OVERVIEW

The Christman Company is receiving LEED® (Leadership in Energy and Environmental Design) certification in two categories: The Christman Building's core and shell project, and for the firm's headquarters commercial interiors project, which occupies roughly half the building.

This 1928 landmark, listed as the Mutual Building on the National Register of Historic Places and renamed The Christman Building in 2008, was a brownfield site in Lansing, Michigan, near the state Capitol.

This grand old building's new lease on life was accomplished through a commitment to sustainable, green, historic preservation at a cost no greater than conventional practices.

Significant Environmental Aspects

The Christman Building and headquarters showcase the company's integrated, sustainable and historic preservation construction capabilities, and its commitment to the environment and the community.

Reuse of this historic building tapped the inherent embodied energy and resources, avoided suburban sprawl and contributed to downtown revitalization. Its location utilizes existing public transportation and parking facilities. Showers and locker rooms encourage walking and bicycling to work. The white roof and reduced exterior lighting reduce heat island effects and light pollution.

This grand old building's new lease on life was accomplished through a commitment to sustainable, green, historic preservation at a cost no greater than conventional practices.

Energy use is reduced by task lighting, occupancy sensors, programmed timers in common areas, daylighting for 92% of occupants, high efficiency windows and Energy Star office equipment and appliances. High efficiency HVAC systems provide individually controlled comfort conditions. The under floor air distribution system maximizes efficient, healthy ventilation. Low flow fixtures reduce water consumption by 40%.

The design reused 92% of existing walls, roof and floors, and most of the company's former office furnishings. Recycled and regionally manufactured materials, and low emission sealants, paints, carpets, and furniture were used extensively. All wood was FSC certified.

The interior provides outdoor views to 90% of occupants. Workspaces were designed for flexibility, adaptability, collaboration and teamwork.

Extensive recycling diverted 77% of construction debris from the landfill.

PROCESS

Pre-Design

This 114 year-old construction firm's decision to relocate its national headquarters addressed Christman's need for additional space and demonstrated their commitment to integrated and sustainable design and construction, to historic preservation, and to the downtown revitalization of the company's home city.

A landmark downtown building brownfield site provided an excellent candidate for a milestone green and historic preservation project. The firm set out to make it an example of sustainable redevelopment at the same cost as conventional practices. Formerly known as the Mutual Building, the original structure was built in 1928 to house the headquarters of Michigan Millers Mutual Fire Insurance Company.

The company conducted a pre-design organizational development study, which included an open-ended questionnaire to elicit opinions and input for follow-up small group discussions, which were attended by the project architect. The study produced five design criteria: to represent the company's core values, people, energy, expertise, accomplishments, and history; to encourage team collaboration internally, with branch offices and with customers in both informal and formal settings; to create an environment that shares successes and energy, and also provides for mental and physical breaks; to maximize comfort with individual thermal and lighting controls, ergonomic workstations, and daylighting; and to plan adaptively for growth, change and the space needs of short-term on-site project personnel.

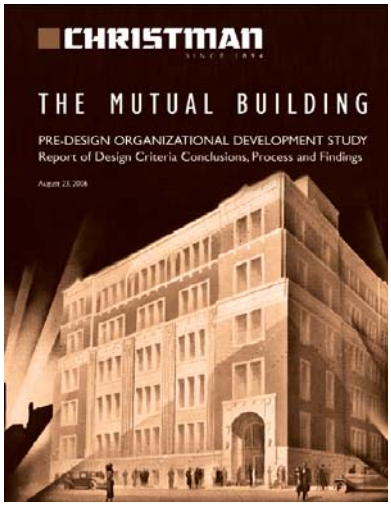
Design

The project team included the company's preservation, sustainable design and construction, urban revitalization, real estate development, LEED, and project planning experts, who worked closely with the SmithGroup designers. Evaluation of the design within sustainability metrics led to an integrated and cost efficient implementation of the design criteria.

The original five-story, limestone-trimmed, red brick office building is a stylized version of Elizabethan architecture with an asymmetrical segmental-arch-headed recess entrance. The building's exterior, main stairway, main corridor and first floor paneled offices were meticulously restored.

A sky lighted atrium accessible to floors 4, 5 and the new 6th floor was created between the two rear extensions of this U-shaped building. This inner courtyard, called"Christman Square," provides daylight and encourages employee interaction.

The new 6th floor space, which is not visible from the street, provides outstanding views of the state capitol and cityscape.



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CHRISTMAN
Project Planning Group

Designed for functions, it can be sub-divided to accommodate varying numbers of people.

