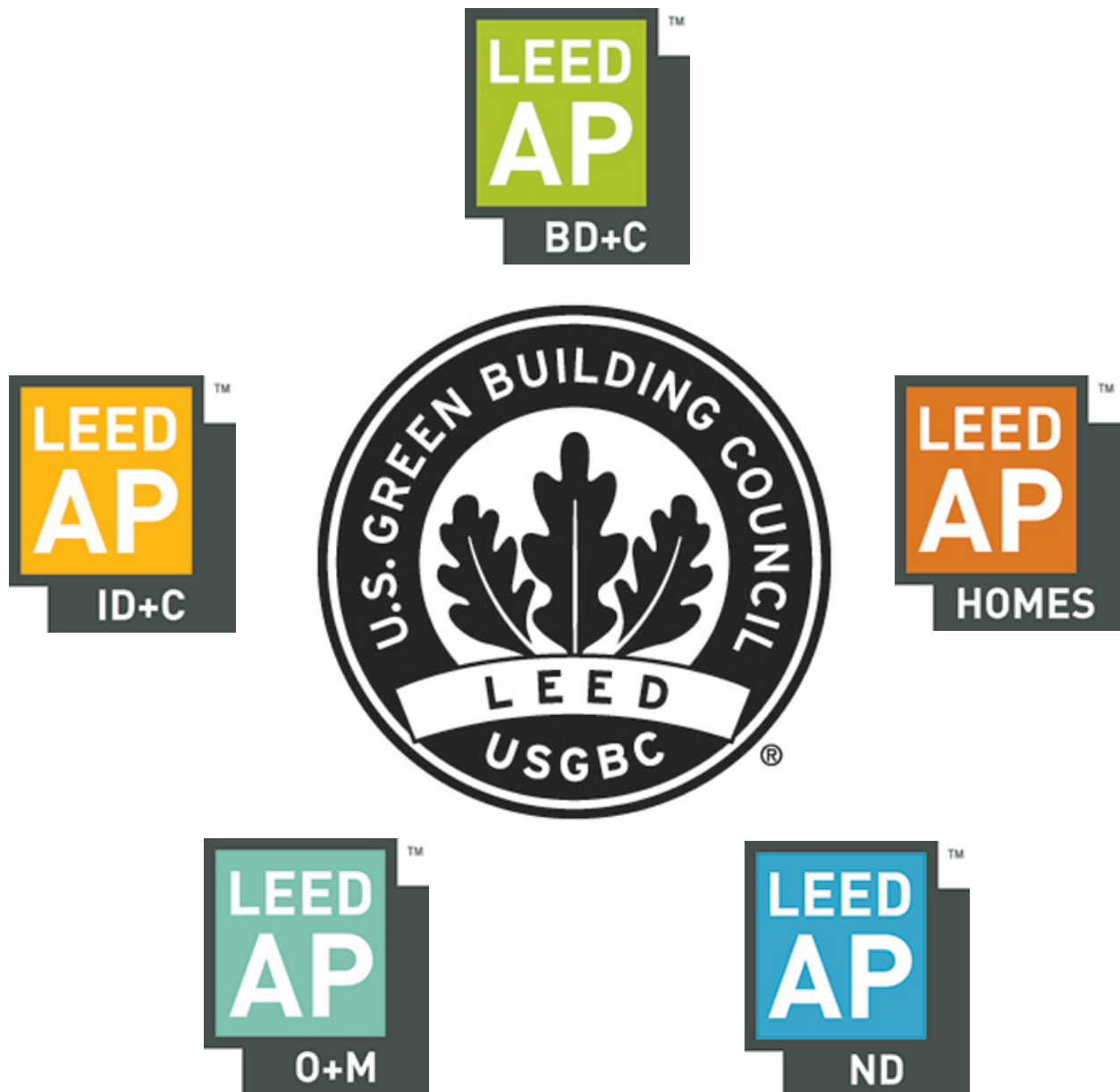


The Landscape Architecture Student's Guide to LEED Accreditation



Spring 2009



THE LANDSCAPE ARCHITECTURE STUDENT'S GUIDE TO LEED ACCREDITATION

by Mark Morris



THE LANDSCAPE ARCHITECTURE STUDENT'S GUIDE TO LEED ACCREDITATION

Table of Contents

Introduction

Ch. 1 History of LEED

Ch. 2 Applying, scheduling and taking exams

Ch. 3 What was 2.2?

