CALGARY COMPOSTING FACILITY, ALBERTA

STATE-OF-THE-ART COMPOSTING FOR CALGARY'S ORGANICS

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 Infrastructure:
Calgary Composting Facility
Alberta

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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 – Calgary Composting Facility[2]

Project type

Design-Build-Finance—Operate-Maintain (DBF-OM)

Asset/Service

24 months of site work and construction
10 years of operations and maintenance

Status

In operation – substantial completion achieved June 29th, 2017

Partners

Public Sector

- City of Calgary

Private Sector

- Chinook Resources Management General Partnership (CRMG)

Other Participants

Public Sector

- Blake, Cassels & Graydon LLP (Legal Advisors)
- P1 Consulting (Fairness Monitor)
- CH2M (Technical Advisor)
- Deloitte (Financial Advisor)

Private Sector

- Bird Capital Limited Partnership (Developer and Equity Partner)
- Maple Reinders PPP Group Ltd. (Developer and Equity Partner)
- Nason Contracting Group Ltd., a wholly owned subsidiary of Bird Construction Inc. (Design-Builder)
- Maple Reinders Inc., a wholly owned subsidiary of Maple Reinders Group Ltd. (Design-Builder)
- Stantec Consulting Inc. (Lead Design)
- Christiaens Group (Process Design and Technology)
- Aim Environmental Group (Facility Operator)
- Balzer's Canada Inc. (Mechanical Subcontractor)
- Canem Systems Ltd. (Electrical Subcontractor)
- McMillan LLP (Legal Advisor)
- Osler, Hoskin & Harcourt LLP (Lenders' Counsel)

Project cost, financing and value for money

Total Project Cost (NPV)[3]

- $163 million (including $125 million in capital costs)

Project Financing

- Debt
  - A $93 million credit facility was arranged with lenders to cover all design and construction, development and financing cost for the project except a 10% builders' lien holdback and a $15 million performance holdback.
- Equity
  - The $27 million holdback was funded with working capital of members of the Design-Build Joint Venture (Bird and Maple).

Project highlights and innovative features

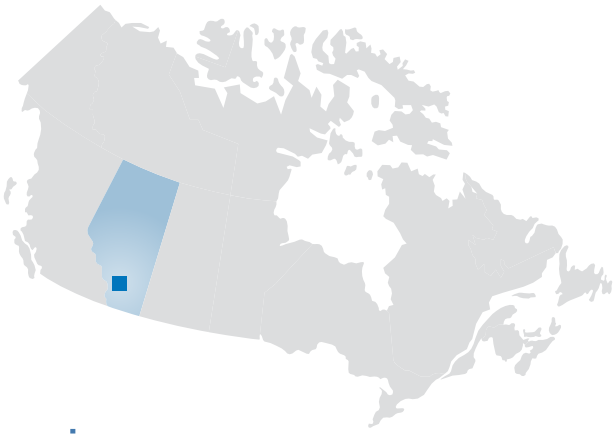
- The project is the first composting facility to be constructed using the P3 model in Canada.
- It is also the first P3 in Canada to allow the private sector to use a P3 performance bond to demonstrate their liquidity; the bond was issued by Travelers Insurance of Canada.
- The project used a unique DBF-OM structure that integrated short-term financing during the construction period with long-term operations, maintenance and renewal, providing the City of Calgary with the optimal mix of risk transfer and value for money.
- The project's education and administration building is the first building in Alberta registered to target Leadership in Energy and Environmental Design (LEED) V4 Gold certification.
- To offset the large water demand inherent to processing compost, 100% of site stormwater is recovered and used in the facility.
- The facility supports the City's Green Cart program and will collect and process up to 100,000 metric tonnes of residential food and yard waste each year.
- The facility will also receive up to 45,500 metric tonnes of dewatered biosolids, alleviating pressure on the City's existing land-application beneficial reuse program. The biosolids will produce high-quality, nutrient-rich composts.

Project website

http://www.calgary.ca/UEP/WRS/Pages/Recycling-information/Residential-services/Green-cart/Green-Cart-organics-composting-facility.aspx

[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, other sources as noted, and personal interviews with project partner representatives.

[3] Net Present Value (NPV) is based on a contract date of June 25, 2015, and a discount rate of 10%. While this discount rate is higher than average for infrastructure, the City of Calgary wanted to spend more capital upfront on the facility in order to reduce the long-term operating costs associated with the project.



Overview

Until recently, household waste generated by Calgarians living in single-family homes was disposed of at one of three municipally-owned landfills. Studies have shown that the process of decomposition in landfills is extremely slow—plastic, for example, can take hundreds of years to break down. Organic materials like food and yard waste can break down quite quickly in the right environment, but in landfills often lack the oxygen[4] needed to do so. Decomposing organic materials in landfills also produce gases composed primarily of methane, a greenhouse gas 25 times more potent than carbon dioxide in terms of its impact on climate change.[5] As rainwater and liquid wastes percolate through other waste materials, they become a highly concentrated "garbage soup" known as leachate, which can also adversely affect the environment if it is not continually collected.

As long as humans continue to produce garbage we will need landfills to store it. But once they reach capacity, landfills often have limited reuse possibilities, since they may be unstable as waste materials settle and because of the chemicals that can be produced and released by their contents. Most materials being sent to landfills can be diverted, however, including recyclables such as plastics and organic materials such as food and yard waste. A 2014 waste characterization study by the City of Calgary found that only around 20 per cent of waste generated in single-family homes should be going to landfills.

The City of Calgary has a long history of trying to divert waste from landfills. The first residential recycling pilot program, including blue boxes and drop-off depots, took place in 1991, when City Council opted to approve a drop-off style of collection as the best balance of cost and resident participation.[6] That same year the municipality also tested a residential leaf collection program, its first attempt at exploring composting options. It was not until more than 15 years later, in 2007, that The City set the ambitious goal of diverting 80 per cent of waste from landfills by the year 2020. Shortly after, in 2009, its Blue Cart recycling program was implemented. The next initiative The City wanted to undertake was a Green Cart program for collecting and repurposing food and yard waste, but to do so they would need a composting facility to process the collected materials.

A Design-Build-Finance—Operate-Maintain (DBF-OM) model was used to construct the three buildings that comprise the Calgary Composting Facility. The private sector partner, Chinook Resources Management General Partnership (CRMG), will operate and maintain the facility for a ten-year period. The project had a total cost NPV of $163 million, including a $125 million capital cost.

The Canadian Council for Public-Private Partnerships chose this project for its Silver Award for Infrastructure Delivery for its innovative adaptation of the P3 model, which optimized costs by using short-term construction financing while still effectively transferring risks over a 10-year operations and maintenance term. Its DBF-OM structure is a unique P3 solution that allows municipalities that struggle with long-term capital availability requirements associated with traditionally structured DBFOM projects to obtain the benefits of fully integrated operations, maintenance and life cycle renewal without the cost implications of long-term financing. The City of Calgary and CRMG signed one project agreement for the Calgary Composting Facility that encompassed the design and construction of the new facilities, the short-term financing of construction costs until substantial completion, and the following 10-year operations and maintenance period. The strong relationship among all consortium members including the operator and maintainer, Aim Environmental Group, a subsidiary of one of the design-builders and equity providers, gave them ample opportunity to provide input during the design and construction stages and made the unique interface of the DBF and OM components possible. The project also utilized a P3 performance bond, the first project to do so in Canada. The P3 performance bond 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. Finally, this municipal project is the first composting facility delivered by a P3 in Canada, leading the way for future P3 projects in the environmental sector.

Background and rationale

First incorporated as a town in 1884 when its population was 506,[7] the city of Calgary, which by 2016 had a population of 1.2 million people,[8] is now Alberta's largest urban centre and Canada's third-largest municipality.

[4] There are two general types of composting, aerobic and anaerobic ("with oxygen" and "without oxygen"). In an aboveground aerobic system the microorganisms that aid in decomposition access free oxygen directly from the surrounding atmosphere. Below-ground anaerobic composting is slower, but this process may be beneficial for things such as pest control.

