City Projects Case Study

Airport Way Center, Building C
Seattle Fleets & Facilities Department

Photo by Lara Swimmer

Square Feet: 163,241

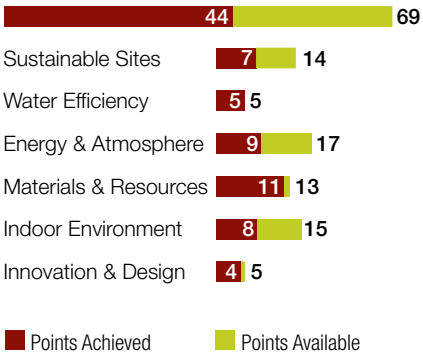
Site: 10.1 acres

Location: Duwamish Manufacturing and Industrial Center neighborhood

Construction Cost: $95/square feet

Completed: August 2006

LEED Facts - NC Gold



Benefits

- 18% energy savings - $32,425 in annual savings
- 31% water savings - $9,467 in annual savings
- 99% reuse of structural systems and building envelope
- 96% of construction waste recycled
- 57% of all wood FSC-certified

Project Overview

In the Airport Way Center, Building C, the City of Seattle makes adaptive reuse of a 125,000-square-foot high-bay warehouse for specialized police functions. The high-security facility includes forensic labs, offices, classrooms, lockers, storage, and interior parking. All were relocated to the industrial area from cramped quarters in downtown Seattle. Because of specific uses and 24-hour continuous occupancy, the building was designed for up to three times the wear and tear of a standard office building.

Surrounded by land officially classified as brownfield, the project puts previously polluted soil into permanent use. It also preserves the entire shell and core of an existing industrial building, effectively salvaging thousands of tons of potential construction waste.

Photo left by Luke Blackstone, middle and right by Lara Swimmer

The Public Art Program of the Office of Arts & Cultural Affairs integrates artworks and the ideas of artists into a variety of public settings.

Title: *Copper*
Artist: Luke Blackstone
Completed: 2004
Commissioned: Fleets & Facilities 1% for Art Funds

This artwork, pictured above, features both recycled materials and solar power, and references both issues of sustainability and police work. A tall aluminum housing contains a recycled bronze cylinder which is struck by a mechanism powered by solar panels. The sustained rhythm of the resulting sounds mimics a heartbeat. The legs of the structure glow with LEDs mounted inside glass laboratory bottles, alluding to the evidence handling that occurs in the facility.

Located in a tidal mudflat zone with a high water table, more than 300 gallons of groundwater per hour was previously pumped into the storm sewer to prevent flooding of an adjacent building. The project effectively saves this lost resource by storing it in a vault on site and reusing it for irrigation, toilet flushing and vehicle washing.

Sustainable Sites

Building C is located along Airport Way, a major arterial in the Duwamish manufacturing and industrial center south of downtown Seattle. It is convenient to bus transit and also promotes alternative transportation choices by providing bike storage, locker and shower facilities, and preferred parking for vanpools.

Interior and exterior circulation is redesigned to improve connections between all of the buildings on the site, and to provide a secure courtyard between building C and building A, which houses city and state police functions.

The project, which lies on land with a high water table, has realized sustainable benefits through the retention and reuse of potentially flooding groundwater on site. In addition, the landscape plan features bioswales in parking areas. These open, linear channels filter stormwater before it seeps into groundwater or is caught in the underground detention vault.

Grass turf and English Ivy (an invasive species) were replaced with native plants, which require less water for irrigation and provide better habitat for birds and animals. Plantings of new deciduous trees provide shade during the summer months and reduce heat generated by asphalt parking.

Water Efficiency

A water reclamation system captures groundwater on site, storing it in a 19,900 gallon vault and using it as a resource for irrigation, toilet flushing and vehicle washing. This measure diverts more than 300 gallons of groundwater per hour, which was previously pumped into the storm sewer to prevent flooding of an adjacent building. This system also provides a community benefit by reducing peak flows to the combined stormwater and sewage system during storm events.

The water reclamation system saves over 1 million gallons of potable water each year. A dual pumping system supplies potable water for drinking and showering along with captured groundwater for other uses. By integrating the system with low-flow fixtures, indoor water use alone was reduced by 535,840 gallons per year, a 31 percent savings over conventional use generating $9,467 in annual savings.

Photos by David Durham, DKA

Energy & Atmosphere

Energy-saving strategies include a uniquely adapted plenum-based heating and cooling system and sensor-based area lighting in the large, open warehouse space that is used for storage of evidence and other police materials.

A plenum-based heating and cooling system uses an under floor chamber to deliver air precisely where needed through floor vents. The system requires little pressure and provides individual control, making it highly efficient and user-friendly. The concrete ground floor precluded an under-floor plenum on the first level. The benefits of the system were achieved, however, by placing offices upstairs with the plenum between floors. Support functions on the ground floor are served with conventional ceiling vents. Offices are located upstairs, with the raised-floor heating, ventilation and air conditioning system. The system discharges waste heat into adjoining interior parking areas, heating garage space at no additional cost or energy usage. A system to directly vent individual lockers eliminates odors with less energy use.

Energy efficient lighting systems reduce the total energy consumption. In the warehouse, where lights are rarely turned off, sensors turn lights on when a forklift or person approaches an individual aisle.

