RESPECT AND REUSE: SUSTAINABLE PRESERVATION IN PORTLAND, OREGON

by

BETHANY N. JOHNSON

A THESIS

Presented to the Interdisciplinary Studies Program:
Historic Preservation
and the Graduate School of the University of Oregon
in partial fulfillment of the requirements
for the degree of
Master of Science

June 2009

"Respect and Reuse: Sustainable Preservation in Portland, Oregon," a thesis prepared by Bethany N. Johnson in partial fulfillment of the requirements for the Master of Science degree in the Interdisciplinary Studies Program: Historic Preservation. This thesis has been approved and accepted by:

Dr. Kingston Heath, Chair of the Examining Committee

June 2, '09
Date

Committee in Charge: Dr. Kingston Heath, Chair
Shannon Bell

Accepted by:

Dean of the Graduate School

An Abstract of the Thesis of

Bethany N. Johnson for the degree of Master of Science

in the Interdisciplinary Studies Program: Historic Preservation

to be taken June 2009

Title: RESPECT AND REUSE: SUSTAINABLE PRESERVATION IN PORTLAND, OREGON

Approved: _____
Dr. Kingston Heath

The 'culture of sustainability' is rapidly developing across the United States and the globe. Prompted by economic and environmental crisis, the need to understand and implement sustainable practices has become the paramount objective of the building industry. Utilization of historic preservation as a *response* to sustainable development is an important aspect of the building profession not yet fully understood, though its roots are found in the "new life for old buildings" movement of the 1970s. This lack of understanding is, in part, due to limited research addressing the conservation and sustainability of the existing building stock within the United States. This thesis will provide case study research on successful sustainable preservation strategies that have been filtered through the National Register of Historic Places and the LEED Green Building Rating System, helping to define the opportunities for beneficial interchange.

CURRICULUM VITAE

NAME OF AUTHOR: Bethany N. Johnson

PLACE OF BIRTH: Anaheim, California

DATE OF BIRTH: January 15, 1983

GRADUATE AND UNDERGRADUATE SCHOOLS ATTENDED:

University of Oregon, Eugene

Brigham Young University, Provo

DEGREES AWARDED:

Master of Science, Historic Preservation, 2009, University of Oregon

Bachelor of the Arts, Anthropology: Archaeology, 2005, Brigham Young University, Provo

AREAS OF SPECIAL INTEREST:

Sustainable Preservation
Advocacy and Policy
Community Impacts
Adaptive Reuse

PROFESSIONAL EXPERIENCE:

Graduate Teaching Fellow, Historic Preservation Program, University of Oregon, Eugene, 2008

Graduate Teaching Fellow, Anthropology, University of Oregon, Eugene, 2007

Executive Office and Council Liaison, American Historical Association, Washington, D.C., 2005-2007

PUBLICATIONS:

Johnson, Bethany N. "Why We Preserve: A Student's Response." *Associated Students for Historic Preservation Journal* 21, no. 1 (Spring 2008): 2-5.

Johnson, Bethany N. "White Stag, Green Stag: The Role of Sustainable Preservation at UO Portland." *Associated Students for Historic Preservation Journal* 21, no. 1 (Spring 2008): 22-26.

ACKNOWLEDGMENTS

I wish to express appreciation to Dr. Kingston Heath and Shannon Bell for their guidance and direction in the research and writing of this thesis. In addition, appreciation to all the building professionals that gave of their time to answer questions and offer their insight and experience is in order. I gained valuable experience and understanding by conversing with these individuals. In addition, special thanks to fellow Historic Preservation classmates for the many hours of learning, laughing, and commiserating.

DEDICATION

I dedicate this thesis to my parents, who always believe that I can do anything. Also, to my siblings and friends who have spent many hours encouraging and joyfully celebrated the many milestones, great and small.

TABLE OF CONTENTS

Chapter Page

Chapter Page

LIST OF FIGURES

Figure Page

LIST OF TABLES

CHAPTER I
INTRODUCTION

Preface

"We recycle newspapers but not buildings?" This is the exact phrase that came into my mind one day while on my way home from work. As a result of riding the D.C. Metro to and from work twice a day, five days a week, on average I was walking by eight newspaper recycling bins *a day.* Also in my daily commute of two years to the *American Historical Association,* I walked by almost a mile of historic row houses through the Capital Hill Historic District. Having grown up in one of the most rigidly planned cities in the nation, encircled by the suburban sprawl of Orange County, I marveled daily at the variety, individuality, and endurance of historic architecture. I began to wonder why we recycled small things like newspapers, soda cans, and glass bottles fervently in the name of "saving the earth" only to demolish entire buildings with seemingly no thought of the environmental impact. Not to mention the resulting impact on entire communities. I continued to ponder this seemingly incongruous connection, to no avail. I simply could not grasp the logic behind it and even started to wonder if the connection I had drawn between recycling and buildings made much sense. This question and these thoughts led me to the University of Oregon and to the research and writing of this thesis.

Overview

"We cannot *build* our way to sustainability, we must *conserve* our way to it."[1] This is the declaration given by architect Carl Elefante, effectively calling both building and preservation professionals to arms in the battle for truly sustainable development. Donovan Rypkema, preservationist and economic development consultant, made the same connection as described in the above preface, choosing Coke cans instead of newspapers to illustrate the concept of embodied energy. He reports that the demolition of one typical American downtown building – 25 feet wide and 120 feet deep – negates the environmental benefit of recycling 1,344,000 aluminum cans.[2] Not only has a

historic building been wasted, months of diligent recycling by an entire community has been thrown away. When placed in real and tangible terms, the connections between historic preservation and sustainability are readily apparent. The academic and commercial literature, however, demonstrate a severe gap in articulating this convergence.

To be clear, the present global concern of climate change, compounded by the energy crisis in the United States, has spurred widespread interest in sustainability and 'green' building.[3] Commercial literature abounds on the subject, as the building industry quickly attempts to address the impacts of the built environment on natural and urban ecologies.[4] The literature addressing sustainability, however, focuses predominately on new construction, systematically ignoring the already existing building stock. Likewise, the literature for adaptive reuse of historic structures only vaguely asserts its natural alignment with the concept of sustainable building.[5] The fact that these two movements are rarely discussed concurrently in the academic literature of architecture, planning, and preservation, exacerbates the need for an evaluation of the sustainable reuse of historic buildings.[6]

Intended Audience and Research Scope

Building professionals are the general intended audience for this thesis. The building industry is comprised of a variety of professions that are intimately involved with each other in order to address the broader context of the built environment. Addressing all facets of the building industry, specifically those involved with sustainable development and historic preservation is integral to the main argument of this thesis -- that the sustainability and historic preservation movements can be successfully utilized to address the environmental, economic, and socio-cultural responsibilities of sustainable development. This thesis aims to provide a clear articulation of how the sustainability and historic preservation movements share core governing principles, and that the integration of the National Register program and the LEED Green Building Rating System can address growing global climate concerns. It will also provide building

professionals with an assessment of three diverse case study examples. These case studies will be evaluated through both lenses of the National Register and LEED programs and will be available as templates for future projects.

Due to the broad audience and the complexity of the topic, there are many fascinating and important research avenues that cannot be explored within this thesis. The scope of this paper specifically does *not* include an in-depth analysis of the correlation between historic or current building practices and their environmental impacts, the implications of community redevelopment, or the impacts of urban redevelopment on society. These topics, although pertinent and influential to the discussion on sustainable preservation, fall outside the scope of this thesis. Areas for future research and suggestions to encourage the evolution of sustainable preservation include: "What can we learn?" "How are we preparing future building professionals?" "How can we communicate more effectively?" Specifically, future research on the topic includes:

1) The development of sustainable preservation educational programs that incorporate both sustainability and historic preservation education;
2) The cultivation of integrative design practices that encourage collaborative interaction in the beginning stages of project design and development;
3) The establishment of a "best practices" document for sustainable preservation utilizing the integration of the National Register and the LEED Green Building Rating System.
4) Federal support for compatible in-fill design that addresses both the historic fabric and sustainable practices.

Case Study Research

Little case study research has been published demonstrating the use of historic buildings as tools for achieving environmental, economic, and socio-cultural sustainability. Architect Nancy B. Solomon maintains that, "conservation underlies the basic principles of both the preservation and the sustainable movement."[7] Solomon draws attention to historic architecture's inherently green design principles -- now reemerging in contemporary designs as "sustainable" features -- and addresses the complex demands of real world reuse of historic buildings.[8] Elefante agrees, maintaining

that the preservation movement has always been 'green,' even if preservationists do not think of themselves as environmentalists. These clear articulations of historic preservation as a *response* to sustainable development are particularly effective in drawing attention to the symbiotic relationship of these two movements. Case studies can further articulate this relationship, offering application models and demonstrating successful sustainable preservation strategies to the preservation and building industries.[9]

A common expression by advocates of sustainable preservation is the need for a holistic approach when assessing the integration of these two fields. The literature consistently compartmentalizes the individual aspects of sustainability, dismissing a more appropriate holistic view.[10] Elefante, Rypkema, and Solomon assert that assessing buildings as a whole by evaluating site, materials, construction, energy performance, and life cycle energy costs together will provide a better sense of a historic building's sustainability.[11] This 'whole building' or 'integrated design' approach is not limited to the physical materials and location of the solitary building. It encompasses the cultural and social value of reusing an entire structure and its setting rather than simply recycling its parts and diverting waste from landfills.[12] The National Trust for Historic Preservation (NTHP) supports this holistic approach and maintains that it addresses *both* movements appropriately. In 2006 NTHP created the Sustainable Preservation Coalition in order to influence organizations actively developing sustainable building rating systems. Officially establishing the Sustainability Initiative in January 2008, the Trust formally acknowledged the role that sustainable preservation can and will play in the future of the built environment. "The conservation and improvement of our existing built resources, including re-use of historic and older buildings, greening the existing building stock, and reinvestment in older and historic communities, [are] crucial to combating climate change."[13]

Accrediting Programs

Addressing the conservation and sustainability of the existing building stock of the United States is the challenge that both preservation and building professionals face.

Both fields have established industry standards and developed accrediting systems. The 1966 National Historic Preservation Act (NHPA) established guidelines, or standards, for the Preservation of Historic American Buildings under the review of the Secretary of Interior in the National Parks Service (NPS). The Secretary of Interior Standards for the Treatment of Historic Properties "are neither technical nor prescriptive, but are intended to promote responsible preservation practices that help protect our Nation's irreplaceable cultural resources."[14] Conversely, the sustainability movement is led by the U.S. Green Building Council (USGBC), a non-profit organization comprised of more than 15,000 organizations across the building industry that are "committed to expanding sustainable building practices."[15] USGBC membership includes building owners and users, real-estate developers, facility managers, architects, designers, engineers, contractors, manufactures, and even government agencies.

Similarly to NPS, USGBC has an accrediting process called the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. It "is a third-party certification program and the nationally accepted benchmark for the design, construction and operation of high performance green buildings."[16] Both the NPS and the USGBC systems adequately addressed their prescribed fields and even acknowledge the existence of the other; however, neither is designed to address both sustainable and historic preservation considerations at the same time within a single project. Outlining completed projects of adaptively reused historic buildings that are influenced by both the LEED Green Building Rating System and the Secretary of Interior Standards will provide building and preservation professionals with a "best practices" assessment of sustainable preservation. This thesis aims to articulate the shared goals of the Sustainability and Historic Preservation movements as well as to provide examples of historic building reuse as a starting point for sustainable development.

Research Methods

Historical inquiry and an extensive literature search provided the basis for the first section of this thesis. The articulation of the three tenets of sustainable preservation --

environmental, economic, and socio-cultural responsibility -- contextualized the argument for building reuse as a desirable starting point for sustainable development. This complimentary relationship will be explored further through the lens of two organizations and their accrediting systems as they attempt to provide guidelines and regulations on the built environment. The Secretary of the Interior Standards and the LEED Green Building Rating System provided a framework in which to evaluate the proceeding case studies outlined in chapters three, four, and five.

These three chapters will present the case studies, selected to illustrate the points of convergence or divergence of historic preservation and sustainability in existing sustainable preservation projects. Three case studies were selected based on the following criteria:

- A building located in the city of Portland, Oregon.
- A building originally constructed at minimum 50 years ago.
- A building that has received a sustainable or 'green' renovation.
- A building showing documentary evidence that the NPS's *Secretary of the Interior Standards* were consulted during the re-design and renovation (National Register of Historic Places listing *not* required.)
- A building showing documentary evidence that the USGBC's LEED Green Building Rating System was consulted during the re-design and renovation (LEED certification *not* required.)
- A building that has been completed and is in-use.

Portland, Oregon

The specification that all of the case study projects be located in the city of Portland, Oregon was established mainly for consistency of climate. Climate is the greatest influencing factor on the selection process because of its affect on both evaluations of sustainability and historic preservation. Due to the highly specialized nature of both fields, it is important to recognize the influence of region and climate.

Historic resources are highly varied and 'unique.' No two historic buildings are exactly alike, even if they have similar functions, construction methods, materials, and design. Existing buildings become regionally distinct through patterns-of-use over extended periods of time, as well as other contextual forces particularly to 'place' acting upon them. Quoting landscape artist Allan Gussow, Rypkema defines place in a very unconventional way: "a piece of the whole environment that has been claimed by feelings."[17] It is often an intangible "sense" that makes *place* out of *location*. The conditions of each historic building -- both external and internal -- must be assessed and incorporated into the design process in order to truly achieve sustainable development.

Two other highly influential factors in delimiting the case study location are the existing preservation and sustainability ethos found in the Pacific Northwest (and particularly Portland), and the socio-political climate of the State of Oregon. The presence of both of these characteristics has produced an atmosphere conducive to sustainable preservation in the city of Portland. An example of this is the Bottle Bill – a law passed in 1971 to address the recycling of glass soda and beer bottles. "Requiring a five-cent deposit on every soft drink and beer initiated a new relationship between Oregonians and their used containers. Suddenly "an empty" gained a second life: a refill, a reincarnation or, at the very least, a nickel in your pocket."[18] This reuse mentality was fostered and continues to extend beyond the realm of bottles and into the built environment, reflected in the city's pioneering sustainable preservation projects. "Portland adopted an architectural strategy comparable to thrift-store shopping and resoling old shoes. Call it the Bottle Bill Era of Portland Architecture. To be sure many of our old buildings, sturdy and refillable as the chunky Coca Cola bottles of old, proved well suited to the cause."[19]

This atmosphere is even used as a marketing tool by convention planning and travel/tourism websites. One site claims the following about Portland: "This is a city where, according to the 2000 U.S. Census, some 5,000 residents commute to work each day by bicycle; [...] Currently, Portland also boasts the most LEED-certified buildings per capita in the nation."[20] This assertion is confirmed by SustainLane's "City Rankings"

feature. As of 2008, Portland has 149 LEED registered and 43 LEED certified buildings and was ranked as SustainLane's number one city.[21] Billed as a national leader in sustainability, the media group attributes the city's sustainability savvy to a thirty-year head start, thanks to city-planners starting in the 1970s. "The city enacted strict land-use policies, implementing an urban growth boundary, requiring density, and setting a strong precedent for sustainable development."[22] Portland ranked number one in 4 of the 16 categories assessed by SustainLane, including Energy and Climate Change Policy, City Innovation, Green Economy, and Green LEED Buildings.

Reflecting this green economy and building ethos is Portland-based environmental consulting firm Green Building Services (GBS). As of Feb 9, 2009, they report to have consulted on 113 LEED certified buildings, including all three of the case studies to be discussed in this thesis.[23] While not all of the buildings that GBS consults on are located in Portland, this reflects the sustainability ethos prevalent in the city. Among Portland's LEED certified buildings are a few milestones for the rating system and the Nation, including two of the case studies presented later. The Balfour-Guthrie Building is the nation's first LEED Silver architecture office. Another national first is The First Regiment Armory Annex (also known as the Gerding Theater at the Armory), which was the first historic building and first theater to achieve LEED Platinum.[24]

Portland is also a pre-war city, meaning that the majority of its development occurred before 1945. Pre-1845 cities, such as New York City's Manhattan or Washington, D.C., have streets laid out in a grid pattern and densely packed mixed-use buildings. Mixed-use development is characterized by the presence of commercial storefronts on the street level with residences on the upper floors of buildings. It also suggests that, "people live within walking distance of corner markets, retail stores, coffee shops, and other amenities. [These] older cities also tend to offer better public transportation options," such as subways and bus systems.[25] The fact that Portland is a pre-war city is important to this thesis also because of the implications that historic development has on sustainability. According to SustianLane, pre-1945 cities out performed post-1945 cities by 15 points on average:

> SustainLane divided the 50 cities into two categories, based on when the majority of their development occurred: before 1945 or after 1945. The goal was to see how historical development relates to sustainability rankings. It quickly became apparent that one reason for the 15-point average difference is that predominant planning practices in the United States saw a marked shift mid-century.

As a pre-1945 city with a socio-political inclination towards environmentalism, Portland is an ideal incubator for the implementation of sustainable preservation as a tool to be used to achieve sustainable preservation. "But Portland's redo culture also reaches well below the monumental." The McMenamin brothers have turned old theaters, schools, and a state mental hospital into popular brewpubs. Also, "Consider the Rebuilding Center with more than 20,000 square feet of salvaged building parts housed in a shed made of out reused windows – a veritable cathedral to the we-redo ethic."[26] These examples, coupled with the three case studies presented in this thesis, demonstrate Portland's commitment to the reuse of historic buildings in sustainable ways.

Case Study Outline

Chapters three, four, and five each present a case study to be evaluated in terms of historic use, adaptive reuse, ownership and occupational status, and the influence of both the *Secretary of Interior Standards* and *LEED Green Building Rating System*. The evaluation of each case study will include the following:

- Introduction
    - Building Details
    - Stakeholders
    - Design Team
    - Project Costs
    - Financial Incentives
- Historic Context
- Project Description
    - National Register
    - LEED

- Design Process
- Connecting the National Register and LEED
- Project Reflections
- Author's Reflection

Chapter three explores the Balfour-Guthrie Building – a National Register listed building that has achieved LEED Silver certification. It is the first poured-in-place concrete building in Portland and the first architectural firm to achieve LEED Silver certification. Chapter four conveys the White Stag Block, which has achieved LEED Gold certification and is located within a National Register District. Evaluation of the White Stag Block will offer an example of how sustainable preservation contributes to the development of both the socio-economic community and sustainability. Chapter five explores the First Regiment Armory Annex, another first for sustainable preservation. The Annex became the first LEED platinum building on the National Register, as well as the first LEED platinum theater, achieving the current highest sustainability rating. These case studies will help to articulate the realities of utilizing both the National Register and LEED programs and offer helpful insight into design and execution successes, as well as lessons learned and areas for improvement or expansion.

In order to gain a better perspective of the working relationship between these two accrediting systems and to more fully understand the dynamics of sustainable preservation, building professionals will need to be interviewed. These professionals include: preservation and sustainability consultants, heritage developers, architects/designers, and building-users. Their experiences and perspectives, coupled with the case study assessments, will offer insights into the interface between sustainability and historic preservation. Of particular interest will be post-occupancy reflections from both professionals and building users. This information will shed light on everyday building use and its alignment with design goals, perhaps exposing both positive results as well as areas needing re-evaluation. The diversity of these four case studies, combined with interviews and post-occupancy evaluations, will allow an

evolving assessment of the sustainable reuse of historic structures and help to advance the field of sustainable preservation.[27]

Notes

[1] Carl Elefante, "The Greenest Building Is ... One That Is Already Built," *Forum Journal: The Journal of the National Trust for Historic Preservation* 21, no. 4 (Summer 2007): 26.

[2] Donovan D. Rypkema. "Economics, Sustainability, and Historic Preservation," National Trust Annual Conference, http://www.placeeconomics.com/speeches.html (accessed Febuary 22, 2009).

[3]Deborah Snoonian and Kira L. Gould. "Architecture rediscovers being green." *Architectural Record* 189, no. 6 (June, 2001): 86.

[4] Andrew T. Douglas, "Green historic preservation is the ultimate recycling project." *The San Antonio Business Journal,* 7: (September, 2007): 1.

[5] Mike Jackson, "Building a Culture that Sustains Design," *APT Bulletin: Journal of Preservation Technology* 36, no. 4 (2005): pg 3.

[6] Karen H. Hyllegard, Jennifer Paff Ogle, and Brian Dunbar. "Sustainability and Historic Preservation in Retail Design: Integrating Design into a Model of the REI Denver Decision-Making Process." *Journal of Interior Design* 29, no. 1 & 2 (2003): 33; Mike Jackson. "Building a Culture that Sustains Design." *APT Bulletin: Journal of Preservation Technology* 36, no. 4 (2005): 52; Derek Latham. "Creative Re-Use: Working with the Building." *Journal of Architectural Conservation* 5, no. 2 (July 1999) 10; Julia Wallace, Marilyn Higgins, and Jeremy Raemaekers. "Architectural Conservation and Environmental Sustainability: Conflict or Convergence?" *Journal of Architectural Conservation* 5, no. 2 (July 1999): 60; J. Leslie Zachariah, Christopher Kennedy, and Kim Pressnail. "What makes a building green?" *International Journal of Environmental Technology and Management* 2, no. 1/2/3 (2002): 40.

[6] Nancy B. Solomon. "Tapping the Synergies of Green Building and Historic Preservation." *Architectural Record* vol. 191, no. 7 (July 2003): 155.

[7] Ibid.

[8] Ibid.

[9] Hyllegard, Ogle, Dunbar, 44; Wallace, Higgings, Raemaekers, 61.

[10] Wallace, Higgings, Raemaekers, 58; Solomon, 162.

[11] Elefante, 9; John D. Lesak, "APT and Sustainability: The Halifax Symposium." *APT Bulletin: Journal of Preservation Technology* 36, no. 4 (2005): 3; Zachariah, Kennedy, and Pressnail, 40.

[12] Lesak, 4; Kim O'Connell "Finding Common Ground." *Traditional Building Magazine* (June 2007): 156

[13] National Trust For Historic Preservation, "Our Position on Sustainability" http://www.preservationnation.org/issues/sustainability/public-policy/our-position-on.html (accessed on March 3, 2009).

[14] Park Service, "Introduction: Standards and Guidelines," http://www.nps.gov/history/hps/tps/standguide/overview/choose_treat.htm (accessed February 28, 2009).

[15] U.S. Green Building Council, "About USGBC," http://www.usgbc.org/DisplayPage.aspx?CMSPageID=124 (accessed February 28, 2009).

[16] U.S. Green Building Council, "LEED Rating System," http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222 (accessed March 1, 2009).

[17] Donovan D. Rypkema, "Community, Place and The Economics of Historic Preservation," New Jersey Historic Preservation Awards Ceremony, http://www.placeeconomics.com/speeches.html (accessed April 3, 2009).

[18] Randy Gragg, "An Ethos of Renewal." in *Voices of the Armory: A Chronicle of the Transfromation of a 19th Century icon into a 21st century Theater.* Narrative by Chris Coleman, 126. Portland, Oregon: Portland Family of Funds Holdings, Inc.

[19] Ibid.

[20] Travel Portland, "Green Meetings," http://www.travelportland.com/meeting_planners/green_meetings/ (accessed March 5, 2009).

[21] Sustainlane.com. "2008 US City Rankings," http://www.sustainlane.com/us-city-rankings/categories/green-building (accessed March 4, 2009).

[22] Sustainalane.com. "Portland, Oregon," http://www.sustainlane.com/us-city-rankings/cities/portland (accessed March 4, 2009).

[23] Chatterbox.typepad.com. "113 LEED projects and counting for Green Building Services," http://chatterbox.typepad.com/portlandarchitecture/2009/02/113-leed-projects-and-counting-for-green-building-services.html (accessed March 5, 2009).

[24] U.S. Green Building Council. "Certified Project List: Jean Vollum Natural Capital Center," http://leedcasestudies.usgbc.org/overview.cfm?ProjectID=393 (accessed March 1, 2009); Brian Libby. "The Art of Compromise: A LEED Platinum rehab in Portland finds a balance between preservation and sustainability." http://www.metropolismag.com/story/20070110/the-art-of-compromise (accessed March 2, 2009).

[25] Sustainlane.com. "Cities by Age," http://www.sustainlane.com/us-city-rankings/categories/cities-by-age (accessed March 1 2009).

[26] Gragg.

