

Jordan Institute Case Study

850 Winter Street, Waltham, MA

Introduction

The commercial office building at 850 Winter Street in Waltham, Massachusetts was designed and built to meet the high performance building standards called LEED (Leadership in Energy & Environmental Design), the U.S. Green Building Council's robust certification program. This case study highlights the project's design process and its most notable green features.



Goals and Design Process

During initial programming and pre-planning meetings, the need to consider environmentally conscious alternatives to conventional construction was proposed and quickly embraced. The green building goal was discussed with the project's planning and design professionals as each was engaged, and environmental performance quickly became a critical planning and design objective among the entire project team.

At the time the project was conceived, each of the project's design professionals had some LEED experience and felt genuinely pleased with the sustainable design and construction goals. All of the architects, engineers, planners, designers, contractors and other professionals involved in the project shared a common view of their involvement in the built environment – that with a little effort, clever collaboration, and some fun and “outside the box” thinking, each is able to make the products of his or her efforts much more healthful, energy efficient, cost-effective, and environmentally responsible than usual.

The Jordan Institute was asked to join the project team to reinforce and strengthen the team's skill set, challenge the team to explore new ideas and sustainable alternatives collaboratively, and to spearhead

PROJECT OVERVIEW

Location: Waltham, MA

LEED Status: Pursuing LEED for Core & Shell Gold

Completion Date: Summer 2008

Size: 212,000 square feet

Use: Commercial office space

Cost per Square Foot: \$133

Owner: PDM 850 Unit, LLC, an affiliate of Davis Marcus Partners, Boston, MA

Architect: Elkus Manfredi Architects, Boston, MA

Construction: John Moriarty & Associates, Inc., Winchester, MA

MEP/FP Engineer: AHA Consulting Engineers, Inc., Lexington, MA

Site Engineer: John G. Crowe & Associates, Inc., Belmont, MA

Commissioning Agent: MAW Consulting, Inc., Duxbury, MA

LEED Consultant: The Jordan Institute, Concord, NH

the team's efforts with respect to achieving its green building objectives.

Site Development

When the owner acquired the property, a functionally obsolete manufacturing facility stood on the site. The building was constructed in the 1960s for the purpose of manufacturing batteries for "film-packs" used by instant cameras of that day. The building was vacated in 2006 without a future use or user as the need for further production waned. The functionally obsolete structure had to be removed for this project to proceed; fortunately, 100% of demolition material was sent to recycling facilities.



The site planners and engineers leveraged the property's pre-existing topography and resources to enhance stormwater management, control sedimentation, and minimize release of airborne particulates during the project's construction and indefinitely. The architect, site engineer and landscape architect were careful to locate, orient and design a new building of simple but elegant geometry to conform to local zoning guidelines while minimizing site disruption and maximizing open space. To that end, 10% of parking spaces and all the secure bicycle storage serving the new

building were tucked under the new building. Also, exterior light fixtures were selected to provide safe and secure surroundings without adversely impacting the night sky.

Water Efficiency

The owner retained STANTEC (previously Geller Associates, Inc.) to study the site and its environs and to then design the new building's surroundings using hardy native plants, appropriate mulching, and limited irrigation with climate-based controllers. In addition, the building's engineers specified high-efficiency, low-flow sensor activated lavatory sinks, toilet fixtures and showerheads which are expected to reduce water consumption by approximately 32% when compared to average buildings of similar size and use.

Energy Efficiency and Indoor Environmental Quality

At the schematic phase, the project team established a very important goal: Improve the building so that energy costs are reduced by at least 20% when compared to other buildings of similar type and use. Through careful material and component selections, systems integration, and dedicated commissioning efforts, the team succeeded in reducing costs by 21%. The architects, engineers and commissioning authority used multiple strategies to achieve this improvement:

- The team worked together very closely to select high performance exterior wall and roof system components and model the requirements of the building's new mechanical and electrical systems and controls.
- The building's white TPO roofing membrane was selected to enhance the roof-insulation system and reduce heat absorption.
- Lighting systems have been installed with occupancy sensors and dimming controls to maximize energy efficiency.
- High efficiency HVAC equipment was selected to operate with refrigerants that minimize emissions of environmentally undesirable compounds.



- The building's DDC control system optimizes equipment operation based on indoor and outdoor environments.

The team also made a concerted effort to improve indoor air quality and comfort. First, the building's simple geometry is enhanced by large, insulating perimeter window units that span vertically from 2'6" to 9'6" above the floor. These maximize views to the outdoors and allow a high degree of natural lighting. Another measure for both efficiency and comfort are the CO₂ sensors that determine the building's ventilation requirements and adjust the ventilation level accordingly. Also, interior finish materials such as adhesives, paints, and carpets were chosen to eliminate exposure to harmful vapors. Each of these strategies contributes to occupant well-being and productivity as well as environmental responsibility.

Materials

The Project began with the demolition and removal of the 100,000 sf manufacturing building that originally occupied the property. Demolition crews dissected the old structure, its foundations and its underground infrastructure, classified and segregated the waste materials and directed each waste material type to appropriate recycling locations. Between demolition and construction, more than 95% of the project's waste materials was diverted from landfills and incinerators and was recycled.

Before materials for the construction of the new building were specified, the design professionals and the contractor's and owner's representatives discussed the building's components, system by system, to understand the team's options for making use of materials with recycled content. In the end, over 20% of the materials used to construct the building, including virtually all metal, contained recycled content



Building Operation

The owner has worked with its building management representatives to select vendors who are familiar with and committed to recycling, actively maintaining mechanical equipment, control systems and envelope components, keeping the new building clean using environmentally-friendly cleaning products and assisting with transportation alternatives. The owner's property managers will familiarize each of the new building's tenants with the design and construction considerations made toward sustainability and encourage each to incorporate green concepts into the design and construction of their respective work spaces. Each tenant will be given numerous materials that would facilitate LEED for Commercial Interiors certification.

Lessons Learned

- Because LEED certification was a central objective from the start, the team was able to achieve its credit goals with relative ease. If LEED had been a late "add-on," it would have been much harder to incorporate the strategies necessary for certification.
- A level of interpretation is required to apply LEED guidelines to a specific project.
- The owner's extensive knowledge of the area and close understanding of end users' requirements added substantially to the project's strength.

For More Information

Contact the Jordan Institute, (603) 226-1009, www.jordaninstitute.org.