FORT MCMURRAY WEST 500-kV TRANSMISSION PROJECT, ALBERTA

CANADA'S FIRST TRANSMISSION INFRASTRUCTURE P3

THE CANADIAN COUNCIL FOR PUBLIC-PRIVATE PARTNERSHIPS
2018 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 2018 National Award Case Studies

Gold Award for Project Financing: Fort McMurray West 500-kV Transmission Project, Alberta

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Introduction

For nearly 30 years, The Canadian Council for Public-Private Partnerships and its almost 400 members from both the public and private sectors have played a strong role in refining the P3 model and promoting new approaches to public infrastructure development and service delivery.

Governments across Canada are using the public-partnership (P3) model to build, maintain and operate much-needed infrastructure, from schools and hospitals to bridges and highways — and new projects and new jurisdictions, such as Newfoundland and Labrador, Nova Scotia, Northwest Territories, and several Indigenous communities are becoming involved.

In 2019, there are more than 280 active P3 projects in operation or under construction valued at $136.6 billion.[1] And a majority of Canadians (64 per cent) remain supportive of the P3 model to build much-needed infrastructure.[2]

Along the way, the 'made-in-Canada' P3 model has become globally renowned but, as the winners of the 2018 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 70 that have been published to date. Designed to inspire others to consider innovative and efficient models for procuring public 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.

For the past decade or so, Canada has been involved in what some have called 'a golden age of infrastructure development,' which the use of P3s and a stable pipeline of projects have helped make possible. But we still have a national infrastructure deficit estimated at anywhere from $50 billion[3] to as high as $1 trillion.[4]

The federal government is working to address this gap with its Investing in Canada plan, which will spend more than $180 billion by 2028 to support infrastructure projects in provinces, territories, municipalities, and Indigenous communities. The plan includes the Canada Infrastructure Bank, which has $35-billion available to partner with private investors and provinces, territories, municipalities and Indigenous communities to build more much-needed infrastructure. Several provinces are also stepping up with record levels of investment, including Ontario, and are once again leading in P3 projects coming to market.

It is important to keep in mind that 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.

[1] P3 SPECTRUM, www.p3spectrum.ca, accessed March 25, 2019.

[2] Nanos research survey, www.pppcouncil.ca/web/pdf/nanos_infrastructure_survey_102018.pdf, p.4.

[3] The Government of Canada, Investing in Canada Plan, (April 2018) http://publications.gc.ca/collections/collection_2018/infc/T94-9-2018-eng.pdf p. 11. Accessed March 26, 2019.

[4] The Globe and Mail (December 13, 2017) www.theglobeandmail.com/report-on-business/time-and-money-lost-to-canadas-infrastructure-gap-a-tremendous-loss/article37302054/

2018 Award Winners

Fort McMurray West 500-kV Transmission Project — Gold Award for Project Financing

This vital power project, stretching 500 kilometres northeast from Edmonton, will increase the capacity and overall reliability of Alberta's transmission system in order to meet booming demand in the Fort McMurray area. This is also the first transmission infrastructure P3 to be procured in Canada.

The awards committee commended the project's use of a "unique funding competition that took place after the route for the transmission line was finalized and regulatory approval had been granted, resulting in significant savings for the public." At the time of award, the cost savings were estimated to be more than $400 million — approximately 25 per cent of total capital costs.

The City of Saskatoon's North Commuter Parkway & Traffic Bridge Project — Gold Award for Infrastructure

When Saskatoon residents and civil and Indigenous leaders came together to celebrate the official opening in the fall of 2018, it was clear this project was about more than improved infrastructure and reduced commutes. It was also building a more inclusive community.

The new six-lane bridge on the Parkway pays tribute to Chief Mistawasis, the Cree Chief who signed Treaty 6, while the modern steel-truss structure of the rebuilt Traffic Bridge uses complex engineering to preserve its historical character while meeting today's safety standards.

The project is the largest infrastructure project ever delivered in the City of Saskatoon and the first bundled transportation P3 in Canada. The project's cost savings by using the P3 delivery model are estimated at $69.4 million, compared to conventional project procurement.

Quad at York University — Silver Award for Service Delivery

Every student knows how important it is to be close to campus to optimize time for classes, research and studying. In August 2017, York University opened the first phase of the Quad, offering much-needed apartment-style accommodations for more than 800 students in Toronto.

The project is among the largest student housing P3 endeavours ever undertaken in Canada and uses a model that freed York from risks associated with capital costs, operations and maintenance, enabling the university to focus its resources on its academic mission.

Milton District Hospital Expansion — Silver Award for Infrastructure

As one of Canada's fastest growing communities, Milton needed to improve and expand its hospital — and fast. Opened in October 2017, the 455,000-sq. foot facility means residents of all ages and abilities can stay close to home and access a wide range of health-care services.

The expansion, designed with community, staff and patient input, was delivered on time and on budget in just 25 months and took place without disrupting essential and lifesaving clinical services at the existing hospital building. The project, which employed 600 workers at its construction peak and created 200 new jobs within the hospital, transferred significant risk to the private sector partner and resulted in projected cost savings of $124.9 million.

Finch West LRT Project — Silver Award for Project Financing

Under construction in northwestern Toronto, the 11-kilometre light-rail system is an Ontario government priority to transform the busy Finch Avenue West corridor. The LRT is expected to open in 2023.

The $1.4-billion Finch West LRT project utilized more than $800 million in private financing consisting of short-term bank financing combined with a cost efficient combination of medium- and long-term bonds. The project reached financial close in an "impressive" 26 days, the awards committee noted. Importantly for an LRT project, the financing structure was also designed to accommodate future system expansion. Overall, the P3 project has an estimated cost savings of $566 million via the alternative financing and procurement model.

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 2018 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, 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
- Godyne Sibay, Partner, Real Property and Planning Group, McCarthy Tétrault LLP
- Lindsay Wright, Manager, Global Infrastructure, KPMG LLP

Deborah Reid authored the 2018 Award Case Studies and we thank her for bringing the essence of these award-winning projects to life. The case studies are developed with significant input and review from the project partners and procurement agencies as well as the diligent work of the researchers. CCPPP would like to thank them for their contributions as well as Infrastructure Canada for its research support for the case studies.

Infrastructure Canada

The Awards are made possible by the generous support of the following 2018 sponsors:

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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. Our mission is to collaborate with all levels of government and Indigenous communities to enable smart, innovative approaches to public infrastructure development and service delivery that achieve the best outcomes for Canadians. 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.

Our reports, case studies, guidance and surveys are available on CCPPP'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.

Quick Facts – The Fort McMurray West 500-kV Transmission Project[5]

Project type

Develop-Design-Build-Finance-Own-Operate-Maintain (DDBFOOM)

Asset/Service

A new 500-kilovolt alternating current single-circuit electrical transmission line in Alberta running approximately 500 kilometres from west of Edmonton to Fort McMurray. Assets are handed over to the Alberta Electric System Operator [6] at the end of the contract.

The approximately 40-year term includes two agreements:

1. Project development agreement (PDA) (approx. 3 years); and
2. Project agreement (PA) (approx. 37 years) consisting of:
   - 2-year construction period (approx.); and
   - 35-year operating period.

Status

Energized March 28, 2019, three months ahead of target energization date of June 27, 2019.[7]

[5] Background and facts in this case study rely on the information contained in the award application submitted jointly by the project partners in September 2018 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, other sources as noted and personal interviews with project partner representatives.

