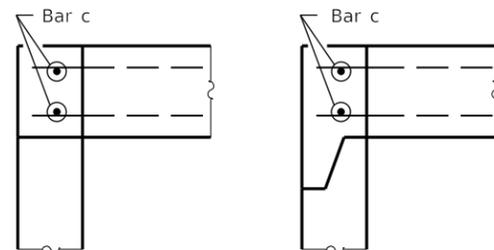
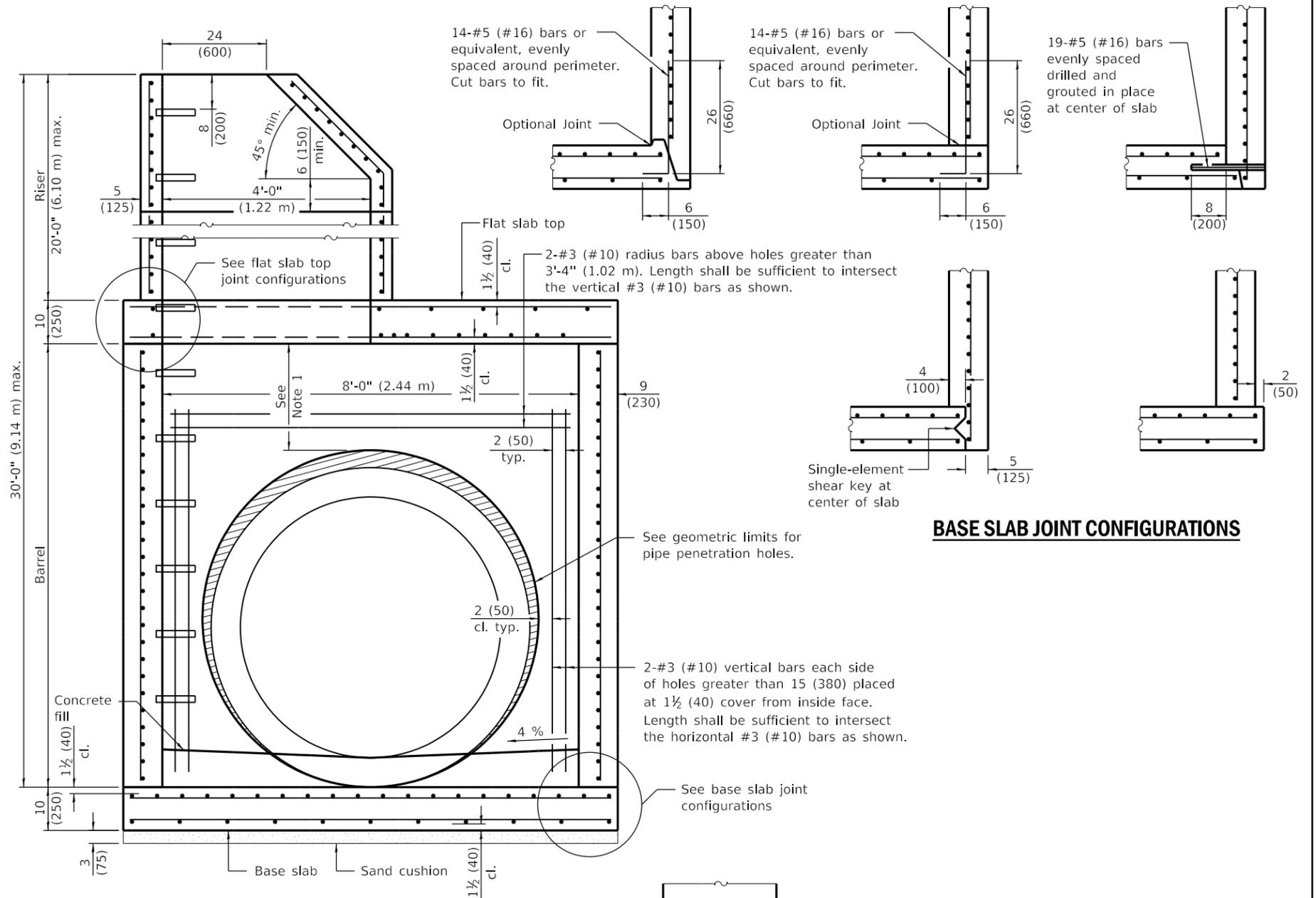


