

WATERLOO LIGHT RAIL TRANSIT (ION STAGE 1)

Transformational Transit in the Heart of Canada's Innovation Corridor



THE CANADIAN COUNCIL FOR PUBLIC-PRIVATE PARTNERSHIPS
2020 NATIONAL AWARDS CASE STUDY

The Canadian Council for
Public-Private Partnerships



Le Conseil Canadien pour
les Partenariats Public-Privé



The Canadian Council for Public-Private Partnerships 2020 National Award Case Studies

National Award Case Studies Gold Award for Service Delivery:
Waterloo Light Rail Transit (ION Stage 1)

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Introduction

For nearly 30 years, The Canadian Council for Public-Private Partnerships and its members from the public and private sectors have played a strong role in refining the P3 model and promoting new approaches to infrastructure development and service delivery.

Governments across Canada are using the public-private partnership (P3) model to build, maintain and operate much-needed infrastructure, from schools and hospitals to bridges and highways. In 2021, there are close to 300 active P3 projects in operation or under construction valued at more than \$139.4 billion.

Along the way, the 'made-in-Canada' P3 model has become globally renowned but, as the winners of the 2020 National Awards for Innovation and Excellence in Public-Private Partnerships demonstrate, it has never stopped evolving.

This year, CCPPP is publishing three case studies on these exemplary projects, joining the more than 80 that have been published to date. Designed to inspire others to consider innovative and efficient models for procuring infrastructure, the studies highlight many of the lessons learned about P3s. Each case provides a close look at how a successful P3 has worked, including how the partnership was established, its structure and operation and its resulting benefits.

It is important to learn from these complex projects as we move forward. After all, investment in infrastructure is critical for the future of our communities and country because it creates jobs, drives growth, stimulates productivity, and builds a legacy for us to thrive.

Canadians want — and expect — critical infrastructure to be built quickly and with the best value for taxpayers. Using public-private partnerships is an advantage given their fixed price, on-time private sector delivery commitment, risk allocation and improved life cycle maintenance and operations.

In 1998, CCPPP established the National Awards for Innovation and Excellence in Public-Private Partnerships to honour governments and/or public institutions and their private sector partners who have demonstrated excellence and innovation in P3s. Gold, silver and bronze Awards of Merit are given in the areas of project development, financing, infrastructure, service delivery or other notable attributes to projects from across the country and at all levels of government.

Winning projects are chosen on the basis of the following criteria:

- Innovative features;
- Relevance or significance as a national and/or international model;
- Economic benefit (job creation, enhanced economic value, export potential, etc.);
- Measurable enhancement of quality and excellence of service or project;
- Appropriate allocation of risks, responsibilities and returns between partners; and
- Effective use of financing and/or use of non-traditional sources of revenue.

2020 Award Winners



Waterloo LRT ION Stage 1 — Gold Award for Service Delivery

This 19-kilometre LRT system, which opened in 2019, has already transformed travel in one of Canada's key high-tech startup scenes. The ION corridor in Ontario's Kitchener-Waterloo area passes through two historic downtowns, a university campus and business parks and is fully integrated into the region's bus network, cycling and pedestrian routes. Using the P3 model achieved estimated cost savings of 12 per cent compared with traditional procurement. The awards committee noted that for the first year and a half of service GrandLinq and the OM&R provider Keolis improved system performance and met operating and maintenance targets, despite the challenges of the COVID-19 pandemic. The project is also helping limit urban sprawl and protect farmland by intensifying development in existing urban areas.



Energy Services Acquisition Program (ESAP)/Energy Service Modernization (ESM) Project — Gold Award for Project Development

This ambitious \$1.8-billion initiative is modernizing energy centres in five locations — some of which date back almost a century — to provide heating and/or cooling for 80 buildings in the nation's capital, including Parliament. The upgrades will lower operating costs for taxpayers and help reduce the Canadian government's energy consumption and greenhouse gas emissions. This design-build-finance-operate P3 is set to reach substantial completion in 2025, followed by 30 years of operations and maintenance. The awards committee noted the project is complex because it involves the private sector mitigating risks from federal and interprovincial brownfield construction, six years of interim operations during construction, as well as factoring in protections for heritage assets. It also has built in flexibility to potentially expand the modernized district energy system to other public and private buildings in the region.



Regina Bypass — Gold Award for Infrastructure

Opened in 2019 after four years of construction, the Regina Bypass is the largest transportation infrastructure project in Saskatchewan history and its single largest job creator. Improving traffic safety and mobility were the key drivers for the project, the awards committee noted. Previously, residents and visitors to the communities east of Regina had to cross the Trans-Canada Highway on non-signalized at-grade intersections, potentially in inclement weather with poor visibility. Since the bypass was completed, there has been a marked reduction in collisions. The \$1.88-billion project involved building 12 interchanges, 60 kilometres of four-lane highway, 55 kilometres of

new service roads, twinning on Highway 6, as well as the province's first highway roundabouts.



Corner Brook Acute Care Hospital — Silver Award for Project Development

The project involves the development of a new 164 bed acute care regional hospital to serve the people of western Newfoundland. The project is the largest capital project ever contemplated in Newfoundland and Labrador and faces the challenge of being constructed in a lightly populated area. Using the P3 model for the project is estimated to have resulted in cost savings of \$90 million compared with traditional procurement. The awards committee noted the project is using technology to find innovative design, operational and environmental solutions to help in the delivery of care, as well as in reducing long-term operational costs and the site's carbon footprint.



Highway 104 Sutherlands River to Antigonish Twinning Project — Silver Award for Project Development

The twinning of this stretch of Nova Scotian highway, from the boundary with New Brunswick to Antigonish, has been a significant community concern for years to help reduce fatal collisions. It is also the first highway P3 project in the province in more than 20 years and was one of the first P3 projects to reach financial close last spring in the midst of highly volatile financial market conditions caused by the pandemic. Among other things, the awards committee noted that considerable cooperation and flexibility were required by all parties including government, bank lenders and bond underwriters/purchasers to close the project — and with no impact on overall project duration.

Acknowledgements

CCPPP has a team of dedicated Award selection committee volunteers who review the applications, select the winners and provide feedback on the case studies. Using their extensive P3 knowledge and experience, they select the winners from a pool of very qualified applications and then ensure the case studies provide a learning tool for seasoned practitioners, as well as those new to the P3 model. The following panelists comprised the 2020 selection committee:

- Cliff Inskip, Chair of the Awards Selection Committee and President, Polar Star Advisory Services Inc.
- Shariq Alvi, Managing Director, Infrastructure and Project Finance, CIBC
- Rupesh Amin, Founder and CEO, Conquora Capital Partners Inc.
- Peter Hepburn, Managing Director and Head, Infrastructure and Project Finance, National Bank Financial Markets
- Alain Massicotte, Partner, Blake Cassels and Graydon LLP
- Johanne Mullen, Partner, National Capital Projects and Infrastructure Leader, PwC Canada
- Dr. Alan Russell, Professor Emeritus & Chair, Computer Integrated Design & Construction, Department of Civil Engineering, University of British Columbia
- Brad Nicpon, Partner, Real Property & Planning Group, McCarthy Tétrault LLP
- Lindsay Wright, Senior Manager, Global Infrastructure, KPMG

Deborah Reid and Jennifer Robinson authored the 2020 Award Case Studies, which were developed with significant input and review from the project partners and procurement agencies as well as the diligent work of the researchers. CCCPP would like to thank them for their contributions as well as Infrastructure Canada for its research support for the case studies.



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About CCCPP

Established in 1993, CCCPP is a national not-for-profit non-partisan, member-based organization with broad representation from across the public and private sectors. Our mission is to collaborate with all levels of government, Indigenous communities and the private sector to enable smart, innovative and sustainable approaches to developing and maintaining infrastructure that achieve the best outcomes for Canadians.

Our reports, case studies, guidance and surveys are available on CCCPP's online bookstore at www.pppcouncil.ca/web/bookstore.

Additional resources include: P3 Spectrum (www.p3spectrum.ca), Canada's premier source for up-to-date P3 project info.

Waterloo Light Rail Transit (ION Stage 1) Project¹

Project type

Design-Build-Finance-Operate-Maintain (DBFOM)

Asset/Service

33-year DBFOM agreement for a 19-kilometre light rail transit (LRT) system with 19 stops linking the Ontario cities of Waterloo and Kitchener, plus an operations, maintenance and storage facility.

Construction period:

- 3 years

Operations period:

- Up to 30 years (minimum 10 years, renewals every 5 years thereafter)

Maintenance and rehabilitation period:

- 30 years

Status

Operational June 21, 2019

Partners

Public Sector

- Regional Municipality of Waterloo, ON

Private Sector

- GrandLinq General Partnership comprised of:
 - Plenary GrandLinq GP Inc.
 - Meridiam Infrastructure Waterloo LRT ULC
 - Aecon GrandLinq GP Inc.
 - Kiewit Waterloo Investors Corp.
 - Keolis Waterloo General Partner Inc.

Other participants

Public Sector

- Infrastructure Ontario – Procurement Advisor
- Norton Rose Fulbright Canada LLP – Legal Advisor
- Deloitte LLP – Financial Advisor
- P1 Consulting – Fairness Advisor

Private Sector

- Peter Kiewit Infrastructure Co. – Design/Builder
- Aecon Construction and Materials Limited – Design/Builder
- AECOM – Engineer of Record
- Keolis Grand River L.P. – Operations, Maintenance and Rehabilitation Contractor
- Blake, Cassels & Graydon LLP – Legal Advisor
- CIBC World Markets – Financial Advisor

Project cost, financing and Value for Money (VfM)

Cost of DBFOM construction (nominal dollars)

- \$583 million

Sources of Capital (nominal dollars)

- Private sector – DBFOM
 - Equity – \$27 million
 - Long-term bonds – \$103 million
 - Short-term credit facility – \$40 million
- Public sector – DBFOM and non-DBFOM
 - Government of Canada – \$265 million
 - Government of Ontario – \$300 million
 - Regional Municipality of Waterloo – \$253 million

Payments – DBFOM

- Monthly construction milestone payments during construction period with 15 per cent held back
- Construction completion payment comprised of the sum of amounts held back from milestone payments
- Monthly performance-based availability payments during OM&R period

Value for money – DBFOM

- 12.1 per cent

¹ Background and facts in this case study rely on the information contained in the award application submitted jointly by the project partners in September 2020 to The Canadian Council for Public-Private Partnerships. Information from the submission has been supplemented and updated with information from the procurement documents, project documents, other sources as noted and personal interviews with project partner representatives.

