A winter without end finally gives way to warm spring temperatures, rivers choked with ice and swollen with runoff are causing floods in many parts of Canada. Since the beginning of May, parts of Alberta, Quebec, Ontario, British Columbia and, especially, New Brunswick were under water. As soggy as the situation is now, many regions of Canada are likely to experience more flooding in the future, says Shawna Peddle, director of Partners for Action in the University of Waterloo's Faculty of Environment.

"There are many reasons," said Peddle. "For example, changing weather patterns and an increase in the number of storm cell events. In addition, there is more and more development and paving-over of formerly empty ground, so there are fewer wetlands to absorb run-off."

On top of that, says Peddle, much of Canada's water infrastructure is old and out of date, and unable to handle the increased water volumes caused by up-stream development. Although some regions of the U.S., such as the lower Mississippi River valley, and some countries, such as the Netherlands, are more often under water than Canada, flooding is still the number one cause of death from natural disasters, and personal losses in this country.

Most people remember such major flooding events that happen to cause the country is growing and people and buildings are being added to vulnerable flood plains every year," said Lyle.

"There is no time to spare in taking action but those buildings could collapse if an earthquake struck." Dave Murray, a principal and water resource engineer in the Victoria office of consulting engineers Kerr Wood Leidal Associates Ltd., says Canada should look abroad for ideas on flood mitigation.

"We need to study the Netherlands' Room for the River floodplain management program," Murray said.

"We could, for example, put buildings on stilts, to keep them above water in the case of a flood. But those buildings could collapse if an earthquake struck," Murray said. "People's perception of risk impacts their awareness of the link between climate change and flood risk. Once the public recognizes that extreme weather, including flooding, is scientifically attributed to climate change, subsequent events reinforce this concern and a desire to take mitigation steps."

"Room for the river" in a number of ways — increasing stream depth, storing water, relocating dikes, creating high water channels, and lowering into the river structures that disrupt water flow. The program allows land lying along rivers to act as natural water sponges in the event of a flood. Since it was developed, the Dutch have taken the Room for the River program to other countries, including the Philippines.

Alexa Tanner & Scott McKenzie
SPECIAL TO THE JOC

For the past five years the message has been the same, Alberta, specifically Calgary, needs flood mitigation, and there is no time to spare in taking action before the Bow or Elbow Rivers spill their banks again.

After all, there were only eight years between Calgary's last two “100-year” floods, the most recent of which resulted in $6 billion in damages.

The increasing frequency and severity of flooding in Calgary and Alberta. That city is built along two flood-prone river systems and yet mitigation efforts are reactionary and piecemeal.

This is more than evident with flood events being reported across the country this spring, with hundreds of people ordered to evacuate in New Brunswick, Alberta and British Columbia. In New Brunswick, the flooding has been described as the worst in 80 years.

One way flood mitigation can be addressed is through system-wide regional planning that is shaped by public involvement within a transparent decision process. However, the complex nature of massive public works projects frequently results in inaction. Broader support is needed.

Recent research found that the public’s perceptions about the risk of flooding are slowing Calgary's ability to take the steps it should to lessen the damage from future floods.

Damage from flooding doesn’t have to be inevitable: experts

Alexa Tanner & Scott McKenzie
SPECIAL TO THE JOC

For the past five years the message has been the same, Alberta, specifically Calgary, needs flood mitigation, and there is no time to spare in taking action before the Bow or Elbow Rivers spill their banks again.

After all, there were only eight years between Calgary's last two “100-year” floods, the most recent of which resulted in $6 billion in damages.

The increasing frequency and severity of flooding in Calgary and Alberta. That city is built along two flood-prone river systems and yet mitigation efforts are reactionary and piecemeal.

This is more than evident with flood events being reported across the country this spring, with hundreds of people ordered to evacuate in New Brunswick, Alberta and British Columbia. In New Brunswick, the flooding has been described as the worst in 80 years.

One way flood mitigation can be addressed is through system-wide regional planning that is shaped by public involvement within a transparent decision process. However, the complex nature of massive public works projects frequently results in inaction. Broader support is needed.

Recent research found that the public’s perceptions about the risk of flooding are slowing Calgary's ability to take the steps it should to lessen the damage from future floods.

What Alberta and the rest of Canada needs is a justifiable decision process backed by increasing awareness of the impacts of climate change.

People’s perception of risk impacts their beliefs about flooding and their preferred methods to prevent floods.