[6] The AESO manages and operates Alberta's transmission system. It is a not-for-profit organization with no financial investment in the industry and is responsible for planning the province's network of towers, wires and related infrastructure. It is also responsible for balancing supply and demand in the province's competitive electricity market where private companies own generation, transmission and distribution facilities. The AESO dispatches the power sold by generators, using the lowest-priced electricity first and then the next lowest until the need for power has been satisfied.

[7] Project Agreement (execution copy), Fort McMurray West 500-kV Transmission Project, Independent System Operator (Operating as the Alberta Electric System Operator) and Alberta Powerline Limited Partnership, September 28, 2017, p. 24, as appended to Alberta PowerLine Tariff Application to Alberta Utilities Commission, November 30, 2017.

Partners

Public Sector

- Alberta Electric System Operator (AESO)

Private Sector

- Alberta PowerLine Limited Partnership (APL) (Issuer)

Other participants

Public Sector

- Norton Rose Fulbright Canada LLP – Legal Advisor

Private Sector

- Canadian Utilities Limited – Equity Sponsor
- Quanta Services CC (QSCC) Canada Ltd. – Equity Sponsor
- Valard Construction LP – Construction Contractor
- ATCO Electric – Construction Contractor and O&M Contractor
- Bennett Jones LLP – Legal Advisor to Issuer
- Fasken Martineau DuMoulin LLP – Legal Advisor to QSCC
- CIBC World Markets Inc. – Joint Bond Underwriter and Joint Bookrunner
- RBC Capital Markets – Financial Advisor to Issuer and Equity Sponsors, Joint Bond Underwriter and Joint Bookrunner
- Aon Reed Stenhouse Inc. – Insurance Advisor to Issuer
- Tory's LLP – Lenders' Legal Advisor
- Altus Group – Lenders' Technical Advisor
- INTECH Risk Management – Lenders' Insurance Advisor
- BDO LLP – Lenders' Model Auditor

Project cost, financing and value for money

Total project cost (present value dollars)

- $1.57 billion (2019$) net present cost (NPC)[8]

Project financing (nominal dollars)

- Funded equity
  - $187.7 million
- Senior bonds
  - $1.38 billion in fixed rate senior secured amortizing bonds split across four tranches (two medium-term tranches and two long-term tranches).

[8] The net present cost is the present value of the capital payments and O&M payments. The base date is the original target energization date (June 1, 2019), i.e., the date on which payments were forecasted to commence. The discount rate is 6.8 per cent.

Payments

- Monthly payments for capital, O&M and insurance starting on the energization date.
- Subject to deductions based on performance and reliability targets.

Value for money (nominal dollars)

- AESO estimated cost savings for Alberta ratepayers at more than $400 million when the winning bidder was selected.

Project highlights and innovative features

- A new asset class for Canadian P3s: The project marks the first transmission infrastructure P3 project procured in the Canadian market.
- Unique financing structure for the Canadian bond market: It was the first broadly marketed bond offering to use a synthetic quarterly-pay amortizing structure and it represents the largest P3 bond offering ($1.385 billion) in Canada to date.
- Multi-phase procurement: The AESO's procurement process required the private partner to be responsible for a wide range of pre-development activities that resulted in the project being carried out in two distinct phases – the project development agreement phase (PDA phase) and the project agreement phase (PA phase). Bidders were required to bid the route path of the transmission line rather than have it dictated by AESO. During the PDA phase, all costs were equity funded and the capital markets financing occurred concurrent with the start of the PA phase.
- Unique payment mechanism: In the absence of any contributions by the Government of Alberta or AESO during the construction period given the rate-base funding mechanism, a unique payment mechanism was developed resulting in a significant level of equity at risk and a more robust financing structure.
- Land and regulatory approvals: APL was obligated to obtain all necessary land and regulatory approvals. Its scope of work included all land transfer and acquisition responsibilities, as well as stakeholder management.

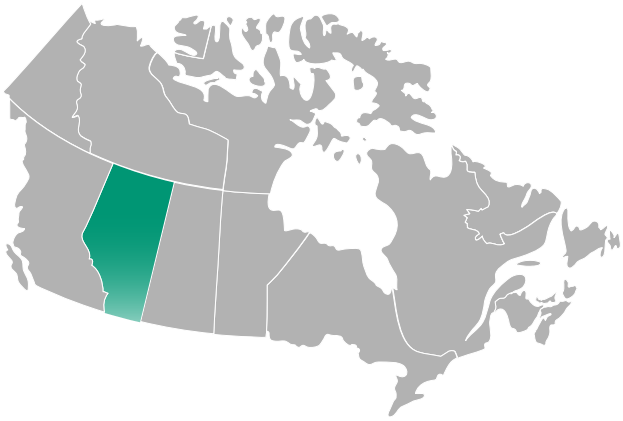
Project websites

www.aeso.ca/grid/competitive-process

www.aeso.ca/grid/competitive-process/fort-mcmurray-west-500-kv-transmission-project

www.albertapowerline.com

Thickwood Wood Hills substations – ATCO Electric 240 kV on the right and APL 500kV on the left. Source: Valard drone.



Overview

In December 2008, the Alberta Government (the Government) introduced the Provincial Energy Strategy, a comprehensive plan for the province's energy future. The strategy noted the importance of electricity as a "facilitator of economic development" in Alberta. To assist with the implementation of the strategy, legislative amendments were subsequently introduced giving priority to certain major upgrades to Alberta's transmission system.

One of these upgrades, identified by the Alberta Electric System Operator (AESO), was the need for significant investment in transmission infrastructure at a cost of approximately $14.5 billion over the period 2009 to 2019.

To keep costs down, the Government wanted to deliver some of the upgrades through an innovative competitive process rather than through the traditional cost-of-service process. Opening the market to multiple proponents was expected to put downward pressure on the cost of transmission.

In 2010, the Government required the AESO to develop and implement a competitive process that would require approval by the provincial regulator, the Alberta Utilities Commission.

The competitive process developed was an innovative and first-of-its kind hybrid public-private partnership (P3) model for transmission facilities. The Fort McMurray West 500-kV Transmission Project was the first project in the province and the first transmission infrastructure project in the country to make use of this approach.

In 2014, AESO closed a performance and availability-based P3 for the project that included development, design, construction, finance, ownership, operation and maintenance. Alberta PowerLine Limited Partnership (APL) was selected as the successful proponent.

The deal itself is unique and innovative for several reasons. It is the first-ever P3 for transmission facilities in Canada, it was the first broadly marketed bond offering to use a synthetic quarterly-pay amortizing structure and it represents the largest P3 bond offering ($1.385 billion) in Canada to date. In addition, it is structured with two separate underlying agreements:

1. project development agreement (PDA) – for the development and route selection phase; and
2. project agreement (PA) – for the construction, operations and maintenance phase.

This case study will examine these and other distinctive features of the project, which won gold for project financing in the 2018 National Awards for Innovation and Excellence in Public-Private Partnerships, presented by The Canadian Council for Public-Private Partnerships.

Figure 1 shows the location of the route of the project.

Background and rationale

Originally established in 1870 as a Hudson's Bay Company trading post, Fort McMurray is known today as the residential and commercial hub of Canada's oil sands industry.[9]

In 2016, the national census reported 66,573 people living in Fort McMurray.[10] Residents come to the community in northeastern Alberta from all regions of Canada and around the world.