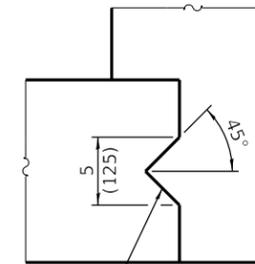
**SECTION PARALLEL TO PIPE**  
(Without conical top riser)



**FLAT SLAB TOP JOINT CONFIGURATIONS**  
(Shown at access hole)



**SECTION PERPENDICULAR TO PIPE**  
(With conical top riser)



Single-element shear key at center of slab

**SHEAR KEY GEOMETRY**

(Reinforcement not shown for clarity)

**BASE SLAB JOINT CONFIGURATIONS**

**GEOMETRIC LIMITS FOR PIPE PENETRATION HOLES**

- Note 1: A minimum of 12 (300) of monolithic reinforced concrete shall be maintained above pipe penetration holes > 3'-4" (1.02 m).
- Note 2: A minimum 12 (300) inside arc length of reinforced concrete shall be maintained between pipe penetration holes > 15 (380).
- Note 3: A maximum of 60 percent of the inside perimeter of the reinforced concrete manhole walls may be removed.
- Note 4: Horizontal joints that intersect pipe penetration holes > 15 (380) shall have one joint splice for every location around the perimeter of the joint where the inside arc length between pipe penetration holes is < 24 (600). See joint splice detail.
- Note 5: The recommended pipe penetration hole is equal to the O.D. of the pipe plus 4 (100).
- Note 6: Only pipe penetration holes ≤ 15 (380) are allowed in riser sections.

DATE	REVISIONS
1-1-21	Revised Note 1 and lifting hole general note.
3-1-19	Moved wall reinforcement from inside face to middle.

**GENERAL NOTES**

- Pipe holes shall be formed to facilitate proper placement of hole reinforcement.
- The manufacturer shall ensure that all precast manhole sections are additionally reinforced where required to resist damage from handling, shipping and installation stresses.
- Lifting holes shall be located in the sections as per the manufacturer's recommendations.
- See Standard 602701 for details of manhole steps.
- All dimensions are in inches (millimeters) unless otherwise noted.

**PRECAST MANHOLE TYPE A**  
**8' (2.44 m) DIAMETER**

(Sheet 1 of 3)