CHAPTER II
CONVERGING GOALS:
THE NATIONAL REGISTER AND LEED

Coining the phrase, "the greenest building is … one that is already built," Carl Elefante, in one sentence has summed up the common ground shared by historic preservation and green building.[1] At first glance both seem to *singularly* address the relationship between the built and natural environments. Preservationists have long maintained that the reuse of an older building is the ultimate kind of recycling and that the goals of sustainability and historic preservation converge beyond the environment into economic and socio-cultural responsibility.[2] According to Elefante and others, once the intersection of goals is examined, sustainable development and historic preservation prove to be natural allies.[3] Both fields emphasize the value of cultural and economic sustainability in addition to the value placed on the conservation of the environment. The evolving "culture of sustainability" being developed today in the United States has the potential to catapult historic preservation into a prominent position in America's new building ethos. This cultural shift could provide building and preservation professionals with the opportunity to redefine neighborhoods, encouraging downtown investment, and limit the worst effects of sprawl.[4]

Since the 1970s, the converging goals of preservation and sustainability have been cautiously and often unintentionally hinted at by professional preservation organizations.[5] In efforts to validate the preservation of historic resources, the field has associated itself with other social interests such as patriotism, economic return, urban revitalization, and even energy savings during the shortages of the 1970s. The most current concerns for energy efficiency and climate change provides the opportunity for a national paradigm shift in how the existing built environment is viewed. While the sustainable building movement is the most current embodiment of architectural environmentalism, sustainability encompasses more than just the environment and should not be viewed as merely a trend. Sustainability encompasses a necessary commitment for a sustainable

planet. It includes economic and socio-cultural responsibility as well as a commitment to the environment in order for development to be truly sustainable.[6] Advocates of the historic built environment have the opportunity to harness the momentum of this movement by encouraging heritage preservation. However, the academic literature on sustainable building (particularly the LEED Green Building Rating System) places a hurdle along this path, as it tends to focus solely on new construction.[7] Reuse of existing buildings is often hinted at but consistently fails to identify building reuse as a desirable, feasible, and a legitimate alternative to new construction.[8] This disconnect between sustainability and the existing building stock is a pivotal issue that must be addressed if a truly sustainable approach is on the national agenda for environmentally responsive design.[9]

Elements of Sustainability

An important key to understanding the alliance between sustainability and historic preservation is the clear articulation of a definition and carefully outlined characteristics of a sustainable building.[10] This lack of comprehension in relation to the building industry stems from the ambiguity of the word *sustainable*. Sustaining what? "Even the language used to define performance is changing, as "sustainable design," "green design," and "high-performance design" are all being utilized to describe ecologically beneficial building practices.[11] Jason McLennan claims that, "few words in the design and construction industry have been so poorly used as that of *sustainable design* and *green architecture*. These terms have come to mean a lot of different things to different people ..." and are used as descriptors for a wide range of building construction, from the implementation of new bamboo flooring to the re-use of entire buildings.[12] Today, they are often simply reduced to marketing tools.

Elefante suggests that sustainable human activities, "need to increase vitality of the planet, not diminish it" by consuming less energy, releasing fewer harmful substances, increasing the efficiency of technology, and reduce waste resulting from building, renovating, and demolishing.[13] The National Trust for Historic Preservation

articulates sustainability as: "a way of living that will ensure the longevity and health of our environmental, economic, and social resources."[14] McLennan suggests the use of the term sustainable design and defines it as: "a design philosophy that seeks to maximize the quality of the built environment, while minimizing or eliminating negative impact to the natural environment."[15] Since buildings are the largest contributor to greenhouse gas emissions, one of the most immediate and measurable ways to address global warming is to make buildings more energy efficient.[16] The nation's building stock proves to be one of its greatest energy investments and sustainable adaptive reuse of these historic and existing buildings can prove to be an even more immediate response to the mitigation of climate change.

Environmental Responsibility

Sustainability means environmental, economic, and socio-cultural responsibility – all three of which are key components in defining and evaluating both movements discussed in this thesis.[17] These three objectives are key to the sustainable reuse of historic buildings because they guide and influence the collaboration of the LEED and the National Register accrediting systems. *Environmental* conservation is the most common aspect of sustainability addressed in the literature, and has been a major theme in the past of the historic preservation movement. Following the oil embargo crisis of the 1970s, the National Trust (NTHP) published an entire book on the subject – *New Energy from Old Buildings*.[18] The opening quote seems to fit the sustainability ethos of contemporary society and not the decade of excess that often characterizes the 1980s when it was published. Kevin Green of the Research and Design division states:

> Energy – or the lack of it – has shaped the nation's buildings from time immemorial. From the solar-oriented pueblos of native Americans to the half-buried sodbuster homes of the Midwest, from New England's salt boxes to Charleston's breezy piazzas, much of America's architectural evolution documents a struggle to defeat the less pleasant aspects of climate and environment without energy as an ally … But with the onset of the energy crisis, designers have gradually become more aware of their forebears' struggles, and their solutions.[19]

The collection of articles in this book boldly asserts -- and at times even boldly *celebrates* -- the "end of the cheap-energy era," supposing that the crisis would have lasting affects on American building practices. One author opens his article somberly relaying the lessons learned by the energy crisis, having "taught us the limitations of our resources and the urgent need to conserve, protect and defend our national patrimony. The values that historic preservation has long represented are gradually becoming the norm."[20] The author continues with this sentiment, stating that it is, "highly gratifying that the necessity of energy conservation in the home is finally sinking in."[21] He goes on to quote opinion polls on individual homeowner's willingness to spend increasingly more money on home insulation packages in order to reduce energy consumption and costs. Unfortunately, the necessity of energy conservation did not sink in and almost thirty years later the arguments for energy efficient buildings are still trying to be made.

In terms of architecture, the environmental aspects of sustainability are best understood through the topic of *embodied energy*. Mike Jackson defines embodied energy as the, "sum of all the energy required to extract, process, deliver, and install the materials needed to construct a building."[22] This topic has been viewed as a primary link between preservation and sustainability advocates, as it provides a more "quantitative method of measuring the overall environmental benefits of building renovation versus new construction."[23] Reuse of historic buildings as an alternative to demolition retains the energy embodied in historic building materials and has a profound effect on the reduction of waste that ends up in landfills. Adaptive reuse of entire buildings -- not just their parts -- is the ultimate type of recycling, and when renovated using sustainable strategies, such an approach can be the most responsible form of development.

This link between preservation and sustainability advocates, however, is not completely formed. Due to constraints of the research, as well as the specialized goals of the accrediting systems, embodied energy does not play a prominent role in either the National Register or LEED systems. While LEED does award a point for building reuse, the system grossly undervalues the impact of reusing an existing building (further explanation on page 13). In 1976, a report titled *Energy Use for Building Construction*

was published based upon construction industry data from 1967 and does not accurately assess historic buildings and their materials. While there has not been an adequate update to the study in over forty years, "this pioneering effort is still the most thorough evaluation of the embodied energy of building materials to have been produced in the U.S." (table 2.1 and 2.2.)[24] Using this information to compare existing buildings to new construction raises some questions on the validity of the results. According to Jackson, "there is a strong likelihood that the overall building figures in the report underestimate the equivalent embodied energy of older buildings" because "older buildings often had more volume and greater amounts of materials."[25] Another concern is the "potential change in the individual building-material values based upon newer, more efficient industrial processes [...] which reduces the overall embodied energy of these materials."[26]

Table 1. Embodied energy for new construction by building type

New Building Construction 1967 Input/Output 399 Level	Btu/sq. ft.
Residential – 1 family	702,047
Residential – 2-4 family	625,050
Residential – Garden apt	648,445
Residential – High rise	735,978
Residential – Alter and addn.	-
Hotel/Motel	1,128,655
Dormitories	1,430,724
Industrial buildings	972,551
Office buildings	1,641,748
Warehouses	558,432
Garages/Service stations	771,489
Stores/Restaurants	941,353
Religious buildings	1,257,766
Educational	1,386,046
Hospital buildings	1,722,200
Other non-farm buildings	1,449,216
a. Amusement, social and rec.	1,379,793
b. Misc. non-residential bldg	1,101,991
c. Laboratories	2,074,056
d. Libraries, museums, etc.	1,743,588
Farm residences	554,703
Farm service	149,071

Data from *Energy Use for Building Construction.*

Table 2.1 An example of the embodied energy calculations for 1967 construction. Jackson argues that this information does not reflect historic construction practices or materials. From Mike Jackson, "Embodied Energy and Historic Preservation: A needed Reassessment," *APT Bulletin: Journal of Preservation Technology* 36, no. 4 (2005): pg 47.

Economic Responsibility

Rypkema helps further the embodied energy argument by interlinking it with the next key to sustainable development – *economic responsibility*. The World Bank specifically relates the concept of embodied energy with historic buildings saying, "... the key economic reason for the cultural patrimony case is that a vast body of valuable assets [in other words, the historic built environment], for which sunk costs have already been paid by prior generations, is available. It is a waste to overlook such

assets."[27] In light of the current economic crisis, the American people are among those who cannot afford to overlook the reuse of the existing building stock.

The combination of the economic and environmental concerns most notably overlaps on the subject of energy consumption. Increased energy-use directly translates into increased costs. After construction, buildings consume most of their energy through heating, cooling, and lighting systems. Proponents of sustainable building maintain that

Table 2. Embodied energy of typical construction materials

Material	Unit	Embodied energy (Btu/unit) – Before delivery to jobsite	Embodied energy (Btu/unit) – After delivery to jobsite
Wood products			
Softwood			
Rough lumber	Board foot	5,229	7,661
Dressed lumber	Board foot	5,399	7,859
Hardwood			
Rough lumber	Board foot	6,744	9,816
Dressed lumber	Board foot	6,633	9,655
Wood shingles and shakes	Square foot	4,682	7,315
Wood window units			
Double hung	Each	845,671	1,127,234
Awning and casement	Each	893,021	1,190,349
Other	Each	1,373,150	1,830,335
Wood doors			
Panel type, interior and exterior	Each	654,851	872,881
Flush type, hollow core	Each	259,952	346,502
Flush type, solid core	Each	893,696	1,191,182
Veneer and plywood			
Hardwood	Square foot	12,942	17,025
Softwood, interior	Square foot	3,790	4,986
Softwood, exterior	Square foot	4,393	5,779
Prefabricated structural wood members			
Glued and laminated	Board foot	14,673	16,773
Paper products			
Construction Paper	Pound	8,841	10,479§
Paint products			
Exterior oil paints and enamels	Gallon	413,066	488,528
Exterior water base paints	Gallon	413,519	489,063
Interior oil base paints	Gallon	429,932	508,475
Interior water base paints	Gallon	369,519	437,025
Asphalt products			
Roofing asphalt	Pound	6,701	6,914
Roll roofing, smooth surface	Square foot	7,514	7,753
Roll roofing, mineral surface	Square foot	10,673	11,012
Standard strip shingles	Square foot	24,553	25,334
Asphalt-saturated felts	Pound	13,210	13,630
Tar-saturated felts	Pound	16,416	16,938
Glass products			
Window glass, single strength	Square foot	11,895	13,659
Window glass, double strength	Square foot	13,437	15,430
Plate glass, average (¼ inch)	Square foot	41,828	48,031
Laminated plate, average	Square foot	185,058	212,504
Stone and clay products			
Portland cement	Barrel	1,526,498	1,528,126
Brick (2¼ by 7¼ inches)			
Common and face	Each	13,570	14,283
Other unglazed	Each	24,306	25,582
Facing tile and ceramic			
Glazed brick	Each	31,749	33,416
Quarry tile	Square foot	46,589	51,031
Ceramic mosaic tile, glazed	Square foot	62,682	68,660
Ceramic mosaic tile, unglazed	Square foot	58,081	63,619
Concrete block (8 by 8 by 16 inches)	Each	29,108	31,821
Ready-mix concrete	Cubic yard	2,584,938	2,594,338
Quick lime	Ton	6,394,720	6,867,465
Hydrated lime	Ton	8,812,374	9,463,852
Dead burned dolomite	Ton	9,077,302	9,748,365
Gypsum building materials	Ton	6,189,370	6,970,088
Mineral-wool insulation			
Loose fiber	Ton	11,426,830	12,826,171
Batts, blankets, and rolls (3½ inches thick)	Square foot	6,112	6,860
Primary iron and steel			
Pig iron	Pound	7,075	7,444
Carbon-steel sheet, hot rolled and enameled	Pound	15,965	16,803
Carbon-steel sheet, galvanized	Pound	26,458	27,836
Hot-rolled bars and shapes			
Carbon-steel	Pound	17,808	18,736
Carbon-steel reinforcing bars	Pound	14,888	15,664
Alloy steel, plates and structural shapes	Pound	25,377	26,910
Wire for prestressed concrete	Pound	42,423	44,633
Carbon-steel nails and staples	Pound	32,331	34,016
Steel wire, plain	Pound	29,635	31,179
Steel wire, galvanized	Pound	32,683	34,385
Concrete-reinforcing mesh (welded wire)	Pound	22,989	24,187
Carbon steel pipe	Pound	24,535	25,813
Stainless steel			
Sheets, hot rolled	Pound	76,814	80,816
Sheets, cold rolled	Pound	131,449	138,298
Bars, hot rolled	Pound	25,577	26,910
Bars, cold finished	Pound	183,579	193,144
Wire	Pound	228,046	239,927
Fabricated metal products			
Fabricated structural steel	Pound	21,711	22,707
Primary nonferrous metals			
Aluminum			
Plate	Pound	113,049	115,567
Sheet	Pound	94,596	95,943
Rolled bars and structural shapes	Pound	90,852	92,146
Screw machine products			
Hex nuts, lag screws, and bolts, studs, and threaded rods	Pound	22,474	26,625
Rivets, ½-inch and over	Pound	14,640	17,344

Table 2.2 Table of typical construction materials used in 1967. They do not reflect historic materials or methods of extraction. From Mike Jackson, "Embodied Energy and Historic Preservation: A needed Reassessment," *APT Bulletin: Journal of Preservation Technology* 36, no. 4 (2005): pg 48.

"green buildings" can substantially reduce energy as well as other utility costs. This claim is well documented with, "**30 percent in energy savings, 35 percent carbon savings, 30-50 percent water savings, and 50-90 percent waste cost savings.**"[28] In the literature, these savings often refer to new construction and some even label historic design principles as new environmental and money saving 'green design' features.[29]

Desiring a similar outcome, the preservation movement has utilized the economic argument for decades, although it has not historically linked this key with conservation of the environment. The economic key to sustainable development goes beyond reducing energy costs, into the realm of investment. The fiscal resources of the United States arguably can suggest that the value placed on certain programs reflects the ideals of the nation. Monetary investment, while it is only one form of currency, is by far the greatest determinant of action and is often used to evaluate success. As the World Bank and the President of the National Trusts, Richard Moe have suggested, the American building stock represents a tremendous investment and a lucrative asset. Elefante agrees and suggests, "taking into account the massive investment of materials and energy in existing buildings, it is both obvious and profound that extending the useful service life of the building stock is common sense, good business, and sound resource management."[30]

Preservation economist Donovan Rypkema, as well as the National Trust's Main Street Program, clearly articulate the role that historic preservation can play in local economies. The success of local communities that invest in the preservation of historic downtown core neighborhoods is unparalleled by any other program.[31] The Main Street approach is centered on commercial district revitalization, using "an innovative methodology that combines historic preservation with economic development to restore prosperity and vitality to downtowns and neighborhood business districts."[32]

The result is historic preservation functioning as an incubator for small businesses, creating an unmatched return on investment, and stimulating the local economy. Rypkema reports that "85% of all net new jobs are created by firms employing less than 20 people" and that it is no accident that new and small businesses are found in the *historic* commercial blocks because of their affordable rents.[33] Economic

development is characterized by the creation of jobs and the increase of local household income – two areas in which historic preservation is particularly affective. Generally speaking, the cost of new construction will be spent half on materials and half on labor. The rehabilitation of older and historic buildings, however, is labor intensive, requiring sixty to seventy percent of the budget spent on labor with thirty to forty percent spent on materials. This translates into more money being spent on local services and paying local individual wages, as opposed to being spent on products. For example:

> We buy an HVAC system from Ohio and lumber from Idaho, but we buy the services of the plumber, the electrician, and the carpenter from across the street. Further, once we hang the drywall, the drywall doesn't spend any more money. But the plumber gets a hair cut on the way home, buys groceries, and joins the YMCA – each recirculating that paycheck within the community."[34]

This alone is reason to consider historic preservation as a tool for economic revitalization and Rypkema does not even touch upon the opportunity for "sweat equity" or the development of permanently useful skills for people in the local community as a means of reducing construction costs and increasing individual and community pride.[35]

While much of the world has begun to acknowledge the intimately intertwined nature of sustainable development and heritage conservation, the United States is notably late to the game, with one exception – *Smart Growth.* Rypkema maintains that, "There is no movement in America today that enjoys more widespread support across political, ideological, and geographical boundaries than does Smart Growth."[36] He also notes that if a community did nothing but protect its historic neighborhoods it will address every principle outlined by the Smart Growth movement. The role that sustainable preservation can play in this movement is particularly pertinent during the current recession being experienced in the United States and around the globe. In "speaking of the recession, Ralph DiNola notes a shift in green buildings: more clients are looking at existing buildings to renovate green instead of starting from the ground up. "New office buildings that didn't happen because of the economy, those owners are upgrading green instead," he reports.[37] Economic pressures could influence an industry-wide increase in green

renovations, which has the potential to be both positive and negative to sustainable preservation.

Socio-Cultural Responsibility

The National Trust has anticipated this possibility by publishing a book in 1991 titled, *The Economic Benefits of Preserving Community Character: A Practical Methodology*, as preservation has always been subject to strict financial scrutiny. Containing detailed information on the various economic factors, this guide articulates the advantages of historic preservation and helps to bridge the economic factor of sustainability with *socio-cultural responsibility*.[38] The influence that sustainable adaptive reuse can have beyond the built environment – namely in communities and homes – is referred to as *cultural capital* by economist David Throsby. This term, he argues, can provide preservationists with, "a coherent and rigorous framework within which both the economic and cultural contribution of the cultural resource can be analyzed and assessed."[39] The term cultural capital expands the concept of cultural heritage to encompass not only the built environment, but the traditions and memories made day-in and day-out. Throsby maintains:

> The principal benefits of built cultural heritage are in fact intangible in nature and include, for example, local residents' pride in their town's cultural facilities, the links with local history that a heritage building represents, the educational value of presenting heritage to the public, and the symbolic role that heritage plays in representing people to themselves.[40]

The built environment has the ability to connect the past, present, and future in space and time. Social and cultural sustainability takes preservation beyond an aesthetic and artificial practice of saving relics into a more meaningful and humanistic realm. Echoing the diverse composition of the country, preservation has turned to "a broader, more constructive and inclusive social purpose … mov[ing] beyond the problem of saving architectural artifacts and begin[ning] to think about how [it] can [help] conserve urban neighborhoods, rural landscapes, and natural resources for human purposes."[41] Historic preservation has the opportunity to exert great influence on the redevelopment of

urban centers and the maintenance of the historic built environment as an embodiment of cultural values.[42]

This entails "enhancing, or perhaps providing for the first time, *a better quality of life* for people. This is especially so for the growing number of our population who must confront an increasingly dismal existence in a rapidly deteriorating urban environment."[43] A better quality-of-life in the context of preservation, *first* means having a physical connection or link to the collective past and cultural identity of 'place,' as defined and discussed in the Introduction, as a more than just a location but a locale imbued with sentiment and feeling.[44] *Second*, a better quality-of-life is characterized by a dynamic, not static, built environment that enhances our lives, while bearing the marks of those who have come before. *Third*, a better quality-of-life reflects quality, craftsmanship, beauty, and the symbols of our heritage that mark our growth and evolution, much like a child's growth chart penciled onto a pantry door. *Fourth*, a better quality-of-life allows for celebration of individuality in an increasingly homogenous cultural landscape, reflecting our evolving regional character and local identities.

Evaluating Sustainable Preservation

LEED Green Building Rating System

In the past versions of the LEED Green Building Rating System, the points awarded for the reuse of an existing building has not been adequately or accurately reflected in real terms. Many preservation professionals have criticized the USGBC for LEED's "lack of incentive in building reuse, offering only minimal recognition when the impact can be pivotal."[45] The USGBC "acknowledges that the first version of LEED was not designed explicitly for historic buildings," but another version now in development may be more applicable for at least some aspects of historic buildings. "LEED is on a cycle of continual improvements. [One] can imagine that these issues will be taken up in future versions of it."[46]

To be clear, historic buildings can and have achieved the highest LEED ratings as demonstrated by the three case studies explored in this thesis. Architect Barbara

Campagna, one of the leaders of the National Trust's Sustainability Program, outlined the allocation of points as designated under LEED 2008: "out of 69 points, about 20 are building-type neutral, meaning any building type – renovation or new construction – can get these points; another 10 points directly support preservation activities; any existing buildings can basically get a "certified" rating with very little effort' and getting "silver requires a bit more effort and "gold" is also readily achievable."[47]

The National Trust's Sustainable Preservation Coalition formed in 2006 felt that the LEED rating system could be improved even though historic buildings regularly achieved gold and platinum LEED ratings. The Coalition maintained that, "the current versions of LEED: 1) overlooked the impact of projects on cultural value; 2) do not effectively consider the performance, longer service lives, and embodied energy of historic materials and assemblies; and 3) are overly focused on current or future technologies, neglecting the advantages of many traditional buildings practices."[48] The USGBC, working with the Coalition, has acknowledged some of these objections and has recently announced LEED 2009, which claims to better account for the reuse of existing buildings according to the National Trust of Historic Preservation.[49]

Barbara Campanga outlines for preservationists the changes made to LEED-NC: New Construction & Major Renovation that will benefit historic buildings most (LEED-NC is the most commonly used rating system for large rehabilitation projects – all three case studies in this thesis were accredited under LEED-NC). "The biggest complaint about the current LEED rating system (such as LEED NC 2.2) is that every credit is worth the same one point."[50] In LEED 2009, points are distributed and weighted according to Life Cycle Assessment (LCA) criteria. "Life Cycle Assessment is a scientific methodology to calculate the environmental performance of a product over its full life cycle [...] The six measurement categories remain the same, but the points have been reallocated according to the results of the LCA weighting. [51] The science and technology behind LCA is young and will require continued research as LEED 2009 is implicated across the country over the coming year.

National Register of Historic Places

Also concerned with the conservation of the United State's historic building stock, the Secretary of Interior through the National Park Service administers the National Register of Historic Places – "the official list of the Nation's historic places worthy of preservation."[52] The National Register has three main criteria for evaluation: age, integrity, and significance -- and was created not for environmental benefits, but social and cultural benefits. The objective of the National Register is to designate properties that meet the prescribed criteria for national recognition for their contribution to the history of the United States of America. It has also become a way to qualify properties for federal funding and specially designed tax programs to encourage the stewardship and dissemination of information related the historic cultural environment. The Secretary of Interior Standards for Treatment of Historic Properties apply to all proposed grant-in-aid development projects assisted through the National Historic Preservation Fund and are subject to strict regulations.[53] Significance in American history, architecture, archaeology, engineering, and culture is recognized by NPS to be present in "districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and[54]:

A. That are associated with events that have made a significant contribution to the broad patterns of our history;
B. That are associated with the lives of persons significant in our 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;
D. That have yielded or may be likely to yield, information important in prehistory or history.

Although not a common topic of discussion in the literature, Ralph DiNola, environmental consultant for the Portland based Green Buildings Services (GBS), intimates that a reassessment of the National Register process might be needed. He

informally suggests that, "the National Park Service consider a multi-level system in which certain historically significant buildings are designated worth preserving as close to the original look as possible, but others have more leeway to, say for example, enlarge windows to allow in more daylight. "It's black and white the way the National [Register] does it today," DiNola added. "We ought to be able to say, "This building is maybe less architecturally significant, so we can do more to it."[55]

Sustainable Preservation

Integrating Systems

Sustainable preservation involves the integrated use of LEED and the National Register of Historic Places in order to address environmental, economic, and socio-cultural responsibility -- goals encompassed by both programs. The confluence of these two accrediting systems is the primary focus of this thesis. The clear articulation of these systems can benefit both disciplines and foster development that is truly sustainable. Inquiry into the validity of such systems -- independently as well as collaboratively -- is both necessary and important. Questioning the reliability and level of appropriateness of the measurements is essential in determining the value of both programs in relation to sustainable development. The way in which the LEED and the National Register systems work together is also another aspect needing to be assessed.

Literature on historic preservation and adaptive reuse suggests that, "in order to be effective, environmental-assessment methods for historic buildings must include considerations appropriate to older buildings and must weigh social and cultural factors."[56] LEED 2009 is hoping to mitigate some of these complaints. The collaborative evolution between historic preservation and sustainable design is an important aspect of the evaluative process. This necessitates an examination of completed projects through the lens of both evaluation systems, which will be attempted in chapters two, three, and four of this thesis. The American Institute of Architects (AIA) acknowledges numerous integrated projects and the feasibility of combining these two systems, stating: "Adaptive reuse demonstrates that meeting strict US Department of the

Interior guidelines while implementing environmental resource efficiency goals is achievable."[57]

Broader Implications

Sustainable preservation has greater implications related to the American building ethos, far beyond the conjoining of environmentalism and design aesthetics. Historic buildings are up to the task of being utilized as a step in the direction of sustainable development. Advocates must become the mouthpiece of the historic built environment and continue to "challen[ge] society to see the value of reusing historic buildings. This experience has shown that buildings, no matter how well built, will be sustained only if they are seen as having a positive cultural and economic value. Ecological value should now be added to this list as well."[58] This recognition of a multi-faceted approach to preservation is demonstrated by the inherent practices of building preservation: retaining entire buildings, thereby harnessing the embodied energy of the already manufactured parts. "In terms of material, the greenest thing you can do is continue its life. Next comes salvage and reuse, then recycling. Specifying new green materials is last."[59]

Derek Latham asserts that building reuse requires skills that are greater in breadth and understanding than those for the design of new 'signature' buildings, and that "the sensitive re-use of buildings has arguably more impact upon our future working and living environments than new architecture."[60] While new design is a rigorous mental challenge, "the design opportunities in an established context can be even more challenging professionally."[61] Historic design features that meet sustainability ideals include "operable windows that allow fresh air and daylight into a building, a compact building form that is more efficient to build and heat, and cisterns that capture rainwater" all of which were "features common in late-nineteenth-century buildings and are now championed as green."[62]

"To fully capture the value of the existing building stock requires merging two disciplines: historic preservation and green building. It requires an understanding of how to respect and renew what is already here and a vision for where and how to transform

the legacy of the past into the promise of tomorrow."[63] Implementing historic preservation as a response to sustainable development makes sense from every aspect of sustainability. "Considering that up to 30 percent of landfill waste in the U.S. is composed of construction and demolition debris, adapting existing structures or reusing their materials are simple ideas that can make significant contributions in environmental stewardship."[64] The potential opportunities for technological and design innovation, as well as meaningful societal impact provided by sustainable preservation, are only beginning to be understood and documented. A sustainable approach to historic preservation requires the embracing of change, and an evolution of thought related to building use from both preservation and sustainable building advocates. "The museum approach to preservation, while appropriate in some cases, will not work as a general pattern. Change is an inevitable part of life and it should be celebrated rather than regretted."[65]

Notes

[1] Elefante, Carl. "The Greenest Building is ... One That is Already Built." *Forum Journal Preservation* 21, no. 4 (Summer 2007): 26.
[2] O'Connell, Kim A. "Finding Common Ground." *Clem Labine's Traditional Building Magazine* (June 2007) 16-20. Solomon, Nancy B. "Tapping the Synergies of Green Building and Historic Preservation." *Architectural Record* vol. 191, no. 7 (July 2003): 155.

