

REVISION RECORD FOR THE STATE OF CALIFORNIA

ERRATA

January 1, 2017

2016 Title 24, Part 11, California Green Building Standards Code

General Information:

1. The date of these errata is for identification purposes only. See the History Note Appendix at the end of the code.
2. These errata are issued by the California Building Standards Commission in order to correct nonsubstantive printing errors or omissions in California Code of Regulations, Title 24, Part 11, of the 2016 *California Green Building Standards Code*. Instructions are provided below.
3. Health and Safety Code Section 18938.5 establishes that only building standards in effect at the time of the application for a building permit may be applied to the project plans and construction. This rule applies to both adoptions of building standards for Title 24 by the California Building Standards Commission and local adoptions and ordinances imposing building standards. An erratum to Title 24 is a nonregulatory correction because of a printing error or omission that does not differ substantively from the official adoption by the California Building Standards Commission. Accordingly, the corrected code text provided by this erratum may be applied on and after the stated effective date.
4. You may wish to retain the superseded material with this revision record so that the prior wording of any section can be easily ascertained.

Title 24, Part 11

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logical conditions. For the purpose of this section, climatic, topographical or geological conditions include local environmental conditions as established by the city, county, or city and county.

2. The city, county, or city and county shall file the amendments, additions or deletions expressly marked and identified as to the applicable findings. Cities, counties, cities and counties, and fire departments shall file the amendments, additions or deletions and the findings with the California Building Standards Commission at 2525 Natomas Park Drive, Suite 130, Sacramento, CA 95833.
3. Findings prepared by fire protection districts shall be ratified by the local city, county, or city and county and filed with the California Department of Housing and Community Development at 2020 West El Camino Avenue, Suite 250, Sacramento, CA 95833-1829.
4. The city, county, or city and county shall obtain California Energy Commission approval for any energy-related ordinances consistent with *Public Resources Code* Section 25402.1(h)(2) and Title 24, Part 1, Section 10-106. Local governmental agencies may adopt and enforce energy standards for newly constructed buildings, additions, alterations and repairs, provided the California Energy Commission finds that the standards will require buildings to be designed to consume no more energy than permitted by Part 6. Such local standards include, but are not limited to, adopting the requirements of Part 6 before their effective date, requiring additional energy conservation measures, or setting more stringent energy budgets.

101.8 Alternate materials, designs and methods of construction. The provisions of this code are not intended to prevent the use of any alternate material, appliance, installation, device, arrangement, method, design or method of construction not specifically prescribed by this code, provided that any such alternative has been approved. An alternate shall be approved on a case-by-case basis where the enforcing agency finds that the proposed alternate is satisfactory and complies with the intent of the provisions of this code and is at least the equivalent of that prescribed in this code in planning and design, energy, water, material conservation and resource efficiency, environmental air quality, performance, safety and the protection of life and health. Consideration and compliance provisions for occupancies regulated by adopting state agencies are found in the sections listed below.

1. Section 1.2.2 in the *California Building Code* (CBC) for the California Building Standards Commission.
2. Section 104.11 of Chapter 1, Division II for the Division of the State Architect.
3. Section 1.8.7, Chapter 1, Administration, Division 1, of the 2016 *California Building Code* and Section 1.2.6, Chapter 1, Administration, Division 1, of the 2016 *California Residential Code* for the Department of Housing and Community Development.

4. Section 7-104, 2013 *California Administrative Code* for the Office of the Statewide Health Planning and Development.

101.9 Effective date of this code. Only those standards approved by the California Building Standards Commission that are effective at the time an application for a building permit is submitted shall apply to the plans and specifications for, and to the construction performed under, that permit. For the effective dates of the provisions contained in this code, see the appropriate application checklist and the History Note page of this code.

101.10 Mandatory requirements. This code contains both mandatory and voluntary green building measures. Mandatory and voluntary measures are identified in the appropriate application checklist contained in this code.

101.11 Effective use of this code. The following steps shall be used to establish which provisions of this code are applicable to a specific occupancy:

1. Establish the type of occupancy.
2. Verify which state agency has authority for the established occupancy by reviewing the authorities list in Sections 103 through 106.
3. Once the appropriate agency has been identified, find the chapter which covers the established occupancy.
4. The Matrix Adoption Tables at the beginning of Chapters 4 and 5 identify the mandatory green building measures necessary to meet the minimum requirements of this code for the established occupancy.
5. Voluntary tier measures are contained in Appendix Chapters A4 and A5. A checklist containing each green building measure, both required and voluntary, is provided at the end of each appendix chapter. Each measure listed in the application checklist has a section number which correlates to a section where more information about the specific measure is available.
6. The application checklist identifies which measures are required by this code and allows users to check off which voluntary items have been selected to meet voluntary tier levels if desired or mandated by a city, county, or city and county.

SECTION 102 CONSTRUCTION DOCUMENTS AND INSTALLATION VERIFICATION

102.1 Submittal documents. Construction documents and other data shall be submitted in one or more sets with each application for a permit. Where special conditions exist, the enforcing agency is authorized to require additional construction documents to be prepared by a licensed design professional and may be submitted separately.

Exception: The enforcing agency is authorized to waive the submission of construction documents and other data not required to be prepared by a licensed design professional.

102.2 Information on construction documents. Construction documents shall be of sufficient clarity to indicate the location, nature and scope of the proposed green building feature and show that it will conform to the provisions of this code, the *California Building Standards Code* and other relevant laws, ordinances, rules and regulations as determined by the enforcing agency.

102.3 Verification. Documentation of conformance for applicable green building measures shall be provided to the enforcing agency. Alternate methods of documentation shall be acceptable when the enforcing agency finds that the proposed alternate documentation is satisfactory to demonstrate substantial conformance with the intent of the proposed green building measure.

SECTION 103 BUILDING STANDARDS COMMISSION

103.1 BSC-CG. Specific scope of application of the agency responsible for enforcement, the enforcement agency, and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

1. **Application**—All occupancies where no state agency has the authority to adopt green building standards applicable to those occupancies.

Enforcing agency—State or local agency specified by the applicable provisions of law.

Authority cited—*Health and Safety Code* Sections 18930.5(a), 18938, and 18940.5.

Reference—*Health and Safety Code*, Division 13, Part 2.5, commencing with Section 18901.

103.1.1 Adopting agency identification. The provisions of this code applicable to buildings identified in this section will be identified in the Matrix Adoption Tables under the acronym **BSC-CG**.

SECTION 104 DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

104.1 Scope. Specific scope of application of the agency responsible for enforcement, the enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

1. **Housing construction.**

Application—Hotels, motels, lodging houses, apartments, dwellings, dormitories, condominiums, shelters for homeless persons, congregate residences, employee housing, factory-built housing and other types of dwellings containing sleeping accommodations with or without common toilet or cooking facilities including accessory buildings, facilities and uses thereto.

Enforcing agency—Local building department or the Department of Housing and Community Development.

Authority cited—*Health and Safety Code* Sections 17921, 17922 and 19990.

Reference—*Health and Safety Code* Sections 17000 through 17060, 17910 through 17990, and 19960 through 19997.

SECTION 105 DIVISION OF THE STATE ARCHITECT

105.1 Specific scope of application of the agency responsible for enforcement, the enforcement agency, and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

105.1.1 Application—Public elementary and secondary schools and community colleges. New building construction and related site work on a new or existing site.

Note: The Application of Standards outlined in Title 24, Part 6 supersedes the above application as it applies to the California Energy Code.

Enforcing agency—The Division of the State Architect-Structural Safety (DSA-SS) has been delegated the responsibility and authority by the Department of General Services to review and approve the design and observe the construction of public elementary and secondary schools, and community colleges.

Authority cited—*Education Code* Sections 17310 and 81142.

Reference—*Education Code* Sections 17280 through 17317, and 81130 through 81147.

105.1.2 Applicable administrative standards.

1. **Title 24, Part 1, California Code of Regulations:**

Sections 4-301 through 4-355, Group 1, Chapter 4, for public elementary and secondary schools, and community colleges.

2. **Title 24, Part 2, California Code of Regulations:**

2.1. Sections 1.1 and 1.9.2 of Chapter 1, Division I.

2.2. Sections 102.1, 102.2, 102.3, 102.4, 102.5, 104.9, 104.10 and 104.11 of Chapter 1, Division II.

105.1.3 Applicable building standards. *California Building Standards Code*, Title 24, Parts 2, 3, 4, 5, 6, 9, 11 and 12, *California Code of Regulations*, for school buildings and community colleges.

SECTION 106 OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT

106.1 OSHPD 1. Specific scope of application of the agency responsible for enforcement, enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

Application—General acute care hospitals and acute psychiatric hospitals, excluding distinct part units or distinct part freestanding buildings providing skilled nursing or intermediate care services. For structural regulations: Skilled nursing facilities and/or intermediate care facilities

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE

CHAPTER 4 – RESIDENTIAL MANDATORY MEASURES

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	BSC-CG	SFM	HCD			DSA		OSHDP				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1/AC	AC	SS	1	2	3	4								
Adopt entire CA chapter				X																
Adopt entire chapter as amended (amended sections listed below)																				
Adopt only those sections that are listed below																				
Chapter/Section																				
4.2				†																

The state agency does not adopt sections identified by the following symbol: †.

CHAPTER 4

RESIDENTIAL MANDATORY MEASURES

Division 4.1 – PLANNING AND DESIGN

SECTION 4.101 GENERAL

4.101.1 Scope. The provisions of this division outline planning, design and development methods that include environmentally responsible site selection, building design, building siting and development to protect, restore and enhance the environmental quality of the site and respect the integrity of adjacent properties.

SECTION 4.102 DEFINITIONS

4.102.1 Definitions. The following terms are defined in Chapter 2.

FRENCH DRAIN.

WATTLES.

SECTION 4.103 SITE SELECTION (Reserved)

SECTION 4.104 SITE PRESERVATION (Reserved)

SECTION 4.105 DECONSTRUCTION AND REUSE OF EXISTING STRUCTURES (Reserved)

SECTION 4.106 SITE DEVELOPMENT

4.106.1 General. Preservation and use of available natural resources shall be accomplished through evaluation and careful planning to minimize negative effects on the site and adjacent areas. Preservation of slopes, management of storm water drainage and erosion controls shall comply with this section.

4.106.2 Storm water drainage and retention during construction. Projects which disturb less than one acre of soil and are not part of a larger common plan of development which in total disturbs one acre or more, shall manage storm water drainage during construction. In order to manage storm water drainage during construction, one or more of the following measures shall be implemented to prevent flooding of adjacent property, prevent erosion and retain soil runoff on the site.

1. Retention basins of sufficient size shall be utilized to retain storm water on the site.
2. Where storm water is conveyed to a public drainage system, collection point, gutter or similar disposal method, water shall be filtered by use of a barrier system, wattle or other method approved by the enforcing agency.

3. Compliance with a lawfully enacted storm water management ordinance.

4.106.3 Grading and paving. Construction plans shall indicate how the site grading or drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include, but are not limited to, the following:

1. Swales
2. Water collection and disposal systems
3. French drains
4. Water retention gardens
5. Other water measures which keep surface water away from buildings and aid in groundwater recharge.

Exception: Additions and alterations not altering the drainage path.

4.106.4 Electric vehicle (EV) charging for new construction. New construction shall comply with Sections 4.106.4.1 and 4.106.4.2 to facilitate future installation and use of EV chargers. Electric vehicle supply equipment (EVSE) shall be installed in accordance with the *California Electrical Code*, Article 625.

Exceptions: On a case-by-case basis, where the local enforcing agency has determined EV charging and infrastructure are not feasible based upon one or more of the following conditions:

1. Where there is no commercial power supply.
2. Where there is evidence substantiating that meeting the requirements will alter the local utility infrastructure design requirements on the utility side of the meter so as to increase the utility side cost to the homeowner or the developer by more than \$400.00 per dwelling unit.

4.106.4.1 New one- and two-family dwellings and townhouses with attached private garages. For each dwelling unit, install a listed raceway to accommodate a dedicated 208/240-volt branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall originate at the main service or subpanel and shall terminate into a listed cabinet, box or other enclosure in close proximity to the proposed location of an EV charger. Raceways are required to be continuous at enclosed, inaccessible or concealed areas and spaces. The service panel and/or subpanel shall provide capacity to install a 40-ampere minimum dedicated branch circuit and space(s) reserved to permit installation of a branch circuit overcurrent protective device.

4.106.4.1.1 Identification. The service panel or subpanel circuit directory shall identify the overcurrent protective device space(s) reserved for future EV charging as “EV CAPABLE”. The raceway termination location shall be permanently and visibly marked as “EV CAPABLE”.

4.106.4.2 New multifamily dwellings. Where 17 or more multifamily dwelling units are constructed on a building site, 3 percent of the total number of parking spaces pro-

vided for all types of parking facilities, but in no case less than one, shall be electric vehicle charging spaces (EV spaces) capable of supporting future EVSE. Calculations for the required number of EV spaces shall be rounded up to the nearest whole number.

Note: Construction documents are intended to demonstrate the project’s capability and capacity for facilitating future EV charging. There is no requirement for EV spaces to be constructed or available until EV chargers are installed for use.

4.106.4.2.1 Electric vehicle charging space (EV space) locations. Construction documents shall indicate the location of proposed EV spaces. At least one EV space shall be located in common use areas and available for use by all residents.

When EV chargers are installed, EV spaces required by Section 4.106.4.2.2, Item 3, shall comply with at least one of the following options:

1. The EV space shall be located adjacent to an accessible parking space meeting the requirements of the *California Building Code*, Chapter 11A, to allow use of the EV charger from the accessible parking space.
2. The EV space shall be located on an accessible route, as defined in the *California Building Code*, Chapter 2, to the building.

