



BCIT's Green Roof Research Facility features two extensive green roof systems that will provide research data on stormwater mitigation, thermal performance and rainwater harvesting.

Green on Top

BCIT's Green Roof Research Facility, first of its kind on the West Coast, was built to address the growing interest in green roofs and the need to collect research data. The research will play an important role in developing standards and programs to support green roof development.

BY LINDA GEORGE

GREEN ROOFS — roofing systems that support vegetation growth — are garnering interest as a cost-efficient, earth-friendly alternative to traditional roofs.

In British Columbia, the B.C. Institute of Technology is producing climate-specific data at its Green Roof Research Facility with the aim of providing industry, government and consumers with locally researched information to support the use of green roofs in B.C.

Green roof research at BCIT

The BCIT Green Roof Research Facility, a 100,000-square-metre building, was constructed in 2004 on Vancouver's Great Northern Way Campus with the purpose of researching the storm water control and thermal performance of green roofs.

Growing demand for product development and testing from industry has prompted BCIT to expand its capacity and create the Centre for Advancement of Green Roof Technology, with funding support from the Natural Science and Engineering Research Council and Western Economic Diversification Canada.

The research centre is a hub for the local green roof industry,

conducting product performance testing and providing demonstration roofs. BCIT develops educational programming on integrated green roof systems to support industry growth. Pre-packaged green roof evaluation modules are also available for companies wanting to test the performance of their products, or determine the climatic performance of a green roof in their area.

About green roofs

Green roofs are layered roofing systems that include waterproof and root-resistant membranes, a drainage system, filter cloth, growing media and plants. They can be created in place or installed using modular sections.

Green roofs have limited impact in short span construction. The weight of a 3" green roof is approximately equal to gravel ballast use in inverted roof systems. For long span construction, load considerations need to be engineered.

In B.C., the Community Charter and Local Government Act allow vegetated roof systems. The roofing system meets municipal demand for pervious surfaces on building sites. As well, green roofs are proven to not increase fire risk.

Versions of green roofs have been used around the world for centuries, particularly in Western Europe. In Vancouver, the Regional District has identified approximately 300 roofs with some type of vegetation; several of these were established as early as 1976. The recent interest in British Columbia has been spurred by benefits that include:

- **Reduced storm water runoff** – This is an issue in urban areas, particularly those in rainy climates such as Vancouver. During heavy or continuous rain, runoff can overpower storm water systems and damage waterways and fish habitat. The research centre is now quantifying research that indicates green roofs could absorb 60 to 70 per cent of Greater Vancouver's rooftop rainfall.
- **Energy Efficiency** – Green roofs reduce the energy required to heat or cool a building. The research centre has found that green roofs reduce energy loss through the roof by 35 per cent during a Vancouver winter (summer data will be available in October, 2005.) As a result, we expect less expensive building air-handling systems can be used. And while the initial cost for a green roof is higher, their lifecycle cost is competitive with traditional roofs. Membranes on green roofs typically last twice as long as those on traditional roofs because the temperature is regulated.
- **Reduced Urban Heat Island effect** – For a city, the mass adoption of green roofs will reduce the "urban heat island," cooling cities during the hot summer months.
- **Extended lifetime** – Greening the roof provides protection by reducing the daily temperature change of the roof membrane and extending its length of performance over time.
- **Creation of "extra" green spaces** – Green roofs make the most of unused space within the increasing density of our cities. Rooftops can be developed into social and recreational spaces and used for urban agriculture.

Green roofs typically fall into two categories:

1. Extensive Green Roofs

Low-maintenance ground-cover systems are ideal for large flat-roof buildings and apartments, but are also suitable for sloped residential roofs. Desert grasses and succulent plants are embedded in three to six inches of lightweight growing media. After one year, they do not require watering although annual spring weeding of tree seedlings brought in by birds is needed. In preparation for the 2010 sustainable Olympics, the Vancouver Convention Centre will have 2.4 hectares of very low maintenance green roofing.

2. Intensive Green Roofs

Fully landscaped roof top gardens can accommodate many uses and require regular maintenance. Diverse plants and trees are planted in 8 to 12 inches of soil amid features such as walkways, railings and lighting. Parks, playgrounds or vegetable gardens are possible. In Greater Vancouver, Electronic Arts has a rooftop park, while the Vancouver Fairmont Hotel grows herbs on its rooftop for the hotel kitchen.

Outlook

Long-term owner/operators such as government and large organizations are expected to be the first to adopt green roofs. Developers typically wait for proven consumer demand, which

in this case is likely, as green roofs offer a good fit to the heightening interest in environmental stewardship, quality of life, sustainable design and ecological lifestyles.

The marketplace is primed for this innovation, which has huge potential for growth and job creation. The trend has

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already begun in Vancouver, where all civic buildings — including the Olympic Athletes Village at Southeast False Creek — are designated to be LEED Gold buildings, undoubtedly resulting in a booming green roof industry. **CB**

Linda George, LEED AP, has a Masters in Education and a background in course development and marketing. She is currently developing a business plan for BCIT's innovative Green Roof Evaluation Performance Module. For more information, please refer to the BCIT website: <http://www.greenroof.bcit.ca>.

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