

WATER CANADA

CRUMBLING ASSETS

Cities Struggling to Fund Water Asset Maintenance

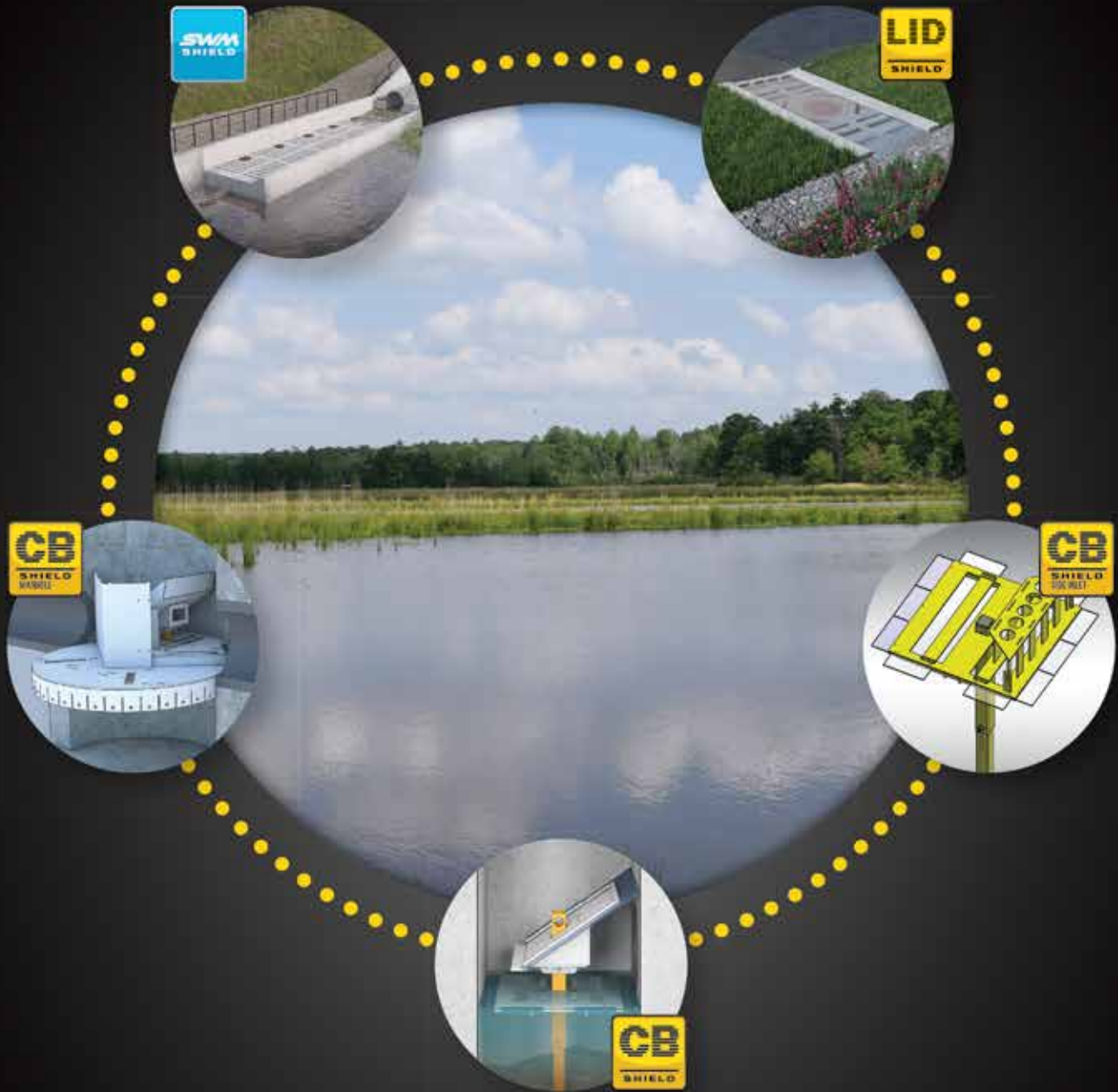
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A Timely Investment

BY ANDREW MACKLIN

WHEN I WROTE my first draft of this editor's note, I was lamenting the fact that the federal government was obviously going to miss the deadline for the removal of long-term boil water advisories in Canada.

A few days later, I began to wonder if the government had somehow read the note.

The announcement from Indigenous Services Minister Marc Miller that the March 31st deadline would not be reached was, sadly, inevitable. And it is, without question, an absolute shame that the government has missed the deadline. Too many communities have waited far too long and, even with the understandable reasons for the delays to have occurred, I am sure it doesn't make it any easier to accept the reality that boiling water will still need to occur for months, if not years, into the future.

It would be very easy though for the announcement of the missed deadline to overshadow the announcement of new funding (\$616.3 million over the next six years, followed by \$114.1 million per year) for First Nations communities. I want to shift focus to this announcement, because it's in need of a little more analysis.

The federal government's announcement of dedicated funding to support the operations and maintenance of water systems is almost as long time coming as the removal of the advisories. It could provide the one thing that all infrastructure assets owners have

been screaming for years: predictable funding that can be added to a balance sheet's bottom line.

But the funding for operations and maintenance of systems doesn't exclusively address what is still needed to ensure that every community in Canada, regardless of size or location, has access to clean drinking water.

Potentially the greatest infrastructure deficit exposed during the COVID-19 pandemic has been the lack of a strong broadband network. How can remote communities be expected to afford to train, service, and manage new water infrastructure solutions without a solid connection online resources? Simply put, they can't. Nor can anyone else in a similar situation. There is also the need for energy redundancy, ensuring remote communities have access to electricity resources that don't rely on fuel deliveries. Transmission networks delivering clean electricity, or local renewable energy solutions, need to be addressed as well.

As the federal government continues its work to end long-term boil water advisories, it needs to also consider how to ensure that they provide the needed funding tools and secondary infrastructure to ensure they never become an issue in Canada ever again. **wc**

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ABOUT THE COVER

Municipalities across Canada continue to struggle with funding for proactive asset maintenance, leading many to have to be reactive, absorbing a higher cost of repair. However, there are some federal funding programs in place that hope to close the gap. Read more on page 10.



Government of Canada Creates Task Force on Flood Insurance and Relocation

THE CREATION OF an interdisciplinary Task Force on Flood Insurance and Relocation has been announced by the Government of Canada.

“Flooding in Canada has devastating effects for thousands of Canadians each year,” said Bill Blair, minister of public safety and emergency preparedness. “Our Government is making investments to reduce the impact of climate-related disasters to foster a more resilient Canada. This important Task Force who will work with all levels of government and the insurance industry to make our communities safer and more resilient to impacts of flooding.”

As a first step in creating a National High Risk Residential Flood Insurance Program, the Task Force will look at options to protect homeowners who are at high risk of flooding and don’t have adequate insurance protection. The Task Force will also examine

the viability of a low-cost national flood insurance program and consider options for potential relocation for residents of areas at the highest risk of recurrent flooding.

“Every Canadian deserves a safe and affordable place to call home,” said Ahmed Hussen, minister of families, children, and social development. “Flooding threatens our homes and our livelihood. This task force will explore the best ways to mitigate flood risks for many Canadians and guide us in developing future housing plans.”

The Task Force will be composed of representatives from the federal government, provincial and territorial governments, and the insurance industry. At the same time, Indigenous Services Canada will work with First Nations partners on a dedicated Steering Committee on First Nations Home Flood Insurance Needs to examine the unique context on reserves. *wc*

Coming up in the next issue:
MARCH/APRIL

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Canada Invests in Research on Impacts of Plastic Pollution on Natural Environment



THE GOVERNMENT OF CANADA is providing \$2,256,554 to 16 science-based research projects to learn more about the impacts of plastic pollution on our natural environment. This funding is provided through the Increasing Knowledge on Plastic Pollution Initiative.

“The Government of Canada is working hard to address plastic pollution and move toward a more circular economy, including by banning certain harmful single-use plastics,” said Peter Schiefke, parliamentary secretary to the minister of environment and climate change.

“By collaborating with university researchers and not-for-profit organizations, we are bridging the information gaps on the effects of plastics on the health of Canadians and our environment, making progress toward zero plastic waste by 2030, and creating a cleaner future for our children and grandchildren,” added Schiefke.

The Government of Canada recently published the final Science Assessment of Plastic Pollution, which looks at the presence of plastic pollution and its effects on the environment and human health. This assessment confirms that

plastic pollution is everywhere and negatively impacts our environment, but it also determined that there are gaps in our knowledge. The funding announced seeks to fill these knowledge gaps and help us move toward a cleaner, healthier world.

The parliamentary secretary made the announcement during the virtual Zero Waste Conference, where he also emphasized the importance of collaboration in research to support the implementation of Canada’s Plastics Science Agenda.

The Government of Canada has a comprehensive plan to address plastic waste, according to its announcement. The plan includes moving toward a circular economy, an approach that seeks to support change across the entire lifecycle of plastics—from design to manufacture, use, and recovery.

The plan also includes a ban on certain harmful single-use plastic items that are often found in the environment, are often not recycled, and have readily available alternatives. The proposed approach will put Canada on a pathway to achieve zero plastic waste by 2030. **wc**

Online at
WATERCANADA.NET



NEWS: Water Equity Commission Convened by Great Lakes and St. Lawrence Cities Initiative.

bit.ly/WaterEquityCommission



NEWS: All Communities in NWT Now Have Modern Water Treatment Plants.

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NEWS: COVID-19 Early Warning System Developed for Saskatoon.

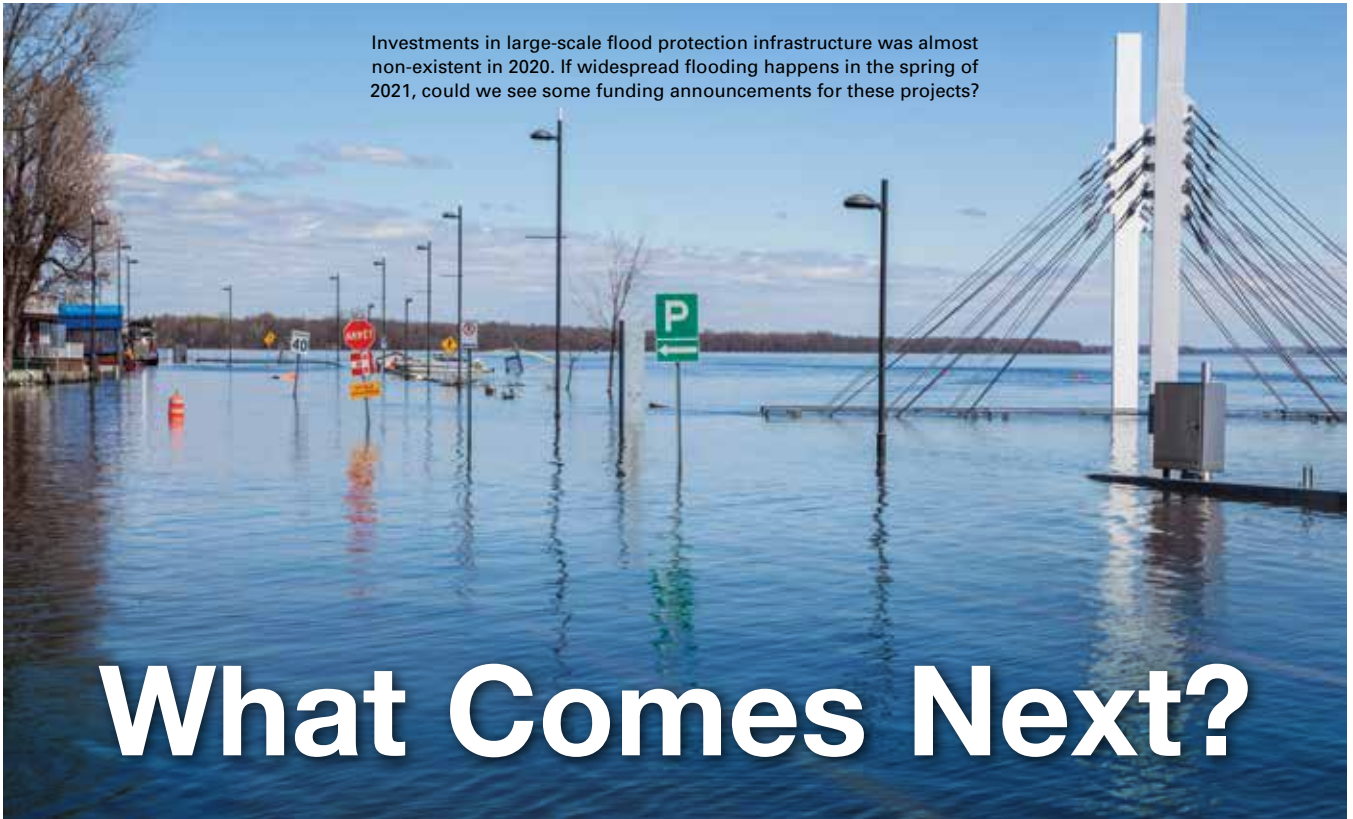
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NEWS: Alberta Government and CIB Make Historic Investment in Irrigation Infrastructure. bit.ly/AlbertaIrrigation

