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LEED[®] and CCA:
Construction Phase Submittal Best Practices

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I. Introduction

Since its release by the United States Green Building Council in 2000, the Leadership in Energy and Environmental Design (LEED[®]) Certification System has grown from being understood by few architects, and fewer owners, to being a globally recognized approach for evaluating the sustainable design features of constructed projects. As of August 2011, over 8,000 projects have achieved some level of LEED certification, with another 23,000 registered but not yet certified. Using statistics published by the USGBC in 2009, the value of green building construction is approximately \$60 billion. By 2009, 82% of American corporations were “greening” some part of their real estate holdings; that percentage is undoubtedly higher now.

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With all this green design and construction going on, does that mean that all U.S. architects fully understand the LEED certification system and have hands-on experience seeing a LEED-certified project through construction? Not necessarily. There are between 100,000 and 120,000 licensed architects in the U.S. When you include at least as many unlicensed architectural interns, that adds up to around 200,000 to 250,000 architectural professionals working on 31,000 LEED-certified or -registered projects. That alone suggests that many architects do not have direct experience with getting a project certified during construction, and probably couldn't fully explain the process to an owner or contractor.

What many architects need is a simple description of what it takes to turn a LEED-registered project into a LEED-certified one. With this paper, we hope to fill that need.

Let's address some LEED basics: First, what's the difference between a LEED-registered project and a LEED-certified one? Any project can be registered for a nominal fee. Registration gives the design team access to a wide variety of tools provided by the USGBC. These tools allow the design team to make realistic sustainability goals, and to evaluate the project's design to see if it's meeting those goals. For a project to be LEED certified, the project team must demonstrate to the USGBC, through design documents and construction records, that the requirements of the LEED program have been met. This is a rigorous effort for all parties—owners, designers, and builders.

Second, while the USGBC developed, maintains, and periodically updates the LEED rating system, it is another organization, the Green Building Certification Institute (GBCI), that actually evaluates projects for certification and professionals for accreditation.

Third, when the LEED rating system was rolled out, it was suited mostly for New Construction (now Building Design + Construction (BD+C)) projects. Since then, other versions have been introduced, including Interior Design + Construction (ID+C), Core and Shell (CS), Healthcare (HC), Schools, and Homes. This paper will primarily discuss LEED-BD+C, but the principles apply to the others.

Fourth, with the most recent version of LEED for Building Design + Construction (LEED BD+C version 3.0), there are a total of 110 possible LEED credit points in seven categories: Sustainable Sites (SS) (26 points), Water Efficiency (WE) (10 points), Energy & Atmosphere (EA) (35 points), Materials & Resources (MR) (14 points), Indoor Environmental Quality (EQ) (15 points), Innovation & Design Process (IP) (6 points), and Regional Priority Credits (RP) (4 points). The level of certification depends on the number of points GBCI accepts at the end of construction. The lowest level—Certified—requires a minimum of 40 points. The

higher levels—Silver, Gold, and Platinum—require, respectively, 50, 60, and 80 points. In addition, there are eight prerequisite points that all projects must attain for any level of LEED certification.

And last, as mentioned above, the USGBC continually evaluates the LEED rating system and periodically revises it to more effectively rate sustainable design and construction. The most recent proposed update is currently under review and is anticipated to be released before mid-2012.

II. Construction Phase Credits

Of those 110 points and eight prerequisites, only 19 points and one prerequisite depend on construction activities for USGBC approval. The other credits are determined by the selection of site and materials, the design of building systems, and the building configuration, and are therefore addressed as Design Phase Credits. These Design Phase Credits are usually submitted to GBCI at the end of design, but may be submitted directly after bid acceptance if any bid alternates affect LEED credits. GBCI will review all the submitted Design Phase Credits and categorize them as “anticipated,” “pending,” or “denied.” (“Anticipated” means that, based on the design documentation, the credit is expected to be achieved, “pending” that there are comments or corrections the design team needs to address for GBCI’s re-evaluation, and “denied” that the design documentation does not show the credit can be achieved.)