4.106.4.2.2 Electric vehicle charging space (EV space) dimensions. The EV spaces shall be designed to comply with the following:

1. The minimum length of each EV space shall be 18 feet (5486 mm).
2. The minimum width of each EV space shall be 9 feet (2743 mm).
3. One in every 25 EV spaces, but not less than one, shall also have an 8-foot (2438 mm) wide minimum aisle. A 5-foot (1524 mm) wide minimum aisle shall be permitted provided the minimum width of the EV space is 12 feet (3658 mm).
 - a. Surface slope for this EV space and the aisle shall not exceed 1 unit vertical in 48 units horizontal (2.083 percent slope) in any direction.

4.106.4.2.3 Single EV space required. Install a listed raceway capable of accommodating a 208/240-volt dedicated branch circuit. The raceway shall not be less than trade size 1 (nominal 1-inch inside diameter). The raceway shall originate at the main service or subpanel and shall terminate into a listed cabinet, box or enclosure in close proximity to the proposed location of the EV spaces. Construction documents shall identify the raceway termination point. The service panel and/or subpanel shall provide capacity to install a 40-ampere minimum dedicated branch circuit and space(s) reserved to permit installation of a branch circuit overcurrent protective device.

CHAPTER 4

RESIDENTIAL MANDATORY MEASURES

Division 4.3 – WATER EFFICIENCY AND CONSERVATION

SECTION 4.301 GENERAL

4.301.1 Scope. The provisions of this chapter shall establish the means of conserving water used indoors, outdoors and in wastewater conveyance.

SECTION 4.302 DEFINITIONS

4.302.1 Definitions. Reserved.

SECTION 4.303 INDOOR WATER USE

4.303.1 Water conserving plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following:

4.303.1.1 Water closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush. Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Tank-type Toilets.

Note: The effective flush volume of dual flush toilets is defined as the composite, average flush volume of two reduced flushes and one full flush.

4.303.1.2 Urinals. The effective flush volume of wall-mounted urinals shall not exceed 0.125 gallons per flush. The effective flush volume of all other urinals shall not exceed 0.5 gallons per flush.

4.303.1.3 Showerheads.

4.303.1.3.1 Single showerhead. Showerheads shall have a maximum flow rate of not more than 2.0 gallons per minute at 80 psi. Showerheads shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Showerheads.

4.303.1.3.2 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all showerheads and/or other shower outlets controlled by a single valve shall not exceed 2.0 gallons per minute at 80 psi, or the shower shall be designed to allow only one shower outlet to be in operation at a time.

Note: A hand-held shower shall be considered a showerhead.

4.303.1.4 Faucets.

4.303.1.4.1 Residential lavatory faucets. The maximum flow rate of residential lavatory faucets shall not exceed 1.2 gallons per minute at 60 psi. The minimum flow rate of residential lavatory faucets shall not be less than 0.8 gallons per minute at 20 psi.

4.303.1.4.2 Lavatory faucets in common and public use areas. The maximum flow rate of lavatory faucets installed in common and public use areas (outside of dwellings or sleeping units) in residential buildings shall not exceed 0.5 gallons per minute at 60 psi.

4.303.1.4.3 Metering faucets. Metering faucets when installed in residential buildings shall not deliver more than 0.25 gallons per cycle.

4.303.1.4.4 Kitchen faucets. The maximum flow rate of kitchen faucets shall not exceed 1.8 gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.8 gallons per minute at 60 psi.

Note: Where complying faucets are unavailable, aerators or other means may be used to achieve reduction.

4.303.2 Standards for plumbing fixtures and fittings. Plumbing fixtures and fittings shall be installed in accordance with the *California Plumbing Code*, and shall meet the applicable standards referenced in Table 1701.1 of the *California Plumbing Code*.

SECTION 4.304 OUTDOOR WATER USE

4.304.1 Outdoor potable water use in landscape areas. After December 1, 2015, new residential developments with an aggregate landscape area equal to or greater than 500 square feet shall comply with one of the following options:

1. A local water efficient landscape ordinance or the current California Department of Water Resources' Model Water Efficient Landscape Ordinance (MWELO), whichever is more stringent; or
2. Projects with aggregate landscape areas less than 2,500 square feet may comply with the MWELO's Appendix D Prescriptive Compliance Option.

Notes:

1. The Model Water Efficient Landscape Ordinance (MWELO) and supporting documents are available at: <http://www.water.ca.gov/wateruseefficiency/landscapeordinance/>
2. A water budget calculator is available at: <http://www.water.ca.gov/wateruseefficiency/landscapeordinance/>

SECTION 4.305 WATER REUSE SYSTEMS (Reserved)

5.504.7 Environmental tobacco smoke (ETS) control.

Where outdoor areas are provided for smoking, prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows and within the building as already prohibited by other laws or regulations; or as enforced by ordinances, regulations or policies of any city, county, city and county, California Community College, campus of the California State University, or campus of the University of California, whichever are more stringent. When ordinances, regulations or policies are not in place, post signage to inform building occupants of the prohibitions.

SECTION 5.505 INDOOR MOISTURE CONTROL

5.505.1 Indoor moisture control. Buildings shall meet or exceed the provisions of *California Building Code*, CCR, Title 24, Part 2, Sections 1203 (Ventilation) and Chapter 14 (Exterior Walls). For additional measures not applicable to low-rise residential occupancies, see Section 5.407.2 of this code.

SECTION 5.506 INDOOR AIR QUALITY

5.506.1 Outside air delivery. For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 120.1 (Requirements For Ventilation) of the *California Energy Code*, or the applicable local code, whichever is more stringent, and Division 1, Chapter 4 of CCR, Title 8.

5.506.2 Carbon dioxide (CO₂) monitoring. For buildings or additions equipped with demand control ventilation, CO₂ sensors and ventilation controls shall be specified and installed in accordance with the requirements of the *California Energy Code*, Section 120.1(c)(4).

SECTION 5.507 ENVIRONMENTAL COMFORT

5.507.4 Acoustical control. Employ building assemblies and components with Sound Transmission Class (STC) values determined in accordance with ASTM E90 and ASTM E413 or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E1332, using either the prescriptive or performance method in Section 5.507.4.1 or 5.507.4.2.

Exception: Buildings with few or no occupants or where occupants are not likely to be affected by exterior noise, as determined by the enforcement authority, such as factories, stadiums, storage, enclosed parking structures and utility buildings.

Exception: [DSA-SS] For public schools and community colleges, the requirements of this section and all subsections apply only to new construction.

5.507.4.1 Exterior noise transmission, prescriptive method. Wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope

or altered envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 in the following locations:

1. Within the 65 CNEL noise contour of an airport.

Exceptions:

1. L_{dn} or CNEL for military airports shall be determined by the facility Air Installation Compatible Land Use Zone (AICUZ) plan.
2. L_{dn} or CNEL for other airports and heliports for which a land use plan has not been developed shall be determined by the local general plan noise element.
2. Within the 65 CNEL or L_{dn} noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway source as determined by the Noise Element of the General Plan.

5.507.4.1.1 Noise exposure where noise contours are not readily available. Buildings exposed to a noise level of 65 dB L_{eq} -1-hr during any hour of operation shall have building, addition or alteration exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30).

5.507.4.2 Performance method. For buildings located as defined in Section 5.507.4.1 or 5.507.4.1.1, wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level (L_{eq} -1Hr) of 50 dBA in occupied areas during any hour of operation.

5.507.4.2.1 Site features. Exterior features such as sound walls or earth berms may be utilized as appropriate to the building, addition or alteration project to mitigate sound migration to the interior.

5.507.4.2.2 Documentation of compliance. An acoustical analysis documenting complying interior sound levels shall be prepared by personnel approved by the architect or engineer of record.

5.507.4.3 Interior sound transmission. Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places shall have an STC of at least 40.

Note: Examples of assemblies and their various STC ratings may be found at the California Office of Noise Control: http://www.toolbase.org/PDF/CaseStudies/stc_icc_ratings.pdf.

SECTION 5.508 OUTDOOR AIR QUALITY

5.508.1 Ozone depletion and greenhouse gas reductions. Installations of HVAC, refrigeration and fire suppression equipment shall comply with Sections 5.508.1.1 and 5.508.1.2.

5.508.1.1 Chlorofluorocarbons (CFCs). Install HVAC, refrigeration and fire suppression equipment that do not contain CFCs.

5.508.1.2 Halons. Install HVAC, refrigeration and fire suppression equipment that do not contain Halons.

5.508.2 Supermarket refrigerant leak reduction. New commercial refrigeration systems shall comply with the provisions of this section when installed in retail food stores 8,000 square feet or more conditioned area, and that utilize either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units. The leak reduction measures apply to refrigeration systems containing high-global-warming potential (high-GWP) refrigerants with a GWP of 150 or greater. New refrigeration systems include both new facilities and the replacement of existing refrigeration systems in existing facilities.

Exception: Refrigeration systems containing low-global warming potential (low-GWP) refrigerant with a GWP value less than 150 are not subject to this section. Low-GWP refrigerants are nonozone-depleting refrigerants that include ammonia, carbon dioxide (CO₂), and potentially other refrigerants.

5.508.2.1 Refrigerant piping. Piping compliant with the *California Mechanical Code* shall be installed to be accessible for leak protection and repairs. Piping runs using threaded pipe, copper tubing with an outside diameter (OD) less than 1/4 inch, flared tubing connections and short radius elbows shall not be used in refrigerant systems except as noted below.

5.508.2.1.1 Threaded pipe. Threaded connections are permitted at the compressor rack.

5.508.2.1.2 Copper pipe. Copper tubing with an OD less than 1/4 inch may be used in systems with a refrigerant charge of 5 pounds or less.

5.508.2.1.2.1 Anchorage. One-fourth-inch OD tubing shall be securely clamped to a rigid base to keep vibration levels below 8 mils.

5.508.2.1.3 Flared tubing connections. Double-flared tubing connections may be used for pressure controls, valve pilot lines and oil.

Exception: Single-flared tubing connections may be used with a multiring seal coated with industrial sealant suitable for use with refrigerants and tightened in accordance with manufacturer's recommendations.

5.508.2.1.4 Elbows. Short radius elbows are only permitted where space limitations prohibit use of long radius elbows.

5.508.2.2 Valves. Valves and fittings shall comply with the *California Mechanical Code* and as follows.

5.508.2.2.1 Pressure relief valves. For vessels containing high-GWP refrigerant, a rupture disc shall be installed between the outlet of the vessel and the inlet of the pressure relief valve.

5.508.2.2.1.1 Pressure detection. A pressure gauge, pressure transducer or other device shall be installed in the space between the rupture disc and the relief valve inlet to indicate a disc rupture or discharge of the relief valve.

5.508.2.2.2 Access valves. Only Schrader access valves with a brass or steel body are permitted for use.

5.508.2.2.2.1 Valve caps. For systems with a refrigerant charge of 5 pounds or more, valve caps shall be brass or steel and not plastic.

5.508.2.2.2.2 Seal caps. If designed for it, the cap shall have a neoprene O-ring in place.

5.508.2.2.2.2.1 Chain tethers. Chain tethers to fit over the stem are required for valves designed to have seal caps.

Exception: Valves with seal caps that are not removed from the valve during stem operation.

5.508.2.3 Refrigerated service cases. Refrigerated service cases holding food products containing vinegar and salt shall have evaporator coils of corrosion-resistant material, such as stainless steel; or be coated to prevent corrosion from these substances.

5.508.2.3.1 Coil coating. Consideration shall be given to the heat transfer efficiency of coil coating to maximize energy efficiency.

5.508.2.4 Refrigerant receivers. Refrigerant receivers with capacities greater than 200 pounds shall be fitted with a device that indicates the level of refrigerant in the receiver.

5.508.2.5 Pressure testing. The system shall be pressure tested during installation prior to evacuation and charging.

5.508.2.5.1 Minimum pressure. The system shall be charged with regulated dry nitrogen and appropriate tracer gas to bring system pressure up to 300 psig minimum.

5.508.2.5.2 Leaks. Check the system for leaks, repair any leaks, and retest for pressure using the same gauge.

5.508.2.5.3 Allowable pressure change. The system shall stand, unaltered, for 24 hours with no more than a +/- one pound pressure change from 300 psig, measured with the same gauge.

5.508.2.6 Evacuation. The system shall be evacuated after pressure testing and prior to charging.

5.508.2.6.1 First vacuum. Pull a system vacuum down to at least 1000 microns (+/- 50 microns), and hold for 30 minutes.

5.508.2.6.2 Second vacuum. Pull a second system vacuum to a minimum of 500 microns and hold for 30 minutes.

5.508.2.6.3 Third vacuum. Pull a third vacuum down to a minimum of 300 microns, and hold for 24 hours with a maximum drift of 100 microns over a 24-hour period.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE

CHAPTER 8 – COMPLIANCE FORMS, WORKSHEETS AND REFERENCE MATERIAL

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.

See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	BSC-CG	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1/AC	AC	SS	1	2	3	4								
Adopt entire CA chapter		X						X												
Adopt entire chapter as amended (amended sections listed below)																				
Adopt only those sections that are listed below																				
Chapter/Section																				

CHAPTER 8

COMPLIANCE FORMS, WORKSHEETS AND REFERENCE MATERIAL

[BSC] Sample forms found in “A Guide to the California Green Building Standards Code (Nonresidential)” located at <http://www.bsc.ca.gov/Home/CALGreen.aspx> may be used to assist in documenting compliance with the waste management plan and other provisions of this code.

[HCD 1] Sample forms located at www.hcd.ca.gov/CALGreen.html may be used to assist in documenting compliance with *CALGreen*.

