

• 2008 • City of • Los Angeles • Building • Code

• Volume 2

• Based on the 2007 CBC and 2006 IBC®



2008 City of Los Angeles Building Code — Volume 2
(Based on the 2007 CBC and the 2006 IBC)

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REVISION RECORD FOR THE CITY OF LOS ANGELES

Effective Date January, 2008

By starting with a loose-leaf copy of the 2007 *California Building Code*, Volume 2, and substituting the Los Angeles pages (yellow), the user will have a complete 2008 *City of Los Angeles Building Code*, Volume 2, in correct numerical sequence. It is suggested that original 2007 CBC pages that have been removed and replaced by Los Angeles pages be retained in a separate file for possible future reference.

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CITY OF LOS ANGELES

DEPARTMENT OF BUILDING AND SAFETY

Published Codes:

2008 Edition of the City of Los Angeles Building Code, Volumes 1 and 2
2008 Edition of the City of Los Angeles Electrical Code
2008 Edition of the City of Los Angeles Plumbing Code
2008 Edition of the City of Los Angeles Mechanical Code

Related Codes and Standards:

City of Los Angeles Municipal Code
City of Los Angeles Planning and Zoning Code
California Building Standards Code, Parts 7, 8, and 10



CITY OF LOS ANGELES DEPARTMENT OF BUILDING AND SAFETY

The mission of the Department of Building and Safety is to protect the lives and safety of the residents and visitors of the City of Los Angeles, preserve the City's quality of life, and contribute to the City's economic development. This is accomplished through implementation of the Zoning, Building, Plumbing, Mechanical, and Electrical Codes, as well as, the State Energy and Disabled Access regulations, and State and local laws for construction and maintenance of commercial, industrial and residential buildings.

The Department of Building and Safety is the largest organization of its kind in the United States with a dedicated staff of more than 870 employees. The Department provides service to a population of more than 3.8 million people in a metropolitan area of more than 470 square miles with its 16 offices located throughout the City.

AWARDS AND COMMENDATIONS:

The recent innovations and improvements in the City of Los Angeles Department of Building and Safety have been recognized and acknowledged by a number of local, state and national organizations. Some of these recent awards and commendations are:

Building Department of the Year: The Department was named "The 1999 Building Department of the Year" by the California Building Officials (CALBO) in March 1999. The Department was recognized for demonstrating excellence and achieving success in innovation, community service, education, code development and customer service.

Innovations In American Government Award: In May 2002, the Department was awarded the prestigious "Innovations In American Government Award" from Harvard University's John F. Kennedy School of Government for its use of technology and performance measurements to increase productivity and customer service in a large governmental organization.

Grand Prize for Productivity and Quality: In September 1999, the Los Angeles County Quality and Productivity Commission awarded its "Grand Prize for Productivity and Quality" to the City of Los Angeles Department of Building and Safety and the County of Los Angeles Building Division for their tremendous innovation in creating and developing the Los Angeles Regional Uniform Code Program (LARUCP). This program creates regional uniformity and reduces the number of local technical amendments to model codes, including the Uniform Building Code, Uniform Plumbing Code, Uniform Mechanical Code and the National Electrical Code, as amended by the State of California, for adoption by jurisdictions in the greater Los Angeles region.

National Streamlining Achievement Award: The National Conference of States on Building Codes and Standards, Inc. (NCS/BCS) in April 1999 announced that City of Los Angeles was the 1999 recipient of the "Streamlining Achievement Award." The Department was recognized for its innovation in its Case Management Unit, which assists customers by guiding them through City's regulatory agencies, policies and procedures in a timely and efficient manner.

Building Official of the Year: In March 2000, Department General Manager, Andrew A. Adelman was presented with this award by California Building Officials, which represents all Building Officials in the State of California, for his extraordinary accomplishments in the City of Los Angeles and in helping others in the building code enforcement profession.

Los Angeles Downtown Breakfast Club's Rose Award: The Department received the Rose Award from the Downtown Breakfast Club in April of 1999 for its outstanding contribution to the enhancement of the City's business climate and economic development, which includes the Department's One Stop Construction Service Center and streamlining the development review process.

Local Government Official of the Year - West Region: This award was given to the Department of Building and Safety from the Building Industry Association in February 2000 in recognition of the improvement and innovations in development review and approval that have been implemented by the Department of Building and Safety.

The Westside Prize 2000 and Westside Prize 2002: In June 2000, the General Manager of the Department of Building and Safety, Andrew A. Adelman, received a "Special Award" from the Westside Urban Forum for the outstanding work in creating a new culture of customer service in the Department. Then, in June 2002, the City of Los Angeles Department of Building and Safety was recognized again by the Westside Urban Forum for the e-Permit project, which allows the Department of Building and Safety customers to apply for, pay for and receive express permits via the internet or a fax machine 24 hours a day, seven days a week.

Treasure of Central City Association: The Los Angeles Central City Association on January 2002 gave an award of “Treasure of Central City Association” to the Department of Building and Safety for outstanding contributions in community service and for promoting the health and vitality of the City of Los Angeles.

Public Service Award: In June 2000, the Department of Building and Safety was recognized by the Structural Engineers Association of Southern California for its efforts in reorganizing and improving the Department.

Leadership in Engineering for Revitalizing Key Municipal Services: This award was given to the Department in February 2000 based on the nominations from Consulting Engineers and Land Surveyors of California in recognition of the Department’s outstanding contributions to the advancement of the Engineering Profession.

Special Recognition Award: In October 2001, Andrew Adelman, General Manager of the Department of Building and Safety was given this award by the Los Angeles Area Chamber of Commerce and Construction Industry Awards Committee in honor of the outstanding contribution to local construction in the community.

Award for Dedicated Services to the Los Angeles Regional Uniform Code Program (LARUCP): In June 2003, the Department of Building and Safety was recognized by the Structural Engineers Association of Southern California for its efforts in participating with the Engineering Community of Los Angeles with the development of Structural and Seismic Design standards for the construction of buildings.

Growing With Our Cities and Communities Award: In October 2002, the Andrew Adelman, General Manager of the Department of Building and Safety, was given this award from the Asian-American Architects/ Engineers Association for significant achievement in the community.

City of Los Angeles Productivity Improvement Award: The Department has received 24 Productivity Improvement Awards from the City of Los Angeles Quality and Productivity Improvement Commission from 1997 to 2005. The 24 Productivity Improvement Awards are as follows: Building Permit Clearance Handbook, Internet Request for Inspection System, Code Enforcement Information System (CEIS), Inspection Bureau Performance Report, Van Nuys District Office One Stop Construction Services Center, Streamlining the Residential Property Report Process, Customer Call Center, e-Permits, Streamlining Over-the-Counter Building Permit Process, Q-Matic Customer Queuing System, Code Enforcement Bureau, Proactive Code Enforcement Program, Los Angeles Regional Uniform Code Program, LADBS Information Bulletins Program, Automated Inspection Request System, Centralized Request for Inspections, Vacant Building Abatement Program, Citywide Nuisance Abatement Program, Delivering Guaranteed & Responsive Customer Service, Case Management Unit, Appointment Plan Check, Automated Certificate of Occupancy System (ACOS), Fire Life Safety Testing Program, and Alternative Maritime Power (AMP) Program.

FUNCTIONS AND RESPONSIBILITIES OF THE DEPARTMENT

A Few Noteworthy Facts about the Department of Building and Safety:

- Provides services to Los Angeles City residents through 16 different offices located throughout the City
- Serves over 500,000 walk-in customers annually
- Responds to over 822,000 customer phone calls annually
- Issues over 139,000 permits with a total valuation of over \$5.3 billion annually
- Conducts over 900,000 inspections annually
- Issues over 16,900 trade licenses for 16 different occupations annually
- Provides information for over 80,000 addresses annually
- Responds to over 43,000 Code Enforcement service requests annually
- Brings back over 36,000 properties to compliance annually
- Abate over 640 nuisance and abandoned buildings annually
- Reviews and approves plans for over 50,000 projects annually

The Responsibilities of the Department of Building and Safety Are Assigned to Four Bureaus:

The Engineering Bureau is primarily responsible for the plan checking, report approval, and permit issuance related to building projects within privately owned property in the City of Los Angeles. In the course of carrying out these responsibilities, the Engineering Bureau enforces the structural, building, plumbing, mechanical, electrical, grading and zoning regulations of the City. In addition, the Engineering Bureau is responsible for reviewing applications for building, plumbing, mechanical and electrical product approvals through its Electrical and Mechanical Test Laboratories.

The Inspection Bureau is responsible for inspection of all construction activities for new and existing buildings, plumbing, mechanical, electrical, elevator and pressure vessel systems, the enforcement of applicable State and local laws relating to existing buildings and property, and the administration of various special programs mandated by the City Council.

The Code Enforcement Bureau was created as a part of a reorganization of code enforcement functions in 1999. This Bureau is responsible for the enforcement of Municipal Code requirements for all existing buildings in the City of Los Angeles, except rental multi-family dwellings. The Bureau handles complaints, citations, processing of vacant and nuisance buildings for repair or demolition, Signs, Vehicle Establishment Inspection Program and Proactive Code Enforcement Program among others.

The Resource Management Bureau is responsible for the direction and coordination of administrative and financial projects, systems development, training and acts as the emergency disaster coordinator for all Department operations.

The Board of Building and Safety Commissioners:

The Board of Building and Safety Commissioners is a five-member board of citizens residing in the City and appointed by the Mayor and confirmed by the City Council. The Commission has the authority to hear and act upon appeals from determinations, orders, or actions of the Department or the Superintendent of Building, pertaining to enforcement of the codes under the jurisdiction of the Department. In addition, the Commission conducts public hearings, as needed, regarding procedures, new codes and various functions of the Department. Finally, the Commission acts in an advisory capacity to the Department and the Superintendent of Building.

EFFECTIVE USE OF THE CITY OF LOS ANGELES BUILDING CODE

The *City of Los Angeles Building Code* was established in 1889 with the appointment of the first superintendent of building. In 1923, the first of 18 volumes of the Los Angeles Annual Builder's Guide was published. This guide is a handbook for architects and builders and contains a complete cross index of the Los Angeles building ordinances, electrical ordinances and supplementary rulings and the California State Housing Act.

After 1936, the building regulations of Chapter IX of the *Los Angeles Municipal Code* were established by the passage of Ordinance No. 77,000. But it was 1943 when Ordinance No. 87,000 amended in its entirety Article 1 of Chapter IX of the *Los Angeles Municipal Code* and a new *Los Angeles City Building Code* was published. This edition of the *Los Angeles Municipal Code* established the format of the different divisions and sections relevant to the building regulations in the city.

Through the intervening years, the code has been amended and revised regularly to keep pace with the ever-changing technology of the construction industry and new and proven concepts of structural design.

The State of California has mandated the City of Los Angeles to enforce the *California Building Code* (CBC). The City Council for the City of Los Angeles has passed Ordinance Number 179,324 (operative January 1, 2008) to amend Article 1 of Chapter IX of the *Los Angeles Municipal Code* and to adopt by reference the 2007 edition of the *California Building Code* (CBC) and hereinafter shall be called the 2008 edition of the *City of Los Angeles Building Code*.

Chapter 1 is the general administrative provisions of the City of Los Angeles and replaces Chapter 1 of the CBC.

Chapters 2 through 35 are the general provisions of the *California Building Code*.

Chapters 61 through 72 have been added to the code to provide special requirements of the City of Los Angeles.

Chapters 81 through 91 are the city code requirements of existing buildings and structures.

Chapters 92 through 96 are the city standard for voluntary earthquake hazard reduction standards for existing buildings.

At the end of Volume 2 of the Building Code, "Excerpts" has been added for additional reference to the industry. Excerpts are the accumulation of related Los Angeles City codes and municipal and administrative code sections pertaining to Department of Building and Safety.

Marginal Markings

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This symbol indicates that a City of Los Angeles amendment has been added to the 2007 *California Building Code*.

[For HCD 1] This italicized notation is used to identify which state agency has amended a section of the IBC.

For a complete listing of state agencies, refer to CBC Section 101.17 et seq.

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1609.1.1 Determination of wind loads. Wind loads on every building or structure shall be determined in accordance with Chapter 6 of ASCE 7. The type of opening protection required, the basic wind speed and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of SBCCI SSTD 10 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of the AF&PA WFCM.
3. Designs using NAAMM FP 1001.
4. Designs using TIA/EIA-222 for antenna-supporting structures and antennas.
5. [OSHPD 2] Exception in Section 1609.4 shall apply to ASCE 7.

1609.1.1.1 Applicability. The provisions of SSTD 10 are applicable only to buildings located within Exposure B or C as defined in Section 1609.4. The provisions of SBCCI SSTD 10 and the AF&PA WFCM shall not apply to buildings sited on the upper half of an isolated hill, ridge or escarpment meeting the following conditions:

1. The hill, ridge or escarpment is 60 feet (18 288 mm) or higher if located in Exposure B or 30 feet (9144 mm) or higher if located in Exposure C;
2. The maximum average slope of the hill exceeds 10 percent; and
3. The hill, ridge or escarpment is unobstructed upwind by other such topographic features for a distance from the high point of 50 times the height of the hill or 1 mile (1.61 km), whichever is greater.

1609.1.1.2 High wind velocity areas. The Superintendent of Building may designate certain areas of the City as "high wind velocity areas" when evidence or studies indicate that the wind velocity results in damage to structures conforming to the minimum requirements of this Code. The Superintendent of Building may specify additional requirements over and above those required by this Code with respect to the following:

1. Glazing of openings in exterior walls.
2. Anchorage of post and beam construction.
3. Cantilever overhangs.
4. Roofing and roof framing.

1609.1.2 Protection of openings. In wind-borne debris regions, glazing in buildings shall be impact-resistant or protected with an impact-resistant covering meeting the requirements of an approved impact-resisting standard or ASTM E 1996 and ASTM E 1886 referenced therein as follows:

1. Glazed openings located within 30 feet (9144 mm) of grade shall meet the requirements of the Large Missile Test of ASTM E 1996.
2. Glazed openings located more than 30 feet (9144 mm) above grade shall meet the provisions of the Small Missile Test of ASTM E 1996.

Exceptions:

1. Wood structural panels with a minimum thickness of $\frac{7}{16}$ inch (11.1 mm) and maximum panel span of 8 feet (2438 mm) shall be permitted for opening protection in one- and two-story buildings. Panels shall be precut so that they shall be attached to the framing surrounding the opening containing the product with the glazed opening. Panels shall be secured with the attachment hardware provided. Attachments shall be designed to resist the components and cladding loads determined in accordance with the provisions of ASCE 7. Attachment in accordance with Table 1609.1.2 is permitted for buildings with a mean roof height of 33 feet (10 058 mm) or less where wind speeds do not exceed 130 mph (57.2 m/s).
2. Glazing in Occupancy Category I buildings as defined in Section 1604.5, including greenhouses that are occupied for growing plants on a production or research basis, without public access shall be permitted to be unprotected.
3. Glazing in Occupancy Category II, III or IV buildings located over 60 feet (18 288 mm) above the ground and over 30 feet (9144 mm) above aggregate surface roofs located within 1,500 feet (458 m) of the building shall be permitted to be unprotected.

1609.1.2.1 Louvers. Louvers protecting intake and exhaust ventilation ducts not assumed to be open that are located within 30 feet (9144 mm) of grade shall meet requirements of an approved impact-resisting standard or the Large Missile Test of ASTM E 1996.

TABLE 1609.1.2
WIND-BORNE DEBRIS PROTECTION FASTENING
SCHEDULE FOR WOOD STRUCTURAL PANELS^{a,b,c,d}

FASTENER TYPE	FASTENER SPACING (inches)		
	Panel Span ≤ 4 feet	4 feet < Panel Span ≤ 6 feet	6 feet < Panel Span ≤ 8 feet
No. 6 screws	16	12	9
No. 8 screws	16	16	12

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.4 N, 1 mile per hour = 0.44 m/s.

- a. This table is based on a maximum wind speed (3-second gust) of 130 mph and mean roof height of 33 feet or less.
- b. Fasteners shall be installed at opposing ends of the wood structural panel. Fasteners shall be located a minimum of 1 inch from the edge of the panel.
- c. Fasteners shall be long enough to penetrate through the exterior wall covering a minimum of 1.75 inches into wood wall framing; a minimum of 1.25 inches into concrete block or concrete; or into steel framing by at least three threads. Fasteners shall be located a minimum of 2.5 inches from the edge of concrete block or concrete.
- d. Where screws are attached to masonry or masonry/stucco, they shall be attached utilizing vibration-resistant anchors having a minimum withdrawal capacity of 490 pounds.

STRUCTURAL DESIGN

1609.2 Definitions. The following words and terms shall, for the purposes of Section 1609, have the meanings shown herein.

HURRICANE-PRONE REGIONS. Areas vulnerable to hurricanes defined as:

1. The U. S. Atlantic Ocean and Gulf of Mexico coasts where the basic wind speed is greater than 90 mph (40 m/s) and
2. Hawaii, Puerto Rico, Guam, Virgin Islands and American Samoa.

WIND-BORNE DEBRIS REGION. Portions of hurricane-prone regions that are within 1 mile (1.61 km) of the coastal mean high water line where the basic wind speed is 110 mph (48 m/s) or greater; or portions of hurricane-prone regions

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where the basic wind speed is 120 mph (53 m/s) or greater; or Hawaii.

1609.3 Basic wind speed. The basic wind speed, in mph, for the determination of the wind loads shall be determined by Figure 1609. Basic wind speed for the special wind regions indicated, near mountainous terrain and near gorges shall be in accordance with local jurisdiction requirements. Basic wind speeds determined by the local jurisdiction shall be in accordance with Section 6.5.4 of ASCE 7.

In nonhurricane-prone regions, when the basic wind speed is estimated from regional climatic data, the basic wind speed shall be not less than the wind speed associated with an annual probability of 0.02 (50-year mean recurrence interval), and the estimate shall be adjusted for equivalence to a 3-second gust wind speed at 33 feet (10 m) above ground in Exposure Category C. The data analysis shall be performed in accordance with Section 6.5.4.2 of ASCE 7.

1609.3.1 Wind speed conversion. When required, the 3-second gust basic wind speeds of Figure 1609 shall be converted to fastest-mile wind speeds, V_{fm} , using Table 1609.3.1 or Equation 16-34.

$$V_{fm} = \frac{(V_{3s} - 10.5)}{1.05} \quad (\text{Equation 16-34})$$

where:

V_{3s} = 3-second gust basic wind speed from Figure 1609.

1609.4 Exposure category. For each wind direction considered, an exposure category that adequately reflects the characteristics of ground surface irregularities shall be determined for the site at which the building or structure is to be constructed. Account shall be taken of variations in ground surface roughness that arise from natural topography and vegetation as well as from constructed features.

Exception: [OSHPD 2] *The wind design shall comply with Exposure C requirements unless the architect or structural engineer in general responsible charge can justify to the enforcement agency that the building site and surrounding terrain conform to the criteria for Exposure B. Minimum data to establish the exposure category shall be a topographic map (e.g., United States Geological Survey quadrangle maps) and aerial photographs except that for Exposure B sites located within urban areas, a vicinity map of sufficient size and scale to verify compliance may be provided.*

1609.4.1 Wind directions and sectors. For each selected wind direction at which the wind loads are to be evaluated,

the exposure of the building or structure shall be determined for the two upwind sectors extending 45 degrees (0.79 rad) either side of the selected wind direction. The exposures in these two sectors shall be determined in accordance with Sections 1609.4.2 and 1609.4.3 and the exposure resulting in the highest wind loads shall be used to represent winds from that direction.

1609.4.2 Surface roughness categories. A ground surface roughness within each 45-degree (0.79 rad) sector shall be determined for a distance upwind of the site as defined in Section 1609.4.3 from the categories defined below, for the purpose of assigning an exposure category as defined in Section 1609.4.3.

Surface Roughness B. Urban and suburban areas, wooded areas or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger.

Surface Roughness C. Open terrain with scattered obstructions having heights generally less than 30 feet (9144 mm). This category includes flat open country, grasslands, and all water surfaces in hurricane-prone regions.

Surface Roughness D. Flat, unobstructed areas and water surfaces outside hurricane-prone regions. This category includes smooth mud flats, salt flats and unbroken ice.

1609.4.3 Exposure categories. An exposure category shall be determined in accordance with the following:

Exposure B. Exposure B shall apply where the ground surface roughness condition, as defined by Surface Roughness B, prevails in the upwind direction for a distance of at least 2,600 feet (792 m) or 20 times the height of the building, whichever is greater.

Exception: For buildings whose mean roof height is less than or equal to 30 feet (9144 mm), the upwind distance is permitted to be reduced to 1,500 feet (457 m).

Exposure C. Exposure C shall apply for all cases where Exposures B or D do not apply.

Exposure D. Exposure D shall apply where the ground surface roughness, as defined by Surface Roughness D, prevails in the upwind direction for a distance of at least 5,000 feet (1524 m) or 20 times the height of the building, whichever is greater. Exposure D shall extend inland from the shoreline for a distance of 600 feet (183 m) or 20 times the height of the building, whichever is greater.

TABLE 1609.3.1
EQUIVALENT BASIC WIND SPEEDS^{a,b,c}

V_{3s}	85	90	100	105	110	120	125	130	140	145	150	160	170
V_{fm}	71	76	85	90	95	104	109	114	123	128	133	142	152

For SI: 1 mile per hour = 0.44 m/s.

a. Linear interpolation is permitted.

b. V_{3s} is the 3-second gust wind speed (mph).

c. V_{fm} is the fastest mile wind speed (mph).

1613.7 Additional seismic requirements.

1613.7.1 Suspended ceilings. Minimum design and installation standards for suspended ceilings shall be determined in accordance with the requirements of Chapter 25 and this section.

1613.7.1.1 Scope. This part contains special requirements for suspended ceilings and lighting systems. The provisions of Section 13.5.6 of ASCE 7 shall apply except as modified here.

1613.7.1.2 General. The suspended ceilings and lighting systems shall not be located more than 6 feet (1828 mm) below the structural floor or roof system above unless the entire system is designed by a licensed engineer or architect.

1613.7.1.3 Design and installation requirements.

1613.7.1.3.1 Bracing at discontinuity. Positive bracing to the structure shall be provided at changes in the ceiling plane elevation or at discontinuities in the ceiling grid system.

1613.7.1.3.2 Support for appendages. Cable trays, electrical conduits and piping shall be independently supported and independently braced from the structure.

1613.7.1.3.3 Sprinkler heads. All sprinkler heads (drops) except fire-resistance-rated floor/ceiling or roof/ceiling assemblies shall be designed to allow for free movement of the sprinkler pipes with oversize rings, sleeves or adaptors through the ceiling tile in accordance with Section 13.5.6.2.2 (e) of ASCE 7.

Sprinkler heads penetrating fire-resistance-rated floor/ceiling or roof/ceiling assemblies shall comply with Section 712 of this Code.

1613.7.1.3.4 Perimeter members. A minimum wall angle size of at least a 2-inch (51 mm) horizontal leg shall be used at perimeter walls and interior full height partitions. The first ceiling tile shall maintain $\frac{3}{4}$ -inch (19 mm) clear from the finish wall surface. An equivalent alternative detail that will provide sufficient movement due to anticipated lateral building displacement may be used in lieu of the long leg angle subject to the approval of the Superintendent of Building.

1613.7.1.4 Special requirements for means of egress. Suspended ceiling assemblies located along means of egress serving an occupant load of 30 or more shall comply with the following provisions:

- General.** Ceiling suspension systems shall be connected and braced with vertical hangers attached directly to the structural floor or roof system above and along the means of egress serving an occupant load of 30 or more and at lobbies accessory to Group A occupancies. Spacing of vertical hangers shall not exceed 2 feet (610 mm) on center along the entire length of the suspended ceiling assembly located along the means of egress or at the lobby.

- Assembly device.** All lay-in panels shall be secured to the suspension ceiling assembly with two hold-down clips minimum for each tile within a 4-foot (1219 mm) radius of the exit lights and exit signs.

- Emergency systems.** Independent supports and braces shall be provided for light fixtures required for exit illumination. Power supply for exit illumination shall comply with the requirements of Section 1006.3 of this Code.

- Supports for appendage.** Separate support from the structural floor or roof system above shall be provided for all appendages, such as light fixtures, air diffusers, exit signs and similar elements.

1613.7.2 Wood diaphragms supporting concrete or masonry walls. In addition to other requirements of this Chapter for lateral-force-resisting systems, wood diaphragms shall comply with the following provisions:

- Continuous tie spacing.** The spacing of continuous ties shall not exceed 40 feet (1219 mm). Added chords of diaphragms may be used to form subdiaphragms to transmit the anchorage forces to the main continuous crossties.
- Anchorage force.** The maximum diaphragm shear used to determine the depth of the subdiaphragm shall not exceed 75 percent of the maximum diaphragm shear.
- Horizontal irregularities.** Chords and drag strut members in diaphragms having horizontal structural irregularities listed in Table 12.3-1 of ASCE 7 shall be designed for forces in Section 12.3.3.4 of ASCE 7.

1613.8 Earthquake recording instrumentation.

1613.8.1 Applicability. The requirements of this section shall apply to buildings for which permits were issued after July 1, 1965.

1613.8.2 General. Every new building over six stories in height with an aggregate floor area of 60,000 square feet (5574 m²) or more and every new building over ten stories in height regardless of the floor area shall be equipped with at least three approved recording accelerographs.

Exception: A building selected by the State of California as part of its Strong Motion Instrumentation Program (Section 2700, Chapter 8, Division 2, *California Public Resources Code*) need not comply with this section until it ceases to be part of the program.

All new buildings that are designed using the nonlinear response history procedure of "Seismic Response History Procedures" in Chapter 16 of ASCE 7 shall be equipped with a structural monitoring system in accordance with standards established by the Superintendent of Building.

1613.8.3 Maintenance. Maintenance and service of the instruments shall be provided by the owner of the building subject to the approval of the Superintendent of Building. Data produced by the instruments shall be made available to the Superintendent of Building on request.

Maintenance and service of the instruments shall be performed annually and shall be performed only by an approved testing agency. The owner shall file with the Department a written report from an approved testing agency certifying that each instrument has been serviced and is in proper working condition. This report shall be submitted when the instruments are installed and annually thereafter. Each instrument shall have affixed to it an externally visible tag specifying the date of the last maintenance or service and the printed name and address of the testing agency performing the service.

1613.8.4 Location. For new buildings requiring accelerographs per Section 1613.8.2, the instruments shall be located in the basement, mid-height and near the top of the building. Each instrument shall be located so that access is maintained at all times and is unobstructed by room contents. A sign stating "MAINTAIN CLEAR ACCESS TO THIS INSTRUMENT" in 1-inch (25 mm) block letters shall be posted in a conspicuous location at the instrument.

1613.8.5 Instrumentation of existing buildings. All owners of existing structures selected by the Department shall provide accessible space for the installation of appropriate earthquake-recording instruments. Locations of the instruments shall be determined by the engineer of record and approved by the Department. The owners shall make arrangements with the Department to provide, maintain and service the instruments as required above. Data shall be the property of the Department, but copies of individual records shall be made available to the public on request with the payment of an appropriate fee.

All legally existing instruments shall be maintained and serviced in proper working condition. Each instrument shall be maintained and serviced as specified by Section 1613.8.3 and shall be provided with a sign as required by Section 1613.8.4.

1613.9 Seismic design provisions for hillside buildings.

1613.9.1 Purpose. The purpose of this section is to establish minimum regulations for the design and construction of new buildings and additions to existing buildings when constructing these buildings on or into slopes steeper than one unit vertical in three units horizontal (33.3-percent slope). These regulations establish minimum standards for seismic force resistance to reduce the risk of injury or loss of life in the event of earthquakes.

1613.9.2 Scope. The provisions of this section shall apply to the design of the lateral-force-resisting system for hillside buildings at and below the base level diaphragm. The design of the lateral-force-resisting system above the base level diaphragm shall be in accordance with the provisions for seismic and wind design as required elsewhere in this Chapter.

Exception: Nonhabitable accessory buildings and patio decks not supporting or supported from the main building are exempt from these regulations.

1613.9.3 Definitions. For the purposes of this section, certain terms are defined as follows:

BASE LEVEL DIAPHRAGM. The floor at, or closest to, the top of the highest level of the foundation.

DIAPHRAGM ANCHORS. Assemblies that connect a diaphragm to the adjacent foundation at the uphill diaphragm edge.

DOWNHILL DIRECTION. The descending direction of the slope approximately perpendicular to the slope contours.

FOUNDATION. Concrete or masonry, which supports a building, including footings, stem walls, retaining walls and grade beams.

FOUNDATION EXTENDING IN THE DOWNHILL DIRECTION. A foundation running downhill and approximately perpendicular to the uphill foundation.

HILLSIDE BUILDING. Any building or portion of a building constructed on or into a slope steeper than one unit vertical in three units horizontal (33.3-percent slope). If only a portion of the building is supported on or into the slope, these regulations apply to the entire building.

PRIMARY ANCHORS. Diaphragm anchors designed for and providing a direct connection as described in Sections 1613.9.5 and 1613.9.7.3 between the diaphragm and the uphill foundation.

SECONDARY ANCHORS. Diaphragm anchors designed for and providing a redundant diaphragm to foundation connection as described in Sections 1613.9.6 and 1613.9.7.4.

UPHILL DIAPHRAGM EDGE. The edge of the diaphragm adjacent and closest to the highest ground level at the perimeter of the diaphragm.

UPHILL FOUNDATION. The foundation parallel and closest to the uphill diaphragm edge.

1613.9.4 Analysis and design.

1613.9.4.1 General. Every hillside building within the scope of this section shall be analyzed, designed and constructed in accordance with the provisions of this Chapter. When the code-prescribed wind design produces greater stresses than seismic design stress, the wind design shall govern, but detailing requirements and limitations prescribed in this and referenced sections shall be followed.

1613.9.4.2 Base level diaphragm—downhill direction. The following provisions shall apply to the seismic analysis and design of the connections for the base level diaphragm in the downhill direction:

1613.9.4.2.1. Base for lateral force design defined. For seismic forces acting in the downhill direction, the base of the building shall be the floor at or closest to the top of the highest level of the foundation.

1613.9.4.2.2. Base shear. In developing the base shear for seismic design, the response modification coefficient (R) shall not exceed 4.5 for bearing wall and building frame systems. The total base shear shall include the forces tributary to the base level diaphragm including forces from the base level diaphragm.

1613.9.5 Base shear resistance-primary anchors.

1613.9.5.1 General. The base shear in the downhill direction shall be resisted through primary anchors from diaphragm struts provided in the base level diaphragm to the foundation.

1613.9.5.2 Location of primary anchors. A primary anchor and diaphragm strut shall be provided in line with each foundation extending in the downhill direction. Primary anchors and diaphragm struts shall also be provided where interior vertical lateral-force-resisting elements occur above and in contact with the base level diaphragm. The spacing of primary anchors and diaphragm struts or collectors shall in no case exceed 30 feet (9144 mm).

1613.9.5.3 Design of primary anchors and diaphragm struts. Primary anchors and diaphragm struts shall be designed in accordance with the requirements of Section 1613.9.8.

1613.9.5.4 Limitations. The following lateral-force-resisting elements shall not be designed to resist seismic forces below the base level diaphragm in the downhill direction:

1. Wood structural panel wall sheathing;
2. Cement plaster and lath;
3. Gypsum wallboard; and
4. Tension only braced frames.

Braced frames designed in accordance with the requirements of Section 2205.2.2 of this Code may be used to transfer forces from the primary anchors and diaphragm struts to the foundation, provided lateral forces do not induce flexural stresses in any member of the frame or in the diaphragm struts. Deflections of frames shall account for the variation in slope of diagonal members when the frame is not rectangular.

1613.9.6 Base shear resistance-secondary anchors.

1613.9.6.1 General. In addition to the primary anchors required by Section 1613.9.5, the base shear in the downhill direction shall be resisted through secondary anchors in the uphill foundation connected to diaphragm struts in the base level diaphragm.

Exception: Secondary anchors are not required where foundations extending in the downhill direction spaced at not more than 30 feet (9144 mm) on center extend up to and are directly connected to the base level diaphragm for at least 70 percent of the diaphragm depth.

1613.9.6.2 Secondary anchor capacity and spacing. Secondary anchors at the base level diaphragm shall be designed for a minimum force equal to the base shear, including forces tributary to the base level diaphragm, but not less than 600 pounds per lineal foot (8.76 kN/m). The secondary anchors shall be uniformly distributed along the uphill diaphragm edge and shall be spaced a maximum of 4 feet (1219 mm) on center.

1613.9.6.3 Design. Secondary anchors and diaphragm struts shall be designed in accordance with Section 1613.9.8.

1613.9.7 Diaphragms below the base level—downhill direction. The following provisions shall apply to the lateral analysis and design of the connections for all diaphragms below the base level diaphragm in the downhill direction.

1613.9.7.1 Diaphragm defined. Every floor level below the base level diaphragm shall be designed as a diaphragm.

1613.9.7.2 Design force. Each diaphragm below the base level diaphragm shall be designed for all tributary loads at that level using a minimum seismic force factor not less than the base shear coefficient.

1613.9.7.3 Design force resistance-primary anchors. The design force described in Section 1613.9.7.2 shall be resisted through primary anchors from diaphragm struts provided in each diaphragm to the foundation. Primary anchors shall be provided and designed in accordance with the requirements and limitations of Section 1613.9.5.

1613.9.7.4 Design force resistance-secondary anchors.

1613.9.7.4.1 General. In addition to the primary anchors required in Section 1613.9.7.3, the design force in the downhill direction shall be resisted through secondary anchors in the uphill foundation connected to diaphragm struts in each diaphragm below the base level.

Exception: Secondary anchors are not required where foundations extending in the downhill direction, spaced at not more than 30 feet (9144 mm) on center, extend up to and are directly connected to each diaphragm below the base level for at least 70 percent of the diaphragm depth.

1613.9.7.4.2 Secondary anchor capacity. Secondary anchors at each diaphragm below the base level diaphragm shall be designed for a minimum force equal to the design force but not less than 300 pounds per lineal foot (4.38 kN/m). The secondary anchors shall be uniformly distributed along the uphill diaphragm edge and shall be spaced a maximum of four feet (1219 mm) on center.

1613.9.7.4.3 Design. Secondary anchors and diaphragm struts shall be designed in accordance with Section 1613.9.8.

1613.9.8 Primary and secondary anchorage and diaphragm strut design. Primary and secondary anchors and diaphragm struts shall be designed in accordance with the following provisions:

1. **Fasteners.** All bolted fasteners used to develop connections to wood members shall be provided with square plate washers at all bolt heads and nuts. Washers shall be minimum $\frac{3}{16}$ -inch (4.8 mm) thick

and 2-inch (51 mm) square for $\frac{1}{2}$ -inch (12.7 mm) diameter bolts, and $\frac{1}{4}$ -inch (6.4 mm) thick and 2- $\frac{1}{2}$ -inch (64 mm) square for $\frac{3}{8}$ -inch (15.9 mm) diameter or larger bolts. Nuts shall be wrench tightened prior to covering.

2. **Fastening.** The diaphragm to foundation anchorage shall not be accomplished by the use of toenailing, nails subject to withdrawal, or wood in cross-grain bending or cross-grain tension.
3. **Size of wood members.** Wood diaphragm struts, collectors and other wood members connected to primary anchors shall not be less than 3-inch (76 mm) nominal width. The effects of eccentricity on wood members shall be evaluated as required per Item 9.
4. **Design.** Primary and secondary anchorage, including diaphragm struts, splices, and collectors shall be designed for 125 percent of the tributary force.
5. **Allowable stress increase.** The one-third allowable stress increase permitted under Section 1605.3.2 shall not be taken when the working (allowable) stress design method is used.
6. **Seismic load factor.** The seismic load factor shall be 1.7 for steel and concrete anchorage when the strength design method is used.
7. **Primary anchors.** The load path for primary anchors and diaphragm struts shall be fully developed into the diaphragm and into the foundation. The foundation must be shown to be adequate to resist the concentrated loads from the primary anchors.
8. **Secondary anchors.** The load path for secondary anchors and diaphragm struts shall be fully developed in the diaphragm but need not be developed beyond the connection to the foundation.
9. **Symmetry.** All lateral force foundation anchorage and diaphragm strut connections shall be symmetrical. Eccentric connections may be permitted when demonstrated by calculation or tests that all components of force have been provided for in the structural analysis or tests.
10. **Wood ledgers.** Wood ledgers shall not be used to resist cross-grain bending or cross-grain tension.

1613.9.9 Lateral-force-resisting elements normal to the downhill direction.

1613.9.9.1 General. In the direction normal to the downhill direction, lateral-force-resisting elements shall be designed in accordance with the requirements of this section.

1613.9.9.2 Base shear. In developing the base shear for seismic design, the response modification coefficient (R) shall not exceed 4.5 for bearing wall and building frame systems.

1613.9.9.3 Vertical distribution of seismic forces. For seismic forces acting normal to the downhill direction, the distribution of seismic forces over the height of the building using Section 12.8.3 of ASCE 7 shall be determined

using the height measured from the top of the lowest level of the building foundation.

1613.9.9.4 Drift limitations. The story drift below the base level diaphragm shall not exceed 0.005 times the story height. The total drift from the base level diaphragm to the top of the foundation shall not exceed $\frac{3}{4}$ of an inch (19 mm). Where the story height or the height from the base level diaphragm to the top of the foundation varies because of a stepped footing or story offset, the height shall be measured from the average height of the top of the foundation. The story drift shall not be reduced by the effect of horizontal diaphragm stiffness.

Where code-prescribed wind forces govern the design of the lateral force resisting system normal to the downhill direction, the drift limitation shall be 0.0025 for the story drift and the total drift from the base level diaphragm to the top of the foundation may exceed $\frac{3}{4}$ of an inch (19 mm) when approved by the Department. In no case, however, shall the drift limitations for seismic forces be exceeded.

1613.9.9.5 Distribution of lateral forces.

1613.9.9.5.1 General. The design lateral force shall be distributed to lateral-force-resisting elements of varying heights in accordance with the stiffness of each individual element.

1613.9.9.5.2 Wood structural panel sheathed walls. The stiffness of a stepped wood structural panel shear wall may be determined by dividing the wall into adjacent rectangular elements, subject to the same top-of-wall deflection. Deflections of shear walls may be estimated by Section 2305.3.2 of this Code. Sheathing and fastening requirements for the stiffest section shall be used for the entire wall. Each section of wall shall be anchored for shear and uplift at each step. The minimum horizontal length of a step shall be 8 feet (2438 mm) and the maximum vertical height of a step shall be 2 feet 8 inches (813 mm).

1613.9.9.5.3 Reinforced concrete or masonry shear walls. Reinforced concrete or masonry shear walls shall have forces distributed in proportion to the rigidity of each section of the wall.

1613.9.9.6 Limitations. The following lateral force-resisting-elements shall not be designed to resist lateral forces below the base level diaphragm in the direction normal to the downhill direction:

1. Cement plaster and lath;
2. Gypsum wallboard; and
3. Tension-only braced frames.

Braced frames designed in accordance with the requirements of Chapter 22 of this Code may be designed as lateral-force-resisting elements in the direction normal to the downhill direction, provided lateral forces do not induce flexural stresses in any member of the frame. Deflections of frames shall account for the variation in slope of diagonal members when the frame is not rectangular.

1613.9.10 Specific design provisions.

1613.9.10.1 Footings and grade beams. All footings and grade beams shall comply with the following:

1. Grade beams shall extend at least 12 inches (305 mm) below the lowest adjacent grade and provide a minimum 24-inch (610 mm) distance horizontally from the bottom outside face of the grade beam to the face of the descending slope.
2. Continuous footings shall be reinforced with at least two No. 4 reinforcing bars at the top and two No. 4 reinforcing bars at the bottom.
3. All main footing and grade beam reinforcement steel shall be bent into the intersecting footing and fully developed around each corner and intersection.
4. All concrete stem walls shall extend from the foundation and be reinforced as required for concrete or masonry walls.

1613.9.10.2 Protection against decay and termites. All wood to earth separation shall comply with the following:

1. Where a footing or grade beam extends across a descending slope, the stem wall, grade beam, or footing shall extend up to a minimum of 18 inches (457 mm) above the highest adjacent grade.

Exception: At paved garage and doorway entrances to the building, the stem wall need only extend to the finished concrete slab, provided the wood framing is protected with a moisture proof barrier.

2. Wood ledgers supporting a vertical load of more than 100 pounds per lineal foot (1.46 kN/m) and located within 48 inches (1219 mm) of adjacent grade are prohibited. Galvanized steel ledgers and anchor bolts, with or without wood nailers or treated or decay resistant sill plates supported on a concrete or masonry seat, may be used.

1613.9.10.3 Sill plates. All sill plates and anchorage shall comply with the following:

1. All woodframed walls, including nonbearing walls, when resting on a footing, foundation or grade beam stem wall shall be supported on wood sill plates bearing on a level surface.
2. Power-driven fasteners shall not be used to anchor sill plates except at interior nonbearing walls not designed as shear walls.

1613.9.10.4 Column base plate anchorage. The base of isolated wood posts (not framed into a stud wall) supporting a vertical load of 4000 pounds (17.8 kN) or more and the base plate for a steel column shall comply with the following:

1. When the post or column is supported on a pedestal extending above the top of a footing or grade beam, the pedestal shall be designed and reinforced as required for concrete or masonry columns. The pedestal shall be reinforced with a

minimum of four No. 4 bars extending to the bottom of the footing or grade beam. The top of exterior pedestals shall be sloped for positive drainage.

2. The base plate anchor bolts or the embedded portion of the post base and the vertical reinforcing bars for the pedestal shall be confined with two No. 4 or three No. 3 ties within the top 5 inches (127 mm) of the concrete or masonry pedestal. The base plate anchor bolts shall be embedded a minimum of 20 bolt diameters into the concrete or masonry pedestal. The base plate anchor bolts and post bases shall be galvanized and each anchor bolt shall have at least two galvanized nuts above the base plate.

1613.9.10.5 Steel beam to column supports. All steel beam to column supports shall be positively braced in each direction. Steel beams shall have stiffener plates installed on each side of the beam web at the column. The stiffener plates shall be welded to each beam flange and the beam web. Each brace connection or structural member shall consist of at least two $\frac{5}{8}$ inch (15.9 mm) diameter machine bolts.

1613.10 Modifications to ASCE 7. Chapter 12 of ASCE 7 is adopted by reference, except Section 12.12.3 of ASCE 7 is not adopted. It is replaced with the following modification:

12.12.3 Building separation. All portions of the structure shall be designed and constructed to act as an integral unit in resisting seismic forces unless separated structurally by a distance sufficient to avoid damaging contact under the maximum inelastic response displacement. The maximum inelastic response displacement shall be determined at critical locations with consideration for both translational displacement and torsional displacements of the structure using δ_{max} (defined in Section 12.8.4.3 of ASCE 7) as follows:

$$\delta_M = C_d \delta_{max} / I \quad (\text{Formula 12.12-1})$$

Where δ_M is the Maximum Inelastic Response Displacement, which is the total drift or total story drift that occurs when the structure is subjected to the Design Basis Ground Motion, including estimated elastic and inelastic contributions to the total deformation as determined in Section 12.8.6 of ASCE 7.

All structures shall be separated from adjoining structures. Adjacent buildings on the same property shall be separated by at least a distance δ_{MT} , where

$$\delta_{MT} = \sqrt{(\delta_{M1})^2 + (\delta_{M2})^2} \quad (\text{Formula 12.12-2})$$

and δ_{M1} and δ_{M2} are the maximum inelastic response displacements of the adjacent buildings.

Where a structure adjoins a property line not common to a public way, the structure shall also be set back from the property line by at least the displacement, δ_M , of that structure.

Exception: Smaller separations or property line setbacks shall be permitted when justified by rational analysis based on maximum expected ground motions.

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CHAPTER 17

STRUCTURAL TESTS AND SPECIAL INSPECTIONS

SECTION 1701 GENERAL

1701.1 Scope. The provisions of this chapter shall govern the quality, workmanship and requirements for materials covered. Materials of construction and tests shall conform to the applicable standards listed in this code.

1701.2 New materials. New building materials, equipment, appliances, systems or methods of construction not provided for in this code, and any material of questioned suitability proposed for use in the construction of a building or structure, shall be subjected to the tests prescribed in this chapter and in the approved rules to determine character, quality and limitations of use.

1701.3 Used materials. The use of second-hand materials that meet the minimum requirements of this code for new materials shall be permitted.

SECTION 1702 DEFINITIONS

1702.1 General. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

APPROVED AGENCY or APPROVED TESTING AGENCY. An established and recognized agency regularly engaged in conducting tests or furnishing inspection services which has been approved.

APPROVED FABRICATOR. An established and qualified person, firm or corporation approved by the Superintendent of Building pursuant to Chapter 17 of this Code and Section 96.200 of the *Los Angeles Municipal Code*.

CERTIFICATE OF COMPLIANCE. A certificate stating that materials and products meet specified standards or that work was done in compliance with approved construction documents.

DESIGNATED SEISMIC SYSTEM. Those architectural, electrical and mechanical systems and their components that require design in accordance with Chapter 13 of ASCE 7 and for which the component importance factor, I_p , is greater than 1 in accordance with Section 13.1.3 of ASCE 7.

FABRICATED ITEM. Structural, load-bearing or lateral load-resisting assemblies consisting of materials assembled prior to installation in a building or structure or subjected to operations such as heat treatment, thermal cutting, cold working or reforming after manufacture and prior to installation in a building or structure. Materials produced in accordance with standard specifications referenced by this code, such as rolled structural steel shapes, steel-reinforcing bars, masonry units and wood structural panels shall not be considered "fabricated items."

INSPECTION CERTIFICATE. An identification applied on a product by an approved agency containing the name of the manufacturer, the function and performance characteristics, and the name and identification of an approved agency that indicates that the product or material has been inspected and evaluated by an approved agency (see Section 1703.5 and "Label," "Manufacturer's designation" and "Mark").

LABEL. An identification applied on a product by the manufacturer that contains the name of the manufacturer, the function and performance characteristics of the product or material, and the name and identification of an approved agency and that indicates that the representative sample of the product or material has been tested and evaluated by an approved agency (see Section 1703.5 and "Inspection certificate," "Manufacturer's designation" and "Mark").

MAIN WIND-FORCE-RESISTING SYSTEM. An assemblage of structural elements assigned to provide support and stability for the overall structure. The system generally receives wind loading from more than one surface.

MANUFACTURER'S DESIGNATION. An identification applied on a product by the manufacturer indicating that a product or material complies with a specified standard or set of rules (see also "Inspection certificate," "Label" and "Mark").

MARK. An identification applied on a product by the manufacturer indicating the name of the manufacturer and the function of a product or material (see also "Inspection certificate," "Label" and "Manufacturer's designation").

SPECIAL INSPECTION. Inspection as herein required of the materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards (see Section 1704).

SPECIAL INSPECTION, CONTINUOUS. The full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.

SPECIAL INSPECTION, PERIODIC. The part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work has been or is being performed and at the completion of the work.

SPRAYED FIRE-RESISTANT MATERIALS. Cementitious or fibrous materials that are spray applied to provide fire-resistant protection of the substrates.

STRUCTURAL OBSERVATION. The visual observation of the structural system by a registered design professional for general conformance to the approved construction documents at significant construction stages and at completion of the structural system. Structural observation does not include or waive the responsibility for the inspection required by Sections 109, Appendix Chapter 1, and 1704 or other sections of this code.

SECTION 1703 APPROVALS

1703.1 Approved agency. An approved agency shall provide all information as necessary for the Superintendent of Building to determine that the agency meets the applicable requirements pursuant to Section 98.0503 of the *Los Angeles Municipal Code*.

1703.2 Written approval. Any material, appliance, equipment, system or method of construction meeting the requirements of this Code shall be approved in writing after satisfactory completion of the required tests and submission of required test reports pursuant to Sections 98.0501 and 98.0502 of the *Los Angeles Municipal Code*.

1703.3 Approved record. For any material, appliance, equipment, system or method of construction that has been approved, a record of that approval, including the conditions and limitations of the approval, shall be kept on file in the Department and shall be open to public inspection at appropriate times.

1703.4 Performance. Specific information consisting of test reports conducted by an approved testing agency in accordance with standards referenced in Chapter 35 of this Code, or other information as necessary, shall be provided for the Superintendent of Building to determine that the material meets the applicable Code requirements, including Sections 98.0501 and 98.0502 of the *Los Angeles Municipal Code*.

1703.4.1 Research and investigation. Sufficient technical data shall be submitted to the Superintendent of Building to substantiate the proposed use of any material or assembly. If it is determined that the evidence submitted is satisfactory proof of performance for the use intended, the Superintendent of Building shall approve the use of the material or assembly subject to the requirements of this Code. The costs, reports and investigations required under these provisions shall be paid by the permit applicant as required by this Code and Sections 98.0501, 98.0502 and 98.0503 of the *Los Angeles Municipal Code*.

1703.4.2 Research reports. Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this Code, shall consist of valid research reports from approved sources as required in Sections 98.0501 and 98.0502 of the *Los Angeles Municipal Code*.

1703.5 Labeling. Where materials or assemblies are required by this code to be labeled, such materials and assemblies shall be labeled by an approved agency in accordance with Section 1703. Products and materials required to be labeled shall be labeled in accordance with the procedures set forth in Sections 1703.5.1 through 1703.5.3.

1703.5.1 Testing. An approved agency shall test a representative sample of the product or material being labeled to the relevant standard or standards. The approved agency shall maintain a record of the tests performed. The record shall provide sufficient detail to verify compliance with the test standard.

1703.5.2 Inspection and identification. The approved agency shall periodically perform an inspection, which shall be in-plant if necessary, of the product or material that is to be labeled. The inspection shall verify that the labeled product or material is representative of the product or material tested.

1703.5.3 Label information. The label shall contain the manufacturer's or distributor's identification, model number, serial number or definitive information describing the product or material's performance characteristics and approved agency's identification.

1703.6 Heretofore approved materials. The use of any material already fabricated or of any construction already erected, which conformed to requirements or approvals heretofore in effect, shall be permitted to continue, if not detrimental to life, health or safety to the public.

1703.7 Evaluation and follow-up inspection services. Where structural components or other items regulated by this code are not visible for inspection after completion of a prefabricated assembly, the permit applicant shall submit a report of each prefabricated assembly. The report shall indicate the complete details of the assembly, including a description of the assembly and its components, the basis upon which the assembly is being evaluated, test results and similar information and other data as necessary for the building official to determine conformance to this code. Such a report shall be approved by the building official.

1703.7.1 Follow-up inspection. The permit applicant shall provide for special inspections of fabricated items in accordance with Section 1704.2.

1703.7.2 Test and inspection records. Copies of necessary test and inspection records shall be filed with the building official.

SECTION 1704 SPECIAL INSPECTIONS

1704.1 General. Where application is made for construction as described in this section, the owner or the registered design professional in responsible charge who is acting as the owner's agent shall employ one or more deputy inspectors to provide inspections during construction on the types of work listed in Sections 1704 and 1707. The Registered Deputy Inspector shall be a qualified person as set forth in Section 1704.1.3 and shall demonstrate competence to the satisfaction of the Superintendent of Building for inspection of the particular type of construction or operation requiring special inspection. The Registered Deputy Inspector shall be approved by and shall be responsible to the registered design professional in charge of the design of the structure.

The special inspections shall be in addition to the inspections made by the employees of the Department as set forth in Section 108 of this Code.

All special inspections shall be made by a Registered Deputy Inspector. Whenever the term "Special Inspector" is used in

this Code, it shall mean "Registered Deputy Inspector" as described in Section 1704.1.3.

Exceptions:

1. Special inspections are not required for work of a minor nature or as warranted by conditions in the jurisdiction as approved by the Superintendent of Building.
2. Special inspections are not required for building components unless the design involves the practice of professional engineering or architecture as defined by applicable state statutes and regulations governing the professional registration and certification of engineers or architects.
3. The provisions of *Health and Safety Code* Part 6, Division 13 and Chapter 3, Division 1 of Title 25 of the *California Code of Regulations*, commencing with Section 3000, shall apply to the construction and inspection of factory-built housing as defined in Section 19971 of the *Health and Safety Code*.

1704.1.1 Statement of special inspections. The permit applicant shall in accordance with Section 106.3.3 of this Code submit a statement of special inspections prepared by the registered design professional in responsible charge as a condition for permit issuance. The statement of special inspection shall provide information in accordance with Section 1705.

Exceptions:

1. A statement of special inspections is not required for structures designed and constructed in accordance with the conventional construction provisions of Section 2308 of this Code.
2. The statement of special inspections is permitted to be prepared by a qualified person approved by the Superintendent of Building for construction not designed by a registered design professional.

1704.1.2 Report requirement. In addition to all the requirements of Section 1704.1.4, Registered Deputy Inspectors shall keep records of inspections. The Registered Deputy Inspector shall furnish inspection reports to the Superintendent of Building and to the registered design professional in responsible charge. Reports shall indicate that work inspected was done in conformance with approved construction documents. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the Superintendent of Building and to the registered design professional in responsible charge prior to the completion of that phase of the work. A final report documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon by the permit applicant and the Superintendent of Building prior to the start of work.

1704.1.3 Registered deputy inspector. Application for registration as a Registered Deputy Inspector shall be made to the Superintendent of Building on a form furnished by the

Department. A separate application shall be made for each type of registration desired.

A committee appointed by the Superintendent of Building shall examine each applicant as to his or her experience and training for performing the duties of an inspector of the type for which application has been made. Additionally, the applicant will be examined on the applicant's knowledge of the *Los Angeles Municipal Code* and Register Deputy Inspector duties, responsibilities and procedures. When satisfied as to the fitness of the applicant, the Superintendent of Building shall issue a Certificate of Registration. Upon application for renewal of a Certificate of Registration, the applicant shall be reexamined to ascertain the applicant's fitness to perform the duties of inspector of the type for which application has been made.

Exception: If the Department determines that the initial examination (which includes general knowledge, code requirements and plan comprehension) for the special inspector program under the International Code Council (ICC) is equivalent to the above-described initial or renewal examination, then the Department may accept the results of the ICC examination in lieu of the Department's examination in that category; however, the Department will be examining the applicant's knowledge of the *Los Angeles Municipal Code* and deputy inspector duties, responsibilities and procedures.

The Superintendent of Building shall issue separate Certificate of Registration for each type of registration requiring special inspection in accordance with Sections 1704 and 1707 and as determined by the Superintendent of Building for any construction requiring either continuous or periodic special inspection.

Nothing here shall be deemed to prohibit any one person from being qualified for more than one type of special inspection, provided he or she makes application, pays the required fees, takes the required examinations and is duly qualified by the Superintendent of Building for each type.

Each Certificate of Registration shall expire three years from the date of issuance, but may be renewed by the Superintendent of Building within a grace period of 30 days thereafter.

The Department shall maintain a list of the names of all Registered Deputy Inspectors, showing the type of work each has been authorized to inspect. This list shall be available to the public.

Upon evidence, satisfactory to the Superintendent of Building, of incompetence, of willful or negligent failure to observe or report violations of this Code, or of any other failure to perform properly and effectively the duties assumed by a Registered Deputy Inspector, the Superintendent of Building may revoke, suspend or refuse to renew any Certificate of Registration, but prior to that action, the holder shall be given an opportunity to appear before the Superintendent of Building and be heard.

Except where there is an employee of the City of Los Angeles inspecting buildings or structures being erected or repaired by the City, no Registered Deputy Inspector shall

LA receive any compensation whatsoever from the City. A Registered Deputy Inspector shall undertake and perform the duties of inspection solely on the request of the owner or the owner's agent. The designation shall be deemed to indicate that the duties incident to the inspection are within the course and scope of the Registered Deputy Inspector's employment by the owner or agent, and except where the Registered Deputy Inspector is in fact an employee of the City, the Registered Deputy Inspector shall not be deemed an employee of the City, the contractor, a subcontractor or a material vendor for any purpose.

1704.1.4 Duties and responsibilities of the registered deputy inspector.

1. The Registered Deputy Inspector employed on any work must be present during the execution of all the work the Registered Deputy Inspector has undertaken to inspect. The Registered Deputy Inspector shall notify the Department of the commencement of inspection of a job and shall specify the type of inspection for which the Registered Deputy Inspector has been engaged. This notification shall be made no later than the last working day preceding the commencement of inspection. The Registered Deputy Inspector shall report to the job sufficiently in advance of construction to review the plans and to inspect all materials to be used or concealed within the work; shall inspect the construction, erection, placing or other use of the materials; and shall observe whether there is compliance with the code as to all of the foregoing. During the execution of the work, the Registered Deputy Inspector shall not undertake or engage in any other task or occupation that will interfere with the proper performance of his or her duties relating to the inspections. The Registered Deputy Inspector shall report, as directed, to the Superintendent of Building, noting all violations of this Code that have occurred and any other information as may be required. At the conclusion of the Registered Deputy Inspector's duties on any project, which has been completed in accordance with this Code, the Registered Deputy Inspector shall submit a report to the Department setting forth the portion of the work inspected. The report shall be made on forms supplied by the Department and shall be filed in the records of the Department.
2. Nothing here shall be deemed to authorize any Registered Deputy Inspector to approve any inspection required by this Code, other than the special inspection for which the Registered Deputy Inspector was hired.
3. Where, in the opinion of the Department, the magnitude or complexity of a job is sufficient to warrant, additional Registered Deputy Inspectors may be required.
4. Where, in the opinion of the Department, the Registered Deputy Inspector is negligent in the performance of the Deputy Inspector's duties, the job shall be stopped.

1704.1.4.1 Fees for registered deputy inspector.

1. Before accepting an application for registration as a Registered Deputy Inspector, the Department shall collect an initial examination fee of \$200.00. A separate application shall be submitted and a separate initial examination fee shall be collected for each type of registration desired. When the applicant passes the initial examination, a Certificate of Registration fee of \$150.00 shall be collected for each type of initial examination passed.
2. Before renewing a Certificate of Registration as Registered Deputy Inspector, the Department shall collect a renewal examination fee in the amount of \$180.00 for each type of registration to be renewed. When the applicant passes the renewal examination, a Certificate of Registration renewal fee in the amount of \$140.00 shall be collected for each type of renewal examination passed.
3. If the Department accepts the results of the applicant's ICC examination in lieu of taking the Department's initial or renewal examination, then the Department's initial or renewal examination fee as specified in this section shall be reduced to \$60.00 for each applicable type of registration for which application has been made. An examination will be given for each type of registration. Upon passing the examination, a Certificate of Registration fee or renewal fee as specified in this section shall be collected.

1704.1.4.2 Failure to pass examination for registered deputy inspector.

1. Every applicant who fails to pass an initial examination shall not be eligible for another examination until 90 days after taking the previous examination. Any applicant who fails to pass on the third try shall not be eligible again until 6 months after taking the previous examination.
2. Every applicant who fails to pass a renewal examination shall not be eligible for reexamination until 30 days after taking the previous examination.

1704.2 Inspection of fabricators. Where fabrication of structural load-bearing members and assemblies is being performed on the premises of a fabricator's shop, special inspection of the fabricated items shall be required by this section and as required elsewhere in this code.

1704.2.1 Fabrication and implementation procedures.

The special inspector shall verify that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards. The special inspector shall review the procedures for completeness and adequacy relative to the code requirements for the fabricator's scope of work.

Exception: Special inspections as required by Section 1704.2 shall not be required where the fabricator is approved in accordance with Section 1704.2.2.

1704.2.2 Fabricator approval. Pursuant to Section 96.200 of the *Los Angeles Municipal Code*, special inspections required by this Code are not required where the work is done on the premises of an approved fabricator licensed and approved to perform the work without special inspection. Approval shall be based upon review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by the Department. At completion of fabrication, the approved fabricator shall submit a certificate of compliance to the Superintendent of Building stating that the work was performed in accordance with the approved construction documents.

1704.3 Steel construction. The special inspections for steel elements of buildings and structures shall be as required by Section 1704.3 and Table 1704.3.

Exceptions:

1. Special inspection of the steel fabrication process shall not be required where the fabricator does not perform any welding, thermal cutting or heating operation of any kind as part of the fabrication process. In such cases, the fabricator shall be required to submit a detailed procedure for material control that demonstrates the fabricator's ability to maintain suitable records and procedures such that, at any time during the fabrication process, the material specification, grade and mill test reports for the main stress-carrying elements are capable of being determined.
2. The special inspector need not be continuously present during welding of the following items, provided the materials, welding procedures and qualifications of welders are verified prior to the start of the work; periodic inspections are made of the work in progress; and a visual inspection of all welds is made prior to completion or prior to shipment of shop welding.
 - 2.1. Single-pass fillet welds not exceeding $\frac{5}{16}$ inch (7.9 mm) in size.
 - 2.2. Floor and roof deck welding.
 - 2.3. Welded studs when used for structural diaphragm.
 - 2.4. Welded sheet steel for cold-formed steel framing members such as studs and joists.
 - 2.5. Welding of stairs and railing systems.

1704.3.1 Welding. Welding inspection shall be in compliance with AWS D1.1. The basis for welding inspector qualification shall be AWS D1.1.

1704.3.2 Details. The special inspector shall perform an inspection of the steel frame to verify compliance with the details shown on the approved construction documents, such as bracing, stiffening, member locations and proper application of joint details at each connection.

TABLE 1704.3
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD ^a	IBC REFERENCE
1. Material verification of high-strength bolts, nuts and washers:				
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	—	X	Applicable ASTM material specifications; AISC 360, Section A3.3	—
b. Manufacturer's certificate of compliance required.	—	X	—	—
2. Inspection of high-strength bolting:				
a. Bearing-type connections.	—	X	AISC 360, Section M2.5	1704.3.3
b. Slip-critical connections.	X	X		
3. Material verification of structural steel:				
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	—	—	ASTM A 6 or ASTM A 568	1708.4
b. Manufacturers' certified mill test reports.	—	—	ASTM A 6 or ASTM A 568	
4. Material verification of weld filler materials:				
a. Identification markings to conform to AWS specification in the approved construction documents.	—	—	AISC 360, Section A3.5	—
b. Manufacturer's certificate of compliance required.	—	—	—	—
5. Inspection of welding:	—	—		
a. Structural steel:				
1) Complete and partial penetration groove welds.	X	—	AWS D1.1	1704.3.1
2) Multipass fillet welds.	X	—		
3) Single-pass fillet welds $> 5/16"$	X	—		
4) Single-pass fillet welds $\leq 5/16"$	—	X		
5) Floor and roof deck welds.	—	X	AWS D1.3	—
b. Reinforcing steel:	—	—	AWS D1.4 ACI 318: 3.5.2	—
1) Verification of weldability of reinforcing steel other than ASTM A 706.	—	X		
2) Reinforcing steel-resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special reinforced concrete shear walls and shear reinforcement.	X	—		
3) Shear reinforcement.	X	—		
4) Other reinforcing steel.	—	X		
6. Inspection of steel frame joint details for compliance with approved construction documents:		X	—	1704.3.2
a. Details such as bracing and stiffening.	—	—		
b. Member locations.	—	—		
c. Application of joint details at each connection.	—	—		

For SI: 1 inch = 25.4 mm.

a. Where applicable, see also Section 1707.1, Special inspection for seismic resistance.

engineering, mechanical engineering and certification as air balancers.

1704.15 Certifications by architect, engineer or geologist. If a structure or portion of a structure has been designed to utilize higher stresses requiring continuous inspection, the architect or engineer in responsible charge of the design shall certify by signature to the Department that to the best of his or her knowledge the structure or portion utilizing higher stresses was constructed in conformity with the approved design. If the grading or foundation earthwork has required continuous inspection, the responsible engineering geologist or soils engineer shall certify by signature to the Department that to the best of his or her knowledge the field work was completed in conformity with the technical design data.

1704.16 Department's responsibility. The employment of a Registered Deputy Inspector for any work does not deprive the Department of the right to make periodic or called inspections of all or portions of the work. On any work requiring continuous inspection by a Registered Deputy Inspector, the called inspections required by Section 108 of this Code may be delegated to the Registered Deputy Inspector by the Superintendent of Building.

1704.17 Structural, termite and fungus damage. Every building raised from its foundation shall be inspected. If there is any superficial evidence of structural damage, termites or fungus growth, the permittee shall remove and renew the damaged or infested members before reseating the building or moving it from its existing site or into the City.

1704.18 Emergencies or catastrophes. In the event of an emergency or of a major catastrophe in the City, the Department may deputize Emergency Building Inspectors for the Department. The inspectors shall receive no compensation from the City, and they shall be appointed for the periods of time the Department deems advisable.

1704.19 Controlled activities. In addition to the construction or work inspected as described in Sections 108 and 1704 through 1718 of this Code, there are other construction activities that are sufficiently important to the structural stability of the structure, the occupants of and the fire and life safety of the structure. An inspection by a specially qualified inspector of these activities is necessary in order to ensure compliance with the requirements of this Code. These controlled activities may occur during off-site fabrication or during on-site construction.