[5] Government of Canada, *Municipal solid waste and greenhouse gases* (Aug. 11, 2017): https://www.canada.ca/en/environment-climate-change/services/managing-reducing-waste/municipal-solid/greenhouse-gases.html

[6] City of Calgary, *Black Cart Garbage Collection* (n.d.): http://www.calgary.ca/UEP/WRS/Pages/Garbage-collection-information/Residential-services/Garbage-Collection.aspx

[7] City of Calgary, *Historical Information* (n.d.): http://www.calgary.ca/CA/city-clerks/Pages/Corporate-records/Archives/Historical-information/Historical-Information.aspx

[8] Statistics Canada, *Calgary [Population centre], Alberta and Alberta [Province]* table (2016 Census): http://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E

An important driver of Calgary's prosperity over the past century has been the expansion of the oil and gas industries—Canada is the world's fifth-largest producer of natural gas, and the oil sands in northern Alberta give Canada the third largest crude oil reserves in the world.[9]

In recent years Alberta has experienced significant shifts in its weather as a result of global climate change, including an increase in the severity and frequency of extreme weather events. From 1983 to 2008 Alberta averaged around $100 million a year in catastrophic losses due to extreme weather events.[10] Beginning in 2009 these costs increased substantially—between 2009 and 2012 insured losses from extreme weather events averaged $673 million per year. In 2013 Alberta experienced a super-flood that washed across a quarter of the province, including through the heart of Calgary. The flooding resulted in substantial infrastructure losses, including 1,000 kilometres of destroyed roads and hundreds of washed-away bridges and culverts. It was Canada's costliest natural disaster, with projected losses and recovery costs exceeding $6 billion, including a record $2 billion in insured losses[11]—certainly less deadly but far more expensive than eastern Canada's 1998 ice storm.

In line with the Pan-Canadian Framework on Clean Growth and Climate Change, the City of Calgary (the City) is tracking its greenhouse gas emissions and taking steps to reduce future emissions and be a leader in clean growth. In 2008 the City began implementing multiple programs that support the long-term diversion of solid waste. The process began with recycling, including the introduction of a curbside collection program for single-family homes.

After considering a series of options, the City identified food and yard waste as the next major waste stream to be diverted. In total, approximately 227,500 tonnes of food and yard waste are sent to Calgary landfills annually.[12]

In March 2012, the City launched its Green Cart Pilot test program, starting with 7,500 residences in four communities that received weekly cart-based collection of food and yard waste. The program was a success, collecting and composting over 8.9 million kilograms of material that would have otherwise gone to landfills as of June 2016.[13] This represented a 40 per cent reduction in garbage collected from pilot communities. Research conducted at the time with the pilot's participating residents showed that 89 per cent were satisfied with the program and 91 per cent would support a city-wide program.

Around the time the City implemented the Green Cart Pilot program, it also began exploring options for the procurement of a composting facility to process the collected food and yard waste. The City's Waste and Recycling Services business unit conducted several information-gathering activities and evaluations to define the scope of the project and evaluate alternative procurement approaches before deciding on a Design-Build-Finance—Operate-Maintain public-private partnership.

City Council approved the commencement of a procurement process for the facility on May 27, 2013. Just over four years later, on June 29, 2017, the Calgary Composting Facility began operations. It is the first composting facility completed using the P3 model in Canada. The facility processes organic waste collected from the Green Cart program, which was expanded in the summer of 2017 to collect food and yard waste weekly from all single-family homes in the city.

Project objective

If the City was to achieve the ambitious target that had first been approved in 2007 by Council—"80/20 by 2020"—that is, diverting 80 per cent of solid waste from landfills by 2020,[14] it had to construct a composting facility.

The first program implemented to help achieve this goal was the successful Blue Cart Recycling program for single-family homes in 2009. Of the remaining waste from single-family households in Calgary that could not be recycled, more than 60 per cent was compostable food scraps, food-soiled paper and yard waste (see Figure 1); the collection and composting of food and yard waste was recommended as the next major step toward reaching the 80/20 by 2020 goal.

The initial 80/20 by 2020 strategy called for a Green Cart program to be in place by 2010. There were delays, however, and the City issued a Request for Information (RFI) for a composting facility only in 2012. In 2015 The City modified its original 80/20 by 2020 waste-diversion strategy to 70 per cent diversion by 2025, averaged across all sectors, including single and multi-family residential, business and organization, and construction and demolition waste.

[9] Calgary Economic Development, *World Leaders in Responsible Energy Production* (n.d.): https://www.calgaryeconomicdevelopment.com/industries/focus-areas/energy/

[10] Government of Alberta, *Climate change in Alberta* (n.d.): https://www.alberta.ca/climate-change-alberta.aspx

[11] Environment and Climate Change Canada, *Canada's top ten weather stories of 2013* (Oct. 10, 2017): https://www.ec.gc.ca/meteo-weather/default.asp?lang=En&n=5BA5EAFC-1&offset=2&toc=hide

[12] City of Calgary, *Food and Yard Waste Diversion: Bylaw 20M2001 Amendments* (Oct. 19, 2016): https://pub-calgary.escribemeetings.com/filestream.ashx?DocumentId=29406

[13] City of Calgary, *Green Cart Program: Summary of Council Direction* (May 30, 2016): https://pub-calgary.escribemeetings.com/filestream.ashx?DocumentId=18017

[14] The City of Calgary, *Leading Calgary to zero waste* (n.d.): http://www.calgary.ca/UEP/WRS/Pages/About-WRS/Calgary-Waste-Goals.aspx

Figure 1: What's in Calgary's single-family residential garbage*

*according to a 2014 waste characterization study

Project Scope

The Calgary Composting Facility project included the design, construction and short-term financing of three structures spanning over 500,000 square feet (46,452 square metres) with a completely enclosed and covered process area. The City decided to construct the facility on the Shepard Waste Management Facility site (see Figure 2), on a plot of land not used for landfilling.

The project followed a unique DBF-OM model—one project agreement integrated the design, construction, and short-term financing with a ten-year O&M component, but no long-term financing. Instead, the City paid all capital costs associated with construction of the facility by substantial completion and will make smaller payments over the operations period that include a fixed payment for maintenance and renewal and a variable fee based on the amount of feedstock (the raw materials used to create the compost) processed at the facility each month. While this variation of the usual model does not transfer as much risk from the public to the private sector as traditional DBFOM projects, which generally include a 25- to 30-year operations and maintenance period with long-term private financing, it provided the City with the optimal balance of construction-risk transfer and the flexibility to bring operations and maintenance back in-house in ten years while also keeping costs low.

The project includes the following components:

- indoor receiving, storage and pre-processing areas for both source-separated organics and dewatered biosolids delivered to the facility;
- an indoor area that contains the composting process;
- processes that treat and reduce odours both indoors and outdoors that result from the composting process;
- storage and loading areas for stabilized, mature and non-odorous compost products produced by the facility;
- process-monitoring and control systems to maintain key parameters and ensure pathogen reduction in the composting materials;
- a leachate collection and storage facility; and
- administration offices and an educational facility.

