

Project Owner: Woodland Park Zoo
Architect/ Landscape Architect /Interior Designer: Mithun
Civil Engineer: SvR
Electrical Engineer: Hltz/BHU/Cross
Structural Engineer: Magnusson Klemencic Associates
Contractor: Kirtley-Cole Associates



Zoomazium

THE CASE FOR GREEN BUILDING

"A great zoo experience is a powerful way to help build a lifelong love of nature for kids from all walks of life. If we're going to ask folks to care more about nature, and take actions to save wildlife, we have an obligation to show that we care too. This means Zoomazium had to be built to extremely high ecological standards."

- Dr. Deborah Jensen, Woodland Park Zoo President and CEO

The mission at the heart of The Woodland Park Zoo highlights conservation, education and exceptional animal care. With many of the animal exhibits located outdoors, zoo visitors didn't have many options during inclement weather. Zoomazium, a much-needed play-space, was created to improve the visitor experience. Using a green design approach not only promotes visitor awareness but perfectly aligns with the Zoo values. At the onset, there were several key challenges inherent in designing this sustainable space. Space flexibility was crucial in order to house a variety of different exhibits which provide year-round value for visitors. Reducing operational costs was also a key component that would help re-direct funding to animals and their habitats.

PROCESS/APPROACH

Some of the core values discussed in the goal-setting process included energy conservation, pollution reduction and optimized building performance and comfort. These key elements set up a framework for the entire Zoomazium design process. In order to achieve these goals, extensive research went into site analyses and modeling in order to determine appropriate siting that would best use the wind and sun for a heating/cooling strategy as well as daylighting strategies for energy conservation. Durable materials, easy maintenance and adaptability are essential elements for a building that will be used for more than fifty years. In this case, building adaptability was vital in order to meet new program requirements and uses. Air quality was also a

concern that needed to be addressed. Additionally, there were acoustic challenges to consider. With many visitors engaging with numerous exhibit elements, there was great potential for sound to overwhelm visitors and staff alike. Methods of how to best create the green roof, which would maximize habitat opportunities for birds and insects, were also investigated. And finally, existing foliage around Zoomazium played a vital part of the building design and site relationship, ensuring that the building would compliment the zoo's existing biomes.

PROJECT RESULTS

Ultimately Zoomazium is a space that performs well by creating acoustic comfort and excellent lighting with minimal temperature changes and good air quality – all key elements for successful green building. The interior performance of the building is exceptional on numerous levels. Acoustic challenges were addressed by using dense materials that deliver acoustic comfort for visitors and staff, and the space offers ample flexibility to meet changing exhibit needs. Zoomazium performs well from a lighting and thermal standpoint, with measures including natural cooling and generous daylight harvesting, which reduces energy needs. In addition, the space positively impacts occupant health by utilizing low VOC finishes and no urea-formaldehyde resulting in good air quality.

The completion and integration of the green roof has been successful on many levels; first, the structural layering provides an additional source of buffering that is part of the acoustic solution. Furthermore, the creation of additional habitat is an ecological innovation and finally, the green roof serves as effective storm water management.

The combined educational power of the building interior and the green roof perfectly matches the mission of the Woodland Park Zoo and earned Zoomazium Gold LEED certification, the first for any U.S. zoo project.

MATERIALS & RESOURCES

Sustainable materials were incorporated into the primary structural elements of Zoomazium, most notably the columns and trusses which are made of glu-laminated timber certified by the Forest Stewardship Council (FSC). The FSC serves as a benchmark for sustainable forest practices to enhance wildlife habitats and ecology through better stewardship of timber forests.

Zoomazium was constructed with a wide variety of materials, many of which were factory fabricated to reduce on-site material waste. Given the tight parameters of the construction site, organization and handling of waste and materials was central to the building process. Waste was effectively sorted and recycled, resulting in a 93% diversion of construction waste. Recycled content materials were used wherever possible, including green seal carpeting, recycled glass tile, recycled content steel, recycled content aluminum storefront system, and recycled rubber walk-off mats. High fly-ash content concrete mix was another key product. This mixture uses fly-ash (a waste by-product of burning coal) as a substitution for 40 percent of the typical Portland cement content to reduce the embodied energy of the mix while achieving the desired strength goals.