Project highlights and innovative features

- The project is producing wide-ranging socio-economic and environmental benefits for the Region of Waterloo including increased development, more jobs and reduced traffic congestion.
- It has met the expectations of encouraging a more compact urban form and protecting valuable agricultural land by attracting commercial and residential development to the transit corridor.
- The light rail transit (LRT) system is fully integrated with, and forms the spine of, the existing Grand River Transit (GRT) bus network with multiple transfer nodes, coordinated schedules and a common fare structure.
- A section of track is shared with heavy rail, saving urban green space and facilitating the needs of local industry.
- Stations were designed and constructed to be user friendly, easily recognizable and accommodate future passenger growth with minimal impact to operations.

Project websites

<http://rapidtransit.regionofwaterloo.ca/en/multimedialibrary/Project-Agreement.asp>

http://rapidtransit.regionofwaterloo.ca/en/multimedialibrary/Reports2014.asp?_mid_=26025

<https://www.grt.ca/en/ion-light-rail.aspx>

<http://rapidtransit.regionofwaterloo.ca/en/resourcesGeneral/ION-Story-Fall-2016-access.pdf>





Overview

Known as the “Creative Capital of Canada,” the Regional Municipality of Waterloo (the Region)² was the fastest growing metropolitan area in the country in 2019 with a population of more than 600,000. Located in the heart of southwestern Ontario’s greenbelt, the Region is about 100 kilometres northwest of Toronto and more than double the size of Toronto in area at 1,369 square kilometres.

Its two universities, Waterloo and Wilfrid Laurier, have spawned some of the world’s most talented computer science and engineering graduates, including smartphone inventor and BlackBerry founder Mike Lazaridis, Engineers without Borders co-founder Parker Mitchell, and Ethereum and *Bitcoin Magazine* co-founder Vitalik Buterin. The University of Waterloo is also home to Donna Strickland, the first woman to win a Nobel Prize in Physics in more than 50 years.³

The Region incorporates seven lower tier municipalities (three urban and four rural) and is responsible for, among other services, public transit and land-use planning through the authority of the *Ontario Municipal Act*. Its development plans place an importance

² A regional government in Ontario is a federation of the local municipalities within its boundaries. Regions are referred to as “upper tier” municipalities and provide services such as: arterial roads; transit; policing; sewer and water systems; waste disposal; region-wide land use planning and development; as well as health and social services. Depending on its size and its history, a local municipality may be called a city, town, township or village. They are referred to as “lower tier” municipalities when there is another level of municipal government like a region involved in providing services to residents.
<https://www.amo.on.ca/about-us/municipal-101/ontario-municipalities> (Accessed March 23, 2021).

³ <https://blog.waterlooeo.ca/facts-university-waterloo> (Accessed March 23, 2021).

on growth management with a focus on providing the amenities of a large urban centre while maintaining the charm and character of a smaller rural community.

The vision for a light rail transit (LRT) system to connect the Region’s three cities (Cambridge, Kitchener and Waterloo) was first raised in its 1976 Official Plan with the identification of a Central Transit Corridor (CTC) to act as a “nucleus for a transportation system using other means of travel, such as light rail transit.” In 2003, the Region approved a framework for future residential and employment growth focused along the CTC and supported by the construction of a light rail transit system.

Following public consultation on the LRT route and environmental issues, and an examination of procurement and delivery models, the Regional Council determined the best delivery model for the light rail portion of the rapid transit project was a design-build-finance-operate-maintain (DBFOM) public-private partnership (P3).

Regional Council selected this approach as it provided the best balance of government control and ownership, while transferring appropriate risks to the private sector. It also enabled it to take advantage of private sector innovation and provided the greatest assurance for completing the project on time and within budget.

Once the decision was made in 2011 to go ahead with light rail transit, direct economic impacts emerged, and since then, new building permits valued at more than \$3 billion have been issued by the Region. In particular, Google attributes its decision to locate its Canadian headquarters in Kitchener to the presence of the LRT system.

Choosing a name for the project was just as important as choosing the delivery model. Through public consultation, the Region asked residents what they felt was a good name for the service. The intent was to have a name that was edgy, gave the impression of motion and reflected “the tech-savvy nature” of Waterloo Region. “ION,” symbolizing an electrically charged atom that is always in motion, was the top pick by residents and was officially adopted as the name of the service in mid-2013.

In January 2014, after a competitive P3 procurement process, GrandLinq General Partnership was selected by the Region as the preferred proponent to deliver the DBFOM portion of the light rapid transit project. GrandLinq’s bid included a combination of equity and private financing to fund the construction costs. Using the P3 model for the DBFOM project achieved estimated cost savings of

12.1 per cent compared with traditional procurement. Additional funding for both the DBFOM and non-DBFOM project costs was provided by three levels of government — Canada, Ontario and the Region.

On June 21, 2019, Stage 1 of the Waterloo ION LRT system launched, marking a milestone day for Waterloo Region and for light rail transit projects across Ontario.

Free access was provided for 330,000 riders during the first 11 days of service. During the first few months of operation, the 19-kilometre LRT system had already transformed travel in one of Canada's key high-tech startup communities. The ION corridor passes through two historic downtowns, a university campus and business parks and is fully integrated into the Region's bus network, cycling and pedestrian routes.

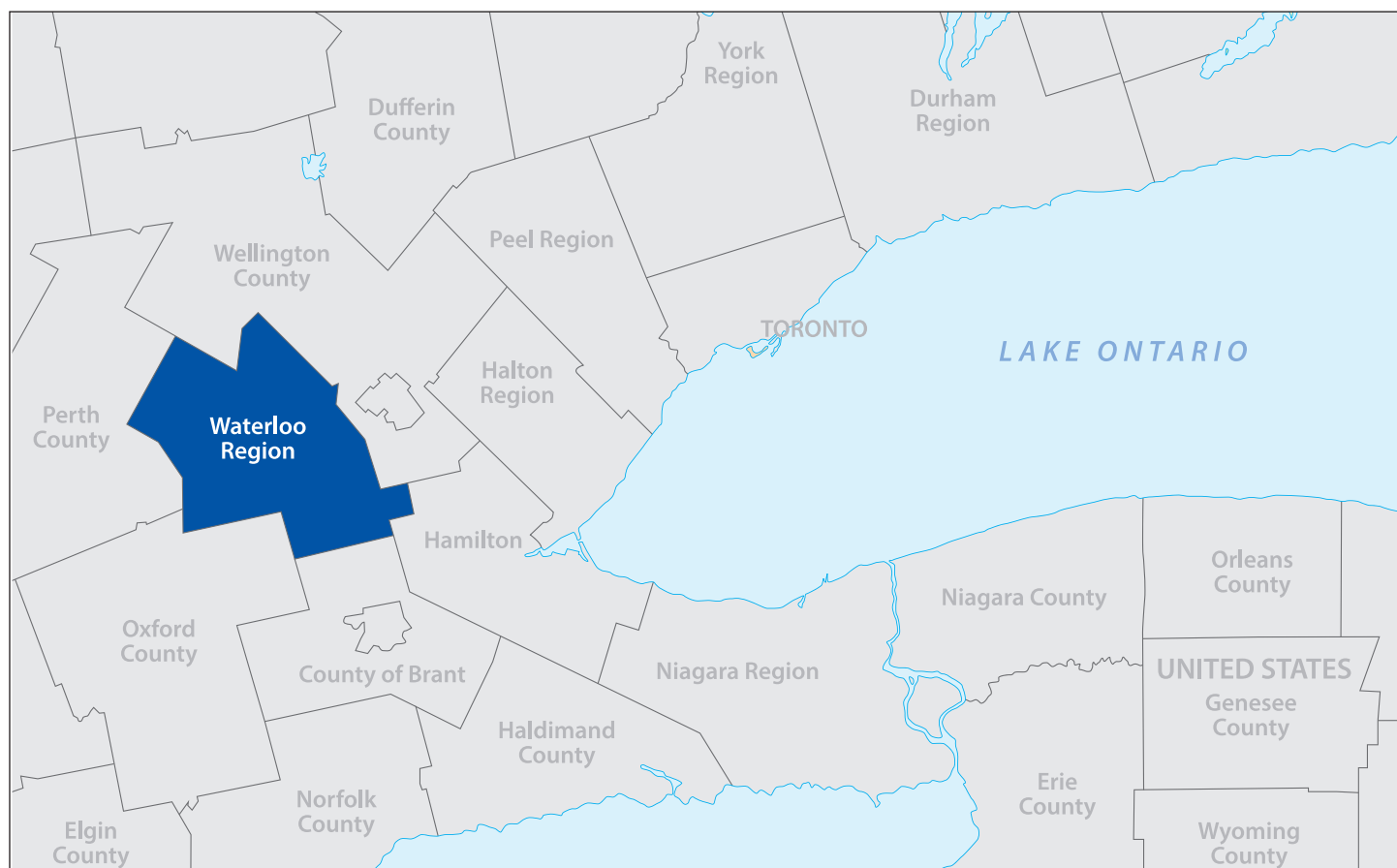
The project was chosen by the Awards Committee of The Canadian Council for Public-Private Partnerships (CCPPP) to receive the

2020 Gold Service Delivery Award. In its first year and a half of service, GrandLinq and the OM&R provider Keolis Grand River L.P. (Keolis) have improved system performance and met operating and maintenance targets, despite the challenges of the COVID-19 pandemic. The project has met and continues to meet its expectation of encouraging intensification upwards in existing core urban areas, instead of outwards, thus protecting the Region's precious farmland.