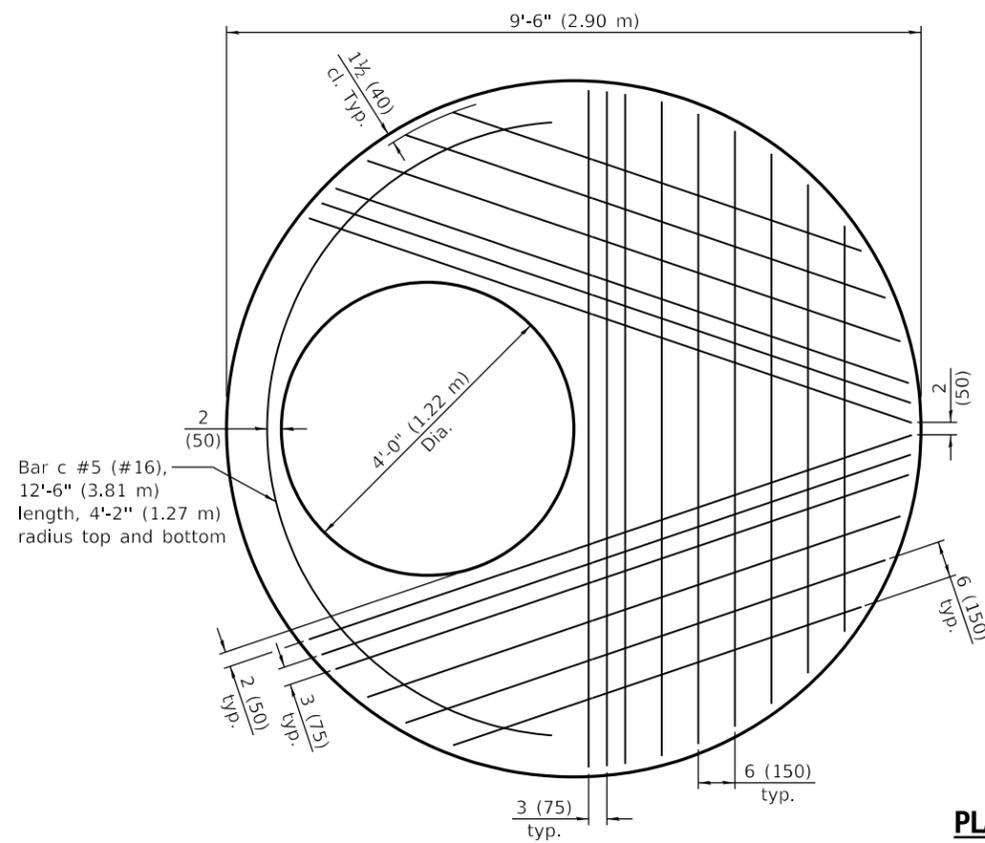
**STANDARD 602416-09**

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APPROVED January 1, 2021  
  
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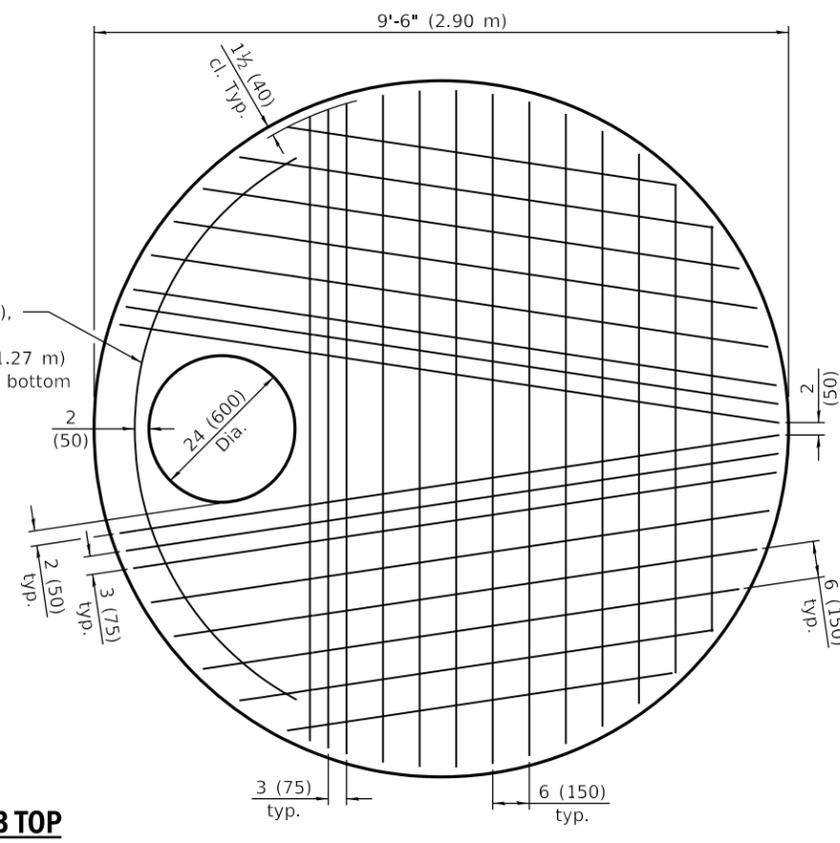
ISSUED 4-1-06



**PLAN - FLAT SLAB TOP**

(Showing layout of bottom reinforcement bars and c bars)

