



CORE & SHELL DEVELOPMENT

Version 2.0

REFERENCE GUIDE

First Edition June 2006

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78	6,990 lbs.	65,564 gallons	10,032 kWh	16,668 lbs.	36 lbs.

*One harvested tree = approx. 575 lbs.

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LEED-CS ratings:

- Certified 23-27 points
- Silver 28-33 points
- Gold 34-44 points
- Platinum 45-61points

Foreword from the USGBC

The built environment has a profound impact on our natural environment, economy, health and productivity. Breakthroughs in building science, technology and operations are now available to designers, builders, operators and owners who want to build green and maximize both economic and environmental performance.

The U.S. Green Building Council (USGBC) is coordinating the establishment and evolution of a national consensus effort to provide the industry with tools necessary to design, build and operate buildings that deliver high performance inside and out. Council members work together to develop industry standards, design and construction practices and guidelines, operating practices and guidelines, policy positions and educational tools that support the adoption of sustainable design and building practices. Members also forge strategic alliances with key industry and research organizations, federal government agencies and state and local governments to transform the built environment. As the leading organization that represents the entire building industry on environmental building matters, the Council's unique perspective and collective power provides our members with enormous opportunity to effect change in the way buildings are designed, built, operated and maintained.

USGBC Membership

The Council's greatest strength is the diversity of our membership. The USGBC is a balanced, consensus nonprofit representing the entire building industry, consisting of over 6,500 companies and organizations. Since its inception in 1993, the USGBC has played a vital role in providing a leadership forum and a unique, integrating force for the building industry. Council programs are—

❑ Committee-Based

The heart of this effective coalition is our committee structure in which volunteer members design strategies that are implemented by staff and expert consultants. Our committees provide a forum for members to resolve differences, build alliances and forge cooperative solutions for influencing change in all sectors of the building industry.

❑ Member-Driven

The Council's membership is open and balanced and provides a comprehensive platform for carrying out important programs and activities. We target the issues identified by our members as the highest priority. We conduct an annual review of achievements that allows us to set policy, revise strategies and devise work plans based on member needs.

❑ Consensus-Focused

We work together to promote green buildings and in doing so, we help foster greater economic vitality and environmental health at lower costs. The various industry segments bridge ideological gaps to develop balanced policies that benefit the entire industry.

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Introduction

I. Why Make Your Building Green?

The environmental impact of the building design, construction and operation industry is significant. Buildings annually consume more than 30% of the total energy and more than 60% of the electricity used in the U.S. Each day five billion gallons of potable water is used solely to flush toilets. A typical North American commercial construction project generates up to 2.5 pounds of solid waste per square foot of completed floor space. Development shifts land usage away from natural, biologically-diverse habitats to hardscape that is impervious and devoid of biodiversity. The far reaching influence of the built environment necessitates action to reduce its impact.

Green building practices can substantially reduce or eliminate negative environmental impacts and improve existing unsustainable design, construction and operational practices. As an added benefit, green design measures reduce operating costs, enhance building marketability, increase worker productivity, and reduce potential liability resulting from indoor air quality problems. For example, energy efficiency measures have reduced operating expenses of the Denver Dry Goods building by approximately \$75,000 per year. Students in day-lit schools in North Carolina consistently score higher on tests than students in schools using conventional lighting fixtures. Studies of workers in green buildings reported productivity gains of up to 16%, including reductions in absenteeism and improved work quality, based on “people-friendly” green design. At a grocery store in Spokane, Washington, waste management costs were reduced by 56% and 48 tons of waste was recycled during construc-

tion. In other words, green design has environmental, economic and social elements that benefit all building stakeholders, including owners, occupants and the general public.