Workspaces are arranged in "quads," which provide non-disruptive visual accessibility to employee energy and creativity, and foster collaboration. Only a few executive offices have doors.

Under floor air distribution systems have been installed on floors 2 through 6. The flooring on the first floor was restored to meet historic preservation standards. Thermal control is provided through floor registers and thermostats in each workspace.

Construction

Sustainable construction practices were used extensively for the building's core and shell, as well as the Christman headquarters commercial interior. The firm also used these practices to fit out space under contract to two tenants.

Indoor air quality was carefully managed during construction. Low-emission VOC products were used. The under floor air distribution system, which provides 200-300% more ventilation than conventional systems, and the MERV- 13 rated air filtration system created a healthier construction site.

LEED construction guidelines were tied to subcontractors' contracts. Workers came to appreciate green methods and products, and to value their participation in this significant project.

By weight, 77% of all CI project construction and demolition waste was diverted from the landfill through a reclamation and recycling program. Many components of the building were reused thereby tapping the inherent embodied energy and avoiding the need to use more energy and resources to produce new products. These components included the building's walls, floors, roof, front windows, historic light fixtures, door hardware, flooring, wall tiles and wood trim.

All of the preservation work on the building was approved by the State Historic Preservation Office and the National Park Service to ensure that standards protecting the National Register building were upheld. Restoration of historically significant building features included the main entrance doors and plaques, the mica shade light fixtures and Pewabic wall tiles in the main hall, and the light fixtures and verdigris bronze handrail finish in the stairwell and lower level. Other restored and reused building components included door hardware, wood trim, wood windows, and floors in the entry and historic stair made of Bluestone or black and white linoleum. Bricks salvaged from the removal of the penthouse were used to patch exterior walls. Benign products, such as citrus strippers, wet grinding, and low VOC coatings, were used to restore historic finishes, such as the walnut paneling in the executive offices on the first floor. All plaster walls were restored, using several restoration techniques.

Restoration of historically significant building features included the main entrance doors and plaques, the mica shade light fixtures and Pewabic wall tiles in the main hall, and the light fixtures and verdigris bronze handrail finish in the stairwell and lower level.

CHRISTMAN
Historic Preservation Group

Operations/Maintenance

The Christman Company developed detailed specifications for a green housekeeping program that stipulates the use of environmentally responsible and low-emission cleaning products and practices. The computerized building management system (BMS), which has several thousand control points, is used extensively for fine tuning the operation of HVAC and lighting systems to occupancy and climatic conditions. The BMS is also used to prompt maintenance activities.

Commissioning

The project included a commissioning agent beginning in the earliest planning stages. The building was extensively commissioned with functional checks on all HVAC and electrical systems, lighting controls and domestic water systems. The intention is to continuously commission the building for the first year and then to re-commission all systems every five years.

Measurement and Verification/Post-Occupancy Evaluation

Energy usage is subject to continuous monitoring and evaluation. The data is used to fine-tune the systems, to prepare the annual energy budget, and to charge the tenants for their electrical usage. A post occupancy survey will be conducted after the first six months of occupancy and the systems will be further fine tuned, if necessary, to ensure maximum comfort conditions for the staff.

Financing

The financing for the project utilized a number of economic incentives in order to make it feasible. These included Federal programs such as New Market Tax Credits and Historic Tax Credits which help urban projects move forward when traditional financing does not work. The project also enjoys property tax relief through the Federal Obsolete Property Rehabilitation act, which freezes the taxable value on the building prior to improvements for 12 years.

The project is a great example of Public/Private partnership. The City of Lansing, through the Brownfield Authority, has a development agreement with the project. This enables the recapture of Michigan Single Business Tax Credits for eligible costs associated with the project. The City also provided key economic information that supported requests for the New Market Tax Credits. The City of Lansing, knowing that a healthy downtown leads to healthy communities, was eager to assist in the development of the project.

The specific economic incentives that supported the development of this project are:

The financing for the project utilized a number of economic incentives in order to make it feasible. …The project is a great example of Public/Private partnership.

- $672,500 in State of Michigan Brownfield Single Business Tax (SBT) Credits
- $2 million in Federal Historic Tax Credits
- $500,000 in State Historic Tax Credits
- Allocation of $8.5 million in Federal New Market Tax Credits
- $1.2 million ($100,000/year for 12 years) in Property Tax Relief through establishment of a Federal Obsolete Property Rehabilitation Act (OPRA) District

This project clearly demonstrates that sustainable design and construction does not have to cost more than conventional construction. For the core and shell project, the costs associated with achieving green goals represented 1.3% of the total budget. Two-thirds of those green costs were related to the LEED certification process. For the commercial interior project, the costs associated with achieving green goals represented 0.70% of the total budget. Of those green costs, 95% were related to LEED certification.

