

*Process Guide*

Applying  
**Sustainability**  
to UC Projects

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*November 2004*



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# Foreword

This guide presents the University of Cincinnati's process for applying sustainable design. It is intended to help Project Administrators, architects, and engineers understand University policy and approach each project phase from a sustainability perspective. The guide was developed in consultation with the University Architect and the University's Sustainable Design Committee.

The University embraces sustainable design principles in its construction and renovation initiatives. As this guide explains, projects at UC may or may not be recommended for certification under the Leadership in Energy and Environmental Design (LEED) Green Building Rating Systems advanced by the United States Green Building Council. However, all UC projects are expected to apply sustainability to the greatest extent possible.

## Text Conventions

*Applying Sustainability to UC Projects* presents sustainability in the context of the project life cycle (Programming – A/E selection – Design – Construction – Turnover and Closeout), with each section of the guide corresponding to a phase or phases. The guide's organization follows the process flow chart shown on page 3.

Sections of the guide begin with a listing of sustainability steps and outputs (or deliverables) for the phase(s) at hand; for example:

	<b>Projects Seeking Certification</b>	<b>Projects Not Seeking Certification</b>
<b>Steps</b>	<ul style="list-style-type: none"><li>• Deliver LEED certification submittal to USGBC</li><li>• Respond to USGBC review comments and questions</li><li>• Perform commissioning</li><li>• Conduct post-occupancy evaluation</li></ul>	<ul style="list-style-type: none"><li>• Perform commissioning</li><li>• Conduct post-occupancy evaluation</li></ul>
<b>Outputs or Deliverables</b>	<ul style="list-style-type: none"><li>• LEED certification submittal</li><li>• Commissioning report</li></ul>	<ul style="list-style-type: none"><li>• Commissioning report</li></ul>



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<b>Figure 4</b>	Example Letter Template for a Prerequisite
<b>Figure 5</b>	Example Letter Template for a Credit

## *List of Acronyms and Abbreviations*

A/E	Architect/Engineer
ASTM	American Society for Testing and Materials
BEES	Building for Environmental and Economic Sustainability
BREEAM	Building Research Establishment Environmental Assessment Method
DOE	(United States) Department of Energy
EPA	(United States) Environmental Protection Agency
LCA	Life-cycle assessment
LEED	Leadership in Energy and Environmental Design
POE	Post-occupancy evaluation
SDC	Sustainable Design Committee (UC)
USGBC	United States Green Building Council

# Applying Sustainability to UC Projects

November 2004

The University of Cincinnati requires that projects address **sustainability**, an emerging design methodology, in Program Statements, designs, and construction. Project teams must identify and incorporate sustainable design features that are practical and economically feasible.

## Background

In late 1999, the University Architect decided to incorporate sustainable design into future projects. UC's Division of the University Architect first included sustainable design in its *Design Guidelines and Standards* in May 2000. In 2001, the University President formally approved the concept and issued [Administrative Memo #127](#), dated October 2001.

The University has adopted the [Leadership in Energy and Environmental Design \(LEED\)](#) Green Building Rating Systems as the standard for measuring a project's sustainable design performance. UC is a member of the United States Green Building Council (USGBC), which created LEED.

***Sustainable design*** is an intelligent, holistic design methodology that integrates

- a project's *program, user needs, and budget*;
- high-quality *aesthetic and functional design solutions*;
- *cost and energy*;
- concern for *occupant health and productivity*, and
- *environmental stewardship*.

***Sustainable design*** meets the needs of the present while preserving resources for future generations.

## How UC Implements Sustainable Design

University policy requires that the **most appropriate** LEED rating system for a project be applied **in its most current version**. The various LEED rating systems are evolving rapidly, so the University must continually compare projects with available LEED versions to determine the best match of project and system.

University policy requires project teams to evaluate a project's sustainability potential by considering:

- **Applicability.** Project teams will identify and pursue those sustainable design strategies that are feasible within the project's scope. Certification under the LEED rating system is a minimum requirement for major construction and rehabilitation projects.
- **Affordability.** The project team must choose those sustainable design measures that can be delivered within budget. The University Architect and the leader or senior member of the project sponsor team will have the final decision on recommended sustainable design strategies that affect cost, schedule, or program.

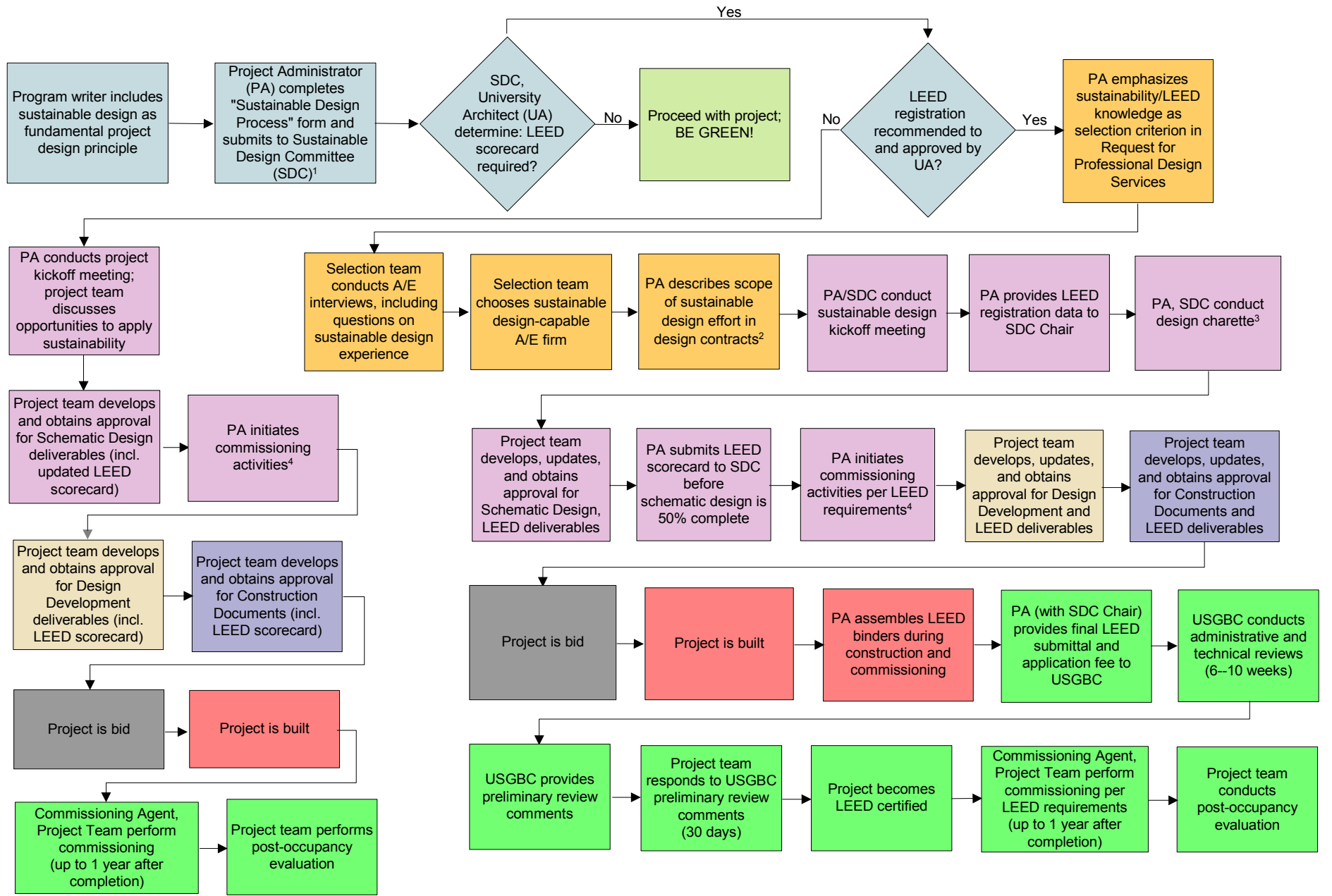
## **Flow Chart: Sustainable Design in the Project Life Cycle**

The flow chart on the following page illustrates UC's process for applying sustainable design at each project phase. Text that follows provides additional details about the flow chart steps.