Commercial Interiors

New Construction

Sustainable sites

Water Efficiency

Energy and Atmosphere

Materials and Resources

Indoor Environmental Quality

Innovation in Design

Ch. 4 What is 3?

LEED Green Associate

LEED AP

Building Design and Construction

Homes

Interior Design and Construction

Neighborhood Development

Operations and Maintenance

LEED Fellow

Ch. 5 Future

Sustainable Sites Initiative

Earth House

Glossary

Conclusion

Works cited

Intro

When this project began, it was intended to be an introduction to LEED and a study guide for the LEED New construction v. 2.2 exam. In my studies of Landscape architecture at the University of California Davis I had heard mention of LEED and knew it meant sustainable building but I had little idea of what it entailed or how it applied to landscape architecture. I saw this project as an opportunity to not only answer my questions about LEED, but also as a chance to serve my classmates with answers as well. What I knew of LEED was that it included many facets of the building process and my life's experiences have given me an education I know some of my fellow classmates have not had. I sought to use my unique perspective to help give my friends the same knowledge I have which might have helped them gain LEED accreditation.

I say these things in the past tense because a little less than halfway through my research, I came across a little fact that would make my efforts useless. Starting in April of 2009 the Green Building Certification Institute (GBCI) instituted a completely new version of the LEED program, including LEED professional accreditation. After pondering for a while about what to do I decided to answer the new questions I was sure my classmates also had. My new course of action would be to decode this new version and compare it to the old one. Then I realized the same basic questions about the history and intention of LEED still applied. With a new version coming out, these questions would serve as clues to why a change was necessary.

As I looked into the history of LEED, the GBCI and the United States Green Building Council (USGBC) I realized that LEED was but one possible avenue that we must seek for the sustainable future we all want and need. I had heard echoes of a Sustainable Sites Initiative (SSI) that would be designed to certify landscape designs the way LEED certified buildings, but never had a chance to look into it or had it

explained to me. Then one day Fritz Steiner, Head of the University of Texas School of architecture, gave a lecture on what SSI was and it showed me that there are other guidelines available for sustainable design. This is where the last chapter came into play, to bring to light these guides the same way I hoped to explain LEED.

That is the evolution of a project looking to explain a process which itself is still being developed. I hope those who read it will find answers to questions they may have, or even better, raise new questions for which no answer have yet been dreamt of. That is what has always drawn me to this movement, the spirit of asking questions and looking for better answers.

Ch. 1 History of LEED

A program has emerged in the U.S., one which marries elements of building into a national “Green Building” rating system. The Leadership in Energy and Environmental Design (LEED) rating system is not the first green building program in the U.S. but it is the only program with national scope and the only program that has been adopted by many private organizations (Herman Miller, Ford Motor Co., Natural Resources Defense Council) as well as local (Portland OR, Seattle WA, San Jose CA) and federal (GSA, Department of State) government bodies.

History of LEED

The U.S. Green Building Council (USGBC) is a nonprofit organization that was formed in 1993. The USGBC is made up of building industry stakeholders such as architects, building product manufacturers, owners, contractors and environmental groups who are interested in the promotion of green building in the U.S. The USGBC is a committee-based, voluntary, nongovernmental organization. Early council members advocated the development of a system to define green buildings. After researching existing programs and metrics the council decided to develop a custom system for U.S. buildings.

