

**TABLE R602.10.1.3
BRACED WALL LINE SPACING**

APPLICATION	CONDITION	BUILDING TYPE	BRACED WALL LINE SPACING CRITERIA	
			Maximum Spacing	Exception to Maximum Spacing
Wind bracing	Ultimate design wind speed 100 mph to < 140 mph	Detached, townhouse	60 feet	None
Seismic bracing	SDC A – C	Detached	Use wind bracing	
	SDC A – B	Townhouse	Use wind bracing	

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m², 1 mile per hour = 0.447 m/s.

TABLE R602.10.3(1)
BRACING REQUIREMENTS BASED ON WIND SPEED

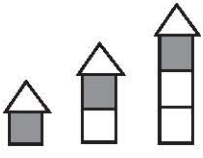
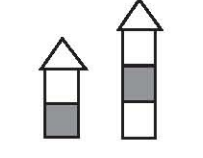
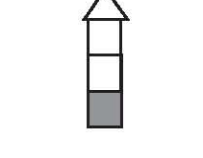
<ul style="list-style-type: none"> EXPOSURE CATEGORY B 30-FOOT MEAN ROOF HEIGHT 10-FOOT WALL HEIGHT 2 BRACED WALL LINES 			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE ^a			
Ultimate Design Wind Speed (mph)	Story Location	Braced Wall Line Spacing (feet)	Method LIB ^b	Method GB	Methods DWB, WSP, SFB, PBS, PCP, HPS, BV-WSP, ABW, PFH, PFC, CS-SFB ^c	Methods CS-WSP, CS-G, CS-PF
≤ 115		10	3.5	3.5	2.0	2.0
		20	6.5	6.5	3.5	3.5
		30	9.5	9.5	5.5	4.5
		40	12.5	12.5	7.0	6.0
		50	15.0	15.0	9.0	7.5
		60	18.0	18.0	10.5	9.0
		10	7.0	7.0	4.0	3.5
		20	12.5	12.5	7.5	6.5
		30	18.0	18.0	10.5	9.0
		40	23.5	23.5	13.5	11.5
		50	29.0	29.0	16.5	14.0
		60	34.5	34.5	20.0	17.0
		10	NP	10.0	6.0	5.0
		20	NP	18.5	11.0	9.0
		30	NP	27.0	15.5	13.0
		40	NP	35.0	20.0	17.0
		50	NP	43.0	24.5	21.0
		60	NP	51.0	29.0	25.0

TABLE R602.10.3(2)
WIND ADJUSTMENT FACTORS TO THE REQUIRED LENGTH OF WALL BRACING

ITEM NUMBER	ADJUSTMENT BASED ON	STORY/SUPPORTING	CONDITION	ADJUSTMENT FACTOR ^{a, b} [multiply length from Table R602.10.3(1) by this factor]	APPLICABLE METHODS
1	Exposure category	One-story structure	B	1.00	All methods
		Two-story structure	B	1.00	
		Three-story structure	B	1.00	
2	Roof eave-to-ridge height	Roof only	≤ 5 feet	0.70	All methods
			10 feet	1.00	
			15 feet	1.30	
			20 feet	1.60	
		Roof + 1 floor	≤ 5 feet	0.85	
			10 feet	1.00	
			15 feet	1.15	
			20 feet	1.30	
Roof + 2 floors	≤ 5 feet	0.90			
	10 feet	1.00			
	15 feet	1.10			
	20 feet	Not permitted			
3	Wall height adjustment	Any story	8 feet	0.90	All methods
			9 feet	0.95	
			10 feet	1.00	
			11 feet	1.05	
			12 feet	1.10	
4	Number of braced wall lines (per plan direction) ^c	Any story	2	1.00	All methods
			3	1.30	
			4	1.45	
			≥ 5	1.60	
5	Additional 800-pound hold-down device	Top story only	Fastened to the end studs of each braced wall panel and to the foundation or framing below	0.80	DWB, WSP, SFB, PBS, PCP, HPS
6	Interior gypsum board finish (or equivalent)	Any story	Omitted from inside face of braced wall panels	1.40	DWB, WSP, SFB, PBS, PCP, HPS, CS-WSP, CS-G, CS-SFB
7	Gypsum board fastening	Any story	4 inches o.c. at panel edges, including top and bottom plates, and all horizontal joints blocked	0.7	GB

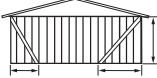



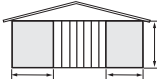




For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.48 N.

a. Linear interpolation shall be permitted.

b. The total adjustment factor is the product of all applicable adjustment factors.

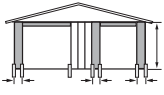
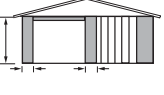
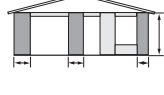
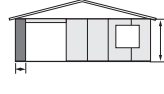
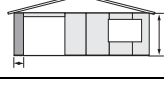
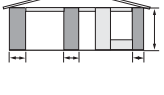
c. The adjustment factor is permitted to be 1.0 when determining bracing amounts for intermediate braced wall lines provided the bracing amounts on adjacent braced wall lines are based on a spacing and number that neglects the intermediate braced wall line.

**TABLE R602.10.4
BRACING METHODS**

METHODS, MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA ^a		
			Fasteners	Spacing	
Intermittent Bracing Method	LIB Let-in-bracing	1 × 4 wood or approved metal straps at 45° to 60° angles for maximum 16" stud spacing		Wood: 2-8d common nails or 3-8d (2 1/2" long x 0.113" dia.) nails Metal strap: per manufacturer	Wood: per stud and top and bottom plates Metal: per manufacturer
	DWB Diagonal wood boards	3/4" (1" nominal) for maximum 24" stud spacing		2-8d (2 1/2" long x 0.113" dia.) nails or 2 - 1 3/4" long staples	Per stud
	WSP Wood structural panel (See Section R604)	3/8"		Exterior sheathing per Table R602.3(3) Interior sheathing per Table R602.3(1) or R602.3(2)	6" edges 12" field Varies by fastener
	BV-WSP^c Wood structural panels with stone or masonry veneer (See Section R602.10.6.5)	7/16"	See Figure R602.10.6.5	8d common (2 1/2" x 0.131) nails	4" at panel edges 12" at intermediate supports 4" at braced wall panel end posts
	SFB Structural fiberboard sheathing	1/2" or 25/32" for maximum 16" stud spacing		1 1/2" long x 0.12" dia. (for 1/2" thick sheathing) 1 3/4" long x 0.12" dia. (for 25/32" thick sheathing) galvanized roofing nails or 8d common (2 1/2" long x 0.131" dia.) nails	3" edges 6" field
	GB Gypsum board	1/2"		Nails or screws per Table R602.3(1) for exterior locations Nails or screws per Table R702.3.5 for interior locations	For all braced wall panel locations: 7" edges (including top and bottom plates) 7" field
	PBS Particleboard sheathing (See Section R605)	3/8" or 1/2" for maximum 16" stud spacing		For 3/8", 6d common (2" long x 0.113" dia.) nails For 1/2", 8d common (2 1/2" long x 0.131" dia.) nails	3" edges 6" field
	PCP Portland cement plaster	See Section R703.6 for maximum 16" stud spacing		1 1/2" long, 11 gage, 7/16" dia. head nails or 7/8" long, 16 gage staples	6" o.c. on all framing members
	HPS Hardboard panel siding	7/16" for maximum 16" stud spacing		0.092" dia., 0.225" dia. head nails with length to accommodate 1 1/2" penetration into studs	4" edges 8" field
	ABW Alternate braced wall	3/8"		See Section R602.10.6.1	See Section R602.10.6.1

(continued)

