Integrating Green Building Practices Into the Building Regulatory Process

by Anthony Floyd, AIA, C.B.O., and Edward Peaser, C.B.O.

"Green building," "sustainable architecture" and "environmentally responsible building" are terms we hear when a building is designed and built to reduce energy consumption, improve indoor air quality and limit environmental impacts. Such designs may cause anxiety for building officials due to nonconventional building techniques and potential code-compliance issues, but is important to bear in mind that the alternatives represent a growing recognition of the impact of building design and practices on our health and physical environment. However trite such terms as "green" may threaten to become, the fundamental underlying principle is a comprehensive attempt to address public welfare.

The issue of green building practices addresses a small piece of a large picture, yet it gives us a chance to promote the idea that nothing we do happens in isolation. Connecting building to the local, regional and global environment allows other elements to fall into place within the broader context of energy, resource conservation and environmental impacts.

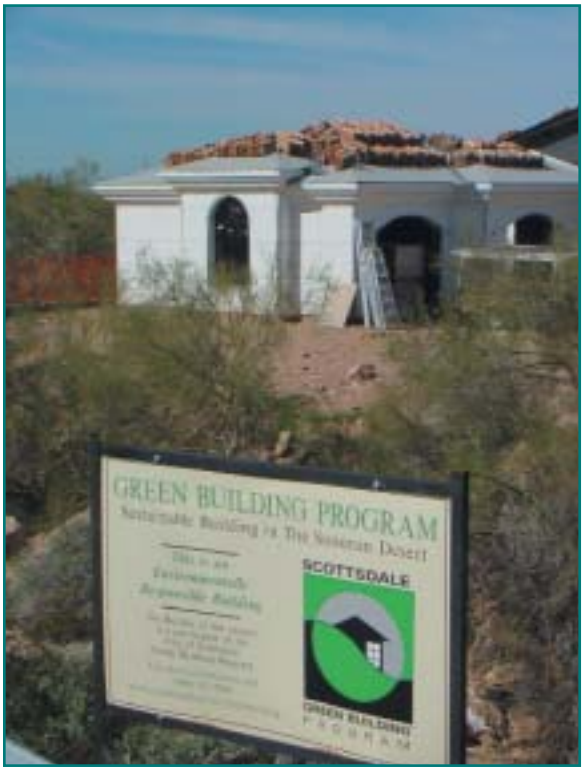
Over the past decade, green building has taken an integrative approach to design and building by addressing energy-efficiency, water conservation, the use of low-impact materials, waste reduction and indoor air quality. Its goal is to provide healthy, durable and environmentally responsible buildings in which to live and work. Regulatory agencies have a vested interest and public obligation to ensure that buildings are designed and built to safeguard life, health, property and public welfare. With continued growth and development, the scope of public welfare is broadening to encompass the welfare of our natural environment, and market incentives—in conjunction with performance standards and certifications—have evolved to substantiate these efforts.

The City of Scottsdale, Arizona, recognizes the environmental implications of natural resource depletion and energy consumption. These issues will increasingly influence the way buildings are built now and into the future, and Scottsdale has made a conscious decision to jump-start the green building regulatory process. The City fully supports and promotes green building, and encourages others to follow suit. This article addresses how the City is integrating green building into its building code regulatory process.

Voluntary Programs in a Regulatory Setting

The City of Austin, Texas, established the first green building program in 1991. There are now close to 20 municipal residential green building programs in the U.S., with at least a dozen more under development. Such programs are designed to reduce the environmental impacts involving energy, water, materials, waste and indoor air quality. The programs are usually voluntary and rely on rating checklists to qualify projects. Incentives are typically offered to attract builder participation, often including some type of development incentive and builder recognition through various marketing tools.

The City of Scottsdale initiated Arizona's first Green Building Program in 1998. It was developed to encourage



environmentally responsible building in the Sonoran Desert region by incorporating healthy, resource- and energy-efficient materials and methods in the design and construction of homes. The program's goals are to reduce the environmental impact of building; achieve both short and long-term savings of energy, water and other natural resources; and encourage a healthier indoor environment.