In 1998 the LEED 1.0 pilot program was released. By March 2000, 12 buildings had been certified under the pilot program. During the pilot period extensive revisions were underway and by March 2000 LEED 2.0 was released. LEED is developed by a steering committee of the USGBC, which coordinates input from each of the different LEED programs (LEED for New Construction, LEED for Existing Buildings, LEED Commercial Interiors, LEED Residential, LEED Core and Shell, and LEED Multiple Buildings). Five Technical Advisory Groups (TAGs), one for each impact area of LEED, define program features. The TAGs, made up of “expert” volunteers from the building industry, also resolve program interpretation issues and work on revisions to the program. The LEED steering committee also “directs

technical issues that require expert research and consideration” to a Technical Scientific Advisory Committee.

LEED has experienced exponential growth in the U.S. since the release of LEED 1.0 in 1998. Almost 12,000 people in California alone consider LEED of enough value to take the exam to become a “LEED Accredited Professional”. Regional Chapters have sprung up around the country to facilitate local green building activity and LEED implementation. However only 14 buildings were certified under LEED 1.0, and to date (June 2009) more than 2700 projects have been certified under LEED 2.0, 2.1 and 2.2. Hundreds of buildings complete the certification process every year representing millions of dollars of investment and thousands of hours of time, all with the goal of improving the environmental performance of buildings.

LEED Program Organization

LEED is a voluntary rating program, whose goal is to “evaluate environmental performance from a whole building perspective over a building’s life cycle,”. According to the USGBC, LEED was created for the following reasons–

- Facilitate positive results for the environment, occupant health and financial return
- Define “green” by providing a standard for measurement
- Prevent “greenwashing” (false or exaggerated claims)
- Promote whole-building, integrated design processes

LEED is a credit-based system. Version, 2.2 had 64 credit points while Version 3 has 100. These credits are divided among 5 environmental impact areas –

- Sustainable Sites (SS)
- Water Efficiency (WE)

- Energy and Atmosphere (EA)
- Materials and Resources (MR)
- Indoor Environmental Quality (IEQ)

In addition there were 5 credit points for Innovation and Design Process (ID) activities under v2.2 while there are 6 under v3. New to version 3 is the addition of 4 possible credits for what are deemed Regional priorities out of a total of 6. There are prerequisites in 4 of these areas that every building must meet and several credit options in each area. Many credits have several tiers for increasing performance achievements. In order to earn a LEED certification under v3 a minimum of 40 points must be achieved, up from 26 (in addition to all the prerequisites). A Silver rating is achieved by earning between 50 and 59 points (v2.2: 33 and 38 points), Gold between 60-79 (v2.2: 39-51) and Platinum between 80-100 (v2.2: 52-69).

Every credit consists of a description of intent, requirements and documentation submittals. In many cases there is a referenced standard and credit calculation procedures. Credit requirements are accompanied by descriptive information about economic, environmental and community issues related to the credit. In many cases, examples and additional resources are also listed. The LEED process consists of registering a building project and then fulfilling the credit requirements and submitting the required documentation. Additional costs for the LEED certification process can run into the tens of thousands of dollars.

Clearly LEED has been a success as a tool for marketing green building and as a stimulant for policy change. The USGBC is committed to being an independent third-party for validation of green buildings. To this objective the USGBC created the Green Building Certification Institute (GBCI) in January 2008. Created to regulate the certification of buildings, the GBCI has taken the reigns of the green building movement.

Ch. 2 Applying, scheduling and taking exams

Before diving into the technicalities of the exam some general knowledge should be gained first. While previously LEED certification and accreditation were controlled by the USGBC, they are now handled by the GBCI. Introduced in the beginning of 2008, GBCI was created to be an independent third party who could oversee the green building process.

Another new fold in the process is the number of allowed failed tests one may have. While previously applicants could take exams as often as desired, Version 3 does not allow this. An applicant is allowed three exams in one full calendar year from the date their application is approved. Should an applicant fail to pass their exam in the year provided, or simply allow the year to pass, they are subject to a 90 day waiting period and must resubmit a new application.

Another key idea to understand is that the GBCI does not administer the exam themselves. Instead they employ a third party testing agency named Prometric to schedule and administer the exam. More about Prometric will be discussed later in the chapter.