WORKSHEET (WS-1) BASELINE WATER USE

BASELINE WATER USE CALCULATION TABLE									
FIXTURE TYPE	FLOW RATE		DURATION		DAILY USES		OCCUPANTS ¹		GALLONS PER DAY
Showerheads	2.0 gpm @ 80 psi	×	5 min.	×	1	×	Note 1a	=	
Lavatory faucets nonresidential	0.5 gpm @ 60 psi	×	.25 min.	×	3	×		=	
Kitchen faucets	1.8 gpm @ 60 psi	×	4 min.	×	1	×	Note 1b	=	
Replacement aerators	2.2 gpm	×		×		×		=	
Wash fountains	1.8 gpm/20 [rim space(in.)@ 60 psi]	×		×		×		=	
Metering faucets	0.20 gal/cycle	×		×	3	×		=	
Metering faucets for wash fountains	0.20 gal/cycle/20 [rim space(in.)@ 60 psi]	×	.25 min.	×		×		=	
Gravity tank-type water closets	1.28 gal/flush	×	1 flush	×	1 male ² 3 female	×		=	
Flushometer tank water closets	1.28 gal/flush	×	1 flush	×	1 male ² 3 female	×		=	
Flushometer valve water closets	1.28 gal/flush	×	1 flush	×	1 male ² 3 female	×		=	
Electromechanical hydraulic water closets	1.28 gal/flush	×	1 flush	×	1 male ² 3 female	×		=	
Urinals	0.5 or 0.125 ³ gal/flush	×	1 flush	×	2 male	×		=	
Total daily baseline water use (BWU)								=	

1. For nonresidential occupancies, refer to Table A, Chapter 4, 2016 *California Plumbing Code*, for occupant load factors.

a. Shower use by occupants depends on the type of use of a building or portion of a building, e.g., total occupant load for a health club, but only a fraction of the occupants in an office building as determined by the anticipated number of users.

b. Kitchen faucet use is determined by the occupant load of the area served by the fixture.

2. The daily use number shall be increased to three if urinals are not installed in the room.

3. Floor-mounted urinals @ 0.5 GPF or wall-mounted urinals @ 0.125 GPF.

**WORKSHEET (WS-2)
WATER USE REDUCTION**

12-, 20- 25-PERCENT REDUCTION WATER USE CALCULATION TABLE									
FIXTURE TYPE	FLOW RATE		DURATION		DAILY USES		OCCUPANTS ¹		GALLONS PER DAY
Showerheads		×	5 min.	×	1	×	Note 1a	=	
Lavatory faucets nonresidential ⁴		×	.25 min.	×	3	×		=	
Kitchen faucets		×	4 min.	×	1	×	Note 1b	=	
Replacement aerators		×		×		×		=	
Wash fountains		×		×		×		=	
Metering faucets		×	.25 min.	×	3	×		=	
Metering faucets for wash fountains		×	.25 min.	×		×		=	
Gravity tank-type water closets		×	1 flush	×	1 male ³ 3 female	×		=	
Flushometer tank water closets		×	1 flush	×	1 male ³ 3 female	×		=	
Flushometer valve water closets		×	1 flush	×	1 male ³ 3 female	×		=	
Electromechanical hydraulic water closets		×	1 flush	×	1 male ³ 3 female	×		=	
Urinals		×	1 flush	×	2 male	×		=	
Urinals Nonwater supplied	0.0 gal/flush		1 flush		2 male	×			
Proposed water use								=	
12% Reduction _____ (BWU from WS-1) × .88 = _____ Allowable water use 20% Reduction _____ (BWU from WS-1) × .80 = _____ Allowable water use 25% Reduction _____ (BWU from WS-1) × .75 = _____ Allowable water use									

1. For occupancies, refer to Table A, Chapter 4, 2016 *California Plumbing Code*, for occupant load factors.
 - a. Shower use by occupants depends on the type of use of a building or portion of a building, e.g., total occupant load for a health club, but only a fraction of the occupants in an office building as determined by the anticipated number of users.
 - b. Kitchen faucet use is determined by the occupant load of the area served by the fixture.
2. Includes single and dual flush water closets with an effective flush of 1.28 gallons or less.

Single flush toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is the average flush volume when tested in accordance with ASME A112.19.2.

Dual flush toilets - The effective flush volume shall not exceed 1.28 gallons (4.8 liters). The effective flush volume is defined as the composite, average flush volume of two reduced flushes and one full flush. Flush volumes will be tested in accordance with ASME A112.19.2 and ASME A112.19.14.
3. The daily use number shall be increased to three if urinals are not installed in the room.
4. Where complying faucets are unavailable, aerators rated at 35 gpm or other means may be used to achieve reduction.

Construction Waste Management (CWM) Acknowledgment

Note: This sample form may be used to assist in documenting compliance with the waste management plan.

[illegible]

Title 23, Waters, California Code of Regulations

APPENDIX D Prescriptive Compliance Option

Note: Appendix D – Prescriptive Compliance Option is reprinted from the Model Water Efficient Landscape Ordinance (MWEL0) contained in the *California Code of Regulations*, Title 23, Division 2, Chapter 2.7, Section 490, as adopted by the Department of Water Resources (DWR) on July 15, 2015. The language contained in Appendix D is reprinted herein as a resource. Please contact DWR to verify the applicable Title 23 requirements prior to using this document for enforcement purposes. For questions regarding this appendix (interpretation, effectiveness, applicability, etc.), DWR may be contacted by the following information:

California Department of Water Resources

Urban Water Use Efficiency Unit

ATTN: Julie Saare-Edmonds, Senior Environmental Scientist

P.O. Box 942836

Sacramento, CA 94236-0001 Email: Julie.Saare-

Edmonds@water.ca.gov

Telephone: 916-651-9676

<http://water.ca.gov/wateruseefficiency/landscapeordinance/>

Appendix D – Prescriptive Compliance Option

- (a) This appendix contains prescriptive requirements which may be used as a compliance option to the Model Water Efficient Landscape Ordinance.
- (b) Compliance with the following items is mandatory and must be documented on a landscape plan in order to use the prescriptive compliance option:
 - (1) Submit a Landscape Documentation Package which includes the following elements:
 - (A) date
 - (B) project applicant
 - (C) project address (if available, parcel and/or lot number(s))
 - (D) total landscape area (square feet), including a breakdown of turf and plant material
 - (E) project type (e.g., new, rehabilitated, public, private, cemetery, homeowner-installed)
 - (F) water supply type (e.g., potable, recycled, well) and identify the local retail water purveyor if the applicant is not served by a private well
 - (G) contact information for the project applicant and property owner
 - (H) applicant signature and date with statement, "I agree to comply with the requirements of the prescriptive compliance option to the MWEL0".
 - (2) Incorporate compost at a rate of at least four cubic yards per 1,000 square feet to a depth of six inches into landscape area (unless contraindicated by a soil test);
 - (3) Plant material shall comply with all of the following:
 - (A) For residential areas, install climate adapted plants that require occasional, little or no summer water (average WUCOLS plant factor 0.3) for 75% of the plant area excluding edibles and areas using recycled water; For non-residential areas, install climate adapted plants that require occasional, little or no summer water (average WUCOLS plant factor 0.3) for 100% of the plant area excluding edibles and areas using recycled water;
 - (B) A minimum three inch (3") layer of mulch shall be applied on all exposed soil surfaces of planting areas except in turf areas, creeping or rooting groundcovers, or direct seeding applications where mulch is contraindicated.
 - (4) Turf shall comply with all of the following:
 - (A) Turf shall not exceed 25% of the landscape area in residential areas, and there shall be no turf in non-residential areas;
 - (B) Turf shall not be planted on sloped areas which exceed a slope of 1 foot vertical elevation change for every 4 feet of horizontal length;
 - (C) Turf is prohibited in parkways less than 10 feet wide, unless the parkway is adjacent to a parking strip and used to enter and exit vehicles. Any turf in parkways must be irrigated by subsurface irrigation or by other technology that creates no overspray or runoff.
 - (5) Irrigation systems shall comply with the following:
 - (A) Automatic irrigation controllers are required and must use evapotranspiration or soil moisture sensor data and utilize a rain sensor.
 - (B) Irrigation controllers shall be of a type which does not lose programming data in the event the primary power source is interrupted.
 - (C) Pressure regulators shall be installed on the irrigation system to ensure the dynamic pressure of the system is within the manufacturers' recommended pressure range.
 - (D) Manual shut-off valves (such as a gate valve, ball valve, or butterfly valve) shall be installed as close as possible to the point of connection of the water supply.
 - (E) All irrigation emission devices must meet the requirements set in the ANSI standard, ASABE/ICC 802-2014, "Landscape Irrigation Sprinkler and Emitter Standard." All sprinkler heads installed in the landscape must document a distribution uniformity low quarter of 0.65 or higher using the protocol defined in ASABE/ICC 802-2014.
 - (F) Areas less than ten (10) feet in width in any direction shall be irrigated with subsurface irrigation or other means that produces no runoff or overspray.
 - (6) For non-residential projects with landscape areas of 1,000 sq. ft. or more, a private submeter(s) to measure landscape water use shall be installed.
- (c) At the time of final inspection, the permit applicant must provide the owner of the property with a certificate of completion, certificate of installation, irrigation schedule and a schedule of landscape and irrigation maintenance.

APPENDIX A4

RESIDENTIAL VOLUNTARY MEASURES

Division A4.2 – ENERGY EFFICIENCY

SECTION A4.201 GENERAL

A4.201.1 Scope. For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory standards. It is the intent of these voluntary provisions to encourage local jurisdictions through codification to achieve exemplary performance in the area of building energy efficiency. Local jurisdictions adopting these voluntary provisions as mandatory local energy efficiency standards shall submit the required application and receive the required approval of the California Energy Commission in compliance with Chapter 10, Section 106 of the *California Administrative Code*, prior to enforcement. Once approval is granted by the Energy Commission, local jurisdictions shall file an ordinance expressly marking the local modification along with findings and receive the required acceptance from the California Building Standards Commission in compliance with Section 101.7 of this code, prior to enforcement. (Chapter 10, Section 106 of the *California Administrative Code* is available at <http://www.energy.ca.gov/title24/2016standards/>)

SECTION A4.202 DEFINITIONS

A4.202.1 Definitions. The following terms are defined in Chapter 2.

ENERGY BUDGET.

ENERGY DESIGN RATING.

TIME DEPENDENT VALUATION (TDV) ENERGY.

SECTION A4.203 PERFORMANCE APPROACH FOR NEWLY CONSTRUCTED BUILDINGS

A4.203.1 Energy efficiency. Newly constructed low-rise residential buildings shall comply with Sections A4.203.1.1 and either A4.203.1.2.1, A4.203.1.2.2 or A4.203.1.2.3.

A4.203.1.1 Tier 1, Tier 2, and zero net energy design prerequisites. Each of the following efficiency measures is required for all applicable components of the building project.

A4.203.1.1.1 Energy design rating. An energy design rating for the Proposed Design Building shall be computed by Compliance Software certified by the Energy Commission and this rating shall be included in the Certificate of Compliance documentation.

A4.203.1.1.2 Quality Insulation Installation (QII). The QII procedures specified in the Building Energy Efficiency Standards Reference Residential Appendix RA3.5 shall be completed.

A4.203.1.2 Performance standard. Comply with one of the advanced efficiency levels indicated below.

A4.203.1.2.1 Tier 1. Buildings complying with the first level of advanced energy efficiency shall have either an Energy Budget that is no greater than 85 percent of the Title 24, Part 6 Energy Budget for the Standard Design Building, or an Energy Design Rating showing a 15% or greater reduction in its Energy Budget component compared to the Standard Design Building, as calculated by Title 24, Part 6 Compliance Software approved by the Energy Commission.

A4.203.1.2.2 Tier 2. Buildings complying with the second level of advanced energy efficiency shall have either an Energy Budget that is no greater than 70 percent of the Title 24, Part 6 Energy Budget for the Standard Design Building, or an Energy Design Rating showing a 30% or greater reduction in its Energy Budget component compared to the Standard Design Building, as calculated by Title 24, Part 6 Compliance Software approved by the Energy Commission.

A4.203.1.2.3 Zero net energy design. Buildings complying with this elective designation shall have on-site renewable energy generation sufficient to achieve an Energy Design Rating of zero (0) as calculated by Title 24, Part 6 Compliance Software approved by the Energy Commission, and:

1. Single-family buildings in Climate Zones 6 and 7, and low-rise multifamily buildings in Climate Zone 3, 5, 6, and 7 shall comply with Section A4.203.1.2.1 (Tier 1); and
2. Single-family buildings in Climate Zones 1 through 5 and 8 through 16 and low-rise multifamily buildings in Climate Zones 1, 2, 4, and 8 through 16 shall comply with Section A4.203.1.2.2 (Tier 2).

Note: For Energy Budget calculations, high-rise residential and hotel/motel buildings are considered nonresidential buildings.

Authority: *Public Resources Code* Sections 25218, subd. (e), 25402, 25402.1, 25402.4, 25402.5, 25402.5.4, 25402.8, 25910 and 25943, and *Health and Safety Code* Sections 18930.5 and 18941.5.

Reference: *Public Resources Code* Sections 25402, subd. (a)-(c), 25402.1, 25402.4, 25402.5, 25402.5.4, 25402.8, 25910 and 25943, and *Health and Safety Code* Sections 18930.5 and 18941.5.

SECTION A4.204

PERFORMANCE APPROACH FOR ADDITIONS

A4.204.1 Energy efficiency. Additions to low-rise residential buildings shall comply with Section A4.204.1.1 or A4.204.1.2.