[3] Mike Jackson, "Building a Culture that Sustains Design," *APT Bulletin: Journal of Preservation Technology* 36, no. 4 (2005): pg 32.; Roberts pg 13
[4] O'Connell 2007, 16-20; Andrew T. Douglas. "Green historic preservation is the ultimate recycling project." *The San Antonio Business Journal,* 7, September 2007, [database online]; available from Bizjournals, http://sanfrancisco.bizjournal.com/sanfrancisco/othercities/sanantonio (21 September 2007). This brief business journal article, while general and superficial, is indicative of the mainstream discussion going on in realms other than that of preservation and building professionals.
[5] Hyllegard, Ogle, Dunbar, 44; Wallace, Higgings, Raemaekers, 61.

[6] Andrew Poweter and Susan Ross. "Integrating Environmental and Cultural Sustainability for Heritage Porperties," *APT Bulletin: Journal of Preservation Technology* 36, no. 4 (2005): 5; Donovan D. Rypkema, "Economics, Sustainability, and Historic Preservation," The National Trust Annual Conference. http://www.placeeconomics.com/speeches.html (accessed April 3, 2009.); Hyllegard, Ogle, Dunbar, 44.

[7] Deborah Snoonian and Kira L. Gould. "Architecture rediscovers being green." *Architectural Record* 189, no. 6 (June, 2001): 86; J. Leslie Zachariah, Christopher Kennedy, and Kim Pressnail. "What makes a building green?" *International Journal of Environmental Technology and Management* 2, no. 1/2/3 (2002): 40.

[8] Jackson, 53; John D. Lesak, "APT and Sustainability: The Halifax Symposium." *APT Bulletin: Journal of Preservation Technology* 36, no. 4 (2005): 3; Zachariah, Kennedy, and Pressnail, 41.

[9] Richard Moe, "Historic Preservation and Green Building: Finding Common Ground." National Trust for Historic Preservation, http://www.preservationnation.org/issues/sustainability/sustainability-preservation-1.html (accessed May 21, 2009).

[10] Zachariah, Kennedy, and Pressnail, 38.

[11] Jackson, 53; Douglas; Elefante; 31; Zachariah, Kennedy, and Pressnail, 41.

[12] Jason McLennon. *The Philosophy of Sustainable Design: The Future of Architecture.* (Bainbridge Island, Washington: Ecotone , 2004) 2. Chapter one provides an interesting discussion on the definition of sustainable design. While the detailed discussion on the definition and use of terms is beyond the scope of this thesis; and the author of this thesis does not necessarily utilize the term sustainability in the same way that McLennan does, it is an insightful and compelling chapter tracing the usage and establishment of sustainable design as a philosophy and not a movement.

[13] Elefante, 31.

[14] National Trust for Historic Preservation. "Our Position on Sustainability," http://www.preservationnation.org/issues/sustainability/public-policy/our-position-on.html (accessed May 21, 2009).

[15] McLennan, 4.

[16] Barbara Campagna. "How changes to LEED will Benefit Existing and Historic Buildings." *Forum News: National Trust for Historic Preservation* vol. XV, no. 2 (November/December 2008): 2

[17] Nancy B. Solomon. "Tapping the Synergies of Green Building and Historic Preservation." *Architectural Record* vol. 191, no. 7 (July 2003): 156.

[18] National Trust for Historic Preservation. *New Energy from Old Buildings* 1980 (Washington, D.C.: The Preservation Press, 1981).

[19] Ibid, cover page.

[20] John C. Sawhill. "Preserving History and Saving Energy: Two Sides of the Same Coin," in *New Energy from Old Buildings*, National Trust for Historic Preservation (Washington, D.C.: The Preservation Press, 1981): 19.

[21] Sawhill, 24.

[22] Jackson, 47.

[23] Ibid.

[24] Ibid.

[25] Ibid, 47-48.

[26] Ibid, 48.

[27] Donovan D. Rypkema, "Economics, Sustainability, and Historic Preservation," The National Trust Annual Conference. http://www.placeeconomics.com/speeches.html (accessed April 3, 2009.)

[28] Campagna, 2.

[29] Snoonian and Gould, 86.

[30] Elefante, 32; Moe.

[31] Donovan Rypkema. *The Economics of Historic Preservation: A Community Leader's Guide.* (Washington, D.C.: The Preservation Press, 1994): 3.

[32] Main Street. "The National Trust Main Street Center," http://www.mainstreet.org/content.aspx?page=2&section=1 (accesses on April 2, 2009.)

[33] Rypkema, "Economics, Sustainability, and Historic Preservation," 6 (italics added by author for emphasis.)

[34] Ibid.

[35] David G. Woodcock. "Introduction" in *Adaptive Reuse: Issues and Case studied in Building Preservation* 1988 comp. Richard L. Austin (New York: Van Nostrand Reinhold Company 1988): viii-ix.

[36] Rypkema "Economics, Sustainability, and Historic Preservation," 5; For a full discussion on Smart Growth, please see the Lincoln Institute of Land Policy's *Smart Growth: Form and Consequences*, edited by Terry S. Szold and Armando Carbonell, 2002. Smart Growth principles include: "preservation of public goods; minimization of adverse land use impacts; maximization of positive land use impacts; minimization of public fiscal costs; and maximization of social equity."

[37] Chatterbox.typepad.com. "113 LEED projects and counting for Green Building Services," http://chatterbox.typepad.com/portlandarchitecture/2009/02/113-leed-projects-and-counting-for-green-building-services.html (accessed March 5, 2009).

[38] Joni L. Leithe, with Thomas Muller, John E. Petersen, and Susan Robinson. *The Economic Benefits of Preserving Community Character: A Practical Methodology.* The National Trust for Historic Preservation (Washington, D.C.: The Center for Preservation Policy, 1991.)

[39] David Throsby. "Sustainability in the Conservation of the Built Environment: An Economist's Perspective." In *Managing Change: Sustainable Approaches to the Conservation of the Built Environment,* ed. Jeanne Marie Teutonico and Frank Matero, 3-10. (Los Angeles: The Getty Conservation Institute, 2001): 6.

[40] Ibid, 4.

[41] R. E. Stipe, ed., *A Richer Heritage: Historic Preservation in the Twenty-First Century* (Chapel Hill: The University of North Carolina Press, 2003): xv.

[42] John C. Keene. "The Links between Historic Preservation and Sustainability: An Urbanist's Perspective." In *Managing Change: Sustainable Approaches to the Conservation of the Built Environment,* ed. Jeanne Marie Teutonico and Frank Matero, 11-19. Los Angeles: The Getty Conservation Institute, 200: 14-15.

[43] Stipe, xv. (Italics added.)

[44] Donovan D. Rypkema, "Community, Place and The Economics of Historic Preservation," New Jersy Historic Preservation Awards Ceremony, http://www.placeeconomics.com/speeches.html (accessed April 3, 2009).

[45] Jackson, 47; Solomon,163; Elefante, 31; Powter, 5.

[46] Solomon, 162.

[47] Campagna, 2.

[48] Ibid.

[49] Ibid.

[50] Ibid, 6.

[51] Ibid. For a full breakdown of the point reallocation, please see page 6.

[52] National Park Service. "The National Register of Historic Places," http://www.nps.gov/nr/ (accessed

April 2, 2009.)

[53] National Park Service. "Part 68.1 Intent: The Secretary of the Interior's Standards for the Treatment of Historic Properties," http://www.nps.gov/nr/national_register_fundamentals.htm (accessed May 21, 2009.)

[54] National Park Service. "Listing a Property: Some Frequently Asked Questions," http://www.nps.gov/history/nr/listing.htm (accessed May 21, 2009).

[55] Chatterbox.typepad.com. "113 LEED projects and counting for Green Building Services," http://chatterbox.typepad.com/portlandarchitecture/2009/02/113-leed-projects-and-counting-for-green-building-services.html February 09, 2009 (accessed on March 5, 2009.)

[56] Lesak, 3; Powter, 5.

[57] Hyllegard, Ogle, Dunbar, 45.

[58] Jackson, 3.

[59] Solomon,156.

[60] Latham, 22.

[61] Woodcock, viii-ix.

[62] Jackson, 2.

[63] Elefante, 32.

[64] Soonian and Gould, 92-94.

[65] Woodcock, vii.

CHAPTER III
ANCHORED VALUES:
THE BALFOUR-GUTHRIE BUILDING

> These eternal changes and permutations among old city buildings can be called makeshifts only in the most pedantic sense. It is rather that a form of raw material has been found in the right place. It has been put to a use that might otherwise be unborn.
>
> - Jane Jacobs
> *The Death and Life of the Great American City, 1961*

Introduction

The evolution of the Balfour-Guthrie building from grain trading office to architecture studio should not be considered makeshift, but the utilization of "raw material … found in the right place." The architectural firm of Thomas Hacker Architects' (THA) contemporary use of an historic building for their studio epitomizes Jane Jacob's observation that old city buildings experience "eternal changes and permutations." Built in 1913, the stripped-down classical architectural style of the Balfour-Guthrie building emphasizes both honesty of material and functionality of design (fig. 3.1). It also serves as a tangible point of connection to the city's past, while simultaneously projecting the current values of THA. Its new identity is that of an early example of a LEED certified project in Portland. As such, the Balfour-Guthrie Building case study is highly notable in the city of Portland – a national leader in sustainable development. That notability is enhanced by the fact that it is a historic building over 50 years old, and on the National Register of Historic Places that has achieved LEED Silver certification. Therefore, this case study sheds light on the early process of the LEED accrediting system within the bounds of the National Register, and will help to establish a basis for discussion and evaluation of the evolutionary history of sustainable preservation in Portland, Oregon.

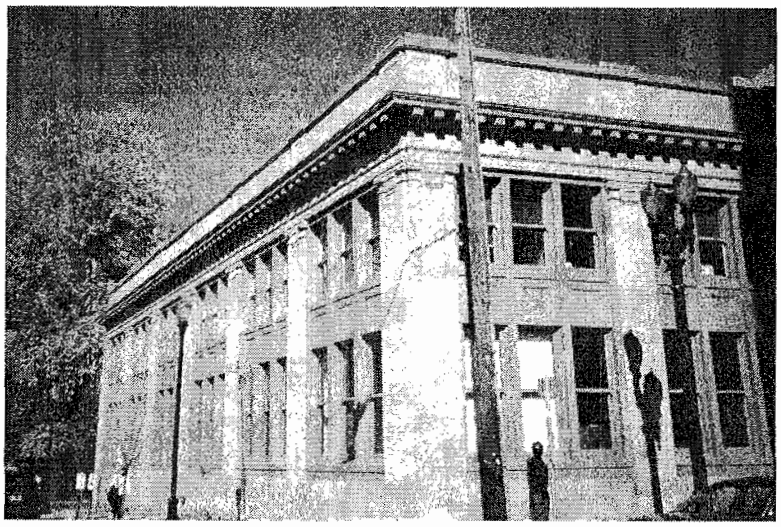


Figure 3.1 The southwest facades of the Balfour-Guthrie Building. The stripped-down classical architectural style built of concrete conveys the Balfour-Guthrie Company as a pillar of Portland society. Built in 1913, this is one of Portland's first reinforced, poured-in-place concrete buildings. Photo by K. Heath, 2003.

Building Details

Historic Name: Balfour-Guthrie Building

Location: 733 SW Oak St. Portland, Oregon

Building Type: Commerce (Office)

Original Architect: Morris Whitehouse

Date of Construction: 1913

Architectural Style: American Renaissance or 20th Century Classical

Renovation Architect: Thomas Hacker Architects, Inc.

Date of Renovation: 2002

Adaptive Re-use Function: Commerce (Office)

National Register Listed: Yes

LEED Certification: Silver (?pts)

Owner/Developer: Thomas Hacker Architects, Inc. & Gray Purcell, Inc.

Occupant: Thomas Hacker Architects and tenant

Stakeholders

Thomas Hacker Architects (THA), Inc. and Gray Purcell, Inc.

Design Team

Architect/Designer: Thomas Hacker Architects, Inc.

Contractor: Gray Purcell, Inc.

Sustainability Consultant: PGE Green Building Services

Mechanical Engineer: American Heating (Design Build)

Electrical Engineer: Northwest Electrical Specialties (Design Build)

Lighting Designer: Architectural Lighting Design

Other Consultants: Systems Commissioning Consultants

Project Costs

The total cost of the rehabilitation of the Balfour-Guthrie building was three million dollars. Approximately half of the cost ($1.6 million) was calculated as "soft costs", or the amount of money spent related to the design and administration of the project. Soft costs include the consultants and fees related to both the LEED and National Register programs. The remaining $1.4 million reflects "hard costs" or, the amount of money spent on labor and materials. Approximately 7% of the adjusted construction costs are attributed to LEED. This is an average of 3% higher than non-LEED certified construction. This cost was attributed to reusing the existing shell.[1] A breakdown of the LEED costs is as follows:

Energy modeling: $5,240

System commissioning: $10,685

Green Building Consulting: $2,000

Recycling of fluorescent bulbs and ballasts: $1,152

New HVAC System: $20,000 beyond code-compliant system

Additional fan wiring: $1,484 for OSA fans

Lighting fitup: $119,707 costs above standard lighting allowance of $1.50/sf

Storm windows: $25,884

Shower: $743

Bike racks: $200

Lockers: $695

FSC certified wood: $12,404

Wheatboard panels – upcharge: $700

Roof insulation: $8,500

Recycled drywall – upcharge: $1,093

Financial Incentives:

State of Oregon, Business Energy Tax Credit (BET/C)

State of Oregon – Dept of Energy, Low Interest Loan Program

City of Portland – Office of Sustainable Design – G-Rated Program

State Historic Preservation Office, Property Tax Incentive Program

Federal Historic Tax Credit

Total Adjusted costs:

Historic Context

Located in what was originally planned to become the "park blocks"-- a natural open space the length of downtown -- the two-story 20th Century American Renaissance building was constructed on the westernmost end of an odd-shaped block. This intersection is "where the city streets of the downtown core, that parallel the Willamette River, meet the northern blocks that are shifted to a north-south axis."[2] As a result of Portland's expansion and building boom specifically between 1910 and 1915, the Balfour-Guthrie was built at the southern end of the park blocks in what continues today to be the nexus of city between the Pearl District and the Downtown Core (fig. 3.2). Designed by Portland architect Morris Whitehouse, use of concrete for the original construction of the Balfour-Guthrie building is a likely reason for hiring an architect with little experience designing commercial spaces. He did, however, have experience working with concrete in projects such as the Multnomah Amateur Athletic Club and Grandstands – now PGE Field (1910). The Balfour-Guthrie building is significant and listed on the National Register of Historic Places, under Criteria A and C for its

representation of the city's expansion in the 19th century and because it was designed by Whitehouse.[3] According to the nomination:

> It was designed by Morris Whitehouse, an architect who, during his 36-year Portland practice, was responsible for a number of Oregon's significant public buildings, country clubs and private residences. The Balfour-Guthrie Building also appears to be unique among works of Whitehouse as perhaps the only commercial office building he designed.[4]

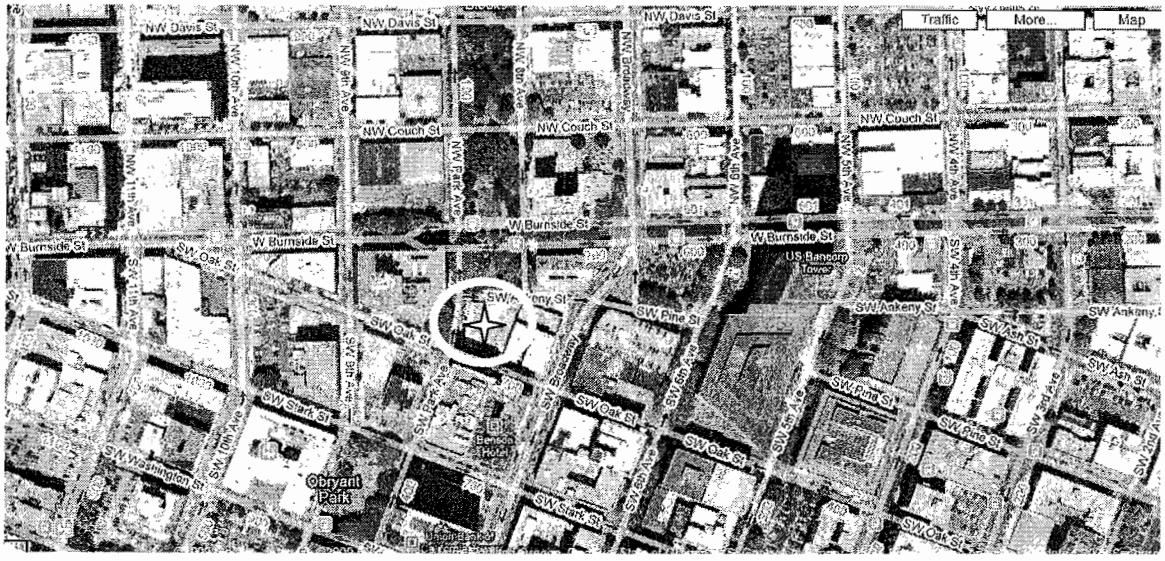


Figure 3.2 Map of north- and south-west Portland. Delineated by Burnside Street, the Balfour-Guthrie Building is located on the southwest section of the city, immediately south of the North Park Blocks. Truly at the transect of many interesting and diverse communities, the Pearl District is northwest, downtown is south, and Old Town/Chinatown is east of the Balfour-Guthrie. Map from googlmaps.com

As an early project in the office of Whitehouse and Fouilhoux, the Balfour-Guthrie building reflects Whitehouse's involvement in the Portland Atelier with Ellis F. Lawrence and A.E. Doyle. The Atelier was formed for the, "discussion and advancement of the Beaux Arts (after the École des Beaux-Arts in Paris) school of thinking about architectural design and education."[5] Using the classical vocabulary of the Beaux-Arts School of Design, Whitehouse sought for the appropriate architectural expression of commerce for the Balfour-Guthrie building. While simple and restrained in comparison with its "larger and more prestigious nearby buildings, and [Whitehouse's] own larger,

more public projects," such as the U.S. Courthouse (1933); the Balfour-Guthrie building uses the same classical language "in a very spare, business-like manner."[6] The highly simplified classical Doric/Tuscan order is conveyed through the honesty of materials and construction. Use of sandstone, which was more economical when compared with the harder, more expensive granites and marbles used in bank construction, still "conveyed the message that this was a place to do business in a trustworthy, straightforward and economical way."[7] This message was further expressed in the corner columns on Oak Street, Park Avenue, and Ankeny Street that were cut in a way that reveal the "truth" that the stonework was an applied veneer.

Project Description

The Balfour-Guthrie Building project was a historic rehabilitation and adaptive reuse of a 1913 building with a 6,000 square foot floor plate completed through joint ownership between the architecture and contracting firms. The jointed-owners acted in their respective professional capacities on the project during the renovation. The building was originally constructed for the Balfour-Guthrie Company, who occupied the entire building from 1913 until around 1957. Few changes were made to the building until the 1960s when it appears that the company removed the classical elements at the Oak Street entrance, remodeled the vestibule, and divided the interior in order to lease space.[8] In 1969 a major remodel to accommodate the needs of the City Rubber Stamp Company took place with multiple minor interior modifications to follow, until the purchase of the building in 2001 by Thomas Hacker Architects (THA), Inc. and Gray Purcell, Inc.[9]

The Balfour-Guthrie building is one of Portland's first reinforced, poured-in-place concrete buildings, a construction method in its infancy on the west coast in 1913. The Balfour-Guthrie Company was interested in using the material for multiple reasons, mainly because of their recent loss of two building to fires, one in San Francisco and one in Portland; the location of their Tacoma headquarters in the Perkins Building (1906), "the first large reinforced concrete office buildings in the northwest;" and also because they had recently opened a concrete plant in Bellingham, Washington.[10] Seismically

more stable than other historic building practices – the concrete construction resulted in lower expenses with regards to seismic retrofitting costs. The building was renovated into office space for THA and the Energy Trust of Oregon (the Energy Trust was the first tenant of the third floor after completion; however, various tenants have occupied the space over the past 7 years.)

Design Process

Both stakeholders felt that success hinged upon their communication and the allowance of time. "THA and Gray Purcell had never worked together and, before the project could progress, they spent [considerable amounts] of time familiarizing themselves with each other's objective and ways of doing business."[11] This time was important in order to align project goals and to outline development roles. "THA, who had never worn the hat of developer, served as project designer and Gray Purcell managed all of the development and finances."[12] Both companies agreed that listing the building on the Nation Register of Historic Places and to design for LEED certification were priorities for the project.

National Register Listing

Listing the Balfour-Guthrie on the National Register of Historic Places resulted from both the notoriety of the architect, Morris Whitehouse, as well as the building's connection to the city's development. National Register listing allowed the owners to freeze their property tax at the pre-development rate for fifteen years as well as utilize the Federal Historic Tax Credit program. Another important aspect of the listing process was the involving and maintaining of a good working relationship of the State Historic Preservation Office (SHPO).[13] An open dialogue with the SHPO ensured compliance with the Secretary of Interior Standards for Treatment of Historic Properties.

LEED Accreditation

LEED accreditation was added to the project's scope because of the desire for the owners to 'practice what they preached' to their clients. THA was encouraging their own clients to build more sustainable buildings and decided that it was extremely important for the firm to do the same. Indoor air quality, one category of LEED, was of particular interest to THA due to their previous office space's poor ventilation and natural lighting.[14] THA found that both the reuse of the Balfour-Guthrie and its historically respectful and environmentally sustainable rehabilitation reflected their values of material honesty, respect for place, and responsibility to the future.

Connecting the National Register and LEED

Spatial Flexibility

Simple and creative design strategies, coupled with innovative technologies helped the THA, Inc. and Gray Purcell, Inc. design team respond to the existing fabric as well as to both accrediting systems. Modest modifications to the core and shell were deemed necessary and appropriate to the reuse of the Balfour-Guthrie building, and were carefully filtered through the National Register and LEED systems. A good example of how the team used design to address both the systems is found in the challenge spatially-integrate the three stratified stories of the building. THA was not large enough to utilize the entire building; to be economical, the owners needed to have rental space. The top floor proved to be the most marketable for leasing to commercial tenants and the firm occupies the basement and second floor of the building (fig. 3.3).

The open floor plan of the Balfour-Guthrie promised to foster the open studio design approach of THA; however, the firm needed to find a way to connect two of the floors for their own use. In order to make the basement a desirable workspace, THA proposed to cut a large rectangular section out of the first floor plate and designed an open railing and staircase leading down into the basement. While this design decision required removing a large amount of the historic fabric, the SHPO approved the design. As a result, a cross-section of the historic concrete is exposed, revealing materials in this

early construction method. As such, it offers a structural section view and is an educational highlight of the building. The removal of part of the first floor plate further allows the basement to take advantage of sunlight -- a desirable feature acknowledged by LEED. A wall was built enclosing a storage space on the west side of the basement, making the studio space shallow and less cavernous. This necessitated the larger divisions of space, such as conference rooms, be located on the east. Consisting of a glass walled business office and conference rooms located on both floors, the glass serves as a reflector, bouncing light into the basement. The wall of windows and the floor opening allow visual access to the outside where trees and sky can be seen from the basement as well. The building's program was designed to increase office interaction between the floors by locating the kitchen and main bathrooms in the basement. The variation in work setting allows accommodation for those who enjoy either the basement or first floor setting by frequently moving teams and desks around the office.

Figure 3.3 Rectangular section removed from the first floor, used to spatially integrate the basement and the main level. Daylight from the upper floor is reflected down into the basement space using a wall of glass opposite the windows. Photo by author, 2009.