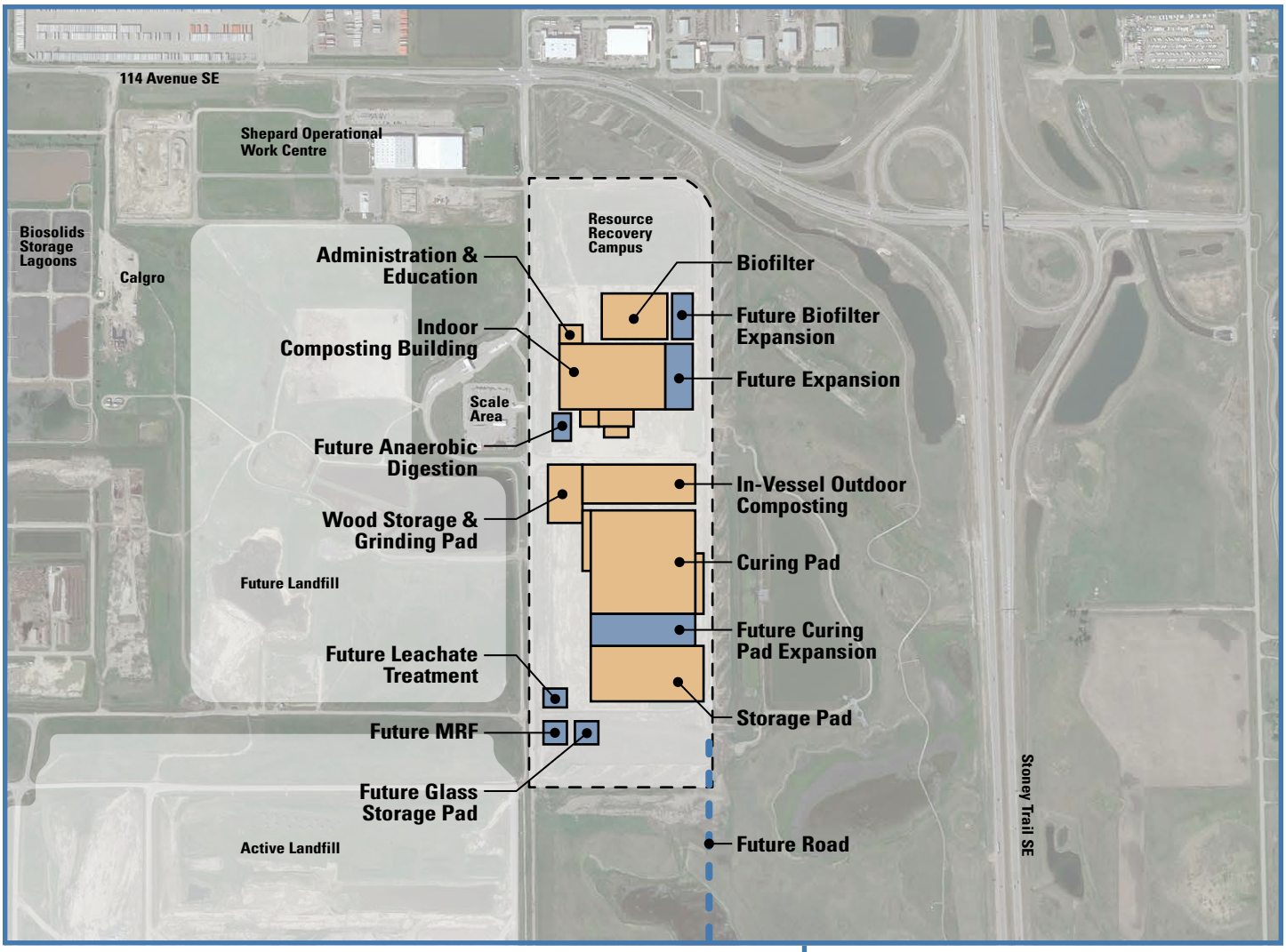
In addition to the physical infrastructure, the project includes operations and maintenance of the facilities over a ten-year period. Collection and delivery of feedstock to the facility is not included in the scope of the operations and maintenance contract.

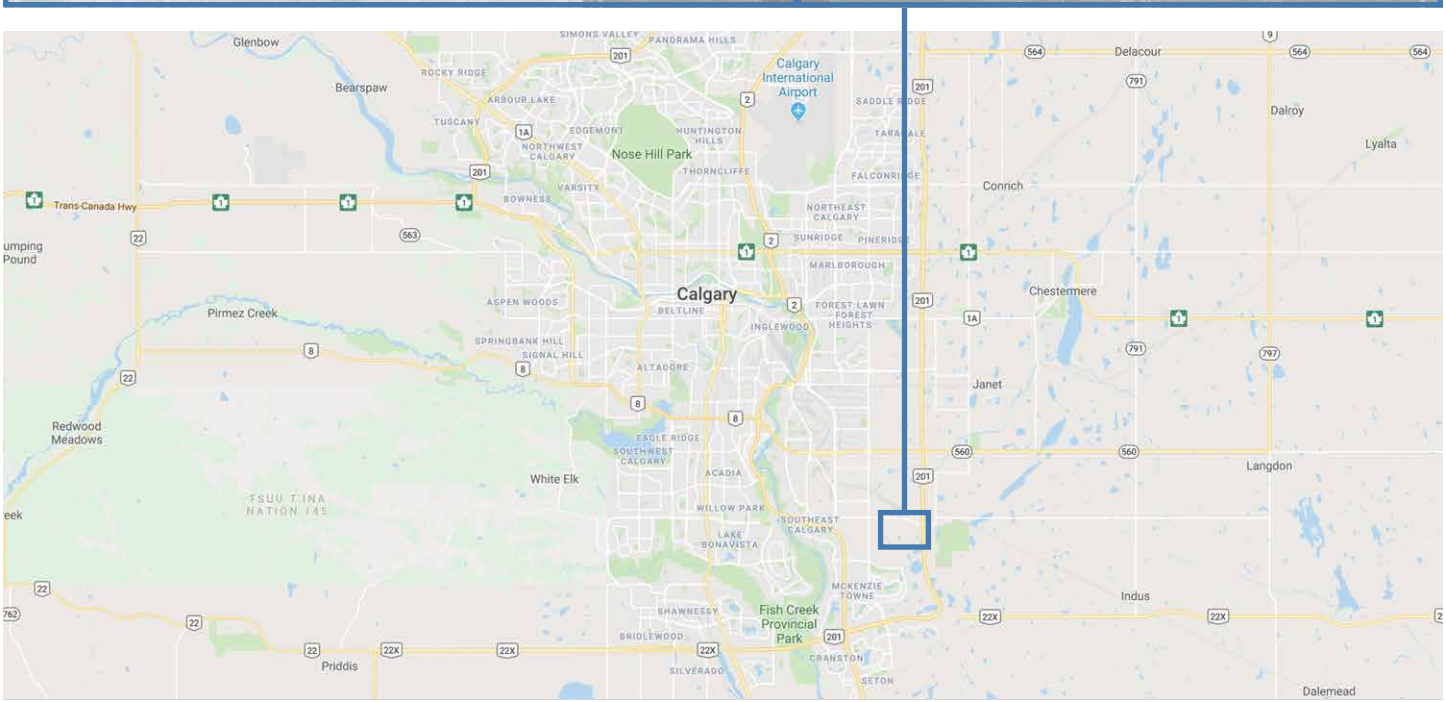
The facility is capable of receiving, processing and producing compost from two types of products, which at all times must be kept separate:

1. Source-separated organics, including both food scraps and leaf and yard waste collected from single-family households throughout Calgary:
    - The food scraps stream, which is anticipated to be fairly constant at about 600 tonnes per week; and
    - Leaf and yard waste, which is expected to range from between 100 and 3,000 tonnes per week from April to November each year.
2. Dewatered biosolids from the Bonnybrook Wastewater Treatment Plant.

In total, the minimum annual processing capacity for the Calgary Composting Facility is 100,000 tonnes for source-separated organics and 45,500 wet tonnes for dewatered biosolids. The City makes payments on a per-tonne basis for the amount of feedstock accepted for processing. The proceeds from the city's sale of the compost go towards lowering the cost of the City's Green Cart program.

Figure 2: Conceptual Site Layout: Shepard Landfill and Proposed Composting Site





Innovative Features

Design innovations

While ultimately environmentally friendly, the composting process itself requires a significant amount of water. In order to increase the facility's resilience and reduce its reliance on the City of Calgary's utility services and associated water costs, the team came up with a unique design solution.

All rainwater on the 25-hectare (62-acre) site is collected in a pond on the property. The team designed a force main system to take that rainwater from the pond back into the facility, where it can be used in the composting process. This design innovation has increased the sustainability of the entire site, including a reduction in the facility's utility costs, and it is the first facility in Alberta registered to target Leadership in Energy and Environmental Design (LEED) v4.[15]

Other examples of value engineering during the design and construction period included:

- using different types of foundation systems and a variety of building structural elements, enabling the team to have separate subcontractors in the same division work concurrently in separate parts of the facility, which resulted in an expedited schedule of work;
- incorporating fibrous material into the final concrete layer of the flooring (called the sacrificial layer) in the tipping room to reduce erosion, thus increasing the lifespan of the floor;
- using a fibre membrane instead of a steel frame for both the curing and storage buildings, increasing sustainability and value for money; and
- adding heating coils in the ventilation system of the composting vessels that process biosolids to ensure temperatures adequate to significantly reduce pathogens are reached.

