


## ANALYSIS

This ordinance repeals those provisions of Title 30 - Residential Code to the Los Angeles County Code, which had incorporated portions of the 2010 Edition of the California Residential Code by reference, and replaces them with provisions incorporating portions of the 2013 California Residential Code, published by the California Building Standards Commission, by reference, with certain changes and modifications.

State law requires that the County adopt ordinances that contain the same requirements as are contained in the building standards published in the California Residential Code. State law allows the County to change or modify these requirements only if it determines that such changes or modifications are reasonably necessary because of local climatic, geological, or topographical conditions.

The changes and modifications to requirements contained in the building standards published in the 2013 California Residential Code which are contained in this ordinance are based upon express findings, contained in the ordinance, that such changes are reasonably necessary due to local climatic, geological, or topographical conditions.

JOHN F. KRATTLI  
County Counsel

By   
CAROLE B. SUZUKI  
Deputy County Counsel  
Public Works Division

CBS:gjv

Requested: 07/10/13  
Revised: 09/26/13

**ORDINANCE NO. \_\_\_\_\_**

An ordinance amending Title 30 – Residential Code of the Los Angeles County Code, by adopting the 2013 California Residential Code by reference, with certain changes and modifications.

The Board of Supervisors of the County of Los Angeles ordains as follows:

**SECTION 1.** Chapters 2 through 10, Chapter 44, and Appendix H, which incorporate by reference and modify portions of the 2010 California Residential Code, are hereby repealed.

**SECTION 2.** Chapter 1 is hereby amended to read as follows:

**R100 ADOPTION BY REFERENCE**

Except as hereinafter changed or modified, Sections 102 through 119 of Chapter 1, Section 1207 of Chapter 12, Chapters 34, 67, 69, 98, 99, and Appendix J of Title 26 of the Los Angeles County Code are adopted by reference and incorporated into this Title 30 as if fully set forth below, and shall be known as Sections 102 through 119 of Chapter 1, Section 1207 of Chapter 12, Chapters 34, 67, 69, 98, 99, and Appendix J of Title 30 of the Los Angeles County Code.

Except as hereinafter changed or modified, Chapters 2 through 10, Chapter 44, and Appendix H of that certain code known and designated as the ~~2010~~2013 California Residential Code as published by the California Building Standards Commission are adopted by reference and incorporated into this Title 30 as if fully set forth below, and

shall be known as Chapters 2 through 10, Chapter 44, and Appendix H of Title 30 of the Los Angeles County Code.

A copy of the 20102013 California Residential Code shall be at all times maintained by the Building Official for use and examination by the public.

**SECTION 3.** Section R301.1.3.2 is hereby amended to read as follows:

**R301.1.3.2** ~~Woodframe structures greater than two stories.~~

The Building Official shall require construction documents to be approved and stamped by a California licensed architect or engineer for all dwellings of woodframe construction more than two stories and basement in height located in Seismic Design Category A, B, or C. Notwithstanding other sections, the law establishing these provisions is found in Business and Professions Code sections 5537 and 6737.1.

The Building Official shall require construction documents to be approved and stamped by a California licensed architect or engineer for all dwellings of woodframe construction more than one story in height or with a basement located in Seismic Design Category D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub>.

**SECTION 4.** Section R301.1.4 is hereby added to read as follows:

**R301.1.4** Seismic design provisions for buildings constructed on or into slopes steeper than one unit vertical in three units horizontal (33.3 percent slope).

The design and construction of new buildings and additions to existing buildings when constructed on or into slopes steeper than one unit vertical in three units

horizontal (33.3 percent slope) shall comply with Section 1613.7 of the Los Angeles County Building Code.

**SECTION 5.** Section R301.2 is hereby amended to read as follows:

**R301.2 Climatic and geographic design criteria.**

Buildings shall be constructed in accordance with the provisions of this eCode as limited by the provisions of this sSection. ~~Additional criteria shall be established by the local jurisdiction and set forth~~ Consult with the Building Official regarding additional criteria in Table R301.2(1).

**SECTION 6.** Section R301.2.2.2.5 is hereby amended to read as follows:

**R301.2.2.2.5 Irregular buildings.**

...

1. When exterior shear wall lines or braced wall panels are not in one plane vertically from the foundation to the uppermost story in which they are required.

**Exception:** ~~For wood light-frame construction, floors with cantilevers or setbacks not exceeding four times the nominal depth of the wood floor joists are permitted to support braced wall panels that are out of plane with braced wall panels below provided that:~~

- ~~1. Floor joists are nominal 2 inches by 10 inches (51 mm by 254 mm) or larger and spaced not more than 16 inches (406 mm) on center.~~
- ~~2. The ratio of the back span to the cantilever is at least 2 to 1.~~
- ~~3. Floor joists at ends of braced wall panels are doubled.~~

~~4. For wood frame construction, a continuous rim joist is connected to ends or all cantilever joists. When spliced, the rim joists shall be spliced using a galvanized metal tie not less than 0.058 inch (1.5 mm) (16 gage) and 1 1/2 inches (38 mm) wide fastened with six 16d nails on each side of the splice or a block of the same size as the rim joist of sufficient length to fit securely between the joist space at which the splice occurs fastened with eight 16d nails on each side of the splice; and~~

~~5. Gravity loads carried at the end of cantilevered joists are limited to uniform wall and roof loads and the reactions from headers having a span of 8 feet (2438 mm) or less.~~

2. When a section of floor or roof is not laterally supported by shear walls or braced wall lines on all edges.

**Exception:** Portions of floors that do not support shear walls or braced wall panels above, or roofs, shall be permitted to extend no more than 6 feet (1829 mm) beyond a shear wall or braced wall line.

3. When the end of a braced wall panel occurs over an opening in the wall below and ends at a horizontal distance greater than 1 foot (305 mm) from the edge of the opening. This provision is applicable to shear walls and braced wall panels offset in plane and to braced wall panels offset out of plane as permitted by the exception to Item 1 above.

**Exception:** ~~For wood light frame wall construction, one end of a braced wall panel shall be permitted to extend more than 1 foot (305 mm) over an opening not more than 8 feet (2438 mm) wide in the wall below provided that the opening includes a~~

header in accordance with the following:

- ~~1. The building width, loading condition and framing member species limitations of Table R502.5(1) shall apply; and~~
- ~~2. Not less than one 2x12 or two 2x10 for an opening not more than 4 feet (1219 mm) wide; or~~
- ~~3. Not less than two 2x12 or three 2x10 for an opening not more than 6 feet (1829 mm) wide; or~~
- ~~4. Not less than three 2x12 or four 2x10 for an opening not more than 8 feet (2438 mm) wide; and~~
- ~~5. The entire length of the braced wall panel does not occur over an opening in the wall below.~~

4. When an opening in a floor or roof exceeds the lesser of 12 feet (3658 mm) or 50 percent of the least floor or roof dimension.

5. When portions of a floor level are vertically offset.

**Exceptions:**

- ~~1. Framing supported directly by continuous foundations at the perimeter of the building.~~
- ~~2. For wood light-frame construction, floors shall be permitted to be vertically offset when the floor framing is lapped or tied together as required by section R502.6.1.~~

...

**SECTION 7.** Section R301.2.2.3.8 is hereby added to read as follows:

**R301.2.2.3.8 Anchorage of mechanical, electrical, or plumbing components and equipment.**

Mechanical, electrical, or plumbing components and equipment shall be anchored to the structure. Anchorage of the components and equipment shall be designed to resist loads in accordance with the Los Angeles County Building Code and ASCE 7, except where the component is positively attached to the structure and flexible connections are provided between the component and associated ductwork, piping, and conduit; and either:

1. The component weighs 400 lb (1,780 N) or less and has a center of mass located 4 ft (1.22 m) or less above the supporting structure; or
2. The component weighs 20 lb (89N) or less or, in the case of a distributed system, 5 lb/ft (73 N/m) or less.

**SECTION 8.** Table R302.1(2) is hereby amended by deleting Footnote a, as follows:

**TABLE R302.1(2)  
EXTERIOR WALLS—DWELLINGS AND ACCESSORY BUILDINGS WITH AUTOMATIC RESIDENTIAL FIRE SPRINKLER PROTECTION**

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E 119 or UL 263 with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet*
Projections	Fire-resistance rated	1 hour on the underside	2 feet*
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	N/A	< 3 feet
	Unlimited	0 hours	3 feet*
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet*

a. ~~For residential subdivisions where all dwellings and accessory buildings are equipped throughout with an automatic sprinkler systems installed in-~~

~~accordance with Section R313, the fire separation distance for nonrated exterior walls and rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.~~

**SECTION 9.** Section R322.2.2 is hereby amended to read as follows:

**R322.2.2 Enclosed area below design flood elevation.**

Enclosed areas for attached and detached buildings and structures, including crawl spaces, that are below the design flood elevation shall:

...

**SECTION 10.** Section R327.1.1 is hereby amended to read as follows:

**R327.1.1 Scope.**

This ~~Chapter~~ applies to building materials, systems and or assemblies used in the exterior design and construction of new buildings, and to additions, alterations, or repairs made to existing buildings, erected, constructed, located, or moved within a Wildland-Urban Interface Fire Area as defined in Section R327.2.

**SECTION 11.** Section R327.1.3 is hereby amended to read as follows:

**R327.1.3 Application.**

New buildings, and any additions, alterations, or repairs made to existing buildings located in or moved within any Fire Hazard Severity Zone or any Wildland-Urban Interface Fire Area designated by the ~~enforcing agency~~ Los Angeles County Fire



Department constructed after the application date shall comply with the provisions of this eChapter.

**Exceptions:**

...

~~4. Additions to and remodels of buildings originally constructed prior to the applicable application date.~~

**SECTION 12.** Section R327.1.3.1 is hereby amended to read as follows:

**R327.1.3.1 Application date and where required.**

New buildings for which an application for a building permit is submitted on or after July 1, 2008, and any additions, alterations, or repairs made to existing buildings for which an application for a building permit is submitted on or after January 1, 2014, located in any Fire Hazard Severity Zone or Wildland Interface Fire Area shall comply with all sSections of this eChapter, including all of the following areas:

...

