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ROOFTOP OASIS

story | 34

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ROOFTOP OASIS

Calgary's climate creates a challenge to sow a successful garden, as many know, with Chinook winds, droughts and floods all in the same season. But many local citizens are taking this challenge to their rooftops—and improving their living space, as well as the local ecology. They are convinced that green roofs are the latest answer to urban growing pains, and the state of the local environment.

As the annual spring melt begins to wash and carry away any ill feelings of another bitter Albertan winter, average Calgarians won't be found peeking their heads out of their respective homes or habitats until the sun shines high in the clear blue sky.

But local architectural consultant Kerry Ross is anything but an average Calgarian.

Ross is one of Calgary's local green roof experts and come spring, this early bloomer will be found standing on the roof of her backyard shed, inspecting the new layer of native grasses that she and her husband installed as their own personal green roof project last spring.

Ross is a member of Green Roofs for Healthy Cities and participates in a number of committees—mainly research and policy development related—and has attended a number of courses to soon become a

certified green roof consultant. She has also presented the Alberta Eco-Roof Initiative project at the Green Roofs for Healthy Cities annual conference and will present this year, in Baltimore. Last fall she made a trip to Iceland and the Scandinavian countries to explore green roofs in colder climates.

"Green roofs are a growing trend in gardening, and a wonderful new take on an ancient technology," says Ross. "People have been building gardens on their rooftops as far back as the Hanging Gardens of Babylon."

What's a green roof, you ask? Don't be embarrassed if your first thought is of a sickly shade of shingle that is sweeping the stratosphere. You would be close, however.

In a nutshell, a green roof is a thin layer of living plant life installed on top of a conventional roof. It can also be called a "vegetated roof cover," "living roof" or

"eco-roof" and when properly designed, it is a stable, living ecosystem that replicates many of the processes found in nature, right outside in your backyard.

The benefits are abundant. The costs are absorbable. And in 10 years time, you may be able to look across your street and be vaguely unmoved by the sight of various flora and fauna growing out of your neighbour's roof.

"That is the dream," says Dave MacKillop. He's an industry specialist and one of the most passionate advocates, spokespersons and believers of the green roofing industry in Calgary.

Now dreaming of various rooftop *sisyrinchium montanum* and *geranium richardsonii* sounds like something from a regretful mind after some late night pepperoni pizza escapade, but the benefits of having a green roof bear much fruit.

Cnt'd on pg 38 >



Green roofs provide both ecological and aesthetic benefits.

Cnt'd from pg 35 >

Green roofs provide many ecological and aesthetic benefits, including but not exclusive to: Controlled stormwater runoff, erosion and pollution; cooler and cleaner air; doubled or tripled extended lifetime of the existing roof; energy conservation and lower utility bills; reduced sound reflection; a personal wildlife habitat; a secluded meditation area; and finally, an overall improved aesthetic environment.

Green roofs also help that battle against the Urban Heat Island Effect, which is a relatively new concept in today's vastly growing metropolises. The Urban Heat Island Effect is the difference in temperature between a city and the surrounding countryside, which can be as much as 10 degrees Celsius during the summer months. It is mainly due to the expanse of hard and reflective surfaces, such as roofs, which absorb solar radiation and re-radiate it as heat.

The solution is in the form of green roofs and reduction of the Urban Heat Island Effect will also reduce the distribution of dust and particulate matter throughout the city and the production of smog. More green roofs would also play a role in reducing greenhouse gas emissions and adapting urban areas to a future climate with warmer summers.

Oh, and you can eat it too. Some food for thought; the Fairmount Waterfront Hotel in Vancouver uses their green roof to grow herbs, flowers and vegetables to save themselves an estimated \$30,000 in grocery costs annually.

Not surprisingly, Vancouver is the national leader in the green roof industry. The city is home to the Centre of the Advancement of Green Roof Technology and also boasts the biggest green roof in Canada, the multi-hectare unit on top of the Vancouver Convention and Exhibition Centre.

Toronto is also a Canadian green roof icon and is headquarters of Green Roofs for Healthy Cities, the North American industry authority. Since 1999, Green Roofs for Healthy Cities—a non-profit membership-based association—has worked to promote, research and implement green roofs across Canada and the United States.

Toronto is one of the few municipalities across the country that offers policies to support green roof development and offers home and business owners incentives to offset the cost of installing a green roof.

