to Index 425-001, unless otherwise noted.
- Alt. A or Alt. B structure bottoms may be used in conjunction with curb inlet tops Types 1, 2, 3, 4, 5, 6, 9, and 10, and any manhole or junction box unless otherwise shown in the plans or other standard drawings. Alt. B structure bottoms may be used in conjunction with curb inlet Types 7 & 8, or any ditch bottom inlet unless otherwise shown in the plans or other standard drawings.
- Rectangular structures may be rotated as directed by the Engineer in order to facilitate connections between the structure walls and storm sewer pipes.
- Except when ACI hooks are specifically required, reinforcement in top and bottom slab shall be straight embedment.
- All reinforcement must have 2" minimum cover except for 3'-6" diameter precast circular units manufactured under ASTM C478, keyed construction otherwise shown. Additional bars used to restrain hole formers for precast structures with grouted pipe connections may be left flush with the hole surface. Cut or bend reinforcement at pipe openings to maintain cover. Exposed ends of reinforcing at precast pipe openings and grouted joints must be removed to 1" below the concrete surface and sealed with a Type F epoxy in accordance with Specification Section 926. Horizontal steel in rectangular structures shall be lapped a minimum of 30 bar diameters or by standard hooks at corners.
- The corner fillets shown are necessary for rectangular structures used with circular risers and inlet throats and when used on skew with rectangular risers, inlets and inlet throats. Fillets will be required in the top slab of the Alt. A structure bottoms when used with the Alt. B risers. Each fillet shall be reinforced with two #5 bars.
- Inlet walls, throats, risers or manhole tops shall be secured to structures as shown on Index 425-001 Optional Construction Joints.
- Structures with depths over 14' below the mean high water table are to be checked for flotation by the designer of the drainage project.
- Units larger than specified standards may be substituted at the contractor's option when these units will not cause or increase the severity of utility conflicts. Such larger units shall be furnished at no additional cost to the Department. Larger Alt. A units cannot replace Alt. B units without approval of the Engineer. This note applies to this Index only.
- For manhole and junction box tops, for frames and covers, and, for supplementary details and notes see Index 425-001.
- Type J structure bottoms must have a minimum 6'-0" wall height when possible, for maintenance access.

Notes 12 and 15 moved to SPI, Note 5 in Spec 931

Note 9 separated and is found under "Reinforcement Notes"

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LAST REVISION 11/01/17	DESCRIPTION: 11/01/20	FDOT FY 2019-20 STANDARD PLANS	STRUCTURE BOTTOMS TYPE J AND P	INDEX 425-010	SHEET 2 of 5
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TABLE 3-MINIMUM STRUCTURE SIZES FOR SINGLE PIPE CONNECTION

PIPE SIZE	F Sid Single Pipe	ROUND	
		Pipe Diameter (D)	Pipes
18"		2 to 4	0-90°
24"		6"	4'-0"
30"		6"	5'-0"
36"		0"	6'-0"
42"		0"	7'-0"
48"	6'-0"	6'-0"	8'-0"
54"	6'-0"	7'-0"	10'-0"
60"	7'-0"	7'-0"	10'-0"
66"	7'-0"/8'-0"	8'-0"	12'-0"
72"	8'-0"	8'-0"	12'-0"
78"	9'-0"	10'-0"	12'-0"
84"	9'-0"	12'-0"	N/A

TABLE 3 NOTES:

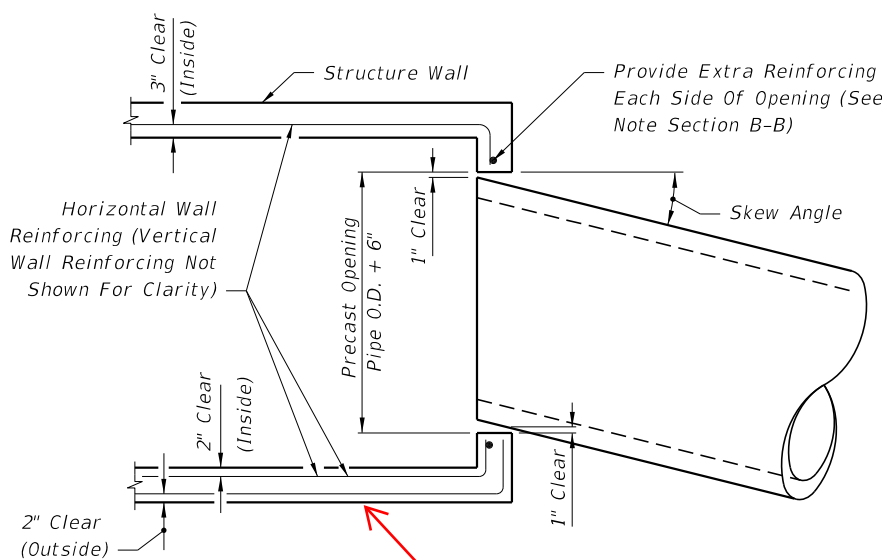
- For Round Structures sizes with variable angles between pipes and variable pipe sizes, refer to the FDOT Storm Drain Handbook.
- For 3'-6" Precast Square Structure Bottoms, 30" Pipes with similar invert elevations are not permitted in adjacent walls. Use 4'-0" Side Dimensions when 30" pipe openings are required on adjacent walls and the difference in flow lines is less than 3'-0".
- For 4'-0" Precast Square Structure Bottoms, 36" Pipes with similar invert elevations are not permitted in adjacent walls. Use 5'-0" Side Dimensions when 36" pipe openings are required on adjacent walls and the difference in flow lines is less than 3'-0".
- For 7'-0" Precast Square Structure Bottoms, 66" Pipes with similar invert elevations are not permitted in adjacent walls. Use 8'-0" Side Dimensions when 66" pipe openings are required on adjacent walls and the difference in flow lines is less than 4'-0".

TARIF 4-MINIMUM SIZES FOR MULTIPLE PIPE CONNECTIONS FOR RECTANGULAR STRUCTURE BOTTOMS

PIPE SIZE	PIPE SPACING (S)	MINIMUM WALL LENGTH (L) FOR NUMBER OF PARALLEL PIPES		
		2	3	4
18"	2'-10"	6'-0"	8'-6"	11'-0"
24"	3'-5"	6'-6"	10'-0"	13'-6"
30"	4'-3"	8'-0"	12'-6"	16'-6"
36"	5'-1"	9'-6"	14'-6"	19'-6"
42"	6'-0"	11'-0"	17'-0"	-
48"	6'-9"	12'-6"	19'-0"	-
54"	7'-8"	14'-0"	-	-
60"	8'-6"	15'-0"	-	-
66"	9'-0"	16'-6"	-	-
72"	10'-0"	18'-0"	-	-
78"	10'-9"	19'-0"	-	-
84"	11'-8"	20'-6"	-	-

TABLE 4 NOTES:

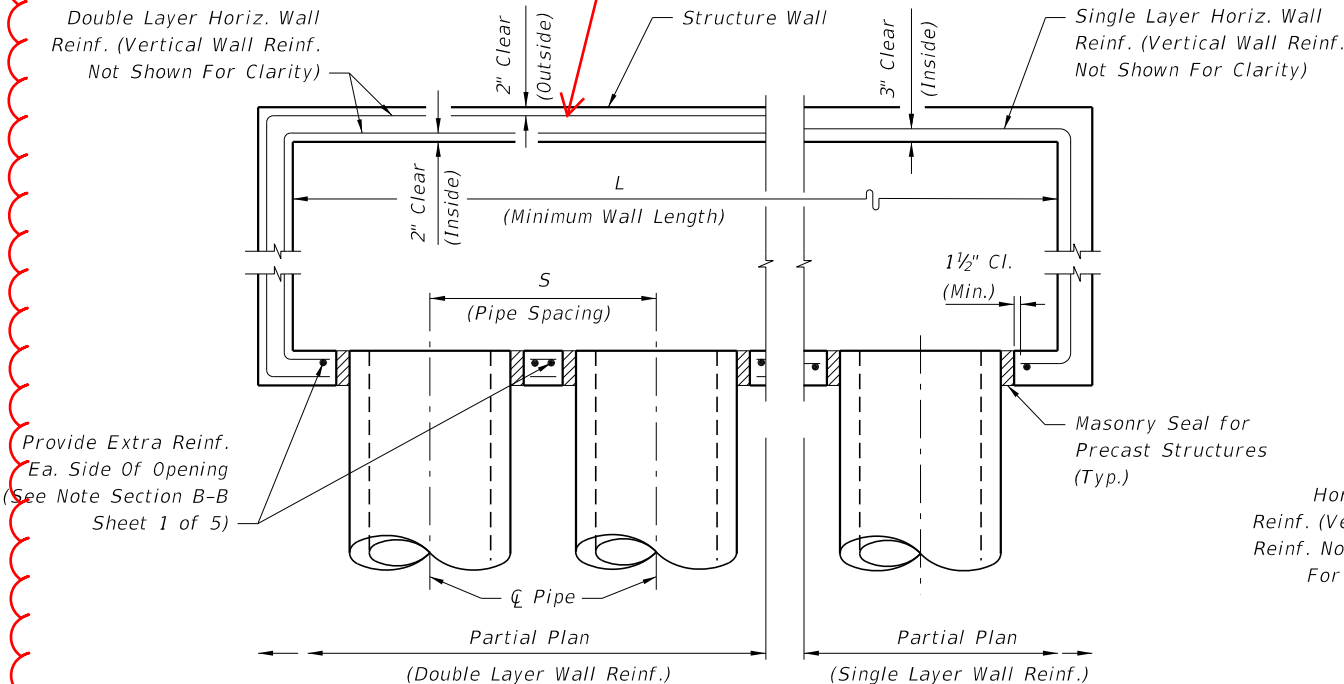
- Minimum wall lengths based on precast structures, using concrete pipe with maximum skew angles per Table 5.
- Wall lengths exceeding 20'-0" require special designs.