Commercial buildings and speculative developments can also benefit from a reduction in operating costs, tenant retention and improved market position. For example, a 734,073 sq.ft. commercial office building in Atlanta, Georgia, was designed with a computer modeled reduction of its annual energy cost by 22.2% from the ASHRAE/IESNA 90.1-2004 baseline, for a modeled annual energy cost savings of \$238,000.00. A 109,000 sq.ft. commercial office building in Port Huron, Michigan reduced its building water use by 32.2% below the Energy Policy Act of 1992. And, a 172,000 sq.ft. multiple building retail project in Savannah, Georgia computer modeled an annual energy cost reduction across five buildings by 31.0% from the ASHRAE/IESNA 90.1-2004 baseline, for a modeled annual cost savings of \$27,980.00. This same project was able to reduce 173,000 sq.ft. of site water use requirements for irrigation to zero by utilizing only on site captured rainwater.

II. LEED® Green Building Rating System

A. History of LEED®

Following the formation of the U.S. Green Building Council (USGBC) in 1993, the membership quickly realized that a priority for the sustainable building industry was to have a system to define and measure “green buildings.” The USGBC began to research existing green building metrics and rating systems. Less than a year after formation, the member-

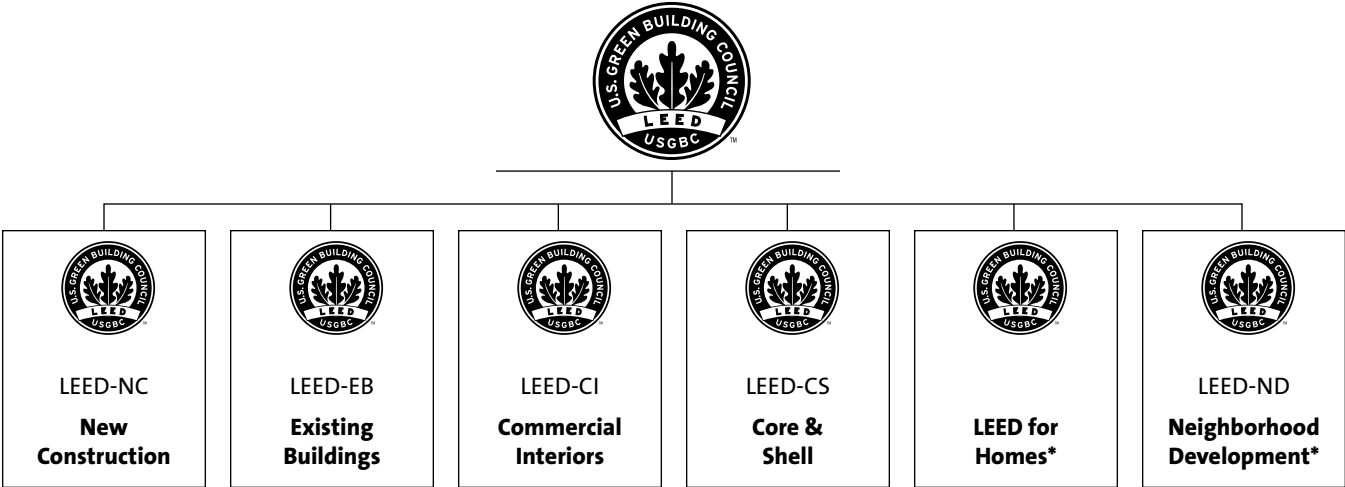
ship followed up on the initial findings with the establishment of a committee to focus solely on this topic. The diverse initial composition of the committee included architects, realtors, a building owner, a lawyer, an environmentalist and industry representatives. This cross section of people and professions added a richness and depth both to the process and to the ultimate product.

The first LEED Pilot Project Program, also referred to as LEED Version 1.0, was launched at the USGBC Membership Summit in August 1998. After extensive modifications, the LEED Green Building Rating System Version 2.0 was released in

March 2000. This rating system is now called the LEED Green Building Rating System for New Commercial Construction and Major Renovations, or LEED-NC. The current version of LEED-NC is version 2.2.

As LEED has evolved and matured, the program has undertaken new initiatives. In addition to a rating system specifically devoted to building operational and maintenance issues, LEED addresses the different project development/delivery processes that exist in the U.S. building design and construction market. Currently, the LEED product portfolio is being expanded to the following areas:

**Rating System
Product Portfolio**



** under development
as of May 2006*

LEED for Core & Shell (LEED-CS) is part of the growing portfolio of rating system products serving specific market sectors.

