

LIVING ARCHITECTURE MONITOR®

A GREEN ROOFS FOR HEALTHY CITIES PUBLICATION

VOLUME 19 / ISSUE 3 / FALL 2017

THE BIOPHILIC DESIGN ISSUE

- Design Guru Bill Browning and Amanda Sturgeon on The Rise of Biophilic Design
- Chicago's New Sustainable Development Policy
- Annual Green Roof Market Survey Results - Toronto Takes Top Spot As Industry Grows 10%
- How The WELL And Living Building Challenge Standards Are Driving Biophilic Design
- Living Architecture Performance Tool and Biophilic Design Workshops at *CitiesAlive*

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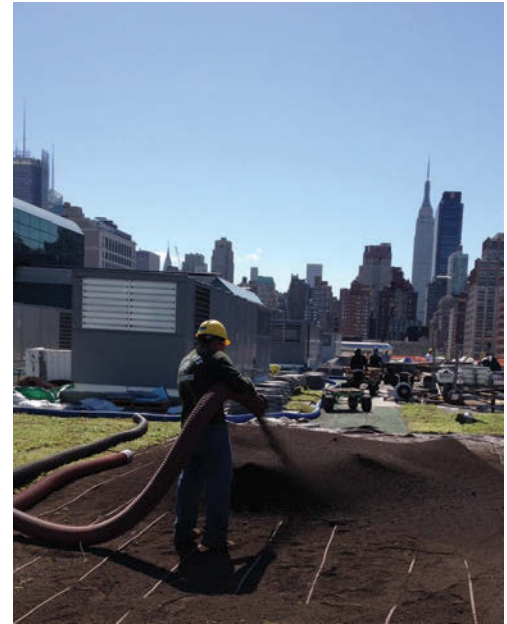
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MISSION

Green Roofs for Healthy Cities' mission is to develop and protect the market by increasing the awareness of the economic, social and environmental benefits of green roofs, green walls, and other forms of living architecture through education, advocacy, professional development and celebrations of excellence.

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EMBRACING HEALTH AND WELL BEING THROUGH BIOPHILIC DESIGN

From its origins as a means of delivering more energy efficient buildings and fighting climate change, the green building industry is increasingly focused upon human health and well being. Given that we spend more than 90 per cent of our time indoors, our built environment is either damaging or nurturing us. E.O. Wilson and Stephen Kellert's *Biophilia's Hypothesis* (1984) described the innate tendency of humanity to seek connections with other forms of life and lifegiving environments, particularly those that contribute to our survival. Our desire, for example, to be close to moving water and vegetation are perhaps the strongest beneficial nature-human connections.

Despite our modern technology, we are still hardwired to seek and value environments that satisfy this fundamental need for nature. By doing so, we also improve our health and well being and establish the basis for market values. Researchers across half a dozen disciplines, from evolutionary biology to neuroscience are shedding more light on the things we desire and respond favorably to in our surroundings. This has given rise to several sets of principles or patterns of biophilic design. My interview with green building guru Bill Browning in this Biophilic Issue of the *Living Architecture Monitor* (LAM), explores some of these patterns in more detail. Elizabeth Calabrese also describes how The Living Building Challenge and the WELL Building Standard have biophilic design firmly embedded in them. Health and well being is firmly rooted in the developing Living

Architecture Performance Tool (LAPT), which will be the subject of further consultations in Seattle on September 20 by the charitable Green Infrastructure Foundation. The LAPT is to green roofs and walls what LEED was to green buildings and the LAPT promises to facilitate better design, project performance and policy making. (see page 29) Together, these developments promise to drive design in a biophilic direction.

The good news is that if we pay close attention, we can now develop built environments - be they neighborhoods or buildings, that we know are going to be better for people! The potential benefits to individuals and society are enormous.

The cost of sick workers has been estimated at more than \$576 billion annually in the U.S., of which \$227 billion is employee absenteeism. Yet designing healthier indoor environments is a remedy to this problem. Research by Rob Watson projects that by 2030, over 21 million employees will be working in indoor environments with better environmental quality through LEED buildings, and that this will result in additional economic value from improved labor productivity of \$90 billion. Another related study by the Mahone Group found that office workers with the best possible views, those incorporating natural life and green infrastructure as opposed to no views, performed 10 to 25 per cent better on mental function and memory recall. There are many more studies that link human health, market value and productivity to improved biophilic working environments.

The trend towards incorporating biophilic design principles into new and

retrofit buildings will help to further drive the market for living architecture technologies. Congratulations to the many awards of excellence winning projects featured in this LAM which have significant and multilayered biophilic benefits associated with them. While they store stormwater, reduce energy consumption and the urban heat island, they are also engaging, desirable and beautiful, and can therefore, contribute to our health and well being - yet another pathway to improving the bottom line. Progressive, thoughtful and sustainable firms realize this and are growing their businesses as a result. Learn more about the Biophilic Design business case at *CitiesAlive* in Seattle this September.

Sincerely yours,



Steven W. Peck,
GRP, Honorary ASLA
Founder and President

Delmas, Magali A. and Pekovic, Sanja (2012). Environmental standards and labor productivity: Understanding the mechanisms that sustain sustainability. Heschong Mahone Group, Inc. (2003). Windows and Offices: A Study of Office Worker Performance and the Indoor Environment - CEC Pier 2003. Watson, Rob. Green Building and Market Impact Report - 2011.

STRATA



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CitiesAlive® 2017 highlights the necessity of green roofs and walls alongside the region's unique characteristics as they contribute to community, place making and the resilience of the people in a variety of sessions and workshops.

Visit CitiesAlive.org to register.



IN MEMORIAM – RECOGNIZING A TRUE PIONEER

Yale University Professor Stephen Kellert and the father of Biophilic Design passed away in December of last year after battling cancer. He was a strong believer in our ability to design healthier living environments and pioneered the practical application of the Biophilia hypothesis by establishing many of the principles or elements that contribute to our mental and physical well being. In this issue of the LAM, and at *CitiesAlive* in Seattle in September, we pay tribute to his legacy. At *CitiesAlive* we will have a special plenary session on his work, and explore the business case and future of biophilic design. On Monday, September 18, we will also hold a biophilic design workshop with Bill Browning, Principal Terrapin Bright Green, to explore how to maximize the benefits of biophilic research and design as it pertains to green roofs and walls.

Image of Stephen Kellert, Courtesy of Elizabeth Calabrese.

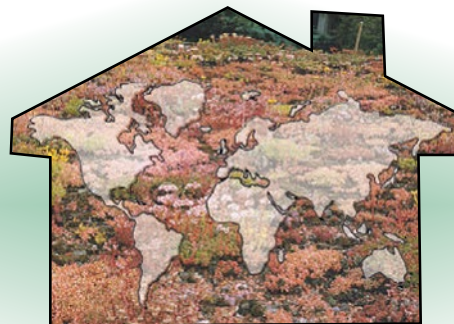
10TH ANNUAL WORLD GREEN INFRASTRUCTURE CONGRESS A HUGE SUCCESS

In late June 2017 more than 800 professionals from over 40 countries gathered for the 10th Annual World Green Infrastructure Congress in Berlin to learn the latest information in green infrastructure policy, design, research and technology, and to wish the World Green Infrastructure Network (WGIN) a Happy 10th Birthday! WGIN is a non-profit association of associations that exchanges best practices information to strengthen green roof, wall and infrastructure markets around the world. It's 11th Annual World Congress is being planned for Bangalore, India from February 26 to 28, 2018 in partnership with the Indian Green Infrastructure Network. WGIN has published *Green Cities in the World*, 2nd edition which features articles on design and policy from more than 20 countries. See worldgreenroof.org for more details on events, conference proceedings and updates.

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GREEN DESIGN GURU BILL BROWNING ON BIOPHILIC DESIGN PRACTICE

INTERVIEW BY STEVEN PECK

Bill Browning's composure is that of a man who thinks deeply and acts with a calmness and deliberateness that speaks volumes about his experience and confidence. As the Founding Partner of Terrapin Bright Green, he now works with Fortune 500 companies, non-profits, foreign governments and universities to help them craft and implement policies that contribute to social, economic and ecological sustainability. In the early 1990s he founded the Green Development Services arm of the Rocky Mountain Institute and worked on planning, renovations and high profile demonstration projects for firms like Walmart, Disney Hong Kong, Lucas Films and the Sydney Olympic Village. Bill was a founding member of the USGBC Board of Directors and has served on many other non-profit boards and institutes.

Since founding Terrapin Bright Green, Bill has directed much of his team's attention on research into the science of Biophilia as well as the development and application of practical approaches to its implementation. They have developed a set of 14 patterns that can help guide biophilic design (see overleaf). I caught up with Bill in his Washington, D.C. office to ask him some pointed questions about biophilic design, living architecture and our upcoming workshop and plenary session on the subject of biophilic design at *CitiesAlive* in Seattle.

SWP: Hi Bill. Thanks for the interview. Biophilic design research and practice has been called an exercise in "proving things we already know to be true?", what does this mean?

BB: We intuitively sense when a built or natural place is a good habitat for humans. Biophilic design builds on the science of understanding those elements that lead to that positive response. It allows us to design buildings that support our health and well being more effectively.

SWP: What do think of Stephen Kellert's contribution to biophilic design?

BB: Stephen Kellert did important research on how biophilia impacts the lives of children, particularly in inner cities. He was one of the first to translate the need for connection with nature into a way of thinking about design.

SWP: There are a number of different frameworks around biophilic design, and possibly more to come in the future. Can you briefly describe the framework you developed and how people can learn more?

BB: The Terrapin team developed the 14 Patterns of Biophilic Design as a way to codify the various pieces of science on human response to nature in the built environment. The intended audience is the design community, and a pattern language is an old tool for understanding design concepts.

SWP: Biophilic design is about more than working through a checklist of elements - green roof, natural light, fountains etc... What is this magic and why is it important?

BB: Plants, animals and water are the things that most people assume are the sole basis of biophilic design. Biomorphic forms, natural materials, fractal patterns, prospect views, and spaces that provide refuge are other strong elements of biophilic design. Sometimes too many elements are not as effective as the right elements done really well. The best results, the magic, sometimes involve one or two elements.

SWP: Your firm has done some excellent work on the biophilic design-human health-economic benefit relationship. What have you found that is most surprising to you in this work?

BB: We first pulled together evidence for *The Economics of Biophilia* to show owners and others that connection to nature in the built environment is not a frivolous luxury, but actually has significant health and economic benefits. For example, biophilic design can increase retail sales, improve healing times in hospitals and improve the academic performance of school children. Increased productivity of employees can result in office settings.

We are continuing to research how biophilic elements change people's use of space and economic outcomes. Our latest paper,

FOR SOME, BIOPHILIA MAY BE THE CURRENT FAD, BUT THE SCIENCE UNDERLYING IT IS GROWING AND AS WE CONTINUE TO URBANIZE THE NEED BECOMES EVEN GREATER FOR THE CONNECTION TO NATURE IN THE BUILT ENVIRONMENT. IT IS AN IDEA THAT IS HERE TO STAY.

- BILL BROWNING

Human Spaces 2.0 which we released in July of 2017, looks at the impact biophilic design on guest experience and economic performance in hospitality properties.

SWP: How do green roofs provide biophilic benefits to building occupants? What affects do they have on our health and well being?

BB: A well designed green roof has the obvious environmental benefits of stormwater

mitigation, reduced heat island and increased biodiversity. If it is visible and/or can be occupied, it provides a direct connection to nature that can lower stress, improve cognitive function and elevate mood.

SWP: How do green walls provide biophilic benefits to building occupants/visitors?

BB: Green walls, particularly if they are biodiverse and placed in highly visible locations, provide a strong visual connection to na-



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ture which can result in lower blood pressure, reduce heart rates and improve attention.

SWP: We are going to have a workshop on biophilic design at CitiesAlive! Do you think it is possible to design the 'ultimate' green roof or green wall project, one that has the maximum number of biophilic elements and if yes, what could some of these elements be.

BB: There are a number of strategies from the 14 Patterns of Biophilic Design that can be used in the 'ultimate' green roof or green wall. Most people will focus on just the visual aspect and forget about the need to design for the other senses, to include movement, water elements and the need for change over time.

SWP: Do you have a favorite biophilic living architecture project?
BB: My current favorite is the Parkroyal Hotel on Pickering in Singapore. It has sky gardens that are 2.7 times the footprint of the building, amazing water features, and the structure features wildly biomorphic forms. It was almost like being in Avatar staying in this amazing hotel!

SWP: What do you see as the future of biophilic research and design? Is this going to be revolutionary, or perhaps just another fad?
BB: For some, biophilia may be the current fad, but the science underlying it is growing and as we continue to urbanize the need becomes even greater for the connection to nature in the built environment. It is an idea that is here to stay.