Financing innovations

The project involved a robust security package, structured by Bird Capital and Maple Reinders, which provided lenders with enough comfort to finance the project. The most innovative aspect of the package was a P3 performance bond, issued by Travelers Insurance of Canada, which covered both a performance guarantee and a liquid component intended to cover any damages to the lenders in the case of any delay in achieving substantial completion. The P3 performance bond (which is a surety, not a debt) resulted in lower costs than traditional performance guarantees and liquid security, thereby reducing project cost and delivering maximum value to the City.

Historically, the most common way contractors have demonstrated their liquidity in the event of schedule overruns or other issues during the construction period has been through a letter of credit. These letters of credit are quite onerous from a capital cost perspective; many contractors have sought alternate ways to demonstrate liquidity. In the past, however, P3 performance bonds were never accepted by lenders because, all else being equal, they were often deemed to be more difficult to call upon when needed. Because of this perception, considerable efforts were made by the legal and finance teams to convince the team of lenders of the benefits of using the P3 performance bond, including working with ratings agencies such as DBRS and Moody's. The project marks the first use of a P3 performance bond in the Canadian infrastructure market. In 2015, the year that the Calgary Composting Facility reached financial close, Bird and Maple were able to successfully utilize P3 performance bonds for four other public-private partnerships in Canada.

Bird Capital's in-house finance and legal teams, in conjunction with Maple Reinders, also worked to ensure lenders were comfortable with the various project requirements, principally the large holdback requirements. Lenders, who as a rule are very risk-averse, are not normally comfortable with large holdbacks because they represent the risk of nonpayment. With public-private partnerships a preferential lending rate is often provided because it is the public sector that will be paying for the infrastructure—as such, the debt is not considered corporate debt, since the public sector is viewed as guaranteed to repay its loan. However, large holdbacks can increase the risk of public sector nonpayment and as such pose challenges when working with lenders.

The Results

The Calgary Composting Facility comprises three buildings: a composting building (containing an administration and education annex), a curing building and a storage building.

The completely enclosed facility is fully automated, using a "supervisory control and data acquisition" (SCADA) system that allows for process operations to be controlled by a single operator in one centralized control room. The control-system architecture is composed of 19 programmable logic controllers (PLCs) that are strategically located within the facility to provide process control and the monitoring of equipment and process parameters. The PLC system controls over 7,500 horsepower of connected equipment and monitors more than 750 instruments and control devices; the system uses a plant-wide fibre-optics network to communicate and transmit data to the plant's PC-based operator workstations and for logging and archiving historical operational and process treatment data. The odour-control and air-processing HVAC system has the capacity to treat approximately 830,000 cubic metres of air per hour.

[15] LEED (Leadership in Energy and Environmental Design) is an internationally recognized green building rating system that scores buildings for sustainability measures including energy conservation, waste reduction, and decreased water consumption. LEED v4, its updated and expanded scoring system, has been in use since November 2016.

Given its size and complexity, the facility could not be operated without using a plant-wide SCADA system. While the facility is only manned during the hours between 7:00 a.m. and 7:00 p.m., it is designed to operate on a 24-hour-a-day/365-days-a-year basis, with the SCADA system continuously monitoring the various treatment processes and making real-time changes and adjustments to ensure reliable and repeatable results. The system is programmed to simultaneously control air, water, and temperature of the 18 composting vessels that may be in different phases of the composting and maturation process, and also provides automated control of all ancillary support systems such as water supply, air handling, climate control and leachate water control.

The facility produces two in-demand Category A[16] compost varieties from two different sources, a compost made from Green Cart food and yard waste, and a more nutrient-rich biosolid-based compost. The two products will be processed concurrently during the fall, winter and spring seasons when the yard-waste component of the feedstock is minimal.

The composting process

From the time waste is dropped off at the plant it takes approximately 60 days to produce compost products. The composting process includes six steps:

1. Food and yard waste arrives by trucks at the composting facility and is shredded to optimize decomposition (see Figure 7). During the fall, winter and spring, dewatered biosolids are also brought to the facility from the Bonnybrook wastewater treatment plant and blended with wood chips. Approximately 300 to 500 truckloads of food and yard waste arrive at the facility per week, depending on the season. Front-end loaders and conveyers move all materials into large composting vessels.
2. These mixed materials are kept in composting vessels for 21 days. During this time, pipes pump air into the material to ensure the microorganisms that break down the material remain alive and continue to get the oxygen they need to work. Vessels are monitored for temperature, moisture and oxygen levels, keeping the decomposition process running smoothly. Odour management is one of the main priorities during this step, and large biofilters are used to reduce odours (Figure 4). This system effectively removes a number of pollutants from waste air and has been used successfully by Maple in other Canadian composting projects. Once it has served its purpose (every 2-3 years), the wood from the filter is replaced with fresh wood and combined with the biosolids as a carbon amendment, so that none of it is wasted. In order to eliminate pathogens, compost piles are kept at sustained temperatures of at least 55 degrees Celsius for a minimum of 3 days.
3. The resulting materials are screened to remove any remaining contaminants (which are taken to landfills) and to break down what remains into ten-millimetre or smaller components, producing top-quality compost.
4. The compost material is conveyed automatically to the curing building, where it remains for 21 days, being automatically turned and mixed every five days for further oxygenation before it is screened again, then moved to the compost storage facility.
5. To ensure the product meets Category A compost standards and is safe to use anywhere, including farms, gardens and parks, samples are sent to a Compost Quality Alliance-accredited lab for analysis to ensure it passes the criteria set by the Canadian Council of Ministers of the Environment.
6. Once certified, the compost is ready for distribution.

Compost promotes plant growth by increasing water retention and adding nutrients to the soil, and is used both in small-scale gardening and large-scale crop cultivation. Most of the compost produced at the Calgary Composting Facility will be sold in bulk to companies such as landscape soil blenders. The City shares responsibility for marketing the compost product with the CRMG and gets a share of the product at no charge.

[16] CCME Guidelines on Compost Quality can be accessed at https://www.ccme.ca/files/Resources/waste/organics/compostgdlns_1340_e.pdf

Figure 3: The curing building (left) and the administrative and educational annex (right)

Figure 4: A critical component of the Calgary Composting Facility's odour management is its wood-chip-based biofilter

Procurement Process

The City of Calgary's 10-year capital plan for 2008–2017 identified over $10 billion in unfunded capital needs,[17] prompting the City to consider untraditional financing methods including public-private partnerships, which have been increasingly pursued by all orders of government. The City enacted a P3 policy[18] adopted by Council in September 2008, which provided a framework for identifying potential P3 opportunities, evaluating them and ensuring that decision-making and procurement processes related to P3s followed a standard approach: every project identified as having P3 potential had to be evaluated against standard screening criteria before receiving a strategic and value-for-money assessment, and it recognized that P3 procurement would not be suitable for every project. In March 2012 the City implemented a second, administrative, policy that designated the Innovative Financing workgroup in the Finance and Supply Business Unit as the City's P3 Unit, with the responsibility of guiding the roles and internal processes of evaluating potential P3 projects and ensuring that both the evaluation processes and the procurement processes that result are consistent and conform to this Council policy.

Selecting the P3 model

In July 2012, the City issued a Request for Information (RFI) to solicit information on interest and capabilities from potential contractors and suppliers in the marketplace to construct a composting facility. The City received and reviewed 17 submissions from compost facility operators, owners, technology providers, engineers, compost producers and marketers.

The City subsequently completed a strategic assessment and market sounding in late 2012, where it was found that the two most common methods for procuring composting facilities in Canada over the past decade were design-build-operate (DBO) and design-build-own-operate (DBOO), where the private-sector service provider owns the facility. While these models have their benefits, including the transfer of risk from the public sector to the private sector, they are not considered public-private partnerships because ownership of the infrastructure does not remain with the public sector and there is no public-sector financing component.

