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## Careful Conservancy

by Lauri Puchall

The Trustees of Reservations, one of the oldest land conservancies in the United States, is in the business of improving and preserving scenic landscapes in Massachusetts. When it came time to design an administrative center, the largest capital project in its 113-year history, the statewide nonprofit organization took pains to apply its own tenets of environmental stewardship.

Given a large site and the conflicting directives of conservation and construction, [HKT Architects Inc.](#) broke up the massing of the Doyle Conservation Center to create what appears as a cluster of outbuildings auxiliary to a stunning natural setting in the town of Leominster.

From the approach, one spies a red New England saltbox cottage. "Turn the corner ... [and] the articulation is quite modern, although the forms are traditional," says Jim Younger, director of structural resources for [The Trustees of Reservations](#). HKT's 18,000-square-foot (1,700-square-meter) addition was completed in 2004.

### Practicing What's Preached

What one cannot readily discern is that the new building consumes fewer resources and sits more lightly on the land than its conventional counterparts. Some of its high-performance technology, like the geothermal well, has been around for decades, but is only recently gaining acceptance in the United States. Many of the features that allow the building to leave a miniscule environmental footprint are



*The Doyle Conservation Center in Leominster, Massachusetts, by HKT Architects Inc., is a model for construction that protects the land.  
Photo: Dan Gair/ Blind Dog Photo, Inc.*

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literally buried below the surface and require ongoing management to keep them operating smoothly.

The trustees and their 22 employees have deemed the new Doyle Conservation Center a success. Others agree. According to Younger, Leominster Mayor Dean Mazzone commented at the opening ceremony on the overwhelming sense of calm one feels when inhabiting the new space.

While the trustees had not originally planned to rent out the facility, it is in high demand by local groups. "Most of the events are not our own," explains Younger. Other land conservancies send groups to the center for training and seminars as well. >>>

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*Upper floor open offices with mechanically operated clerestory windows.*

*Photo: Dan Gair/ Blind Dog Photo, Inc.*

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### Careful Conservancy

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Ensuring minimal environmental impact was essential for an organization whose mission it is to protect open space from encroachment. According to the Trustees of Reservations' Web site: "Already, more than twice as much land in Massachusetts has been developed in the last 50 years than in the previous 300 years combined. And each day, 44 acres (18 hectares) of open space is developed. That's the equivalent of paving over the Boston Common every 12 hours."

When an anonymous \$5 million donation provided the opportunity for the trustees to revamp their statewide programs and offices and to help coordinate efforts among smaller New England land conservancies, they began planning this new center. A smaller grant from the [Massachusetts Technology Collaborative](#) covered the cost of the solar panels.

#### Landscaping the Center

The trustees opted to build on the least forested portion of the 50-acre (20-hectare) property adjacent to the existing neocolonial (circa 1980s) grouping that includes offices, a workshop, and garage. The land was already partially cleared and developed as a maintenance area. An onsite stump grinder converted the few young trees they sacrificed into mulch for roadway covering. Lampposts were milled locally from red pine grown nearby. Landscaped courtyards link the existing grouping with the new addition.

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*Main entry to the Doyle Conservation Center.  
Photo: Dan Gair/ Blind Dog Photo, Inc.*



*The Doyle Conservation Center in Leominster,*

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Adjacent to the Doyle Conservation Center, a meadow of native grasses demonstrates a sustainable alternative to traditional lawns. Like the rest of the landscaping by Hines Wasser and Associates of Brookline, Massachusetts, no irrigation is required.

The contractor built a wall from old fieldstones set aside at the time farmers cleared the land for farmsteads. The stone wall establishes a border between formal and wild landscapes and delineates the approach to the building. Visitors leave their cars, walk along the wall, and traverse a footbridge that spans the first of two retention ponds.

Bioswales "control runoff on the site," says Eric Kluz, principal of HKT, and "prevent the water from flooding the streams." The ponds collect roof and runoff rainwater in a granite weir, cleaning the stormwater by allowing sediment to settle out before the water goes back into the wetlands. The ponds themselves are seeded with native wetland plants.

### Conservation Within

As compensation for the necessity of taking from the land in order to build on it, the Doyle Conservation Center uses geothermal wells, photovoltaic cells, and composting toilets. Additional energy-saving elements exist throughout the building, such as passive solar heating, daylighting, tight construction (including triple-glazed windows), cross-ventilation, and windows that automatically open on the hottest days.

Employees work at desks made from Dakota burl: panels made of sunflower hulls and soy-based glue. The contractor recycled over 50 percent of the construction scraps and debris. To ensure high indoor air quality, the architects selected low-VOC paints, adhesives, and other interior finishes, such as recycled wall fabric and cork flooring.

An interpretive "green" guide to the architecture showcases these design features and provides public education on environmentally sensitive construction.

The composting toilets look similar to ordinary toilets but use 80 percent less water. Biodegradable soap foam clears the basin with each flush. According to Younger, "one would need to flush the toilet 65 times to equal one flush of an ordinary toilet." Lift the lid and you find a one-pint (half-liter) water tank and a foam reservoir the size of a small bottle of "Wite-Out" correction fluid.

*Massachusetts, by HKT Architects Inc. Rear courtyard and walkway linking to existing building. Photo: Dan Gair/ Blind Dog Photo, Inc.*



*Blurring boundaries between inside and out. Photo: Dan Gair/ Blind Dog Photo, Inc.*



*Building section through below-grade mechanical room, offices, lobby, and auditorium. Image: HKT Architects Inc.*

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Composting tanks in the basement contain and biodegrade the waste, reducing its overall volume. The six toilets produce only a wheelbarrow full of compost every three or four years.

Also below grade, an enthalpy wheel or energy recovery system heats and conditions the air in conjunction with a 1500-foot- (460-meter-) deep geothermal well system that maintains water at a constant 52 degrees Fahrenheit (11 degrees Centigrade). According to Younger, there is no on-site storage of fossil fuel. One quarter of the building's electricity is supplied by photovoltaic cells mounted on the roof.

Compared to the mechanical room equipment in an ordinary building, the green technology requires less space. The basement also houses an on-site recycling center.

### **Tapping Energy from Below**

Geothermal wells are still relatively experimental in the United States, particularly for a building smaller than a high rise, explains Kluz. The hardest part of building commissioning was learning to service the heat pumps throughout the building with water from the geothermal wells. "We were drawing the water out of the well too quickly before it had time to replenish itself," Kluz admits.

Now that the system is fully operational, there are various controls to monitor as each of the 15 to 20 heat pumps is modulated separately. A facilities manager oversees the automation system remotely and receives e-mailed notices when adjustments are required.

The initial cost of specialized training, beyond that of the geothermal well system itself, and the ongoing costs of day-to-day operations necessitate unusual "hands-on" attention for a building of this size.

To underscore the exceptional organizational commitment that allows the Doyle Conservation Center Doyle to be on the leading edge of ecological architecture, Younger remarks, "We have been green since 1891."

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*Site plan showing the approach, field stone wall, and retention ponds.  
Image: Hines Wasser & Associates LLC.*



*Daylit meeting room.  
Photo: Dan Gair/ Blind Dog Photo, Inc.*



[Lauri Puchall](#) writes about architecture and the environment from the San Francisco Bay Area



Doyle Center auditorium with view to the surrounding landscape.  
Photo: Dan Gair/ Blind Dog Photo, Inc.



Doyle Center entrance lobby.  
Photo: Dan Gair/ Blind Dog Photo, Inc.

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