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Investments in large-scale flood protection infrastructure was almost non-existent in 2020. If widespread flooding happens in the spring of 2021, could we see some funding announcements for these projects?



What Comes Next?

Developing stories in the Canadian water sector in 2021.

BY ANDREW MACKLIN

THE NEXT 12 MONTHS will be very important for the Canadian water sector. Billions of dollars are floating around as governments look to boost their economies in the wake of the COVID-19 pandemic, but how much of that makes it into water projects is yet to be seen. And speaking of projects there are many, many key water projects that are in the discussion phase, but need to move into the procurement stage. And oh, the politics of it all, how will our elected officials threat the needs of the Canadian water sector over the next 12 months?

Here is our annual look at some of the key stories for 2021, and how they might play out in the year ahead.

The deadline

March 31st marks the federal government's deadline for removing long-standing boil water advisories (BWAs) in communities across Canada. We haven't seen new tracking numbers in several months, likely a result of the COVID-19 pandemic, but in early 2020 there were still around 60 BWAs to resolve.

It should not have come as a surprise

to hear Indigenous Services Minister Marc Miller announce on November 21, 2020 that the deadline would not be met, citing pandemic-related construction delays among the reasons. However, the \$1.5 billion in additional funding announced, targeted at operations and maintenance of safe drinking water systems, was an important next step in providing support for water needs in Indigenous communities.

The Canadian Water Agency

According to the Government of Canada, the Canadian Water Agency will play a role "in keeping our freshwater resources safe, clean and well-managed for generations to come."

What exactly that means will likely be answered in 2021, as the federal government looks set to provide the Canadian water sector with some clarity about what the agency's mandate will be, how it will be operated, who will be involved and, most importantly, what funding will be attached to its work.

The best case scenario is that this becomes the driver for new funding

for the water sector, something that is desperately needed. The worst case scenario is, well, something we would rather not imagine at this point.

Large-scale flood protection

In a year where procurement and construction managed to progress on many fronts in the infrastructure landscape, this was an issue that did not get its due. Granted the environmental assessment process can be a long one, and so is developing solution that make sense long-term. But in 2020, it really didn't feel like headway was made on major flood provinces in Alberta, Manitoba, Ontario, and New Brunswick.

As another round of spring storms create havoc in different parts of the country, perhaps the federal government, and a couple of provincial governments, will put some further financial backing behind long-term flood prevention infrastructure.

Tracking COVID-19 in wastewater

We have already seen case studies

outlining the success of implementing technology that can help to detect concentrations of the coronavirus in wastewater. And we know that cleantech companies in the water space here in Canada have been working on portable, rapid detection systems.

The question is, with several vaccines in the offing, will this be a forgotten technology, or one that communities install in order to detect what comes next. Preventative measures will be a valuable component of Canada's pandemic recovery. Funding for such systems would be a clear signal from government, at any level, that they are serious about ensuring that the need outbreak does hit our communities nearly as hard as COVID-19 has.

The Biden effect

A new President in the United States could impact the Canadian water sector in a positive way, especially the Great Lakes and St. Lawrence. President-elect Biden has committed significant dollars to his infrastructure plan (\$2 trillion), a plan set to include climate-friendly and green solutions.

The new President had strong support from many of the states bordering the Great Lakes and the St. Lawrence, and a strong case has been made for water infrastructure in the communities on those bodies of water. With a focus on green infrastructure, President Biden could be good news for strengthening our bi-national water assets.

Ontario's Bill 229

Conservation authorities in Ontario were left shaking their heads when the provincial government introduced Bill 229, an omnibus budget measures bill that includes changes to the *Conservation Authorities Act*. The amendments would allow developers to bypass conservation authorities, and removes some citizen involvement from CA boards.

The outcry that followed the announcement in November has been immense, but the question is whether or not any of it will matter. Developers in Ontario have long pressed the provincial government for carte blanche access to develop anywhere a piece of property is purchased. If this passes, it will be a slap



in the face to the water sector and the environment sector in Ontario.

Flushable wipes on federal radar?

Is this the year that the federal government finally takes the issue of flushable wipes seriously? It might be a stretch, but as more and more municipalities deal with the ill effects of clogged pipes resulting from wipes than don't actually break down in water, and foot the bill for the damage it causes, perhaps the federal government will take notice. Post-secondary institutions are doing some key research on the issue, and the research may help bolster the case for the government to finally take action on this 'crappy' issue.

Water and recovery spending

Without question, the Canadian water sector has done an impeccable job in keeping clean water flowing throughout the country. The problem? The Canadian water sector did an impeccable job providing clean water to Canadians throughout the pandemic.

As governments continue to look for

where to spend funds to help support economic recovery, especially on infrastructure, it may be easy to overlook the water sector after it performed so well during the pandemic. Governments may see it as a sector that is performing just fine, not needing financial support.

Of course, we all know that isn't the case. Pipes are nearing the end of their usable life, asset maintenance has been constantly deferred, and new assets are desperately needed in some communities.

Hopefully the sector's strong performance won't be a detriment. *wc*

Andrew Macklin is the managing editor of Water Canada.



What do you think? Did we encapsulate the biggest storylines of 2021?

Let us know your thoughts and you could be included in the digital edition of this story, posted on watercanada.net.

Email your ideas and opinions to andrew@actualmedia.ca.

Many federal programs are available to support municipal water, wastewater, and stormwater infrastructure.

Funding Water Infrastructure

What federal programs are available to help municipalities fund water infrastructure? BY SIMRAN CHATTHA

ALL LEVELS OF GOVERNMENT in Canada have been affected by the COVID-19 pandemic in some way, shape, or form since March 2020. This is especially true for municipalities across the country.

As reported by Water Canada, the Federation of Canadian Municipalities (FCM) was calling for emergency funding for municipalities as early as April 2020 due to the economic impacts of COVID-19.

“From turning arenas into safe shelters to deferring property taxes, municipal leaders are working flat-out to support Canadians through this pandemic,” said FCM President Bill Karsten. “But with new expenses, staggering drops in revenue and no freedom to run deficits, municipalities need emergency funding to keep essential services going strong.”

In June 2019, conversations started to take place about what would be needed

to support a safe economic restart across the country.

“We need to work together to pull Canadians out of this pandemic and come back even stronger,” said Karsten. “There’ll be no full economic recovery without tackling the municipal financial crisis first, and the Prime Minister has created an opening to do that. Now all orders of government need to seize this opportunity to get support to the front lines where it’s so urgently needed.”

As conversations about a safe economic restart have taken place, funding municipal infrastructure projects has been seen as a way to support the economic recovery in communities across Canada.

The federal government has made a number of announcements about investments in drinking water, wastewater,

and stormwater infrastructure (more information is available on watercanada.net). Organizations like the Federation of Canadian Municipalities (FCM) and crown corporations like the Canada Infrastructure Bank (CIB) have also been supporting projects.

To explore what federal funding opportunities are available for municipal water infrastructure, Water Canada and the Canadian Water and Wastewater Association (CWWA) hosted the Window on Infrastructure webinar on September 16, 2020.

A number of industry leaders joined the webinar including:

- **Carl Bodimeade** from Hatch Infrastructure.
- **John Cuddihy, Natasha Faruqi,** and **Katie Hogan** from Infrastructure Canada.

- **Patrick Kehoe** and **Matt Gemmell** from the Federation of Canadian Municipalities (FCM).
- **Sashen Guneratna** from the Canada Infrastructure Bank (CIB).
- **Hiran Sandanayake** from the City of Ottawa.
- **Indra Maharjan** from the Ontario Clean Water Agency (OCWA).

Government of Canada's Investing in Canada Infrastructure Program (ICIP)

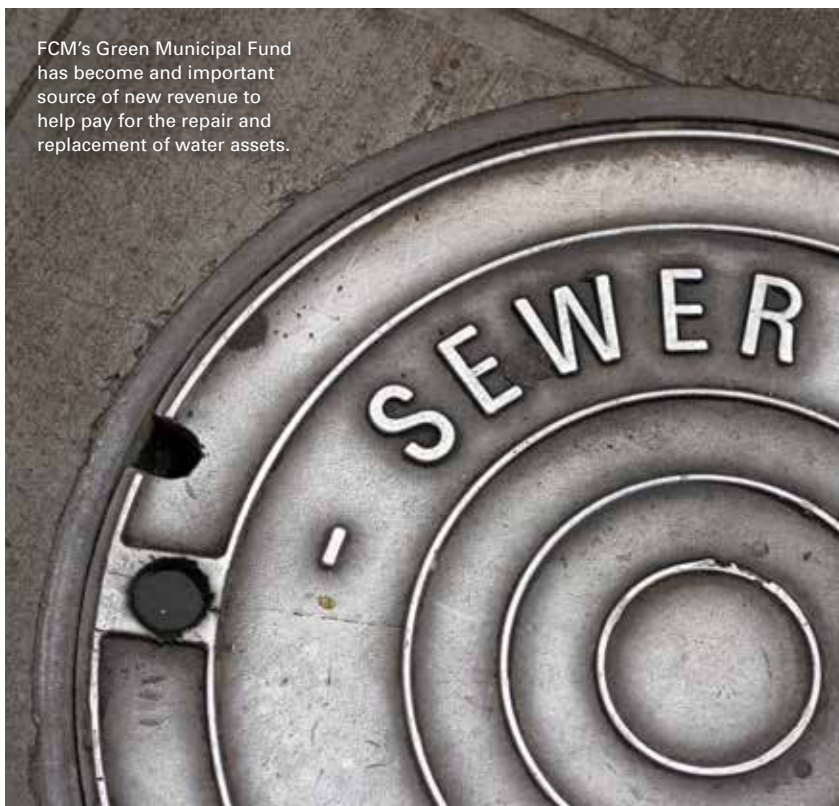
John Cuddihy, Natasha Faruqui, and Katie Hogan from Infrastructure Canada kicked off the Window on Infrastructure by providing some information about the Investing in Canada Infrastructure Program (ICIP) and how it has been adapted as a result of COVID-19.