Systems: HVAC and Lighting

The spatial flexibility of the building is also demonstrated through the decentralized HVAC system. Sensitive to the building's inherent design aspects, such as the western façade's large windows, the system consists of automatically dimming lights that allow for "daylight harvesting" activated when direct sun is available and overhead light is not needed. Jonah Cohen, one of four principals at THA, reports that while the energy modeling projected a 24% better than code energy performance, in actuality they are

experiencing energy usage that is 40% better than code. Attributing this energy savings to the high efficiency zoned HVAC system, Cohen explains that the building is divided into eleven different zones which allow for building users to heat, cool, light, or ventilate specific spaces only and not the entire building. In addition to zoned heating and cooling, light sweeps at 6pm, 8pm, 10pm and midnight are incorporated into the system, blinking the overhead lights and giving any remaining occupants one minute to reset the system before completely shutting off. "The really great thing about it is that it reminds people that it is time to go home … you're there late at night … [working] and its kind of a humanizing thing … there is noone else here [you should go home.]"[15]

Sustaining Character Defining Features

A neighbor to some of the most upscale hotels in the city to the south and the Park Blocks with public restrooms to the North, the Balfour-Guthrie has a great location according to Cohen. However, being at the intersections of the Pearl District, China Town, and Downtown does lend itself to the occasional undesirable occurrence of 'tagging' or graffiti.[16] The stripping of many layers of gray paint from the exterior of the building exposed the original sandstone veneer facades -- an unknown and welcome surprise that both the owners and the Oregon SHPO wanted to maintain (fig. 3.4). THA desired to protect the sandstone exterior by applying a protective coating. They sought the approval of SHPO, who required inspection and ensured the application did not alter the color or appearance of the historic material.

Another area of concern for the SHPO was the extremely altered main entrance off of Oak Street. The original pediment had been removed, presumably in the late 1950s, and a storefront had been put in sometime afterward (fig. 3.5). The SHPO closely monitored the proposed design as the owners restored the remaining historic fabric within the entry lobby. Three different species of wood grace the lobby, acknowledging the historic material and design through a sustainable approach.[17] Dark stained, tight grained, old growth white oak from the original design and construction remains as paneling in the stairway leading up to the third floor. In homage, but not replication, the

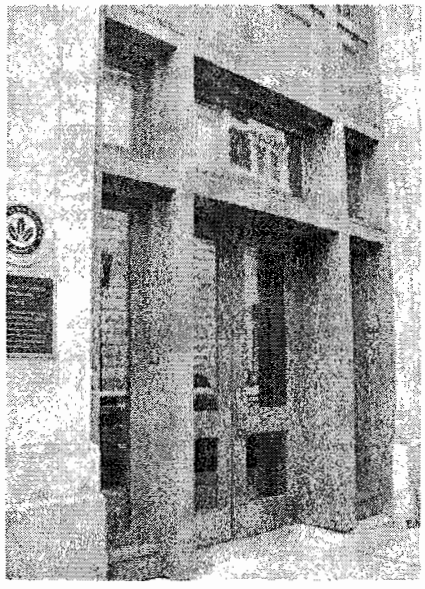
entry doors to THA's office are new, responsibly harvested, white oak left unstained as a distinction between contemporary and historic fabric. The third species of wood in the lobby is found in the old growth Douglas fir entrance doors. Recycled wood from Portland's dismantled dry-dock, the wood is also left unstained in order to expose the tight grain of the old growth wood, conveying its own story.

Two aspects where LEED and the Secretary of Interior Standards typically have inherent conflict are the replacement of historic windows and rooftop additions. The Balfour-Guthrie project reflects the ability for both systems to be satisfied, and in the case of the windows, prevent any extra accrual of costs by the owners. Storm windows were placed on the *inside* in order to maintain the historic look that is a requirement of the National Register, but also provide the thermal insulation needed to meet LEED standards (fig. 3.6). These windows magnetically adhere to the historic windows and can be removed in warmer months. The roof, although no addition has been added, was designed for a future set-back fourth-floor rooftop addition within the specifications of the Secretary of Interior Standards.[18] The large parapet was braced with ell-shaped brackets with the addition in mind and will encourage a garden or terrace setting to occupy the set-back space. A garden terrace will also help to reduce the building's heat absorption and contribution to the "heat-island affect" in the future.

Figure 3.4 Sandstone, double hung windows, and dentil cornice of the south façade. Removing multiple layers of paint revealed a sandstone veneer that was preserved and treated for protection against graffiti. Photo by author, 2009.

Practitioner's Reflections

Reuse of the Balfour-Guthrie Building for the office of Thomas Hacker Architects, Inc. was the best choice for the firm for multiple reasons. "It has a lot of things that were similar to our [design] values – a lot of light, big windows, an amazing exposed structure."[19] The project allowed THA to reflect upon their commitment to environmental and cultural sustainability to their clients, which include educational institutions such as schools, universities, libraries, museums, and theaters, as well as historic renovations for these public spaces. The Balfour-Guthrie building, in particular, expressed these values because of the design and the honest expression of materials.



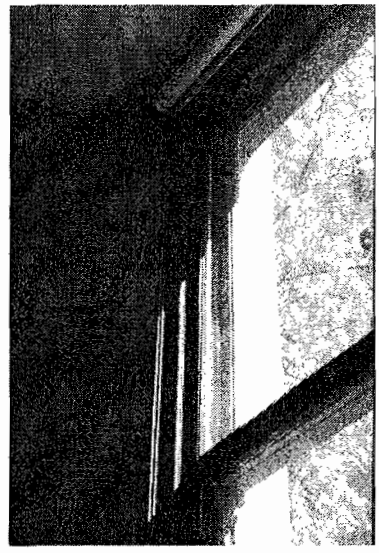


Figure 3.5 Left: Current entrance, missing the historic pediment removed sometime after 1950. The Secretary of Interior Standards does not require or typically encourage the replacement of missing architectural features or elements. Photo by author, 2009.

Figure 3.6 Right: Interior storm windows help to maintain the historic look while increasing energy efficiency. Photo by K. Heath, 2003.

THA wanted to use their office space to connect with Portland's past, while conveying their design aesthetic and values through the existing building fabric. Even the peculiarities and quarks of the building were seen as ways in which the building and its original architect could "speak." "Notice the size of the columns; they are different

widths and get smaller as you go around. Did they run out of concrete? Rather than make all the columns the same size as they would today – a sort of rational order to things [where the thin upper piers reflect the lighter vertical compressive loads] … Whitehouse did calculations … [and] their version of the math and [then] built it to that … the second tier is smaller, [they] don't all line up."[20] THA also found more pieces to the building's story through the renovation: "columns were plastered … you could see the old world fir used in concrete forms on the columns" (fig. 3.7).[21] It was these elements that the firm wanted to retain that also reflected honestly the method of construction.

The owners felt that the synergy between the Secretary of Interior Standards and LEED Green Building Rating System "forced them in the right direction."[22] According to the project architect Alexander Lungershausen, the design team "knew the SHPO standards, took their advice and tried to address it … [we] tried to meet both [National Register and LEED] expectations. [We] gained something … it wasn't really a hindrance; it was positive from all angles."[23] An example of this positive force is found in the restoration of the original sandstone veneer façade. In removing the paint to expose the sandstone, the building became more noticeable and even better reflected the values of the firm in its truth to materials. THA takes pride in the sensitive approaches developed to address the historic fabric, using a non-evasive system of structural ties for the sandstone blocks – addressing modern building code and retaining the character and design of the Balfour-Guthrie. The story of the Balfour-Guthrie Building also left a personal imprint on Jonah Cohen as a young architect. "There had been a rubber stamp company here for years … I had gotten my architect stamp here in about 1980 … I

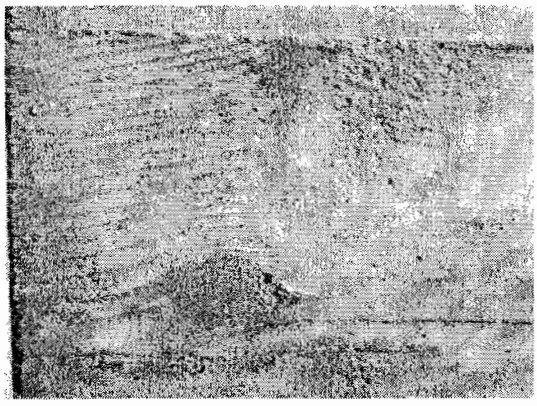


Figure 3.7 The grain of the wood form used in 1913 to cast the concrete in place is still visible in the columns today -- 96 years later. Photo by author, 2009.

remember the day I picked up my architect stamp because it was a big moment in my life." At the heart of the sustainability and historic preservation movements for THA is the issue of reusing a building. "You don't throw away what you will be rebuilding .... [Building reuse] is definitely the way to go."[24]

Being on the cutting edge of LEED and National Register influenced design in 2002, THA learned valuable and insightful lessons. While listing the building on the National Register qualified the project for a fixed property tax, "in the end there were a lot of LEED things that kept adding up ... $200,000 total for all the energy things we did."[25] This proved to be a test to the firm, "a moment of truth – are we still going to go for LEED? If so, how are we going to pay for it? And what we ended up doing was saying, "Yeah, we need to do this, we need to practice what we preach."[26] In the eleventh hour the four partners of THA turned to the State of Oregon in order to access a Department of Energy loan, each individually taking on more debt. When asked if it was worth it, Cohen replies, "I don't have any regrets ... because you are here, you wouldn't be here if we didn't."[27] Seven years later people are still talking about it and wanting to know how it was done. The relevance of the project remains and the interest of architects and preservationists alike is still held.

The firm welcomes the attention that has, in turn, provided an opportunity to shape the future use of LEED in the city of Portland. The Energy Trust of Oregon came to THA after the building had been occupied for three years, and asked if it could do an energy audit and collect user feedback. In 2002 energy-modeling, young in development and use, had projected that the building would use 20% less energy than current building codes required. In 2005, the Energy Trust of Oregon discovered that in reality the Balfour-Guthrie performed two times better than energy modeling projections, using 40% less energy than code. THA "thought silver is fine, we were just happy to get LEED;" however, had energy modeling provided more accurate schemes, the Balfour-Guthrie would likely have received Gold accreditation. Cohen also commented on the unexpected costs that energy modeling consumed saying, "the cost caught us by surprise," since three studies were needed at four- to five-thousand dollars each.[28] The

energy performance is translating into financial savings for THA, however inaccurate the speculative modeling software proved to be. Cohen estimates that their utilities are 1/3 less than normal costs for a class B office building in downtown Portland.

Other experience gained by THA include, collaboration with other building professionals also new to LEED, as well as the importance for long-range thinking. The willingness of contractors and sub-contractors to learn about LEED, and the successful integration of mechanical systems and a historic and sustainable project contributed directly to the success of the project. Working directly with system installers, the project used 'design-build' systems -- HVAC systems designed and built/installed directly by the sub-contractors. Learning alongside other industry professionals, THA further anchored their commitment and values within the sustainability ethos emerging in Portland. "The concept of sustainability – has to be the future … can't be anything else – the impact of architecture as a material user or a toxic producer is too great … it has to happen … we are only halfway there."[29]

Author's Reflections

Highlights

The Balfour-Guthrie Building was the first LEED Silver certified architectural office in the United States.[30] The impact of building reuse is illustrated most profoundly through two LEED sections: 1) reduction of construction and demolition waste, and 2) the utilization of a developed urban site. The rehabilitation and reuse of entire buildings help to divert construction and demolition waste from landfills. The Balfour-Guthrie project resulted in the recycling of 75% of the construction and demolition waste. Also, the locations of historic buildings are often ideal for sustainable development. The Balfour-Guthrie building is located at the transect of the Pearl District, the North Park Blocks, and the downtown commercial core, which allows the building's occupants to take alternative transportation to work –of which 75% do.[31] This not only affects energy use and carbon-emissions, it encourages a connection to the surrounding community that only a walking familiarity can impart. Some of the other energy-efficient highlights include: using

insulating storm windows, and installing a heat-reflecting Energy Star roof, day lighting controls, and low-flow, water-conserving fixtures.

This case study can be used as an example for a variety of reasons and is applicable to a wide range of projects. Among its 'firsts' is the designation as the United State's first LEED certified architecture firm. An early example of a LEED certified building in Portland, Oregon, it also sets a precedent combining LEED certification with National Register of Historic Places designation. This interesting fact on the surface seems coincidental, although it should not be seen as such, as both systems have a common underlying principle of conservation. It is this fact, and ultimately its lack of publicity, that suggests the field of preservation has missed an opportunity to call attention to the sustainable aspects of historic buildings. This case study could be better utilized as a basis for dialogue within the building community, and further establish building reuse as an ideal starting point for the application of sustainable development and specifically the LEED system.

The Balfour-Guthrie project illustrates the ability of historic buildings to act as a tangible connection among past, present, and future identities of place -- specifically when used in a relevant, modern, and historically compatible way. It is particularly interesting and relevant to the tenets of both movements that THA expressed a connection with the building's original design and construction. The firm articulated the feeling that the building's architectural style, material construction, location, and role in the city's historic development reflected their own professional ideals and values. Personal experiences and interactions with the building helped to enrich the building's history and connect the occupants with the building. In this respect, the building's adaptive-reuse approach is successful in addressing the social and cultural aspects of sustainability and historic preservation. The Balfour-Guthrie's role as an informal classroom and laboratory also serves this function, as students and professional groups continue to learn about and understand the sustainable and preservation aspects of the project.

Concerns

Of concern in this particular case study are the economic and environmental motivations of sustainability and historic preservation. These two aspects are closely intertwined in this project, which allows for their joint discussion. Energy performance of the Balfour-Guthrie has proven to be even better than models projected; however, the economic feasibility of the key energy saving aspects of the buildings must be further explored. It would be interesting to see if it would be possible to attribute specific design strategies or systems with percentages of energy savings. The owner's insight into the project financials, particularly the need for extra funding through grants and additional loans, prompts reflection on the availability and necessity of federal, state, and city incentives. All of these funding resources profoundly influence both sustainable and preservation development projects.

On one hand, listing the building on the National Register made the acquisition of the building possible, because it provided access to a fixed pre-development property tax. On the other hand, energy grants made the sustainable (or LEED) aspects possible. Initial capital is needed in order to invest in specific technologies and restorations and to realize later energy savings (both economic and environmental). Another factor is the impact that legislation can have on both sustainability and historic preservation activities. What impacts will a change in legislation have on the future of similar projects? The influence of Portland's sustainability ethos on funding for these projects plays a large role in the availability of funds and thus the success of sustainable preservation.

Post-occupancy use is another concern that affects both the economic and environmental aspects of sustainability and historic preservation. User understanding of the design and operation of a building directly affects the performance and sustainability of a space, as well as the success of a design. An example of where this building could improve in this area can be found in the leased third floor space. For the first three years after completion of the project, the Energy Trust of Oregon occupied the entire third floor of the Balfour-Guthrie. Because the tenant was extremely committed to using their space in an environmentally, economically, and socially responsible way, THA designed a

LEED certified space that incorporated a manual light and flushing system. This system required people to manually open windows and vents at specified times throughout the day in order to allow light and air to periodically flush the office. After three years of use by the Energy Trust of Oregon, a new tenant moved in and the use of the system has become sporadic at best. No formal manual or operating system currently exists, nor does the understanding of how the system could improve the indoor environment, among other things. Sustainable development is only successful when used as designed. The documentation and training of how buildings and their systems operate are crucial aspects to sustainable preservation performance.

Another area of concern connected to occupant-use is the operable windows on the second and third floors. This aspect of the Balfour-Guthrie illustrates the synergy of historic design and sustainability. While the windows are operable on both floors, the occupants report that the ground floor windows are rarely opened mainly because of a security issue. A combination of the urban neighborhood and a large amount of electronic equipment often dissuade the use of natural ventilation and cooling. This also means that the interior storm windows, while removable, tend to remain on all year round on this floor. On the third floor, however, the windows are frequently opened and used by the occupants to address human comfort issues. The problem arises here in the transition from the warmer summer months, when the interior storm windows were removed, to the cooler fall and winter seasons when they are to be re-installed. The owners report a margin of human error when this re-installation occurs. Due to their historic nature, the windows required custom storm windows to be fabricated. Each is numbered to simplify the re-installation process; however, the reality is that the storm windows inevitably get mixed up and are often not properly installed. Since the windows are not being used in the correct locations for which they were designed, this results in the possibility of a decrease in energy efficiency. A feasible solution seems to be the hiring of a building manager to ensure the performance of the building as designed.

The Balfour-Guthrie Building provides a good illustration of the beginnings of sustainable preservation in Portland, Oregon. The integration of the LEED accrediting

system within the context of a National Register listed building reflects the preservation and sustainability ethos prevalent in the city. Both were vital in accessing funding and necessitate a heightened level of communication and articulation of the owners' goals both internally and externally. As a result, the project can be used as an exemplar for a variety of projects, including: 1) existing reinforced masonry buildings; 2) stratified floor plates that necessitate a connection strategy; 3) multiple tenant and/or leased space; 4) multi-owner properties; 5) creative grant and funding strategies; 6) construction material treatment of concrete and sandstone; 7) climate zone HVAC and lighting within an existing building; 8) daylighting strategies; 9) and use of interior storm windows. The Balfour-Guthrie case study is not without its concerns, and it is important to acknowledge this. Concessions of historic material as well as the integration of building systems were made. However, the lessons provided by this project will continue to influence the practice of sustainable preservation in the Portland area and beyond. The areas of concern, such as the user's-understanding of building design and operation, can serve as valuable learning opportunities. Future projects can use the Balfour-Guthrie building as a spring-board for even better results.

Notes

[1] City of Portland, Oregon www.portlandonline.com/osd/index/cfm?c=41645 (accessed May 1, 2009).

[2] David Shelman, "Balfour-Guthrie Building Nomination." National Register of Historic Places Nomination, section 7, pg 1.

[3] Please see page 22 for an outline of the National Register of Historic Places criteria.

[4] Shelman, section 8, pg 1.

[5] Ibid, section 8, pg 3.

[6] Ibid, section 8, pgs 3-4.

[7] Ibid.

[8] Ibid, section 7, pg 8.

[9] Ibid.

[10] Ibid, section 7, pg 2.

[11] City of Portland, Oregon.

[12] Ibid.

[13] Jonah Cohen, interview by author, 10 April 2009, Portland, OR, audio recording. Joy Sears, interview by author, 13 April 2009, Salem, OR, audio recording.

[14] Alexander Lungershausen, interview by author, 9 April 2009, Portland, OR, audio recording.

[15] Cohen.

[16] Ibid.

[17] Ibid.

[18] Ibid.

[19] Ibid.

[20] Ibid.

[21] Ibid.

[22] Lungershausen.

[23] Ibid.

[24] Ibid.

[25] Cohen.

[26] Ibid.

[27] Ibid.

[28] Ibid.

[29] Lungershausen.

[30] Portland Cement Association, "Balfour-Guthrie Building." www.cement.org/buildings/buildings_office_balfour.asp (accessed Febuary 25, 2009).

[31] Ibid.

CHAPTER IV
INTEGRATIVE LEARNING:
THE WHITE STAG BLOCK

> The preservation of an old downtown drugstore building should be combined with an attempt to preserve the drugstore business itself, or a similar customer-oriented business. The functions [the "verbs"] are what define downtown as a focus of community life, not simply the physical groupings of buildings (the "nouns"). Downtown preservation, therefore, has goals beyond the physical preservation of buildings."
>
> - Norman Tyler
> *Historic Preservation, 2000*

Introduction

Aiming to bring the "focus of community life" back to Old Town, the White Stag Block project is using the physical grouping of buildings or the "nouns" and their functions or the "verbs" of the built environment to catalyze change. Clearly demonstrating "goals beyond the physical preservation of buildings," as suggested by Norman Tyler, this case study demonstrates the power of applying integrated design and learning towards sustainable preservation. Once the center of commerce and entertainment, the Skidmore/Old town Historic District contains Portland's largest remaining collection of mid-to-late nineteenth century business buildings.[1] Ideally situated along Tom McCall Waterfront Park and the Willamette River, the White Stag Block is nestled along the Burnside Bridge in the heart of an historic district that is currently considered Portland's *skidrow* (fig 4.1). Illustrating the power of preservation in economic and community development, the White Stag Block project takes advantage of the inherently sustainable design of three historic buildings and offers a precedent for a creative sustainable preservation project. The reuse of these buildings has catalyzed further investment into the Old Town area, demonstrating that preservation is an important tool in sustainable development.

Building Details

Historic Name(s): Bickel Block, Hirsch-Weis, Skidmore

Location: 23-33 NW Naito Parkway, Portland, OR

Building Type: Warehouse, Retail, Office Space

Original Architect: Justus Krumbein (Bickel Block); unknown (Skidmore and Hirsh-Weis Buildings)

Date of Construction: 1883 (Bickel Block), 1889 (Skidmore Building), 1907 (Hirsh-Weis)

Renovation Architect: Fletcher Farr Ayotte Architects

Date of Renovation: May 2008

Adaptive Reuse Function: Educational, Retail, Office Space

National Register Listed: Yes, contributing properties to National Register Historic Landmark District

LEED Certification: LEED NC v. 2.2 Gold (43 points)

Owner/Developer: White Stag Block, LLC

Manager: Venerable Properties, Inc.

Occupant: Venerable Properties, United Fund Advisors, The University of Oregon

Stakeholders

The University of Oregon

Venerable Properties

Portland Family of Funds

Design Team

Architect/Designer: Fletcher Farr Ayotte Architects

Contractor: Bremik Construction

Sustainability Consultant: Green Building Services

Mechanical/Electrical Engineer: Interface Engineering

Project Costs and Financial Partners:

The White Stag Block sustainable renovation cost $30.3 billion and included the following partners:

The University of Oregon

Venerable Properties

Portland Family of Funds

Portland new Markets Fund I, LLC

Historic Rehabilitation Fund I, LLC

Portland Development Commission

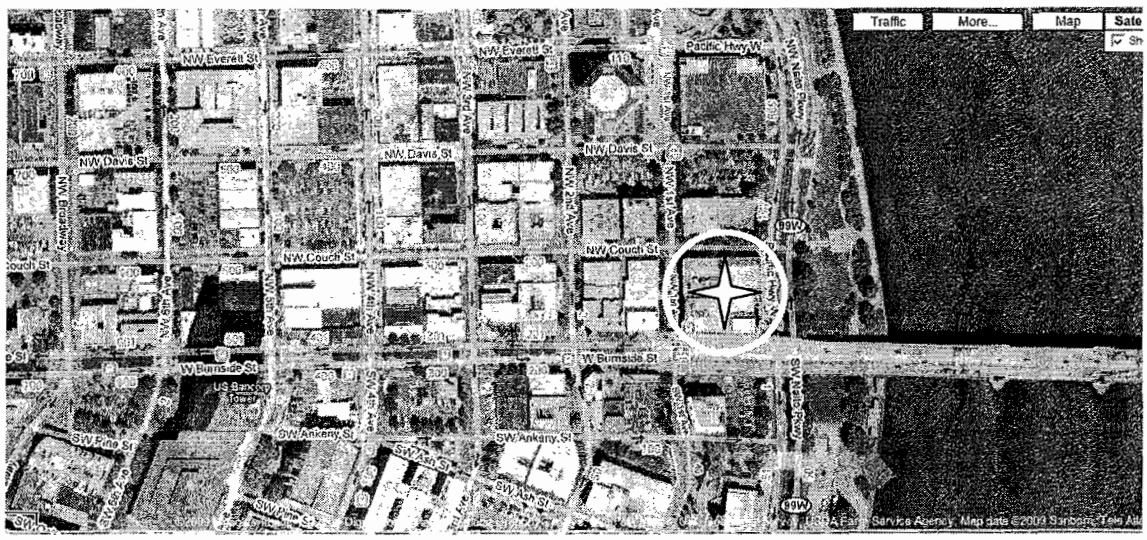


Figure 4.1 Map of the west side of Portland – west of the Willamette River. The White Stag Block is located on Naito Parkway along the Governor Tom McCall Parkway to the east and the Burnside Bridge to the south in the Skidmore/Old Town Historic Landmark District. This neighborhood saw the genesis of the city of Portland and was the first commercial district. Map from googlmaps.com.