After evaluating a range of alternative procurement models, the City opted for a design-build-finance—operate-maintain (DBF-OM) model with a

[17] The City of Calgary, *Public-Private Partnership (P3) Policy* (Dec. 15, 2008): http://www.calgary.ca/_layouts/cocis/DirectDownload.aspx?target=http%3a%2f%2fwww.calgary.ca%2fCA%2fcity-clerks%2fDocuments%2fCouncil-policy-library%2fcfo011-Public-Private-Partnerships-(P3)-Policy.pdf&noredirect=1&sf=1

[18] The City of Calgary's P3 policies can be found here: http://www.calgary.ca/CA/cmo/Pages/Financial-Administration-Policies.aspx

10-year operations period. Under this model the City retains ownership of the facility while the contractor is responsible for building and operating the facility and must achieve a detailed list of performance specifications. The rationale for selecting this model was that it offered an optimal combination of public control and contractor flexibility as well as the potential for access to composting technologies still being developed by the private sector. City Council approved the start of the procurement process on May 27, 2013.

Selecting a partner

Request for Qualifications

A Request for Qualifications (RFQ) was issued in November 2013. Proponents were required to identify a complete team of firms that could design, build and operate the facility. The RFQ defined the organics composting process as "the actively managed process(es) by which feedstock is biologically decomposed under aerobic, thermophilic and microbial condition which transforms feedstock into compost," and disqualified any other composting technology.

Each applicant was required to submit a technical information package, setting out each team member's ability to achieve technical requirements, and a financial information package, setting out each team member's ability to meet the financial requirements. Seven qualifications packages were received and reviewed.

The City and its representatives evaluated prequalification submissions according to a five-step process:

1) Submissions were reviewed to determine whether they were substantially complete and whether the composting technology submitted met the required definition;
2) Technical and financial teams established by the City evaluated the technical and financial information packages of the prequalification submissions that had passed the substantial-completeness review;
3) These teams then presented their preliminary evaluations and rankings from Step 1 and 2 to an evaluation committee, identifying the four highest-ranking applicants; the evaluation committee, after reviewing their results, confirmed these applicants as the "preliminary shortlisted applicants." These applicants received notification from the City that they had been selected to proceed to Step 4.
4) The preliminary shortlisted applicants were subject to occupational health, safety and environmental assessment. Only those who passed this assessment were eligible for identification as a prequalified party.
5) The contact person for each applicant was informed whether or not they had been determined to be a prequalified party.

Four teams were shortlisted as prequalified parties.

The proponents were:

Chinook Resource Management Group

- Stantec Consulting Ltd.
- Bird Capital/Bird Construction
- Maple Reinders Group Ltd/Maple Reinders PPP Ltd.
- Maple Reinders Inc./Nason Contracting Group Ltd.
- Aim Environmental Group Inc.

EllisDon SENA Team

- EllisDon Construction Services Inc.
- Suez Environment North America Canada Holding Inc./SENA Solid Waste Holdings Inc. (SENA Waste Services)
- AECOM Canada Ltd.

Harvest Power Calgary Consortium

- Harvest Power Inc.
- PCL Construction Management Inc.
- MMM Group Limited

Calgary Biocompost Group

- Orgaworld Canada Ltd.
- Graham Infrastructure LP
- Conestoga-Rovers & Associates Limited

Request for Proposals

A request for proposals (RFP) containing a draft project agreement (PA) was issued to shortlisted teams for comment in July 2014. The draft PA included technical requirements for the facility that would govern design, construction, performance testing, operations and maintenance of the facility.

Between August and December 2014 the City held three rounds of commercially confidential meetings concerning contractual issues, and a parallel series of design-presentation meetings and feedback with each of the shortlisted firms. The procedure was useful in establishing a common understanding of the City's requirements and the proponents' solutions. The process led to a number of changes in both the technical and financial requirements. For example, a clause in the draft project agreement included in the RFP stated that if the private partner did not complete the project within a specific time frame the City had the right to terminate the agreement and complete the project on its own. All four shortlisted proponents indicated during these meetings that the period of time between the project becoming delayed and the City having the ability to terminate the agreement was not long enough to allow lenders to step in and resolve the problem. As a result of this feedback, the City relaxed the requirements—which, as it happened, did not have to be used, as the project proceeded on time. These meetings also resulted in changes to the

proponents' proposed solutions, optimizing the project specifications and minimizing errors in proposals.

Technical proposals were due in February 2015, followed by financial proposals in March 2015. Technical proposals were reviewed and scored first according to a set of weighted criteria (see Appendix A). Proposals were evaluated on a pass/fail basis. The technical proposals that achieved a minimum score of 60 points out of a possible 100 then proceeded to financial evaluation on an equal basis, regardless of their technical proposal scores. Financial proposals were evaluated based on the net present value (NPV) of the project, along with pricing and other financial information. Proponents were given the opportunity to propose additional features or services, which were evaluated on a dollar-value basis and used to adjust the NPV of the proposed facility.

The financial proposals were then evaluated and scored for the added value of the services by an Evaluation Committee subcommittee. If one or more proponents' financial proposals met all the technical requirements set out in the RFP and had included added services with a proposal price of less than $12 million higher than the highest ranked proponent, then the proposals were re-ranked based on the added value.

Based on these evaluations, Chinook Resources Management General Partnership (CRMG) was selected as the preferred proponent on May 13, 2015. CRMG was required to provide an irrevocable standby letter of credit in the amount of $5 million within three business days of being notified of their preferred proponent status. Financial close was achieved shortly after.

Timeline

Between the release of the RFQ on November 13, 2013, and the commencement of operations in June 2017 less than four years had elapsed, as shown in Table 1.

Table 1: Project Timeline

- **2013 November 13**
  RFQ issued
- **2014 January 23**
  RFQ closed
- **2014 June 25**
  Shortlist
- **2014 July 25**
  RFP issued

cont.

- **2015 February 19**
  Technical submissions due
- **2015 March 12**
  Financial submissions due
- **2015 May 13**
  Preferred proponent
- **2015 June 25**
  Financial close
- **2015 August 18**
  Construction site work start
- **2017 June 29**
  Operations start
- **2027 June 29**
  Contract expiry

Fairness of the process

The City appointed P1 Consulting to act as the fairness monitor during the procurement process. In this role, they

- evaluated the RFQ and RFP documents to identify any fairness issues;
- reviewed the evaluation process to ensure that requirements of both the RFQ and RFP were met;
- attended and monitored all briefing sessions;
- monitored questions, comments and communications;
- briefed evaluation team members; and
- monitored the application of the City's evaluation process.

The fairness monitor concluded that the selection process was carried out fairly and reasonably. The fairness advisor was given access to all documents, meetings, and information related to the evaluation process during both the RFQ and RFP stages. Reports were issued for both processes. The RFP report concluded that the procurement process as described in the RFP was fair, reasonable and appropriate, and that the project team reasonably implemented and complied with that process.

Overall Structure of the Agreement

The City of Calgary and Chinook Resources Management General Partnership (CRMG) entered into a project agreement that comprised approximately 24 months of site work and construction and 10 years of operations and maintenance. Under the project agreement CRMG is contracted to:

- design and construct the composting facility to meet the technical requirements and environmental obligations by the scheduled substantial completion date;
- finance the construction and capital costs over the construction term; and
- operate, maintain and rehabilitate the facility for ten years in accordance with requirements set out in the agreement and in compliance with environmental obligations.

As part of the project agreement, CRMG acknowledges that while the City of Calgary, the public partner, retains full ownership of the Calgary Composting Facility at all times, the private partner is solely responsible for completing the project, including obtaining all required permits, licenses and approvals, making all required arrangements related to utilities, and complying with all applicable law. The project agreement also notes that the City shall assist the private partner with any reasonable requests in relation to permits, licences and approvals.

CRMG is also solely responsible for paying all costs, fees and charges required to complete the project with the exception of those associated with the City's own personnel, consultants and professional advisors, or the dispute resolution procedure.

Figure 5: The process of combining industry leaders to form the CRMG team was extremely successful, and a sense of team unity was quickly established—to the point where some of the management teams couldn't readily tell Maple and Bird's employees apart.