Hogan provided an overview of the Investing in Canada Plan. According to Hogan, over \$180 billion is expected to be invested into the program over 12 years. She noted that the Investing in Canada Infrastructure Program (ICIP) is the flagship program under the Investing in Canada Plan and it is divided into four streams. The streams include the:

- 1 Green infrastructure stream, which has \$9.2 billion allocated for projects.
- 2 Public transit stream, which has \$20.1 billion allocated for projects.
- 3 Community, culture, and recreation stream, which has \$1.3 billion allocated for projects.
- 4 Rural and northern communities stream, which has \$2.4 billion allocated towards for projects.

"The Investing in Canada Infrastructure program is an outcomes-based eligibility model," noted Hogan. "It basically moves the vessel away from a traditional asset-based model. The water and wastewater context is the perfect example to think about how that outcomes-based approach can help identify more innovative projects to do in your local communities."

"Under a traditional asset-based eligibility model, we would be looking for water and wastewater investments," added Hogan. "We would be looking at the standard pipes, pumps, treatment stations, and things like that. Under an outcomes-based eligibility model,



we've identified the outcomes as being increased capacity to treat and manage wastewater and stormwater, and increased access to potable water."

"Thinking about the outcomes-based model, if that's the overall outcome we want to achieve, the federal government is not being prescriptive about how you achieve that," noted Hogan. "We could really be looking at innovative types of solutions for water purification and stormwater management that would not have otherwise fit in a very restricted asset class-based model."

In March 2020, the federal government started thinking about how it could help communities respond to the COVID-19 pandemic. The Investing in Canada Infrastructure Program was adapted in two ways: a fifth funding stream (COVID-19 Resilience Infrastructure) was created and eligibility was temporarily expanded for three of the four existing streams.

Federation of Canadian Municipalities' (FCM) Green Municipal Fund

Patrick Kehoe, an advisor at FCM, provided an update on the support that

is available to municipalities through the well-known Green Municipal Fund.

"The support comes in two ways: there is the direct funding aspect of it and there is a resource end to it," said Kehoe. "[There are] tools, instances for providing peer-to-peer support, and learning from others around the country to spur their projects."

The funding has been targeted to environmental sustainability projects and most of these have been infrastructure projects, according to Kehoe. This has helped inform the funding streams (water, energy, land use/brownfields, waste, and transportation) that have been offered by FCM.

"We like to fund projects at different stages," said Kehoe. "We start out by providing grant funding for feasibility studies. This will cover up to 50 per cent of eligible costs to a maximum of \$175,000. [...] Next up are pilot projects that test out real-world solutions on a small scale. This again is grant-based and is up to \$500,000. Typically, [we cover] about 50 per cent of eligible costs. However, municipalities under 20,000, so smaller municipalities, can request up to 80 per cent funding."

NEED FOR ADDITIONAL FEDERAL FUNDING SUPPORT

During the Window on Infrastructure webinar, we asked attendees a series of questions about water infrastructure. Here is what they had to say.

What type of water infrastructure is in the greatest need of additional federal funding support?

- Wastewater 56.7%
- Drinking Water 26.7%
- Stormwater 13.3%
- Water Conservation 3.3%

Has your municipality/company has benefited from funding available through the Green Municipal Fund?

- Yes 58.8%
- No 41.2%

Would you consider approaching the Canada Infrastructure Bank to secure funding for a water infrastructure project?

- Yes 35%
- No 5%
- I don't know enough about the bank 60%

“Finally, we do have our capital project financing,” added Kehoe. “The capital projects financing is based on combination of low-interest loans and grants. Typically, we are able to cover up to 80 per cent of project costs up to a maximum of \$10 million. However, we do consider larger amounts so don’t let that be a barrier.”

Beyond the direct funding that is available, FCM also supports knowledge-sharing between municipalities. Best practices and lessons learned can be accessed at fcm.ca/resources

Individuals can also access the funded projects database, which has information about projects FCM has funded over the last 20 years, on FCM’s website.

Opportunities to advance water infrastructure through the Canada Infrastructure Bank (CIB)

The CIB is a federal crown corporation that has three core functions, according to Sashen Guneratna. These core functions include: investing, advising, and knowledge.

The CIB has the ability to “invest in

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new, revenue-generating infrastructure using project-specific structures that attract private capital and appropriately allocate risks,” according to Guneratna. In addition to this, the CIB is able to “advise public sector sponsors about project development, effective project structuring options, private sector, and CIB investment options.” The CIB is also able to “collect and develop data and knowledge, facilitate evidence-based decision making.”

Under an outcomes-based eligibility model, we’ve identified the outcomes as being increased capacity to treat and manage wastewater and stormwater.

Guneratna noted that the CIB has played an active advisory role in water infrastructure projects. “We’ve had a lot of conversations with municipalities,” said Guneratna. “We can assess projects at no-cost and evaluate these projects

at no-cost. We’re also able to help with structuring debt equity, help look at financial models, and provide advice to municipalities on their projects.”

In the context of municipal water and wastewater projects, Guneratna spoke about two challenges municipalities face and how the CIB can help address those challenges. One challenge Guneratna noted was that “municipalities are often close to reaching existing debt limits, restricting their ability to invest the significant capital required for replacement, growth, or compliance.” Also, municipalities with a “small tax and/or rate base cannot absorb increases caused by large investments.”

In order to help address these challenges, the CIB can work with the municipality to attract private investment that provides “flexible terms to accommodate longer duration

and complex projects that would not otherwise be commercially available.” The CIB can also help municipalities attract private investment that provides “access to direct debt financing rates to help contribute to both the financial and environmental sustainability of water and wastewater networks.”

Concluding thoughts

A number of federal funding programs are available to help municipalities make investments in drinking water, wastewater, and stormwater projects. Hopefully municipalities are able to leverage these programs in order to get on road to economic recovery. WC

A modified version of this article was originally published in the November/December 2020 issue of ReNew Canada.



Simran Chattha is the associate editor of Water Canada.

THE KEYS TO A BLUE ECONOMY

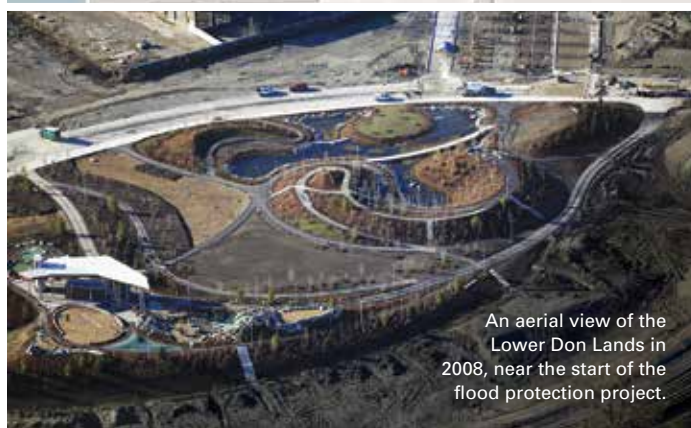
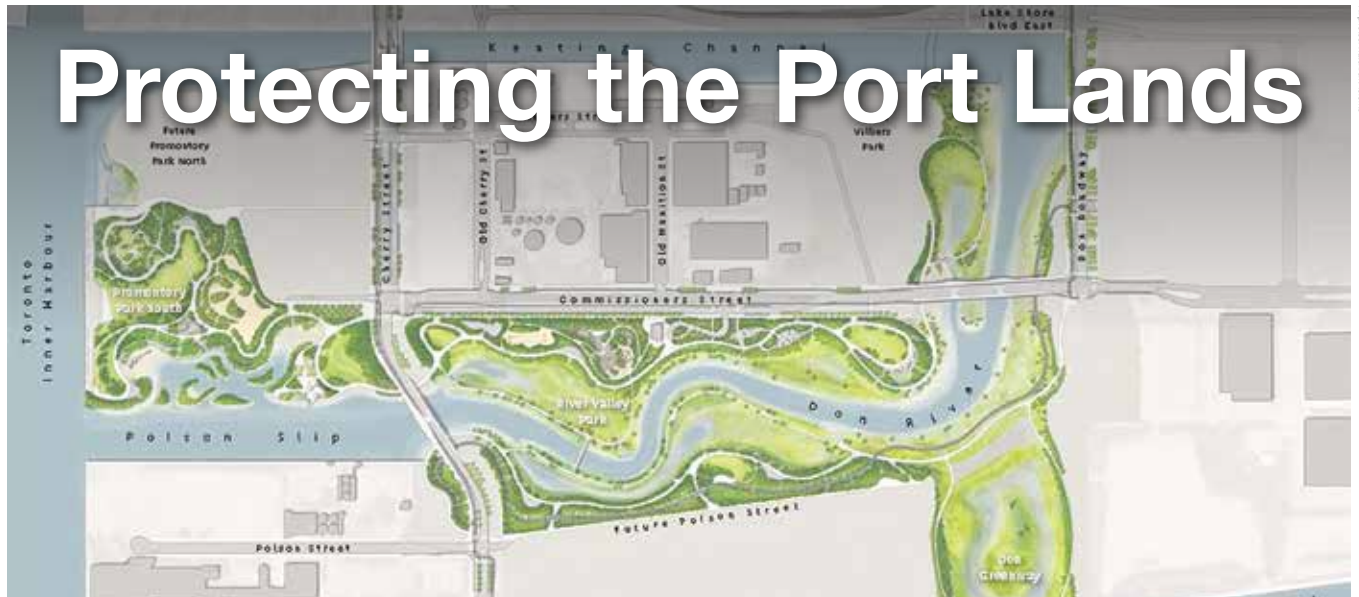
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Protecting the Port Lands



An aerial view of the Lower Don Lands in 2008, near the start of the flood protection project.



Keeping the Don Lands above water in the wake of increasing flood risk.

BY MIRA SCHENKER

IT'S BEEN 15 YEARS since the Port Lands Flood Protection project officially began, with an Environmental Assessment (EA) to study how best to restore the natural mouth of the Don River. But that's just a blip in the life of this 38-kilometre river. Going back as far as 7,000 years, this river was a gathering place for Indigenous peoples, and a source of food and water.

Waterfront Toronto's role in this story officially started 2005 with the Don Mouth Naturalization and Port Lands Flood Protection EA. A joint study with Toronto and Region Conservation Authority (TRCA), the goal was to re-naturalize the river mouth and protect the Port Lands and surrounding neighbourhoods from flooding in the event of a regulatory storm—all within

an urban context. Flood protection was core to Waterfront Toronto's mandate from the time it was created by three orders of government in 2001. The first phase of flood protection stemmed from an environmental assessment for the West Don Lands completed in 2005 in partnership with TRCA and City of Toronto. By building a flood protection landform under Corktown Common and lengthening of the Metrolinx railway crossing over the Don River, Waterfront Toronto and its partners protected a large swath of downtown Toronto from riverine flooding, allowing a master planned community in West Don Lands to take shape.

The next stage of flood protection was in the Port Lands, where flooding from the Don River puts approximately 290

hectares of land at risk. This represents nearly one third of the 800-hectare area Waterfront Toronto is tasked with revitalizing. Neighbourhoods like the Canary District in the West Don Lands are envisioned for the Port Lands once flood protection is complete in 2024.

