

The International Code Council (ICC) intends to publish a new building code in the year 2000. This code will be known as the "International Building Code" (IBC). The new code is intended to replace the three model codes. The ICC is also making recommendations to amend and revise the CABO One and Two Family Dwelling Code or replace the CABO Code with the International Residential Code (IRC). When revised and adopted, the new residential building code should be universally applicable throughout the United States. While the IRC document draws heavily from the CABO One and Two Family Dwelling Code, FEMA has determined that the CABO Code is not substantially equivalent to the NEHRP document in high seismic risk areas. In these areas, the appropriate model code should be used.

All model codes, including the CABO One and Two Family Dwelling Code, are revised periodically so that new regulations can be incorporated. State and local governments usually adopt the most current version of each code and, in some cases, with modifications. Home builders should ask their local building code jurisdiction or plan review agency about the specific codes which may apply to one-and two-family dwellings in their area.

Home builders should note that the codes set minimum requirements. Builders may always choose more conservative construction procedures to provide better protection against earthquakes. As noted before, in some instances, the recommendations included in the Guide may exceed the minimum code requirements because experience has demonstrated that superior performance in earthquakes can be achieved by simple, inexpensive details. In high seismic risk areas, the use of construction practices that exceed the minimum code levels may be used as a positive sales incentive.

Examples of CABO One and Two Family Dwelling Code requirements for basement walls and masonry construction by seismic risk areas are shown in Tables 6 & 7 on page 66. They include requirements for masonry and concrete foundation walls subjected to pressure equal to or less than exerted by backfill having an equivalent fluid weight of 30 pounds per cubic foot when located in seismic risk areas, or subjected to unstable ground conditions.

The CABO One and Two Family Dwelling Code also includes the following requirements:

1. All masonry or concrete chimneys that are in high seismic risk areas and that extend more than 7 feet above the last contact with the structure shall be reinforced. The code also requires that masonry or concrete chimneys in high seismic risk areas shall be anchored at each floor, ceiling, or roof line more than 6 feet above grade, except when constructed completely within the exterior walls.
2. Appliances fixed in position shall be fastened in place. Water heaters that have nonrigid water connections and are over 4 feet in height from the base to the top of the tank case shall be anchored or strapped to the building to resist horizontal displacement due to the earthquake motion. See Figure 118 on page 66.

Examples and comparisons of requirements for bracing and sheathing of wood framed walls, as included in the various codes referred to in the Guide, are shown in the following tables.

1. Table 8 on page 68 shows the minimum bracing (shear) wall panel types and their fastenings.
2. Tables 9 on page 69, 10 on page 70 and 11 on page 70 tabulate, for the various codes, where the bracing wall panel types shown in Table 8 may be used and other limiting requirements.

Reference Standards:

1. 1994 and 1997 Uniform Building Code (UBC). International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, CA 90601-2298
2. 1994 and 1997 Standard Building Code (SBC). Southern Building Code Conference International, Inc., 900 Montclair Road, Birmingham, AL 35213-1206
3. 1993 and 1997 National Building Code (NBC), (BOCA). Building Officials and Code Administrators International, Inc., 4051 W. Flossmor Road, Country Club Hills, IL 60478-5795
4. 1995 CABO One and Two Family Dwelling Code. The Council of American Building Officials, 5203 Leesburg Pike, Falls Church, VA 22041
5. NEHRP Recommended Provisions for the Development of Seismic Regulations for New Buildings, 1994 and 1997 Editions. Building Seismic Safety Council, Washington, DC 20005
6. APA Residential Construction Guide. American Plywood Association, P.O. Box 11700, Tacoma, WA 98411-0700
7. 1997 supplement to the CABO One and Two Family Dwelling Code, the Council of American Building Officials, 5203 Leesburg PIKE, Falls Church, VA 22041
8. Prescriptive Method for Residential Cold-Formed Steel Framing - August 1997, prepared by the NAHB Research Center for HUD and AISI.
9. Low-Rise Construction Details and Guidelines - AISI, June 1993
10. Building Code Requirements for Masonry Structures (ACI 530-95/ASCE 5-95/TMS 402-95), American Society of Civil Engineers, 1801 Alexander Bell Dr., Reston, VA 20191-4400.