Allocation of responsibilities between the partners

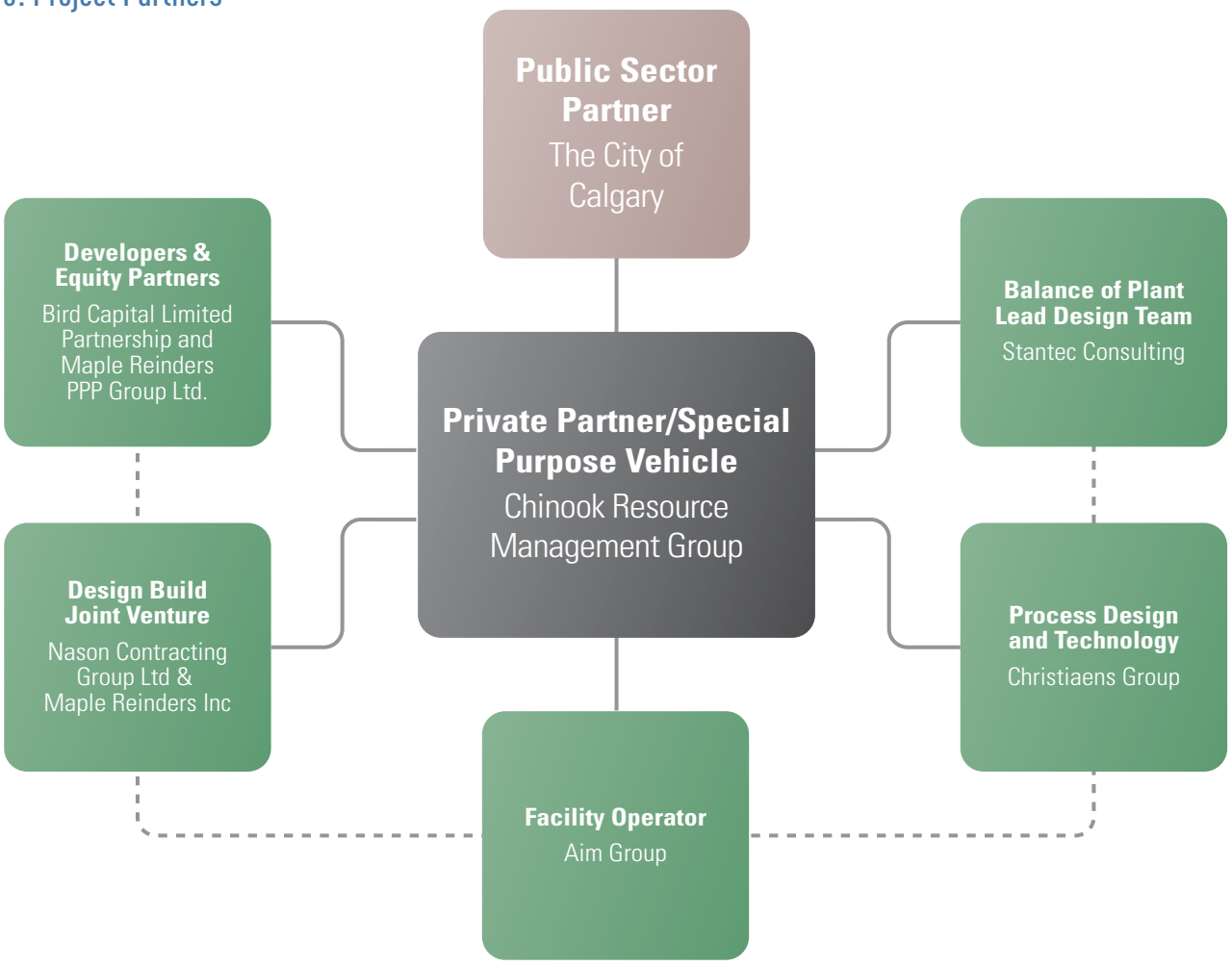
The Chinook Resource Management General Partnership (CRMG) is a design-build joint venture (DBJV) comprising Maple Reinders Group and Bird Design-Build Construction Inc. Bird and Maple brought their unique sets of skills and experience to the collaboration—Bird already had extensive construction and management experience with large-scale projects, including a number of P3 projects across Canada and Maple Reinders brought expertise in large-scale and highly technical composting plants. CRMG was responsible for all construction elements of the project as well as testing and commissioning with the operator, Aim Environmental Group. As composting is a highly technical process, the DBJV subcontracted the Netherlands-based Christiaens Group for technical design and process support; its initial composting concept had been based on the Christiaens Group's technology and processes. It also subcontracted a more traditional engineering firm, Stantec, to deal with all other design and engineering requirements.

The consortium brought together a cohesive group of in-house major trades that were able to leverage their collective knowledge of the group in executing the project. Bird and its subsidiary, Nason Contracting Group, self-performed HVAC, building mechanical, electrical, controls and instrumentation, completing these aspects of the project with its own skilled labor force, while Maple self-performed all mechanical and process mechanical services. Both companies have extensive local experience in structural, formwork, and concrete construction, so CRMG performed this work as well. All miscellaneous galvanized-metal structures, such as walkways, stairs and equipment support, were designed and fabricated by Nason at a facility in St. Albert, Alberta.

As the operations team, AIM Environmental provided valuable assistance in the design of the plant based on its previous operational experiences with other similar facilities. AIM was a full partner in the design team, working closely with both the Christiaens Group and the balance-of-plant design consultant, Stantec.

Where specific related skilled trades could not be self-performed by a CRMG member or supplemental subcontractor, the team made a special effort to hire the most established, reliable, and qualified local subcontractors, recognizing the importance of engaging local companies and leveraging their 70 years of experience in the Calgary market.

Figure 6: Project Partners



Centre corridor access to the composting vessels

Public Sector

- City of Calgary

Private Sector

- Developer and Equity Partners – Bird Capital Limited Partnership and Maple Reinders PPP Group Ltd.
- Design-Build Joint Venture – Nason Contracting Group Ltd., a wholly-owned subsidiary of Bird Construction Inc., and Maple Reinders Inc., a wholly-owned subsidiary of Maple Reinders Group Ltd.
- Balance of Plant Lead Design Team – Stantec Consulting Inc.
- Process Design and Technology – Christiaens Group
- Facility Operator – Aim Environmental Group, a subsidiary of the Maple Reinders Group

Local Subcontractors and Suppliers

- 3E Glass
- AAA Steel
- AGF
- Balzer's Canada
- Canem Electric
- Concrete Solutions
- Cousins Concrete
- Creative Doors
- Deane Roofing
- Elktone Contracting
- Fastline Construction
- Fish Creek Excavating
- HPS Piling
- KaeWest
- Montech Mechanical Industries
- Peak Contracting
- Prairie Dog Earthworks
- Rubydale Asphalt Works
- Serv-All Mechanical Services
- Sterling Crane
- Sunbelt Rentals
- Terra Boyz Contracting
- Thermo Design Insulation
- Tru-Steel
- Tyco Integrated Fire & Security
- Ultimate Edge Concrete
- Ultimate Tradesmen
- Victory Painting
- ZiO Doors & Security

Handback Requirements

CRMG and the City shall jointly carry out the handback inspections in order to assess what work (including possible renewal work) is likely to be required. These include

- a first handback inspection at least 24 months prior to the expiry of the project term;
- second handback inspection at least six months and not more than 12 months prior to the expiry of the project term; and
- a third handback inspection no more than one month prior to the expiry of the project term.

Following each inspection a work plan and schedule acceptable to the City must be provided, to ensure that the facility will meet handback requirements upon expiry of the project terms. Work plans shall be provided within 60 days of the first inspection, 30 days of the second inspection and seven days of the third inspection.

If CRMG fails to deliver the handback work plan and schedule in accordance with the project agreement and RFP, the City may hold back any amounts thereafter owed to CRMG under the project agreement. The City may hold back an amount sufficient to complete the handback requirements at the end of the project term and release it to CRMG when these handback requirements are achieved.

Financial Arrangements

Chinook Resources Management General Partnership was required to finance the Calgary Composting Facility during the construction period, resulting in significant project risk transfer to the private sector. The total NPV of the project is $163 million, which includes $125 million in capital costs.

The main source of project funding was a $93 million credit facility arranged with three lenders. In order to secure the loan, Bird Capital and Maple Reinders secured a P3 performance bond with Travelers Insurance of Canada, marking the first modern utilization of a P3 bond issued by the company.