Renovations, because of their limited scope, may be unable to achieve LEED certification. Therefore, renovations are not generally required to follow the process shown on the flow chart, although they **are** required to incorporate sustainable design principles wherever possible. Some significant or half-life renovations may be exceptions. The Director of Renovations or the appropriate senior project manager will advise the University Architect, and the University Architect will determine the appropriate sustainable design strategies for significant renovation projects.



Sustainable Design Process Flow



1 This requirement does not apply to most renovation projects.

2 The process for projects designed internally is similar to that for projects designed by an A/E, except for references to the Request for Professional Design Services, A/E interviews, and A/E contracts.

3 The SD effort will include a design charrette that explores conceptual space plans, conceptual site designs, and related sustainable design ideas concurrently in a forum that involves building users and design reviewers.

4 Commissioning should begin with schematic design, continue through the design and construction phases, and continue into the first year of the project (to ensure complete systems testing).

Programming
  A/E Selection
  Schematic Design
  Design Development
  Construction Documents
  Bidding
  Construction
  Turnover/Closeout

## Programming

<b>Steps</b>
<ul style="list-style-type: none"><li>• Include sustainability in the Program Statement</li><li>• Complete a Sustainable Design Process form to help the Sustainable Design Committee (SDC) and the University Architect determine the sustainability process to be used for the project</li></ul>
<b>Outputs/Deliverables</b>
<ul style="list-style-type: none"><li>• Program Statement</li><li>• Sustainable Design Process Form</li></ul>

### *Including Sustainability in the Program Statement*

The program writer must include sustainability as a fundamental project design principle. The University's sustainable design policy is referenced under "Project Criteria" in the Program Statement template.

### *Completing the Sustainable Design Process Form*

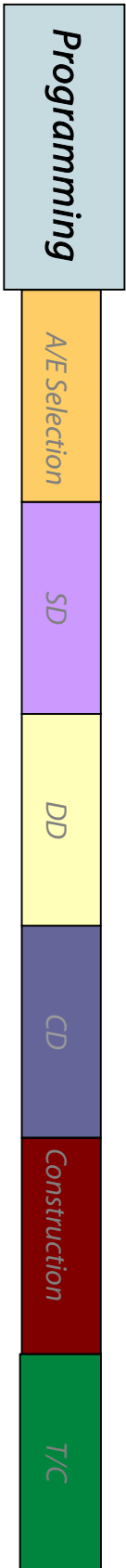
Figure 1 shows the Sustainable Design Process form, which the Project Administrator must complete to determine the project's potential for sustainable design application.

The completed form is reviewed first by UC's interdisciplinary Sustainable Design Committee (SDC). On the basis of the information provided, the committee makes a recommendation to the University Architect either for or against the completion of a preliminary LEED scorecard.

Completion of a preliminary LEED scorecard is usually recommended for new construction and major rehabilitation projects. In a very few cases, the University Architect and the SDC may determine that the LEED scorecard is not necessary. Projects with this outcome are still expected to apply sustainability to the maximum extent possible.

Project Administrators instructed to complete a preliminary LEED scorecard should do so early in design and submit the scorecard before schematic design is halfway complete.





**UNIVERSITY OF CINCINNATI**

**SUSTAINABLE DESIGN PROCESS**

All projects at the University of Cincinnati need to incorporate sustainable design principles. This form will help determine whether a LEED scorecard needs to be completed. Please refer to the flow chart on the reverse side.

Project Name: \_\_\_\_\_

Project Number: \_\_\_\_\_

FLCC Amount: \_\_\_\_\_

Project Administrator: \_\_\_\_\_

Date Submitted: \_\_\_\_\_

(Please Circle One)

BE GREEN !

Return Completed Scorecard before Schematic Design is 50% Complete

No Scorecard Required

**NOTE:** This box will be completed by the UC Sustainable Design Committee, with the concurrence of the University Architect.

- |  |   |   |
|--|---|---|
| 1. Will this project be presented to the UC Design Review Committee?       | Y | N |
| 2. Is this a new building?   | Y | N |
| 3. Is this a building addition?  | Y | N |
| 4. If this is a renovation or rehab project, does it impact the following? |   |   |
| a. Building Envelope?  | Y | N |
| b. Mechanical/Electrical Systems?  | Y | N |
| c. Site Work?  | Y | N |

Please submit completed form to the Executive Staff Assistant for the Sustainable Design Committee **before** schematic design begins.

**Figure 1: Sustainable Design Process Form**

The University Architect, after considering a recommendation from the SDC, decides whether the project will register with LEED (the first step toward LEED certification). There are three possible outcomes:

1. Certification under LEED is not considered practical for the project; however, the project is still expected to apply sustainability to the maximum extent possible.
2. Certification under LEED is not considered practical, but the team should complete the LEED scorecard and update it at each design phase submittal and at the end of the project. This provides an internal measure of sustainable design achievement.
3. The project should pursue LEED certification and follow the registration process. This decision influences the Architect/Engineer (A/E, or Associate) selection process, because the A/E's LEED knowledge, sustainable design experience, and capability will factor into the selection decision.

### Why Are Some Projects Excused from LEED Registration and Certification?

The division recognizes that for many smaller renovation projects each year, certification may not be appropriate. These projects must follow all LEED guidance that applies to their scope.

Some smaller, lower-cost projects might be ideal candidates for certification if they involve most or all of the design features described on the Sustainable Design Process form.

As with other aspects of UC's design guidance, the University Architect can grant a variance from LEED certification if a project warrants it.

### *Project Budget Considerations*

Reaching for higher levels of LEED certification may be limited by a project's funding constraints, particularly in periods of declining state revenues. However, it is important to realize that sustainable design is not an assembly of "green" design components that can be budgeted for individually, nor should it be seen as an "extra" that can be deleted during value engineering.

If a project is designed well, many of sustainable design's economic benefits will be realized after the building transitions from construction to occupancy. If capital costs are higher for sustainable designs, they are often counterbalanced by lower costs for energy, operation, and maintenance, as well as higher long-term asset value that greatly prolongs the life of a building. A recent report<sup>1</sup> states that a 2% increase in up-front costs will result in average life-cycle savings of 20% of total construction costs, for a tenfold return on investment.

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<sup>1</sup> Kats, Greg, et al. *The Costs and Financial Benefits of Green Buildings: a Report to California's Sustainable Building Task Force*. 2003, p ii.



Additionally, the report notes that higher up-front costs are often for additional design time, not higher construction costs.

Sustainable design strategies that hold potential for a “fast payback” are more easily embraced; however, others that offer primarily long-term benefits should also be considered. For example, rehabilitating the University’s oldest building will cost more per square foot than most new academic buildings, but will allow it to be used for important functions on a very visible site for another 100 years.

Not all sustainable design practices involve higher project costs. An integrated approach to sustainable design reduces repetition of effort and promotes coordination among disciplines and technologies. Cost savings realized for one element can be used to offset potentially higher initial costs for others (for example, lower-capacity, energy-saving mechanical systems made feasible by high-performance windows and shading devices). Some strategies reduce both initial and life-cycle costs. For example, when space that can be shared is identified during the programming and schematic design phases, capital, operating, and energy costs can be greatly reduced<sup>2</sup>.

