MOMENTUM

Mueller

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The design of the Thomas Jefferson Visitor Center and Smith Education Center at Monticello features a closed-loop geothermal system and several water- and energy-conserving measures. Monticello is the only home in the U.S. on UNESCO's World Heritage list.

VISITOR CENTER OPENS AT MONTICELLO

Hillside Village "Sits Lightly on the Land"

Photo courtesy of Thomas Jefferson Foundation/Mary Porter

Photo courtesy of Thomas Jefferson Foundation/Leonard Phillips

After several years of careful planning and a meticulous design phase reflecting the highest standards in sustainable ingenuity, the Thomas Jefferson Foundation is celebrating the opening of the new Thomas Jefferson Visitor Center and Smith Education Center. The center is located at Monticello, Jefferson's mountaintop home near Charlottesville, Virginia.

Foundation goals included minimizing the impact of the 42,000-square-foot center on the historic site and providing an educational and inspiring "gateway" experience for visitors as they arrive to tour one of the country's most famous residences. The incorporation of state-of-the-art, environmentally friendly design concepts was a further challenge to the architectural and engineering team, led by Baltimore-based Ayers/Saint/Gross. Mueller Associates provided mechanical/electrical engineering for the project, which is designed to LEED®-Gold certification standards.

The new complex is composed of five pavilions constructed on a sloping, hillside site around a central courtyard. The three-level structures house four major exhibitions, a small theater, a gift shop, cafe, classrooms, and the new Griffin Discovery Room—an interactive environment in which children can explore Jefferson's life and achievements with hands-on activities that include reproductions from the home and plantation.

Embracing Technology

Although traditional geothermal heat pump systems are not frequently used in museum settings—where temperature and humidity control is paramount—the team employed a highly efficient geothermal chiller/heater system at Monticello. "The foundation members felt that geothermal technology was something that Jefferson would have embraced," says Todd Garing, PE, project manager for Mueller. "It's innovative yet organic in that it optimizes use of the land." Garing points out that a geothermal system provides the energy efficiency of a chilled water system but eliminates the need for a cooling tower or condensers that require screening. "There is no exterior equipment here, and that is an important consideration for an historic site, in terms of both noise and sightlines."

In order to install the system, contractors had to drill 72 bore holes down through 500 feet of granite—a challenging process that took approximately six weeks. "This is a unique well field site, but it offers an advantage in terms of heat extraction," says Garing. "We were able to backfill with the local river stone rather than grout. The pipes are essentially set in water that is moving through the aquifers, and that provides a much more efficient heat transfer."

Conserving Resources

The Mueller team also worked closely with Ayers/Saint/Gross on a number of other sustainable design aspects, including optimization of the building envelope, wall insulation, use of high-performance glass and external shading, and the incorporation of three green roofs. Additional measures include use of water-conserving fixtures and an on-site wastewater treatment

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plant that feeds a drip irrigation field.

The geothermal chiller/heater system also saves a significant amount of water in comparison to the use of a water-cooled chiller. "The closed-loop geothermal system requires minimal water make-up," says Garing, "so that element alone represents a savings of approximately 850,000 gallons of water a year."

Many of the electrical design elements are designed to conserve power while providing optimum comfort to visitors and staff. Features include central lighting controls with occupancy sensors and the introduction of minimal site lighting in order to reduce light pollution and energy use.

"The design of the new center supports the foundation's mission of education and preservation," says Sandra Parsons Vicchio, AIA, LEED AP, project director for Ayers/Saint/Gross. "Our team was able to develop a design that does not compete with the mountaintop home, yet provides the classroom, exhibit, and support space that will help to create a first-class visitor experience.

"The mechanical system for this project is a crucial part of the LEED-certification process," Vicchio adds. "More importantly, working in the shadow of Jefferson's home demands that the system be carefully integrated into the architecture of the new center. Mueller's experience with museums and historic settings was important to us in designing this highly visible project."

The new visitor center at the Nemours Mansion and Gardens in Delaware recently earned recognition in the Baltimore AIA's design awards program.

NEMOURS VISITOR CENTER CELEBRATES LANDSCAPE

Addition to Historic Estate Preserves Garden Views

As part of a major restoration of Delaware's most famous residence, the Nemours Foundation recently opened a new visitor center on the grounds of the Nemours Mansion and Gardens in Wilmington. Mueller Associates supported Ayers/Saint/Gross on the design of the building, which features exhibits about the history of the property and its original owner, Alfred I. duPont, as well as his family.

Built in 1910, the Nemours Mansion was designed in a French neoclassical style by renowned architects Carerre and Hastings. Inspired by the Petit Trianon at Versailles, the mansion is surrounded by lush gardens, ponds, statues, and a reflecting pool. The 5,000-square-foot visitor center, which includes ticketing, a small auditorium, and exhibition space, provides an introduction to the estate and leads to the home's formal entrance.

The center, which is linear in form, is clad in fieldstone and wood with large expanses of glass to optimize views of the gardens. "Our goal was to create a place that would put the story of the duPonts and Nemours into context," says Sandra Parsons Vicchio, AIA, LEED AP, principal-in-charge for Ayers/Saint/Gross. "This was accomplished through a progression of exhibits and film. We wanted to welcome visitors and maintain sweeping views to the beautiful gardens, which are an important aspect of the broader experience."

Todd Garing, PE, project manager for Mueller, notes that while the extensive use of glass was somewhat unusual in a museum exhibition hall, the engineering team collaborated with Ayers/Saint/Gross to devise energy-efficient measures that would maintain comfortable temperature control. The design features finned-tube radiant heat and energy-efficient heat pumps with multiple stages of controls to address varying load levels. Ayers/Saint/Gross also incorporated a series of energy-saving building envelope features including exterior solar shades, high-performance glazing, and a structural insulated panel roof system.

"The center features very high-end finishes, and it was a challenge to incorporate the systems and conceal all of the components," says Garing. "We needed to heat, cool, light, and sprinkler the space in an unobtrusive way, but in a way that was effective and efficient. This is a building that required close integration of the architecture and the engineering design, and an appreciation for the architects' vision."

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