It is a transformational community project that will shape Waterloo Region for decades to come. This case study highlights the features that make the project an innovative and successful P3 and shares the experiences and lessons learned to benefit future P3 transit projects.

Figure 1 shows the location of the project.

Figure 1: ION Stage 1 project location



Background and rationale

The Region's 2003 Growth Management Strategy⁴ included "providing greater transportation choices" as one of its six goals.

Two significant concepts supported these goals:

- Establishing a firm countryside line to limit urban sprawl, protect valuable agricultural lands and maintain the region's rural character; and
- Intensifying the CTC, including the implementation of an LRT system, to leverage capital investment and support the revitalization of the downtown core.⁵

Planning guidelines from the Ontario government's 2006 *Places to Grow Plan*, boosted the strategy with a mandate for the Region to plan for major population growth. With little opportunity to expand the road network in core areas, Regional Council continued to examine rapid transit as the most sustainable solution to meet the community's growth and transportation needs.

A rapid transit environmental assessment began in 2006, followed by the evaluation of rapid transit technologies and route designs the next year. Based on this, bus rapid transit (BRT) and light rail transit (LRT) were short-listed as having the greatest potential to:

- Support development/intensification objectives;
- Manage the use of road/railway corridors to service major destinations; and
- Be compatible with existing and planned neighbourhoods.

In 2009 and 2011, third-party experts in transportation planning, urban planning and policy development conducted reviews of rapid transit technologies. Each time, experts unanimously endorsed light rail transit for the following reasons:

- It was more likely to achieve growth management objectives;
- LRT had a greater potential to attract ridership;
- It was a stronger catalyst to attract development; and
- LRT had a positive influence on land values.

Extensive public consultation was also undertaken to understand the community's needs and to communicate with residents

⁴ Region of Waterloo, Planning Our Future – Regional Growth Management Strategy, July 2003 (<https://www.regionofwaterloo.ca/en/resources/RegionalGrowthManagementStrategy.pdf> (Accessed February 24, 2021).

⁵ Ibid. p. 5.

⁶ The Region of Waterloo and Ontario Infrastructure and Lands Corporation, Project Agreement (Execution Version) The Region Of Waterloo Stage 1 Light Rail Project, Queen's Printer for Ontario, May 6, 2014, p. 1.

about the benefits of a higher order transit system. It could offer social, environmental and economic benefits, including shaping community growth.

Studies also showed that without the introduction of a light rail transit system, the Region would need to build 500 new land kilometres of roads over the next 20 years to accommodate expected growth. These new roads would cost approximately \$1.4 billion and would cause significant social and environmental disruption as they would need to be built through existing neighbourhoods.

As a result, in June 2011, a staged approach to building a rapid transit system was approved by the Regional Council. ION Stage 1 includes light rail transit between the cities of Waterloo and Kitchener and bus rapid transit service between Kitchener and Cambridge. The proposed Stage 2 will see light rail transit replace the bus rapid transit service, creating a continuous light rail transit system connecting the Region's three cities.

Regional government objectives

ION has three main objectives to meet the Region's goal of ensuring a sustainable community that facilitates and manages expected growth: move people; shape the community; and limit urban sprawl to protect farmland.

More specifically, the construction of the rapid transit system and the associated infrastructure is expected to have a positive impact on the Region of Waterloo by:

- Providing a core transit artery as part of an integrated, expandable, multi-mode transit network;
- Providing a fast, convenient, safe, comfortable and appealing travel mode choice;
- Facilitating higher-density urban development;
- Increasing transit ridership and reducing traffic congestion;
- Meeting infrastructure needs to address continued population and employment growth; and
- Improving quality of life for residents and travellers.⁶

Project objectives

In addition to the Regional socio-economic objectives noted above, specific objectives for the P3 project included:

- Complete the project on time;
- Complete design and construction as well as operate and maintain the LRT system within the Region's budget;

- Provide and operate the LRT system in a manner that enhances ridership;
- The Region of Waterloo and Ontario Infrastructure and Lands Corporation, Project Agreement (Execution Version) The Region Of Waterloo Stage 1 Light Rail Project, Queen's Printer for Ontario, May 6, 2014, p. 1.
- Design and construct the LRT system in a manner that promotes passenger integration into the transit hub planned at the Kitchener intersection of King and Victoria Streets;
- Design and construct the LRT system to provide a smooth integration with other transportation modes;
- Design and construct the LRT stops in a manner that promotes integration of the station stop with its surroundings; and
- Implement the project to enhance the potential of extending the LRT towards Cambridge.⁷

Description of the Project

ION Stage 1 includes a 19-kilometre light rail transit route from Waterloo to Kitchener with linked bus rapid transit (BRT) service from Kitchener to Cambridge. The latter is not part of the P3 project agreement (the agreement) and is not included in this case study.

Under the agreement, GrandLinq is responsible for the design, construction, partial financing, operations, maintenance and rehabilitation of the LRT system between Conestoga Mall in Waterloo and Fairview Park Mall in Kitchener with 19 stops. The agreement also required GrandLinq to build an operations, maintenance and storage facility (OMSF).

The LRT system is entirely above ground and runs on a single or double right-of-way track along the side of the road or through the centre. The vehicles are given priority on city streets with traffic signals at intersections. Level crossings in other areas are protected by standard railway lights, bells and gates. Traction power (electricity) is provided at 750 volts DC from overhead wires fed from substations along the alignment. The power system is controlled at the Central Control Facility (CCF) located in the OMSF. The vehicle fleet is 15 double-ended Bombardier Flexity Freedom light rail vehicles (LRVs).⁸

A five-kilometre section between Waterloo Square and Northfield Drive is shared with CN local freights, usually outside of LRT operating periods. This existing rail corridor was incorporated into

the project because it is owned by the Region and provides access to the University of Waterloo campus.

The project included upgrading the existing heavy rail track to include grade crossings and railway signaling and constructing a new dedicated LRT track alongside. CN had, and continues to have, limited usage rights to move freight on the upgraded heavy rail track.

Special track modifications were included at the three stations along this section so freight trains will safely clear the LRT platforms. A CN radio is in the control room for contact with CN trains when a freight train movement along the shared track is imminent. The Keolis controller sets up the routing and makes the appropriate releases to permit passage of the CN train.⁹ Sharing this section of rail allowed the Region to reduce costs and protect urban park space. It also simplified the planning/approval process through the Transit Project Assessment Process as it was an existing corridor.

The operations, maintenance and storage facility (OMSF) is located in Waterloo near the Northfield Station and features a fully equipped maintenance shop with six service bays and a wash plant for exterior and interior car cleaning. It also houses the control room, which is staffed 24/7. A display board tracks the location of all vehicles and the status of the power network, and a bank of closed-circuit TV monitors allows controllers to observe station platforms continuously should passengers require assistance. Public address announcements at stations can be made from the control room.¹⁰

The Region owns the system (including all infrastructure and vehicles), sets fares and service levels, collects fares, and provides customer service. Security and fare checking are conducted through a separate contractor.

Stage 2 ION plans have not been finalized. At the time of publication, the Region was in the midst of undertaking the Transit Project Assessment Process required by the Ontario government. Following that a business case must be prepared, funding sourced and procurement options assessed. These processes are expected to take several years.

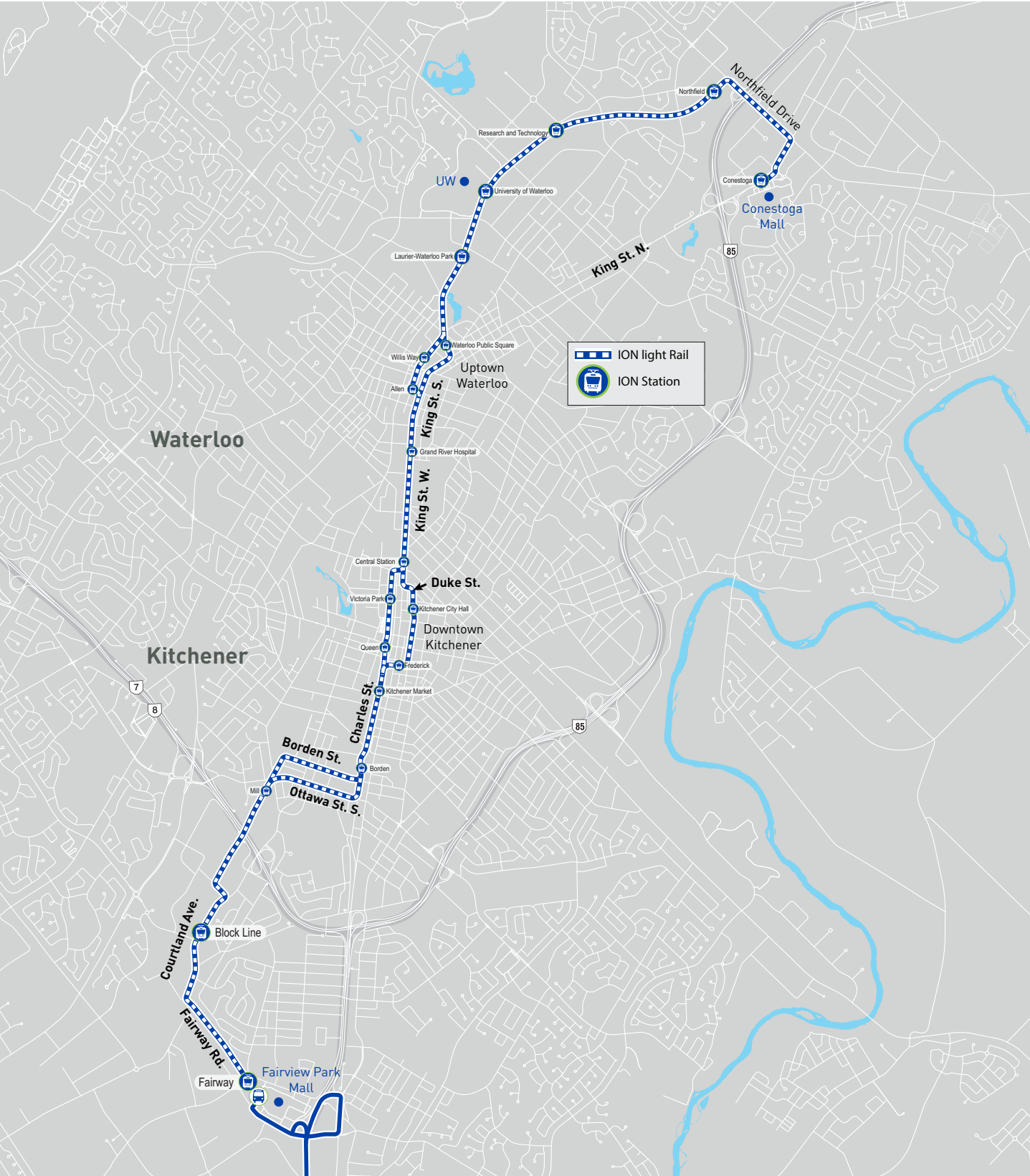
Figure 2 shows the route map for ION stage one transit stations.