FIND OUT MORE

Visit terrabinbrightgreen.com to download articles and research papers (some documents are available in French). Attend the biophilic workshop at CitiesAlive Monday, September 18th being led by Bill Browning.

14 PATTERNS OF BIOPHILIC DESIGN

Over the years, academics, researchers and others have identified numerous design strategies for improving health and well-being in the built environment. Terrapin has codified this research into 14 patterns of biophilic design:



NATURE IN THE SPACE

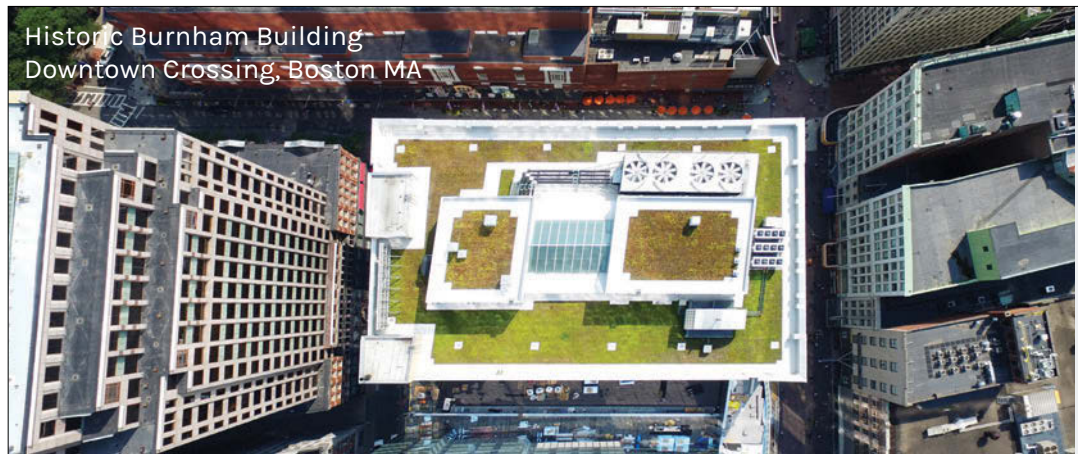
- 1. Visual Connection with Nature
- 2. Non-Visual Connection with Nature
- 3. Non-Rhythmic Sensory Stimuli
- 4. Access to Thermal & Airflow Variability
- 5. Presence of Water
- 6. Dynamic & Diffuse Light
- 7. Connection with Natural Systems

NATURAL ANALOGUES

- 8. Biomorphic Forms & Patterns
- 9. Material Connection with Nature
- 10. Complexity & Order

NATURE OF THE SPACE

- 11. Prospect
- 12. Refuge
- 13. Mystery
- 14. Risk/Peril



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LIVING BUILDING CHALLENGE LEADER AMANDA STURGEON ON ILFI'S BIOPHILIC DESIGN INITIATIVE

INTERVIEWED BY STEVEN PECK

Amanda Sturgeon, FAIA, is a driving force of the living building movement in Cascadia, and throughout the world. As CEO of the International Living Future Institute (ILFI), she has pushed the boundaries of biophilic design to reconcile humanity's relationship with the natural world, and is now taking on a new challenge: The Biophilic Design Initiative. Amanda will be one of our keynote speakers at *CitiesAlive* in Seattle when we pay tribute to the late Stephen Kellert and explore the future of biophilic design. She shares with me how the new initiative came to be, its goals, and how important this initiative will be to meet the Living Future Challenges.

SWP: Stephen Kellert introduced the first comprehensive framework of biophilic design, what do you think about his contribution?

AS: In my perspective, he really put biophilic design on the map. He framed biophilic design in a comprehensive way and brought people together who could accelerate its adoption. He built on E.O. Wilson's work on biophilia and adapted it to the built environment. He understood its ability to deeply connect people and nature in the built environment.

SWP: Can you tell us more about the Biophilic Design Initiative and what your plans are to promote the biophilic design?

AS: The biophilic design Initiative was created by ILFI to bring together renown experts on biophilic design so that there could be collaboration and acceleration of the discipline. After 18 months of working together we are collaborating around three areas; research, education and tools. We have developed a webinar series, and have started research on 15 case studies that will soon be published. A summit was held at the Living Future unConference that explored how to accelerate the adoption of biophilic design.

A new grant has been secured that will be accelerating the work of the initiative over the next two years.

BIOPHILIC DESIGN IS PRETTY KEY TO MEETING THE LIVING BUILDING AND LIVING COMMUNITY CHALLENGES. - AMANDA STURGEON

SWP: When will the Biophilic Design Initiative Resources be available?

AS: The Biophilic Design webinar series is available now in ILFI's on-demand education platform. This month we will be releasing a one-hour PowerPoint that our volunteers can deliver around the world. Fifteen global case studies will go live on our website this fall.

SWP: How important is biophilic design to meet the Living Future Challenge?

AS: Biophilic design is pretty key to meeting the Living Building and Living Community Challenges. In order to move towards the creation

of living systems, designing in response to place, climate and culture are key. Biophilic design will help to revolutionize the way we design and in turn make the creation of Living Buildings easier.

SWP: Is there a particular design process that lends itself to biophilic design?

AS: Integrative design processes which are multi-disciplinary are at the heart of what it takes to achieve living buildings and biophilic design. These processes involve multi-stakeholder involvement and looking at all aspects of the building and surrounding site at the beginning of a project.

SWP: What is your vision of the

future of biophilic design in North America and beyond?

AS: We'd like to see biophilic design become much more prevalent in architectural design, whether they are Living Building Challenge or not. We have a long way to go to integrate it into architecture and design curriculum and to train existing professionals but ultimately people resonate with designing with nature in mind and are inspired by the opportunity to connect to nature.

FIND OUT MORE

Learn more about the Biophilic Design Initiative here:

<https://living-future.org/biophilic-design/>

See the Biophilic Design webinar series here:

<https://living-future.org/online-learning/>

Join us for our Biophilic Design Workshop, Monday, September 18th at CitiesAlive. Register at citiesalive.org.

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THE 'PERFECT' BIOPHILIC PLANT

KOELERIAMACRANTHA

DR. BRADLEY ROWE, MICHIGAN STATE UNIVERSITY, EAST LANSING

The theme of this *Living Architecture Monitor* is biophilia – a term that literally means a love of life or living things. For most of us, there is a psychological and/or biological need to be connected to nature. Many studies have shown that human beings are healthier, more productive, and experience less stress when they have some interaction with the natural world. In line with the concept of biophilia, plants that can move or sway in the breeze tend to catch our eye to a greater extent than those that are shorter or more static such as sedum or mown grass. Taller plants also provide more structure during the winter months as they rise above the snow. One species that is suitable for some green roofs and also fits this description is the grass *Koeleriamacrantha* (Prairie Junegrass).

Prairie Junegrass is a cool season, perennial clump-forming grass that is native throughout much of Europe, Asia, and North America except for the southeastern United States. It primarily occurs in prairie habitats at elevations from 1220 to 3660 m (4,000 to 12,000 ft) that receive 30 to 50 cm (12 to 20 in) of annual precipitation and is classified within USDA hardiness zones 3 to 9. It naturally grows in full sun in rocky to sandy soils with good drainage and low fertility which makes it an ideal candidate for green roofs. The species is considered tolerant of cold, heat, and drought, but the magnitude of its tolerance depends on the seed source. It has survived on our roof when grown in 20 cm (8 in), but completely died out in a depth of 10 cm (4 in) without any supplemental irrigation.

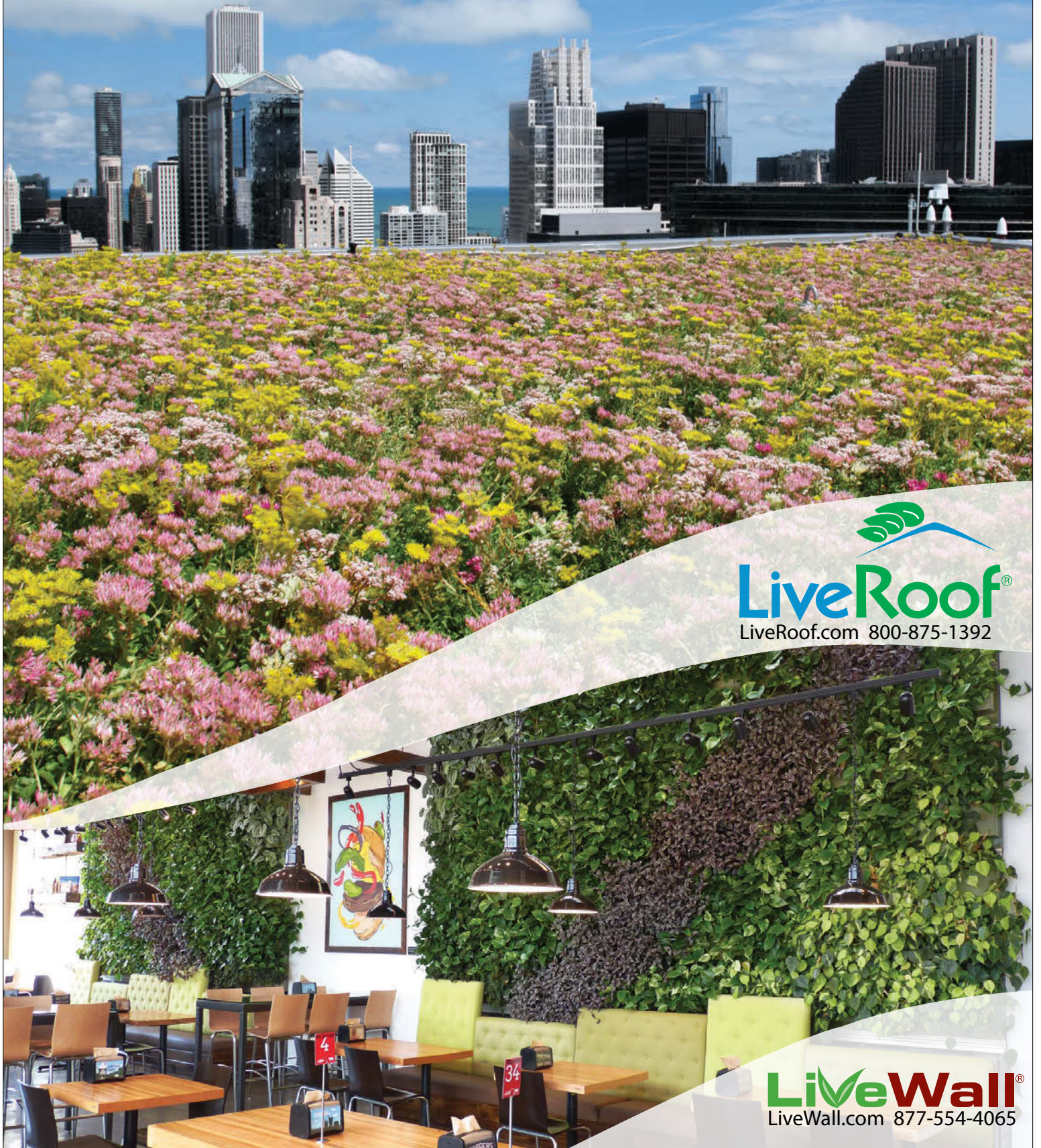
The species reaches heights from 30 to 60 cm (12 to 24 in) with a typical spread of 23 to 45 cm (9 to 18 in). The narrow, pointed, light green leaves are basal and relatively short (up to 18 cm (7 in) long). What gives the species its height are the long flower spikes located well above the leaves that appear during late spring. The green to purplish seed heads fluff open during flowering and become more silver as they mature. It has early season appeal as it greens up early in spring and flowers by May or June. On the down side, even though it is one of the first grasses to green-up in the early spring, it may brown out and enter dormancy during the summer in areas with hot climates. The cooler the climate, the longer it will last into the fall.

Prairie Junegrass may naturalize a roof by spreading seed, but it is unlikely to invade surrounding areas as it usually spreads slowly because seedlings are slow to establish. If sowing seed on a roof, the area must be maintained weed free as the seedlings will not compete with faster growing vegetation. Planting plugs generally results in greater success. It experiences no significant insect or disease problems, but the pollen can make life miserable for those of us with grass allergies.

Dr. Brad Rowe has been conducting green roof research at MSU since 2000. He was the founding chair of the GRHC Research Committee and received the GRHC Research Award of Excellence in 2008. Brad also teaches a course on green roofs and walls at MSU.