Financial Incentives:

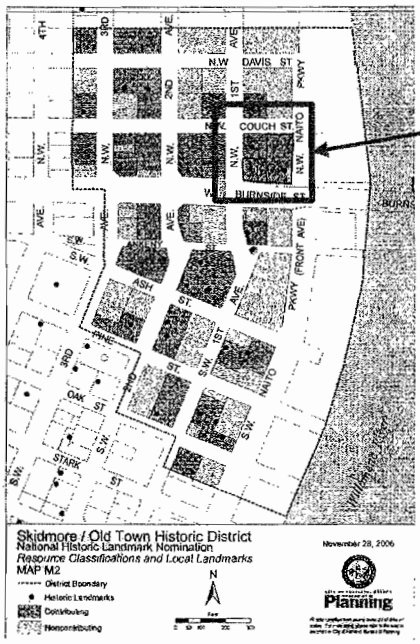
New Markets Tax Credits (NMTC)

Federal Historic Tax Credit

Historic Context

Making up the historic commercial core, the Skidmore/Old Town Historic Landmark district saw the genesis of Portland. The city benefited and developed from profits derived from gold and timber, as well as the Indian wars. "By 1860, the frame structures were replaced by 'commercial palaces' of brick and cast iron."[2] A variety of high-Victorian styles, many made of cast iron, comprise one of the most impressive historic commercial blocks on the west coast. "The wooden cornices, masonry bearing walls, and the use of architectural cast iron in the street level facades once typified the streets of Portland and are well represented in the present Skidmore/Old Town Historic District."[3] Known nationally for its Italianate architecture, the Skidmore/Old Town Historic Landmark District has the largest intact collection of cast-iron fronts in the West and is considered second in the nation to New York City's SoHo cast iron district. "The district is an area of approximately 20 blocks centered on Burnside Street and bordered by the Willamette River on the east." (fig. 4.2.)[4] The Bickel Block (1883), Skidmore (1889), and Hirsch-Weis (1907) buildings make up three of the four buildings of the block bordering the north side of the Burnside Bridge and the west bank of the Willamette River. "The first businesses in these buildings read like a cross section of Portland's history. [They] once housed a logging machinery company, a tent and outdoor supply factory, and even a china importer."[5]

The oldest of the group, the Bickel Block Building (fig. 4.3) constructed in 1883 with a cast iron front, was the first of many Victorian gothic buildings in Oregon designed by architect Justus Krumbein. During the mid 19th century, "cast iron was the new building material both for its ornamentation and its assumed resistance to fire in industrial buildings. New York City, San Francisco and other major cities were also building cast-iron façades at this time."[6]



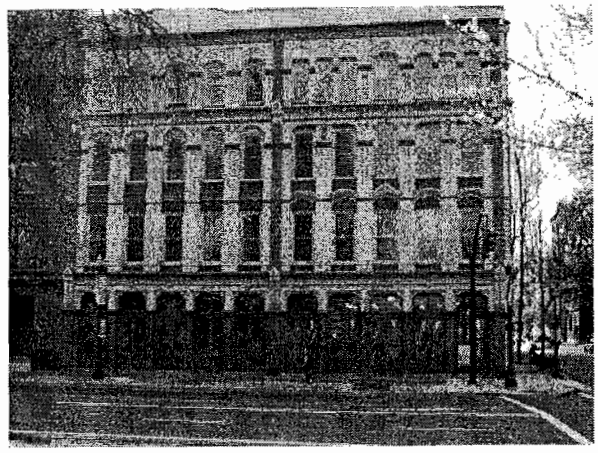


Figure 4.2 Left: Map of the Skidmore/Old Town Historic District. All three buildings that make up the White Stag Block are considered contributing buildings to the district. Map courtesy of Portland Planning Commission.

Figure 4.3 Right: Bickel Block, east façade facing Naito Parkway and the Willamette River. This is an early example of a Gothic Cast Iron front. Behind a masonry wall, the construction crew found fire damage from the 1970s. The façade along with the first floor wood doors were restored using local craftsman. Photo by author, 2008.

Owned by Fredrick Bickel – a candy entrepreneur turned real estate developer – the original occupant of the Bickel Block was the Parke and Lacy Machinery Company, a manufacturer of engines and heavy logging machinery. By 1958, the current owner concealed the ornate cast-iron columns and wood storefront doors with a masonry product called "Wonderstone," damaging the column capitals. Further damage occurred to the façade in 1972 when the subsequent owner set fire to the building in order to collect the insurance money, leaving charred heavy timber doors and blackened cast-iron columns.

The Skidmore Block Building (fig. 4.4), completed in 1889, was also constructed with a cast-iron front. The Italianate-style building was originally owned by Stephen Skidmore, and was to be his office, but was inherited by his brother-in-law Charles E. Sitton upon his death in 1882.[7] In 1926 the south façade of the building was removed to make way for the construction of the Burnside Bridge.

The south façade of the adjoining building, the Hirsh-Weiss (fig. 4.5) built in 1907, was also removed for the Burnside Bridge. The first occupants of the building were Max and Leopold Hirsh of the Willamette Tent and Awning Company. The building was used as manufacturing and warehouse space and has a much more industrial and utilitarian design than the other two buildings that make up the White Stag Block. The Hirsh-Weiss Building was home to White Stag Sporting Goods by 1931, but is best known for the neon-sign located on its roof.

> In 1940, the roof space was rented to the White Satin Sugar Company for the placement of a sign promoting that company's name. But, in 1959, the sign was changed to read 'White Stag' to reflect Hirsch-Weis' new status as a division of White Stag. The sign was re-worded again in 1997 to read 'Made in Oregon' under the patronage of the Made in Oregon Company, a retail chain of Oregon foods and crafts.[8]

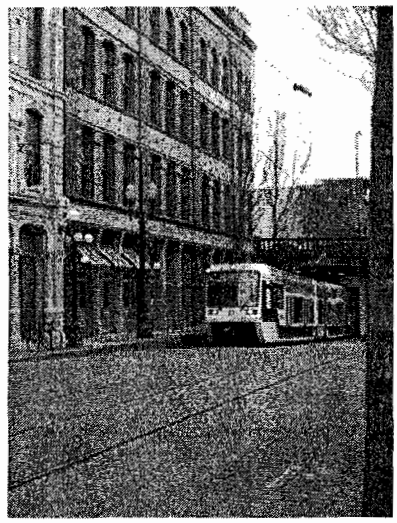


Figure 4.4 The Skidmore building's Italianate cast-iron façade faces west on NW First Ave. A MAX light rail stop is located across the street. Photo by author, 2008.

Project Description

The White Stag project consists of the sustainable renovation and adjoining of three distinct historic buildings into one cohesive space. Originally, these five-story load-bearing brick buildings were configured for both office space and warehouse use. The renovation resulted in approximately 66,000 square feet of available space; it now houses office, commercial, and academic space. The renovation process was configured to address both the Secretary of Interior Standards, as well as the LEED Green Building

Rating System. "The reuse of salvaged materials was critical to achieving this balance [...] Many creative elements of the renovation process were not dictated by LEED certification."[9] The White Stag opened for University of Oregon students in Summer Term of 2008, becoming the permanent home for the University of Oregon in Portland. Not only does the building provide classroom and administrative space, it "enable[s] the University to host lectures, exhibits, and other public events."[10]

The project was viewed as a catalyst for new investment in Old Town Portland and a demonstration of the city's investment in higher education, historic preservation, and sustainable development. A sustainable renovation was a central goal articulated early on in the design process. The project scope was to "co-locate schools of Architecture and Allied Arts, journalism, law, services programs and administration, a library, gallery space, and ground-floor bookstore with café" as well as provide "support of 250 students (expected to reach 400 in 2 years) and 75-100 employees [and] house office space focused on sustainable practice."[11] "Venerable was excited to have the chance to make a positive impact in Portland's Old Town – a neighborhood that has long been considered Portland's skid row."[12] The White Stag Block received LEED Gold certification in Summer 2008, specifically by addressing the sustainable practices of building and material reuse, water efficiency, reduction in energy consumption, and user/occupant education.

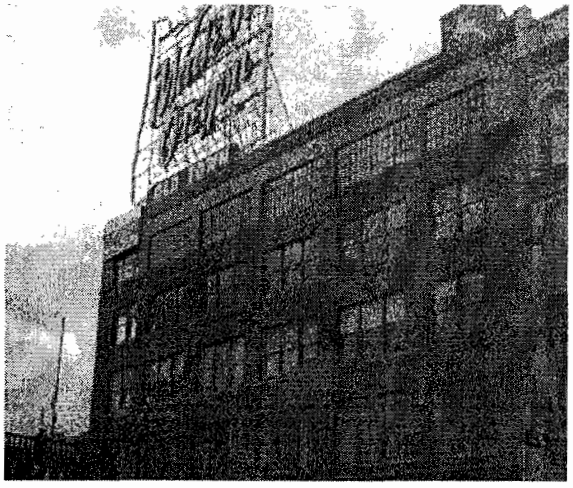


Figure 4.5 The Hirsh-Weis Building, commonly referred to as the White Stag Building faces east toward Naito Parkway, Tom McCall Waterfront Park, and the Willamette River. The most industrial of the three buildings, the former warehouse is now home to the University of Oregon at Portland. Photo by author, 2008.

Design Process

The renovation of a building can be a large and involved project, without the additional goals of historic preservation and sustainability. The design team for the White Stag Block faced the challenge: "how to modernize building performance while keeping the appearance historically accurate."[13] Armed with this task, the design team filtered each decision through the goals of maintaining historic integrity while increasing the inherently sustainable aspects of the buildings. In March 2006, the building team convened in an Eco-Charette, or workshop, led by sustainability consultants at Green Building Services in order to establish and articulate both goals and strategies in achieving sustainability and LEED certification. "These initial goals for the White Stag Block renovation project included creating a safe and friendly environment, integrating and communicating green buildings strategies, meeting budget and scheduling goals, and planning for the future."[14] Utilizing both the Secretary of Interior Standards for Treatment of Historic Structures and LEED New Construction v. 2.2, the project team achieved their goals specifically "by earning all water efficiency points, increasing energy performance, diverting 98% of construction waste from landfills, increasing recycled content from 10% to 20%, and buying Green power."[15]

Balancing modern structural performance requirements with historic fabric and construction techniques was a challenging aspect of the White Stag project. Creative and innovative approaches to structural improvements and replacements were necessitated by strict historic preservation guidelines required for the buildings to remain as contributing resources to the Skidmore/Old Town Historic Landmark District on the National Register, thus ensuring the project's eligibility for Historic Rehabilitation Tax Credits. Structural improvements were made internally in order to maintain the historic facades of each of the buildings, and included: "the use of massive steel beams in a post and lintel system to open up load bearing brick walls; the reinforcing of brick walls around stairwells and elevators with concrete; the shoring of the building foundations; the re-pointing of all the mortar on the original brick walls; the restoration and reuse of original cast-iron support columns."[16] Long-term structural damage had occurred to both the

Skidmore and Hirsh-Weis Buildings as a result of the construction of the Burnside Bridge in 1926. The bridge necessitated the removal of the south sides of both buildings, which were subsequently not adequately reinforced. "These façades had actually been load-bearing walls, meaning that they helped support the floor slabs. Removing the walls overloaded the wooden capitals of the interior columns. In subsequent years, the load of the buildings crushed and twisted the column capitals."[17] The renovation process involved shoring up the walls of both buildings beyond the fourth floors, replacing the crushed timber capitals with replicas, and adding steel reinforcing plates (fig. 4.6.)

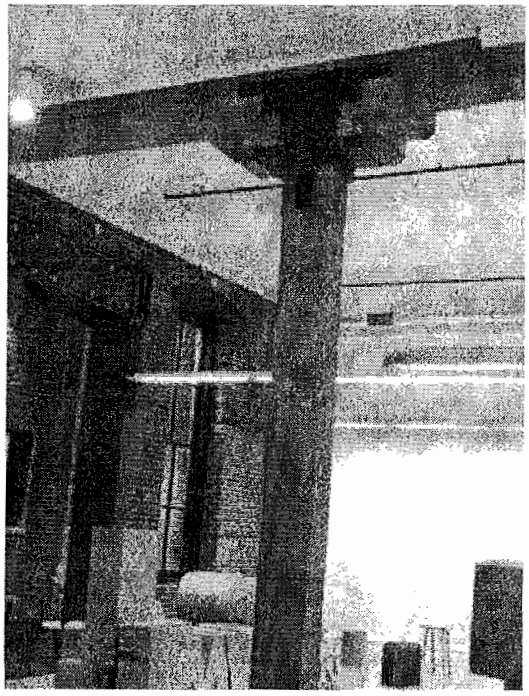


Figure 4.6 Reconstructed and reinforced capitals of the Skidmore building that were damaged when the south façade was removed for the construction of the Burnside Bridge in 1926. Photo by author, 2008.

Other renovation challenges include the mitigation of various floor plate heights between the three buildings and the joining of both the Skidmore Building on the west side and the Bickel Building on the north side to the Hirsh-Weis Building. Historically, slender open spaces were often located between buildings acting as conduits for light and ventilation between structures (fig 4.7.) Two existing lightwells between the three buildings were used creatively to address both historic preservation and sustainability.

Between the Skidmore and Hirsh-Weis buildings the basement level of the lightwell was "lined with concrete to create [a] 10,000 gallon water storage tank that collects rainwater from the roof and is used to flush the buildings' toilets."[18] The water retention tank acts as a connection and circulation site among all three buildings, although it is concealed beneath the floor covering and only noticeable by two distinct manhole covers cast with the University's trademark "O" (fig 4.8.) The remaining lightwell, located between the Bickel Block and the Blagen Block (which is not a part of the White Stag project) was enclosed in order to conceal the ventilation systems for all four buildings located on the block. This helped to significantly reduce the amount of floor space needed for ventilation shafts.

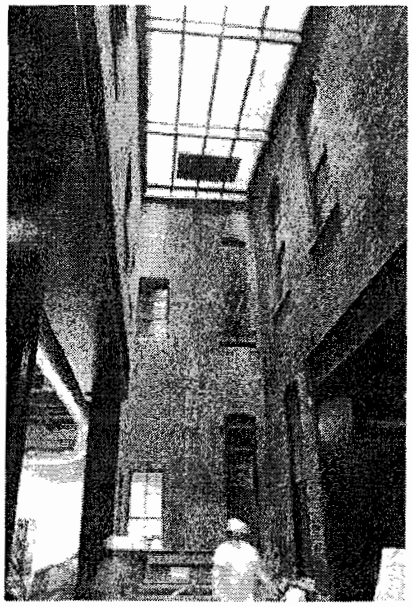


Figure 4.7 Looking south, the historic lightwell between the Hirsh-Wies (left) and the Skidmore (right) buildings was enclosed with a glass ceiling to continue to allow it to function as a conduit for natural light space. The basement level of the lightwell was lined with concrete, acting as a water retention tank. Photo by author, 2008.

Connecting the National Register and LEED

Site

Sustainability goals support the reinvestment and development of urban core areas because they take advantage of already developed sites, existing infrastructure, public transportation, and assist in limiting fringe development – all of which are common characteristics of historic buildings and neighborhoods. Historic buildings are also often found in low-income communities and economically depressed areas as demonstrated in the Skidmore/Old Town Historic Landmark District that has an unemployment rate that is 5 times the national average. The poverty rate in the area is 41.3%, and the district has been classified as a federal Housing as well as Urban Development (HUD) Enterprise community and an Urban Renewal Area.[19] Projects like the White

Stag Block demonstrate sustainable preservation as an economic and community revitalization tool, and act as a catalyst for change in the most needed areas of urban centers.

The site location itself is important with regard to the LEED Sustainable Sites "Development Density & Community Connectivity" credit. "In order to obtain this credit, at least ten amenities must be reachable within a half mile's walking distance. The White Stag Block's location lends itself to flexible space usage by closely linking the building and its occupants to historic locales, local restaurants, shops, medical services, public transportation, and more."[20] Directly west of the Skidmore Building's main entrance is the MAX light rail stop, as well as several bus stops within four blocks. The basement of the Skidmore Building contains both bicycle storage and changing rooms, thus encouraging and accommodating bicycle commuters. In addition to these amenities, Old Town has a distinct historic riverfront character and is close to Portland's Chinese Classical Garden, the Japanese American Historical Plaza, and the Portland Saturday Market.

Building Reuse and Materials

Earning 7 of 13 LEED points for the Materials & Resources category, the White Stag Block used a varied resource-saving approach which included: building reuse, material reuse, recycled material content, and construction waste management. Building reuse became the broad foundation for the integration of both the National Register and LEED programs in the

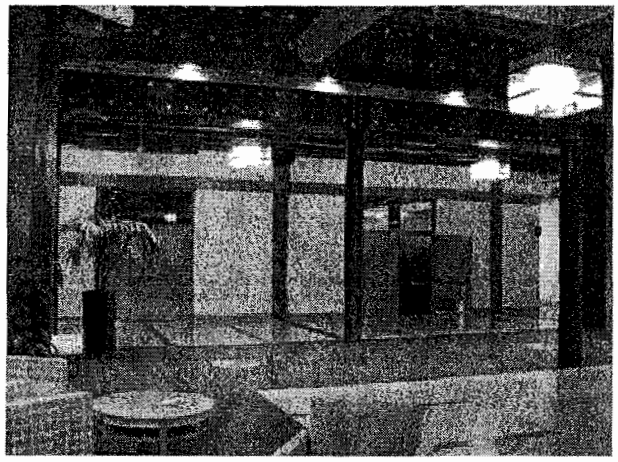


Figure 4.8 Looking east from the Skidmore Building into the Hirsh-Weis Building. The water retention tank is located beneath the floor, allowing for movement and circulation between these two buildings. Two manhole covers can be seen inlaid in the floor. Photo by author, 2008.

White Stag Block project. Both the University of Oregon and Venerable Properties felt that, "the importance of retaining existing buildings [could not] be understated, as a building that is already standing requires far fewer resources than a building built from scratch."[21] The orientation to sustainable preservation is reflective of both stake holders' mission statements. Venerable's mission: "to preserve and revitalize Oregon's historical resources through development of commercial real estate," directly applies to the historic fabric of the White Stag Block. The University's mission could be applied to the tenets of sustainable development through its commitment to "a recognition that research, both basic and applied, is essential to the intellectual health of the university, as well as to the enrichment of the lives of Oregonians, by energizing the state's economic, cultural, and political structure."[22] Art DeMuro, President of Venerable Properties, praises the University of Oregon for understanding its potential for influence in Portland's Old Town area and for working towards a positive economic and social impact.[23]

Building and material reuse are points where LEED and the National Register have converging goals. Strategic planning to ensure compliance, as necessitated by the LEED program, allowed for the articulation and achievement of these goals. The White Stag Block earned "Innovation and Design" points for "Exemplary Performance" by recycling over 98% of all materials associated with the buildings, diverting them from being placed in local landfills. "Reusing building materials can [also] greatly reduce the demand for virgin materials, which must be extracted, processed, transported, and installed."[24] Materials not reused on site were recycled through BoneyardNW, an online commercial building materials exchange, as well as Portland's ReBuilding Center, a nonprofit organization dedicated to the reuse of building materials.[25] The project team recognized the importance of diverting architectural and construction debris from landfills, as well as the influence of using recycled and recyclable materials in building construction.

The brokering of sustainability and preservation goals within the realities of construction logistics continually necessitates creative solutions. An example of this creativity can be seen in the project's seismic and structural upgrades. Structurally, the

brick walls needed to be reinforced with concrete; however historically the brick would have been covered with plaster. Competing with both of these approaches is the market allure of exposed brick surfaces. The compromise that was reached addressed all of those needs – "rather than reinforce all the brick walls with concrete, some historic brick surfaces were left exposed while others were encased in plaster."[26]

Reuse of buildings and their materials can do more than divert waste from landfills; it can also help to "increase regional demand for these products, stimulat[e] the local economy, and reduc[e] environmental impacts associated with the use of virgin materials."[27] These impacts are also the result of using regional materials. "Regional materials can contribute to sustainable building by reducing transportation costs and pollution."[28] LEED requirements specify that at least 10% of the project's materials must be extracted, harvested, recovered, and/or manufactured within 500 miles of the project site. "In addition to local concrete and steel companies, the White Stag Block used local artisans for historic restoration components. Charles Marpet Fine Woodworking in Cottage Grove, Oregon, reproduced two sets of historic wood doors, and Barr Casting, Inc. in Portland, Oregon, cast aluminum replicas of the damaged cast-iron, both for the façade of the Bickel Building (fig. 4.9.)"[29] Employing traditional craftsmanship in historic buildings helps to stimulate local economies and tie individuals to the communities and regions they live and work in.

In addition to reusing all three of the historic buildings' envelopes and structural systems – including the exterior skin, framing, and the interior brick walls – the White Stag Block reused salvaged materials and materials with recycled content. "Timber cut from stairwells and elevator shafts were re-milled and used in interior trim and removed brick was reused to fill existing holes. Ductwork and storm water pipes made of recyclable materials [were] used in the rainwater reclamation system."[30] LEED requires that recycled and recyclable materials with post- and pre-consumer content must comprise at least 20% of the project's total materials. The Architecture and Allied Arts (AAA) space illustrates the complementary use of salvaged and recycled materials in one place. Rubber flooring composed of 85% post-consumer truck tires was installed in the

Figure 4.9 The Victorian Gothic cast-iron façade of the Bickel Block was carefully restored after fire damage and being covered by a masonry wall. Local craftsman were employed to recast missing and damaged elements. Photo by author, 2008.

studio spaces of the fourth and fifth floor, providing not only environmental benefits, it also addresses the functional needs of students. The recycled tire floor is both durable and comfortable to stand on – both characteristics desirable for a professional program that often necessitates long hours and creative approaches to model making since students can use the floor as a cutting mat.

Juxtaposed against the recycled rubber flooring is a very tangible example of a different type of recycling. The wood flooring for the Architecture, Digital Arts, and the first floor Duck Store was the original gym floor of the Gerlinger Annex located on the Eugene campus (fig 4.10.)[31] Installed in 1969, the floors have seen almost forty years of UO basketball, dance, and gym classes, but with its pealing finish it was no longer adequate to serve as an athletic court. The wood was carefully removed and sent north to Portland. After reinstallation and refinishing, it continues its UO legacy at the White Stag Block, and act as a physical connection between the two campuses. These two contrasting materials, the recycled tire floor and the reused wood gym floor, represent the various approaches to reusing and recycling materials utilized in the project. One can be seen as a representation of technological innovations – taking something and recycling it into a new use – while the other demonstrates how the repurposing of materials in a new location can be a way to mitigate waste and reduce resource depletion.

Windows and Lighting

The interface of the National Register and LEED programs is most overtly met at the apertures of a building. Through an extensive dialogue with the SHPO, the design

team was able to mitigate concerns about historic windows and their affect on building energy performance. Compromises were made and permission was given by the SHPO to allow the project architects to place new openings in historic "blind" window space on the corner of the Bickel building and replace significantly damaged windows with low-emissivity windows on the south facing façade of the Hirsh-Weis building. The SHPO gave permission to replace these windows, with the stipulation that they match the aesthetic appearance of the originals. "In total, roughly half of the windows in the three-building complex were replaced and the remainder restored."[32]

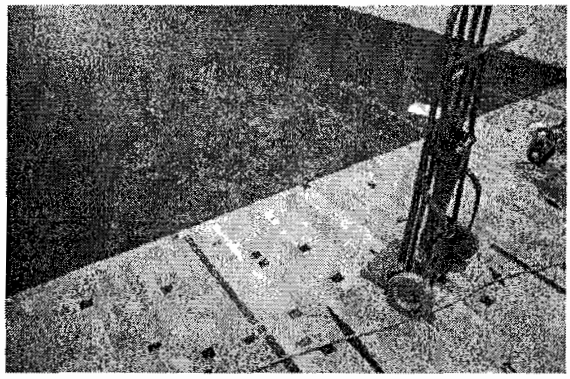


Figure 4.10 The juxtaposition of the recycled tire floor and the reused gym floor on the fourth and fifth floors of the Hirsh-Weis Building demonstrate the project's creative approach to sustainable preservation. Photo by author, 2008.

Accessibility to natural lighting is another area in which the White Stag Block demonstrates its efforts to marry sustainability and historic preservation. The roof of the Hirsch-Weis Building illustrates an historic design strategy that is inherently sustainable. The historic saw-tooth roof creates large light monitors, casting daylight deep within the floor-plate (fig. 4.11). Restoration of the building and the retention of these inherently 'green' design features demonstrate the converging goals of the movement. "The original monitors on the fifth floor [...] were preserved [and] retrofitted so that they could be renovated in the future to allow for their easy opening and closing which can aid with building ventilation."[33] In order to maximize the benefits of daylighting, the University opted to sacrifice square footage floor space on the fifth floor to give the fourth floor access to natural light from the light monitors and top story windows. Like the Balfour-Guthrie, the White Stag Block removed a section of the flooring between the fourth and fifth floors in the AAA space. "This space has been converted to a stairwell that allows

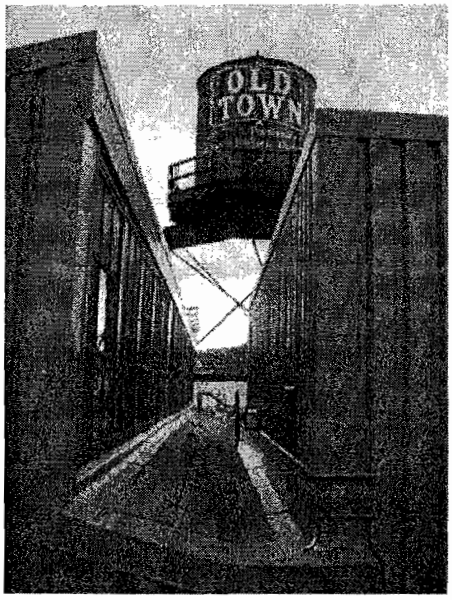


Figure 4.11 The historic water tower overlooks the saw-tooth roof of the Hirsh-Weis Building. These east facing light monitors bring natural light into the fourth and fifth floors, an historic design strategy that reduces the need for artificial light. Photo by author, 2008.

daylinghting to penetrate deeper into the building. The use of daylighting helps to increase efficient building operations by reducing the need for artificial light."[34]

Systems: Electrical, HVAC, and Water

An integrated design approach was used to address mechanical, electrical and building envelope considerations. "Together these improvements amount to seven LEED energy performance optimization points, awarded for a predicted increase in energy efficiency of 24.5% above baseline."[35] HVAC systems are typically the systems that consume the largest amount of energy in a building. In mitigation, the building owners opted to install high-efficiency, natural gas boilers that are 8-10% more efficient than industry standards.[36] In addition to this equipment, hot water is only provided in limited locations: the showers and mop sink in the basement, the Duck Store coffee area, and the main restroom and kitchen for the conference center. "There are also point-of-use water heaters in the custodial closets, and break room sinks throughout the buildings. However, there is no hot water in any restroom above the first floor."[37] Necessitated by the historic nature and the contribution to the Historic Landmark district, all major mechanical equipment is located in the basement.

