CITY OF SAINT JOHN SAFE, CLEAN DRINKING WATER PROJECT, NEW BRUNSWICK

A NEW DRINKING WATER SYSTEM FOR CANADA'S OLDEST CITY

THE CANADIAN COUNCIL FOR PUBLIC-PRIVATE PARTNERSHIPS

2017 NATIONAL AWARD CASE STUDY

The Canadian Council for Public-Private Partnerships

Le Conseil Canadien pour les Partenariats Public-Privé

The Canadian Council For Public-Private Partnerships
2017 National Award Case Studies

Silver Award for Project Development:
City of Saint John Safe, Clean Drinking Water Project
New Brunswick

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Introduction

Canada continues to be a world leader in public-private partnerships (P3's), with over 275 projects valued at $127 billion under construction or in operation. Health and transportation remain the most active P3 sectors, and major public transit projects are at various stages of development across the country. The federal government, as well as provincial and territorial governments, are making historical investments in infrastructure, with most using the P3 approach for some major projects. Municipalities across the country are also using P3's to deliver infrastructure such as roads, water and wastewater treatment plants, transit, recreational facilities and energy solutions. There is also increasing interest from Canada's indigenous communities to use the P3 model to address their infrastructure deficit.

Public-private partnerships have enabled the delivery of much needed infrastructure across the country and have presented the following benefits:

- Attracting private capital investment to accelerate the delivery of public infrastructure
- Fixed price, on-time private sector delivery commitment
- Design benefits from input by construction contractors and operators
- Design and overall project cost reflect whole lifecycle cost of the asset
- Greater innovation in project delivery
- Reforming sectors through a reallocation of roles, incentives, and accountability
- Allocating risks between the public and private sector based on who is better able to manage it
- The public sector is able to enforce achievement of its performance specifications through a pay for performance contract which includes penalties in the event of availability or performance failures[1]

Canada's long-standing experience using the P3 approach has created a process of continuous improvement, as each generation of people and projects provide lessons learned to the ones in the pipeline. The market continues to be competitive, with an average of five domestic and international bidders responding to Requests for Qualifications and three being shortlisted for the Request for Proposals stage. This helps ensure that taxpayers are receiving the best value for money and Canada's P3 expertise is being exported to other countries.

The expertise and diversity of Canadian P3s are well represented in the 2017 National Awards for Innovation and Excellence in Public-Private Partnerships. The Canadian Council for Public-Private Partnerships (CCPPP) established the awards in 1998 to honour governments and/or public institutions and their private sector partners who have demonstrated excellence and innovation in public-private partnerships. Gold, Silver and 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.

2017 Award Winners

Iqaluit International Airport

Gold Award for Infrastructure

The redeveloped Iqaluit International Airport is a key transportation gateway for people and goods in Nunavut and northern Canada, replacing a decades-old facility in need of repair. As the first complete airport infrastructure to be built as a P3 in North America, the facility required innovative design and construction to withstand the arctic environment. The design of the terminal building's igloo-shaped rotunda as well as the artwork and sculpture on display reflect the imagery of Canada's North. The project included several requirements for Inuit labour, services and training to ensure local employment and economic development.

Canada Line

Gold Award for Service Delivery

The 19.5-kilometre Canada Line links Vancouver International Airport with the cities of Vancouver and Richmond, British Columbia, providing a much-improved transportation alternative to the existing road network. Initially delivered ahead of schedule and on budget for the 2010 Olympics, its usage level over the past eight years is far ahead of expectations. The system service delivery performance meets and exceeds requirements, and it has been a major catalyst of economic activity along the corridor. The design-build-finance-operate-maintain contract achieved a savings of 5.5% compared to conventional procurement.

[1] PricewaterhouseCoopers LLP and The Canadian Council for Public-Private Partnerships, *A Process Guide for Public Sponsors,* April 2017.

Calgary Composting Facility
Silver Award for Infrastructure

The new Calgary Composting Facility, the first P3 composting facility constructed in Canada, will allow the city to divert a minimum of 145,000 tonnes of organics and dewatered biosolids from landfill each year. The three buildings were developed under a unique DBF-OM agreement, which allowed the city to obtain the benefits of fully integrated operations, maintenance and life cycle renewal over 10 years without the cost implications of long-term financing. The project also utilized a P3 performance bond that allowed contractors to overcome the normally onerous capital cost of using traditional securities such as letters of credit to demonstrate liquidity in the event of cost or schedule overruns.

City of Saint John Safe, Clean Drinking Water Project
Silver Award for Project Development

Saint John's new $217-million water treatment contract was developed using a unique P3 agreement that combined a design-build-finance-operate-maintain (DBFOM) model for the primary infrastructure (treatment plant and reservoirs) and a design-build-finance (DBF) model for the additional infrastructure dams and distribution system). Service to residents needed to be maintained during the project construction and care was taken to inform customers and stakeholders throughout the process about using the P3 model. The new infrastructure means residents will no longer endure boil water advisories and will be provided with high-quality drinking water for many years to come.

The Centre for Addiction and Mental Health (CAMH)
Silver Award for Project Development

The CAMH Phase 1C redevelopment project will add two modern new buildings with more than 655,000 square feet to the Queen Street campus, providing inpatient and outpatient services for people with complex mental illness. The P3 project saved $105 million compared to conventional procurement and excelled in its extensive plans to integrate new buildings with the surrounding community to create a more inclusive environment. In addition, the project required an enhanced contractual and risk allocation structure as a result of directly interfacing with existing CAMH facilities and with a company involved with an earlier phase of development.

Bert Clark
P3 Champion Award

Bert Clark received the P3 Champion Award for his outstanding contributions to P3 in Canada. He is President and CEO of the Investment Management Corporation of Ontario and was previously President and CEO of Infrastructure Ontario from 2012 to 2016, overseeing the management of the provincial government's real estate portfolio and the delivery of major infrastructure projects using the alternative financing and procurement (AFP) model. He has been instrumental in developing the AFP approach to deliver major projects on time and on budget. Earlier in his career, he played a lead role in the establishment of Ontario's first long-term infrastructure investment plan. Bert spent four years running the North American infrastructure business for Scotiabank, where he was an effective champion for public-private partnerships, and four years at Osler, Hoskin & Harcourt LLP.

2017 National Award Case Studies

Three projects were selected among this year's five winners to be developed into case studies, with stories detailing their infrastructure and project development. The Iqaluit International Airport will provide an important transportation hub for people and goods, constructed with unique design elements reflecting the Inuit culture and arctic environment. The Calgary Composting Facility will divert compost and biosolids from landfill and provide fully-integrated operations and maintenance without long-term financing costs. Following years of boil water advisories, the new Saint John Safe, Clean Drinking Water Project features a dual P3 model agreement that delivered a new treatment plant, reservoirs and upgraded distribution system to residents.

CCPPP has published 72 case studies of selected Award winners since 1998. Each one details the project's deliverables, its procurement process, contracts, financing and risk allocation, benefits and lessons learned, and testimonials from partners. A complete list of case studies is included in the Appendix, and are available from the CCPPP bookstore: www.pppcouncil.ca/web/bookstore.

Acknowledgements

CCPPP has a team of dedicated Awards selection committee volunteers that 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 that the case studies provide a learning tool for seasoned practitioners as well as those new to the P3 model. The following panelists comprised the 2017 selection committee:

- Rupesh Amin, Managing Partner, Infrastructure & Development, Forum Equity Partners
- 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 and Leader, Canadian Infrastructure and Project Finance Group, PricewaterhouseCoopers LLP
- Dr. Alan Russell, Professor & Chair, Computer Integrated Design & Construction, Department of Civil Engineering, University of British Columbia
- Murray Totland, former City Manager, City of Saskatoon

The Awards are made possible by the generous support of the following 2017 sponsors:

Deborah Reid and Margaret Campbell authored the 2017 National Award Case Studies. They interviewed the partners, reviewed all the documentation and conducted additional research. Their thoroughness and insights produced an account of these award-winning projects that is both informative and engaging. CCPPP would also like to thank the project partners, procurement agencies and government representatives, who were invaluable contributors from the applications stage through to the finalization of the case studies.

About CCPPP

Established in 1993, CCPPP is a national not-for-profit, non-partisan, member-based organization with broad representation from across the public and private sectors. Its mission is to promote smart, innovative and modern approaches to infrastructure development and service delivery through public-private partnerships with all levels of government. The Council is a proponent of evidence-based public policy in support of P3s, facilitates the adoption of international best practices, and educates stakeholders and the community on the economic and social benefits of public-private partnerships. The Council organizes an annual conference that is recognized internationally as the premier forum bringing together senior government and business leaders in the P3 community at which the most successful Canadian public-private partnerships are celebrated through CCPPP's National Awards for Innovation and Excellence.

CCPPP conducts research on topical P3 issues and sectors to help further the understanding and best practices of Canada's P3 market. Our reports, case studies, guidance and surveys are available on CCPPP's online bookstore at: www.pppcouncil.ca/web/bookstore.

Quick Facts – City of Saint John Safe, Clean Drinking Water Project[2]

Project type

Design-Build-Finance-Operate-Maintain (DBFOM) – Primary Infrastructure
Design-Build-Finance (DBF) – Additional Infrastructure

Asset/Service

32-year-10-month performance-based agreement:

- Primary Infrastructure – design, build, finance, operate and maintain a new drinking water treatment plant with the capacity of 75 million litres per day (MLD) and storage capacity of 33 million litres; and
- Additional Infrastructure – design, build and finance improvements to the municipal water transmission and distribution system, including installation of new and rehabilitation of existing pipelines, new and upgraded pumping stations and rehabilitation of dams.

Construction period:

- 2 years and 10 months

Operating & Maintenance period:

- 30 years

Status

Under construction (substantial completion scheduled for November 2018)

Partners

Public Sector

- City of Saint John (the City)

Private Sector

- Port City Water Partners (PCWP), a general partnership of:
  - Brookfield (PCWP) Inc.;
  - Acciona Agua International Inc.; and
  - NAC (PCWP) Inc.

Other participants

Public Sector

- PricewaterhouseCoopers LLP – Financial Advisor
- CBCL Limited – Technical Advisor
- Partnerships New Brunswick – P3 Process Advisor
- Torys LLP – Legal Advisor

Private Sector

- Brookfield Financial Securities LP – Lead Developer, Financial Advisor, Equity Sponsor (50% through Brookfield Infrastructure Partners LP)
- Acciona Agua – Equity Sponsor (40%), Design-Build Joint Venture (50%), Design Team Member, Operations-Maintenance-Rehabilitate (OMR) Team Member
- Acciona Infrastructure Canada Inc. – Design-Build Joint Venture (50%)
- North America Construction – Equity Sponsor (10%), Design-Build Subcontractor
- Amec Foster Wheeler (now "Wood") Environment and Infrastructure – Design Team Member
- Stantec Consulting Ltd. – Design Team Member
- SIMO Management Inc. – OMR Team Member
- FCC Construction – Design-Build Subcontractor
- Gulf Operators Ltd. – Design-Build Subcontractor
- Revolution Strategy – Communications Manager
- Davies Ward Phillips & Vineberg LLP – Legal Advisor

Project cost, financing and value for money

Total project cost (present value dollars)

- $216.8 million net present value (NPV)[3]

Project financing (nominal dollars)

- Equity – $10.7 million (PCWP)
- Short-term bank loan – $116.6 million (PCWP)
- Long-term amortizing bonds – $25.4 million (PCWP)
- Construction milestone payment – $25.0 million (City of Saint John)
- Substantial completion payment – $131.5 (City of Saint John)

Value for money (present value dollars)

- $24.1 million NPV or 8.7 per cent

[2] Background and facts in this case study rely on the information contained in the award application submitted jointly by the project partners in September 2017 to the Canadian Council for Public-Private Partnerships. Information from the submission has been supplemented and updated with information from the procurement documents, the project agreement, the value-for-money report, other sources as noted and personal interviews with project partner representatives.