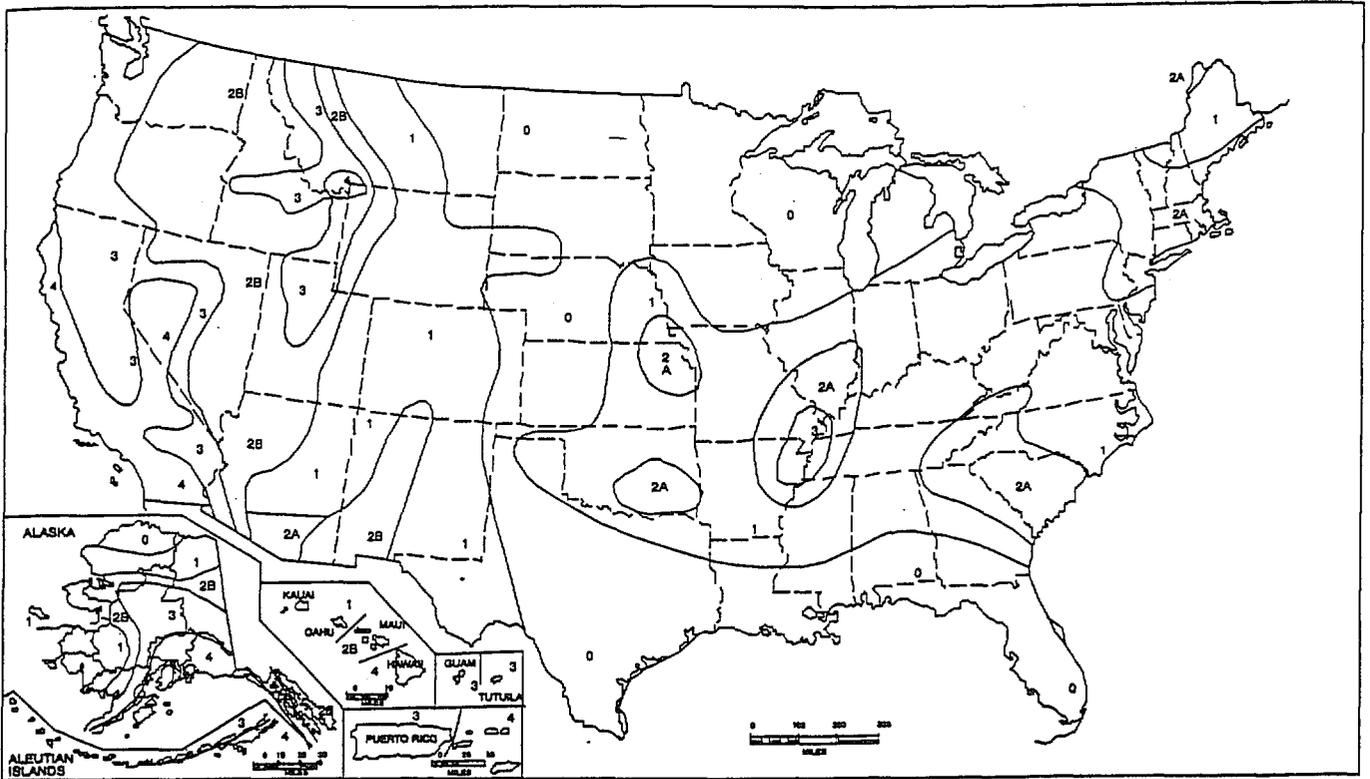


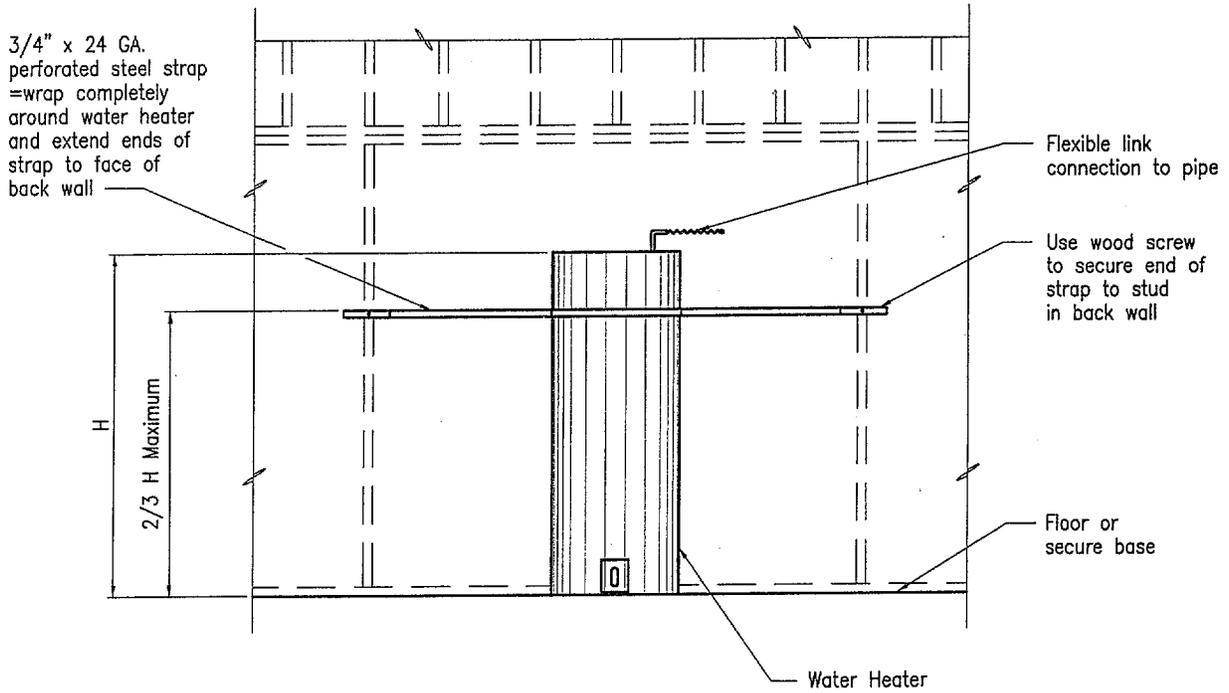
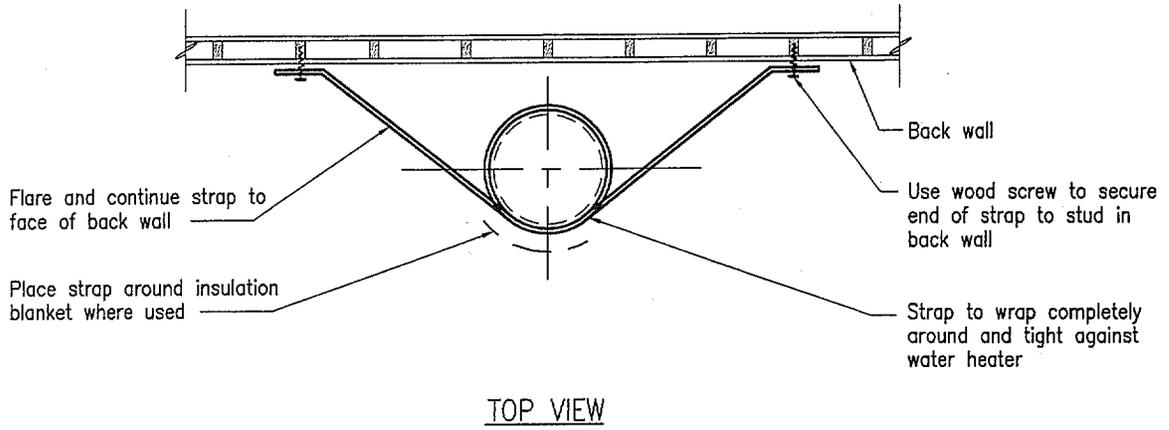
FIGURE 16-2—SEISMIC ZONE MAP OF THE UNITED STATES
For areas outside of the United States, see Appendix Chapter 16.

Figure 117

Reproduced from the 1997 Edition of the *Uniform Building Code*.™

Table No. 5
Seismic Risk Areas

SEISMIC RISK AREA	SBCCI BOCA	CABO UBC (ZONE)	MAPS PREPARED FOR 1997 NEHRP RECOMMENDED PROVISIONS FOR NEW NEW BUILDINGS	WHAT'S EXPECTED
High	D, E, F	2B, 3, 4	$S_{DS} \geq 0.5g$ $S_{D1} \geq 0.2g$	Ductile Behavior Significant seismic detailing recommended
Moderate	B, C	1, 2A	$S_{DS} \geq 0.167g < 0.5g$ $S_{D1} \geq 0.067g < 0.2g$	Full seismic resisting system with complete load path
Low	A	0	$S_{DS} < 0.167g$ $S_{D1} < 0.067g$	Meets wind load resisting requirements and min. component interconnection requirements



