

Warren Skaaren Environmental Learning Center at Westcave Preserve

Westcave Preserve is a natural treasure of the Texas Hill Country, possessing unique and majestic beauty and ecological diversity. Located adjacent to the Pedernales River about 40 miles from downtown Austin, this 30-acre gem offers an array of natural science and interdisciplinary educational programs for children and adults from Austin and surrounding communities.

Two distinct ecosystems meet on the Preserve, forming a unique opportunity for visitors. The Preserve's grasslands are scattered with wildflower meadows, ash junipers, oaks and cactus bordering a sheltered limestone canyon punctuated with rare plants and cypress trees. The highlight of the site is its 40-foot waterfall backed by caves, tumbling over fern-covered travertine columns into an emerald pool.

The challenge for the architects was to create a learning center, sensitive to the delicate ecological balance at the site, while meeting the educational needs of visitors. Sited in an existing clearing near the preserve entrance, the building functions as a gateway, both welcoming visitors and restricting access to the trails beyond. The plan and massing of the building were adjusted to align with the earth's axis and to require minimal disruption of the existing vegetation. The project successfully uses one space to connect many integrated exhibits (covering a range of subjects including: geology, hydrology, meteorology, energy, local plant and animal communities, cycles of nature, orientation, math and local culture, history and archeology), reinforcing the overall theme of the interconnectedness of the natural world. For educational as well as ecological reasons, materials and systems utilize sustainable elements where possible.

The essence of this project is to use the 'green' elements of the building as educational tools, to instruct students on the basic four, non-living parts of our world: earth, water, air and energy. The building 'exhibits' by example, thus freeing up interior space for multiple/flexible use.

The resultant Warren Skaaren Environmental Learning Center at Westcave Preserve design employs a multi-purpose, continuous space that aligns with the north-south axis of the earth. Doors centered on each façade open out, extending the classroom space outdoors so that visitors can further interact with nature. The precise orientation of the building allowed for the installation of a meridian line and solar calendar in the center of the building. A small aperture in the ceiling allows a sunspot to be projected on the floor. Visitors can track the movement of the sun across the sky and understand the relationship between sun and earth at different times of the day and year.

Design Philosophy

Summarized by Albert Good in his Apologia to the 3 part book *Park and Recreation Structures* in 1938:

“When [the park planner] concluded that only the most persistent demands for a facility should trap him into playing the part of the jester, he established a principal that remains paramount today for such areas—to build only structures which are undeniably essential, and to know that he is not equipped to embellish, but only to mar, Nature's better canvases. Now and forever, the degree of his success within such areas will be measurable by the yardstick of his self-restraint.”

We believe this humble and appropriate approach to the architectural forms, combined with the best sustainable techniques available, best expresses our design intent at the Warren Skaaren Environmental Learning Center.

Program

The Warren Skaaren Environmental Learning Center was designed to be flexible in order to accommodate large school groups of 150 students simultaneously with smaller visitor groups of one to 10 people and to serve as a community center. The building had to be an efficient classroom which provides standard teaching tools such as computers, projection screens, marker boards, tack boards, exhibit walls, while making the space feel like it is part of the outdoors and open to the surrounding preserve. The building creates an awareness and understanding of the basic environmental systems that we live within. The educational challenge of environmental learning is to simplify the complexities of the natural sciences and ecology to these basic components: air quality, water quality, protection of the soil and the conservation of energy.

Sensitive Siting

The Westcave site includes two distinct and adjacent ecosystems. Nature programs at the site focus on the characteristics of the dry, rocky uplands site and the lush riparian canyon with a 40 foot waterfall and towering cypress trees. The building is sited near the boundary between the systems and provides a staging area for trails to view and study upland systems. The building was placed in the only open area on the site and required the loss of only one small juniper tree.

The building's location serves as a gateway to monitor access to the protected preserve trail. All landscape work around the building utilized native plants as a part of a plant exhibit. The original remnant ranch road was retained as the road to the facility. Existing new landscaped areas around the facility are served by the rainwater harvesting system.

Site sustainable design innovations include locating the building in an open area on the site. Location on the site utilizes the existing ranch road and pocket parking amidst trees. Location creates a control 'gateway' to the Preserve trail. North and south ends of the building are near grade for easy accessible circulation and easy connection to the site. The site is also aligned to Earth's rotation (true north) for earth/sun exhibits and for views of trails to the uplands portion of the site and the canyon. The headquarters building is sited for full visual control of the site and proximity to the manager's/director's quarters. Xeriscaping and plant exhibits replaced site construction damage around the building.

Environmental Education:

One of the primary objectives of the Warren Skaaren Environmental Learning Center at Westcave Preserve was to create an awareness and understanding of the basic environmental systems that we live within. Most of us are ignorant of the basic relationships between ourselves and our environment. Awareness of the basic systems of our world is not taught thoroughly in schools. To this end, we wanted the sustainable elements of the building to teach lessons on the conservation and protection of the environment, water quality and cycles, air quality and cycles, soil and geography of the site, conservation of energy, seasonal cycles, and numbers and patterns in nature. The design of the structure was conceived of as a three-dimensional textbook. The architectural expression of the building is a framework for analogies between building materials and systems and how they mimic or model natural systems.

Unique innovations include:

1. **Water:** Water quality and water cycles are demonstrated through the use of a rainwater collection and filtration system. Wetlands and Clivus Multrum (a self-composting restroom) wastewater systems show recycling of materials in nature.
2. **Air:** Natural ventilation, orientation and a weather station illustrate the physics of air currents and air quality at the site. (Ventilation fans, high/low operable windows)
3. **Geology/Earth:** Stone walls illustrate fossils of local sedimentary stones. A panel exhibit shows how the canyon was formed over 250,000 years ago.

4. Energy: Sustainable energy systems such as a photovoltaic array, ground source heat pumps, daylighting, R-30 cellulose insulation, large over hangs, attic fans and efficient lighting are integrated into the building. An interactive panel shows how these sustainable energy systems can be controlled to balance energy demand with incoming “clean” solar power.
5. Seasonal Cycles: Seasonal cycles are illustrated by a meridian line and sky map embedded in the terrazzo floor marking the sun’s motion (correct to atomic time) during the seasons through an aperture in the ceiling.
6. Natures Numbers: Also embedded into the terrazzo floor, this exhibit illustrates the enigmatic relationship between the Fibonacci Series, golden rectangle, logarithmic curve and the form of a 90 million year old ammonite.

Adaptability

Community response to the project has been positive: designed primarily for daytime use as an educational center, the Warren Skaaren Environmental Learning Center has expanded to host additional events. We integrated many exhibits into the physical structure of the building which frees the space for maximum flexibility of use. The simplicity and flexibility of the building has proven that it easily adapts to multiple uses and participants: school children in groups of 150-175 sit on the terrazzo floor in the “classroom” area in the morning; a community group of 30-35 meet in the afternoon around tables to plan the year-end strategy; yet another group of visitors view exhibits in the space; while a fourth group meets informally under the large roof canopy with canyon wrens and the sound of the river rapids below. The elegant simplicity of the building’s form combined with it’s flexible plan and sensitive design is expected to delight and inspire for generations to come.