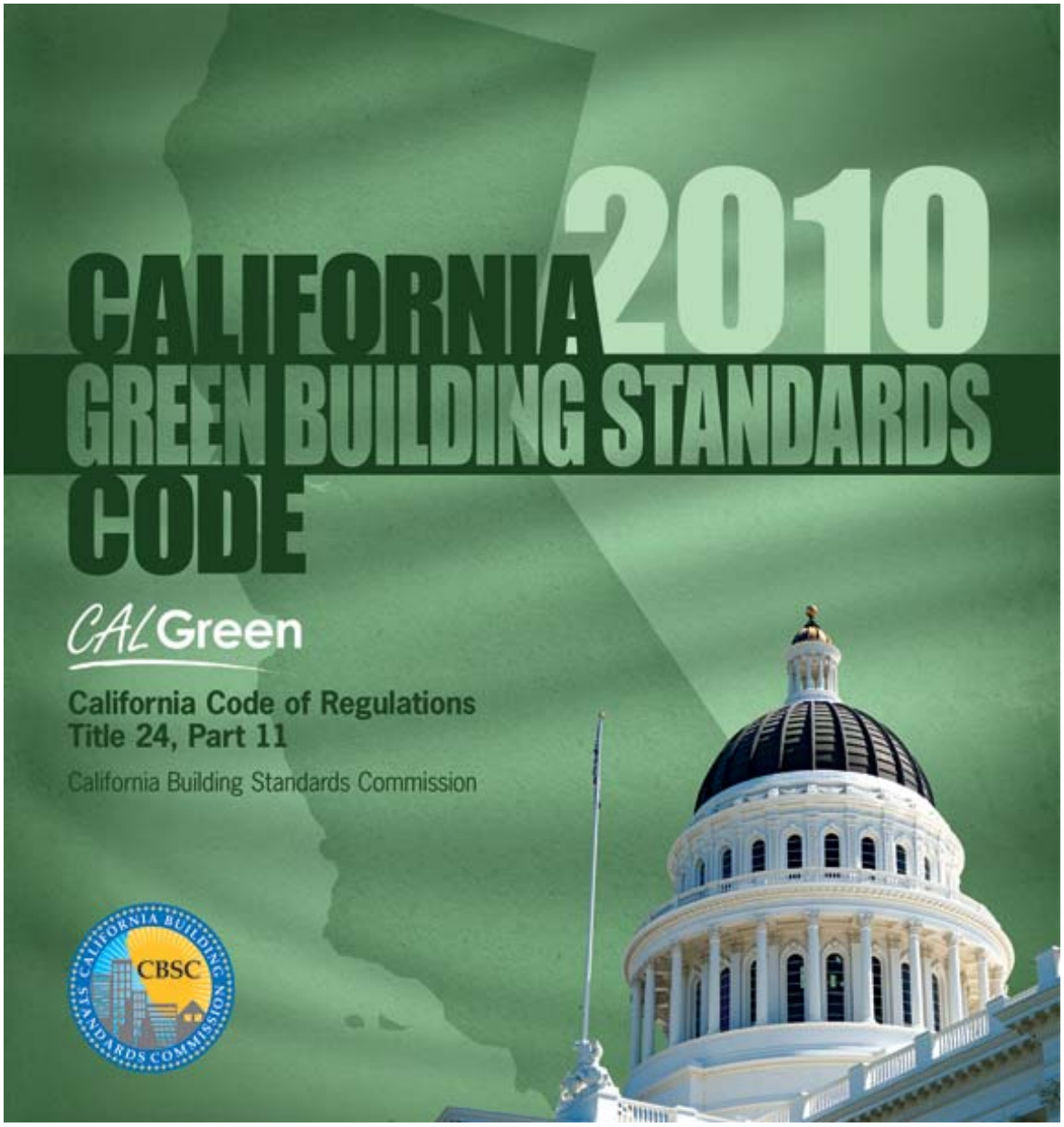
Guide to the (Non-Residential) California Green Building Standards Code

Including changes effective July 1, 2012



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Preface

This guide was developed and is distributed by the California Building Standards Commission as a means of introducing the 2010 California Green Building Standards Code, which is Part 11 of the California Building Standards Code in Title 24 of the California Code of Regulations. Part 11 is also known as the CALGreen Code. The contents of this guide will provide information as to the application of the California Green Building Standards Code and how to use it. It is critical to understand that this code became throughout California and applies to most all new building design and construction beginning on January 1, 2011. Even prior to the development of this guide the Commission staff conducted introductory training throughout California in recognition of the critical importance of the new requirements meant to encourage green building design and green construction practices.

This guide should be helpful, but it is not a substitute for studying the code itself. An online version of the CALGreen Code is available through the California Building Standards Commission website: http://www.bsc.ca.gov/ . See page 4 of this guide for information on how to purchase the CALGreen Code, other individual parts of Title 24 or the entire twelve-part set. The California Building Standards Commission issues updated editions of this guide. This update includes changes that were made during the 2010 Intervening Code Adoption Cycle to clarify mandatory and voluntary standards in the 2010 CALGreen Code. They go into effect on July 1, 2012. These are highlighted throughout this guide in a buff tone for ready identification. To be certain you have the most recent edition, check the date shown on the cover against the edition date to be shown on the website of the California Building Standards Commission.

Written comments and suggestions regarding this guide are welcomed in order to make future editions more effective. Address written comments and suggestions to:

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Table of Contents

Executive Summary

The 2010 California Green Building Standards Code is a code with mandatory requirements for new residential and nonresidential buildings (including buildings for retail, office, public schools and hospitals) throughout California beginning on January 1, 2011. As of July 1, 2012, some mandatory requirements were extended to certain nonresidential additions and alterations as specified in a supplement to the code. The code is Part 11 of the California Building Standards Code in Title 24 of the California Code of Regulations and is also known as the CALGreen Code. In short, the code is established to reduce construction waste, make buildings more efficient in the use of materials and energy, and reduce environmental impact during and after construction.

It is essential that local government recognize this relatively new code and take steps to ensure that building department personnel are properly trained to carry out enforcement activities beginning on January 1, 2011. In particular, building department personnel performing plan examinations and building inspections are those who will be primarily responsible for enforcing the code. Chapter 7 of the CALGreen Code provides a guideline for minimum inspector qualification criteria. Builders and design professionals will be required to incorporate features within the design of buildings and site preparation in order to meet the new requirements. Plans and specifications will need to be supplemented by documentation of conformance with the CALGreen Code. The CALGreen Code contains requirements for construction site selection, storm water control during construction, construction waste reduction, indoor water use reduction, material selection, natural resource conservation, site irrigation conservation and more.

The code provides for design options allowing the designer to determine how best to achieve compliance for a given site or building condition. The code also requires building commissioning which is a process for the verification that all building systems, like heating and cooling equipment and lighting systems are functioning at their maximum efficiency.

State law in Health and Safety Code Sections 17958.5 and 18941.5(b) allows a city, county, or city and county, to adopt more restrictive green building standards than those provided in the CALGreen Code. Such local standards along with a finding of need based on local climatic, geological, or topographical conditions must be filed with the California Building Standards Commission to become effective. Requirements for filing local ordinances establishing more restrictive green building requirements are explained in Section 101.7 of the CALGreen Code. Otherwise, the CALGreen Code is effective January 1, 2011 throughout the state.

This guide was developed as a means for providing an introduction to the CALGreen Code. The technical information in Parts 2, 3 and 4 pertain to buildings that are subject to adoptions by the California Building Standards Commission as explained on page 20 of this guide. In depth study of the CALGreen Code is recommended in order for design professionals, builders, and code enforcement personnel to become proficient. Other sources of information and training may include the following organizations:

- Department of Housing and Community Development (http://www.hcd.ca.gov/codes/)
- Division of the State Architect (http://www.dsa.dgs.ca.gov/default.htm)
- Office of Statewide Health Planning and Development (http://www.oshpd.ca.gov/)
- CALBO- California Building Officials (http://www.calbo.org)
- International Code Council, local chapters (http://www.iccsafe.org)
- Green Technology (http://www.green-technology.org/)
- California Building Industry Association (http://www.cbia.org/go/cbia/)
- American Institute of Architects (http://www.aia.org/index.htm)

Part 1- Introduction and Application

The location of the CALGreen Code

The CALGreen Code is Part 11 of the California Building Standards Code in Title 24 of the California Code of Regulations. The full name of Part 11 is the California Green Building Standards Code, but in short it is known as the CALGreen Code, or just CALGreen.

On January 1, 2011, the 2010 edition of the CALGreen Code became effective throughout California. The 2008 edition, the first edition of the CALGreen Code, contained only voluntary standards. The 2010 edition contains both mandatory and voluntary standards applying to the design and construction of buildings and construction site management. A supplement to the code effective July 1, 2012 modifies some of its mandatory and voluntary provisions. The organization of 2010 edition of the California Building Standards Code in Title 24 is:

- Part 1, California Building Standards Administrative Code;
- Part 2, Volume 1 and 2, which is named the California Building Code and is based on the 2009 International Building Code;
- Part 2.5, which is named the California Residential Code and is based on the 2009 International Residential Code;
- Part 3, which is named the California Electrical Code and is based on the 2008 National Electrical Code;
- Part 4, which is named the California Mechanical Code and is based on the 2009 Uniform Mechanical Code;
- Part 5, which is named the California Plumbing Code and is based on the 2009 Uniform Plumbing Code;
- Part 6, which is named the California Energy Code;
- Part 7, currently vacant;
- Part 8, which is named the California Historical Building Code;
- Part 9, which is named the California Fire Code and is based on the 2009 International Fire Code;
- Part 10, which is named the California Existing Building Code and is based on provisions from the 2009 International Existing Building Code;
- Part 11, which is named the **California Green Building Standards Code**;
- Part 12, which is named the California Referenced Standards Code.

CALGreen Code

The California Code of Regulations contains regulations adopted by various state departments, boards, and commissions, under the authority provided in state law. The California Code of Regulations is divided into 28 separate titles, i.e. Title 1 through Title 28. State law requires that buildings throughout California are designed, constructed and maintained in compliance with state regulations, known as building standards, published in Title 24 of the California Code of Regulations by the California Building Standards Commission.

Much of Title 24 is available through the website of the California Building Standards Commission at www. http://www.bsc.ca.gov/ . To learn more about the California Building Standards Code in Title 24 including its organization, application and proper use, visit the website of the California Building Standards Commission and look for the link "Title 24", then click on "About Title 24". You may print this training document for study or staff training purposes. You may read more about the history of Title 24 by selecting the "About BSC" tab and the history link.

To purchase any Part of Title 24, or the entire set of the twelve Parts, there are several vendors including, but not limited to:

- ICC (http://www.iccsafe.org/Store)
- IAPMO (http://www.iapmostore.org/
- California Book Express (http://www.constructionbook.com)
- Bookmark Inc. (http://www.bookmarki.com)
- BNI Books (http://www.bnibooks.com)
- NFPA (http://www.nfpa.org)

The purpose of the CALGreen Code

The development of the CALGreen Code is intended to (1) cause a reduction in greenhouse gas emissions from buildings; (2) promote environmentally responsible, cost-effective, healthier places to live and work; (3) reduce energy and water consumption; and (4) respond to directives by the Governor. The reduction in greenhouse gases has been mandated in recent years by former Governor Schwarzenegger through executive orders and the passage of the California Global Warming Solutions Act of 2006 (Assembly Bill 32, Chapter 488 of the 2006 Statutes) adding Division 25.5 to the California Health and Safety Code. The provisions of AB 32 require a cap on greenhouse gas emissions by 2020, mandatory emissions reporting, and an ongoing market-based compliance program. Establishing the CALGreen Code is an important step towards more efficient and responsible building designs. The California Air Resources Board estimated that the mandatory provisions in this code will reduce greenhouse gases by 3 million metric tons by the year 2020, and this number should increase with the code's new application to nonresidential additions and alterations.

Green building legislation proposed in the 2007-2008 legislative session (AB 35 concerning state-owned buildings, AB 888 concerning commercial B-occupancy buildings and AB 1035 concerning residential construction) was vetoed by Governor Schwarzenegger. In his veto messages, the Governor expressed his support for development of green building standards, but that they should not be statutory, conflict with current safety standards, and rely on private entities to set standards. He directed the California Building Standards Commission to work with state agencies to develop standards for the 2010 codes, gleaned from nationally recognized programs and the input of other state agencies, ensuring an open public adoption process.

The specific authority in law for each of the state agencies taking part in the development of the CALGreen Code, including the California Building Standards Commission, is provided within Chapter 1 of the CALGreen Code.

CALGreen Code effective date

The 2010 California Building Standards Code, including the California Green Building Standards Code (CALGreen Code) in Part 11, went into effect on January 1, 2011. Supplementary changes adopted and approved in the 2010 Intervening Code Adoption Cycle will become effective on July 1, 2012.

The state agencies that developed the CALGreen Code

The provisions of the CALGreen Code were developed by the California Building Standards Commission, Department of Housing and Community Development, Division of the State Architect and the Office of Statewide Health Planning and Development.

Use of local ordinances to amend the Standards

The 2010 edition of the CALGreen Code became effective throughout the state on January 1, 2011. However, as explained herein, a city, county, or city and county, may enact local ordinances with more restrictive green building standards because of local conditions. Read the requirements for filing of more restrictive building standards provided on page 7 of this guide.

Types of buildings subject to the CALGreen Code

Residential type buildings of three stories and less are subject to the 2010 CALGreen Code when constructed new, under a permit issued on or after January 1, 2011. The specific types of residential buildings identified in the CALGreen Code include motels, hotels, apartments, one and two family dwellings and several others listed in Section 104 of the CALGreen Code. Nonresidential buildings subject to the mandatory provisions of the CALGreen Code include state owned buildings and state university and community college buildings, privately owned buildings used for retail, office, and medical services, and others listed in Section 103. The Office of Statewide Health Planning and Development has adopted voluntary provisions that may be applied to hospitals and medical care buildings as explained in Section 106 of the CALGreen Code. The Division of the State Architect has adopted mandatory and voluntary provisions of the CALGreen Code that apply to public schools. Read more about the application of the CALGreen Code beginning on page 11.

Enforcement of the CALGreen Code

The responsibility for enforcing the CALGreen Code is the same as for the balance of Title 24. New buildings subject to plan review, permits and inspections by the local building department are subject to the CALGreen Code requirements and enforcement as of January 1, 2011. Certain additions and alterations must comply on or after July 1, 2012. State owned buildings will continue to be subject to enforcement by the state.

More restrictive local green building standards

The mandatory provisions of the CALGreen Code set the minimum standard throughout California effective on and after January 1, 2011. However, a city, county, or city and county may enact local ordinances establishing more restrictive green standards as reasonably necessary because of local climatic, geological, topographical or environmental conditions. Reference Section 101.7 of the CALGreen Code for the legal references and the means to establish a local ordinance and make required filings with the California Building Standard Commission.

CALGreen Code training availability

At the time this guide was published, numerous CALGreen Code training opportunities arose and were offered by the proposing agencies. Look to private organizations listed on page 3 for their training offerings. In addition to this guide, the California Building Standards Commission continues to offer training in the form of seminars.

The meaning of Tier 1 and Tier 2 requirements

Tier 1 and Tier 2 relates to green measures that are voluntary and not mandatory. A building said to contain Tier 2 measures will have achieved green efficiencies greater than a Tier 1 complying building. Buildings having achieved either Tier 1 or Tier 2 will have achieved more green efficiencies than a building complying solely with the mandatory green measures.

Special Inspection for CALGreen Code requirements

Special inspection and special inspectors may be required by the local building department. Refer to Chapter 7 of the CALGreen Code for details. Additionally, Chapter 7 contains requirements for installers of heating, ventilation, and air conditioning systems and equipment in new residential construction.

Use of compliance worksheets

CALGreen Code Section 102 establishes requirements for documenting conformance. Chapter 8 offers sample compliance forms and worksheets that may be used to document conformance with water use reduction and waste management planning. As of July 1, 2012, those sample forms for waste management planning will be omitted from the code; they will remain in this guide, along with those for commissioning and other provisions included in the previous edition. The local building department may require these worksheets, or may establish other forms to be completed and accompany plans and submittal at project completion. Applicants for building permits should check with the local building department to determine the requirement. As the need arises, the California Building Standards Commission can develop more sample compliance forms to be included in future editions of this guide.

Identifying Requirements for Specific Buildings

Residential Buildings

Section 104 of the CALGreen Code explains that the Department of Housing and Community Development has adopted provisions of the CALGreen Code for residential structures. Section 101.3.1 (3) and 104 lists the types of residential structures subject to the HCD adoptions. That includes hotels, motels, apartments, condominiums, one and two family dwellings and more, up to three stories.

> Note: “Low-rise residential buildings” used in Section 101.3.1 (3) is defined in Section 202 as being three stories or less.

A Matrix Adoption Table is provided at the beginning of each chapter or division of the CALGreen Code to identify adoptions by the state agencies. The abbreviation "HCD 1" is used within the Matrix Adoption Tables to identify HCD's adoptions. In the 2010 CALGreen Code, HCD adopts the mandatory provisions of Chapter 4 and the voluntary measures in Appendix A4. Other HCD adoptions are identified in the Matrix Adoption Tables for the various chapters of the CALGreen Code.

> Note: If training is needed on the use of the Matrix Adoption Tables, open and print the training document available at the website of the California Building Standards Commission at www. http://www.bsc.ca.gov/ . Click on the link "Title 24", then click on "About Title 24". You may print this training document for study or staff training purposes.

Privately Owned Nonresidential Buildings

Section 101.3.1 and 103 of the CALGreen Code explains that the California Building Standards Commission has adopted provisions of the CALGreen Code for state owned buildings and for privately owned nonresidential structures. A Matrix Adoption Table is provided at the beginning of each chapter or division of the CALGreen Code to identify adoptions by the state agencies. The abbreviation "BSC" is used within the Matrix Adoption Tables to identify

adoptions by the California Building Standards Commission. Accordingly, when an "X" appears in the column under the heading "BSC", and it means the section number or numbers listed on the left side of the table is adopted for application to nonresidential structures. Privately owned nonresidential buildings is meant to include common buildings of Group A Occupancy (assembly), Group B Occupancy (offices), Group M Occupancy (retail) and other common occupancies.

A good question at this point is: *Why is the California Building Standards Commission adopting green building standards for privately owned nonresidential buildings?* The answer lies in state law. Health and Safety Code Section 18930.5 provides authority to the California Building Standards Commission to adopt green building standards if no other state agency has specific authority to do so. The Department of Housing and Community Development, Division of the State Architect, and Office of Statewide Health Planning and Development, have authority to develop green building standards for specific building types or uses. None of these state agencies has the authority to adopt green building standards for privately owned buildings of Group A, B or M Occupancy that is not a public school, state building or medical facility. Therefore the California Building Standards Commission has exercised the authority provided in Health and Safety Code Section 18930.5 to adopt green building standards with application to privately owned nonresidential buildings not already subject to the authority of another state agency.

Mandatory adoptions for nonresidential buildings are located within Chapter 5 of the CALGreen Code. Voluntary measures in Appendix A5 adopted by the California Building Standards Commission are identified in the Matrix Adoption Table at the beginning of the appendix.

Public Schools

Section 105 of the CALGreen Code explains that the Division of the State Architect has adopted provisions within the CALGreen Code for application to public elementary, secondary and community college buildings. The adoptions

are identified by an "X" in the column under the abbreviation "DSA-SS" within the Matrix Adoption Tables located before each chapter of the code. Read Section 105 for more detail.

Mandatory DSA-SS adoptions for public schools are within Chapter 5 of the CALGreen Code. DSA-SS adopted voluntary measures in Appendix A5.

Medical Facilities

Section 106 of the CALGreen Code explains that the Office of Statewide Health Planning and Development has adopted provisions within the CALGreen Code for application to specific types of buildings providing medical services. Examples include general acute care hospitals, skilled nursing facilities, intermediate care facilities, and correctional treatment centers.

At this time, OSHPD adoptions for medical facilities are found within Appendix A5 of the CALGreen Code, which are voluntary standards and not mandatory. The adoptions are identified by an "X" in the column under the abbreviation OSHPD1, 2 or 4" within the Matrix Adoption Table located at the beginning of the appendix. Read Section 106 for more detail.

Introduction of the Chapters within the CALGreen Code

Including changes effective July 1, 2012

Chapter 1

Chapter 1 provides important administrative requirements and clarifications that apply throughout the CALGreen Code. Most importantly are Sections 103, 104, 105 and 106 that identify the application of the adoptions by the state agencies as discussed previously, as well as sections that address local authority. Study Chapter 1 carefully to gain an understanding of the application of the CALGreen Code requirements.

Chapter 1 amendments by the Commission effective July 1, 2012 clarify the authority of the Commission for green building standards. Amendments were made to Sections 101.3.1 and 103 citing the authority granted the Commission by Health and Safety Code §18930.5.

Chapter 2

Chapter 2 provides definitions for terms used within the CALGreen Code used within the CALGreen Code in more than one Chapter. Definitions are important for correct application of requirements. Chapter 2 amendments effective July 1, 2012by all the agencies include a definition for the acronyms ARB and CARB for the Air Resources Board and one for Time Dependent Valuation (TDV) Energy.

Chapter 3

Chapter 3 provides clarifications that are general in nature and apply throughout the CALGreen Code. An example is how to apply requirements to a building with mixed uses or to a project that is constructed in phases. Voluntary measures are addressed including those in tiers adopted by the Department of Housing and Community Development, the California Building Standards Commission, and the Office of Statewide Health Planning and Development.

Section 304.1.1 was amended effective July 1, 2012 by HCD and the Commission to clarify application of voluntary measures in tiers adopted by local jurisdictions, including adding a reference to Section 107.1 for local amendment requirements.

Chapter 4

Chapter 4 is divided into five separate Divisions and contains adoptions by the California Department of Housing and Community Development with application to residential structures as explained in Section 104 of the CALGreen Code. The Matrix Adoption Table for Chapter 4 is shown below.

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																			

The "X" under the column heading HCD 1 is located opposite "Adopt Entire CA chapter". Thus, HCD has adopted the entire Chapter 4. The abbreviation CA means California Amendment. There are no other "X" symbols in this table, thus no other state agency adopts this Chapter. Accordingly, the provisions will apply to only residential structures subject to HCD 1 as explained in Section 104 of the CALGreen Code.

Chapter 4 regulatory subjects for residential buildings are:

- Site development
- Energy efficiency
- Water Efficiency and Conservation
- Material conservation and resource efficiency
- Environmental quality'

Chapter 5

Chapter 5 is divided into five Divisions and contains adoptions by the California Building Standards Commission and the Division of the State Architect.
The adopted sections of this chapter by these agencies are identified in the Matrix Adoption Table at the beginning of each division of the chapter. New to

Chapter 5 for July 1, 2012 is Division 5.7, Additions and Alterations to Existing Nonresidential Buildings, adopted by the Commission. This division was derived from a similar adoption of a local amendment by the City of Los Angeles.

There are six Matrix Adoption Tables; one for each Division of the Chapter. This is necessary because of the differing adoptions by the state agencies and thus differing applications to buildings. The application of the adoptions by these agencies was discussed previously and is identified in Sections 103 and 105 of Chapter 1 of the CALGreen Code. Below is the Matrix Adoption Table for Division 1 of Chapter 5.

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

This "X" symbol under in the column heading BSC is opposite "Adopt Entire CA Chapter. That means the Building Standards Commission has adopted the entire chapter. Accordingly, the chapter will apply to buildings subject to the BSC jurisdiction as explained in Section 103 of the CALGreen Code.

The other "X" symbols in this table appear in the DSA-SS column. However, as shown above, the DSA-SS only adopts those section numbers to the left of the "X" symbols. DSA-SS does not adopt the entire Division. Section 105 of the CALGreen Code explains that DSA-SS adoptions apply to public schools.

The Matrix Adoption Table for Division 5.4 of Chapter 5 is shown below.

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												

This table shows that BSC adopts the entire Division 5.4 of Chapter 5. It shows that DSA-SS adopts selected sections of Division 5.4 and not the entire Division.

The two Matrix Adoption Tables for Chapter 5 shown above identify adoptions by only BSC and DSA-SS. Accordingly, the chapter has no application to residential buildings subject to HCD 1, or to medical buildings subject to OSHPD 1, 2 or 4. Changes to Chapter 5 regulatory subjects for nonresidential buildings, described in more detail in Part 2, modified provisions in the following divisions:

- Planning and design
- Energy efficiency
- Water efficiency and conservation
- Material conservation and resource efficiency
- Environmental Quality
- Additions and Alterations to Existing Nonresidential Buildings

Chapter 6

Chapter 6 provides a listing of standards adopted by reference and applicable to any building subject to the CALGreen Code. This chapter has been expanded by

the Commission to include standards for cool pavements in Division A5.1 and concrete in Division A5.4 effective July 1, 2012.

Chapter 7

Chapter 7 provides minimum qualifications for installers of HVAC equipment in residential buildings and standards for special inspection and was not amended this code cycle by the Commission.

Requirements may vary for different types of buildings so take notice of the state agency adopting the requirements. Not all code provisions apply to all building types. So, watch for the state agency abbreviation (HCD 1, BSC, DSA-SS) in order to identify the application of the code requirement.

Chapter 8

Chapter 8 contained sample forms that may be used to document compliance with the CALGreen Code and water use worksheets to calculate compliance with mandatory and voluntary water measures. The sample forms have been removed from the code, since they are non-regulatory.

Appendix A4

Appendix A4 provides voluntary measures for residential buildings. Adoptions are by HCD 1 as shown in the Matrix Adoption Table for this appendix. By its adoption, the Department of Housing and Community Development makes available voluntary measures, including the tiers, for local jurisdictions to adopt and for designers to employ voluntarily.

Appendix A5

Appendix A5 is divided into seven Divisions and provides voluntary measures for nonresidential buildings with adoptions by BSC, DSA-SS and OSHPD 1, 2 and 4 as shown in the Matrix Adoption Tables for each of the Divisions of Appendix A5. Still, the provisions are voluntary and not mandatory. Local adoption and voluntary use of these provisions is the same as for Appendix A4, except that local adoption is not available for public schools and medical facilities under the

authority of the Division of the State Architect (DSA-SS) and the Office of Statewide Health Planning and Development.