TABLE R602.10.4—continued
BRACING METHODS

METHODS, MATERIAL		MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA ^a	
				Fasteners	Spacing
Intermittent Bracing Methods	PFH Portal frame with hold-downs	$\frac{3}{8}$ "		See Section R602.10.6.2	See Section R602.10.6.2
	PFG Portal frame at garage	$\frac{7}{16}$ "		See Section R602.10.6.3	See Section R602.10.6.3
Continuous Sheathing Methods	CS-WSP Continuously sheathed wood structural panel	$\frac{3}{8}$ "		Exterior sheathing per Table R602.3(3)	6" edges 12" field
				Interior sheathing per Table R602.3(1) or R602.3(2)	Varies by fastener
	CS-G^{b,c} Continuously sheathed wood structural panel adjacent to garage openings	$\frac{3}{8}$ "		See Method CS-WSP	See Method CS-WSP
	CS-PF Continuously sheathed portal frame	$\frac{7}{16}$ "		See Section R602.10.6.4	See Section R602.10.6.4
	CS-SFB^d Continuously sheathed structural fiberboard	$\frac{1}{2}$ " or $\frac{25}{32}$ " for maximum 16" stud spacing		$1\frac{1}{2}$ " long \times 0.12" dia. (for $\frac{1}{2}$ " thick sheathing) $1\frac{3}{4}$ " long \times 0.12" dia. (for $\frac{25}{32}$ " thick sheathing) galvanized roofing nails or 8d common ($2\frac{1}{2}$ " long \times 0.131" dia.) nails	3" edges 6" field

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.0175 rad, 1 pound per square foot = 47.8 N/m², 1 mile per hour = 0.447 m/s.

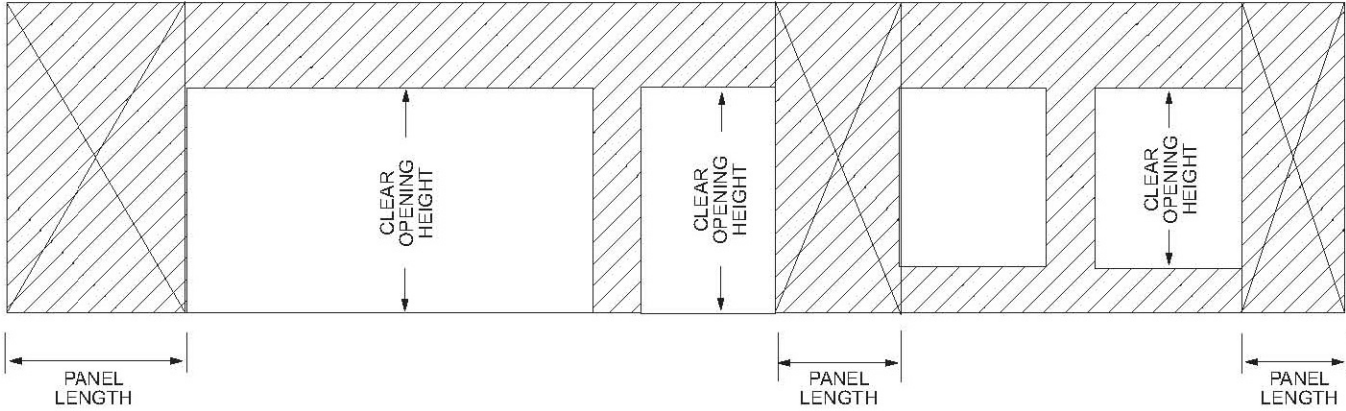
a. Adhesive attachment of wall sheathing, including Method GB, shall not be permitted in Seismic Design Categories C, D₀, D₁ and D₂.

b. Applies to panels next to garage door opening where supporting gable end wall or roof load only. Shall only be used on one wall of the garage. In Seismic Design Categories D₀, D₁ and D₂, roof covering dead load shall not exceed 3 psf.

c. Garage openings adjacent to a Method CS-G panel shall be provided with a header in accordance with Table R502.5(1). A full-height clear opening shall not be permitted adjacent to a Method CS-G panel.

d. Method CS-SFB does not apply in Seismic Design Categories D₀, D₁ and D₂.

e. Method applies to detached one- and two-family dwellings in Seismic Design Categories D₀ through D₂ only.



**FIGURE R602.10.5
BRACED WALL PANELS WITH CONTINUOUS SHEATHING**

**TABLE R602.10.5.2
PARTIAL CREDIT FOR BRACED WALL PANELS LESS THAN 48 INCHES IN ACTUAL LENGTH**

ACTUAL LENGTH OF BRACED WALL PANEL (inches)	CONTRIBUTING LENGTH OF BRACED WALL PANEL (inches) ^a	
	8-foot Wall Height	9-foot Wall Height
48	48	48
42	36	36
36	27	N/A

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

N/A = Not Applicable.

a. Linear interpolation shall be permitted.

**TABLE R602.10.5
MINIMUM LENGTH OF BRACED WALL PANELS**

METHOD (See Table R602.10.4)		MINIMUM LENGTH ^a (inches)					CONTRIBUTING LENGTH (inches)
		Wall Height					
		8 feet	9 feet	10 feet	11 feet	12 feet	
DWB, WSP, SFB, PBS, PCP, HPS, BV-WSP		48	48	48	53	58	Actual ^b
GB		48	48	48	53	58	Double sided = Actual Single sided = 0.5 × Actual
LIB		55	62	69	NP	NP	Actual ^b
ABW	SDC A, B and C, ultimate design wind speed < 140 mph	28	32	34	38	42	48
	SDC D ₀ , D ₁ and D ₂ , ultimate design wind speed < 140 mph	32	32	34	NP	NP	
PFH	Supporting roof only	16	16	16	18 ^c	20 ^c	48
	Supporting one story and roof	24	24	24	27 ^c	29 ^c	48
PFG		24	27	30	33 ^d	36 ^d	1.5 × Actual ^b
CS-G		24	27	30	33	36	Actual ^b
CS-PF	SDC A, B and C	16	18	20	22 ^e	24 ^e	1.5 × Actual ^b
	SDC D ₀ , D ₁ and D ₂	16	18	20	22 ^e	24 ^e	Actual ^b
CS-WSP, CS-SFB	Adjacent clear opening height (inches)						
	≤ 64	24	27	30	33	36	Actual ^b
	68	26	27	30	33	36	
	72	27	27	30	33	36	
	76	30	29	30	33	36	
	80	32	30	30	33	36	
	84	35	32	32	33	36	
	88	38	35	33	33	36	
	92	43	37	35	35	36	
	96	48	41	38	36	36	
	100	—	44	40	38	38	
	104	—	49	43	40	39	
	108	—	54	46	43	41	
	112	—	—	50	45	43	
	116	—	—	55	48	45	
	120	—	—	60	52	48	
	124	—	—	—	56	51	
	128	—	—	—	61	54	
132	—	—	—	66	58		
136	—	—	—	—	62		
140	—	—	—	—	66		
144	—	—	—	—	72		

