
STRIKING GOLD: HISTORIC PRESERVATION AND LEED¹

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INTRODUCTION

“How can historic preservation be green?” “Can efforts toward a sustainable future embrace and respect historic preservation?” While adherents to the preservation movement and the environmental movement argue these questions demonstratively from their particular perspectives, a growing number of successful historic preservation projects have begun to provide clear evidence that preservation is indeed green, especially when the broader view that encompasses social, environmental, and economic sustainability is understood. Ironically, the historic preservation movement and the environmental movement both derive from the same intent to provide stewardship of the environment. The preservation movement largely has focused on the built environment with some more recent efforts recognizing the broader environment of cultural landscapes. Conversely, the environmental movement has largely been seen as a tool for stewardship of the natural environment. At the surface, both movements may appear to be opposite sides of the same coin with overlapping and at times seemingly conflicting agendas. For those familiar with the long-term tenets of the preservation movement, this is a false perception since within the historic preservation movement it has long been known and accepted that reusing existing buildings is one of the most sustainable forms of stewardship of the environment.

This article explores the growth and emergence of the preservation movement as an increasingly recognized and important form of sustainable design in contemporary society. The efforts for historic preservation and environmental conservation have resulted in two programs—the Federal Tax Incentive Program for Historic Buildings, administered jointly by the United States Department of the Interior and the United States Department of Commerce, and the LEED Rating System administered by the United States Green Building Council—that each separately defines a model for stewardship of the built environment. The article provides an overview for the preservation and environmental movement that would appear to some as two entirely divergent strategies for proceeding with construction activity for a more sustainable future. The truth is that a number of synergies exist that can be used to multiply the benefits of historic preservation and environmental stewardship. This synergy will be further explained in the case study that explores the successful rehabilitation of the W. P. Fuller Paint Company Building completed by the Big-D Construction Company for use as its office headquarters in Salt Lake City. This project (see Figure 1) is among the first to simultaneously incorporate LEED and Historic Preservation Tax Incentives to achieve a “Gold” rating by LEED while meeting conformance requirements to the Secretary of the Interior’s Standard for Rehabilitation and earning a 20% historic preservation tax credit.

OVERVIEW AND BACKGROUND

Carl Elefante, a noted preservation architect and director of sustainable design at Quinn-Evans in Washington, DC, has stated that “The greenest building is . . . one that is already built.” (Elefante 2007, 26). At first review, this statement is puzzling since the common perception of many is that only new buildings can be considered truly green. Many might question how existing buildings that have been labeled “energy hogs” could be considered contributory to sustainability efforts.

In the modern context of the early twenty-first century there are indeed a substantial number of mid- to late-twentieth-century buildings, built in the 1950s, 1960s, and 1970s that were insensitively designed and constructed by taking advantage of technological advances in mechanical and electrical systems to achieve modern comfort standards. Although the early buildings of this Post–World War II period have only become eligible for consideration as historic in the past decade, they have largely shaped the perception of how the typical existing building

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FIGURE 1. The adaptive use of the W. P. Fuller Paint Company building to serve as the office headquarters of the Big-D Construction Company in Salt Lake City, UT, is among the first projects in the nation to achieve LEED “Gold” status and simultaneously qualify for Federal historic preservation tax credits (© 2007, Robert A. Young, all rights reserved).



performs, especially those built just prior to the two energy crises of the 1970s. In the headlong rush at the turn of the twenty-first century to make buildings more energy efficient, there have been efforts to establish how energy efficient a *new* building would or could be. In the process, many of the energy efficiency measures used for new construction have been proven to be economically unfeasible when they were considered as retrofit opportunities when retaining and reusing existing buildings. As a result, many of the energy efficiency measurement parameters for a successful building are based on those strategies that work well on new construction but have gained only limited application to existing buildings. In a growing number of instances (Curtis 2002), components such as glazing and cladding commonly used in curtain walls and building envelope construction were removed, discarded, and replaced with contemporary products (See Figures 2 and 3).

Subsequently, through the late-twentieth century the use of the parameter of energy efficiency was expanded to include “green” features of a building and eventually has been further revised to demonstrate a broadened concept of “sustainable” design aspects that form the basis of high performance building standards such as those promoted by the Leadership in Energy and Environmental Design (LEED)

FIGURE 2. Technology of the twenty-first century can be used to reclad mid-twentieth-century façades that have become aesthetically “dated” with more contemporary facades. In some instances, this is done to update the appearance while in others it has been done to reduce operating and maintenance costs (© 2005, Robert A. Young, all rights reserved).



program administered by the United States Green Building Council (USGBC). Unfortunately, while this broadened perspective advances the concept of what sustainable design can include, the initial filtering caused by the early energy efficiency bias as the primary aspect of green or sustainable building for new construction still limits the acceptance by many non-preservation oriented people that the continued use or adaptive use of historic and existing buildings could be considered sustainable.

Meanwhile, preservationists have persevered to identify and understand the technologies of the mid-twentieth century and what the historic character-

FIGURE 3. By the late-twentieth century, the curtain wall system on the Lever House, completed in 1952, had fallen into disrepair. The curtain wall was removed and an entirely new curtain wall system was installed to upgrade the appearance and energy performance of the building (© 2007, Robert A. Young, all rights reserved).



defining features of these buildings are and their significance. Many of the mid-twentieth-century buildings in question were constructed of a vast array of new materials, technologies, and construction systems that emerged as a result of advances made just prior to, during, and immediately after World War II. However, what has been lost or overlooked are the many historic buildings built prior to the mid-twentieth century that employed what are now called low-technology approaches (e.g., building orientation, thermal mass, natural ventilation, daylighting) to thermal and visual comfort that are surprisingly now being rediscovered and touted “sustainable design concepts” in new construction.

