REVISION RECORD FOR THE STATE OF CALIFORNIA

SUPPLEMENT

July 1, 2012

2010 Title 24, Part 11, California Green Building Standards Code

PLEASE NOTE: The date of this errata is for identification purposes only.
See the History Note Appendix.

It is suggested that the section number, as well as the page number be checked when inserting this material and removing the superseded material. In case of doubt, rely on the section numbers rather than the page numbers because the section numbers must run consecutively.

It is further suggested that the superseded material be retained with this revision record sheet so that the prior wording of any section can be easily ascertained.

Please keep the removed pages with this revision page for future reference.

Note

Due to the fact that the application date for a building permit establishes the California Building Standards Code provisions that are effective at the local level, which apply to the plans, specifications, and construction for that permit, it is strongly recommended that the removed pages be retained for historical reference.

Part 11

Remove Existing Pages	Insert Blue-Colored Pages
vii and viii	vii and viii
1 through 4	1 through 4
7 through 14	7 through 14
17 through 26	17 through 26.2
27 through 42	27 through 42.8
43 and 44	43 and 44
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Item No. 5570S1002

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CHAPTER 1 – ADMINISTRATION

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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**				**X**	**X**	**X**		**X**								
Chapter/Section																			
101	X		X				X	X	X		X								
102	X		X				X	X	X		X								
103	X																		
104			X																
105							X												
106								X	X		X								

CHAPTER 1
ADMINISTRATION

SECTION 101
GENERAL

101.1 Title. These regulations shall be known as the *California Green Building Standards Code* and may be cited as such and will be referred to herein as "this code." It is intended that it shall also be known as the *CALGreen* Code. The *California Green Building Standards Code* is Part 11 of twelve parts of the official compilation and publication of the adoption, amendment and repeal of building regulations to the *California Code of Regulations*, Title 24, also referred to as the *California Building Standards Code*.

101.2 Purpose. The purpose of this code is to improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a reduced negative impact or positive environmental impact and encouraging sustainable construction practices in the following categories:

1. Planning and design
2. Energy efficiency
3. Water efficiency and conservation
4. Material conservation and resource efficiency
5. Environmental quality

101.3 Scope. The provisions of this code shall apply to the planning, design, operation, construction, use and occupancy of every newly constructed building or structure, unless otherwise indicated in this code, throughout the State of California.

It is not the intent that this code substitute or be identified as meeting the certification requirements of any green building program.

101.3.1 State-regulated buildings, structures and applications. Provisions of this code shall apply to the following buildings, structures and applications regulated by state agencies as referenced in the Matrix Adoption Tables and as specified in Sections 103 through 106, except where modified by local ordinance pursuant to Section 101.7. When adopted by a state agency, the provisions of this code shall be enforced by the appropriate enforcing agency, but only to the extent of authority granted to such agency by statute.

1. State-owned buildings, including buildings constructed by the Trustees of the California State University, and to the extent permitted by California law, buildings designed and constructed by the Regents of the University of California and regulated by the Building Standards Commission. See Section 103 for additional scoping provisions.
2. Energy efficiency standards regulated by the California Energy Commission.
3. Low-rise residential buildings constructed throughout the State of California, including but not limited to, hotels, motels, lodging houses, apartment houses, 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 toilets or cooking facilities regulated by the Department of Housing and Community Development. See Section 104 for additional scoping provisions.
4. Public elementary and secondary schools, and community college buildings regulated by the Division of

the State Architect. See Section 105 for additional scoping provisions.

5. Qualified historical buildings and structures and their associated sites regulated by the State Historical Building Safety Board within the Division of the State Architect.
6. General acute care hospitals, acute psychiatric hospitals, skilled nursing and/or intermediate care facilities, clinics licensed by the Department of Public Health and correctional treatment centers regulated by the Office of Statewide Health Planning and Development. See Section 106 for additional scoping provisions.
7. Graywater systems regulated by the Department of Water Resources and the Department of Housing and Community Development.
8. Green building standards for occupancies where no state agency has authority or expertise, adopted by the California Building Standards Commission. See Section 103 for additional scoping provisions.

101.4 Appendices. Provisions contained in the appendices of this code are not mandatory unless specifically adopted by a State agency or adopted by a city, county, or city and county in compliance with *Health and Safety Code* Sections 18930 and 18941.5, respectively, for Building Standards Law; *Health and Safety Code* Section 17950 for State Housing Law; and *Health and Safety Code* Section 13869.7 for Fire Protection Districts. See Section 101.7 of this code.

101.5 Referenced codes and standards. The codes and standards referenced elsewhere in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference.

101.5.1 Building. The provisions of the *California Building Code* and *California Residential Code*, as applicable, shall apply to the construction, alteration, movement, enlargement, replacement, repair, use and occupancy, location, maintenance, removal and demolition of every structure or any appurtenances connected or attached to such buildings or structures.

101.5.2 Electrical. The provisions of the *California Electrical Code* shall apply to the installation of electrical systems, including but not limited to, alterations, repair, replacement, equipment, appliances, fixtures, fittings and appurtenances thereto.

101.5.3 Mechanical. The provisions of the *California Mechanical Code* shall apply to the installation, alterations, repair and replacement of mechanical systems, including equipment, appliances, fixtures, fittings and/or appurtenances, including ventilating, heating, cooling, air-conditioning and refrigeration systems, incinerators and other energy-related systems.

101.5.4 Plumbing. The provisions of the *California Plumbing Code* shall apply to the installation, alteration, repair and replacement of plumbing systems, including equipment, appliances, fixtures, fittings and appurtenances where connected to a water or sewage system.

101.5.5 Fire prevention. The provisions of CCR, Title 19, Division 1 and CCR, Title 24, Part 2 and Part 9 relating to fire and panic safety as adopted by the Office of the State Fire Marshal shall apply to all structures, processes and premises for protection from the hazard of fire, panic and explosion.

101.5.6 Energy. The provisions of the *California Energy Code* shall apply to the minimum design and construction of buildings for energy efficiency.

101.6 Order of precedence and use.

101.6.1 Differences. In the event of any differences between these building standards and the standard reference documents, the text of these building standards shall govern. In the event a local amendment to this code results in differences between these building standards and the amendment, the text of the amendment shall govern.

101.6.2 Specific provision. Where a specific provision varies from a general provision, the specific provision shall apply.

101.6.3 Conflicts. When the requirements of this code conflict with the requirements of any other part of the *California Building Standards Code*, Title 24, the most restrictive requirement shall prevail.

101.6.4. Explanatory notes. Explanatory material, such as references to websites or other sources where additional information may be found, is included in this code in the form of notes. Notes are informational only and are not enforceable requirements of this code.

101.7 City, county, or city and county amendments, additions or deletions. This code is intended to set mandatory minimum Green Building Standards and includes optional tiers that may, at the discretion of any city, county, or city and county, be applied.

This code does not limit the authority of city, county, or city and county governments to make necessary changes to the provisions contained in this code pursuant to Section 101.7.1. The effective date of amendments, additions, or deletions to this code for cities, counties, or cities and counties filed pursuant to Section 101.7.1 shall be the date on which it is filed. However, in no case shall the amendments, additions or deletions to this code be effective any sooner than the effective date of this code.

Local modifications shall comply with *Health and Safety Code* Section 18941.5(b) for Building Standards Law, *Health and Safety Code* Section 17958.5 for State Housing Law or *Health and Safety Code* Section 13869.7 for Fire Protection Districts.

101.7.1 Findings and filings.

1. The city, county, or city and county shall make express findings for each amendment, addition or deletion based upon climatic, topographical or geological 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 1800 3rd Street, Room 260, Sacramento, CA 95811.

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 2010 *California Building Code* and Section 1.2.6, Chapter 1, Administration, Division 1, of the 2010 *California Residential Code* for the Department of Housing and Community Development.

4. Section 7-104, 2010 *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 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—**New construction, unless otherwise indicated in this code, of State buildings (all occupancies), including buildings constructed by the Trustees of the California State University and the Regents of the University of California

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

   Authority cited—*Health and Safety Code* Section 18934.5.

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

2. **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 and 18938 (b).

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

3. **University of California, California State Universities and California Community Colleges.**

   Application—Standards for lighting for parking lots and primary campus walkways at the University of California, California State Universities and California Community Colleges.

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

   Authority cited—*Government Code* Section 14617.

   Reference—*Government Code* Section 14617.

4. **Existing State-Owned Buildings, including those owned by the University of California and by the California State University.**

   Application—Building seismic retrofit standards including abating falling hazards of structural and nonstructural components and strengthening of building structures. See also Division of the State Architect.

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

   Authority cited—*Government Code* Section 16600.

   Reference—*Government Code* Sections 16600 through 16604.

5. **Unreinforced Masonry Bearing Wall Buildings.**

   Application—Minimum seismic strengthening standards for buildings specified in Appendix Chapter 1 of the *California Code for Building Conservation*, except for buildings subject to building standards adopted pursuant to Part 1.5 (commencing with Section 17910).

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

   Authority cited—*Health and Safety Code* Section 18934.6.

   Reference—*Health and Safety Code* Sections 18901 through 18949.

SECTION 104
DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

104.1 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.

1. **Housing construction.**

   Application—Hotels, motels, lodging houses, apartment houses, 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. Sections of this code which pertain to applications listed in this section are identified in the Matrix Adoption Table using the abbreviation "HCD 1."

   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 construction on a new campus site or new construction on an existing site cleared of all existing structures.

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.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 2 – DEFINITIONS

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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)								**X**	**X**		**X**								
Adopt only those sections that are listed below							**X**												
Chapter/Section																			
201							X												
202 ARB (CARB)							X												
202 AUTOMATIC							X												
202 BUILDING ENVELOPE							X												
202 CALIFORNIA BUILDING CODE							X												
202 CALIFORNIA ELECTRICAL CODE							X												
202 CALIFORNIA ENERGY CODE							X												
202 CALIFORNIA MECHANICAL CODE							X												
202 CALIFORNIA PLUMBING CODE							X												
202 CALIFORNIA RESIDENTIAL CODE								†	†		†								
202 CONDITIONED SPACE							X												
202 COOLING EQUIPMENT							X												
202 ENERGY COMMISSION							X												
202 ENFORCING AGENCY							X												
202 GREEN BUILDING							X												
202 INFILTRATION							X												
202 KITCHEN							X												
202 LOW-RISE RESIDENTIAL BUILDING							X	†	†		†								
202 OUTDOOR AIR (Outside air)							X												
202 PLANTS								†	†		†								
202 RESIDENTIAL BUILDING							X	†	†		†								
202 RESILIENT FLOORING							X	†	†		†								
202 TIME DEPENDENT VALUATION (TDV) ENERGY							X												
202 VAPOR BARRIER							X												

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

CHAPTER 2
DEFINITIONS

SECTION 201
GENERAL

201.1 Scope. Unless otherwise stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this chapter.

201.2 Interchangeability. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

201.3 Terms defined in other documents. Where terms are not defined in this code and are defined in the *California Building Standards Code* or other referenced documents, such terms shall have the meanings ascribed to them as in those publications.

201.4 Terms not defined. Where terms are not defined as specified in this section, such terms shall have ordinarily accepted meanings such as the context implies.

SECTION 202
DEFINITIONS

ARB (CARB). The California Air Resources Board.

AUTOMATIC. Automatic means capable of operating without human intervention.

BUILDING ENVELOPE. The ensemble of exterior and demising partitions of a building that enclose conditioned space.

CALIFORNIA BUILDING CODE. The current version of the *California Building Code*.

CALIFORNIA ELECTRICAL CODE. The current version of the *California Electrical Code*.

CALIFORNIA ENERGY CODE. The current version of the *California Energy Code*, unless otherwise specified.

CALIFORNIA MECHANICAL CODE. The current version of the *California Mechanical Code*.

CALIFORNIA PLUMBING CODE. The current version of the *California Plumbing Code*.

CALIFORNIA RESIDENTIAL CODE. The current version of the *California Residential Code*.

CONDITIONED FLOOR AREA. The floor area (in square feet) of enclosed conditioned space on all floors of a building, as measured at the floor level of the exterior surfaces of exterior walls enclosing the conditioned space.

CONDITIONED SPACE. A space in a building that is either directly conditioned or indirectly conditioned.

CONDITIONED SPACE, DIRECTLY. An enclosed space that is provided with wood heating, is provided with mechanical heating that has a capacity exceeding 10 Btu/hr-ft^2, or is provided with mechanical cooling that has a capacity exceeding 5 Btu/hr-ft^2, unless the space-conditioning system is designed for a process space. (See Process Space.)

CONDITIONED SPACE, INDIRECTLY. Enclosed space, including but not limited to, unconditioned volume in atria, that (1) is not directly conditioned space; and (2) either (a) has a thermal transmittance area product (UA) to directly conditioned space exceeding that to the outdoors or to unconditioned space and does not have fixed vents or openings to the outdoors or to unconditioned space, or (b) is a space through which air from directly conditioned spaces is transferred at a rate exceeding three air changes per hour.

COOLING EQUIPMENT. Equipment used to provide mechanical cooling for a room or rooms in a building.

DISPOSAL. The management of solid waste through landfilling or transformation at permitted solid waste facilities.

DIVERSION. Activities which reduce or eliminate the amount of solid waste from solid waste disposal for purposes of this code.

ENERGY COMMISSION. The California State Energy Resources Conservation and Development Commission.

ENFORCING AGENCY. The designated department or agency as specified by statute or regulation.

EXFILTRATION. The uncontrolled outward air leakage from inside a building, including leakage through cracks and interstices, around windows and doors, and through any other exterior partition or duct penetration.

GREEN BUILDING. A holistic approach to design, construction, and demolition that minimizes the building's impact on the environment, the occupants and the community.

HAZARDOUS WASTE.

(a) A waste, defined as a "hazardous waste" in accordance with Section 25117 of the *Health and Safety Code*, or a combination of wastes, which because of its quantity, concentration or physical, chemical or infectious characteristics may do either of the following:

(1) Cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness.

(2) Pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of, or otherwise managed.

(b) Unless expressly provided otherwise, "hazardous waste" includes extremely hazardous waste and acutely hazardous waste.

INERT SOLIDS OR INERT WASTE. A non-liquid solid waste including, but not limited to, soil and concrete, that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board pursuant to Division 7 (commencing with

Section 13000) of the *California Water Code* and does not contain significant quantities of decomposable solid waste.

INFILTRATION. An uncontrolled inward air leakage from outside a building or unconditioned space, including leakage through cracks and interstices, around windows and doors and through any other exterior or demising partition or pipe or duct penetration.

KITCHEN. That portion in a residential dwelling unit that is a room or area used for cooking, food storage and preparation and washing dishes, including associated counter tops and cabinets, refrigerator, stove, ovens and floor area.

LOW-RISE RESIDENTIAL BUILDING. A building that is of Occupancy Group R and is three stories or less, or that is a one- or two-family dwelling or townhouse.

NEWLY CONSTRUCTED (or NEW CONSTRUCTION). A newly constructed building (or new construction) does not include additions, alterations or repairs.

OUTDOOR AIR (Outside air). Air taken from outdoors and not previously circulated in the building.

PLANTS.

Adaptive plants. Adaptive plants are plants that grow well in a given habitat with minimal attention in the form of winter protection, pest protection, irrigation and fertilization once established.

Note: Adaptive plants are considered low in maintenance and are not invasive plants.

Invasive plants. Invasive plants are both indigenous and nonindigenous species with growth habits that are characteristically aggressive.

Note: Invasive plants typically have a high reproductive capacity and tendency to overrun the ecosystems they inhabit.

Native plants. Native plants are plants that have adapted to a given area and are not invasive.

PROCESS SPACE. A space that is thermostatically controlled to maintain a process environment temperature less than 55ºF or to maintain a process environment temperature greater than 90º F for the whole space that the system serves, or that is a space with a space-conditioning system designed and controlled to be incapable of operating at temperatures above 55º F or incapable of operating at temperatures below 90º F at design conditions.

RECYCLE or RECYCLING. The process of collecting, sorting, cleansing, treating and reconstituting materials that would otherwise become solid waste, and returning them to the economic mainstream in the form of raw material for new, reused or reconstituted products which meet the quality standards necessary to be used in the marketplace. "Recycling" does not include transformation, as defined in *Public Resources Code* Section 40201.

RESIDENTIAL BUILDING. See "LOW-RISE RESIDENTIAL BUILDING."

RESILIENT FLOORING. Refers to nontextile flooring materials which have a relatively firm surface, yet characteristically have "give" and "bounce back" to their original surface profile from the weight of objects that compress its surface. Resilient flooring materials are made in various shapes and sizes including both tile and roll form. Common types of resilient flooring include but are not limited to:

1. Vinyl composition tile
2. Vinyl tile and sheet flooring
3. Linoleum tile and sheet
4. Cork tile and sheet flooring
5. Rubber tile and sheet flooring
6. Polymeric poured seamless flooring
7. Other types of non-textile synthetic flooring

RE-USE. The use, in the same form as it was produced, of a material which might otherwise be discarded

SOLID WASTE.

(a) All putrescible and nonputrescible solid, semisolid and liquid wastes, including garbage, trash, refuse, paper, rubbish, ashes, industrial wastes, demolition and construction wastes, abandoned vehicles and parts thereof, discarded home and industrial appliances, dewatered, treated or chemically fixed sewage sludge which is not hazardous waste, manure, vegetable or animal solid and semisolid wastes, and other discarded solid and semisolid wastes.

(b) "Solid waste" does not include any of the following wastes:

(1) Hazardous waste, as defined in *Public Resources Code* Section 40141.

(2) Radioactive waste regulated pursuant to the Radiation Control Law (Chapter 8, commencing with Section 114960, of Part 9 of Division 104 of the *Health and Safety Code*).

(3) Medical waste regulated pursuant to the Medical Waste Management Act (Part 14 commencing with Section 117600) of Division 104 of the *Health and Safety Code*). Untreated medical waste shall not be disposed of in a solid waste landfill, as defined in *Public Resources Code* Section 40195.1. Medical waste that has been treated and deemed to be solid waste shall be regulated pursuant to this division.

TIME DEPENDENT VALUATION (TDV) ENERGY. The time varying energy caused to be used by the building to provide space conditioning and water heating and for specified buildings lighting. TDV energy accounts for the energy used at the building site and consumed in producing and in delivering energy to a site, including, but not limited to, power generation, transmission and distribution losses.

VAPOR BARRIER. Material that has a permeance of one perm or less and that provides resistance to the transmission of water vapor.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 3 – GREEN BUILDING

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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**				**X**	**X**	**X**		**X**								
Chapter/Section																			
301	X		X				X	X	X		X								
302	X		X				X	X	X		X								
303	X		X				X	X	X		X								
304	X		X					X	X		X								
305								X											
306							X												

CHAPTER 3
GREEN BUILDING

SECTION 301
GENERAL

301.1 Scope. Buildings shall be designed to include the green building measures specified as mandatory in the application checklists contained in this code. Voluntary green building measures are also included in the application checklists and may be included in the design and construction of structures covered by this code, but are not required unless adopted by a city, county, or city and county as specified in Section 101.7.

SECTION 302
MIXED OCCUPANCY BUILDINGS

302.1 Mixed occupancy buildings. In mixed occupancy buildings, each portion of a building shall comply with the specific green building measures applicable to each specific occupancy.

SECTION 303
PHASED PROJECTS

303.1 Phased projects. For shell buildings and others constructed for future tenant improvements, only those code measures relevant to the building components and systems considered to be new construction (or newly constructed) shall apply.

303.1.1 Tenant improvements. The provisions of this code shall apply only to the initial tenant or occupant improvements to a project.

SECTION 304
VOLUNTARY TIERS

304.1 Purpose. Voluntary tiers are intended to further encourage building practices that improve public health, safety and general welfare by promoting the use of building concepts which minimize the building's impact on the environment and promote a more sustainable design.

304.1.1 Tiers. The provisions of Divisions A4.6 and A5.6 outline means, in the form of voluntary tiers, for achieving enhanced construction levels by incorporating additional measures for residential and nonresidential new construction. Voluntary tiers may be adopted by local governments and, when adopted, enforced by local enforcing agencies. Buildings complying with tiers specified for each occupancy contain additional prerequisite and elective green building measures necessary to meet the threshold of each tier. See Section 101.7 of this code for procedures and requirements related to local amendments, additions or deletions, including changes to energy standards.

[BSC] Where there are practical difficulties involved in complying with the threshold levels of a tier, the enforcing agency may grant modifications for individual cases. The enforcing agency shall first find that a special individual reason makes the strict letter of the tier impractical and that modification is in conformance with the intent and purpose of the measure. The details of any action granting modification shall be recorded and entered in the files of the enforcing agency.

SECTION 305 [OSHPD 1]
CALGreen TIER 1 AND CALGreen TIER 2

305.1 *CALGreen* Tier 1 and *CALGreen* Tier 2 buildings contain voluntary green building measures necessary to meet the threshold of each level.

305.1.1 *CALGreen* Tier 1. To achieve *CALGreen* Tier 1, buildings must comply with the latest edition of "Savings By Design, Healthcare Modeling Procedures" found online at http://www/energysoft.com/ep/2007SBDHProcedures.pdf.

305.1.2 *CALGreen* Tier 2. To achieve *CALGreen* Tier 2, buildings must exceed the latest edition of "Savings By Design, Healthcare Modeling Procedures" by a minimum of 15 percent.

SECTION 306 [DSA-SS] VOLUNTARY MEASURES

306.1 Purpose. Voluntary measures are intended to further encourage building practices that improve public health, safety and general welfare by promoting the use of building concepts which minimize the building's impact on the environment, promote a more sustainable design and high-performance educational facilities.

306.1.1 The provisions of Appendix A5 outline means of achieving enhanced construction levels by incorporating additional measures.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 4 – RESIDENTIAL MANDATORY MEASURES

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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																			

CHAPTER 4
RESIDENTIAL MANDATORY MEASURES

Division 4.1 – PLANNING AND DESIGN

SECTION 4.101
GENERAL

4.101.1 Purpose. 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 words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

FRENCH DRAIN. A trench, hole or other depressed area loosely filled with rock, gravel, fragments of brick or similar pervious material used to collect or channel drainage or runoff water.

WATTLES. Wattles are used to reduce sediment in runoff. Wattles are often constructed of natural plant materials such as hay, straw or similar material shaped in the form of tubes and placed on a downflow slope. Wattles are also used for perimeter and inlet controls.

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.

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

SECTION 4.303
INDOOR WATER USE

4.303.1 Twenty percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by at least 20 percent shall be provided. The reduction shall be based on the maximum allowable water use per plumbing fixture and fitting as required by the *California Building Standards Code*. The 20 percent reduction in potable water use shall be demonstrated by one of the following methods:

1. **Prescriptive Method.** Each plumbing fixture and fitting shall not exceed the Maximum Flow Rate at ≥ 20 Percent Reduction column in Table 4.303.2; or
2. **Performance Method.** A calculation demonstrating a 20 percent reduction in the building "water use" baseline as established in Table 4.303.1 shall be provided. For low-rise residential occupancies, the calculation shall be limited to the following plumbing fixture and fitting types: showerheads, lavatory faucets, water closets and urinals.

4.303.2 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all the showerheads controlled by a single valve shall not exceed the Maximum Flow Rates at ≥ 20 Percent Reduction column in Table 4.303.2 or the shower shall be designed to only allow one showerhead to be in operation at a time.

Exception: The maximum flow rate for showerheads when using the performance method specified in Section 4.303.1, Item 2, is 2.5 gpm @ 80 psi.

4.303.3 Plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall meet the standards referenced in Table 4.303.3.

TABLE 4.303.1
WATER USE BASELINE[1]

FIXTURE TYPE	BASELINE FLOW RATE	DURATION	DAILY USES	OCCUPANTS[2]
Showerheads, residential	2.5 gpm @ 80 psi	8 min.	1	
Lavatory faucets, residential	2.2 gpm @ 60 psi	.25 min.	3	
Lavatory faucets, nonresidential	0.5 gpm @ 60 psi	.25 min.	3	
Kitchen faucets	2.2 gpm @ 60 psi	4 min.	1	
Replacement aerators	2.2 gpm @ 60 psi			
Gravity tank-type water closets	1.6 gallons/flush	1 flush	1 male[3] 3 female	
Flushometer tank water closets	1.6 gallons/flush	1 flush	1 male[3] 3 female	
Flushometer valve water closets	1.6 gallons/flush	1 flush	1 male[3] 3 female	
Electromechanical hydraulic water closets	1.6 gallons/flush	1 flush	1 male[3] 3 female	
Urinals	1.0 gallon/flush	1 flush	2 male	

Fixture "Water Use" = Flow rate × Duration × Occupants × Daily uses

1. Use Worksheet WS-1 to calculate baseline water use.
2. For low-rise residential occupancies, the number of occupants shall be based on two persons for the first bedroom, plus one additional person for each additional bedroom.
3. The daily use number shall be increased to three if urinals are not installed in the room.

TABLE 4.303.2
FIXTURE FLOW RATES

FIXTURE TYPE	BASELINE FLOW RATE	MAXIMUM FLOW RATE AT ≥ 20 PERCENT REDUCTION
Showerheads	2.5 gpm @ 80 psi	2 gpm @ 80 psi
Lavatory faucets, residential	2.2 gpm @ 60 psi	1.5 gpm @ 60 psi[1]
Lavatory faucets, nonresidential	0.5 gpm @ 60 psi	0.4 gpm @ 60 psi[2]
Kitchen faucets	2.2 gpm @ 60 psi	1.8 gpm @ 60 psi[3]
Gravity tank-type water closets	1.6 gallons/flush	1.28 gallons/flush[4]
Flushometer tank water closets	1.6 gallons/flush	1.28 gallons/flush[4]
Flushometer valve water closets	1.6 gallons/flush	1.28 gallons/flush[4]
Electromechanical hydraulic water closets	1.6 gallons/flush	1.28 gallons/flush[4]
Urinals	1.0 gallon/flush	.5 gallon/flush

1. Lavatory faucets shall not have a flow rate less than 0.8 gpm at 20 psi.
2. Where complying faucets are unavailable, aerators rated at .35 gpm or other means may be used to achieve reduction.
3. Kitchen faucets may temporarily increase flow above the maximum rate, but not above 2.2 gpm @ 60 psi and must default to a maximum flow rate of 1.8 gpm @ 60 psi.
4. 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.

TABLE 4.303.3
STANDARDS FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

REQUIRED STANDARDS	
Water closets (toilets)—flushometer valve-type single flush, maximum flush volume	ASME A112.19.2/CSA B45.1 – 1.28 gal (4.8 L)
Water closets (toilets)—flushometer valve-type dual flush, maximum flush volume	ASME A112.19.14 and U.S. EPA WaterSense Tank-Type High-Efficiency Toilet Specification – 1.28 gal (4.8 L).
Water closets (toilets)—tank-type	U.S. EPA WaterSense Tank-Type High-Efficiency Toilet Specification
Urinals, maximum flush volume	ASME A112.19.2/CSA B45.1 – 0.5 gal (1.9 L)
Urinals, nonwater urinals	ASME A112.19.19 (vitreous china) ANSI Z124.9-2004 or IAPMO Z124.9 (plastic)
Public lavatory faucets: Maximum flow rate – 0.5 gpm (1.9 L/min)	ASME A112.18.1/CSA B125.1
Public metering self-closing faucets: Maximum water use – 0.25 gal (1.0 L) per metering cycle	ASME A112.18.1/CSA B125.1
Residential bathroom lavatory sink faucets: Maximum flow rate – 1.5 gpm (5.7 L/min)	ASME A112.18.1/CSA B125.1
Showerheads: Maximum flow rate – 2.5 gal (9.5 L/min)	ASME A112.18.1/CSA B125.1

SECTION 4.304
OUTDOOR WATER USE

4.304.1 Irrigation controllers. Automatic irrigation system controllers for landscaping provided by the builder and installed at the time of final inspection shall comply with the following:

1. Controllers shall be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plants' needs as weather conditions change.
2. Weather-based controllers without integral rain sensors or communication systems that account for local rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s). Soil moisture-based controllers are not required to have rain sensor input.

Note: More information regarding irrigation controller function and specifications is available from the Irrigation Association.

SECTION 4.305
WATER REUSE SYSTEMS
(Reserved)

CHAPTER 4
RESIDENTIAL MANDATORY MEASURES

Division 4.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

SECTION 4.401
GENERAL

4.401.1 Scope. The provisions of this chapter shall outline means of achieving material conservation and resource efficiency through protection of buildings from exterior moisture; construction waste diversion; employment of techniques to reduce pollution through recycling of materials; and building commissioning or testing, adjusting and balancing.

SECTION 4.402
DEFINITIONS

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

SECTION 4.403
FOUNDATION SYSTEMS
(Reserved)

SECTION 4.404
EFFICIENT FRAMING TECHNIQUES
(Reserved)

SECTION 4.405
MATERIAL SOURCES
(Reserved)

SECTION 4.406
ENHANCED DURABILITY AND REDUCED MAINTENANCE

4.406.1 Rodent proofing. 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 a similar method acceptable to the enforcing agency.

SECTION 4.407
WATER RESISTANCE AND MOISTURE MANAGEMENT
(Reserved)

SECTION 4.408
CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

4.408.1 Construction waste management. Recycle and/or salvage for reuse a minimum of 50 percent of the nonhazardous construction and demolition waste in accordance with either Section 4.408.2, 4.408.3 or 4.408.4, or meet a more stringent local construction and demolition waste management ordinance.

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 or are not located reasonably close to the jobsite.
3. The enforcing agency may make exceptions to the requirements of this section when isolated jobsites are located in areas beyond the haul boundaries of the diversion facility.

4.408.2 Construction waste management plan. Submit a construction waste management plan in conformance with Items 1 through 5. The construction waste management plan shall be updated as necessary and shall be available during construction for examination by the enforcing agency.

1. Identify the construction and demolition waste materials to be diverted from disposal by recycling, reuse on the project or salvage for future use or sale.
2. Specify if construction and demolition waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).
3. Identify diversion facilities where the construction and demolition waste material will be taken.
4. Identify construction methods employed to reduce the amount of construction and demolition waste generated.
5. Specify that the amount of construction and demolition waste materials diverted shall be calculated by weight or volume, but not by both.

4.408.3 Waste management company. Utilize a waste management company, approved by the enforcing agency, which can provide verifiable documentation that the percentage of construction and demolition waste material diverted from the landfill complies with Section 4.408.1.

Note: The owner or contractor may make the determination if the construction and demolition waste materials will be diverted by a waste management company.

4.408.4 Waste stream reduction alternative. Projects that generate a total combined weight of construction and demolition waste disposed of in landfills, which do not exceed four (4) lbs./sq. ft. of the building area shall meet the minimum 50 percent construction waste reduction requirement in Section 4.408.1.

4.408.5 Documentation. Documentation shall be provided to the enforcing agency which demonstrates compliance with Section 4.408.2, Items 1 through 5, Section 4.408.3 or Section 4.408.4.

Notes:

1. Sample forms found in "A Guide to the California Green Building Standards Code (Low-Rise Residential)" located at www.hcd.ca.gov/CALGreen.html may be used to assist in documenting compliance with this section.
2. Mixed construction and demolition debris (C&D) processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

SECTION 4.409
LIFE CYCLE ASSESSMENT
(Reserved)

SECTION 4.410
BUILDING MAINTENANCE AND OPERATION

4.410.1 Operation and maintenance manual. At the time of final inspection, a manual, compact disc, web-based reference or other media acceptable to the enforcing agency which includes all of the following shall be placed in the building:

1. Directions to the owner or occupant that the manual shall remain with the building throughout the life cycle of the structure.
2. Operation and maintenance instructions for the following:
   a. Equipment and appliances, including water-saving devices and systems, HVAC systems, water-heating systems and other major appliances and equipment.
   b. Roof and yard drainage, including gutters and downspouts.
   c. Space conditioning systems, including condensers and air filters.
   d. Landscape irrigation systems.
   e. Water reuse systems.
3. Information from local utility, water and waste recovery providers on methods to further reduce resource consumption, including recycle programs and locations.
4. Public transportation and/or carpool options available in the area.
5. Educational material on the positive impacts of an interior relative humidity between 30–60 percent and what methods an occupant may use to maintain the relative humidity level in that range.
6. Information about water-conserving landscape and irrigation design and controllers which conserve water.
7. Instructions for maintaining gutters and downspouts and the importance of diverting water at least 5 feet away from the foundation.
8. Information on required routine maintenance measures, including, but not limited to, caulking, painting, grading around the building, etc.
9. Information about state solar energy and incentive programs available.
10. A copy of all special inspection verifications required by the enforcing agency or this code.

CHAPTER 4
RESIDENTIAL MANDATORY MEASURES

Division 4.5 – ENVIRONMENTAL QUALITY

SECTION 4.501
GENERAL

4.501.1 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 4.502
DEFINITIONS

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

AGRIFIBER PRODUCTS. Agrifiber products include wheatboard, strawboard, panel substrates and door cores, not including furniture, fixtures and equipment (FF&E) not considered base building elements.

COMPOSITE WOOD PRODUCTS. Composite wood products include hardwood plywood, particleboard and medium density fiberboard. "Composite wood products" does not include hardboard, structural plywood, structural panels, structural composite lumber, oriented strand board, glued laminated timber, prefabricated wood I-joists or finger-jointed lumber, all as specified in CCR, Title 17, Section 93120.1(a).

MAXIMUM INCREMENTAL REACTIVITY (MIR). The maximum change in weight of ozone formed by adding a compound to the "base reactive organic gas (ROG) mixture" per weight of compound added, expressed to hundredths of a gram (g O^3/g ROC).

Note: MIR values for individual compounds and hydrocarbon solvents are specified in CCR, Title 17, Sections 94700 and 94701.

MOISTURE CONTENT. The weight of the water in wood expressed in percentage of the weight of the oven-dry wood.

PRODUCT-WEIGHTED MIR (PWMIR). The sum of all weighted MIR for all ingredients in a product subject to this article. The PWMIR is the total product reactivity expressed to hundredths of a gram of ozone formed per gram of product (excluding container and packaging).

Note: PWMIR is calculated according to equations found in CCR, Title 17, Section 94521(a).

REACTIVE ORGANIC COMPOUND (ROC). Any compound that has the potential, once emitted, to contribute to ozone formation in the troposphere.

VOC. A volatile organic compound broadly defined as a chemical compound based on carbon chains or rings with vapor pressures greater than 0.1 millimeters of mercury at room temperature. These compounds typically contain hydrogen and may contain oxygen, nitrogen and other elements. See CCR Title 17, Section 94508(a).

Note: Where specific regulations are cited from different agencies such as the South Coast Air Quality Management District (SCAQMD), California Air Resources Board (ARB or CARB), etc., the VOC definition included in that specific regulation is the one that prevails for the specific measure in question.

SECTION 4.503
FIREPLACES

4.503.1 General. Any installed gas fireplace shall be a direct-vent sealed-combustion type. Any installed woodstove or pellet stove shall comply with U.S. EPA Phase II emission limits where applicable. Woodstoves, pellet stoves and fireplaces shall also comply with applicable local ordinances.

SECTION 4.504
POLLUTANT CONTROL

4.504.1 Covering of duct openings and protection of mechanical equipment during construction. At the time of rough installation, during storage on the construction site and until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of water, dust and debris, which may enter the system.

4.504.2 Finish material pollutant control. Finish materials shall comply with this section.

4.504.2.1 Adhesives, sealants and caulks. Adhesives, sealants and caulks used on the project shall meet the requirements of the following standards unless more stringent local or regional air pollution or air quality management district rules apply:

1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable or SCAQMD Rule 1168 VOC limits, as shown in Table 4.504.1 or 4.504.2, as applicable. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene), except for aerosol products, as specified in Subsection 2 below.
2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than 1 pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain

toxic compounds, of *California Code of Regulations*, Title 17, commencing with Section 94507.

4.504.2.2 Paints and coatings. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Suggested Control Measure, as shown in Table 4.504.3, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in Table 4.504.3 shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-High Gloss coating, based on its gloss, as defined in subsections 4.21, 4.36, and 4.37 of the 2007 California Air Resources Board, Suggested Control Measure, and the corresponding Flat, Nonflat or Nonflat-High Gloss VOC limit in Table 4.504.3 shall apply.

4.504.2.3 Aerosol paints and coatings. Aerosol paints and coatings shall meet the Product-Weighted MIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522(c)(2) and (d)(2) of *California Code of Regulations*, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8, Rule 49.

4.504.2.4 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following:

1. Manufacturer's product specification.
2. Field verification of on-site product containers.

4.504.3 Carpet systems. All carpet installed in the building interior shall meet the testing and product requirements of one of the following:

1. Carpet and Rug Institute's Green Label Plus Program.
2. California Department of Public Health, "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.)
3. NSF/ANSI 140 at the Gold level.
4. Scientific Certifications Systems Indoor Advantage™ Gold.

TABLE 4.504.1
ADHESIVE VOC LIMIT[1,2]
Less Water and Less Exempt Compounds in Grams per Liter

ARCHITECTURAL APPLICATIONS	CURRENT VOC LIMIT
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesive	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Drywall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single-ply roof membrane adhesives	250
Other adhesives not specifically listed	50
SPECIALTY APPLICATIONS	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Contact adhesive	80
Special purpose contact adhesive	250
Structural wood member adhesive	140
Top and trim adhesive	250
SUBSTRATE SPECIFIC APPLICATIONS	
Metal to metal	30
Plastic foams	50
Porous material (except wood)	50
Wood	30
Fiberglass	80

1. If an adhesive is used to bond dissimilar substrates together, the adhesive with the highest VOC content shall be allowed.
2. For additional information regarding methods to measure the VOC content specified in this table, see South Coast Air Quality Management District Rule 1168.

TABLE 4.504.2
SEALANT VOC LIMIT
Less Water and Less Exempt Compounds in Grams per Liter

SEALANTS	CURRENT VOC LIMIT
Architectural	250
Marine deck	760
Nonmembrane roof	300
Roadway	250
Single-ply roof membrane	450
Other	420
SEALANT PRIMERS	
Architectural Nonporous Porous	 250 775
Modified bituminous	500
Marine deck	760
Other	750

TABLE 4.504.3
VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS[2, 3]
Grams of VOC per Liter of Coating,
Less Water and Less Exempt Compounds

COATING CATEGORY	EFFECTIVE 1/1/2010	EFFECTIVE 1/1/2012
Flat coatings	50	
Nonflat coatings	100	
Nonflat-high gloss coatings	150	
Specialty Coatings		
Aluminum roof coatings	400	
Basement specialty coatings	400	
Bituminous roof coatings	50	
Bituminous roof primers	350	
Bond breakers	350	
Concrete curing compounds	350	
Concrete/masonry sealers	100	
Driveway sealers	50	
Dry fog coatings	150	
Faux finishing coatings	350	
Fire resistive coatings	350	
Floor coatings	100	
Form-release compounds	250	
Graphic arts coatings (sign paints)	500	
High temperature coatings	420	
Industrial maintenance coatings	250	
Low solids coatings[1]	120	
Magnesite cement coatings	450	
Mastic texture coatings	100	
Metallic pigmented coatings	500	
Multicolor coatings	250	
Pretreatment wash primers	420	
Primers, sealers, and undercoaters	100	
Reactive penetrating sealers	350	
Recycled coatings	250	
Roof coatings	50	
Rust preventative coatings	400	250
Shellacs Clear Opaque	 730 550	
Specialty primers, sealers and undercoaters	350	100
Stains	250	
Stone consolidants	450	
Swimming pool coatings	340	
Traffic marking coatings	100	
Tub and tile refinish coatings	420	
Waterproofing membranes	250	
Wood coatings	275	
Wood preservatives	350	
Zinc-rich primers	340	

1. Grams of VOC per liter of coating, including water and including exempt compounds.
2. The specified limits remain in effect unless revised limits are listed in subsequent columns in the table.
3. Values in this table are derived from those specified by the California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008. More information is available from the Air Resources Board.

4.504.3.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute's Green Label program.

4.504.3.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 4.504.1.

4.504.4 Resilient flooring systems. Where resilient flooring is installed, at least 50 percent of floor area receiving resilient flooring shall comply with one or more of the following:

1. VOC emission limits defined in the Collaborative for High Performance Schools (CHPS) High Performance Products Database.
2. Products compliant with CHPS criteria certified under the Greenguard Children & Schools program.
3. Certification under the Resilient Floor Covering Institute (RFCI) FloorScore program.
4. Meet the California Department of Public Health, "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.)

4.504.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure for Composite Wood (17 CCR 93120 et seq.), by or before the dates specified in those sections, as shown in Table 4.504.5.

TABLE 4.504.5
FORMALDEHYDE LIMITS[1]
Maximum Formaldehyde Emissions in Parts per Million

PRODUCT	CURRENT LIMIT	JANUARY 1, 2012	JULY 1, 2012
Hardwood plywood veneer core	0.05		
Hardwood plywood composite core	0.08		0.05
Particleboard	0.09		
Medium density fiberboard	0.11		
Thin medium density fiberboard[2]	0.21	0.13	

1. Values in this table are derived from those specified by the California Air Resources Board, Air Toxics Control Measure for Composite Wood as tested in accordance with ASTM E 1333-96(2002). For additional information, see *California Code of Regulations*, Title 17, Sections 93120 through 93120.12.
2. Thin medium density fiberboard has a maximum thickness of 8 millimeters.

4.504.5.1 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following:

1. Product certifications and specifications
2. Chain of custody certifications
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, *et seq.*)
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Associa-

tion, the Australian AS/NZS 2269 or European 636 3S standards.

5. Other methods acceptable to the enforcing agency.

SECTION 4.505
INTERIOR MOISTURE CONTROL

4.505.1 General. Buildings shall meet or exceed the provisions of the *California Building Standards Code*.

4.505.2 Concrete slab foundations. Concrete slab foundations required to have a vapor retarder by the *California Building Code*, Chapter 19 or concrete slab-on-ground floors required to have a vapor retarder by the *California Residential Code*, Chapter 5, shall also comply with this section.

4.505.2.1 Capillary break. A capillary break shall be installed in compliance with at least one of the following:

1. A 4-inch (101.6 mm) thick base of $^1/_2$ inch (12.7 mm) or larger clean aggregate shall be provided with a vapor retarder in direct contact with concrete and a concrete mix design, which will address bleeding, shrinkage, and curling, shall be used. For additional information, see American Concrete Institute, ACI 302.2R-06.
2. Other equivalent methods approved by the enforcing agency.
3. A slab design specified by a licensed design professional.

4.505.3 Moisture content of building materials. Building materials with visible signs of water damage shall not be installed. Wall and floor framing shall not be enclosed when the framing members exceed 19 percent moisture content. Moisture content shall be verified in compliance with the following:

1. Moisture content shall be determined with either a probe-type or contact-type moisture meter. Equivalent moisture verification methods may be approved by the enforcing agency and shall satisfy requirements found in Section 101.8 of this code.
2. Moisture readings shall be taken at a point 2 feet (610 mm) to 4 feet (1219 mm) from the grade stamped end of each piece to be verified.
3. At least three random moisture readings shall be performed on wall and floor framing with documentation acceptable to the enforcing agency provided at the time of approval to enclose the wall and floor framing.

Insulation products which are visibly wet or have a high moisture content shall be replaced or allowed to dry prior to enclosure in wall or floor cavities. Wet-applied insulation products shall follow the manufacturers' drying recommendations prior to enclosure.

SECTION 4.506
INDOOR AIR QUALITY AND EXHAUST

4.506.1 Bathroom exhaust fans. Each bathroom shall be mechanically ventilated and shall comply with the following:

1. Fans shall be ENERGY STAR compliant and be ducted to terminate outside the building.
2. Unless functioning as a component of a whole house ventilation system, fans must be controlled by a humidity control.
   a. Humidity controls shall be capable of adjustment between a relative humidity range of ≤ 50 percent to a maximum of 80 percent. A humidity control may utilize manual or automatic means of adjustment.
   b. A humidity control may be a separate component to the exhaust fan and is not required to be integral (i.e., built-in).

Notes:

1. For the purposes of this section, a bathroom is a room which contains a bathtub, shower, or tub/shower combination.
2. Lighting integral to bathroom exhaust fans shall comply with the *California Energy Code*.

SECTION 4.507
ENVIRONMENTAL COMFORT

4.507.1 Openings. Whole house exhaust fans shall have insulated louvers or covers which close when the fan is off. Covers or louvers shall have a minimum insulation value of R-4.2.

4.507.2 Heating and air-conditioning system design. Heating and air-conditioning systems shall be sized, designed and have their equipment selected using the following methods:

1. The heat loss and heat gain is established according to ANSI/ACCA 2 Manual J—2004 (Residential Load Calculation), ASHRAE handbooks or other equivalent design software or methods.
2. Duct systems are sized according to ANSI/ACCA 1 Manual D—2009 (*Residential Duct Systems*), ASHRAE handbooks or other equivalent design software or methods.
3. Select heating and cooling equipment according to ANSI/ACCA 3 Manual S—2004 (*Residential Equipment Selection*) or other equivalent design software or methods.

Exception: Use of alternate design temperatures necessary to ensure the systems function are acceptable.

SECTION 4.508
OUTDOOR AIR QUALITY
(Reserved)

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 5 – NONRESIDENTIAL MANDATORY MEASURES
DIVISION 5.1 – PLANNING AND DESIGN

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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							X												
Chapter/Section																			
5.101							X												
5.102 Definitions							X												
5.106.8							X												
5.106.10							X												

CHAPTER 5
NONRESIDENTIAL MANDATORY MEASURES

Division 5.1 – PLANNING AND DESIGN

SECTION 5.101
GENERAL

5.101 Purpose. The provisions of this chapter 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 5.102
DEFINITIONS

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

CUTOFF LUMINAIRES. Luminaires whose light distribution is such that the candela per 1000 lamp lumens does not numerically exceed 25 (2.5 percent) at an angle of 90° above nadir, and 100 (10 percent) at a vertical angle of 80° above nadir. This applies to all lateral angles around the luminaire.

LOW-EMITTING AND FUEL EFFICIENT VEHICLES. Eligible vehicles are limited to the following:

1. Zero emission vehicle (ZEV), including neighborhood electric vehicles (NEV), partial zero emission vehicle (PZEV), advanced technology PZEV (AT ZEV) or CNG fueled (Original equipment manufacturer only) regulated under Health and Safety Code section 43800 and CCR, Title 13, Sections 1961 and 1962.
2. High-efficiency vehicles, regulated by U.S. EPA, bearing High-Occupancy Vehicle (HOV) car pool lane stickers issued by the Department of Motor Vehicles.

NEIGHBORHOOD ELECTRIC VEHICLE (NEV). A motor vehicle that meets the definition of "low-speed vehicle" either in Section 385.5 of the Vehicle Code or in 49 CFR571.500 (as it existed on July 1, 2000), and is certified to zero-emission vehicle standards.

TENANT-OCCUPANTS. Building occupants who inhabit a building during its normal hours of operation as permanent occupants, such as employees, as distinguished from customers and other transient visitors.

VANPOOL VEHICLE. Eligible vehicles are limited to any motor vehicle, other than a motortruck or truck tractor, designed for carrying more than 10 but not more than 15 persons including the driver, which is maintained and used primarily for the nonprofit work-related transportation of adults for the purposes of ridesharing.

Note: Source: Vehicle Code, Division 1, Section 668

ZEV. Any vehicle certified to zero-emission standards.

SECTION 5.103
SITE SELECTION
(Reserved)

SECTION 5.104
SITE PRESERVATION
(Reserved)

SECTION 5.105
DECONSTRUCTION AND REUSE OF EXISTING STRUCTURES
(Reserved)

SECTION 5.106
SITE DEVELOPMENT

5.106.1 Storm water pollution prevention. Newly constructed projects which disturb less than one acre of land shall prevent the pollution of stormwater runoff from the construction activities through one or more of the following measures:

5.106.1.1 Local ordinance. Comply with a lawfully enacted stormwater management and/or erosion control ordinance.

5.106.1.2 Best management practices (BMP). Prevent the loss of soil through wind or water erosion by implementing an effective combination of erosion and sediment control and good housekeeping BMP.

