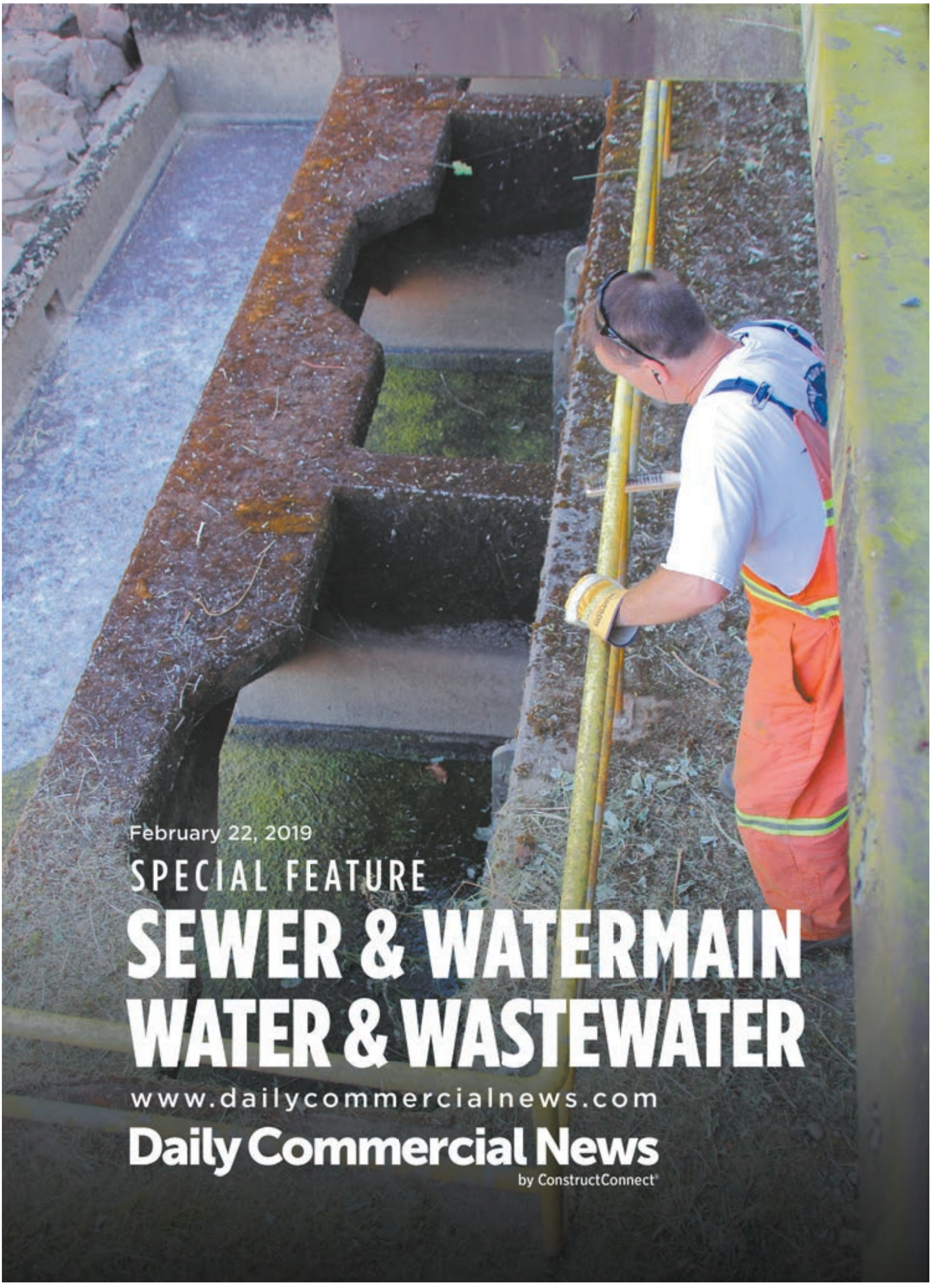

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SPECIAL FEATURE

SEWER & WATERMAIN WATER & WASTEWATER

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Replacement

$14-million water and sewer project sets Sutton, Ont. for its future

DAN O'REILLY
CORRESPONDENT

No doubt residents of Dalton Road in Sutton , Ont. heaved a sigh of relief late last fall when a major two-year $14-million water and sewer replacement was completed.