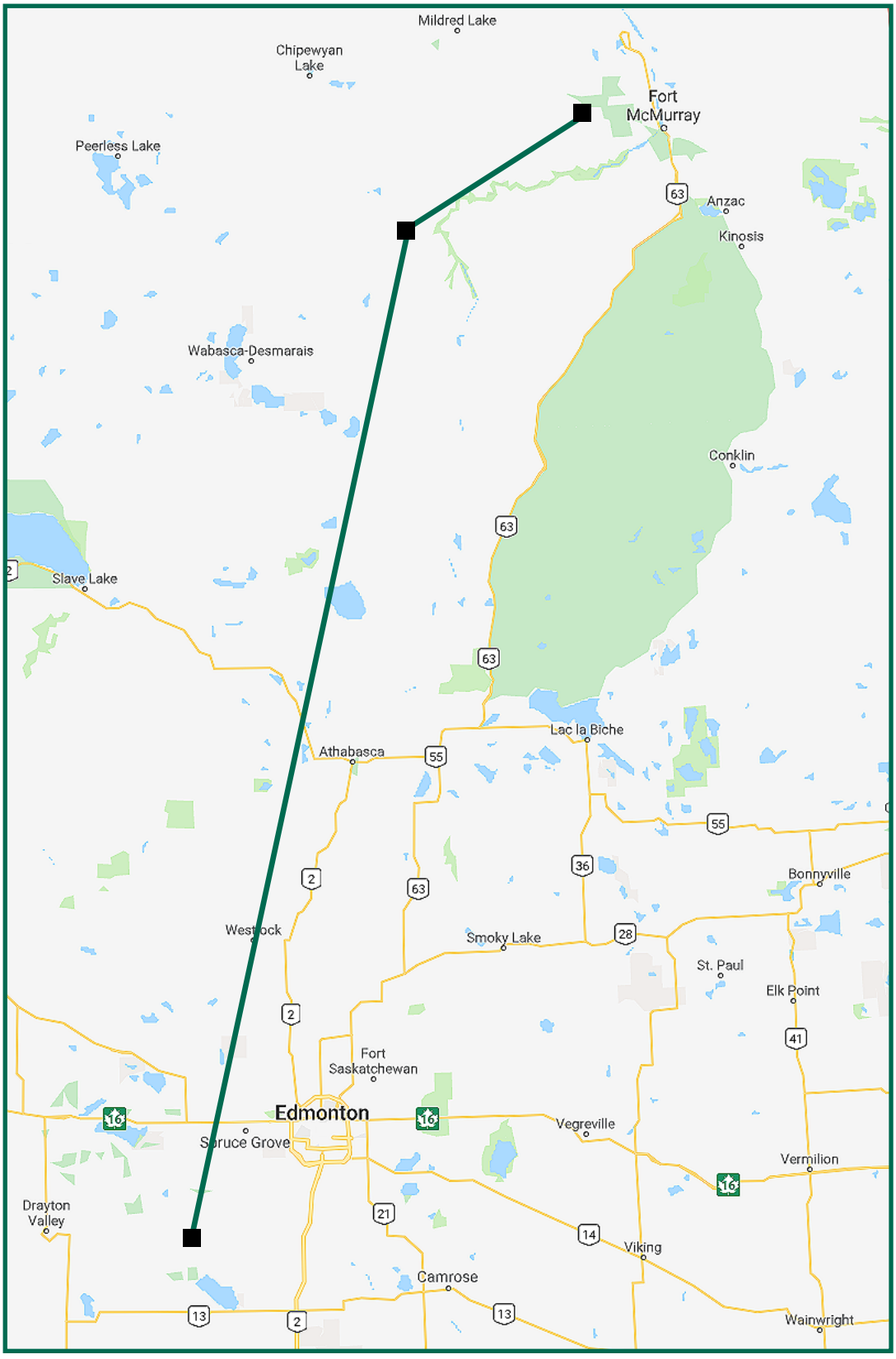
The Regional Municipality of Wood Buffalo, with Fort McMurray as its urban centre accounts for approximately 25 per cent of Alberta's total electricity use. It is home to some of Canada's largest oil, gas and petrochemical industries. The amount of power consumed in the region today is about the same as the amount of power used in each of Alberta's major cities (Calgary and Edmonton).

In 2009, provincial legislation designated the need for a new transmission line between Edmonton and Fort McMurray as critical, with demand for power in the Fort McMurray area

[9] Regional Municipality of Wood Buffalo website: www.rmwb.ca/living/Communities/Fort-McMurray.htm, accessed December 14, 2018.

[10] Statistics Canada website: http://tinyurl.com/y5bgk72k, accessed December 14, 2018.

Figure 1: Fort McMurray West 500-kV Transmission Line



Line 12L44 south of Buffalo Creek Source: Helicopter (Arden Spachynski)

expected to almost double in the coming decade. Existing lines had also reached their maximum flow.

The project was intended to increase capacity to meet this expected growth in demand and improve the overall reliability of Alberta's transmission system.

Government objectives

In 2010, the Government issued a mandate requiring AESO to develop and implement a competitive process for the Fort McMurray West 500-kV Transmission Project. The AESO's objectives for the competitive process included:

- minimizing life cycle costs through the use of a competitive process;
- creating opportunity for maximum innovation throughout the life cycle of the facilities;
- creating opportunity for new market entry; and
- allocating risk to most efficiently and effectively manage it and reduce costs.

Description of the Project

The project is being delivered in two phases with two separate agreements:

1. PDA phase: Approximately three years to undertake activities before financial close of the PA including route selection, stakeholder consultation, land/right-of-way acquisition, regulatory approvals (facilities application to obtain a permit and license from the Alberta Utilities Commission), engineering and design work and other related activities. The costs of these activities were entirely equity funded.
2. PA phase; Approximately 37 years to undertake activities after financial close including construction and a 35-year operations and maintenance period.

The transmission line runs:

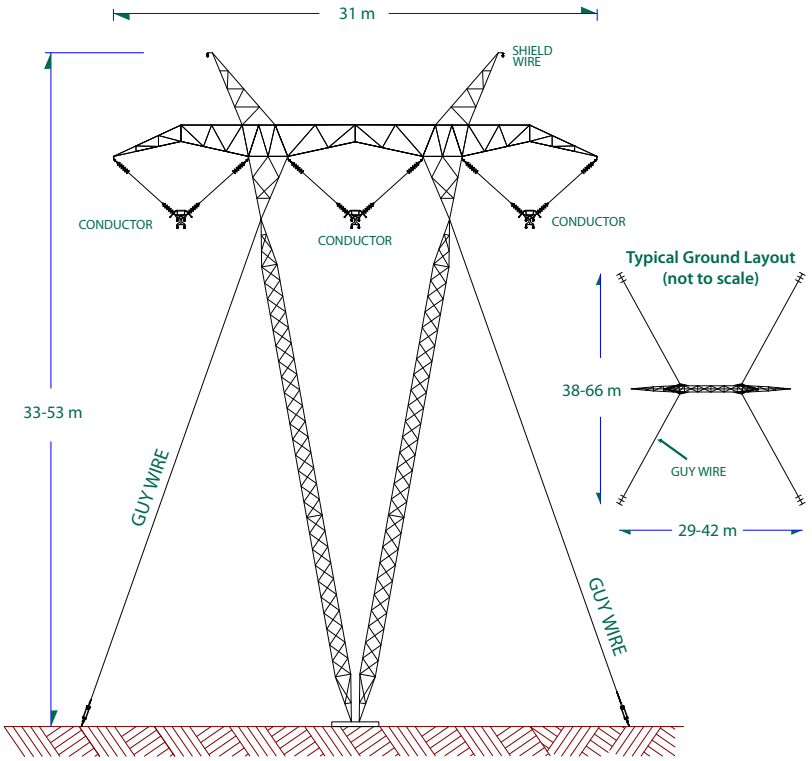
- approximately 95 kilometres from the new Thickwood Hills 951S 500-kV Substation to the new Livock 939S 500-kV Substation; and
- approximately 414 kilometres from the new Livock 939S 500-kV Substation to the existing Sunnybrook 510S 500-kV Substation.