Inspections by Controlled Activity Inspectors will be required in accordance with regulations promulgated by the Superintendent of Building where:

1. The structure is more than five stories or 60 feet (18 288 mm) in height.
2. The structure exceeds 50,000 square feet (4645 m²) of ground area or 200,000 square feet (18 580 m²) of total floor area.
3. Nondestructive structural testing methods are utilized.
4. The quality identification markings of the materials used are not inspectable after installation.
5. The manner of use of materials precludes full inspection after installation.

Exception: The Department may waive continuous or periodic inspection required by this section where minor quantities are involved and no unusual hazards exist.

In addition to the projects included in the above categories, the Superintendent of Building may require controlled activity inspections, if the Superintendent of Buildings determines that these inspections are needed to ensure compliance with the provisions of this Code and the work involves:

1. Unique, novel or innovative construction;
2. Highly complex or intricate construction;
3. Unique, novel or innovative grading, earth support or foundation procedures; or
4. New methods of construction not yet provided for in the rules and regulations.

Controlled Activity inspection authority will be issued only as a supplement to a valid Deputy Inspector registration. The Superintendent of Building shall adopt rules and regulations implementing the provisions of this section. These regulations may establish and set the requirements for different types of Controlled Activity Inspectors.

1704.19.1 Controlled activity inspection authority.

1704.19.2 Registration. The procedures and conditions of registration as a Controlled Activity Inspector shall be the same as applicable to a Registered Deputy Inspector under Section 1704.1.3, except that the extent and duration of controlled inspection authority shall be as specified in the rules and regulations adopted by the Superintendent of Building.

1704.19.3 Duties. Except as otherwise indicated by regulations promulgated by the Superintendent of Building, the duties and responsibilities for a Controlled Activity Inspector shall be the same as specified for a Registered Deputy Inspector under Section 1704.1.4.

1704.19.4 Fees. The procedures for the examination, registration and renewal of authority as a Controlled Activity Inspector shall be the same as specified for Registered Deputy Inspectors under Section 1704.1.3. However, the fees for registration are modified as follows:

Initial authority registration:

Examination, including one class	\$25.00
Additional classes, per class	\$6.00
Registration	\$13.00

Adding classes to existing authority:

Examination and registration, per class . . .	\$13.00
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Renewal:

Examination and registration, per class . . .	\$6.00
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1704.19.5 Renewal process. Section 1704.1.3 applies to the application, examination and renewal process for registration as a Controlled Activity Inspector.

1704.20 Certification of welders.

1704.20.1 The Department shall establish procedures, rules and regulations for the issuance of Welder's Certifications.

A fee of \$110.00 shall be paid on each application for certification or renewal. Fifty dollars of the fee shall be paid prior to the Department's examination for a new certification and the remaining amount shall be paid after the examination. Certificates shall be issued for a period of 3 years and may be renewed for additional 3-year periods.

1704.20.2 The Superintendent of Building shall suspend or revoke any certificate upon evidence of failure of the person so certified to conduct welding operations in compliance with any of the conditions upon which it is based, or where quality of workmanship is not equivalent to that required by the code, or for any of the reasons set forth in Article 8, Chapter IX of the *Los Angeles Municipal Code*. Any action shall be in accordance with the provisions of Article 8, Chapter IX of the *Los Angeles Municipal Code*.

SECTION 1705 STATEMENT OF SPECIAL INSPECTIONS

1705.1 General. Where special inspection or testing is required by Section 1704, 1707 or 1708, the registered design professional in responsible charge shall prepare a statement of special inspections in accordance with Section 1705 for submittal by the permit applicant (see Section 1704.1.1).

1705.2 Content of statement of special inspections. The statement of special inspections shall identify the following:

1. The materials, systems, components, research reports and work required to have special inspection or testing by the Superintendent of Building or by the registered design professional responsible for each portion of the work.
2. The type and extent of each special inspection.
3. The type and extent of each test.
4. Additional requirements for special inspection or testing for seismic or wind resistance as specified in Sections 1705.3, 1705.4, 1707 and 1708.
5. For each type of special inspection, identification as to whether it will be continuous special inspection or periodic special inspection.

1705.3 Seismic resistance. The statement of special inspections shall include seismic requirements for the following cases:

1. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F in accordance with Section 1613.
2. Designated seismic systems in structures assigned to Seismic Design Category D, E or F.
3. The following additional systems and components in structures assigned to Seismic Design Category C:
 - 3.1. Heating, ventilating and air-conditioning (HVAC) ductwork containing hazardous materials and anchorage of such ductwork.
 - 3.2. Piping systems and mechanical units containing flammable, combustible or highly toxic materials.

- 3.3. Anchorage of electrical equipment used for emergency or standby power systems.
4. The following additional systems and components in structures assigned to Seismic Design Category D:
 - 4.1. Systems required for Seismic Design Category C.
 - 4.2. Exterior wall panels and their anchorage.
 - 4.3. Suspended ceiling systems and their anchorage.
 - 4.4. Access floors and their anchorage.
 - 4.5. Steel storage racks and their anchorage, where the importance factor is equal to 1.5 in accordance with Section 15.5.3 of ASCE 7.
5. The following additional systems and components in structures assigned to Seismic Design Category E or F:
 - 5.1. Systems required for Seismic Design Categories C and D.
 - 5.2. Electrical equipment.

Exception: Seismic requirements are permitted to be excluded from the statement of special inspections for structures designed and constructed in accordance with the following:

1. The structure consists of light-frame construction; the design spectral response acceleration at short periods, S_{DS} , as determined in Section 1613.5.4, does not exceed 0.5g; and the height of the structure does not exceed 35 feet (10 668 mm) above grade plane; or
2. The structure is constructed using a reinforced masonry structural system or reinforced concrete structural system; the design spectral response acceleration at short periods, S_{DS} , as determined in Section 1613.5.4, does not exceed 0.5g; and the height of the structure does not exceed 25 feet (7620 mm) above grade plane; or
3. Detached one- or two-family dwellings not exceeding two stories in height, provided the structure does not have any of the following plan or vertical irregularities in accordance with Section 12.3.2 of ASCE 7:
 - 3.1. Torsional irregularity.
 - 3.2. Nonparallel systems.
 - 3.3. Stiffness irregularity-extreme soft story and soft story.
 - 3.4. Discontinuity in capacity-weak story.

1705.3.1 Seismic requirements in the statement of special inspections. When Section 1705.3 specifies that seismic requirements be included, the statement of special inspections shall identify the following:

1. The designated seismic systems and seismic-force-resisting systems that are subject to special inspections in accordance with Section 1705.3.
2. The additional special inspections and testing to be provided as required by Sections 1707 and 1708 and other applicable sections of this code, including the applicable standards referenced by this code.

1705.4 Wind resistance. The statement of special inspections shall include wind requirements for structures constructed in the following areas:

1. In wind Exposure Category B, where the 3-second-gust basic wind speed is 120 miles per hour (mph) (52.8 m/s) or greater.
2. In wind Exposure Category C or D, where the 3-second-gust basic wind speed is 110 mph (49 m/s) or greater.

1705.4.1 Wind requirements in the statement of special inspections. When Section 1705.4 specifies that wind requirements be included, the statement of special inspections shall identify the main windforce-resisting systems and wind-resisting components subject to special inspections as specified in Section 1705.4.2.

1705.4.2 Detailed requirements. The statement of special inspections shall include at least the following systems and components:

1. Roof cladding and roof framing connections.
2. Wall connections to roof and floor diaphragms and framing.
3. Roof and floor diaphragm systems, including collectors, drag struts and boundary elements.
4. Vertical windforce-resisting systems, including braced frames, moment frames and shear walls.
5. Windforce-resisting system connections to the foundation.
6. Fabrication and installation of systems or components required to meet the impact-resistance requirements of Section 1609.1.2.

Exception: Fabrication of manufactured systems or components that have a label indicating compliance with the wind-load and impact-resistance requirements of this code.

SECTION 1706 CONTRACTOR RESPONSIBILITY

1706.1 Contractor responsibility. Each contractor responsible for the construction of a main wind- or seismic-force-resisting system, designated seismic system or a wind- or seismic-resisting component listed in the statement of special inspections shall submit a written statement of responsibility to the building official and the owner prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain the following:

1. Acknowledgment of awareness of the special requirements contained in the statement of special inspections;
2. Acknowledgment that control will be exercised to obtain conformance with the construction documents approved by the building official;
3. Procedures for exercising control within the contractor's organization, the method and frequency of reporting and the distribution of the reports; and
4. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.

SECTION 1707 SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE

1707.1 Special inspections for seismic resistance. Special inspections itemized in Sections 1707.2 through 1707.11 are required for the following, unless exempted by the exceptions of Section 1704.1:

1. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F as determined in Section 1613 of this Code.
2. Designated seismic systems in structures assigned to Seismic Design Category D, E or F.
3. Architectural, mechanical and electrical components in structures assigned to Seismic Design Category C, D, E or F that are required in Sections 1707.7 and 1707.8.

1707.2 Structural steel. Continuous special inspection is required for structural welding in accordance with AISC 341 and during the fabrication and erection of buildings over 160 feet (48 768 mm) in height with structural steel moment-resisting frames. A Registered Deputy Inspector under the supervision of the engineer responsible for the structural design shall be present during the performance of all structural welding or the installation of all high-strength bolts whether in a fabricator's shop or at the job site.

Exceptions:

1. Single-pass fillet welds not exceeding $\frac{5}{16}$ -inch (7.9 mm) in size.
2. Floor and roof deck welding.

1707.2.1 Certification. For buildings exceeding 160 feet (48 768mm) in height, the engineer responsible for the structural design and the general contractor responsible for the construction, or their competent authorized representatives, shall make periodic inspections of the work at the site to verify general compliance with the approved plans, specifications and change orders. The engineer and general contractor shall submit a statement in writing to the Department stating that they know from personal knowledge that the materials installed and the structural work performed is in compliance with the approved plans, specifications and change orders.

The term "**personal knowledge**" as used above in reference to the engineer and general contractor is interpreted to mean the personal knowledge, which is the result of the general observation by the engineer and general supervision by the contractor of the work as is required of and accepted from both the engineer and general contractor in the superintendence of construction of the building and as distinguished from the continuous personal superintendence of the special inspector and/or deputy inspector who are continuously at the site during the progress of the work. The exercise of reasonable diligence to obtain the facts is required and anyone who intentionally remains unaware may be charged with knowledge. The interpretation of personal knowledge as it applies to the special inspector and/or deputy inspector is that the inspector(s) must have actual personal knowledge that the requirements of the plans and specifications are being carried out, which is obtained by the

LA inspector's continuous observation of the work of construction at the site in all stages of its progress.

1707.3 Structural wood. Continuous special inspection is required during field gluing operations of elements of the seismic-force-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of components within the seismic-force-resisting system, including wood shear walls, wood diaphragms, drag struts, braces, shear panels and hold-downs.

Exception: Special inspection is not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the seismic-force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).

1707.4 Cold-formed steel framing. Periodic special inspection is required during welding operations of elements of the seismic-force-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of components within the seismic-force-resisting system, including struts, braces, and hold-downs.

1707.5 Pier foundations. Special inspection is required for pier foundations for buildings assigned to Seismic Design Category C, D, E or F in accordance with Section 1613. Periodic special inspection is required during placement of reinforcement and continuous special inspection is required during placement of the concrete.

1707.6 Storage racks and access floors. Periodic special inspection is required during the anchorage of access floors and storage racks 8 feet (2438 mm) or greater in height in structures assigned to Seismic Design Category D, E or F.

1707.7 Architectural components. Periodic special inspection is required during the erection and fastening of exterior cladding, interior and exterior nonbearing walls and interior and exterior veneer in structures assigned to Seismic Design Category D, E or F.

Exceptions:

1. Special inspection is not required for architectural components in structures 30 feet (9144 mm) or less in height.
2. Special inspection is not required for cladding and veneer weighing 5 psf (24.5 N/m²) or less.
3. Special inspection is not required for interior nonbearing walls weighing 15 psf (73.5 N/m²) or less.

1707.8 Mechanical and electrical components. Special inspection for mechanical and electrical equipment shall be as follows:

1. Periodic special inspection is required during the anchorage of electrical equipment for emergency or standby power systems in structures assigned to Seismic Design Category C, D, E or F;
2. Periodic special inspection is required during the installation of anchorage of other electrical equipment in structures assigned to Seismic Design Category E or F;
3. Periodic special inspection is required during installation of piping systems intended to carry flammable, combustible or highly toxic contents and their associated mechanical units in structures assigned to Seismic Design Category C, D, E or F;

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4. Periodic special inspection is required during the installation of HVAC ductwork that will contain hazardous materials in structures assigned to Seismic Design Category C, D, E or F; and
5. Periodic special inspection is required during the installation of vibration isolation systems in structures assigned to Seismic Design Category C, D, E or F where the construction documents require a nominal clearance of 0.25 inches (6.4 mm) or less between the equipment support frame and restraint.

1707.9 Designated seismic system verifications. The Registered Deputy Inspector shall examine designated seismic systems requiring seismic qualification in accordance with Section 1708.5 and verify that the label, anchorage, mounting conforms to the certificate of compliance and any applicable research report.

1707.10 Seismic isolation system. Periodic special inspection is required during the fabrication and installation of isolator units and energy dissipation devices that are part of the seismic isolation system.

1707.11 Structural inspection—concrete. During the construction of all buildings over 160 feet (48 768 mm) in height with concrete special moment-resisting space frames, a structural inspector under the supervision of the engineer responsible for the structural design shall be present to inspect the materials and workmanship for conformance with approved plans, specifications and change orders involved in construction of the ductile frames and shear walls. This inspection may be made by one or more structural inspectors, provided that at least one structural inspector is present during the placement of all concrete and reinforcement in the structural frame and shear walls.

The number of structural inspectors to be provided for each structure shall be determined by the engineer responsible for the structural design, provided that more than one structural inspector shall be provided where the magnitude of a structure prevents a single inspector from adequately performing the inspection.

The owner shall provide for each structural inspector. Each structural inspector shall be paid by the owner directly or through the person responsible for the structural design. Each structural inspector shall be responsible to the person who prepared the structural design.

The inspection by the structural inspector or inspectors shall be in addition to inspections made by Department employees as specified in Section 108 of this Code and by Registered Deputy Inspectors as specified for other parts of the work in Section 1704.1.

Prior to the issuance of the Certificate of Occupancy, each structural inspector shall submit a report in writing to the engineer and the Department certifying that the portions of the structural frame inspected by the inspector were constructed in accordance with the approved plans, specifications, change orders and Chapter 19 of this Code.

1708.1.1 Empirically designed masonry and glass unit masonry in Occupancy Category I, II or III. For masonry designed by Section 2109 or 2110 or by Chapter 5 or 7 of ACI 530/ASCE 5/TMS 402 in structures classified as Occupancy Category I, II or III, in accordance with Section 1604.5, certificates of compliance used in masonry construction shall be verified prior to construction.

1708.1.2 Empirically designed masonry and glass unit masonry in Occupancy Category IV. The minimum testing and verification prior to construction for masonry designed by Section 2109 or 2110 or by Chapter 5 or 7 of ACI 530/ASCE 5/TMS 402 in structures classified as Occupancy Category IV, in accordance with Section 1604.5, shall comply with the requirements of Table 1708.1.2.

MINIMUM TESTS AND SUBMITTALS

MINIMUM TESTS AND SUBMITTALS
Certificates of compliance used in masonry construction.
Verification of f'_m and f'_{AAC} prior to construction, except where specifically exempted by this code.

1708.1.3 Engineered masonry in Occupancy Category I, II or III. The minimum testing and verification prior to construction for masonry designed by Section 2107 or 2108 or by chapters other than Chapter 5, 6 or 7 of ACI 530/ASCE 5/TMS 402 in structures classified as Occupancy Category I, II or III, in accordance with Section 1604.5, shall comply with Table 1708.1.2.

1708.1.4 Engineered masonry in Occupancy Category IV. The minimum testing and verification prior to construction for masonry designed by Section 2107 or 2108 or by chapters other than Chapter 5, 6 or 7 of ACI 530/ASCE 5/TMS 402 in structures classified as Occupancy Category IV, in accordance with Section 1604.5, shall comply with Table 1708.1.4.

MINIMUM TESTS AND SUBMITTALS

MINIMUM TESTS AND SUBMITTALS
Certificates of compliance used in masonry construction.
Verification of f'_m and f'_{AAC} prior to construction and every 5,000 square feet during construction.
Verification of proportions of materials in mortar and grout as delivered to the site.

1708.2 Testing for seismic resistance. The tests specified in Sections 1708.3 through 1708.6 are required for the following:

1. The seismic-force-resisting systems in structures assigned to Seismic Design Category C, D, E or F, as determined in Section 1613.
2. Designated seismic systems in structures assigned to Seismic Design Category D, E or F.
3. Architectural, mechanical and electrical components in structures assigned to Seismic Design Category C, D, E or F that are required in Section 1708.5.

1708.3 Reinforcing and prestressing steel. Certified mill test reports shall be provided for each shipment of reinforcing steel used to resist flexural, shear and axial forces in reinforced concrete intermediate frames, special moment frames and boundary elements of special reinforced concrete or reinforced masonry shear walls. Where ASTM A 615 reinforcing steel is used to resist earthquake-induced flexural and axial forces in special moment frames and in wall boundary elements of shear walls in structures assigned to Seismic Design Category D, E or F, as determined in Section 1613, the testing requirements of ACI 318 shall be met. Where ASTM A 615 reinforcing steel is to be welded, chemical tests shall be performed to determine weldability in accordance with Section 3.5.2 of ACI 318.

1708.4 Structural steel. The testing described in the quality assurance plan shall be as required by AISC 341 and the additional requirements in this section. Nondestructive testing shall be performed by an approved agency and the written report, including the test results, shall be submitted for evaluation by the Superintendent of Building. The acceptance criteria for nondestructive testing shall be as required in AWS D1.1 as specified by the registered design professional.

Base metal thicker than 1.5 inches (38 mm), where subject to through-thickness weld shrinkage strains, shall be ultrasonically tested for discontinuities behind and adjacent to those welds after joint completion. Any material discontinuities shall be accepted or rejected on the basis of ASTM A 435 or ASTM A 898 (Level 1 criteria) and criteria as established by the registered design professional(s) in responsible charge and the construction documents.

1708.5 Seismic qualification of mechanical and electrical equipment. The registered design professional in responsible charge shall state the applicable seismic qualification requirements for designated seismic systems on the construction documents. Each manufacturer of designated seismic system components shall test or analyze the component and its mounting system or anchorage and submit a certificate of compliance for review and acceptance by the registered design professional in responsible charge of the design of the designated seismic system and for approval by the building official. Qualification shall be by an actual test on a shake table, by three-dimensional shock tests, by an analytical method using dynamic characteristics and forces, by the use of experience data (i.e., historical data demonstrating acceptable seismic performance) or by a more rigorous analysis providing for equivalent safety.

1708.6 Seismically isolated structures. For required system tests, see Section 17.8 of ASCE 7.

SECTION 1709 STRUCTURAL OBSERVATIONS

1709.1 General. Where required by the provisions of Section 1709.2 or 1709.3, the owner shall employ a registered design professional to perform structural observations as defined in Section 1702.

The owner or owner's representative shall coordinate and call a preconstruction meeting between the engineer or architect responsible for the structural design, structural observer, contractor, affected subcontractors and deputy inspectors. The structural observer shall preside over the meeting. The purpose of the meeting shall be to identify the major structural elements and connections that affect the vertical and lateral load systems of the structure and to review scheduling of the required observations. A record of the meeting shall be included in the first report submitted to the Superintendent of Building.

Observed deficiencies shall be reported in writing to the owner's representative, Registered Deputy Inspector, contractor and the Superintendent of Building. Upon the form prescribed by the Superintendent of Building, the structural observer shall submit to the Superintendent of Building a written statement at each significant construction stage stating that the site visits have been made and identifying any reported deficiencies, which, to the best of the structural observer's knowledge, have not been resolved. A final report by the structural observer, which states that all observed deficiencies have been resolved, is required before acceptance of the work by the Superintendent of Building.

At the conclusion of the work included in the permit, the structural observer shall submit to the Superintendent of Building a written statement that the site visits have been made and shall identify any reported deficiencies that, to the best of the structural observer's knowledge, have not been resolved.

1709.2 Structural observations for seismic resistance. Structural observations shall be provided for those structures included in Seismic Design Category D, E or F, as determined in Section 1613, where one or more of the following conditions exist:

1. The structure is classified as Occupancy Category III or IV in accordance with Section 1604.5.
2. The height of the structure is greater than 75 feet (22 860 mm) above the base.
3. The structure is assigned to Seismic Design Category E, is classified as Occupancy Category I or II in accordance with Section 1604.5 and is greater than two stories in height.
4. When so designated by the registered design professional in responsible charge of the design.
5. When such observation is specifically required by the building official.

1709.3 Structural observations for wind requirements. Structural observations shall be provided for those structures sited where the basic wind speed exceeds 110 mph (49 m/s), determined from Figure 1609, where one or more of the following conditions exist:

1. The structure is classified as Occupancy Category III or IV in accordance with Table 1604.5.
2. The building height is greater than 75 feet (22 860 mm).
3. When so designated by the registered design professional in responsible charge of the design.
4. When such observation is specifically required by the building official.

SECTION 1710 DESIGN STRENGTHS OF MATERIALS

1710.1 Conformance to standards. The design strengths and permissible stresses of any structural material that are identified by a manufacturer's designation as to manufacture and grade by mill tests, or the strength and stress grade is otherwise confirmed to the satisfaction of the building official, shall conform to the specifications and methods of design of accepted engineering practice or the approved rules in the absence of applicable standards.

1710.2 New materials. For materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests as provided for in Section 1711.

SECTION 1711 ALTERNATIVE TEST PROCEDURE

1711.1 General. In the absence of approved rules or other approved standards pertaining to new materials or assemblies, the Superintendent of Building shall make, or cause to be made, any necessary tests and investigations; or the Superintendent of Building shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in Section 104.2.6 of this Code. The cost of all tests and other investigations required under the provisions of this Code shall be borne by the permit applicant.

SECTION 1712 TEST SAFE LOAD

1712.1 Where required. Where proposed construction is not capable of being designed by approved engineering analysis, or where proposed construction design method does not comply with the applicable material design standard, the system of construction or the structural unit and the connections shall be subjected to the tests prescribed in Section 1714. The building official shall accept certified reports of such tests conducted by an approved testing agency, provided that such tests meet the requirements of this code and approved procedures.

SECTION 1713 IN-SITU LOAD TESTS

1713.1 General. Whenever there is a reasonable doubt as to the stability or load-bearing capacity of a completed building, structure or portion thereof for the expected loads, an engineering assessment shall be required. The engineering assessment

shall involve either a structural analysis or an in-situ load test, or both. The structural analysis shall be based on actual material properties and other as-built conditions that affect stability or load-bearing capacity, and shall be conducted in accordance with the applicable design standard. If the structural assessment determines that the load-bearing capacity is less than that required by the code, load tests shall be conducted in accordance with Section 1713.2. If the building, structure or portion thereof is found to have inadequate stability or load-bearing capacity for the expected loads, modifications to ensure structural adequacy or the removal of the inadequate construction shall be required.

1713.2 Test standards. Structural components and assemblies shall be tested in accordance with the appropriate material standards listed in Chapter 35. In the absence of a standard that contains an applicable load test procedure, the test procedure shall be developed by a registered design professional and approved. The test procedure shall simulate loads and conditions of application that the completed structure or portion thereof will be subjected to in normal use.

1713.3 In-situ load tests. In-situ load tests shall be conducted in accordance with Section 1713.3.1 or 1713.3.2 and shall be supervised by a registered design professional. The test shall simulate the applicable loading conditions specified in Chapter 16 as necessary to address the concerns regarding structural stability of the building, structure or portion thereof.

1713.3.1 Load test procedure specified. Where a standard listed in Chapter 35 contains an applicable load test procedure and acceptance criteria, the test procedure and acceptance criteria in the standard shall apply. In the absence of specific load factors or acceptance criteria, the load factors and acceptance criteria in Section 1713.3.2 shall apply.

1713.3.2 Load test procedure not specified. In the absence of applicable load test procedures contained within a standard referenced by this code or acceptance criteria for a specific material or method of construction, such existing structure shall be subjected to a test procedure developed by a registered design professional that simulates applicable loading and deformation conditions. For components that are not a part of the seismic-load-resisting system, the test load shall be equal to two times the unfactored design loads. The test load shall be left in place for a period of 24 hours. The structure shall be considered to have successfully met the test requirements where the following criteria are satisfied:

1. Under the design load, the deflection shall not exceed the limitations specified in Section 1604.3.
2. Within 24 hours after removal of the test load, the structure shall have recovered not less than 75 percent of the maximum deflection.
3. During and immediately after the test, the structure shall not show evidence of failure.

SECTION 1714 PRECONSTRUCTION LOAD TESTS

1714.1 General. In evaluating the physical properties of materials and methods of construction that are not capable of being designed by approved engineering analysis or do not comply

with applicable material design standards listed in Chapter 35, the structural adequacy shall be predetermined based on the load test criteria established in this section.

1714.2 Load test procedures specified. Where specific load test procedures, load factors and acceptance criteria are included in the applicable design standards listed in Chapter 35, such test procedures, load factors and acceptance criteria shall apply. In the absence of specific test procedures, load factors or acceptance criteria, the corresponding provisions in Section 1714.3 shall apply.

1714.3 Load test procedures not specified. Where load test procedures are not specified in the applicable design standards listed in Chapter 35, the load-bearing and deformation capacity of structural components and assemblies shall be determined on the basis of a test procedure developed by a registered design professional that simulates applicable loading and deformation conditions. For components and assemblies that are not a part of the seismic-load-resisting system, the test shall be as specified in Section 1714.3.1. Load tests shall simulate the applicable loading conditions specified in Chapter 16.

1714.3.1 Test procedure. The test assembly shall be subjected to an increasing superimposed load equal to not less than two times the superimposed design load. The test load shall be left in place for a period of 24 hours. The tested assembly shall be considered to have successfully met the test requirements if the assembly recovers not less than 75 percent of the maximum deflection within 24 hours after the removal of the test load. The test assembly shall then be reloaded and subjected to an increasing superimposed load until either structural failure occurs or the superimposed load is equal to two and one-half times the load at which the deflection limitations specified in Section 1714.3.2 were reached, or the load is equal to two and one-half times the superimposed design load. In the case of structural components and assemblies for which deflection limitations are not specified in Section 1714.3.2, the test specimen shall be subjected to an increasing superimposed load until structural failure occurs or the load is equal to two and one-half times the desired superimposed design load. The allowable superimposed design load shall be taken as the lesser of:

1. The load at the deflection limitation given in Section 1714.3.2.
2. The failure load divided by 2.5.
3. The maximum load applied divided by 2.5.

1714.3.2 Deflection. The deflection of structural members under the design load shall not exceed the limitations in Section 1604.3.

1714.4 Wall and partition assemblies. Load-bearing wall and partition assemblies shall sustain the test load both with and without window framing. The test load shall include all design load components. Wall and partition assemblies shall be tested both with and without door and window framing.

1714.5 Exterior window and door assemblies. The design pressure rating of exterior windows and doors in buildings shall be determined in accordance with Section 1714.5.1 or 1714.5.2.

Exception: Structural wind load design pressures for window units smaller than the size tested in accordance with Section 1714.5.1 or 1714.5.2 shall be permitted to be higher than the design value of the tested unit provided such higher pressures are determined by accepted engineering analysis. All components of the small unit shall be the same as the tested unit. Where such calculated design pressures are used, they shall be validated by an additional test of the window unit having the highest allowable design pressure.

1714.5.1 Exterior windows and doors. Exterior windows and sliding doors shall be tested and labeled as conforming to AAMA/WDMA/CSA101/I.S.2/A440. The label shall state the name of the manufacturer, the approved labeling agency and the product designation as specified in AAMA/WDMA/CSA101/I.S.2/A440. Exterior side-hinged doors shall be tested and labeled as conforming to AAMA/WDMA/CSA101/I.S.2/A440 or comply with Section 1714.5.2. Products tested and labeled as conforming to AAMA/WDMA/CSA 101/I.S.2/A440 shall not be subject to the requirements of Sections 2403.2 and 2403.3.

1714.5.2 Exterior windows and door assemblies not provided for in Section 1714.5.1. Exterior window and door assemblies shall be tested in accordance with ASTM E 330. Exterior window and door assemblies containing glass shall comply with Section 2403. The design pressure for testing shall be calculated in accordance with Chapter 16. Each assembly shall be tested for 10 seconds at a load equal to 1.5 times the design pressure.

1714.6 Test specimens. Test specimens and construction shall be representative of the materials, workmanship and details normally used in practice. The properties of the materials used to construct the test assembly shall be determined on the basis of tests on samples taken from the load assembly or on representative samples of the materials used to construct the load test assembly. Required tests shall be conducted or witnessed by an approved agency.

SECTION 1715 MATERIAL AND TEST STANDARDS

1715.1 Test standards for joist hangers and connectors.

1715.1.1 Test standards for joist hangers. The vertical load-bearing capacity, torsional moment capacity and deflection characteristics of joist hangers shall be determined in accordance with ASTM D 1761 using lumber having a specific gravity of 0.49 or greater, but not greater than 0.55, as determined in accordance with AF&PA NDS for the joist and headers. Required testing shall be conducted or witnessed by an approved agency.

Exception: The joist length shall not be required to exceed 24 inches (610 mm).

1715.1.2 Vertical load capacity for joist hangers. The vertical load capacity for the joist hanger shall be determined by testing a minimum of three joist hanger assemblies as specified in ASTM D 1761. If the ultimate vertical load for any one of the tests varies more than 20 percent from the average ultimate vertical load, at least three additional tests shall be con-

ducted. The allowable vertical load of the joist hanger shall be the lowest value determined from the following:

1. The lowest ultimate vertical load for a single hanger from any test divided by three (where three tests are conducted and each ultimate vertical load does not vary more than 20 percent from the average ultimate vertical load).
2. The average ultimate vertical load for a single hanger from all tests divided by three (where six or more tests are conducted).
3. The average from all tests of the vertical loads that produce a vertical movement of the joist with respect to the header of 0.125 inch (3.2 mm).
4. The sum of the allowable design loads for nails or other fasteners utilized to secure the joist hanger to the wood members and allowable bearing loads that contribute to the capacity of the hanger.
5. The allowable design load for the wood members forming the connection.

1715.1.3 Torsional moment capacity for joist hangers. The torsional moment capacity for the joist hanger shall be determined by testing at least three joist hanger assemblies as specified in ASTM D 1761. The allowable torsional moment of the joist hanger shall be the average torsional moment at which the lateral movement of the top or bottom of the joist with respect to the original position of the joist is 0.125 inch (3.2 mm).

1715.1.4 Design value modifications for joist hangers. Allowable design values for joist hangers that are determined by Item 4 or 5 in Section 1715.1.2 shall be permitted to be modified by the appropriate duration of loading factors as specified in AF&PA NDS but shall not exceed the direct loads as determined by Item 1, 2 or 3 in Section 1715.1.2. Allowable design values determined by Item 1, 2 or 3 in Section 1715.1.2 shall not be modified by duration of loading factors.

1715.2 Concrete and clay roof tiles. Required tests for concrete and clay roof tiles shall be conducted or witnessed by an approved testing agency.

1715.2.1 Overturning resistance. Concrete and clay roof tiles shall be tested to determine their resistance to overturning due to wind in accordance with SBCCI SSTD 11 and Chapter 15.

1715.2.2 Wind tunnel testing. When roof tiles do not satisfy the limitations in Chapter 16 for rigid tile, a wind tunnel test shall be used to determine the wind characteristics of the concrete or clay tile roof covering in accordance with SBCCI SSTD 11 and Chapter 15.

SECTION 1716 CERTIFIED LICENSED CONTRACTORS

1716.1 Registration. Application for registration as a certified licensed contractor shall be made to the Superintendent of building on a form furnished by the Department and a separate application shall be made for each type of registration desired. Before the application can be accepted, the applicant must furnish proof satisfactory to the Department that the applicant

holds a valid active California State Contractor's License in the same specialty as the certification requested.

1716.2 Application.

1716.2.1 Forms. Application for a Certificate of Registration shall be made on a form furnished by the Department.

1716.2.2 Information necessary. The application shall bear the name and address of the applicant and, if the applicant is employed by a firm, partnership or corporation, the names of the principal officers should also be included. The application shall carry other information deemed necessary by the Department.

1716.2.3 Verification. The applicant shall declare that the information contained in the application is true and correct.

1716.2.4 Fee. The application shall be accompanied by an examination fee of \$125.

1716.3 Examination.

1716.3.1 Examination required. Before issuance of a Certificate of Registration, the applicant shall have successfully passed the examination required for the issuance of the Certificate of Registration within 90 days preceding the date of the issuance. To be eligible for the examination for a Certificate of Registration, the applicant shall have a valid California State Contractor's License in an appropriate specialty and a valid City Business Tax Certificate.

1716.3.2 Board of examiners. The Superintendent of Building and/or Board of Examiners composed of three qualified persons appointed by the Superintendent shall conduct examinations.

The results of every examination shall be subject to the approval of the Superintendent of Building.

Each examiner shall serve at the pleasure of the Superintendent of Building and shall serve for a period of 1 year unless reappointed by the Superintendent of Building.

1716.3.3 Scope of examination. The examination shall, in the judgment of the Superintendent of Building, fairly determine the ability of the applicant to perform properly the work, which he or she would be authorized to do by the Certificate of Registration requested, and may include the following:

1. A written test.
2. Practical tests as may be required.
3. An oral interview as may be required.
4. Other tests as may be required by the Board of Examiners.

1716.3.4 Time of examination. The applicant shall be examined as soon as practicable after filing an application.

1716.3.5 Rules and regulations. The Department shall have the authority to establish rules and regulations for the conduct of examinations.

1716.3.6 Fitness of applicant. Any applicant may be required to submit satisfactory proof of his or her fitness to carry out the intent of this Code.

1716.3.7 Failure to pass. An applicant who fails to pass an examination shall not be eligible for another examination until 4 weeks after taking the previous examination.

1716.4 Issuance of certificates.

1716.4.1 The Superintendent of Building shall issue separate Certificates of Registration for each of the following categories:

1. FAU/AC units; evaporative coolers.
2. Domestic water piping/plumbing fixtures/hot water heaters/solar panels.
3. Reroofing and roof repair.
4. Electrical equipment/fixtures/smoke detectors.
5. Masonry and concrete fences.
6. Masonry chimney repairs.
7. Shower pan replacement.

Nothing here prohibits any person from being qualified for more than one type of certification, provided the person makes application, pays the required fees, takes the required examinations and is duly qualified by the Superintendent of Building for each type of certification.

1716.4.2 Upon payment of a \$30.00 fee, the Department may issue a Certificate of Registration to every applicant who passes the required examination for a Certified Licensed Contractor.

1716.4.3 Each Certificate of Registration shall expire three years from the date of issuance.

1716.4.4 The Superintendent of Building shall keep on file a list, open to public inspection, of the names of all registered certified licensed contractors, showing the type of work each has been authorized to inspect.

1716.4.5 Renewal of certificates. Expired Certificates of Registration may be renewed at any time within 12 months following the date of expiration. However, after the first month, the renewal fee shall be increased ten percent for each subsequent month.

After a Certificate of Registration has been expired for one year, it may not be renewed; rather, a new application for a new certificate must be submitted at that time.

1716.5 Exhibition of certificate.

1716.5.1 Every person having a fixed place of business shall keep his or her Certificate of Registration posted in some conspicuous location at his or her place of business during the time the certificate is in force.

1716.5.2 Every person not having a fixed place of business shall carry his or her Certificate of Registration with him or her at all times while doing any inspections or other work pursuant to this certificate.

1716.6 Revocation of certificate. The Superintendent of Building may revoke, suspend or refuse to renew any Certificate of Registration upon a showing of incompetence, willful or negligent failure to observe or report violations of this Code, or failure to maintain a valid active California State Contractor's License in the same specialty as the certification. Prior to

any action, the holder shall be given an opportunity to appear before the Superintendent of Building and be heard.

Suspension or revocation of any Certificate of Registration issued under this section shall be in accordance with the provisions of Article 8, Chapter IX of the *Los Angeles Municipal Code*.

SECTION 1717 CERTIFIED SECURITY BAR INSTALLER

1717.1 General. A certified security bar installer may certify to the Department of Building and Safety that any bars, grilles, grates, security rolldown shutters, or similar devices installed on required emergency escape windows or doors meet the requirements of Section 6304.3 of this Code.

The Department may allow the use of a certified installer if:

1. The certified installer obtains a Certificate of Registration in accordance with the provisions of this section.
2. The certified installer files with the Department a Certificate of Compliance for each dwelling unit for which certification is being made. The Certificate of Compliance shall be on a form provided by the Department and shall be signed by the property owner and the certified installer.
3. The Certificate of Compliance processing fee is paid in accordance with Section 107.7 of this Code.
4. The certified installer files the Certificate of Compliance with the Department within 15 days after completion of the installation.

1717.2 Registration. A certified installer shall obtain a Certificate of Registration from the Department of Building and Safety.

1717.3 Application.

1717.3.1 Forms. Application for a certified security bar installer Certificate of Registration shall be made on a form furnished by the Department.

1717.3.2 Information necessary. The application shall bear the name and address of the applicant and, if a firm, partnership or corporation, the names of the principal officers. The application shall carry other information deemed necessary by the Department.

1717.3.3 Verification. The applicant shall declare that the information contained in the application is true and correct.

1717.3.4 Fees. The application shall be accompanied by an examination fee of \$125.00.

1717.4 Examination.

1717.4.1 Examination required. Before any person shall be issued a Certificate of Registration, the applicant, who must be an officer in the case of a firm, partnership or corporation, shall have successfully passed the examination required for the issuance of the certificate within 90 days preceding the date of the issuance.

1717.4.2 Experience required. To be eligible for the examination for a Registration Certificate, the applicant shall have a valid California State Contractor's License in an

appropriate specialty and a valid City Business Tax Certificate.

1717.4.3 Board of examiners. The Superintendent of Building or a Board of Examiners composed of three qualified persons appointed by the Superintendent shall conduct examinations.

The results of every examination shall be subject to the approval of the Superintendent of Building.

Each examiner shall serve at the pleasure of the Superintendent of Building and shall serve for a period of one year unless reappointed by the Superintendent of Building.

1717.4.4 Scope of examination. The examination shall, in the judgment of the board, fairly determine the ability of the applicant to perform properly the work, which he or she would be authorized to do by the certificate requested, and may include the following:

1. A written test.
2. Practical tests as may be required.
3. An oral interview as may be required.
4. Other tests as may be required by the Board of Examiners.

1717.4.5 Time of examination. The applicant shall be examined as soon as practicable after filing an application.

1717.4.6 Rules and regulations. The Department shall have the authority to establish rules and regulations for the conduct of examinations.

1717.4.7 Fitness of applicant. Any applicant for a certificate may be required to submit satisfactory proof of his or her fitness to carry out the intent of this Code.

1717.4.8 Failure to pass. Every applicant who fails to pass an examination shall not be eligible for another examination until four weeks after taking the previous examination. Any applicant who fails to pass on the third try shall not be eligible again until 6 months after taking the previous examination.

1717.5 Issuance of certificates.

1717.5.1 Upon the payment of a \$90.00 fee, the Department may issue a Certificate of Registration to every applicant who passes the required examination for a certified security bar installer.

1717.5.2 Renewal of certificates. Expired certificates may be renewed at any time within 12 months following the date of expiration. However, after the first month, the renewal fee shall be increased by ten percent for each subsequent month. After a certificate has been expired for one year, it may not be renewed; however, an applicant may apply for a new certificate at that time.

1717.6 Exhibition of certificate.

1717.6.1 Every person having a fixed place of business shall keep his or her Certificate of Registration posted in some conspicuous location at his or her place of business during the time the certificate is in force.

1717.6.2 Every person not having a fixed place of business shall carry his or her Certificate of Registration with him or

her at all times while doing any work pursuant to this certificate.

1717.7 Revocation of Certificate. Any certificate may be suspended or revoked in accordance with the provisions of Article 8, Chapter IX of the *Los Angeles Municipal Code*.

1717.8 Transfer of Certificate. No certificate shall be transferable. A Certificate of Registration issued to a firm, partnership or corporation may not be transferred. The dissolution of a firm, partnership or corporation renders the certificate void.

SECTION 1718 PREFABRICATED CONSTRUCTION

1718.1 General.

1718.1.1 Purpose. The purpose of this section is to regulate materials and establish methods of safe construction where any structure or portion of the structure is wholly or partially prefabricated.

1718.1.2 Scope. Unless otherwise specifically stated in this section, all prefabricated construction and all materials used in the construction shall conform to all the requirements of this Code. (see Section 104.2.6 of this Code.)

1718.1.3 Definition.

PREFABRICATED ASSEMBLY. A structural unit, the integral parts of which have been built up or assembled prior to incorporation in the building.

1718.2 Tests of materials. Every approval of a material not specifically mentioned in this Code shall incorporate as a proviso, the kind and number of tests to be made during prefabrication.

1718.3 Tests of assemblies. The Superintendent of Building may require special tests to be made on assemblies to determine their durability and weather resistance.

1718.4 Connections. See Section 1611.11.1 of this Code for design requirements of connections for prefabricated assemblies.

1718.5 Pipes and conduits. See Section 1611.11.2 of this Code for design requirements for removal of material for pipes, conduits and other equipment.

1718.6 Certificate and inspection.

1718.6.1 Materials. Materials and the assembly of materials shall be inspected to determine compliance with this Code. Every material shall be graded, marked or labeled where required elsewhere in this Code.

1718.6.2 Certificate. A Certificate of Approval shall be furnished with every prefabricated assembly, except where the assembly is readily accessible to inspection at the site. The Certificate of Approval shall certify that the assembly in question has been inspected and meets all the requirements of this Code. When mechanical equipment is installed so that it cannot be inspected at the site, the Certificate of Approval shall certify that the equipment complies with all applicable laws and regulations.

1718.6.3 Certifying agency. To be acceptable under this Code, every Certificate of Approval shall be made by an approved agency.

1718.6.4 Field erection. Placement of prefabricated assemblies at the building site shall be inspected by the Department to determine compliance with this Code.

1718.6.5 Continuous inspection. If continuous inspection is required for certain materials where construction takes place on the site, it shall also be required where the same materials are used in prefabricated construction.

Exception: Continuous inspection will not be required during prefabrication if the approved agency certifies to the construction and furnishes evidence of compliance.

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CHAPTER 18

SOILS AND FOUNDATIONS

SECTION 1801 GENERAL

1801.1 Scope. The provisions of this Chapter shall apply to building and foundation systems in those areas not subject to scour or water pressure by wind and wave action. Buildings and foundations subject to those scour or water pressure loads shall be designed in accordance with Chapter 16 of this Code.

Requirements governing excavation, grading and earthwork construction, including fills and embankments are set forth in Chapter 70 of this Code.

Hillside buildings (buildings constructed on slopes steeper than one unit vertical in three units horizontal (33.3-percent slope) shall comply with Section 1613.9 of this Code (seismic design provisions for hillside buildings) and this Chapter.

1801.2 Design. Allowable bearing pressures, allowable stresses and design formulas provided in this chapter shall be used with the allowable stress design load combinations specified in Section 1605.3. The quality and design of materials used structurally in excavations, footings and foundations shall conform to the requirements specified in Chapters 16, 19, 21, 22 and 23 of this code. Excavations and fills shall also comply with Chapter 33.

[HCD 1] For limited-density owner-built rural dwellings, pier foundations, stone masonry footings and foundations, pressure-treated lumber, poles, or equivalent foundation materials or designs may be used provided that the bearing is sufficient for the purpose intended.

1801.2.1 Foundation design for seismic overturning. Where the foundation is proportioned using the load combinations of Section 1605.2, and the computation of the seismic overturning moment is by the equivalent lateral-force method or the modal analysis method, the proportioning shall be in accordance with Section 12.13.4 of ASCE 7.

SECTION 1802 FOUNDATION AND SOILS INVESTIGATIONS

1802.1 General. Foundation and soils investigations shall be conducted in conformance with Sections 1802.2 through 1802.8. Where required by the building official, the classification and investigation of the soil shall be made by a registered design professional.

1802.1.1 General and where required for applications listed in Section 108.2.1.1 regulated by the Department of Housing and Community Development. *[HCD 1] Foundation and soils investigations shall be conducted in conference with Health and Safety Code Sections 17953 through 17955 as summarized below.*

1802.1.1.1 Preliminary soil report. *Each city, county, or city and county shall enact an ordinance which requires a preliminary soil report, prepared by a civil engineer who is registered by the state. The report shall be based upon adequate test borings or excavations, of every subdivision, where a tentative and final map is required pursuant to Section 66426 of the Government Code.*

The preliminary soil report may be waived if the building department of the city, county or city and county, or other enforcement agency charged with the administration and enforcement of the provisions of this part, shall determine that, due to the knowledge such department has as to the soil qualities of the soil of the subdivision or lot, no preliminary analysis is necessary.

1802.1.1.2 Soil investigation by lot, necessity, preparation, and recommendations. *If the preliminary soil report indicates the presence of critically expansive soils or other soil problems which, if not corrected, would lead to structural defects, such ordinance shall require a soil investigation of each lot in the subdivision.*

The soil investigation shall be prepared by a civil engineer who is registered in this state. It shall recommend corrective action which is likely to prevent structural damage to each dwelling proposed to be constructed on the expansive soil.

1802.1.1.3 Approval, building permit conditions, appeal. *The building department of each city, county or city and county, or other enforcement agency charged with the administration and enforcement of the provisions of this part, shall approve the soil investigation if it determines that the recommended action is likely to prevent structural damage to each dwelling to be constructed. As a condition to the building permit, the ordinance shall require that the approved recommended action be incorporated in the construction of each dwelling. Appeal from such determination shall be to the local appeals board.*

1802.2 Where required. The owner or applicant shall submit a foundation and soils investigation to the building official where required in Sections 1802.2.1 through 1802.2.7.

Exception: The building official need not require a foundation or soils investigation where satisfactory data from adjacent areas is available that demonstrates an investigation is not necessary for any of the conditions in Sections 1802.2.1 through 1802.2.6.

[OSHPD 2] Geotechnical reports are not required for one-story, wood-frame and light-steel-frame buildings of Type V construction and 4,000 square feet (371 m²) or less in floor area, not located within Earthquake Fault Zones or Seismic Hazard Zones as shown in the most recently published maps from California Geological Survey (CGS). Allowable foundation and lateral soil pressure values may be determined from Table 1804.2.

1802.2.1 Questionable soil. Where the classification, strength or compressibility of the soil are in doubt or where a load-bearing value superior to that specified in this code is claimed, the building official shall require that the necessary investigation be made. Such investigation shall comply with the provisions of Sections 1802.4 through 1802.6.

1802.2.2 Expansive soils. In areas likely to have expansive soil, the building official shall require soil tests to determine where such soils do exist.

1802.2.3 Ground-water table. A subsurface soil investigation shall be performed to determine whether the historical high ground-water table is above or within 5 feet (1524 mm) below the elevation of the lowest floor level where the lowest floor level is located below the finished ground level adjacent to the foundation.

Exception: A subsurface soil investigation shall not be required where waterproofing is provided in accordance with Section 1807.

1802.2.4 Pile and pier foundations. Pile and pier foundations shall be designed and installed on the basis of a foundation investigation and report as specified in Sections 1802.4 through 1802.6 and Section 1808.2.2.

1802.2.5 Rock strata. Where subsurface explorations at the project site indicate variations or doubtful characteristics in the structure of the rock upon which foundations are to be constructed, a sufficient number of borings shall be made to a depth of not less than 10 feet (3048 mm) below the level of the foundations and to a depth that would allow investigation of any unsupported bedding planes or any other rock discontinuities that could influence the foundation stability to provide assurance of the soundness of the foundation bed and its load-bearing capacity.

1802.2.6 Seismic Design Category C. Where a structure is determined to be in Seismic Design Category C in accordance with Section 1613, an investigation shall be conducted and shall include an evaluation of the following potential hazards resulting from earthquake motions: slope instability, liquefaction and surface rupture due to faulting or lateral spreading.

1802.2.7 Seismic Design Category D, E or F. Where the structure is determined to be in Seismic Design Category D, E or F, in accordance with Section 1613, the soils investigation requirements for Seismic Design Category C, given in Section 1802.2.6, shall be met, in addition to the following. The investigation shall include:

1. A determination of lateral pressures on basement and retaining walls due to earthquake motions.
2. An assessment of potential consequences of any liquefaction and soil strength loss, including estimation of differential settlement, lateral movement or reduction in foundation soil-bearing capacity, and shall address mitigation measures. Such measures shall be given consideration in the design of the structure and can include but are not limited to ground stabilization, selection of appropriate foundation type and depths, selection of appropriate structural systems to accommodate anticipated displacements or any combination of these measures. The potential for liquefaction and soil strength loss shall be evaluated for site peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions. Peak ground acceleration shall be determined from a site-specific study taking into account soil amplification effects, as specified in Chapter 21 of ASCE 7.

Exception: A site-specific study need not be performed, provided that peak ground acceleration

equal to $S_{DS}/2.5$ is used, where S_{DS} is determined in accordance with Section 21.2.1 of ASCE 7.

1802.3 Soil classification. Where required, soils shall be classified in accordance with Section 1802.3.1 or 1802.3.2.

1802.3.1 General. For the purposes of this chapter, the definition and classification of soil materials for use in Table 1804.2 shall be in accordance with ASTM D 2487.

1802.3.2 Expansive soils. Soils meeting all four of the following provisions shall be considered expansive, except that tests to show compliance with Items 1, 2 and 3 shall not be required if the test prescribed in Item 4 is conducted:

1. Plasticity index (PI) of 15 or greater, determined in accordance with ASTM D 4318.
2. More than 10 percent of the soil particles pass a No. 200 sieve (75 μ m), determined in accordance with ASTM D 422.
3. More than 10 percent of the soil particles are less than 5 micrometers in size, determined in accordance with ASTM D 422.
4. Expansion index greater than 20, determined in accordance with ASTM D 4829.

1802.4 Investigation. Soil classification shall be based on observation and any necessary tests of the materials disclosed by borings, test pits or other subsurface exploration made in appropriate locations. Additional studies shall be made as necessary to evaluate slope stability, soil strength, position and adequacy of load-bearing soils, the effect of moisture variation on soil-bearing capacity, compressibility, liquefaction and expansiveness.

1802.4.1 Exploratory boring. The scope of the soil investigation including the number and types of borings or soundings, the equipment used to drill and sample, the in-situ testing equipment and the laboratory testing program shall be determined by a registered design professional.

1802.5 Soil boring and sampling. The soil boring and sampling procedure and apparatus shall be in accordance with generally accepted engineering practice. The registered design professional shall have a fully qualified representative on the site during all boring and sampling operations.

1802.6 Reports. The soil classification and design load-bearing capacity shall be shown on the construction document. Where required by the building official, a written report of the investigation shall be submitted that includes, but need not be limited to, the following information:

1. A plot showing the location of test borings and/or excavations.
2. A complete record of the soil samples.
3. A record of the soil profile.
4. Elevation of the water table, if encountered.
5. Recommendations for foundation type and design criteria, including but not limited to: bearing capacity of natural or compacted soil; provisions to mitigate the effects of expansive soils; mitigation of the effects of liquefaction, differential settlement and varying soil strength; and the effects of adjacent loads.
6. Expected total and differential settlement.

4. Test methods for determining the acceptance of the CLSM in the field.
5. Number and frequency of field tests required to determine compliance with Item 4.

SECTION 1804 ALLOWABLE LOAD-BEARING VALUES OF SOILS

1804.1 Design. The presumptive load-bearing values provided in Table 1804.2 shall be used with the allowable stress design load combinations specified in Section 1605.3.

1804.2 Presumptive load-bearing values. The maximum allowable foundation pressure, lateral pressure or lateral sliding-resistance values for supporting soils near the surface shall not exceed the values specified in Table 1804.2 unless data to substantiate the use of a higher value are submitted and approved.

Presumptive load-bearing values shall apply to materials with similar physical characteristics and dispositions.

Mud, organic silt, organic clays, peat or uncertified fill shall not be assumed to have a presumptive load-bearing capacity.

1804.3 Lateral sliding resistance. The resistance of structural walls to lateral sliding shall be calculated by combining the values derived from the lateral bearing and the lateral sliding resistance shown in Table 1804.2 unless data to substantiate the use of higher values are submitted for approval. For clay, sandy clay, silty clay and clayey silt, in no case shall the lateral sliding resistance exceed one-half the dead load.

1804.3.1 Increases in allowable lateral sliding resistance. The resistance values derived from the table are permitted to be increased by the tabular value for each additional foot (305 mm) of depth to a maximum of 15 times the tabular value.

Isolated poles for uses such as flagpoles or signs and poles used to support buildings that are not adversely affected by a 0.5 inch (12.7 mm) motion at the ground surface due to short-term lateral loads are permitted to be designed using lateral-bearing values equal to two times the tabular values.

SECTION 1805 FOOTINGS AND FOUNDATIONS

1805.1 General. Footings and foundations shall be designed and constructed in accordance with Section 1805. Footings and foundations shall be built on undisturbed soil, compacted fill material or controlled low-strength material (CLSM). Compacted fill material shall be placed in accordance with Section 1803.5. CLSM shall be placed in accordance with Section 1803.6.

The top surface of footings shall be level. The bottom surface of footings is permitted to have a slope not exceeding one unit vertical in ten units horizontal (ten 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 ten units horizontal (ten percent slope). This stepping requirement shall also apply to the top surface of grade beams supporting walls. Footings shall be reinforced with four 1/2-inch diameter (12.7 mm) deformed reinforcing bars. Two bars shall be placed at the top and bottom of the footings as shown in Figure 1805.1 of this Code.

1805.2 Depth of footings. The minimum depth of footings below the surface of undisturbed soil, compacted fill material or CLSM shall be 12 inches (305 mm). Where applicable, the depth of footings shall also conform to Sections 1805.2.1 through 1805.2.3.

1805.2.1 Frost protection. Except where otherwise protected from frost, foundation walls, piers and other permanent supports of buildings and structures shall be protected by one or more of the following methods:

1. Extending below the frost line of the locality;
2. Constructing in accordance with ASCE 32; or
3. Erecting on solid rock.

Exception: Free-standing buildings meeting all of the following conditions shall not be required to be protected:

1. Classified in Occupancy Category I, in accordance with Section 1604.5;

TABLE 1804.2
ALLOWABLE FOUNDATION AND LATERAL PRESSURE

CLASS OF MATERIALS	ALLOWABLE FOUNDATION PRESSURE (psf) ^d	LATERAL BEARING (psf/f below natural grade) ^d	LATERAL SLIDING	
			Coefficient of friction ^a	Resistance (psf) ^b
1. Crystalline bedrock	12,000	1,200	0.70	—
2. Sedimentary and foliated rock	4,000	400	0.35	—
3. Sandy gravel and/or gravel (GW and GP)	3,000	200	0.35	—
4. Sand, silty sand, clayey sand, silty gravel and clayey gravel (SW, SP, SM, SC, GM and GC)	2,000	150	0.25	—
5. Clay, sandy clay, silty clay, clayey silt, silt and sandy silt (CL, ML, MH and CH)	1,500 ^c	100	—	130

For SI: 1 pound per square foot = 0.0479 kPa, 1 pound per square foot per foot = 0.157 kPa/m.

- a. Coefficient to be multiplied by the dead load.
- b. Lateral sliding resistance value to be multiplied by the contact area, as limited by Section 1804.3.
- c. Where the building official determines that in-place soils with an allowable bearing capacity of less than 1,500 psf are likely to be present at the site, the allowable bearing capacity shall be determined by a soils investigation.
- d. An increase of one-third is permitted when using the alternate load combinations in Section 1605.3.2 that include wind or earthquake loads.

2. Area of 600 square feet (56 m²) or less for light-frame construction or 400 square feet (37 m²) or less for other than light-frame construction; and
3. Eave height of 10 feet (3048 mm) or less.

Footings shall not bear on frozen soil unless such frozen condition is of a permanent character.

1805.2.2 Isolated footings. Footings on granular soil shall be so located that the line drawn between the lower edges of adjoining footings shall not have a slope steeper than 30 degrees (0.52 rad) with the horizontal, unless the material supporting the higher footing is braced or retained or otherwise laterally supported in an approved manner or a greater slope has been properly established by engineering analysis.

1805.2.3 Shifting or moving soils. Where it is known that the shallow subsoils are of a shifting or moving character, footings shall be carried to a sufficient depth to ensure stability.

1805.3 Footings on or adjacent to slopes. The placement of buildings and structures on or adjacent to slopes steeper than one unit vertical in three units horizontal (33.3-percent slope) shall conform to Sections 1805.3.1 through 1805.3.5.

1805.3.1 Building clearance from ascending slopes. In general, buildings below slopes shall be set a sufficient distance from the slope to provide protection from slope drainage, erosion and shallow failures. Except as provided for in

Section 1805.3.5 and Figure 1805.3.1, the following criteria will be assumed to provide this protection. Where the existing slope is steeper than one unit vertical in one unit horizontal (100-percent slope), the toe of the slope shall be assumed to be at the intersection of a horizontal plane drawn from the top of the foundation and a plane drawn tangent to the slope at an angle of 45 degrees (0.79 rad) to the horizontal. Where a retaining wall is constructed at the toe of the slope, the height of the slope shall be measured from the top of the wall to the top of the slope.

1805.3.2 Footing setback from descending slope surface. Footings on or adjacent to slope surfaces shall be founded in firm material with an embedment and set back from the slope surface sufficient to provide vertical and lateral support for the footing without detrimental settlement. Except as provided for in Section 1805.3.5 and Figure 1805.3.1, the following setback is deemed adequate to meet the criteria. Where the slope is steeper than 1 unit vertical in 1 unit horizontal (100-percent slope), the required setback shall be measured from an imaginary plane 45 degrees (0.79 rad) to the horizontal, projected upward from the toe of the slope.

1805.3.3 Pools. The setback between pools regulated by this code and slopes shall be equal to one-half the building footing setback distance required by this section. That portion of the pool wall within a horizontal distance of 7 feet (2134 mm) from the top of the slope shall be capable of supporting the water in the pool without soil support.

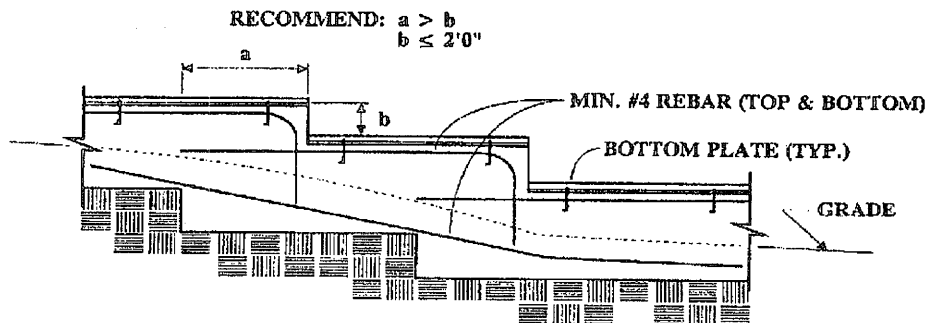


FIGURE 1805.1
STEPPED FOUNDATIONS

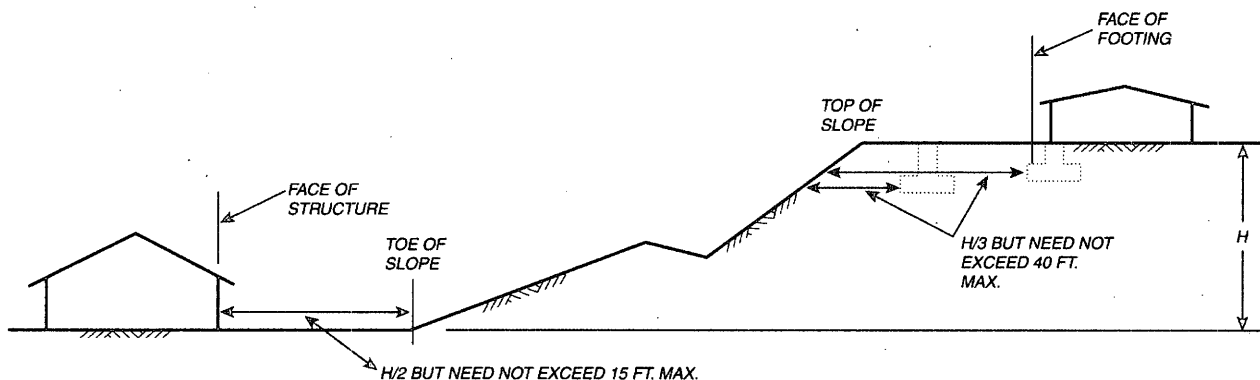


FIGURE 1805.3.1
FOUNDATION CLEARANCES FROM SLOPES

For SI: 1 foot = 304.8 mm.

1805.3.4 Foundation elevation. On graded sites, the top of any exterior foundation shall extend above the elevation of the street gutter at point of discharge or the inlet of an approved drainage device a minimum of 12 inches (305 mm) plus 2 percent. Alternate elevations are permitted subject to the approval of the building official, provided it can be demonstrated that required drainage to the point of discharge and away from the structure is provided at all locations on the site.

1805.3.5 Alternate setback and clearance. Alternate setbacks and clearances are permitted, subject to the approval of the building official. The building official is permitted to require an investigation and recommendation of a registered design professional to demonstrate that the intent of this section has been satisfied. Such an investigation shall include consideration of material, height of slope, slope gradient, load intensity and erosion characteristics of slope material.

1805.4 Footings. Footings shall be designed and constructed in accordance with Sections 1805.4.1 through 1805.4.6.

1805.4.1 Design. Footings shall be so designed that the allowable bearing capacity of the soil is not exceeded, and that differential settlement is minimized. The minimum width of footings shall be 12 inches (305 mm).

Footings in areas with expansive soils shall be designed in accordance with the provisions of Section 1805.8.

1805.4.1.1 Design loads. Footings shall be designed for the most unfavorable effects due to the combinations of loads specified in Section 1605.2 or 1605.3. The dead load is permitted to include the weight of foundations, footings and overlying fill. Reduced live loads, as specified in Sections 1607.9 and 1607.11, are permitted to be used in the design of footings.

1805.4.1.2 Vibratory loads. Where machinery operations or other vibrations are transmitted through the foundation, consideration shall be given in the footing design to prevent detrimental disturbances of the soil.

1805.4.2 Concrete footings. The design, materials and construction of concrete footings shall comply with Sections 1805.4.2.1 through 1805.4.2.6 and the provisions of Chapter 19.

Exception: Where a specific design is not provided, concrete footings supporting walls of light-frame construction

are permitted to be designed in accordance with Table 1805.4.2.

1805.4.2.1 Concrete strength. Concrete in footings shall have a specified compressive strength (f'_c) of not less than 2,500 pounds per square inch (psi) (17 237 kPa) at 28 days.

1805.4.2.2 Footing seismic ties. Where a structure is assigned to Seismic Design Category D, E or F in accordance with Section 1613, individual spread footings founded on soil defined in Section 1613.5.2 as Site Class E or F shall be interconnected by ties. Ties shall be capable of carrying, in tension or compression, a force equal to the product of the larger footing load times the seismic coefficient, S_{DS} divided by 10 unless it is demonstrated that equivalent restraint is provided by reinforced concrete beams within slabs on grade or reinforced concrete slabs on grade.

1805.4.2.3 Plain concrete footings. The edge thickness of plain concrete footings supporting walls of other than light-frame construction shall not be less than 8 inches (203 mm) where placed on soil.

Exception: For plain concrete footings supporting Group R-3 occupancies, the edge thickness is permitted to be 6 inches (152 mm), provided that the footing does not extend beyond a distance greater than the thickness of the footing on either side of the supported wall.

1805.4.2.4 Placement of concrete. Concrete footings shall not be placed through water unless a tremie or other method approved by the building official is used. Where placed under or in the presence of water, the concrete shall be deposited by approved means to ensure minimum segregation of the mix and negligible turbulence of the water.

1805.4.2.5 Protection of concrete. Concrete footings shall be protected from freezing during depositing and for a period of not less than five days thereafter. Water shall not be allowed to flow through the deposited concrete.

1805.4.2.6 Forming of concrete. Concrete footings are permitted to be cast against the earth where, in the opinion of the building official, soil conditions do not require forming. Where forming is required, it shall be in accordance with Chapter 6 of ACI 318.

TABLE 1805.4.2
FOOTINGS SUPPORTING WALLS OF LIGHT-FRAME CONSTRUCTION^{a, b, c, d, e}

NUMBER OF FLOORS SUPPORTED BY THE FOOTING ^f	WIDTH OF FOOTING (inches)	THICKNESS OF FOOTING (inches)
1	12	6
2	15	6
3	18	8 ^g

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

a. Depth of footings shall be in accordance with Section 1805.2.

b. The ground under the floor is permitted to be excavated to the elevation of the top of the footing.

c. Not adopted.

d. See Section 1908 for additional requirements for footings of structures assigned to Seismic Design Category C, D, E or F.

e. For thickness of foundation walls, see Section 1805.5.

f. Footings are permitted to support a roof in addition to the stipulated number of floors. Footings supporting roof only shall be as required for supporting one floor.

g. Plain concrete footings for Group R-3 occupancies are permitted to be 6 inches thick.