How did we get here?

In 1912, the Board of the Toronto Harbour Commission completed a plan to transform Ashbridges Bay Marsh into a massive industrial district. By 1922, the marsh had been filled in to create more than 200 hectares of land, with another 200 hectares soon to follow. The Keating Channel was built along the northern edge of the former marsh in the late 1890s. The mouth of the Don River was redirected into the concrete lining of the Keating

Channel, sending the river out into the inner harbour through a 90-degree turn. Over 100 years, the area was filled in to create what we now know as the Port Lands. This transformation from a large coastal wetland to a hard, channelized river and low-lying in-fill has left the Port Lands and surrounding area vulnerable to flooding from the Don River.

Starting in the 1950s, a second wave of development began. The Leslie Spit was built, as well as the Hearn Generating Station and the Commissioners Incinerator. The Gardiner Expressway was built in the 1950s over the mouth of the Don River. The opening of the St. Lawrence Seaway ignited a renewed effort to turn the Port Lands into a major shipping hub and industrial district. These aspirations never materialized and by the 1980s, the Port Lands remained underutilized but contaminated by a legacy of historical industrial activities. The area had become home primarily to civic and city-serving uses such as salt storage, as well as light industrial uses.

In 1989, a citizen-led task force began pushing for a re-naturalization of the Don River. The Task Force to Bring Back the Don sketched out the first vision of how the river could be revived. This recommendation from the Task Force was reinforced in 1992 with the release of *Regeneration: Royal Commission on the Future of the Toronto Waterfront*, which included recommendations for environmental enhancements and flood protection at the Don River mouth.

A 15-year timeline

In 2005, we began the process to establish the Terms of Reference process for the Don Mouth Naturalization and Port Lands Flood Protection Environmental Assessment (DMNP EA). This set the conditions of the EA.

In September 2006, the Ontario Ministry of Environment and Climate Change approved the terms of reference for the DMNP EA and the study formally began.

In 2007, Waterfront Toronto launched an international design competition to create a concept design that included habitat creation and flood protection fully integrated in a comprehensive plan for addressing urban design, transportation, naturalization, sustainability, and other



Port Lands project rendering.

ecological issues. This involved an extensive public consultation process and a week-long public exhibition. The winning design is by Michael Van Valkenburgh Associates. This provided the framework for what would become the preferred alternative through the DMNP EA.

In 2011, Toronto City Council adopted what would later be called the Port Lands Acceleration Initiative (PLAI). The goal of the initiative was to retain the core ideas behind the DMNP EA while developing strategies for accelerating revitalization in the Port Lands. This plan was refined in 2012 and became known as PLAI 2, which included the Port Lands Planning Framework, Villiers Island Precinct Plan and Port Lands, and South of Eastern Transportation and Servicing Master Plan Environmental Assessment.

In 2014, the Lower Don Lands Master Plan Environmental Assessment was approved. In 2015, the Don Mouth Naturalization and Port Lands Flood Protection Environmental Assessment was approved.

In May 2015, work began on the Due Diligence Report for Port Lands Flood Protection.

In October 2016, the Due Diligence Report for the Port Lands Flood Protection Project was completed,

providing governments with additional assurance on the cost of this project, ways to mitigate the risks, and a strategy and schedule for executing the project. The first piece of work as part of Port Lands Flood Protection, Cherry Street Lakefilling, received tri-government funding in 2016 through the Clean Water and Wastewater Fund

In June 2017, \$1.25 billion in municipal, provincial, and federal funding was awarded to the Port Lands Flood Protection Project.

In October 2017, the Port Lands Planning Framework and Villiers Island Precinct Plan were adopted by Toronto City Council.

Construction on the full Port Lands Flood Protection project began in December 2017. This ambitious undertaking is slated for completion in 2024. Cherry Street Lakefilling was completed in 2019. And with excavation on the river valley well underway and the first of four new bridges installed in the fall, this project is on track. **wc**



Mira Schenker is the senior manager, communications and public engagement, at Waterfront Toronto and a former editor of this publication.



What's happening at the federal level with respect to wastewater management?

BY SIMRAN CHATTHA

WASTEWATER MANAGEMENT plays an important role in reducing the amount of pollution that ends up in our natural environment. In Canada, every level of government, including the federal government, plays a role in managing wastewater.

The Government of Canada notes that it's "responsible for managing the risks posed by substances listed under the *Canadian Environmental Protection Act, 1999* (CEPA 1999)." The federal government is also responsible for the Wastewater Systems Effluent Regulations (WSER).

"The wastewater regulations are in part the result of a federal commitment in the 2009 Canadian Council of Ministers of the Environment (CCME) Canada-wide Strategy for Wastewater," according to a presentation by Sarah Radovan from Environment and Climate Change Canada (ECCC) and Nelson Ferguson from Indigenous Services Canada. The presentation was made during the AFN's National Water Symposium.

In 2020, ECCC was considering amendments to the WSER. To find about the proposed amendments and other work that's happening at the federal level with respect to wastewater management, Water Canada and the Canadian Water and Water Association (CWWA) hosted the Window on Wastewater webinar on October 21, 2020. During the webinar, Water Canada and CWWA were joined by a number of industry leaders including:

- **Beth Weir** from York Region.
- **Sarah Radovan** from Environment and Climate Change Canada (ECCC).
- **Shirley Anne Smyth** from ECCC.
- **Klas Ohman** from Associated Engineering.

Updates on the proposed amendments to the Wastewater Systems Effluent Regulations (WSER)

Sarah Radovan from ECCC kicked off the Window on Wastewater webinar by

providing updates on the Wastewater Systems Effluent Regulations.

"As we know, wastewater management is one of these areas where every jurisdiction has an important role to play," said Radovan. "The federal role stems from our authorities under the *Fisheries Act*. The *Fisheries Act* prohibits the deposit of deleterious substances into water frequented by fish or a place that could get to water frequented by fish, unless that release is authorized by a regulation."

"The Wastewater Systems Effluent Regulations lay out the conditions under which the wastewater effluent is authorized to be released under the *Fisheries Act*," added Radovan. "The federal regulation sets the baseline standard, which leaves room for provincial and municipal authorities to make those standards more stringent as they see fit."

Radovan noted that there are three authorizations that let undertreated wastewater to be released.

These include the:

- ❶ Temporary Bypass Authorization.
- ❷ Temporary Authorization to Deposit Un-ionized Ammonia.
- ❸ Transitional Authorization.

At the time of the webinar, ECCC was considering amendments to the Temporary Bypass Authorizations and the Transitional Authorizations. ECCC was also looking at clarifying and simplifying administration provisions.

ECCC has issued Transitional Authorizations based on three factors: effluent quality, annual average daily volume, and sensitivity of the receiving environment. Owners that were looking to get an authorization were required to collect data at the final discharge point for 12 consecutive months before an application was submitted. Owners also needed to include a reason why a transitional authorization was needed and include a plan to achieve the regulatory standards.

An issue that came up with respect to the Transitional Authorizations was that owners had until June 2014 to apply for them. “Owners of more than 230 systems, spread in 130 communities across Canada, did not apply for a [Transitional Authorization] even though they would have been eligible,” noted Radovan.

“These systems have been out of compliance since 2015 with both the Wastewater Systems Effluent Regulations and the *Fisheries Act*,” added Radovan. “While communities have expressed a desire to comply with [the Wastewater Systems Effluent Regulations], there is no authority in the regulations to issue [Transitional Authorizations] after the 2014 deadline.”

One of the proposed amendments to the Wastewater Systems Effluent Regulations would “provide a new opportunity for owners of wastewater systems to receive a Transitional Authorization,” noted Radovan. “These amendments would apply to wastewater systems that would be eligible to receive a [Transitional Authorization] to the end of 2030 or 2040. The amendments would be based on current eligibility criteria, existing system of points at the final discharge points, and existing system of



Wastewater tracers, like artificial sweeteners, have been used to understand how wastewater moves in the environment.

points at combined sewer overflows.”

As of October 2020, Environment and Climate Change Canada was looking for comments and/or concerns on the following areas:

- ❶ Re-opening the Transitional Authorization provisions.
- ❷ Application criteria.
- ❸ Monitoring periods to determine eligibility.
- ❹ Transitional Authorization conditions and compliance obligations.

Federal research on emerging contaminants in wastewater streams

Following Radovan’s presentation, Shirley Anne Smyth from ECCC provided updates on federal research on emerging contaminants in wastewater streams.

One of the chemicals Smyth spoke about was triclosan, which is an antimicrobial that’s found in cleaning and personal care products.

“This substance was assessed by our risk assessment colleagues on whether

or not it met any criteria under the *Canadian Environmental Protection Act*,” said Smyth. “They concluded that triclosan, in the levels it is entering the environment, may have a harmful effect on the environment or on biological diversity.”

According to Smyth, triclosan was always detected in influents, effluents, and biosolids during a three-year period when monitoring took place. ECCC found that there was better removal in biological treatment systems and it found that there was an “interesting” correlation with nitrification.

Smyth also spoke about wastewater tracers, more specifically artificial sweeteners, that have been used to understand how wastewater moves in the environment.

“Some of our colleagues in Burlington looked at sulfamate,” said Smyth. “Sulfamate is also used in other industrial processes and so they found it was widely present in all environmental waters, including precipitation if you can believe it. So sulfamate obviously does not make a good wastewater tracer.”



Ontario has been used as an example to identify opportunities where building codes can be improved to provide benefits, such as reducing basement flooding and save taxpayer dollars, according to Beth Weir from York Region.

“However, they looked at acesulfame and sucralose, which are included in a lot of diet drinks,” added Smyth. “They found these substances in wastewater influents and effluents, and septic plumes at sufficiently high levels that they could be used as tracers for getting more information about how wastewater effluents move and dilute into the environment.”

Wastewater treatment options for small municipalities and Indigenous communities

During the Window on Wastewater webinar, Klas Ohman from Associated Engineering spoke about some work the company has done in collaboration with Robert Delatolla from the University of Ottawa for ECCC. In particular, Associated Engineering and the University of Ottawa have been working on an inventory and assessment of commercially available wastewater treatment options for small communities across Canada.

Ohman noted that meeting the criteria in the Wastewater Systems Effluent Regulations is challenging for certain areas. As a result, the study undertaken by Associated Engineering and the University of Ottawa focused on communities in Newfoundland, the eastern portion of the Northwest Territories, Nunavut, the northern portion of Quebec, and Indigenous communities that have less than 5,000 to 6,000 people living in them.

With these parameters, Ohman noted that the project proponents identified “applicable communities and associated treatment technologies (20 of the more common ones) across Canada.”

What the project proponents found was that “passive systems, such as lagoons and wetlands, are more common in Northern and in Indigenous communities.” They also found that

there’s a “significant difference in capital and operational needs in these communities compared to what is found in Southern, and more populated parts of, Canada.”

Going forward, Ohman indicated that there are a number of factors to take into account when building systems for Northern and Indigenous communities. The factors include: topography, geography, education, culture, geology, and climate.

Updates on CWWA’s advocacy work and Wastewater Committee activities

Beth Weir, the chair of CWWA’s Wastewater Committee, closed the Window on Wastewater webinar by providing an update on CWWA’s advocacy work to encourage changes to the Ontario Building Code and the National Building Code.

“Inflow and infiltration has come to the forefront for us as a large issue for our industry to tackle,” said Weir. “This puts us in a unique situation as the property line delineates regulating governing agencies. The public side is governed by provincial and territorial standards whereas the private side is governed by the Building Code.”