Note:
 High Seismic Zones
 should have two straps
 - top and bottom

WATER HEATER SECURED TO WALL

Figure 118

Table No.6 - CABO ONE AND TWO FAMILY DWELLING CODE

MINIMUM THICKNESS ALLOWABLE DEPTH OF UNBALANCED FILL FOR UNREINFORCED MASONRY AND CONCRETE FOUNDATION WALLS ^{1,2} WHERE UNSTABLE SOIL OR GROUND WATER CONDITIONS DO NOT EXIST IN LOW SEISMIC RISK AREA

Foundation Wall Construction	Nominal Thickness ³ (inches)	Maximum Depth of Unbalanced Fill ¹ (feet)
Masonry of Hollow Units, UngROUTed	8	4
	10	5
	12	6
Masonry of Solid Units	6	3
	8	5
	10	6
	12	7
Masonry of Hollow or Solid Units, Fully Grouted	8	7
	10	8
	12	8
Plain Concrete	6 ⁴	6
	8	7
	10	8
	12	8
Rubble Stone Masonry	16	8
Masonry of hollow units reinforced vertically with No. 4 bars and grout at 24 inches on center. Bars located not less than 4 ½ inches from pressure side of wall.	8	7

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

¹ Unbalanced fill is the difference in height of the exterior and interior finish ground levels. Where an interior concrete slab is provided, the unbalanced fill shall be measured from the exterior finish ground level to the top of the interior concrete slab.

² The height between lateral supports shall not exceed 8 feet.

³ The actual thickness shall not be more than ½ inch less than the required nominal thickness specified in the table.

⁴ Six-inch plain concrete walls shall be formed on both sides.

Table No.7 - CABO ONE AND TWO FAMILY DWELLING CODE

REQUIREMENTS FOR MASONRY OR CONCRETE FOUNDATION WALLS SUBJECTED TO NO MORE PRESSURE THAN WOULD BE EXERTED BY BACKFILL HAVING AN EQUIVALENT FLUID WEIGHT OF 30 POUNDS PER CUBIC FOOT LOCATED IN MODERATE TO HIGH SEISMIC RISK AREA SUBJECTED TO UNSTABLE SOIL CONDITIONS

Material Type	Height of Unbalanced Fill in Feet	Length of Wall Between Supporting Masonry or Concrete Walls in Feet	Minimum ² Wall Thickness in Inches ³	Required Reinforcing	
				Horizontal Bar in Upper 12 inches of Wall	Size and Spacing of Vertical Bars
Hollow Masonry	4 or less	unlimited	8	not required	not required
	more than 4	design required	design required	design required	design required
Concrete or Solid Masonry ⁴	4 or less	unlimited	8	not required	not required
	more than 4	less than 8	8	2-No. 3	No. 3 @ 18" o.c.
	8 or less	8 to 10	8	2-No. 4	No. 3 @ 18" o.c.
	8 or less	10 to 12	8	2-No.5	No. 3 @ 18" o.c.
	more than 8	design required	design required	design required	design required

For SI: 1 inch = 25.4mm, 1 foot = 304.8mm, 1 pound per cubic foot (pcf) = 0.1572 kN/m³.

¹ Backfilling shall not be commenced until after the wall is anchored to the floor.

² Thickness of concrete walls may be 6 inches, provided reinforcing is placed not less than 1 inch or more than 2 inches from the face of the wall not against the earth.

³ The actual thickness shall not be more than ½ inch less than the required thickness specified in the table.

⁴ Solid masonry shall include solid brick or concrete units and hollow masonry units with all cells grouted.

Table No.8

MINIMUM BRACING WALL PANEL TYPES

Wall Panel Type	Sheathing Type	Minimum Thickness	Maximum Stud Spacing	Fastener Type	Fastener Spacings	
					Panel Edge Nailing	Intermediate Bearing Points
1	Continuous diagonal braces let into top and bottom plates and intervening studs, placed at an angle not more than 60 degrees or less than 45 degrees from the horizontal	1 x 4 nominal	No limit	8d common nails	(2) at each stud and plate, face nail	(2) at each stud and plate, face nail
2	Diagonal wood boards	5/8" net x 6" nominal	24" o.c.	8d common nails	(3) per board	(2) per board
				8d box nails	(5) per board	(3) per board
		5/8" net x 8" nominal	24" o.c.	8d common nails	(4) per board	(3) per board
				8d box nails	(6) per board	(4) per board
3	Fiberboard	7/16"	16" o.c.	No. 11 gage, 1-½ inch long, 7/16 inch head, galvanized roofing nails	3" o.c.	6" o.c.
4	Wood structural panels	5/16"	16" o.c.	6d common nails	6" o.c.	12" o.c.
		3/8"	24" o.c.	6d common nails	6" o.c.	12" o.c.
5	2-M-W particle board sheathing	3/8"	16" o.c.	6d common nails	6" o.c.	12" o.c.
		7/16"	24" o.c.	6d common nails	6" o.c.	12" o.c.
	2-M-1, 2-M-2 or 2-M-3 particle board sheathing *	½"	16" o.c.	6d common nails	6" o.c.	12" o.c.
6	Gypsum sheathing	½"	16" o.c.	No. 11 gage, 1-3/4 inch long, 7/16 inch head, diamond head, galvanized nails	4" o.c.	4" o.c.
7	Gypsum wallboard or veneer - 4 foot wide sheets	½"	24" o.c.	1-3/8 inch drywall nail (ASTM C514)	8" o.c.	8" o.c.
8	Portland cement plaster on expanded metal or woven wire lath	7/8"	16" o.c.	No. 11 gage, 1-½ inch long, 7/16 inch head nails	6" o.c.	6" o.c.
9	Square edge hardwood panel siding	3/8"	24" o.c.	6d common nails	4" o.c.	8" o.c.
	Shiplap edge hardwood panel siding	3/8"	16" o.c.	6d common nails	4" o.c.	4" o.c.
10	Reinforced cement mortar	1"	24" o.c.			

* BOCA National Building Code allows the use of only 2-M-1 and 2-M-2 particle board; SBCCI Standard Building Code allows the use of only 2-M-1 particle board.