### Budgeting for Sustainable Design

To ensure that budgets provide for high-quality sustainable designs, estimates and design schedules must:

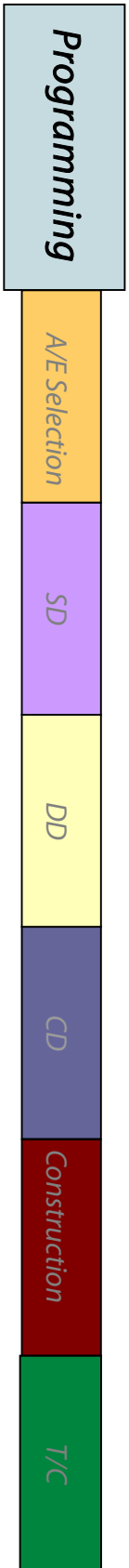
- Reflect unit costs for comparable high-quality academic buildings
- Include allowances for site development, furnishings, equipment, inflation, contingencies, construction administration, and unique site conditions or project goals
- Include LEED program fees and cost of preparing documentation for certification
- Recognize that more design time is needed in the early phases of design

Sustainable materials and services are becoming more affordable as their use increases. At appropriate intervals, UC will assess the market forces affecting sustainable design implementation and determine whether more aggressive strategies can be adopted.

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**Note:** Costs for LEED certification are factored into UC project budgets.

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<sup>2</sup> On two recent UC projects, costs were reduced by about 10% before design work even began.

### *Explaining Sustainable Design to Clients*

Many UC client representatives are unfamiliar with the sustainable design concept. Their introduction to it may come from a division staff member during the A/E selection or schematic design phase. Clients may initially doubt sustainable design's value. They will want to know that their requirements — for programmed spaces, budget, and other project needs — will not be compromised by the incorporation of sustainable design.

To demonstrate the many benefits of sustainable design, project staff members should refer clients to LEED and UC resources. In particular, the Sustainable Design Committee can provide case studies showing positive results this design approach has achieved for many different institutions and companies. The appendix to this guide lists some internal and external sustainability resources.



## A/E Selection

	Projects Seeking Certification	Projects Not Seeking Certification
<b>Steps</b>	<ul style="list-style-type: none"> <li>Emphasize sustainability in Request for Professional Design Services</li> <li>Include sustainable design questions in A/E interviews</li> <li>Describe scope of sustainable design effort in contracts</li> </ul>	<ul style="list-style-type: none"> <li>Follow UC's standard process for A/E selection</li> </ul>
<b>Outputs or Deliverables</b>	<ul style="list-style-type: none"> <li>Request for Professional Design Services</li> <li>Design contract(s) reflecting sustainability requirements</li> </ul>	

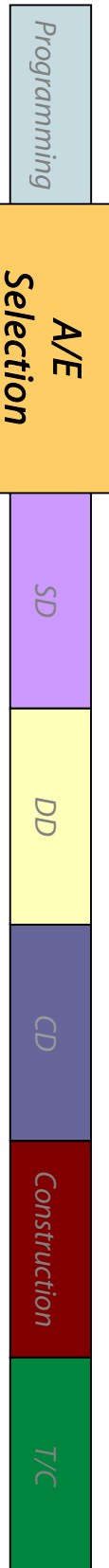
Sustainable design considerations influence the major steps in the A/E (Associate) and design consultant selection processes, including Request for Professional Design Services development/distribution and candidate selection.

LEED has an accreditation program to encourage development of green building expertise among design and construction professionals. A project earns one point in the LEED ratings systems if its A/E has a LEED Accredited Professional on staff. The [LEED accreditation page](#) gives a current list of accredited professionals.

Perhaps the best way to encourage sustainable design is to select an A/E firm that has completed one or more LEED-certified projects, or one whose marketing documents and qualifications statement give strong emphasis to its practice of sustainable design. Because the LEED rating systems have been in use only a short time, relatively few design firms have completed a LEED-certified project.

A more realistic strategy may be to select high-quality A/E firms that are interested in pursuing sustainable design and are ready to develop their knowledge and experience in the process. The section "Interviewing A/E Candidates for Sustainable Design Projects," below, provides sample questions to help identify such firms.

**Note:** See the *Guide for Project Administration* chapter "Selecting the A/E Design Firm" for more information on UC's A/E selection process.



### *Developing and Distributing the Request for Professional Design Services*

Requests for Professional Design Services, which announce to design firms the availability of UC design work for major projects, must instruct respondents to address sustainable design in their selection interviews. Firms must explain how they will integrate sustainable design goals into their work if awarded the contract. Sustainable design experience must be a selection criterion.

### *Interviewing A/E Candidates for Sustainable Design Projects*

Many A/E firms that lack specific experience in LEED practices and documentation have incorporated sustainable design concepts in previous projects. Each project's A/E selection committee should ask questions to draw out that experience. For example:

- Has the firm designed any environmentally responsible or sustainable facilities (with or without LEED certification)?
- If the firm has designed one or more LEED-certified buildings, what types of facilities were they? What level of certification did they earn?
- Has the firm completed projects that comply with the requirements of any other green building system? (Examples: EPA/DOE's Energy Star; Building Research Establishment Environmental Assessment Method [BREEAM])
- Does the firm have a LEED Accredited Professional on staff?
- Does the firm have references for green building projects?
- Can the firm outline how it uses an integrated process to deliver sustainable design?
- Can the firm cite projects that incorporate any of the following sustainable design approaches:
  - Environmentally responsible site-planning measures?
  - Energy-efficient building orientation?
  - Effective use of natural light and ventilation?
  - Strategies to minimize storm water runoff?
  - Designs that use less energy than minimum code requirements?
  - Use of renewable resources?
  - Reduction or elimination of harmful substances?
  - Strategies to improve indoor environmental quality?
  - Reuse of construction waste, building materials, and/or materials recovered in demolitions?

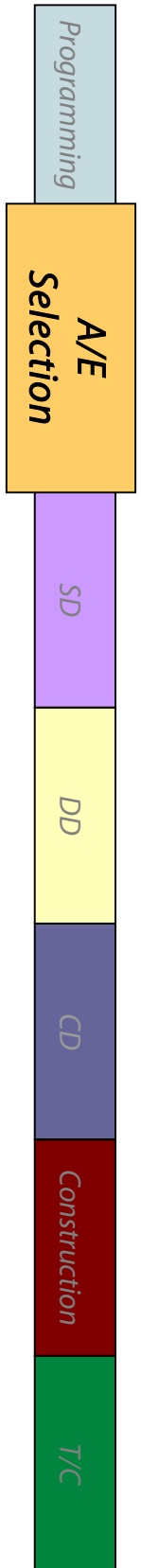
### *Issuing the Request for Technical Proposal*

After the A/E firm has been selected, the Project Administrator issues a Request for Technical Proposal that more precisely defines the firm’s response to the scope of work in the program. The firm’s technical proposal must provide more specific details of its plans to incorporate sustainable design features into the project and must include their estimate for related design and documentation fees. The technical proposal is subsequently incorporated into the A/E contract by reference.

### *Preparing Design Contracts*

With an A/E selected, the Project Administrator develops the details of the Professional Design Services Agreement (contract), including sustainable design requirements.

The selected firm is contractually required to provide specific deliverables related to sustainable design and commissioning at each phase of design (see “The Design Phases” in this document). If an A/E fails to deliver these items within the required time frames, the University can legally withhold payment.