“To note, currently the plumbing and heating industry is moving to harmonize building codes across Canada,” added Weir. “Therefore, all code change

Triclosan, in the levels it is entering the environment, may have a harmful effect on the environment or on biological diversity.

requests are required to be submitted to both national and provincial codes until the harmonization has been completed.”

Weir noted that municipalities have brought forward a number of concerns. One of the areas of concern has to do with mainline sewer connections. Weir noted that “faulty joints create the potential for leaking to occur” and that “the connections at the mainline sewer

are not always tested or inspected.”

Weir also noted that the National Building Code “does not include specifications for this type of connection” and that “design standards, product materials, and testing specifications need to include requirements for connections at the property line/mainline sewer.”

On the private side, one area of concern is when storm and sanitary services are located underneath basement foundation. “This can lead to potential issues with damaged pipes as well as the freeze-thaw cycles that occur with the foundation, which can affect those connections,” said Weir.

During the webinar, Weir noted that a number of organizations have been consulted to address these issues. Ontario has been used as an example to identify opportunities where building codes can be improved to provide benefits, such as reducing basement flooding and save taxpayer dollars.

“We submitted 10 code change requests to the National Building Code and Ontario Building Code,” said Weir. “These code change requests consisted of enhancing the construction and materials [...] to prevent cracks and sagging as well as other code changes for identification.”

Individuals can track the status of the Code Change Requests by visiting the following link: bit.ly/CodeChangeRequests

The Window on Wastewater webinar was the fourth and final installment of the Window on Water webinar series hosted by Water Canada and CWWA. But wait...there's more! Water Canada's Canadian Water Summit will be held in conjunction with CWWA's Window on Ottawa in June 2021.

Together, the Canadian Water Summit and Window on Ottawa will help build important conversations on the policy and governance issues that are key to unlocking Canada's blue economy. Find out more at watersummit.ca. wc

Simran Chattha is the associate editor of Water Canada.

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Credit: Fluor Construction



The new raw sewage pumping station at Woodward Avenue.

Credit: Fluor Construction



The pumping station contains a circular split wet well located inside a circular dry well where 12 KSB Sewatec K700-950 G1 VGW vertical dry pit solid handling pump sets are installed.

Credit: KSB Canada



The first of the pumps being installed and anchored to their mountings.

Pumped to Clean Up

Pumps a key component of Woodward project.

BY BRYAN ORCHARD

THE 45-KILOMETRE LONG shoreline of Hamilton Harbour on Canada’s Lake Ontario has been at the heart of its surrounding communities for many centuries. Once a pristine source of fresh fish and a place of leisure for the local population, industrialisation and the growth of the City of Hamilton have had a detrimental effect on the life of the harbour. By the middle of the twentieth century, decades of toxic sediment, stormwater runoff, habitat loss, water quality deterioration, and other factors had caused severe damage to the Hamilton Harbour ecosystem.

In 1987, the International Joint Commission (IJC)—the organization overseeing the Canada-United States Great Lakes Water Quality Agreement—identified the 500-square-kilometre Hamilton Harbour as one of 43 areas of concern (AOC). Being on a list of locations where environmental degradation seriously impaired the use and environmental health of the Great Lakes was a wake-up call for the city. Over the past few years significant environmental engineering programmes have been implemented, the largest of which being the multiphase Clean Harbour programme.

Wastewater treatment project

In 2008, the City completed the Woodward Avenue Wastewater Treatment Plant (WWTP) Service Area Environmental Study Report to determine a plan for upgrades to the plant. This recommended investment to manage wet weather flows, provide treatment capacity, and meet treatment objectives defined by the Hamilton Harbour Remedial Action Plan, the Ministry of Environment, Conservation and Parks, and the *Federal Environmental Protection Act*.

Located near the southeast corner of the harbour, it is the largest wastewater treatment plant in the Hamilton Harbour watershed and amongst the largest in Ontario. The Harbour also contains one of the largest toxic sediment sites on the Canadian side of the Great Lakes. Because the plant is the largest single source of water flowing into Hamilton Harbour, the quality of that effluent has a direct and powerful impact on the harbour’s water quality and environmental health. The Woodward upgrade project is a multi-phase, multi-year process that includes a number of sub-projects, each of which

has its own specification and timelines.

Costing \$340 million, the upgrades include elevating the plant's final treatment process from the secondary level to the tertiary (third) level. This increases the processing of the plant's treated wastewater and will allow the plant to reach strict discharge limits described by the Hamilton Harbour Remedial Action Plan for phosphorus, ammonia and suspended solids. A significant sub-project is the construction of a new raw sewage pumping station and collection system control to support wet weather and flooding control initiatives. Having an effective pumping station capable of handling current and projected flows is essential to the functioning of the wastewater treatment and the prevention of overflows in the harbour. Construction on the upgrade began in May 2017 and is projected to be complete in July 2021.

Woodward Avenue pumping station

Now approaching 60 years of age, the existing wastewater treatment plant has a rated average capacity of 409 million litres per day (MLD) and peak rated capacity of 614MLD. If this is exceeded, the excess water, being a mix of industrial and domestic waste and run-off from the land, is discharged into the harbour. To comply with the long-term projected processing requirements, the plant will have a maximum receiving capacity of 1,700MLD. In order to meet this requirement, considerable effort

At times when the effluent level is low cavitation has to be avoided, and when storm conditions arise, high flows have to be accommodated.

had to be put into designing a highly efficient pumping station containing pumps with a proven track record in handling high volumes of untreated wastewater. After due consideration of the various pump options available, Maple Reinders, contractors for the pump station, together with the City of Hamilton selected KSB Pumps Inc.,

Canada as its pump supplier on the basis of KSB's technology and knowledge of pump station design.

The design of the existing pump house at Woodward Avenue is rather unusual in that it is a circular construction. This has proved to have its advantages and benefits, for the new pump house now under construction is also circular, containing a circular split wet well located inside a circular dry well where 12 KSB Sewatec K700-950 G1 VGW vertical dry pit solid handling pump sets are installed. The pump house has a total elevation of 81m above sea level, and at almost 30m the subterranean wet well is much deeper than its predecessor. This larger and deeper wet well prevents system flooding and provides increased system storage.

There are several benefits of the wet well inside the dry well configuration. Firstly, dry well pumps, as opposed to wet well pumps, enable easy access to all pump parts for in-situ maintenance and repair. When components need to be removed from the dry well, they can be easily craned to the surface. The split wet well design, with six pumps allocated to either side, allows one side to be taken off stream for cleaning without there being any adverse impact on the efficiency of the pump house.

The challenge

With the pump house being of a rather unconventional design, KSB had to address a number of design challenges imposed on the configuration of the pump mountings. Formulating a layout for the pumps around the exterior of the wet well was the first issue to contend with. The answer was

differing installation angles of pressure for the connection piece/inlet pipe. This in turn meant coming up with mountings peculiar to the configuration. For this KSB provided a tailor made volute casing for each pump with an integrated mounting flange foot, which allows the pumps to be anchored directly to the cast-in-place foundation blocks is, a concept unique to KSB.

In order to handle the optimum flow of wastewater through the plant, 10 pumps would be required for full-time availability, and a further two for standby

demands. In addition, collectively the pumps had to be capable of handling up to 23,600l/s and a potential solids content size of 190mm. The third significant issue to address was varying flows. At times when the effluent level is low cavitation has to be avoided, and when storm conditions arise, high flows have to be accommodated. By installing four variable frequency drives (VFDs), all the pumps automatically respond to the incoming flow. Finally, the pumps had to deliver high levels of efficiency.

Being able to handle large solids and control flow velocity gives the treatment plant the opportunity to drain the interceptors for cleaning through the manipulation and control of the interceptor. On the existing plant it is not possible to lower the level in the wet well to control the velocity in the interceptors. Thus, when storms occur, extra inflow and increased velocity result in the interceptors losing the ability to contain accumulated sediment and this passes directly to the head works creating an overload condition. With the new pump house design, it will be possible to drain the interceptors as necessary and remove the extra grit load to the plant.

For the mechanical seals KSB worked with the local seal supplier on a special configuration to accommodate the pump installation and shaft. Split mechanical seals were selected and positioned above the bearing housing, thereby allowing them to be accessed and replaced in-situ. The dry well design gives the advantage of allowing easy access to both the seals and the bearings for maintenance.

By spring of 2020, construction of the dry and wet wells, including the cast-in-place foundation blocks for the pumps, had been completed and work on the service areas at and above ground level were underway. The first of the pumps had been craned into position and anchored to the mountings and complete installation of the pumps, drives and shafts is expected in early 2021. **wc**



Bryan Orchard is an independent technical author and journalist based in the United Kingdom.



Community marine debris monitoring survey, Placentia Bay Ocean Debris Team (PODS), Terrenceville, Nfld.

PHOTO: JAMES ANTONIO/ISTOCK

All Waters are Ocean Waters

Bridging water and ocean literacy in Canada.

BY DIZ GLITHERO, MARK MATTSON, AND SARAH MACNEIL

IN 1966, LEGENDARY CANOEIST

Bill Mason taught a generation of Canadians what a watershed was through his iconic film adaptation of Holling C. Holling's book *Paddle to the Sea* (1941). In the film, viewers follow the tale of a young boy's hand-carved canoe as it journeys from the spring melt waters in the Lake Superior region to the Gulf of St. Lawrence. This story led thousands of Canadians to recognize that we are each connected to a watershed that ultimately leads to the ocean, no matter where in this country we call home.

Fast forward 55 years to a question posed by educator and artist, Karen Tamminga-Paton, from Crowsnest Pass, Alberta: "What do ranchers, heavy-duty mechanics, teachers, and secretaries from this part of Canada say to the ocean? How do we see Canada's extensive coastal waters in relation to our wheat fields and coal mines?" Karen was one of

more than 3,000 Canadians who engaged in the collaborative Understanding Ocean Literacy in Canada study (2019-2020), led by the Canadian Ocean Literacy Coalition (COLC). The study co-examined Canadians' relationship with the ocean through different lenses and lived experiences with the goal of co-developing a national ocean literacy strategy. However, to engage all Canadians in a strategy on ocean literacy necessarily requires engaging Canadians on water literacy. In fact, when silos are stripped away, they are one in the same: all waters are ocean waters.

Through the lens of 'ocean literacy'

Ocean literacy is widely defined internationally as an understanding of how the ocean influences us and how we influence the ocean. More recently it has been described as the

development of a "civic relationship with the ocean" by the Intergovernmental Oceanographic Commission of UNESCO. Fundamentally, ocean literacy is about humans' relationship with the ocean.

Canada's Oceans Strategy articulates that "Canada is an ocean nation." Indeed, with the exception of Alberta and Saskatchewan, all provinces and territories touch on the approximate 243,042 kilometres of our coastline, the longest of any country in the world. The global ocean provides many basic necessities to Canadians—clean air, food, transportation, medicine, jobs—and is a determining force of weather and climate systems.

And yet, of Canada's current population of 37.6 million, only an approximate seven million Canadians live near our marine coasts. Roughly nine in ten Canadians live within 200 kilometres of the United States border, with nearly

half of those congregated along the Great Lakes and St. Lawrence waterways. What's more, a poll conducted by Nanos Research in 2019 showed a significant gap in the Canadian public's relational understanding of our personal, day-to-day impact on the ocean and the ocean's impact on our daily activities. This is the very essence of ocean literacy.