Table No.9

BOCA National Building Code

Effective Peak Velocity Related Acceleration, A_v	Seismic Performance Category	Maximum Distance Between Interior Braced Walls (feet)	Maximum Stories (height) Permitted	Seismic Wall Bracing (4'-0" min. panel located at each wall corner and at 25 feet o.c. max or % of wall length as shown below).																	
				Wall Panel Type in Top or Only Story																	
				1	2	3	4	5	6	7	8	9	10								
$A_v < 0.05$	A	No Limit	No Limit		NA	NA	NA	NA	NA												
$0.05 \leq A_v < 0.10$	B	35	3 (40 feet)		X		X	20%	20%												
$0.10 \leq A_v < 0.15$	C	25	2 (30 feet)		X		X	28%	28%												
$0.15 \leq A_v < 0.20$	C	25	2 (30 feet)		20%		20%	36%	36%												
$0.20 \leq A_v < 0.30$	D	25	2 (30 feet)		32%		32%	56%	56%												
$0.30 \leq A_v$	D	25	2 (30 feet)		40%		40%	72%	72%												

BOCA National Building Code

Effective Peak Velocity Related Acceleration, A_v	Seismic Performance Category	Maximum Distance Between Interior Braced Walls (feet)	Maximum Stories (height) Permitted	Seismic Wall Bracing (4'-0" min. panel located at each wall corner and at 25 feet o.c. max or % of wall length as shown below).																	
				Wall Panel Type in First of Two Stories or Second of Three Stories																	
				1	2	3	4	5	6	7	8	9	10								
$A_v < 0.05$	A	No Limit	No Limit		NA	NA	NA	NA	NA												
$0.05 \leq A_v < 0.10$	B	35	3 (40 feet)		20%	72%	20%	36%	36%												
$0.10 \leq A_v < 0.15$	C	25	2 (30 feet)		28%		28%	52%	52%												
$0.15 \leq A_v < 0.20$	C	25	2 (30 feet)		40%		40%	68%	68%												
$0.20 \leq A_v < 0.30$	D	25	2 (30 feet)		56%		56%	100%	100%												
$0.30 \leq A_v$	D	25	2 (30 feet)		72%		72%	128%	128%												

BOCA National Building Code

Effective Peak Velocity Related Acceleration, A_v	Seismic Performance Category	Maximum Distance Between Interior Braced Walls (feet)	Maximum Stories (height) Permitted	Seismic Wall Bracing (4'-0" min. panel located at each wall corner and at 25 feet o.c. max or % of wall length as shown below).																	
				Wall Panel Type in First of Three Stories																	
				1	2	3	4	5	6	7	8	9	10								
$A_v < 0.05$	A	No Limit	No Limit		NA		NA	NA	NA												
$0.05 \leq A_v < 0.10$	B	35	3 (40 feet)		28%		28%	52%	52%												
$0.10 \leq A_v < 0.15$	C	25	2 (30 feet)																		
$0.15 \leq A_v < 0.20$	C	25	2 (30 feet)																		
$0.20 \leq A_v < 0.30$	D	25	2 (30 feet)																		
$0.30 \leq A_v$	D	25	2 (30 feet)																		

Table No.10

SBCCI Standard Building Code

Effective Peak Velocity Related Acceleration, A_v	Seismic Performance Category	Maximum Distance Between Interior Braced Walls (feet)	Maximum Height Permitted	Seismic Wall Bracing (4'-0" min. panel located at each wall corner and at 25 feet o.c. max or % of wall length as shown below).										
				Wall Panel Type in Top or Only Story										
				1	2	3	4	5	6	7	8	9	10	
$A_v < 0.05$	A	N/A	No Limit	X	X	X	X	X	X	X				X
$0.05 \leq A_v < 0.10$	B	N/A	No Limit		X	X	X	X	X	X				X
$0.10 \leq A_v < 0.15$	C	N/A	35 feet		X	X	X	X	X	X				X
$0.15 \leq A_v < 0.20$	C	N/A	35 feet		X	X	X	X	X	X				X
$0.20 \leq A_v < 0.30$	D	N/A	35 feet		X	X	X	X	X	X				X
$0.30 \leq A_v$	D	N/A	35 feet		X	X	X	X	X	X				X

SBCCI Standard Building Code

Effective Peak Velocity Related Acceleration, A_v	Seismic Performance Category	Maximum Distance Between Interior Braced Walls (feet)	Maximum Height Permitted	Seismic Wall Bracing (4'-0" min. panel located at each wall corner and at 25 feet o.c. max or % of wall length as shown below).										
				Wall Panel Type in Second of Three Stories										
				1	2	3	4	5	6	7	8	9	10	
$A_v < 0.05$	A	N/A	No Limit	X	X	X	X	X	X	X				X
$0.05 \leq A_v < 0.10$	B	N/A	No Limit		X	X	X	X	X	X				X
$0.10 \leq A_v < 0.15$	C	N/A	35 feet		X	X	X	X	X	X				X
$0.15 \leq A_v < 0.20$	C	N/A	35 feet		X	X	X	X	X	X				X
$0.20 \leq A_v < 0.30$	D	N/A	35 feet		40%	40%	40%	40%	40%	40%				40%
$0.30 \leq A_v$	D	N/A	35 feet		40%	40%	40%	40%	40%	40%				40%

SBCCI Standard Building Code

Effective Peak Velocity Related Acceleration, A_v	Seismic Performance Category	Maximum Distance Between Interior Braced Walls (feet)	Maximum Height Permitted	Seismic Wall Bracing (4'-0" min. panel located at each wall corner and at 25 feet o.c. max or % of wall length as shown below).										
				Wall Panel Type in First of Two Stories or First of Three Stories										
				1	2	3	4	5	6	7	8	9	10	
$A_v < 0.05$	A	N/A	No Limit	X	X	X	X	X	X	X				X
$0.05 \leq A_v < 0.10$	B	N/A	No Limit		25%	25%	25%	25%	25%	25%				25%
$0.10 \leq A_v < 0.15$	C	N/A	35 feet		25%	25%	25%	25%	25%	25%				25%
$0.15 \leq A_v < 0.20$	C	N/A	35 feet		25%	25%	25%	25%	25%	25%				25%
$0.20 \leq A_v < 0.30$	D	N/A	35 feet		40%	40%	40%	40%	40%	40%				40%
$0.30 \leq A_v$	D	N/A	35 feet		40%	40%	40%	40%	40%	40%				40%

Table No.11

ICBO Uniform Building Code

Seismic Zone	Seismic Performance Category	Maximum Distance Between Interior Braced Walls (feet)	Maximum Height Permitted	Seismic Wall Bracing (4'-0" min. panel located at each wall corner and at 25 feet o.c. max or % of wall length as shown below).									
				Wall Panel Type in Top or Only Story									
				1	2	3	4	5	6	7	8	9	10
0	N/A	25 or 34 feet *	N/A	X	X	X	X	X		X	X	X	
1	N/A	25 or 34 feet *	N/A	X	X	X	X	X		X	X	X	
2A	N/A	25 or 34 feet *	N/A	X	X	X	X	X		X	X	X	
2B	N/A	25 or 34 feet *	N/A	X	X	X	X	X		X	X	X	
3	N/A	25 feet **	65 feet		X	X	X	X		X	X	X	
4	N/A	25 feet **	65 feet		X	X	X	X		X	X	X	