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1805.4.3 Masonry-unit footings. The design, materials and construction of masonry-unit footings shall comply with Sections 1805.4.3.1 and 1805.4.3.2, and the provisions of Chapter 21.

Exception: Where a specific design is not provided, masonry-unit footings supporting walls of light-frame construction are permitted to be designed in accordance with Table 1805.4.2.

1805.4.3.1 Dimensions. Masonry-unit footings shall be laid in Type M or S mortar complying with Section 2103.8 and the depth shall not be less than twice the projection beyond the wall, pier or column. The width shall not be less than 8 inches (203 mm) wider than the wall supported thereon.

1805.4.3.2 Offsets. The maximum offset of each course in brick foundation walls stepped up from the footings shall be 1.5 inches (38 mm) where laid in single courses, and 3 inches (76 mm) where laid in double courses.

1805.4.4 Steel grillage footings. Grillage footings of structural steel shapes shall be separated with approved steel spacers and be entirely encased in concrete with at least 6 inches (152 mm) on the bottom and at least 4 inches (102 mm) at all other points. The spaces between the shapes shall be completely filled with concrete or cement grout.

1805.4.5 Timber footings. Timber footings are permitted for buildings of Type V construction and as otherwise approved by the building official. Such footings shall be

treated in accordance with AWP A U1 (Commodity Specification A, Use Category 4B). Treated timbers are not required where placed entirely below permanent water level or where used as capping for wood piles that project above the water level over submerged or marsh lands. The compressive stresses perpendicular to the grain in untreated timber footings supported upon treated piles shall not exceed 70 percent of the allowable stresses for the species and grade of timber as specified in the AF&PA NDS.

1805.4.6 Wood foundations. Wood foundation systems shall be designed and installed in accordance with AF&PA Technical Report No. 7 and as otherwise approved by the Superintendent of Building. Lumber and plywood shall be treated in accordance with AWP A U1 (Commodity Specification A, Use Category 4B and Section 5.2) and shall be identified in accordance with Section 2303.1.8.1 of this Code.

Exception: Accessory buildings not used for human occupancy and less than 120 square feet (11.1m²) in area may be supported on treated wood mud sills.

1805.5 Foundation walls. Concrete and masonry foundation walls shall be designed in accordance with Chapter 19 or 21, respectively. Foundation walls that are laterally supported at the top and bottom and within the parameters of Tables 1805.5(1) through 1805.5(5) are permitted to be designed and constructed in accordance with Sections 1805.5.1 through 1805.5.5.

TABLE 1805.5(1)
PLAIN MASONRY FOUNDATION WALLS^{a, b, c}

MAXIMUM WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT ^e (feet)	MINIMUM NOMINAL WALL THICKNESS (inches)		
		Soil classes and lateral soil load ^d (psf per foot below natural grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and Inorganic CL soils 60
7	4 (or less)	8	8	8
	5	8	10	10
	6	10	12	10 (solid ^c)
	7	12	10 (solid ^c)	10 (solid ^c)
8	4 (or less)	8	8	8
	5	8	10	12
	6	10	12	12 (solid ^c)
	7	12	12 (solid ^c)	Note d
9	8	10 (solid ^c)	12 (solid ^c)	Note d
	4 (or less)	8	8	8
	5	8	10	12
	6	12	12	12 (solid ^c)
9	7	12 (solid ^c)	12 (solid ^c)	Note d
	8	12 (solid ^c)	Note d	Note d
	9	Note d	Note d	Note d

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157kPa/m.

- For design lateral soil loads, see Section 1610. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist soil conditions without hydrostatic pressure.
- Provisions for this table are based on construction requirements specified in Section 1805.5.2.2.
- Solid grouted hollow units or solid masonry units.
- A design in compliance with Chapter 21 or reinforcement in accordance with Table 1805.5(2) is required.
- For height of unbalanced backfill, see Section 1805.5.1.2.

Dampproofing shall consist of a bituminous material, 3 pounds per square yard (16 N/m²) of acrylic modified cement, 0.125 inch (3.2 mm) coat of surface-bonding mortar complying with ASTM C 887, any of the materials permitted for waterproofing by Section 1807.3.2 or other approved methods or materials.

1807.2.2.1 Surface preparation of walls. Prior to application of dampproofing materials on concrete walls, holes and recesses resulting from the removal of form ties shall be sealed with a bituminous material or other approved methods or materials. Unit masonry walls shall be parged on the exterior surface below ground level with not less than 0.375 inch (9.5 mm) of portland cement mortar. The parging shall be coved at the footing.

Exception: Parging of unit masonry walls is not required where a material is approved for direct application to the masonry.

1807.3 Waterproofing required. Where the ground-water investigation required by Section 1802.2.3 indicates that a hydrostatic pressure condition exists, and the design does not include a ground-water control system as described in Section 1807.1.3, walls and floors shall be waterproofed in accordance with this section.

1807.3.1 Floors. Floors required to be waterproofed shall be of concrete and designed and constructed to withstand the hydrostatic pressures to which the floors will be subjected.

Waterproofing shall be accomplished by placing a membrane of rubberized asphalt, butyl rubber, fully adhered/fully bonded HDPE or polyolefin composite membrane or not less than 6-mil [0.006 inch (0.152 mm)] polyvinyl chloride with joints lapped not less than 6 inches (152 mm) or other approved materials under the slab. Joints in the membrane shall be lapped and sealed in accordance with the manufacturer's installation instructions.

1807.3.2 Walls. Walls required to be waterproofed shall be of concrete or masonry and shall be designed and constructed to withstand the hydrostatic pressures and other lateral loads to which the walls will be subjected.

Waterproofing shall be applied from the bottom of the wall to not less than 12 inches (305 mm) above the maximum elevation of the ground-water table. The remainder of the wall shall be dampproofed in accordance with Section 1807.2.2. Waterproofing shall consist of two-ply hot-mopped felts, not less than 6-mil (0.006 inch; 0.152 mm) polyvinyl chloride, 40-mil (0.040 inch; 1.02 mm) polymer-modified asphalt, 6-mil (0.006 inch; 0.152 mm) polyethylene or other approved methods or materials capable of bridging nonstructural cracks. Joints in the membrane shall be lapped and sealed in accordance with the manufacturer's installation instructions.

1807.3.2.1 Surface preparation of walls. Prior to the application of waterproofing materials on concrete or masonry walls, the walls shall be prepared in accordance with Section 1807.2.2.1.

1807.3.3 Joints and penetrations. Joints in walls and floors, joints between the wall and floor and penetrations of the wall and floor shall be made water-tight utilizing approved methods and materials.

1807.4 Subsoil drainage system. Where a hydrostatic pressure condition does not exist, dampproofing shall be provided and a base shall be installed under the floor and a drain installed around the foundation perimeter. A subsoil drainage system designed and constructed in accordance with Section 1807.1.3 shall be deemed adequate for lowering the ground-water table.

1807.4.1 Floor base course. Floors of basements, except as provided for in Section 1807.1.1, shall be placed over a floor base course not less than 4 inches (102 mm) in thickness that consists of gravel or crushed stone containing not more than 10 percent of material that passes through a No. 4 (4.75 mm) sieve.

Exception: Where a site is located in well-drained gravel or sand/gravel mixture soils, a floor base course is not required.

1807.4.2 Foundation drain. A drain shall be placed around the perimeter of a foundation that consists of gravel or crushed stone containing not more than 10-percent material that passes through a No. 4 (4.75 mm) sieve. The drain shall extend a minimum of 12 inches (305 mm) beyond the outside edge of the footing. The thickness shall be such that the bottom of the drain is not higher than the bottom of the base under the floor, and that the top of the drain is not less than 6 inches (152 mm) above the top of the footing. The top of the drain shall be covered with an approved filter membrane material. Where a drain tile or perforated pipe is used, the invert of the pipe or tile shall not be higher than the floor elevation. The top of joints or the top of perforations shall be protected with an approved filter membrane material. The pipe or tile shall be placed on not less than 2 inches (51 mm) of gravel or crushed stone complying with Section 1807.4.1, and shall be covered with not less than 6 inches (152 mm) of the same material.

1807.4.3 Drainage discharge. The floor base and foundation perimeter drain shall discharge by gravity or mechanical means into an approved drainage system that complies with the *Plumbing Code*.

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SECTION 1808 PIER AND PILE FOUNDATIONS

1808.1 Definitions. The following words and terms shall, for the purposes of this section, have the meanings shown herein.

FLEXURAL LENGTH. Flexural length is the length of the pile from the first point of zero lateral deflection to the underside of the pile cap or grade beam.

MICROPILES. Micropiles are 12-inch-diameter (305 mm) or less bored, grouted-in-place piles incorporating steel pipe (casing) and/or steel reinforcement.

PIER FOUNDATIONS. Pier foundations consist of isolated masonry or cast-in-place concrete structural elements extend-

ing into firm materials. Piers are relatively short in comparison to their width, with lengths less than or equal to 12 times the least horizontal dimension of the pier. Piers derive their load-carrying capacity through skin friction, through end bearing, or a combination of both.

Belled piers. Belled piers are cast-in-place concrete piers constructed with a base that is larger than the diameter of the remainder of the pier. The belled base is designed to increase the load-bearing area of the pier in end bearing.

PILE FOUNDATIONS. Pile foundations consist of concrete, wood or steel structural elements either driven into the ground or cast in place. Piles are relatively slender in comparison to their length, with lengths exceeding 12 times the least horizontal dimension. Piles derive their load-carrying capacity through skin friction, end bearing or a combination of both.

Augered uncased piles. Augered uncased piles are constructed by depositing concrete into an uncased augered hole, either during or after the withdrawal of the auger.

Caisson piles. Caisson piles are cast-in-place concrete piles extending into bedrock. The upper portion of a caisson pile consists of a cased pile that extends to the bedrock. The lower portion of the caisson pile consists of an uncased socket drilled into the bedrock.

Concrete-filled steel pipe and tube piles. Concrete-filled steel pipe and tube piles are constructed by driving a steel pipe or tube section into the soil and filling the pipe or tube section with concrete. The steel pipe or tube section is left in place during and after the deposition of the concrete.

Driven uncased piles. Driven uncased piles are constructed by driving a steel shell into the soil to shore an unexcavated hole that is later filled with concrete. The steel casing is lifted out of the hole during the deposition of the concrete.

Enlarged base piles. Enlarged base piles are cast-in-place concrete piles constructed with a base that is larger than the diameter of the remainder of the pile. The enlarged base is designed to increase the load-bearing area of the pile in end bearing.

Steel-cased piles. Steel-cased piles are constructed by driving a steel shell into the soil to shore an unexcavated hole. The steel casing is left permanently in place and filled with concrete.

Timber piles. Timber piles are round, tapered timbers with the small (tip) end embedded into the soil.

1808.2 Piers and piles-general requirements.

1808.2.1 Design. Piles are permitted to be designed in accordance with provisions for piers in Section 1808 and Sections 1812.3 through 1812.10 where either of the following conditions exists, subject to the approval of the building official:

1. Group R-3 and U occupancies not exceeding two stories of light-frame construction, or
2. Where the surrounding foundation materials furnish adequate lateral support for the pile.

1808.2.2 General. Pier and pile foundations shall be designed and installed on the basis of a foundation investi-

gation as defined in Section 1802, unless sufficient data upon which to base the design and installation is available.

The investigation and report provisions of Section 1802 shall be expanded to include, but not be limited to, the following:

1. Recommended pier or pile types and installed capacities.
2. Recommended center-to-center spacing of piers or piles.
3. Driving criteria.
4. Installation procedures.
5. Field inspection and reporting procedures (to include procedures for verification of the installed bearing capacity where required).
6. Pier or pile load test requirements.
7. Durability of pier or pile materials.
8. Designation of bearing stratum or strata.
9. Reductions for group action, where necessary.

1808.2.3 Special types of piles. The use of types of piles not specifically mentioned herein is permitted, subject to the approval of the building official, upon the submission of acceptable test data, calculations and other information relating to the structural properties and load capacity of such piles. The allowable stresses shall not in any case exceed the limitations specified herein.

1808.2.4 Pile caps. Pile caps shall be of reinforced concrete, and shall include all elements to which piles are connected, including grade beams and mats. The soil immediately below the pile cap shall not be considered as carrying any vertical load. The tops of piles shall be embedded not less than 3 inches (76 mm) into pile caps and the caps shall extend at least 4 inches (102 mm) beyond the edges of piles. The tops of piles shall be cut back to sound material before capping.

1808.2.5 Stability. Piers or piles shall be braced to provide lateral stability in all directions. Three or more piles connected by a rigid cap shall be considered braced, provided that the piles are located in radial directions from the centroid of the group not less than 60 degrees (1 rad) apart. A two-pile group in a rigid cap shall be considered to be braced along the axis connecting the two piles. Methods used to brace piers or piles shall be subject to the approval of the building official.

Piles supporting walls shall be driven alternately in lines spaced at least 1 foot (305 mm) apart and located symmetrically under the center of gravity of the wall load carried, unless effective measures are taken to provide for eccentricity and lateral forces, or the wall piles are adequately braced to provide for lateral stability. A single row of piles without lateral bracing is permitted for one- and two-family dwellings and lightweight construction not exceeding two stories or 35 feet (10 668 mm) in height, provided the centers of the piles are located within the width of the foundation wall.

1808.2.6 Structural integrity. Piers or piles shall be installed in such a manner and sequence as to prevent distor-

tion or damage that may adversely affect the structural integrity of piles being installed or already in place.

1808.2.7 Splices. Splices shall be constructed so as to provide and maintain true alignment and position of the component parts of the pier or pile during installation and subsequent thereto and shall be of adequate strength to transmit the vertical and lateral loads and moments occurring at the location of the splice during driving and under service loading. Splices shall develop not less than 50 percent of the least capacity of the pier or pile in bending. In addition, splices occurring in the upper 10 feet (3048 mm) of the embedded portion of the pier or pile shall be capable of resisting at allowable working stresses the moment and shear that would result from an assumed eccentricity of the pier or pile load of 3 inches (76 mm), or the pier or pile shall be braced in accordance with Section 1808.2.5 to other piers or piles that do not have splices in the upper 10 feet (3048 mm) of embedment.

1808.2.8 Allowable pier or pile loads.

1808.2.8.1 Determination of allowable loads. The allowable axial and lateral loads on piers or piles shall be determined by an approved formula, load tests or method of analysis.

1808.2.8.2 Driving criteria. The allowable compressive load on any pile where determined by the application of an approved driving formula shall not exceed 40 tons (356 kN). For allowable loads above 40 tons (356 kN), the wave equation method of analysis shall be used to estimate pile driveability of both driving stresses and net displacement per blow at the ultimate load. Allowable loads shall be verified by load tests in accordance with Section 1808.2.8.3. The formula or wave equation load shall be determined for gravity-drop or power-actuated hammers and the hammer energy used shall be the maximum consistent with the size, strength and weight of the driven piles. The use of a follower is permitted only with the approval of the building official. The introduction of fresh hammer cushion or pile cushion material just prior to final penetration is not permitted.

1808.2.8.3 Load tests. Where design compressive loads per pier or pile are greater than those permitted by Section 1808.2.10 or where the design load for any pier or pile foundation is in doubt, control test piers or piles shall be tested in accordance with ASTM D 1143 or ASTM D 4945. At least one pier or pile shall be test loaded in each area of uniform subsoil conditions. Where required by the building official, additional piers or piles shall be load tested where necessary to establish the safe design capacity. The resulting allowable loads shall not be more than one-half of the ultimate axial load capacity of the test pier or pile as assessed by one of the published methods listed in Section 1808.2.8.3.1 with consideration for the test type, duration and subsoil. The ultimate axial load capacity shall be determined by a registered design professional with consideration given to tolerable total and differential settlements at design load in accordance with Section 1808.2.12. In subsequent installation of the balance of foundation piles, all piles shall be deemed to

have a supporting capacity equal to the control pile where such piles are of the same type, size and relative length as the test pile; are installed using the same or comparable methods and equipment as the test pile; are installed in similar subsoil conditions as the test pile; and, for driven piles, where the rate of penetration (e.g., net displacement per blow) of such piles is equal to or less than that of the test pile driven with the same hammer through a comparable driving distance.

1808.2.8.3.1 Load test evaluation. It shall be permitted to evaluate pile load tests with any of the following methods:

1. Davisson Offset Limit.
2. Brinch-Hansen 90% Criterion.
3. Butler-Hoy Criterion.
4. Other methods approved by the building official.

1808.2.8.4 Allowable frictional resistance. The assumed frictional resistance developed by any pier or uncased cast-in-place pile shall not exceed one-sixth of the bearing value of the soil material at minimum depth as set forth in Table 1804.2 up to a maximum of 500 psf (24 kPa), unless a greater value is allowed by the Superintendent of Building after a soil investigation as specified in Section 1802 is submitted, or a greater value is substantiated by a load test in accordance with Section 1808.2.8.3. Frictional resistance and bearing resistance shall not be assumed to act simultaneously.

1808.2.8.5 Uplift capacity. Where required by the design, the uplift capacity of a single pier or pile shall be determined by an approved method of analysis based on a minimum factor of safety of three or by load tests conducted in accordance with ASTM D 3689. The maximum allowable uplift load shall not exceed the ultimate load capacity as determined in Section 1808.2.8.3 divided by a factor of safety of two. For pile groups subjected to uplift, the allowable working uplift load for the group shall be the lesser of:

1. The proposed individual pile uplift working load times the number of piles in the group.
2. Two-thirds of the effective weight of the pile group and the soil contained within a block defined by the perimeter of the group and the length of the pile.

1808.2.8.6 Load-bearing capacity. Piers, individual piles and groups of piles shall develop ultimate load capacities of at least twice the design working loads in the designated load-bearing layers. Analysis shall show that no soil layer underlying the designated load-bearing layers causes the load-bearing capacity safety factor to be less than two.

1808.2.8.7 Bent piers or piles. The load-bearing capacity of piers or piles discovered to have a sharp or sweeping bend shall be determined by an approved method of analysis or by load testing a representative pier or pile.

1808.2.8.8 Overloads on piers or piles. The maximum compressive load on any pier or pile due to mislocation shall not exceed 110 percent of the allowable design load.

1808.2.9 Lateral support.

1808.2.9.1 General. Only undisturbed soil, compacted fill material or CLSM shall be deemed to afford sufficient lateral support to the pier or pile to prevent buckling and to permit the design of the pier or pile in accordance with accepted engineering practice and the applicable provisions of this Code.

1808.2.9.2 Unbraced piles. Piles standing unbraced in air, water or in fluid soils shall be designed as columns in accordance with the provisions of this code. Such piles driven into firm ground can be considered fixed and laterally supported at 5 feet (1524 mm) below the ground surface and in soft material at 10 feet (3048 mm) below the ground surface unless otherwise prescribed by the building official after a foundation investigation by an approved agency.

1808.2.9.3 Allowable lateral load. Where required by the design, the lateral load capacity of a pier, a single pile or a pile group shall be determined by an approved method of analysis or by lateral load tests to at least twice the proposed design working load. The resulting allowable load shall not be more than one-half of that test load that produces a gross lateral movement of 1 inch (25 mm) at the ground surface.

1808.2.10 Use of higher allowable pier or pile stresses. Allowable stresses greater than those specified for piers or for each pile type in Sections 1809 and 1810 are permitted where supporting data justifying such higher stresses is filed with the building official. Such substantiating data shall include:

1. A soils investigation in accordance with Section 1802.
2. Pier or pile load tests in accordance with Section 1808.2.8.3, regardless of the load supported by the pier or pile.

The design and installation of the pier or pile foundation shall be under the direct supervision of a registered design professional knowledgeable in the field of soil mechanics and pier or pile foundations who shall certify to the building official that the piers or piles as installed satisfy the design criteria.

1808.2.11 Piles in subsiding areas. Where piles are installed through subsiding fills or other subsiding strata and derive support from underlying firmer materials, consideration shall be given to the downward frictional forces that may be imposed on the piles by the subsiding upper strata.

Where the influence of subsiding fills is considered as imposing loads on the pile, the allowable stresses specified in this chapter are permitted to be increased where satisfactory substantiating data are submitted.

1808.2.12 Settlement analysis. The settlement of piers, individual piles or groups of piles shall be estimated based on approved methods of analysis. The predicted settlement shall cause neither harmful distortion of, nor instability in, the structure, nor cause any stresses to exceed allowable values.

1808.2.13 Preexcavation. The use of jetting, augering or other methods of preexcavation shall be subject to the approval of the building official. Where permitted, preexcavation shall be carried out in the same manner as used for piers or piles subject to load tests and in such a manner that will not impair the carrying capacity of the piers or piles already in place or damage adjacent structures. Pile tips shall be driven below the preexcavated depth until the required resistance or penetration is obtained.

1808.2.14 Installation sequence. Piles shall be installed in such sequence as to avoid compacting the surrounding soil to the extent that other piles cannot be installed properly, and to prevent ground movements that are capable of damaging adjacent structures.

1808.2.15 Use of vibratory drivers. Vibratory drivers shall only be used to install piles where the pile load capacity is verified by load tests in accordance with Section 1808.2.8.3. The installation of production piles shall be controlled according to power consumption, rate of penetration or other approved means that ensure pile capacities equal or exceed those of the test piles.

1808.2.16 Pile driveability. Pile cross sections shall be of sufficient size and strength to withstand driving stresses without damage to the pile, and to provide sufficient stiffness to transmit the required driving forces.

1808.2.17 Protection of pile materials. Where boring records or site conditions indicate possible deleterious action on pier or pile materials because of soil constituents, changing water levels or other factors, the pier or pile materials shall be adequately protected by materials, methods or processes approved by the building official. Protective materials shall be applied to the piles so as not to be rendered ineffective by driving. The effectiveness of such protective measures for the particular purpose shall have been thoroughly established by satisfactory service records or other evidence.

1808.2.18 Use of existing piers or piles. Piers or piles left in place where a structure has been demolished shall not be used for the support of new construction unless satisfactory evidence is submitted to the building official, which indicates that the piers or piles are sound and meet the requirements of this code. Such piers or piles shall be load tested or redriven to verify their capacities. The design load applied to such piers or piles shall be the lowest allowable load as determined by tests or redriving data.

1808.2.19 Heaved piles. Piles that have heaved during the driving of adjacent piles shall be redriven as necessary to develop the required capacity and penetration, or the capacity of the pile shall be verified by load tests in accordance with Section 1808.2.8.3.

1808.2.20 Identification. Pier or pile materials shall be identified for conformity to the specified grade with this identity maintained continuously from the point of manu-

Seismic Design Category D or E, the height of the wall shall not exceed 8 feet (2438 mm), the thickness shall not be less than 7 1/2 inches (190 mm), and the wall shall retain no more than 4 feet (1219 mm) of unbalanced fill. Walls shall have reinforcement in accordance with 22.6.6.5.

- (b) Isolated footings of plain concrete supporting pedestals or columns are permitted, provided the projection of the footing beyond the face of the supported member does not exceed the footing thickness.

Exception: In detached one- and two-family dwellings three stories or less in height, the projection of the footing beyond the face of the supported member is permitted to exceed the footing thickness.

- (c) Plain concrete footings supporting walls are permitted, provided the footings have at least two continuous longitudinal reinforcing bars. Bars shall not be smaller than No. 4 and shall have a total area of not less than 0.002 times the gross cross-sectional area of the footing. For footings that exceed 8 inches (203 mm) in thickness, a minimum of one bar shall be provided at the top and bottom of the footing. Continuity of reinforcement shall be provided at corners and intersections.

Exceptions:

1. In detached one- and two-family dwellings three stories or less in height and constructed with stud-bearing walls, plain concrete footings without longitudinal reinforcement supporting walls are permitted.
2. For foundation systems consisting of a plain concrete footing and a plain concrete stemwall, a minimum of one bar shall be provided at the top of the stemwall and at the bottom of the footing.
3. Where a slab on ground is cast monolithically with the footing, one No. 5 bar is permitted to be located at either the top of the slab or bottom of the footing.

1908.1.16 ACI 318, Section D.3.3. Modify ACI 318, Sections D.3.3.2 through D.3.3.5, to read as follows:

D.3.3.2—In structures assigned to Seismic Design Category C, D, E or F, post-installed anchors for use under D.2.3 shall have passed the Simulated Seismic Tests of ACI 355.2.

D.3.3.3—In structures assigned to Seismic Design Category C, D, E or F, the design strength of anchors shall be taken as $0.75\phi N_n$ and $0.75\phi V_n$, where ϕ is given in D.4.4 or D.4.5, and N_n and V_n are determined in accordance with D.4.1.

D.3.3.4—In structures assigned to Seismic Design Category C, D, E or F, anchors shall be designed to be governed by tensile or shear strength of a ductile steel element, unless D.3.3.5 is satisfied.

D.3.3.5—Instead of D.3.3.4, the attachment that the anchor is connecting to the structure shall be designed so that the attachment will undergo ductile yielding at a load level corresponding to anchor forces no greater than the design strength of anchors specified in D.3.3.3, or the minimum design strength of the anchors shall be at least 2.5 times the factored forces transmitted by the attachment.

1908.1.17 Equation 14-7 of Sections 14.8.3 and 14.8.4 of ACI 318. Sections 14.8.3 and 14.8.4 of ACI 318 are modified as follows:

Section 14.8.3 of ACI 318: I_{cr} shall be calculated by Equation (14-7), and M_a shall be obtained by iteration of deflections.

$$I_{cr} = \frac{E_s}{E_c} \left(A_s + \frac{P_u}{f_y} \frac{h}{2d} \right) (d - c)^2 + \left(\frac{l_w c^3}{3} \right)$$

(Formula 14-7)

and the value E_s/E_c shall not be taken less than six.

Section 14.8.4 of ACI 318: Maximum out-of-plane deflection, Δ_s , due to service loads, including $P\Delta$ effects, shall not exceed $l_c/150$.

If M_a , maximum moment at mid-height of wall due to service lateral and eccentric loads, including $P\Delta$ effects, exceed $(2/3)M_{cr}\Delta_s$ shall be calculated by Equation (14-8):

$$\Delta_s = \frac{2}{3} \Delta_{cr} + \frac{M_a - \frac{2}{3} M_{cr}}{M_n - \frac{2}{3} M_{cr}} \left(\Delta_n - \frac{2}{3} \Delta_{cr} \right)$$

(Formula 14-8)

If M_a does not exceed $(2/3)M_{cr}$, Δ_s shall be calculated by Equation (14-9):

$$\Delta_s = \left(\frac{M_a}{M_{cr}} \right) \Delta_{cr}$$

(Formula 14-9)

where:

$$\Delta_{cr} = \frac{5M_{cr}l_c^2}{48E_cI_{cr}}$$

$$\Delta_n = \frac{5M_nl_c^2}{48E_cI_{cr}}$$

I_{cr} shall be calculated by Equation (14-7), and M_a shall be obtained by iteration of deflections.

SECTION 1909 STRUCTURAL PLAIN CONCRETE

1909.1 Scope. The design and construction of structural plain concrete, both cast-in-place and precast, shall comply with the minimum requirements of Section 1909 and ACI 318, Chapter 22, as modified in Section 1908.

1909.1.1 Special structures. For special structures, such as arches, underground utility structures, gravity walls and

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shielding walls, the provisions of this section shall govern where applicable.

1909.2 Limitations. The use of structural plain concrete shall be limited to:

1. Members that are continuously supported by soil, such as walls and footings, or by other structural members capable of providing continuous vertical support.
2. Members for which arch action provides compression under all conditions of loading.
3. Walls and pedestals.

The use of structural plain concrete columns and structural plain concrete footings on piles is not permitted. See Section 1908.1.15 for additional limitations on the use of structural plain concrete.

1909.3 Joints. Contraction or isolation joints shall be provided to divide structural plain concrete members into flexurally discontinuous elements in accordance with ACI 318, Section 22.3.

1909.4 Design. Structural plain concrete walls, footings and pedestals shall be designed for adequate strength in accordance with ACI 318, Sections 22.4 through 22.8..

Exception: For Group R-3 occupancies and buildings of other occupancies less than two stories in height of light-frame construction, the required edge thickness of ACI 318 is permitted to be reduced to 6 inches (152 mm), provided that the footing does not extend more than 4 inches (102 mm) on either side of the supported wall

1909.5 Precast members. The design, fabrication, transportation and erection of precast, structural plain concrete elements shall be in accordance with ACI 318, Section 22.9.

1909.6 Walls. In addition to the requirements of this section, structural plain concrete walls shall comply with the applicable requirements of ACI 318, Chapter 22.

1909.6.1 Basement walls. The thickness of exterior basement walls and foundation walls shall be not less than $7\frac{1}{2}$

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inches (191 mm). Structural plain concrete exterior base-ment walls shall be exempt from the requirements for special exposure conditions of Section 1904.2.2.

1909.6.2 Other walls. Except as provided for in Section 1909.6.1, the thickness of bearing walls shall be not less than $\frac{1}{24}$ the unsupported height or length, whichever is shorter, but not less than $5\frac{1}{2}$ inches (140 mm).

1909.6.3 Openings in walls. Not less than two No. 5 bars shall be provided around window and door openings. Such bars shall extend at least 24 inches (610 mm) beyond the corners of openings.

SECTION 1910 MINIMUM SLAB PROVISIONS

1910.1 General. The thickness of concrete floor slabs supported directly on the ground shall not be less than $3\frac{1}{2}$ inches (89 mm). A 6-mil (0.006 inch; 0.15 mm) polyethylene vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the base course or subgrade and the concrete floor slab, or other approved equivalent methods or materials shall be used to retard vapor transmission through the floor slab.

Exception: A vapor retarder is not required:

1. For detached structures accessory to occupancies in Group R-3, such as garages, utility buildings or other unheated facilities.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m²) and carports attached to occupancies in Group R-3.
3. For buildings of other occupancies where migration of moisture through the slab from below will not be detrimental to the intended occupancy of the building.
4. For driveways, walks, patios and other flatwork which will not be enclosed at a later date.

5. Where approved based on local site conditions.

SECTION 1911 ANCHORAGE TO CONCRETE—ALLOWABLE STRESS DESIGN

1911.1 Scope. The provisions of this section shall govern the allowable stress design of headed bolts and headed stud anchors cast in normal-weight concrete for purposes of transmitting structural loads from one connected element to the other. These provisions do not apply to anchors installed in hardened concrete or where load combinations include earthquake loads or effects. The bearing area of headed anchors shall be not less than one and one-half times the shank area. Where strength design is used, or where load combinations include earthquake loads or effects, the design strength of anchors shall be determined in accordance with Section 1912. Bolts shall conform to ASTM A 307 or an approved equivalent.

1911.2 Allowable service load. The allowable service load for headed anchors in shear or tension shall be as indicated in Table 1911.2. Where anchors are subject to combined shear and tension, the following relationship shall be satisfied:

$$(P_s/P_t)^{5/3} + (V_s/V_t)^{5/3} \leq 1 \quad \text{(Equation 19-1)}$$

where:

P_s = Applied tension service load, pounds (N).

P_t = Allowable tension service load from Table 1911.2, pounds (N).

V_s = Applied shear service load, pounds (N).

V_t = Allowable shear service load from Table 1911.2, pounds (N).

1911.3 Required edge distance and spacing. The allowable service loads in tension and shear specified in Table 1911.2 are for the edge distance and spacing specified. The edge distance and spacing are permitted to be reduced to 50 percent of the val-

TABLE 1911.2
ALLOWABLE SERVICE LOAD ON EMBEDDED BOLTS (pounds)

BOLT DIAMETER (inches)	MINIMUM EMBEDMENT (inches)	EDGE DISTANCE (inches)	SPACING (inches)	MINIMUM CONCRETE STRENGTH (psi)					
				$f'_c = 2,500$		$f'_c = 3,000$		$f'_c = 4,000$	
				Tension	Shear	Tension	Shear	Tension	Shear
$\frac{1}{4}$	$2\frac{1}{2}$	$1\frac{1}{2}$	3	200	500	200	500	200	500
$\frac{3}{8}$	3	$2\frac{1}{4}$	$4\frac{1}{2}$	500	1,100	500	1,100	500	1,100
$\frac{1}{2}$	4	3	6	950	1,250	950	1,250	950	1,250
	4	5	5	1,450	1,600	1,500	1,650	1,550	1,750
$\frac{5}{8}$	$4\frac{1}{2}$	$3\frac{3}{4}$	$7\frac{1}{2}$	1,500	2,750	1,500	2,750	1,500	2,750
	$4\frac{1}{2}$	$6\frac{1}{4}$	$7\frac{1}{2}$	2,125	2,950	2,200	3,000	2,400	3,050
$\frac{3}{4}$	5	$4\frac{1}{2}$	9	2,250	3,250	2,250	3,560	2,250	3,560
	5	$7\frac{1}{2}$	9	2,825	4,275	2,950	4,300	3,200	4,400
$\frac{7}{8}$	6	$5\frac{1}{4}$	$10\frac{1}{2}$	2,550	3,700	2,550	4,050	2,550	4,050
1	7	6	12	3,050	4,125	3,250	4,500	3,650	5,300
$1\frac{1}{8}$	8	$6\frac{3}{4}$	$13\frac{1}{2}$	3,400	4,750	3,400	4,750	3,400	4,750
$1\frac{1}{4}$	9	$7\frac{1}{2}$	15	4,000	5,800	4,000	5,800	4,000	5,800

For SI: 1 inch = 25.4 mm, 1 pound per square inch = 0.00689 MPa, 1 pound = 4.45 N.

2111.13.2 Masonry fireplaces. Listed combustion air ducts for masonry fireplaces shall be installed according to the terms of their listing and manufacturer's instructions.

2111.13.3 Exterior air intake. The exterior air intake shall be capable of providing all combustion air from the exterior of the dwelling. The exterior air intake shall not be located within the garage, attic, basement or crawl space of the dwelling nor shall the air intake be located at an elevation higher than the firebox. The exterior air intake shall be covered with a corrosion-resistant screen of 1/4-inch (6.4 mm) mesh.

2111.13.4 Clearance. Unlisted combustion air ducts shall be installed with a minimum 1-inch (25 mm) clearance to combustibles for all parts of the duct within 5 feet (1524 mm) of the duct outlet.

2111.13.5 Passageway. The combustion air passageway shall be a minimum of 6 square inches (3870 mm²) and not more than 55 square inches (0.035 m²), except that combustion air systems for listed fireplaces or for fireplaces tested for emissions shall be constructed according to the fireplace manufacturer's instructions.

2111.13.6 Outlet. The exterior air outlet is permitted to be located in the back or sides of the firebox chamber or within 24 inches (610 mm) of the firebox opening on or near the floor. The outlet shall be closable and designed to prevent burning material from dropping into concealed combustible spaces.

SECTION 2112 MASONRY HEATERS

2112.1 Definition. A masonry heater is a heating appliance constructed of concrete or solid masonry, hereinafter referred to as "masonry," which is designed to absorb and store heat from a solid fuel fire built in the firebox by routing the exhaust gases through internal heat exchange channels in which the flow path downstream of the firebox may include flow in a horizontal or downward direction before entering the chimney and which delivers heat by radiation from the masonry surface of the heater.

2112.2 Installation. Masonry heaters shall be installed in accordance with this section and comply with one of the following:

1. Masonry heaters shall comply with the requirements of ASTM E 1602; or
2. Masonry heaters shall be listed and labeled in accordance with UL 1482 and installed in accordance with the manufacturer's installation instructions.

2112.3 Footings and foundation. The firebox floor of a masonry heater shall be a minimum thickness of 4 inches (102 mm) of noncombustible material and be supported on a noncombustible footing and foundation in accordance with Section 2113.2.

2112.4 Seismic reinforcing. In Seismic Design Category D, E and F, masonry heaters shall be anchored to the masonry foundation in accordance with Section 2113.3. Seismic reinforcing shall not be required within the body of a masonry heater with a height that is equal to or less than 3.5 times its body width and where the masonry chimney serving the heater is not supported by the body of the heater. Where the masonry chimney shares a common wall with the facing of the masonry heater, the chim-

ney portion of the structure shall be reinforced in accordance with Section 2113.

2112.5 Masonry heater clearance. Combustible materials shall not be placed within 36 inches (765 mm) of the outside surface of a masonry heater in accordance with NFPA 211, Section 8-7 (clearances for solid fuel-burning appliances), and the required space between the heater and combustible material shall be fully vented to permit the free flow of air around all heater surfaces.

Exceptions:

1. When the masonry heater wall thickness is at least 8 inches (203 mm) thick of solid masonry and the wall thickness of the heat exchange channels is at least 5 inches (127 mm) thick of solid masonry, combustible materials shall not be placed within 4 inches (102 mm) of the outside surface of a masonry heater. A clearance of at least 8 inches (203 mm) shall be provided between the gas-tight capping slab of the heater and a combustible ceiling.
2. Masonry heaters listed and labeled in accordance with UL 1482 and installed in accordance with the manufacturer's instructions.

SECTION 2113 MASONRY CHIMNEYS

2113.1 Definition. A masonry chimney is a chimney constructed of concrete or masonry, hereinafter referred to as "masonry." Masonry chimneys shall be constructed, anchored, supported and reinforced as required in this chapter.

2113.2 Footings and foundations. Footings for masonry chimneys shall be constructed of concrete or solid masonry at least 12 inches (305 mm) thick and shall extend at least 6 inches (152 mm) beyond the face of the foundation or support wall on all sides. Footings shall be founded on natural undisturbed earth or engineered fill below frost depth. In areas not subjected to freezing, footings shall be at least 12 inches (305 mm) below finished grade.

2113.3 Seismic reinforcing. Masonry or concrete chimneys shall be constructed, anchored, supported and reinforced as required in this Chapter. In Seismic Design Category D, masonry and concrete chimneys shall be reinforced and anchored as detailed in Sections 2113.3.1, 2113.3.2 and 2113.4. In Seismic Design Category A, B or C, reinforcement and seismic anchorage is not required. In Seismic Design Category E or F, masonry and concrete chimneys shall be reinforced in accordance with the requirements of Sections 2101 through 2108.

Notwithstanding any other provisions of this Code, an existing masonry chimney which is altered or repaired more than ten percent of its replacement cost within a 12-month period shall have its entire chimney structure comply with the current requirements of this Code or other standards approved by the Superintendent of Building.

2113.3.1 Vertical reinforcing. For chimneys up to 40 inches (1016 mm) wide, four No. 4 continuous vertical bars anchored in the foundation shall be placed in the concrete between wythes of solid masonry or within the cells of hollow unit masonry and grouted in accordance with Section

2103.12. Grout shall be prevented from bonding with the flue liner so that the flue liner is free to move with thermal expansion. For chimneys greater than 40 inches (1016 mm) wide, two additional No. 4 vertical bars shall be provided for each additional 40 inches (1016 mm) in width or fraction thereof.

2113.3.2 Horizontal reinforcing. Vertical reinforcement shall be placed enclosed within $\frac{1}{4}$ -inch (6.4 mm) ties, or other reinforcing of equivalent net cross-sectional area, spaced not to exceed 18 inches (457 mm) o.c. in concrete, or placed in the bed joints of unit masonry, at a minimum of every 18 inches (457 mm) of vertical height. Two such ties shall be provided at each bend in the vertical bars.

2113.4 Seismic anchorage. Masonry and concrete chimneys and foundations in Seismic Design Category D shall be anchored at each floor, ceiling or roof line more than 6 feet (1829 mm) above grade, except where constructed completely within the exterior walls. Anchorage shall conform to the following requirements.

2113.4.1 Anchorage. Two $\frac{3}{16}$ -inch by 1-inch (4.8 mm by 25 mm) straps shall be embedded a minimum of 12 inches (305 mm) into the chimney. Straps shall be hooked around the outer bars and extend 6 inches (152 mm) beyond the bend. Each strap shall be fastened to a minimum of four floor joists with two $\frac{1}{2}$ -inch (12.7 mm) bolts.

2113.5 Corbeling. Masonry chimneys shall not be corbeled more than half of the chimney's wall thickness from a wall or foundation, nor shall a chimney be corbeled from a wall or foundation that is less than 12 inches (305 mm) in thickness unless it projects equally on each side of the wall, except that on the second story of a two-story dwelling, corbeling of chimneys on the exterior of the enclosing walls is permitted to equal the wall thickness. The projection of a single course shall not exceed one-half the unit height or one-third of the unit bed depth, whichever is less.

2113.6 Changes in dimension. The chimney wall or chimney flue lining shall not change in size or shape within 6 inches (152 mm) above or below where the chimney passes through floor components, ceiling components or roof components.

2113.7 Offsets. Where a masonry chimney is constructed with a fireclay flue liner surrounded by one wythe of masonry, the maximum offset shall be such that the centerline of the flue above the offset does not extend beyond the center of the chimney wall below the offset. Where the chimney offset is supported by masonry below the offset in an approved manner, the maximum offset limitations shall not apply. Each individual corbeled masonry course of the offset shall not exceed the projection limitations specified in Section 2113.5.

2113.8 Additional load. Chimneys shall not support loads other than their own weight unless they are designed and constructed to support the additional load. Masonry chimneys are permitted to be constructed as part of the masonry walls or concrete walls of the building.

2113.9 Termination. Chimneys shall extend at least 2 feet (610 mm) higher than any portion of the building within 10 feet (3048 mm), but shall not be less than 3 feet (914 mm) above the highest point where the chimney passes through the roof.

2113.9.1 Spark arrestors. All chimneys attached to any appliance or fireplace that burns solid fuel shall be equipped with an approved spark arrestor. The spark arrestor shall meet all of the following requirements:

1. The net free area of the spark arrestor shall not be less than four times the net free area of the outlet of the chimney.
2. The spark arrestor screen shall have heat and corrosion resistance equivalent to 12-gage wire, 19-gage galvanized wire or 24-gage stainless steel.
3. Openings shall not permit the passage of spheres having a diameter larger than $\frac{1}{2}$ inch (12.7 mm) and shall not block the passage of spheres having a diameter of less than $\frac{3}{8}$ inch (9.5 mm).
4. The spark arrestor shall be accessible for cleaning and the screen or chimney cap shall be removable to allow for cleaning of the chimney flue.

2113.10 Wall thickness. Masonry chimney walls shall be constructed of concrete, solid masonry units or hollow masonry units grouted solid with not less than 4 inches (102 mm) nominal thickness.

2113.10.1 Masonry veneer chimneys. Where masonry is used as veneer for a framed chimney, through flashing and weep holes shall be provided as required by Chapter 14.

2113.11 Flue lining (material). Masonry chimneys shall be lined. The lining material shall be appropriate for the type of appliance connected, according to the terms of the appliance listing and the manufacturer's instructions.

2113.11.1 Residential-type appliances (general). Flue lining systems shall comply with one of the following:

1. Clay flue lining complying with the requirements of ASTM C 315, or equivalent.
2. Listed chimney lining systems complying with UL 1777.
3. Factory-built chimneys or chimney units listed for installation within masonry chimneys.
4. Other approved materials that will resist corrosion, erosion, softening or cracking from flue gases and condensate at temperatures up to 1,800°F (982°C).

2113.11.1.1 Flue linings for specific appliances. Flue linings other than those covered in Section 2113.11.1 intended for use with specific appliances shall comply with Sections 2113.11.1.2 through 2113.11.1.4 and Sections 2113.11.2 and 2113.11.3.

2113.11.1.2 Gas appliances. Flue lining systems for gas appliances shall be in accordance with the *California Mechanical Code*.

2113.11.1.3 Pellet fuel-burning appliances. Flue lining and vent systems for use in masonry chimneys with pellet fuel-burning appliances shall be limited to flue lining systems complying with Section 2113.11.1 and pellet vents listed for installation within masonry chimneys (see Section 2113.11.1.5 for marking).

2113.11.1.4 Oil-fired appliances approved for use with L-vent. Flue lining and vent systems for use in

CHAPTER 22

STEEL

SECTION 2201 GENERAL

2201.1 Scope. The provisions of this chapter govern the quality, design, fabrication and erection of steel used structurally in buildings or structures.

SECTION 2202 DEFINITIONS

2202.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meaning shown herein.

STEEL CONSTRUCTION, COLD-FORMED. That type of construction made up entirely or in part of steel structural members cold formed to shape from sheet or strip steel such as roof deck, floor and wall panels, studs, floor joists, roof joists and other structural elements.

STEEL JOIST. Any steel structural member of a building or structure made of hot-rolled or cold-formed solid or open-web sections, or riveted or welded bars, strip or sheet steel members, or slotted and expanded, or otherwise deformed rolled sections.

STEEL MEMBER, STRUCTURAL. Any steel structural member of a building or structure consisting of a rolled steel structural shape other than cold-formed steel, or steel joist members.

SECTION 2203 IDENTIFICATION AND PROTECTION OF STEEL FOR STRUCTURAL PURPOSES

2203.1 Identification. Steel furnished for structural load-carrying purposes shall be properly identified for conformity to the ordered grade in accordance with the specified ASTM standard or other specification and the provisions of this chapter. Steel that is not readily identifiable as to grade from marking and test records shall be tested to determine conformity to such standards.

2203.2 Protection. Painting of structural steel shall comply with the requirements contained in AISC 360. Individual structural members and assembled panels of cold-formed steel construction, except where fabricated of approved corrosion-resistant steel or of steel having a corrosion-resistant or other approved coating, shall be protected against corrosion with an approved coat of paint, enamel or other approved protection.

SECTION 2204 CONNECTIONS

2204.1 Welding. The details of design, workmanship and technique for welding, inspection of welding and qualification of welding operators shall conform to the requirements of the specifications listed in Sections 2205, 2206, 2207, 2209 and 2210. Special inspection of welding shall be provided where required by Section 1704 of this Code.

All welding, except when performed at the shop of an approved fabricator, shall be done by operators certified by the

Department for the type of operation involved in accordance with the provisions of Section 1704.3.1 of this Code.

Complete details of location, type, size and amount of all welds shall be clearly shown on the plans. Where symbols are used on the plans, they shall be the "Standard Welding Symbols," AWS A 2.4, of the American Welding Society (AWS). When it is necessary to use a special erection sequence of welding to minimize locked-up stresses or distortion, the Department may require the erection sequence of welding to be shown on the plans.

Welding procedures are qualified if they are in accordance with the AWS. Other welding procedures require special qualification approval by the Department. Each application for a special qualification shall be accompanied by a fee of \$50.00.

2204.2 Bolting. The design, installation and inspection of bolts shall be in accordance with the requirements of the specifications listed in Sections 2205, 2206, 2209 and 2210. Special inspection of the installation of high-strength bolts shall be provided where required by Section 1704.

2204.2.1 Anchor rods. Anchor rods shall be set accurately to the pattern and dimensions called for on the plans. The protrusion of the threaded ends through the connected material shall be sufficient to fully engage the threads of the nuts, but shall not be greater than the length of the threads on the bolts.

SECTION 2205 STRUCTURAL STEEL

2205.1 General. The design, fabrication and erection of structural steel for buildings and structures shall be in accordance with AISC 360. Where required, the seismic design of steel structures shall be in accordance with the additional provisions of Section 2205.2.

2205.2 Seismic requirements for steel structures. The design of structural steel structures to resist seismic forces shall be in accordance with the provisions of Section 2205.2.1 or 2205.2.2 for the appropriate seismic design category.

2205.2.1 Seismic Design Category A, B or C. Structural steel structures assigned to Seismic Design Category A, B or C shall be of any construction permitted in Section 2205. An *R* factor as set forth in Section 12.2.1 of ASCE 7 for the appropriate steel system is permitted where the structure is designed and detailed in accordance with the provisions of AISC 341, Part I. Systems not detailed in accordance with the above shall use the *R* factor in Section 12.2.1 of ASCE 7 designated for "structural steel systems not specifically detailed for seismic resistance."

2205.2.2 Seismic Design Category D, E or F. Structural steel structures assigned to Seismic Design Category D, E or F shall be designed and detailed in accordance with AISC 341, Part I.

2205.3 Seismic requirements for composite construction. The design, construction and quality of composite steel and concrete components that resist seismic forces shall conform to the require-

ments of the AISC 360 and ACI 318. An R factor as set forth in Section 12.2.1 of ASCE 7 for the appropriate composite steel and concrete system is permitted where the structure is designed and detailed in accordance with the provisions of AISC 341, Part II. In Seismic Design Category B or above, the design of such systems shall conform to the requirements of AISC 341, Part II.

2205.3.1 Seismic Design Categories D, E and F. Composite structures are permitted in Seismic Design Categories D, E and F, subject to the limitations in Section 12.2.1 of ASCE 7, where substantiating evidence is provided to demonstrate that the proposed system will perform as intended by AISC 341, Part II. The substantiating evidence shall be subject to building official approval. Where composite elements or connections are required to sustain inelastic deformations, the substantiating evidence shall be based on cyclic testing.

SECTION 2206 STEEL JOISTS

2206.1 General. The design, manufacture and use of open web steel joists and joist girders shall be in accordance with one of the following Steel Joist Institute (SJI) specifications:

1. SJI K-1.1
2. SJI LH/DLH-1.1
3. SJI JG-1.1

Where required, the seismic design of buildings shall be in accordance with the additional provisions of Section 2205.2 or 2210.5.

2206.2 Design. The registered design professional shall indicate on the construction documents the steel joist and/or steel joist girder designations from the specifications listed in Section 2206.1 and shall indicate the requirements for joist and joist girder design, layout, end supports, anchorage, non-SJI standard bridging, bridging termination connections and bearing connection design to resist uplift and lateral loads. These documents shall indicate special requirements as follows:

1. Special loads including:
 - 1.1. Concentrated loads;
 - 1.2. Nonuniform loads;
 - 1.3. Net uplift loads;
 - 1.4. Axial loads;
 - 1.5. End moments; and
 - 1.6. Connection forces.
2. Special considerations including:
 - 2.1. Profiles for nonstandard joist and joist girder configurations (standard joist and joist girder configurations are as indicated in the SJI catalog);
 - 2.2. Oversized or other nonstandard web openings; and
 - 2.3. Extended ends.
3. Deflection criteria for live and total loads for non-SJI standard joists.

2206.3 Calculations. The steel joist and joist girder manufacturer shall design the steel joists and/or steel joist girders in accordance with the current SJI specifications and load tables to support the load requirements of Section 2206.2. The registered design professional may require submission of the steel joist and

joist girder calculations as prepared by a registered design professional responsible for the product design. If requested by the registered design professional, the steel joist manufacturer shall submit design calculations with a cover letter bearing the seal and signature of the joist manufacturer's registered design professional. In addition to standard calculations under this seal and signature, submittal of the following shall be included:

1. Non-SJI standard bridging details (e.g. for cantilevered conditions, net uplift, etc.).
2. Connection details for:
 - 2.1. Non-SJI standard connections (e.g. flush-framed or framed connections);
 - 2.2. Field splices; and
 - 2.3. Joist headers.

2206.4 Steel joist drawings. Steel joist placement plans shall be provided to show the steel joist products as specified on the construction documents and are to be utilized for field installation in accordance with specific project requirements as stated in Section 2206.2. Steel placement plans shall include, at a minimum, the following:

1. Listing of all applicable loads as stated in Section 2206.2 and used in the design of the steel joists and joist girders as specified in the construction documents.
2. Profiles for nonstandard joist and joist girder configurations (standard joist and joist girder configurations are as indicated in the SJI catalog).
3. Connection requirements for:
 - 3.1. Joist supports;
 - 3.2. Joist girder supports;
 - 3.3. Field splices; and
 - 3.4. Bridging attachments.
4. Deflection criteria for live and total loads for non-SJI standard joists.
5. Size, location and connections for all bridging.
6. Joist headers.

Steel joist placement plans do not require the seal and signature of the joist manufacturer's registered design professional.

2206.5 Certification. At completion of fabrication, the steel joist manufacturer shall submit a certificate of compliance in accordance with Section 1704.2.2 stating that work was performed in accordance with approved construction documents and with SJI standard specifications.

SECTION 2207 STEEL CABLE STRUCTURES

2207.1 General. The design, fabrication and erection including related connections, and protective coatings of steel cables for buildings shall be in accordance with ASCE 19.

2207.2 Seismic requirements for steel cable. The design strength of steel cables shall be determined by the provisions of ASCE 19 except as modified by these provisions.

1. A load factor of 1.1 shall be applied to the prestress force included in T_3 and T_4 as defined in Section 3.12.
2. In Section 3.2.1, Item (c) shall be replaced with "1.5 T_3 " and Item (d) shall be replaced with "1.5 T_4 ."

CHAPTER 23

WOOD

SECTION 2301 GENERAL

2301.1 Scope. The provisions of this Chapter shall govern the materials, design, construction and quality of wood members and their fasteners.

Hillside buildings (buildings constructed upon slopes steeper than one unit vertical in three units horizontal (33.3-percent slope) shall comply with Section 1613.9 of this Code (seismic design provisions for hillside buildings) and this Chapter.

2301.1.1 Application. [DSA-SS & OSHPD 1, 2 and 4] The scope of application of Chapter 23 is as follows:

1. Applications listed in Section 109.2, regulated by the Division of the State Architect—Structural Safety (DSA-SS). These applications include public elementary and secondary schools, community colleges and state-owned or state-leased essential services buildings.
2. Applications listed in Section 110, regulated by the Office of Statewide Health Planning and Development (OSHPD). These applications include hospitals, skilled nursing facilities, intermediate care facilities and correction treatment centers.

Exception: For applications listed in Section 110.3 (Licensed Clinics), the provisions of this chapter without OSHPD amendments identified per Section 2301.1.2 shall apply.

2301.1.2 Identification of amendments. [DSA-SS & OSHPD 1, 2 and 4] Division of the State Architect—Structural Safety and Office of Statewide Health Planning and Development amendments appear in this chapter preceded with the appropriate acronym, as follows:

1. Division of the State Architect—Structural Safety: [DSA-SS] For applications listed in Section 109.2.
2. Office of Statewide Health Planning and Development:
[OSHPD 1] For applications listed in Section 110.1.
[OSHPD 2] For applications listed in Section 110.2.
[OSHPD 4] For applications listed in Section 110.4.

2301.1.3 Reference to other chapters. [DSA-SS & OSHPD 1 and 4] Where reference within this chapter is made to sections in Chapters 16, 17, 18, 19, 21, 22 and 34, the provisions in Chapters 16A, 17A, 18A, 19A, 21A and 34A, respectively, shall apply instead.

Exception: For DSA-SS, the requirements of Chapter 34 shall apply instead of Chapter 34A.

2301.2 General design requirements. The design of structural elements or systems, constructed partially or wholly of wood or wood-based products, shall be in accordance with one of the following methods:

1. Allowable stress design in accordance with Sections 2304, 2305 and 2306.
2. Load and resistance factor design in accordance with Sections 2304, 2305 and 2307.
3. Conventional light-frame construction in accordance with Sections 2304 and 2308.

Exception: Buildings designed in accordance with the provisions of the AF&PA WFCM shall be deemed to meet the requirements of the provisions of Section 2308.

2301.3 Nominal sizes. For the purposes of this chapter, where dimensions of lumber are specified, they shall be deemed to be nominal dimensions unless specifically designated as actual dimensions (see Section 2304.2).

SECTION 2302 DEFINITIONS

2302.1 Definitions. The following words and terms shall, for the purposes of this chapter, have the meanings shown herein.

ACCREDITATION BODY. An approved, third-party organization that is independent of the grading and inspection agencies, and the lumber mills, and that initially accredits and subsequently monitors, on a continuing basis, the competency and performance of a grading or inspection agency related to carrying out specific tasks.

BRACED WALL LINE. A series of braced wall panels in a single story that meets the requirements of Section 2308.3 or 2308.12.4.

BRACED WALL PANEL. A section of wall braced in accordance with Section 2308.9.3 or 2308.12.4.

COLLECTOR. A horizontal diaphragm element parallel and in line with the applied force that collects and transfers diaphragm shear forces to the vertical elements of the lateral-force-resisting system and/or distributes forces within the diaphragm.

CONVENTIONAL LIGHT-FRAME WOOD CONSTRUCTION. A type of construction whose primary structural elements are formed by a system of repetitive wood-framing members. See Section 2308 for conventional light-frame wood construction provisions.

CRIPPLE WALL. A framed stud wall extending from the top of the foundation to the underside of floor framing for the lowest occupied floor level.

DIAPHRAGM, UNBLOCKED. A diaphragm that has edge nailing at supporting members only. Blocking between supporting structural members at panel edges is not included. Diaphragm panels are field nailed to supporting members.

DRAG STRUT. See "Collector."

FIBERBOARD. A fibrous, homogeneous panel made from lignocellulosic fibers (usually wood or cane) and having a density of less than 31 pounds per cubic foot (pcf) (497 kg/m³) but more than 10 pcf (160 kg/m³).

GLUED BUILT-UP MEMBER. A structural element, the section of which is composed of built-up lumber, wood structural panels or wood structural panels in combination with lumber, all parts bonded together with structural adhesives.

GRADE (LUMBER). The classification of lumber in regard to strength and utility in accordance with American Softwood Lumber Standard DOC PS 20 and the grading rules of an approved lumber rules-writing agency.

HARDBOARD. A fibrous-felted, homogeneous panel made from lignocellulosic fibers consolidated under heat and pressure in a hot press to a density not less than 31 pcf (497 kg/m³).

NAILING, BOUNDARY. A special nailing pattern required by design at the boundaries of diaphragms.

NAILING, EDGE. A special nailing pattern required by design at the edges of each panel within the assembly of a diaphragm or shear wall.

NAILING, FIELD. Nailing required between the sheathing panels and framing members at locations other than boundary nailing and edge nailing.

NATURALLY DURABLE WOOD. The heartwood of the following species with the exception that an occasional piece with corner sapwood is permitted if 90 percent or more of the width of each side on which it occurs is heartwood.

Decay resistant. Redwood, cedar, black locust and black walnut.

Termite resistant. Redwood and Eastern red cedar.

NOMINAL SIZE (LUMBER). The commercial size designation of width and depth, in standard sawn lumber and glued-laminated lumber grades; somewhat larger than the standard net size of dressed lumber, in accordance with DOC PS 20 for sawn lumber and with the AF&PA NDS for glued-laminated lumber.

PARTICLEBOARD. A generic term for a panel primarily composed of cellulosic materials (usually wood), generally in the form of discrete pieces or particles, as distinguished from fibers. The cellulosic material is combined with synthetic resin or other suitable bonding system by a process in which the interparticle bond is created by the bonding system under heat and pressure.

PREFABRICATED WOOD I-JOIST. Structural member manufactured using sawn or structural composite lumber flanges and wood structural panel webs bonded together with

exterior exposure adhesives, which forms an "T" cross-sectional shape.

PRESERVATIVE-TREATED WOOD. Wood (including plywood) pressure treated with preservatives in accordance with Section 2303.1.8.

SHEAR WALL. A wall designed to resist lateral forces parallel to the plane of a wall.

Shear wall, perforated. A wood structural panel sheathed wall with openings, that has not been specifically designed and detailed for force transfer around openings.

Shear wall segment, perforated. A section of shear wall with full-height sheathing that meets the height-to-width ratio limits of Section 2305.3.4.

STRUCTURAL COMPOSITE LUMBER. Structural member manufactured using wood elements bonded together with exterior adhesives. Examples of structural composite lumber are:

Laminated veneer lumber (LVL). A composite of wood veneer sheet elements with wood fibers primarily oriented along the length of the member.

Parallel strand lumber (PSL). A composite of wood strand elements with wood fibers primarily oriented along the length of the member.

STRUCTURAL GLUED-LAMINATED TIMBER. An engineered, stress-rated product of a timber laminating plant, comprised of assemblies of specially selected and prepared wood laminations in which the grain of all laminations is approximately parallel longitudinally and the laminations are bonded with adhesives.

SUBDIAPHRAGM. A portion of a larger wood diaphragm designed to anchor and transfer local forces to primary diaphragm struts and the main diaphragm.

TIE-DOWN (HOLD-DOWN). A device used to resist uplift of the chords of shear walls.

TREATED WOOD. Wood impregnated under pressure with compounds that reduce its susceptibility to flame spread or to deterioration caused by fungi, insects or marine borers.

WOOD SHEAR PANEL. A wood floor, roof or wall component sheathed to act as a shear wall or diaphragm.

WOOD STRUCTURAL PANEL. A panel manufactured from veneers, wood strands or wafers or a combination of veneer and wood strands or wafers bonded together with waterproof synthetic resins or other suitable bonding systems. Examples of wood structural panels are:

Composite panels. A wood structural panel that is comprised of wood veneer and reconstituted wood-based material and bonded together with waterproof adhesive;

Oriented strand board (OSB). A mat-formed wood structural panel comprised of thin rectangular wood strands arranged in cross-aligned layers with surface layers normally arranged in the long panel direction and bonded with waterproof adhesive; or

Plywood. A wood structural panel comprised of plies of wood veneer arranged in cross-aligned layers. The plies are

tive-treated wood unless separated from such floors or roofs by an impervious moisture barrier.

2304.11.5 Supporting member for permanent appurtenances. Naturally durable or preservative-treated wood shall be utilized for those portions of wood members that form the structural supports of buildings, balconies, porches or similar permanent building appurtenances where such members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering to prevent moisture or water accumulation on the surface or at joints between members.

Exception: When a building is located in a geographical region where experience has demonstrated that climatic conditions preclude the need to use durable materials where the structure is exposed to the weather.

2304.11.6 Termite protection. In geographical areas where hazard of termite damage is known to be very heavy, wood floor framing shall be of naturally durable species (termite resistant) or preservative treated in accordance with AWPA U1 for the species, product preservative and end use or provided with approved methods of termite protection.

LA
LA
LA

2304.11.7 Wood used in retaining walls. No retaining wall shall be constructed of wood.

2304.11.8 Attic ventilation. For attic ventilation, see Section 1203.2.

2304.11.9 Under-floor ventilation (crawl space). For under-floor ventilation (crawl space), see Section 1203.3.

2304.11.10 Earth fills. [SPCB] *Separate the earth fills such as under porches or paving from all woodwork by concrete, masonry, good quality cement plaster or other material approved by local building codes. Chemical treatment of earth fills is considered adequate if the foundation adjoining the fill meets standards of the current building codes.*

2304.12 Long-term loading. Wood members supporting concrete, masonry or similar materials shall be checked for the effects of long-term loading using the provisions of the AF&PA NDS. The total deflection, including the effects of long-term loading, shall be limited in accordance with Section 1604.3.1 for these supported materials.

Exception: Horizontal wood members supporting masonry or concrete nonstructural floor or roof surfacing not more than 4 inches (102 mm) thick need not be checked for long-term loading.

SECTION 2305 GENERAL DESIGN REQUIREMENTS FOR LATERAL-FORCE-RESISTING SYSTEMS

2305.1 General. Structures using wood shear walls and diaphragms to resist wind, seismic and other lateral loads shall be designed and constructed in accordance with the provisions of this section. Alternatively, compliance with the AF&PA SDPWS shall be permitted subject to the limitations therein and the limitations of this code.

2305.1.1 Shear resistance based on principles of mechanics. Shear resistance of diaphragms and shear walls are permitted to be calculated by principles of mechanics using values of fastener strength and sheathing shear resistance.

2305.1.2 Framing. Boundary elements shall be provided to transmit tension and compression forces. Perimeter members at openings shall be provided and shall be detailed to distribute the shearing stresses. Diaphragm and shear wall sheathing shall not be used to splice boundary elements. Diaphragm chords and collectors shall be placed in, or tangent to, the plane of the diaphragm framing unless it can be demonstrated that the moments, shears and deformations, considering eccentricities resulting from other configurations can be tolerated without exceeding the adjusted resistance and drift limits.

2305.1.2.1 Framing members. Framing members shall be at least 2 inch (51 mm) nominal width. In general, adjoining panel edges shall bear and be attached to the framing members and butt along their centerlines. Nails shall be placed not less than $\frac{3}{8}$ inch (9.5 mm) from the panel edge, not more than 12 inches (305 mm) apart along intermediate supports, and 6 inches (152 mm) along panel edge bearings, and shall be firmly driven into the framing members.

2305.1.3 Openings in shear panels. Openings in shear panels that materially affect their strength shall be fully detailed on the plans, and shall have their edges adequately reinforced to transfer all shearing stresses.

2305.1.4 Shear panel connections. Positive connections and anchorages capable of resisting the design forces shall be provided between the shear panel and the attached components. In Seismic Design Category D, E or F, the capacity of toenail connections shall not be used when calculating lateral load resistance to transfer lateral earthquake forces in excess of 150 pounds per foot (2189 N/m) from diaphragms to shear walls, drag struts (collectors) or other elements, or from shear walls to other elements.

2305.1.5 Wood members resisting horizontal seismic forces contributed by masonry and concrete walls. Wood shear walls, diaphragms, horizontal trusses and other members shall not be used to resist horizontal seismic forces contributed by masonry or concrete walls in structures over one story in height.