⁷ The Region of Waterloo and Ontario Infrastructure and Lands Corporation, The Region of Waterloo Stage 1 Light Rail Project Request for Proposals - Schedule 1 RFP Version 4.0, Queen's Printer for Ontario, 2013, p. 4.

⁸ John Thompson, Canadian Contributing Editor, Kitchener-Waterloo LRT, An in-depth look, Railway Age, July 08, 2019.

^{9/10} Ibid.

Figure 2: ION rapid transit system route map



Service Delivery

Design

The LRT features 19 stations, including stops at the two universities, two city centres (Waterloo Public Square and Kitchener City Hall) and the Grand River Hospital. It also passes through the David Johnson Research & Technology Park in north Waterloo, home to globally leading technology firms, game-changing startups, world-class research institutes, government agencies, and nonprofit organizations.

Every station features:¹¹

- EasyGO platform card readers;
- Fare vending machines;
- Benches for waiting riders;
- Information displays and audio speakers that provide up-to-date information;
- A canopy and shelters for protection from the weather;
- Security cameras and emergency call boxes;
- A yellow platform edge to remind riders to stay clear of the train;
- A black platform edge to indicate where train doors will line up to help riders enter and exit the train safely; and
- Level boarding on all platforms (no steps).

Stations are designed to be easily recognizable as ION stations and share common features and characteristics. Each station is distinguished by an anchor wall with a colour and pattern unique to its neighbourhood. Anchor walls are approximately three-metres square and composed of large tiles in glass, ceramic or stone. Each wall includes illuminated ION and GRT logos and the station's name in a font and size that can be seen clearly from a distance.

Each train is made up of one car approximately 32 metres long with seating for 60 people, including four priority seating areas for those with wheelchairs and mobility devices. There is also room for approximately 140 people standing. Trains are equipped with passenger displays and audio announcements to indicate arrival at each station.

¹¹ GRT website: <https://www.grt.ca/en/about-grt/ion-station-and-train-features.aspx> (Accessed March 25, 2021).

Public art

During the construction period, the Regional Council approved a process to include public art installations at selected ION stations. Community input was sought online and through two interactive workshops to help shape the form and theme of the artworks. Selections were made from submissions by local artists using the Region's two-stage juried process to create unique and creative spaces along the ION route.

Ten stations now have public art installations at or near them that reflect a current or historical aspect of the community. For instance, "Spinal Column," located at Grand River Hospital station, is a bench forged out of a piece of the ION light rail track (see photo below). The bench depicts a spinal column linking it to biology, health and the hospital. It is also a metaphor for ION as the spine of the community and represents manufacturing as the backbone of the region.¹² There is an "ION public art passport" available on the GRT website for anyone to download and use as a guide to exploring all 10 installations.¹³



Rider service

Service is operated from 4:45 a.m. to 12:30 a.m. daily, with a slightly later start time on weekends. Trains typically run every 10 minutes at peak times during the day and every 15 minutes during the evening. The full trip from end to end takes 45 minutes. Fares can be purchased in a variety of ways including: GRT customer service

¹² GRT website: <https://www.grt.ca/en/about-grt/ion-public-art.aspx> (Accessed March 25, 2021).

¹³ ION public art passport, GRT website: <https://www.grt.ca/en/about-grt/resources/ION/ION-public-art-passport-access.pdf> (Accessed March 25, 2021).

centres; vending machines on station platforms; and university bookstores. Riders can use single tickets, a pre-paid “EasyGo” fare card, or monthly or daily passes with pricing customized for seniors, students, veterans and other groups. Riders are able to load their fare cards online.

Fare card readers are located on all LRT station platforms, and buses use card tap readers or, for those using cash, fare boxes. All fares are integrated with the ION bus service and the full GRT transit system. There is also a special rate “Connect to GO 50¢ fare” for riders going to and from the Kitchener inter-city GO transit station.

User satisfaction

From June 2019 to March 2020, the ION LRT operated with up to 98 per cent monthly service availability (scheduled service delivered) and 99 per cent monthly service reliability (on-time performance), maintaining a monthly operating performance score of 98.47 per cent, surpassing the contractual target of 97.25 per cent.

The Region started to study social media trends related to community use of ION and planned a customer satisfaction survey for mid-2020 but the onset of the pandemic halted those plans. The Region’s plans to reschedule the survey remained on hold at time of publication.

The Region continues to improve the system from a user perspective, including additional crossings for cyclists and pedestrians to help more fully integrate the ION LRT into regional mobility.



COVID-19 impacts

Since the onset of the pandemic, the project partners have worked closely to adjust service levels and rework integrated service schedules in response to changing travel demand, striving to maintain ease of travel and accommodate physical distancing. As a result, a reliable integrated service has been maintained throughout the pandemic. There have however, been significant ridership and budget impacts.

Ridership has been operating at 40 per cent of the pre-pandemic level of about 20,000 riders per day. Revenues followed a similar pattern. Service reductions were implemented in March 2020 and were continued into 2021. The Region is projecting 2021 ridership to remain low in the first half of the year and increase as vaccines are administered and economic activity increases. Overall for 2021, ridership and revenues are projected to be 55 per cent of typical levels and service is projected to operate at approximately 95 per cent of normal service.

Fortunately, the Region received COVID-relief funding from the federal and provincial governments that will offset some of the decreased revenues in 2021.

COVID-19 safety measures implemented for the system are posted on the GRT website and are updated frequently.¹⁴ The webpage also includes public service information related to COVID-19 testing of ION employees and taking transit to vaccination clinics. In addition to the measures posted on the GRT website, the following actions have been taken and are ongoing:

- Since the Region declared a state of emergency in March/ April 2020 Keolis has been working in accordance with their emergency management plan and their pandemic plan.
- From mid-March until September 7, 2020 a reduced frequency seven-vehicle service was introduced to reflect the reduced demand and to create additional spare driver/operator capacity in the event of a COVID-19 outbreak among drivers. A 10-vehicle weekday service with 10 minutes between trains at peak hours resumed on September 7, 2020.

¹⁴ GRT COVID-19 Rider Information: <https://www.grt.ca/en/rider-information/novel-coronavirus.aspx> (Accessed March 25, 2021). station platforms or within public areas of transit vehicles – GRT has implemented enforcement measures to help ensure compliance.

- Effective July 13, 2020 the transit code-of-use bylaw was amended to require face coverings for passengers when on
- Keolis continues with additional cleaning and disinfecting of vehicles. Hard contact surfaces are wiped down daily, vehicles are fogged weekly and driver areas are wiped down at every shift change (outgoing and incoming).
- Non-essential Region, GrandLinq and Keolis staff are working from home.
- Policies to cover remote work, self-monitoring and self-isolations have been implemented.
- Cleaning within the OMSF has been prioritized to focus on shared areas – control centre, lunchrooms, washrooms and locker rooms.
- Vehicle operators have been provided with latex gloves and sanitizers and a work instruction has been developed for them to wipe down the cabs at shift changes (before and after).
- As much as possible, Keolis schedules control centre staff to restrict movement between shifts at the OMSF.

Innovative Features

Future proofing

ION Stage 1 LRT was designed to manage future growth in ridership without impacting operations. As part of the initial build, the platforms were constructed to accommodate two-car trains and the OMSF was built to accommodate a fleet of up to 33 vehicles.

The traction power system has also been designed and built to accommodate more trains on the existing line to meet future increased service demands.

Linkages

With the addition of the ION Stage 1 service, the Region's transit system is now seamless from a transit rider's perspective no matter what mode they use. The LRT is the spine linking the bus network with multiple transfer nodes. Schedules are coordinated and a common fare structure is in place.

A significant innovative outcome for the area has been the increased linkages between the ION rail system and a number of new mixed-use trails, such as the Spurline Trail, which is a 2.4

kilometre paved multi-use urban recreational trail running adjacent to the existing CN rail corridor. The trail connects uptown Waterloo and downtown Kitchener and is easily accessed from a number of LRT stations. Bike riding passengers can bring their non-motorized bicycles on all LRT trains and buses (carried on bus bike racks), and their e-bikes (battery assisted) on trains only.