Changes effective July 1, 2012 to Appendix A5 voluntary standards for nonresidential buildings, described in more detail in Part 2 of this Guide, modified provisions in the following divisions:

- Planning and Design
- Energy Efficiency
- Water Efficiency and Conservation
- Material Conservation and Resource Efficiency
- Environmental Quality
- Voluntary Tiers

Part 4 Suggested Forms and Templates

In coordination with updates to indoor water use reduction in the code, Water Use Worksheets WS-1 – WS-4 were amended effective July 1, 2012 for consistency of entries in the tables and footnotes in both mandatory and voluntary measures.

Appendix A

Commissioning Project Samples & Additional Forms and Templates

Appendix B

Additional Commissioning Resources

Appendix C

Appendix C, Bird-friendly Building Design is a voluntary standard by the Commission introduced as a guideline.

Part 2 – Technical Application to Nonresidential Buildings

Note:
This guide is updated to include changes to the CALGreen Code which was modified during the 2010 intervening code adoption cycle with an effective date of July 1, 2012.

Note:
1. This part is designed to explain provisions of the CALGreen Code that apply to common occupancies (Group A, B, M) subject to building code enforcement by the local building department. The other adopting agencies (HCD, DSA, and OSHPD) may provide specific training on housing, public schools, and medical buildings separately.
2. This part provides a reprint of only those CALGreen Code Sections needing explanation.
3. The Matrix Adoption Tables for Chapter 5 are not reprinted here. To identify the adoption and application of the code provisions, refer to the Matrix Adoption Tables in the CALGreen Code.
4. Calculations to determine numbers of items shall be rounded up to the nearest whole number.
5. Products or materials substituted after permit issuance shall be self-certified or verified for equivalency to those specified.
6. Implementation of local ordinances relative to this code may require alternate means of compliance.
7. Sections affected by changes effective July 1, 2012 have the Intent: title shaded in green and the affected language is lightly tinted in a buff color. Explanations of the changes follow "Intent", in a "Change for 2012" section.

CALGreen Chapter 1, Administration

CALGreen Sections: 101.3.1 State-regulated buildings, structures and applications, and 103 Building Standards Commission

This guideline intends to assist the user in applying *green building standards* to all occupancies, including newly constructed privately owned nonresidential structures, newly constructed state owned buildings, state universities, and all other occupancies where no state agency has authority; and where applicable, occupancies regulated by Division of the State Architect (DSA) including public schools and community colleges.

Examples of privately owned nonresidential structures include, but are not limited to, new buildings or portions of new buildings classified by occupancy as:

Assembly Group A – Motion picture theaters, concert halls, banquet halls, night clubs, restaurants, bowling allies, community halls, courtrooms, libraries, museums, arenas, amusement parks, and stadiums.

Business Group B – Banks, barber and beauty shops, civic administration, motor vehicle showrooms, post offices, print shops, professional services offices, radio and television stations.

Educational Group E – Privately-funded educational purpose buildings for more than six students at one time through the 12th grade and daycare for more than six children 2 years and older.

Factory Group F – Building or structure used for factory industrial uses, moderate hazard occupancy, like food processing and dry cleaning; and low hazard manufacturing, such as of brick and ice.

High-Hazard Group H – Building or structure used for manufacturing and storing high hazard materials.

Institutional Group I – Building or structure used for caring of children, of physically disabled and include assisted living facilities, child care facilities, and adult care facilities.

Laboratory Group L – Laboratories with limited storage of hazardous materials as defined in the California Building Code (CBC).

Mercantile Group M – Department stores, drug stores, markets, motor fuel-dispensing stations, retail and wholesale stores, and sales rooms.

Storage Group S – Storage of moderate-hazard materials like furnishings and building materials and storage of low-hazard noncombustible materials such as food and, bottles and cans, and cement.

Utility and Miscellaneous Group U – Accessory or miscellaneous buildings as applicable.

Refer to 2010 CBC Chapter 3 "Use and Occupancy Classification" for complete lists of uses for these occupancy groups

CALGreen Code Chapter 5

DIVISION 5.1 PLANNING AND DESIGN

SECTION 5.106 SITE DEVELOPMENT

CALGreen Section: 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

Intent:
The intent of this code provision is to prevent the discharge of surface water pollutants, dust and sediment from the project site into receiving waters to maintain water and air quality, using recognized soil loss and housekeeping best management practices (BMP).
This provision applies to newly constructed projects which disturb less than one acre of land.

Change for 2012: This section was modified to remove any reference to the State Storm water NPDES [National Pollutant Discharge Elimination System] Construction Permit 99-08-DWQ on which the CALGreen provision for projects that disturb less than one acre of soil was originally based, and it was replaced with recommended BMP. It was expanded to apply to certain additions. Also, to alleviate confusion as to which permit might apply, any reference to the state permits was deleted. Additionally, the requirement for a formal plan was eliminated to simplify compliance for these small projects.

Existing Law or Regulation:
For projects that are one acre or larger in size, refer to the California Water Code and Federal Water Pollution Control Act.

Compliance Method:
Design Team: Without the need to prepare a formal plan, the design team must be able to demonstrate to a plans examiner the method to comply with the regulations. Options are to describe in plans and/or specifications one of the following:

- How a local stormwater management ordinance is being met;
- The BMP that will be employed, specific to the site and season of construction;
- A stormwater pollution management plan;
- Delegation of stormwater control measures to the contractor for his or her separate submittal to the enforcing agency prior to commencement of excavation and grading; or
- Other descriptive means acceptable to the enforcing agency

Contractor: No grading should be done until site- and season-specific soil loss and housekeeping stormwater BMP have been approved by the enforcing agency. The contractor should employ the design BMP and any others needed as situations arise. He or she should conduct site inspections before, during and after each extended storm event to identify conditions that may contribute to erosion and sediment problems or any other pollutant discharges. If additional control measures are needed, he or she should implement them immediately.

Note: *A sample checklist of BMP and self-certification form may be found in Part 4 of this Guide.*

Enforcement:
Plan intake: The reviewer and/or plan checker should make sure the storm water pollution prevention BMP are either included with the construction documents (plans and/or specifications), or submitted separately and meets these regulations or local requirements.

On-Site enforcement: The inspector should check the erosion and sediment controls for conformance with the BMP during the normal inspection process, or a separate inspection may be deemed appropriate by the enforcing agency. Additional site inspections may be required during extended storm events to verify mitigation measures.

CALGreen Section: 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.

Intent:
The intent of this code provision is to ensure that newly constructed projects provide short term and/or long term bicycle parking accommodations to promote the use of bicycles as an alternate means of transportation in an attempt to reduce greenhouse gas emissions.

Change for 2012: The proposed modification deletes, at the request of the University of California, a reference to the University of California Policy on Sustainable Practices.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision. However, there are some jurisdictions that have adopted local ordinances.

Compliance Method:
Short-Term Bicycle Parking:
Construction documents (plans & specifications and/or site plan) should reflect the location of the required number of short-term permanently anchored bicycle parking racks for 5 percent of visitor motorized vehicle parking capacity, with a minimum of one two-bike capacity rack.

Long-Term Bicycle Parking:
1. Determine which of the three options will be used to comply or identify an alternate method(s).
2. Construction documents (plans & specifications and/or site plan) should reflect the method and location of the required number of long-term secured bicycle parking facilities based on 5 percent of motorized vehicle parking capacity, with a minimum of one space.

Note: *If the applicant is seeking a parking capacity reduction under §A5.106.6, or the local jurisdiction has a zoning ordinance for reduced parking, use the parking requirements that apply before the reduction is taken or outside any special zone in the calculations. This is to recognize that, with reduced parking capacity, more people are likely to ride bicycles.*

Suggestion: *Provide a calculation table or a note on the plans showing the total number of required short-term spaces by multiplying the anticipated visitor parking spaces by 5 percent and for long-term spaces by multiplying the total vehicular parking required spaces by 5 percent.*

Examples:
Short-term: Visitor parking capacity at 42 x 5 percent =2.1 – Provide racks for 3 bicycles.
Long-term: Total Vehicular parking capacity at 216 x 5 percent =10.8 –Provide 11 spaces.
If specifying lockers, consider using six two-bicycle lockers.

Enforcement:
Plan intake: The reviewer and/or plan checker should review the plans and confirm that the correct number of bicycle parking racks and/or secured areas are included with the drawings and meet the requirements.

On-Site Enforcement: The inspector should review the permit set of plans to verify that all required bicycle parking requirements as shown on the plans have been provided and installed.

CALGreen Section: 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 not shown – refer to Code]

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.

Intent:
This code provision is to ensure that newly constructed projects provide designated parking for clean air vehicles (low-emitting, fuel efficient, and carpool/van pool vehicles) which gives reserved parking to those who drive clean air vehicles. The intent is to promote the use of clean air vehicles in an attempt to conserve natural resources and reduce green house gas emissions.

Change for 2012: 2012 modificationss, proposed by CARB, are to delete the definition for a PZEV vehicle, which does not qualify, and change the stall marking designation to read **CLEAN AIR/VANPOOL/EV** to reflect qualifying vehicles that shall be permitted to park there. Based on comment made at the Green Building Code Advisory Committee (GB CAC), CBSC has worked with ARB to shorten the stall marking language and clarify which vehicles are eligible for the parking.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision. However, there are some jurisdictions that have adopted ordinances.

Compliance Method:
Design Team: Construction documents (site plan) should reflect the location of the required number of designated parking stalls with the marking "CLEAN AIR/VANPOOL/EV" toward the back of the stall, similar to an accessible symbol, so that the writing can be seen when a clean air vehicle is parked. Lettering should be at least 8 inches high. The parking stalls can be located anywhere on the site without preferential location.

Suggestion: *The plans should reflect the total number of required vehicular spaces and refer to TABLE 5.106.5.2 to ensure that the correct number of designated parking stalls is being provided. Include all parking spaces in the calculation. As approved by the enforcing agency, some compact stalls may also be marked for clean air vehicles.*

Examples:

1. ***55 total parking spaces:*** *based on TABLE 5.106.5.2 – Provide 6 clean air/vanpool/ev spaces which fall within the range.*
2. ***240 total parking spaces:*** *based on TABLE 5.106.5.2, calculate 240 x 8 percent = 19.2 – Provide 20 clean air/vanpool/ev spaces.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and confirm that the correct number and configuration of "CLEAN AIR/VANPOOL/EV" parking stalls are included on the drawings.

On-Site Enforcement: The inspector should review the permit set of plans to verify that the correct number of clear air vehicle parking stalls have been provided and marked.

CALGreen Section: 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.

TABLE 5.106.8

[Table not shown for clarity, refer to Code]

Intent:
The intent of this code provision is to ensure that newly constructed projects reduce the amount of light and glare from both interior and exterior light sources leaving the site. This is to minimize light pollution in order to maintain our dark skies.

Change for 2012: This section is proposed to be moved from the voluntary Appendix A5 where it was located after modification in a recent emergency rulemaking. Problems with the version published in the 2010 code were identified as potential threats to public safety due to inadequate site illumination. In the intervening months between the emergency rulemaking and the effective date of the 2012 supplement, it should have been tested for utility and ease of compliance and enforcement as a voluntary standard when it becomes mandatory in its new format.

Existing Law or Regulation:
There are several existing codes that are being referenced in this provision as follows:
1. Lighting power requirements in the California Energy Code, CCR, Title 24, Part 6.
2**.** Lighting zone characteristics and lighting zones 1-4 as defined in Chapter 10 of the California Administrative Code, CCR Title 24, Part 1.
3. California Building Code, CCR title 24, Part 2 Section 1205.6 exception regarding campus lighting for parking and walkways.
4. The latest standards of the Illuminating Engineers Society in TM-15-11.

Compliance Method:
FIRST:
Comply with California Energy Commission regulations in Part 1 and Part 6 cited above. Those standards form a basis upon which to build for the purpose of light pollution reduction in addition to energy efficiency. The provisions in Part 1 provide a weighted approach to the project site location, with a project located in the middle of a big city allowed more light to escape than a project at a rural or urban location. Part 6 addresses power and energy efficiency of outdoor lighting. There are exceptions for certain occupancies for lighting power requirements which would apply to this provision, but voluntary compliance with any or all of the items is encouraged.

THEN:
To comply with this provision, either:

1. Consult and comply with a local dark skies ordinance, if more stringent than these regulations.
2. Specify exterior lighting fixtures that meet IESNA TM-15-11 regarding backlight, uplight and glare. Rating may not exceed those values shown in Table 5.106.8

Enforcement:

Plan Intake: The reviewer and/or plan checker should review the construction documents, including exterior light sources, to confirm compliance with Part 1, Part 2 and Part 6; review the electrical plans and specifications for complying building and exterior lighting, including photometric data for perimeter site lighting fixtures; and review specifications for any controls to be installed on the project.

On-Site Enforcement: The inspector should review the permit set of plans to verify that all lighting and power calculations and specified products are installed as specified on the approved plans and specifications.

CALGreen 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

Intent:

The intent of this code provision is to ensure that newly constructed project sites are planned and developed to keep surface water from entering the building, to extend the longevity of the exterior building walls, to prevent mold and keep moisture from entering the exterior wall and perimeter slabs.

Change for 2012: This provision is being modified slightly to emphasize means of compliance. Grading and paving plans, typically required by enforcing agencies, will show how this is to be accomplished, and a list of methods for managing flows, aligned with the Department of Housing and Community Development's (HCD) section, has been added.

Existing Law or Regulation:

There is **NO** current law or regulation for this code provision. However, there are some code sections in the California Building Code (for example Section *1805.3.4* Foundation elevation) that address sloping grades away from buildings but does not address how all surface water flows will be managed on site.

Compliance Method:

Show on the construction documents (site plan or grading plan) how site grading and/or a drainage system will manage all surface water flows to keep water from entering the building. This is particularly critical on sloped sites.

Suggestion: *Show on the grading plan, in addition to draining the water away from the exterior walls, how surface water will be managed on site. Methods include but are not limited to, those now listed in the regulation.*

Enforcement:

Plan Intake: The reviewer and/or plan checker should review the grading plan and confirm that there are slopes away from the building and adequate measures to manage surface water flows. In addition, the reviewer should ensure that the plans indicate protection from water intrusion for buildings located on sloped sites or having flood plain requirements.

On-Site Enforcement: The inspector should review the permit set of plans to verify that all grading and/or drainage systems have been installed as specified on the approved plans and specifications.

DIVISION 5.2 ENERGY EFFICIENCY

GENERAL
CALGreen Section: 5.201.1 Scope. 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.

Intent:
The intent of this code provision is to recognize that the California Energy Commission retains its authority for energy efficiency standards. While not required by this code, a 15 percent reduction in building energy usage compared to current mandatory energy efficiency standards is recommended by the Energy Commission.

Existing Law or Regulation:
For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory building standards. Local amendments increasing energy efficiency standards beyond those required in the California Energy Code may apply,

Compliance Method:
Meet the minimum mandatory energy efficiency standards as currently required by California Energy Code, CCR Title 24, Part 6.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans, Title 24 Energy Compliance Forms and specifications as currently done for other portions of the code.

On-Site Enforcement: The inspector should review the permit set of plans to verify that all energy efficiency standards as specified on the approved plans and specifications are installed.

DIVISION 5.3 WATER EFFICIENCY AND CONSERVATION

SECTION 5.303 INDOOR WATER USE

CALGreen Section: 5.303.1 Meters. Separate submeters or metering devices 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 (4645 m^2). 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).

Intent:
The intent of this code provision is to reduce potable water use in new buildings by making building owners and/or tenants aware of their daily potable water consumption to encourage voluntary reduction of potable water use. Note: Owner billing of tenants based on actual use is not intended but is not prohibited.

Change for 2012: CBSC is proposing the amendment of this section to provide clarity to the code user regarding the use of meters, submeters, and metering devices. For buildings in excess of 50,000 s.f., the amendments consolidate the language for tenants expected to use more than 100 gal/day, and they add submetering for specified subsystems where it is unfeasible to meter individual tenants. These provisions also apply to certain additions and alterations per Division 5.7.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
First determine if the new project will require separate meters based on the 50,000 square foot or excess consumption regulation. If so then:

1. Determine if your leased, rented, or other tenant space within the 50,000 square foot building (including spaces used for laundry or cleaners, restaurant or food service, medical or dental office, laboratory, or beauty salon or barber shop) is projected to consume more than 100 gal/day. If so, then provide separate submeters to be installed by the owner or contractor after the main meter supplied by the utility.
2. If any building within a project or space within a building is projected to consume more than 1,000 gal/day then provide a separate submeter or metering devices. Examples are car washes and aquariums.
3. If separate meters for tenants is infeasible, for example, in some high-rise projects, separately meter instead any of the applicable systems listed.

Suggestion: *Show separate meters on the plans (Site Utility Plan) and provide specifications for the submeters and/or metering devices.*

Enforcement:

Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that separate meters and/or metering devices are specified on the plans when required.

On-Site Enforcement: The inspector should review the permit set of plans to verify that all separate submeters and/or metering devices are installed as specified on the approved plans and specifications.

CALGreen Section: 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. 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.

[Tables 5.303.2.2 and 5.303.2.3 are not shown for clarity, but these footnotes have been added to the tables:

Footnotes for Table 5.303.2.2:

[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.

Footnotes for Table 5.303.2.3:

[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.

Intent :

The intent of this code provision is to reduce the overall use of potable water within the building by 20 percent. Governor Schwarzenegger issued a proclamation in 2009 making 20 percent water use reduction a statewide goal.

Change for 2012: 5.302.2. 20 percent savings, Table 5.303.2.2, and **Table 5.303.2.3**. CBSC is proposing the modification of these sections and tables in response to comments from CARB and to coordinate language with HCD. Changes include clarifications to prescriptive and performance measures, identification of baseline flow rates in the tables, deletion of the word "Indoor" from the title of Table 5.303.2.2, and correction of the duration of a nonresidential shower in the table.

and

Proposed also are footnotes to Table 5.303.2.2 clarifying number of occupants to be considered shower or kitchen faucet users in commercial applications. Being deleted is footnote 2 to Table 5.303.2.2, which referenced the California Energy Commission Appliance Efficiency Standards in Title 20 as the source of most baseline flow rates, as superfluous, since the baseline flow rates are shown in the tables. Proposed for Table 5.303.2.3 is a new footnote to advise code users of means of compliance for nonresidential faucets, the baseline of which is also the lowest flow rate currently available from manufacturers.

Existing Law or Regulation:

AB 715 (Stats 2007, c. 499) modified the Health and Safety Code to allow only high-efficiency toilets and urinals to be sold or installed after January 1, 2014.

Compliance Method:

Demonstrate a 20 percent reduction in potable water use by using one of the following methods:

1. Prescriptive Method: Refer to Table 5.303.2.3 and select the plumbing fixtures and fittings with the reduced flow rates.

OR

2. Performance Method: Refer to Table 5.303.2.2 and provide a calculation demonstrating a 20 percent reduction in the building "water use baseline" as established in the table.

Suggestion: *For the Prescriptive Method, provide a note on the plans and specify the fixtures and fittings that meet the requirement.*
For the Performance Method, provide a plumbing calculation on the plans demonstrating an overall 20 percent water use reduction.

Sample worksheets are included in Chapter 8 of the code and in Part 4 of this Guide.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that either the prescriptive or performance method has been submitted and check for the 20 percent water reduction compliance. If the performance method is used, review the water calculations showing the 20 percent reduction.

On-Site Enforcement: The inspector should review the permit set of plans to verify that the specified water efficient plumbing fixtures and fixture fittings are installed. If the performance method was used, the inspector will verify that fixtures or systems used to reduce overall water use by 20 percent have been installed. The inspector may review the fixture specifications to verify compliance or accept a self-certification form.

CALGreen Section: 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 5.303.2.1, Item 2 is 2.5 gpm @ 80 psi.

Intent:
The intent of this code provision is to establish that the maximum flow rate in the 20 percent reduction table covers all applications where water sprays from multiple sources at one time. It is not the intent to permit multiple independent water supply lines to a single shower enclosure. This is intended to cover a single shower enclosure or space. In multiple shower spaces or gang showers, the requirement shall apply to each shower.

Change for 2012: CBSC is proposing the modification of these sections and tables in response to comments from CARB and to coordinate language with HCD. The primary modification is to indicate that only those showerheads controlled by a single valve must comply. Though it is stated above that it is not the intent to encourage multiple supply lines, they are not prohibited by this section.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
Specify the shower fixture and fittings to either:
1. Restrict the flow at the valve that serves all the showerheads to provide no more than 2 gpm @ 80 psi as specified in the 20 percent reduction column contained in Table 5.303.2.3;
2. Specify a valve that is designed to allow only one showerhead to be in operation at a time with a maximum flow rate of 2 gpm @ 80 psi; or
3. Performance Method: Refer to Table 5.303.2.2 and provide a calculation demonstrating a 20 percent reduction in the building "water use baseline" with a maximum combined flow rate of 2.5 gpm@80 psi for multiple showerheads.

Contractor: Contractor should be able to provide documentation or self-certification form to the inspector.

Suggestion: *Provide a note on the plans that multiple shower heads controlled by a single valve shall have a combined flow rate of all the showerheads not to exceed the maximum flow rates specified in the 20 percent reduction column contained in Table 5.303.2.3. Or note that shower heads are being controlled to work independently. When using the Exception, provide a plumbing calculation on the plans.*

Sample worksheets are included in Chapter 8 of the code and Part 4 of this Guide.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and confirm that multiple shower heads specified meet the combined flow rates on the tables or that they are plumbed to operate independently or that the performance method does not exceed the combined maximum flow rates.

On-Site Enforcement: The inspector should review the permit set of plans to verify that the specified showerheads and/or water reducing fittings are installed. If the performance method was used, the inspector will confirm that showerheads or systems used to reduce overall water use by 20 percent have been installed. The inspector may review fixture specifications provided by the manufacturers as verification of compliance. Testing of flow rates may be done at the inspector's discretion.

CALGreen Section: 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].

Intent:
The intent of this code provision is to reduce wastewater discharge potable and non-potable, into the municipal sewer system, thereby reducing energy used in sewage treatment.

Existing Law or Regulation:
Chapter 16A of the California Plumbing Code (CPC) regulates residential graywater and dual plumbing for residential and nonresidential recycled water systems. Appendix G contains provisions for nonresidential graywater.

Compliance Method:
Demonstrate a 20 percent waste water reduction by using one of the following methods:
1. Comply with the 20% water use reduction provision of section 5.303.2 discussed above.
2. Where available and/or permitted by the local jurisdiction, utilize non-potable water systems (captured rainwater, graywater, and municipally treated wastewater [recycled water]).
3. Use waterless urinals.
4. Irrigate landscape with graywater from fixtures or appliances per CPC Appendix G

Suggestion: *Provide a note on the plans stating the method of compliance to be used. Specify appropriate fixtures and/or show plumbing calculations. If using non-potable water systems, detail on the plans.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and confirm that either the water-conserving fixtures (prescriptive or performance) method has been submitted and check for the 20 percent waste water reduction compliance. If the non-potable water systems method will be used, confirm availability and compliance with local ordinance.

On-Site Enforcement: The inspector should review the permit set of plans to verify that the specified water efficient plumbing fixtures and fixture fittings are installed. If the performance method was used, the inspector will verify that the 20 percent waste water reduction as approved has been followed. If a non-potable water systems is installed, the inspector will confirm that it meets local ordinances and operates properly.

CALGreen Section: 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 is not shown for clarity,* but referenced standard ASME 112.18.1/CSA B125.1 was added in the table for showerheads with a maximum flow rate of 2.5 gal (9.5l.)/min.]

Intent:
The intent of this code provision is to provide specifications for plumbing fixtures and fittings by referencing US EPA WaterSense labels and ASME standards for fixtures that can be used to meet the 20 percent water use reduction.

Change for 2012: This table for referenced standards for plumbing fixtures and fittings is being proposed for amendment to include the standards for showerheads to provide clarity to the code user, in coordination with HCD.

Existing Law or Regulation:
AB 715 (Stats. 2007, c. 499) modified the Health and Safety Code to specify standards for high efficiency toilets and urinals. AB 1953 (Stats. 2006, c. 853) changed the code to redefine "lead free plumbing" to reduce the amount of lead allowed in potable water fittings and fixtures effective January 1, 2010. (AB 1953 is referenced in Section 604.10 of the California Plumbing Code) Subsequent legislation in SB 1334 (Stats. 2008, c. 580) and SB 1395 (Stats. 2008, c. 581) required that products be certified as to lead levels by an ANSI-accredited third party.

Compliance Method:
Specify plumbing fixtures and fittings to meet the reference standards on Table 5.303.6.

Note: *If the performance method of compliance is used and a tradeoff is included in the calculation, not all fixtures need to meet these standards.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that plumbing fixtures and fittings specified meet the reference standards on Table 5.303.6. If the performance method is used and the water calculations produce a 20 percent reduction, it is possible that not all water closets and flush urinals will meet the standards on Table 5.303.6.

On-Site Enforcement: The inspector should review the permit set of plans to verify that the specified fixtures and fittings that meet the reference standards on Table 5.303.6 have been installed. If the performance method was used, the inspector will verify that fixtures or systems used to reduce overall water use by 20 percent have been installed, including any water closets and flush urinals which do not meet the standards on Table 5.303.6.

CALGreen Section: 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

Intent:
The intent of this code provision is to reduce the overall outdoor potable water use by requiring that a water budget be developed for landscape irrigation.

Existing Law or Regulation:
The California Department of Water Resources has adopted a Model Water Efficient Landscape Ordinance (MLO) which requires that a water budget be developed that is currently in effect. There are some local jurisdictions that have adopted water efficient landscape ordinances that may be more restrictive.

Compliance Method:
Develop a water budget using one of the following methods:
1. Check with your local jurisdiction to confirm whether a local water efficient landscape ordinance is in place and if so develop a water budget for landscape irrigation that conforms to the local ordinance.
Or
2. Develop a water budget for landscape irrigation use that conforms to the California Department of Water Resources Model Water Efficient Landscape Ordinance for landscaped areas 2,500 square feet or more.

Note: *Prescriptive measures and compliance forms 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*

An example of a water budget calculation is shown below.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for calculations to confirm that a water budget is developed by either using the local ordinance and/or the California Department of Water Resources Model Water Efficient Landscape Ordinance.

On-Site Enforcement: The inspector should review the permit set of plans and calculations to verify that the approved water budget as specified is followed during construction. The MLO or local ordinance compliance forms may serve this purpose.