To what extent, then, if at all, do we recognize the ocean in our national identity and acknowledge its critical importance to our own physical, economic, and socio-cultural wellbeing?

Through the lens of 'water literacy'

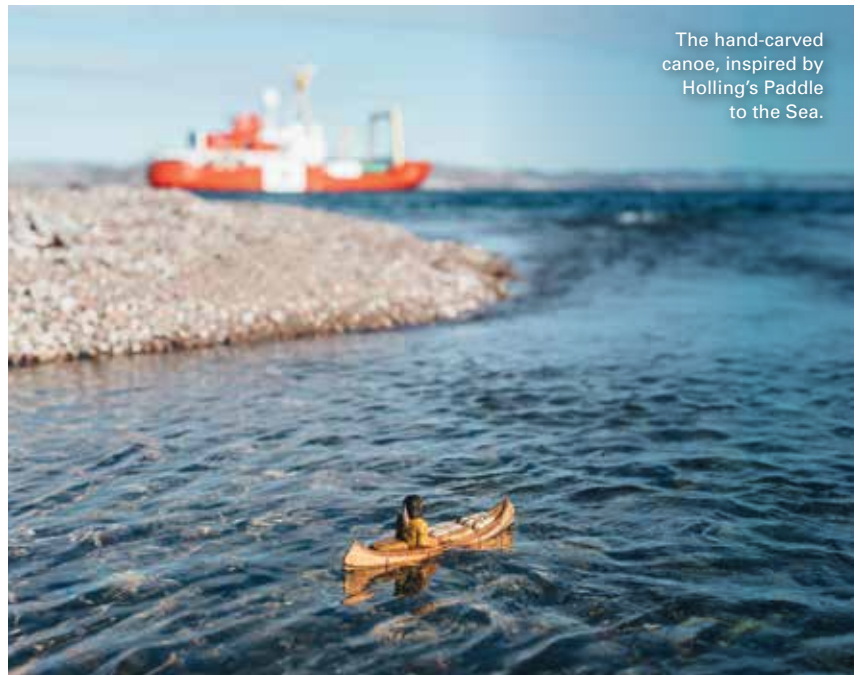
For many Canadians, it is not the ocean and coastline that form the pulse of our ecosystems, but rather the vast interconnected landscape of wetlands, lakes, rivers, and waterways. In classrooms and communities across the country, we are commonly taught that Canada has roughly 20 per cent of the planet's freshwater resources, made up of over two million lakes and more than 8,500 rivers. These resources provide drinking water for all Canadians before discharging into the ocean through one of five drainage basins.

Inland waterways have long been used as the country's original "highways," serving as important means for trade, navigation, and travel for Indigenous peoples, long before the arrival of European settlers. These freshwater routes, along with abundant access to drinking water, are the main reasons communities developed rapidly around

To engage all Canadians in a strategy on ocean literacy necessarily requires engaging Canadians on water literacy.

the Great Lakes and on our rivers, and why still today they are home to Canada's largest urban centres.

It is clear that for some of the 30 million Canadians who live inland, their connection to local freshwater sources and waterways is far more tangible and relevant than their connection to the ocean. However, these connections are



The hand-carved canoe, inspired by Holling's Paddle to the Sea.

Credit: Nana Surovich

not mutually exclusive, and it is long past time to adjust this narrative.

An opportunity to unite

Interconnections between our inland waterways and the ocean exist everywhere we look, as well as opportunities to safeguard and care for both. Alberta's watersheds alone drain into four ocean basins: Pacific, Hudson Bay, Arctic, and the Gulf of Mexico. Likewise, the North Saskatchewan River waters discharge in Churchill, Manitoba, with polar bears living at the confluence of river and ocean. Fish and birds also take advantage of these aquatic connections, travelling between ocean and Canada's fresh inland waters throughout the year.

The challenge is not in finding the interconnections. Rather, the gap exists because current efforts to engage people in

caring for local freshwater have been siloed by what distinguishes them from the ocean instead of what connects them.

Potential pathways forward together

Bridging current water and ocean literacy efforts will require an enhanced awareness of the value of this work

within and across different levels and departments of government, as well as corporate, non-governmental organizations, and broader civic society. It will be essential to incorporate innovative partnerships, sustained support for education, dynamic communication, meaningful community engagement—including through citizen science and open data sharing—and a broad commitment to access and equity.

Re-connecting our inland urban areas to the ocean will require re-imagining our cities, where most Canadians live. Our cities were built to discharge waste into our waters, effectively alienating Canadians by emphasizing the need to keep away from polluted areas. "No Swimming" signs may have been intended for the public's health and safety, but ultimately, they have served to disconnect us from the water and, in turn, the ocean.

Exciting new initiatives in urban centres such as the Gord Edgar Downie Pier in Kingston, the proposed River House in Ottawa, or the False Creek swim beach in Vancouver help to restore peoples' connections to water and increase water accessibility for all Canadians. Perhaps most importantly, these public spaces will enable people to form the emotional foundations for increased water and ocean literacy.



Storytelling and the arts can also be a powerful means of establishing these emotional foundations and drawing people ‘to the water’s edge.’ They are crucial to providing a bridge between freshwater and ocean experiences, as well as in engaging those who do not already see themselves in this space. Bringing these stories into Canadians’ homes can deepen the connection between water and our everyday lives; the ocean is always present, even if the water is hidden from view. It may be locked away in the rock beneath us or diverted through pipes and underground tunnels. The closest coastline may be a hundred kilometres away. But the ocean shapes our lives and we, in turn, shape the ocean.

It is imperative that we incorporate water literacy into the education system. We must also support, streamline, and scale community-based monitoring, citizen science programs, and tools related to water/ocean health as well as data sharing (e.g., DataStream, Swim Guide, Land Guardians, Marine Debris Tracker Canada, etc.).

It is a high priority to reorient existing sectors toward inclusive practices to meaningfully engage young and early

career Canadians in decision-making processes in response to youth calls to action for land-water health, ocean sustainability, and broader nature-based solutions. In particular, as the sustainable blue economy grows in Canada, we must broaden perceptions to ensure that both freshwater and ocean career, innovation, and tech opportunities are well communicated, promoted, and accessed by as many diverse communities as possible.

While these represent a few pathways forward, there remain broader considerations to creating an inclusive space in which all Canadians can feel connected to local waterways and to the one global ocean to which all waters flow. Perhaps most importantly, we must ask ourselves how the current and emerging water and ocean literacy efforts are an opportunity to contribute to true reconciliation between Indigenous and settler societies, and between broader Canadian society and the land and waters. Above all, it is essential to increase coordination and use more holistic, integrated approaches to terrestrial, freshwater, and marine conservation. These efforts must engage and reflect community-level priorities

and recognize and learn from Indigenous-led conservation efforts (i.e., IPCAs; Land Needs Guardians). Indigenous Peoples of Canada understand best the interconnectivity between land, freshwater, coasts, sea ice (particularly for Inuit), and the ocean.

A concluding thought

If we all accept that the ocean is the determining life system of the planet, recognizing that a healthy global ocean is essential to life on land (and not the other way around), then ocean literacy is a necessary pursuit. The goal of ocean literacy, at least in a Canadian context, is to encourage and support Canadians to discover for themselves the connections that water makes possible in our lives, jobs, culture, and economy.

In 1985, before personal computers, Apple ran an ad during the Super Bowl portraying people tearing down the walls surrounding the fortress of knowledge. The idea was that the invention of personal computers would replace mainframe computers and give people access to knowledge and knowledge sharing in their homes and offices—a brilliant insight, as it turns out. Ocean literacy, including citizen science, has the same potential. It will revolutionize our understanding of water. The connectedness of freshwater and the ocean and all life that depends on these connections can be discovered anywhere in Canada. You do not need to be on the ocean or live on the coast to discover it. You just need to go to the water’s edge. wc

Diz Glithero is the national coordinator for the Canadian Ocean Literacy Council.

Mark Mattson is the founder of Swim Drink Fish.

Sarah MacNeil is the St. Lawrence regional coordinator for the Canadian Ocean Literacy Council.



To read the Understanding Ocean Literacy in Canada study regional and national reports (2020) and to learn more about the national strategy, visit colcoalition.ca



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Grizzly bear feasting on chum salmon in a river in Mussel Inlet in the Great Bear Rainforest, British Columbia.

Photo: WWF-Canada

Freshwater Health

New data from WWF-Canada unveils issues of concerns. BY ELIZABETH HENDRIKS

CANADA HOLDS 20 per cent of the world's freshwater, which is facing high levels of stress from pollution, habitat loss and fragmentation, overuse, and increasingly, climate change, and biodiversity loss. The health of freshwater in Canada remains largely unprotected and unknown, and without enough data it will be difficult to address freshwater health in the face of climate change and provide the proper protection it needs. This year, we took a deeper look at the state of freshwater to see how it has changed since our last assessment in 2017. Our new report raises serious questions about how freshwater ecosystems are faring in response to threats from human activities, and once again underlines the need for consistent water monitoring across the country to identify those watersheds that need urgent conservation action.

For the 2020 Watershed Reports, we reassessed the health indicators (flow, water quality, benthic invertebrates, and fish) for all 167 sub-watersheds and found both exciting and concerning results. Sixty-four per cent of sub-watersheds with enough data scored good or very

good for overall health. However, 100 sub-watersheds did not have enough data to receive a score. This is a slight improvement from 2017 where 110 were data deficient, with 19 receiving a score of less than good. Despite significant efforts and additional available data, data deficiency is still a major challenge and it continues to obscure how threats are affecting most of Canada's watersheds.

Erratic flows are a growing concern for maintaining freshwater health

The additional data that was available for the 2020 report did, however, highlight some new findings that can help determine future freshwater conservation efforts. For instance, with flow we found that the number of sub-watersheds scoring below good has nearly doubled since 2017, going from 37 to 67. This new data, which was available due to additional hydrological stations, revealed that river flow is a much bigger problem than we thought. The lower water flow scores vary by region and are likely the result of both physical and

climatic disruptions. In the Arctic Coast Islands for example, there have been significant changes in flow in the past three years compared to historic periods. With no major dams in the watershed, that fluctuation, and the resulting lower score, are likely driven by climate change.

Benthic data can give us a better picture of freshwater health

Sixty-four per cent of Canada's sub-watersheds are data deficient for the benthic invertebrate indicators—small creatures such as insects, worms, snails, and mussels living at the bottom of streams whose presence can indicate healthy freshwater. But where we do have sufficient data, it tells a good story with 78 per cent of sub-watersheds earning a score of good or better. For example, the Ottawa watershed was overall data deficient in 2017 due to lack of data for the benthic indicator. And now, with focused monitoring programs, such as WWF-Canada's Sequencing the Rivers for Environmental Assessment and Monitoring (STREAM), new benthic data was available, resulting in a good score

for the indicator, which contributed to the watershed's overall score going from data deficient to fair. STREAM, a partnership between WWF-Canada, Living Lakes Canada, the University of Guelph, Genome Canada, and Environment and Climate Change Canada, has trained hundreds of individuals from dozens of organizations and communities across Canada providing them the tools to monitor their waters and contribute valuable benthic data.

