

The background of the cover is a photograph of a construction site at sunset. In the foreground, there is a large orange lattice crane structure. Below it, a large spool of black cable sits on a metal platform. In the background, a cityscape is visible under a sky with orange and blue hues. The magazine title 'ReNew' is in large yellow and white letters at the top left, with 'CANADA' in smaller yellow letters below it. The subtitle 'The Infrastructure Magazine' is in white below that. The main headline 'BUILDING UP' is in large white letters in the center. Below it, a sub-headline 'Partnerships drive projects towards completion' is in white. To the left, there is a list of three topics with yellow plus signs: 'Indigenous Alliances', 'Cogeneration Power', and 'Canada's Ports'. At the bottom left, the price '\$8.00' and the website 'renewcanada.net' are listed.

ReNew

September/October 2022

C A N A D A

The Infrastructure Magazine

BUILDING UP

Partnerships drive projects
towards completion

- + Indigenous Alliances
- + Cogeneration Power
- + Canada's Ports

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ReNew

CANADA

The Infrastructure Magazine

SEPTEMBER/OCTOBER 2022

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Top100
Canada's Biggest
Infrastructure Projects

For details regarding our annual celebration visit
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CHALLENGING THE P3 MODEL

By John Tenpenny

Will they, or won't they? When it comes to using the public-private partnership (P3) model, the government of Alberta is sending mixed messages.

In May, the Government of Alberta announced that work is progressing on five P3 high schools in the province, which are expected to open in September 2024.

The P3 contract for the delivery of the project was finalized in 2021, following a competitive procurement process.

Two months later the same provincial government announced it was cancelling a P3 approach to upgrade the Deerfoot Trail in Calgary, opting instead to procure the improvements in smaller pieces.

In a 2020 safety audit of the road, the province identified several priority areas to be upgraded to increase both the safety and usability of Deerfoot Trail, including widening the highway between 17 Avenue S.E. and Airport Trail to four lanes in each direction and reconfiguring the 17 Avenue S.E. and Memorial Drive interchanges and eliminating weaving traffic.

The province planned to complete that work using a P3 funding model, but recently announced it was scrapping that plan because it would cost taxpayers too much money.

"So instead of doing one P3, from south to north, including the road expansion and the bridges, we're going to split it into smaller packages," explained Alberta Transportation Minister Prasad Panda.

"Current economic conditions have resulted in pricing volatility and historically high inflation in the construction industry, which means a P3 approach to Deerfoot Trail improvements is not economically viable," he added.

Is the P3 model suddenly falling out of favour?

With the Parliamentary Budget Officer

projecting that the federal government will spend more than \$31 billion this year on infrastructure and provinces adding to the pot, the number of complex projects will continue to grow and P3s can certainly help governments and the private sector cross the finish line.

Are there challenges? Absolutely. The impact of inflation, supply chain disruption, and ongoing labour shortages in the construction industry will have real implications for the sector in Canada.

According to Lisa Mitchell, president and CEO of the Canadian Council for Public-Private Partnerships (CCPPP), ongoing dialogue, collaboration in implementing potential solutions, and research and evidence to support decision-making will be necessary to not only support P3s going forward but infrastructure more broadly.

Speaking at our annual Top100 Projects Key Players Owners Dinner, Mitchell acknowledged the perfect storm of issues around cost escalation that will impact the P3 pipeline going forward and that some public owners are delaying or cancelling projects due to affordability issues.

But she challenged the assumption that the P3 model is irreparably broken or that its time has passed.

"For those of us involved in the P3 industry, these issues are just an added layer of complexity into what is already an evolving space."

If the 2022 Top100 Projects list is any indication—with P3 projects such as the Gordie Howe International Bridge (No. 12), the Energy Services Acquisition Program (No. 26), and the Port of Montreal's Contrecoeur Terminal (No. 62), to name a few—the future of P3s looks bright. ♣

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The design and construction of two new trickling filters at Delta's Annacis Island Wastewater Treatment Plant is one of over 20 projects to expand the capacity of the plant.

Once completed in 2027, the plant will serve 1.5 million people in 14 Metro Vancouver municipalities.

Read more about this Top100 Project (No. 55) on page 38.

Brown and Caldwell

OTTAWA SENATORS TO DEVELOP EVENT CENTRE AT LeBRETON FLATS



The NHL's Ottawa Senators is proposing to build a hockey arena and events venue surrounded by mixed-use development, located on Albert Street.

The National Capital Commission (NCC) and Capital Sports Development Inc. (CSDI), a group led by the Ottawa Senators NHL hockey team, announced the signing of a memorandum of understanding (MOU) toward the development of a major event centre at LeBreton Flats.

CSDI is proposing to build an NHL hockey arena and events venue surrounded by mixed-use development, located on Albert Street between Preston Street and City Centre Avenue. This site was identified for a potential major facility in the 2021 LeBreton Flats Master Concept Plan. CSDI's concept for an arena facility is still in the very early stages and will be developed further over the coming months.

"This is another important step in the implementation of our Building LeBreton plan: the start of an incredibly exciting and transformative city-building project that will become a landmark and major destination in the National Capital Region," said Tobi Nussbaum, CEO, National Capital Commission. 🍁

National Capital Commission

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B.C.'s Highway 7 at Ruby Creek after flooding in November 2021.

CANADA ANNOUNCES FUNDS FOR CLIMATE RESILIENT INFRASTRUCTURE

The Government of Canada announced funding of \$46.7 million for two important climate resilience initiatives; the Climate Resilient Built Environment (CRBE) initiative and the Standards to Support Resilience in Infrastructure Program (SSRIP).

The CRBE initiative, funded by Infrastructure Canada and led by the National Research Council of Canada, will provide the knowledge to adapt infrastructure where necessary, inform changes to building and infrastructure codes, and create guides, standards, tools, and technical solutions for climate resilience. With funding of \$35 million over five years, the initiative will highlight the importance of resilience through collaboration across the construction sector, from design and decision-making to construction, operation, maintenance and retrofit.

"Communities across Canada have felt the impacts of climate change over the last number of years. As we continue to take bold action to reduce our emissions and protect nature, we must support key research that guides mitigation and adaptation efforts to ensure that new and existing infrastructure can better withstand extreme weather events," said Infrastructure Minister Dominic LeBlanc.

The SSRIP, led by the Standards Council of Canada, will receive new funding of \$11.7 million over five years, to deliver standards and related guidance that address priority areas such as heat, flooding, and permafrost degradation in the North. The program is working with communities and beneficiaries to ensure these standardization projects promote a consistent approach to climate change adaptation, enhance resilience, and support informed decision making for infrastructure and buildings across Canada.

"Climate-adapted standards for infrastructure and buildings can help by codifying key principles and best practices to ensure that communities in Canada will be safer and healthier as we move forward," said Chantal Guay, CEO, Standards Council of Canada. 🍁

B.C. Ministry of Transportation and Infrastructure



Ron Saporta, U of T's COO, property services and sustainability, takes Ehren Cory, CEO of CIB, Karina Gould, MP for Burlington, and U of T president Meric Gertler on a tour of the university's central steam plant.

U OF T PARTNERS WITH CIB FOR DEEP ENERGY RETROFITS

The University of Toronto will receive \$56 million in financing from the Canada Infrastructure Bank (CIB) to accelerate the university's plans to achieve a climate positive campus.

Through the launch of Project LEAP, U of T will use the CIB financing to complete deep energy retrofit projects—such as converting gas boilers to electric boilers and installing energy storage solutions—to reduce greenhouse gas emissions by more than 50 per cent, or 45,000 tonnes of CO₂ equivalents, by the end of the decade.

The project will also involve private sector partners that will provide additional financing while meeting stringent performance requirements.

It's all part of U of T's ambitious Climate Positive plan to achieve emissions reduction targets on the St. George campus that exceed the emissions physically produced by 2050.

"The University of Toronto is a global leader in addressing the urgent challenge of climate change," U of T president Meric Gertler said. "Our Climate Positive plan is transforming energy sources and reducing energy consumption on our historic St. George campus. This will help us ensure we can deliver on our mission of excellence in

research and learning more sustainably for generations to come.

"We are grateful to the CIB for recognizing and supporting our commitment to Canada's net-zero targets and to harnessing the innovation of cleantech startups on our campuses and beyond."

CIB's agreement with U of T represents the infrastructure bank's first partnership with an academic institution. It's part of CIB's Public Retrofits Initiative, which provides financial support for building retrofits to achieve significant energy savings from infrastructure owned or managed by the public sector.

Ehren Cory, CIB's chief executive officer, hailed U of T, and its commitment to addressing climate change at an event held at the university to mark the collaboration.

"We hope this is a call to action for others in the public institution space," said Cory, noting that CIB also recently announced a partnership with Toronto Western Hospital, University Health Network. "We, as the broader public sector, own a lot of the building stock in this country—and a lot of the aged and less energy efficient building stock in this country.

"This announcement is a major milestone,

but it's just a step in your journey and we're excited to be with you the whole way."

U of T's planned retrofits include replacing gas boilers with electric boilers in its central steam plant and installing a supplemental steam turbine. U of T also plans to use the CIB financing to undertake deep energy retrofits of two labs and the Earth Sciences Centre, and to establish a local low carbon energy source that supplies renewable energy through technology such as solar.

"Underneath our campus, we have one of Canada's largest and oldest district energy systems," said Ron Saporta, U of T's chief operating officer, property services and sustainability. "It's over 120 years old and it's the primary contributor to a lot of our carbon emissions because it heats and powers up buildings.

"This project allows us to modernize that system and to start to migrate away from fossil fuels as the primary heating source. We can upgrade energy-intensive buildings to reduce the amount of carbon they emit."

There are also plans to pilot green technology solutions such as carbon capture, utilization and a waste-to-fuel digester that would take the more than 500 kilograms of organic waste and convert it into fuel to heat buildings. 🌱



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AUTHENTIC LEADERSHIP

Infrastructure Ontario's chief development officer
on transit-oriented, accessible infrastructure development

By Connie Vitello

As chief development officer at Infrastructure Ontario (IO), Heather Grey-Wolf oversees IO's work on transit-oriented communities, leveraging surplus lands for government priorities such as long-term care, and supporting master development exercises like the redevelopment of Ontario Place.

Her experience is a unique blend of development leadership across the public and private sectors. *ReNew Canada* recently invited Grey-Wolf to take a little time to divulge her lessons learned and provide us with some insight into the guiding principles she applies to her efforts in improving infrastructure for the millions of people working, living, and playing in Canada's most populated province.

How did your educational background in business administration and architecture inform your career in infrastructure, and did you have any mentors to help guide the way?

Well, I think you know infrastructure is a lot more than just bridges, roads, and tunnels nowadays, especially at Infrastructure Ontario. We think of healthcare infrastructure such as hospitals, or long-term care homes and affordable housing as infrastructure and so my background combination of architecture, business and in real estate development is very relevant to the work that we are doing every day.

I had the opportunity to work both in India and South Africa at the start of my career in architecture and project management in in-

ternational development, then I came back to Canada to do my MBA at Rotman at University of Toronto. I was fortunate coming out of business school to start my career at a boutique real estate consulting shop called N. Barry Lyon Consultants. Barry Lyon was a huge figure in the real estate development industry in Toronto and was a key mentor to me. He really got me started understanding all aspects of the land development process, using my full skill set and taking on assignments across the country.