1. Soil loss BMP that should be considered for implementation as appropriate for each project include, but are not limited to, the following:
   a. Scheduling construction activity
   b. Preservation of natural features, vegetation and soil
   c. Drainage swales or lined ditches to control stormwater flow
   d. Mulching or hydroseeding to stabilize disturbed soils
   e. Erosion control to protect slopes
   f. Protection of storm drain inlets (gravel bags or catch basin inserts)
   g. Perimeter sediment control (perimeter silt fence, fiber rolls)
   h. Sediment trap or sediment basin to retain sediment on site
   i. Stabilized construction exits
   j. Wind erosion control
   k. Other soil loss BMP acceptable to the enforcing agency
2. Good housekeeping BMP to manage construction equipment, materials and wastes that should be considered for implementation as appropriate for each project include, but are not limited to, the following:
   a. Material handling and waste management
   b. Building materials stockpile management
   c. Management of washout areas (concrete, paints, stucco, etc.)
   d. Control of vehicle/equipment fueling to contractor's staging area
   e. Vehicle and equipment cleaning performed off site
   f. Spill prevention and control
   g. Other housekeeping BMP acceptable to the enforcing agency

5.106.4 Bicycle parking. Comply with Sections 5.106.4.1 and 5.106.4.2; or meet local ordinance, whichever is stricter.

5.106.4.1 Short-Term bicycle parking. If the project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack.

5.106.4.2 Long-Term bicycle parking. For buildings with over 10 tenant-occupants, provide secure bicycle parking for 5 percent of motorized vehicle parking capacity, with a minimum of one space. Acceptable parking facilities shall be convenient from the street and may include:

1. Covered, lockable enclosures with permanently anchored racks for bicycles;
2. Lockable bicycle rooms with permanently anchored racks; and
3. Lockable, permanently anchored bicycle lockers.

Note: Additional information on recommended bicycle accommodations may be obtained from Sacramento Area Bicycle Advocates.

5.106.5.2 Designated parking. Provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as follows:

TABLE 5.106.5.2

TOTAL NUMBER OF PARKING SPACES	NUMBER OF REQUIRED SPACES
0–9	0
10–25	1
26–50	3
51–75	6
76–100	8
101–150	11
151–200	16
201 and over	At least 8 percent of total

5.106.5.2.1 Parking stall marking. Paint, in the paint used for stall striping, the following characters such that the lower edge of the last word aligns with the end of the stall striping and is visible beneath a parked vehicle:

"CLEAN AIR/
VANPOOL/EV"

Note: Vehicles bearing Clean Air Vehicle stickers from expired HOV lane programs may be considered eligible for designated parking spaces.

5.106.8 Light pollution reduction. Outdoor lighting systems shall be designed and installed to comply with the following:

1. The minimum requirements in the *California Energy Code* for Lighting Zones 1-4 as defined in Chapter 10 of the California Administrative Code; 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:

1. Luminaires that qualify as exceptions in Section 147 of the *California Energy Code*
2. Emergency lighting

Note: See also *California Building Code*, Chapter 12, Section 1205.6 for college campus lighting requirements for parking facilities and walkways.

5.106.8.1 Effective date. Newly constructed nonresidential projects with outdoor lighting for which an application for a building permit is submitted on or after July 1, 2012 shall comply with this section.

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, 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

TABLE 5.106.8
MAXIMUM ALLOWABLE BACKLIGHT, UPLIGHT AND GLARE (BUG) RATINGS[1,2]

ALLOWABLE RATING	LIGHTING ZONE 1	LIGHTING ZONE 2	LIGHTING ZONE 3	LIGHTING ZONE 4
Maximum Allowable Backlight Rating[3]				
Luminaire greater than 2 mounting heights (MH) from property line	No Limit	No Limit	No Limit	No Limit
Luminaire back hemisphere is 1 – 2 MH from property line	B2	B3	B4	B4
Luminaire back hemisphere is 0.5 – 1 MH from property line	B1	B2	B3	B3
Luminaire back hemisphere is less than 0.5 MH from property line	B0	B0	B1	B2
Maximum Allowable Uplight Rating				
For area lighting[4]	U0	U0	U0	U0
For all other outdoor lighting, including decorative luminaires	U1	U2	U3	U4
Maximum Allowable Glare Rating[5]				
Luminaire greater than 2 MH from property line	G1	G2	G3	G4
Luminaire front hemisphere is 1 – 2 MH from property line	G0	G1	G1	G2
Luminaire front hemisphere is 0.5 – 1 MH from property line	G0	G0	G1	G1
Luminaire back hemisphere is less than 0.5 MH from property line	G0	G0	G0	G1

1. IESNA Lighting Zones 0 and 5 are not applicable; refer to Lighting Zones as defined in the *California Energy Code* and Chapter 10 of the *California Administrative Code.*
2. For property lines that abut public walkways, bikeways, plazas and parking lots, the property line may be considered to be 5 feet beyond the actual property line for purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public transit corridor for the purpose of determining compliance with this section.
3. If the nearest property line is less than or equal to two mounting heights from the back hemisphere of the luminaire distribution, the applicable reduced Backlight rating shall be met.
4. General lighting luminaires in areas such as outdoor parking, sales or storage lots shall meet these reduced ratings. Decorative luminaires located in these areas shall meet *U*-value limits for "all other outdoor lighting".
5. If the nearest property line is less than or equal to two mounting heights from the front hemisphere of the luminaire distribution, the applicable reduced Glare rating shall be met.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 5 – NONRESIDENTIAL MANDATORY MEASURES
DIVISION 5.2 – ENERGY EFFICIENCY

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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 5
NONRESIDENTIAL MANDATORY MEASURES

Division 5.2 – ENERGY EFFICIENCY

SECTION 5.201
GENERAL

5.201.1 Scope [BSC]. ***California Energy Code*** **[DSA-SS].** For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory building standards.

Note: It is the intent of this code to encourage buildings to achieve exemplary performance in the area of energy efficiency. For the purposes of energy efficiency standards, the California Energy Commission believes specifically, a green building should achieve at least a 15 percent reduction in energy usage when compared to the State's mandatory energy efficiency standards.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 5 – NONRESIDENTIAL MANDATORY MEASURES
DIVISION 5.3 – WATER EFFICIENCY AND CONSERVATION

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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							X												
Chapter/Section																			
5.301.1							X												
5.302.1 Definitions							X												
5.303.2							X												
Table 5.303.2.2							X												
Table 5.303.2.3							X												
5.303.4, Item 1 only							X												
5.303.6							X												
Table 5.303.6							X												

CHAPTER 5
NONRESIDENTIAL MANDATORY MEASURES

Division 5.3 – WATER EFFICIENCY AND CONSERVATION

SECTION 5.301
GENERAL

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

SECTION 5.302
DEFINITIONS

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

GRAYWATER. Untreated household waste which has not come into contact with toilet waste. Graywater includes used water from bathtubs, showers, bathroom wash basins and water from clothes washing machines and laundry tubs. It shall not include waste water from kitchen sinks, dishwashers or laundry water from soiled diapers.

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MLO). The California ordinance regulating landscape design, installation and maintenance practices that will ensure commercial, multifamily and other developer installed landscapes greater than 2500 square feet meet an irrigation water budget developed based on landscaped area and climatological parameters.

POTABLE WATER. Water that is drinkable and meets the U.S. Environmental Protection Agency (EPA) Drinking Water Standards. See definition in the *California Plumbing Code*, Part 5.

RECYCLED WATER. Water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur [*Water Code* Section 13050 (n)]. Simply put, recycled water is water treated to remove waste matter attaining a quality that is suitable to use the water again.

SUBMETER. A meter installed subordinate to a site meter. Usually used to measure water intended for one purpose, such as landscape irrigation. For the purposes of this section, a dedicated meter may be considered a submeter.

WATER BUDGET. Estimated total landscape irrigation water use shall not exceed the maximum applied water allowance calculated in accordance with the Department of Water Resources Model Efficient Landscape Ordinance (MLO).

SECTION 5.303
INDOOR WATER USE

5.303.1 Meters. Separate submeters or metering devices shall be installed for the uses described in Sections 5303.1.1 and 5303.1.2.

5.303.1.1 Buildings in excess of 50,000 square feet (4645 m²). Separate submeters shall be installed as follows:

1. For each individual leased, rented, or other tenant space within the building projected to consume more than 100 gal/day (380 L/day), including, but not limited to, spaces used for laundry or cleaners, restaurant or food service, medical or dental office, laboratory, or beauty salon or barber shop.
2. Where separate submeters for individual building tenants are unfeasible, for water supplied to the following subsystems:
   a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s)
   b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s)
   c. Steam and hot-water boilers with energy input more than 500,000 Btu/h (147 kW)

5.303.1.2 Excess consumption. Any building or a space within a building that is projected to consume more than 1,000 gal/day (3800 L/day).

5.303.2 Twenty percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 20 percent shall be provided. The reduction shall be based on the maximum allowable water use per plumbing fixture and fittings as required by the *California Building Standards Code.* The 20 percent reduction in potable water use shall be demonstrated by one of the following methods:

1. Prescriptive method. Each plumbing fixture and fitting shall not exceed the maximum flow rate at ≥ 20 percent reduction as specified in Table 5.303.2.3, or
2. Performance method. A calculation demonstrating a 20% reduction in the building "water use baseline" as established in Table 5.303.2.2 shall be provided.

5.303.2.1 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all the showerheads controlled by a single valve shall not exceed the maximum flow rate at ≥ 20 percent reduction contained in Table 5.303.2.2 or the shower shall be designed to only allow one showerhead to be in operation at a time.

Exception: The maximum flow rate for shower heads when using the performance method specified in Section 5.303.2, Item 2 is 2.5 gpm @ 80 psi.

TABLE 5.303.2.2
WATER USE BASELINE[3]

FIXTURE TYPE	BASELINE FLOW RATE	DURATION	DAILY USES	OCCUPANTS[2]
Showerheads	2.5 gpm @ 80 psi	5 min.	1	X[2a]
Lavatory faucets residential	2.2 gpm @ 60 psi	.25 min.	3	X
Lavatory faucets nonresidential	0.5 gpm @ 60 psi	.25 min.	3	X[2b]
Kitchen faucets	2.2 gpm @ 60 psi	4 min.	1	X
Replacement aerators	2.2 gpm @ 60 psi			X
Wash fountains	2.2 [rim space (in.)/20 gpm @ 60 psi]			X
Metering faucets	0.25 gallons/cycle	.25 min.	3	X
Metering faucets for wash fountains	.25 [rim space (in.)/20 gpm @ 60 psi]	.25 min.		X
Gravity tank type water closets	1.6 gallons/flush	1 flush	1 male[1] 3 female	X
Flushometer tank water closets	1.6 gallons/flush	1 flush	1 male[1] 3 female	X
Flushometer valve water closets	1.6 gallons/flush	1 flush	1 male[1] 3 female	X
Electromechanical hydraulic water closets	1.6 gallons/flush	1 flush	1 male[1] 3 female	X
Urinals	1.0 gallons/flush	1 flush	2 male	X

Fixture "Water Use" = Flow rate × Duration × Occupants × Daily uses

1. The daily use number shall be increased to three if urinals are not installed in the room.
2. Refer to Table A, Chapter 4, *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. Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
3. Use Worksheet WS-1 to calculate base line water use.

TABLE 5.303.2.3
FIXTURE FLOW RATES

FIXTURE TYPE	BASELINE FLOW RATE	MAXIMUM FLOW RATE AT ≥ 20 PERCENT REDUCTION
Showerheads	2.5 gpm @ 80 psi	2 gpm @ 80 psi
Lavatory faucets—residential	2.2 gpm @ 60 psi	1.5 gpm @ 60 psi[1]
Lavatory faucets—nonresidential	0.5 gpm @ 60 psi	0.4 gpm @ 60 psi[3]
Kitchen faucets	2.2 gpm @ 60 psi	1.8 gpm @ 60 psi[2]
Wash fountains	2.2 [rim space (in.)/20 gpm @ 60 psi]	1.8 [rim space (in.)/20 gpm @ 60 psi]
Metering faucets	0.25 gallons/cycle	0.2 gallons/cycle
Metering faucets for wash fountains	.25 [rim space (in.)/20 gpm @ 60 psi]	.20 [rim space (in.)/20 gpm @ 60 psi]
Gravity tank type water closets	1.6 gallons/flush	1.28 gallons/flush[1]
Flushometer tank water closets	1.6 gallons/flush	1.28 gallons/flush[1]
Flushometer valve water closets	1.6 gallons/flush	1.28 gallons/flush[1]
Electromechanical hydraulic water closets	1.6 gallons/flush	1.28 gallons/flush[1]
Urinals	1.0 gallons/flush	.5 gallons/flush

1. Lavatory Faucets Residential shall not have a flow rate less than 0.8 gpm at 20 psi.
2. Kitchen faucets may temporarily increase flow above the maximum rate, but not above 2.2 gpm @ 60 psi and must default to a maximum flow rate of 1.8 gpm @ 60 psi.
3. Where complying faucets are unavailable, aerators rated at .35 gpm or other means may be used to achieve reduction.
4. 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 A 112.19.233.2.
   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 A 112.19.2 and ASME A 112.19.14.

5.303.4 Wastewater reduction. Each building shall reduce by 20 percent wastewater by one of the following methods:

1. [DSA-SS] The installation of water-conserving fixtures (water closets, urinals) meeting the criteria established in Section 5.303.2 or
2. Utilizing nonpotable water systems [captured rainwater, graywater, and municipally treated wastewater (recycled water) complying with the current edition of the California Plumbing Code or other methods described in Section A5.304].

5.303.6 Plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall meet the standards referenced in Table 5.503.6.

TABLE 5.303.6
STANDARDS FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

REQUIRED STANDARDS	
Water closets (toilets) – flushometer valve type single flush, maximum flush volume	ASME A 112.19.2/ CSA B45.1 – 1.28 gal (4.8 L)
Water closets (toilets) – flushometer valve type dual flush, maximum flush volume	ASME A 112.19.14 and USEPA WaterSense Tank-type High-efficiency Toilet Specification – 1.28 gal (4.8 L)
Water closets (toilets) – tank-type	U.S. EPA WaterSense Tank-type High-efficiency Toilet Specification
Urinals, maximum flush volume	ASME A 112.19.2/ CSA B45.1 – 0.5 gal (1.9 L)
Urinals, nonwater urinals	ASME A 112.19.19 (vitreous china) ANSI Z124.9-2004 or IAPMO Z124.9 (plastic)
Public lavatory faucets: Maximum flow rate – 0.5 gpm (1.9 L/min)	ASME A 112.18.1/CSA B125.1
Public metering self-closing faucets: Maximum water use – 0.25 gal (1.0 L) per metering cycle	ASME A 112.18.1/CSA B125.1
Residential bathroom lavatory sink faucets: Maximum flow rate – 1.5 gpm (5.7 L/min)[1]	ASME A 112.18.1/CSA B125.1
Showerheads: Maximum flow rate – 2.5 gal (9.5 l/min)	ASME A112.18.1/CSA B125.1

SECTION 5.304
OUTDOOR WATER USE

5.304.1 Water budget. A water budget shall be developed for landscape irrigation use that conforms to the local water efficient landscape ordinance or to the California Department of Water Resources Model Water Efficient Landscape Ordinance where no local ordinance is applicable.

Note: Prescriptive measures to assist in compliance with the water budget are listed in Sections 492.5 through 492.8, 492.10 and 492.11 of the ordinance, which may be found at: http://www.owue.water.ca.gov/landscape/ord/ord.cfm.

5.304.2 Outdoor potable water use. For new water service for landscaped areas of at least 1,000 square feet but not more than 5,000 square feet (the level at which *Water Code* §535 applies), separate submeters or metering devices shall be installed for outdoor potable water use.

5.304.3 Irrigation design. In new nonresidential construction with at least 1,000 but not more than 2,500 square feet of landscaped area (the level at which the MLO applies), install irrigation controllers and sensors which include the following criteria, and meet manufacturer's recommendations.

5.304.3.1 Irrigation controllers. Automatic irrigation system controllers installed at the time of final inspection shall comply with the following:

1. Controllers shall be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plants' needs as weather conditions change.
2. Weather-based controllers without integral rain sensors or communication systems that account for local rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s). Soil moisture-based controllers are not required to have rain sensor input.

Note: More information regarding irrigation controller function and specifications is available from the Irrigation Association.

SECTION 5.305
WATER REUSE SYSTEMS
(Reserved)

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 5 – NONRESIDENTIAL MANDATORY MEASURES
DIVISION 5.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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							X												
Chapter/Section																			
5.401.1							X												
5.402.1 Definitions							X												
5.402.1 ADJUST							X												
5.402.1 BALANCE							X												
5.402.1 TEST							X												
5.407							X												
5.408.1–5.408.3							X												
5.410.1							X												
5.410.1.1							X												

CHAPTER 5
NONRESIDENTIAL MANDATORY MEASURES

Division 5.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

SECTION 5.401
GENERAL

5.401.1 Scope. The provisions of this chapter shall outline means of achieving material conservation and resource efficiency through protection of buildings from exterior moisture, construction waste diversion, employment of techniques to reduce pollution through recycling of materials, and building commissioning or testing and adjusting.

SECTION 5.402
Definitions

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

ADJUST. To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.

BALANCE. To proportion flows within the distribution system, including submains, branches and terminals, according to design quantities.

BUILDING COMMISSIONING. A systematic quality assurance process that spans the entire design and construction process, including verifying and documenting that building systems and components are planned, designed, installed, tested, operated and maintained to meet the owner's project requirements.

TEST. A procedure to determine quantitative performance of a system or equipment.

SECTION 5.403
FOUNDATION SYSTEMS
(Reserved)

SECTION 5.404
EFFICIENT FRAMING TECHNIQUES
(Reserved)

SECTION 5.405
MATERIAL SOURCES
(Reserved)

SECTION 5.406
ENHANCED DURABILITY AND REDUCED MAINTENANCE (Reserved)

SECTION 5.407
WATER RESISTANCE AND MOISTURE MANAGEMENT

5.407.1 Weather protection. Provide a weather-resistant exterior wall and foundation envelope as required by *California Building Code* Section 1403.2 (Weather Protection) and *California Energy Code* Section 150, (Mandatory Features and Devices), manufacturer's installation instructions or local ordinance, whichever is more stringent.

5.407.2 Moisture control. Employ moisture control measures by the following methods.

5.407.2.1 Sprinklers. Design and maintain landscape irrigation systems to prevent spray on structures.

5.407.2.2 Entries and openings. Design exterior entries and/or openings subject to foot traffic or wind-driven rain to prevent water intrusion into buildings.

Notes:

1. Use features such as overhangs and recesses, and flashings integrated with a drainage plane.
2. Use nonabsorbent floor and wall finishes within at least two feet around and perpendicular to such openings.

SECTION 5.408
CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

5.408.1 Construction waste management. Recycle and/or salvage for reuse a minimum of 50 percent of the nonhazardous construction waste in accordance with Section 5.408.1.1, 5.408.1.2 or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent.

5.408.1.1 Construction waste management plan. Where a local jurisdiction does not have a construction and demolition waste management ordinance that is more stringent, submit a construction waste management plan that

1. Identifies the construction waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project or salvage for future use or sale.
2. Determines if construction waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).
3. Identifies diversion facilities where construction waste material collected will be taken.
4. Specifies that the amount of construction waste materials diverted shall be calculated by weight or volume, but not by both.

5.408.1.2 Waste management company. Utilize a waste management company that can provide verifiable documentation that the percentage of construction waste material diverted from the landfill complies with this section.

Note: The owner or contractor shall make the determination if the construction waste material will be diverted by a waste management company.

Exceptions to Sections 5.408.1.1 and 5.408.1.2:

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, where demolition of an existing structure(s) is necessary for the construction of a new structure.

5.408.1.3 Waste stream reduction alternative. The combined weight of new construction disposal that does not exceed 2 lbs/sq. ft. of building area may be deemed to meet the 50 percent minimum requirement as approved by the enforcing agency.

5.408.1.4 Documentation. Documentation shall be provided to the enforcing agency which demonstrates compliance with Sections 5.408.1.1 through 5.408.1.3. The waste management plan shall be updated as necessary and shall be accessible during construction for examination by the enforcing agency.

Notes:

1. Sample forms found in "A Guide to the California Green Building Standards Code (Nonresidential)" located at http://www.bsc.ca.gov/CALGreen/default.htm may be used to assist in documenting compliance with the waste management plan.
2. Mixed construction and demolition debris (C&D) processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

5.408.2 Isolated jobsites. The enforcing agency may make exceptions to the requirements of this section when jobsites are located in areas beyond the haul boundaries of the diversion facility.

5.408.3 Excavated soil and land clearing debris [BSC]. 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phased project, such material may be stockpiled on site until the storage site is developed.

Exception: Reuse, either on-or off-site, of vegetation or soil contaminated by disease or pest infestation.

Notes:

1. If contamination by disease or pest infestation is suspected, contact the County Agricultural Commissioner and follow its direction for recycling or disposal of the material. (www.cdfa.ca.gov/exec/county/county_contacts.html)

2. For a map of known pest and/or disease quarantine zones, consult with the California Department of Food and Agriculture. (www.cdfa.ca.gov)

SECTION 5.409
LIFE CYCLE ASSESSMENT
(Reserved)

SECTION 5.410
BUILDING MAINTENANCE AND OPERATION

5.410.1 Recycling by occupants. 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 and metals.

5.410.1.1 Sample ordinance. Space allocation for recycling areas shall comply with Chapter 18, Part 3, Division 30 of the *Public Resources Code.* Chapter 18 is known as the California Solid Waste Reuse and Recycling Access Act of 1991 (Act).

Note: A sample ordinance for use by local agencies may be found in Appendix A of the document at the CalRecycle's web site.

5.410.2 Commissioning. For new buildings 10,000 square feet and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements. Commissioning shall be performed in accordance with this section by trained personnel with experience on projects of comparable size and complexity. Commissioning requirements shall include:

1. Owner's or Owner representative's project requirements
2. Basis of design
3. Commissioning measures shown in the construction documents
4. Commissioning plan
5. Functional performance testing
6. Documentation and training
7. Commissioning report

Exceptions:

1. Dry storage warehouses of any size
2. Areas under 10,000 square feet used for offices or other conditioned accessory spaces within dry storage warehouses
3. Tenant improvements under 10,000 square feet as described in Section 303.1.1

All building operating systems covered by Title 24, Part 6, as well as process equipment and controls, and renewable energy systems shall be included in the scope of the commissioning requirements.

5.410.2.1 Owner's or Owner representative's Project Requirements (OPR). The expectations and requirements of the building appropriate to its phase shall be documented before the design phase of the project begins. This documentation shall include the following:

1. Environmental and sustainability goals
2. Energy efficiency goals
3. Indoor environmental quality requirements
4. Project program, including facility functions and hours of operation, and need for after hours operation
5. Equipment and systems expectations
6. Building occupant and operation and maintenance (O&M) personnel expectations

5.410.2.2 Basis of Design (BOD). A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project. The Basis of Design document shall cover the following systems: <

1. Heating, ventilation, air conditioning (HVAC) systems and controls
2. Indoor lighting system and controls
3. Water heating system
4. Renewable energy systems
5. Landscape irrigation systems
6. Water reuse systems

5.410.2.3 Commissioning plan. Prior to permit issuance a commissioning plan shall be completed to document how the project will be commissioned. The commissioning plan shall include the following: <

1. General project information
2. Commissioning goals
3. Systems to be commissioned. Plans to test systems and components shall include:
   a. An explanation of the original design intent
   b. Equipment and systems to be tested, including the extent of tests
   c. Functions to be tested
   d. Conditions under which the test shall be performed
   e. Measurable criteria for acceptable performance
4. Commissioning team information
5. Commissioning process activities, schedules and responsibilities. Plans for the completion of commissioning shall be included. <

5.410.2.4 Functional performance testing. Functional performance tests shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications. Functional performance testing reports shall contain information addressing each of the building

components tested, the testing methods utilized, and include any readings and adjustments made.

5.410.2.5 Documentation and training. A systems manual and systems operations training are required, including Occupational Safety and Health Act (OSHA) requirements in *California Code of Regulations* (CCR), Title 8, Section 5142, and other related regulations.

5.410.2.5.1 Systems manual. Documentation of the operational aspects of the building shall be completed within the systems manual and delivered to the building owner or representative. The systems manual shall include the following:

1. Site information, including facility description, history and current requirements
2. Site contact information
3. Basic operations and maintenance, including general site operating procedures, basic troubleshooting, recommended maintenance requirements, site events log
4. Major systems
5. Site equipment inventory and maintenance notes
6. A copy of verifications required by the enforcing agency or this code
7. Other resources and documentation, if applicable

5.410.2.5.2 Systems operations training. A program for training of the appropriate maintenance staff for each equipment type and/or system shall be developed and documented in the commissioning report and shall include the following:

1. System/equipment overview (what it is, what it does and with what other systems and/or equipment it interfaces)
2. Review and demonstration of servicing/preventive maintenance
3. Review of the information in the systems manual
4. Review of the record drawings on the system/equipment

5.410.2.6 Commissioning report. A report of commissioning process activities undertaken through the design and construction phases of the building project shall be completed and provided to the owner or representative.

Note: Guidance on implementation and enforcement of commissioning requirements, including sample compliance forms and templates, may be found in Appendix A6, Division A6.1, of this code.

5.410.4 Testing and adjusting. Testing and adjusting of systems shall be required for buildings less than 10,000 square feet.

5.410.4.1 (Reserved)

5.410.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include, as applicable to the project:

1. HVAC systems and controls
2. Indoor and outdoor lighting and controls
3. Water heating systems
4. Renewable energy systems
5. Landscape irrigation systems
6. Water reuse systems

5.410.4.3 Procedures. Perform testing and adjusting procedures in accordance with manufacturer's specifications and applicable standards on each system.

5.410.4.3.1 HVAC balancing. In addition to testing and adjusting, before a new space-conditioning system serving a building or space is operated for normal use, balance the system in accordance with the procedures defined by the Testing Adjusting and Balancing Bureau National Standards; the National Environmental Balancing Bureau Procedural Standards; Associated Air Balance Council National Standards or as approved by the enforcing agency.

5.410.4.4 Reporting. After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.

5.410.4.5 Operation and maintenance (O & M) manual. Provide the building owner or representative with detailed operating and maintenance instructions and copies of guaranties/warranties for each system. O & M instructions shall be consistent with OSHA requirements in CCR, Title 8, Section 5142, and other related regulations.

5.410.4.5.1 Inspections and reports. Include a copy of all inspection verifications and reports required by the enforcing agency.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 5 – NONRESIDENTIAL MANDATORY MEASURES
DIVISION 5.5 – ENVIRONMENTAL QUALITY

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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							X												
Chapter/Section																			
5.501.1							X												
5.502.1 Definitions							X												
5.504.3							X												
5.504.4							X												
5.504.4.1							X												
Table 5.504.4.1							X												
Table 5.504.4.2							X												
5.504.4.3							X												
5.504.4.3.1							X												
Table 5.504.4.3							X												
5.504.4.3.2							X												
5.504.4.4 and subsections							X												
5.504.4.5							X												
Table 5.504.4.5							X												
5.504.4.6							X												
5.504.5.3							X												
5.505							X												
5.506.1							X												
5.508.1 and subsections							X												

CHAPTER 5
NONRESIDENTIAL MANDATORY MEASURES

Division 5.5 – ENVIRONMENTAL QUALITY

SECTION 5.501
GENERAL

5.501.1 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 5.502
DEFINITIONS

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

ARTERIAL HIGHWAY. A general term denoting a highway primarily for through traffic usually on a continuous route.

A-WEIGHTED SOUND LEVEL (dBA). The sound pressure level in decibels as measured on a sound level meter using the internationally standardized A-weighting filter or as computed from sound spectral data to which A-weighting adjustments have been made.

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL). A metric similar to Ldn, except that a 5 dB adjustment is added to the equivalent continuous sound exposure level for evening hours (7 p.m. to 10 p.m.) in addition to the 10 dB nighttime adjustment used in the Ldn.

COMPOSITE WOOD PRODUCTS. Composite wood products include hardwood plywood, particleboard and

medium density fiberboard. "Composite wood products" does not include hardboard, structural plywood, structural panels, structural composite lumber, oriented strand board, glued laminated timber, prefabricated wood I-joists or finger-jointed lumber, all as specified in CCR, Title 17, Section 93120.1(a).

Note: See CCR, Title 17, Section 93120.1.

DAY-NIGHT AVERAGE SOUND LEVEL (Ldn). The A-weighted equivalent continuous sound exposure level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during nighttime hours (10 p.m. to 7 a.m.).

DECIBEL (dB). A measure on a logarithmic scale of the magnitude of a particular quantity (such as sound pressure, sound power, sound intensity) with respect to a reference quantity.

ENERGY EQUIVALENT (NOISE) LEVEL (L_{eq}). The level of a steady noise which would have the same energy as the fluctuating noise level integrated over the time period of interest.

EXPRESSWAY. An arterial highway for through traffic which may have partial control of access, but which may or may not be divided or have grade separations at intersections.

FREEWAY. A divided arterial highway with full control of access and with grade separations at intersections.

MERV. Filter minimum efficiency reporting value, based on ASHRAE 52.2-1999.

MAXIMUM INCREMENTAL REACTIVITY (MIR). The maximum change in weight of ozone formed by adding a compound to the "Base Reactive Organic Gas (ROG) Mixture" per weight of compound added, expressed to hundredths of a gram (g O3 /g ROC).

Note: MIR values for individual compounds and hydrocarbon solvents are specified in CCR, Title 17, Sections 94700 and 94701.

PRODUCT-WEIGHTED MIR (PWMIR). The sum of all weighted-MIR for all ingredients in a product subject to this article. The PWMIR is the total product reactivity expressed to hundredths of a gram of ozone formed per gram of product (excluding container and packaging).

Note: PWMIR is calculated according to equations found in CCR, Title 17, Section 94521(a).

REACTIVE ORGANIC COMPOUND (ROC). Any compound that has the potential, once emitted, to contribute to ozone formation in the troposphere.

VOC. A volatile organic compound broadly defined as a chemical compound based on carbon chains or rings with vapor pressures greater than 0.1 millimeters of mercury at room temperature. These compounds typically contain hydrogen and may contain oxygen, nitrogen and other elements. See CCR Title 17, Section 94508(a).

Note: Where specific regulations are cited from different agencies such as South Coast Air Quality Management District (SCAQMD), California Air Resources Board (ARB or CARB), etc, the VOC definition included in that specific regulation is the one that prevails for the specific measure in question.

SECTION 5.503
FIREPLACES

5.503.1 General. Install only a direct-vent sealed-combustion gas or sealed wood-burning fireplace, or a sealed woodstove or pellet stove, and refer to residential requirements in the *California Energy Code*, Title 24, Part 6, Subchapter 7, Section 150. Woodstoves, pellet stoves and fireplaces shall comply with applicable local ordinances.

5.503.1.1 Woodstoves. Woodstoves and pellet stoves shall comply with U.S. EPA Phase II emission limits.

SECTION 5.504
POLLUTANT CONTROL

5.504.1.3 Temporary ventilation. The permanent HVAC system shall only be used during construction if necessary to condition the building within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with a Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30 percent based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy.

5.504.3 Covering of duct openings and protection of mechanical equipment during construction. At the time of rough installation and during storage on the construction site until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of dust, water and debris which may enter the system.

5.504.4 Finish material pollutant control. Finish materials shall comply with Sections 5.504.4.1 through 5.504.4.4.

5.504.4.1 Adhesives, sealants and caulks. Adhesives, sealants, and caulks used on the project shall meet the requirements of the following standards:

1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits, as shown in Tables 5.504.4.1 and 5.504.4.2. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene), except for aerosol products as specified in subsection 2, below.
2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of *California Code of Regulations*, Title 17, commencing with Section 94507.

TABLE 5.504.4.1
ADHESIVE VOC LIMIT[1,2]
Less Water and Less Exempt Compounds in Grams Per Liter

ARCHITECTURAL APPLICATIONS	CURRENT VOC LIMIT
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesive	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Drywall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single-ply roof membrane adhesives	250
Other adhesive not specifically listed	50
SPECIALTY APPLICATIONS	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Contact adhesive	80
Special purpose contact adhesive	250
Structural wood member adhesive	140
Top and trim adhesive	250
SUBSTRATE SPECIFIC APPLICATIONS	
Metal to metal	30
Plastic foams	50
Porous material (except wood)	50
Wood	30
Fiberglass	80

1. If an adhesive is used to bond dissimilar substrates together the adhesive with the highest VOC content shall be allowed.
2. For additional information regarding methods to measure the VOC content specified in this table, see South Coast Air Quality Management District Rule 1168, http://www.arb.ca.gov/DRDB/SC/CURHTML/R1168.PDF.

TABLE 5.504.4.2
SEALANT VOC LIMIT
Less Water and Less Exempt Compounds in Grams per Liter

SEALANTS	CURRENT VOC LIMIT
Architectural	250
Marine deck	760
Nonmembrane roof	300
Roadway	250
Single-ply roof membrane	450
Other	420
SEALANT PRIMERS	
Architectural Nonporous Porous	 250 775
Modified bituminous	500
Marine deck	760
Other	750

Note: For additional information regarding methods to measure the VOC content specified in these tables, see South Coast Air Quality Management District Rule 1168.

5.504.4.3 Paints and coatings. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Coatings Suggested Control Measure, as shown in Table 5.504.4.3, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in Table 5.504.4.3 shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-High Gloss coating, based on its gloss, as defined in Subsections 4.21, 4.36 and 4.37 of the 2007 California Air Resources Board Suggested Control Measure, and the corresponding Flat, Nonflat or Nonflat-High Gloss VOC limit in Table 5.504.4.3 shall apply.

5.504.4.3.1 Aerosol paints and coatings. Aerosol paints and coatings shall meet the PWMIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522(c)(2) and (d)(2) of *California Code of Regulations*, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8 Rule 49.

TABLE 5.504.4.3
VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS[2, 3]
Grams of VOC Per Liter of Coating,
Less Water and Less Exempt Compounds

COATING CATEGORY	EFFECTIVE 1/1/2010	EFFECTIVE 1/1/2012
Flat coatings	50	
Nonflat coatings	100	
Nonflat high gloss coatings	150	
Specialty Coatings		
Aluminum roof coatings	400	
Basement specialty coatings	400	
Bituminous roof coatings	50	
Bituminous roof primers	350	
Bond breakers	350	
Concrete curing compounds	350	
Concrete/masonry sealers	100	
Driveway sealers	50	
Dry fog coatings	150	
Faux finishing coatings	350	
Fire resistive coatings	350	
Floor coatings	100	
Form-release compounds	250	
Graphic arts coatings (sign paints)	500	
High-temperature coatings	420	
Industrial maintenance coatings	250	
Low solids coatings[1]	120	
Magnesite cement coatings	450	
Mastic texture coatings	100	
Metallic pigmented coatings	500	
Multicolor coatings	250	
Pretreatment wash primers	420	
Primers, sealers and undercoaters	100	
Reactive penetrating sealers	350	
Recycled coatings	250	
Roof coatings	50	
Rust preventative coatings	400	250
Shellacs: Clear Opaque	 730 550	
Specialty primers, sealers and undercoaters	350	100
Stains	250	
Stone consolidants	450	
Swimming pool coatings	340	
Traffic marking coatings	100	
Tub and tile refinish coatings	420	
Waterproofing membranes	250	
Wood coatings	275	
Wood preservatives	350	
Zinc-rich primers	340	

1. Grams of VOC per liter of coating, including water and including exempt compounds.
2. The specified limits remain in effect unless revised limits are listed in subsequent columns in the table.
3. Values in this table are derived from those specified by the California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008. More information is available from the Air Resources Board.

5.504.4.3.2 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following:

1. Manufacturer's product specification
2. Field verification of on-site product containers

5.504.4.4 Carpet systems. All carpet installed in the building interior shall meet the testing and product requirements of one of the following:

1. Carpet and Rug Institute's Green Label Plus Program
2. California Department of Public Health 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)
3. NSF/ANSI 140 at the Gold level or higher
4. Scientific Certifications Systems Sustainable Choice

5.504.4.4.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute's Green Label program.

5.504.4.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 5.504.4.1.

5.504.4.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure for Composite Wood (17 CCR 93120 et seq.), by or before the dates specified in those sections, as shown in Table 5.504.4.5.

TABLE 5.504.4.5
FORMALDEHYDE LIMITS[1]
Maximum Formaldehyde Emissions in Parts per Million.

PRODUCT	CURRENT LIMIT	JAN 1, 2012	JUL 1, 2012
Hardwood plywood veneer core	0.05		
Hardwood plywood composite core	0.08		0.05
Particle board	0.09		
Medium density fiberboard	0.11		
Thin medium density fiberboard[2]	0.21	0.13	

1. Values in this table are derived from those specified by the California Air Resources Board, Air Toxics Control Measure for Composite Wood as tested in accordance with ASTM E 1333-96 (2002). For additional information, see *California Code of Regulations,* Title 17, Sections 93120 through 93120.12.
2. Thin medium density fiberboard has a maximum thickness of eight millimeters.

5.504.4.5.1 Early compliance. Reserved.

5.504.4.5.3 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following:

1. Product certifications and specifications
2. Chain of custody certifications

3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, *et seq*)
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards
5. Other methods acceptable to the enforcing agency

5.504.4.6 Resilient flooring systems. For 50 percent of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 Collaborative for High Performance Schools (CHPS) criteria and listed on its High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the Resilient Floor Covering Institute (RFCI) FloorScore program; or meet 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.)

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

5.504.5.3 Filters. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air that provides at least a Minimum Efficiency Reporting Value (MERV) of 8. MERV 8 filters shall be installed prior to occupancy, and recommendations for maintenance with filters of the same value shall be included in the operation and maintenance manual.

Exception: A MERV-1 filter shall be allowed for return air only or return with prefiltered outside air, if the filter is of a reusable, nondisposable type, and the fan energy use of that air delivery system is 0.4W/cfm or less at design airflow.

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 121 (Requirements For Ventilation) of the 2010 *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 (CO_2) monitoring. For buildings equipped with demand control ventilation, CO_2 sensors and ventilation controls shall be specified and installed in accordance with the requirements of the 2010 *California Energy Code*, Section 121(c).

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 E 90 and ASTM E 413 or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E 1332,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.

5.507.4.1 Exterior noise transmission, prescriptive method. Wall and roof-ceiling assemblies exposed to the noise source making up the building 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 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 A5.507.4.1 or A5.507.4.1.1, wall and roof-ceiling assemblies exposed to the noise source 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.

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.

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.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 5 – NONRESIDENTIAL MANDATORY MEASURES
DIVISION 5.7 – ADDITIONS AND ALTERATIONS TO EXISTING NONRESIDENTIAL BUILDINGS

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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																			

CHAPTER 5
NONRESIDENTIAL MANDATORY MEASURES

Division 5.7 – ADDITIONS AND ALTERATIONS TO EXISTING NONRESIDENTIAL BUILDINGS

SECTION 5.701
ADMINISTRATION

5.701.1 Scope. For those occupancies subject to Section 103 of this code, the provisions of this division shall apply to the planning, design, operation, construction, use and occupancy of additions to buildings or structures, unless otherwise indicated in this code. The provisions of this division shall only apply to the portions of the building being added or altered within the scope of the permitted work. Compliance for additions and alterations is required on or after the dates shown in Table 5.701.

TABLE 5.701

EFFECTIVE DATE OF COMPLIANCE	SQUARE FOOTAGE OF ADDITION	PERMIT VALUATION OR ESTIMATED CONSTRUCTION COST OF ALTERATION
July 1, 2012	2,000	$500,000
Effective date of the 2013 *California Building Standards Code*	1,000	$200,000

Notes:

1. The effective date of the 2013 *California Building Standards Code* currently is projected to be January 1, 2014.
2. This division does not apply to additions and alterations of qualified historical buildings.

SECTION 5.702
DEFINITIONS

5.702.1 Definitions. Unless otherwise stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this division. Refer also to definitions in Chapter 2 of this code.

ADDITION. An extension or increase in floor area of an existing building or structure.

ALTERATION OR ALTER. Any construction or renovation to an existing structure other than repair for the purpose of maintenance or addition.

ARB (CARB). The California Air Resources Board.

SECTION 5.703
GREEN BUILDING

5.703.1 Scope. Building additions and alterations shall be designed to include the green building measures specified as mandatory in the application checklists for alterations or additions contained in this code.

5.703.2 Phased projects. For shell buildings and others constructed for future tenant improvements, only those code measures relevant to the building components and systems considered to be new construction (or newly constructed) shall apply.

5.703.2.1 Tenant improvements. The provisions of this code shall apply to the initial tenant or occupant improvements to a project and to subsequent tenant improvements subject to Section 5.701.1.

SECTION 5.710
PLANNING AND DESIGN

5.710.1 General. The provisions of this chapter 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.

5.710.2 Definitions. Refer to Section 5.102 of this code.

5.710.3 Site selection. Reserved.

5.710.4 Site preservation. Reserved.

5.710.5 Deconstruction and reuse of existing structures. Reserved.

5.710.6 Site development.

5.710.6.1 Storm water pollution prevention. Additions that disturb soil of less than one acre shall prevent the pollution of stormwater runoff from the construction activities through one or more of the following measures:

5.710.6.1.1 Local ordinance. Comply with a lawfully enacted stormwater management and/or erosion control ordinance.

5.710.6.1.2 Best management practices (BMP). Prevent the loss of soil through wind or water erosion by implementing an effective combination of erosion and sediment control and good housekeeping BMP.

1. Soil loss BMP that should be considered for implementation as appropriate for each project include, but are not limited to, the following:
    a. Scheduling construction activity
    b. Preservation of natural features, vegetation and soil
    c. Drainage swales or lined ditches to control stormwater flow
    d. Mulching or hydroseeding to stabilize disturbed soils
    e. Erosion control to protect slopes
    f. Protection of storm drain inlets (gravel bags or catch basin inserts)
    g. Perimeter sediment control (perimeter silt fence, fiber rolls)
    h. Sediment trap or sediment basin to retain sediment on site
    i. Stabilized construction exits
    j. Wind erosion control
    k. Other soil loss BMP acceptable to the enforcing agency
2. Good housekeeping BMP to manage construction equipment, materials, and wastes that should be considered for implementation as appropriate for each project include, but are not limited to, the following:
    a. Material handling and waste management
    b. Building materials stockpile management
    c. Management of washout areas (concrete, paints, stucco, etc.)
    d. Control of vehicle/equipment fueling to contractor's staging area
    e. Vehicle and equipment cleaning performed off site
    f. Spill prevention and control
    g. Other housekeeping BMP acceptable to the enforcing agency

5.710.6.2 Bicycle parking. Comply with Sections 5.710.6.2.1 and 5.710.6.2.2; or meet the applicable local ordinance, whichever is stricter.

5.710.6.2.1 Short-term bicycle parking. If the project is anticipated to generate visitor traffic and adds 10 or more vehicular parking spaces, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of the additional visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack.

5.710.6.2.2 Long-term bicycle parking. For buildings with over 10 tenant-occupants that add 10 or more vehicular parking spaces, provide secure bicycle parking for 5 percent of additional motorized vehicle parking capacity, with a minimum of one space. Acceptable parking facilities shall be convenient from the street and may include:

1. Covered, lockable enclosures with permanently anchored racks for bicycles;
2. Lockable bicycle rooms with permanently anchored racks; and
3. Lockable, permanently anchored bicycle lockers.

5.710.6.3 Designated parking. For projects that add 10 or more vehicular parking spaces, provide designated parking for any combination of low-emitting, fuel-efficient, and carpool/van pool vehicles as shown in Table 5.106.5.2 of Division 5.1 based on the number of additional spaces.

5.710.6.3.1 Parking stall marking. Paint, in the paint used for stall striping, the following characters such that the lower edge of the last word aligns with the end of the stall striping and is visible beneath a parked vehicle:

CLEAN AIR/
VANPOOL/EV

5.710.6.4 Reserved.

5.710.6.5 Reserved.

5.710.6.6 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, 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.

SECTION 5.711
ENERGY EFFICIENCY
Reserved

SECTION 5.712
WATER EFFICIENCY AND CONSERVATION

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

5.712.2 Definitions. Refer to Section 5.302 of this code.

5.712.3 Indoor water use.

5.712.3.1 Meters. Separate submeters or metering device shall be installed for the uses described in Sections 5.712.3.1.1 and 5.712.3.1.2.

5.712.3.1.1 Additions to existing buildings in excess of 50,000 square feet (4645 m²). Separate submeters shall be installed as follows:

1. For each individual leased, rented, or other tenant space within the building projected to consume more than 100 gal/day (380 L/day), including, but not limited to, spaces used for laundry or cleaners, restaurant or food service, medical or dental office, laboratory, or beauty salon or barber shop.
2. Where meters for individual building tenants are unfeasible, for water supplied to the following subsystems:
    a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s).
    b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s).
    c. Steam and hot-water boilers with energy input more than 500,000 Btu/h (147 kW).

5.712.3.1.2 Excess consumption. Any addition or added space within an addition that is projected to consume more than 1,000 gal/day (3800 L/day).

5.712.3.2 20 percent savings. A schedule of newly installed plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the addition or area of alteration to the building by 20 percent shall be provided. The reduction shall be based on the maximum allowable water use per plumbing fixture and fittings as required by the *California Building Standards Code*. The 20 percent reduction in potable water use shall be demonstrated by one of the following methods.

1. Prescriptive method. Each plumbing fixture and fitting shall not exceed the maximum flow rate at ≥ 20 percent reduction as specified in Table 5.303.2.3 of Division 5.3, or
2. Performance method. A calculation demonstrating a 20 percent reduction in the building "water use baseline" as established in Table 5.303.2.2 shall be provided.

5.712.3.3 Multiple showerheads serving one shower. When a shower is served by more than one newly installed showerhead, the combined flow rate of all the showerheads controlled by a single valve shall not exceed the maximum flow rate at ≥ 20 percent reduction contained in Table 5.303.2.2 or the shower shall be designed to only allow one showerhead to be in operation at a time.

Exception: The maximum flow rate for shower heads when using the performance method specified in Section 5.303.2.1, Item 2 is 2.5 gpm @ 80 psi.

5.712.3.4 Reserved.

5.712.3.5 Plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall meet the standards referenced in Table 5.503.6 of Division 5.3.

5.712.4 Outdoor water use.

5.712.4.1 Water budget. A water budget shall be developed for landscape irrigation use installed in conjunction with addition or alteration that conforms to the local water efficient landscape ordinance or to the California Department of Water Resources Model Water Efficient Landscape Ordinance where no local ordinance is applicable.

Note: Prescriptive measures to assist in compliance with the water budget are listed in Sections 492.5 through 492.8, 492.10 and 492.11 of the ordinance, which may be found at: http://www.owue.water.ca.gov/landscape/ord/ord.cfm.

5.712.4.2 Outdoor potable water use. For building addition or alteration requiring upgraded water service for landscaped areas of at least 1,000 square feet but not more than 5,000 square feet (the level at which *Water Code* Section 535 applies), separate submeters or metering devices shall be installed for outdoor potable water use.

5.712.4.3 Irrigation design. In building addition or alteration with at least 1,000 square feet but not more than 2,500 square feet of cumulative landscaped area (the level at which the MLO applies), install irrigation controllers and sensors which include the following criteria, and meet manufacturer's recommendations.

Exception: New irrigation controllers are not required when existing irrigation controllers have sufficient capacity to serve the new landscaped area.

5.712.4.3.1 Irrigation controllers. Automatic irrigation system controllers installed at the time of final inspection shall comply with the following:

1. Controllers shall be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plants' needs as weather conditions change.
2. Weather-based controllers without integral rain sensors or communication systems that account for local rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s). Soil moisture-based

controllers are not required to have rain sensor input.

Note: More information regarding irrigation controller function and specifications is available from the Irrigation Association.

5.712.5 Water reuse systems. Reserved.

SECTION 5.713
MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

5.713.1 Scope. The provisions of this chapter shall outline means of achieving material conservation and resource efficiency through protection of buildings from exterior moisture, construction waste diversion, provisions in the workplace for recycling of materials, and system testing and adjusting and balancing of HVAC.

5.713.2 Definitions. Refer to Section 5.402 of this code.

5.713.3 Foundation systems. Reserved.

5.713.4 Efficient framing techniques. Reserved.

5.713.5 Material sources. Reserved.

5.713.6 Enhanced durability and reduced maintenance. Reserved.

5.713.7 Water resistance and moisture management.

5.713.7.1 Weather protection. Provide a weather-resistant exterior wall and foundation envelope as required by *California Building Code* Section 1403.2 (Weather Protection) and *California Energy Code* Section 150, (Mandatory Features and Devices), manufacturer's installation instructions, or local ordinance, whichever is more stringent.

5.713.7.2 Moisture control. Employ moisture control measures by the following methods.

5.713.7.2.1 Sprinklers. Design and maintain landscape irrigation systems to prevent spray on structures.

5.713.7.2.2 Entries and openings. Design exterior entries and/or openings subject to foot traffic or wind-driven rain to prevent water intrusion into buildings.

Notes:

1. Use features such as overhangs and recesses, and flashings integrated with a drainage plane.
2. Use nonabsorbent floor and wall finishes within at least two feet around and perpendicular to such openings.

5.713.8 Construction waste reduction, disposal and recycling.

5.713.8.1 Construction waste management. Recycle and/or salvage for reuse a minimum of 50 percent of the nonhazardous construction waste in accordance with Section 5.713.8.1.1 or 5.713.8.1.2; or meet a local construction and demolition waste management ordinance, whichever is more stringent.