The rainwater catchments system of the White Stag Block is an extraordinary example of how historic buildings can adapt to modern technological advances in sustainability. Rainwater is collected from all three building's roofs using downspouts

and inboard rooftop catchments systems. "Pipes carrying the filtered rainwater are made of clearly-marked, bright green, recyclable polypropylene. These pipes are not only less expensive than copper pipes, but are also the first of their kind in Portland."[38] Water is carried to a 10,000 gallon storm-water retention tank located in the basement beneath the main lightwell. "The collected rainwater feeds low-flow toilet fixtures that reduce water use. There are urinals that require only 1/8 gallon (1 pint) to flush. There are also dual-flush toilets that allow users to choose a half flush or a full flush based on waste."[39] Art DeMuro reports that 85-90% of the White Stag Block's water usage is directly from the catchements system, dramatically reducing the building's need for municipal water. It is also important to note that the building's highest occupancy rate, and thus peak in water usage, coincides with the rainiest times of year in Portland – between September and June. The notion that sustainable preservation is achieved by first starting with the right use for the right building is clearly illustrated by this example.

Practitioner's Reflections

Exceeding many expectations, the White Stag Block is viewed to be a highly successful exercise in sustainable preservation, as well as economic and community development. Art Demuro confesses that the project has been far better received and there has been greater demand to lease space in the sustainable historic building than even he had anticipated.[40] A new experience for many of the stakeholders and project team members, the White Stag Block provided an opportunity for many companies and individuals to navigate the National Register and LEED processes. The goal to use the presence and resources of the University to positively affect a community in need is in motion. Acting as a catalyst for further investment in the Old Town area, the White Stag Block is credited with influencing Mercy Corps' decision to rehabilitate an historic building and relocate their headquarters across the street, among other proposed future development in the area.

The creative financial structure was a seminal piece to making the White Stag Block a reality. Using both Historic Rehabilitation and New Markets Tax Credits, the

project reflects the importance of public money in shaping the cultural landscape. "The resulting equity [from the use of NMTC and Historic Rehabilitation Fund] fills the gap between project costs and traditional financing means, and allows historic restoration and sustainable design efforts to proceed at levels consistent with Portland's values."[41] With these financial incentives come requirements and expectations to stimulate the local economy and increase community vitality. The White Stag Block's "use of the $28.6 million worth of the federal tax credits effectively allows $11.2 million in foregone federal taxes over nearly 12 years" and is expected to directly, indirectly and induce an economic impact of $89.9 million to Multnomah County during the same period.[42]

"Mark Heizer, Senior Mechanical Engineer and LEED Specialist at Interface Engineering, believes that individual decisions do not work in isolation, but influence other decisions and their outcomes."[43] This case study demonstrates this idea, as many factors and forces have ensured the success of the project. Another of these factors on the success of the project was the developer and owner's experience with the National Register Nomination process and their established positive working relationship with SHPO. The impact of this relationship is tremendous, allowing for better communication and more understanding between each participants goals and expectations for the project. The commitment of the stakeholders, particularly Venerable Properties, the United Fund Advisors, and the University of Oregon were large factors in meeting the stated established goal of sustainable preservation. Each participant remained dedicated, was working to compromise and further the project in any way possible, even contributing additional funds at times to ensure the retention of sustainable preservation amenities.

Although the building has been in operation for less than a year, it is clear that the overarching goals of sustainable preservation have been met. While more information will be revealed in time with regard to the building's overall energy performance, the retention of three historic buildings and the impact of their restoration in the Old Town community is visible. Certain aspects of achieving sustainability will inevitably be revealed over time, however the design has a built-in allowance for increased efficiency as funds and technologies come available. For example, Art DeMuro expressed regret

concerning the inoperability of the light monitors on the fifth floor of the Hirsh-Weis Building – claiming that they were a point of embarrassment for him. However, the project provides areas for improvement, such as the light monitors, that will ensure that these three buildings will be relevant and functional for another hundred years.

Author's Reflections

The White Stag Block case study is highly effective in demonstrating the adaptability of historic buildings and the importance of all three tenets of sustainable development. Addressing social and economic concerns by rehabilitating historic buildings in a landmark district, the project reflects the catalytic abilities of sustainable preservation. Simultaneously, the White Stag Block provides substantial insight into the relationship between historic design and building fabric with regards to environmental sustainability. A number of features found in the three buildings that comprise the White Stag Block reflect the inherently sustainable aspects of historic design. These include: large windows, lightwells and monitors, thick masonry walls, flexible and open floor plans, and a high-density urban location close to public transportation. Coupled with historic construction materials and techniques, these inherently sustainable historic design features demonstrate that historic preservation can be a tool to achieve sustainable development. These sustainable preservation tools include the reuse of the existing shell, core, and much of the structural system. Reusing the Bickel, Skidmore, and Hirsh-Weis buildings reinvests the energy embodied in historic construction material such as cast-iron, brick, and old-growth timber.

Established Relationships

An understanding of historic design and building fabric, as well as a familiarity with the review process associated with National Register listed buildings, proved to be invaluable to the success of the White Stag Block project. The experience of Venerable Properties in the preservation and adaptive reuse of historic buildings in the city of Portland helped to lead and shape the design. Having a reputation as a heritage developer

specializing in the preservation and development of historic buildings, Venerable has built a relationship with city and state government offices such as the Planning Commission, the Landmarks Commission, and the State Historic Preservation Office. Establishing and maintaining a working relationship with these offices ensures communication of ideas and the implementation of federal requirements, helping to minimize confusion and to increase success.

A well-established professional relationship with the SHPO and the sustainability consultant, Green Building Services (GBS), was an aspect of this project that helped to finesse the initial conflicts and complications between the National Register and LEED. The establishment of the buildings as contributing resources to the district necessitated design review by the SHPO in order to access Historic Tax Credits. By engaging the historic reviewer early on in the process, and utilizing previously gained experience, the design team could mitigate conflicts as they arose. The use of integrated design approaches and an eco-charrette led by GBS helped to establish and articulate goals for all project members and stress the importance of adhering to all National Register and LEED requirements.

Economic and Community Impacts

The White Stag Block is a particularly unique and interesting case study of Green preservation principles for two main reasons: 1) it consists of three historic buildings conjoined during the renovation process; and 2) the buildings are located within a National Register Historic Landmark District. In addressing the goals of sustainable preservation, the White Stag Block is particularly affective in addressing the socio-cultural aspect of sustainable development. This project is particularly influential because it demonstrates the impact that sustainable preservation can have in low-income communities providing creative opportunities that stimulate innovative solutions. The impacts that these buildings have had on the surrounding area are due, in part, to the adaptive reuse function as a University campus and commercial office space. However, the true synergy of this project is the co-mingling of uses within once derelict historic

buildings in Portland's skidrow. These three buildings provide a standard for the neighborhood and the city, demonstrating the power of reinvesting in historic communities. This power and influence associated with preservation in low-income communities convey the importance of utilizing existing resources and not simply removing them.

For example, the White Stag Block project brought "532 jobs – 483 temporary jobs during the 15 month construction and 49 permanent jobs created and expected to be retained during the first 10 years of operations."[44] This translates to "$37.9 million in wages, $21.3 million in fiscal impact, [for a total impact of] $89.8 million."[45] The issue of gentrification is, of course, a concern as many missions and shelters serving the homeless and vagrant populations of Portland are starting to either be pushed out due to rising rents, or selling out in order to capitalize on the rising property values. Either way, the issue of displacement is of much concern when dealing with development, and sustainable preservation is not immune.

Another aspect of the socio-cultural responsibility tenet of sustainable preservation that is exemplified at the White Stag Block is the preservation of buildings in the context of a greater historic cultural landscape. The preservation of buildings that are contributing resources to a National Register Historic Landmark District reflects the commitment of the city of Portland to its cultural and architectural heritage, as well as its historic center. Reinvestment in the Skidmore/Old Town District is, in turn, a reinvestment in the city itself, as Old Town is Portland's most historic and destitute community. An example of this is the historic Bickel Block cast-iron façade. Influenced by the Secretary of Interior Standards and the LEED Green Building Rating System, the façade's restoration illustrates the synergies that can be created from the two systems because the design team utilized local craftsmanship to restore a character-defining feature of the building. Acknowledging and celebrating these buildings conveys an understanding of both local and national history, as two of the three buildings are premiere examples of cast-iron architecture. Overall, the White Stag Block represents investment in higher education, sustainable preservation as a catalyst for economic

development in an underserved area, and a commitment to transit-oriented sustainable development.

Looking Forward

Keeping in line with the academic institution housed in the complex, the stakeholders asked a class made up of students in the School of Architecture and Allied Arts at the University of Oregon to create an education program to explain the green features of the White Stag Block and to promote more sustainable behaviors among the building users. "User behavior is just as important to sustainability as materials and resources used in the renovation process, the buildings' water efficiency and energy performance. Behind the historic facades, the building has been infused with new interior spaces and sustainable technologies."[46] There is tremendous room for improvement in education about the buildings and their history, their sustainable preservation features, and in user-education in order to ensure that the buildings are used as designed. A building manager is in place, which assists in the maintenance and monitoring of systems; however, the disconnect between the building, its users, and the maintenance staff demonstrates an aspect of sustainable building that may need to be better addressed.

While the monitoring and use of the White Stag Block was not designed to be a work in progress, there are other areas intentionally designed for future implementation as funds and opportunity allows. Two examples are related to the historic rooftops. The differing profiles of the three buildings are defining features, making the use of typical LEED rooftop strategies complicated. Currently, the historic roofs are unable to support the weight of a green roof or photovoltaic panels. Stakeholders, however, are interested in exploring the future possibility of those options. In the future, as technology, design, and implementation of green roofs and solar technology improves, the option to install one or both of these sustainable strategies may be a possibility. Also concerning the roof, the inoperable light monitors of the saw-tooth roof of the Hirsh-Weis Building can be made operable to provide ventilation and the circulation of air. Placing these skylights in

service will reduce demand on mechanical cooling and ventilation systems in the future. These areas where improvements can be made should be seen, not as failures or inadequacies, but opportunities for future development and improvement. The basis of sustainable preservation has been laid in a very visible and tangible way in the Skidmore/Old Town Historic Landmark District. The example set by the White Stag Block is that historic preservation can be one of the most vital and purposeful tools of sustainable development because it reaches beyond the environmental aspects, catalyzing economic and community development as well.

Notes

[1] Carolyn Pitts, "Skidmore/Old Town Historic District Nomination." National Register of Historic Places Nomination, section 7.

[2] Ibid, section 8.

[3] Ibid, section 7.

[4] Ibid.

[5] Zach Rose and Diana Fischetti, "The White Stag Block: History," http://pdx.uoregon.edu/leed/index.html (accesses April 10, 2009).

[6] Ibid.

[7] Ibid.

[8] Ibid.

[9] Casey Kleinhenz, et al., "The White Stag Block: Historic Character and Sustainability," http://pdx.uoregon.edu/leed/index.html (accesses April 10, 2009).

[10] Rose and Fischetti, "The White Stag Block: History."

[11] United Fund Advisors, *The White Stag Block.* [Portland, OR United Fund Advisors, 2009.]

[12] Jessica Engeman, "The White Stag Block: Financing," http://pdx.uoregon.edu/leed/index.html (accesses April 10, 2009).

[13] Casey Kleinhenz, et al., "The White Stag Block: Renovation," http://pdx.uoregon.edu/leed/index.html (accesses April 10, 2009).

[14] Ibid.

[15] Ibid.

[16] Casey Kleinhenz, et al., "The White Stag Block: Structural Renovation," http://pdx.uoregon.edu/leed/index.html (accesses April 10, 2009).

[17] Ibid.

[18] Casey Kleinhenz, et al., "The White Stag Block: Historic Character and Sustainability."

[19] United Fund Advisors, *The White Stag Block.*

[20] Cody Evers, "The White Stag Block: Transportation," http://pdx.uoregon.edu/leed/index.html (accessed April 10, 2009).

[21] Zach Rose and Diana Fischetti, "The White Stag Block: History."

[22] University of Oregon, "UO Mission Statement." http://aaa.uoregon.edu/bov/mission/uo/ (accessed May 20, 2009).

[23] Art Demuro, interview by author, Portland, OR. May 7, 2009.

[24] Bethany Johnson, John Wallace, and Diana Fischetti, "The White Stag Block: Materials & Resources," http://pdx.uoregon.edu/leed/index.html (accessed April 10, 2009).

[25] Ibid.

[26] Casey Kleinhenz, et al., "The White Stag Block: Historic Character and Sustainability."

[27] Bethany Johnson, John Wallace, and Diana Fischetti, "The White Stag Block: Materials & Resources."

[28] Ibid.

[29] Ibid.

[30] Ibid.

[31] Rose and Fischetti, "The White Stag Block: History."

[32] Cody Evers, "The White Stag Block: Transportation."

[33] Casey Kleinhenz, et al., "The White Stag Block: Historic Character and Sustainability."

[34] Ibid.

[35] Dawn O'Connor, et al., "The White Stag Block: Energy Performance - Heating, Lighting, and Windows," http://pdx.uoregon.edu/leed/index.html (accessed April 10, 2009).

[36] Ibid.

[37] Ibid.

[38] Diana Fischetti, Ashley Garrett, and Jolyn Overton, "The White Stag Block: Water Efficiency," http://pdx.uoregon.edu/leed/index.html (accessed April 10, 2009).

[39] Ibid.

[40] Art Demuro, interview by author, 7 May 2009, Portland, OR, audio recording.

[41] United Fund Advisors, *The White Stag Block*

[42] Ibid.

[43] Ray Neff, et al., "The White Stag Block: Energy Performance," http://pdx.uoregon.edu/leed/index.html (accessed April 10, 2009).

[44] United Fund Advisors, *The White Stag Block*

[45] Ibid.

[46] Casey Kleinhenz, et al., "The White Stag Block: Historic Character and Sustainability." Note: The author participated in developing this case study document and can attest to the wealth of information it provides. Written by graduate and undergraduate planning, architecture, environmental studies, and historic preservation students, the document is easily accessible on the UO Portland website, however many of the educational and informational programs suggested and designed by the students were not developed due to poor planning and direction.

CHAPTER V
SETTING THE STAGE, RAISING THE STANDARD: THE FIRST REGIMENT ARMORY ANNEX

When we build let us think that we build forever. Let it not be for present delight, nor for present use alone; let it be such work as our descendants will thank us for, and let us think, as we lay stone on stone, that a time is to come when those stones will be held sacred because our hands have touched them, and that men will say as they took upon the labor and wrought substance of them, 'See! This our fathers did for us.' For, indeed, the greatest glory of a building is not in its stones, or it its gold. Its glory is in its Age.

- John Ruskin
The Seven Lamps of Architecture, 1849

Introduction

The First Regiment Armory Annex (the Annex) has had various iterations on its historic name over the last 118 years. These names include: The Portland Oregon National Guard Armory Annex, the National Guard Armory, and the Armory Hall. On the primary entrance on the east elevation between two turrets in raised letters is the title, "First Regiment Armory." Today the castellated building with its rusticated ashlar stone base and towering brick crenellated parapets is commonly known as the Gerding Theater at the Armory (fig 5.1). The Annex is the largest covered public space in Portland and has housed an intriguing assortment of events and organizations over the years.[1] Not only are the stones of this building "held sacred because [of the] hands [that] have touched them" as John Ruskin states, the community treasures the Annex because, "Its glory is in its Age" and the events held within the walls of stone. The Annex has always provided a backdrop for Portland's public life. Beyond the National Guard drills and training exercises, the building has hosted symphony and opera shows, political rallies and speeches, concerts and campfires, wrestling and tennis matches, dog shows and dances. The sustainable reuse of the historic First Regiment Armory Annex by the theater group Portland Center Stage (PCS) is yet another reflection of Portland and its leadership in environmental, economic, and socio-cultural responsibility as it is the first building on the National Register of Historic Places and the first theater to achieve a

LEED Platinum rating in the United States. This case study demonstrates the synthesis of historic preservation and sustainability -- a LEED Platinum building on the National Register of Historic Places. The project also reveals the complicated realities of sustainable preservation, highlighting the importance of clearly articulated project goals.

Figure 5.1 The west façade of the First Regiment Armory Annex located at 128 NW 11th Ave, Portland, Oregon. The building is a rare example of castellated style architecture in Oregon. Photo by author, 2009.

Building Details

Historic Name: First Regiment Armory Annex

Location: 128 NW 11th Ave, Portland, Oregon

Building Type: Military, Oregon National Guard

Original Architect: McCaw and Martin

Date of Construction: 1891

Renovation Architect: GBD Architects, Inc.

Date of Renovation: 2006

Adaptive Re-use Function: Theater, Café, Offices

National Register Listed: Yes

LEED Certification: NC-v.2.1 -- Platinum (53 pts)

Owner: Portland Historic Rehabilitation Fund

Developer: Gerding Edlen Development Co.

Occupant: Portland Center Stage

Stakeholders

Portland Historic Rehabilitation Fund, Corp. (PHRF)

Portland Center Stage (PCS)

Design Team

Owner/Developer: Portland Historic Rehabilitation Fund, Corp.

Architect: GBD Architects, Inc.

Contractor: Hoffman Construction Company

Civil and Structural Engineer: KPFF, Inc.

Mechanical Engineer/Lighting Designer: Glumac

Interior Designer: GBD Architects, Inc.

Landscape Architect: Murase Associates

Environmental Building Consultant: Green Building Services, Inc.

Theater Consultant: Landry & Bogan, Inc.

Project Costs and Financial Partners

The project cost a total of $36 million dollars. The financial partners include:

U.S. Bank

Portland Family of Funds

Portland Development Commission

Goldman Sachs

Portland Historic Rehabilitation Fund

Armory Theater Fund

Friends of the Armory

Financial Incentives

Portland Development Commission

Federal Historic Tax Credit

Historic Rehabilitation Fund

Business Energy Tax Credits
New Market Tax Credits

Historic Context

In response to considerable violence against the local Chinese population, the newly formed Oregon National Guard built the first armory in the State of Oregon in 1888. Almost immediately, the first Armory building was found to be too small and the construction of the Annex was completed three years later in 1891. The Annex has statewide significance as the only National Guard Armory in the state of Oregon for over 20 years. Interestingly, "no shot was ever fired from the First Regiment Armory's gun slots. The city's volunteer army, in effect, played "fort," doing marching drills, dining and hobnobbing. In the wilds of an open Western city like Portland, the Armory became a king of informal finishing school for young men."[2]

As early as 1903 the Annex was used in other capacities beyond military drills and a shooting range. Orchestras, symphonies, and operas all took place within the stone and brick walls of the Annex in the early 20th century. The Circus, political rallies, boxing matches, American Legion, and National Guard Dances each took place as well. In 1928, the Portland Kennel Club held their dog show at the Armory, followed by the year's Olympic wrestling trials. Campfire girls, refugees of the Vanport flood, and spectators of the Pacific Coast Professional Basketball League Championship game all gathered (at various times) under the expansive fir trusses of the Armory Annex. In 1953 the Armory made its debut on the small screen, hosting the Portland Wrestling Club mat show for KPTV's Big Time Wrestling. The early sixties saw two more firsts – exhibition tennis matches between some of the world's greatest tennis pros, Jack Kramer and Bobby Riggs in 1962, and the Godfather of Soul, James Brown, headlined a show in the Annex with his big 18-piece band in 1965. Before the building was turned into a keg warehouse for the brewery in 1968, these cultural events drew varied and diverse Portland crowds, each making individual memories in the same Annex.

Originally designed to encompass the entire city block, the Annex is the only remaining building connected to the establishment of the Oregon National Guard and is located on the north end of 11th Street (figure 5.2), it is situated in the "Pearl District"-- a term coined in 1987 "to describe the Northwest neighborhood's plethora of crusty warehouses filled with art." The Annex is among various warehouses and industrial buildings today.[3] Through the years it has "maintain[ed] the original elements of style, form, proportion and scale, thereby retaining the feeling and sense of its historic period

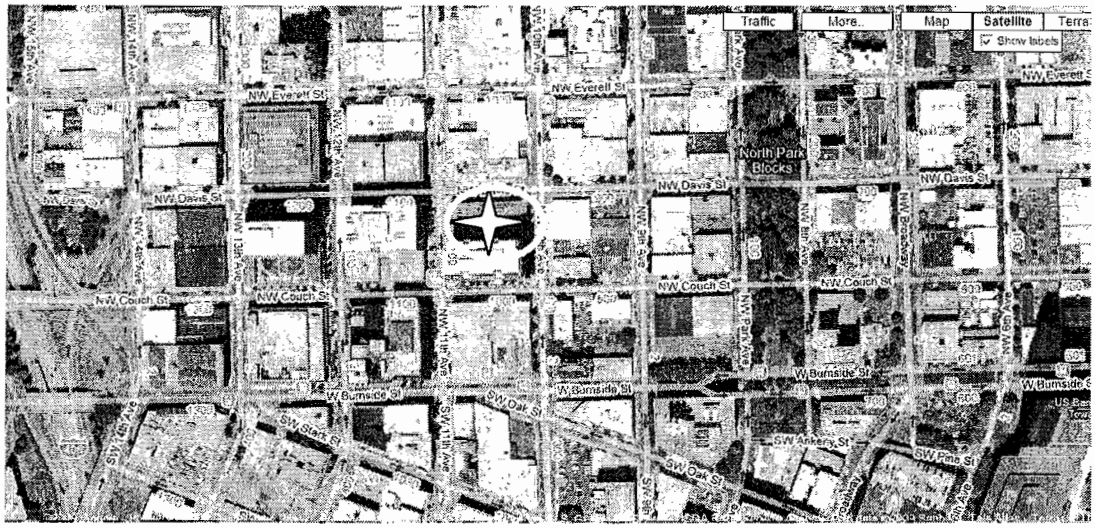


Figure 5.2 Map of Northwest Portland's Pearl District. Located three blocks west of the North Park Blocks, the sustainable preservation of the Annex for the Home of Portland Center Stage continues to stimulate the growth of this hip urban center. The Annex is conveniently located to a grocery store, shopping, and public transportation. Map from googlmaps.com

through its present appearance."[4] The Annex is eligible under criterion A, "as the earliest armory facility in the State of Oregon, representing the beginnings of the National Guard history in Oregon," and criterion C, "as an excellent example of the castellated style in Portland designed by the early architectural firm of McCaw and Martin."[5]

The Portland firm designed the two and a half story fortress-like structure, measuring 200 by 100 feet and "constructed of random ashlar stone [for the basement and first floor] and painted red brick (fig. 5.3.) The structure features a pentagonal corner tower, and central, recessed arched entrance flanked by turrets on the upper portion. The turrets have crenellated parapets and loophole vertical slots for firing arms."[6] The lot is sloped, exposing the northeast corner of the basement; multiple beltcourses serve to divide the first and second floors. The primary entrance is located on the east elevation and is distinguished by a two-story projecting bay that flares at the base and is topped with a crenellated parapet.

The interior is a single large open space made possible by a unique bowstring trussing system of "laminated wood and wrought iron bars [that enable] maximum use of wood and minimum use of metal to minimize costs yet not compromise on strength or durability" (fig. 5.4).[7] The concrete floor and the interior stone and brick walls were unfinished. The building, while remaining in use as an armory until 1968, had minor alterations including the filling of original skylights and windows as well as modifications of the west entrance to include a garage door and a new opening on the south wall to allow access for the Blitz-Weinhard Brewery.

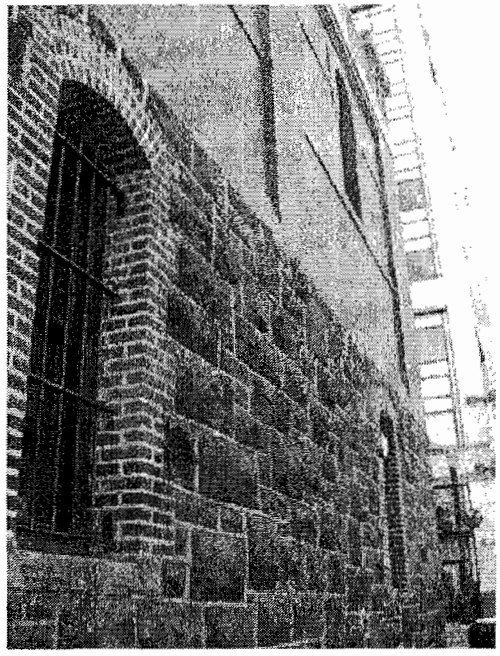


Figure 5.3 The west façade facing Davis Street and the Vera Katz silver park features the random ashlar first floor, exposed brick-framed vertical gun-slot windows, and red painted brick second floor. Photo by author, 2009.