How has your previous professional experience, which includes the revitalisation of Regent Park (the largest urban renewal project in Canada), provided you with the



L to R: As chief development officer, **Heather Grey-Wolf** oversees IO's work on transit-oriented communities, leveraging surplus lands for government priorities such as long-term care, and supporting master development exercises like the redevelopment of Ontario Place; The revitalization of the iconic **Ontario Place** site is underway. Celebrating the legacy of the site, the visionary concept is a publicly accessible space that can be explored inside and outside of programmed events and attractions.

know-how to tackle your current role at Infrastructure Ontario?

I think my previous experience gives me an in depth understanding and real hands-on experience in these really complicated multi-stakeholder negotiations that you engage in when you're involved in a major public development project. Coming out of business school with a housing background, I wanted to get valuable experience in the private sector in real estate and project management with the goal of bringing that skill set back to the public or non profit sector.

In my role with N. Barry Lyon Consultants, I had a lot of exposure to the team at Toronto Community Housing and was eventually able to join that organization as a senior project

manager in their development group. Leading the Regent Park revitalization provided me with a background in public private partnerships in a complex multi-stage project, with both a development and construction team reporting to me. I really enjoyed the work that I was able to do every day in the community, where I got to see the impact of the work on families, as they move into the new housing or played in the park that my team delivered.

After Toronto Community Housing, I spent

ment function in the work that we do at Infrastructure Ontario. I can say that through my previous experience and the work of the Transient-Oriented Communities team, we understand the value and importance of that engagement.

We held a series of virtual open houses to solicit feedback from the community and their feedback is included in the solutions that we're putting forward in the final form of the proposed TOC developments. We will continue to build on that dialogue because

"Authenticity of purpose and approach, as well as empathy, helps to understand the different parties and their points of view and how to create a solution that is a win-win."

several years in the private sector doing development work across the country and in different jurisdictions. The opportunity to join Infrastructure Ontario, and the scale of projects underway in the development division, whether it's the Transit Oriented Communities group or a project like Ontario Place is something you can't find anywhere else. Our work has a profound impact on the lives of the people of Ontario and that is what really inspires me every day.

What are some key guiding principles that help you execute the development of major infrastructure projects and partnerships in Ontario?

One of the key principles is that we approach the work with authenticity. We really are trying to take an opportunity and make the best of it for all the stakeholders involved. So, we take a lot of time to work with a wide range of stakeholders and understand their concerns and figure out how we can incorporate that into the solution that we're going to provide. Authenticity of purpose and approach, as well as empathy, really trying to understand the different parties and their points of view and how it's always about creating a solution that is win-win. It's how you create a solution to a land development problem that answers the stakeholders concern while still delivering on the objectives that you've been given.

When it comes to your work in transit-oriented communities how does your team achieve effective collaboration with local community groups?

We are still at the start of the journey in terms of continuing to develop the public engage-

these communities are going to be delivered in around seven to ten years. It's a long-time horizon, which gives us a lot of time to mature these relationships and those with local stakeholder groups. We want to make sure that the public continues to have opportunities to provide input on these developments, which are going to have such an impact on their communities.

Tell us about your newest project supporting the redevelopment of the iconic Ontario Place. What is the plan and what are some special features that we can look forward to?

Ontario Place is such an exciting project. It's an eighty-acre site on Toronto's waterfront that's been sitting fallow for about a decade. Back in 2019, IO issued a Call for Development, an international call process, to solicit proposals from family-oriented entertainment and hospitality groups for the revitalization of the site. Through that process we had companies come forward with exciting proposals for the first phase of the revitalization and we now have two anchor tenants.

Therme, an international wellness group will be building an 800,000 square foot waterpark and wellness spa on the West Island. And, Live Nation, which is the Budweiser stage that's there today, but they have proposed a brand-new amphitheater that'll be indoor and outdoor, so it'll allow for programming 365 days a year.

With all this vision and work that we're putting in place, one thing that remains important, is that Ontario place continues to be publicly accessible for all. So, although we will have these various tenants doing developments in different parts of the site, more



As a senior development leader with the Toronto Community Housing Corporation for seven years, Grey-Wolf led the revitalization of **Regent Park**, the largest urban renewal project in Canada.

than 60 per cent of the site area and certainly the entire waterfront will remain open and public and accessible. The Ontario Place site will be renewed and be a great place for people to come and visit but it'll remain public and with free access for all.

Earlier this spring, a live virtual visioning workshop was held to seek input, ideas, and preferences related to the public realm at Ontario Place. The public realm area will include park areas, open spaces, trails, landscaping, art installations, and benches, and we look forward to continuing this work and continuing to engage the public.

I would also add, that this are just the first steps in the site redevelopment, so it's probably half of the site that we're talking about and there is still a phase two that we're working on the vision for and, we'll have more about that further down the line.

What industry trends most interest you, for example regarding public and private partnerships or innovative technology solutions, or other emerging trends in Canada?

The provincial government has moved to leverage the value of existing surplus provincial assets to deliver on government priorities, such as housing, long-term care, hospitals, and Transit-Oriented Communities. For the surplus lands programs, these properties are being put back into productive use with specific requirements to some much-needed sectors, such as housing and long-term care. The Transit-Oriented Communities (TOC) program has allowed the province to start to maximize development-related benefits from its investments in transit. Under the

TOC approach, new lands being taken for the purpose of permanent and temporary station infrastructure can be considered as potential TOCs.

We continue to monitor inflationary pressures and cost inflation, not just in our industry but across the entire economy, as concerns we are aware of and preparing mitigation strategies to address.

We are also looking at how we can adapt our P3 delivery model to be able to respond to construction cost inflation and changing market conditions.

With regards to our development work, we are building out a development platform that will look at all provincial real estate, uncover new opportunities through land development and create a vision for the properties before they go to market—this is one of the many ways we can maximize value for the people of Ontario.

The provincial government was criticized for its shortcomings in long-term care during the pandemic. How are you and your team working to address the gaps and ensure the well being of an increasing number of elderly people who inhabit these critical infrastructure facilities?

IO has looked at the long-term care space and tried to understand the different challenges facing the service providers in that space. One of the biggest challenges is just a shortage in the number of beds and we determined that there were three key challenges in that industry; one of them was lending to these service providers; the second one was the overall operating model and fund-

ing structure; and then the third one was the availability of land.

One approach was to work with the industry on the rapid building of three long-term care facilities. These projects are using modular construction to shorten the design and construction process so that we can bring urgently needed additional beds into service. A 320-bed facility has already been completed in Durham Region.

On the development side, what we've heard from the industry was that they were unable to acquire land at rates to build the long-term care facilities that we need here in Ontario to serve our elderly. This is how the surplus lands program was born. IO is currently leading this program, where we are leverage the value of surplus government lands to the market for development but with the specific purpose of delivering a long-term care component.

Working with the Ministry of Long-Term Care, we identified areas of province where there was the greatest shortage of beds. We were able to find sites in those areas and then create a market offering that included a combination of long-term care and highest and best use market housing. Through this program six sites have been launched since 2019, and it is expected to deliver around 2,200 long-term card beds in communities where they are urgently needed. ♣



Connie Vitello is the contributing editor of ReNew Canada.



BUILDING HEALTHCARE INFRASTRUCTURE THAT LASTS



Healthcare infrastructure is essential to every community. Finding innovative ways to construct these types of buildings within their changing constraints is an ongoing challenge for companies, especially when services and operations are ongoing. From hospitals to long-term care homes to health centres, Pomerleau has built upon their experience over the years to provide efficient and safe solutions for the construction and revitalization of healthcare infrastructures.



Ontario: Cornwall Community Hospital

Prioritizing the wellbeing of current staff and patients is Pomerleau's first commitment when it comes to working on healthcare projects. Pomerleau did just that when redeveloping the Cornwall Community Hospital. The scope of the project was to centralize the activities of two separate locations under one roof, while maintaining the operations of the existing facility. Pomerleau limited construction disturbances, planning their work around the operations of the facility. They renovated a new two-storey area to house five operating rooms, retrofitted the emergency services new electrical room and replaced two generators. They also performed an electrical substation relocation of vibration-sensitive equipment (MRIS and x-ray machines) and waterworks/sewer systems.

New Brunswick: Gagetown Integrated Health Service Centre Phase Two

Health projects are not limited to hospitals and retirement facilities. The industry is reimagining ways to provide a wide range of accessible health services to the public. In New Brunswick, Pomerleau is constructing a new portion of an Integrated Health Service Centre. The new construction includes the completion of the new Health Centre within two floors of the building. The centre will include occupational therapy, hydrotherapy, odontology, with an emergency operating theatre and an outpatient clinic. The existing centre will be renovated to accommodate a new pharmacy, administrative offices, training rooms, psychosocial services, and x-ray rooms.

Quebec: Montreal University Hospital Centre (CHUM) Phase Two

Maintaining the performance and safety of CHUM's various hospital services and equipment while demolishing the existing hospital to allow for the construction of two new towers during phase two of the project, was essential to Pomerleau. To do this, members of Pomerleau's Innovation Group's planning axis deployed PlaniPOM, which modernizes the logistics of on-site deliveries. BIM was also used to improve the monitoring deficiencies and visualization of models and interfaces, and inspections of the work. The CHUM project provided an opportunity for Pomerleau's innovation team to optimize their initiatives.



CAPACITY LIMITS

Strengthening Canada's supply chain through its ports

By John Tenpenny

Canada will see significant investment in port infrastructure over the coming decade, as efforts will continue to expand port capacity at several of the country's largest ports to be able to meet growing demand.

Recent years have seen considerable investment in the country's ports as trade has increased, driving up demand for expanded capacity. While the COVID-19 pandemic has weighed on port activity in the country since early 2020 and clouded projections of future trade demand, the expected acceleration of economic activity both within Canada and globally over the coming months will bolster the investment outlook for the sector, supporting port development over the coming years.

During a recent INFRAIntelligence webinar, *ReNew Canada* brought together a panel of experts to discuss current and future efforts by Canadian Port Authorities to invest in infrastructure to meet future capacity demands.



Daniel-Robert Gooch,
President and CEO,
Association of Canadian Port Authorities (ACPA)



Captain Allan Gray,
President and CEO,
Halifax Port Authority



Chris Hall,
President and CEO,
Shipping Federation of Canada



Ian Hamilton,
President and CEO,
Hamilton-Oshawa Port Authority (HOPA)

ReNew Canada: Demand for increased capacity at Canadian ports hasn't slowed despite the pandemic. What investments have been made and what future investments and projects will help ports keep up with capacity demands in the future?

Captain Allan Gray, president and CEO, Halifax Port Authority

For us, the long-term investment that needs to be done needs to be away from the port. It needs to be inland ports, intermodal facilities; things that will pull [cargo] away from the birth at a rapid rate so we can decrease dwell times. And we've seen that on the U.S. west coast, where they just don't have the capacity to pull the cargo away from the ports. That's essential for all our

ports. Some ports will have a demand for more birth space, but some of us just need a method to get it further away from the port as quickly as possible.

Ian Hamilton, president and CEO, Hamilton-Oshawa Port Authority (HOPA)

We've invested about half a billion dollars into infrastructure over the last eight years at HOPA. And one of the areas that we particularly focused on is building the material handling resources and terminal operations for agriculture. Hamilton has always traditionally been a steel port.

A decade ago, approximately 80 per cent of our business was related to steel, but that number has dropped down to less than 60 per cent and 20 to 30 per cent of our busi-

ness is now agriculture. Last year we did well over \$2 billion worth of exports from Ontario farmers to international markets. This illustrates how using infrastructure can really impact Canada's competitiveness and supply chain resilience.