Exceptions:

1. Wood floor and roof members are permitted to be used in horizontal trusses and diaphragms to resist horizontal seismic forces contributed by masonry or concrete walls, provided such forces do not result in torsional force distribution through the truss or diaphragm.
2. Wood structural panel sheathed shear walls are permitted to be used to provide resistance to seismic forces contributed by masonry or concrete walls in two-story structures of masonry or concrete walls, provided the following requirements are met:

- 2.1. Story-to-story wall heights shall not exceed 12 feet (3658 mm).
- 2.2. Diaphragms shall not be designed to transmit lateral forces by rotation and shall not cantilever past the outermost supporting shear wall.
- 2.3. Combined deflections of diaphragms and shear walls shall not permit story drift of supported masonry or concrete walls to exceed the limit of Section 12.12.1 in ASCE 7.
- 2.4. Wood structural panel sheathing in diaphragms shall have unsupported edges blocked. Wood structural panel sheathing for both stories of shear walls shall have unsupported edges blocked and, for the lower story, shall have a minimum thickness of $1\frac{5}{32}$ inch (11.9 mm).
- 2.5. There shall be no out-of-plane horizontal offsets between the first and second stories of wood structural panel shear walls.

2305.1.6 Wood members resisting seismic forces from nonstructural concrete or masonry. Wood members shall be permitted to resist horizontal seismic forces from nonstructural concrete, masonry veneer or concrete floors.

2305.1.7 Additional requirements. [DSA-SS & OSHPD 1, 2 and 4] The following limitations shall apply:

1. Straight-sheathed horizontal lumber diaphragms are not permitted.
2. Gypsum-based sheathing shear walls and portland cement plaster shear walls are not permitted.
3. Shear wall foundation anchor bolt washers (refer to Section 4.3.6.4.3 of the SDPWS) shall conform with the requirements of Section 2305.3.11.
4. The engineering analysis shall include a statement indicating whether the lateral-force-resisting system has been designed in accordance with Section 2305, or in accordance with the AF&PA SDPWS and the limitations of this code.

2305.2 Design of wood diaphragms.

2305.2.1 General. Wood diaphragms are permitted to be used to resist horizontal forces provided the deflection in the plane of the diaphragm, as determined by calculations, tests or analogies drawn therefrom, does not exceed the permissible deflection of attached distributing or resisting elements. Connections shall extend into the diaphragm a sufficient distance to develop the force transferred into the diaphragm.

2305.2.2 Deflection. Permissible deflection shall be that deflection up to which the diaphragm and any attached distributing or resisting element will maintain its structural integrity under design load conditions, such that the resisting element will continue to support design loads without danger to occupants of the structure. Calculations for diaphragm deflection shall account for the usual bending and shear components as well as any other factors, such as nail deformation, which will contribute to deflection.

The deflection (Δ) of a blocked wood structural panel diaphragm uniformly nailed throughout is permitted to be calculated by using the following equation. If not uniformly nailed, the constant 0.188 (For SI: $1/1627$) in the third term must be modified accordingly.

$$\Delta = \frac{5vL^3}{8EAb} + \frac{vL}{4Gt} + 0.188Le_n + \frac{\Sigma(\Delta_c X)}{2b} \quad (\text{Equation 23-1})$$

$$\text{For SI: } \Delta = \frac{0.052vL^3}{EAb} + \frac{vL}{4Gt} + \frac{Le_n}{1627} + \frac{\Sigma(\Delta_c X)}{2b}$$

where:

- A = Area of chord cross section, in square inches (mm^2).
 b = Diaphragm width, in feet (mm).
 E = Elastic modulus of chords, in pounds per square inch (N/mm^2).
 e_n = Nail or staple deformation, in inches (mm) [see Table 2305.2.2(1)].
 Gt = Panel rigidity through the thickness, in pounds per inch (N/mm) of panel width or depth [see Table 2305.2.2(2)].
 L = Diaphragm length, in feet (mm).
 v = Maximum shear due to design loads in the direction under consideration, in pounds per linear foot (plf) (N/mm).
 Δ = The calculated deflection, in inches (mm).
 $\Sigma(\Delta_c X)$ = Sum of individual chord-splice slip values on both sides of the diaphragm, each multiplied by its distance to the nearest support.

TABLE 2305.2.2(1)
 e_n VALUES (inches) FOR USE IN CALCULATING DIAPHRAGM DEFLECTION DUE TO FASTENER SLIP (Structural I)^{a,d}

LOAD PER FASTENER ^c (pounds)	FASTENER DESIGNATIONS ^b			
	6d	8d	10d	14-Ga staple x 2 inches long
60	0.01	0.00	0.00	0.011
80	0.02	0.01	0.01	0.018
100	0.03	0.01	0.01	0.028
120	0.04	0.02	0.01	0.04
140	0.06	0.03	0.02	0.053
160	0.10	0.04	0.02	0.068
180	—	0.05	0.03	—
200	—	0.07	0.47	—
220	—	0.09	0.06	—
240	—	—	0.07	—

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.448 N.

- a. Increase e_n values 20 percent for plywood grades other than Structural I.
- b. Nail values apply to common wire nails or staples identified.
- c. Load per fastener = maximum shear per foot divided by the number of fasteners per foot at interior panel edges.
- d. Decrease e_n values 50 percent for seasoned lumber (moisture content < 19 percent).

smaller. Figure 2305.2.5(2) illustrates the dimensions of l and w for a cantilevered diaphragm.

Structures with rigid wood diaphragms having a torsional irregularity in accordance with Table 12.3-1, Item 1, of ASCE 7 shall meet the following requirements: the l/w ratio shall not exceed 1 for one-story structures or 0.67 for structures over one story in height, where l is the dimension parallel to the load direction for which the irregularity exists.

Exception: Where calculations demonstrate that the diaphragm deflections can be tolerated, the width is permitted to be increased and the l/w ratio is permitted to be increased to 1.5 where sheathed in compliance with Section 2305.2.4 or 1 where sheathed in compliance with Section 2306.3.4 or 2306.3.5.

2305.3 Design of wood shear walls.

2305.3.1 General. Wood shear walls are permitted to resist horizontal forces in vertical distributing or resisting elements, provided the deflection in the plane of the shear wall, as determined by calculations, tests or analogies drawn therefrom, does not exceed the more restrictive of the permissible deflection of attached distributing or resisting elements or the drift limits of Section 12.12.1 of ASCE 7. Shear wall sheathing other than wood structural panels shall not be permitted in Seismic Design Category E or F (see Section 1613).

2305.3.2 Deflection. Permissible deflection shall be that deflection up to which the shear wall and any attached distributing or resisting element will maintain its structural integrity under design load conditions, i.e., continue to support design loads without danger to occupants of the structure.

The deflection (Δ) of a blocked wood structural panel shear wall uniformly fastened throughout is permitted to be calculated by the use of the following equation:

$$\Delta = \frac{8vh^3}{Eab} + \frac{vh}{Gt} + 0.75he_n + d_a \frac{h}{b} \quad (\text{Equation 23-2})$$

$$\text{For SI: } \Delta = \frac{vh^3}{3Eab} + \frac{vh}{Gt} + \frac{he_n}{407.6} + d_a \frac{h}{b}$$

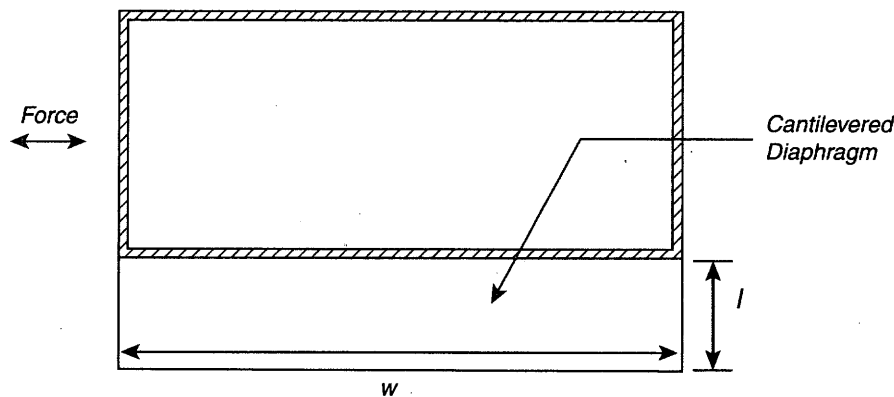


FIGURE 2305.2.5(2)
DIAPHRAGM LENGTH AND WIDTH FOR PLAN VIEW OF CANTILEVERED DIAPHRAGM

where:

A = Area of boundary element cross section in square inches (mm^2) (vertical member at shear wall boundary).

b = Wall width, in feet (mm).

d_a = Vertical elongation of overturning anchorage (including fastener slip, device elongation, anchor rod elongation, etc.) at the design shear load (v).

E = Elastic modulus of boundary element (vertical member at shear wall boundary), in pounds per square inch (N/mm^2).

e_n = Nail or staple deformation, in inches (mm) [see Table 2305.2.2(1)].

Gt = Panel rigidity through the thickness, in pounds per inch (N/mm) of panel width or depth [see Table 2305.2.2(2)].

h = Wall height, in feet (mm).

v = Maximum shear due to design loads at the top of the wall, in pounds per linear foot (N/mm).

Δ = The calculated deflection, in inches (mm).

2305.3.3 Construction. Wood shear walls shall be constructed of wood structural panels manufactured with exterior glue and not less than 4 feet by 8 feet (1219 mm by 2438 mm) except at boundaries and at changes in framing. All edges of all panels shall be supported by and fastened to framing members or blocking. Wood structural panel thickness for shear walls shall not be less than that set forth in Table 2304.6 for corresponding framing spacing and loads and shall be at least $\frac{3}{8}$ inch (9.5 mm) thick with studs spaced no more than 16 inches (406 mm) on center.

2305.3.4 Shear wall aspect ratios. Size and shape of shear walls, perforated shear wall segments within perforated shear walls and wall piers within shear walls that are designed for force transfer around openings shall be limited as set forth in Table 2305.3.4. The height, h , and the width, w , shall be determined in accordance with Sections 2305.3.5 through 2305.3.5.2 and 2305.3.6 through 2305.3.6.2, respectively.

TABLE 2305.3.4
MAXIMUM SHEAR WALL DIMENSION RATIOS

TYPE	MAXIMUM HEIGHT- WIDTH RATIO
Wood structural panels or particleboard, nailed edges	For other than seismic: $3\frac{1}{2}:1$ For seismic: $2:1^a$
Diagonal sheathing, single	$2:1$
Fiberboard	$1\frac{1}{2}:1$
Gypsum board, gypsum lath, cement plaster	$1\frac{1}{2}:1^b$

- a. For design to resist seismic forces, shear wall height-width ratios greater than $2:1$, but not exceeding $3\frac{1}{2}:1$, are permitted provided the allowable shear values in Table 2306.4.1 are multiplied by $2w/h$.
- b. Ratio shown is for unblocked construction. Height-to-width ratio is permitted to be $2:1$ where the wall is installed as blocked construction in accordance with Section 2306.4.5.1.2.

2305.3.5 Shear wall height definition. The height of a shear wall, h , shall be defined as:

1. The maximum clear height from the top of the foundation to the bottom of the diaphragm framing above; or
2. The maximum clear height from the top of the diaphragm to the bottom of the diaphragm framing above [see Figure 2305.3.5(a)].

2305.3.5.1 Perforated shear wall segment height definition. The height of a perforated shear wall segment, h ,

shall be defined as specified in Section 2305.3.5 for shear walls.

2305.3.5.2 Force transfer shear wall pier height definition. The height, h , of a wall pier in a shear wall with openings designed for force transfer around openings shall be defined as the clear height of the pier at the side of an opening [see Figure 2305.3.5(b)].

2305.3.6 Shear wall width definition. The width of a shear wall, w , shall be defined as the sheathed dimension of the shear wall in the direction of application of force [see Figure 2305.3.5(a)].

2305.3.6.1 Perforated shear wall segment width definition. The width of a perforated shear wall segment, w , shall be defined as the width of full-height sheathing adjacent to openings in the perforated shear wall [see Figure 2305.3.5(a)].

2305.3.6.2 Force transfer shear wall pier width definition. The width, w , of a wall pier in a shear wall with openings designed for force transfer around openings shall be defined as the sheathed width of the pier at the side of an opening [see Figure 2305.3.5(b)].

2305.3.7 Overturning restraint. Where the dead load stabilizing moment in accordance with Chapter 16 allowable stress design load combinations is not sufficient to prevent uplift due to overturning moments on the wall, an anchoring device shall be provided. Anchoring devices shall maintain a continuous load path to the foundation.

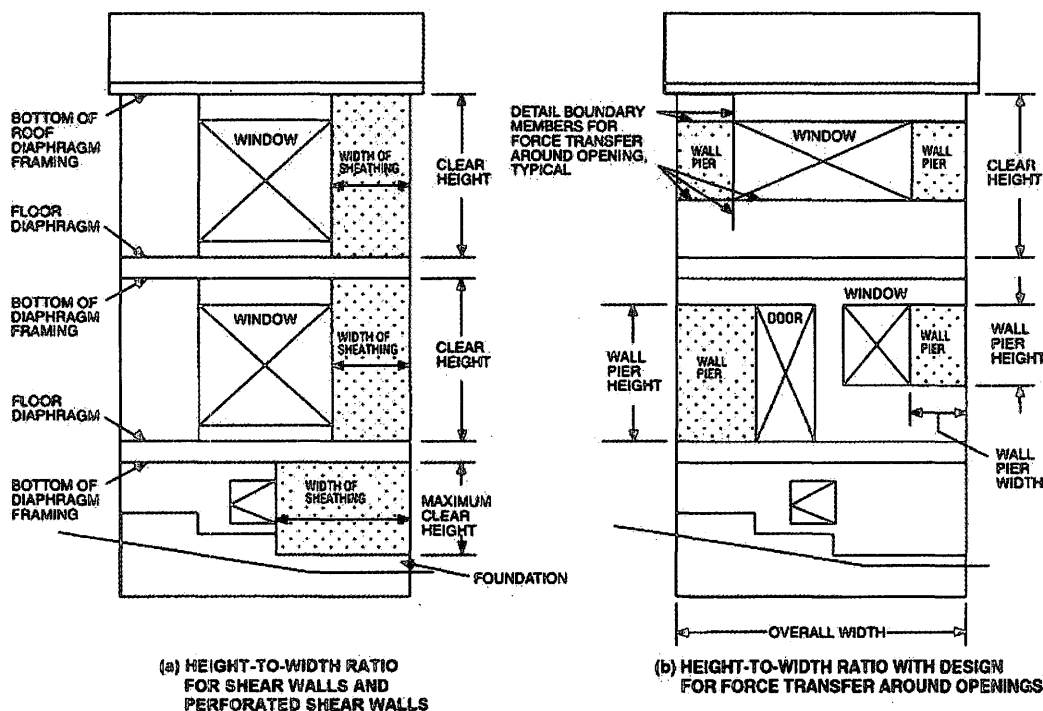


FIGURE 2305.3.5
GENERAL DEFINITION OF SHEAR WALL HEIGHT, WIDTH AND HEIGHT-TO-WIDTH RATIO

opposite faces, fiberboard structural sheathing and gypsum wallboard on opposite faces or hardboard panel siding and gypsum wallboard on opposite faces shall equal the sum of the sheathing capacities of each face separately.

2305.3.10 Adhesives. Adhesive attachment of shear wall sheathing is not permitted as a substitute for mechanical fasteners, and shall not be used in shear wall strength calculations alone, or in combination with mechanical fasteners in Seismic Design Category D, E or F.

2305.3.11 Sill plate size and anchorage in Seismic Design Categories D, E or F. Anchor bolts for shear walls shall include steel plate washers a minimum of 0.229 inch by 3 inches by 3 inches (5.82 mm by 76 mm by 76 mm) in size, or as per Table 2305.3.11, between the sill plate and nut. The hole in the plate washer is permitted to be diagonally slotted with a width of up to $\frac{3}{16}$ of an inch (4.76 mm) larger than the bolt diameter and a slot length not to exceed $1\frac{3}{4}$ inches (44 mm), provided a standard cut washer is placed between the plate washer and the nut. Sill plates resisting a design load greater than 490 plf (7154 N/m) using load and resistance factor design or 350 plf (5110 N/m) using allowable stress design shall not be less than a 3-inch (76 mm) nominal member. Where a single 3-inch (76 mm) nominal sill plate is used, 2-20d box end nails shall be substituted for 2-16d common end nails found in line 8 of Table 2304.9.1.

Exception: In shear walls where the design load is greater than 490 plf (7151 N/m) but less than 840 plf (12 264 N/m) using load and resistance factor design or greater than 350 plf (5110 N/m) but less than 600 plf (8760 N/m) using allowable stress design, the sill plate is permitted to be a 2-inch (51 mm) nominal member if the sill plate is anchored by two times the number of bolts required by design and 0.229-inch by 3-inch by 3-inch (5.82 mm by 76 mm by 76 mm) plate washers are used.

**TABLE 2305.3.11
MINIMUM SIZE FOR SQUARE PLATE WASHERS**

BOLT SIZE (inches)	PLATE WASHER SIZE (inches by inches by inches)
$\frac{1}{2}$	$\frac{3}{16} \times 2 \times 2$
$\frac{5}{8}$	$\frac{1}{4} \times 2\frac{1}{2} \times 2\frac{1}{2}$
$\frac{3}{4}$	$\frac{5}{16} \times 2\frac{3}{4} \times 2\frac{3}{4}$
$\frac{7}{8}$	$\frac{5}{16} \times 3 \times 3$
1	$\frac{3}{8} \times 3\frac{1}{2} \times 3\frac{1}{2}$

For SI: 1 inch = 25.4 mm.

SECTION 2306 ALLOWABLE STRESS DESIGN

2306.1 Allowable stress design. The structural analysis and construction of wood elements in structures using allowable stress design shall be in accordance with the following applicable standards:

American Forest & Paper Association.

NDS National Design Specification for Wood Construction

American Institute of Timber Construction.

AITC 104 Typical Construction Details

AITC 110 Standard Appearance Grades for Structural Glued Laminated Timber

AITC 113 Standard for Dimensions of Structural Glued Laminated Timber

AITC 117 Standard Specifications for Structural Glued Laminated Timber of Softwood Species

AITC 119 Structural Standard Specifications for Glued Laminated Timber of Hardwood Species

AITC A190.1 Structural Glued Laminated Timber

AITC 200 Inspection Manual

American Society of Agricultural Engineers.

ASAE EP 484.2 Diaphragm Design of Metal-Clad, Post-Frame Rectangular Buildings

ASAE EP 486.1 Shallow Post Foundation Design

ASAE 559 Design Requirements and Bending Properties for Mechanically Laminated Columns

APA—The Engineered Wood Association.

Panel Design Specification

Plywood Design Specification Supplement 1 -
Design & Fabrication of Plywood Curved Panel

Plywood Design Specification Supplement 2 -
Design & Fabrication of Glued Plywood-Lumber Beams

Plywood Design Specification Supplement 3 -
Design & Fabrication of Plywood Stressed-Skin Panels

Plywood Design Specification Supplement 4 -
Design & Fabrication of Plywood Sandwich Panels

Plywood Design Specification Supplement 5 -
Design & Fabrication of All-Plywood Beams

EWS T300 Glulam Connection Details

EWS S560 Field Notching and Drilling of Glued Laminated Timber Beams

EWS S475 Glued Laminated Beam Design Tables

EWS X450 Glulam in Residential Construction

EWS X440 Product and Application Guide: Glulam

EWS R540 Builders Tips: Proper Storage and Handling of Glulam Beams

Truss Plate Institute, Inc.

TPI 1 National Design Standard for Metal Plate Connected Wood Truss Construction

2306.1.1 Joists and rafters. The design of rafter spans is permitted to be in accordance with the *AF&PA Span Tables for Joists and Rafters*.

2306.1.2 Plank and beam flooring. The design of plank and beam flooring is permitted to be in accordance with the *AF&PA Wood Construction Data No. 4*.

2306.1.3 Treated wood stress adjustments. The allowable unit stresses for preservative-treated wood need no adjustment for treatment, but are subject to other adjustments.

The allowable unit stresses for fire-retardant-treated wood, including fastener values, shall be developed from an approved method of investigation that considers the effects of anticipated temperature and humidity to which the fire-retardant-treated wood will be subjected, the type of treatment and the redrying process. Other adjustments are applicable except that the impact load duration shall not apply.

2306.1.4 Lumber decking. The capacity of lumber decking arranged according to the patterns described in Section 2304.8.2 shall be the lesser of the capacities determined for flexure and deflection according to the formulas in Table 2306.1.4.

TABLE 2306.1.4
ALLOWABLE LOADS FOR LUMBER DECKING

PATTERN	ALLOWABLE AREA LOAD ^{a,b}	
	Flexure	Deflection
Simple span	$\sigma_b = \frac{8F'_b d^2}{l^2 6}$	$\sigma_\Delta = \frac{384\Delta E' d^3}{5l^4 12}$
Two-span continuous	$\sigma_b = \frac{8F'_b d^2}{l^2 6}$	$\sigma_\Delta = \frac{185\Delta E' d^3}{l^4 12}$
Combination simple- and two-span continuous	$\sigma_b = \frac{8F'_b d^2}{l^2 6}$	$\sigma_\Delta = \frac{131\Delta E' d^3}{l^4 12}$
Cantilevered pieces intermixed	$\sigma_b = \frac{20F'_b d^2}{3l^2 6}$	$\sigma_\Delta = \frac{105\Delta E' d^3}{l^4 12}$
Controlled random layup		
Mechanically laminated decking	$\sigma_b = \frac{20F'_b d^2}{3l^2 6}$	$\sigma_\Delta = \frac{100\Delta E' d^3}{l^4 12}$
2-inch decking	$\sigma_b = \frac{20F'_b d^2}{3l^2 6}$	$\sigma_\Delta = \frac{100\Delta E' d^3}{l^4 12}$
3-inch and 4-inch decking	$\sigma_b = \frac{20F'_b d^2}{3l^2 6}$	$\sigma_\Delta = \frac{116\Delta E' d^3}{l^4 12}$

For SI: 1 inch = 25.4 mm.

- a. σ_b = Allowable total uniform load limited by bending.
 σ_Δ = Allowable total uniform load limited by deflection.
- b. d = Actual decking thickness.
 l = Span of decking.
 F'_b = Allowable bending stress adjusted by applicable factors.
 E' = Modulus of elasticity adjusted by applicable factors.

2306.2 Wind provisions for walls.

2306.2.1 Wall stud bending stress increase. The AF&PA NDS fiber stress in bending (F_b) design values for sawn lumber wood studs resisting out of plane wind loads shall be increased by the factors in Table 2306.2.1, in lieu of the 1.15 repetitive member factor. These increases take into consideration the load sharing and composite actions provided by the wood structural panels as defined in Section 2302.1. The increases shall apply where the studs are designed for bending and are spaced no more than 16 inches (406 mm) o.c., covered on the inside with a minimum of $1/2$ -inch (12.7 mm)

gypsum board fastened in accordance with Table 2306.4.5 and sheathed on the exterior with a minimum of $3/8$ -inch (9.5 mm) wood structural panel sheathing. All panel joints shall occur over studs or blocking and shall be attached using a minimum of 8d common nails spaced a maximum of 6 inches o.c. (152 mm) at panel edges and 12 inches o.c. (305 mm) at intermediate framing members.

TABLE 2306.2.1
WALL STUD BENDING STRESS INCREASE FACTORS

STUD SIZE	SYSTEM FACTOR
2 × 4	1.5
2 × 6	1.35
2 × 8	1.25
2 × 10	1.2
2 × 12	1.15

2306.3 Wood diaphragms.

2306.3.1 Wood structural panel diaphragms. Wood structural panel diaphragms are permitted to resist horizontal forces using the allowable shear capacities set forth in Tables 2306.3.1 or 2306.3.2, provided staples as fasteners are not used.

Exception: Staples designated in Tables 2306.3.1 and 2306.3.2 may be used for wood structural panel diaphragms to resist seismic loading when the allowable shear values of Tables 2306.3.1 and 2306.3.2 are substantiated by cyclic testing and approved by the Department.

All wood structural panel shear wall capacities shall be established by an approved test report considering cyclic loading.

2306.3.2 Shear capacities modifications. The allowable shear capacities in Tables 2306.3.1 and 2306.3.2 for horizontal wood structural panel diaphragms shall be increased 40 percent for wind design.

2306.3.3 Diagonally sheathed lumber diaphragms. Diagonally sheathed lumber diaphragms shall be nailed in accordance with Table 2306.3.3.

2306.3.4 Single diagonally sheathed lumber diaphragms. Single diagonally sheathed lumber diaphragms shall be constructed of minimum 1-inch (25 mm) thick nominal sheathing boards laid at an angle of approximately 45 degrees (0.78 rad) to the supports. The shear capacity for single diagonally sheathed lumber diaphragms of southern pine or Douglas fir-larch shall not exceed 300 plf (4378 N/m) of width. The shear capacities shall be adjusted by reduction factors of 0.82 for framing members of species with a specific gravity equal to or greater than 0.42 but less than 0.49 and 0.65 for species with a specific gravity of less than 0.42, as contained in the AF&PA NDS.

TABLE 2306.3.3
DIAGONALLY SHEATHED LUMBER DIAPHRAGM NAILING SCHEDULE

SHEATHING NOMINAL DIMENSION	NAILING TO INTERMEDIATE AND END-BEARING STUDS		NAILING AT THE SHEAR PANEL BOUNDARIES	
	Type, size and number of nails per board			
	Common nails	Box nails	Common nails	Box nails
1 × 6	2 - 8d	3 - 8d	3 - 8d	5 - 8d
1 × 8	3 - 8d	4 - 8d	4 - 8d	6 - 8d
2 × 6	2 - 16d	3 - 16d	3 - 16d	5 - 16d
2 × 8	3 - 16d	4 - 16d	4 - 16d	6 - 16d

2306.3.4.1 End joints. End joints in adjacent boards shall be separated by at least one stud or joist space and there shall be at least two boards between joints on the same support.

2306.3.4.2 Single diagonally sheathed lumber diaphragms. Single diagonally sheathed lumber diaphragms made up of 2-inch (51 mm) nominal diagonal lumber sheathing fastened with 16d nails shall be designed with the same shear capacities as shear panels using 1-inch (25 mm) boards fastened with 8d nails, provided there are not splices in adjacent boards on the same support and the supports are not less than 4 inch (102 mm) nominal depth or 3 inch (76 mm) nominal thickness.

2306.3.5 Double diagonally sheathed lumber diaphragms. Double diagonally sheathed lumber diaphragms shall be constructed of two layers of diagonal sheathing boards at 90 degrees (1.57 rad) to each other on the same face of the supporting members. Each chord shall be considered as a beam with uniform load per foot equal to 50 percent of the unit shear due to diaphragm action. The load shall be assumed as acting normal to the chord in the plan of the diaphragm in either direction. The span of the chord or portion thereof shall be the distance between framing members of the diaphragm, such as the joists, studs and blocking that serve to transfer the assumed load to the sheathing. The shear capacity of double diagonally sheathed diaphragms of Southern pine or Douglas fir-larch shall not exceed 600 plf (8756 kN/m) of width. The shear capacity shall be adjusted by reduction factors of 0.82 for framing members of species with a specific gravity equal to or greater than 0.42 but less than 0.49 and 0.65 for species with a specific gravity of less than 0.42, as contained in the AF&PA NDS. Nailing of diagonally sheathed lumber diaphragms shall be in accordance with Table 2306.3.3.

2306.3.6 Gypsum board diaphragm ceilings. Gypsum board diaphragm ceilings shall be in accordance with Section 2508.5.

2306.4 Shear walls. Panel sheathing joints in shear walls shall occur over studs or blocking. Adjacent panel sheathing joints shall occur over and be nailed to common framing members (see Section 2305.3.1 for limitations on shear wall bracing materials).

2306.4.1 Wood structural panel shear walls. The allowable shear capacities for wood structural panel shear walls shall be in accordance with Table 2306.4.1 of this Code. These capacities are permitted to be increased 40 percent for wind design. The maximum allowable shear value for three-ply plywood resisting seismic forces is 200 pounds per foot (2.92 kN/m). Nails shall be placed not less than $\frac{1}{2}$ inch (12.7 mm) in from the panel edges and not less than $\frac{3}{8}$ of an inch (9.5 mm) from the edge of the connecting members for shear greater than 350 pounds per foot (5.11 kN/m). Nails shall be placed not less than $\frac{3}{8}$ of an inch (9.5 mm) from panel edges and not less than $\frac{1}{4}$ of an inch (6.4 mm) from the edge of the connecting members for shears of 350 pounds per foot (5.11 kN/m) or less.

Wood structural panel shear walls that use staples as fasteners shall not be permitted.

All wood structural panel shear wall capacities shall be established by an approved test report considering cyclic loading.

2306.4.2 Lumber sheathed shear walls. Single and double diagonally sheathed lumber diaphragms are permitted using the construction and allowable load provisions of Sections 2306.3.4 and 2306.3.5.

2306.4.3 Particleboard shear walls. The design shear capacity of particleboard shear walls shall be in accordance with Table 2306.4.3. Shear panels shall be constructed with particleboard sheets not less than 4 feet by 8 feet (1219 mm by 2438 mm), except at boundaries and changes in framing. Particleboard panels shall be designed to resist shear only, and chords, collector members and boundary elements shall be connected at all corners. Panel edges shall be backed with 2-inch (51 mm) nominal or wider framing. Sheets are permitted to be installed either horizontally or vertically. For $\frac{3}{8}$ -inch (9.5 mm) particleboard sheets installed with the long dimension parallel to the studs spaced 24 inches (610 mm) o.c., nails shall be spaced at 6 inches (152 mm) o.c. along intermediate framing members. For all other conditions, nails of the same size shall be spaced at 12 inches (305 mm) o.c. along intermediate framing members. Particleboard panels less than 12 inches (305 mm) wide shall be blocked. Particleboard shall not be used to resist seismic forces in structures in Seismic Design Category D, E or F.

2306.4.4 Fiberboard shear walls. The design shear capacity of fiberboard shear walls shall be in accordance with Table 2306.4.4. The fiberboard sheathing shall be applied vertically or horizontally to wood studs not less than 2 inch (51 mm) in nominal thickness spaced 16 inches (406 mm) o.c. Blocking not less than 2 inch (51 mm) nominal in thickness shall be provided at horizontal joints. Fiberboard shall not be used to resist seismic forces in structures in Seismic Design Category D, E or F.

2306.4.5 Shear walls sheathed with other materials. Shear capacities for walls sheathed with lath, plaster or gypsum board shall be in accordance with Table 2306.4.5. Shear walls sheathed with lath, plaster or gypsum board shall be constructed in accordance with Chapter 25 of this Code and Section 2306.4.5.1. Walls resisting seismic loads shall be subject to the limitations in Section 12.2.1 of ASCE 7. The allowable shear values shown in Table 2306.4.5 for materials in Category 1 are limited to 90 pound per foot (1.31 kN/m) and materials in Categories 2 through 4 are limited to 30 pounds per foot (438 N/m).

2306.4.5.1 Application of gypsum board or lath and plaster to wood framing.

2306.4.5.1.1 Joint staggering. End joints of adjacent courses of gypsum board shall not occur over the same stud.

2306.4.5.1.2 Blocking. Where required in Table 2306.4.5, wood blocking having the same cross-sectional dimensions as the studs shall be provided at joints that are perpendicular to the studs.

2306.4.5.1.3 Fastening. Studs, top and bottom plates and blocking shall be fastened in accordance with Table 2304.9.1.

2306.4.5.1.4 Fasteners. The size and spacing of fasteners shall be set forth in Table 2306.4.5. Fasteners shall be spaced not less than $\frac{3}{8}$ inch (9.5 mm) from edges and ends of gypsum boards or sides of studs, blocking and top and bottom plates.

TABLE 2306.4.1
ALLOWABLE SHEAR (POUNDS PER FOOT) FOR WOOD STRUCTURAL PANEL SHEAR WALLS WITH
FRAMING OF DOUGLAS FIR-LARCH OR SOUTHERN PINE^a FOR WIND OR SEISMIC LOADING^{b, h, i, j, l, m}

PANEL GRADE	MINIMUM NOMINAL PANEL THICKNESS (inch)	MINIMUM FASTENER PENETRATION IN FRAMING (inches)	PANELS APPLIED DIRECT TO FRAMING					PANELS APPLIED OVER 1/2" OR 5/8" GYPSUM SHEATHING				
			NAIL (common or galvanized box) or staple size ^k	Fastener spacing at panel edges (inches)				NAIL (common or galvanized box) or staple size ^k	Fastener spacing at panel edges (inches)			
				6	4	3	2 ^e		6	4	3	2 ^e
Structural I Sheathing	5/16	1 1/4	6d (2" × 0.113" common, 2" × 0.099" galvanized box)	150	200	200	200	6d (2" × 0.113" common, 2" × 0.099" galvanized box)	200	300	390	510
	3/8	1 3/8	8d (2 1/2" × 0.131" common, 2 1/2" × 0.113" galvanized box)	200	200	200	200	8d (2 1/2" × 0.131" common, 2 1/2" × 0.113" galvanized box)	230 ^d	360 ^d	460 ^d	610 ^d
	7/16	1 3/8	8d (2 1/2" × 0.131" common, 2 1/2" × 0.113" galvanized box)	255 ^d	395 ^d	505 ^d	670 ^d	8d (2 1/2" × 0.131" common, 2 1/2" × 0.113" galvanized box)	255 ^d	395 ^d	505 ^d	670 ^d
	15/32	1 3/8	8d (2 1/2" × 0.131" common, 2 1/2" × 0.113" galvanized box)	280	430	550	730	8d (2 1/2" × 0.131" common, 2 1/2" × 0.113" galvanized box)	280	430	550	730
		1 1/2	10d (3" × 0.148" common, 3" × 0.128" galvanized box)	340	510	665 ^f	870	10d (3" × 0.148" common, 3" × 0.128" galvanized box)	340	510	665 ^f	870
Sheathing, plywood siding ^g except Group 5 Species	5/16 or 1/4 ^c	1 1/4	6d (2" × 0.113" common, 2" × 0.099" galvanized box)	180	200	200	200	6d (2" × 0.113" common, 2" × 0.099" galvanized box)	180	270	350	450
	3/8	1 1/4	6d (2" × 0.113" common, 2" × 0.099" galvanized box)	200	200	200	200	6d (2" × 0.113" common, 2" × 0.099" galvanized box)	200	300	390	510
		1 3/8	8d (2 1/2" × 0.131" common, 2 1/2" × 0.113" galvanized box)	220	200	200	200	8d (2 1/2" × 0.131" common, 2 1/2" × 0.113" galvanized box)	220 ^d	320 ^d	410 ^d	530 ^d
	7/16	1 3/8	8d (2 1/2" × 0.131" common, 2 1/2" × 0.113" galvanized box)	240 ^d	350 ^d	450 ^d	585 ^d	8d (2 1/2" × 0.131" common, 2 1/2" × 0.113" galvanized box)	240 ^d	350 ^d	450 ^d	585 ^d
	15/32	1 3/8	8d (2 1/2" × 0.131" common, 2 1/2" × 0.113" galvanized box)	260	380	490	640	8d (2 1/2" × 0.131" common, 2 1/2" × 0.113" galvanized box)	260	380	490	640
		1 1/2	10d (3" × 0.148" common, 3" × 0.128" galvanized box)	310	460	600 ^f	770	10d (3" × 0.148" common, 3" × 0.128" galvanized box)	310	460	600 ^f	770
	19/32	1 1/2	10d (3" × 0.148" common, 3" × 0.128" galvanized box)	340	510	665 ^f	870	10d (3" × 0.148" common, 3" × 0.128" galvanized box)	340	510	665 ^f	870
			Nail Size (galvanized casing)					Nail Size (galvanized casing)				
	5/16 ^c	1 1/4	6d (2" × 0.099")	140	200	200	200	6d (2" × 0.099")	140	210	275	360
3/8	1 3/8	8d (2 1/2" × 0.113")	160	200	200	200	8d (2 1/2" × 0.113")	160	240	310	410	

For SI: 1 inch = 25.4 mm, 1 pound per foot = 14.5939 N/m.

- For framing of other species: (1) Find specific gravity for species of lumber in AF&PA NDS. (2) For nails find shear value from table above for nail size for actual grade and multiply value by the following adjustment factor: Specific Gravity Adjustment Factor = $[1 - (0.5 - SG)]$, where SG = Specific Gravity of the framing lumber. This adjustment factor shall not be greater than one.
- Panel edges backed with 2-inch nominal or thicker framing. Install panels either horizontally or vertically. Space fasteners maximum 6 inches on center along intermediate framing members for $\frac{3}{8}$ -inch and $\frac{7}{16}$ -inch panels installed on studs spaced 24 inches on center. For other conditions and panel thickness, space fasteners maximum 12 inches on center on intermediate supports. $\frac{1}{4}$ -inch panel thickness or siding with a span rating of 16 inches on center is the minimum recommended where applied direct to framing as exterior siding.
- Except for wood structural panel sheathing used for shear walls that are part of the seismic-force-resisting system, allowable shear values are permitted to be increased to values shown for $\frac{15}{32}$ -inch sheathing with same nailing provided (a) studs are spaced a maximum of 16 inches on center, or (b) panels are applied with long dimension across studs.
- Framing at adjoining panel edges shall be three inches nominal or wider, and nails shall be staggered where nails are spaced 2 inches on center.
- Framing at adjoining panel edges shall be three inches nominal or wider, and nails shall be staggered where both of the following conditions are met: (1) 10d (3" x 0.148") nails having penetration into framing of more than $1\frac{1}{2}$ inches and (2) nails are spaced three inches on center.
- Values apply to all-veneer plywood. Thickness at point of fastening on panel edges governs shear values.
- Where panels applied on both faces of a wall and nail spacing is less than six inches on center on either side, panel joints shall be offset to fall on different framing members, or framing shall be three-inch nominal or thicker at adjoining panel edges and nails on each side shall be staggered.
- In Seismic Design Category D, E or F, where shear design values exceed 350 pounds per linear foot, all framing members receiving edge nailing from abutting panels shall not be less than a single three-inch nominal member, or two two-inch nominal members fastened together in accordance with Section 2306.1 to transfer the design shear value between framing members. Wood structural panel joint and sill plate nailing shall be staggered in all cases. See Section 2305.3.11 for sill plate size and anchorage requirements.
- Galvanized nails shall be hot dipped or tumbled.
- The maximum allowable shear value for three-ply plywood resisting seismic forces is 200 pounds per foot (2.92 kg/m).
- For shear loads of normal or permanent load duration as defined by the AF&PA NDS, the values in the table above shall be multiplied by 0.63 or 0.56, respectively.
- [DSA-SS & OSHPD 1, 2 and 4] Refer to Section 2305.2.4.2, which requires any wood structural panel sheathing used for diaphragms and shear walls that are part of the seismic-force-resisting system to be applied directly to framing members.

TABLE 2306.4.3
ALLOWABLE SHEAR FOR PARTICLEBOARD SHEAR WALL SHEATHING^b

PANEL GRADE	MINIMUM NOMINAL PANEL THICKNESS (inch)	MINIMUM NAIL PENETRATION IN FRAMING (Inches)	PANELS APPLIED DIRECT TO FRAMING				
			Nail size (common or galvanized box)	Allowable shear (pounds per foot) nail spacing at panel edges (inches) ^a			
				6	4	3	2
M-S “Exterior Glue” and M-2 “Exterior Glue”	³ / ₈	1 ¹ / ₂	6d	120	180	230	300
	³ / ₈	1 ¹ / ₂	8d	130	190	240	315
	¹ / ₂			140	210	270	350
	¹ / ₂	1 ⁵ / ₈	10d	185	275	360	460
	⁵ / ₈			200	305	395	520

For SI: 1 inch = 25.4 mm, 1 pound per foot = 14.5939 N/m.

a. Values are not permitted in Seismic Design Category D, E or F.

b. Galvanized nails shall be hot-dipped or tumbled.

TABLE 2306.4.4
ALLOWABLE SHEAR VALUES (plf) FOR WIND OR SEISMIC LOADING ON
SHEAR WALLS OF FIBERBOARD SHEATHING BOARD CONSTRUCTION FOR TYPE V CONSTRUCTION ONLY^{a,b,c,d,e,f,g,h}

THICKNESS AND GRADE	FASTENER SIZE	SHEAR VALUE (pounds per linear foot) 3-INCH NAIL SPACING AROUND PERIMETER AND 6-INCH AT INTERMEDIATE POINTS
$\frac{1}{2}$ " Structural	No. 11 gage galvanized roofing nail $1\frac{1}{2}$ " long, $\frac{7}{16}$ " head	125 ^g
$\frac{25}{32}$ " Structural	No. 11 gage galvanized roofing nail $1\frac{3}{4}$ " long, $\frac{7}{16}$ " head	175 ^g

For SI: 1 inch = 25.4 mm, 1 pound per foot = 14.5939 N/m.

a. Fiberboard sheathing diaphragms shall not be used to brace concrete or masonry walls.

b. Panel edges shall be backed with 2 inch or wider framing of Douglas fir-larch or Southern pine.

c. Fiberboard sheathing on one side only.

d. Fiberboard panels are installed with their long dimension parallel or perpendicular to studs.

e. Fasteners shall be spaced 6 inches on center along intermediate framing members.

f. For framing of other species: (1) Find specific gravity for species of lumber in AF&PA NDS and (2) Multiply the shear value from the above table by 0.82 for species with specific gravity of 0.42 or greater, or 0.65 for all other species.

g. The same values can be applied when staples are used as described in Table 2304.9.1.

h. Values are not permitted in Seismic Design Category D, E or F.

2306.4.5.1.5 Gypsum lath. Gypsum lath shall be applied perpendicular to the studs. Maximum allowable shear values shall be as set forth in Table 2306.4.5.

2306.4.5.1.6 Gypsum sheathing. Four-foot-wide (1219 mm) pieces of gypsum sheathing shall be applied parallel or perpendicular to studs. Two-foot-wide (610 mm) pieces of gypsum sheathing shall be applied perpendicular to the studs. Maximum allowable shear values shall be as set forth in Table 2306.4.5.

2306.4.5.1.7 Other gypsum boards. Gypsum board shall be applied parallel or perpendicular to studs. Maximum allowable shear values shall be as set forth in Table 2306.4.5.

2306.5 Hold-down connectors. Hold-down connectors shall be designed to resist shear wall overturning moments using approved cyclic load values or 75 percent of the allowable earthquake load values that do not consider cyclic loading of the product. Connector bolts into wood framing require steel plate washers in accordance with Table 2305.3.11 of this Code.

Hold-downs shall be re-tightened just prior to covering the wall framing.

2306.6 Shear wall displacement analysis. Wood structural panel shear walls shall meet the story drift limitation of Section 12.12.1 of ASCE 7. Conformance to the story drift limitation shall be determined by approved testing or calculation or analogies drawn from the approved testing and not the use of an aspect ratio. Calculated deflection shall be determined according to Section 2305.3.2 and shall be increased 25 percent to account for inelastic action and repetitive loading. Contribution to the deflection from the anchor or tie down slippage shall also be included. The slippage contribution shall include the vertical elongation of the metal, the vertical slippage of the fasteners and compression or shrinkage of the wood elements. The total vertical slippage shall be multiplied by the aspect ratio and added to the total horizontal deflection.

2306.7 Quality of nails. Mechanically driven nails used in shear wall panel construction shall meet the same tolerances as that required for hand driven nails. The allowable design value for clipped nails in existing construction may be taken at no more than the nail-head-area ratio of that of the same size hand driven nails.

TABLE 2306.4.5
ALLOWABLE SHEAR FOR WIND OR SEISMIC FORCES FOR SHEAR WALLS OF LATH
AND PLASTER OR GYPSUM BOARD WOOD FRAMED WALL ASSEMBLIES

TYPE OF MATERIAL	THICKNESS OF MATERIAL	WALL CONSTRUCTION	FASTENER SPACING ^b MAXIMUM (inches)	SHEAR VALUE ^{a,e} (plf)	MINIMUM FASTENER SIZE ^{c,d,j,k}
1. Expanded metal or woven wire lath and portland cement plaster	$\frac{7}{8}$ "	Unblocked	6	180	No. 11 gage $1\frac{1}{2}$ " long, $\frac{3}{16}$ " head 16 Ga. Galv. Staple, $\frac{1}{8}$ " legs
2. Gypsum lath, plain or perforated	$\frac{3}{8}$ " lath and $\frac{1}{2}$ " plaster	Unblocked	5	100	No. 13 gage, $1\frac{1}{8}$ " long, $\frac{19}{64}$ " head, plasterboard nail 16 Ga. Galv. Staple, $1\frac{1}{8}$ " long 0.120" Nail, min. $\frac{3}{8}$ " head, $1\frac{1}{4}$ " long
3. Gypsum sheathing	$\frac{1}{2}$ " $\times$ 2' $\times$ 8'	Unblocked	4	75	No. 11 gage, $1\frac{3}{4}$ " long, $\frac{7}{16}$ " head, diamond-point, galvanized
	$\frac{1}{2}$ " $\times$ 4'	Blocked ^f Unblocked	4 7	175 100	16 Ga. Galv. Staple, $1\frac{1}{4}$ " long
	$\frac{5}{8}$ " $\times$ 4'	Blocked	4" edge/ 7" field	200	6d galvanized 0.120" Nail, min. $\frac{3}{8}$ " head, $1\frac{1}{4}$ " long
4. Gypsum board, gypsum veneer base or water-resistant gypsum backing board	$\frac{1}{2}$ "	Unblocked ^f	7	75	5d cooler ($1\frac{1}{8}$ " $\times$.086") or wallboard 0.120" nail, min. $\frac{3}{8}$ " head, $1\frac{1}{2}$ " long 16 Gage Staple, $1\frac{1}{2}$ " long
		Unblocked ^f	4	110	
		Unblocked	7	100	
		Unblocked	4	125	
		Blocked ^g	7	125	
		Blocked ^g	4	150	No. 6 $1\frac{1}{4}$ " screws ⁱ
		Unblocked	8/12 ^h	60	
		Blocked ^g	4/16 ^h	160	
		Blocked ^g	4/12 ^h	155	
		Blocked ^{f, g}	8/12 ^h	70	
		Blocked ^g	6/12 ^h	90	
	$\frac{5}{8}$ "	Unblocked ^f	7	115	6d cooler ($1\frac{1}{8}$ " $\times$ 0.092") or wallboard 0.120" Nail, min. $\frac{3}{8}$ " head, $1\frac{3}{4}$ " long 16 Gage Staple, $1\frac{1}{2}$ " legs, $1\frac{3}{8}$ " long
			4	145	
		Blocked ^g	7	145	
			4	175	
		Blocked ^g Two-ply	Base ply: 9 Face ply: 7	250	Base ply-6d cooler ($1\frac{1}{8}$ " $\times$ 0.092") or wallboard $1\frac{3}{4}$ " $\times$ 0.120" Nail, min. $\frac{3}{8}$ " head $1\frac{3}{8}$ " 16 Ga. Galv. Staple $1\frac{3}{8}$ " 16 Gage Galv. Staple Face ply-8d cooler ($2\frac{1}{8}$ " $\times$ 0.113") or wallboard 0.120" Nail, min. $\frac{3}{8}$ " head, $2\frac{1}{8}$ " long 15 Ga. Galv. Staple, $2\frac{1}{4}$ " long
		Unblocked	8/12 ^h	70	No. 6- $1\frac{1}{4}$ " screws ⁱ
		Blocked ^g	8/12 ^h	90	

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per foot = 14.5939 N/m.

- These shear walls shall not be used to resist loads imposed by masonry or concrete construction (see Section 2305.1.5). Values shown are for short-term loading due to wind or seismic loading. Walls resisting seismic loads shall be subject to the limitations in Section 12.2.1 of ASCE 7. Values shown shall be reduced 25 percent for normal loading.
- Applies to fastening at studs, top and bottom plates and blocking.
- Alternate fasteners are permitted to be used if their dimensions are not less than the specified dimensions. Drywall screws are permitted to substitute for the 5d ($1\frac{1}{8}$ " $\times$ 0.086"), and 6d ($1\frac{1}{8}$ " $\times$ 0.092") (cooler) nails listed above, and No. 6 $1\frac{1}{4}$ " inch Type S or W screws for 6d ($1\frac{1}{8}$ " $\times$ 0.092) (cooler) nails.
- For properties of cooler nails, see ASTM C 514.
- Except as noted, shear values are based on a maximum framing spacing of 16 inches on center.
- Maximum framing spacing of 24 inches on center.
- All edges are blocked, and edge fastening is provided at all supports and all panel edges.
- First number denotes fastener spacing at the edges; second number denotes fastener spacing at intermediate framing members.
- Screws are Type W or S.
- Staples shall have a minimum crown width of $\frac{7}{16}$ " inch, measured outside the legs, and shall be installed with their crowns parallel to the long dimension of the framing members.
- Staples for the attachment of gypsum lath and woven-wire lath shall have a minimum crown width of $\frac{3}{4}$ " inch, measured outside the legs.

SECTION 2307 LOAD AND RESISTANCE FACTOR DESIGN

2307.1 Load and resistance factor design. The structural analysis and construction of wood elements and structures using load and resistance factor design shall be in accordance with AF&PA NDS.

2307.1.1 Wood structural panel shear walls. In Seismic Design Category D, E or F, where shear design values exceed 490 pounds per foot (7154 N/m), all framing members receiving edge nailing from abutting panels shall not be less than a single 3-inch (76 mm) nominal member or two 2-inch (51 mm) nominal members fastened together in accordance with AF&PA NDS to transfer the design shear value between framing members. Wood structural panel joint and sill plate nailing shall be staggered in all cases. See Section 2305.3.11 for sill plate size and anchorage requirements.

SECTION 2308 CONVENTIONAL LIGHT-FRAME CONSTRUCTION

2308.1 General. The requirements of this section are intended for conventional light-frame construction. Other methods are permitted to be used, provided a satisfactory design is submitted showing compliance with other provisions of this code. Interior-bearing partitions, ceilings and curtain walls of conventional light-frame construction are not subject to the limitations of this section. Alternatively, compliance with AF&PA WFCM shall be permitted subject to the limitations therein and the limitations of this code.

2308.1.1 Portions exceeding limitations of conventional construction. When portions of a building of otherwise conventional construction exceed the limits of Section 2308.2, these portions and the supporting load path shall be designed in accordance with accepted engineering practice and the provisions of this code. For the purposes of this section, the term "portions" shall mean parts of buildings containing volume and area such as a room or a series of rooms.

2308.2 Limitations. Buildings are permitted to be constructed in accordance with the provisions of conventional light-frame construction, subject to the following limitations and the further limitations of Sections 2308.11 and 2308.12.

1. Buildings shall be limited to a maximum of three stories above grade plane. For the purposes of this section, for buildings in Seismic Design Category D or E as determined in Section 1613 of this Code, cripple stud walls shall not be considered to be a story, provided the cripple stud walls are solid blocked and do not exceed 14 inches (356mm) in height measured from the top of the footing to the bottom of the floor joist.
2. Bearing wall stud height shall not exceed ten feet (3048 mm). The height of floor framing shall not exceed 16 inches (406 mm).

3. Loads as determined in Chapter 16 of this Code shall not exceed the following:

- 3.1. Average dead loads shall not exceed 15 psf (718 N/m²) for the combined roof and ceiling, exterior walls, floors and partitions.

Exceptions:

1. Subject to the limitations of Sections 2308.11.2 and 2308.12.2, stone or masonry veneer up to the lesser of 5 inches (127 mm) thick or 50 psf (2395 N/m²) and installed in accordance with Chapter 14 of this Code is permitted to a height of 30 feet (9144 mm) above a noncombustible foundation with an additional 8 feet (2438 mm) permitted for gable ends.
2. Concrete or masonry fireplaces, heaters and chimneys shall be permitted in accordance with the provisions of this Code.
- 3.2. Ground snow loads shall not exceed 50 psf (2395 N/m²).
- 3.3. Ground snow loads shall not exceed 50 psf (2395 N/m²).
4. Wind speeds shall not exceed 100 miles per hour (mph) (44 m/s) (3-second gust).
Exception: Wind speeds shall not exceed 110 mph (48.4 m/s) (3-second gust) for buildings in Exposure Category B.
5. Roof trusses and rafters shall not span more than 40 feet (12 192 mm) between points of vertical support.
6. The provisions of this section shall not apply to Occupancy Category IV buildings assigned to Seismic Design Category B, C, D, E or F, as determined in Section 1613 of this Code.
7. Conventional light-frame construction is limited in irregular structures in Seismic Design Category D or E, as specified in Section 2308.12.6.
8. For all occupancies, interior nonload-bearing partitions 8 feet (2348 mm) or higher shall be laterally braced at the top at eight feet (2348 mm) maximum on center.

2308.2.1 Basic wind speed greater than 100 mph (3-second gust). Where the basic wind speed exceeds 100 mph (3-second gust), the provisions of either AF&PA WFCM, or the SBCCI SSTD 10 are permitted to be used.

2308.2.2 Buildings in Seismic Design Category B, C, D or E. Buildings of conventional light-frame construction in Seismic Design Category B or C, as determined in Section 1613, shall comply with the additional requirements in Section 2308.11.

Buildings of conventional light-frame construction in Seismic Design Category D or E, as determined in Section

1613, shall comply with the additional requirements in Section 2308.12.

Exceptions:

1. [HCD 1] Detached one- and two- family dwellings in Seismic Design Category B.
2. [HCD 1] Detached one- and two- family dwellings in Seismic Design Category C where masonry veneer is limited to the first two stories above grade.

2308.3 Braced wall lines. Buildings shall be provided with exterior and interior braced wall lines as described in Section 2308.9.3 and installed in accordance with Sections 2308.3.1 through 2308.3.4.

2308.3.1 Spacing. Spacing of braced wall lines shall not exceed 35 feet (10 668 mm) o.c. in both the longitudinal and transverse directions in each story.

2308.3.2 Braced wall panel connections. Forces shall be transferred from the roofs and floors to braced wall panels and from the braced wall panels in upper stories to the braced wall panels in the story below by the following:

1. Braced wall panel top and bottom plates shall be fastened to joists, rafters or full-depth blocking. Braced wall panels shall be extended and fastened to roof framing at intervals not to exceed 50 feet (15 240 mm) between parallel braced wall lines.

Exception: Where roof trusses are used, lateral forces shall be transferred from the roof diaphragm to the braced wall by blocking of the ends of the trusses or by other approved methods.

2. Bottom plate fastening to joist or blocking below shall be with not less than 3-16d nails at 16 inches (406 mm) o.c.
3. Blocking shall be nailed to the top plate below with not less than 3-8d toenails per block.
4. Joists parallel to the top plates shall be nailed to the top plate with not less than 8d toenails at 6 inches (152 mm) o.c.

In addition, top plate laps shall be nailed with not less than 8-16d face nails on each side of each break in the top plate.

2308.3.3 Sill anchorage. Where foundations are required by Section 2308.3.4, braced wall line sills shall be anchored to concrete or masonry foundations. Such anchorage shall conform to the requirements of Section 2308.6 except that such anchors shall be spaced at not more than 4 feet (1219 mm) o.c. for structures over two stories in height. The anchors shall be distributed along the length of the braced wall line. Other anchorage devices having equivalent capacity are permitted.

2308.3.3.1 Anchorage to all-wood foundations. Where all-wood foundations are used, the force transfer from the braced wall lines shall be determined based on calcu-

lation and shall have a capacity greater than or equal to the connections required by Section 2308.3.3.

2308.3.4 Braced wall line support. Braced wall lines shall be supported by continuous foundations.

Exception: For structures with a maximum plan dimension not over 50 feet (15 240 mm), continuous foundations are required at exterior walls only.

2308.4 Design of elements. Combining of engineered elements or systems and conventionally specified elements or systems is permitted subject to the following limits:

2308.4.1 Elements exceeding limitations of conventional construction. When a building of otherwise conventional construction contains structural elements exceeding the limits of Section 2308.2, these elements and the supporting load path shall be designed in accordance with accepted engineering practice and the provisions of this code.

2308.4.2 Structural elements or systems not described herein. When a building of otherwise conventional construction contains structural elements or systems not described in Section 2308, these elements or systems shall be designed in accordance with accepted engineering practice and the provisions of this code. The extent of such design need only demonstrate compliance of the nonconventional elements with other applicable provisions of this code and shall be compatible with the performance of the conventionally framed system.

2308.5 Connections and fasteners. Connections and fasteners used in conventional construction shall comply with the requirements of Section 2304.9.

2308.6 Foundation plates or sills. Foundations and footings shall be as specified in Chapter 18 of this Code. Foundation plates or sills resting on concrete or masonry foundations shall comply with Section 2304.3.1. Foundation plates or sills shall be bolted or anchored to the foundation with not less than 1/2-inch-diameter (12.7 mm) steel bolts or approved anchors. Bolts shall be embedded at least 7 inches (178 mm) into concrete or masonry and spaced not more than 6 feet (1829 mm) apart. There shall be a minimum of two bolts or anchor straps per piece with one bolt or anchor strap located not more than 12 inches (305 mm) or less than 4 inches (102 mm) from each end of each piece. A properly sized nut and washer shall be tightened on each bolt to the plate as per Table 2305.3.11 in this Chapter.

2308.7 Girders. Girders for single-story construction or girders supporting loads from a single floor shall not be less than 4 inches by 6 inches (102 mm by 152 mm) for spans 6 feet (1829 mm) or less, provided that girders are spaced not more than 8 feet (2438 mm) o.c. Spans for built-up 2-inch (51 mm) girders shall be in accordance with Table 2308.9.5 or 2308.9.6. Other girders shall be designed to support the loads specified in this code. Girder end joints shall occur over supports.

Where a girder is spliced over a support, an adequate tie shall be provided. The ends of beams or girders supported on masonry or concrete shall not have less than 3 inches (76 mm) of bearing.

2308.8 Floor joists. Spans for floor joists shall be in accordance with Table 2308.8(1) or 2308.8(2). For other grades and or species, refer to the *AF&PA Span Tables for Joists and Rafters*.

2308.8.1 Bearing. Except where supported on a 1-inch by 4-inch (25.4 mm by 102 mm) ribbon strip and nailed to the adjoining stud, the ends of each joist shall not have less than 1½ inches (38 mm) of bearing on wood or metal, or less than 3 inches (76 mm) on masonry.

2308.8.2 Framing details. Joists shall be supported laterally at the ends and at each support by solid blocking except where the ends of the joists are nailed to a header, band or rim joist or to an adjoining stud or by other means. Solid blocking shall not be less than 2 inches (51 mm) in thickness and the full depth of the joist. Notches on the ends of joists shall not exceed one-fourth the joist depth. Holes bored in joists shall not be within 2 inches (51 mm) of the top or bottom of the joist, and the diameter of any such hole shall not exceed one-third the depth of the joist. Notches in the top or bottom of joists shall not exceed one-sixth the depth and shall not be located in the middle third of the span.

Joist framing from opposite sides of a beam, girder or partition shall be lapped at least 3 inches (76 mm) or the opposing joists shall be tied together in an approved manner.

Joists framing into the side of a wood girder shall be supported by framing anchors or on ledger strips not less than 2 inches by 2 inches (51 mm by 51 mm).

2308.8.2.1 Engineered wood products. Cuts, notches and holes bored in trusses, structural composite lumber, structural glue-laminated members or I-joists are not permitted except where permitted by the manufacturer's recommendations or where the effects of such alterations are specifically considered in the design of the member by a registered design professional.

2308.8.3 Framing around openings. Trimmer and header joists shall be doubled, or of lumber of equivalent cross section, where the span of the header exceeds 4 feet (1219 mm). The ends of header joists more than 6 feet (1829 mm) long shall be supported by framing anchors or joist hangers unless bearing on a beam, partition or wall. Tail joists over 12 feet (3658 mm) long shall be supported at the header by framing anchors or on ledger strips not less than 2 inches by 2 inches (51 mm by 51 mm).

2308.8.4 Supporting bearing partitions. Bearing partitions parallel to joists shall be supported on beams, girders, doubled joists, walls or other bearing partitions. Bearing partitions perpendicular to joists shall not be offset from supporting girders, walls or partitions more than the joist depth unless such joists are of sufficient size to carry the additional load.

2308.8.5 Lateral support. Floor, attic and roof framing with a nominal depth-to-thickness ratio greater than or equal to 5:1 shall have one edge held in line for the entire span. Where the nominal depth-to-thickness ratio of the framing member exceeds 6:1, there shall be one line of bridging for each 8 feet (2438 mm) of span, unless both edges of the member are held in line. The bridging shall consist of not less than 1-inch by 3-inch (25 mm by 76 mm) lumber, double nailed at each end, of equivalent metal bracing of equal rigidity, full-depth solid blocking or other approved means. A line of bridging shall also be required at supports where equivalent lateral support is not otherwise provided.

2308.8.6 Structural floor sheathing. Structural floor sheathing shall comply with the provisions of Section 2304.7.1.

2308.8.7 Under-floor ventilation. For under-floor ventilation, see Section 1203.3.

2308.9 Wall framing.

2308.9.1 Size, height and spacing. The size, height and spacing of studs shall be in accordance with Table 2308.9.1 except that utility-grade studs shall not be spaced more than 16 inches (406 mm) o.c., or support more than a roof and ceiling, or exceed 8 feet (2438 mm) in height for exterior walls and load-bearing walls or 10 feet (3048 mm) for interior nonload-bearing walls.

2308.9.2 Framing details. Studs shall be placed with their wide dimension perpendicular to the wall. Not less than three studs shall be installed at each corner of an exterior wall.

Exception: At corners, two studs are permitted, provided wood spacers or backup cleats of ¾-inch-thick (9.5 mm) wood structural panel, ¾-inch (9.5 mm) Type M "Exterior Glue" particleboard, 1-inch-thick (25 mm) lumber or other approved devices that will serve as an adequate backing for the attachment of facing materials are used. Where fire-resistance ratings or shear values are involved, wood spacers, backup cleats or other devices shall not be used unless specifically approved for such use.