Because Design Phase Credits are based on calculated or predicted building performance, credits that are categorized as “anticipated” are not re-evaluated, either at the end of construction or after the building has been occupied. Therefore, once a Design Phase Credit has been categorized as “anticipated,” it is considered closed. For example, if at the end of the design phases, GBCI accepts the submitted calculations showing the building will use 20% less potable water, then the Water Use Reduction credit will be awarded; that credit is not contingent on actual post-occupancy water usage. (As one of its Minimum Program Requirements, the USGBC now requires that owners of certified buildings submit actual building performance records during the first five years of occupancy. However, this is to track how the performance of buildings compares to their predicted performance; USGBC won’t take away or reduce certification if the actual performance doesn’t meet the design predictions.)

These 19 Construction Phase Credits and one prerequisite require some level of documentation during the construction phase:

SS Prerequisite 1: Construction Activity Pollution Prevention

- EA Credit 5: Measurement & Verification (counts for as many as 3 points)
- MR Credit 2.1: Construction Waste Management, Divert 50% from Disposal
- MR Credit 2.2: Construction Waste Management, Divert 75% from Disposal
- MR Credit 3.1: Materials Reuse, 5%
- MR Credit 3.2: Materials Reuse, 10%
- MR Credit 4.1: Recycled Content, 10%
- MR Credit 4.2: Recycled Content, 20%
- MR Credit 5.1: Regional Materials, 10% Extracted, Processed & Manufactured Regionally
- MR Credit 5.2: Regional Materials, 20% Extracted, Processed & Manufactured Regionally
- MR Credit 7: Certified Wood
- EQ Credit 3.1: Construction IAQ Management Plan, During Construction
- EQ Credit 3.2: Construction IAQ Management Plan, Before Occupancy
- EQ Credit 4.1: Low-Emitting Materials, Adhesives & Sealants
- EQ Credit 4.2: Low-Emitting Materials, Paints & Coatings
- EQ Credit 4.3: Low-Emitting Materials, Flooring Systems
- EQ Credit 4.4: Low-Emitting Materials, Composite Wood & Agrifiber Products

Since these are the only credits that are likely to be audited by GBCI after the completion of construction, it is essential for you to understand the documentation requirements for each, and who—architect, owner, or contractor—is responsible for achieving and verifying each credit. Additionally, while ID Credits may be achievable through exemplary performance in any of the above Construction Phase Credit categories (e.g., achieving 30% Recycled Content instead of 20%), the documentation remains the same.

SS Prerequisite 1: Construction Activity Pollution Prevention

This prerequisite must be completed and approved by GBCI for the project to be considered for certification. To satisfy this prerequisite, the contractor must submit

a sediment and erosion control plan that complies with EPA recommendations or local requirements, whichever is more stringent.

Required submittals: Sediment and erosion control plan

EA Credit 5: Measurement & Verification

A measurement and verification plan, measuring the building's performance for at least a year after occupancy, is required to meet this credit. This plan is developed by the design team, but the execution of the plan can be by either the contractor or an independent testing and inspection agency. If your specifications require that the contractor is responsible, then an implementation plan needs to be submitted for your review.

Required submittals: Measurement and verification plan, and product data and wiring diagrams for sensors and data collection system providing continuous metering of building energy consumption.

MR Credits 2.1 and 2.2: Construction Waste Management

To satisfy the requirements of one or both of these credits, at least 10% or 20% of the nonhazardous construction and demolition waste must be salvaged or recycled, rather than dumped in a landfill or incinerated. This percentage is measured by weight or volume. (The project team can choose either weight or volume. This choice should be made at the beginning of the construction process and tracked consistently; once the proposed credits are submitted at the end of construction, the choice can't be changed.)

Required submittals: Waste Management Plan; Waste Reduction Progress Reports; waste reduction calculations; records of donations or sales for salvaged materials; recycling and processing facility records; landfill and incineration disposal records; and a LEED credit form for Credit MR 2, signed by the contractor, tabulating the total waste material generated by demolition and construction, and the quantity of material diverted and where it was diverted to.

MR Credits 3.1 and 3.2: Materials Reuse

To get these credits, a minimum percentage (5% or 10%) of the construction materials must consist of salvaged, refurbished, or reused materials. Certain kinds of materials, such as those used in mechanical, electrical, and plumbing systems, and in elevators, are excluded from this calculation. The documentation must list the dollar value of all the construction materials (without the excepted ones) and the value of all the reused materials.

Required submittals: Receipts for salvaged and refurbished materials used in the project identifying the sources and costs for those materials, and a LEED credit form for Credit MR 3, signed by the contractor, tabulating the total reused materials in comparison to total materials.