Unfortunately, the inherently sustainable attributes of buildings built before World War II continue to be overlooked and lost among the problematic conditions found with the postwar buildings described above. Combined with economic conditions that promoted and hastened the demolition of existing buildings, the early efforts to formulate sustainability and high performance building standards often ignored or minimized the contribution that reusing older and historic buildings could have towards sustainability. For example, reusing a building significantly reduces the amount of new materials needed to create a building that meets the need of the new use while simultaneously reducing the overall demolition waste (see Figure 4) going to a landfill and is therefore exceptionally sustainable as an ultimate form of recycling in place (Young 2004). This becomes particularly true when the sustainability is measured in broader parameters that extend beyond simply accounting for energy efficiency as the only metric for evaluating the sustainability of a building. When these parameters have been broadened to account for things such as embodied energy, reduction in demand for new materials, the social aspects of retaining buildings that reuse existing infrastructure, and the time needed to

FIGURE 4. Without any substantial network of recycling options in place, demolition of existing buildings creates increasingly greater pressures on landfill space. Similarly, the complete replacement of an existing building with a new building of equal or greater size continues the cycle of extraction of raw materials to create new building products (© 2007, Robert A. Young, all rights reserved).



economically recover the additional costs of demolition and replacement, a new perception emerges that does in fact reinforce the concept that historic preservation and reuse of existing building are extremely sustainable (Jackson 2004).

HISTORIC PRESERVATION PERSPECTIVE

Before continuing, some further orientation is needed for those readers who are unfamiliar with the development of the contemporary historic preservation practice. The first recognized historic preservation activities occurred in the early nineteenth century with the first publicly organized effort being the purchase of Independence Hall in Philadelphia in 1816 to save it from demolition and the first private effort being the restoration of the Touro Synagogue in Newport, Rhode Island in 1828. Since then, there has been a steady and growing effort to develop preservation activities. These efforts include the restoration of Mt. Vernon, the creation of national parks and monuments, the enactment of various Federal laws to protect historic antiquities and cultural resources, the formation of the National Park Service (NPS), the formation of a number of preservation advocacy organizations such as Historic New England (formerly known as the Society for the Preservation of New England Antiquities), and the National Trust for Historic Preservation. These efforts led to the enactment of the National Historic Preservation Act of 1966 and subsequent amendments that form the framework that guides modern preservation practice (Young 2008b).

National Historic Preservation Act of 1966 (as amended)

The National Historic Preservation Act (NHPA) was originally enacted in 1966. Among the provisions of the NHPA and its subsequent amendments is the authorization for the Secretary of the Interior (working through the NPS) to:

- Establish a State Historic Preservation Office (SHPO) in each state.
- Expand and maintain the National Register of Historic Places (NRHP).
- Establish a review system to verify the effect of proposed projects that use Federal funds on properties on or eligible for the NRHP.

These three aspects constitute the framework for the contemporary system of oversight that safeguards the retention of historic buildings, structures, sites, and properties.

The SHPO is the individual state's agency that identifies historic buildings and acts as an information clearing house to provide technical assistance on questions related to the preservation of buildings, sites, structures, and districts on the NRHP. As such, the SHPO provides preliminary findings on proposed nominations to the NRHP and tax credit applications and works with the public to protect and preserve historic buildings and mitigate adverse effect wherever possible.

The primary purposes of the NRHP are to identify and protect potentially historically significant buildings, sites, structures, and districts from adverse effect from projects (e.g., urban renewal, highways, and tax credits) financed with Federal funds. However, to fully understand how this system functions, the difference between a historic building and an older building must be defined and how they are deemed eligible for nomination to the NRHP. While not all older buildings are historically significant and not all historically significant buildings are old, the criteria for defining the historic significance of a building are given in the inset below. Unless there is a concurrent listing on a state or local historic register that enables oversight powers to a state or local agency, listing on the NRHP only protects the historic building, site, structure, or district from adverse effect caused by Federal funding.

While the standard practice is that the minimum fifty-year age requirement is the threshold at which historic buildings, structures, and sites are typically nominated to and placed on the NRHP, buildings from the modern era (e.g., Dulles International Airport) built well after World War II have already been placed on the NRHP.

Buildings may be nominated for their individual significance or as a contributing building in a historic district. A historic district is composed of multiple buildings that meet one or more of the criteria for consideration of significance. A district may be comprised of buildings of a single type (e.g., commercial, residential) or a combination of types. The nomination includes: a physical description of the building or buildings being considered with an

CRITERIA FOR NOMINATION TO THE NATIONAL REGISTER OF HISTORIC PLACES

Criteria for Evaluation

Buildings can be nominated and accepted on the National Register of Historic Places (NRHP) for significance at the local, state, or national level. The NRHP defines significance based on four criteria.

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B. That are associated with the lives of significant persons in the past; or
- C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. That have yielded or may be likely to yield, information important in history or prehistory.

Criteria Considerations

Ordinarily cemeteries, birthplaces, graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

- a. A religious property deriving primary significance from architectural or artistic distinction or historical importance; or
- b. A building or structure removed from its original location but which is primarily significant for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- c. A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building associated with his or her productive life; or
- d. A cemetery that derives its primary importance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or
- e. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or
- f. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or
- g. A property achieving significance within the past 50 years if it is of exceptional importance (National Register of Historic Places 2002).

assessment of the integrity of the historic character defining elements; a documented history of the building that includes the names of the original and subsequent owners, the original architect and/or builder, and other parameters such as original and current uses, building type, and so forth; and, a statement of why it is significant. The statement of significance makes a case for the nomination with regard to the four criteria and the seven consider-

ations shown in the inset. The nomination is then reviewed by the SHPO and, if approved, is sent to the NPS for comment and review. If accepted there, the nomination goes to the NRHP for final determination and acceptance to the NRHP.

Secretary of the Interior

After the NHPA was originally enacted, the 1970s and 1980s saw a rapid rise in efforts to “rehabilitate,”

“preserve,” or “restore” historic and older buildings. During this era many of the architectural design and engineering firms, preservation consultants, product manufacturers, construction firms, and tradespeople that formed the initial foundation of the current preservation-related industry gained the knowledge and expertise that comprises the basis of how preservation is practiced today. In this period, many efforts were made to work with buildings and structures that were composed of materials that were uncommon in modern construction and had been installed using early construction methods that were no longer commonly understood.