TABLE 2308.8(1)
FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
 (Residential Sleeping Areas, Live Load = 30 psf, L/Δ = 360)

JOIST SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
		2x6	2x8	2x10	2x12	2x6	2x8	2x10	2x12
		Maximum floor joist spans							
		(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	Douglas Fir-Larch SS	12-6	16-6	21-0	25-7	12-6	16-6	21-0	25-7
	Douglas Fir-Larch #1	12-0	15-10	20-3	24-8	12-0	15-7	19-0	22-0
	Douglas Fir-Larch #2	11-10	15-7	19-10	23-0	11-6	14-7	17-9	20-7
	Douglas Fir-Larch #3	9-8	12-4	15-0	17-5	8-8	11-0	13-5	15-7
	Hem-Fir SS	11-10	15-7	19-10	24-2	11-10	15-7	19-10	24-2
	Hem-Fir #1	11-7	15-3	19-5	23-7	11-7	15-2	18-6	21-6
	Hem-Fir #2	11-0	14-6	18-6	22-6	11-0	14-4	17-6	20-4
	Hem-Fir #3	9-8	12-4	15-0	17-5	8-8	11-0	13-5	15-7
	Southern Pine SS	12-3	16-2	20-8	25-1	12-3	16-2	20-8	25-1
	Southern Pine #1	12-0	15-10	20-3	24-8	12-0	15-10	20-3	24-8
	Southern Pine #2	11-10	15-7	19-10	24-2	11-10	15-7	18-7	21-9
	Southern Pine #3	10-5	13-3	15-8	18-8	9-4	11-11	14-0	16-8
	Spruce-Pine-Fir SS	11-7	15-3	19-5	23-7	11-7	15-3	19-5	23-7
	Spruce-Pine-Fir #1	11-3	14-11	19-0	23-0	11-3	14-7	17-9	20-7
	Spruce-Pine-Fir #2	11-3	14-11	19-0	23-0	11-3	14-7	17-9	20-7
	Spruce-Pine-Fir #3	9-8	12-4	15-0	17-5	8-8	11-0	13-5	15-7
16	Douglas Fir-Larch SS	11-4	15-0	19-1	23-3	11-4	15-0	19-1	23-0
	Douglas Fir-Larch #1	10-11	14-5	18-5	21-4	10-8	13-6	16-5	19-1
	Douglas Fir-Larch #2	10-9	14-1	17-2	19-11	9-11	12-7	15-5	17-10
	Douglas Fir-Larch #3	8-5	10-8	13-0	15-1	7-6	9-6	11-8	13-6
	Hem-Fir SS	10-9	14-2	18-0	21-11	10-9	14-2	18-0	21-11
	Hem-Fir #1	10-6	13-10	17-8	20-9	10-4	13-1	16-0	18-7
	Hem-Fir #2	10-0	13-2	16-10	19-8	9-10	12-5	15-2	17-7
	Hem-Fir #3	8-5	10-8	13-0	15-1	7-6	9-6	11-8	13-6
	Southern Pine SS	11-2	14-8	18-9	22-10	11-2	14-8	18-9	22-10
	Southern Pine #1	10-11	14-5	18-5	22-5	10-11	14-5	17-11	21-4
	Southern Pine #2	10-9	14-2	18-0	21-1	10-5	13-6	16-1	18-10
	Southern Pine #3	9-0	11-6	13-7	16-2	8-1	10-3	12-2	14-6
	Spruce-Pine-Fir SS	10-6	13-10	17-8	21-6	10-6	13-10	17-8	21-4
	Spruce-Pine-Fir #1	10-3	13-6	17-2	19-11	9-11	12-7	15-5	17-10
	Spruce-Pine-Fir #2	10-3	13-6	17-2	19-11	9-11	12-7	15-5	17-10
	Spruce-Pine-Fir #3	8-5	10-8	13-0	15-1	7-6	9-6	11-8	13-6

(continued)

TABLE 2308.8(2)—continued
 FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
 (Residential Living Areas, Live Load = 40 psf, $L/\Delta = 360$)

JOIST SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
		2x6	2x8	2x10	2x12	2x6	2x8	2x10	2x12
		Maximum floor joist spans							
		(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
19.2	Douglas Fir-Larch SS	9-8	12-10	16-4	19-10	9-8	12-10	16-4	19-2
	Douglas Fir-Larch #1	9-4	12-4	15-0	17-5	8-10	11-3	13-8	15-11
	Douglas Fir-Larch #2	9-1	11-6	14-1	16-3	8-3	10-6	12-10	14-10
	Douglas Fir-Larch #3	6-10	8-8	10-7	12-4	6-3	7-11	9-8	11-3
	Hem-Fir SS	9-2	12-1	15-5	18-9	9-2	12-1	15-5	18-9
	Hem-Fir #1	9-0	11-10	14-8	17-0	8-8	10-11	13-4	15-6
	Hem-Fir #2	8-7	11-3	13-10	16-1	8-2	10-4	12-8	14-8
	Hem-Fir #3	6-10	8-8	10-7	12-4	6-3	7-11	9-8	11-3
	Southern Pine SS	9-6	12-7	16-0	19-6	9-6	12-7	16-0	19-6
	Southern Pine #1	9-4	12-4	15-9	19-2	9-4	12-4	14-11	17-9
	Southern Pine #2	9-2	12-1	14-8	17-2	8-8	11-3	13-5	15-8
	Southern Pine #3	7-4	9-5	11-1	13-2	6-9	8-7	10-1	12-1
	Spruce-Pine-Fir SS	9-0	11-10	15-1	18-4	9-0	11-10	15-1	17-9
	Spruce-Pine-Fir #1	8-9	11-6	14-1	16-3	8-3	10-6	12-10	14-10
	Spruce-Pine-Fir #2	8-9	11-6	14-1	16-3	8-3	10-6	12-10	14-10
	Spruce-Pine-Fir #3	6-10	8-8	10-7	12-4	6-3	7-11	9-8	11-3
24	Douglas Fir-Larch SS	9-0	11-11	15-2	18-5	9-0	11-11	14-9	17-1
	Douglas Fir-Larch #1	8-8	11-0	13-5	15-7	7-11	10-0	12-3	14-3
	Douglas Fir-Larch #2	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4
	Douglas Fir-Larch #3	6-2	7-9	9-6	11-0	5-7	7-1	8-8	10-1
	Hem-Fir SS	8-6	11-3	14-4	17-5	8-6	11-3	14-4	16-10 ^a
	Hem-Fir #1	8-4	10-9	13-1	15-2	7-9	9-9	11-11	13-10
	Hem-Fir #2	7-11	10-2	12-5	14-4	7-4	9-3	11-4	13-1
	Hem-Fir #3	6-2	7-9	9-6	11-0	5-7	7-1	8-8	10-1
	Southern Pine SS	8-10	11-8	14-11	18-1	8-10	11-8	14-11	18-1
	Southern Pine #1	8-8	11-5	14-7	17-5	8-8	11-3	13-4	15-11
	Southern Pine #2	8-6	11-0	13-1	15-5	7-9	10-0	12-0	14-0
	Southern Pine #3	6-7	8-5	9-11	11-10	6-0	7-8	9-1	10-9
	Spruce-Pine-Fir SS	8-4	11-0	14-0	17-0	8-4	11-0	13-8	15-11
	Spruce-Pine-Fir #1	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4
	Spruce-Pine-Fir #2	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4
	Spruce-Pine-Fir #3	6-2	7-9	9-6	11-0	5-7	7-1	8-8	10-1

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 47.8 N/m².

a. End bearing length shall be increased to 2 inches.

TABLE 2308.10.3(4)—continued
RAFTER SPANS FOR COMMON LUMBER SPECIES
 (Ground Snow Load = 50 pounds per square foot, Ceiling Not Attached to Rafters, $L/\Delta = 180$)

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 pounds per square foot				DEAD LOAD = 20 pounds per square foot					
		2 x 4	2 x 6	2 x 8	2 x 10	2 x 4	2 x 6	2 x 8	2 x 10	2 x 12	
		(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
19.2	Douglas Fir-Larch SS	7-3	11-4	14-6	17-8	20-6	7-3	10-7	13-5	16-5	19-0
	Douglas Fir-Larch #1	6-6	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Douglas Fir-Larch #2	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Douglas Fir-Larch #3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Hem-Fir SS	6-10	10-9	14-2	17-5	20-2	6-10	10-5	13-2	16-1	18-8
	Hem-Fir #1	6-4	9-3	11-9	14-4	16-7	5-10	8-7	10-10	13-3	15-5
	Hem-Fir #2	6-0	8-9	11-1	13-7	15-9	5-7	8-1	10-3	12-7	14-7
	Hem-Fir #3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Southern Pine SS	7-1	11-2	14-8	18-9	22-10	7-1	11-2	14-8	18-7	21-9
	Southern Pine #1	7-0	10-8	13-5	16-0	19-1	6-8	9-11	12-5	14-10	17-8
	Southern Pine #2	6-6	9-4	12-0	14-4	16-10	6-0	8-8	11-2	13-4	15-7
	Southern Pine #3	4-11	7-3	9-2	10-10	12-11	4-6	6-8	8-6	10-1	12-0
	Spruce-Pine-Fir SS	6-8	10-6	13-5	16-5	19-1	6-8	9-10	12-5	15-3	17-8
	Spruce-Pine-Fir #1	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-Pine-Fir #2	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-Pine-Fir #3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
24	Douglas Fir-Larch SS	6-8	10-3	13-0	15-10	18-4	6-6	9-6	12-0	14-8	17-0
	Douglas Fir-Larch #1	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Douglas Fir-Larch #2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Douglas Fir-Larch #3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0
	Hem-Fir SS	6-4	9-11	12-9	15-7	18-0	6-4	9-4	11-9	14-5	16-8
	Hem-Fir #1	5-8	8-3	10-6	12-10	14-10	5-3	7-8	9-9	11-10	13-9
	Hem-Fir #2	5-4	7-10	9-11	12-1	14-1	4-11	7-3	9-2	11-3	13-0
	Hem-Fir #3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0
	Southern Pine SS	6-7	10-4	13-8	17-5	21-0	6-7	10-4	13-8	16-7	19-5
	Southern Pine #1	6-5	9-7	12-0	14-4	17-1	6-0	8-10	11-2	13-3	15-9
	Southern Pine #2	5-10	8-4	10-9	12-10	15-1	5-5	7-9	10-0	11-11	13-11
	Southern Pine #3	4-4	6-5	8-3	9-9	11-7	4-1	6-0	7-7	9-0	10-8
	Spruce-Pine-Fir SS	6-2	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Spruce-Pine-Fir #1	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-Pine-Fir #2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-Pine-Fir #3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 47.9 N/m².

a. Span exceeds 26 feet in length. Check sources for availability of lumber in lengths greater than 20 feet.

TABLE 2308.10.3(5)
RAFTER SPANS FOR COMMON LUMBER SPECIES
 (Ground Snow Load = 30 pounds per square foot, Ceiling Attached to Rafters, $L/\Delta = 240$)

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 pounds per square foot					DEAD LOAD = 20 pounds per square foot				
		2 x 4	2 x 6	2 x 8	2 x 10	2 x 12	2 x 4	2 x 6	2 x 8	2 x 10	2 x 12
		Maximum rafter spans									
		(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	Douglas Fir-Larch SS	9-1	14-4	18-10	24-1	Note a	9-1	14-4	18-10	24-1	Note a
	Douglas Fir-Larch #1	8-9	13-9	18-2	22-9	Note a	8-9	13-2	16-8	20-4	23-7
	Douglas Fir-Larch #2	8-7	13-6	17-5	21-4	24-8	8-5	12-4	15-7	19-1	22-1
	Douglas Fir-Larch #3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Hem-Fir SS	8-7	13-6	17-10	22-9	Note a	8-7	13-6	17-10	22-9	Note a
	Hem-Fir #1	8-5	13-3	17-5	22-2	25-9	8-5	12-10	16-3	19-10	23-0
	Hem-Fir #2	8-0	12-7	16-7	21-0	24-4	8-0	12-2	15-4	18-9	21-9
	Hem-Fir #3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Southern Pine SS	8-11	14-1	18-6	23-8	Note a	8-11	14-1	18-6	23-8	Note a
	Southern Pine #1	8-9	13-9	18-2	23-2	Note a	8-9	13-9	18-2	22-2	Note a
	Southern Pine #2	8-7	13-6	17-10	22-3	Note a	8-7	12-11	16-8	19-11	23-4
	Southern Pine #3	7-7	11-2	14-3	16-10	20-0	6-9	10-0	12-9	15-1	17-11
	Spruce-Pine-Fir SS	8-5	13-3	17-5	22-3	Note a	8-5	13-3	17-5	22-3	Note a
	Spruce-Pine-Fir #1	8-3	12-11	17-0	21-4	24-8	8-3	12-4	15-7	19-1	22-1
	Spruce-Pine-Fir #2	8-3	12-11	17-0	21-4	24-8	8-3	12-4	15-7	19-1	22-1
	Spruce-Pine-Fir #3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
16	Douglas Fir-Larch SS	8-3	13-0	17-2	21-10	Note a	8-3	13-0	17-2	21-3	24-8
	Douglas Fir-Larch #1	8-0	12-6	16-2	19-9	22-10	7-10	11-5	14-5	17-8	20-5
	Douglas Fir-Larch #2	7-10	11-11	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Douglas Fir-Larch #3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Hem-Fir SS	7-10	12-3	16-2	20-8	25-1	7-10	12-3	16-2	20-8	24-2
	Hem-Fir #1	7-8	12-0	15-9	19-3	22-3	7-7	11-1	14-1	17-2	19-11
	Hem-Fir #2	7-3	11-5	14-11	18-2	21-1	7-2	10-6	13-4	16-3	18-10
	Hem-Fir #3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Southern Pine SS	8-1	12-9	16-10	21-6	Note a	8-1	12-9	16-10	21-6	Note a
	Southern Pine #1	8-0	12-6	16-6	21-1	25-7	8-0	12-6	16-2	19-2	22-10
	Southern Pine #2	7-10	12-3	16-2	19-3	22-7	7-10	11-2	14-5	17-3	20-2
	Southern Pine #3	6-7	9-8	12-4	14-7	17-4	5-10	8-8	11-0	13-0	15-6
	Spruce-Pine-Fir SS	7-8	12-0	15-10	20-2	24-7	7-8	12-0	15-10	19-9	22-10
	Spruce-Pine-Fir #1	7-6	11-9	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-Pine-Fi #2	7-6	11-9	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-Pine-Fi #3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6

(continued)

CHAPTER 30

ELEVATORS AND CONVEYING SYSTEMS

SECTION 3001 GENERAL

3001.1 Scope. This chapter governs the design, construction, installation, alteration and repair of elevators and conveying systems and their components. All elevators shall comply with the additional requirements of the *LA City Elevator Code*.

3001.2 Referenced standards. Except as otherwise provided for in this code, the design, construction, installation, alteration, repair and maintenance of elevators and conveying systems and their components shall conform to ASME A17.1, ASME A90.1, ASME B20.1, ALI ALCTV, and ASCE 24 for construction in flood hazard areas established in Section 1612.3.

3001.3 Accessibility. Passenger elevators and special access lifts required to be accessible by Chapters 11A or 11B shall conform to Chapter 11A for applications listed in Section 108.2.1.2 regulated by the Department of Housing and Community Development or Chapter 11B for applications listed in Section 109.1 regulated by the Division of the State Architect—Access Compliance.

3001.4 Change in use. A change in use of an elevator from freight to passenger, passenger to freight, or from one freight class to another freight class shall comply with Part XII of ASME A17.1.

SECTION 3002 HOISTWAY ENCLOSURES

3002.1 Hoistway enclosure protection. Elevator, dumbwaiter and other hoistway enclosures shall be shaft enclosures complying with Section 707.

3002.1.1 Opening protectives. Openings in hoistway enclosures shall be protected as required in Chapter 7.

Exception: The elevator car doors and the associated hoistway enclosure doors at the floor level designated for recall in accordance with Section 3003.2 shall be permitted to remain open during Phase I Emergency Recall Operation.

3002.1.2 Hardware. Hardware on opening protectives shall be of an approved type installed as tested, except that approved interlocks, mechanical locks and electric contacts, door and gate electric contacts and door-operating mechanisms shall be exempt from the fire test requirements.

3002.2 Number of elevator cars in a hoistway. Where four or more elevator cars serve all or the same portion of a building, the elevators shall be located in at least two separate hoistways. Not more than four elevator cars shall be located in any single hoistway enclosure.

3002.3 Emergency signs. An approved pictorial sign of a standardized design shall be posted adjacent to each elevator call

station on all floors instructing occupants to use the exit stairways and not to use the elevators in case of fire. The sign shall read: IN FIRE EMERGENCY, DO NOT USE ELEVATOR. USE EXIT STAIRS. The emergency sign shall not be required for elevators that are part of an accessible means of egress complying with Section 1007.4.

3002.4 Elevator car to accommodate ambulance stretcher. Where elevators are provided in buildings four or more stories above grade plane or four or more stories below grade plane, at least one elevator shall be provided for fire department emergency access to all floors. The elevator car shall be of such a size and arrangement to accommodate a 24-inch by 84-inch (610 mm by 1930 mm) ambulance stretcher in the horizontal, open position and shall be identified by the international symbol for emergency medical services (star of life). The symbol shall not be less than 3 inches (76 mm) high and shall be placed inside on both sides of the hoistway door frame.

The following California sections replace the corresponding model code section for applications specified in Section 111 for the Office of the State Fire Marshal.

3002.4a General stretcher requirements. All buildings and structures with one or more passenger service elevators shall be provided with not less than one medical emergency service to all landings meeting the provisions of Section 3002.4a.

Exceptions:

1. Elevators in structures used only by maintenance and operating personnel.
2. Elevators in jails and penal institutions.
3. Elevators in buildings or structures where each landing is at ground level or is accessible at grade level or by a ramp.
4. Elevator(s) in two-story buildings or structures equipped with stairs of a configuration that will accommodate the carrying of the gurney or stretcher as permitted by the local jurisdictional authority.
5. Elevators in buildings or structures less than four stories in height for which the local jurisdictional authority has granted an exception in the form of a written document.

3002.4a.1 Gurney size. The medical emergency service elevator shall accommodate the loading and transport of an ambulance gurney or stretcher [maximum size 24 inches by 84 inches (610 mm by 2134 mm)] in the horizontal position.

3002.4a.2 Hoistway doors. The hoistway landing openings shall be provided with power-operated doors.

3002.4a.3 Elevator entrance openings and car size. The elevator car shall be of such a size and arrangement to accommodate a 24-inch by 84-inch (610 mm by 2134 mm) ambulance gurney or stretcher in the horizontal, open position, shall be provided with a minimum clear distance between walls or between walls and door excluding return panels not less than 80 inches by 54 inches (2032 mm by 1372 mm), and a minimum distance from wall to return panel not less than 51 inches (1295 mm) with a 42-inch (1067 mm) side slide door.

Exception: The elevator car dimensions and/or the clear entrance opening dimensions may be altered where it can be demonstrated to the local jurisdictional authority's satisfaction that the proposed configuration will handle the designated gurney or stretcher with equivalent ease. Documentation from the local authority shall be provided to the Occupational Safety and Health Standards Board.

3002.4a.4 Elevator recall. The elevator(s) designated the medical emergency elevator shall be equipped with a key switch to recall the elevator nonstop to the main floor. For the purpose of this section, elevators in compliance with Section 3003.2.1.1 shall be acceptable.

3002.4a.5 Designation. Medical emergency elevators shall be identified by the international symbol (Star of Life) for emergency medical services.

3002.4a.6 Symbol size. The symbol shall not be less than 3 inches (76 mm) in size.

3002.4a.7 Symbol location. A symbol shall be permanently attached to each side of the hoistway door frame on the portion of the frame at right angles to the hallway or landing area. Each symbol shall be not less than 78 inches (1981 mm) and not more than 84 inches (2134 mm) above the floor level at the threshold.

3002.5 Emergency doors. Where an elevator is installed in a single blind hoistway or on the outside of a building, there shall be installed in the blind portion of the hoistway or blank face of the building, an emergency door in accordance with ASME A17.1.

3002.6 Prohibited doors. Doors, other than hoistway doors and the elevator car door, shall be prohibited at the point of access to an elevator car unless such doors are readily openable from the car side without a key, tool, special knowledge or effort.

3002.7 Common enclosure with stairway. Elevators shall not be in a common shaft enclosure with a stairway.

3002.8 Glass in elevator enclosures. Glass in elevator enclosures shall comply with Section 2409.1.

3002.9 Photoelectric tube bypass switch.

3002.9.1 Elevators equipped with photoelectric tube devices which control the closing of automatic, power-operated car or hoistway doors, or both, shall have a switch in

the car which, when actuated, will render the photoelectric tube device ineffective.

3002.9.2 The switch shall be constant-pressure type, requiring not less than 10 pounds (44.5 N) or more than 15 pounds (66.7 N) pressure to actuate.

3002.9.3 The switch shall be located not less than 6 feet (1829 mm) or more than 6 feet 6 inches (1981 mm) above the car floor and shall be located in or adjacent to the operating panel.

3002.9.4 The switch shall be clearly labeled: **TO BE USED IN CASE OF FIRE ONLY.**

3002.9.5 Switches shall be kept in working order or be removed when existing installations are arranged to comply with Section 3002.9.5, Exception 1 or 2.

Exceptions:

1. Elevators installed and maintained in compliance with Section 3003.2.1.
2. Where alternate means acceptable to the fire authority having jurisdiction are provided that will ensure the doors can close under adverse smoke conditions.

**[F] SECTION 3003
EMERGENCY OPERATIONS**

[F] 3003.1 Standby power. In buildings and structures where standby power is required or furnished to operate an elevator, the operation shall be in accordance with Sections 3003.1.1 through 3003.1.4.

[F] 3003.1.1 Manual transfer. Standby power shall be manually transferable to all elevators in each bank.

[F] 3003.1.2 One elevator. Where only one elevator is installed, the elevator shall automatically transfer to standby power within 60 seconds after failure of normal power.

[F] 3003.1.3 Two or more elevators. Where two or more elevators are controlled by a common operating system, all elevators shall automatically transfer to standby power within 60 seconds after failure of normal power where the standby power source is of sufficient capacity to operate all elevators at the same time. Where the standby power source is not of sufficient capacity to operate all elevators at the same time, all elevators shall transfer to standby power in sequence, return to the designated landing and disconnect from the standby power source. After all elevators have been returned to the designated level, at least one elevator shall remain operable from the standby power source.

[F] 3003.1.4 Venting. Where standby power is connected to elevators, the machine room ventilation or air conditioning shall be connected to the standby power source.

[F] 3003.2 Fire-fighters' emergency operation. Elevators shall be provided with Phase I emergency recall operation and Phase II emergency in-car operation in accordance with ASME A17.1.

3104.3 Construction. The pedestrian walkway shall be of noncombustible construction.

Exceptions:

1. Combustible construction shall be permitted where connected buildings are of combustible construction.
2. Fire-retardant-treated wood, in accordance with Section 603.1, Item 1.3, shall be permitted for the roof construction of the pedestrian walkway where connected buildings are a minimum of Type I or II construction.

3104.4 Contents. Only materials and decorations approved by the building official shall be located in the pedestrian walkway.

3104.5 Fire barriers between pedestrian walkways and buildings. Walkways shall be separated from the interior of the building by fire-barrier walls with a fire-resistance rating of not less than 2 hours. This protection shall extend vertically from a point 10 feet (3048 mm) above the walkway roof surface or the connected building roof line, whichever is lower, down to a point 10 feet (3048 mm) below the walkway and horizontally 10 feet (3048 mm) from each side of the pedestrian walkway. Openings within the 10-foot (3048 mm) horizontal extension of the protected walls beyond the walkway shall be equipped with devices providing a $\frac{3}{4}$ -hour fire protection rating in accordance with Section 715.

Exception: The walls separating the pedestrian walkway from a connected building are not required to have a fire-resistance rating by this section where any of the following conditions exist:

1. The distance between the connected buildings is more than 10 feet (3048 mm), the pedestrian walkway and connected buildings, except for open parking garages, are equipped throughout with an automatic sprinkler system in accordance with NFPA 13 and the wall is constructed of a tempered, wired or laminated glass wall and doors subject to the following:
 - 1.1. The glass shall be protected by an automatic sprinkler system in accordance with NFPA 13 and the sprinkler system shall completely wet the entire surface of interior sides of the glass wall when actuated.
 - 1.2. The glass shall be in a gasketed frame and installed in such a manner that the framing system will deflect without breaking (loading) the glass before the sprinkler operates.
 - 1.3. Obstructions shall not be installed between the sprinkler heads and the glass.
2. The distance between the connected buildings is more than 10 feet (3048 mm) and both sidewalls of the pedestrian walkway are at least 50 percent open with the open area uniformly distributed to prevent the accumulation of smoke and toxic gases.
3. Buildings are on the same lot in accordance with Section 503.1.2.
4. Where exterior walls of connected buildings are required by Section 704 to have a fire-resistance rating greater than 2 hours, the walkway shall be

equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13.

The previous exception shall apply to pedestrian walkways have a maximum height above grade of three stories or 40 feet (12 192 mm), or five stories or 55 feet (16 764 mm) where sprinklered.

3104.6 Public way. Pedestrian walkways over a public way shall also comply with Chapter 32.

3104.7 Egress. Access shall be provided at all times to a pedestrian walkway that serves as a required exit.

3104.8 Width. The unobstructed width of pedestrian walkways shall not be less than 36 inches (914 mm). The total width shall not exceed 30 feet (9144 mm).

3104.9 Exit access travel. The length of exit access travel shall not exceed 200 feet (60 960 mm).

Exceptions:

1. Exit access travel distance on a pedestrian walkway equipped throughout with an automatic sprinkler system in accordance with NFPA 13 shall not exceed 250 feet (76 200 mm).
2. Exit access travel distance on a pedestrian walkway constructed with both sides at least 50 percent open shall not exceed 300 feet (91 440 mm).
3. Exit access travel distance on a pedestrian walkway constructed with both sides at least 50 percent open, and equipped throughout with an automatic sprinkler system in accordance with NFPA 13, shall not exceed 400 feet (122 m).

3104.10 Tunneled walkway. Separation between the tunneled walkway and the building to which it is connected shall not be less than 2-hour fire-resistant construction and openings therein shall be protected in accordance with Table 715.4.

SECTION 3105 AWNINGS AND CANOPIES

3105.1 General. Awnings or canopies shall comply with the requirements of this section and other applicable sections of this code.

3105.2 Definition. The following term shall, for the purposes of this section and as used elsewhere in this code, have the meaning shown herein.

RETRACTABLE AWNING. A retractable awning is a cover with a frame that retracts against a building or other structure to which it is entirely supported.

3105.3 Design and construction. Awnings and canopies shall be designed and constructed to withstand wind or other lateral loads and live loads as required by Chapter 16 with due allowance for shape, open construction and similar features that relieve the pressures or loads. Structural members shall be protected to prevent deterioration. Awnings shall have frames of noncombustible material, fire-retardant-treated wood, wood of Type IV size, or 1-hour construction with combustible or noncombustible covers and shall be either fixed, retractable, folding or collapsible.

3105.4 Canopy materials. Canopies shall be constructed of a rigid framework with an approved covering that meets the fire propagation performance criteria of NFPA 701 or has a flame spread index not greater than 25 when tested in accordance with ASTM E 84.

SECTION 3106 MARQUEES

3106.1 General. Marquees shall comply with this section and other applicable sections of this Code. The plans and specifications and the type, design, arrangement and location of every marquee shall be approved by the Board of Cultural Affairs Commissioners of the City of Los Angeles and the Board of Public Works of the City of Los Angeles prior to the issuance of a building permit.

3106.2 Thickness. The maximum height or thickness of a marquee measured vertically from its lowest to its highest point shall not exceed 3 feet (914 mm) where the marquee projects more than two-thirds of the distance from the property line to the curb line, and shall not exceed 9 feet (2743 mm) where the marquee is less than two-thirds of the distance from the property line to the curb line.

3106.3 Roof construction. Where the roof or any part thereof is a skylight, the skylight shall comply with the requirements of Chapter 24. Every roof and skylight of a marquee shall be sloped to downspouts that shall conduct any drainage from the marquee in such a manner so as not to spill over the sidewalk.

3106.4 Location prohibited. Every marquee shall be so located as not to interfere with the operation of any exterior standpipe, and such that the marquee does not obstruct the clear passage of stairways or exit discharge from the building or the installation or maintenance of street lighting.

3106.5 Construction. A marquee shall be supported entirely from the building and constructed of noncombustible materials. Marquees shall be designed as required in Chapter 16. Structural members shall be protected to prevent deterioration.

SECTION 3107 SIGNS

3107.1 General. Signs shall be designed, constructed and maintained in accordance with this code.

SECTION 3108 RADIO AND TELEVISION TOWERS

3108.1 General. Subject to the provisions of Chapter 16 and the requirements of Chapter 15 governing the fire-resistance ratings of buildings for the support of roof structures, radio and television towers shall be designed and constructed as herein provided.

3108.2 Location and access. Towers shall be located and equipped with step bolts and ladders so as to provide ready access for inspection purposes. Guy wires or other accessories shall not cross or encroach upon any street or other public space, or over above-ground electric utility lines, or encroach upon any privately owned property without written consent of the owner of the encroached-upon property, space or above-ground electric utility lines.

3108.3 Construction. Towers shall be constructed of approved corrosion-resistant noncombustible material. The minimum type of construction of isolated radio towers not more than 100 feet (30 480 mm) in height shall be Type IIB.

3108.4 Loads. Towers shall be designed to resist wind loads in accordance with TIA/EIA-222. Consideration shall be given to conditions involving wind load on ice-covered sections in localities subject to sustained freezing temperatures.

3108.4.1 Dead load. Towers shall be designed for the dead load plus the ice load in regions where ice formation occurs.

3108.4.2 Wind load. Adequate foundations and anchorage shall be provided to resist two times the calculated wind load.

3108.5 Grounding. Towers shall be permanently and effectively grounded.

SECTION 3109 SWIMMING POOL ENCLOSURES AND SAFETY DEVICES

3109.1 General. Swimming pools shall comply with the requirements of this section and other applicable sections of this code.

3109.2 Definition. The following word and term shall, for the purposes of this section and as used elsewhere in this code, have the meaning shown herein.

SWIMMING POOLS. Any structure intended for swimming, recreational bathing or wading that contains water over 24 inches (610 mm) deep. This includes in-ground, above-ground and on-ground pools; hot tubs; spas and fixed-in-place wading pools.

3109.3 Public swimming pools. Public swimming pools shall be completely enclosed by a fence or screen enclosure at least 5 feet (1524 mm) in height. Openings in the fence or screen enclosure shall not permit the passage of a 4-inch-diameter (102 mm) sphere. The fence or screen enclosure shall be equipped with self-closing and self-latching gates.

3109.4 Residential swimming pools. Residential swimming pools on a lot with one to three dwelling units shall comply with Section 3109.4.1 and Sections 3109.4.1.1 through 3109.4.4.7.

Exception: A swimming pool with a power safety cover or a spa with a safety cover complying with ASTM F 1346.

3109.4.1 Barrier height and clearances. For residential swimming pools, the top of the barrier shall be at least 60 inches (1524 mm) above grade measured on the side of the barrier that faces away from the swimming pool. The maximum vertical clearance between grade and the bottom of the barrier shall be 2 inches (51 mm) measured on the side of the barrier that faces away from the swimming pool. Where the top of the pool structure is above grade, the barrier is permitted to be mounted on top of the pool structure, provided the maximum vertical clearance between the top of the pool structure and the bottom of the barrier shall be 4 inches (102 mm), or at grade level.

3109.4.1.1 Openings. Openings in the barrier shall not allow passage of a 4-inch-diameter (102 mm) sphere.

3109.4.1.2 Solid barrier surfaces. Solid barriers which do not have openings shall not contain indentations or

Authority: Health and Safety Code Section 18942(b)

Reference: Health and Safety Code Section 115926

Ab 3305, Statutes 1996, C.925

3109.4.4.7 Modification and interpretation of division. *Notwithstanding any other provision of law, this article shall not be subject to further modification or interpretation by any regulatory agency of the state, this authority being reserved exclusively to local jurisdictions, as provided for in Item 5 of Section 3109.4.4.2 and Item 3 of Section 3109.4.4.5.*

Authority: Health and Safety Code Section 18942(b)

Reference: Health and Safety Code Section 115927

Ab 3305, Statutes 1996, C.925

3109.5 Entrapment avoidance. Suction outlets shall be designed to produce circulation throughout the pool or spa. Single-outlet systems, such as automatic vacuum cleaner systems, or other such multiple suction outlets whether isolated by drains or otherwise shall be protected against user entrapment.

3109.5.1 Suction fittings. All pool and spa suction outlets shall be provided with a cover that conforms to ASME A112.19.8M, a 12-inch by 12-inch (305 mm by 305 mm) drain grate or larger, or an approved channel drain system.

Exception: Surface skimmers.

3109.5.2 Atmospheric vacuum relief system required. All pool and spa single- or multiple-outlet circulation systems shall be equipped with an atmospheric vacuum relief should grate covers located therein become missing or broken. Such vacuum relief systems shall include at least one approved or engineered method of the type specified herein, as follows:

1. Safety vacuum release systems conforming to ASME A112.19.17; or
2. Approved gravity drainage system.

3109.5.3 Dual drain separation. Single- or multiple-pump circulation systems shall be provided with a minimum of two suction outlets of the approved type. A minimum horizontal or vertical distance of 3 feet (914 mm) shall separate such outlets. These suction outlets shall be piped so that water is drawn through them simultaneously through a vacuum-relief-protected line to the pump or pumps.

3109.5.4 Pool cleaner fittings. Where provided, vacuum or pressure cleaner fitting(s) shall be located in an accessible position(s) at least 6 inches (152 mm) and not greater than 12 inches (305 mm) below the minimum operational water level or as an attachment to the skimmer(s).

SECTION 3110 PATIO COVERS

3110.1 General. Patio covers shall be permitted to be detached from or attached to dwelling units. Patio covers shall be used only for recreational, outdoor living purposes and not as carports, garages, storage rooms or habitable rooms. Openings shall be permitted to be enclosed with insect screening,

approved translucent or transparent plastic not more than 0.125 inch (3.2 mm) in thickness, glass conforming to the provisions of Chapter 24 or any combination of the forenamed.

3110.2 Definitions. The following word and term shall, for the purposes of this appendix, have the meaning shown herein.

PATIO COVERS. One story structures not exceeding 12 feet (3657 mm) in height. Enclosure walls shall be permitted to be of any configuration, provided the open or glazed area of the longer wall and one additional wall is equal to at least 65 percent of the area below a minimum of 6 feet 8 inches (2032 mm) of each wall (measured from the floor).

3110.3 Exterior openings. Exterior openings required for light and ventilation shall be permitted to open into a patio structure. However, the patio structure shall be unenclosed if such openings are serving as emergency egress or rescue openings from sleeping rooms. Where such exterior openings serve as an exit from the dwelling unit, the patio structure, unless unenclosed, shall be provided with exits conforming to the provision of Chapter 10.

3110.4 Structural provisions. Patio covers shall be designed and constructed to sustain, within the stress limits of this code, all dead loads plus a minimum vertical live load of 10 pounds per square foot (0.48 kN/m²) except that snow loads shall be used where such snow loads exceed this minimum. Such patio covers shall be designed to resist the minimum wind and seismic loads set forth in this code.

3110.4.1 Footings. In areas with a frost depth of zero, a patio cover shall be permitted to be supported on a concrete slab on grade without footings, provided the slab conforms to the provisions of Chapter 19 of this code, is not less than 3½ inches (89 mm) thick and further provided that the columns do not support loads in excess of 750 pounds (3.36 kN) per column.

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CHAPTER 32

PROJECTIONS FROM BUILDINGS AND CONSTRUCTION IN THE PUBLIC RIGHT-OF-WAY

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SECTION 3201 GENERAL

LA 3201.1 **Scope.** The provisions of this Chapter shall govern the
LA encroachment of structures into the public right-of-way.
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LA No portion of any projection from any building over any
LA roadway shall be lower than an elevation of 14 feet (4267 mm)
LA above the roadway surface.
LA

3201.2 **Measurement.** The projection of any structure or portion thereof shall be the distance measured horizontally from the lot line to the outermost point of the projection.

LA 3201.3 **Other laws.** The provisions of this Chapter shall not be
LA construed to permit the violation of other laws or ordinances
LA regulating the use and occupancy of public property.
LA

LA Projections into the public right-of-way shall require the
LA approval of the Department of Public Works.
LA

3201.4 **Drainage.** Drainage water collected from a roof, awning, canopy or marquee, and condensate from mechanical equipment shall not flow over a public walking surface.

SECTION 3202 ENCROACHMENTS

3202.1 **Encroachments below grade.** Encroachments below grade shall comply with Sections 3202.1.1 through 3202.1.3.

3202.1.1 **Structural support.** A part of a building erected below grade that is necessary for structural support of the building or structure shall not project beyond the lot lines, except that the footings of street walls or their supports which are located at least 8 feet (2438 mm) below grade shall not project more than 12 inches (305 mm) beyond the street lot line.

3202.1.2 **Vaults and other enclosed spaces.** The construction and utilization of vaults and other enclosed space below grade shall be subject to the terms and conditions of the authority or legislative body having jurisdiction.

3202.1.3 **Areaways.** Areaways shall be protected by grates, guards or other approved means.

3202.2 **Encroachments above grade and below 8 feet in height.** Encroachments into the public right-of-way above grade and below 8 feet (2438 mm) in height shall be prohibited except as provided for in Sections 3202.2.1 through 3202.2.3. Doors and windows shall not open or project into the public right-of-way.

3202.2.1 **Steps.** Steps shall not project more than 12 inches (305 mm) and shall be guarded by approved devices not less than 3 feet (914 mm) high, or shall be located between columns or pilasters.

3202.2.2 **Architectural features.** Columns or pilasters, including bases and moldings shall not project more than 12 inches (305 mm). Belt courses, lintels, sills, architraves, pediments and similar architectural features shall not project more than 4 inches (102 mm).

3202.2.3 **Awnings.** The vertical clearance from the public right-of-way to the lowest part of any awning, including valances, shall be 7 feet (2134 mm) minimum.

3202.3 **Encroachments 8 feet or more above grade.** Encroachments 8 feet (2438 mm) or more above grade shall comply with Sections 3202.3.1 through 3202.3.4.

3202.3.1 **Awnings, canopies, marquees and signs.** Awnings, canopies, marquees and signs shall be constructed so as to support applicable loads as specified in Chapter 16. Awnings, canopies, marquees and signs with less than 15 feet (4572 mm) clearance above the sidewalk shall not extend into or occupy more than two-thirds the width of the sidewalk measured from the building. Stanchions or columns that support awnings, canopies, marquees and signs shall be located not less than 2 feet (610 mm) in from the curb line.

3202.3.2 **Windows, balconies, architectural features and mechanical equipment.** Where the vertical clearance above grade to projecting windows, balconies, architectural features or mechanical equipment is more than 8 feet (2438 mm), 1 inch (25 mm) of encroachment is permitted for each additional 1 inch (25 mm) of clearance above 8 feet (2438 mm), but the maximum encroachment shall be 4 feet (1219 mm).

3202.3.3 **Encroachments 15 feet or more above grade.** Encroachments 15 feet (4572 mm) or more above grade shall not be limited.

3202.3.4 **Pedestrian walkways.** The installation of a pedestrian walkway over a public right-of-way shall be subject to the approval of local authority having jurisdiction. The vertical clearance from the public right-of-way to the lowest part of a pedestrian walkway shall be 15 feet (4572 mm) minimum.

3202.4 **Temporary encroachments.** Where allowed by the local authority having jurisdiction, vestibules and storm enclosures shall not be erected for a period of time exceeding 7 months in any one year and shall not encroach more than 3 feet (914 mm) nor more than one-fourth of the width of the sidewalk beyond the street lot line. Temporary entrance awnings shall be erected with a minimum clearance of 7 feet (2134 mm) to the lowest portion of the hood or awning where supported on removable steel or other approved noncombustible support.

3203.1 **Awnings, canopies, marquees and signs.** Awnings, canopies, marquees and signs shall be constructed so as to support applicable loads as specified in Chapter 16 of this Code. LA
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LA Awnings, canopies, marquees and signs with less than 15 feet
LA (4572 mm) clearance above the sidewalk shall not extend into
LA or occupy more than two-thirds the width of the sidewalk mea-
LA sured from the building. Stanchions or columns that support
LA awnings, canopies, marquees and signs shall be located not less
LA than 2 feet (610 mm) in from the curb line.

LA Plans and specifications and the type, design, arrangement
LA and location of every marquee shall be approved by the Board
LA of Cultural Affairs Commissioners of the City of Los Angeles
LA and the Board of Public Works prior to the issuance of a build-
LA ing permit.

CHAPTER 33

SITE WORK DEMOLITION AND CONSTRUCTION

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SECTION 3301 GENERAL

3301.1 Scope. The provisions of this Chapter shall govern safety during construction and the protection of adjacent public and private properties.

This section shall not be construed to waive the requirements of the General Safety Orders of the Department of Industrial Relations of the State of California, nor the provisions of Section 832 of the *Civil Code of California* concerning the rights of coterminous owners as to excavations.

See Chapter 70 of this Code for all grading, excavation and fill requirements.

3301.2 Storage and placement. Construction equipment and materials shall be stored and placed so as not to endanger the public, the workers or adjoining property for the duration of the construction project.

SECTION 3302 CONSTRUCTION SAFEGUARDS

3302.1 Remodeling and additions. Required exits, existing structural elements, fire protection devices and sanitary safeguards shall be maintained at all times during remodeling, alterations, repairs or additions to any building or structure.

Exceptions:

1. When such required elements or devices are being remodeled, altered or repaired, adequate substitute provisions shall be made.
2. When the existing building is not occupied.

3302.2 Manner of removal. Waste materials shall be removed in a manner which prevents injury or damage to persons, adjoining properties and public rights-of-way.

SECTION 3303 DEMOLITION

3303.1 Construction documents. Construction documents and a schedule for demolition must be submitted when required by the building official. Where such information is required, no work shall be done until such construction documents or schedule, or both, are approved.

3303.2 Pedestrian protection. The work of demolishing any building shall not be commenced until pedestrian protection is in place as required by this chapter.

3303.3 Means of egress. A party wall balcony or horizontal exit shall not be destroyed unless and until a substitute means of egress has been provided and approved.

3303.4 Vacant lot. Where a structure has been demolished or removed, the vacant lot shall be filled and maintained to the existing grade or in accordance with the ordinances of the jurisdiction having authority.

3303.5 Water accumulation. Provision shall be made to prevent the accumulation of water or damage to any foundations on the premises or the adjoining property.

3303.6 Utility connections. Service utility connections shall be discontinued and capped in accordance with the approved rules and the requirements of the authority having jurisdiction.

SECTION 3304 SITE WORK

3304.1 Excavation and fill. Excavation and fill for buildings and structures shall be constructed or protected so as not to endanger life or property. Stumps and roots shall be removed from the soil to a depth of at least 12 inches (305 mm) below the surface of the ground in the area to be occupied by the building. Wood forms which have been used in placing concrete, if within the ground or between foundation sills and the ground, shall be removed before a building is occupied or used for any purpose. Before completion, loose or casual wood shall be removed from direct contact with the ground under the building.

3304.1.1 Slope limits. Slopes for permanent fill shall not be steeper than one unit vertical in two units horizontal (50-percent slope). Cut slopes for permanent excavations shall not be steeper than one unit vertical in two units horizontal (50-percent slope). Deviation from the foregoing limitations for cut slopes shall be permitted only upon the presentation of a soil investigation report acceptable to the building official.

3304.1.2 Surcharge. No fill or other surcharge loads shall be placed adjacent to any building or structure unless the building or structure is capable of withstanding the additional loads caused by the fill or surcharge. Existing footings or foundations, which can be affected by any excavation, shall be underpinned adequately or otherwise protected against settlement and shall be protected against lateral movement.

3304.1.3 Footings on adjacent slopes. For footings on adjacent slopes, see Chapter 18.

3304.1.4 Fill supporting foundations. Fill to be used to support the foundations of any building or structure shall comply with Section 1803.5 and Chapter 70 of this Code. Special inspections of compacted fill shall be in accordance with Section 1704.7 of this Code.

SECTION 3305 TOILET FACILITIES DURING CONSTRUCTION

3305.1 Toilet facilities required. No person shall commence or proceed with the erection, construction, alteration, repair, raising, adding to, removal or demolition of any building or structure unless adequate, suitable, sanitary toilet facilities, under the control of that person, are provided for the use of any person employed or working upon the building or structure. The toilet facilities shall be located upon or within a reasonable

LA distance of the lot, premises, or site upon which the work is
LA being done. In no case shall the line of travel to any toilet facil-
LA ity exceed 500 feet (152 400 mm).

LA **3305.2 Toilet standards.** Every toilet shall be of the water-
LA flush type and connected to a public sewer or a private sewage
LA disposal system built in accordance with the provisions of the
LA *Plumbing Code*. All toilet structures shall be completely
LA enclosed on four sides and the top, and the door shall be
LA self-closing. The toilet floor shall be smooth, and screened ven-
LA tilation shall be provided for the toilet compartment. Where
LA workers are employed during the night hours, the toilet build-
LA ing shall be provided with artificial light. In lieu of flush water
LA closets, approved chemical toilets, which meet the require-
LA ments of Chapter III of the *Los Angeles Municipal Code*, may
LA be provided.

SECTION 3306 PROTECTION OF PEDESTRIANS

LA **3306.1 Protection required.** Pedestrians shall be protected
LA during construction, remodeling and demolition activities as
LA required by this Chapter and Table 3306.1. Signs shall be pro-
LA vided to direct pedestrian traffic.

LA Nothing contained in this section shall be construed to grant
LA permission to use, construct or place a canopy over any street or
LA public place without first obtaining the necessary permits from
LA the Department of Public Works.

3306.2 Walkways. A walkway shall be provided for pedestrian travel in front of every construction and demolition site unless the authority having jurisdiction authorizes the sidewalk to be fenced or closed. Walkways shall be of sufficient width to accommodate the pedestrian traffic, but in no case shall they be less than 4 feet (1219 mm) in width. Walkways shall be provided with a durable walking surface. Walkways shall be accessible in accordance with Chapter *IIA* or *IIB* and shall be designed to support all imposed loads and in no case shall the design live load be less than 150 pounds per square foot (psf) (7.2 kN/m²).

3306.3 Directional barricades. Pedestrian traffic shall be protected by a directional barricade where the walkway extends into the street. The directional barricade shall be of sufficient size and construction to direct vehicular traffic away from the pedestrian path.

3306.4 Construction railings. Construction railings shall be at least 42 inches (1067 mm) in height and shall be sufficient to direct pedestrians around construction areas.

3306.5 Barriers. Barriers shall be a minimum of 8 feet (2438 mm) in height and shall be placed on the side of the walkway nearest the construction. Barriers shall extend the entire length of the construction site. Openings in such barriers shall be protected by doors which are normally kept closed.

3306.6 Barrier design. Barriers shall be designed to resist loads required in Chapter 16 unless constructed as follows:

1. Barriers shall be provided with 2-inch by 4-inch (51 mm by 102 mm) top and bottom plates.
2. The barrier material shall be a minimum of $\frac{3}{4}$ -inch (19.1 mm) boards or $\frac{1}{4}$ -inch (6.4 mm) wood structural use panels.
3. Wood structural use panels shall be bonded with an adhesive identical to that for exterior wood structural use panels.
4. Wood structural use panels $\frac{1}{4}$ inch (6.4 mm) or $\frac{5}{16}$ inch (23.8 mm) in thickness shall have studs spaced not more than 2 feet (610 mm) on center (o.c.).
5. Wood structural use panels $\frac{3}{8}$ inch (9.5 mm) or $\frac{1}{2}$ inch (12.7 mm) in thickness shall have studs spaced not more than 4 feet (1219 mm) o.c., provided a 2-inch by 4-inch (51 mm by 102 mm) stiffener is placed horizontally at midheight where the stud spacing exceeds 2 feet (610 mm) o.c.
6. Wood structural use panels $\frac{5}{8}$ inch (15.9 mm) or thicker shall not span over 8 feet (2438 mm).

3306.7 Covered walkways. Covered walkways shall have a minimum clear height of 8 feet (2438 mm) as measured from the floor surface to the canopy overhead. Adequate lighting shall be provided at all times. Covered walkways shall be designed to support all imposed loads. In no case shall the design live load be less than 150 psf (7.2 kN/m²) for the entire structure.

Exception: Roofs and supporting structures of covered walkways for new, light-frame construction not exceeding two stories in height are permitted to be designed for a live load of 75 psf (3.6 kN/m²) or the loads imposed on them, whichever is greater. In lieu of such designs, the roof and supporting structure of a covered walkway are permitted to be constructed as follows:

1. Footings shall be continuous 2-inch by 6-inch (51 mm by 152 mm) members.

TABLE 3306.1
PROTECTION OF PEDESTRIANS

HEIGHT OF CONSTRUCTION	DISTANCE FROM CONSTRUCTION TO LOT LINE	TYPE OF PROTECTION REQUIRED
8 feet or less	Less than 5 feet	Construction railings
	5 feet or more	None
More than 8 feet	Less than 5 feet	Barrier and covered walkway
	5 feet or more, but not more than one-fourth the height of construction	Barrier and covered walkway
	5 feet or more, but between one-fourth and one-half the height of construction	Barrier
	5 feet or more, but exceeding one-half the height of construction	None

For SI: 1 foot = 304.8 mm.

2. Posts not less than 4 inches by 6 inches (102 mm by 152 mm) shall be provided on both sides of the roof and spaced not more than 12 feet (3658 mm) o.c.
3. Stringers not less than 4 inches by 12 inches (102 mm by 305 mm) shall be placed on edge upon the posts.
4. Joists resting on the stringers shall be at least 2 inches by 8 inches (51 mm by 203 mm) and shall be spaced not more than 2 feet (610 mm) o.c.
5. The deck shall be planks at least 2 inches (51 mm) thick or wood structural panels with an exterior exposure durability classification at least $\frac{23}{32}$ inch (18.3 mm) thick nailed to the joists.
6. Each post shall be knee braced to joists and stringers by 2-inch by 4-inch (51 mm by 102 mm) minimum members 4 feet (1219 mm) long.
7. A 2-inch by 4-inch (51 mm by 102 mm) minimum curb shall be set on edge along the outside edge of the deck.

3306.8 Repair, maintenance and removal. Pedestrian protection required by this chapter shall be maintained in place and kept in good order for the entire length of time pedestrians may be endangered. The owner or the owner's agent, upon the completion of the construction activity, shall immediately remove walkways, debris and other obstructions and leave such public property in as good a condition as it was before such work was commenced.

3306.9 Adjacent to excavations. Every excavation on a site located 5 feet (1524 mm) or less from the street lot line shall be enclosed with a barrier not less than 6 feet (1829 mm) high. Where located more than 5 feet (1524 mm) from the street lot line, a barrier shall be erected when required by the building official. Barriers shall be of adequate strength to resist wind pressure as specified in Chapter 16.

SECTION 3307 PROTECTION OF ADJOINING PROPERTY

3307.1 Protection required. Adjoining public and private property shall be protected from damage during construction, remodeling and demolition work. Protection must be provided for footings, foundations, party walls, chimneys, skylights and roofs. Provisions shall be made to control water runoff and erosion during construction or demolition activities.

For excavations, adjacent property shall be protected as set forth in Section 832 of the *Civil Code of California*.

Prior to the issuance of any permit, which authorizes an excavation where the excavation is to be of a greater depth than are the walls or foundation of any adjoining building or structure and located closer to the property line than the depth of the excavation, the owner of the site shall provide the Department of Building and Safety with evidence that the adjacent property owner or owners have been given a 30-day written notice of the intent to excavate. This notice shall state the depth to which the excavation is intended to be made and when the excavation will commence. This notice shall be by certified mail with return receipt requested.

3307.2 Underpinning.

3307.2.1 General. In constructing underpinning, all portions of the structure shall be supported so that no structural material is stressed beyond the yield point.

3307.2.2 Closure. All spaces between the existing footing and the underpinning shall be packed full of mortar conforming to the provisions of Section 2103 of this Code and having no slump when tested by the method specified in ASTM C 143.

3307.3 Temporary excavations and shoring.

3307.3.1 General. Excavations shall not remove the lateral support from a public way, from an adjacent property or from an existing structure. For the purpose of this section, the lateral support shall be considered to have been removed when any of the following conditions exist:

1. The excavation exposes any adverse geological formations, which would affect the lateral support of a public way, an adjacent property or an adjacent structure.
2. The excavation extends below a plane extending downward at an angle of 45 degrees from the edge of the public way or an adjacent property.

Exception: Normal footing excavations not exceeding 2 feet (610 mm) in depth will not be construed as removing lateral support.

3. The excavation extends below a plane extending downward at an angle of 45 degrees from the bottom of a footing of an existing structure.

3307.3.2 Removal of lateral support. Approval of the Department of Public Works shall be obtained prior to the issuance of a permit for any excavation that would remove the lateral support from a public way.

The slopes of excavations adjacent to an existing structure, an adjacent property or public way may exceed one horizontal to one vertical where either:

1. A soil report recommending that the slope may be in excess of one to one has been approved by the Department and the Department of Public Works when the excavation is adjacent to a public way.

When justified by the soils engineer, the Department may approve the use of the proposed building and/or shoring to support an adjacent structure on an adjoining property in lieu of underpinning, provided:

- (i) Evidence is submitted that the adjoining property owner has been notified in advance of the proposed excavation in compliance with Section 832 of the *Civil Code of California*.
- (ii) The owner of the site records a sworn affidavit with the Office of the County Recorder, which will inform future owners of the site that the lateral support of a portion of the building footings on the adjoining property is provided by the subterranean walls of the building on the site.
2. Underpinning is designed to support adjacent structures, temporary shoring is designed to support the excavation, and plans are approved and permits are issued by the Department.

Allowable stresses used in the design of temporary shoring may be increased 33⅓ percent for structural and reinforcing steel and 25 percent for wood. No increase will be permitted for concrete. Other values shall be those prescribed by the Code.

3308.2 Utility fixtures. Building materials, fences, sheds or any obstruction of any kind shall not be placed so as to obstruct free approach to any fire hydrant, fire department connection, utility pole, manhole, fire alarm box or catch basin, or so as to interfere with the passage of water in the gutter. Protection against damage shall be provided to such utility fixtures during the progress of the work, but sight of them shall not be obstructed.

3309.2 Fire hazards. The provisions of this code and the *California Fire Code* shall be strictly observed to safeguard against all fire hazards attendant upon construction operations.

Exception: Approved temporary means of egress systems and facilities.

3311.4 Water supply. Water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material accumulates.

[F] 3312.2 Operation of valves. Operation of sprinkler control valves shall be permitted only by properly authorized personnel and shall be accompanied by notification of duly designated parties. When the sprinkler protection is being regularly turned off and on to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

CHAPTER 34

EXISTING STRUCTURES

SECTION 3401 GENERAL

3401.1 Scope. In addition of the requirements of Chapter 34 of this Code, existing buildings and structures shall comply with the applicable regulations of Chapters 81, 82, 83, 84, 85, 86, 88, 89 and 91 of this Code and the voluntary earthquake hazard reduction standards of Chapters 92, 93, 94, 95 and 96 of this Code.

Alteration, repair or additions to existing bleachers, grandstands and folding and telescopic seating shall comply with ICC 300-02.

3401.1.1 Existing state-owned structures. *The provisions of Sections 3415 through 3420 establish minimum standards for earthquake evaluation and design for retrofit of existing state-owned structures, including buildings owned by the University of California and the California State University.*

The provisions of Sections 3415 through 3420 may be adopted by a local jurisdiction for earthquake evaluation and design for retrofit of existing buildings.

3401.1.2 Public school buildings. [DSA-SS] *The provisions of Sections 3415 through 3421 establish minimum standards for earthquake evaluation and design for the rehabilitation of existing buildings for use as public school buildings under the jurisdiction of the Division of the State Architect—Structural Safety (DSA-SS, refer to Section 109.2).*

The provisions of Section 3415 through 3421 also establish minimum standards for earthquake evaluation and design for rehabilitation of existing public school buildings under the jurisdiction of DSA-SS.

3401.2 Maintenance. Buildings and structures, and parts thereof, shall be maintained in a safe and sanitary condition. Devices or safeguards which are required by this code shall be maintained in conformance with the code edition under which installed. The owner or the owner's designated agent shall be responsible for the maintenance of buildings and structures. To determine compliance with this subsection, the building official shall have the authority to require a building or structure to be reinspected. The requirements of this chapter shall not provide the basis for removal or abrogation of fire protection and safety systems and devices in existing structures.

3401.3 Compliance. Where there are different requirements in this Code, the most restrictive requirement shall

govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable.

3401.4 Existing Group R-3 occupancies. [SFM] *For smoke alarm requirements in existing buildings, see Section 907.2.10.5.*

SECTION 3402 DEFINITIONS

3402.1 Definitions. The following term shall, for the purposes of this chapter and as used elsewhere in the code, have the following meaning:

PRIMARY FUNCTION. A primary function is a major activity for which the facility is intended. Areas that contain a primary function include, but are not limited to, the customer service lobby of a bank, the dining area of a cafeteria, the meeting rooms in a conference center, as well as offices and other work areas in which the activities of the public accommodation or other private entity using the facility are carried out. Mechanical rooms, boiler rooms, supply storage rooms, employee lounges or locker rooms, janitorial closets, entrances, corridors and restrooms are not areas containing a primary function.

TECHNICALLY INFEASIBLE. An alteration of a building or a facility that has little likelihood of being accomplished because the existing structural conditions require the removal or alteration of a load-bearing member that is an essential part of the structural frame, or because other existing physical or site constraints prohibit modification or addition of elements, spaces or features which are in full and strict compliance with the minimum requirements for new construction and which are necessary to provide accessibility.

SECTION 3403 ADDITIONS, ALTERATIONS OR REPAIRS

3403.1 Existing buildings or structures. Additions or alterations to any building or structure shall comply with the requirements of the code for new construction. Additions or alterations shall not be made to an existing building or structure that will cause the existing building or structure to be in violation of any provisions of this code. An existing building plus additions shall comply with the height and area provisions of Chapter 5. Portions of the structure not altered and not affected

by the alteration are not required to comply with the code requirements for a new structure.

Exceptions: [HCD 1]

1. *Limited-density owner-built rural dwellings.*
2. *Local ordinances or regulations shall permit the replacement, retention and extension of original materials, and the use of original methods of construction, for any building or accessory structure, provided such building or structure complied with the building code provisions in effect at the time of original construction and the building or accessory structure does not become or continue to be a substandard building. For additional information, see Health and Safety Code Sections 17912, 17920.3, 17922(d), 17922.3, 17958.8 and 17958.9.*

3403.1.1 Flood hazard areas. For buildings and structures in flood hazard areas established in Section 1612.3, any additions, alterations or repairs that constitute substantial improvement of the existing structure, as defined in Section 1612.2, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

3403.2 Structural. Additions or alterations to an existing structure shall not increase the force in any structural element by more than 5 percent, unless the increased forces on the element are still in compliance with the code for new structures, nor shall the strength of any structural element be decreased to less than that required by this code for new structures. Where repairs are made to structural elements of an existing building, and uncovered structural elements are found to be unsound or otherwise structurally deficient, such elements shall be made to conform to the requirements for new structures.

Exception: For state-owned buildings, including those owned by the University of California and the California State University, the requirements of Section 3403.2 are replaced by the requirements of Sections 3415 through 3420.

3403.2.1 Existing live load. Where an existing structure heretofore is altered or repaired, the minimum design loads for the structure shall be the loads applicable at the time of erection, provided that public safety is not endangered thereby.

3403.2.2 Live load reduction. If the approved live load is less than required by Section 1607, the areas designed for the reduced live load shall be posted in with the approved load. Placards shall be of an approved design.

3403.2.3 Seismic. Additions, alterations or modification or change of occupancy of existing buildings shall be in accordance with this section for the purposes of seismic considerations.

3403.2.3.1 Additions to existing buildings. An addition that is structurally independent from an existing structure shall be designed and constructed with the seismic requirements for new structures. An addition that is not structurally independent from an existing structure shall

be designed and constructed such that the entire structure conforms to the seismic-force-resistance requirements for new structures unless the following conditions are satisfied:

1. The addition conforms with the requirements for new structures,
2. The addition does not increase the seismic forces in any structural element of the existing structure by more than 10 percent cumulative since the original construction, unless the element has the capacity to resist the increased forces determined in accordance with ASCE 7, and
3. Additions do not decrease the seismic resistance of any structural element of the existing structure by more than 10 percent cumulative since the original construction, unless the element has the capacity to resist the forces determined in accordance with ASCE 7. If the building's seismic base shear capacity has been increased since the original construction, the percent change in base shear may be calculated relative to the increased value.

3403.2.3.2 Alterations. Alterations are permitted to be made to any structure without requiring the structure to comply with Section 1613, provided the alterations conform to the requirements for a new structure. Alterations that increase the seismic force in any existing structural element by more than 10 percent cumulative since the original construction or decrease the design strength of any existing structural element to resist seismic forces by more than 10 percent cumulative since the original construction shall not be permitted unless the entire seismic-force-resisting system is determined to conform to ASCE 7 for a new structure. If the building's seismic base shear capacity has been increased since the original construction, the percent change in base shear may be calculated relative to the increased value.

Exception: Alterations to existing structural elements or additions of new structural elements that are not required by ASCE 7 and are initiated for the purpose of increasing the strength or stiffness of the seismic-force-resisting system of an existing structure need not be designed for forces conforming to ASCE 7, provided that an engineering analysis is submitted indicating the following:

1. The design strength of existing structural elements required to resist seismic forces is not reduced.
2. The seismic force to required existing structural elements is not increased beyond their design strength.
3. New structural elements are detailed and connected to the existing structural elements as required by Chapter 16.
4. New or relocated nonstructural elements are detailed and connected to existing or new structural elements as required by Chapter 16.

5. The alterations do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.
6. The alterations do not result in the creation of an unsafe condition.

3403.2.3.3 Adoption. [OSHPD 2] All additions, alterations, repairs and seismic retrofit to the existing structures or portions thereof may be designed and constructed in accordance with the provisions of FEMA 356, as modified herein.

3403.2.3.3.1 Referenced standards. All referenced standards listed in FEMA 356 shall be replaced by referenced standards listed in Chapter 35 of this code.

3403.2.3.3.2 FEMA 356 Section 1.5—Target building performances. Target building performance level shall be Life Safety Building Performance Level (3-C) as defined in Section 1.5.3.3, with Structural performance level S-3 as defined in Section 1.5.1.3 and Non-structural performance level N-C as defined in Section 1.5.2.3.

3403.2.3.3.3 FEMA 356 Section 1.6—Seismic hazard. The ground motion characterization shall be based on ground shaking having a 10-percent probability of exceedance in 50 years.

Ground shaking having a 10-percent probability of exceedance in 50 years need not exceed $\frac{2}{3}$ of the maximum considered earthquake.

Response spectra and acceleration time histories shall be constructed in accordance with Sections 1613, 1802.7 and 1802.8.

3403.2.3.3.4 Analysis procedure. The selection of a particular analysis procedure from FEMA 356 may be subject to the approval of the enforcement agent.

3403.2.3.3.5 Design criteria. Prior to implementation of FEMA 356 non-linear procedures, the ground motion, analysis and design methods, material assumptions and acceptance criteria proposed by the engineer shall be reviewed by the enforcement agent.

3403.2.3.3.6 Enforcement agency approval. The analysis, conclusion and design decisions shall be reviewed and accepted by the enforcement agent.

3403.2.3.3.7 Structural observation, testing and inspections. Construction testing, inspection and structural observation requirements shall be as required for new construction.

3403.3 Nonstructural. Nonstructural alterations or repairs to an existing building or structure are permitted to be made of the same materials of which the building or structure is constructed, provided that they do not adversely affect any structural member or the fire-resistance rating of any part of the building or structure.

3403.4 Stairways. An alteration or the replacement of an existing stairway in an existing structure shall not be required to comply with the requirements of a new stairway as outlined in

Section 1009 where the existing space and construction will not allow a reduction in pitch or slope.

SECTION 3404 FIRE ESCAPES

3404.1 Where permitted. Fire escapes shall be permitted only as provided for in Sections 3404.1.1 through 3404.1.4.

3404.1.1 New buildings. Fire escapes shall not constitute any part of the required means of egress in new buildings.

3404.1.2 Existing fire escapes. Existing fire escapes shall be continued to be accepted as a component in the means of egress in existing buildings only.

3404.1.3 New fire escapes. New fire escapes for existing buildings shall be permitted only where exterior stairs cannot be utilized due to lot lines limiting stair size or due to the sidewalks, alleys or roads at grade level. New fire escapes shall not incorporate ladders or access by windows.

3404.1.4 Limitations. Fire escapes shall comply with this section and shall not constitute more than 50 percent of the required number of exits nor more than 50 percent of the required exit capacity.

3404.2 Location. Where located on the front of the building and where projecting beyond the building line, the lowest landing shall not be less than 7 feet (2134 mm) or more than 12 feet (3658 mm) above grade, and shall be equipped with a counter-balanced stairway to the street. In alleyways and thoroughfares less than 30 feet (9144 mm) wide, the clearance under the lowest landing shall not be less than 12 feet (3658 mm).

3404.3 Construction. The fire escape shall be designed to support a live load of 100 pounds per square foot (4788 Pa) and shall be constructed of steel or other approved noncombustible materials. Fire escapes constructed of wood not less than nominal 2 inches (51 mm) thick are permitted on buildings of Type 5 construction. Walkways and railings located over or supported by combustible roofs in buildings of Type 3 and 4 construction are permitted to be of wood not less than nominal 2 inches (51 mm) thick.

3404.4 Dimensions. Stairs shall be at least 22 inches (559 mm) wide with risers not more than, and treads not less than, 8 inches (203 mm) and landings at the foot of stairs not less than 40 inches (1016 mm) wide by 36 inches (914 mm) long, located not more than 8 inches (203 mm) below the door.

3404.5 Opening protectives. Doors and windows along the fire escape shall be protected with $\frac{3}{4}$ -hour opening protectives.

SECTION 3405 GLASS REPLACEMENT

3405.1 Conformance. The installation or replacement of glass shall be as required for new installations.

SECTION 3406 CHANGE OF OCCUPANCY

3406.1 Conformance. No change shall be made in the use or occupancy of any building that would place the building in a different division of the same group of occupancy or in a different group of occupancies, unless such building is made to comply with the requirements of this code for such division or group of occupancy. Subject to the approval of the building official, the use or occupancy of existing buildings shall be permitted to be changed and the building is allowed to be occupied for purposes in other groups without conforming to all the requirements of this code for those groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use.

3406.2 Certificate of occupancy. A certificate of occupancy shall be issued where it has been determined that the requirements for the new occupancy classification have been met.

3406.3 Stairways. Existing stairways in an existing structure shall not be required to comply with the requirements of a new stairway as outlined in Section 1009 where the existing space and construction will not allow a reduction in pitch or slope.

3406.4 Change of occupancy. When a change of occupancy results in a structure being reclassified to a higher occupancy category, the structure shall conform to the seismic requirements for a new structure.

Exceptions:

1. Specific seismic detailing requirements of this code or ASCE 7 for a new structure shall not be required to be met where it can be shown that the level of performance and seismic safety is equivalent to that of a new structure. Such analysis shall consider the regularity, overstrength, redundancy and ductility of the structure within the context of the existing and retrofit (if any) detailing provided.
2. When a change of use results in a structure being reclassified from Occupancy Category I or II to Occupancy Category III and the structure is located in a seismic map area where $S_{DS} < 0.33$, compliance with the seismic requirements of this code and ASCE 7 are not required.