So where does that leave Calgary? “We have a few examples of green roofs here in the city, but simply not as much as in other places, especially in Europe,” says MacKillop. In Germany, specifically, he added.

The Germans have long embraced the issue of sustainability in public policy and are at the helm of the global industry.

In Calgary, the growth of green roof development is driven largely by clients and building professionals who want their project to achieve to a LEED (Leadership in Energy and Environmental Design) Green Building certification.

However, many residential clients are now inquiring about using green roofs on their houses or garages to either create a green space on a deck or roof or help the building fit better into its context. For example, on sloped sites, a number of residential clients wish to cover the roof of their garage with vegetation rather than look at a bare roof; just like Ross did last spring.

“Homeowners wanting to install a green roof typically do so because they prefer to look out at a beautiful landscape, surrounding themselves with nature, rather than viewing

a bare roof,” says Ross. “Whether looking at their green roof from their window or enjoying it from an elevated vantage point, people are inspired by the beauty of roofs that are growing.”

Presently, the only widely-accepted established standards for green roof construction are those developed in Germany by the more-than-a-mouthful *Forschungsgesellschaft Landschaftsentwicklung Landschaftsbau*, or FLL, for short.

But Calgary is pulling its weight, says MacKillop.

“There is a lot of great research going on here in Calgary which is looking at green roof technology for our specific semi-arid climate,” he says.

MacKillop and Ross are actually responsible for the bulk of the research being implemented in the city. The pair recently teamed up with several industry professionals for the Alberta Eco-Roof Initiative.

The 3000 sq. ft. project is the result of a 22-member business team with the common goal of putting a green roof on Calgary Technology Inc.'s (CTI) Alastair Ross Technology Centre near the University of Calgary. MacKillop is currently manager of the centre, so he never strays too far from the site.

The project consists of two separate plots on either side of the CTI building and is made up of various plant life including wheat, strawberries, native grasses, kinnikinnick and galardias.

The project is extremely relevant to Calgary and beyond, and will now demonstrate how a green roof can be supported in the city's unique climate.

// We're still pretty much in the first 10% of the life cycle of the market.”
—Peck

Some owners choose a thin layer of plant life, a complete oasis or anything in between.



“Here in Calgary we have a very different climate than anywhere else in the country; it's almost a desert but not quite,” says MacKillop. “We get a fair amount of rain here and most of that comes during our thunderstorms. And we have the Chinook, which can wreak havoc when trying to grow anything going from warm to cold all the time.”

“The (Alberta Eco-Roof Initiative) project has successfully gotten the ball rolling on the advancement of green roofs,” adds Ross. “Many other private-sector projects are being built which will build the level of confidence in the use of this technology. More projects that the public can access and see will help speed this up. More local field research is needed to create the baseline for Calgary, which will lead to policy development.”

Although the researchers for the Alberta Eco-Roof Initiative are presently looking at the subtleties of soil levels, plant growth and erosion, there are a number of green roof projects that have been put into practice at a public level.

The Bridges, an award-winning multi-unit residential “urban village” in the community of Bridgeland-Riverside, incorporated a

green roof into the newly-built community association hall last year.

One of the most significant characteristics of The Bridges is the open space, which comprises almost one third of the land. The new Bridgeland-Riverside Community Association Hall has many energy efficient elements incorporated into the design but the green roof on the north-south portion of the building adds increased insulation and a usable space for viewing. Native plants were used throughout the project to reduce the amount of water use substantially, says the City of Calgary.

The Arriva condo towers, currently under construction in the community of Victoria Park, are also incorporating green roofing into the development, with one tower recently occupied by residents, the second tower slated to open this fall, and a third tower coming onto the market in 2009.

“If you're talking about multi-unit residential it's already a well-developed market because you can either create individual green roof gardens or parks on the top floor or you create a collective space for everybody in the building. It's fairly well established and pretty much a market-driven niche,” says Steve

Peck, president and CEO of Green Roofs for Healthy Cities.

In the present market however, a green roof would simply be out of reach for the average homeowner, he says. “The bottom line on green roof systems, primarily because there is a higher upfront capital cost in many cases, you are not going to get significant green roof implementation without some form of public policy support.”

In the bigger picture, green roofs deliver many public benefits including aesthetics, air quality, storm water management, decreased Urban Heat Island Effect, biodiversity, noise reduction and more, he says. It should be a public policy concern.