Eventually a number of these early efforts were found to be detrimental, either immediately or over the long term, to the historic fabric of the building. Common contemporary construction methods were often used to repair, replace, or reconstruct damaged or missing historic features of the building. These treatment methods (e.g., sand blasting, abrasive and chemical cleaning, mortar repointing, window replacement), were either immediately detrimental to the historic features of the building or subsequently caused damage that only became apparent over the several years after the treatment had been completed. Similarly, insensitive design and construction decisions were also having a negative impact on historic and older buildings. These decisions centered along the attempts to reuse an older building in a way that destroyed its historic integrity by removing or significantly altering character defining elements or the practice of simply demolishing deteriorated historic elements because it was perceived to be less expensive to reconstruct them in modern materials or that repair methods and materials were unavailable. These misconceptions often led to the loss of the historic integrity of the building and introduced constructions that were simultaneously irreversible and inappropriate.

To clarify these processes, the Secretary of the Interior established definitions for the four possible treatments (preservation, rehabilitation, restoration, and reconstruction) of historic properties. The four treatments (Weeks and Grimmer 1995) include:

- Preservation: the process of applying measures necessary to sustain the existing form, integrity, and materials of a historic property.
- Rehabilitation: the process of making a compatible use for a property by repair, alterations, and additions while preserving features that convey its historical, cultural, or architectural values.
- Restoration: the process of accurately depicting the form or feature as it appeared at a particular period of time by removing features from later periods in its history and reconstructing missing features from the restoration period.
- Reconstruction: the process of recreating with new construction the form, features, and detailing of a non-surviving site, landscape, building, structure, or object for the purpose of replicating its appearance.

The Secretary of the Interior also established an accompanying set of standards and guidelines to define the parameters of acceptable and unacceptable work proposed for a project. In the tax credit process, the Secretary of the Interior Standards for Rehabilitation (Weeks and Grimmer 1995) given below are used in determining potentially adverse effects:

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.
2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided (see Figure 5).
3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.
4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.
5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.
6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in

design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical or physical treatments, such as sand-blasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.
8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.
9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.
10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Preservation Dynamics

There are multiple and sometimes overlapping layers of administrative oversight for historic buildings, structures, sites, and districts. In addition to the NRHP, many municipalities, counties, and states have developed their own registers that recognize historically significant buildings of local importance. While some of these listings are concurrent to both the NRHP and these other registers, many are not. In this regard, the complexity of the review and oversight of each agency varies by local and state ordinances. In certain instances a building may only be listed on a local or state register and subject only to the criteria defined by local and state enabling ordinances or design guidelines. Nationwide, many of these guidelines are based directly on the Secretary of the Interior's Standards.

In situations where actions requiring the use of federal funds are contemplated that will affect a building on or eligible for just the NRHP, the oversight and review of these actions is undertaken by

FIGURE 5. The single pane glazing in the original industrial sash was replaced with laminated glass to enhance the energy performance of the windows at the Big-D Construction Office. This allowed the window rehabilitation to retain its original appearance and thus conform to the Secretary of the Interior Standards for Rehabilitation (© 2007, Robert A. Young, all rights reserved).



the NPS, which acts on behalf of the Secretary of the Interior. This ultimately leads to what is known as a "Section 106 Review" where the project is reviewed to determine what adverse effects, if any, are created for the historic property. When there is an adverse effect, the agency attempting to complete the proposed project is required to mitigate that effect. For example, a highway project using Federal funds may have to be realigned so that the proposed road improvement project minimizes or eliminates the adverse effect on the historic property or it may otherwise have to document the building with mea-

sured drawings and photography and then seek a demolition permit to remove the building.

Preservation Tax Incentives

The Federal government encourages the preservation of historic buildings through the use of Federal tax incentives to support the rehabilitation of historic and older buildings. The Federal Historic Preservation Tax Incentives for Historic Buildings Program (U.S. Department of the Interior 1996) has proven to be one of the most successful and cost-effective community revitalization programs in the nation. This success in community revitalization is a significant indicator of the sustainable attributes of reusing historic and older buildings. Since 1976, the NPS has administered the program in partnership with the Internal Revenue Service (IRS) and with the SHPOs. These incentives have been instrumental in preserving buildings that give cities, towns and rural areas their individual character. These preservation tax incentives generate private investment; create jobs; bolster property values; and increase revenues through increased property, business, sales, and income taxes. The Preservation Tax Incentives also help create moderate and low-income housing when used in conjunction with other Federal affordable and low-income housing incentive programs.

Although the program has evolved over the past four decades, its intent remains to provide an incentive for owners of historic properties to invest in the rehabilitation, preservation, or restoration of historic and older buildings. Initially, this program was created, in part, to overcome the broadly held perception that rehabilitation would cost more than new construction. Subsequent analysis has revealed that rehabilitation has often cost less than or at least competitive with comparable new construction (Rypkema 1994). Similarly, but to a lesser degree, many states have enacted historic preservation incentives that utilize tax credits, low interest loans, and other programs to encourage historic preservation activities locally. These state level programs are broadly diverse, and descriptions of the individual state programs can be found at the National Conference of State of Historic Preservation Officers (NCSHPO) web site (<http://www.ncshpo.org/>).

There are currently two Federal historic preservation tax credit programs. The first is a 20% tax

credit for the certified rehabilitation of a certified historic building. The second is a 10% tax credit for the rehabilitation of a non-historic, non-residential building built before 1936. A tax credit is different from a tax deduction in that, while a deduction lowers the amount of income subject to taxation, a tax credit reduces the amount of tax owed. For either credit, the rehabilitation must be substantial and must involve an income producing building that can be depreciated. The term “substantial” is a quantification based on comparing the construction cost with the adjusted basis of the building. To be considered substantial the cost of construction must exceed the adjusted basis of the building (i.e., the property value remaining after the land value, the value of any improvements, and accumulated depreciation have been deducted) or \$5,000, whichever is higher. With the exception of small residential rental properties, for the most part, the former case is the deciding metric. When the project is completed, an accounting of the project costs is made and applicable costs are tabulated. The 10% tax credit program differs from the 20% program in that the building cannot be on or be eligible for the NRHP. It is limited to buildings constructed before 1936 that will be reused for commercial purposes and not residential housing. These projects are also required to:

- Retain at least 50% of the exterior walls as exterior walls.
- Retain at least 75% of the exterior walls in place as exterior of interior walls.
- Retain at least 75% of the building's interior structural framework in place.