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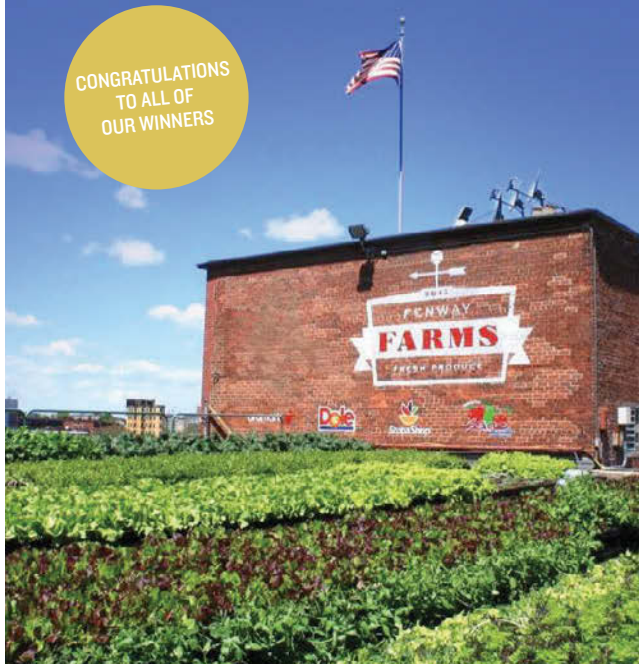
AWARDS OF EXCELLENCE

The Green Roof and Wall Awards of Excellence Luncheon will be held on September 20th at the 15th Annual CitiesAlive in Seattle, WA. We celebrate the most outstanding examples of green roof and wall design; policy; research; and corporate leadership.

This year's exceptional people and projects are doing everything from reimagining our public spaces, implementing the most cutting edge integrative design concepts, to experimenting with new and innovative urban agriculture projects. These awards acknowledge excellence in innovative green roof and wall design; raise awareness of the multiple benefits that green infrastructure provides; honors individuals who have made outstanding contributions to green roof research and supportive public policies; and highlight companies and people who have been champions of the green roof industry. Please join us for the awards luncheon September 20.

We invite everyone to submit your projects to be considered for the 2018 Awards to be presented at CitiesAlive in New York City. Submission details can be found at greenroofs.org or citiesalive.org.

CONGRATULATIONS
TO ALL OF
OUR WINNERS



JUDGE'S TABLE

We would like to thank the judges who generously donated their time and expertise.

Jeffrey Bruce, GRP, FASLA, ASIC, LEED
Jeffrey L. Bruce and Co. LLC & Chair,
GRHC Board of Directors

Chris Brunner
New York Green Roofs

Terry Guen, FASLA
Terry Guen Design Associates

Michael Krause
Kandiyo Consulting

Monica Kuhn, GRP, O.A.A
Monica E. Kuhn, Architect Inc.

Christopher Lyon, MBA
Tournesol Siteworks

David J. Yocca, FASLA, AICP, LEED AP
Conservation Design Forum

Ishi Buffam
Assistant Professor,
University of Cincinnati

Dr. Reid Coffman
Associate Professor, Kent State University

Virginia Russell, FASLA, RLA, LEED AP, GRP
Professor of Architecture,
Horticulture Program Director,
University of Cincinnati

Dr. Youbin Zheng
Environmental Horticulture Chair,
University of Guelph

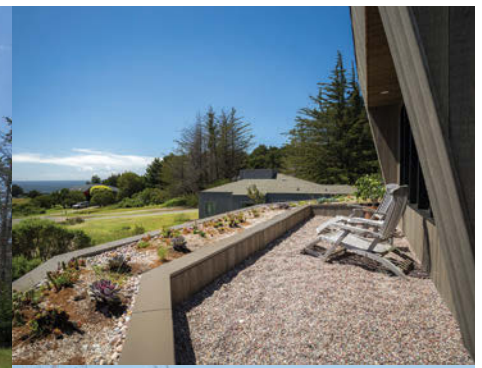
Peter Lowitt, FAICP
Director, Devens Enterprise Commission

Hamid Karimi, PhD
Deputy Director, Natural Resources
Administration, DC Department
of Energy & Environment



"By raising the native meadow to a living roof, Hedgagate softens the foreground and preserves the public view of the California Coastal National Monument."

— Janet MacKinnon,
AE Design, Owner/Architect/Construction Manager



All photos courtesy of Jonnu Singleton

A BIOPHILIC RESIDENCE ALONG THE PACIFIC

Hedgagate is located on the west side of California Highway 1 on the scenic, north Sonoma coast. From the highway, the view to the Pacific Ocean and the California Coastal National Monument is protected by legislation to preserve this natural wonder for public appreciation. The protective legislation placed significant controls on the design of Hedgagate. The structure was limited to 1,300 square feet and the height limited to 16 feet above the coastal meadow. The limited conditioned space interdigitates with protected outdoor spaces and the ready access to the exterior on both the ground floor and upper (main) level encourage outdoor living.

Bill Browning's work on the 14 Patterns of Biophilic Design provides a vocabulary to discuss the design architects intuitive integration of "spatial configurations in Nature commingled with patterns of Nature in the Space and Natural Analogues."

The Hedgagate design provides abundant visual connection with Nature as well as non-visual connections: the sound of surf, the bark of seals, the caw of crows and seagulls, the call of California quail and the smell of grasses and salt air. The sounds of flowing water from the rain room provide the analogue to a native stream. The unimpeded view of the Pacific Ocean and shoreline whitewater yield a prospect both stimulating and inviting. In contrast, the back corner of the rain room, its green walls and flowing water create refuge from the circulation of the household and natural elements. The view from this back corner expands to a panoramic view of the Pacific Ocean providing the mystery and anticipation of more beyond the refuge. Entering and exiting Hedgagate stimulate the senses with variable airflow and temperatures. The numerous angles, skylights and open roofs provide changing conditions of light and shadow. The native plants lifted to the roofs reflect the local coastal meadow. As one climbs the stairs into Hedgagate, more of the living roof becomes visible, then the green wall appears, and finally when the top of the stairs, the view opens and one looks down, from the safety of solid footing, 15 feet into lush vegetation and flowing water of the rain room. A slight turn of the head to the left, and the first glimpse of the oceanic views draws one further into the living space with the promise of more.

Built during a severe five year drought, it was important to maximize use of all available water. The rainwater/stormwater from the roof, retaining wall, rain room, and driveway, is collected for irrigation of the living roof and graywater is collected for irrigation of the ground landscaping. The judges praised this project for its integration both into the site's ecology, as well as the region's broader cultural goals.

DESIGN AWARD CATEGORY
Small Scale Residential

PROJECT
Hedgagate

LOCATION
The Sea Ranch, California

AWARD WINNER
AE Design

TEAM MEMBERS

Architectural Photographer
Jonnu Singleton

Growing Media Supplier
Joe DiNorscia, Rooflite –
Redi-Gro Corporation

Owner/Architect/Construction Manager
Janet MacKinnon, AE Design

**Rainwater/Graywater Systems
and Green Roof & Irrigation**
Kevin Heston, AE Design

**Stormwater, Graywater,
and Living Roof Design**
Paul Kephart, Rana Creek Design

Structural Engineer
Ivan Lee Welte,
I.L. Welte & Associates

DESIGN AWARD CATEGORY

Special Recognition

PROJECT

Mountain Equipment Coop Head Office

LOCATION

Vancouver, British Columbia

AWARD WINNER

Connect Landscape Architecture

TEAM MEMBERS

Architect

Greg Piccini, Proscenium Architecture & Interiors Inc

Hugh Cochlin, Proscenium Architecture & Interiors Inc

Civil Engineer

Peter Tapp, Kerr Wood Liedal

Client/Owner

Sandy Treagus, Mountain Equipment Co-op

Commissioning Agent

Stantec

Electrical/Mechanical Engineers

Roland Charneux, Pageau Morel and Associates

Energy Consultant

FVB Energy Inc

Environmental Consultant

Golder Associates, Ltd

General Contractor

Ventana Construction Corporation

Green Building Consultant

Corin Flood, Green Building Consulting & Design

Green Roof Landscape Installation

North by Northwest

Landscape Architect

Ken Larsson, Connect Landscape Architecture, Inc

LEED Consultant

Jason Packer, Recollective

Membrane Supplier

Homan Roofing Ltd

Roofing Contractor

Metro Roofing

Structural Engineer

Tanya Luthi,
Fast + Epp Structural Engineers

EXCELLENCE IN INTEGRATIVE, HOLISTIC DESIGN

The MEC Corporate Headquarters is a four-story heavy timber building located on a 101,000 sq.ft. former industrial site and it represents a highly visible example of a high performance building and landscape: passive energy, water management, and both interior and exterior amenity for occupants. The landscape and architectural design create a head office that functions as an extension of one of MEC's core values - "sustainability by design".

DESIGN OBJECTIVES INCLUDE:

1. Celebration of Rain Water

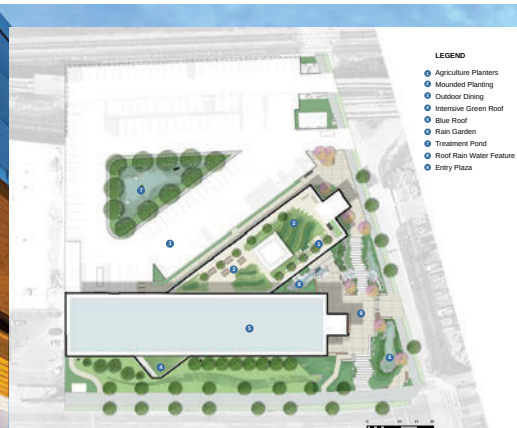
Located on the original China Creek, the project "daylights" and passively treats stormwater. The 'blue roof' captures rainwater for irrigation and non-potable building use. Stormwater is filtered and managed through a series of rain gardens and native water wise plantings. A vertical wall displays rain water falling from the roof to an at grade rain water feature.

2. Activating the Outdoors

The site is accessible - located adjacent to a rapid transit station and bike route. A large intensive green roof with panoramic views of the north shore offers leisure space, vegetable planters, and fruit trees for employees and clients. An entry plaza encourages social interaction with custom seating and bicycle storage.

Overall, the landscape supports MEC's vision of creating a forward-thinking workplace that fosters staff health. The plan provides approximately 8,565 sq.ft of intensive/extensive green roof space (27.5% of the 31,000 sq.ft. building footprint).

Judges praised the project's integration of green roof technology into broader systems such as water management and highlighting a great step in local community design leadership in the meadow roof and integration of small trees.



"This project includes some wonderful collaborative and social spaces and has been tailored to its inhabitants, offering up environmental features as a way to enhance their day-to-day working life. The green roof is not there just to gain a credit, but is a habitable program space for the enjoyment of employees"

- SAB Magazine

"The design completely plays into MEC's idea that you can have a place with a sense of environment, where you can connect with the context around you."

- Ron Clay, Proscenium



All images courtesy of Connect Landscape Architecture

RECONNECTING PEOPLE TO MODERN ENVIRONMENTAL CONCERNS

The state-of-the-art Visitor Centre in Vancouver re-connects people to the environmental issues of the 21st Century including water and energy conservation, re-use and recycle, beauty of our native plant ecology, and a healthier way of building and design. The overall scope was five acre site master plan including a 16,000-ft² green and blue roof.

Inspired by the form of a native orchid leaf, the VanDusen Botanical Garden Visitor Centre forges a unique relationship between architecture, landscape, and ecology to create a landmark facility. The dynamic roof is the cornerstone of the building's water conservation strategy with six individual undulating roof petals; two blue roofs for water collection and solar hot water tubes and four petals planted with living roofs. The restorative planting strategy is inspired by the Pacific Northwest Coastal Grassland communities featuring custom fescue grasses with native perennial bulbs and sedums. 100 per cent of site runoff is managed on site for a net zero water runoff facility.

The roof itself is shaped and divided like the orchid leaves. The green roof was carefully planned to reflect the Pacific Northwest Coastal grassland community and includes over twenty species of native plants, bulbs, and grasses. The unique undulating roof planes simulate rolls and hummocks with gentle slopes of 5 per cent to near vertical grades. The variety of solar orientation creates multiple opportunities for grassland/bulb plant communities.

Green roof runoff is directed to an existing stream, enhanced infiltration beds, and wetlands in addition to underground cistern. Key sitelines were established from the main arrival bridge, upper terrace, restaurant, and street and throughout the gardens to reinforce the importance of the roof to the image of the project. The project is certified for LEED Platinum and Living Building Challenge (LBC) 2.0. The judges praised the project's connection to greater site systems and integration of ecology and technology.