The transmission facilities consist of three conductor bundles (four wires each), two overhead shield wires (one containing fibre optics) and guyed "V" lattice towers. There are 1,368 towers in total (1,182 being guyed V towers) with:

- 6,096 kilometres of conductor wire (longer than the distance across Canada[11]);
- 508 kilometres of overhead shield wire;
- 508 kilometres of fiber optic cable; and
- approximately 22,000,000 kilograms of tower steel.

[11] The distance measured from Victoria, British Columbia to Cape Spear, Newfoundland is approximately 5,070 kilometres "as the crow files" on Google Maps.

Figure 2: Typical single circuit 500-kV guyed "V" structure



The typical tower structure is shown in Figure 2.

In addition, the AESO has, under its legislative authority, directed certain transmission facility owners to modify or build certain substations.

Procurement Process

Selecting the P3 model

In 2011, AESO consulted with stakeholders and reviewed competitive models in other jurisdictions to develop a procurement model that would reduce costs, allocate risks efficiently and bring innovation to Alberta's transmission system.

AESO considered several possible options but settled on a single-owner model in which the private partner would be responsible for all development activities, engineering, procurement, construction and financing. The private partner would also own, operate and maintain the project for the duration of the agreement and the assets would be handed over to AESO at the end of the contract.

AESO selected the single-owner model because it determined it would deliver the greatest degree of cost optimization. The ownership aspect of the model also encourages the private partner to innovate and be more accountable to customers. By selecting this model, AESO moved away from the traditional cost-of-service process for delivering new transmission facilities in Alberta to a fixed-price performance contract based on P3 principles.

This move meant traditional P3 principles had to be expanded and modified to accommodate the unique timing aspects, regulatory oversight and other requirements of transmission facilities and their integration into Alberta's transmission system. The end result saw AESO develop a hybrid P3 procurement model that added development and ownership to a typical DBFOM P3 model.

Table 1: RFQ scored tests and weightings

Scored test	Weightings	Basis of evaluation
Financing	20%	▪ Past experience ▪ Key individuals ▪ Understanding and approach
Respondent team lead	15%	
Route development, environment, consultation, relationship management	25%	
Design and construction	20%	
Operations & maintenance	20%	

This new made-in-Alberta model is known as a develop-design-build-finance-own-operate-maintain (DDBFOOM) P3 model.

The AESO submitted the framework for the DDBFOOM procurement model to the Alberta Utilities Commission in September 2011 for regulatory approval. The process was approved in February 2013.

Selecting a partner

Competitive process

Following the Alberta Utilities Commission's approval, the competitive process to procure the project was undertaken in three stages: (1) A Request for Expressions of Interest (REOI), (2) followed by a Request for Qualifications (RFQ), and (3) a Request for Proposals (RFP).

Request for Expressions of Interest

As this was a "first of its kind" P3, a non-obligatory market-sounding REOI was undertaken to help create better awareness of the project, to assist prospective developers in the identification of local partners and to better understand the concerns of developers and investors over risk.

These activities were undertaken in May and June 2013 and assisted in identifying the type of developers and investors who were likely to participate in the competitive process. More than 125 individuals representing over 60 companies attended an information session for all interested parties held on June 11, 2013.[12]

Request for Qualifications

The RFQ was issued in July 2013 to pre-qualify proponents. There were three unique aspects that set it apart from what has become a typical P3 RFQ process.

First, since transmission facilities are a new asset class for a P3, the draft PDA and the draft PA were provided at this stage rather than at the RFP stage. This allowed proponents an earlier look at AESO's proposed risk allocation.

Second, because of the lack of market precedent in the transmission facilities asset class, five qualified proponents, rather than the usual three, were to be short listed. This was a requirement of the Alberta Utilities Commission in its regulatory decision approving the use of the competitive process.[13]

Third, independent experts from across North America with expertise in finance, route development and technical matters were retained to serve as submission evaluators.[14] This helped to avoid any real or perceived bias regarding the evaluation of

[12] Moore, McLean, Killoran & Ghannoum; *A New Model for Developing, Constructing, Financing and Operating Major Transmission Projects in Alberta*, Paper presented to the CIGRE Symposium August 22-26, Paris, France, p. 8. (CIGRE (Conseil Internationale Grande Reseaux Electric) is a collaborative global community committed to the world's leading knowledge development program for the creation and sharing of power system expertise https://www.cigre.org/).

[13] Ibid, p. 8.

[14] Ibid, p. 8.

Table 2: Five qualified short-listed teams

Team	Owners	Design & Construction	Operating & Maintenance
Alberta PowerLine	Canadian Utilities Limited and Quanta Services CC (QSCC) Canada Ltd.	Valard Construction LP	ATCO Electric Ltd.
Athabasca Transmission	AltaLink LP and AEP Transmission Holding Company LLC	Burns and McDonnell Canada Ltd. and SNC-Lavalin T&D	AltaLink LP and AEP Transmission Holding Company LLC
NorSpan Partners LP	EPCOR Utilities Inc. and LS Power Associates LP	Kiewit Energy Canada Corp. and Sargent & Lundy LLC	EPCOR Utilities Inc.
TAMA Transmission LP	MidAmerican Energy Holdings Company and TransAlta.	MidAmerican Energy Holdings Company (through its wholly owned subsidiary MidAmerican Transmission)	TAMA Transmission
TransCanada/Elecnor	TransCanada PipeLines Limited and Elecnor S.A.	Elecnor	TransCanada PipeLines Limited

submissions and contributed to the legislative requirement for AESO to conduct a fair and open competitive process.

The RFQ had pass/fail tests on financial strength and capacity, as well as on experience with designing, building, operating or maintaining substations and transmission facilities of more than 240 kV. The process concluded in December 2013 and attracted 10 teams from around the world including Asia, Europe, South America and North America.[15,16] Scored tests and weightings are shown in Table 1. The five short-listed teams are listed in Table 2.

Request for Proposals

The RFP was issued in January 2014 and final bids were submitted in November 2014. This stage included three rounds of two sets of confidential commercial meetings. Meetings were held between each RFP proponent and AESO: one set focused on technical matters and the other on commercial matters. In total, 30 meetings were held.