For simplicity, this article will only look at the 20% preservation tax credit program that was used in the W. P. Fuller Paint Company Building rehabilitation completed by the Big-D Construction Company described in the case study below.

The 20% tax credit is calculated as a direct percentage of the applicable construction related rehabilitation costs. Applicable rehabilitation costs include the costs of the work on the historic building and do not include the cost of buying the building, landscaping, furnishing, or costs associated with any new additions to the original building. These costs may also include design and development fees, site survey fees, construction-related costs, and legal expenses.

Federal Tax Credit Application Process

The process for filing an application for Federal tax credits consists of three parts: significance, intended scope of work, and confirmation of completed work. To be eligible to receive tax credits, the subject building or buildings must be on or eligible for the NRHP. Any building not listed on the NRHP at the start of the project must have been approved for inclusion on the NRHP before tax credits can be taken. Part 1 includes the "Evaluation of Significance" of the building either by confirming that the building is listed individually or is a contributing building within an historic district. A building not yet listed on the NRHP may be deemed to be eligible for the NRHP based on consultations with the SHPO and NPS to formulate a preliminary determination of significance. Although this preliminary determination is not binding, work can thus proceed while the actual nomination continues. Part 2 of the application "Description of Rehabilitation" documents the "before" conditions using photographs and provides a written description of the intended course of work proposed for the rehabilitation. This part of the application is supplemented by construction documents including plans, renderings, and specifications that illustrate the scope of the proposed work. This portion of the application is first reviewed by the SHPO and then forwarded to the NPS with its recommendations. The NPS then reviews the proposed work for conformance to the Secretary of the Interior's Standards and determines whether the proposed project meets the requirements for a certified rehabilitation. After the work has been completed, the owner then submits Part 3 "Request for Certification of Completed Work" to the SHPO who reviews the application and inspects the work on site. The submission includes "after" photos and a final description of work completed. As with Parts 1 and 2, the SHPO reviews the application and forwards the application to the NPS with its recommendations. The NPS compares the completed work with the proposed work described in Part 2. When the completed work has been shown to conform to the standards the NPS then issues a "certified rehabilitation" approval for the project.

Once the tax credit has been approved, the applicants can redeem the credit on their annual Federal tax filing. When the tax credit exceeds the tax

owed in the first year of redemption, the balance of the credit can be carried forward to the next year or back to the previous year. The carry forward can continue until the tax credit balance is depleted or for a maximum of 20 years, whichever comes first. The owner must also continue to own the building for five full years after completing the rehabilitation, or pay back the credit on a prorated basis. Selling the property in the first year would prompt a 100% repayment of the credit and the percentage of repayment would decrease by 20% each year until reaching zero percent after the fifth year. The SHPO or the NPS may inspect the property at any time during this five-year period and revoke certification if the completed work was not done as described in Part 2 of the application or if unapproved alterations were made in the first five years after certification of the rehabilitation.

Additionally, a number of provisions in the Internal Revenue Code include the "at-risk" rules, passive activity limitations, and the alternative minimum tax. In practice, these provisions define the conditions under which the taxpayer is eligible to use tax credits earned in a certified rehabilitation project. As such, applicants should seek professional advice regarding the financial implications of these provisions.

ENVIRONMENTAL CONSERVATION PERSPECTIVE

Here again, some further orientation is needed for those readers who are unfamiliar with the development of the contemporary environmental performance standards. As with the preservation perspective, this is intended to be a summary overview to provide the basis for understanding aspects of the performance parameters used in the Big-D Office Building used in the case study. The first recognized environmental conservation activities can be seen as coming into public notice during the industrial and urban expansion era of the early nineteenth century with the initial writings of such noted and outspoken environmental advocates as Henry David Thoreau that were subsequently extended and continued by John Burroughs, John Muir, and Rachel Carson (U.S. Environmental Protection Agency 1992). The same tenor of growing conservation awareness initiated by the early preservationist activities had broadened to include environmental and cultural conser-

vation and resulted in the initial formation of the now many national parks and monuments enjoyed to this day. Indeed, many preservationists see the environmental conservation movement as a long-term outgrowth of early preservation efforts. As a result of this overlap, environmentalists can include the creation of national parks and monuments, the enactment of various Federal laws to protect cultural resources, and the formation of the National Park Service (NPS) as part of its earliest roots. The environmental movement also has included the formation of such notable conservation organizations, among others, as the Sierra Club, the National Wildlife Foundation, and the Audubon Society.

Conservationists can also point towards the presidential imperatives and programs initiated by Theodore Roosevelt, Franklin D. Roosevelt, Lyndon B. Johnson, Richard M. Nixon, and James E. Carter during their separate terms in office. Like preservation, social concerns over the environment led to the passage of the National Environmental Policy Act in 1969, which provided the framework for establishing the United States Environmental Protection Agency in 1970 that was charged with the responsibility of overseeing environmental quality issues nationwide (U.S. Environmental Protection Agency 1992; U.S. Department of Energy n. d.). Subsequently, the two energy crises of the 1970s hastened the exploration of environmentally sensitive construction practices with a specific focus on the conservation of energy as a primary goal. In 1977, the United States Department of Energy was formed to oversee the use and protection of energy resources (U.S. Department of Energy, n. d.), which further heightened the nation's focus on energy usage and conservation. In response to the demands for greater energy efficiency, building code officials, professional societies, and trade organizations began developing various standards intended to reduce energy consumption. One of these standards was ASHRAE/IESNA 90 that established performance standards for building energy. This standard, or variations of it, has been incorporated into building codes nationwide.

Building Codes and Performance Standards

One constraint of this period was that the new standards and codes were largely intended for design and construction of new buildings. Therefore,

many current building codes and high performance building standards are written specifically for new construction and may not be directly compatible with or cognizant of construction systems found in older and historic buildings. However, the International Building Code and its related sub-codes recognize and give specific exemptions to buildings that have been listed on or are eligible for the NRHP or that have been listed on a state or local register. Several states and municipalities also have alternatively adopted "smart" codes that enable interpretation of requirements to adapt them for use on historic buildings.