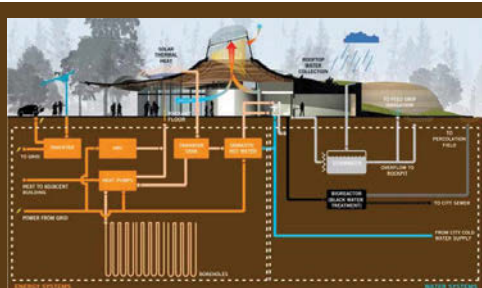
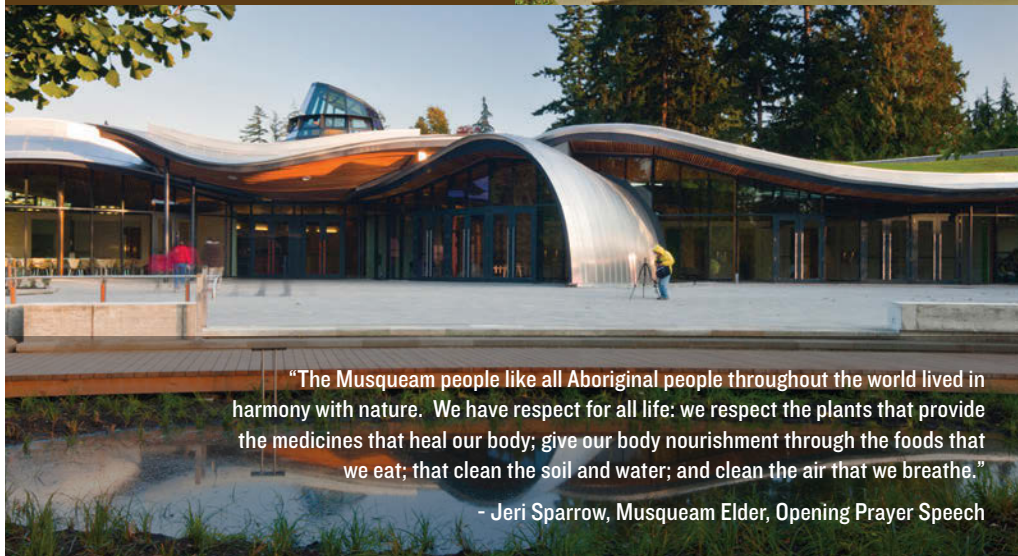


Image courtesy of Connect Landscape Architecture



All photos courtesy of Brett Ryan Studios



"The Musqueam people like all Aboriginal people throughout the world lived in harmony with nature. We have respect for all life: we respect the plants that provide the medicines that heal our body; give our body nourishment through the foods that we eat; that clean the soil and water; and clean the air that we breathe."

- Jeri Sparrow, Musqueam Elder, Opening Prayer Speech

DESIGN AWARD CATEGORY

Extensive Institutional

PROJECT

VanDusen Botanical Garden
Visitor Centre

LOCATION

Vancouver, British Columbia

AWARD WINNER

Connect Landscape Architecture

TEAM MEMBERS

Acoustics

BKL Consultants Ltd

Green Roof Advisor/Supplier

Jelle Vonk, Zinco Canada

Architect

Jim Huffman, Perkins + Will
Canada

Building Envelope

Sophie Mercier, Morrison Hershfield

Civil Engineer

RJ Binnie & Associates

Client

Harry Jongerdon,
VanDusen Botanical Gardens

John Ross, Vancouver Parks Board

Construction Manager

Rebecca McDiarmid, Ledcor Construction

Landscape Architects

Cornelia Hahn Oberlander

Ken Larsson, Connect Landscape
Architecture, Inc

Landscape Contractor

Jeremy Miller, Houston Landscapes

Living Roof Consultant & Supplier

Ron Schwenger, Architek

Mechanical/Electrical

Goran Ostojic, Integral Group

Membrane Installer

Metro Roofing

Membrane Supplier

Soprema

Structural Engineer

Duane Paibroda, Fast and Epp



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INSPIRING THE SPORTS COMMUNITY TO CELEBRATE HEALTHY CHOICES

Linda Henry, wife of Red-Sox owner, John Henry, wanted to support urban agriculture and provide a healthy-food alternative to the standard hot-dog-and-hamburger fare that Fenway has traditionally offered. Gate A is located on the corner of Yawkey Way and Brookline Street, and for 100 years, the backside of the third baseline stadium looked down on Gate A's hot roof and air-handling equipment. On April 13th 2015, Opening Day, fans looked down on a new, sprawling 5,000-square foot rooftop farm. Peppers, kale, and tomatoes replaced black rubber and grey metal; and tens of thousands of onlookers couldn't believe what they saw. The site has since become the most popular stop on the Fenway-Park tour, and the Huffington Post ranked it the number one great secret spot in Boston.

In order to prevent the growing media from blowing off the roof, milk crate-planters were lined with fabric pots to secure it. The milk crate square shape maximizes every inch of limited roof space and provides structural support for irrigation lines, trellising, and low tunnels without penetrating the membrane. Drip emitters distribute water directly to the roots and eliminate runoff. GCG harvested over 4,800 lbs of vegetables in 2015, and Fenway contracted planting of the adjacent roof in 2016.

The mission of this project was to inspire the Red Sox community in Boston, New England and beyond, to celebrate health; individually, inspiring healthy daily choices and together, inspiring us to imagine what is possible to bring about healthier communities. With 2.9 million visitors each year, over 5,000 pounds of fresh food harvested each year, and Michelle Obama taking note: "six years ago, I don't think any of us could have imagined that Fenway Park would have a 5,000-square-foot farm on its rooftop to provide fresh produce for its fans." Judges praised for the project's ability to connect green roof technology with new audiences, and exceeding typical expectations for sports and commercial institutions.

DESIGN AWARD CATEGORY

Intensive Institutional

PROJECT

Fenway Farms

LOCATION

Boston, Massachusetts

AWARD WINNER

Recover Green Roofs

TEAM MEMBERS

Client

Chris Knight, FenwayPark

Maintenance / Irrigation Technician

Richie Harvey, Recover Green Roofs

Membrane Installation

Peter Chaffee,
Chaffee Industrial Roofing

Project Manager

Mark Winterer, Recover Green Roofs

Turf Consultant

Scott Koesterich,
New England Turf Store

Irrigation System

Weathermatic Smatlink
Drip Irrigation

Waterproofing

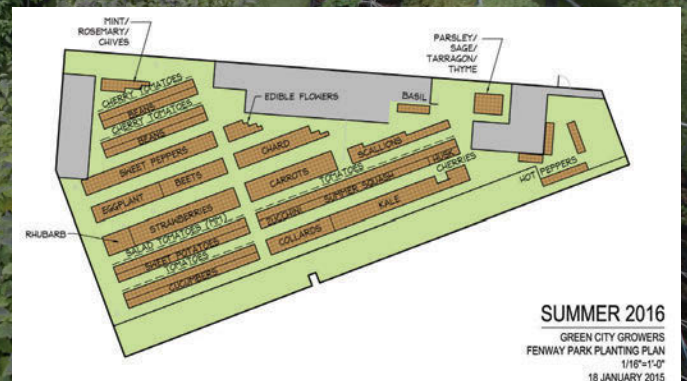
Carlisle EPDM



All images courtesy of Recover Green Roofs

"The beauty in this design is its simplicity. Our goal was to maximize every inch of space on MLB's oldest park, so we created a modular raised-bed system using square milk crates that fit into perfect rows. The recycled plastic shells provide structure for attaching farm components and are easy to move away from snowdrift-prone areas after the final harvest. We used responsibly-sourced organic potting soil, fabric liners that promote rapid root growth, and an on-demand smart irrigation system that distributes water directly to each plant's roots. A turf layer protects the waterproof membrane and provides a durable surface for the farmers at Green City Growers who harvest over 5,000 pounds of organic vegetables annually."

- Mark Winterer, Recover Green Roofs



SUMMER 2016
GREEN CITY GROWERS
FENWAY PARK PLANTING PLAN
1/16"-1/4"
18 JANUARY 2015

Photo courtesy of Hanna Hoggatt Photography



DESIGN AWARD CATEGORY

Extensive Industrial/Commercial

PROJECT

Rooftop Wheat Prairie

LOCATION

Chicago, Illinois

AWARD WINNER

Omni Ecosystems

TEAM MEMBERS

General Contractor

Pat O'Bryan, Bulley & Andrews

Green Roof Designer, Manufacturer, Installer

Molly Meyer, Omni Ecosystems

Landscape Architect

Studio Gang Architects

Owners Representative

Len Skiba, Daccord LLC

Wheat Farming & Processing

Tracy Boychuk, The Roof Crop LLC

CHICAGO'S AMBER WAVES OF GRAIN

The Chicago Wheat Prairie is a unique, picturesque landscape growing three stories above a bustling Chicago intersection. A complete anomaly in aesthetics and general design, it is the only rooftop in the city growing amber waves of grain. The golden wheat accented by bright wildflowers offers city dwellers a one-of-a-kind visual splendor. To immerse visitors into the wheat prairie, a room of floor-to-ceiling glass windows was constructed in the middle of the roof, offering incredible views from all angles.

In designing this roof, a team of architects and ecologists sowed a crop of red winter wheat into a 4,700-square-foot, 5-inch rooftop prairie. The grain's purpose was threefold: creating a singular pastoral aesthetic for the client, one that mirrored the Midwestern landscape; providing wind protection for cover crops and wildflowers also growing in the meadow; and determining the extent to which green roofs could address food security issues in urban landscapes vis-a-vis cereal grain production. The proof-of-concept research conducted at this site resulted in the first-known rooftop wheat harvest, which produced 66 pounds of high-quality whole wheat pastry flour from a hyperlocal source, create employment opportunities along the way, and provided a working model for urban grain production.

With more cities incentivizing green roofs, this project takes important steps in shaping the future of urban landscapes. It lays important groundwork for creating a city where rooftops are no longer passive landscapes but spaces for discovery, productivity and resiliency. Judges praised the project for its interesting mixture of agriculture and ecology.

"The unassuming star of this project was the prolific crop of winter wheat which matured into an edible, harvestable grain. The amber waves created a unique pastoral aesthetic for the client, protected the underlying prairie from wind damage, and tasted delicious when milled into pastry flour and baked into cookies."

- Omni Ecosystems CEO Molly Meyer

"With more than fifty species planted on top of a historic building, our mini prairie functions more as a thriving ecosystem than a green roof, creating food and habitat for birds, butterflies, insects, fungi, and now people."

- Studio Gang Founding Principal Jeanne Gang

A PIONEER IN CHICAGO URBAN AGRICULTURE

The Commercial Rooftop Farm is a fully-functioning, commercial-scale rooftop farm located on the West Side of Chicago. The roof produces an impressive yield of 44 different crops in more than 100 varieties including green beans, potatoes, radishes, turnips and raspberries. Every week during harvest season, produce from the roof is picked, processed and packaged on-site before it's sold to nearby restaurants and consumers, and served in locally-sourced dishes.

The site features four roofs, three of which are farmed commercially, and one 1,200-square-foot rooftop lawn used for observation and research. The food meadow is supported by an exceptionally lightweight substrate ranging in depth from 4 to 8 inches. The roof is a polyculture system, combining perennials and food crops to establish a healthy nutrient cycle and generate bountiful harvests. Perennial cover crops, many of which are edible, create a stable and established ecosystem. Seasonal seedling crops, including tomatoes, peppers, and eggplant, are added to diversify the rooftop menu.

The Carroll project is laying the groundwork and providing crucial research for these future rooftop farming projects, making it a pioneer in urban agriculture in Chicago. The building below the commercial rooftop farm houses three education-focused non profits. Two of these are after-school programs which incorporate the farm into much of their programming, teaching lessons in ecology, biology and food production and using the green roof as their classroom. Urban youth with little to no knowledge of agriculture are provided invaluable exposure to a fully-functioning farm. Select students who wish to continue their education are offered summer employment with the green-roof company. The third organization is a coalition of Chicago chefs who create food and nutrition programming for local schools. Rooftop produce is occasionally used in their classroom demonstrations and lessons, and the farm collaborates with this group.

Fruits, veggies and florals harvested from the farm are purchased by nearby food cooperatives, consumers and restaurants which use them in locally-sourced dishes. The farm grows more than 100 varieties of crops including peppers, raspberries, melons, cucumbers, kales, apples and more. Harvests are conducted weekly, making the roof a viable and reliable source of hyperlocal food. Judges praised the project for its integration of urban living and agriculture as well as its array and diversity of food production.

"The roof farm epitomizes Omni's mission to create resilient landscapes that are beautiful and that create social and ecological solutions. Serving as a hands-on classroom, hyper-local food source, native pollinator pathway, and peaceful workplace respite, the rooftop farm elevates the possibilities of living infrastructure systems."