5.713.8.1.1 Construction waste management plan. Where a local jurisdiction does not have a construction and demolition waste management ordinance that is more stringent, submit a construction waste management plan that:

1. Identifies the construction waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project, or salvage for future use or sale.
2. Determines if construction waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).
3. Identifies diversion facilities where construction waste material collected will be taken.
4. Specifies that the amount of construction waste materials diverted shall be calculated by weight or volume, but not by both.

5.713.8.1.2 Waste management company. Utilize a waste management company that can provide verifiable documentation that the percentage of construction waste material diverted from the landfill complies with this section.

Note: The owner or contractor shall make the determination if the construction waste material will be diverted by a waste management company.

Exceptions to Sections 5.713.8.1.1 and 5.713.8.1.2:

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, where demolition of an existing structure(s) is necessary for the new construction

5.713.8.1.3 Documentation. Documentation shall be provided to the enforcing agency which demonstrates compliance with Section 5.713.8.1.1, Items 1 through 4. The waste management plan shall be updated as necessary and shall be accessible during construction for examination by the enforcing agency.

Notes:

1. Sample forms found in "A Guide to the California Green Building Standards Code (Nonresidential)" located at http://www.bsc.ca.gov/CALGreen/default.htm may be used to assist in documenting compliance with the waste management plan.
2. Mixed construction and demolition debris (C&D) processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

5.713.8.2 Isolated jobsites. The enforcing agency may make exceptions to the requirements of this section when

jobsites are located in areas beyond the haul boundaries of the diversion facility.

5.713.8.3 Excavated soil and land clearing debris. 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phased project, such material may be stockpiled on site until the storage site is developed.

Exception: Reuse, either on-or off-site, of vegetation or soil contaminated by disease or pest infestation.

Notes:

1. If contamination by disease or pest infestation is suspected, contact the County Agricultural Commissioner and follow its direction for recycling or disposal of the material. (www.cdfa.ca.gov/exec/county/county_contacts.html)
2. For a map of known pest and/or disease quarantine zones, consult with the California Department of Food and Agriculture. (www.cdfa.ca.gov)

5.713.9 Life cycle assessment. Reserved.

5.713.10 Building maintenance and operation.

5.713.10.1 Recycling by occupants. If not provided on the existing site and where site conditions permit, provide readily accessible areas that serve the entire building and are identified for the depositing, storage, and collection of nonhazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics and metals in accordance with one of the following:

1. For additions or alterations by on owner or a tenant conducted within a 12-month period under single or multiple permits resulting in an increase of 30 percent or more in floor area
2. For additions or alterations by an owner or a tenant for which multiple permits are applied within a 12-month period resulting in an increase of 30 percent or more in floor area
3. As required by a lawfully enacted local recycling ordinance, if more restrictive.

5.713.10.1.1 Sample ordinance. Space allocation for recycling areas shall comply with Chapter 18, Part 3, Division 30 of the *Public Resources Code*. Chapter 18 is known as the California Solid Waste Reuse and Recycling Access Act of 1991 (Act).

Note: A sample ordinance for use by local agencies may be found in Appendix A of the document at the CalRecycle's website.

5.713.10.2. Reserved.

5.713.10.3. Reserved.

5.713.10.4 Testing and adjusting. Testing and adjusting of new systems installed to serve an addition or alteration subject to Section 5.701.1 shall be required.

5.713.10.4.1. Reserved.

5.713.10.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include, as applicable to the project:

1. HVAC systems and controls
2. Indoor and outdoor lighting and controls
3. Water heating systems
4. Renewable energy systems
5. Landscape irrigation systems
6. Water reuse systems

5.713.10.4.3 Procedures. Perform testing and adjusting procedures in accordance with manufacturer's specifications and applicable standards on each system.

5.713.10.4.3.1 HVAC balancing. In addition to testing and adjusting, before a new space-conditioning system serving a building or space is operated for normal use, balance the system in accordance with the procedures defined by the Testing Adjusting and Balancing Bureau National Standards; the National Environmental Balancing Bureau Procedural Standards; or Associated Air Balance Council National Standards or as approved by the enforcing agency.

5.713.10.4.4 Reporting. After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.

5.713.10.4.5 Operation and maintenance (O&M) manual. Provide the building owner or representative with detailed operating and maintenance instructions and copies of guaranties/warranties for each system. O&M instructions shall be consistent with OSHA requirements in CCR, Title 8, Section 5142, and other related regulations.

5.713.10.4.5.1 Inspections and reports. Include a copy of all inspection verifications and reports required by the enforcing agency.

SECTION 5.714
ENVIRONMENTAL QUALITY

5.714.1 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.

5.714.2 Definitions. Refer to Section 5.502 of this code.

5.714.3 Fireplaces.

5.714.3.1 General. Install only a direct-vent sealed-combustion gas or sealed wood-burning fireplace, or a sealed woodstove or pellet stove, and refer to residential requirements in the *California Energy Code,* Title 24, Part 6, Subchapter 7, Section 150. Woodstoves, pellet stoves and fireplaces shall comply with applicable local ordinances.

5.714.3.1.1 Woodstoves. Woodstoves and pellet stoves shall comply with US EPA Phase II emission limits.

5.714.4 Pollutant control.

5.714.4.1 Temporary ventilation. The permanent HVAC system shall only be used during construction if necessary to condition additions or areas of alteration within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with a Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30 percent based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy, or, if the building is occupied during alteration, at the conclusion of construction.

5.714.4.2. Reserved.

5.714.4.3 Covering of duct openings of mechanical equipment during construction. At the time of rough installation and during storage on the construction site until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of dust, water and debris which may enter the system.

5.714.4.4 Finish material pollutant control. Finish materials shall comply with Sections 5.714.4.4.1 through 5.714.4.4.4.

5.714.4.4.1 Adhesives, sealants and caulks. Adhesives, sealants and caulks used on the project shall meet the requirements of the following standards.

1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits, as shown in Tables 5.504.4.1 and 5.504.4.2 in Division 5.5. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene), except for aerosol products as specified in Subsection 2, below.
2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of California Code of Regulations, Title 17, commencing with Section 94507.

5.714.4.4.2. Reserved.

5.714.4.4.3 Paints and coatings. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Coatings Suggested Control Measure, as shown in Table 5.504.4.3 in Division 5.5, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in Table 5.504.4.3, shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-High Gloss coating, based on its gloss, as defined in Subsections 4.21, 4.36 and 4.37 of the 2007 California Air Resources Board, Suggested Control Measure, and the corresponding Flat, Nonflat, or Nonflat-High Gloss VOC limit in Table 5.504.4.3 shall apply.

5.714.4.4.3.1 Aerosol paints and coatings. Aerosol paints and coatings shall meet the Product-Weighted MIR Limits for ROC in section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in sections 94522(c)(2) and (d)(2) of California Code of Regulations, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8 Rule 49.

5.714.4.4.3.2 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following:

1. Manufacturers product specification
2. Field verification of on-site product containers

5.714.4.4.4 Carpet systems. All carpet installed in the building interior shall meet the testing and product requirements of one of the following:

1. Carpet and Rug Institute's Green Label Plus Program
2. California Department of Public Health 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)
3. NSF/ANSI 140 at the Gold level or higher
4. Scientific Certifications Systems Sustainable Choice

5.714.4.4.4.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute Green Label program.

5.714.4.4.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 5.504.4.1 in Division 5.5.

5.714.4.4.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure for Composite Wood (17 CCR 93120 et seq.), by or before the dates specified in those sections, as shown in Table 5.504.4.5 in Division 5.5.

5.714.4.4.5.1 Early compliance. Reserved.

5.714.4.4.5.2 Documentation. Verification of compliance with this section shall be provided as

requested by the enforcing agency. Documentation shall include at least one of the following.

1. Product certifications and specifications
2. Chain of custody certifications
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.)
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards
5. Other methods acceptable to the enforcing agency

5.714.4.4.6 Resilient flooring systems. For 50 percent of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 Collaborative for High Performance Schools (CHPS) criteria and listed on its High Performance Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the Resilient Floor Covering Institute (RFCI) FloorScore program; or meet 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.)

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

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

5.714.4.5.1. Reserved.

5.714.4.5.2. Reserved.

5.714.4.5.3 Filters. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air that provide at least a Minimum Efficiency Reporting Value (MERV) of 8. MERV 8 filters shall be installed after any flush-out or testing and prior to occupancy, and recommendations for maintenance with filters of the same value shall be included in the operation and maintenance manual.

Exception: A MERV-1 filter shall be allowed for return air only or return with prefiltered outside air, if the filter is of a reusable, nondisposable type, and the fan energy use of that air delivery system is 0.4W/cfm or less at design airflow.

5.714.4.6. Reserved.

5.714.4.7 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 prohibition.

5.714.5 Indoor moisture control.

5.714.5.1 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.

5.714.6 Indoor air quality.

5.714.6.1 Outside air delivery. For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 121 (Requirements For Ventilation) of the 2010 *California Energy Code*, or the applicable local code, whichever is more stringent, and Chapter 4 of CCR, Title 8.

5.714.6.2 Carbon dioxide (CO_2) monitoring. For additions equipped with demand control ventilation, CO_2 sensors and ventilation controls shall be specified and installed in accordance with the requirements of the current edition of the 2010 *California Energy Code*, Section 121(c).

5.714.7 Environmental comfort.

5.714.7.1 Acoustical control. Employ building assemblies and components with Sound Transmission Class (STC) values determined in accordance with ASTM E90 and ASTM E 413 or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E 1332, using either the prescriptive or performance method in Section 5.714.7.1.1 or 5.714.7.1.2.

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.

5.714.7.1.1 Exterior noise transmission, prescriptive method. Wall and roof-ceiling assemblies exposed to the noise source making up the building addition 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 building 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 noise source as determined by the Noise Element of the General Plan

5.714.7.1.1.1 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).

5.714.7.1.2 Performance method. For buildings located as defined in Section A5.714.7.1.1 or A5.714.7.1.1.1, wall and roof-ceiling assemblies exposed to the noise source making up the building addition 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.

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

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

5.714.7.1.3 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.

5.714.8 Outdoor air quality.

5.714.8.1 Ozone depletion and greenhouse gas reductions. Installations of HVAC, refrigeration, and fire suppression equipment shall comply with Sections 5.714.8.1.1 and 5.714.8.1.2.

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

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

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 6 – REFERENCED ORGANIZATIONS AND STANDARDS

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

CHAPTER 6
REFERENCED ORGANIZATIONS AND STANDARDS

SECTION 601
GENERAL

601.1 This chapter lists the organizations and standards that are referenced in various sections of this document. The standards are listed herein by the promulgating agency of the standard.

ORGANIZATION	STANDARD	REFERENCED SECTION
AABC Associated Air Balance Council		
1518 K St NW Washington, DC 20005 www.aabc.com	National Standards, 1989	5.410.4.3.1 A5.410.5.3.1
ACCA Air Conditioning Contractors of America		
2800 Shirlington Road, Suite 300 Arlington, VA 22206 www.acca.org	ANSI/ACCA 2 Manual J–2004 ANSI/ACCA 1 Manual D–2009 ANSI/ACCA 3 Manual S–2004	4.507.2 4.507.2 4.507.2
ANSI American National Standards Institute		
Operations Office 25 West 43rd Street, Fourth Floor New York, NY 10036 www.ansi.org	ANSI A190.1-2002 ANSI Z124.9-2004 NSF/ANSI 140-2007 ANSI/ACCA 2 Manual J–2004 ANSI/ACCA 1 Manual D–2009 ANSI/ACCA 3 Manual S–2004	4.502 Table 4.303.3 4.504.3, 5.504.4.4 4.507.2 4.507.2 4.507.2
ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.		
1791 Tullie Circle, NE Atlanta, GA 30329 www.ashrae.org	52.1-92 52.2-99 62.2 90.1	A5.504.1 A4.502 A5.504.1 5.108.8
ASME American Society of Mechanical Engineers		
Three Park Avenue New York, NY 10016-5990 www.asme.org	ASME A112.18.1 ASME A112.19 ASME A112.19.2 ASME A112.19.14 ASME A112.19.19	Table 4.303.3, 5.303.6 5.303.6 Table 4.303.3, 5.303.2 Table 4.303.3, 5.303.6 Table 4.303.3
ASTM ASTM International		
100 Barr Harbor Drive West Conshohocken, PA 19428-2859 www.astm.org	ASTM C 33 ASTM C 150 ASTM C 595 ASTM C 618 ASTM C 989 ASTM C 1157 ASTM C 1240 ASTM C 1371-98 ASTM C 1549 ASTM C 1602 ASTM C 1697 ASTM E 90 ASTM E 408-02 ASTM E 413 ASTM E 1332 ASTM E 1333-02 ASTM E 1903-97 ASTM E 1918 ASTM E 1980-01	A 5.405.5.3.2 A 5.405.5.1 A 5.405.5.1 A 5.405.5.2.1 A 5.405.5.2.1 A 5.405.5.1 A 5.405.5.2.1 A4.205.1, A5.106.11.2.2 A5.106.11.1 A5.405.5.3.2.3 A5.405.5.2.1 5.507.4 A4.205.1, A5.10, 6.11.2.2 5.507.4 5.507.4 Tables 4.504.5 & 5.504.4.5 A 5.103.4 A5.106.11.1 A4.106.5.3, A5.106.11.2.3
CSA Canadian Standards Association		
5060 Spectrum Way, Suite 100 Mississauga, Ontario, Canada L4W 5N6 www.csa.ca	CSA B45.1 CSA B125.1	Table 4.303.1, Table 4.303.3 Table 4.303.3, 5.303.6
IAPMO International Association of Plumbing and Mechanical Officials		
5001 E. Philadelphia St. Ontario, CA 91761 iapmo@iapmo.org	IAPMO Z124.9	Table 4.303.3, 5.303.6
NEBB National Environmental Balancing Bureau		
8575 Grovemont Cir Gaithersburg, MD 20877 http://nebb.org/index.php	Procedural Standards, 1983	5.410.4.3.1 A5.410.5.3.1
NSF International		
789 Dixboro Rd. Ann Arbor, MI 48113-0140 http://www.nsf.org/	NSF/ANSI 140-2007	4.504.3, 5.504.4.4
TABB Testing, Adjusting and Balancing Bureau		
601 N Fairfax St, Ste 250 Alexandria, VA 22314 http://www.tabbcertified.org/contact.html	National Standards, 2003	5.410.3.3.1 A5.410.5.3.1

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER 8 – COMPLIANCE FORMS AND WORKSHEETS

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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			**X**																
Chapter/Section																			
WS 1 – BASELINE WATER USE			X																
WS 2 – 20% REDUCTION WATER USE CALCULATION TABLE			X																
WS 3 – 30, 35 or 40% REDUCTION WATER USE CALCULATION TABLE																			

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CHAPTER 8

COMPLIANCE FORMS AND WORKSHEETS

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

[HCD 1] Sample forms found in "A Guide to the California Green Building Standards Code (Low-Rise Residential)" located at www.hcd.ca.gov/CALGreen.html may be used to assist in documenting compliance with the waste management plan.

WORKSHEET (WS-1)
BASELINE WATER USE

BASELINE WATER USE CALCULATION TABLE									
FIXTURE TYPE	FLOW RATE (gpm)		DURATION		DAILY USES		OCCUPANTS[1,2]		GALLONS PER DAY
Showerheads	2.5	×	5 min.	×	1	×	Note 2a	=	
Showerheads residential	2.5	×	8 min.	×	1	×		=	
Lavatory faucets residential	2.2	×	.25 min.	×	3	×		=	
Lavatory faucets nonresidential	0.5	×	.25 min.	×	3			=	
Kitchen faucets	2.2	×	4 min.	×	1	×	Note 2b	=	
Replacement aerators	2.2	×		×		×		=	
Wash fountains	2.2	×		×		×		=	
Metering faucets	0.25	×	.25 min.	×	3	×		=	
Metering faucets for wash fountains	2.2	×	.25 min.	×		×		=	
Gravity tank-type water closets	1.6	×	1 flush	×	1 male[3] 3 female	×		=	
Flushometer tank water closets	1.6	×	1 flush	×	1 male[3] 3 female	×		=	
Flushometer valve water closets	1.6	×	1 flush	×	1 male[3] 3 female	×		=	
Electromechanical hydraulic water closets	1.6	×	1 flush	×	1 male[3] 3 female	×		=	
Urinals	1.0	×	1 flush	×	2 male	×		=	
Total daily baseline water use (BWU)								=	
_____ (BWU) × .80 = _____ Allowable water use									

1 . For low-rise residential occupancies, the number of occupants shall be based on two persons for the first bedroom, plus one additional person for each additional bedroom.

2. For nonresidential occupancies, refer to Table A, Chapter 4, 2010 *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. Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.

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

WORKSHEET (WS-2)
20 PERCENT REDUCTION WATER USE

20 PERCENT REDUCTION WATER USE CALCULATION TABLE									
FIXTURE TYPE	FLOW RATE (gpm)[1]		DURATION		DAILY USES		OCCUPANTS[2,3]		GALLONS PER DAY
Showerheads		×	5 min.	×	1	×	Note 3a	=	
Showerheads residential		×	8 min.	×	1	×		=	
Lavatory faucets residential		×	.25 min.	×	3	×		=	
Lavatory faucets nonresidential		×	.25 min.	×	3	×		=	
Kitchen faucets		×	4 min.	×	1	×	Note 3b	=	
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[5] 3 female	×		=	
HET[4] High-efficiency toilet	1.28	×	1 flush	×	1 male[5] 3 female	×		=	
Flushometer tank water closets		×	1 flush	×	1 male[5] 3 female	×		=	
Flushometer valve water closets		×	1 flush	×	1 male[5] 3 female	×		=	
Electromechanical hydraulic water closets		×	1 flush	×	1 male[5] 3 female	×		=	
Urinals		×	1 flush	×	2 male	×		=	
Urinals Nonwater supplied	0.0	×	1 flush	×	2 male	×		=	
Proposed water use								=	
_____ (BWU from WS-1) × .80 = _____ Allowable water use									

1. The flow rate values shall not exceed the baseline flow rates from the *California Code of Regulations*, Title 20, 2010 Appliance Efficiency Regulations (See Table 4.303.2.)
2. For low-rise residential occupancies, the number of occupants shall be based on two persons for the first bedroom, plus one additional person for each additional bedroom.
3. For nonresidential occupancies, refer to Table A, Chapter 4, 2010 *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. Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
4. 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 A 112.19.2.
   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 A 112.19.2 and ASME A 112.19.14.
5. The daily use number shall be increased to three if urinals are not installed in the room.

WORKSHEET (WS-3)
30–35 OR 40 PERCENT REDUCTION WATER USE

30, 35 OR 40 PERCENT REDUCTION WATER USE CALCULATION TABLE									
FIXTURE TYPE	FLOW RATE (gpm)[1]		DURATION		DAILY USES		OCCUPANTS[2,3]		GALLONS PER DAY
Showerheads		×	5 min.	×	1	×	Note 3a	=	
Showerheads residential		×	8 min.	×	1	×		=	
Lavatory faucets residential		×	.25 min.	×	3	×		=	
Lavatory faucets nonresidential		×	.25 min.	×	3	×		=	
Kitchen faucets		×	4 min.	×	1	×	Note 3b	=	
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[5] 3 female	×		=	
HET[4] High-efficiency toilet	1.12	×	1 flush	×	1 male[5] 3 female	×		=	
Flushometer tank water closets		×	1 flush	×	1 male[5] 3 female	×		=	
Flushometer valve water closets		×	1 flush	×	1 male[5] 3 female	×		=	
Electromechanical hydraulic water closets		×	1 flush	×	1 male[5] 3 female	×		=	
Urinals		×	1 flush	×	2 male	×		=	
Urinals Nonwater supplied	0.0	×	1 flush	×	2 male	×		=	
Proposed water use								=	

30% Reduction_____ (BWU from WS-1) × .70 = _____ Allowable water use
35% Reduction_____ (BWU from WS-1) × .65 = _____ Allowable water use
40% Reduction_____ (BWU from WS-1) × .60 = _____ Allowable water use

1. The flow rate values shall not exceed the baseline flow rates from the 2010 *California Code of Regulations*, Title 20, Appliance Efficiency Regulations (See Table 4.303.2.)
2. For low-rise residential occupancies, the number of occupants shall be based on two persons for the first bedroom, plus one additional person for each additional bedroom.
3. For nonresidential occupancies, refer to Table A, Chapter 4, 2010 *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. Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
4. 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 A112.19.233.2.
   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.
5. The daily use number shall be increased to three if urinals are not installed in the room.

Pages 53 and 54 deleted by State of California.
Text continues on Page 55.

A4.106.3 Landscape design. Postconstruction landscape designs shall accomplish one or more of the following:

1. Areas disrupted during construction are restored to be consistent with native vegetation species and patterns.
2. Limit turf areas to the greatest extent possible.

   Tier 1 not more than 50 percent of the total landscaped area.

   Tier 2 not more than 25 percent of the total landscaped area.
3. Utilize at least 75 percent native California or drought tolerant plant and tree species appropriate for the climate zone region.
4. Hydrozoning irrigation techniques are incorporated into the landscape design.

A4.106.4 Water permeable surfaces. 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.

Exceptions:

1. The primary driveway, primary entry walkway and entry porch or landing shall not be included when calculating the area required to be a permeable surface.
2. Required accessible routes for persons with disabilities as required by *California Code of Regulations*, Title 24, Part 2, Chapter 11A and/or Chapter 11B as applicable.

A4.106.5 Cool roof. Roofing materials for Tier 1 and Tier 2 buildings shall comply with this section:

Exception: Roof constructions that have a thermal mass over the roof membrane with a weight of at least 25 lb/sf.

A4.106.5.1 Solar reflectance. Roofing materials shall have a minimum 3-year aged solar reflectance equal to or greater than the values specified in Table A4.106.5(1) for Tier 1 and Table A4.106.5(2) for Tier 2.

If CRRC testing for 3-year aged reflectance is not available for any roofing products, the 3-year aged value shall be determined using the Cool Roof Rating Council (CRRC) certified initial value using the equation R_{aged} = [0.2 + 0.7[$\rho_{initial}$ – 0.2], Where $\rho_{initial}$ = the initial Solar Reflectance.

Solar reflectance may also be certified by other supervisory entities approved by the Energy Commission pursuant to Title 24, Part 1, Section 10-113.

A4.106.5.2 Thermal emittance. Roofing materials shall have a CRRC initial or 3-year aged thermal emittance equal to or greater than those specified in Table A4.106.5(1) for Tier 1 and Table A4.106.5(2) for Tier 2.

Thermal emittance may also be certified by other supervisory entities approved by the Commission pursuant to Title 24, Part 1, Section 10-113.

A4.106.5.3 Solar reflectance index alternative. Solar Reflectance Index (SRI) equal to or greater than the values specified in Table A4.106.5(1) for Tier 1 and Table A4.106.5(2) for Tier 2 may be used as an alternative to compliance with the 3-year 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 3-year aged reflectance value of the roofing product or the equation in Section A4.106.5.1 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 3-year 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, Section 10-113.

Note: The Solar Reflectance Index Calculation Worksheet (SRI-WS) is available by contacting the Energy Standards Hotline at 1-800-772-3300, website at www.energy.ca.gov or by email at Title24@energy.state.ca.us.

TABLE A4.106.5(1)
TIER 1

ROOF SLOPE	ROOF WEIGHT	CLIMATE ZONE	Minimum 3-year Aged Solar Reflectance	Thermal Emittance	SRI
≤ 2 : 12	N/A	13 & 15	0.55	0.75	64
> 2 : 12	< 5 lb/ft^2	10-15	0.20	0.75	16
	≥ 5 lb/ft^2	1-16	0.15	0.75	10

TABLE A4.106.5(2)
TIER 2

ROOF SLOPE	ROOF WEIGHT	CLIMATE ZONE	MINIMUM 3-YEAR AGED SOLAR REFLECTANCE	THERMAL EMITTANCE	SRI
≤ 2 : 12	N/A	2,4,6–15	0.65	0.85	78
> 2 : 12	N/A	2,4,6–15	0.23	0.85	20

A4.106.5.4 Verification. Inspection shall be conducted to ensure roofing materials meet cool roof aged solar reflectance and thermal emittance or SRI values.

A4.106.6 Electric vehicle (EV) charging. Dwellings shall comply with the following requirements for the future installation of electric vehicle supply equipment (EVSE).

A4.106.6.1 One-and two-family dwellings. Install a listed raceway to accommodate a dedicated branch circuit. The raceway shall not be less than trade size 1. The raceway shall be securely fastened at the main service or subpanel and shall terminate in close proximity to the proposed location of the charging system into a listed cabinet, box or enclosure. Raceways are required to be continuous at enclosed or concealed areas and spaces. A raceway may terminate in an attic or other approved location when it can be demonstrated

that the area is accessible and no removal of materials is necessary to complete the final installation.

Exception: Other pre-installation methods approved by the local enforcing agency that provide sufficient conductor sizing and service capacity to install Level 2 EVSE.

Note: Utilities and local enforcing agencies may have additional requirements for metering and EVSE installation, and should be consulted during the project design and installation.

A4.106.6.1.1 Labeling requirement. A label stating "EV CAPABLE" shall be posted in a conspicuous place at the service panel or subpanel and next to the raceway termination point.

A4.106.6.2 Multifamily dwellings. At least 3 percent of the total parking spaces, but not less than one, shall be capable of supporting future electric vehicle supply equipment (EVSE).

A4.106.6.2.1 Single charging space required. When only a single charging space is required, install a listed raceway capable of accommodating a dedicated branch circuit. The raceway shall not be less than trade size 1. The raceway shall be securely fastened at the main service or subpanel and shall terminate in close proximity to the proposed location of the charging system into a listed cabinet, box or enclosure.

Exception: Other pre-installation methods approved by the local enforcing agency that provide sufficient conductor sizing and service capacity to install Level 2 EVSE.

A4.106.6.2.2 Multiple charging spaces required. When multiple charging spaces are required, plans shall include the location(s) and type of the EVSE, raceway method(s), wiring schematics and electrical calculations to verify that the electrical system has sufficient capacity to simultaneously charge all the electrical vehicles at all designated EV charging spaces at their full rated amperage. Plan design shall be based upon Level 2 EVSE at its maximum operating ampacity. Only underground raceways and related underground equipment are required to be installed at the time of construction.

Note: Utilities and local enforcing agencies may have additional requirements for metering and EVSE installation, and should be consulted during the project design and installation.

A4.106.6.2.3 Labeling requirement. A label stating "EV CAPABLE" shall be posted in a conspicuous place at the service panel or subpanel and the EV charging space.

SECTION A4.107
INNOVATIVE CONCEPTS AND LOCAL ENVIRONMENTAL CONDITIONS

A4.107.1 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 A4.2 – ENERGY EFFICIENCY

SECTION A4.201
GENERAL

A4.201.1 Scope. For the purposes of energy efficiency standards in this appendix, the California Energy Commission will continue to adopt mandatory standards. It is the intent of this code to encourage buildings to achieve exemplary performance in the area of energy efficiency. Specifically, a green building should achieve at least a 15 percent reduction in energy usage when compared to the State's mandatory energy efficiency standards.

SECTION A4.202
DEFINITIONS
(Reserved)

SECTION A4.203
PERFORMANCE APPROACH

A4.203.1 Energy performance. Using an Alternative Calculation Method (ACM) approved by the California Energy Commission, calculate the annual Time Dependent Valuation (TDV) energy for each proposed building and compare it to the TDV energy budget (standard building) to achieve the following:

Tier 1. Exceed the 2010 *California Energy Code* requirements by 15 percent.

Tier 2. Exceed the 2010 *California Energy Code* requirements by 30 percent.

Field verify and document the measures and calculations used to reach the desired level of efficiency following the requirements specified in the Title 24 Reference Appendices.

SECTION A4.204
PRESCRIPTIVE APPROACH
(Reserved)

SECTION A4.205
BUILDING ENVELOPE

A4.205.1 Radiant roof barriers. Radiant roof barrier is installed in Climate Zones 2, 4 and 8 through 15. The radiant barrier must be tested according to ASTM C-1371-98 or ASTM E 408-71(2002) and must be certified by the Department of Consumer Affairs. Radiant barriers must also meet installation criteria specified in Appendix D, Section RA 4.2.2 of the *California Energy Commission 2008 Residential Compliance Manual*.

A4.205.2 Window shading. Exterior shading at least 18 inches in depth is provided on south and west windows by at least one of the following methods:

1. Moveable exterior awnings or louvers
2. Porch or patio covers
3. Overhangs

SECTION A4.206
AIR SEALING PACKAGE

A4.206.1 Reduced infiltration. Infiltration is reduced and verified by third party testing to comply with requirements contained in the *California Energy Code*.

SECTION A4.207
HVAC DESIGN, EQUIPMENT AND INSTALLATION

A4.207.1 Innovative systems. Radiant, hydronic, ground source and other innovative space heating and cooling systems included in the proposed design shall be designed using generally accepted industry-approved guidelines and design criteria.

A4.207.2 Commissioning. A commissioning plan shall be developed to document specified building components meet the project design and performance goals.

A4.207.2.1 Commissioning of HVAC Systems. In addition to other items in the commissioning plan the following items, as appropriate, pertaining to the heating, ventilating and cooling systems shall be inspected and certified by an independent third party that is trained or certified to inspect and test building systems as specified in Section 702.2.

1. Verify compliance with the manufacturer's recommended start-up procedures.
2. Verify refrigerant charge by super-heat or other methods specified by the manufacturer.
3. Burner is set to fire at the nameplate input rating.
4. Temperature drop across the evaporator is within the manufacturer's recommended range.
5. Test and verify air flow to be within 10 percent of the initial design air flow.
6. Static pressure within the duct system is within the manufacturer's acceptable range.
7. Verify that the whole house and exhaust ventilation systems meet Title 24 requirements.
8. Verify that the recommended maintenance procedures and schedules are documented and provided to the home owner.

A4.207.2.3 Commissioning checklist. Results of the commissioning inspection shall be included in the *Operation and Maintenance Manual* required in Section 4.410.1.

A4.207.4 Gas-fired heating equipment. Install gas-fired (natural or propane) space heating equipment with an Annual Fuel Utilization Ratio (AFUE) of .90 or higher.

A4.207.5 Heat pumps. If an electric heat pump must be used, select equipment with a Heating Seasonal Performance Factor (HSPF) of 8.0 or higher.

A4.207.6 Cooling equipment. When climatic conditions necessitate the installation of cooling equipment, select cooling equipment with a Seasonal Energy Efficiency Ratio (SEER) higher than 13.0 and an Energy Efficiency Ratio (EER) of at least 11.5.

A4.207.7 Ducts location. Install ductwork to comply with at least one of the following:

1. Install ducts within the conditioned envelope of the building.
2. Install ducts in an underfloor crawl space.
3. Use ducts with an R-6 insulation value or higher.
4. Install ductwork which is buried in the ceiling insulation.

A4.207.8 Duct leakage. Perform duct leakage testing to verify a total leakage rate of less than 6 percent of the total fan flow.

A4.207.9 Whole house fans. In Climate Zones 2, 4 and 8 through 15, install a whole-house fan with insulated louvers or an insulated cover.

A4.207.10 Ceiling fans. ENERGY STAR ceiling fans are installed in all bedrooms and living areas.

SECTION A4.208
WATER HEATING DESIGN, EQUIPMENT AND INSTALLATION

A4.208.1 Tank type water heater efficiency. The Energy Factor (EF) for a gas-fired storage water heater is higher than .60.

A4.208.2 Tankless water heater efficiency. The Energy Factor (EF) for a gas-fired tankless water heater is .80 or higher.

A4.208.3 Distribution systems. Where the hot water source is more than 10 feet from a fixture, the potable water distribution system shall convey hot water using one of the following methods:

1. A central manifold plumbing system with parallel piping configuration ("home-run system") is installed using the smallest diameter piping allowed by the *California Plumbing Code* or an approved alternate.
2. The plumbing system design incorporates the use of a demand controlled circulation pump.
3. A gravity-based hot water recirculation system is used.
4. A timer-based hot water recirculation system is used.
5. Other methods approved by the enforcing agency.

SECTION A4.209
LIGHTING

A4.209.1 Lighting. Building lighting consists of at least 90 percent ENERGY STAR qualified hard-wired fixtures.

SECTION A4.210
APPLIANCES

A4.210.1 Appliance rating. Each appliance provided by the builder meets ENERGY STAR if an ENERGY STAR designation is applicable for that appliance.

SECTION A4.211
RENEWABLE ENERGY

A4.211.1 New solar homes partnership. Install a solar photovoltaic (PV) system in compliance with the California Energy Commission New Solar Homes Partnership (NSHP).[1,2,3] Install energy efficiency measures meeting either Tier I or Tier II below.

Tier I. Exceed the 2010 *California Energy Code* requirements by 15 percent.

Tier II. Exceed the 2010 *California Energy Code* requirements by 30 percent.

Solar water heating may be used to assist in meeting the energy efficiency requirements of either Tier I or Tier II.

1. In addition, for either Tier I or II, each appliance provided by the builder must be ENERGY STAR if an ENERGY STAR designation is applicable for that appliance.
2. Tier II requires a 30 percent reduction in the building's space cooling (air conditioning) energy compared to the 2010 *California Energy Code.*
3. Information on NSHP incentives available through the California Energy Commission may be obtained at the "Go Solar California" website.

A4.211.2 Solar water heating system. A Solar Rating and Certification Corporation (SRCC) OG 100 solar collector or OG 300 solar water heating system is installed. The SRCC Solar Energy Factor (SE) shall be used to determine the Solar Fraction (SF), which shall be at least 0.5 as determined using the California F-Chart available at the "gosolarcalifornia" website or through the California Energy Commission.

A4.211.3 Space for future solar installation. A minimum of 300 square feet of unobstructed roof area facing within 30° of south is provided for future solar collector or photovoltaic panels. Rough-in penetrations through the roof surface within 24 inches (610 mm) of the boundary of the unobstructed roof area are provided for electrical conduit and water piping.

A4.211.4 Future access for solar system. A minimum one-inch (25.4 mm) electrical conduit is provided from the electrical service equipment to an accessible location in the attic or other location approved by the enforcing agency.

APPENDIX A4
RESIDENTIAL VOLUNTARY MEASURES

Division A4.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

SECTION A4.401
GENERAL
(Reserved)

SECTION A4.402
DEFINITIONS

ASSEMBLY (ASSEMBLY PRODUCT). An assembly (assembly product) includes or has been formulated using multiple materials.

POSTCONSUMER CONTENT. Any material which has been used by a consumer and then recycled for use in a new material or product.

PRECONSUMER (OR POSTINDUSTRIAL) CONTENT. Material diverted from the waste stream during one manufacturing process, including scraps, damaged goods and excess production that is reclaimed and used in another manufacturing process. Excluded is reutilization of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated those wastes.

PROPORTIONAL RECYCLED CONTENT (PRC_M). The amount of recycled content of a material in an assembly as related to the percentage of the material in an assembly product. PRC_M is derived by multiplying the percentage of each material in an assembly by the percentage of recycled content in the material.

RECYCLED CONTENT (RC). The amount of recycled material in an assembly product or material. Refer to International Organization for Standardization ISO 14021 – Environmental labels and declarations – Self-declared environmental claims (Type II environmental labeling).

RECYCLED CONTENT VALUE (RCV).

Assembly products (RCV_A). Assembly product cost multiplied by the recycled content of the assembly based on all of the postconsumer content and 50 percent of the preconsumer content.

Materials (RCV_M). Material cost multiplied by recycled content of the material based on all of the postconsumer content and 50 percent of the preconsumer content.

SECTION A4.403
FOUNDATION SYSTEMS

A4.403.1 Frost protected foundation systems. As allowed by local conditions, utilize a Frost-Protected Shallow Foundation (FPSF) in compliance with the *California Residential Code* (CRC). When an FPSF foundation system is installed, the manual required by Section 4.410.1 shall include instructions to the owner or occupant regarding the necessity for heating the structure as required in Section R403.3 of the *California Residential Code.*

A4.403.2 Reduction in cement use. As allowed by the enforcing agency, cement used in foundation mix design shall be reduced as follows:

Tier 1. Not less than a 20 percent reduction in cement use.

Tier 2. Not less than a 25 percent reduction in cement use.

Note: Products commonly used to replace cement in concrete mix designs include, but are not limited to:

1. Fly ash
2. Slag
3. Silica fume
4. Rice hull ash

SECTION A4.404
EFFICIENT FRAMING TECHNIQUES

A4.404.1 Lumber size. Beams and headers and trimmers are sized and installed as specified in CRC Tables R502.5(1) and R502.5(2). Other calculations acceptable to the enforcing agency which use the minimum size member for the tributary load shall be acceptable.

A4.404.2 Building dimensions and layouts are designed to minimize waste by one or more of the following measures in at least 80 percent of the structure:

1. Building design dimensions in 2-foot increments are used.
2. Windows and doors are located at regular 16″ or 24″ stud positions.
3. Other methods acceptable to the enforcing agency.

A4.404.3 Building systems. Use premanufactured building systems to eliminate solid sawn lumber whenever possible. One or more of the following premanufactured building systems is used:

1. Composite floor joist or premanufactured floor framing system
2. Composite roof rafters or premanufactured roof framing system
3. Panelized (SIPS, ICF or similar) framing systems
4. Other methods approved by the enforcing agency

A4.404.4 Pre-cut materials and details. Material lists are included in the plans which specify the material quantity and provide direction for on-site cuts to be made from the material provided. Material lists and direction shall be provided for the following systems:

1. Floor framing
2. Wall framing

3. Ceiling and roof framing
4. Structural panels and roof sheathing

SECTION A4.405
MATERIAL SOURCES

A4.405.1 Prefinished building materials. Utilize prefinished building materials which do not require additional painting or staining when possible. 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 Concrete floors. Floors that do not require additional coverings are used including but not limited to stained, natural or stamped concrete floors.

A4.405.3 Recycled content. Comply with the requirements for recycled content in Section A4.405.3.1.

A4.405.3.1 Recycled content. Use materials, equivalent in performance to virgin materials with a total (combined) recycled content value (RCV) of:

Tier 1. The RCV shall not be less than 10 percent of the total material cost of the project.

Required Total RCV (dollars) = Total Material Cost (dollars) x 10 percent **(Equation A4. 4-1)**

Tier 2. The RCV shall not be less than 15 percent of the total material cost of the project.

Required Total RCV (dollars) = Total Material Cost (dollars) x 15 percent **(Equation A4. 4-2)**

For the purposes of this section, materials used as components of the structural frame shall not be used to calculate recycled content. The structural frame includes the load bearing structural elements, such as wall studs, plates, sills, columns, beams, girders, joists, rafters and trusses.

Notes:

1. Sample forms which allow user input and automatic calculation are located at www.hcd.ca.gov/CALGreen.html and may be used to simplify documenting compliance with this section and for calculating recycled content value of materials or assembly products.
2. Sources and recycled content of some recycled materials can be obtained from CalRecycle if not provided by the manufacturer.

A4.405.3.1.1 Total material cost. Total material cost is the total estimated or actual cost of materials and assembly products used in the project. The required total recycled content value for the project (in dollars) shall be determined by Equation A4.4-1 or Equation A4.4-2.

Total material cost shall be calculated by using one of the methods specified below:

1. **Simplified method.** To obtain the total cost of the project, multiply the square footage of the residential structure by the square foot valuation established pursuant to Table A4.405.3 or as established by the enforcing agency. The total material cost is 45 percent of the total cost of the project. Use Equations A4.4-3A or A4.4-3B to determine total material costs using the simplified method.

   Total material costs = Project square footage x square foot valuation x 45 percent **(Equation A4.4-3A)**

   Total estimated or actual cost of project x 45 percent **(Equation A4.4-3B)**

TABLE A4.405.3
SQUARE FOOT VALUATION

TYPE OF STRUCTURE	SQUARE FOOT CONSTRUCTION COSTS
Residential, one- and two-family	$101.90
Residential, multiple family	$92.94

Note: Minimum square foot construction costs for residential one- and two-family and multiple family dwellings are from the International Code Council's (ICC) *Building Valuation Data (BVD)—February 2011.*

2. **Detailed method.** To obtain the total cost of the project, add the estimated and/or actual costs of materials used for the project, including the structure (steel, concrete, wood or masonry); the enclosure (roof, windows, doors and exterior walls); the interior walls, ceilings and finishes (gypsum board, ceiling tiles, etc.). The total estimated and/or actual costs shall not include fees, labor and installation costs, overhead, appliances, equipment, furniture or furnishings.

A4.405.3.1.2 Determination of total recycled content value (RCV). Total RCV may be determined either by dollars or percentage as noted below.

1. **Total recycled content value for the project (in dollars).** This is the sum of the recycled content value of the materials and/or assemblies considered and shall be determined by Equation A4.4-4. The result of this calculation may be directly compared to Equations A4.4-1 and A4.4-2 to determine compliance with Tier 1 or Tier 2 prerequisites.

   Total Recycled Content Value (dollars) = $(RCV_M + RCV_A)$ **(Equation A4.4-4)**

2. **Total recycled content value for the project (by percentage).** This is expressed as a percentage of the total material cost and shall be determined by Equation A4.4-4 and Equation A4.4-5. The result of this calculation may be directly compared for

compliance with Tier 1 (10 percent) or Tier 2 (15 percent) prerequisites.

Total Recycled Content Value (percent) = [Total Recycled Content Value (dollars) ÷ Total Material Cost (dollars)] x 100 **(Equation A4.4-5)**

A4.405.3.1.3 Determination of recycled content value of materials (RCV_M). The recycled content value of each material (RCV_M) is calculated by multiplying the cost of material, as defined by the recycled content. See Equations A4.4-6 and A4.4-7.

RCV_M (dollars) = Material cost (dollars) x RC_M (percent) **(Equation A4.4-6)**

RC_M (percent) = Postconsumer content percentage + ($^1/_2$) Preconsumer content percentage **(Equation A4.4-7)**

Notes:

1. If the postconsumer and preconsumer recycled content is provided in pounds, Equation A4.4-7 may be used, but the final result (in pounds) must be multiplied by 100 to show RC_M as a percentage.
2. If the manufacturer reports total recycled content of a material as one percentage in lieu of separately reporting preconsumer and postconsumer values, one-half of the total shall be considered preconsumer recycled material and one-half of the total shall be considered post consumer recycled material.

A4.405.3.1.4 Determination of recycled content value of assemblies – (RCV_A). Recycled content value of assemblies is calculated by multiplying the total cost of the assembly by the total recycled content of the assembly (RC_A), and shall be determined by Equation A4.4-8.

RCV_A (dollars) = Assembly cost (dollars) x Total RC_A (percent) **(Equation A4.4-8)**

If not provided by the manufacturer, Total RC_A (percent) is the sum (Σ) of the Proportional Recycled Content (PRC_M) of each material in the assembly. RC_A shall be determined by Equation A4.4-9.

$RC_A = \Sigma PRC_M$ **(Equation A4.4-9)**

PRC_M of each material may be calculated by one of two methods using the following formulas:

Method 1: Recycled content (postconsumer and preconsumer) of each material provided in percentages

PRC_M (percent) = Weight of material (percent) x RC_M (percent) **(Equation A4.4-10)**

Weight of material (percent) = [Weight of material (lbs) ÷ Weight of assembly (lbs)] x 100 **(Equation A4.4-11)**

RC_M (percent) = Postconsumer content percentage + ($^1/_2$) Preconsumer content percentage **(See Equation A4.4-7)**

Method 2: Recycled content (postconsumer and preconsumer) provided in pounds

PRC_M (percent) = [RC_M (lbs) ÷ Weight of material (lbs)] x 100 **(Equation A4.4-12)**

RC_M (lbs) = Postconsumer content (lbs) + ($^1/_2$) Preconsumer content (lbs) **(Equation A4.4-13)**

Note: If the manufacturer reports total recycled content of a material as one percentage in lieu of separately reporting preconsumer and postconsumer values, one-half of the total shall be considered preconsumer recycled material and one-half of the total shall be considered postconsumer recycled material.

A4.405.3.1.5 Alternate method for concrete. When Supplementary Cementitious Materials (SCMs), such as fly ash or ground blast furnace slag cement, are used in concrete, an alternate method of calculating and reporting recycled content in concrete products shall be permitted. When determining the recycled content value, the percent recycled content shall be multiplied by the cost of the cementitious materials only, not the total cost of the concrete.

A4.405.4 Use of building materials from rapidly renewable sources. One or more of the following materials manufactured from rapidly renewable sources or agricultural by-products is used:

1. Insulation
2. Bamboo or cork
3. Engineered products
4. Agricultural based products
5. Other products acceptable to the enforcing agency

Note: The intent of this section is to utilize building materials and products which are typically harvested within a 10-year or shorter cycle.

SECTION A4.406 ENHANCED DURABILITY AND REDUCED MAINTENANCE (Reserved)

SECTION A4.407 WATER RESISTANCE AND MOISTURE MANAGEMENT

A4.407.1 Drainage around foundations. Install foundation and landscape drains which discharge to a dry well, sump, bioswale or other approved on-site location.

A4.407.2 Roof drainage. 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 Flashing details. Provide flashing details on the building plans which comply with accepted industry standards or manufacturer's instructions. Details are shown on house plans at all of the following locations:

1. Around windows and doors
2. Roof valleys
3. Deck connections to the structure
4. Roof-to-wall intersections
5. Chimneys to roof intersections
6. Drip caps above windows and doors with architectural projections

Note: Reference details may be found in the *Residential Sheet Metal Guidelines* published by the Sheet Metal and Air Conditioning Contractors' National Association Inc.

A4.407.4 Material protection. Protect building materials delivered to the construction site from rain and other sources of moisture.

A4.407.5 Ice and water barriers. In Climate Zone 16, an ice and water barrier is installed at valley, eaves and wall to roof intersections. The ice and water barrier shall extend at least 24″ inside the exterior wall line or as specified by the manufacturer's installation instructions.

A4.407.6 Door protection. Exterior doors to the dwelling are covered to prevent water intrusion by one or more of the following:

1. An awning at least 4 feet in depth is installed
2. The door is protected by a roof overhang at least 4 feet in depth
3. The door is recessed at least 4 feet
4. Other methods which provide equivalent protection

A4.407.7 Roof overhangs. A permanent overhang or awning at least 2 feet in depth is provided at all exterior walls.

SECTION A4.408
CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

A4.408.1 Enhanced construction waste reduction. Nonhazardous construction and demolition debris generated at the site is diverted to recycle or salvage in compliance with one of the following:

Tier 1. At least a 65 percent reduction

Tier 2. At least a 75 percent reduction

Exceptions:

1. Equivalent or alternative waste reduction methods are developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.
2. The enforcing agency may make exceptions to the requirements of this section when jobsites are located in areas beyond the haul boundaries of the diversion facility.

A4.408.1.1 Documentation. Documentation shall be provided to the enforcing agency which demonstrates compliance with this section. Documentation shall be in compliance with Section 4.408.5.

SECTION A4.409
LIFE CYCLE ASSESSMENT
(Reserved)

SECTION A4.410
BUILDING MAINTENANCE AND OPERATION
(Reserved)

SECTION A4.411
INNOVATIVE CONCEPTS AND LOCAL ENVIRONMENTAL CONDITIONS

A4.411.1 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 A4.5 – ENVIRONMENTAL QUALITY

SECTION A4.501
GENERAL
(Reserved)

SECTION A4.502
DEFINITIONS

MERV. Filter minimum efficiency reporting value, based on ASHRAE 52.2-1999.

NO ADDED FORMALDEHYDE (NAF) BASED RESINS. Resins formulated with no added formaldehyde as part of the resin cross linking structure for making hardwood plywood, particle board or medium density fiberboard. "No added formaldehyde based resins" include, but are not limited to, resins made from soy, polyvinyl acetate or methylene diisocyanate.

ULTRA-LOW EMITTING FORMALDEHYDE (ULEF) RESINS. Resins formulated such that average formaldehyde emissions are consistently below the Phase 2 emission standards in Section 93120.2, as provided in Section 93120.3(d) of Title 17, *California Code of Regulations*.

SECTION A4.503
FIREPLACES
(Reserved)

SECTION A4.504
POLLUTANT CONTROL

A4.504.1 Early compliance with formaldehyde limits. Meet the formaldehyde limits contained in Table 4.504.5 before the mandatory compliance date, or use composite wood products made with either California Air Resources Board approved no-added formaldehyde (NAF) resins or ultra-low emitting formaldehyde (ULEF) resins.

Note: Documentation must be provided that verifies that finish materials are certified to meet the pollutant emission limits.

A4.504.2 Resilient flooring systems. Resilient flooring systems installed in the building shall meet the percentages specified in this section and comply with the VOC-emission limits defined in at least one of the following:

1. VOC emission limits defined in the Collaborative for High Performance Schools (CHPS) High Performance Products Database.
2. Products compliant with CHPS criteria certified under the Greenguard Children & Schools program.
3. Certification under the Resilient Floor Covering Institute (RFCI) FloorScore program.
4. Meet the California Department of Public Health, "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.)