B. Features of LEED®

The LEED Green Building Rating System is a voluntary, consensus-based, market-driven building rating system based on existing proven technology. It evaluates environmental performance from a whole building perspective over a building's life cycle, providing a definitive standard for what constitutes a "green building." The development of the LEED Green Building Rating System was initiated by the USGBC Membership, representing all segments of the building industry, and has been open to public scrutiny.

The rating system is organized into five environmental categories: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. An additional category, Innovation & Design Process, addresses sustainable building expertise as well as design measures not covered under the five environmental categories.

LEED is a measurement system designed for rating new and existing commercial, institutional and residential buildings. It is based on accepted energy and environmental principles and strikes a balance between known established practices and emerging concepts.

It is a performance-oriented system where credits are earned for satisfying criterion designed to address specific environmental impacts inherent in the design, construction and O&M of buildings. Different levels of green building certification are awarded based on the total credits earned. The system is designed to be comprehensive in scope, yet simple in operation.

C. The Future of LEED®

The green design field is growing and changing daily. New technologies and products are coming into the marketplace and innovative designs are proving their effectiveness. Therefore, the Rating System and the Reference Guide will evolve

as well. Teams wishing to certify with LEED should note that they will need to comply with the version of the rating system that is current at the time of their registration.

The USGBC will highlight new developments on its website on a continuous basis at www.usgbc.org.

III. LEED for Core & Shell Overview and Process

The Leadership in Energy and Environmental Design® (LEED) Green Building Rating System for Core & Shell Development (LEED-CS) is a set of performance standards for certifying the sustainable design and construction of speculative and core and shell buildings. It has been developed as part of the U.S. Green Building Council's ongoing effort to provide a national standard for what constitutes a "green building." The intent of which is to assist in the creation of high performance, healthful, durable, affordable and environmentally sound buildings.

The LEED for Core & Shell Rating System is a market specific application, which recognizes the unique nature of core and shell development. The LEED-CS Rating System acknowledges the limited level of influence a developer can exert in a speculatively developed building. For example, some key building areas, interior space layout, interior finishes, lighting, mechanical distribution, and other tenant related systems are often outside the direct control of the developer. LEED-CS encourages the implementation of green design and construction practices in areas the developer can control and fosters a synergistic relationship, which allows future tenants to capitalize on green strategies implemented by the developer. It is the responsibility of the owner/developer to properly identify which LEED rating system to use for the LEED building certification as further described herein.

LEED-CS is designed to be complementary to the LEED for Commercial Interiors Green Building Rating System (LEED-CI). The LEED-CI and LEED-CS rating systems establish green building criteria for both owner/developers and tenants.

LEED-CS addresses:

- ❑ Site selection
- ❑ Water efficiency in core and shell building systems
- ❑ Energy optimization of the core and shell systems and provisions for fit out of tenant spaces to optimize operational building energy use
- ❑ Materials and resource guidelines for construction of building core and shell
- ❑ Indoor Environmental Quality planning of the building core and shell to ensure tenant fit out is able to make optimal use of Indoor Environmental Quality attributes including thermal comfort, daylight and views as well as prevention of contamination from indoor pollutants

A. When to Use LEED-CS

The LEED-CS Rating System was developed to serve the speculatively driven development market where project teams routinely do not control all aspects of a building's design and construction. The scope of LEED-CS is limited to those elements of the project under the direct control of the owner/developer. Depending on how the project is structured, this scope can range significantly from project to project. The LEED-CS Rating System has been developed to address a variety of project types and a broad project range.

Scope of Construction

- ❑ LEED-CS can be used for projects where the developer controls the design and construction of the entire core and shell base building including

MEP/FP systems, but has no control over the design and construction of the tenant fit-out. Examples of this type of project are a commercial office building, medical office building, retail center, warehouse, or lab facility.