- Omni Ecosystems CEO Molly Meyer



All photos courtesy of Hanna Hoggatt Photography

DESIGN AWARD CATEGORY

Intensive Industrial/Commercial

PROJECT

1516 West Carroll Ave Roof Farm

LOCATION

Chicago, Illinois

AWARD WINNER

Omni Ecosystems

TEAM MEMBERS

Architect

Lynsey Sorrell,
Perimeter Architects

Farm Marketing & Operations

Tracy Boychuk,
The Roof Crop LLC

General Contractor

Kirk Bacastow, LG Construction

Green Roof Designer, Manufacturer, & Installer

Molly Meyer, Omni Ecosystems

Owners Representative

Paul Clausen,
Clausen Management Services

Roofer

Andy Moglieniki, AB Edwards

"I've marveled watching this rooftop grow-- not only as an ecosystem, with a more impressive array of crops establishing every year-- but as a space for fellowship and community."

- Tracy Boychuk,
The Roof Crop Manager and Co-Founder

"1516 West Carroll represents the best of what Perimeter Architects strive for in every project: innovation, collaboration, great design and clever solutions. The roof system is so light and flexible, engineering the roof was far less complex than with other systems on the market but the results are incomparable."

- Lynsey Sorrell,
Perimeter Architects Principal

eco roof

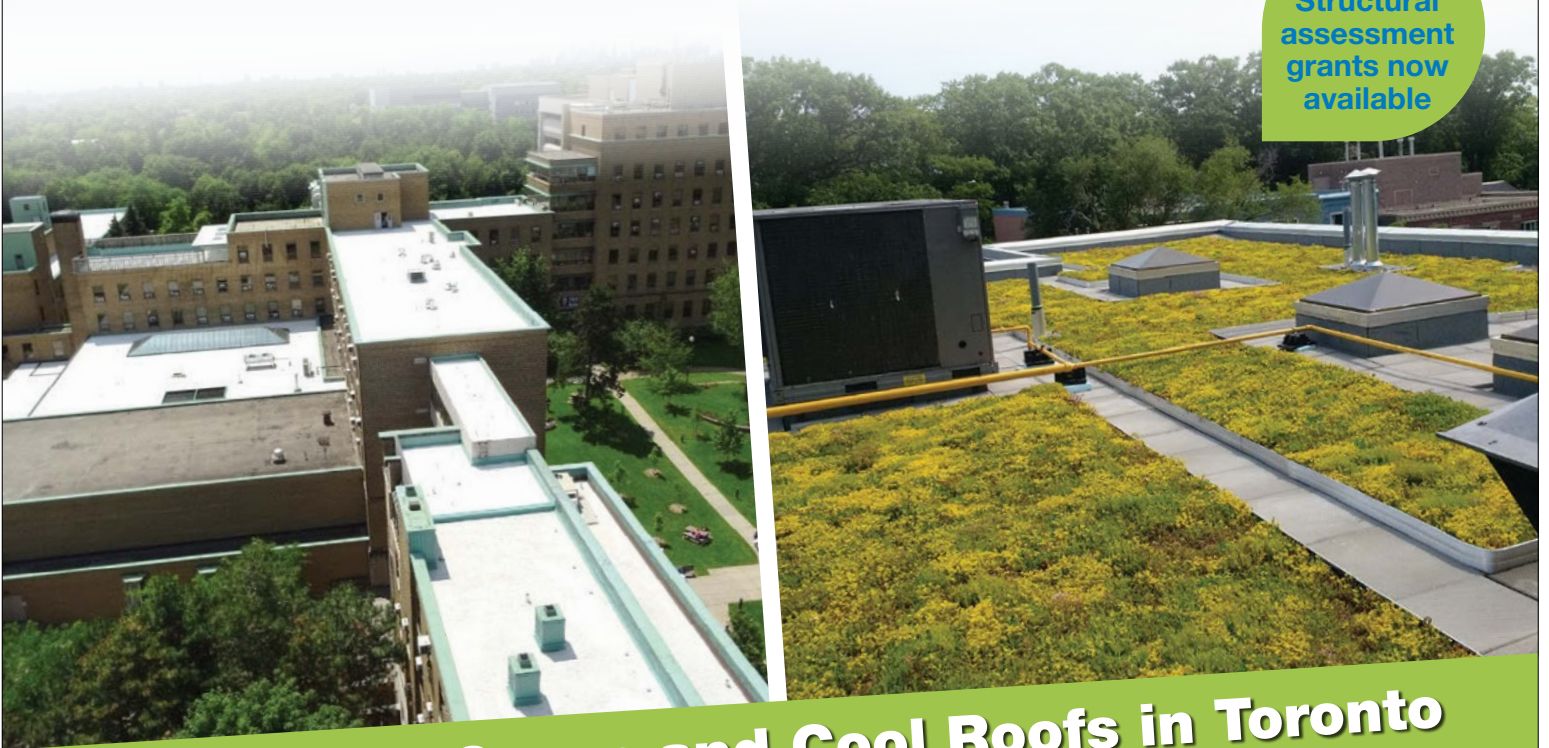
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"Thanks to the Restorative Design Collective, the Bertschi Living Building Science Wing is a model for sustainability in construction, and has challenged our industry to push for more net-zero buildings in our region and beyond."

- Chris Toher,
Skanska Executive Vice President
and Seattle General Manager

"The Living Building Science Wing will allow students to expand upon current components of the science and sustainability curriculum, such as rainwater harvesting and solar energy. In addition, students will learn about passive ventilation, net-zero water and net-zero energy consumption, concepts that will push their thinking and understanding decades into the future!"

- Brigitte Bertschi,
Head of Bertschi School

All images courtesy of GGLO

A MODEL FOR THE WAY WE APPROACH THE BUILT ENVIRONMENT

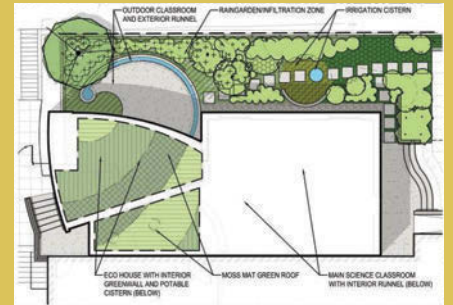
The Green Wall was designed as an integral component of The Bertschi School Science Wing, with a primary role of meeting the Water Petal requirement of the Living Building Challenge (LBC). Located in Seattle's Capitol Hill Neighborhood, the project was one of the first in the world to pursue the Living Building Challenge v2.0 criteria.

This non-profit elementary school science wing was collaboratively designed with the students and designed pro-bono by the entire design team. A 20-kilowatt PV system produces all of the electricity for the building and allows students to participate in real-time monitoring of the building's energy use and solar power production. All the water needed for the building is collected and treated on site. This is done through a variety of methods including cisterns for storage, an interior green wall which treats grey water and a composting toilet to treat black water. The most important aspect of the project is that all sustainable features are visible and functional to students to learn ecological concepts that can become intrinsic values for future generations.

The Water Petal of the LBC requires 100 per cent of stormwater and building water discharge to be managed onsite. Greywater from the classroom sinks flows down the drain, through an initial filtration system (Aqua2Use filtration units) and then is pumped to the green wall with distribution through an embedded (red list compliant) drip irrigation system. The plant material, selected for its hardiness, tolerance of low light, and ability to absorb water from the soil, uptakes the greywater and disperses it through evapotranspiration. The wall is a key feature of the Eco-haus, designed as a demonstration space to meet the 'Beauty' Petal which includes imperatives for Beauty + Spirit and Inspiration + Education. An education facility for pre-k through 5th grade, each of the sustainable systems is expressed, through design, as a visible living learning tool for the students, who measure and monitor performance of the green wall, rainwater harvesting cisterns, and other key features of the building.

Intended to be a model for the way we approach the built environment, the project is open for weekly tours by neighborhood residents, parents, and design professionals and has received thousands of visitors in the short time that it has been open. The judges praised the project's connections to water and research, varied plant palette, as well as its integration into a larger system.

Visit this project in a tour during CitiesAlive Seattle, September 18-21, 2017.



DESIGN AWARD CATEGORY

Interior Green Wall

PROJECT

Bertschi Living Building Science Wing

LOCATION

Seattle, Washington

AWARD WINNER

GGLO

TEAM MEMBERS

Architectural Design

Chris Hellstern, KMD Architects

Civil Engineering

Colleen Mitchell, 2020 Engineering

Food Systems Consultant

Brook Sullivan, Back to Nature LLC

Geotechnical Engineering

Dave Cook, GeoEngineers

Landscape Architect

Mark Sindell, GGLO

Mechanical/Electrical/Plumbing

Hollis Heron, Rushing

Preconstruction/Construction Services

Stacey Smedley, Skanska

Public Relations Services

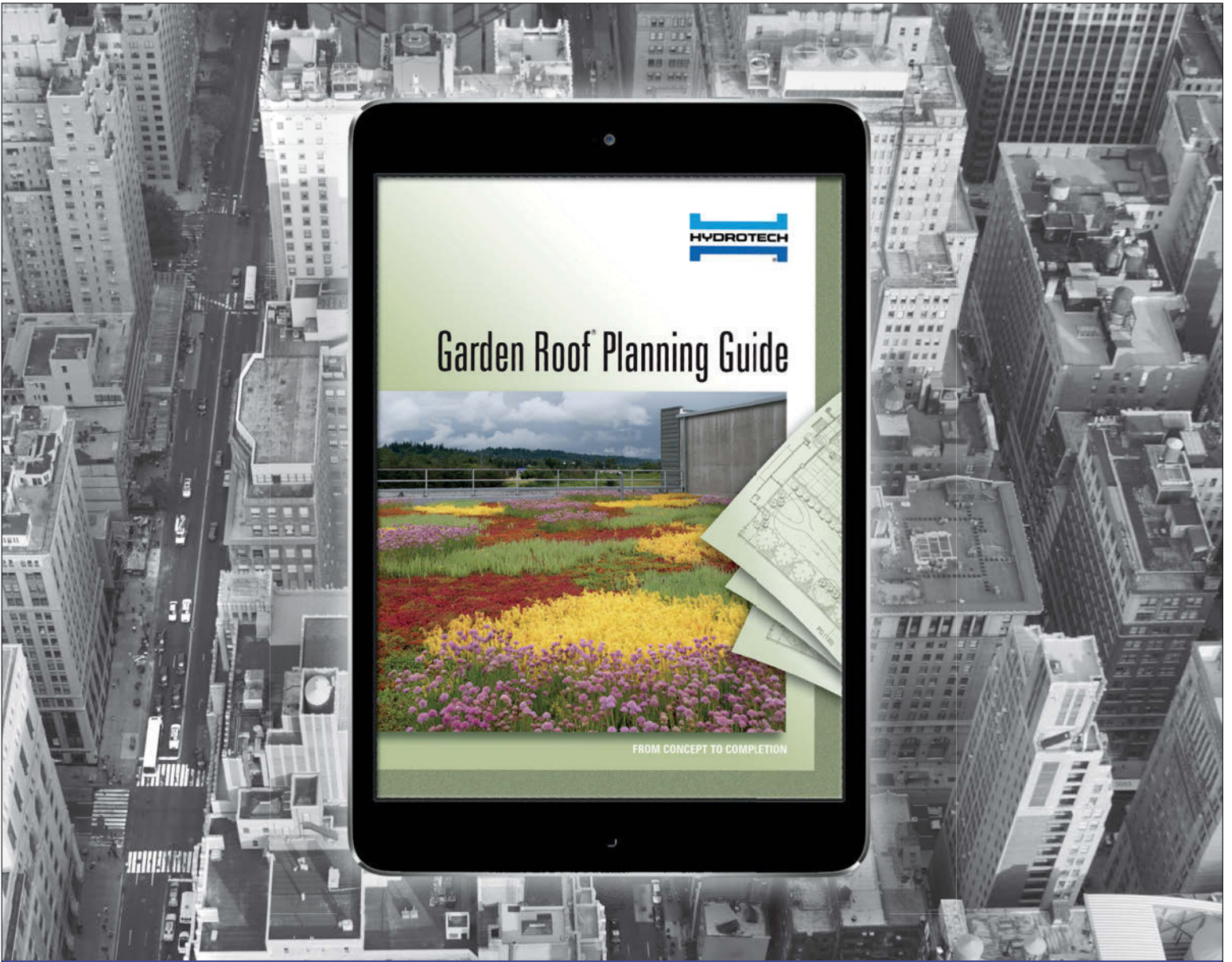
Megan Hilfer, Parsons Public Relations

Structural Engineering

Quantum Consulting Engineers

Sustainability Consultant

Chris Edlin, O'Brien and Company



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GREEN ROOFS FOR HEALTHY CITIES PRESENTS

THE LIVING ARCHITECTURE POLICY LIBRARY AND CHICAGO'S NEW SUSTAINABLE DEVELOPMENT POLICY

BY MICHAEL BERKSHIRE AND EMMA TAMLIN

BOX: GRHC POLICY COMMITTEE MEMBERS

HAMID KARIMI - Chair, Washington DC
(Board Representative)

PETER LOWITT - Vice Chair, Director Devens Enterprise
Commission (Board Representative)

ADRIANA AIONA - Stormwater Management Manual,
Bureau of Environmental Services, City of Portland

MICHAEL BERKSHIRE - Green Projects Administrator,
City of Chicago

ANNE BRASK - Planner/Urban Designer,
San Francisco Planning Department

AMY CHOMOWICZ - Ecoroof Program Administrator,
City of Portland

ALICE COKER - Environmental Specialist,
City of Portland

JEFF JOSLIN - Director of Current Planning,
San Francisco Planning Department

BRANDON RIETHEIMER - Denver Green
Roof Initiative

MICHELLE SAWKA - Project Manager, Green
Infrastructure at Toronto and Region Conservation

JANE WELSH - Senior Planner, Toronto
City Planning

Green Roofs for Healthy Cities (GRHC) works to develop the green roof and wall industry through education, advocacy, celebrations of excellence and promoting supportive policy development. GRHC's mission is to provide policy makers with tools and resources to make informed decisions about implementing green roof and wall policies. With the help of Policy Committee members from a variety of jurisdictions, we are rolling out the Living Architecture Policy Library (LAPL), a series of case studies that detail green roof and wall policies across North America. The LAPL expands on a policy's parameters, shares lessons learned, and provides goals for the future. Now more than ever, resources such as this can enable policy development at the local and regional level.