Tier 1. At least 80 percent of the total area of resilient flooring installed shall comply.

Tier 2. At least 90 percent of the total area of resilient flooring installed shall comply.

Note: Documentation must be provided that verifies that finish materials are certified to meet the pollutant emission limits in this section. <

A4.504.3 Thermal insulation. Thermal insulation installed in the building shall meet the following requirements:

Tier 1. Install thermal insulation in compliance with the VOC-emission limits defined in Collaborative for High Performance Schools (CHPS) High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; or meet California Department of Public Health, "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).

Tier 2. Install insulation which complies with Tier 1 plus does not contain any added formaldehyde.

Note: Documentation must be provided that verifies the materials are certified to meet the pollutant emission limits in this section.

SECTION A4.505
INTERIOR MOISTURE CONTROL
(Reserved)

SECTION A4.506
INDOOR AIR QUALITY AND EXHAUST

A4.506.1 Filters. Filters with a higher value than MERV 6 are installed on central air or ventilation systems. Pressure drop across the filter shall not exceed .1 inches water column.

A4.506.2 Direct-vent appliances. Direct-vent heating and cooling equipment is utilized if the equipment will be located in the conditioned space or install the space heating and water heating equipment in an isolated mechanical room.

SECTION A4.507
ENVIRONMENTAL COMFORT
(Reserved)

SECTION A4.508
OUTDOOR AIR QUALITY
(Reserved)

SECTION A4.509
INNOVATIVE CONCEPTS AND LOCAL ENVIRONMENTAL CONDITIONS

A4.509.1 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 I 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 at least two elective measures selected from Division A4.1.
2. From Division A4.2, Energy Efficiency.
   - 2.1. Exceed the 2010 *California Energy Code* requirements by 15 percent.
   - 2.2. Comply with at least four elective measures selected from Division A4.2.
3. From Division A4.3, Water Efficiency and Conservation.
   - 3.1. Comply with the reduced flow rate for kitchen sink faucets in Section A4.303.1
   - 3.2. Comply with the landscape irrigation water budget requirement in Section A4.304.3.
   - 3.3. Comply with the Tier 1 potable water use reduction for landscape irrigation design in Section A4.304.4.
   - 3.4. Comply with at least one elective measure 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 80 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 at least four elective measures selected from Division A4.1.
2. From Division A4.2, Energy Efficiency.
    - 2.1 Exceed the 2010 *California Energy Code* requirements by 30 percent.
    - 2.2 Comply with at least six elective measures selected from Division A4.2.
3. From Division A4.3, Water Efficiency and Conservation.
    - 3.1 Comply with the Tier 1 reduced flow rate for kitchen sink faucets in Section A4.303.1.
    - 3.2 Comply with the Tier 2 dishwasher requirements in Section A4.303.1.
    - 3.3 Comply with the landscape irrigation water budget requirement in Section A4.304.3.
    - 3.4 Comply with the Tier 2 potable water use reduction for landscape irrigation design in Section A4.304.4.
    - 3.5 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 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 90 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.

APPENDIX A4

RESIDENTIAL VOLUNTARY MEASURES

SECTION A4.602
RESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST

FEATURE OR MEASURE	LEVELS APPLICANT TO SELECT ELECTIVE MEASURES			VERIFICATIONS ENFORCING AGENCY TO SPECIFY VERIFICATION METHOD		
		Prerequisites and electives[1]		Enforcing Agency	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
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.		☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐
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.	☒					
A4.106.1 Orient buildings to optimize the use of solar energy with the long side of the house oriented within 30° of south.		☐	☐	☐	☐	☐
A4.106.2.1 Soil analysis is performed by a licensed design professional and the findings utilized in the structural design of the building.		☐	☐	☐	☐	☐

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	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
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.		☒[2]	☒[2]			
Tier 2. The construction area shall be identified and delineated by fencing or flagging to limit construction activity to the construction area.			☒[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. Limit turf areas to the greatest extent possible.						
a. Not more than 50 percent for Tier 1.		☐		☐	☐	☐
b. Not more than 25 percent for Tier 2.			☐	☐	☐	☐
3. Utilize at least 75 percent native California or drought tolerant plant and tree species appropriate for the climate zone region.		☐	☐	☐	☐	☐
4. Hydrozoning irrigation techniques are incorporated into the landscape design.		☐	☐	☐	☐	☐
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.		☒[2]		☐	☐	☐
Tier 2. Not less than 30 percent of the total parking, walking or patio surfaces shall be permeable.			☒[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) and A4.106.5(2).						
Tier 1 roof covering shall meet or exceed the values contained in Table A4.106.5(1).		☒[2]				
Tier 2 roof covering shall meet or exceed the values contained in Table A4.106.5(2).			☒[2]			
A4.106.6 Electric vehicle charging. Provide capability for dedicated electrical vehicle supply equipment in single-family and multifamily structures.		☐	☐	☐	☐	☐

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	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
A4.207.9 In cooling Climate Zones 2, 4, and 8 through 15 install a whole-house fan with insulated louvers or an insulated cover.		☐	☐	☐	☐	☐
A4.207.10 ENERGY STAR ceiling fans are installed in all bedrooms and living areas.		☐	☐	☐	☐	☐
Water Heating Design, Equipment and Installation						
A4.208.1 The Energy Factor (EF) for a gas-fired storage water heater is higher than .60.		☐	☐	☐	☐	☐
A4.208.2 The Energy Factor (EF) for a gas-fired tankless water heater is .80 or higher.		☐	☐	☐	☐	☐
A4.208.3 Where the hot water source is more than 10 feet from a fixture, the potable water distribution system shall convey hot water using a method designed to minimize wait time for hot water to arrive at the fixture.		☐	☐	☐	☐	☐
Lighting						
A4.209.1 Building lighting consists of at least 90 percent ENERGY STAR qualified hard-wired fixtures.		☐	☐	☐	☐	☐
Appliances						
A4.210.1 Each appliance provided by the builder meets ENERGY STAR if an ENERGY STAR designation is applicable for that appliance.		☐	☐	☐	☐	☐
Renewable Energy						
A4.211.1 Install a solar photovoltaic (PV) system in compliance with the California Energy Commission New Solar Homes Partnership (NSHP).[1,2,3] Install energy efficiency measures meeting either Tier I or Tier II below. Tier 1. Exceed the 2010 *California Energy Code* requirements by 15 percent. Tier 2. Exceed the 2010 *California Energy Code* requirements by 30 percent. Solar water heating may be used to assist in meeting the energy efficiency requirements of either Tier I or Tier II. 1. In addition, for either Tier I or II, each appliance provided by the builder must be ENERGY STAR if an ENERGY STAR designation is applicable for that appliance. 2. Tier II requires a 30 percent reduction in the building's space cooling (air conditioning) energy compared to the 2010 *California Energy Code*. 3. Information on NSHP incentives available through the California Energy Commission may be obtained at the "Go Solar California" website.		☐ ☐			☒ ☒	☒ ☒
A4.211.2 A solar water heating system is installed.		☐	☐	☐	☐	☐
A4.211.3 Space on the roof surface and penetrations through the roof surface are provided for future solar installation.		☐	☐	☐	☐	☐
A4.211.4 A minimum one-inch conduit is provided from the electrical service equipment for the future installation of a photovoltaic (PV) system.		☐	☐	☐	☐	☐

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	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
Elevators, Escalators and Other Equipment—(Reserved)						
Innovative Concepts and Local Environmental Conditions						
A4.213.1 Items in this section are necessary to address innovative concepts or local environmental conditions.						
Item 1	☐	☐	☐	☐	☐	☐
Item 2	☐	☐	☐	☐	☐	☐
Item 3	☐	☐	☐	☐	☐	☐
WATER EFFICIENCY AND CONSERVATION						
Indoor Water Use						
4.303.1 Indoor water use shall be reduced by at least 20 percent using one of the following methods. 1. Water saving fixtures or flow restrictors shall be used. 2. A 20 percent reduction in baseline water use shall be demonstrated.	☒ 7/01/2011			☐	☐	☐
4.303.2 When using the calculation method specified in Section 4.303.1, multiple showerheads controlled by a single valve shall not exceed maximum flow rates.	☒ 7/01/2011			☐	☐	☐
4.303.3 Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with specified performance requirements.	☒ 7/01/2011			☐	☐	☐
A4.303.1 Kitchen faucets and dishwashers shall comply with this section. Tier 1. The maximum flow rate at a kitchen sink faucet shall not be greater than 1.5 gallons per minute at 60 psi. Tier 2. In addition to the kitchen faucet requirements for Tier 1, dishwashers in Tier 2 buildings shall be ENERGY STAR qualified and not use more than 5.8 gallons of water per cycle.		☒[2]	☒[2] ☒[2]	☐	☐	☐
A4.303.2 Nonwater supplied urinals or waterless toilets are installed.		☐	☐	☐	☐	☐
Outdoor Water Use						
4.304.1 Automatic irrigation systems controllers installed at the time of final inspection shall be weather or soil moisture-based.	☒			☐	☐	☐
A4.304.1 Install a low-water consumption irrigation system which minimizes the use of spray type heads.		☐	☐	☐	☐	☐
A4.304.2 A rainwater capture, storage and re-use system is designed and installed.		☐	☐	☐	☐	☐
A4.304.3 A water budget shall be developed for landscape irrigation.		☒[2]	☒[2]	☐	☐	☐

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	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
A4.304.4 Provide water efficient landscape irrigation design that reduces the use of potable water. Tier 1. Does not exceed 65 percent of *ETo* times the landscape area. Tier 2. Does not exceed 60 percent of *ETo* times the landscape area.		☒[2]	☒[2]	☐	☐	☐
A4.304.5 A landscape design is installed which does not utilize potable water.		☐	☐	☐	☐	☐
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	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
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.		☐	☐	☐	☐	☐

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	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
Construction Waste Reduction, Disposal and Recycling						
4.408.1 Recycle and/or salvage for reuse a minimum of 50 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 2. Tier 2 at least a 75 percent reduction **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.	☒			☐	☐	☐
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 US EPA Phase II emission limits where applicable. 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.	☒			☐	☐	☐

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	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
4.504.3 Carpet and carpet systems shall be compliant with VOC limits.	☒			☐	☐	☐
4.504.4 50 percent of floor area receiving resilient flooring shall comply with the VOC-emission limits defined in the Collaborative for High Performance Schools (CHPS) High Performance Products Database or be certified under the Resilient Floor Covering Institute (RFCI) FloorScore program; or meet California Dept. of Public Health, "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.)	☒					
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 Meet the formaldehyde limits contained in Table 4.504.5 before the mandatory compliance date, or 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 80 percent of the resilient flooring installed shall comply. Tier 2. At least 90 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 the VOC-emission limits defined in Collaborative for High Performance Schools (CHPS) Low-emitting Materials List. Tier 2. Install insulation which contains No-Added Formaldehyde (NAF) and is in compliance with the VOC-emission limits defined in Collaborative for High Performance Schools (CHPS) Low-emitting Materials List.		☒[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						
4.506.1 Exhaust fans which terminate outside the building are provided in every bathroom.	☒			☐	☐	☐
A4.506.1 Higher than MERV 6 filters are installed on central air or ventilation systems.		☐	☐	☐	☐	☐
A4.506.2 Direct vent appliances are used or isolated from the conditioned space.		☐	☐	☐	☐	☐

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	Installer or Designer	Third party
	Mandatory	Tier 1	Tier 2	☐ All	☐ All	☐ All
Environmental Comfort						
4.507.1 Whole house exhaust fans shall have insulated louvers or covers which close when the fan is off. Covers or louvers shall have a minimum insulation value of R-4.2.	☒			☐	☐	☐
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-2004 or equivalent. 2. Size duct systems according to ANSI/ACCA 1 Manual D-2009 or equivalent. 3. Select heating and cooling equipment according to ANSI/ACCA 3 Manual S-2004 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.

Division A4.7– RESIDENTIAL MODEL ORDINANCE

A4.701.1 General. The voluntary measures of this code are designed and promulgated to be adopted by reference and made mandatory by local ordinance pursuant to Section 101.7. Jurisdictions wishing to adopt the voluntary provisions of this code as an enforceable regulation governing structures and premises should ensure that certain factual information is included in the adopting ordinance and that the measures are appropriate and achievable and are considered to be suitable as mandatory by the city, county, or city and county. The following sample adoption ordinance addresses several key elements of a code adoption ordinance, including the information required for insertion into the code text.

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.

SAMPLE RESOLUTION FOR ADOPTION OF THE TIER 1 OR TIER 2 PROVISIONS OF THE CALIFORNIA GREEN BUILDING STANDARDS CODE WITH OR WITHOUT ADDITIONAL ITEMS NECESSARY TO ADDRESS INNOVATIVE CONCEPTS OR LOCAL ENVIRONMENTAL CONDITIONS.

ATTACHMENT___.

SAMPLE RESOLUTION ADOPTING THE CALIFORNIA GREEN BUILDING STANDARDS CODE APPENDICES AS A MANDATORY REFERENCE STANDARD

CITY OF _____

RESOLUTION # _____

RESOLUTION ADOPTING ENHANCED GREEN BUILDING MEASURES FOR NEW HOME CONSTRUCTION.

WHEREAS, the City/County of _____ 's (City or County) General Plan sets forth goals for preserving and improving the natural and built environment of the City/County, protecting the health of its residents and visitors, and fostering its economy; and

WHEREAS, green building is a holistic approach to design, construction, and demolition that minimizes the building's impact on the environment, the occupants, and the community; and

WHEREAS, green buildings benefit building industry professionals, residents, and communities by improving construction quality; increasing building durability; reducing utility, maintenance, water and energy costs; creating healthier homes; and enhancing comfort and livability; and

WHEREAS, the *California Green Building Standards Code* appendices have included voluntary tiers to provide a city, county, or city and county, building professionals, and the general public with a range of voluntary green building measures for builders to choose from when constructing homes in California; and

WHEREAS, the *California Green Building Standards Code* appendices benefited from extensive input from a city, county, or city and county, building professionals, State agencies, and recognized green building professionals and the practices contained in these guidelines were selected for their viability in today's market and their ability to promote sustainable buildings and communities; and

WHEREAS, adoption of the *California Green Building Standards Code* appendices promotes statewide consistency and predictability for building professionals; and

NOW THEREFORE, BE IT RESOLVED, that the City/County hereby finds that green building design, construction and operation furthers the goals set forth in the City/County General Plan, including land use, conservation, open space and (include others, if applicable.)

NOW THEREFORE, BE IT RESOLVED, that newly constructed low-rise residential buildings shall meet the _____ (Tier 1 or Tier 2) measures contained in the *California Green Building Standards Code* appendices and the green building design, construction, and operation innovative concepts or additions or amendment thereto contained in Attachment _____ to address local environmental conditions; and;

NOW THEREFORE, BE IT FURTHER RESOLVED, that the City Council or County Board of Supervisors of the City/County of _____ adopts the *California Green Building Standards Code* appendices, as they may be amended from time to time, as a City/County mandatory reference document and directs City/County staff to enforce these green building measures as mandatory standards within the City/County.

ADOPTED BY THE FOLLOWING VOTE:

AYES:

NOES:

ABSENT:

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
CHAPTER A5 – NONRESIDENTIAL VOLUNTARY MEASURES
DIVISION A5.1 – PLANNING AND DESIGN—continued

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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)	**X**																		
Adopt only those sections that are listed below							**X**	**X**	**X**		**X**								
Chapter/Section																			
Appendix A5 – First paragraph under Nonresidential Voluntary Measures title.							X												
A5.101.1							X												
A5.102.1 Definitions							X												
A5.106.4	†						X												
A5.106.4.1	†						X												
A5.106.4.2	†						X												
A5.106.4.3							X												
Table A5.106.4.3							X												
A5.106.5.1							X												
A5.106.5.1.1							X												
Table A5.106.5.1.1							X												
A5.106.5.1.3							X												
A5.106.5.1.4							X												
A5.106.5.3							X												
A5.106.5.3.1							X												
Table A5.106.5.3.1							X												
A5.106.6							X												
A5.106.6.1							X												
A5.106.7 and subsections							X												
A5.106.9							X	X	X		X								
A5.106.9.1	†						X												
A5.106.11							X												
A5.106.11.1							X												
A5.106.11.2 and subsections							X												
Table A5.106.11.2.1							X												
Table A5.106.11.2.2							X												

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

APPENDIX A5
NONRESIDENTIAL VOLUNTARY MEASURES

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 and provide additional measures that designers, builders and property owners may wish to consider during the planning, design and construction process.

Division A5.1 – PLANNING AND DESIGN

PREFACE

Given that land use and planning are largely regulated locally, cities, counties and cities and counties should consider reducing greenhouse gas emissions associated with development through local land-use practices in conjunction with enforcing the provisions of this code. Specific land use strategies a city, county or city and county may wish to consider include but are not limited to the following:

Site selection. Develop sites for buildings, hardscape, roads or parking areas consistent with the local general plan and regional transportation plan pursuant to SB 375 (Stats 2008, Ch. 728).

Regional sustainable communities strategy. Site selection and building design and use shall conform the project with the prevailing regional sustainable communities strategy or alternative planning strategy, whichever meets the greenhouse gas target established by the California Air Resources Board pursuant to SB375 (Stats. 2008, Ch. 728), including the general location of uses, residential densities and building intensities.

Transit priority projects. To qualify as a transit priority project, the project shall meet three criteria:

(1) (a) contain at least 50 percent residential use, based on total building square footage and, if the project contains between 26 and 50 percent nonresidential uses, a floor area ratio of not less than 0.75; (b) provide a minimum net density of at least 20 dwelling units per acre; and (c) be within one-half mile of a major transit stop or high-quality transit corridor included in a regional transportation plan as described in Section 21155 of Stats. 2008, Ch. 728;

(2) be consistent with the prevailing sustainable communities strategy or alternative planning strategy, whichever meets the greenhouse gas target established by the California Air Resources Board, including the general location of uses, residential densities and building intensities; and

(3) have all necessary entitlements required by the applicable local government.

Note: For additional information, see Government Code Sections 65080, 65080.1 and 65400 and Public Resources Code Sections 21061.3 and 21155.

SECTION A5.101
GENERAL

A5.101.1 General. The provisions of this chapter 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 A5.102
DEFINITIONS

A5.102.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

ALBEDO. Synonymous with solar reflectance, which is a ratio of the energy reflected back into the atmosphere to the energy absorbed by the surface, with 100 percent being total reflectance.

BIORETENTION. A shallow depression that utilizes conditioned soil and vegetation for the storage, treatment or infiltration of storm water runoff.

BROWNFIELD SITE. Real property, the expansion, redevelopment or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant, with certain legal exclusions and additions.

Note: See the full text at EPA's website.

DEVELOPMENT FOOTPRINT. The total area of the building footprint, hardscape, access roads and parking.

GREENFIELDS. Sites that are not previously developed or graded and remain in a natural state able to support agriculture, open space or habitat.

Note: Previously developed sites are those that previously contained buildings, roadways or parking lots or were graded or altered by direct human activities.

GREYFIELD SITE. Any site previously developed with at least 50 percent of the surface area covered with impervious material.

FLOOR AREA RATIO. Gross square footage of all structures on a site divided by gross square footage of the site.

INFILL SITE. A site in an urbanized area that meets criteria defined in *Public Resources Code* Section 21061.3.

LOW IMPACT DEVELOPMENT (LID). Control of storm-water at its source to mimic drainage services provided by an undisturbed site.

LOW-EMITTING AND FUEL EFFICIENT VEHICLES. Eligible vehicles are limited to the following:

1. Zero emission vehicle (ZEV), including neighborhood electric vehicles (NEV), partial zero emission vehicle

(PZEV), advanced technology PZEV (AT ZEV) or CNG fueled (original equipment manufacturer only) regulated under *Health and Safety Code* section 43800 and CCR, Title 13, Sections 1961 and 1962.

2. High-efficiency vehicles, regulated by US EPA, bearing High Occupancy Vehicle (HOV) car pool lane stickers issued by the Department of Motor Vehicles.

NEIGHBORHOOD ELECTRIC VEHICLE (NEV). A motor vehicle that meets the definition of "low-speed vehicle" either in Section 385.5 of the *Vehicle Code* or in 49 CFR571.500 (as it existed on July 1, 2000) and is certified to zero emission vehicle standards.

PERMEABLE PAVING. [BSC] Permeable paving materials and techniques which allow the movement of water around the paving material and allow precipitation to percolate through the paving surface to the soil below.

SOLAR REFLECTANCE. A measure of the fraction of solar energy that is reflected by a surface (measured on a scale of 0 to 1).

SOLAR REFLECTANCE INDEX (SRI). A measure of a material surface's ability to reflect solar heat, as shown by a small temperature rise. It includes both solar reflectance and thermal emittance and is quantified such that a standard black surface (solar reflectance 0.05, thermal emittance 0.90) is 0 and a standard white surface (solar reflectance 0.80, thermal emittance 0.90) is 100.

THERMAL EMITTANCE. The relative ability of a surface to radiate absorbed heat (measured on a scale of 0 to 1).

VANPOOL VEHICLE. Eligible vehicles are limited to any motor vehicle, other than a motor truck or truck tractor, designed for carrying more than 10 but not more than 15 persons including the driver, which is maintained and used primarily for the nonprofit work-related transportation of adults for the purposes of ridesharing.

Note: Source: *Vehicle Code*, Division 1, Section 668

VEGETATED SPACE. Vegetated spaces include, but are not limited to, native, undisturbed areas; rehabilitation of previously disturbed areas with landscaping; green belts; and recreation facilities that include landscaping, such as golf courses.

ZEV. Any vehicle certified to zero emission standards.

SECTION A5.103
SITE SELECTION

A5.103.1 Community connectivity. Where feasible, locate project on a previously developed site within a $^1/_2$ mile radius of at least ten basic services, readily accessible by pedestrians, including, but not limited, to one each of bank, place of worship, convenience grocery, day care, cleaners, fire station, barber shop, beauty shop, hardware store, laundry, library, medical clinic, dental clinic, senior care facility, park, pharmacy, post office, restaurant (two may be counted), school, supermarket, theater, community center, fitness center, museum or farmers market. Other services may be considered on a case-by-case basis.

A5.103.2 Brownfield or greyfield site redevelopment or infill area development. If feasible, select for development a brownfield in accordance with Section A5.103.2.1 or on a greyfield or infill site as defined in Section A5.102.

A5.103.2.1 Brownfield redevelopment. Develop a site documented as contaminated by means of an ASTM E1903-97 Phase II Environmental Site Assessment or on a site defined as a brownfield by a local, state or federal government agency. The site must be fully remediated in accordance with EPA regulations to the level required of the anticipated land use.

SECTION A5.104
SITE PRESERVATION

A5.104.1 Reduce development footprint and optimize open space. Optimize open space on the project site in accordance with Sections A5.104.1.1, A5.104.1.2 or A5.104.1.3.

A5.104.1.1 Local zoning requirement in place. Exceed the zoning's open space requirement for vegetated open space on the site by 25 percent.

A5.104.1.2 No local zoning requirement in place. Provide vegetated open space area adjacent to the building equal to the building footprint area.

A5.104.1.3 No open space required in zoning ordinance. Provide vegetated open space equal to 20 percent of the total project site area.

SECTION A5.105
DECONSTRUCTION AND REUSE OF EXISTING STRUCTURES

A5.105.1 If feasible, disassemble existing buildings instead of demolishing to allow reuse or recycling of building materials.

A5.105.1.1 Existing building structure. Maintain at least 75 percent of existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing) based on surface area.

Exceptions:

1. Window assemblies and nonstructural roofing material.
2. Hazardous materials that are remediated as a part of the project.
3. A project with an addition of more than two times the square footage of the existing building.

A5.105.1.2 Existing nonstructural elements. Reuse existing interior nonstructural elements (interior walls, doors, floor coverings and ceiling systems) in at least 50 percent of the area of the completed building (including additions).

Exception: A project with an addition of more than two times the square footage of the existing building.

A5.105.1.3 Salvage. Salvage additional items in good condition such as light fixtures, plumbing fixtures and doors as follows. Document the weight or number of the items salvaged.

1. Salvage for reuse on the project items that conform to other provisions of Title 24 in an on-site storage area.
2. Nonconforming items may be salvaged in dedicated collection bins for exempt projects or other uses.

SECTION A5.106
SITE DEVELOPMENT

A5.106.2 Storm water design. Design storm water runoff rate and quantity in conformance with Section A5.106.2.1 and storm water runoff quality by Section A5.106.3.2 or by local requirements, whichever are stricter.

A5.106.2.1 Storm water runoff rate and quantity. Implement a storm water management plan resulting in no net increase in rate and quantity of storm water runoff from existing to developed conditions.

Exception: If the site is already greater than 50 percent impervious, implement a storm water management plan resulting in a 25 percent decrease in rate and quantity.

A5.106.2.2 Storm water runoff quality. Use postconstruction treatment control best management practices (BMPs) to mitigate (infiltrate, filter or treat) storm water runoff from the 85th percentile 24-hour runoff event (for volume-based BMPs) or the runoff produced by a rain event equal to two times the 85th percentile hourly intensity (for flow-based BMPs).

A5.106.3 Low impact development (LID). Reduce peak runoff in compliance with Section 5.106.1. Employ at least two of the following methods or other best management practices to allow rainwater to soak into the ground, evaporate into the air or collect in storage receptacles for irrigation or other beneficial uses. LID strategies include, but are not limited to:

1. Bioretention (rain gardens);
2. Cisterns and rain barrels;
3. Green roofs meeting the structural requirements of the building code;
4. Roof leader disconnection;
5. Permeable and porous paving;
6. Vegetative swales and filter strips; tree preservation; and
7. Volume retention suitable for previously developed sites.

A5.106.3.1 Implementation. If applicable, coordinate LID projects with the local Regional Water Quality Control Board, which may issue a permit or otherwise require LID.

Note: Further information on design of specific control measures may be found on U.S. EPA's website, on SWRCB's website and from local boards that require LID.

A5.106.3.2 Greyfield or infill site. Manage 40 percent of the average annual rainfall on the site's impervious surfaces through infiltration, reuse or evaportranspiration.

A5.106.4 Bicycle parking and changing rooms. Comply with Sections A5.106.4.1 through A5.106.4.3; or meet local ordinance, whichever is stricter.

A5.106.4.1 Short-term bicycle parking. If the project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack.

A5.106.4.2 Long-term bicycle parking. For buildings with over 10 tenant-occupants, provide secure bicycle parking for 5 percent of tenant-occupant motorized vehicle parking capacity, with a minimum of one space. For public schools and community colleges, provide secure bicycle parking for 15 percent of occupants (students, teachers and staff). Acceptable parking facilities shall be convenient from the street and may include, but not be limited to:

1. Covered, lockable enclosures with permanently anchored racks for bicycles;
2. Lockable bicycle rooms with permanently anchored racks; and
3. Lockable, permanently anchored bicycle lockers.

A5.106.4.3 Changing rooms. For buildings with over 10 tenant-occupants, provide changing/shower facilities for tenant-occupants only in accordance with Table A5.106.4.3 or document arrangements with nearby changing/shower facilities.

[DSA-SS] For public schools and community colleges, provide changing/shower facilities for the "number of administrative/teaching staff" equal to the "number of tenant-occupants" shown in Table A5.106.4.3.

TABLE A5.106.4.3

NUMBER OF TENANT-OCCUPANTS	SHOWER/CHANGING FACILITIES REQUIRED[2]	2-TIER (12" X 15" X 72") PERSONAL EFFECTS LOCKERS[1,2] REQUIRED
0–10	0	0
11–50	1 unisex shower	2
51–100	1 unisex shower	3
101–200	1 shower stall per gender	4
Over 200	1 shower stall per gender for each 200 additional tenant-occupants	One 2-tier locker for each 50 additional tenant-occupants

1. One 2-tier locker serves two people. Lockers shall be lockable with either padlock or combination lock.
2. Tenant spaces housing more than 10 tenant-occupants within buildings sharing common toilet facilities need not comply; however, such common shower facilities shall accommodate the total number of tenant-occupants served by the toilets and include a minimum of one unisex shower and two 2-tier lockers.

Note: Additional information on recommended bicycle accommodations may be obtained from Sacramento Area Bicycle Advocates.

A5.106.5.1 Designated parking for fuel-efficient vehicles. Provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table A5.106.5.1.1 or A5.106.5.1.2.

A5.106.5.1.1 Tier 1 [BSC]. 10% of total spaces [DSA-SS]. Provide 10 percent of total designated parking spaces for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as follows:

TABLE A5.106.5.1.1

TOTAL NUMBER OF PARKING SPACES	NUMBER OF REQUIRED SPACES
0–9	0
10–25	2
26–50	4
51–75	6
76–100	9
101–150	11
151–200	18
201 and over	At least 10 percent of total

A5.106.5.1.2 Tier 2. Provide 12% of total designated parking spaces for any combination of low-emitting, fuel-efficient, and carpool/van pool vehicles as follows:

TABLE A5.106.5.1.2

TOTAL NUMBER OF PARKING SPACES	NUMBER OF REQUIRED SPACES
0–9	1
10–25	2
26–50	5
51–75	7
76–100	9
101–150	13
151–200	19
201 and over	At least 12 percent of total

A5.106.5.1.3 Parking stall marking. Paint, in the paint used for stall striping, the following characters such that the lower edge of the last word aligns with the end of the stall striping and is visible beneath a parked vehicle:

CLEAN AIR/
VANPOOL/EV

Note: Vehicles bearing Clean Air Vehicle stickers from expired HOV lane programs may be considered eligible for designated parking spaces.

A5.106.5.1.4 Vehicle designations. Building managers may consult with local community Transit Management Associations (TMAs) for methods of designating qualifying vehicles, such as issuing parking stickers.

Notes:

1. Information on qualifying vehicles, car labeling regulations and DMV SOV stickers may be obtained from the following sources:
   a. California DriveClean
   b. California Air Resources Board
   c. U.S. EPA fuel efficiency standards
   d. Janet Okino, DMV Registration Operations, (916) 657 6678 and John Swanton, ARB Public Information, (626) 575-6858
2. Purchasing policy and refueling sites for low emitting vehicles for state employees use can be found at the Department of General Services.

A5.106.5.3 Electric vehicle charging. Provide facilities meeting Section 406.7 (Electric Vehicle) of the *California Building Code* and as follows:

A5.106.5.3.1 Electric vehicle supply wiring. For each space required in Table A5.106.5.3.1, provide panel capacity and dedicated conduit for one 208/240 V 40 amp circuit terminating within 5 feet of the midline of each parking space.

TABLE A5.106.5.3.1

TOTAL NUMBER OF PARKING SPACES[1]	NUMBER OF REQUIRED SPACES
1–50	1
51–200	2
201 and over	4

1. In a parking garage, the total number of parking spaces is for each individual floor or level.

A5.106.6 Parking capacity. Design parking capacity to meet but not exceed minimum local zoning requirements.

A5.106.6.1 Reduce parking capacity. With the approval of the enforcement authority, employ strategies to reduce on-site parking area by

1. Use of on street parking or compact spaces, illustrated on the site plan or
2. Implementation and documentation of programs that encourage occupants to carpool, ride share or use alternate transportation.

Note: Strategies for programs may be obtained from local TMAs.

A5.106.7 Exterior wall shading. Meet requirements in the current edition of the *California Energy Code* and comply with either Section A5.106.7.1 or A5.106.7.2 for wall surfaces. If using vegetative shade, plant species documented to reach desired coverage within 5 years of building occupancy.

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. Calculate shade coverage on the summer solstice at 10 AM for east-facing walls and at 3 PM for west-facing walls.

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 minimum SRI 25 (aged), for 75% of opaque wall areas.

Exception: Use of vegetated shade in Wildland-Urban Interface Areas as defined in Chapter 7A (Materials and Construction Methods for Exterior Wildfire Exposure)

of the *California Building Code* shall meet the requirements of that chapter.

Note: If not available from the manufacturer, aged SRI value calculations may be found at the California Energy Commission's web site at www.energy.ca.gov.

A5.106.9 Building orientation. Locate and orient the building as follows:

1. When site and location permit, orient the long axis of the building east and west, with a maximum allowable deviation of 30º.
2. [OSHPD 1, 2 & 4] When site and location permit orient the building with the long sides facing north and south.
3. Protect the building from thermal loss, drafts and degradation of the building envelope caused by wind and wind-driven materials such as dust, sand, snow and leaves with building orientation and landscape features.

Note: For information on sun angles and shading, visit: http://www2.aud.ucla.edu/energy-design-tools/. Calculations may be made using the Solar-2 tool.

A5.106.9.1 Building orientation and shading. Locate orient and shade the building as follows:

1. Provide exterior shade for south-facing windows during the peak cooling season. [DSA-SS] In Public School and Community College buildings, shade may be provided by trees, solar shade structures or other alternate methods.

A5.106.11 Heat island effect. Reduce nonroof heat islands by Section A5.106.11.1 and roof heat islands by Section A5.106.11.2.

A5.106.11.1 Hardscape alternatives. Use one or a combination of strategies 1 through 3 for 50 percent of site hardscape or put 50 percent of parking underground.

1. Provide shade (mature within 5 years of occupancy). [DSA-SS] In Public School and Community College buildings, solar shade structures may be used in lieu of trees to provide required shade.
2. Use light colored materials with an initial solar reflectance value of at least .30 as determined in accordance with American Society for Testing and Materials (ASTM) Standards E 1918 or C 1549.
3. Use open-grid pavement system or pervious or permeable pavement system.

A5.106.11.2 Cool roof. Use roofing materials having a minimum 3-year aged solar reflectance and thermal emittance complying with Sections A5.106.11.2.1 and A5.106.11.2.2 or a minimum aged Solar Reflectance Index (SRI) complying with Section A5.106.11.2.3 and as shown in Table A5.106.11.2.1 for Tier 1 or A5.106.11.2.2 for Tier 2.

A5.106.11.2.1 Solar reflectance. Roofing materials shall have a minimum 3-year aged solar reflectance equal to or greater than the values specified in Table A5.106.11.2.1 for Tier 1 and Table A5.106.11.2.2 for Tier 2.

If CRRC testing for 3-year aged reflectance is not available for any roofing products, the 3-year aged value shall be determined using the Cool Roof Rating Council (CRRC) certified initial value using the equation R_{aged} = [0.2 + 0.7[$\rho_{initial}$ – 0.2], where $\rho_{initial}$ = the initial Solar Reflectance.

Solar reflectance may also be certified by other supervisory entities approved by the Commission pursuant to Title 24, Part 1, Section 10-113.

A5.106.11.2.2 Thermal emittance. Roofing materials shall have a CRRC initial or 3-year aged thermal emittance as determined in accordance with ASTM E 408 or C 1371 equal to or greater than those specified in Table A5.106.11.2.1 for Tier 1 and Table A5.106.11.2.2 for Tier 2.

Thermal emittance may also be certified by other supervisory entities approved by the Commission pursuant to Title 24, Part 1, Section 10-113.

A5.106.11.2.3 Solar reflectance index alternative. Solar Reflectance Index (SRI) equal to or greater than the values specified in Table A5.106.11.2.1 for Tier 1 and Table A5.106.11.2.2 for Tier 2 may be used as an alternative to compliance with the 3-year 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 E 1980-01 as specified in the *California Energy Code*, Section 118(i)3. Solar reflectance values used in the SRI-WS shall be based on the 3-year 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 three year 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, Section 10-113.

Note: The Solar Reflectance Index Calculation Worksheet (SRI-WS) is available by contacting the Energy Standard Hotline at 1-800-772-3300, website at www.energy.ca.gov or by email at Title24@energy.state.ca.us.

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.

TABLE A5.106.11.2.1 [BSC]
TIER 1

ROOF SLOPE	ROOF WEIGHT	CLIMATE ZONE	Minimum 3-year Aged Solar Reflectance	Thermal Emittance	SRI
≤ 2 : 12	N.A	2–15	0.55	0.75	64
> 2 : 12	< 5 lb/ft^2	2–16	0.20	0.75	16
	≥ 5 lb/ft^2	1–16	0.15	0.75	10

TABLE A5.106.11.2.2
TIER 2

ROOF SLOPE	ROOF WEIGHT	CLIMATE ZONE	Minimum 3-year Aged Solar Reflectance	Thermal Emittance	SRI
≤ 2 : 12	N/A	2–15	0.65	0.85	78
> 2 : 12	< 5 lb/ft^2	2–16	0.23	0.85	23
	≥ 5 lb/ft^2	1–16	0.30	0.85	30

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
APPENDIX A5 – NONRESIDENTIAL VOLUNTARY MEASURES
DIVISION A5.2 – ENERGY EFFICIENCY

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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**	**X**	**X**		**X**								
Chapter/Section																			
A5.201.1	X						X												
A5.202.1 Definitions	X						X												
A5.203.1and subsections	X						X												
A5.203.2 and subsections								X											
A5.204.1	X						X	X	X		X								
A5.204.2 and subsections	X						X												
A5.204.3 and subsections	X																		
A5.204.4 and subsections								X			X								
A5.204.6	X							X	X		X								
A5.205 and subsections and tables								X			X								
A5.207 and subsections and tables								X	X		X								
A5.209 and subsections and tables								X	X		X								
A5.210								X	X		X								
A5.211.1	X						X												
A5.211.1.1	X						X												
A5.211.1.2 and subsections							X												
A5.211.3	X						X												
A5.211.4 and subsections	X						X												
A5.212.1	X						X												
A5.212.1.1 and subsection	X						X												
A5.212.1.2	X						X												
A5.212.1.3							X												
A5.212.1.4	X						X												
A5.213	X																		

APPENDIX A5
NONRESIDENTIAL VOLUNTARY MEASURES

Division A5.2 – ENERGY EFFICIENCY

SECTION A5.201
GENERAL

A5.201.1 Scope. For the purposes of energy efficiency standards in this appendix, the California Energy Commission will continue to adopt mandatory standards. It is the intent of this code to encourage buildings to achieve exemplary performance in the area of energy efficiency. Specifically, a green building should achieve at least a 15 percent reduction in energy usage when compared to the State's mandatory energy efficiency standards.

SECTION A5.202
DEFINITIONS

A5.202.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

ENERGY STAR. A joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy. ENERGY STAR is a voluntary program designed to identify and promote energy-efficient products and practices.

DEMAND RESPONSE AUTOMATION INTERNET SOFTWARE CLIENT. Software that resides in a building Energy Management Control System that can receive a demand response signal and automatically reduce HVAC and lighting system loads. Demand Response programs developed by Utilities and ISO's depend upon timely and reliable communications of events and information to the buildings that are participating in the programs.

GEOTHERMAL. Renewable energy generated by deep-earth water or steam.

GRID NEUTRAL. A site that produces at least as much electricity as it uses in a year shall be deemed grid neutral.

OVERCURRENT PROTECTION DEVICE RATING. The highest current at rated voltage that an overcurrent protection device is intended to interrupt under standard test conditions.

PROCESS. An activity or treatment that is not related to the space conditioning, lighting, service water heating or ventilating of a building as it relates to human occupancy. >

SECTION A5.203
PERFORMANCE APPROACH

A5.203.1 Energy performance. Using an Alternative Calculation Method approved by the California Energy Commission, calculate each nonresidential building's annual TDV regulated energy use components and compare them to the standard or "budget" building.

Note: The "percent better than" calculation omits Process and Receptacle energy use components in comparing the Standard and Proposed energy use.

A5.203.1.1 Tier 1 [BSC]. Energy efficiency – 15 percent above the *California Energy Code* [DSA-SS]. Exceed the 2010 *California Energy Code* requirements by 15 percent.

A5.203.1.2 Tier 2 [BSC]. Energy efficiency – 30 percent above the *California Energy Code* [DSA-SS]. Exceed the 2010 *California Energy Code* requirements by 30 percent.

Field verify and document the measures and calculations used to reach the desired level of efficiency following the requirements specified in the Title 24 Reference Appendices.

A5.203.2 Energy performance. It is the intent of this code to encourage green buildings to achieve exemplary performance in the area of energy efficiency.

A5.203.2.1 *CALGreen* Tier 1. To achieve *CALGreen* Tier 1, buildings must comply with the latest edition of "Savings By Design, Healthcare Modeling Procedures" found online at http://www.energysoft.com/ep/2007SBDHProcedures.pdf.

A5.203.2.2 *CALGreen* Tier 2. To achieve *CALGreen* Tier 2, buildings must exceed the latest edition of "Savings By Design, Healthcare Modeling Procedures" by a minimum of 15 percent.

SECTION A5.204
PRESCRIPTIVE APPROACH

A5.204.1 ENERGY STAR equipment and appliances. All equipment and appliances provided by the builder shall be ENERGY STAR labeled if ENERGY STAR is applicable to that equipment or appliance.

A5.204.2 Energy monitoring. Provide submetering or equivalent combinations of sensor measurements and thermodynamic calculations, if appropriate, to record energy use data for each major energy system in the building, including chillers, heat pumps, packaged AC systems, fans, pumps, cooling towers, boilers and other heating systems, lighting systems and process loads. This energy use data, once collected, shall be stored within a data management system.

A5.204.2.1 Data storage. The data management system must be capable of electronically storing energy data and creating user reports showing hourly, daily, monthly and annual energy consumption for each major energy system. Hourly data shall be retained a minimum of 30 days, daily data shall be retained a minimum of 6 months and monthly data shall be retained a minimum of 2 years.

A5.204.2.2 Data access. Hourly energy use data shall be accessible through a central data management system and must be available daily.

A5.204.3 Demand response. HVAC systems with Direct Digital Control Systems and centralized lighting systems shall include preprogrammed demand response strategies that are automated with either a Demand Response Automation Internet Software Client or dry contact relays.

A5.204.3.1 HVAC. The preprogrammed demand response strategies shall be capable of reducing the peak HVAC demand by cooling temperature set point adjustment.

A5.204.3.2 Lighting. The preprogrammed demand response strategies shall be capable of reducing the total lighting load by a minimum 30 percent through dimming control or bi-level switching.

A5.204.3.3 Software clients. The software clients shall be capable of communicating with a DR Automation Server.

A5.204.4 Commissioning [OSHPD 1 & 4]. Building commissioning shall be included in the design and construction processes of the building project to verify that the building's energy related systems are installed, calibrated and perform according to the owner's project requirements, basis of design and construction documents.

The owner and designer shall designate an individual as the Commissioning Authority (CxA) to lead, review and oversee the completion of the commissioning process activities. The owner shall document the Owner's Project Requirements (OPR). The design team shall develop the Basis of Design (BOD). The CxA shall review these documents for clarity and completeness. The owner and design team shall be responsible for updates to their respective documents, develop and incorporate commissioning requirements into the construction documents and develop and implement a commissioning plan. The CxA shall verify the installation and performance of the systems to be commissioned, verify that training and operation and maintenance documentation have been provided to the owner's operations staff and complete a commissioning report.

Commissioning process activities shall be completed for the following energy-related systems, at a minimum:

1. Heating, ventilating, air conditioning and refrigeration (HVAC&R) systems (mechanical and passive) and associated controls
2. Lighting and daylighting controls
3. Domestic hot water systems
4. Renewable energy systems (wind, solar, etc.)
5. Building envelope systems

A5.204.4.1 Owner's Project Requirements (OPR). The expectations and requirements of the building shall be documented by the owner and the designer before the design phase of the project begins. This shall be reviewed by the CxA. At a minimum, this documentation shall include the following:

1. Environmental and sustainability goals
2. Energy efficiency goals
3. Indoor environmental quality requirements
4. Equipment and systems expectations
5. Building occupant and O&M personnel expectations

A5.204.4.2 Basis of Design (BOD). A written explanation of how the design of the building systems meets the Owner's Project Requirements shall be completed at the design phase of the building project and updated as necessary during the design and construction phases. This shall be reviewed by the CxA. At a minimum, the Basis of Design document shall cover the following systems:

1. Heating, ventilation, air conditioning (hvac) systems and controls
2. Indoor lighting system and controls
3. Water heating system
4. Renewable energy systems

A5.204.4.3 Commissioning plan. A commissioning plan shall be completed to document the approach to how the project will be commissioned and shall be started during the design phase of the building project. This shall be reviewed by the CxA. The Commissioning Plan shall include the following at a minimum:

1. General project information
2. Commissioning goals
3. Systems to be commissioned. Plans to test systems and components shall include at a minimum:
    a. A detailed explanation of the original design intent;
    b. Equipment and systems to be tested, including the extent of tests;
    c. Functions to be tested;
    d. Conditions under which the test shall be performed; and
    e. Measurable criteria for acceptable performance.
4. Commissioning team information

5. Commissioning process activities, schedules and responsibilities – plans for the completion of commissioning requirements listed in Sections A5.204.4.4 through A5.204.4.6 shall be included.

A5.204.4.4 Functional performance testing. Functional performance tests shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized and include any readings and adjustments made. This shall be reviewed and verified by the CxA.

A5.204.4.5 Postconstruction documentation and training. A systems manual and systems operations training are required.

A5.204.4.5.1 Systems manual. Documentation of the operational aspects of the building shall be completed within the systems manual and delivered to the building owner and facilities operator. This shall be reviewed by the CxA. At a minimum, the systems manual shall include the following:

1. Site information, including facility description, history and current requirements
2. Site contact information
3. Basic operations and maintenance, including general site operating procedures, basic troubleshooting, recommended maintenance requirements, site events log
4. Major systems
5. Site equipment inventory and maintenance notes
6. Other resources and documentation

A5.204.4.5.2 Systems operations training. The CxA shall oversee the training of the appropriate maintenance staff for each equipment type and/or system. The training shall include, as a minimum, the following:

1. System/equipment overview (what it is, what it does and what other systems and/or equipment it interfaces with)
2. Review of the information in the systems manual
3. Review of the record drawings on the system/equipment

A5.204.4.6 Commissioning report. The CxA shall create a complete report of commissioning process activities undertaken through the design, construction and postconstruction phases of the building project and provided to the owner.

A5.204.6 Building orientation and shading. Locate orient and shade the building as required in Section A5.106.9.

SECTION A5.205 [OSHPD 1 & 4] BUILDING ENVELOPE

A5.205.1 Fenestration products and exterior doors.

A5.205.1.1 Certification of fenestration products and exterior doors other than field-fabricated. Any fenestration product and exterior door, other than field-fabricated fenestration products and field-fabricated exterior doors, may be installed only if the manufacturer has certified to the California Energy Commission or if an independent certifying organization approved by the Commission has certified that the product complies with all of the applicable requirements of this subsection.

A5.205.1.1.1 Air leakage. Manufactured fenestration products and exterior doors shall have air infiltration rates not exceeding 0.3 cfm/ft² of window area, 0.3 cfm/ft² of door area for residential doors, 0.3 cfm/ft² of door area for nonresidential single doors (swinging and sliding) and 1.0 cfm/ft² for nonresidential double doors (swinging), when tested according to NFRC-400 or ASTM E 283 at a pressure differential of 75 pascals (or 1.57 pounds/ft²), incorporated herein by reference.

A5.205.1.1.2 *U*-factor. A fenestration product's *U*-factor shall be rated in accordance with NFRC 100 or the applicable default *U*-factor set forth in Table A.5.205.1-A.

Exception: If the fenestration product is a skylight or is site-built fenestration in a building covered by the nonresidential standards with less than 10,000 square feet of site-built fenestration, the default *U*-factor may be calculated as set forth in Reference Nonresidential Appendix NA6 of the California Energy Commission 2008 *Building Energy Efficiency Standards for Residential and Nonresidential Buildings*.

A5.205.1.1.3 SHGC. A fenestration product's SHGC shall be rated in accordance with NFRC 200 for site-built fenestration or use the applicable default SHGC set forth in Table A5.205.1-B.

Exception: If the fenestration product is a skylight or is site-built fenestration in a building covered by the nonresidential standards with less than 10,000 square feet of site-built fenestration, the default SHGC may be calculated as set forth in Reference Nonresidential Appendix NA6 of the California Energy Commission 2008 *Building Energy Efficiency Standards for Residential and Nonresidential Buildings.*

A5.205.1.1.4 Labeling. Fenestration products shall:

1. Have a temporary label (or label certificate for site-built fenestration) meeting the requirements of Section 10-111(a)1 of Title 24, Part 1 not to be removed before inspection by the enforcement agency, listing the certified *U*-factor and SHGC and certifying that the air leakage requirements of Section A5.205.1.1.1 are met for each product line; and
2. Have a permanent label (or label certificate for site-built fenestration) meeting the requirements

of Section 10-111(a)2 of Title 24, Part 1 if the product is rated using NFRC procedures.