MR Credits 4.1 and 4.2: Recycled Content

To obtain one or both of these credits, either 10% or 20% of the building materials must satisfy the recycled content requirements. This is measured based on the weight (then converted to cost) of the materials. This requirement can be met in one of two ways: 10% or 20% of the total building materials can be of recycled content, or certain products can have specified recycled content percentages that will add up to 10% or 20% overall. In either case, a detailed chart of the value of all building materials in the project, and the value of the materials with recycled content, must be kept up to date. Responsibility for meeting this credit is shared by the design team, who specify the materials, and the contractor, who assembles the data verifying that the supplied products meet the specified criteria.

Required submittals: Product data and certification letters from product manufacturers showing the percentages by weight of post- and pre-consumer recycled content and a LEED letter template for Credit MR 4, signed by the contractor, tabulating the total recycled materials in comparison to total materials.

MR Credits 5.1 and 5.2: Regional Materials

This credit requires that either 10% or 20% of the building materials be extracted, harvested or recovered, and manufactured within 500 miles, as the crow flies, from the project site. The percentages are measured by cost, and exclude mechanical, plumbing, electrical, and elevator components. Most of the responsibility for meeting this credit lies with the design team, who specified the materials. The contractor's role is to verify that the supplied products meet the specified criteria. In cases where "or equal" products are allowed, the specifications should be written so that only regional products are considered "equal."

Required submittals: Product data for regional materials indicating the location of the product's manufacturing plant, and the point of extraction, harvesting, or recovery for each raw material. The submittal must include a statement identifying the cost of each regional material and the fraction of that material that is considered regional. Also required is a LEED credit form for Credit MR 5, signed by the contractor, tabulating the total regional materials in comparison to total materials.

MR Credit 7: Certified Wood

Forest Stewardship Council (FSC)-accredited certified wood must make up at least 50% of the wood-based materials and products on the project. This percentage is measured by cost.

Required submittals: Product data and chain-of-custody certificates for products containing certified wood, along with a statement identifying the cost of each certified wood product and a LEED credit form for Credit MR 7, signed by the contractor, tabulating the total cost of certified wood materials in comparison to total wood materials.

EQ Credit 3.1: Construction IAQ Management Plan, During Construction

The contractor must develop and implement an Indoor Air Quality (IAQ) plan during the construction period.

Required submittals: Construction IAQ management plan, product data for temporary filters, product data for filters used during occupancy, and photographs (identified in the plan) shot at three different times during construction demonstrating implementation of the IAQ plan.

EQ Credit 3.2: Construction IAQ Management Plan, Before Occupancy

To meet this requirement, a building-air flush-out of the building's air handling system must be performed to demonstrate that IAQ criteria are being met. The specifications can require that this be performed by either the contractor or an independent testing agency.

Required submittals: Signed statement describing the building-air flush-out procedures; product data for filters used during flush-out and during occupancy; and a report indicating the results of IAQ testing and documenting compliance with IAQ testing procedures and requirements.

EQ Credits 4.1–4.4: Low-Emitting Materials

This represents four potential credits. To get one or more of them, certain materials, such as adhesives, sealants, paints, coatings, floor systems, composite wood, and agrifiber products used in the interior of the building must comply with specific VOC or other IAQ requirements. (Note that “interior of the building” means “inside the weatherproofing barrier.”) The VOC requirements can be noted either in Section 01 81 13 for all materials, or in each specification section. Product data (but not necessarily Material Safety Data Sheets—see more on this below) and other product submittals are required as documentation for these credits.

Required submittals: Product data for materials showing (1) the VOC content of adhesives, sealants, paints, and coatings; (2) that floor systems comply with the

FloorScore Standard; and (3) that composite wood or agrifiber products or wood glues do not contain ureaformaldehyde.

III. Managing the LEED Certification Process

Developing a Team Approach

For a project to meet its LEED sustainability goal, there has to be a strong commitment by all members of the team. Everyone—designers, engineers, owner, contractor, and subcontractors—needs to feel that achieving, or even exceeding, the targeted LEED certification is important. That doesn't mean that everyone's motives are the same. Some may feel a responsibility to our planet's environment, others a concern for the project's occupants, and others may simply want to have a LEED-certified project in their resumes. But it doesn't matter what the team members' motives are, as long as their ultimate goals align. For the purpose of this discussion, what's important is how to achieve LEED certification, not why.