- ❑ LEED-CS can also be used for projects that have limited control of the building systems. This is often found in retail development. Projects with limited scope should review the specific credit requirements for guidance.
- ❑ In projects that are designed and constructed to be partially occupied by the owner/developer, it is assumed the owner/developer has direct influence over the portion of the work that would typically be tenant interior construction. For projects of this type to utilize the LEED-CS Rating System, the owner/tenant must occupy 50% or less of the building's leasable space. Projects with greater than 50% of the building's tenant space occupied by a owner/tenant should utilize LEED-NC.

Core & Shell and Tenant Space Guidance

Due to the particular nature of core and shell project development the project team may not know the tenant make up and the resulting occupant count during the building's design. To guide core and shell projects, a default occupancy count table has been developed. For some credits, projects will need to refer to this default occupancy count table to determine credit compliance. The method of determining occupancy must be consistent across all credits in a submittal. The default occupancy count table is included as Appendix 1.

Included as Appendix 2 are the Core & Shell Energy Modeling Guidelines. These guidelines are intended to ensure that projects in different markets with different project teams are approaching the energy modeling requirements in a similar

manner, and that a minimum benchmark for energy optimization is established. Guidance is included for how to model both designed core and shell spaces and tenant spaces that are not part of the project design and construction scope.

To assist project teams in defining the owner/tenant division in the project design as well as certification review process, the Core & Shell/Tenant Interiors Checklist has been developed. This checklist is attached as Appendix 3.

B. LEED-CS Registration

Project teams interested in obtaining LEED-CS Certification for their project must first register this intent with the USGBC. Projects can be registered on the USGBC website (www.usgbc.org) in the LEED section, under Register Your Project. The website includes information on registration costs for USGBC member companies as well as non-members. Registration is an important step that establishes contact with the USGBC and provides access to software tools, errata, critical communications and other essential information.

C. Credit Interpretation Rulings

In some cases, the design team may encounter challenges in applying a LEED-CS prerequisite or credit to their particular project. These difficulties arise from instances where the Reference Guide does not sufficiently address a specific issue or there is a special conflict that requires resolution. To address such issues, the USGBC has established the LEED-CS Credit Interpretation Ruling (CIR) process (separate from the CIR page found in other LEED rating systems). See the LEED-CS section of the USGBC website for more information at www.usgbc.org.

The Credit Interpretation process is summarized as follows:

1. Project teams should review the CIR webpage to read previously posted

credit interpretation requests and USGBC responses. Many questions can be resolved by reviewing existing CIRs and the LEED-CS v2.0 Reference Guide. Note that CIRs for other rating systems (LEED-EB, LEED-CI and LEED-NC) are not necessarily applicable.

2. If no existing Credit Interpretation Rulings are relevant to the project, the LEED project team should submit an on-line credit interpretation request. The description of the challenge encountered by the project team should be brief but explicit; should be based on prerequisite or credit information found in the Rating System and Reference Guide; and should place a special emphasis on the Intent of the prerequisite or credit. If possible, the project team should offer potential solutions to the problem and solicit approval or rejection of their proposed interpretation. Follow the detailed instructions in the “CIR Guidelines” document available on the CIR webpage in the LEED section of the USGBC website.
3. USGBC will rule on your request electronically according to the posted schedule, either through a posting on the CIR Page or via e-mail correspondence.

D. LEED-CS Precertification Application

Overview

LEED-CS Precertification is a unique aspect of the LEED-CS program. Precertification is formal recognition by USGBC given to a candidate project for which the owner/developer has established a goal to develop a LEED-CS building. LEED-CS Precertification is granted to projects after USGBC has reviewed early design stage documentation. This documentation, which reflects a studied and realistic set of project goals and intentions, forms the basis for an award of Precertification at the project’s anticipated LEED-CS

certification level. Precertification is not required for a documented and completed building nor is it confirmation of, or a commitment to, achieve LEED-CS certification. Precertification is not LEED Certification.