SECTION 3407 HISTORICAL BUILDINGS

3407.1 Historic buildings. Historic buildings or structures shall comply with Section 8119 of this Code. LA
LA
LA

SECTION 3408 MOVED STRUCTURES

3408.1 Moved structures. Buildings or structures that are relocated in whole or in part into or within the City of Los Angeles shall comply with the provisions of Chapter 83 of this Code. LA
LA
LA
LA

SECTION 3409 *Reserved*

SECTION 3410 COMPLIANCE ALTERNATIVES

3410.1 Compliance. The provisions of this section are intended to maintain or increase the current degree of public safety, health and general welfare in existing buildings while permitting repair, alteration, addition and change of occupancy without requiring full compliance with Chapters 2 through 33, or Sections 3401.3, and 3403 through 3407, except where compliance with other provisions of this code is specifically required in this section.

3410.2 Applicability. Structures existing prior to *January 1, 2008*, in which there is work involving additions, alterations or changes of occupancy shall be made to conform to the requirements of this section or the provisions of Sections 3403 through 3407. The provisions in Sections 3410.2.1 through 3410.2.5 shall apply to existing occupancies that will continue to be, or are proposed to be, in Groups A, B, E, F, M, R, S and U. These provisions shall not apply to buildings with occupancies in Group H or I.

3410.2.1 Change in occupancy. Where an existing building is changed to a new occupancy classification and this section is applicable, the provisions of this section for the

CHAPTER 61

SPECIAL HAZARD AREAS

SECTION 6101 IMPACT HAZARD GLAZING IN EXISTING BUILDINGS

6101.1 Impact hazard glazing in existing buildings. When application is made for a permit for alterations, repairs or additions to real property, the permit shall be withheld until the department receives a sworn affidavit from the real property owner stating:

1. Prior to final inspection of the work under the permit, the owner shall replace the glass in every existing sliding glass panel of sliding-type doors, other than wardrobe doors and bathroom shower doors and French-type wooden doors, in the residential portion of the building with approved safety glazing pursuant to Section 2406 of this Code; or
2. The owner declares the existing glazing of the glass in every sliding glass panel of sliding-type doors, other than wardrobe doors and bathroom shower doors and French-type wooden doors, in the residential portion of the building complies with the safety glazing requirements pursuant to Section 2406 of this Code.

Exception: The owner may install film on the glass in every existing sliding glass panel of sliding-type doors, other than wardrobe doors and bathroom shower doors and French-type wooden doors, in the residential portion of the building with film approved by the department.

6101.2 Application. The provisions of this section shall apply only in the following circumstances:

1. To Group R-3 occupancy, if a permit is issued with a valuation of \$10,000 or more per unit for alterations, repairs or additions;
2. To Group R-1, R-2, R-3.1 or R-4 occupancy, if a permit is issued for \$3,000 or more per dwelling unit and/or guest room for alterations, repairs or additions;
3. To an individual unit of Group R-1, R-2, R-3.1 or R-4 occupancy, townhouse or condominium, if a permit is issued for \$10,000 or more for alterations, repairs or additions to that individual unit; and
4. To any Group R occupancy that is sold or exchanged, including an individual townhouse or condominium unit.

SECTION 6102 RUBBISH ROOMS

Every room, except a room in a Group R, Division 3 occupancy, appropriated for the storage or treatment of combustible rubbish, shall be of 1-hour fire-resistive construction. All openings in interior partitions shall be protected by a fire assembly having a 1-hour fire-resistive rating. All openings in exterior

walls shall be protected by a fire assembly having a $\frac{3}{4}$ hour fire-resistive rating.

SECTION 6103 SHAFTS, PITS AND SIMILAR EXCAVATION – MISDEMEANOR

Every person owning or having charge of land upon which is located any active or abandoned mining shaft, test hole, well, pit or similar excavation which exceeds 6 inches (152 mm) in any lateral dimension and 3 feet (914 mm) in depth shall cover, fence securely or provide some equivalent protection for the hazard and keep it so protected. Failure to do so shall cause such person to be guilty of a misdemeanor.

SECTION 6104 FIRE DISTRICTS

Buildings located in a fire district shall comply with the provisions of Chapter 72 in addition to the general requirements of this Code.

SECTION 6105 SEPARATION FROM OIL WELLS

No building more than 400 square feet (37 m²) in area and less than 36 feet (10 973 mm) in height shall be erected within 50 feet (15 240 mm) from the center of an oil well casing and no building 36 feet (10 973 mm) in height shall be erected closer to the center of an oil well casing than a horizontal distance equal to one and one-half times the height of the building provided, however, that that distance need not exceed 200 feet (60 960 mm). The building shall be measured vertically from the adjacent ground elevation adjoining the building to the ceiling of the top story.

Exceptions: The distance separation between a building and an oil well may be reduced to the following:

1. Thirty-five feet (10 668 mm) if a solid masonry wall not less than 6 feet (1829 mm) high and six inches (152 mm) thick is constructed between the oil well and all portions of the buildings, which are less than 50 feet (15 240 mm) from the wall;
2. Twenty-five feet (7 620 mm) if all walls of the building, which are located less than 50 feet (15 240 mm) from the oil well, are of 1-hour fire-resistive construction, have no openings, and are surmounted by a 3-foot (914 mm) high parapet;
3. Fifteen feet (4 572 mm) if all walls of the building, which are located less than 50 feet (15 240 mm) from the oil well, are of 2-hour fire-resistive construction, have no openings, and are surmounted by a 3-foot (914 mm) high parapet.

LA No building used for the housing of human beings located on
LA any premises where there is a school, hospital, sanitarium or
LA assembly occupancy shall be within 200 feet (60 960 mm) from
LA the center of an oil well casing, nor shall any public utility fuel
LA manufacturing plant, or public utility electrical generating,
LA receiving or distribution plant be located closer than 200 feet
LA (60 960 mm) from the center of the oil well casing.
LA

SECTION 6109

SWIMMING POOLS AND OTHER BODIES OF WATER – PROTECTIVE DEVICES REQUIRED

LA **6109.1 Fences.** Every swimming pool, fish pond or other body
LA of water, which contains water 18 inches (5486 mm) or more in
LA depth, shall be enclosed by a fence, the height of which, includ-
LA ing gates, shall be not less than 4½ feet (1372 mm) above the
LA ground. Gates shall be self-latching with the latch located 4½
LA feet (1372 mm) minimum above the ground. However, for new
LA swimming pools or spas, the height and construction of the
LA fence and gate shall comply with the requirements of Chapter
LA 31, whichever is more restrictive and provide greater safety.
LA

LA Where the ground surface on the side of the fence away from
LA the body of water slopes upward, 4½ feet (1372 mm) clearance
LA shall be maintained between the fence and the face of the slope.
LA

LA In lieu of maintaining a fence, the owner may provide a com-
LA petent person who shall keep the pool under observation at all
LA times while water is kept in the pool.
LA

LA **Exception:** The provisions of this section shall not apply to
LA oceans, lakes, rivers, streams and similar bodies of water,
LA which are publicly owned over which the State of California
LA of the City or County of Los Angeles has control and juris-
LA diction.
LA

LA **6109.2 Existing body of water.** The provisions of this section
LA shall also apply to all existing bodies of water.
LA

CHAPTER 62

SIGNS

SECTION 6201 GENERAL PROVISIONS

6201.1 General. A sign shall not be erected in a manner that would confuse or obstruct the view of or interfere with exit signs required by Chapter 10 or with official traffic signs, signals or devices. Signs and sign support structures, together with their supports, braces, guys and anchors, shall be kept in repair and in proper state of preservation. The display surfaces of signs shall be kept neatly painted or posted at all times.

6201.2 Sign permits. A building permit shall be obtained from the department in accordance with the provisions of Section 106 of this Code for any sign (including a temporary sign) and/or sign alteration, other than changes or replacement of copy, that are regulated by this chapter or by Chapter I of the *Los Angeles Municipal Code*. Where signs are illuminated by electric lighting, an electrical permit shall also be obtained as required by the *Electrical Code*.

Exception: The following signs are exempt from the requirements to obtain a permit before erection:

1. Signs not exceeding 20 square feet in area, placed upon the surface of the ground, no part of which extends more than 6 feet 6 inches (1981 mm) above the underlying ground, which have no mechanical or moving parts or to which no electricity or other source of illumination or power are attached to or made a part of the sign. Signs that fit within this category shall be separated from each other a minimum distance of 15 feet.
2. Boards and signs used exclusively to display official notices issued by any court or public officer in the performance of a public duty or by a private person in giving legal notice.
3. Temporary signs containing political, ideological or other noncommercial messages.

The Department may revoke any sign permit as provided in Section 98.0601(a) of the *Los Angeles Municipal Code*.

6201.3 Sign permit priority status.

1. To maintain location, area, frontage, or spacing status, signs must be installed within 6 months of issuance of a building permit or prior to expiration of any permit extension granted by the Department.
2. Where more than one permit has been issued and the effect of those permits when considered together results in a violation of this chapter, all permits except the permit with the earlier date and time of issuance shall be invalid.

6201.4 Violations. It shall be unlawful for any person to erect, construct, install, enlarge, alter, repair, move, remove, convert, demolish, use or maintain any sign or sign support structure or cause or permit those actions to be done, in violation of any of the provisions of this chapter.

Any person who violates or causes or, permits another person to violate any of the provisions of this chapter is guilty of a misdemeanor.

6201.5 Penalties. Any person convicted of a misdemeanor under the provisions of this chapter shall be punishable by a fine of not more than \$1,000.00 or by imprisonment in the county jail for a period of not more than 6 months, or by both fine and imprisonment. Each violation of the provisions of this chapter and each day during which a violation is committed or continues is a separate offense.

Any person convicted of violating any provision of this chapter may be required to pay restitution to the City of Los Angeles for all costs expended to investigate and/or enforce the provisions of this chapter.

6201.6 Modifications.

6201.6.1 Authority. In addition to its authority to grant slight modifications pursuant to Section 98.0403.1 of the *Los Angeles Municipal Code*, the board shall have the authority to grant significant modifications from these sign regulations.

6201.6.2 Basis. Before granting a significant modification, the board must find that (1) a special, individual reason makes the strict letter of the ordinance impractical and (2) the requested modification is in conformity with the spirit and purposes of the objectives set forth in Section 6201.6.6 of this Code.

6201.6.3 Procedure.

6201.6.3.1 Requests for modifications in individual cases shall be made in accordance with the procedure established in Section 98.0403.1 of the *Los Angeles Municipal Code*.

6201.6.3.2 The Department shall determine whether an application is for a slight modification or a significant modification. The department's determination that a proposed modification is significant shall be final and may not be appealed to the Board.

6201.6.3.3 An application for a request for significant modification shall be made to the Board. The applicant, in his or her request, shall state the special, individual reason that makes compliance with the strict letter of the provisions in question impractical and shall show that the modification requested is in conformity with the spirit and purpose of this chapter.

On the date of receipt of filing of the application, the file of the Department shall be forwarded to the board. Upon receipt of the application, the board shall set the matter for hearing and give notice by mail not less than ten days before the hearing of the time, place and purpose of the hearing to the applicant, to the owners of the property involved, and to the owners of all property within or outside of the City that is within a 300-foot (91 440 mm)

radius of the property on which the sign is to be placed as shown on the records of the City Clerk, or in the case of property outside the City, the records of the County Assessor.

6201.6.4 Board referral. The Board may refer a request for a significant modification to the Sign Advisory Committee (Section 105.4 of this code) for evaluation and recommendation before it renders a decision.

6201.6.5 Fees. Processing fees for significant modifications are the same as those set forth for appeals to the Board in Section 98.0403.1 of the *Los Angeles Municipal Code*. Significant modifications may also be subject to the fees set forth in Section 105.4 of this Code and Section 19.05 of the *Los Angeles Municipal Code*.

6201.6.6 Purpose. The purpose of this chapter is to promote public safety and welfare by regulating signs in keeping with the following objectives:

1. That the design, construction, installation, repair and maintenance of signs will not interfere with traffic safety or otherwise endanger public safety; and
2. That both the public and sign users will benefit from signs having improved legibility, readability and visibility.

SECTION 6202 DEFINITIONS

6202.1 General. Unless otherwise expressly stated, the following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 of the *California Building Code* for general definitions.

COMBINATION SIGN. A sign incorporating any combination of the features of pole, projecting and roof signs.

ELECTRIC SIGN. A sign containing electrical wiring, but not including signs illuminated by an exterior light source.

GROUND SIGN. A billboard or similar type of sign which is supported by one or more uprights, poles or braces in or upon the ground other than a combination sign or pole sign, as defined by this code.

MASONRY INFILL. Masonry infill is the unreinforced or reinforced masonry wall construction within a reinforced concrete frame.

POLE SIGN. A sign wholly supported by a sign structure in the ground.

PROJECTING SIGN. A sign other than a wall sign, which projects from and is supported by a wall of a building or structure.

ROOF SIGN. A sign erected upon or above a roof or parapet of a building or structure.

SIGN. Any letter, figure, character, mark, plane, point, marquee sign, design, poster, pictorial, picture, stroke, stripe, line, trademark, reading matter or illuminated service, which shall be constructed, placed, attached, painted, erected, fastened or manufactured in any manner whatsoever, so that the same shall be used for the attraction of the public to any place, subject, per-

son, firm, corporation, public performance, article, machine or merchandise, whatsoever, which is displayed in any manner outdoors. Every sign shall be classified and conform to the requirements of that classification as set forth in this chapter.

SIGN STRUCTURE. Any structure which supports or is capable of supporting a sign as defined in this code. A sign structure is permitted to be a single pole and is not required to be an integral part of the building.

SOLID MASONRY. Solid masonry shall mean reinforced masonry properly designed in accordance with Chapter 21 of this Code and shall not include an unreinforced masonry bearing wall as defined in Section 8803 of this Code and masonry infill as defined in this section.

WALL SIGN. Any sign attached to or erected against the wall of a building or structure with the exposed face of the sign in a plane parallel to the plane of said wall.

SECTION 6203 LOCATION

6203.1 Location restrictions. Signs shall not be erected, constructed or maintained so as to obstruct any fire escape or any window or door or opening used as a means of egress or so as to prevent free passage from one part of a roof to any other part thereof. A sign shall not be attached in any form, shape or manner to a fire escape, nor be placed in such manner as to interfere with any opening required for ventilation.

SECTION 6204 IDENTIFICATION

6204.1 Identification. Every outdoor advertising display sign hereafter erected, constructed or maintained, for which a permit is required shall be plainly marked with the name of the person, firm or corporation erecting and maintaining such sign and shall have affixed on the front thereof the permit number issued for said sign or other method of identification approved by the building official.

6204.2 Notification to sign purchasers. Any person who sells an identification sign, monument sign, pole sign, projecting sign or wall sign, as those terms are defined in Chapter I of the *Los Angeles Municipal Code*, for installation in the City of Los Angeles, shall provide written notice of the provisions of this chapter to the purchaser. The Superintendent of Building shall promulgate regulations setting forth the content for this notification.

SECTION 6205 DESIGN AND CONSTRUCTION

6205.1 General requirements. Signs shall be designed and constructed to comply with the provisions of this Code for use of materials, loads and stresses. Glass panels used in signs shall comply with the size, thickness and type of glass as shown in Table 4-A of this chapter. The use, location, size, area and height of the sign shall comply with the provisions of this Code and Chapter I of the *Los Angeles Municipal Code*, whichever is more restrictive.

6205.2 Permits, drawings and specifications. Where a permit is required, as provided in Chapter 1 of this Code, construction documents shall be required. These documents shall show the dimensions, material and required details of construction, including loads, stresses and anchors.

6205.3 Wind load. Signs shall be designed and constructed to withstand wind pressure as provided for in Chapter 16.

6205.4 Seismic load. Signs designed to withstand wind pressures shall be considered capable of withstanding earthquake loads, except as provided for in Chapter 16.

6205.5 Working stresses. In outdoor advertising display signs, the allowable working stresses shall conform to the requirements of Chapter 16. The working stresses of wire rope and its fastenings shall not exceed 25 percent of the ultimate strength of the rope or fasteners.

Exceptions:

1. The allowable working stresses for steel and wood shall be in accordance with the provisions of Chapters 22 and 23.
2. The working strength of chains, cables, guys or steel rods shall not exceed one-fifth of the ultimate strength of such chains, cables, guys or steel.

6205.6 Attachment. Signs attached to masonry, concrete or steel shall be safely and securely fastened by means of metal anchors, bolts or approved expansion screws of sufficient size and anchorage to safely support the loads applied.

6205.18 Off-site sign periodic inspection program.

6205.18.1 General. All off-site signs subject to the provisions of Chapter I of the *Los Angeles Municipal Code* will be subject to regular inspection by the Superintendent or an authorized representative. Inspections may also be complaint-based.

6205.18.2 Fees for inspection. This fee shall be known as the "Off-Site Sign Periodic Inspection Fee." The person in control of an off-site sign subject to inspection shall pay a regulatory fee on or before October 1, 2002. Thereafter, the fee shall be due on October 1 of each and every year. The fee for the 2002-2003 fiscal year is \$314.00 per off-site sign structure.

If the fees are not paid on or before the last day of the month in which they are due, a monthly penalty equal to 5 percent of any outstanding fees, but not less than \$10.00, shall be added to those fees. Any fees remaining unpaid after the last day of the month shall continue to accrue an additional monthly penalty of 5 percent of the outstanding principal fees on the last day of each month until paid in full. Should the owner fail to pay the required fee, the City of Los Angeles will recover it, plus accrued penalties, utilizing any remedies provided by law.

The department shall cause all money collected pursuant to this section to be deposited into the Off-Site Sign Periodic Inspection Fee Trust Fund described in Section 5.111.17 of the *Los Angeles Administrative Code* for purposes of disbursement as that section permits. Any unspent fees collected under the provisions of this section shall be credited and considered for purposes of determining the amount of

the fee for the next fiscal year. The Department of Building and Safety shall report to the city council, no later than June 30 of each year, on the actual costs of the regulatory program and shall recommend the amount of the fee for the next fiscal year.

The regulatory fee shall be used to finance the costs of administering the inspection program, including but not limited to investigation, inspection, issuance of inspection certificates, maintenance of the off-site sign database and the cost of civil enforcement. Payment of the fee shall not create a presumption that the sign is lawfully erected, as that term is defined in Section 6205.18.9 of this Code.

6205.18.3 Inspection certificate. The Department or its designee shall upon payment of proper fees, and furnishing of the building permit number, or a copy of the building permit, or a statement signed under penalty of perjury setting forth the circumstances by which the sign was acquired and/or installed and/or the date of issuance of the building permit, issue a certificate affirming that the "Off-Site Sign Periodic Inspection Fee" was paid. Thereafter, the Department or its designee shall issue a renewal certificate upon payment of proper fees and the furnishing of a statement affirming that there are no changes to the information provided for the original inspection certificate, or a statement signed under penalty of perjury setting forth any updated information. The certificate or renewal certificate shall be attached to the exterior surface of the sign body in a location that will be readable from ground level.

6205.18.4 Frequency of inspection. Each off-site sign shall be inspected annually after the initial inspection.

6205.18.5 Off-site sign inventory. The Department shall maintain a database containing the following information on all signs subject to inspection pursuant to Section 6205.18 et seq. of this Code. The database shall contain: building permit number, size of sign as shown on the building permit, date installed, any subsequent building permits issued for that sign, and any information required pursuant to this chapter or obtained pursuant to inspection.

6205.18.6 Orders. If, upon inspection, the Superintendent of Building or an authorized representative discovers one or more violations of this Code, the Superintendent of Building shall cause to be issued an Order To Comply.

6205.18.7 Reinspection. The Superintendent or an authorized representative shall reinspect the off-site sign after the time specified in the order has passed to determine whether the violation has been corrected. If it has not been corrected, then the Superintendent of Building may take any enforcement action the Superintendent of Building deems appropriate.

6205.18.8 Violations. If the person in control of an off-site sign fails to pay the fees required in this section and the Department determines that the off-site sign was not lawfully erected, the off-site sign shall be subject to the provisions of Section 6205.18.9 of this Code.

6205.18.9 Usage. If the Department determines that an off-site sign was not lawfully erected, then the off-site sign shall have its sign face removed and replaced with blank

panels. The term "lawfully erected" means an off-site sign that was erected in compliance with the provisions of this code in effect at the time of its erection or which was subsequently brought into full compliance with the provisions of this Code, except that the term does not apply to any off-site sign whose use was modified after erection in a manner that caused it to become illegal.

SECTION 6206 ELECTRICAL

6206.1 Illumination. A sign shall not be illuminated by other than electrical means, and electrical devices and wiring shall be installed in accordance with the requirements of the *California Electrical Code*. Any open spark or flame shall not be used for display purposes unless specifically approved.

6206.1.1 Internally illuminated signs. Except as provided for in Sections 402.14 and 2611, where internally illuminated signs have facings of wood or approved plastic, the area of such facing section shall not be more than 120 square feet (11.16 m²) and the wiring for electric lighting shall be entirely enclosed in the sign cabinet with a clearance of not less than 2 inches (51 mm) from the facing material. The dimensional limitation of 120 square feet (11.16 m²) shall not apply to sign facing sections made from flame-resistant-coated fabric (ordinarily known as "flexible sign face plastic") that weighs less than 20 ounces per square yard (678 g/m²) and that, when tested in accordance with NFPA 701, meets the fire propagation performance requirements of both Test 1 and Test 2 or that when tested in accordance with an approved test method, exhibits an average burn time of 2 seconds or less and a burning extent of 5.9 inches (150 mm) or less for 10 specimens.

6206.2 Electrical service. Signs that require electrical service shall comply with the *California Electrical Code*.

SECTION 6207 COMBUSTIBLE MATERIALS

6207.1 Use of combustibles. Wood, approved plastic or plastic veneer panels as provided for in Chapter 26 of this Code or other materials of combustible characteristics similar to wood that is used for moldings, cappings, nailing blocks, letters and latticing shall comply with Section 6209.1 of this Code and shall not be used for other ornamental features of signs, unless approved.

6207.1.1 Plastic materials. Notwithstanding any other provisions of this code, plastic materials which burn at a rate no faster than 2.5 inches per minute (64 mm/s) when tested in accordance with ASTM D 635 shall be deemed approved plastics and can be used as the display surface material and for the letters, decorations and facings on signs and outdoor display structures.

6207.1.2 Electric sign faces. Individual plastic facings of electric signs shall not exceed 200 square feet (18.6 m²) in area.

6207.1.3 Area limitation. If the area of a display surface exceeds 200 square feet (18.6 m²), the area occupied or cov-

ered by approved plastics shall be limited to 200 square feet (18.6 m²) plus 50 percent of the difference between 200 square feet (18.6 m²) and the area of display surface. The area of plastic on a display surface shall not in any case exceed 1,100 square feet (102 m²).

6207.1.4 Plastic appurtenances. Letters and decorations mounted on an approved plastic facing or display surface can be made of approved plastics.

SECTION 6208 ANIMATED DEVICES

6208.1 Fail-safe device. Signs that contain moving sections or ornaments shall have fail-safe provisions to prevent the section or ornament from releasing and falling or shifting its center of gravity more than 15 inches (381 mm). The fail-safe device shall be in addition to the mechanism and the mechanism's housing which operate the movable section or ornament. The fail-safe device shall be capable of supporting the full dead weight of the section or ornament when the moving mechanism releases.

SECTION 6209 GROUND SIGNS

6209.1 Height restrictions. The structural frame of ground signs shall not be erected of combustible materials to a height of more than 35 feet (10668 mm) above the ground. Ground signs constructed entirely of noncombustible material shall not be erected to a height of greater than 100 feet (30 480 mm) above the ground. Greater heights are permitted where approved and located so as not to create a hazard or danger to the public.

6209.2 Required clearance. The bottom coping of every ground sign shall be not less than 3 feet (914 mm) above the ground or street level, which space can be filled with platform decorative trim or light wooden construction.

6209.3 Wood anchors and supports. Where wood anchors or supports are embedded in the soil, the wood shall be pressure treated with an approved preservative.

SECTION 6210 ROOF SIGNS

6210.1 General. Roof signs shall be constructed entirely of metal or other approved noncombustible material except as provided for in Sections 6206.1.1 and 6207.1 of this Code. Provisions shall be made for electric grounding of metallic parts. Where combustible materials are permitted in letters or other ornamental features, wiring and tubing shall be kept free and insulated from each other. Roof signs shall be so constructed as to leave a clear space of not less than 6 feet (1829 mm) between the roof level and the lowest part of the sign and shall have at least 5 feet (1524 mm) clearance between the vertical supports. No portion of any roof sign structure shall project beyond an exterior wall.

6210.2 Bearing plates. The bearing plates of roof signs shall distribute the load directly to or upon masonry walls, steel roof

girders, columns or beams. The building shall be designed to avoid overstress of these members.

6210.3 Height of solid signs. A roof sign having a solid surface shall not exceed, at any point, a height of 24 feet (7315 mm) measured from the roof surface.

6210.4 Height of open signs. Open roof signs in which the uniform open area is not less than 40 percent of total gross area shall not exceed a height of 75 feet (22 860 mm) on buildings of Type 1 or Type 2 construction. On buildings of other construction types, the height shall not exceed 40 feet (12 192 mm). Such signs shall be thoroughly secured to the building upon which they are installed, erected or constructed by iron, metal anchors, bolts, supports, chains, stranded cables, steel rods or braces and they shall be maintained in good condition.

6210.5 Height of closed signs. A closed roof sign shall not be erected to a height greater than 50 feet (15 240 mm) above the roof of buildings of Type 1 or Type 2 construction, nor more than 35 feet (10 668 mm) above the roof of buildings of Type 3, 4 or 5 construction.

SECTION 6211 WALL SIGNS

6211.1 Materials. Wall signs that have an area exceeding 40 square feet (3.72 m²) shall be constructed of metal or other approved noncombustible material, except for nailing rails and as provided for in Sections 6206.1.1 and 6207.1 of this Code.

6211.2 Exterior wall mounting details. Wall signs attached to exterior walls of solid masonry, concrete or stone shall be safely and securely attached by means of metal anchors, bolts or expansion screws of not less than $\frac{3}{8}$ inch (9.5 mm) diameter and shall be embedded at least 5 inches (127 mm). Wood blocks shall not be used for anchorage, except in the case of wall signs attached to buildings with walls of wood. A wall sign shall not be supported by anchorages secured to an unbraced parapet wall.

6211.3 Extension. Wall signs shall not extend above the top of the wall, nor beyond the ends of the wall to which the signs are attached unless such signs conform to the requirements for roof signs, projecting signs or ground signs.

SECTION 6212 PROJECTING SIGNS

6212.1 General. Projecting signs shall be constructed entirely of metal or other noncombustible material and securely attached to a building or structure by metal supports, such as bolts, anchors, supports, chains, guys or steel rods. Staples or nails shall not be used to secure any projecting sign to any building or structure. The dead load of projecting signs not parallel to the building or structure and the load due to wind pressure shall be supported with chains, guys or steel rods having net cross-sectional dimension of not less than $\frac{3}{8}$ inch (9.5 mm) diameter. Such supports shall be erected or maintained at an angle of at least 45 percent (0.78 rad) with the horizontal to resist the dead load and at angle of 45 percent (0.78 rad) or more with the face of the sign to resist the specified wind pressure. If such projecting sign exceeds 30 square feet (2.8 m²) in

one facial area, there shall be provided at least two such supports on each side not more than 8 feet (2438 mm) apart to resist the wind pressure.

6212.2 Attachment of supports. Supports shall be secured to a bolt or expansion screw that will develop the strength of the supporting chains, guys or steel rods, with a minimum $\frac{5}{8}$ -inch (15.9 mm) bolt or lag screw, by an expansion shield. Turn buckles shall be placed in chains, guys or steel rods supporting projecting signs.

6212.3 Wall mounting details. Chains, cables, guys or steel rods used to support the live or dead load of projecting signs are permitted to be fastened to solid masonry walls with expansion bolts or by machine screws in iron supports, but such supports shall not be attached to an unbraced parapet wall. Where the supports must be fastened to walls made of wood, the supporting anchor bolts must go through the wall and be plated or fastened on the inside in a secure manner.

6212.4 Height limitation. A projecting sign shall not be erected on the wall of any building so as to project above the roof or cornice wall or above the roof level where there is no cornice wall; except that a sign erected at a right angle to the building, the horizontal width of which sign is perpendicular to such a wall and does not exceed 18 inches (457 mm), is permitted to be erected to a height not exceeding 2 feet (610 mm) above the roof or cornice wall or above the roof level where there is no cornice wall. A sign attached to a corner of a building and parallel to the vertical line of such corner shall be deemed to be erected at a right angle to the building wall.

6212.5 Additional loads. Projecting sign structures which will be used to support an individual on a ladder or other servicing device, whether or not specifically designed for the servicing device, shall be capable of supporting the anticipated additional load, but not less than a 100-pound (445 N) concentrated horizontal load and a 300-pound (1334 N) concentrated vertical load applied at the point of assumed or most eccentric loading. The building component to which the projecting sign is attached shall also be designed to support the additional loads.

SECTION 6213 MARQUEE SIGNS

6213.1 Materials. Marquee signs shall be constructed entirely of metal or other approved noncombustible material and/or approved plastic and glass.

6213.2 Attachment. Marquee signs shall be attached to approved marquees that are constructed in accordance with Section 3106.

6213.3 Dimensions. Marquee signs, whether on the front or side, shall not project beyond the perimeter of the marquee.

6213.4 Height limitation. Marquee signs shall not extend more than 6 feet (1829 mm) above, nor 1 foot (305 mm) below such marquee, but under no circumstances shall the sign or signs have a vertical dimension greater than 8 feet (2438 mm).

SECTION 6214 PORTABLE SIGNS

6214.1 General. Portable signs shall conform to requirements for ground, roof, projecting, flat and temporary signs where such signs are used in a similar capacity. The requirements of this section shall not be construed to require portable signs to have connections to surfaces, tie-downs or foundations where provisions are made by temporary means or configuration of the structure to provide stability for the expected duration of the installation.

SECTION 6215 REFERENCED STANDARDS

ASTM D 635-03	Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position	Section 6207.1.1
CEC-07	International Code Council <i>Electrical Code</i> <i>Administrative Provisions</i>	Sections 6206.1, 6206.2
NFPA 701-99	Methods of Fire Test for Flame Propagation of Textiles and Films	Section 6206.1.1

SECTION 6216 EXISTING SIGNS

6216.1 Existing sign rights. Every existing sign and/or sign support structure constructed under a valid permit and used in conformance with these regulations and Department approvals in effect at the time of construction shall be allowed to continue to exist under those regulations and approvals even though subsequent adopted regulations and approvals have changed the requirements.

6216.2 Maintenance of existing signs. Every sign and/or sign support structure shall be maintained in conformity with the requirements of this chapter and Chapter I of the *Los Angeles Municipal Code*.

6216.3 Illegal signs, construction and use. Every existing sign and/or sign support structure or portion of a sign and/or sign support structure constructed without a valid building permit shall be made to conform to the current provisions of this Code or shall be demolished and removed. Any use of an existing sign constructed without a valid building permit shall be discontinued.

6216.4 Alterations, repairs or rehabilitation.

6216.4.1 Alterations, repairs or rehabilitation of any existing sign and/or support structure may be of the same type of construction as the existing sign or sign support structure provided:

1. The aggregate value of the work in any one year does not exceed ten percent of the replacement cost of both the sign and sign support structure; and
2. That there is no increase in sign area or height and no change in the location or orientation of the sign.

6216.4.2 Alterations, repairs or rehabilitation of existing sign and/or sign support structures in excess of ten percent of the replacement cost of both the sign and sign support structure may be made provided:

1. That the cost of the work does not exceed 50 percent of the replacement cost of both the sign and sign support structure; and
2. That there is no increase in the sign area or height and no change in the location or orientation of the sign; and
3. All new construction shall be as required for a new sign of the same type.

6216.4.3 Alterations, repairs or rehabilitation of existing sign and/or sign support structures that exceed 50 percent of the replacement cost of both the sign and sign support structure shall comply with all the requirements of this Code.

6216.5 Additions. Existing signs and/or sign support structures with additions or alterations that increase the sign area or height or which change the location or orientation of the sign shall comply with all of the requirements of this Code.

**TABLE 4-A
SIZE, THICKNESS AND TYPE OF GLASS PANELS IN SIGNS**

MAXIMUM SIZE OF EXPOSED PANEL		MINIMUM THICKNESS OF GLASS (inches)	TYPE OF GLASS
Any dimension (inches)	Area (square inches)		
30	500	1/8	Plain, plate or wired
45	700	3/16	Plain, plate or wired
144	3,600	1/4	Plain, plate or wired
>144	>3,600	1/4	Wired glass

For SI: 1 inch = 25.4 mm, 1 square inch = 645.16 mm².

**TABLE 4-B
THICKNESS OF PROJECTION SIGN**

PROJECTION (feet)	MAXIMUM THICKNESS (feet)
5	2
4	2.5
3	3
2	3.5
1	4

For SI: 1 foot = 304.8 mm.

CHAPTER 63

ADDITIONAL PROVISIONS FOR SPECIFIC USES

SECTION 6301 GENERAL

In addition to the requirements of this Code, buildings housing special uses as specified herein shall conform to the requirements of this chapter.

SECTION 6302 FOOD ESTABLISHMENT

6302.1 General. This section shall apply to every building or portion thereof appropriated to the processing, storage or sale of food or drink for human consumption, but not including any private dwelling. Every food establishment shall conform to the requirements of this Code.

Exceptions:

1. Food establishments that are used exclusively for the sale of farm produce sold at or on the premises where produced.
2. Food preparation units installed in school buildings with the following provisions:
 - A. A sign must be posted requiring all mouth utensils to be of single-use, disposable type.
 - B. The floor surface of the area must be of linoleum, asphalt tile, or equivalent nonabsorbent material.
 - C. A residential-type vent must be installed when a residential kitchen range is provided.
3. Employee lunch rooms if no food other than beverages is prepared on the premises, and all mouth utensils provided are of the disposable type. Heating devices limited to this use need not be vented.
4. Food establishments in which all food is to be sold in sealed packages, and in which there is to be no preparing or packaging of food shall comply with all applicable food establishment regulations. The Certificate of Occupancy shall state "**Packaged Food Only.**"

6302.2 Ceiling heights. Every room shall have a ceiling height of not less than 8 feet (2438 mm) between the finished floor and the finished ceiling.

Exceptions:

1. Toilet rooms may have a ceiling height of not less than 7 feet 6 inches (2286 mm).
2. Refrigerated cold storage rooms are exempted from this ceiling height requirement.

6302.3 Special ventilation. A mechanical exhaust ventilation system capable of effectively removing cooking odors, smoke, steam, grease and vapors shall be provided at or above cooking equipment, such as ranges, griddles, ovens, deep fat fryers, barbecues and rotisseries.

All hoods, ducts, fans and other devices provided to ventilate the cooking areas of commercial food preparation equipment in commercial food establishments shall be installed as required by and in compliance with the provisions of the *Los Angeles Mechanical Code*. Rooms in which exhaust systems are installed shall be provided with acceptable air inlets to admit at least as much air as is exhausted by these systems.

Ducts penetrating a ceiling or floor shall be enclosed in a shaft enclosure conforming to the requirements of Section 707 of this Code. Where a shaft enclosure is not required by Section 707 of this Code, ducts that convey grease vapors shall be enclosed in a 1-hour fire-resistive shaft. The shaft shall be separated from the duct by a minimum 3-inch (76 mm) air space vented to the outside air.

6302.4 Toilet rooms and vestibules. Toilet rooms and vestibules for public or employees shall conform to the following standards:

1. **Toilet rooms required.** At least one toilet room shall be provided for every food establishment. Adequate separate toilet facilities for each sex shall be provided where the number of employees is four or more. In or immediately adjacent to every toilet room required hereunder there shall be installed one-half as many lavatories as there are water closets and urinals. Each lavatory shall be equipped with running hot and cold water.

Each place of business selling beer, wine, or liquor to be consumed on the premises shall be provided with separate toilet rooms for each sex, which also are readily available to the customers and patrons. These toilet rooms shall contain at least one water closet and lavatory, and at least one urinal for men.

2. **Location.** Toilet rooms shall be located on the premises of the food establishment. Toilet rooms for public use shall be readily accessible to customers. Toilet rooms shall be separated from other portions of the establishment by a tight-fitting, self-closing door.

Additional lavatories or equivalent hand-washing facilities shall be provided in all food preparation areas where the lavatories required in Item 1 are not conveniently located on the same floor and in or adjacent to the food preparation areas.

3. **Privacy.** Toilet rooms shall be so arranged or equipped with view screens as to protect users of toilets and urinals from view from outside the room when the door to the toilet room is open. Entrances to the toilet rooms for different sexes shall be properly separated by a space of at least 10 feet (3048 mm) or by view screens.

4. **Dimensions.** Toilet rooms shall have dimensions and area as required in Chapter 11.

6302.5 Dressing rooms. Dressing rooms for employees to store their clothes shall be provided for all restaurants and food

establishments. Separate dressing rooms shall be provided for each sex where the number of employees is four or more.

Dressing rooms shall be separated from food storage rooms and food preparation areas and shall be provided with self-closing doors.

Exception: Individual lockers to store clothes will be accepted in lieu of dressing facilities where there are fewer than four employees on any shift.

6302.6 Garbage rooms. Restaurants with a seating capacity of 50 or more patrons shall be provided with a room or enclosed space for the keeping of garbage containers. The room shall have portland cement plaster, fireclay tile, ceramic tile or equally durable waterproof walls to a height of at least 6 feet (1829 mm) above the floor. Doors and windows of such rooms shall be tight fitting and self-closing and all exterior openings shall be screened. Each such room shall be equipped with a hose or other suitable garbage can washing device connected to hot and cold running water and the floor shall slope to a drain and comply the requirements of the Los Angeles County Health Department.

Exception: Such garbage rooms need not be provided at places maintaining an approved device for discharging garbage to the sewer system.

6302.7 Rat protection. Every food establishment shall be completely surrounded by a continuous exterior foundation wall not less than 12 inches (305 mm) below grade.

SECTION 6303 SERVICE STATIONS

Every service station located within 660 feet (201 168 mm) of an accessible right-of-way of any interstate or primary highway, shall provide, during business hours, public restrooms for use by its customers. The public restroom shall not be temporary or portable but shall be permanent and shall include separate facilities for men and women, each with toilets and sinks suitable for use by the handicapped in accordance with Title 24 of the California Code of Regulations and shall be maintained in a clean and sanitary manner. This section shall not apply to service stations which are fully operational prior to January 1, 1990.

SECTION 6304 RESIDENTIAL USES

6304.1 Interior doors. In any residential building, every interior door in a doorway through which occupants pass shall have a minimum width of 32 inches (813 mm).

Exception: The provisions of this section shall not apply to doors located in shower compartment and bathtub enclosures.

6304.2 Interior illumination. All recreation or service rooms accessory to apartment houses shall be provided with an incandescent light bulb (minimum of 60 watts) or other artificial light at a maximum height of 8 feet (2438 mm) and shall provide have a minimum average surface illumination of 0.2 footcandles (2.15 lux) at floor level. Where, in any specific

case, different sections of the *Los Angeles Municipal Code* specify different requirements, the most restrictive shall govern.

Exception: Recreation or service rooms accessory to condominiums which comply with Article 2.9 (condominiums) of Chapter I of the *Los Angeles Municipal Code*.

6304.3 Additional requirements for installation of bars, grills, grates or similar devices. In addition to the requirements of Section 1026 of this Code, all bars, grills, grates or similar devices shall comply with the following:

1. A permit is obtained from the Department of Building and Safety and a fee is paid as required in Section 107.4.5 of this Code. Any permit so issued shall be valid for a period of 90 days from its issuance. The Department may allow a "certified installer" to be used, in lieu of obtaining a permit, in accordance with Section 1716.
2. Any person who willfully or knowingly, with the intent to deceive, makes a false statement or representation, or knowingly fails to disclose a material fact in any documentation required by the Department to ascertain facts relative to this section, Section 107.4.5 or to Section 1716 of this Code, including any oral or written evidence presented, shall be guilty of a misdemeanor.

SECTION 6305 PARKING GARAGES SERVING RESIDENTIAL USES

6305.1 Light. All parking garages serving dwelling units or guest rooms shall be provided with an incandescent light bulb (minimum of 60 watts) or other artificial light at a maximum height of 8 feet (2438 mm) and shall provide a minimum average surface illumination of 0.2 footcandles (2.15 lux) at floor level. Where, in any specific case, different sections of the *Los Angeles Municipal Code* specify different requirements, the most restrictive shall govern.

6305.2 Exterior illumination. All parking garages serving dwelling units or guest rooms shall be provided with an incandescent light bulb (minimum of 60 watts) or other artificial light at a maximum height of eight feet (2438 mm) and shall provide have a minimum average surface illumination of 0.2 footcandles (2.15 lux), however, exterior lighting that is brighter than 2 footcandles (21.5 lux) and affecting adjacent residential properties shall be activated by motion sensors for a period of not to exceed 20 minutes.

Exterior lighting shall be provided for areas accessory to apartment houses, such as driveways, side yards, walkways, recreation areas and similar locations.

Where, in any specific case, different sections of the *Los Angeles Municipal Code* specify different requirements, the most restrictive shall govern.

SECTION 6306 ANTIGRAFFITI FINISH TO EXTERIOR WALLS

In all buildings, except detached one- and two-family dwellings and their accessory buildings, the first 9 feet (2743 mm), measured from grade, of exterior walls and doors shall be built

and maintained with a graffiti-resistant finish consisting of either a hard, smooth impermeable surface such as ceramic tile, baked enamel or a renewable coating of an approved antigraffiti material or a combination of both.

SECTION 6307 SHOWER AND LOCKER FACILITIES

6307.1 Shower and locker facilities for office commercial, business and professional uses. For office commercial, business and professional uses in the C and M zones, and for buildings owned by the City of Los Angeles and used by the City for government purposes, regardless of zone, shower facilities shall be available and accessible for all employees in new buildings and in existing buildings, when additions are made thereto, as follows:

1. For new buildings and additions to existing building with at least 50,000 square feet (4645 m²) of floor area, one shower for each gender.
2. For new buildings and additions to existing buildings with 150,000 square feet (13 935 m²) to less than 250,000 square feet (23 225 m²) of floor area, two showers for each gender.
3. For new buildings and additions to existing buildings with 250,000 square feet (23 225 m²) of floor area or more, one additional shower for each gender for each increment of 100,000 square feet (9290 m²) of floor area or portion thereof.

For the uses specified above, where bicycle parking spaces are required pursuant to Section 12.21-A16 of the *Los Angeles Municipal Code*, one locker facility shall be provided for each required bicycle parking space. Locker facilities required by this section shall be located to permit access by either gender.

6307.2 Shower and locker facilities for industrial uses. For industrial uses in the C and M zones, shower facilities shall be available and accessible for all employees in new buildings and in existing buildings, when additions are made thereto, as follows:

For new buildings and additions to existing building with 50,000 square feet (4645 m²) of floor area and greater, one shower for each gender.

For the uses specified above, where bicycle parking spaces are required pursuant to Section 12.21-A16 of the *Los Angeles Municipal Code*, one locker facility shall be provided for each required bicycle parking space. Locker facilities required by this section shall be located to permit access by either gender.

6307.3 Shower and locker facilities for retail and other commercial uses. For retail and other commercial uses in the C and M zones not specified herein, employee shower facilities shall be available and accessible for all employees in new buildings and in existing buildings, when additions are made thereto, as follows:

1. For new buildings and additions to existing building with at least 100,000 square feet (9290 m²) to less than 300,000 square feet (27 870 m²) of floor area, one shower for each gender.

2. For new buildings and additions to existing buildings with 300,000 square feet (27 870 m²) of floor area or greater, one additional shower for each gender for each additional increment of 200,000 square feet (18 580 m²) of floor area or portion thereof.

For the uses specified above, where bicycle parking spaces are required pursuant to Section 12.21-A16 of the *Los Angeles Municipal Code*, one locker facility shall be provided for each required bicycle parking space. Locker facilities required by this section shall be located to permit access by either gender.

CHAPTER 67

SECURITY PROVISIONS

SECTION 6701 PURPOSE

The purpose of this chapter is to provide a nominal level of resistance to unlawful entry of buildings by establishing minimum standards of construction and hardware for the closure of openings regulated by this chapter.

SECTION 6702 GENERAL

In every Group B, F, M, S and R occupancy, the openings regulated by this chapter shall be completely secured in accordance with the provisions specified herein.

Exceptions: The requirements of this chapter shall not apply to:

1. Detached buildings which are accessory to Group R, Division 3 occupancies.
2. Group B, F, M, S occupancies which, by the nature of their operation, are unenclosed.
3. Group B, F, M, S occupancies where the owner submits written notice to the Department of intent to substitute security personnel and/or site security installations in lieu of requirements of this chapter of this Code. Such exemption shall be subject to the concurrence of the Department and shall be one of the conditions upon which the Certificate of Occupancy is issued.

SECTION 6703 LIMITATIONS

The provisions of this chapter shall not be applicable to latching or locking devices on exit doors to the extent that the provisions of this chapter are contrary to the provisions of Section 1026 or chapter 10 of this Code, nor shall the regulations of this chapter be construed to waive any other provision of this Code.

No person shall sell, offer for sale, advertise, display for sale or install any metal bars, grilles, grates, security roll-down shutters or similar devices manufactured or installed to preclude human entry through windows and exterior doors without a label attached to each product, printed in at least ten-point type and that reads as follows: "A building permit is required in most cases for the installation of this product. If this product is installed in a sleeping room, unless exempt by the provisions of Section 1026 of this Code, the device must be equipped with a quick-release latch openable from inside and the dwelling unit provided with an approved smoke detector."

SECTION 6704 ALTERNATE SECURITY PROVISIONS

The provisions of this chapter are not intended to prevent the use of any device, hardware, or method of construction, not specifically prescribed in this chapter, when such alternate provides equivalent security and is approved by the Department.

SECTION 6705 DEFINITIONS

For the purpose of this chapter, certain terms are defined as follows:

CYLINDER GUARD. A ring surrounding the exposed portion of the lock cylinder, or any other device, which is fastened as to protect the cylinder from wrenching, prying, cutting +or pulling by attack tools. The ring shall be made from steel or brass and shall have a minimum taper of 15 degrees (0.26 rad).

DEADLOCKING LATCH. A latch in which the latch bolt is positively held in the projected position by a guard bolt, a plunger or an auxiliary mechanism.

DEADBOLT. A bolt which has no automatic spring action and is operated by a key cylinder, thumb-turn, or lever, and is held fast when in the projected position.

ENCLOSING PARTITION. A partition extending the full height of the story to the floor or roof above separating tenant spaces.

LATCH. A device for automatically retaining a door, upon its closing, in a closed position.

SECURITY OPENING. An opening in a wall, partition, or roof when such opening occurs in any of the following locations:

1. In an exterior wall and less than 16 feet (4879 mm) above the grade of any adjoining yard, court, passageway, public way, walk, breezeway, patio, planter porch or similar area.
2. In an exterior wall and less than 16 feet (4879 mm) above the surface of any adjoining roof, balcony, landing, stair tread, platform, or similar structure when that surface is accessible to the public or another tenant or when any portion of such surface is itself less than 16 feet (4879 mm) above an accessible grade.
3. In the enclosing partitions of a dwelling unit, private garage, guest room or single-tenant nonresidential area.
4. In a roof when any portion of such roof is less than 16 feet (4879 mm) above an accessible grade or surface accessible by another tenant or the public.

SECTION 6706 ENTRY VISION

In residential occupancies, all entry doors to dwelling units or guest rooms shall be arranged so that the occupant has a view of the area immediately outside the door without opening the door. Such view may be provided by a door viewer, through windows located in the vicinity of the door or through view ports in the door or adjoining wall. Such windows or view ports shall be constructed in compliance with the provisions of Section 6713.

SECTION 6707 APPURTENANT ACCESS

Buildings located within 8 feet (2438 mm) of utility poles or similar structures which could otherwise be used to gain access to the building's roof, balcony or similar surfaces shall have access to such building surfaces protected by screens, barricades or fences made of materials which preclude human climbing. Such protection shall extend to where the surfaces are more than 8 feet (2438 mm) from the pole or access structure.

SECTION 6708 DOORS - GENERAL

Every door in a security opening shall be constructed, installed and secured as set forth in Sections 6709, 6710, 6711 and 6712. Glazing in doors shall comply with Section 6713.

Every door in a security opening for an apartment house shall be provided with an incandescent light bulb (minimum of 60 watts) at a maximum height of 8 feet (2438 mm) or lights on the exterior side of the unit that have a minimum surface illumination of 0.2 footcandles (2.15 lux) at the security opening. Where, in any specific case, different sections of the *Los Angeles Municipal Code* specify different requirements, the most restrictive shall govern.

SECTION 6709 SWINGING DOORS

6709.1 Swinging wood doors which are openable from the inside without the use of a key shall be of one of the following constructions or shall be of a construction having equivalent forced entry resistance:

1. Solid core doors not less than $1\frac{3}{8}$ inches (1.38 mm) in thickness.
2. Wood panel type door with panels fabricated of lumber not less than $\frac{9}{16}$ -inch thickness, provided shaped portions of the panels are not less than $\frac{1}{4}$ -inch (6 mm) thick. Individual panels shall not exceed 300 square inches (28 m²) in area. Stiles and rails shall be of solid lumber with overall dimensions of not less than $1\frac{3}{8}$ inches (1.38 mm) in thickness and 3 inches (76 mm) in width. Mullions shall be considered a part of adjacent panels unless sized as required herein for stiles and rails, except mullions not over 18 inches (457 mm) long may have an overall width of not less than two inches. Carved areas shall have a

thickness of not less than $\frac{3}{8}$ -inches (0.38 mm). Dimensional tolerances published in recognized industry standards may be utilized.

3. Hollow core doors or doors less than $1\frac{3}{8}$ inches (1.38 mm) in thickness either of which are covered on the inside face with 16 gauge sheet metal attached with screws at 6 inches (152 mm) maximum centers around the perimeter. Glazing in doors shall be as set forth in Section 6713.

6709.2 A single swinging door the active leaf of a pair of doors, and the bottom leaf of Dutch doors shall be equipped with a deadbolt and deadlocking latch. The deadbolt and latch may be activated by one lock or by individual locks. Deadbolts shall contain hardened inserts to repel cutting tools. The lock or locks shall be key-operated from the exterior side of the door and openable from the interior side by a device which does not require a key, special knowledge or special effort to operate.

Exceptions:

1. The latch may be omitted from doors in Group B, F, M, S occupancies.
2. In other than residential buildings, locks may be key operated on the inside when not prohibited by the provisions of Chapter 10.
3. A swinging door greater than 5 feet (127 mm) in width may be secured as set forth in Section 6711.

A straight deadbolt shall have a minimum throw of 1 inch (25 mm) and an embedment of not less than $\frac{5}{8}$ inch (0.63 mm) into the holding device receiving the projected bolt. A hook-shaped or an expanding-lug deadbolt shall have a minimum throw of $\frac{3}{4}$ -inch (19 mm). All deadbolts of locks which automatically activate two or more deadbolts shall embed at least $\frac{1}{2}$ -inch (13 mm) into the holding devices receiving the projected bolts.

6709.3 The inactive leaf of a pair of doors and the upper leaf of Dutch doors shall be equipped with a deadbolt or deadbolts as set forth in Section 6709.2.

Exceptions:

1. The deadbolt or bolts need not be key operated, but shall not be otherwise activated from the exterior side of the door.
2. The deadbolt or bolts may be engaged or disengaged automatically with the deadbolt or by another device on either the active leaf or the lower leaf.
3. Manually operated hardened bolts at the top and bottom of the leaf which embed a minimum of $\frac{1}{2}$ -inch (13 mm) into the receiving device may be used when not prohibited by Chapter 10.

6709.4 Door stops of in-swinging doors shall be of one-piece construction with the jamb, or joined by rabbet to the jamb.

6709.5 All pin-type hinges which are accessible from outside the secured area when the door is closed shall have nonremovable hinge pins. In addition, such hinges shall have jamb studs which project through both hinge leaves and prevent removal of the door if the pin is removed from the hinge. Jamb studs shall be not less than $\frac{1}{4}$ -inch (6 mm)-diameter steel

and shall project into the door and jamb not less than 1/4 inch (6 mm).

Exception: Jamb studs are not required for hinges which are shaped to prevent removal of the door if the hinge pin is removed.

6709.6 Cylinder guards shall be installed on all mortise or rim-type cylinder locks whenever the cylinder projects beyond the face of the door or is otherwise accessible to gripping tools.

6709.7 In wood construction, the metal strike plate for latches shall be secured to the jamb with screws and the holding device for projecting dead bolts shall be secured to the jamb and wall framing with at least two screws not less than 2 1/2 inches (64 mm) in length which penetrate the wall framing. In aluminum construction, the strike plate and dead bolt holding device shall be secured in an area of reinforced heavy gauge jamb material.

SECTION 6710 SLIDING GLASS DOORS

Sliding glass doors shall be equipped with locking devices and shall be so constructed and installed that they remain intact and engaged when subjected to the tests specified in Section 6717.1. Cylinder guards shall be installed on all mortise or rim-type cylinder locks whenever the cylinder projects beyond the face of the door or is otherwise accessible to gripping tools. A device shall be installed in the upper channel of the moving panel to prohibit raising and removal of the moving panel from the track while in the closed position.

SECTION 6711 OVERHEAD AND SLIDING DOORS

Metal or wooden overhead and sliding doors shall be secured with a cylinder lock, padlock with a minimum 9/32-inch (0.28 mm) diameter hardened steel shackle bolted, hardened steel hasps, metal slide board, bolt or equivalent device unless secured by an electrical power operation.

Cylinder guards shall be installed on all mortise or rim-type cylinder locks whenever the cylinder projects beyond the face of the door or is otherwise accessible to gripping tools.

SECTION 6712 METAL ACCORDION-GRATE OR GRILLE-TYPE DOORS

Metal accordion-grate or grille-type doors shall be equipped with metal guides at the top and bottom and cylinder locks or padlocks having minimum 9/32-inch (0.28 mm) hardened steel shackles with hardened steel hasps, bolted in place. Cylinder guards shall be installed on all mortise or rim-type cylinder locks whenever the cylinder projects beyond the face of the door or is otherwise accessible to gripping tools.

SECTION 6713 GLAZED OPENING – GENERAL

All windows, skylights, glazing in doors or other glazing in security openings shall conform to this section and to the applicable requirements of Sections 6714, 6715 and 6716.

Glazed openings within 40 inches (1016 mm) of the required locking device of the door, when the door is in the closed and locked position and when the door is openable from the inside without the use of a key, shall be fully tempered glass, conforming to the provisions of Section 2406, or approved burglary-resistant material, or shall be protected by metal bars, screens or grilles having a pattern such that the maximum dimension of any opening does not exceed 2 inches (51 mm).

Exception: The provisions of this section shall not apply to sliding glass doors which conform to the provisions of Section 6710 or to view ports or windows which do not exceed 2 inches (51 mm) in their greatest dimension.

SECTION 6714 GLAZING

In Group B, F, M, S occupancies, panes of glazing with at least one dimension greater than six inches, but less than 48 inches (1219 mm), shall be constructed of fully tempered glass or approved burglary-resistant material or shall be protected by metal bars or grilles which are constructed to preclude human entry. Such bars or grilles shall have a pattern such that at least one dimension of any opening shall be no greater than 6 inches (152 mm).

SECTION 6715 WINDOWS

6715.1 Sliding glass windows shall be provided with locking devices and shall be so constructed and installed that they remain intact and engaged when subjected to the tests specified in Section 6717.2. A device shall be installed in the upper channel of the moving panel to prohibit the raising and removal of the moving panel from the track while in the closed or partially open position.

6715.2 Other openable windows shall be provided with substantial locking devices which render the building as secure as the devices required by this section. In Group B, F, M, S occupancies, such devices shall be glide bars, bolts, cross bars and/or padlocks with minimum 9/32-inch (0.28 mm) hardened steel shackles and bolted, hardened steel hasps.

6715.3 Special. Louvered windows shall be protected by metal bars or grilles which are constructed to preclude human entry. Such bars or grilles shall have a pattern such that no less than one dimension of any opening shall be 6 inches (152 mm) or less.

6715.4 Any release for metal bars, grilles, grates or similar devices constructed to preclude human entry that are installed shall be located on the inside of the adjacent room and at least 24 inches (610 mm) from the closest opening through such

metal bars, grilles, grates or similar devices that exceed 2 inches (51 mm) in any dimension.

Exception: Metal bars, grilles, grates or similar devices may be padlocked in position where such padlocks or similar devices are not prohibited by law.

SECTION 6716 OPENINGS OTHER THAN DOORS OR GLAZED OPENINGS

6716.1 Security openings other than doors or glazed openings shall be protected in accordance with the requirements of this section.

6716.2 Hatchway covers of less than 1³/₄-inch (44 mm) thick solid wood construction shall be covered on the inside with 16-gauge sheet metal attached by screws around the perimeter spaced at 6-inch (152 mm) maximum centers.

6716.3 Hatchway covers shall be secured from the inside with slide bars, slide bolts, and/or padlocks with hardened steel shackles. Hasps shall be hardened steel and bolted.

6716.4 Outside pin-type hinges shall be provided with non-removable pins.

6716.5 Openings within 40 inches (1016 mm) of the required locking device of the door when said door is in the closed and locked position and when said door is openable without the use of a key shall not exceed two inches in their greatest dimension or shall be protected by metal bars or grilles having a pattern such that the openings of which do not exceed 2 inches (51 mm) in the greatest dimension.

6716.6 All other openings shall be protected by metal bars or grilles constructed to preclude human entry. Such bars or grilles shall have a pattern such that no less than one dimension of any opening shall be 6 inches (152 mm) or less.

Exception: Openings which are more than 40 inches (1016 mm) from the required locking device of a door in the closed and locked position when the door is openable from the inside without the use of a key, and which do not exceed 96 square inches (8.91 m²) in area, with no less than one dimension thereof being 6 inches (152 mm) or less.

SECTION 6717 TESTS – GENERAL

Doors, windows, and similar closures of security openings regulated by the provisions of this chapter, including the frames, jambs, hardware and locking devices of such closures, shall be shown to satisfactorily pass the tests specified in this chapter. The tests shall be performed by an approved testing laboratory on the units as installed at the jobsite or installed in test assemblies constructed according to the manufacturer's details. Each typical job installation shall be tested or the units shall be constructed and installed in conformance to a general approval issued by the Department.

6717.1 Sliding glass doors. Panels shall be closed and locked. Tests shall be performed in the following order:

1. **Test A.** With the panels in the normal position, a concentrated load of 300 pounds (1320 N) shall be applied separately to each vertical pull stile incorporating a locking device at a point on the stile within 6 inches (152 mm) of the locking device in the direction parallel to the plane of glass that would tend to open the door.
2. **Test B.** Repeat Test A while simultaneously adding a concentrated load of 150 pounds (660 N) to the same area of the same stile in a direction perpendicular to the plane of glass toward the interior side of the door.
3. **Test C.** Repeat Test B with 150-pound (660 N) force in the reverse direction toward the exterior side of the door.
4. **Tests D, E and F.** Repeat Tests A, B and C with the movable panel lifted upwards to its full limit within the confines of the door frame.
5. Moveable panels shall not be rendered easily openable or removable from the frame during or after the tests or the panel shall have failed the test.

6717.2 Sliding glass windows. Sash shall be closed and locked. Tests shall be performed in the following order:

1. **Test A.** With the sliding sash in the normal position, a concentrated load of 150 pounds (660 N) shall be applied separately to each sash member incorporating a locking device at a point on the sash member within six inches of the locking device in the direction parallel to the plane of glass that would tend to open the window.
2. **Test B.** Repeat Test A while simultaneously adding a concentrated load of 75 pounds (330 N) to the same area of the same sash member in the direction perpendicular to the plane of glass toward the interior side of the window.
3. **Test C.** Repeat Test B with the 75-pound (330 N) force in the reversed direction toward the exterior side of the window.
4. **Tests D, E and F.** Repeat Tests A, B and C with the movable sash lifted upwards to its full limit within the confines of the window frame.
5. Movable panels shall not be rendered easily openable or removable from the frame during or after the tests or the panel shall have failed the test.

CHAPTER 70

GRADING, EXCAVATIONS AND FILLS

SECTION 7001 PURPOSE

The purpose of this chapter is to safeguard life, limb, property and the public welfare by regulating grading on private property.

SECTION 7002 SCOPE

All grading shall be performed in accordance with the provisions of this chapter and with rules and regulations as established by the Superintendent of Building, and shall be in accordance with the zoning, private street and Chapter of land regulations contained in Chapter I of the *Los Angeles Municipal Code*, and the requirements of the approved general plan for the area in which the grading is to be done.

SECTION 7003 DEFINITIONS

For the purposes of this chapter, the definitions listed hereunder shall be construed as specified in this section.

APPROVAL. shall mean the proposed work or completed work conforms to this chapter to the satisfaction of the Superintendent of Building.

AS-GRADED. The extent of surface conditions on completion of grading.

BEDROCK. In-place solid rock.

BENCH. A relatively level step excavated into earth material on which fill is to be placed.

BORROW. Earth material acquired from an on-site or off-site location for use in grading on a site.

CIVIL ENGINEER. A professional engineer registered in the state to practice in the field of civil engineering works.

CIVIL ENGINEERING. The application of the knowledge of the forces of nature, principles of mechanics and the properties of materials to the evaluation, design and construction of civil works.

COMPACTION. The densification of a fill by mechanical means.

EARTH MATERIAL. Any rock, natural soil, fill or combination thereof.

ENGINEERING GEOLOGIST. A geologist duly licensed by the State of California and experienced and knowledgeable in engineering geology.

ENGINEERING GEOLOGY. The application of geologic knowledge and principles in the investigation and evaluation of naturally occurring rock and soil for use in the design of civil engineering works.

EROSION. The wearing away of the ground surface as a result of the movement of wind, water or ice.

EXCAVATION. The mechanical removal of earth material.

FILL. A deposit of earth material placed by artificial means.

GEOTECHNICAL ENGINEER. See "Soils engineer."

GRADE. The vertical location of the ground surface.

Existing Grade. The grade prior to grading.

Finish Grade. The final grade of the site which conforms to the approved plan.

Rough Grade. The stage at which the grade approximately conforms to the approved plan.

GRADING. Any excavating or filling or combination thereof.

HILLSIDE AREAS. Any land designated as a Hillside Area based on the latest Bureau of Engineering Basic Grid Map No. A-13372 and made part of this section.

KEY. A designed compacted fill placed in a trench excavated in earth material beneath the toe of a proposed fill slope.

PROFESSIONAL INSPECTION. The inspection required by this Code to be performed by the civil engineer, soils engineer or engineering geologist. Such inspections include that performed by persons supervised by such engineers or geologists and shall be sufficient to form an opinion relating to the conduct of the work.

ROCK. Any consolidated or coherent and relatively hard natural formed mass of mineral material.

SEEPAGE. The flow of water through earth material caused by gravitational forces.

SITE. Any lot or parcel of land or contiguous combination thereof, under the same ownership, where grading is performed or permitted.

SLOPE. An inclined ground surface the inclination of which is expressed as a ratio of horizontal distance to vertical distance. Slope greater than 10% shall be considered as a sloping surface.

SLOPE FAILURE CLASS I. Involves bedrock, and a combined geologic and geotechnical report that need to be submitted to address its cause and to provide recommended repair methods.

SLOPE FAILURE, CLASS II. Involves soil, and a geotechnical report needs to be submitted to address its cause and to provide recommended repair methods.

SLOPE FAILURE, CLASS III. Involves surficial problems, and unless determined as necessary by inspection, neither a geologic nor a geotechnical report is required prior to the repair.

SOIL. Naturally occurring superficial deposits overlying bedrock.

SOILS ENGINEER (GEOTECHNICAL ENGINEER). A civil engineer duly licensed by the State of California who is experienced in the application of the principles of soil mechanics in the investigation, evaluation and design of civil works involving the use of earth materials and who is approved by the Department, or a geotechnical engineer licensed by the State of California.

SOILS ENGINEERING (GEOTECHNICAL ENGINEERING). The application of the principles of soils mechanics in the investigation, evaluation and design of civil engineering works involving the use of earth materials and the inspection or testing of the construction thereof.

TERRACE. A relatively level step constructed in the face of a graded slope surface for drainage and maintenance purposes.

SECTION 7004 GRADING DESIGNATION

Grading in designated hillside areas or in excess of 5,000 cubic yards (3825 m³) of either cut or fill, or a combination thereof, shall be performed in accordance with the approved grading plan prepared by a civil engineer, and shall be designated as "engineered grading." Grading involving less than 5,000 cubic yards (3825 m³) in a non hillside area shall be designated "regular grading" unless the permittee chooses to have the grading performed as engineered grading, or the Superintendent of Building determines that special conditions or unusual hazards exist, in which case grading shall conform to the requirements for engineered grading.

SECTION 7005 GENERAL REQUIREMENTS

7005.1 Hillside areas. No person shall conduct any grading operation for other than building site development in hillside areas.