ICBO Uniform Building Code

Seismic Zone	Seismic Performance Category	Maximum Distance Between Interior Braced Walls (feet)	Maximum Height Permitted	Seismic Wall Bracing (4'-0" min. panel located at each wall corner and at 25 feet o.c. max or % of wall length as shown below).									
				Wall Panel Type in First of Two Stories or Second of Three Stories									
				1	2	3	4	5	6	7	8	9	10
0	N/A	25 or 34 feet *	N/A	X	X	X	X	X		X	X	X	
1	N/A	25 or 34 feet *	N/A	X	X	X	X	X		X	X	X	
2A	N/A	25 or 34 feet *	N/A	X	X	X	X	X		X	X	X	
2B	N/A	25 or 34 feet *	N/A	X	X	X	X	X		X	X	X	
3	N/A	25 feet **	65 feet		25%	25%	25%	25%		25%	25%	25%	
4	N/A	25 feet **	65 feet		25%	25%	25%	25%		25%	25%	25%	

ICBO Uniform Building Code

Seismic Zone	Seismic Performance Category	Maximum Distance Between Interior Braced Walls (feet)	Maximum Height Permitted	Seismic Wall Bracing (4'-0" min. panel located at each wall corner and at 25 feet o.c. max or % of wall length as shown below).									
				Wall Panel Type in First of Three Stories									
				1	2	3	4	5	6	7	8	9	10
0	N/A	25 or 34 feet *	N/A	X	X	X	X	X		X	X	X	
1	N/A	25 or 34 feet *	N/A	X	X	X	X	X		X	X	X	
2A	N/A	25 or 34 feet *	N/A	X	X	X	X	X		X	X	X	
2B	N/A	25 or 34 feet *	N/A	X	X	X	X	X		X	X	X	
3	N/A	25 feet **	65 feet		40%	40%	40%	40%		40%	40%	40%	
4	N/A	25 feet **	65 feet		40%	40%	40%	40%		40%	40%	40%	

* Spacing shall not exceed 34 feet on center in both the longitudinal and transverse directions in each story where the basic wind speed is less than or equal to 80 MPH, and spacing shall not exceed 25 feet on center in both the longitudinal and transverse directions in each story where the basic wind speed exceeds 80 MPH.

Exception: In one and two story Group R, Division 3 buildings, interior braced wall line spacing may be increased to not more than 34 feet on center in order to accommodate one single room per dwelling unit not exceeding 900 square feet. The Building Official may require additional walls to contain braced panels when this exception is used.

** Exception: In one and two story Group R, Division 3 buildings, interior braced wall line spacing may be increased to not more than 34 feet on center in order to accommodate one single room per dwelling unit not exceeding 900 square feet. The Building Official may require additional walls to contain braced panels when this exception is used.

Table No. 12

CABO One and Two Family Dwelling Code

Seismic Zone	Seismic Performance Category	Maximum Distance Between Interior Braced Walls (feet)	Maximum Height Permitted	Seismic Wall Bracing (4'-0" min. panel located at each wall corner and at 25 feet o.c. max or % of wall length as shown below).										
				Wall Panel Type in Top or Only Story										
				1	2	3	4	5	6	7	8	9	10	
0	N/A	N/A	N/A	X		X			X					
1	N/A	N/A	N/A	X		X			X					
2A	N/A	N/A	N/A	X		X			X					
2B	N/A	N/A	N/A	X		X			X					
3	N/A	N/A	N/A	X		X			X					
4	N/A	N/A	N/A	X		X			X					

CABO One and Two Family Dwelling Code

Seismic Zone	Seismic Performance Category	Maximum Distance Between Interior Braced Walls (feet)	Maximum Height Permitted	Seismic Wall Bracing (4'-0" min. panel located at each wall corner and at 25 feet o.c. max or % of wall length as shown below).										
				Wall Panel Type in First of Two Stories or Second of Three Stories										
				1	2	3	4	5	6	7	8	9	10	
0	N/A	N/A	N/A	X		X			X					
1	N/A	N/A	N/A	X		X			X					
2A	N/A	N/A	N/A	X		X			X					
2B	N/A	N/A	N/A	X		X			X					
3	N/A	N/A	N/A			25%			25%					
4	N/A	N/A	N/A			25%			25%					

CABO One and Two Family Dwelling Code

Seismic Zone	Seismic Performance Category	Maximum Distance Between Interior Braced Walls (feet)	Maximum Height Permitted	Seismic Wall Bracing (4'-0" min. panel located at each wall corner and at 25 feet o.c. max or % of wall length as shown below).										
				Wall Panel Type in First of Three Stories										
				1	2	3	4	5	6	7	8	9	10	
0	N/A	N/A	N/A	X	X	X	X	X	X	X	X	X	X	
1	N/A	N/A	N/A	X	X	X	X	X	X	X	X	X	X	
2A	N/A	N/A	N/A	X	X	X	X	X	X	X	X	X	X	
2B	N/A	N/A	N/A	X	X	X	X	X	X	X	X	X	X	
3	N/A	N/A	N/A		40%	40%	40%	40%	40%	40%	40%	40%	40%	
4	N/A	N/A	N/A		40%	40%	40%	40%	40%	40%	40%	40%	40%	

15. HOME BUILDERS CHECK LIST

A check list is provided for the home builder to use to determine whether important recommendations for seismic resistant design have been considered when constructing a residence. The builder should refer to the Guide for information on each of the items listed. This list should not be considered as being all inclusive.