A4.204.1.1 Tier 1. Buildings complying with the first level of advanced energy efficiency shall have an Energy Budget that is no greater than indicated below, depending on the number of mechanical systems added. Space heating systems, space cooling systems and water heating systems are each separate mechanical systems for the purpose of complying with this requirement. If the addition changes only the envelope with no change to any mechanical system, then no additional performance requirements above Title 24, Part 6 are required.

1. For one and only one mechanical system: No greater than 95 percent of the Title 24, Part 6 Energy Budget for the Standard Design Building as calculated by Compliance Software certified by the Energy Commission.
2. For two or more mechanical systems: No greater than 90 percent of the Title 24, Part 6 Energy Budget for the Standard Design Building as calculated by Compliance Software certified by the Energy Commission.

A4.204.1.2 Tier 2. Buildings complying with the second level of advanced energy efficiency shall have an Energy Budget that is no greater than indicated below, depending on the number of mechanical systems added. Space heating systems, space cooling systems and water heating systems are each separate mechanical systems for the purpose of complying with this requirement. If the addition changes only the envelope with no change to any mechanical

system, then no additional performance requirements above Title 24, Part 6 are required.

1. For one and only one mechanical system: No greater than 90 percent of the Title 24, Part 6 Energy Budget for the Standard Design Building as calculated by Compliance Software certified by the Energy Commission.
2. For two or more mechanical systems: No greater than 85 percent of the Title 24, Part 6 Energy Budget for the Standard Design Building as calculated by Compliance Software certified by the Energy Commission.

Note: For Energy Budget calculations, high-rise residential and hotel/motel buildings are considered nonresidential buildings.

APPENDIX A4

RESIDENTIAL VOLUNTARY MEASURES

Division A4.3 – WATER EFFICIENCY AND CONSERVATION

SECTION A4.301 GENERAL (Reserved)

SECTION A4.302 DEFINITIONS

A4.302.1 Definition. The following term is defined in Chapter 2.

REFERENCE EVAPOTRANSPIRATION (*E_T*o).

SECTION A4.303 INDOOR WATER USE

A4.303.1 Kitchen faucets. The maximum flow rate of kitchen faucets shall not exceed 1.5 gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.5 gallons per minute at 60 psi.

Note: Where complying faucets are unavailable, aerators or other means may be used to achieve reduction.

A4.303.2 Alternate water sources for nonpotable applications. Alternate nonpotable water sources are used for indoor potable water reduction. Alternate nonpotable water sources shall be installed in accordance with the *California Plumbing Code*.

A4.303.3 Appliances. Install at least one qualified ENERGY STAR dishwasher or clothes washer.

Note: See Section A5.303.3 for nonresidential dishwashers and clothes washers.

A4.303.4 Nonwater supplied urinals and waterless toilets. Nonwater supplied urinals or composting toilets are installed.

Where approved, hybrid urinals, as defined in Chapter 2, shall be considered waterless urinals.

A4.303.5 Hot water recirculation systems. One- and two-family dwellings shall be equipped with a demand hot water recirculation system, as defined in Chapter 2. The demand hot water recirculation system shall be installed in accordance with the *California Plumbing Code*, *California Energy Code*, and the manufacturer's installation instructions.

SECTION A4.304 OUTDOOR WATER USE

A4.304.1 Rainwater catchment systems. An approved rainwater catchment system is designed and installed to use rainwater generated by at least 65 percent of the available roof area. Rainwater catchment systems shall be designed and installed in accordance with the *California Plumbing Code*.

A4.304.2 Potable water elimination. When landscaping is provided and as allowed by local ordinance, a water efficient landscape irrigation design that eliminates the use of potable water beyond the initial requirements for plant installation and establishment should be provided. Methods used to accomplish the requirements of this section must be designed to the requirements of the *California Building Standards Code* and shall include, but not be limited to, the following:

1. Use of captured rainwater.
2. Use of recycled water.
3. Water treated for irrigation purposes and conveyed by a water district or public entity.
4. Use of graywater.

A4.304.3 Landscape water meters. For new water service connections, landscaped irrigated areas less than 5,000 square feet shall be provided with separate submeters or metering devices for outdoor potable water use.

SECTION A4.305 WATER REUSE SYSTEMS

A4.305.1 Graywater. Alternative plumbing piping is installed to permit the discharge from the clothes washer or other fixtures to be used for an irrigation system in compliance with the *California Plumbing Code*.

A4.305.2 Recycled water piping. Based on projected availability, dual water piping is installed for future use of recycled water at the following locations:

1. Interior piping for the use of recycled water is installed to serve all water closets, urinals and floor drains.
2. Exterior piping is installed to transport recycled water from the point of connection to the structure. Recycled water systems shall be designed and installed in accordance with the *California Plumbing Code*.

A4.305.3 Recycled water for landscape irrigation. Recycled water is used for landscape irrigation.

**SECTION A4.306
INNOVATIVE CONCEPTS AND LOCAL
ENVIRONMENTAL CONDITIONS**

A4.306.1 Innovative concepts and local environmental conditions. The provisions of this code are not intended to prevent the use of any alternate material, appliance, installation, device, arrangement, method, design or method of construction not specifically prescribed by this code. This code does not limit the authority of city, county, or city and county government to make necessary changes to the provisions contained in this code pursuant to Section 101.7.1.

APPENDIX A4

RESIDENTIAL VOLUNTARY MEASURES

Division A4.6 – TIER 1 AND TIER 2

SECTION A4.601 GENERAL

> **A4.601.1 Scope.** The measures contained in this appendix are not mandatory unless adopted by a city, county, or city and county as specified in Section 101.7. The provisions of this section outline means of achieving enhanced construction or reach levels by incorporating additional green building measures. In order to meet one of the tier levels designers, builders or property owners are required to incorporate additional green building measures necessary to meet the threshold of each level.

A4.601.2 Prerequisite measures. Tier 1 and Tier 2 thresholds require compliance with the mandatory provisions of this code and incorporation of the required prerequisite measures listed in Section A4.601.4.2 for Tier 1 and A4.601.5.2 for Tier 2. Prerequisite measures are also identified in the Residential Occupancies Application Checklist in Section A4.602.

As specified in Section 101.7, additional prerequisite measures may be included by the enforcing agency to address specific local environmental conditions and may be listed in the Innovative Concepts and Local Environmental Conditions portions of the checklist.

A4.601.3 Elective measures. In addition to the required measures, Tier 1 and Tier 2 buildings must incorporate at least the number of elective measures specified in Sections A4.601.4.2 and A4.601.5.2.

A4.601.4 Tier 1. To achieve Tier 1 status a project must comply with the following:

A4.601.4.1 Mandatory measures for Tier 1. The project shall meet or exceed all of the mandatory measures in Chapter 4, Divisions 4.1 through 4.5 and Chapter 7 as applicable.

A4.601.4.2 Prerequisite and elective measures for Tier 1. In addition to the mandatory measures, compliance with the following prerequisite and elective measures from Appendix A4 is also required to achieve Tier 1 status:

1. From Division A4.1, Planning and Design.
 - 1.1. Comply with the topsoil protection requirements in Section A4.106.2.3.
 - 1.2. Comply with the 20 percent permeable paving requirements in Section A4.106.4.
 - 1.3. Comply with the cool roof requirements in Section A4.106.5.
 - 1.4. Comply with the electric vehicle (EV) charging requirements in Section A4.106.8.

- 1.5. Comply with at least two elective measures selected from Division A4.1.
2. From Division A4.2, Energy Efficiency.
 - 2.1. For newly constructed low-rise residential buildings, comply with the energy efficiency requirements in Section A4.203.1.1 and A4.203.1.2.1.
 - 2.2. For additions to low-rise residential buildings, comply with the energy efficiency requirements in Section A4.204.1.1.
3. From Division A4.3, Water Efficiency and Conservation.
 - 3.1. Comply with at least two elective measures selected from Division A4.3.
4. From Division A4.4, Material Conservation and Resource Efficiency.
 - 4.1. Comply with the 20 percent cement reduction requirements in Section A4.403.2.
 - 4.2. Comply with the 10 percent recycled content requirements in Section A4.405.3.1.
 - 4.3. Comply with the 65 percent reduction in construction waste in Section A4.408.1.
 - 4.4. Comply with at least two elective measures selected from Division A4.4.
5. From Division A4.5, Environmental Quality.
 - 5.1. Comply with the 90-percent resilient flooring systems requirements in Section A4.504.2.
 - 5.2. Comply with the thermal insulation requirements for Tier 1 in Section A4.504.3.
 - 5.3. Comply with at least one elective measure selected from Division A4.5.

Note: The Residential Occupancies Application Checklist contained in Section A4.602 may be used to show which elective measures are selected.

A4.601.5 Tier 2. To achieve Tier 2 status a project must comply with the following.

Note: The measures necessary to achieve Tier 2 status are very stringent. Cities, counties, and cities and counties considering adoption of Tier 2 as mandatory should carefully consider the stringency of each measure and ensure that the measures are achievable in their location.

A4.601.5.1 Mandatory measures for Tier 2. The project shall meet or exceed all of the mandatory measures in Chapter 4, Divisions 4.1 through 4.5 and Chapter 7 as applicable.

A4.601.5.2 Prerequisite and elective measures for Tier

2. In addition to the mandatory measures, compliance with the following prerequisite and elective measures from Appendix A4 is also required to achieve Tier 2 status.

1. From Division A4.1, Planning and Design.
 - 1.1. Comply with the topsoil protection requirements for Tier 1 and Tier 2 in Section A4.106.2.3.
 - 1.2. Comply with the 30 percent permeable paving requirements in Section A4.106.4.
 - 1.3. Comply with the cool roof requirements in Section A4.106.5.
 - 1.4. Comply with the Tier 1 electric vehicle (EV) charging requirements in Section A4.106.8.
 - 1.5. Comply with at least four elective measures selected from Division A4.1.
2. From Division A4.2, Energy Efficiency.
 - 2.1. For newly constructed low-rise residential buildings, comply with the energy efficiency requirements in Sections A4.203.1.1 and A4.203.1.2.2.
 - 2.2. For additions to low-rise residential buildings, comply with the energy efficiency requirements in Section A4.204.1.2.
3. From Division A4.3, Water Efficiency and Conservation.
 - 3.1. Comply with at least three elective measures selected from Division A4.3.
4. From Division A4.4, Material Conservation and Resource Efficiency.
 - 4.1. Comply with the 25 percent cement reduction requirements in Section A4.403.2.
 - 4.2. Comply with the 15 percent recycled content requirements in Section A4.405.3.1.
 - 4.3. Comply with the 75 percent reduction in construction waste in Section A4.408.1.
 - 4.4. Comply with at least four elective measures selected from Division A4.4.
5. From Division A4.5, Environmental Quality.
 - 5.1. Comply with the 100-percent resilient flooring systems requirements in Section A4.504.2.
 - 5.2. Comply with the thermal insulation requirements for Tier 1 and Tier 2 in Section A4.504.3.
 - 5.3. Comply with at least one elective measure selected from Division A4.5.

Note: The Residential Occupancies Application Checklist contained in Section A4.602 may be used to show which elective measures are selected.

DIVISION A4.6 – TIER 1 AND TIER 2—continued

SECTION A4.602 RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST Effective July 1, 2015

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD				
		Prerequisites and electives ¹		Enforcing Agency ☐ All	Installer or Designer ☐ All	Third party ☐ All		
		Mandatory	Tier 1	Tier 2				
PLANNING AND DESIGN								
Site Selection								
A4.103.1 A site which complies with at least one of the following characteristics is selected: 1. An infill site is selected. 2. A greyfield site is selected. 3. An EPA-recognized Brownfield site is selected.		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐		
A4.103.2 Facilitate community connectivity by one of the following methods: 1. Locate project within a 1/4-mile true walking distance of at least 4 basic services; 2. Locate project within 1/2-mile true walking distance of at least 7 basic services; 3. Other methods increasing access to additional resources.		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐		
Site Preservation								
A4.104.1 An individual with oversight responsibility for the project has participated in an educational program promoting environmentally friendly design or development and has provided training or instruction to appropriate entities.		☐	☐	☐	☐	☐		
Deconstruction and Reuse of Existing Materials								
A4.105.2 Existing buildings are disassembled for reuse or recycling of building materials. The proposed structure utilizes at least one of the following materials which can be easily reused: 1. Light fixtures 2. Plumbing fixtures 3. Doors and trim 4. Masonry 5. Electrical devices 6. Appliances 7. Foundations or portions of foundations		☐	☐	☐	☐	☐		
Site Development								
4.106.2 A plan is developed and implemented to manage storm water drainage during construction.	☒			☐	☐	☐		
4.106.3 Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings.	☒			☐	☐	☐		
4.106.4 Provide capability for electric vehicle charging in one- and two-family dwellings and in townhouses with attached private garages; and 3 percent of total parking spaces, as specified, for multifamily dwellings.	☒			☐	☐	☐		
A4.106.1 Reserved		☐	☐	☐	☐	☐		

continued

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
	Mandatory	Prerequisites and electives ¹		Enforcing Agency	Installer or Designer	Third party
		Tier 1	Tier 2	☐ All	☐ All	☐ All
A4.106.2.1 Soil analysis is performed by a licensed design professional and the findings utilized in the structural design of the building.		☐	☐	☐	☐	☐
A4.106.2.2 Soil disturbance and erosion are minimized by at least one of the following: 1. Natural drainage patterns are evaluated and erosion controls are implemented to minimize erosion during construction and after occupancy. 2. Site access is accomplished by minimizing the amount of cut and fill needed to install access roads and driveways. 3. Underground construction activities are coordinated to utilize the same trench, minimize the amount of time the disturbed soil is exposed and the soil is replaced using accepted compaction methods.		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐
A4.106.2.3 Topsoil shall be protected or saved for reuse as specified in this section. Tier 1. Displaced topsoil shall be stockpiled for reuse in a designated area and covered or protected from erosion. Tier 2. The construction area shall be identified and delineated by fencing or flagging to limit construction activity to the construction area.		☒ ²	☒ ^{2"/> ☒²}	☐	☐	☐
A4.106.3 Postconstruction landscape designs accomplish one or more of the following: 1. Areas disrupted during construction are restored to be consistent with native vegetation species and patterns. 2. Utilize at least 75 percent native California or drought tolerant plant and tree species appropriate for the climate zone region.		☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
A4.106.4 Permeable paving is utilized for the parking, walking or patio surfaces in compliance with the following: Tier 1. Not less than 20 percent of the total parking, walking or patio surfaces shall be permeable. Tier 2. Not less than 30 percent of the total parking, walking or patio surfaces shall be permeable.		☒ ²	☒ ²	☐ ☐	☐ ☐	☐ ☐
A4.106.5 Roofing materials shall have a minimum 3-year aged solar reflectance and thermal emittance or a minimum Solar Reflectance Index (SRI) equal to or greater than the values specified in Tables A4.106.5.1(1) and A4.106.5.1(2) for low-rise residential buildings and Tables A4.106.5.1(3) and A4.106.5.1(4) for high rise residential buildings. Low-rise Residential Tier 1 roof covering shall meet or exceed the values contained in Table A4.106.5.1(1). Tier 2 roof covering shall meet or exceed the values contained in Table A4.106.5.1(2). High-rise Residential, Hotels and Motels Tier 1 roof covering shall meet or exceed the values contained in Table A4.106.5.1(3). Tier 2 roof covering shall meet or exceed the values contained in Table A4.106.5.1(4).		☒ ^{2"/> ☒²}	☒ ^{2"/> ☒²}	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐

