Whole Building Design Guide
Sustainable Historic Buildings
Resource Page

Richard Paradis, P.E.
Steven Winter Associates
The goal of 'Whole Building' Design is to create a successful high-performance building. To achieve that goal, we must apply the integrated design approach and the integrated team approach to the project during the planning and programming phases. [Read more]

Join us for FEDCon 06!
The National Institute of Building Sciences will present FEDCon '06 on December 5, 2006 at the Washington Convention Center in Washington, DC. This year's event is co-sponsored by AIA, AGC, CSI and [Read more]

WBDG Focus
United States National CAD Standard™
The United States National CAD Standard (NCS) is the only comprehensive U.S. CAD Standard for the design, construction and facility management industries. The program's goal is broad voluntary adoption of the CAD standard by the building design, construction and operation sectors, thereby establishing a common language for the building design and documentation process. [Read more]

WBDG Quick Links
Below are a selection of WBDG pages, documents or tools that are frequently requested by users:
What is Whole Building Design?

• It is an **Integrated Design Approach** and an
• **Integrated Team Process** to achieve high-performance buildings

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Sustainable Historic Preservation
‘Whole Building’ Approach

- Materials, systems, and assemblies reviewed from many different perspectives

- Building components, sub-systems and materials are interdependent, can impact the total performance of the whole, and can perform ‘double duty’

NREL Solar Laboratory
Golden, CO

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Integrated Project Team

- Comprehensive Stakeholder involvement throughout the building’s life cycle

- Evaluation for cost, quality-of-life, future flexibility, energy efficiency, overall environmental impact, productivity, creativity, and how the occupants will be enlivened
Applying the Integrated Team Process

Who needs to be at the table at the outset of your project to ensure an integrated team process?

- Architect
- Landscape Architect
- Owner, Client, Tenants
- Engineers
- Programmers
- Interior Designer
- Contractor
- Specialists (security, telecom, acoustics)
- Community Members or Other Stakeholders
- Operations and Maintenance Personnel
- Others???? (real estate buyer)
WBDG Goal

… to provide centralized access and use of facility information in a knowledge based management environment, from a ‘whole building’ perspective.

WBDG Building Type Page on Child Development Ctrs
w/ direct links to: Daylighting RP; Playground Design & Equipment RP; Assessment Tools for Accessibility, etc.

CCB Documents
DoD UFC 4-740-14 Design: Child Development Centers
GSA PBS-100 Child Care Center Design Guide

NGS
Handbook for Public Playground Safety

w/ DIRECT LINKS to Other Resources & Pubs.
Nation’s Network of Child Care Resource & Referral (NACCRRA)
National Association for the Education of Young Children (NAEYC).

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Impact of WBDG as a Tool

In October 2006
• 757,003 page views (June 06 highest 947,394)
• 402,490 visitor sessions*
• 193,358 unique visitors*
• 160,588 visitors who visited more than once*
• 993,150 pdf downloads from the WBDG website (Sep 06 highest 1,100,790)

By the end of this year, the totals will have exceeded the totals for the year 2005 by over 3 million

* All Time High Total

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Whole Building Design Guide
www.wbdg.org

Level 1
Homepage

Level 2
Category Pages

- News, Events & Training
- Design Guidance
- Tools
- Project Management
- Mandates/References

WBDG News

WBDG News

Events & Training

Level 3

- Building Types
- Space Types
- Design Objectives
- Products & Systems
- Design Disciplines

Level 4

- General Building Types Pages
- Space Type Pages
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- General Products & Systems Pages
- Design Discipline Pages

Level 5

Specific Building Types Pages

Principles Pages

Specific Products & Systems Pages

Resource Pages

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Design Objectives

Each design objective described herein is significantly important, yet it is just one aspect of what it takes to achieve a successful project. A truly successful project is one where the interdependencies of all building systems are coordinated concurrently from the planning and programming phase. Further, all WBDG design objectives: accessible, aesthetics, cost effective, functional/operational, historic preservation, productive, secure/safe, and sustainable and their interrelationships must be understood, evaluated and appropriately applied.

Accessible > - Provide Equal Access
- Plan for Flexibility

Aesthetics > - Respect the Language
- Engage the Integrated
- Select Appropriate Design
- Design Awards

Cost Effective > - Utilize Cost Management
- Design, and Development
- Use Economic Analysis
- Investment Decisions
- Consider Non-Monetary Historic Preservation, etc.