APPLYING

The first step in applying for an exam is by creating an online account with the GBCI. Called a “my credentials account”, the online profile is a permanent way to track progress throughout ones career and provides access to online study materials. When the account is opened, one can choose whether they wish to be listed in the GBCI's national register of accredited professionals.

The next step in the process is new to version 3. In an effort to reduce the number of applicants who have no experience in the field of green building, applicants now must upload a letter stating their experience with green building. This letter must be written by a supervisor, client, or teacher and must describe personal involvement on the job or in the classroom. The letter, with a maximum of 750 words, must be dated, signed and on letterhead or provide other evidence of its authenticity.

The next step for continuing students taking the Green associate exam is to request student pricing. Student pricing provides the same discount (\$50) as being a USGBC member which lowers the total to \$150. However it is only available for the Green associate exam and if student pricing is not requested the fee is \$200. An alternate method is to take both the green associate and a specialty exam at the same time. This method does not allow a student discount, yet if the applicant's employer is a USGBC member, the total is \$300 for both exams. If one does not have access to a USGBC member number the fee is \$450 for both, or \$250 for a specialty exam.

Next is the option to select special testing accommodations for disabilities. In accordance with ADA, special testing accommodations are available based on the nature of the disability. Forms can be found at www.gbci.org/DisplayPage.aspx?CMSPageID=120, and must be filled out and submitted to the GBCI. The information needed include the nature of the disability, name of tests used to evaluate the condition, length of the condition, date you were last seen by health care provider, and the specific suggested accommodation(s). There is no additional charge for special accommodations.

Once this is completed one should review their application. If so desired it can be left incomplete and it will be saved under one's profile, however it will not be processed until it has been submitted. Upon submission the applicant will have to enter a debit or credit card number to pay for the \$50 non-refundable application fee. For the specialty exams the application fee is \$100. Within seven days of application completion, the applicant will be notified of approval or a request for more information will be sent. If an application is denied the applicant must wait 90 days before re-applying and must submit another application fee.

SCHEDULING

Once an applicant has setup their online profile and had their application approved, a test must be scheduled. To schedule an exam one must visit the Prometric website at www.prometric.com/gbci. The applicant must then enter their eligibility ID which should be received after their application has been approved. Once logged in with Prometric, the applicant will have to pick a Prometric testing site near

them and the date they wish to test. The suggested lead time for scheduling an exam is two months. While this may seem long, there is a \$30 fee for any change in site or date within 30 days of the original chosen date. Once an exam has been scheduled, the applicant will receive a verification number from Prometric. This number will be different from the GBCI application number and must be used for any changes in date or site with Prometric.

An applicant can seek an excused absence based on an emergency situation but must contact Prometric's candidate care within 10 days of the original examination date. Prometric requires a fax documenting the emergency in order to excuse the absence. Inclement weather is not acceptable as an excused absence unless the test center was closed. If, on the day of an exam, one is unable to attend the examination scheduled, they may be excused and be allowed to retest without charge for the following reasons: Documented illness, either you or immediate family member, Death in the immediate family, Disabling traffic accident, Court appearance or jury duty, and Military duty.

TEST DAY

As one may expect by this point Prometric does not offer much leeway anywhere. This is also the case on test day. On the day of an exam, the test subject must present identification that bears a picture and a signature. This can be on the same ID (such as a passport, driver's license, or military ID) or on two separate forms (such as a check or credit card and an employee or student ID). The name on this ID has to match the name submitted to Prometric within a very small range of error. Differences accepted are missing or added initials and maiden or hyphenated names, while differences not accepted include initials instead of names, different first or last names, and misspellings. This ID must be presented each time the subject enters and exits the room. If the exam subject does not have acceptable ID with them before the test starts, they are not allowed to take the exam and forfeit the full exam fee.