## The Design Phases

	<b>Projects Seeking Certification</b>	<b>Projects Not Seeking Certification</b>
<b>Steps</b>	<p><b>Pre-design:</b></p> <ul style="list-style-type: none"> <li>• Conduct sustainable design kickoff meeting</li> <li>• Provide LEED registration data to SDC chair</li> <li>• Develop, update, and obtain approval for pre-design deliverables</li> </ul> <p><b>Schematic Design:</b></p> <ul style="list-style-type: none"> <li>• Conduct design charrette</li> <li>• Develop, update, and obtain approval for schematic design and LEED deliverables</li> <li>• Submit preliminary LEED scorecard to SDC chair</li> <li>• Initiate commissioning activities</li> </ul> <p><b>Design Development:</b></p> <ul style="list-style-type: none"> <li>• Develop, update, and obtain approval for design development and LEED deliverables</li> </ul> <p><b>Construction Documents:</b></p> <ul style="list-style-type: none"> <li>• Develop, update, and obtain approval for construction documents and LEED deliverables</li> </ul>	<p><b>Pre-design:</b></p> <ul style="list-style-type: none"> <li>• Conduct project kickoff meeting and discuss sustainability opportunities</li> </ul> <p><b>Schematic Design:</b></p> <ul style="list-style-type: none"> <li>• Develop, update, and obtain approval for schematic design deliverables, including updated LEED scorecard</li> <li>• Initiate commissioning activities</li> </ul> <p><b>Design Development:</b></p> <ul style="list-style-type: none"> <li>• Develop, update, and obtain approval for design development deliverables, including updated LEED scorecard</li> </ul> <p><b>Construction Documents:</b></p> <ul style="list-style-type: none"> <li>• Develop, update, and obtain approval for construction documents deliverables, including updated LEED scorecard</li> </ul>
<b>Outputs or Deliverables</b>	<ul style="list-style-type: none"> <li>• LEED initial registration data (at schematic design)</li> <li>• Life-cycle assessment (LCA), updated at each phase</li> <li>• Design documents for each phase</li> <li>• LEED scorecard, tracking sheets, and letter templates updated at each phase</li> </ul>	<ul style="list-style-type: none"> <li>• Design documents for each phase</li> <li>• LCA for each phase</li> <li>• Updated LEED scorecard for each phase</li> </ul>



Each design phase includes deliverables and activities. The lists of design deliverables presented below are applicable to LEED-registering projects, but should be applied insofar as possible to non-registered projects. The deliverables lists presented here relate only to sustainable design requirements, i.e., they are not all-inclusive submittal lists for each design phase. For comprehensive project submittals lists, see “[Design Phase Submission Requirements](#)” in the University’s *Design Guidelines and Standards*.

### *Pre-design Activities*

#### Holding the Sustainable Design Kickoff Meeting

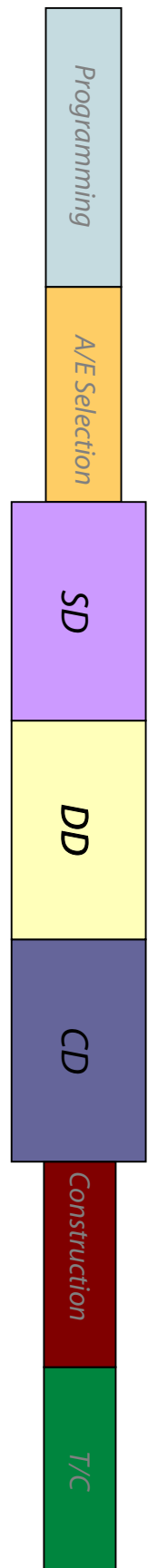
A sustainable design kickoff meeting (separate from the regular project kickoff) must take place before schematic design begins. The UC Project Administrator organizes and facilitates the kickoff meeting, with the assistance of the SDC Chair. Participants should include:

- All design consultants
- Engineering consultants for each discipline
- The project’s Construction Manager (if applicable)
- Client representative(s)
- Representatives of the UC Sustainable Design Committee

The Project Administrator should also invite the University Architect, UC Facilities Management representatives, and other stakeholders.

This meeting sets the stage for identifying sustainable design goals to be met. At a minimum, the meeting should accomplish the following:

- Provide all participants with a common vocabulary and an understanding of sustainable design and its incorporation into UC projects
- Reinforce the University’s commitment to sustainable design and LEED certification
- Discuss integrated, holistic design (i.e., sustainable design is not an exercise in value engineering)
- Establish project team consensus on the project’s sustainable design goals and expectations
- Discuss project-specific strategies for attaining goals (for example, if the project involves demolition, opportunities for salvaging and recycling old building materials should be explored at this time)
- Include an item-by-item review of the LEED Green Building Rating Systems criteria and a determination of which credit points can be achieved (see “Conducting a LEED Credit Point Review” below)



- Review sustainable design submittal requirements for each design phase
- Introduce the project's Commissioning Authority, who will plan and oversee the quality-control checks required for the commissioning process

### *Conducting a LEED Credit Point Review*

The sustainable design kickoff meeting includes a preliminary discussion of which LEED credit points (from the LEED Green Building Rating Systems) the project should seek to attain. One way to begin this discussion is to list each credit point under one of the following categories:

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<b><i>Achievable</i></b>	Measures for achieving this credit are within standards of good professional practice.
<b><i>Questionable</i></b>	Unknown design issues, market conditions, or technical barriers may affect UC's ability to pursue this credit.
<b><i>Challenging</i></b>	Known barriers must be overcome to earn this credit (for example, conflicting UC design guidelines, or issues of code or availability)
<b><i>Dismissed</i></b>	This credit is unattainable because of acknowledged site or regional factors, or University policy.

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Adding together the points in all but the "Dismissed" category reveals the project's potential LEED certification level.

### **Preparing LEED Registration Data for the SDC Chair**

The SDC Chair serves as each project's contact with the USGBC, receiving the application data provided by the project team and coordinating certification tasks. Before design begins, the Project Administrator provides at least the following data to the SDC Chair for the LEED registration process:

- Project title and street address
- Project description
- Project team information (names of individuals and companies; company locations; e-mail addresses for individuals; whether any team member is a LEED Accredited Professional)
- Project Administrator
- Estimated date of occupancy
- Current project phase
- Project cost (not including site work, furniture, fit-out, or equipment)



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- Project scope (single building, multiple buildings [campus], core and shell, or commercial interior)
- Total property area of the project site (in acres)
- Gross square footage of the project (not including parking or outdoor facilities)
- Total building footprint (gsf)
- Number of surface parking spaces dedicated to support the project
- Number of structured parking spaces dedicated to support the project
- Site context/setting (urban, suburban, or rural)
- Site conditions (previously undeveloped, previously developed, Brownfield [contaminated], or Greenfield [pristine])
- UC project fund number (to which the LEED registration fee will be charged)

**Note:** The USGBC's [current registered projects](#) list can be helpful in preparing registration information.

Achieving LEED certification is a team effort. At each design phase, the Project Administrator and team members provide the Sustainable Design Committee Chair with design submittals that will demonstrate the project's sustainable design goals and accomplishments to the USGBC. These submittals include the LEED scorecard and other LEED documentation in the required format, which ultimately will be forwarded to the USGBC with the application.

## *Online Project Registration*

Registration enhances the project's chances for certification by establishing correspondence with the USGBC at design inception. As the project progresses, USGBC may be able to provide clarification on specific credit issues. Registration also ensures that in the event of a ratings system update, the version in place at registration will be used to evaluate the project.

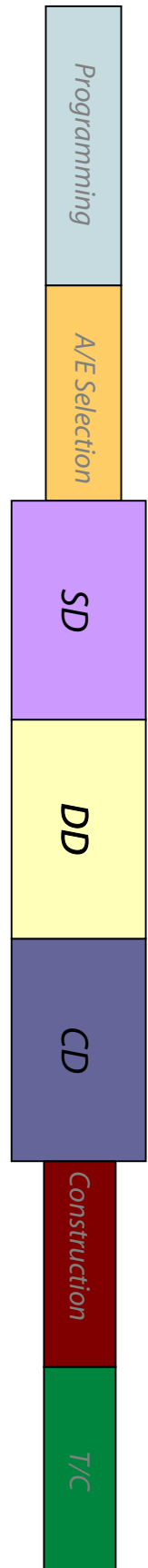
The online registration system includes checklists for LEED credit categories. On the interactive registration form, the Sustainable Design Committee Chair lists the credit points the design team anticipates achieving, based on the current phase of design.

Once the USGBC processes and accepts the registration, UC and the design team members will receive an orientation letter and access to LEED software tools, letter templates (input formats for each credit), and other certification resources. The person registering the project is responsible for forwarding information to team members.

## *Predesign Submission Requirements*

The A/E and programming consultant must submit the following items at the conclusion of predesign activities:

1. **Space Needs.** Describe the following:
  - Number of people planned for each space



- Demand for learning rooms
  - Identification of shared functions
  - Rooms programmed to serve multiple functions
2. **Comparative analysis of new construction vs. rehabilitation/renovation** to meet program needs.
  3. **Analysis of potential sites** considered from an environmental perspective.