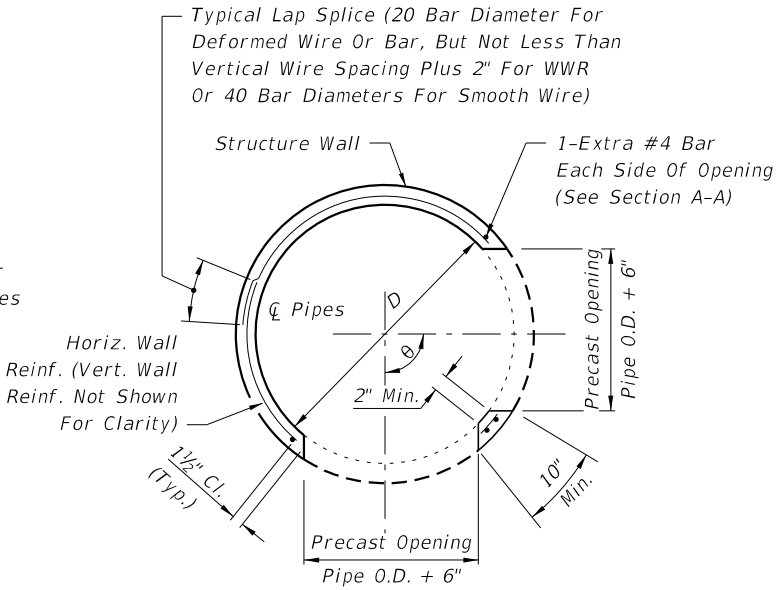
MAXIMUM PIPE SKEW FOR PRECAST ROUND OPENINGS PLAN VIEW

TABLE 5 - MAXIMUM PIPE SKEW FOR PRECAST ROUND OPENINGS													
	WALL THICKNESS	PIPE SIZE											
		18"	24"	30"	36"	42"	48"	54"	60"	66"	72"	78"	84"
		8"	19°	17°	16°	16°	15°	14°	14°	13°	13°	13°	12°
MAXIMUM SKEW ANGLE	6"	21°	20°	18°	17°	17°	16°	15°	15°	14°	14°	13°	13°

TABLE 5 NOTES:
These values are based on 2" clearance for precast structures. Larger skews are possible for Cast-In-Place Structures or elliptical pipe openings when approved by the Engineer.



MULTIPLE PARALLEL PIPE CONNECTIONS DETAIL PLAN VIEW



PRECAST ROUND STRUCTURES WITH MULTIPLE PIPE CONNECTIONS

STRUCTURE SIZES FOR PIPE CONNECTIONS

MISCELLANEOUS PIPE CONNECTION DETAILS

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SLAB DESIGNS - SQUARE AND RECTANGULAR STRUCTURES (TABLE 6)
(ALL SLABS 8" THICK EXCEPT AS NOTED - REINFORCING PARALLEL TO SHORT WAY AND LONG WAY)

SHORT-WAY		LONG-WAY	
SLAB DEPTH	SCHEDULE (Bars A)	SLAB DEPTH	SCHEDULE (Bars B)
SIZE: 3'-6" x UNLIMITED			
≥0.5' < 8'	B10	≥0.5' < 24'	B10
8' < 13'	B5.5	24'-40'	B5.5
13' < 31'	C6.5		
31'-40'	D7		
SIZE: 4' x UNLIMITED			
≥0.5' < 7'	B5.5	≥0.5' < 15'	B10
7' < 19'	C6.5	15' < 29'	B5.5
19' < 31'	D7	29'-40'	C6.5
31'-40'	E5		
SIZE: 5' x 5'			
≥0.5' < 3'	C6.5	≥0.5' < 3'	C6.5
3' < 7'	B5.5	3' < 13'	C6.5
7' < 22'	C6.5	13' < 22'	D7
22' < 29'	D7	22' < 29'	D4.5
29'-40'	E5	29'-40'	E5
SIZE: 5' x 6'			
≥0.5' < 12'	C6.5	≥0.5' < 3'	C6.5
12' < 26'	D7	3' < 9'	B5.5
26'-40'	E5	9' < 23'	C3.5
		23' < 35'	D4.5
		35'-40'	E5
SIZE: 5' x 7'			
≥0.5' < 10'	C6.5	≥0.5' < 10'	B5.5
10' < 20'	D7	10' < 31'	C3.5
20' < 34'	E5	31'-40'	D4.5
34'-40'	F5		
SIZE: 5' x 8'			
≥0.5' < 7'	C6.5	≥0.5' < 8'	B10
7' < 13'	D7	8' < 17'	B5.5
13' < 24'	E5	17' < 25'	C6.5
24'-40'	F5	25'-40'	C3.5
SIZE: 5' x 9'			
≥0.5' < 8'	C6.5	≥0.5' < 14'	B10
8' < 14'	D7	14' < 24'	B5.5
14' < 25'	E5	24' < 34'	C6.5
25'-40'	F5	34'-40'	C3.5
SIZE: 5' x UNLIMITED			
≥0.5' < 8'	C6.5	≥0.5' < 14'	B10
8' < 14'	D7	14' < 24'	B5.5
14' < 25'	E5	24' < 34'	C6.5
25'-40'	F5	34'-40'	C3.5

SHORT-WAY		LONG-WAY	
SLAB DEPTH	SCHEDULE (Bars A)	SLAB DEPTH	SCHEDULE (Bars B)
SIZE: 6' x 6'			
≥0.5' < 13'	C6.5	≥0.5' < 10'	C3.5
13' < 23'	D7	10' < 18'	D4.5
23'-40'	E5	18' < 27'	E5
		27' < 33'	E3
		33'-40'	F5
SIZE: 6' x 7'			
≥0.5' < 8'	C6.5	≥0.5' < 8'	C6.5
8' < 16'	D7	8' < 12'	C3.5
16' < 28'	E5	12' < 21'	D4.5
28'-40'	F5	21' < 28'	E5
		28' < 35'	E3
		35'-40'	F5
SIZE: 6' x 8'			
≥0.5' < 6'	C6.5	≥0.5' < 6'	B5.5
6' < 13'	D7	6' < 11'	C6.5
13' < 22'	E5	11' < 17'	C3.5
22' < 35'	F5	17' < 22'	D4.5
35'-40'	G5	22' < 32'	E5
		32'-40'	E3
SIZE: 6' x 9'			
≥0.5' < 8'	D7	≥0.5' < 8'	B5.5
8' < 14'	E5	8' < 14'	C6.5
14' < 24'	F5	14' < 21'	C3.5
24'-34'	G5	21' < 25'	D4.5
		25'-34'	E5
SIZE: 6' x UNLIMITED			
≥0.5' < 8'	D7	≥0.5' < 8'	B5.5
8' < 14'	E5	8' < 14'	C6.5
14' < 24'	F5	14' < 21'	C3.5
24'-34'	G5	21' < 25'	D4.5
		25'-34'	E5
SIZE: 7' x 7'			
≥0.5' < 8'	C6.5	≥0.5' < 4'	C6.5
8' < 15'	D7	4' < 7'	C3.5
15' < 26'	E5	7' < 11'	D4.5
26'-40'	F5	11' < 22'	E3
		22' < 32'	F3.5
		32'-40'	G3.5
SIZE: 7' x 8'			
≥0.5' < 5'	C6.5	≥0.5' < 5'	C6.5
5' < 11'	D7	5' < 8'	C3.5
11' < 19'	E5	8' < 13'	D4.5
19' < 30'	F5	13' < 22'	E3
30'-40'	G5	22' < 30'	F3.5
		30'-40'	G3.5
SIZE: 7' x 9'			
≥0.5' < 9'	D7	≥0.5' < 7'	C6.5
9' < 15'	E5	7' < 10'	C3.5
15' < 25'	F5	10' < 14'	D4.5
25' - 34'	G5	14' < 21'	E5
		21' < 29'	F5
		29'-34'	F3.5