It is recommended that you arrive at the test center at least 30 minutes prior to your scheduled exam appointment to get settled, check in, and begin the tutorial. Candidates who arrive at test site after

their scheduled exam times will lose their reservations and are considered to have failed the exam and forfeit the exam fee. Rarely the exam does not start within the suggested 30 minutes, and in these cases the exam subject is given the choice of waiting or rescheduling. Once called, the subject is escorted to a computer station. If at any time the subject experiences problems or needs a break, they must raise their hand until a staff member.

Nothing may be brought into the exam room. Lockers are provided for subjects to secure purses, wallets, keys, cellular telephones, pagers, etc. Lockers are not large enough to fit briefcases, laptops or large purses and bags. No papers, books, food, beverages, bags (including purses), or electronic devices • (including calculators) are allowed in the exam room. Scratch paper and pencils are provided by the test site staff and collected at the conclusion of the exam. The subject is not allowed to leave without proctor's permission. If the subject leaves the building before the exam is completed, the exam is considered a fail and the exam fee is forfeited.

Ch. 3 LEED v2.2

As mentioned previously, in LEED v2.2 for new construction and major renovations for commercial buildings there were 69 possible points and buildings could qualify for four levels of certification: certified (26-32 points), silver (33-38 points), gold (39-51) points and platinum (52-69 points). These point totals were achieved by compiling points from the five categories of Sustainable sites, Water efficiency, Energy and atmosphere, Materials and resources, and Indoor environmental quality. For some categories there were prerequisites which had to be met for any points to be awarded. For the most part these have stayed the same for version 3, but it should be studied separately to ensure nothing is missed

SUSTAINABLE SITES (14 points total)

Comprising more than 20 percent of the points possible, sustainable sites is the category which has the most resemblance to landscape architecture. This category has the greatest effect on how the building is actually built and connects with surrounding areas. This is most apparent in the mandatory Construction Activity Pollution Prevention Plan, which is designed to prevent contamination from materials included in the construction process.

The majority of points in this area are obtained through measures of promoting Alternative transportation (through mass transit, biking, carpooling and clean fuels), Reducing impact to open space, and managing storm water (both how much runoff there is and how it is treated), and reducing the heat island effect both on and off the roof. The remainder of the

available points comes from ideas like increasing density and community, redevelopment of brownfields and reducing light pollution (the amount of light wasted by going off into space).

WATER EFFICIENCY (5 points total)

Totaling a less than impressive 7 percent of the points available, water efficiency also has to do with landscape. Four of the five points available are achieved by reducing the amount of water used, including up to 30% of the overall water use and up to 100% of the landscaping irrigation (meaning no potable water is used). The remaining credit is achieved through the reduction of either potable or waste water in a term called innovative wastewater technologies.

ENERGY AND ATMOSPHERE (17 points total)

Having less to do with landscape architecture and more to do with, energy and atmosphere contributes almost a quarter of the points possible. To garner any points from this category though a project must pass three prerequisites. The first is the formation of a commissioning authority to oversee that the project's energy systems perform as designed. The second is a minimal level of energy efficiency for the building's system as defined by the American Society of Heating, Refrigerating, and Air-Conditioning Engineers and the Department of Energy (ASHRAE). The third prerequisite is to reduce ozone depletion through zero use and replacement of chlorofluorocarbon (CFC) based refrigerants.

Should a project complete these prerequisites, it can earn up to ten points for the first credit alone. The optimizing energy performance credit uses the ASHRAE standard '90.1-2004' (which includes factors from heating, ventilation, air conditioning [HVAC], power usage,

lighting and water) as a baseline for which a new building can earn a first credit for a 10.5% improvement with an available point

Should a project complete these prerequisites, it can earn up to ten points for the first credit alone. The optimizing energy performance credit uses the ASHRAE standard '90.1-2004' (which includes factors from heating, ventilation, air conditioning [HVAC], power usage lighting, and water) as a baseline for which a new building can earn a first point for a 10.5% improvement with an additional point available for each 3.5% improvement up to a total of ten points. The other seven points in the category are for using on-site renewable energy (1-3 points), including the commissioning authority in the building design phase (1), zero use of refrigerants (1), ongoing energy accountability (1), and purchasing power from renewable sources(1).