This closely coordinated York Region/Town of Georgina project included the open cut installation of just over three kilometres of watermains consisting of 400- and 300-mm sections, 120- metres of a 200- mm diameter sanitary forcemain and a 120-long, 300-mm diameter sanitary sewer.

Significant above-ground works were also completed, including a complete repaving of Dalton Road and installing AODA- (Accessibility for Ontarians with Disabilities Act) compliant crosswalks, says York Region manager of engineering Nick Colarusso.

Memme Excavation Company Limited was the general contractor and the design consultant was Cole Engineering.

Dalton Road is a fairly busy thoroughfare with many homes and businesses and is the main route for boaters, fishing enthusiasts, and tourists heading to the nearby Lake Simcoe recreation area during the summer months.

Combined with a relatively narrow right-of-way, that traffic volume made construction staging particularly challenging for Memme. It was also trying for residents and business owners who were occasionally without water, sometimes for more than a few hours, he concedes.

> "Some of the as-built drawings were dated from the 1960's when records were not quite as accurate as today,"
>
> Greg Caruso
> York Region

But the project was necessary to replace aging and deteriorating watermains and sewer mains, which in some cases date back to the 1960s, and to accommodate future growth in Sutton and throughout the Town of Georgina, says Colarusso.

To minimize the impact of the construction several measures were put in place including conducting planned shutdowns in service at night. The shutdowns were necessary to make connections with the existing water distribution system, says regional environmental Services Design technologist Greg Caruso.

At least three of the water service disruptions were due to breaks of the existing watermains and not related to the construction, says Caruso highlighting the state of the old infrastructure.

A major complication for the contractor was that several utility lines and even some of the local connections were not in the identified locations.

"Some of the as-built drawings were dated from the 1960's when records were not quite as accurate as today," says Caruso.

Another complication was that partial closures of Dalton Road were necessary to complete some watermain connections. To meet that particular challenge paid duty police officers and the contractor's traffic control personnel worked together to ensure vehicle traffic, public transit, pedestrian movement, road winter maintenance, garbage collection progressed without interruption, he says.

In addition to the combination of the lane closures, the night work, and the mistakenly identified utility locations, the contractor also had to contend with Caruso describes as "unforeseen soil conditions".

Soil containing high levels of benzopyrene, a hydrocarbon, was discovered along the route. But this was in very specific area and did not impact the pace of the project, he says.

Asked how the old system was taken out of service, he explains that once the new one was operational, many sections were decommissioned and capped by grouting the valve chambers. But there were also many spots where the decades-old pieces had to be removed because they would have interfered with the new water and sewer mains, says Caruso.

The origins of the project actually began with the 2012-2014 design of a new York Region feedermain. But once design was completed the Town of Georgina requested that the project be redesigned and expanded to include a new town watermain and a section of a sanitary gravity sewer forcemain as well, says engineering manager Colarusso.

"It just sense to do everything at once to help reduce costs."

An added benefit of the redesigned and more encompassing project was the inclusion of the AODA-compliant sidewalks which wasn't included in the original design, says Colarusso.

THE REGIONAL MUNICIPALITY OF YORK

Memme Excavation Company Ltd. worker working within an open cut trench to cover a newly installed watermain.

Economic Snapshot

LNG will help fuel the B.C. economy in 2019 and beyond

John Clinkard

There is clear evidence that the B.C. economy downshifted in 2018 following unsustainably strong back-to-back gains of 3.2% in 2016 and 3.8% in 2017.

Nevertheless, the combined impact of strong (+7%) growth of exports and a rebound in non-residential construction should cause growth for the year just ended to average in the range of 2% to 3%. Consistent with this estimated solid gain in overall growth, total employment in the province has increased by +57,400 over the past 12 months, the largest gain over a comparable period since April, 2017. Looking forward, according to the most recent CFIB private sector job vacancy survey, B.C. has the second highest private sector job vacancy rate in the country. Industries with significant shortages of labour include accommodation and food services, healthcare, retail sales and construction.

After posting a very strong year-to-date gain of 8.3% in 2017, consumer spending, reflected by inflation-adjusted retail sales, is up by a very modest 0.6% during the first eleven months of 2018.