Chris Hall, president and CEO, Shipping Federation of Canada

Often you think of just the marine component as being the biggest gap in capacity, but you must look at the entire system. It's road, it's rail, it's even air. You must look at the entire network because you've got to get that cargo out of the port facility as fast as you can. And we're seeing congestion in a few places in Canada and of course, many places in the U.S., and that's the problem. It



The Hamilton-Oshawa Port Authority (HOPA) is investing \$30 million to extend the marine infrastructure in Oshawa to accommodate two docked vessels and improve loading and un-loading times.

“We must start investing some money on the resilience of the supply chain.”

– Captain Allan Gray

may not be the port itself, but it's the other related infrastructure. So, the infrastructure discussion must be a much larger discussion involving many stakeholders, not just the ports.

Daniel-Robert Gooch, president and CEO, Association of Canadian Port Authorities (ACPA)

We've been advocating for greater financial flexibility for ports to be able to make investments themselves without the federal government being involved. So, we are seeing investments in physical infrastructure, yes, like the Roberts Bank 2 project in Vancouver. But different parts of the country have different challenges. And we're not the only ones calling on the government to work with us

on a national strategy for supply chains and the movement of goods, so that these investments that we're seeing across the country can be better coordinated and aligned with our national goals.

What are the key areas you would like to see addressed by Transport Canada's Port Modernization Review to help ports strengthen their global competitiveness?

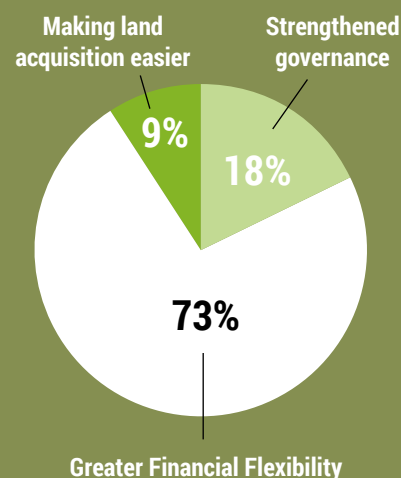
Daniel-Robert Gooch

One area of top concern for us is governance. It's essential that the local nature of Canadian Port Authorities working at arm's length from government be maintained. Another thing that ports are looking for is the abili-

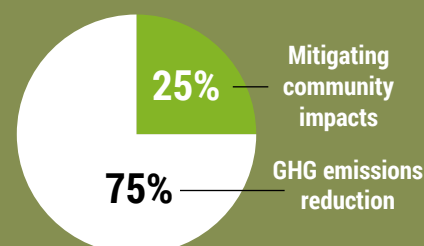
MODERN VIEW

We asked recent INFRAIntelligence webinar attendees about Canadian ports. Here's what they had to say:

What should be the No. 1 priority of the Ports Modernization Review from the point of view of port authorities?



What is the most important area for ports to improve on when it comes to their environmental performance?



To watch a replay of the entire discussion or listen to the podcast, visit www.renewcanada.net.

“Often you think of just the marine component as being the biggest gap in capacity, but you have to look at the whole thing.”

– Chris Hall



In 2021, the total impact of the Port of Halifax on the Province of Nova Scotia was \$4.37 billion in economic output with the direct portion being \$2.72 billion.

ty to be nimbler, through greater financial flexibility and this means different things to different ports. For some, it means a streamlined approach to being able to borrow for infrastructure investments that need to be made, such as replacing the current limits on borrowing with minimum credit ratings or minimum debt service standards, or at the very least streamlining the borrowing process and the ability to get those limits raised. For other ports, it means continued access to funding options, like the National Trade Corridors Fund.

Chris Hall

There needs to be more alignment between departments. Transport Canada is the regulator, but there are so many other government agencies and departments that all form part of the transportation system. It's one thing if you create more capacity somewhere, but if other government agencies can't support that extra capacity, then it's not going to be effective.

Ian Hamilton

One thing we've discovered is that for every

dollar we invest in infrastructure, industry is willing to invest four times that amount. Creating additional financial flexibility to allow port authorities to partner with industry, to create the funds, to pay for infrastructure is very important. The more financial tools in terms of equity partnerships and joint ventures that are available to us, the more ability we have to be creative in attracting those funds to drive more infrastructure investments.

Captain Alan Gray

We need to partner more with the private sector, but our ability to do that is hampered in some ways and we need to get that freed up. And that's not to bypass due diligence or good governance, but the government needs to be more agile and make approval processes quicker, so that we don't lose the opportunities with investors that come to us and say, 'Here's what we can do.' Now, whether there needs to be a shift in our financial ability, or whether it needs to be an assessment or approval, it just needs to be far more responsive, so that we don't lose the possibility of delivering some important infrastructure for Canada.

In the long term, what areas should the National Trade Corridors Fund focus on to help ports facilitate better movement of goods and reduce bottlenecks in Canada's supply chain?

Captain Alan Gray

I want to see funds for developing resiliency in the supply chain. The Chignecto Isthmus connects Nova Scotia to New Brunswick, and it carries major highways, railway as well as energy and communications systems. With climate change, all of it is at very high risk. We saw something similar last year on the west coast with the fires and the flooding. Why aren't we fixing this problem? Studies have indicated that the payback for investing in making sure the Chignecto Isthmus safe and resilient is 140 times.

With efficient ports as a reliable place to ship cargo through, the supply chain becomes resilient enough to withstand natural disasters that can affect our highway and railway systems, which are at risk.

Ian Hamilton

In Ontario, we struggle with having the capacity to manage demand. So, for us, it's about building that capacity and building resiliency and redundancy inside of our supply chains. What COVID highlighted was that if one thing goes wrong, the whole system shuts down. We need a national strategy around creating redundancy in our systems to deal with the peaks and the troughs of demand and how to keep cargo flowing when one part of the system goes down.

Daniel-Robert Gooch

And what we really need is a strategic long-term vision, a plan for what this country needs in terms of its multiple trade corridors, so that we can all work together a little bit more efficiently and more effectively to support our future trade growth, global competitiveness, all while reducing the impact of marine transport on the environment. There are significant challenges ahead in terms of decarbonization. Direct investments are required in terms of shore power electrification, but also for infrastructure to support the newer, cleaner fuels that ship owners are going to be using in the decades ahead. There's a lot of work that needs to be done. And I think as a country, we'd be well served to have that long-term vision, and strategy for supply chains and the movement goods across the country. 🍁

John Tenpenny is the editor of ReNew Canada.

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(L to R): Cian Murphy, P.Eng., partner, vice-president, major projects, Canada; Vanessa Chau, P.Eng., MIAM, associate partner, senior director, project management; and Yves Roland Mondou, P.Eng., partner, senior vice-president, project management.

CRITICAL MASS

Supporting inclusion and diversity within the asset management community

By John Tenpenny

Engineering and asset management used to be fields dominated by men. That of course is no longer the reality, but as more women continue to join the ranks involved in the acquisition, operation, and care of physical assets, especially critical infrastructure—or asset management—there is a need for platforms and organizations that emphasize the empowerment of women and provide them with resources they require to get better at their jobs and become valuable assets to the companies that employ them.

One of those organizations is Women in Asset Management North America (WiAM NA)—launched in 2019, at the first Global Institute of Asset Management (IAM) North American conference in Chicago—which exists to support diversity and inclusion within

the Institute of Asset Management (IAM) and the wider asset management practitioner community in Canada and the United States.

According to Vanessa Chau, as one of the WiAM NA (Canadian-based) founding board members and co-chair of the diversity and inclusion committee for IAM Canada, the drive of the group is to elevate the understanding and execution of asset management activities and principles across all industries through support, leadership, and promotion of diverse and effective asset management teams.

“Because we enjoy each other’s ideas, we want to encourage other women to get involved in strategic asset management, share our experiences, develop the way forward for our profession—and sometimes we

need to challenge behaviours together,” says Chau, an associate partner, senior director with CIMA+, based in Canada.

Chau was also one of the founding members of Asset Management Ontario (AMON-Tario), which supported the development of Canada’s first asset management planning regulation (O.Reg. 588/17) with the Ontario Ministry of Infrastructure and Infrastructure Canada. She also created the first Institute of Asset Management (IAM) Training and Innovation Centre in Canada during her tenure as executive lead of asset management at the City of Brampton.

Most recently, she was appointed the asset management program consultant the Toronto Transit Commission (TTC)—the largest transit agency in Canada—and received a

distinguished service award for her outstanding contributions toward the TTC's asset management transformation program and the launch of the first transit-oriented asset management training and innovation centre.

WiAM NA collaborates with similar organizations in North America and across around the world, including the Women in Asset Management group and Women in Reliability and Asset Management (WIRAM).

Engineers Canada is working to increase the representation of women within engineering through its 30 by 30 initiative. This initiative, first conceived by the Association of Professional Engineers and Geoscientists of Alberta (APEGA) in 2010, was adopted by Engineers Canada as the national goal of raising the percentage of newly licensed engineers who are women to 30 per cent by the year 2030. Thirty per cent is universally held as the tipping point for sustainable change—reaching 30 by 30 will help drive the shift in the overall membership of the engineering profession as more and more women continue to enter the profession.

As part of its mandate WiAM NA is developing an inaugural global mentorship program for IAM, something that will be highlighted

during the upcoming IAM North American conference in Denver, Colorado in October.

As co-chair of IAM's diversity and inclusion committee, Chau feels this is the next step in an overall global diversity and inclusion program.

educating members about their “piece of the bigger picture of asset management” to show how their role fits into the larger asset management field, as expansion of the asset management network, as the future of asset management industry will be moving

“Because we enjoy each other’s ideas, we want to encourage other women to get involved in strategic asset management, share our experiences, develop the way forward for our profession—and sometimes we need to challenge behaviours together.”

“We need more of D&I as the infrastructure asset management industry heads into the next phase globally,” says Chau, who notes that the 2023 event will be held in Canada.

“D&I including true collaboration in thinking allows for true optimized evidence (values)-based values decision-making.”

Goals for the mentoring program include

towards formalization of the profession and leveraging global best practices across different intensive sectors, and access to resource materials to enhance career advancement opportunities. 🍁

John Tenpenny is the editor of ReNew Canada.