### *Schematic Design Activities*

#### Conducting a Design Charette

A charette is a collaborative design forum involving all project stakeholders. By directing the discussion, establishing a common vocabulary, and addressing the issues that can arise from competing design goals, the facilitator leads the client group toward consensus on specific sustainable design goals and strategies. The Project Administrator or A/E should facilitate a design charette early in the schematic design phase of major construction and rehabilitation projects.

The charette facilitator should strive to consider design issues from all stakeholder viewpoints. The facilitator should also be aware of possible linkages and be prepared to help stakeholders resolve competing or conflicting goals.

#### Submitting the Preliminary LEED Scorecard

Project teams required to complete a preliminary LEED scorecard (Figure 2) should do so before schematic design is halfway complete and return the scorecard to the SDC chair. This “preliminary” scorecard helps the design team and Sustainable Design Committee arrive at the most appropriate design goals for the project. Design teams must keep the scorecard current throughout the project and provide an updated version with design deliverables at each phase. Ultimately the completed scorecard will be included in the project’s application for LEED certification.

On the scorecard, credits sought should be listed on the left side under the appropriate category (i.e., sustainable sites, water efficiency, etc.; see example). Prerequisites are pre-entered on the template. The anticipated point value for each credit is entered in the column on the right.

#### Launching the Commissioning Process

Commissioning should begin during schematic design with an assessment of commissioning requirements for whichever LEED version applies to the project. The commissioning process will continue throughout the design and construction phases and into the project’s first year of occupancy and use.



**This worksheet summarizes the prerequisites and credits documented and achieved and provides a notes area for the team to track credit issues**  
 Compiled automatically from the individual letter templates for each prerequisite and credit - only the Team Notes can be manually entered by the team on this

					<b>Credits and Prerequisites</b>	<b>Team Notes</b>			
<b>Sustainable Sites</b>					<b>Possible</b>	<b>Pending</b>	<b>Documented</b>	<b>Responsible</b>	
Prerequisite 1	Erosion & Sedimentation Control				0	No	No	Fred Schwar(RB)	
Credit 1	Site Selection				1	0	0	Fred Schwar(RB)	
Credit 2	Urban Redevelopment				1	0	0	Eric Essique(MT)	
Credit 3	Brownfield Redevelopment				1	0	0	#N/A	
Credit 4.1	Alternative Transportation, Public Transportation Access				1	0	0	Ron Kull, AIA	
Credit 4.2	Alternative Transportation, Bicycle Storage & Changing Rooms				1	0	0	Eric Essique(MT)	
Credit 4.3	Alternative Transportation, Alternative Fuel Refueling Stations				1	0	0	#N/A	
Credit 4.4	Alternative Transportation, Parking Capacity				1	0	0	#N/A	
Credit 5.1	Reduced Site Disturbance, Protect or Restore Open Space				1	0	0	Marc Heiber	
Credit 5.2	Reduced Site Disturbance, Development Footprint				1	0	0	Marc Heiber	
Credit 6.1	Stormwater Management, Rate and Quantity				1	0	0	Fred Schwar(RB)	
Credit 6.2	Stormwater Management, Treatment				1	0	0	#N/A	
Credit 7.1	Landscape & Ext Design to Reduce Heat Islands, Non-Roof				1	0	0	Ken Haines	
Credit 7.2	Landscape & Ext Design to Reduce Heat Islands, Roof				1	0	0	Eric Essique(MT)	
Credit 8	Light Pollution Reduction				1	0	0	#N/A	
<b>Sustainable Sites Totals</b>					14	0	0		
<b>Water Efficiency</b>					<b>Possible</b>	<b>Pending</b>	<b>Documented</b>	<b>Responsible</b>	<b>Team Notes</b>
Credit 1.1	Water Efficient Landscaping, Reduce by 50%				1	0	0	Marc Heiber	
Credit 1.2	Water Efficient Landscaping, No Potable Use or No Irrigation				1	0	0	#N/A	
Credit 2	Innovative Wastewater Technologies				1	0	0	#N/A	
Credit 3.1	Water Use Reduction, 20% Reduction				1	0	0	Don Kubertanz	
Credit 3.2	Water Use Reduction, 30% Reduction				1	0	0	Don Kubertanz	
<b>Water Efficiency Totals</b>					5	0	0		
<b>Energy &amp; Atmosphere</b>					<b>Possible</b>	<b>Pending</b>	<b>Documented</b>	<b>Responsible</b>	<b>Team Notes</b>
Prerequisite 1	Fundamental Building Systems Commissioning				0	No	Yes	Mark LeBrun	
Prerequisite 2	Minimum Energy Performance				0	No	Yes	David Brooks	
Prerequisite 3	CFC Reduction in HVAC&R Equipment				0	No	Yes	David Brooks	

**Figure 2: Example LEED Preliminary Project Scorecard (page 1 of 3)**

Credit 1.1-1.10	Optimize Energy Performance	10	0	5	David Brooks	
Credit 2.1	Renewable Energy, 5%	1	0	0	#N/A	
Credit 2.2	Renewable Energy, 10%	1	0	0	#N/A	
Credit 2.3	Renewable Energy, 20%	1	0	0	#N/A	
Credit 3	Additional Commissioning	1	0	1	Mark LeBrun	
Credit 4	Ozone Depletion	1	0	0	#N/A	
Credit 5	Measurement & Verification	1	1	0	David Brooks	
Credit 6	Green Power	1	0	0	#N/A	
<b>Energy &amp; Atmosphere Totals</b>		17	1	6		
<b>Materials &amp; Resources</b>		<b>Possible</b>	<b>Pending</b>	<b>Documented</b>	<b>Responsible</b>	<b>Team Notes</b>
Prerequisite 1	Storage & Collection of Recyclables	0	No	Yes	Eric Essique(MT)	
Credit 1.1	Building Reuse, Maintain 75% of Existing Shell	1	0	0	Eric Essique(MT)	
Credit 1.2	Building Reuse, Maintain 100% of Existing Shell	1	0	0	Eric Essique(MT)	
Credit 1.3	Building Reuse, Maintain 100% Shell & 50% Non-Shell	1	0	0	Eric Essique(MT)	
Credit 2.1	Construction Waste Management, Divert 50%	1	0	0	TBD	
Credit 2.2	Construction Waste Management, Divert 75%	1	0	0	TBD	
Credit 3.1	Resource Reuse, Specify 5%	1	0	0	TBD	
Credit 3.2	Resource Reuse, Specify 10%	1	0	0	TBD	
Credit 4.1	Recycled Content, Specify 5% PC or 10% PC+PI	1	0	0	TBD	
Credit 4.2	Recycled Content, Specify 10% PC or 20% PC+PI	1	0	0	TBD	
Credit 5.1	Local/Regional Materials, 20% Manufactured Locally	1	0	0	TBD	
Credit 5.2	Locally	1	0	0	TBD	
Credit 6	Rapidly Renewable Materials	1	0	0	#N/A	
Credit 7	Certified Wood	1	0	0	TBD	
<b>Materials &amp; Resources Totals</b>		13	0	0		
<b>Indoor Environmental Quality</b>		<b>Possible</b>	<b>Pending</b>	<b>Documented</b>	<b>Responsible</b>	<b>Team Notes</b>
Prerequisite 1	Minimum IAQ Performance	0	No	Yes	David Brooks	
Prerequisite 2	Environmental Tobacco Smoke (ETS) Control	0	No	No	Ron Kull, AIA	
Credit 1	Carbon Dioxide (CO2) Monitoring	1	1	0	David Brooks	
Credit 2	Increase Ventilation Effectiveness	1	1	0	David Brooks	
Credit 3.1	Construction IAQ Management Plan, During Construction	1	1	0	David Brooks	