Scottsdale's program is strictly voluntary and uses incentives in the forms of builder recognition and expedited plan review to entice builder/developer participation. A conscious effort has been made to promote the program to the construction and home-buying communities through publications and public activities. Promotional materials include brochures, building-strategy handouts, job site signs, a directory of participating builders and designers, green building home certificates, and a homeowner's manual. A monthly lecture series is provided covering such topics as energy conservation, alternative materials, water conservation and indoor air quality. With the help of the City Green Building Advisory Committee the program also hosts other events, including an Annual Green Building Expo and Home Tour. The City also has a green building website (*www.scottsdaleaz.gov/greenbuilding*) that contains program criteria, builder profiles, upcoming events and links to other environmental building resources.

To qualify, a project must meet a set number of prerequisites and score a minimum number of points from a rating worksheet. The worksheet was developed by the City Green Building Advisory Committee, which consists of representatives from the building community, utility companies, product manufacturers and Arizona State University. The worksheet rates homes in the areas of site use, water and energy consumption, building materials, solid waste production, and indoor air quality. The designer or builder can select from a checklist of green building options to achieve a rating of either "entry level" or "advanced level."

By the end of 2002, 79 builders had submitted 183 projects for building permits under Scottsdale's program. The projects exhibited a wide range of construction strategies and materials, ranging from standard wood construction to hybrid systems, using innovative products such as insulated concrete form systems, masonry walls with integral insulation, foam structural panels, pumice concrete, cast-earth, straw bale and super-insulated frame construction.

The decision to integrate green building into the plan review and inspection process was initiated as a result of limited staff resources. The green building program previously functioned with two staff members devoted exclusively to green building. As the success of the program grew, it became increasingly difficult to keep up with project qualifications, inspections and outreach. When general building permit activity slowed as the result of a generally sluggish economy, a window of opportunity opened to involve plan review and inspection in the green building process. Recognizing the growing interest of staff, the building official and inspection manager embraced the idea of integrating green building and making it a tool for learning about building trends.

In fall of 2002, Scottsdale's building plan review and inspection units began reviewing and inspecting projects for conformance to the City's green building guidelines. The program is still voluntary, but requires that participating builders adhere to program guidelines from start to finish. This protects the benefits and interests of both the homeowner and builder, while supporting the credibility and long-term goals of the program.

Integration into the Regulatory Process

Why integrate a non-regulatory program into a legislative infrastructure? First, the City of Scottsdale believes that green building is a growing trend and wants to be prepared for the inevitable. From our experience, we have noticed that many builders decide to participate in the green building program because they are already implementing many of its energy conservation strategies as a result of the competitive building market. Because of the City's program incentives, most of these builders are willing to go even further by incorporating the additional criteria involving water conservation, the use of low-impact materials, waste reduction and indoor environmental quality.

Plan review and inspections are key. Without oversight, builders are not always consistent in their applications of the program criteria. Integrating green building into the plan review and inspection process also educates plan reviewers and inspectors on trends involving building strategies and alternate materials and methods of construction. It also serves to build the confidence of the citizens of Scottsdale in the City's concern for the long-term health and viability of the community.

Project Qualification and Plan Review

Once an owner or builder decides to participate in the Scottsdale Green Building Program, a project qualification meeting is required prior to making a formal application for plan review permitting. Applicants complete a green building checklist and enrollment form prior to the meeting. The

checklist is used to rate the project based on accumulated point values from 161 options. In addition, the project must include 26 mandatory items. Either the green building manager or one of two designated building plan reviewers can conduct the meeting.

The meeting not only qualifies a project into the program but also helps to resolve potential code-compliance issues. This in turn helps streamline the expedited plan review process offered as an incentive for participation in the program.

Once the project is submitted for review at the Plan Review/Permit Services counter, it is given a "green building designation" as part of the plan review/permit tracking system. This puts the project on the expedited plan review track, which means that the plans will go through the initial building, planning, fire and civil engineering review process in about half the time (two weeks) as a regular project. As part of the process, the plans are reviewed for conformance with the 26 mandatory green building checklist items. These requirements must be fully integrated into the notes and details of the plans. The green building checklist options must also be listed in the plan set.

Inspections

In 1999, the City of Scottsdale hired Arizona's first green building inspector. This position was dedicated exclusively to green building and did not involve code inspections. By 2002, the building inspection unit took over the responsibility of inspecting green buildings for compliance with program guidelines. A lead building inspector was selected from a recruitment list of four inspectors who applied for the special assignment. After training over a six-month period, the lead inspector became responsible for training Scottsdale's remaining inspectors. Once training is complete, each inspector is responsible for green building projects in his or her respective inspection area.

Green Building Inspectors on a job site.

