



Cambridge City Hall Annex

The renovation/restoration of the City Hall Annex in Cambridge, Massachusetts, demonstrates that green buildings need not be new buildings. The annex, built in 1871, is a public showcase of renewable energy technologies, green materials and sustainable construction practices. It all came together when the City of Cambridge -- committed to holding itself to the same green standards as those who build in the city -- chose HKT Architects and their consultants, and Consigli Construction to make it happen.

City Hall Annex houses many of Cambridge's public offices, including the Cambridge Arts Council; Community Development Department; Traffic, Parking and Transportation Department; Animal Commission; and Conservation Commission. The building is also the public meeting place of the Planning Board and Conservation Commission as well as several advisory committees. With tens of thousands of visitors passing through the building annually, these departments experience substantial community contact.

They client and the building team approached the revitalization of this historic building as an opportunity to show leadership in green municipal design, by using the guidelines of the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) program. Cambridge, a USGBC member, is applying for certification and expect at least a Silver rating. The building is meeting LEED standards in the following ways:

The Site

Sustainable site: By reusing an existing building, the project contributes positively to urban redevelopment, while 50 percent of the landscape has been restored to native vegetation thereby reducing site disturbance.

Water efficiency: Water efficient landscaping will reduce water usage by 50 percent.

Public transit: located on the T bus route and near the subway, Annex offers employees incentives including pre-tax subsidized MBTA passes and an on-site employee transportation coordinator

Cycling: indoor bicycle storage room and shower facilities. Visitors are provided with outdoor bicycle racks. Four bicycles are also housed in the building for use by employees during the workday

Car pooling: limited parking: one space for every four employees; two reserved for car poolers

Energy and Atmosphere

Lower energy use: for heating, cooling, lighting, office equipment than conventionally designed building.

Maximized daylighting: to reduce the need for lighting during the workday, most workspaces have a window; 90 percent of the spaces have outside views. Skylights, part of the original building and later painted over, have been restored. A lightwell has been created between the fourth and third floors.

Minimized heat absorption: the Energy Star rated roof is coated with a high reflectance/low emissivity material to minimize heat absorption, which will lower the demand for cooling in summer months.

No furnace or boiler: ground source heat pump system, in three 1500 feet wells, provides all heating and cooling. Thermostat levels and systems operations monitored remotely by the Public Works Department.

Windows: “low-e” double-glazed panes in operable windows minimize heat loss and gain, since glazing not only reflects infrared radiation that causes heat gain, but reduces ultraviolet radiation that causes fading of fabrics.

“Intelligent” lighting: daylight and occupancy sensors minimize electricity demand. Lights automatically adjust artificial light output to daylight levels and shut down when rooms are unoccupied. System can be adjusted by occupants within a governed range through their computer terminals.

HVAC: Displacement ventilation system and heat recovery system in public meeting rooms ensure 100 percent of air is provided from outside the building while

minimizing heat loss by pre-heating the incoming air with heat from the outgoing air. And, since heating and cooling for these rooms is independent, evening meetings can be held while minimizing energy use for the rest of the unoccupied building.

Solar power: A roof-mounted 28-kilowatt solar photovoltaic (PV) system provided by Global Resource Options will create about 10 percent of the building's electricity. That electricity will be "net metered", i.e. electricity provided by local utility will be offset, resulting in savings to the City. By producing a portion of the electricity with a PV system, pollution levels associated with the energy use will be lowered. The Massachusetts Technology Collaborative, which administers the Commonwealth's Renewable Energy Trust, funded the PV system installation via a grant.

Waste Management

Recycled construction waste: Contractor, Consigli Construction, recycled about 80 percent of the construction waste, including brick, concrete and wood. Brick and concrete can be reused as paving material. The wood will be chipped for use as fuel in biomass power plants to produce electricity.

Materials and Resource Management

Recycled materials: Wherever possible, materials with recycled content were used. Steel framing, carpet and ceiling all contain high levels of recycled content. Carpeting consists of 25 percent recycled material, and is 100 percent recyclable at the end of its life. Manufacturer guarantees it will not end up in a landfill or incinerator.

Sustainable forestry: Over 50 percent of the wood used in the building came from certified forests where sustainable forestry practices are used. The wood is certified through the Forest Stewardship Council.

Indoor Environmental Quality

Carbon dioxide sensors: ensure fresh air throughout the building. If carbon dioxide levels reach excessive levels, the building manager is notified by an alarm.

Minimized exposure: Indoor air quality plans were implemented during and after construction to ensure occupants would not be exposed to dust and other contaminants. Ducts were sealed off during construction to prevent dust accumulation. Proper cleaning took place afterward, which included a two-week airing out to allow "off-gassing" of any volatile compounds in building materials and furniture.

Low-emitting materials (related to volatile organic compounds) were used for paints, adhesives, carpets and wood products. Water-based products were preferred.

Melding Green and Historic

The overall design process required approvals from the Mid-Cambridge Neighborhood Historic District Commission. Although supportive of the green aspects of the design, they opposed any adverse impact on the historic nature of the building, such as seeing mechanical equipment or photovoltaic panels on the roof. In addition, they were concerned about the appearance of the new windows, which are large double hung units. It was a major challenge to provide thermally glazed windows with intermediate mullions that matched the original and met the State energy code as well.

The redesign of this 33,216 square foot building is a marriage of old and new that intends to set an example of civic responsibility concerning environmental and historic preservation issues. Historic detailing -- both inside and out -- strives to respect the original building design. Old photographs guided the restoration of the brick parapets; skilled masons recreated the ornate patterns. Inside, wood paneling and lighting fixtures reflect the civic nature of the building while incorporating the latest technology: motion sensor lighting controls and, in the public hearing room, accommodations for a wide range of presentation modes and equipment. The building is now completely handicapped accessible, with a new main entry that includes a two-story entry lobby and elevator access to every floor.

Project Photos (click for a larger view)



Main Entrance

The building houses five City Departments that receive visitors and do business with the public on a daily basis. The new double height lobby serves as an active circulation and information hub and in scale and finishes, reflects the civic tone desired by the City in the redesign. Featured are murals by nationally recognized artist, Mike Glier.



4th FI Conference

The Community Development Department encompasses several divisions that regularly work with home-owners, residents, small businesses and developers on a wide variety of matters. Each of the Department's six conference rooms are infused with direct or borrowed daylighting.



Office Overview

In addition to energy efficiency, green design also involves the indoor environment. HKT's redesign includes low emitting materials, operable windows, maximized day lighting with 90% of building employees with views to the outside (the remaining 10% have 'borrowed' light), as well as CO2 monitoring as part of the indoor air quality protection plan.



Ticket Window

The Traffic and Parking Department is one of the most frequently visited departments in the City. Residents will visit the Annex to pay their parking tickets, apply for and renew parking permits, reserve moving spaces, etc.

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