

Spring | Printemps 2021
vol.23-no.1 | 8.00\$

LANDSCAPES PAYSAGES

LANDSCAPE
ARCHITECTURE
IN CANADA

L'ARCHITECTURE
DE PAYSAGE
AU CANADA



technology
technologie

Smart cities aren't born that way.
They're designed intelligently with Relay.

Une ville ne naît pas intelligente.
Elle le devient grâce à Relay.

VICTOR STANLEY RELAY^{MC}

STREET LEVEL SENSING^{MC} & WASTE CONTROL SERVICE

Planning and running a smart city depends on a stream of secure, accurate, real-time data that can be used to make remarkable changes in how cities can optimize the use of resources. Relay technology provides it in a street-level sensor that measures fill level, weight and temperature inside waste receptacles, and air quality, foot traffic and noise pollution on the outside. Providing insight for years to track and tackle everything from waste management cost savings to environmental equity. With actionable data from every street corner,TM you can start immediately. **What can we do for your city?**

La planification et le fonctionnement d'une ville intelligente requièrent un flux continu de données sécurisées et exactes, qui peuvent servir à apporter des changements remarquables dans l'optimisation des ressources municipales. La technologie Relay génère ces données au moyen d'un détecteur qui mesure le volume, le poids et la température des déchets à l'intérieur des poubelles de rues, ainsi que la qualité de l'air, la circulation piétonne et la pollution sonore à l'extérieur. Les renseignements obtenus au fil des ans permettent de surveiller toute une gamme de paramètres, allant des économies en gestion des déchets à l'équité environnementale, et de régler les problèmes relevés. Grâce à des données exploitables provenant de tous les coins de rue,^{MC} vous pouvez commencer dès maintenant. **Que pouvons-nous faire pour votre ville?**



VICTORSTANLEY.COM





Upfit

landscapeforms®



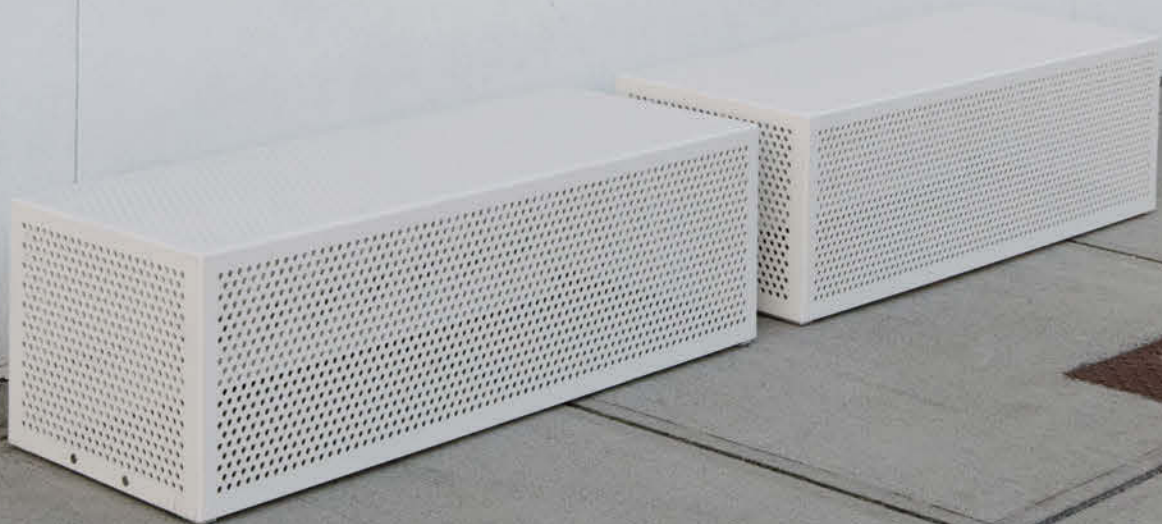
Bring the Indoors, Outdoors

Now more than ever, bringing the fundamental aspects of life indoors outside has proven crucial to the health and vitality of our communities. Upfit takes the complexity out of designing custom outdoor structures, providing a modular, scalable system to adapt to a site's specific needs. From lighting and power, to infill panels and retractable screens, to seating, storage and dining solutions, Upfit transforms outdoor areas into sought-out destinations.

Find us at landscapeforms.com or contact us toll free at 800.430.6205

DESIGN. CULTURE. CRAFT.

Vancouver Bench



Designed in collaboration with LM Studio and Studio Block, Vancouver Bench is inspired by our home city.

"When I plan a playground...my desire is that not only children, but also **teenagers** and adults feel at home there."

— Peter Hohenauer, playspace planner



Plan your playground at www.apeoriginal.com
and www.richter-spielgeraete.de

ape STUDIO

Exclusive North American partner of

Richter Spielgeräte GmbH



LANDSCAPES PAYSAGES

www.csla-aapc.ca

ISSN 1492-9600

Editorial Board | Comité de rédaction :

Jean Trottier, Chair, MALA, CSLA
Cameron DeLong, CSLA Board Rep., NuALA, CSLA
Douglas Carlyle, AALA, FCSLA
Luc Deniger, AALA, CSLA
Marilou Champagne, AAPQ, CSLA
Robert LeBlanc, APALA, FCSLA
Kevin Fraser, BCSLA, FCSLA
Ryan Wakshinski, MALA, CSLA
Heidi Redman, NuALA, CSLA
Alexandra Borowiecka, NWTALA, CSLA
Linda Irvine, OALA, FCSLA
Joanne Moran, OALA, FCSLA

CSLA Board of Directors | Conseil d'administration de l'AAPC :

Hope Parnham, APALA, CSLA, President, présidente
Glenn O'Connor, OALA, FCSLA, ASLA, Past President, président sortant
Carolyn Woodland, OALA, FCSLA, President-Elect, présidente-élue
Cynthia Graham, OALA, CSLA, Chair, Finance and Risk Management
Committee, présidente, comité des finances et gestion des risques
Carol Craig, AALA, FCSLA
Tracey Hesse, AAPQ, CSLA
Matthew Mills, APALA, CSLA
Kathy Dunster, BCSLA, CSLA
David Bodnarchuk, MALA, CSLA
Cameron DeLong, NuALA, CSLA
Margaret Ferguson, NWTALA, FCSLA
Doris Chee, OALA, CSLA
Trevor Tumach, SALA, CSLA
Michelle Legault, Executive Director, directrice générale
www.csla-aapc.ca | executive-director@csla-aapc.ca

Translation | Traduction :

François Couture, trad.a., réd.a. | fcouture@voilatranslations.com
Matthew Sendbuehler | letraducteur@gmail.com

Editor | Rédactrice : Laurie J. Blake

Published by | Publié par :



200-1200 Portage Avenue, Winnipeg, MB R3G 0T5
Tel: 204.947.0222 | Fax: 204.947.2047 | www.naylor.com

Publisher | Éditeur : Bryan Metcalfe

Naylor Editor | Rédactrice Naylor : Andrea Németh

Project Manager | Directrice de projet : Angela McDougall

Project Coordinator | Spécialiste de projet : Alana Place

Publication Director | Directeur de la publication : Ralph Herzberg

Marketing Associate | Adjointe à la commercialisation : Taylor Hicks

Sales Representatives | Représentants des ventes :

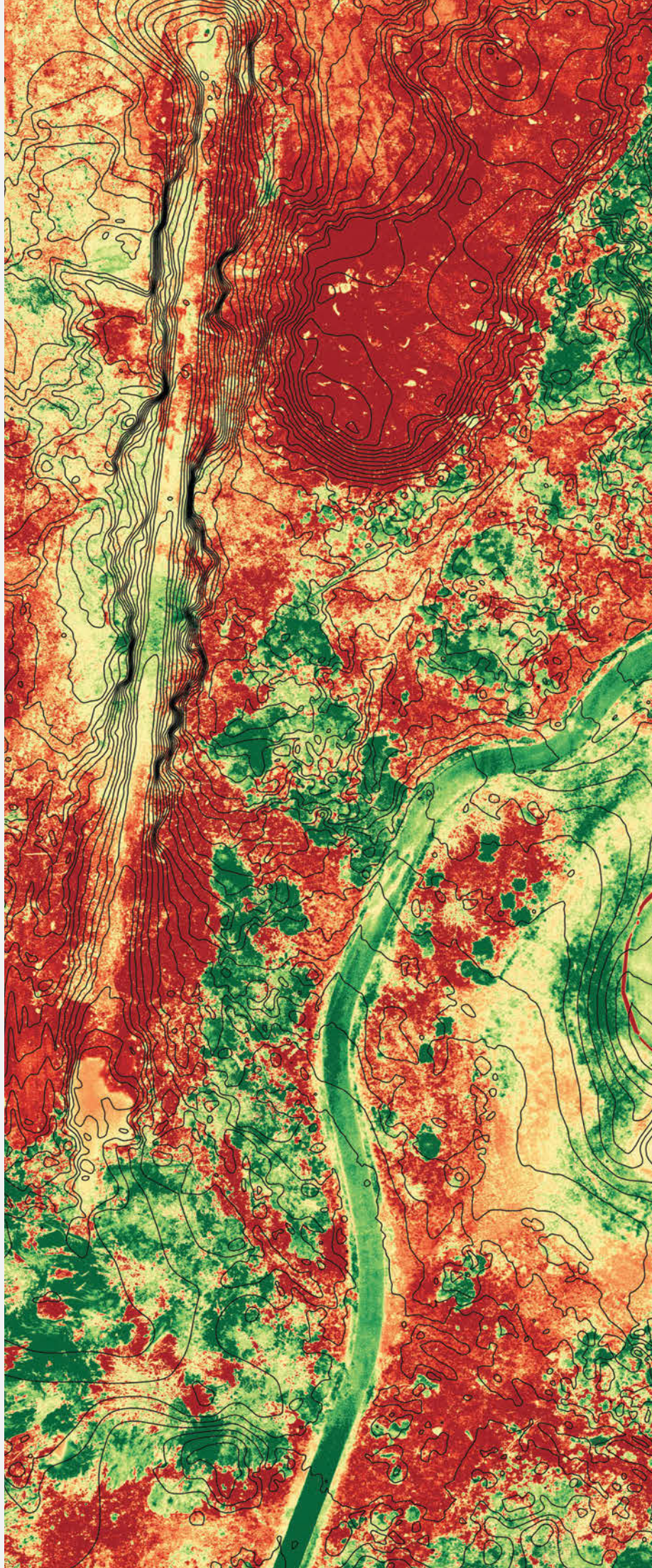
Maria Antonation, Brian Hoover, Scott Paquette, Trevor Perrault,
Amanda Rowluk, Lana Taylor

Layout & Design | Mise en page et conception graphique : Emma Law

©2021 Naylor (Canada) Inc. All rights reserved. The contents of this
publication may not be reproduced by any means, in whole or in part,
without the prior written consent of the publisher.

Return undeliverable Canadian addresses to: Naylor (Canada) Inc.,
Distribution Dept., 200-1200 Portage Avenue, Winnipeg, MB R3G 0T5

Canadian Publication Agreement #40064978
PUBLISHED MARCH 2021/CSL-Q0121/2817



TECHNOLOGY | TECHNOLOGIE

8 | TO BEGIN WITH | POUR COMMENCER

The Future is Now | L'avenir, c'est maintenant
Rob LeBlanc, Guest Editor | Rédacteur invité

10 | OUR WRITERS | NOS RÉDACTEURS

14 | PROLOGUE

iNaturalist – An Online Community Pardon Me, Is Anyone Using That Bulldozer?
Moulding Potential
The Memory Box
Interactive Heritage Interpretation

ESSAY | ESSAI

20 | TECHNOLOGY AND THE CHANGING LANDSCAPE

> **FR_LP+** LA TECHNOLOGIE ET L'ÉVOLUTION DU PAYSAGE
Rob LeBlanc

FOCUS | FOCUS

26 | VIRTUALIZATION OF THE LANDSCAPE DESIGN PROCESS

> **FR_LP+** VIRTUALISATION DU PROCESSUS DE CONCEPTION DU PAYSAGE
Mansoor Ma

32 | LE PAYSAGE VIRTUEL COMME OUTIL DE TRAVAIL

> **EN_LP+** THE VIRTUAL LANDSCAPE: AN INCREASINGLY USEFUL TOOL
Patrick Sheito

34 | DATA-DRIVEN ZONING CODES FOR CLIMATE ACTION

> **FR_LP+** DES CODES DE ZONAGE BASÉS SUR LES DONNÉES POUR L'ACTION CLIMATIQUE
Fadi Masoud + Isaac Seah

38 | 3D FAX MACHINES

> **FR_LP+** NUMÉRISSEURS 3D
Rob LeBlanc + Nick LeBlanc

40 | LA TECHNOLOGIE À LA RESCOURS DE LA SENSIBILITÉ

> **EN_LP+** TECHNOLOGY: MAPPING A SENSE OF PLACE
Louis-Philippe Rousselle-Brosseau

FORUM | FORUM

44 | CRITIQUE

Digital Journal Addresses Wide Range of Topical Subjects
Reviewed by John Zvonar

46 | INTERVIEW

Trees – A Panel, Part 2
> **FR_LP+** Panel sur les arbres – Partie 2

54 | FORUM

Trees at Regina's Mosaic Stadium
Geoffrey Katz

66 | THE PARTING SHOT | UNE DERNIÈRE SALVE

Drawing on Napkins, Writing on Walls
Linda A. Irvine

LP+ ONLINE | EN LIGNE

TRANSLATIONS | TRADUCTIONS

> **EN_LP+** | ENGLISH VERSION
> **FR_LP+** | VERSION FRANÇAISE

COVER | COUVERTURE

USING DRAWING TABLET IN OVERLAYING LOOSE HAND SKETCHES ON A COMPUTER IMAGE TO PRODUCE EARLY DESIGN SKETCHES
PHOTO MANSOOR MA

upcoming issues

fall 21 | water's edge

deadline may 15

winter 21 | reset

deadline august 10

prochains numéros

automne 21 | rivages

date de tombée 15 mai

hiver 21 | renouveau

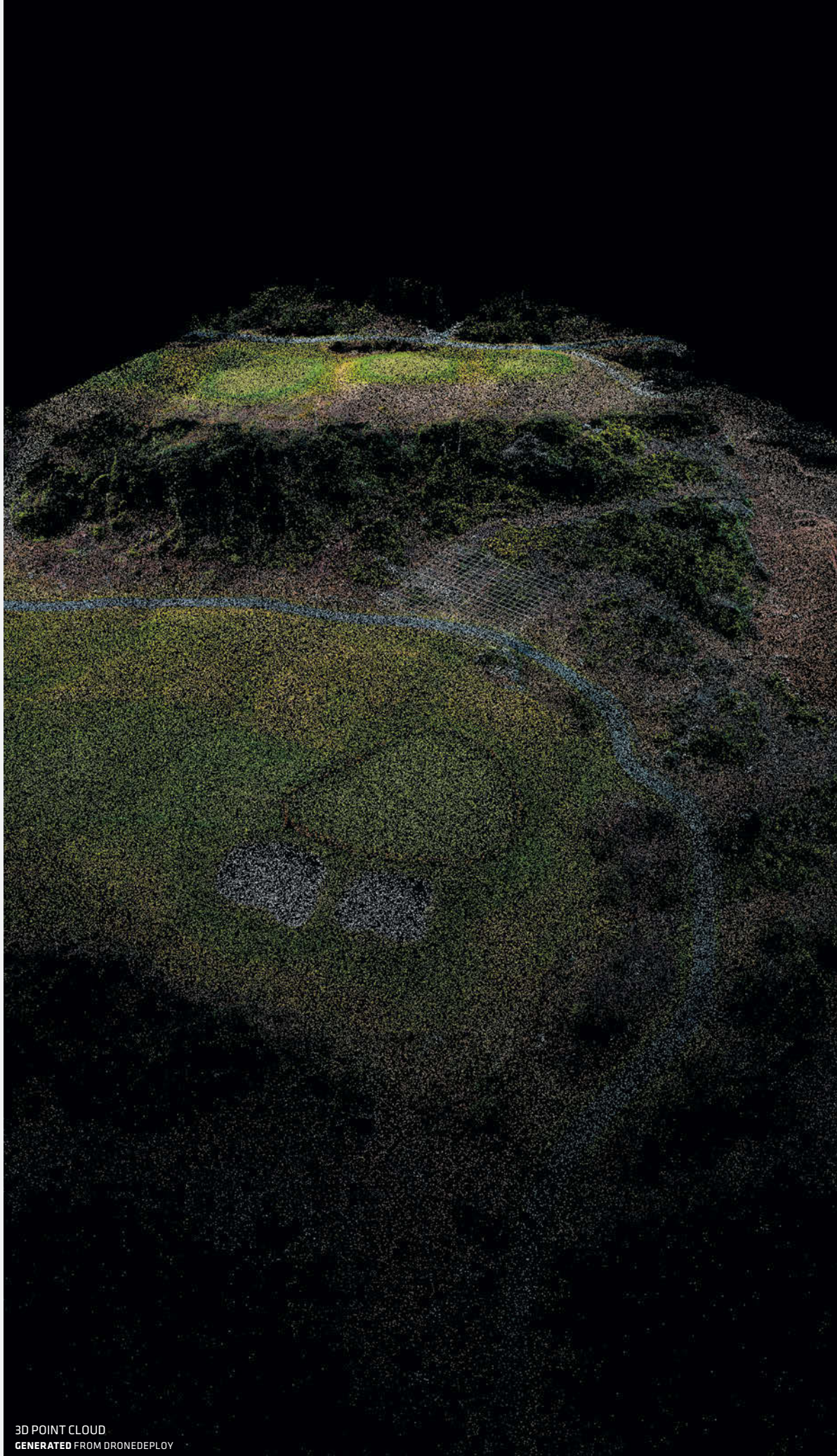
date de tombée 10 août

For submission guidelines |
Pour connaître les normes
rédactionnelles :

Laurie J. Blake,
Editor | Rédactrice
lp@csla-aapc.ca

LANDSCAPES | PAYSAGES is published by the Canadian Society of Landscape Architects to provide a national platform for the exchange of ideas related to the profession. The views expressed in LANDSCAPES | PAYSAGES are those of the authors and do not necessarily reflect those of CSLA. Guest editors and contributors are volunteers, and article proposals are encouraged. Articles may be submitted in either English or French.

LANDSCAPES | PAYSAGES est publiée par l'Association des architectes paysagistes du Canada pour servir de plate-forme nationale destinée à l'échange d'idées sur la profession. Les opinions exprimées dans LANDSCAPES | PAYSAGES appartiennent aux auteurs et ne reflètent pas forcément celles de l'AAPC. Nos rédacteurs invités contribuent bénévolement. Nous attendons, en français ou en anglais, vos propositions d'articles.



3D POINT CLOUD
GENERATED FROM DRONEDEPLOY

ROB LEBLANC
GUEST EDITOR | RÉDACTEUR INVITÉ

THE FUTURE IS NOW

ALTHOUGH MANY ASPECTS of our profession remain unchanged since the days of Frederick Law Olmsted, it's exhilarating to witness the tools of our practice evolving in new and exciting directions. In this Technology issue, we look at how technology is changing our design process, our construction approach, our palette of materials and the expectations of society for greater communication of design intent. We also explore the potential for technology to disrupt our profession, as it is doing with so many others.

Designers are, first and foremost, "creative communicators." Landscape architects, more specifically, are the storytellers of place. So, when society rapidly shifts the way it communicates, as it has over the last 30 years, it is incumbent upon design professions to harness new ways of communicating design intent.

In the very near future, the public will expect to immerse themselves in the intent of our vision virtually, long before it's ever built. We will be harnessing the tools of 3D capture as a starting place in the same ways we use base plans created by surveyors today. The tools of the future will allow us to create robust simulation capabilities to measure the impacts of our proposals on microclimate, ecological health, hydrology and even social well-being. Although drawing remains a fundamental imperative for design, the impending mass adoption of virtual and augmented reality will fundamentally change the nature and expectations for design communication.

Technology is making our world smaller in ways that will impact our profession in the coming decades. The coming driverless (AV) revolution means we may be able to finally "un-pave paradise by removing a parking lot," creating much-needed opportunities to re-naturalize our urban cores; possibly, though, at the risk of more sprawl. It will be more important than ever to preserve natural areas and agricultural land that could become at risk. Technology that made our world smaller has put us at greater risk for more, and possibly more intense, pandemics on the horizon. COVID-19 has shone a bright light on how important our outdoor natural areas are for human health, and it is imperative that landscape architects and planners advocate loudly for more and better open space in our ever-crowding cities.

This was a challenging issue to compile. Though the quality of the submissions received were high, the low quantity of submissions implies that landscape architects remain uncomfortable or apathetic about the topic; or worse, that they don't recognize the potential disruptions that could impact how we work, or if we remain relevant.

As I look to the future, I remain optimistic about the increasing importance and visibility of the profession, but we must remain committed to embracing change, adapting to new technologies, and undertaking applied research as we move forward. I hope this issue spurs much needed conversation.

L'AVENIR, C'EST MAINTENANT

BIEN QUE DE nombreux aspects de notre profession soient restés inchangés depuis l'époque de Frederick Law Olmsted, il est exaltant de voir les outils de notre pratique évoluer dans des directions nouvelles et passionnantes. Dans ce numéro sur la Technologie, nous examinons comment la technologie modifie notre processus de conception, notre approche de la construction, notre palette de matériaux et les attentes de la société pour une meilleure communication des intentions de conception. Nous explorons également le potentiel de la technologie à perturber notre profession, comme c'est le cas pour tant d'autres.

Les designers sont, avant tout, des « communicateurs créatifs ». Les architectes paysagistes, plus précisément, sont les conteurs de lieux. Ainsi, lorsque la société modifie rapidement sa façon de communiquer, comme elle l'a fait au cours des 30 dernières années, il incombe aux professions du design d'exploiter de nouveaux moyens de communiquer les intentions du design.

Dans un avenir très proche, le public s'attendra à se plonger virtuellement dans l'intention de notre vision, bien avant qu'elle ne soit construite. Nous exploiterons les outils de capture 3D comme point de départ, de la même manière que nous utilisons les plans de base créés par les géomètres aujourd'hui. Les outils de l'avenir nous permettront de créer de solides capacités de simulation pour mesurer les impacts de nos propositions sur le microclimat, la santé écologique, l'hydrologie et même le bien-être social. Bien que le dessin reste un impératif fondamental pour la conception, l'adoption massive imminente de la réalité virtuelle et augmentée va fondamentalement changer la nature et les attentes en matière de communication de la conception.

La technologie rend notre monde plus petit d'une manière qui aura un impact sur notre profession dans les prochaines décennies. La révolution des véhicules sans conducteur à venir signifie que nous pourrions peut-être enfin « mettre au jour un paradis en supprimant un parc de stationnement », créant ainsi des opportunités indispensables pour renaturaliser nos noyaux urbains, au risque toutefois d'un étalement plus important. Il sera plus important que jamais de préserver les zones naturelles et les terres agricoles qui pourraient être menacées. La technologie qui a rendu notre monde plus petit nous a fait courir un plus grand risque de voir des pandémies plus nombreuses et peut-être plus intenses se profiler à l'horizon. COVID-19 a mis en lumière l'importance de nos espaces naturels extérieurs pour la santé humaine, et il est impératif que les architectes paysagistes et les urbanistes plaident vigoureusement en faveur d'espaces ouverts plus nombreux et de meilleure qualité dans nos villes toujours plus peuplées.

La compilation de ce numéro a été un défi. Bien que la qualité des contributions reçues ait été élevée, la faible quantité de soumissions implique que les architectes paysagistes restent mal à l'aise ou apathiques sur le sujet; ou pire, qu'ils ne reconnaissent pas les perturbations potentielles qui pourraient avoir un impact sur notre façon de travailler, ou si nous restons pertinents.

En regardant vers l'avenir, je reste optimiste quant à l'importance et à la visibilité croissantes de la profession, mais nous devons rester engagés à accepter le changement, à nous adapter aux nouvelles technologies et à entreprendre des recherches appliquées à mesure que nous avançons. J'espère que cette question suscitera des discussions très nécessaires.