Strategies for developing team commitment may depend on the project delivery method used. Sharing common project goals among all the major team players is easier on delivery methods that encourage and reward collaboration. This level of team collaboration is inherent with Integrated Project Delivery. With other delivery methods, such as Design-Build and Construction Manager-at-Risk, more effort and planning may be needed to achieve that level of collaboration and alignment of goals.

Team collaboration is most difficult to achieve with Design-Bid-Build on publicly funded projects where prequalification of contractors is not allowed. In this case, the owner and design team may be 100% in agreement with the sustainability goals, yet be forced to award the contract to a low-bid contractor who has no interest in or knowledge of the LEED certification process. In this case, clear specifications and procedural diligence are of utmost importance in fostering success. Since this situation is the most challenging for an architect, this will be the assumed scenario for most of the discussion to follow.

For any project seeking LEED certification, the project team must determine if a LEED consultant is needed on the team during construction. There are a few factors to consider: First, USGBC does not require that a project have a LEED consultant, or even a LEED-accredited professional (LEED AP), on the team. However, the project can get one ID credit if one of the principal participants is accredited. Second, being a LEED AP does not necessarily mean that an architect is familiar with the certification procedures during construction. And third, if there

is no LEED consultant on the project, the owner is going to look toward the architect to lead the team through the certification process. So the answer to the question depends on how comfortable you, as the architect, feel about taking on this responsibility.

LEED Coordinator

Your counterpart on the contractor's side is the LEED coordinator (or sustainable design manager, depending on the specification language). The specifications should require (in Section 01 81 13) that the contractor "engage an experienced LEED-Accredited Professional to coordinate LEED requirements and submittals." This person is responsible for making sure that the contractor, the subcontractors, and the suppliers are diligent in maintaining their LEED documentation. Some of the LEED coordinator's tasks include:

1. Developing and maintaining the Materials Tracking Sheet covering all submittals for Divisions 03 thru 10 (as well as Division 12 Furniture & Furnishings, if applicable).
2. Tracking and compiling dump tickets for Construction Waste Management.
3. For construction waste materials that are donated or otherwise diverted from dumps, ensuring that the materials are photographed and otherwise documented.
4. Developing and implementing the Construction IAQ Management Plan during construction and before occupancy.
5. Reviewing all applicable submittals and vendor documentation to ensure that LEED requirements are met for Low-Emitting Materials (e.g., VOC content or no added urea-formaldehyde resins).
6. Procuring documentation from vendors indicating percentage of recycled content of all applicable materials.
7. Procuring documentation from vendors indicating distance from jobsite to the locations of material harvesting and manufacturing of all applicable materials.
8. Procuring FSC certificates and chain-of-custody documents.

Your project specification should require that the LEED coordinator's qualifications be submitted as a preconstruction submittal. These qualifications include evidence of relevant experience on similar projects.

LEED Action Plan

Specification Section 01 81 13 requires that the contractor submit, within some number of days after the Notice to Proceed date, a LEED Action Plan (sometimes referred to as the Environmental Procedures Compliance Plan). This plan is to show how the contractor proposes to meet the specified LEED certification requirements, and is to include the following:

- Erosion and Sediment Control Plan (SS Prerequisite 1)
- Waste management plan (Credit MR 2)
- List of proposed salvaged, refurbished, and reused materials, with associated costs (Credit MR 3)
- List of proposed materials with recycled content, with associated costs (Credit MR 4)
- List of proposed regional materials, with associated costs (Credit MR 5)
- List of proposed certified wood products, with associated costs (Credit MR 7)
- Construction indoor-air-quality management plan
- Commissioning Plan, coordinated with the commissioning agent.

The LEED Action Plan is an essential preconstruction submittal, particularly when the specifications (in Division 01) identify overall requirements for meeting specific LEED credits rather than identifying specific requirements in Divisions 02 through 12 sections. Without it, it will be impossible to review product submittals for all aspects of their LEED compliance.

With each monthly payment application, the contractor should submit a LEED Progress Report that describes the status of each of the items in the Action Plan.

LEED Certification Process: Getting Started

Since our topic here is achieving LEED certification during construction, we'll make a few assumptions:

1. Your Design Phase Credits have been submitted to GBCI and were categorized as “anticipated.”
2. GBCI categorized your proposed Construction Phase Credits as “pending.”
3. Your documents have been issued for bid.
4. Your owner and engineers are fully committed to the LEED goal.