Example of water budget calculation

1 The water budget is first calculated by determining the **Maximum Applied Water Allowance (MAWA)** which is in turn established in part by the project's location. The rate of Evapotranspiration from the soil and plant tissues increases with higher temperature and lower humidity.

The project's Maximum Applied Water Allowance shall be calculated using this equation:

MAWA = (ETo) (0.62) [(0.7 x LA) + (0.3 x SLA)]

where:

MAWA = Maximum Applied Water Allowance (gallons per year)
ETo = Reference Evapotranspiration from Appendix A (inches per year)
0.7 = ET Adjustment Factor (ETAF) [1]
LA = Landscaped Area includes Special Landscape Area (square feet)
0.62 = Conversion factor (to gallons per square foot)
SLA = Portion of the landscape area identified as Special Landscape Area (square feet)[2]
0.3 = the additional ET Adjustment Factor for Special Landscape Area (1.0 - 0.7 = 0.3)

Maximum Applied Water Allowance is expressed in gallons per year.

Example calculation for a Sacramento landscape project with 10, 000 square feet of landscape area including a 1000 square foot demonstration vegetable garden:

MAWA = (51.9 inches) (0.62) [(0.7 x 10,000 square feet) + (0.3 x 1000 square feet)] = 234,899 gallons per year.

[1] ETAF is based on a mixed landscape of plants with different water needs modified by the efficiency of the irrigation system (IE). This plant factor (PF) in MAWA is assumed to be 50% of ETo. ETAF is .5 PF x .71 IE, or 70% of ETo.

[2] SLA is defined in the Model Water Efficient Landscape Ordinance (MLO) as an area devoted to edible plants, recreational areas, or areas served by recycled water.

2. The water budget for the project is then established by calculating the **Estimated Total Water Use (ETWU)** and comparing that with the MAWA. ETWU for all hydrozones shall not exceed MAWA.

The project's Estimated Total Water Use is calculated using the following formula:

$$ETWU = (ETo)(0.62)\left(\frac{PF\,x\,HA}{IE} + SLA\right)$$

where:

ETWU = Estimated total water use per year (gallons per year)
ETo = Reference Evapotranspiration (inches per year)
PF = Plant Factor from WUCOLS[3]
HA = Hydrozone Area [high, medium, and low water use areas] (square feet)
SLA = Special Landscape Area (square feet)
0.62 = Conversion Factor (to gallons per square foot)
IE = Irrigation Efficiency (minimum 0.71)

Sample hydrozone Table for Calculating ETWU for the Sacramento project:

Hydrozone	Plant Water Use Type(s)	Plant Factor (PF)	Area (HA) (square feet)	PF x HA (square feet)
1	High	0.7	1000	700
2	Medium	0.5	4000	2000
3	Low	0.3	4000	1200
			Sum	3900
4	SLA	1.0	1000	1000

ETWU = (51.9) (0.62) (3900/.71 + 1000) = 208,930 gallons per year, within the MAWA of 234,899 gallons per year.

[3] WUCOLS is the Water Use Classification of Landscape Species published by the UC Cooperative Extension, DWR, and the Bureau of Reclamation, 2000, and uses the range of water use values shown in this table:

Plant Water Use Type	**Plant Factor**
Low	0 - 0.3
Medium	0.4 - 0.6
High	0.7 - 1.0
SLA	1.00

Notes:
WUCOLS may be accessed from DWR's website at:
http://www.water.ca.gov/wateruseefficiency/docs/wucols00.pdf

A MAWA and ETWU calculator in Excel format is also available on DWR's website at:
http://www.water.ca.gov/wateruseefficiency/docs/WaterBudget101.xls

SECTION 5.304 OUTDOOR WATER USE

CALGreen Section: 5.304.2 Outdoor potable water use. For new water service for landscaped areas of at least 1000 square feet but not more than 5000 square feet (the level at which Water Code §535 applies), separate submeters or metering devices shall be installed for outdoor potable water use.

Intent:
The intent of this code provision is to reduce outdoor potable water use for new water service for landscaped areas between 1,000 square feet and 5,000 square feet by making building owners and/or tenants aware of their daily outdoor potable water consumption for landscaping. Additionally, it allows the consumer to monitor water use to identify spikes that may occur due to leaks in irrigation systems. Water loss attributed to leaks can be substantial.

Change for 2012: CBSC is proposing minor modification of this section to identify more clearly the landscape areas subject to the provisions. Clarification is made that the requirement is for submeters or metering devices, not separate meter connections by water purveyors, which can be very expensive. However, local jurisdictions that promote or require separate meters point out that they do not charge sewer impact fees on the outdoor water use, but those savings may be small for the subject landscaped areas.

Existing Law or Regulation:
AB 1881 (Stats. 2006, c. 559) currently requires that a separate water meter be installed by the water purveyor for new water service serving more than 5,000 square feet of irrigated landscape. There might be some local jurisdictions that have adopted ordinances that may be more restrictive.

Compliance Method:
How to comply:
First determine if the new project will require separate metering based on the 1,000-5,000 square foot landscape area. If so then:
1. Owner or contractor shall install a submeter after the main meter for outdoor potable water use.

Suggestion: *Show separate meters and submeters on the plans (Site Utility Plan) and specifications.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents to confirm that a separate submeter for landscape irrigation was provided.

On-Site Enforcement: The inspector should review the permit set of plans to verify that separate meters as specified on the approved construction documents are installed.

CALGreen Section: 5.304.3 Irrigation design. In new nonresidential construction with at least 1000 square feet but not more than 2500 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.

Intent:
The intent of this code provision is to reduce outdoor potable water use for new construction landscaped areas with at least 1000 square feet but not more than 2500 square feet by requiring the installation of irrigation controllers and sensors that are weather-or soil moisture-based.

Change for 2012: This is a clarification of this section to identify more clearly the landscape areas subject to the provisions.

Existing Law or Regulation:
The California Department of Water Resources has adopted a Model Water Efficient Landscape Ordinance (MLO) which requires that irrigation controllers utilizing either evapotranspiration or soil moisture sensor data for landscape areas 2,500 square feet or more. There might be some local jurisdictions that have adopted ordinances.

Compliance Method:
First determine if the new project landscape area is at least 1,000 square feet but not more than 2,500 square feet.
If so, then:
Determine which type of controller is going to be installed (weather based versus soil-moisture based).
If specifying a weather-based controller, make sure that it either has an integral rain sensor, or provide a separate sensor.
Install all components of the irrigation control system per the manufacturer's instructions.

Note: *More information regarding irrigation controller function and specifications is available from the Irrigation Association at http://www.irrigation.org/SWAT/Industry/ia-tested.aspx*

Suggestion: *Show on the plans (Landscaping Plan) and specifications the irrigation controllers and sensors and design criteria outlined in section 492.7 of the MLO.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents to confirm that irrigation controllers and sensors are weather-or soil moisture-based.

On-Site Enforcement: The inspector should review the permit set of plans to verify that irrigation controllers and sensors as specified on the approved construction documents are installed according to the manufacturer's instructions and as shown on the irrigation design plan. The inspector may accept a certification form as a method of compliance, including any forms used for compliance with MLO or local ordinance.

SECTION 5.407 - CONSTRUCTION WASTE MANAGEMENT, DISP0SAL AND RECYCLING

CALGreen Section: 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.

Intent:
The intent of this code provision is to provide a weather-resistant exterior wall and foundation envelope as currently required by California Building Codes. This measure is to spotlight those existing code provisions and increase the integrity and longevity of the structure.

Existing Law or Regulation:
Currently this code provision is regulated by California Building Code Section 1403.2 (Weather Protection) and California Energy Code Section 150, (Mandatory Features and Devices for low-rise residential) and some local ordinances.

Compliance Method:
Design Team: Determine local conditions that may affect the amount of moisture that might penetrate the envelope due to weather, wind-driven rain or exposure to salt spray, etc. For example, the protection measures in Section 150 of the energy code are required for Climate Zones 14 & 16, in the mountains. Design and detail exterior wall systems to reflect local findings, specifying appropriate materials and vapor retardance. Show on the plans and specifications.

Suggestion: *Pay particular attention to openings and changes of material in detailing exterior wall systems.*
Contractor: Install any exterior wall system in accordance with architectural details and manufacturer's installation instructions.

Suggestion: *Systems like exterior insulation and finish systems, if not installed to manufacturer's installation instructions, have the potential for moisture penetration and condensation that may lead to mold, structural failure, and increased liability.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents to confirm that the exterior wall and foundation envelope meets the California Building Code Section 1403.2 (Weather Protection) and California Energy Code Section 150, (Mandatory Features and Devices for low-rise residential) and/or local ordinances are being met.

On-Site Enforcement: The inspector should review the permit set of plans to verify that the exterior wall and foundation envelope as specified on the approved plans and specifications are installed.

CALGreen Section: 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 non-absorbent floor and wall finishes within at least two feet around and perpendicular to such openings.

Intent:
The intent of this code provision is to minimize the amount of moisture entering the building; at the exterior entries & openings from wind-driven rain and at exterior walls from poorly designed sprinkler systems.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
For Sprinklers: Design irrigation systems to prevent spray on structures by specifying sprinkler heads which are adjacent to or near exterior walls to have a maximum degree head rotation or spray pattern that ensures protection of the building exterior.

For entries and openings:
1. Use design features such as overhangs and recesses, and flashings integrated with a drainage plane.
2. Specify non-absorbent flooring material at the interior landing surface a minimum of two feet in the direction of travel and at wall finishes adjacent to the door opening on the sides and at the top. If two feet is not available above the opening, wall finishes may terminate at the ceiling.

Suggestion: *Show on the plans (Landscaping Plan, Site plan and Floor plans,) and specifications the sprinkler design and design features that meet the requirements.*

Diagrams in development.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that the sprinkler design and design features at entries and openings are included in the submitted plans.

On-Site Enforcement: The inspector should review the permit set of plans to verify that the sprinkler design and design features at entries and openings as specified on the approved plans and specifications are installed per specifications.

CALGreen Section: 5.408. 1 Construction waste management. Recycle and/or salvage for reuse a minimum of 50 percent 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.

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 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/s.f. of building area may be deemed to meet the 50% 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 Section 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.

Intent:

Since construction waste makes up about 27% of the waste stream in California, this code provision is reducing the amount of construction waste from new construction that would be sent to the landfills, thereby extending the life of the landfills. Its purpose is also to encourage material resource efficiency through re-use and recycling of construction waste products.

Change for 2012: CBSC is proposing combining three sections into one, **5.408.1 Construction waste management**, to provide clarity to the code user. Terms are being

coordinated to mean the same things. Options for utilization of an approved waste management company and a waste stream reduction alternative for efficient construction methods are added to provide more methods of compliance. Exceptions are broadened to recognize that 50% of demolition waste may not be recyclable locally.

Existing Law or Regulation:
AB 939 (Stats. 1989, c. 1095) mandated a 50% diversion of all waste by 2000, but the CALGreen regulation targets 50% of new construction waste that makes up a smaller percentage of the total waste stream. There are some local jurisdictions that have ordinances in place that have requirements for this provision.

Compliance Method:

1. Determine if a local construction waste management ordinance is in place in your jurisdiction and comply with the more stringent requirement
2. Determine what local hauling and recycling facilities are available in your area to establish the most economically feasible option for recycle and/or salvage of construction debris. If there is no facilities in your area, use Exception 2 and work with the local enforcing agency to establish an acceptable alternate.
3. If applicable to the project, e.g., where walls are framed off-site or panelized wall systems are employed that reduce site waste significantly, the waste stream alternative may be appropriate. Document the weight of total waste compared to the building area, which may considered the gross square footage of each floor and the roof as approved by the enforcing agency.
4. Include for recycling the following materials: carpet, wood, aggregate, paint, shingles, wallboard or any other materials that have recyclable value. For more information on various materials visit the C&D Publications link on the CALRecycle website, the Construction Waste Management (CWM) Worksheet provided in Part 4 of this Guide, or as required by local ordinance.

Note: *The demolition debris provision may be applicable in the CALGreen code if an EXISTING building is going to be completely torn down and a NEW building built on the same site, where both are considered to be part of the same project. This would be determined on a case by case basis. Local market conditions may determine the level of diversion of demolition debris acceptable to the local enforcing agency.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans, specifications and/or forms to confirm that a construction waste management plan has been included with the plan submittal or that and Exception 2 has been approved by the enforcing agency.

On-Site Enforcement: The inspector should review the approved construction waste management plan or Exception 2 to verify that the plan is being followed or that an exception is being used. The inspector may ask for haul tags and/or reports from the contractor to verify compliance with the 50 percent waste reduction. Verification by documentation from a waste management company or recycling facility is acceptable.

Suggestion: *Building departments are strongly urged to work with their jurisdictions' Recycling Coordinators to determine if local conditions warrant exemptions and to identify appropriate means of alternate compliance.*

CALGreen Section: 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. 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)

Intent:

The intent of this code provision is to reduce the high volume, bulky land clearing materials from filling up the landfills and to encourage the market for non-hazardous land clearing debris. It is not meant to apply to clearing of contaminated sites for purposes such as brownfield remediation.

Change for 2012: In response to comment from the building industry, CBSC is proposing to add an exception to exempt certifiably diseased soil and land clearing debris from being reused. This section is also being renumbered to 5.408.3 to coordinate with the format of the previous section and subsections.

Existing Law or Regulation:

There is **NO** current law or regulation for this code provision. However, there are some local jurisdictions that have ordinances in place that have requirements for this provision.

Compliance Method:

1. Determine if a local construction ordinance is in place in your jurisdiction and comply with the more stringent requirement or as accepted by the local enforcing agency.
2. Look for local markets and salvage opportunity for re-use of clearing debris.
3. For phased developments and other long term projects, the materials may be stored on site until project completion.

Suggestion: *The need to salvage or recycle land clearing debris can be reduced by site planning that maintains such features as trees and rocks in the project where feasible.*

Enforcement:

Plan Intake: The reviewer and/or plan checker should review the plans and look for the appropriate note on the plans (civil plan), WMP or CWM Worksheet that describes the method of disposal of land clearing debris.

On-Site Enforcement: The inspector should review the permit set of plans and will verify that the excavated soil and land clearing debris is being reused or recycled as specified on the plans.

CALGreen Section: 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 Cal Recycle's web site.

Intent:
The intent of this code provision is to direct attention to existing law to provide areas for recycling by occupants, including collection and loading of recyclable materials.

Existing Law or Regulation:
Currently there is a requirement for a model ordinance in 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) that can be used for statewide application.

Compliance Method:
1. Determine if a local recycling ordinance is in place in your jurisdiction and comply. If no ordinance; then use the model recycling ordinance.
2. Show on the plans (site and/or floor plans) readily accessible areas and signage for those areas that serve the entire building for recycling of non-hazardous materials by occupants.
3. In accordance with the model ordinance, recycling areas shall be secure; be protected from the elements, such as rain; and be adequately separated from occupied spaces for protection against impacts such as noise, odor and pests.
4. Where feasible, recycling areas should be located adjacent to solid waste collection areas.

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

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and confirm that the appropriate recycling areas and signage for those areas have been provided on the plans.

On-Site Enforcement: The inspector should review the permit set of plans to verify that the recycling areas and signage for those areas on the plans and specifications are installed.

CALGreen Section: 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 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

All building systems and components 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.

Exceptions:

1 .Dry storage warehouses of any size
2. Areas less than 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.

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.

Change for 2012: In response to comments received during the 15-day comment period last code cycle for substantive changes, CBSC is proposing modifications to simplify this complex section for code users and enforcing agencies, including providing exceptions for dry storage warehouses and other uses in phased projects.

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 for July, 2012 are allowed for dry storage warehouses of any size; conditioned spaces under 10,000 square feet accessory to them; and for tenant improvements under 10,000 square feet 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 sub-contractor. 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.**See (Part 4) for forms and templates.*

1. Owner's Project Requirements

CALGreen Section: 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 O&M Personnel Expectations

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 pre-design 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.

Existing Law or Regulation:
No existing law or regulation. Review local ordinances for any applicable commissioning OPR requirement.

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

See (Part 4) for forms and templates.

Enforcement:

At their 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.

See (Part 4) for forms and templates.

2. Basis of Design (BOD)

CALGreen Section: 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

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.

Change for 2012: These change to remove the requirement for updates to the BOD, along with the recent publication of a guideline for building commissioning, are intended to clarify the process and ease verification of compliance while the number of personnel certified in commissioning grows. Builders and local officials are implementing these provisions for all new buildings over 10,000 s.f., which, for a city like Los Angeles, means hundreds of projects.

Existing Law or Regulation:
No existing law or regulation. Review local ordinances for any applicable commissioning BOD requirement.

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/ft²)

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

See (Part 4) for forms and templates.

Enforcement:

At their 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.

See (Part 4) for forms and templates.

3. Commissioning measures shown in the construction documents

CALGreen Section: 5.410.2 Commissioning. For new buildings 10,000 square feet and over, building commissioning shall be included in the design and construction processes…. Commissioning requirements shall include:
1. Owner's Project Requirements
2. Basis of Design
3. Commissioning measures shown in the construction documents
4. Commissioning Plan
5. Functional Performance Testing
6. Documentation & Training
7. Commissioning Report

This section provides details for element 3: *Commissioning measures shown in the construction documents.*

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.

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.

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 non-contractor 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 non-compliance 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.

See (Part 4) for forms and templates.

Enforcement:

At their 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.

See (Part 4) for forms and templates.

4. Commissioning plan

CALGreen Section: 5.410.2.3 Commissioning plan. 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 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.

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.

Change for 2012: Item #5 above was simplified for additional flexibility of compliance.

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.

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, sub-contractors, 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

See (Part 4) for forms and templates.

Enforcement:

At their 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.

See (Part 4) for forms and templates.

5. Functional performance testing

CALGreen Section: 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.

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

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.

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.

See (Part 4) for forms and templates.

Enforcement:

At their 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.

See (Part 4) for forms and templates.

6. **Documentation and training.**

CALGreen Section: 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.

See sections* 5.410.2.5.1 and 5.410.2.5.2 *below.

CALGreen Section: 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 shall include the following:
1. Site information, including facility description, history and current requirements.
2. Site contact information
3. Basic operations & 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.

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.

Change for 2012: Items #6 and 7 above were simplified for additional flexibility of compliance.

Existing Law or Regulation:
No existing law or regulation. Review local ordinances for any applicable Systems manual requirement.

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 & 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, & pressure, CO2 setpoints
   iii. Summer and winter setback schedules
   iv. Chilled & 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 & 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 & 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 & log
      ii. Building control system sensor calibration schedule & log
   e) Operation & Maintenance Manuals - Location or delivery information
4. *Major systems*
   a) HVAC systems & 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 & controls
    i. Lighting control panels
    ii. Occupancy sensors
    iii. Daylight harvesting systems
c) Renewable energy systems
    i. Photovoltaic panels & inverters
    ii. Wind powered electrical generators & 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*

See (Part 4) for forms and templates.

Enforcement:

At their 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.

See (Part 4) fort forms and templates.

CALGreen Section: 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 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

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.

Change for 2012: The language of 5.410.5.2 has been simplified for flexibility of compliance and to recognize that buildings not immediately leased or occupied may not have an imminent need for trained maintenance personnel. Requiring a plan for training, and not the training itself, is appropriate for these situations occurring in a down economy.

Existing Law or Regulation:

No existing law or regulation. Review local ordinances for any applicable Systems Operation Training requirement.

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 & 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

See (Part 4) for forms and templates.

Enforcement:

At their 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.

See (Part 4) for forms and templates.

7. Commissioning report

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

Intent:
The Intent of the Commissioning Report is to document 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.

Change for 2012: The language of 5.410.2.6 has been simplified for flexibility of compliance.

Existing Law or Regulation:
No existing law or regulation. Review local ordinances for any applicable Commissioning Report requirement.

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

See (Part 4) for forms and templates.

Enforcement:
At their 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.

See (Part 4) for forms and templates.

CALGreen Section: 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 applicable standards on each system as determined by the enforcing agency.

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; or 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.

Intent:
For construction projects less than 10,000 square feet testing and adjusting the building systems can ensure maximum efficiency of the equipment operation as well improve the indoor air quality for occupants. Additionally, testing and adjusting building system can prolong the life of the systems and maximize the equipment intended design parameters.

Change for 2012: These provisions for means of achieving quality control for building systems in projects under 10,000 are being proposed for minor changes in coordination with the changes proposed for commissioning, above, to provide additional clarity and flexibility of compliance.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
Design Team: Specify the systems in the project to be tested and adjusted; the testing team members and their qualifications, and the procedures, including those recommended by the manufacturer, as well as the report forms to be used in testing and adjusting.

Contractor: Maintain evidence of the qualifications of the testing and adjusting team and install the specified building systems in accordance with the plans and specifications. Examine systems for functional deficiencies that cannot be adjusted and report deficiencies discovered before and during testing and adjusting.
Prepare a testing and adjusting plan with step by step procedures and perform testing and adjusting of systems according to those procedures. Remedy any deficiencies that are discovered during testing. For HVAC systems use the balancing procedures defined by the organizations listed in the regulations, and perform additional testing and balancing as required to verify that balanced conditions are being maintained.

Complete testing and adjusting reports as required.
Prepare the O & M manual for turning over to the owner to encourage proper maintenance and optimum performance of the systems after Certificate of Occupancy.

Enforcement:
Plan Intake: Confirm that the testing and adjusting requirements are specified for the applicable building systems.

On-Site Enforcement: The inspector will collect copies of the testing, adjusting and balancing reports after all functional testing has been completed.

DIVISION 5.5 ENVIRONMENTAL QUALITY

SECTION 5.503 – FIREPLACES

CALGreen Section: 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.

Intent:
Although limited in non-residential applications, this code provision is intended to prevent the use of indoor air for combustion and to prevent contaminated air and any unused fuel from escaping the sealed fireplace to maintain indoor air quality and increased energy efficiency.

Existing Law or Regulation:
Currently the California Energy Code, CCR, Title 24, Part 6, Subchapter 7, Section 150 regulates residential fireplaces. There may be a local or regional ordinance in place.

Compliance Method:
1. Specify and install a direct-vent gas fireplace
2. Specify and install a pellet or wood stove which meets the US EPA Phase II emission standards.
3. Comply with local or regional ordinance.

Suggestion:
Contractor: *Retain product data sheets for onsite verification by the enforcing agency and for the operation and maintenance manual.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that the fireplaces and/or woodstoves meet the direct-vent sealed-combustion and/or US EPA Phase II emission limits.

On-Site Enforcement: The inspector should review the permit set of plans and product data sheets to verify that the fireplaces and/or woodstoves as specified on the approved plans and specifications are installed, or are stored on site with the ability to be verified.

SECTION 5.504 – POLLUTANT CONTROL

CALGreen Section: 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% based on ASHRAE 52.1 1992. Replace all filters immediately prior to occupancy.

Intent of new section for 2012:
The intent of this new section is for mandatory compliance, taken from voluntary Section A5.504.1.1, Item 3, which allows limited use of the permanent heating and cooling system during construction and requires the use of air filters with a Minimum Efficiency Reporting Value (MERV) of 8. It is intended to control air pollutants for workers during construction and ensure good air quality for occupants when the building is turned over to the owner. It allows ventilation using air conditioning systems if necessary, though this practice is noted not to be an optimum choice due to possible damage to equipment that may jeopardize a warranty.

Existing Law or Regulation:
The California Energy Code, CCR, Part 6 contains ventilation standards for conditioned spaces. CCR, Title 8 contains additional regulations for the protection of worker safety.

Compliance Method:
Engineers and designers should include the measures intended to promote air quality in the project specifications for ventilation, materials and others as applicable. The contractor should be responsible for employing them on the job and being able to demonstrate that the practices are being followed if requested by the enforcing agency.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications for directions on ventilation practices to be followed by the contractor.

On-Site Enforcement: The inspector should review the permit set of plans to verify which air quality practices the contractor is to use on the project and ask for demonstration of their employment during site visits.

CALGreen Section: 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.

Intent:
To enhance HVAC equipment efficiency and indoor air quality at building occupancy by preventing construction debris from building up in the air ducts during construction.

Change for 2012: CBSC is proposing to modify this section in concert with HCD, in response to comments made by CARB, to clarify for the code user when protection is needed, which equipment to protect, and against what pollutants ducts should be sealed.

Existing Law or Regulation:
The California Energy Code, CCR, Part 6 contains ventilation standards for conditioned spaces. CCR, Title 8 contains additional regulations for the protection of worker safety.

Compliance Method:
Engineers and designers should include the measures intended to promote air quality in the project specifications for ventilation, materials and others as applicable. The contractor should be responsible for employing them on the job and being able to demonstrate that the practices are being followed if requested by the enforcing agency.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications for directions on ventilation practices to be followed by the contractor.

On-Site Enforcement: The inspector should review the permit set of plans to verify which air quality practices the contractor is to use on the project and ask for demonstration of their employment during site visits.

CALGreen Section: 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.

Tables not shown – refer to Code

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.

5.504.4.4 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 CARB'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 not shown – refer to Code

5.504.4.5.1 Early compliance. Reserved.

5.504.4.5.2 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.

5.504.4.6. 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.)

[DSA-SS] Documentation shall be provided that verifies that finish materials are certified to meet the pollutant emission limits.

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

Intent:
The purpose of these measures is to reduce the volatile organic compounds (VOC) of finish materials commonly installed on a project, which will help improve air quality for the building occupants.

Change for 2012: Most of the changes proposed for this division resulted from comments received from CARB. They are intended to provide clarity and accuracy for the code user.

Sections 5.504.4.4 Carpet systems and 5.504.4.3.1 Carpet cushion. CBSC has updated the referenced standards as suggested by CARB to their current names. The standard for NSF/ANSI 140 "Gold" is also tagged as a minimum standard, not an absolute, for clarity.

Section 5.504.4.4.2 Documentation [for composite wood products]. This section is modified in response to comments by CARB to clarify for the code user the qualifying product certifications.

Section 5.504.4.6 Resilient flooring systems. CBSC is proposing updating the referenced standards as suggested by CARB to their current names, including a reference to Greenguard-certified products previously cited in a note.

Existing Law or Regulation:
The low-VOC provisions are based on the recommendations, guidelines and regulations of the Air Resources Board cited in each section. Regulations for aerosol adhesives and paints and for composite wood products are found in California Code of Regulations, Title 17 as noted above.

