APA CASE STUDY

Wood-framed Environmental Nature Center Inspires Sustainable Design

"Real sustainability is not about a score card," says Dan Heinfeld, FAIA, LEED AP, President of LPA Inc. This belief guided the creation of the new home of the Environmental Nature Center (ENC), a LEED Platinum certified building that, according to Heinfeld, "wears its DNA" by displaying its structure rather than disguising it behind additive materials. Although LEED certification points are not awarded for minimizing dropped ceilings or carpet, the design team took a more truth-seeking approach to sustainable design. The resulting exposed wood-roof structure on a poured-concrete slab has a stark beauty and minimal carbon footprint that elevates this environmental teaching facility into something beyond a building of classrooms and public spaces. The building itself now serves as an educational tool showcasing the benefits of environmentally-conscious design.

For more than 35 years, the ENC has provided quality education to the public through hands-on experiences with nature. Its 3.5 acre campus features a diverse combination of 15 California native plant communities. Until 2008, the non-profit organization functioned out of an onsite trailer. Creating a new home for the ENC that complemented the organization's mission was essential for the design team. Key considerations included optimized site orientation to minimize disturbance of the natural landscape, programming, budget, and the client's desire for LEED certification. The building, completed in June 2008, exceeds these expectations.

Built in the same location as the original trailer, the ENC's new home is a 8,500 square foot, mixed-use building containing administration offices, classrooms, a museum and a gift shop. The structure was constructed per the 2001 California Building Code (based on the 1997 Uniform Building Code) and is classified as a Type 5N, fully sprinkled, mixed occupancy A-3/B building. The primarily glass-faced north side of the building optimizes the use of natural ventilation provided by coastal breezes. A main building that houses public areas is separated from the administrative offices by a breezeway.

Budget considerations were a factor in many of the building's design features. An exposed structure, for example,

Project Summary

PROJECT
Environmental Nature Center

LOCATION
Newport Beach, California

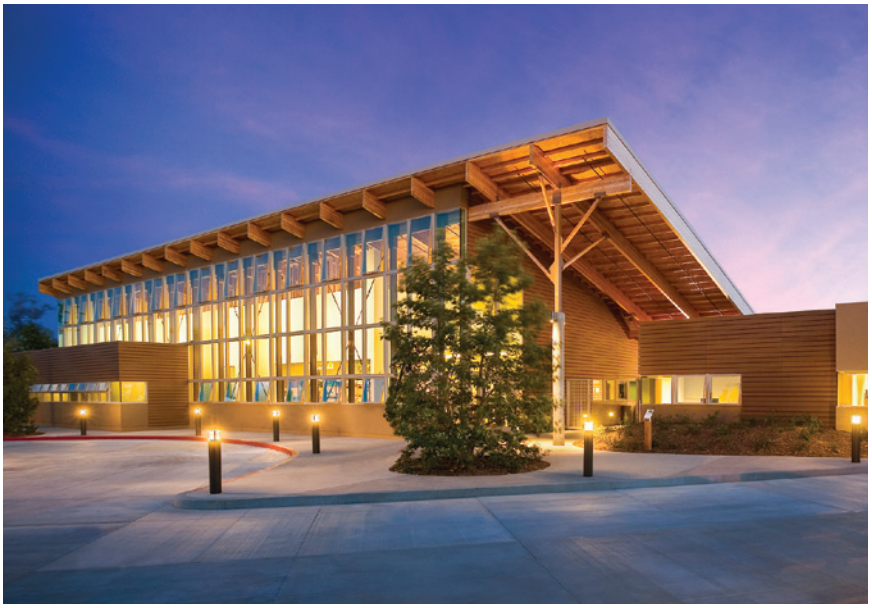
OWNER
ENC

ARCHITECT
LPA Inc.

ENGINEER
Culp & Tanner
Structural Engineers

GENERAL CONTRACTOR
Gentosi Builders, Inc.

COMPLETION DATE
June 2008



PHOTOGRAPH BY COSTEA PHOTOGRAPHY, INC.

In addition to housing classrooms and educational spaces, the new home of the Environmental Nature Center is itself an educational tool.