CHRISTMAN SINCE 1894

PERFORMANCE

Land Use and Community

The preservation of this landmark building has made a substantial contribution to Lansing's downtown revitalization.

The use of a brownfield site avoided creating urban sprawl. Its location in the heart of downtown provides pedestrian access to community services, reducing the use of fossil fuel transportation. Transportation alternatives include five bus lines connecting to all parts of the metropolitan area. Bike racks, showers and locker facilities encourage building occupants to walk, run or bike to work. No parking spaces were added to the site. Of the existing spaces, reserved parking has been provided for fuel efficient vehicles to encourage the transition to hybrid and other fuel efficient personal transportation. Additional parking is available in nearby existing parking facilities.

The white roof reduced the urban heat island effect and energy use. Exterior cut-off light fixtures aim all light downward. Although the final foot-candle measurement for these fixtures came in just above LEED credit standards, their use will nonetheless reduce light pollution.

Christman, as building owner, has made long-term lease commitments with its tenants to reduce the future environmental costs associated with turnover. Green guidelines have been prepared for building tenant fit-outs.

This project seeks a LEED educational credit for its permanent signage about the building's sustainable design, for its educational materials and for the tour available to visitors.

Site and Water

The project is situated in a densely developed urban setting among office and retail space on the major street that passes in front of the nearby state Capitol building.

The firm selected a previously developed brownfield site, a landmark building which had fallen into functional obsolescence and disrepair. This offered an excellent opportunity to showcase green historic preservation at a cost no greater than conventional design and construction practices.

The original building housed an insurance company that insured many of Michigan's mills. Numerous millstones from those mills had been incorporated in the sidewalk in front of the building. These were carefully extracted when the sidewalk was replaced and are now featured in the landscaping along the façade.

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Water Conservation and Use

The landscaping was designed to require no potable water irrigation.

A 40% reduction in potable water and sewage use was achieved by careful selection of water efficient plumbing, such as low-flow fixtures, 0.5 gallon-per-minute automatic lavatory faucets with aerators, and dual flush valves throughout the building.

Energy Use and Conservation

Energy modeling projections for this building show that the building will exceed minimum energy efficiency requirements by 34%. Natural gas and electricity consumption savings will reduce CO_2 by 1,002,945 lb/year, SO_2 emissions by 4,524 gm/year, and NOX emissions by 2,148 gm/year. This is the equivalent of planting 4,112 trees or reducing driving by 1,094,212 miles.

The original exterior brick walls of the building have been cleaned and tuck pointed to historic preservation standards. Due to these standards, insulation could not be added to the walls. The white roof and 6" of added insulation reduce the urban heat island effect and reduce energy use.

The building's original front façade windows frames have been meticulously restored and fitted with double-glazed glass to increase their energy efficiency. The building's side and rear exterior windows have been replaced with high efficiency aluminum windows.

Commissioning of all HVAC, lighting and domestic water systems was conducted to ensure that all systems operated as designed and were fine-tuned.

The HVAC systems were designed and equipment selected to minimize energy use while providing individually controlled comfort conditions. The under floor air distribution system is more energy efficient than conventional ducted systems. All cooling equipment uses refrigerants that cause minimal damage to the environment.

The design took advantage of large perimeter windows to provide daylighting to 92% of occupied spaces building-wide and outside views to 90% of the occupants in the Christman headquarters. Additional background lighting is provided by high efficiency fixtures and T-5 fluorescent lamps with a very high color rendering index (CRI). All workstations have individually controlled multi-level task lighting. The lighting system energy savings are projected to be 27%. Use is controlled by occupancy sensors in private offices and stairways, programmed timers in common spaces, daylighting dimming controls, and individually controlled task lighting.

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A web-based building management system (BMS) tracks and measures electricity and gas usage, as well as atmospheric conditions inside and outside the building. The BMS has several thousand control points that are used to operate the building systems for maximum efficiency and comfort. Energy use is metered at the building and tenant levels to encourage conservation.

All appliances and office equipment, including copiers, fax machines and computers, are Energy Star rated.

Renewable Energy Certificates for clean wind energy were purchased to offset 70% of the building's core and shell electricity use for two years and 100% of the Christman Company headquarters' electricity use for two years. The 843,215 kWh will be offset, reducing CO_2 emissions by 1,149,302 lb/year, which is equivalent to planting 5,730 trees or reducing driving by 1,254,649 miles.

MATERIALS AND RESOURCES

The reuse of a historic building on a previously developed site is intrinsically resource efficient. The design reused 92% of existing walls, roof and floors.