OUR WRITERS | NOS RÉDACTEURS



OUR GUEST EDITOR | NOTRE RÉDACTEUR INVITÉ

ROB LEBLANC

Rob LeBlanc, MLArch, BSC, BDEP, FCSLA, CIP, LEED AP LPPANS, is the President of Fathom Studio, an interdisciplinary collective of landscape architects, architects, graphic designers and engineers in Atlantic Canada. Rob's innate curiosity guides his fascination with new technology and its application to landscape research and design. Rob is also the president of GroupThing, an online business platform for consultants. www.groupthing.com An L|P Editorial Board member, Rob took the lead on this issue when "Technology" became its theme. www.fathomstudio.ca



MANSOOR MA

Mansoor Ma, OALA, CSLA, is a Landscape Architect and Associate Principal at LANDinc. Throughout his professional practice he has been dedicated to applying cutting-edge computer technologies for analyzing, understanding, exploring, interactively designing and interpreting landscape design space. He is the primary visionary actively involved in developing the LANDinc's Immersive Media Portal – an interactive virtual and augmented reality platform for design assessment and presentation. Mansoor has been a key team member on many projects, nationally and internationally, from park master planning to resort club facilities to community planning and high-end residential design. As a leader in the field, he is called upon across Canada and internationally to give lectures as well as interactive design and visualization workshops. He is the author of two dynamic 5-day design communication workshops: Integrated-Media 360, and Designing In 3D. He is also a SketchUp Visiting Professional. www.landinc.ca



PATRICK SHEITO

Patrick Sheito, M.A.P., AAPQ, AAPC, s'intéresse aux technologies de visualisation informatique depuis plus de 15 ans. Il en a fait un sujet d'étude dans son parcours académique et continu de développer ce volet dans un contexte professionnel. Il oeuvre chez Rousseau Lefebvre depuis 2016 où il combine cette passion à sa profession d'architecte paysagiste.

p.sheito@rousseau-lefebvre.com



LOUIS-PHILIPPE ROUSSELLE-BROSSEAU

Louis-Philippe Rousselle-Brosseau s'est forgé un champ de pratique gravitant autour des questions paysagères et patrimoniales des milieux ruraux québécois : aménagement régional, participation citoyenne, caractérisation paysagère, représentation graphique de dynamiques, enquête toponymique, viabilité et revitalisation des communautés. Il a aussi développé une expertise en patrimonialisation dynamique. Ses projets ont pour point commun l'entrée en contact directe et sensible avec les lieux et leurs acteurs, le plus souvent par le biais de la marche. À temps perdu, il enseigne le Grand paysage à l'Université de Montréal.



JAMES HUDSON

James Hudson, AALA, MALA, CSLA, is an associate at HTFC Planning & Design with over 18 years of experience, and a passion for urban design and heritage interpretation. In Winnipeg's Historic East Exchange District, James applied this passion to help the neighbourhood transform into a modern urban-lifestyle district that celebrates and displays the unique history of one of Canada's oldest Warehouse Districts.

JEREMY CHOY

Jeremy Choy has been working with web and interactive technologies for over half his lifetime and yearns to merge the physical with the digital. He lives and breathes user experience design for work and for fun, including finding faults in an airplane's infotainment system while flying home to Winnipeg.

jeremy@patterninteractive.com



FADI MASOUD

Fadi Masoud is an Assistant Professor of Landscape Architecture and Urbanism at the University of Toronto and the Director of the Centre for Landscape Research. His research, teaching and design work focuses on establishing relationships between dynamic large-scale environmental systems, design and instrumental planning policy tools. Fadi leads research projects on adaptive urban and landscape design, novel resilient urban codes and the future of metropolitan public open space. Prior to joining the University of Toronto, Fadi held teaching and research appointments at the Harvard University's Graduate School of Design and Massachusetts Institute of Technology. Fadi currently sits on Waterfront Toronto's Design Review Panel, as well as the City of Toronto's Urban Flooding Working Group.

ISAAC SEAH

Isaac Seah is a Research Associate at the University of Toronto and Product Manager at Zesty.ai, building AI-powered risk products to tackle climate change. Having held various product roles in tech, consulting and academia, his work and research involves building computational competencies to combat climate change and enhance urban planning processes. He continues to apply his experiences in analytics, design, and product delivery in the provision of enterprise-level technology solutions across public and private domains.



JOHN E. ZVONAR

John Zvonar, OALA, FCSLA, graduated with an MLA from the University of Manitoba in 1988. For the past 28 years, John has exercised his vocation at the Canadian federal government's centre of expertise in Heritage Conservation. As the next in a continuum of stewards employing a values- and principles-based conservation approach, he helps in the protection of nationally significant cultural landscapes, including sites under the jurisdiction of Parks Canada, the Parliamentary Precinct in Ottawa and other federal departments such as Veterans Affairs Canada. John is also closely associated with the Alliance for Historic Landscape Preservation, an interdisciplinary forum for exploring and exchanging ideas about historic landscapes and their stewardship. He is also actively involved with the Cultural Landscapes committee of ICOMOS Canada and is the Canadian voting member with the International Scientific Committee for Cultural Landscapes.



GEOFFREY KATZ

Geoffrey Katz, SALA, AALA, BCSLA, CSLA, ASLA, LEED-AP, has over 22 years' experience in landscape architecture. He was landscape architecture design and technical lead for the new Mosaic Stadium in Regina, SK – his work included layout of the plazas and transit mall. He is the former Vice-Chair of the Sustainable Sites TAG at the USGBC. Geoffrey grew up in Quebec and has worked, travelled and is licensed in BC, Alberta, Saskatchewan, Ontario and California. He currently works in the Ottawa/Gatineau area.

sustainableladybug@gmail.com



All of our outdoor kitchens feature dozens of styles available in hundreds of sizes, all made from durable and environmentally-friendly stainless steel, powder coated in a rich palette of finishes.

DANVER



BROWN JORDAN
OUTDOOR
KITCHENS

Trex® Outdoor Kitchens™

Canada	danver.ca	403.899.3725	4770 46 Avenue SE, Calgary, AB Canada	info@danver.ca
USA	danver.com	205.269.2300	1 Grand Street, Wallingford, CT USA	info@danver.com

Extraordinary for Landscape Architects

Product: **Solid Edge System**, Gatineau (QC)

STREETLIFE is a design driven label for the outdoor concept. The Collection consists of the following categories: Benches, Picnic Sets, Tree Planters, Tree Grilles & Guards, Bicycle Parking, Bollards, Shades, Parklets & Bridges. Go to www.streetlifeamerica.com for the complete collection and request **the new 21/22 Catalogue** or one of our special theme editions!



Twisting Bridge **NEW**



Mobile Green Isle
Modules



Rough&Ready Curved Bench
All Black **TWIN**



Solid Picnic Set



High Grass Pillar **NEW**

PROLOGUE

01/ iNATURALIST – AN ONLINE COMMUNITY FOR NATURALISTS

MARY ANNE YOUNG

RECENTLY, MEMBERS OF our design team paid a visit to an island in Georgian Bay to get a sense of a restoration plan we will be working on for next spring. The landscape is dominated by wind-blown White Pine trees, stunted Eastern White Cedar, spectacular Winterberry shrubs, and some unknown grasses. But what are those grasses? We want to prepare a design that is true to the ecology of the place, so we needed to know what species they are. We turned to iNaturalist (www.inaturalist.org), an online community of naturalists and scientists with a strong technological foundation where you can share, identify and browse biodiversity observations from around the planet.

iNaturalist is a web- and app-based platform with a simple premise – to connect people to nature. Members use the app on their smartphone or upload photos to the website to share their individual observations of living organisms (plants, wildlife, insects, fungi, lichens, mosses and more), then identifications are crowd-sourced by other members, many of whom are experts in their fields. Observations are included on a map where users can search by location or taxa, which is helpful in getting an idea of diversity in your neighbourhood or the observed distribution of a species. iNaturalist is a joint initiative of the California Academy of Sciences and the National Geographic Society that began as a final project in 2008 by three graduate students at the UC Berkeley's School of Information.

The data collected by this platform spans the globe and the observations recorded by members are frequently used as data points in scientific studies. The platform is very well used – I did a search for Dundas, Ontario, where I work, and over 21,000 observations are recorded. Users can also create projects, where observations are collected under a theme (i.e., Butterflies of Ontario, naturalist group outings, bioblitz records). The site's team sums it up by saying, “We really believe that recording information

about nature in a social context is a tremendous way to understand the awesome depth and breadth of life on Earth.”

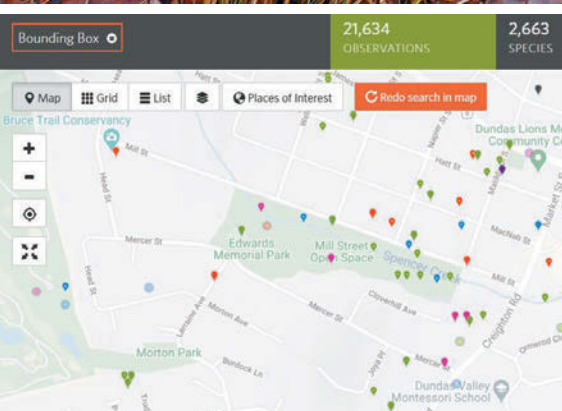
iNaturalist is a tool that could greatly benefit landscape architects and students, particularly as the use of native plants in landscape designs continues to grow. For practising LAs, it is a relatively fast and easy way to identify and learn about the plants in natural areas, and potentially grow a native plant palette that is applicable to your project's local conditions and habitat niches. A deeper understanding of where native plants grow, and how plants grow in communities, can help designers to understand what kind of garden environment would be needed for these plants to thrive. Identifying plants in the wild can also be helpful in understanding what plants may be escaping cultivation and should therefore be avoided in planting designs.

For students, the same is true, however, the “projects” option could also be useful for collaborative plant and wildlife ID lists during site analysis visits for studio projects. The site's Bioblitz Guide provides helpful information about how to crowd-source an identification list, and there are also teacher resources. In these ways, landscape architects could consider iNaturalist another tool in their design toolbox.

Understanding the ecology of a place is a lifelong endeavour, and technological tools should be supplemented with a deeper understanding of ecological features and functions gained through observation, study and experience. iNaturalist is a fantastic resource that can help people along this path – and can also be used when you're just stumped on a plant, like the *Deschampsia flexuosa* (Crinkled Hair Grass) I found on Georgian Bay and which the people and technology of iNat helped to identify.

Find it online at www.inaturalist.org

Mary Anne Young, BLA, OALA, CSLA, ISA, is a Landscape Architect, Ecologist, and unabashed plant nerd. When not nose-first in a field guide she works at Virginia Burt Designs in Dundas, ON.



1, 2

1 *DESCHAMPSIA FLEXUOSA* OBSERVED BY THE AUTHOR ON GEORGIAN BAY **2** OBSERVATIONS NEAR THE VIRGINIA BURT DESIGNS OFFICE (GREEN PINS = PLANTS, BLUE = WILDLIFE, RED = INSECTS, PINK = FUNGI)

02/ PARDON ME, IS ANYONE USING THAT BULLDOZER?

RYAN WAKSHINSKI

BETWEEN 1962 AND 1968, construction of the Red River Floodway in Manitoba represented the second largest earth-moving project in the world, after the Panama Canal. Some 76.5 million cubic metres of earth were moved to create this “ditch” that diverts floodwaters around the city of Winnipeg and saves it from disastrous inundations that the province experiences on a regular basis. An additional 21 million cubic metres were moved in the 2005–2010 expansion, following the 1997 Flood of the Century, increasing the capacity to handle a 1 in 700-year flood.

The floodway was a project championed by Dufferin “Duff” Roblin, the 14th Premier of Manitoba. Although he did not consider it to be his greatest accomplishment in a long and distinguished career in politics, “Duff’s Ditch,” as it came to be known, is definitely his most famous achievement. A park honouring Duff was established in the early 2000s, but only recently was sufficient funding available for the construction of park visitor facilities. Development includes an observation platform accessed via a wheelchair accessible ramp, parking, planting, site furniture and interpretive signage, adjacent to the gates that hold back the waters of the Red River and channel them into the floodway.

Most of the earth for the floodway was moved by a tractor/scrapper combination and by the humble, but effective, bulldozer. There is an iconic photo of Duff Roblin with his son on a bulldozer at the start of construction. Our Manitoba Parks design team hoped to give visitors a chance to recreate the image (in this, the selfie generation) by incorporating a decommissioned dozer as a “static sculpture” or folly on the site. But where does one find an old bulldozer?

Turns out the Caterpillar D-Series are rarely decommissioned as they are so well built and sturdy they just keep on running. However, on a trip to northern Manitoba for another project, we noticed a ‘64 Cat sitting in the long grass and weeds of the Paint Lake maintenance yard. “Is anyone using that bulldozer?” I asked our Park District Manager Linda Horner, who told us it had been there “forever” and was surplus. It was an opportunity not to be missed, and it turned out that with a battery and some diesel, it still ran! We were able to drive it up onto a flatbed and have it shipped to Winnipeg for a few thousand dollars, and park it on site adjacent to the viewing platform ramp.

To make the dozer safer for climbing, we contacted Rhino Linings of Winnipeg to retrofit it by removing all the gas, oil, wiring, glass and sharp/dangerous edges and putting in a floor and seat. This was followed by sandblasting and a liberal coating of truck bed liner paint in eye-popping, high-vis yellow to make it more “grippy” and contrast with the rusty red of the corten steel ramp walls. Along the way, several contractors and workers were amazed that we



2, 3

were taking this machine out of commission, but it was not helping anyone rotting up at Paint Lake, and the price was definitely right, compared to what we might pay to have a playground company fabricate something new.

When the park had a “virtual” opening (thanks, COVID-19!) on October 22, 2020, the dozer featured prominently in photos and video footage, and my nieces and nephew had a great time climbing all over it when we visited that weekend. I think Duff would approve!

See the opening video tweet from Sarah Guillemard, Manitoba Minister of Conservation and Climate, at <https://twitter.com/MinSGuillemard/status/1319308678311260161?s=20>.

Ryan Wakshinski, MALA, CSLA, is a Winnipeg-based landscape architect, working for Manitoba Conservation & Climate, Parks and Protected Spaces Branch, as part of a multi-disciplinary team responsible for a \$10-million dollar annual capital project program, including all facets of design, development and construction.

1 DUFF WITH SON ON DOZER
2 DOZER AND SIGNS **3** KIDS ON DOZER
PHOTOS 1 COURTESY UNIVERSITY OF MANITOBA ARCHIVES **2,3** RYAN WAKSHINSKI





03/ MOULDING POTENTIAL

JASON HARE + JONATHAN WATTS

THE URBAN ENVIRONMENT is awash with a series of planar, or nearly planar, surfaces. We walk on them, drive on them, bike on them, sit on them, sing about them and ultimately live with them. We give form to the “concrete waste land” and in turn, it forms us. Although surfaces are just a generic category, it takes substance to elevate a surface into existence.

In a recent article, the *Guardian's* global environment editor Jonathan Watts states that concrete is “the most widely used building material in the world. There are now approximately 2 tonnes of concrete for each person on the planet earth.”

Watts goes on to visualise the scale at which this castable material is being deposited, noting, “In a single year, there is enough [concrete poured] to patio over every hill, dale, nook and cranny in England.” If the sheer scale at which this global material is forming the built environment is any indication of our anthropogenic legacy, we might well ask what other methods of moulding exist to inspire future generations and to reduce our impact on our planet?

REDUCING INPUTS

Concrete requires a surface to rest against when undergoing its stiffening cycle. In the construction and fabrication industry this formal process is typically done through a series of moulds; be it *in situ* or precast. Within an open casting or closed moulding system, one thing remains consistent between these methods: it is faster and “cheaper” to set up and cast within a standardized planar mould than it would be for a non-planar bespoke mould. For what standardized techniques offer in speed and modularity, they blunder with their higher embodied energy values. This is due, in part, to the limited formal options resulting from planar moulds.

A simple retaining wall mould might house twice the material volume that is structurally necessary for it to exist. Yet this mould does not offer up convenient formal alternatives or structural solutions towards reducing material mass through a moulding process. In this regard, mass is an unintended consequence of the formal process. If mass is unintentional in a planar moulding system, why not design an alternative system?

Enter a flexible approach to surface moulds, the Variable Moulding Surface (VMS).

VARIABLE MOULDING SURFACE

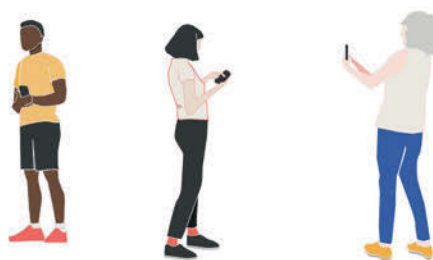
Inspired by the actions of children playing with “pin art boards,” the VMS is an attempt to develop a system in which an open or closed mould can be used to cast a variety of thermal set materials, such as concrete. The VMS employs the flexibility of polyurethane as a casting surface with a fixed series of metal rods embedded in an array of orbital sockets. This entire moulding system is built on a modular design principle, to allow for scalability.

EXPANDING POTENTIAL

Developing alternatives to current moulding techniques is not new, nor novel. Though what might be considered unique in this system is the ability for the casting surface to be positioned by either the human touch or through computer-aided pin placement. In this regard, we have a system that attempts to directly translate digital geometry into physical elements by expanding what “standards” are offered through precast moulding systems. Having the ability to translate digital information into direct physical positioning, opens a world of potential. This includes the ability to cast forms that mimic existing topologies, expand formal expression options, reduce material mass while keeping structural capacity intact, and eliminate mould waste. All this, while being considerate of the environmental impact formal geometry plays on the built environment.

Jason Hare, B.ED., MLA, is the embodiment of process-based research. As one of the founding members and current manager of the FABLab within the Faculty of Architecture, University of Manitoba, Jason continues to parse novel means of digital craft by critically engaging with vested parties and sharing his passion for the built environment.

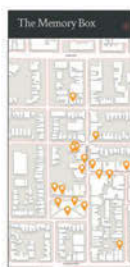
Jon Watts is a technician at the FABLab within the Faculty of Architecture, University of Manitoba. Jon's work focuses on advanced 3D modelling techniques involving the development of parametric computer scripts, robotics and drones.



The information they've submitted is taken and stored in the Memory Box's database



Where it is able to be cross-referenced, analysed, and filtered



04/ THE MEMORY BOX

BETH BRAY

IN CHANGES IN THE LAND, author William Cronan details the existential plight of the transcendentalist Henry David Thoreau. Thoreau, troubled by the loss New England's plant and animal species, began documenting the landscape – detailing changes that had occurred over the previous two centuries of European colonization.

Similar to Thoreau, our society is on the brink of catalytic change. As engaged and conscious citizens, we have a duty to document the natural world in its current state, enabling future generations to understand our landscape in the same way we experience pre-industrial America through Thoreau. Merging Thoreau's prescient environmentalism with today's technological advancements and access to data, I developed a smartphone application prototype, *The Memory Box*.

The Memory Box's primary purpose is to prompt users to input written memories, photographs and videos relating to personal experiences of the landscape. Collecting data in a transparent, objective manner provides designers with an understanding of how past and present demographics perceive, use

and connect to specific sites. Alternatively, designers may use the information gathered to apply best-use practices to future designs.

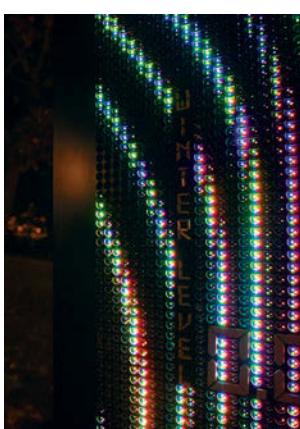
The application's secondary function provides a public consultation tool, enabling users to connect with consultants both in-person and remotely. This allows an individual the ability to provide opinions that reflect their respective culture, knowledge, experience and abilities. Additionally, the participant can engage, learn about their local landscape's history and processes, and remain informed about the study at a convenient time and location.

As individuals begin using the app, their submissions will become accessible (depending on privacy settings) to other users as they explore and share personal narratives, memories and images that are relevant

to the project's cultural landscapes. This function provides marginalized populations with a medium to share their perceptions and landscape values, ensuring that their histories and cultural narratives – ones often historically ignored, improperly represented, or overshadowed by dominant cultures – are captured, respected and acted upon.

Ultimately, the Memory Box envisions the two functions working together by connecting GIS data points to shared and personal histories. Collecting personalised data before it is lost becomes increasingly important as climate change manifests itself through impacts on our cities, shorelines and biodiversity. Like Thoreau, we must thoroughly document the natural world – not only to understand changes and mourn inevitable losses – but also remind future civilizations of what will need to be regained.

Beth Bray is a junior landscape designer at IBI Group Inc. in Toronto, ON, and a recent graduate of the University of Guelph's Bachelor of Landscape Architecture program. She loves data, dogs, design and sewing.



1, 2, 3, 4, 5

05/ INTERACTIVE HERITAGE INTERPRETATION

James Avenue Water Level Indicator

JAMES HUDSON + JEREMY CHOY

FOR MANY YEARS, a river-level gauging chamber sat next to the James Avenue Pumphouse on the west bank of the Red River in Winnipeg's Historic East Exchange District. Functioning as a kind of measuring tape, the gauge calculated and transmitted water levels every 15 minutes to city and federal officials and was the primary device used to determine fluctuating river levels in Winnipeg.

Technical advancements led to the removal of the chamber in 2016, replaced by Station 050J15, operated by the Water Survey of Canada. As part of streetscape improvements on James Avenue, HTFC Planning & Design and Pattern Interactive developed a heritage interpretation piece to honour the significance of the river-level gauging chamber.

The James Avenue Water Level Indicator is a pre-programmed and motion activated light cycle indicating nine historically significant flood events throughout Winnipeg's history and compares them to the current Red River water level reading at James Avenue.

Housed within an I-beam, the display is double-sided, made up of 15 vertically stacked LED modules capable of displaying 281 trillion colours, and requires only 692 watts of power to run at full brightness. The display's internal components are located within two heated, weatherproof enclosures at the base of the I-beam and include a computer (CPU) to handle the dynamic water levels and visuals, a Video Imaging Processor (VIP) for translating the visuals to the display, a router to connect to the web, a computer vision sensor located at the top of the I-beam

that responds to motion and triggers animations, and a custom temperature monitor designed to alert if any faults are present within the enclosure.

The web connection allows the display to indicate real-time water level data, collected from the Government of Canada's Water Office web site, and provides vital health statistics on the internal hardware components. Additional background animations and customized text can be uploaded and displayed during special events and the water level indicator can be connected to social media networks like Twitter and Instagram in real time.

Motion activated vision sensor-zones trigger a variety of changes to the display program, allowing the Water Level Indicator to have some A.I. (artificial Intelligence). The display can determine from which direction a person is approaching and decide what to play based on where they stand.

Flexible and customizable software allows the Water Level Indicator limitless passive and social interaction. The two-way communication creates an engaging user experience filled with unique animations.

This interactive piece of heritage interpretation has revealed a curious remnant of Winnipeg's past, reminding us of our flood history while becoming an exciting subject of social media posts for a new generation of information seekers.

1 WATER LEVEL INDICATOR TESTING **2** WATER LEVEL INDICATOR FALL 2020 **3** WATER LEVEL INDICATOR FALL 2020 **4** WATER LEVEL INDICATOR SUMMER 2020 **5** WATER LEVEL INDICATOR SPECIAL EVENT NOV 11 2020
PHOTOS 1 JEREMY CHOY, PATTERN INTERACTIVE
2, 3, 5 DAVID MODER, DAVID MODER PHOTOGRAPHY
4 CONSTANTINA DOUVIRIS, HTFC PLANNING & DESIGN

Munch

DESIGN TANK PHOTO NICOLAS TOURENCO



Name
Munch

Products
Chair, bench, seat, café chair and café table

vestre.com

Designer
Andreas Engelsvik & Jonas Ravlo Stokke

vestre



ROB LEBLANC

TECHNOLOGY AND THE CHANGING LANDSCAPE

COULD THE BUSINESS OF LANDSCAPE ARCHITECTURE BE SUSCEPTIBLE TO TECHNOLOGICAL DISRUPTIONS IMPACTING OTHER PROFESSIONS?

>FR_LP+ LA TECHNOLOGIE ET L'ÉVOLUTION DU PAYSAGE

L'architecture paysagère pourrait-elle être sujette à une ou plusieurs perturbations technologiques majeures susceptibles de modifier nos pratiques?

LET'S TAKE A journey into the future and ask where technology is taking us and how might it impact landscape architecture over the coming decade. With new technological innovations coming at an ever-rapid pace, it's hard to discern what is a short-term fad and what is a long-term trend. Understanding the potential directions can help shape priorities and investments for practitioners.