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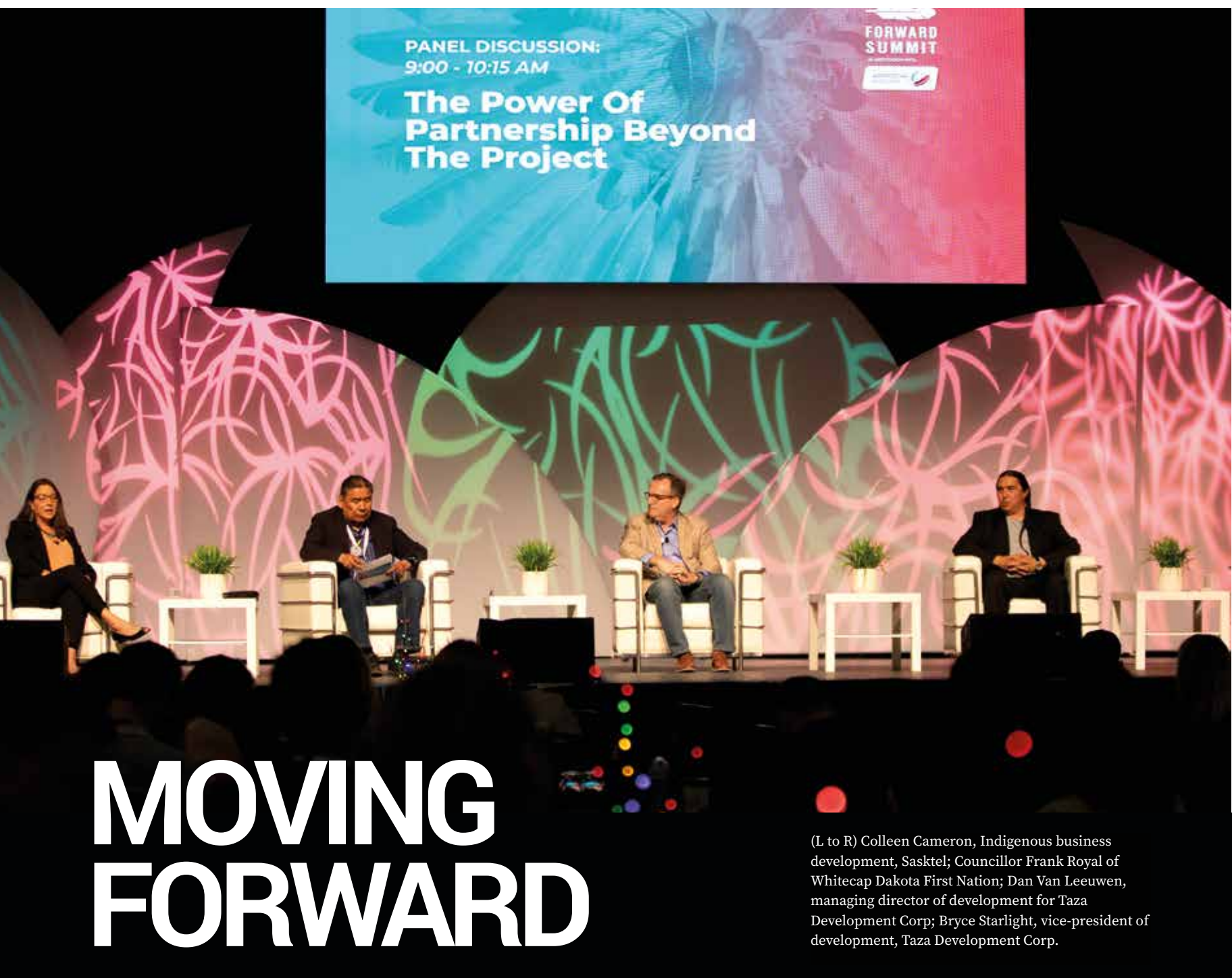
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MOVING FORWARD

(L to R) Colleen Cameron, Indigenous business development, Sasktel; Councillor Frank Royal of Whitecap Dakota First Nation; Dan Van Leeuwen, managing director of development for Taza Development Corp; Bryce Starlight, vice-president of development, Taza Development Corp.

The power of partnership takes centre stage at Forward Summit 2022

By Andrew Snook

The Forward Summit 2022, in association with the Canadian Council of Aboriginal Business, featured a panel that focused on the value of true partnerships between industry and Indigenous communities.

The panel, “The Power of Partnership Beyond the Project,” focused on the long-term partnerships involved in two projects: a collaboration between Whitecap Dakota First Nation and SaskTel to bring access to fibre-optic broadband service to the community of Whitecap Dakota First Nation in Whitecap, Sask.; and the Taza development project, a massive First Nations redevelopment project on 1,200 acres of Tsuut’ina Nation land in the Calgary area involving a

partnership between the Nation and real estate developer Canderel to build a major commercial development.

The session was moderated by Tim Coldwell of Chandos Construction. The speakers were Councillor Frank Royal of Whitecap Dakota First Nation; Colleen Cameron, Indigenous business development, Sasktel; Dan Van Leeuwen, managing director of development for Taza Development Corp; and Bryce Starlight, vice-president of development, Taza Development Corp.

The first questions posed by Coldwell was, “How did you develop a vision for what you want it to achieve for the project, and what checks and balances or governance did you put in place?”

The first speaker to answer was Starlight, the Tsuut’ina Nation’s representative leading the long-term economic development mandate for the Taza development project.

“When we first went out to the market looking for partners for land development, we were focused mostly on true partnership, genuine partnership,” he said. “What we didn’t want to do was engage with a developer who was going to have us sit in the backseat while they did all the driving and gave all the directions. We wanted to actually actively participate in the design, the development, the creation of that vision, and then also the ownership on a long-term basis.”

Starlight added that one of the major impediments for many First Nations looking

to take on larger infrastructure projects is a lack of access to free capital.

“So, the partner that we brought to the table had to realize that and had to be willing to put up that that risk, while we put up the land as our own equity investment,” he said. “Being able to have that type of partnership where we both equally took on the risk, and we really took on the rewards was extremely important.”

The Tsuut’ina Nation also wanted to ensure that the development wasn’t a typical development you would see in Calgary or Edmonton or downtown Toronto.

“We wanted it to really speak that you’re on Nation land. This is a First Nation development and it’s not just about painting beads and feathers on the side of the building, but it actually integrates the culture, the tradition, and the ability for the Nation to have that ownership and have its members working there, both on a short- and long-term basis.”

Van Leeuwen says too often developers look at developing on First Nations land come in with the wrong approach.

“I think a lot of other developers look at developing on First Nations as we’ll come in, show you what to do, tell you what to do, and

if we make money, we’ll share some. I think that’s a flawed beginning and a flawed start,” he said.

Van Leeuwen says Canderel took the approach from the very beginning that things had to be set up equally.

“And then from that point forward, you start to say to yourself, ‘Well, what does equal vision and equal opportunity mean?’

“The idea is not to pull the money off this project so that it leaves the community. The idea is to make sure that this partnership truly is an inclusion,” he said. “We have a saying together at Tsuut’ina, and it’s more than just together in terms of Tsuut’ina and Canderel. We want to see everybody locally, regionally, and further, not only come to get a benefit from being on the Nation, but also benefit

“What we didn’t want to do was engage with a developer who was going to have us sit in the backseat while they did all the driving and gave all the directions.”

You know, the Nation has a tremendous value in their land. We, as a company, have a tremendous access to capital. How can you bring those things together to create an equal benefit?” he said.

Van Leeuwen said the benefits from the project need to come back to the Nation for a long-term reward.

back to the Nation for the long term. Our partnership, its first term is 40 years. I think if there’s any developers in the room, they would call us crazy. But we said, let’s set this out to have a long-term vision. That is what is making the partnership run well. It’s governed by a board of equal Tsuut’ina and Canderel. We have a dispute mechanism that we



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could put in, but we've never had a dispute because we've set it up on that basis."

Councillor Royal said the collaboration between Whitecap Dakota First Nation and SaskTel was vital for the future development of the Nation for the casino and resort, residential development, as well as the development of new twin arenas. He added that having a

executive supporting the project acknowledged early on that it needed to have a core group of people who are Indigenous and who understood Indigenous and First Nations communities.

"As a result, we've been able to create and develop some amazing partnerships and have that long-term vision and that strategy

a golf course, hotel, and a sub-development.

"But in order to have all that, they needed to have some infrastructure. And that partnership went together in terms of having that dialogue, we at SaskTel ensuring that we follow their vision, and we have those checks and marks in balance that we could identify and work with them and bring that construction to the community," Cameron said, adding that now all community members have access to fibre-optic broadband service technology, which creates opportunities for the Elders and the youth.

The recent developments at the Nation have resulted in about 800 jobs between the casino, golf course and hotel, and more potential jobs could be created through the development of the twin arenas, a spa resort, and future residential projects.✶

"That is what is making the partnership run well. It's governed by a board of equal Tsuut'ina and Canderel."

strong internet infrastructure for business, and community was needed throughout the COVID-19 coronavirus pandemic.

"Before the pandemic we were having monthly Elders lunches. During COVID, we turned to Zoom with the Elders and bought them all iPads," he said, adding that the internet infrastructure was also vital for e-Learning.

SaskTel's Cameron said that the company's

together with our customers and the communities," she said.

The relationship between Sasktel and Whitecap Dakota First Nation has been developing over the past 20 years. About 15 years ago, the Nation built a cell tower with Sasktel as part of its long-term vision for economic growth. The internet infrastructure was another major step for achieving the Nation's long-term growth, which also includes

This is an edited version of an article originally published in the July/August issue of Rock to Road.



Andrew Snook is a freelance business-to-business writer based in Mississauga, Ontario.

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RCCAO congratulates Premier Doug Ford on his government's new mandate and all MPPs who will have the honour of representing the people of Ontario at Queen's Park. RCCAO is eager to continue its collaboration with elected officials and all levels of governments to ensure critical infrastructure is built.



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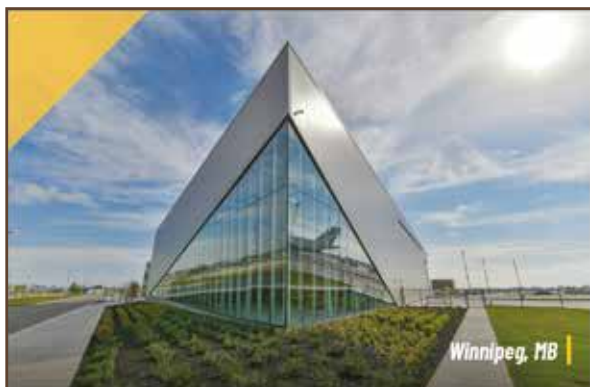
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The Heart of Edmonton

The Groat Road Bridge spans the North Saskatchewan River and is in the heart of Edmonton. The bridge rehabilitation replaced the existing haunched concrete girder bridge built in 1955 with a new haunched steel girder bridge. The new bridge carries four lanes of traffic with a widened sidewalk across the river. Demolition of the existing bridge began in May 2018 with the new structure being opened to traffic in October 2020. The project received a 2022 Award of Merit from the Consulting Engineers of Alberta in the transportation infrastructure category.





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The stainless-steel system designed for the Fort McMurray #468 First Nation water pump station was constructed quickly with an aesthetically appealing design, which was important to residents in the community.

BUILDING FOR THE FUTURE

First Nations community gets first-rate water treatment facility

By David Horton

Since the 1970s, the Canadian government has promised to provide communities living on First Nation Reserves with the same quality water and wastewater systems used by most Canadians, but progress has been slow. Many First Nation communities continue to live under drinking water advisories while the government works out plans to build water and sewage facilities that will raise their standard of living.

While many indigenous communities wait for water service improvements, residents of the Fort McMurray #468 First Nation recently witnessed the construction of a water reservoir and pump station on their reserve that will deliver clean, reliable, potable water to their nearly 600 residents. The pump

station, scheduled for completion in early 2022, is part of an infrastructure project that will bring life-changing water and sewage service to the area, improving the quality of life for residents and creating community and economic development opportunities.

Meeting community goals

In 2016, the Nation engaged McElhanney, an engineering and land surveying firm based in Western Canada, to establish a water and sewage service plan to help meet the community's goal of achieving social, environmental, and economic sustainability for seven generations.

At that time, residents received water and sewage servicing via a truck haul system. Al-

though well-intentioned, this system could be unreliable. It limited development opportunities, and due to significant handling requirements, increased health, and environmental risks. The Nation had a vision for a new future that included secure, reliable, and safe drinking water and sewage servicing for all its members—and in 2016 they acted.