**Exceptions:**

1. ~~New~~ bBuildings located in any Fire Hazard Severity Zone within State Responsibility Areas, for which an application for a building permit is submitted on or after January 1, 2008, shall comply with all sSections of this eChapter.

2. ~~New~~ bBuildings located in any Fire Hazard Severity Zone within State Responsibility Areas or any Wildland Interface Fire Area designated by cities and other local agencies for which an application for a building permit is submitted on or after

December 1, 2005 but prior to July 1, 2008, shall only comply with the following

Sections of this Chapter:

...

**SECTION 13.** Section R327.1.4 is hereby amended to read as follows:

**R327.1.4 Inspection and certification.**

...

1. Building permit issuance. The local Building Official shall, prior to construction, provide the owner or applicant a certification that the building as proposed to be built complies with all applicable state and local building standards, including those for materials and construction methods for wildfire exposure as described in this Chapter. Issuance of a building permit by the local Building Official for the proposed building shall be considered as complying with this Section.

2. Building permit final. The local Building Official shall, upon completion of construction, provide the owner or applicant with a copy of the final inspection report that demonstrates the building was constructed in compliance with all applicable state and local building standards, including those for materials and construction methods for wildfire exposure as described in this Chapter. Issuance of a certificate of occupancy by the local Building Official for the proposed building shall be considered as complying with this Section.

**SECTION 14.** Section R327.2 is hereby amended to read as follows:

## SECTION R327.2

### DEFINITIONS

...

**FIRE PROTECTION PLAN** is a document prepared for a specific project or development proposed for a Wildland-Urban Interface Fire Area. It describes ways to minimize and mitigate potential for loss from wildfire exposure. The fire protection plan shall be in accordance with this eChapter and the CaliforniaLos Angeles County Fire Code, Title 32, Chapter 49. When required by the enforcing agency for the purposes of granting modifications, a fire protection plan shall be submitted. ~~Only locally adopted ordinances that have been filed with the California Building Standards Commission or the Department of Housing and Community Development in accordance with Section 1.1.8 shall apply.~~

**FIRE HAZARD SEVERITY ZONES** are geographical areas designated pursuant to California Public Resources Code Sections 4201 through 4204 and classified as Very High, High, or Moderate in State Responsibility Areas or as Local Agency Very High Fire Hazard Severity Zones designated pursuant to California Government Code sections 51175 through 51189. See CaliforniaLos Angeles County Fire Code, Article 86Chapter 49.

...

**HEAVY TIMBER.** A type of construction classification specified in Section 602 of the CaliforniaLos Angeles County Building Code. For use in this eChapter, heavy timber shall be sawn lumber or glue laminated wood with the smallest minimum nominal

dimension of 4 inches (102 mm). Heavy Timber walls or floors shall be sawn or glue-laminated planks splined, tongue-and-grove, or set close together and well spiked.

...

**WILDLAND-URBAN INTERFACE FIRE AREA** is a geographical area identified by the state as a "Fire Hazard Severity Zone" in accordance with the Public Resources Code Sections 4201 through 4204 and Government Code Sections 51175 through 51189, or other areas designated by the enforcing agency Los Angeles County Fire Department to be at a significant risk from wildfires.

**SECTION 15.** Section R327.3.2 is hereby amended to read as follows:

**R327.3.2 Qualification by testing.**

Material and material assemblies tested in accordance with the requirements of Section ~~703AR~~R327.3 shall be accepted for use when the results and conditions of those tests are met. Product evaluation testing of material and material assemblies shall be approved or listed by the State Fire Marshal, the Building Official or identified in a current report issued by an approved agency.

**SECTION 16.** Section R327.3.3 is hereby amended to read as follows:

**R327.3.3 Approved agency.**

Product evaluation testing shall be performed by an approved agency as defined in Section 1702 of the California Los Angeles County Building Code. The scope of accreditation for the approved agency shall include building product compliance with eCode.

**SECTION 17.** Section R327.3.5.2 is hereby amended to read as follows:

**R327.3.5.2 Weathering.**

Fire-retardant-treated wood and fire-retardant-treated wood shingles and shakes shall meet the fire test performance requirements of this eChapter after being subjected to the weathering conditions contained in the following standards, as applicable to the materials and the conditions of use.

**SECTION 18.** Section R327.3.5.2.1 is hereby amended to read as follows:

**R327.3.5.2.1 Fire-retardant-treated wood.**

Fire-retardant-treated wood shall be tested in accordance with ASTM D2898, "Standard Practice for Accelerated Weathering of Fire-Retardant Treated Wood for Fire Testing (Method A)" and the requirements of sSection 2303.2.

**SECTION 19.** Section R327.3.5.2.2 is hereby deleted in its entirety.

~~**R327.3.5.2.2 Fire-retardant-treated wood shingles and shakes.** Fire-retardant-treated wood shingles and shakes shall be approved and listed by the State Fire Marshal in accordance with Section 208(c), Title 19 California Code of Regulations.~~

**SECTION 20.** Section R327.3.6 is hereby amended to read as follows:

**R327.3.6 Alternates for materials, design, tests and methods of construction.**

The enforcing agency Building Official is permitted to modify the provisions of this eChapter for site-specific conditions in accordance with Chapter 1, Section 1.11.2.4104.2.7. When required by the enforcing agency Building Official for the

purposes of granting modifications, a fire protection plan shall be submitted in accordance with the ~~California~~Los Angeles County Fire Code, Chapter 49.

**SECTION 21.** Section R327.4.3 is hereby amended to read as follows:

**R327.4.3 Alternative methods for determining Ignition-resistant material.**

...

2. Fire-retardant-treated wood. Fire-retardant-treated wood identified for exterior use that complies with the requirements of ~~s~~Section 2303.2 of the ~~California~~Los Angeles County Building Code.

~~3. Fire-retardant-treated wood shingles and shakes. Fire-retardant-treated wood shingles and shakes, as defined in section 1505.6 and listed by State Fire Marshal for use as "Class B" roof covering, shall be accepted as an Ignition-resistant wall-covering material when installed over solid sheathing.~~

**SECTION 22.** Section R327.5.2. is hereby amended to read as follows:

**R327.5.2 Roof coverings.**

Roof coverings shall be Class A as specified in Section R902.1. Where the roof profile allows a space between the roof covering and roof decking, the spaces shall be constructed to prevent the intrusion of flames and embers, be firestopped with approved materials or have one layer of minimum 72 pounds (32.4 kg) mineral-surfaced non-perforated cap sheet complying with ASTM D 3909 installed over the combustible decking. Wood shingles and wood shakes are prohibited in any Fire Hazard Severity Zones regardless of classification.

**SECTION 23.** Section R327.6.1 is hereby amended to read as follows:

**R327.6.1 General.**

Where provided, ventilation openings for enclosed attics, enclosed eave soffit spaces, enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters, and underfloor ventilation shall be in accordance with Section 1203 of the California Los Angeles County Building Code and ~~s~~Sections R327.6.1 through R327.6.3 of this ~~s~~Section to resist building ignition from the intrusion of burning embers and flame through the ventilation opening.

**SECTION 24.** Section R327.6.3 is hereby amended to read as follows:

**R327.6.3 Ventilation openings on the underside of eaves and cornices.**

...

**Exceptions:**

1. The ~~enforcing agency~~Building Official may accept or approve special eave and cornice vents that resist the intrusion of flame and burning embers.

2. Vents complying with the requirements of Section R327.6.2 may be installed on the underside of eaves and cornices in accordance with either one of the following conditions:

2.1. The attic space being ventilated is fully protected by an automatic sprinkler system installed in accordance with Section 903.3.1.1 of the California Los Angeles County Building Code or,

...

**SECTION 25.** Section R327.10.3.2 is hereby amended to read as follows:

**R327.10.3.2** When required by the ~~enforcing agency~~Building Official, detached accessory structures within 50 feet of an applicable building shall comply with the requirements of this ~~s~~Section.

**SECTION 26.** Section R327.10.4 is hereby amended to read as follows:

**R327.10.4 Requirements.**

When required by the ~~enforcing agency~~Building Official, accessory structures shall be constructed of noncombustible or ignition-resistant materials.

**SECTION 27.** Section R401.1 is hereby amended to read as follows:

**R401.1 Application.**

...

Wood foundations in Seismic Design Category D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub> shall ~~be designed in accordance with accepted engineering practice~~not be permitted.

Exception: In non-occupied, single-story, detached storage sheds and similar uses other than carport or garage, provided the gross floor area does not exceed 200 square feet, the plate height does not exceed 12 feet in height above the grade plane at any point, and the maximum roof projection does not exceed 24 inches.

**SECTION 28.** Section R403.1.2 is hereby amended to read as follows:

**R403.1.2 Continuous footing in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub>.**

The braced wall panels at exterior walls of buildings located in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub> shall be supported by continuous footings. All required



interior braced wall panels in buildings with plan dimensions greater than 50 feet (15240 mm) shall also be supported by continuous footings.

**SECTION 29.** Section R403.1.3 is hereby amended to read as follows:

**R403.1.3 Seismic reinforcing.**

...

**Exception:** In detached one-and two-family dwellings located in Seismic Design Category A, B, or C which are three stories or less in height and constructed with stud bearing walls, isolated plain concrete footings, supporting columns or pedestals are permitted.