A5.205.1.1.5 Fenestration acceptance requirements. Before an occupancy permit is granted, site-built fenestration products in other than low-rise residential buildings shall be certified as meeting the Acceptance Requirements for Code Compliance, as specified by the Reference Nonresidential Appendix NA7 of the California Energy Commission 2008 *Building Energy Efficiency Standards for Residential and Nonresidential Buildings* to ensure that site-built fenestration meet Standards requirements, including a matching label certificate for each product installed and be readily accessible at the project location. A Certificate of Acceptance shall be submitted to the enforcement agency that certifies that the fenestration product meets the acceptance requirements.

Exception: Fenestration products removed and reinstalled as part of a building alteration or addition.

TABLE A.5.205.1-A
DEFAULT FENESTRATION PRODUCT *U*-FACTORS

FRAME	PRODUCT TYPE	SINGLE PANE *U*-FACTOR	DOUBLE PANE[1] *U*-FACTOR	GLASS BLOCK[2] *U*-FACTOR
Metal	Operable	1.28	0.79	0.87
	Fixed	1.19	0.71	0.72
	Greenhouse/garden window	2.26	1.40	N.A.
	Doors	1.25	0.77	N.A.
	Skylight	1.98	1.30	N.A.
Metal, thermal break	Operable	N.A.	0.66	N.A.
	Fixed	N.A.	0.55	N.A.
	Greenhouse/garden window	N.A.	1.12	N.A.
	Doors	N.A.	0.59	N.A.
	Skylight	N.A.	1.11	N.A.
Nonmetal	Operable	0.99	0.58	0.60
	Fixed	1.04	0.55	0.57
	Doors	0.99	0.53	N.A.
	Greenhouse/garden windows	1.94	1.06	N.A.
	Skylight	1.47	0.84	N.A.

1. For all dual-glazed fenestration products, adjust the listed *U*-factors as follows:
   a. Add 0.05 for products with dividers between panes if spacer is less than $^{7}/_{16}$ inch wide.
   b. Add 0.05 to any product with true divided lite (dividers through the panes).
2. Translucent or transparent panels shall use glass blocks.

TABLE A5.205.1-B
DEFAULT SOLAR HEAT GAIN COEFFICIENT (SHGC)

FRAME TYPE	PRODUCT	GLAZING	TOTAL WINDOW SHGC		
			Single Pane	Double Pane	Glass Block[1]
Metal	Operable	Clear	0.80	0.70	0.70
	Fixed	Clear	0.83	0.73	0.73
	Operable	Tinted	0.67	0.59	N.A.
	Fixed	Tinted	0.68	0.60	N.A.
Metal, thermal break	Operable	Clear	N.A.	0.63	N.A.
	Fixed	Clear	N.A.	0.69	N.A.
	Operable	Tinted	N.A.	0.53	N.A.
	Fixed	Tinted	N.A.	0.57	N.A.
Nonmetal	Operable	Clear	0.74	0.65	0.70
	Fixed	Clear	0.76	0.67	0.67
	Operable	Tinted	0.60	0.53	N.A.
	Fixed	Tinted	0.63	0.55	N.A.

1. Translucent or transparent panels shall use glass block values.

TABLE A5.205.3-B
MINIMUM PERFORMANCE REQUIREMENTS FOR LIQUID APPLIED ROOF COATINGS

PHYSICAL PROPERTY	ASTM TEST PROCEDURE	REQUIREMENT
Initial percent elongation (break)	D 2370	Minimum 200 percent 73ºF (23ºC)
Initial percent elongation (break) OR Initial flexibility	D 2370 D 522, Test B	Minimum 60 percent 0ºF (-18ºC) Minimum pass 1″ mandrel 0ºF (-18ºC)
Initial tensile strength (maximum stress)	D 2370	Minimum 100 psi (1.38 Mpa) 73ºF (23ºC)
Initial tensile strength (maximum stress) OR Initial flexibility	D 2370 D 522, Test B	Minimum 200 psi (2.76 Mpa) 0ºF (-18ºC) Minimum pass 1″ mandrel 0ºF (-18ºC)
Final percent elongation (break) after accelerated weathering 1000 h	D 2370	Minimum 100 percent 73ºF (23ºC)
Final percent elongation (break) after accelerated weathering 1000 h OR Flexibility after accelerated weathering 1000 h	D 2370	Minimum 40 percent 0ºF (-18ºC) Minimum pass 1″ mandrel 0ºF (-18ºC)
Permeance	D 1653	Maximum 50 perms
Accelerated weathering 1000 h	D 4798	No cracking or checking[1]

1. Any cracking or checking visible to the eye fails the test procedure.

SECTION A5.207 [OSHPD 1, 2 & 4] HVAC DESIGN, EQUIPMENT AND INSTALLATION

A5.207.1 Space-conditioning equipment certification by manufacturers. Any space-conditioning equipment listed in this section may be installed only if the manufacturer has certified that the equipment complies with all the applicable requirements of this section.

A5.207.1.1 Efficiency. Equipment shall meet the applicable requirements in Tables A5.207.1-A through A5.207.1-M, subject to the following:

1. If more than one standard is listed for any equipment in Tables A5.207.1-A through A5.207.1-M, the equipment shall meet all the applicable standards that are listed; and
2. If more than one test method is listed in Tables A5.207.1-A through A5.207.1-M, the equipment shall comply with the applicable standard when tested with each test method; and
3. Where equipment can serve more than one function, such as both heating and cooling or both space heating and water heating, it shall comply with all the requirements applicable to each function; and
4. Where a requirement is for equipment rated at its "maximum rated capacity" or "minimum rated capacity," the capacity shall be as provided for and allowed by the controls, during steady-state operation.

Exception: Water-cooled centrifugal water-chilling packages that are not designed for operation at ARI Standard 550 test conditions of 44°F leaving chilled water temperature and 85°F entering condenser water temperature shall have a minimum full load COP rating as shown in Tables A5.207.1-H, A5.207.1-I and A5.207.1-J and a minimum NPLV rating as shown in Tables A5.207.1-K, A5.207.1-L and A5.207.1-M. The table values are only applicable over the following full load design ranges:

Leaving Chiller Water Temperature	40 to 48°F
Entering Condenser Water Temperature	75 to 85°F
Condensing Water Temperature Rise	5 to 15°F

A5.207.1.2 Controls for heat pumps with supplementary electric resistance heaters. Heat pumps with supplementary electric resistance heaters shall have controls:

A5.207.1.2.1 That prevent supplementary heater operation when the heating load can be met by the heat pump alone; and

A5.207.1.2.2 In which the cut-on temperature for compression heating is higher than the cut-on temperature for supplementary heating and the cut-off temperature for compression heating is higher than the cut-off temperature for supplementary heating.

Exceptions: The controls may allow supplementary heater operation during:

1. Defrost; and
2. Transient periods such as start-ups and following room thermostat setpoint advance, if the controls provide preferential rate control, intelligent recovery, staging, ramping or another control mechanism designed to preclude the unnecessary operation of supplementary heating.

A5.207.1.3 Thermostats. All unitary heating and/or cooling systems including heat pumps that are not controlled by a central energy management control system (EMCS) shall have a setback thermostat.

1. **Setback capabilities.** All thermostats shall have a clock mechanism that allows the building occupant to

program the temperature set points for at least four periods within 24 hours. Thermostats for heat pumps shall meet the requirements of Section A5.207.1.2.

Exception: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, noncentral electric heaters, fireplaces or decorative gas appliances, wood stoves, room air conditioners and room air-conditioner heat pumps need not comply with this requirement. Additionally, room air-conditioner heat pumps need not comply with Section A5.207.1.2 Under performance method of compliance, the resulting increase in energy use due to elimination of the setback thermostat shall be factored into the compliance analysis in accordance with a method prescribed by the Executive Director.

A5.207.1.4 Gas- and oil-fired furnace standby loss controls. Gas-fired and oil-fired forced air furnaces with input ratings ≥ 225,000 Btu/h shall also have an intermittent ignition or interrupted device (IID) and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for furnaces where combustion air is drawn from the conditioned space. All furnaces with input ratings ≥ 225,000 Btu/h, including electric furnaces, that are not located within the conditioned space shall have jacket losses not exceeding 0.75 percent of the input rating.

TABLE A5.207.1-A
ELECTRICALLY OPERATED UNITARY AIR CONDITIONERS AND CONDENSING UNITS—MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	SIZE CATEGORY	EFFICIENCY[1]		TEST PROCEDURE
		Before 1/1/2010	After 1/1/2010	
Air conditioners, Air cooled	≥ 65,000 Btu/h and < 135,000 Btu/h	10.3 EER[2]	11.2 EER[2]	ARI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h	9.7 EER[2]	11.0 EER[2]	ARI 340/360
	≥ 240,000 Btu/h and < 760,000 Btu/h	9.5 EER[2] and 9.7 IPLV[2]	10.0 EER[2] and 9.7 IPLV[2]	
	≥ 760,000 Btu/h	9.2 EER[2] and 9.4 IPLV[2]	9.7 EER[2] and 9.4 IPLV[2]	
Air conditioners, water and evaporatively cooled				ARI 210/240
	> 240,000 Btu/h	11.0 EER[2] and 10.3 IPLV[2]		ARI 340/360
Condensing Units, Air Cooled	≥ 135,000 Btu/h	10.1 EER and 11.2 IPLV		ARI 365
Condensing units, water or evaporatively cooled	≥ 135,000 Btu/h	13.1 EER and 13.1 IPLV		

1. IPLVs are only applicable to equipment with capacity modulation.
2. Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.

TABLE A5.207.1-B
UNITARY AND APPLIED HEAT PUMPS—MINIMUM EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	SIZE CATEGORY	SUBCATEGORY OR RATING CONDITION	EFFICIENCY[1]		TEST PROCEDURE
			Before 1/1/2010	After 1/1/2010	
Air cooled (cooling mode)	≥ 65,000 Btu/h and < 135,000 Btu/h	Split system and single package	10.1 EER[2]	11.0	ARI 340/360
	≥ 135,000 Btu/h and < 240,000 Btu/h		9.3 EER[2]	10.6	
	≥ 240,000 Btu/h		9.0 EER[2] and 9.2 IPLV[2]	9.5 EER[2] and 9.2 IPLV[2]	
Air cooled (heating mode)	≥ 65,000 Btu/h and < 135,000 Btu/h (Cooling capacity)	47°F db/43°F wb outdoor air	3.2 COP	3.3 COP	ARI 210/240
	≥ 135,000 Btu/h (Cooling capacity)	47°F db/43°F wb outdoor air	3.1 COP	3.2 COP	ARI 340/360

1. IPLVs and Part load rating conditions are applicable only to equipment with capacity modulation.
2. Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.

4. Thermostatic controls for all unitary single zone, air conditioners, heat pumps and furnaces, shall comply with the setback thermostat requirements of Section A5.207.1.3 or, if equipped with DDC to the Zone level, with the Automatic Demand Shed Controls of Section A5.207.5.5.

   Exception: Systems serving zones that must have constant temperatures to prevent degradation of materials, a process, plants or animals.

A5.207.5.3 Heat pump controls. All heat pumps with supplementary electric resistance heaters shall be installed with controls that comply with Section A5.207.1.2.

A5.207.5.4 Dampers for air supply and exhaust equipment. Outdoor air supply and exhaust equipment shall be installed with dampers that automatically close upon fan shutdown.

Exceptions:

1. Where it can be demonstrated to the satisfaction of the enforcing agency that the equipment serves an area that must operate continuously.
2. Gravity and other nonelectrical equipment that has readily accessible manual damper controls.
3. At combustion air intakes and shaft vents.
4. Where prohibited by other provisions of law.

A5.207.5.5 Automatic demand shed controls. HVAC systems with DDC to the Zone level shall be programmed to allow centralized demand shed for noncritical zones as follows:

1. The controls shall have a capability to remotely setup the operating cooling temperature set points by 4 degrees or more in all noncritical zones on signal from a centralized contact or software point within an Energy Management Control System (EMCS).
2. The controls shall remotely set down the operating heating temperature set points by 4 degrees or more in all noncritical zones on signal from a centralized contact or software point within an EMCS.
3. The controls shall have capabilities to remotely reset the temperatures in all noncritical zones to original operating levels on signal from a centralized contact or software point within an EMCS.
4. The controls shall be programmed to provide an adjustable rate of change for the temperature setup and reset.

A5.207.6 Pipe insulation. The piping for all space-conditioning and service water-heating systems with fluid temperatures listed in Table A5.207.6-A shall have the amount of insulation specified in Subsection A5.207.6.1 or A5.207.6.2. Insulation conductivity shall be determined in accordance with ASTM C 335 at the mean temperature listed in Table A5.207.6-A and shall be rounded to the nearest $^1/_{100}$ Btu-inch per hour per square foot per °F.

Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance and wind, including but not limited to, the following:

Insulation exposed to weather shall be suitable for outdoor service, e.g., protected by aluminum, sheet metal, painted canvas or plastic cover. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall include a vapor retardant located outside the insulation (unless the insulation is inherently vapor retardant), all penetrations and joints of which shall be sealed.

Exceptions:

1. Factory-installed piping within space-conditioning equipment certified under Section A5.210.1 or A5.207.1.
2. Piping that conveys fluids with a design operating temperature range between 60°F and 105°F.
3. Piping that serves process loads, gas piping, cold domestic water piping, condensate drains, roof drains, vents or waste piping.
4. Where the heat gain or heat loss to or from piping without insulation will not increase building source energy use.
5. Piping that penetrates framing members shall not be required to have pipe insulation for the distance of the framing penetration. Metal piping that penetrates metal framing shall use grommets, plugs, wrapping or other insulating material to assure that no contact is made with the metal framing.

A5.207.6.1 For insulation with a conductivity in the range shown in Table A5.207.6-A for the applicable fluid temperature range, the insulation shall have the applicable thickness shown in Table A5.207.6-A.

A5.207.6.2 For insulation with a conductivity outside the range shown in Table A5.207.6-A for the applicable fluid temperature range, the insulation shall have a minimum thickness as calculated with Equation A5.207.6-A below.

EQUATION A5.207.6-A
INSULATION THICKNESS EQUATION

$$T = PR\left[\left(1+\frac{t}{PR}\right)^{\frac{K}{k}}-1\right]$$

where:

T = Minimum insulation thickness for material with conductivity K, inches.

PR = Pipe actual outside radius, inches.

t = Insulation thickness from Table A5.207.6-A, inches.

K = Conductivity of alternate material at the mean rating temperature indicated in Table A5.207.6-A, for the applicable fluid temperature range, in Btu-inch per hour per square foot per °F.

k = The lower value of the conductivity range listed in Table A5.207.6-A, for the applicable fluid temperature range, Btu-inch per hour per square foot per °F.

TABLE A5.207.6-A
PIPE INSULATION THICKNESS

FLUID TEMPERATURE RANGE (°F)	CONDUCTIVITY RANGE (in Btu-inch per hour per square foot per °F)	INSULATION MEAN RATING TEMPERATURE (°F)	NOMINAL PIPE DIAMETER (in inches)					
			Runouts up to 2	1 and less	1.25-2	2.50-4	5-6	8 and larger
			INSULATION THICKNESS REQUIRED (in inches)					
Space heating systems (steam, steam condensate and hot water)								
Above 350	0.32-0.34	250	1.5	2.5	2.5	3.0	3.5	3.5
251-350	0.29-0.31	200	1.5	2.0	2.5	2.5	3.5	3.5
201-250	0.27-0.30	150	1.0	1.5	1.5	2.0	2.0	3.5
141-200	0.25-0.29	125	0.5	1.5	1.5	1.5	1.5	1.5
105-140	0.24-0.28	100	0.5	1.0	1.0	1.0	1.5	1.5
Service water-heating systems (recirculating sections, all piping in electric trace tape systems and the first 8 feet of piping from the storage tank for nonrecirculating systems)								
Above 105	0.24-0.28	100	0.5	1.0	1.0	1.5	1.5	1.5
Space cooling systems (chilled water, refrigerant and brine)								
40-60	0.23-0.27	75	0.5	0.5	0.5	1.0	1.0	1.0
Below 40	0.23-0.27	75	1.0	1.0	1.5	1.5	1.5	1.5

A5.208
Not used

A5.209 [OSHPD 1, 2 & 4] LIGHTING

A5.209.1 Lighting control devices, ballasts and luminaires. Any lighting control device, ballast or luminaire subject to the requirements of Section A5.209 shall be installed only if the manufacturer has certified to the Commission that the device complies with all of the applicable requirements of Section A5.209.

Lighting control devices may be individual devices or systems consisting of two or more components. For control systems consisting of two or more components, such as an Energy Management Control System (EMCS), the manufacturer of the control system shall certify each of the components required for the system to comply with Section A5.209.

A5.209.1.1 All devices: Instructions for installation and calibration. The manufacturer shall provide step-by-step instructions for installation and start-up calibration of the device.

A5.209.1.2 Indicator lights. Indicator lights integral to lighting control devices shall consume no more than one watt of power per indicator light.

A5.209.1.3 Automatic time switch control devices. Automatic time switch control devices or system shall:

1. Be capable of programming different schedules for weekdays and weekends; and
2. Have program backup capabilities that prevent the loss of the device's schedules for at least 7 days and the device's time and date setting for at least 72 hours if power is interrupted.

A5.209.1.4 Occupant sensors, motion sensors and vacancy sensors. Occupant sensors, motion sensors and vacancy sensors shall be capable of automatically turning off all the lights in an area no more than 30 minutes after the area has been vacated and shall have a visible status signal that indicates that the device is operating properly or that it has failed or malfunctioned. The visible status signal may have an override switch that turns the signal off. In addition, ultrasonic and microwave devices shall have a built-in mechanism that allows calibration of the sensitivity of the device to room movement in order to reduce the false sensing of occupants and shall comply with either Subsection A5.209.1.4.1 or A5.209.1.4.2 below, as applicable:

A5.209.1.4.1 If the device emits ultrasonic radiation as a signal for sensing occupants within an area, the device shall:

1. Have had a Radiation Safety Abbreviated Report submitted to the Center for Devices and Radiological Health, Federal Food and Drug Administration, under 21 Code of Federal Regulations, Section 1002.12 (1996) and a copy of the report shall have been submitted to the California Energy Commission; and
2. Emit no audible sound; and
3. Not emit ultrasound in excess of the decibel (dB) values shown in Table A5.209.1-A, measured no more than 5 feet from the source, on axis.

TABLE A5.209.4-C
ADDITIONAL LIGHTING POWER ALLOWANCE FOR ORDINANCE REQUIREMENTS

ADDITIONAL LIGHTING POWER ALLOWANCE (W/ft^2) WHEN AVERAGE LIGHT LEVELS ARE REQUIRED BY LOCAL ORDINANCE.				
Required (horizontal foot-candles, AVERAGE)	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
0.5	0	0	0	0
1.0	0.004	0	0	0
1.5	0.024	0.015	0	0
2.0	0.044	0.035	0	0
3.0	0.084	0.075	0.028	0.005
4.0 or greater	0.124	0.115	0.068	0.045
ADDITIONAL LIGHTING POWER ALLOWANCE (W/ft^2) WHEN MINIMUM LIGHT LEVELS ARE REQUIRED BY LOCAL ORDINANCE.				
Required (horizontal foot-candles, MINIMUM)	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
0.5	0.004	0	0	0
1.0	0.044	0.035	0	0
1.5	0.124	0.115	0.068	0.045
2.0	0.164	0.155	0.108	0.085
3.0	0.164	0.155	0.108	0.085
4.0 or greater	0.164	0.155	0.108	0.085

A5.209.5 Signs. This section applies to all internally illuminated and externally illuminated signs, unfiltered light emitting diodes (LEDs) and unfiltered neon, both indoor and outdoor. Each sign shall comply with either Subsection A5.209.5.1 or A5.209.5.2, as applicable.

A5.209.5.1 Maximum allowed lighting power.

A5.209.5.1.1 For internally illuminated signs, the maximum allowed lighting power shall not exceed the product of the illuminated sign area and 12 watts per square foot. For double-faced signs, only the area of a single face shall be used to determine the allowed lighting power.

A5.209.5.1.2 For externally illuminated signs, the maximum allowed lighting power shall not exceed the product of the illuminated sign area and 2.3 watts per square foot. Only areas of an externally lighted sign that are illuminated without obstruction or interference, by one or more luminaires, shall be used.

A5.209.5.2 Alternate lighting sources. The sign shall comply if it is equipped only with one or more of the following light sources:

A5.209.5.2.1 High pressure sodium lamps; or

A5.209.5.2.2 Metal halide lamps that are:

1. Pulse start or ceramic served by a ballast that has a minimum efficiency of 88 percent or greater or
2. Pulse start that are 320 watts or smaller, are not 250 watt or 175 watt lamps and are served by a ballast that has a minimum efficiency of 80 percent.

Where ballast efficiency is the measured output wattage to the lamp divided by the measured operating input wattage when tested according to ANSI C82.6-2005; or

A5.209.5.2.3 Neon or cold cathode lamps with transformer or power supply efficiency greater than or equal to the following:

1. A minimum efficiency of 75 percent when the transformer or power supply rated output current is less than 50 mA; or
2. A minimum efficiency of 68 percent when the transformer or power supply rated output current is 50 mA or greater.

Where the ratio of the output wattage to the input wattage is at 100 percent tubing load; or

A5.209.5.2.4 Fluorescent lamps with a minimum color rendering index (CRI) of 80; or

A5.209.5.2.5 Light emitting diodes (LEDs) with a power supply having an efficiency of 80 percent or greater; or

Exception: Single voltage external power supplies that are designed to convert 120 volt AC input into lower voltage DC or AC output and have a nameplate output power less than or equal to 250 watts, shall comply with the applicable requirements of the *Appliance Efficiency Regulations*, Title 20.

A5.209.5.2.6 Compact fluorescent lamps that do not contain medium screw base sockets (E24/E26) ; or

A5.209.5.2.7 Electronic ballasts with a fundamental output frequency not less than 20 kHz;

Exception 1 to Section A5.209.5: Unfiltered incandescent lamps that are not part of an electronic message center (EMC), an internally illuminated sign or an externally illuminated sign.

Exception 2 to Section A5.209.5: Exit signs. Exit signs shall meet the requirements of the *Appliance Efficiency Regulations.*

Exception 3 to Section A5.209.5: Traffic Signs. Traffic signs shall meet the requirements of the *Appliance Efficiency Regulations.*

A5.209.6 Sign lighting controls. All signs with permanently connected lighting shall meet the requirements below:

1. Automatic time switch control. All signs with permanently connected lighting shall be controlled with an automatic time switch control that complies with the applicable requirements of Section A5.209.1.
2. Photocontrol or outdoor astronomical time switch control. All outdoor signs shall be controlled with a photocontrol or outdoor astronomical time switch control.

   Exception: Outdoor signs in tunnels and large covered areas that require illumination during daylight hours.
3. Dimming. All outdoor signs shall be controlled with a dimmer that provides the ability to automatically reduce sign power by a minimum of 65 percent during nighttime hours.

   Exceptions:

   1. Signs that are illuminated for less than 1 hour per day during daylight hours.
   2. Outdoor signs in tunnels and large covered areas that require illumination during daylight hours.
   3. Metal halide, high pressure sodium, cold cathode and neon lamps used to illuminated signs or parts of signs.
   4. Demand Responsive Electronic Message Center Control. An Electronic Message Center (EMC) having a new connected lighting power load greater than 15 kW shall have a control installed that is capable of reducing the lighting power by a minimum of 30 percent when receiving a demand response signal that is sent out by the local utility.
   5. EMCs required by a health or life safety statue ordinance or regulation, including but not limited to exit signs and traffic signs.

A5.209.7 Nonresidential lighting control acceptance. Before an occupancy permit is granted for a new building or space or a new lighting system serving a building, space or site is operated for normal use, all indoor and outdoor lighting controls serving the building, space or site shall be certified as meeting the Acceptance Requirements for Code Compliance. A Certificate of Acceptance shall be submitted to the enforcement agency under Section 10-103(a) of Title 24, Part 1, that:

1. Certifies that plans, specifications, installation certificates and operating and maintenance information meet the requirements of Title 24, Part 6.
2. Certifies that automatic daylighting controls meet the applicable requirements of Sections A5.209.1 and A5.209.2.3.2.4.
3. Certifies that when a multilevel astronomical time switch is used to meet Exception 3 to Section A5.209.2.3.2.2 all general lighting in the skylit area is controlled by a multilevel astronomical time switch that meets the applicable requirements of Section A5.209.1 and that has an override switch that meets the requirements of Section A209.2.4.2.
4. Certifies that lighting controls meet the requirements of Sections A5.209.2.1 through A5.209.2.3 and Title 24, Part 6, Sections 131(e) and (f) and 146(a)2, as applicable.
5. Certifies that automatic lighting controls meet the applicable requirements of Sections A5.209.1 and A5.209.2.4.
6. Certifies that occupant-sensors meet the applicable requirements of Sections A5.209.1 and A5.209.2.4.
7. Certified that outdoor lighting controls meet the applicable requirements of Sections A5.209.1 and A5.209.3.

SECTION A5.210 [OSHPD 1, 2 & 4] APPLIANCES

A5.210.1 Appliances regulated by the *Appliance Efficiency Regulations*. Any appliance for which there is a California standard established in the *Appliance Efficiency Regulations* may be installed only if the manufacturer has certified to the Commission, as specified in those regulations, that the appliance complies with the applicable standard for that appliance.

Note: For certified appliances, go to www.energy.ca.gov/appliances/database/.

SECTION A5.211 RENEWABLE ENERGY

A5.211.1 On-site renewable energy. Use on-site renewable energy sources such as solar, wind, geothermal, low-impact hydro, biomass and bio-gas for at least 1 percent of the electric power calculated as the product of the building service voltage and the amperage specified by the electrical service overcurrent protection device rating or 1kW, (whichever is greater), in addition to the electrical demand required to meet 1 percent of the natural gas and propane use. The building project's electrical service overcurrent protection device rating shall be calculated in accordance with the 2010 *California Electrical Code*. Natural gas or propane use is calculated in accordance with the 2010 *California Plumbing Code*.

A5.211.1.1 Documentation. Using a calculation method approved by the California Energy Commission, calculate the renewable on-site energy system to meet the requirements of Section A5.211.1, expressed in kW. Factor in net-metering, if offered by local utility, on an annual basis.

A5.211.1.2 Grid neutral. Using the proposed annual electrical energy budget (kWh) as set forth by the Title 24, Part 6 of the *California Energy Code* and adding the additional annual energy consumption estimated for the appliances and equipment not covered by Title 24, Part 6 (e.g., kitchen and laundry equipment and appliances, swimming pool heaters and circulation pumps, industrial and art equipment, computers, etc.) calculate the site's annual electrical production and consumption ratio by dividing the proposed annual renewable electrical energy production (kWh) by the proposed annual electrical energy budget (kWh). The estimated plug loads shall be included in the annual electrical energy budget (kWh).

Exceptions:

1. Existing buildings with one year of occupancy or greater shall use actual data of the annual electrical energy consumption of the facilities. Using the data logged for the facilities, calculate the site's annual electrical production and consumption ration by dividing the proposed annual renewable electrical energy production (kWh) by the actual annual electrical energy consumption (kWh).
2. The annual renewable electrical energy can be renewable energy produced off-site on a remote property owned by the applicant.

A5.211.1.2.1 35 percent grid neutral. A site's annual electrical production and consumption ratio is equal or greater than 0.35.

A5.211.1.2.2 75 percent grid neutral. A site's annual electrical production and consumption ratio is equal or greater than 0.75.

A5.211.1.2.3 Grid neutral. A site's annual electrical production and consumption ratio is equal or greater than 1.

A5.211.3 Green power. If offered by local utility provider, participate in a renewable energy portfolio program that provides a minimum of 50 percent electrical power from renewable sources. Maintain documentation through utility billings.

A5.211.4 Prewiring for future rooftop solar. Size and install conduit from the building roof or eave to a location within the building identified as suitable for future installation of controls and/or storage batteries.

A5.211.4.1 Grid-connected system without storage. Location within the building shall be of sufficient dimensions to accommodate an inverter and/or other controls as approved by the utility.

A5.211.4.2 System for future energy storage. If battery storage is anticipated, location within the building shall:

1. Be stable, weather-proof, insulated against very hot and very cold weather, and isolated from occupied spaces.
2. Be able to accommodate batteries, ventilation complying with the *California Fire Code*, an inverter with or without a charge controller (regulator) and, if grid-connected, other controls as approved by the utility.

SECTION A5.212
ELEVATORS, ESCALATORS AND OTHER EQUIPMENT

A5.212.1 Elevators and escalators. In buildings with more than one elevator or two escalators, provide systems and controls to reduce the energy demand of elevators and escalators as follows. Document systems operation and controls in the project specifications and commissioning plan.

A5.212.1.1 Elevators. Traction elevators shall have a regenerative drive system that feeds electrical power back into the building grid when the elevator is in motion.

A5.212.1.1.1 Car lights and fan. A parked elevator shall turn off its car lights and fan automatically until the elevator is called for use.

A5.212.1.2 Escalators. An escalator shall have a VVVF motor drive system that is fully regenerative when the escalator is in motion.

A5.212.1.3 Stairs as an alternative [DSA-SS]. In Public School and Community College buildings, locate stairs conveniently to encourage their use in lieu of elevators or escalators.

A5.212.1.4 Controls. Controls that reduce energy demand shall meet requirements of CCR, Title 8, Chapter 4, Subchapter 6 and shall not interrupt emergency operations for elevators required in CCR, Title 24, Part 2, California Building Code.

SECTION A5.213
ENERGY EFFICIENT STEEL FRAMING

A5.213.1 Steel framing. Design steel framing for maximum energy efficiency. Techniques for avoiding thermal bridging in the envelope include:

1. Exterior rigid insulation;
2. Punching large holes in the stud web without affecting the structural integrity of the stud;
3. Spacing the studs as far as possible while maintaining the structural integrity of the structure; and
4. Detailed design of intersections of wall openings and building intersections of floors, walls and roofs.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
APPENDIX A5 – NONRESIDENTIAL VOLUNTARY MEASURES
DIVISION A5.3 – WATER EFFICIENCY AND CONSERVATION

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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)	X																		
Adopt only those sections that are listed below							X												
Chapter/Section																			
A5.301.1							X												
A5.302.1 Definitions							X												
A5.303.2.3.1							X												
Table A5.303.2.2							X												
Table A5.303.2.3.1							X												
A5.303.3							X												
Table A5.303.3							X												
A5.304.1.1	†						X												
A5.304.4.4	†						X												

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

APPENDIX A5
NONRESIDENTIAL VOLUNTARY MEASURES

Division A5.3 – WATER EFFICIENCY AND CONSERVATION

SECTION A5.301
GENERAL

A5.301.1 Scope. The provisions of this chapter shall establish the means of conserving water used indoors, outdoors and in wastewater conveyance.

SECTION A5.302
DEFINITIONS

A5.302.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

HYDROZONE. A portion of the landscaped area having plants with similar water needs.

LANDSCAPE (PLANT) COEFFICIENT [*KL*]. The product of the species factor multiplied by the density factor and the microclimate factor. ($Kl = Ks \times Kd \times Kmc$) The landscape coefficient is used in the landscape water budget calculation. (UCCE, 2000)

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE. The California ordinance regulating landscape design, installation and maintenance practices that will ensure commercial, multifamily and other developer installed landscapes greater than 2500 square feet meet an irrigation water budget developed based on landscaped area and climatological parameters.

PLANTS.

Adaptive plants. Adaptive plants are plants that grow well in a given habitat with minimal attention in the form of winter protection, pest protection, irrigation and fertilization once established.

Note: Adaptive plants are considered low in maintenance and are not invasive plants.

Invasive plants. Invasive plants are both indigenous and nonindigenous species with growth habits that are characteristically aggressive.

Note: Invasive plants typically have a high reproductive capacity and tendency to overrun the ecosystems they inhabit.

Native plants. Native plants are plants that have adapted to a given area and are not invasive.

POTABLE WATER. Water that is drinkable and meets the U.S. Environmental Protection Agency (EPA) Drinking Water Standards. See definition in the *California Plumbing Code*, Part 5.

RECYCLED WATER. Water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur (*Water Code* Section 13050 (n)). Simply put, recycled water is water treated to remove waste matter attaining a quality that is suitable to use the water again.

REFERENCE EVAPOTRANSPIRATION (ET_O). The estimated rate of evapotranspiration from a standardized surface of well watered, actively growing cool season turfgrass clipped to 12 cm with sufficient density to fully shade the soil. The water needs of a landscape planting can be calculated by multiplying the Landscape Coefficient (*Kl*) and Reference Evapotranspiration (*ETo*)

SUBMETER. A meter installed subordinate to a site meter. Usually used to measure water intended for one purpose, such as landscape irrigation, also known as a Dedicated Meter.

SECTION A5.303
INDOOR WATER USE

A5.303.2.3.1 Tier 1 – 30 percent savings [BSC]. 30 percent savings [DSA-SS]. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 30 percent shall be provided. The reduction shall be based on the maximum allowable water use per plumbing fixture and fitting as required by the *California Building Standards Code*. The 30 percent reduction in potable water use shall be demonstrated by one of the following methods:

1. Prescriptive method. Each plumbing fixture and fitting shall not exceed the maximum flow rate at ≥ 30 percent reduction as specified in Table A5.303.2.1, or
2. Performance method. A calculation demonstrating a 30 percent reduction in the building "water use baseline" as established in Table A5.303.2.2 shall be provided.

A5.303.2.3.2 Tier 2 – 35 percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 35 percent shall be provided. A calculation demonstrating a 35 percent reduction in the building "water use baseline" as established in Table A5.303.2.2 shall be provided.

A5.303.2.3.3 40 percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 40 percent shall be provided. A calculation demonstrating a 40 percent reduction in the building "water use baseline" as established in Table A5.303.2.2 shall be provided.

A5.303.3 Appliances and fixtures for commercial application. Appliances and fixtures shall meet the following:

1. Clothes washers shall have a maximum Water Factor (WF) that will reduce the use of water by 10 percent below the California Energy Commissions' WF standards for commercial clothes washers located in Title 20 of the *California Code of Regulations.*

2. Dishwashers shall meet the following water use standards:
   a. Residential—5.8 gallons (21.9 L) per cycle
   b. Commercial—refer to Table A5.303.3
3. Ice makers shall be air cooled.
4. Food steamers shall be connectionless or boilerless.
5. [BSC] The use and installation of water softeners that discharge to the community sewer system may be limited or prohibited by local agencies if certain conditions are met.
6. Combination ovens shall not consume more than 10 gph (38 L/h) in the full operational mode.
7. Commercial pre-rinse spray valves manufactured on or after January 1, 2006 shall function at equal to or less than 1.6 gpm (0.10 L/s) at 60 psi (414 kPa) and
   a. Be capable of cleaning 60 plates in an average time of not more than 30 seconds per plate.
   b. Be equipped with an integral automatic shutoff.
   c. Operate at static pressure of at least 30 psi (207 kPa) when designed for a flow rate of 1.3 gpm (0.08 L/s) or less.

TABLE A5.303.2.2
WATER USE BASELINE[3]

FIXTURE TYPE	BASELINE FLOW RATE	DURATION	DAILY USES	OCCUPANTS[2]
Showerheads	2.5 gpm @ 80 psi	5 min.	1	X[2a]
Lavatory faucets nonresidential	.5 gpm @ 60 psi	.25 min.	3	X
Kitchen faucets	2.6 gpm @ 60 psi	4 min.	1	X[2b]
Replacement aerators	2.6 gpm @ 60 psi			X
Wash fountains	2.2 [rim space (in.)/20 gpm @ 60 psi]			X
Metering faucets	0.25 gallons/cycle	.25 min.	3	X
Metering faucets for wash fountains	.25 [rim space (in.)/20 gpm @ 60 psi]	.25 min.	1 male[1] 3 female	X
Gravity tank type water closets	1.6 gallons/flush	1 flush	1 male[1] 3 female	X
Flushometer tank water closets	1.6 gallons/flush	1 flush	1 male[1] 3 female	X
Flushometer valve water closets	1.6 gallons/flush	1 flush	1 male[1] 3 female	X
Electromechanical hydraulic water closets	1.6 gallons/flush	1 flush	1 male[1] 3 female	X
Urinals	1.6 gallons/flush	1 flush	2 male	X

1. The daily use number shall be increased to three if urinals are not installed in the room.
2. Refer to Table A, Chapter 4, 2007 *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. Nonresidential kitchen faucet use is determined by the occupant load of the area served by the fixture.
3. Use worksheet WS-1 to calculate base line water use.

TABLE A5.303.2.3.1
FIXTURE FLOW RATES

FIXTURE TYPE	BASELINE FLOW-RATE[2]	MAXIMUM FLOW RATE AT ≥ 30 PERCENT REDUCTION
Showerheads	2.5 gpm @ 80 psi	1.8 gpm @ 80 psi
Lavatory faucets nonresidential	0.5 gpm @ 60 psi	0.35 gpm @ 60 psi
Kitchen faucets	2.2 gpm @ 60 psi	1.6 gpm @ 60 psi
Wash fountains	2.2 [rim space(in.)/20 gpm @ 60 psi]	1.6 [rim space(in.)/20 gpm @ 60 psi]
Metering faucets	0.25 gallons/cycle	0.18 gallons/cycle
Metering faucets for wash fountains	.25 [rim space(in.)/20 gpm @ 60 psi]	.18 [rim space(in.)/20 gpm @ 60 psi]
Gravity tank type water closets	1.6 gallons/flush	1.12 gallons/flush[1]
Flushometer tank water closets	1.6 gallons/flush	1.12 gallons/flush[1]
Flushometer valve water closets	1.6 gallons/flush	1.12 gallons/flush[1]
Electromechanical hydraulic water closets	1.6 gallons/flush	1.12 gallons/flush[1]
Urinals	1.0 gallons/flush	.5 gallons/flush

1. Includes water closets with an effective flush rate of 1.12 gallons or less when tested per ASME A 112.19.2 and ASME A 112.19.14.
2. See Table 5.503.2.3 for additional notes and references.

TABLE A5.303.3
COMMERCIAL DISHWASHER WATER USE

TYPE	HIGH-TEMPERATURE—MAXIMUM GALLONS PER RACK	CHEMICAL—MAXIMUM GALLONS PER RACK
Conveyer	0.70 (2.6 L)	0.62 (4.4 L)
Door	0.95 (3.6 L)	1.16 (2.6 L) [BSC] 2.26 (8.6 L) [DSA-SS]
Undercounter	0.90 (3.4 L)	0.98 (3.7 L)

A5.303.5 Dual plumbing. New buildings and facilities shall be dual plumbed for potable and recycled water systems for toilet flushing when recycled water is available as determined by the enforcement authority.

SECTION A5.304
OUTDOOR WATER USE

A5.304.1.1 Water budget. A water budget shall be developed for landscape irrigation use that conforms to the local water efficient landscape ordinance or to the California Department of Water Resources Model Water Efficient Landscape Ordinance where no local ordinance is applicable.

Note: Prescriptive measures to assist in compliance with the water budget are listed in Sections 492.5 through 492.8, 492.10 and 492.11 of the ordinance, which may be found at: http://www.owue.water.ca.gov/landscape/ord/ord.cfm.

A5.304.2.1 Outdoor potable water use. For new water service not subject to the provisions of *Water Code* Section 535, separate meters or submeters shall be installed for indoor and outdoor potable water use for landscaped areas of at least 500 square feet but not more than 1,000 square feet (the level at which Section 5.304.2 applies).

A5.304.4 Potable water reduction. Provide water efficient landscape irrigation design that reduces the use of potable water beyond the initial requirements for plant installation and establishment in accordance with Section A5.304.4.1 or A5.304.4.2. Calculations for the reduction shall be based on the water budget developed pursuant to Section 5.304.1.

A5.304.4.1 Tier 1. Reduce the use of potable water to a quantity that does not exceed 60 percent of ETo times the landscape area.

A5.304.4.2 Tier 2. Reduce the use of potable water to a quantity that does not exceed 55 percent of ETo times the landscape area.

Note: 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. Plant coefficient
2. Irrigation efficiency and distribution uniformity
3. Use of captured rainwater
4. Use of recycled water
5. Water treated for irrigation purposes and conveyed by a water district or public entity
6. Use of graywater

A5.304.4.3 Verification of compliance. A calculation demonstrating the applicable potable water use reduction required by this section shall be provided.

A5.304.4.4 Potable water reduction. Provide water efficient landscape irrigation design that reduces the use of potable water beyond the initial requirements for plant installation and establishment by 50 percent. Calculations for the reduction shall be based on the water budget developed pursuant to section A5.304.1.1.

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. Plant coefficient
2. Irrigation efficiency and distribution uniformity
3. Use of captured rainwater
4. Use of recycled water
5. Water treated for irrigation purposes and conveyed by a water district or public entity

A5.304.5 Potable water elimination. Provide a water efficient landscape irrigation design that eliminates the use of potable water beyond the initial requirements for plant installation and establishment. 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. Plant coefficient
2. Irrigation efficiency and distribution uniformity
3. Use of captured rainwater
4. Use of recycled water
5. Water treated for irrigation purposes and conveyed by a water district or public entity
6. Use of graywater

A5.304.6 Restoration of areas disturbed by construction. Restore all landscape areas disturbed during construction by planting with local adaptive and/or noninvasive vegetation.

A5.304.7 Previously developed sites. On previously developed or graded sites, restore or protect at least 50 percent of the site area with adaptive and/or noninvasive vegetation. Projects complying with Section A5.106.3, Item 3 may apply vegetated roof surface to this calculation if the roof plants meet the definition of adaptive and noninvasive.

Exception: Area of the building footprint is excluded from the calculation.

A5.304.8 Graywater irrigation system. Install a graywater collection system for onsite subsurface irrigation using graywater collected from bathtubs, showers, bathroom wash basins and laundry water. See Appendix G, 2010 *California Plumbing Code*.

SECTION A5.305
WATER REUSE
(Reserved)

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
APPENDIX A5 – NONRESIDENTIAL VOLUNTARY MEASURES
DIVISION A5.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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**	**X**	**X**		**X**								
Chapter/Section																			
A5.401.1	X						X												
A5.402.1 Definitions	X						X												
A5.402.1 BUILDING COMMISSIONING							X												
A5.402.1 EMBODIED ENERGY	X						X												
A5.402.1 LIFE CYCLE ASSESSMENT	X						X												
A5.402.1 OVE	X						X												
A5.402.1 POSTCONSUMER CONTENT	X						X												
A5.402.1 PRECONSUMER (or POSTINDUSTRIAL) CONTENT	X						X												
A5.402.1 RECYCLED CONTENT	X						X												
A5.402.1 RECYCLED CONTENT VALUE (RCV)	X						X												
A5.404 and subsections	X						X												
A5.405 and subsections	X																		
A5.405.4, 10% only							X												
A5.405.4.1							X												
A5.405.4.2							X												
A5.405.4.3							X												
A5.405.4.4							X												
A5.406.1	X						X												
A5.406.1.1	X						X												
A5.406.1.2	X																		
A5.406.1.3	X						X												
A5.407								X	X		X								
A5.408.3.1	X																		
A5.408.3.1.1	X						X												
A5.408.3.1.2	X						X												
A5.408.5								X	X		X								
A5.408.6 w/Exceptions								X	X		X								
A5.408.7								X	X		X								
A5.409 and subsections	X																		
A5.409.1							X												
A5.409.2 and subsection							X												
A5.409.3							X												
A5.410.3 and subsections							X												
A5.410.4 and subsections							X												
A5.410.6								X	X		X								

APPENDIX A5
NONRESIDENTIAL VOLUNTARY MEASURES

Division A5.4 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

SECTION A5.401
GENERAL

A5.401.1 Scope. The provisions of this chapter shall outline means of achieving material conservation and resource efficiency through reuse of existing building stock and materials; use of recycled, regional, rapidly renewable and certified wood materials; and employment of techniques to reduce pollution through recycling of materials.

SECTION A5.402
DEFINITIONS

A5.402.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

BUILDING COMMISSIONING. A systematic quality assurance process that spans the entire design and construction process, including verifying and documenting that building systems and components are planned, designed, installed, tested, operated and maintained to meet the owner's project requirements.

EMBODIED ENERGY. The energy used for raw material extraction, transportation, manufacturing, assembly, installation and disposal during the life of a product, including the potential energy stored within the product.

EUTROPHICATION. Excessive growth of aquatic plants, especially algae, producing bacteria which consume nearly all the oxygen required to sustain fauna and other flora.

LIFE CYCLE ASSESSMENT (LCA). A technique to evaluate the relevant energy and material consumed and environmental impacts associated with the entire life of a product, process, activity or service, including a whole building.

LIFE CYCLE INVENTORY (LCI). A process of quantifying energy and raw material requirements, atmospheric emissions, waterborne emissions, solid wastes and other releases for the entire life cycle of a product, process or activity, including a whole building.

OVE. Optimal Value Engineering, another term for advanced wood framing techniques.

POSTCONSUMER CONTENT. Waste material generated by consumers after it is used and which would otherwise be discarded.

PRECONSUMER (or POSTINDUSTRIAL) CONTENT. Material diverted from the waste stream during one manufacturing process, including scraps, damaged goods and excess production, that is used in another manufacturing process.

RECYCLED CONTENT. Refer to International Organization of Standards ISO 14021—Environmental labels and declarations—Self-declared environmental claims (Type II environmental labeling).

RECYCLED CONTENT VALUE (RCV). Material cost multiplied by postconsumer content plus $^1/_2$ the preconsumer content or RCV = $ x (postconsumer content + $^1/_2$ preconsumer content).

SECTION A5.403
FOUNDATION SYSTEMS
(Reserved)

SECTION A5.404
EFFICIENT FRAMING TECHNIQUES

A5.404.1 Wood framing. Employ advanced wood framing techniques or OVE, as recommended by the U.S. Department of Energy's Office of Building Technology, State and Community Programs and as permitted by the enforcing agency.

A5.404.1.1 Structural or fire-resistance integrity. The OVE selected shall not conflict with structural framing methods or fire-rated assemblies required by the *California Building Code.*

A5.404.1.2 Framing specifications. Advanced framing techniques include the following:

1. Building design using 2-foot modules;
2. Spacing wall studs up to 24 inches on center;
3. Spacing floor and roof framing members up to 24 inches on center;
4. Using 2-stud corner framing and drywall clips or scrap lumber for drywall backing;
5. Eliminating solid headers in non-load-bearing walls;
6. Using in-line framing, aligning floor, wall and roof framing members vertically for direct transfer of loads; and
7. Using single lumber headers and top plates where appropriate.

Note: Additional information can be obtained from the U.S. DOE Energy Efficiency and Renewable Energy (EERE) website.

SECTION A5.405
MATERIAL SOURCES

A5.405.1 Regional materials. Compared to other products in a given product category, select building materials or products for permanent installation on the project that have been har-

vested or manufactured in California or within 500 miles of the project site.

1. For those materials locally manufactured, select materials manufactured using low embodied energy or those that will result in net energy savings over their useful life.
2. Regional materials shall make up at least 10 percent, based on cost, of total materials value.
3. If regional materials make up only part of a product, their values are calculated as percentages based on weight.
4. Provide documentation of the origin, net projected energy savings and value of regional materials.

A5.405.2 Bio-based materials. Select bio-based building materials and products made from solid wood, engineered wood, bamboo, wool, cotton, cork, straw, natural fibers, products made from crops (soy-based, corn-based) and other bio-based materials with at least 50 percent bio-based content.

A5.405.2.1 Certified wood. Certified wood is an important component of green building strategies and the California Building Standards Commission will continue to develop a standard through the next code cycle.

A5.405.2.2 Rapidly renewable materials. Use materials made from plants harvested within a ten-year cycle for at least 2.5 percent of total materials value, based on estimated cost.

A5.405.3 Reused materials. Use salvaged, refurbished, refinished or reused materials for a minimum of 5 percent of the total value, based on estimated cost of materials on the project. Provide documentation as to the respective values.

Note: Sources of some reused materials can be found at CalRecycle. See also Appendix A5, Division A5.1, Section A5.105.1 for on-site materials reuse.

> **A5.405.4 Recycled content.** Use materials, equivalent in performance to virgin materials with a total (combined) recycled content value (RCV) of:

> **Tier 1 [BSC]. Recycled content [DSA-SS].** The RCV shall not be less than 10 percent of the total material cost of the project.

Required Total RCV (dollars) =
Total Material Cost (dollars) x 10 percent **(Equation A5. 4-1)**

Tier 2 [BSC]. The RCV shall not be less than 15 percent of the total material cost of the project.

Required Total RCV (dollars) =
Total Material Cost (dollars) x 15 percent **(Equation A5. 4-2)**

For the purposes of this section, materials used as components of the structural frame shall not be used to calculate recycled content. The structural frame includes the load bearing structural elements such as wall studs, plates, sills, columns, beams, girders, joists, rafters and trusses.