Around this time, the neighboring Regional Municipality of Wood Buffalo (RMWB) was interested in constructing a regional water and sewage system in the area, which could also be adapted and extended to provide the Nation service access. After evaluating options, the Nation selected a servicing plan that involved connecting to the RMWB system and constructing an on-reserve water reservoir



First Nations' leadership, including chief, councilors, and administration, join representatives of Chandos, the general contractor, at the golden shovel project groundbreaking ceremony.



Members of the construction team take time out for a photo on site.



In all, more than 50 prefabricated spools – some of which are pictured here – were delivered to the site.

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and pump station to meet the local community's needs. The pre-existing relationship between the Nation and the surrounding RMWB was strengthened during this process, advancing the spirit of collaboration and mutual support between them.

According to McElhanney project engineer Andy Tenham, overall project manager, project engineer, and project coordinator, "This was a traditional project with extraordinary impact."

With this facility, "This community gets drinking water that is safe and reliable, as well as fire protection, for years to come," he said. "For the Nation, this could drastically improve their quality of life and opportunities"

Local engagement

Construction on the pump station began in the summer of 2020 as part of a broader infrastructure plan to be carried out on both federal and provincial land. The project comprises a new potable water reservoir and pumping station, water distribution piping, sewage collection piping, a retrofitted sewage lift station, and a new sewage force main to the RMWB regional infrastructure.

As with many projects with complex funding mechanisms and multiple stakeholders, working out the pre-construction project details took more time than expected, which meant the general contractor, Chandos Construction (mechanical sub-contractor Gold-

conferencing to virtually work through the project design. Together, the team was able to identify assembly issues and resolve them before construction began.

"Victaulic was really focused on minimizing waste," McInroy said. "When we were in

"Not only are we securing safe drinking water for our present and future generations, but we are also providing Nation members like myself with the opportunity to start a career in a vitally important field."

bar Contractors Inc.), started work on the project slightly behind schedule.

According to Goldbar project manager Chris McInroy, working with Victaulic helped make up for lost time. The Victaulic Virtual Design and Construction (VDC) team expanded on the 3D design files produced by McElhanney and generated detailed models that were shared with Goldbar via video

the design phase, there was overhead piping running above some large 12-inch suction lines for the pumps. There was no way to see how operators would be able to access the valves above the suction lines within the model." The VDC team pointed out the issue and suggested a design change that rerouted the piping, simplifying maintenance and eliminating a safety risk.



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VDC's drawing changes made it easy for Goldbar to make a case for changing the original design. "Once they modified the piping, I could take screenshots and send them to the engineer to explain why we wanted to relocate some of this piping," McInroy said.

With the final design changes approved, prefabrication began. VDC coordinated with the Victaulic manufacturing facility in Edmonton, Alberta to ensure all the components were fabricated and prepared for shipment.

Victaulic provided a full stainless steel piping package for aboveground piping from three-quarter inch through 12 inch that connected to four pumps installed onsite. In addition, multiple flow control solutions were provided, including hydraulic control valves, stainless steel butterfly valves, and three-way actuated stainless steel butterfly valves. In all, more than 250 couplings were assembled on more than 50 prefabricated spools.

"It was a big weight off my shoulders," McInroy said. "Having these items broken down into manageable spools that were palletized and itemized made it easy to stack them in the building and have everything available as we needed it."

Receiving the prefabricated material this way also simplified the process of moving some of the larger components down a stairwell and into a basement where they were to be installed.

"Our typical method of installation would have been to weld fittings," McInroy said, which would have seriously compromised the ability to meet the project schedule. Breaking down the assemblies into more manageable lengths would have required more flanges, more welding, and more time. It also would have required skilled welders. "Being able to break the spools down into manageable pieces definitely made it easier for our guys to handle the material," he said.

Even though McInroy knew the grooved couplings would deliver efficiencies, the time required for the crew to install the piping exceeded his expectations. "The installers found it very easy to make adjustments," he said, and that made it possible to complete the entire installation with only two journeyman plumbers. "Being able to reference the VDC and McElhanney drawings and simple instructions made for a very positive experience," McInroy said.

In fact, the piping was installed in only a few days, enabling Goldbar to make up for much of the delay incurred at the front end of the project and finish the process piping construction in a significantly compressed schedule compared to the schedule assumptions at the time of bid.

The most significant outcome of this project is the win for the community, but from an engineering perspective, it is always a challenge to retroactively install major civil works into an existing residential/urban setting. Water and sewer servicing is an "earthworks heavy" type of project, and although having water and sewage services are enormously advantageous in the long run, project execution is invasive. Anything that can be done to speed up the construction phase translates into real quality of life improvements and reduced impact on the community.

It is equally important to design such that maintenance is minimized. "For municipal engineering, long-term maintenance is the second most important thing we design for," Tenham explained, and on this project, "Victaulic components certainly contributed to achieving our goals of quick installation



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and minimizing the Nations long-term maintenance”

The stainless-steel system designed for this installation was not only constructed quickly, it also is aesthetically appealing and neat, something that was important to residents in the community, according to Tenham, who noted that making sure the local community was pleased with the result was important to McElhanney and to him as the project engineer.

Throughout the duration of the project, Chandos made it a priority to offer employment and related support to local Nation youth, both through direct employment and by engaging local contractors.

According to Chandos project manager Ben Blakney, the company was happy to be part of this project. “Chandos is proud and honoured to have partnered with the Nation in delivering such an important project” he said. “For us to have been able to deliver such critical infrastructure, while also exposing [through direct employment] several local Nation members to a variety of jobs that went into this project is very satisfying. It was a really good experience for them, and now they can always know they were part of this story.”

Because the Nation will own and operate the water and wastewater systems, community members will have to be certified for specialized work. Underscoring its commitment to the Fort McMurray #468 First Nation community and its future, McElhanney jump-started this process by establishing an annual \$5,000 scholarship for operator training.

This opportunity was a welcome one for the community. According to Corey Wiltzen, Nation member and water plant operator trainee, “It is a major accomplishment for the Nation to complete a project of this scope and magnitude. Not only are we securing safe drinking water for our present and future generations, but we are also providing Nation members like myself with the opportunity to start a career in a vitally important field.”

Realizing a dream

“After many years of hard work, the Nation will finally be able to see this long-awaited goal come to fruition. Watching the Nation take pride in a functional and good looking pumphouse—which I know is also high quality—after all these years, is very satisfying,”

Tenham said. “There was a lot of hard work the Nation did from the very beginning, and this has been one of their goals for a very long time” he said. “With the completion of this project, they’ve been set up well for their next success story.”

Steve Jani, the Nations’ acting chief sustainability officer and project owner agreed that the safe drinking water and career opportunities for Nation members delivers value to the community. He also pointed out the significance of the project being completed on time and on budget and noted that “the dedication of our contractors and vendors,” was a critical element of the project’s success.

“Working together in unison to create a better environment in regard to public works, water, and sewer has been a great accomplishment between the Nation and its vendors/contractors,” Jani said. “Kudos to all the teams involved in progressing this upgrade to the community.” 🍁



David Horton is Alberta territory manager for water/wastewater/infrastructure with Victaulic.

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Climate adaptation and resiliency strategies are needed, especially considering last year's severe flooding in B.C., which left behind heavy damage to roads and bridges.

CLIMATE CHANGE WON'T WAIT

Getting started on climate adaptation and resiliency plans *By John Estey*

Climate change is here to stay, and its impacts are creating different challenges for communities across Canada. From flooding to wildfires, the impacts of climate change can result in devastating damage to physical infrastructure and cause major disruptions to the supply chain and daily lives of residents. Rebuilding and recovering are often a slow and costly process. So, how can local governments better prepare to withstand more frequent and intense weather?

Climate adaptation and resiliency strategies enable local governments to build or upgrade community infrastructure so it can withstand the impacts of extreme weather or temperatures in a future where extreme is the new normal. With climate changing at a pace ten times faster than ever before, stewards of public infrastructure can't rely on historical weather data and traditional approaches to form their planning assumptions. Local governments today need to

look ahead to predict and prepare new, sustainable strategies for the future.

Climate adaptation and resilience planning

The Government of Canada released its strengthened climate plan, *A Healthy Environment and a Healthy Economy* in December 2020. As part of this plan, it committed to developing Canada's first *National Adaptation Strategy* in partnership with provincial, territorial, and municipal governments, as well as Indigenous Peoples and other key parties.

This commitment resulted in identifying new actions to build resilience and mitigate the impacts of climate change by:

- Translating scientific information and traditional knowledge into action;
- Building climate resilience through infrastructure;
- Protecting and improving human health and wellbeing;
- Supporting particularly vulnerable regions;

- Reducing climate-related hazards and disaster risks.

Scheduled for release by the end of 2022, this national adaptation strategy will be a valuable resource to inform and support local governments and other organizations in pursuing their adaptation and resiliency efforts. This strategy, and others, are supported by record levels of capital investment at both the federal and provincial levels. Many local governments have already prepared, budgeted, and prioritized adaptation and climate resiliency plans—while others, at their own peril, have done very little in this regard.

Resilience planning and resources

Author and futurist, Jamais Cascio summarizes the goal of resilience planning perfectly. He believes, "Resilience is all about being able to overcome the unexpected. Sustainability is about survival. The goal of resilience is to thrive." This is something that local

governments need to consider when re-evaluating community infrastructure. Can all built assets withstand changing climate and extreme weather events? Can the existing infrastructure continue to perform throughout its full design life? Does planned infrastructure include future weather considerations? Will essential services be compromised, and will transportation networks and supply chains be disrupted? Will public safety be at risk?

It's a case of investing relatively little now to prepare for the inevitable or reacting to a weather event that is likely to result in greater, wide-ranging costs in the future. Local governments need to consider potential climate impacts specific to their geography, their capacity to respond to weather events, the resources available to improve resiliency measures, and their ability to normalize climate adaptation in day-to-day operations and services.

In addition to acting themselves, local governments can also consider regional collaboration, as localized adaptation measures may have far-reaching, and potentially negative, impacts to neighboring communities. By including regional perspectives, local governments can create synergistic opportunities by strategically aligning with nearby jurisdictions, particularly when it comes to securing funding from higher levels of government or elsewhere.

Implementing climate adaptation and resiliency is a multifaceted journey. A recent publication by Environment and Climate Change Canada entitled *Talking it Through: A Discussion Guide for Local Government Staff on Climate Adaptation* suggests the following steps to get started:

- Research and initiate the climate adaptation process;
- Identify climate change impacts and conduct a vulnerability and/or climate risk assessment;
- Determine suitable actions, programs, policies, and processes to adapt to the impacts of climate change;
- Begin implementing actions and/or a climate adaptation plan;
- Monitor and evaluate the implemented actions or climate adaptation plan.

The activities that inform these steps are critical and may require substantial effort depending on regional interactions, organizational maturity, and the number of physical assets that a local government has within its purview.

Three key tasks all local governments or multi-asset organizations need to develop before they can get started are:

1. An asset management framework



Crews working on the Jessica Bridge located on B.C.'s Coquihalla Highway after severe weather events ravaged the province last November.

A detailed inventory of existing assets is the ideal starting point. Understanding the role and interrelationship of infrastructure types, and the broader systems that they support, facilitates prioritization, as does knowledge of each asset's condition, remaining life and replacement value. Given that this is such a critical element to developing a solid adaptation strategy, local governments and organizations without an asset management framework, or the capacity or tools to implement one, are advised to seek external guidance and support.