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

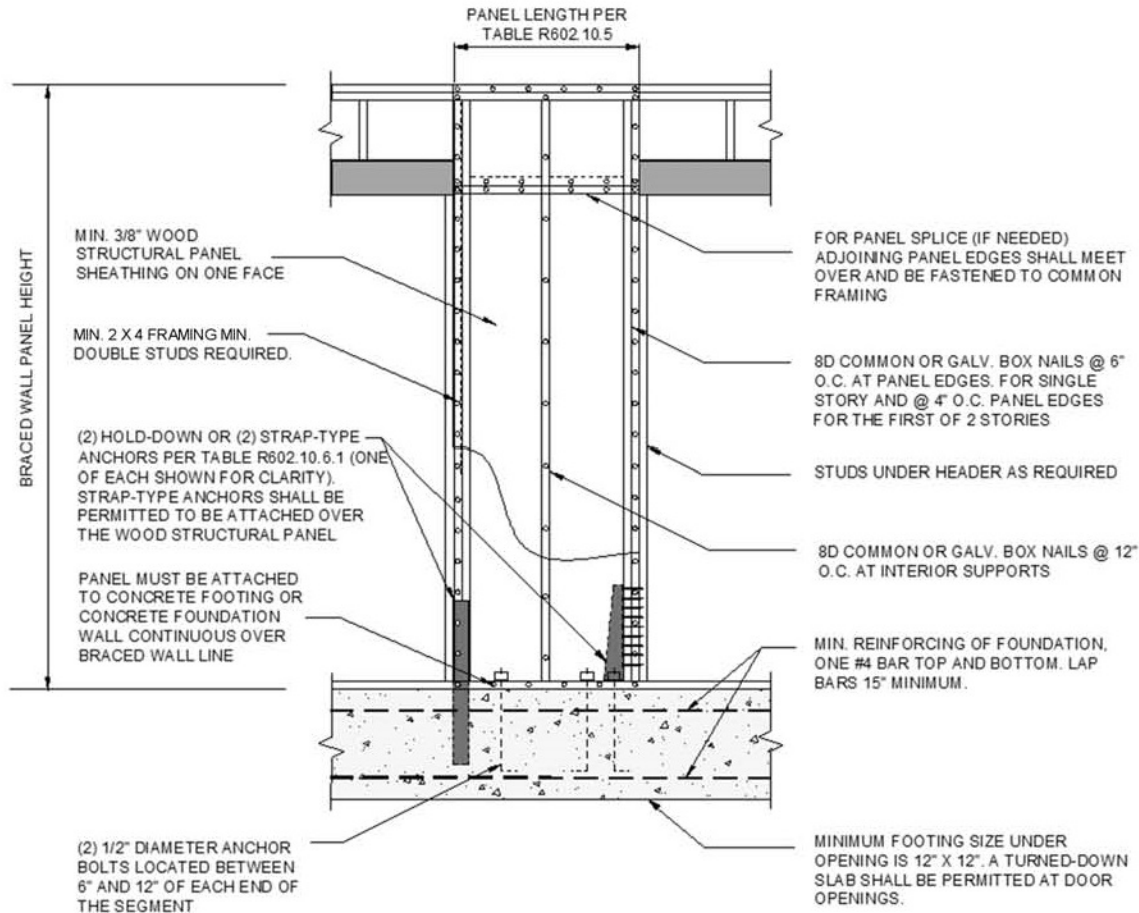
NP = Not Permitted.

- a. Linear interpolation shall be permitted.
- b. Use the actual length where it is greater than or equal to the minimum length.
- c. Maximum header height for PFH is 10 feet in accordance with Figure R602.10.6.2, but wall height shall be permitted to be increased to 12 feet with pony wall.
- d. Maximum opening height for PFG is 10 feet in accordance with Figure R602.10.6.3, but wall height shall be permitted to be increased to 12 feet with pony wall.
- e. Maximum opening height for CS-PF is 10 feet in accordance with Figure R602.10.6.4, but wall height shall be permitted to be increased to 12 feet with pony wall.

TABLE R602.10.6.1
MINIMUM HOLD-DOWN FORCES FOR METHOD ABW BRACED WALL PANELS

SEISMIC DESIGN CATEGORY AND WIND SPEED	SUPPORTING/STORY	HOLD-DOWN FORCE (pounds)				
		Height of Braced Wall Panel				
		8 feet	9 feet	10 feet	11 feet	12 feet
SDC A, B and C Ultimate design wind speed < 140 mph	One story	1,800	1,800	1,800	2,000	2,200
	First of two stories	3,000	3,000	3,000	3,300	3,600
SDC D ₀ , D ₁ and D ₂ Ultimate design wind speed < 140 mph	One story	1,800	1,800	1,800	NP	NP
	First of two stories	3,000	3,000	3,000	NP	NP

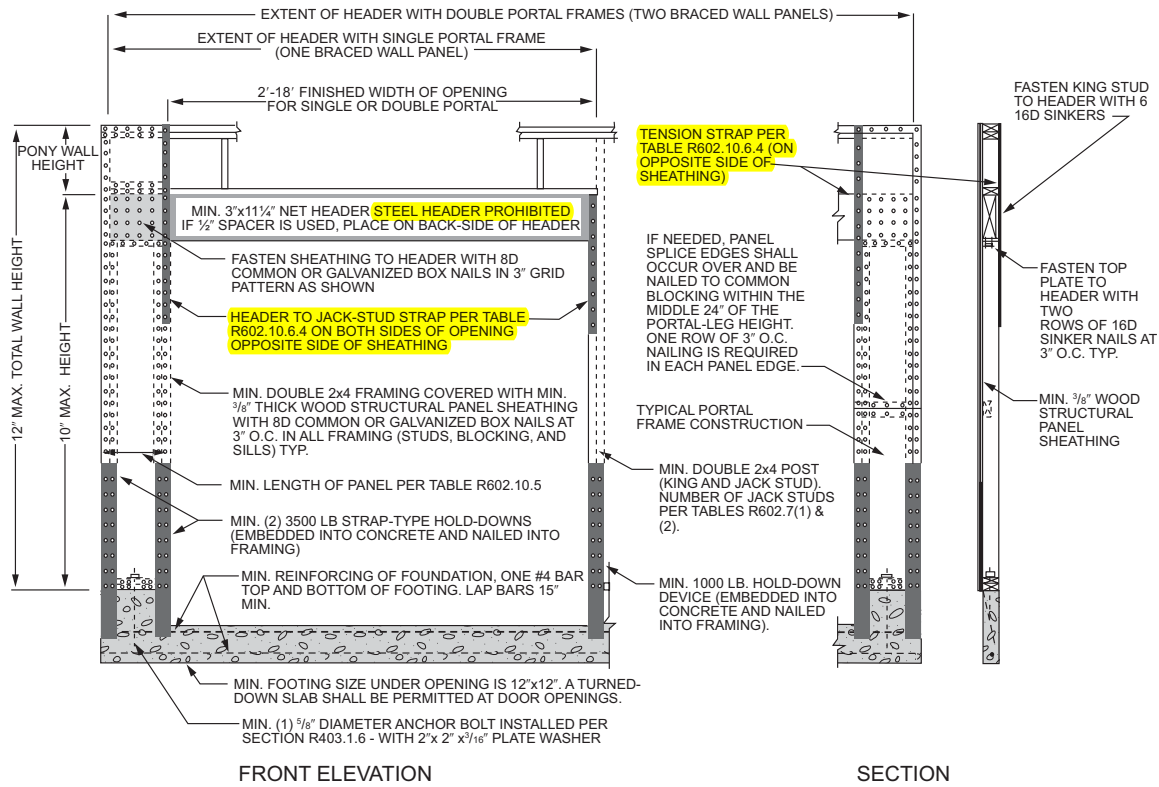
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.45 N, 1 mile per hour = 0.447 m/s.
NP = Not Permitted.



For SI: 1 inch = 25.4 mm.