Water quality scores are failing

Water quality is still a major concern in Canada with 61 per cent of sub-watersheds with scores receiving poor or fair. More sub-watersheds obtained a score for this indicator in 2020, but the percentage of those scoring below good is the same as 2017, indicating that sub-watersheds that are data deficient may not necessarily be in good health. Despite this, we noted some good news in the Lower Mackenzie watershed, which previously scored data deficient for the water quality indicator. Out of its 22 sub-watersheds, 11 were lacking enough data,

This new data, which was available due to additional hydrological stations, revealed that river flow is a much bigger problem than we thought.

showing the need for more monitoring. Thanks to additional monitoring carried out by local communities, the watershed now has an overall score of good. The success of obtaining this score is due almost entirely to watershed organizations, First Nations, concerned citizens, and NGOs among many others, that monitor, track, and collect data in their local watersheds.

Community-based water monitoring is helping to close the gap on data

A significant amount of the new data for this year's report came from community groups and non-scientists who, with training and support, have helped uncover these important new findings. These programs contributed to additional scores, provided a more comprehensive



picture of freshwater health in certain regions, and demonstrated how without consistent monitoring data can quickly go out of date. Data deficiencies were not only observed in remote areas but were overwhelmingly present in areas with major development proposals, like Northern Québec and Northern Ontario. If we're unable to understand their health now, we won't be able to see how future development activities or climate change will further stress these sub-watersheds.

Modernizing Canada's approach to freshwater

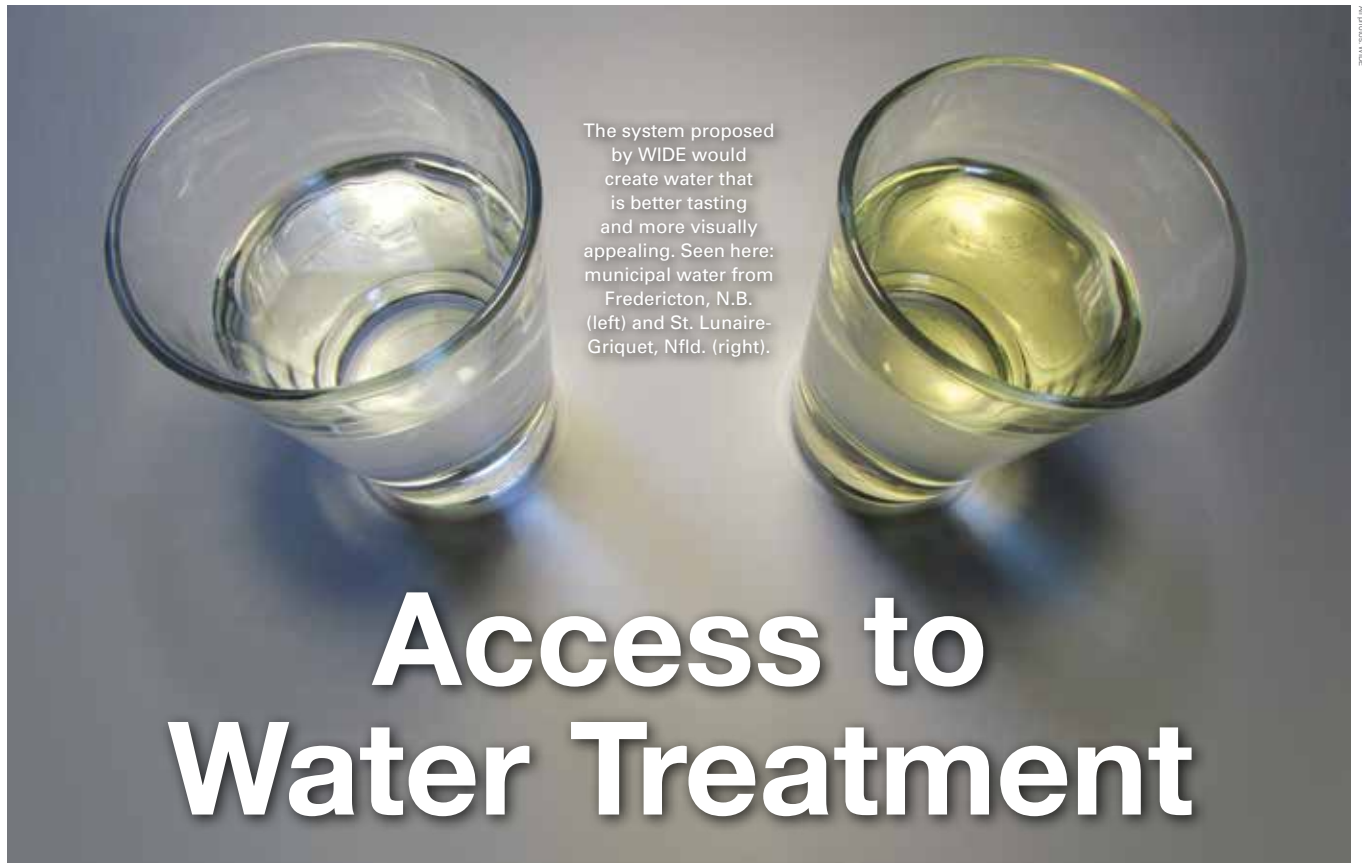
In order to keep Canada's freshwater healthy, we need a system that recognizes the value of community-based water monitoring programs, standardizes monitoring protocols, and allows access to open data. And we might be getting closer to this with the federal government's recent commitment to creating a Canada Water Agency.

Committing to the agency is only the first step. We expect this agency to provide national and scientific leadership

across the country, build up and support community expertise and Indigenous knowledge, and convene provincial and federal actors in freshwater conservation. In order to do this, the agency needs a national framework that can influence development policies and help bridge local knowledge and expertise into a national story of our freshwater health. And the watershed reports can help shape that process as it addresses areas of concern, where monitoring should occur, and where efforts should be continued to keep up freshwater health.

With the right framework, the agency can prioritize the areas that require most attention and create policies that can help ensure freshwater health, especially in the face of increasing pressures from climate change and biodiversity loss. Protecting all of Canada's freshwater systems can't be done alone. We need a collaborative effort and we need to be bolder with our solutions and actions to make sure that freshwater systems are healthy for the millions of wildlife and people that depend on them. **wc**

Elizabeth Hendriks is the vice president of restoration and regeneration at WWF-Canada.



Students reach beyond the classroom to impact positive change.

BY RACHEL HUDSON, NATHAN MCNALLY, AND MUDIWA MHARAPARA

WATER IS ESSENTIAL to all forms of life and for many around the world safe water is not readily accessible or necessarily safe. The reasons and issues why this reality is true for so many are vast. Even right here in Canada, there are many small rural and Indigenous communities that do not have proper access to clean water. Currently working on helping to change this reality is team WIDE: Water Integrated Design and Empowerment. Team WIDE is working on developing a water treatment system that can provide high quality water to remote communities in a sustainable way.

The story began when clean drinking water issues in rural and Indigenous communities piqued the interest of students at the University of New Brunswick (UNB). The UNB Water Project was formed as a campus club in November 2017 by students across several faculties. Through participation in the club, the members learned more about the lack of access to safe water across the country. In

February 2020, the club learned about a tech-entrepreneurship competition: the 2020 Atlantic AquaHacking Challenge (aquahacking.com/en), that focused on water issues in Atlantic Canada. As this challenge seemed similar in nature to some of the goals of the UNB Water Project, members of the club, along with some other students and recent graduates, formed team WIDE to tackle one of the challenges: “How can we develop tools to empower small rural and Indigenous communities to manage their drinking water supplies in a sustainable and culturally appropriate way?.” WIDE began developing a sustainable water treatment system, placing third in the Atlantic AquaHacking Challenge finals in September 2020. WIDE is continuing to pursue their project following the competition.

To help bring accessible water treatment to remote communities, WIDE is hoping to take advantage of a valuable resource that already exists in remote communities: waste heat released

from power generation. Many remote communities rely on diesel generators for electricity. However, in diesel generators less than 40 per cent of the energy in the fuel is converted to electricity due to the power cycle’s limitations. The remaining 60 per cent of the fuel energy is released to the atmosphere through engine exhaust and cooling. Team WIDE is working on recovering this heat to power a water treatment system to produce high quality drinking water. Additionally, heat will be recovered from the system for community use.

The team is pursuing multiple effect distillation as a means of producing high quality water with the recovered waste heat. The process mimics the natural water cycle by evaporating the water into steam and recondensing the steam as pure water. The multiple effect distillation process is highly efficient because it uses the steam produced to evaporate more water. By heating, evaporating, and condensing the water, bacteria, metals,



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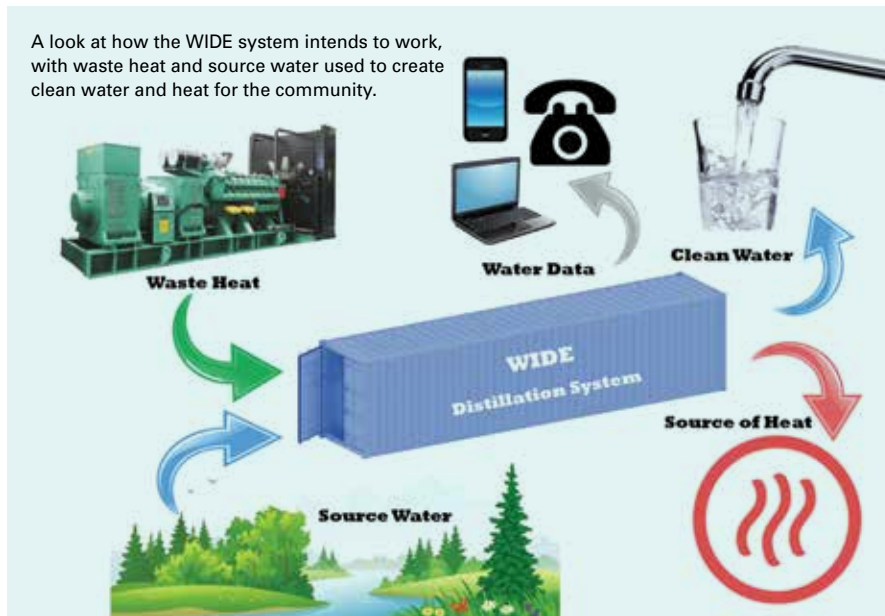
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minerals, and other contaminants are removed. This ensures that the water is safe to drink. The removal of various contaminants will also result in visually appealing and good tasting water, which is not presently the case in many small rural and Indigenous communities. (see figure 3, water cups) As the resulting water from the distillation is already safe to drink, only a small amount of chlorine, below perceivable taste levels, needs

The process mimics the natural water cycle by evaporating the water into steam and recondensing the steam as pure water.

to be added to protect the water as it travels through the distribution system. These low levels of chlorine will not form dangerous disinfection by-products.

Team WIDE is working to develop a small community scale version of this process which is currently used in medium to large scale desalination. WIDE is working on designing a customizable containerized distillation water treatment system. The containerized format means it can be quickly transported, and set-up, reducing water treatment project wait times, as well as capital costs. This will allow for more communities to have accessible water treatment in a shorter timeline.

Preliminary calculations have shown that there would be sufficient excess heat released from the diesel generators in a typical remote community to distill enough water to meet the community's residential water demand.

Although distillation is a heat intensive process, a significant amount of that heat can be recovered. This could be used in the community to heat homes, community buildings, or a community

greenhouse, generating additional value for the community and reducing the reliance on heating fuel. This fits well with the foundational goal of WIDE, to

integrate different systems to empower communities in a sustainable and culturally appropriate way.