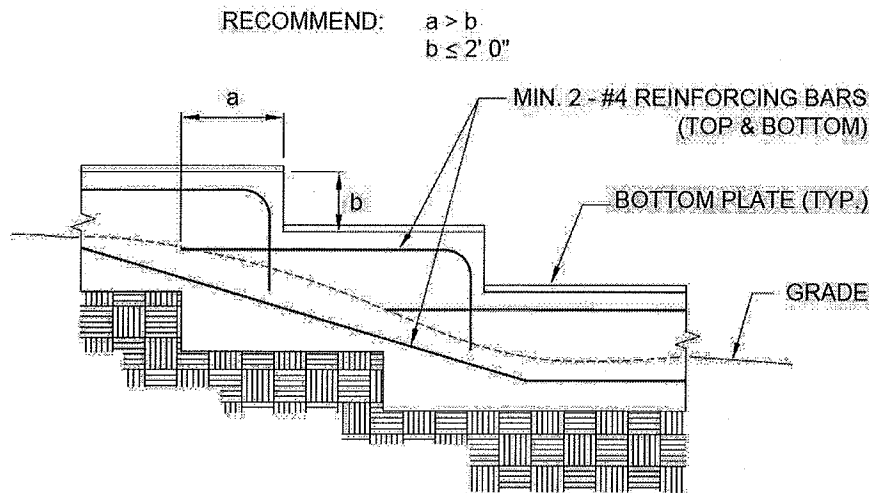
**SECTION 30.** Section R403.1.5 is hereby amended to read as follows:

**R403.1.5 Slope.**

The top surface of footings shall be level. The bottom surface of footings shall be permitted to have a slope not exceeding one unit vertical in 10 units horizontal (10-percent slope). Footings shall be stepped where it is necessary to change the elevation of the top surface of the footing or where the surface of the ground slopes more than one unit vertical in 10 units horizontal (10-percent slope).

For structures located in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub>, stepped footings shall be reinforced with two No. 4 reinforcing bars located at the top and bottom of the footings as shown in Figure R403.1.5.

**SECTION 31.** Figure R403.1.5 is hereby added to read as follows:



**FIGURE R403.1.5  
 STEPPED FOOTING**

**SECTION 32.** Section R404.2 is hereby amended to read as follows:

**R404.2 Wood foundation walls.**

Wood foundation walls shall be constructed in accordance with the provisions of Sections R404.2.1 through R404.2.6 and with the details shown in Figures R403.1(2) and R403.1(3). Wood foundation walls shall not be used for structures located in Seismic Design Category D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub>.

**SECTION 33.** Section R501.1 is hereby amended to read as follows:

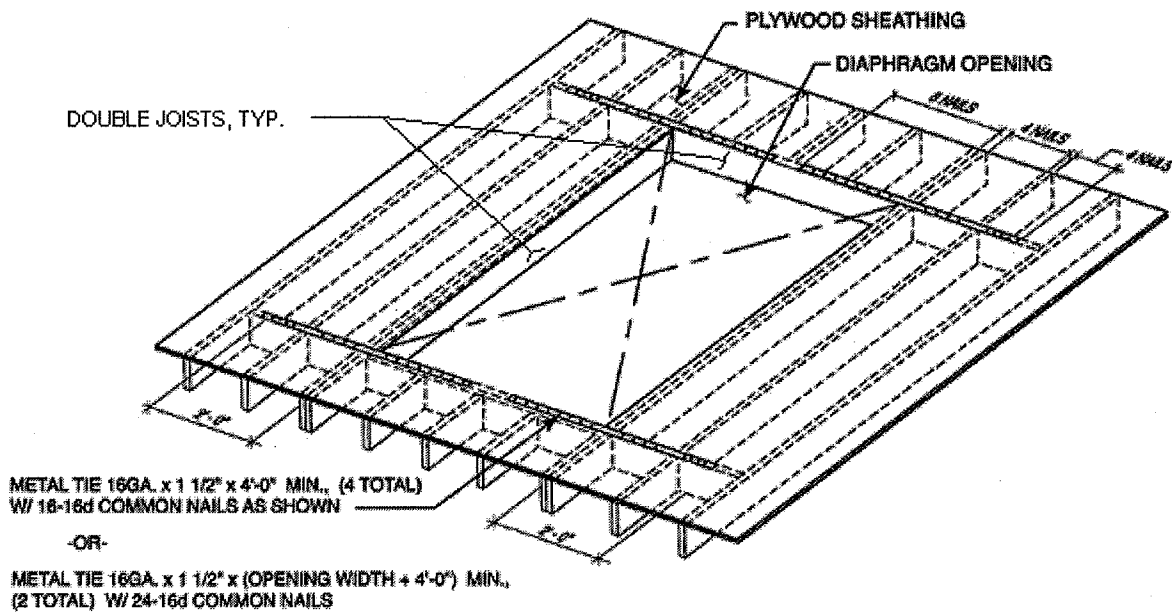
**R501.1 Application.**

The provision of this eChapter shall control the design and construction of the floors for all buildings including the floors of attic spaces used to house mechanical or plumbing fixtures and equipment. Mechanical or plumbing fixtures and equipment shall be attached or anchored to the structure in accordance with Section R301.2.2.3.8.

**SECTION 34.** Section R503.2.4 is hereby added to read as follows:

### R503.2.4                    Openings in horizontal diaphragms.

Openings in horizontal diaphragms with a dimension perpendicular to the joist that is greater than 4 feet (1.2 m) shall be constructed in accordance with Figure R503.2.4.



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

#### Notes:

- a. Blockings shall be provided beyond headers.
- b. Metal ties not less than 0.058 inch [1.47 mm (16 galvanized gage)] by 1.5 inches (38 mm) wide with eight 16d common nails on each side of the header-joist intersection. The metal ties shall have a minimum yield of 33,000 psi (227 MPa).

c. Openings in diaphragms shall be further limited in accordance with Section R301.2.2.2.5.

**FIGURE R503.2.4**

**OPENING IN HORIZONTAL DIAPHRAGMS**

**SECTION 35.** Section R602.3.2 is hereby amended to read as follows:

**R602.3.2** Top plate.

...

**Exception:** In other than Seismic Design Category D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub>, a single top plate may be installed in stud walls, provided the plate is adequately tied at joints, corners and intersecting walls by a minimum 3-inch-by-6-inch by a 0.036-inch-thick (76 mm by 152 mm by 0.914 mm) galvanized steel plate that is nailed to each wall or segment of wall by six 8d nails on each side, provided the rafters or joists are centered over the studs with a tolerance of no more than 1 inch (25 mm). The top plate may be omitted over lintels that are adequately tied to adjacent wall sections with steel plates or equivalent as previously described.

**SECTION 36.** Table R602.3(1) is hereby amended to read as follows:

**TABLE R602.3(1)**

**FASTENER SCHEDULE FOR STRUCTURAL MEMBERS**

**TABLE R602.3(1)  
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS**

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER <sup>a,b,c</sup>	SPACING OF FASTENERS
<b>Roof</b>			
1	Blocking between joists or rafters to top plate, toe nail	3-8d (2½" × 0.113")	—
2	Ceiling joists to plate, toe nail	3-8d (2½" × 0.113")	—
3	Ceiling joists not attached to parallel rafter, laps over partitions, face nail	3-10d	—
4	Collar tie to rafter, face nail or 1¼" × 20 gage ridge strap	3-10d (3" × 0.128")	—
5	Rafter or roof truss to plate, toe nail	3-16d box nails (3½" × 0.135") or 3-10d common nails (3" × 0.148")	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss <sup>d</sup>
6	Roof rafters to ridge, valley or hip rafters: toe nail face nail	4-16d (3½" × 0.135") 3-16d (3½" × 0.135")	—
<b>Wall</b>			
7	Built-up studs-face nail	10d (3" × 0.128")	24" o.c.
8	Abutting studs at intersecting wall corners, face nail	16d (3½" × 0.135")	12" o.c.
9	Built-up header, two pieces with ½" spacer	16d (3½" × 0.135")	16" o.c. along each edge
10	Continued header, two pieces	16d (3½" × 0.135")	16" o.c. along each edge
11	Continuous header to stud, toe nail	4-8d (2½" × 0.113")	—
12	Double studs, face nail	10d (3" × 0.128")	24" o.c.
13	Double top plates, face nail	10d (3" × 0.128")	24" o.c.
14	Double top plates, minimum 24-inch offset of end joints, face nail in lapped area	8-16d (3½" × 0.135")	—
15	Sole plate to joist or blocking, face nail	16d (3½" × 0.135")	16" o.c.
16	Sole plate to joist or blocking at braced wall panels	3-16d (3½" × 0.135")	16" o.c.
17	Stud to sole plate, toe nail	3-8d (2½" × 0.113") or 2-16d (3½" × 0.135")	—
18	Top or sole plate to stud, end nail	2-16d (3½" × 0.135")	—
19	Top plates, laps at corners and intersections, face nail	2-10d (3" × 0.128")	—
20	1" brace to each stud and plate, face nail	2-8d (2½" × 0.113") 2 staples 1¾"	—
21	1" × 6" sheathing to each bearing, face nail	2-8d (2½" × 0.113") 2 staples 1¾"	—
22	1" × 8" sheathing to each bearing, face nail	2-8d (2½" × 0.113") 3 staples 1¾"	—
23	Wider than 1" × 8" sheathing to each bearing, face nail	3-8d (2½" × 0.113") 4 staples 1¾"	—
<b>Floor</b>			
24	Joist to sill or girder, toe nail	3-8d (2½" × 0.113")	—
25	Rim joist to top plate, toe nail (roof applications also)	8d (2½" × 0.113")	6" o.c.
26	Rim joist or blocking to sill plate, toe nail	8d (2½" × 0.113")	6" o.c.
27	1" × 6" subfloor or less to each joist, face nail	2-8d (2½" × 0.113") 2 staples 1¾"	—
28	2" subfloor to joist or girder, blind and face nail	2-16d (3½" × 0.135")	—
29	2" planks (plank & beam - floor & roof)	2-16d (3½" × 0.135")	at each bearing
30	Built-up girders and beams, 2-inch lumber layers	10d (3" × 0.128")	Nail each layer as follows: 32" o.c. at top and bottom and staggered. Two nails at ends and at each splice.
31	Ledger strip supporting joists or rafters	3-16d (3½" × 0.135")	At each joist or rafter