For instance, after experiencing a flood event, people’s concerns about repeating the experience diminish over time. This makes sense. The motivation to prevent future disasters as an event is high, but it decreases as time elapses.

Since personal memories and emotions from large-scale events come and go, many studies have suggested that if we can change the underlying belief systems that drive people's actions, we would encourage proactive steps to prevent future flooding.

One way to do this is to strengthen people's awareness of the link between climate change and flood risk. Once the public recognizes that extreme weather, including flooding, is scientifically attributed to climate change, subsequent events reinforce this concern and a desire to take mitigation steps.

After the 2013 flooding in Calgary, a survey found people grasped the future risk of flooding in the short-term (five-year), but not for long-term (100-year).

For the rest of this article, please visit www.jocurl.com.
Maple Ridge sets North American record for sewer pipe bursting technology

Jean Soersen

Trenchless technology took a major leap forward when a B.C. company and Fraser Valley municipality were recognized regionally for a record breaking, pipe bursting project that converted a smaller 15-inch sewer line, under-sized for a developing area, into a 34-inch line running through an environmentally sensitive area.

"The intent of upsize had never been achieved in North America," said David O'Sullivan, owner of PW Trenchless Construction Inc., the project contractor and services a 15-inch pipe to 28 inches on four sections but then upgraded the 15-inch line to 34 inches over three sections in the Maple Ridge area.

Technical literature on pipe bursting recommends only up-sizing three sizes or 127 percent, but PW Trenchless was able upgrade nine sizes or 127 percent.

The feat was recognized as one of the most challenging projects by a member at the North American Society of Trenchless Technology (NASTT) 2018 No-Dig Show held in Palm Springs California in March. Sullivan attended with the City of Maple Ridge's Velimir Stetin, P.Eng., to present on the up sizing. The team carrying out the work consisted of PW Trenchless, City of Maple Ridge as contract administrator, TT Technologies as equipment supplier and ISCO Industries as the supplier of heavy-duty polyethylene pipe.

The challenge facing the city was a burgeoning population in the Albion area and the original sewer line was operating at capacity; especially critical were 2,456 feet of 15-inch diameter PVC sanitary sewer.

The project was originally considered feasible in terms of life span, he said. "The first lining was done in day, said Bontus.

"It would have been very intrusive — we were not sure we could do it. The city and the contractor both took a risk," Velimir Stetin City of Maple Ridge.

Yet, O'Sullivan estimates that only 15 per cent of the B.C. water and sewer pipe replacement work today in the Lower Mainland of B.C. is done by trenchless technology although it has the capacity to reduce costs by an estimated 25 per cent to 60 per cent. Municipalities such as Port Coquitlam, New Westminster and Maple Ridge are leading the way with regular trenchless technology use, he said, although 90 per cent of the B.C. water and sewer pipe asset value of Lower Mainland sewer, water and potable pressure pipelines throughout North America.

Even smaller municipalities on the Prairies have opted into CIPP realizing the cost-savings achieved over excavating and working in an open cut. "Some of the regional governments have banded together to reduce the cost of the contractor mobilizing to the area," he said.

In B.C., Victoria and District of Saanich have both used CIPP.

"Their lines are not that deep," he said, but the roads can be narrow causing traffic congestion over a longer period. Using open cut is used for rehabbing pipe. With CIPP a whole block or more can be done in day, said Bontus.

CIPP technology is going beyond what was originally considered feasible in terms of life span, said. "The first lining was used in 1971 in England and tested after 30 years and found performing better than predicted." The lifelines are given a 50-year life but even that is being predicted to extend to a 75 year life. The first CIPP was used in Canada was in 1976 in Winnipeg.

"B.C. is behind the times," agrees director Bob Taylor of Mar-Tech Underground Services (located in the Fraser Valley) and specializes in trenchless technology.
Winnipeg facing billions in upgrade costs to wastewater treatment systems

JEAN SORENSEN

The city of Winnipeg is facing almost $3 billion in needed upgrades and expansions of its wastewater treatment and city collection system as it attempts to deal with end-of-life equipment. The cost also meets new provincial standards for emptying wastewater into public water bodies.

“I think mostly it is the provincial regulations which have changed and that is causing us to change how we operate,” said city councillor Brian Mayes, who chairs the environment committee responsible for city’s water and waste department.