These and other strategies cumulatively reduced projected gas and electric use by 18 percent compared to typical usage, translating to annual savings of $32,425 in 2004 dollars. Calculating for rising energy costs, this will save more than $1 million over 20 years.

Materials & Resources

Over 99 percent of the building's structure and shell was retained and reused. Concrete tilt-up walls, structural heavy timber and glu-lam roof beams received seismic structural upgrades. In addition to reusing the shell and core of the building, the design team integrated a number of existing fittings, finishes and furnishings into the new design. Office furniture purchased from the seller of the property was cleaned, selectively repainted and repaired for a fraction of the cost of buying new. A total of 14 percent of interior materials were salvaged, including reused office furniture, windows, doors, cabinets and ceiling tiles, in total a $513,530 savings.

Asphalt in parking areas was pulverized on site and used as base material under the new asphalt surface. Roofing was replaced with heat-reflective material to reduce summer heat gain. A total of 96 percent of construction waste was recycled-diverting 3,469 tons from landfills. Of all the specified materials in the building, 23 percent was made with recycled content, valued at $868,000. A total of 22 percent of these materials were manufactured regionally, adding $831,670 to local economies.

Indoor Environment

To make the best use of the vast warehouse space, 30,000 square feet of evidence storage was placed in one end of the oblong building, with office and lab structures on the other, oriented toward views and street access. Interiors were designed to maximize light and views, including a skylight that creates a natural gathering place where daylight reaches the center of the building. Other strategically placed skylights introduce natural light throughout the building.

During interior demolition, workers opened doors and windows, used fans for ventilation, minimized dust, and ran air filters. Low-emitting adhesives and sealants, interior paints and coatings, carpet, and composite wood products minimized off-gassing. Janitor closets, labs, fitness rooms and locker areas are all equipped with exhaust and drain systems to move odors and chemicals out of work areas and out of the building.

Photos by Lara Swimmer

Innovation & Design

- Exemplary Performance for Construction Waste Management. The project team demonstrated a recycling rate of 95.99% exceeding this innovation credit threshold requirement.
- Exemplary Performance for Recycled Content Materials Value. The project team provided back-up documentation used to track recycled content materials including letters from manufacturers and product data sheets. Calculations demonstrate a recycled content materials value of 28% exceeding the threshold of 15% to earn this innovation credit.
- Exemplary Performance for Water Use Reduction. Calculations demonstrate water use reduction of 49% from modeled base case conditions exceeding the threshold of 40% to earn this innovation credit.

Lessons Learned

Based on a number of factors, including reuse of material resources in the built environment and natural resources in underground water, the project is highly sustainable and achieved the LEED Gold rating. This accomplishment is due to a great deal of support from the City and creativity on the part of the design and construction team.

Research showed good paybacks from solar and wind power, but the project schedule lacked time to include them. The project team concluded that starting early in the project and structuring it around sustainability and LEED is essential to maximum opportunities and benefits. Planning for sustainability should be a part of site purchase and also of the selection and structuring of the design, contracting and commissioning team. An independent commissioning agent may be included from the beginning, selected for LEED experience and knowledge, and provisions referencing LEED should be included in contracts for the designer, contractor, and commissioning agent.

Initially, the design team concluded that Forest Stewardship Council (FSC) lumber was cost prohibitive and not available in the needed quantities. The general contractor worked with local lumber suppliers to expand the available sources for FSC lumber in the Seattle area-which made the cost more competitive. After showing a few suppliers the quantity of FSC lumber being purchased for the project, there were more competitive bids for FSC lumber by the second purchase. A total of 57 percent of all the wood purchased is FSC certified ($133,000 worth).

December 2008

Rating & Awards

U.S. Green Building Council LEED® for New Construction Gold Rating

2006 Gold Award Building Technology Systems, American Council of Engineering Companies

2005 Sustainable Local Development, National Association of Industrial & Office Properties

2005 Willie O'Neil Environmental Excellence Award, Associated General Contractors of WA

2005 Excellence in Design, Environmental Design & Construction Magazine

The Team

Owner
Seattle Fleets and Facilities Department
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www.dkarch.com

GC/CM
Turner Construction
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Civil
Haozous Engineering
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Structural
Peterson Strehle Martinson
www.psm-engineers.com

Mechanical & Electrical
Wood/Harbinger
www.woodharbinger.com

Commissioning
Engineering Economics Inc.
www.eeiseattle.com

To Learn More

City Green Building promotes green building through education, technical assistance and incentives. www.seattle.gov/dpd/greenbuilding

Office of Arts & Cultural Affairs promotes the value of arts and culture in and of communities throughout Seattle. www.seattle.gov/arts

Fleets & Facilities Capital Programs provides great environments that lift the human spirit and engender public trust. www.seattle.gov/fleetsfacilities

LEED® is the national benchmark for high performance green buildings developed by the US Green Building Council. www.usgbc.org

Seattle City Light Built Smart Services offers incentives and technical assistance for commercial customers. www.seattle.gov/light

Puget Sound Energy provides services and incentives to help customers save energy and money. www.pse.com

Seattle Public Utilities provides customers with reliable and cost-effective water, sewer, drainage and solid waste services, while protecting public health and balancing social and environmental responsibilities to the community. www.seattle.gov/util/services