Notes:

1. Sample forms which allow user input and automatic calculation are located at www.hcd.ca.gov/CALGreen.html and may be used to simplify documenting compliance with this section and for calculating recycled content value of materials or assembly products.
2. Sources and recycled content of some recycled materials can be obtained from CalRecycle if not provided by the manufacturer.

A5.405.4.1 Total material cost. Total material cost is the total estimated or actual cost of materials and assembly products used in the project. The required total recycled content value for the project (in dollars) shall be determined by Equation A5.4-1 or A5.4-2.

Total material cost shall be calculated by using one of the methods specified below:

1. **Simplified method.** To obtain the total cost of the project multiply the square footage of the structure by the square foot valuation established by the enforcing agency. The total material cost is 45 percent of the total cost of the project. Use Equations A5.4-3A or A5.4-3B to determine total material costs using the simplified method.

   Total material costs =

   Project square footage x square foot valuation x 45 percent **(Equation A5.4-3A)**

   Total estimated or actual cost of project x 45 percent **(Equation A5.4-3B)**

2. **Detailed method.** To obtain the total cost of the project, add the estimated and/or actual costs of materials used for the project including the structure (steel, concrete, wood or masonry); the enclosure (roof, windows, doors and exterior walls); the interior walls, ceilings and finishes (gypsum board, ceiling tiles, etc.). The total estimated and/or actual costs shall not include fees, labor and installation costs, overhead, appliances, equipment, furniture or furnishings.

A4.405.4.2 Determination of total recycled content value (RCV). Total RCV may be determined either by dollars or percentage as noted below.

1. **Total recycled content value for the project (in dollars).** This is the sum of the recycled content value of the materials and/or assemblies considered and shall be determined by Equation A5.4-4. The result of this calculation may be directly compared to Equations A5.4-1 and A5.4-2 to determine compliance with Tier 1 or Tier 2 prerequisites.

   Total Recycled Content Value (dollars) =
   $(RCV_M + RCV_A)$ **(Equation A5.4-4)**

2. **Total recycled content value for the project (by percentage).** This is expressed as a percentage of the total material cost and shall be determined by Equations A5.4-4 and A5.4-5. The result of this calculation may be directly compared for compliance with Tier 1 (10 percent) or Tier 2 (15 percent) prerequisites.

   Total Recycled Content Value (percent) =

   [Total Recycled Content Value (dollars) ÷ Total Material Cost (dollars)] x 100 **(Equation A5. 4-5)**

A5.405.4.3 Determination of recycled content value of materials (RCV_M). The recycled content value of each material (RCV_M) is calculated by multiplying the cost of material, as defined by the recycled content. See Equations A5.4-6 and A5.4-7.

RCV_M (dollars) =
Material cost (dollars) x RC_M (percent) **(Equation A5. 4-6)**

RC_M (percent) = Postconsumer content percentage + ($^1/_2$) Preconsumer content percentage **(Equation A5. 4-7)**

Notes:

1. If the postconsumer and preconsumer recycled content is provided in pounds, Equation A5.4-7 may be used, but the final result (in pounds) must be multiplied by 100 to show RC_M as a percentage.
2. If the manufacturer does not separately identify the pre-consumer and post-consumer recycled content of a material but reports it as a total single percentage, one half of the total shall be considered preconsumer and one half shall be considered postconsumer recycled material.

A5.405.4.4 Determination of recycled content value of assemblies – (RCV_A). Recycled content value of assemblies is calculated by multiplying the total cost of assembly by the total recycled content of the assembly (RC_A), and shall be determined by Equation A5.4-8.

RCV_A (dollars) = Assembly cost (dollars) x
Total RC_A (percent) **(Equation A5.4.8)**

If not provided by the manufacturer, Total RC_A (percent) is the sum (Σ) of the Proportional Recycled Content (PRC_M) of each material in the assembly. RC_A shall be determined by Equation A4.4-9.

$RC_A = \Sigma PRC_M$ **(Equation A5.4-9)**

PRC_M of each material may be calculated by one of two methods using the following formulas:

Method 1: Recycled content (Postconsumer and Preconsumer) of each material provided in percentages

PRC_M (percent) = Weight of material (percent) x RC_M (percent) **(Equation A5.4-10)**

Weight of material (percent) =
[Weight of material (lbs) ÷ Weight of assembly (lbs)] x 100 **(Equation A5.4-11)**

RC_M (percent) = Postconsumer content percentage + ($^1/_2$) Preconsumer content percentage **(See Equation A5.4-7)**

Method 2: Recycled content (Postconsumer and Preconsumer) provided in pounds

PRC_M (percent) = [RC_M (lbs) Weight of material (lbs)] x 100 **(Equation A5.4-12)**

RC_M (lbs) = Postconsumer content (lbs) + ($^1/_2$) Preconsumer content (lbs) **(Equation A5.4-13)**

Note: If the manufacturer does not separately identify the preconsumer and postconsumer recycled content of a material but reports it as a total single percentage, one half of the total shall be considered preconsumer and one half shall be considered postconsumer recycled material.

A5.405.4.5 Alternate method for concrete. When Supplementary Cementitious Materials (SCMs), such as fly ash or ground blast furnace slag cement, are used in concrete, an alternate method of calculating and reporting recycled content in concrete products shall be permitted. When determining the recycled content value, the percent recycled content shall be multiplied by the cost of the cementitious materials only, not the total cost of the concrete.

A5.405.5 Cement and concrete. Use cement and concrete made with recycled products and complying with the following sections.

A5.405.5.1 Cement. Cement shall comply with one of the following standards:

1. Portland cement shall meet ASTM C 150, *Standard Specification for Portland Cement*
2. Blended cement shall meet ASTM C 595, Standard Specification for Blended Hydraulic Cement or ASTM C 1157, *Standard Performance Specification for Hydraulic Cement.*
3. Other Hydraulic Cements shall meet ASTM C 1157, *Standard Performance Specification for Hydraulic Cement.*

A5.405.5.2 Concrete. Unless otherwise directed by the Engineer of Record, use concrete manufactured with cementitious materials in accordance with Sections A5.405.5.2.1 and A5.405.5.2.1.1, as approved by the enforcing agency.

A5.405.5.2.1 Supplementary cementitious materials (SCM). Use concrete made with one or more supplementary cementitious materials (SCM) conforming to the following standards:

1. Fly ash conforming to ASTM C 618, *Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete*
2. Slag cement (GGBFS) conforming to ASTM C 989, *Specification for Use in Concrete and Mortars*
3. Silica fume conforming to ASTM C 1240, *Specification for Silica Fume Used in Cementitious Mixtures.*
4. Natural pozzolan conforming to ASTM C 618, *Specification for Coal Fly Ash* and Raw or Calcined Natural Pozzolan for Use in Concrete.
5. Blended supplementary cementitious materials conforming to ASTM C 1697, Standard Specification for Blended Supplementary Cementitious Materials. The amount of each SCM in the blend will be used separately in calculating Equation A5.4-1. If Class C fly ash is used in the blend, it

will be considered to be "SL" for the purposes of satisfying the equation.

6. Ultra-fine fly ash (UFFA) conforming to ASTM C 618, *Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete* and the following chemical and physical requirements:

Chemical Requirements	Percent
Sulfur Trioxide (SO_3)	1.5 max.
Loss on ignition	1.2 max.
Available Alkalies (as Na_2O) equivalent	1.5 max.
Physical Requirements	**Percent**
Particle size distribution Less than 3.5 microns Less than 9.0 microns	 50 90
Strength Activity Index with portland cement 7 days 28 days	 95 (minimum % of control) 110 (minimum % of control)
Expansion at 16 days when testing job materials in conformance with ASTM C 1567*	0.10 max.

* In the test mix, cement shall be replaced with at least 12% UFFA by weight.

7. Metakaolin conforming to ASTM C 618, *Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete, the following chemical and physical requirements:*

Chemical Requirements	Percent
Silicon Dioxide (SiO_2) + Aluminum Oxide (Al_2O_3)	92.0 min.
Calcium Oxide (CaO)	1.0 max.
Sulfur Trioxide (SO_3)	1.0 max.
Loss on ignition	1.2 max.
Available Alkalies (as Na_2O) equivalent	1.0 max.
Physical Requirements	**Percent**
Particle size distribution Less than 45 microns	 95
Strength Activity Index with portland cement 7 days 28 days	 100 (minimum % of control) 100 (minimum % of control)

8. Other materials with comparable or superior environmental benefits, as approved by the Engineer of Record and enforcing authority.

A5.405.5.2.1.1 Mix design equation. Use any combination of one or more SCM, satisfying Equation A5.4-14. When ASTM C 595 or ASTM C 1157 cement is used, the amount of SCM in these cements shall be used in calculating Equation A5.4-14.

Exception: Minimums in mix designs approved by the Engineer of Record may be lower where high early strength is needed for concrete products or to meet an accelerated project schedule.

$$F/25 + SL/50 + UF/12 \geq 1 \qquad \textbf{(Equation A5.4-14)}$$

where:

F = Fly ash, natural pozzolan or other approved SCM as a percent of total cementitious material for concrete on the project

SL = GGBFS, as a percent of total cementitious material for concrete on the project

UF = Silica fume, metakaolin or UFFA, as a percent of total cementitious material for concrete on the project

A5.405.5.3 Additional means of compliance. Any of the following measures shall be permitted to be employed for the production of cement or concrete, depending on their availability and suitability, in conjunction with Section A5.405.5.2.

A5.405.5.3.1 Cement. The following measures shall be permitted to be used in the manufacture of cement.

A5.405.5.3.1.1 Alternative fuels. The use of alternative fuels where permitted by state or local air quality standards.

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 C 33, *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 C 1602, 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 A5.407 [OSHPD 1, 2 & 4]
WATER RESISTANCE AND MOISTURE MANAGEMENT

A5.407.3 Weather protection. Provide a weather-resistant exterior wall and foundation envelope as required by *California Building Code* Section 1403.2 and *California Energy Code* Section 150, manufacturer's installation instructions or local ordinance, whichever is more stringent.

A5.407.4 Moisture control. Employ moisture control measures by the following methods.

A5.407.4.1 Sprinklers. Design and maintain landscape irrigation systems to prevent spray on structures.

A5.407.4.2 Entries and openings. Design exterior entries and/or openings subject to foot traffic or wind-driven rain to prevent water intrusion into buildings.

Notes:

1. Use features such as overhangs and recesses and flashings integrated with a drainage plane.
2. Use nonabsorbent floor and wall finishes within at least two feet around and perpendicular to such openings.

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 waste generated at the site.

A5.408.3.1.1 Enhanced construction waste reduction – Tier 2 [BSC]. Enhanced construction waste reduction (80 percent) [DSA-SS]. Divert to recycle or salvage at least 80 percent of nonhazardous construction 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, where demolition of an existing structure(s) is necessary for the construction of a new structure.

A5.408.5 Construction waste diversion [OSHPD 1, 2 &4]. Establish a construction waste management plan for the diverted materials or meet local construction and demolition waste management ordinance, whichever is more stringent.

A5.408.6 Construction waste reduction of at least 50 percent [OSHPD 1, 2 & 4]. Recycle and/or salvage for reuse a minimum of 50 percent of the nonhazardous construction and demolition debris or meet a local construction and demolition waste management ordinance, whichever is more stringent. Calculate the amount of materials diverted by weight or volume, but not by both.

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.

A5.408.7 Excavated soil and land clearing debris [OSHPD 1, 2 & 4]. 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phased project, such material may be stockpiled on site until the storage site is developed.

SECTION A5.409
LIFE CYCLE ASSESSMENT

A4.409.1 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 2010 *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).
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 website and the NIST BEES website.

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.

SECTION A5.410
BUILDING MAINTENANCE AND OPERATION

A5.410.3 Commissioning [DSA-SS]. For new buildings 10,000 square feet and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements. Commissioning shall be performed in accordance with this section by trained personnel with experience on projects of comparable size and complexity. Commissioning requirements shall include:

1. Owner's or owner repesentative's project requirements
2. Basis of design
3. Commissioning measures shown in the construction documents
4. Commissioning plan
5. Functional performance testing
6. Documentation and training
7. Commissioning report

Exceptions:

1. Dry storage warehouses of any size
2. Areas under 10,000 square feet used for offices or other conditioned accessory spaces within dry storage warehouses
3. Tenant improvements under 10,000 square feet as described in Section 303.1.1.

All building operating systems covered by Title 24, Part 6, as well as process equipment and controls and renewable energy systems shall be included in the scope of the commissioning requirements.

A5.410.3.1 Owner's or owner representative's Project Requirements (OPR). The expectations and requirements of the building appropriate to its phase shall be documented before the design phase of the project begins. This documentation shall include the following:

1. Environmental and sustainability goals
2. Energy efficiency goals
3. Indoor environmental quality requirements
4. Project program, including facility functions and hours of operation, and need for after hours operation
5. Equipment and systems expectations
6. Building occupant and operation and maintenance O&M personnel expectations

A5.410.3.2 Basis of Design (BOD). A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project. The Basis of Design document shall cover the following systems:

1. Heating, ventilation, air conditioning (hvac) systems and controls
2. Indoor lighting system and controls
3. Water heating system
4. Renewable energy systems

5. Landscape irrigation systems

A5.410.3.3 Commissioning plan. Prior to permit issuance a commissioning plan shall be completed to document how the project will be commissioned. The commissioning plan shall include the following:

1. General project information
2. Commissioning goals
3. Systems to be commissioned. Plans to test systems and components shall include:
    a. An explanation of the original design intent
    b. Equipment and systems to be tested, including the extent of tests
    c. Functions to be tested
    d. Conditions under which the test shall be performed
    e. Measurable criteria for acceptable performance
4. Commissioning team information
5. Commissioning process activities, schedules and responsibilities. Plans for the completion of commissioning shall be included.

A5.410.3.4 Functional performance testing. Functional performance tests shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized and include any readings and adjustments made.

A5.410.3.5 Documentation and training. A systems manual and systems operations training are required, including Occupational Safety and Health Act (OSHA) requirements in California Code of Regulations (CCR), Title 8, Section 5142, and other related regulations.

A5.410.3.5.1 Systems manual. Documentation of the operational aspects of the building shall be completed within the systems manual and delivered to the building owner or representative. The systems manual shall include the following:

1. Site information, including facility description, history and current requirements
2. Site contact information
3. Basic operations and maintenance, including general site operating procedures, basic troubleshooting, recommended maintenance requirements, site events log
4. Major systems
5. Site equipment inventory and maintenance notes
6. A copy of all special inspection verifications required by the enforcing agency or this code
7. Other resources and documentation, if applicable

A5.410.3.5.2 Systems operations training. A program for training of the appropriate maintenance staff for each equipment type and/or system shall be developed and documented in the commissioning report and shall include the following:

1. System/equipment overview (what it is, what it does and what other systems and/or equipment it interfaces)
2. Review and demonstration of servicing/preventive maintenance
3. Review of the information in the systems manual
4. Review of the record drawings on the system/equipment

A5.410.3.6 Commissioning report. A report of commissioning process activities undertaken through the design and construction phases of the building project shall be completed and provided to the owner or representative.

A5.410.4 Testing and adjusting [DSA-SS]. Testing and adjusting of systems shall be required for buildings less than 10,000 square feet.

A5.410.4.1 Reserved.

A5.410.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting and balancing shall include the following, as applicable to the project:

1. HVAC systems and controls
2. Indoor and outdoor lighting and controls
3. Water heating systems
4. Renewable energy systems
5. Landscape irrigation systems

A5.410.4.3 Procedures. Perform testing and adjusting procedures in accordance with manufacturer's specifications and applicable national standards on each system.

A5.410.4.3.1 HVAC balancing. In addition to testing and adjusting, before a new space-conditioning system serving a building or space is operated for normal use, balance the system in accordance with the procedures defined by the Testing Adjusting and Balancing Bureau National Standards, the National Environmental Balancing Bureau Procedural Standards or Associated Air Balance Council National Standards or as approved by the enforcing agency.

A5.410.4.4 Reporting. After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.

A5.410.4.5 Operation and maintenance (O & M) manual. Provide the building owner or representative with detailed operating and maintenance instructions and copies of guaranties/warranties for each system. O & M instructions shall be consistent with OSHA requirements in CCR, Title 8, Section 5142 and other related regulations.

A5.410.4.5.1 Inspections and reports. Include a copy of all inspection verifications and reports required by the enforcing agency.

A5.410.6 Recycling by occupants [OSHPD 1, 2 & 4]. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics and metals.

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

Adopting agency			HCD			DSA		OSHPD											
	BSC	SFM	1	2	1-AC	AC	SS	1	2	3	4	CSA	DPH	AGR	DWR	CEC	CA	SL	SLC
Adopt entire CA chapter																			
Adopt entire chapter as amended (amended sections listed below)																			
Adopt only those sections that are listed below	**X**						**X**	**X**	**X**		**X**								
Chapter/Section																			
A5.501.1	X						X												
A5.502.1 Definitions	X						X												
A5.504.1	X						X												
A5.504.1.1, Items 1 & 2	X																		
A5.504.1.1, Items 1 – 4							X												
A5.504.1.2	X						X												
A5.504.2	X						X												
A5.504.2.1 and subsections	X																		
A5.504.4.5.1	X						X	X	X		X								
A5.504.4.5.2	X																		
A5.504.4.7	X						X												
A5.504.4.7.1	X																		
A5.504.4.7.2	X																		
A5.504.4.8	X						X												
A5.504.4.8.1	X						X												
A5.504.4.8.2	X																		
A5.504.4.9	X						X	X	X		X								
A5.504.4.9.1	X																		
A5.504.5	X						X	X	X		X								
A5.504.5.1	X						X	X	X		X								
A5.504.5.2	X						X												
A5.504.5.3.1	X						X												
A5.504.8 and subsections and tables								X	X		X								
Table A5.504.8.5	X						X	X	X		X								
A5.504.9								X	X		X								
A5.505								X	X		X								
A5.507.1 and subsections	X						X												
A5.507.2	X						X												
A5.507.3 and subsections	X						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 words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

INTERIOR, BUILDING. The inside of the weatherproofing system.

MERV. [BSC, DSA-SS] Filter minimum efficiency reporting value, based on ASHRAE 52.2-1999.

MULTI-OCCUPANT SPACES. Indoor spaces used for presentations and training, including classrooms and conference rooms.

NO ADDED FORMALDEHYDE (NAF) BASED RESINS. Resins formulated with no added formaldehyde as part of the resin cross linking structure for making hardwood plywood, particle board or medium density fiberboard. "No added formaldehyde-based resins" include, but are not limited to, resins made from soy, polyvinyl acetate or methylene diisocyanate. See CCR, Title 17, Section 93120.1(a).

SINGLE OCCUPANT SPACES. Private offices, workstations in open offices, reception workstations and ticket booths.

ULTRA-LOW EMITTING FORMALDEHYDE (ULEF) RESINS. Resins formulated such that average formaldehyde emissions are consistently below the Phase 2 emission standards in Section 93120.2, as provided in Section 93120.3(d) of Title 17, *California Code of Regulations*. See CCR, Title 17, Section 93120.1(a).

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 121 (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 National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, 1995, Chapter 3.
3. The permanent HVAC system shall only be used during construction if necessary to condition the building within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with a Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30 percent based on ASHRAE 52.1- 1992. Replace all filters immediately prior to occupancy.
4. During dust-producing operations, protect supply and return HVAC system openings from dust.

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 ft^3/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 3-6 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 website.

A5.504.4.5.1 Early compliance with formaldehyde limits, Tier 1 [BSC]. Early compliance with formaldehyde limits [DSA-SS]. Meet the requirements contained in Table A5.504.8.5 before the compliance dates. <

A5.504.4.5.2 No added formaldehyde, Tier 2. 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. For Tier 2 requirements, 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.

[DSA-SS] Where complying composite wood product is readily available for nonresidential occupancies, meet requirements before the compliance dates indicated in Table A5.504.8.5 or use composite wood products made with either CARB-approved no-added formaldehyde (NAF) resins or CARB-approved ultra-low emitting formaldehyde (ULEF) resins.

A5.504.4.7 Resilient flooring systems, Tier 1 [BSC]. Resilient flooring systems [DSA-SS]. For 80 percent of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 Collaborative for High Performance Schools (CHPS) criteria and listed on its High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the Resilient Floor Covering Institute (RFCI) FloorScore program; or meet 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.)

A5.504.4.7.1 Resilient flooring systems, Tier 2. For 90 percent of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 Collaborative for High Performance Schools (CHPS) criteria and listed on its High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the Resilient Floor Covering Institute (RFCI) FloorScore program; or

meet 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.)

A5.504.4.7.2 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 [BSC]. Thermal insulation [DSA-SS]. 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 [BSC]. Thermal insulation, No-Added Formaldehyde. [DSA-SS] 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.

Note: [OSHPD 1, 2 &4] Documentation shall be provided that verifies that finish materials are certified to meet the pollutant emission limits.

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. 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.

A5.504.8 Finish material pollutant control [OSHPD 1, 2 & 4]. Finish materials shall comply with Sections A5.504.4.1 through A5.504.4.5.

A5.504.8.1 Adhesives, sealants and caulks. Adhesives, sealants and caulks used on the project shall meet the requirements of the following standards:

1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable or SCAQMD Rule 1168 VOC limits, as shown in Tables A5.504.8.1 and A5.504.8.2. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene), except for aerosol products as specified in Subsection 2, below.
2. Aerosol adhesives and smaller unit sizes of adhesives and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of *California Code of Regulations,* Title 17, commencing with Section 94507.

Note: Title 17 may be found at http://ccr.oal.ca.gov/.

TABLE A5.504.8.1
ADHESIVE VOC LIMIT[1,2]
Less Water and Less Exempt Compounds in Grams per Liter

ARCHITECTURAL APPLICATIONS	CURRENT VOC LIMIT
Indoor carpet adhesives	50
Carpet pad adhesives	50
Outdoor carpet adhesives	150
Wood flooring adhesive	100
Rubber floor adhesives	60
Subfloor adhesives	50
Ceramic tile adhesives	65
VCT and asphalt tile adhesives	50
Drywall and panel adhesives	50
Cove base adhesives	50
Multipurpose construction adhesives	70
Structural glazing adhesives	100
Single-ply roof membrane adhesives	250
Other adhesive not specifically listed	50
SPECIALTY APPLICATIONS	
PVC welding	510
CPVC welding	490
ABS welding	325
Plastic cement welding	250
Adhesive primer for plastic	550
Contact adhesive	80
Special purpose contact adhesive	250
Structural wood member adhesive	140
Top and trim adhesive	250
SUBSTRATE SPECIFIC APPLICATIONS	
Metal to metal	30
Plastic foams	50
Porous material (except wood)	50
Wood	30
Fiberglass	80

1. If an adhesive is used to bond dissimilar substrates together the adhesive with the highest VOC content shall be allowed.
2. For additional information regarding methods to measure the VOC content specified in this table, see South Coast Air Quality Management District Rule 1168, http://www.arb.ca.gov/DRDB/SC/CURHTML/R1168.PDF.

TABLE A5.504.8.2
SEALANT VOC LIMIT
Less Water and Less Exempt Compounds in Grams per Liter

SEALANTS	CURRENT VOC LIMIT
Architectural	250
Marine deck	760
Nonmembrane roof	300
Roadway	250
Single-ply roof membrane	450
Other	420
SEALANT PRIMERS	
Architectural Nonporous Porous	 250 775
Modified bituminous	500
Marine deck	760
Other	750

Note: For additional information regarding methods to measure the VOC content specified in these tables, see South Coast Air Quality Management District Rule 1168: http://www.arb.ca.gov/DRDB/SC/CURHTML/R1168.PDF.

A5.504.8.3 Paints and coatings. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Coatings Suggested Control Measure, as shown in Table A5.504.8.3, unless local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in Table A5.504.8.3, shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-High Gloss coating, based on its gloss, as defined in Subsections 4.21, 4.36 and 4.37 of the 2007 California Air Resources Board, Suggested Control Measure and the corresponding Flat, Nonflat or Nonflat-High Gloss VOC limit in Table A5.504.8.3 shall apply.

A5.504.8.3.1 Aerosol paints and coatings. Aerosol paints and coatings shall meet the Product-Weighted MIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522(c)(2) and (d)(2) of *California Code of Regulations*, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8 Rule 49.

A5.504.8.3.2 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following:

1. Manufacturers product specification
2. Field verification of on-site product containers

A5.504.8.4 Carpet systems. All carpet installed in the building interior shall meet the testing and product requirements of one of the following:

1. Carpet and Rug Institute's Green Label Plus Program
2. California Department of Public Health Standard Practice for the testing of VOCs (Specification 01350)
3. NSF/ANSI 140 at the Gold level
4. Scientific Certifications Systems Sustainable Choice

TABLE A5.504.8.3
VOC CONTENT LIMITS FOR ARCHITECTURAL COATINGS[2, 3]
Grams of VOC Per Liter of Coating, Less Water and Less Exempt Compounds

COATING CATEGORY	EFFECTIVE 1/1/2010	EFFECTIVE 1/1/2012
Flat coatings	50	
Nonflat coatings	100	
Nonflat-high gloss coatings	150	
Specialty coatings		
Aluminum roof coatings	400	
Basement specialty coatings	400	
Bituminous roof coatings	50	
Bituminous roof primers	350	
Bond breakers	350	
Concrete curing compounds	350	
Concrete/masonry sealers	100	
Driveway sealers	50	
Dry fog coatings	150	
Faux finishing coatings	350	
Fire resistive coatings	350	
Floor coatings	100	
Form-release compounds	250	
Graphic arts coatings (sign paints)	500	
High-Temperature coatings	420	
Industrial maintenance coatings	250	
Low solids coatings[1]	120	
Magnesite cement coatings	450	
Mastic texture coatings	100	
Metallic pigmented coatings	500	
Multicolor coatings	250	
Pretreatment wash primers	420	
Primers, sealers and undercoaters	100	
Reactive penetrating sealers	350	
Recycled coatings	250	
Roof coatings	50	
Rust preventative coatings	400	250
Shellacs: Clear Opaque	 730 550	
Specialty primers, sealers and undercoaters	350	100
Stains	250	
Stone consolidants	450	
Swimming pool coatings	340	
Traffic marking coatings	100	
Tub and tile refinish coatings	420	
Waterproofing membranes	250	
Wood coatings	275	
Wood preservatives	350	
Zinc-Rich primers	340	

1. Grams of VOC Per liter of coating, including water and including exempt compounds.
2. The specified limits remain in effect unless revised limits are listed in subsequent columns in the table.
3. Values in this table are derived from those specified by the California Air Resources Board, Architectural Coatings Suggested Control Measure, February 1, 2008. More information is available at Air Resources Board.

A5.504.8.4.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute Green Label program.

A5.504.8.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table A5.504.8.1.

A5.504.8.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure for Composite Wood (17 CCR 93120 et seq.), by or before the dates specified in those sections, as shown in Table A5.504.8.5

A5.504.8.5.2 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following:

1. Product certifications and specifications
2. Chain of custody certifications
3. Other methods acceptable to the enforcing agency

TABLE A5.504.8.5
FORMALDEHYDE LIMITS[1]
Maximum formaldehyde emissions in parts per million.

Product	Current Limit	Jan 1, 2012	July 1, 2012
Hardwood plywood veneer core	0.05		
Hardwood plywood composite core	0.08		0.05
Particle board	0.09		
Medium density fiberboard	0.11		
Thin medium density fiberboard[2]	0.21	0.13	

1. Values in this table are derived from those specified by the California Air Resources Board, Air Toxics Control Measure for Composite Wood as tested in accordance with ASTM E 1333-96 (2002). For additional information, see *California Code of Regulations*, Title 17, Sections 93120 through 93120.12.
2. Thin medium density fiberboard has a maximum thickness of eight millimeters.

A5.504.9 Environmental tobacco smoke (ETS) control [OSHPD 1, 2 & 4]. 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, if not 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 A5.505 [OSHPD 1, 2 & 4] INDOOR MOISTURE CONTROL

A5.505.2 Indoor moisture control. Buildings shall meet or exceed the provisions of *California Building Code*, CCR, Title 24, Part 2, Sections 1203 and Chapter 14.

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 121 (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 toplighting 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 2'6" and 7'6" 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.

A5.507.3.2 Multi-occupant spaces. Include in the calculation the square footage with direct line of sight to perimeter vision glazing.

Exceptions to Sections A5.507.2 and A5.507.3. Copy/printing rooms, storage areas, mechanical spaces, restrooms, auditoria and other intermittently or infrequently occupied spaces or spaces where daylight would interfere with use of the space.

A5.507.5 Acoustical control. Public Schools and Community Colleges: Unoccupied, furnished classrooms must have a maximum background noise level of no more than 45 dBA LAeq and a maximum (unoccupied, furnished) reverberation of 0.6-second time for classrooms with less than 10,000 cubic feet and a maximum (unoccupied, furnished) reverberation of 0.7-second time for classroom volumes with between 10,000 cubic feet and 20,000 cubic feet.

SECTION A5.508
OUTDOOR AIR QUALITY

A5.508.1.3 Hydrochlorofluorocarbons (HCFCs). Install HVAC and refrigeration equipment that do not contain HCFCs.

A5.508.1.4 Hydrofluorocarbons (HFCs). Install HVAC complying with either of the following:

1. Install HVAC, refrigeration and fire suppression equipment that do not contain HFCs or that do not contain HFCs with a global warming potential greater than 150.
2. Install HVAC and refrigeration equipment that limit the use of HFC refrigerant through the use of a secondary heat transfer fluid with a global warming potential no greater than 1.

CALIFORNIA GREEN BUILDING STANDARDS CODE – MATRIX ADOPTION TABLE
APPENDIX A5 – NONRESIDENTIAL VOLUNTARY MEASURES
DIVISION A5.6 – VOLUNTARY TIERS

Adopting agency	BSC	SFM	HCD			DSA		OSHPD				CSA	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. 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 1 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 energy efficiency standards in this code the California Energy Commission will continue to adopt mandatory building standards.

Using an alternative calculation method approved by the California Energy Commission, calculate each nonresidential building's annual TDV regulated energy use components, and compare them to the standard or "budget" building.

Note: The "percent better than" calculation omits Process and Receptacle energy use components in comparing the Standard and Proposed energy use.

A5.601.2.3 Tier 1. Exceed *California Energy Code* requirements, based on the 2010 *California Energy Code*, by 15 percent. Field verify and document the measures and calculations used to reach the desired level of efficiency following the requirements specified in the Title 24 *Nonresidential Alternative Calculation Method Manual.*

A5.601.2.4 Voluntary measures for *CALGreen* 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 30 percent reduction for indoor potable water use in Section A5.303.2.3.1.
   b. Comply with Section A5.304.4.1 for outdoor potable water use not to exceed 60 percent of ETo.
   c. 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 in Section A5.405.4.
   b. Comply with the 65 percent reduction in construction 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 80 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.

A5.601.3 *CALGreen* Tier 2.

A5.601.3.1 Prerequisites. To achieve *CALGreen* Tier 2 status, a project must meet all of the mandatory measures in Chapter 5 and, in addition, meet the provisions of this section.

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

Using an Alternative Calculation Method approved by the California Energy Commission, calculate each nonresidential building's annual TDV regulated energy use components, and compare them to the standard or "budget" building.

Note: The "percent better than" calculation omits Process and Receptacle energy use components in comparing the Standard and Proposed energy use.

A5.601.3.3 Tier 2. Exceed *California Energy Code* requirements, based on the 2010 *California Energy Code*, by 30 percent. Field verify and document the measures and calculations used to reach the desired level of efficiency following the requirements specified in the Title 24 *Nonresidential Alternative Calculation Method Manual.*

A5.601.3.4 Voluntary measures for CALGreen 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 35 percent reduction for indoor potable water use in Section A5.303.2.3.1.
    b. Comply with Section A5.304.4.1 for outdoor potable water use not to exceed 55 percent of ETo.
    c. 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 in Section A5.405.4.1.
    b. Comply with the 80 percent reduction in construction 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 90 percent of resilient flooring in Section A5.504.4.7.1.
    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.

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.

[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 by 15 or 30 percent 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.

TABLE A5.601: NONRESIDENTIAL BUILDINGS:
Green Building Standards Code Proposed Performance Approach

Note: This table is intended only as an aid in illustrating the nonresidential tier structure

CATEGORY	ENVIRONMENTAL PERFORMANCE GOAL	TIER 1	TIER 2
All	Minimum Mandatory	Meet all of the provisions of Chapter 5	Meet all of the provisions of Chapter 5
Planning and Design	Designated Parking for Fuel Efficient Vehicles	10 percent of total spaces	12 percent of total spaces
	Cool Roof to Reduce Heat Island Effect	Roof Slope < 2:12 SRI 64 Roof Slope > 2:12: < 5 lb/sf SRI 16 = 5 lb/sf SRI 10	Roof Slope < 2:12 SRI 78 Roof Slope > 2:12: < 5 lb/sf SRI 23 = 5 lb/sf SRI 30
		1 additional Elective from Division A5.1	3 additional Electives from Division A5.1
Energy Efficiency	Energy Performance	Exceed 2010 *CA Energy Code* by 15 percent	Exceed 2010 *CA Energy Code* by 30 percent
Water Efficiency and Conservation	Indoor Water Use	30 percent Savings	35 percent Savings
	Outdoor Water Use	Not exceed 60 percent of ETo times the landscape area	Not exceed 55 percent of ETo times the landscape area
		1 additional Elective from Division A5.3	3 additional Electives from Division A5.3
Material Conservation and Resource Efficiency[2]	Construction Waste Reduction	At least 65 percent reduction	At least 80 percent reduction
	Recycled Content	Utilize recycled content materials for 10 percent of total material cost	Utilize recycled content materials for 15 percent of total material cost
		1 additional Elective from Division A5.4	3 additional Electives from Division A5.4
Environmental Quality	Low-VOC Resilient Flooring	80 percent of flooring meets VOC limits	90 percent of flooring meets VOC limits
	Low-VOC Thermal Insulation	Comply with VOC limits	Install no-added formaldehyde insulation and comply VOC limits
		1 additional Elective from Division A5.5	3 additional Electives from Division A5.5
Additional Measures	Added measures shall be achieved across at least 3 categories	1 Additional Elective	3 Additional Electives
Approximate Total Measures		14	24

SECTION A5.602
NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLISTS

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
Requirements			
Project meets all of the requirements of Divisions 5.1 through 5.5.	☒	☐	☐
Planning and Design			
Site Selection			
A5.103.1 Community connectivity. Locate project on a previously developed site within a $^1/_2$ mile radius of at least ten basic services, listed in Section A5.103.1.		☐	☐
A5.103.2 Brownfield or greyfield site redevelopment or infill area development. Select for development a brownfield in accordance with Section A5.103.2.1 or on a greyfield or infill site as defined in Section A5.102. **A5.103.3.1 Brownfield redevelopment.** Develop a site documented as contaminated and fully remediated or on a site defined as a brownfield.		☐	☐
Site Preservation			
A5.104.1.1 Local zoning requirement in place. Exceed the zoning's open space requirement for vegetated open space on the site by 25 percent.		☐	☐
A5.104.1.2 No local zoning requirement in place. Provide vegetated open space area adjacent to the building equal to the building footprint area.		☐	☐
A5.104.1.3 No open space required in zoning ordinance. Provide vegetated open space equal to 20 percent of the total project site area.		☐	☐
Deconstruction and Reuse of Existing Structures			
A5.105.1.1 Existing building structure. Maintain at least 75 percent of existing building structure (including structural floor and roof decking) and envelope (exterior skin and framing) based on surface area.		☐	☐
Exceptions: 1. Window assemblies and nonstructural roofing material. 2. Hazardous materials that are remediated as a part of the project. 3. A project with an addition of more than two times the square footage of the existing building.		☐	
A5.105.1.2 Existing nonstructural elements. Reuse existing interior nonstructural elements (interior walls, doors, floor coverings and ceiling systems) in at least 50 percent of the area of the completed building (including additions).			☐
Exception: A project with an addition of more than two times the square footage of the existing building.		☐	
A5.105.1.3 Salvage. Salvage additional items in good condition such as light fixtures, plumbing fixtures and doors for reuse on this project in an onsite storage area or for salvage in dedicated collection bins. Document the weight or number of the items salvaged.			☐
Site Development			
5.106.1 Storm water pollution prevention. Newly constructed projects which disturb less than one acre of land shall prevent the pollution of stormwater runoff from the construction activities through local ordinance in Section 5.106.1.1	☒		
or	or		
Best management practices (BMP) in Section 5.106.1.2	☒		
A5.106.2 Storm water design. Design storm water runoff rate and quantity in conformance with Section A5.106.3.1 and storm water runoff quality by Section A5.106.3.2 or by local requirements, whichever are stricter.			
A5.106.2.1 Storm water runoff rate and quantity. Implement a storm water management plan resulting in no net increase in rate and quantity of storm water runoff from existing to developed conditions.		☐	☐
Exception: If the site is already greater than 50 percent impervious, implement a storm water management plan resulting in a 25 percent decrease in rate and quantity.		☐	☐
A5.106.2.2 Storm water runoff quality. Use post construction treatment control best management practices (BMPs) to mitigate (infiltrate, filter or treat) storm water runoff from the 85th percentile 24-hour runoff event (for volume-based BMPs) or the runoff produced by a rain event equal to two times the 85th percentile hourly intensity (for flow-based BMPs).			
A5.106.3 Low impact development (LID). Reduce peak runoff in compliance with Section 5.106.3.1. Employ at least two of the following methods or other best management practices to allow rainwater to soak into the ground, evaporate into the air or collect in storage receptacles for irrigation or other beneficial uses. LID strategies include, but are not limited to those listed in Section A5.106.4.		☐	☐

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
5.106.4 Bicycle parking. Comply with Sections 5.106.4.1 and 5.106.4.2; or meet local ordinance, whichever is stricter.	☒		
5.106.4.1 Short-Term bicycle parking. If the project is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5 percent of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack.	☒		
5.106.4.2 Long-Term bicycle parking. For buildings with over 10 tenant-occupants, provide secure bicycle parking for 5 percent of tenant-occupied motorized vehicle parking capacity, with a minimum of one space.	☒		
A5.106.4.3 Changing rooms. For buildings with over 10 tenant-occupants, provide changing/shower facilities in accordance with Table A5.106.4.3 or document arrangements with nearby changing/shower facilities.		☐	☐
A5.106.5.1 Designated parking for fuel-efficient vehicles. Provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in:			
A5.106.5.1.1. Tier 1 10% of total spaces per Table A5.106.5.1.1		☒	
A5.106.5.1.2. Tier 1 10% of total spaces per Table A5.106.5.1.2			☒
5.106.5.2 Designated parking. Provide designated parking for any combination of low-emitting, fuel-efficient and carpool/van pool vehicles as shown in Table 5.106.6.2.	☒		
A5.106.5.3.1 Electric vehicle supply wiring. For each space required in Table A406.1.6.2.1, provide panel capacity and dedicated outlet for one 208/240 V 40 amp circuit terminating within 5 feet of the midline of each parking space.		☐	☐
A5.106.6 Parking capacity. Design parking capacity to meet but not exceed minimum local zoning requirements.			
A5.106.6.1 Reduce parking capacity. With the approval of the enforcement authority, employ strategies to reduce on-site parking area by			
1. Use of on street parking or compact spaces, illustrated on the site plan or		☐	☐
2. Implementation and documentation of programs that encourage occupants to carpool, ride share or use alternate transportation.		☐	☐
A5.106.7 Exterior walls. Meet requirements in the current edition of the *California Energy Code* 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.		☐	☐
5.106.8 Light pollution reduction. Outdoor lighting systems shall be designed and installed to comply with the following:	Mandatory as of 7/1/2012		
1. The minimum requirements in the *California Energy Code* for Lighting Zones 1–4 as defined in Chapter 10 of the *California Administrative Code*; 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	or		
Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent.	☒		
Exceptions:			
1. Luminaires that qualify as exceptions in Section 147 of the *California Energy Code*			
2. Emergency lighting			
A5.106.9 Building orientation. Locate and orient the building as follows:			
1. When site and location permit, orient the long axis of the building east and west, with a maximum allowable deviation of 30°.		☐	☐
2. Protect the building from thermal loss, drafts and degradation of the building envelope caused by wind and wind-driven materials.		☐	☐
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.	☒		
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 3 for 50 percent of site hardscape or put 50 percent of parking underground.		☐	☐
1. Provide shade (mature within 5 years of occupancy).		☐	☐
2. Use light colored materials with an initial solar reflectance value of at least .30 as determined in accordance with ASTM Standards E 1918 or C 1549.		☐	☐
3. Use open-grid pavement system or pervious or permeable pavement system.		☐	☐
A5.106.11.2 Cool roof. Use roofing materials having a minimum 3-year aged solar reflectance, thermal emittance complying with Sections A5.106.11.2.1 and A5.106.11.2.2 or a minimum aged or Solar Reflectance Index (SRI)3 equal to or greater than the values shown in:			
Table A5.106.11.2.1 – Tier 1 or		☐	
Table A5.106.11.2.2 – Tier 2			☐

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
Energy Efficiency			
Performance Requirements			
5.201.1 Scope. The California Energy Commission will continue to adopt mandatory building standards.[1]	☒		
A5.203.1 Energy performance. Using an Alternative Calculation Method approved by the California Energy Commission, calculate each nonresidential building's annual TDV regulated energy use components and compare them to the standard or "budget" building. **A5.203.1.1 Tier 1.** Exceed the *2010 California Energy Code* requirements by 15 percent. **A5.203.1.2 Tier 2.** Exceed the *2010 California Energy Code* requirements by 30 percent.		☐	☐
Prescriptive Measures			
A5.204.1 ENERGY STAR equipment and appliances. All equipment and appliances provided by the builder shall be ENERGY STAR labeled if ENERGY STAR is applicable to that equipment or appliance.		☐	☐
A5.204.2 Energy monitoring. Provide submetering or equivalent combinations of sensor measurements and thermodynamic calculations, if appropriate, to record energy use data for each major energy system in the building. **A5.204.2.1 Data storage.** The data management system must be capable of electronically storing energy data and creating user reports showing hourly, daily, monthly and annual energy consumption for each major energy system. **A5.204.2.2 Data access.** Hourly energy use data shall be accessible through a central data management system and must be available daily.		☐ ☐ ☐	☐ ☐ ☐
A5.204.3 Demand response. HVAC systems with Direct Digital Control Systems and centralized lighting systems shall include preprogrammed demand response strategies that are automated with either a Demand Response Automation Internet Software Client or dry contact relays. **A5.204.3.1 HVAC.** The preprogrammed demand response strategies should be capable of reducing the peak HVAC demand by cooling temperature set point adjustment. **A5.204.3.2 Lighting.** The preprogrammed demand response strategies should be capable of reducing the total lighting load by a minimum 30 percent through dimming control or bi-level switching. **A5.204.3.3 Software clients.** The software clients will be capable of communicating with a DR Automation Server.		☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
Renewable Energy			
A5.211.1 On-site renewable energy. Use on-site renewable energy for at least 1 percent of the electrical service overcurrent protection device rating calculated in accordance with the 2007 *California Electrical Code* or 1KW, whichever is greater, in addition to the electrical demand required to meet 1 percent of natural gas and propane use calculated in accordance with the 2007 *California Plumbing Code.* **A5.211.1.1 Documentation.** Calculate renewable on-site system to meet the requirements of Section A5.211.1. Factor in net-metering, if offered by local utility, on an annual basis. **A5.211.3 Green power.** Participate in the local utility's renewable energy portfolio program that provides a minimum of 50 percent electrical power from renewable sources. Maintain documentation through utility billings. **A5.211.4 Prewiring for future rooftop solar.** Size and install conduit from the building roof or eave to a location within the building identified as suitable for future installation of controls and/or storage batteries. **A5.211.4.1 Grid-connected system without storage.** Location within the building shall be of sufficient dimensions to accommodate an inverter and/or other controls as approved by the utility. **A5.211.4.2 System for future energy storage.** If battery storage is anticipated, location within the building shall: 1. Be stable, weather-proof, insulated against very hot and very cold weather and isolated from occupied spaces. 2. Be able to accommodate batteries, ventilation, an inverter, a charge controller (regulator) and, if grid-connected, other controls as approved by the utility.		☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
Elevators, Escalators and Other Equipment			
A5.212.1 Elevators and escalators. In buildings with more than one elevator or two escalators, provide systems and controls to reduce the energy demand of elevators and escalators as follows. Document systems operation and controls in the project specifications and commissioning plan. **A5.212.1.1 Elevators.** Traction elevators shall have a regenerative drive system that feeds electrical power back into the building grid when the elevator is in motion. **A5.212.1.1.1 Car lights and fan.** A parked elevator shall turn off its car lights and fan automatically until the elevator is called for use. **A5.212.1.2 Escalators.** An escalator shall have a VVVF motor drive system that is fully regenerative when the escalator is in motion.		☐ ☐ ☐	☐ ☐ ☐

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
Energy Efficient Steel Framing			
A5.213.1 Steel framing. Design for and employ techniques to avoid thermal bridging.		☐	☐
Water Efficiency and Conservation			
Indoor Water Use			
5.303.1 Meters. Separate meters shall be installed for the uses described in Sections 5.303.1.1 and 5.303.1.2.			
5.303.1.1 Buildings in excess of 50,000 square feet. Separate submeters shall be installed as follows:			
1. For each individual leased, rented or other tenant space within the building projected to consume more than 100 gal/day.	☒		
2. Where separate submeters for individual building tenants are unfeasible, for water supplied to the following subsystems:			
a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s)	☒		
b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s)	☒		
c. Steam and hot-water boilers with energy input more than 500,000 Btu/h (147 kW)	☒		
5.303.1.2 Excess consumption. Any building or a space within a building that is projected to consume more than 1,000 gal/day (3800 L/day).	☒		
5.303.2 20 percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 20 percent shall be provided. (Calculate savings by Water Use Worksheets)	☒		
5.303.2.1 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all the showerheads controlled by a single valve shall not exceed the maximum flow rate at ≥ 20 percent reduction contained in Table 5.303.2.3 or the shower shall be designed to only allow one showerhead to be in operation at a time.	☒		
A5.303.2.3.1 Tier 1 – 30 percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 30 percent shall be provided.		☒	
A5.303.2.3.2 Tier 2 – 35 percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 35 percent shall be provided.			☒
A5.303.2.3.3 40 percent savings. A schedule of plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the building by 40 percent shall be provided. (Calculate savings by Water Use Worksheets)		☐	☐
A5.303.3 Appliances.			
1. Clothes washers shall have a maximum Water Factor (WF) that will reduce the use of water.		☐	☐
2. Dishwashers shall meet the criteria in Section A5.303.3(2)(a) and (b).		☐	☐
3. Ice makers shall be air cooled.		☐	☐
4. Food steamers shall be connectionless or boilerless.		☐	☐
5. The use and installation of water softeners shall be limited or prohibited by local agencies.		☐	☐
6. Combination ovens shall not consume more than 10 gph (38 L/h) in the full operational mode.		☐	☐
7. Commercial pre-rinse spray valves manufactured on or after January 1, 2006 shall function at equal to or less than 1.6 gpm (0.10 L/s) at 60 psi (414 kPa) and		☐	☐
a. Be capable of cleaning 60 plates in an average time of not more than 30 seconds per plate			
b. Be equipped with an integral automatic shutoff			
c. Operate at static pressure of at least 30 psi (207 kPa) when designed for a flow rate of 1.3 gpm (0.08 L/s) or less			
5.303.4 Wastewater reduction. Each building shall reduce the generation of wastewater by one of the following methods:	As applicable		
1. The installation of water-conserving fixtures or	☒		
2. Utilizing nonpotable water systems.	☒		
A5.303.5 Dual plumbing. New buildings and facilities shall be dual plumbed for potable and recycled water systems.		☐	☐
5.303.6 Plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the requirements listed for each type in Items listed in Table 5.303.6.	As applicable		
1. Water closets (toilets) – flushometer type	☒		
2. Water closets (toilets) – tank type	☒		
3. Urinals	☒		
4. Public lavatory faucets	☒		
5. Public metering self-closing faucets	☒		
6. Residential bathroom lavatory sink faucets	☒		
7. Residential kitchen faucets	☒		
8. Residential shower heads	☒		
9. Single shower fixtures served by more than one showerhead	☒		