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SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives ¹		Enforcing Agency ☐ All	Installer or Designer ☐ All	Third party ☐ All
		Mandatory	Tier 1	Tier 2		
A4.106.6 Install a vegetated roof for at least 50 percent of the roof area. Vegetated roofs shall comply with requirements for roof gardens and landscaped roofs in the <i>California Building Code</i> , Chapters 15 and 16.			☐	☐	☐	☐
A4.106.7 Reduce nonroof heat islands for 50 percent of sidewalks, patios, driveways or other paved areas by using one or more of the methods listed.			☐	☐	☐	☐
A4.106.8.1 Tier 1 and Tier 2 for one- and two-family dwellings and townhouses with attached private garages. Install a dedicated 208/240-volt branch circuit, including an overcurrent protective device rated at 40 amperes minimum per dwelling unit.			☒ ²	☒ ²	☐	☐
A4.106.8.2 Tier 1 and Tier 2 for multifamily dwellings. Provide capability for future electric vehicle charging in 5 percent of total parking spaces, as specified.			☒ ²	☒ ²	☐	☐
A4.106.9 Provide bicycle parking facilities as noted below or meet a local ordinance, whichever is more stringent. Number of bicycle parking spaces may be reduced, as approved by the enforcing agency, due to building site characteristics, including but not limited to, isolation from other development. 1. Provide short-term bicycle parking, per Section A4.106.9.1. 2. Provide long-term bicycle parking for multifamily buildings, per Section A4.106.9.2. 3. Provide long-term bicycle parking for hotel and motel buildings, per Section A4.106.9.3.			☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐
A4.106.10 [HR] Outdoor lighting systems shall be designed and installed to comply with: 1. The minimum requirements in the <i>California Energy Code</i> for Lighting Zones 1-4; and 2. Backlight, Uplight and Glare (BUG) ratings as defined in IES TM-15-11; and 3. Allowable BUG ratings not exceeding those shown in Table A4.106.10; or Comply with a lawfully enacted local ordinance, whichever is more stringent.			☐ ☐	☐ ☐	☐ ☐	☐ ☐

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SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives ¹		Enforcing Agency ☐ All	Installer or Designer ☐ All	Third party ☐ All
		Mandatory	Tier 1	Tier 2		
Innovative Concepts and Local Environmental Conditions						
A4.108.1 Items in this section are necessary to address innovative concepts or local environmental conditions.						
Item 1	☐	☐	☐	☐	☐	☐
Item 2	☐	☐	☐	☐	☐	☐
Item 3	☐	☐	☐	☐	☐	☐
ENERGY EFFICIENCY						
General						
4.201.1 Building meets or exceeds the requirements of the <i>California Building Energy Efficiency Standards</i> ³ .	☒	☒ ²	☒ ²	☐	☐	☐
Performance Approach for Newly Constructed Buildings						
A4.203.1.1.1 An Energy Design Rating for the Proposed Design Building is included in the Certificate of Compliance documentation.		☒ ²	☒ ²	☐	☐	☐
A4.203.1.1.2 QII procedures specified in the Building Energy Efficiency Standards Reference Residential Appendix RA3.5 are completed.		☒ ²	☒ ²	☐	☐	☐
A4.203.1.2.1 Tier 1: Buildings complying with the first level of advanced energy efficiency shall have either an Energy Budget that is no greater than 85 percent of the Title 24, Part 6 Energy Budget for the Standard Design Building, or an Energy Design Rating showing a 15% or greater reduction in its Energy Budget component compared to the Standard Design Building, as calculated by Title 24, Part 6 Compliance Software approved by the Energy Commission.		☒ ²		☐	☐	☐
A4.203.1.2.2 Tier 2: Buildings complying with the second level of advanced energy efficiency shall have either an Energy Budget that is no greater than 70 percent of the Title 24, Part 6 Energy Budget for the Standard Design Building, or an Energy Design Rating showing a 30% or greater reduction in its Energy Budget component compared to the Standard Design Building, as calculated by Title 24, Part 6 Compliance Software approved by the Energy Commission.			☒ ²	☐	☐	☐
A4.203.1.2.3 Zero Net Energy Design (elective): Shall comply with all of the following: 1. Section A4.203.1.1 (Prerequisite) and 2. Section A4.203.1.2.1 • for single-family buildings in Climate Zones 6 and 7, and low-rise multifamily buildings in Climate Zones 3, 5, 6, and 7 or Section A4.203.1.2.2 • for single-family buildings in Climate Zones 1-5 and 8-16, and low-rise multifamily buildings in Climate Zones 1, 2, 4, and 8-16 3. Energy Design Rating of zero (0) or less		☐	☐	☐	☐	☐
Performance Approach for Additions						
A4.204.1.1 Tier 1. If only one mechanical system is added or modified, the Energy Budget is no greater than 95 percent of the Title 24, Part 6, Energy Budget for the Standard Design Building. If two or more mechanical systems are added or modified, the Energy Budget is no greater than 90 percent of the Title 24, Part 6, Energy Budget for the Standard Design Building.		☒ ²		☐	☐	☐
A4.204.1.2 Tier 2. If only one mechanical system is added or modified, the Energy Budget is no greater than 90 percent of the Title 24, Part 6, Energy Budget for the Standard Design Building. If two or more mechanical systems are added or modified, the Energy Budget is no greater than 85 percent of the Title 24, Part 6, Energy Budget for the Standard Design Building.			☒ ²	☐	☐	☐

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SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives ¹		Enforcing Agency ☐ All	Installer or Designer ☐ All	Third party ☐ All
		Mandatory	Tier 1			
WATER EFFICIENCY AND CONSERVATION						
Indoor Water Use						
4.303.1 Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) installed in residential buildings shall comply with the prescriptive requirements of Sections 4.303.1.1 through 4.303.1.4.4.	☒			☐	☐	☐
4.303.2 Plumbing fixtures and fittings required in Section 4.303.1 shall be installed in accordance with the <i>California Plumbing Code</i> , and shall meet the applicable referenced standards.	☒			☐	☐	☐
A4.303.1 Kitchen faucets. The maximum flow rate of kitchen faucets shall not exceed 1.5 gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.5 gallons per minute at 60 psi. Note: Where complying faucets are unavailable, aerators or other means may be used to achieve reduction.		☐	☐	☐	☐	☐
A4.303.2 Alternate water source for nonpotable applications. Alternate nonpotable water sources are used for indoor potable water reduction. Alternate nonpotable water sources shall be installed in accordance with the <i>California Plumbing Code</i> .		☐	☐	☐	☐	☐
A4.303.3 Install at least one qualified ENERGY STAR dishwasher or clothes washer.		☐	☐	☐	☐	☐
A4.303.4 Nonwater supplied urinals or waterless toilets are installed.		☐	☐	☐	☐	☐
A4.303.5 One- and two-family dwellings shall be equipped with a demand hot water recirculation system.		☐	☐	☐	☐	☐
Outdoor Water Use						
4.304.1 After December 1, 2015, new residential developments with an aggregate landscape area equal to or greater than 500 square feet shall comply with one of the following options: 1. A local water efficient landscape ordinance or the current California Department of Water Resources’ Model Water Efficient Landscape Ordinance (MWELO), whichever is more stringent; or 2. Projects with aggregate landscape areas less than 2,500 square feet may comply with the MWELO’s Appendix D Prescriptive Compliance Option.	☒			☐ ☐	☐ ☐	☐
A4.304.1 A rainwater capture, storage and re-use system is designed and installed.		☐	☐	☐	☐	☐
A4.304.2 A landscape design is installed, which does not utilize potable water.		☐	☐	☐	☐	☐
A4.304.3 For new water service connections, landscaped irrigated areas less than 5,000 square feet shall be provided with separate submeters or metering devices for outdoor potable water use.		☐	☐	☐	☐	☐

continued

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
	Mandatory	Prerequisites and electives ¹		Enforcing Agency	Installer or Designer	Third party
		Tier 1	Tier 2	☐ All	☐ All	☐ All
WATER REUSE SYSTEMS						
A4.305.1 Piping is installed to permit future use of a graywater irrigation system served by the clothes washer or other fixtures.		☐	☐	☐	☐	☐
A4.305.2 Recycled water piping is installed.		☐	☐	☐	☐	☐
A4.305.3 Recycled water is used for landscape irrigation.		☐	☐	☐	☐	☐
Innovative Concepts and Local Environmental Conditions						
A4.306.1 Items in this section are necessary to address innovative concepts or local environmental conditions.						
Item 1	☐	☐	☐	☐	☐	☐
Item 2	☐	☐	☐	☐	☐	☐
Item 3	☐	☐	☐	☐	☐	☐
MATERIAL CONSERVATION AND RESOURCE EFFICIENCY						
Foundation Systems						
A4.403.1 A Frost-protected Shallow Foundation (FPSF) is designed and constructed.		☐	☐	☐	☐	☐
A4.403.2 Cement use in foundation mix design is reduced. Tier 1. Not less than a 20 percent reduction in cement use. Tier 2. Not less than a 25 percent reduction in cement use.		☒ ²	☒ ²	☐	☐	☐
Efficient Framing Techniques						
A4.404.1 Beams and headers and trimmers are the minimum size to adequately support the load.		☐	☐	☐	☐	☐
A4.404.2 Building dimensions and layouts are designed to minimize waste.		☐	☐	☐	☐	☐
A4.404.3 Use premanufactured building systems to eliminate solid sawn lumber whenever possible.		☐	☐	☐	☐	☐
A4.404.4 Material lists are included in the plans which specify material quantity and provide direction for on-site cuts.		☐	☐	☐	☐	☐

continued

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives ¹		Enforcing Agency ☐ All	Installer or Designer ☐ All	Third party ☐ All
		Mandatory	Tier 1	Tier 2		
Material Sources						
A4.405.1 One or more of the following building materials, that do not require additional resources for finishing are used: 1. Exterior trim not requiring paint or stain 2. Windows not requiring paint or stain 3. Siding or exterior wall coverings which do not require paint or stain		☐	☐	☐	☐	☐
A4.405.2 Floors that do not require additional coverings are used including but not limited to stained, natural or stamped concrete floors.		☐	☐	☐	☐	☐
A4.405.3 Postconsumer or preconsumer recycled content value (RCV) materials are used on the project. Tier 1. Not less than a 10-percent recycled content value. Tier 2. Not less than a 15-percent recycled content value.		☒ ²	☒ ²	☐	☐	☐
A4.405.4 Renewable source building products are used.		☐	☐	☐	☐	☐
Enhanced Durability and Reduced Maintenance						
4.406.1 Annular spaces around pipes, electric cables, conduits or other openings in plates at exterior walls shall be protected against the passage of rodents by closing such openings with cement mortar, concrete masonry or similar method acceptable to the enforcing agency.	☒			☐	☐	☐
Water Resistance and Moisture Management						
A4.407.1 Install foundation and landscape drains.		☐	☐	☐	☐	☐
A4.407.2 Install gutter and downspout systems to route water at least 5 feet away from the foundation or connect to landscape drains which discharge to a dry well, sump, bioswale, rainwater capture system or other approved on-site location.		☐	☐	☐	☐	☐
A4.407.3 Provide flashing details on the building plans and comply with accepted industry standards or manufacturer's instructions.		☐	☐	☐	☐	☐
A4.407.4 Protect building materials delivered to the construction site from rain and other sources of moisture.		☐	☐	☐	☐	☐
A4.407.5 In Climate Zone 16 an ice/water barrier is installed at roof valleys, eaves and wall to roof intersections.		☐	☐	☐	☐	☐
A4.407.6 Exterior doors to the dwelling are protected to prevent water intrusion.		☐	☐	☐	☐	☐
A4.407.7 A permanent overhang or awning at least 2 feet in depth is provided.		☐	☐	☐	☐	☐