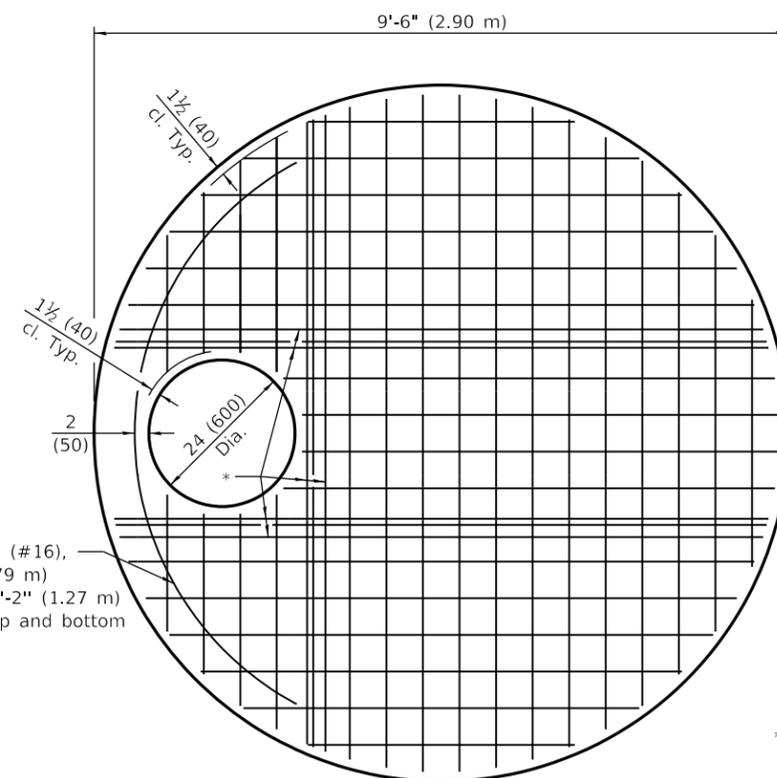
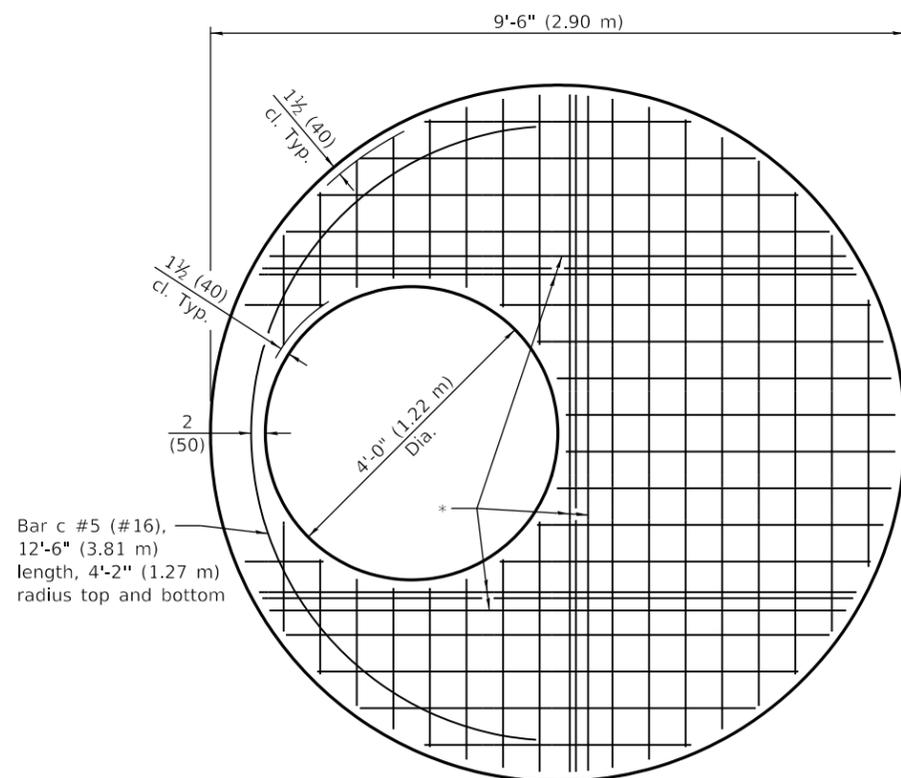
Bar c #5 (#16),  
9'-2" (2.79 m)  
length, 4'-2" (1.27 m)  
radius top and bottom



**PLAN - FLAT SLAB TOP**

(Showing layout of Welded Wire Reinforcement and c bars)  
WWR not permitted for riser heights > 10' (3.05 m).

Bar c #5 (#16),  
9'-2" (2.79 m)  
length, 4'-2" (1.27 m)  
radius top and bottom



\* #6 (#19) bars bottom. Bundle first bar with closest WWR bar to the opening and place second bar ±3 (75) away.

**PRECAST MANHOLE TYPE A**  
**8' (2.44 m) DIAMETER**

(Sheet 2 of 3)