As of right now, this is just a concept, but team WIDE is working hard to make it a reality. There are still many challenges as well as drawbacks to examine. A few of the main drawbacks of distillation as a water purification process are that it is more complicated, often takes up more space, and often has a higher capital cost than traditional water treatment systems. Through a containerized simple design, team WIDE hopes to address the space and complexity challenges. Whether the system will be financially competitive and viable is in the process of being

evaluated. Four of the team members are pursuing the system detailed design as an engineering final year design project at UNB. This will involve building a prototype to help validate the concept and perform a financial feasibility analysis. The team is anticipating other members participating in a start-up accelerator program through Planet Hatch to assist in the development of a successful business plan. The team is also pursuing research collaborations with the university. Both the design project and the start-up accelerator will finish in April 2021, which will provide a comprehensive overview of the technological, economical, and business feasibility of the concept. This comprehensive overview will help the team determine the concept's feasibility and hopefully launch as an incorporated business and work to pilot the system in a community.

Throughout the entire process, the team is engaging in conversations with different communities to ensure the design is accessible and culturally appropriate. Team WIDE is also designing a system to allow water information to be distributed to the community to build trust and pride in the community's water and water system. Each step the team takes brings us one step closer to a goal we as a society should strive towards: clean water for all. WC



Rachel Hudson is a programmer for the Government of Canada and a former student at the University of New Brunswick.

Nathan McNally is currently working on his mechanical engineering degree at the University of New Brunswick.

Mudiwa Mharapara is a recent graduate of civil engineering at the University of New Brunswick.

For more information on team WIDE's project, email widewaterteam@gmail.com

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APPOINTED



ROBERT BALDWIN

The Lake Simcoe Region Conservation Authority (LSRCA) has announced that **Robert (Rob) Baldwin** will be joining the organization as the chief administrative officer (CAO) on January 1, 2021.

“I’m incredibly humbled to have this opportunity to take on the role of chief administrative officer,” said Baldwin. “Over the past two decades, I’ve been proud and inspired to have played an active role in the growth and emergence of the Authority as a leading environmental agency in Ontario, with worldwide recognition.”

“Certainly, these are challenging times, but challenges also represent opportunities and I thank the Board of Directors for their confidence in me,” added Baldwin. “I’m committed to working with staff and board members to continue to protect and restore this watershed for the benefit of all its inhabitants.”

For nearly two decades Rob has worked for the conservation authority in various business portfolios. Most recently, he was the general manager of planning and development and watershed restoration services.



JEANETTE JACKSON

The Foresight Cleantech Accelerator Centre (Foresight) has announced the formation of the waterNEXT Advisory Board.

“We are excited to welcome this exemplary group of advisors to the waterNEXT board,” said **Jeanette Jackson**, CEO of Foresight. “They bring decades of leadership in how

to accelerate and grow markets that are vital to both water security and the future success of the sector. The formation of this board strengthens our commitment to the water sector and the global transition to a green economy.”

The waterNEXT Advisory Board Members include:

- **Jeanette Jackson**, CEO, Foresight Cleantech Accelerator Centre.
- **Kim Sturgess**, CEO, WaterSMART.
- **Rick Van Sant**, Senior Advisor, MaRS Discovery District.
- **Rodger Bernar**, Archer Business Development.
- **Terry Mah**, Thales Water Advisors.
- **Bruce Edgelow**, Managing Partner, EdgeMark Capital, and Advisory Services Inc.
- **John Van Ham**, Executive Director, InnoTech Alberta.
- **Jeff Guild**, Vice President, BlueTech Research.
- **Jack Elliott**, Principal, Scorpion Advisors.



LYNN BROADDUS

The Water Environment Federation (WEF) has announced its 2020-2021 board of trustees, which will be led by new President **Dr. Lynn Broaddus**.

“For nearly a century, the Water Environment Federation has been connecting the world’s water professionals so that collectively we can continue to raise the bar for returning clean water to our shared environment,” reflected Broaddus.

“We are at a moment in time when that need is as essential as it has ever been, and collectively we have an awareness of the importance of

being able to do this in a sustainable, equitable, and inclusive way,” added Broaddus. “I am honoured and energized by the opportunity to add my contribution as a leader on behalf of clean water across the globe.”

In addition to Broaddus, the 2020-21 Board of Trustees includes:

- Past-President **Jackie Jarrell** (Charlotte, N.C.).
- President-Elect **Jamie Eichenberger** (Denver, Colo.).
- Vice President **Ifetayo Venner** (Tampa, Fla.).
- Treasurer **Keith Hobson** (Ames, Iowa).
- Secretary and WEF Executive Director **Walt Marlowe** (Alexandria, Va.).
- Trustees **Rajendra Bhattarai** (Austin, Texas), **Howard Carter** (Saco, Maine), **Shellie Chard** (Oklahoma City, Okla.), **Gustavo Gallo-Chacon** (Monterrey, Mexico), **Aimee Killeen** (Baton Rouge, La.), and **John Trofatter** (Land O’Lakes, Fla.).



GARTH FRIZZELL

The Federation of Canadian Municipalities’ (FCM) members elected a new president and board of directors during its first-ever virtual annual general meeting.

“Local governments across the country are working on the front lines to keep people safe through this pandemic,” said incoming FCM President **Garth Frizzell**. “FCM’s advocacy has helped secure the federal support we’ve needed to protect essential services, families, and local businesses. As the pandemic progresses, and as we gear up for Canada’s recovery, we need municipal voices from every corner of our country to be heard at the federal level.”

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City of Prince George Councillor Garth Frizzell succeeds long-time Halifax Regional Municipality Councillor **Bill Karsten** as FCM President.

Registered FCM voters also ratified members to FCM's 75-seat Board of Directors, and the following FCM Table Officers:

- First vice president:
Joanne Vanderheyden, mayor of Strathroy-Caradoc and councillor for Middlesex County, Ontario.
- Second vice president:
Darren Hill, councillor in Saskatoon, Saskatchewan.
- Third vice president: **Scott Pearce**, mayor of Canton de Gore in Quebec.



MATT MADEKSZA

Veolia North America announced that **Matt Madeksza** has been named as its president and CEO.

"I am very excited about the opportunity to lead Veolia North America at a time when environmental solutions and resource management are needed more than ever before," said Madeksza. "I look forward to making the most of my experience to support the strategic goals of the company and the customers who rely on us for safe, reliable solutions in energy, water, and waste."

In his new role, Madeksza will be responsible for overseeing a company that serves approximately 4,000 industrial and municipal customers across the U.S. and Canada.



EHREN CORY

Ehren Cory has been appointed as the new CEO of the Canada Infrastructure Bank (CIB).

Cory was selected by the Board of Directors

of the CIB following a recruitment process that attracted diverse and highly qualified applicants. The Board of Directors subsequently recommended Cory for the Government's approval.

Minister of Infrastructure and Communities **Catherine McKenna** confirmed the government's acceptance of the CIB Board of Directors' recommendation to appoint Cory to the position.

"The Canada Infrastructure Bank has an important role to play in Canada's economic recovery and expanding Canada's ambition to build more sustainable infrastructure and clean energy," said McKenna.

"I am pleased with the Bank's announcement of Ehren Cory as its new CEO, as he has extensive experience in getting innovative and large-scale infrastructure projects built," added McKenna. "Our government is looking to Mr. Cory to deliver on the Bank's \$10-billion Growth Plan that will create 60,000 jobs across the country."



ANTHONY KARAKATSANIS

The Association of Consulting Engineering Companies - Canada (ACEC) announced that **Anthony Karakatsanis** has been named as the chair of the ACEC Board of Directors.

Karakatsanis, the president and chief executive officer of the Morrison Hershfield Group, will serve as the chair of ACEC for the 2020-2021 term. The announcement was made at the ACEC annual general meeting of members held virtually on October 27, 2020.

"Anthony's professional success combined with his passion for our sector will make him an effective ambassador and advocate for our industry and our association," said **John Gamble**, president and chief executive officer of ACEC.

Karakatsanis first joined the ACEC-Canada Board in 2016 and served on various committees. During his term as ACEC Chair, he looks to build upon the excellent work of his predecessor Lawrence Lukey (P.Eng.) and will continue to promote the important role of consulting engineers in Canadian society.



GEORGE HEYMAN

George Heyman has been renamed the Minister of Environment and Climate Change for the Government of British Columbia.



ROB FLEMING

Heyman was first elected as the Member of the Legislative Assembly representing the riding of Vancouver-Fairview in the 2013 general election. He was re-elected in

2017, and was named as the Minister of Environment and Climate Change in Premier **John Horgan's** cabinet. After again retaining his seat in the 2020 election, Heyman was awarded his previous cabinet portfolio.

Rob Fleming, MLA for Victoria-Swan Lake, was named the new Minister of Transportation and Infrastructure. **Claire Trevena**, who previously held the position, chose not to run for re-election. **wc**



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Step in the Wrong Direction

Schedule 6 in Bill 229 is supposedly intended to improve governance, oversight, and accountability. Instead, it will increase risks for Ontario residents.

Why Schedule 6 in Bill 229, Ontario's omnibus budget, is bad for Ontario.

BY SIMRAN CHATTHA

THE ONTARIO GOVERNMENT is looking to “improve the governance, oversight, and accountability of conservation authorities while respecting taxpayer dollars,” according to a source quoted by the CBC. But under the guise of improving the governance, oversight and accountability, the Ontario government is opening up opportunities to undermine the role of conservation authorities and create risks for Ontario residents.

In November 2020, the Progressive Conservatives introduced Bill 229: Protect, Support and Recover from COVID-19 Act (Budget Measures). Schedule 6 in Bill 229 is particularly contentious in the environmental sector because of the amendments it includes.

One particular concern about the changes in Schedule 6 is that they will give the Minister of Natural Resources and Forestry the ability to override permit decisions made by conservation authorities. There is no information on what type of information Minister of

Natural Resources and Forestry will use when making permit decisions.

The reality is that the Minister is likely to make political decisions that favour developers. This approach will be a departure from how conservation authorities make decisions. More specifically, they make decisions by taking science-based information and public safety into account.

The proposed changes in Schedule 6 don't stop there. According to an update from the Toronto and Region Conservation Authority (TRCA), Schedule 6 will force conservation authorities “to issue permits where Minister's Zoning Orders have been issued by the Province in support of development.”

This completely undermines the work that conservation authorities do because it doesn't give them an opportunity to evaluate the potential risks a development might have. If risks are found, it doesn't give conservation authorities an opportunity to set

conditions for mitigating those risks.

Unfortunately, Bill 229 passed on December 8, 2020 with Schedule 6 intact. The Ontario government decided not to listen to the concerns brought forward by conservation authorities, municipalities, and other organizations in the environmental sector. Given that Doug Ford's government has called itself the “Government for the People,” it's unfortunate that it didn't listen to its own people when including Schedule 6 in Bill 229.

Do I think that conservation authorities should have good governance, oversight, and accountability? My answer is: of course. Do I think that the changes in Schedule 6 help do that? My answer is: no. If anything, Schedule 6 has the potential to create risks for those that live in Ontario. That's why I think that Schedule 6 in Bill 229 is a step in the wrong direction. **wc**

Simran Chattha is the associate editor of Water Canada.

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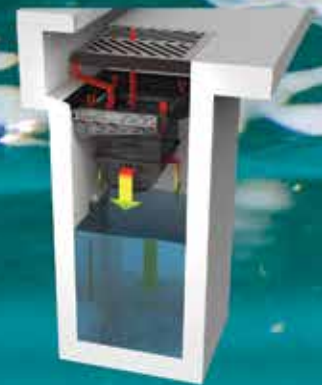
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