[3] Net present value of contract price as of January 1, 2013, using a discount rate of 4.25%.

Project highlights and innovative features

- This is the first large drinking water P3 project in Canada and the largest municipal infrastructure project in New Brunswick.
- The project will result in a reliable drinking water system for the oldest incorporated city in Canada.
- The project agreement combines two P3 delivery models—DBFOM and DBF—and two types of infrastructure—vertical and horizontal—in a single contract.
- The project uses sliplining technology, an alternative approach, to eliminate latent defect risk for more-than-hundred-year-old water pipes
- The private partner is required to operate a water treatment plant with inputs and outputs, a significant departure from traditional "available for use" infrastructure assets operated by the public sector.

Project website

http://www.saintjohn.ca/en/home/cityhall/sjwater/drinkingwater/safecleandrinkingwater/default.aspx

Robertson Lake Dam

Overview

The City of Saint John (the City) is the oldest city in Canada. Founded in 1604 and incorporated in 1785, it has an existing water transmission and distribution system that is more than 100 years old and that has significant challenges with respect to reliability, serviceability and efficiency. Some cast iron water main pipes were installed as long ago as 1873.

Currently, the City does not filter its water. Treatment consists only of coarse screening and chlorination, and disinfection byproducts do not meet current and proposed provincial standards. Since 1999 the City has invested over $128 million in drinking water improvements, but these improvements were not good enough to bring the municipal water treatment system up to current standards.

Boil-water orders and non-revenue water losses were frequent and could occur widely throughout the City. Boil-water orders could last between three and five days and affect as many as 45,000 customers.[4]

Saint John Common Council, the municipal council, determined that water-system improvements were critical to the City's future prosperity and that more extensive upgrades were needed. To meet this need, the City initiated the Safe Clean Drinking Water Project (the project) as a cornerstone municipal initiative to give city residents access to better-quality drinking water on a consistent basis.

To deliver the project, the City developed a unique public-private partnership (P3) agreement that combined the use of two P3 procurement models in one contract—to construct a new water treatment facility and associated water-storage reservoirs (the Primary Infrastructure) and to upgrade and rehabilitate the City's network of underground water transmission and distribution pipelines, pumping stations and dams (the Additional Infrastructure).

A design-build-finance-operate-maintain (DBFOM) model was used for the Primary Infrastructure and a design-build-finance (DBF) model was used for the Additional Infrastructure.

This is the first DBFOM in Canada for a clean drinking water project. The City partnered with Port City Water Partners (PCWP) on a 32-year-10-month performance- and availability-based agreement to deliver the $216.8 million NPV contract. The estimated total cost savings over a traditional public-sector design-bid-build (DBB) comparator is $24.1 million NPV, or 8.7 per cent.

The Canadian Council for Public-Private Partnerships chose this project for the Silver Project Development Award because of its unique two-pronged approach within one P3 agreement. This case study will explore the development of the project, its innovative aspects and lessons learned, to share with municipalities with similar challenges.

Figure 1 shows the location of the City of Saint John.

Background and rationale

Saint John is the largest city in New Brunswick and after Halifax the second largest in the Canadian maritime provinces. It is located along the northern shore of the Bay of Fundy, at the mouth of the Saint John River. Founded in 1604 and incorporated in 1785, the City is the oldest in Canada. As such, it has a rich history and vibrant culture, but it also has aging infrastructure.

The City's population is approximately 67,500,[5] with about 126,000[6] in the Saint John metropolitan area. The economy of Saint John has historically been linked to the sea and industry, with shipbuilding at one time one of its major industries. Today, the city is home to Canada's largest oil refinery, Canada's largest independent brewer, several pulp and paper mills and the largest cargo port east of Montreal.

There were three core issues the City needed to address regarding its water supply:

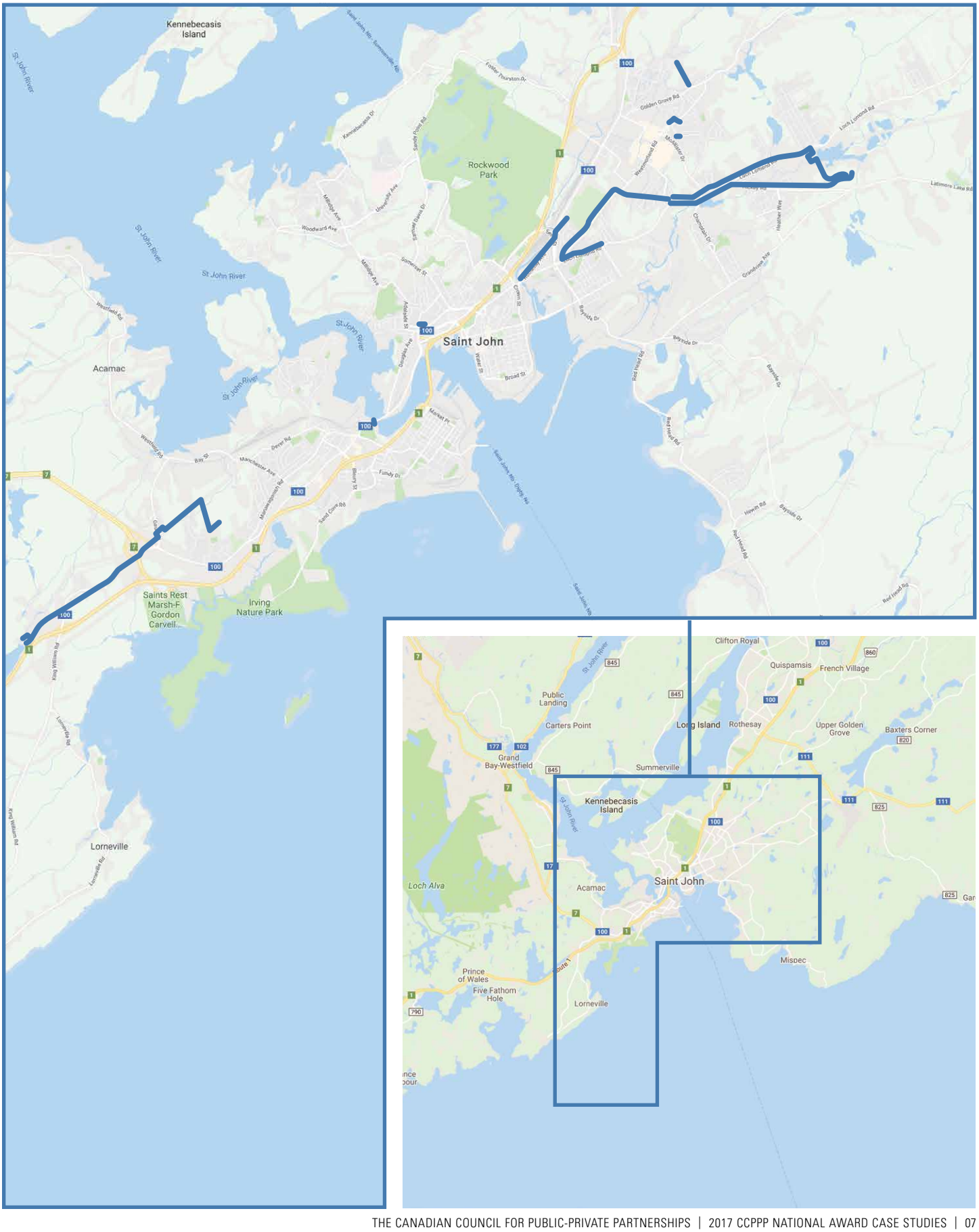
- A new water treatment plant had become critically important to city residents as they were suffering through frequent boil-water orders. Drinking water is currently supplied to city customers from two surface-water sources, Spruce Lake and the Loch Lomond watershed. The water delivered to customers is coarse-screened and chlorinated. This unfiltered surface water contains significant amounts of disinfection byproducts, at levels that often exceed those identified as acceptable by current standards. These byproducts, together with the limited treatment for potentially harmful waterborne protozoa such as giardia and cryptosporidium, create a risk to public health;

[4] City Solicitor, correspondence dated January 10, 2018.

[5] Population of the City of Saint John in 2016 was 26,575. Statistics Canada, http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=1301006&Geo2=PR&Code2=13&Data=Count&SearchText=Saint%20John&SearchType=Begins&SearchPR=01&B1=Population&TABID=1, accessed December 11, 2017.

[6] Population of the Census Metropolitan Area of Saint John in 2016 was 126,202. Statistics Canada, http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CMACA&Code1=310&Geo2=PR&Code2=13&Data=Count&SearchText=Saint%20John&SearchType=Begins&SearchPR=01&B1=All&TABID=1, accessed December 11, 2017.

Figure 1: Location map



- The City also needed to improve the existing water transmission and distribution system as the current supply of water has a low pH (i.e., is mildly acidic), which caused an ongoing corroding of existing cast iron and copper water piping. Pumping clean water from a new treatment plant through corroded and brittle water pipes would not provide city residents with a reliable supply of safe, clean drinking water;
- And finally, commercial and industrial water customers were receiving treated water whether or not it was needed for their respective uses, which required a high volume of water to be treated unnecessarily.

City objectives

The City had several objectives for the project:

- to provide good quality drinking water meeting all relevant water quality standards, including those of the *Guidelines for Canadian Drinking Water Quality*;
- to provide drinking water that meets customer expectations regarding taste, odour, health and safety;
- to correct deficiencies in the current water transmission and distribution system;
- to deliver water reliably and with little or no interruptions in service; and
- to ensure appropriate risk transfer and good value for money.

Project development

To address the core issues and meet the project objectives, City officials worked with independent consultants over several years. At the outset, the team had to identify the work the entire water system required and the preliminary concepts. Then the team had to identify the individual projects that would achieve the goal of the larger project—safe, clean drinking water. The team eventually determined that the work involved to achieve safe, clean drinking water involved a new water treatment plant, new water reservoirs, upgrades to existing dams, new wells and new pieces and upgrades to the distribution system. This part of the project development process took over five years.

According to City officials, the team initially identified twenty-two individual projects. After further analysis, the team narrowed the projects down to seventeen:

- two water treatment plant projects (a new facility and storage reservoirs);
- two dam projects; and
- thirteen distribution system projects.