Compliance Method:
Specify finish materials that meet the limits of VOC shown in the tables for adhesives and sealants, paints and coatings, and composite wood products (particle board and hardboard casework). Flooring products (carpet systems and resilient flooring) shall be specified to meet VOC limit criteria as tested by the listed organizations. Substitutes may be approved by the local enforcing authority if it deems equivalency.

Suggestion:
Contractor: *Retain product data sheets for onsite verification by the enforcing agency and for the operation and maintenance manual. Sample compliance forms can be found in Part 4 of this Guide.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that the finishes are specified to meet VOC emission limits.

On-Site Enforcement: The inspector should review the permit set of plans and product data sheets maintained by the contractor to verify finishes specified on the approved plans and specifications are installed, or at least stored on site with the ability to be verified. The inspector may review data on material containers or specifications provided with products or accept self-certification form.

CALGreen Section: 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 re-usable, non-disposable type, and the fan energy use of that air delivery system is 0.4W/cfm or less at design airflow.

Intent:
The intent of this regulation is to filter particulate matter from the air by the use of at least MERV 8-rated filters for improved air quality.

Change for 2012: CBSC is proposing modification of this section providing clarity for the code user to emphasize that MERV 8 filters are to be installed prior to occupancy and that their replacement with like filters should be a recommendation for operation of a building. (See also Section 5.504.1.3, above.) Also, in response to comment, an exception has been added for certain ductless HVAC equipment which is incompatible with the MERV 8 filter requirement, but which is highly efficient and provides other benefits to a building operator or occupant.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
Specify and install prior to occupancy at least MERV 8 filters for the return air grilles.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that the filters are specified to meet MERV 8, or that specified equipment qualifies for the exception.

On-Site Enforcement: The inspector should review the permit set of plans and product data sheets maintained by the contractor to verify that HVAC filtration specified on the approved plans and specifications are installed, or are stored on site with the ability to be verified. The inspector may check a sample of installed filters to verify the MERV rating.

CALGreen Section: 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.

Intent:
By prohibiting smoking in buildings, and in those instances where outdoor areas are and dedicated for the use of smokers, this provision is intended to improve indoor air quality and to protect non-smokers from second hand smoke.

Change for 2012: CBSC is proposing a minor change in response to comment from CARB to recognize that other laws and regulations may apply to smoking in and around buildings. Smoking is a public health issue that is within the authority of California Department of Public Health, and currently the Labor Code allows smoking in certain workplaces. Building codes are intended to regulate construction and installation of building appurtenances, not building operations or occupant behavior.

Existing Law or Regulation:
State law prohibits smoking inside most buildings, and many local jurisdictions and college campuses have regulations that require a certain distance that smoking can occur outside a building. AB 1807 (Stats. 1983, c. 1047) is the public policy of the state that emissions of toxic air contaminants should be controlled to levels which prevent harm to the public health.

Compliance Method:
Include in the signage specification and post signs that prohibit smoking for an outdoor smoking area within 25 feet of building entries, outdoor air intakes and operable windows where they occur.

Suggestion: *In order to clarify sign placement and smoking area(s), show on one or all of the following plans: Site Plan, Floor Plan, Elevations and/or Detail Sheet.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that, if an outdoor smoking area is shown, signage is specified and located.

On-Site Enforcement: The inspector should review the permit set of plans against the outdoor smoking area and verify signage installed in the field.

CALGreen Section: 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.

Intent:
The intent is to direct the code user to other parts of Title 24 and this part for those provisions that are intended to reduce the probability of mold and mildew growth and improve air quality.

Existing Law or Regulation:
California Building Code Section 1203 for attic spaces and under-floor ventilation, Chapter 14 for a weather-resistant exterior wall envelope, and Section 5.407.2.2 Entries and openings in this code.

Compliance Method:
Design Team: Include details on the construction plans addressing issues of moisture control,

Contractor: Understand and install moisture control according to construction documents and manufacturer's installation recommendations.

Note: *Vapor control recommendations for different climate zones may found at www.buildingscience.com .*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that moisture control features which meet Title 24 are specified and detailed.

On-Site Enforcement: The inspector should review the permit set of plans and confirm that moisture control measures have been incorporated into the building. Collect a copy of self-certification form if completed and signed by the contractor.

SECTION 5.506 INDOOR AIR QUALITY

CALGreen Section: 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.

Intent:
The purpose is to point building designers and contractors to the ventilation requirements in the California Code of Regulations that are intended to improve indoor air quality for building occupants.

Existing Law or Regulation:
The California Energy Code, CCR, Title 24, Part 6, Sections 121(a) through 121(e) with flow rates as required by Table121-A. There is a possibility of a more stringent local ordinance.

Compliance Method:
Most engineers and contactors are familiar with following the provisions of the energy code that specify requirements for naturally and mechanically ventilated spaces, and may comply with this provision by using energy code compliance tools currently in place. Title 8 for Cal OSHA may have additional regulations which emphasize air quality for workers in particular environments which should be followed as required.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that building ventilation is calculated and specified to Title 24, Part 6, and if applicable, Part 8.

On-Site Enforcement: The inspector should review the permit set of plans against the natural ventilation features and mechanical ventilation systems that are installed on the project, requesting results of any testing of ventilation rates. Adequate pre-occupancy building ventilation shall be verified.

CALGreen Section: 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 2010 California Energy Code, Section 121(c).

Intent:
When demand control ventilation is required by Part 6, this provision intends to maintain CO^2 levels which are within the range that is safe for human occupation.

Existing Law or Regulation:
The current edition of the California Energy Code, CCR, Title 24, Part 6, Section 121(c) identifies the sensors, controls and devices required to keep CO^2 emissions at safe levels.

Compliance Method:
Design Team: The designer should specify and show calculations and locations for CO^2 sensors in the construction documents. The team familiar with demand control ventilation will be familiar with these requirements.

Contractor: The contractor should install the specified equipment and make sure that it is operating as designed. Again, familiarity with demand control ventilation will be an advantage.

Suggestion:
Contractor: *Retain product data sheets for onsite verification by the enforcing agency and for the operation and maintenance manual.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans, specifications and calculations to confirm that sensors are included which meet the requirements of Part 6.

On-Site Enforcement: The inspector should review the permit set of plans and product data sheets to verify that complying sensors displaying readings are installed in designated locations. He/she should obtain assurance that the readings are recorded as required by Part 6.

SECTION 5.507 ENVIRONMENTAL COMFORT

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

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

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. Ldn or CNEL for military airports shall be determined by the facility Air Installation Compatible Land Use Zone (AICUZ) plan.
2. Ldn 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

5.507.4.1.1 Noise exposure where noise contours are not readily available. Buildings exposed to a noise level of 65 dB Leq-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 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 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 .

Intent:
Where buildings are sited in the noisy areas described in this provision, the intent is to keep sound levels low enough to carry out the activities that take place inside the building without the distraction or discomfort of unwanted noise.

Change for 2012: This section is proposed for modification in response to comment to include performance and prescriptive measures to achieve compliance with exterior noise transmission, using measurements recognized in acoustical industry practice. It coordinates noise exposure

locations with those cited in local general plans and aligns also with Chapter 12 of the California Building Code for noise control in residential occupancies regulated by HCD.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision for nonresidential buildings. There may be local ordinances that apply in those communities that have noise exposure such as commercial airports.

Compliance Method:
Design Team: The designer should determine if a building's location requires compliance, then specify and detail wall and ceiling assemblies and show in the construction documents, show on plans and/or sections the placement of sound walls and floor/ceilings.

Contractor: The contractor should install the wall and ceiling assemblies as designed.

Suggestion:
Employing the services of an acoustical engineer is another option to assist with compliance and is required if using the performance method. Choose an assembly from the "examples of assemblies" link that meet the corresponding sound ratings class.

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

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans, specifications and calculations to confirm that STC ratings are included which meet the requirements of this section.

On-Site Enforcement: The inspector should review the permit set of plans and product data sheets to verify that complying wall and ceiling assemblies are installed correctly.

SECTION 5.508 OUTDOOR AIR QUALITY

CALGreen Section: 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.

Intent:
This measure eliminates the use of chlorofluorocarbons and Halons in fire suppression, HVAC and refrigeration systems in order to assist in meeting statewide requirements for the reduction of greenhouse gas emissions to 1990 levels and to prevent ozone destruction.

Existing Law or Regulation:
Refrigerants are regulated at the federal level by the Environmental Protection Agency and those containing ozone depleting chemicals are being gradually phased out. In California, the Global Warming Solutions Act of 2006, Assembly Bill 32 (Stats 2006, c. 488), calls for the reduction of greenhouse gas emissions to 1990 levels. Although these damaging compounds have been widely outlawed for most uses, prior to CALGreen, these issues were not addressed by the CCR Title 24 building standards.

Compliance Method:
Clearly note in appropriate place(s) in the construction documents and in the equipment specifications that the required total restriction of these compounds has been followed.

Note: *Typically, new fire suppression, HVAC and refrigeration systems are designed to operate on a new generation of refrigerants that do not contribute to greenhouse gases; but there is an inventory of CFCs and Halons used for the recharge of existing equipment. Ensure that new equipment is specified and installed, which is usually required in a new project.*

Enforcement:
Plan Intake: Enforcement provided by plan check and the on-site inspection by the building official should insure the drawing and installation requirements have been met and that no HVAC, fire suppression or refrigeration systems installed use the above mentioned environmental contaminants.

On-Site Enforcement: The inspector should review the permit set of plans and product data sheets to verify that complying equipment is installed. Inspection of this equipment may be combined with verification of building commissioning or testing and adjusting.

NEW DIVISION for 2012

DIVISION 5.7 ADDITIONS AND ALTERATIONS TO EXISTING NONRESIDENTIAL BUILDINGS

This is a new division proposed to include standards for additions and alterations to existing nonresidential buildings. The reason for this proposal is to extend the benefits of reduction in greenhouse gas emissions, water use, and polluting finish products to a larger class of buildings than newly constructed buildings. It is modeled after similar provisions recently adopted locally by the City of Los Angeles for its considerable body of construction projects. It proposes and scopes some of the provisions from Divisions 5.3 through 5.5 for which cost benefit analysis was prepared last cycle for the mandatory code. The provisions are those readily applicable to additions and renovations.

SECTION 5.701 – ADMINISTRATION

CALGreen Section: 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	2000	$500,000
Effective date of the 2013 California Building Standards Code	1000	$200,000

Notes:

1) The effective date of the 2013 California Building Standards Code is currently projected to be January 1, 2014.

2) This division does not apply to additions and alterations of qualified historical buildings.

Intent: Scope for additions and alterations to existing nonresidential buildings is limited to 2000 s.f. for additions and $500,000 for alterations, with that limit to drop in the next edition of the code. At the request of the Division of the State Architect, this section also includes an exception for qualified historic buildings regulated by that agency.

Existing Law or Regulation:
Building standards generally apply to additions and alterations for which a permit is applied. CALGreen has an exception, applying only to newly constructed buildings, so this division aligns CALGreen with other Parts of Title 24. There may be a more stringent local ordinance in place.

Compliance Method:
Determine if the addition or alteration triggers compliance (see Section 5.701 above and Section 7.502 Definitions) then comply with the specific provisions applicable.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans, specifications for the areas of additions and construction cost estimates for alterations for to confirm the need for complianc.

On-Site Enforcement: The inspector should review the permit set of plans and product data sheets for compliance with specific provisions, following.

SECTION 5.702 – DEFINITIONS

CALGreen Section: 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.

Intent:
Section 5.702.1 Definitions.
CBSC is including definitions of addition and of alteration, which are exclusive of each other, taken from the building code.

SECTION 5.703 GREEN BUILDING

CALGreen Section: 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.

Intent:
Section 5.703.1 Scope.
CBSC is proposing that the mandatory provisions in this division be found in the checklists in the appendix in the code.

Section 5.703.2 Phased projects and **5.703.2.1 Tenant improvements.** CBSC is proposing to clarify for the code user the application of the provisions of this division to shell buildings and tenant improvements.

SECTION 5.710 – PLANNING AND DESIGN

SECTION 5.710.6 SITE DEVELOPMENT

CALGreen Section: 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:

5.106.1.1 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

Intent:

The intent of this section means to prevent pollution from storm water runoff similar to that for new construction, where an addition disturbs less than one acre of soil. It recognizes that a local ordinance may govern, and it adds best management practices that can be used to prevent soil loss. This brings renovation projects in line with new construction projects disturbing similar amounts of soil to prevent soil and sediment from entering receiving waters.

Compliance and Enforcement: See **§ 5.106.1** of this guide

CALGreen Section: 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% 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. 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.

Intent:
The Intent of this section and subsections require additional bicycle parking when 10 or more parking spaces are added as part of an addition or alteration project, thus encouraging additional building occupants to use alternate forms of transportation to standard automobiles.

Compliance and Enforcement: See **§ 5.106.4** of this guide

CALGreen Section: 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.

5.106.5.2.1 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.

Intent:
Change for 2012: The intent of this section and subsections requires additional designated parking stalls when 10 or more parking spaces are added as part of an addition or alteration project, thus encouraging additional building occupants to use alternate forms of transportation to standard automobiles.

Compliance and Enforcement: See **§ 5.106.5.2** of this guide

CALGreen Section: 5.710.10 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

Exception: Additions and alterations not altering the drainage path.

Intent:

The intent of this section, including BMP aligned with HCD, has been included for compliance where grading and paving occur as part of an addition or alteration project altering the drainage path, protecting those structures from surface water.

This provision intends to emphasize means of compliance. Grading and paving plans, typically required by enforcing agencies, will show how this is to be accomplished, and a list of methods for managing flows, aligned with the Department of Housing and Community Development's (HCD) section, has been added.

Compliance and Enforcement: See **§ 5.106.10** of this guide

SECTION 5.712 WATER EFFICIENCY AND CONSERVATION

SUBSECTION 5.712.3 INDOOR WATER USE

CALGreen Section: 5.712.3.1 Meters. Separate submeters or metering devices 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 (4645 m^2). 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).

Intent:

The intent of this section and subsections means to provide clarity to the code user regarding the use of meters, submeters, and metering devices. For buildings in excess of 50,000 s.f., additions that result in high water-using tenancy or new subsystems would be subject to these provisions. For smaller projects, additions that project very high water use would also need to have separate submeters. The meters are intended as a means of water conservation, a high priority for California, where water is scarce.

Compliance and Enforcement: See **§ 5.303.1** of this guide

CALGreen Section: 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. 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% reduction in potable water use shall be demonstrated by one of the following methods.

[Balance of subsections are identical to those in Division 5.3]

Intent :
The intent of this code is to reduce the use of potable water within the building by 20%. These sections require 20% reduction in water use and for referenced standards for newly installed fixtures in additions and alterations. The purpose is to enhance water conservation in buildings.

Compliance and Enforcement: See **§ 5.303.2** of this guide

CALGreen Section: 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.

Intent:
The intent of this section, specific to showerheads, for 20% reduction in water use is required for newly installed fixtures in additions and alterations addressing controls for multiple shower heads serving one shower.

Change for 2012: CBSC is proposing the adoption of these sections for 20% reduction in water use and for referenced standards for newly installed fixtures in additions and alterations. Again, the purpose is to enhance water conservation in buildings.

Compliance and Enforcement: See **§ 5.303.2.1** of this guide

CALGreen Section: 5.713.3.5 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.

[*Table 5.303.6 is not shown for clarity,* but referenced standard ASME 112.18.1/CSA B125.1 was added in the table for showerheads with a maximum flow rate of 2.5 gal (9.5l.)/min.]

Intent:
The intent of this table for referenced standards for plumbing fixtures and fittings is amended to include the standards for showerheads to provide clarity to the code user, in coordination with HCD.

Compliance and Enforcement: See **§ 5.303.6** of this guide

SUBSECTION 5.712.4 – OUTDOOR WATER USE

CALGreen Section: 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

Intent:
CBSC adopted this section for developing a water budget for landscape irrigation installed in conjunction with additions or alterations.

Compliance and Enforcement: See **§ 5.304.1** of this guide

CALGreen Section: 5.712.4.2 Outdoor potable water use. For building addition or alteration requiring upgraded water service for landscaped areas of at least 1000 square feet but not more than 5000 square feet (the level at which Water Code §535 applies), separate submeters or metering devices shall be installed for outdoor potable water use.

Intent:
CBSC adopted this section for submeters or metering devices when additions or alterations require upgraded water service for landscaped areas between 1000 and 5000 s.f. The purpose is primarily to alert building owners and operator to excess dry season irrigation and thus conserve water.

Compliance and Enforcement: See **§ 5.304.2** of this guide

CALGreen Section: 5.712.4.3 Irrigation design. In building addition or alteration with at least 1000 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.

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

[Balance of subsections are unchanged from those in Division 5.3]

Intent:
CBSC adopted use of weather- or soil moisture-based irrigation controllers and rain sensors where additions or alterations increase landscaped area to between 1000 and 2500 s.f. These controllers are designed to direct the right amount of water to landscape plants and prevent excess dry season irrigation.

Compliance and Enforcement: See **§ 5.304.3 & § 5.304.3.1** of this guide

SECTION 5.713 – MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

CALGreen Section: 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.

Intent:
CBSC adopted this section from the new construction section to provide clarity to the code user requiring weather protection to additions and alterations, preventing damage to the structure and mold contamination. The section refers to regulations already in place.

Compliance and Enforcement: See **§ 5.407.1** of this guide

CALGreen Section: 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 non-absorbent floor and wall finishes within at least two feet around and perpendicular to such openings.

Intent:
CBSC adopted these sections from the new construction section to provide clarity to the code user requiring moisture control as it applies to additions and alterations, preventing mold contamination and damage to the structure and interior finishes.

Compliance and Enforcement: See **§ 5.407.2** and subsections of this guide

SUBSECTION 5.713.8 CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

CALGreen Section: 5.713.8.1 Construction waste management. For additions and remodels recycle and/or salvage for reuse a minimum of 50 percent of the non-hazardous 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.

[The provision in Division 5.4 for a waste stream alternative is eliminated from this subsection, with the balance of subsections unchanged from those in Division 5.4]

Intent:
The intent of this measure is to ensure that construction waste is diverted away from landfills and re-used or recycled at a rate of at least 50% of total construction waster, either in conformance with local ordinance, a construction Waste Management Plan (WMP) or utilization of a waste management company certifying to a 50% diversion.

Change for 2012: CBSC adopted this section and subsections as modified for the new construction division, to provide clarity to the code user. The pounds-per-square-foot alternative is not included here, because more demolition waste is expected with additions or alterations

than with new construction; however, there is more potential for reuse of materials. Other than that, this proposal recognizes that waste generated from additions and alterations should be recycled at the same rate as for new construction. The exception for demolition debris is maintained for those circumstances where, due to local facilities and markets, demolition may be recycled at other than a 50% rate.

Compliance and Enforcement: See **§ 5.408.1** and subsections of this guide

CALGreen Section: 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:

3. 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)
4. For a map of known pest and/or disease quarantine zones, consult with the California Department of Food and Agriculture (www.cdfa.ca.gov)

Intent:
The intent of this code provision is in the event of land clearing for an addition or a renovation, CBSC adopted this section, including an exception to exempt certifiably diseased soil and land clearing debris from being reused, as for new construction.

Compliance and Enforcement: See **§ 5.408.4.3** of this guide

SUBECTION 5.713.10 – BUILDING MAINTENANCE AND OPERATION

CALGreen Section: 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 non-hazardous 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% 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% or more in floor area
3. As required by a lawfully enacted local recycling ordinance, if more restrictive.

[Balance of subsections are identical to those in Division 5.4]

Intent:
CBSC adopted and amended this section from the new construction division to provide clarity to the code user regarding the establishment of recycling areas for occupants, if not provided on site, in the event of an addition or alteration. It clarifies its application only to certain additions and alterations. This conforms to the California Solid Waste Reuse and Recycling Access Act of 1991.

Compliance and Enforcement: See **§ 5.410.1 & § 5.410.1.1** of this guide

CALGreen Section: 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.

[Balance of subsections are unchanged from those in Division 5.4]

Intent:
These provisions for means of achieving quality control for building systems are being proposed additions and alterations where a new system is installed or an existing one upgraded to serve a new or renovated space. This promotes energy and water savings as systems are installed, tested, and adjusted for maximum efficiency when the project is turned over to the owner. Operation and maintenance information is to be provided to the owner to assist with continued efficiency beyond certificate of occupancy.

Compliance and Enforcement: See **§ 5.410.4** and subsections of this guide

DIVISION 5.714 ENVIRONMENTAL QUALITY

SECTION 5.714.3 – FIREPLACES

CALGreen Section: 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 U.S. EPA Phase II emission limits.

Intent:
CBSC adopted this section from the new construction division to provide clarity to the code user regarding the use of gas and wood burning appliances listed in this section for additions or alterations. As rarely-used amenities in new nonresidential construction, they are not required for heat but are typically installed for effect.

Compliance and Enforcement: See **§ 5.503** of this guide

CALGreen Section: 5.714.4.1 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% based on ASHRAE 52.1 1992. Replace all filters immediately prior to occupancy.

Intent:
This new section for mandatory compliance for newly constructed buildings, taken from Section A5.504.1.1, Item 3, allows limited use of the permanent heating and cooling system during construction of additions and areas of alteration. It requires the use of air filters with a Minimum Efficiency Reporting Value (MERV) of 8 and is intended to control air pollutants for workers during construction and ensure good air quality for occupants.

Compliance and Enforcement: See **§ 5.504.1.3** of this guide

CALGreen Section: 5.714.4.3 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.

Intent:
To enhance HVAC equipment efficiency and indoor air quality at building occupancy by preventing construction debris from building up in the air ducts during construction. CBSC adopted this section for applicable additions and alterations as modified for new construction. The purpose is to protect building occupants from indoor pollution from HVAC equipment operation and to protect the equipment against damage.

Compliance and Enforcement: See **§ 5.504.3** of this guide

SECTION 5.714.4.4 – ENVIRONMENTAL QUALITY

CALGreen Section: 5.714.4.4 Finish material pollutant control.

Finish materials shall comply with Sections 5.714.4.4.1 through 5.714.4.4.6 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.)

Intent:
The purpose of these measures is to reduce the volatile organic compounds (VOC) of finish materials commonly installed on an addition and alteration project, which will help improve air quality for the building occupants as for new construction in Division 5.5. During rulemaking and publication, an error was made in the referenced sections. They should read "Sections 5.714.4.4.1 through 5.714.4.4.6, up to and including resilient flooring systems.

Compliance and Enforcement: See **§ 5.504.4.4** through **§ 5.504.4.6** of this guide

CALGreen Section: 5.714.4.6.1 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 re-usable, non-disposable type, and the fan energy use of that air delivery system is 0.4W/cfm or less at design airflow.

Intent:
The intent of this regulation is to filter particulate matter from the air by the use of at least MERV 8-rated filters for improved air quality.

Change for 2012: CBSC adopted this section and exception as applicable to additions and alterations as modified for new construction to provide clarity for the code user to emphasize that MERV 8 filters are to be installed prior to occupancy and that their replacement with like filters should be a recommendation for operation of a building. It proposes the same exception for highly energy-efficient ductless HVAC equipment.

Compliance and Enforcement: See **§ 5.504.5.3** of this guide

CALGreen Section: 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 prohibitions.

Intent:
By prohibiting smoking in buildings, and in those instances where outdoor areas are and dedicated for the use of smokers, this provision is intended to improve indoor air quality and to protect non-smokers from second hand smoke.

Change for 2012: CBSC has adopted this section where it may apply to an addition or alteration, including a minor amendment for new construction in response to comment from CARB to recognize that other laws and regulations may apply to smoking in and around buildings.

Compliance and Enforcement: See **§ 5.504.7** of this guide

CALGreen Section: 5.714.7.1 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.

Intent:
CBSC adopted this section to provide clarity to the code user regarding moisture control. CBSC is proposing to include references to direct the code user to the California Building Code for general ventilation and moisture control requirements, which are intended to protect occupants from harmful molds and mildews.

Compliance and Enforcement: See **§ 5.505.1** of this guide

SECTION 5.714.6 INDOOR AIR QUALITY

CALGreen Section: 5. 714.7.2 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.

Intent:
CBSC adopted this section to provide clarity to the code user regarding the mechanical or natural delivery of outdoor air to additions or areas of alteration, including references to direct the code user to the California Energy Code, Title 24, Part 6 and Title 8, Chapter 4 for requirements.

Compliance and Enforcement: See **§ 5.506.1** of this guide

CALGreen Section: 5.714.7.3 Carbon dioxide (CO_2) monitoring. [BSC] For buildings equipped with demand control ventilation, CO_2 sensors and ventilation controls shall be specified and installed in accordance with the requirements of 2010 California Energy Code, Section 121(c).

Intent:
This section intends to provide clarity to the code user regarding carbon dioxide monitoring systems to protect occupant health and minimize GHG emissions. It is limited to additions and alterations to buildings equipped with demand control ventilation and as provided in the California Energy Code, Part 6, Title 24.

Compliance and Enforcement: See **§ 5.506.2** of this guide

CALGreen Section: 5.714.7.4.1 Acoustical control. Employ building assemblies and components with Sound Transmission Class (STC) values determined in accordance with ASTM E90 and ASTM E413 or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E1332 using either the prescriptive or performance method in Section 5.714.1.1 or 5.714.1.2.

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.

5.714.7.4.2 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

5.714.7.4.2.1 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).

5.714.7.4.2.2 Performance method. For buildings located as defined in Sections 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.

5.714.7.4.2.3 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.

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

5.714.7.4.3 Interior sound transmission. Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places in additions and in alterations modifying existing partitions or installing new partitions 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 .

Intent:
CBSC adopted these sections as modified for new construction to provide clarity to the code user regarding environmental acoustics. When installed as part of an addition or alteration, new exterior walls and roof-ceiling assemblies in buildings located near specified noise-producing neighbors, as well as new wall and floor-ceiling assemblies separating tenants inside the building, shall comply. The proposed provisions are intended to have a positive health and psychological impact on building occupants and promote healthy work attendance and increased productivity.

Compliance and Enforcement: See **§ 5.507** of this guide

CALGreen Section: 5.714.8 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.
5.714.8.1 Chlorofluorocarbons (CFCs.) Install HVAC, refrigeration and fire suppression equipment that do not contain CFCs.
5.714.8.2 Halons. Install HVAC, refrigeration and fire suppression equipment that do not contain Halons.