Exception: Grading that is not connected with building site development may be conducted in hillside areas when the Department finds that such work enhances the physical stabilization of property, or is not detrimental to public health, safety or welfare, and conforms with the approved master plan for the area. A tentative tract or chapter of land map shall also not be required for such exempt grading.

7005.2 Building foundations. Building foundations and temporary shoring shall be designed and constructed as specified in Chapter 18 of this Code.

7005.3 Removal of ground cover. The existing vegetative ground cover of any watershed in any hillside area shall not be destroyed, removed or damaged except pursuant to lawful grading, use or occupancy of the property. Except for oak trees regulated by the provisions of Article 7 of Chapter I or Article 6 of Chapter IV of the *Los Angeles Municipal Code*, removal of trees and shrubbery will be allowed where such work will not disturb the turf, sod or other existing vegetative ground cover. Whenever such ground cover is removed or damaged pursuant to a grading permit, the permittee shall restore and maintain approved ground cover, or shall accomplish such other erosion control protection as is required. Such erosion control shall be

completed within 30 days after cessation of the grading work where no valid building permit is in effect for the site.

7005.4 Exceptions for emergencies. The provisions of this Code shall be temporarily waived for any grading operation which is conducted during a period of emergency disaster and which is directly connected with or related to relief of conditions caused by such emergency or disaster. This emergency exception shall not be construed to waive compliance with the provisions of this Code subsequent to the emergency or disaster.

7005.5 Cemetery interment sites. Cemetery interment sites shall not be located on slopes steeper than one unit vertical in three units horizontal (33.3-percent slope), provided further, where interment sites are located adjacent to slopes steeper than one unit vertical in two units horizontal (50-percent slope), the site shall not be located closer to the face of such slopes than a one unit vertical in two units horizontal (50-percent slope) imaginary plane projected up from the toe of the slope.

Exception: Encroachment of the interment sites beyond the imaginary plane may be permitted, provided it can be shown to the Department's satisfaction through investigation and report by both a soils engineer and an engineering geologist that the underlying bedrock and the materials on the slope have strength characteristics sufficient to provide a stable soil with a minimum factor of safety of not less than 1.5 static loads.

No permit shall be required for preparing an area for planting of lawn or landscaping in a cemetery, provided the resulting maximum slope of one unit vertical in three units horizontal (33.3-percent slope) is maintained and there is no change to the existing drainage pattern.

The Department may waive or reduce the requirements of Sections 7012 and 7013 of this Code for planting, irrigation, erosion control and drainage devices for portions of a cemetery graded or to be graded with a maximum slope of one unit vertical in three units horizontal (33.3-percent slope) if the applicant shows to the Department's satisfaction that slope erosion and drainage will be controlled entirely within the boundaries of the property which is dedicated, used or to be used for cemetery purposes.

7005.6 Maintenance of protective devices. The owner of any property on which an excavation or fill has been made pursuant to a permit granted under Chapter 1 of this Code, or any other person or agent in control of such property, shall maintain in good condition and repair all retaining walls, cribbing, drainage structures and other protective devices, on said property, as shown on the approved plans and specifications submitted with the application for a permit.

7005.7 Hazardous soil and earth conditions. Whenever the Department determines by inspection that any land or any existing excavation or fills have, from any cause, become a menace to life or limb, or endangers public or private property, or affects the safety, usability or stability of public or private property, the owner or other person in legal control of the property concerned shall, upon receipt of a written notice thereof from the Department, correct such condition in accordance with the provisions of this chapter and the requirements and

conditions set forth in the notice so as to eliminate the hazardous condition. The owner or other person in legal control of the property shall immediately comply with the provisions set forth in the notice and shall complete the work within 180 days from the date of the notice unless a shorter period of time for completion has been specified in the notice in which case the owner shall comply with the shorter period of time. Upon written application therefor, the Department may approve the request for an extension of time to complete the work required by notice.

If the above condition is not eliminated within the specified time period, the Department shall file with the Office of the County Recorder a certificate stating that the property is substandard and that the owner thereof has been so notified. The certificate shall specify the conditions creating the substandard classification.

When the above conditions have been corrected to the Department's satisfaction, upon receiving a \$60 fee from the owner or his or her agent, the Department shall file with the Office of the County Recorder a certificate specifying that the conditions creating the substandard classification have been corrected and that the property is no longer considered substandard.

7005.8 Violations.

7005.8.1 General. No person shall fail, refuse or neglect to comply with the following provisions:

1. All orders issued by the Department pursuant to the provisions of this chapter;
2. All conditions imposed on grading permits pursuant to the provisions of this chapter; and
3. All rules and regulations of the Department with respect to grading which are in effect at the time the grading permit is issued.

Any person violating the above shall be guilty of a misdemeanor.

7005.8.2 Noncompliance fee. See Section 98.0411 of the *Los Angeles Municipal Code*.

7005.9 Nonconforming sites. All additions to existing buildings shall conform to the provisions of this Code.

Whenever the principal building on a site is added to, altered or repaired in excess of 50 percent of its replacement value, the entire site shall be made to conform with the provisions of this Chapter and Chapter 18.

SECTION 7006 CONDITIONS PRECEDENT TO ISSUING A GRADING PERMIT

7006.1 Plans and specifications. Application for a grading permit shall be accompanied by plans and specifications prepared and signed by an individual licensed by the State to prepare such documents. Plans shall be drawn to appropriate scale upon substantial paper or cloth and shall be of sufficient clarity to indicate the nature and extent of the work proposed and show in detail that the plans will conform to the provisions of this Code and all relevant laws, ordinances, rules and regulations.

The first sheet of each set of plans shall give the location of the work, the name and address of the owner and the person by whom they were prepared.

The plans shall include, but not be limited to, the following information:

1. General vicinity of the proposed site.
2. Property limits and accurate contours of existing ground and details of terrain and area drainage.
3. Limiting dimensions, elevations or finish contours to be achieved by the grading, and proposed drainage channels and related construction.
4. Detailed plans of all surface and subsurface drainage devices, walls, cribbing, dams and other protective devices to be constructed with, or as a part of, the proposed work together with a map showing the drainage area and the estimated runoff of the area served by any drains.
5. Location of any buildings or structures on the property where the work is to be performed and the location of any buildings or structures on land of adjacent owners which are within 15 feet (4572 mm) of the property or which may be affected by the proposed grading operations.
6. The location of the top and toe of all cuts and fills, the location of all "daylight" lines, the amount of cut and fill, the location of disposal site for excess material, if known, and the estimated dates for starting and completing grading work.
7. When reports are required pursuant to Section 7006.2, recommendations included in the approved soils engineering report and engineering geology report shall be incorporated into the grading plans. A copy of the soils report, geological report, and Department letter approving such reports shall be attached to the approved set of grading plans and kept at the job site.
8. When reports are required pursuant to Section 7006.2, the dates of the soils engineering and engineering geology reports together with the names, addresses and phone numbers of the firms or individuals who prepared the reports shall be incorporated in the grading plans.

The Department may require some plans to be prepared by a licensed surveyor when the property location and its limits are not clear. Portions of the aforementioned plan requirements may be waived by the Department if it finds that the information on the application and/or submitted plans is sufficient to show that the work will conform to the provisions of this Code and other relevant laws.

7006.2 Report requirement. Reports shall be submitted to the Department for review and approval in, but not limited to, the following circumstances:

1. Soils and/or geological reports are required when they are stipulated in a Grading Preinspection Report prepared in accordance with Section 107.3.2 of this Code.
2. Soils and geological reports are required for all grading work in excess of 5,000 cubic yards (3825 m³) of cut or fill, or a combination thereof.

3. Foundation reports are required when the design of the foundations does not conform to the requirements of Chapter 18.
4. Foundation, soils, and/or geological reports may be required when previously unknown adverse soils or geologic conditions are revealed during construction.
5. Seismic Report as required by Section 1631 or for projects located on site designated as Alquist-Priolo (Fault) Studies Zone.

The Superintendent of Building may require a geotechnical investigation in accordance with Section 1804.5 to address the potential of liquefaction when, during the course of an investigation, all of the following conditions are discovered:

1. Shallow ground water, 50 feet (15 240 mm) or less.
2. Unconsolidated sandy alluvium.

7006.3 Report content.

7006.3.1 Soils engineering report. The soils engineering report required by Section 7006.2 shall include data regarding the nature, distribution and strength of existing soils, conclusions and recommendations for grading procedures and design criteria for corrective measures, including buttress fills, when necessary, and opinion on adequacy for the intended use of sites to be developed by the proposed grading as affected by soils engineering factors, including the stability of slopes.

7006.3.2 Engineering geology report. The engineering geology report required by Section 7006.2 shall include an adequate description of the geology of the site, conclusions and recommendations regarding the effect of geologic conditions on the proposed development, and opinion on the adequacy for the intended use of sites to be developed by the proposed grading, as affected by geologic factors.

In addition, all soils engineering and engineering geology reports for grading work in hillside areas shall also comply with rules and standards established by the Department.

7006.4 Hillside exploratory work. Surface and subsurface exploratory work shall be performed by a soils engineer and an engineering geologist on all hillside grading work. This exploratory work shall conform to the rules and regulations for hillside exploratory work established by the general manager of the Department. The Department may waive this requirement when it determines from the application and site conditions that the proposed grading will conform to the provisions of the Code.

No person shall conduct any grading operation for the access of exploration equipment unless the Department has approved a plan signed by the soils engineer and/or geologist showing the extent of access grading and how the site is to be restored after exploration.

7006.5 Bonds in hillside areas required. The Superintendent of Building may require bonds in such form and amounts as may be deemed necessary to assure that the work, if not completed in accordance with the approved plans and specifications, will be corrected to eliminate hazardous conditions.

7006.5.1 Surety bond. Before a permit is issued for excavation or fill of 250 cubic yards (13 m³) or more of earth in a hillside area, the owner of the property shall file with the Department a bond for the benefit of the city. The bond shall be executed by the owner and a corporate surety authorized to do business in this state as a surety in an amount sufficient to cover the entire project.

Exception: Upon application by the owner, the Department may waive this requirement if:

1. The proposed grading is neither actually nor potentially hazardous;
2. The grading work performed is in compliance with a Department order; or
3. The applicant can substantiate, to the satisfaction of the Department, that the work under a grading permit will be fully executed.

7006.5.2 Cash bond. In lieu of a surety bond, the owner may file a cash bond with the Department on the same terms and conditions and in an amount equal to that which would be required in the surety bond. The deposit may be in the form of negotiable United States securities in lieu of cash.

7006.5.3 Application of bond to adjacent property. Where grading is required on property adjacent to the grading site under permit in order to complete a project satisfactorily, the owner of such adjacent property need not provide an additional grading bond if the original bond is of sufficient amount to include such additional grading.

7006.5.4 Conditions of the bond. Every bond shall be conditioned such that the owner shall:

1. Comply with all applicable provisions of this Code and all other applicable laws.
2. Comply with all of the terms and conditions of the grading permit to the satisfaction of the Department.
3. Complete all of the work described by the permit, and the plans and specifications relating thereto, within the time limit specified in the permit. Upon application by the permittee, the Department, or the Board, in case an appeal is made to it pursuant to Section 98.0403 of the *Los Angeles Municipal Code*, may, for sufficient cause, extend the time specified in the permit, but no such extension shall release any surety on the bond.
4. Install temporary erosion control devices when required to do so by the provisions of this Code.

7006.5.5 Period and termination of bond. The term of each bond shall begin on the date of filing and shall remain in effect until the work is completed to the satisfaction of the Department or until replaced by a new bond in the event of a change of ownership. In the event of failure to complete the work and/or failure to comply with all of the conditions and terms of the permit, the Department may order some or all of the work to be completed to correct any hazardous conditions. The surety executing such bond, or such deposit, shall continue to be firmly bound under a continuing obligation for the payment of all necessary costs and expenses that may be incurred or expended by the city in causing any and all of

such required work to be done and that said surety or the depositor assents to any lawful extension of time within which to construct and complete such work. Such costs shall include an amount equal to the cost to the city of administering the contract and supervising the work required. In the case of a cash bond, the deposit, or any unused portion thereof, shall be refunded to the depositor upon completion of the work to the satisfaction of the Department. The Department may release or exonerate the bond under appropriate conditions when the public health and welfare is not jeopardized.

7006.5.6 New ownership. In the event of change of ownership during grading, the new owner shall secure a new grading permit and post a new bond to ensure completion of the grading.

7006.5.7 Amount of bond. The amount of the bond shall be based on the number of cubic yards of material in either excavation or fill, whichever is the greater amount, and in addition shall include the cost of all drainage or other protective devices such as, but not limited to retaining walls, as may lawfully be required. That portion of the bond valuation covering the cost of excavation or fill shall be computed as follows:

250 to 10,000 cubic yards	\$1,000, plus \$1.00 per cubic yard
10,001 to 100,000 cubic yards	\$11,000, plus 50 cents per cubic yard for each additional cubic yard in excess of 10,000
Over 100,000 cubic yards	\$56,000, plus 35 cents per cubic yard for each additional cubic yard in excess of 100,000

For SI: 1 cubic yard = 0.765 m³

7006.5.8 Installment refunds. When a substantial portion of the required grading work has been completed to the satisfaction of the Department, and when the completion of the remaining grading work, site development or planting is delayed, the Department may accept the completed portion of the grading work and consent to the proportionate reduction of the bond to an amount estimated to be adequate to ensure completion of the grading work, site development or planting remaining to be performed. Only one such reduction shall be considered for each bond posted.

7006.5.9 Entry upon premises. The Department, the Board of Public Works, the surety company, or their duly authorized representative, shall have access to the premises described in the permit for the purpose of inspecting the progress of the work.

In the event of default in the performance of any terms or conditions of the permit, the surety or any person employed or engaged in his or her behalf shall have the right to go upon the premises to complete the required work, including the installation of temporary erosion control devices.

Should the permittee or the surety fail to perform the work described by the permit and the plans and specification relating thereto or required by any applicable law, and it is determined by either the Department or the Board of Public Works that the public health, safety or general welfare is endangered by such failure, the Department, the Board of

Public Works, or the representative of either may enter upon the premises to perform all or any part of such work, including the installation of temporary erosion control devices.

It shall be unlawful for the owner or any other person to interfere with the ingress and egress from such premises of any authorized representative or agent of any surety company or the city engaged in the work ordered by the Department or the Board of Public Works.

7006.6 Consent of adjacent property owner. Whenever any excavation or fill requires entry onto adjacent property for any reason, the permit applicant shall obtain the written consent of the adjacent property owner or the owner's authorized representative, and shall file a copy of said consent with the Department before a permit for such grading work may be issued. The signature on such written consent shall be notarized.

In the event contours on adjacent properties are permanently changed, structures or drainage devices are added or modified, and/or the work done requires a grading permit under Section 106.1.2, a separate permit shall be required for each such affected adjoining property in addition to the consent letter. Furthermore, the adjacent property owner shall acknowledge his or her consent on plans showing such work. The consent letter will not be required if such grading permit is taken out by the adjoining owner.

7006.7 Limitation of export and import.

7006.7.1 Export-import defined. As used in this Chapter, the term "export" and its derivatives shall be defined as the earth, brush or similar materials transported from a grading site. The term "import" and its derivatives shall be defined as earth, brush or similar materials transported to a grading site.

7006.7.2 General conditions. The Department may designate routes of ingress and egress and may impose such conditions and require such safety precautions for pedestrian and vehicular traffic as it determines are required in the interest of public health, safety and welfare.

The imposed conditions may include, but are not limited to:

1. Restricting the size and type of hauling equipment.
2. Requiring traffic control device, flaggers, and signs and markers at appropriate locations along the designated routes as provided in the City of Los Angeles Department of Public Works and Traffic pamphlet, "Work Area Traffic Control Handbook," 1990 edition, or latest subsequent revisions.
3. Establishing a temporary "no parking" area authorized by the general manager of the Transportation Department when determined to be necessary.
4. Securing all loads by trimming, watering or other appropriate means to prevent spillage and dust.

7006.7.3 Subdivision conditions. All conditions of import and export imposed in the approval of a tentative tract map shall be made a part of the grading permit.

7006.7.4 Special hillside conditions. No permit requiring the import or export of more than 1,000 cubic yards (764 m³) shall be issued for areas designated "hillside" except as

hereinafter specified. A fee of \$350.00 in addition to the permit fee shall be paid for processing such application for grading under provisions of this section.

1. The applicant shall submit a proposed method of hauling, which shall include the location of borrow and/or dispersal sites within the hillside area, the truck staging areas, the portion of the haul route within the hillside area and extending to or from a major or secondary highway, the maximum gross weight of haul vehicles when loaded and other information as may be required by the Departments of Building and Safety, Transportation and Public Works. In addition, the applicant shall submit a copy of the soil/geological report approval letter when reports are required pursuant to Section 7006.2, a vicinity map, and a list of affected property owners to be notified of the public hearing pursuant to Item 4.
2. The Department shall immediately forward a copy of the hauling proposal to the Department of Public Works which shall review same to determine the effect of the proposed hauling operation on the structural integrity of the public streets, on public safety due to street alignment, width and grade, and on public health and welfare due to noise and vibration as it may affect private property situated on or adjacent to the haul route within the hillside area.

The Department of Public Works shall collect a fee and may require a bond as specified in Article 2 of Chapter VI of the *Los Angeles Municipal Code*. The Department of Public Works may, within 21 days after receipt of the proposal, recommend conditions to be imposed on the hauling operations to protect the public health, safety and welfare in the respects herein above specified.

3. The Department shall also immediately forward a copy of the hauling proposal to the Department of Transportation which shall review same to determine the effect thereof on vehicular and pedestrian traffic in the affected area. The Department of Transportation may, within 21 days after receipt of the proposal, recommend any traffic control measures deemed necessary to protect the public health, safety and welfare.
4. The Department shall within 45 days after receipt of the proposed method of hauling, schedule a public hearing before the board provided that any environmental document required pursuant to the provisions of the California Environmental Quality Act has been completed and that the soils/geology report for the project, if required pursuant to Section 7006.2, has been reviewed and approved by the Department's Grading Division.

The Department shall give notice of the time, place and purpose of the hearing as follows:

- a. By publishing a notice in at least one publication of general circulation in the City, designated for that purpose by the City Clerk, not less than 10 days prior to the date of the hearing; and

- b. By mailing a written notice at least ten days prior to the date of the hearing to the owner or owners of the property involved, and to the owners of all properties within 300 feet (91 440 mm) of the exterior boundaries of the site for which the grading permit has been requested using, for the purpose of notification, the last known name and address of owners as are shown on the records of the City Clerk or the records of the County Assessor; and

- c. By the applicant posting notice of the public hearing in a conspicuous place and in clear public view on the property involved at least five days prior to the date of the public hearing.

5. At the public hearing, the Board of Building and Safety Commissioners shall consider the views of the applicant and all other affected persons. The Board shall then grant or conditionally grant approval of export and import operations or, in the event it determines that the grading activity, including the hauling operation, will endanger the public health, safety and welfare, it shall deny the request. Where conditions of the permit are recommended by the Department of Public Works, including the condition that a bond be posted pursuant to Section 62.202 of the *Los Angeles Municipal Code*, such conditions shall be made a part of any permit which may be issued. The decision of the board shall not be effective until 10 calendar days have elapsed from the date of the Board's decision.
6. Any affected person, including the applicant, who is dissatisfied with the decision of the board, may appeal the board's decision within 10 days to the City Council by filing an appeal with the City Clerk. The City Council shall hear and make its determination on the appeal not later than the 30th day after the appeal has been filed. The decision of the City Council on the matter shall be final. If the City Council fails to act on any appeal within the time limit specified in this section, the action of the Board on the matter shall be final.
7. The provisions of this section shall not apply to applications for permits which apply to export or import operations which have been approved in accordance with Section 17.13 of the *Los Angeles Municipal Code*.

7006.8 Conformance with zoning regulations required.

7006.8.1 Subdivision map act. No permit shall be issued for any grading or import or export of earth materials to or from any grading site except in compliance with the zoning, private street and division of land regulations contained in Chapter I of the *Los Angeles Municipal Code*, the Subdivision Map Act of the State of California and the approved master plan for the area in which the grading is to be done.

7006.8.2 Tentative tract map. No permit shall be issued for the import or export of earth materials to or from and no grading shall be conducted on any grading site in hillside areas having an area in excess of 60,000 square feet (5574 m²) unless a tentative tract map has been approved therefor

by the advisory agency. The advisory agency may waive this requirement if it determines that a tract map is not required by the division of land regulations contained in Chapter I of the *Los Angeles Municipal Code*.

Exception: The requirements of this section shall not apply to any grading allowed under the exception to Section 7005.1.

SECTION 7007 SAFETY PRECAUTIONS DURING GRADING

If at any stage of work on an excavation or fill the Department determines that further work as authorized by an existing permit is likely to endanger any property or public way, the Department may require as a condition to allow the work to continue that plans for such work be amended to include adequate safety precautions. Safety precautions may include, but shall not be limited to, specifying a flatter exposed slope or construction of additional drainage facilities, berms, terracing, compaction, cribbing, retaining walls or buttress fills, slough walls, desilting basins, check dams, benching wire mesh and guniting, rock fences revetments or diversion walls.

No person shall excavate or fill so as to cause falling rocks, soil or debris in any form to fall, roll, slide or flow onto adjoining properties.

7007.1 Restriction of work during rainy season. The period between October 1 and April 15 is hereby determined to be the period in which heavy rainfall normally occurs in the City of Los Angeles and is declared to be the “rainy season.” During this period no grading work in excess of 200 cubic yards (153 m³) shall be commenced on any single grading site under permit until an erosion control system has been approved and it has been demonstrated to the Department’s satisfaction that such grading work will not endanger life, limb, health, property or public welfare.

Whenever it appears that repair work to rectify substandard conditions and any grading project previously commenced pursuant to a permit issued by the Department will not be completed prior to the commencement of the rainy season, the Department may order and the permittee shall install temporary erosion control devices to protect the persons and property near such project. In addition, the Board of Public Works may direct the permittee to comply with the provisions of Section 61.02 of the *Los Angeles Municipal Code*.

All hillside property owners or their agents shall submit erosion control plans to their district grading inspectors prior to October 1 for grading projects within unfinished grading work in excess of 200 cubic yards (153 m³) and sites with substandard conditions, unless specifically exempted by the grading inspectors.

7007.2 Duration of work. No person shall conduct any grading excavation or filling, including the export or import of earth material, between the hours of 6:00 p.m. and 7:00 a.m. on any day nor on Sunday, at any time, except in emergencies as provided in Section 7005.4.

SECTION 7008 PROFESSIONAL INSPECTION AND CERTIFICATION FOR ENGINEERED GRADING

Grading operations, as indicated in Section 108.9, for which a permit is required shall be subject to inspection by the Department. Professional inspection of grading operations shall be provided by the civil engineer, soils engineer and the engineering geologist retained to provide such services in accordance with Section 7008.6 for engineered grading and as required by the Department for regular grading.

7008.1 Civil engineer. The civil engineer shall provide professional inspection within such engineer’s area of technical specialty, which shall consist of observation and review as to the establishment of line, grade and surface drainage of the development area. If revised plans are required during the course of the work, they shall be prepared by the civil engineer.

Upon completion of hillside tract grading, grading work in excess of 5,000 cubic yards (3825 m³) of either cut or fill, or a combination thereof, and other grading work if deemed warranted by the Department, the civil engineer or land surveyor responsible for the design shall submit a dated as-graded plan to the Department for approval of all work covered by the grading permit(s) and shall include the following:

1. The plan shall be no more than one-inch equals 40 feet scale (25 mm equals 12 192 mm scale) and shall show the locations of streets, pads, slopes, structures, pertinent elevations, original contours and finished elevations, and other pertinent information required to accurately show the as-graded condition.
2. The plan shall bear the signature of the design civil engineer or land surveyor which shall certify he or she has inspected the site, prepared the as-graded plans and that the work within his or her area of responsibility was done in accordance with the final approved grading plan.

7008.2 Soils engineer. The soils engineer shall provide professional inspection within such engineer’s area of technical specialty, which shall include observation during grading and testing for required compaction. The soils engineer shall provide sufficient observation during the preparation of the natural ground and placement and compaction of the fill to verify that such work is being performed in accordance with the conditions of the approved plan and the appropriate requirements of this chapter. Revised recommendations relating to conditions differing from the approved soils engineering and engineering geology reports shall be submitted to the owner, the Department and the civil engineer.

The soils engineer, at the completion of hillside tract grading, grading work in excess of 5,000 cubic yards (3825 m³) of either cut or fill, or a combination thereof, and other grading work if deemed warranted by the Department, shall submit a final report. The final report shall include:

1. His or her professional opinion of the suitability of the fill material and their placement, and the ability of the natural materials to support the compacted fill without excessive settlement of the fill or potential damage to structures erected thereon;

2. The results of all in-place density tests;
3. A statement that all subdrains were inspected prior to backfill;
4. A statement to the effect that the soils engineers has inspected all cuts and fills and that in his or her opinion they meet the design requirements; and
5. All locations of the in-place density tests, retaining walls, subdrains and cut/fill slopes shall be shown on a plot plan which may be referenced to a dated as-graded plan prepared by the design civil engineer or land surveyor.

7008.3 Engineering geologist. The engineering geologist shall provide professional inspection within such engineer's area of technical specialty, which shall include professional inspection of the bedrock excavation to determine if conditions encountered are in conformance with the approved report. Revised recommendations relating to conditions differing from the approved engineering geology report shall be submitted to the soils engineer and the Department.

For hillside tract grading, grading work in excess of 5,000 cubic yards (3825 m³) of either cut or fill, or a combination thereof, and other grading work if deemed warranted by the Department, geologists shall submit periodic in-grading inspection reports at intervals determined by the Department. In addition, the engineering geologist at the completion of grading shall submit a final geological report stating he or she had maintained the required in-grading inspection, the recommendations of his or her pregrading report(s) have been followed, that in his or her professional opinion all known adverse geologic conditions have been corrected or provided for, future adverse geologic conditions are not anticipated, and all lots or sites are geologically suitable and safe for construction.

The final report shall include the geologist's certification that he or she has inspected all cut slopes and sidehill fill placement areas prior to placement of fill. The engineering geologist shall also certify that all subdrain placement areas were inspected prior to installation of the subdrains. The final report shall be referenced to a dated as-graded plan prepared by the design civil engineer or land surveyor.

7008.4 Grading contractor. For hillside tract grading, grading work in excess of 5,000 cubic yards (3825 m³) of either cut or fill, or a combination thereof, and other grading work if deemed warranted by the Department, the grading contractor shall submit in a form prescribed by the Superintendent of Building a statement of conformance to said as-built plan and the specifications.

7008.5 Transfer of responsibility. If, for any reason, the civil engineer, the soils engineer, or the engineering geologist of record is terminated during the progress of the grading work, he or she and the owner shall immediately notify the Department in writing.

Such transfer of responsibility may result in temporary delays in the grading operations until satisfactory arrangements are made to assure the Department that competent professional supervision is provided. The new professional(s) shall submit to the Department a letter of responsibility that the previous professional's designs, reports and recommendations

have been reviewed and all provisions of the Department required as conditions of the grading permit will be complied with during the course of the work.

7008.6 Owner. The owner shall be responsible for the work to be performed in accordance with the approved plans and specifications and in conformance with the provisions of this Code, and the owner shall engage consultants, if required, to provide professional inspections on a timely basis. The owner shall provide a registered deputy grading inspector as required by Section 1701. The owner shall act as a coordinator between the consultants, the contractor and the Superintendent of Building. In the event of changed conditions, the owner shall be responsible for informing the Superintendent of Building of such change and shall provide revised plans for approval. The Department may require the submittal of a supplemental soils and/or geological report justifying such change.

7008.7 Notification of noncompliance. If, in the course of fulfilling their respective duties under this chapter, the civil engineer, the soils engineer or the engineering geologist finds that the work is not being done in conformance with this chapter or the approved grading plans, the discrepancies shall be reported immediately in writing to the owner and to the Superintendent of Building.

SECTION 7009 PROFESSIONAL INSPECTION FOR REGULAR GRADING

When soils and/or geological reports are submitted to the Department per Section 7006.2, professional inspection for regular grading work may be required by the Department and so stipulated on a Department letter approving such reports.

SECTION 7010 EXCAVATIONS

7010.1 Height. No cut slope shall exceed a vertical height of 100 feet (30 480 mm) unless horizontal benches with a minimum width of 20 feet (6096 mm), as shown in Figure D are installed at each 100 feet (30 480 mm) of vertical height.

7010.2 Slope. No excavation shall be made with a cut face steeper than one unit vertical in two units horizontal (50-percent slope).

Exception: The Department or the Board, in case an appeal is made to it under Section 105, may permit the excavation to be made with a cut face steeper in slope than one unit vertical in two units horizontal (50-percent slope) if the applicant shows through investigation, subsurface exploration, analysis and report by both a soils engineer and an engineering geologist, to the Department's satisfaction, that the underlying bedrock and the materials to be exposed on the slope have strength characteristics sufficient to produce a stable slope with a factor of safety of not less than 1.5 for static loads.

Existing or proposed slopes shall be regraded or cut so as to be not steeper than the bedding planes in formation where the cut slope will lie on the dip side of the strike line or the bedding planes shall be supported by retaining walls or but-

stress fills designed pursuant to the provisions of Section 1819 or Section 7015 of this Code.

Exception: Where special conditions warrant, the Department may approve slopes steeper than the bedding planes if the applicant shows through investigation, subsurface exploration, analysis and report by both a soils engineer and an engineering geologist, to the Department's satisfaction, that the slopes will have a factor of safety against sliding of not less than 1.5 for static loads.

Whenever grading at the top of any natural or manufactured slope exposes soil or bedrock material that will allow the infiltration of water in a manner that would adversely affect the stability of the slope, the exposed area shall be capped with a relatively impervious compacted soil blanket seal having a minimum thickness of 2 feet (610 mm). The soils engineer shall certify in writing that the blanket seal is adequate to reduce water infiltration to permissible levels.

7010.3 Top of cut slope. The top of cut slopes shall not be made nearer to a site boundary line than one fifth of the vertical height of cut with a minimum of 2 feet (610 mm) and a maximum horizontal distance of 10 feet (3048 mm). The setback may need to be increased for any required interceptor drains. Setback dimensions shall be horizontal distances measured perpendicular to the site boundary. Setback dimensions shall be as shown in Figure E of this chapter.

SECTION 7011 FILLS

7011.1 Height. No fill slope shall exceed a vertical height of 100 feet (30 480 mm) unless horizontal benches with a minimum width of 20 feet (6096 mm), as shown in Figure D are installed at each 100 feet (30 480 mm) of vertical height.

7011.2 Slope. No fill shall be made which creates an exposed surface steeper than one unit vertical in two units horizontal (50-percent slope). The fill slopes abutting and above public property shall be placed so that no portion of the fill lies above a plane through a public property line extending upward at a slope of one unit vertical in two units horizontal (50-percent slope).

Exception: The Department or the Board in case an appeal is made to it under Section 105 may permit a fill to be made which creates an exposed surface steeper in slope than one unit vertical in two units horizontal (50-percent slope), provided:

1. The use of the steeper slope is determined to be necessary due to special design limitations on the site,
2. The gradient does not exceed one unit vertical in one and one-half units horizontal (66.7-percent slope) and
3. The applicant shows through investigation, subsurface exploration, analysis and report by both a soils engineer and an engineering geologist, to the Department's satisfaction, that the fill to be used and the underlying bedrock or soil supporting the fill have strength characteristics sufficient to produce a stable slope with a minimum factor of safety not less than 1.5 for static loads. The soils engineer shall verify by

necessary testing and observation and shall certify attainment of the required strength characteristics in the fill materials as specified in the approved report.

7011.3 Compaction. All manufactured fills shall be placed on natural undisturbed material or approved compacted fill. Fills shall be compacted throughout their full extent to a minimum relative compaction of 90 percent of maximum dry density within 40 feet (1219 mm) below finish grade and 93 percent of maximum dry density deeper than 40 feet (1219 mm) below finish grade, unless a lower relative compaction (not less than 90 percent of maximum dry density) is justified by the soils engineer. The relative compaction shall be determined by ASTM soil D 1557. Every manufactured fill shall be tested for relative compaction by a soil testing agency approved by the Department. A compaction report including a Certificate of Compliance setting forth densities so determined shall be submitted to the Department for review before approval of any fill is given. For slopes to be constructed with an exposed slope surface steeper than two horizontal to one vertical, compaction at the exposed surface of the slope shall be obtained either by overfilling and cutting back the slope surface until the compacted inner core is exposed, or by compacting the outer horizontal 10 feet (3048 mm) of the slope at least 92 percent of relative compaction.

Prior to permitting building on deep fills, the Department may require the determination of the settlement characteristics of the fills to establish that any movements have substantially ceased. In those cases, a system of benchmarks shall be installed at critical points on the fill and accurate measurement of both horizontal and vertical movements shall be taken for a period of time sufficient to define the settlement behavior. In no case shall the period of time be less than 1 year, with at least four consecutive checks made at intervals of 3 months.

Exceptions:

1. The Department may approve uncompacted fill in self-contained areas where the fills are not to be used to support buildings or structures and no hazard will be created.
2. Fill material placed in areas within cemeteries used or to be used for internment sites shall be compacted to a minimum of 80 percent, unless the fill is placed on a slope steeper than three horizontal to one vertical, or placed on slopes adjacent to public properties or private properties in separate ownership, or is to be used to support buildings or structures, in which cases it shall be compacted to a minimum of 90 percent.
3. Compaction report is not required for gravel backfill behind retaining walls provided the following conditions are met:
 - A. The retaining wall does not exceed 10 feet (3048 mm) in height.
 - B. The maximum distance between the retaining wall and the backcut shall not exceed 24 inches (610 mm).
 - C. The gravel backfill shall be mechanically compacted and covered with concrete pavement or be capped with a 24-inch thick soil blanket

mechanically compacted to the Department's satisfaction.

- D. The gravel backfill does not provide vertical or lateral support for any structures or adverse bedding planes.

7011.4 Fill slopes. Fill slopes shall be prepared for planting in one of the following three ways:

1. The slope surface of fills may be prepared for planting by casting topsoil over the slope surface. The topsoil layer shall not exceed three inches (76 mm) in depth.
2. The slope surface may be scarified to a depth not to exceed 3 inches (76 mm).
3. Loose material not to exceed 3 inches (76 mm) in depth may be left on the slope.

7011.5 Toe of fill slope. The toe of fill slope shall be made not nearer to a site boundary line adjoining other private properties than one half the height of the fill slope with a minimum of two feet (610 mm) and a maximum of 20 feet (6096 mm).

In the event retaining walls are constructed to retain fill, the height of the fill shall be measured from the elevation of the fill behind the wall and the setback distance may be measured from the face of the wall to the boundary line.

Setback dimensions shall be horizontal distances measured perpendicular to the site boundary. Setback dimensions shall be as shown in Figure E of this chapter.

7011.6 Old fills. All manufactured fills, whether compacted or not, which were placed prior to April 25, 1963, shall be investigated by the soils engineer to determine their suitability for the proposed use before any approval to build is issued.

7011.7 Combined cut and fill slopes. Where a combined cut and fill slope exceeds 25 feet (7620 mm) in height, the required drainage bench shall be placed at the top of the cut slope. The effect of surcharge of the fill upon the cut bedrock shall be considered by the soils engineer and engineering geologist, and specific recommendations shall be made relative to the setback between the cut and fill.

7011.8 Fill areas. Areas on which fill is to be placed shall be investigated by the soils engineer, or by the soils engineer and geologist to determine if they are adequate to support the fill without undue detrimental consolidation. Slopes exceeding one unit vertical in five units horizontal (20-percent slope) shall be benched prior to placing fill.

Exception: The Department may waive this investigation where it determines by inspection that the underlying material is adequate to support the proposed fill.

SECTION 7012 PLANTING AND IRRIGATION OF CUT AND FILL SLOPES IN HILLSIDE AREAS

7012.1 General. All fill and cut slopes in designated hillside areas shall be planted and irrigated with a sprinkler system to promote the growth of ground cover plants to protect the slopes against erosion, as required in this section.

The owner shall be responsible for planting and maintaining all slopes where such is required in this section.

7012.2 Minimum requirements.

7012.2.1 Low slopes to 15 feet (4572 mm) in vertical height. Slopes with vertical height of less than 15 feet (4572 mm) shall comply with the following:

1. Plant with grass or ground cover plants as recommended on the planting schedule approved by the Department. Other plants recommended by a registered landscape architect will be considered for approval by the Department.
2. A sprinkler system shall be installed to irrigate these slopes.
3. The owner shall water the slopes which have been planted with grasses and/or ground cover plants at sufficient time intervals to promote growth.

Exception: Where the Department finds the slope is located in such an area as to make hand watering possible, conveniently located hose bibs will be accepted in lieu of the required sprinkler system when a hose no longer than 50 feet (15 240 mm) would be necessary.

7012.2.2 Medium slopes [15 to 38 feet (4572 to 11 582 mm) in vertical height]. Slopes with vertical height from 15 feet (4572 mm) up to 38 feet (11 582 mm) shall comply with the following:

1. Plant with grass or ground cover plants as recommended on the planting schedule approved by the Department. Other plants may be recommended by a landscape architect for approval by the Department.
2. In addition to grass or ground cover plants, approved shrubs having a 1 gallon (3.8 L) minimum size shall be planted on the slope at 10 feet (3048 mm) on center in both directions. The plants and planting pattern may be varied to include trees on the recommendation of the landscape architect and approved by the Department.
3. Install an adequate sprinkler system during grading prior to planting of the shrubs and trees and before grading is approved.

7012.2.3 High slopes [38 feet (11 582 mm) or over in vertical height]. Slopes with vertical height of 38 feet (11 582 mm) and higher shall comply with the following:

1. Plant with grass or ground cover plants as recommended on the planting schedule approved by the Department. Other plants recommended by landscape architects may be submitted to the Department for approval.
2. In addition to grass or ground cover plants, approved shrubs having a minimum one gallon (3.8 L) size shall be planted at 10 feet (3048 mm) on center in both directions on the slope, or trees at 20 feet (6096 mm) on center both ways may be used. A combination of shrubs and trees may be utilized. This plant and planting pattern may be varied on the recommendation of a landscape architect and approved by the Department.

3. Install an adequately designed sprinkler system prior to planting shrubs and trees and before grading is approved.

7012.3 Special requirements for sprinkler systems.

7012.3.1 Plans for the sprinkler system shall be submitted to and approved by the Department prior to installation.

7012.3.2 Sprinkler systems shall be designed to provide a uniform water coverage at a rate of precipitation of not less than $\frac{1}{10}$ inch (2.5 mm) per hour or more than $\frac{3}{10}$ inch (7.6 mm) per hour on the planted slope. In no event shall the duration of sprinkling be permitted such as to create a saturated condition and cause an erosion problem, or allow the discharge of excess water into any public or private street.

7012.3.3 A check valve and balance cock shall be installed in the system where the drainage from sprinkler heads will create an erosion problem.

7012.3.4 Adequate backflow protection shall be installed in each sprinkler system as required by the *Plumbing Code*.

7012.3.5 A functional test of the sprinkler system shall be performed by the installer for every sprinkler system prior to approval.

7012.3.6 Where PVC pipes are used on slopes, they shall be a minimum of schedule 40 and embedded at least eight inches (203 mm) below grade. Such pipes may be exposed for above ground installations provided they are ASTM rated as resistant to ultraviolet sunlight. All risers, sprinkler heads, valves and fittings shall be brass or galvanized metal, or rated as sunlight resistant.

7012.4 Plants. All plants required by this section shall be selected from a list approved by the Department.

SECTION 7013 EROSION CONTROL AND DRAINAGE DEVICES

7013.1 Interceptor terraces. Paved interceptor terraces shall have a minimum width of 8 feet (2438 mm) and shall be installed on the face of all cut and fill slopes at intervals not to exceed 25 feet (7620 mm) measured along a vertical plane. Where only one terrace is required, it shall be at mid-height.

The cross section of interceptor terraces shall meet the specification shown in Figure A of this chapter.

The longitudinal slope of interceptor terraces shall not be less than 5 percent or more than 12 percent and any change in rate of grade within these allowable slopes shall increase the grade in the direction of flow.

A single run of an interceptor terrace shall not exceed 150 feet (45 720 mm) to a down drain.

Down drain shall be embedded round pipes enclosed in concrete shaped as shown in Section C-C of Figure G of this chapter, or an alternate design which is prepared by a civil engineer and acceptable to the Department.

7013.2 Diverter terraces. Paved diverter terraces, constructed as shown in Figure B of this chapter, shall be installed at the top of all cut slopes where the tributary drainage area above has a slope exceeding one unit vertical in 10 units horizontal (10-per-

cent slope) and a horizontal projection of greater than 40 feet (12 192 mm).

7013.3 Berms. Berms conforming to the provisions of Figure C of this chapter shall be constructed at the top of all slopes.

7013.4 Vee channels. Where a slough wall is required at the toe of the slope by other provisions of this Code, or a retaining wall is built to support any cut or fill slope, a vee channel shall be constructed behind the wall to carry off the slope waters to interceptors, down drains or other approved drainage devices.

7013.5 Inlet structures, down drains and outlet structures.

7013.5.1 Inlet structures. Inlet structures shall be of concrete, galvanized iron hot dipped in asphalt or equivalent. The inlet structure shall be grated or grided, or of such entry shape as to prevent entry of objects of greater than four inches (102 mm) in dimension. The inlet structure shall be placed on the bench as shown in Section Y-Y of Figure G of this chapter and shall be so shaped as to provide small entry losses. An overflow structure into the vee down drains shall be provided.

7013.5.2 Down drains. Down drains shall have paved inverts and shall be of concrete, minimum 18 gauge corrugated galvanized iron hot dipped in asphalt, or corrugated alloy 3004-H-34 aluminum of minimum 16 gauge and hot dipped in asphalt or equivalent. Pipe down drains shall conform with Section C-C of Figure G of this chapter and shall have a diameter of a size required by runoff calculations, but not less than 12 inches (305 mm).

Open channel down drains shall be designed by a civil engineer and shall have a minimum capacity equal to four times the required pipe size. The alignment of down drains shall be such as to conserve velocity head.

7013.5.3 Outlet structures. Outlet structures shall be of concrete, galvanized iron hot dipped in asphalt or equivalent.

Where outletting into street or other approved termination areas, the structure shall be of a design approved by the Department of Public Works. Where outletting into natural watercourses or other approved locations, the structure shall be provided with adequate velocity reducers, diversion walls, rip-rap, concrete aprons or any similar energy dissipator. All slope drainage shall be collected and disposed of in the drainage device.

7013.6 Runoff computations. Runoff shall be based on the proper 50-year isohyetal, and the runoff calculation shall be based on the latest methods adopted by the Bureau of Engineering.

7013.7 Drainage dispersal wall. A drainage dispersal wall shall be constructed as set forth in Figure F of this chapter whenever it is necessary to convert channel flow to sheet flow.

7013.8 Subdrains. Subdrains shall be laid under all fills placed in natural watercourses. Subdrains shall be placed along the watercourse flow line and along the flow line of any branches tributary thereto. Additional subdrains shall be installed to collect any active or potential springs or seeps which will be covered by the fill. Subdrains shall be installed after the watercourse has been excavated to firm material in preparation for receiving the fill. Individual design shall be shown on each

plan for city approval, based on recommendations of the soils engineer and geologist to the satisfaction of the Department.

7013.9 Gutters. Eave or ground gutters shall be provided to receive all roof water and deliver it through a nonerosive device via gravity to a street or watercourse, or approved drainage facility, if the slope of the underlying natural ground exceeds three percent or if more than 3 feet (914 mm) of compacted fill or more than 1 foot (305 mm) of uncompacted fill is placed on the ground.

7013.10 Site drainage. All pads with cut or fill shall slope a minimum of 2 percent to an approved drainage device or facility, or to a public street. Where used, the drainage device shall be an adequately designed system of catch basins and drain lines, which conducts the water to a street.

Exception: Where the slope of the underlying natural ground does not exceed 3 percent and the compacted fill is less than three feet (914 mm) in depth, the slope of the pad may be reduced to one percent.

7013.11 Drainage around buildings. On all building sites, acceptable drainage devices shall be installed to conduct storm water around buildings whenever the distance from the building to the top of any slope is less than 5 feet (1524 mm). Where used, the drainage device shall be an adequately designed system of catch basins and drain lines which conducts the water to a street.

7013.12 Maintenance of drainage. Drainage in conformance with the provisions of this Code shall be maintained during and subsequent to construction.

SECTION 7014 CONSTRUCTION REQUIREMENTS AND LIMITATIONS

7014.1 Construction, general. No structure shall be constructed upon a slope steeper than one unit vertical in two units horizontal (50-percent slope). For building location and setback requirements, see Chapter 18.

Exceptions:

1. Subject to approval by the Department, construction may be placed upon slopes steeper than one unit vertical in two units horizontal (50-percent slope), provided reports from a soils engineer and engineering geologist recommend favorably toward construction. The reports shall include adequate information and analysis to show to the Department's satisfaction that the underlying bedrock and natural soils and slope surface materials have strength characteristics sufficient to produce a stable slope with a factor of safety of not less than 1.5 for static loads. The reports shall incorporate provisions for downhill creep in the design of footings where applicable.
2. Where a minor amount of the structure is constructed on the slope or where the construction consists of an unroofed deck, the Department may approve the construction without engineering and geological reports.

7014.2 Slough wall. If potential sloughing hazards affecting buildings or structures are present on natural, cut or fill slopes

in excess of 20 feet (6096 mm) in vertical height, slough protection devices may be required by the Department.

7014.3 Flood and mudflow protection. Flood and mudflow protection shall be provided for all new buildings, additions to buildings and substantial improvements to buildings, which are located on sites determined by the Department to be subject to those conditions, in accordance with Ordinance No. 163,913.

The recommendations for mudflow protection shall be contained in a site investigation report made by persons qualified and licensed in civil engineering, engineering geology and/or soils engineering to ascertain the location, magnitude and extent of potential mudflow hazards and to recommend measures for protection or the elimination of those hazards. The use of the minimum design parameters specified in this Code shall be justified in the report.

Minimum design parameters to be used for mud/debris flow control systems within and at the base of concentration drainage areas are:

1. A channel flow capacity of ten cubic feet per second (0.28 m³/s) per acre (ha) of tributary drainage area; or
2. A temporary storage capacity of 400 cubic yards (306 m³) per acre (ha) of tributary drainage area

SECTION 7015 BUTTRESS FILLS

7015.1 General. A buttress fill is a designed compacted earth fill used for providing lateral support to an unstabilized rock mass. All buttress fills shall comply with the more restrictive of the requirements of this section or Section 7006.

7015.2 Foundation. The ability of the foundation material to support the buttress shall be investigated and the soils engineer shall provide specifications for keying of the base of the buttress and for bonding the buttress to the natural ground.

7015.3 Base width. The minimum base width of a buttress fill shall not be less than 12 feet (3658 mm) or less than one half its height, whichever is the greater. The width of a buttress fill may vary uniformly to a top width of not less than 12 feet (3658 mm).

7015.4 Slope. The exposed surface of a buttress fill shall not exceed a slope of one unit vertical in two units horizontal (50-percent slope).

Exception: The Department or the board, in case an appeal is made to it under Section 105, may permit a buttress fill to be made which creates an exposed surface steeper in slope than one unit vertical in two units horizontal (50-percent slope), provided:

1. The use of the steeper slope is determined to be necessary due to special design limitations on the site;
2. The gradient does not exceed one unit vertical in one and one-half units horizontal (66.7-percent slope); and
3. The applicant shows through investigation, subsurface exploration, analysis and report by both a soils engineer and an engineering geologist to the Department's satisfaction, that the buttress fill to be

used and the underlying earth material supporting the fill will have strength characteristics sufficient to produce a stable slope with a minimum factor of safety of not less than 1.5 for static loads.

7015.5 Subdrains. Subdrains which blanket the entire back face of the buttress or which occur at intervals shall be provided to prevent buildup of hydrostatic pressure. Details of subdrains shall be provided by the soils engineer and approved by the Department.

7015.6 Blanket seals. Blanket seals of relatively impervious material shall be required on cut pads above buttress fills where grading exposes the strata to infiltration of water. The blanket shall be of 2-foot (610 mm) minimum thickness or of such greater dimension as specified by the soils engineer.

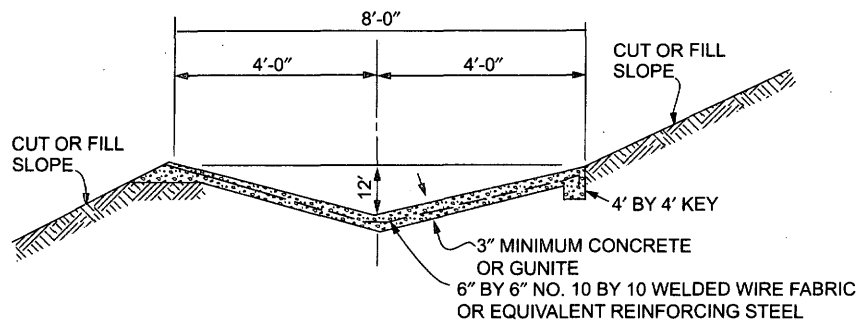
7015.7 Design. For design purposes, a maximum value of 75 pound per square feet (3.6 kN/m²) cohesion and an angle of internal friction of 6 degrees (0.10 rad) may be used to determine the resistance of the bedding plane. Use of greater value shall be substantiated by tests taken along the probable slip plane under conditions simulating the worst possible field conditions. The method of performing these tests shall be included in the soils engineer's report.

The type, percentage of compaction, cohesion and angle of internal friction of the materials to be placed in the buttress shall be specified.

The buttress fill shall be designed for a minimum safety factor of 1.50 based on the residual strength of the bedrock and the lowest shear strength of the fill material.

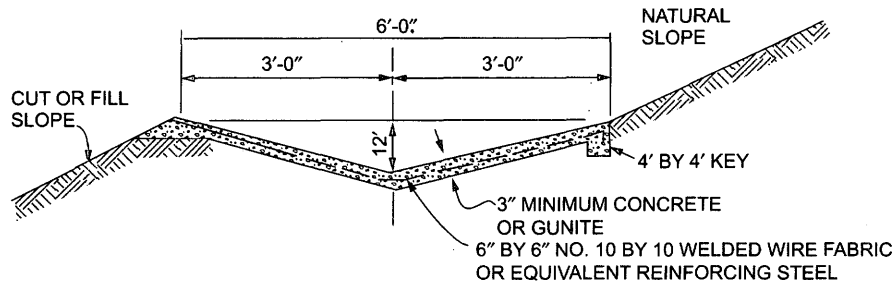


BASIC GRID MAP
No. A-13372



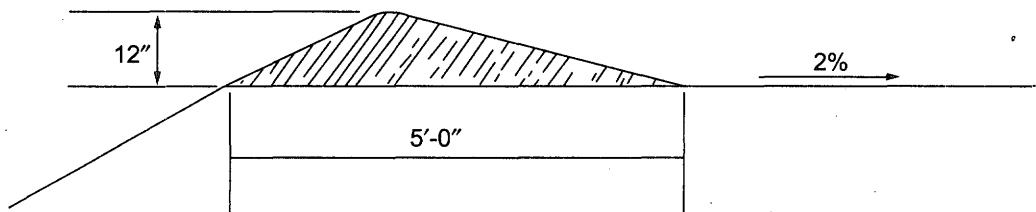
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

INTERCEPTOR TERRACE
FIGURE A



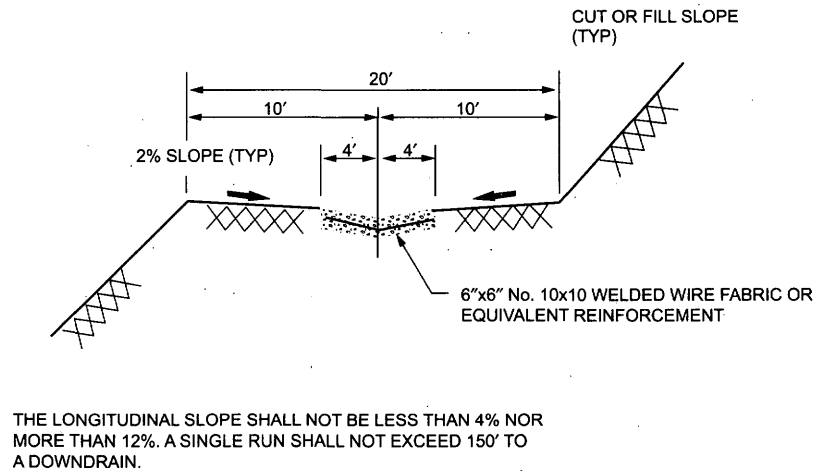
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

DIVERTER TERRACE
For top of cut slopes
FIGURE B



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

BERM DETAIL
FIGURE C

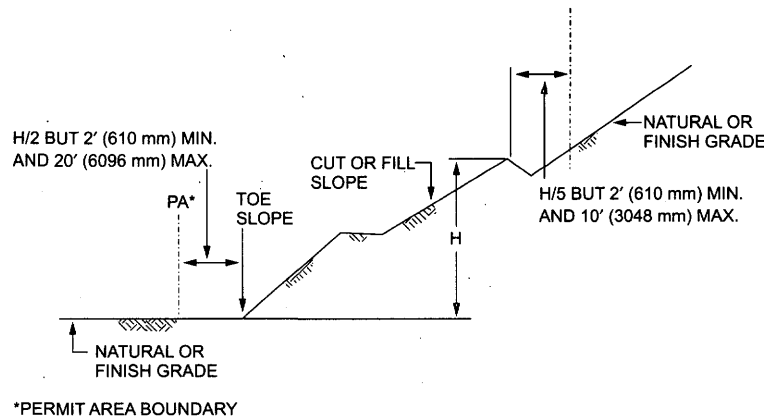


For SI: 1 foot = 304.8 mm.

**20-FOOT HORIZONTAL BENCH
FIGURE D**

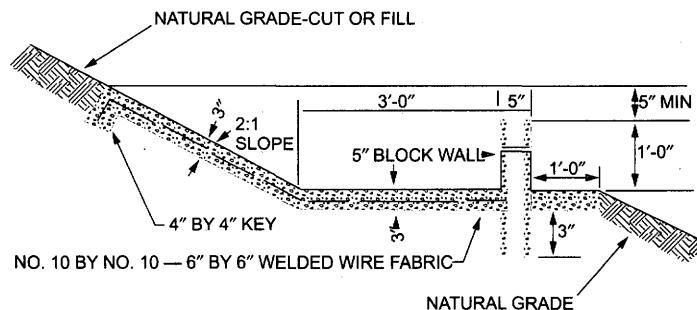
NOTES:

1. Concrete drainage benches shall be formed before pouring concrete. Forms shall be set to grade and alignment at all breaks in the cross sections. The concrete shall be screeded to cross sections.
2. Guniting drainage benches shall be shot to wire guides. Guides shall be set to grade and alignment at all breaks in the cross section. The guniting shall be screeded to cross section.
3. When concrete is to be placed against earth, the area to be covered shall be trimmed and finished to the dimensions shown on the plans. The area shall be moistened and thoroughly compacted to form a firm foundation. Grade stakes shall be installed to clearly establish flow lines.



For SI: 1 foot = 304.8 mm.

FIGURE E

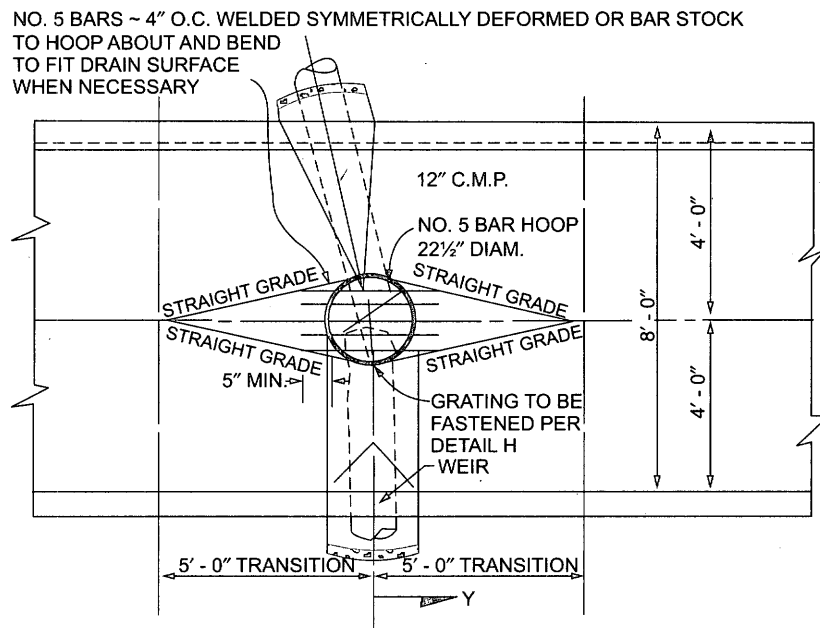


For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

**DRAINAGE DISPERSAL WALL
FIGURE F**

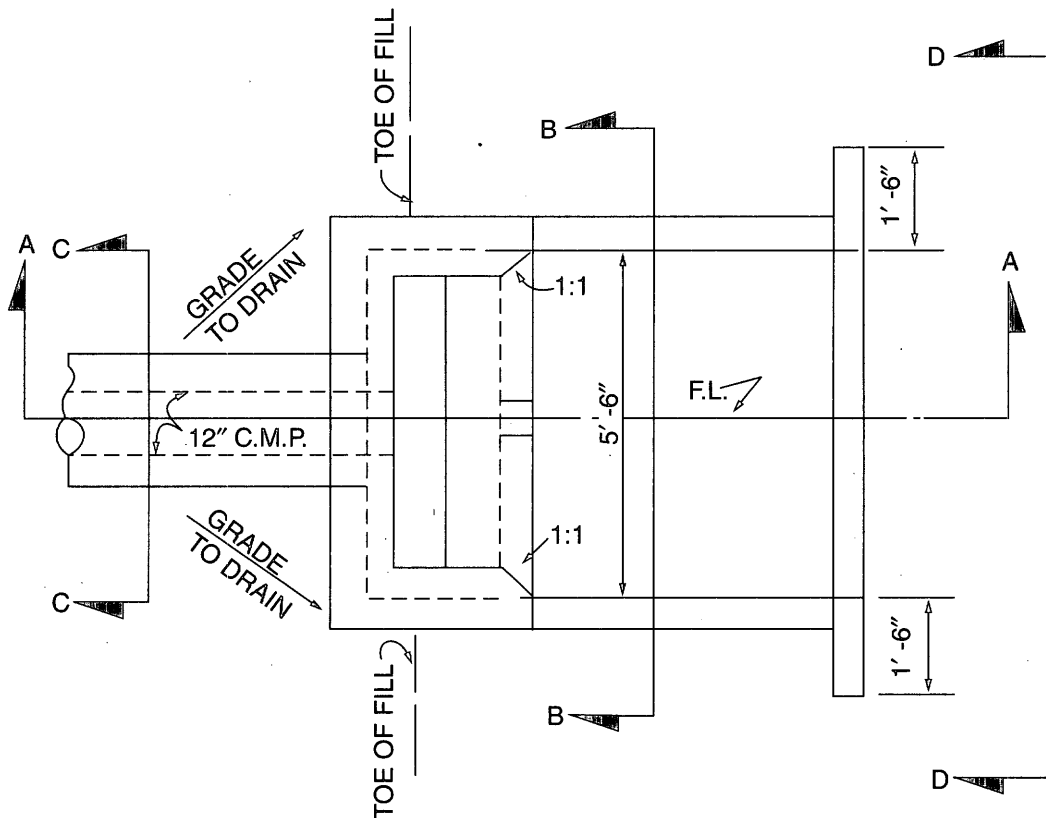
NOTES:

1. Grout all cells and omit all head joints first course.
2. Wall to be located along contour line to establish uniform overflow or seepage.
3. Length of wall to equal length of contour line affected by grading.
4. When concrete is to be placed against earth, the area to be covered shall be trimmed and finished to the dimensions shown on the plans. The area shall be moistened and thoroughly compacted to form a firm foundation. Grade stakes shall be installed to clearly establish flow lines.



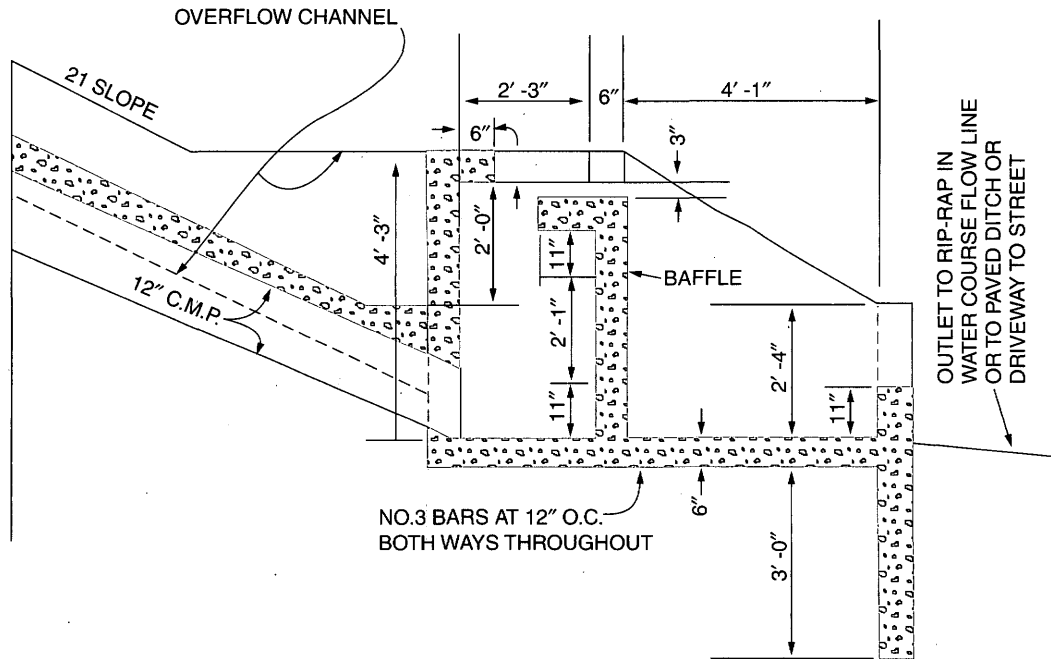
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

PLAN VIEW INLET STRUCTURE

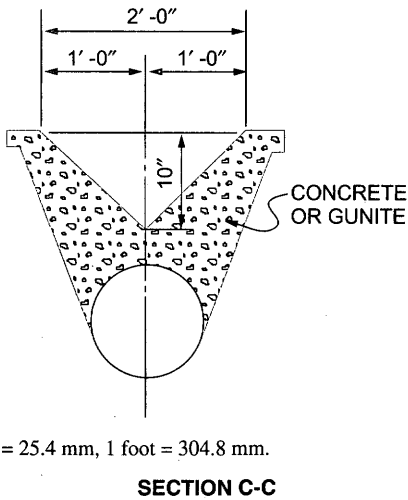
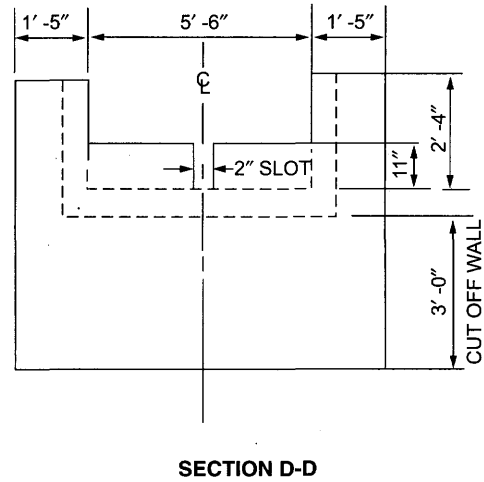
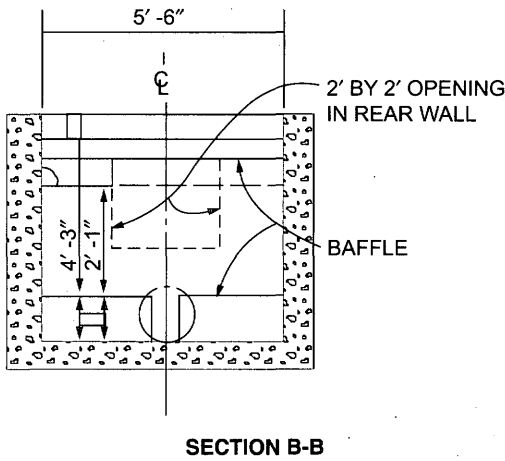


For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

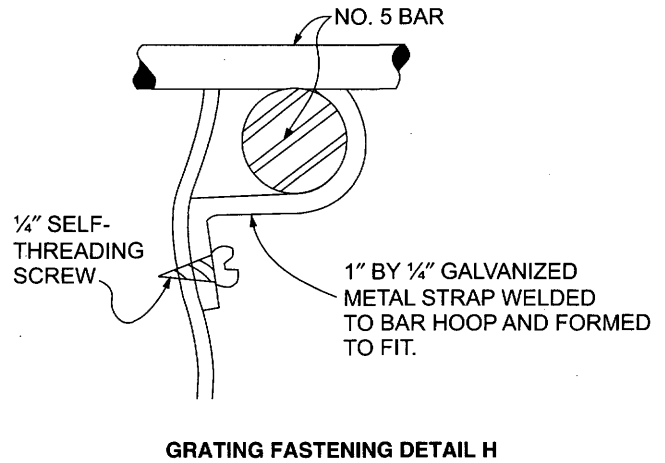
PLAN VIEW OUTLET STRUCTURE
FIGURE G

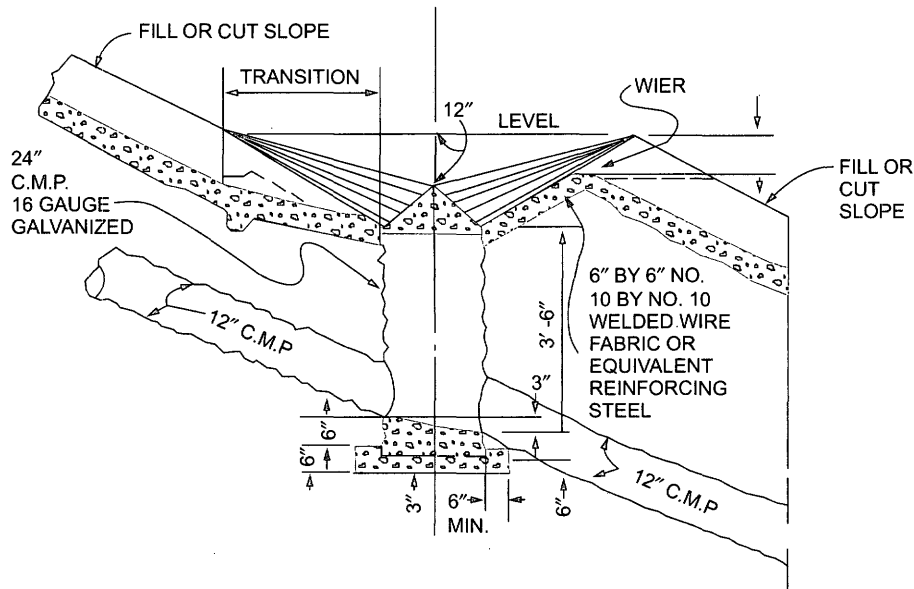


For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.