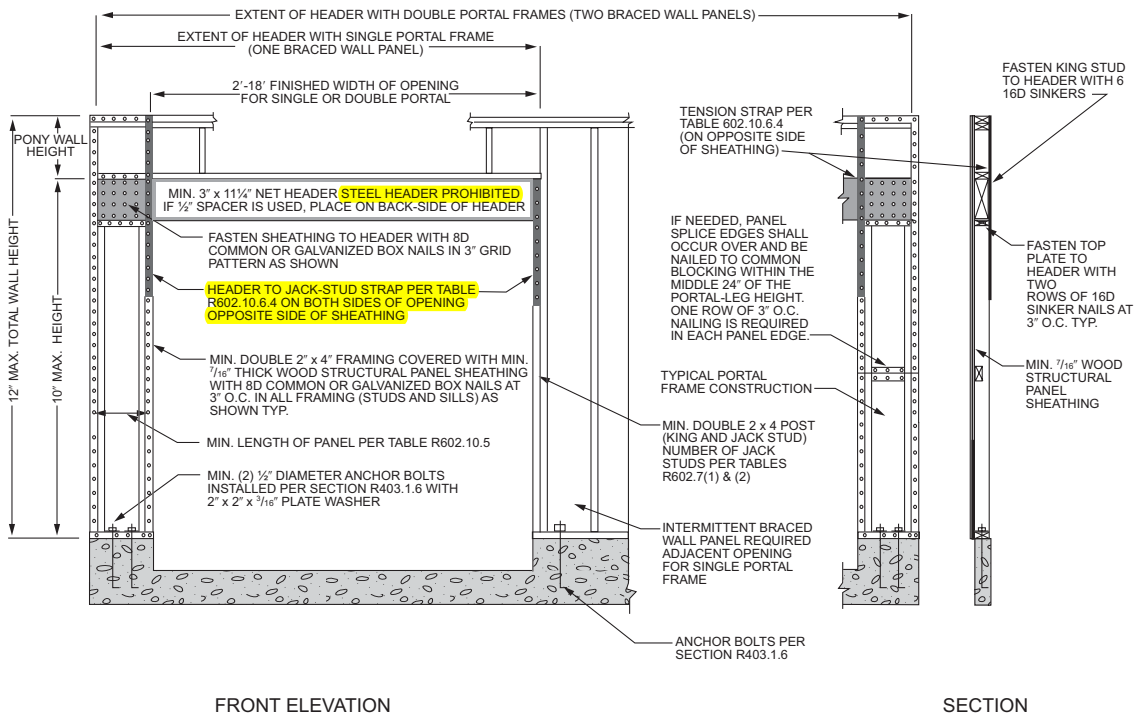
FIGURE R602.10.6.1
METHOD ABW—ALTERNATE BRACED WALL PANEL

WALL CONSTRUCTION



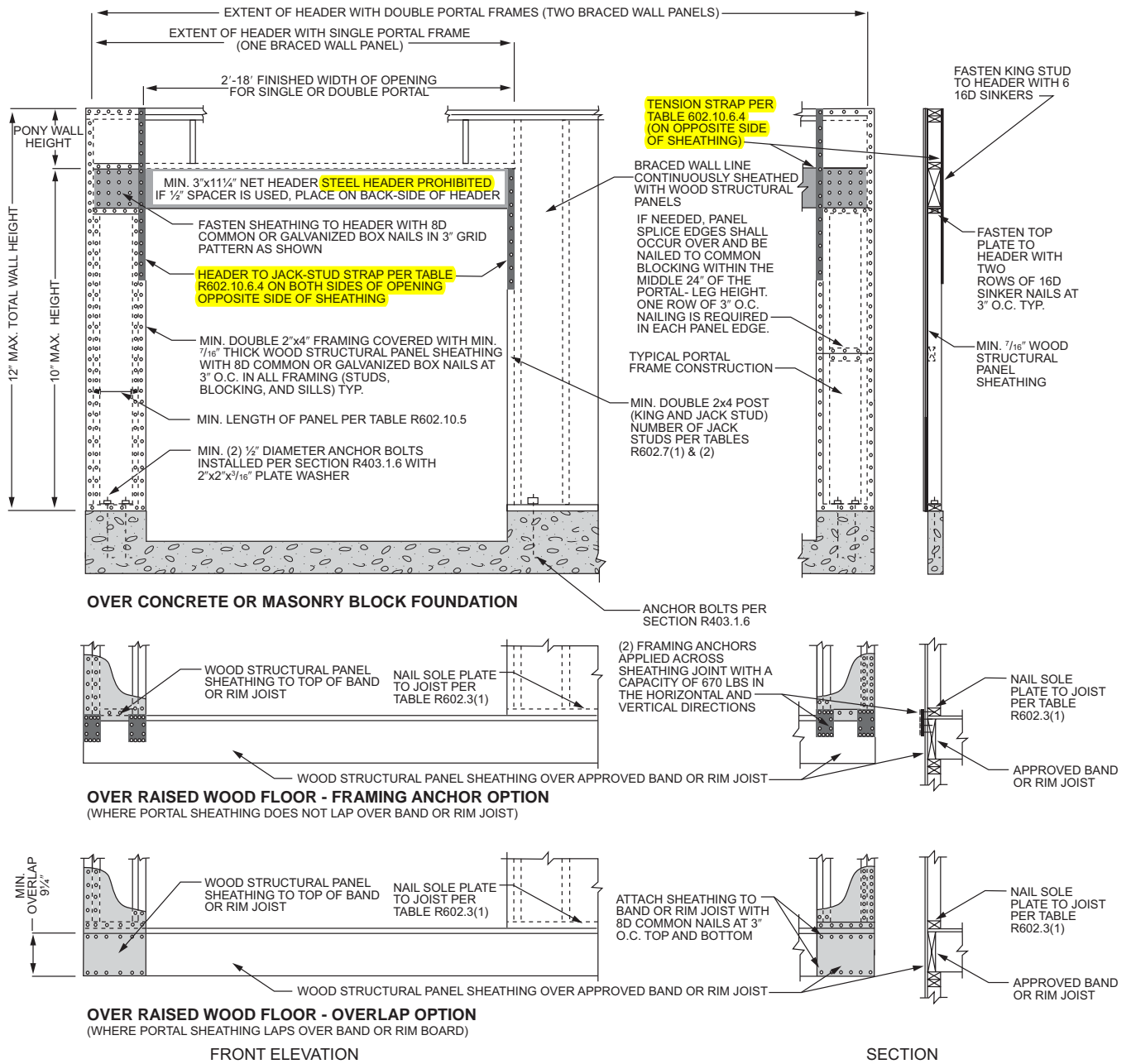
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

**FIGURE R602.10.6.2
METHOD PFH—PORTAL FRAME WITH HOLD-DOWNS**



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

**FIGURE R602.10.6.3
METHOD PFG—PORTAL FRAME AT GARAGE DOOR OPENINGS IN SEISMIC DESIGN CATEGORIES A, B AND C**



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R602.10.6.4
METHOD CS-PF—CONTINUOUSLY SHEATHED PORTAL FRAME PANEL CONSTRUCTION

TABLE R602.10.6.4
TENSION STRAP CAPACITY FOR RESISTING WIND PRESSURES
PERPENDICULAR TO METHODS PFH, PFG AND CS-PF BRACED WALL PANELS

MINIMUM WALL STUD FRAMING NOMINAL SIZE AND GRADE	MAXIMUM PONY WALL HEIGHT (feet)	MAXIMUM TOTAL WALL HEIGHT (feet)	MAXIMUM OPENING WIDTH (feet)	TENSION STRAP CAPACITY REQUIRED (pounds) ^{a, b}					
				Ultimate Design Wind Speed V_{ult} (mph)					
				110	115	130	110	115	130
			Exposure B			Exposure C			
2 × 4 No. 2 Grade	0	10	18	1,000	1,000	1,000	1,000	1,000	1,050
			9	1,000	1,000	1,000	1,000	1,000	1,750
	1	10	16	1,000	1,025	2,050	2,075	2,500	3,950
			18	1,000	1,275	2,375	2,400	2,850	DR
			9	1,000	1,000	1,475	1,500	1,875	3,125
	2	10	16	1,775	2,175	3,525	3,550	4,125	DR
			18	2,075	2,500	3,950	3,975	DR	DR
			9	1,150	1,500	2,650	2,675	3,175	DR
	2	12	16	2,875	3,375	DR	DR	DR	DR
			18	3,425	3,975	DR	DR	DR	DR
			9	2,275	2,750	DR	DR	DR	DR
	4	12	12	3,225	3,775	DR	DR	DR	DR
9			1,000	1,000	1,700	1,700	2,025	3,050	
2 × 6 Stud Grade	2	12	16	1,825	2,150	3,225	3,225	3,675	DR
			18	2,200	2,550	3,725	3,750	DR	DR
			9	1,450	1,750	2,700	2,725	3,125	DR
	4	12	16	2,050	2,400	DR	DR	DR	DR
			18	3,350	3,800	DR	DR	DR	DR
			9	1,000	1,000	1,700	1,700	2,025	3,050

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

a. DR = Design Required.

b. Straps shall be installed in accordance with manufacturer's recommendations.