How We Design

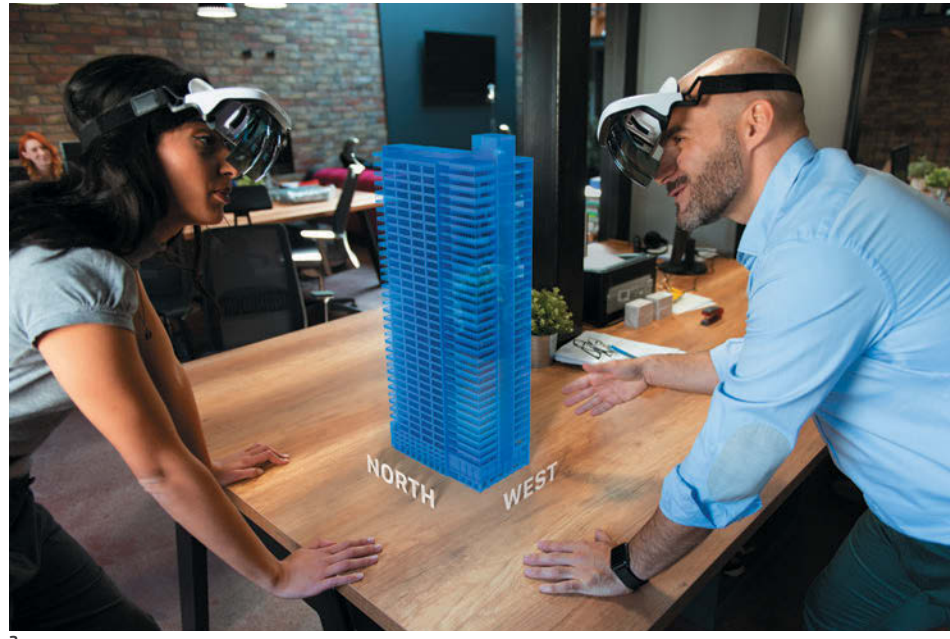
How we design will be very different in 10 years than it is today. Not only will computer hardware and software take giant leaps forward improving our capability to design and visualize, new hardware interfaces in virtual and augmented reality will become commonplace allowing us to be fully immerse in the spaces we create. We'll also

be able to share those immersive digital environments with other design teams, our clients, contractors and the public.

Apple and other hardware vendors will soon be releasing augmented reality (AR) glasses that will likely see mass adoption (some say, dethroning the smartphone) by 2024 or 2025, allowing everyone to visualize, and interact with, proposed sites and spaces. Landscape architects will be increasingly required to "prototype" these new virtual environments to provide proof of concept, long before projects are constructed. Complex environmental simulations will increasingly be incorporated as plug-ins into our modelling software using complex physics engines now found in gaming software.

1 DIGITAL VISUALIZATION ON A 1:1 SCALE IS A PRACTICAL STEP THAT CAN UNCOVER COSTLY HIDDEN ISSUES ON THE WORK SITE **2** TWO PEOPLE WORKING ON VIRTUAL 3D BUILDING BY USING AR GLASSES **3** ARCHITECTS OFFICE WITH MINIATURE CHARACTERS AND FURNITURE RENDERED WITH AUGMENTED REALITY
PHOTOS **1** ERIC HARRIS, TRIMBLE **2** ISTOCK.COM/1064489758 **3** ISTOCK.COM/661923466

Computational fluid dynamic (CFD) simulations built into our 3D applications will allow us to see where snow will accumulate, where wind may be modified and generally where human thermal comfort may be improved through design. We will also be able to visualize how different storm events will impact our site design. The prototypes will be accessible to most people (not just those with beefy hardware), providing the potential for more inclusive design and allowing the public to interact and shape our designs, or to rate what they like or dislike. Human preference engines may also be built into future design applications to evaluate how people will interact with new spaces. Parametric design applications will allow us to design even more complex and efficient structures that better meet the design requirements of our local environments.



2

Beyond the need to respond to growing environmental and social consequences of human expansion, the pandemic has shone a bright spotlight on the importance of public open space in our downtowns and our communities...



3



4

How We Construct

Once our design development is approved, we will have a suite of new technologies to see our projects built. First, with the mass adoption of AR, the construction industry will start to rely more on 3D models viewed through AR and a little less on working drawings on construction sites. When you can stand onsite and see exactly where the footing starts and how deep or what the final design would look like *in situ*, surveying will start to play a diminishing role. Also, when you can click on any element of the design in the field through AR and see exactly how it is conceived in 3D, there will be less reliance on traditional construction details. The two will merge over the coming decade, but clearly, projects will have to be fully conceived in 3D (4D if the time dimension is added, and multi-dimensional if specifications and other properties are linked to AR objects).

The other benefit of AR is that site changes, site instructions and shop drawings will be immediately available through the cloud for field workers. 3D printing and onsite micro-production techniques will allow for new ways to fabricate complex geometric forms. Construction administration will be aided by high-resolution 3D point clouds captured onsite daily by aerial drones or through AR glasses with embedded LiDAR scanners, showing the progress of construction and even the quantities of materials changing daily onsite. It is

very easy now to rapidly 3D scan a site in very high resolution to share with design teams as construction progresses, so this technology is already here and just needs more adoption (*see the "Surface Fax" article on page 38*).

I expect many of these tools will become commonplace on every construction site in the very near future, keeping a detailed catalogue of exactly what was built and where. Coupled with AR advances, you will easily be able to see behind and under landscapes and within the walls of buildings with great accuracy. More and more clients will require this type of technology for every project, providing a record of what was built and when.

The Importance of LA

I believe the prominence of landscape architecture will take a giant leap forward in the next decade. Beyond the need to respond to growing environmental and social consequences of human expansion, the pandemic has shone a bright spotlight on the importance of public open space in our downtowns and our communities, and the need for diverse multi-modal transportation networks. At the same time, autonomous electric vehicles are fast approaching level-5 autonomy and will soon be priced for the masses, changing the paradigm for how people travel and where they park their car. Giant swaths of parking in our downtowns could be converted to parks or new development sites, as cars self-navigate (using clean energy) to outlying areas of the city where land values for parking are cheaper.

Alternately, people may choose to own homes further from where they work due to advances in teleworking adoption and AVs, to travel into work less frequently. This could encourage more urban sprawl, but it will also place more pressure on suburban open space as the suburbs grow, while at the same time, freeing nature to return to its rightful place in the city.

Could the business of landscape architecture be susceptible to technological disruptions now impacting other professions? Many industries are now facing disruption due to rapid technological change. It's not just robots replacing workers, entire industries are being disrupted by technology. The advertising industry was partially disrupted by the Internet (for example, Google Ads) and even some design industries such as graphic design are being partially disrupted by crowd-sourcing platforms that allow clients to use low cost graphic designers from other countries to do basic logo or web design work. In our own professional sphere of influence, the field of surveying could face partial disruption from aerial drones that can now easily 3D scan large swaths of land to create detailed topographic maps, and the rise of augmented reality where construction surveying will play a less prominent role on sites.

Generally speaking, I believe that creative industries such as architecture, landscape architecture and engineering will be spared from any major disruptions in the coming decades due to the place-specificity of our work, but certain parts of our work could become redundant.

Navigating the Next Decade

Technology will create new opportunities for landscape architects and a new demand for our special and unique skills. We will, however, have to step-up to adopt the new challenges much more rapidly than we have in the past. Fundamental aspects of our design and construction process will be altered in the coming decade. We will need to keep a close pulse on the changes and how rapidly they are being adopted by our allied professions and contractors. The next 10 years are going to be a wild and exciting ride in landscape architecture, so grab your mouse (or your VR headset) and strap in for the fun.

4 FLYING DRONE OVER CIVIL
CONSTRUCTION SITE IN PROGRESS
PHOTO 4 ISTOCK.COM/96910603

ENLIVENING EVERYDAY LIFE WITH
SITE FURNITURE BUILT TO LAST.



Photo © Stéphane Gréneau

Base de plein air Sainte-Foy / Québec / QC

DESIGN
DURABILITY
EXPERTISE


Equiparc

1 800 363-9264



— EXCEPTIONAL DESIGN DESERVES EXCEPTIONAL PAVERS

EXCEPTIONAL DESIGN – EXTREME DURABILITY – LOW MAINTENANCE

From the smooth lines of extruded pavers to molded pavers' distinctive characteristics, our brick's geometric perfection is a simple yet powerful asset to your paving design! Whether you're proposing a brick patio, walkway, driveway, or an entire streetscape, The Belden Brick Company has a wide range of clay pavers that are an ideal choice for high strength industrial and commercial to residential paving applications. Visit our website to discover the many colors, sizes, textures, and shapes.

PRODUCTS: City Line Pavers - Landmark Gray,
Lighthouse Gray, and Sienna Blend

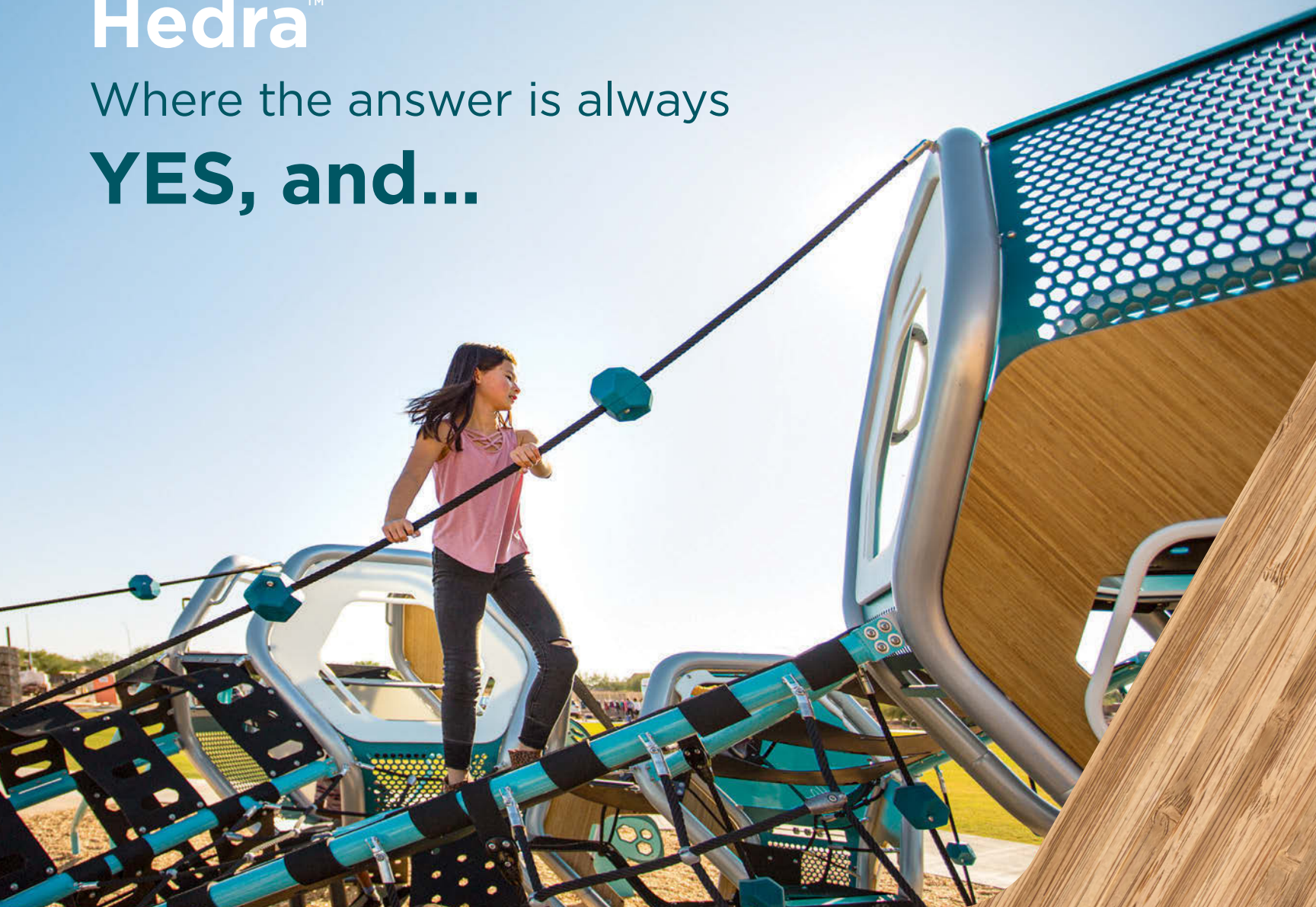
RESIDENTIAL | COMMERCIAL | PAVERS



beldenbrick.com | 330-456-0031 | *The Standard of Comparison Since 1885*

Hedra™

Where the answer is always
YES, and...



Endless formations of fun form a fascinating interconnected matrix of three-dimensional play where the next move is always the right one. Explore this continuous hive of evolving play at playlsi.com/hedra.

The new shape of play.

#shapedbyplay



©2020 Landscape Structures Inc. All rights reserved.



MANSOOR MA

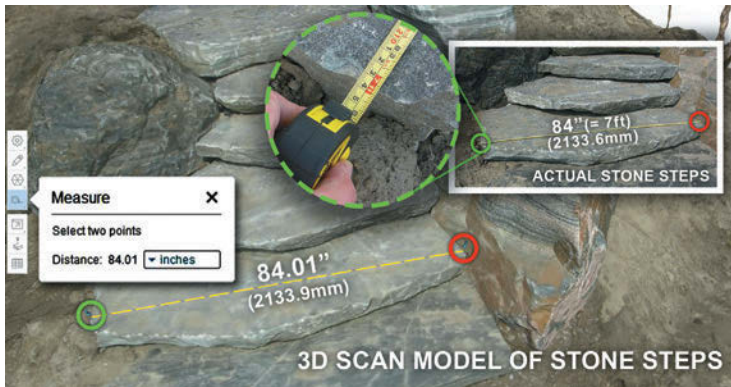
VIRTUALIZATION OF THE LANDSCAPE DESIGN PROCESS

> FR_LP+ VIRTUALISATION DU PROCESSUS DE CONCEPTION DU PAYSAGE

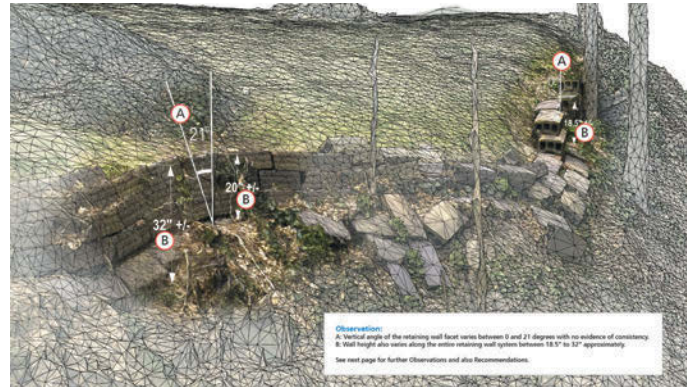
La pandémie a été dévastatrice pour beaucoup; cependant, s'il y avait une conséquence positive de la fermeture de COVID-19 à Toronto pour notre studio d'architecture paysagiste (LANDinc.), ce serait la reconfirmation de notre approche dans l'utilisation des technologies pour notre pratique orientée vers les processus.

1 PROJECT MANAGER BRUCE GILCHRIST WEARING VIRTUAL REALITY (VR) GOGGLES TO VISUALIZE AND CRITIQUE CERTAIN ASPECTS OF A MIDDLE EAST PROJECT **2** POINT CLOUD 3D MODEL OF THE SITE SCAN OF TRILLIUM PARK, ONTARIO PLACE, WHICH CONSISTS OF MILLIONS OF "POINTS" **3** ACCURACY COMPARISON BETWEEN REAL WORLD OBJECT AND THE VIRTUAL COUNTERPART. A DIFFERENCE OF 1/100 INCH **4** A COMPOSITE OF THE 3D SCAN MODEL WITH THE ACTUAL BLUFF IN THE PHOTO **5** A PAGE EXTRACTED FROM THE 3D DOCUMENTATION REGARDING SITE CONDITION OF THE RETAINING WALL. THE VIRTUAL ENVIRONMENT PROVIDES UNLIMITED WAYS AND LOCATIONS TO TAKE MEASUREMENTS **6** SLOPE ANALYSIS FROM THE SCAN MODEL HELPS OUR CLIENT TO UNDERSTAND THE PHYSICAL LIMITS OF SLOPE % VISUALLY
PHOTOS • IMAGES LANDinc.

THE PANDEMIC HAS been devastating for many, however, if there is a positive consequence of the COVID-19 lockdown in Toronto for our landscape architecture studio (LANDinc.), it would be the reconfirmation of our approach in the use of technologies for our process-oriented practice. We are not talking about BIM or 3D production. We are talking about the virtualization of design and construction in all phases of a planning or design project. The following descriptions highlight the use of recent technologies in the design process as well as the communication value to clients and stakeholders.



2, 3, 4, 5



If “a picture is worth a thousand words,” then the value of a virtual site visit with clients will be priceless if there are design attributes that are difficult to communicate otherwise.



6

Meetings with Clients at a Virtual Site

We recently launched a new significant project on the Toronto Meadowway – a key and iconic entry park for the Garden Club of Toronto, Toronto Regional Conservation Authority, Infrastructure Ontario, Hydro One, the City of Toronto and the community at large. During one memorable stage of the project, we entered a Zoom meeting from the comforts of 17 individual spaces and were transported virtually to the site in Scarborough, a northern section of Toronto. Within seconds, all stakeholders were interactively studying the site from

various vantage points – moving from one spot to the next, stopping as a group to pan around 360 degrees on a nice virtual autumn day during our winter afternoon call. We looked at the site from adjacent buildings, the roadway and elevated vantage points; witnessing and reviewing the constraints of a hydro corridor that appeared to be suspended above our heads. We are not advocating that we replace actual visits to the site, however, rarely before would it be common ground to experience a site virtually as a team – interactively studying aspects of plant material, drainage patterns and physical

structures, encouraging early input while beginning to define criteria for the project.

An example of design review meetings with overseas clients at a virtual location is shown in Figure 1. Schedule, budget and time constraints all contribute to staff not always being able to visit overseas clients in person on a regular basis. Instead, we have embraced virtual walk-throughs to explore design alternatives. Our clients in Dubai meet us on site virtually while we are physically 11,064 kms apart. Our review is interactive as we critique layouts, elements, physical options and location of



7



8

plants by adjusting components within the virtual model or just leave virtual markups/ notes for further studies.

We have been using virtual design expressions internally in the office for years to test options and critique our own work. Now we can easily explain the true attributes and principles of design at a human 1:1 scale without the misinterpretation of a rendered plan or perspective graphic. If “a picture is worth a thousand words,” then the value of a virtual site visit with clients will be priceless if there are design attributes that are difficult to communicate otherwise.

Site Inventory, Analysis and 3D Documentation

A conventional site inventory and analysis involves multiple disciplines including landscape architects, arborists, geotechnical engineers, surveyors, environmental scientist heritage specialists, etc. Some of the basic building blocks include a survey plan, site photos and critical site measurements. Sometimes this information is limiting for complex sites, especially sites that have complex topographies with unique built and natural features like rock outcrops, detailed wetland conditions, etc. A more truly accurate technique in capturing site data is by augmenting a LiDAR scan, or using photogrammetry techniques, to perform a 3D scan of the site.

7 DESIGN SIMULATION OF NEW RETAINING WALL AT THE PROXIMITY OF THE EXISTING CRUMBLD WALL **8** THREE COMPUTER ANIMATIONS HELPED TO SIMULATE THE SENSATION AT 60KM/HR FROM THE DRIVER'S PERSPECTIVE **9** TABLE SIZE SAND MODEL (LEFT); IMPORTED 3D SCAN MODEL OF THE SAND MODEL IN A 3D SOFTWARE (RIGHT)

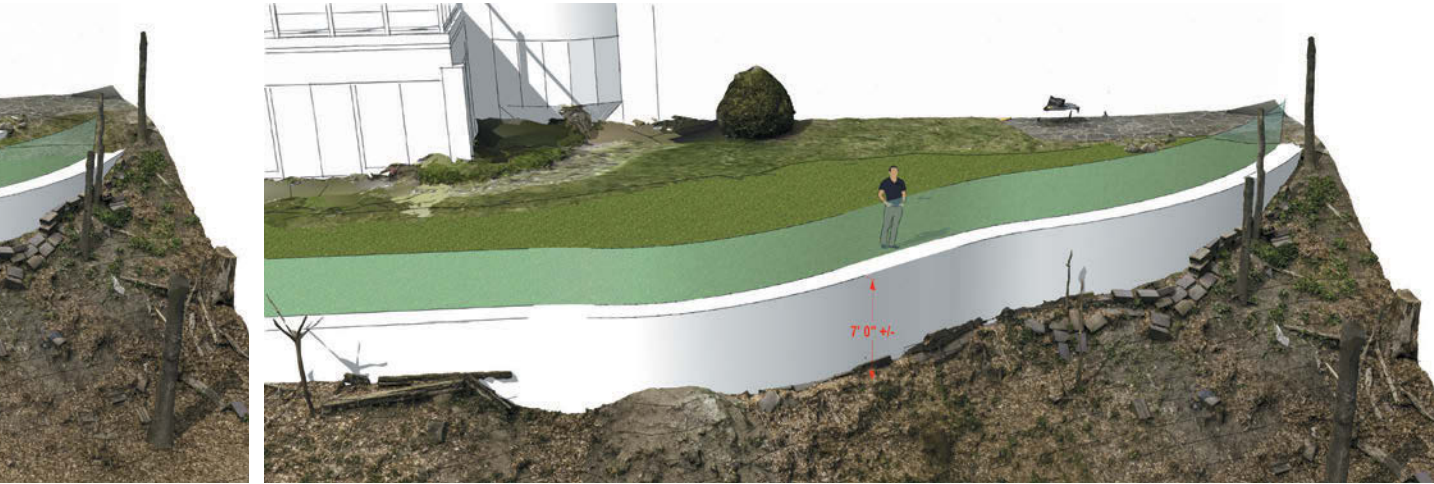
A site scan captures the site or any specific site elements (e.g., ground features, fence, rocks, tree trunk location, etc.) in a three-dimensional representation of “points” with individual XYZ coordinates. While they independently exist in a virtual space, they are positioned relative to each other. When looking at these points from a distance, they resemble a photograph, but in fact, they are individual points at close-up (Fig. 2). Hence the name “Point Cloud” model. This is the foundation from which we extract information to become a 3D digital terrain model that can be used for site analysis or 3D documentation.

To be sure that we can achieve accuracy for the purpose of analysis, we have conducted accuracy comparison between the real-world physical object and our 3D scan model. Figure 3 shows the difference in measurements between the object and the scan to be 1/100 of an inch (0.03mm). In other words, our scan model is a “digital twin” of the real-world counterpart. This means we are taking the entire site at

millimetre accuracy back to our office for detailed site analysis.

Figure 4 shows the “digital twin” of the Bluff landscape sculpture in Trillium Park, Ontario Place. This image is a blended composite of the 3D scan model onto a photo of the actual Bluff for visual comparison between the two. The 3D model reflects all the features of the Bluff used as our in-house 3D documentation.

The advantage of using a detailed 3D scan model of a crumbled retaining wall is demonstrated in Figures 5 and 6. Not only we can conduct a whole series of “virtual activities” within the model such as observation and measurements (Fig. 5), slope analysis (Fig. 6), etc., it also provides safety for the staff. As can be seen from the slope analysis image (Fig. 6), this crumbled retaining wall is located at a severe 40% slope with a subsequent 6m drop. It would be dangerous to reach and perform measurements. Virtual measurements provide safety, and can be taken at *any* point in the model from the comfort of the office.



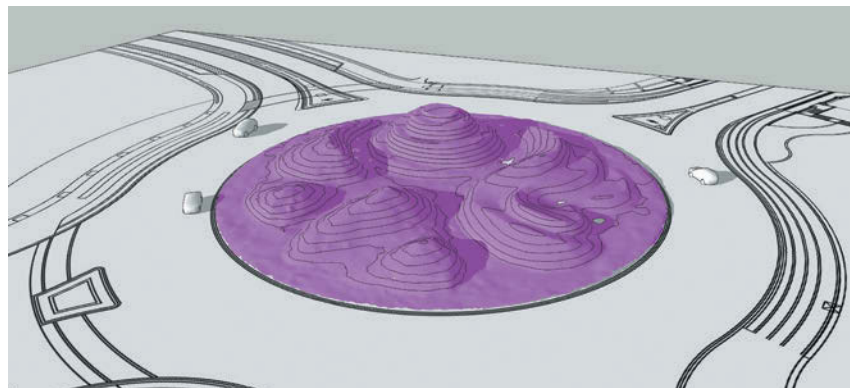
For this slope analysis, we even wore our VR goggles and virtually hovered 6m off the ground, like a hummingbird, to take a closer look at the existing condition of the crumbled retaining wall as a virtual inspection.

Based on the virtual site analysis, three early massing models were created allowing our client to visually understand his intention of creating the new wall at the same proximity of the existing wall (Fig. 7).

Concept Design & Design Development Phases

Throughout the entire design process, we employ an integrated approach of tools and medium from both hand and digital world for design exploration and expression. We have never abandoned traditional tools and techniques for virtualization. In fact, we find ways to integrate them into our digital workflow.

A good example of a “hand drawing-with-digital” design approach was designing landform and a prime sculptural element for a 60m diameter roundabout. Prior to engaging in the design process, three computer drive-through simulations at 60km/hr were conducted for determining the appropriate height of the main sculpture at 3, 6, and 9m height (Fig. 8), as well as the associated cone of vision and distraction factors.





