News Release

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All Taxa Biodiversity Inventory Scientists Get New, Sustainable Building to Facilitate Research Efforts

Twin Creeks Science and Education Center to be National Park Service's first LEED building in the Southeast and a model for other NPS sites

GREAT SMOKY MOUNTAINS NATIONAL PARK, Tenn., Nov. 26, 2007 – For nearly a decade, scientists in the Great Smoky Mountains National Park were working in less than optimum conditions on the All Taxa Biodiversity Inventory (ATBI), a project that is documenting the 800-square-mile Park's estimated 100,000 species of living organisms.

Now these park scientists have moved their work to a new 15,000-square-foot, site-sensitive, sustainable building that will facilitate their research efforts. Designed by the architecture firm Lord, Aeck & Sargent, the new Twin Creeks Science and Education Center will help scientists gain the knowledge that is essential for the effective protection and preservation of the Park's ecosystem.

Targeting LEED Silver certification from the U.S. Green Building Council, the $4.4 million Twin Creeks facility, which will become the National Park Service's (NPS) first LEED building in

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the southeastern United States, responds to a variety of challenges and constraints placed on the architects.

"We were concerned that the facility not disturb the nearby resources, which include two trout streams, forestland, archaeological sites, and a collection of historic buildings where the park scientists have been working under makeshift conditions until now," said Dianne Flaugh, a National Park Service landscape architect who worked closely with the Lord, Aeck & Sargent team from site selection through construction.

"We also wanted an environmentally appropriate LEED building that would harmonize with its mountainous surroundings and become a model for other Park Service resource-based facilities," Flaugh continued. "Lord, Aeck & Sargent responded to our challenges and constraints, creating a beautiful building that fits into the site without disturbing the surrounding areas."

The Twin Creeks Science and Education Center is located about two miles from and 1,000 feet above Gatlinburg, Tennessee. Sited on a relatively flat spur along a scenic mountain trail, the building speaks to a mountain cabin aesthetic. Featuring five gabled dormers that introduce natural light through clerestory windows, it is clad in regional river stone around the base, with cedar wood and generous amounts of glass above. Covered porches at each of the two entryways serve as an extra gathering and work space.

But beyond the beauty of the building and its natural surroundings lie several important sustainable design strategies that will help Twin Creeks Science and Education Center use significantly less energy and water than a conventional facility of the same size.

High-efficiency lighting, natural ventilation and thermal envelope drive energy savings

To help achieve the NPS' energy savings goal, Lord, Aeck & Sargent partnered with the Rocky Mountain Institute (RMI) Built Environment Team to conduct an integrated daylight

harvesting design analysis. Jim Nicolow, AIA, LEEP AP, a Lord, Aeck & Sargent senior associate who leads the firm's Sustainability Initiative, said that the analysis with the RMI Built Environment Team had a major impact on the building's overall form.

"As a result of our daylighting analysis with the RMI Built Environment Team, we were able to optimize Twin Creeks' use of natural daylight and reduce the requirements for artificial lighting," Nicolow said. "We designed a high central bay with gabled dormers and clerestory windows to reduce dependency on artificial lighting."

Nicolow explained that the building is fitted with high-efficiency automatic lighting controls for daylight harvesting. Photo cells drive artificial lighting, and occupancy lighting controls ensure that artificial lighting will turn off in an area when no one is there. With the exception of curatorial, field storage, wet laboratory and mechanical spaces, the entire building is daylit. "The LEED requirements for daylight and views were met and exceeded," Nicolow said.

Lord, Aeck & Sargent employed natural ventilation as another energy efficiency strategy. "The Park has seasons where it makes perfect sense to rely on natural ventilation, so we designed an energy management system (EMS) that initiates an economizer cycle for the heating and ventilation system, exhausting hot air out and cycling outside air in," said Meg Needle, AIA, LEED AP, a Lord, Aeck & Sargent associate who served as Twin Creeks project manager.

Needle explained that the EMS controls operable clerestory windows, allowing them to open automatically when temperature and humidity conditions are appropriate and to close automatically when outside conditions are no longer suitable for building conditioning, at which point the EMS demands heating or cooling from the HVAC system. She also noted that offices have operable casement windows and individual HVAC temperature sensors so that occupants can bring in the fresh forest air when they want to.