The United States Green Building Council

The United States Green Building Council (USGBC) is an independent non-profit organization that was formed in 1993 and is composed of leaders of companies and organizations that span the spectrum of the building industry. Like the preservationist's efforts to define the four treatments used on historic buildings, the USGBC was established in response to the design and construction industry's desire to be able to quantify how "green" and therefore sustainable a proposed building will be. Initially established with a focus on new construction, the LEED program now includes or will be expanded to include the following aspects of the built environment:

Existing Programs

- LEED-NC (new construction): applied to new construction.
- LEED-EB (existing buildings): applied to systems improvement in existing buildings.
- LEED-CS (core and shell): applied to new construction where tenant improvements are to be done separately.
- LEED-H (homes): applied to new individual houses.

Proposed Programs

- LEED-R (retail): applied to new retail buildings.
- LEED-HC (health care): applied to new hospitals and other health care facilities.
- LEED-ND (neighborhood development): applied to neighborhoods.

As can be seen, these programs are still oriented substantially toward new construction. While

LEED-EB is applied to projects that serve to enhance mechanical and electrical systems, all of the existing programs give only nominal credit for the reuse of existing buildings, historic or otherwise.

Similar to the way that the Secretary of the Interior's Standards are used to confirm how well a project respects the historic integrity of a proposed project, the LEED program sets performance parameters that enable the designer, owner, materials supplier/manufacturer, and builder to evaluate how green the building could be (see Figure 6).

Each program includes a system of credits that establishes how the proposed project builds value towards being green by examining its potential

FIGURE 6. Daylighting plays a prominent role in sustainable building design. Shown here is the central atrium that was created as a focal point to the Big-D Construction Company adaptive use of the W. P. Fuller Paint Company Building (© 2007, Robert A. Young, all rights reserved).



performance in several key areas. Using the LEED-NC standards that the Big-D project followed as an example, these key areas included (with allowable points in each area given in parentheses):

- Sustainable Sites (14 points)
- Water Efficiency (5 points)
- Energy and Atmosphere (17 points)
- Materials and Resources (13 points)
- Indoor Environmental Quality (15 points)
- Innovation and Design Process (5 points)

There are also prerequisites in several of the key areas that must be met before any credits can be earned in that area (Note: As the LEED program has grown, there have been several generations of scoring systems devised, and the separate programs use varying criteria for their specific market type). To provide further incentive, the USGBC has established a ranking system to identify the level of success in accomplishing the green goals. This was done so that real estate professionals, owners, and design teams can credibly identify a common understanding of the green qualities of buildings in more general terms and designers, owners, manufacturers, and builders can establish further credibility when marketing their own sustainability ethos. Again, for the LEED-NC program the scoring tabulation is defined as thus:

- Platinum: 52–69 points
- Gold: 39–51 points
- Silver: 33–38 points
- Certified: 26–32 points.

Applying LEED in Practice

Along the same lines as the Federal Preservation Tax Credit Program, there is an application process involved with LEED. Property owners wishing to qualify for a LEED rating on a proposed building project submit an application to the USGBC. To enhance the building community's ability to interpret and implement the design strategies needed to achieve these ratings and to complete the documentation needed to confirm compliance, the USGBC has established the role of "LEED accredited professional" (more commonly known as a LEED-AP) who monitors and coordinates the design with the requirements and documentation paperwork of the program. The LEED-AP is a member of the design team, and there

also can be multiple LEED-APs working within the organizations of the designer, manufacturer, and builder. The LEED-AP has a role similar to that of the SHPO in that the LEED-AP provides technical assistance and monitors the documentation needed to achieve certification. The USGBC has established a training and examination program to develop this role from within the building industry. When the building is completed and has met all of the design, systems operations, and documentation requirements, the USGBC, much like the NPS for historic preservation tax credit projects, reviews the project to confirm the actual implementation of the proposed work. In this process the point credits are confirmed or denied and the final rating is granted (U.S. Green Building Council n.d.).

Early Controversies

Due to the original point system that was developed for LEED-NC and the way it was seemingly insensitive to the preservation of buildings, many preservationists have decried the way the treatment of existing buildings, especially since it appeared to ignore altogether any historically significant ones, was defined. One consequence of this has been the inclination of property owners to forgo LEED credits to protect and ensure the availability of the preservation tax credits (Farneth 2007). Although many argued for a greater percentage of credits that took into account embodied energy and the concept that recycling a building in place was a proven sustainability strategy, little if any credence was given toward expanding the credits in this direction.

Similarly, since the public perception that only highly energy efficient buildings are the primary means of measuring sustainability meant that surely the older and existing buildings—long considered “energy hogs” from the perceptions gained after the 1970s energy crises—could in no way, shape, or form be viewed as sustainable. This “new construction” bias not only is inaccurate, much in the same way that many in the building industry originally thought rehabilitation was more expensive than new construction, but it also remains a stumbling block in getting to the truly functional definition of what constitutes a sustainable building. The following case study shows how this perception can begin to be mitigated if not eliminated altogether.

CASE STUDY: BIG-D CONSTRUCTION COMPANY HEADQUARTERS, SALT LAKE CITY, UTAH

The Big-D Construction Company was founded in 1967 by Dee Livingood in Ogden, Utah. The firm has grown significantly in the subsequent four decades and was ranked 146th in the *Engineering News Record* “Top 400 Contractors” list with revenues exceeding \$400M in 2006. Based on this ranking, Big-D is among the top 0.25% of building contractors in the United States (Big-D Construction 2007). In 2000, Jack Livingood, the CEO and son of the company founder Dee Livingood, began looking for a building to house the corporate headquarters. His objective was to find an existing historic building that could be adaptively used to house the 105 employees of the company. The final result was the selection of the long vacant W. P. Fuller Paint Company building located on the west side of downtown Salt Lake City. Two of the goals for the project were to demonstrate the feasibility of adaptively using an historic building in accordance with the Federal Preservation Tax Credit Program and to obtain at least a Silver ranking in the LEED-NC category (Note: this was the only category available at the time of the project.). Construction activities commenced in December 2003 and were completed a year later at a cost of \$6.5M (Big-D 2005b, 23). The final approval of the NRHP listing occurred in September of 2005.