Intent:
These sections mean to provide clarity to the code user regarding the installation of HVAC, refrigeration, and fire suppression systems that use chlorofluorocarbons (CFCs) and halons. Currently, federal law prohibits the use of CFCs and halons in new installations, but they are still available for use in existing systems. Since most contracts for construction require new equipment installed as part of additions or alterations, building owners and contractors are predisposed to comply and assist with the reduction of greenhouse gas emissions from structures, one of the primary goals of the CALGreen Code.

Compliance and Enforcement: See **§ 5.508** of this guide

Part 3 Appendix A5 Nonresidential Voluntary Measures

CALGreen Code Appendix A5

Note:
1. Some of the voluntary measures described in the following pages are required for compliance with the voluntary tiers, which themselves are explained in Division A5.6.
2. The tiers and other voluntary measures are intended for a local jurisdiction to adopt as mandatory for its city or county. In that case, they are enforced as are the mandatory provisions of the code.
3. If an owner or developer elects to employ measures voluntarily, he or she should direct attention to the being used on the project when applying for a building permit.
4. Where employed voluntarily by a building owner or developer, voluntary measures should also be enforced by local building departments to make sure they are being met as described in each provision.

A5.103 SITE SELECTION

CALGreen Section: A5.103.1 Community connectivity. Where feasible, locate project on a previously developed site within a ½ 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, 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.

Intent:
The intent of this code provision is to ensure the reuse of existing sites in developed areas for non-residential districts to help minimize the impact of new site development on undeveloped lands, local air and water quality, as well as to minimize the greenhouse gas emissions generated from the development of a new site.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision. However, some jurisdictions may have "Special Districts" or zoning that may benefit from these provisions. Verify with the local enforcing authority the existence of any special zoning conditions prior to implementation of community connectivity for your project.

Compliance Method:
For newly constructed projects only, select a previously developed site with connectivity to the community that can provide pedestrian access to basic services anticipated to be available within a community (examples listed above). In addition, other types of services may be considered on a case-by-case basis to lend greater flexibility to the site selection process. Provide ½ mile radius map of the project site area showing the ten basic services and their proximity to the site for review and approval.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans, specifications and ½ mile area map to confirm the appropriate site selection has occurred.

CALGreen Section: A5.103.2 Brownfield or greyfield site redevelopment or infill area development. If feasible, select for a 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.

Intent:
The intent of these provisions is to encourage the use of Brownfield sites, previously unusable sites due to contamination, or Greyfield sites, which are 50% covered with impervious materials. The use of these sites can reduce the impact on undeveloped land and greenhouse gas emissions created from the development of new sites as well as enhance the existing developed area with new construction further helping to minimize urban blight and promote economic growth.

Existing Law or Regulation:
Environmental Protection Agency (EPA) regulations and ASTM E1903-97 Phase II Environmental Site Assessment apply to Brownfields, and local ordinances may also be in place.

Compliance Method:
Prepare documentation regarding remediation of contaminated sites per ASTM and EPA assessment process. Confirm with local enforcing agency any zoning requirements or specific local, state or federal limitations related to Brownfield or Greyfield project sites.

Enforcement:
Verification that remediation has occurred in accordance with appropriate local, state or federal requirements for Brownfield or Greyfield development.

SECTION A5.104 SITE PRESERVATION

CALGreen Section: 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.

Intent:
The intent of this provision is to optimize the open space on a job site and to encourage the utilization of vegetation within available open spaces. Incorporation of these provisions may result of improving ground water recharge, open space preservation and wildlife habitat preservation, as well as increasing the carbon sink effect, thus reducing greenhouse gas emissions.

Existing Law or Regulation:
No known state law exists. However, local zoning ordinances may have impact on these provisions.

Compliance Method:
Provide open space for vegetation via local ordinance and document location and calculations on site or landscape plans.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for the open space areas and calculations.

On Site Enforcement: The inspector should review the permit set of plans to confirm that the open space represented in the construction documents is preserved and planted as specified.

SECTION A5.105 DECONSTRUCTION AND REUSE OF EXISTING STRUCTURES

CALGreen Section: 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.

Intent:

The intent of these provisions is to reduce the amount of demolished material from an existing project that would otherwise end up in a landfill. It also encourages the reuse of materials, when possible, by integrating them into the new construction. The reuse of existing materials and the reduction in new material needs are established ways to reduce the amount of fuel for delivery vehicles and the amount of new material needed, resulting in reduced greenhouse gas emissions produced during new building construction.

Existing Law or Regulation:

No known laws or regulations currently exist. Check with local jurisdiction regarding ordinances for these provisions.

Compliance Method:

A5.105.1.1 Existing building structure – Document for verification the calculations performed to establish the 75% minimum requirement for existing building structural components and show on a demolition, site or building plan.

A5.105.1.2 Existing nonstructural elements – Document for verification the calculations performed to establish that at least 50% of the area of the completed building the reuse of existing interior nonstructural elements and show in the plans.

A5.105.1.3 Salvage – Document for verification the calculations performed to establish the salvage weight or number of items salvaged for a given project.

Enforcement:

Plan Intake: The reviewer and/or plan checker should review the plans and calculations that show the required percentages of reused existing building elements.

On Site Enforcement: The inspector should review the permit set of plans and confirm that the required percentages have been integrated, reused and salvaged as shown.

SECTION A5.106 SITE DEVELOPMENT

CALGreen Section: 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 A5.106.2.2 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.

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

A5.106.2.2 Strom 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).

Intent:
The intent of these provisions is to limit the amount and rate of water runoff to ensure no measurable increase from existing to developed conditions occurs. This will help to prevent the discharge of surface water pollutants from the project site into receiving waters in an attempt to maintain water quality. These provisions make exception for impervious sites that cannot retain all of the storm water on site. Additionally, the quality of the water runoff can be increased by incorporating treatment control best management practices (BMPs) through recommendations for project maintenance.

Existing Law or Regulation:
No known laws or regulations currently exist. Check with local jurisdiction regarding ordinances for these provisions.

Compliance Method:
The designer should design the site to insure that storm water runoff quality and rate does not increase from existing conditions. BMPs for storm water treatment control should be employed during construction. Recommendations for continuing treatment control should be included in the operation and maintenance manual.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for BMPs to control the storm water runoff rate, quantity and quality.

On Site Enforcement: The inspector should review the permit set of plans and verify that on site treatment controls meet with design criteria. He or she may check the operations and maintenance manual for recommendations on ongoing compliance.

CALGreen Section: 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 rain water 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. Bio retention (rain gardens);
2. Cisterns and rain barrels;
3. Green roof 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 evapotranspiration.

Intent:
A5.106.3.1 - The intent of these provisions is to encourage low impact development to reduce peak rain water runoff by utilizing local Regional Water Quality Control Boards mitigation measures and/or additional mitigation measures listed above.

A5.106.3.2 – For greyfield or infill sites, the intent is to manage rainfall on the site's impervious surfaces at a lower rate than for undeveloped sites.

Existing Law or Regulation:
Verify the existence of local Regional Water Quality Control Board mitigation measures required for LID.

Compliance Method:
Design specific control measures per EPA requirements of local Regional Water Control Board requirements for implementation on a LID site.

Show site design documents that demonstrate control measures for rainfall for undeveloped sites using mitigation measures listed above or from other referenced sources.
For greyfield or infill sites with impervious surfaces, indicate that at least 40 percent of annual rainfall is to be managed on site.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents to confirm compliance measures have been incorporated in the site design.

On Site Enforcement: The inspector should review the permit set of plans and verify that on site control measures meet with design criteria.

SECTION A5.106 SITE DEVELOPMENT

CALGreen Section: 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.

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

Intent:
Changing rooms are included with the intent of enhancing the mandatory long term bicycle parking requirements by providing changing rooms and showers for tenant-occupants to further encourage alternate means of transportation. The goals are to reduce energy use and greenhouse emissions associated with motorized transportation and provide for the comfort of building occupants.

Change for 2012: In coordination with CBSC's proposed modification for the mandatory measure, it deletes, at the request of the University of California, a reference to the University of California Policy on Sustainable Practices.

Existing Law or Regulation:
Check with local jurisdiction regarding local ordinances. For projects of the University of California, consult the University of California Policy on Sustainable Practices.

Compliance Method:
Provide plans and specifications for the project that show the changing rooms and amenities required per Table A5.106.4.3.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents to confirm compliance measures for changing rooms/shower facilities.

On Site Enforcement: The inspector should review the permit set of plans and verify that on site changing rooms/shower facilities meet with design criteria.

CALGreen Section: 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% 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 not shown for clarity – see Code]*

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 A5.106.5.1.1 not shown for clarity – see Code]*

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.

Intent:
These code provisions are to encourage newly constructed projects to provide enhanced designated, reserved parking for clean air vehicles (low-emitting, fuel efficient, and carpool/van pool vehicles). The intent is to promote the use of clean air vehicles and conserve natural resources and reduce greenhouse gas emissions. These voluntary levels of compliance at 10% and 12% are intended to provide "reach" standards to help California meet its energy and greenhouse gas reduction goals.

Change for 2012: (Tier 1 and 2)**.** In coordination with DSA-SS, CBSC made formatting changes to provide clarity to the code user and accommodate DSA-SS' partial adoption of this section and its subsections. See rationale for Section 5.106.5.2 above for changes to parking stall marking.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision. Check to see if local jurisdiction ordinances exist and incorporate whichever is stricter.

Compliance Method:
On the site plan for the project provide identification of fuel-efficient parking stall locations, the number of stalls required based on total number of parking spaces and the application method, including the paint type to be used. The size of the characters included in the stall markings should be at least 8" high as for the mandatory Section 5.106.5.2.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents to confirm that fuel-efficient parking stall requirements have been incorporated in the site design.

On Site Enforcement: The inspector should review the permit set of plans and verify that on site parking designation meets with design criteria.

CALGreen Section: **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 amp circuit terminating within 5 feet of the midline of each parking space.

Intent:
The intent of these provisions is to encourage the use of electric vehicles as an alternate means of transportation. These vehicles can help to reduce the amount of greenhouse gas emission released into the environment and can assist in reducing personal transportation expenses.

Change for 2012: CARB requested that this provision be changed to omit the 120V circuit, which is a potential for unlawful use by transient RVs and other vehicles, providing conduit for 208/240 only.

Existing Law or Regulation:
The California Building Code has provisions in Chapter 4 regarding electric vehicle charging requirements. Check to see if local jurisdiction ordinances exist and incorporate whichever is stricter.

Compliance Method:
Include on the site plan and electrical plans the number of stalls required to have electric vehicle charging stations and the installation method, including the type of wiring to be used and the amperage required for that condition.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents to confirm compliance with the electrical vehicle recharging measures.

On Site Enforcement: The inspector should review the permit set of plans and verify that on site electrical vehicle charging stations have been installed on the site or parking garage in accordance with design criteria.

CALGreen Section: **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.

Intent:
The intent of these provisions is to provide vehicle parking to meet local zoning requirements but that reduces the on-site area needed to accommodate the required number of parking spaces.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision. However, verify if local jurisdiction ordinances or TMA's (Transportation Management Authorities) exist.

Compliance Method:
Include on the site plans location and configuration of parking spaces, which could include on-street parking, a mix of standard and compact spaces or other approved strategies. Plans may include a reference to the local TMA program that may be used to reduce parking demand. If a TMA program is cited, include it in the operation and maintenance manual for reference by future building occupants.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents to confirm compliance measures have been incorporated in the site design as they relate to the parking capacity requirements and local zoning ordinances.

On Site Enforcement: The inspector should review the permit set of plans and verify that the reduced parking capacity strategies shown in the design have been carried out in construction. He or she may check the operation and maintenance manual if TMA programs are recommended for compliance.

CALGreen Section: 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 .

Intent:
The intent of these provisions is to reduce the amount of heat gain from solar exposure. During certain times of the year the exterior surfaces of a structure are subject to increased solar exposure. The reduction in heat gain through windows can be significantly reduced by exterior shading of the windows. Also, increasing the reflectance of opaque walls is intended to reduce the heat island effect for the area.

Change for 2012: CBSC effected minor changes to this voluntary section in response to comments from the California Energy Commission (CEC) to provide clarity to the code user. The changes include re-formatting the section to show more clearly different shading options for each side of a building and coverage required.

Existing Law or Regulation:
California Energy Code, Part 6, Title 24, California Code of Regulations regulates the energy efficiency of the building envelope.

Compliance Method:
Include in the landscape design and plant specifications species of plants that meet the shading requirements for exterior wall surfaces. Additionally, man-made shading devices can also be specified for exterior wall applications. Energy compliance forms and software programs may serve as documentation of the efficacy of exterior shading and/or solar reflectance.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents to confirm compliance measures have been incorporated in the building and site design.

On Site Enforcement: The inspector should review the permit set of plans and verify that man-made or vegetative shading devices are installed as designed and confirm that any exposed opaque walls are compliant with specified SRI values.

CALGreen Section: 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^{o}.
2. 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.

Intent:

The intent of these provisions is to encourage employment of passive solar design principles to moderate the ill effects of solar radiation. This can result in reduced energy usage and greenhouse gas emissions and in reduced cost of operation. Additional measures may be applied to assist in protecting the building envelope during weather events.

Change for 2012: CBSC made a minor modification in response to a comment from the building industry to have this provision align with a similar provision HCD adopts for residential new construction to provide clarity and consistency for the code user.

Existing Law or Regulation:

There is **NO** current law or regulation for this code provision. Verify with local authorities any ordinances that may impact building orientation.

Compliance Method:

Include in the site and building plans and landscape plan building location and orientation to consider passive solar principles, as well as landscaping specifications that meet the exterior wall surface protection requirements.

Enforcement:

Plan Intake: The reviewer and/or plan checker should review the construction documents to confirm compliance measures have been incorporated in the building and site design.

On Site Enforcement: The inspector should review the permit set of plans and verify that the building is oriented as intended and that the landscape features are installed as designed.

CALGreen Section: **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% of site hardscape or put 50% 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 American Society for Testing and Materials (ASTM) Standards E1918 or C1549.
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 A5.106.11.2.1 and A5.106.11.2.2 or a minimum aged Solar Reflectance Index (SRI) complying with 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[ṕ initial – 0.2], where ṕ 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 Reflective 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.

[Tables A5.106.11.2.1 and A5.106.11.2.2 are omitted for clarity – see code for changes to values in the tables]

Intent:
The intent of these provisions is to minimize the creation of nonroof and roof heat islands in new construction to reduce the energy load for building cooling and to moderate atmospheric temperature.
Additionally, cool roof installations are included in Tier 1 and Tier 2 provisions for adoption by cities and counties wishing to go beyond the minimum mandatory requirements for their communities.

Change for 2012: CBSC amended this voluntary section and subsections which are a recognized method for reducing global warming. CBSC received comment on these provisions from the California Nevada Cement Association (CNCA) to include standards for reflective surfaces and options for hardscape materials supported by the industry. CARB provided technical assistance on applicable definitions and standards. CBSC also made modifications to coordinate with CEC's regulations for cool roofs, coordinating also with HCD. These minor changes are intended to provide clarity and consistency for the code user, especially those adopting a tier, of which the cool roof provisions are an element.

Existing Law or Regulation:
California Energy Code, Part 6, Title 24, California Code of Regulations regulates the energy efficiency of the building envelope.

Compliance Method:
Show on the site/landscape plan the application of hardscape material with a calculation that represents at least a 50% area for alternatives to hardscape material.

For cool roof application include with the energy calculations a Solar Reflective Index – Work Sheet (SRI-WS) and specifications for cool roof materials selected to comply with the cool roof provisions shown in Table A1.506.11.2.1 or A1.506.11.2.2.

Suggestion:
Contractor: *Maintain product data sheets for roofing materials for onsite verification by the enforcing agency and for the operation and maintenance manual.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for the hardscape design calculations; and energy compliance forms and specifications for compliance with the cool roof provisions.

On Site Enforcement: The inspector should review the permit set of plans and verify that hardscape alternatives are constructed as calculated. He or she should check product data sheets for the roofing materials for compliance with cool roof values. If no documentation is available, he or she should inspect the project to ensure materials selected meet the SRI values.

DIVISION A5.2 ENERGY EFFICIENCY

SECTION A5.203 PERFORMANCE APPROACH

CALGreen Section: 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% 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% 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.

Intent:
The intent of these "reach" standards is to encourage building performance beyond the requirements in the 2010 California Energy Code, CCR, Title 24, Part 6, which are based on the Energy Commission's 2008 Building Energy Efficiency Standards. The State 2008 Long Term Energy Efficiency Strategic Plan calls for zero net energy use in newly constructed commercial buildings by 2030, and these reach standards are meant to assist with meeting that goal.

Change for 2012: CBSC proposed modifications of this voluntary section regarding reduction of energy use and greenhouse gas emissions in two tiers of efficiency above the requirements in the California Energy Code. In addition to deleting a duplicative sentence and making reference and syntax corrections, CBSC responded to comments from energy consultants regarding calculation of the "15 and 30 percent better than" numbers to provide clarity to the code user.

Existing Law or Regulation:
The 2010 California Energy Code, CCR, Title 24, Part 6 sets the minimum energy efficiency standards for those buildings under the authority of the California Energy Commission, including most commercial occupancies. Some local jurisdictions have adopted stricter energy efficiency standards with the approval of the Energy Commission.

Compliance Method:
Software used to calculate a building's energy performance for compliance with Part 6 (commonly referred to locally as "Title 24") is also used for the purposes of achieving either 15 percent or 30 percent improvement. Compliance documents should be submitted with the construction documents in whatever format the enforcing agency requires for basic energy code compliance.

Note: *For guidance on the associated voluntary standards included in the tiers for each project, refer to each section's guidelines in this Part of the Guidebook.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications for the energy compliance forms or other documentation as for basic energy code compliance. He or she should also verify compliance with the associated voluntary measures. (See note above.)

On-Site Enforcement: The inspector should review the permit set of plans and energy compliance documents against what features are installed in the project, including HVAC, windows, insulation, roofing, lighting, controls, etc., to make sure the installations comply. This is similar to what site inspectors or third party inspectors do for basic energy code compliance.

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.

Intent:
The intent of this provision is to encourage the installation of equipment and appliances that, carrying the ENERGY STAR label, are certified under that national program to be more energy efficient than standard equipment and appliances. ENERGY STAR products meet federal energy efficiency standards (see section immediately following), include features appealing to customers, and are generally available in the marketplace.

Existing Law or Regulation:
The National Appliance Energy Conservation Act (NAECA) of 1987 set minimum energy efficiency standards for residential appliances for all the states. Its updates and subsequent acts in the Energy Policy Act (EPAct) of 1992 and 2005 and the Energy Independence and Security Act (EISA) of 2007 broadened the scope of equipment and appliances. The provisions are managed by the Department of Energy. In California, CCR, Title 20 contains appliance energy efficiency standards that address appliances not covered by the federal standards.

Compliance Method:
Specify appliances to be provided by the contractor to be ENERGY STAR where that appellation is available for the products needed. Substitutions may be submitted if data is supplied to show equivalency in energy savings to an ENERGY STAR product. Where a product is not available with an ENERGY STAR designation, make sure that it meets minimum federal and/or state energy efficiency standards.

Note: *ENERGY STAR product listing is available on the ENERGY STAR website.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications and/or the energy compliance documentation for ENERGY STAR specifications or equivalency if this voluntary measure is declared for this project.

On-Site Enforcement: The inspector should review the permit set of plans and/or energy compliance documents and make sure the equipment and appliances specified to be ENERGY STAR or their equivalents are installed.

A5.204.2 Energy monitoring. Provide sub-metering 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.

Intent:
The intent of energy monitoring is to encourage building performance beyond the requirements established by the Energy Commission's Title-24 Part 6 Energy Efficiency Standards. Building monitoring provides continuous data feed which can be used to correct system imbalances, incorrect adjustments and other system problems, assuring optimal system performance when used by maintenance and management staff after building occupancy. The installation of building monitoring requires carefully followed installation protocols to assure that the initial building performance readings are correct. The building performance shall be established by one of the four options provided by the International Performance Measurement and Verification Protocol (IPMVP, 2002).

Existing Law or Regulation:
No regulation exists within the state that requires energy monitoring beyond a basic utility level metering for the purpose of tariffs (i.e., end-user billing) at monthly or other acceptable time-scale aggregation of metered reading.

Compliance Method:

Based on the type of measures installed in the candidate building that establishes the level of energy performance, select one appropriate IPMVP option (i.e., option A, B, C or D) to showcase the candidate building's performance levels. Once selected, the option will provide the required parameters, methodology, and measurement techniques to establish the building performance levels. Upon the selection of an IPMVP option, the building performance will be established by following the selected option to perform energy assessment (both methodology and measurement techniques) as described in the IPMVP compliance manual and the appendices of the compliance manual.

Enforcement:
Plan intake: The building owner or their agent will be expected to certify the building performance levels to the building department staff to attain the desired level status to the satisfaction of the enforcing agency.

On-site enforcement: Building department staff may complete the process by verifying the performance levels through on-site data (i.e., nameplate data, monitored data) for simple measures and/or using special inspection verification for complex systems. A special inspector or owners' agent may provide the performance verification by providing supporting calculations, calibrated whole-building simulation using the installed monitored parameters and established methodology as outlined for the selected option in the IPMVP.

A5.204.3 Demand response. HVAC systems with Direct Digital Control Systems and centralized lighting systems shall include pre-programmed 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 pre-programmed demand response strategies shall be capable of reducing the peak HVAC demand by cooling temperature set point adjustment.

A5.204.3.2 Lighting. The pre-programmed demand response strategies shall be capable of reducing the total lighting load by a minimum 30% 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.

Intent:
The intent of this provision is to encourage the installation of automated controls that can reduce a building's power demand in response to a request signal. The request signal is typically issued by a local utility.

Existing Law or Regulation:

Title 24, Part 6 (Sections 122(h), 131(g), 133(a)3 Exception 4), requires installation of controls for certain building types and applications that enable demand response but there is no existing law or regulation that requires enrollment in a demand response program.

When demand response controls are installed, there are portions of numerous existing codes and standards which may be applicable depending on the installed technology.

Compliance Method:
Specify and install demand response controls that meet or exceed the requirements for each system type. Include, in the construction documents, load schedules for the amount of power demand that will be reduced for each system type. Enroll in local utility or utility sponsored demand response program.

Enforcement:
Plan Intake: The reviewer and/or plan checker should verify that demand response controls are specified in construction documents. He or she should review the control diagrams, circuiting/wiring, and load schedules for the appropriate amounts of controlled power demand reduction for each system type.

On-Site Enforcement: The inspector should verify that demand response controls, as specified in the construction documents, are installed. To the extent possible, he or she should use the load schedules and a test signal to verify that the appropriate loads are controlled in response to the test signal. To the extent possible, he or she should use the load schedules and a test signal to verify that the appropriate amounts of power demand reduction are achieved in response to the test signal. He or she should verify enrollment in local utility or utility sponsored demand response program.

A5.211.3 Green Power. If offered by local utility provider, participate in a renewable energy portfolio program that provides a minimum of 50% electrical power from renewable sources. Maintain documentation through utility billings.

Intent:
The intent of this provision is to encourage the purchase of electricity from a utility that offers a renewable energy portfolio, reducing dependency on carbon-based fuel for energy generation and associated greenhouse gas emissions.

Existing Law or Regulation:
There may be regulations for utilities to follow for their portfolios or pricing mechanisms for consumer protection, but there are no building energy standards relative to this concept.

Compliance Method:
Indicate in the electrical plans and/or specifications the intent to enroll in the renewable energy portfolio of the local utility to purchase electricity at least at the 50% renewables level. As construction draws to a close, the intent should be recorded in the operation and maintenance manual as a recommended practice in the operation of the building beyond certificate of occupancy.

Suggestion: *If enrolled during construction, the contractor should make available for the enforcing agency utility billings showing the program details.*

Enforcement:
Plan Intake: If the permittee expresses the intent to participate in the utility's renewable energy portfolio for the purchase of electricity, the reviewer and/or plan checker should review the plans and specifications for the documentation.

On-Site Enforcement: The inspector should review the permit set of plans, check any utility electricity billings documenting enrollment in a renewable energy program, and check the operation and maintenance manual for recommendations to continue with the program.

SECTION A5.211 RENEWABLE ENERGY

CALGreen Section: A5.211.4 Pre-wiring 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.

Intent:
The intent of this provision is to facilitate the installation of photovoltaic panels on a building in the future, if it is not accomplished during the initial construction of the project.

Change for 2012: CBSC modified these provisions and their format in response to comments from the CEC to provide clarity to the code user concerning future installation and accommodation of commercial rooftop solar. Changes distinguish between installations that will require battery storage and those that will not.

Existing Law or Regulation:
No statewide solar electricity building standards have been adopted for nonresidential new construction. Local jurisdictions may have adopted standards for solar installations. Some utilities and federal agencies offer rebate programs for the installation of photovoltaics to encourage their installation.

Compliance Method:
Show in the construction documents the location and specifications for the conduit(s) to be installed, ready for future installation of solar panels and ancillary equipment on the project. For off grid installations, batteries for storage of electricity should be anticipated in extending conduit to an appropriate location in the building.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications for the intended location of the conduit and the sizing to accomplish the purpose.

On-Site Enforcement: The inspector should review the permit set of plans and make sure that the specified conduit is installed in the location(s) shown.

SECTION A5.212 ELEVATORS, ESCALATORS AND OTHER EQUIPMENT

CALGreen Section: 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.

Intent:
The intent of this provision is to encourage, within the parameters established by Title 8 for elevator and escalator safety and the California Building Standards Code for fire regulations concerning vertical conveyances, installation and controls of elevators and escalators to conserve energy. Regenerative drive systems for both elevators and escalators are currently available for a price; in the case of elevators in a high-rise, approximately a 15% reduction in energy use could be realized, with a payback of 5 to 7 years.

Change for 2012: In response to comment concerning a potential conflict with Title 8 for escalators, CBSC reworked this voluntary section to promote the use of regenerative drive systems in elevators and escalators. These systems are designed to return electricity into the building grid when the conveyances are loaded going down and making use of gravitational force. Somewhat more expensive than those with conventional drives, regenerative drive elevators in high-rise buildings can reduce elevator energy use by about 15% and pay back the additional cost in around 5 years.