10

Our senior designer and sculptor at LANDinc then used the traditional sculpting tools and techniques in creating a table size physical sand model (Fig. 9) based on the compute drive-through simulation findings. The sand model was then 3D scanned as point cloud model and converted into 3D modelling software (Fig. 9) for further terrain manipulation, contour creation, solar orientation studies, quantifying fill requirements, planting arrangements, section-elevation illustrations and finally accurate construction documentation. All of these virtual activities came from a hand-carved sand model in the physical world.

10 "SKETCHY" STYLE OF RENDERING FOR DESIGN STUDIES HELPS TO BRING OUT THE OVERALL DESIGN ATMOSPHERE OF THE SPACE RATHER THAN LOOKING AT INDIVIDUAL DESIGN ELEMENTS. **11** PHOTOREALISTIC RENDERING FOR FINAL PRESENTATION OF THE SAME PROJECT AS ABOVE **12** A 3D DESIGN CONCEPT MODEL IS SHOWN ON THE ANDROID TABLET SCREEN BY POINTING IT AT THE PLAN DRAWING ON THE TABLE USING OUR AR APP **13** CLIENT WEARING OUR VR HEADSET IN OUR LANDINC OFFICE TO VIRTUALLY WALKTHROUGH THE PROPOSED DESIGN

PHOTOS + IMAGES LANDinc.

Without the use of a large format scanner, large format printer and traditional ways of sharing our sketch design ideas in the office during the lockdown, we rely on the use of hand drawing on 32" Cintiq monitors. That simple switch has allowed us to document the evolution of the design more easily, share material, interactively mark-up designs, while skipping a few steps such as scanning drawings that would have taken place in the office. Virtualizing this process due to our isolation, even though it continues to be a traditional approach, transfers hand drawing skill directly into the graphic software used for final presentation processing. Very often these renderings are draped over 3D models to start the process of adding 3D attributes including cars, people, trees, etc.

We have also had success in employing other virtualization technologies such as Augmented Reality (AR) and Virtual Reality (VR). The advantage of using AR makes clients understand the design from their own iPad/Android Tablets or smart phone. By pointing at a pre-programmed piece of graphics such as the masterplan using their device, a 3D model of the

design will be displayed on the screen. As clients move their device left and right, the model on the screen keeps updating to match the correct perspective. This gives a very convincing illusion and sensation as if the 3D model actually "sits" on the masterplan. Most landscape architects have experienced clients in the past who could not understand the design in design plan view. This process of moving around and through a site plan with an iPhone projecting it in 3D, has allowed us to overcome that obstacle (Fig. 12). Essentially, it demystifies the design ideas and convinces the physical and natural attributes of a design. Again, we employ 3D models in AR very early in the concept stage. The model is designed to be crude but articulated enough for the client to understand the site constraints and coming to the agreement on the design concept quickly.

VR is similar to AR in that it "fools" our visual senses. By wearing the VR headset with earphones, our clients can be in a totally immersive environment walkthrough of the design as if they were actually at the site (Fig. 13). On different projects, we also use VR to virtually experience the design ourselves.



11

By wearing the VR headset with earphones, our clients can be in a totally immersive environment walk-through of the design as if they were actually at the site.



12, 13

It is our experience that AR and VR has greatly assisted clients in making quick and confident decisions. We were clients ourselves when it came to designing and renovating our own office. We used both AR and VR to discuss design issues from lighting, colour and pattern of the carpet, wall colours, room size and separations, etc.

Our office has also developed rendering styles to suit each project phase to balance client receptiveness with internal staff resources. For example, we use a loose watercolour style and sketchy line types 3D models and/or hand sketches for representing early design concepts (Fig. 10). We find the looseness of the graphic style helps our client to “breathe into” the design at the early stage. As the design refines further, so does the more sophisticated 3D model detail and design style. We tend to use a “photoreal,” physical-based rendering (PBR) style for our final presentation where all design materials are rendered and behave based on real world materials (Fig. 11). Using PBR at the end of the project helps our clients to reflect upon the various design decisions and aligns with the design direction.

We can summarize our virtualization journey as follows:

- Our vision in the virtualization of our design process is evolving and adapting all the time as new technologies arise. There is always a research and development process in every step in exploring these techniques in our process. In most cases, these are not “off the shelf” applications and take time to employ unless a specialist is hired.
- Hand sketching is always essential in a design communication process in our LANDinc office. Despite the advanced technologies we have in the office, hand sketching (pen and marker on paper or using stylus on pressure sensitive drawing tablet) is our common denominator. While some have ventured away from this essential art, technology is allowing hand drawing to become more relevant again making it easier to transition hand ideas into real models and the built environment. These high-tech tools still make use of the unique and subliminal engagement of the hand-eye-mind process. Such a process makes

a designer think about the design while they are sketching – lines, forms, shades and shadow, volume of space, etc.

- All of the tools and techniques for our design and design communication come from a deliberate integration of both conventional and digital worlds. We never disregard either because they are all “tools.” We maximize and combine the benefits together to produce effective results. It is a “combine and conquer” attitude rather than hand “versus” digital.
- We are advancing the use of 3D models much earlier in our design process, rather than the conventional way of using 3D just for impressive rendering. We find that even at early concept stage, a simple 3D model provides important real-time feedback to our design team for assessing early design ideas and to check for any potential design flaws/issues. We can tackle them earlier, rather than realizing and fixing them later on in the process, hence minimizing design revisions.



1

PATRICK SHEITO

LE PAYSAGE VIRTUEL COMME OUTIL DE TRAVAIL

> EN_LP+ THE VIRTUAL LANDSCAPE: AN INCREASINGLY USEFUL TOOL

There's more and more talk about new technology in our profession – BIM processes, LiDAR scans and even virtual reality. In this context, we are rediscovering 3D modelling and the virtual landscapes it can reveal.

ON ENTEND DE plus en plus parler de nouvelles technologies dans l'industrie. Les procédés BIM, les relevés LiDAR ou encore l'intégration de la réalité virtuelle. C'est dans ce contexte que nous retrouvons la maquette 3D et le paysage virtuel qu'elle dévoile. Si l'outil n'est pas encore indispensable dans la pratique professionnelle, il est néanmoins de plus en plus commun. C'est à ce vaste sujet que nous venons greffer le concept de rendu en temps réel, devenu réalité par les percés technologiques de la dernière décennie. Le rendu en temps réel passe par

l'utilisation d'un puissant moteur graphique, issue du monde du jeu vidéo. Cette industrie, maintenant plus grande que l'industrie du film, a connu une croissance exponentielle depuis ses débuts il y a plus de trente ans et de nombreux outils de conception et diffusion qui en découlent sont maintenant utilisés dans plusieurs sphères de notre vie quotidienne. Les effets spéciaux dans nos films préférés et la réalité augmentée utilisant le gyroscope dans nos téléphones intelligents en sont des exemples.

Comme son nom l'indique, le rendu en temps réel vise à présenter rapidement un résultat aux caractères esthétiques à partir d'une maquette 3D. Ceci permet de simuler une multitude de variantes sans passer par les longs processus de rendus qui s'étiraient sur plusieurs heures ou sur un processus de photo-montage traditionnellement plus lent.

Les avantages de cette technologie ont deux portées distinctes d'application, soit les avantages en conception de projet et en



diffusion d'information. Ces deux sujets s'entrecroisent dans leur utilisation, car qui bénéficie un, peut aider l'autre, surtout pour ce qui est de la lecture d'un site.

En conception, la simulation en temps réel permet d'intégrer plusieurs variantes d'un concept et de représenter ces plusieurs maquettes dans un environnement virtuel instantanément. Ces mêmes outils permettent de rapidement ajouter des variables, tel que la météo, la période d'ensoleillement ou même la saison

En conception, la simulation en temps réel permet d'intégrer plusieurs variantes d'un concept et de représenter ces plusieurs maquettes dans un environnement virtuel instantanément.

pour en évaluer ou démontrer l'impact sur le site. Il devient facile et surtout rapide de générer une image d'automne avec un soleil de midi ou un soir pluvieux d'été pour démontrer des ambiances différentes. Le concepteur peut juger de la validité de son concept et le client peut pleinement l'apprécier sans souci d'interprétation. Cette maquette 3D, appuyé par le moteur graphique peut servir à extraire des images, des vidéos ou des scènes en réalité virtuelle qui viennent en support aux méthodes de promotion d'un projet choisi.

Cette flexibilité à l'avantage de faciliter la compréhension pour tous, tant pour le client que pour les professionnels collaborateurs. Elle permet une meilleure représentation des ambiances recherchées ainsi qu'une présentation dynamique d'un projet sans un investissement de temps considérable ce qui regroupe les deux aspects de conception et de diffusion.

Cependant comme tout outil disponible, il faut être conscient des inconvénients à son utilisation. Il y a une réelle difficulté d'utilisation. L'intégration nécessite un échange d'information entre plusieurs logiciels ce qui complexifie la tâche. La courbe d'apprentissage peut être difficile lorsqu'on débute. De plus, la nature organique des ouvrages de paysage complexifie la tâche par rapport à la représentation d'ouvrages plus cadrés tels qu'en architecture. Les outils sont moins bien adaptés au paysage. Ces technologies nécessitent un matériel informatique plus puissant, ce qui limite certains bureaux au budget plus modeste. Un rendu peut sembler parfois trop réaliste, trop grossier, trop froid. Une approche d'artiste est requise pour ajouter les détails fins comme les imperfections qui font la différence. Les égratignures, les flaques d'eau ou l'imperfection des végétaux. Une maquette 3D peut parfois faire mentir sur un projet, donner un faux sentiment ou une fausse perception. Le client peut, par exemple, arrocher sur un détail de couleur de bâtiment annexe au projet et perdre complètement le sentiment d'immersion dans l'environnement virtuel ou remarquer que l'arbre existant devrait être un conifère et non un feuillu.

Que l'on aime ou non les outils de modélisation et visualisation 3D, ils sont là pour rester et vont continuer à évoluer. Ils peuvent parfois créer plus de problèmes qu'en régler par leur complexité, mais leur potentiel positif est indéniable. Comme tout autre outil, il faut simplement les apprivoiser et apprendre à les utiliser dans un contexte pertinent. Ils peuvent bénéficier l'architecte paysagiste en outil de conception, en l'aidant à concevoir en trois dimensions et en outil de diffusion en rendant une vision réelle de son projet.



1 RENDU SOIR D'ÉTÉ, MIDI D'AUTOMNE / SUMMER EVENING, FALL AT NOON
RENDER 2 RENDU SIMPLE VS DÉTAILLÉ / SIMPLE VS DETAILED RENDER
PHOTOS ROUSSEAU LEFEBVRE

FADI MASOUD + ISAAC SEAH

DATA-DRIVEN ZONING CODES FOR CLIMATE ACTION

>FR_LP+

DES CODES DE ZONAGE BASÉS SUR LES DONNÉES POUR L'ACTION CLIMATIQUE

La façon dont une région urbaine est conçue par rapport aux systèmes et processus naturels qui la sous-tendent a des conséquences considérables sur sa capacité à prévenir, à survivre, à atténuer et à s'adapter aux défis climatiques. Mais dans quelle mesure les citoyens et les décideurs comprennent-ils les attributs physiques de leur environnement?

HOW AN URBAN region is designed in relation to its underlying natural systems and processes has tremendous consequence for its capacity to prevent, survive, mitigate and adapt to climactic challenges. But to what extent do citizens and decision-makers comprehend the physical attributes of their environmental surroundings? Are they aware, for

example, of the topographic or geological variabilities of their neighbourhood and its capacity to retain and convey water? Are they aware how far the water table is from the foundations of their homes and basements? Do they grasp the effects of paved surfaces or a healthy tree canopy on urban heat islands and their physical and mental well-being? Do they see the value of continuous protected networks of parks, ravines and wetlands in reducing overland flooding and rejuvenating ground water aquifers? Cities and regional conservation authorities tend to be the front-runners in acting and garnering political will to respond to climate change. As such, it is important to build public and institutional literacy of our landscapes as critical infrastructures in the fight against climate change, the future of urban resilience, mitigation and adaptation.

With the proliferation of data in our digital age, it is critical to find ways for landscape architects to harness environmental knowledge in service of climate action. Many of our natural systems are already digitally monitored, modelled and quantified. From tidal gauges to stormwater runoff valves, and from heat sensors to soil salinity gradients, to water-table levels, the geophysical-digital interface is generating billions of data points every minute, describing the environment around us in bits and bytes in real-time.


With the voluminous explosion of data available about the world, designers and policymakers are now able to leverage rich data ecosystems to substantiate different aspects of a design and planning process. This goes from predicting trends in a physical space, to synthesizing data-driven solutions, to improving green infrastructure performance within the built environment. We see this as an opportunity to create new visualization tools that render visible the interrelations between geo-physical conditions and the process of city building. We see this as the basis for better informed decision making and climate action – especially in the context of our dated land use zoning codes.

Static Planning Tools in a Dynamic Landscape

Reductive land use policies, such as the universally adopted Land-based Classification Standards (LBCS) have formed the basis of our cities' land use zoning laws for almost a century. LBCS describe the permitted uses of land parcels (residential, commercial, industrial, etc.) absent a robust and nuanced description of the land itself. LBCS also jettison the scenario-driven models needed for climate-based adaptive resilient design, as they are static and neglect to factor in the dynamic conditions of changing landscapes. In many places, these normative zoning codes have rendered themselves extraneous in truly dealing with the impacts of climate change. For example, some regions continue to be zoned for typical future residential land use, knowing they are under severe risk of future flooding. We simply ask:



1 SUNNY DAY - KING TIDE FLOODING IN FORT LAUDERDALE (OCTOBER 2016) 2 SOUTH FLORIDA'S URBAN FABRIC IS SITUATED WITHIN A LARGE ESTUARY. PHOTO/IMAGE 1+2 FADI MASOUD

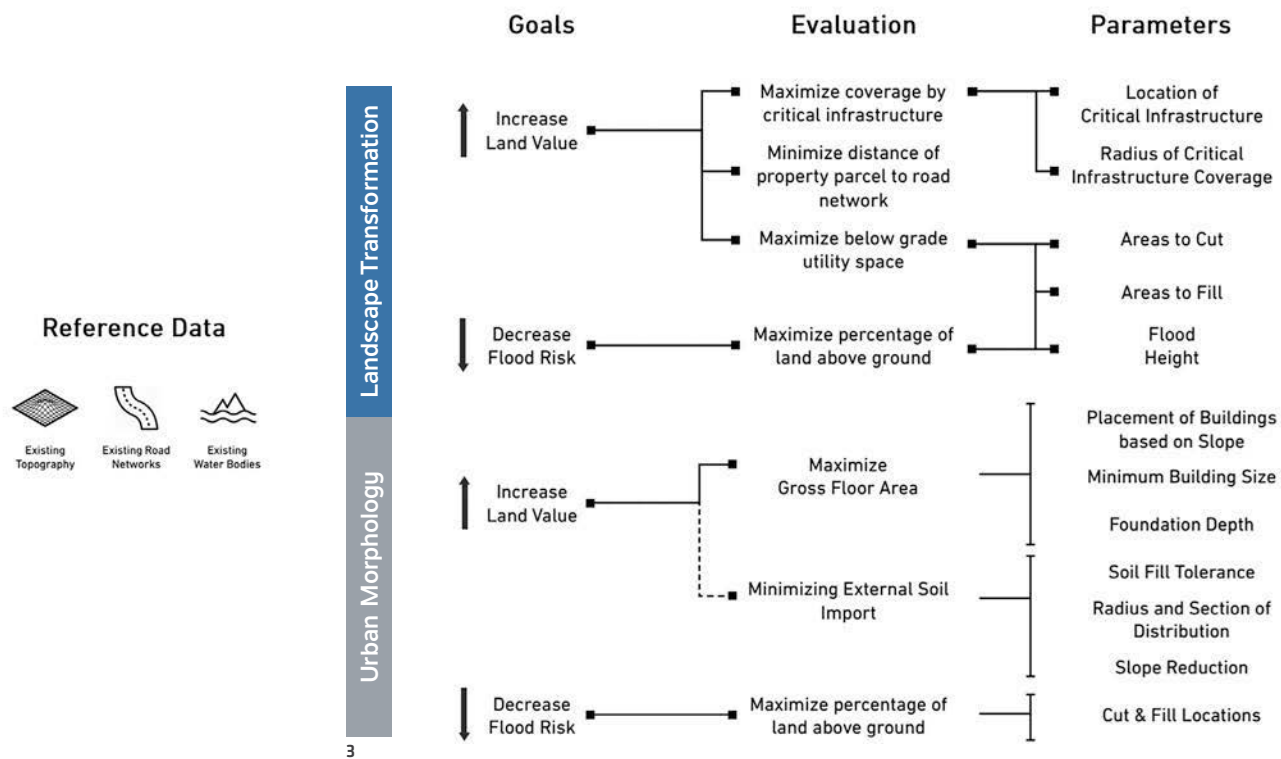
An aerial photograph of a coastal city, likely San Francisco, with a blue semi-transparent overlay. The text is placed over the city's urban area and the surrounding water.

In the absence of new innovative climate adaptation tools, the status quo building process, insurance-driven regulations, and urban expansion will continue to proliferate and eventually fail.

why does land use zoning continue to remain static when we know that landscapes are dynamic?

In the absence of new innovative climate adaptation tools, the status quo building process, insurance-driven regulations, and urban expansion will continue to proliferate and eventually fail. Despite the rapid transformation in climate and geo-spatial modelling, the codification of the urban environment through normative or traditional zoning continues to rely on two historically ingrained and dated conditions: the regulation of land and the regulation of use. However, these conditions fail to capture the temporal, environmental and social conditions that govern their relationships and fluctuations, resulting in increasingly ineffective land use planning. This is especially true in areas of extreme risk due to climate change, as well as in sensitive landscapes such as environmentally sensitive areas and greenbelts that are under continuous threats of suburban and industrial development.

If designers, builders and decision-makers can tap into rich data environments, the typical process of land subdivision, density and land-use allocation may be improved significantly. The urban design process can potentially account for environmental performative factors by introducing a dynamic ecological data-driven layer of environmental performance into the traditional zoning code. With the right data points, the siting, shape, program and use of buildings and land parcels can be calibrated by the capacity of the



3

land. Instead of the rigid reductionism of conventional land use, new categories could eventually evolve into a series of overlapping gradients, eliciting a multifunctional, dynamic understanding of land(scape) and use that are absent from current regulation.

Harnessing Data for a Rapidly Changing Urban Environment

In the face of recent erratic climate change events, the need for a zoning approach that embraces change as well as multiple endpoints of uncertainty is ever more pressing. As rising sea levels threaten an increasing number of growing coastal cities, unpredictable rain events overwhelm dated infrastructures, and forest wildfires inch closer to residential communities, stakeholders need to recognize that a one size fits all zoning approach is no longer effective.

The idealized concept of “highest and best use” should be left behind. In this new reality, our team at the University of Toronto's Centre for Landscape Research proposes a data-driven, flexible zoning code that allows land use standards to emerge from dynamic, ecologically

informed thinking, rather than a dated static approach.

As we become increasingly surrounded by the aggregation of data from a multitude of sources, revisiting how we regulate the use of land and what may be built on it has become more achievable than ever. After all, geo-spatial mapping, planning, design and construction delivery are all digitally produced and acquiesced. By aligning rich environmental data with computational advancements in algorithmic design, optimization and parametric variation, our existing computer-aided design and planning processes can be realigned to produce novel and more nuanced codes for the environments they serve. In essence, instead of applying a generic code to a region or parcel of land, the land use-code is derived, informed and shaped through the optimal design for that parcel based on environmental and geo-physical data, as well as projected climatic risks overtime.

Deploying Data Driven Design at Different Scales

Despite the prevalence and availability of data, finding the right application is equally,

if not more important. As the size of a project increases, so does the reservoir of information to which the project might respond. At a larger scale, a data driven process will be more effective if it focuses on understanding, categorizing and prioritizing these vast reservoirs of data. In contrast, at a smaller design scale, the process would excel at identifying and negotiating the relationships between details and tactics, form and performance.

We test this idea in the context of Southeast Florida, a growing urban region at the front lines of the climate crisis. Despite being one of North America's fastest-growing regions, Southeast Florida is also one of its most threatened. Due to its low-lying estuarine condition and porous geology, it is projected that as many as 2.5 million residents will be forced to move due to sea level rise by 2050. Defined by a combination of hard mechanical infrastructural systems, and developer-driven, master-planned subdivisions, current zoning codes have proven to be generally ineffective in truly adapting to this region's dramatically fluctuating environment.

By adopting a data-driven approach to re-imagine the land use zoning code of Broward County, Florida, we used geo-physical and environmental risk factors to categorize the county into distinct development zones. In a series of modelling sets provided by the county, three zones can be observed: the coastal zone, which

3 SERIES OF PROJECTIVE SPECULATIVE “FLUX” CODES THAT COMBINE PERFORMATIVE LANDSCAPE STRATEGIES AND BUILT FORM 4 GROUND WATER STORAGE POTENTIAL MODELS. BLUE: HIGHEST STORAGE POTENTIAL - RED: LOWEST STORAGE POTENTIAL 5 INTERACTIVE WEB-PLATFORM THAT VISUALIZES AND OVERLAYS VARIOUS EXISTING, PROJECTED, AND REAL-TIME HYDROLOGIC, GEOLOGIC, AND POLICY DATA LAYERS. THE PLATFORM REVEALS SECTIONAL RELATIONSHIPS BETWEEN THE BUILT FROM AND GROUND WATER CONDITIONS. IT ALSO SHOWS THE RELATIONSHIPS BETWEEN LAND USE AND FLOOD RISK GRADIENTS.

IMAGES 3 FADI MASOUD - CENTRE FOR LANDSCAPE RESEARCH 4 BROWARD COUNTY ENVIRONMENTAL PROTECTION AND GROWTH MANAGEMENT DEPARTMENT (2016) 5 MIT URBAN RISK LAB AND CENTRE FOR LANDSCAPE RESEARCH - UNIVERSITY OF TORONTO (MASOUD / MAZEREUEW)

is the already generally inundated “red” zone; the inland and generally flood-safe “blue” zone; and the shifting “yellow” flux zone that demarcates the extents of salt water intrusion into the groundwater aquifer. Within the red zone and yellow flux zone, we see opportunities for immediate climate adaptation strategies, more stringent flood-proof building codes, the provision of continuous systems of blue-green infrastructure, as well as the expansion of green and permeable open spaces. The prioritization of the location of these strategies were all determined through a refined data driven aggregation process, where environmental details, performance and flood scenarios were considered.

Performance Driven Design

Through the same process, we also identified development appropriate clusters throughout this yellow flux zone. The process includes the optimization of form, performance and details of land parcels in different neighbourhoods.

The scaling down includes allowing for a compatible set of unique codes to be discovered through the processing and analytics of well-curated subsets of geo-physical data and development needs. Here, each development cluster is characterized by collected data on its physical, environmental and temporal conditions. The most fundamental of these is the depth from surface to groundwater, a parameter that influences soil storage, building foundation type, land use, seasonal flood condition, site-specific water management options, and the effectiveness of drainage system components.

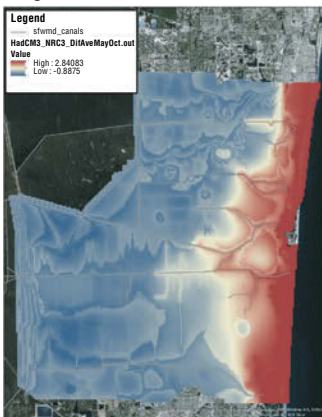
By leveraging modern advances in optimization algorithms and methodologies such as generative design, the response to a development cluster can be designed systematically through well-defined goals, parameters and performance metrics. For example, to achieve the competing goals of increasing land value while decreasing flood risk, a proposed design is evaluated by factors such as access to near-by critical

infrastructure, percentage of land above the average water-datum, or the distance of the property parcel to other important transportation, energy and potable networks. Within this defined cluster, our data-driven algorithm identified areas to cut (make room for water) and fill (increase height of flood datums) and, as such, a code for the placement and setback of buildings, location of new critical infrastructures, and open space ratios. All optimized based on different configurations, parameters, and performance metrics.

This ultimately resulted in a novel set of highly contextual and nuanced zoning codes, uses, programs, building and landscape typologies. By leveraging live environmental data feeds in tandem with a well-defined generative design process, we can envisage new land-use types that respond appropriately to rapidly changing environments. The team organized these codes along a matrix. The codes within the matrix reflect a gradient of uses that goes from the most dynamic, adaptable and elastic elements of an urban region (appearing along the wettest axis, such as wetlands, marshes and parks spaces), to the most fixed and static elements (appearing along the driest; such as food, energy, waste infrastructures, airports, transit hubs and medical campuses). The ultimate goal of this matrix is to capture the temporal, environmental and spatial conditions of the urban environment along a landscape-derived continuum, versus a static reading of the land.

