CASE STUDY 1

Philadelphia, Pennsylvania

By SARA HART

A Gallery in a Garden, A Garden in a Gallery

At its new LEED Platinum campus in downtown Philadelphia, the Barnes Foundation continues its mission of art and education.

A translucent light canopy cantilevers over a terrace. The limestone rainscreen is attached to the gallery building (at right) and a pavilion wing (at left).

The Barnes Foundation, established by physician, chemist, and art collector Albert C. Barnes in 1922, houses one of America's premier collections of Post-Impressionist and early Modern art. After nine decades in a Paul Philippe Cret–designed museum in Merion, Pennsylvania, the collection was relocated to a new campus in downtown Philadelphia. (The Barnes Merion campus remains home to an arboretum and a horticulture program.)

The decision to relocate the museum from its original home was highly controversial. The museum's charter prohibited moving the collection, and though the plan was eventually approved by court order, the decision is debated to this day. Still, Merion's loss is Philadelphia's gain. In its new location near the Rodin Museum and the Philadelphia Museum of Art, the Barnes Foundation greatly enhances the city's growing cultural center.

Designed by New York–based Tod Williams Billie Tsien Architects (TWBTA) and completed in 2012, the two-story building and below-grade level are crowned by a rooftop "light box." The tripartite parti consists of a gallery housing the collection, an L-shaped support building, and a grand interior courtyard separating the two structures. The 12,000-square-foot series of galleries replicate the scale, proportion, and configuration of the original Merion spaces, per the court's mandate.

The support building provides space for the foundation's art-education programs, as well as facilities for conservation and temporary exhibitions, a gift shop, and café. The gallery building includes a classroom on each floor, an internal garden, and state-of-the-art lighting. The light box, running the length of the building and cantilevering over a terrace, casts daylight into the serene central interior court below and allows borrowed light into some of the galleries through court-facing windows. At night, it is transformed into an iconic beacon for the new museum.

The Barnes is LEED Platinum certified, the first institution of its kind to be so designated. It is also on track to receive a significant rebate from energy company Peco's Smart Construction Incentives Program to encourage customers to use energy-efficient construction methods and products.

The museum was designed to exceed the performance of the 2007 version of the

1

MICHAEL MORAN/OTTO

>TEAM

ARCHITECT Tod Williams Billie Tsien Architects (architect of record); Ballinger Architects and Engineers (associate)
Client The Barnes Foundation
Engineers Severud Associates (structural); Hunt (civil); Altieri Sebor and Wieber (consulting)
Consultants The OLIN Studio (landscape); Fisher Marantz Stone (lighting); Acoustic Dimensions (acoustics and audio/visual)
General contractor L.F. Driscoll
Commissioning agent Facility Dynamics

>KEY PARAMETERS

LOCATION Philadelphia, PA (Schuylkill River confluence with Delaware River)
Gross area 93,000 ft² (8,639 m²)
Cost $150 million
Date completed May 2012
Annual purchased energy use (based on utility bills) 130 kBtu/ft² (1,470 MJ/m²)
Annual carbon footprint (predicted) 35 lbs CO_2/ft² (170 kg CO_2/m²)
Program Museum

>SOURCES

Doors Curries/Assa Abloy; Total Door (metal); Harring Doors (wood)
Acoustical ceilings Tectum; Baswaphon Acoustic Plaster
Wall coverings Libeco-Lagae; Melfabco
Solid surfacing LG Hi-Macs
Flooring Brazilian Ipe (from the Coney Island boardwalk)
Carpet Miliken Carpet; Bloomsburg Carpet/TUVA Looms
Office furniture Knoll AutoStrada and Dividends
Lighting Artemide (task); Bega; Cooper Lighting (exterior)
Elevators Kone
BMS Siemens
PVs Sharp

2

3

1 OLIN's pools and a stone crossing ease the transition from the street to the main entrance.

2 The lower-level library looks into an enclosed garden.

3 In the re-created galleries, the architects tweaked the details of the original design, stripping the moldings and door frames of some decorative detail.