**STANDARD 602416-09**

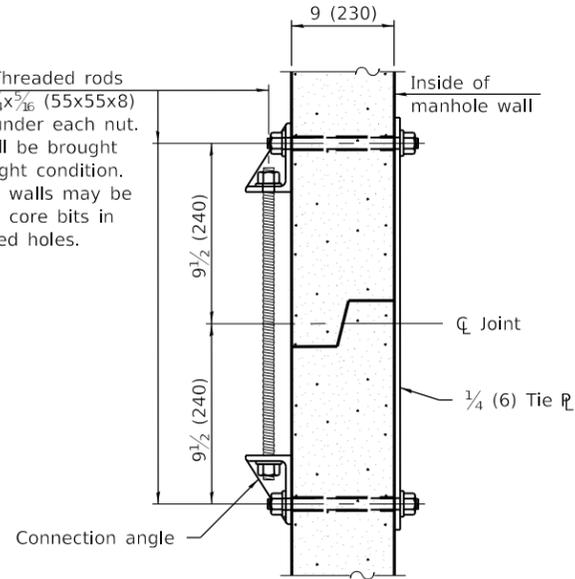
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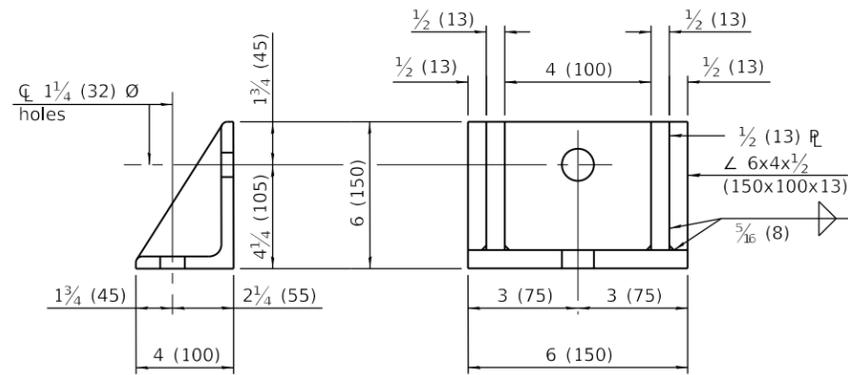
APPROVED January 1, 2021  
*J. E. ...*  
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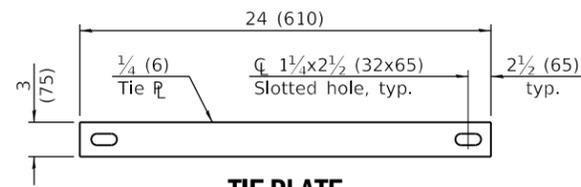
1(25)  $\varnothing$  Threaded rods with  $2\frac{1}{4} \times 2\frac{1}{4} \times \frac{5}{16}$  (55x55x8)  $\varnothing$  washers under each nut. All nuts shall be brought to a snug tight condition. Holes in the walls may be drilled using core bits in lieu of formed holes.



**JOINT SPLICE**



**CONNECTION ANGLE**



**TIE PLATE**

**FLAT SLAB TOP REINFORCEMENT**

Location	Riser Height (RH)	WWR (each direction)		Rebar (each direction except as noted)		
		A <sub>s</sub> (min.)	Spacing (max.)	A <sub>s</sub> (min.)	Spacing (max.)	Bar Size
Top Mat	All	0.11 sq. in./ft. (233 sq. mm/m)	18 (450)	0.11 sq. in./ft. (233 sq. mm/m)	18 (450)	#3 or #4 (#10) (#13)
Bottom Mat	RH ≤ 10 ft. (3.05 m)	** 0.88 sq. in./ft. (1863 sq. mm/m)	6 (150)	See plan view for rebar orientation and spacing and this table for bar size		#6 (#19)
	RH > 10 ft. (3.05 m)	WWR not permitted				#7 (#22)

\*\* Only one layer of WWR permitted to avoid congestion.

**WALL REINFORCEMENT**

Location	Orientation	WWR or Rebar	
		A <sub>s</sub> (min.)	Spacing (max.)
4 ft. (1.22 m) $\varnothing$ Riser	Circumferential	0.12 sq. in./ft. (254 sq. mm/m)	6 (150)
	Vertical	0.045 sq. in./ft. (95 sq. mm/m)	8 (200)
8 ft. (2.44 m) $\varnothing$ Barrel	Circumferential	0.24 sq. in./ft. (508 sq. mm/m)	6 (150)
	Vertical	0.045 sq. in./ft. (95 sq. mm/m)	8 (200)

**BASE SLAB REINFORCEMENT**

Location	Riser Height (RH)/ Total Height (TH)	WWR or Rebar (each direction)	
		A <sub>s</sub> (min.)	Spacing (max.)
Top Mat	RH ≤ 10 ft. (3.05 m) & TH ≤ 20 ft. (6.10 m)	0.36 sq. in./ft. (762 sq. mm/m)	6 (150)
	RH > 10 ft. (3.05 m) or TH > 20 ft. (6.10 m)	0.60 sq. in./ft. (1270 sq. mm/m)	6 (150)
Bottom Mat	All	0.11 sq. in./ft. (233 sq. mm/m)	18 (450)

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**PRECAST MANHOLE TYPE A  
8' (2.44 m) DIAMETER**

(Sheet 3 of 3)

**STANDARD 602416-09**