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
Outdoor Water Use			
5.304.1 Water budget. A water budget shall be developed for landscape irrigation use.[1]	☒		
5.304.2 Outdoor potable water use. For new water service, separate meters or submeters shall be installed for indoor and outdoor potable water use for landscaped areas of at least 1,000 square feet but not more than 5,000 square feet, separate submeters shall be installed for outdoor potable water use. **A5.304.2.1 Outdoor potable water use.** For new water service not subject to the provisions of *Water Code* Section 535, separate meters or submeters shall be installed for outdoor potable water use for landscaped areas of at least 500 square feet but not more than 1,000 square feet (the level at which Section 5.304.2 applies).	☒ ☐	☐	☐
5.304.3 Irrigation design. In new nonresidential projects with at least 1,000 square feet but not more than 2,500 square feet of landscaped area (the level at which the MLO applies), install irrigation controllers and sensors which include the following criteria and meet manufacturer's recommendations. **5.304.3.1 Irrigation controllers.** Automatic irrigation system controllers installed at the time of final inspection shall comply with the following: 1. Controllers shall be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plants' needs as weather conditions change. 2. Weather-based controllers without integral rain sensors or communication systems that account for local rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s). Soil moisture-based controllers are not required to have rain sensor input.	☒ As applicable ☒		
A5.304.4 Potable water reduction. Provide water efficient landscape irrigation design that reduces by the use of potable water. **A5.304.4.1 Tier 1** – Reduce the use of potable water to a quantity that does not exceed 60 percent of ETo times the landscape area. **A5.304.4.2 Tier 2** –Reduce the use of potable water to a quantity that does not exceed 55 percent of ETo times the landscape area. Methods used to accomplish the requirements of this section shall include, but not be limited to, the items listed in A5.304.4. **A5.304.4.3 Verification of compliance.** A calculation demonstrating the applicable potable water use reduction required by this section shall be provided.		☒ ☒	 ☒ ☒
A5.304.5 Potable water elimination. Provide a water efficient landscape irrigation design that eliminates the use of potable water beyond the initial requirements for plant installation and establishment. Methods used to accomplish the requirements of this section shall include, but not be limited to, the items listed in Section A5.304.4.		☐	☐
A5.304.6 Restoration of areas disturbed by construction. Restore all areas disturbed during construction by planting with local native and/or noninvasive vegetation.		☐	☐
A5.104.7 Previously developed sites. On previously developed or graded sites, restore or protect at least 50 percent of the site area with native and/or noninvasive vegetation.		☐	☐
A5.304.8 Graywater irrigation system. Install graywater collection system for onsite subsurface irrigation using graywater.		☐	☐
Material Conservation and Resource Efficiency			
Efficient Framing Systems			
A5.404.1 Wood framing. Employ advanced wood framing techniques or OVE, as permitted by the enforcing agency.		☐	☐
Material Sources			
A5.405.1 Regional materials. Select building materials or products for permanent installation on the project that have been harvested or manufactured in California or within 500 miles of the project site, meeting the criteria listed in Section A5.405.1.		☐	☐
A5.405.2 Bio-based materials. Select bio-based building materials per Section A5.405.2.1 or A5.405.2.2. **A5.405.2.1 Certified wood products.** Certified wood is an important component of green building strategies and the California Building Standards Commission will continue to develop a standard through the next code cycle. **A5.405.2.2 Rapidly renewable materials.** Use materials made from plants harvested within a ten-year cycle for at least 2.5 percent of total materials value, based on estimated cost.		☐ ☐	☐ ☐
A5.405.3 Reused materials. Use salvaged, refurbished, refinished or reused materials for at least 5 percent of the total value, based on estimated cost of materials on the project.		☐	☐

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
A5.405.4 Recycled content. Use materials, equivalent in performance to virgin materials, with a total (combined) recycled content value (RCV) of:			
Tier 1. The RCV shall not be less than 10 percent of the total material cost of the project.		☒	
Tier 2. The RCV shall not be less than 15 percent of the total material cost of the project.			☒
Note: Use the equations in the subsections for calculating total materials cost, recycled content, RCV of materials and assemblies, and total RCV.		☐	☐
A5.405.5 Cement and concrete. Use cement and concrete made with recycled products and complying with the following sections:			
A5.405.5.1 Cement. Cement shall comply with one of the following standards:			
1. Portland cement shall meet ASTM C 150.			
2. Blended hydraulic cement shall meet ASTM C 595.		☐	☐
3. Other Hydraulic Cements shall meet ASTM C 1157.			
A5.405.5.2 Concrete. Unless otherwise directed by the Engineer of Record, use concrete manufactured with cementitious materials in accordance with Sections A5.405.5.2.1 and A5.405.5.2.1.1, as approved by the enforcing agency.			
A5.405.5.2.1 Supplementary cementitious materials (SCMs). Use concrete made with one or more of the SCMs listed in Section A5.405.5.2.1.		☐	☐
A5.405.5.2.1.1 Mix design equation. Use any combination of one or more SCMs, satisfying Equation A4.5-14.		☐	☐
Exception: Minimums in mix designs approved by the Engineer of Record may be lower where high early strength is needed.			
A5.405.5.3 Additional means of compliance. Any of the following measures shall be permitted to be employed for the production of cement or concrete, depending on their availability and suitability, in conjunction with Section A5.405.5.2.			
A5.405.5.3.1 Cement. The following measures may be used in the manufacture of cement.			
A5.405.5.3.1.1 Alternative fuels. Where permitted by state or local air quality standards.		☐	☐
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 may 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 materials listed in Section A5.405.5.3.2.2.		☐	☐
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.		☐	☐
A5.405.5.3.2.4 High strength concrete. Concrete elements designed to reduce their total size compared to standard 3,000 psi concrete, as approved by the Engineer of Record.		☐	☐
Enhanced Durability and Reduced Maintenance			
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.		☐	☐
A5.406.1.3 Recyclability. Select materials that can be re-used or recycled at the end of their service life.		☐	☐
Weather Resistance and Moisture Management			
5.407.1 Weather protection. Provide a weather-resistant exterior wall and foundation envelope as required by *California Building Code* Section 1403.2 and *California Energy Code* Section 150, manufacturer's installation instructions or local ordinance, whichever is more stringent.[1]	☒		
5.407.2 Moisture control. Employ moisture control measures by the following methods;			
5.407.2.1 Sprinklers. Prevent irrigation spray on structures.	☒		
5.407.2.2 Entries and openings. Design exterior entries and openings to prevent water intrusion into buildings.	☒		

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
Construction Waste Reduction, Disposal and Recycling			
5.408.1 Construction waste management. Recycle and/or salvage for reuse a minimum of 50% of the non-hazardous construction waste in accordance with Section 5.408.1.1, 5.408.1.2 or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent.	☒ or		
5.408.1.1 Construction waste management plan. Where a local jurisdiction does not have a construction and demolition waste management ordinance that is more stringent, submit a construction waste management plan that complies with Items 1 through 4 of this section.	☒		
5.408.1.2 Waste management company. Utilize a waste management company that can provide verifiable documentation that the percentage of construction waste material diverted from the landfill complies with this section.	☒		
Exceptions to Sections 5.408.1.1 and 5.408.1.2: 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			
5.408.1.4 Documentation. Provide documentation of the waste management plan that meets the requirements listed in Sections 5.408.1.1 through 5.408.1.3, and the plan is accessible to the enforcement authority.	☒		
5.408.2 Isolated jobsites. The enforcing agency may make exceptions to the requirements of this section when jobsites are located in areas beyond the haul boundaries of the diversion facility.			
5.408.3 Excavated soil and land clearing debris. 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled.	☒		
Exception: Reuse, either on-or off-site, of vegetation or soil contaminated by disease or pest infestation.			
A5.408.3.1 Enhanced construction waste reduction–Tier 1. Divert to recycle or salvage at least 65% of nonhazardous construction and demolition debris generated at the site.		☒	
A5.408.3.1.1 Enhanced construction waste reduction–Tier 2. Divert to recycle or salvage at least 80% of nonhazardous construction 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.			
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.		☐	☐
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.		☐	☐
A5.409.3 Materials and system assemblies. If whole building analysis of the project is not elected, select a minimum of 50% of materials or assemblies based on life cycle assessment of at least three for the impacts listed in Section A5.409.2.2, one of which shall be climate change.		☐	☐
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 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.		☐	☐
See notes for available tools.			
Building Maintenance and Operation			
5.410.1 Recycling by occupants. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of nonhazardous materials for recycling.[1]	☒		
5.410.2 Commissioning. For new buildings 10,000 square feet and over, building commissioning for all building systems covered by T24, Part 6, process systems and renewable energy systems shall be included in the design and construction processes of the building project. Commissioning requirements shall include items listed in Section 5.410.2.	☒		
Exceptions: 1. Dry storage warehouses of any size 2. Areas under 10,000 square feet used for offices or other conditioned accessory spaces within dry storage warehouses 3. Tenant improvements under 10,000 square feet as described in Section 303.1.1.			
5.410.2.1 Owner's Project Requirements (OPR). Documented before the design phase of the project begins the OPR shall include items listed in Section 5.410.4.	☒		

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
5.410.2.2 Basis of Design (BOD). A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project to cover the systems listed in Section 5.410.2.2.	☒		
5.410.2.3 Commissioning plan. A commissioning plan describing how the project will be commissioned shall include items listed in Section 5.410.2.3.	☒		
5.410.2.4 Functional performance testing shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications.	☒		
5.410.2.5 Documentation and training. A Systems manual and systems operations training are required.	☒		
5.410.2.5.1 Systems manual. The systems manual shall be delivered to the building owner or representative and facilities operator and shall include the items listed in Section 5.410.2.5.1.	☒		
5.410.2.5.2 Systems operations training. A program for training of the appropriate maintenance staff for each equipment type and/or system shall be developed and shall include items listed in Section 5.410.2.5.2.	☒		
5.410.2.6 Commissioning report. A report of commissioning process activities undertaken through the design and construction phases of the building project shall be completed and provided to the owner or representative.	☒		
5.410.4 Testing and adjusting. Testing and adjusting of systems shall be required for buildings less than 10,000 square feet.	☒		
5.410.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include, as applicable to the project, the systems listed in Section 5.410.4.2.	☒		
5.410.4.3 Procedures. Perform testing and adjusting procedures in accordance with applicable standards on each system as determined by the enforcing agency.	☒		
5.410.4.3.1 HVAC balancing. Before a new space-conditioning system serving a building or space is operated for normal use, balance in accordance with the procedures defined by national standards listed in Section 5.410.4.3.1 or as approved by the enforcing agency.	☒		
5.410.4.4 Reporting. After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.	☒		
5.410.4.5 Operation and maintenance manual. Provide the building owner with detailed operating and maintenance instructions and copies of guaranties/warranties for each system prior to final inspection.	☒		
5.410.4.5.1 Inspections and reports. Include a copy of all inspection verifications and reports required by the enforcing agency.	☒		
Environmental Quality			
Fireplaces			
5.503.1 Install only a direct-vent sealed-combustion gas or sealed wood-burning fireplace or a sealed woodstove and refer to residential requirements in the *California Energy Code,* Title 24, Part 6, Subchapter 7, Section 150.	☒ As applicable		
5.503.1.1 Woodstoves. Woodstoves shall comply with US EPA Phase II emission limits.	☒		
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 121 of the *California Energy Code,* CCR, Title 24, Part 6 and Chapter 4 of CCR, Title 8 and ass listed in Items 1 and 2 in Section A5.504.1.2.		☐	☐
A5.504.1.2 Additional IAQ measures. Employ additional measures as listed in Items 1 through 5 in Section A5.504.1.3.		☐	☐
5.504.1.3 Temporary ventilation. If the HVAC system is used during construction, use return air filters with a MERV of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30% based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy.	☒		
A5.504.2 IAQ postconstruction. Flush out the building per Section A5.504.2 prior to occupancy or if the building is occupied.		☐	☐
A5.504.2.1 IAQ Testing. A testing alternative may be employed after all interior finishes have been installed, using testing protocols recognized by the United State Environmental Protection Agency (U.S. EPA) and in accordance with Section A5.504.2.1.2. Retest as required in Section A5.504.2.1.3.		☐	☐
A5.504.2.1.1 Maximum levels of contaminants. Allowable levels of contaminant concentrations measured by testing shall not exceed the following:		As applicable	As applicable
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): 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 elements listed in Items 1 through 4.		☐	☐
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.		☐	☐

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
5.504.3 Covering of duct openings and protection of mechanical equipment during construction. At the time of rough installation and during storage on the construction site and until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of dust, water and debris which may enter the system.	☒		
5.504.4 Finish material pollutant control. Finish materials shall comply with Sections 5.504.4.1 through 5.504.4.4.			
5.504.4.1 Adhesives, sealants, caulks. Adhesives and sealants used on the project shall meet the requirements of the following standards.			
1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable or SCAQMD Rule 1168 VOC limits, as shown in Tables 5.504.4.1 and 5.504.4.2.	☒		
2. Aerosol adhesives and smaller unit sizes of adhesives and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of *California Code of Regulations*, Title 17, commencing with Section 94507.	☒		
5.504.4.3 Paints and coatings. Architectural paints and coatings shall comply with Table 5.504.4.3 unless more stringent local limits apply.	☒		
5.504.4.3.1 Aerosol paints and coatings. Aerosol paints and coatings shall meet the Product-Weighted MIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances (CCR, Title 17, Section 94520 et seq).	☒		
5.504.4.3.2 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency.	☒		
5.504.4.4 Carpet systems. All carpet installed in the building interior shall meet the testing and product requirements of one of the standards listed in Section 5.504.4.4.	☒		
5.504.4.4.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute's Green Label program.	☒		
5.504.4.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 5.504.4.1.	☒		
5.504.4.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in Table 5.504.4.	☒		
A5.504.4.5.1 Early compliance with formaldehyde limits, Tier 1. Meet the requirements contained in Table A5.504.8.5 before the compliance dates.		☒	
A5.504.4.5.2 No added formaldehyde, Tier 2. Use composite wood products approved by the ARB as no-added formaldehyde (NAF) based resins or ultra-low emitting formaldehyde (ULEF) resins.			☒
5.504.4.5.3 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following.	☒ As applicable	☐	☐
1. Product certifications and specifications	☒		
2. Chain of custody certifications	☒		
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.)	☒		
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards.	☒		
5. Other methods acceptable to the enforcing agency.	☒		
5.504.4.6 Resilient flooring systems. Comply with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the FloorScore program of the Resilient Floor Covering Institute; or meet California Department of Public Health 2010 Specification 01350.	☒		
A5.504.4.6.1 Verification of compliance. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.	☒		
A5.504.4.7 Resilient flooring systems, Tier 1. For 80 percent of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the FloorScore program of the Resilient Floor Covering Institute; or meet California Department of Public Health 2010 Specification 01350.		☒	
A5.504.4.7.1 Resilient flooring systems, Tier 2. For 100 percent of floor area to scheduled to receive resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its High Performance Products Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the FloorScore program of the Resilient Floor Covering Institute; or meet California Department of Public Health 2010 Specification 01350.			☒
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 standards listed in Items 1 through 3.		☒	
A5.504.4.8.1 Thermal insulation, Tier 2. 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.		☒	☒

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
A5.504.4.9 Acoustical ceilings and wall panels. Comply with Chapter 8 in Title 24, Part 2 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.		☐	☐
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 as listed in Items 1 through 3 in Section A5.504.5.1.		☐	☐
A5.504.5.2 Isolation of pollutant sources. In rooms where activities produce hazardous fumes or chemicals, exhaust them and isolate them from their adjacent rooms as listed in Items 1 through 3 in Section A5.504.5.2.			
5.504.5.3 Filters. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air that provides at least a MERV of 8. MERV 8 filters shall be installed prior to occupancy, and recommendations for maintenance with filters of the same value shall be included in the operation and maintenance manual.	☒		
Exception: A MERV-1 filter shall be allowed for return air only or return with prefiltered outside air, if the filter is of a re-usable, nondisposable type, and the fan energy use of that air delivery system is 0.4W/cfm or less at design airflow.		☐	☐
A5.504.5.3.1 Filters. 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 MERV of 11.			
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 *California Building Code*, CCR, Title 24, Part 2, Sections 1203 and Chapter 14.1.[1]	☒		
Air Quality and Exhaust			
5.506.1 Outside air delivery. For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 121 of the *California Energy Code* and Chapter 4 of CCR, Title 8 or the applicable local code, whichever is more stringent.[1]	☒		
5.506.2 Carbon dioxide (CO_2) monitoring. For buildings 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 121(c).[1]	☒		
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 2007 *California Energy Code* 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 2007 *California Energy Code*. 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.		☐	☐

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
5.507.4 Acoustical control. Employ building assemblies and components with STC values determined in accordance with ASTM E 90 and ASTM E 413 or OITC determined in accordance with ASTM E 1332, 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.	☒		
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).	☒ or		
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.	☒		
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.	☒		
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.	☒		
Outdoor Air Quality			
5.508.1 Ozone depletion and global warming reductions. Installations of HVAC, refrigeration and fire suppression equipment shall comply with Sections 5.508.1.1 and 5.508.1.2.	As applicable		
5.508.1.1 CFCs. Install HVAC and refrigeration equipment that does not contain CFCs.[1]	☒		
5.508.1.2 Halons. Install fire suppression equipment that does not contain Halons.[1]	☒		
A5.508.1.3 Hydrochlorofluorocarbons (HCFCs). Install HVAC and refrigeration equipment that does not contain HCFCs.		☐	☐
A5.508.1.4 Hydrofluorocarbons (HFCs). Install HVAC complying with either of the following:			
1. Install HVAC, refrigeration and fire suppression equipment that do not contain HFCs or that do not contain HFCs with a global warming potential greater than 150.		☐	☐
2. Install HVAC and refrigeration equipment that limit the use of HFC refrigerant through the use of a secondary heat transfer fluid with a global warming potential no greater than 1.		☐	☐
Additions and Alterations to Existing Nonresidential Buildings			
Planning and Design			
5.710.6 Site development			
5.710.6.1 Storm water pollution prevention. Additions that disturb less than one acre of land shall prevent the pollution of stormwater runoff from the construction activities through local ordinance in Section 5.710.6.1.1 or Best management practices (BMP) in Section 5.710.6.1.2	☒ or ☒		
5.710.6.2 Bicycle parking. Comply with Sections 5.710.6.2.1 and 5.710.6.2.2; or meet the applicable local ordinance, whichever is stricter.	☒ or		
5.710.6.2.1 Short-term bicycle parking. If the project is anticipated to generate visitor traffic and adds 10 or more vehicular parking spaces, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5% of the additional visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack.	☒		
5.710.6.2.2 Long-term bicycle parking. For buildings with over 10 tenant-occupants that add 10 or more vehicular parking spaces, provide secure bicycle parking for 5% of additional motorized vehicle parking capacity, with a minimum of one space.	☒		
5.710.6.3 Designated parking. For projects that add 10 or more vehicular parking spaces, provide designated parking for any combination of low-emitting, fuel-efficient, and carpool/van pool vehicles as shown in Table 5.106.2.2 of Division 5.1 based on the number of additional spaces.	☒		
5.710.6.10 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.	☒		

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
Water Effeciency and Conservation			
5.712.3 Indoor water use.			
5.712.3.1 Meters. Separate submeters or metering device shall be installed for the uses described in Sections 5.712.3.1.1 and 5.713.3.1.2.	☒		
5.712.3.1.1 Additions to existing buildings in excess of 50,000 square feet. Separate submeters shall be installed as follows:	☒		
1. For each individual leased, rented, or other tenant space within the building projected to consume more than 100 gal/day.	☒ or		
2. Where separate submeters for individual building tenants are unfeasible, for water supplied to the following subsystems:	☒		
a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s)			
b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s)			
c. Steam and hot-water boilers with energy input more than 500,000 Btu/h (147 kW)			
5.712.3.1.2 Excess consumption. Any addition or added space within an addition that is projected to consume more than 1,000 gal/day (3800 L/day).	☒		
5.712.3.2 20% Savings. A schedule of newly installed plumbing fixtures and fixture fittings that will reduce the overall use of potable water within the addition or area of alteration to the building by 20% shall be provided. (Calculate savings by Water Use Worksheets)	☒		
5.712.3.3 Multiple showerheads serving one shower. When a shower is served by more than one newly installed showerhead, the combined flow rate of all the showerheads controlled by a single valve shall not exceed the maximum flow rate at ≥ 20 percent reduction contained in Table 5.303.2.2 or the shower shall be designed to only allow one showerhead to be in operation at a time.	☒		
5.712.3.5 Plumbing fixtures and fittings. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall meet the standards referenced in Table 5.503.6 of Division 5.3.	☒		
5.712.4 Outdoor water use.			
5.712.4.1 Water budget. A water budget shall be developed for landscape irrigation use installed in conjunction with addition or alteration.	☒		
5.712.4.2 Outdoor potable water use. For building addition or alteration requiring upgraded water service for landscaped areas of at least 1,000 square feet but not more than 5,000 square feet (the level at which Water Code §535 applies), separate submeters or metering devices shall be installed for outdoor potable water use.	☒		
5.712.4.3 Irrigation design. In building addition or alteration with at least 1,000 square feet but not more than 2500 square feet of cumulative landscaped area (the level at which the MLO applies), install irrigation controllers and sensors which include the following criteria, and meet manufacturer's recommendations.	☒ ☒		
5.712.4.3.1 Irrigation controllers. Automatic irrigation system controllers installed at the time of final inspection shall comply with the following:	☒		
1. Controllers shall be weather- or soil moisture-based controllers that automatically adjust irrigation in response to changes in plants' needs as weather conditions change.	As applicable		
2. Weather-based controllers without integral rain sensors or communication systems that account for local rainfall shall have a separate wired or wireless rain sensor which connects or communicates with the controller(s). Soil moisture-based controllers are not required to have rain sensor input.	☒		
Material Conservation and Resource Efficiency			
5.713.7 Water resistance and moisture management.			
5.713.7.1 Weather protection. Provide a weather-resistant exterior wall and foundation envelope as required by *California Building Code* Section 1403.2 (Weather Protection) and *California Energy Code* Section 150, (Mandatory Features and Devices), manufacturer's installation instructions, or local ordinance, whichever is more stringent.	☒		
5.713.7.2 Moisture control. Employ moisture control measures by the following methods.			
5.713.7.2.1 Sprinklers. Design and maintain landscape irrigation systems to prevent spray on structures.	☒		
5.713.7.2.2 Entries and openings. Design exterior entries and/or openings subject to foot traffic or wind-driven rain to prevent water intrusion into buildings.	☒		

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
5.713.8 Construction waste reduction, disposal and recycling.			
5.713.8.1 Construction waste management. Recycle and/or salvage for reuse a minimum of 50% of the nonhazardous construction waste in accordance with Section 5.713.8.1.1 or 5.713.8.1.2; or meet a local construction and demolition waste management ordinance, whichever is more stringent.	☒		
5.713.8.1.1 Construction waste management plan. Where a local jurisdiction does not have a construction and demolition waste management ordinance that is more stringent, submit a construction waste management plan that complies with Items 1 through 4 of this section.	☒		
or			
5.713.8.1.2 Waste management company. Utilize a waste management company that can provide verifiable documentation that the percentage of construction waste material diverted from the landfill complies with this section.	☒		
Exceptions to Sections 5.713.8.1.1 and 5.713.8.1.2:			
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, where demolition of an existing structure(s) is necessary for the new construction			
5.713.8.1.3 Documentation. Documentation shall be provided to the enforcing agency which demonstrates compliance with Section 5.713.8.1.1, Items through 4. The waste management plan shall be updated as necessary and shall be accessible during construction for examination by the enforcing agency.	☒		
5.713.8.2 Isolated jobsites. The enforcing agency may make exceptions to the requirements of this section when jobsites are located in areas beyond the haul boundaries of the diversion facility.	☐		
5.713.8.3 Excavated soil and land clearing debris. 100% of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phased project, such material may be stockpiled on site until the storage site is developed.	☒		
Exception: Reuse, either on-or off-site, of vegetation or soil contaminated by disease or pest infestation.			
5.713.10 Building maintenance and operation.			
5.713.10.1 Recycling by occupants. If not provided on the existing site and where site conditions permit, provide readily accessible areas that serve the entire building and are identified for the depositing, storage, and collection of nonhazardous materials for recycling in accordance with one of the items listed in 1 through 3.	☒		
5.713.10.4 Testing and adjusting. Testing and adjusting of new systems installed to serve an addition or alteration subject to Section 5.701.1 shall be required.	☒		
5.713.10.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include, as applicable to the project, the systems listed in Section 5.713.10.4.2.	☒		
5.713.10.4.3 Procedures. Perform testing and adjusting procedures in accordance with manufacturer's specifications and applicable standards on each system.	☒		
5.713.10.4.3.1 HVAC balancing. In addition to testing and adjusting, before a new space-conditioning system serving a building or space is operated for normal use, balance the system in accordance with the procedures defined by national standards listed in Section 5.713.10.4.3.1or as approved by the enforcing agency.	☒		
5.713.10.4.4 Reporting. After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.	☒		
5.713.10.4.5 Operation and maintenance manual. Provide the building owner or representative with detailed operating and maintenance instructions and copies of guaranties/warranties for each system prior to final inspection.	☒		
5.713.10.4.5.1 Inspections and reports. Include a copy of all inspection verifications and reports required by the enforcing agency.	☒		
Environmental Quality			
5.714.3 Fireplaces.	☒		
5.714.3.1 General (Fireplaces). Install only a direct-vent sealed-combustion gas or sealed wood-burning fireplace, or a sealed woodstove or pellet stove, and refer to residential requirements in the 2010 *California Energy Code,* Subchapter 7, Section 150.	As applicable		
5.714.3.1.1 Woodstoves. Woodstoves and pellet stoves shall comply with US EPA Phase II emission limits.	☒		

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
5.714.4 Pollutant control.			
5.714.4.1 Temporary ventilation. If the HVAC system is used during construction, use return air filters with a MERV of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30% based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy.	☒		
5.714.4.3 Covering of duct openings of mechanical equipment during construction. At the time of rough installation and during storage on the construction site until final startup of the heating, cooling and ventilating equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of dust, water and debris which may enter the system.	☒		
5.714.4.4 Finish material pollutant control. Finish materials shall comply with Sections 5.714.4.4.1 through 5.714.4.4.4.			
5.714.4.4.1 Adhesives, sealants, and caulks. Adhesives, sealants and caulks used on the project shall meet the requirements of the following standards.			
1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits, as shown in Tables 5.504.4.1 and 5.504.4.2 in Division 5.5.	☒		
2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of California Code of Regulations, Title 17, commencing with Section 94507.	☒		
5.714.4.4.3 Paints and coatings. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Coatings Suggested Control Measure, as shown in Table 5.504.4.3 in Division 5.5, unless more stringent local limits apply.	☒		
5.714.4.4.3.1 Aerosol paints and coatings. Aerosol paints and coatings shall meet the Product-Weighted MIR Limits for ROC in section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances (CCR, Title 17, Section 94520 et seq),	☒		
5.714.4.4.3.2 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency.	☒		
5.714.4.4.4 Carpet systems. All carpet installed in the building interior shall meet the testing and product requirements of one of the standards listed in Section 5.714.4.4.4.	☒		
5.714.4.4.4.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the Carpet and Rug Institute Green Label program.	☒		
5.714.4.4.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 5.504.4.1 in Division 5.5.	☒		
5.714.4.4.5 Composite wood products. Hardwood plywood, particleboard, and medium density fiberboard composite wood products used on the interior or exterior of the building shall meet the requirements for formaldehyde as specified in Table 5.504.4.5 in Division 5.5.	☒		
5.714.4.4.5.2 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following.	☒		
1. Product certifications and specifications.	As applicable		
2. Chain of custody certifications.	☒		
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, *et seq.*)	☒ ☒		
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards.	☒		
5. Other methods acceptable to the enforcing agency.	☒		
5.714.4.4.6 Resilient flooring systems. For 50% of floor area receiving resilient flooring, install resilient flooring complying with the VOC-emission limits defined in the 2009 CHPS criteria and listed on its High Performance Database; products compliant with CHPS criteria certified under the Greenguard Children & Schools program; certified under the Resilient Floor Covering Institute (RFCI) FloorScore program; or meet California Department of Public Health 2010 Specification 01350.	☒		
5.714.4.4.6.1 Verification of compliance. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.	☒		
5.714.4.5.3 Filters. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air that provide at least a MERV of 8. MERV 8 filters shall be installed after any flush-out or testing and prior to occupancy, and recommendations for maintenance with filters of the same value shall be included in the operation and maintenance manual.	☒		
Exception: A MERV-1 filter shall be allowed for return air only or return with prefiltered outside air, if the filter is of a re-usable, non-disposable type, and the fan energy use of that air delivery system is 0.4W/cfm or less at design airflow.			
5.714.4.7 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 prohibition.	☒		

continued

APPLICATION CHECKLIST FOR BSC	MANDATORY	VOLUNTARY	
		CALGreen Tier 1	*CALGreen* Tier 2
5.714.5 Indoor moisture control			
5.714.5.1 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.[1]	☒		
5.714.6 Indoor air quality.			
5.714.6.1 Outside air delivery. For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 121 (Requirements For Ventilation) of the 2010 *California Energy Code*, or the applicable local code, whichever is more stringent, and Chapter 4 of CCR, Title 8.[1]			
5.714.6.2 Carbon dioxide (CO_2) monitoring. For additions equipped with demand control ventilation, CO_2 sensors and ventilation controls shall be specified and installed in accordance with the requirements of the current edition of the 2010 *California Energy Code*, Section 121(c).[1]	☒		
5.714.7 Environmental comfort.			
5.714.7.1 Acoustical control. Employ building assemblies and components with STC values determined in accordance with ASTM E 90 and ASTM E 413 or OITC determined in accordance with ASTM E 1332, using either the prescriptive or performance method in Section 5.714.7.1.1 or 5.714.7.1.2.	☒		
5.714.7.1.1 Exterior noise transmission, prescriptive method. Wall and roof-ceiling assemblies exposed to the noise source making up the building addition or altered 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.	☒		
5.714.7.1.1.1 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 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).	☒ or		
5.714.7.1.2 Performance method. For buildings located as defined in Sections A5.507.4.1 or A5.507.4.1.1, wall and roof-ceiling assemblies exposed to the noise source making up the building addition 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.	☒		
5.714.7.1.2.1 Documentation of compliance. An acoustical analysis documenting complying interior sound levels shall be prepared by personnel approved by the architect or engineer of record.	☒		
5.714.7.1.3 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.	☒		
5.714.8 Outdoor air quality.			
5.714.8.1 Ozone depletion and greenhouse gas reductions. Installations of HVAC, refrigeration, and fire suppression equipment shall comply with Sections 5.714.8.1.1 and 5.714.8.1.2.			
5.714.8.1.1 Chlorofluorocarbons (CFCs.) Install HVAC, refrigeration and fire suppression equipment that do not contain CFCs.	☒		
5.714.8.1.2 Halons. Install HVAC, refrigeration and fire suppression equipment that do not contain Halons.	☒		

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

Pages 167 through 170 deleted by State of California.
Text continues on Page 172.

NONRESIDENTIAL OCCUPANCIES APPLICATION CHECKLIST [OSHPD 1, 2 and 4]				
	COMPLIANCE LEVELS			
		VOLUNTARY *CALGreen*		
FEATURE OR MEASURE	MANDATORY *CALGreen*	Tier 1	Tier 2	NOTES
DIVISION A5.1 – PLANNING AND DESIGN				
SECTION Site Development				
A5.106.9 Building orientation. Locate and orient the building as follows: 1. Long sides facing north and south. 2. Protect the building from thermal loss, drafts and degradation of the building envelope caused by wind and wind-driven materials.		☐	☐	
DIVISION A5.2 – ENERGY EFFICIENCY				
SECTION A5.203 Performance Measures				
A5.203.1 Energy performance. [OSHPD 1] **A5.203.1.1 CALGreen Tier 1. [OSHPD 1]** Buildings must comply with the latest edition of "Savings By Design, Healthcare Modeling Procedures." **A.5.203.1.2 CALGreen Tier 2. [OSHPD 1]** Buildings must exceed the latest edition of "Savings By Design, Healthcare Modeling Procedures" by 15 percent.		☐	☐	
SECTION A5.204 Prescriptive Measures				
A5.204.1 ENERGY STAR equipment and appliances. All equipment and appliances provided by the builder shall be ENERGY STAR labeled if ENERGY STAR is applicable to that equipment or appliance.		☐	☐	
A5.204.4 Commissioning. Building commissioning for all building systems covered by T24, Part 6, process systems and renewable energy systems shall be included in the design and construction processes of the building project. Commissioning requirements shall include as a minimum items listed in Section A5.204.4.		☐	☐	
A5.204.4.1 Owner's Project Requirements (OPR). Documented before the design phase of the project begins the OPR shall include items listed in Section A5.204.4.		☐	☐	
A5.204.4.2 Basis of Design (BOD). A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project and updated periodically to cover the systems listed in Section A5.204.4.2.		☐	☐	
A5.204.4.3 Commissioning plan. A commissioning plan describing how the project will be commissioned shall be started during the design phase of the building project and shall include as a minimum items listed in Section A5.204.4.3.		☐	☐	
A5.204.4.4 Functional performance testing shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications.		☐	☐	
A5.204.4.5 Post construction documentation and training. A systems manual and systems operations training are required.		☐	☐	
A5.204.4.5.1 Systems manual. The systems manual shall be delivered to the building owner and facilities operator and shall include the items listed in Section A5.204.4.5.1.		☐	☐	
A5.204.4.5.2 Systems operations training. The training of the appropriate maintenance staff for each equipment type and/or system shall include as a minimum items listed in Section A5.204.4.5.2.		☐	☐	
A5.204.4.6 Commissioning report. A complete report of commissioning process activities undertaken through the design, construction and postconstruction phases of the building project shall be completed and provided to the owner.		☐	☐	
A5.204.6 Building orientation and shading. Locate orient and shade the building as required in Section A5.106.11.		☐	☐	
SECTION A5.205 Building Envelope				
A5.205.1 Fenestration products and exterior doors. **A5.205.1.1 Certification of fenestration products and exterior door other than field-fabricated.**		☐	☐	
A5.205.1.2 Installation of field-fabricated fenestration and exterior doors.		☐	☐	
A5.205.2 Joints and other openings.		☐	☐	
A5.205.3 Installation and roofing products.		☐	☐	

continued

APPENDIX A6
REFERENCED STANDARDS

The following CALGreen Referenced Standards are included herein as a convenience for the users of the *California Green Building Standards Code* and its Guidebook, but they are not considered to be part of the code unless they are officially adopted as such.

Contents

A6.1-2011, PART 1

STANDARDS FOR COMPLIANCE WITH BUILDING COMMISSIONING

A6.1
Section 5.410.2 Commissioning

Introduction:

The purpose of this code is to improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of concepts that reduce negative and increase positive environmental impacts. Commissioning is a vital element in this effort.

Definitions used in the CALGreen CX Guide:

Acronyms

BOD	Basis of Design
Cx	Commissioning
FPT	Functional Performance Test
HVAC	Heating Ventilating and Air-Conditioning
O&M	Operations and Maintenance
OPR	Owner's Project Requirements

Glossary:

Acceptance Criteria – The conditions that must be met for systems or equipment to meet defined expected outcomes.

Commissioning (Cx) – Building commissioning as required in this code involves a quality assurance process that begins during design and continues to occupancy. Commissioning verifies that the new building operates as the owner intended and that building staff are prepared to operate and maintain its systems and equipment. Exceptions are allowed for dry storage warehouses of any size and conditioned spaces under 10,000 square accessory to them; and for tenant improvements under 10,000 within a larger space.

Owner – The individual or entity holding title to the property on which the building is constructed.

Commissioning Coordinator – The person who coordinates the commissioning process. This can be either a third-party commissioning provider or an experienced member of the design team or owner in-house staff member.

Commissioning Team – The key members of each party involved with the project designated to provide insight and carry out tasks necessary for a successful commissioning project. Team members may include the commissioning coordinator, owner or owner's representative, building staff, design professionals, contractors or manufacturer's representatives, and testing specialists.

Independent Third-Party Commissioning Professional – A commissioning consultant contracted directly by the owner who is not responsible to, or affiliated with any other member of the design and construction team.

Operation and Maintenance (O&M) Manuals – Documents that provide information necessary for operating and maintaining installed equipment and systems.

Owner Representative – An individual or entity assigned by the owner to act and sign on the owner's behalf.

Process Equipment – Energy-using equipment and components that are not used for HVAC, Electrical, Plumbing and Irrigation operations.

Such devices would include but are not limited to heat transfer, water purifying, air cleaning, air vacuum and air compressing.

Sequence of Operation – A written description of the intended performance and operation of each control element and feature of the equipment and systems.

Selecting Trained Personnel for (Commissioning)

This code requires that "Commissioning shall be performed in accordance with this section by trained personnel with experience on projects of comparable size and complexity." The trained personnel manage and facilitate the commissioning process. The trained personnel develop and implement the commissioning tasks and documentation identified in Sections 5.410.2.1 through 5.410.2.7. Trained personnel may include appropriate members of owner staff, contractor and design team as well as independent commissioning professionals.

It is essential that there is a single person designated to lead and manage the commissioning activities. In practice, this individual has been referenced by various identifiers such as commissioning authority, agent, provider, coordinator, lead, etc. In this guide the term "commissioning coordinator" is used.

The designated commissioning coordinator may be an independent third-party commissioning professional, a project design team member (e.g., engineer or architect), an owner's engineer or facility staff, contractor or specialty subcontractor. Methods of evaluating the designated commissioning coordinator and trained personnel include review of the following:

1. Technical knowledge
2. Relevant experience
3. Potential conflict of interest concerns
4. Professional certifications and training
5. Communication and organizational skills
6. Reference and sample work products

Selection of "trained", qualified personnel is required by this Code. In order to meet this requirement, the commissioning provider should be evaluated via the methods discussed above. In addition, various organizations have training and certification programs that may be a source for identification of qualified commissioning providers.

For information about enforcement and compliance of each commissioning element, see Sections 5.410.2.1 through 5.410.2.7.

Find sample forms and templates in Part 2 following the standard.

A6.1.1 Owner's Project Requirements
CALGreen Section: 5.410.2.1 Owner's or Owner representative's Project Requirements (OPR).

A6.1.1.1 Intent:

The Owner's Project Requirements (OPR) documents the functional requirements of a project and expectations of the building use and operation as it relates to systems being commissioned. The document describes the physical and functional building characteristics desired by the owner and establishes performance and acceptance criteria. The OPR is most effective when developed during predesign and used to develop the Basis of Design (BOD) during the design process. The level of detail and complexity of the OPR will vary according to building use, type and systems.

A6.1.1.2 Existing Law or Regulation:

No existing law or regulation. Review local ordinances for any applicable commissioning OPR requirement.

A6.1.1.3 Compliance Method:

Compliance is demonstrated by the owner or owner's representative developing and/or approving the Owner's Project Requirements (OPR) document and can be defined as follows:

1. *Environmental and Sustainability Goals* – Establish environmental project goals and objectives exceeding the code for the project's sustainability which may include:
   a) CALGreen voluntary measures or Tiers sought, or other specific green building rating system or program credits and/or level of certification sought
   b) Specific environmental or sustainability goals such as water efficiency, water reuse, CO2 monitoring, xeriscaping, etc.
2. *Energy Efficiency Goals* – Establish goals and targets affecting energy efficiency which may include:
   a) Overall energy efficiency less than the *California Energy Code* performance approach energy budget by __%)
   b) Lighting system efficiency (less than the *California Energy Code* performance approach energy budget by __%)
   c) HVAC equipment efficiency & characteristics
   d) Any other measures affecting energy efficiency desired by owner
      – Building orientation and siting
      – Daylighting
      – Facade, envelope and fenestration
      – Roof

- Natural ventilation
- Onsite renewable power generation and net-zero energy use
- Landscaping and shading

3. *Indoor Environmental Quality Requirements* – For each program space describe indoor environmental requirements including intended use and anticipated schedule
   a) Lighting
   b) Temperature and humidity
   c) Acoustics
   d) Air quality, ventilation and filtration
   e) Desired adjustability of system controls
   f) Accommodations for after-hours use
   g) Other owner requirements including natural ventilation, operable windows, daylight, views, etc.
4. *Project Program, including facility functions and hours of operation, and need for after hours operation* – Describe primary purpose, program and use of proposed project
   a) Building size, number of stories, construction type, occupancy type and number
   b) Building program areas including intended use and anticipated occupancy schedules
   c) Future expandability and flexibility of spaces
   d) Quality and/or durability of materials and building lifespan desired
   e) Budget or operational constraints
   f) Applicable codes
5. *Equipment and Systems Expectations* – Describe the following for each system commissioned:
   a) Level of quality, reliability, equipment type, automation, flexibility, maintenance and complexity desired
   b) Specific efficiency targets, desired technologies, or preferred manufacturers for building systems, acoustics and vibration
   c) Degree of system integration, automation and functionality for controls; i.e., load shedding, demand response, energy management
6. *Building Occupant and O&M Personnel Expectations* – Describe the following:
   a) How building will be operated and by whom
   b) Level of training and orientation required to understand, operate and use the building systems for building operation and maintenance staff, as well as occupants
   c) Building operation and maintenance staff location and capabilities

Find sample forms and templates in Part 2 following the standard.

A6.1.1.4 Enforcement:

At his or her discretion, the building official confirms demonstrated compliance at Plan Intake by:

a) Receipt of a copy of the OPR document, or
b) Receipt of a form signed by the owner or owner representative attesting that the OPR has been completed and approved by the owner.

Find sample forms and templates in Part 2 following the standard.

A6.1.2 Basis of Design (BOD)
CALGreen Section: 5.410.2.2 Basis of Design (BOD).

A6.1.2.1 Intent:

The Basis of Design (BOD) describes the building systems to be commissioned and outlines design assumptions not indicated in the design documents. The design team develops the BOD to describe how the building systems design meets the Owner's Project

Requirements (OPR), and why the systems were selected. The BOD is most effective when developed early in the project design and updated as necessary throughout the design process.

A6.1.2.2 Existing Law or Regulation:

No existing law or regulation. Review local ordinances for any applicable commissioning BOD requirement.

A6.1.2.3 Compliance Method:

Compliance requires the completion of the BOD document and should include the following where applicable:

1. *Heating, Ventilation, Air Conditioning (HVAC) Systems and Controls*
    a) Provide narrative description of system – system type, location, control type, efficiency features, outdoor air ventilation strategy, indoor air quality features, environmental benefits, other special features.
    b) Describe reasons for system selection – why chosen system is better than alternatives, issues such as comfort, performance, efficiency, reliability, flexibility, simplicity, cost, owner preference, site constraints, climate, maintenance, acoustics
    c) Provide design criteria including the following:
        – Load calculation method/software
        – Summer outdoor design conditions(__°F drybulb and __°F wetbulb)
        – Winter outdoor design conditions (__°F drybulb and __°F wetbulb)
        – Indoor design conditions (__°F drybulb cooling, __%RH cooling;
          __°F drybulb heating, __%RH heating)
        – Applicable codes, guidelines, regulations and other references used
        – Load calculation assumptions
    d) Sequence of Operations – operating schedules, setpoints, may refer to plans or specifications if sequence indicated within permit documents
    e) Describe how system meets the OPR
2. *Indoor Lighting System and Controls*
    a) Provide narrative description of system – type of fixtures, lamps, ballasts, controls
    b) Describe reason for system selection – why chosen system better than alternatives, issues such as visual comfort, performance, efficiency, reliability, cost, flexibility, owner preference, color rendering, integration with daylighting, ease of control
    c) Provide design criteria for each type of space including the following:
        – Applicable codes, guidelines, regulations and other references used
        – Illumination design targets (footcandles) and lighting calculation assumptions
    d) Provide lighting power design targets for each type of space
        – Title 24 lighting power allowance and lighting power design target (watts/ft^2)
    e) Describe how system meets the OPR
3. *Water Heating System*
    a) Provide narrative description of system – system type, control type, location, efficiency features, environmental benefits, other special features
    b) Describe reason for system selection – why chosen system is better than alternatives, issues such as performance, efficiency, reliability, space constraints, cost, utility company incentives, owner preference, ease of maintenance
    c) Water heating load calculations
    d) Describe how system meets the OPR
4. *Renewable Energy Systems*
    a) Provide narrative description of system – type, performance, control type, energy savings, payback period

b) Describe reason for system selection – why chosen system is better than alternatives, issues such as performance, efficiency, reliability, flexibility, simplicity, expandability, cost, payback period, utility company incentives, owner preference,

c) Sequence of Operation – operating schedules, setpoints, storage capacity

d) Describe how system meets the OPR

5. *Landscape Irrigation Systems*

a) Provide narrative description of system – type, performance, water usage

b) Describe reason for system selection – why chosen system is better than alternatives, issues such as performance, efficiency, reliability, flexibility, expandability, cost, owner preference, simplicity

c) Sequence of Operation – operating schedules, setpoints

d) Describe how system meets the OPR

6. *Water Reuse Systems*

a) Provide narrative description of system – type, performance, capacity, reuse purpose

b) Describe reason for system selection – why chosen system is better than alternatives, issues such as performance, efficiency, reliability, flexibility, expandability, cost, owner preference, simplicity

c) Sequence of Operation – operating schedules, setpoints

d) Describe how system meets the OPR

Find sample forms and templates in Part 2 following the standard.

A6.1.2.4 Enforcement:

At his or her discretion, the building official confirms demonstrated compliance at Plan Intake by:

a) Receipt of a copy of the BOD document, or

b) Receipt of a form signed by the architect, engineer or designer of record, attesting that the BOD has been completed and meets the requirements of the OPR.

Find sample forms and templates in Part 2 following the standard.

A6.1.3 Commissioning measures shown in the construction documents CALGreen Section: 5.410.2 Commissioning.

This section provides details for element 3: Commissioning measures shown in the construction documents.

A6.1.3.1 Intent:

Include commissioning measures or requirements in the construction documents (plans and specifications). Commissioning measures or requirements should be clear, detailed and complete to clarify the commissioning process.

A6.1.3.2 Existing Law or Regulation:

Title 24 Part 6 requires that specific functional test procedure forms be included in the construction documents. These test forms create a subset of the broader CalGreen commissioning requirements described herein. Review local ordinances for additional applicable requirements.

A6.1.3.3 Compliance Method:

Compliance is achieved by including commissioning requirements in the project specifications. The commissioning specifications should include the following:

1. Primary (and optionally all) commissioning requirements are included in the general specification division (typically Division 1) and clear cross references of all commissioning requirements to and from the general division are included to ensure all subcontractors are held to them
2. A list of the systems and assemblies covered by the commissioning requirements.
3. Roles and responsibilities of all parties including:

- General contractor and subcontractors, vendors, construction manager
- Commissioning provider lead
- Owner, facility staff
- Architect and design engineers
- Including the noncontractor parties in the construction specifications is for information only to provide the contractor with context for their work
- Include who writes checklists and tests, who reviews and approves test forms, who directs tests, who executes tests, who documents test results and who approves completed tests. These roles may vary by system or assembly.

4. Meeting requirements
5. Commissioning schedule management procedures
6. Issue and noncompliance management procedures
7. Requirements for execution and documentation of installation, checkout and start up, including controls point-to-point checks and calibrations
8. Specific testing requirements by system, including:
   - Monitoring and trending
   - Opposite season or deferred testing requirements, functions and modes to be tested
   - Conditions of test
   - Acceptance criteria, and any allowed sampling
   - Include details of the format and rigor of the test forms required to document test execution
   - Including example forms is recommended
9. Submittal review requirements and approval process
10. Content, authority and approval process of the commissioning plan
11. Commissioning documentation and reporting requirements
12. Facility staff training requirements and verification procedures
13. O&M manual review and approval procedures
14. System's manual development and approval requirements and procedures
15. Definitions section

Find sample forms and templates in Part 2 following the standard.

A6.1.3.4 Enforcement:

At his or her discretion, the building official confirms demonstrated compliance at Plan Intake by:

a) Receipt of a copy of the commissioning specifications, or
b) Receipt of a form signed by the owner or owner representative or designer of record attesting that the owner-approved commissioning specifications are included in the construction documents.

Find sample forms and templates in Part 2 following the standard.

A6.1.4 Commissioning plan.
CALGreen Section: 5.410.2.3 Commissioning plan.

A6.1.4.1 Intent:

The Commissioning Plan (Cx Plan) establishes the commissioning process guideline for the project and commissioning team's level of effort by identifying the required Cx activities to ensure that the Owner's Project Requirements (OPR) and the Basis of Design (BOD) are met. The Cx Plan also includes a commissioning schedule from design to occupancy.

A6.1.4.2 Existing Law or Regulation:

No previous existing State of California laws or regulations. Review local county, city or jurisdiction ordinances for any applicable commissioning planning requirements.

