

How a Green Roof Became a Green Building: The Highland Beach LEED Platinum Certified Town Hall

By William H. Sanders III, Dr.P.H., LEED AP • Mayor, Town of Highland Beach

In June 2006, the Town of Highland Beach welcomed a world-class addition to its community, the 2,127 square-foot Highland Beach Town Hall. The building represents the efforts of a green building design team, a committed Town Board of Commissioners, and three successive Town mayors. The facility—the product of more than three years of planning, design, redesign, and construction—represents a hallmark of environmental sustainability in an historic community. But, it didn't start out that way...

This is a tale of how a green roof solution to a stormwater management conundrum became a green building, one of the greenest in the nation and perhaps the smallest building in the country to be certified platinum by the U. S. Green Building Council. It is a success story that is being replicated in many forms by municipalities across the nation, in growing numbers, as our awareness of the benefits of green building grows. Building green means first of all not only building a quality constructed facility, but also creating a building that provides a healthy environment for its occupants, is protective of the environment, uses materials produced sustainably and without toxic chemicals, and is energy efficient. We join many other communities that have learned that building green can be done without added cost, dispelling a widespread myth that building green cannot be accomplished without significant added cost. But, I digress.

Our eco-friendly building did not start out to be green. The path to green started a few years back, when the town found itself in need of a replacement facility for our caretaker's cottage, a small facility that historically had housed the caretaker for residents' homes during winter months, who "summered" at their cottage home in Highland

Beach, hence, the name. Subsequently, the house was used as the community's town hall. But decades of use of the facility as the town hall left the residents with a building that no longer served the needs of the community, either in size or, more importantly, in safety. Plans for a replacement facility surged forward when funds were raised for construction, and plans were drawn for a new town hall. Then, however, came the hold.

Because the new facility would be larger than the caretaker's cottage, the foot print of the new building did not meet the county's previous

to non-pervious requirement for the site. So, the project stalled as the Town Commissioners pondered solutions. But a few months into her new job as town manager, the "new" kid on the block, Zora Lathan, discovered the cause of the project's delay, and offered a novel solution: how about a green roof? Most had not heard of a green roof, that is, putting plants on the roof of the building for stormwater mitigation, and other benefits. Stormwater falling on the roof would be absorbed and filtered by the low-growing sedums; the energy requirement for heating and cooling the building would be lowered due to the increased insulation provided by the plants and soil matrix

construction. The Town Board, and its Mayor, Crystal Chissell, and Commissioner Ray Langston—also a former mayor who together with Ms. Chissell had conceived the project and worked diligently to secure funding—were also committed to environmental protection. So it was not a difficult sell when Zora Lathan's husband (the current mayor) presented an additional idea: why stop at a green roof? Let's do a green building. That idea would mean further delays in construction, and additional costs for consultants and equipment not originally part of the project. But the Board of Commissioners agreed, and I volunteered to lead a design team to green the building.

on the roof, mitigating the so-called heat island effect; and the life of the roof would be extended by isolating the roofing material from the intensity of the sun's rays. Quite a list. But most said while this was an interesting idea, it was doubtful that it could be accomplished.

They didn't then know of Ms. Lathan's ability to creatively think outside the box. She persevered by developing a cogent plan, which included not only the green roof, but a series of rain gardens located at the town hall and in other locations in the community. Over the course of several months, she met with, presented, and ultimately secured approval of the plan from the Critical Area Commission and Anne Arundel County officials, with the goal that "rainfall that falls on our building site, will stay on our building site." The design intent was to replenish groundwater, while avoiding stormwater runoff to the local creek and ultimately to the Chesapeake Bay. Thus, the project was back on track.

Lighting
Building design provides for natural light in 100% of floor space. Lighting fixtures meet stringent industry efficiency standards. Reflective surfaces, task lighting, daylighting dimmers and occupancy sensors reduce energy use.

Photovoltaic Panels
16 solar panels mounted on the southern facing roof will output 2.65 kW at peak sun.

Green Roof
1,400 sq. ft. modular roof system planted with sedums reduces storm-water pollution, minimizes heat island effects, and absorbs carbon dioxide.

Materials Use and Management
Low volatile organic compound-emitting interior finishes promote indoor air quality. Materials used in frame, interior surfaces and workspaces include all energy star rated appliances and fixtures, sustainably managed wood, and recycled glass, plastics and steel. Large amounts of waste—including steel, concrete, bricks, glass and wood—were recycled throughout demolition and construction activities.

Daylighting and Views to the Outside
Particular attention was paid during the design phase to ensure adequate daylighting and views to the outside by extra tall, multiple windows in each room, and by using skylights.

Wind Turbines
Wind energy purchases will offset more than 100% of building electricity use.

Water Savings
High-efficiency plumbing fixtures and ultra low-flow water closets will achieve nearly 50% water savings compared to baseline.

Green Maintenance and Operations
Extensive recycling program and green housekeeping measures focus on a sustainable, healthy and productive work environment.

Energy Requirements
Baseline
Envelope + Lighting
HVAC

Energy Savings
Models predict nearly 78% cumulative energy savings compared to current standards for office buildings (ASHRAE 90.1 1999).

Building Design
To ensure minimal energy demand, the facility design included 2x6 inch stud construction to accommodate a greater amount of blown-in sol-based insulation, dual-pane low-e argon gas filled windows and doors, a green roof, reflective shingles, and recycled content materials.

Heating and Cooling Systems
HVAC system designed for energy and ventilation efficiency. A four zone HVAC system with individual controls in each room, operable windows, highly efficient fans, and CO₂ monitors ensure thermal comfort as well as good indoor air quality. A geothermal system is employed for maximum energy efficiency.

The Anatomy of a Green Building
A strong commitment to environmental quality and resource conservation is evident throughout the Town Hall's design, construction and operating systems.