**Figure 2: Example LEED Preliminary Project Scorecard (page 2 of 3)**

Credit 3.2	Construction IAQ Management Plan, Before Occupancy	1	0	1	David Brooks	
Credit 4.1	Low-Emitting Materials, Adhesives & Sealants	1	0	1	Eric Essique(MT)	
Credit 4.2	Low-Emitting Materials, Paints	1	0	1	Eric Essique(MT)	
Credit 4.3	Low-Emitting Materials, Carpet	1	0	1	Eric Essique(MT)	
Credit 4.4	Low-Emitting Materials, Composite Wood	1	0	1	Eric Essique(MT)	
Credit 5	Indoor Chemical & Pollutant Source Control	1	0	1	Eric Essique(MT)	
Credit 6.1	Controllability of Systems, Perimeter	1	1	0	David Brooks	
Credit 6.2	Controllability of Systems, Non-Perimeter	1	0	0	David Brooks	
Credit 7.1	Thermal Comfort, Comply with ASHRAE 55-1992	1	1	0	David Brooks	
Credit 7.2	Thermal Comfort, Permanent Monitoring System	1	1	0	David Brooks	
Credit 8.1	Daylight & Views, Daylight 75% of Spaces	1	0	1	Eric Essique(MT)	
Credit 8.2	Daylight & Views, Views for 90% of Spaces	1	0	1	Eric Essique(MT)	
<b>Indoor Environmental Quality Totals</b>		15	6	8		
<b>Innovation &amp; Design Process</b>		<b>Possible</b>	<b>Pending</b>	<b>Documented</b>	<b>Responsible</b>	<b>Team Notes</b>
Credit 1.1	Innovation in Design	1	0	0	Paul Goldsmith	
Credit 1.2	Innovation in Design	1	0	0	Paul Goldsmith	
Credit 1.3	Innovation in Design	1	0	0	Paul Goldsmith	
Credit 1.4	Innovation in Design	1	0	0	Paul Goldsmith	
Credit 2	LEED™ Accredited Professional	1	0	1	Eric Essique(MT)	
<b>Innovation &amp; Design Process Totals</b>		5	0	1		
<b>TOTAL</b>		<b>69</b>	<b>7</b>	<b>15</b>		
				All prerequisites not documented.		
<b>Potential LEED Rating</b>				<b>Uncertified</b>		
Certified: (26 to 32 points)		Silver: (33 to 38 points)		Gold: (39 to 51 points)		Platinum: (> 52 points)
		Audited Passed	Unaudited Passed	Audited Failed	Total Earned Points	Final Rating
<b>USGBC LEED Rating</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

Figure 2: Example LEED Preliminary Project Scorecard (page 3 of 3)

### *Schematic Design Submission Requirements*

The A/E or design consultant's submission at the schematic design phase must address the following:

1. **Space needs:** Update the information submitted in the predesign phase.
2. **Analysis of potential sites:** Update the information submitted in the predesign phase.
3. **Building orientation and shading:** Illustrate the relationships of buildings and outdoor uses to each other and to the site; illustrate the relationship of the solar orientation/exposure and prevailing winds to the buildings and open space.
4. **Energy use:** Provide initial energy modeling results comparing baseline building to current design proposal.

### **Internal Deliverable: Life-Cycle Assessment**

At each design phase, the A/E provides an updated life-cycle assessment (LCA) that addresses all systems and materials being analyzed for life-cycle cost. This deliverable should be in a tabular format and should include all systems and materials put forth as alternatives by the client and/or design team members during predesign activities, including concepts carried through to the conclusion of the sustainable design charrette or kickoff meeting.

The completed table must be capable of summarizing the cost of each recommended system or building material and must break down each cost into the following categories:

- Initial investment (product and installation cost)
- Ongoing operation (including energy use and fuel costs)
- Annual maintenance and repair cost
- Replacement cost at end of system or material's intended life
- Financial incentives anticipated (if applicable)
- Disposal cost at end of system or material's life
- Total life-cycle cost (based on 50-year study period) <sup>3</sup>

Economic performance must be measured using the American Society for Testing and Materials (ASTM) standard life-cycle cost method or an equivalent standardized and science-based life-cycle assessment approach.<sup>4</sup>

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<sup>3</sup> The design team can offer results for different building life spans as long as the 50-year span is provided.

<sup>4</sup> ASTM (1994): Standard Practice for Measuring Life-Cycle Costs of Buildings and Building Systems. ASTM Designation E 917-99, American Society for Testing and Materials (ASTM), West Conshohocken, PA, USA.

At each design phase, the Project Administrator and team members provide the Sustainable Design Committee Chair with design submittals that will demonstrate the project’s sustainable design goals and accomplishments to the USGBC. Besides the LEED scorecard, these items include the LEED tracking sheet and letter templates for each attempted or possible LEED credit.

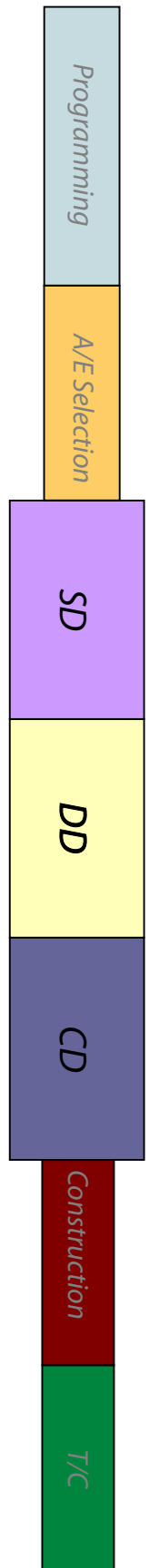
### Internal Deliverable: The Tracking Sheet

The tracking sheet (Figure 3), a separate LEED Excel document, is used by the consultant team throughout design to help the project team and Sustainable Design Committee track progress on each credit. This document acts as a record of decisions made about the strategies used to pursue credits. It is flexible and easily shared among project team members.

Maintaining the tracking sheet allows readers to compare the “anticipated” credits shown on the scorecard with the total number of credits possible. In the “Design Strategy” column, designers enter an explanation of the approach to achieving the “LEED Performance Criteria” for each credit.

### Internal and LEED Deliverables: Letter Templates

The Letter Template Workbook is an Excel file developed by USGBC to help project teams collect, share, and present the information needed to develop complete and accurate certification submittals. This file is the required USGBC submittal, and the tabs within it are interdependent and cannot be modified. The workbook can be downloaded from the USGBC site using UC’s log-in identification. It is formatted to perform some of the calculations necessary for tracking progress.