5. You have a LEED credit contingency, in case you don't get all the points you are hoping to get (more on this later).
6. You, as the architect, will be leading the LEED certification process through construction.

With these assumptions in mind, what do you need to successfully start the certification process during the construction phase?

First, you need good Contract Documents. As with any other aspect of design, the effort required during construction to achieve the design intent is directly related to the quality of the documents. And for the most part, when it comes to LEED Construction Phase Credits, what you really need are good specifications.

This starts with Section 01 81 13 *Sustainable Design Requirements*. This section gives the general requirements and the ground rules that will establish the contractor's performance. The LEED credits that are targeted for the project will be identified here.

Each Division 02 through 12 specification section will provide the specific requirements related to the system or products specified in that section. For example, in Section 05 12 00 *Structural Steel Framing*, specific requirements for complying with credits MR 4 (recycled content) and IEQ 4 (low-emitting materials, for primers) are described.

Second, the construction phase startup activities need to address LEED certification. Again, the specifications should help you with this. Section 01 31 00 *Project Management and Coordination* can provide a number of requirements to ensure that the contractor's activities are consistent with achieving certification:

- The requirement that LEED credits be on the agendas for the preconstruction conference, pre-installation meetings, project closeout conferences, and project progress meetings.
- The requirements for a LEED Coordination Conference, along with the required attendees and agenda items.
- In addition, it's recommended to include a provision for regularly scheduled progress meetings dedicated to LEED documentation.

Third, find a way to collaborate with the contractor's LEED coordinator. It will be the coordinator's role to make sure the subcontractors and vendors are complying with all the requirements of the specifications and providing all the necessary LEED documentation. When you and the coordinator are working collaboratively, the project's chances of attaining its LEED goals improve exponentially.

LEED Certification: Leading the Process

If there is no LEED consultant on the project team, the owner will look to the architect as the LEED administrator who understands the USGBC documentation and submittal process. But that doesn't mean you are supposed to do all the work. You need to know what you, as the LEED consultant for the project, have to do, and what the contractor is contractually required to do.

For starters, you, as the architect and LEED administrator, have the best overall view of the LEED process, the design intent, and the contract documents; therefore, you should lead any meeting that is dedicated to LEED certification documentation. That includes the initial LEED coordination conference and the regular LEED progress meetings.

The LEED coordination conference should be held before construction begins. Attendees should include a representative of the owner; representatives of the contractor (at a minimum, the project manager, the superintendent and the LEED coordinator); engineers, consultants, subcontractors, and suppliers who have some relationship to the targeted LEED credits; onsite inspectors; the commissioning agent; and the architect. The meeting should address the following topics:

1. The project's LEED checklist, with an emphasis on the credits that need to be tracked during construction.
2. The project's Basis of Design and Owner's Project Requirements, both of which should be prepared early in the design phases.
3. The relevant specification sections, particularly Section 01 18 13.
4. LEED closeout procedures and required documentation.
5. The role of the contractor's LEED coordinator.
6. The contractor's LEED Action Plan (specified in Section 01 81 13)
7. The schedule and agenda for LEED progress meetings
8. Site logistics, particularly as they relate to construction activity pollution prevention, recycling, and indoor air quality

The LEED progress meetings should occur at least every month, and sometimes as frequently as every two weeks for quick-burn projects. The agenda should address each targeted credit that requires documentation from the contractor. The status of each required document should be reviewed.

For the LEED coordination conference and the LEED progress meetings, the architect should record and distribute the minutes.

Roles of Engineers and Other Consultants

Other members of the design team—engineers and other consultants—also play important LEED-certification roles. Here is what you should be expecting from them during Construction Contract Administration. Make sure you include these activities and responsibilities in your Architect-Consultant Agreements:

Civil Engineer: Review Erosion and Sedimentation Control Plan for construction activities. Review submittals pertaining to stormwater management quality control.

Landscape Architect: Review irrigation system submittal.

Mechanical Engineer: Review all mechanical submittals to ensure that requirements are met for all applicable Energy & Atmosphere and Indoor Environmental Quality credits.

Plumbing Engineer: Review plumbing fixture submittals pertaining to Water Use Reduction. Review Waste Water Technologies.

Electrical Engineer: Review submittals pertaining to Light Pollution Reduction.

Commissioning Agent: Perform commissioning tasks as required by LEED. (Note: The commissioning agent will most likely be under contract directly with the owner.)