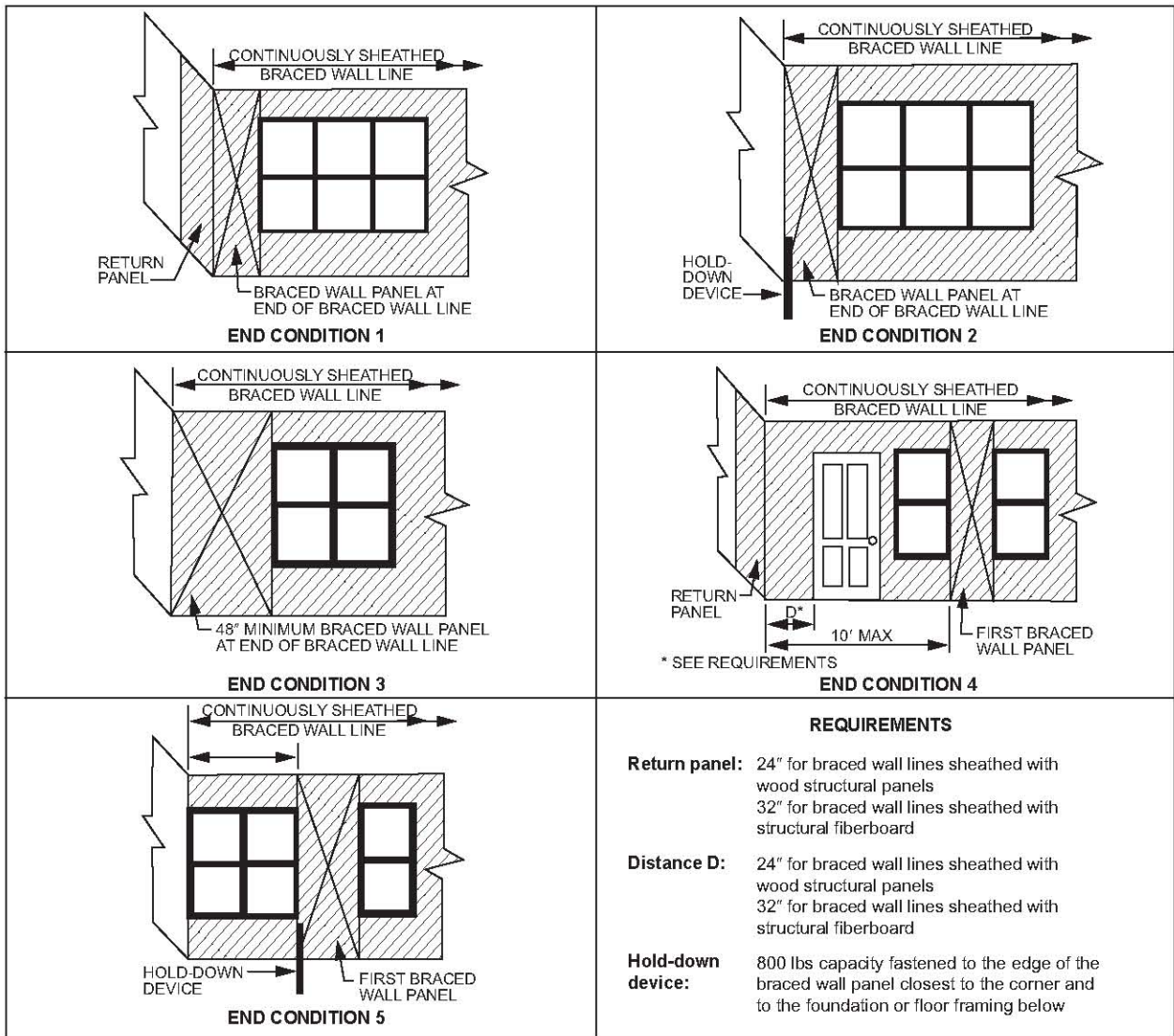
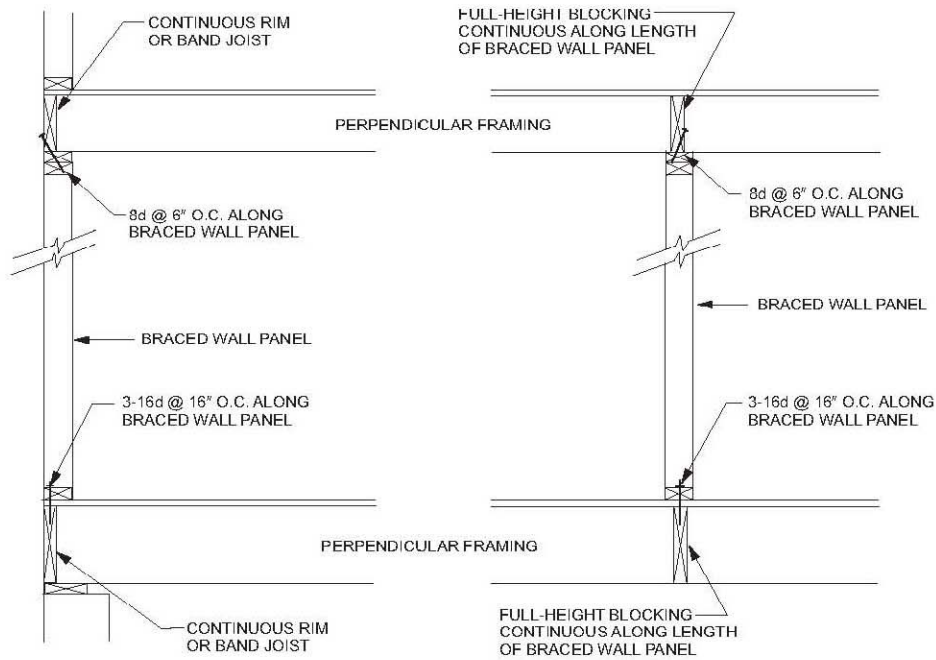
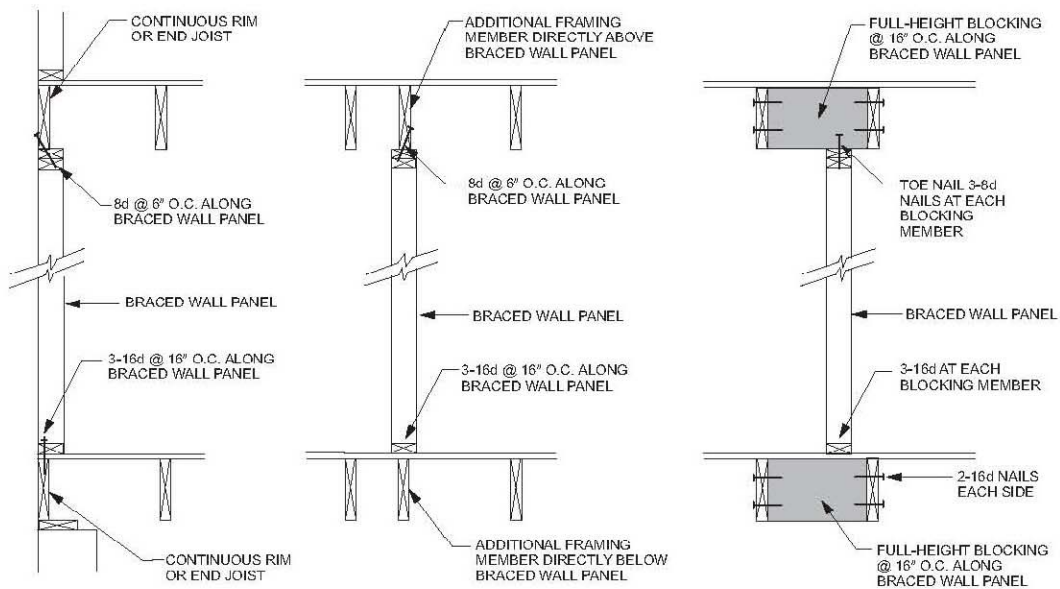


FIGURE R602.10.7



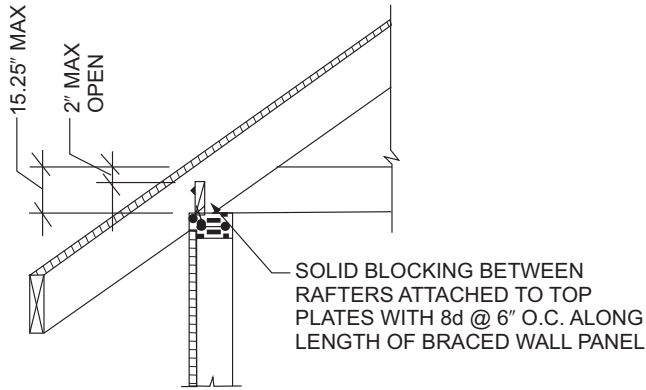
For SI: 1 inch = 25.4 mm.