In the future, the Region is planning to build an integrated transportation hub adjacent to the ION Central Station and will offer seamless access to multiple modes of inter- and intra-city transportation, including:

- ION light rail transit;
- Grand River Transit bus services;
- Inter-city rail and bus services (GO, VIA Rail, Coach);
- Car sharing; and
- Walking and cycling.

Located at the northeast corner of King and Victoria streets in Kitchener, the future transit hub will include an ultra-modern terminal building, separate platforms and waiting areas for LRT and inter-city passenger trains and buses, commuter parking, passenger drop off areas, and a modern public plaza. It is expected to become a focal point for the growing region and promote the region's connection to the Toronto-Waterloo innovation corridor.¹⁵

Currently, the Region has approved a planned approach to development of the site and is in the preliminary design phase. This includes direct construction of the transit building, and transportation related features, by both the Region and Metrolinx.¹⁶

Procurement Process

Selecting the P3 model

As directed by Council in June 2011, Region staff examined a wide range of project procurement and delivery models for the light rail transit project, including traditional and public-private partnership (P3) models.

¹⁵ The Toronto-Waterloo innovation corridor is the largest tech cluster in North America outside of Silicon Valley. The area is home to more than 15,000 tech companies, including 5,000+ startups, and nearly 300,000 employees in high-tech industries: <https://blog.waterlooeedc.ca/what-is-toronto-waterloo-corridor> and <https://thecorridor.ca/> (Accessed March 30, 2021).

¹⁶ Region of Waterloo website – Transit Hub: <https://www.regionofwaterloo.ca/en/exploring-the-region/transit-hub.aspx#> (Accessed March 26, 2021).

Based on this comprehensive analysis, staff recommended design-build-finance-operate-maintain (DBFOM) as the optimal model for the project with a 30-year term for the operations, maintenance and rehabilitation components.

This approach was selected by the Region for a number of reasons:

- It provided the best balance of Regional control and ownership, while transferring appropriate risks to the private sector;
- It enabled the Region to take advantage of private sector innovation; and
- It provided the greatest assurance for completing the project on time and within budget.

Selecting a partner

A two-stage competitive process was used following the guidelines of Infrastructure Ontario's P3 process. Regional Council established

a steering committee that included Regional Councillors and Waterloo Region senior management.

Request for Qualifications

A comprehensive evaluation framework was developed by the Region with its consultants to evaluate RFQ submissions and select the pre-qualified parties. Seven submissions were received.

Based on the completed evaluation process, Council approved three short-listed teams to move forward to the RFP stage. These teams had the highest overall score and demonstrated they had the required design, construction, operations, maintenance and rehabilitation capabilities, and had the experience, personnel and financial strength to deliver a project of this size and scope. Table 1 lists the three pre-qualified teams.

Table 1: Shortlisted teams¹⁷

GrandLinq	Kitchener Waterloo Cambridge Transit Partners	Tricity Transit System
Plenary Group Canada Ltd.	Gracorp Capital Advisors Ltd.	SNC-Lavalin Capital Inc.
Meridiam Infrastructure Waterloo LRT ULC	Fluor Canada Ltd.	SNC-Lavalin Constructors
Aecon Construction and Materials Ltd.	Connor, Clark & Lunn GWest Traditional	SNC-Lavalin Operations & Maintenance Inc.
Aecon Concessions	Infrastructure Partnership	SNC-Lavalin Inc.
Peter Kiewit Infrastructure Co.	Parsons Canada Ltd.	EllisDon Capital Inc.
Kiewit Canada Development Corp.	Parsons Enterprise Inc.	Fengate Capital Management Ltd.
Mass Electric Construction Canada Co.	Graham Infrastructure LP	URS Canadian Operations Ltd.
Keolis SA	IBI Group	Hatch Mott MacDonald Ltd.
Keolis Canada Inc.	exp Services Inc.	
AECOM Canada Ltd.	E & E Seegmiller Ltd.	
STV Canada Construction Inc.	Guild Electric Ltd.	
CIBC World Markets Inc.	Alternate Concepts Inc.	
	Investec North America Ltd.	

¹⁷ Region of Waterloo, Rapid Transit Project Update, March 2013.

Request for Proposals

Request for Proposal No. 2012-01 was issued on June 6, 2013. A series of commercially confidential meetings took place with each team between July and November 2013. These meetings allowed the teams to ask questions and seek clarification relating to all aspects of the project, and helped ensure a common understanding of the project.

The Region's service specifications were refined throughout this stage to ensure the resulting system would fully meet the Region's needs. The draft project agreement was reviewed by proponents, refined for clarity and reissued at certain points to ensure the Region's specific technical and financial needs were met and to further clarify the responsibility of the private sector partner. The Region received proposals from all three proponents.

RFP evaluation

An evaluation framework was developed by the Region and its consultants to govern the review of the proposals. Submissions were reviewed first for compliance with mandatory requirements and completeness. All bids passed. Evaluation teams with representation from Region staff and the Region's technical and financial advisors then assessed the technical and financial submissions.

Separate technical and financial evaluation teams were established, and the evaluations were conducted in different locations. The technical submission review was based out of the Region's Rapid Transit Office in Kitchener, while the financial submissions were stored and evaluated at Infrastructure Ontario offices in Toronto. The technical team had no knowledge of the financial submissions, evaluation process or results, and vice versa to ensure the evaluators were completely objective and unbiased.

The results of the technical and financial evaluations were presented separately to, and confirmed by, the evaluation committee comprised of Regional senior management.

Affordability cap

The capital cost budget for the entirety of the ION Stage 1 rapid transit system was set by Council in 2011 at \$818 million (see Table 2). This included both DBFOM and non-DBFOM costs such as vehicle purchases, land acquisition and early works. This budget was shared with proponents and an affordability cap was established in the RFP to ensure bidders understood the interplay between the Region-lead project costs and the bidders' costs. This test was set to create competitive tension and encourage bidders to propose affordable solutions for the Region and provide maximum scope for the available funding.



Table 2: Stage 1 rapid transit project budget

Stage 1 Rapid Transit Capital Cost Budget (\$ millions nominal)	
DBFOM (net of recoveries) ¹⁸	\$545
Non DBFOM	
Vehicles	\$96
Land	\$45
Project office & consulting	\$58
MTO underpass construction	\$11
Early works and other infrastructure	\$39
Adaptive bus rapid transit vehicles and construction	\$24
Total	\$818



¹⁸ The overall contract is \$583 million, of which \$38 million represents other public infrastructure projects completed by GrandLinq while completing the LRT project.

Table 3: Project timeline

February 2012	Council approved DBFOM procurement and delivery model
October 5, 2012	RFQ issued
November 23, 2012	RFQ Closed
March 6, 2013	Three qualifying teams announced
June 6, 2013	RFP issued
July to November 2013	Commercially confidential meetings; design and technical presentation meetings
2013	Region of Waterloo agrees to purchase 14 light rail vehicles from Bombardier for Stage 1
December 16, 2013	RFP closed
January 2014	Preferred proponent notified
March 2014	Council approved GrandLinq as preferred proponent

May 6, 2014

Commercial close

May 9, 2014

Financial close

July 2017

Construction completed

July 28, 2017

Original substantial completion date

2017 – 2019

Vehicle delivery; system testing and commissioning;
driver training

June 19, 2019

Substantial completion certified

June 21, 2019

Start of OM&R services

July 28, 2047

End of concession period

Fairness of the process

P1 Consulting was engaged to act as fairness monitor to ensure the procurement process was conducted with an established process, that the process was followed and there was no bias. As this was the first P3 process undertaken by the Region, the fairness monitor played an important role in educating Region staff participating on project teams by providing briefings on best practices, including the principles and duties of fairness, care and protection of confidential information, avoidance and disclosure of conflict of interest, bias and undue influence, scoring procedures and sign-off on individual scoring sheets, preparation, treatment and retention of evaluation documents.

At the end of the RFP process, P1 Consulting certified the principles of openness, fairness, consistency and transparency were properly established and maintained throughout the entire process.¹⁹

Overall Structure of the Agreement

At the time of commercial and financial close, GrandLinq's bid consortium entered into an equity contribution agreement to create GrandLinq General Partnership (GP), a single purpose vehicle (SPV) to be responsible for the terms of the project agreement.

GrandLinq GP executed two drop-down agreements: a design-build contract with GrandLinq Contractors, comprised of Peter Kiewit Infrastructure Co. and Aecon Construction and Materials Ltd.; and an OM&R contract with Keolis Grand River LP. There is also an interface agreement among the three parties — GrandLinq GP, GrandLinq Contractors and Keolis Grand River LP.

The project agreement includes an option for the Region to take over operations after 10 years, moving from a DBFOM to a DBFM model. Regional officials explained that it was expected that the best transfer of risk to GrandLinq was on the maintenance side.