2. An expert-informed climate risk assessment

With a prioritized list of assets in hand, local governments can then evaluate the impacts of climate risk on infrastructure that is deemed high-priority or critical. Through a vulnerability assessment, asset owners can draw on the specialized expertise of climate scientists and infrastructure engineering professionals to identify and mitigate risk to vulnerable assets. The PIEVC Protocol is one of the more prominent and formal tools engineers use to assess infrastructure vulnerability and identify climate adaptation measures.

3. A strong project governance framework

With a confirmed list of priority infrastruc-

ture adaptation projects established, the next step is to evaluate the capacity and ability of internal staff to take on this program of work. With multiple internal and external stakeholders typically involved in the implementation of a climate adaptation strategy, having a clear project governance framework is fundamental to its success. A project governance framework provides organizational structure across multiple teams to facilitate collaboration, accountability, and timely decision-making.

With these three steps, local governments are better informed and prepared to develop a strong climate adaptation strategy. Climate change impacts are not going to decrease anytime soon, but there are resources available to support organizations of all sizes as they take on this important issue. By investing in climate preparation and mitigation planning now, local governments are making the clear choice to adapt and overcome the challenges ahead. 🍁



John Estey is director of infrastructure services, Western Canada with Colliers Project Leaders.

POWER SUPPLY

Calgary's Bonnybrook Cogeneration Expansion project turns waste gas into power *By George Koch*

Sewage treatment generates large volumes of gases as solids are broken down by bacterial and physical action. This “biogas”, full of impurities, was historically allowed to vent into the atmosphere, contributing to the malodorous air long associated with wastewater treatment. More modern wastewater facilities capture and safely incinerate or “flare” their biogas. In recent years, some plants began adding portions of their biogas to commercially sourced natural gas and burning the mixture to produce steam or modest amounts of electricity, while still flaring most of their biogas. Calgary's Bonnybrook Wastewater Treatment Facility is one such site.

Today, Bonnybrook is taking biogas handling to the highest level: using all its biogas as the primary fuel source to meet its needs for electric power and industrial steam for its advanced treatment process. The Bonnybrook Cogeneration Expansion Project was handed over to the City of Calgary in July. It is a first in Canada.

“This project is aligned with our corporate energy plan, which includes conserving energy, improving efficiency and reducing greenhouse gas emissions,” says Jifan Liu, the City of Calgary's project manager. “It will help in that manner and is the best way for us to do it. Biogas is a by-product of our wastewater treatment process, so we have the biogas. We should harness it to no longer flare and use it to produce energy. Otherwise, it goes to waste.”

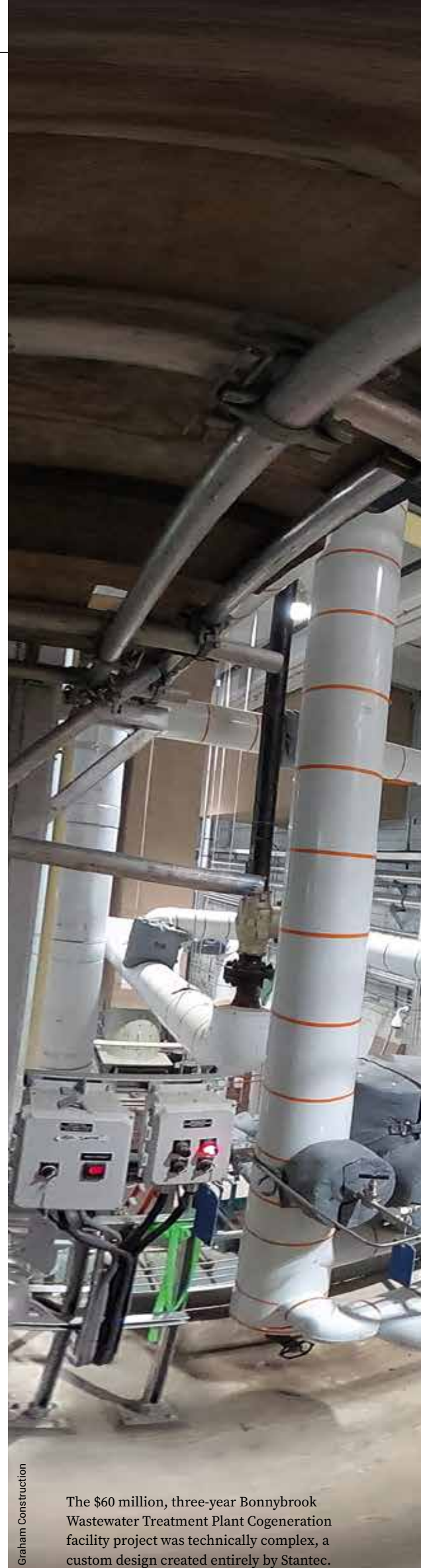
Graham, who has delivered numerous other projects at Bonnybrook, was the general contractor and Stantec was the designer and lead consultant on the \$60 million, three-year project. The ambitious project was technically complex, a custom design created entirely by Stantec, introduced a new operations concept for the Bonnybrook wastewater team, required vendor-packaged equipment sourced from around the world, and during construction was severely burdened by the effects of the COVID-19 pandemic.

Meeting these challenges and keeping the project moving forward required close cooperation and a goal-oriented focus among the design, construction, and City of Calgary teams. All three parties say that an antagonistic approach by anyone would have derailed the project more than once. Instead, it became a case study in applied cooperation.

“This facility is designed with a certain intent, and it's going to be run by the client, and so the collaborative approach we took to ensure we had a positive outcome is one that I'll take forward to future projects,” says Andrew Buchner, Stantec's B.C. practice lead for water, and resident engineer for the project. “It's the only way I see to commission a complicated project, especially one that is unique to all of the key parties.”

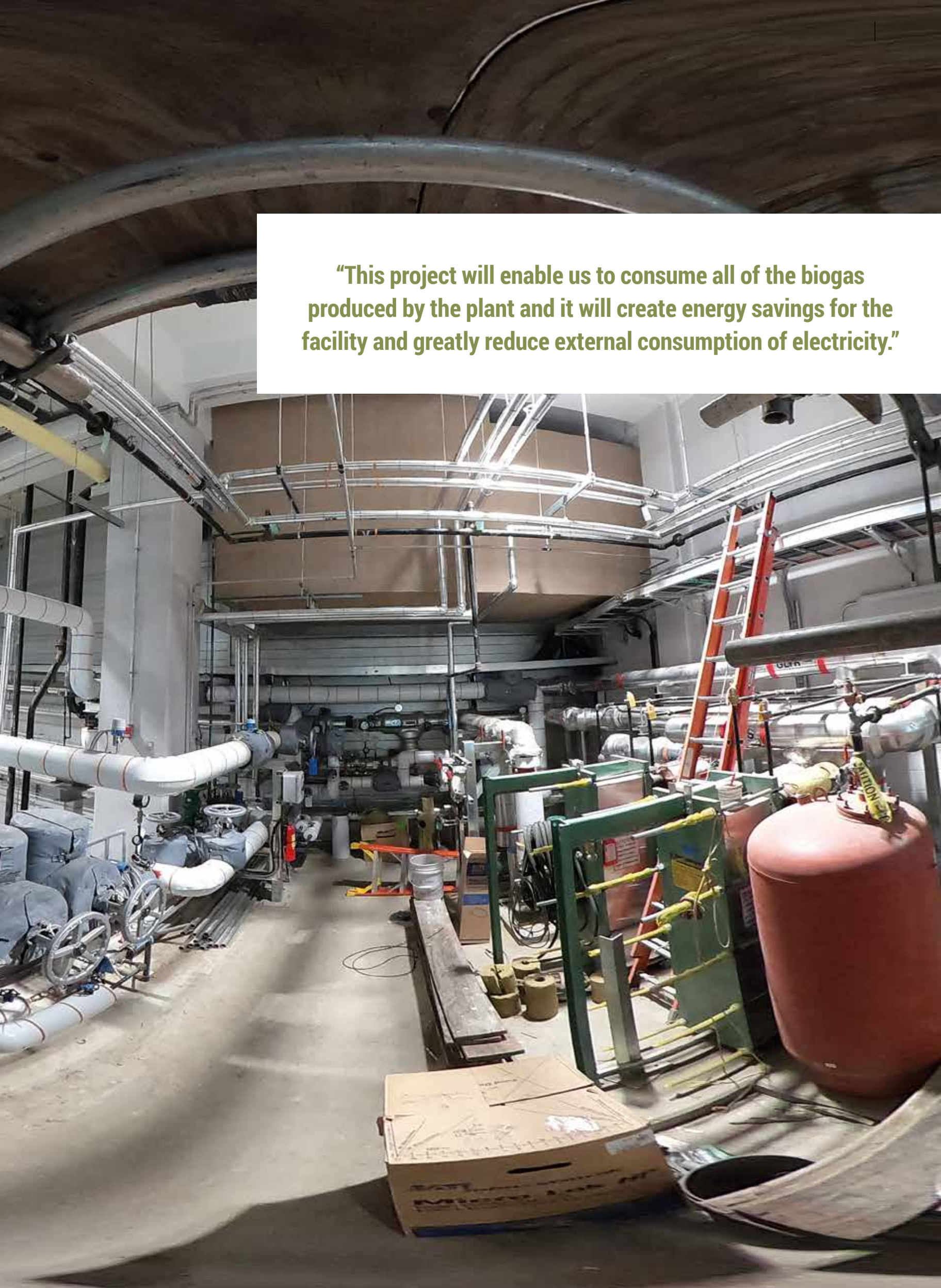
Technical complexity

Although Bonnybrook's new cogeneration facility is small by power plant standards, its technical complexity is greater than that of



Graham Construction

The \$60 million, three-year Bonnybrook Wastewater Treatment Plant Cogeneration facility project was technically complex, a custom design created entirely by Stantec.

The image shows the interior of a large industrial facility, likely a wastewater treatment plant. The ceiling is high and features a complex network of white pipes and metal trusses. In the foreground, a large red gas cylinder stands on the right, with a yellow caution tag attached. To its left is a green metal frame structure. The floor is concrete and cluttered with various items, including a large cardboard box in the lower center, a long metal beam, and some yellow containers. In the background, more industrial equipment, including large tanks and pipes, is visible. A red ladder is leaning against a structure on the right side. The overall scene depicts a busy industrial environment with ongoing work or maintenance.

“This project will enable us to consume all of the biogas produced by the plant and it will create energy savings for the facility and greatly reduce external consumption of electricity.”



The City of Calgary's Bonnybrook Cogeneration Expansion Project takes biogas handling to the highest level: using all its biogas as the primary fuel source to meet its needs for electric power and industrial steam for its advanced treatment process.

a commercial gas-fired electrical generating station with 100 times the output. The power plant provides both combined-cycle power generation and cogeneration of power and heat.

"Cogenerations of power and steam is totally different from wastewater treatment, which is the facility's core business," says Liu. "It is technically complicated and there are a lot of components that all need to work together. Our technology goals were significant, and we are using the most advanced gas turbine, steam turbine, and the latest biogas conditioning and water treatment systems."

The intricacies include the capability to handle an adjustable fuel mix of biogas and commercial natural gas. Because biogas production varies greatly along with wastewater treatment volume, a low-pressure biogas storage bubble was included. Even then, however, some natural gas will be required from time to time. On the other hand, the power plant must also satisfy regulatory requirements that it always operate with at least some biogas; it is not allowed to operate entirely on natural gas.