FIGURE R602.10.8(1)
BRACED WALL PANEL CONNECTION WHEN PERPENDICULAR TO FLOOR/CEILING FRAMING



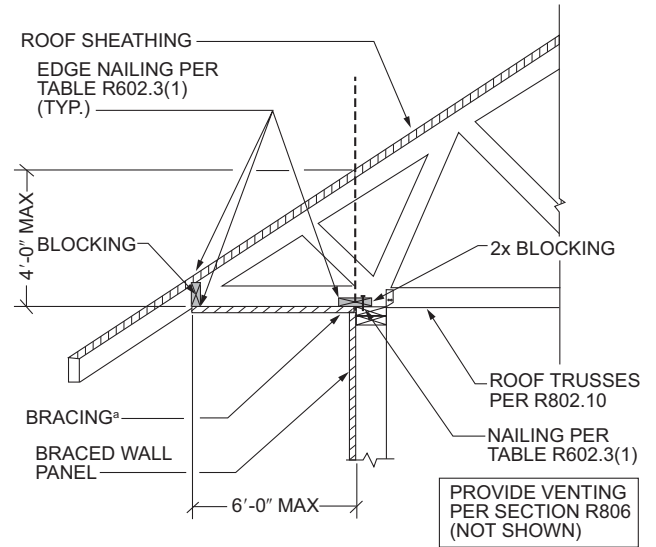
For SI: 1 inch = 25.4 mm.

FIGURE R602.10.8(2)
BRACED WALL PANEL CONNECTION WHEN PARALLEL TO FLOOR/CEILING FRAMING



For SI: 1 inch = 25.4 mm.

FIGURE R602.10.8.2(1)
BRACED WALL PANEL CONNECTION
TO PERPENDICULAR RAFTERS



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Methods of bracing shall be as described in Section R602.10.4.

FIGURE R602.10.8.2(2)
BRACED WALL PANEL CONNECTION OPTION TO
PERPENDICULAR RAFTERS OR ROOF TRUSSES

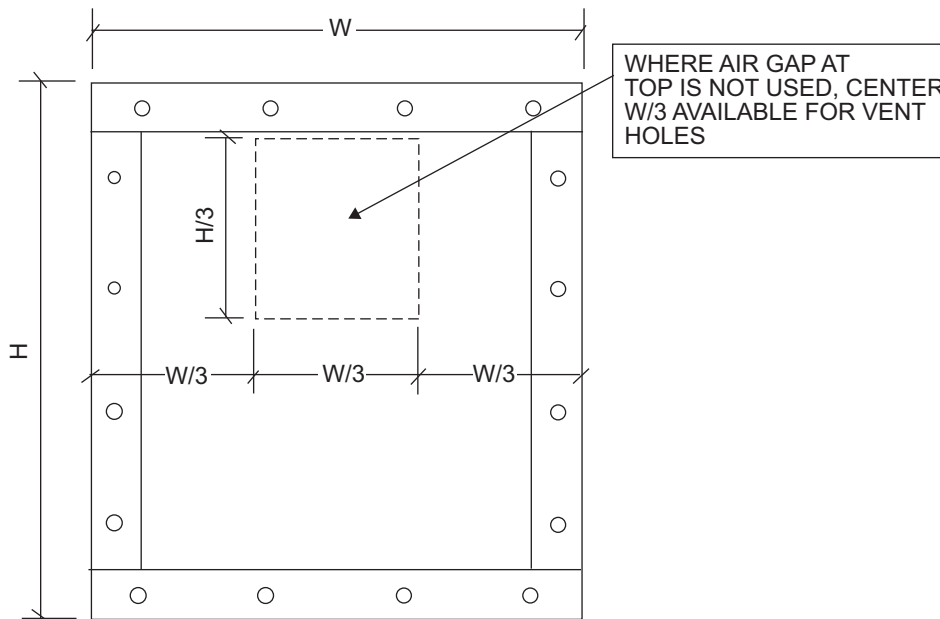
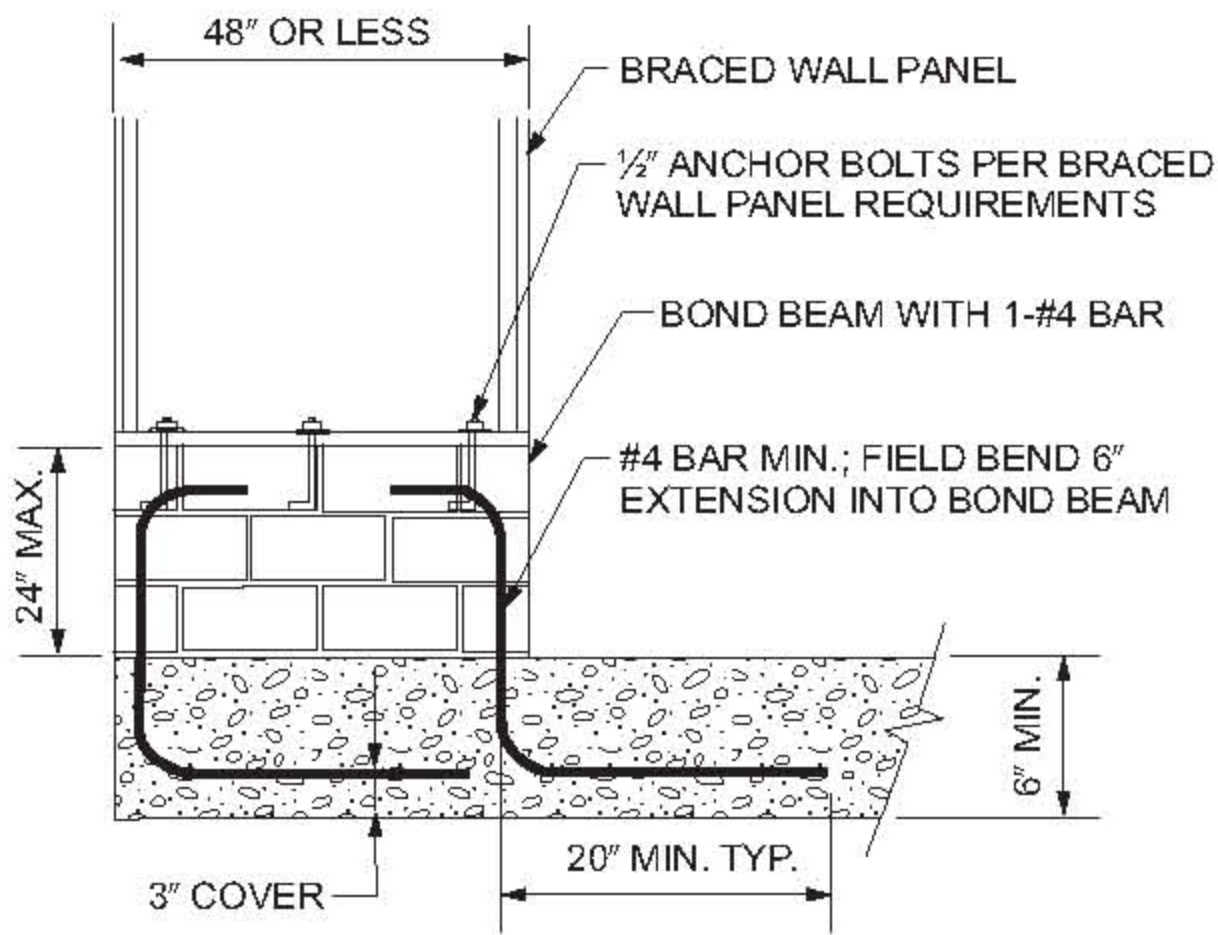
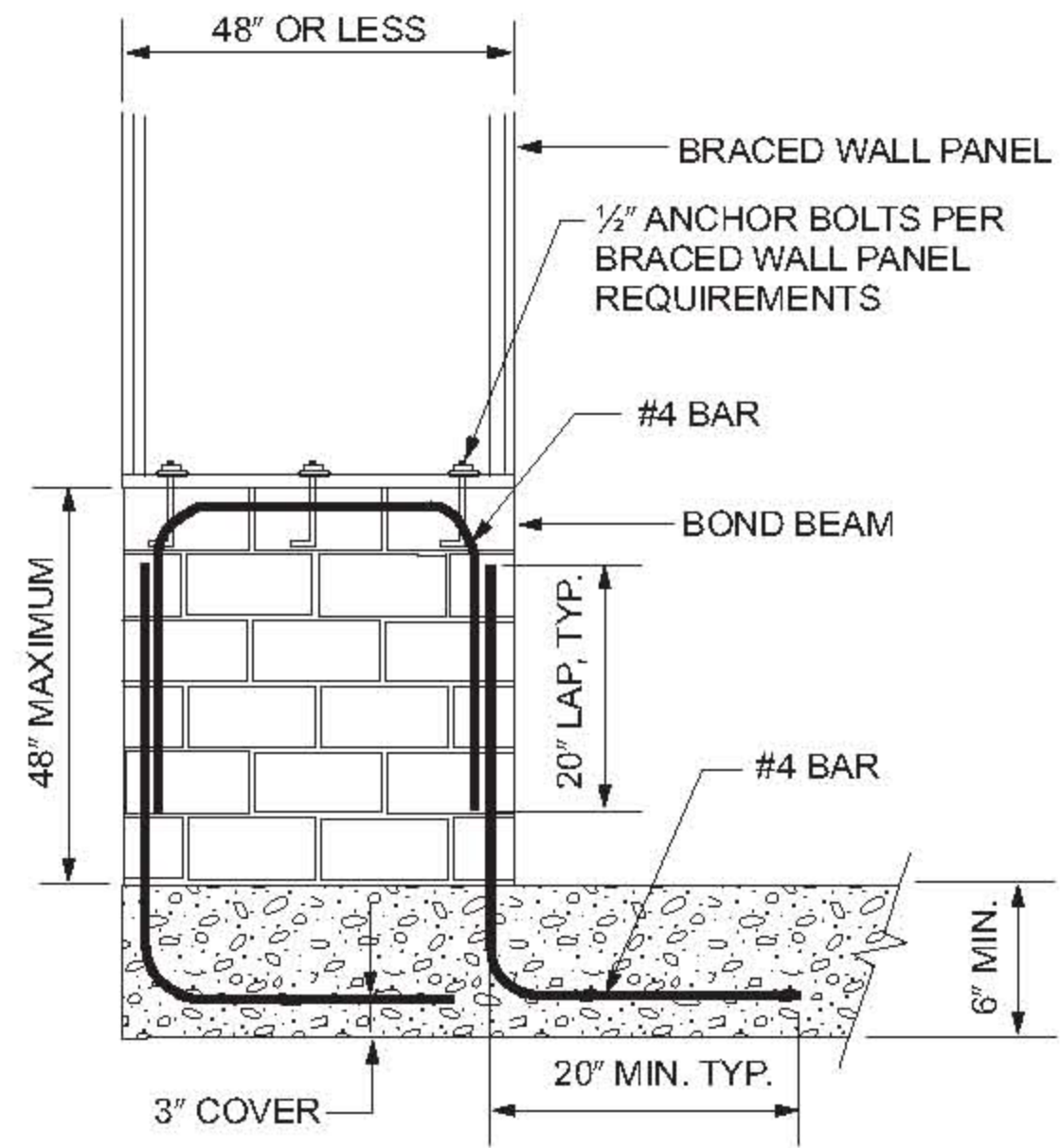