“But it is not all the result of regulation, as the North End treatment plant has some equipment that is reaching end-of-life and a couple of hundreds of million dollars of upgrades are needed.

The upgrade cost at the city’s North End Wastewater Pollution Control Centre (NEWPCC), which handles 70 per cent of the city’s wastewater, is estimated now at $1.4 billion, while upgrading the city’s storm sewer system is pegged at $1.3 billion as well. The city is in the midst of an upgrade of its second south end wastewater treatment plant at a cost of $335 million.

Duane Griffin, branch head of Winnipeg’s water planning and project delivery, said fortunately the city has an extended timeline to accommodate the vast sewer collection system and it can parcel out the work to meet new regulations.

“We have 27 years,” he said. However, Winnipeg is moving forward on its master plan (due for completion in 2019) which involves remedies such as sewer separation. The city is also spending close to $30 million annually upgrading the sewer lines in city areas.

The North End plant is a different story. Mayes said: “The North End plant, which is the biggest hot potato — it will be the largest capital expenditure in needed upgrades and the city counsellor Brian Mayes, who chairs the environment committee responsible for city’s water and waste department.

“It is a project that has been under discussion for the past decade and equipment at the facility is reaching end of life in 2019. “We are clearly not going to make that,” he said as city approval has been given to the concept of upgrading the plant but no actual plan.

Funding remains a problem. “We have set aside $795 million,” said Mayes. “We will be seeking help from both levels of government (provincial and federal).”

There are two other challenges facing the rebuilt, said Mayes. He said the council needs to decide how to go forward on the proposal to upgrade the NEWPCC (doing the end of life replacement only or a complete upgrade). He also wants to see a decision made before the October fall elections which could mean a council change with different priorities.

Once a decision is made on how to proceed, Mayes said he expects his committee will approach federal and provincial governments for financial support.

“Later this summer we need to make a decision,” he said.

A portion of the NEWPCC rebuild has already started. Jackie Veilleux, the city’s project manager for sewage treatment projects, said the upgrade of the North End plant would require more power to facilitate enhanced nutrient extraction. As a result, the city has commissioned a new $50 million power plant. In February, Black M. McDonald, a construction company that specializes in high voltage construction projects, was awarded the contract as the preferred proponent to design build the power plant upgrade project.

The agreed contract was for $35 million for the two year project.

The upgrade to meet provincial licence requirements will see the NEWPCC remove more nitrogen and phosphates from wastewater material to have reduced pathogens and be usable ground cover on flower beds.

“Almost 80 per cent of the process is going to be brand new,” Veilleux said, adding that while end-of-life equipment is being replaced, the auxillary equipment meshing with the new equipment also needs upgrading.

“We are budgeting for a new screening and grit system,” she said, adding that once the new equipment is installed there will be more stringent screening required.

Also, a new pump station and greater intake feed required. The plant will also provide for wet weather flow — that short rush of water that occurs annually when winter snow in the city thaws. Unless the city can release water, the system will be overwhelmed, she said.

She said several reports on how the project could proceed and where it stands financially have been filed with the city’s finance committee. One of the considerations is building the project in phases. ‘That is under review,’ she said.

While consideration is given to the NEWPCC rebuild, she said her department still has much to keep it busy.

“We have another $335 million project, under construction, she said.

The South End sewage treatment plant, which handles 20 per cent of the city’s wastewater, is currently undergoing a major expansion and upgrade. In addition to the odour control stack and the thermal oxidizer unit, a new bio-filter system is being added. Concentrated foul air sources from a new sludge thickening system and new sludge fermenters will be sent to the facility’s bio-filter for treatment.

Bio filtration is a biological process that converts odour-causing compounds into non-odorous gases and salts. The biofilter system will be housed in a concrete enclosure. The $180 million contract for the work went to Morrisont, Ont-based NAC Constructors, the lowest bidder on a job which will prepare the concrete foundations for buildings and infrastructure for equipment to be installed.

A smaller third plant, which takes only 10 per cent of the city’s wastewater, has already undergone an upgrade.

The longer upgrade facing the city centres on its combined sewers, which make up approximately 31 per cent of the city’s system and are in the older city sections. Normally, water run off from heavy melts or rain and sewage go through the treatment plants prior to release into public waterways. However, during peak run-off periods which overwhelm the treatment plants’ ability, untreated material is discharged into public water bodies.

For the rest of this article, please visit www.jocnl.com.