MATERIALS AND RESOURCES (13 points total)

Comprised wholly from what materials are used, this category has the possibility for high landscape architect involvement, however that depends on the Architect and Contractor. The prerequisite of this category is that recyclables (including glass, paper, metal, plastic, and cardboard) be collected and stored in an effort to reduce waste.

The majority of points available come from reuse of materials, including building structure (1-2), construction waste (1-2), and existing materials (1-2). Using recycled content can earn up to 2 points as will using local materials. The remaining points are for using rapidly renewable materials and certifying that 50% of the project's wood is harvested from environmentally friendly practices.

INDOOR ENVIRONMENTAL QUALITY (15 points total)

This category has almost nothing to do with landscape architecture and as such should be studied the most. Comprising more than 20% of available points, a project would have to get almost every other

point to gain a platinum rating without any points from this category. The prerequisites for this is to meet the minimum standards for the ventilation sections of ASHRAE 90.1-2004 and to prohibit smoking except in designated areas to contribute to the well being of the occupants.

A majority of points in this category (10) pertain to occupant comfort. There are points for providing ventilation monitoring (1), increased outdoor ventilation (1), reduction of volatile organic compounds (4), individual control of lighting and thermostat (2), Long term thermal comfort surveys (2), and creating daylight and outdoor views (2). The remaining three credits come from reducing indoor air quality problems during the construction process and by creating entryways designed to control the amount of particulates and pollutants that penetrate into the building.

INNOVATION AND DESIGN PROCESS (5 points total)

The innovation and design category is the wild card in the certification process. As such there is no way to quantify how much landscape architecture plays. This category gives up to four points for ideas put in practice which further the green building movement. To qualify, the idea has to be reproducible on other projects and if significant evidence is shown as to how and why the idea furthers an existing LEED credit it will be evaluated by the GCBI.

The remaining point is given if a LEED accredited professional is part of the design team. The main goal of this credit is to educate the project members and to streamline the certification process. This is one of the easiest points to obtain and as such increases the desirability by employers for LEED accredited professionals.

CH. 4: LEED v3

The new third version of LEED launched in April of 2009 and will take through the end of 2009 and into 2010 to be completely brought online. LEED v3 is a completely new system with new certifications and new accreditations. As outlined in the previous chapter, a person wishing to become a LEED AP simply had to apply study and take one exam and if passed, they could call themselves a LEED AP. The new system has much more infrastructure, including new certifications and a whole new system to become a LEED AP.

Under the new system, not only buildings can become LEED certified. Yet as of May 15, 2009, only three of the five new certification manuals have been released to the public, all of which pertain to buildings. Under the heading of Building Design and Construction are certifications for New Construction, Core and Shell, Schools, Healthcare, and Retail. Included in Green Interior Design and Construction are both Commercial and Retail Interiors while Existing Buildings and Existing Schools fell under the Green Operations and Maintenance heading. The two guides yet to be released are for homes and neighborhood development.

REGIONAL PRIORITY CREDITS

In addition to the new headings, LEED v3 has new regional priority credits. Regional Priority Credits (or RPC's) are specially designed by zip code to emphasize areas of the design process determined to be of greater impact in energy efficiency. RPC's work by crediting a project an extra point for achieving one of six existing credits designated to be of higher importance. The maximum RPC's any project can earn is four and they do not apply to projects certified or applied for certification before the implementation of LEED 2009. As one may suspect, in California the RPC's focus mainly on sustainable sites and water efficiency, with every zip code in California qualifying for the RPC for using reclaimed

water in landscape irrigation. Problems may form in cities which occupy more than one zip code and may have different RPC's for each different zip code.

PROFESSIONAL ACCREDITATION

That being all good and well, you are probably reading this because you are interested in becoming a LEED Accredited Professional. The sad news for you my friend is that under this new system it is harder, more expensive and takes more time. Under earlier forms of LEED, accreditation was a one exam process yet under the new system it can be up to a three exam process.