Through the careful orchestration of data, algorithms, and design intent, designers, policy makers and stakeholders can develop novel, more responsive, zoning codes that enable climate resilient and adaptive design strategies. As algorithms continue to mature, and data streams continue to become more prolific, it also becomes easier to understand and create structures for more complex urban design problems. By incorporating the uncertainty of shifting environmental systems with the execute of urban codes, we have an opportunity to develop a more robust and dynamic understanding of our physical environments. This may result in more appropriate design solutions that better respond to the environmental challenges and uncertainties we face today.

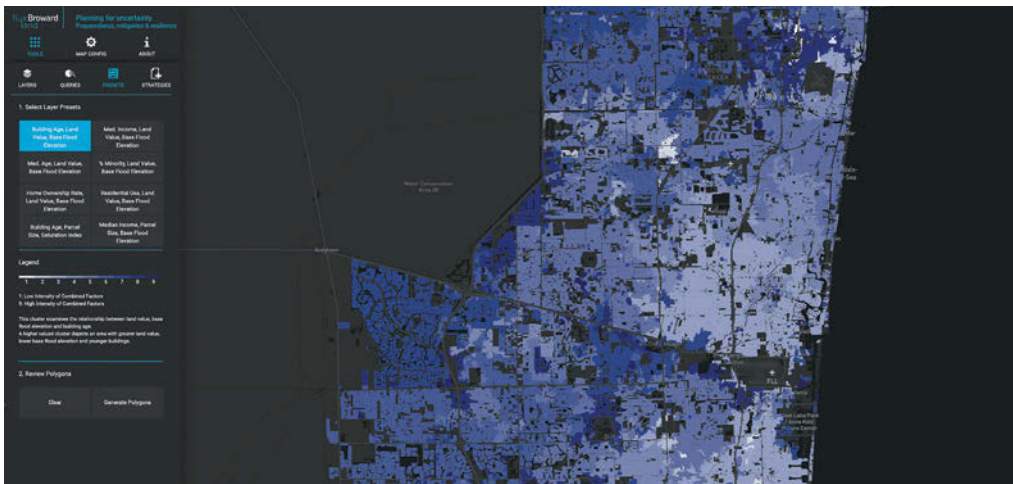
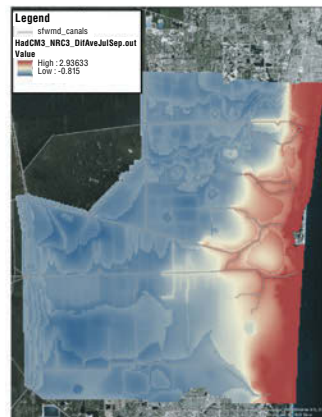
May - Oct



Aug - Oct



Jul - Sep



ROB LEBLANC + NICK LEBLANC

3D Fax Machines

FR > LP+ NUMÉRISSEURS 3D

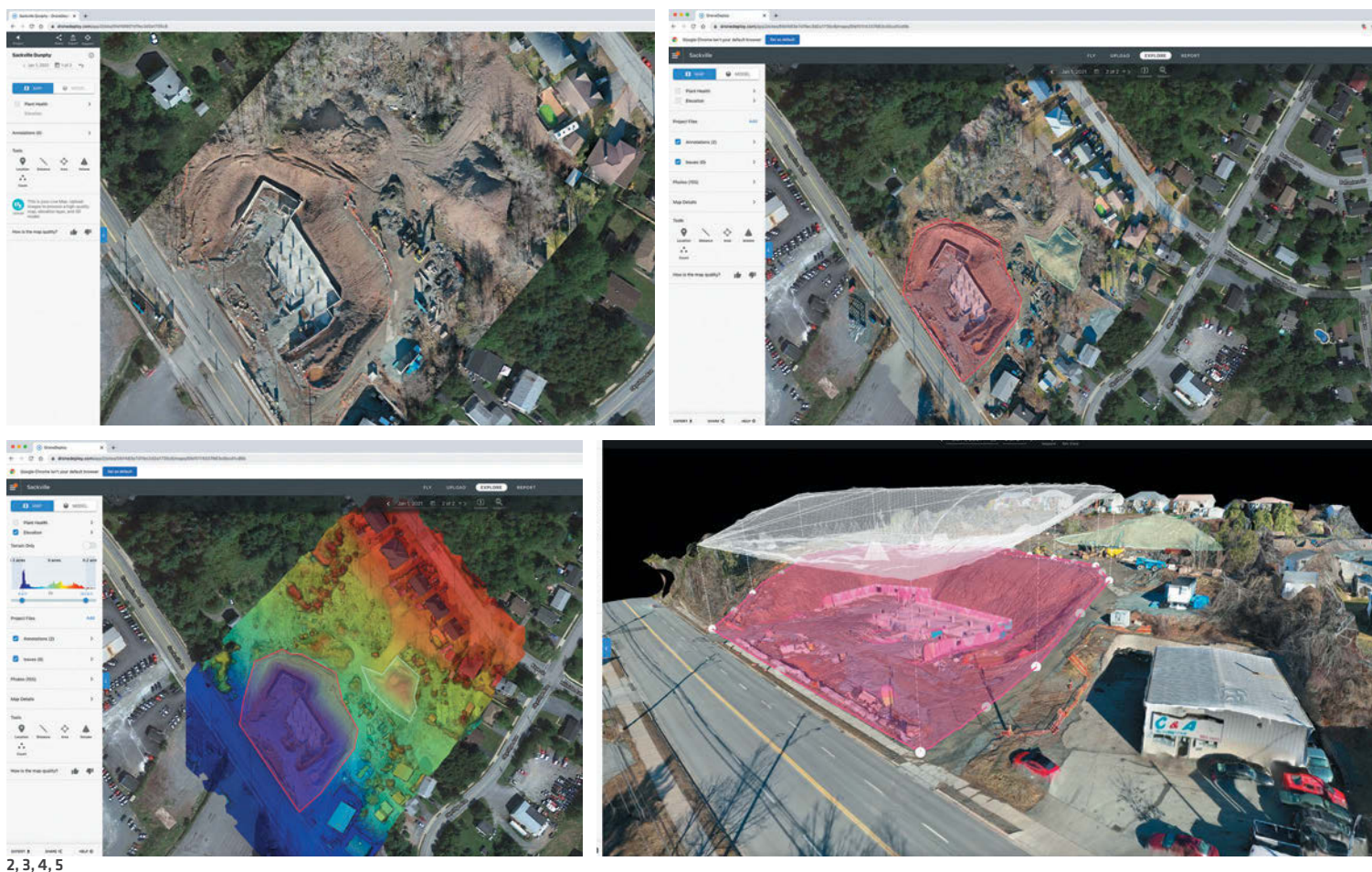
THE DIGITAL FAX machine helped propel success for many landscape architecture businesses when it was introduced in the 1990s, before being replaced by a more modern Internet a decade later. In the last few years, a new type of “fax” machine is poised to change how landscape architects work and do business over the next decade.

These new facsimile machines create a perfect digital replica of sites and landscapes that can be used as part of the design process, throughout construction and as part of the inspection and closeout. While LiDAR (Light Detection and Ranging) is rapidly growing in popularity, and with its recent introduction into Apple's new iPhone 12 Pro (albeit with a reduced range of 5m), it will still be a number of years before laser imaging has practical and cost effective application for large sites. Instead, a technology known as ortho-photogrammetry has made some amazing strides, and the technology is now within reach of any landscape architect. This tool employs aerial drones to autonomously 3D scan a site in minutes, creating a perfectly accurate digital facsimile of a site or development, which can be easily imported into CAD, BIM or 3D applications. There are a number of software applications that can do this, however, in this article we focus on one called DroneDeploy.

The DroneDeploy workflow is simple and employs a subscription model, like most new software packages (\$299 US per month with no limit on the number of projects). While this price may sound a bit steep, hold on until the end, there is tremendous value in what landscape architects get for this price and it is an easy markup on any job. The typical DroneDeploy workflow goes something like this:

1. Download the DroneDeploy app on your phone to connect and control your aerial drone. With the app, you simply pick an area you want to scan from your phone, and the app connects to your drone and flies it automatically, collecting hundreds of photos that are used to stitch together a 3D surface. You still need your drone pilot license, but the software does all the flying from take-off to landing. It is all completely automated.
2. The Drone automatically creates a georeferenced, high-resolution base map as soon as the drone lands. A detailed geo-corrected PDF is emailed to you within a few minutes of landing the drone and a high-resolution base map is created on your mobile device overlaid on a Google Earth image. If the software just stopped here it would be worth it, but it does much, much more.

11 FOOT CONTOUR INTERVAL DIGITAL TERRAIN MODEL GENERATED FROM DRONEDEPLOY FOR A 2 ACRE SITE IN SACKVILLE, NS. DETAILED TERRAIN FEATURES ARE EASILY VISIBLE.
2-5 DRONEDEPLOY, SACKVILLE NS



2, 3, 4, 5

3. Once you land your drone, upload the photos (usually about 100 photos per acre are automatically generated) to the DroneDeploy website, where DroneDeploy's backend stitches them into a detailed 3D model of your site with a resolution of inches. Within an hour or two of uploading, your detailed 3D model is ready to use. You can also upload one or more survey control points for greater map and 3D accuracy; however, the sub-foot accuracy is astonishing even without any control points.
4. With the 3D surface created, you can export an AutoCAD 3D surface TIN completely georeferenced with one-foot contour intervals (you pick your map projection). This allows you to pull the surface into Civil 3D or REVIT easily. You can also export the point cloud file into Autodesk ReCap for further processing and point cloud editing. DroneDeploy has an algorithm to generate a ground surface under a tree canopy that works pretty well. You can also export OBJ files to be imported into 3D applications like Blender, Lumion or even Sketchup.
5. DroneDeploy has an intuitive interface for easily doing cut and fill calculations and slope profiles, area takeoffs and cross sections. Once you add your material unit costs, the software can quickly generate volume costs estimates. You can also upload your CAD design files to monitor the progress of construction in the application. Once the flight path is saved, you can return to the site whenever you want to gather new 3D data as site construction progresses. It is easy to compare the 3D model of any different dates including cut and fill quantities or differences between a proposed surface and actual surfaces.
6. The software allows you to make a variety of annotations on the 3D model to track progress and do site inspection reports. This reporting, along with the 3D surfaces, can be shared with clients or sub-consultants to monitor construction progress (here's a link to the site used in this article as an example). DroneDeploy also allows you to add ground-based photos, aerial panoramas, and even 360 camera walkthroughs as part of the project file, creating a comprehensive tool for site inspections and construction progress reports.
7. There are many other tools built into the software, including a plant health simulation tool, that are too detailed for this short article. Take it from us, there are some very cool tools in this application that landscape architects should be very excited about.

DroneDeploy and other aerial Drone ortho-photogrammetry applications, are some of the most compelling tools for landscape architects to come out in the last decade and they have the power to radically improve our workflow and indeed the business of landscape architecture.

Rob LeBlanc, APALA, FCSLA, is the president of Fathom Studio in Halifax.

Nick LeBlanc is president at Luminous Labs, a 3D visualization studio in Halifax.
www.luminouslabs.ca

LOUIS-PHILIPPE ROUSSELLE-BROSSEAU

LA TECHNOLOGIE À LA RESCOUSSE DE LA SENSIBILITÉ

MIXER LES MÉDIUMS POUR RESENTIR LE PAYSAGE SUR PAPIER

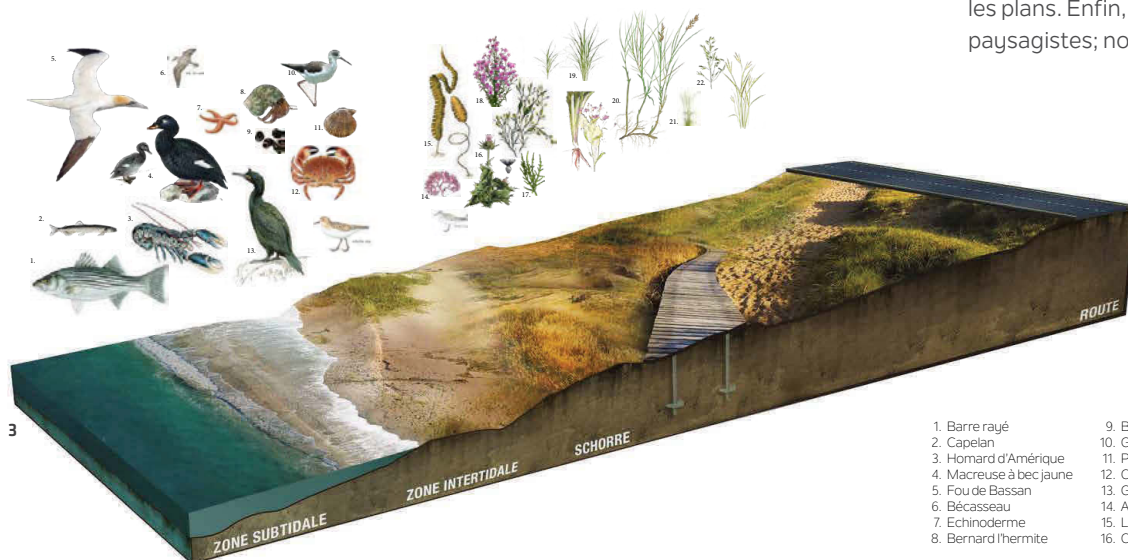
>EN_LP+

TECHNOLOGY: MAPPING A SENSE OF PLACE

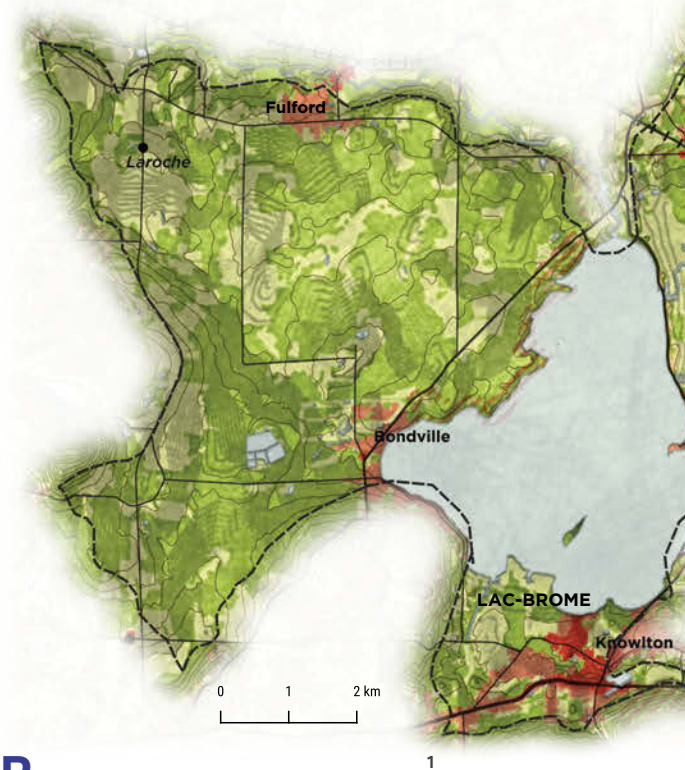
We are landscape architects: the value we add to the broader field of land-use planning resides in our alertness to the landscape's nuances. That means we need to produce graphical representations that capture the qualitative aspects of a landscape, from its overall ambiance to its fine details.

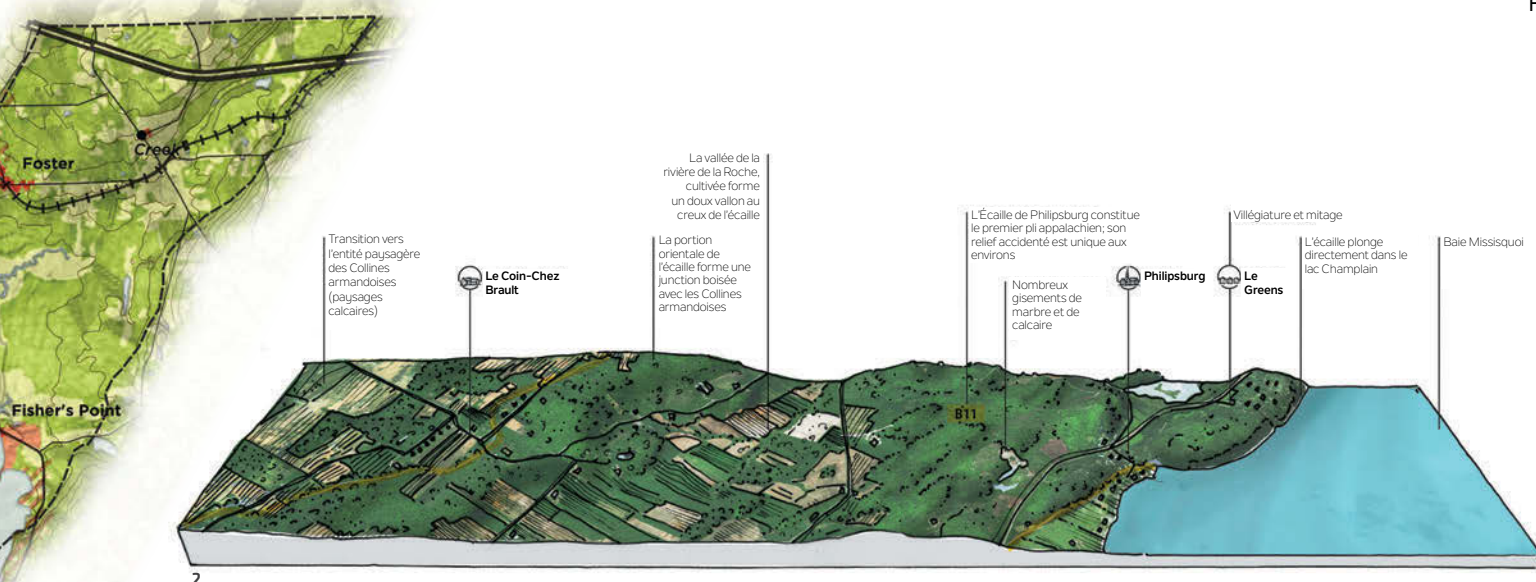
À LA COOPÉRATIVE Mille Lieux, nous abordons le plus souvent le paysage à très grande échelle. Nos clients, pour la plupart des municipalités et des régions, nous demandent de les aider à comprendre les dynamiques de leurs paysages ou encore de réfléchir à des plans d'intervention régionaux. Notre pratique de l'architecture de paysage se retrouve ici teintée par les disciplines de la géographie culturelle, de la géographie physique, de l'ethnographie et de l'aménagement du territoire.

Ces commandes représentent un quadruple défi. D'une part, il faut réussir à exprimer une évolution dynamique à travers le temps, ce qui n'est pas mince tâche lorsque le support final du rendu sera le papier. Ensuite, il faut réussir à synthétiser une somme considérable d'information sur un seul document visuel. L'information doit être présentée de manière à être compréhensible pour le plus grand nombre; il est important que la population, qui participe grandement au processus de caractérisation des paysages, puisse s'appropriier les conclusions des études et comprendre les plans. Enfin, nous sommes architectes paysagistes; notre plus-value dans le grand



- | | | |
|-------------------------|------------------------|-----------------------|
| 1. Barre rayé | 9. Bigorneau | 17. Salicorne |
| 2. Capelan | 10. Grand chevalier | 18. Aster du Golfe |
| 3. Homard d'Amérique | 11. Palourde d'Islande | 19. Saint-Laurent |
| 4. Macreuse à bec jaune | 12. Crabe | 20. Elyme des sables |
| 5. Fou de Bassan | 13. Grand cormoran | 21. Spartine pectinée |
| 6. Bécasseau | 14. Algue rouge | 22. Barbon de Gerard |
| 7. Echinoderme | 15. Laminaires | 23. Fétuque rouge |
| 8. Bernard l'hermite | 16. Chardon écaillé | |





2

domaine de l'aménagement du territoire demeure notre sensibilité au paysage... Nous nous faisons donc un devoir de produire des rendus graphiques sensibles, qui sauront exprimer toutes les dimensions sensibles d'un paysage, son ambiance générale, ses fins détails.

La technologie nous permet de mixer les médiums en combinant la rapidité de l'informatique et la délicatesse du dessin à la main.

La cartographie

S'il y a une discipline où la cartographie est autant sensible que technique, c'est bien le paysage. Avec les systèmes d'information géographique (SIG), il est aisé d'obtenir rapidement une quantité phénoménale d'information pour l'analyse et la cartographie du paysage. Bien qu'ils évoluent rapidement, les logiciels comme QGIS ou ArcGIS produisent des rendus

froids. En revenant à la base et en dessinant nos plans de paysage régionaux au crayon de couleur, nous tirons plusieurs bénéfices : l'exercice nous permet de connaître le territoire étudié plus rapidement, et puis c'est franchement plaisant. Ensuite, il suffit de numériser le plan colorié, de le géoréférencer sur un modèle numérique de terrain et d'éditer quelques couches *shapefile*, le réseau routier ou les noms de lieux par exemple, pour obtenir une cartographie beaucoup plus révélatrice et personnelle.

Le bloc-diagramme

Pour montrer des tendances paysagères, nous utilisons couramment le bloc diagramme. À l'ère des SIG, il est possible d'en générer un en quelques secondes. Cependant, l'imagerie aérienne est une information trop brute; il faut pouvoir sélectionner l'information à montrer afin de clarifier le message de l'illustration. Pour

ce faire, la superposition d'un croquis à la main numérisé sur une base informatique, puis quelques manipulations sur un logiciel comme Adobe Photoshop, permettent de retrouver un trait dynamique. On peut annoter afin de créer la narration souhaitée. On peut même se permettre quelques folies infographiques, par exemple en profiter pour montrer la faune ou la flore qu'un paysage peut supporter. Les possibilités sont infinies.

Le croquis

Plus ancien outil de l'architecte paysagiste, le croquis révèle le paysage dans son intimité. Notre équipe est vieux-jeu; nous sommes de très grands adeptes du carnet, que nous trainons avec nous chaque fois que nous nous déplaçons sur le terrain. Le numériseur est notre plus grand ami au bureau. Nous nous en servons entre autres pour informatiser des textures d'aquarelle. Quel plaisir que d'incorporer ces dernières à nos croquis! Quelques clics, un masque et un tampon duplicateur plus loin, nous avons donné une nouvelle atmosphère au paysage.

On entend souvent que l'informatisation de la pratique de l'architecture de paysage crée des rendus génériques. Au contraire, nous pensons qu'elle ouvre grandes les portes de l'expression sensible.



4

1 CARTE SENSIBLE DE L'ENTITÉ DE PAYSAGE DU LAC BROME, RÉGION DE BROME-MISSISQUOI, AU QUÉBEC
2 BLOC-DIAGRAMME ILLUSTRANT LES TENDANCES DU PAYSAGE **3** BLOC-DIAGRAMME MONTRANT LA BIODIVERSITÉ DE LA CÔTE GASPÉSIENNE, À PERCÉ (QUÉBEC) **4** UN PAYSAGE NOCTURNE DE LA RÉGION D'ARGENTEUIL AU QUÉBEC (MÉDIUMS MIXTES)
IMAGE 1, 2, 4 LOUIS-PHILIPPE ROUSSELLE-BROSSEAU (MILLE LIEUX) **3** MARIANNE PASCUAL (MILLE LIEUX)



STEVE MILLER, Arborist and Bartlett Champion



My favorite thing about trees? How much time have you got?

Steve Miller is a Bartlett Tree Experts champion. He, like all on his team, is the best in the business. An expert who champions the trees, landscapes and property investments of the customers in his care. He leaves no detail unexplored and no question unanswered.

Contact us today at 877-BARTLETT | bartlett.com



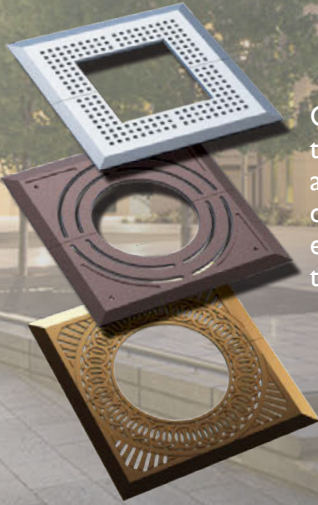
**BARTLETT
TREE EXPERTS**

SCIENTIFIC TREE CARE SINCE 1907

EVERY TREE NEEDS A CHAMPION.



Leadership by design



Combining Art with function, the optional Trim Rings are available in iron, aluminum or copper alloys and allow for the expansion of the tree opening to accommodate tree growth.

Paver-Grate® - What you don't see can make all the difference.

IRONSMITH's Paver-Grate® suspended paver system lets you design over—instead of around—tree areas for optimized planting, tree health and pedestrian comfort. An excellent choice for urban areas, the Paver-Grate® System seamlessly provides root space without impeding on pedestrian walk areas. Paver-Grates® can be specified in standard sizes with or without opening trim rings or in custom sizes to meet your exact needs.