CASE STUDY #1: A LEADER IN SUSTAINABILITY: CHICAGO, IL

Chicago, IL was one the first jurisdictions in North America to implement a sustainable development policy for buildings. The Sustainable Development Policy was first created in 2004 as a way to encourage the adoption of sustainable building practices. The initial policy required projects receiving public funding or needing special approval to achieve a recognized green building certification (LEED, ENERGY STAR, and Green Globes), install a green roof, or exceeds stormwater ordinance performance requirements.

In 2016, the Sustainable Development Policy was completely overhauled to reflect changes in the market, and increase flexibility in meeting the City's sustainability goals. The yearlong review process was completed by Chicago's Department of Planning and Development with the help of an advisory committee and extensive community /stakeholder outreach.

Today, Chicago has the highest percentage of LEED certified or ENERGY STAR office buildings (66 per cent) of the 30 largest real estate markets in the US. In 2016, Chicago went up 6.5 per cent in green office space square footage (CBRE, 2017). For over a decade Chicago also had the highest number of green roof installations annually, before being taken over by Washington, D.C. As of 2013, Chicago had over 500 green roofs totaling more than 5.5 million square feet.

The new Sustainable Development Policy allows development teams to choose from a menu of strategies that can be tailored to fit the project's characteristics. Each strategy is assigned a point value. New construction projects are required to achieve 100 points and moderate and substantial renovations of existing buildings are required to reach 25 or 50 points respectively depending on the scale of the renovation. Moderate Renovation are projects that include partial or minor upgrades to the building systems and minor repairs to the exterior envelope. Substantial Renovations are projects that include new and/or upgraded building systems and extensive repairs to the exterior envelope.

The updated policy provides two compliance paths. One path requires projects to achieve the required number of points from the Menu of Sustainable Strategies (Figure 1). This path does not require the building to be certified through a pre-existing building certification program such as LEED, Passive House or the Living Building Challenge. The point system strategies fall under 10 categories: Health, Energy, Stormwater, Landscapes, Green Roofs, Water, Transportation, Solid Waste, Workforce and Wildlife.

Green roofs that cover 50-100 per cent of a building's net roof area are worth 10 points, and green roofs that cover 100 per cent of a buildings net roof area are worth 20 points. Green roof systems can earn an additional 10 points if the green roof growing media is at least 6 inches deep or if the plant list for the green roof contains at least 30 genera as plant diversity improves the long-term viability of the green roof. Deeper systems generally provide more stormwater benefits and improve the performance of plants.

The second path is for projects that are choosing to achieve building certification. Points are automatically given to these projects depending on the type of building certification being achieved and also the level of certification in some instances. Buildings that choose the certification path are still required to earn additional points, except for projects that are being certified under the Living Building Challenge program.

FIND OUT MORE

If you are interested in participating in the work of the Policy Committee please contact Emma Tamlin, etamlin@greenroofs.org

CBRE (2017). 2017 National Green Building Adoption Index; Chicago Department of Planning and Development (2017). Strengthening Chicago's Sustainable Development Policy. USGBC Webinar: Options for Incentivizing Voluntary Above Code Construction.

Chasen, Emily (2017). Chicago Grabs Lead in Green Office Buildings, Study Shows. Bloomberg.com Chicago Department of Planning and Development (2017). Strengthening Chicago's Sustainable Development Policy. USGBC Webinar: Options for Incentivizing Voluntary Above Code Construction. Michael Berkshire is the Green Projects Administrator, City of Chicago and Emma Tamlin is the Special Projects Coordinator, Green Roofs for Healthy Cities. etamlin@greenroofs.org

POLICY DRIVERS

The main motivations in updating the policy are improving stormwater management, reducing the urban heat island, mitigating and adapting to climate change, protecting wildlife, conserving water and developing the workforce.

STEPS TO IMPLEMENTATION

1. Assembled a committee of experts that met three times as a large group and then broke into smaller sub-groups and met separately.
2. Extensive community/ stakeholder outreach
3. Employee training
4. Stakeholder engagement/training

IMPLEMENTATION RESOURCES

The update of the policy includes:

1. Online policy introduction
2. Online policy handbook
3. Online compliance form

CHALLENGES ENCOUNTERED

Creating the policy was challenging as it was difficult to place a comparative value on various sustainable strategies and building certification programs.

SOLUTIONS

1. Thoughtful interpretation of policy
2. Consistent implementation of policy

LOOKING FORWARD

Chicago's Department of Planning and Development will review the policy and the implementation results in 6 months to a year and possibly make modifications/improvements at that time. For more information on the policy please contact Michael Berkshire, Green Projects Administrator, City of Chicago. Phone: 312-744-0363 / Email: michael.berkshire@cityofchicago.org

CHICAGO SUSTAINABLE DEVELOPMENT POLICY 2017

COMPLIANCE OPTIONS	POINTS REQUIRED		SUSTAINABLE STRATEGIES MENU														
	Starting Points	Number of Optional Points Required New Construction / Substantial Rehab / Moderate Rehab	Health								Stormwater						
1.1 Achieve WELL Building Standard			2.1 Designed to earn the Energy Star	CHOOSE ONE				CHOOSE ONE		CHOOSE ONE			3.4 Sump Pump Capture & Reuse	3.5 100-year detention for lot-to-lot buildings	3.6 100-year Detention for Bypass		
COMPLIANCE PATHS					2.2 Exceed Energy Code (5%)	2.3 Exceed Energy Code (10%)	2.4 Exceed Energy Code (25%)	2.5 Exceed Energy Code (40%)	2.6 Onsite Renewable Energy (3%)	2.7 Onsite Renewable Energy (5%)	3.1 Exceed Stormwater Ordinance by 25%	3.2 Exceed Stormwater Ordinance by 50%	3.3 100% Stormwater Infiltration				
Options Without Certification																	
All Options Available	0	100/50/25	40	30	20	30	40	50	10	20	10	20	40	5	5	5	
Options With Certification																	
LEED Platinum	95	5/0/0	40	NA	NA	NA	NA	NA	NA	NA	10	20	40	5	5	5	
LEED Gold	90	10/0/0	40	NA	NA	NA	NA	50	10	20	10	20	40	5	5	5	
LEED Silver	80	20/0/0	40	NA	NA	NA	40	50	10	20	10	20	40	5	5	5	
Green Globes 4-Globes	90	10/0/0	40	NA	NA	NA	NA	50	10	20	10	20	40	5	5	5	
Green Globes 3-Globes	80	20/0/0	40	NA	NA	NA	40	50	10	20	10	20	40	5	5	5	
Green Globes 2-Globes	70	30/0/0	40	NA	NA	NA	40	50	10	20	10	20	40	5	5	5	
Living Building Challenge	100	0/0/0	40	NA	NA	NA	NA	NA	NA	NA	10	20	40	5	5	5	
Living Building Challenge Petal	90	10/0/0	40	NA	20	30	40	50	NA	NA	10	20	40	5	5	5	
Enterprise Green Communities*	80	20/0/0	40	NA	NA	NA	NA	NA	10	20	10	20	40	5	5	5	
PassiveHouse	70	30/0/0	40	NA	NA	NA	NA	NA	10	20	10	20	40	5	5	5	

Planned Development Projects (PD) - New Construction

100 points required

PD, TIF, DPD-H MF and Class L - Renovation Projects*

TIF Funded Development Projects (TIF) - New Construction*

100 points required

Moderate Renovation Projects

25 points required

DPD Housing, Multi-family (>5 units) Projects (DPD-H MF) - New Construction

100 points required

Substantial Renovation Projects

50 points required

*does not apply to TIF assistance of less than \$1M (including but not limited to TIF-NIP, TIF Purchase Rehab, Streamlined TIF and SBIF programs)



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SUSTAINABLE STRATEGIES MENU																		
Landscapes				Green Roofs		Water		Transportation							Solid Waste	Work Force	Wildlife	
4.1 Working Landscapes	4.2 Natural Landscapes	4.3 Tree Planting	4.4 Achieve Sustainable Sites Certification	CHOOSE ONE		CHOOSE ONE		7.1 Proximity to Transit Service	7.2 Bikeshare Sponsorship	7.3 Bike Parking Residential	7.4 Bike Parking Commercial & Industrial	7.5 EV Charging Stations	7.6 EV Charger Readiness	7.7 CTA Digital Displays	8.1 80% Waste Diversion	8.2 Workforce Development	CHOOSE ONE	
				5.1 Green Roof 50-100%	5.2 Green Roof 100%	6.1 Indoor Water Use Reduction (25%)	6.2 Indoor Water Use Reduction (40%)										9.1 Bird Protection (Basic)	9.2 Bird Protection (Enhanced)
5	5	5	20	10	20	10	20	5	5	5	5	10	5	5	10	10	5	10
NA	NA	NA	20	10	20	NA	NA	NA	5	NA	NA	NA	5	5	NA	10	5	10
5	NA	5	20	10	20	NA	NA	NA	5	NA	NA	10	5	5	10	10	5	10
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5	5	5	20	10	20	NA	20	NA	5	NA	NA	10	5	5	10	10	5	10
NA	NA	NA	20	NA	NA	NA	NA	NA	NA	NA	NA	10	5	NA	NA	10	5	10
5	NA	5	20	10	20	10	20	NA	5	NA	NA	10	5	5	10	10	5	10
5	5	5	20	10	20	10	20	5	5	NA	NA	10	5	5	10	10	5	10
5	5	5	20	10	20	10	20	5	5	5	5	10	5	5	10	10	5	10

Moderate Renovation Projects = projects including partial or minor upgrades to building systems and minor repairs to the exterior envelope
Substantial Renovation Projects = projects including new and/or upgraded building systems and extensive repairs to the exterior envelope

Table courtesy City of Chicago Department of Planning and Development

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BIOPHILIA'S ROLE IN LIVING BUILDING CHALLENGE AND WELL CERTIFICATION

BY ELIZABETH CALABRESE, AIA, LEED AP

Photo courtesy of Elizabeth Calabrese

I was recently in Texas and spent a few hours along the San Antonio River Walk. I was reminded of the power of a place like this as I watched hundreds of people, young and old, alone, couples and groups meandering along the river's edge. Some people strolled along enjoying the views while others sat at umbrella topped tables, vine-covered trellises, or perched protected overlooks.

Along the river there were curved stone walls, cypress trees and rich pockets of green that provide playgrounds for ducklings following their mamas, squirrels and a large variety of birds. Many businesses back up to the River Walk, where employees have easy access to abundant nature and miles of walkways, punctuated with elegant bridges and sweeping stairways. The River Walk is an excellent example of how blue infrastructure, in this case San Antonio's flood control and storm sewer system, can be incorporated holistically to create a biophilic environment - thus fostering health and wellbeing - by connecting people to nature, natural systems and processes and to each other. Currently, there are two building certification programs that incorporate biophilic environments as part of their certification requirements, the Living Building Challenge (LBC) and the WELL Building Standard.