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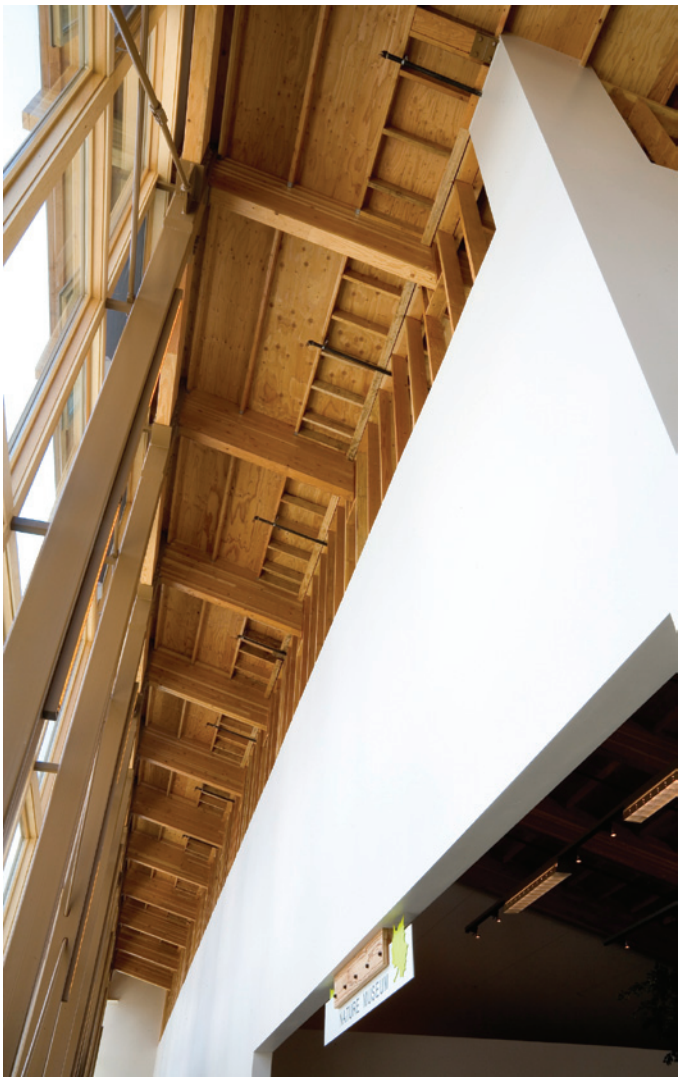
reduced the need for traditional interior finishes, such as carpet and dropped ceilings. This not only kept initial costs lower, but also minimizes ongoing interior maintenance costs. Projected maintenance costs were also significant in the decision to use wood framing (as opposed to steel, given the close proximity to the ocean) as well as Trek Wood Siding and integral colored plaster on the exterior walls. Conventional wood framing also reduced costs because construction did not require specially-trained workers or unique equipment.

The ENC's main building uses 1/2-inch Structural 1 APA Rated exposed plywood roof sheathing, supported by 2x6 Douglas-fir subpurlins at 24 inches on center, and 5-1/8 inch x 25-1/2 inch glulam purlins. The eastern, western, and southern walls are framed with 6-inch wood studs supported by plywood shear walls to resist lateral forces. The northern face of the building uses ordinary braced frames with steel tension-only rods to maximize natural light and ventilation. The administrative building includes wood shear walls for the lateral system and exposed I-joist roof framing for the gravity system. Wood was selected as the main structural building material primarily because of its sustainability (wood is bio-based and renewable). In terms of aesthetics, wood adds warmth and quality to the building.

The sustainable features of the building, now a highlight of the ENC's programming, are identified in educational signage placed throughout the structure. One exhibit, for example, reveals the recycled denim insulation within the walls. The building's LEED Platinum status, the highest level of LEED certification and a first in Orange County, California, is also on display. LEED (Leadership in Energy and Environmental Design) certification is a third-party rating system led by the U.S. Green Building Council. Receiving 55 out of 69 possible points towards LEED certification, the design team met or exceeded standards in six LEED categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation and design process.



PHOTOGRAPH BY COSTEA PHOTOGRAPHY, INC.

An exposed roof and open studs above a partial-height wall maximizes natural light and ventilation.

Key elements in the environmentally-conscious design include: optimizing site orientation to maximize light and ventilation; implementing a photovoltaic array on the roof to create on-site renewable energy; minimizing the building's use of potable water; wall insulation comprised of 85 percent recycled denim jeans and 15 percent cotton fibers that are rapidly renewable resources; a rainwater collection system; the lack of additive materials (made possible by the exposed structure); rain-screen wall detailing (a double-layer wall that aids drainage, preventing moisture accumulation within the wall cavity); and the superior life cycle assessment performance of wood framing.

LPA has been "designing green buildings since before it was cool to do so," said Heinfeld, including more than 35 LEED certified projects. In designing the ENC, they took a "less is more" approach: they looked at the building globally, assessed the client's desires, and created a sustainable building that was cost effective and built conventionally. "This method yields a sustainable building without chasing points," finishes Heinfeld. A building, the ENC hopes, will inspire and teach visitors to implement sustainable design features in their own homes and businesses.

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