Background Parameters

The W. P. Fuller Paint Company building is located on the near west side of the downtown of Salt Lake City and within an early twentieth-century industrial neighborhood that had been established as a redevelopment zone by the Salt Lake City Redevelopment Authority (RDA). Since the building was located within a redevelopment, Big-D was able to obtain a \$2.5M low interest loan from the RDA (Redevelopment Agency of Salt Lake City 2005) that enhanced the economic attractiveness of the building.

Big-D took an additional step to enhance the economic feasibility by pursuing the 20% Federal tax credit for historic buildings. While the building was not originally listed on the NRHP at the time of acquiring the property, the SHPO preliminarily determined that it was eligible for the NRHP.

According to Jack Livingood, anticipated receipt of the tax credits was the final aspect that made the project financially feasible (Young 2007b).

In addition to being the client/owner, Big-D was the natural choice to serve as the general contractor for the project. In seeking an architect, Big-D had already been working with the architectural firm of Gillies Stransky Brems Smith (GSBS) of Salt Lake City to assist Big-D in identifying potentially feasible buildings. Big-D had worked on several adaptive use projects with GSBS and was quite familiar with how GSBS approached the process of design. GSBS also had become quite familiar with the LEED certification process and had numerous green buildings in their portfolio including the Olympic Speed Skating Oval that had earned a LEED Silver rating. With David Brems, FAIA, LEED-AP as the principal in charge, GSBS organized a design team that included CCI Mechanical (mechanical engineer), Spectrum Engineering (electrical engineer), Dunn Engineering (structural engineer), and Great Basin Engineering (civil engineer), and began working on the design that ultimately transformed the W. P. Fuller Paint Company building into the Big-D Construction Company Headquarters (Big-D 2005b).

Building History

W. P. Fuller, originally from New Hampshire, had ventured west to California in 1849 seeking gold. His lack of success in that endeavor led to his eventually gaining his own personal fortune through working within the paint and glass industry. After successfully amassing his fortune through a series of partnerships, W. P. Fuller passed away in 1890 but his eponymous company continued after his death as W. P. Fuller & Company. It is believed that concerns from losses suffered from the San Francisco earthquake and ensuing fire in 1906 prompted the company leaders to view concrete construction as “particularly attractive” (Durst 2005, 8).

The W. P. Fuller Paint Company Building was constructed in 1922 as a regional office and distribution center warehouse. The building exhibits some modest Art Deco influences that are noted in tile and painted details and is comprised of a four-story reinforced concrete commercial style building on a raised foundation. There is a tower on the Southeast corner of the building that is three stories taller than the oth-

erwise flat roof. The building is made of reinforced concrete and is clad in a stucco finish. The building measures approximately 120' × 150' with an interior area of 69,600 square feet. The building was the first large-scale all-concrete building in Salt Lake City (Broschinsky 2005) and the first all-concrete warehouse west of the Mississippi (Huffaker 2005).

The building was used as a manufacturing facility, warehouse, and offices. Only the office portions of the building were heated. The heavy concrete construction was well suited to carrying the loads imposed by thousands of gallons of oils and other raw materials used in making paints, varnishes, and enamels. Also located within the building was a glass department that made a variety of glass products that included “inch thick” glass steps. All in all, the facility was considered to be state-of-the-art technology in 1992 (Deseret New 1992).

LEED Credits Checklist

The Big-D Construction Company's adaptive use of the W. P. Fuller Paint Company building was certified under the guidelines for LEED-NC Version 2.1. A listing of the credits earned is given in Table 1 and is followed by a summary of the methods, strategies, and materials used in each of the six LEED-NC categories.

Sustainable Sites. This W. P. Fuller Paint Company building rehabilitation qualified for eight points in this category. The “brownfield” site in the former industrial neighborhood is located adjacent to a ten acre city park, and is within walking distance of public mass transit systems that at the time of the rehabilitation included buses and light rail.³ The site was not prime farmland, parkland, or habitat for endangered species and was not located within proximity to a 100-year flood plain. In the rehabilitation, GSBS included designated carpool parking space convenient to the front door to encourage carpooling (see Figure 7) and also included bicycle storage and changing facilities for bicyclists.

³There is now also an intermodal transit hub, completed in 2005 and located three blocks away, that serves as the interface between the local public transit system, taxicabs, bicyclists, pedestrians, AMTRAK, and a commuter rail system (currently in final stages of testing and operator training).

TABLE 1. Big-D Construction Company LEED summary of credits allowed for LEED-NC Version 2.1 Project Checklist (Big-D Construction 2005a).

Credit	Sustainable Sites	Points
1	Site Selection	1
3	Brownfield Redevelopment	1
4.1	Alternative Transportation, Public Transportation Access	1
4.2	Alternative Transportation, Bicycle Storage & Changing Rooms	1
4.4	Alternative Transportation, Parking Capacity and Carpooling	1
7.1	Heat Island Effect, Non-Roof	1
7.2	Heat Island Effect, Roof	1
8	Light Pollution Reduction	1
		8
Credit	Water Efficiency	Points
1.1	Water Efficient Landscaping, Reduce by 50%	1
		1
Credit	Energy & Atmosphere	Points
1	Optimize Energy Performance	4
6	Green Power	1
		5
Credit	Materials & Resources	Points
1.1	Building Reuse, Maintain 75% of Existing Shell	1
1.2	Building Reuse, Maintain 100% of Shell	1
1.3	Building Reuse, Maintain 100% of Shell & 50% Non-Shell	1
2.1	Construction Waste Management, Divert 50%	1
2.2	Construction Waste Management, Divert 75%	1
4.1	Recycled Content, Specify 5%	1
4.2	Recycled Content, Specify 10%	1
5.1	Local/Regional Materials, 20% Manufactured Locally	1
5.2	Local/Regional Materials, 20% Above, 50% Harvested Locally	1
		9
Credit	Indoor Environmental Quality	Points
1	Carbon Dioxide (CO ₂) Monitoring	1
2	Ventilation Effectiveness	1
3.1	Construction IAQ Management Plan, During Construction	1
3.2	Construction IAQ Monitoring Plan, Before Occupancy	1
4.1	Low-Emitting Materials, Adhesives and Sealants	1
4.2	Low-Emitting Materials, Paints	1
4.3	Low-Emitting Materials, Carpet	1
4.4	Low-Emitting Materials, Composite Wood and Agrifiber	1
5	Indoor Chemical and Pollutant Source Control	1
7.1	Thermal Comfort, Comply with ASHRAE 55-1992	1
7.2	Thermal Comfort, Permanent Monitoring System	1
8.2	Daylight and Views, Views for 90% of Spaces	1
		12
Credit	Innovation & Design Process	Points
1.1	Innovation in Design: Low Emitting Materials—Furniture and Seating	1
1.2	Innovation in Design: Education	1
1.3	Innovation in Design: Exemplary Performance—Green Power	1
2	LEED Accredited Professional	1
		4
Grand Total		39

LEED Rating: Gold

FIGURE 7. Parking for carpooling was designated near the front entrance for convenient access for carpool participants (©2008, Robert A. Young, all rights reserved).