(continued)

**TABLE R602.3(1)—continued  
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS**

ITEM	DESCRIPTION OF BUILDING MATERIALS	DESCRIPTION OF FASTENER <sup>a,c,e</sup>	SPACING OF FASTENERS	
			Edges (inches) <sup>i</sup>	Intermediate supports <sup>c,o</sup> (inches)
<b>Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing</b>				
32	$\frac{3}{8}$ " - $\frac{1}{2}$ "	6d common (2" x 0.113") nail (subfloor wall) <sup>j</sup> 8d common (2 $\frac{1}{2}$ " x 0.131") nail (roof) <sup>f</sup>	6	12 <sup>g</sup>
33	$\frac{19}{32}$ " - 1"	8d common nail (2 $\frac{1}{2}$ " x 0.131")	6	12 <sup>g</sup>
34	$1\frac{1}{8}$ " - $1\frac{1}{4}$ "	10d common (3" x 0.148") nail or 8d (2 $\frac{1}{2}$ " x 0.131") deformed nail	6	12
<b>Other wall sheathing<sup>b</sup></b>				
35	$\frac{1}{2}$ " structural cellulose fiberboard sheathing	$1\frac{1}{2}$ " galvanized roofing nail, $\frac{7}{16}$ " crown or 1" crown staple 16 ga., $1\frac{1}{4}$ " long	3	6
36	$\frac{25}{32}$ " structural cellulose fiberboard sheathing	$1\frac{3}{4}$ " galvanized roofing nail, $\frac{7}{16}$ " crown or 1" crown staple 16 ga., $1\frac{1}{2}$ " long	3	6
37 <sup>k</sup>	$\frac{1}{2}$ " gypsum sheathing <sup>d</sup>	$1\frac{1}{2}$ " galvanized roofing nail; staple galvanized, $1\frac{1}{2}$ " long; $1\frac{1}{4}$ " screws, Type W or S	7	7
38 <sup>k</sup>	$\frac{5}{8}$ " gypsum sheathing <sup>d</sup>	$1\frac{3}{4}$ " galvanized roofing nail; staple galvanized, $1\frac{5}{8}$ " long; $1\frac{5}{8}$ " screws, Type W or S	7	7
<b>Wood structural panels, combination subfloor underlayment to framing</b>				
39	$\frac{3}{4}$ " and less	6d deformed (2" x 0.120") nail or 8d common (2 $\frac{1}{2}$ " x 0.131") nail	6	12
40	$\frac{7}{8}$ " - 1"	8d common (2 $\frac{1}{2}$ " x 0.131") nail or 8d deformed (2 $\frac{1}{2}$ " x 0.120") nail	6	12
41	$1\frac{1}{8}$ " - $1\frac{1}{4}$ "	10d common (3" x 0.148") nail or 8d deformed (2 $\frac{1}{2}$ " x 0.120") nail	6	12

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 Ksi = 6.895 MPa.

- a. All nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less.
- b. Staples are 16 gage wire and have a minimum  $\frac{7}{16}$ -inch on diameter crown width.
- c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.
- d. Four-foot by 8-foot or 4-foot by 9-foot panels shall be applied vertically.
- e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).
- f. For regions having basic wind speed of 110 mph or greater, 8d deformed (2 $\frac{1}{2}$ " x 0.120") nails shall be used for attaching plywood and wood structural panel roof sheathing to framing within minimum 48-inch distance from gable end walls, if mean roof height is more than 25 feet, up to 35 feet maximum.
- g. For regions having basic wind speed of 100 mph or less, nails for attaching wood structural panel roof sheathing to gable end wall framing shall be spaced 6 inches on center. When basic wind speed is greater than 100 mph, nails for attaching panel roof sheathing to intermediate supports shall be spaced 6 inches on center for minimum 48-inch distance from ridges, eaves and gable end walls; and 4 inches on center to gable end wall framing.
- h. Gypsum sheathing shall conform to ASTM C 1396 and shall be installed in accordance with GA 253. Fiberboard sheathing shall conform to ASTM C 208.
- i. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at all floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.
- j. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe nails on one side of the rafter and toe nails from the ceiling joist to top plate in accordance with this schedule. The toe nail on the opposite side of the rafter shall not be required.
- k. Use of staples in braced wall panels shall be prohibited in Seismic Design Category D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub>.

**SECTION 37.** Table R602.3(2) is hereby amended to read as follows:

**TABLE R602.3(2)**

**ALTERNATE ATTACHMENTS TO TABLE R602.3(1)**

...

b. Staples shall have a minimum crown width of 7/16-inch on diameter except as noted. Use of staples in roof, floor, subfloor, and braced wall panels shall be prohibited in Seismic Design Category D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub>.







...

SECTION 38. Table R602.10.3(3) is hereby amended to read as follows:

**TABLE R602.10.3(3)**

**BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY**







**TABLE R602.10.3(3)  
BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY**

<ul style="list-style-type: none"> <li>• SOIL CLASS D<sup>b</sup></li> <li>• WALL HEIGHT = 10 FEET</li> <li>• 10 PSF FLOOR DEAD LOAD</li> <li>• 15 PSF ROOF/CEILING DEAD LOAD</li> <li>• BRACED WALL LINE SPACING ≤ 25 FEET</li> </ul>			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE <sup>a</sup>				
Seismic Design Category	Story Location	Braced Wall Line Length (feet)	Method LIB <sup>c</sup>	Method GB <sup>e</sup>	Methods DWS, SFB, PBS, PCP, HPS, CS-SFB <sup>d,e</sup>	Method WSP	Methods CS-WSP, CS-G
C (townhouses only)		10	2.5	2.5	2.5	1.6	1.4
		20	5.0	5.0	5.0	3.2	2.7
		30	7.5	7.5	7.5	4.8	4.1
		40	10.0	10.0	10.0	6.4	5.4
		50	12.5	12.5	12.5	8.0	6.8
		10	NP	4.5	4.5	3.0	2.6
		20	NP	9.0	9.0	6.0	5.1
		30	NP	13.5	13.5	9.0	7.7
		40	NP	18.0	18.0	12.0	10.2
		50	NP	22.5	22.5	15.0	12.8
		10	NP	6.0	6.0	4.5	3.8
		20	NP	12.0	12.0	9.0	7.7
		30	NP	18.0	18.0	13.5	11.5
		40	NP	24.0	24.0	18.0	15.3
		50	NP	30.0	30.0	22.5	19.1
D <sub>0</sub>		10	NP	<del>2.8</del> 5.6	<del>2.8</del> 5.6	1.8	1.6
		20	NP	<del>5.5</del> 11.0	<del>5.5</del> 11.0	3.6	3.1
		30	NP	<del>8.3</del> 16.6	<del>8.3</del> 16.6	5.4	4.6
		40	NP	<del>11.0</del> 22.0	<del>11.0</del> 22.0	7.2	6.1
		50	NP	<del>13.8</del> 27.6	<del>13.8</del> 27.6	9.0	7.7
		10	NP	<del>5.3</del> NP	<del>5.3</del> NP	3.8	3.2
		20	NP	<del>10.5</del> NP	<del>10.5</del> NP	7.5	6.4
		30	NP	<del>15.8</del> NP	<del>15.8</del> NP	11.3	9.6
		40	NP	<del>21.0</del> NP	<del>21.0</del> NP	15.0	12.8
		50	NP	<del>26.3</del> NP	<del>26.3</del> NP	18.8	16.0
		10	NP	<del>7.3</del> NP	<del>7.3</del> NP	5.3	4.5
		20	NP	<del>14.5</del> NP	<del>14.5</del> NP	10.5	9.0
		30	NP	<del>21.8</del> NP	<del>21.8</del> NP	15.8	13.4
		40	NP	<del>29.0</del> NP	<del>29.0</del> NP	21.0	17.9
		50	NP	<del>36.3</del> NP	<del>36.3</del> NP	26.3	22.3

(continued)