A Solar Turbines Inc. Centaur 50 Gas Turbine-Driven Generator Set (CTG) gas combustion turbine is coupled to a generator producing 4 MW of power. All waste heat from the CTG is cycled through the Heat Recovery Steam Generator (HRSG) where steam is produced. That steam is then either sent to the

Steam Turbine Generator (STG) to create additional power or, will feed the future thermal hydrolysis process (THP) facility—part of Bonnybrook's Plant D expansion—that will make waste solids more digestible and, in turn, produce even more biogas. The Steam Surface Condenser (S.S.C) condenses all excess steam not used by the STG or THP, and exhaust steam from the STG back into feed-water. A gas-fired steam boiler is included to provide a backup steam source. Incoming or "makeup" water for steam production also requires complex purification. Gas compression and chemical feed systems are further elements.

"This plant has a lot of features, so for an engineer it was extremely interesting," says Kyle Jensen, Stantec's electrical and process design engineer. "Using biogas as a fuel is interesting. It only contains about half the energy of commercial natural gas. And it comes with a host of impurities, including highly toxic hydrogen sulfide, or H₂S, which requires careful handling."

For safety and to avoid damaging the turbine, the process design includes sophisticated gas conditioning, cleaning, and dehydration to remove impurities such as siloxane, housed inside a robust blast-proof gas conditioning room. H₂S, however, remains part of the fuel inlet stream and is safely incinerated during engine combustion.

The complex design, in turn, required so-

phisticated electrical and control systems, including a motor control system, switchgears and cabling room. The new plant had to be integrated in three different ways: with Bonnybrook's wastewater treatment system, with its existing reciprocating-engine cogeneration plant, and with the facility's power system, which draws from Alberta's electrical grid. "You have three different power sources all producing electricity, that all have to 'talk' to each other through the power control system," notes Cedric McIntosh, Graham's project manager.

COVID issues

Following several other completed and on-going projects at Bonnybrook—New Headworks Building, Plant B & C Upgrades, Plant D Expansion, and numerous smaller projects—Graham submitted its bid for the Cogeneration Facility and received notice to proceed in July 2019. Construction began that October and the technical complexity immediately made itself felt.

"There was a lot of research and development as we went, there were a lot of changes as we went, and we had to do a lot of work to optimize the schedule to fit the changes and work with the consultant and owner to end up with a product that is useful," recalls McIntosh. This stemmed from the fact that a lot of key technical information wasn't initially available to Stantec. "The team solved

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a lot of problems during the project,” says McIntosh. “It required people recognizing the challenges, where they came from and how we could all work together in good faith to solve each challenge towards a favourable outcome. A lot of that success has to do with the relationship we have with the city and with Stantec.”

The pandemic’s arrival in March 2020 caused immense problems. In addition to the by-now familiar productivity-sapping effects of working under COVID protocols, supply chain issues hit this project particularly hard. Equipment was being sourced from Canada, the U.S., Mexico, Switzerland, India, and other countries. “We had a truly international supply chain, with things coming from all over the world, and certain factories around the world simply shut down in the pandemic, and so there were serious challenges in getting equipment,” says McIntosh. In addition to serious delays in fabricating and shipping the physical items, vendor reviews of shop drawings and vendor site inspections were all delayed, cancelled or had to be moved online.

“The supply chain issues related to COVID were some of the biggest challenges,” agrees

Stantec’s Buchner. “The issue-for-tender design was based on certain vendor packages and assumed pieces of equipment, but we did not even get pricing from some of the intended vendors.” Having to switch vendors mid-stream contributed to significant delivery delays on some of the large equipment packages. Equally bad were unforeseen—and continuing—shortages of entirely mundane items. “Off-the-shelf things like 1-inch valves were suddenly requiring 20-week lead times,” Buchner says, further complicating construction and now, the commissioning process.

Stantec and Graham initiated numerous design review and execution meetings, held along with the City of Calgary. “The city recognized that a lot of the challenges weren’t a mark on the people doing the work, but were about the nature of the project,” says McIntosh. A decision that proved highly beneficial was to separate the discussions over cost increases from those related to executing the project and keeping it moving. Liu agrees: “Overall we have very good teams from Stantec and Graham, and they have been very cooperative with the city.”

Creative thinking was applied to re-se-

quence equipment installation and other key tasks. Under normal sequencing, for example, large equipment packages are placed on-site, and the building envelope is later constructed around them. But when delays on certain packages like the steam turbine generator threatened to halt the entire project, Graham decided to leave a large gap in the building’s second-floor envelope. Once the package finally arrived, it was craned into position, inserted, and placed inside on its skid mounts, after which the building was enclosed.

While delivering the Bonnybrook Cogeneration Expansion Project has been a complicated and difficult process, Liu is excited by what the new facility will deliver. “This project will enable us to consume all of the biogas produced by the plant,” he says. “It will create energy savings for the facility and greatly reduce external consumption of electricity, which will reduce our power bill, and also improve the overall reliability of our power supply.” ♣

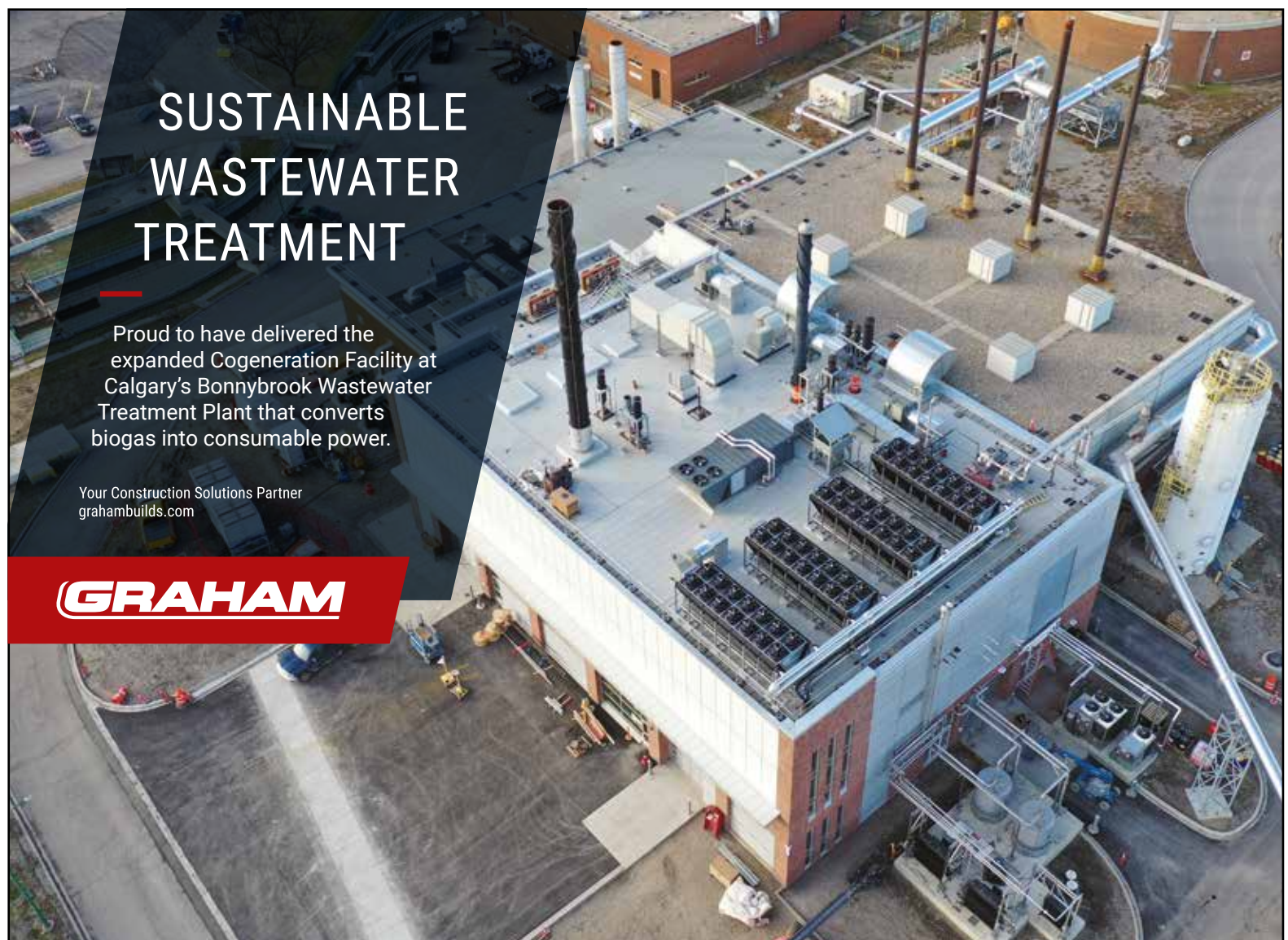
George Koch is a researcher and writer based in Calgary who has written extensively about construction and public infrastructure.

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Annacis Island Wastewater Treatment Plant

2022 Top100 Projects Rank: 55
Value: \$1.27 billion



A project is underway at Metro Vancouver's Annacis Island Wastewater Treatment Plant to increase capacity and enhance seismic resiliency at the world's largest trickling filter solids contact wastewater facility.

Part of a multi-year program of over 20 projects to expand the capacity of the plant, the newly initiated project involves the design and construction of two new trickling filters and an associated pump station. The plant's four existing centrifuges will be replaced with new, larger capacity units to improve dewatering output and avoid a costly and invasive dewatering building expansion. Additionally, a modern maintenance workshop will be built so that staff can maintain the expanded facility.

Detailed design and construction engineer-

ing services are being delivered by Brown and Caldwell. As prime consultant, Brown and Caldwell will lead program, project, and quality management; and construction management. Major sub-consultants EIC Solutions, Kohn Crippen Berger, and J.L. Richards and Associates will provide electrical/instrumentation and controls, geotechnical and hydrogeological, and architectural design services respectively.

A critical early component of constructing the new assets entails extensive ground improvements to improve seismic performance. The complex groundwork includes risk mitigation, geotechnical, and resiliency considerations to protect existing structures and utilities during installation. Paramount to the project's success is carefully sequencing of con-

struction activities to maintain plant integrity and minimize operational disruptions during site works.

"We commend Metro Vancouver's unwavering commitment to environmental stewardship while continuing to serve its communities through innovative and sustainable practices," said Brown and Caldwell program manager Mike Thorstenson. "Our team relishes the opportunity to help write the next chapter of this monumental expansion and maintain the Annacis plant as a premier North American treatment facility."

Once complete, the suite of upgrades will increase capacity to serve approximately 1.6 million people. The new facility will be designed with future expansions and seismic resiliency in mind. 🍁



Port Hope Area Initiative

2022 Top100 Projects Rank: 54
Value: \$1.28 billion

Canadian Nuclear Laboratories (CNL) marked the completion of the Port Granby Project—undertaken as part of the Port Hope Area Initiative (PHAI).

The Port Granby Project involved the safe excavation and transfer of low-level radioactive waste from an unstable site to a newly constructed waste management facility.

Over 1.3 million tonnes of waste excavated from the Lake Ontario shoreline in Southeast Clarington is now safely stored in the engineered, aboveground storage mound that was

capped and closed in fall 2021.

"This remarkable achievement was brought to fruition through strong working relationships with our federal and municipal partners, with our contractors and suppliers, with many stakeholders who have an interest in the project, and with local Indigenous communities who care so deeply about the environment," said Joe McBrearty CNL president and CEO.

