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Green on Top

by

School's roof includes plants to produce oxygen, reduce storm-water runoff, and reduce the building's temperature.

The only green-roof school in Delaware County (PA) and one of few in the region, this 195,000-sq.-ft., four-story structure takes the learning environment to a new level through green technology, flexible and healthy learning spaces, motivating architecture, and high-tech learning tools. Equipped at the edge of its time, this school sets the standard of expectation for our next generation by reflecting the possibilities the future holds and challenging every student to see more than just today.

The Motivation Behind the Project

From the inception of the idea for the new school, Blackney Hayes Architects (BHA) guided the Radnor Township School District through a gradual realization of a vision to create a school of the future. Engaging the stakeholders in the community-wide dialogue, BHA forwarded the possibility of a responsible, high performance building that would not only protect the environment and provide significant savings in terms of energy usage and building maintenance, but also create the utmost healthy and stimulating learning setting for the students. The resulting design concept incorporated both sustainable architecture and an innovative "learning pod" teaching structure.

Innovation

The new Radnor Middle School is the only green-roof school in Delaware County. Among very few other public schools in PA and NJ, it is eligible to receive LEED certification from the U.S. Green Building Council for its environmentally-conscious features and healthy learning spaces.

Sustainability Essentials

The school's green roof is one of the most distinguishing features. The plants on the roof and canopy tops produce oxygen, reduce storm-water runoff, and keep the building's temperature down. The school's climate control is supported by geothermal heating and cooling through 144 wells 500 ft. below surface level, saving fuel and keeping energy costs low.

There are recycled materials in structural steel, concrete masonry units, concrete footings of the building, and finish materials including carpets, ceiling tiles, counters, and tackboards. Even the terrazzo floor in the lobby contains recycled glass aggregate, instead of marble chips.

To create a more comfortable learning environment, plentiful windows allow natural light to pour into the learning spaces, while also minimizing solar heat gain. When artificial lighting is used, the building's fluorescent bulbs reproduce the colors of natural light. All classrooms have daylight and motion sensors that dim lights when there is enough natural light or turn them off in empty rooms to save energy. In the restrooms, low flow toilets, waterless urinals, and motion-activated sinks contribute to water conservation. In each classroom, the carbon dioxide level is monitored, and more fresh air is piped in if it gets too high.

Recycling was an essential component of the sustainability equation. The crushed brick and concrete from the existing middle school was used as fill to contribute to the storm-water management system. This helped retain the storm-water on the site by letting it infiltrate into the ground water, rather than travel further downstream flooding houses situated at the lower levels of the township.

Before demolition of the existing middle school, an auction was held to sell off usable equipment and elements of the building. Building materials not suitable for fill were removed, sorted, and sent to recycling plants. Approximately 85 percent of all construction waste for both construction and demolition was diverted from landfills and recycled.

Positive Impact

By exploring a curriculum around the green features concept, students get a first-hand look at the positive effects of an environmentally sound design. As a result, the school in itself becomes a learning lab that spurs the students' imagination and curiosity.

For example, a "Green Touch Screen" in the school's main lobby serves as an interactive educational resource on the green features of the building, and reports on the efficiency of the building's systems as

they maintain temperature and humidity. (For more info on the concept, see www.qualityattributes.com.)

Also, Radnor's integrated recycling program is changing students' resource consumption habits. Each classroom throughout all grade levels has three distinct recycling containers: blue for paper, green for plastics, and brown for trash.

Using green design as a learning tool creates a generation of students who have learned good habits of living in balance with the environment from the beginning. These early experiences truly set the future generation at the forefront of sustainable development.

According to Concord Engineering Group (CEG) specialists, the new Radnor Middle School will use approximately 30 to 35 percent less energy than a base ASHRAE 90.1 budget building.

Due to the use of geothermal systems for heating and cooling, Radnor Middle School is making a huge difference in the environment. The geothermal system eliminates more than 100 tons of carbon dioxide production by not using fossil fuels to heat the facility. GSHP systems conserve energy and, since they move heat that already exists rather than burning fossil fuels to create heat, reduce the amount of toxic emissions in the atmosphere.

By using geothermal heat pumps Radnor Middle School is saving approximately 2,500 gal. per year of public water. Furthermore, with the use of waterless urinals the school is able to use approximately 324,000 gal. less public water per 180-day school year for flushing purposes.

Radnor Middle School bears great significance to the development of future educational facilities in the area and the nation. The experience gained from this strong performing school can and will serve as a blueprint for the future of teaching and learning.

From the U.S. House of Representatives to the individual school districts, the move towards green schools is on the rise. Early pioneers like Radnor Middle School pave the road for many to follow one green brick at a time.

Source: SP&M, April 2008

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