Once the projects were identified they were bundled, and P3 models were selected for the bundles based on the different needs and characteristics of each project.

Ultimately, the DBFOM model was chosen for the new infrastructure—the water treatment plant and reservoirs, which are known as the Primary Infrastructure in the project agreement, and the DBF model was chosen for the existing infrastructure—the dams and distribution system, known as the Additional Infrastructure in the project agreement.

After the initial business case was completed, a well-water site was identified as capable of serving the residents of Saint John West. The development of this site was added to the scope of the Additional Infrastructure component, and the capacity of the new water treatment plant was reduced from 100 million litres per day (MLD) to 75 MLD to serve Saint John East.

The City's choice to proceed with two P3 models gave it access to funds to carry out the project through funding partners that the City may not otherwise have had. Ultimately, the positive value for money (VFM) analysis on the project demonstrated the viability of the P3 models. During early project development, the City's dedicated project team and advisors spent considerable time educating the City's Common Council and other city stakeholders on the project, the P3 delivery model and its key benefits, establishing a strong base of support. This enabled the City to advance the project to financial close quickly and decisively once the project and its P3 delivery model were approved. Following financial close, subject to limited exceptions, PCWP bears the risk of delays and therefore has the incentive to complete the project on time.

Throughout the process there were several challenges:

- The project involves work being done on a live water system, and requires uninterrupted delivery of potable water throughout the construction phase;
- Damage to the transmission network or other nearby utility networks during the construction period could affect the availability of water or other essential services. Much time was spent developing a custom-made performance regime to account for this risk;
- The public misperception that potable water was being privatized[7] had to be addressed, particularly when the Common Council was being called upon to decide the procurement model, as well as during every phase of the procurement and the project thereafter;

[7] The P3 procurement model leverages partnerships with the private sector to expand, modernize and replace public infrastructure by driving innovation and transferring risks to the private sector. In Canada, new public infrastructure delivered with this approach continues to be publicly owned. http://www.infrastructureontario.ca/Major-Projects/

- Multiple stakeholders and funding partners had to be kept informed of the process. P3 Canada and the Province of New Brunswick were funding partners; major consumers such as Moosehead Brewery and Irving Oil stood to be greatly affected by changes to water quality or interruptions in service; multiple land owners were involved in negotiations for easements, which were required before the RFP was issued and the project could proceed; and
- Potential rate shock for ratepayers had to be assessed and managed.

The City recognized that water projects delivered through alternative procurement models are socially sensitive. Very early on in the project, a dedicated communications team was established that developed a comprehensive communication strategy to inform and educate city residents and councillors about the added value and benefits of public-private partnerships.

Two Government of New Brunswick infrastructure experts were directly integrated into the project team. These experts helped draft the procurement documentation and provided invaluable advice during the project structuring.

Also at the beginning of the planning stage, large customers were asked for their input, to make sure that the project addressed any concerns they might have. This dialogue has been maintained throughout construction and will continue until substantial completion to help them manage any impact of changes that occur during the project.

One large customer, Moosehead Brewery, will continue to need potable water for its business and will continue to pay water and sewerage bylaw rates; since Irving Oil will receive raw industrial water instead of potable water once the new water treatment plant is commissioned, a separate rate structure will be developed for the company.

Description of the Project

The project is divided into two parts:

1. Primary Infrastructure:
   - a new water treatment plant with a capacity of 75 MLD; and
   - new storage reservoirs with a capacity of 33 million litres.
2. Additional Infrastructure:
   - rehabilitation of and improvements to the Robertson Lake and Latimer Lake dams and intakes;
   - new water transmission mains;
   - well-site development and pumping-station upgrades;
   - rehabilitation of selected existing water transmission mains; and
   - other related modifications and improvements to ensure the functionality of the entire water transmission and distribution system.

The term of the project consists of approximately 34 months of construction, followed by turnover of the Additional Infrastructure to the City and a 30-year operation and maintenance (O&M) period of the Primary Infrastructure. On expiry of the O&M period, responsibility for the Primary Infrastructure will be returned to the City.

An important construction component of the project involves the rehabilitation of a dam and the installation of new intakes in Latimer Lake. However, this work cannot begin until after the water treatment facility is completed, to ensure that the water is properly filtered and treated during the works in the lake bed.

Because of this, the water treatment facility must be fully calibrated and commissioned before substantial completion, creating a situation where PCWP is operating the water treatment facility during a five-month interim O&M period.

Another key aspect of the project includes the critical requirement that drinking water quality be maintained during construction. PCWP is responsible for maintaining the water quality of the active water distribution system to specified requirements during construction. Failure to do so will result in deductions being applied to the interim monthly payments during the construction period and/or to the substantial completion payment.

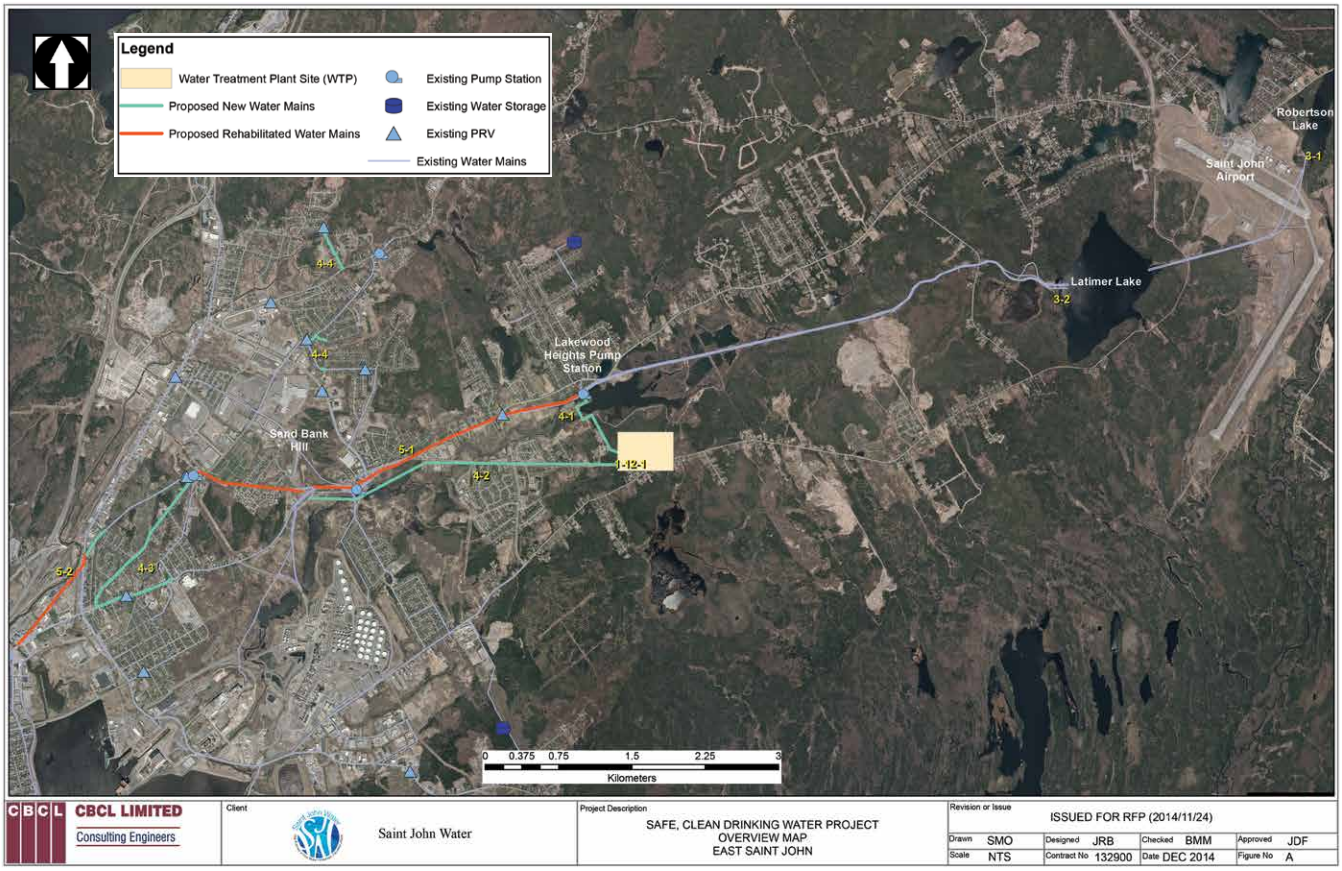
The project requires PCWP to operate the water treatment plant with inputs and outputs, which is a significant departure from traditional available-for-use infrastructure assets, where operations are undertaken by the public sector. In light of this requirement, unique key performance indicators (KPIs) and operational measures for evaluating PCWP's performance were developed. Payment deductions will be applied when standards, measures and requirements are not achieved.

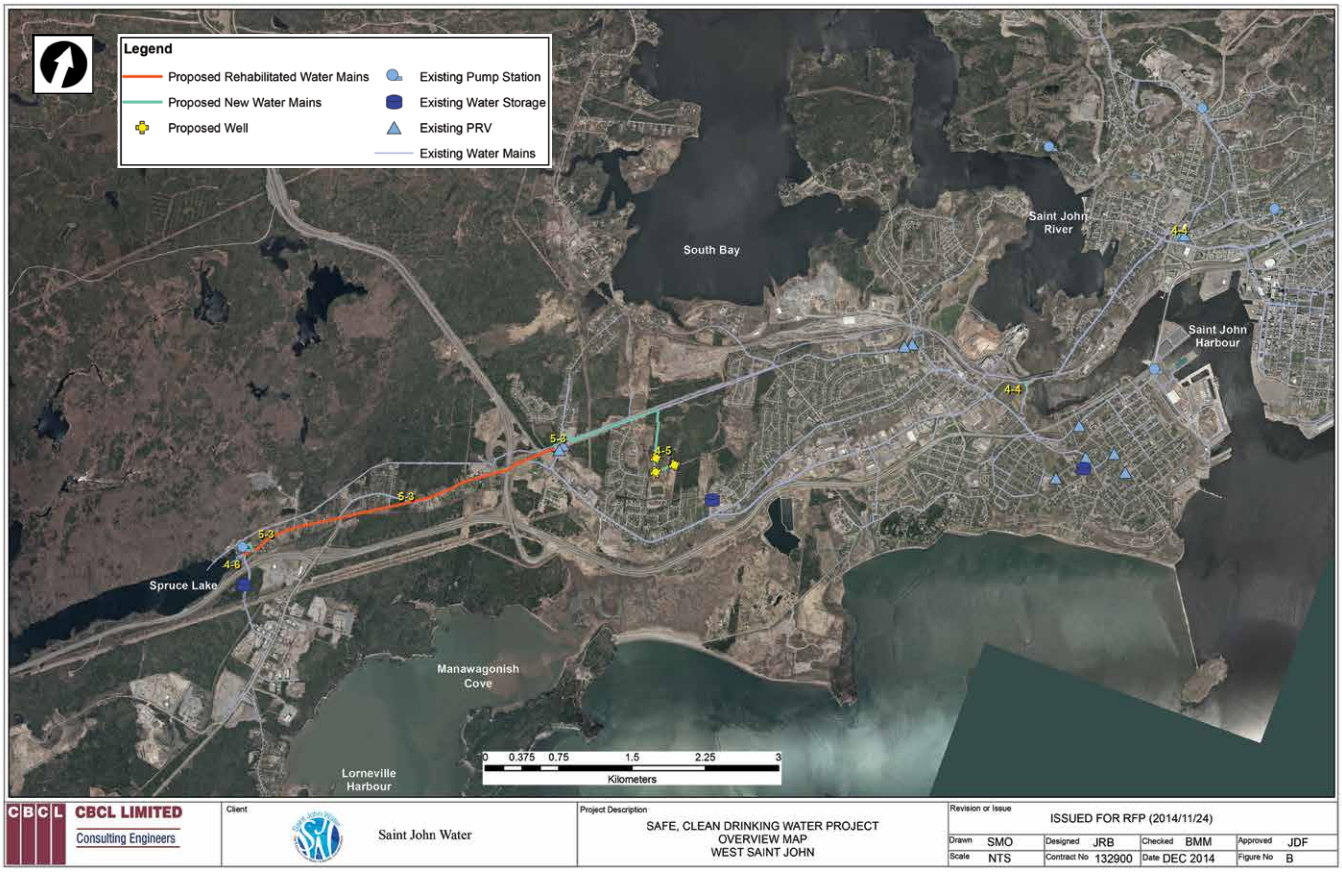
Table 1 shows individual components and deliverables for each part of the project. Figure 2 illustrates the location of each component.