FOUNDATIONS

1. Suitable and uniform ground conditions
2. Consistent foundation systems
3. Depth of footing below grade
4. Placing of reinforcing – lapped splices and at corners and intersections
5. Size, location, spacing and embedment of anchor bolts – type of washers
6. Location of hold-down anchor bolts or strap hold-downs
7. Treated lumber sill plates – 2x or 3x lumber

FLOORS

1. Square or rectangular plan
2. Diaphragm ratio limits
3. Perimeter blocking or rim joists nailed to sill plates or wall top plates
4. Splicing of collectors
5. Orientation of sheathing
6. Sheathing joints centered and nailed to common framing member.
7. Sheathing at openings blocked and nailed
8. Ties at split-level construction

SHEAR WALLS

1. Shear wall or panel in each exterior elevation
2. Four foot width of shear wall at each corner
3. Symmetrical pattern and balanced widths
4. Twenty-five feet maximum between shear walls/panel
5. Conformance with aspect ratios
6. Selection of wall bracing material
7. Wall sheathing materials on full height of wall
8. Consistent selection of wall sheathing material
9. Nailing of sheathing
10. Internailing of wall top plates
11. Hold-down at each end of shear wall/panel
12. Post or double studs at hold-downs
13. Attachment of hold-downs
14. Edge of sheet nailing to hold-down posts/studs
15. Blocking of all edges of sheathing not over studs
16. Bracing or shear panels at garage door openings

ROOFS

1. Square or rectangular plan
2. Diaphragm ratio limits
3. Perimeter supported on shear wall or panels

4. Edge joist, rim joist or blocking at perimeter nailed or fastened with clips to wall top plates
5. Blocking over interior shear walls
6. Orientation of sheathing sheets
7. Sheathing joints centered and nailed to common joists, rafters or blocking
8. Nailing of roof sheathing
9. Blocking and edge of sheet nailing at breaks in roof planes
10. No openings at corners
11. Blocking and edge of sheet nailing of sheathing around openings
12. Collector ties to shear walls or panels

MASONRY CHIMNEYS

1. Footing dowels each vertical reinforcing bar
2. Full height reinforcing bar – including extension above roof
3. Vertical reinforcing bar (minimum) each corner
4. Horizontal ties around vertical bars
5. Reinforcing bars fully embedded in grout
6. Blocking in roof framing to receive anchor straps
7. Strap anchor at each side of chimney
8. Strap anchor at each horizontal diaphragm bolted or nailed to framing
9. Nailing of Wood Structural Panel sheathing to block supporting strap

10. Blocking and nailing around opening in roof for chimney
11. No heavy veneer at adjacent shear walls or panels

CONCRETE MASONRY

1. Square or rectangular floor plan
2. Continuous wall footing – reinforcing and wall dowels
3. Corner shear walls of proper dimension
4. Bond pattern
5. Horizontal/vertical reinforcing
6. Horizontal chord bars – spliced for continuity
7. Vertical reinforcing bars at corners
8. Horizontal bars lapped and tied at corners
9. Reinforced cells grouted
10. Wall anchor straps attached to floors/roofs
11. Sheathing nailed to tops of ledgers at face of wall

CLAY MASONRY

1. See CONCRETE MASONRY
2. Reinforcing in cavity or cells fully embedded in grout
3. Metal wall ties or joint reinforcing
4. Spacing of wall ties – horizontal/vertical

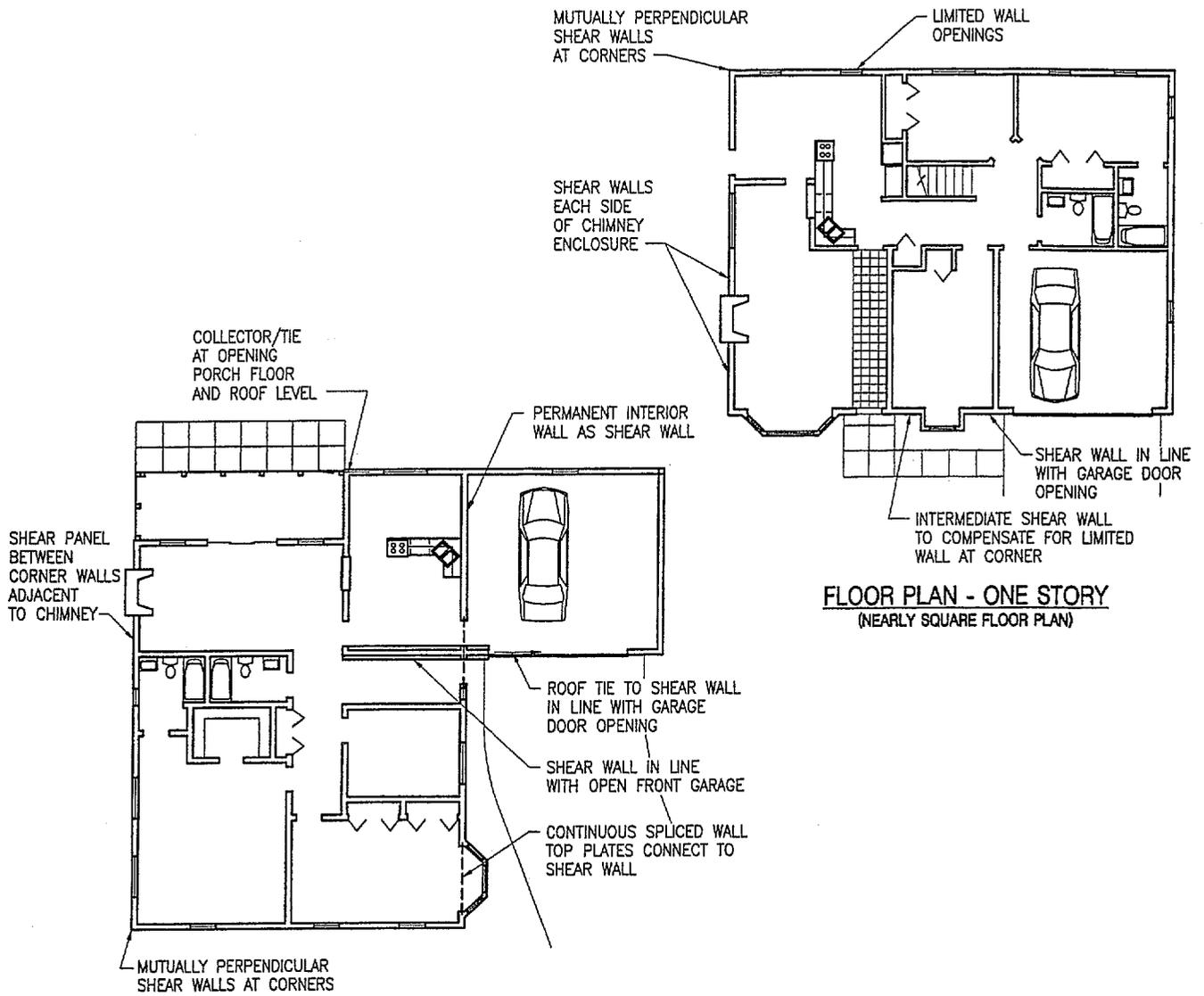
5. Empirical rules for wall thickness
6. Height to thickness ratio – shear walls
7. Running bond – unreinforced