Enforcing LEED Compliance

Consider the following scenario: You are the architect for a publicly funded project. The design team and the owner are fully committed to achieving a LEED Gold Certification. But the project has to be competitively bid, with the lowest responsive and responsible bidder being awarded the project. There has been no opportunity to partner with the contractor or to share the team's sustainability goals. The contractor may or may not want to achieve a high LEED certification. What can you do to make the contractor perform?

The answer is simple: LEED requirements in the contract documents are no different than any other requirements. And the tools of enforcement are the same. The best tool that you have available to you is withholding payments when certifying payment requests. And to help you with this, you need a good schedule of values.

The initial schedule of values is a required preconstruction submittal for all projects. This submittal gives the architect the opportunity to see that contractor's and the subcontractors' scopes of work are broken down in sufficient detail to

allow accurate estimates for how complete the project is each month. For instance, having carpeting broken down by type and by floor allows the architect to more accurately determine what percent complete it is than if all the carpeting in the project were a single line item.

The same is true for LEED requirements. When reviewing the initial schedule of values, make sure that there are specific line items for things such as LEED Action Plan, LEED Progress Reports, and Material Certification Forms. Each month, when reviewing the work to determine level of completion, check to see if the progress reports are being kept up to date, if the certification forms are being completed, etc. If not, don't certify the payments for those line items.

Getting to the Next Level of Certification During Construction

Your project's LEED certification goal does not have to be a fixed target. When you register the project with USGBC (usually early in the design phases) you complete a preliminary LEED point checklist. You will place all the possible credits into one of three categories: the Yeses, which you are confident can be achieved; the Noes, which either are impossible to achieve due to site constraints or have been identified by the design team and owner as unacceptably costly or not feasible; and the Maybes, which may be achievable, but are uncertain until full analysis is completed and the design is more developed. Your LEED target at the time of registration will be the total of all the Yeses you have on the checklist, which will translate into Attempted Credits on the LEED online website.

Throughout the design phases, your focus will be to make sure that the design is consistent with all the Yes credits, and to give the Maybes further study. By the end of design, when you submit your Design Phase Credits to GBCI, all the Design Phase Credit Maybes must be turned into Yeses or Noes, while some of the Construction Phase Credits may remain Maybes pending what happens during construction.

In the same way that Yes credits can be lost during construction as a result of poorly followed procedures or incomplete documentation, there may be opportunities to convert some remaining No or Maybe credits into Yeses. But like all opportunities, you need to have a strategy in place to take advantage of them.

The first thing to consider is, when the project is complete, you may not get all your Yes credits. Regional products that you were counting on to get an MR 5 credit may become unavailable, or the construction waste diversion falls just short of the 75% target for an MR 2.2 credit. To allow for this, you should make sure, when submitting to GBCI for your Design Phase Credits, that your LEED checklist

has at least three or four credits more than what you need for your LEED-certification target. For example, if you're aiming for Silver (50 points), try to have 53 or 54 Yes points; this gives the project a contingency if everything doesn't go as planned during construction.

Second, while preparing the contract documents and bid documents, identify potential bid alternates that, if accepted, might increase the project's LEED score. Many of the decisions as to which credits to pursue are driven by the budget. Using bid alternates allows the owner to take advantage of good bids to increase the sustainability of the project.

Third, look for opportunities for Innovation credits during construction. The USGBC provides a list on its website of all the Innovation credits that have been accepted on projects. Many of these may result in little or no additional cost to the project. The following are examples of Innovation credit opportunities that could arise during construction:

- Donation and protection of additional open space
- Clearing of invasive plant species
- Alternative transportation management plans
- Use of Energy Star appliances
- Purchase of carbon offsets
- Selection of furniture with low-VOC content
- Reduced use of paper during construction (by using web-based management systems, for example)

USGBC also has identified a number of Pilot Credits on their website. These are credits that are being considered for inclusion in a future version of the LEED rating system, but can be used now as Innovation credits. Examples of Pilot Credits include Bird Collision Deterrence, Acoustics, and Chemical Avoidance in Building Materials.

Adding LEED credits during construction requires the complete commitment and participation of the owner, designers, and builders. But with teams that are working collaboratively and thinking creatively, many projects have the opportunity to reach a higher level of LEED certification.