This slowdown is largely the result of a -0.5% drop in sales of new motor vehicles following a 12.3% year-to-date gain in 2017. While B.C. consumers scaled back their spending in 2018, two indicators point to a stronger pattern of spending in 2019.

First, over the past six months through January of 2019, total employment is up by just shy of 68,000, well ahead of the 9,000 job gain during the same period a year prior. Second, although gas prices in British Columbia are still the highest in the country, they have, over the past six months, declined by 15% to 20%.

While this decline is smaller than experienced by other provinces, it will give a tangible boost to the disposable incomes of the approximately two and a half million owners of passenger cars with internal combustion engines.

Hobbled by a lack of affordability, higher mortgage rates, the federal government's stricter mortgage qualification rules and higher provincial taxes on foreign house buyers, existing home sales in British Columbia dropped by 24.8% and average house prices retreated by 1.3% in 2018.

In response to this sharp drop in sales of existing homes and a steady increase in the number of completed and unoccupied new homes, (which are at a three-and-a-half year high and mostly (69%) located in Vancouver) it is not surprising that housing starts in the province over the twelve months ending January of this year are down by 9.6% compared to the same period a year earlier.

Looking forward, while the above-mentioned negative factors will continue to weigh on residential construction over the near term, housing demand should stabilize due to the impact of sustained net international migration plus the above-noted recent strength of total employment. For the year, we expect starts to total in the range of 36,000 to 39,000 units down from 41,000 in 2018. Assuming that employment moderates in 2020 due to a softening in both domestic and external demand, housing starts should ease further into the range of 33,000 to 36,000.

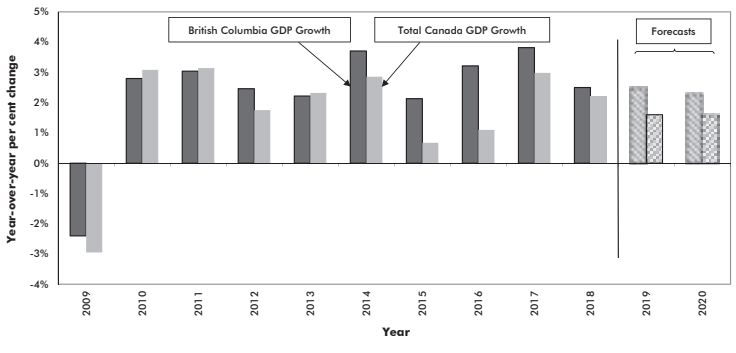
Led by a 21% year-to-date increase in commercial building, constant dollar investment in non-residential building construction rebounded by 17.9% ytd in 2018 following a drop of 9.7% during the first eleven months of 2017.

Also, institutional and government building was up by +16.8% while industrial posted a more modest 2% gain. While the most recent B.C. Major Project Inventory reported that in the third quarter of 2018 the total value of major construction projects was off by -1.2% year over year, more recent evidence indicates that the LNG Canada natural gas project, with an estimated cost of $40 billion, will give a major boost to the province's growth this year and indeed over the next several years. Other significant projects which started in the third quarter include the Dockside Green Development in Victoria, the Abbotsford Law Courts and the Hilton Hotel and Residential Tower in Surry.

Based on the fact that the value of non-residential building approvals in the province was up by 30% y/y in 2018 largely due to a 49.2% rise in commercial project approvals, the contribution of non-residential investment to overall growth should remain strong into 2020. However, the longer-term outlook for British Columbia is severely overshadowed by recent increases in its business taxes which, on top of its carbon taxes (the highest in North America), have given the province the highest marginal effective tax rate on new investment in the country. As a result, the province is less attractive to both new and existing firms attempting to sell goods and/or services in an increasingly competitive international marketplace.

John Clinkard has over 35 years' experience as an economist in international, national and regional research and analysis with leading financial institutions and media outlets in Canada.

Real* Gross Domestic Product (GDP) Growth – British Columbia vs Canada



* "Real" is after adjustment for inflation.

Data Sources: Actuals — Statistics Canada; Forecasts — CanaData.
Chart: ConstructConnect — CanaData.

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Logistics

Delicate planning needed for $40-million Whitby sewer project

DAN O'REILLY
CORRESPONDENT

A major multi-phased redevelopment of a large quadrant of northwest Whitby is the driver of a $40-million sewer project which comes with its fair share of challenges and obstacles.