MASONRY AND STONE VENEER

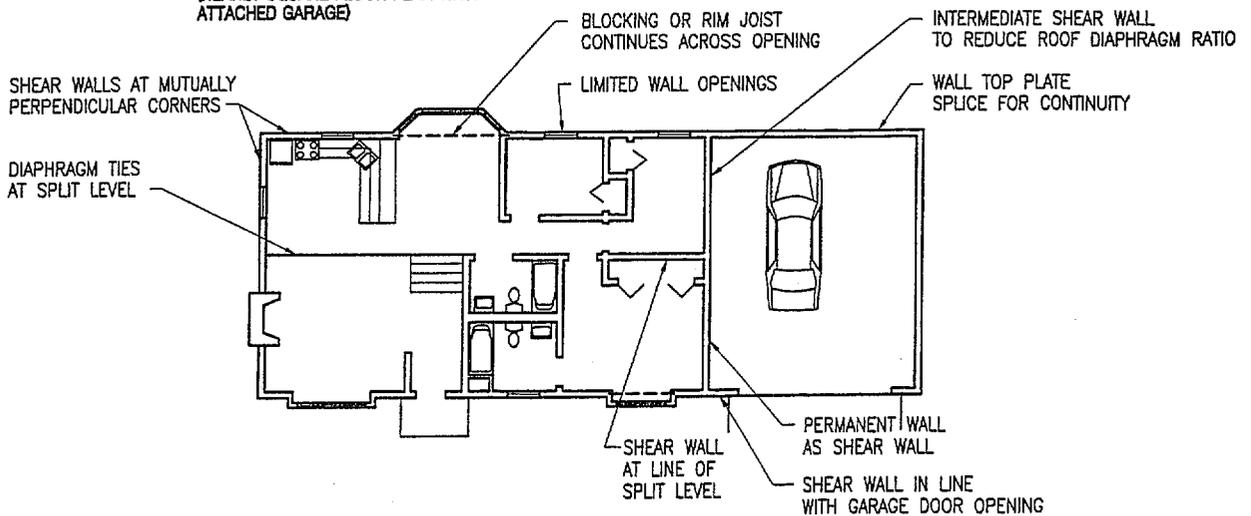
1. Firm backing – Wood structural Panel
2. Tooled mortar joints
3. Concrete or steel foundation/support
4. Bond pattern
5. Lath attached with non-corrosive nails/screws
6. Space provided between veneer and backing (may be filled)
7. Wire tie anchors – galvanized
8. Joint reinforcing

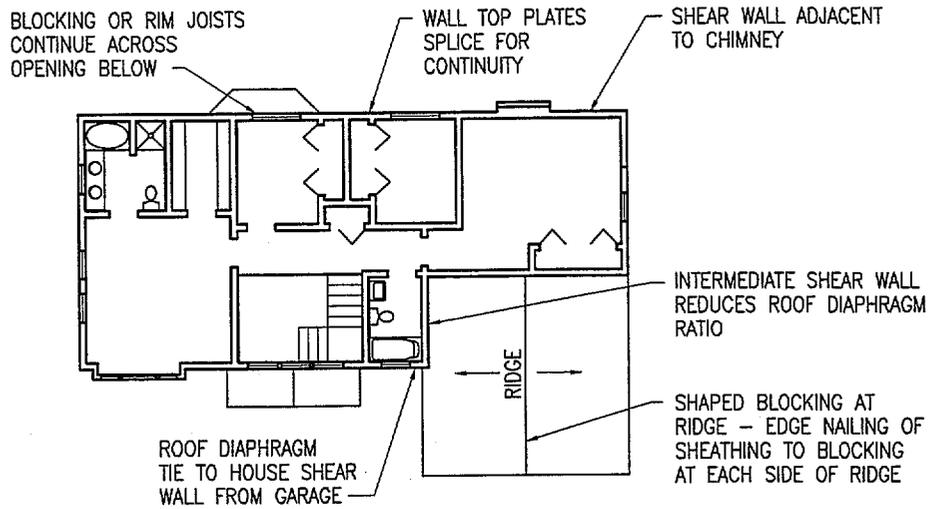
16. APPENDIX

TYPICAL REGULAR FLOOR PLANS
FOR
EARTHQUAKE RESISTANCE

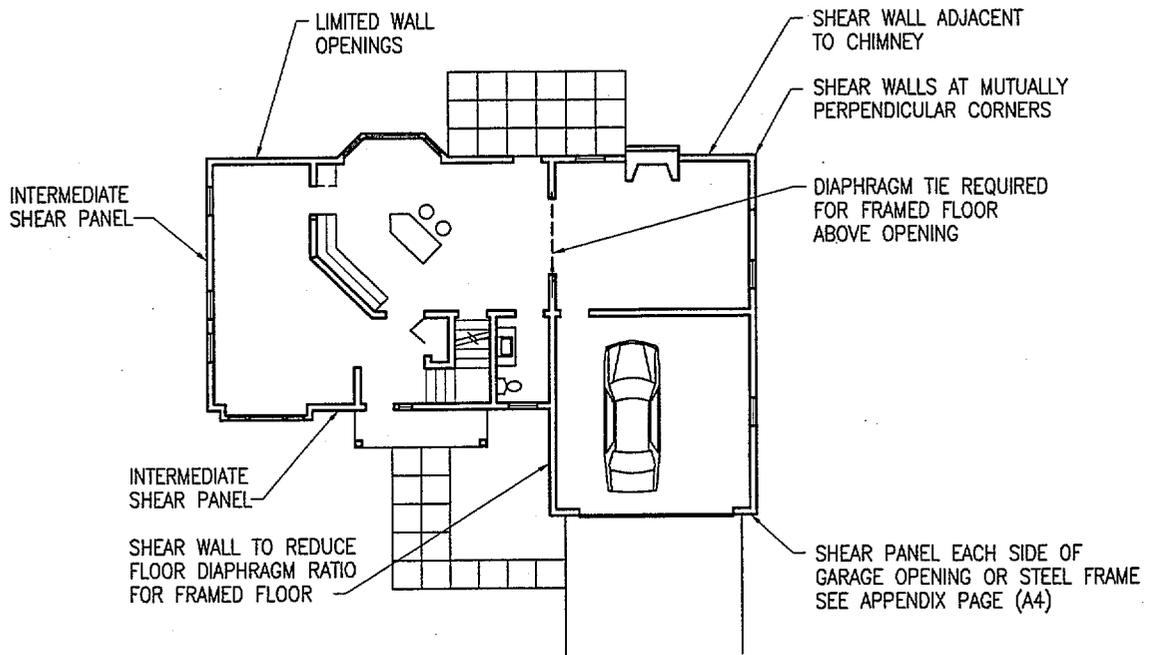


FLOOR PLAN - ONE STORY
(NEARLY SQUARE FLOOR PLAN WITH ATTACHED GARAGE)