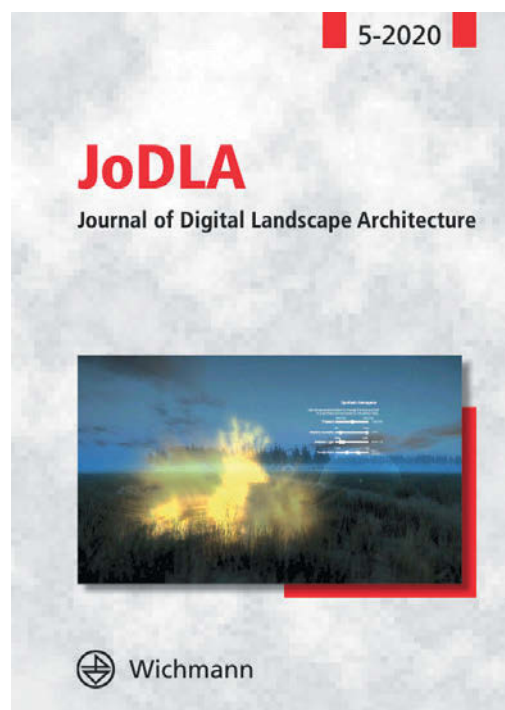
For more information about all IRONSMITH products visit us online at, www.ironsmith.biz or call, 760-776-5077.



tree grates
tree guards
trench grates
drain grates
bollards
paver-grate®

IRONSMITH

an employee owned company.



**JOURNAL OF
DIGITAL LANDSCAPE
ARCHITECTURE (JODLA)**

<https://gispoint.de/jodla.html>

DIGITAL JOURNAL ADDRESSES WIDE RANGE OF TOPICAL SUBJECTS

REVIEWED BY JOHN ZVONAR

I ADMIT IT: I'm a Landscape Architect working in Heritage Conservation. For some 30 years, I have been tasked with protecting Canada's cultural heritage no matter where, what size, or what purpose/vocation. I have been forever fascinated with the stories embedded in these historic places.

As a professional, however, I cannot ignore technology: I have no choice. But thankfully, where I work – the federal government's Centre of Expertise in Heritage Conservation – there have long been technically adept people to keep me out of trouble.

We are obligated to keep an eye out for what's trending out there, via the normal "go to" channels of journals, conferences and now the web. If not exactly our focus on a day-to-day basis, who couldn't use another source of information/inspiration about new tools or new techniques to minimize the more mundane task, if not expand our view of the ever-changing world?

Yet in this digital age, is there too much? There appears to be an overwhelming number of sites out there, each aching for our attention; following the trends has always risked forgetting the fundamentals of what we were taught and why we are involved in landscape architecture in the first place.

**...who couldn't use another source of information/
inspiration about new tools or new techniques to
minimize the more mundane task, if not expand our
view of the ever-changing world?**

Now There's The Journal of Digital Landscape Architecture

So, why would I be weighing in on a journal that “addresses all aspects of digital technologies, applications, information, and knowledge bases in research, education, and practice pertaining to landscape architecture and related fields”? When asked to review the *Journal of Digital Landscape Architecture*, or *JoDLA*, an open access publication since 2016, my first reaction was to determine if there was any immediate connection with what I do.

In general, the range of *JoDLA* articles are “original works that have not and will not appear elsewhere,” and are reviewed by an editorial board made up of renowned professionals. As the web site states: “The journal publishes original papers that address theoretical and practical issues, innovative developments, methods, applications, findings, and case studies that are drawn primarily from work presented at the annual international Digital Landscape Architecture conference. Its intent is to encourage the broad dissemination of these ideas, innovations, and practices.”

Now, while I am less enthused about pursuing topics such as “Cybernetic Ground, Algorithmic Design” and “Analysis and Geodesign Approaches,” I was intrigued by others.

For those of us who remember the use of tethered balloons to shoot aerial photographs, the appeal of drones has become an extremely alluring tool. Not surprisingly, the section entitled “Drone/UAV Imagery and Uses” covers a range from use in academia to the monitoring of parks to the generation of high resolution 3D maps for landscape planning and design.

And again, as one who remembers “constructing” 3D perspectives, the technology that exists today as presented in the “Visualization and Animation of Landscapes” section has forever reduced ambiguity in honestly portraying these ever-dynamic environments. This category offered papers on everything from 3D point cloud simulation to wind simulation to pedestrian simulations.

Furthermore, in our unsettled COVID-19 world, the next best thing may simply be the future of “Augmented Reality (AR), Virtual Reality (VR), and Immersive Environments.” While many will, in due time, enjoy the freedom and benefits of travel, for those

less fortunate, levelling the playing field in terms of “alternative experiences” regardless of socioeconomic/geographic place is aspirational.

And while I am prone to deriding tweets and Instagram posts – how much *is* too much? – the fact that many are now mapping landscape values with social media (which resonates with my work), and “Telling the Story of a Landscape Plan Online” should be reason enough to explore the papers under “Social Media in Landscape Architecture” on the *JoDLA* website.

There are also explorations into the realms of “Mobile Devices,” the “Internet-of-Things,” and “Smart Systems,” as well as “Data Science and Landscape Information Modelling.” The “Teaching of Digital Landscape Architecture” and “Digital Landscape Architecture in Practice” are also covered.

The Existential Threat

I have been using this term a lot lately, whether about politics or about projects with which I am involved but which seem to be going off in less than satisfactory directions. Surely, the larger and more terrifying existential threat of our age is that of climate change and the resultant outcomes of more dramatic climate events, rising sea levels and the like. The *JoDLA* summarily responds to this through its section, “Digital Landscape Architectural Responses to Climate Change.” Subjects such as coastal storm events, resilient community design, and even the design of bio-shelters, should be of interest to all who agonize as to what will be the legacy we leave for future generations.

For those in academia, it is likely apparent that the *JoDLA* addresses topics that have typically fallen between the disciplinary cracks of traditional research journals for landscape architecture. Furthermore, that such a publication addresses such a wide range of subjects in a topical and timely manner, is more than welcome.

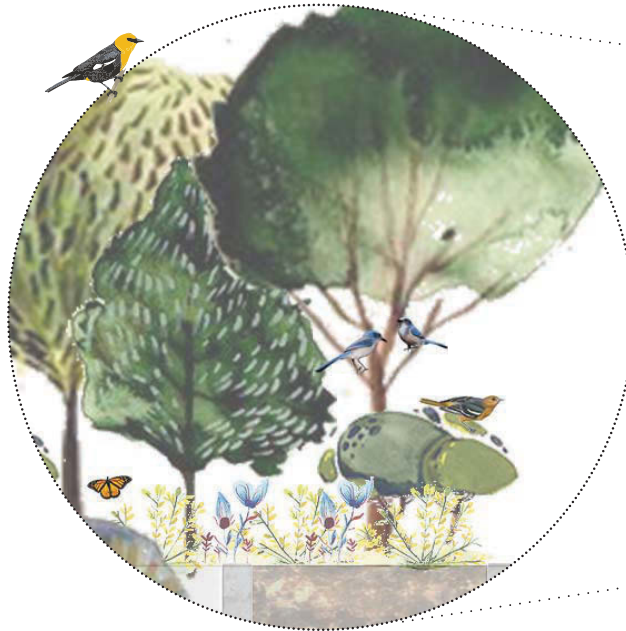
So, in responding to the question “Is the *JoDLA* worth looking at?” I would proffer an emphatic yes! And take that from the unabashedly avowed “conservation” professional that I am.

COMPILED BY JOANNE MORAN
+ LAURIE BLAKE

TREES – A PANEL

PART 2*

> FR_LP+
PANEL SUR LES ARBRES – PARTIE 2



HABITAT 3 strata planting

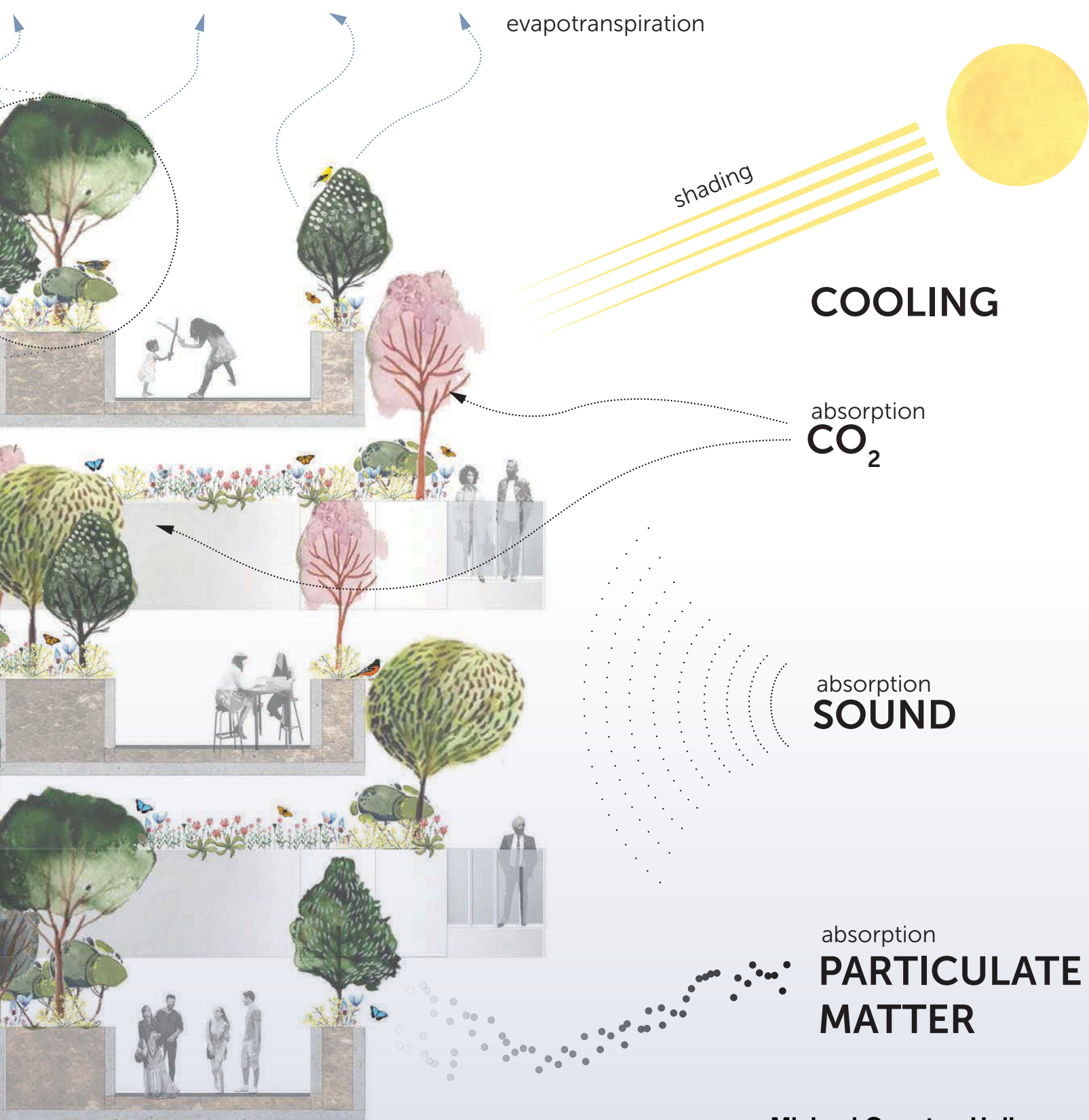
Q Trees are living entities. If we don't use a measured, research-driven approach to tree planning, layout design, associated support of soil systems and then implementation, our best laid plans will fail. What are your thoughts and advice?

Michael Ormston-Holloway: What are the easy ideas that we can promote to get things started? Generally, I think a good place to begin is infusing more value into living landscapes and understanding that landscape needs to be at the table first, or as one of the first players, when planning decisions are being made. I'll touch on the example of the Pan Am village in the West Don Lands community. It was extremely rewarding making urban and landscape

design decisions as a part of the planning process. At a high level, we determined, comprehensively, that the streets were going to go here, the parks were going to go there, and the building parcels were going in these places over here. That's fundamentally a different sequence than we typically see. And it was fascinating to witness. At these first meetings, as the architects were presenting a vision of the massing and access, it was the landscape architects' vision that reoriented the built form to respond to larger, and much more comprehensive or neighbourhood-scale design. The building wanted an access somewhere specific, but the neighbourhood – the public realm – required it elsewhere. The Park is that way; the street works this way, and this is part of a bigger strategy of placemaking and designing more robust greening strategies. Nothing was led by any discipline alone. There was a bigger lens put on the community. Everyone came to the table and said, what do we want this to be?



* Continuation of our 6-person panel discussion.
Find Part 1 of the discussion in the Winter 2020 issue.



Michael Ormston-Holloway
The Planning Partnership

OUR PANELISTS



JAMES URBAN, FASLA, is well known for his skills in the areas of urban arboriculture and soils, including the preservation and installation of trees in the urban environment and the specification and installation of specialized planting soils for roof gardens, urban landscape plantings, and rain water management. He has written and lectured extensively on the subjects of soil and urban tree planting and has been responsible for the introduction of many innovations and current standards relating to urban tree plantings and soil specifications. His most recent book, *Up by Roots*, was published by the International Society of Arboriculture (ISA). Jim has received many awards, including the ASLA's National Merit Award (1997) and Medal of Excellence (2007), as well as the ISA's Award of Achievement (2013).



ROBERT WRIGHT, BSC, MLA, OALA, FCSLA, is Dean, John H. Daniels Faculty of Architecture, Landscape + Design, University of Toronto. Rob's design-centered and eclectic work does not privilege the traditional professional disciplines of architecture, landscape architecture or urban design; he places his work within a more contemporary and trans-disciplinary framework. As the Principle of iz-design, an open and exploratory design practice, Rob seeks to develop creative design experimentation not only in architecture, landscape architecture or urban design but also in fashion, furniture, art and the industrial arts. Rob was the Director of the Centre for Landscape Research. He has also been the Director of the Landscape Program, Associate Dean and Director of the Knowledge Media institute.



BOB SOMERS, MALA, FCSLA, Principal, Scatliff + Miller + Murray Landscape Architecture + Urban Design. Bob joined Scatliff + Miller + Murray (SMM) in 2000 after seven years in the horticultural industry. With SMM, Bob became involved in some of the most exciting projects Winnipeg had seen in decades. As a Principle at SMM since 2007, Bob has continually demonstrated the benefits of investing in landscape architecture with a number of CSLA-award winning projects for his clients including Waterfront Drive, The Plaza @ The Forks, East Side Road Revegetation, and Wascana Landscape Irrigation Master Plan. Continuing to recognize the team-based approach to all aspects of design, Bob works closely with SMM's group of planners, scientists, engagement professionals and others to find long-lasting solutions for an extensive list of clients across Manitoba, Saskatchewan and Northern Ontario.



MARCHALLÉ, BEng, MLA, OALA, Senior Landscape Associate, Claude Cormier + Associés Inc. Marc Hallé is a landscape architect at Claude Cormier et Associés, joining the practice in 2003. Trained in both Civil Engineering from the University of Saskatchewan and Landscape Architecture from the University of Toronto, Marc's technical and creative backgrounds combine to guide projects from concept to built form. Working back and forth between large scale and minute detail, Marc helps to maintain continuity and consistency between the detailed elements of a project and their conceptual origins.



DARBY MCGRATH, PhD, Senior Research Scientist, Environmental Horticulture, Vineland Research and Innovation Centre. Darby joined Vineland in 2013 and is Senior Research Scientist, Environmental Horticulture, and was named Program Leader for the Greening the Canadian Landscape Program in 2018. She works with land managers, cities and producers across the country and internationally to improve tree planting success in challenging settings. Her program work includes experimental research, education and outreach, and new technology development. She is also an adjunct professor at Brock University and the University of Waterloo. Darby obtained her master's degree from the University of Waterloo and her PhD in Social and Ecological Sustainability from the University of Waterloo.



MICHAEL ORMSTON-HOLLOWAY, BSC, MSC P, GDHORT, MLA, ASLA, ISA Certified Arborist, Principal, Landscape Architecture + Urban Ecology, The Planning Partnership, Guest Editor of the Winter 2020 issue of *LP*. Michael takes immense pride in designing, building, and reinvigorating urban forests in municipalities across Southern Ontario, Canada and beyond. The management of urban forestry, the rebalancing of soil chemistry, enhancements to species representation, and arboricultural best practice is at the core of Michael's work, through which he believes we can promote the highest quality work with respect to establishing, large, mature and rapidly developing trees.



...[the planning] wasn't led by one architect or one landscape architect. Everyone came to the table and said, what do we want this to be?

— Michael Ormston-Holloway

The same thing is needed for the urban forest to thrive. We need to think comprehensively about the trees, the soil structure, chemistry, texture, and other physical properties, the water, the air quality, the microclimates and then all of our urban critters, as well. We need to fine-tune the local ecologies to make this work. Everyone needs to come to the table so that we see more clearly what a place can be, and how it should perform. This panel was selected very carefully. We have designers at the table, LAs at the table. We have soil scientists, and arborists at the table. We have researchers, we have academics. And this is the sort of group that we need at these early planning meetings in order to have these comprehensive discussions because sometimes we cannot steward them alone.

Marc Hallé: It's easy to be enthusiastic about consolidating everyone's knowledge, but I am also cynical about how the outcome is executed. It's true, we need to have everybody's expertise on board. There are so many that have a different niche knowledge that need to come together to help us move trees forward. Choreographing this needs leadership, a champion. What makes me pessimistic is that the boundaries that define living systems are rarely a match with legal boundaries and property titles. On projects where these are in conflict, the latter usually prevails. Legally, property boundaries are virtually written in stone, and renegotiating these is a Sisyphean task. Virtuous intentions are resisted by private and commercial interests and addressing these is typically beyond a landscape architect's skill set.

The example Michael gives of the West Don Lands is an interesting case for optimism. You had a cleared terrain with strong leadership that was able to redefine those boundaries along landscape principles. But for more typical conditions where land is already deeded and bound up by cadastral boundaries, it is hard to achieve the same kind of coherence.

Rob Wright: There's a couple of things that I think are going to happen in the way we look at our cities. One of them is that we're facing a battle now over publicness, what constitutes the public realm. COVID-19 really brought that into focus for us because now people are looking at open space in a lot of ways. The irony for me is that when we look at the downtown of Toronto, everybody now says, where's the open space? Well, we spent 20 years taking cash in lieu for open space and now we don't have any. We're going to spend \$2 billion to put a 20-acre park over a railway and that's how we're going to spend our money.

We're challenging the way we think about these things. For example, all of us are involved in design projects and designing. We take capital and we separate it from maintenance. We spent a lot of money on buildings and capital projects and we do not set aside anything for maintenance. We have a situation in Toronto where we can't maintain our parks, where our beautiful valley systems, which we love and appreciate, are collapsing. These are collapsing ecosystems. They are not sustainable. When we talk about sustainability, what we're saying is we want to make things that are failsafe and if you're an ecologist, there's nothing that's failsafe. The two rules are everything's connected to everything else. And the second, harder to learn, as you get older, you learn it really fast: everything dies.

We're looking at resilience now, which is defined as safe to fail. We're trying to think about environments in which we're planning constantly because trees will be dying. We need to understand and position ourselves along those lines, particularly as landscape architects. It's our time to shine. Everybody knows how important open spaces are. What are we going to do about it and how are we going to do it?

And when I try to think about it in terms of the school, you know, going to take the back of what's behind it here and I want to

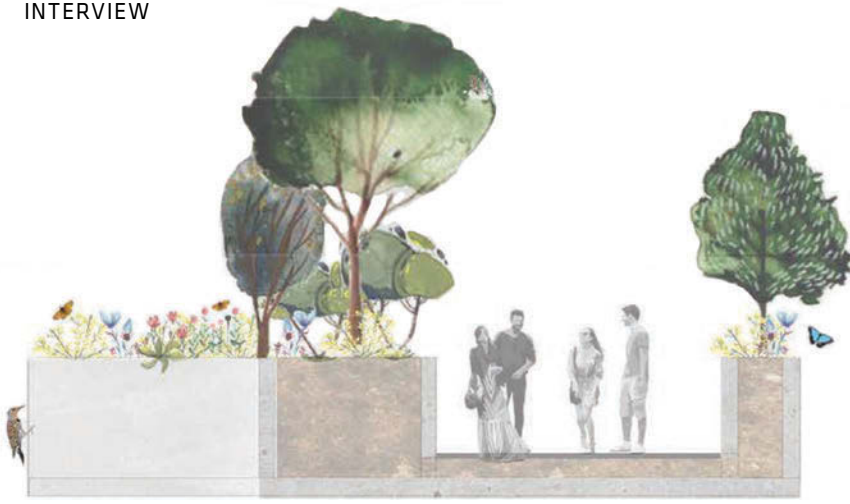
re-wild it. I also look at our students. I say we have 1,400 students in this faculty. We have every one of them plant a tree a year. And the number of years. How many trees would that be over the time? We've got to translate a lot of the stuff into action.

There's that great saying – great cultures always plant trees under whose shade they will never sit.

Bob Somers: I don't read very often anymore. But now I have a new book that I have to read from this conversation, called *The Overstory*. I read when I go on holidays and it seems that I've been only reading books that paint a bleak picture about the future of the planet. I was asked before I went on holidays about a year ago to speak to a group of mayors and reeves from around the city of Winnipeg because they had seen a presentation that I had done in a different context on water management using native grasslands and wetland approaches. Clearly, forests and grasslands are two very different ecosystems, but critical to our geography here.

I was reading at the time a book that I found to be very depressing about the future of our planet called *Collapse* by Jared Diamond. Its full title is *Collapse: How Societies Choose to Fail or Succeed*. The striking thing about this book for this conversation is that, as an anthropological review that looks at societies and what caused them to fail, one of the top three problems that were integral to any society that has failed over history was deforestation. Rounding out the top three were related to that – as with deforestation, societies then had soil issues and water management problems. Spring ahead to the presentation that I had to give, and the first slide I put up highlighted this book and how societies have failed. Through that I encouraged every single mayor and reeve to read that book because





We continue learning and making mistakes as we adapt living systems into more intense non-natural environments. And if our trees die, we keep trying so they grow again. Trees have their own pace and time. The downer is that we usually won't live long enough to see if we got it right.

— Marc Hallé

as we learned in grade school: we have to learn from our past, and the issues are social and political and the problems that challenge societies existing beyond our invisible property lines.

A more recent example in that same book relates to the Island of Guinea, which is divided geographically and politically into two sides. Politically, they were run very differently. As the book put forward, one side (Papua New Guinea) was run by a dictator whose sister loved what is now colloquially known as forest bathing: she loved going into the forest and loved the trees. So, the dictator embedded the nation's forestry department into the Militaristic Defense Department and therefore the forest was heavily protected over time.

Now, if you look at the dividing line between these two countries, one striking difference is just how forested Papua New Guinea was, and how West Papua became more and more deforested because people used the trees without regulation for fuel, for building and, in general, for survival. The example used isn't to promote dictatorships, but to demonstrate that the strength of Papua New Guinea's society in the long term was improved based on protection of the forest, and its critical role in society.

It was a critical book for me to read at that time. It emphasized the critical nature of the forest and whether it's that 60 foot by

40 foot forest patch or the hundred acre wood. All these things are critical to our urban environment and our society as a whole. And we've only seen this more and more over time.

Darby McGrath: That's a pretty extreme example that Bob gave. But interesting to think about the fact that essentially what you're doing is protecting ecosystem services for your population. It's an idea, that moving forward, is going to be critically important to consider for urban forestry and green space in general in cities.

I think about smaller municipalities frequently, and I don't want to be the pessimist either, but some of the challenges in smaller towns across Canada is that there's just not a lot of resources and staffing support to do new and interesting things. Some smaller towns are quite scared, because if something goes wrong, they don't feel they even have the resources to be able to go out and to deal with it. It comes back to the fact that all towns need an urban forest management plan; this needs to become the new standard, something that every city and town has the ability and the access to do. Otherwise you don't have a way to benchmark and it makes it very difficult to monitor success. There's no way to understand where you are or where you're going.

We see some language right now from the PM to the Minister of Natural Resources on urban forestry and that's exciting. This means that we need a coordinated approach for urban forest planning in Canada. I don't think this needs to be dumped onto small cities and towns to deal with on their own. There has to be a set of guiding principles that managers can look towards. Once we understand what those forest management plans look like, then certainly we have the ability to build data in to help support the needs and really understand what the future looks like across the entire spectrum of the country, rather than where we see pockets of activity. Maybe it's a pipe dream, but I think it will become increasingly important with climate change.