GREEN ASSOCIATE

The first step in the ladder of infrastructure is the newly introduced title of LEED Green Associate. Touted as being “for professionals who want to demonstrate green building expertise in non-technical fields of practice”, the Green Associate title appears to be more of a ‘weeding out’ process, but appearances can be deceiving. To pass the green associate exam one must process knowledge of a wide array of topics. These topics include: LEED Application process; Site factors; Water management; Project systems and energy impacts; Acquisition, installations and management of project materials; Stakeholder involvement in innovation; and Project surroundings and public outreach. Each of these sections has within it two to three subsections with the exception of the application process which has more than fifteen. Despite the introductory level of Green associate, the process for registering is still the same and still carries with it a lofty price of \$ 200 with a \$50 discount for USGBC members and students enrolled in full time classes.

The advanced knowledge one must master to become a green associate in combination with it being a prerequisite for any further aspiration of LEED accreditation make this exam a wise choice for anyone looking to move forward in the “green” building industries.

BUILDING DESIGN AND CONSTRUCTION

The LEED credential which will most resemble the new construction and commercial interiors from the previous version will be the Building Design and Construction credential. The handbook for this credential will not be released until the summer of 2009, however it has been said that it will be very similar to the 2.2 version which consisted of six categories. These categories are: Sustainable sites, Water efficiency, Energy & atmosphere, Materials and resources, Indoor environmental air quality, and Innovation in design. These categories are outlined in chapter two however this was for v2.2. The handbook published by the GBCI should be consulted for any changes in v3.

INTERIOR DESIGN AND CONSTRUCTION

Interior Design and Construction is for professionals who conduct business in designing and constructing commercial interior spaces and oversee major improvements. Under these guidelines interiors can be designed to be healthier workplaces, cost less to operate and maintain, and are environmentally responsible. This concentration is best suited for individuals who like interior design and has little to do overall with landscape architecture.

GREEN OPERATIONS AND MAINTENANCE

Green Operations and Maintenance is for professionals involved in the running and management of buildings and facilities. Through control of where and how materials and energy are acquired, used and disposed of, a building which was not designed to be energy efficient can be ran more sustainably. This concentration partially touches on the practices of landscape architecture and would appeal to those looking to do more hands on work in an industry rather than design based.

HOMES

The LEED AP Homes concentration is similar to the New Construction and design concentration with differences in a few key areas. The homes concentration focuses more on community development, energy use, indoor air quality, and public outreach. These factors can provide better options for transportation, healthier places to live, and reduction of some of the worst energy wasting parts of a home. This concentration has some similarities to landscape architecture and is best suited for someone looking to work individually with owners and designers rather than with large clients and firms.

NEIGHBORHOOD DEVELOPMENT

The most anticipated and cloudy concentration in version 3 is Neighborhood development. It is described as being for professionals who participate in design and development of neighborhoods that meet high levels of environmentally responsible, sustainable design. Very few details are available at this time, yet this concentration appears to have a high degree of compatibility with landscape architecture and is for those interested in community development and developing.

LEED AP FELLOW

Also new for v3 is the position on LEED AP Fellow. Still under development, a fellow would be someone whose experience and work has led to new and innovative ideas and the spread of green building techniques. Although unfinished, qualifications for fellow are thought to be a minimum of ten years experience and a minimum of five projects.

CH. 5: The Future

With a new version of LEED still in the process of taking effect, one may wonder what else the future may hold. A promising thing on the horizon is the Sustainable Sites initiative. Known simply as SSI, the Sustainable sites initiative is designed to give landscape architects and designers tools to design more sustainably. Thought to be a future part of LEED, SSI is a partnership between the American society of Landscape architects, The Lady Bird Johnson Wildflower Center at The University of Texas at Austin and the United States Botanic Garden. It was:

“Created to promote sustainable land development and management practices that can apply to sites with and without buildings including, but not limited to the following:

- Open spaces such as local, state and national parks, conservation easements and buffer zones and transportation rights-of-way.
- Sites with buildings including industrial, retail and office parks, military complexes, airports, botanical gardens, streetscapes and plazas, residential and commercial developments and public and private campuses.”