The LBC is made up of 7 petals or performance categories: Place, Water, Energy, Health & Happiness, Materials, Equity and Beauty. Within the Health & Happiness Petal is the Biophilic Environments Imperative:

“The project must be designed to include elements that nurture the innate human/nature connection. Each project team must engage in a minimum of one all-day exploration of the biophilic design potential for the project. The exploration must result in a biophilic framework and plan for the project that outlines the following:

- How the project will be transformed by deliberately incorporating nature through Environmental Features, Light and Space, and Natural Shapes and Forms;
- How the project will be transformed by deliberately incorporating nature's patterns through Natural Patterns and Processes and Evolved Human-Nature Relationships;
- How the project will be uniquely connected to the place, climate and culture through Place-based Relationships; and
- The provision of sufficient and frequent human-nature interactions in both the interior and exterior of the project to connect the majority of occupants with nature directly.

The plan must contain methods for tracking biophilia at each design phase. The plan should include historical, cultural, ecological, and climatic studies that thoroughly examine the site and context for the project.”

The Well Building Standard consists of 7 Concepts being Air, Water, Nourishment, Light, Fitness, Comfort and Mind. Biophilia is a feature of the Mind Concept. The intent of the Mind Concept “requires design, technology and treatment strategies designed to provide a physical environment that optimizes cognitive and emotional health.”

MIND CONCEPT

BIOPHILIA I – QUALITATIVE INTENT: TO NURTURE THE INNATE HUMAN-NATURE CONNECTION WITHIN THE PROJECT.

1. Nature Incorporation – environmental elements, lighting, space layout
2. Pattern Incorporation – nature’s patterns throughout the design
3. Nature Interaction – within the building and within the project boundary, external to the building

BIOPHILIA II – QUANTITATIVE INTENT: TO SUPPORT EMOTIONAL AND PSYCHOLOGICAL WELL-BEING BY INCLUDING THE NATURAL ENVIRONMENT IN INTERIOR AND EXTERIOR DESIGN.

1. Outdoor Biophilia – landscaped grounds, rooftop gardens and plantings accessible to building occupants
2. Indoor Biophilia – potted plants, planted beds and planted wall
3. Water Feature – ultraviolet sanitation or other technology to address water safety”

THE PRINCIPLES OF BIOPHILIC DESIGN, (KELLERT AND CALABRESE 2015) WERE CREATED TO OFFER GUIDANCE FOR CREATING A MORE HOLISTIC, INTEGRATED OR “ECO-SYSTEM” APPROACH TO BIOPHILIC DESIGN:

1. Biophilic design requires repeated and sustained engagement with nature.
2. Biophilic design focuses on human adaptations to the natural world that over evolutionary time have advanced people’s health, fitness, and wellbeing.
3. Biophilic design encourages an emotional attachment to particular settings and places.
4. Biophilic design promotes positive interactions between people and nature that encourages an expanded sense of relationship and responsibility for human and natural communities.
5. Biophilic design encourages mutual reinforcing, interconnected, and integrated architectural solutions.

Let us now consider how green and blue roofs, walls and infrastructure can play a significant role in achieving the biophilic requirements for the Living Building Challenge and WELL Building Standard certifications. Keeping in mind the River Walk and Biophilic Principles, a green roof can become a park, if there is consideration and integration of the natural and human constructed systems. A green roof can include diverse gardens, food production, gathering spaces, protected over-looks, niches, indigenous flora and fauna, paths for walking and exercise nodes. Trellises and terraces can be made of local wood and stone. Metalwork with nature inspired patterns can be used for balustrades and guardrails. Murals and mosaics or curved sweeping benches can be canvases for artists depictions of local lore and history. There are spots available for people to sit quietly to meditate or contemplate life, to serenade a loved one or visit with friends. Pergolas draped with wisteria or grape vines provide a sense of protection while breezes flow through them and patterns of dynamic light dance on the stone below. Vegetated trellises above windows create summer shading for glass and facades, inviting birds and butterflies to visit while allowing the façades to become visually and functionally dynamic with the changing of the seasons. Gray water can circulate through constructed wetlands teaming with tadpoles, frogs and newts into decorative or naturalistic fountains. Water features can add soothing sounds to mask the noise of traffic or coworker’s conversations, providing the sound and feel of clean water moving that we humans love.

Biophilic design offers the opportunity to create that same experience in your projects while also meeting the Living Building Challenge or the WELL Building Certification requirements.

FIND OUT MORE

The Practice of Biophilic Design - Kellert and Calabrese 2015 <http://www.biophilic-design.com/>
The Living Building Challenge <https://living-future.org/wp-content/uploads/2016/12/Living-Building-Challenge-3.0-Standard.pdf>
The WELL Building Standard https://www.wellcertified.com/sites/default/files/resources/WELL%20Building%20Standard_v1%20with%20January%202017%20addenda%20.pdf
Elizabeth Freeman Calabrese, AIA, LEED AP, has been in the design industry for 30 years. She is principal of Calabrese Architects, Inc. located in Burlington, Vermont, and her work includes national and international projects. Liz@CalabreseArchitects.com



Photo courtesy of Green Infrastructure Foundation

GREEN INFRASTRUCTURE FOUNDATION POISED TO RELEASE LIVING ARCHITECTURE PERFORMANCE TOOL

HAVE YOUR SAY ON THE PERFORMANCE TOOL WORKSHOP AT CITIESALIVE IN SEATTLE

BY ROHAN LILAUWALA, GRP

The Green Infrastructure Foundation (GIF) continues to develop the Living Architecture Performance Tool (LAPT), a program designed to set performance criteria and metrics for living architecture such as green roofs and green walls. The goal is to ensure that living architecture projects will achieve the maximum performance benefits, so they can be funded, designed, implemented, maintained and incented with greater confidence.

The LAPT has been undergoing development based on a series of white papers and subject matter expert meetings for several years. GIF is hosting a workshop Wednesday, September 20 in Seattle, in conjunction with *CitiesAlive*, to solicit feedback and continue to develop this standard. GIF's objective is to release the first full version of the standard in 2018 and invite designers and regulators to join in the pilot project stage over 2018 and 2019. GIF is looking for input from key stakeholders and subject matter experts on the performance of green roofs and walls, including metrics, weighting of credits, validation approaches, and strategies to achieve performance. If you are interested in participating in this free workshop and consultation please contact the author at rlilauwala@greenroofs.org.

GREEN INFRASTRUCTURE CHARRETTES TO BRING GREEN VISIONS AND ECONOMIC ANALYSIS TO SEATTLE AND THREE OTHER COMMUNITIES IN 2017

GIF's innovative Green Infrastructure Charrette program continues to bring together teams of interdisciplinary experts with local stakeholders to develop conceptual plans for the application of green stormwater infrastructure on actual sites. These plans are then subjected to a customized cost-benefit matrix developed by GIF. The goal of this project is to combine visuals with economic analysis to create a compelling vision for green infrastructure, while engaging policy and decision makers. GIF recently completed a successful charrette at Grey to Green for the cities of Toronto and Mississauga.

GIF is currently partnering with IoT Impact LABS on a unique Charrette in New Bedford, MA (August 11), where teams will explore the application of green infrastructure, enhanced by internet of things technologies like sensors, controls, analytics, and network-connected devices. Other upcoming Charrettes include Seattle, WA (September 21), Barrie, ON (October 11), and Richmond Hill, ON (October 26). Ontario Charrettes are supported by the Ontario Trillium Foundation, while the Seattle Charrette is supported by King County, CollinsWoerman and MIG|SvR. For participation or sponsorship opportunities, contact the author at rlilauwala@greenroofs.org.

Roban Lilauwala is Program Manager at the Green Infrastructure Foundation and Senior Researcher at Green Roofs for Healthy Cities.

CITY OF TORONTO TAKES TOP SPOT IN THE 13TH ANNUAL GREEN ROOF INDUSTRY SURVEY

BY BLAINE STAND

On July 13, 2017, Green Roofs for Healthy Cities (GRHC) released the results of its 13th Annual Green Roof Market Survey, and reported that the industry grew by double-digits in 2016. For the first time, GRHC Corporate Members reported that Toronto, Ontario had the most square footage of green roofing installed in 2016 of any region, with Chicago, Washington D.C., and Seattle following closely behind.

In response to this finding, Jennifer Keesmaat, Chief Planner for the City of Toronto said "It's no small feat that Toronto has been recognized as the leading city for green roof installation in North America. Our Green Roof Bylaw, in effect since 2010, has resulted in a new roof-scape for Toronto, cooling the city, helping to mitigate water runoff, while also adding beauty and biodiversity: it's a win win win!"

The North American green roof industry experienced an estimated 10.3% growth in 2016 over 2015. The survey results also point out that there were several new municipalities reporting green roof construction in 2016. According to the 2016 survey, corporate members recorded 889 projects in 40 US states and six Canadian provinces, installing 4,061,024 square feet of green roofing.

Matt Barmore, of Greenrise Technologies and GRHC's Chair of the Corporate Members Committee said, "The annual Green Roof Market Survey is vital to our understanding of the health and direction of the industry. We use the information contained in the Survey to identify new geographic priorities, to contextualize our business growth relative to the overall industry, and to determine potential gaps that we want to fill."

Although the green roof market continues to grow, there is still an enormous potential for new green roofs to be installed on tens of billions of square feet across North America. Strong policy support in cities like Washington, D.C. and Toronto is driving market growth. Green Roofs for Healthy Cities encourages municipalities, regions, states, and provinces to adopt policies in support of green roofs and green walls in order to build healthier, more sustainable and resilient communities. For the 2016 Annual Green Roof Industry Survey executive summary, visit greenroofs.org/green-roof-industry-survey.

*Blaine Stand is the Membership Coordinator at GRHC.
bstand@greenroofs.org*



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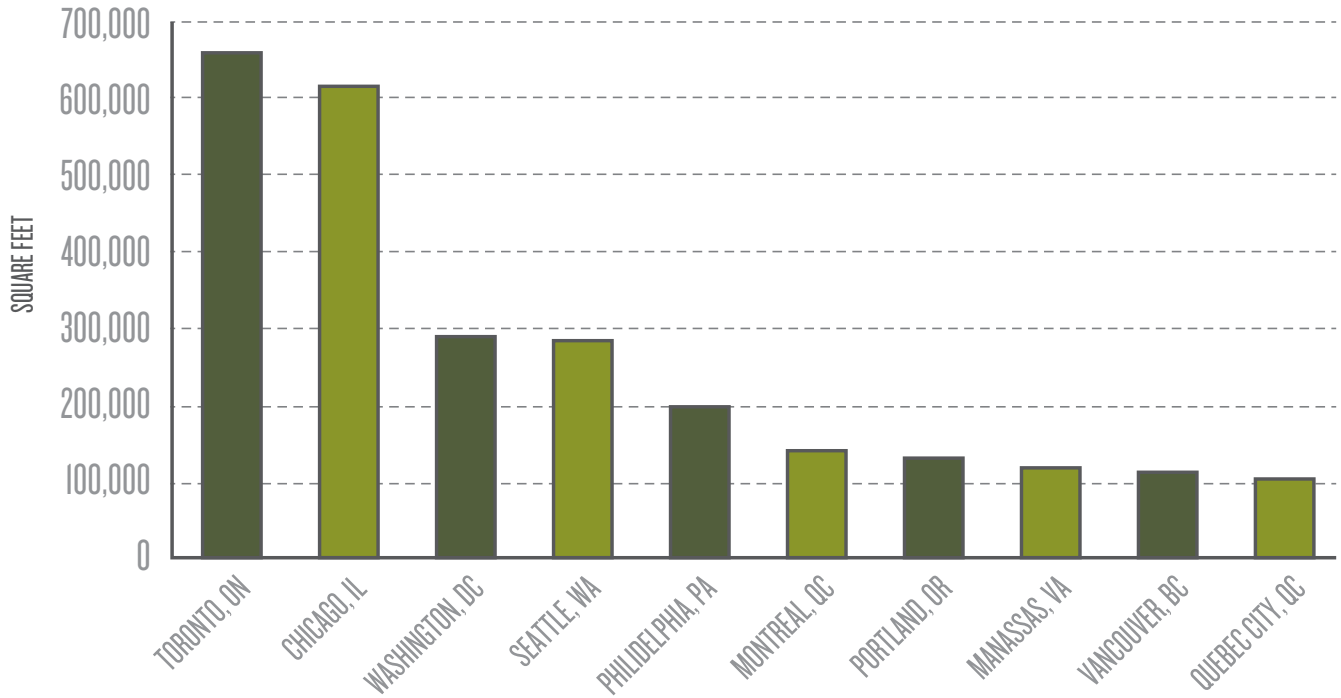
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JOURNAL

OF LIVING ARCHITECTURE

A GREEN INFRASTRUCTURE FOUNDATION PUBLICATION

The Journal of Living Architecture (JLIV) is the official, peer-reviewed journal of Green Infrastructure Foundation. The JLIV is written, reviewed, and edited by living architecture research professionals, sharing with their colleagues: successful educational applications, original research findings, scholarly opinions, educational resources and challenges on issues of critical importance to living architecture professionals and educators. The JLIV is published exclusively on the Living Architecture Monitor magazine website. The magazine publishes the abstracts of each published JLIV manuscript, with a link to the full paper online.