Financing

The project was financed through two main sources:

1. A $93 million credit facility arranged with lenders covered design, construction, development and financing cost for the project except for a 10 per cent builders' lien holdback and $15 million in performance holdbacks.
    - The debt facility was fully repaid as scheduled within a few days of substantial completion of the project to the full satisfaction of lenders.

2. Working capital from Bird and Maple and letters of credit funded the various holdbacks, amounting to $27 million.

Required holdbacks:

- a biosolids testing performance security
- a source-separated organics testing performance security; and
- a builders' lien holdback in the amount of 10 per cent of the contract value between the City of Calgary and CRMG.

Structuring a security package for the loan

A major reason for the project's success was the initial structure of the team. The significant performance holdbacks on payments were not financeable by lenders and therefore had to be self-financed by CRMG.

Bird Capital, along with Maple Reinders, structured an innovative security package to provide lenders with enough confidence to finance the project with the exception of the holdbacks. The security package comprised four elements:

- a P3 performance bond provided by Travelers Insurance Company of Canada covered both a performance guarantee and a liquid component intended to cover any liquidated damages to the lenders in the case of a delay in achieving substantial completion;
- a parental-company guarantee for 40 per cent of the construction contract value, which was joint between Bird Construction and Maple Reinders Group Ltd.;
- a 50 per cent labour and materials bond provided by Travelers Insurance Company of Canada; and
- the obligation to require bonding from all subcontractors with contract values of $200,000 or higher.

Bird Capital has developed several recent municipal P3 projects and has introduced different project-agreement structures. The Calgary Composting Facility successfully reached financial close with significant deviations from standard project agreements. Bird Capital's in-house finance and legal teams, in conjunction with Maple Reinders, worked diligently to ensure lenders were comfortable with the various project requirements, principally the large holdback requirements.

Selecting lenders

Given the nature of the City's 100 per cent substantial completion payment, the project only required short-term financing. The size of the deal dictated which institutions would be most interested in financing the project.

Options for short-term facilities include short bonds or bank debt. Bird Capital conducted a funding competition and selected a group of lenders that could provide the most economical financing rate.

The $93 million short-term credit facility was provided by:

- The Toronto Dominion Bank;
- Business Development Bank of Canada; and
- Alberta Treasury Branch (ATB).

ATB expressed interest in the project due to its location within the province of Alberta. Following the funding competition the most suitable financing for the project was arranged in part through government agencies (Business Development Bank of Canada and ATB), in addition to TD Bank—a more traditional financing option for P3s.

Payments

The City made two payments to CRMG for the Calgary Composting Facility:

- a construction milestone payment in late April 2017 in the amount of $54 million; and
- a substantial completion payment shortly after June 29, 2017.

Both payments were issued on the day agreed upon in the project agreement. The total amounts of these two payments were sufficient to repay the credit facility for the project.

From the substantial completion date, the City makes all-inclusive monthly payments to CRMG for the operation of the facility, calculated as follows:

- a fixed payment to cover operational costs unrelated to the amount of feedstock processed each month;
- a variable payment based on the amount of monthly feedstock (food and yard waste and dewatered biosolids delivered to the facility);
- a wood amendment payment to compensate for wood consumed on a monthly basis during the composting process if that amount is in excess of the predetermined tonnage, with no payment for wood consumption in excess of the amount stipulated; and
- a renewal payment for periodic planned rehabilitation, replacement or renovation of the facility, excluding any routine maintenance.

Main source separated organics and biosolids receiving area

Aerial view of the 135-hectare project site

Table 2: An example of a variable monthly feedstock table*

Monthly Feedstock Amount (tonnes)		Variable Fee	
Band No.	Greater than	Less than and equal to	Real 2014$ per tonne of feedstock
1	0	100	$5.00
2	100	200	$4.00
3	200	300	$3.00
4	300	400	$2.00
5	400	15,600	$1.00

*As included in the 2014 RFP documents

The fee for any given amount would be calculated by multiplying the monthly feedstock tonnage by the variable fee per tonne, starting with the most expensive rate for the first hundred tonnes—the first "band" in this example—and then a progressively lower rate for each band thereafter. So if, for example, the monthly feedstock was 350 tonnes, the fee would be $500 for the first 100 tonnes ($5/tonne for 100 tonnes), $400 for the second 100 tonnes ($4/tonne for 100 tonnes), $300 for the third 100 tonnes ($3/tonne for 100 tonnes) and $100 for the last 50 tonnes ($2/tonnes for 50 tonnes), for a total of $1,300.

Risk Allocation

The purpose of public-private partnerships when constructing public infrastructure is the effective transfer of risk to those best able to manage it. This often results in the private sector taking on all risks during the construction period, including the risk of late delivery or cost overruns. The success of the Calgary Composting Facility project for the City of Calgary is a result of successful risk allocation between parties, which in turn lowers the overall cost of the project and generates benefit for both public and private partners.

Except for obligations specifically set out in the project agreement, CRMG was responsible during the construction period for everything required to complete the project, including obtaining required permits, licenses and approvals including amendments, authorizations and acknowledgments under Alberta Environment and Sustainable Resource Development (ESRD) regulations,[19] making all required arrangements relating to utilities and complying with applicable laws. The project agreement also stipulated that the City was to provide the private partner with reasonable assistance and information in relation to permits, licences and approvals if requested.

The City was permitted to stop work at any point if it considered that construction was not complying with technical requirements, applicable law, ESRD approval or environmental law and obligations. Any subsequent determination that design and construction had been carried out in accordance with these requirements would constitute a relief event.

The City retained the risk of ensuring the facility is kept "state-of-the-art" and meets changing regulations, which is not surprising given the shorter O&M period under this contract compared to most P3s in Canada. Having the private partner take on that risk would likely have increased costs without seeing any major capital reinvestments within the first ten years of operations and maintenance.

Benefits

Cost Savings/Value for Money

Over all, the City's partnering approach enabled CRMG to continually innovate and deliver value for money throughout every stage of the project. The effective allocation of risks and the ability to take advantage of value-engineering innovations were the primary drivers of cost savings:

- Structuring the DBJV at the team-forming stage allowed the parties to be comfortable with the main challenges and risks, reducing risk premiums and thereby reducing the overall cost of the project;
- Innovative financing tools, including the utilization of a P3 performance bond from Travelers Insurance of Canada, resulted in lower costs than traditional performance guarantees and liquid securities, thereby reducing the project cost and delivering maximum value to the City. Self-financing performance holdbacks through letters of credit and running a funding competition to select the most cost-effective institutions to finance the project further contributed to value for money;
- Designing a force main system to route on-site stormwater into the facility reduced the facility's water costs;
- Using various foundation materials throughout the facility enabled different subcontractors to work in different parts of the building at the same time, expediting construction;
- Adding fibrous materials into the final layer of concrete flooring has made it more durable than conventional concrete, extending its life cycle; and

[19] Alberta Environment and Sustainable Resource Development (ESRD) changed its name to Alberta Environment and Parks (AEP) during the course of construction.

- Using fibre membranes instead of steel frames in the construction of both the curing and storage buildings made them less expensive and more sustainable.

Community socio-economic benefits

Since food and yard waste represents nearly 65 per cent of Calgary's single-family residential waste stream, it presented the City with the biggest opportunity after recycling to make progress towards its goal—to divert 70 per cent of waste from landfills by 2025. When food and yard waste is collected along with regular garbage and dumped into landfills, it gets buried and compacted, and because oxygen is limited in such environments it cannot break down quickly. Instead, it produces greenhouse gases and takes up space unnecessarily. Instead, the composting facility is enabling the City to take advantage of this "waste" produced by residents to create a valuable, marketable product.

Diverting Calgarians' food and yard waste to the composting facility will not only extend the life of Calgary's landfills; because the composting process adds oxygen, the amount of methane and leachate that would otherwise result is also significantly reduced, thus eliminating a source of future greenhouse-gas emissions and reducing other environmental liabilities for the City. Approximately 300 to 500 loads of organic waste will be transported to the composting facility each week by the City's waste-collection trucks, collected through its residential Green Cart program.