Value

Precertification provides the core & shell owner/developer with the ability to market to potential tenants and financiers the unique and valuable green features of a proposed building.

Submittal and Review

Once a project is registered as a LEED-CS project with the USGBC, the project team may complete the LEED-CS precertification letter templates and submit the project for precertification. This is a voluntary submittal at the discretion of the project team.

Because much of the value of precertification occurs early in a project's development, the project team's documentation and the USGBC's review is less comprehensive than the final LEED-CS certification application. Project teams are required to provide confirmation that the project intends to meet the requirements of a credit. This is provided using the LEED-CS precertification letter templates on the appropriate design team member's letterhead for each credit pursued, with a brief description of the strategy and/or technology that will be employed. The owner/developer is also required to provide a signed letter template declaring that they are in agreement with the intention and strategies as indicated on each credit-specific letter template submitted.

The LEED-CS Project Scope checklist will also need to be submitted. This checklist includes information about building use, LEED-CS occupancy numbers and core and shell scope. It serves as a design team tool and also provides the USGBC with useful building information for the review.

The project is reviewed and a LEED-CS precertification level (certified, silver, gold or platinum) is granted. A certificate and letter are provided to the project. The review will allow the developer to market the project's intention to achieve a particular LEED-CS certification level. This precertification process is not intended to be a supplementary comprehensive review of a project's submittal for the anticipated LEED-CS certification level. LEED-CS certification review must still occur with the USGBC's established two-phase application (Design and Construction). Because of the many factors inherent in project design, construction and project documentation and review, it is possible that the final certification review will not correspond exactly to the Precertification review. Project team members should be aware that it is incumbent upon the team to demonstrate that the credit requirements have been met at the design and construction certification reviews.

E. LEED-CS Certification Application

Once a project is registered, the project design team begins to collect information and perform calculations to satisfy the prerequisite and credit submittal requirements. Since submittal documentation should be gathered throughout design and construction, it is helpful to designate a LEED team leader who is responsible for managing the compilation of this information by the LEED-CS project team. The Letter Templates that are provided through the LEED project resources webpage, located in the LEED section of the USGBC website, should be used. These templates contain embedded calculators, and are instrumental in documenting fulfillment of credit requirements and prompting for correct and complete supporting information.

Two-Phase Application

A feature of LEED-CS v2.0 is the option of splitting a LEED-CS certifica-

tion application into two phases. Rather than submitting all documentation for a project at the end of the construction phase, project teams will be able to submit designated “design phase credits” at the end of the design phase for review by USGBC. Design phase credits are those credits that USGBC can reasonably adjudicate based on design phase documentation. For example, if a project site meets the LEED-CS Sustainable Sites Credit 3: Brownfield Redevelopment Requirements, USGBC can assess the likelihood of the project achieving this credit prior to the completion of construction. It is important to remember that LEED credit is not awarded at the design review stage. Project teams are notified of the likelihood of their project to achieve a LEED credit if construction is executed in accordance with design phase plans. Projects must submit verification that design elements were implemented as planned after completion of construction. A list of the potential design phase credits can be found in the LEED section of the USGBC website. Project Teams are allotted one design phase review. At the completion of construction, the balance of attempted credits, verification of design phase credits, and additional documentation for any design phase credits that has changed since the design phase review are documented and submitted for USGBC review. See **Table 1** for a complete listing of design and construction phase credits.

F. Review and Certification

To earn LEED-CS certification, the applicant project must satisfy all of the prerequisites and a minimum number of points to attain the established LEED-CS project ratings as listed below. Having satisfied the basic prerequisites of the program, applicant projects are then rated according to their degree of compliance within the rating system. All LEED-CS projects

will need to comply with the version of LEED-CS that is current at the time of project registration.