The Building Inspection Manager identified key green building categories and subcategories for integration into the City's automated inspection request system. The 26 mandatory green building requirements and 14 optional categories were then assigned inspection numbers (see Table 1). A total of 40 green building inspection types were identified and aligned with the code compliance inspection types. This system allows the builder to request the necessary green building inspection at the appropriate stage of construction.

When a green building permit is issued, a census code is used to notify the responsible inspector, allowing him or her to establish contact with the builder regarding the inspection process and procedures. This has proven extremely beneficial for both the builders and the inspectors, fostering a level of comfort on the part of builders with the knowledge that they can contact their inspector whenever necessary.

(continued)

Table 1. Green Building Inspection Categories.

Insp. No.	Category
121-199	Mandatory Requirements
205	Site Use Options
225	Structural Element Options
240	Building Envelope Options
265	Insulation Content Options
275	HVAC Options
290	Indoor Air Quality Options
305	Electrical Power, Lighting & Appliances Options
325	Plumbing System Options
340	Roofing Options
350	Exterior Finish Options
365	Interior Finish Options
375	Doors, Cabinetry & Trim Options
390	Finish Floor Options
405	Pool & Spa Options
415	Solid Waste Options
425	Special Options

The inspectors also have the ability to make field changes if it becomes apparent that a chosen green building option cannot be met. The inspector reviews the checklist of available options with the builder in order to find another item of similar point value and makes the necessary changes to the green building documents. This allows the builder to continue construction under program guidelines without the need to go through the plan review process again.

Unfortunately, some participating builders have used the green building program to get expedited plan review and permitting, only to fail to comply with program guidelines during construction. In order to resolve this type of situation, the building inspector has the authority to issue a Stop Construction Notice until the construction plans are revised to remove green building checklist items. This requires that the plans be resubmitted for review, which can take up to three additional weeks. As an added deterrent, a double-hourly plan review fee is assessed. Thanks to this policy and the continued education of builders by City staff, the withdrawal rate has fallen dramatically.

By integrating green building into the automated inspection system, paperwork is reduced by 80 percent and a complete history of both code compliance and green building inspections are recorded. In addition, all requested inspections for both green building and code compliance are able to be performed within 24 hours. Finally, when all of the required inspections are approved, a Certificate of Occupancy is issued stating that the building complies with Scottsdale's Green Building Program standards.