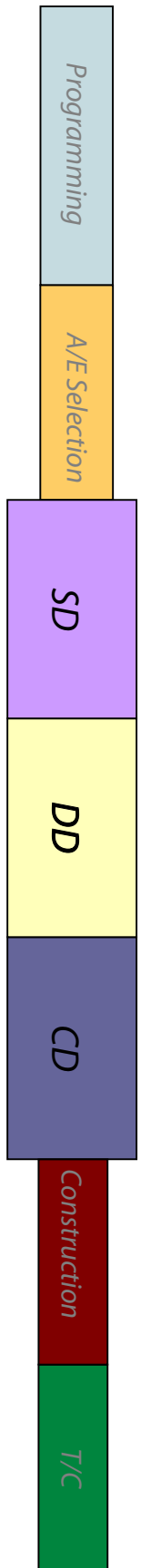
UC MSB Expansion Renovation LEED Building Rating System									
Points		LEED CREDIT ITEM	LEED PERFORMANCE CRITERIA	DESIGN STRATEGY	Responsible Team Member	Draft Template	Completed Template		
CARE	LEED								
<b>SUSTAINABLE SITES(SS)</b>									
NA	NA	Site Prerequisite	CONTROL EROSION TO REDUCE NEGATIVE IMPACTS ON WATER AND AIR QUALITY. Design to a site sediment and erosion control plan that conforms to best management practices in the EPA's Storm Water Management for Construction Activities.	NEED HAMILTON COUNTY EROSION / SEDIMENTATION CONTROL STANDARDS (SUBMITTAL TO SPECIFY EPA OR LOCAL STANDARDS )	HarleyEllis Fred Schwar	Y	Y		
			Design to a site sediment and erosion control plan that conforms to best management practices in the EPA's Storm Water Management for Construction Activities. EPA Document No. EPA-833-R-92-001, Chapter 3, OR local Erosion and Sedimentation control standards and codes, whichever is more stringent. The plan shall <ul style="list-style-type: none"> <li>Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for future use.</li> <li>Prevent sedimentation of storm water or receiving streams and/or air pollution with dust and particulate matter.</li> </ul>	<ul style="list-style-type: none"> <li>Soils compositions of the site to be identified, with potential erosion problem areas identified.</li> <li>Topography to be analyzed, with surface runoff patterns identified.</li> <li>A Site Plan will be developed with proposed solutions for stabilization and structural control of</li> </ul>					
1	1	SS Credit 1 - Site Selection	AVOID DEVELOPMENT OF INAPPROPRIATE SITES AND REDUCE THE ENVIRONMENTAL IMPACT FROM THE LOCATION OF A BUILDING ON A SITE. Do not develop buildings on portions of sites that meet any one of the following criteria : <ul style="list-style-type: none"> <li>Prime agricultural land as defined by the</li> <li>Land whose elevation is lower than 5 feet above the elevation of the 100 year flood as defined</li> <li>Land that provides habitat for any species on the Federal or State threatened or endangered list.</li> <li>Within 100 feet of any wetland as defined by 40 CFR,Parts 230-233 and Part 22,OR as defined</li> <li>Land which prior to acquisition for the project</li> </ul>	<ul style="list-style-type: none"> <li>The site is not Prime agricultural land .</li> <li>NEED FEMA MAP / ELEVATIONS CONFIRM NOT IN FLOOD ZONE</li> <li>The site is not habitat for any Federal or State endangered species.</li> <li>The site is not in proximity to any wetlands.</li> <li>None of the site parcel had been</li> </ul>	HarleyEllis Fred Schwar	Y	Y		

Figure 3: Example Page from Tracking Sheet

The Letter Template Workbook’s structure and worksheets are described below.

<b><u>Tab Name</u></b>	<b><u>Worksheet Contents / Function</u></b>
<b><i>Introduction</i></b>	<ul style="list-style-type: none"> <li>• How to navigate the workbook and respond to prompts</li> <li>• How to present letter template submittals to USGBC</li> <li>• Usability tips (explains macros, view settings, etc.)</li> </ul>
<b><i>The Team</i></b>	<ul style="list-style-type: none"> <li>• Form for entering the functions, names, and contact information for all project team members.</li> </ul>
<b><i>Responsibility</i></b>	<ul style="list-style-type: none"> <li>• Matrix used to assign responsibility for prerequisites and credits to team members.</li> </ul>
<b><i>Credit Summary</i></b>	<ul style="list-style-type: none"> <li>• Worksheet that uses data from the Credit and Prerequisite Letter Template tabs to compile a credit status summary by category.</li> </ul>
<b><i>Project Info</i></b>	<ul style="list-style-type: none"> <li>• Form for entering general project information that can be used in calculations.</li> </ul>
<b><i>Prerequisite Letter Template tabs</i></b>	<ul style="list-style-type: none"> <li>• <b>LEED deliverable.</b> Prerequisites are organized by category (i.e., Sustainable Sites, Water Efficiency, etc.). A Letter Template is provided for each prerequisite.</li> </ul>
<b><i>Credit Letter Template tabs</i></b>	<ul style="list-style-type: none"> <li>• <b>LEED deliverable.</b> Credits are organized by category (i.e., Sustainable Sites, Water Efficiency, etc.). A Letter Template is provided for each credit.</li> </ul>

Example Letter Templates for prerequisites and credits appear on the following pages (Figures 4 and 5).



### MR Prerequisite 1: Storage & Collection of Recyclables

Declaration not made

(Architect, Interior Designer or Responsible Party)

I, \_\_\_\_\_, declare that an easily accessible area of appropriate size has been dedicated to serve the recycling needs of the entire building.

The separation and storage area for recycling will accommodate the following materials (at a minimum):

- paper
- corrugated cardboard
- glass
- plastics
- metals

I have provided the following documentation to support the declaration:

- a plan showing the area(s) dedicated to recycled material collection and storage

**MR Pr 1      Prerequisite NOT Documented**

Name: \_\_\_\_\_

Organization: \_\_\_\_\_

Role in project:

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Figure 4: Example Letter Template for a Prerequisite



### *Design Development Submission Requirements*

For this phase, the A/E or design consultant must update and submit in complete form the design and LEED deliverables provided at the design development phase (including drawings, specifications, life-cycle cost analysis, scorecard, tracking sheet, and letter templates.

The A/E or design consultant's submission at the design development phase must address the following:

1. **Space Needs.** Provide/update the information submitted during schematic design.
2. **Energy Use/Heating, Ventilation, and Air Conditioning Systems:** Provide/update the information submitted during schematic design.
3. **Reduction of Water Pollution and Erosion.**
4. **Site Grading and Drainage Plan.**
5. **Building Orientation and Shading.**
6. **Energy-Efficient Artificial and Natural Lighting.**
7. **Commissioning Plan:** Provide Commissioning Plan that meets guidance.
8. **Collection/Storage of Construction Waste and Recyclables.**
9. **Global Warming and Protecting the Ozone Layer.**
10. **Chemical Storage, Use, and Disposal.**
11. **Air Monitoring.**
12. **Hazardous Materials Abatement and Disposal.** Remove and dispose of hazardous materials in major rehabilitation projects, in accordance with applicable laws.

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**Remember:** Design phase submissions for projects seeking LEED certification must include a statement and supporting data indicating that the design has met sustainable design goals appropriate for the project, plus an updated LEED scorecard, tracking sheet, and applicable letter templates showing specific strategies proposed for each credit point.

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### *Construction Documents Submission Requirements*

For this phase, the A/E or design consultant must update and submit in complete form items 2, 4, 6, 7, 8, 11, and 12 under "Design Development Submission Requirements" above.

## Construction

	Projects Seeking Certification	Projects Not Seeking Certification
<b>Steps</b>	<ul style="list-style-type: none"> <li>• Prepare for commissioning activities</li> <li>• Oversee construction; communicate with contractors and stakeholders</li> <li>• Assemble and maintain binders for LEED submission</li> </ul>	<ul style="list-style-type: none"> <li>• Prepare for commissioning activities</li> <li>• Oversee construction; communicate with contractors and stakeholders</li> </ul>

### *Preparing for Commissioning Activities*

The Project Administrator and/or A/E must ensure that the prime contractors join the Commissioning Team and understand their commissioning obligations at the start of construction. This preparation also includes ensuring that the project's Commissioning Plan and Commissioning Schedule are kept up to date and finalized.

The commissioning team must include the Facilities Management commissioning agent. This commissioning agent must take part in testing and turnover.

### Commissioning Tests

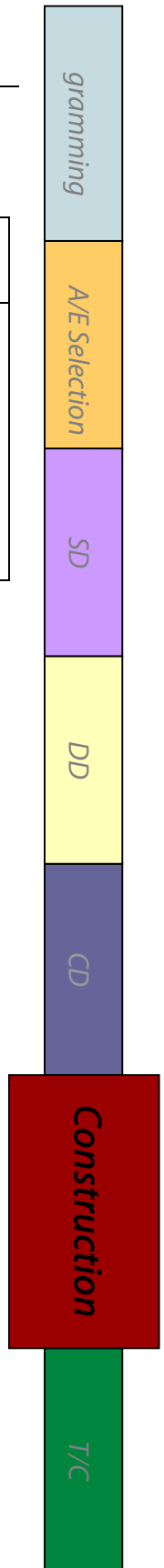
The prefunctional and functional tests conducted as part of the commissioning process ensure that commissioned systems perform as their designs intended. In commissioning, any deficiencies noted in testing must be corrected and retested successfully before the work can be accepted.