Credit Compliance

Overview

The LEED-CS Rating System is written for core and shell development and is intentionally neutral regarding requirements for tenant build-out. A core and shell rating can be attained without making any requirements of a tenant. A tenant can choose to pursue or not to pursue a LEED for Commercial Interiors (LEED-CI) rating with no impact on the building’s LEED-CS rating. However, if a developer chooses to make specific lease requirements part of their tenant negotiation, and these requirements meet the criteria of a particular credit in the LEED-CS Rating System, the LEED-CS project may be able to receive a point for this credit even if the work is not part of the core and shell design and construction.

The following describes this approach to credit compliance and may be used, as applicable, throughout the rating system.

Requirements

Meet LEED-CS Credit requirements through either

- Design and construction of the building core and shell;

OR

- Establishment of tenant requirements that meet the LEED-CS credit requirements, but will be implemented as part of the tenant controlled build-out.

Submittals

- Provide the LEED letter template, signed by the building owner/developer for the credit being pursued,

Table 1: Design & Construction Phase Credits

Sustainable Sites	Design Submittal	Construction Submittal
SSp 1: Construction Activity Pollution Prevention		*
SSc 1: Site Selection	*	
SSc 2: Development Density & Community Connectivity	*	
SSc 3: Brownfield Redevelopment	*	
SSc 4.1: Alternative Transportation, Public Transportation Access	*	
SSc 4.2: Alternative Transportation, Bicycle Storage & Changing Rooms	*	
SSc 4.3: Alternative Transportation, Low-Emitting & Fuel-Efficient Vehicles	*	
SSc 4.4: Alternative Transportation, Parking Capacity	*	
SSc 5.1: Site Development, Protect or Restore Habitat		*
SSc 5.2: Site Development, Maximize Open Space	*	
SSc 6.1: Stormwater Management, Quantity Control	*	
SSc 6.2: Stormwater Management, Quality Control	*	
SSc 7.1: Heat Island Effect, Non-Roof		*
SSc 7.2: Heat Island Effect, Roof	*	
SSc 8: Light Pollution Reduction	*	
SSc 9: Tenant Design & Construction Guidelines	*	
Water Efficiency		
WEc 1.1: Water Efficient Landscaping: Reduce by 50%	*	
WEc 1.2: Water Efficient Landscaping: No Potable Water Use or No Irrigation	*	
WEc 2: Innovative Wastewater Technologies	*	
WEc 3.1: Water Use Reduction, 20%	*	
WEc 3.2: Water Use Reduction, 30%	*	
Energy & Atmosphere		
EAp 1: Fundamental Commissioning of the Building Energy Systems		*
EAp 2: Minimum Energy Performance	*	
EAp 3: Fundamental Refrigerant Management	*	
EAc 1: Optimize Energy Performance	*	
EAc 2: On-Site Renewable Energy	*	
EAc 3: Enhanced Commissioning		*
EAc 4: Enhanced Refrigerant Management	*	
EAc 5.1: M&V— Base Building	*	
EAc 5.2: M&V— Tenant Sub-metering	*	
EAc 6: Green Power		*

continued on page 20

Table 1: Design & Construction Phase Credits

Materials and Resources	Design Submittal	Construction Submittal
MRp 1: Storage and Collection of Recyclables	*	
MRC 1.1: Building Reuse: Maintain 25% of Existing Walls, Floors & Roof		*
MRC 1.2: Building Reuse: Maintain 50% of Existing Walls, Floors & Roof		*
MRC 1.3: Building Reuse: Maintain 75% of Walls, Floors & Roof		*
MRC 2.1: Construction Waste Management: Divert 50% from Disposal		*
MRC 2.2: Construction Waste Management: Divert 75% from Disposal		*
MRC 3: Materials Reuse: 1%		*
MRC 4.1: Recycled Content: 10% (post-consumer + 1/2 pre-consumer)		*
MRC 4.2: Recycled Content: 20% (post-consumer + 1/2 pre-consumer)		*
MRC 5.1: Regional Materials: 10% Extracted, Processed & Manufactured Regionally		*
MRC 5.2: Regional Materials: 20% Extracted, Processed & Manufactured Regionally		*
MRC 6: Certified Wood		*
Indoor Environmental Quality		
EQp 1: Minimum IAQ Performance	*	
EQp 2: Environmental Tobacco Smoke (ETS) Control	*	
EQc 1: Outdoor Air Delivery Monitoring	*	
EQc 2: Increased Ventilation	*	
EQc 3: Construction IAQ Management Plan, During Construction		*
EQc 4.1: Low-Emitting Materials, Adhesives & Sealants		*
EQc 4.2: Low-Emitting Materials: Paints & Coatings		*
EQc 4.3: Low-Emitting Materials: Carpet Systems		*
EQc 4.4: Low-Emitting Materials: Composite Wood & Agrifiber Products		*
EQc 5: Indoor Chemical & Pollutant Source Control	*	
EQc 6: Controllability of Systems: Thermal Comfort	*	
EQc 7: Thermal Comfort: Design	*	
EQc 8.1: Daylight and Views: Daylight 75% of Spaces	*	
EQc 8.2: Daylight and Views: Views for 90% of Spaces	*	