Not only did Highway 401 have to be traversed, thick bedrock and two provincially significant wetlands are along the route of the Jeffery Street Sewage Pumping Station and West Whitby Sanitary Trunk Sewer project.

"We wanted to minimize any impacts to the wetlands," says Durham Region project manager Jeff MacDonald, in explaining why a 100 per cent tunneling operation was chosen.

Bolton-based Dibco Construction Ltd. was the tunneling contractor for the 2.4-kilometre-long, (1.5-mile) 20-metre-deep, (65-foot) 900-mm to 1,200-mm sewer which extends from the existing Jeffery Street pumping station south of Highway 401 in a northwest direction under the GO Transit/CN Railway Line and the highway to Dundas Street.

The tunnel sections were connected by five shafts which were spaced periodically to accommodate tunnel drive lengths and changes in horizontal alignment, he says.

Construction started in late 2016 and is targeted for completion this July. At this stage the actual tunneling has been completed and concrete pressure pipe installation and manhole construction are now underway, says MacDonald.

KENAIDAN CONTRACTING LTD.

An aerial view of a portion of the Jeffrey Street Sewage Pumping Station and West Whitby Sanitary Trunk Sewer project which came with a variety of challenges, among them were traversing and working around Highway 401, thick bedrock and two provincially significant wetlands. Construction started in late 2016 and is targeted for completion in July 2019.

For the most part, the tunneling was a straightforward five-day-a-week process with only one tunnel boring machine. However, the shifts had to be modified periodically to meet the contract schedule, he says.

Overseen by general contractor Kenaidan Contracting Ltd., the project also includes the building of a new more technologically advanced Jeffrey Street sanitary sewage pumping station. Its output will vary and increase as the development of the West Whitby lands progresses.

"The 3,800 homes it will service translates to an approximate average flow of 154 litres per second."

Design started in 2014, with Aecom completing the design of the pumping station, while WSP was the consultant for the sanitary sewer, says MacDonald.

Although the old station will be demolished, the feedermain and some of the below ground infrastructure components will be retained, says MacDonald.

And that demolition will commence as soon as the now-underway commissioning of the new structure is completed, says Kenaidan project manager Christopher Stewart.

Asked to highlight some of the project challenges, he points out that both the tunnel and the founding elevation of the pump station are in shale bedrock and that required extensive monitoring and ventilation of methane gas.

The remote nature of the tunneling shafts also meant that several access roads had to be built and maintained regularly, especially throughout the winter, to ensure they remained passable at all times.

As well, the tight delivery timetable also necessitated significant winter concrete pouring and the precautions that entails.

"It is the regular challenges of working with concrete in the winter," says Stewart, stressing the need for heaters and concrete blankets.

About 30 workers were on site at the peak of the project which occurred about January 2018, says Stewart.

The sewer is needed to ultimately service approximately 500 hectares of developable land in the West Whitby Secondary Plan Area which is bounded by Lyndebrook Road to the north, the town's existing built boundary to the east, Highway 401 to the south and Lakeridge Road to the west.

Approximately 7,600 housing units and mix of industrial and commercial buildings will ultimately developed there. Servicing for some of the Phase 1 subdivisions has started and, in some areas, completed, says Alex Lam, manager of development engineering and environment services with the Town of Whitby's public works department.

KENAIDAN CONTRACTING LTD.

A new Jeffrey Street sanitary sewage pumping station is being built as part of the $40-million sewer proejct in Whitby, Ont.

Upgrade

Trenchless tech helps deliver $11-million Nickel Lift Station upgrade in Sudbury

DAN O'REILLY
CORRESPONDENT

Construction on the rock hard Canadian Shield is never easy at the best of times and comes with even more complications when it involves diverting a community's sewage from one treatment plant to another, as was the case with the $11-million Nickel Lift Station upgrade and forcemain project in the City of Greater Sudbury.

This recently completed two-component project involved the construction of a two-metre-deep 2.9-kilometre-long, (1.8-mile) 600-to 750-mm forcemain from the Nickel Lift pumping station in the community of Copper Cliff to Sudbury's wastewater treatment plant on Kelly Road and a 600-mm gravity sewer along that road.