Functional / Operational > - Account for Spatial Needs
- Meet Performance Objectives

Historic > - Apply the Preservation
- Preservation - Update Building System
- Accommodate Life Safety
- Conform with Accessibility

Secure / Safe > - Plan for Fire Protection
- Ensure Occupant Safety and Health
- Resist Natural Hazards
- Provide Security for Building Occupants and Assets

Sustainable > - Optimize Site Potential
- Minimize Energy Consumption
- Protect and Conserve Water
- Use Environmentally Preferable Products
- Enhance Indoor Environmental Quality (IEQ)
- Optimize Operational and Maintenance Practices
Realizing the need to protect America's cultural resources, Congress established the National Historic Preservation Act (NHPA) in 1966, which mandates the active use of historic buildings for public benefit and to preserve our national heritage. Cultural resources, as identified in the National Register for Historic Places, include buildings, archeological sites, structures, objects, and historic districts. The surrounding landscape is often an integral part of a historic property. Not only can significant archaeological remains be destroyed during the course of construction, but the landscape, designed or natural, may be irreparably damaged, and caution is advised whenever major physical intervention is required in an extant building or landscape. The Archaeological Protection Act established the public mandate to protect these resources.
Four Treatment Approaches

• **Preservation** focuses on the maintenance, stabilization, and repair of existing historic materials and retention of a property's form as it has evolved over time.

• **Rehabilitation** acknowledges the need to alter or add to a historic property to meet continuing or changing uses while retaining the property's historic character.

• **Restoration** depicts a property at a particular period of time in its history, while removing evidence of other periods.

• **Reconstruction** re-creates vanished or non-surviving portions of a property for interpretive purposes.
Apply the Preservation Process Successfully
by the WBDG Historic Preservation Subcommittee

OVERVIEW

Work on historic buildings, landscapes, archaeological sites, or other cultural resources, requires knowledge of a unique process of compliance and review. This process differs from work on existing buildings or on new construction and should be considered in concert with other project goals requiring close collaboration between preservationists and design disciplines. To ensure a balanced, economically viable, and preservation-sensitive project, the outline below should be followed.

A. Initial Project Planning Stage

Determining What Makes a Building Historic and Who Makes this Determination

In the United States, a property—either public or private—is considered historic if it meets a set of criteria established by the National Register of Historic Places, a division of the National Park Service that lists cultural resources worthy of preservation. The nomination process is initiated by a property owner and/or interested citizen in collaboration with the following entities (these entities also determine if a property is eligible for listing): State Historic Preservation Officers (SHPOs) for properties in their state, Federal Preservation Officers (FPO) for
For many historic structures, "building systems" are new additions that must be incorporated with as much sensitivity to the original fabric as possible. However, more recently constructed buildings, such as early 20th century commercial buildings, may contain early systems that may be historic themselves and can be reused. For example, decorative ventilation grilles and switch plates may contribute to a building's significance as much as marble wainscoting or decorative stenciling.

Careful planning is required to balance preservation objectives with interior systems, such as HVAC, electrical, plumbing, structural systems, information and communication technologies, and conveyance systems. Since new mechanical and other related systems, such as electrical and fire suppression, can use up to 10% of a building's square footage and 30%-40% of an overall rehabilitation budget, decisions must be made in a systematic and coordinated manner. While it might not be always possible to completely conceal the presence of new technology, it may be possible to lessen the impact on a building's integrity and retain as much of the original building fabric as possible.

Changes—both big and small—can have a significant cumulative impact over time. Care must be taken during initial project design and periodic upgrades to avoid the incremental loss of integrity. Following are four basic principles to keep in mind when
Accommodate Life Safety and Security Needs
by the WBDG Historic Preservation Subcommittee

OVERVIEW

Most building projects place a higher priority on the protection of building occupants and assets than on the preservation of cultural resources. However, it is important to address the protection of the building’s historic spaces, finishes, and collections in the design and implementation of safety and security measures. Because historic buildings are each a unique case, cost effective, synergistic, performance solutions developed in a collaborative environment will produce the best results. See also WBDG Whole Building Approach.

Designers, facility managers, fire, security and code officials, curators, preservation officials, and building occupants should be involved early on in the planning and design process. This allows the project team to look at issues holistically and remain flexible to the challenges of the historic property.
OVERVIEW

Most historic buildings were not originally designed to accommodate people with disabilities and special needs. However, persons with disabilities should experience sites, landscapes, buildings, and spaces in the same manner as other users whenever possible.

Providing access (exterior and interior) for persons with disabilities in ways that preserve the character of the historic property is a challenge and requires creativity and collaboration among the project team members. Compliance is required in these areas, but the accessibility standards (such as Uniform Federal Accessibility Standards (UFAS) and American with Disabilities Act Accessibility Guidelines (ADAAG)) are more flexible when applied to historic buildings. UFAS and ADAAG provide alternative solutions that allow retention of original historic fabric (such as narrow corridors).

