

## *Green from the ground up to the rooftop:*

# Green building takes root

By Robin Rogers, Built Green™ Director  
from **Master Builder** magazine, October 2003

For starters, a green roof is sometimes green in name only. The color depends entirely upon the type or species of plants that grow on it. So, then, what is a green roof and why are major cities across the country, including Seattle, installing, testing and funding them? Why would this year's first-ever national green roofs conference, "Green Roofs for Healthy Cities," draw more than 500 attendees, including several representatives from King County? How is a green roof an appropriate technology for residential development?

The answers to these questions lie partly in a local project known as the Green Roof Project, partially funded and supported by King County, and spearheaded by local architectural designer Patrick Carey and The Northwest Ecobuilding Guild, a Built Green™ member organization. Jon Alexander of Sunshine Construction, one of Built Green™'s most active members, also has been involved with building two green roofs as part of the Green Roof Project, along with Carey.



*Members of Teufel Nursery's landscaping division distribute soil and water it slightly before setting the plants on Alexander's garage-top garden.*

Carey stresses that one of the goals of the project is to adapt technologies that have been used on larger, commercial projects to smaller residential ones. Basically, a green roof is designed to facilitate the growing of vegetation to take the place of bare membrane, gravel ballast, shingles or tiles. It is installed with extra consideration of the loads based on soil thickness — typically between two and-one-half inches and 12 inches — and the weight when saturated with water. All green roofs include a single- to multi-ply waterproofing layer, drainage, growing media and plants, covering the entire roof deck surface in either an extensive (shallow) or intensive (deeper) design.

### **Green roof possibilities**

Alexander became involved with green roofs mainly because he wanted to address surface runoff issues that could adversely affect salmon habitat. He saw green roofs as a high-end option, with significant environmental benefits that compare in price to tile or top-of-the-line metal roof systems.

Alexander also recognized an opportunity to provide green roofs to clients as an aesthetically pleasing upgrade as compared with most existing roof systems. He believes their higher aesthetic value arises out of their ability to change throughout the seasons, attracting butterflies and birds, while growing flowers and reducing the environmental impact. He adds that green roofs can blend into the landscape without altering the function of the structure. “It’s a challenge to take a usually ‘dead’ space and create a living, dynamic system that also minimizes the effects of rainwater runoff,” he says.



*Patrick Carey and Katie Spataro spread soil on the Sproull-Radke workshop roof after the waterproof membrane and root barrier have been installed.*

Carey notes that green roofs have some additional benefits, including significant acoustic and energy saving qualities. Acoustically, they absorb neighborhood sound rather than reflect it, and they act as a sound barrier, shielding the house from ambient neighborhood noise. They also contribute to both cooling in the summer and heating during the winter.

Alexander’s first green roof project is growing in Juanita atop a Built Green™ workshop garage built by his company and designed by architect Rob Harrison. Owners Susan Radke and Jim Sproull wanted to spare their higher-sitting neighbors from having an unattractive view of a typical garage rooftop. This has been accomplished by setting the floor level low, digging the building partly into the site, sloping the roof up and away from the neighbors’ yards, and planting the roof with a variety of vegetation.

Alexander’s second green roof is his own workshop garage. What was formerly a view from his house above to a conventional flat-roof system below now blends almost seamlessly with the backyard landscape as the plants have taken root.

Other Built Green™ members also have materials or technologies that can be used on green roofs. For example, Cedar Grove Composting mixes specialized soils for green roofs and has provided blends according to Carey’s specifications. Glacier Northwest manufactures waterproof concrete and has installed it on a Redmond project to cover an underground parking garage that is now both drivable and vegetated.

### **County and city support**

Both King County and the city of Seattle are sponsoring such projects in an effort to study and develop cost-effective and reproducible models of green roof technologies appropriate for wide-scale residential application. Green roofs have the ability to reduce storm water runoff, and many believe they are a superior alternative to other storm water management options that require scarce and expensive land. They retain 60 to 75 percent — sometimes as much as 90 percent — of the total annual runoff volume of a roof, they slow water velocity, help return water to the hydrological cycle through evapotranspiration and naturally filter water to improve water quality.

According to Katie Spataro of the King County's Solid Waste Division and Built Green™ executive committee co-chair, the county's support of green roofs is consistent with its overall goals of promoting sustainable and low-impact development, limiting negative environmental impacts, managing storm water runoff, increasing wildlife habitat and creating markets for recycled materials.

Lucia Athens, Sustainable Design and Construction Specialist with Seattle Public Utilities and chair of Seattle's Green Building Team, says the city of Seattle also supports the Green Roof Project, and is interested in green roofs as applied at different scales — residential to commercial. Most green roof technology is currently applied on the larger, commercial scale. For example, Seattle's new Justice Center and City Hall both have green roofs. The Justice Center roof is part of an accessible rooftop deck and provides an aesthetically appealing social space. Adjacent to courtrooms, it provides a place for jurors to take breaks during trials. The green roof on City Hall is not accessible, but overflow from it is also used to collect rainwater for irrigation and toilet flushing. Both buildings are undergoing post-occupancy analyses to determine the effectiveness of the vegetated roofs.

Athens says the city is especially interested in "how green roofs might contribute to storm water functions for both peak flow and water quality, as well as reducing heat island effects." A shift to a higher percentage of green, or pervious, rooftops could have a significant impact on the area's storm water runoff as recent estimates suggest that Seattle-area rooftops could cover as much as fifteen square miles.

## **Maintenance**

Alexander believes one of the great features of the smaller-scale residential roofs is they require virtually no maintenance after they are established. Many of the extensive systems, up to about four inches of soil, are planted with drought-tolerant, hardy, low-growing sedums that do not need watering or mowing, are easy to plant, provide a variety of colors and pose little risk of becoming invasive. In fact, they like to grow in sunny, hot, dry places. The pilot projects have purchased plant cuttings from Squaw Mountain Gardens near Portland, Ore., specialists in sedums. Alexander jokes that he's thought of putting a goat on his roof, but it's not even necessary. Instead, he will consider adding some organic fertilizer in a couple of years to keep the plants and soil healthy, and that's about it.

## **Green building methods take root at Idea Home**

As part of a Built Green™ Idea Home — a demonstration project at Issaquah Highlands sponsored by Port Blakely, the MBA and the city of Issaquah — a small green roof or green deck, will be installed. The Idea Home will be open to the public for nine weeks beginning in February 2004, and will show how building green can be mainstreamed with little added cost above conventional construction methods.