WATER CONSERVATION:

Extensive research was used to determine which plants would enhance the Northwest forest biome and eliminate the need for permanent irrigation. A variety of sources including the zoo horticultural staff and other soil and plant experts were involved with the decision making process. The outcome was successful with no permanent irrigation included in the project for either adjacent landscaping or the vegetated roof system.

All of the building's plumbing fixtures are designed to reduce water consumption to thirty percent below baseline standards. Typical strategies include low-flow flush valves and fixtures and dual flush toilets.

ENERGY CONSERVATION:

Zoomazium achieves energy efficiency on all levels. The building management system uses 100 percent Green Power to reduce reliance on fossil fuels. Energy use is minimized considerably, through careful selection of energy-efficient lighting and natural heating and cooling systems.

The building was a conscious departure from the "black box" exhibit model, which typically relies entirely on artificial lighting. Instead, Zoomazium uses solar shading provided by existing trees along with ceiling fans inside the building allows for natural daylight harvesting which minimizes the need for artificial lighting throughout the building. In addition, energy efficient lighting systems reduce electrical loads.

The raised access floor system delivers high-efficiency heating/cooling and high performance glazing reduces energy demand. The vegetated roof, operable windows and adjacent foliage help keep the building cool during summer months. Planted walls or 'solar screens' are strategically placed to shield office windows, which filter low early sunlight and reduce heat gain for interior spaces.

In the event of a blackout during operating hours, the entire building will be illuminated and functional through natural daylighting. Together with emergency power generation provided through remote diesel generators, the zoo campus is adequately set up to operate normally regardless of a blackout.

By embracing these important new ways of approaching traditional building, Woodland Park Zoo has gone a long way towards their mission of lessening the footprints of human beings on the planet.

SYSTEMS INTEGRATION

A noteworthy component of green building is the collaborative nature of the process. As a result of this fundamental, innovative interaction, single solutions are created that successfully solve a multitude of problems.

One such solution is Zoomazium's vegetated roof system which is planted with grass and 21,000 native plants. This simulates a temperate forest floor habitat while aiding in the natural reduction of storm water runoff. Another collaborative innovation is the raised

access floor, a system that allows a great deal of flexibility for future exhibits and program elements while also serving as an air supply plenum. This air delivery system uses less material for ductwork, increases indoor air quality and comfort, while reducing energy use. Moreover it houses water pipes and electrical wiring.

Patterned or 'fritted' glass was suggested by an expert Ornithologist to help reduce the likelihood of bird strikes. The pattern makes windows more visible to wildlife from the exterior, while appearing clear from the inside. This new glass technology makes Zoomazium one of the first buildings in the nation to address the prevalent issue of bird strikes, which often result in bird deaths, while also serves to reduce solar heat gain in the building.

ABOUT the Woodland Park Zoo

Accredited by the American Zoo and Aquarium Association, award-winning Woodland Park Zoo is famed for pioneering naturalistic exhibits and setting a standard for zoos all over the world. With conservation, education and excellent animal care at the core of the zoo's mission, the zoo is helping to save endangered species in Washington state and around the world including tree kangaroos, snow leopards, red-crowned cranes, African wild dogs, western pond turtles and Oregon Silverspot butterflies. By inspiring visitors and others to care and act, Woodland Park Zoo is making a difference in our planet's future.

SIDEBAR

Zoomazium at the Woodland Park Zoo

5500 Phinney Avenue North
LEED – Gold Certified

BUSINESS BENEFITS

- 30% less water use
- Increased efficiency of heating and cooling system
- Energy saving over ASHRAE 90.1
- National THEA Award, 2006, Best Green Project, Northwest, 2006