**TABLE R602.10.3(3)—continued**  
**BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY**

<ul style="list-style-type: none"> <li>• SOIL CLASS D<sup>a</sup></li> <li>• WALL HEIGHT = 10 FEET</li> <li>• 10 PSF FLOOR DEAD LOAD</li> <li>• 15 PSF ROOF/CEILING DEAD LOAD</li> <li>• BRACED WALL LINE SPACING ≤ 25 FEET</li> </ul>			MINIMUM TOTAL LENGTH (FEET) OF BRACED WALL PANELS REQUIRED ALONG EACH BRACED WALL LINE <sup>b</sup>					
Seismic Design Category	Story Location	Braced Wall Line Length (feet)	Method LIB <sup>c</sup>	Method GB <sup>d</sup>	Methods DWB, SFB, PBS, PCP, HPS, CS-SFB <sup>e</sup>	Method WSP	Methods CS-WSP, CS-G	
D <sub>1</sub>		10	NP	<del>3.0</del> 6.0	<del>3.0</del> 6.0	2.0	1.7	
		20	NP	<del>6.0</del> 12.0	<del>6.0</del> 12.0	4.0	3.4	
		30	NP	<del>9.0</del> 18.0	<del>9.0</del> 18.0	6.0	5.1	
		40	NP	<del>12.0</del> 24.0	<del>12.0</del> 24.0	8.0	6.8	
		50	NP	<del>15.0</del> 30.0	<del>15.0</del> 30.0	10.0	8.5	
		10	NP	<del>6.0</del> NP	<del>6.0</del> NP	4.5	3.8	
		20	NP	<del>12.0</del> NP	<del>12.0</del> NP	9.0	7.7	
		30	NP	<del>18.0</del> NP	<del>18.0</del> NP	13.5	11.5	
		40	NP	<del>24.0</del> NP	<del>24.0</del> NP	18.0	15.3	
		50	NP	<del>30.0</del> NP	<del>30.0</del> NP	22.5	19.1	
		10	NP	<del>8.5</del> NP	<del>8.5</del> NP	6.0	5.1	
		20	NP	<del>17.0</del> NP	<del>17.0</del> NP	12.0	10.2	
		30	NP	<del>25.5</del> NP	<del>25.5</del> NP	18.0	15.3	
		40	NP	<del>34.0</del> NP	<del>34.0</del> NP	24.0	20.4	
		50	NP	<del>42.5</del> NP	<del>42.5</del> NP	30.0	25.5	
D <sub>2</sub>		10	NP	<del>4.0</del> 8.0	<del>4.0</del> 8.0	2.5	2.1	
		20	NP	<del>8.0</del> 16.0	<del>8.0</del> 16.0	5.0	4.3	
		30	NP	<del>12.0</del> 24.0	<del>12.0</del> 24.0	7.5	6.4	
		40	NP	<del>16.0</del> 32.0	<del>16.0</del> 32.0	10.0	8.5	
		50	NP	<del>20.0</del> 40.0	<del>20.0</del> 40.0	12.5	10.6	
		10	NP	<del>7.5</del> NP	<del>7.5</del> NP	5.5	4.7	
		20	NP	<del>15.0</del> NP	<del>15.0</del> NP	11.0	9.4	
		30	NP	<del>22.5</del> NP	<del>22.5</del> NP	16.5	14.0	
		40	NP	<del>30.0</del> NP	<del>30.0</del> NP	22.0	18.7	
		50	NP	<del>37.5</del> NP	<del>37.5</del> NP	27.5	23.4	
		10	NP	NP	NP	NP	NP	NP
		20	NP	NP	NP	NP	NP	NP
		30	NP	NP	NP	NP	NP	NP
		40	NP	NP	NP	NP	NP	NP
		50	NP	NP	NP	NP	NP	NP
	Cripple wall below one- or two-story dwelling	10	NP	NP	NP	NP	7.5	6.4
		20	NP	NP	NP	NP	15.0	12.8
		30	NP	NP	NP	NP	22.5	19.1
		40	NP	NP	NP	NP	30.0	25.5
		50	NP	NP	NP	NP	37.5	31.9

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

- a. Linear interpolation shall be permitted.
- b. Wall bracing lengths are based on a soil site class "D." Interpolation of bracing length between the  $S_{ds}$  values associated with the Seismic Design Categories shall be permitted when a site-specific  $S_{ds}$  value is determined in accordance with Section 1613.3 of the *International Building Code*.
- c. Method LIB shall have gypsum board fastened to at least one side with nails or screws per Table R602.3(1) for exterior sheathing or Table R702.3.5 for interior gypsum board. Spacing of fasteners at panel edges shall not exceed 8 inches.
- d. Method CS-SFB applies in SDC C only.
- e. Methods GB and PCP braced wall panel h/w ratio shall not exceed 1:1 in SDC D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub>. Methods DWB, SFB, PBS, and HPS are not permitted in SDC D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub>.

SECTION 39. Table R602.10.4 is hereby amended to read as follows:







**TABLE R602.10.4  
BRACING METHODS**

**TABLE R602.10.4  
BRACING METHODS <sup>1</sup>**

METHODS, MATERIAL	MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA*			
			Fasteners	Spacing		
Intermittent Bracing Method	<b>LIB</b> Let-in-bracing	1 x 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	
	<b>DWB</b> 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	
	<b>WSP</b> Wood structural panel (See Section R604)	3/8" or 15/32"		8d common (2 1/2" x 0.131) nails 3/8" edge distance to panel edge 8d common (2 1/2" x 0.131) nails 3/8" edge distance to panel edge	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 - 6" edges 12" field
	<b>BV-WSP</b> 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	
	<b>SFB</b> 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	
	<b>GB</b> 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	
	<b>PBS</b> 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	
	<b>PCP</b> 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 <sup>a</sup>	6" o.c. on all framing members	
	<b>HPS</b> 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	
	<b>ABW</b> 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<sup>1</sup>**

METHODS, MATERIAL		MINIMUM THICKNESS	FIGURE	CONNECTION CRITERIA <sup>a</sup>	
				Fasteners	Spacing
Intermittent Bracing Methods	<b>PFH</b> Portal frame with hold-downs	$\frac{3}{8}$ "		See Section R602.10.6.2	See Section R602.10.6.2
	<b>PFG</b> Portal frame at garage	$\frac{7}{16}$ "		See Section R602.10.6.3	See Section R602.10.6.3
Continuous Sheathing Methods	<b>CS-WSP</b> Continuously sheathed wood structural panel	$\frac{3}{8}$ " 15/32"	 8d common (2 1/2"x0.131") nails 3/8" edge distance to panel edge	Exterior sheathing per Table R602.3(3)	6" edges 12" field
	<b>CS-G<sup>1,c</sup></b> Continuously sheathed wood structural panel adjacent to garage openings	$\frac{3}{8}$ " 15/32"	 8d common (2 1/2"x0.131") nails 3/8" edge distance to panel edge	Interior sheathing per Table R602.3(1) or R602.3(2)	Varies by fastener— 6" edges 12" field
	<b>CS-PF</b> Continuously sheathed portal frame	$\frac{7}{16}$ " 15/32"		See Method CS-WSP	See Method CS-WSP
	<b>CS-SFB<sup>4</sup></b> Continuously sheathed structural fiberboard	$\frac{1}{2}$ " or $\frac{25}{32}$ " for maximum 16" stud spacing		See Section R602.10.6.4	See Section R602.10.6.4
				$1\frac{1}{2}$ " long $\times$ 0.12" dia. (for $\frac{3}{8}$ " thick sheathing) $1\frac{3}{4}$ " long $\times$ 0.12" dia. (for $\frac{5}{32}$ " 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 = 305 mm, 1 degree = 0.0175 rad, 1 pound per square foot = 47.8 N/m<sup>2</sup>, 1 mile per hour = 0.447 m/s.

- Adhesive attachment of wall sheathing, including Method GB, shall not be permitted in Seismic Design Categories C, D<sub>0</sub>, D<sub>1</sub>, and D<sub>2</sub>.
- Applies to panels next to garage door opening when supporting gable end wall or roof load only. May only be used on one wall of the garage. In Seismic Design Categories D<sub>0</sub>, D<sub>1</sub>, and D<sub>2</sub> roof covering dead load may not exceed 3 psf.
- 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.
- Method CS-SFB does not apply in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub>, and D<sub>2</sub> and in areas where the wind speed exceeds 100 mph.
- Method applies to detached one- and two-family dwellings in Seismic Design Categories D<sub>0</sub> through D<sub>2</sub> only.
- Methods GB and PCP braced wall panel h/w ratio shall not exceed 1:1 in SDC D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub>. Methods LIB, D/WB, SFB, PBS, HPS, and PFG are not permitted in SDC D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub>.
- Use of staples in braced wall panels shall be prohibited in SDC D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub>.

**SECTION 40.** Table R602.10.5 is hereby amended to read as follows:

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

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

METHOD (See Table R602.10.4)		MINIMUM LENGTH <sup>a</sup> (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 <sup>b</sup>
GB		48	48	48	53	58	Double sided = Actual Single sided = 0.5 × Actual
LIB		55	62	69	NP	NP	Actual <sup>b</sup>
ABW	SDC A, B and C, wind speed < 110 mph	28	32	34	38	42	48
	SDC D <sub>o</sub> , D <sub>1</sub> and D <sub>2</sub> , wind speed < 110 mph	32	32	34	NP	NP	
PFH	Supporting roof only	16-24	16-24	16-24	18-24 <sup>e</sup>	20-24 <sup>e</sup>	48
	Supporting one story and roof	24	24	24	27 <sup>c</sup>	29 <sup>c</sup>	48
PFG		24	27	30	33 <sup>d</sup>	36 <sup>d</sup>	1.5 × Actual <sup>b</sup>
CS-G		24	27	30	33	36	Actual <sup>b</sup>
CS-PF		16-24	18-24	20-24	22-24 <sup>e</sup>	24 <sup>e</sup>	Actual <sup>b</sup>
CS-WSP, CS-SFB	Adjacent clear opening height (inches)						Actual <sup>b</sup>
	≤ 64	24	27	30	33	36	
	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 when it is greater than or equal to the minimum length.