Existing Law or Regulation:
Title 8 contains regulations for elevator and escalator safety, including a reference to ASME A17.1-2004. ASME A17.1, in Section 6.1.4.1, states that "The speed attained by an escalator after start-up shall not be intentionally varied." This could be considered at odds with A5.212.1, and unless the permittee has obtained a variance from Title 8, as was the case at LAX in a recent remodel of the people-mover systems, other options for energy savings for escalators may be sought. The Building Standards Code regulates fire and panic safety concerning vertical conveyances and their controls, including use of elevators for fire access as required in an emergency.

Compliance Method:
Where appropriate for the use intended specify traction elevators and/or escalators that feature energy-saving mechanisms and controls that meet Title 8 and Title 24 and features regenerative drive systems. If submitted on a deferred approval basis, actual elevator and/or escalator product data should be made available to the enforcing agency.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for elevator and/or escalator specifications that include features for energy-savings and that meet

Title 8 and Title 24. He or she should request product data and specifications for elevators and/or escalator information submitted separately as a deferred approval.

On-Site Enforcement: The inspector should review the permit set of plans and/or deferred approval submittal to make sure that the elevators and/or escalators and controls specified are installed as intended. Typically, elevators and escalators are inspected by the Department of Industrial Relations, Division of Occupational Safety & Health in addition to any building inspections.

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.

Intent:
The intentions of this provision are to provide means to reduce the thermal bridging of materials in contact with steel framing and to conserve the amount of steel used in a steel framing system.

Existing Law or Regulation:

Structural standards for building framing and for steel in particular are found in CCR, Title 24, Part 2, the California Building Code, and building energy efficiency standards are found in Part 6, the California Energy Code.

Compliance Method:

Within the structural parameters of the California Building Code and the energy efficiency standards of the energy code, specify material-efficient steel framing for those projects framed in steel. Reflect framing, assembly and intersections details, and material specifications in the construction documents. Where it is feasible, install exterior rigid insulation to avoid the transmission of heat through the steel framing. It is possible that rigid insulation cannot span widely-spaced framing members, so a choice of techniques may need to be made.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications for energy efficiency measures taken with the steel framing system and for compliance with Parts 2 and 6 of Title 24.

On-Site Enforcement: The inspector should review the permit set of plans and/or energy compliance documents to make sure that the energy efficiency measures shown in the documents are included on the project. A framing inspection may reveal any steel material conservation measures, and an additional inspection to examine envelope and detailing may be advisable.

DIVISION A5.3 WATER EFFICIENCY AND CONSERVATION

SECTION A5.303 INDOOR WATER USE

CALGreen Section: A5.303.2.3.1 Tier 1 – 30 percent Savings. [DSA-SS] 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. 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 A5.303.2.3.1, or
2. Performance method. A calculation demonstrating a 30% reduction in the building "water use baseline" as established in Table 5.303.2.2shall 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.

[Tables A5.303.2.2 and A5.303.2.3.1 are not shown for clarity – see discussion on mandatory Section 5.303.2 above for footnotes added to the tables.]

Intent:
The intent of these code provisions is to enhance indoor potable water use reduction beyond the mandatory requirement of 20 percent. They recognize that California's water supply is unpredictable and likely to be stretched by future population growth and drought periods. The provisions also respond to the energy demands of treating potable water and moving it around the state. A 30 percent reduction is required for the achievement of Tier 1 compliance, and a 35 percent reduction for Tier 2.

Change for 2012: CBSC modified these sections and tables in response to comments from CARB and to coordinate language with HCD. Changes include clarifications to prescriptive and performance measures and identification of baseline flow rates in the tables, correction of the duration of a nonresidential shower in the table, addition of a reference to national standards for fixtures not regulated by the Energy Commission in Title 20 and coordination of footnotes with tables in Chapters 5 & 8. The changes provide consistency among the sections for indoor water use reduction.

Existing Law or Regulation:
Section 5.303.2 of this code mandates a 20 percent reduction in indoor potable water use through either a prescriptive or performance approach, and there may be a local ordinance in place otherwise for a reduction in water usage.

Compliance Method:
1. Specify each fixture or fitting to meet the 30 percent reduction shown on Table A5.303.2.
OR
2. Performance method: As in the 20 percent reduction method, a calculation is performed to demonstrate overall 30, 35 or 40 percent savings using Table A5.303.2.2.

Note: *It may prove difficult to locate fixtures needed in a project that have reduced flows beyond the 20 percent level; for example, commercial lavatory faucets, widely available at 0.5 gpm are*

not widely available in a 0.4 gpm flow rate (20 percent savings), though aerators are available that can reduce flows to .35 gpm. The performance method may be a preferable path of compliance, where, for example, waterless urinals or 1-pint urinals are installed, or recycled water is available for flushing.

Sample worksheets are included in Part 4 of the Guide.

Enforcement:

Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that either the prescriptive or performance method has been submitted and check for the 30 percent water reduction compliance. If the performance method is used, review the water calculations showing the 30, 35 or 40 percent reduction.

On-Site Enforcement: The inspector should review the permit set of plans to verify that the specified water 30 percent efficient plumbing fixtures and fixture fittings are installed. If the performance method was used, the inspector will verify that fixtures or systems used to reduce overall water use by 30, 35 or 40 percent have been installed. The inspector may review the fixture specifications to verify compliance or accept self-certification form.

CALGreen Section: A5.303.3 Appliances.

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 (21.9L) per cycle
   b. Commercial—refer to Table 603.3

TABLE A5.303.3
COMMERCIAL DISHWASHER WATER USE

Type	High-Temperature—maximum gallons per rack	Chemical—maximum gallons per rack
Conveyer	0.70	0.62 (4.4L)
Door	0.95	1.16 (2.6L) [BSC] 2.26 (8.6L) [DSA-SS]
Undercounter	0.90	0.98 (3.7L)

3. Ice makers shall be air cooled.
4. Food steamers shall be connection-less or boiler-less.
5. **[BSC]** The use and installation of water softeners that discharge to the community sewer system shall 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

Intent:
The intent of this code provision is to enhance indoor potable water use reduction when a project includes water-using appliances supplied as part of the construction contract, not just plumbing fixtures. It may also be used to assist compliance with the mandatory requirement of 20 percent reduction in Section 5.303.2, the Tiers, or the 40 percent reduction.

Change for 2012: CBSC made modifications to provide clarity to the code user regarding indoor water use conservation of appliances. After reviewing provisions in ASHRAE 189.1, the International Association of Plumbing and Mechanical Officials' 2010 Green Plumbing and Mechanical Code Supplement, and credits in LEED, CBSC proposes adding combination ovens and commercial pre-rinse spray valves with standards for their compliance. It also is including metric equivalencies in liters to each of the gallon measurements in this section.

Existing Law or Regulation:
Section 5.303.2 of this code mandates a 20 percent reduction in indoor potable water use through either a prescriptive or performance approach. If a Tier is adopted by your city or county, a 30 percent or a 35 percent reduction will likely be required, and there may be a local ordinance in place otherwise for a reduction in water usage.

Compliance Method:
Show in the construction documents the appliance specifications meeting these criteria. If substitutions are made during construction, provide documentation that the substituted appliances also meet them.

Enforcement:

Plan Intake: The reviewer and/or plan checker should review the plans and specifications to check for appliance specifications to meet the criteria. Any deferred approvals should be checked for compliance.

On-Site Enforcement: The inspector should review the permit set of plans to verify that the specified water-using appliances are installed. The inspector may review the fixture specifications or approved substitutions to verify compliance or accept self-certification form.

CALGreen Section: 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.

Intent:
The intent of this code provision is to reduce indoor potable water use when recycled water is available in the community. It can be used to meet the 20 percent, Tier 1 and Tier 2 or 40 percent reduction standards.

Existing Law or Regulation:
Section 5.303.2 of this code mandates a 20 percent reduction in indoor potable water use through either a prescriptive or performance approach. If a Tier is adopted by your city or county, a 30 or 35 percent reduction will likely be required, and there may be a local ordinance in place otherwise for a reduction in water usage. Chapter 16A, Division II, of the 2010 California Plumbing Code regulates the installation of dual plumbing systems for potable and recycled water.

Compliance Method:
Concurrently with the adoption of this voluntary standard, Department of Water Resources adopted dual plumbing standards for the plumbing code. Those standards must be met to satisfy this voluntary CALGreen provision, with certain exceptions approved by the enforcing agency for pre-plumbed systems. Particular emphasis is placed on prevention of cross-contamination, on labeling of non-potable systems, and on testing.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to verify that the dual plumbing standards in the 2010 California Plumbing Code, Chapter 16A, Division II are used in the design.

On-Site Enforcement: The inspector should review the permit set of plans to verify that the dual piping is installed and labeled as specified and in accordance with the plumbing code. If recycled water is immediately intended for use in the project, and not just pre-plumbed, the inspector should witness any testing of the system as required by the plumbing code and collect the results of any tests.

SECTION A5.304 – OUTDOOR WATER USE

CALGreen Section: 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 1000 square feet (the level at which Section 5.304.2 applies).

Intent:
The intent of this code provision is to reduce indoor potable water use when recycled water is available in the community. It can be used to meet the 20 percent, Tier 1 and Tier 2 or 40 percent reduction standards.

Change for 2012: CBSC made a minor modification of this section to identify more clearly the landscape areas subject to the provisions, is it has for Section 5.304.2, the mandatory provision for landscape submeters.

Existing Law or Regulation:
Section 5.303.2 of this code mandates a 20 percent reduction in indoor potable water use through either a prescriptive or performance approach. If a Tier is adopted by your city or county, a 30 or 35 percent reduction will likely be required, and there may be a local ordinance in place otherwise for a reduction in water usage. Chapter 16A, Division II, of the 2010 California Plumbing Code regulates the installation of dual plumbing systems for potable and recycled water.

Compliance Method:
Concurrently with the adoption of this voluntary standard, Department of Water Resources adopted dual plumbing standards for the plumbing code. Those standards must be met to satisfy this voluntary CALGreen provision, with certain exceptions approved by the enforcing agency for pre-plumbed systems. Particular emphasis is placed on prevention of cross-contamination, on labeling of non-potable systems, and on testing.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to verify that the dual plumbing standards in the 2010 California Plumbing Code, Chapter 16A, Division II are used in the design.

On-Site Enforcement: The inspector should review the permit set of plans to verify that the dual piping is installed and labeled as specified and in accordance with the plumbing code. If recycled water is immediately intended for use in the project, and not just pre-plumbed, the inspector should witness any testing of the system as required by the plumbing code and collect the results of any tests.

CALGreen Section: 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

Intent:
The intent of these code provisions is to reduce the use of potable water for landscape irrigation beyond the mandatory requirements of the water budget in Section 5.304.1. The idea is to recognize that water is a scarce resource in California and take opportunities to reduce use whenever feasible. For this reason, these provisions are made part of the tier structure, which if adopted at the local level, will become minimum mandatory requirements for that community.

Existing Law or Regulation:
California Code of Regulations, Title 23, Division 2, Chapter 2.7 is the Department of Water Resources Model Water Efficient Landscape Ordinance (MLO) that contains provisions and calculations to establish water budgets for irrigation. Local jurisdictions may also have adopted landscape irrigation ordinances. As noted above, Section 5.304.1 of the CALGreen Code requires that each new nonresidential project establish a water budget in accordance with the MLO or local ordinance.

Compliance Method:
The basic water budget calculation sets up a base rate factor of evapotranspiration (ETo). It is made up of a mix of plant types that yield a plant factor (PF) multiplied by the efficiency of a typical landscape irrigation system (IE). The resulting number is the ETo adjustment factor (ETAF) which is 0.70 of the ETo for the project area.

Tier 1 goes one better by establishing the percentage of ETo, or ETAF, at 60%, 10% more restrictive than the base water budget. Likewise, Tier 2, at 55% drops the percentage of water budget ETo by 15%. These ETAFs are substituted for the one in the water budget formula to comply with Tier 1 or Tier 2.

Note: *The guidelines for Section 5.304.1 in this guidebook include sample calculations for the water budget which may also be followed for these tier calculations.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for calculations to confirm that a water budget using the reduced ETo factor is developed by either using the local ordinance and/or the California Department of Water Resources Model Water Efficient Landscape Ordinance.

On-Site Enforcement: The inspector should review the permit set of plans and calculations to verify that the approved water budget as specified is followed during construction. The MLO or local ordinance compliance forms may serve this purpose.

CALGreen Section: 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.

Intent:
The intent of these code provisions is to eliminate the use of potable water for landscape irrigation altogether. It emphasizes preserving the resource for human and wildlife consumption and for growing food exclusively.

Existing Law or Regulation:
The California Plumbing Code, in Appendix G, includes provisions for the installation of graywater systems. The Water Code contains many sections that encourage the safe use of recycled water for landscape irrigation and in buildings. The California Department of Public Health, the Department of Water Resources, the State Water Resources Control Board, and the nine California regional water boards regulate the treatment and use of recycled water. In Title 23 of the California Code of Regulations, the State Water Resources Control Board sets policy for recycled water projects.

Compliance Method:
There are three basic ways with which to comply with this provision:

1. Specify landscaping plant species that do not require irrigation beyond their establishment; for example, cacti, other dry-climate native shrubs, and trees. Show the names and locations of the plants on the landscape plan.
2. Provide a graywater irrigation system complying with California Plumbing Code Appendix G or a recycled water system meeting state standards, where provided by the locality, as acceptable to the local jurisdiction. Detail in construction documents.
3. Use a combination of landscaping that requires no water beyond plant establishment and other landscape materials such as paving, decomposed granite, gravel or mulch. Indicate these on landscape plans and in specifications.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for landscape plans and specifications for landscape materials. He or she should make sure that any alternate source of water for irrigation meets applicable local, regional or state standards.

On-Site Enforcement: The inspector should review the permit set of plans for the landscaping or alternative source of irrigation water and make sure that landscaping materials and/or irrigation sources are installed as shown in the plans.

CALGreen Section: A5.304.6 Restoration of areas disturbed by construction. Restore all landscape areas disturbed during construction by planting with local adaptive and/or non-invasive vegetation.

A5.304.7 Previously developed sites. On previously developed or graded sites restore or protect at least 50% of the site area with adaptive and/or non-invasive 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 non-invasive.

Exception: Area of the building footprint is excluded from the calculation.

Intent:
The intent of these code provisions is reduce the use of potable water for landscape irrigation through restoring disturbed or previously developed sites with locally adaptive, including native, vegetation. It is meant to assist with control of erosion and stormwater pollution during and after construction. It also seeks to reduce the possibility of the spread of invasive exotic vegetation that have a tendency to overrun their ecosystems, reducing diversity of flora and fauna.

Existing Law or Regulation:
CCR, Title 3, contains Department of Food and Agriculture regulations for invasive plants. Various laws in California's Fish and Game, Food and Agriculture, Harbors and Navigation, and Public Resources Codes address invasive plant and animal species, such as control of species carried in ships' ballast water and of stands of tamarisk, a highly invasive plant species.

Section 5.106.1 of this code and state and local regulations address storwmwater pollution prevention, and this voluntary provision can assist with loss of soil due to erosion for the purposes of keeping receiving waters clean.

Compliance Method:
Site plans or landscape plans may be used to show where plants are intended to go as construction on the building project winds down. The 50% area calculations for previously developed sites can be shown on the site plan, and if applicable, on the roof plan. Any areas that are disturbed by accessing the building project, installing utilities, or stockpiling of earth for fill, for example, can be remediated using this provision.

Judicial siting of temporary facilities for the contractor's field office, utilities, sanitary facilities, and public access to the project site to disturb as little as possible of the area can assist with compliance with this provision. Restoring these areas as completion nears with the recommended vegetation should be shown on site or landscaping plans.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for landscape plans and specifications for landscape materials. In the case of previously developed sites, he or she should check the calculations for 50% coverage with recommended plantings.

On-Site Enforcement: The inspector should review the permit set of plans for the landscaping and make sure that the plants specified are installed in the locations as shown, checking to make sure that disturbed or previously developed or graded areas are covered.

CALGreen Section: 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.

Intent:
The intent of these code provisions is to eliminate the use of potable water for landscape irrigation. It emphasizes preserving the resource for human and wildlife consumption and for growing food exclusively.

Existing Law or Regulation:
The California Plumbing Code, in Appendix G, includes provisions for the installation of graywater systems. There may be local prohibitions or requirements for the use of graywater.

Compliance Method:
Provide a graywater irrigation system complying with California Plumbing Code Appendix G as acceptable to the local jurisdiction. Detail in construction documents on a graywater system piping plan and specifications for system components.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for the graywater system piping plan and the component specifications. He or she should make sure that the graywater system for irrigation meets applicable local, regional or state standards.

On-Site Enforcement: The inspector should review the permit set of plans for the graywater system and make sure that the system is installed as shown in the drawings, using the specified components.

SECTION A5.404 EFFICIENT FRAMING TECHNIQUES

CALGreen Section: A5.404.1 Wood framing. Employ Advanced Wood Framing Techniques, or Optimum Value Engineering (OVE), as recommended by the US 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 at the following web site: www.buildingscience.com

Intent:
The intent of this measure is to decrease the quantity of wood needed to achieve structural framing standards that meet or exceed Title 24 wood framing requirements.

A framing plan can do more than just layout studs, openings, floor and roof joists, etc. There are opportunities to value engineer the floor system to and obtain a proper joist count, to ensure all plumbing and HVAC is coordinated with the floor framing and to insure that the "stack framing" concept is followed on the job site. Most importantly, all these issues are resolved on paper prior to casting the foundation

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
Incorporate as many OVE innovations and techniques to increase the overall efficiency of materials and energy required to achieve equivalent results to standard construction practices. Detailing drawings down to the level of individual framing members will make the plan reviewers' and inspectors' jobs easier. OVE includes more than just the arrangement of wood framing members.

Other categories

- Dimensional design and layout
- Material selection and purchase
- Delivery and on-site storage
- Framing techniques (including an innovative new shear panel)
- Waste and disposal – an innovative structural use of wood waste

(Use (SEE) stud per www.buildingscience.com —Advanced Framing: Using Wood Efficiently from Optimizing Design to Minimizing the Dumpster) See Section A5.408 for Tier Requirements)

Note: OVE techniques may require alternate material specifications such as drywall thickness, insulation thickness, sheathing thickness and nailing spacing and size. Further information may be found at; www.buildingscience.com , www.eere.energy.gov or any other source developed to meet Title 24 Building standards.

Enforcement:

Plan Intake: The reviewer will review the plans in order to verify that any OVE measures are done in accordance with the innovative developing practices employed and other requirements of Title 24.

On-Site Enforcement: The inspector should review the permit set of plans and make sure all measures taken toward this goal are satisfied as drawn and specified. The level of inspection will likely be in proportion to the level of details specified in the construction documents.

SECTION A5.405 MATERIAL SOURCES

CALGreen Section: 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 harvested 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%, 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.

Intent:
The intent of this code provision is to conserve the energy associated with the transportation of building materials over long distances to the jobsite.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
Identify the available sources of material products and choose the most sustainable and cost effective source within 500 miles of project site or within California. Show in the construction documents those intended to be obtained locally for 10% of materials cost. Keep receipts and records of material supply sources to present to the enforcing agency for verification that at least 10% of building materials, based on cost, are from a source within 500 miles of the project site or from within California.

Enforcement:
Plan Intake: Plan Intake: The reviewer and/or plan checker should review the construction documents for the building products specified that are locally available and the projected calculation of 10% of materials value.

On-Site Enforcement: Using receipts and records supplied by the building contractor, the inspector should verify that 10% has been acquired from a source within 500 miles of project

CALGreen Section: **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% 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% of total materials value, based on estimated cost.

Intent:
The intent of this code provision is to promote sustainable building practices by using self regenerating materials wherever possible; as opposed to finite and limited source materials.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
Show in the construction documents bio-based materials intended to be used in the project for 2.5% of materials estimated cost. Retain all certification accompanying the bio-based, certified and rapidly renewable component sources for verification by the enforcing agency for these conservation measures.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for the bio-based materials specified and calculations for 2.5% of estimated materials value.

On-Site Enforcement: The inspector should verify, using receipts and certifications provided by the contractor, what portion of the materials used meet the requirements of the bio-based resource conservation measures.

CALGreen Section: A5.405.3 Reused materials. Use salvaged, refurbished, refinished, or reused materials for a minimum of 5% 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, and Section A5.105.1 for on-site materials reuse.

Intent:

The intent of this voluntary code measure is to further conserve materials through the re-use of at least 5% of total building materials based on estimated construction cost.

Existing Law or Regulation:

There is **NO** current law or regulation for this code provision.

Compliance Method:

Show in the construction documents reused materials intended to be used in the project for 5% of materials estimated cost. Retain all documentation accompanying the reused materials for verification by the enforcing agency.

Enforcement:

Plan Intake: The reviewer and/or plan checker should review the construction documents for the reused materials specified and calculations for 5% of estimated materials value.

On-Site Enforcement: The inspector should verify through receipts and other product purchase documentation that the percentage of building materials that have been re-used replacing the need for those additional "new materials" is 5% or greater of the overall material usage.

CALGreen Section: **A5.405.4.1 Recycled content, [BSC, DSA-SS].** 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 A5.4-1)**

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 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.

A5.405.4.1.1 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 Equation 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.

A4.405.4.1.2 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 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 Equation A5.4-4 and Equation 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)

A5.405.4.1.3 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 A5.4-6 and A5.4-7.

RCV_M (dollars) = Material cost (dollars) x RC_M (percent) **(Equation A5. 4-6)**

RC_M (percent) = Post-consumer content percentage + (½) Pre-consumer content percentage (**Equation A5. 4-7)**

Notes:
1. If the post-consumer and pre-consumer 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 pre-consumer and one half shall be considered post-consumer recycled material.

A5.405.4.1.4. 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 (∑) of the Proportional Recycled Content (**PRC_M**) of each material in the assembly. **RC_A** shall be determined by Equation A5.4-9.

RC_A = ∑ **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 (Post-consumer and Pre-consumer) 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) = Post-consumer content percentage + (½) Pre-consumer content percentage **(See Equation A5.4-7)**

Method 2: Recycled content (Post-consumer and Pre-consumer) provided in pounds

PRC_M (percent) = [**RC_M** (lbs) ÷ Weight of material (lbs)] x 100 **(Equation A5.4-12)**

RC_M (lbs) = Post-consumer content (lbs) + (½) Pre-consumer content (lbs) **(Equation A5.4-13)**

Note: 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 pre-consumer and one half shall be considered post-consumer recycled material.

A5.405.4.1.5. 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.

Intent:
The purpose of this code measure is to reduce the use of virgin materials in favor of a percentage of the materials to meet varying levels of pre- or post-consumer recycled content values (RVC). These voluntary levels of compliance at 10% and 15% are intended to provide "reach" standards to help California meet its energy and greenhouse gas reduction goals.

Change for 2012: These amendments provide a revised structure for meeting Tier 1 and Tier 2 requirements when utilizing materials with recycled content on projects. Sections addressing recycled content value are modified in coordination with the Department Housing and Community Development (HCD). The amendments and new language provide additional clarity for determining recycled content and recycled content value for construction materials and assemblies. These changes are the product of an initial proposal by CBSC to clarify the meaning and calculation of Recycled Content Value in response to questions at trainings throughout the state. HCD further developed the standards and created worksheets, referenced at the beginning of the sections, to assist with calculations.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
The target values are in terms of estimated cost, and cost is determined by the weight of the recycled content. By comparing the cost as determined by the weight the total RCV (defined in Section A5.402) is calculated and Tier levels are achieved accordingly. Show in the construction documents the recycled materials and calculations for 10% or 15% of estimated materials cost.

Note: *Sources and recycled content of some recycled materials can be found at CalRecycle.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for the reused materials specified and calculations for 10% or 15% of estimated materials value.

On-Site Enforcement: The inspector should verify through documentation supplied by the contractor the actual RCV of the materials used and the tier level achieved at either 10% or 15%.

CALGreen Section: 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
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 Slag Cement 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:

[Table of values for UFFA are omitted for clarity – see Code]

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:

[Table of values for Metakaolin are omitted for clarity – see Code]

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 A5.4-1. When ASTM C 595 or ASTM C 1157 cement is used, the amount of SCM in these cements shall be used in calculating Equation A5.4-1.

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.

$$F/25 + SL/50 + UF/12 \geq 1 \qquad \textbf{Equation A5.4-1}$$

Where: F = Fly ash, natural pozzolan, or other approved SCM, as a percent of total cementitious material for concrete on the project

L = 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

Intent:
The intent of these measures encourage the use of alternate *supplementary cementitious materials* (SCMs) (which would otherwise be industrial byproducts that would make its way into the waste stream) as a replacement for the energy intensive transformation of limestone and clay to cement in the manufacture of concrete. Using ASTM Standards listed above see Equation A5.4-1 and Exception to determine minimum portions of the various SCMs that may be substituted for cement.

Change for 2012: CBSC amended these sections comments from California-Nevada Cement Association (CNCA) on the 2010 standards. Changes update standards references, eliminate all references to CalTrans specifications and provide consistency of terms throughout the sections.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
Design Team: Show in the engineering specification the concrete mix designs intended to be used on the project contain the required amount of SCMs. Total SCMs including F, SL and/or UF (as defined above) may be added in any combination that satisfies ASTM Standards listed above and Equation A5.4-1 where the *total minimum SCMs* for *amount of concrete being mixed* is one (1).

Example use of Equation A5.4-1:
For a batch of concrete that requires 400 lb of cementitious materials with a 50% addition of cement and 50% SCMs
Using Equation A5.4-1 --- F/25 + SL/50 + UF/12 ≥ 1; adding 80lb of F or 20% and 120lb of SL or 30% then

20/25 + 30/50 + 0/12 = .8 + .6 = 1.4 which is ≥ 1; so mix is OK

Contractor: Place concrete for the specified uses that complies with the engineer's mix design and minimum amount of SCMs.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the engineer's specifications for the minimum SCMs and for any calculations. (All concrete used on the project must also meet the structural provisions of the California Building Code.)

On-Site Enforcement: The building inspector should verify mix designs of concrete per industry standards for substitution of SCMs as prescribed in A5.405.5 – A5.405.2.1.1.

CALGreen Section: **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 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 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 C1602, Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete.