Approximately 3% of the building components were refurbished and reused, including historic door hardware, light fixtures and wood trim molding. The majority of file cabinets, office furniture and work stations were moved and reused from the former headquarters offices. Carpet tiles were installed so that small sections, such as high traffic areas, can be replaced as needed.

Recycled materials were used extensively. By cost, recycled materials made up 20% of the materials costs for the core and shell project, and 25% for the Christman Company commercial interior project. Regionally manufactured materials made up 37% of total materials costs for the commercial interior project. Regionally manufactured materials (10% extracted) made up 42% of total materials costs for the core and shell project, and 24% for the commercial interior project.

All wood used in the core and shell project was certified by the Forest Stewardship Council (FSC).

Recycling containers for paper at each desk and for other materials on each floor are emptied regularly and contents sent to a dedicated, central recycling room in the basement. Paper, plastic, cardboard, glass, batteries, lamps and metals are all recycled.

All tenants have signed long term leases, a policy designed to reduce turnover and the associated use of resources to renovate the space.

Waste

During the demolition phase of the project, all carpet squares in the building were saved and donated to Habit for Humanity. All ceiling tiles were sent to Armstrong Industries for recycling into new ceiling tiles. Drywall was used as an additive for road construction projects. A comprehensive reclamation and recycling program during construction provided on-site recycling containers. The recycled materials were sent to specific recycling centers. These focused efforts diverted 77% of the CI project construction waste from the landfill.

Recycling containers for paper at each desk and for other materials on each floor are emptied regularly and contents sent to a dedicated, central recycling room in the basement. Paper, plastic, cardboard, glass, batteries, lamps and metals are all recycled.

Design for Adaptability to Future Uses

One of the project's important design criteria was to plan for growth, change and the accommodation of short-term on-site project personnel. The interior design kept fixed walls to a minimum. The "quad" work areas were designed to promote the flexible use of space. Demountable wall dividers in the new 6th floor allow the space to be adapted for use by function and number of people.

INDOOR ENVIRONMENT

Indoor Environment Approach

The HVAC system was designed to substantially exceed the minimum IAQ requirements set by code. It maintains temperatures and humidity in accordance with ASHRAE Standard 55-2004. A computerized building management system continuously monitors the system and notifies facility personnel if a problem occurs.

The under floor air distribution system provides 200-300% more ventilation to the breathing zone than required by ASHRAE Standard 62.1–2004. Good indoor air quality is maintained by the air filtration system, reduced use of re-circulated air, and CO_2 monitoring. Air flow sensors continuously measure the amount of outside air brought in by the air handlers.

An indoor air quality plan during construction included the selection of environmentally sensitive materials and construction practices to reduce any adverse effects once the building was occupied.

All carpeting, paints, coatings, adhesives and sealants met rigorous low-emission VOC standards. All office furniture is ergonomic and meets strict VOC standards.

Large windows provide daylighting to 92% of occupied spaces building-wide and views to the outside for 90% of the occupants in The Christman Company commercial interior.

Thermal, ventilation, and lighting systems can be controlled at every work station and in every conference room by individual climate controls, floor registers, and task lighting.

All janitorial and chemical storage rooms are separated and exhausted directly to the outside, and entrance mats catch outdoor debris before it enters the building. The building's maintenance plan requires green housekeeping.

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RESULTS

Lessons Learned

This project proved that sustainable design and construction need not cost more than conventional practices.

Commitment to the LEED approach and collaboration among the owner, project team and subcontractors was essential to success.

The historic preservation and sustainable construction goals of the project were mostly complementary.

Installation and keeping under floor air system space clean proved to be a real challenge due to the debris generated by some of the historic preservation activities, such as plaster restoration.

Public interest in this green historic preservation project continues to be high. Visitors to the facility learn about sustainable design and construction through permanent signage and guided tours by Christman staff.

Ongoing evaluation of energy use efficiency measures and tracking consumption information are used to make changes needed to achieve our goals.

This project proved that sustainable design and construction need not cost more than conventional practices.

Project Credits

In grateful appreciation of the fine collaboration and partnership on behalf of the many individuals and organizations that helped to make this project possible, including: SmithGroup architecture, Mayotte Group Architects, the City of Lansing, the Lansing Economic Development Corporation, the Lansing Historic District Commission, the State of Michigan, the Michigan Economic Development Corporation, Michigan's State Historic Preservation Office, Chase Bank, Michigan Millers Mutual Insurance Company, the U.S. Green Building Council, and the many fine trade organizations and individuals who contributed their time, passion and talents.

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