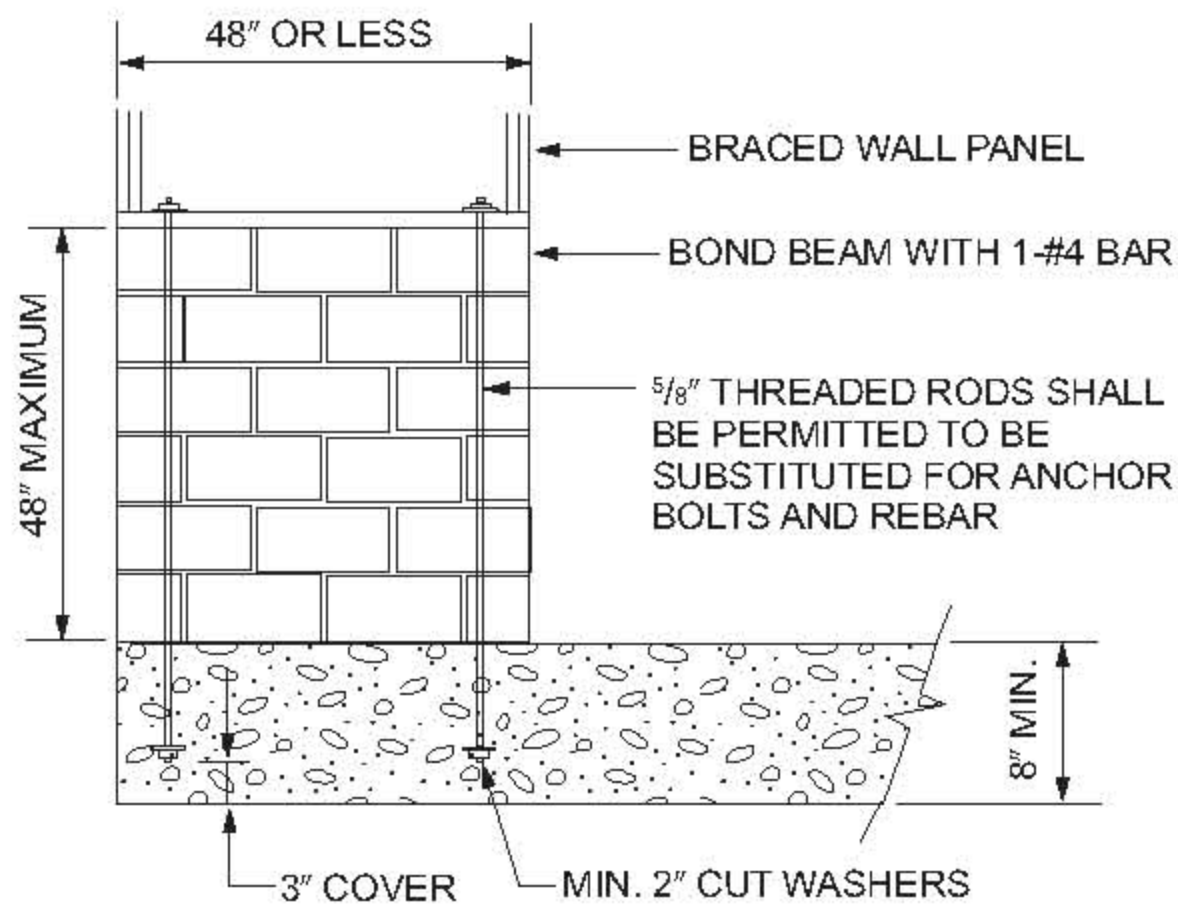
FIGURE R602.10.8.2(3)
BRACED WALL PANEL CONNECTION OPTION TO PERPENDICULAR RAFTERS OR ROOF TRUSSES