Table 1: Project components and deliverables

PART 1 – PRIMARY INFRASTRUCTURE – DBFOM		
Component #	**Category**	**Main Deliverables**
Water Treatment		
1-1	Water treatment plant	Water treatment plant – 75 MLD capacity and water transmission mains within the Primary Infrastructure boundary
Storage		
2-1	Storage	Above-ground water-storage reservoirs – 33 ML total capacity
PART 2 – ADDITIONAL INFRASTRUCTURE – DBF		
Component #	**Category**	**Main Deliverables**
Source Improvements		
3-1	Robertson Lake dam	Rehabilitate and improve dam and spillway; construct access road
3-2	Latimer Lake intakes and dam upgrades	Construct new intakes and improve existing 1946 intake; rehabilitate and improve main and south dams; construct new spillways at main and south dams; install culverts and tailrace channels for spillage to Dry Lake and Mispec River
Transmission & Piping		
4-1	Lakewood Heights pump station to WTP	3 new 900-millimetre (mm) transmission mains 1 new 600-mm transmission main 1 new 300-mm transmission main
4-2	WTP to Commerce Drive	1 new 900-mm transmission main 1 new 600-mm transmission main 1 new 500-mm transmission main
4-3	Loch Lomond Road and Westmorland Road	1 new 600-mm transmission main 1 new 500-mm transmission main Construct PRV chamber and appurtenances
4-4	East pressure modifications	1 new 300-mm distribution main 1 new 200-mm distribution main
4-5	Well-site development *(Note: City has constructed three production-scale wells)*	Well-head buildings, pumps, piping, emergency power and connections to existing transmission system
4-6	Spruce Lake pump station modifications	Retrofit existing pump station, including 3 new pumps; retrofit existing chlorine disinfection system and remove fluoride system
Water Main Rehabilitation		
5-1	Lakewood Heights pump station to Westmorland Road	Structural rehabilitation of 2 600-mm transmission mains 1 new 200-mm distribution main 1 new 150-mm distribution main
5-2	Rothesay Avenue	Structural rehabilitation or replacement of existing 600-mm transmission main 1 new 200-mm distribution main 1 new 150-mm distribution main
5-3	Ocean Westway	Structural rehabilitation or replacement of existing 600-mm transmission main 1 new 600-mm transmission main 1 new 500-mm transmission main

Figure 2: Project components






Ocean Westway sliplining of existing transmission main

Innovative Features

Two P3 delivery models

The project is unique and innovative in that it combines two P3 delivery models, DBFOM and DBF, as well as two types of infrastructure—vertical and horizontal[8]—into a single P3 contract.

Well-water component

This is the first time a project in Canada has integrated a well-water component into the procurement process. Three wells were drilled in the west Saint John area, and since the water was found to meet the *Guidelines for Canadian Drinking Water Quality* the new wells will be used to serve approximately 5,400 customers (approximately 15,000 individuals) on the west side of the city, moving the entire west side of Saint John from surface water from Spruce Lake to well water. Incorporating well water into the project minimized the overall project cost to the public, whereas continuing with surface water would have necessitated the construction of a second large-scale water treatment facility.

Use of sliplining technology

The Additional Infrastructure component consists primarily of underground infrastructure assets that date back to the nineteenth century. There is a significant risk transfer to PCWP with respect to upgrading these assets; however, improving the water transmission system with the use of sliplining technology (a method of rehabilitating water pipelines by installing smaller-diameter "carrier" pipes within the existing larger-diameter "host" pipes) results in latent defect risk only with respect to the existing water pipe and not the ground conditions surrounding the Additional Infrastructure.

Eliminating latent defect risk related to the surrounding ground conditions is a significant achievement for the project since the existing water pipes form a complex latticework throughout Saint John. Sliplining is a relatively new technology worldwide. Because sliplining involves less disruption to the road infrastructure than traditional pipe replacement would require, the use of this technology also reduces the impact of construction on residents and local businesses in the community.

Unique performance regime

The project agreement includes a custom-made performance regime for the underground component, including the provision of uninterrupted service throughout construction, traffic management and a unique mechanism for dealing with damage to nearby infrastructure:

- This is one of the first projects in Canada to implement penalties for interruption of service during the construction period. Unlike more conventional P3 projects, where service begins after substantial completion, this project delivers a critical service before and after substantial completion, for which any interruption, particularly during the construction phase, can have dire consequences. Therefore, the project agreement calls for the implementation of a payment deduction regime during the construction phase which was novel in the P3 industry.
- PCWP and the City share the risk of damage to existing water transmission infrastructure that is not included in the works, with PCWP bearing the risk of damage to existing water infrastructure located within a prescribed "zone of influence" and the City bearing the risk of damage to existing water infrastructure outside this zone.

[8] Horizontal construction generally refers to bridge, road and pipeline construction, and vertical construction refers to buildings.

Interim O&M period

The new water treatment plant will be fully operational for a period of five months during the last leg of the construction period, when construction related to the installation of new water intakes in Latimer Lake and other work around the existing chlorination facility is taking place. During this period the water will be treated at the new treatment plant before it is distributed to city residents. Therefore, O&M payments will start before substantial completion is reached.

Warranties on Additional Infrastructure

The project agreement also includes a unique mechanism to address warranties on installed components of the Additional Infrastructure, taking into account the multi-year build's staggered deliveries and the desire to obtain extended warranties.

PCWP's warranties cover labour and materials for a period of two years following handover to the City of each component of the Additional Infrastructure, with a one-year extension of the warranties for workmanship and parts replaced during the applicable warranty period.

Procurement Process

Selecting the P3 model

The City chose to procure the project as a P3 based on the conclusion of an initial business case and value-for-money (VFM) analysis dated March 15, 2013, and submitted to the Common Council. The business case concluded that the P3 procurement models (DBFOM for the Primary Infrastructure and DBF for the Additional Infrastructure) yielded strategic benefits and positive value for money over a traditional DBB procurement model.[9]

Key objectives for selection of the DBFOM and DBF models included:

- ensuring the project meets the City's design, operational and life cycle performance criteria;
- delivering the project at the lowest possible risk-adjusted whole life cycle cost;
- enabling appropriate risk allocation and mitigation, with creditworthy counterparties with a clear line of responsibility;
- managing water quality during construction;
- fostering competition;
- benefiting from the private sector's innovative solutions and practices for similar projects; and
- ensuring a fair and transparent procurement process.

Selecting a partner

Competitive process

A competitive two-stage selection process was undertaken. A Request for Qualifications (RFQ) stage was followed by a Request for Proposals stage (RFP).

Request for Qualifications

On July 22, 2014, the City issued the RFQ inviting interested parties to submit their qualifications for the project by September 11, 2014.

Six responses were received and evaluated. On November 3, 2014, the City's Common Council approved the selection of a shortlist of proponents. Table 2 lists the three qualified respondents selected to proceed to the RFP stage.

Table 2: Qualifying teams

Port City Water Partners	Port City Water Partnership	Port City Water Solutions
■ Brookfield Financial Corp. ■ Acciona Agua Internacional, S.L. ■ North America Construction (1993) Ltd. ■ Acciona Agua S.A. ■ Acciona Infrastructure Canada Inc. ■ AMEC Americas Ltd. ■ Dessau Inc. ■ Simo Management Inc.	■ Forum Equity Partners Inc. ■ CH2M Hill Canada Inc. ■ Kenaidan Contracting Ltd. ■ Dillon Consulting Limited	■ Meridiam Water Solutions ULC ■ Bird Capital Limited Partnership ■ American Water Canada Corp. ■ Bird Design-Build Construction Inc. ■ Tetra Tech QI Inc. ■ AW Contract Services (Canada) Inc. ■ Maple Reinders PPP Ltd. ■ Maple Reinders Group Ltd.

[9] PricewaterhouseCoopers LLP, *The City of Saint John Safe Clean Drinking Water Project, Post-financial close value for money report*, April 1, 2016.

Request for Proposals

The RFP was issued on January 8, 2015. Between then and July 2015 proponents attended several meetings with the City. Meetings were also held with representatives of affected utilities to address their questions.

A business-to-business (B2B) networking meeting was held to give proponents an opportunity to meet with representatives of local contractors and suppliers interested in working on the project. Finally, each proponent attended three rounds of commercially confidential meetings with the City to provide comments on the draft project agreement, the proposed legal and financial arrangements and the technical requirements of the project.

On July 29, 2015, each proponent submitted a technical proposal and on September 21, 2015, each proponent submitted a financial proposal. All three shortlisted proponents submitted compliant technical and financial proposals; the preferred proponent would be the one that offered the lowest total cost based on net present value.

Financial proposals were to be submitted according to the requirements of Form 8 of Appendix G of the RFP, which specified all costs and payments to be included.[10] The net present value of total payments could not exceed $242.8 million, calculated as at January 1, 2013, using a discount rate of 4.25%.[11]

In the event two or more technically and financially compliant proposals offered the same total cost, proponents would be given five business days to revise and resubmit their proposals, and the revised proposal that offered the lowest total cost would then be selected as the preferred proponent. However, in this case, revised proposals were not necessary.

Name of private partner

Port City Water Partners (PCWP) offered the lowest-cost financial proposal. On November 6, 2015, the Common Council approved PCWP as the preferred proponent and authorized signing the project agreement with them.

Commercial and financial close

Commercial close and financial close took place on February 4, 2016. Table 3 shows the overall timeline of the project.