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

Intent:
These measures encourage the use of alternative energy sources, mined aggregate replacement and an alternative to potable water in the manufacture of concrete in addition to the provisions of Sections A5.405.5 – A5.405.2.1.1 in an overall approach of conserving energy and materials in order to achieve resource efficiency.

Change for 2012: CBSC amended these sections in response to comments from CNCA, mainly for clarity and consistency of terminology. A5.405.5.3.2.4 is added to recognize cement saving through use of smaller high-strength concrete members.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
Use any combination of the alternative materials and manufacturing methods listed above. Show in the construction documents. Contractor should keep all receipts and paperwork to show the enforcing agency which alternate methods of compliance were used in manufacture of cement or concrete.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for any cement or concrete alternates employed in addition to the provisions in Sections A5.405.5 – A5.405.2.1.1.

On-Site Enforcement: The building inspector should verify documentation of cement or concrete alternates employed on the project.

SECTION A5.406 ENHANCED DURABILITY AND REDUCED MAINTENANCE

CALGreen Section: 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.

[DSA-SS] Use materials, equivalent in performance to virgin materials, with post-consumer or pre-consumer recycled content value (RVC) for a minimum of 10 percent of the total value, based on estimated cost of materials on the project. Provide documentation as to the respective values.

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.

Intent:
The intent of this code provision is to reduce the consumption of resources by specifying the use of those materials shown to have a longer service life; reduced maintenance materials that require a minimum of other material maintenance and materials that are able to be cycled cradle to cradle rather than cradle to grave (recyclability). It is a conservation measure to create structures that are more durable and require less maintenance in order to increase the service life of the entire building, this approach requires consideration of all materials and equipment to work together to increase the usable service life of a building.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
Compliance with this voluntary measure relies mainly with the designer and his selection and specification of materials. The building contractor shall retain all receipts, written verification or other documentation that verifies the service life of materials selected from this category. In order to comply with this provision in a meaningful way, it is important to carry the concept of materials and equipment that have an inherent quality (i.e. – increased service life) throughout the project. For example the selection and use of color impregnated stucco versus wood exterior finish—reduces maintenance and increases service life. Using masonry walls, with a non service life increase in the roof and window systems, would not meet the intent of this voluntary regulation. If you choose to create a building with enhanced durability and reduced maintenance, the lifespan of all systems and components must have a reasonably balanced durability.

Enforcement:
The enforcement of this voluntary requirement will require life cycle analysis information to evolve to a level which proves the durability of systems have lifespan ratings or warrantees in order to evaluate overall building durability. Until that time, the assessed durability will be more subjective. Objectivity in this pursuit is the goal. That is achievable at this time by choosing a 50 year roof rather than one with a 15 year warrantee or lifespan.

Plan Intake: The reviewer and/or plan checker should review the construction documents for any materials from this section that are used may be verified according to the requirements listed above.

On-Site Enforcement: The building inspector should verify documentation of all enhanced materials called for and verify that those materials have been installed according to required standards.

SECTION A5.408 CONSTRUCTION WASTE REDUCTION, DISPOSAL, AND RECYCLING

CALGreen Section: A5.408.3.1 Enhanced construction waste reduction – Tier 1. Divert to recycle or salvage at least 65% of non-hazardous construction waste generated at the site.

A5.408.3.1.1 Enhanced construction waste reduction – Tier 2. Divert to recycle or salvage at least 80% of non-hazardous 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.

Intent:
This code provision is to go beyond the mandatory 50% salvage of all non-hazardous, "new" construction waste; for Tier 1—65% and for Tier 2—80% or as required by local ordinance whichever is more restrictive; reducing the amount of construction waste from new construction that would be sent to the landfills, thereby extending the life of the landfills. Its purpose is also to encourage material resource efficiency through re-use and recycling of construction waste products.

Change for 2012: These modifications mean to provide clarity to the code user regarding increased construction waste diversion that align with proposed changes to the mandatory standards in Section 5.408.1 and subsections. Numbering and formatting changes facilitate coordination with other agency adoptions.

Existing Law or Regulation:
AB 939 (Stats. 1989, c. 1095) mandated a 50% diversion of all waste by 2000, but the CALGreen regulation targets 50% of new construction waste that makes up a smaller percentage of the total waste stream. There are some local jurisdictions that have ordinances in place that have more restrictive requirements for this provision.

Compliance Method:
Complete waste management report in order to verify that you are meeting Tier 1 or Tier 2, whichever level of material conservation is chosen.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for the level of enhanced construction waste reduction called for by the designer and make sure a report is called for showing the level indicated.

On-Site Enforcement: The building inspector should verify documentation according to available report or other equivalent documentation to show that at least 65% to (meet Tier 1) or 80% (to meet Tier 2) of construction waste is re-used/ recycled if option 408.3.1 is chosen as a conservation measure.

SECTION A5.409 LIFE CYCLE ASSESSMENT

CALGreen Section: 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% of materials or assemblies based on life cycle assessment of at least three for the impacts listed in Section A5.409.2.3, one of which shall be climate change.

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

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

A5.409.5 Verification of compliance. Documentation of compliance shall be provided as follows:
1. The assessment is performed in accordance with ISO 14044.
2. The project meets the requirements of other parts of Title 24.
3. A copy of the analysis shall be made available to the enforcement authority.
4. A copy of the analysis and any maintenance or training recommendations shall be included in the operation and maintenance manual.

Intent:
The intent of this code provision is to conserve energy and resources indirectly by creating buildings with a longer life cycle. If one building lasts 100 years and a similar building occupancy building lasts a mere 30 years, the energy and resources to rebuild that particular building will be saved twice by merely increasing its usefulness (life-cycle) by a factor of 3.

Change for 2012: CBSC renumbered, reformatted and revised this voluntary section in response to changes initially proposed by CNCA.

Changes emphasize standards for whole building life cycle assessment (LCA) as a preferred option to assessment of individual building assemblies or components. It includes the impacts to be measured for a target of 10% improvement in environmental performance compared to a referenced building. A subsection, A5.409.3, provides an option for LCA of materials and system assemblies if whole building LCA is not elected. LCA is a relatively new tool for measurement of environmental performance of buildings, and the options are intended to introduce it to code users at whatever level they feel comfortable.

Existing Law or Regulation:
Data is being created and collected on all types of materials and systems by the organizations named above. For long span life cycle analysis, clearly the collection of this data needs to continue over several generations. Only then can the cost along with the life cycle be quantified, so a more objective data set will exist for the "most" efficient materials and systems for a given use.

Compliance Method:
The generation of cost to life cycle analysis is in its early stages. This type of analysis is by definition a very lengthy process. Until the energy and resources to produce a material or product is fully quantified, then objectively joined to the life-cycle of the materials and products, an accurate overall efficiency may be placed on the cost to life-cycle ratio, which will help designers make the best choices for specified materials and products. There are available software programs that can be employed to calculate LCA, some of which are noted in this code section.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the construction documents for buildings using the increased durability inherent in materials and products intended to create a longer lifecycle; a data base should be instituted to keep information on the projected life cycle vs. actual lifecycle will be the means by which such types of buildings have a superior overall energy and resource efficiency when compared to less durable construction materials, methods and products.

On-Site Enforcement: The building inspector should verify that all applicable standards are met in the quality of construction of buildings designed to be more durable.

DIVISION A5.5 ENVIRONMENTAL QUALITY

SECTION A5.504 POLLUTANT CONTROL

CALGreen Section: 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.

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.

Intent:
The intent of this voluntary provision is to promote practices to maintain healthy air quality during the construction process to protect worker health and leave the building prepared for occupancy.

Section A5.504.1.1 addresses means of ventilating the building while protecting HVAC systems from contamination. It allows ventilation using air conditioning systems if necessary, though this practice is noted not to be an optimum choice due to possible damage to equipment that may jeopardize a warranty.

Section A5.504.1.2 directs the user to additional practices for the use of materials on the project to make sure they are aired or dried, installed to prevent cross-contamination, and cleaned prior to certification of occupancy. Use of clean generators is promoted for those urban areas where noxious fumes may affect adjacent neighbors.

Change for 2012: CBSC has amended Section A5.504.1.1 to omit Item 2, which concerns sealing HVAC ducts and openings, mandatory under Section 5.504.3; and Item 3, which has been adopted for mandatory compliance in new Section 5.504.1.3.

Existing Law or Regulation:
The California Energy Code, CCR, Part 6 contains ventilation standards for conditioned spaces. CCR, Title 8 contains additional regulations for the protection of worker safety.

Compliance Method:
Engineers and designers should include the measures intended to promote air quality in the project specifications for ventilation, materials and others as applicable. The contractor should be responsible for employing them on the job and being able to demonstrate that the practices are being followed if requested by the enforcing agency.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications for directions on ventilation practices to be followed by the contractor.

On-Site Enforcement: The inspector should review the permit set of plans to verify which air quality practices the contractor is to use on the project and ask for demonstration of their employment during site visits.

CALGreen Section: A5.504.2 IAQ Post-construction. 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%. 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.

Intent:
The intent of this voluntary provision is to promote practices to insure healthy air quality at the close of construction, after all finishes are installed, to protect occupant health after Certification of Occupancy or Temporary Occupancy. It spells out the means of flushing out air contaminated by pollution from materials and construction activities. It is intended to allow early occupancy when needed by an owner by providing flush-out recommendations for that situation.

Change for 2012: Item #5 of this section contains a minor clarification of non-continuous flush-out calculations recommended by CARB.

Existing Law or Regulation:
The California Energy Code, CCR, Part 6 contains ventilation standards for conditioned spaces. CCR, Title 8 contains additional regulations for the protection of worker safety.

Compliance Method:
Engineers and designers should include the requirements for flush out, including by mechanical or outside air, contingency plans, early occupancy, etc. in the project specifications for ventilation and others as applicable. The contractor should be responsible for employing them on the job and being able to demonstrate that the practices are being followed if requested by the enforcing agency. Extenuating circumstances should be documented in writing, and the contractor should be able to verify the dates or volume equivalencies of the 14-day flush-out period.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications for directions on flush-out practices to be followed by the contractor.

On-Site Enforcement: The inspector should review the permit set of plans to verify which flush-out practices the contractor is to use on the project and ask for documentation of their employment at the conclusion of the construction process.

CALGreen Section: 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 State Environmental Protection Agency (US 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 Non-complying 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: US EPA-recognized testing protocols may be found on the Air Resources Board website at: http://www.arb.ca.gov/research/indoor/methods.htm .

Intent:

The intent of this voluntary provision is to provide a testing alternative to building flush-out to promote practices to insure healthy air quality at the close of construction. It spells out test protocols, allowable levels of pollutants, and retesting requirements if needed. Testing can be more expensive than building flush-out, but it is noted that, with CALGreen's requirements for low VOC-emitting materials, pollutant levels from finishes may be low; testing could target those areas of potential problems if building flush-out is determined by the engineer to be infeasible.

Existing Law or Regulation:

The California Energy Code, CCR, Part 6 contains ventilation standards for conditioned spaces. CCR, Title 8 contains additional regulations for the protection of worker safety.

Compliance Method:

Engineers and designers should include the requirements for testing of pollutant levels of air and materials in the project specifications for ventilation and others as applicable. Materials to be tested and test methods and protocols should be included. As determined in the contract for construction, a testing laboratory or other qualified personnel should be engaged to conduct IAQ tests according to the protocols. If test results show excessive concentrations, retesting should be carried out until compliance is achieved. Test methods and results should be made available to the enforcement agency.

Enforcement:

Plan Intake: The reviewer and/or plan checker should review the plans and specifications for the engineer's testing alternative to building flush-out.

On-Site Enforcement: The inspector should review the permit set of plans to verify that testing is to be employed on the project and ask for documentation of test methods and results at the conclusion of the construction process.

CALGreen Section: 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 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

Intent:
The intent of this voluntary provision is to encourage the use of low- or no-formaldehyde-emitting composite wood products ahead of the schedule indicated in Section 5.504.5 and Table A5.504.8.5. Providing composite wood materials that beat the schedule satisfies a Tier 1 "reach" component. Using no-added or ultra-low emitting formaldehyde resins in the composites wood products is indicated for compliance with Tier 2.

Change for 2012: CBSC adopted renumbering and reformatting of this Section A5.504.4.5.1 at the recommendation of CARB to provide clarity for the code user concerning the Tier 1 and Tier 2 criteria.

Existing Law or Regulation:
The California Air Resources Board (CARB) adopted regulations for low formaldehyde-emitting composite wood products in CCR, Title 17, that are reprised in Section 5.504.5 for building standards. Compliance is according to a timetable adopted by CARB, shown in Table 5.504.5, which is reprinted as Table A5.504.8.5 in the voluntary appendix.

Compliance Method:
Specify levels of formaldehyde in composite wood products on the plans or in the project specifications that show earlier dates than that those in Table A5.504.8.5 (Tier 1), or specify NAF or ULEF resins (Tier 2).

Suggestion:
Contractor: *Retain product data sheets for onsite verification by the enforcing agency and for the operation and maintenance manual.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that the composite wood products and/or resins are specified to beat the CARB timetable or meet the ultra-low formaldehyde levels.

On-Site Enforcement: The inspector should review the permit set of plans and product data sheets to verify that composite wood products specified on the approved plans and specifications are installed, or at least stored on site with the ability to be verified.

CALGreen Section: A5.504.4.7 Resilient flooring systems, Tier 1 [BSC] Resilient flooring systems [DSA-SS]. For 80% 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% 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. Chapter 12-13 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. 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.

Intent:

The purpose of these measures is to reduce the volatile organic compounds (VOC) of finish materials commonly installed on a project, which will help improve air quality for the building occupants. These regulations exceed the mandatory provisions in Chapter 5, Division 5.5 as "reach" standards and are components of the tier structure in Division A5.6.

Change for 2012: These voluntary reach standards were modified at the recommendation of CARB and CDPH to update referenced standards to provide clarity for the code user. The changes are also intended to provide clarity to the code user concerning the Tier 1 and Tier 2 criteria.

Existing Law or Regulation:

The low-VOC provisions are based on the recommendations, guidelines and regulations of the Air Resources Board cited in each section. Regulations for aerosol adhesives and paints and for composite wood products are found in California Code of Regulations, Title 17 as noted above.

Compliance Method:
Specify finish materials that meet the limits of VOC criteria as tested by the listed organizations. Substitutes may be approved by the local enforcing authority if it deems equivalency.

Notes: *Some compliant products may be found on the following websites:*

1. *CHPS Low-emitting Materials List may be found at www.chpsregistry.com/live or http://www.chps.net/dev/Drupal/node/445.*
2. *Products certified under the FloorScore program may be found at: http://www.rfci.com/int_FS-ProdCert.htm*
3. *Products certified under the Greenguard Children & Schools program and compliant with CHPS criteria may be found at: http://www.greenguard.org/Default.aspx?tabid=135.*

Suggestion:
Contractor: *Retain product data sheets for onsite verification by the enforcing agency and for the operation and maintenance manual. Sample compliance forms can be found in Part 4 of this Guide.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that the finishes are specified to meet VOC emission limits.

On-Site Enforcement: The inspector should review the permit set of plans and product data sheets maintained by the contractor to verify finishes specified on the approved plans and specifications are installed, or at least stored on site with the ability to be verified. The inspector may review specifications provided with products or accept self-certification form.

CALGreen Section: 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.

Intent:
The purpose of these measures is to reduce the amount of pollutants brought into a building at points of entry from people's shoes or rain-soaked apparel. This keeps the air and finish surfaces free of contaminants that may be tracked into regularly occupied spaces and is intended to maintain good air quality for building occupants.

Existing Law or Regulation:
There is **NO** current law or regulation for this code provision.

Compliance Method:
Specify entrance mats that are permanently fixed and cleanable from debris. The specifications should include a maintenance schedule to be followed after certification of occupancy.

Roll out mats are not recommended, usually not considered contract furnishings and with maintenance an uncertain prospect. If specified, however, recommend a maintenance schedule to be followed after occupancy.

Suggestion:
Contractor: *Retain product data sheets and recommended maintenance for onsite verification by the enforcing agency and for the operation and maintenance manual.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to confirm that the entrance mats are included and that a maintenance schedule is also recommended in the specifications.

On-Site Enforcement: The inspector should review the permit set of plans and product data sheets maintained by the contractor to verify mats specified on the approved plans and specifications are installed, or at least stored on site with the ability to be verified. The inspector may review specifications and maintenance recommendations provided with products or accept self-certification from the contractor.

SECTION A5.507 ENVIRONMENTAL COMFORT

CALGreen Section: 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% of the building occupants.

A5.507.1.1.2 Thermal comfort. Provide individual thermal comfort controls for at least 50% 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.

Intent:
The purpose of these measures is to allow building occupants a measure of control within their workspaces as to lighting levels and thermal comfort, including multi-occupant spaces where they can reach consensus on ambient lighting and temperature, humidity and air speed. Though scant research exists to support claims of higher productivity or attendance for workers who have control of lighting and thermal comfort, the goal is increase their satisfaction with the workplace and reap whatever benefits to them and their employers there may be.

Existing Law or Regulation:
The California Energy Code, CCR, Title 24, Part 6, regulates energy use associated with lighting, air conditioning and ventilation of conditioned spaces. ASHRAE 55 contains standards for thermal comfort.

Compliance Method:
Provide, in plans and specifications, lighting locations, fixture types and access to daylight for a minimum of 90% of occupants. Show means of thermal control, such as thermostats, directional air registers, and proximity to solar gain for a minimum of 50% of occupants. Contract furnishings for control of light and heat through windows may be shown. Make sure that compliance with the California Energy Code is maintained.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to verify the lighting and thermal control means are shown for at least 90% and 50% of occupants, respectively. Verify energy code compliance is demonstrated.

On-Site Enforcement: The inspector should review the permit set of plans and/or specifications and verify that lighting and thermal controls are installed as shown and that the building complies with provisions in the California Energy Code.

CALGreen Section: 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% 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% of each area has direct line of sight to perimeter vision glazing.

A5.507.32 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.

Intent:
The purposes of these provisions are to achieve building lighting through the use of daylight and to provide sightlines to outdoor environments whenever possible. This reduces the need for electrical lighting during normal work hours and saves energy. It also creates a pleasant ambience of high-quality light and views, which may have a salutary effect on building occupants, such as reducing eye strain exacerbated by increasing use of electronic devices in the workplace.

Existing Law or Regulation:
The California Energy Code, CCR, Title 24, Part 6, regulates energy use associated with electrical lighting, and with toplighting and sidelighting with daylight.

Compliance Method:
Provide, in plans and specifications, means of achieving daylighting and views on the project while minimizing glare and direct sunlight. Wall and ceiling finishes and colors may need to be identified on a finish schedule. Make sure that compliance with the California Energy Code is maintained.

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to verify the daylighting strategies and line-of-sight calculations employed on the project. Verify energy code compliance is demonstrated.

On-Site Enforcement: The inspector should review the permit set of plans and/or specifications and verify that daylighting features are installed and view access is provided as shown and that the building complies with provisions in the California Energy Code.

SECTION A5.508 OUTDOOR AIR QUALITY

CALGreen Section: 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.

Intent:
The purpose of these provisions is to reduce voluntarily the use of refrigerants that deplete the ozone layer and contribute to the greenhouse effect. These are gradually being phased out of use by the EPA, but voluntary implementation of these standards can accelerate the process and protect our atmosphere.

Existing Law or Regulation:
The California Mechanical Code, CCR, Title 24, Part 4 and California Fire Code, CCR, Title 24, Part 9, regulate fire suppression equipment and refrigerants.

Compliance Method:
Provide specifications for equipment that uses refrigerants and include the specifications for the refrigerants to be used. Include recommendations in the Operation and Maintenance Manual for replenishment of refrigerants to meet these regulations, since inventory of phased-out refrigerants still exists for maintenance of older equipment.

Suggestion:
Contractor: *Retain product data sheets and recommended maintenance for onsite verification by the enforcing agency and for the operation and maintenance manual.*

Enforcement:
Plan Intake: The reviewer and/or plan checker should review the plans and specifications to verify the equipment and refrigerant types on the project.

On-Site Enforcement: The inspector should review the permit set of plans and/or specifications and product data sheets and verify that specified equipment and refrigerants are indeed installed on the project.

DIVISION A5.6 VOLUNTARY TIERS

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 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 A5.303.2.3.2.
   a) Comply with Section A5.304.4.2 for outdoor potable water use not to exceed 55 percent of ETo.
   b) Comply with three elective measures selected from this division.
3. From Division A5.4[2],
   a) Comply with recycled content of 15 percent of materials based on estimated total cost 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.

Intent:

Tier 1 and Tier 2 are included in the Appendix of the CALGreen Code for cities, counties, and city and county that wish to adopt more stringent standards than the mandatory measures. Because of the increased energy savings and additional provisions that are required for each tier, these standards are meant to assist the state in achieving its greenhouse gas emission and net zero energy goals. Coupled with the energy efficiency savings, cool roofs and enhanced water use reduction and construction waste diversion are examples of this combined approach.

A city, county, or city and county that wishes to adopt a tier will pass an ordinance, like any other ordinance to adopt an appendix chapter or other local amendment to the California Building Standards Code, and must make appropriate findings. Because the tiers contain energy

efficiency standards more rigorous than those required by Part 6, the California Energy Code, the local agency must submit its amendment package to the California Energy Commission for approval prior to filing it with the California Building Standards Commission as required by section §101.7.1 of the CALGreen code.

This edition includes guidelines for all of the voluntary measures including those required to fulfill each tier. A table which simplifies the narrative language from the tier provisions follows.

Change for 2012: CBSC adopted modifications to align language with the changes proposed for Section A5.203 and subsections, the energy performance tiers that are repeated here. It also made minor changes recommended by CARB to clarify for the code user the criteria for the companion requirements to the energy tiers.

Table 1: NON-RESIDENTIAL 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/s.f. SRI 16 ≥ 5 lb/s.f. SRI 10	Roof Slope < 2:12 SRI 78 Roof Slope > 2:12: < 5 lb/s.f. SRI 23 ≥ 5 lb/s.f. 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	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 CHPS VOC limits	90 percent of flooring meets CHPS VOC limits
	Low-VOC Thermal Insulation	Comply with CHPS VOC limits	Install no-added formaldehyde insulation & comply with CHPS 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

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Part 4 – Suggested Forms and Templates

SOIL LOSS PREVENTION PLAN CHECKLIST **FOR NEW PROJECTS LESS THAN ONE ACRE**	**CALGreen** **Std. BSC-5.1-1** **Rev. 06-24-11**

Project location: **Project area:**

Contact Name & Title:

Telephone: **Cell Phone:**

Date plan submitted: **On plans** ☐ **Separately** ☐

BMP NAME	APPLICABLE TO THIS PROJECT	CONTR. INITIAL
EROSION AND SEDIMENT CONTROL BMPs		
Scheduling construction activity	☐	
Preservation of natural features, vegetation and soil	☐	
Drainage swales or lined ditches to control stormwater flow	☐	
Mulching or hydroseeding to stablilize disturbed soils	☐	
Erosion control to protect slopes	☐	
Protection of storm drain inlets (gravel bags or catch basin inserts)	☐	
Perimeter sediment control (perimeter silt fence, fiber rolls)	☐	
Sediment trap or sediment basin to retain sediment on site	☐	
Stabilized construction exits	☐	
Wind erosion control	☐	
Others (specify):	☐	
	☐	
	☐	
	☐	
HOUSEKEEPING BMPs		
Material handling and waste management	☐	
Building materials stockpile management	☐	

Management of washout areas (concrete, paints, stucco, etc.)	☐	
Control of vehicle/equipment fueling to contractor's staging area	☐	
Vehicle and equipment cleaning performed off site	☐	
Spill prevention and control	☐	
Others (specify):	☐	
	☐	
	☐	
	☐	
	☐	
STORM EVENT INSPECTIONS (If applicable during project construction)		
Date and time:	☐	
Date and time:	☐	
Date and time:	☐	
Date and time:	☐	
Date and time:	☐	
Date and time:	☐	
Date and time:	☐	
	☐	
	☐	
	☐	
	☐	

Contractor (Documentation Author's /Responsible Designer's Declaration Statement)

- I certify that this Certificate of Compliance documentation is accurate and complete.
- I certify that the features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 11 of the California Code of Regulations.
- The design features identified on this Certificate of Compliance are consistent with the information documented on other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with the permit application.

Signature:	
Company:	Date:
Address:	License:
City/State/Zip:	Phone:

WORKSHEET (WS-1)
BASELINE WATER USE

CALGreen Std. – BSC-5.3-1 1-1-12

BASELINE WATER USE CALCULATION TABLE									
Fixture Type	**Flow-rate (gpm)**		**Duration**		**Daily uses**		**Occupants [1, 2]**		**Gallons per day**
Showerheads	2.5	X	5 min.	X	1	X	[2a]	=	
Showerheads Residential	2.5	X	8 min.	X	1	X		=	
Lavatory Faucets Residential	2.2	X	.25 min.	X	3	X		=	
Kitchen Faucets	2.2	X	4 min.	X	1	X	[2b]	=	
Replacement Aerators	2.2	X		X		X		=	
Wash Fountains	2.2	X		X		X		=	
Metering Faucets	0.25	X	.25 min.	X	3	X		=	
Metering Faucets for Wash Fountains	2.2	X	.25 min.	X		X		=	
Gravity tank type Water Closets	1.6	X	1 flush	X	1 male[3] 3 female	X		=	
Flushometer Tank Water Closets	1.6	X	1 flush	X	1 male[3] 3 female	X		=	
Flushometer Valve Water Closets	1.6	X	1 flush	X	1 male[3] 3 female	X		=	
Electromechanical Hydraulic Water Closets	1.6	X	1 flush	X	1 male[3] 3 female	X		=	
Urinals	1.0	X	1 flush	X	2 male	X			
Total daily baseline water use (BWU)								=	
_____ (BWU) X .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 non-residential 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.