based on the core and shell design and construction.

OR

The LEED letter template for the credit pursued indicating that 100% of leased square footage complies with credit requirements. Lease or sales agreements may be requested.

AND

100% of the unleased square footage shall comply with the credit requirements when leased. A statement signed by the owner/developer that all leases and/or sales agreements will comply may be requested.

The USGBC recognizes the realities and complexity of tenant fit out and the difficulties associated with the enforcement of a 100% compliance path requirement. As a result, in certain instances, a minor portion (defined as a 10% variance) of the final fully occupied tenant spaces may not meet the 100% requirement. Under such situations, the committee acknowledges the 100% assurance has been met.

Design Phase Review

Once USGBC has received your complete design phase application and the design phase fee (which is a portion of the total certification fee), the USGBC will formally rule on your application by designating each attempted credit as either *Anticipated* or *Denied*. No certification award will be given at this time, nor will any credits be awarded. This process serves to allow project teams the opportunity to assess the likelihood of credit achievement, and requires follow through to ensure the design is executed in the construction phase according to design specifications.

Construction Phase Review

At the completion of construction, the project team will submit all attempted credits for review. If the project team had

elected to have a design phase review and any of the design phase *Anticipated* credits have changed, additional documentation must be submitted to substantiate continued compliance with credit requirements. For design phase *Anticipated* credits that have not substantively changed, the project team must submit a verification that the design has been executed per requirements in the construction phase. Once USGBC has received the complete application and fee (the remainder of the total certification fee, if a design review has been conducted), the USGBC will formally rule on your full application. All applicant-verified design phase credits that were designated as *Anticipated* and have not changed since the design phase review will be declared as *Achieved*. All other credits will be designated as either *Achieved* or *Denied*.

Appeals

Appeals may be filed either after the design phase review or the final review. Please see the LEED-CS section of the USGBC website for more information on appeals.

Figure 1 (*following page*) illustrates the general sequence of submittals for LEED-CS precertification and certification. The activities are indicated in relation to the typical project delivery phase.

Fees

Certification fee information can be found in the LEED-CS section of the USGBC website. The USGBC will acknowledge receipt of your application and proceed with application review when all project documentation has been submitted.

The LEED-CS ratings are awarded according to the following scale—

- Certified 23-27 points
- Silver 28-33 points
- Gold 34-44 points
- Platinum 45-61 points

Figure 1: Sequence of Submittals for LEED-CS Precertification and Certification

Pre-design	Design	Construction	Post Construction
Registration			
	LEED-CS precertification Preliminary Final Appeal(s) Submittal at project's discretion	Design Phase Review Preliminary Final Appeal(s)	Construction Phase Review Preliminary Final Appeal(s)

The USGBC will recognize buildings that achieve one of these rating levels with a formal letter of certification and a mountable plaque.