In designing the parking lot, lighter colored concrete was specified to reduce the amount of heat absorption as compared to darker concretes. Likewise, the roof was clad with light-colored, single-ply, EPDM roofing (Livingood 2003) (see Figure 8). Both of these strategies contribute to the mitigation of the urban heat island effect common in many cities and urban areas. Lastly, the parking lot lights and building illumination systems were selected to eliminate light trespass from the site and light pollution to the sky (see Figure 9).

Water Efficiency. As part of the redesign of the parking lot and site, the landscaping was selected for its xeriscaping and drought tolerance qualities (see Figure 10). Grasses and plants native to Utah were

FIGURE 8. Lighter colored roofing reflects solar energy and helps to reduce internal heat gain and the urban heat island effect (©2008, Robert A. Young, all rights reserved).



FIGURE 9. Lighter colored concrete was selected for the parking lot since it reduces heat absorption during the day while lighting systems were selected to eliminate light pollution and trespass at night (©2008, Robert A. Young, all rights reserved).



selected to achieve this goal. Storm water recapture is accomplished by using permeable materials, such as mulch, to allow water to percolate into the planting beds directly.

Energy & Atmosphere. In addition to meeting the prerequisites for fundamental commissioning, complying with the energy standard ASHRAE 90.1, and the elimination of CFC-based refrigerants, the project was able to capture five credits in this section. The design of the mechanical systems resulted in a

FIGURE 10. Xeriscaping or drought tolerant plant species were used to minimize the use of water for irrigation purposes (©2008, Robert A. Young, all rights reserved).



FIGURE 11. The large atrium created by removing sections of concrete slab provides light and air flow paths that enhance the energy performance of the building (©2008, Robert A. Young, all rights reserved).



34% reduction in energy consumption as compared to a standard office building (Durst 2005). Literally at the heart of the building, a central atrium was created by removing sections from the concrete floor slabs from the first, second, and third floors. Care was taken to not damage the concrete columns since they had been identified as character-defining features of early reinforced concrete construction practices. The atrium not only introduced a substantial amount of daylight but afforded the opportunity to introduce nighttime convective cooling (see Figure 11). In the evenings when the building is unoccupied, the skylights at the top of the atrium can be opened to permit the evacuation of built up heat by natural convection (e.g., warm air rises) and when need be, 12' diameter fans can be used to provide updraft or downdraft circulation. Similarly, in the spring and fall, outdoor air can be brought into the building via the former freight elevator shaft to the mechanical room where it can be filtered and directed through an evaporative cooling system to provide cooling without using the electrical chillers (Young 2008a).

As with many older buildings built before the introduction of Thermopane windows in 1934 (Young 2008b), the W. P. Fuller Paint Company building was constructed with single paned glazing set into industrial steel sash (refer back to Figure 5). Their replacement was contemplated, however, since they comprised one of the major character defining aspects of the exterior façade and their removal could jeopardize the receipt of the highly desirable tax credits, the design team sought other alternatives. Their solution was to devise a replacement glazing that could directly replace each of the multiple panes of glass located in each sash. This glazing was comprised of thicker multilayered laminated glass that not only increased the thermal performance from a heating perspective but incorporated a layer of shielding material that could reduce the UV component admitted into the building. This decreased the heat gain and in turn lowered the amount of energy needed to cool the building. The window sash was removed, the existing glass was removed, and the sash was repaired. The laminated glass panes were then installed and the rehabilitated windows were reinstalled in the façade (Young 2007a).

Additionally, electrical power usage is reduced through the use of occupancy sensors and daylight

sensors that dim or turn off lighting when there is sufficient daylight available to meet users' needs (Big-D n.d.). Big-D also purchased wind power in sufficient quantities to meet the green power requirements of LEED-NC (Big-D 2005a).

Materials & Resources. This is the category that LEED gives the most credence to reusing existing buildings. With the possibility of up to three points for reusing various aspects of the existing building envelope and structural components, Big-D in fact did just that. Not only were the original exterior and interior structural support framework retained but concrete materials removed during the creation of the central atrium were recycled and used in the fabrication of the concrete parking lot. This also earned credits for diverting more than 75% of the demolished materials from the waste stream and out of the landfill.

LEED awards points for recycled content and using locally manufactured materials. In this regard, the Big-D project earned points through the use of products and materials with more than 10% recycled content in them. In this same direction, "nearly 33% of the materials" used in the rehabilitation were acquired from local or regional producers within 500 miles (Argyle 2007a).

Indoor Environmental Quality. As with several of the earlier categories, Big-D met the prerequisites for minimum indoor air quality and the prevention of occupant exposure to environmental tobacco smoke. They further gained credit for CO₂ monitoring and ventilation effectiveness. The oversized, industrial quality of the ductwork layout throughout the building readily demonstrates the use of this strategy (see Figure 12). Careful selection of equipment and judicious placement on the roof, in the Southeast tower, and in basement areas enable the Big-D building to achieve thermal comfort throughout the building in compliance with modern criteria.