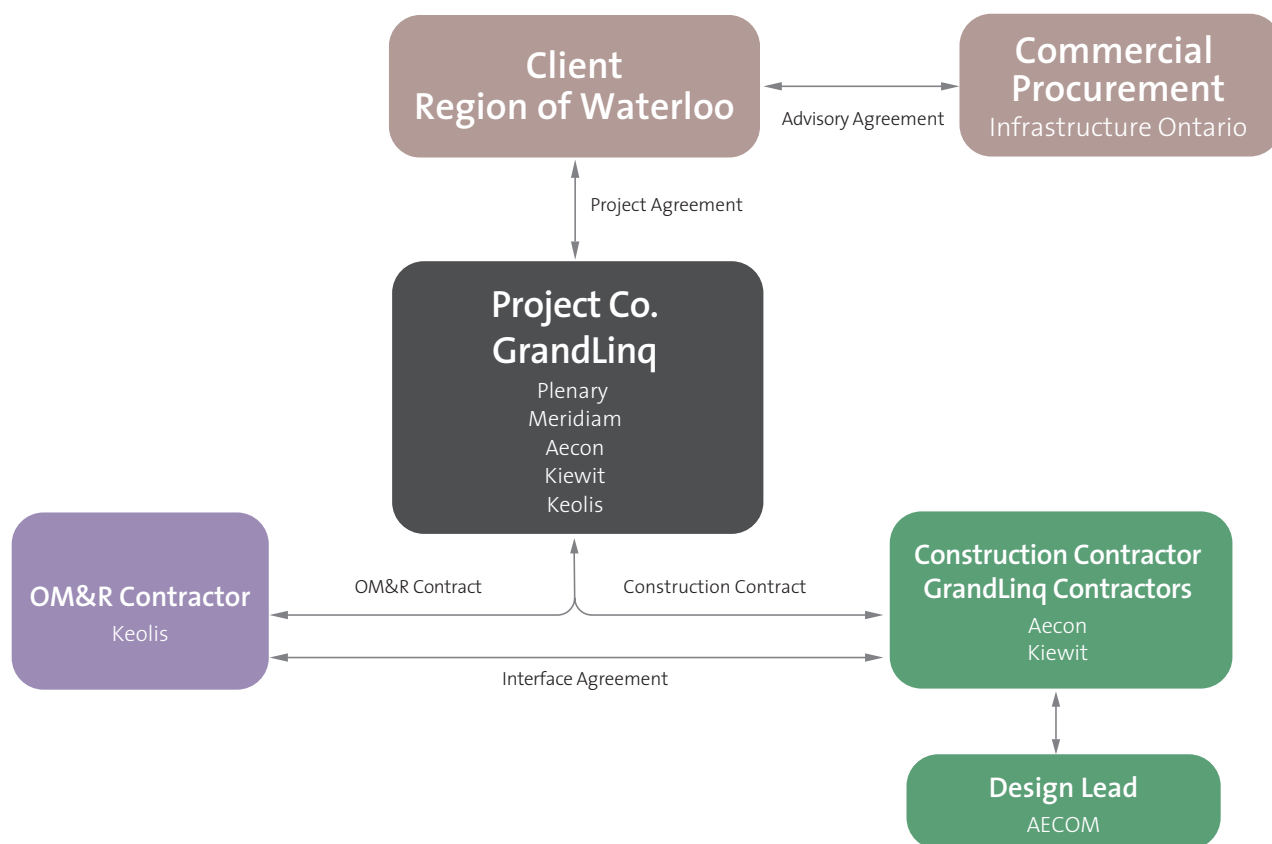
Before the 10-year mark is reached, the project agreement outlines a process for the Region to continue operations with GrandLinq or to notify them to terminate the operations portion. Should the Region decide to take over operations, the payment mechanism for GrandLinq would be adjusted according to the details set out in Schedule 20 of the project agreement.²⁰

GrandLinq's costs for operations for up to 30 years were included in their bid and were built into the project agreement. Thus an extension of operations with GrandLinq would not require payment mechanism adjustments. After the first 10 years, further options to extend the operations term are in successive five-year periods for a total of 30 years.

¹⁹ P1 Consulting, Final Fairness Monitor's Report, February 21, 2014, Appendix E Region of Waterloo Report: E-14-032/F-14-019.

²⁰ The Region of Waterloo and Ontario Infrastructure and Lands Corporation, Project Agreement (Execution Version) The Region of Waterloo Stage 1 Light Rail Project, Queen's Printer for Ontario, May 6, 2014, Schedule 20, Part G.

Figure 3: Partnership structure



Financial Arrangements

Construction costs were financed with a combination of private financing and government funding. GrandLinq financed capital costs through a combination of equity and debt. This consisted of \$27 million of equity, \$103 million in long-term bonds and \$40 million in a short-term credit facility.

The long-term rated bonds were underwritten by CIBC World Markets and have fixed pricing over the project's entire construction and operations period. The bonds were broadly marketed following financial close to an investor base of more than 10 Canadian institutions.

The short-term credit facility was provided through Alberta Treasury Branches (ATB Financial) and was repaid at substantial completion. During the procurement period, GrandLinq ran a funding competition in the market to determine the optimal short-term capital provider.

Non-DBFOM costs, such as vehicles, land acquisition and early works, and the remaining portion of the DBFOM costs were funded by three levels of government:

- the Government of Canada contributed \$265 million through the Building Canada Fund;
- Ontario contributed \$300 million; and
- the Regional Municipality of Waterloo contributed \$253 million.

The Region funded its portion with a special property tax levy of 1.2 per cent from 2012-2018 for residents of the three urban municipalities: Cambridge, Kitchener and Waterloo.

Payments

Throughout the construction term, monthly construction period payments were made to GrandLinq based on monthly construction milestones, with 15 per cent held back from each payment. Amounts held back by the Region were paid to GrandLinq at construction completion and at substantial completion.

The Region is making monthly service period payments to GrandLinq during the OM&R term. These payments have several components including:²¹

- Capital portion — to repay construction term debt and equity;
- Operations portion — a set amount to cover operational costs based on the current baseline service plan (BSP) multiplied by an inflation escalation factor;
- Maintenance portion — a set amount to cover maintenance costs based on the current baseline service plan (BSP) multiplied by an inflation escalation factor;
- Life cycle portion — vehicle life cycle costs based on the number of vehicles in service and non-vehicle (infrastructure) life cycle costs multiplied by an inflation escalation factor;
- Insurance — based on the actual insurance costs; and
- Deductions — for availability failures and service failures.

Revenue sharing

The Region of Waterloo and GrandLinq do not have a revenue sharing agreement. Revenue risk is with the Region of Waterloo.

Responsibilities and Risk Allocation

The Region worked with its advisors to determine the optimal risk allocation for the DBFOM project. Following are some of the main features.

The Region of Waterloo:

- Owns the ION LRT system, including all infrastructure and vehicles;
- Sets fares and the frequency of the service;
- Is responsible for customer service, security and system-wide integration;
- Collects and retains all fare revenue;
- Monitors the performance of GrandLinq to ensure all service requirements are met.

The Region also took the risk of changes in base market interest rates between the time of bid submission and the date of commercial close.

GrandLinq is responsible for:

- Completion of the final design for the ION Stage 1 LRT system;
- Construction of the ION Stage 1 LRT system, including an operations, maintenance and storage facility;
- Operation of the ION Stage 1 LRT system for an initial period of 10 years, with renewals for successive five-year terms, to a maximum of 30 years;
- Maintenance of the ION Stage 1 LRT system and the OMSF for 30 years; and
- Life cycle rehabilitation of the ION Stage 1 LRT system and the OMSF for 30 years.

Other key risk features have divided components. For instance, the Region assumed inflation risk on the availability payments based on a number of published inflation indices from which GrandLinq could select. The risk of disparity between the selected inflation indices and actual inflation of OM&R costs is retained by GrandLinq.

A unique feature of this transaction was that procurement of LRT vehicles was undertaken by the Region while the commissioning risk was fully passed down to GrandLinq, which in turn passed it to the design-build contractor. All maintenance and life cycle obligations, as well as management of the warranties from the vehicle supplier were also transferred to GrandLinq, which in turn passed them to the OM&R contractor.



²¹ The Region of Waterloo and Ontario Infrastructure and Lands Corporation, Project Agreement (Execution Version) The Region Of Waterloo Stage 1 Light Rail Project, Queen's Printer for Ontario, May 6, 2014, Schedule 20, Part B.

Benefits

Cost savings/value for money

In the spring of 2013, before the release of the RFP, the Region's financial advisor completed an initial value-for-money (VfM) analysis that showed the use of the DBFOM model would cost 12.3 per cent less than the use of a traditional design-bid-build (DBB) model. Following the selection of the recommended preferred proponent, Deloitte updated the analysis with the results from GrandLinq's bid submission. The updated analysis showed a VfM result of 12.1 per cent savings for Regional taxpayers.²²

The VfM analysis compared all design, construction, financing, operating and maintenance costs of the project including the difference between the cost of Regional long-term financing and private financing and the costs to the Region for the retained risk.

Community socio-economic benefits

The direct economic impact of ION in Waterloo Region has been clear. Several commercial, government and residential development projects were launched once the decision had been made by Council to build a light rail transit system rather than use bus rapid transit. This was based on the greater certainty a fixed rail route provided to investors over that of a bus route, which has the potential to change over time.

Between 2011 and 2018 new building permits valued at more than \$3 billion were issued by the Region. Two projects in particular made significant investments:

- A consolidated regional courthouse brought provincial courts from Cambridge, Kitchener and Waterloo into one building in Kitchener;
- Google chose to build its Canadian headquarters for 3,000 employees in Kitchener, developing a heritage building combined with new construction. Google directly attributes its choice of location to the presence of ION. There is an ION station one block away from the new headquarters and the

location of the inter-city transit hub to be built in future is also close by.

Further economic outcomes between 2011 and 2018 included:

- Population growth: The annual population growth rate in the Central Transit Corridor was 1.8 per cent, compared to the overall 1.2 per cent growth rate for the Region as a whole.
- Culture related industry and activity growth: Population growth boosted growth in restaurants, festivals and cultural events along the Central Transit Corridor. For example, there was a marked increase in the number of culture related businesses, with product manufacturing (such as breweries, bakeries) showing a 100 per cent increase.
- Decline in vacant land: The amount of land assessed as vacant declined by 10 per cent.
- Increase in property tax revenue: Property tax revenue on properties within the Central Transit Corridor increased by an average of 4.5 per cent annually, significantly outpacing the rate of increase on properties outside the corridor.

In addition, the project boosted labour force growth in the construction sector. At the peak of construction, there were approximately 800 people working on the project.

Communications

Between the partners

From the outset, regular meetings were established between the Region and GrandLinq. As required by the project agreement, a monthly work committee meeting was established throughout the construction phase to review progress and resolve issues as they arose. This meeting was supplemented by many other monthly and weekly meetings and working groups to promote effective communication among the project teams. Discussions were wide ranging, for example: resolution of design review comments; planning construction works; managing safety, quality and environmental issues; and resolution of commercial issues.