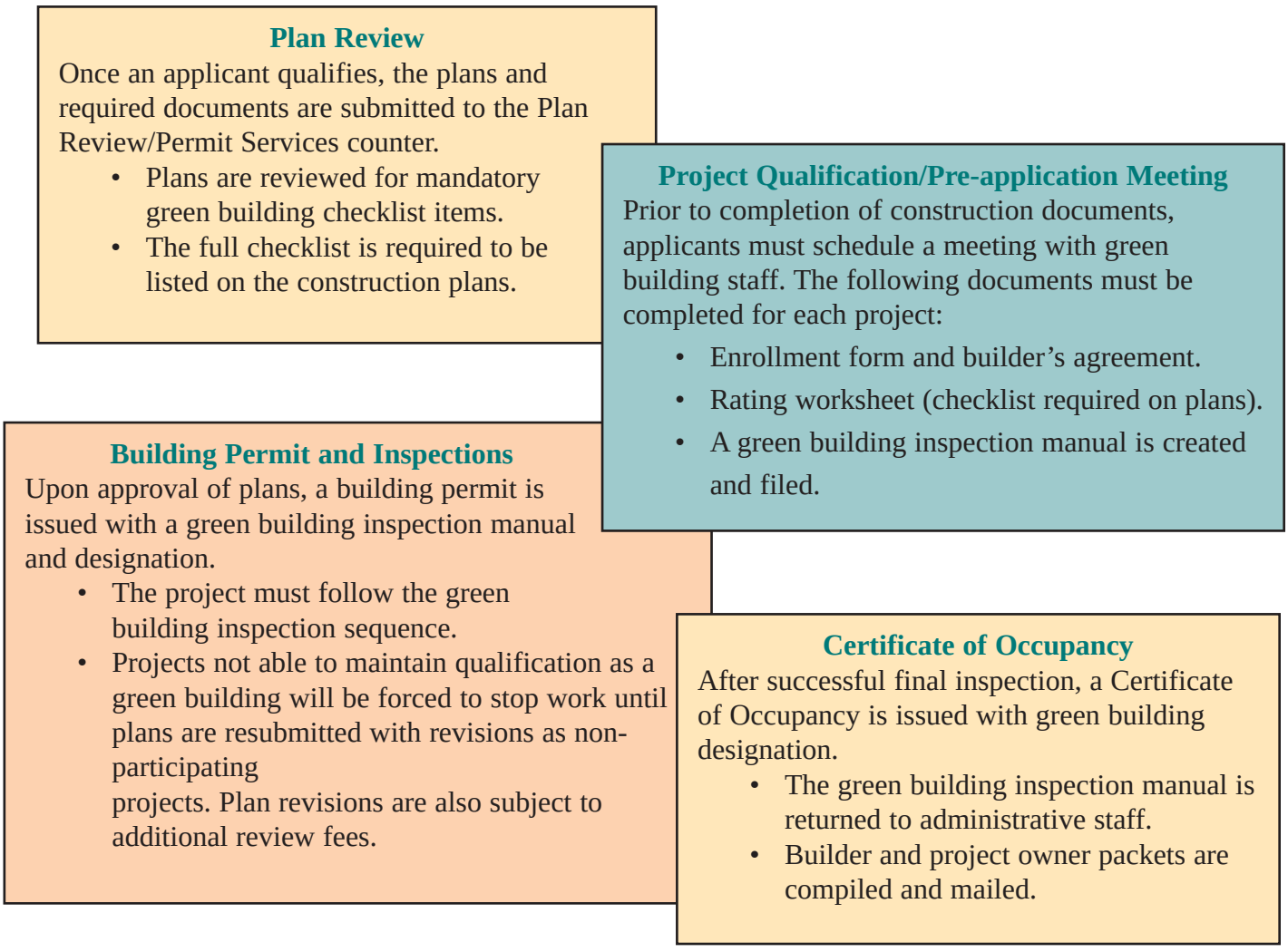


Figure 1. The Green Building process.

To our knowledge, no other city in the U.S. has an automated green building inspection request program with a full staff of building inspectors performing green building inspections. Nor are we aware of any jurisdiction that issues a Certificate of Occupancy with a green building designation.

Summary

Arizona does not currently have an energy code but as a "home rule" State, local jurisdictions maintain a significant amount of autonomy. Scottsdale attempted to adopt an energy code in the early 1990s, but was unsuccessful due to the political climate of the building industry at the time. Fortunately, the situation has improved and the City is now preparing for the adoption of the 2003 *International Energy Conservation Code*® (IECC®). Integrating the provisions of the IECC into the existing building code will result in mandating most of the energy provisions that are now part of the voluntary green building program. It is expected that this will create a greater synergy for the integration of other green building standards into the regulatory process.

As we continue the process of integration, we will face some challenges. The first will be to maintain a proactive and open-minded attitude toward alternate building practices. Meeting this challenge will require a thorough understanding of the intents of both the building code and specific green building guidelines in order to minimize conflicts. Having a green building specialist on staff will certainly help in this area. The second challenge involves the prescriptive nature of the green building rating checklist. As with any checklist, the intended effect could be compromised if careful consideration is not given to how one component may affect another. For instance, selecting strategies for well-insulated walls in conjunction with low-performance windows will minimize overall energy performance. The adoption of energy and performance-based codes can be of significant benefit, but a good understanding of the integrative approach is paramount.

Building departments are often reluctant to embrace unconventional materials and methods of construction. However, by undertaking a comprehensive view of the built environment, proposed projects can be evaluated within the context of sustainability without sacrificing health- and life-safety standards. Fortunately, there is an ever-increasing number of sources for information regarding environmentally responsible building systems, materials and products. Green building programs around the country have certainly helped lay the foundation, and the next-generation building codes are helping bridge the sustainability gap by taking a life-cycle approach. Moving forward, we must also look to utilize historically proven solutions exhibited in indigenous building systems around the world.

Building codes and standards are a critical part of the technical framework by which the built environment takes its form. Code agencies and standards bodies can help clarify the scope of building regulation as sustainability becomes a reality in the development process by improving provisions for health- and life-safety in the broader context of public welfare. The intent of specific code provisions and standards may vary, but they must ultimately be in alignment with principles that encompass a comprehensive and integrative approach in the design and construction of the built environment. Today, this stands as perhaps the greatest challenge, and opportunity, for every building regulatory agency and jurisdiction in the U.S. and around the globe. ◆

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