SHORT-WAY		LONG-WAY	
SLAB DEPTH	SCHEDULE (Bars A)	SLAB DEPTH	SCHEDULE (Bars B)
SIZE: 8' x 8'			
≥0.5' < 10'	D7	≥0.5' < 9'	D4.5
10' < 19'	E5	9' < 13'	E5
19'-30'	F5	13' < 18'	F5
		18' < 23'	F3.5
		23'-30'	G3.5
SIZE: 8' x 9'			
≥0.5' < 8'	D7	≥0.5' < 7'	D7
8' < 14'	E5	7' < 9'	D4.5
14' < 23'	F5	9' < 15'	E3
23'-31'	G3.5	15' < 20'	F5
		20' < 23'	F3.5
		23'-31'	G3.5
SIZE: 9' x 9'			
≥0.5' < 8'	D7	≥0.5' < 7'	D4
8' < 14'	E5	7' < 10'	E5
14' < 22'	F5	10' < 17'	F3.5
		17' < 22'	G3.5
SIZE: 9'x9'x10" SLAB THICKNESS			
22' < 36'	F5	22' < 31'	F3.5
36'-40'	G5	31'-40'	G3.5
SIZE: 10'x10'x10" SLAB THICKNESS			
≥0.5' < 7'	C6.5	0.5' < 6'	C6.5
7' < 10'	D7	6' < 9'	D4.5
10' < 18'	E5	9' < 15'	E5
18' < 27'	F5	15' < 22'	F5
27'-32'	G5	22'-32'	G3.5
SIZE: 12'x12'x12" SLAB THICKNESS			
≥0.5' < 10'	D7	≥0.5' < 8'	D7
10' < 16'	E5	8' < 14'	E5
16' < 25'	F5	14' < 22'	F5
25'-35'	G5	22' < 30'	G5
		30'-35'	H4

SLAB AND WALL DESIGN TABLE NOTES

1. Size is the inside dimension(s) of a structure.
2. Slab reinforcement is appropriate for top, intermediate, and bottom slabs.
3. Bottom Slabs for precast 3'-6" x 3'-6" rectangular structures at 15' depth or less, may be 6" thick.
4. Slab depth is measured from finished grade to top of slab.
5. Wall depth is measured to the top of the bottom slab for boxes and to the top of the intermediate slab for risers.
6. Wall height is the distance between top of lower slab to bottom of upper slab. Maximum wall height is 12' for wall lengths exceeding 5', or 10' for wall lengths exceeding 12'.
7. Wall lengths exceeding 6'-0" require two layers of reinforcing (See Table 8) with 2" of cover from the horizontal bars to the inside and outside faces for each layer.
8. Wall lengths exceeding the dimensions or depths shown in Table 8, or 12'-0" diameter require a special design.
9. Wall thickness and reinforcing for rectangular structures is based on the longer wall length.
10. Reinforcing schedules with larger areas of steel may be substituted for schedules with smaller bar or wire spacing, except that Schedule B10 may not be substituted for Schedule A6. See Index 425-001 for allowable bar spacing adjustments when larger areas of reinforcing are substituted.

SLAB DESIGNS - ROUND STRUCTURES (TABLE 7)

SLAB DEPTH	SLAB THICKNESS	REINF. (2-WAY) SCHEDULE
SIZE: 3'-6" DIAMETER		
2'-15'	6" Precast	C6.5
0.5' < 30'	8"	A6
30'-40'	8"	B5.5
SIZE: 4'-0" DIAMETER		
≥0.5' < 19'	8"	A6
19' < 30'	8"	B5.5
30'-40'	8"	C6.5
SIZE: 5'-0" DIAMETER		
≥0.5' < 15'	8"	B5.5
15' < 26'	8"	C6.5
26' < 35'	8"	D7
35'-40'	8"	D4.5
SIZE: 6'-0" DIAMETER		
≥0.5' < 9'	8"	B5.5
9' < 15'	8"	C6.5
15' < 22'	8"	C3.5
22' < 30'	8"	D4.5
30'-40'	8"	E5
SIZE: 7'-0" DIAMETER		
≥0.5' < 8'	8"	C3.5
8' < 16'	8"	D4.5
16' < 23'	8"	E5
23' < 27'	8"	E3
27'-40'	8"	F3.5
SIZE: 8'-0" DIAMETER		
≥0.5' < 10'	8"	D4.5
10' < 16'	8"	E5
16' < 19'	8"	E3
19' < 29'	8"	F3.5
29'-40'	10"	F5
SIZE: 10'-0" DIAMETER		
≥0.5' < 12'	10"	D4.5
12' < 20'	10"	E5
20' < 28'	10"	F5
28'-40'	10"	G3.5
SIZE: 12'-0" DIAMETER		
≥0.5' < 8'	10"	D4.5
8' < 13'	10"	E5
13' < 18'	10"	F5
18' < 26'	10"	G3.5
26'-40'	12"	G3.5

Notes 5,6,7,8,and 9 moved to Sheet 3, Remaining Notes renumbered.



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WALL DESIGNS - RECTANGULAR STRUCTURES (TABLE 8)

VERTICAL REINFORCING			HORIZONTAL REINFORCING		WALL THICKNESS
WALL DEPTH	SCHEDULE		WALL DEPTH	SCHEDULE	
SIZE: 3'-6' & RISERS					
≥1.17' - 40'	A12		≥1.17' < 10'	B10	6"/8"
			10' < 18'	B5.5	6"/8"
			18' < 29'	C6.5	6"/8"
			29' - 40'	C3.5	6"/8"
SIZE: 4'-0"					
≥1.17' - 40'	A12		≥1.17' < 6'	B10	6"/8"
			6' < 10'	B5.5	6"/8"
			10' < 20'	C6.5	6"/8"
			20' < 28'	C3.5	6"/8"
			28' - 40'	D4.5	6"/8"
SIZE: 5'-0"					
≥1.17' - 40'	A12		≥1.17' < 5'	B5.5	6"/8"
			5' < 9'	C6.5	6"/8"
			9' < 15'	C3.5	6"/8"
			15' < 22'	D4.5	6"/8"
			22' - 40'	E3	8"
SIZE: 6'-0"					
≥1.17' < 26'	A12		≥1.17' < 9'	C3.5	6"/8"
			9' < 15'	D4.5	6"/8"
			15' < 26'	E3	8"
	Inside	Outside		Inside	Outside
26' - 40'	A12	A12	26' - 40'	D7	D7
SIZE: 7'-0"					
	Inside	Outside		Inside	Outside
≥1.17' < 25'	A12	A12	≥1.17' < 7'	B10	B10
26' - 40'	B10	B10	7' < 10'	B5.5	B5.5
			10' < 20'	C6.5	C6.5
			20' < 30'	D7	D7
			30' - 40'	E5	E5
SIZE: 8'-0"					
	Inside	Outside		Inside	Outside
≥1.17' < 20'	A12	A12	≥1.17' < 6'	B5.5	B5.5
20' - 40'	C6.5	C6.5	6' < 13'	C6.5	C6.5
			13' < 22'	D7	D7
			22' < 31'	E5	E5
			31' - 40'	F5	F5
SIZE: 9'-0"					
	Inside	Outside		Inside	Outside
≥1.17' < 12'	A12	A12	≥1.17' < 8'	C6.5	C6.5
12' < 28'	C6.5	C6.5	8' < 15'	D7	D7
28' - 40'	D7	D7	15' < 23'	E5	E5
			23' - 40'	F5	F5
SIZE: 10'-0"					
	Inside	Outside		Inside	Outside
≥1.17' < 10'	B10	B10	≥1.17' < 10'	D7	D7
10' < 21'	C6.5	C6.5	10' < 17'	E5	E5
21' < 26'	D7	D7	17' < 26'	F5	F5
26' - 40'	C6.5	C6.5	26' - 40'	F5	F5