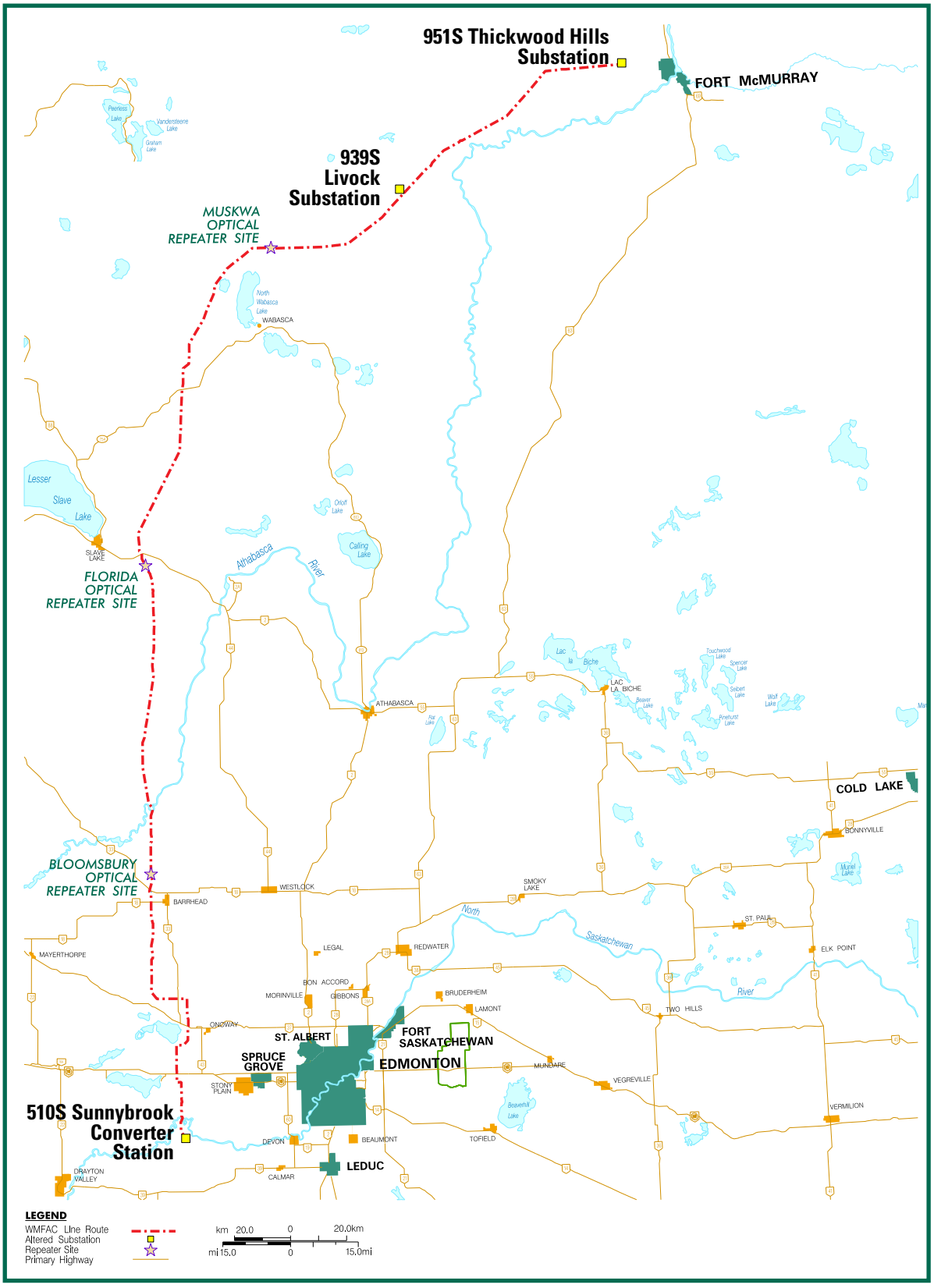
AESO used input from these meetings to refine the PDA and PA and issue final versions for all proponents to use for their final submission. Only proponents whose technical submissions received a passing grade were able to submit a final price submission.

Similar to the RFQ stage, RFP submissions were evaluated on a pass/fail basis by independent financial and technical experts retained by AESO to determine whether they were

[15] Ibid, p. 2.

[16] News Release from Alberta Electric System Operator: January 17, 2014, *Five companies selected to bid on Fort McMurray West 500-kV Transmission Project*.

Figure 3: Approved route map



credible, robust and deliverable under current market conditions. The key requirements of the technical submission included:

- general proponent information;
- project management plan;
- proposed routes and other detailed technical plans; and
- indicative financial model and financing plan.

The financial submission requirements included:

- audited final financial model;
- final financing plan; and
- financial offer with lowest net present cost (NPC) monthly payments.

The proponent with the lowest cost bid that passed the technical and financial requirements was selected as the preferred proponent.

Name of private partner

In December 2014, AESO selected Alberta PowerLine Limited Partnership (APL) as the successful proponent in accordance with the RFP requirements.

Commercial and financial close

APL executed the project development agreement (PDA) immediately. The project agreement (PA) was required to be executed after regulatory approvals were received for the route and transmission facilities and pricing adjustments were completed.

APL submitted its application for transmission facilities and route approvals to the Alberta Utilities Commission on December 1, 2015. In its application, APL included both east and west route options for the line, with three local alternative variations.

On February 10, 2017, the Commission announced it had approved the west route option and common route variation #1 (which lies on Crown Land) based on landholder feedback, land use, social factors, cost and environmental considerations.[17] Figure 3 shows the approved route map.[18]

Financial close of the PA occurred on October 2, 2017. The first tower was erected on November 9, 2017 north of the Athabasca River.[19]

Fairness of the process

A fairness advisor, PI Consulting, oversaw all stages of the process which included reviewing documentation and evaluation considerations, and attending meetings between AESO and bidders during the RFP stage.

Table 3 outlines the overall timeline for the project.

Table 3: Project timeline

2010 September

The Government of Alberta requires AESO to develop a competitive process

2011 September

AESO application to the Alberta Utilities Commission for regulatory approval of the competitive process

2013 February 14

Alberta Utilities Commission approves the competitive process

2013 May 9

REOI issued

2013 June 11

REOI information session

2013 July

RFQ issued

2014 January

RFP issued

cont.

[17] Alberta Utilities Commission, Decision 21030-D02-2017, *Alberta PowerLine General Partner Ltd. Fort McMurray West 500-Kilovolt Transmission Project*, February 10, 2017, www.auc.ab.ca/Pages/default.aspx (registration & login required).

[18] APL project website: www.albertapowerline.com

[19] Ibid.

2014 November 17

Final bid submission date

2014 December 18

APL selected as preferred proponent
Execution of the PDA

2015 December 1

APL submission to the Alberta Utilities Commission for facilities and route options

2017 February 10

Alberta Utilities Commission approval of facilities and route

2017 June 2

Debt funding competition opened

2017 July 5

Debt funding competition closed

2017 August 3

APL debt funding competition decision formalized with respect to financing

2017 September 28

PA Commercial close

2017 October 2

PA Financial close

2017 Summer

Construction started

2019 March 28

Transmission line energized

2019 June 27

Target energization date

Overall Structure of the Project Agreement

Partner roles and responsibilities

As the system operator, the AESO has all necessary rights and powers, conveyed to it by the Government, with respect to the safe, reliable and economic operation of Alberta's transmission system. The AESO is also the counterparty to the PDA and the PA, and is therefore also governed by its obligations and commitments to APL as set out in these agreements.

APL is responsible for development and regulatory approvals under the PDA and for design, construction, ownership, finance, operation, maintenance and handover under the PA.

A design-build joint venture (DBJV) between Valard Construction and ATCO Electric Ltd. is responsible for providing turnkey engineering, procurement and construction services for the project in addition to the route planning activities and obtaining all necessary regulatory approvals for the transmission facilities. ATCO Electric is responsible for operations and maintenance of the facilities.

On the energization date, APL will become a transmission facility owner (TFO). As with all other TFOs in the province of Alberta, APL must file its tariff with the Alberta Utilities Commission and is subject to applicable legislation, including the Electric Utilities Act, Transmission Regulation[20], ISO Rules[21] and Alberta Reliability Standards.[22] The tariff for the duration of the PA has already been filed and has been approved by the commission. No further tariff is required to be filed. This is an important difference between APL and most other TFOs that must file their tariffs annually.