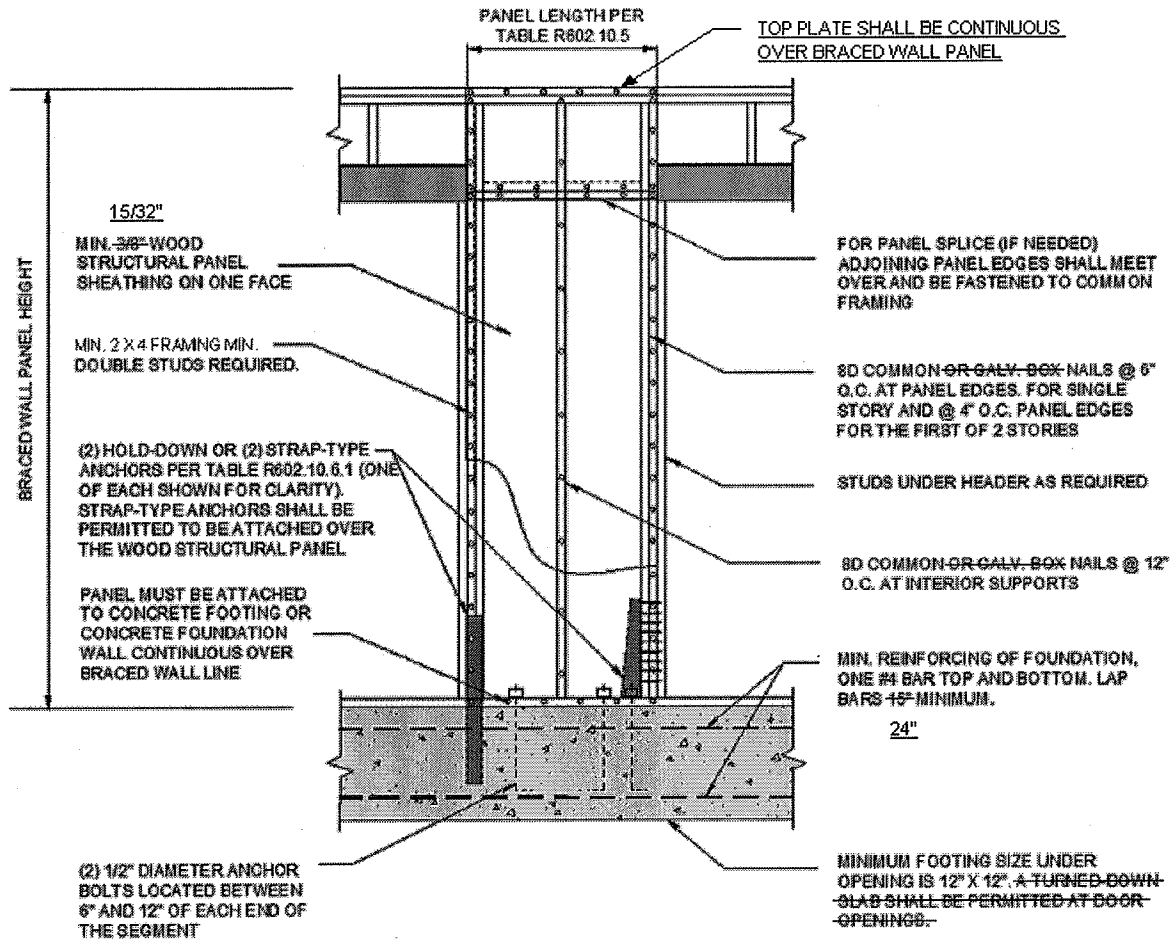
c. Maximum header height for PFH is 10 feet in accordance with Figure R602.10.6.2, but wall height may be increased to 12 feet with pony wall.

d. Maximum opening height for PFG is 10 feet in accordance with Figure R602.10.6.3, but wall height may 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 may be increased to 12 feet with pony wall.

**SECTION 41.**

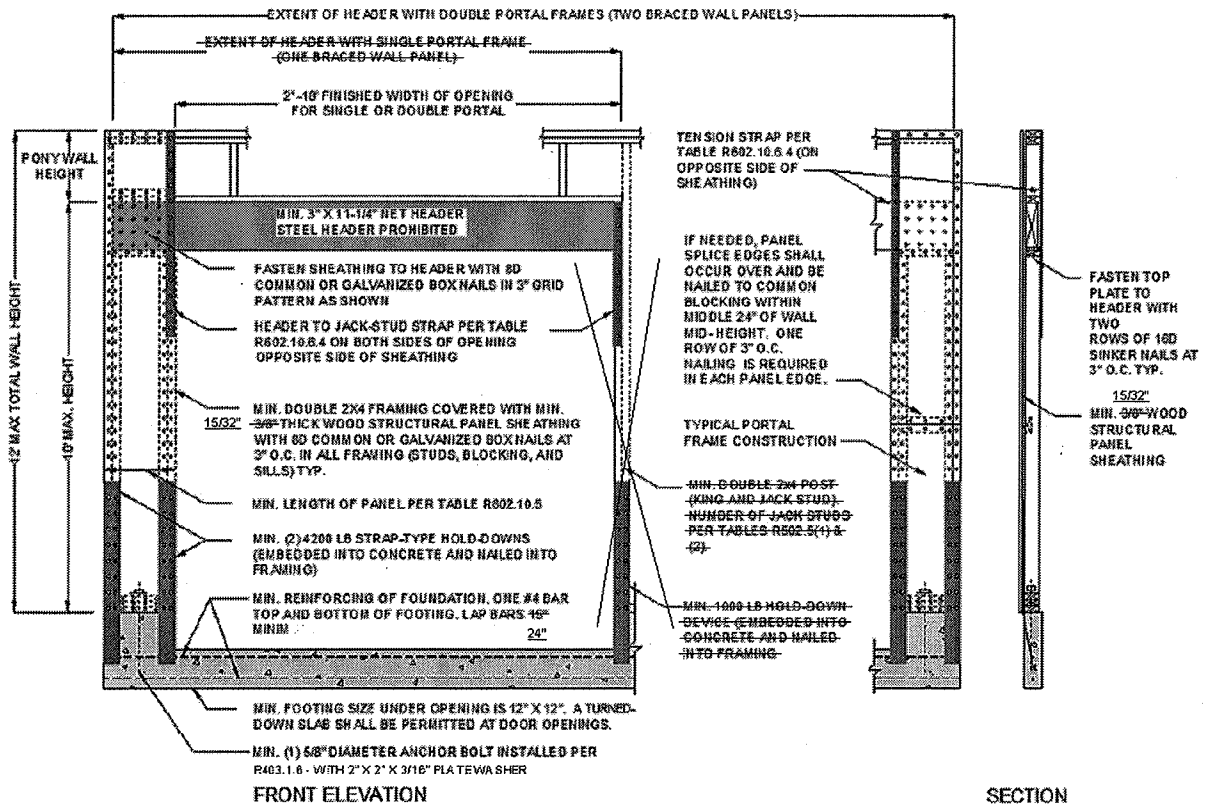
Figure R602.10.6.1 is amended to read as follows:



**FIGURE R602.10.6.1  
METHOD ABW—ALTERNATE BRACED WALL PANEL**

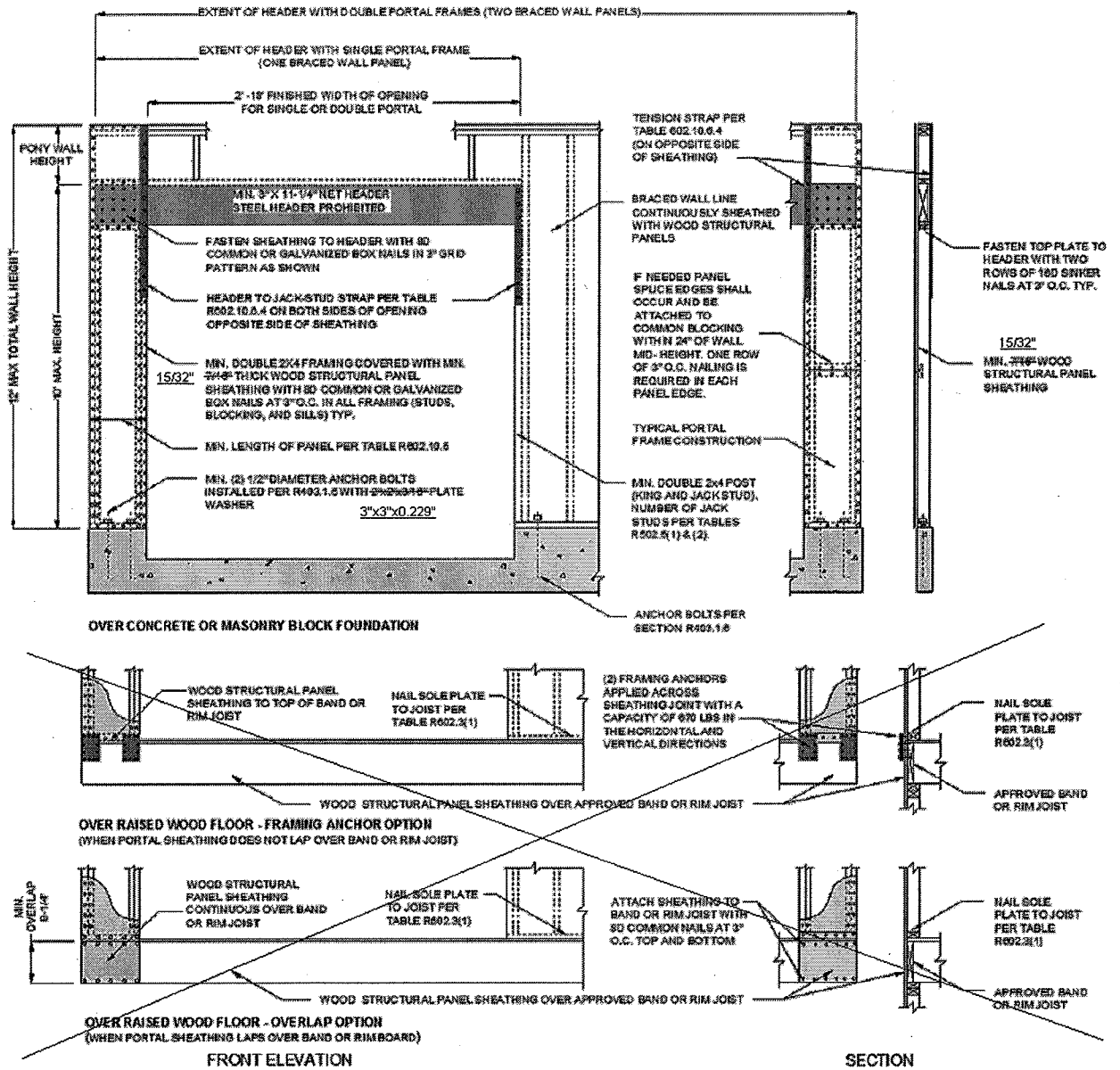
**SECTION 42.**

Figure R602.10.6.2 is hereby amended to read as follows:



**FIGURE R602.10.6.2**  
**METHOD PFH—PORTAL FRAME WITH HOLD-DOWNS**  
**AT DETACHED GARAGE DOOR OPENINGS**

**SECTION 43.** Figure R602.10.6.4 is hereby amended to read as follows:



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

SECTION 44. Section R602.10.9.1 is hereby deleted in its entirety.