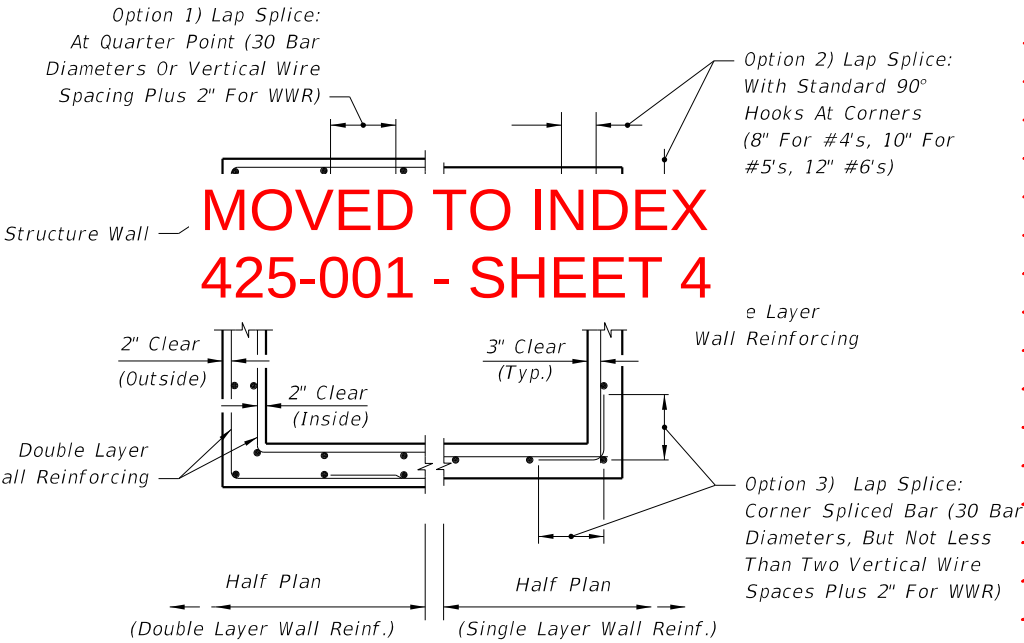
VERTICAL REINFORCING			HORIZONTAL REINFORCING			WALL THICKNESS
WALL DEPTH	SCHEDULE		WALL DEPTH	SCHEDULE		
SIZE: 10'-0" (Precast Only)						
	Inside	Outside		Inside	Outside	
26' - 40'	D7	D7	26' - 40'	F5	F5	9"
SIZE: 12'-0"						
	Inside	Outside		Inside	Outside	
≥1.17' < 14'	B10	B10	≥1.17' < 10'	C6.5	C6.5	10"
14' < 25'	C6.5	C6.5	10' < 17'	D7	D7	10"
25' - 40'	D7	D7	17' < 24'	E5	E5	10"
			24' - 40'	F5	F5	10"
SIZE: 12'-0" (Precast Only)						
	Inside	Outside		Inside	Outside	
≥1.17' < 12'	B10	B10	≥1.17' < 10'	D7	D7	9"
12' < 24'	C6.5	C6.5	10' < 17'	D4.5	D4.5	9"
24' - 40'	D7	D7	17' < 23'	E5	E5	9"
			23' < 32'	F5	F5	9"
			32' - 40'	G5	G5	9"
SIZE: 16'-0"						
	Inside	Outside		Inside	Outside	
≥1.17' < 11'	C6.5	C6.5	≥1.17' < 13'	D7	D7	10"
11' < 20'	D7	D7	13' < 20'	E5	E5	10"
20' < 28'	E5	E5	20' < 28'	F5	F5	10"
28' - 40'	F5	F5	28' - 40'	G5	G5	10"
SIZE: 16'-0" (Precast Only)						
	Inside	Outside		Inside	Outside	
≥1.17' < 10'	C6.5	C6.5	≥1.17' < 9'	D7	D7	9"
10' < 18'	D7	D7	9' < 13'	D4.5	D4.5	9"
18' < 25'	E5	E5	13' < 19'	E5	E5	9"
25' - 35'	F5	F5	19' < 27'	F5	F5	9"
			27' - 35'	G5	G5	9"
SIZE: 20'-0"						
	Inside	Outside		Inside	Outside	
≥1.17' < 10'	C6.5	C6.5	≥1.17' < 8'	D7	D7	10"
10' < 17'	D7	D7	8' < 12'	E5	E5	10"
17' - 30'	E5	E5	12' < 20'	F5	F5	10"
			20' - 30'	G5	G5	10"
SIZE: 20'-0" (Precast Only)						
	Inside	Outside		Inside	Outside	
≥1.17' < 8'	C6.5	C6.5	≥1.17' < 8'	D4.5	D4.5	9"
8' < 13'	D7	D7	8' < 12'	E5	E5	9"
13' - 25'	E5	E5	12' < 19'	F5	F5	9"
			19' - 25'	G5	G5	9"

TABLE 3

REINFORCING SCHEDULE				
SCHEDULE	GRADE 60 BARS OR 65 KSI & 70 KSI WELDED WIRE REINFORCING			
	GRADE 60 AREA (in. ² /ft.)	MAXIMUM SPACING		
		GR 60 BARS (in.)	65 KSI (in.)	70 KSI (in.)
A12	0.20	12	8	8
A6	0.20	6	5	4½
B10	0.24	10	8	7½
B5.5	0.24	5½	5	4
C6.5	0.37	6½	6	5
C3.5	0.37	3½	3	2½
D7	0.53	7	6	5
D4.5	0.53	4½	4	3½
E5	0.73	5	4	4
E3	0.73	3	3	3
F5	1.06	5	4	4
F3.5	1.06	3½	3	3
G5	1.45	5	4	4
G.3.5	1.45	3½	3	3
H4	1.75	4	3	3

*Equivalent Area Welded Wire Reinforcing may be substituted in accordance with Index 425-001.

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WALL REINFORCING SPLICE DETAILS (ALTERNATE B)

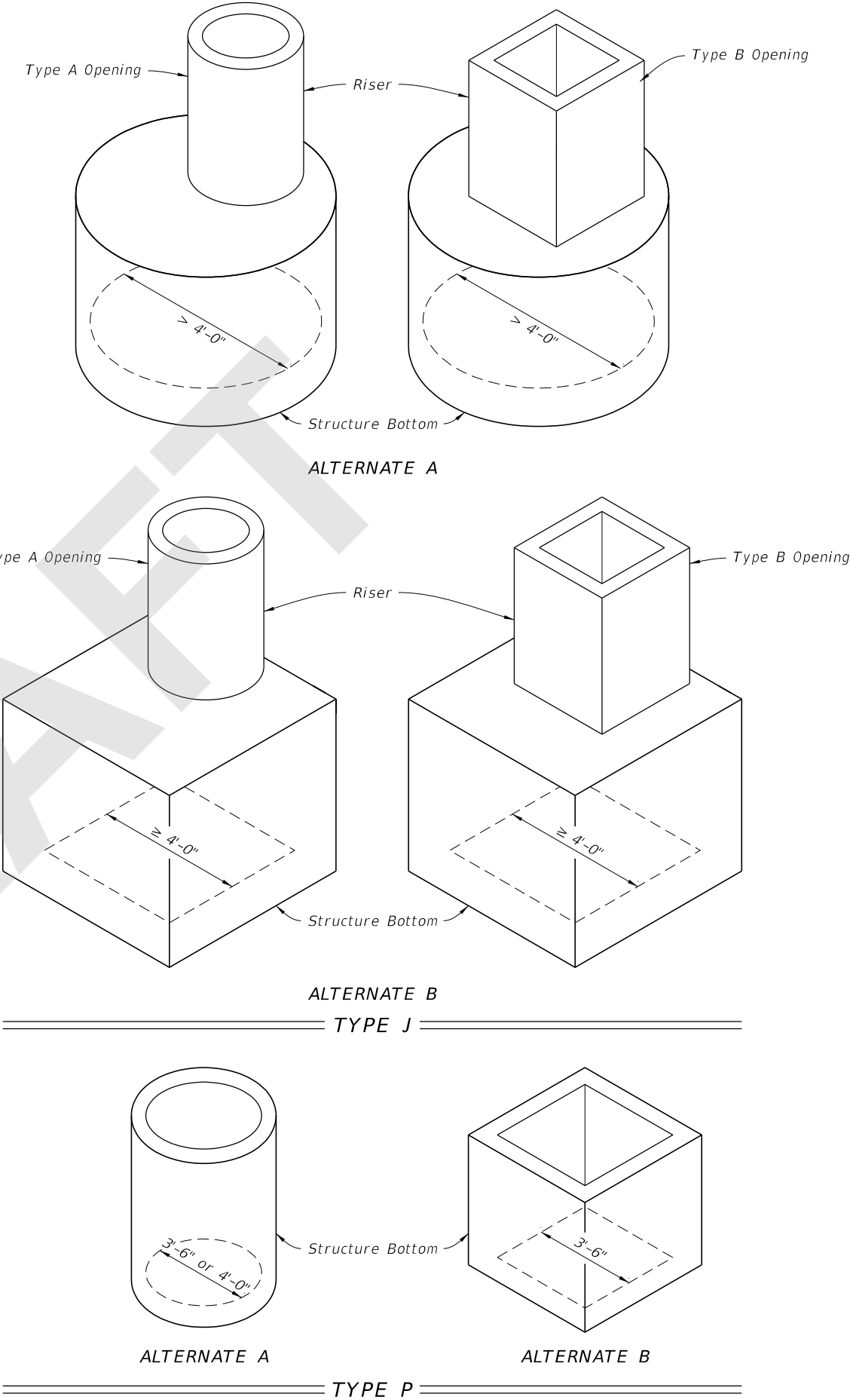
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GENERAL NOTES:

1. Work this Index with Specification 425 and Index 425-001.
2. Type P standard structure bottoms are 4'-0" diameter and smaller (Alt. A) and 3'-6" square (Alt. B) . Larger standard structure bottoms are designated Type J. Risers are permitted for all structures.
3. Walls of circular structures (Alt. A) constructed in place may be of brick or reinforced concrete. Construct precast and rectangular structures (Alt. B) with reinforced concrete only.
4. Wall thickness and reinforcement are for either reinforced cast-in-place or precast concrete units except that precast circular units may be furnished with walls in accordance with ASTM C478 (See Table 1).
5. Top and bottom slab thickness and reinforcement are for precast and cast-in-place construction. Use Class II concrete, except when Class IV concrete is shown in the Plans.
6. Alt. A or Alt. B structure bottoms may be used in conjunction with curb inlet tops Types 1, 2, 3, 4, 5, 6, 9, and 10, and any manhole or junction box. Alt. B structure bottoms may be used in conjunction with curb inlet Types 7 & 8, or any ditch bottom inlet.
7. Rectangular structures may be rotated as directed by the Engineer in order to facilitate connections between the structure walls and pipes.
8. Use straight embedment reinforcement in top and bottom slabs ,except when ACI hooks are specifically required.
9. Construct corner fillets as shown for rectangular structures used with circular risers and inlet throats, and when used on skew with rectangular risers, inlets, and inlet throats. Construct fillets in the top slab of the Alt. A structure bottoms when used with the Type B risers. Reinforce each fillet with two #5 bars.
10. Units larger than specified standards may be substituted at the contractor's option when these units will not cause or increase the severity of utility conflicts. Furnish such larger units at no additional cost to the Department. Larger Alt. A units cannot replace Alt. B units without approval of the Engineer. This Note applies to this Index only.

REINFORCEMENT NOTES:

1. Locate wall reinforcement in rectangular structures as shown in the WALL REINFORCEMENT SPLICE DETAILS in Index 425-001.
2. Provide a minimum 2"clear cover for all reinforcement unless otherwise noted and except for 3'6"diameter ASTM C478 units.
3. Additional bars used to restrain hole formers for precast structures with grouted pipe connections may be left flush with the hole surface.
4. Cut or bend reinforcement at pipe openings to maintain cover.
5. Remove exposed ends of reinforcing at precast pipe openings and grouted joints to 1" below the concrete surface and seal with a Type F Epoxy meeting the requirements of Specification 926.
6. Equivalent area smooth or deformed welded wire reinforcement may be substituted in accordance with Index 425-001.

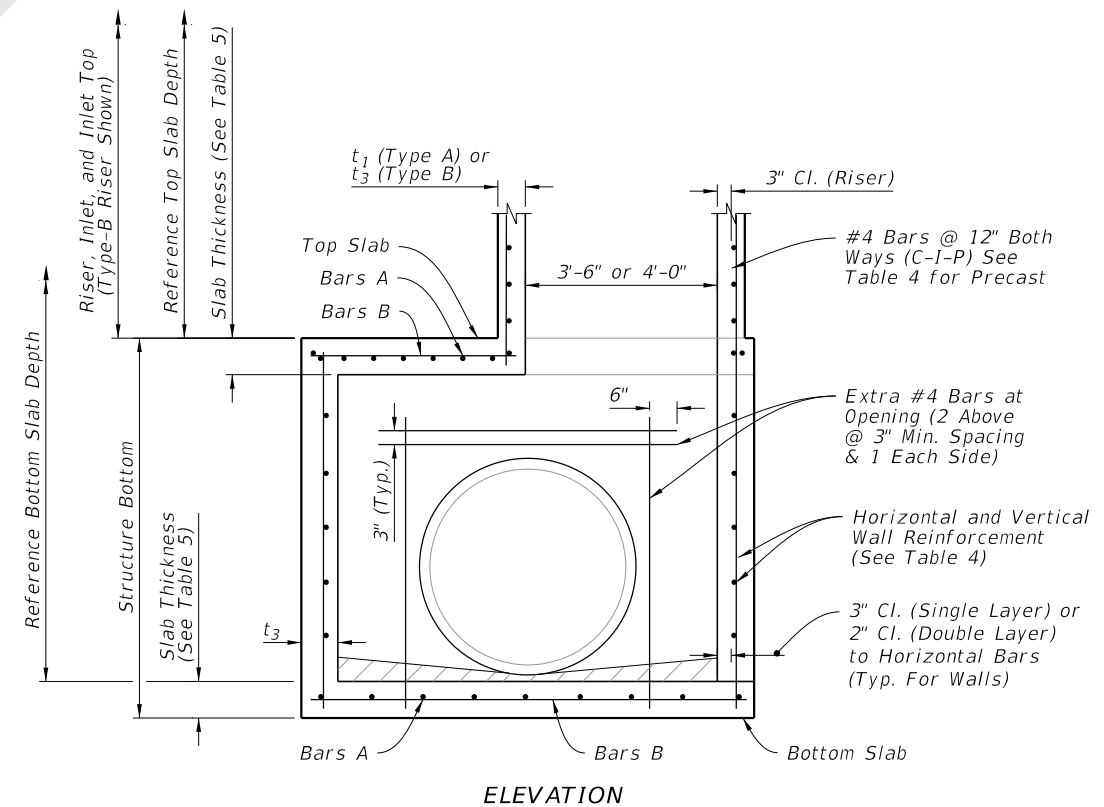
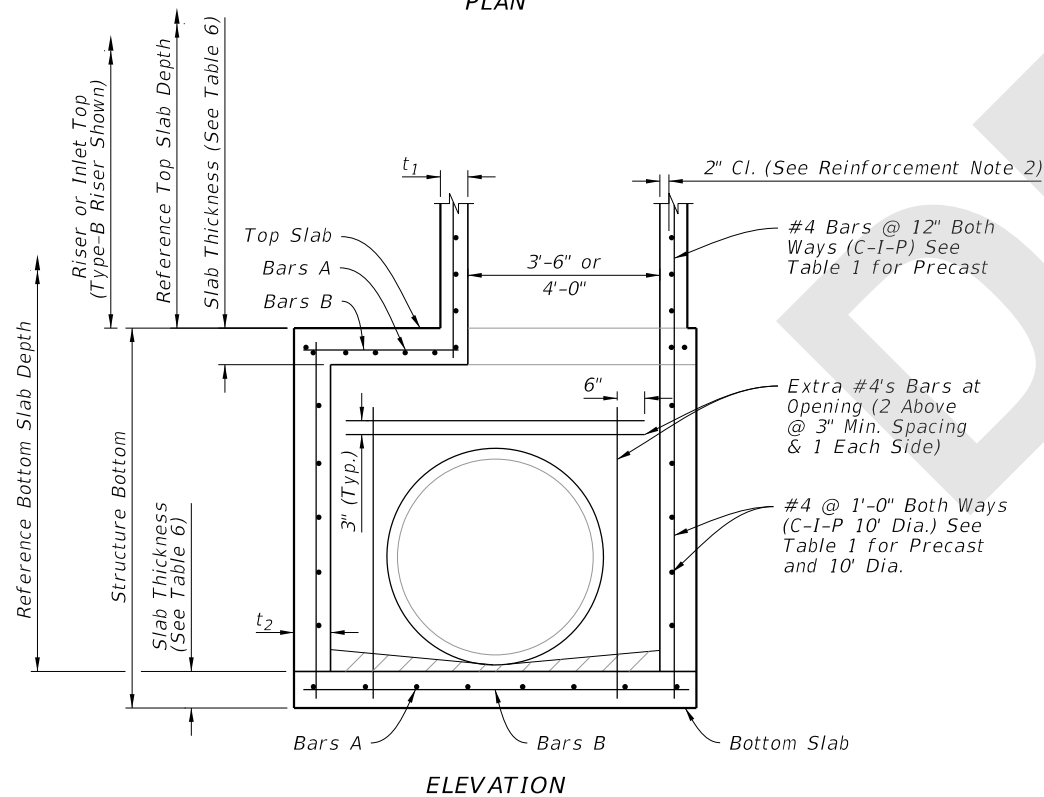
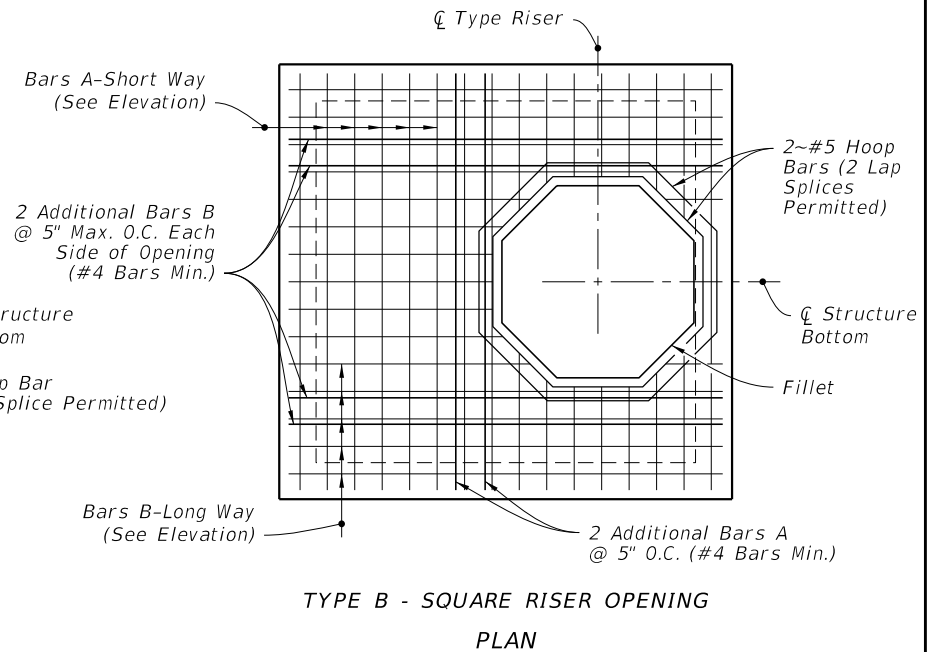
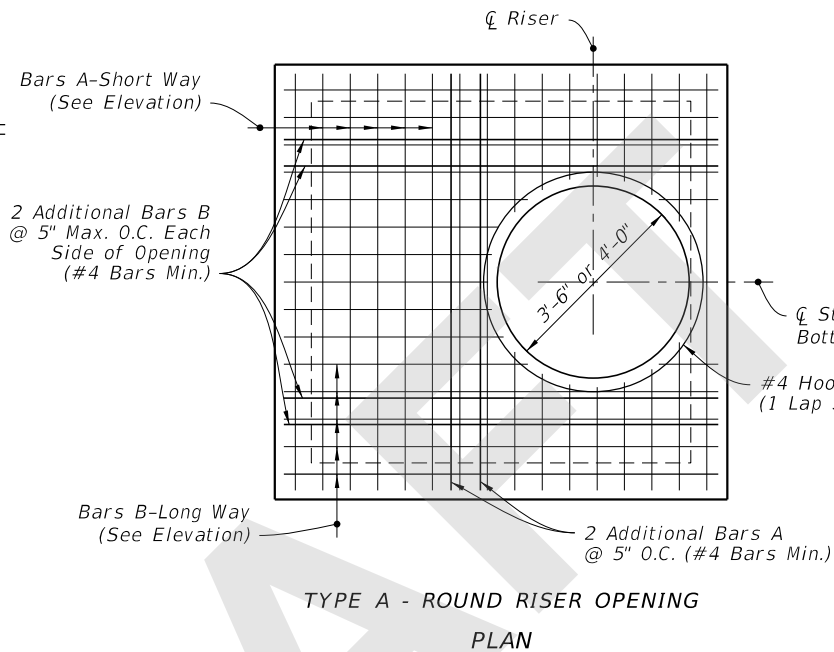
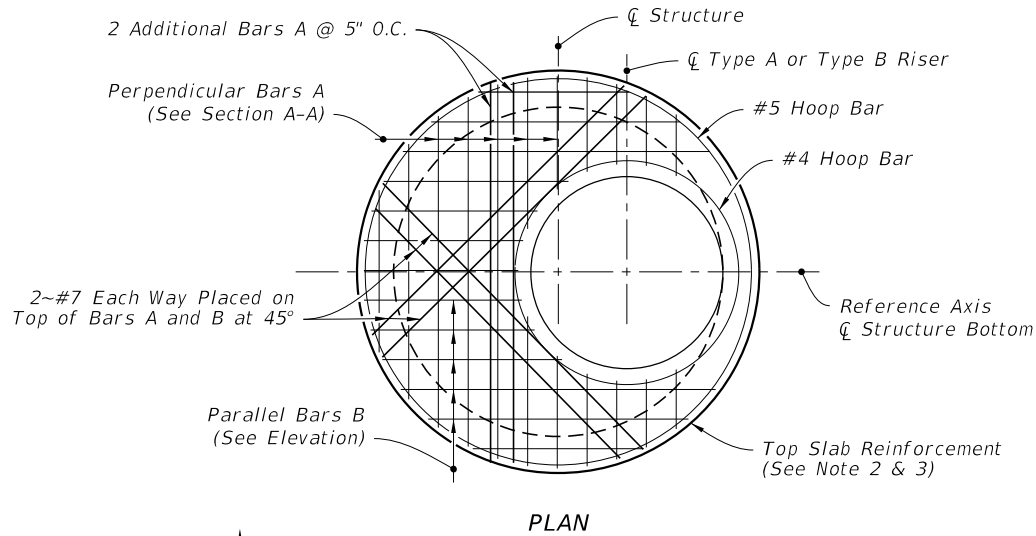
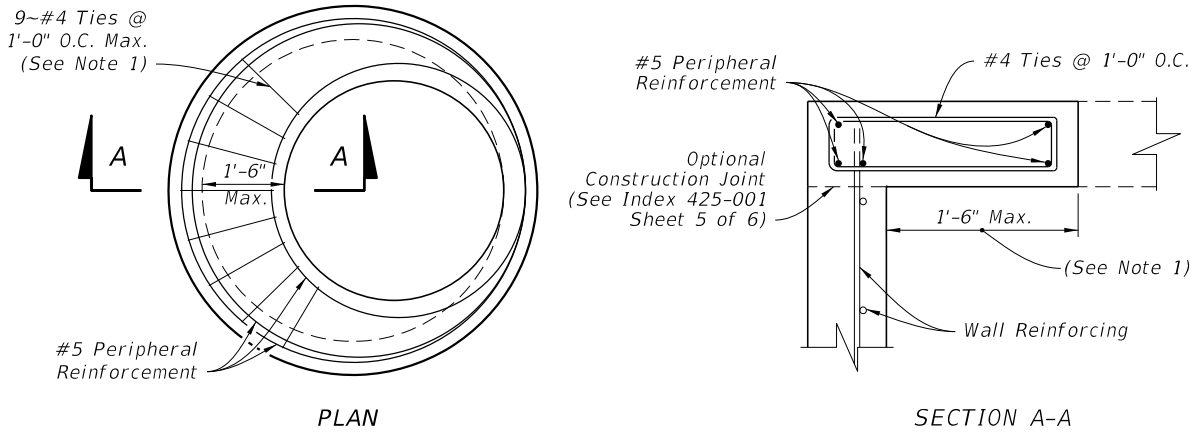