Volume 4 Number 2 Pages 1-15, 2017

DEPLOYING LIVING WALLS AS KINETIC FACADES

Leann Andrews, Nancy Rottle, University of Washington Green Futures Lab, University of Washington, United States

ABSTRACT

This paper explores ideas for integrating moveable exterior living walls with the facades of high-rise buildings to enhance urban ecosystems while contributing opportunities for personal interaction with the natural world. Rethinking the typical static nature of living walls, kinetic green walls convey a dynamic aesthetic that provides multiple potential benefits including habitat, passive cooling and opportunity for personal expressions in dense urban environments. This article proposes prototypes of kinetic green walls and suggests their expanded application to the ultra-urban built environment. It offers a preliminary typology, presents a moveable green wall system prototype installed in an urban university setting in Seattle, and demonstrates how the kinetic qualities afford flexible operational, educational, and aesthetic functions. Reflecting upon the challenges and solutions for the built project, this article identifies essential considerations for designing and constructing moveable living walls, illustrated through photographs, construction details and diagrams of new kinetic living wall applications.

Volume 4 Number 2 Pages 16-32, 2017

DEPLOYING SHIPPING CONTAINERS FOR INNOVATIVE LIVING ARCHITECTURE DESIGN EDUCATION

Reid Coffman, Kent State University; Lee Fithian, University of Oklahoma; Edwin Adkins, Kennesaw State University

ABSTRACT

Academic training and investigation for innovative living architecture demands educational settings be conceptual, experiential, and cost effective. To assist, we advance the idea that shipping containers offer an acceptable setting for faculty and students investigating kinetic forms of living architecture and opportunities for reflective thinking. Described here are three separate, uncoordinated academic engagements exploring moving, sliding and mobile green roofs and walls on shipping containers that occurred in the design studio, field laboratory, and public setting. When collectively viewed, the outcomes of the projects indicate a positive use of shipping containers as conceptual and participatory spaces for living architecture education and innovation.

Read more at livingarchitecturemonitor.com

DEAR GRHC MEMBERS

The 2016 market data is in, and our industry has grown by just over 10 per cent since the previous year! As plans come together for the 2017 CitiesAlive conference in Seattle there are several items that are important to highlight to our Members:

- Everything is taking place at the downtown Sheraton Seattle Hotel and there is an excellent conference room rate so please plan to stay at the conference hotel. Call 888-627-7056 to receive conference rate before September 1.
- Opportunities for member engagement: there are many committee meetings being held during the conference. The Policy Committee, Green Walls Committee, JLIV Committee, GRP Committee and Research Committee will all be meeting. The Corporate Members Committee meeting will be held at 3:00-4:30pm on Monday, September 18. This is an excellent chance for Corporate Members to learn more about GRHC and GIF activities and to provide important input on future activities.
- After the Trade Show on Monday evening, there is a GRP Welcome Reception open to all attendees which promises to be a great networking event.
- On Tuesday, after the Trade Show, the Local Host Committee Reception at the Seattle Aquarium is not to be missed. Thanks to all the firms that contributed to this event, which will showcase West Coast food and drink.
- On Wednesday, after the Awards of Excellence Luncheon, there is a consultation on the Living Architecture Performance Standard which is being developed by the Green Infrastructure Foundation. This standard has the potential to improve the performance of all green roofs and walls, and to support public policy development. Don't miss this opportunity to learn more by attending this important event.

Have a fantastic fall and we'll see you in Seattle!

Sincerely yours,

Matt Barmore, GRP
Chair, Corporate Members Committee
Vice President, Technical Sales
Greenrise Technologies

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Living Facades

These trellis systems provide excellent protection for building cladding systems, thermal conservation & acoustic buffering. Climbing plants allow for large coverage inexpensively.

Water Management: Permeable Pavement

Permeable pavements allow the movement of stormwater through the surface. In addition to reducing runoff, this effectively filters pollutants from the water table.

Water Management: Rainwater Harvesting

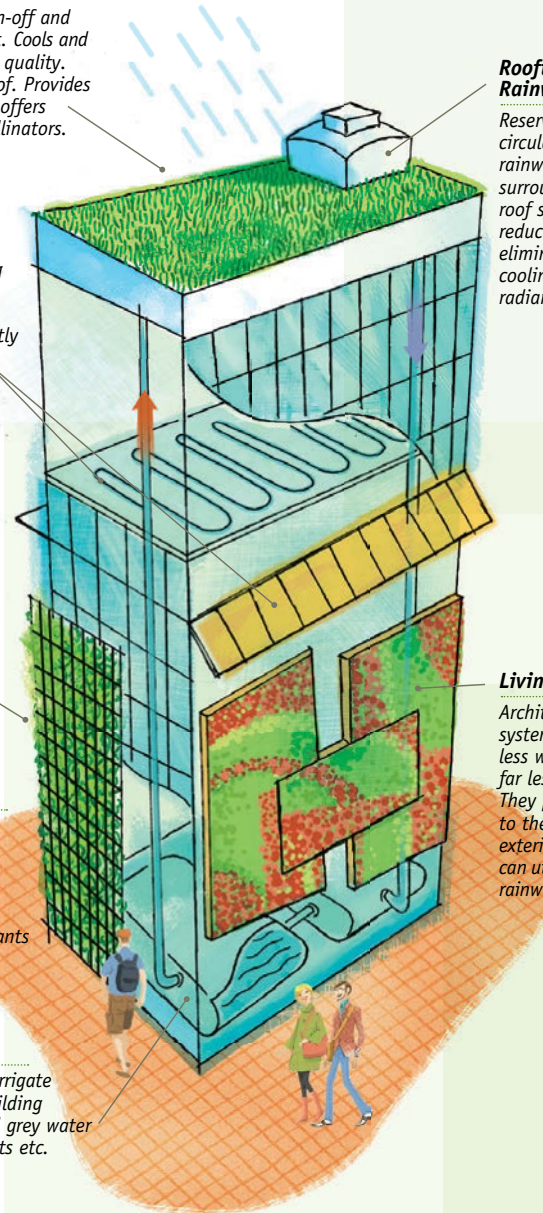
Captured rainwater can irrigate landscapes, cool the building and provide an optional grey water source for flushing toilets etc.

Rooftop Rainwater Cisterns

Reservoir for circulating recaptured rainwater. Irrigates surrounding green roof system. Can reduce (& sometimes eliminate) HVAC cooling costs radiantly.

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EVENTS

GRHC SYMPOSIA PROGRAM

GRHC is planning a new year of Local Market Symposia events. This year, you can choose the cities we visit by sponsoring or exhibiting one or more of the events.

Symposia are one-day events held in emerging green roof markets to highlight the importance of strong green roof and wall policy and highlight local designers, manufacturers, and suppliers. Sponsoring a symposium is an excellent way to distinguish yourself as an industry leader and in local green roof and wall market as well as leverage our promotional network to highlight your brand.

Cities available for 2017:

Buffalo, NY • Denver, CO – 11/2 • Detroit, MI • Hoboken, NJ – 10/30
Houston, TX • Pittsburgh, PAVisit greenroofs.org/local-market-symposia for more information about table tops, sponsorships, speaking opportunities and registration.

IN-CLASS GREEN ROOF PROFESSIONAL TRAINING

Toronto, ON: GRP Training - 10/5 – 10/7

New York, NY: GRP Training - 10/31 - 11/02

Milwaukee, WI: GRP Training - 10/26 – 10/28

Denver, CO: GRP Training - 11/2 – 11/4

Milton, ON: Green Roof Plants and Growing Media - 11/ 30

Milton ON: Advanced Green Roof Maintenance - 12/ 5

Go to greenroofs.org for more information. Dates subject to change.

PROFESSIONAL DEVELOPMENT AT CITIESALIVE

Seattle, WA: Introduction to Rooftop Urban Agriculture – 09/18

Seattle, WA: Green Walls 101: Systems Overview & Design – 09/18

Seattle, WA: Green Roof Design & Installation - Full Day – 09/18

Seattle, WA: Advanced Green Roof Maintenance – 09/18

Seattle, WA: Stormwater Workshop – 09/18

Seattle, WA: Biophilic Design Workshop – 09/18

Go to citiesalive.org for more information and to register.

GREEN ROOF PROFESSIONAL ONLINE TRAINING

Accessing Green Roof Professional training has never been easier! Our renowned three-course program has been segmented in order accommodate each trainees specific learning goals. Pursue Green Roof Design & Installation, Green Roof Waterproofing & Drainage, or Green Roof Plants and growing media separately, and at your own pace.

NET ZERO WATER FOR BUILDINGS AND SITES ONLINE TRAINING

The result of over five years of research and development, this course contains the technical information that professionals need in order to push the limits of water conservation. Net Zero Water for Buildings and Sites provides detailed information of best practices in water conservation and usage, and lays the foundation for water harvesting and conservation principles.

Visit greenroofs.org/education for more information and to register.

CONGRATULATIONS NEW GREEN ROOF PROFESSIONALS

- Xingcheng Huang, University of Toronto
- Emeline Decoray, Shelter Over Head
- Erich Bonner, Oak Ridge Farm
- Peter Olney, FXFOWLE Architects
- Holly Horne, Urban Garden

GO TO CITIESALIVE FOR MORE INFORMATION AND TO REGISTER. ALL CLASSES WILL BE HELD AT THE SHERATON HOTEL, 1400 6TH AVENUE. CALL (888) 627-7056 FOR BOOKING.

NEW MAYOR CAN BE CHAMPION OF A RESILIENT, LIVEABLE CITY

BY DEBRA GUENTHER, FASLA, LEED AP BD+C, PARTNER, MITHUN

In the fall of 2017, a new mayor will be elected to represent the city of Seattle, a rapidly changing metropolis nestled within the second largest estuary in the country. The city's mayoral candidates can become strong national voices for green infrastructure development as key to a healthy city — a city that has an implementable resilience strategy.

According to the US Green Building Council (USGBC), green infrastructure is any practice that uses or replicates natural systems to achieve a desired outcome. Vegetated roofs and green walls are key elements of these systems, which can be integrated into larger constructed systems, bio-retention and permeable pavement—utilizing soft solutions to manage large quantities of water.

Early work in Washington state focused on improving water quality for salmon under the federal Endangered Species Act. It is now a given that green solutions are key to this recovery, and also deliver many co-benefits that go beyond absorbing polluted runoff, including flood control, air cleansing, moderating temperature. These solutions are also the building blocks of a successful urban climate change mitigation and adaptation strategy. This is the foundation of resilience: mitigation—the ability to reduce flooding, heat impacts and water use; and adaptation—the ability to respond and transform when surprise disturbances occur, such as flooding, increased storm frequency and droughts.

Large-scale green infrastructure is now being deployed as a resiliency strategy to prevent coastal flooding of urban neighborhoods, increase aquatic biodiversity and strengthen social connections through public participation. These innovative projects address the social, economic and ecological systems whose interdependence is essential to urban sustainability. With a champion mayor, Seattle is poised to leverage its culture of innovation, entrepreneurship and environmentalism to contribute to the national conversation on the role of green infrastructure in building a resilient city.

Opportunities include:

- Develop a holistic story for the Puget Sound describing the multiple benefits of green infrastructure to developers and corporate partners to encourage their investment
- Leverage and incentivize retrofit projects, for which green roofs are key opportunities, to more rapidly reach the city's goal of managing 750 million gallons of stormwater
- Continue to build on strong existing certification programs like SITES and support regional examples like Salmon Safe, which was embraced by local developer Vulcan to certify their urban projects with a focus on urban ecosystem health
- Include ecological and social resilience as critical elements in conversations about liveability, affordability and density

The next mayor of Seattle will face many immediate demands, but will also need a comprehensive strategy that addresses the many challenges on the horizon. A robust green infrastructure framework can be foundation of a resilient Seattle.

Debra Guenther is a regular contributor to conversations on equity, resilience and climate change at venues such as Greenbuild, Living Futures, and the Urban Land Institute. Nationally recognized for her leadership on green infrastructure and ecosystem service issues, she was awarded the American Society of Landscape Architects President's Medal in 2010. Debra will be speaking at the all new 'In the Design Studio With...' session at CitiesAlive, September 18-21, 2017 in Seattle, Washington.



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A portrait of Carlo Ratti, a man with glasses and a beard, wearing a light blue button-down shirt. He is looking directly at the camera with a serious expression, his right hand raised to his forehead.

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