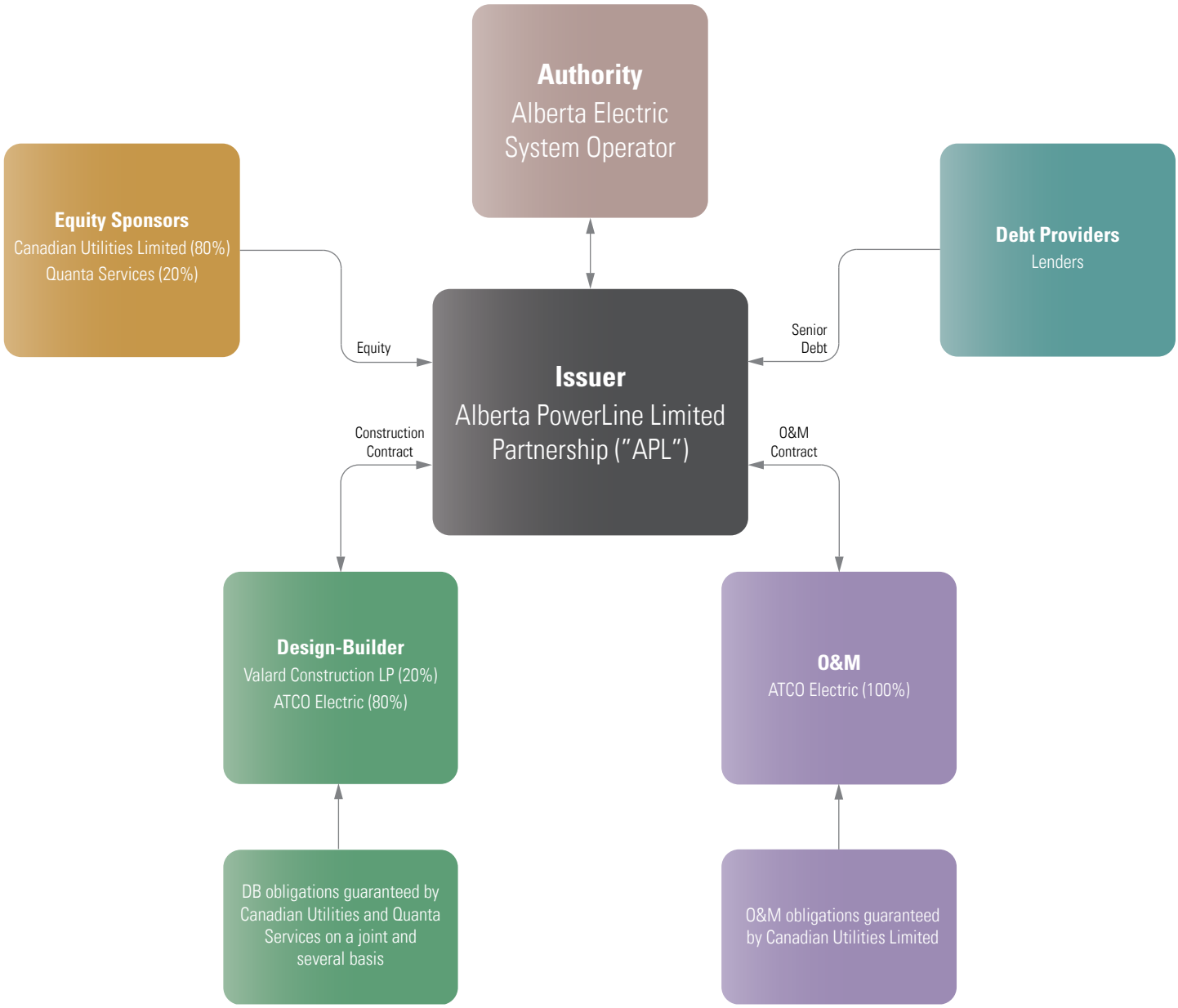
The partnership structure is illustrated in Figure 4.

[20] Province of Alberta, *Electric Utilities Act Transmission Regulation*, Alberta Regulation 86/2007, With amendments up to and including Alberta Regulation 114/2018, Current as of August 1, 2018, Office Consolidation, Alberta Queen's Printer.

[21] AESO, ISO Rules, Updated September 23, 2018, see: www.aeso.ca/rules-standards-and-tariff/iso-rules/complete-set-of-iso-rules/ , accessed December 20, 2018.

[22] AESO, Alberta Reliability Standards, Updated October 1, 2018, see: www.aeso.ca/rules-standards-and-tariff/alberta-reliability-standards/ , accessed December 20, 2018.

Figure 4: Partnership structure



Financial Arrangements

The financing structure for the project was priced and put into place at financial close of the PA in 2017, following the completion of a unique and comprehensive debt funding competition—the first of its kind in the Canadian P3 market. It was undertaken in the last few months of the PDA, and involved the AESO, APL and APL's financial advisor, RBC Capital Markets.

The competition resulted in a fully underwritten financing solution with an extended commitment period.

Debt funding competition

Launched in June 2017, the debt funding competition solicited proposals from Canadian, American and other international banks and dealers to secure the most competitive

financing. Proponents were asked to bid on a number of predetermined financing structures and were also given the option to put forward alternative structures. Proposals were requested on both an underwritten and agency basis for a senior debt financing requirement of approximately $1.4 billion.

Based on the results of the competition, it was determined that an underwritten and broadly marketed private placement bond offering in the debt capital markets in Canada and select foreign jurisdictions would result in the most efficient and cost-effective method of financing.

CIBC was selected as the preferred proponent based on its 100 per cent underwritten submission and was mandated as Joint Bond Underwriter and Bookrunner for APL. As financial advisor to APL during the RFP stage and because of their involvement with the draft of the debt funding competition RFP, RBC Capital Markets was not permitted to bid. However, the company did have a right of first refusal for up to 50 per cent in the winning financing, which it exercised and worked alongside CIBC as Joint Bond Underwriter and Bookrunner.

The project financing structure consists of two medium-term tranches and two long-term tranches of senior bonds. The blend of tenor was used to take advantage of the shape of the yield curve and credit curve used for pricing the bonds. The details of the senior bonds are shown in Table 4.

Supporting and enhancing the bond financing is a structured deposit note of approximately $700 million provided by CIBC. This is used to reduce the negative carry on any not-yet-used bond proceeds over the course of the construction period.

Finally, given the significant capital costs incurred during the development phase, the proposed financing structure contemplated repayment, at financial close of the PA, of all equity invested pre-financial close (i.e. during the PDA phase) to minimize the all-in financing costs of the project over both phases. The required equity during the PA phase is to be injected after all bond proceeds have been expended and the commitment for this is supported by letters of credit pending injection into the project.

Table 5 provides estimates for the general sources and uses of funds through the development phase and the construction phase, up to the energization date.

Payment structures

There are no construction progress or completion payments made by AESO. Monthly payments will be made to APL by AESO starting on the energization date. They include:

- a capital payment with no indexation—primarily covering the return of, and return on, debt and equity;
- an indexed O&M payment—covering operations and maintenance costs; and
- an insurance payment, subject to annual benchmarking—covering amounts reasonably required to maintain the minimum insurance coverage as set out in the PA.

These monthly payments will be subject to deductions based on performance and reliability targets. Deductions will be levied for outage events, major mis-operation events, failure to deliver reports and other deliverables, failure to complete handover work and failure to comply with management systems and plans. Payment deductions cannot exceed the amount of the monthly payment for any month.