Project Description

The rehabilitation of the Portland Oregon National Guard Armory Annex is best understood through the examination of two questions: why the Armory Annex for the

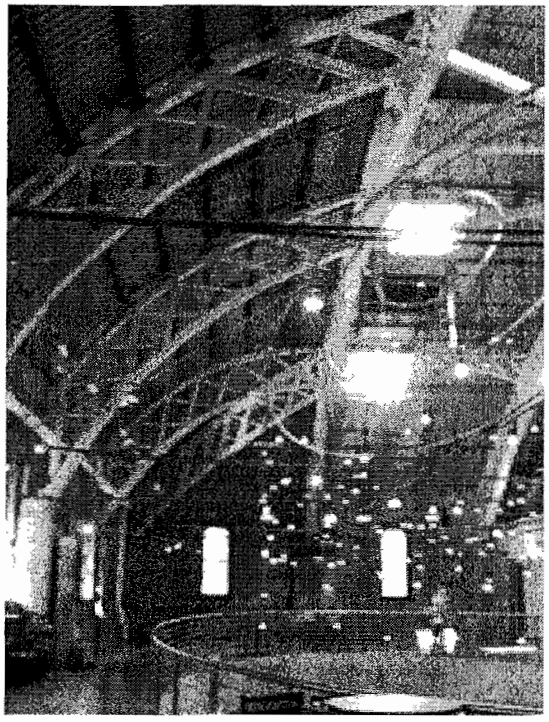


Figure 5.4 As a character defining feature of the Annex, the unique bowstring truss system was left exposed. Interior design draws visitors attention to the structural system with the lighting design on the mezzanine of the lobby. The photo by author

home of PCS?; and, how was it done? The Gerding Theater at the Armory is often likened to building a ship within a bottle. This particular project's 'ship' was a theater inside the 'bottle' of the National Register listed Armory Annex. The task was to construct a state-of-the art performance space without disrupting the historic façade and roofline, both of which are character-defining features of the "Castellated" styled building. The Annex became both the first building on the National Register of Historic Places *and* the first theater to achieve a **LEED Platinum** rating from the USGBC in September 2006. It was also one of the first major projects in the country to make use of the New Markets Tax Credits program.

Portland's national prominence in resource conservation, reflecting the cultural and environmental ethos of the city, is demonstrated by the adaptive reuse of the Armory Annex. This information sets the stage for the first question – Why the Armory Annex for the home of PCS? "A historic building renovated to LEED Platinum standards [must] offer a space that [is] more human, more intimate, and uniquely "Portland."[8] This desire for a fluid connection to the community was important to PCS and is apparent in the lobby's "public theater" design. In efforts to balance the fortress-like architectural character with the welcoming and accessible nature that the theater group wanted to convey, the lobby was designed to provide "a stage for the expression of public life, with doors open all day, the café,

couches, interactive exhibits, and lighting design [need to] become set pieces for the stories that unfold on the stage."[9]

The project's design was to help Portland's largest theater company to connect with its neighbors in the Pearl District and the city as a whole. "On a regional scale, the project supported the goals of Portland's 2030 Growth Concept by contributing to urban density and brownfield redevelopment."[10] This was achieved specifically through the reuse and sustainable renovation of a significant historic building that connected with the State's past. PCS Art Director Chris Coleman confessed, "Honestly, my hopes were for a space that was less grand and more authentic."[11] The theater group kept telling the architects that they wanted their home to convey the essence of Portland. "... To say that something "feels Portland" means it is smart in a substantive, forward-thinking way; it's comfortable for the most granola-crunching and the most fancy-schmancy among us; and it celebrates the quirky, untidy mixture of all these colliding ideals."[12]

The universality and flexibility of the space embodied that "Portland feeling" according to project architect Craig Mendenhal, and also begins to answer the second question: How was it done? Designed to highlight the existing structural expression through minimal finishing, as well as to convey high material contrast between old and new, it was ultimately intended to be flexible and used for a variety of different things.[13] The space changes frequently and it can have multiple uses at the same time. This adaptable character has always been a part of the Annex's identity and story -- many different uses, representing the many different ideals of a distinct city. The Annex not only conveys regional identity, it illustrates the potential synergies and struggles of Sustainable Preservation. Achieved through the coupling of the National Register with the LEED program, the project was truly an exercise in compromise and creativity.

Design Process

Sustainable design was seen as an important and necessary component of the Annex project, connecting the historic structure to contemporary community needs and attitudes. "In assessing the mission of the project and fundraising feasibility,

environmental responsibility was quickly recognized as both an essential driver of the theater design and a statement about the growing company's relationship to its community."[14] As the architect, Mendenhall was charged with meeting the desires of the client – Portland Center Stage, within both the project's traditional, as well as its highly specific, constraints. The typical constraints for a building project include the budget, schedule, and site. The Annex project increased complexity by reusing an existing building, complying with historic tax-credit guidelines, and implementing 'green' design principles. Compounding the complexity even more, the design team was asked to design a *green theater* -- a highly specialized space -- within the existing historic building. "The key, team members say, was to treat the interior theater as much as possible like a self-contained building."[15]

According to Mendenhall, the project's design came together once they started seeing the space through the eyes of PCS. The existing Annex was itself already theatrical (not to mention the theatrics that had taken place over the past century) and designers sought to contrast the raw weathered shell and rustic timber trusses with a sleek modern interior.[16] While the visible finishes were designed for contrast, the LEED and National Register programs were administered with the hopes of being complimentary. Integration of specialists and consultants early on was an influential aspect of the project's success in this area. "The process required more design iterations than usual and often meant exploring all possible options."[17] The regular dialogue between all members of the design team, including the SHPO, also translated into a more comprehensive commissioning approach. This consistent communication translated into extensive commissioning efforts -- undertaken to ensure that a building's mechanical and lighting systems were not only installed properly, but were operating as designed."[18]

Connecting the National Register and LEED

Purchased by Gerding/Edlen development in 1998 as part of the Brewery Blocks package, the Annex was placed on the National Register in 2000 before its use was determined. Once PCS was identified as the future tenant, the plan was set forward to

include sustainable design. The green building piece was an aspect of the community that Coleman did not always understand. However, in assessing the project's feasibility, Coleman and PCS soon realized that when coupled with the reuse of the historic Annex in the up-and-coming Pearl District, sustainability was the catalyst to make it financially and politically feasible. Already a National Register listed building, the project's main focus was the orchestration of the Secretary of Interior Standards for the Treatment of Historic Properties and the LEED Green Building Rating System. "Meeting sustainability goals and preserving architectural integrity involved a complex series of interdependent decisions," that demonstrate the strengths and weaknesses of integrating both programs.

Building Reuse

The synergy of the sustainability and historic preservation movements is illustrated through the design team's approach, which refrained from asking - "Can we achieve LEED Platinum in a historic building? Instead, they framed the question as, "How will we do it?" The construction team met frequently to make sure the project compliance documentation and requirements for LEED were met and the design aimed for future adaptability. The flexibility of the design not only supports the current tenant needs and use-goals, it demonstrates an acknowledgement of the building's value and recognizes the potential for future use over the next century. A self contained building inside the Annex is a sensitive approach to maintaining the character of the building while giving it a contemporary use. "The constraints of the existing shell forced the design team to make efficient use of the available space," demanding creativity, innovation, and problem solving solutions from the design team. Approaching the project with the view that the theater was contained within the walls of the historic Armory Annex also, at times, allowed for a separation of the LEED and National Register criteria, helping to maintain historic fabric and utilize a modern building program. Verified by the LEED documentation system, 79% of the existing Annex building was reused, "conserving the embodied energy in the building materials and

preserving the craftsmanship and aesthetic character of the original 30 inch-thick brick walls and rusticated basalt stone foundation." [19]

An example of this creativity in addressing the National Register and LEED can be seen in the lack of natural light in the space. The existing building shell had only small windows or gun slots for firing weapons that did not allow much natural light or ventilation into the vast interior space (fig 5.5). "New windows could not be added, however, without violating the criteria for historic preservation, so regularly occupied work and rehearsal spaces were located on top of the theater volume, where they could receive daylight and natural ventilation via skylights."[20] Historically, the Annex did have a center skylight that ran the length of the roof but was removed at some point due to its failing. In lengthy discussions with SHPO reviewers, GBD sought for a compromise for daylighting of regularly occupied upper spaces. A compromise was reached and the benefit of natural light (a LEED requirement for natural daylight and indoor air quality) was realized with 42 skylights, 17 of them operable for natural ventilation. "About 75% of the regularly occupied office, rehearsal, and meeting space is daylit; this represents about 25% of the entire building."[21] While they are not visible from a block away as stipulated by the Secretary Standards, they can be seen from a three block distance.

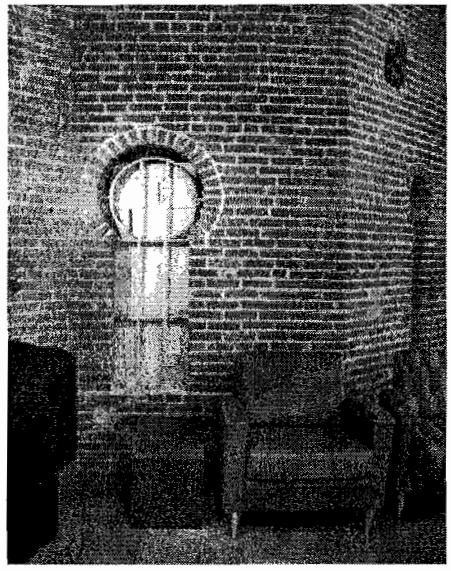


Figure 5.5 Moorish "keyhole" design feature in the exposed brick wall is now enclosed as this southwest corner abuts a luxury condominium high-rise building. Photo by author, 2009.

Other ways in which the project's design helped to maintain historic fabric and address sustainability goals (even if not directly associated with LEED points) were the historic structural concrete lobby floors which, "helped provide structural support so additional steel bracing was not needed, thereby keeping the building's brick walls

unobstructed and its massive old-growth-timber ceiling trusses viewable from the multistory lobby. "We used fewer materials this way, but that's not something you get a LEED point for," Domreis points out"[22] The Annex's truss system is an extremely important character defining feature that SHPO insisted remain visible to convey the building's structural system. The designers also felt that this feature of the Annex was a showpiece to be celebrated. Other measures taken to keep the trusses visible were to install glass elevator shafts, allowing light and an unobstructed view from the lobby's ground floor, through the mezzanine, up into the roof structure (Fig 5.6). The concrete floors of the lobby and mezzanine "also act as a conduit for the ultra-efficient radiant-heating and displacement-ventilation systems, canceling the need for ceiling ducts and using far less energy – something that did earn them six LEED points." [23]

Water and Lighting

Water conservation may seem like an incongruous topic when discussing sustainability in the rainy Pacific Northwest, however it is runoff and not the lack of water that is usually the concern. "The nearby Willamette River's water quality is threatened during large storms due to overflows from the city's combined sewer system."[24] The Annex's water systems were designed to reduce the amount of water the building takes from the city's potable water resources while *also* reducing the amount of water it puts back into the sewer system. This is accomplished through a rainwater-harvesting system and

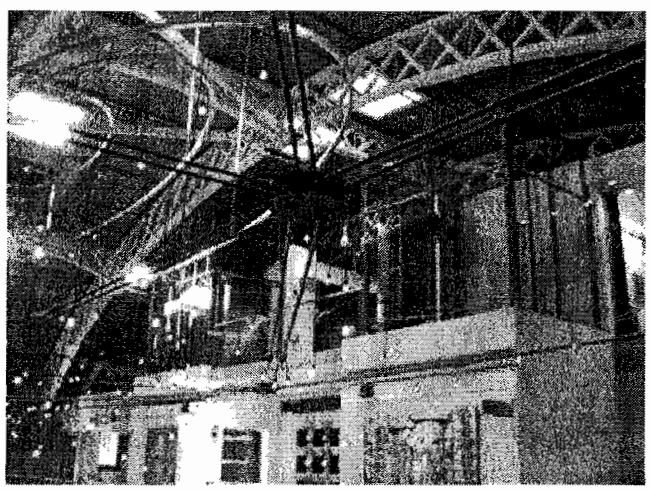


Figure 5.6 Facing north on the second floor, glass elevator shafts were installed at the suggestion of the State Historic Preservation Office. The transparency ensures visual access to the Douglas fir truss system and helps convey the open expanse of the Annex. Photo by author, 2009.

stormwater swales that "rely on a combination of reuse, detention, transpiration, and mechanical filtration to reduce the quantity of stormwater entering the municipal sewer system by 26%, compared with a conventional system."[25] The building harvests rainwater from the roof in a 10,000-gallon tank to flush toilets and urinals and is successfully reducing the amount of potable water used for sewage conveyance by more than half. In addition to the rainwater-harvesting system, stormwater swales, or planters that treat water through natural filtration of the vegetation and soil medium, are used to absorb the water tank's overflow and sidewalk runoff. "The rainwater harvesting system, lack of a permanent irrigation system, dual-flush toilets, and low-flow showerheads and faucets combine to reduce the project's total demand for potable water by 88%."[26]

"Since the building massing, envelope, orientation, and footprint were already established, the project's energy-efficiency strategy was focused on its mechanical systems."[27] Connecting with an existing efficient district-chilled-water plant located two blacks away and utilizing chilled beams for cooling administrative offices were two examples of the Annex's mechanical system approach to energy-efficiency. Efficient cooling added greater comfort than conventional fan-driven mechanical systems. Chilled beams were placed overhead as suspended fixtures (with integrated lighting) to "supply radiant cooling by convection, allowing air [to be] cooled by coming in contact with radiator fins to sink at low velocity to the occupied zones below. Alternatively, hot water can be circulated to provide warm air circulated by a small fan."[28] Lighting control strategies were also used to minimize energy use with automatically dimming lights when daylight is sufficient.

Practitioner's Reflections

A highly visible and politically motivated project in the city of Portland, the success of the reuse and rehabilitation of the Armory Annex can be viewed from various perspectives. The project's success on local, state, and national stages can be asserted by its status as the first LEED Platinum Historic Building and the first LEED Platinum Theater in the United States. This suggests that the use of both the National Register and

LEED programs in one project is not only possible, but can achieve the highest standard in sustainable building. In the eyes of Portland's politics, the Annex is seen to optimize the notion that the preservation of historic structures can more than adequately address environmental, economic, and socio-cultural responsibilities. Sam Adams, City Commissioner and former Chief of Staff for Portland Mayor Vera Katz says:

> To me, the Armory project is a rebirth of public place. This space was a near fortress, emanating exclusion and alienation. The Armory project turns this past inside out, toward a vision of inclusion and inspiration. Seeing a welder at work seemed a perfect symbol of this transformation, fusing history to future, illuminating the dark with sparks of imagination. [Projects like this] invite every community to come, to remember, and to create anew together."[29]

Randy Gragg, Architecture and Urban Design writer for *The Oregonian*, likens the City of Portland's architectural strategy of reusing old buildings to "thrift-store shopping and resoling old shoes," influenced by Oregon's 1971 Bottle Bill, encouraging the reuse of chunky Cocoa Cola bottles.[30] Like those old bottles, Portland's old buildings are sturdy and well suited to the cause – the Annex being the exemplar. Similar to giving new life to old bottles by simply refilling them, the Annex has been "filled with state-of-the-art performing arts facilities … On one level it has essentially become a classier and more overt version of what it really was for most of its life: a theater. On another, it is simply the most ambitious example yet of the Bottle Bill tradition of the refill."[31] This case study conveys the civic desire for authentic and meaningful public spaces. The city of Portland has an architectural tradition of maintaining the tangible and gritty expressions of the past while asserting its role as a leader in sustainable development.

Projects like the Annex are pivotal pieces to change urban core areas, not just on environmental and social platforms, but economic ones as well. Illustrating the use of sustainable preservation in addressing economic responsibility, the reuse of the Annex has been a catalyst for the transformation of the urban blight once found in the Pearl District. Various financing avenues were explored and resources from the city, state, and federal programs were necessary components of the Annex rehabilitation as the new home of PCS. The complicated building program is matched only by its complicated

funding structure, with seven different partners involved. Michael J. Novogradac, CPA and managing partner of Novogradac & Company LLP, outlines the financial impact and its success by saying:

> The Armory building blazes a trail for historic projects looking to contribute to the economic vitality of once-neglected neighborhoods. The $36 million retrofit, rehabilitation and redesign of the 19th-century landmark is a small part of the transformation and revitalization of the city's booming Pearl District, but it is a principal player nationally as one of the earliest and largest project in the country to combine federal New Markets Tax Credits with historic tax credits.[32]

While ultimately the project is viewed as being successful at meeting the outlined goals for PCS, sustainability, and historic preservation, the administrative process between the National Register and LEED was, at times, frustrating and inconsistent. Both program's goals were gently finessed, requiring compromise on both sides. An example was the decision to excavate down rather than to add up. In order to both accommodate the state-of-the-art 'green' theater that PCS would need *and* maintain the height, roofline, and original massing of the Annex, the much more expensive option of excavation of the basement was done.

Another glimpse into the extensive dialogue required when implementing both of these programs can be seen in the skylight design issue. Preservation officials originally outlined that the skylights could not be visible from the street – a standard requirement. The architects, however, felt that a compromise had to be made in order to address the needs of PCS. More natural light was needed if the space was going to be usable and functioning. The compromise between the architects and SHPO was that they weren't visible on the same block, but could be seen from three blocks away. Stephen Domreis of GBD architects suggested that difficulties in communication and intent over such issues as skylights, were sources of contention in the project. Referring to the struggles, he noted, "There's reason why a historic building has not earned Platinum before, but I think the processes are evolving to complement one another."[33] Architect Craig Mendenhall expressed the same concern as Domreis, with regard to being frustrated over the unclear guidelines and the seemingly incongruous interpretation of the Secretary of

Interior Standards. When offering multiple solutions to the conflicts, the architects were met with opposition and suggestions that they felt were in poor design taste for the project.[34]

The compatibility of the National Register and LEED programs -- while difficult and often requiring lengthy discussion -- is something that all parties expressed a desire to continue exploring. Designers are often hesitant to get involved with historic buildings because of past interactions with historic review boards. Mendenhall specifically mentioned the need for a more transparent historic review process to assist designers in understanding defining features and acceptable approaches to adaptively reusing historic buildings. The rigidity of the conversations and the lack of accessibility to the reviewers to engage in a dialogue with architects and owners has been a source of great frustration. Architecture and design firms tend of engage in an integrated approach to their projects and suggest the same should be true to the evaluation of historic resources. Ultimately, the design team of the Annex realized the synergies of historic preservation and sustainability, utilizing both movements to shape the story of PCS.

Mendenhall specifically hopes that the Annex can be seen as an exercise in sustainable preservation. At the beginning, the team was not aiming to be the first at anything, since any level of LEED certification while maintaining the National Register listing of the Annex were already two big goals and tough challenges. Adding a sustainable theater on top of that would be even harder. Ultimately, GBD needed to make the space into a home for PCS and once they filtered all other goals through this, they began to realize they could do what had not yet been done. Mendenhall expressed the desire that "the formula they have developed in the creation of the first LEED Platinum historic building and LEED Platinum Theater might work for other projects and be reproduced. [This project shows] we can do green buildings inside historic buildings."[35]

Author's Reflections

The Annex project "illuminates just how tricky (yet ultimately feasible) it can be to strike a balance between the principles of sustainability and preservation."[36] This case study specifically highlights the importance of choosing the right use for the right building and proceeding with caution and creativity. The Annex is a highly specialized resource – an expansive, unobstructed, almost windowless, enclosed space – that could not be appropriately reused for just any purpose. It is located in an urban renewal area and is considered a 'distressed location' characterized by an unemployment rate that is 1.5 times the national average with a median family income that is less than 80% of the state benchmark.[37] This raises the issue of gentrification. Are individuals or communities being displaced by fancy condos and upscale shopping that make money off the gritty and edgy neighborhood? According to United Fund Advisors and Portland Family of Funds the total impact of the Annex is $116.4 million, with a $15.8 million fiscal impact. The project also provided 510 temporary jobs during the 24-month construction and 12 permanent jobs during operations. Additionally, 104 existing theater jobs were retained. "An estimated total of $46.7 million in direct, indirect, and induced wages have been paid during the construction period and will be paid over ten years of operations. 15.8 million in Federal, State and Local tax revenues are estimated to be generated over twelve years, including 6.7 million during the 24-month construction period, and $915,000 annually over ten years."[38] While the issue of gentrification and population displacement is beyond the scope of this thesis, the Annex case study is a prime topic for future research on the subject because it provides an opportunity to evaluate the impact of job creation and tax base improvements with the social issue of displacement.

Individuals such as Michael Novogradac, involved in the financing and assessment of the economic aspects of the project continue to claim that the Armory is helping the local economy, which it very well might be. However, the emphasis is not placed locally; it is placed on the impact nationally for the use and success of similar funding schematics. Novogradac states:

> The combination of historic and NMTC credits supported the performing arts center in a way that conventional financing alone could not. By combining tax credits with traditional capital, the Armory's developer's created an exceptional project that added to the Pearl District's growing prominaince, helped stimulate the local economy, generated new jobs and, perhaps most importantly, acted as a catalyst for similar tax credit projects across the country.[39]

The gray area of preservation that many architects and building owners find so frustrating about working with historic buildings is due to the loose and unpredictable interpretation of the Secretary of Interior Standards for the Treatment of Historic Buildings. The review process was very closed and exclusive, according to Mendenhall, and the lack of communication prevented the architects from understanding the reasoning behind recommendations, mandates, and "rulings." Mendenhall also expressed a desire for a hierarchy, or ranking list, to help building professionals understand which resources were more significant or important to preserve to a greater extent than others. This assertion is not a new one; however, it is a common desire of the building community, which is often not trained in building science or historical methodology. While it appears simple to implement the use of an hierarchical system to rank the significance of the country's historic buildings, in practice it would be extremely complicated to apply general categories to such a varied and dynamic resource as the nation's building stock. This assertion, however, is worth being explored further in the future in order to incorporate language conveying the importance of particular character defining features or other significant aspects of historic buildings. One suggestion is that the Portland Development Corporation (PDC) work with the SHPO to target key resources for development and encourage reuse of specific resources in the city.

Overall, this case study offers an interesting point of comparison between the National Register and LEED programs. The interface between the two illustrate the contrasting bases upon which each program is established. The National Register system was designed to objectively evaluate, nominate, and protect historic resources on the basis of age, integrity, and significance. This system is static in some respects, as the guidelines do not tend to change or evolve in a regular manner (although there are

bulletins added to address how to interpret certain issues that may arise.) The LEED system, on the other hand, was specifically designed to not merely be amended but to evolve as a complete system over time as new technology and understanding develops. The gradation of achievement in a sustainable building --acknowledged by the LEED program through rankings of certified, silver, gold, and platinum -- is in stark contrast to the process of nominating a building to the National Register. While buildings designated on the National Register are eligible to be listed under one or more of the criteria (A, B, C, D), there is no hierarchy to distinguish importance within each of these criteria or even within a project, only the criterion itself in which resources are nominated.

For example, both the Annex and the Balfour-Guthrie Building outlined in chapter 3 are listed on the National Register under criteria A and C. There is no distinction between these two buildings as to which is more important or more "historical," which is deemed unnecessary by preservationists. Their respective LEED ratings, however, reflect that the LEED Platinum Annex is more "sustainable" than the LEED Silver Balfour-Guthrie Building. It is proposed not that the National Register program distinguish which building is more "historical" or "historically important;" instead, it is suggested that each building's or resource's defining features be articulated in an evolving hierarchy determined by age, integrity, and significance. This distinguishing of elements will assist building professionals in understanding historic resources and their distinguishing features, translating into more integrative and historically sensitive adaptive reuse designs. The difference between the LEED criteria and the Secretary of Interior Standards is that significance of a resource is not determined by such a reductive system, but instead contextual issues often differ between resources and determine significance.

The ambitious 2030 Building Challenge issued by non-profit group *Architecture 2030*, would continue to bring these two building movements together, forcing these issues to be addressed. The challenge to make buildings carbon neutral by the year 2030 is a highly influential factor on the future of sustainable preservation in the years to

come.[40] Portland has a fairly good start, incorporating this architectural inclination over the past ten years. While the sustainable adaptive reuse design premise is not the dominant form of sustainable development as of yet, the success of projects like the Annex promise to bring more attention to the existing built environment as a response to sustainable development. One of the goals of the 2030 Building Challenge is to bring historic and existing buildings in line with sustainability, which will greatly influence the development of the relationship between the National Register and LEED programs. The possibility of increased inter-disciplinary working relationships promises to improve the dialogue among designers, consultants, and the SHPO.

This case study is often seen as the pinnacle of sustainable preservation; however, it can only act as one exceptional example and not the rule. If preservationists use the Annex as their only measuring stick, we have fallen short and missed the true spirit of the movement. The Annex must only be viewed as the beginning, the first of a long list of historic buildings that are environmentally, economically, and socio-culturally responsible to their local, regional, national and even global communities. Today's Platinum will be tomorrow's Gold, which is exactly how the LEED program is designed. This principle – evolution – becomes the critical issue at the point of integration between LEED and the National Register programs. Can these systems evolve together to produce equitable and vibrant spaces? The success of the Annex, with all of its positive and its difficult experiences, suggests that these two movements can spawn even more dynamic and influential projects in the future.