R602.10.9.1 — Braced wall panel support for Seismic Design Category

D<sub>2</sub>

~~In one-story buildings located in Seismic Design Category D<sub>2</sub>, braced wall panels shall be supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm). In two-story buildings located in Seismic Design Category D<sub>2</sub>, all braced wall panels shall be supported on continuous foundations.~~

~~**Exception:** Two-story buildings shall be permitted to have interior braced wall panels supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that:~~

- ~~1. The height of cripple walls does not exceed 4 feet (1219 mm).~~
- ~~2. First floor braced wall panels are supported on doubled floor joists, continuous blocking or floor beams.~~
- ~~3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall line.~~

**SECTION 45.** Section R606.2.4 is hereby amended to read as follows:

**R606.2.4 Parapet walls.**

Unreinforced solid masonry parapet walls shall not be less than 8 inches (203 mm) thick and their height shall not exceed four times their thickness. Unreinforced hollow unit masonry parapet walls shall be not less than 8 inches (203 mm) thick, and their height shall not exceed three times their thickness. Masonry parapet walls in areas subject to wind loads of 30 pounds per square foot (1.44 kPa) or located in Seismic Design Category D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub>, or on townhouses in Seismic Design Category C shall be reinforced in accordance with Section R606.12.



**SECTION 46.** Section R606.12.2.2.3 is hereby amended to read as follows:

**R606.12.2.2.3 Reinforcement requirements for masonry elements.**

Masonry elements listed in Section R606.12.2.2.2 shall be reinforced in either the horizontal or vertical direction as shown in Figure ~~R606.11(2)~~R606.11(3) and in accordance with the following:

1. Horizontal reinforcement. Horizontal joint reinforcement shall consist of ~~at least two longitudinal W1.7 wires spaced not more than 16 inches (406 mm) for walls greater than 4 inches (102 mm) in width and at least one longitudinal W1.7 wire spaced not more than 16 inches (406 mm) for walls not exceeding 4 inches (102 mm) in width; or at least one No. 4 bar spaced not more than 48 inches (1219 mm). Where two longitudinal wires of joint reinforcement are used, the space between these wires shall be the widest that the mortar joint will accommodate.~~ Horizontal reinforcement shall be provided within 16 inches (406 mm) of the top and bottom of these masonry elements.

2. Vertical reinforcement. Vertical reinforcement shall consist of at least one No. 4 bar spaced not more than 48 inches (1219 mm). Vertical reinforcement shall be within ~~16~~8 inches (~~406~~203 mm) of the ends of masonry walls.

**SECTION 47.** Section R803.2.4 is hereby added to read as follows:

**R803.2.4 Openings in horizontal diaphragms.**

Openings in horizontal diaphragms shall conform with Section R503.2.4.

**SECTION 48.** Section R1001.3.1 is hereby amended to read as follows:

**R1001.3.1 Vertical reinforcing.**

For chimneys up to 40 inches (1016 mm) wide, four No. 4 continuous vertical bars adequately anchored into the concrete foundation shall be placed between wythes of solid masonry or within the cells of hollow unit masonry and grouted in accordance with Section R609. Grout shall be prevented from bonding with the flue liner so that the flue liner is free to move with thermal expansion. For chimneys more than 40 inches (1016 mm) wide, two additional No. 4 vertical bars adequately anchored into the concrete foundation shall be provided for each additional flue incorporated into the chimney or for each additional 40 inches (1016 mm) in width or fraction thereof.

**SECTION 49.** The provisions of this ordinance contain various changes, modifications, and additions to the 2013 Edition of the California Residential Code. Some of these changes are administrative in nature in that they do not constitute changes or modifications to requirements contained in the building standards published in the California Building Standards Code.

Pursuant to California Health and Safety Code sections 17958.5, 17958.7, and 18941.5, the Board of Supervisors hereby expressly finds that all of the changes and modifications to requirements contained in the building standards published in the California Building Standards Code contained in this ordinance, which are not administrative in nature, are reasonably necessary because of local climatic, geological, or topographical conditions in the County of Los Angeles as more particularly described in the table set forth below.

Code Section	Condition	Explanation of Amendment
R301.1.3.2	Geological	<p>Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. After the 1994 Northridge Earthquake, the Wood Frame Construction Joint Task Force recommended that the quality of wood frame construction needs to be greatly improved. One such recommendation identified by the Task Force is to improve the quality and organization of structural plans prepared by the engineer or architect so that plan examiners, building inspectors, contractors, and special inspectors may logically follow and construct the presentation of the seismic force-resisting systems in the construction documents. For buildings or structures located in Seismic Design Category D<sub>0</sub>, D<sub>1</sub>, D<sub>2</sub>, or E that are subject to a greater level of seismic forces, the requirement to have a California licensed architect or engineer prepare the construction documents is intended to minimize or reduce structural deficiencies that may cause excessive damage or injuries in wood frame buildings. Structural deficiencies such as plan and vertical irregularities, improper shear transfer of the seismic force-resisting system, missed details or connections important to the structural system, and the improper application of the prescriptive requirements of the California Residential Code can be readily addressed by a registered design professional.</p>
R301.1.4	Geological Topographical	<p>This technical amendment is for buildings constructed on hillsides. Due to the local topographical and geological conditions of the sites within the greater Los Angeles region and their susceptibility to earthquakes, this amendment is required to address and clarify special needs for buildings constructed on hillside locations. A joint Structural Engineers Association of Southern California (SEAOSC) and Los Angeles City Joint Task Force investigated the performance of hillside building failures after the Northridge earthquake. Numerous hillside failures resulted in loss of life and millions of dollars in damage. These criteria were developed to minimize the damage to these structures and have been in use by the City and County of Los Angeles for several years.</p>
R301.2.2.2.5	Geological	<p>Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. Due to the high geologic activities in the Southern</p>

Code Section	Condition	Explanation of Amendment
		California area and the expected higher level of performance on buildings and structures, this local amendment limits the type of irregular conditions as specified in the 2013 California Residential Code. Such limitations are recommended to reduce structural damages in the event of an earthquake. The cities and County of the Los Angeles region have taken extra measures to maintain the structural integrity of the framing of the shear walls and all associated elements when designed for high levels of seismic loads.
R301.2.2.3.8	Geological	Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. Due to the high geologic activities in the Southern California area and the expected higher level of performance on buildings and structures, this local amendment limits the potential anchorage and supporting frame failure resulting from additional weight. There is no limitation for weight of mechanical and plumbing fixtures and equipment in the International Residential Code. Requirements from ASCE 7 and the International Building Code would permit equipment weighing up to 400 lbs. when mounted at 4 feet or less above the floor or attic level without engineering design. Where equipment exceeds this requirement, it is the intent of this proposed amendment that a registered design professional be required to analyze if the floor support is adequate and structurally sound.
Table R302.1(2)	Climatic	This amendment will not allow unprotected openings (openings that do not resist the spread of fire) to be in the exterior wall of a residential building that is located on a property line. This amendment is necessary due to local climatic conditions. During the hot, dry weather conditions of late summer in combination with the Santa Ana winds creates an extreme fire danger. Residential buildings with unprotected openings located on a property line will allow the spread of fire from the inside of the building to adjacent properties and likewise from exterior properties to the interior of the building.
R327.1.1	Climatic	Clarifies the application of Chapter R327 to include additions, alterations, and/or relocated buildings. Many areas of the County have been designated as Fire Hazard Severity Zones due to low humidity, strong winds, and dry

Code Section	Condition	Explanation of Amendment
		vegetation. Additions, alterations, and/or relocated buildings have the same fire risk as new buildings.
R327.1.3	Climatic	Clarifies the application of Chapter R327 to include additions, alterations, and/or relocated buildings. Many areas of the County have been designated as Fire Hazard Severity Zones due to the increased risk of fire caused by low humidity, strong winds, and dry vegetation. Additions, alterations, and/or relocated buildings have the same fire risk as new buildings.
R327.1.3.1	Climatic	Clarifies the application of Chapter R327 to include additions, alterations, and/or relocated buildings. Many areas of the County have been designated as Fire Hazard Severity Zones due to the increased risk of fire caused by low humidity, strong winds, and dry vegetation. Additions, alterations, and/or relocated buildings have the same fire risk as new buildings.
R327.3.5.2	Climatic	Disallows the use of wood-shingle/wood-shake roofs due to the increased risk of fire in the County caused by low humidity, strong winds, and dry vegetation.
R327.3.5.2.2	Climatic	Disallows the use of wood-shingle/wood-shake roofs due to the increased risk of fire in the County caused by low humidity, strong winds, and dry vegetation.
R327.4.3	Climatic	Disallows the use of wood-shingle/wood-shake roofs due to the increased risk of fire in the County caused by low humidity, strong winds, and dry vegetation in High Fire Severity Zones.
R327.5.2	Climatic	Disallows the use of wood-shingle/wood-shake roofs and requires the use of Class A roof covering due to the increased risk of fire in the County caused by low humidity, strong winds, and dry vegetation in High Fire Severity Zones.
R401.1	Geological	Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. Wood foundations, even those that are preservative-treated, encounter a higher risk of deterioration when contacting the adjacent ground. The required seismic anchorage and transfer of lateral forces into the foundation system necessary for 2-story structures and foundation walls could become compromised at varying states of wood decay. In addition, global structure overturning moment and sliding resistance is reduced when utilizing