Table 4: Senior bonds

	Series A	Series B	Series C	Series D
Issue size	$548.6 million	$548.6 million	$143.7 million	$143.8 million
Maturity date	1-Dec-53	1-Mar-54	1-Sep-32	1-Jun-32
Coupon	4.065%	4.065%	3.351%	3.34%

Table 5: Sources and uses of funds

Sources and uses of funds | PDA phase and construction period			
Sources	**$**	**Uses**	**$**
Series A Bonds	$548,633,000	Capital costs	$1,396,452,634
Series B Bonds	$548,606,000	Financing fees	$32,088,266
Series C Bonds	$143,677,000	Underwriting fees and expenses	$23,931,744
Series D Bonds	$143,762,000	Interest during construction	$76,952,066
Total debt	**$1,384,678,000**	Debt service reserve account (DSRA) funding	$41,636,221
		Working capital	$1,307,991
Funded PA equity commitment	$15,000,000		
Unfunded PA equity commitment	$172,690,922		
Total equity	**$187,690,922**		
Total sources	**$1,572,368,922**	**Total uses**	**$1,572,368,922**

Innovative Features

New hybrid P3 model

AESO's competitive process, which required the private partner to be responsible for a wide range of pre-development activities in a separate development phase before the PA was executed, is a first in the Canadian P3 market. This new hybrid DDBFOOM P3 procurement model was designed specifically for the transmission asset class.

Financing structure

Delayed financial close

Separating financial close from the start of development was a unique aspect to this project and a unique feature applied to the P3 model. As noted earlier, the ultimate debt/equity financing structure was priced and put into place at financial close of the PA through a debt funding competition. This was the first of its kind in the Canadian P3 market and occurred during the last few months of the PDA phase. During the approximately three-year PDA phase, the underlying rates were borne by AESO, while in certain circumstances the credit spreads were borne by AESO, APL or possibly shared. APL was responsible for maintaining the credit rating of the project.

Largest P3 bond offering to date in Canada

Senior bonds were broadly marketed in the private placement market in Canada and select foreign jurisdictions, including the United States, and ultimately sold to a wide range of institutional investors, including life insurance companies and asset management firms.

The debt financing was well received by the broad bond market, earning solid credit ratings (A2/A(low)), robust investor support and strong pricing. The APL offering represents the largest P3 bond offering to date for a Canadian P3 project.

First to use synthetic quarterly amortizing structure

The new bond issue was the first broadly marketed bond offering in Canada to use a synthetic quarterly amortizing structure. Each medium- and long-term tranche consisted of two bonds with payment dates and maturities offset by three months. Given that each bond is a semi-annual pay amortizing bond, the two-bond offset structure created a synthetic quarterly amortizing structure, which further enhanced the efficiency of the financing.

Payment mechanism

The payment mechanism developed for the project is unique relative to other recent Canadian P3 projects given the absence of any contributions by the Government or AESO during the construction phase and the rate-base funding mechanism. This resulted in a significant level of equity at risk and a more robust financing structure.

Quantity adjustment mechanism

The PDA contemplated increased or decreased costs based on the incremental length of the route approved by the Alberta Utilities Commission compared to the route submitted. The quantity associated with the capital costs was a shared risk. AESO took the risk of a price increase up to 15 per cent. Any additional cost overages were APL's risk.

Benefits

Cost savings/value for money

AESO estimated cost savings for Alberta ratepayers from using the hybrid P3 competitive process at more than $400 million at the time the project was awarded to APL. This figure is approximately 22 per cent of total capital costs compared to AESO's 2013 long-term planning estimate of $1.8 billion +/- 50 per cent, which only included construction costs for the project.

Community socio-economic and environmental benefits

As a growing community and the home of some of Canada's largest industries, the main driver for the project is to increase transmission capacity to allow more power to flow into and out of the Fort McMurray area and bolster the overall reliability of the system. The Fort McMurray West 500-kV Transmission project is also an important addition to Alberta's overall transmission system and a critical enabler of continuous growth in the province.

Indigenous contract strategy

APL committed to Indigenous involvement throughout the project with the implementation of an Indigenous contracting strategy. To date, APL has awarded $85 million in contracts to Indigenous communities and Indigenous contractors. These contracts have helped create jobs and opportunities for skills training and have contributed to local economic development.

Indigenous equity ownership model

Through respectful collaboration with Indigenous communities, APL is developing an equity ownership model enabling Indigenous communities to acquire an ownership stake in the project when it is complete, thereby becoming direct owners and participants in Alberta's energy sector.

Caribou protection program

The woodland caribou, a threatened species in Alberta, is

ATCO employees and members of the Fort McMurray First Nation meet at a project site to review and monitor construction activity.

APL established a historical and archeological resource protection plan to identify and preserve historical resources before and during construction. Field supervisors were trained by project archeologists and given hands-on instruction about potential high historical resource value areas of the project. Training included methods to successfully identify and protect resources when encountered in the field. Rare plants and plant communities identified during pre-construction surveys were relocated from the primary right-of-way, as appropriate, to maintain the plants' viability and limit impact from construction activities.

Woodland caribou, a threatened species in Alberta, is being protected through a caribou protection program. The program is setting a new standard for construction in Alberta.

Risk Allocation

The hybrid P3 process required APL to take on development and regulatory risk. APL was responsible for a wide range of development activities, including: route path selection, preliminary design, landowner and stakeholder consultation, siting, land acquisition and all regulatory approvals from the Alberta Utilities Commission and other regulators. Construction activities started under the PDA phase before the PA was executed. This is in contrast to other Canadian P3 projects, which do not include a broad scope of development activities such as those assumed by APL during the PDA phase before the PA phase started.

The form of the PA covering the two-year construction phase and the 35-year operation and maintenance phase is largely consistent with other Alberta P3 projects except that the private partner owns the project until the end of the term. At that time, the assets are handed over to AESO. Handover requirements are set out in Schedule 6 of the PA.[23]

Table 6 shows a high-level summary of the allocation of key project risks.

[23] Schedule 6, Project Agreement (execution copy), Fort McMurray West 500-kv Transmission Project, Independent System Operator (Operating as The Alberta Electric System Operator) and Alberta Powerline Limited Partnership, September 28, 2017, as appended to Alberta PowerLine Tariff Application to Alberta Utilities Commission, November 30, 2017.

Communications

Between the partners

Extensive and ongoing communication among the partners involved in the project is essential for success. Meetings occur regularly at multiple levels from the executive management team to the field monitoring team. The project uses document management systems established to facilitate the transfer, storage and retention of information using best practices. Where possible, document transfers are automated and web conferencing is used.

APL reports regularly to AESO through:

- monthly status reports;
- quarterly safety reports;
- health and safety and environment-incident notices as needed; and
- other correspondence by letters, memos, emails, and telephone as needed.

Joint collaboration meetings are held biweekly and monthly to review long-term plans, update action items and to schedule interface tasks and processes with other transmission facility owners. Participants in these meetings include APL, AESO, the design-build joint venture, the independent certifier and other transmission facility owners.

With the public

During the development phase, APL conducted one-on-one consultations with hundreds of parties who have land interests on or directly adjacent to the route options. Feedback from stakeholders as well as information from field surveys and other sources were used to identify the route options with the least overall impact. APL adjusted routes and developed new route options because of these conversations.

A stakeholder engagement plan was developed for the construction phase to keep them informed of key project construction activities and schedule. The plan outlined engagement with Indigenous and non-Indigenous stakeholders, government agencies and elected officials, local law enforcement and media using a variety of communication methods.