Practitioners must also be realistic when viewing the Annex case study. The most influential factor of the Annex achieving LEED Platinum and becoming the new green home of Portland Center Stage was the "ship in a bottle" approach. Building a self-contained theater within the walls and under the wood trusses of the historic armory ensured the success of the project in terms of meeting both the National Register and LEED program criteria. The nature of the Annex as a vast wide-open space also allowed this to happen. It is a wonderful and highly compatible use of the building. But one must ask, can every historic building be like the Armory? Can every historic building have

another separate 'green' building constructed inside? Can every historic building achieve LEED platinum? No, probably not. Nor should they be expected to, especially because so much historic fabric is found on the inside of buildings. Not every historic building was designed with a vast unobstructed expanse and few windows. Portland Center Stage only needs one permanent home. The point is this: historic buildings can be sustainable and they can even achieve the highest level of efficiency if we want them to -- the Annex demonstrates this. Each building, climate, and market demand unique and extremely site specific approaches. This simply means that we need to be creative, and we need to open up the dialogue among all building professionals. The Annex not only proves that it can be done; it provides a basic template on *how* it is done.

Notes

[1] U.S. Green Building Council, LEED Case Study, "Gerding Theater at the Armory: Process," http://leedcasestudies.usgbc.org/process.cfm?ProjectID=833 (accessed April 5, 2009).

[2] Randy Gragg, "An Ethos of Renewal" in *Voices of the Armory: A Chronicle of the Transformation of a 19th Century Icon into a 21st Century Theater.* Narrative by Chris Coleman, 126. Portland, Oregon: Portland Family of Funds Holdings, Inc.

[3] Bart King, "A Century in Portland: Through the Lens of the Armory" in *Voices of the Armory: A Chronicle of the Transformation of a 19th Century icon into a 21st century Theater.* Narrative by Chris Coleman, 12. Portland, Oregon: Portland Family of Funds Holdings, Inc.

[4] John M. Tess, "First Regiment Armory Annex." National Register of Historic Places Nomination, section 3, pg 2. "The Annex was in continuous use as designed from its construction in 1891 up until 1968. The period of significance is outlined as 1891-1948 (the 50-year mark from the time of its nomination in 1998) and is listed under the National Register criteria 'A' and 'C.'"

[5] *Ibid.* Section 7 pg 1.

[6] *Ibid.* Section 3 pg 2.

[7] Ibid;

[8] U.S. Green Building Council, LEED Case Study, "Gerding Theater at the Armory: Process."

[9] Ibid.

[10] Ibid.

[11] Chris Coleman. *Voices of the Armory: A Chronicle of the Transfromation of a 19th Century Icon into a 21st Century Theater.* Portland, Oregon: Portland Family of Funds Holdings, Inc: 51.

[12] Ibid. 54.

[13] Craig Mendenhall interview by author, 30 April 2009, Portland, OR, audio recording.

[14] U.S. Green Building Council, LEED Case Study, "Gerding Theater at the Armory: Process."

[15] Brian Libby. "Art of Compromise," in *Metropolis Magazine* January 10, 2007 http://www.metropolismag.com/story/20070110/the-art-of-compromise (accessed April 25, 2009.)

[16] Ibid.

[17] U.S. Green Building Council, LEED Case Study, "Gerding Theater at the Armory: Land Use."

[18] Ibid.

[19] U.S. Green Building Council, LEED Case Study, "Gerding Theater at the Armory: Materials."

[20] U.S. Green Building Council, LEED Case Study, "Gerding Theater at the Armory: Indoor Enviornment."

[21] Ibid.

[22] Libby.

[23] Ibid.

[24] U.S. Green Building Council, LEED Case Study, "Gerding Theater at the Armory: Site."

[25] Ibid.

[26] Ibid.

[27] U.S. Green Building Council, LEED Case Study, "Gerding Theater at the Armory: Energy."

[28] Ibid.

[29] Coleman, 67.

[30] Gragg, 126.

[31] Ibid.

[32] Michael J. Novogradac, "The Armory Reclaims Vitality: Banking on Community-Building Cachet," in *Voices of the Armory: A Chronicle of the Transfromation of a 19th Century icon into a 21st century Theater.* Narrative by Chris Coleman, 73. Portland, Oregon: Portland Family of Funds Holdings, Inc.

[33] Libby.

[34] Mendenhall, interview by author.

[35] Ibid.

[36] Libby.

[37] United Fund Advisors and Portland Family of Funds, "The Gerding Theater at the Armory," *Armory Council of Development Finance Agencies 2009 Practicioner's Showcase Project Entry.* Portland, OR:1.

[38] Ibid, 6.

[39] Novogradac, 73.

[40] Mendenhall, interview by author.

CHAPTER VI
CONCLUSION

Addressing the conservation and sustainability of the existing building stock of the United States is the challenge that both preservation and building professionals face. Both fields have established industry standards and developed accrediting systems in order to evaluate their respective concerns. Truly sustainable development, however, requires an integrative design approach in order to adequately address environmental, economic, and socio-cultural responsibilities. The coupling of the National Register with the LEED Green Building Rating System is a highly effective way to address all three responsibilities of sustainable development. The sustainable building movement has raised some important questions and opportunities for preservationists to consider, and Historic preservation does the same for the sustainability movement. Historic preservation brings knowledge of historic design principles back to the building trades through education and collaborative design. Combining these two movements into a sustainable preservation development strategy outlined by the Balfour-Guthrie Building, the White Stag Block, and the First Regiment Armory Annex illustrate the integration of passive historic vernacular systems with highly efficient technologies.

The preservation movement has always been green, even if preservationists have not considered themselves as such. Historic preservation is as linked to sustainability as is environmentally sensitive new construction – and perhaps even more so because it conserves an existing resource. The three case studies presented here articulate the symbiotic relationship of both movements, offering application models and demonstrating successful sustainable preservation strategies for the building industry. The case studies also function to establish a basis for the continual evolution of the practice of sustainable preservation. The National Register of Historic Places and the LEED Green Building Rating System can be utilized as mechanisms for evaluating and understanding the points of compatibility and conflict between the two movements. Discovering and articulating the relationship between these two evaluative programs is

important for the future because it provides the basis for an understanding of how to address environmental, economic, and socio-cultural responsibilities of the built environment and achieve sustainable development.

Advocacy

To be truly effective and to realize the full potential that sustainable preservation has to offer the building industry, practitioners of historic preservation must prepare themselves to be better advocates. The responsibility to bring historic preservation onto the national stage of sustainable development rests on preservation professionals because of their expertise on the existing built environment. Specifically, preservationists must develop the skills to successfully navigate the two standards of sustainable preservation – the National Register and LEED programs. There are two areas that must be more fully developed in order to adequately train historic preservationists to be effective advocates for the reuse of historic buildings as a tool of sustainable development. These areas include: a highly integrative educational program and the cultivation of effective communication skills.

Education

The first step towards effective advocacy is education. Providing educational opportunities for both movements will increase communication among preservation and sustainability professionals in the field. The understanding and identification of historic design, construction, and most importantly character defining features, coupled with education of applicable green design technologies that are sensitive to historic resources, will foster a relationship characterized by "respect" and "compromise" that will be extremely influential to the American building ethos. Discussing critical issues, and offering training workshops on historic design principles and their often inherently sustainable aspects with architects, designers, engineers, and builders will produce more informed designs and construction practices, as well as more sensitive designers and builders.

Educational opportunities surrounding sustainability and its partnering with historic preservation are currently being established and show promise. Curricula at the University of Oregon are being developed to meld sustainability and preservation to include graduate level classes and an undergraduate and graduate *Ecological Design Certificate (EDC).* Individual classes, such as the *LEED Eco-Communication* class (developed exclusively in response to the University's interest in the White Stag Block project and offered one time only during the Winter and Spring 2008 terms) and *Preservation and Sustainability* (offered for the first time in Spring 2009) represent the School of Architecture and Allied Art's efforts to train and educate future building professionals to address the requirements of the National Register and LEED programs. The goal is to produce heritage and design professionals who can think across disciplines when addressing the built environment. The newly developed Environmental Design certificate program frames sustainability within the context of historic design by listing *American Building Construction History* offered by the Historic Preservation Program as a foundation course – it is estimated that Winter 2010 there will be 45 students involved in the course. Establishing the class as a core requirement acknowledges historic construction techniques and building materials as a basis for sustainable design and exposes design students to historic resources in this context. Also, in the Fall 2010 term historic preservation and environmental Design will be offering a six credit architecture studio and seminar on "Cultural Process and Environmental Response."

These classes and programs are a step in the right direction for the establishment of sustainable preservation as an iteration of the green building movement; however they are often only temporary or extremely limited opportunities. These classes are often only special topic courses offered in conjunction with specific projects, or faculty and do not comprise an established curriculum addressing sustainable preservation. The School of Architecture and Allied Arts at the University of Oregon provides an atmosphere for interdisciplinary studies by allowing architecture, planning, and preservation students (among others) to cross-list classes and engage with fellow students with common interests and disparate backgrounds. The cross-listing enrollment in interdisciplinary

courses, however, is of concern due to the demands of individual programs. The resources are available, but the feasibility of participating in these classes is often thwarted by department scheduling and requirement constraints. Overall, sustainable preservation must take a national stage in order to have a meaningful impact on the building industry. A national presence will in turn spur investment in educational and training programs, strengthening advocacy for sustainable preservation.

Effective Communication and Integrated Design

The interaction between students in the educational phase of their training will establish relationships and encourage dialogue among building professionals as they graduate. Familiarity with collaborative and multi-disciplinary design will also serve to increase and improve communication. Educational opportunities regarding sustainable preservation are not confined to the traditional classroom or educational framework, as demonstrated by all three case studies in this thesis. The importance of professional development in the workplace and among colleagues is extremely vital to the development of the field of sustainable preservation. Integrated design is a "whole-building" design approach that encourages collaboration between builders, consultants, contractors, engineers, and designers, as well as architects, owners, and occupants. Building professionals that participate in integrated design projects further develop important communication skills and familiarity with varied operating styles. By consulting with a variety of experts in the early design stages, the goal of this approach is to navigate through the conflicts and concerns in a holistic manner, taking into account all systems affected by development.

An integrated design approach is not only the wave of the future in development, but a vital skill for individual building professionals. In interviews with multiple architects, owners, developers, and consultants the resounding consensus is the importance of communication, and the articulation of goals upfront, and throughout the process. All three case studies illustrate the importance of multi-disciplinary and holistic design approaches to the projects. Green Building Services, the sustainability consultant

on all three projects, orchestrated eco-design-charettes for both the Annex and the White Stag Block in order to ensure communication and compliance with both the LEED and the Secretary of Interior Standards. This process proved to be critical in ensuring the highest level of success. Clarification of expectations, criteria, and application when involving historic buildings is a critical part of this communication strategy. The lack of communication and articulation that has characterized past projects hurts the preservation of historic resources because goals are not clearly articulated. The most difficult aspect of the interface between these two movements and their representative programs lie with the practitioners. Three key factors influence successful communication among building professionals on sustainable preservation projects. Success starts first with each building professional by:

1) Committing to outlined goals;

2) Understanding their role in a project and the importance of meeting the outlined expectations; and

3) Performing their services as collectively determined.

The perceived disconnect between preservationists and building professionals lie in communication of the ten Secretary of Interior Standards (and the many facets by which significance is determined) as well as the six LEED categories. The National Register currently functions as a list of buildings with historical significance, determined through the interpretation of the Secretary Standards. The National Register and LEED can work together towards achieving sustainable development; however, the Annex case study demonstrates how a lack of communication can add a level of complexity to a project. Architects appreciate that LEED offers direction toward the goal or standard, helping to outline acceptable design solutions. The regulatory criteria for the National Register, by contrast, is viewed to be vague, highly variable, and often times unpredictable due to variations on interpretation of the standards at various levels of oversight. Historic Review Boards and preservation professionals, in general, have remained intentionally aloof in the conversation of sustainable preservation, effectively driving a wedge between the historic preservation and sustainability movements until the

recent activity of the National Trust of Historic Preservation on behalf of the preservation field.

"Should the Secretary's Standards be modified to include and incorporate language addressing the sustainability of historic buildings?" is the next big question on sustainable preservationist's minds. The answer is: "Yes." The identification of a set of principles for sustainable rehabilitation is in the best interest of preserving historic resources. A proactive measure to address the sustainability movement to ensure the protection and appropriate adaptive reuse of historic buildings will serve to protect and enhance the value of America's historic built environment. If preservationists will not navigate this divide – who will? The USGBC operates by groups advocating for their interest and agenda and preservationists must establish a presence in this dialogue in shaping the LEED system. In short, no one else can advocate for historic buildings the way that preservationists can. And they are beginning to do so through the National Trust and professionals like Ralph DiNola of Green Building Service who have been working to interface between the National Register and LEED. More action and forward movement, however, is needed if historic preservation is to assert itself as a valuable tool in addressing climate change.

An Evolving Practice

It is important to note in closing the evolving practice of sustainable preservation. As demonstrated by these three case studies, the field is young and both movements are attempting to reconcile converging and conflicting values of both the National Register and LEED programs. The Balfour-Guthrie case study is a pioneering effort in the integration of the National Register and the LEED programs. The White Stag Block provides an example of utilizing creative and integrative design principles to make positive community and economic impacts. Finally, while preservationists can look to the Annex as an effective public relations project to demonstrate the capabilities and potential adaptive reuse options that historic buildings can both provide and

accommodate, we must also be explicit about the project's ability to be translated into other sustainable preservation projects, and measure its local social impact as well.

The most important lesson to be learned from the Annex is that it is not the pinnacle of sustainable preservation, despite its national achievements. The Annex is a unique project -- spatially, financially, and politically -- and is not easily transferable to other historic resources. Spatially, the Annex is a massive, unobstructed space with few windows. These characteristics lent the building to be adaptively reused as a theater – the right use for the right building. Financially, the project was extremely complicated and involved an advanced exercise in investment accounting. Coupled with citywide political support, the extensive budget and access to funding ensured the success of the project. Most sustainable preservation projects will not have the luxury of such spatial, financial, and political support; therefore, the Annex is a difficult case study to use as a template for future projects. The Annex, however, offers the perfect exemplar for the importance of respect and reuse in sustainable preservation, adapting the right resource for the right use.

Another concern in looking to the Annex as the finest example of sustainable preservation yet to appear in Portland lies in the central principle of historic preservation and sustainability. The heart of sustainable preservation is the integration of inherently 'green' historic design principles and features with modern sustainable technologies. The Balfour-Guthrie Building and the White Stag Block, to varying degrees, effectively capture this spirit, while the Annex circumvents such efforts by building a sustainable building within the existing historic building. As one example, the Balfour-Guthrie couples the full height windows that comprise the western façade with highly efficient zoned lighting and heating systems and glass walled conference rooms on the east side of the building. This respectful and advantageous design maximizes the light and ventilation facilitated by the historic fenestration design. An example of the White Stag Building encompassing the central goal of sustainable preservation can be seen in the utilization of the saw-tooth roof on the fifth floor of the Hirsch-Weis Building. The south-facing windows of the roofline act as light-monitors, diverting natural light deep into interior spaces and reducing the need for additional light during the day. In the

future they will also be operable, adding increased air circulation and ventilation to the light-monitor's functional design.

The most profound impact of coupling historic preservation and the sustainability movement is the mutual benefit that they can provide one another. Historic preservation can bring knowledge about conserving buildings and general building science to the sustainability movement; in turn, the sustainability movement can bring cultural awareness of the historic built environment to the public to foster livability. Historic preservation can help the sustainable building movement address its environmental, economic, and socio-cultural responsibilities in order to achieve truly sustainable development through the incorporation of historically environmentally sensitive passive designs. These historic designs include south-facing windows, thick masonry walls (for thermal mass), centrally located and easily accessible urban sites, spatial flexibility, access to natural light and ventilation, and passive heating and cooling systems. Sustainable preservation also offers the opportunity to positively affect development in the most destitute and desperate corners of our urban environments, helping sustainable development to address its socio-cultural responsibility. These three case studies demonstrate what the historic built environment can be when re-imagined and re-incorporated into the contemporary urban landscape in a respectful and useful way. Historic preservation can be an influential tool within the sustainability movement – providing a continuously evolving, environmentally responsible, and culturally responsive basis for sustainable development.

BIBLIOGRAPHY

"Campagna, Barbara. "How changes to LEED will Benefit Existing and Historic Buildings." *Forum News: National Trust for Historic Preservation* vol. XV, no. 2 (November/December 2008): 2-4.

Chatterbox.typepad.com. "113 LEED projects and counting for Green Building Services," http://chatterbox.typepad.com/portlandarchitecture/2009/02/113-leed-projects-and-counting-for-green-building-services.html (5 March 2009).

City of Portland, Oregon www.portlandonline.com/osd/index/cfm?c=41645 (1 May 2009).

Cohen, Jonah. Interview by author, 10 April 2009, Portland, OR, audio recording.

Coleman, Chris. *Voices of the Armory: A Chronicle of the Transfromation of a 19th Century Icon into a 21st Century Theater*. Portland, Oregon: Portland Family of Funds Holdings, Inc

Demuro, Art. Interview by author, 7 May 2009, Portland, OR, audio recording.

Douglas, Andrew T. "Green historic preservation is the ultimate recycling project." *The San Antonio Business Journal,* 7, September 2007, [database online]; available from Bizjournals, http://sanfrancisco.bizjournal.com/sanfrancisco/othercities/sanantonio (21 September 2007).

Elefante, Carl. "The Greenest Building Is … One That Is Already Built." *Forum Journal: The Journal of the National Trust for Historic Preservation.* vol. 21 no. 4 (Summer 2007): 26-38.

Randy Gragg, "An Ethos of Renewal." in *Voices of the Armory: A Chronicle of the Transfromation of a 19th Century icon into a 21st century Theater.* Narrative by Chris Coleman, 126. Portland, Oregon: Portland Family of Funds Holdings, Inc.

Hyllegard, Karen H., Jennifer Paff Ogle, and Brian Dunbar. "Sustainability and Historic Preservation in Retail Design: Integrating Design into a Model of the REI Denver Decision-Making Process." *Journal of Interior Design* vol. 29, nos. 1&2 (2003) 32-49.

Jackson, Mike. "Embodied Energy and Historic Preservation: A Needed Reassessment." *Association for Preservation Technology (APT): Bulletin* vol. 36 no. 4 (2005) 47-53.

Keene, John C. "The Links between Historic Preservation and Sustianability: An Urbanist's Perspective." In *Managing Change: Sustainable Approaches to the Conservation of the Built Environment,* ed. Jeanne Marie Teutonico and Frank Matero, 11-19. Los Angeles: The Getty Conservation Institute, 2001.

Bart King, "A Century in Portland: Through the Lens of the Armory" in *Voices of the Armory: A Chronicle of the Transformation of a 19th Century icon into a 21st century Theater.* Narrative by Chris Coleman, 12. Portland, Oregon: Portland Family of Funds Holdings, Inc.

Latham, Derek. "Creative Re-Use: Working with the Building." *Journal of Architectural Conservation: Historic Buildings, Monuments, Places, and Landscapes* vol. 5 no. 2 (July 1999) 7-23.

Leithe, Joni L. with Thomas Muller, John E. Petersen, and Susan Robinson. *The Economic Benefits of Preserving Community Character: A Practical Methodology.* The National Trust for Historic Preservation. Washington, D.C.: The Center for Preservation Policy, 1991.

Lesak, John D. 2005. APT and Sustainability: The Halifax Symposium. *APT Bulletin: Journal of Preservation Technology* 36, no. 4: 3-4.

Libby, Brian. "The Art of Compromise: A LEED Platinum rehab in Portland finds a balance between preservation and sustainability." http://www.metropolismag.com/story/20070110/the-art-of-compromise (2 March 2009)

Lungershausen, Alexander. Interview by author, 9 April 2009, Portland, OR, audio recording.

Main Street. "The National Trust Main Street Center," http://www.mainstreet.org/content.aspx?page=2&section=1 (2 April 2009).

McLennon, Jason. *The Philosophy of Sustainable Design: The Future of Architecture.* Bainbridge Island, Washington: Ecotone, 2004.

Mendenhall, Craig. Interview by author, 30 April 2009, Portland, OR, audio recording.

National Park Service, "Introduction: Standards and Guidelines," http://www.nps.gov/history/hps/tps/standguide/overview/choose_treat.htm (28 February 2009).

_____. "The National Register of Historic Places," http://www.nps.gov/nr/ (2 April 2009.)

_____. "Listing a Property: Some Frequently Asked Questions," http://www.nps.gov/history/nr/listing.htm (accessed May 21, 2009).

National Trust for Historic Preservation. *New Energy from Old Buildings*. Washington, D.C.: The Preservation Press, 1981.

_____. "Our Position on Sustainability" http://www.preservationnation.org/issues/sustainability/public-policy/our-position-on.html (3 March 2009).

Novogradac, Michael J. "The Armory Reclaims Vitality: Banking on Community-Building Cachet," in *Voices of the Armory: A Chronicle of the Transfromation of a 19th Century icon into a 21st century Theater.* Narrative by Chris Coleman, 73. Portland, Oregon: Portland Family of Funds Holdings, Inc.

O'Connell, Kim A. 2007. Finding Common Ground. *Clem Labine's Traditional Building Magazine,* (June) 16-20.

Carolyn Pitts, "Skidmore/Old Town Historic District Nomination." National Register of Historic Places Nomination.

Portland Cement Association, "Balfour-Guthrie Building." www.cement.org/buildings/buildings_office_balfour.asp (25 Febuary 2009).

Roberts, Tristan. 2007. Historic Preservation and Green Building: A Lasting Relationship. *Environmental Building News.* (January) 1-13

Rypkema, Donovan D. "Community, Place and The Economics of Historic Preservation." New Jersey Historic Preservation Awards Ceremony, http://www.placeeconomics.com/speeches.html (3 April 2009).

_____. "Economics, Sustainability, and Historic Preservation," National Trust Annual Conference, http://www.placeeconomics.com/speeches.html (22 Febuary 2009).

_____. *The Economics of Historic Preservation: A Community Leader's Guide.* Washington, D.C.: The Preservation Press, 1994.

Sears, Joy. Interview by author, 13 April 2009, Salem, OR, audio recording.

Shelman, David. "Balfour-Guthrie Building Nomination." National Register of Historic Places Nomination.

Snoonian, Deborah, and Kira L. Gould. "Architecture rediscovers being green." *Architectural Record* 189, no. 6 (June 2001): 86. *Academic Search Premier*, EBSCO*host* (9 April 2008).

Solomon, Nancy B. "Tapping the Synergies of Green Building and Historic Preservation." *Architectural Record* vol. 191, no. 7 (July 2003): 155-162.

Stipe, Richard E, ed., *A Richer Heritage: Historic Preservation in the Twenty-First Century.* Chapel Hill: The University of North Carolina Press, 2003.

Sustainlane.com. "2008 US City Rankings," http://www.sustainlane.com/us-city-rankings/categories/green-building (4 March 2009).

_____."Cities by Age," http://www.sustainlane.com/us-city-rankings/categories/cities-by-age (1 March 2009).

_____. "Portland, Oregon," http://www.sustainlane.com/us-city-rankings/cities/portland (4 March 2009).

Throsby, David. "Sustainability in the Conservation of the Built Environment: An Economist's Perspective." In *Managing Change: Sustainable Approaches to the Conservation of the Built Environment,* ed. Jeanne Marie Teutonico and Frank Matero, 3-10. Los Angeles: The Getty Conservation Institute, 2001.

Tess, John M. "First Regiment Armory Annex." National Register of Historic Places Nomination,

Travel Portland, "Green Meetings," http://www.travelportland.com/meeting_planners/green_meetings/ (5 March 2009).

University of Oregon. "The White Stag Block." http://pdx.uoregon.edu/leed/index.html (10 April 2009).

_____. "UO Mission Statement." http://aaa.uoregon.edu/bov/mission/uo/ (20 May 2009).

U.S. Green Building Council, "About USGBC," http://www.usgbc.org/DisplayPage.aspx?CMSPageID=124 (28 February 2009).

_____. "LEED Rating System," http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222 (1 March 2009).

_____. "Certified Project List: Jean Vollum Natural Capital Center," http://leedcasestudies.usgbc.org/overview.cfm?ProjectID=393 (1 March 2009).

_____. "Gerding Theater at the Armory: Process," http://leedcasestudies.usgbc.org/process.cfm?ProjectID=833 (5 April 2009).

Wallace, Julia, Marilyn Higgins, and Jeremy Raemaekers. "Architectural Conservation and Environmental Sustainability: Conflict or Convergence?" *Journal of Architectural Conservation: Historic Buildings, Monuments, Places, and Landscapes* vol. 5 no. 2 (July 1999) 56-71.

United Fund Advisors and Portland Family of Funds, "The Gerding Theater at the Armory," *Armory Council of Development Finance Agencies 2009 Practicioner's Showcase Project Entry*. Portland, OR

Woodcock, David G. "Introduction" in *Adaptive Reuse: Issues and Case studied in Building Preservation* 1988 comp. Richard L. Austin (New York: Van Nostrand Reinhold Company 1988): viii-ix.

Zachariah, J. Leslie, Christopher Kennedy, and Kim Pressnail. "What Makes a Building Green?" *International Journal of Environmental Technology and Management* vol. 2, nos.1/2/3 (2002): 38-53.