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SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives ¹		Enforcing Agency ☐ All	Installer or Designer ☐ All	Third party ☐ All
		Tier 1	Tier 2			
Construction Waste Reduction, Disposal and Recycling						
4.408.1 Recycle and/or salvage for reuse a minimum of 65 percent of the nonhazardous construction and demolition waste in accordance with one of the following: 1. Comply with a more stringent local construction and demolition waste management ordinance; or 2. A construction waste management plan, per Section 4.408.2; or 3. A waste management company, per Section 4.408.3; or 4. The waste stream reduction alternative, per Section 4.408.4.	☒			☐	☐	☐
A4.408.1 Construction waste generated at the site is diverted to recycle or salvage in compliance with one of the following: 1. Tier 1 at least a 65 percent reduction with a third-party verification. 2. Tier 2 at least a 75 percent reduction with a third-party verification. Exception: Equivalent waste reduction methods are developed by working with local agencies.		☒ ²	☒ ²	☐ ☐	☐ ☐	☐ ☐
Building Maintenance and Operation						
4.410.1 An operation and maintenance manual shall be provided to the building occupant or owner.	☒			☐	☐	☐
4.410.2 Where 5 or more multifamily dwelling units are constructed on a building site, provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics, organic waste, and metals or meet a lawfully enacted local recycling ordinance, if more restrictive. Exception: Rural jurisdictions that meet and apply for the exemption in Public Resources Code Section 42649.82 (a)(2)(A) et seq. will also be exempt from the organic waste portion of this section.	☒			☐	☐	☐
Innovative Concepts and Local Environmental Conditions						
A4.411.1 Items in this section are necessary to address innovative concepts or local environmental conditions.						
Item 1	☐	☐	☐	☐	☐	☐
Item 2	☐	☐	☐	☐	☐	☐
Item 3	☐	☐	☐	☐	☐	☐
ENVIRONMENTAL QUALITY						
Fireplaces						
4.503.1 Any installed gas fireplace shall be a direct-vent sealed-combustion type. Any installed woodstove or pellet stove shall comply with U.S. EPA New Source Performance Standards (NSPS) emission limits as applicable, and shall have a permanent label indicating they are certified to meet the emission limits. Woodstoves, pellet stoves and fireplaces shall also comply with applicable local ordinances.	☒			☐	☐	☐
Pollutant Control						
4.504.1 Duct openings and other related air distribution component openings shall be covered during construction.	☒			☐	☐	☐
4.504.2.1 Adhesives, sealants and caulks shall be compliant with VOC and other toxic compound limits.	☒			☐	☐	☐
4.504.2.2 Paints, stains and other coatings shall be compliant with VOC limits.	☒			☐	☐	☐
4.504.2.3 Aerosol paints and coatings shall be compliant with product weighted MIR limits for ROC and other toxic compounds.	☒			☐	☐	☐
4.504.2.4 Documentation shall be provided to verify that compliant VOC limit finish materials have been used.	☒			☐	☐	☐

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SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
	Mandatory	Prerequisites and electives ¹		Enforcing Agency ☐ All	Installer or Designer ☐ All	Third party ☐ All
		Tier 1	Tier 2			
4.504.3 Carpet and carpet systems shall be compliant with VOC limits.	☒			☐	☐	☐
4.504.4 80 percent of floor area receiving resilient flooring shall comply with specified VOC criteria.	☒			☐	☐	☐
4.504.5 Particleboard, medium density fiberboard (MDF) and hardwood plywood used in interior finish systems shall comply with low formaldehyde emission standards.	☒			☐	☐	☐
A4.504.1 Use composite wood products made with either California Air Resources Board approved no-added formaldehyde (NAF) resins or ultra-low emitting formaldehyde (ULEF) resins.		☐	☐	☐	☐	☐
A4.504.2 Install VOC compliant resilient flooring systems. Tier 1. At least 90 percent of the resilient flooring installed shall comply. Tier 2. At least 100 percent of the resilient flooring installed shall comply.		☒ ²	☒ ²	☐	☐	☐
A4.504.3 Thermal insulation installed in the building shall meet the following requirements: Tier 1. Install thermal insulation in compliance with VOC limits. Tier 2. Install insulation which contains No-Added Formaldehyde (NAF) and is in compliance with Tier 1.		☒ ²	☒ ²	☐	☐	☐
Interior Moisture Control						
4.505.2 Vapor retarder and capillary break is installed at slab-on-grade foundations.	☒			☐	☐	☐
4.505.3 Moisture content of building materials used in wall and floor framing is checked before enclosure.	☒			☐	☐	☐
Indoor Air Quality and Exhaust						
A4.506.1 Return air filters with a value greater than MERV 6 shall be installed on HVAC systems. Pressure drop across the filter shall not exceed 0.1 inches water column.		☐	☐	☐	☐	☐
A4.506.2 [HR] Provide filters on return air openings rated MERV 6 or higher during construction when it is necessary to use HVAC equipment.		☐	☐	☐	☐	☐
A4.506.3 Direct-vent appliances shall be used when equipment is located in conditioned space; or the equipment must be installed in an isolated mechanical room.		☐	☐	☐	☐	☐

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SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
	Mandatory	Prerequisites and electives ¹		Enforcing Agency ☐ All	Installer or Designer ☐ All	Third party ☐ All
		Tier 1	Tier 2			
Environmental Comfort						
4.507.2 Duct systems are sized, designed, and equipment is selected using the following methods: 1. Establish heat loss and heat gain values according to ANSI/ACCA 2 Manual J-2011 or equivalent. 2. Size duct systems according to ANSI/ACCA 1 Manual D-2014 or equivalent. 3. Select heating and cooling equipment according to ANSI/ACCA 3 Manual S-2014 or equivalent.	☒			☐	☐	☐
Outdoor Air Quality Reserved						
Innovative Concepts and Local Environmental Conditions						
A4.509.1 Items in this section are necessary to address innovative concepts or local environmental conditions.						
Item 1		☐	☐	☐	☐	☐
Item 2		☐	☐	☐	☐	☐
Item 3		☐	☐	☐	☐	☐
Installer and Special Inspector Qualifications						
Qualifications						
702.1 HVAC system installers are trained and certified in the proper installation of HVAC systems.	☒			☐	☐	☐
702.2 Special inspectors employed by the enforcing agency must be qualified and able to demonstrate competence in the discipline they are inspecting.	☒			☐	☐	☐
Verifications						
703.1 Verification of compliance with this code may include construction documents, plans, specifications builder or installer certification, inspection reports, or other methods acceptable to the enforcing agency which show substantial conformance.	☒			☐	☐	☐

1. Green building measures listed in this table may be mandatory if adopted by a city, county, or city and county as specified in Section 101.7.

2. Required prerequisite for this Tier.

3. These measures are currently required elsewhere in statute or in regulation.

A5.405.5.3.1.2 Alternative power. Alternate electric power generated at the cement plant and/or green power purchased from the utility meeting the requirements of Section A5.211.

A5.405.5.3.2 Concrete. The following measures shall be permitted to be used in the manufacture of concrete.

A5.405.5.3.2.1 Alternative energy. Renewable or alternative energy meeting the requirements of Section A5.211.

A5.405.5.3.2.2 Recycled aggregates. Concrete made with one or more of the following materials:

1. Blast furnace slag as a lightweight aggregate in unreinforced concrete.
2. Recycled concrete that meets grading requirements of ASTM C33, *Standard Specification for Concrete Aggregates*.
3. Other materials with comparable or superior environmental benefits, as approved by the engineer and enforcing authority.

A5.405.5.3.2.3 Mixing water. Water recycled by the local water purveyor or water reclaimed from manufacturing processes and conforming to ASTM C1602, *Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete*.

A5.405.5.3.2.4 High strength concrete. Concrete elements designed to reduce their total size compared to standard 3,000 psi concrete, thereby reducing the total volume of cement, aggregate and water used on the project, as approved by the Engineer of Record.

SECTION A5.406 ENHANCED DURABILITY AND REDUCED MAINTENANCE

A5.406.1 Choice of materials. Compared to other products in a given product category, choose materials proven to be characterized by one or more of the following.

A5.406.1.1 Service life. Select materials for longevity and minimal deterioration under conditions of use.

A5.406.1.2 Reduced maintenance. Select materials that require little, if any, finishing. For those with surface protection, choose materials that do not require frequent applications of toxic or malodorous finishes.

A5.406.1.3 Recyclability. Select materials that can be reused or recycled at the end of their service life in the project.

SECTION A5.408 CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

A5.408.3.1 Enhanced construction waste reduction – Tier 1. Divert to recycle or salvage at least 65 percent of nonhazardous construction and demolition waste gener-

ated at the site. Any mixed recyclables that are sent to mixed-waste recycling facilities shall include a qualified third party verified facility average diversion rate. Verification of diversion rates shall meet minimum certification eligibility guidelines, acceptable to the local enforcing agency.

A5.408.3.1.1 Enhanced construction waste reduction – Tier 2. Divert to recycle or salvage at least 80 percent of nonhazardous construction and demolition waste generated at the site.

A5.408.3.1.2 Verification of compliance. A copy of the completed waste management report or documentation of certification of the waste management company utilized shall be provided.

Exceptions:

1. Excavated soil and land-clearing debris.
2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.
3. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets.

SECTION A5.409 LIFE CYCLE ASSESSMENT

A5.409.1 General. Life cycle assessment shall be ISO 14044 compliant. The service life of the building and materials assemblies shall not be less than 60 years unless designated in the construction documents as having a shorter service life as approved by the enforcing agency.

A5.409.2 Whole building life cycle assessment. Conduct a whole building life assessment, including operating energy, showing that the building project achieves at least a 10 percent improvement for at least three of the impacts listed in Section A5.409.2.2, one of which shall be climate change, compared to a reference building of similar size, function, complexity and operating energy performance, and meeting the 2016 *California Energy Code* at a minimum.

A5.409.2.1 Building components. The building envelope, structural elements, including footings and foundations, interior ceilings, walls, and floors; and exterior finishes shall be considered in the assessment.

Exceptions:

1. Plumbing, mechanical and electrical systems and controls; fire and smoke detection and alarm systems and controls; and conveying systems.
2. Interior finishes are not required to be included.

Notes:

1. Software for calculating whole building life cycle assessments includes those found at the Athena Institute website (Impact Estimator software), the PE International website (GaBi software), and the PRe Consultants website (SimaPro software).

NONRESIDENTIAL VOLUNTARY MEASURES

2. Interior finishes, if included, may be assessed using the NIST BEES tool.

A5.409.2.2 Impacts to be considered. Select from the following impacts in the assessment:

1. Climate change (greenhouse gases).
2. Fossil fuel depletion.
3. Stratospheric ozone depletion.
4. Acidification of land and water sources.
5. Eutrophication.
6. Photochemical oxidants (smog).

A5.409.3 Materials and system assemblies. If whole building analysis of the project is not elected, select a minimum of 50 percent of materials or assemblies based on life cycle assessment of at least three of the impacts listed in Section A5.409.2.2, one of which shall be climate change.

Note: Software for calculating life cycle assessments for assemblies and materials may be found at the Athena Institute web site and the NIST BEES web site.

A5.409.4 Substitution for prescriptive standards. Performance of a life cycle assessment completed in accordance with Section A5.409.2 may be substituted for other prescriptive Material Conservation and Resource Efficiency provisions of Division A5.4, including those made mandatory through local adoption of Tier 1 or Tier 2 in Division A5.6.

A5.409.5 Verification of compliance. Documentation of compliance shall be provided as follows:

1. The assessment is performed in accordance with ISO 14044.
2. The project meets the requirements of other parts of Title 24.
3. A copy of the analysis shall be made available to the enforcement authority.
4. A copy of the analysis and any maintenance or training recommendations shall be included in the operation and maintenance manual.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
APPENDIX A5 – NONRESIDENTIAL VOLUNTARY MEASURES
DIVISION A5.5 – ENVIRONMENTAL QUALITY

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	BSC- CG	SFM	HCD			DSA		OSHDPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1/AC	AC	SS	1	2	3	4								
Adopt entire CA chapter																				
Adopt entire chapter as amended (amended sections listed below)																				
Adopt only those sections that are listed below		X						X												
Chapter/Section																				
A5.501.1		X																		
A5.502.1 Definitions		X																		
A5.504.1		X																		
A5.504.1.1, Items 1 & 2		X																		
A5.504.1.2		X																		
A5.504.2		X																		
A5.504.2.1 and subsections		X																		
A5.504.4.5.1		X																		
A5.504.4.7		X																		
A5.504.4.7.1		X																		
A5.504.4.7.2		X																		
A5.504.4.8		X																		
A5.504.4.8.1		X																		
A5.504.4.8.2		X																		
A5.504.4.9		X																		
A5.504.4.9.1		X																		
A5.504.5		X																		
A5.504.5.1		X																		
A5.504.5.2		X																		
A5.504.5.3.1		X																		
A5.504.5.3.1.1		X																		
Table A5.504.8.5		X																		
A5.507.1 and subsections		X																		
A5.507.2		X																		
A5.507.3 and subsections		X																		
A5.507.5								X												
A5.508		X																		

APPENDIX A5

NONRESIDENTIAL VOLUNTARY MEASURES

Division A5.5 – ENVIRONMENTAL QUALITY

SECTION A5.501 GENERAL

A5.501.1 Scope. The provisions of this chapter shall outline means of reducing the quantity of air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of a building's installers, occupants and neighbors.

SECTION A5.502 DEFINITIONS

A5.502.1 Definitions. The following terms are defined in Chapter 2.

INTERIOR, BUILDING.

MERV. [BSC]

MULTI-OCCUPANT SPACES.

NO ADDED FORMALDEHYDE (NAF) BASED RESINS.

SINGLE OCCUPANT SPACES.

ULTRA-LOW EMITTING FORMALDEHYDE (ULEF) RESINS.