The APL website provided up-to-date information on construction activities for the general public with timelines

Table 6: Summary of key project risks

AESO	APL
Financing Risk: Underlying rates and in certain circumstances, credit spreads, during development period. **Regulatory Risk:** Risk of delay or rejection connected to the regulatory approval process; risks associated with an appeal to a regulatory approval. **Route Change:** Risk of routing change cost increase/decrease due to changes in line length as per the approved route subject to a cap on cost increases.	**Financing Risk:** Credit rating and in certain circumstances, credit spreads, during development period. **Development Risk:** All risks associated with designing, locating and constructing the project. **Regulatory Risk:** Regulatory risk associated with bringing a facility application before the Alberta Utilities Commission; risks associated with obtaining regulatory approvals under environmental legislation; risks associated with an appeal to a regulatory approval. **Operating & Maintenance Risk:** All risks associated with operating and maintaining the project.

for each segment of the route. Newsletters were mailed to stakeholders and made available on the website. Detailed mapping products were also included on the website providing an additional level of information to keep affected parties informed.

Indigenous liaisons and landowner construction liaisons maintained close communication with directly affected stakeholders to address concerns as they arose. As APL finalizes reclamation works post energization, land agents will continue to work with landowners to resolve any outstanding issues related to the construction.

Indigenous consultation

In addition to meeting with hundreds of landowners in communities along the route, designing and constructing the project included extensive Indigenous consultation and engagement, and as noted earlier, the development of a comprehensive Indigenous contracting strategy.

Over a three-year period, APL engaged with 27 Indigenous communities with traditional land use in proximity to the transmission facilities. APL worked collaboratively with the communities to ensure Indigenous land use was well understood and where needed, respectful accommodation strategies were implemented. Wherever possible, APL tailored engagement efforts to be inclusive of communities' protocols, offering community open houses, mapping sessions with elders, site visits, flyovers, construction monitoring and numerous meetings with community leadership. The Government granted the project First Nation Consultation Adequacy in July 2017.

Environmental issues

During route planning, APL consulted environmental specialists to ensure wildlife soils, vegetation, wetlands and historical resources were given appropriate consideration.

Dispute resolution mechanism

The PA outlines a step-by-step procedure for resolving disputes that moves through notification, discussion, referral to a referee and arbitration. This is similar to most Canadian P3 projects except that the arbitration is not binding. A final step is added that allows either party to refer a dispute to the Alberta Utilities Commission for a final and binding decision if the issue is not resolved through arbitration.

Performance Monitoring

Using historical performance data from the Canadian Electrical Association and other sources relating to transmission facilities, AESO developed and incorporated first-of-its-kind (for North America) performance metrics into the PA for payment deduction events such as outages and loss of service. Under the PA, if APL fails to comply with these metrics, AESO is entitled to

make payment deductions. More significantly, AESO identified certain "major mis-operation events" that could present significant risk to the reliability of Alberta's transmission system.

In the event of any such major mis-operation event, APL is subject to significantly higher payment deductions and other consequences. The P3-based performance requirements are in addition to those generally imposed by Alberta law on utility owners. Major mis-operation events and related payment deductions are set out in Schedule 18 of the PA.

To meet or exceed these requirements, APL engineered a 35-year life cycle approach to operate, maintain and rehabilitate the project. In developing its approach, APL undertook a detailed probabilistic analysis of similar-sized transmission facilities built in similar terrain, and used extensive history of building transmission facilities around the world to identify risks, and develop appropriate mitigation strategies. This full life cycle approach is a first for an Alberta transmission facility.

Lessons Learned

Debt funding competition

The following helped to make the debt funding competition (DFC) successful:

- An early start for setting the competition parameters. This permitted sufficient time to evaluate the process and potential funding options and address concerns in an unrushed manner, resulting in a well thought out and executable process.
- Providing participants with a thoroughly comprehensive and detailed RFP including penultimate drafts of the various detailed project, finance and bond marketing documents (including having been reviewed by funders' counsel), third-party reports and forms of commitment documents. This resulted in a tight time frame between DFC response and financial close which is believed to have minimized some of the contingency included in the DFC RFP pricing responses.
- Establishing the right of first refusal option (ROFR). This provided the incentive for the financial advisor of the winning proponent to ensure the original bid submission financing proposal and the additional ones included in the DFC RFP were well thought through and ultimately financeable.

Project setup for execution

APL recognizes that a strong benefit to the execution of the project was realized by having the key team members involved from the very beginning at bid development, through the development phase (including regulatory approvals, the DFC and financial close) to the construction phase.

This allowed for the development of administration and information sharing processes to meet the requirements of all aspects of the project. Work flow and documentation were also tailored for the requirements of the project and seamless through the phases.

The experience of Valard and ATCO Electric also contributed to the setup and efficiency of the project, particularly their recent work on the East Alberta Transmission Line.

Clarity in requirement documents

The design and execution of the project was facilitated by a detailed set of requirement documents issued by AESO. This enabled bidders to develop extensive management systems, plans and tools specific to the project during the RFP. The detailed requirements also allowed bidders to integrate innovations into their proposals. In particular, it allowed APL to use guyed V towers, which are quicker and safer to erect.

Contracting strategy

As part of APL's contracting strategy, almost all requirements and risks were dropped down to its contractors through the use of back-to-back contracts. This model ensured the requirements were clear for the contractors, especially with respect to the number of interface requirements between contractors. This helped to reduce the execution risk associated with the project.

Project execution

A review of construction contingency planning helped further define the construction execution plan to reduce risks where possible. In performing the review, the definition of work fronts and TiLOS (a linear planning and scheduling tool) were key tools that helped understand the work involved and the local risks.

Concluding Comments

The project is a landmark for Canada and the global P3 community. As the first P3 transmission facility procured in Canada, it has expanded the list of Canadian asset classes that can be successfully procured using a P3 model. The two-phased, hybrid P3-procurement model developed by AESO is also a groundbreaking approach with its incorporation of a separate development phase.

Giving the winning proponent the risk and responsibility of route selection, stakeholder consultation, land acquisition and regulatory approvals was bold and not typical for a P3 project. Notwithstanding this, AESO's fair, open and transparent competitive process garnered strong interest and resulted in a short-list of five qualified proponents from a pool of 10 respondent teams from around the world.

The result was a winning bid of $1.57 billion (NPC) from Alberta PowerLine Limited Partnership, with estimated cost savings to Alberta ratepayers of $400 million.

The financing structure was unique for the Canadian bond market for two reasons: it was the first broadly marketed bond offering to use a synthetic quarterly-pay amortizing structure and it represents the country's largest P3 bond offering ($1.385 billion) to date. The debt financing was well received by the broad bond market with robust investor support and strong pricing.

APL's experience, coupled with a solid contractual structure with all construction, operating and maintenance obligations guaranteed by high credit quality parent companies, enabled it to achieve a strong credit rating from two of the Canadian rating agencies, which was fundamental to the attractiveness of the credit from a financing perspective.

The project is designated as critical transmission infrastructure for Alberta and its development will bring benefits not only to the local Fort McMurray area, but also to the Indigenous communities involved in the project and to the Canadian economy as a whole.

At the time of writing this case study, the target energization date for the project was June 27, 2019. Just before publication, APL announced that construction was completed three months ahead of schedule and on budget. Energization took place on March 28, 2019.[24]

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Appendix: CCPPP's National Award Case Studies 1998 - 2018

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)

[24] Canadian Utilities Limited, News Release, *Canadian Utilities Partnership completes and energizes $1.6-billion Fort McMurray transmission project ahead of schedule*, March 28, 2019.

Energy
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
North Commuter Parkway & Traffic Bridge Replacement, Saskatchewan (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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