An indoor air quality (IAQ) management plan was implemented during construction and prior to occupancy to ensure that any dust or residue generated during these periods was not allowed to remain in the building after occupancy. Another contributing factor to the IAQ success was the use of low

FIGURE 12. Ventilation management enabled the Big-D project to gain credit towards its Gold rating (© 2008, Robert A. Young, all rights reserved).



emitting materials in adhesives, sealants, paints, carpets, and composite wood products. In doing so the introduction of volatile organic compounds (VOCs), urea-formaldehyde, and other potentially hazardous chemicals into the workspace were curtailed. In addition, the HVAC systems were designed to provide thermal comfort in accordance with ASHRAE Standard 55-1992 and were configured to achieve continuous monitoring and control of both thermal and humidity conditions.

Ironically, although the building prides itself on its extraordinary daylighting opportunities created by the central atrium, the project team could not predict the minimum daylight factor of 2% in 75% of the interior spaces to achieve credit in this regard. The methodology predicted only 71% of the space met that criteria. On the other hand, interior spaces have access to exterior views throughout the building by the careful selection of glazing in doors to perimeter offices on each floor. This glazing also has permitted daylight to pass through the perimeter offices and into the interior spaces adjoining them.

Innovation & Design Process. LEED provides the opportunity for innovations⁴ that have not been codified elsewhere within the LEED standards.

⁴It is the author's opinion that the combination of LEED, historic preservation tax credits from the Federal government, and the low interest loan from the Redevelopment Authority present an innovation that went unrewarded in this project.

This provides for potential solutions and enhancements that otherwise may go unrecognized or, worse, unconsidered by other design teams. This practice extends the possibility that these innovations may model a practice that can be applied to other projects of similar design intent or scope. For the Big-D project, three innovative ideas were recognized and given credit toward LEED certification. In addition to the low-emitting materials used in rehabilitation, the selection of the furnishings that were constructed of low-emitting materials was deemed innovative. A second idea was the intent of the building to act as a teaching tool to allow employees, clients, and other visitors to understand the true innovative nature of the rehabilitation and how it contributes to a more sustainable environment. Lastly, Big-D purchased wind power from a local utility to compensate for energy usage beyond the requirements that granted a point for the Energy & Atmosphere Credit 6 “Green Power.”

To encourage the advancement of LEED, the USGBC also recognizes the inclusion of a LEED-AP as an integral part of the design team. In this instance, Kerry Arnold, a BIG-D senior project manager, served in that role (Big-D Construction n.d.) and was complemented by several LEED-APs from GSBS (Argyle 2007a).

DISCUSSION

As can be noted by the broad-based input that contributed to the rehabilitation that now comprises the Big-D Construction Company Office Headquarters, the process was complex but not impossible. The vision and goals of Jack Livingood as CEO of Big-D challenged the design team to explore and evaluate numerous possible solutions. From a strictly LEED perspective, the building presented many directions in which to proceed. From a financial perspective, the project prospects were considerably enhanced by the receipt of the low interest loan from the Salt Lake City Redevelopment Authority and the availability and eventual granting of the Federal Historic Preservation Tax Credits.

In defying the ongoing perception that older buildings are not sustainable, the Big-D design and construction team has shown that careful consideration of options and an open-minded approach to patiently refining potential solutions can create a

successful outcome. The successful combination of LEED certification, financing, and tax credits that focused on a historically-significant building is innovative and among the rarest of building project types in the nation. The success of this project contradicts the common (mis)perceptions that older buildings, especially those built prior to World War II, cannot be considered sustainable.

As noted earlier, one of the arguments against retaining older buildings draws its foundation from the attempts to make buildings more energy efficient in the late-twentieth century. As this project clearly shows, despite the limitations imposed on modifying the building envelope, and in the broader context of social sustainability and economics, projects directed at existing buildings can alleviate those shortfalls through the recognition of merit from all six LEED categories rather than focusing on the energy difficulties alone as a reason not to retain and adaptively use existing buildings.

Also, the confusion as to what can or cannot be done to the exterior of the building, both in materials and physical massing of proposed addition in relationship with the existing building, needs to be abated. For instance, there is a surprising commonality between LEED and the Federal Historic Preservation Tax Credit guidelines that gives promise for further recognition and expansion of the concept of adaptive use in existing buildings. Similarly, while there is a considerable opportunity for the use of renewable power sources such as photovoltaic and wind power generators, the location of these systems must take into account the appearance of a significantly historic building. While the Secretary of the Interior's Standards and their accompanying Guidelines for Rehabilitation do permit their use on a historic building, they must be located such that they do not detract or alter the perception of the building as seen from a building way. In this scenario, renewable power systems can be placed on a flat roof of larger buildings so that the appearance of the primary façades is left intact. By stepping the location of the renewable power collectors back away from the edge of the roof such that they cannot be seen from the street, the energy usage of older buildings can be drawn from the sun and not the utility grid. However, much like the early misperception about rehabilitation costs, there must be a

continued effort to reduce the installation costs of these renewable energy systems that may only come from tax credit and financing systems. Eventually, as demand increases and the imperative to recover the development costs of these systems is abated, their use on older and historic buildings will negate the current bias that they are not sustainable simply based on energy inefficiency.

Although only 39 LEED credits were certified for the W. P. Fuller Paint Company building rehabilitation, this amount still enabled the project to achieve a “Gold” rating. This made the Big-D project among the first, if not the first, in the nation to qualify for the historic preservation tax credit concurrently with achieving the Gold certification. As such, while even for a very specific building typology (e.g., industrial warehouse), this project demonstrates that LEED and historic preservation can combine their mutual synergies to retain an existing older and historic building as a part of the move towards a more sustainable future.

Some may point out the success of this project may, in part, be attributed to the fact that the interior spaces were not deemed historically significant, which in turn allowed for the creation of the interior atrium that contributes substantially toward the overall success of the interior of the Big-D building. More importantly, however, was the astute vision of Jack Livingood and the perseverance of the Big-D design team that enabled him to assemble the financing, recognize the historic significance and pursue the tax credits, locate a property within a redevelopment zone that made it eligible for low-interest loan financing programs, and understand the importance of a well qualified design-build team that fostered the patience that ultimately made the rehabilitation the success that it has been.

CONCLUSION

In response to the questions at the start of this article, the success of the Big-D project readily demonstrates that historic preservation can indeed be green. The project therefore provides an exemplary model to emulate in efforts to achieve a sustainable future by embracing and respecting the historic preservation and rehabilitation of existing buildings.

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