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ALTERNATE A NOTES:

1. Rotate #4 Bars as required to maintain cover.
2. Construct the top or riser of the structure according to the top slab to the "Special Top Slab" details, when the inside diameter of a round structure is not more than 1'-6" larger than the opening in the riser or top slab.
3. Alternate A slab reinforcing not applicable for Type A, B, C, D & E Ditch Bottom Inlets or Type S & V Gutter Inlets. See Indexes 425-040, 425-050, 425-051, and 425-052.

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TABLE 1 - ALTERNATE A - STRUCTURES									
TYPE	STRUCTURE/RISER DIAMETER (ft)	CAST-IN-PLACE ITEMS CLASS II CONCRETE			PRECAST ITEMS				
		CLASS II CONCRETE			ASTM C478				
		t ₁ RISER (in.)	t ₂ BOTTOM (in.)	A _S (in. ² /ft.)	t ₁ RISER (in.)	t ₂ BOTTOM (in.)	A _S (in. ² /ft.)	t ₁ or t ₂ (in.)	A ₂ *** (in. ² /ft.)
P	3'-6"	6	8	0.20	6	8	0.20	4**	0.105
P	4'-0"	6	8	0.20	6	8	0.20	5**	0.120
J	5'-0"	-	8	0.20	-	8	0.20	6**	0.150
J	6'-0"	-	8	0.20	-	8	0.20	6	0.180
J	7'-0"	-	8	0.20	-	8	0.20	7	0.210
J	8'-0"	-	8	0.20	-	8	0.20	8	0.240
J	10'-0"	-	10	0.40##	-	10	0.40##	10	0.300
J	12'-0"	-	10	0.40##	-	12	0.40##	12	0.360

t₁ and t₂- Wall Thickness.

A_S- Vertical and horizontal areas of reinforcement.

##Provide 0.20 eq. in.²/ft. at each face, 12" max. bar spacing.

**Modified minimum wall thickness.

***Min. total circumferential reinforcement for continuous steel hoops:

A₂ = 0.40 sq. in. for riser section height equal or less than 2'-0" (2 hoop min.)

A₂ = 0.60 sq. in. for riser section height more than 2'-0" up to 4'-0" (3 hoop min.)

Areas of reinforcing for precast items are based on Grade 60 reinforcing.

No reduction in the area of reinforcement is allowed for welded wire fabric in Table 1.

Area of vertical reinforcing may be reduced in accordance with ASTM C478.