Table 3: Project timeline

- **2014 July 22**
  RFQ issued
- **2014 September 11**
  RFQ closed
- **2014 November 3**
  Qualified proponents announced
- **2015 January 8**
  RFP issued
- **2015 January 8 to 2015 July 29**
  RFP bid preparation (including bilateral commercially confidential meetings and three rounds of proponent comments on the draft project agreement)
- **2015 July 29**
  Technical submission due
- **2015 September 21**
  Financial submission due
- **2015 November 6**
  Preferred proponent announced
- **2016 February 4**
  Commercial close
- **2016 February 4**
  Financial close
- **2016 February 4**
  Start of design and construction period
- **2018 November**
  Substantial completion target date
- **2048 November**
  Handback target date

cont.

[10] City of Saint John, *Request for Proposals for the Design, Construction, Financing, Operation, Maintenance and Rehabilitation of a Water Treatment Plant and Storage Reservoirs, and the Design, Construction and Financing of Water Transmission System Improvements in the City of Saint John*, RFP #2015-Scdwp-RFP, issued January 8, 2015, updated September 30, 2015, to reflect Addenda 1-37, pp. G-26-31.

[11] Ibid., p. 39.

Fairness of the Process

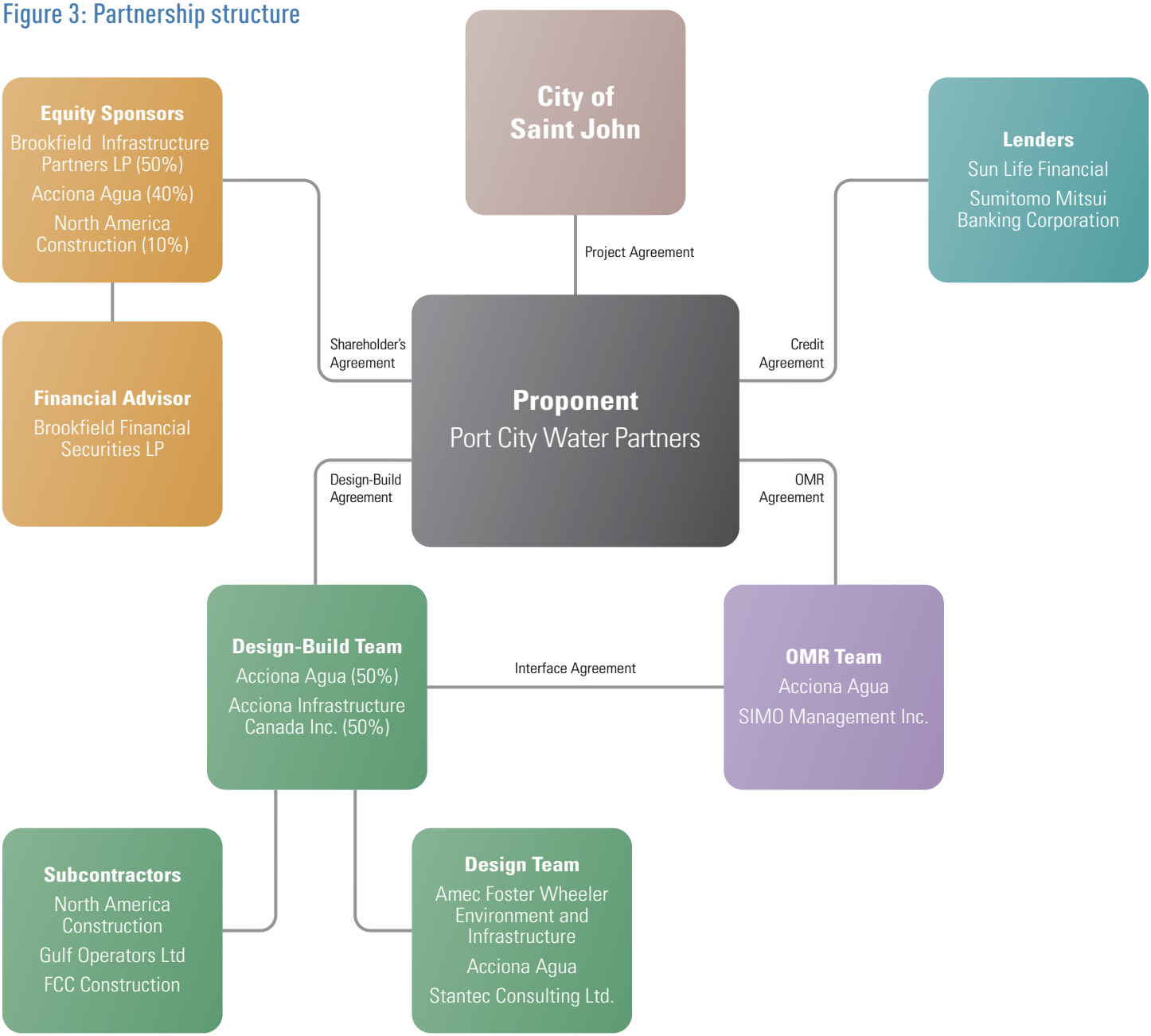
The City engaged Grant Thornton LLP as fairness advisor to review the development and implementation of the procurement process and monitor the evaluation of the proposals and selection of the preferred proponent. The fairness advisor reported to the City and provided an objective opinion at the conclusion of the process:

Based on our review of the Project Evaluation Committee's adherence to the procedures and criteria set out in the RFP and the evidence of reasonable and unbiased judgment exercised by the Due Diligence Committee and their Evaluation Teams in the evaluation of Proposals submitted in response to the RFP, we have concluded that the submission of each Respondent was evaluated fairly and consistently.[12]

Overall Structure of the Agreement

The partnership structure is illustrated in Figure 3.

Figure 3: Partnership structure



[12] Grant Thornton LLP, *Final Fairness Advisory Report, City of Saint John for the Safe Clean Drinking Water (SCDW) Procurement Project*, February 5, 2016, p. 8.

Installation of new transmission mains crossing Little River

Financial Arrangements

Project financing

Capital costs were financed with a combination of equity, debt and construction-period payments:

- $10.7 million in equity from PCWP to be invested at the end of the construction period;
- $116.6 million in a revolving bank loan to be used during the construction period and fully repaid by the substantial completion payment;
- $25.4 million in long-term amortizing bonds issued at financial close and to be repaid by the end of the 30-year O&M period;
- $25.0 million milestone payment paid upon completion of the Saint John West Works; and
- $131.5 million substantial completion payment.

The capital cost of the Additional Infrastructure (approximately 46 per cent of the total project capital costs) will be paid to PCWP in full at substantial completion.

The Government of Canada is contributing $52.3 million to the capital costs through the P3 Canada Fund, and the Province of New Brunswick is also contributing $52.3 million to the capital costs.

Service period payments

Before the construction period ends, the City will make interim performance-based monthly O&M payments for five months after the commissioning and testing phase for the Primary Infrastructure.

Over the 30-year O&M period, the City will make performance-based payments to pay down the remaining capital cost of the Primary Infrastructure and compensate PCWP for operations, maintenance and rehabilitation.

Revenue sharing

There is no revenue sharing in the project agreement. The City retains all rights to any commercial or other opportunities related to the project and, at its discretion, may grant these to PCWP.

Once the construction is completed, all customers will continue to pay their water bills to the City of Saint John as they have always done. A shared services model exists between the City of Saint John and Saint John Water (the utility) for the collection of funds, and there will be no change to this process.

Debt

Brookfield Financial Securities LP (Brookfield) acted as financial advisor for PCWP with the responsibility for negotiating, structuring and securing all the debt capital funding required for the project.

As part of the lender selection process, Brookfield executed a rigorous funding competition involving a broad range of prospective lenders. Lenders in both the domestic and international markets were asked to compete and were evaluated on financing structures and funding sources both on economics and on terms. The objective of the funding competition was to generate maximum pricing tension.

Brookfield also evaluated the economics between a private placement and underwritten bond solution for the long-term portion of the project debt, ultimately assessing it unlikely that it would be able to obtain a credit rating with a rating agency through an underwritten bond solution comparable to one obtained through a private placement, given the challenges in obtaining high investment-grade ratings for new asset classes such as the project.

After a critical analysis of the debt markets at that time and an evaluation of a range of possible scenarios, PCWP engaged the following lenders to provide the debt capital requirements for the project:

- Short-term debt – $116.6 million bank loan credit facility provided by Sumitomo Mitsui Banking Corporation (SMBC), with the full amount to be repaid upon substantial completion;
- Long-term debt – $25.4 million provided by Sun Life Assurance Company of Canada for the entire 30-year service term through a private-placement bond; the 30-year bond eliminates the need for refinancing.

Equity

The $10.7 million in equity represents approximately seven per cent of the capital structure and was provided by PCWP in the following shares:

- Brookfield (PCWP) Inc. – 50 per cent;
- Acciona Agua International Inc. – 40 per cent; and
- NAC (PCWP) Inc. – 10 per cent.

Equity will be drawn in the last three months of the construction period, following the full drawdown of the senior debt capital.

Letters of credit were provided by the equity investors at financial close as security against the deferred drawdown in amounts equal to the total equity capital required. The letters of credit will remain in place until the equity is fully drawn.

It should be noted that the $10.7 million in equity commitments includes $3.6 million in short-term contingent equity, as required by SMBC and Sun Life, to guarantee a maximum gearing requirement of 93:7. The contingent equity has been provided by the equity investors through letters of credit at financial close. No draw on contingent equity is anticipated during construction since all the project costs are fully funded by the long-term equity and senior credit facilities to eliminate future contingent obligations. The commitment of short-term contingent equity expires at substantial completion.

Risk Allocation

The project's key risks are highlighted below.

On-time/on-budget delivery

Providing residents with access to safe and clean drinking water as quickly as possible is the primary goal of the project. Subject to limited exceptions, the project agreement transfers the risk of delays and cost overruns to PCWP.

Existing water transmission infrastructure risk transfer and risk sharing

There is a significant risk transfer to PCWP around subsurface assets that date back to the nineteenth century. As well, PCWP and the City share the risk of damage to existing water transmission infrastructure that is not included in the works, with PCWP bearing the risk of damage to existing water infrastructure located within a prescribed "zone of influence" and the City bearing the risk of damage to existing water infrastructure outside that zone. This risk-sharing mechanism was implemented to ensure that good value for money was achieved.

Technical requirements

PCWP must satisfy the project's technical requirements related to the new water treatment plant and new storage reservoirs throughout the term of the project.

Water quality of the active water distribution system during construction

PCWP is responsible for maintaining the water quality of the active water distribution system to specified requirements during construction. Failure to do so will result in deductions being applied to the interim monthly payments during the construction period and/or the substantial completion payment.

Traffic management/coordination

PCWP assumes responsibility for managing and coordinating traffic within detailed traffic management and coordination constraints. Non-compliance will result in deductions being applied to the substantial completion payment.

Table 4 summarizes key risk allocations.