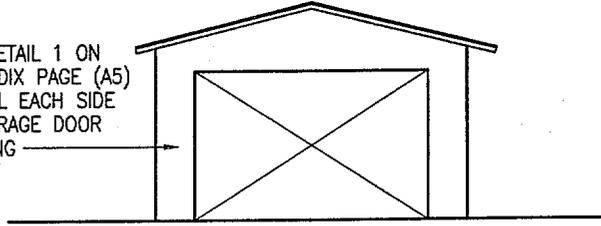
PLAN - SECOND STORY



PLAN - FIRST STORY

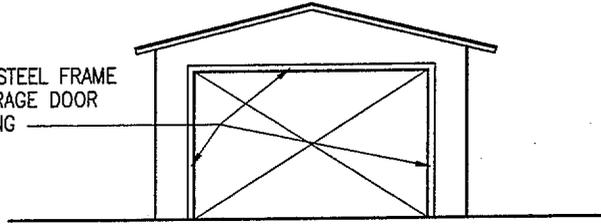
FLOOR PLANS - TWO STORY
(NEARLY RECTANGULAR FLOOR PLAN)

SEE DETAIL 1 ON
APPENDIX PAGE (A5)
TYPICAL EACH SIDE
OF GARAGE DOOR
OPENING

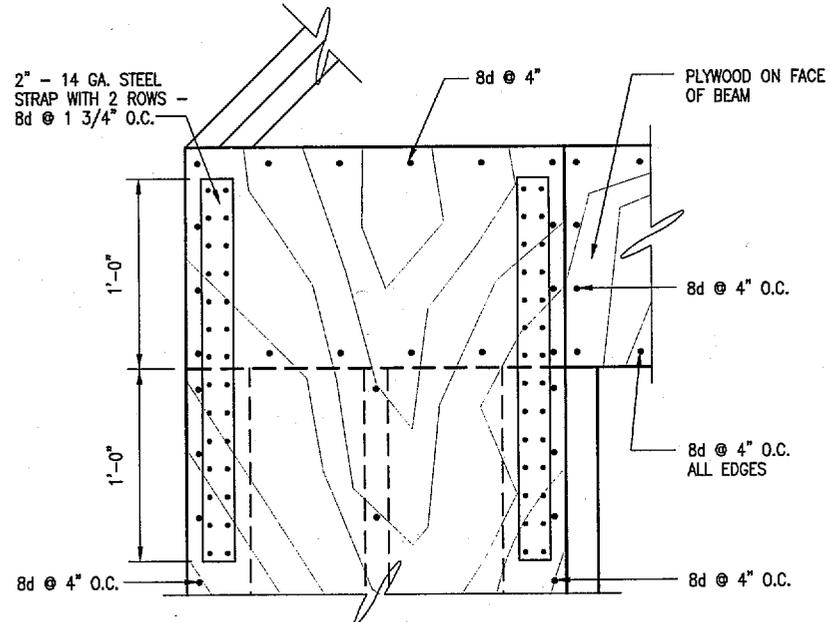
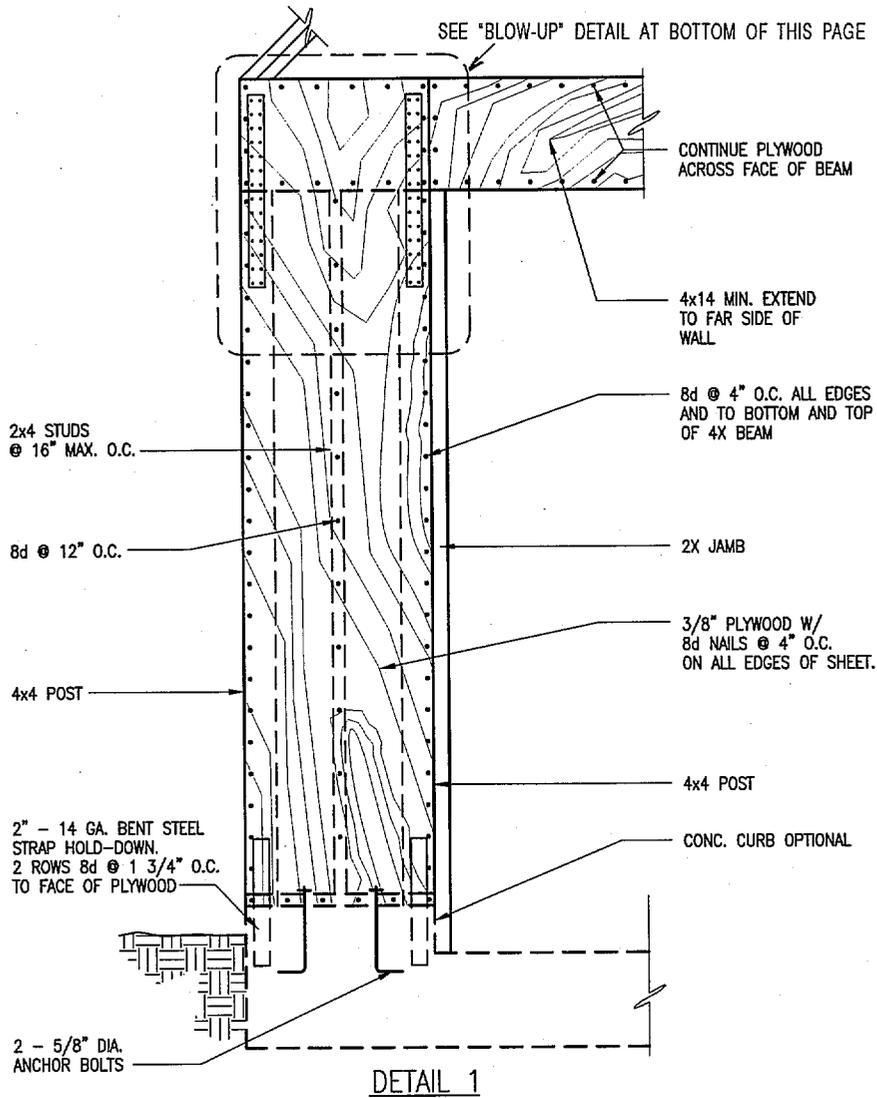


OPEN FRONT GARAGE

RIGID STEEL FRAME
AT GARAGE DOOR
OPENING



OPEN FRONT GARAGE
(OPTIONAL)



SPECIAL GARAGE FRONT WALL DETAIL FOR SINGLE STORY GARAGES

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