TABLE 3 - REINFORCING SCHEDULE				
SCHEDULE	GRADE 60 BARS OR 65 KSI & 70 KSI WELDED WIRE REINFORCING			
	GRADE 60 AREA (in. ² /ft)	MAXIMUM SPACING		
		GR 60 BARS (in.)	65 KSI (in.)	70 KSI (in.)
A12	0.20	12	8	8
A6	0.20	6	5	4½
B10	0.24	10	8	7½
B5.5	0.24	5½	5	4
C6.5	0.37	6½	6	5
C3.5	0.37	3½	3	2½
D7	0.53	7	6	5
D4.5	0.53	4½	4	3½
E5	0.73	5	4	4
E3	0.73	3	3	3
F5	1.06	5	4	4
F3.5	1.06	3½	3	3
G5	1.45	5	4	4
G.3.5	1.45	3½	3	3
H4	1.75	4	3	3

TABLE 2 - ALTERNATE B SQUARE AND RECTANGULAR STRUCTURES				
TYPE	WALL LENGTH (FT)	MAX. DEPTH (FT)	WALL THICKNESS (t ₃)	
			C-I-P (in.)	PRECAST (in.)
P	≤ 3'-6"	40	6 Riser 8 Bottom	6
J	4'-0"	40	8	6
J	5'-0"	22	-	6
J	6'-0"	15	-	6
J	5'-0" to 9'-0"	40	8	8
J	10'-0"	26	8	8
J	10'-0" to 12'-0"	40	10	9
J	16'-0"	35	-	9
J	16'-0"	40	10	10
J	20'-0"	25	-	9
J	20'-0"	30	10	10

See Table 4 for Reinforcing Schedule.

TABLE 4 - WALL DESIGNS - RECTANGULAR STRUCTURES													
VERTICAL REINFORCING			HORIZONTAL REINFORCING			WALL THICKNESS	VERTICAL REINFORCING			HORIZONTAL REINFORCING			WALL THICKNESS
WALL DEPTH	SCHEDULE		WALL DEPTH	SCHEDULE			WALL DEPTH	SCHEDULE		WALL DEPTH	SCHEDULE		
SIZE: 3'-6" & RISER							SIZE: 10'-0" (Precast Only)						
≥1.17' - 40'	A12		≥1.17' < 10'	B10		6"/8"		Inside	Outside		Inside	Outside	
			10' < 18'	B5.5		6"/8"	26' - 40'	D7	D7	26' - 40'	F5	F5	9"
			18' < 29'	C6.5		6"/8"	SIZE: 12'-0"						
			29' - 40'	C3.5		6"/8"		Inside	Outside		Inside	Outside	
SIZE: 4'-0"							≥1.17' < 14'	B10	B10	≥1.17' < 10'	C6.5	C6.5	10"
≥1.17' - 40'	A12		≥1.17' < 6'	B10		6"/8"	14' < 25'	C6.5	C6.5	10' < 17'	D7	D7	10"
			6' < 10'	B5.5		6"/8"	25' - 40'	D7	D7	17' < 24'	E5	E5	10"
			10' < 20'	C6.5		6"/8"				24' - 40'	F5	F5	10"
			20' < 28'	C3.5		6"/8"	SIZE: 12'-0" (Precast Only)						
			28' - 40'	D4.5		6"/8"		Inside	Outside		Inside	Outside	
SIZE: 5'-0"							≥1.17' < 12'	B10	B10	≥1.17' < 10'	D7	D7	9"
≥1.17' - 40'	A12		≥1.17' < 5'	B5.5		6"/8"	12' < 24'	C6.5	C6.5	10' < 17'	D4.5	D4.5	9"
			5' < 9'	C6.5		6"/8"	24' - 40'	D7	D7	17' < 23'	E5	E5	9"
			9' < 15'	C3.5		6"/8"				23' < 32'	F5	F5	9"
			15' < 22'	D4.5		6"/8"				32' - 40'	G5	G5	9"
			22' - 40'	E3		8"	SIZE: 16'-0"						
SIZE: 6'-0"								Inside	Outside		Inside	Outside	
≥1.17' < 26'	A12		≥1.17' < 9'	C3.5		6"/8"	≥1.17' < 11'	C6.5	C6.5	≥1.17' < 13'	D7	D7	10"
			9' < 15'	D4.5		6"/8"	11' < 20'	D7	D7	13' < 20'	E5	E5	10"
			15' < 26'	E3		8"	20' < 28'	E5	E5	20' < 28'	F5	F5	10"
	Inside	Outside		Inside	Outside		28' - 40'	F5	F5	28' - 40'	G5	G5	10"
26' - 40'	A12	A12	26' - 40'	D7	D7	8"	SIZE: 16'-0" (Precast Only)						
SIZE: 7'-0"								Inside	Outside		Inside	Outside	
	Inside	Outside		Inside	Outside		≥1.17' < 10'	C6.5	C6.5	≥1.17' < 9'	D7	D7	9"
≥1.17' < 25'	A12	A12	≥1.17' < 7'	B10	B10	8"	10' < 18'	D7	D7	9' < 13'	D4.5	D4.5	9"
26' - 40'	B10	B10	7' < 10'	B5.5	B5.5	8"	18' < 25'	E5	E5	13' < 19'	E5	E5	9"
			10' < 20'	C6.5	C6.5	8"	25' - 35'	F5	F5	19' < 27'	F5	F5	9"
			20' < 30'	D7	D7	8"				27' - 35'	G5	G5	9"
			30' - 40'	E5	E5	8"	SIZE: 20'-0"						
SIZE: 8'-0"								Inside	Outside		Inside	Outside	
	Inside	Outside		Inside	Outside		≥1.17' < 10'	C6.5	C6.5	≥1.17' < 8'	D7	D7	10"
≥1.17' < 20'	A12	A12	≥1.17' < 6'	B5.5	B5.5	8"	10' < 17'	D7	D7	8' < 12'	E5	E5	10"
20' - 40'	C6.5	C6.5	6' < 13'	C6.5	C6.5	8"	17' - 30'	E5	E5	12' < 20'	F5	F5	10"
			13' < 22'	D7	D7	8"				20' - 30'	G5	G5	10"
			22' < 31'	E5	E5	8"	SIZE: 20'-0" (Precast Only)						
			31' - 40'	F5	F5	8"		Inside	Outside		Inside	Outside	
SIZE: 9'-0"							≥1.17' < 8'	C6.5	C6.5	≥1.17' < 8'	D4.5	D4.5	9"
	Inside	Outside		Inside	Outside		8' < 13'	D7	D7	8' < 12'	E5	E5	9"
≥1.17' < 12'	A12	A12	≥1.17' < 8'	C6.5	C6.5	8"	13' - 25'	E5	E5	12' < 19'	F5	F5	9"
12' < 28'	C6.5	C6.5	8' < 15'	D7	D7	8"				19' - 25'	G5	G5	9"
28' - 40'	D7	D7	15' < 23'	E5	E5	8"							
			23' - 40'	F5	F5	8"							
SIZE: 9'-0"								Inside	Outside		Inside	Outside	
	Inside	Outside		Inside	Outside		≥1.17' < 10'	B10	B10	≥1.17' < 10'	D7	D7	8"
≥1.17' < 10'	B10	B10	≥1.17' < 10'	D7	D7	8"	10' < 21'	C6.5	C6.5	10' < 17'	E5	E5	8"
10' < 21'	C6.5	C6.5	10' < 17'	E5	E5	8"	21' < 26'	D7	D7	17' < 26'	F5	F5	8"
21' < 26'	D7	D7	17' < 26'	F5	F5	8"	26' - 40'	C6.5	C6.5	26' - 40'	F5	F5	10"
26' - 40'	C6.5	C6.5	26' - 40'	F5	F5	10"							

TABLE 4 NOTES:

1. Wall depth is measured to the top of the bottom slab for boxes and to the top of the intermediate slab for risers.

2. Wall height is the distance between top of lower slab to top of upper slab. Maximum wall height is 12' for wall lengths exceeding 5', or 10' for wall lengths exceeding 12'.

3. Wall lengths exceeding 6'-0" require two layers of reinforcement (See Table 4) with 2" of cover from the horizontal bars.

2. Wall height is the distance between top of lower slab to bottom of upper slab. Maximum wall height is 12' for wall lengths exceeding 5', or 10' for wall lengths exceeding 12'.
3. Wall lengths exceeding 6'-0" require two layers of reinforcing (See Table 4) with 2" of cover from the horizontal bars to the inside and outside faces for each layer.
4. Wall lengths exceeding the dimensions or depths shown in Table 4, or 12'-0" diameter require a special design.
5. Wall thickness and reinforcing for rectangular structures is based on the longer wall length.