> "Trenchless technology is used by the city when there is a need to avoid any major disturbance/impact,"
>
> Akli Ben-Anteur
> City of Greater Sudbury

Although open cut was used for much of the route on a city-owned right of way on Regional Road 55, trenchless technology had to be utilized for some sections with either natural or man-made barriers, says Akli Ben-Anteur, the city's water and wastewater projects engineer

"Trenchless technology is used by the city when there is a need to avoid any major disturbance/impact to existing infrastructure, environment, business and residents."

Certainly, a lot of rock was encountered during the excavation and the main challenge was to maintain uninterrupted service to the community, he points out.

In this particular project Greeley Ontario-based Marathon Drilling Co. Ltd. used a combination of horizontal drilling and a jack and bore operation to cross under a CP rail line, Regional Road 55, a privately-owned rail bridge, Nickel Street, and a small water crossing.

The exact breakdown was a 140-metre-long (459-foot) stretch to jack and bore under the bridge, rail line and highway and horizontal drilling below the creek and the street for a total distance of 430 metres (1,410 feet), says Ben-Anteur.

Locally based Denis Gratton Construction Ltd. was the general contractor overseeing the construction of the forcemain which commenced in December in 2017 and was completed this January.

The second phase of the project was the installation of new pumps and significant upgrades to the pumping station by Belanger Construction Ltd. That work started in early 2018 and is scheduled for completion this month (February), says Ben-Anteur.

In a sense the origins of the project are a combination of history and geography. For many decades Copper Cliff was a separate municipality and all its wastewater flows were collected at the Nickel Lift station and pumped to the privately owned Inco (now Vale Inco) wastewater treatment plant.

"This private wastewater treatment plant is at its end of life cycle and is in a state of disrepair and it became apparent that we needed to find a solution," says Ben-Anteur, in explaining the need for the project.

A major recommendation in the city's water and wastewater master plan was to transfer all of Copper Cliff's wastewater to the Kelly Road plant because of its proximity and has the available treatment capacity, he points out.

Design work by consultant R.V. Anderson Associates Limited began in 2016.

The new forcemain came in operation in December and switch from the old to new systems was achieved without major complications thanks to a risk management plan and other intensive studies, says Ben-Anteur.

No environmental assessment was required as the forcemain was installed on the city's right of way using the trenchless technologies and the required upgrades to the station were completed entirely within the building.

The project also included a watermain upgrade and road reconstruction with bike lanes along Kelly Lake Road from the wastewater treatment plant to Lorne Street, he says.

CITY OF GREATER SUDBURY

The $11-million Nickel Lift Station upgrade and forcemain project in Sudbury, Ont. was recently completed.

Take a Gander!

Gander's new $35-million wastewater plant a record project for the town

DON PROCTER
CORRESPONDENT

Gander made headlines in September 2001 when its airport accommodated dozens of trans-Atlantic passenger planes, not permitted to fly in American air space after the terrorist attacks on Sept. 11.

Today's headlines in the town of 11,000 residents in northeastern Newfoundland don't compare but Gander is making news in the region for the construction of its biggest project-ever — a $35 million wastewater treatment plant.

> "It was a challenge finding a big pot of money to facilitate a project of this magnitude for a small town like Gander,"
>
> James Blackwood
> Town of Gander

The Gander Wastewater Treatment Plant — slated for completion late this year — is being done through a tripartite agreement between the federal and provincial governments and the Town of Gander which is contributing more than a third of the total, says James Blackwood, director of engineering, Town of Gander.

"It was a challenge finding a big pot of money to facilitate a project of this magnitude for a small town like Gander," says Blackwood, noting that a decade ago the need for a new plant became clear. Loan financing will be repaid overtime largely through property taxes.

The treatment facility will replace two wastewater plants that don't meet the Federal Wastewater Systems Effluent Regulations (WSER). The two plants — Beaverwood and Magee Road — will be demolished.

The new plant is designed to accommodate the needs of Gander over the next 25 years. It is projected to grow to about 18,000 residents by 2040.

The facility is being built in two phases. The linear infrastructure which includes a lift station and a transmission main to transport sewage from two existing sewer sheds to the plant is nearing completion as part of phase one. It is a traditional design-bid build by Springdale Forest Resources Inc., based in Springdale, Nfld., says Blackwood.

One of the first challenges was how to transport sewage from the sheds to the new plant over "fairly flat topography," says Greg Sheppard, senior civil engineer, CBCL Limited, the owner's technical consultant. "It was a little tricky."