LEED Certification Process: Closeout

Assuming that you have been working consistently with the contractor to track all the LEED criteria and required submittals, closeout should be almost as simple as changing the name of the tracking sheets from “progress” to “final.” All materials that arrive onsite should already have had the appropriate documentation collected as part of the standard submittal process and have been logged by the contractor’s LEED coordinator upon delivery. Maintained logs are then reviewed at the regular LEED meetings and ultimately submitted during closeout. If the contractor has not submitted some required information by substantial completion, it is not out of line to include the missing items as part of the punch list.

It is important to note here that the team should never wait for closeout to log and collect backup documentation for all the Construction Phase Credits, as tempting as that efficiency may seem. For one thing, the project may miss the opportunity for additional credits during this phase. More importantly, much of the backup documentation and logging relies on subcontractors that are not necessarily present at the tail end of a project. Thus, it is highly recommended to collect all required LEED submittals, backup documentation, and credit forms on a regular basis during construction; once subcontractors have demobilized, it will be very difficult to get the required documentation.

There is no need to wait until the end of the construction phase to input the compiled information into the LEED online credit forms. The credit forms can be used as the primary tool for tracking the status of your targeted credits. USGBC requires that the same cost figures (typically based on the schedule of values, then adjusted for onsite material delivery as required) be used for all Construction Phase Credits. Thus, you will need to make sure that all amounts remain consistent before submitting the forms to GBCI.

Depending on the contract stipulations, the actual LEED online documentation can be done either by you using the information tracked by the contractor’s LEED coordinator, or by the contractor’s LEED coordinator directly and reviewed by you. Either way, the contractor’s responsibility is not complete until GBCI accepts the uploaded information.

IV. Common Pitfalls to Watch For

Material Safety Data Sheets

There is a myth, reinforced by USGBC’s own LEED Reference Guide, that Material Safety Data Sheets (MSDSs) are required submittals for verifying compliance with low-emitting materials requirements (for IEQ credits 4.1 through 4.4). Most architects regard MSDSs as though they themselves are made of toxic

materials; architects don't want to review them, touch them, or even see them. And for good reason: MSDSs often include information about the level of hazard or toxicity of building materials before or while they are being installed, even if, in their installed state, the materials are perfectly safe. Architects are trained, usually by their lawyers, to not review submittals that include MSDSs. If MSDSs are submitted, the contract documents usually state that they will be returned to the contractor without review.

Fortunately, the myth that they are required to verify LEED compliance is wrong. The product data sheets that are routinely required as submittals usually include the information on VOC content needed to satisfy GBCI for the IEQ credits. In fact, the product data sheets often have better, more conclusive data than the MSDSs. So have no fear, and continue to reject MSDSs as submittals.

But what if the product data doesn't include the information you need, but the MSDS does? Some architectural firms have arrived at a solution. The specifications should state, in those cases where LEED compliance can be verified only by the architect's review of MSDSs, that the MSDSs are to be submitted. However, they will be reviewed only to verify VOC content for the purpose of LEED certification. When reviewing the submittal (and assuming there are no other reasons for rejecting it), the architect should give the MSDSs a "B" action ("Approved as Noted," "Exceptions as Noted," "Reviewed with Comments"; whatever your office calls the B action) along with a note saying, "Reviewed only to verify VOC content for the purpose of LEED certification" (or similar language). If you have any doubts about what approach to take with MSDSs, consult your legal counsel.

Substitutions

So far, we have focused mostly on the Construction Phase Credits, since the Design Phase Credits, by the start of construction, have already been submitted to and reviewed by GBCI. But one pitfall to watch out for during construction is when the contractor submits a substitution request that may affect a Design Phase Credit.

Once again, the specifications can come to your aid. For any substitution, per Section 01 25 00 *Substitution Procedures*, the contractor has the burden of proof to demonstrate that the proposed product is sufficiently equivalent to the specified one. For projects seeking LEED certification, this requirement can be beefed up to include proof that the proposed substitution has the characteristics needed to achieve LEED credits.

All substitution requests require additional effort by the architect to review the contractor's documentation and to recommend that the owner accept or not accept them. In the case of substitutions that affect LEED credits, there is an even greater burden, since the architect must be confident that the proposed product will meet the LEED credit criteria.

Since loss of one credit could mean that the project does not get certified, owners have the option of not considering any Substitutions for Convenience, thus limiting their potential risk. For Substitutions for Cause, they don't have that option. In those cases, the architect needs to be especially diligent in reviewing the contractor's documentation.