G. Updates & Addenda

This is the first edition of the LEED-CS Version 2.0 Reference Guide, dated May 2006. As LEED-CS continues to improve and evolve, updates and addenda will be made available to substitute and augment the current material. The USGBC cannot be held liable for any criteria set forth herein, which may not be applicable to later versions of LEED-CS. Updates and addenda will be accumulated between revisions and will be formally incorporated in major revisions. In the interim between major revisions, the USGBC may use its consensus process to clarify criteria.

When a project registers for certification, the prerequisites, credits, and credit rulings current at the time of project registration will continue to guide the project throughout its certification process.

IV. LEED-CS Version 2.0 Reference Guide

The LEED-CS v2.0 Reference Guide is a supporting document to the LEED-CS Green Building Rating System. The Guide is intended to assist project teams in understanding LEED-CS criteria and the benefits of complying with each criterion. The Guide includes examples of strategies that can be used in each category, case studies of buildings that have implemented these strategies successfully, and additional resources that will provide more information. The guide does not provide an exhaustive list of strategies for meeting the criteria as subsequent strategies will be developed and employed by designers that satisfy the Intent of each credit. Nor does it provide all of the information that design teams need to determine the applicability of a credit to their project.

Prerequisite and Credit Format

Each prerequisite and credit is organized in a standardized format for simplicity

and quick reference. The first section summarizes the key points regarding the measure and includes the Intent, Requirements, and some Potential Technologies & Strategies for achieving the credit. The subsequent sections provide supportive information to help interpret the measure, examples, and links to various resources.

If your project team encounters an out-of-date web link in the Reference Guide, please go to the root website, which should take the form of www.organization.com with no additional text following. Then you may be able to navigate through the website to find the referenced document. Please contact the USGBC at (202) 828-7422 if you are unable to locate a resource.

Greening Opportunity Icons

Throughout this Reference Guide, you will see this icon:



This icon will assist projects that are proceeding with the intention of certifying with LEED-EB, following their LEED-CS certification. It identifies credits that involve measures that are significantly more cost-effective and convenient to implement during design and construction than they are during the operation of the building. These credits are—

- SSc 2: Development Density & Community Connectivity
- SSc 4.1: Alternative Transportation: Public Transportation Access
- EAc 1: Optimize Energy Performance
- EAc 3: Enhanced Commissioning
- EAc 5: Measurement & Verification
- MRc 4: Recycled Content

- MRc 5: Regional Materials
- MRc 6: Rapidly Renewable Materials
- MRc 7: Certified Wood
- EQc 1: Outdoor Air Delivery Monitoring
- EQc 6.2: Controllability of Systems: Thermal Comfort
- EQc 7: Thermal Comfort
- EQc 8: Daylight and Views



This icon will also assist you in identifying the credits and considerations that are important for a LEED-CI pursuit. This will assist the project team with identifying the core and shell building issues that can assist a tenant or buyer with pursuing a LEED-CI certification. It identifies credits that either directly assist with the LEED-CI pursuit, or that provide a core and shell systems capability that can be utilized by the tenant or buyer.

Case Study

National Business Park 318 Annapolis Junction, Maryland



Photo courtesy of: Jeffery Sauers

National Business Park 318 (NBP 318) is a four-story, 125,681-sq.ft. office building, which was fully leased during construction and earned LEED-CS Pilot Gold Certification. NBP 318 is located in a 285-acre business community and is one of three buildings on a business campus arranged around a central sculpture plaza that allows for pedestrian connectivity. NBP 318 had a \$2.84 per sq.ft. green construction premium with a \$0.70 per sq.ft. annual energy savings. The analysis showed a six-month return on investment, after costs were offset by energy savings, waste reduction and other green practices. Some other attributes include highly filtered air, extremely efficient mechanical systems, water usage reduction of 40% and an extensive green housekeeping program. Sustainable features include: a stormwater management system that removes 80% of the total suspended solids and more than 50% of average annual post-development phosphorous; heat island reduction through the use of a white roof; reduced light pollution with exterior lighting designed to prevent spillage beyond the site; alternative transportation opportunities with bicycle storage and changing rooms to encourage tenant employees to bike to work; and tenant design and construction guidelines to promote green practices by tenants.