The 1.6 kilometre and 800-metre trunk sewers meet at a common sewage pumping station which will pump it to the new facility east of Gander, says Sheppard.

The second and larger phase including the main headworks building and lagoons is a design build contract by Pomerlau Inc. EXP is the design engineer.

To meet the new federal wastewater regulations, the system will have a combined sewer overflow which treats stormwater, says Sheppard. The plant will have a four-cell lagoon system covering an area of 500 by 200 metres.

Sheppard says overall the big project has gone smoothly, with only minor changes.

He doesn't expect Pomerlau to face skilled labor shortages during peak construction later this year because there is a sizable pool of workers in the area which is experiencing a sluggish economy.

The plant is scheduled for completion in November at which time there will be a one-year performance testing period.

TOWN OF GANDER

Gander's $35-million wastewater treatment plant project is the town's biggest project ever.

TOWN OF GANDER

The new Gander Wastewater Treatment Plant will replace two wastewater plants which don't meet wastewater regulations.

Peel's east-west trunk sewer diversion another piece in region's servicing puzzle

DAN O'REILLY
CORRESPONDENT

Planning and delivering wastewater treatment service in Peel Region almost seems like a massive jigsaw puzzle.

The next carefully thought-out big move will be the tunnel construction of the 11-kilometre $250-million, 2,400-mm East to West Diversion Trunk Sewer. Design by Jacobs Canada Inc. (formerly CH2M Hill) started in 2017 and will be completed later this year, says Ajay Puri, the region's wastewater division project manager.

Construction will commence in April 2020 and it will require both a rock tunnel boring machine and earth-pressure balance TBM because of the different ground conditions along the route, he says.

"Prequalification of contractors will begin either later this year or early next year."

Servicing Mississauga, Brampton, and parts of Caledon, the region's wastewater system is comprised of two principal trunk systems. They include the west trunk system which delivers flows to the Clarkson Wastewater Treatment Plant and the east trunk which sends sewage to the G. E. Booth Wastewater Plant, which is often simply referred to as Lakeview.

To be built primarily along Derry Road from Pearson International Airport, the diversion trunk will ease pressure on Lakeview by redirecting it to the west trunk system and then to the Clarkson plant which has been the focus of a number of expansions during the past few years.

Once the diversion is completed it will enable the region to facilitate retrofits and expansions at either plant—although as Puri notes—"Lakeview has only so much land to grow."

A master servicing plan which the region aims to update every five years or so pinpointed the need for the diversion to provide greater flexibility to support greenfield development in Brampton and intensification in Mississauga, he says.

The Derry Road corridor was chosen because it is shorter and less built up compared to a more southerly route that had also been under consideration, says Puri.

Last year the Region approved new wastewater standards to limit groundwater infiltration and inflow and that will have major impact on this project. The winning contractor or contractors will have to install concrete pipe which must pass a minimum 50 PSI water (pounds per square inch) pressure test.

"Peel Region is a leader in developing these standards and other municipalities are now considering them. This (water infiltration) is a real problem."

At a sewer and watermain conference, which Puri attended, a consultant showed a CCTV image of a sewer into a new development which had water flowing through it even though the homes hadn't even been connected to the sewer, he says.

Manufacturers are aware of the new standards and he doesn't foresee any fabrication problems or supply delays. Pipes meeting the 50-PSI criteria have been installed in one previous Peel project, the East Brampton trunk sewer.

Similarly, he believes there will be minimal inconvenience to adjacent homes and businesses along the route. Most of the seven entry/exit shafts for the TBMs will be located in either industrial areas or parks and the region is currently negotiating with the small number of impacted owners, he says.

There may also be an opportunity to decommission a sewage pumping station in the community of Meadowvale which would eliminate the costs of operating that plant and "lessen the carbon footprint."

However, a small portion of the route of the diversion trunk sewer will be on Creditview Road and that is where the Ministry of Transportation will be building a new bridge as part of a major widening of Highway 401 in the area.

"The bridge construction may impact the progress and scheduling of the tunnel."

As the tunnel will cross under Hurontario Street, there will also have to be close co-ordination with Metrolinx and the City of Mississauga to ensure there will no interference or disruption to that city's Hurontario Light Rapid Transit project, he says.