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





For SI: 1 inch = 25.4 mm.

**INLET STRUCTURE
SECTION Y-Y**

**SECTION 7016
AREAS SUBJECTED TO
SLIDES AND UNSTABLE SOIL**

7016.1 General. The provisions of this section shall be fully complied with prior to issuance of a grading permit in areas subject to slides or unstable soil.

7016.2 Records and maps. The Department may adopt maps delineating areas of relative hazard for the application of this chapter.

7016.3 Definitions. The following definitions shall apply for the purpose of this section:

ACTIVE LANDSLIDE. A landslide that has been active since January 1, 1952.

HISTORICAL LANDSLIDE. A landslide that was active in historical time prior to 1952 as determined from photographs, maps and written records.

LANDSLIDE. The falling, slipping or flowing of a mass of land from a higher to a lower level.

POSSIBLE PREHISTORIC LANDSLIDE. Areas where there is no record of a historic landslide, but where topographic expression or geological evidence suggests the possibility of past land movement.

PREHISTORIC LANDSLIDE. Conditions where there is no record of historical landslide, but where geological evidence or topographic expression indicates modification of the terrain by land movement.

7016.4 Permission to construct buildings or to do grading work.

7016.4.1 Active landslide or historic landslide area. No building or grading permits shall be issued for development in active or historic landslide areas until, and unless, stabilization of the entire slide or soil mass which may have an

adverse effect on the proposed development or access thereto can be satisfactorily demonstrated to the Department.

7016.4.2 Prehistoric landslide or questionable area. No building or grading permit shall be issued for development in prehistoric landslide or questionable areas except by specific approval of the Department, based on approved statements and calculations from soil engineers and engineering geologists attesting to the apparent safety of the proposed developments and demonstrating a minimum factor of safety of 1.5 for the stability of the site and access to the site. For these areas, the affidavit required in Exception 2 of Section 106.4.1 of this Code shall be filed unless it has been determined that, as a result of satisfactory reports by soils engineers and engineering geologists, the development is not located in an area subject to slides or unstable soil, which may have an adverse effect on the proposed development or access to the proposed development.

7016.4.3 Other conditions. If, in the opinion of the Superintendent of Building, there is evidence of potentially hazardous conditions other than those covered by Sections 7016.4.1 and 7016.4.2, the Department may require satisfactory reports from soils engineers and engineering geologists and, after reviewing those reports, may issue a permit when the reports demonstrate the stability and safety of the development. The affidavit may be required by the Department if it is found that the area in question has elements of hazard or, if the reports so indicate, a permit may be refused.

7016.5 Affidavits required. When an affidavit required in this section, has been filed, upon notice of correction of the unstable conditions due to landslide or unstable soil, the Superintendent of Building shall file with the Office of the County Recorder a certificate specifying that the property is no longer considered hazardous due to landslide or unstable soil.

CHAPTER 71

METHANE SEEPAGE REGULATIONS

SECTION 7101 PURPOSE

This chapter sets forth the minimum requirements of the City of Los Angeles for control of methane intrusion emanating from geologic formations. The requirements do not regulate flammable vapor that may originate in and propagate from other sources, which include, but are not limited to, ruptured hazardous material transmission lines, underground atmospheric tanks, or similar installations.

SECTION 7102 DEFINITIONS

For the purpose of this chapter, certain words and phrases are defined as follows:

ALARM SYSTEM. A group of interacting elements consisting of components and circuits arranged to monitor and annunciate the status of gas concentration levels or supervisory signal-initiating devices and to initiate the appropriate response to those signals.

BUILDINGS WITH RAISED FLOOR CONSTRUCTION. A building with the bottom of the floor system raised above grade where the clearance for each of the following items shall be at least: 12 inches (305 mm) for the girder, 18 inches (457 mm) for the floor joist and 24 inches (610 mm) for the structural floors.

CABLE OR CONDUIT SEAL FITTING. An approved fitting provided in a cable or conduit system to prevent the passage of gases, vapors, or flames through electrical cable or conduit.

DESIGN METHANE CONCENTRATION. The highest concentration of methane gas found during site testing.

DESIGN METHANE PRESSURE. The highest pressure of methane gas found during site testing.

DE-WATERING SYSTEM. A permanent water removal system, consisting of perforated pipes, gravel, sump pumps and pits, designed to permanently maintain the ground water level one foot below the sub-slab vent system.

GAS DETECTION SYSTEM. One or more electrical devices that measure the methane gas concentration and communicate the information to the occupants, building management, central station or alarm company with audible or visual signals.

GRAVEL BLANKET. A layer of gravel, sand or approved material designed to transmit gas to the vent riser without obstructing the venting system.

IMPERVIOUS MEMBRANE. A continuous gas barrier made of material approved by the Department and installed beneath a building for the purpose of impeding methane migration to the interior of the building.

MECHANICAL EXTRACTION SYSTEM. A system operated by a machine which is designed to remove methane gas from below the impervious membrane through the use of fans, blowers, or other powered devices.

MECHANICAL VENTILATION. A fan, blower or other similar group of interacting elements operated by a machine within the building, which introduce and/or remove air from an enclosed space.

NARROW BUILDING. shall mean a building that has a width less than 50 feet (1270 mm), a footprint of less than 50,000 square feet and having a minimum 2-foot (51 mm) wide landscaped area immediately adjacent to the exterior wall for at least 50 percent of the perimeter of the building.

OIL WELL. A deep hole or shaft sunk into the earth for the exploration of oil or gas; or which is on lands producing or reasonably presumed to contain oil or gas; or which is drilled for the purpose of injecting fluids or gas for stimulating oil recovery, re-pressurizing or pressure maintenance of oil or gas, or disposing of waste fluids from an oil or gas field.

PERFORATED HORIZONTAL PIPE. An approved pipe which contains a series of small holes or narrow openings placed equidistant along the length of the approved pipe, which is placed horizontally beneath the foundation of a building, for the purpose of venting accumulated methane gas and preventing the development of elevated gas pressures, or for drainage of ground water to an approved location.

PPMV. Shall mean Parts per Million by Volume.

PRESSURE SENSOR. shall mean a device that measures and communicates surrounding gas pressure to an alarm or control system.

SINGLE STATION GAS DETECTOR. A device consisting of electrical components capable of measuring methane gas concentration and initiating an alarm.

TRENCH DAM. An approved subsurface barrier installed within a furrow or ditch adjacent to the foundation of a building, for the purpose of preventing the migration of methane gas beneath that foundation.

UNOBSTRUCTED OPENING. A permanent clearing or gap in the walls, floors or roof-ceiling assemblies without windows, doors, skylights or other solid barriers that may restrict the flow of air.

VENT RISER. An approved pipe which is placed vertically with joints and fittings connected to perforated horizontal pipes to convey and discharge the gas to the atmosphere.

SECTION 7103 GENERAL METHANE MITIGATION REQUIREMENTS

All new buildings and paved areas located in a methane zone or methane buffer zone shall comply with these requirements and

the methane mitigation standards established by the Superintendent of Building. The methane mitigation standards provide information describing the installation procedures, design parameters and test protocols for the methane gas mitigation system, which are not set forth in the provisions of this chapter.

Boundaries of the methane zones and methane buffer Zones are shown on the "Methane and Methane Buffer Zones Map" designated as Map number A-20960, dated September 21, 2003, which is attached to Council File No. 01-1305.

SECTION 7104 GENERAL METHANE REQUIREMENTS

7104.1 Site testing. Site testing of subsurface geological formations shall be conducted in accordance with the methane mitigation standards. The site testing shall be conducted under the supervision of a licensed architect or registered engineer or geologist and shall be performed by a testing agency approved by the Department.

The licensed architect, registered engineer or geologist shall indicate in a report to the Department, the testing procedure, the testing instruments used to measure the concentration and pressure of the methane gas. The measurements of the concentration and pressure of the methane gas shall be used to determine the design methane concentration and the design methane pressure. The design methane concentration and the design methane pressure shall determine the site design level of Table 71.

Exception: Site testing is not required for buildings designed to the requirements of Site Design Level V as described in Table 71, or for buildings designed using the exceptions set forth in Sections 7104.3.2 or 7104.3.3.

7104.2 Methane mitigation systems. All buildings located in the methane zone and methane buffer zone shall provide a methane mitigation system as required by Table 71 based on the appropriate site design level. The Superintendent of Building may approve an equivalent methane mitigation system designed by an architect, engineer or geologist.

Table 71 prescribes the minimum methane mitigation systems, such as the passive, active and miscellaneous systems, depending on the concentration and pressure of the methane present at the site. Each component of the passive, active and miscellaneous systems shall be constructed of an approved material and shall be installed in accordance with the methane mitigation standards.

7104.2.1 Passive system. The passive system is a methane mitigation system installed beneath or near the building. The components of the passive system may consist of a dewatering system, the sub-slab vent system and impervious membrane. The sub-slab vent system shall consist of perforated horizontal pipes, vent risers, and gravel blankets for the purpose of collecting and conveying methane from the soil underneath the building to the atmosphere.

7104.2.1.1 Dewatering system. The dewatering system is used to lower the ground water table to a level more than 12

inches (305 mm) below the bottom of the perforated horizontal pipes. The dewatering system shall conduct ground water to an approved location.

7104.2.2 Active system. The components of the active system shall consist of one or more of the following: sub-slab system, gas detection system, mechanical ventilation, alarm system and control panel. All components shall be constructed of an approved material, installed in accordance with the methane mitigation standards.

7104.2.3 Miscellaneous system. The components of the miscellaneous system may consist of trench dam, cable or conduit seal fitting or additional vent risers. The component of the miscellaneous system shall be a material approved by the Department and shall be installed in accordance with the methane mitigation standards.

7104.3 Exceptions to Table 71. The provisions of this section are exceptions to the construction requirements of Table 71.

7104.3.1 Narrow buildings. Narrow buildings may substitute pressure sensors below the impervious membrane in lieu of the gas detection system and mechanical ventilation, if the installation of the pressure sensors below the impervious membrane is not required per Table 71 and the narrow building is constructed with a minimum 2 feet (51 mm) wide landscaped area covering at least 50 percent of the ground immediately adjacent to the exterior building walls.

7104.3.2 Buildings with raised floor construction. If a building with raised floor construction has underfloor ventilation construction in accordance with the standards below, then the utilities shall be installed with trench dams and cable or conduit seal fittings and a 4-inch (102 mm) thick gravel blanket shall be installed under and around the elevator pits.

Underfloor ventilation shall be provided by an approved mechanical ventilation system capable of exhausting under-floor air an equivalent of every 20 minutes, or by openings in the underfloor area complying with the following:

- A. The top of the openings shall be located not more than 12 inches (305 mm) below the bottom of the floor joists.
- B. The openings shall be distributed approximately equally and located to provide cross ventilation, for example, by locating the opening along the length of at least two opposite sides of the building.
- C. The openings shall be the larger of:
 1. Openings of not less than 1.5 square feet (0.13 m²) for each 25 linear feet (7620 mm) or fraction of exterior wall; or
 2. Openings shall be equal to 1 percent of under-floor area.
- D. The openings may be covered with corrosion-resistant wire mesh with mesh openings of greater than 1/4 inch (6 mm) and less than 1/2 inch (13 mm) in dimension.

7104.3.3 Buildings with Natural Ventilation. A building with natural ventilation is a building constructed with the following:

- A. The unobstructed openings shall exchange outside air.
- B. The size of the Unobstructed Opening shall be the larger of:
 - 1. Opening equal to at least 25 percent of the total perimeter wall area of the lowest level of the building, or
 - 2. Opening equal to at least 25 percent of the floor area of the lowest level of the building.
- C. The unobstructed openings shall be evenly distributed and located within the upper portion of at least two opposite exterior walls of the lowest level of the building.

Buildings with natural ventilation that are constructed as described above shall have the utilities constructed with trench dams and cable or conduit seal fittings. If there is an enclosed room or space less than 150 square feet (14 m²) within the building, then the enclosed room or space shall be constructed with vent openings that comply with the requirements of Section 7104.3.4.

7104.3.4 Enclosed room or space within building. Individual enclosed rooms or enclosed spaces with floor area less than 2,000 square feet (186 m²) may be exempt from providing the active system as required by Table 71, provided the vent openings comply with all of the following:

- 1. Vent openings are unobstructed openings, except screens made with at least 1/4-inch (6 mm) mesh or wind driven turbines on the roof shall be permitted.
- 2. The aggregate size of vent openings shall be the larger of either 5 percent of the total floor area of the room or the area of enclosed space, or 10 percent of the area of walls on the perimeter of the room or enclosed space.
- 3. The vent openings shall be located to prevent the accumulation of methane gases within the room or enclosed space.
- 4. The top of the vent opening shall be located not more than 12 inches (305 mm) below roof joists or ceiling joists if located in a wall of a building.
- 5. The vent openings shall be located on either two opposite walls or two adjacent walls of the room or enclosed space if located in a wall of a building.
- 6. The vent openings shall be located no more than 50 feet (15 240 mm) from any point within the room or enclosed space.
- 7. When using wind driven turbine, the area of the vent opening shall be calculated by the area of the opening at the attachment of the wind driven turbine at the roof.
- 8. When the vent opening is located in a wall of an adjoining room, then the adjoining room shall be constructed of either an active system, or have natural ventilation as described in Section 7104.3.3.

7104.3.5 Single family dwelling. Single family dwellings and buildings accessory to single family dwellings shall comply with all the methane mitigation requirements of Table 71, except that the following mitigation system may be substituted:

- A. Pressure sensors below impervious membrane may be installed in lieu of gas detection system when pressure sensors below impervious membrane is not required; or
- B. Single station gas detectors with battery back-up may be installed in lieu of alarm system and gas detection system; or
- C. Six-mil thick visquene may be used in lieu of impervious membrane, when the site design levels are I or II; or
- D. Additional vent risers or mechanical ventilation may be omitted for buildings with width less than 50 feet (15 240 mm) and footprint less than 6,000 square feet (557 m²) in area; or
- E. Vent risers may be substituted in lieu of mechanical extraction system, provided the vent risers are designed at a rate twice that established by the methane mitigation standards.

7104.3.6 Buildings located in the methane buffer zone A building, located entirely or partially in the methane buffer zone, shall be designed to the requirements of the methane buffer zone. Buildings located in the methane buffer zone shall not be required to provide any methane mitigation system, if the design methane pressure is less than or equal to 2 inches (51 mm) of water pressure and is either of the following:

- A. Areas which qualify as Site Design Level I or II; or
- B. Areas which qualify as Site Design Level III and the utilities are installed with Trench Dams and Cable or Conduit Seal Fitting.

7104.3.7 Dewatering System. A dewatering system is not required for either of the following:

- A. If during the site testing, the groundwater level is deeper than 10 feet (3048 mm) below the perforated horizontal pipes, or
- B. If the soil investigation or analysis, as approved by the Department, reveals the groundwater level is more than 12 inches below the bottom of the perforated horizontal pipes.

7104.3.8 Buildings located in the first phase playa vista project. The First Phase Playa Vista Project, as approved by the City on September 21, 1993 and December 8, 1995, shall comply with the methane mitigation program as required by the Department pursuant to the methane prevention, detection and monitoring Program approved by the Department on January 31, 2001, in lieu of the requirements of this chapter.

7104.4 Paved areas Paved areas that are over 5,000 square feet in area and within 15 feet (4572 mm) of the exterior wall of a commercial, industrial, institutional or residential building,

shall be vented in accordance with the methane mitigation standards.

Exception: Paved areas located in the methane buffer zone and which qualify for Site Design Levels I, II or III.

SECTION 7105 EXISTING BUILDINGS

Additions, alterations, repairs, changes of use or changes of occupancy to existing buildings shall comply with the methane mitigation requirements of Sections 7104.1 and 7104.2, when required by Chapters 34, 81 or 82 of this Code.

Approved methane mitigation systems in existing buildings shall be maintained in accordance with Section 7106.

SECTION 7106 TESTING, MAINTENANCE AND SERVICE OF GAS-DETECTION AND MECHANICAL VENTILATION SYSTEMS

All gas detection and mechanical ventilation systems shall be maintained and serviced in proper working condition and meet all requirements of the Electrical and Mechanical Code. The testing, maintenance and service procedure for each gas-detection and mechanical ventilation systems shall be performed in accordance with the manufacturer's current written instructions and the following:

- A. **Fire department.** The manufacturer's instructions shall be approved by the fire department. Testing and servicing of each system shall be performed by a person certified by the fire department.
- B. **Notification placard.** A permanent notification placard shall be posted and maintained at the front entrance of a building that is constructed with impervious membrane, except in residential buildings. The placard shall indicate the presence of the impervious membrane.

SECTION 7107 EMERGENCY PROCEDURES

With the exception of single-family dwellings, all buildings required by this chapter to have a gas-detection system or sub-slab vent system shall, subject to fire department approval, have established emergency procedures that include, but are not limited to, the following:

- A. Assignment of a responsible person as safety director to work with the fire department in the establishment, implementation and maintenance of an emergency plan.
- B. Conspicuous posting of the fire department's telephone number in areas designated by the fire department.
- C. Conspicuous posting of emergency plan procedures approved by the fire department.

SECTION 7108 APPLICATION OF METHANE SEEPAGE REGULATIONS TO LOCATIONS OR AREAS OUTSIDE THE METHANE ZONE AND METHANE BUFFER ZONE BOUNDARIES

Upon a determination by the Department of Building and Safety that a hazard may exist from methane intrusion at a geographical location or in an area outside the boundaries established in Section 7103 of this Code, the Department of Building and Safety and the fire department may enforce any or all of the requirements of Chapter 71 of this Code as required to preclude potential fire or explosion from methane concentration.

SECTION 7109 ADDITIONAL REMEDIAL MEASURES

7109.1 General remedial measures. In the event the concentration of methane gas in any building located in a methane zone or methane buffer zone reaches or exceeds 25 percent of the minimum concentration of gas that will form an ignitable mixture with air at ambient temperature and pressure, the owner shall hire an engineer to investigate, recommend and implement mitigating measures. These measures shall be subject to approval of this Department and the fire department.

7109.2 Abandoned oil well. Any abandoned oil well encountered during construction shall be evaluated by the fire department and may be required to be reabandoned in accordance with applicable rules and regulations of the Division of Oil, Gas and Geothermal Resources of the State of California. Buildings shall comply with these provisions and the requirements of Section 6105 of this Code, whichever is more restrictive.

TABLE 71

SITE DESIGN LEVEL			LEVEL I		LEVEL II		LEVEL III		LEVEL IV		LEVEL V
Design Methane Concentration (ppmv)			0-100		101-1,000		1,001-5,000		5,001-12,500		>12,500
Design Methane Pressure (inches of water pressure)			#2	>2	#2	>2	#2	>2	#2	>2	All Pressures
PASSIVE SYSTEM	Dewatering System ¹		X	X	X	X	X	X	X	X	X
	Sub-Slab Vent System	Perforated Horizontal Pipes	X	X	X	X	X	X	X	X	X
		Gravel Blanket Thickness Under Impervious Membrane	2"	2"	2"	3"	2"	3"	2"	4"	4"
		Gravel Thickness Surrounding Perforated Horizontal Pipes	2"	2"	2"	3"	2"	3"	2"	4"	4"
		Vent Risers	X	X	X	X	X	X	X	X	X
	Impervious Membrane		X	X	X	X	X	X	X	X	X
	ACTIVE SYSTEM	Sub-Slab System	Pressure Sensors Below Impervious Membrane							X	X
Mechanical Extraction System ²									X	X	
Lowest Occupied Space System		Gas Detection System ³		X		X	X	X	X	X	X
		Mechanical Ventilation ^{3, 4, 5}		X		X	X	X	X	X	X
		Alarm System		X		X	X	X	X	X	X
Control Panel			X		X	X	X	X	X	X	
MISC. SYSTEM		Trench Dam		X	X	X	X	X	X	X	X
	Conduit or Cable Seal Fitting		X	X	X	X	X	X	X	X	X
	Additional Vent Risers ⁶										X

For SI: 1 inch = 25.4 mm.

X = Indicates a Required Mitigation Component

1. See Section 7104.3.7 for exception.
2. The mechanical extraction system shall be capable of providing an equivalent of a complete change of air every 20 minutes of the total volume of the gravel blanket.
3. See Section 7104.3.1 for narrow buildings.
4. The mechanical ventilation systems shall be capable of providing an equivalent of one complete change of the lowest occupied space air every 15 minutes.
5. Vent opening complying with Section 7104.3.4 may be used in lieu of mechanical ventilation.
6. The total quantity of installed vent risers shall be increased to double the rate for the passive system.



CHAPTER 72

FIRE DISTRICT REGULATIONS

SECTION 7200 PURPOSE

These fire district regulations were formerly found in Chapter 16.

SECTION 7201 GENERAL

7201.1 Fire District No. 1 boundaries. Fire District No. 1 shall include:

I. Downtown. All of the territory bounded by the following streets or freeways:

1. Harbor Freeway from the Santa Monica Freeway to the Santa Ana Freeway;
2. Santa Ana Freeway from the Harbor Freeway to Alameda Street;
3. Alameda Street from the Santa Ana Freeway to Fourth Street;
4. Fourth Street from Alameda Street to Central Avenue;
5. Central Avenue from Fourth Street to the Santa Monica Freeway; and
6. Santa Monica Freeway from Central Avenue to the Harbor Freeway.

II. Hollywood. All of the territory bounded by the following streets:

1. Yucca Street from Highland Avenue to Gower Street;
2. Gower Street from Yucca Street to De Longpre Avenue;
3. De Longpre Avenue from Gower Street to Vine Street;
4. Vine Street from De Longpre Avenue to Fountain Avenue;
5. Fountain Avenue from Vine Street to Wilcox Avenue;
6. Wilcox Avenue from Fountain Avenue to Sunset Boulevard;
7. Sunset Boulevard from Wilcox Avenue to Highland Avenue;
8. Highland Avenue from Sunset Boulevard to Hollywood Boulevard;
9. Hollywood Boulevard from Highland Avenue to Orchid Avenue;
10. Orchid Avenue from Hollywood Boulevard to Franklin Avenue;

11. Franklin Avenue from Orchid Avenue to Highland Avenue;
12. Highland Avenue from Franklin Avenue to Yucca Street;
13. All of the territory within 100 feet (30 480 mm) of Hollywood Boulevard between Hillhurst Avenue and La Brea Avenue; and,
14. All of the territory within 100 feet (30 480 mm) of Sunset Boulevard between Hillhurst Avenue and the city boundary line 190 feet (57 912 mm) west of Havenhurst Drive.

III. Wilshire. All of the territory bounded by the following streets:

1. Sixth Street from Western Avenue to Commonwealth Avenue;
2. Commonwealth Avenue from Sixth Street to Wilshire Boulevard;
3. Wilshire Boulevard from Commonwealth Avenue to Catalina Street;
4. Catalina Street from Wilshire Boulevard to Eighth Street;
5. Eighth Street from Catalina Street to Mariposa Avenue;
6. Mariposa Avenue from Eighth Street to Seventh Street;
7. Seventh Street from Mariposa Avenue to Ardmore Avenue;
8. Ardmore Avenue from Seventh Street to Wilshire Boulevard;
9. Wilshire Boulevard from Ardmore Avenue to Western Avenue;
10. Western Avenue from Wilshire Boulevard to Sixth Street; and
11. All of the territory within 100 feet (30 480 mm) of Wilshire Boulevard between the eastern city boundaries of the City of Beverly Hills and the Harbor Freeway, with the exception of the territory within 100 feet (30 480 mm) of Wilshire Boulevard located between Wilton Place and Highland Avenue.

IV. Beverly Fairfax. All of the territory bounded by the following streets:

1. Beverly Boulevard from Fairfax Avenue to a point 120 feet (36 576 mm) west of Gardner Avenue;
2. A line 120 feet (36 576 mm) west of and parallel to Gardner Avenue from Beverly Boulevard to Third Street;
3. Third Street from a point 120 feet (36 576 mm) west of Gardner Avenue to Fairfax Avenue; and

4. Fairfax Avenue from Third Street to Beverly Boulevard.

V. Crenshaw. All of the territory bounded by the following streets:

1. Crenshaw Boulevard from Thirty-ninth Street to Stocker Street;
2. Stocker Street from Crenshaw Boulevard to Rosalia Drive;
3. Rosalia Drive from Stocker Street to Marlton Avenue;
4. Marlton Avenue from Rosalia Drive to Thirty-ninth Street; and
5. Thirty-ninth Street from Marlton Avenue to Crenshaw Boulevard.

VI. Century City. All of the territory bounded by the following streets:

1. Santa Monica Boulevard between Century Park West and the westerly city boundary of the City of Beverly Hills;
2. The westerly city boundary of the City of Beverly Hills from Santa Monica Boulevard to Olympic Boulevard;
3. Olympic Boulevard from the westerly city boundary of the City of Beverly Hills to Century Park West; and
4. Century Park West from Olympic Boulevard to Santa Monica Boulevard.

Except that portion of the above-described territory described as follows:

Beginning at the point of intersection of the centerline of Olympic Boulevard and Century Park West, thence northwesterly along centerline of Century Park West 791 feet, thence N50° 29'00" E822.21 feet, thence S39° 29'13" E9.63 feet, thence S84° 29'13" E29.59 feet, thence N50° 30'47" E19.00 feet, thence S39° 29'13" E295.17 feet, thence S35 38'00" E to the centerline of Olympic Boulevard thence southwestwesterly along said center line to the point of beginning.

For SI: 1 inch = 25.4 mm, 1 degree = 0.01745 rad.

VII. Westwood. All of the territory bounded by the following streets:

1. Le Conte Avenue from Levering Avenue to Tiverton Avenue;
2. Tiverton Avenue from Le Conte Avenue to the intersection of Lindbrook Drive and Glendon Avenue;
3. Glendon Avenue from the intersection of Lindbrook Drive and Tiverton Avenue to Wilshire Boulevard;
4. Wilshire Boulevard from Glendon Avenue to Gayley Avenue;

5. Gayley Avenue from Wilshire Boulevard to the alley 200 feet (60 960 mm) north of Wilshire Boulevard;
6. The alley directly west of Gayley Avenue from a point 200 feet (60 960 mm) north of Wilshire Boulevard and Weyburn Avenue;
7. Weyburn Avenue from the alley west of Gayley Avenue to Gayley Avenue;
8. Gayley Avenue from Weyburn Avenue to Levering Avenue;
9. Levering Avenue from Gayley Avenue to Le Conte Avenue;
10. All of the territory within 100 feet of Wilshire Boulevard between Veteran Avenue and the westerly city limits of the City of Beverly Hills; and
11. All of the territory within 100 feet of Wilshire Boulevard between Centinela Avenue and Federal Avenue.

VIII. Van Nuys. All of the territory bounded by the following streets:

1. Vesper Avenue from Calvert Street to Victory Boulevard;
2. Victory Boulevard from Vesper Avenue to Sylmar Avenue;
3. Sylmar Avenue from Victory Boulevard to Calvert Street;
4. Calvert Street from Sylmar Avenue to Vesper Avenue; and
5. All of the territory within 100 feet (30 480 mm) of Van Nuys Boulevard between Victory Boulevard and Sherman Way.

IX. Venice. All of the territory bounded by the following streets:

1. Horizon Avenue from Ocean Front Walk to Pacific Avenue;
2. Pacific Avenue from Horizon Avenue to Eighteenth Avenue;
3. Eighteenth Avenue from Pacific Avenue to Ocean Front Walk; and
4. Ocean Front Walk from Eighteenth Avenue to Horizon Avenue.

X. San Pedro. All of the territory bounded by the following streets:

1. Fourth Street from Pacific Avenue to Harbor Boulevard;
2. Harbor Boulevard from Fourth Street to Seventh Street;
3. Seventh Street from Harbor Boulevard to Beacon Street;
4. Beacon Street from Seventh Street to Eighth Street;
5. Eighth Street from Beacon Street to Pacific Avenue; and

6. Pacific Avenue from Eighth Street to Fourth Street.

Except that portion of the above-described territory described as follows:

Beginning at the point of intersection of the easterly line of Mesa Street and the southerly line of Fourth Street; thence southerly along said easterly line of Mesa Street to the northerly line of the alley running parallel to said Fourth Street and distant 155 feet (47 244 mm) southerly of the center line of said Fourth Street; thence along the northerly line of said alley to a point 498 feet (151 790 mm) from the easterly line of said Mesa Street; thence south 10 feet (30 480 mm) and thence easterly to the westerly line of Centre Street; thence northerly along said westerly line to the southerly line of said Fourth Street; thence westerly along said southerly line to the point of beginning.

7201.2 Very high fire hazard severity zone. For the purpose of this chapter, the very high fire hazard severity zone shall be considered a fire district. The very high fire hazard severity zone shall be all of the territory so designated by the boundaries shown on the very high fire hazard severity zone map as established in Section 57.25.01 of the *Los Angeles Municipal Code*.

7201.3 Buildings overlapping fire district boundaries. Every building or structure having any part of the building within a fire district shall be deemed to be entirely in that fire district.

A building or structure located partly within two or more fire districts shall comply throughout with the more restrictive provisions of each fire district.

SECTION 7202 ADDITIONS TO BUILDINGS

An addition may be made to any building in a fire district if the added portion conforms to this chapter, and also if the entire building, including the addition, is within the height and area limits of Section 503 of this Code for building of like type and occupancy.

Exception: An addition to a provisional structure shall not be permitted.

SECTION 7203 GENERAL REQUIREMENTS

7203.1 General. In addition to the general requirements of this code every building located in a fire district shall conform to the requirements of this Chapter.

7203.2 Nonconforming buildings. Alterations and repairs to a nonconforming building in a fire district shall conform to the provisions of Chapters 81 and 86 of this Code.

The provisions of this subsection are subject to the roofing requirements of Section 1503.

7203.3 Construction sheds and canopies. Construction sheds and protection canopies may be erected in a fire district if there is compliance with the other provisions of this Code.

7203.4 Projections from buildings. Projections from buildings conforming to the regulations of Chapter 32 of this Code may be constructed in any fire district.

7203.5 Sprinklers. In every building in Fire District No. 1, every story or basement with a floor surface elevation more than four feet lower than the highest elevation of the floor landing or tread of any required exit from that story shall be sprinklered.

Exception: Sprinklers need not be installed in locations expressly exempt in *Plumbing Code*, provided other approved fire-protection equipment is installed.

7203.6 Miscellaneous structures. In Fire District No. 1, isolated structures constructed of noncombustible materials may be unprotected if used for other than human occupancy.

Loading platforms having no roof and not over 48 inches above the ground may be of wood.

Loading platforms shall be enclosed and shall be firestopped into areas not exceeding 2,500 square feet (232 m²).

SECTION 7204 SPECIAL REQUIREMENTS FOR FIRE DISTRICT NO. 1

7204.1 Types of construction permitted. Every building in Fire District No. 1 shall be one of the following types:

Type I; Type II; Type III; or provisional structures as provided in Section 7205 of this Code.

7204.2 Type IIB buildings. Every building of Type IIB construction in Fire District No. 1, except provisional structures allowed by this section, shall have at least 2-hour fire-resistive construction for exterior walls within 10 feet (3048 mm) of and facing a property line and shall have at least 1-hour fire-resistive construction for exterior walls facing a property line and less than 30 feet (9144 mm) distance from the property line.

Exception: These walls may be 1-hour less fire-resistant-rated than specified here if the building is not more than one story in height or more than 2,500 square feet (232 m²) in area.

7204.3 Openings in exterior walls. In the following cases, all openings in the exterior walls of buildings in Fire District No. 1, other than provisional structures, shall be protected by a fire assembly having a ³/₄-hour fire-resistive rating when the exterior wall is within 10 feet (3048 mm) of a fire separation distance.

7204.4 Roof covering. Roof covering in the fire district shall conform to the requirements of Class A or B roof coverings as defined in Section 1505.

7204.5 Structural fire rating. Walls, floors, roofs and their supporting structural members shall be a minimum of 1-hour fire-resistance-rated constructions.

Exceptions:

1. Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 of this Code.
2. Automobile parking structures.
3. Buildings surrounded on all sides by a permanently open space of not less than 30 feet (9144 mm).
4. Partitions complying with Section 603.1(8) of this Code.

7204.6 Exterior walls. Exterior load-bearing walls of Type II buildings shall have a fire-resistance rating of 2 hours or more where such walls are located within 30 feet (9144 mm) of a common property line or an assumed property line. Exterior nonload-bearing walls of Type II buildings located within 30 feet (9144 mm) of a common property line or an assumed property line shall have fire-resistance ratings as required by Table 601, but not less than 1 hour. Exterior walls located more than 30 feet (9144 mm) from a common property line or an assumed property line shall comply with Table 601.

Exception: In the case of one-story buildings that are 2,000 square feet (186 m²) or less in area, exterior walls located more than 15 feet (4572 mm) from a common property line or an assumed property line need only comply with Table 601.

7204.7 Architectural trim. Architectural trim on buildings located in the fire district shall be constructed of approved noncombustible materials or fire-retardant-treated wood.

7204.8 Permanent canopies. Permanent canopies are permitted to extend over adjacent open spaces provided:

1. The canopy and its supports shall be of non-combustible material, fire-retardant-treated wood, Type IV construction or of 1-hour fire-resistance-rated construction.

Exception: Any textile covering for the canopy shall meet the fire propagation performance criteria of NFPA 701 after both accelerated water leaching and accelerating weathering.

2. Any canopy covering, other than textiles, shall have a flame spread index not greater than 25 when tested in accordance with ASTM E 84 in the form intended for use.
3. The canopy shall have at least one long side open.
4. The maximum horizontal width of the canopy shall not exceed 15 feet (4572 mm).
5. The fire resistance of exterior walls shall not be reduced.

7204.9 Roof structures. Structures, except aerial supports 12 feet (3658 mm) high or less, flagpoles, water tanks and cooling towers, placed above the roof of any building within the fire district shall be of noncombustible material and shall be supported by construction of noncombustible material.

7204.10 Plastic signs. The use of plastics complying with Section 2611 for signs is permitted provided the structure of the sign in which the plastic is mounted or installed is noncombustible.

7204.11 Plastic veneer. Exterior plastic veneer is not permitted in the fire district.

SECTION 7205 PROVISIONAL STRUCTURES

7205.1 Definitions. For the purposes of this section, "provisional structure" shall mean any structure complying with the provisions of this section.

7205.2 Size limit. A Type V provisional structure shall not exceed 12 feet in its longest dimension, 12 feet in height, or 100 square feet in overall area, including any roof projection.

A Type IIB provisional structure shall not exceed 400 square feet in building area and shall not exceed 12 feet in height.

7205.3 Exterior walls. The requirements of Section 503 of this Code shall not apply to provisional structures.

The exterior walls of a Type IIB provisional structure shall not be required to have a fire-resistive time period of construction.

The exterior walls of a Type V provisional structure shall be of one-hour fire-resistive construction.

Exception: The exterior walls of a Type V provisional structure, which is located on an automobile parking station lot, are not required to have a time period of fire resistance if the structure does not exceed 12 feet (305 mm) in its longest dimension and 50 square feet (5 m²) in overall area, including any roof projection and, provided further, that the structure shall be used in conjunction with the business of operating an automobile parking lot and shall maintain a setback from every street front not less than one third of the lot depth.

7205.4 Location. A provisional structure shall be located not less than 40 feet (1016 mm) from any building of Type IIB or Type V construction.

7205.5 Parking lot structures. In lieu of a permanent foundation, a provisional structure used as an automobile parking lot office may be anchored to an asphalt slab by four or more 1/2-inch (12 mm) by 12-inch (305 mm) metal pins or equivalent anchorage. Toilet facilities will not be required.

SECTION 7207 SPECIAL REQUIREMENTS FOR THE VERY HIGH FIRE HAZARD SEVERITY ZONE

7207.1 Unenclosed under-floor areas. Residential buildings shall have all under-floor areas completely enclosed to the ground with construction as required for exterior walls.

Exceptions:

1. Complete enclosure shall not be required where the underside of all exposed floors and all exposed structural columns, beams and supporting walls are protected as required for exterior 1-hour fire-resistive construction.
2. The area under cantilevered balconies and unroofed walking decks need not be considered as under-floor area, provided exposed utilities, pipes or other mechanical devices are not located in the area.

7207.2 Utilities. All utilities, pipes, furnaces, water heaters or other mechanical devices located in an exposed under-floor area of a residential building shall be enclosed with material as required for 1-hour fire-resistant construction. Adequate covered access openings for servicing such utilities shall be provided as required by appropriate codes.

7207.3 Attic openings. All exterior attic openings shall be protected with a maximum 1/4-inch (6 mm) noncombustible and corrosion-resistant screen.

7207.4 Roofing. All buildings shall have a fire retardant roofing assembly complying with the requirements of Class A roof covering as defined in Section 1505 of this Code. Wood shakes and shingle are not permitted in the very high hazard severity zone.

SECTION 7208 PROHIBITED VEHICLES

No vehicle in Fire District Nos. 1 and 2 shall be used except as permitted for a mobile home, travel trailer or camp car in a park designed for that use or for an industrial catering truck as defined in Section 202 of this Code. However, no person shall park an industrial catering truck continuously at any location on private property for the purpose of dispensing food or drink for a period of time exceeding 1 hour, and regardless of the length of time parked at any location, no person after departure from that location shall again park an industrial catering truck at that location, or at any location on private property within 500 feet (152 400 mm) of that location or private property, for the purpose of dispensing food or drink within a period of 4 hours after departure.

CHAPTER 81

EXISTING BUILDINGS AND STRUCTURES – GENERAL REQUIREMENTS

SECTION 8101 GENERAL PROVISIONS

8101.1 Purpose. The purpose of this chapter is to establish minimum standards to regulate and encourage the proper maintenance, use, repair, rehabilitation, alteration, addition and relocation of existing buildings, structures and premises in order to safeguard life, limb, health, property and public welfare.

8101.2 Scope. The provisions of this chapter shall apply to all or portions of existing buildings, structures or premises.

Exceptions:

1. Historical buildings may comply with Section 8119 of this Code.
2. Existing commercial or industrial buildings, for which a building permit was issued prior to April 1, 1994, may be converted to "joint living and work quarters" provided the existing building complies with Chapter 85 of this Code.

SECTION 8102 ENFORCEMENT

8102.1 General. It shall be unlawful for any person, firm or corporation to erect, construct, enlarge, alter, repair, maintain, move, improve, remove, convert, demolish, equip, use or occupy any existing building, structure, premises or portion thereof in violation of the provisions of this chapter.

Any person who violates or causes or permits another person to violate any provision or requirement of this chapter is guilty of a misdemeanor. Any person includes an owner, lessor, sublessor, manager or person in control of a building subject to this chapter. The legal owner of a building is that person, firm, corporation, partnership or other entity whose name or title appears on record with the Los Angeles County Recorder's Office.

8102.2 Occupant responsibility. It shall be unlawful for any tenant or other individual occupying any dwelling unit, efficiency dwelling unit, guest room or suite in a building to fail to keep the dwelling unit, efficiency dwelling unit, guest room or suite free from an accumulation of debris, filth, rubbish and garbage.

8102.3 Penalties. Any person convicted of a misdemeanor due to violation of any provision or requirement of this chapter is subject to penalties as prescribed by Section 11.00(m) of the *Los Angeles Municipal Code*, which is quoted in part as follows:

"Every violation of this Code is punishable as a misdemeanor unless provision is otherwise herein made, shall be punishable by a fine of not more than \$1,000.00 or by imprisonment

in the county jail for a period of not more than 6 months, or by both such fine and imprisonment.

Every violation of this Code which is provided for therein to be an infraction is punishable by a fine as set forth in this Code section, or as otherwise provided in this Code, not to exceed \$50.00 for the first violation, \$100.00 for a second violation of the same provision within one year, and \$250.00 for each additional violation of the same provision within one year.

Each person shall be guilty of a separate offense for each and every day during any portion of which any violations of any provision of this Code is committed, continued or permitted by such person and shall be punishable accordingly."

Nothing in this chapter or Code shall prohibit the payment of investigative costs by any person so convicted of any provision of this chapter, to the Department of Building and Safety to reconstitute said agency for all costs expended to investigate and/or enforce the provisions of this Code.

SECTION 8103 EXISTING BUILDING RIGHTS

8103.1 General. Every existing building or structure constructed under a valid permit and occupied in conformance with code regulations and Department approvals in effect at the time of such construction and occupancy shall be allowed to continue to exist under those regulations and approvals even though subsequently adopted regulations and approvals have changed the requirements, provided the building, structure or portion thereof does not become a nuisance, a hazardous building, or a substandard residential building, and that subsequently adopted regulation specifically applicable to existing buildings or structures are met.

8103.2 Group I occupancy. Buildings classed in Group I occupancy because of the use or character of the occupancy that are not more than three stories in height, that were established prior to March 4, 1972, and that have been continuously operated as that use or character since that time shall comply with Section 3413 of this Code.

SECTION 8104 BASIC MAINTENANCE AND REPAIR OF EXISTING BUILDINGS AND PREMISES

Every existing building, structure, premises or portion thereof shall be maintained in conformity with the code regulations and Department approvals in effect at the time of such construction and occupancy unless specifically exempt by written approval of the Department.

Every existing building, structure, or portion thereof shall be maintained in a safe and sanitary condition and good repair. The premises of every building or structure shall be maintained

in good repair and free from graffiti, debris, rubbish, garbage, trash, overgrown vegetation or other similar material.

8104.1 All physical elements of every existing building, structure or portion thereof shall be maintained by cleaning, painting, staining, refinishing or other restorative means, in a condition as close as reasonably feasible to their originally required and approved state.

8104.2 The interior of every existing building, structure and portion thereof and the exterior wall surfaces and premises thereof shall be maintained clean and free from accumulation of debris, rubbish, garbage, trash, overgrown vegetation and other similar material.

8104.3 The roof of every building or structure shall be kept waterproof and all devices which were provided to convey the roof water from the roof shall be maintained so as to be capable of fulfilling that purpose.

8104.4 The walls and ceilings of every room in every building, structure or portion thereof shall be finished, sealed, coated, painted, or covered in an approved manner so as to maintain them in a clean and sanitary condition. Loose wallpaper or other surfacing shall be removed or repaired so as to provide a smooth, tight-fitting, clean and sanitary surface.

8104.5.1 The doors, windows, cabinets, frames and similar finishes shall be finished, sealed, coated, painted or covered in an approved manner so as to maintain them in a clean and sanitary condition. Broken or cracked glass or plastics shall be replaced. Torn, worn or broken screens shall be repaired, replaced or removed, unless removal is otherwise prohibited by the Code.

8104.5.2 Legally required insect screens shall not be removed for other than repair or replacement.

8104.6 The floor and floor covering of every room in every building, structure or portion thereof shall be maintained in a clean and sanitary condition. The floor and covering shall be maintained free from defects, holes, loose, worn or missing portions which could present a safety hazard to occupants.

8104.7 The plumbing fixtures, shower enclosures, wastewater drain lines, water supply lines, counters, drainboards and adjoining wall and floor areas provided to protect against water damage in every building or structure shall be maintained in good repair and in a clean and sanitary condition.

Leaking drain or supply lines shall be repaired or replaced. Cracked, chipped or damaged fixtures shall be repaired or replaced. All surfaces provided to protect against water damage shall be without cracks, defects or missing portions. All fixtures, enclosures, counters and surfaces shall be kept in a clean and sanitary condition free from dirty or foreign materials.

8104.8.1 The electrical service, lines, switches, outlets, fixtures and fixture coverings and supports in every building or structure shall be maintained in good repair. Broken, loose, frayed, inoperative, defective or missing portions shall be repaired or replaced. The fixtures, fixture coverings, switches, and outlets shall be maintained in a clean and sanitary condition free from dirty or foreign materials.

8104.8.2 Unless specifically permitted in the *Electrical Code*, flexible cords and cables shall not be used as a substitute for the fixed wiring of a structure.

8104.8.3 Panelboards and fuseholders shall not be equipped with fuses which exceed the rated ampacity of the protected circuit.

8104.9 All plumbing and waste drain lines in every building or structure shall be maintained clear of blockages which would cause overflow at any fixture or cause any fixture to overflow under the condition of normal water supply to that fixture.

8104.10.1 All water supply lines to kitchen and bathroom fixtures shall be maintained so as to provide at least 1 gallon per minute (3.785 L/min) rate of water flow, of at least 100° F (38°C). However, the maximum temperature at the water heater or storage tank need not exceed 140° F (60°C).

8104.10.2 Hot water shall continue to be provided to each residential kitchen and bathroom fixture at all times.

8104.10.3 No time clock or other devices shall be installed to prevent the supply of the required hot water to residential rental units at any time.

8104.11 The existing central heating or individual unit heating for each dwelling unit or guest room shall be maintained in good repair and operable.

8104.12 The exterior wall surfaces of every existing building or structure shall be maintained weathertight, in good repair and in a clean and sanitary condition.

8104.13 All fences shall be maintained in good repair and shall be kept straight, uniform and structurally sound. Wooden fences shall be either painted or stained or otherwise treated or sealed in an approved manner to prevent their becoming a nuisance from weathering or deterioration.

8104.14 All masonry units shall be maintained with head, bed and wall joints solidly filled with mortar.

8104.15 The exterior of all privately owned buildings and fences shall be free from graffiti when such graffiti is visible from a public street or alley.

SECTION 8105

ILLEGAL BUILDINGS, CONSTRUCTION AND USE

Every existing building, structure or portion thereof constructed without a building permit shall be made to conform to the provisions of this Code or shall be demolished and removed. Any use or occupancy existing in a building without authorization of a building permit shall be discontinued and removed or shall be made to conform to the provisions of this Code.

SECTION 8106

FIRE DISTRICT REQUIREMENTS

8106.1 Alterations, repairs or rehabilitation. In any fire district, alterations, repairs or rehabilitation to an existing building may be of the same type of construction as the existing building or structure, provided the aggregate value of such work in any 1 year does not exceed 10 percent of the replacement cost of the

building, and provided further, that no hazardous conditions or substandard residential buildings are continued or created. Retroactive provisions shall be applicable when specifically required by this Code.

Alterations, repairs or rehabilitation in excess of 10 percent of the replacement cost of the building or structure may be made provided all of the work conforms to this Code for a new building of like area, height and occupancy in the same location and that no hazardous conditions or substandard residential buildings are continued or created in the remainder of the building as a result of such work.

Whenever an existing building or structure has been damaged, or is in need of repairs, alterations or rehabilitation required by the *Los Angeles Municipal Code* in an amount exceeding 50 percent of the replacement cost, the entire building or structure shall be made to conform to this Code or shall be demolished.

All other alterations, repairs or rehabilitation shall comply with the requirements of this Code.

Nothing shall be done to reduce the seismic stability of the structure below the requirements set forth in Chapter 16.

8106.2 Additions. An addition may be made to any existing building within any fire district if the added portion conforms to this Code and if the entire building, including the addition, is within the limit of area and height specified in Section 504 of this Code for a building of like type and occupancy.

Exception: An addition to a provisional structure shall not be permitted.

8106.3 Fire sprinklers. In an existing building in Fire District No. 1, every story which has a floor surface elevation more than four feet lower than the highest elevation of the floor landing or tread of any required exit from the story, and is used for keeping, storing, manufacturing, repairing or processing any combustible material, shall be sprinklered.

Exception: Building that is occupied only as a single-family dwelling.

SECTION 8107

REQUIREMENTS OUTSIDE OF A FIRE DISTRICT

8107.1 Alterations, repairs or rehabilitation. Any alterations may be made to any building in any location, provided the building as altered conforms to the requirements of the *Los Angeles Municipal Code* for new buildings in the same location.

Exceptions:

1. Alterations or repairs to any existing nonconforming building outside of every fire district may be of the same type of construction as the existing building, provided the aggregate value of such alterations or repairs in any two-year period does not exceed 50 percent of the replacement value of the building.
2. Alterations or repairs may be made to any building in any location provided the new construction conforms to that required for a new building of like area, height and occupancy in the same location.

8107.2 Additions. An addition may be made to any existing building outside of every fire district if the added portion conforms to the requirements of this Code and also if the entire building, including the addition, is within the limit of area and height required by this Code for a building of like type and occupancy.

SECTION 8108

NUISANCES, HAZARDOUS BUILDINGS AND SUBSTANDARD RESIDENTIAL BUILDINGS

Existing buildings which have been determined to be nuisances, hazardous buildings or substandard residential buildings under Chapter 89 of this Code are subject to compliance with all the requirements of this Code for a new building.

The Department may require an existing building which has been determined to be a nuisance, a hazardous building, or a substandard residential building to comply with all current requirements of this Code for a new building, or may allow the repair of the building without requiring compliance with all the requirements of this Code for a new building where it is determined that the continuance of the existing condition does not pose a substantial hazard to life, limb, health, property or public welfare.

8108.1 Additional requirements for buildings determined to be nuisances, hazardous or substandard residential buildings. The Department may impose additional requirements for buildings determined to be nuisances, hazardous or substandard residential buildings in order to address specific conditions that affect proper maintenance, use, repair, rehabilitation, alteration and to safeguard life, limb, health, property and public welfare. If the Department determines to impose additional requirements, the owner shall be notified that a hearing has been scheduled before the Board of Building and Safety Commissioners to determine if additional requirements should be imposed.

8108.2 Notice of intent and public hearing. The notice of intent to impose additional requirements and the notice to hold a public hearing before the Board of Building and Safety Commissioners shall be given either by personal delivery thereof to the person to be notified or by deposit in the United States mail in a sealed envelope, postage prepaid, addressed to the person to be notified at the address shown on the last equalized assessment roll. Service by mail shall be deemed to have been completed at the time of deposit in the U. S. Mail. The failure of any owner or person to receive the notice shall not affect in any manner the validity of any of the proceedings taken thereunder. Proof of giving any notice may be made by an affidavit of any employee of the City which shows service in conformity with this section.

The notice shall indicate:

1. The street address of the building or premise, or the approximate street address if no street address has been assigned.
2. That the condition of the building constitutes a nuisance, hazardous or substandard residential building.

3. The additional requirements to be imposed by the Department.
4. Identify the need for the additional requirement.
5. That the owner must appear at a hearing conducted by the Board, at a time, date and location specified in the notice, which shall be at least 15 days from the date of the notice.
6. That upon any such appearance, the owner will be given the opportunity to present and to elicit testimony and other evidence to show cause why the additional requirements should not be imposed.
7. That this appearance may be made by the submission of written materials if they have been received by the City at least three days prior to the scheduled hearing at the mailing address specified in the notice.

8108.3 Public hearing. The matter shall be scheduled for hearing before the Board on the date and time specified in the notice. The Board shall proceed to determine whether additional requirements should be imposed.

The person notified to appear, or the actual owner of the parcel or premises in the event the person notified is not the owner, or any person representing the owner who attends the hearing, shall be given an opportunity to present and to elicit testimony and any other evidence on whether the additional requirements should be imposed. The Board shall proceed with the hearing whether or not that person is in attendance. Written material shall be considered by the Board if it is received at least three days prior to the scheduled hearing date.

At the conclusion of the hearing, the Board shall make a finding and determine whether the condition of the premises warrants additional requirements in order to safeguard life, limb, health, property and public welfare. The owner and any other person who appeared at the scheduled public hearing on behalf of the owner, either in person or by the submission of written material, shall be notified in writing of the determination of the Board. Once the Board has acted, it shall have no further jurisdiction over any matter relating to the imposition of additional requirements on the premises. Any further determinations in this regard, including requests for extensions of time, shall be within the sole jurisdiction and discretion of the Superintendent of Building and not appealable to the Board.

SECTION 8109 RELOCATED BUILDINGS

Any building or structure moved into, out of or within the City shall comply with the requirements of Chapter 83 of this Code.

SECTION 8110 UNREINFORCED MASONRY BEARING WALL BUILDINGS

Existing unreinforced masonry bearing wall buildings constructed or under construction prior to October 6, 1933, shall conform to the requirements of Chapter 88 of this Code.

SECTION 8111 RESIDENTIAL HEATING

8111.1 Every residential unit which is rented or leased shall be provided with approved heating facilities capable of maintaining a room temperature of 70°F (21°C) at a point three feet above the floor in all habitable rooms.

Where individual heating facilities are provided within a residential unit, a rating of the facilities in B.T.U. equal to six B.T.U. per cubic foot of habitable floor area shall be considered as fulfilling the required temperature level. All gas heating facilities shall be properly vented.

8111.2 Where the heating facilities cannot be activated by the occupant of a residential unit, the owner shall activate the heating facilities whenever the residential unit temperature is 70°F (21°C) or less. No time clocks or other devices shall be installed to prevent the occupants of the residential unit from activating the heating facility.

8111.3 A legally installed comfort heating appliance shall not be removed or made inoperable.

SECTION 8112 RESIDENTIAL PLUMBING

When existing water heaters serving rental or lease residential units are replaced, they shall be replaced with units which will provide an overall equivalency or greater in water heater gallon capacity and rate of heat recovery to the replaced units.

Any water heater which is relocated, reinstalled or newly installed from the interior of the building to a location outside the building shall be installed in an approved enclosure. Any new water heater which is installed outside the building shall be installed in an approved enclosure.

SECTION 8113 ROD BRACING SYSTEMS

Buildings constructed with adjustable steel rod bracing systems designed to transfer horizontal forces shall be subject to inspection after completion of the building or structure for the purpose of maintaining proper adjustments of the bracing assembly. The owner shall be duly notified if adjustments are found necessary and, upon the receipt thereof, shall cause adjustments to be made satisfactory to the Department.

SECTION 8114 PARAPETS AND APPENDAGES

No building shall have any parapet or appendage attached to or supported by an exterior wall of the building and located adjacent to a public way or to a way set apart for exit from a building or passage of pedestrians, if such parapet or appendage is not so adequately constructed, anchored or braced as to remain wholly in its original position in event of an earthquake having the effect designated by Chapter 16 of this Code.

Whenever the Department determines by inspection that an existing parapet or appendage is not so adequately constructed, anchored or braced as to remain wholly in its original position,

the Department shall, by written notice addressed to the owner, person or agent in control of the building, designate and describe the hazards and inadequacies of construction, anchorage or bracing determined by such inspection and direct that the necessary corrections be made to ensure that all of the parapet or appendage remain in its original position. Upon receipt of such notice, the owner, person or agent in control of the building where such parapet or appendage exists, shall, within one year from the date of such notice:

1. Submit to the Department suitable corrective plans;
2. Obtain the necessary alteration permit; and
3. Complete all the work necessary or ordered. All the plans thus submitted shall have the intent of eliminating the parapet or appendage, or reconstructing such parapet or appendage so that it will conform structurally with requirements of this Code, or strengthening such parapet or appendage by bracing or other means so that it will resist the forces of an earthquake and remain in its original position.

Any person receiving a notice as set out in this subsection may appeal from the notice of the Department in the manner provided by Section 98.0403 of the *Los Angeles Municipal Code*.

SECTION 8115 SANDBLASTING

No building or other structure shall be sandblasted except by a wet process precluding the creation of dust and dry debris.

Inspection shall be made by the Department after scaffolding and protective enclosure are in place and before work is started.

Exception: Dry sandblasting may be permitted by the Department only when evidence is submitted that this process is necessary for the proper cleaning of the building or structure. No permission may be granted unless it can be shown that the use of this process will not be detrimental to adjoining property or public welfare.

SECTION 8116 SPECIAL PROVISIONS FOR LIGHT-HOUSEKEEPING ROOMS

8116.1 General. This chapter does not prevent the use of a room as a light-housekeeping room in any building which was erected prior to September 20, 1963, provided that such room fully complies with the provisions of this subsection.

A light-housekeeping room is any room which is designed and used both as a sleeping room and for the cooking or preparation of food.

8116.2 Special provisions.

8116.2.1 Light-housekeeping rooms shall contain not less than 150 square feet (14 m²) in area and shall be occupied by not more than two people. The cooking appliance therein, if any, shall be used solely for the cooking or preparation of meals for consumption by the occupants of the room.

Exception: A room having a superficial floor area of not less than 120 square feet (11 m²) may be used for light-housekeeping if it is occupied by only one person.

8116.2.2 The cooking appliances used therein, if any, shall have no more than two burners. If electric appliances are used, they shall have been tested and approved by the Underwriters Laboratories. If gas appliances are used, they shall have been tested and approved by the American Gas Association.

8116.2.3 The installation, maintenance or use of said cooking appliance shall not be hazardous to life, health or property.

8116.2.4.1 Said cooking appliance shall rest upon its own legs, or shall be an approved, built-in unit of fixed installation. Said appliance shall be set not closer than 6 inches (152 mm) from any wall or projection thereof, and shall rest upon an impervious surface.

8116.2.4.2 The walls behind and adjacent to said cooking appliance shall be lined or back-flashed with noncombustible material equivalent to 1/4-inch (305 mm) asbestos mill board. The back-flashing shall extend from 12 inches (610 mm) below to 24 inches above the base of the appliance. There shall be clear and unobstructed space of 36 inches (914 mm) above the surface of the cooking appliance.

Exception: Approved prefabricated kitchen units.

8116.2.5.1 Gas-burning appliances shall be connected to the gas supply piping by approved metal piping with an approved gas shutoff valve readily accessible within the room, and maintained in accordance with the provisions of the *Plumbing Code*.

Electrical appliances and serving circuits shall be installed and maintained in accordance with the provisions of the *Electrical Code*.

8116.2.5.2 Guest rooms, other than those legally converted for light-housekeeping purposes, shall not contain a fuel-gas-burning or electrically energized cooking appliance.

8116.2.6 The room shall contain an approved sink with hot and cold running water.

8116.2.7 An approved storage cabinet shall be installed in the room. All food, dishes and cooking and eating utensils shall be stored therein when not in use.

8116.2.8 The bed in such a room, or any drapes, curtains or other readily combustible material shall be so located that they do not come in contact with the cooking appliances, if any.

8116.2.9 Any toilet room opening directly into such a room shall have a tight-fitting door.

8116.2.10 An approved method of heating shall be installed in each such room. Cooking appliances shall not be used for the purpose of heating such rooms. No cooking appliance shall be installed within a closet in such a room.

8116.3 Bath and water closet facilities. In any building containing six or more light-housekeeping rooms, there shall be

one water closet and one bath facility for each five units or fraction thereof. In any building containing five or less light-housekeeping rooms, there shall be one water closet and one bath facility which may be in the same room for each three light-housekeeping units in the building. Such toilet and bath facilities shall be accessible to and from a public hallway.

SECTION 8117 FIRE WATCH

Whenever the Department of Building and Safety determines by inspection that a violation affecting life safety from threat of fire exists in an occupied building, the Department may require that a fire watch be assigned to the building. The fire watch shall be a licensed uniformed person chosen by the owner and approved by the Department and shall perform duties in accordance with the Department's fire watch procedures. The fire watch shall remain in effect until all fire safety work is completed and approved by the Department. Any person who fails to comply with a Department fire watch order shall be guilty of a misdemeanor.

SECTION 8118 POOL WATER CLARITY

The recirculation and purification system of any swimming pool, fish pond, or any other body of water which is required to be fenced by Section 6109.1, shall be operated and maintained so as to keep the water in such pool or other body of water clean and of reasonable clarity.

In order to define reasonable clarity of the water in such pool, pond or body of water, the following standard shall be applied:

A painted black disk, 6 inches (152 mm) in diameter on a 12-inch by 12-inch (305 mm by 305 mm) white tile, placed at the bottom of the pool at its deepest point, shall be clearly visible from the sidewalks around the pool from all distances up to 10 yards (9 m) from such disk, or the water is determined to not be of reasonable clarity.

SECTION 8119 HISTORICAL BUILDINGS AND STRUCTURES

Notwithstanding any other provisions of this Code to the contrary, the following provisions shall apply in addition to the provisions of Title 24, Part 8 of the California Code of Regulations, the *State Historical Building Code*.

8119.1 Additions, alterations and repairs. Additions, alterations and repairs shall be made in accordance with the nonconforming rights of Sections 8101.2, 8103 and 8107.

8119.2 Change of use or occupancy. Change of use or occupancy shall comply with Sections 8203 and 8204 of this Code.

8119.3 Earthquake hazard buildings. Where the requirements of Chapter 88 of this Code are more restrictive than the requirements of this chapter, the requirements of Chapter 88 of the Code shall apply.

8119.4 Preservation of historical buildings.

8119.4.1 If the Department determines that any building, structure, premises or portion thereof, (1) has been designated an historical monument or (2) is being considered as a historical monument by the Cultural Heritage Commission, and (3) is subject to vandalism, or unlawful entry, or has become a hazardous building, nuisance or substandard building, then the Department may cause the building, structure, or premises or any portion thereof, to be immediately barricaded and protected by such means as the Department may deem advisable, including the use of a Department awarded contract.

8119.4.2 The Department may cause the building, structure or premises, or any portion of the building, structure or premises, to be immediately barricaded or protected from further deterioration. The barricading or protection may be accomplished by any City department with the forces to perform the work, upon receipt of a request from the Department, or by any forces under contract to the City. Where the work is accomplished by other than City forces, the cost shall be paid from the "Repair and Demolition Fund" as established in Section 8906. All costs incurred pursuant to this section shall be a personal obligation against the owner of the property upon which the particular building or structure or any portion is located, recoverable by the City in an action before any court of competent jurisdiction. These costs shall include an amount equal to 40 percent of the cost to perform the actual work, but not less than the sum of \$100.00, to cover the City's costs for administering any contract and supervising the work required. In addition to this personal obligation and all other remedies provided by law, the City may collect any judgment, fee, cost, or charge, including any permit fees, fines, late charges, or interest, incurred in relation to the provisions of this section as provided in Sections 7.35.1 through 7.35.8 of the *Los Angeles Administrative*.

8119.4.3 The administrative fee of 40 percent of the costs shall not be included in the calculation of costs incurred for or arising out of any barricading, or protecting, resulting from an event or course of events that prompted a declaration of a state of emergency, local emergency, war emergency or major disaster by the Mayor, the Governor of the State, or by the President of the United States.

8119.4.4 If the Department determines that the building, structure, or premises or portion thereof is not in danger of imminent deterioration or vandalism, then the Department may, in lieu of the above, require the building, structure or premises or any portion thereof to be secured, repaired or protected pursuant to the provisions of Chapter 89 of this Code.

8119.5 Vandalism of historical buildings. The Department shall have the authority to issue an Order to Comply to an owner of any building that has been designated an historical monument or is being considered as an historical monument by the Cultural Heritage Commission if the Department determines that the building has become subject to vandalism or constitutes a public nuisance. In such circumstances, the Department shall have the authority to issue any order it deems appropriate to keep the property from being further vandalized