Table 4: Allocation of key risks

Risk	Partner responsible for managing risk	
	City	PCWP
Land acquisition and access	■	
Environmental authorization – project level	■	
Permits and approvals		■
Water/air/soil condition	■	■
Latent defects in respect of the Additional Infrastructure	■	■
Heritage find – pre-existing and unknown	■	
Heritage find – known		■
Delays by city	■	■
Delays by others		■
Force Majeure	■	■
Changes in legislation, regulations and standards	■	■
Design and construction		■
Design error and design sufficiency		■
Water treatment technology selection and performance		■
Weather		■
Geotechnical		■
Quality	■	■
Operation, maintenance and rehabilitation		■

Risk	Partner responsible for managing risk	
	City	PCWP
Water quality during construction	■	■
Raw water quality and flow	■	■
Output water quality		■
Damage to works and infrastructure		■
Asset management and meeting handback standards		■
Workplace health and safety		■
Labour dispute and disruption	■	■
Security		■
Cost overruns		■
Inflation during construction period		■
Inflation during operating period (to the extent provided for in the project agreement)	■	
Chemicals unit price	■	■
Chemicals volume		■
Energy unit price inflation	■	
Energy volume		■
Insurance	■	■
Credit spread fluctuations		■
Base interest rate fluctuations	■	


Installation of new transmission main on Westmorland Road

Benefits

Cost savings/value for money[13]

The estimated total cost savings of the project undertaken as a P3 with PCWP over the City's public sector DBB comparator is $24.1 million net present value, or 8.7 per cent.

As noted previously, a value for money (VFM) analysis was completed at the initial business-case stage of the project and included the following steps:

1. estimation of project costs under a traditional procurement model (the public sector comparator or PSC) in net present value (NPV);
2. estimation of the project costs in NPV under an alternative P3 model (the shadow bid); and
3. identification and quantification of risks and allocation of risks between the City and the private sector under the PSC and shadow bid.

The initial business case concluded that the P3 procurement models (DBFOM for the Primary Infrastructure and DBF for the Additional Infrastructure) yielded positive value for money. Once the preferred proponent was selected, the VFM analysis was updated to confirm that the price proposed by the preferred team delivered value for money. The shadow bid estimates were replaced with the bid submitted by PCWP.

The updated VFM also included the following changes in the project scope after the initial business case was completed:

- The development of the well-water site to serve the residents of Saint John West was added to the scope of the Additional Infrastructure component;
- As a result of the well-water site development, the capacity of the new water treatment plant was reduced from 100 MLD to 75 MLD to serve Saint John East;
- Sliplining was added for part of the Additional Infrastructure; and
- Certain transmission network components were eliminated.

The P3 costs include the present value of all payments to be made by the City to PCWP over the duration of the project agreement and certain ancillary costs and risks retained by the City.

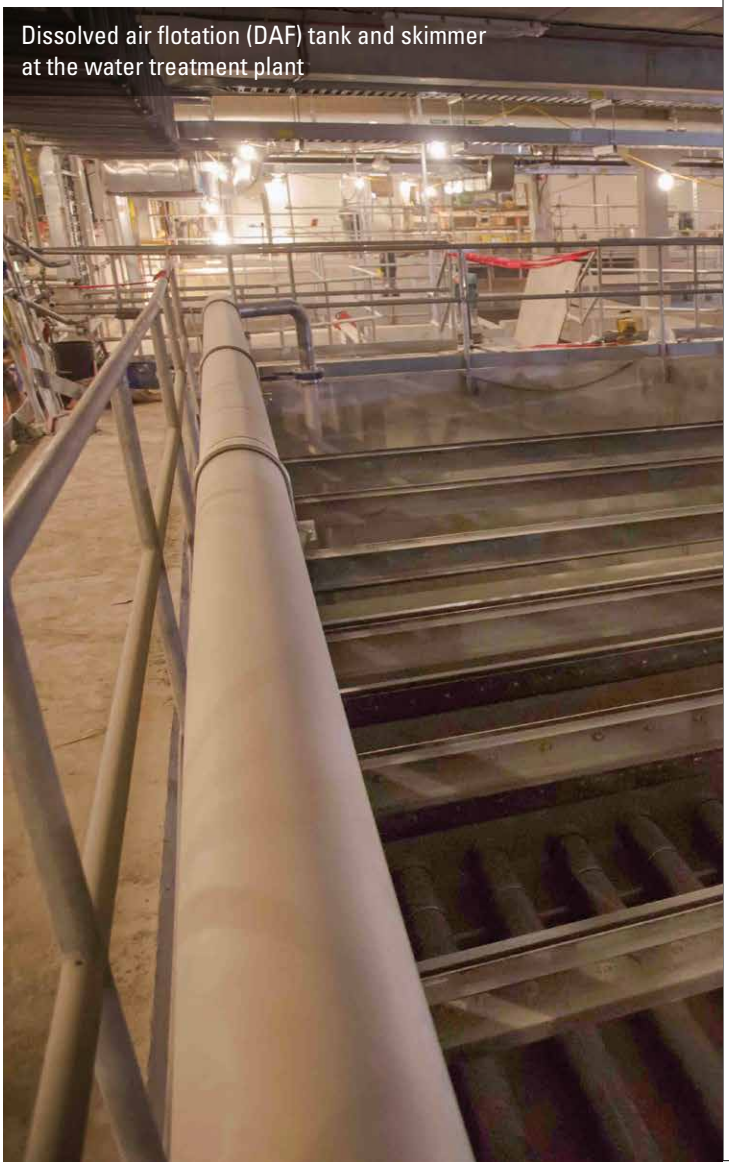
Table 5 shows the project costs for the public sector comparator, Table 6 shows the project costs for the P3 approach and Table 7 shows the project VFM, also illustrated in Figure 4.

[13] PricewaterhouseCoopers LLP, *The City of Saint John Safe Clean Drinking Water Project, Post-financial close value for money report*, April 1, 2016.

Table 5: Public-sector comparator (PSC) project costs

Public Sector Comparator Project Costs*	
Construction-related costs	138.9
O&M costs over 30 years	48.9
Rehabilitation costs over 30 years	10.3
Base Costs	**198.1**
Ancillary costs	13.2
Retained risks	67.2
Total project costs	**278.5**

*in $million NPV as at January 1, 2013, at discount rate of 4.25%



Dissolved air flotation (DAF) tank and skimmer at the water treatment plant

Table 6: P3 project costs

P3 Project Costs*	
Construction period payments	123.5
O&M payments	57.2
Rehabilitation payments	5.6
Capital payments	30.5
P3 Contract price	**216.8**
Ancillary costs	19.7
Retained risks	17.9
Total project costs	**254.4**

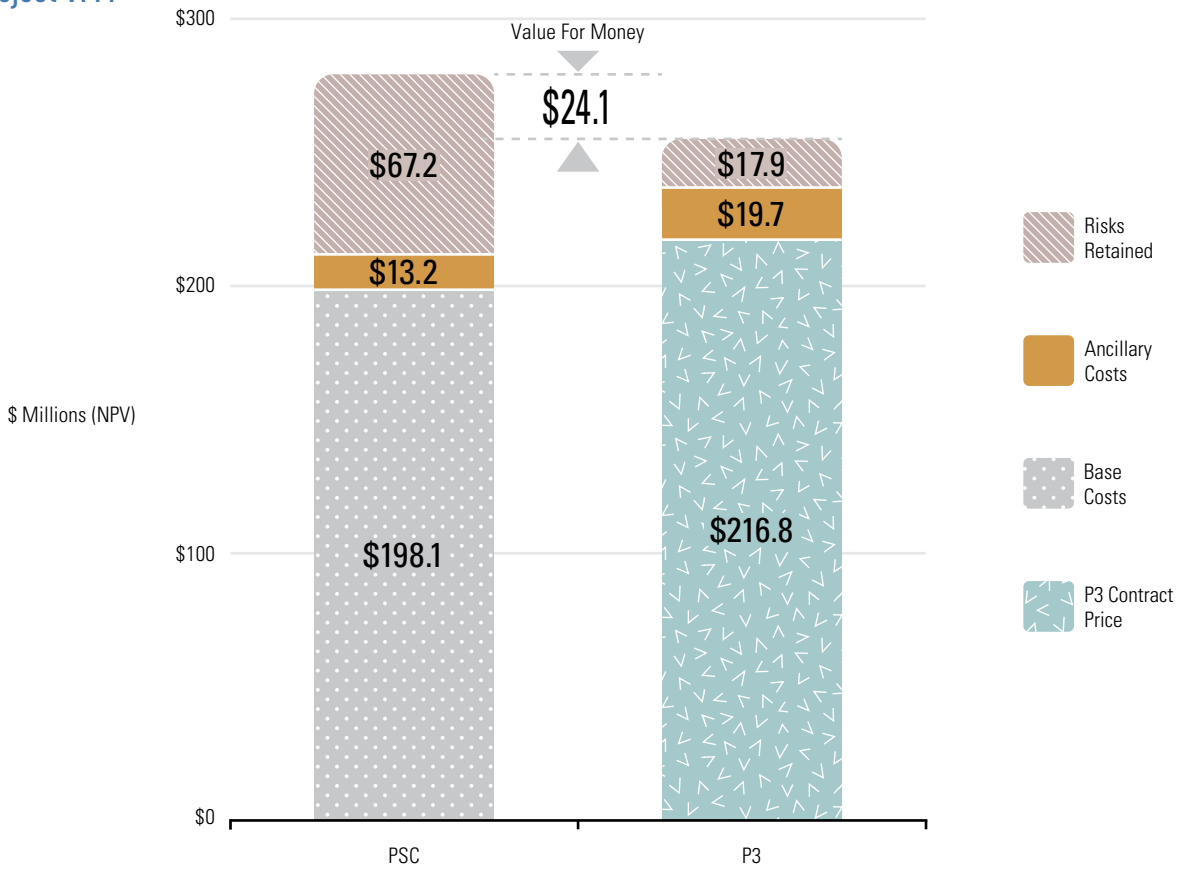
*in $million NPV as at January 1, 2013, at discount rate of 4.25%

Table 7: Project VFM

Project Value for Money*	PSC	P3
Base Costs	198.1	n/a
P3 contract price	n/a	216.8
Ancillary costs	13.2	19.7
Risks retained	67.2	17.9
Total project costs	**278.5**	**254.4**
VFM delivered by the P3 approach	-	24.1
VFM delivered by the P3 procurement approach in %	-	8.7%

*in $million NPV as at January 1, 2013, at discount rate of 4.25%

Figure 4: Project VFM



The VFM of $24.1 million or 8.7 per cent demonstrates the risk-adjusted cost advantage of procuring the project as a P3 and reaffirms the VFM determined in the initial business case.[14]

Community socio-economic benefits

Reliable water quality

Due to the aging water-treatment and distribution infrastructure of the City, residents are currently exposed to water that does not meet water quality standards and often need to endure boil-water orders. Once the project is completed it will provide safe, high-quality drinking water to residents, better protecting their health and the natural environment.

Infrastructure investment

In addition to boasting a modern, service-based economy, Saint John is home to heavy industry and port facilities, and is an important contributor to the province's economy. The City is trying to attract new industries, including manufacturing. An improved, reliable water infrastructure system will enhance these efforts, not just by generating growth opportunities for the City but also by strengthening the economy of all of New Brunswick.