“That's how the industry really took off in Europe; through accommodation of public policy sponsorship and that is how many industries in North America function as well. So there is a lot of opportunity to move the industry forward through that public form of sponsorship and that will be ultimately whether or not we make the transition into the mainstream.”

“We're still pretty much in the first 10% of the life cycle of the market,” says Peck.

Cnt'd on pg 40 >



// The popular misconception is that green roof cause leaks, but the reality is if a green roof is installed correctly by a reputable, knowledgeable firm, it should actually out-perform the traditional roof.”
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Cnt'd from pg 39 >

Ross, MacKillop and Peck agree that in 10 years, green roofs will begin to take a major role in the mainstream housing market.

“I sure hope that what I’ve seen in many parts of Europe start taking root here in Calgary,” says Ross. “In 10 years, there will be some form of regulation requiring a certain percentage of green roof coverage of buildings. This may be for a certain building type, say municipal, commercial or industrial.”

If the municipal government really got on board with the green roofing movement, Calgary’s city skyline could soon be dotted with specks of green and emerald.

“Imagine if all the rooftops of our municipal buildings and on the industrial sector were covered in part by vegetation—what a sight that would be arriving in the city and what an improvement to our air, water and soil adding nature into the urban centre.”

That idea isn’t too far out there either. Last year, the City of Calgary awarded a Mayor’s

Urban Design Award to a local designer who drafted the Grey to Green project: Greening Calgary One Roof At A Time, which flooded the city’s rooftops in a swathe of the environmentally-friendly plant life.

But as Peck says, it’s not a “light bulb switching kind of technology.” There is a lot of work to be done before green roofs enter the average homeowner’s lexicon.

Solution number one: Debunk the myth that green roofs are leaky roofs.

It’s always a bad idea to do what’s called “value engineering,” an exercise meant to find ways to save costs.

With a green roof, you don’t want to go with the cheapest components and lowest contractor bid.

You want to work with people who know what they’re doing, who have experience designing or building green roofs. They should be a reputable company, not just anyone who is available.

“The popular misconception is that green roofs cause leaks, but the reality is if a green roof is installed correctly by a reputable, knowledgeable firm, it should actually outperform the traditional roof,” says Peck.

That’s not a typo, adding a green roof to your home will actually double or even triple the lifetime of the roof itself. Peck says this piece of evidence will be pertinent in the case of selling green roofs to the general public, and more importantly to the powers that be.

The second solution is to lower the upfront costs of green roof installation is the second solution. This can be absolved through a combination of maturation of the market, government incentive programs and technology advancements, Peck adds.

Luckily, Calgary is starting to work towards those solutions. Some City of Calgary administration recently met with Peck and the Green Roofs for Healthy Cities team to learn some tools to help lower the upfront costs that most homeowners would have to hurdle over.



Contrary to belief, you don’t need to live waterside to have a green roof.

Cities like Chicago, Illinois have programs where they give up to a \$5,000 incentive to build a green roof, with \$500,000 in the program on an annual basis. That means they support 100 projects every year.

“That has been really helpful for Chicago because there are always those early adopters who, with a bit of an incentive, will go for it and they have a whole range of green roof projects that have been stimulated all over Chicago as a result of that,” says Peck. “That is something the City of Calgary could do relatively easily, if they wanted to target smaller markets which are important to the overall big picture.”

Speaking in numbers, when you are adding a green roof you are adding additional

components that are not required for the purpose of a traditional roof. That is, keeping out the elements.

A green roof has a number of additional layers, such as drainage, root barrier, engineered soil and of course, the plants.

At this point, costs are still significantly more than a traditional roof. A green roof can cost between \$10 and \$15 per square foot and up, whereas a residential roofing membrane will usually cost approximately \$6 per square foot.

“More systems are becoming available and more roofing contractors are becoming approved installers; this will help drive down costs,” says Ross. “It is not only feasible but

a number of residential owners have done it in Calgary.”

“My husband and I put a green roof on our sloped garden shed primarily for me to experiment with a selection of plant species, but also because we look at it from our kitchen window,” she adds.

A soothing image, no doubt.

And this spring as Ross stands on the top of her shed, inspecting growth and picking weeds, she is simply part of the big picture work going on behind the scenes. Green roofs are a good idea waiting to bloom into a great idea. All that’s needed is a little tender loving care. [h²h](#)