SECTION A5.504 POLLUTANT CONTROL

A5.504.1 Indoor air quality (IAQ) during construction. Maintain IAQ as provided in Sections A5.504.1.1 and A5.504.1.2.

A5.504.1.1 Temporary ventilation. Provide temporary ventilation during construction in accordance with Section 120.1 (Requirements for Ventilation) of the *California Energy Code*, CCR, Title 24, Part 6 and Chapter 4 of CCR, Title 8 and as follows:

1. Ventilation during construction shall be achieved through openings in the building shell using fans to produce a minimum of three air changes per hour.
2. If the building is occupied during demolition or construction, meet or exceed the recommended Control Measures of the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 1995, Chapter 3.

A5.504.1.2 Additional IAQ measures. Employ additional measures as follows:

1. When using generators to generate temporary power, use generators meeting the requirements of CCR, Title 13, Chapter 9 or local ordinance, whichever is more stringent.

2. Protect on-site absorbent materials from moisture. Remove and replace any materials with evidence of mold, mildew or moisture infiltration.
3. Store odorous and high VOC-emitting materials off-site, without packaging, for a sufficient period to allow odors and VOCs to disperse.
4. When possible, once materials are on the jobsite, install odorous and high VOC-emitting materials prior to those that are porous or fibrous.
5. Clean oil and dust from ducts prior to use.

A5.504.2 IAQ postconstruction. After all interior finishes have been installed, flush out the building by supplying continuous ventilation with all air handling units at their maximum outdoor air rate and all supply fans at their maximum position and rate for at least 14 days.

1. During this time, maintain an internal temperature of at least 60°F and relative humidity no higher than 60 percent. If extenuating circumstances make these temperature and humidity limits unachievable, the flush-out may be conducted under conditions as close as possible to these limits, provided that documentation of the extenuating circumstances is provided in writing.
2. Occupancy may start after 4 days, provided flush-out continues for the full 14 days. During occupied times, the thermal comfort conditions of Title 24 must be met.
3. For buildings that rely on natural ventilation, exhaust fans and floor fans must be used to improve air mixing and removal during the 14-day flush-out and windows should remain open.
4. Do not "bake out" the building by increasing the temperature of the space.
5. If continuous ventilation is not possible, flush-out air must total the equivalent of 14 days of maximum outdoor air. The equivalent of 14 days of maximum outdoor air (the target air volume) shall be calculated by multiplying the maximum feasible air flow rate (in ft³/m) by 14 days (20,160 minutes). The air volumes for each period of ventilation are then calculated and summed and the flush-out continues until the total equals the target air volume.

A5.504.2.1 IAQ testing. If the engineer determines that building flush-out pursuant to Section A5.504.2 is not feasible, a testing alternative may be employed after all interior finishes have been installed, using testing protocols recognized by the United States Environmental Protection Agency (U.S. EPA).

A5.504.2.1.1 Maximum levels of contaminants. Allowable levels of contaminant concentrations measured by testing shall not exceed the following:

1. Carbon Monoxide (CO): 9 parts per million, not to exceed outdoor levels by 2 parts per million;
2. Formaldehyde: 27 parts per billion;
3. Particulates (PM10): 50 micrograms per cubic meter;
4. 4-Phenylcyclohexene (4-PCH), if fabrics and carpets with styrene butadiene rubber (SBR) latex backing, are installed: 6.5 micrograms per cubic meter; and
5. Total Volatile Organic Compounds (TVOC): 300 micrograms per cubic meter.

A5.504.2.1.2 Test protocols. Testing of indoor air quality should include the following elements:

1. The contaminant sampling and averaging times and the measurement methods should be sufficient to achieve a Limit of Detection that is below the maximum allowable concentrations.
2. Testing should be conducted with the HVAC system operated at the minimum design outdoor air ventilation rate.
3. Air samplers and monitors should be located near likely sources of formaldehyde and other volatile organic compounds, at a height of 3 to 6 feet from the floor and well away from walls and air diffusers.
4. The test protocols should be justified with documentation to show that appropriate sampling methods and times were used.

A5.504.2.1.3 Noncomplying building areas. For each sampling area of the building exceeding the maximum concentrations specified in Section A5.504.2.1.1, flush out with outside air and retest samples taken from the same area. Repeat the procedures until testing demonstrates compliance.

Note: U.S. EPA-recognized testing protocols may be found on the Air Resources Board web site.

A5.504.4.5.1 No added formaldehyde Tier 1. Use composite wood products approved by the California Air Resources Board (ARB) as no-added formaldehyde (NAF) based resins or ultra-low emitting formaldehyde (ULEF) resins.

Notes:

1. See Title 17, Section 93120.3(c) and (d), respectively.
2. Documentation must be provided verifying that materials are certified to meet the pollutant emission limits. A list of manufacturers and their NAF and ULEF certified materials is provided at: http://www.arb.ca.gov/toxics/compwood/naf_ulef/listofnaf_ulef.htm.

A5.504.4.7 Resilient flooring systems, Tier 1. For 90 percent of floor area receiving resilient flooring, install resilient flooring that is:

1. Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program;
2. Compliant with the VOC-emission limits and testing requirements specified in the California Department of Public Health's 2010 Standard Method for the Testing and Evaluation Chambers, Version 1.1, February 2010;
3. Compliant with the Collaborative for High Performance Schools California (CA-CHPS) Criteria Interpretation for EQ 7.0 and EQ 7.1 (formerly EQ 2.2) dated July 2012 and listed in the CHPS High Performance Product Database; or
4. Products certified under UL GREENGUARD Gold (formerly the Greenguard Children's & Schools Program).

A5.504.4.7.1 Resilient flooring systems, Tier 2. For 100 percent of floor area receiving resilient flooring, install resilient flooring that is:

1. Certified under the Resilient Floor Covering Institute (RFCI) FloorScore program;
2. Compliant with the VOC-emission limits and testing requirements specified in the California Department of Public Health's 2010 Standard Method for the Testing and Evaluation Chambers, Version 1.1, February 2010;
3. Compliant with the Collaborative for High Performance Schools California (CA-CHPS) Criteria Interpretation for EQ 7.0 and EQ 7.1 (formerly EQ2.2) dated July 2012 and listed in the CHPS High Performance Product Database; or
4. Products certified under UL GREENGUARD Gold (formerly the Greenguard Children's & Schools Program).

Exception: Allowance may be permitted in Tier 2 for up to 5-percent specialty purpose flooring.

A5.504.4.7.2 Verification of compliance. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.

A5.504.4.8 Thermal insulation, Tier 1. Comply with the following standards:

1. Chapters 12-13 (Standards for Insulating Material) in Title 24, Part 12, the *California Referenced Standards Code*,
2. The VOC-emission limits defined in 2009 CHPS criteria and listed on its High Performance Products Database.
3. California Department of Public Health 2010 Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version

1.1, February 2010 (also known as Specification 01350.)

A5.504.4.8.1 Thermal insulation, Tier 2. Thermal insulation, No-added Formaldehyde. Install thermal insulation which complies with Tier 1 plus does not contain any added formaldehyde.

A5.504.4.8.2 Verification of compliance. Documentation shall be provided verifying that thermal insulation materials meet the pollutant emission limits.

A5.504.4.9 Acoustical ceilings and wall panels. Comply with Chapter 8 in Title 24, Part 2, the *California Building Code* and with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database.

A5.504.4.9.1 Verification of compliance. Documentation shall be provided verifying that acoustical finish materials meet the pollutant emission limits.

Note: Products compliant with CHPS criteria certified under the Greenguard Children & Schools program may also be used.

A5.504.5 Hazardous particulates and chemical pollutants. Minimize and control pollutant entry into buildings and cross-contamination of regularly occupied areas.

A5.504.5.1 Entryway systems. Install permanent entryway systems measuring at least six feet in the primary direction of travel to capture dirt and particulates at entryways directly connected to the outdoors.

1. Qualifying entryways are those that serve as regular entry points for building users.
2. Acceptable entryway systems include, but are not limited to, permanently installed grates, grilles or slotted systems that allow cleaning underneath.
3. Roll-out mats are acceptable only when maintained regularly by janitorial contractors as documented in service contract or by in-house staff as documented by written policies and procedures.

A5.504.5.2 Isolation of pollutant sources. In rooms where activities produce hazardous fumes or chemicals, such as garages, janitorial or laundry rooms and copy or printing rooms, exhaust them and isolate them from their adjacent rooms.

1. Exhaust each space with no air recirculation in accordance with ASHRAE 62.1, Table 6-4 to create negative pressure with respect to adjacent spaces with the doors to the room closed.
2. For each space, provide self-closing doors and deck to deck partitions or a hard ceiling.
3. Install low-noise, vented range hoods for all cooking appliances and in laboratory or other chemical mixing areas.

A5.504.5.3.1 Filters, Tier 1. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air prior to occupancy that provides at least a Minimum Efficiency Reporting Value (MERV) of 11.

A5.504.5.3.1.1 Filters, Tier 2. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air prior to occupancy that provides at least a Minimum Efficiency Reporting Value (MERV) of 13.

SECTION A5.507 ENVIRONMENTAL COMFORT

A5.507.1 Lighting and thermal comfort controls. Provide controls in the workplace as described in Sections A5.507.1.1 and A5.507.1.2.

A5.507.1.1 Single-occupant spaces. Provide individual controls that meet energy use requirements in the *California Energy Code* in accordance with Sections A5.507.1.1.1 and A5.507.1.1.2.

A5.507.1.1.1 Lighting. Provide individual task lighting and/or daylighting controls for at least 90 percent of the building occupants.

A5.507.1.1.2 Thermal comfort. Provide individual thermal comfort controls for at least 50 percent of the building occupants.

1. Occupants shall have control over at least one of the factors of air temperature, radiant temperature, air speed and humidity as described in ASHRAE 55-2004.
2. Occupants inside 20 feet of the plane of and within 10 feet either side of operable windows can substitute windows to control thermal comfort. The areas of operable window must meet the requirements of Section 120.1 (Requirement for Ventilation) of the *California Energy Code*.

A5.507.1.2 Multi-occupant spaces. Provide lighting and thermal comfort system controls for all shared multi-occupant spaces, such as classrooms and conference rooms.

A5.507.2 Daylight. Provide daylit spaces as required for top-lighting and sidelighting in the *California Energy Code*. In constructing a design, consider the following:

1. Use of light shelves and reflective room surfaces to maximize daylight penetrating the rooms
2. Means to eliminate glare and direct sun light, including through skylights
3. Use of photosensors to turn off electric lighting when daylight is sufficient
4. Not using diffuse daylighting glazing where views are desired

A5.507.3 Views. Achieve direct line of sight to the outdoor environment via vision glazing between 2 feet 6 inches and 7 feet 6 inches above finish floor for building occupants in 90 percent of all regularly occupied areas as demonstrated by plan view and section cut diagrams.

A5.507.3.1 Interior office spaces. Entire areas of interior office spaces may be included in the calculation if at least 75 percent of each area has direct line of sight to perimeter vision glazing.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE

APPENDIX A5 – NONRESIDENTIAL VOLUNTARY MEASURES

DIVISION A5.6 – VOLUNTARY TIERS

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.
See Chapter 1 for state agency authority and building applications.)

Adopting agency	BSC	BSC- CG	SFM	HCD			DSA		OSHPD				BSCC	DPH	AGR	DWR	CEC	CA	SL	SLC
				1	2	1/AC	AC	SS	1	2	3	4								
Adopt entire CA chapter		X																		
Adopt entire chapter as amended (amended sections listed below)																				
Adopt only those sections that are listed below																				
Chapter/Section																				

APPENDIX A5

NONRESIDENTIAL VOLUNTARY MEASURES

Division A5.6 – VOLUNTARY TIERS

SECTION A5.601 **CALGreen TIER 1 AND TIER 2**

A5.601.1 Scope. The measures contained in this appendix are not mandatory unless adopted by local government as specified in Section 101.7. The provisions of this section outline means of achieving enhanced construction or reach levels by incorporating additional green building measures for newly constructed nonresidential buildings as well as additions. In order to meet one of the tier levels designers, builders or property owners are required to incorporate additional green building measures necessary to meet the threshold of each level.

A5.601.2 CALGreen Tier 1

A5.601.2.1 Prerequisites. To achieve *CALGreen* tier status, a project must meet all of the mandatory measures in Chapter 5 and, in addition, meet the provisions of this section.

A5.601.2.2 Energy performance. For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory standards.

A5.601.2.3 Tier 1. Comply with the energy efficiency requirements in Section A5.203.1.1.1 and Section A5.203.1.2.1.

A5.601.2.4 Voluntary measures for Tier 1. In addition to the provisions of Sections A5.601.2.1 and A5.601.2.3 above, compliance with the following voluntary measures from Appendix A5 is required for Tier 1:

1. From Division A5.1,
 - a. Comply with the designated parking requirements for fuel efficient vehicles for a minimum

of 10 percent of parking capacity per Section A5.106.5.1 and Table A5.106.5.1.1.

- b. Comply with thermal emittance, solar reflectance or SRI values for cool roofs in Section A5.106.11.2 and Table A5.106.11.2.1.¹
 - c. Comply with one elective measure selected from this division.
2. From Division A5.3,
 - a. Comply with the 12-percent reduction for indoor potable water use in Section A5.303.2.3.1.
 - b. Comply with one elective measure selected from this division.
3. From Division A5.4,²
 - a. Comply with recycled content of 10 percent of materials based on estimated total cost, or use two products from Table A5.405.4 for at least 75% by cost in Section A5.405.4.
 - b. Comply with the 65-percent reduction in construction and demolition waste in Section A5.408.3.1.
 - c. Comply with one elective measure selected from this division.
4. From Division A5.5,
 - a. Comply with resilient flooring systems for 90 percent of resilient flooring in Section A5.504.4.7.
 - b. Comply with thermal insulation meeting 2009 CHPS low-emitting materials list in Section A5.504.4.8.