Economic benefit

While the project itself is an important investment in infrastructure, generating significant construction activity over many years, the project's results—including providing reliable, clean, safe drinking water for Saint John—are even more important for the City and the regional economy, and provide significant economic benefits:

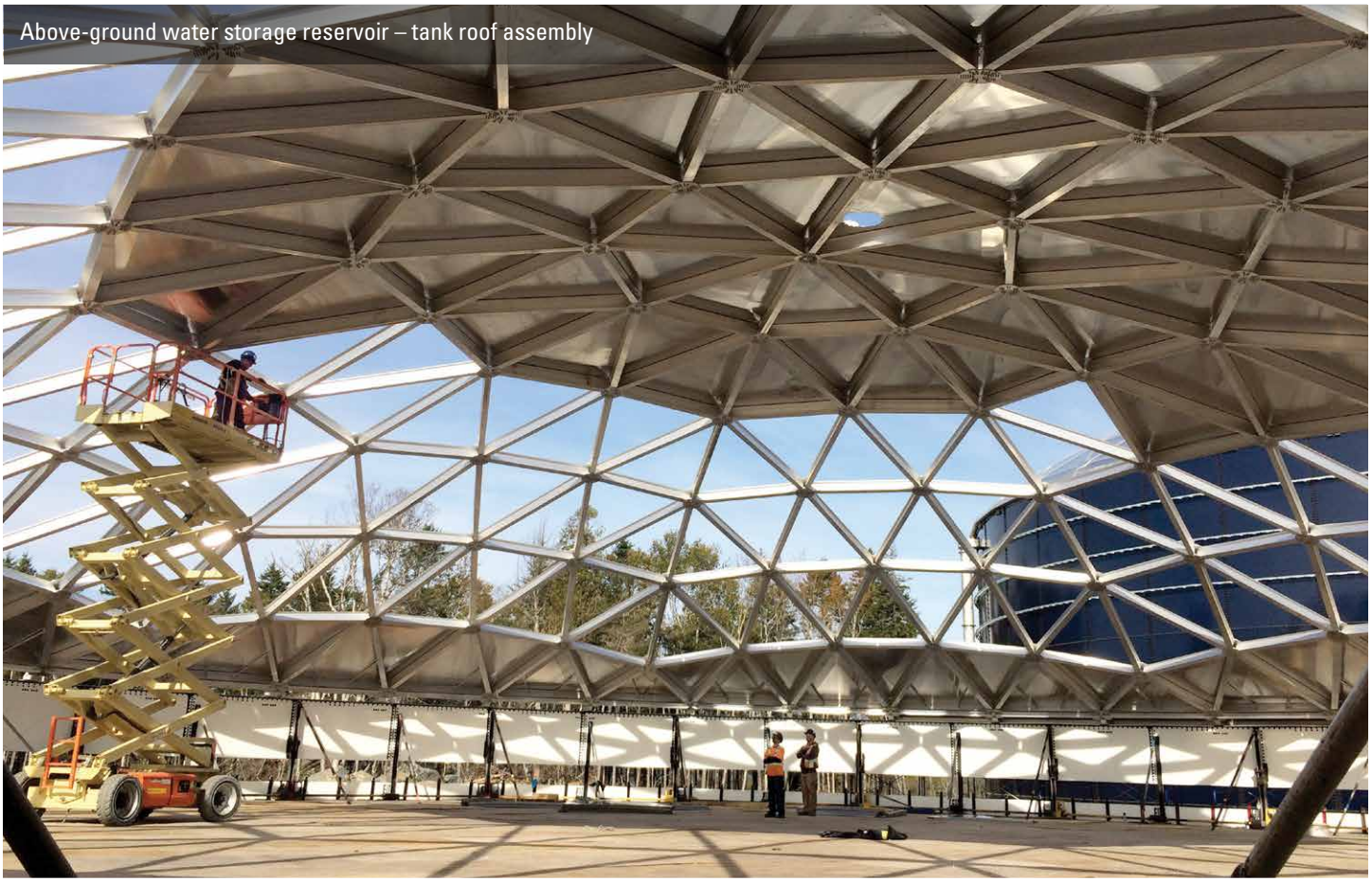
- sustaining current manufacturing/commercial activity and development opportunities;
- enabling development of additional manufacturing/commercial activity;
- enabling development and densification of housing to support population expansion;
- enhancing the City's reputation as an attractive and sustainable community; and
- creating a lower-cost raw-water alternative for industrial customers, thereby improving their competitiveness.

Local business and employment benefits

PCWP has committed to providing full and fair opportunities for qualified local suppliers to participate in the project and to optimizing local employment and training opportunities.

[14] Ibid., p. 6.

Above-ground water storage reservoir – tank roof assembly



Water treatment plant lime silos

Communications

Between the partners

Since entering into the project agreement the City and PCWP have established a positive and collaborative relationship. Regular meetings, partnering workshops and correspondence between the partners have been effective at ensuring the project progresses according to the technical requirements in the project agreement.

Examples of regular meetings:

- A construction-period joint committee (CPJC) was established shortly after financial close and consists of senior-level representatives from the City and PCWP. Meetings are held bi-weekly. The CPJC provides a forum for proactive and regular communication between both parties, facilitating discussions on key commercial issues and all matters relating to design and construction.
- A project coordination meeting is held weekly, and attended by City representatives and key design-build representatives from PCWP. At this meeting the team reviews the status of the Primary and Additional Infrastructure, including all issues relating to design, construction, scheduling, quality, environment and safety.
- A project quality meeting is also held weekly and is attended by City representatives and key design-build representatives from PCWP. At this meeting the team reviews the status of quality, discusses any related quality matters, addresses non-conformity and facilitates a culture of continuous improvement.

With the public

The City assumed the lead role in communicating with ratepayers, the public and other stakeholders. PCWP is required to support the City in keeping these groups informed as needed.

Stakeholders include customers of Saint John Water, suppliers, construction firms, engineering firms and workers potentially or actually employed by the project, agencies of the City, provincial and federal governments, local industry, adjacent and nearby landowners affected by the project, nearby residents and businesses, emergency preparedness and response agencies, and print and broadcast news media.

Few concerns were expressed about the City's choice to look at the use of a P3 delivery model. The City took the initiative to explain the P3 concept to employees and the public throughout the project's development and procurement periods and to share large amounts of information about the project, the process, the models, the benefits, and other aspects of the project. When the time came for Common Council to approve the project and the P3 delivery models, the motion was passed without incident.[15]

The City also took a proactive approach to communications regarding potential rate increases. To avoid rate shock, the City's finance department created a financial model that showed the cost obligations during the project's construction and once it is operational. With this model, a water and sewer rate plan was established that would raise rates the same amount ($72) for each household annually for a period of six years, to reach the point where the utility could sustain the capital and operational costs. Common Council endorsed the plan and it was publicly communicated before the project agreement was signed so there would be no financial surprises.

During the construction period, PCWP supports the City in managing a customer-service telephone line, which addresses inquiries from the public about general construction and active work zones. Notices about construction schedules, working hours and traffic disruptions are periodically distributed to local landowners and businesses as needed.

In June 2016 the City and PCWP jointly hosted two open-house sessions in Saint John to provide local residents with project details and information about ongoing construction activities. Representatives from both the City and PCWP were in attendance to answer questions.

The City will continue to communicate with water consumers after substantial completion.

Dispute resolution mechanism

The project agreement takes a somewhat different approach to dispute resolution than other Canadian P3 deals have done. In general, Canadian P3 projects establish one dispute resolution process that starts with amicable resolution by party representatives and escalates through various steps to a final referral to arbitration or litigation. In contrast, the Saint John project has established two distinct one-step processes, one for the construction period and one for the O&M period.

During the construction period (including the warranty period), disputes are to be resolved by an independent dispute resolution board. A specific timeline is established by the agreement, and the recommendations of the board are final and binding unless one of the parties gives notice of non-acceptance within 20 days, which either may do only for claims in excess of $100,000. Having given proper notice of non-acceptance, a party may pursue the resolution of the construction-period dispute in a court of competent jurisdiction.

O&M period disputes are to be resolved through an arbitration process that is subject to the rules of the Arbitration Act of New Brunswick. The arbitration decision is final and binding and is not subject to any appeal or review unless there was an error in law.[16]

[15] Legal Services and Contract Manager, City of Saint John, correspondence dated January 10, 2018.

[16] *Project Agreement, Saint John Safe Clean Drinking Water Project, Schedule 6 – Dispute Resolution Procedure*, Execution Version, February 4, 2016.

Water treatment plant under construction

Labour

There is no need to transfer a work force for either part of the project. The Primary Infrastructure is a new facility and operating the new plant was never part of the scope of work of current city employees. The Additional Infrastructure has no operating or maintenance component to it.

There is a small existing water treatment plant used for coarse screening and disinfection that is not part of the project, and there will be no staff changes or reductions at this plant as a result of the project or PCWP's operation of the new water treatment plant.

Employees at the existing water treatment plant have responsibilities far broader than simply operating the treatment plant itself—they are also responsible for all the water pumping stations, all the existing water-storage tanks and a pre-existing subdivision well system. When the Additional Infrastructure is completed, they will also be responsible for all of the new well-pumping system and treatment of the Saint John West water. The workplace demands of these additional responsibilities will essentially be the same.

Monitoring

The City has a governance structure in place for the project that includes a full-time dedicated project team. The contract is monitored by this team (known as the Safe Clean Drinking Water Project team) with full-time legal guidance and advice from the legal services and contract manager on the project and oversight by the project steering committee. Members of the steering committee include the mayor, deputy mayor, city manager, deputy city manager and the Saint John water commissioner.

Performance of PCWP throughout the term of the project will be evaluated on the basis of technical standards and specifications, key performance indicators (KPIs), operational performance measures and handback requirements that have been developed for the project and are detailed in the project agreement.

Should standards, specifications, measures and requirements not be achieved, deductions will be applied to the interim monthly payments during the construction period, the substantial completion payment and the monthly payments during the O&M period. The deduction amounts will vary based on the relative importance/significance the City has placed on the obligation being enforced.

For example, payment deductions would be applied for failure to maintain specified safety certifications, issuing boil-water orders, failure to meet specific water quality requirements, failure to maintain specified reservoir levels and failure to communicate water-quality test results. A full list of deductions can be found in Schedule 10 of the project agreement.[17]

[17] *Project Agreement, Saint John Safe Clean Drinking Water Project, Schedule 10 – Payment Mechanism*, Execution Version, February 4, 2016.

Lessons Learned

All parties agreed that a number of elements led to the project's success, not only in achieving significant value for taxpayers' dollars, but also in achieving support from local residents and businesses.

Collaboration

Both partners agreed that collaboration has been an important factor in the project's success. During the procurement phase, three collaborative sessions were held by the City with each of the proponents, where proponents could set the agenda, present design ideas and ask questions. All proponent team members were present as needed, including members from the design, construction and facilities management teams. This helped proponents develop and test their ideas within a confidential environment, and helped them better understand the needs of the City. It also contributed to building trust and mutual respect between the partners from an early stage.