James Urban: When you have to defend proper tree planting, or preservation for a project to your client, the planning board or the project architect, have them read the introduction to my book, *Up by Roots*. It's only three pages. If you think you can lead them further, give them part one, that's another 13 pages, and there are lots of pictures. The book is designed so you take the concepts in little bites, then a little bigger bite. If they are still excited, maybe give them the book.

The politics of trees is much more difficult than the science of trees. Phil Ries said that, when I was first starting on my quest, and I have found it to be incredibly true. That difficult issue has come up in much of this discussion. We need a lot more research to understand these living systems better if we are going to lead the way politically. The facts of a tree's living system requirements should roll off our tongues in conversations in compelling ways. That only happens after we truly understand the details of our craft. That proficiency of any topic is what makes a person truly a professional in their area of expertise. It is hard for me to imagine that a landscape architect would not be assumed to be an expert in the growth requirements of the plants they specify.

I often hear landscape architects say, "We have a soil scientist on our team." Soil science is basically about agricultural

The two rules are everything's connected to everything else. And the second, harder to learn; as you get older, you learn it really fast. Everything dies. So we're looking at resilience now, which is defined as safe to fail.

— Robert Wright

soil science, about how to increase the crop or timber yields. That is not what urban trees are about. An agricultural soil scientist can do as much harm as good without understanding urban soils, urban development processes and the construction industry. They certainly need more ideas about soil than chemistry and texture. Landscape architects should be engaged in this most important aspect of their profession and be able to solve most of their soil problems without a soil scientist. Does your doctor call a pharmacy expert to write you a prescription? When I hear someone say, "We're going to use a good soil," or worse "We're going to make the soil ideal for this particular tree," I cringe. In Toronto, you really only have one kind of soil, it's the black "stuff" that's all around your city and suburbs. While there are soil nuances across the GTA, you have to understand and be able to work with your basic resource. This black and dark brown soil is actually quite good. It's resilient and sustainable, but also quite messy to work with. The local high soil pH and its silt content are the largest limiting factor. This makes matching the plants to the soil rather than the soil to the plant choices imperative. It's also not quite as easy as just putting it in a truck and bring it into town. Be careful about the moisture content. Be careful about how you treat it as you dig it up, store it, load it in the truck, drop it off, spread it around, grade and compact it. Silty soils are relatively fragile compared to soil with more clay and not as forgiving of compaction forces as sandier loam soils

Can we take a more simplistic, less academic, view of soil? About three months before publication of my book, *Up by Roots*, my editor said that they had received a letter from two distinguished soil scientists who said the book should not be published because they heard a lecture in which I referred to soil as "dirt." ISA asked two other distinguished soil scientists to

review the entire book and they found eight things in the book that were incorrect. In 500 pages, I thought that was pretty good. Three of the eight were just simple typos and three were difference in the science, all were corrected. But there remained the question of soil as "dirt." In my discussion with the peer review soil scientist, he said, "As soon as you put soil in a truck, it is no longer is soil, it's dirt. It won't grow anything." I said, "Well, that's interesting because I've never planted a tree in any soil that hasn't been in a truck and most of the time the plants grow pretty well." That led to quite a long discussion and we added a sidebar piece about that discussion in the book.

We have to think about soil as dirt. We have to change our idea that we can control it. We have to remember that the most important thing about dirt and soil is time. Once you wreck it by screening it and mixing it, what we are doing is taking the "time" out the soil. The time it takes to slowly build structure, accumulate complex soil organic matter, not from composted leaves, but from root exudates and root turn over, organic compounds and billions of soil organisms. When you put in a soil in a blender, what you're doing is taking out all the time that it took to make that structure and build that soil biology. It's like taking an expensive dinner and running it through a blender and pouring then entire mess onto your plate. All the wonderful things that are in that soil, or that dinner, are lost.

We still need a huge amount of research on many of our soil questions. That's why I've dedicated the last years of my career to the TREE Fund, trying to raise money for research. I encourage you all to at least look at the TREE Fund as a good place to support. Become proficient in soil and follow the research as it continues to evolve.

CLOSING REMARKS

Michael: Jim, you did write the book, and I am careful to say not a book because it was *the* book. One thing that you said that I found particularly interesting is that even though you wrote the book in 2008, if you were to write it today, it would probably be a very similar book. And that's significant. Another thing to mention is how many times I've heard you say the word "dirt" and I absolutely love it! It's so contentious and didactic, and I think that's how you mean it. Surely you were trying to rile people up when you were first using that word? I don't know. But it's effective because it helps us understand soil for what it is, and it helps us change the way we think about soil as a substrate. It's always been about the substrate, and it's wonderful that more of us are now realizing that.



So it is good to preserve the right mature trees, but we can't forget some of those other areas that are incredibly old, forests that are significant, habitats that have every layer of the appropriate ecology of the understory, the mid-level that has all that stuff. We have to make sure that we're hitting it at all fronts.

— Bob Sommers

We have to think about soil as dirt. We have to change our idea that we can control it. We have to remember that the most important thing about dirt and soil is time. Once you wreck it by screening it and mixing it, what we are doing is taking the “time” out of the soil.

— James Urban

As another parting story, I am doing work in the city of Markham. I've been working on this landscape for many years. The reason that matters is that it has switched ownership three times; the first time, the urban forestry policies were kind of light and the developers said, “OK, we're going to bulldoze all of this down and fill it exhaustively with a subdivision.” Then a couple of years later, the land sold again. Markham had a more progressive urban forestry policy, and it got a little more expensive to take those trees down. But they were still going to do it because it was financially feasible. Markham now uses a version of the CTLA to appraise the trees. In the last transfer of ownership, when I was engaged for an arboricultural assessment, it was determined to be so expensive to take these trees down that the client asked us to look at ways to embrace and retain them as a part of the development.

Because this municipality sharpened its teeth toward better and more accurately valuing its trees, developers here are forced to get more creative and essentially spend more money on tree preservation. Kudos to those who worked behind the scene to create these policies. If only more municipalities would follow suite.

Trees need more champions. Trees need better champions.

Bob: We have to see both the forest and the trees. Here in Winnipeg where I live, in the densest city in a very large province, we work regionally in many different rural municipalities. What we see is that we have one municipality in this province of Manitoba that is a bit more sophisticated in its approach to trees management. I wouldn't say it's the most sophisticated in the country, by far. Although in general it is more sophisticated in this regard than the rest of the province. We spend hours and hours of billable time, and increased

construction costs trying to save every tree in the city, but it is just as easy to go into another municipality/region and see multiple acres bulldozed at the drop of a hat to make room for development. I think that this talk is about the wide range of political perspectives on all these things.

We can talk about the economies of things. We can talk about the science of the importance of forestry. But, we need to use our voices every chance we can, to talk to those that make policies, to start shifting the conversation. Because I don't know if it always needs to sit in a municipality's hands. It can sit in other hands, too, because some of these things that matter to us reach beyond boundaries at both provincial and federal levels. We need policies and mechanisms in place that are enforceable because I see many developments where we're not at the front of the boardroom table and decisions are made long before we even get a shot at trying to protect and preserve our trees.

It is good to preserve the “right” mature trees, but we can't forget some of those other forested areas that are incredibly old, productive, significant, and have a full ecology of the understory. We have to make sure that we're equally protecting those spaces in the appropriate manner.

James: Trees are living things and we have to make sure that people understand our job is to make them live as long as they can. One of the things that we need to work on with our arborists friends is that in Canada and the U.S., we tend to prune our trees from the ground up for some reason. In Great Britain, where they have many marvellous 500 to 1,000 year-old trees, they prune from the top down. They literally “top” their trees, they call it retrenchment, and their trees live a lot longer than our trees. But it is different from brutal large branch removal topping. It is a careful application of reduction

cuts to keep the tree mass in balance as it ages. Keeping lower branches is the most important part of their pruning concept. There is a great book on this subject, *Ancient and other Veteran Trees*, Ancient Tree Forum 2013, available on the web as a free PDF download.

We didn't talk much about nurseries in this discussion. We need to focus in on the root systems and the branching structure of our trees that we're buying. They are generally pretty terrible. Frankly, as bad as you think your trees are, they're a lot better than U.S. trees. We're doing a terrible job down here. The TREE Fund has a new research endowment, the Barborinas Fund, just for nursery research and we made our first grant for nursery research in 2020. If you are interested in nursery production research, this is an opportunity.

We have come far but have a long way to go. Through research and education on all the issues we discussed today, we can start to lead with living systems. We can secure our place at the table of how our cities are built. Look at how much influence we have gained by simply learning a tiny little bit about soil. Imagine what happens if we really understood and included the entire living system in our work. Inspired landscape architects should be able to figure out the living systems we need to respect.

Marc: I remember one summer long ago when *Up By Roots* was my holiday reading, I appreciated how accessible it was. As a neophyte, there were so many considerations that made growing trees seem so difficult, and so easy to get wrong. But the principles behind the art and science of growing trees is not complicated, and education could have a big effect to overcome a sense of helplessness. I have written about the “Miyawaki method,” which outlines in very simple steps an approach to generating a natural forest within a relatively short period of time (see *Landscapes/Paysages*, Winter 2020 issue). Setting up the right variables at the start, to make up for “unnatural” conditions of human environments, allows a forest to become self-sustaining and long-lasting. Much

of it is common sense, but research and experience can shed light on aspects that may be less obvious.

Luckily it is getting easier to advocate for the fundamentals of healthy trees. Meanwhile, we continue learning and making mistakes as we adapt living systems into more intense non-natural environments. And if our trees die, we keep trying so they grow again. Trees have their own pace and time. The downer is that we usually won't live long enough to see if we got it right.

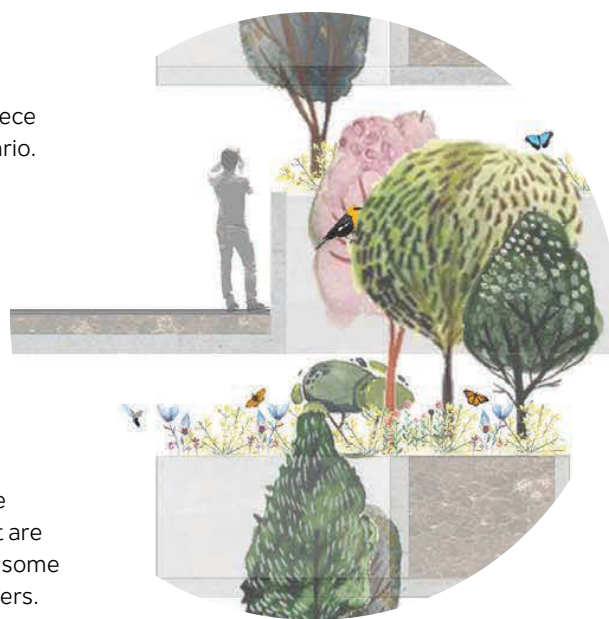
Rob: One of the things we have to remember is that there's a very famous sort of forest ecologist, painter Paul Maycock, who basically spent 60 years of his life walking through a forest in southern Ontario and cataloguing every species, from the understory to the overstory. And in that work, we have a model from that time period that will be very interesting relative to climate change of the actual forest structure and what the species fight. Sociology relates to the species in relation to each other, to each other. Ironwoods related to Maple Beach and that sort of thing. So, it's important that people actually do fieldwork again.

The other thing to understand is that forests are not just trees. What makes them ecologically amazing is, if you walk up northern Ontario and walk from east to west, you hit black spruce by white spruce or Fir, that's true. But the boreal forest is a very complex and incredibly beautiful environment. And we already know how to create forest because we just put a fence around it with 200 years and it will become a forest, just like every swimming pool. Who

wants to be a swamp? Every piece of the ground in southern Ontario. If you left it long enough, we want to be a forest. And it's always good to remember that in Canada, where we have a richness of resources, one-third of our forests that we have primarily to the north of us should never be touched. They should be left alone. It's always good to remember the Biosphere that we think are natural and everything like that are part of a managed system and some were managed better than others.

And then our challenge is in southern Ontario, it's been denuded of forests. What is not plus one, two or three agricultural land should be reforested again into hardwoods. So that's our challenge. If we did, that would be a good thing. My last parting comment is we need to all plant more trees.

Darby: As a researcher, my job is to take this all in and to see what everyone is thinking about. As a natural scientist, it's easy to always try to shrink that lens to one question and to a set of evidence that we can develop to answer that one question. The more I work and the more I learn, I realize that it is a very complex system. I love the idea of talking about resilience and urban forestry, because resilience thinking is necessarily part of urban planning, specifically, and around urban forestry in general. My challenge to myself is to avoid too narrow of a lens on any of these questions because sense of place and community wellbeing all contribute to and enhance the communities that we live in



and enhance urban forests. The greater challenge for all of us is to try to broaden our lens a little bit. That means stepping outside of our disciplinary comfort zone, stepping outside of our particular roles and that certainly means stepping outside of the places where we feel most at ease, to be thinking about the value propositions that help to communicate the importance of urban forestry. It's easy as a scientist to think about quantitative costs and benefits in urban forestry. We can talk about the price of soil or the price of the tree or to think about things in terms of urban canopy cover. But the challenge is to think about the value propositions that more effectively communicate urban forestry value to a broader audience.

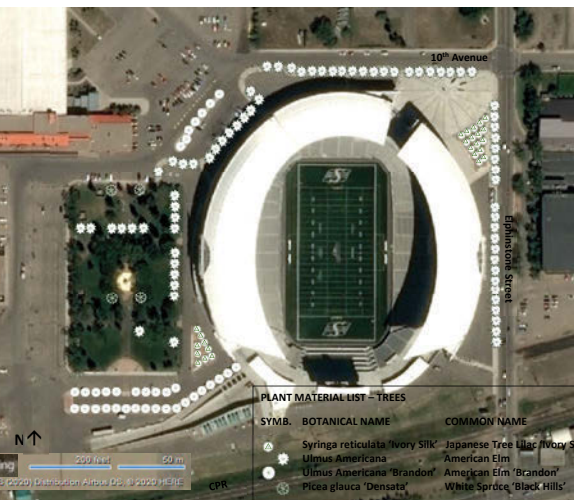
So that's my challenge to myself: to step outside my little discipline every day. To think about what urban forestry means to other people so that we can make sure that we're tackling the questions that need answering and to be able to communicate that science effectively to people who are working in real landscapes, which is all of you.

My challenge to myself is to step outside my little discipline and try to think about what urban forestry means to other people so that we can make sure that we're tackling the questions that need answering. That way, we will be able to communicate the science effectively to people who are implementing the solutions in the real world...

— Darby McGrath



1



2

GEOFFREY KATZ

TREES AT REGINA'S MOSAIC STADIUM

THE NEW MOSAIC Stadium in Regina, Saskatchewan, is located in Evraz Place – originally the Regina Exhibition – about 500m to the west of the old stadium location, which had been home to the Saskatchewan Roughriders Football team from 1936 until 2016. When faced with major renovations at the old stadium in 2012, the owner, the City of Regina, decided to construct a new stadium that would also provide modern conveniences lacking at the old.

The new stadium was designed by HKS, Inc., a Texas-based architecture firm with experience in design of major

1 THE REGULAR SPACED STREET TREES AT THE STADIUM MATCH THE SPACING OF TREES ON NEARBY STREETS, WHICH HAVE ARCADES OF *ULMUS AMERICANA* ON BOTH SIDES. 2 AMERICAN ELM, 'BRANDON' AMERICAN ELM AND JAPANESE TREE LILAC 'IVORY SILK' ARE INSTALLED AROUND MOSAIC STADIUM.



For many people a walk, ride or drive down these elm-lined avenues feels like entering an arcade, a series of lofty arches supported by columns and roofed like the nave of a cathedral...

which supports a bronze statue created by the Fine Art Studio of Rotbaltt-Amrany. Opposite the monument is a grove of trees with bench seating.

American Elm in Regina

Regina has a common, yet remarkable, street tree idiom. Beginning in the early 1900s, American Elm trees (*Ulmus americana*) were typically planted on 20' to 25' (~6m to 7.6m) spacing in the boulevards (between sidewalk and road curb).

American Elm has a branchless trunk with a high, wide-spreading crown. In its native habitat in Saskatchewan, elm occurs in the incised valleys of Prairie rivers, on the alluvial floodplain and upland. It is thus suitable in Regina's urban environment, tolerating both dry conditions and poor drainage, as well as the annual extremes of Saskatchewan temperature.

Many of the older Regina neighbourhoods are lined on both sides of the street with the equally spaced, now mature elms, which create shaded canopies over the entire right-of-way. For many people a walk, ride or drive down these avenues feels like entering an arcade, a series of lofty arches supported by columns and roofed like the nave of a cathedral (Figure 4).

In Regina, as in other Prairie cities, the choice for street trees is limited, due to the low winter temperatures, low rainfall, and typical rough street tree conditions (such as physical damage, pollutants). Dutch Elm Disease (DED) reached Regina in the 1980s, but the elms were monitored and the impact of the disease reduced. Today, the City of Regina continues to implement a control program against DED to limit the annual number of trees lost and elms continue to be installed as street trees.

Trees at Mosaic Stadium

Three tree varieties are installed at Mosaic Stadium: American Elm, 'Brandon' American Elm and Japanese Tree Lilac 'Ivory Silk'. All trees were installed and are maintained by the City of Regina.

American Elms are installed in lines at 8m spacing on centre (OC), to integrate the Stadium landscape visually and experientially into the urban fabric of the city.

The line of elms at the Stadium on Elphinstone Street continues the line of elms north and south of the Stadium on Elphinstone. The regular spaced street elms at the Stadium on the 10th Avenue extension match the spacing of elms on nearby streets: Evraz Place is surrounded by older neighbourhoods, with their arcades of elms on both sides of the street. These lines of elms are *Ulmus americana*, used where the full size and character of the species tree could be achieved.

At the northwest accessible transit/parking area, in the median, are *Ulmus americana* 'Brandon'. From the southwest stadium entry Brandons are installed adjacent the two-storey high

sports venues. Construction of the new stadium was substantially complete in 2016. The stadium normally seats 33,350 people, expandable to 40,000 for larger events.

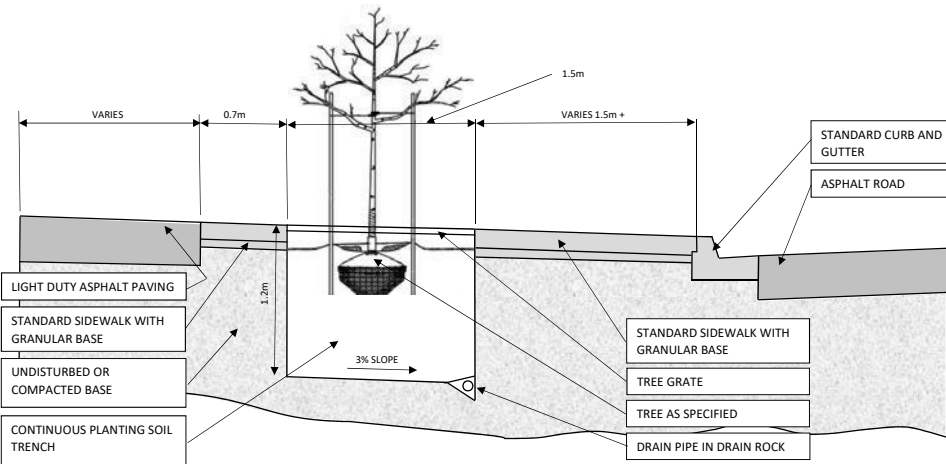
Mosaic Stadium Landscape – Overview

The new stadium is set within a public landscape that includes an exterior pedestrian concourse around the stadium (doubles as an emergency route), four entrance plazas, the outdoor transit mall (four platforms plus accessible bus drop-off/pickup zone), vehicle parking, new vehicular access to Evraz Place, and, on the west side, the historic Confederation Park. The landscape, as well as the underground structures and services to the stadium, were designed by the Regina office of AECOM Canada Ltd. – the author of this article leading the landscape work from that office. Construction of the landscape was substantially complete in 2017.

The stadium's main entrance plaza, in the northeast, is designed as the place of identity and activity for Roughriders fans before and after games. The focus of the Roughriders Fan Plaza is an oval monument platform, with seat-steps and an accessible ramp,



4, 5



6

4 OLDER REGINA NEIGHBOURHOODS ARE LINED WITH THE EQUALLY SPACED *ULMUS AMERICANA* WHICH CREATE SHADED CANOPIES OVER THE STREET. 5 THE LINE OF AMERICAN ELMS SEPARATES THE MOVING (WALKING) AREA AND STANDING (BUS QUEUING) AREA AND HELPS GAME-GOERS DISTINGUISH BETWEEN THE TWO AREAS. 6 THE CONTINUOUS TREE TRENCHES AT MOSAIC STADIUM PROVIDE A SHARED 14.4M3 PER TREE. 7 THE TREE TRENCHES ARE SPANNED BY A CONCRETE BRIDGE THAT PREVENTS TRAMPLING AND AVOIDS TRIPPING HAZARD.

retaining wall of the stadium service ramps. They continue to the Evraz parking lots south of Confederation Park in a double-row. Brandons reach a shorter ultimate growth height than the species.

The 8m OC distance balances between the traditional street tree OC distance and a distance for optimal tree root development.

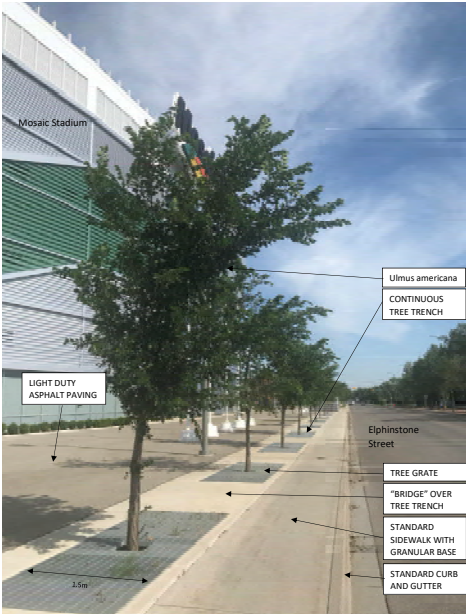
Elms role in crowd and transit management

On the north of the stadium, along 10th Avenue extension, a potentially dangerous condition was averted, partly with the help of the line of American Elms.

The street tree line of American Elms was placed along the “seam” between moving (walking) area and standing (bus queuing) area. This line of trees helps game-goers recognize and distinguish between the two areas; it helps transit officials know where to place queuing barriers. Also installed along this line were lighting fixtures, trash and recycling receptacles, and some signage.

Early in the project, a crowd flow study found that the north concourse was expected to have a significant number of people as they exit the stadium after a game and head either east or west. Investigations into how transit should be located at the stadium concluded that transit should run east along 10th Avenue extension, with loading platforms (four, for two buses each) on the north concourse. The total number of people moving and standing meant that the space north of the Stadium could potentially reach a critical level of sheer overload of people within the space available.

To overcome this potentially dangerous situation, the transit standing platforms were widened out into the east-bound parking lane, and the trees aligned to help separate standing and walking.



7

Tree Lilac shade grove

In the northeast Roughriders Fan Plaza – the stadium main entrance plaza – the grove of Japanese Tree Lilacs 'Ivory Silk' (*Syringa reticulata* 'Ivory Silk') provides game-goers with a place to gather that is a little cooler and more shaded than at the centre of the plaza. Benches from the old stadium were assembled and recreated as street furniture and installed around the sides of the grove. The Tree Lilacs, spaced at 6m OC in each direction, are used for their hardiness and display of white flowers in late spring (the Roughriders colours are green and white). There are 13 trees and 13 benches and the "Thirteenth Player" is traditionally the team's fan base.

Japanese Tree Lilacs are also installed in the smaller plaza grove at the southwest Stadium entrance.

Tree Trenches and Beds

To ensure that urban trees grow to a reasonable size one of the most important requirements is appropriate volume of soil for the roots. Along Elphinstone Street and 10th Avenue extension, the continuous tree trenches provide a shared 14.4m³ per tree (Figures 12, 13).