Contractor (Documentation Author's /Responsible Designer's Declaration Statement) • I certify that this Certificate of Compliance documentation is accurate and complete. • I certify that the features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 11 of the California Code of Regulations. • The design features identified on this Certificate of Compliance are consistent with the information documented on other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with the permit application.	
Signature:	
Company:	Date:
Address:	License:
City/State/Zip:	Phone:

WORKSHEET (WS-2)
20% REDUCTION WATER USE CALCULATION TABLE

CALGreen Std. – BSC-5.3-2 1-1-12

20% REDUCTION WATER USE CALCULATION TABLE									
Fixture Type	**Flow-rate (gpm)** [1]		**Duration**		**Daily uses**		**Occupants** [2, 3]		**Gallons per day**
Showerheads		X	5 min.	X	1	X	[3a]	=	
Showerheads Residential		X	8 min.	X	1	X		=	
Lavatory Faucets Residential		X	.25 min.	X	3	X		=	
Kitchen Faucets		X	4 min.	X	1	X	[3b]	=	
Replacement Aerators		X		X		X		=	
Wash Fountains		X		X		X		=	
Metering Faucets		X	.25 min.	X	3	X		=	
Metering Faucets for Wash Fountains		X	.25 min.	X		X		=	
Gravity tank type Water Closets	\	X	1 flush	X	1 male[5] 3 female	X		=	
HET [4] High Efficiency Toilet	1.28	X	1 flush	X	1 male[5] 3 female	X		=	
Flushometer Tank Water Closets		X	1 flush	X	1 male[5] 3 female	X		=	
Flushometer Valve Water Closets		X	1 flush	X	1 male[5] 3 female	X		=	
Electromechanical Hydraulic Water Closets		X	1 flush	X	1 male[5] 3 female	X		=	
Urinals		X	1 flush	X	2 male	X		=	
Urinals Nonwater supplied	0.0	X	1 flush	X	2 male	X		=	
Proposed water use								=	
_____ (BWU from WS-1) X .80 = _____ 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 non-residential 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 A112.19.2.

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.

☐ Plumbing fixtures installed meet the requirements of Section 5.303.6.

Contractor (Documentation Author's /Responsible Designer's Declaration Statement) • I certify that this Certificate of Compliance documentation is accurate and complete. • I certify that the features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 11 of the California Code of Regulations. • The design features identified on this Certificate of Compliance are consistent with the information documented on other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with the permit application.	
Signature:	
Company:	Date:
Address:	License:
City/State/Zip:	Phone:

WORKSHEET (WS-3)
30%, 35% or 40% REDUCTION WATER USE CALCULATION TABLE

CALGreen Std. – BSC-5.3-3 1-1-12

30, 35 OR 40 % REDUCTION WATER USE CALCULATION TABLE									
Fixture Type	**Flow-rate (gpm)** [1]		**Duration**		**Daily uses**		**Occupants** [2, 3]		**Gallons per day**
Showerheads		X	5 min.	X	1	X	[3a]	=	
Showerheads Residential		X	8 min.	X	1	X		=	
Lavatory Faucets Residential		X	.25 min.	X	3	X		=	
Kitchen Faucets		X	4 min.	X	1	X	[3b]	=	
Replacement Aerators		X		X		X		=	
Wash Fountains		X		X		X		=	
Metering Faucets		X	.25 min.	X	3	X		=	
Metering Faucets for Wash Fountains		X	.25 min.	X		X		=	
Gravity tank type Water Closets	\	X	1 flush	X	1 male[5] 3 female	X		=	
HET [4] High Efficiency Toilet	1.12	X	1 flush	X	1 male[5] 3 female	X		=	
Flushometer Tank Water Closets		X	1 flush	X	1 male[5] 3 female	X		=	
Flushometer Valve Water Closets		X	1 flush	X	1 male[5] 3 female	X		=	
Electromechanical Hydraulic Water Closets		X	1 flush	X	1 male[5] 3 female	X		=	
Urinals		X	1 flush	X	2 male	X		=	
Urinals Nonwater supplied	0.0	X	1 flush	X	2 male	X		=	
Proposed water use								=	

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

[1, 2, 3, 4 and 5]: See footnotes for Water Use Worksheet WS-2.

☐ Plumbing fixtures installed meet the requirements of Section 5.303.6.

Contractor (Documentation Author's /Responsible Designer's Declaration Statement) • I certify that this Certificate of Compliance documentation is accurate and complete. • I certify that the features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 11 of the California Code of Regulations. • The design features identified on this Certificate of Compliance are consistent with the information documented on other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with the permit application.	
Signature:	
Company:	Date:
Address:	License:
City/State/Zip:	Phone:

WORKSHEET (WS-4) FIXTURE FLOW RATES	CALGreen Std. – BSC-5.3-4 7-16-10

Fixture Type	Flow-rate	Maximum flow rate at 20% Reduction	Number installed	SUB-CONTR. INITIAL
Showerheads	2.5 gpm @ 80 psi	2 gpm @ 80 psi		
Lavatory Faucets Residential	2.2 gpm @ 60 psi	1.5 gpm @ 60 psi[2]		
Lavatory Faucets Nonresidential	0.5 gpm @ 60 psi	0.4 gpm @ 60 psi		
Kitchen Faucets	2.2 gpm @ 60 psi	1.8 gpm @ 60 psi		
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] Includes single and dual flush water closets with an effective flush of 1.28 gallons or.
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.

[2] Lavatory faucets shall not have a flow rate less than 0.8 gpm at 20 psi.

☐ Plumbing fixtures installed meet the requirements of Section 5.303.6.

Contractor (Documentation Author's /Responsible Designer's Declaration Statement) • I certify that this Certificate of Compliance documentation is accurate and complete. • I certify that the features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 11 of the California Code of Regulations. • The design features identified on this Certificate of Compliance are consistent with the information documented on other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with the permit application.	
Signature:	
Company:	Date:
Address:	License:
City/State/Zip:	Phone:

CONSTRUCTION WASTE MANAGEMENT (CWM) PLAN WORKSHEET Note: This sample form may be used to assist in documenting compliance with the waste management plan.	**CALGreen Std. – BSC-5.4-1 7-16-10**

Project Name: _____
Job #: _____
Project Manager: _____

Waste Hauling Company: _____
Contact Name: _____

All Subcontractors shall comply with the project's Construction Waste Management Plan.
All Subcontractor foremen shall sign the CWM Plan Acknowledgement Sheet.

Subcontractors who fail to comply with the Waste Management Plan will be subject to backcharges or withholding of payment, as deemed appropriate. For instance, Subcontractors who contaminate debris boxes that have been designated for a single material type will be subject to backcharge or withheld payment, as deemed appropriate.

1. The project's overall rate of waste diversion will be ____ %.

2. This project shall generate the least amount of waste possible by planning and ordering carefully, following all proper storage and handling procedures to reduce broken and damaged materials and reusing materials whenever possible. The majority of the waste that is generated on this jobsite will be diverted from the landfill and recycled for other use.

3. Spreadsheet 1, enclosed, identifies the waste materials that will be generated on this project, the diversion strategy for each waste type and the anticipated diversion rate.
4. Waste prevention and recycling activities will be discussed at the beginning of weekly subcontractor meetings. As each new subcontractor comes on-site, the WMP Coordinator will present him/her with a copy of the CWM Plan and provide a tour of the jobsite to identify materials to be salvaged and the procedures for handling jobsite debris. Each Subcontractor foremen will acknowledge in writing that they have read and will abide by the CWM Plan. Subcontractor Acknowledgement Sheet enclosed. The CWM Plan will be posted at the jobsite trailer.

5. Salvage: Excess materials that cannot be used in the project, nor returned to the vendor, will be offered to site workers, the owner, or donated to charity if feasible.

6. [HAULING COMPANY] will provide a commingled drop box at the jobsite for most of the construction waste. These commingled drop boxes will be taken to [Sorting Facility Name and Location]. The average diversion rate for commingled waste will be ____%. As site conditions permit, additional drop boxes will be used for particular phases of construction (e.g., concrete and wood waste) to ensure the highest waste diversion rate possible.

7. In the event that the waste diversion rate achievable via the strategy described in (6) above, is projected to be lower than what is required , then a strategy of source-separated waste diversion and/or waste stream reduction will be implemented. Source separated waste refers to jobsite waste that is not commingled but is instead allocated to a debris box designated for a single material type, such as clean wood or metal

   Notes:
   1. Waste stream reduction refers to efforts taken by the builder to reduce the amount of waste generated by the project to below four (4) pounds per square foot of building area.
   2. When using waste stream reduction measures, the gross weight of the product is subtracted from a base weight of four (4) pounds per square foot of building area. This reduction is considered additional diversion and can be used in the waste reduction percentage calculations.

8. [HAULING COMPANY] will track and calculate the quantity (in tons) of all waste leaving the project and calculate the waste diversion rate for the project. [HAULING COMPANY] will provide Project Manager with an updated monthly report on gross weight hauled and the waste diversion rate being achieved on the project. [HAULING COMPANY's] monthly report will track separately the gross weights and diversion rates for commingled debris

and for each source-separated waste stream leaving the project. In the event that [HAULING COMPANY] does not service any or all of the debris boxes on the project, the [HAULING COMPANY] will work with the responsible parties to track the material type and weight (in tons) in such debris boxes in order to determine waste diversion rates for these materials.

9. In the event that Subcontractors furnish their own debris boxes as part of their scope of work, such Subcontractors shall not be excluded from complying with the CWM Plan and will provide [HAULING COMPANY] weight and waste diversion data for their debris boxes.

10. In the event that site use constraints (such as limited space) restrict the number of debris boxes that can be used for collection of designated waste the project Superintendent will, as deemed appropriate, allocate specific areas onsite where individual material types are to be consolidated. These collection points are not to be contaminated with non-designated waste types.

11. Debris from jobsite office and meeting rooms will be collected by [DISPOSAL SERVICE COMPANY]. [DISPOSAL SERVICE COMPANY] will, at a minimum, recycle office paper, plastic, metal and cardboard.

CONSTRUCTION WASTE MANAGEMENT (CWM) WORKSHEET

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

CALGreen Std. – BSC-5.4-2 7-16-10

Project Name: _____
Job Number: _____
Project Manager: _____
Waste Hauling Company: _____

Construction Waste Management (CWM) Plan

Waste Material Type	Diversion Method:		Projected Diversion Rate
	Commingled and Sorted Off-site	Source Separated Onsite	
Asphalt			
Concrete			
Shotcrete			
Metals			
Wood			
Rigid Insulation			
Fiberglass Insulation			
Acoustic Ceiling Tile			
Gypsum Drywall			
Carpet/Carpet Pad			
Plastic Pipe			
Plastic Buckets			
Plastic			
Hardiplank Siding and Boards			
Glass			
Cardboard			
Pallets			
Job office trash, paper, glass & plastic bottles, cans, plastic			
Alkaline and rechargeable batteries, toner cartridges, and electronic devices			

Other:			

Contractor (Documentation Author's /Responsible Designer's Declaration Statement) • I certify that this Certificate of Compliance documentation is accurate and complete. • I certify that the features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 11 of the California Code of Regulations. • The design features identified on this Certificate of Compliance are consistent with the information documented on other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with the permit application.	
Signature:	
Company:	Date:
Address:	License:
City/State/Zip:	Phone:

CONSTRUCTION WASTE MANAGEMENT (CWM) ACKNOWLEDGMENT

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

CALGreen Std. – BSC-5.4-3 7-16-10

Project Name: _____
Job Number: _____
Project Manager: _____
Waste Hauling Company: _____

CWM Plan Acknowledgment

The Foreman for each new Subcontractor that comes on site is to receive a copy of the Construction Waste Management Plan and complete this Acknowledgement Form.

I have read the Waste Management Plan for the project; I understand the goals of this plan and agree to follow the procedures described in this plan.

Date	Subcontractor Company Name	Foreman Name	Signature

Contractor (Documentation Author's /Responsible Designer's Declaration Statement) • I certify that this Certificate of Compliance documentation is accurate and complete. • I certify that the features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 11 of the California Code of Regulations. • The design features identified on this Certificate of Compliance are consistent with the information documented on other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with the permit application.	
Signature:	
Company:	Date:
Address:	License:
City/State/Zip:	Phone:

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 non-standard requirements. E.g. pendant-mounted lighting, illumination requirements, special applications.]*

b) Occupant lighting control requirements: *[List any non-standard requirements. E.g. multi-mode controls for assembly spaces]*

c) Thermal comfort requirements: *[List any non-standard temperature or humidity requirements]*

d) Ventilation and filtration requirements: *[List any non-standard requirements]*

e) Occupancy HVAC control requirements: *[List any non-standard requirements. E.g. integration with existing control systems]*

f) Acoustic environment requirements: *[List any non-standard requirements. E.g. local noise sources requiring mitigation, spaces such as classrooms that require low background 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 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

[Describe sizing calculation method, assumptions, and results]

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 non-compliance	☐
7.	Requirements for execution and documentation of installation and equipment start up	☐
8.	Specific testing requirements for each system type1	☐
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	☐

1These 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 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 5.410.2.3-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	☐
4.	An explanation of original design intent	☐
5.	Equipment and systems to be commissioned and tested, including extent of tests	☐
6.	Functions to be tested and conditions of tests1	☐
7.	Measurable performance criteria	☐
8.	Cx team information	☐
9.	Cx activities, schedules and responsibilities	☐

1These 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

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

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 or 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.

	Training Program 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 or Owner Representative 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

FINISH MATERIAL CERTIFICATE – ADHESIVES & SEALANTS	CALGreen Std. BSC-5.5-1 7-16-10

FINISH	WHERE USED (TYPE)	MANUFACTURER	VOC LIMIT (GPL)[1,2]	SUB-CONTR. INITIAL
ADHESIVES				
Indoor carpet adhesives			50	
Carpet pad adhesives			50	
Outdoor carpet adhesives			150	
Wood flooring adhesives			100	
Rubber floor adhesives			60	
Subfloor adhesives			50	
Ceramic tile adhesives			65	
VCT and asphalt tile adhesives			50	
Drywall & panel adhesives	Wall Surface		50	
Cove base adhesives	Floor Base		50	
Multi-purpose construction adhesives	Varies		70	
Structural glazing adhesives	Glazing		100	
Single-ply adhesives	Roof		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			250	
Structural wood member			140	
Top and trim adhesive			250	
SUBSTRAIGHT SPECIFIC APPLICATION				
Metal to metal			30	
Plastic foams / porous material			50	
Wood			30	
Fiberglass			80	
SEALANTS & CAULKS				
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	

1. (GPL) = Grams per liter
2. Where no local or regional air pollution control or quality management district rules are applicable, use the VOC limits in this table.

Contractor (Documentation Author's /Responsible Designer's Declaration Statement) • I certify that this Certificate of Compliance documentation is accurate and complete. • I certify that the features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 11 of the California Code of Regulations. • The design features identified on this Certificate of Compliance are consistent with the information documented on other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with the permit application.	
Signature:	
Company:	Date:
Address:	License:
City/State/Zip:	Phone:

FINISH MATERIAL CERTIFICATE – ARCHITECTURAL COATINGS	CALGreen Std. BSC-5.5-2 7-16-10

FINISH	WHERE USED (TYPE)	MANUFACTURER	VOC LIMIT (GPL)[1]	SUB-CONTR. INITIAL
PAINTS & COATINGS				
Flat coatings			50	
Nonflatlat coatings			100	
Nonflat high gloass 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 coverings			100	
Form-release compounds			250	
Graphic arts coatings (sign paints)			500	
High-temperature coatings			420	
Industrial maintenance coatings			250	
Low solids coatings[2]			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[3]	
Shellacs: Clear Opaque			 730 550	
Specialty primers, sealers and undercoaters			350/100[3]	
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. (GPL) = Grams per liter of coating
2. Grams of VOC per liter of coating, including water and including exempt compounds.
3. Effective on January 1, 2012

Contractor (Documentation Author's /Responsible Designer's Declaration Statement)

- I certify that this Certificate of Compliance documentation is accurate and complete.
- I certify that the features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 11 of the California Code of Regulations.
- The design features identified on this Certificate of Compliance are consistent with the information documented on other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with the permit application.

Signature:	
Company:	Date:
Address:	License:
City/State/Zip:	Phone:

FINISH MATERIAL CERTIFICATE – COMPOSITE WOOD PRODUCTS

CALGreen Std. BSC-5.5-3 7-16-10

FINISH	FORMALDEHYDE LIMITS[1] (Max. emissions in Parts per Million)	Effective JAN. 1, 2012	Effective JUL. 1, 2012	SUB-CONTR. INITIAL
Composite wood products				
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.

Contractor (Documentation Author's /Responsible Designer's Declaration Statement)

- I certify that this Certificate of Compliance documentation is accurate and complete.
- I certify that the features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 11 of the California Code of Regulations.
- The design features identified on this Certificate of Compliance are consistent with the information documented on other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with the permit application.

Signature:	
Company:	Date:
Address:	License:
City/State/Zip:	Phone:

FINISH MATERIAL CERTIFICATE – FLOORING **(CARPET, CARPET CUSHION & RESILIENT)**	**CALGreen** **Std. BSC-5.5-4** **7-16-10**

FINISH	MANUFACTURER	CERTIFICATION ORGANIZATION	SUB-CONTR. INITIAL
FLOORING			
Carpet 1		Carpet and Rug Institute – Green Label Plus Program	
		Specification 01350	
		NSF/ANSI 140 – Gold	
		Scientific Certification Systems – Sustainable Choice	
Carpet 2		Carpet and Rug Institute – Green Label Plus Program	
		Specification 01350	
		NSF/ANSI 140 – Gold	
		Scientific Certification Systems – Sustainable Choice	
Carpet cushion 1		Carpet and Rug Institute – Green Label Plus Program	
Carpet cushion 2		Carpet and Rug Institute – Green Label Plus Program	
Resilient flooring 1		CHPS Product Registry	
		RFCI – Floor Score Program	
		Greenguard Children & Schools	

Resilient flooring 2		CHPS Product Registry	
		RFCI – Floor Score Program	
		Greenguard Children & Schools	

Contractor (Documentation Author's /Responsible Designer's Declaration Statement)

- I certify that this Certificate of Compliance documentation is accurate and complete.
- I certify that the features and performance specifications for the design identified on this Certificate of Compliance conform to the requirements of Title 24, Parts 11 of the California Code of Regulations.
- The design features identified on this Certificate of Compliance are consistent with the information documented on other applicable compliance forms, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with the permit application.

Signature:	
Company:	Date:
Address:	License:
City/State/Zip:	Phone:

Appendix A: Commissioning Project Sample(s) and Additional Forms and Templates

This appendix is supplemental to the Guide to the California Green Building Standards Code – Non-Residential (Commissioning), and is intended to provide additional resources for commissioning.

1. Commissioning sample project(s):
   http://www.documents.dgs.ca.gov/bsc/CALGreen/CX-SAMPLE-PROJECT.pdf

2. Commissioning sample Performance and Functional Testing (FPT) Template:
   http://www.documents.dgs.ca.gov/bsc/CALGreen/FPT-SAMPLE- TEMPLATE.pdf

Appendix B: Additional Commissioning Resources

This appendix is supplemental to the Guide to the California Green Building Standards Code – Non-Residential (Commissioning), and is intended to provide additional resources for commissioning.

Building Commissioning Cost Benefit Assessment report by the Lawrence Berkeley National Laboratory
http://cx.lbl.gov/2009-assessment.html

California Commissioning Collaborative
http://cacx.org

Appendix C: Bird-friendly Building Design

Guidelines in this appendix are supplemental to the California Green Building Standards Code – Nonresidential and are intended to provide additional information that building designers, builders and property owners may wish to consider during the planning, design and construction process.

Why bird-friendly building is "green" design

- Birds serve human society in several important ways
  - They consume tons of insects and rodents annually that could otherwise threaten human populations and structures
  - They pollinate plants, including crops for human consumption, and disperse seeds in natural regeneration of vegetation
  - Birds have fostered a multi-billion dollar industry in professional and recreational birdwatching and associated travel
  - They represent, along with other protected species, a philosophical recognition of the intrinsic value of sentient beings other than ourselves
- Birds, especially migratory songbirds, collide with buildings in great numbers, a possible liability for building owners
  - Estimated numbers of birds that perish in collisions with buildings in this country annually run from 100 million to 1 billion
  - Habitat loss to development forces birds into the built environment on migratory routes
  - Unlike natural predation, buildings threaten strong and healthy birds rather than the weakest among them, compromising their abilities to reproduce
  - Builders and building owners whose buildings attract birds may unwittingly be violating the Migratory Bird Treaty Act, which extends beyond hunting to unintentional deaths deemed to be foreseeable
  - Federal and state wildlife agencies protect wild birds through regulations such as permits for hunting, but they do not have authority to regulate building interaction with birds
  - The Green Globes green building points program of the Green Building Initiative recognizes the dangers some buildings pose to birds and offers credits for bird-friendly building design
- Building to prevent bird collisions is readily achievable, provides creative design opportunities for architects and developers, and can be narrowly focused on sites that present the greatest risk to birds as described in the standards following
  - Large glass surfaces pose the greatest threat to birds and can be mitigated with the use of special glazing or use of other materials in conjunction with glass
  - Nighttime lighting from buildings and grounds also attracts birds, and complying with local dark sky ordinances or CALGreen Code Section 5.106.8, Light Pollution Reduction can diminish this threat
  - Building design, of course, must meet other codes and local ordinances for structural integrity, fire safety and energy efficiency, but can safely comply while incorporating bird-safe features
  - Within the complexity of local conditions in California, building codes are not applied with a "one size fits all" approach; one site may present earthquake, flood, fire, or bird habitat exposure that can be met with code compliant planning and design

SECTION A5.102
DEFINITIONS

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.

SECTION A5.104
SITE PRESERVATION

A5.104.2 Bird-friendly building design. Employ design strategies to avoid migratory bird collisions with buildings in accordance with local ordinance or as planned for sites with the following characteristics;

1. Vegetated space greater than one acre (0.40 Ha) where trees or tall shrubs are planned to be preserved or planted within 35 feet (10.67 m) of the building
2. Adjacency to permanently designated parkland, wetland or vegetated space greater than one acre (0.40 Ha) in size

Note: Buildings planned in fire hazard zones shall comply with vegetation and defensible space provisions of the 2010 California Fire Code.

A5.104.2.1 Assumption of risk. The occurrence of migratory birds on a project site may be assumed from site characteristics noted in A5.104.2, and bird-friendly features should be incorporated in the design of exposed facades.

A5.104.2.1.1. Site survey alternative. Alternately, the occurrence of migratory birds may be determined by a biological site survey conducted by a certified biologist, ornithologist or zoologist and acceptable to the enforcing authority during spring or fall, including nighttimes, whichever season coincides with the project schedule.

A5.104.2.2Glazing. On facades exposed to vegetated space, avoid transparent passageways or corners, see-through glazing and reflective glazing to a height of 40 feet (12 meters) or to the height of adjacent trees, whichever is higher.

A5.104.2.2.1 Alternate glazing strategies. If used on exposed facades, glazing shall meet envelope requirements in the 2010 California Energy Code and can include, but is not limited to, the following:

1. Etched or fritted glass with a density of 2 inches (5.1 cm) horizontally or 4 inches (10.2 cm) vertically or both (the 2x4 rule).
2. Interior or exterior glazing films with a pattern conforming to the 2x4 rule.
3. Laminated glass with a patterned UV-reflective coating visible to birds or use of UV-absorbing and UV-reflecting films on glass that are visible to birds
4. Glass block

A5.104.2.3 Exterior features. Provide exterior features that allow birds to distinguish glass from sky, vegetation, or water that may include, but not be limited to:

1. Shading devices adjacent to untreated glass that meet Section A5.106.7, such as
   a. Grilles, louvers, screens or nettings with openings no more than 2 inches (5.1 cm) horizontally or 4 inches (10.1 cm) vertically or both (the 2x4 rule)
   b. Awnings, overhangs, sunshades or light shelves
   c. Interior blinds visible from the exterior, included as part of the construction contract
2. Water features such as bird baths, pools, fountains and retention ponds isolated or shielded from untreated glazed facades by soil berms, furniture or architectural features

A5.104.2.3.1 Vegetated roofs. Vegetated roofs and structures adjacent to vegetated roofs should comply with the following:

1. Vegetated roofs meeting Section A5.106.3 shielded from adjacent structures by vertical

elements treated to a height of 1 unit per 4 units of perpendicular length of green roof

2. Building facades, canopies, and railings, where located adjacent to vegetated roofs, treated to a height of 1 unit per 4 units of perpendicular length of green roof

A5.104.2.4 Nighttime conditions. Provide lighting time-switch control devices or occupancy sensors, meeting the 2010 California Energy Code, that can be programmed to turn off interior and exterior lights between no later than 11 PM and sunrise.

Exception: Emergency lighting and lighting required for nighttime security.

A5.104.2.4.1 Systems or operation and maintenance manual. Include written recommendations that lighting is extinguished pursuant to Section A5.104.2.2 and janitorial services to the building are scheduled between sunrise and sunset.

Note: More information on bird-safe building design strategies can be obtained from the Birds and Buildings Forum http://www.birdsandbuildings.org/ and the American Bird Conservancy http://www.abcbirds.org/ . San Francisco's new ordinance may be found here: http://sfplanning.org/index.aspx?page=2506

Intent:

The intent of these standards, introduced as guidelines, is to prevent the deaths of millions of beneficial migratory birds from collisions with buildings, for the various reasons outlined in the discussion above on "Why bird-friendly building is 'green' design". The standards are presented as prescriptive measures targeting the elements of a building of most danger to migrating birds: Glazing, exterior architectural elements, vegetated roofs, and nighttime lighting.

Existing Law or Regulation:

At the time of development of these standards, the City and County of San Francisco was developing a local ordinance for bird-safe building design, which was adopted in July of 2011. Other local ordinances may apply. Regulations of the California Energy Commission for building envelope exist in the California Energy Code, as well as do provisions of the State Fire Marshal in the California Building and Fire Codes for proximity of vegetation in high-hazard fire zones.

Compliance Method:

Perform the due diligence in site selection and development to determine if migratory birds frequent the site and could be put in harm's way by design choices for the building's exterior. If so, follow prescriptive standards for glazing, exterior architectural features, and programming of nighttime lighting and activities appropriate to the building to discourage bird strikes. Alternate means complying with Title 24 shall be allowed if demonstrated to be as effective as specified measures. Show all features in the construction documents, including material specifications.

Enforcement:

Plan Intake: The reviewer and/or plan checker should review the plans, Energy Compliance forms, any required vegetative clearance, and construction drawings for and specifications for building elements designed to discourage bird collisions.

On-Site Enforcement: The inspector should review the permit set of plans to verify that all energy efficiency and bird-friendly building components as specified on the approved plans and specifications are installed.