Getting the Right Contract

No matter how passionate an architect is about sustainable design, the fact is that the effort to design LEED-certified projects, and to ensure certification throughout the construction phase, is considerable and increases with each certification level. Therefore, according to AIA Document B101TM-2007 *Standard Form of Agreement Between Owner and Architect*, it should be an additional service. Article 4 Additional Services, paragraph 4.1.24, states that LEED Certification is a service that is "not included in Basic Services, but may be required for the Project." It also refers to B214TM-2007 *Standard Form of Architect's Services: LEED Certification*.

This document stipulates the architect's roles and responsibilities, as they relate to LEED certification, during design and construction phases. Under Article 2.8 LEED Certification Services During Contract Administration, the architect shall perform the following services:

1. Review RFIs—properly prepared and timely ones—from the contractor related to LEED credits.
2. Prepare documents in response to those RFIs.
3. Visit the site at appropriate intervals to be generally familiar with the progress of the work, as it relates to LEED credits.
4. Review contractor's submittals for the purpose of checking for conformance with requirements for LEED certification.
5. Review properly prepared and timely requests, from the owner or contractor, for changes in the work related to LEED certification. (If the proposed changes would potentially affect a LEED credit, the architect is to inform the owner.)
6. Prepare the final LEED Certification Report.

It is important that your Owner-Architect Contract not guarantee any level of LEED certification. The LEED process is necessarily a collaborative one that encompasses not only the design team, but also the owner, the contractor, and others. There are decisions made outside the architect's purview that affect a project's ability to achieve not only credits but prerequisites. (For example, if an owner decides that they absolutely do not want to disallow smoking within 20 feet of building entrances, then the project will not meet IEQp2 and, as a result, not qualify for LEED certification, no matter how many other credits could be achieved.) Instead, it is advisable for the agreement to require supporting the owner in submitting for LEED certification, and delivering design and documentation that meets LEED submission requirements.

Getting Audited

As part of the LEED review process, it is not unusual for GBCI to return review comments that request clarifications on documentation for some or all of the attempted credits. Usually, GBCI reviewers will suggest an approach for revising the credit form in the "Technical Advice" column. If you follow their advice, the GBCI will generally approve the credit. If your response narratives and the additional documentation requested by the GBCI reviewer do not adequately address the identified issues, then GBCI may deny the credit(s) in question. Should this occur, you have the ability to appeal each denied credit by paying a nominal fee and providing further clarifying narratives and documentation.

The key to successfully navigating this part of the process is being able to produce the new or clarified information in a timely fashion. For Construction Phase Credits, the best solution is to collect all tracking documentation on a regular basis, preferably as materials arrive onsite and are installed. There is nothing worse than having to track down a chain-of-custody document for a certified wood balustrade installed a year earlier by a now-defunct subcontractor, through a general contractor that has moved on to the next job. Retain contact information for all parties involved, communicate clearly and swiftly, and collect as you go.

V. References and Resources

While we could go into much more detail on many of the topics discussed here, we believe we have covered the basics to help architects manage the LEED certification process during Construction Contract Administration. For additional information, refer to following reference materials and online resources:

Reference Documents:

AIA Document D503TM-2011, *Guide for Sustainable Projects, including Agreement Amendments and Supplementary Conditions*

AIA Document B101TM-2007 *Standard Form of Agreement Between Owner and Architect*

AIA Document B214TM-2007 *Standard Form of Architect's Services: LEED Certification*

LEED Reference Guide for Green Building Design and Construction For the Design, Construction and Major Renovations of Commercial and Institutional

Buildings Including Core & Shell and K-12 School Projects, United States Green Building Council, 2009 Edition

Online Resources:

LEEDuser: <http://www.leeduser.com/> (For only a nominal subscription cost, anyone can access this useful website.)

Sample Credit Forms (for all Rating Systems):

<https://www.leedonline.com/irj/servlet/prt/portal/prtroot/com.sap.portal.navigation.portallauncher.anonymous#>

Supplemental Guide to the Minimum Program Requirements:

<http://www.usgbc.org/ShowFile.aspx?DocumentID=10131>

Pilot Credits (may be used for Innovation Credits):

<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=2104>

GBCI Resources and FAQs: <http://www.gbci.org/main-nav/building-certification/resources.aspx>

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