Prior to the completion of the construction term, a monthly systems management committee was established as a forum for the Region, GrandLinq and Keolis to discuss and resolve issues relating to the OM&R phase.

²² Deloitte LLP, Region of Waterloo Light Rail Transit Project Value for Money Report, Final Version, Revised February 24, 2014, Appendix "D", Report #-14-033/F-14-019, Region of Waterloo, Stage 1 Light Rail Transit Project: Selection of a Design-Build-Finance-Operate-Maintain Consortium, March 4, 2014.

Since the beginning of the OM&R period, a monthly performance review panel meeting has been held to review the previous month's performance and identify opportunities for improvement.

Outside of these formal meetings, representatives from the Region, GrandLinq and Keolis meet regularly to resolve specific issues as they arise. Since the onset of COVID-19 all meetings have been virtual.

With the public

Community engagement and public input was, and continues to be, a critical part of the Region's development and delivery of its rapid transit system. During each stage of the process, feedback from residents played a key role in decisions. Residents were given information and asked for input in many ways such as outreach events, newsletters and Council meetings.

Before and during procurement

Between 2006 and 2011, Region staff hosted more than 150 public outreach events, including presentations, speaking engagements and information booths. In 2013, when the RFP process started, Region staff continued to engage residents, businesses, stakeholders and community groups through stakeholder events including:

- The Rapid Transit Tradeshow (a partnership with the Greater Kitchener-Waterloo and Cambridge chambers of commerce);
- The Small Business Workshop Series (a partnership with the Waterloo Region Small Business Centre);
- ION presentations to community groups stakeholders and neighbourhood associations;
- Public consultation/information centres on a variety of topics including intersection modifications and station design concepts; and
- Presentations to neighbourhood associations, schools, universities, businesses and community groups.

By 2014, more than 4,000 residents had been reached through these activities.

During construction

Residents and businesses were kept informed during construction by a dedicated communications team lead by the Region. It was

essential to provide accurate and timely information as work progressed. Communication tools used included:

- A dedicated construction website (www.ridelION.ca) that today redirects to the GRT website;
- A dedicated construction phone line and email address;
- One-on-one meetings;
- Regular meetings and updates with business associations;
- Biweekly construction updates;
- Local sponsorships;
- Regular participation in community events/presentations; and
- Social media posts, disruption notices, video project updates, wayfinding signage, fact sheets and a project video for community events.

As launch date approached, the Region began a safety awareness and education campaign to show residents how to navigate on, in and around the new LRT system. This was important for a community that had not had electrified rail transit on its streets since the 1940s. The safety awareness and education campaign included:

- How to drive, walk and cycle near ION light rail tracks and stations;
- How to be an ION light rail transit rider;
- How the ION system is integrated into the wider transit network;
- Safety booklets mailed to the community;
- Outreach to schools, universities;
- Social media campaigns;
- Commercials across all media;
- Road signage;
- Videos;
- Movie theatre advertising;
- Community presentations;
- Tours of the ION vehicle at numerous community events; and
- Celebrations of milestones like the completion of construction and the delivery of the first ION vehicle.

The campaign educated people on the new signage, created different posters targeted at pedestrians, drivers and cyclists and had some fun with a moose analogy while conveying serious messages.

Brand selection

The selection of a brand name for the new rapid transit service represented an important milestone for the project. The Region wanted a brand that was unique, memorable and distinct and that would help create public awareness and build excitement and anticipation for the launch.

In the fall of 2012, the Region embarked on a brand development process. A Rapid Transit Brand Working Group was established that included staff from Regional departments involved in the project, such as Rapid Transit Services, Planning, Housing and Community Services, Corporate Communications and Corporate Publishing.

Working with a communications consultant, the working group established a set of general and Region-specific criteria based on community comments from previous engagement activities, workshops and interviews with key stakeholders, local businesses, and Regional staff and Councillors.

General criteria

- Meaningful, and full of meaning with the ability to unwrap multiple meanings and inspiration over time;
- Easy to pronounce, memorable, inspiring, distinctive/ownable.

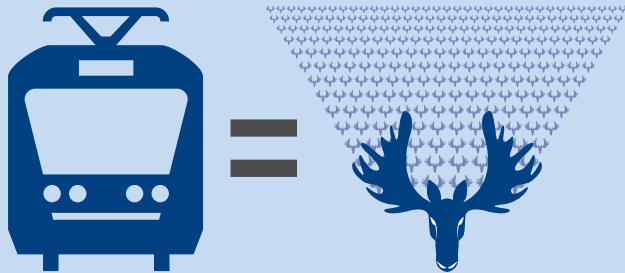
Region-specific criteria

- Aligned with the brand foundation: healthy, prosperous, smart;
- Able to work for both technologies: adaptive bus rapid transit and light rail transit;
- Fits within existing brand family: Region of Waterloo, Grand River Transit, iXpress;
- Feels like a “Made in Waterloo Region” solution;
- Helps tell the rapid transit story: useful now and in the future (pre/post-construction);

Length of 1 ION train = 11 moose



Weight of
1 ION train = 250 moose



They're majestic and captivating, but like a moose, ION trains need their space to move.

Moose and ION trains can go about 50 km/hr. Stay alert to signals and do not try to outrun the train.



Did you know moose have poor eye sight? They rely on their sense of smell and hearing.

ION trains are powered electrically and are quiet amongst traffic. Stop, look up and listen for oncoming trains around the light rail tracks.



ION trains are a new species to Waterloo Region. While they are testing and becoming part of your daily habits, remember to obey new signage, never stop on the tracks and stay alert.

For safety information at your fingertips, visit www.grt.ca/ION

- Short and sweet: can be read as the train or bus passes by; and
- Works beyond Cambridge, Kitchener and Waterloo: connects the townships and other communities outside the Region.

After a period of research, a list of more than 300 possible brand names was reduced to a short list of three: ARC, ION and TRIO. Community feedback was collected through an online survey and at three public consultation centres, one in each of the three cities. Rather than voting on the names, residents were asked to provide comment and opinion on the names, themes and priorities. They were also asked to submit their own suggestions.

During this phase of the brand development process, ION was the most preferred option, registering strong first impressions and word associations. The community suggested more than 500 new names that were reviewed against the criteria. One of these, The Wave, made the final short list.

A telephone survey was then conducted to evaluate the names ION and The Wave and to collect more public comments on the brand. During the telephone survey, ION once again earned strong first impressions, positive word associations and overall perceptions from the residents surveyed. Two-thirds of those interviewed said ION matched the brand values outlined by the Region.

The working group with the Rapid Transit Senior Management Team and Rapid Transit Steering Committee recommended “ION” to Regional Council as the new brand name for the rapid transit service as it reflected the tech-savvy nature of Waterloo Region, represented the established brand strategy, met all of the Region’s brand name criteria and was focused on movement, community transformation and innovation.

Dispute resolution

Most disputes to date have been resolved by discussion and negotiation by the party representatives and/or senior executives with only two disputes during construction referred to the independent certifier. As of April 19, 2021 no formal arbitration or litigation proceedings had been initiated in relation to disputes.²³ Should this be required, the project agreement specifies the escalation process.²⁴

Monitoring

Before the OM&R term began, the project partners carried out a joint review and clarification of the key performance indicators (KPIs) to ensure common understanding of the desired objectives.

The project agreement requires GrandLinq and Keolis to prepare monthly performance monitoring reports describing actual operations, maintenance and rehabilitation services performed in the previous month and comparing them against the planned services. This report includes:

- Total scheduled operating hours;
- Total scheduled train kilometres;
- Monthly operations payment factor;
- Monthly maintenance payment factor;
- Any service failures and associated failure points, in respect of the previous month;
- Any availability failures and associated failure points in respect of the previous month;
- Total of all failure points assigned due to availability failures and service failures; and
- Allocation of the above failure points between GrandLinq and the operator.

The report is then reviewed by the performance review panel made up of representatives from the Region, GrandLinq and Keolis. Monthly performance and opportunities for improvement are discussed and agreed.

With COVID-19 impacts on ridership, the Region and Keolis agreed to changes to the operations schedule (timetable). However, the performance review process remained the same with performance being measured against the reduced service requirements. Schedule 20 of the project agreement provides an extensive list of failure points, deduction factors and key performance indicators (KPIs).

²³ Personal communication with Keolis representative, April 19, 2021.

²⁴ The Region of Waterloo and Ontario Infrastructure and Lands Corporation, Project Agreement (Execution Version) The Region of Waterloo Stage 1 Light Rail Project, Queen’s Printer for Ontario, May 6, 2014, Schedule 27.

Lessons Learned

Collaboration

The project has experienced two major challenges since financial and commercial close. First there was a significant delay in vehicle delivery. And second, the COVID-19 pandemic was declared just nine months after operations launched in June 2019.

As noted earlier, the Region chose to take on the responsibility of purchasing vehicles outside the project agreement. This is not unusual, according to the partners, especially if a project is being undertaken in stages. It allows the public sector partner to maintain consistency in the fleet and to take advantage of economies of scale.

Although GrandLinq completed construction in the agreed timeframe, the vehicle delivery delay pushed the launch date out almost two years. Working together, the partners made several adjustments to the substantial completion date based on known information for vehicle delivery dates. They maintained a collaborative and cooperative approach to the system testing and commissioning process as it was affected significantly by the delays.

Normally, vehicle testing would be done before vehicles were handed over to the constructor or operator who would then undertake the integrated testing and commissioning, final driver training and service readiness testing. In this case, in a true example of partnership, all parties, including the vehicle supplier, worked together to undertake the integrated testing and commissioning, driver training and shadow service operations before the formal vehicle handover and in a compact time frame. An unexpected and positive result was that system reliability was better than expected at the beginning of operations as most of the commissioning, driver training and system integration growing pains were worked out before vehicle handover.