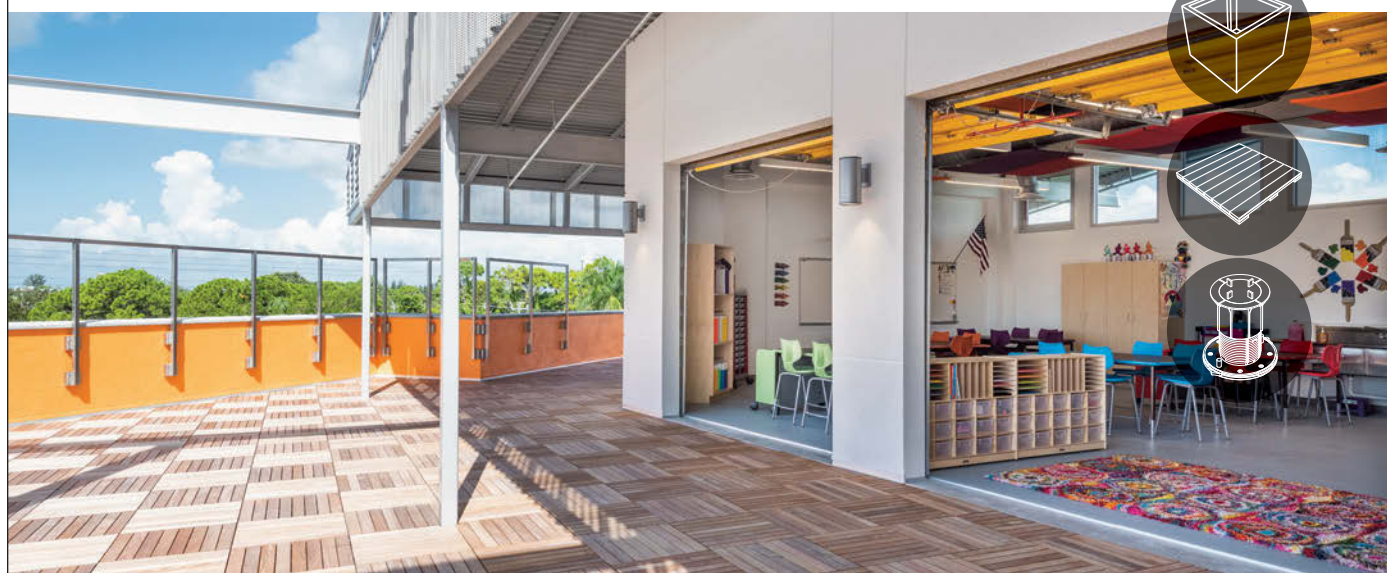
With high volume of pedestrian traffic at peak periods the tree trenches cannot remain open: they would be subject to heavy trampling, and possibly create a tripping hazard. A reinforced concrete "bridge" spans the trench, anchored on either side of the trench.

The pavement surface opening for each tree in the continuous trench is 1.5 x 4.5m. This provides air and water exchange for the tree roots, and access to the trench for servicing. The tree grates were custom designed and fabricated in interchangeable sections to support vehicle weights yet have openings narrow enough that would not catch footwear.

Imported topsoil had been stripped from areas of residential development in and around Regina, and stockpiled by the contractor. Since the project is located on the former Exhibition ground, there was no native soil on site. Soil quality was required as a minimum to meet standard City specifications. Composted manure was specified as an organic amendment, to provide both volume and active biological processes to the soil.

This article looks at design of the new Mosaic Stadium landscape from the perspective of its trees, including layout, urban-neighbourhood context, and technical requirements. As we today benefit from the work of our forebears, the hope is that those who follow will enjoy the benefit of our work today.

Acknowledgements: For their support in preparation of this article, thanks to City of Regina landscape architects Veronica Schroder and Elaine Smit, City of Regina Forestry Manager Richard Horning, and Don Hester, AECOM Associate Principal.



The Heights Foundation Early Learning Center, Fort Myers FL
architect: RG Architects | photographer: Amber Frederiksen

Rooftops transformed.

Not only does it look good, it makes you feel good.

Since 1994, Bison Innovative Products has led the industry in designing and manufacturing versatile pedestals, pavers, and site furnishings that offer the design flexibility to create unique and beautiful rooftop environments. Our independently tested, modular deck system allows rooftop decks to be installed quickly and easily.



bisonip.com | 800.333.4234

WE BUILD TO ORDER TO MEET YOUR CUSTOM NEEDS!

AVAILABLE IN 16 STANDARD COLORS!



440 SM &
WITH OPTIONAL:
A. PET FOUNTAIN
B. JUG FILLER
C. HAND WASH
D. RECESSED HOSE BIBB
WITH LOCKING COVER

SEE ALL AVAILABLE
OPTIONS ONLINE!

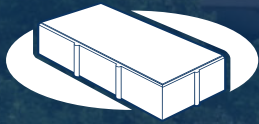
MOST DEPENDABLE FOUNTAINS, INC.™

901-867-0039

Contact: Crozier Enterprises, Ltd. Landmark by Crozier
sales@crozier.ca 866-624-9722

Tessier Recreo Parc (Quebec)
recreo-parc@tessier-rp.com 800-838-8591

 WWW.MOSTDEPENDABLE.COM 



WHITACRE GREER

Celebrating 100 Years
1916-2016



Western Canada:
I-XL Masonry Supplies
ixlmasonry.com | 888.890.1788

Ontario:
Thames Valley Brick
thamesvalleybrick.com | 800.567.5800

Quebec:
Ruel et Frere
rueletfrere.com | 800.463.5282

DISTRIBUTOR: Paragon Supply, Inc | www.paragonsupply.com

PROJECT: Syracuse University Place Promenade | 3x9x3 Boardwalk shades 52 Majestic and 44 Mahogany



"People move chairs." Light weight, built-in handle, stackable, comfortable. Dining height, reclined lounge, and bar height with coordinating tables for all. Wood grain textured recycled plastic or wood seating surfaces.

Product numbers 510, 511, 512, 513, 514, 515, 516

Du Mor

DUMOR.COM | 800-598-4018

Heavy Duty Permeable Ground Grid.

Made of **100% recycled/recyclable plastic**.

Sustainable Urban drainage solutions for **parking, landscaping, truck rest areas and access routes**



GRASPOINTNER
Sustainable innovation.

Citygrid is designed for heavy duty applications and fully compliant to LID (low impact development). Extensively tested and proven, citygrid will:

- Minimize surface water run off
- Reduce flood risk
- Improve water quality
- Encourage biodiversity

For more details ask for the new Citygrid brochure or reach out to us at www.thecitygrid.com

Permeable design

A rigid but open cellular design allows the grids to provide both exceptional support and water management.

Lightweight

Complies with HSE manual handling guidelines.

Flexible

Polymer construction is semi flexible and resistant to cracking unlike concrete.

High load

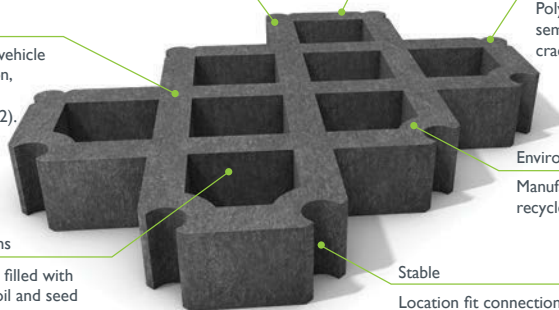
Meets high SLV vehicle usage specification, up to 60 metric tonnes (DIN 1072).

Application options

Open cells can be filled with either gravel or soil and seed depending on your application.

Stable

Location fit connection improves stability once units are in position.



KEY FACTS

- High compressive strength
- Flexible and resistant to cracking
- Anti-slip & UV resistant
- Harmless to the environment
- Meet SLW60 loading category (vehicle up to 60 metric tonnes / 66 tons gross weight)
- Freeze & thaw resistant
- Lighter (1/3rd) in weight vs concrete grids



citygrid



LA Project | DTAH / MBL
Bloor Street BIA

FIRESIDE BENCH

- Remote Programmable Lighting
- 'Easy-Touch' Light Sensor
- Limitless Colour Options
- Modular Aluminum Construction
- Tropical Hardwood Seat Slats
- Stainless Steel Kick Plates

800-268-7328

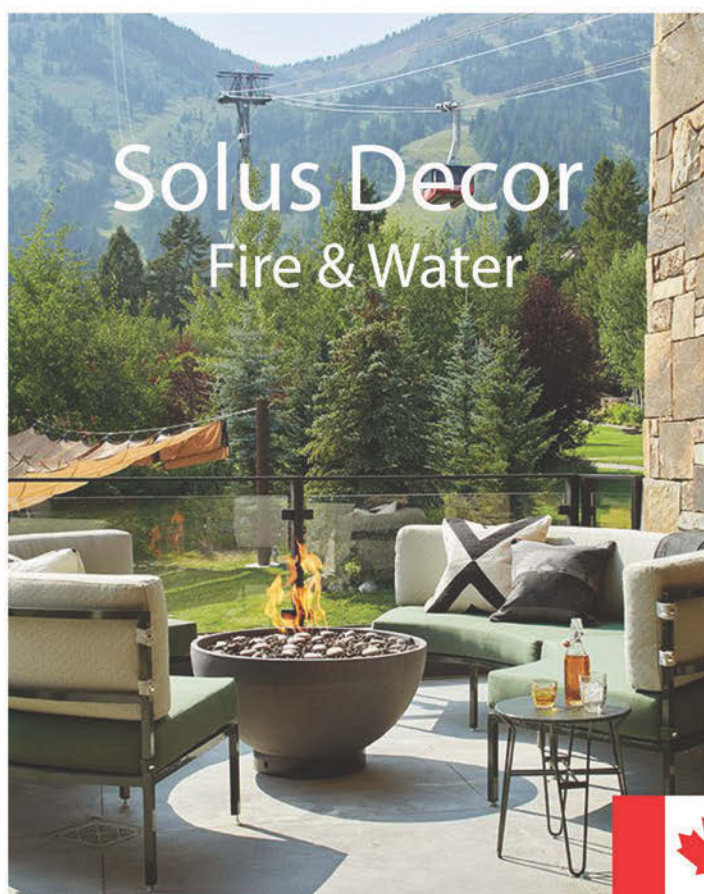
sales@hausersite.com



HAUSER
SITE FURNITURE

www.hausersite.com

Solus Decor Fire & Water



info@solusdecor.com


Made in Canada

www.solusdecor.com



A SOLUTION FOR EVERY SPACE

Make your outdoor design projects extraordinary with premium-quality, made-to-order, fiberglass planters tailored to your customers' needs and wants.

plantersunlimited.com | 866-704-8875 | A Carlsbad Manufacturing Company

PLANTERS UNLIMITED

TRADE | SITE | HOSPITALITY | RESIDENTIAL

See more images at sturdesign.com/gallery



Cascata Pergola • University of Maryland • Baltimore



Made in Ontario 🍁

sturdesign
sturdesign.com

Contemporary Pergolas and Custom Architectural Shade
info@sturdesign.com 855-207-9669

decorable.com




Creative Solutions with stainless steel cable and mesh systems
 Carl Stahl DecorCable | 312.474.1100 | sales@decorable.com

DOGIPOT® The Smart Solution to Dog Pollution



PROVIDING A CLEAN ENVIRONMENT SHOULD BE A WALK IN THE PARK

Junior Bag Dispenser
1002-2

Header Pak Dispenser
1002HP-4

Poly Junior Bag Dispenser
1007-2

Header Pak
1402HP

Trash Liner Bag
1404

Roll Bag
1402

DOGIPOT.com 800.364.7681 DOGIPARK.com



BELLITALIA® Sold in Canada exclusively by **CENTRAL PRECAST**



FOR MORE INFORMATION, CONTACT US AT **613.225.9510**

CentralPrecast.com | info@centralprecast.com

INVISIBLE STRUCTURES™
 Pioneering Stormwater Solutions



A Heritage of Excellence

Since 1982, Invisible Structures has provided the finest in grass porous paving, gravel porous paving, underground water storage, erosion control, drainage, and access ADA mats.

**POROUS PAVING
 STORMWATER MANAGEMENT
 ACCESSIBILITY
 GREEN BUILDING**



RAINSTORE®
 BY INVISIBLE STRUCTURES™

(303) 233-8383
Invisiblestructures.com/why




**A WIDE SELECTION OF
NATURAL STONE
AND PRECAST CONCRETE PRODUCTS**

- Flagstone
- Interlocking
- Aggregates
- Accessories
- Kichler LED Lights
- Masonry products
- Bulk/bag road Salt
- In-Lite LED Lights
- Retaining walls
- Natural & Concrete Veneers

www.beavervalleystone.com
t: 905-886-5787 or t: 416-222-2424

Main Office & Yard: 8081 Woodbine Ave. SE Corner Woodbine/407
Office & Yard: 125 Langstaff Rd E., SE Corner Yonge/Hwy 7-407
Manufacturing Plant: 12350 Keele St., Maple

We Deliver! | Follow us on | Follow us on
@BVSLimited | beavervalleystone



— EXCEPTIONAL DESIGN DESERVES
EXCEPTIONAL PAVERS

©DAVID LAMB PHOTOGRAPHY

RESIDENTIAL | COMMERCIAL | PAVERS

From the smooth lines of extruded pavers to molded pavers' distinctive characteristics, our brick's geometric perfection is a simple yet powerful asset to your paving design!

Visit our website for a wide range of clay pavers.



beldenbrick.com | 330-456-0031



Backdrop combines modern planter and trellis.

greentheorydesign.com/backdrop

Green Theory

Ogden Collection




MAGLIN™
Site Furniture



Palmetto Planters

765-396-4446
www.palmettoplanters.com

INTRODUCING THE STELLA OF SUNNE™ COLLECTION

VOICI LA COLLECTION STELLA OF SUNNE™

Built to withstand the forces of wind, rain and changing tastes.

Une conception qui résiste aux intempéries et aux modes passagères.



US Patent D899,802 S.
Brevet E.-U. D899,802 S.

VICTOR STANLEY®

Create a timeless moment.®
Créateur de moments inoubliables.™

VICTORSTANLEY.COM

ACCESS COVERS/COUVERCLES D'ACCÈS

Wundercovers 65
www.wundercovers.com

ANIMAL WASTE REMOVAL PRODUCTS/PRODUITS ÉLIMINATION DES DÉCHETS D'ANIMAUX

DOGIPOT 63
www.dogipot.com

ARCHITECTURAL WATER FOUNTAINS/LES FONTAINES ARCHITECTURALES D'EAU

Most Dependable Fountains, Inc. 58
www.mostdependable.com

BUILDING & LANDSCAPING STONE/ PIERRE DE CONSTRUCTION ET D'AMÉNAGEMENT PAYSAGER

BG-Graspointner Inc. 60
www.bg-graspointner.com

CONCRETE PRODUCTS/PRODUITS EN BÉTON

BG-Graspointner Inc. 60
www.bg-graspointner.com

Central Precast Inc. 63
www.centralprecast.com

CONTEMPORARY PERGOLAS & CUSTOM ARCHITECTURAL SHADES/PERGOLAS CONTEMPORAINES ET PARE-SOLEILS ARCHITECTURAUX SUR MESURE

STURDESIGN 62
www.sturdesign.com

DECORATIVE CONCRETE/BÉTON DÉCORATIF

BG-Graspointner Inc. 60
www.bg-graspointner.com

DECORATIVE GROWING CONTAINERS/ CONTENEURS DE CULTURE DÉCORATIFS

Planters Unlimited 62
www.plantersunlimited.com

DECORATIVE SCULPTURE/ SCULPTURES DÉCORATIVES

Palmetto Planters, LLC 64
www.palmettoplanters.com

EROSION CONTROL/LUTTE CONTRE L'ÉROSION

BG-Graspointner Inc. 60
www.bg-graspointner.com

FENCING PRODUCTS/PRODUITS POUR CLÔTURES

Carl Stahl DecorCable 63
www.decorable.com

FIBREGLASS PLANTERS/INDOOR - OUTDOOR/JARDINIÈRE EN FIBRE DE VERRE INTÉRIEURES/EXTÉRIEURES

Green Theory Design. 4, 64
www.greentheorydesign.com

Palmetto Planters, LLC 64
www.palmettoplanters.com

Planters Unlimited 62
www.plantersunlimited.com

FIRE & WATER FOUNTAINS/ TABLES DE FEU & FONTAINES DE L'EAU

SOLUS DECOR 61
www.solusdecor.com

GREEN ROOF PLANTERS/JARDINIÈRES DE TOITURE VÉGÉALISÉE

Palmetto Planters, LLC 64
www.palmettoplanters.com

GREEN ROOFS/TOITS VERTS

Bison Innovative Products. 57
www.bisonip.com

IRRIGATION & LANDSCAPE PRODUCTS/ PRODUITS POUR IRRIGATION ET PAYSAGES

BG-Graspointner Inc. 60
www.bg-graspointner.com

IRRIGATION SERVICES/ SERVICES D'IRRIGATION

BG-Graspointner Inc. 60
www.bg-graspointner.com

IRRIGATION SYSTEMS/ SYSTÈMES D'IRRIGATION

BG-Graspointner Inc. 60
www.bg-graspointner.com

LANDSCAPE PRODUCTS/ PRODUITS PAYSAGERS

BG-Graspointner Inc. 60
www.bg-graspointner.com

LANDSCAPE SUPPLIES/NATURAL STONE/ FOURNITURES POUR PAYSAGES/ PIERRE NATURELLE

BG-Graspointner Inc. 60
www.bg-graspointner.com

LARGE CUSTOM PLANTERS/ GROSSES JARDINIÈRES PERSONNALISÉES

Palmetto Planters, LLC 64
www.palmettoplanters.com

OUTDOOR KITCHENS/CUISINES EXTERIEURES

Danver 12
www.danver.com

PAVER EDGE RESTRAINT SYSTEMS/SYSTÈMES DE RETENUE POUR BORDURES DE DALLES

BG-Graspointner Inc. 60
www.bg-graspointner.com

PAVER PRODUCTS/EQUIPMENT/PRODUITS/ MATÉRIEL POUR PAVÉS

Invisible Structures, Inc. 63
www.invisiblestructures.com

The Belden Brick Company. 24, 64
www.beldenbrick.com

PAVER-GRATE/PAVER-GRILLE

IRONSMITH 43
www.ironsmith.biz

PAVING STONES/RETAINING WALLS/ PAVÉS/MURS DE SOUTÈNEMENT

Beaver Valley Stone Ltd. 64
www.beavervalleystone.com

The Whitacre Greer Company 59
www.wgpaver.com

PLAYGROUND & RECREATION EQUIPMENT/ ÉQUIPEMENT POUR ESPACES RÉCRÉATIFS ET TERRAINS DE JEUX

APE Studio Inc. 5
www.apeoriginal.com

PLAYGROUND EQUIPMENT/MATÉRIEL POUR TERRAINS DE JEUX

Landscape Structures Inc. 25
www.playlsi.com

POOL, POND FOUNTAINS & AERATORS/ BASSINS, FONTAINES D'ÉTANGS ET AÉRATEURS

BG-Graspointner Inc. 60
www.bg-graspointner.com

SECURITY/PERIMETER FENCING/ CLÔTURES DE SÉCURITÉ/DE PÉRIMÈTRE

Central Precast Inc. 63
www.centralprecast.com

SITE FURNISHINGS/MOBILIERS EXTÉRIEUR

Central Precast Inc. 63
www.centralprecast.com

DuMor Inc. 60
www.dumor.com

Equiparc 23
www.equiparc.com

Hauser Industries Inc. 61
www.hauser.ca

Landscape Forms Inc. 3
www.landscapeforms.com

Maglin Site Furniture Inc. 64, Outside Back Cover
www.maglin.com

Streetlife BV 13
www.streetlifeamerica.com

Vestre 19
www.vestre.com

Victor Stanley Inc. Inside Front Cover, 64
www.victorstanley.com

Wishbone Site Furnishings Inside Back Cover
www.wishboneltd.com

TREE CARE/ENTRETIEN DES ARBRES

Bartlett Tree Experts 42
www.bartlett.com

TREE GRATES/GRILLES D'ARBRES

IRONSMITH 43
www.ironsmith.biz



WunderCovers®
Hidden Manhole & Utility Access Covers

TRENCH COVERS HIDES LONG TRENCHES



PREP



INSTALL



COMPLETE

- CUSTOM BUILD
- H20, H20+, AND H25 COMPLIANT
- ANY SIZING

WUNDERCOVERS.COM

DRAWING ON NAPKINS, WRITING ON WALLS

LINDA A. IRVINE

I AM CURRENTLY enjoying a book by Peter Korn entitled *Why We Make Things and Why It Matters. The Education of a Craftsman*. Korn is the founder and Executive Director of the Center for Furniture Craftsmanship and the author of several books on furniture making.

I have always thought of landscape architecture as a craft, as an art, as a science and as a profession. We have always used different tools and techniques to engage others and to produce and explain our work.

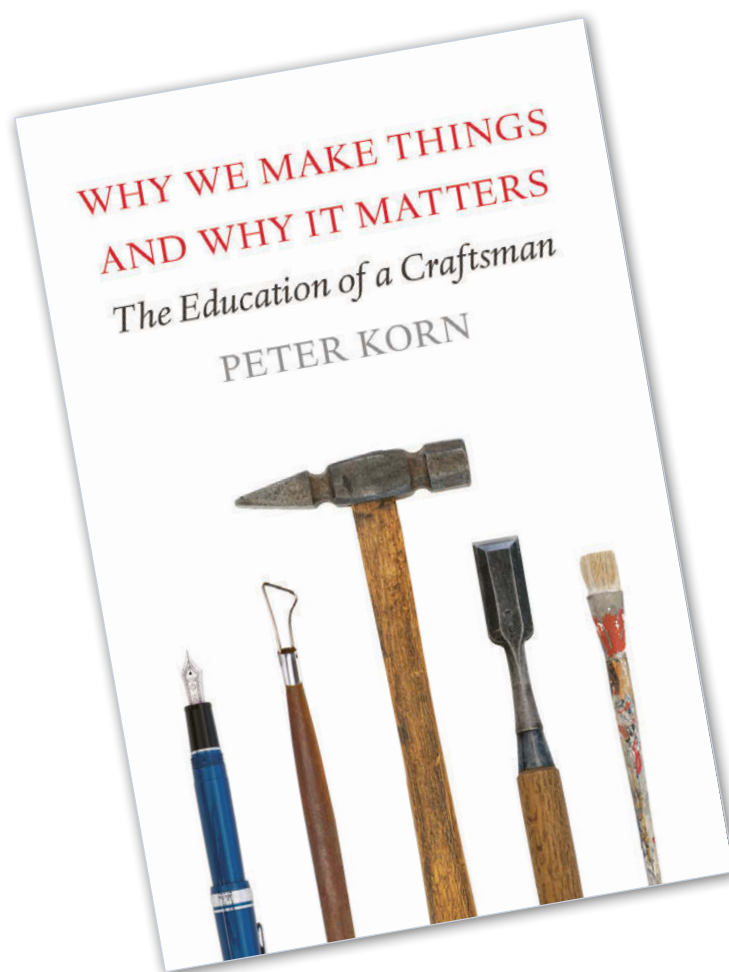
The cover of Korn's book shows an ink pen, a clay carving tool, a hammer, a wood carving tool and a paint brush. I have used all of these tools in my career at different times and for various reasons. I have used other tools as well, including the earliest computer technologies that required punch cards to input data.

Korn says, "It is given that, individually and collectively, we think our world into being. The question is: How do we choose to go about it?"

For me, this issue of technology raises the question about why we use the tools and technology that we do to "think our world into being," as well as, to what end and for what purpose. For me, tools and technology should be a means to an end, not an end in itself.

Our profession is changing rapidly for many reasons and the pandemic has accelerated the use of various computer programs to facilitate working from home. Zoom and Google Meet are now business essentials, as are various programs such as E-Plan, for electronic plan review, that are being used by planning, engineering and building departments in municipalities worldwide.

I think these technological advances are all great, but time will tell if the work that landscape architects do gets better, stronger and more relevant. Are the underlying skills that are required to use these technologies such as drawing, sculpting, visual communications, etc., being adequately taught in universities? Do students know what a horizon line is or a vanishing point when they do computer renderings? From my experience, they should but many do not.



When I graduated in the 1970s, the technology that we used would be considered primitive by today's standards. We had to hand draw and draft everything on Mylar; Letraset was used to add text, and "cut and paste" literally meant that. This was all so labour-intensive that I am surprised that any of us graduated on time. However, we were also taught how to think critically, how to be creative in designing and planning, and how to be passionate about the profession and the values that we cared about.

The world cannot stand still and technology will continue to advance and enrich our lives. But technology needs to be beneficial and purposeful. We need to know which technology is the right technology to be used and when.

However, I am confident in knowing that when the satellite goes out, I and many landscape architects in Canada will still be able to rely on drawing on napkins and writing on walls.

Linda A. Irvine, DALA, FCSLA, is on the Editorial Board of *Landscapes | Paysages*. She cares deeply about the profession of landscape architecture. In her spare time she gardens, draws, and paints. She looks forward to sculpting.



HANDCRAFTED IN CANADA



EVERY PRODUCT THAT LEAVES OUR FACILITY IS A TESTAMENT TO OUR QUALITY CANADIAN CRAFTSMANSHIP AND OUR CONFIDENCE THAT EACH ONE WILL EXCEL AT ITS INTENDED PURPOSE FOR MANY YEARS TO COME

Wishbone
site furnishings

WishboneLtd.com | (866) 626-0476

Ogden | Flexible solutions



Configure the perfect space with the Ogden Collection of backed and backless, curved, circular and straight bench solutions.



MAGLIN™
Site Furniture

800.716.5506 | maglin.com