A6.1.4.3 Compliance Method:

Compliance is demonstrated by preparation of a project specific Cx Plan that includes the elements listed in the code section above. The following gives guidance for developing the components of the Commissioning Plan:

1. General project information – Provide project identifying information including but not limited to the following:
   – Project Name, Owner, Location
   – Building type, Building area
   – Project Schedule
   – Contact information of individual/company providing the commissioning services
2. Commissioning Goals – Document the commissioning goals, including, but not limited to:
   – Meeting CALGreen code requirements for commissioning
   – Meeting OPR and BOD requirements
   – Carrying out requirements for commissioning activities as specified in plans and specifications
3. Systems to be commissioned – See BOD
   a. An explanation of the original design intent – Document the performance objectives and design intent for each system listed to be commissioned in a written narrative
      – Refer to the OPR and BOD documents
   b. Equipment and systems to be tested, including the extent of tests
      – Provide a list of equipment and systems to be tested
      – Describe the range and extent of tests to be performed for each system component, and interface between systems
   c. Functions to be tested – Provide example functional test procedures to identify the level of testing detail required
      – See (section 5.410.2.4) FPT guidance for more information
   d. Conditions under which the test shall be performed – Identify the conditions under which the major operational system functions are to be tested, including:
      – Normal operations and part-load operations
      – Seasonal testing requirements
      – Restart of equipment and systems after power loss
      – System alarm confirmations
   e. Measurable criteria for acceptable performance – Include measurable criteria for acceptable performance of each system to be tested
4. Commissioning Team Information – Provide a contact list for all Commissioning team members, including but not limited to:
   – Owner, owner's representative
   – Architect, Engineers
   – Designated commissioning representative
   – General contractor, subcontractors, and construction manager
5. Commissioning process activities, schedules and responsibilities
   – Establish prescribed commissioning process steps and activities to be accomplished by the Cx team throughout the design to occupancy
   – For each phase of the work, define the roles and responsibilities for each member of the Cx team
   – List the required Cx deliverables, reports, forms and verifications expected at each stage of the commissioning effort
   – Include the confirmation process for the O&M manual, systems manual and the facility operator and maintenance staff training

Find sample forms and templates in Part 2 following the standard.

A6.1.4.4 Enforcement:

At his or her discretion, the building official confirms demonstrated compliance at Plan Intake by:

a) Receipt of a copy of the Commissioning Plan, or

b) Receipt of a form signed by the owner or owner representative attesting that the Cx Plan has been completed.

Find sample forms and templates in Part 2 following the standard.

A6.1.5 Functional performance testing

CALGreen Section: 5.410.2.4 Functional performance testing.

A6.1.5.1 Intent:

Develop and implement the functional performance tests to document, as set forth in the Commissioning Plan, that all components, equipment, systems and system-to-system interfaces were installed as specified, and operate according to the Owner's Project Requirements, Basis of Design, and plans and specifications.

The following systems to be functionally tested are listed in the Basis of Design (5.410.2.2 of the Code):

1. Heating, Ventilation, Air Conditioning (HVAC) Systems and Controls
2. Indoor Lighting System and Controls
3. Water Heating System
4. Renewable Energy Systems
5. Landscape Irrigation Systems
6. Water Reuse Systems

A6.1.5.2 Existing Law or Regulation:

Title 24 Acceptance Testing requirements call for functional testing of some systems and equipment required to be commissioned by CALGreen. Refer to Title 24 and Nonresidential Compliance Manual For California's 2008 Energy Efficiency Standards. http://www.energy.ca.gov/title24/2008standards/nonresidential_manual.html.

Note: CALGreen Functional Performance Tests are not intended to replace the Title 24 Section 6 Acceptance Tests. Instead, the T24 acceptance tests, which focus on energy efficiency, can be part of the broader scope of testing forms and procedures required for CALGreen compliance.

Review local ordinances for any applicable requirements.

A6.1.5.3 Compliance Method:

Compliance is demonstrated by developing and implementing test procedures for each piece of commissioned equipment and interfaces between equipment and systems according to the building-specific Commissioning Plan. Tests should include verification of proper operation of all equipment features, each part of the sequence of operation, overrides, lockouts, safeties, alarms, occupied and unoccupied modes, loss of normal power, exercising a shutdown, startup, low load through full load (as much as is possible) and back, staging and standby functions, scheduling, energy efficiency strategies and loop tuning.

Elements of acceptable test procedures include:

1. Date and Party — Identification of the date of the test and the party conducting the test.
2. Signature Block — Signature of the designated commissioning lead and the equipment installing contractor attesting that the recorded test results are accurate.
3. Prerequisites — Any conditions or related equipment checkout or testing that needs to be completed before conducting this test.
4. Precautions — Identification of the risks involved to the test team members and the equipment and how to mitigate them.
5. Instrumentation — Listing of the instrumentation and tools necessary to complete the test.
6. Reference — In each procedure item, identify the source for what is being confirmed (e.g., sequence of operation ID, operating feature, specification requirement, etc.).
7. Test Instructions — Step-by-step instructions of how to complete the test, including functions to test and the conditions under which the tests should performed.

8. Acceptance Criteria — Measurable pass / fail criteria for each step of the test, as applicable.
9. Results — Expected system response and space to document the actual response, readings, results and adjustments.
10. Return to Normal — Instructions that all systems and equipment are to be returned to their as-found state at the conclusion of the tests.
11. Deficiencies — A list of deficiencies and how they were mitigated.

Find sample forms and templates in Part 2 following the standard.

A6.1.5.4 Enforcement:

At his or her discretion, the building official confirms demonstrated compliance during Onsite Enforcement by:

a) Receipt of a copy of completed and signed Functional Performance Tests and corrected deficiencies, or
b) Receipt of a form signed by the owner, owner representative or commissioning coordinator attesting that the Functional Performance Tests have been completed and any deficiencies corrected.

Find sample forms and templates in Part 2 following the standard.

A6.1.6.1 Documentation and training:
CALGreen Section: 5.410.2.5 Documentation and training.

Section: 5.410.2.5.1 Systems manual.

A6.1.6.1.1 Intent:

The Systems Manual documents information focusing on the operation of the building systems. This document provides information needed to understand, operate, and maintain the equipment and systems and informs those not involved in the design and construction of the building systems. This document is in addition to the record construction drawings, documents, and the Operation & Maintenance (O&M) Manuals supplied by the contractor. The Systems Manual is assembled during the construction phase and available during the contractors' training of the facility staff.

A6.1.6.1.2 Existing Law or Regulation:

No existing law or regulation. Review local ordinances for any applicable Systems manual requirement.

A6.1.6.1.3 Compliance Method:

Compliance is demonstrated by providing the Systems Manual. The information in the Systems Manual includes the following information:

1. Site information, including facility description, history and current requirements
    a) Site Information
        i. Location of property – Address
        ii. Site acreage
        iii. Local utility information
            – Water service provider
            – Natural/LPG gas service provider
            – Electrical service provider
            – Telecommunications service provider
            – Other service providers
    b) Facility Description
        i. Use/Function
        ii. Square footage
        iii. Occupancy Type
        iv. Construction Type

v. Basis of design

vi. Location of major systems & equipment

c) Project History

i. Project requirements

– Owner's Project Requirements (OPR)

– Basis of Design (BOD)

ii. Project undocumented events

iii. Record Drawings and Documents

iv. Final control drawings and schematics

v. Final control sequences

vi. Construction documents – Location or delivery information

– Mechanical & electrical drawings

– Specifications

– Submittals

– Project change orders and information

d) Current requirements

i. Building operating schedules

ii. Space temperature, humidity, and pressure, CO_2 setpoints

iii. Summer and winter setback schedules

iv. Chilled and hot water temperatures

v. As-built control setpoints and parameters

2. Site contact information

a) Owner information

b) Emergency contacts

c) Design Team: Architect, Mechanical, Engineer, Electrical Engineer, etc.

d) Prime Contractor contact information

e) Subcontractor information

f) Equipment supplier contact information

3. Basic operation and maintenance, including general site operating procedures, basic trouble shooting, recommended maintenance requirements site events log

a) Basic operation

i. Written narratives of basic equipment operation

ii. Interfaces, interlocks and interaction with other equipment and systems

iii. Initial maintenance provide by contactor

b) General site operating procedures

i. Instructions for changes in major system operating schedules

ii. Instructions for changes in major system holiday and weekend schedules

c) Basic troubleshooting

i. Cite any recommended troubleshooting procedures specific to the major systems and equipment installed in the building.

ii. Manual operation procedures

iii. Standby/Backup operation procedures

iv. Bypass operation procedures

v. Major system power fail resets and restarts

vi. Trend log listing

d) Recommended maintenance events log
   i. HVAC air filler replacement schedule and log
   ii. Building control system sensor calibration schedule and log
e) Operation & Maintenance Manuals – Location or delivery information

4. Major systems
   a) HVAC systems and controls
      i. Air conditioning equipment (chillers, cooling towers, pumps, heat exchanges, thermal energy storage tanks, etc.)
      ii. Heating equipment (boilers, pumps, tanks, heat exchanges, etc.)
      iii. Air distribution equipment (fans, terminal units, accessories, etc.)
      iv. Ventilation equipment (fans, accessories, and controls)
      v. Building automation system (workstation, servers, panels, variable frequency drives, local control devices, sensors, actuators, thermostats, etc.)
   b) Indoor lighting systems and controls
      i. Lighting control panels
      ii. Occupancy sensors
      iii. Daylight harvesting systems
   c) Renewable energy systems
      i. Photovoltaic panels and inverters
      ii. Wind powered electrical generators and inverters
   d) Landscape irrigation systems
      i. Water distribution diagrams
      ii. Control system
   e) Water reuse systems
      i. Reclaimed water system for indoor use
      ii. Reclaimed water for irrigation use
5. Site equipment inventory and maintenance notes
   a) Spare parts inventory
   b) Frequently required parts and supplies
   c) Special equipment required to operate or maintain systems
   d) Special tools required to operate or maintain systems
6. A copy of all special inspection verifications required by the enforcing agency of this code
7. Other resources and documentation

Find sample forms and templates in Part 2 following the standard.

A6.1.6.1.4 Enforcement:

At his or her discretion, the building official confirms demonstrated compliance during Onsite Enforcement by:

a. Receipt of a copy of the Systems Manual, or
b. Receipt of a form signed by the owner or owner representative attesting that the System's Manual has been completed.

Find sample forms and templates in Part 2 following the standard.

A6.1.6.2 Documentation and training:
CALGreen Section: 5.410.2.5 Documentation and training.

Section: 5.410.2.5.2 Systems operations training.

A6.1.6.2.1 Intent:

The systems operation training verifies that a training program is developed to provide training to the appropriate maintenance staff for each equipment type and/or system and that this training program is documented in the commissioning report. The systems operations training program is specified in the project specifications for the major systems listed. The System Manual, Operation and Maintenance (O&M) documentation, and record drawings are prepared and available to the maintenance staff prior to implementation of any training or the development of a written training program. The training program is to be administered when the appropriate maintenance staff is made available to receive training.

A6.1.6.2.2 Existing Law or Regulation:

No existing law or regulation. Review local ordinances for any applicable Systems Operation Training requirement.

A6.1.6.2.3 Compliance Method:

The written training program includes: (a) learning goals and objectives for each session, (b) training agenda, topics, and length of instruction for each session, (c) instructor information and qualifications, (d) location of training sessions (onsite, off-site, manufacturer's or vendor's facility), (e) attendance forms, (f) training materials, and (g) description on how the training will be archived for future use.

1. Systems/equipment overview
    a) Review OPR and BOD related to the major systems and equipment
    b) Describe system type and configuration
    c) Explain operation all major systems and equipment and how it interfaces with other systems and equipment
    d) Describe operation of critical devices, controls and accessories
    e) Review location of the major systems and equipment
    f) Describe operation of control system for each system, location of critical control elements, and procedures to properly operate control system
    g) Review recommendations for implementation to reduce energy and water use
2. Review and demonstration of servicing/preventive maintenance
    a) Explain location or delivery contact of the Operation and Maintenance manuals
    b) Review of all manufacturer's recommended maintenance activities to maintain warranty
    c) Review and demonstrate frequent maintenance activities (air filter replacement, lubrication, fan belt inspection and/or replacement, condenser water treatment, etc.), and suggested schedule.
    d) Review and demonstrate typical servicing procedures and techniques (electrical current, pressure, and flow readings, etc.; calibration procedures, point trending, power fail restart procedures, etc.)
    e) Locate, observe and identify major equipment, systems, accessories and controls
    f) Review emergency shut-offs and procedures
3. Review of the information in the Systems Manual
    a) Describe use of System Manual
    b) Review elements of System Manual
    c) Explain how to update and add revisions to System Manual
4. Review record drawings on the systems/equipment
    a) Explain location or delivery contact of the record drawings
    b) Review record drawings, revisions, and changes to original design drawings.
    c) Review equipment schedules and compare with actual installed systems

Find sample forms and templates in Part 2 following the standard.

A6.1.6.2.4 Enforcement:

At his or her discretion, the building official confirms demonstrated compliance during Onsite Enforcement by:

1. In the event appropriate maintenance staff is made available to receive training for each equipment type and/or system installed in the building.

a. Receipt of a copy of the written training program and completed attendance forms, or

b. Receipt of a form signed by the owner or owner representative attesting that the training program and delivery of training has been completed.

2. In the event appropriate maintenance staff are unavailable to receive training for each equipment type and/or system installed in the building.

a. Receipt of a copy of the training program provided to the owner or owner's representative, or

b. Receipt of a form signed by the owner or owner representative attesting that the written training program has been provided.

Find sample forms and templates in Part 2 following the standard.

A6.1.7 Commissioning report:

CALGreen Section: 5.410.2.6 Commissioning report.

A6.1.7.1 Intent:

The Commissioning Report documents the commissioning process and test results. The report includes confirmation from the commissioning agent verifying that commissioned systems meet the conditions of the Owner's Project Requirements (OPR), Basis of Design (BOD), and Contract Documents.

A6.1.7.2 Existing Law or Regulation:

No existing law or regulation. Review local ordinances for any applicable Commissioning Report requirement.

A6.1.7.3 Compliance Method:

The Components of the Commissioning Report include the following and are defined as follows:

1. Executive summary of process and results of commissioning program – including observations, conclusions and any outstanding items.
2. History of any system deficiencies and how resolved
   a) Include outstanding deficiencies and plans for resolution
   b) Include plans for seasonal testing scheduled for a later date
3. System performance test results and evaluations
4. Summary of training process completed and scheduled
5. Attach commissioning process documents
   a) Commissioning Plan
   b) Owners Project Requirements (OPR)
   c) Basis of Design (BOD)
   d) Executed installation checklists
   e) Executed Functional Performance Test (FPT) forms
   f) Recommendations for end-of-warranty review activities

Find sample forms and templates in Part 2 following the standard.

A6.1.7.4 Enforcement:

At his or her discretion, the building official confirms demonstrated compliance during Onsite Enforcement by:

a) Receipt of a copy of the Commissioning Report, or

b) Receipt of a form signed by the owner or owner representative attesting that the Cx Report has been completed.

Find sample forms and templates in Part 2 following the standard.

Notation

Authority: *Health and Safety Code* Sections 18928, 18930.5, 18934.5, and 18938(b)
Reference: *Health and Safety Code,* commencing with Section 18901; and Section 38500 et seq.

A6.1-2011, PART 2

SAMPLE FORMS AND TEMPLATES for COMMISSIONING

Note: Following are examples of templates and/or forms that may be used or adopted for verification of compliance with commissioning. Code users may provide their own documents as permitted by the enforcing agency. For each subsection of commissioning, samples are provided; in a few cases with narrative templates, and in most cases with compliance forms. Simplified forms or more detailed forms, but not both, may be selected to submit for each project.

CALGreen Compliance Template-Owner's Project Requirements (OPR)	CALGreen Std. BSC-5.4-4 10-08-10

[The Owner's Project Requirements (OPR) is a step of commissioning required for compliance with the 2010 CALGREEN Code, Section 5.410.2.1, for newly constructed buildings greater than 10,000 sq. ft. This template is a guide to collecting the information recommended for the OPR. The information should be developed by the project team in collaboration with the Owner.]

Owner and User Requirements

a) [Typically already covered in Project Scope as described in the building program. Includes primary purpose, program and use of project. May also describe future expansion needs, flexibility, quality of materials, construction and operation costs.]

Environmental and Sustainability Goals

a) Project shall meet performance requirements required by the owner.

b) Other Owner requirements: [e.g., Owner priorities among CALGREEN Code or other areas]

Energy Efficiency Goals

a) Project shall comply with Title 24 building energy efficiency standards, or achieve increased level of efficiency determined by owner.

b) Lighting systems offer cost effective energy savings potential, and lighting fixtures and/or controls shall be selected to exceed Title 24 minimum efficiency requirements by level determined by owner.

c) High efficiency HVAC equipment offers cost effective energy savings, and HVAC equipment shall be selected that exceeds Title 24 minimum efficiency requirements by level determined by owner.

d) Additional energy efficiency measures that provide cost effective energy savings shall be included wherever feasible.

e) Other Owner requirements: [e.g., orientation, siting, daylighting, cool roof, natural ventilation, landscaping]

Indoor Environmental Quality Requirements

a) Indoor lighting requirements: *[List any specific nonstandard requirements, e.g., pendant-mounted lighting, illumination requirements, special applications.]*

b) Occupant lighting control requirements: *[List any nonstandard requirements, e.g., multimode controls for assembly spaces]*

c) Thermal comfort requirements: *[List any nonstandard temperature or humidity requirements]*

d) Ventilation and filtration requirements: *[List any nonstandard requirements]*

e) Occupancy HVAC control requirements: *[List any nonstandard requirements, e.g., integration with existing control systems]*

f) Acoustic environment requirements: *[List any nonstandard requirements, e.g., local noise sources requiring mitigation, spaces such as classrooms that require low backgrund noise and short reverberation times]*

g) Other Owner requirements: *[e.g., natural ventilation, operable windows, daylight, views]*

Equipment and Systems Expectations

a) Special HVAC equipment requirements: *[e.g., equipment type, quality, reliability, efficiency, control system type, preferred manufacturers, maintenance requirements]*

b) Unacceptable HVAC system types or equipment: *[List if applicable]*

c) Special lighting equipment requirements: *[e.g., list preferred lamp and ballast types that comply with Owner standards if applicable]*

d) Other system requirements:

Building Occupant and O&M Personnel Expectations

Day-to-day HVAC operation by: *[occupants, operating staff]*

Periodic HVAC maintenance performed by: *[building occupants, operating staff, service company, Owner staff, other]*

Lighting system maintenance will be performed by: *[building occupants, operating staff, service company, Owner staff, other]*

Training required for building occupants: *[e.g., demonstration, instruction documents]*

Training required for operating and maintenance staff: *[e.g., demonstration, classroom training, instruction documents]*

Other Owner requirements:

CALGreen Compliance Form-Owner's Project Requirements (OPR)	**CALGreen Std. BSC-5.4-5 10-08-10**

The following form may be required to be printed on the permit set of construction drawings or submitted separately. Italicized text indicates direct or partial quotes from the CALGreen Code.

CALGreen Commissioning Requirement 5.410.2.1-Owner's Project Requirements (OPR)

5.410.2.1 Owner's Project Requirements (OPR). The expectations and requirements of the building appropriate to its phase shall be documented before the design phase of the project begins. The OPR includes the checked elements listed below and have been approved by the Owner or Owner Representative.

	OPR ELEMENTS	INCLUDED
1.	Environmental and sustainability goals.	❑
2.	Energy efficiency goals.	❑
3.	Indoor environmental quality requirements.	❑
4.	Project program, including facility functions and hours of operation, and need for after hours operation.	❑
5.	Equipment and systems expectations.	❑
6.	Building occupant and O&M personnel expectations.	❑

_____ _____

Owner/Owner Representative Signature Date

CALGreen Compliance Form-Owner's Project Requirements (OPR)	CALGreen Std. BSC-5.4-5.1 7-15-11

INCORPORATE THIS FORM IN THE PLANS

Project Address: _____

Permit Number: _____

ITEM #	OPR ITEMS	PAGE NUMBER IN OPR DOCUMENT
	PROJECT PROGRAM	
1	General building information (size, stories, construction type, occupancy type and number)	
2	Intended uses and schedules	
3	Future expandability and flexibility of spaces	
4	Quality and/or durability of materials and desired building lifespan	
5	Budget or operation constraints	
	ENVIRONMENTAL AND SUSTAINABILITY GOALS	
6	Level of compliance with the *California Green Building Standards Code*: Mandatory, Tier 1, or Tier 2	
7	Specific environmental or sustainability goals (e.g., water efficiency, water reuse, CO_2 monitoring, xeriscaping, etc.)	
	ENERGY EFFICIENCY GOALS	
8	Overall efficiency of building: meet *California Energy Code* or exceed by (%)	
9	Lighting system efficiency: meet *California Energy Code* or exceed by (%)	
10	HVAC equipment efficiency and characteristics	
11	Other measures affecting energy efficiency desired by owner (e.g., Building orientation, shading, daylighting, natural ventilation, renewable power, etc.)	
	INDOOR ENVIRONMENTAL QUALITY REQUIREMENTS	
12	Lighting	
13	Temperature and Humidity	
14	Acoustics	
15	Air quality, ventilation, and filtration	
16	Desired adjustability of system controls	
17	Accommodations for after-hours use	
18	Other owner requirements (e.g., natural ventilation, daylight, views, etc.)	
	EQUIPMENT AND SYSTEMS EXPECTATIONS	
19	Level of quality, reliability, equipment type, flexibility, maintenance, and complexity desired	
20	Specific efficiency targets, desired technologies, or preferred manufacturers for building systems, acoustics and vibration	
21	Degree of system integration, automation, and functionality for controls (i.e., load shedding, demand response, energy management)	
	BUILDING OCCUPANT AND O&M PERSONNEL EXPECTATIONS	
22	Description of how the building will be operated and by whom	
23	Level of training and orientation required to understand, operate and use the building systems for building operation and maintenance staff, as well as occupants	
24	Building operation and maintenance staff location and capabilities	
	COMMISSIONING AGENT INFORMATION	
25	Name of Commissioning Agency:	
26	Address of Agency:	
27	Contact person(s) Name(s):	

OWNER/OWNER REPRESENTATIVE ACKNOWLEDGEMENT

Owner's Project Requirements (OPR). The expectations and requirements of the building appropriate to its phase shall be documented before the design phase of the project begins. The OPR includes the elements listed above and have been approved by the Owner or Owner Representative.

Name: _____ ❑ Owner ❑ Owner Representative

Company Name (if applicable): _____

Signature: _____ Date: _____

CALGreen Compliance Template-Basis of Design (BOD)	CALGreen Std. BSC-5.4-6 10-08-10

[Documentation of the Basis of Design (BOD) is a step required for compliance with 2010 CALGREEN Code, Section 5.410.2.1, for newly constructed buildings greater than 10,000 sq. ft. This template is a guide for use by the design team.]

1. HVAC System

1.1. Narrative Description of System

A. [System type(s), location, control type, efficiency features, outdoor air ventilation strategy, indoor air quality features, noise reduction features, environmental benefits, other special features]

B. [Describe how system meets any special requirements listed in the Owner's Project Requirements document.]

1.2. Reasons for System Selection

A. [Reasons that the selected system is a better choice than alternatives, e.g., comfort performance, efficiency, reliability, flexibility, simplicity, cost, owner preferences, site constraints, climate, availability of maintenance, acoustics]

1.3. Load Calculations

A. Load calculation method/software: _____

B. Summer outdoor design conditions: __°F drybulb, __°F wetbulb

C. Winter outdoor design conditions: __°F drybulb

D. Indoor design conditions: __°F, __%RH cooling; __°F heating

E. Internal heat gain assumptions:

SPACE	LIGHTING LOAD	PLUG LOAD	OCCUPANT LOAD	INFILTRATION LOAD	OTHER:

F. Calculated cooling loads and system size:

SYSTEM/AIR HANDLER ID	CALCULATED PEAK COOLING LOAD	SELECTED SYSTEM COOLING CAPACITY	REASONS FOR DIFFERENCE BETWEEN CALCULATED LOAD AND SELECTED SYSTEM CAPACITY

G. Other load calculation assumptions:

1.4. Sequence of Operations

A. Operating schedules, setpoints, etc. May refer to plans and/or specifications if sequence of operations is included there.]

2. Indoor Lighting System

2.1. Narrative Description of System

A. Fixture type(s)

B. Lamp and ballast type

C. Control type

D. Describe how system meets any special requirements listed in the Owner's Project Requirements document.]

2.2. Reasons for System Selection

A. [Reasons that the selected lighting system is a better choice than alternatives, e.g., visual comfort performance, efficiency, reliability, flexibility, simplicity, cost, owner preferences, color rendering, integration with daylighting, ease of maintenance, etc.]

2.3. Lighting Design Criteria

SPACE ID	SPACE TYPE	ILLUMINATION DESIGN TARGET (footcandles)	SOURCE OF TARGET (e.g., IES Standard, Owner Requirement)	OTHER LIGHTING DESIGN CRITERIA: [e.g., CRI, CCT]

2.4. Lighting Power Design Targets

SPACE TYPE	TITLE 24 LIGHTING POWER ALLOWANCE (watts/ft^2)	LIGHTING POWER DESIGN TARGET (watts/ft^2)

3. Water Heating System

3.1. Narrative Description of System

A. [System type(s), location, control type, efficiency features, environmental benefits, other special features]

B. [Describe how system meets any special requirements listed in the Owner's Project Requirements document.]

3.2. Reasons for System Selection

A. [Reasons that the selected water heating system is a better choice than alternatives, e.g., performance, efficiency, reliability, simplicity, space constraints, cost, owner preferences, ease of maintenance, utility company incentives, etc.]

3.3. Water Heating Load Calculations

A. [Describe sizing calculation method, assumptions, and results]

4. Renewable Energy Systems

4.1. Narrative Description of System

A. [System type(s), location, inverter type, control type, performance, efficiency, energy savings, payback period]

B. [Describe how system meets any special requirements listed in the Owner's Project Requirements document.]

4.2. Reasons for System Selection

A. [Reasons that the selected renewable energy systems are a better choice than alternatives, e.g., performance, efficiency, reliability, flexibility, simplicity, expandability, cost, payback period, utility company incentives, owner preference, space constraints, cost, owner preferences, ease of maintenance, etc.]

4.3. Renewable Energy System Generation Calculations

A. [Describe sizing calculation method, assumptions, and results]

5. Landscape Irrigation Systems

5.1. Narrative Description of System

A. [System type(s), location, control type, performance, efficiency, water savings]

B. [Describe how system meets any special requirements listed in the Owner's Project Requirements document.]

5.2. Reasons for System Selection

A. [Reasons that the selected landscape irrigation systems are a better choice than alternatives, e.g., performance, efficiency, reliability, flexibility, simplicity, expandability, cost, payback period, utility company incentives, owner preference, cost, owner preferences, ease of maintenance, etc.]

5.3. Landscape Irrigation System Calculations

A. [Describe sizing calculation method, assumptions, and results]

6. Water Reuse Systems

6.1. Narrative Description of System

A. [System type(s), location, space requirements, equipment requirements, control type, performance, efficiency, potable water savings, payback period]

B. [Describe how system meets any special requirements listed in the Owner's Project Requirements document.]

6.2. Reasons for System Selection

A. [Reasons that the selected water reuse systems are a better choice than alternatives, e.g., performance, efficiency, reliability, flexibility, simplicity, expandability, cost, payback period, utility company incentives, owner preference, space constraints, cost, owner preferences, ease of maintenance, etc.]

6.3. Water Reuse System Calculations

A. [Describe sizing calculation method, assumptions, and results]

CALGreen Compliance Form-Basis of Design (BOD)	CALGreen Std. BSC-5.4-6.1 7-15-11

INCORPORATE THIS FORM IN THE PLANS

Project Address: _____

Permit Number: _____

ITEM #	OPR ITEMS	PAGE NUMBER IN OPR DOCUMENT
	HVAC SYSTEMS AND CONTROLS	
1	Narrative description of system (i.e., system type(s), location, control type, efficiency features, outdoor air ventilation strategy, indoor air quality features, noise reduction features, environmental benefits, other features)	
2	Description of how the system meets requirements in OPR	
3	Reasons for system selection, as opposed to alternatives (e.g., comfort performance, efficiency, reliability, cost, acoustics, etc.)	
4	Load calculations (i.e., method/software, summer outdoor conditions, winter outdoor conditions, indoor design conditions, assumptions, other)	
5	Sequence of Operations (i.e., operating schedules, setpoints, other)	
	INDOOR LIGHTING SYSTEM	
6	Narrative Description of system (e.g., fixture type(s), lamp & ballast type, control type, etc.)	
7	Description of how the system meets requirements in OPR	
8	Reasons for system selection, as opposed to alternatives (e.g., visual comfort performance, efficiency, reliability, flexibility, simplicity, cost, etc.)	
9	Lighting Design Criteria (i.e., space ID, space type, illumination design target, source of target, other)	
10	Lighting Power Design Target (i.e., space type, Title 24-Energy Code lighting power allowance, lighting power design target, other)	
	WATER HEATING SYSTEM	
11	Narrative description of system (i.e., system type, location, control type, efficiency features, environmental benefits, other)	
12	Description of how the system meets requirements in OPR	
13	Reasons for system selection, as opposed to alternatives (e.g., performance, efficiency, reliability, simplicity, cost, ease of maintenance, other)	
14	Water heating load calculations: sizing calculation method, assumptions, and results	
	RENEWABLE ENERGY SYSTEMS (IF ANY)	
15	Narrative description of system (i.e., system type(s), location, inverter type, control type, performance, efficiency, energy savings, payback period, other)	
16	Description of how the system meets requirements listed in OPR	
17	Reasons for system selection, as opposed to alternatives (e.g., performance, efficiency, reliability, flexibility, simplicity, expandability, cost, payback period, etc.)	
18	Renewable energy system generation calculations: sizing calculation method, assumptions, and results	
	LANDSCAPE IRRIGATION SYSTEMS	
19	Narrative description of system (i.e., system type(s), location, control type, performance, efficiency, water savings, other)	
20	Description of how the system meets requirements in OPR	
21	Reasons for system selection, as opposed to alternatives (e.g., performance, efficiency, reliability, flexibility, cost, utility company incentives, etc.)	
22	Landscape irrigation system calculations: sizing calculation method, assumptions, and results	
	WATER REUSE SYSTEM (IF ANY)	
23	Narrative description of system (i.e., system type(s), location, space requirements, equipment requirements, control type, performance, efficiency, potable water savings, payback period, other)	
24	Description of how the system meets requirements in OPR	
25	Reasons for system selection, as opposed to alternatives (e.g., performance, efficiency, reliability, flexibility, simplicity, cost, payback period, etc.)	
26	Water reuse system calculations: sizing calculation method, assumptions, and results	

ARCHITECT/ENGINEER/DESIGNER ACKNOWLEDGEMENT

I hereby acknowledge the Basis of Design (BOD) document has been completed and meets the Owner's Project Requirements (OPR)

	NAME	LICENSE NUMBER	SIGNATURE	DATE
Architect of Record				
Mechanical Designer				
Electrical Designer				
Plumbing Designer				
Landscape Architect				
Renewable Energy System Designer				
Other (specify):				

COMMISSIONING AGENT ACKNOWLEDGEMENT

I have reviewed the Basis of Design (BOD) and verified that it meets the Owner's Project Requirements (OPR):

Name: _____

Company Name (if applicable): _____

Agent's Signature: _____ Date: _____

CALGreen Compliance Form-Commissioning Measures in the Construction Documents	CALGreen Std. BSC-5.4-7 10-08-10

The following form may be required to be printed on the permit set of construction drawings or submitted separately. Italicized text indicates direct or partial quotes from the CALGreen Code.

CALGreen Commissioning Requirement 5.410.2-Commissioning Measures in the Construction Documents

5.410.2. Commissioning measures shall be shown in the construction documents. The commissioning measures shown in the construction documents include the checked elements listed below and have been approved by the Owner, Owner Representative or Designer of record.

	COMMISSIONING MEASURE ELEMENTS	INCLUDED
1.	Measures shown in the specifications and cross referenced	❑
2.	List of commissioned equipment and systems	❑
3.	Cx roles and responsibilities of all parties	❑
4.	Meeting requirements	❑
5.	Commissioning schedule management procedures	❑
6.	Procedures for addressing outstanding issues or noncompliance	❑
7.	Requirements for execution and documentation of installation and equipment start up	❑
8.	Specific testing requirements for each system type[1]	❑
9.	Submittal review and approval requirements	❑
10.	Contents and approval process of the commissioning plan	❑
11.	Cx documentation and reporting requirements	❑
12.	Facility staff training requirements and verification procedures	❑
13.	O&M manual review and approval procedures	❑
14.	Systems manual development and approval procedures	❑
15.	Definitions	❑

1. These are not the detailed step-by-step test procedures, but are lists of features, elements, modes and conditions of tests for specific equipment.

_____ _____

Owner/Owner Representative or Designer of Record Signature

Date

CALGreen Compliance Form- Commissioning Measures in the Construction Documents	CALGreen Std. BSC-5.4-7.1 7-15-11

INCORPORATE THIS FORM IN THE PLANS

Project Address: _____

Permit Number: _____

ITEM #	COMMISSIONING MEASURES ITEMS
1	Measures shown in the specifications and cross referenced
2	List of commissioned equipment and systems
3	Cx roles and responsibilities of all parties
4	Meeting requirements
5	Commissioning schedule management procedures
6	Procedures for addressing outstanding issues or noncompliance
7	Requirements for execution and documentation of installation and equipment start up
8	Specific testing requirements for each system type
9	Submittal review and approval requirements
10	Contents and approval process of the commissioning plan
11	Cx documentation and reporting requirements
12	Facility staff training requirements and verification procedures
13	O & M manual review and approval procedures
14	Systems manual development and approval procedures
15	Definitions

COMMISSIONING AGENT ACKNOWLEDGEMENT

I have reviewed the construction documents listed above and verified their compliance with the owner's project requirements, basis of design, and commissioning plan.

Name: _____

Company Name (if applicable): _____

Agent's Signature: _____ Date: _____

CALGreen Compliance Form-Commissioning Plan	CALGreen Std. BSC-5.4-8 10-08-10

The following form may be required to be printed on the permit set of construction drawings or submitted separately. Italicized text indicates direct or partial quotes from the CALGreen Code.

CALGreen Commissioning Requirement 5.410.3-Commissioning Plan

5.410.2.3 Prior to permit issuance a commissioning plan shall be completed to document how the project will be commissioned and shall be started during the design phase of the building project. The commissioning plan includes the checked elements listed below and has been approved by the Owner or Owner Representative.

	COMMISSIONING PLAN ELEMENTS	INCLUDED
1.	General project information	❑
2.	Commissioning goals	❑
3.	An explanation of original design intent	❑
4.	Equipment and systems to be commissioned and tested, including extent of tests	❑
5.	Functions to be tested and conditions of tests[1]	❑
6.	Measurable performance criteria	❑
7.	Cx team information	❑
8.	Cx activities, schedules and responsibilities	❑

1. These are not the detailed step-by-step test procedures, but are lists of features, elements, modes and conditions of tests for specific equipment.

_____ _____

Owner/Owner Representative Signature Date

Green Compliance Form- Commissioning Plan	CALGreen Std. BSC-5.4-8.1 10-08-10

INCORPORATE THIS FORM IN THE PLANS

Project Address: _____

Permit Number: _____

ITEM #	COMMISSIONING PLAN ITEMS*	PAGE NUMBER IN COMMISSIONING PLAN DOCUMENT
	GENERAL PROJECT INFORMATION	
1	Project name, owner, location	
2	Building type, building area	
3	Overall project commissioning schedule	
4	Contact information for individual/company providing commissioning services	
	COMMISSIONING GOALS	
5	Meet *California Green Building Standards Code* requirements for commissioning	
6	Meeting OPR and BOD requirements	
7	Carrying out requirements for commissioning activities as specified in plans and specifications	
	SYSTEMS TO BE COMMISSIONED	
8	Explanation of the original design intent (refer to OPR and BOD documents)	
9	Equipment and systems to be tested*, functions to be tested, conditions under which the test shall be performed, and measurable criteria for acceptable performance	
	COMMISIONING TEAM INFORMATION	
10	List of all team members and contact information (i.e., owner, owner's representative, architect, engineers, designated commissioning representative, and (if available): general contractor, subcontractors, and construction manager)	
	COMMISSIONING PROCESS ACTIVITIES, SCHEDULES, AND RESPONSIBILITIES	
11	Prescribed commissioning process steps and activities to be accomplished by the Cx team throughout the design to occupancy	
12	Roles and responsibilities for each member of the Cx team for each phase of the work	
13	Required Cx deliverables, reports, forms, and verifications expected at each stage of the commissioning effort	
14	Confirmation process for the O&M manual, systems manual and the facility operator and maintenance staff training	

* The following systems shall be tested: HVAC & controls, indoor lighting system & controls, water heating system, renewable energy systems, landscape irrigation systems and water reuse systems.

OWNER/OWNER REPRESENTATIVE ACKNOWLEDGEMENT

The commissioning plan includes the items listed above and have been approved by the Owner or Owner Representative:

Name: _____ ❑ Owner ❑ Owner Representative

Company Name (if applicable): _____

Signature: _____ Date: _____

CALGreen Compliance Form-Functional Performance Testing	CALGreen Std. BSC-5.4-9 10-08-10

Italicized text indicates direct or partial quotes from the CALGreen Code.

CALGreen Commissioning Requirement 5.410.2.4-Functional Performance Testing

5.410.2.4 Functional performance tests shall demonstrate the correct installation and operation of each component, system, and system-to-system interface in accordance with the approved plans and specifications. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized, and include any readings and adjustments made. Test forms have been developed for each piece of commissioned equipment and system and include the checked elements listed below. These tests have been executed with deficiencies corrected.

	FUNCTIONAL TEST ELEMENTS	INCLUDED
1.	Date and parties participating	❑
2.	Signature block attesting test is complete and accurate	❑
3.	Prerequisites	❑
4.	Precautions	❑
5.	Instrumentation required	❑
6.	Reference to the source of what is being confirmed (sequences, packaged features, etc.)	❑
7.	Detailed step-by-step test instructions	❑
8.	Acceptance criteria	❑
9.	Results	❑
10.	Confirmation of returning to normal	❑
11.	Deficiency list	❑

_____ _____

Cx Coordinator Signature Date

Green Compliance Form- Functional Performance Testing	CALGreen Std. BSC-5.4-9.1 7-15-11

COMPLETE THIS FORM FOR THE TIME OF INSPECTION

Project Address: _____

Permit Number: _____

List the functional test reports below for all systems to be tested (see Form 5.4-8.1, item #9)

REPORT # (e.g., FPT-003)	SYSTEM/EQUIPMENT TEST REPORT (See minimum report requirements on page 2 of this form)	PAGE/TAB # IN COMMISSIONING REPORT

COMMISSIONING AGENT ACKNOWLEDGEMENT

I have reviewed the test reports listed above and verified that they are complete; these tests have been executed with deficiencies corrected.

Name: _____

Company Name (if applicable): _____

Agent's Signature: _____ Date: _____

Minimum Requirements for Test Report

1. Date and Party – Identification of the date of the test and the party conducting the test.
2. Signature Block – Signature of the designated commissioning lead and the equipment installing contractor attesting that the recorded test results are accurate.
3. Prerequisites – any conditions or related equipment checkout or testing that needs to be completed before conducting this test.
4. Precautions – Identification of the risks involved to the test team members and the equipment and how to mitigate them.
5. Instrumentation – Listing of the instrumentation and tools necessary to complete the test.
6. Reference – In each procedure item, identify the source for what is being confirmed (e.g., sequence of operation ID, operating feature, specification requirement, etc.)
7. Test Instructions – Step-by-step instructions of how to complete the test, including functions to test and the conditions under which the tests should be performed.
8. Acceptance Criteria – Measurable pass/fail criteria for each step of the test, as applicable.
9. Results – Expected system response and space to document the actual response, readings, results, and adjustments.
10. Return to Normal – Instructions that all systems and equipment are to be returned to their as-found state at the conclusion of the tests.
11. Deficiencies – A list of deficiencies and how they were mitigated.

CALGreen Compliance Form-Systems Manual	CALGreen Std. BSC-5.4-10 10-08-10

Italicized text indicates direct or partial quotes from the CALGreen Code.

CALGreen Commissioning Requirement 5.410.2.5.1-Documentation and Training-Systems Manual

5.410.2.5.1 Systems Manual. Documentation of the operational aspects of the building shall be completed within the Systems Manual and delivered to the building owner or representative and facilities operator. The Systems Manual includes the checked elements listed below.

	SYSTEM MANUAL ELEMENTS	INCLUDED
1.	Site information including facility description, history and current requirements	❑
2.	Site contact information	❑
3.	Basic operations and maintenance and troubleshooting	❑
4.	Systems covered include major systems listed under the BOD.	❑
5.	Site equipment inventory and maintenance notes	❑
6.	Special inspection verifications	❑
7.	Other resources and documentation	❑

_____ _____

Owner/Owner Representative Signature Date

CALGreen Compliance Form-Training	CALGreen Std. BSC-5.4-11 10-08-10

Italicized text indicates direct or partial quotes from the CALGreen Code.

CALGreen Commissioning Requirement 5.410.2.5.2-Documentation and Training-Training

5.410.2.5.2 Systems Operations Training. The training of the appropriate maintenance staff for each equipment type and/or system shall be documented in the commissioning report. The written training program includes the checked elements listed below.

	SYSTEM MANUAL ELEMENTS	INCLUDED
1.	System/equipment overview (what it is, what it does and with what other systems and/or equipment it interfaces)	❑
2.	Review and demonstration of servicing & preventive maintenance	❑
3.	Review of the information in the Systems Manual	❑
4.	Review of the record drawings on the system/equipment	❑

The Owner or Owner Representative attest that when the appropriate maintenance staff are made available prior to certificate of occupancy that the written training program was executed with these staff. Or, that if appropriate maintenance staff are not available, that the written training program was submitted and approved by the Owner or Owner Representative.

_____ _____

Owner/Owner Representative Signature Date

Green Compliance Form- System Manual/Training	CALGreen Std. BSC-5.4-11.1 7-15-11

COMPLETE THIS FORM FOR THE TIME OF INSPECTION

Project Address: _____

Permit Number: _____

Part One: System Manual

ITEM #	SYSTEM MANUAL ELEMENTS	PAGE NUMBER IN MANUAL
	SITE INFORMATION	
1	General (i.e., address, acreage, local utility information, other)	
2	Facility description (i.e., use/function, square footage, occupancy type, construction type, basis of design, location of major systems & equipment)	
3	Project history (i.e., project requirements (BOD/OPR), project undocumented events, record drawings & documents, final control drawings & schematics, final control sequences, construction documents)	
4	Current requirements (i.e., building operating schedules, space temperature, humidity, pressure, CO_2 setpoints, summer and winter setback schedules, chilled and hot water temperatures, As-built control setpoints & parameters)	
	SITE CONTACT INFORMATION	
5	Owner Information	
6	Emergency contacts	
7	Design Team (i.e., architect, mechanical engineer, electrical engineer, other)	
8	Prime Contractor contact information	
9	Subcontractor information	
10	Equipment supplier contact information	
	BASIC OPERATIONS & MAINTENANCE	
11	Basic operation (i.e., narratives of basic equipment operation, interfaces, interlocks & interaction with other equipment & systems, initial maintenance provided by the contractor)	
12	General site operating schedules (i.e., instructions for changes in major system operating schedules, instructions for changes in major system holiday & weekend schedules)	
13	Basic troubleshooting (i.e., cite recommended troubleshooting procedures specific to major systems & equipment, manual operation procedures, standby/backup/bypass operation procedures, major system power fail resets and restarts, trend log listing)	
14	Recommended maintenance events log (i.e., HVAC air filler replacement schedule & log, building control system sensor calibration schedule & log)	
15	Operation & maintenance manuals (location or delivery information)	
	MAJOR SYSTEMS	
16	HVAC systems & controls (i.e., AC equipment, heating equipment, air distribution equipment, ventilation equipment, building automation system)	
17	Indoor lighting systems & controls (i.e., lighting control panels, occupancy sensors, daylight harvesting systems)	
18	Renewable energy systems (i.e., photovoltaic panels & inverters, wind powered electrical generators & inverters)	
19	Landscape irrigation systems (i.e., water distribution diagrams, and control system)	
20	Water reuse systems (i.e., reclaimed water system for indoor use, reclaimed water for irrigation use)	
	SITE EQUIPMENT INVENTORY & MAINTENANCE NOTES	
21	Spare parts inventory	
22	Frequently required parts and supplies	
23	Special equipment required to operate or maintain systems	
24	Special tools required to operate or maintain systems	
	SPECIAL INSPECTIONS	
25	Copies of all special inspection verifications required by the enforcing agency of this code	
	OTHER	
26	Other resources and documentation	

Part Two: Training

ITEM #	TRAINING PROGRAM ELEMENTS	PAGE NUMBER IN TRAINING DOCUMENT
1	System/equipment overview (i.e., what it is, what it does, and with what other systems and/or equipment it interfaces)	
2	Review and demonstration of servicing & preventative maintenance	
3	Review of the information in the Systems Manual	
4	Review of the record drawings on the system/equipment	

OWNER/OWNER REPRESENTATIVE ACKNOWLEDGEMENT

❑ Documentation of the operation aspects of the building shall be completed within the systems manual and delivered to the building owner or representative and facilities operator. The Systems Manual includes the elements listed in part one of this form; or

❑ When the appropriate maintenance staff is made available prior to the certificate of occupancy, the written training program will be executed to these staff. The written training program includes the elements listed in part two of this form.

Name: _____ ❑ Owner ❑ Owner Representative

Company Name (if applicable): _____

Signature: _____ Date: _____

CALGreen Compliance Form-Commissioning Report	CALGreen Std. BSC-5.4-12 10-08-10

Italicized text indicates direct or partial quotes from the CALGreen Code.

CALGreen Commissioning Requirement 5.410.2.6-Commissioning Report

5.410.2.6 Commissioning Report. A complete report of commissioning process activities undertaken through the design, construction and reporting recommendations for post-construction phases of the building project shall be completed and provided to the owner or representative. The commissioning report includes the checked elements listed below and has been approved by the Owner or Owner Representative.

	COMMISSIONING REPORT ELEMENTS	INCLUDED
1.	Executive summary with conclusions and outstanding issues	❑
2.	History of system deficiencies and resolution	❑
3.	Summary of system functional test results	❑
4.	Summary of training completion	❑
5.	Attachments of Commissioning plan, OPR, BOD, executed (filled in) installation checklists, executed functional tests, recommendations for end-of-warranty review	❑

_____ _____

Owner/Owner Representative Signature Date

CALGreen Compliance Form-Commissioning Report	CALGreen Std. BSC-5.4-12.1 7-15-11

COMPLETE THIS FORM FOR THE TIME OF INSPECTION

Project Address: _____

Permit Number: _____

ITEM #	COMMISSIONING REPORT ELEMENTS	PAGE NUMBER IN COMMISSIONING REPORT DOCUMENT
	EXECUTIVE SUMMARY	
1	Executive summary of process and results of commissioning program (include observations, conclusions, and any outstanding items)	
	HISTORY OF ANY SYSTEM DEFICIENCIES AND HOW RESOLVED	
6	Outstanding deficiencies and plans for resolution	
7	Plans for seasonal testing scheduled for a later date	
	RESULTS	
8	System performance test results and evaluations	
	SUMMARY OF TRAINING	
9	Summary of training process completed and scheduled	
	ATTACH COMMISSIONING PROCESS DOCUMENTS	
10	Commissioning Plan	
11	Owner's Project Requirements (OPR)	
12	Basis of Design (BOD)	
13	Executed installation checklists	
14	Executed Functional Performance Test (FPT) forms	
15	Recommendations for end-of-warranty review activities	

OWNER & COMMISSIONING AGENT ACKNOWLEDGMENT

The commissioning report includes the items listed above and is approved by the owner/owner representative and commissioning agent below.

1. *Owner/Owner Representative*

The commissioning report includes the items listed above and have been approved by the Owner or Owner Representative.

Name: _____ Owner Owner Representative

Company Name (if applicable): _____

Signature: _____ Date: _____

2. *Commissioning Agent*

Name: _____

Company Name (if applicable: _____

Signature: _____ Date: _____

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HISTORY NOTE APPENDIX
CALIFORNIA GREEN BUILDING STANDARDS CODE

(Title 24, Part 11, California Code of Regulations)

For prior history, see the History Note Appendix to the *California Green Building Standards Code*, 2008 Edition, effective August 1, 2009.

1. (BSC 03/09, DSA-SS 05/09, HCD 05/09, OSHPD 06/09) Adoption of mandatory and voluntary green building standards by BSC, HCD and DSA-SS and voluntary green building standards by OSHPD, effective on January 1, 2011.
2. Errata to correct errors in Chapters, 2, 3, 4, A4, 5, A5, A7, 8 and the Index.
3. (BSC EF 01/11 and DSA-SS EF 01/11) Emergency standards for light pollution reduction standards. Effective on April 21, 2011, and approved as permanent on July 20, 2011.
4. (BSC 02/10 & 06/10, HCD 01/10, DSA-SS 03/10) Repeal, amend and add provisions in the *2010 California Green Building Standards Code* for low-rise residential, nonresidential and public school buildings. Effective on July 1, 2012.