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2

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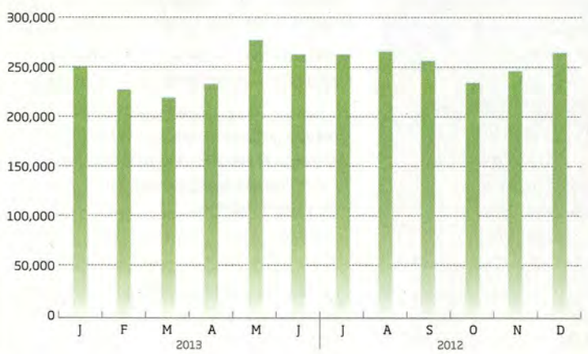
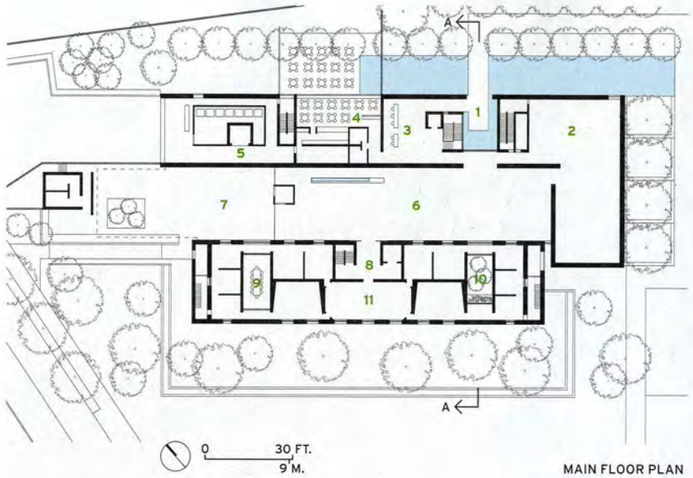
ELECTRICITY 2012-2013
kWh



1 The light canopy shelters a planted terrace and provides protection and illumination.

2 At the west end, the canopy cantilevers 60 feet over the terrace.

3 The architects used light-colored wood, streamlined details, and simple floor patterns in the collection galleries.



MAIN FLOOR PLAN

LEED FOR NEW CONSTRUCTION
2009 PLATINUM

		POINTS/POINTS POSSIBLE
SS: SITES		23/26
WE: WATER		10/10
EA: ENERGY		24/35
MR: MATERIALS		7/14
EQ: INDOORS		12/15
ID: INNOVATION		3/6
RP: REGIONAL PRIORITY		4/4

FLOOR PLAN
1 Entrance
2 Exhibition
3 Lobby
4 Café
5 Support
6 Light court
7 Terrace
8 Gallery foyer
9 Classroom
10 Gallery garden
11 Gallery

SECTION
1 Entrance
2 Light court
3 Light canopy
4 Gallery garden
5 Education lobby

SECTION A-A

energy standard ASHRAE 90.1 by 43 percent. The energy-saving strategies include ventilation-air heat recovery, demand-controlled ventilation, rooftop solar panels, a highly insulated envelope, deep exterior overhangs, and other shading devices.

At the Barnes, the exterior walls have a limestone rainscreen with bronze fins and stainless-steel reveals, rigid insulation with an adhered air-and-vapor barrier, and a grout-filled block wall. The whole assembly, including a plywood and sheetrock interior stud wall, is as thick as 40 inches in some locations. The windows are set back from the limestone skin—a detail that helps limit direct-sunlight penetration and emphasizes the facade's "beefiness" and "heft," giving the building a sense of permanence, said TWBTA senior associate Philip Ryan.

The landscape architect OLIN designed the site to capture the original spirit of the Merion campus while responding to the new urban context. The outdoor spaces include a terrace sheltered by the light box and a garden replete with plantings characteristic of the original Merion garden. Allées of London plane trees and reflecting pools line the approach to the site. A number of elements, including an underground cistern to capture stormwater runoff for irrigation, contribute to the project's LEED certification.

Besides electricity for lighting, cooling, and food service, steam is used for heating and humidity control. A year after opening, data shows that electricity consumption is almost double what was modeled. According to the museum, the extra consumption reflects how popular the facility has become: instead of operating from 9:00 a.m. to 6:00 p.m., as modeled, it's often open late and hosts many catered events. The caterers typically use portable kitchens onsite, which draw electricity from the museum's meter—one unexpected load. Some of the unanticipated energy use can probably be corrected through smart management. For example, a spokesperson said the museum plans to install an energy-efficient kitchen.

After the project's completion, the commissioning agent, Facility Dynamics, found that most systems performed as designed. Occupancy sensors for the lighting system, however, did not have the capability to also work with some air handling units, as they were expected to. Philip Engers, one of the firm's project engineers, does not characterize this as serious enough to cause a significant bump in energy use.

Regardless of these issues, the Barnes is a stunning example of the integration of sustainable strategies and exemplary architectural design. GS