Construction of the storage mound began in 2016 and involved the installation of multi-layered base liner and cover systems to safely

isolate the waste from the environment. In November 2020, CNL completed the excavation and safe transfer of historic waste from the former site on the shore of Lake Ontario. Dedicated systems within the mound and around the perimeter of the facility will allow maintenance and monitoring of the facility's safety and performance for years into the future. 🍁

For additional details on this year's Top100 Projects report, visit top100projects.ca

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Gary Losier

The American Public Works Association (APWA) named **Gary Losier**, P.Eng., PWLF, of Quispamsis, New Brunswick, as its 2022-23 president.

Losier is the director of engineering and works for the Town of Quispamsis and has served in that capacity since 1987. He has been a member of APWA since 1995. He has been a director on the CPWA Board (2006-08) and the national CPWA president (2008-10). He currently chairs APWA's Strategic Planning Committee and is the board liaison to the CPWA Board.



Denis Thivierge

CIMA+ announced that **Denis Thivierge** has been named the firm's new president and CEO.

Thivierge joined CIMA+ in 2007 as vice president of the buildings sector for the Metropolitan Montréal Region before becoming a partner in 2008. He was given additional responsibilities in 2016 as director of the Montreal office and member of the executive committee. Since the fall of 2019, Thivierge has served as COO, while also assuming the role of interim CFO.

"I would like to thank the board of directors and outgoing president François Plourde for the confidence they have shown in me. I look forward to taking on this new challenge with the support of a strong management team to help carry out this mission," said Thivierge.



Shane Beazley

EllisDon announced the appointment of **Shane Beazley** to senior vice president of western operations, and **Ian Kerr** to senior vice president of western business development.

Beazley joined the EllisDon Calgary team in 2002 and was promoted in 2011 to operations manager, followed by vice president of operations in 2015.

"The growth of EllisDon in Western Canada is the result of the innovation and entrepreneurial enthusiasm of our people," said Beazley.

Kerr joined EllisDon in 2011 as a project manager at the Calgary office and transitioned to director of business development for the B.C. region in 2016 and was promoted to vice president in 2019.



Ian Kerr

PortsToronto announced the appointment of **Roelof-Jan (RJ) Steenstra** as its new president and CEO.

Steenstra comes to PortsToronto from Fort McMurray Airport Authority where he has served as president and CEO since 2016.

Steenstra will helm the strategic direction and operations of PortsToronto's various businesses which include Billy Bishop Toronto City Airport, the marine Port of Toronto, and the Outer Harbour Marina.

"The transportation of people and goods will be increasingly important in the months and years ahead as we emerge and recover, and I am convinced that PortsToronto has a significant role to play in providing connectivity, delivering economic benefit, and creating jobs to further entrench Toronto as a world-class city," said Steenstra.



Roelof-Jan (RJ) Steenstra



Carolina Rinfret

WaterPower Canada announced the appointment of **Carolina Rinfret** as the association's new president and CEO.

"Hydroelectricity has been the backbone of Canada's electricity supply for well over a century, and it will be key to our rapid but orderly transition to a very different energy system," said Rinfret. "I know the industry has the capacity for well-planned growth and integration, and I greatly look forward to working with members, governments and stakeholders to help make that happen."



Stephanie Smith

Candu Energy Inc. announced the appointment of **Stephanie Smith** as senior vice president of Engineering for SNC-Lavalin Group's Canadian nuclear business.

Smith was previously president and CEO at CANDU Owners Group- an organization of utilities worldwide operating the CANDU reactors. She also has extensive experience at Ontario Power Generation (OPG)—operator of the Darlington and Pickering Nuclear Generating Stations. Beginning at OPG as an entry-level systems engineer, she was promoted to progressively more senior roles. Most recently at OPG, she was deputy site vice-president of Darlington station.



Lincoln MacDonald

Morrison Hershfield welcomed **Lincoln MacDonald**, P.Eng., PMP in the role of national director, transportation design services.

MacDonald has over 30 years of progressive leadership experience with a portfolio of significant highway and roadway projects across Canada. These include major highways, interchanges, municipal infrastructure (water and wastewater) and roadways.

He has delivered projects using various delivery models, including traditional, design-bid-build, design-build, and construction manager/general contractor. He has also had an active role in the delivery of P3 projects in Ontario and New Brunswick.

"With his track record of successfully delivering major transportation projects, including highways, roadways, and transitways, Lincoln will be an asset to our team, progressing our strategy and strengthening client relationships," said Stan McGillis, vice president, transportation.



Julian Bartlett

Turner & Townsend announced the addition of **Julian Bartlett** as head of infrastructure, Canada.

Julian joins from the Turner & Townsend global head office in the United Kingdom where notably he served as head of cost and controls on the Crossrail project. Julian brings over 25 years of experience in commercial management from a wide range of infrastructure projects in the U.K.

"I am excited to join the Canadian business and look forward to bringing high value services to our clients. Together with our strong and talented team in our infrastructure group, it will be exciting to deliver on Canada's infrastructure goals in the coming years and decades," said Bartlett. ♣

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FCM ANNUAL CONFERENCE REGINA, SK

Municipal leaders from across Canada gathered for FCM's 2022 Annual Conference and Trade Show in Regina, Saskatchewan, in a hybrid model that brought the best of previous gatherings to life—in-person and online. Mayors, councillors, and representatives from all corners of the country engaged with national party leaders, heard from noteworthy keynote speakers, and discussed policy priorities that will help local governments drive the strong and inclusive recovery Canadians deserve.

"The past two years have only emphasized how important our communities are, both to our economy and our quality of life," said incoming FCM president Taneen Rudyk. "Building stronger, more inclusive, and more resilient communities everywhere in Canada is possible, but it will require unprecedented partnership among orders of government to tackle our biggest national issues, like our country's housing crisis. And municipalities are ready to do their part."

Over four days, more than 2,200 participants took part in Canada's fullest gathering of municipal leaders since



FCM's annual conference, held in Regina, SK, hosted 2,200 delegates over four days in the biggest gathering of municipal leaders since 2019.

2019. Themed *Together for Recovery*, the conference allowed local leaders to connect with their federal counterparts by hosting Prime Minister Justin Trudeau, Minister of Intergovernmental Affairs, Infrastructure and Communities Dominic LeBlanc, Marco Mendicino, Minister of Public Safety, CPC MP and Shadow Minister for Infrastructure and Communities Andrew Scheer, and NDP Leader Jagmeet Singh in a series of keynote addresses and meetings. FCM's conference also provided attendees the opportunity to gear up for Canada's recovery through

a trade show and numerous workshops focused on crucial municipal issues like housing affordability and rural growth—among others.

"Municipal leaders that gathered in Regina will go back home eager to drive Canada's recovery where it matters most: in our communities—where people live, work, and raise families," said Rudyk. "We know how important our role is, and we are determined to continue working with our federal partners to get things moving as quickly as possible, from coast to coast to coast to coast."

ACCELERATING TOWARDS NET ZERO PANEL TORONTO, ON

"Accelerating Towards Net Zero—Investing to Reduce Emissions for Infrastructure," a panel, organized by RICS and the Infrastructure Lab, discussed how private finance will play a critical role in accelerating progress to meeting Canada's goal to reach net zero emissions by 2050 for the built environment.

Moderated by Marie Foley, director infrastructure advisory services with BTY, the panelists included Steven Robins, head of strategy, Canada Infrastructure Bank; Tom Timmins, leader, energy sector, Gowling WLG; and Davinder Valeri, director, strategy risk and performance, CPA Canada.

Construction accounts for 40 per cent of global emissions, a proportion that has come under increased focus as the energy



(L to R): Tom Timmins, Gowling WLG; Steven Robins, Canada Infrastructure Bank; Davinder Valeri, CPA Canada; and Marie Foley, BTY.

sector switches to lower emitting fuel sources. Major infrastructure and buildings use vast quantities of materials like steel and cement in construction. Decisions made in design and construction have long lasting implications for emissions for buildings and infrastructure over many years. With the Canada Infrastructure Bank working to attract private capital, world leading institutional investors in infrastructure and real estate, different levels of government setting ambitious targets, and an increasingly active

infrastructure sector, there is growing momentum towards reducing emissions in the sector.

"We are investing \$35 billion in infrastructure to promote economic growth, connect communities and support climate action for the benefit of Canadians," explained Robins. "Our infrastructure partnerships are spread across the nation and reflect our priority sectors—public transit, clean power, green infrastructure, broadband, and trade and transportation."



THE GREEN WINDS OF CHANGE

By Mike Crawley

Offshore wind offers scale that will help drive down costs of hydrogen production overall.

It is virtually certain that the world will need greener power and zero-carbon fuels, like green hydrogen and ammonia, to decarbonize our economy.

With a largely untapped world-class renewable energy resource in our backyard, Canada must be at the forefront of the global energy transition.

Canada's coasts have some of the world's best resources for both onshore and offshore wind projects, though they have not yet been developed due to low demand domestically. However, by harnessing wind energy to generate green hydrogen, and condensing it into a liquid for export to Asia and Europe, project development becomes viable.

These are multi-billion-dollar projects that would generate economic growth—but only if we move fast enough to compete globally.

Countries and global industry players are racing forward with renewables projects that will generate green hydrogen and ammonia. If we don't act quickly, they will have secured market positions.

They're quickly looking for ways to use renewable power to produce green hydrogen and ammonia that can be easily exported.

It's time for Canada to get in the game.

If key players here can embrace entrepreneurial risk-taking and work in partnership, they can catalyze the emergence of an industry that will lay the foundation for a sustainable future.

Collaboration is key to making Canadian low-carbon hydrogen competitive.

Governments must build out a supportive and transparent regulatory and fiscal regime.

Natural Resource Minister Jonathan Wilkinson took significant steps forward this spring when he and his provincial counterparts in Nova Scotia and Newfoundland and Labrador gave new broader energy mandates to offshore regulatory boards that were previously focused on oil and gas.

Those boards must now move quickly to set licensing conditions that will allow the private sector to invest in projects. Years of data from oil and gas can be relied upon to fast-track regional assessment.

Direct funding by the Canada Infrastructure Bank for elements such as transmission lines would accelerate development, and clean energy tax credits could also facilitate support for future projects.

G7 leaders have underscored the need for secure and sustainable sources of energy to displace Russian oil and gas following the invasion of Ukraine.

This May in Berlin, G7 energy ministers highlighted two goals: accelerate compliance with Paris climate goals and enhance energy security through greater reliance on low-carbon sources.

Increasing use of renewable hydrogen and ammonia is “a key enabling step” towards decarbonization of our economies and enhancing energy security, the G7 ministers said in their communique May 27.

There is no better place to do this than Canada's east and west coasts, which offer perfect conditions for the development of large-scale wind projects that can be coupled with hydrogen and ammonia production.

High, steady winds could provide virtually

uninterrupted power. Shallow water and favourable seabeds are conducive to offshore construction. Both provinces have an existing energy services sector that can be deployed to support offshore renewable projects.

Hydrogen produced from renewable power and water yields no carbon emission. Nitrogen can be added to produce ammonia for ease of transport and fueling industrial applications, large transport, and power generation.

Offshore wind offers scale that will help drive down costs of hydrogen production overall.

With this potential at home, and our expertise both in onshore and offshore wind, we believe the time is now to produce the hydrogen and ammonia products that will be in high demand.

A generation ago, the federal government provided critical support and incentives for the emerging oil sands sector in Alberta. The future now belongs to those who can bring that same kind of vision and commitment to a low-carbon energy sector.

As we look to speed the clean energy transition, Canada's federal and provincial governments must be bold and determined. It's up to us to act now if we want to see Canada's renewable resources play an impactful role in building a sustainable future for generations to come. 🍁



Mike Crawley is president and chief executive officer of Northland Power Inc.



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