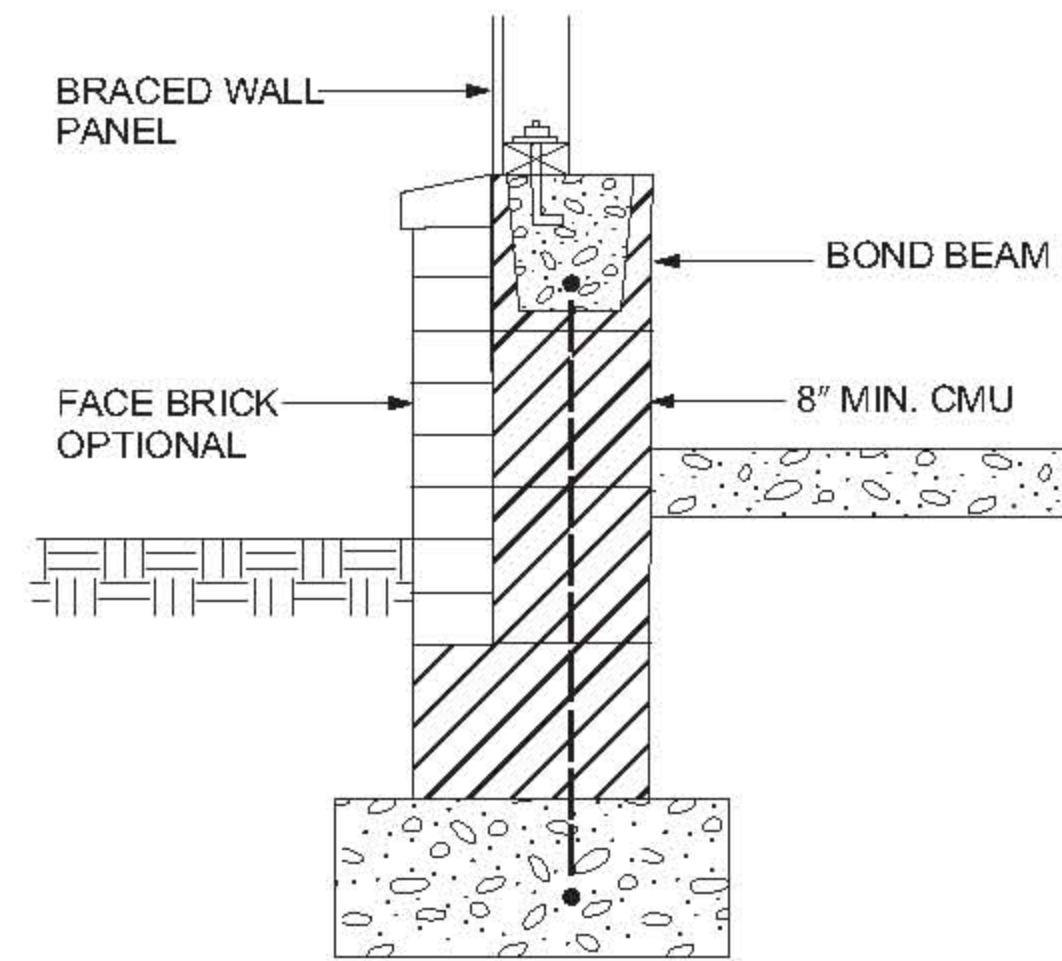
SHORT STEM WALL REINFORCEMENT



TALL STEM WALL REINFORCEMENT



OPTIONAL STEM WALL REINFORCEMENT



TYPICAL STEM WALL SECTION

NOTE: GROUT BOND BEAMS AND ALL CELLS THAT CONTAIN REBAR, THREADED RODS AND ANCHOR BOLTS.

**FIGURE R602.10.9
MASONRY STEM WALLS SUPPORTING BRACED WALL PANELS**

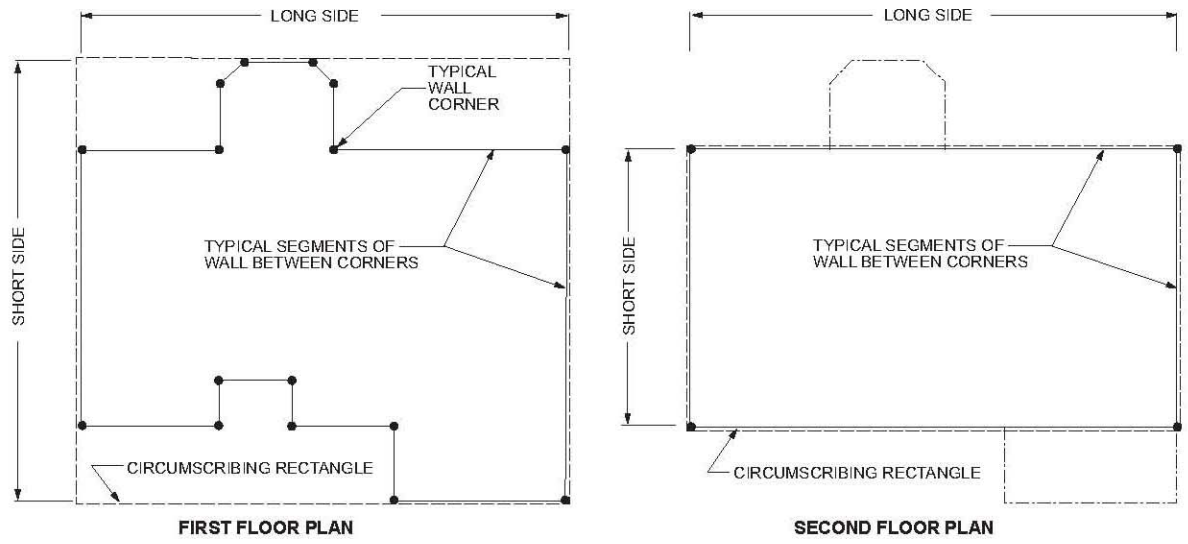
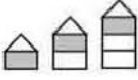







FIGURE R602.12.1
RECTANGLE CIRCUMSCRIBING AN ENCLOSED BUILDING

**TABLE R602.12.4
MINIMUM NUMBER OF BRACING UNITS ON EACH SIDE OF THE CIRCUMSCRIBED RECTANGLE**

ULTIMATE DESIGN WIND SPEED (mph)	STORY LEVEL	EAVE-TO-RIDGE HEIGHT (feet)	MINIMUM NUMBER OF BRACING UNITS ON EACH LONG SIDE ^{a, b, d}						MINIMUM NUMBER OF BRACING UNITS ON EACH SHORT SIDE ^{a, b, d}					
			Length of short side (feet) ^c						Length of long side (feet) ^c					
			10	20	30	40	50	60	10	20	30	40	50	60
115		10	1	2	2	2	3	3	1	2	2	2	3	3
			2	3	3	4	5	6	2	3	3	4	5	6
			2	3	4	6	7	8	2	3	4	6	7	8
		15	1	2	3	3	4	4	1	2	3	3	4	4
			2	3	4	5	6	7	2	3	4	5	6	7
			2	4	5	6	7	9	2	4	5	6	7	9

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

- a. Interpolation shall not be permitted.
- b. Cripple walls or wood-framed basement walls in a walk-out condition shall be designated as the first story and the stories above shall be redesignated as the second and third stories, respectively, and shall be prohibited in a three-story structure.
- c. Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table.
- d. For Exposure Category C, multiply bracing units by a factor of 1.20 for a one-story building, 1.30 for a two-story building and 1.40 for a three-story building.