- c. Comply with one elective measure selected from this division.

- 5. Comply with one additional elective measure selected from any division.

¹ Cool roof is required for compliance with Tiers 1 and 2 and may be used to meet energy standards in Part 6, exceed energy standards and to mitigate heat island effect.

² Life cycle assessment compliant with Section A5.409.4 in this code may be substituted for prescriptive measures from Division A5.4.

A5.601.3 CALGreen Tier 2.

A5.601.3.2 Energy performance. For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory standards.

A5.601.3.3 Tier 2. Comply with the energy efficiency requirements in Section A5.203.1.1 and Section A5.203.1.2.2.

A5.601.3.4 Voluntary measures for Tier 2. In addition to the provisions of Sections A5.601.3.1 and A5.601.3.3 above, compliance with the following voluntary measures from Appendix A5 and additional elective measures shown in Table A5.601.3.4 is required for Tier 2:

1. From Division A5.1,
 - a. Comply with the designated parking requirements for fuel efficient vehicles for a minimum of 12 percent of parking capacity per Section A5.106.5.1 and Table A5.106.5.1.2.
 - b. Comply with thermal emittance, solar reflectance or SRI values for cool roofs in Section A5.106.11.2 and Table A5.106.11.2.2.¹
 - c. Comply with three elective measures selected from this division.
2. From Division A5.3,
 - a. Comply with the 20-percent reduction for indoor potable water use in Section A5.303.2.3.2.
 - b. Comply with three elective measures selected from this division.
3. From Division A5.4,²
 - a. Comply with recycled content of 15 percent of materials based on estimated total cost, or use two products from Table A5.405.4 for at least 75% by cost in Section A5.405.4.1.
 - b. Comply with the 80-percent reduction in construction and demolition waste in Section A5.408.3.1.
 - c. Comply with three elective measures selected from this division.
4. From Division A5.5,
 - a. Comply with resilient flooring systems for 100 percent of resilient flooring in Section A5.504.4.7.1.

Exception: Allowance may be permitted in Tier 2 for up to 5-percent specialty purpose flooring.
 - b. Comply with thermal insulation meeting 2009 CHPS low-emitting materials list and no added formaldehyde in Section A5.504.4.8.1.
 - c. Comply with three elective measures selected from this division.
5. Comply with three additional elective measures selected from any division.

¹ Cool roof is required for compliance with Tiers 1 and 2 and may be used to meet energy standards in Part 6, exceed energy standards and to mitigate heat island effect.

² Life cycle assessment compliant with Section A5.409.4 in this code may be substituted for prescriptive measures from Division A5.4.

A5.601.4 Compliance verification. Compliance with Section A5.601.2 or A5.601.3 shall be as required in Chapter 7 of this code. Compliance documentation shall be made part of the project record as required in Section 5.410.2 or 5.410.3.

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NONRESIDENTIAL VOLUNTARY MEASURES

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued⁴

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY ¹	
		CALGreen Tier 1	CALGreen Tier 2
A5.106.7 Exterior walls. Meet requirements in the current edition of the <i>California Energy Code</i> and comply with either Section A5.106.7.1 or A5.106.7.2 for wall surfaces: A5.106.7.1 Fenestration. Provide vegetative or man-made shading devices for all fenestration on east-, south- and west-facing walls. A5.106.7.1.1 East and west walls. Shading devices shall have 30% coverage to a height of 20 feet or to the top of the exterior wall, whichever is less. A5.106.7.1.2 South walls. Shading devices shall have 60% coverage to a height of 20 feet or to the top of the exterior wall, whichever is less. A5.106.7.2 Opaque wall areas. Use wall surfacing with SRI 25 (aged), for 75% of opaque wall areas. See Exception and Note.		☐ ☐ ☐	☐ ☐ ☐
5.106.8 Light pollution reduction. [N] Outdoor lighting systems shall be designed and installed to comply with the following: 1. The minimum requirements in the <i>California Energy Code</i> for Lighting Zones 1–4 as defined in Chapter 10 of the <i>California Administrative Code</i>; and 2. Backlight, Uplight and Glare (BUG) ratings as defined in IESNA TM-15-11; and 3. Allowable BUG ratings not exceeding those shown in Table 5.106.8, or Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent. Exceptions: [N] 1. Luminaires that qualify as exceptions in Section 140.7 of the <i>California Energy Code</i> 2. Emergency lighting 3. Building facade meeting the requirements in Table 140.7-B of the California Energy Code, Part 6. 4. Custom lighting features as allowed by the local enforcing agency, as permitted by Section 101.8 Alternate materials, designs and methods of construction Note: [N] See also <i>California Building Code</i>, Chapter 12, Section 1205.6 for college campus lighting requirements for parking facilities and walkways.	☒ or ☒		
5.106.10 Grading and paving. Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include those shown in Items 1–5. See exception for additions or alterations.	☒		
A5.106.11 Heat island effect. Reduce nonroof heat islands and roof heat islands as follows: A5.106.11.1 Hardscape alternatives. Use one or a combination of strategies 1 through 2 for 50 percent of site hardscape or put 50 percent of parking underground. 1. Use light colored materials with an initial solar reflectance value of at least 30 as determined in accordance with ASTM Standards E1918 or C1549. 2. Use open-grid pavement system or pervious or permeable pavement system. A5.106.11.2 Cool roof for reduction of heat island effect. Use roofing materials having a minimum aged solar reflectance, thermal emittance complying with Sections A5.106.11.2.2 and A5.106.11.2.3 or a minimum aged or Solar Reflectance Index (SRI)3 equal to or greater than the values shown in: Table A5.106.11.2.2 – Tier 1 or Table A5.106.11.2.3 – Tier 2 Exceptions: 1. Roof constructions that have a thermal mass over the roof membrane, including areas of vegetated (green) roofs, weighing at least 25 lb/sf. 2. Roof area covered by building integrated solar photovoltaic and building integrated solar thermal panels. A5.106.11.2.1 Solar reflectance. Roofing materials shall have a minimum aged solar reflectance equal to or greater than the values specified in Table A5.106.11.2.2 for Tier 1 and Table A5.106.11.2.3 for Tier 2. If Cool Roof Rating Council (CRRC) testing for aged reflectance is not available for any roofing products, the aged value shall be determined using the CRRC certified initial value using the equation $p_{aged} = [0.2 + \beta (p_{initial} - 0.2)]$, where $p_{initial}$ = the initial solar reflectance and soiling resistance, β, listed by product type in Table A5.106.11.2.1. Solar reflectance may also be certified by other supervisory entities approved by the Energy Commission pursuant to Title 24, Part 1, California Administrative Code. A5.106.11.2.2 Thermal emittance. Roofing materials shall have a CRRC initial or aged thermal emittance as determined in accordance with ASTM E408 or C1371 equal to or greater than those specified in Table A5.106.11.2.2 for Tier 1 and Table A5.106.11.2.3 for Tier 2. Thermal emittance may also be certified by other supervisory entities approved by the Energy Commission pursuant to Title 24, Part 1, California Administrative Code. A5.106.11.2.3 Solar reflectance index alternative. Solar Reflectance Index (SRI) equal to or greater than the values specified in Table A5.106.11.2.2 for Tier 1 and Table A5.106.11.2.3 for Tier 2 may be used as an alternative to compliance with the aged solar reflectance values and thermal emittance. SRI values used to comply with this section shall be calculated using the Solar Reflectance Index (SRI) Calculation Worksheet (SRI-WS) developed by the California Energy Commission or in compliance with ASTM E1980-01 as specified in the California Energy Code, Section 118(i)3. Solar reflectance values used in the SRI-WS shall be based on the aged reflectance value of the roofing product or the equation in section A5.106.11.2.1 if the CRRC certified aged solar reflectance are not available. Certified Thermal emittance used in the SRI-WS may be either the initial value or the aged value listed by the CRRC. Solar reflectance and thermal emittance may also be certified by other supervisory entities approved by the Commission pursuant to Title 24, Part 1, California Administrative Code. See Note: A5.106.11.3 Verification of compliance. If no documentation is available, an inspection shall be conducted to ensure roofing materials meet cool roof aged solar reflectance and thermal emittance or SRI values.		☐ ☐ ☐ ☐ ☒	☐ ☐ ☐ ☐ ☒

continued

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NONRESIDENTIAL VOLUNTARY MEASURES

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST—continued⁴

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY ¹	
		CALGreen Tier 1	CALGreen Tier 2
A5.504.5.3.1 Filters, Tier 1. In mechanically ventilated buildings, provide regularly occupied areas of the building with air infiltration media for outside and return air prior to occupancy that provides at least a MERV of 11. A5.504.5.3.1.1 Filters, Tier 2. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air prior to occupancy that provides at least a Minimum Efficiency Reporting Value (MERV) of 13.			
5.504.7 Environmental tobacco smoke (ETS) control. Prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows where outdoor areas are provided for smoking and within the building as already prohibited by other laws or regulations; or as enforced by ordinances, regulations or policies of any city, county, city and county, California Community College, campus of the California State University or campus of the University of California, whichever are more stringent.	☒		
Indoor Moisture and Radon Control			
5.505.1 Indoor moisture control. Buildings shall meet or exceed the provisions of <i>California Building Code</i> , CCR, Title 24, Part 2, Sections 1203 and Chapter 14.1. ³	☒		
Air Quality and Exhaust			
5.506.1 Outside air delivery. For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 120.1 of the <i>California Energy Code</i> and Chapter 4 of CCR, Title 8 or the applicable local code, whichever is more stringent. ³	☒		
5.506.2 Carbon dioxide (CO₂) monitoring. For buildings or additions equipped with demand control ventilation, CO ₂ sensors and ventilation controls shall be specified and installed in accordance with the requirements of the California Energy Code, CCR, Section 120(c)(4). ³	☒		
Environmental Comfort			
A5.507.1 Lighting and thermal comfort controls. Provide controls in the workplace as described in Sections A5.507.1.1 and A5.507.1.2. A5.507.1.1 Single-occupant spaces. Provide individual controls that meet energy use requirements in the <i>California Energy Code</i> by Sections A5.507.1.1.1 and A5.507.1.1.2. A5.507.1.1.1 Lighting. Provide individual task lighting and/or daylighting controls for at least 90 percent of the building occupants. A5.507.1.1.2 Thermal comfort. Provide individual thermal comfort controls for at least 50 percent of the building occupants by Items 1 and 2 in Section A5.507.1.1.2. A5.507.1.2 Multi-occupant spaces. Provide lighting and thermal comfort system controls for all shared multi-occupant spaces.		☐	☐
A5.507.2 Daylight. Provide daylit spaces as required for toplighting and sidelighting in the <i>California Energy Code</i> . In constructing a design, consider Items 1 through 4 in Section A5.507.3.		☐	☐
A5.507.3 Views. Achieve direct line of sight to the outdoor environment via vision glazing between 2'6" and 7'6" above finish floor for building occupants in 90 percent of all regularly occupied areas. A5.507.3.1 Interior office spaces. Entire areas of interior office spaces may be included in the calculation if at least 75 percent of each area has direct line of sight to perimeter vision glazing. A5.507.3.2 Multi-occupant spaces. Include in the calculation the square footage with direct line of sight to perimeter vision glazing.		☐	☐
5.507.4 Acoustical control. Employ building assemblies and components with STC values determined in accordance with ASTM E90 and ASTM E413 or OITC determined in accordance with ASTM E1332, using either the prescriptive or performance method in Section 5.507.4.1 or 5.507.4.2. 5.507.4.1 Exterior noise transmission, prescriptive method. Wall and floor-ceiling assemblies exposed to the noise source making up the building envelope shall have exterior wall and roof ceiling assemblies meeting a composite STC rating of at least 50 or a composite OITC rating of no less than 40 with exterior windows of a minimum STC of 40 or OITC of 30 in the locations described in Items 1 and 2. Also applies to addition envelope or altered envelope. 5.507.4.1.1 Noise exposure where noise contours are not readily available. Buildings exposed to a noise level of 65 dB L _{eq} -1Hr during any hour of operation shall have exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30). Also applies to addition or alteration exterior wall. 5.507.4.2 Performance method. For buildings located as defined in Sections A5.507.4.1 or A5.507.4.1.1, wall and roof-ceiling assemblies making up the building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level (L _{eq} -1Hr) of 50 dBA in occupied areas during any hour of operation. Also applies to addition envelope or altered envelope. 5.507.4.2.1 Site features. Exterior features such as sound walls or earth berms may be utilized as appropriate to the project to mitigate sound migration to the interior. Also applies to addition envelope or altered envelope. 5.507.4.2.1 Documentation of compliance. An acoustical analysis documenting complying interior sound levels shall be prepared by personnel approved by the architect or engineer of record. 5.507.4.3 Interior sound transmission. Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places shall have an STC of at least 40.	☒ ☒ ☒ or ☒ ☒ ☒ ☒		

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HISTORY NOTE APPENDIX

California Green Building Standards Code Title 24, Part 11, California Code of Regulations (CCR)

For prior history, see the History Note Appendix to the *California Green Building Standards Code*, 2013 Edition, effective January 1, 2014.

1. (BSC 04/15, HCD 07/15, DSA-SS 07/15, CEC 01/15)
Repeal, amend and add provisions in the 2016 *California Green Building Standards Code* for residential, nonresidential and public school buildings. Effective on January 1, 2017.
2. Errata to correct editorial errors within the preface as well as throughout various chapters in this code. Effective January 1, 2017.



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