Code Section	Condition	Explanation of Amendment
		wood foundations as opposed to conventional concrete or masonry systems. However, non-occupied, single-story storage structures pose significantly less risk to human safety and should be able to utilize the wood foundation guidelines specified in this Chapter.
R403.1.2 R403.1.3 R403.1.5 Figure R403.1.5	Climatic Geological	Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. These proposed amendments require minimum reinforcement in continuous footings and stepped footings to address the problem of poor performance of plain or under-reinforced footings during a seismic event. These amendments reflect the recommendations by SEAOSC and the Los Angeles City Joint Task Force that investigated the poor performance observed in the 1994 Northridge Earthquake. These proposed amendments are a continuation of an amendment adopted during previous code adoption cycles. Interior walls can easily be called upon to resist over half of the seismic loading imposed on simple buildings or structures. Without a continuous foundation to support the braced wall line, seismic loads would be transferred through other elements such as non-structural concrete slab floors, wood floors, etc. Requiring interior braced walls be supported by continuous foundations is intended to reduce or eliminate the poor performance of buildings or structures.
R404.2	Climatic Geological	No substantiating data has been provided to show that wood foundations are effective in supporting structures and buildings during a seismic event while being subject to deterioration caused by presence of water in the soil as well as other materials detrimental to wood foundations. Wood foundations, when they are not properly treated and protected against deterioration, have performed very poorly and have led to slope failures. Most contractors are typically accustomed to construction in dry weather in the Southern California region and are not generally familiar with the necessary precautions and treatment of wood that makes it suitable for both seismic events and wet applications. With the higher seismic demand placed on buildings and structures in this region, coupled with the dryer weather conditions here as oppose to the northern and eastern part of the country, it is the intent of this proposal to take the necessary precautionary steps to

Code Section	Condition	Explanation of Amendment
		reduce or eliminate potential problems that may result from the use of wood footings and foundations that does not take into consideration the conditions of this surrounding environment.
R501.1	Geological	Due to the high geologic activities in the Southern California area and the expected higher level of performance on buildings and structures, this local amendment limits the potential anchorage and supporting frame failure resulting from additional weight. There is no limitation for weight of mechanical and plumbing fixtures and equipment in the International Residential Code. Requirements from ASCE 7 and the International Building Code would permit equipment weighing up to 400 lbs. when mounted at 4 feet or less above the floor or attic level without engineering design. Where equipment exceeds this requirement, it is the intent of this proposed amendment that a registered design professional be required to analyze if the floor support is adequate and structurally sound.
R503.2.4	Geological	Section R502.10 of the Code does not provide any prescriptive criteria to limit the maximum floor opening size nor does Section R503 provide any details to address the issue of shear transfer near larger floor openings. With the higher seismic demand placed on buildings and structures in this region, it is important to ensure that a complete load path is provided to reduce or eliminate potential damages caused by seismic forces. Requiring blocking with metal ties around larger floor openings and limiting opening size is consistent with the requirements of Section R301.2.2.2.5.
R602.3.2	Geological	Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. The cities and County of the Los Angeles region have taken extra measures to maintain the structural integrity of the framing of the shear walls when designed for high levels of seismic loads by eliminating single top plate construction. The performance of modern day braced wall panel construction is directly related to an adequate load path extending from the roof diaphragm to the foundation system. This proposed amendment is a continuation of an amendment adopted during the previous code adoption cycle.

Code Section	Condition	Explanation of Amendment
Table R602.3(1)	Geological	<p>Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. In September 2007, limited cyclic testing data was provided to the ICC Los Angeles Chapter Structural Code Committee showing that stapled wood structural shear panels do not exhibit the same behavior as the nailed wood structural shear panels. As a matter of fact, the test results of the stapled wood structural shear panels appeared much lower in strength and drift than the nailed wood structural shear panel test results. Therefore, the use of staples as fasteners for shear walls sheathed with other materials shall not be permitted without being substantiated by cyclic testing. This proposed amendment is a continuation of an amendment adopted during the previous Code adoption cycle.</p>
Table R602.3(2)	Geological	<p>Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. In September 2007, limited cyclic testing data was provided to the ICC Los Angeles Chapter Structural Code Committee showing that stapled wood structural shear panels do not exhibit the same behavior as the nailed wood structural shear panels. As a matter of fact, the test results of the stapled wood structural shear panels appeared much lower in strength and drift than the nailed wood structural shear panel test results. Therefore, the use of staples as fasteners for shear walls sheathed with other materials shall not be permitted without being substantiated by cyclic testing. This proposed amendment is a continuation of an amendment adopted during the previous Code adoption cycle.</p>
Table R602.10.3(3)	Geological	<p>Due to the high geologic activities in the Southern California area and the expected higher level of performance on buildings and structures, this local amendment continues to reduce/eliminate the allowable shear values for shear walls sheathed with lath, plaster or gypsum board. The poor performance of such shear walls sheathed with other materials in the 1994 Northridge Earthquake was investigated by SEAOSC and the Los Angeles City Joint Task Force. The cities and County of the Los Angeles region have taken extra measures to maintain the structural integrity of the framing of the shear walls when designed for high levels of seismic loads.</p>



Code Section	Condition	Explanation of Amendment
Table R602.10.4	Geological	3/8" thick 3 ply-plywood shear walls experienced many failures during the Northridge Earthquake. This proposed amendment specifies minimum WSP sheathing thickness and nail size and spacing so as to provide a uniform standard of construction for designers and buildings to follow. This is intended to improve the performance level of buildings and structures that are subject to the higher seismic demands placed on buildings or structure in this region. This proposed amendment reflects the recommendations by SEAOSC and the Los Angeles City Joint Task Force that investigated the poor performance observed in 1994 Northridge Earthquake. In September 2007, cyclic testing data was provided to the structural code committee showing that stapled wood structural shear panels do not exhibit the same behavior as the nailed wood structural shear panels. In addition, the test results of the stapled wood structural shear panels appeared much lower in strength and drift than the nailed wood structural shear panel test results. This proposed amendment is a continuation of an amendment adopted during the previous Code adoption cycle.
Table R602.10.5	Geological	Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. The poor performance of such shear walls sheathed in the 1994 Northridge Earthquake was investigated by SEAOSC and the Los Angeles City Joint Task Force. The cities and County of the Los Angeles region have taken extra measures to maintain the structural integrity with respect to the "maximum shear wall aspect ratios" of the framing of the shear walls when designed for high levels of seismic loads. This proposed amendment is consistent with the shear wall aspect ratio provision of Section 4.3.4 of AF&PA SDPWS-2008.
Figure R602.10.6.1	Geological	3/8" thick 3 ply-plywood shear walls experienced many failures during the Northridge Earthquake. The poor performance of such shear walls sheathed in the 1994 Northridge Earthquake was investigated by SEAOSC and the Los Angeles City Joint Task Force. Box nails were observed to cause massive and multiple failures of the typical 3/8" thick 3 ply-plywood during the Northridge Earthquake. The cities and County of the Los Angeles region have taken extra measures to maintain the

Code Section	Condition	Explanation of Amendment
		structural integrity of the framing of the shear walls when designed for high levels of seismic loads. The performance of modern day braced wall panel construction is directly related to an adequate load path extending from the roof diaphragm to the foundation system. This proposed amendment continues amendments adopted during the previous Code cycles for the California Building Code.
Figure R602.10.6.2	Geological	3/8" thick 3 ply-plywood shear walls experienced many failures during the Northridge Earthquake. The poor performance of such shear walls sheathed in the 1994 Northridge Earthquake was investigated by SEAOSC and the Los Angeles City Joint Task Force. The cities and County of the Los Angeles region have taken extra measures to maintain the structural integrity of the framing of the shear walls when designed for high levels of seismic loads. Box nails were observed to cause massive and multiple failures of the typical 3/8-inch thick plywood during the Northridge Earthquake. The proposal to change the minimum lap splice requirement is consistent with Section 12.16.1 of ACI 318-11. This proposed amendment is a continuation of an amendment adopted during the previous Code adoption cycles.
Figure R602.10.6.4	Geological	3/8" thick 3 ply-plywood shear walls experienced many failures during the Northridge Earthquake. The poor performance of such shear walls sheathed in the 1994 Northridge Earthquake was investigated by SEAOSC and the Los Angeles City Joint Task Force. The cities and County of the Los Angeles region have taken extra measures to maintain the structural integrity of the framing of the shear walls when designed for high levels of seismic loads. The proposal in which "washers shall be a minimum of 0.229 inch by 3 inches by 3 inches in size" is consistent with Section R602.11.1 of the California Residential Code and Section 2308.12.8 of the California Building Code. This proposed amendment is a continuation of an amendment adopted during the previous code adoption cycle.
R602.10.9.1	Geological	Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. The performance of modern day braced wall panel

Code Section	Condition	Explanation of Amendment
		construction is directly related to an adequate load path extending from the roof diaphragm to the foundation system. Interior braced wall panels, therefore, are also directly dependent upon the adequacy of the foundation system. In addition, the proposed amendment for Section R403.1.2 specifies that all exterior walls and required interior braced wall panels in buildings shall be supported with continuous footings.
R606.2.4	Geological	Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. The addition of the word "or" will prevent the use of unreinforced parapets in Seismic Design Category D <sub>0</sub> , D <sub>1</sub> or D <sub>2</sub> , or on townhouses in Seismic Design Category C.
R606.12.2.2.3	Geological	Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. Reinforcement using longitudinal wires for buildings and structures located in high seismic areas are not as ductile as deformed rebar. Having vertical reinforcement closer to the ends of masonry walls help to improve the seismic performance of masonry buildings and structures.
R803.2.4	Geological	Section R802 of the Code does not provide any prescriptive criteria to limit the maximum size of roof openings, nor does Section R803 provide any details to address the issue of shear transfer near larger roof openings. With the higher seismic demand placed on buildings and structures in this region, it is important to ensure that a complete load path is provided to reduce or eliminate potential damage caused by seismic forces. Requiring blocking with metal ties around larger roof openings and limiting the size of openings is consistent with the requirements of Section R301.2.2.5.
R1001.3.1	Geological	Los Angeles County is prone to seismic activity due to the existence of active faults in the Southern California area. The performance of fireplaces/chimneys without anchorage to the foundation has been observed to be inadequate during major earthquakes. The lack of anchorage to the foundation results in overturn or displacement.

**SECTION 49.** This ordinance shall become operative on January 1, 2014.

[TITLE302013CSCC]