While accessible design is covered in WBDG Accessible Branch, unique issues that must be resolved in order to provide accessibility in historic buildings will be discussed in this section.
Sustainable Historic Preservation
by the WBDG Historic Preservation Subcommittee

INTRODUCTION

Historic buildings are inherently sustainable. Preservation maximizes the use of existing materials and infrastructure, reduces waste, and preserves the historic character of older towns and cities. The energy embedded in an existing building can be 30% of the embedded energy of maintenance and operations for the entire life of the building. Sustainability begins with preservation.

Historic buildings were traditionally designed with many sustainable features that responded to climate and site. When effectively restored and reused, these features can bring about substantial energy savings. Taking into account historic buildings' original climatic adaptations, today's sustainable technology can supplement inherent sustainable features without compromising unique historic character.
Sustainable Historic Preservation

- Sustainable Sites
  - Heat Island Reduction

- Water Efficiency
  - Water use reduction

3) Energy and Atmosphere
  - Minimum Energy Performance
  - Reuse of Historic Windows

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This is a guidance document with sample specification language intended to be inserted into project specifications on this subject as appropriate to the agency's environmental goals. Certain provisions, where indicated, are required for U.S. federal agency projects. Sample specification language is numbered to clearly distinguish it from advisory or discussion material. Each sample is preceded by identification of the typical location in a specification section where it would appear using the Section Format™ of the Construction Specifications Institute.

SPECIFIER NOTE:
Resource management: Pervious pavement (also referred to as porous paving and permeable paving) is a porous surface with an underlying stone reservoir to temporarily store surface runoff before it infiltrates into the subsoil. This porous surface replaces traditional pavement, allowing parking lot storm water to infiltrate directly and receive water quality treatment. There are various porous pavement
INTRODUCTION

Windows have long been used in buildings for daylighting and ventilation. Many studies have even shown that health, comfort, and productivity are improved due to well-ventilated indoor environments and access to natural light. However, windows also represent a major source of unwanted heat loss, discomfort, and condensation problems. In 1990 alone, the energy used to offset unwanted heat losses and gains through windows in residential and commercial buildings cost the United States $20 billion (one-fourth of all the energy used for space heating and cooling).
Sustainable Historic Preservation

4) Materials and Resources
   - Source Reduction and Waste Management
   - Optimize Use of IAQ Compliant Products
   - Exterior and Interior Materials

5) Indoor Environmental Quality
   - Outside Air Introduction and Exhaust Systems
   - Controllability of Systems: Lighting
   - Daylighting and Views: Daylighting

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INTRODUCTION

The operations and maintenance (O&M) of facilities covers all that broad spectrum of services required to assure the built environment is available to and will perform the functions for which they were designed and constructed. O&M is comprised of the day-to-day activities necessary for the built entities to perform their intended function. Operations and maintenance are combined into the one term O&M because an entity cannot operate without being maintained; therefore the two are discussed as one.

At this time the Operations and Maintenance section offers guidance in the following areas:

- **Real Property Inventory (RPI)**—Provides an overview on the type of system needed to maintain an inventory of an organization's assets and manage those assets.
- **Computerized Maintenance Management Systems (CMMS)**—Contains descriptions of procedures and practices used to track the maintenance of an organization's assets and associated costs.
This is a guidance document with sample specification language intended to be inserted into project specifications on this subject as appropriate to the agency's environmental goals. Certain provisions, where indicated, are required for U.S. federal agency projects. Sample specification language is numbered to clearly distinguish it from advisory or discussion material. Each sample is preceded by identification of the typical location in a specification section where it would appear using the SectionFormat™ of the Construction Specifications Institute.

SPECIFIER NOTE:
- Resource management: Refer to Section 15700 - HVAC Equipment.
- Toxicity/IEQ: Locate outside air intakes away from potential sources of contamination (e.g. sources of motor vehicle emissions, building HVAC system exhausts). Exhaust directly outdoors the air in rooms where contaminants are
Lighting controls have traditionally been used to create moods. Today, they are also used as part of a high quality energy efficient lighting system that integrates daylight and electric light sources to provide a comfortable and visually interesting environment for the occupants of a space. Electric lighting controls are appropriate for a wide variety of spaces, from restrooms to large open offices, from conference rooms to classrooms. They can be incorporated with daylighting to provide flexibility, energy savings, and ecological benefits. Although lighting controls are still most commonly used in commercial buildings, they are also increasingly being used in residential applications.
Let’s check out the WBDG!

Be sure to visit the site when you start your next project!

www.wbdg.org