In addition, the commissioning report delivered by the project's commissioning agent after acceptance becomes part of the final certification submittal to LEED.

### *Providing Construction Oversight*

Sustainable design requirements during the construction phase include communicating with contractors and stakeholders. With contractors, this includes monitoring progress and discussing sustainable design objectives at every construction progress meeting.

As part of planning for turnover, the Project Administrator should periodically arrange for Facilities Management and other interested stakeholders to observe construction at various stages.



### *Assembling the LEED Certification Submittal*

The LEED documentation prepared during design must be kept current throughout construction, so that it will be ready to submit to USGBC near the end of the project. The A/E and Project Administrator must assemble the application contents in a three-ring binder and/or CD-ROM, organizing the materials according to the [USGBC's instructions](#). Three complete copies will be required (two for the USGBC and one for UC).

The binder must include an overall project narrative; the LEED Project Scorecard (indicating projected prerequisites and credits and the anticipated total score for the project); and a completed LEED letter template for each prerequisite and applicable credit.



## Turnover and Closeout

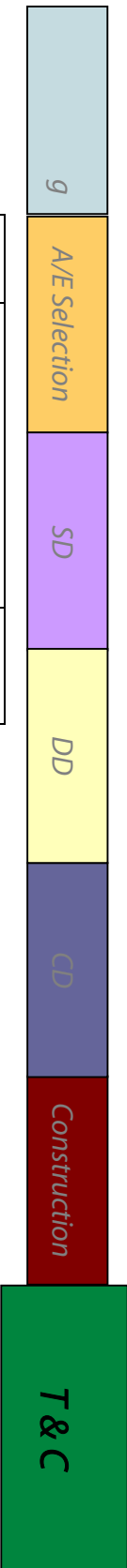
	Projects Seeking Certification	Projects Not Seeking Certification
<b>Steps</b>	<ul style="list-style-type: none"> <li>• Deliver LEED certification submittal to USGBC</li> <li>• Respond to USGBC review comments and questions</li> <li>• Perform commissioning</li> <li>• Conduct post-occupancy evaluation</li> </ul>	<ul style="list-style-type: none"> <li>• Perform commissioning</li> <li>• Conduct post-occupancy evaluation</li> </ul>
<b>Outputs or Deliverables</b>	<ul style="list-style-type: none"> <li>• LEED certification submittal</li> <li>• Commissioning report</li> </ul>	<ul style="list-style-type: none"> <li>• Commissioning report</li> </ul>

Project turnover requirements are detailed in the *Guide to Project Administration* chapter “Project Turnover and Closeout.” In addition to the steps listed above, some of the Project Administrator or A/E’s tasks that relate to sustainable design include the following:

- Ensuring timely completion of punch lists and project record deliverables (and verifying that sustainable design issues are addressed in both)
- Performing the final inspection
- Ensuring that site cleanup conforms to sustainable design practices

### *Delivering the LEED Certification Submittal*

With construction complete, the Project Administrator and SDC Chair should review the LEED certification documentation (assembled into binders and kept current through the construction phase) and submit it to the USGBC. The commissioning report, delivered by the project’s Commissioning Agent after acceptance, should become part of the certification submittal at this time. Remember also to include the application fee (see USGBC’s [fee summary](#) for current fee amounts).



## *Responding to USGBC Reviews*

Once submitted, applications are subject to two separate USGBC review processes. Reviews take 6 to 10 weeks, depending on the completeness of the submittal.

### **Administrative Review**

Within one week of receiving UC's application, USGBC will conduct an administrative review to determine whether the application is complete and meets all submission guidelines. USGBC notifies UC's Sustainable Design Committee Chair of any deficiencies. Once any administrative problems with the application are resolved, USGBC conducts its technical review.

### **Technical Review**

USGBC conducts a technical review of the application within 2 weeks of its administrative approval. From this review, USGBC issues a preliminary report showing credits awarded, credits denied, and credits pending.

Within 30 days of receiving the preliminary report, the University can, if necessary, submit further information to correct or add to the original application data. USGBC reviews any supplementary submittals within 30 days of receipt and issues a final ruling and final credit score.

### **Certification**

If the project achieves a final score of at least 26 points, it becomes a "LEED Certified Building." The University receives a certificate and a plaque showing the project's certification level.

## *Performing Commissioning Tests*

The prefunctional and functional tests conducted as part of the commissioning process ensure that commissioned systems perform as their designs intended. In commissioning, any deficiencies noted in testing must be corrected and retested successfully before the work can be accepted. Commissioning continues for up to 1 year after project completion.

Where commissioning examines systems performance, post-occupancy evaluation (POE) measures occupant comfort and satisfaction.

## *Performing Post-Occupancy Evaluation*

Post-occupancy evaluation (POE) can be an effective final step in the evaluation of designs from all perspectives (including sustainability). Usually conducted about 1 year after occupancy, a POE helps designers determine how well the building meets user needs.



POEs are recommended but not currently required on UC projects. Project teams that wish to pursue post-occupancy evaluation should partner with UC's Sustainable Design Committee.

### POE Scope and Methods

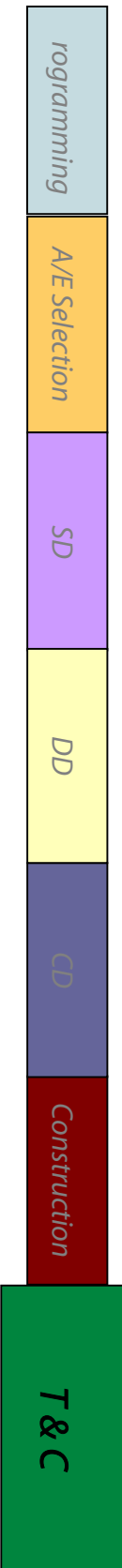
POEs can examine user opinions about the building's lighting, acoustics, privacy, audiovisual systems, office and classroom furnishings, and comfort. They can also focus on performance issues, such as energy and water consumption, that are of special interest to clients and UC Facilities Management.

Information can be gathered through observation, surveys, face-to-face interviews, or any combination of methods.

### POE Benefits

The POE can help measure a project's sustainability performance against its original goals and can be an effective learning tool for future projects. POEs can be especially relevant to sustainable design because they provides a means of evaluating newer design approaches, technologies, or materials. Positive POE results can lend support to the use of new products or technologies.

The Division of the University Architect plans to incorporate post-occupancy evaluation procedures into its project administration process. This section of *Applying Sustainability to UC Projects* will be updated as policy evolves and information becomes available.



## **Appendix: Sustainable Design Resources**

### *External*

The USGBC web site ([www.usgbc.org](http://www.usgbc.org)) is a rich information source for design professionals and others interested in sustainable design. It offers all of the following:

- A comprehensive explanation of the LEED ratings systems
- An introductory PowerPoint presentation on sustainable design
- A nationwide membership list
- Notice of training opportunities
- Profiles of LEED-certified and LEED-registered projects
- A LEED reference guide
- Member support for registration and certification of projects
- The latest information on the scientific and technological aspects of sustainable design

### **Life-Cycle Assessment Resources**

The National Institute for Standards and Technology, with support from the U.S. Environmental Protection Agency, publishes a software tool that uses life-cycle analysis to measure a building's environmental and economic performance. Building for Environmental and Economic Sustainability (BEES) software can be downloaded free of charge at <http://www.bfrl.nist.gov/oae/software/bees.html>.

The Whole Building Design Guide (<http://www.wbdg.org>) offers access to building-related guidance, criteria, and technology, including life-cycle cost analysis.

### *Internal*

The University Architect Division has initiated a sustainable design library. It includes magazines and technical journals containing relevant articles, as well as other resources.

The UC staff resources for sustainable design issues are the Sustainable Design Committee chair and members.

### *Training*

Introductory and follow-up education in sustainable design will be developed for UC design consultants and design professionals as the LEED system evolves.