SSI focuses on five keys of landscape design: Hydrology, Soils, Vegetation, Materials and Human health and Well being. When asked, SSI Executive committee member Fritz Steiner stated there may be a future category regarding innovation in design similar to the 2.2 version of LEED.

To better understand how SSI is designed to work, one must see examples of how each individual category is designed to be implemented. The following are examples given on sustainablesites.org

Hydrology:

- Protect and restore existing hydrologic functions. Avoid development and disturbance near streams and wetlands, and in sites with high risk of flooding.
- Manage and clean water on-site. Design a site to capture, slow, and treat stormwater runoff by reducing impervious surfaces, harvesting rainwater, and directing remaining stormwater runoff to soil- and vegetation-based water treatment methods, such as vegetated bioretention facilities, rain gardens, wetlands, green roofs, and bioswales. Maintain and restore vegetation to ensure water can percolate into the soil or groundwater.
- Design stormwater features to be accessible to site users. Integrate multifunctional stormwater management features into site design to improve both water quality and aesthetics.
- Design the site to minimize or eliminate use of potable water for irrigation. Use native and appropriate non-native vegetation adapted to site conditions, climate, and design intent.

Soil sustainability:

- Preserve and protect healthy soils by mapping out areas where soil is healthy and where it has been disturbed by previous land uses.
- Using plant trimmings as compost to nourish soils therefore reducing waste during maintenance by recovering yard trimmings for compost and mulch.
- Improving health of degraded soils by restoring soil function in areas of previously disturbed soils

Vegetation

- Protect and use existing vegetation. Select sites that do not include habitat for threatened or endangered species. Design the site to minimize disruption to existing habitats.
- Use vegetation that promotes a regional identity and a sense of place. Use native and appropriate non-native plants adapted to site conditions, climate, and design intent to support biodiversity, reduced pesticide use, and water conservation.
- Use vegetation to lower energy consumption. To reduce energy consumption and costs associated with indoor energy needs, place vegetation or vegetated structures in strategic locations around buildings.
- Manage landscapes effectively to reduce potential damage. Control and remove invasive species to limit damage to local ecosystems.

Materials

- Use existing materials. Before purchasing new materials, look for structures, hardscape, infrastructure, and other landscape amenities that can be reused, including existing on-site elements or those salvaged from off-site.
- Purchase local and sustainably-produced plants and materials. Research options for plants and materials before buying. Select plants and products from companies that are striving to use sustainable practices, such as energy and water efficiency.
- Consider the full life cycle of materials. Consider the environmental and health effects of a product, from the raw material extraction phase all the way through the end of the product life.
- Work towards zero net waste. During construction and demolition, look for materials that can be reused or recycled, both on-site and at other nearby sites.
- Reduce urban heat island effect. Use vegetation and reflective materials to reduce heat islands and minimize effects on microclimate and on human and wildlife habitat.

Human health and Well being

- Make the site user-friendly. People are more likely to use sites that are easily accessible and safe. Think about ways to make users feel safe by improving visibility, showing signs of human care and maintenance, and making it easy for users to orient themselves.
- Focus on natural views. Locate building windows and seating areas in front of beautiful views like large trees and water features, including those used for stormwater management.
- Educate site users and keep culture and history alive. Highlight sustainable components and practices on the site with educational, interpretive, and interactive elements.
- Provide spaces for mental restoration, social interaction, and physical activity. Make the site comfortable by including elements like wind breaks, shading, appropriate lighting, and movable furniture. Draw people to the area with features like game tables, dining areas, art, and a wireless internet connection.

With these types of examples it is easy to see how a landscape architect could have more impact using the principles of SSI than LEED. Should SSI become adopted into a future version of LEED it would certainly go a long way toward educating more of the public of the opportunities for energy conservation in Landscape and the skills possessed by landscape architects.