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DESCRIPTION:

TABLE 5 - SLAB DESIGNS - SQUARE AND RECTANGULAR STRUCTURES (ALL SLABS 8" THICK EXCEPT AS NOTED - REINFORCING PARALLEL TO SHORT WAY AND LONG WAY)											
SHORT-WAY				LONG-WAY				SHORT-WAY			
SLAB DEPTH	SCHEDULE (Bars A)	SLAB DEPTH	SCHEDULE (Bars B)	SLAB DEPTH	SCHEDULE (Bars A)	SLAB DEPTH	SCHEDULE (Bars B)	SLAB DEPTH	SCHEDULE (Bars A)	SLAB DEPTH	SCHEDULE (Bars B)
SIZE: 3'-6" x UNLIMITED				SIZE: 6' x 6'				SIZE: 8' x 8'			
≥0.5' < 8'	B10	≥0.5' < 24'	B10	≥0.5' < 13'	C6.5	≥0.5' < 10'	C3.5	≥0.5' < 10'	D7	≥0.5' < 9'	D4.5
8' < 13'	B5.5	24'-40'	B5.5	13' < 23'	D7	10' < 18'	D4.5	10' < 19'	E5	9' < 13'	E5
13' < 31'	C6.5			23'-40'	E5	18' < 27'	E5	19'-30'	F5	13' < 18'	F5
31'-40'	D7					27' < 33'	E3			18' < 23'	F3.5
						33'-40'	F5			23'-30'	G3.5
SIZE: 4' x UNLIMITED				SIZE: 6' x 7'				SIZE: 8' x 9'			
≥0.5' < 7'	B5.5	≥0.5' < 15'	B10	≥0.5' < 8'	C6.5	≥0.5' < 8'	C6.5	≥0.5' < 8'	D7	≥0.5' < 7'	D7
7' < 19'	C6.5	15' < 29'	B5.5	8' < 16'	D7	8' < 12'	C3.5	8' < 14'	E5	7' < 9'	D4.5
19' < 31'	D7	29'-40'	C6.5	16' < 28'	E5	12' < 21'	D4.5	14' < 23'	F5	9' < 15'	E3
31'-40'	E5			28'-40'	F5	21' < 28'	E5	23'-31'	G3.5	15' < 20'	F5
						28' < 35'	E3			20' < 23'	F3.5
						35'-40'	F5			23'-31'	G3.5
SIZE: 5' x 5'				SIZE: 6' x 8'				SIZE: 9' x 9'			
≥0.5' < 3'	C6.5	≥0.5' < 3'	C6.5	≥0.5' < 6'	C6.5	≥0.5' < 6'	B5.5	≥0.5' < 8'	D7	≥0.5' < 7'	D4
3' < 7'	B5.5	3' < 13'	C6.5	6' < 13'	D7	6' < 11'	C6.5	8' < 14'	E5	7' < 10'	E5
7' < 22'	C6.5	13' < 22'	D7	13' < 22'	E5	11' < 17'	C3.5	14' < 22'	F5	10' < 17'	F3.5
22' < 29'	D7	22' < 29'	D4.5	22' < 35'	F5	17' < 22'	D4.5			17' < 22'	G3.5
29'-40'	E5	29'-40'	E5	35'-40'	G5	22' < 32'	E5	SIZE: 9'x9'x10" SLAB THICKNESS			
						32'-40'	E3	22' < 36'	F5	22' < 31'	F3.5
SIZE: 5' x 6'				SIZE: 6' x 9'				36'-40'	G5	31'-40'	G3.5
≥0.5' < 12'	C6.5	≥0.5' < 3'	C6.5	≥0.5' < 8'	D7	≥0.5' < 8'	B5.5	SIZE: 10'x10'x10" SLAB THICKNESS			
12' < 26'	D7	3' < 9'	B5.5	8' < 14'	E5	8' < 14'	C6.5	≥0.5' < 7'	C6.5	0.5' < 6'	C6.5
26'-40'	E5	9' < 23'	C3.5	14' < 24'	F5	14' < 21'	C3.5	7' < 10'	D7	6' < 9'	D4.5
		23' < 35'	D4.5	24'-34'	G5	21' < 25'	D4.5	10' < 18'	E5	9' < 15'	E5
		35'-40'	E5			25'-34'	E5	18' < 27'	F5	15' < 22'	F5
SIZE: 5' x 7'				SIZE: 6' x UNLIMITED				27'-32'	G5	22'-32'	G3.5
≥0.5' < 10'	C6.5	≥0.5' < 10'	B5.5	≥0.5' < 8'	D7	≥0.5' < 8'	B5.5	SIZE: 12'x12'x12" SLAB THICKNESS			
10' < 20'	D7	10' < 31'	C3.5	8' < 14'	E5	8' < 14'	C6.5	≥0.5' < 10'	D7	≥0.5' < 8'	D7
20' < 34'	E5	31'-40'	D4.5	14' < 24'	F5	14' < 21'	C3.5	10' < 16'	E5	8' < 14'	E5
34'-40'	F5			24'-34'	G5	21' < 25'	D4.5	16' < 25'	F5	14' < 22'	F5
						25'-34'	E5	25'-35'	G5	22' < 30'	G5
SIZE: 5' x 8'				SIZE: 7' x 7'						30'-35'	H4
≥0.5' < 7'	C6.5	≥0.5' < 8'	B10	≥0.5' < 8'	D7	≥0.5' < 4'	C6.5	SIZE: 7' x 8'			
7' < 13'	D7	8' < 17'	B5.5	8' < 15'	D7	4' < 7'	C3.5	≥0.5' < 5'	C6.5	≥0.5' < 5'	C6.5
13' < 24'	E5	17' < 25'	C6.5	15' < 26'	E5	7' < 11'	D4.5	5' < 11'	D7	5' < 8'	C3.5
24'-40'	F5	25'-40'	C3.5	26'-40'	F5	11' < 22'	E3	11' < 19'	E5	8' < 13'	D4.5
						22' < 32'	F3.5	19' < 30'	F5	13' < 22'	E3
SIZE: 5' x 9'				SIZE: 7' x 9'				30'-40'	G5	22' < 30'	F3.5
≥0.5' < 8'	C6.5	≥0.5' < 14'	B10	≥0.5' < 8'	D7	≥0.5' < 9'	C6.5			30'-40'	G3.5
8' < 14'	D7	14' < 24'	B5.5	8' < 14'	E5	9' < 15'	E5	SIZE: 7' x 9'			
14' < 25'	E5	24' < 34'	C6.5	15' < 26'	E5	15' < 25'	F5	≥0.5' < 9'	D7	≥0.5' < 7'	C6.5
25'-40'	F5	34'-40'	C3.5	26'-40'	F5	14' < 21'	E5	9' < 15'	E5	7' < 10'	C3.5
						21' < 29'	F5	15' < 25'	F5	10' < 14'	D4.5
SIZE: 5' x UNLIMITED						29'-34'	F3.5	25' - 34'	G5	14' < 21'	E5
≥0.5' < 8'	C6.5	≥0.5' < 14'	B10							21' < 29'	F5
8' < 14'	D7	14' < 24'	B5.5							29'-34'	F3.5
14' < 25'	E5	24' < 34'	C6.5								
25'-40'	F5	34'-40'	C3.5								

TABLE 6 - SLAB DESIGNS ROUND STRUCTURES		
SLAB DEPTH	SLAB THICKNESS	REINF. (2-WAY) SCHEDULE
SIZE: 3'-6" DIAMETER		
2'-15'	6" Precast	C6.5
0.5' < 30'	8"	A6
30'-40'	8"	B5.5
SIZE: 4'-0" DIAMETER		
≥0.5' < 19'	8"	A6
19' < 30'	8"	B5.5
30'-40'	8"	C6.5
SIZE: 5'-0" DIAMETER		
≥0.5' < 15'	8"	B5.5
15' < 26'	8"	C6.5
26' < 35'	8"	D7
35'-40'	8"	D4.5
SIZE: 6'-0" DIAMETER		
≥0.5' < 9'	8"	B5.5
9' < 15'	8"	C6.5
15' < 22'	8"	C3.5
22' < 30'	8"	D4.5
30'-40'	8"	E5
SIZE: 7'-0" DIAMETER		
≥0.5' < 8'	8"	C3.5
8' < 16'	8"	D4.5
16' < 23'	8"	E5
23' < 27'	8"	E3
27'-40'	8"	F3.5
SIZE: 8'-0" DIAMETER		
≥0.5' < 10'	8"	D4.5
10' < 16'	8"	E5
16' < 19'	8"	E3
19' < 29'	8"	F3.5
29'-40'	10"	F5
SIZE: 10'-0" DIAMETER		
≥0.5' < 12'	10"	D4.5
12' < 20'	10"	E5
20' < 28'	10"	F5
28'-40'	10"	G3.5
SIZE: 12'-0" DIAMETER		
≥0.5' < 8'	10"	D4.5
8' < 13'	10"	E5
13' < 18'	10"	F5
18' < 26'	10"	G3.5
26'-40'	12"	G3.5

SLAB AND WALL DESIGN TABLE NOTES

- Size is the inside dimension(s) of a structure.
- Slab reinforcement is appropriate for top, intermediate, and bottom slabs.
- Bottom Slabs for precast 3'-6" x 3'-6" rectangular structures at 15' depth or less, may be 6" thick.
- Slab depth is measured from finished grade to top of slab.
- Reinforcing schedules with larger areas of steel may be substituted for schedules with smaller bar or wire spacing, except that Schedule B10 may not be substituted for Schedule A6. See Index 425-001 for allowable bar spacing adjustments when larger areas of reinforcing are substituted.