Aspects of the process that could be improved for the benefit of similar future projects

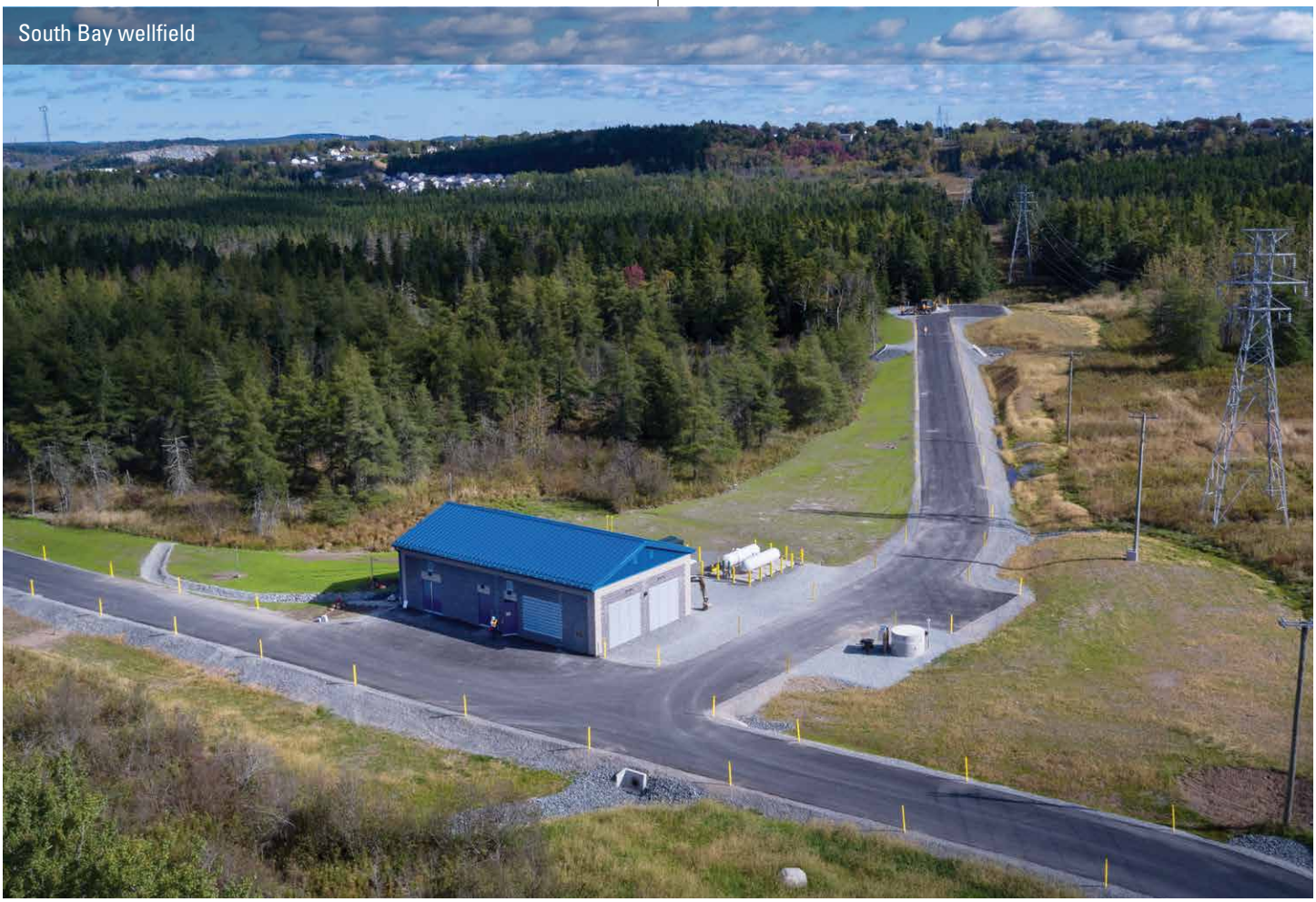
A procurement approach such as this project's, where a contract will be awarded to the lowest-cost proposal, places a significant emphasis on the evaluation criteria and significant amount of pressure on the accuracy and strength of the technical requirements. A careful process around the drafting of the technical requirements will help alleviate some of the pressure, as would a combination of technical and legal input in the drafting.

City officials felt the time and resources needed to implement a P3 procurement process can be formidable and since New Brunswick municipalities do not typically have such internal resources, future municipal infrastructure projects would benefit from the support and expertise of external entities with P3 expertise when pursuing a P3 procurement.

Applicability to other jurisdictions

The project is the largest municipal infrastructure project ever undertaken in the Province of New Brunswick and is one of the largest water projects in Canada to use a P3 approach. Its successful delivery using two P3 delivery models within one contract will serve as a guide for the procurement of future water treatment systems that include new above-ground infrastructure and improvements to existing subsurface transmission and distribution networks.

South Bay wellfield



Concluding Comments

As the first expansive P3 drinking water infrastructure project in Canada, the Saint John Safe Clean Drinking Water Project will serve as a model for similar projects in the future. The City's unique and innovative approach to combining rehabilitation of aging subsurface infrastructure and building new above-ground infrastructure in one contract resulted in the use of a precedent-setting P3 agreement incorporating two delivery models.

A DBFOM model was used for new above-ground infrastructure and a DBF model was used to deliver improvements to the aging subsurface transmission and distribution network. The estimated total cost savings of the project over the City's public sector DBB comparator is $24.1 million in net present value, or 8.7 per cent.

The project also reflects a groundbreaking approach to managing latent defect risk for more-than-hundred-year-old water pipes by using sliplining technology. The result will be a municipal water system that ensures that all residents and commercial and industrial customers needing treated water will have access to potable water that meets standards set both federally and provincially. An important outcome of the project is that it will also create a separate industrial water system for industrial users who until now have had to pay a higher price for treated water for all their processes.

The project will result in substantial economic benefits to the City and the province, not only sustaining current manufacturing and commercial activities, but also enabling development of additional manufacturing and commercial activity and supporting population growth. Significant employment and training opportunities will also be generated for Saint John residents and businesses.

The City of Saint John's Safe Clean Drinking Water Project is an example of how the private and public sectors can come together in an efficient, cost-effective, timely and innovative fashion to meet the infrastructure needs of the public sector.

Testimonials

Public sector

The City of Saint John is the oldest incorporated city in Canada (1785). Part of its water infrastructure dates back to the 1850s and is still in use today. The quality and reliability of water in Saint John have been a challenge partly because the treatment of water consists only of chlorination, and partly because parts of the water system are well beyond the end of their useful lives. Chlorination, in and of itself, for the treatment of lake water is inadequate to properly treat the water so that it meets the *Guidelines for Canadian Drinking Water Quality*. Therefore, Saint John is not able to assure the public of the safety of their drinking water until the Safe Clean Drinking Water Project is completed. As well, and for many years, the City and its citizens have contended with multiple breaks in the old infrastructure and the related multiple boil-water orders yearly.

The Safe Clean Drinking Water Project was born out of a very real need to provide safe and reliable water to the citizens of Saint John. It is the first project of this size for the City, the largest municipal infrastructure project in New Brunswick's history, and for this and other reasons was many years in the making.

The size of the overall project, the risks associated with the conventional delivery method and the need to have the project completed in a relatively short amount of time given the public-health urgency of the situation were driving factors behind the decision to pursue a public-private partnership (P3). Once discussions began around the possibility of pursuing a P3, the support from funding partners like P3 Canada and the New Brunswick Regional Development Corporation (which might not otherwise have been available to the City had it opted for the conventional project delivery method), made the project viable.

The City, like most public authorities, has a record of insufficient long-term investments in infrastructure. The capital maintenance of infrastructure was left to the year-to-year budgeting process. Until recently, the City did not do any long-term (30 years) capital budget planning. Instead, it focused on a four-year plan (the term of any elected Council), and the budget was driven by the "hot" political items of the day. The P3 project delivery model brought to this essential project budgeting certainty, and certainty of payment of appropriate maintenance and operation costs over a 30-year period.

Municipalities are not in the business of efficiently delivering very large infrastructure projects. According to the City's original estimate, had the City delivered the project through the conventional method, it would have cost (VFM) approximately $24 million more to the ratepayers, and taken at least 10 years. A conventional delivery of this project by the City was also dependent on the City's ability to amass the funds necessary to deliver the overall project and to gather and keep the personnel necessary to properly manage it internally, neither of which was a certainty.

The P3 delivery model in this case was instrumental to the viability as well as the success of the project. It also translates into long-term financial planning for infrastructure necessary to deliver an essential service to the citizens of Saint John. But most importantly, the P3 delivery model has allowed the project to proceed promptly, thereby achieving quickly the ultimate goal of protecting the health and safety of the citizens of Saint John.

J. Brent McGovern
Commissioner
Saint John Water

Raw water gallery at the water treatment plant

Private sector

The Safe Clean Drinking Water Project is the largest municipal project ever undertaken in the Province of New Brunswick and one of the first water treatment facilities in Canada to be procured under the public-private partnership (P3) delivery model. It is also a cornerstone initiative for the City of Saint John that will result in the first reliable drinking water system for the oldest city in Canada. Port City Water Partners (PCWP) is honoured to partner with the City of Saint John to deliver this landmark project, which will provide residents with much-needed access to safe and clean drinking water.

The collaborative relationship exhibited by the City throughout the procurement process and into the construction phase of the project demonstrates its professionalism and commitment to investing in the future and fostering a long-term working relationship with PCWP.

Key to the project's success to date has been the close collaboration between all parties, including open, honest and continuous dialogue between PCWP and the City. This has encouraged an environment of trust and mutual respect, which is critical as we work towards the common goal of effectively and efficiently delivering a high quality infrastructure asset, on time and on budget.

The project is unique in that it combines both the Design-Build-Finance-Operate-Maintain (DBFOM) and Design-Build-Finance (DBF) P3 delivery models, as well as both vertical and horizontal infrastructure, into a single contract. It also reflects a groundbreaking approach to latent defect risk for a subsurface water distribution network that is over one hundred years old.

As part of its design solution, PCWP opted to use sliplining technology (a method of rehabilitating existing water pipelines by installing a smaller-diameter "carrier" pipe within a larger-diameter "host" pipe) for improving the Additional Infrastructure, thereby resulting in latent defect risk in respect of the existing water pipe size only, and not the surrounding ground conditions. Eliminating latent defect risk in respect of the ground conditions surrounding the Additional Infrastructure is a significant achievement for the project due to the latticework of existing water pipes throughout Saint John. The use of sliplining technology also minimizes the construction impact on residents, local businesses and the broader community.

The City of Saint John Safe Clean Drinking Water Project is a true testament to the ideals of the P3 model, and we look forward to continuing to work in partnership with the City to deliver value for money to the citizens of Saint John.

Samir Chande
Port City Water Partners

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Appendix: CCPPP's National Award Case Studies 1998 - 2017

Defence

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

Education

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

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

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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