Maintaining this ongoing collaboration and open dialogue during the first year of operations proved to be critical not only in developing and improving reporting systems and processes, but also in helping the partners manage the second challenge of the pandemic.

In mid-March 2020, the Region, GrandLinq GP and Keolis agreed to reduce service between April and September of 2020 to reflect reduced demand during the pandemic. The Region was able to

offset some of the revenue losses with COVID-19 relief funding from the federal and provincial governments.

The partners continue to work collaboratively on implementing and communicating service changes to riders as provincial emergency measures are adjusted and announced.

Strong relationships

As an upper tier municipal government in Ontario, the Region of Waterloo is responsible for transit and thus for deciding upon and implementing the new light rail transit system in Waterloo Region; however, the ION route (including the proposed Stage 2) crosses three separate lower tier municipalities, each with its own municipal government — Cambridge, Kitchener and Waterloo.

This government structure is not unusual in Ontario, but it means Region-wide initiatives require a great deal of collaboration among municipalities. From the outset of the project, the Region worked closely with the three city councils to establish strong relationships. It was important to create an awareness and understanding of why the rapid transit project was crucial to the future development of the region as a whole to ensure the project's success. This strong relationship was apparent with the successful launch of Stage 1.

Early engagement with regulatory authorities

GrandLinq representatives suggest the P3 process could be improved by the project sponsor engaging permitting and regulatory authorities earlier, if possible. In this way, concerns, if any, can be more fully understood, reflected in the project agreement and priced appropriately in proponents' bids.

The experience of GrandLinq's consortium members with large linear projects is that they typically involve a significant amount of permitting and planning approvals with multiple authorities having jurisdiction including federal, provincial and municipal governments, environmental agencies, conservation authorities and utilities. As much as possible, it would be beneficial to provide a complete list of the approvals and permitting required and a clear definition of the relevant processes, including timelines, in the project documents. And wherever possible streamline these processes or have the approvals in hand before the start of the design/build phase. This could reduce the associated risks and improve value for money.

Of note, risk allocation of utility permitting and relocation was raised by the partners involved in the Regina Bypass P3 project, also a linear infrastructure project. In their case, the risk was mitigated by sharing it between the partners with the use of an innovative utilities cash allowance and extending the schedule.²⁵

Design specifications

Both parties agreed future projects could benefit from including more defined design specifications in the project agreement. For instance, establishing that minimum levels of design development and utility permitting had to be reached before construction is started would reduce the number of design revisions needed during construction. Likewise, the project schedule should allow for the time needed to reach whatever design and utility permitting levels are specified.

Also, the public sector partner should be prescriptive about design elements that are important to them and provide clear performance requirements on other elements. This will result in a more streamlined design development process and provide the best value to the public sector partner.

Concluding Comments

After almost two years of operation, the Waterloo ION light rail transit P3 project and the Region's rapid transit system as a whole have demonstrated incredible success on multiple fronts, despite the declaration of the COVID-19 pandemic less than a year into the operation period.

ION Stage 1 is a partnership success for the Region, GrandLinq and public-private partnerships in Canada. The project achieved value-for-money cost savings and demonstrated the value of integrating the design, construction, operations, maintenance and rehabilitation streams early in the planning process.

Public consultation, stakeholder engagement and community input were critical to the project's success, remaining a top priority for the team from the initial concept stage, through the procurement and construction periods to the launch date, and now in service delivery.

²⁵ The Canadian Council for Public-Private Partnerships, Regina Bypass Project, 2020 National Award Case Study, Gold Award for Infrastructure. www.pppcouncil.ca

The partners demonstrated flexibility in the process by adapting to two significant events out of their control: vehicle delays and a pandemic. The Region and GrandLinq worked together to adjust the project agreement to meet both challenges with positive results.

"We are very proud to have been the Region's partner for the construction phase and, as the OM&R delivery partner, we look forward to participating in the ongoing success of the system," said Michael O'Neill, GrandLinq's general manager.

ION has also proven to be an overwhelming socio-economic success for residents in the Waterloo Region. It has created new employment opportunities by attracting new businesses to the area — including Google's Canadian headquarters. Property assessment values and municipal tax revenues have also grown. There has been an increase in the number of restaurants, festivals and events in the Region; and community access to employment opportunities, health care, education and events has improved.

As intended, ION Stage 1 has helped preserve the region's valuable agricultural land by attracting more residential and commercial development within existing urban areas thus helping build the region upwards and not outwards.

"The Region of Waterloo firmly believes building, launching and operating ION light rail transit has been the most significant project in the community's history," said Regional Councillor Tom Galloway, chair of the planning and works committee. "It was a visionary project that has not only come to fruition, but has had, and will continue to have, a transformational impact on Waterloo Region and its residents."

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Appendix: CCPPP's National Award Case Studies 1998 - 2020

Defence

Communications Security Establishment Canada Long-Term Accommodation Project (2011)

Education

Quad at York University, Ontario (2018)
Saskatchewan Joint Use School Projects (2015)
Alberta School Alternative Procurement – Phase 1 (ASAP I), Alberta (2010)
O'Connell Drive Elementary School, Nova Scotia (1998)

Energy

Energy Services Acquisition Program (ESAP)/Energy Service Modernization (ESM) Project, Ottawa-Gatineau (2020)
Fort McMurray West 500-kV Transmission Project, Alberta (2018)
John Hart Generating Station Replacement Project, B.C. (2014)
Britannia Landfill Gas to Electricity Project, Ontario (2005)
Vancouver Landfill Gas Cogeneration Project, B.C. (2003)
Bruce Nuclear Power Facility, Ontario (2000)
Waterloo Landfill Gas Power Project, Ontario (2000)

Government Services

Archives of Ontario – Offsite Archival Storage (2006)
Cook Chill Food Production Centre, Ontario (2005)
DriveTest: Ontario Driver Examination Services (2004)
Transforming the Delivery of Ontario's Social Assistance System (2003)
Emergency Service Mobile Communications in Ontario (2000)
Electronic Child Health Network, Toronto, Ontario (1999)
Teranet, Ontario (1998)

Health

New Oakville Trafalgar Memorial Hospital, Ontario (2016)
Humber River Hospital, Ontario (2015)
BC Cancer Agency Centre for the North and Fort St. John Hospital & Residential Care Project, B.C. (2012)
Centre Hospitalier de l'Université de Montréal Project (2012)
Glen Campus – McGill University Health Centre, Quebec (2010)
Women's College Hospital Redevelopment Project, Ontario (2010)
Royal Jubilee Hospital Patient Care Centre, B.C. (2009)
VIHA Residential Care and Assisted Living Capacity Initiative, B.C. (2007)
Abbotsford Regional Hospital and Cancer Centre, B.C. (2008, 2005)
Facility Management for the Royal Ottawa Health Care Group, Ontario (2000)
Devonshire Care Centre, Alberta (2000)
Shaikh Khalifa Medical Centre, United Arab Emirates (2000)

IT Infrastructure

Connecting Small Schools in Newfoundland (2003)

Justice & Corrections

Forensic Services and Coroner's Complex, Ontario (2016)
Okanagan Correctional Centre, British Columbia (2015)
Elgin County Courthouse, Ontario (2014)
Ontario Provincial Police Modernization Project (2013)
Surrey Pretrial Services Centre Expansion, B.C. (2011)

Durham Consolidated Courthouse, Ontario (2007)
Central North Correctional Centre, Ontario (2002)
Five Corners Project, B.C. (2002)

Real Estate

Aurora College Family Student Housing, Northwest Territories (1999)
Legislative Chamber, Offices and Housing, Nunavut (1999)

Recreation & Culture

L'Adresse symphonique, Quebec (2011)
SHOAL Centre: Seniors Recreation Centre, B.C. (2004)
John Labatt Centre, London, Ontario (2002)
Skyreach Place, B.C. (2000)

Social Housing

Single Room Occupancy Renewal Initiative Project, B.C. (2013)

Transportation

Gordie Howe International Bridge Project (2019)
Tłı̨chǫ All-Season Road Project
North Commuter Parkway & Traffic Bridge Replacement, Sask. (2018)
Iqaluit International Airport, Nunavut (2017)
Southwest Calgary Ring Road, Alberta (2016)
Disraeli Freeway and Bridges Project, Winnipeg, Manitoba (2012)
Canada Line, B.C. (2009)
Confederation Bridge, PEI (2009)
Highway 407 ETR, Ontario (2008 & 1999)
Autoroute 30, Montreal, Quebec (2008)
Northwest Anthony Henday Drive, Alberta (2008)
William R. Bennett Bridge, B.C. (2008)
Autoroute 25, Montreal, Quebec (2007)
Kicking Horse Canyon Project – Phase 2, B.C. (2007)
Golden Ears Bridge, B.C. (2006)
Anthony Henday Drive Southeast Leg Ring Road, Alberta (2005)
Sea-to-Sky Highway Improvement Project, B.C. (2005)
Sierra Yoyo Desan Resource Road, B.C. (2004)
Fredericton-Moncton Highway Project, New Brunswick (2003)
Belledune Port Authority, New Brunswick (2000)
Retendering Alberta's Highway Maintenance Contracts (2000)
Cobequid Pass Toll Highway, Nova Scotia (1998)

Water, Wastewater & Biosolids

Calgary Composting Facility, Alberta (2017)
City of Saint John Safe Clean Drinking Water Project, New Brunswick (2017)
Regina Wastewater Treatment Plant Upgrade Project, Saskatchewan (2014)
Biosolids Management Facility, Sudbury, Ontario (2013)
Britannia Mine Water Treatment Plant, B.C. (2006)
Goderich Water and Sewer Services, Ontario (2000)
Port Hardy Treatment Project, B.C. (2000)

These case studies can be obtained through CCPPP's online bookstore at: www.pppcouncil.ca/web/bookstore

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