In addition to daylighting and natural ventilation strategies, the design team achieved energy savings with a thermal envelope consisting of high-efficiency wood windows throughout the building and R-30 roof insulation, including manufactured structural insulated panel decking over the central vaulted ceiling space.

Natural storm water management protects water quality

Recognizing that the Park's ecosystems are under stress, Lord, Aeck & Sargent was tasked with protecting the water quality of the two nearby trout streams from which the Twin Creeks name derives. The design team responded by creating a natural storm water management and treatment system to ensure that post-construction storm water conditions would be similar to those before the building existed.

"We designed a cascading storm water system off the front of the building. Rather than being piped to a storm sewer, the rainwater that falls off the roof is diverted down into a planter zone," Nicolow said. "It's created by a stone-clad retaining wall and has a series of scuppers, so once the planter is saturated, the water falls over into a swale created by the salvaged boulder embankment. It's then channeled into three cascading water quality ponds designed to encourage infiltration and improve water quality. Pervious paving further reduces storm water runoff."

Other environmentally responsible design strategies

The Twin Creeks facility makes use of salvaged and natural building materials. For example, boulders disturbed on the site were harvested and used for slope stabilization around the banks of the three-pond natural storm water treatment system and around the building's pervious parking lot. Instead of going to a landfill, downed trees were ground and used on site for mulch, erosion control and habitat creation. Twelve salvaged cedar columns run down the structure's

central space on two sides of the building, and high recycled content gypsum board was specified and used to finish walls throughout the building.

Inside, the building makes use of waterless urinals; low-flow automated water faucets with mini hydroelectric rechargers; low-emitting paint, adhesives and sealants; and low-emitting carpet.

What's housed inside

While the Twin Creeks Science and Education Center's largest space is the high-bay flexible workspace where park scientists will do most of their research, the building also includes a smaller wet lab; a rearing room for cultivating and studying species collected throughout the Park; curatorial space for specimen archives; a high-tech GIS (geographic information system) mapping room; a classroom/conference room; offices; and a storage room for the scientists' field equipment.

The Project Team

The Twin Creeks Science and Education Center project team includes:

- Lord, Aeck & Sargent (Atlanta), architect, LEED certification administration, final energy modeling
- Newcomb & Boyd (Atlanta), MEP/FP engineer
- Barge, Waggoner Sumner & Cannon (Knoxville, Tenn.), civil engineer
- Palmer Engineering (Atlanta), structural engineer
- Rocky Mountain Institute Built Environment Team (formerly the ENSAR Group) (Snowmass, Colo.), daylighting and energy optimization consultant
- Enermodal Engineering (Denver), preliminary energy modeling
- Clanton Associates (Boulder, Colo.), lighting design
- Hedges Construction (Atlanta), general contractor

About Lord, Aeck & Sargent

Lord, Aeck & Sargent is an award-winning architectural firm serving clients in scientific, academic, historic preservation, arts and cultural, and multi-family housing and mixed-use markets. The firm's core values are responsive design, technological expertise and exceptional

service. In 2003, The Construction Specifications Institute awarded Lord, Aeck & Sargent its Environmental Sensitivity Award for showing exceptional devotion to the use of sustainable and environmentally friendly materials, and for striving to create functional, sensitive and healthy buildings for clients. In 2007, Lord, Aeck & Sargent was one of the first architecture firms to adopt The 2030 Challenge, an initiative whose ultimate goal is the design of carbon-neutral buildings, or buildings that use no fossil-fuel greenhouse gas-emitting energy to operate, by the year 2030. Lord, Aeck & Sargent has offices in Ann Arbor, Michigan; Atlanta; and Chapel Hill, North Carolina. For more information, visit the firm at www.lordaecksargent.com.

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[1] The LEED (Leadership in Energy and Environmental Design) Green Building Rating System™ is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. The standard was developed by the U.S. Green Building Council, which is the nation's foremost coalition of leaders from across the building industry working to promote buildings that are environmentally responsible, profitable and healthy places to live and work.