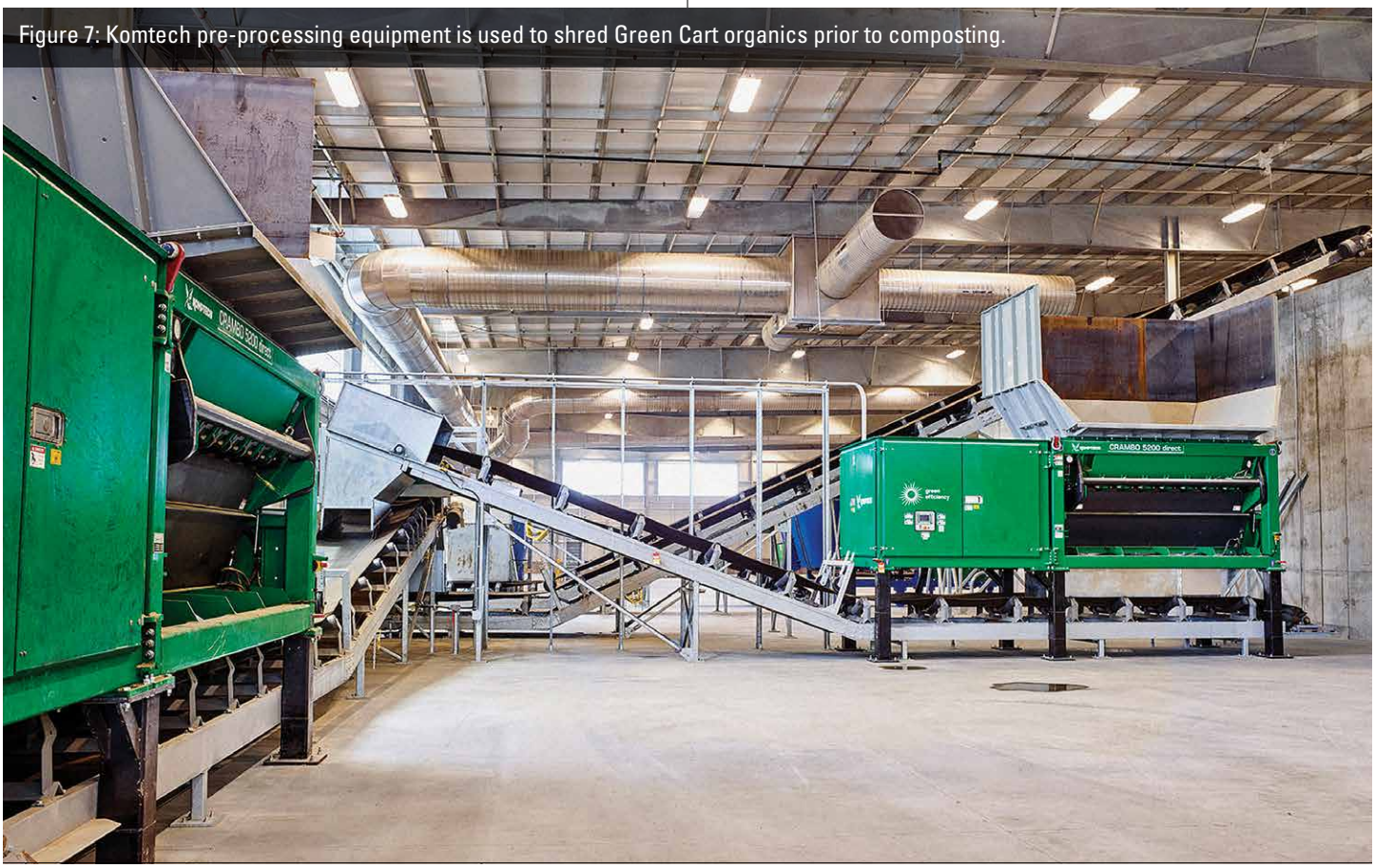
Both the Calgary Green Cart program and the composting facility have created new jobs through the transportation and processing of food and yard waste materials, and anecdotal information from other municipalities suggests that new local business opportunities may also be created if waste management policies (such as disposal bans on waste building materials from construction) are changed to allow new businesses to turn materials that were once buried in landfills into marketable materials. In fact, recent research suggests that resource-recovery facilities create up to ten times more jobs per tonne than waste disposal alone.[20]

In addition to the 100 to 225 people on-site during the various phases of construction, the private-sector operator is employing an average of 28 people on-site during the 10-year operations and maintenance period. The public sector is also employing 1.5 full-time-equivalent (FTE) positions at the facility during this period, in addition to the 107 FTE positions associated with Green Cart collection and maintenance.

Most of the Category A compost produced by the facility will be sold in bulk to companies such as landscape soil blenders. The city's proceeds from the sale of compost will help keep Green Cart program fees low for Calgarians. Additionally, beginning in May of 2018, a portion of the finished product is being offered free to all Calgary residents.

[20] Government of Ontario, *Strategy for a Waste-Free Ontario: Building the Circular Economy* (Mar. 6, 2017): https://www.ontario.ca/page/strategy-waste-free-ontario-building-circular-economy#foot-7

Figure 7: Komtech pre-processing equipment is used to shred Green Cart organics prior to composting.



Communications

Between the partners

The strong relationship between the City and CRMG enabled constant and honest discussion throughout the project. The project was developed with a structure that provided communications at an executive level as well as the project level by two main committees. Project governance was initially overseen by a design and construction committee and is now overseen by an operations, maintenance and rehabilitation committee.

A dispute-resolution mechanism was structured so that issues that could not be settled at the committee level would escalate through levels of resolution, ending with the executive level.Due to the City and CRMG's excellent relationship during project execution, all issues were resolved at the committee level, with no involvement required by executives or directors.

With the public

All communications with the public were coordinated by the City with input as requested from CRMG. There were no concerns or issues with public communications as the project was constructed on time and on budget, meeting all deadlines required for the rollout of Green Carts and the beginning of delivery of source-separated organics to the facility.

While there was overwhelmingly positive support for the implementation of Green Cart food and yard waste collection—89 per cent of Calgarians supported the program, according to a 2014 public-opinion survey—the additional cost of Green Cart collection was one major concern the City did have to address. City Council opted to waive fees as the program rolled out and people adapted to it in 2017. However, beginning on January 1, 2018, residents began to be billed $6.50 per month for the service. In addition to this fee, Calgarians already pay a monthly waste-management charge of $4.90 per month and a fee of $8.50 per month for Blue Cart recycling. As a result of the expanded environmental programs and to encourage further recycling, the City has reduced Black Cart garbage collection from once a week to once every two weeks. The savings from this change, as well as the proceeds from the sale of compost products, help offset the monthly fee charged to single-family households.

Figure 8: The interior of the curing building.

Dispute Resolution

While the dispute resolution process was not required, any disputes with respect to the application or interpretation of any provision of the project agreement would have been resolved through a predetermined dispute resolution procedure, and neither party to the agreement could initiate court proceedings against the other in respect to the application or interpretation of any provision of the project agreement.

Labour Impact

The Calgary Composting Facility is providing a new service to the municipality. As such, all positions created are new and there were no labour transitions.

Monitoring

Project management plans were in place from the start of construction, clearly defining the execution of all processes and procedures. A multi-day meeting was held with the City to coordinate methodologies and work procedures for the design-build phase of the project. Detailed management plans were also developed covering health and safety, traffic management, environmental management, procurement processes, schedule monitoring, cost control, quality assurance, risk management and document control. In advance of substantial completion, management plans for commissioning and testing, and operations were provided as well.

At project completion an exceptional Project Total Recordable Incident Frequency rate[21] of 1.5 was achieved, substantially lower than the industry standard.

Lessons Learned

Aspects contributing to the project's success

The DBF–OM delivery method was critical to the overall success of the project. Completing the design, construction and commissioning of the facility in only 24 months was made possible through the flexibility and innovation of the P3 model. The CRMG team was able to make use of the skill sets and experience of all major project participants without the traditional barriers and lack of communication between parties typical of the traditional design-build process.

The cooperative relationship that quickly developed between the City and CRMG also contributed to the project's positive outcome. The fair and equitable sharing of risk between the public and private sectors contributed fundamentally to CRMG being able to meet the required completion date. In particular, the City of Calgary understood the risk that permitting and regulatory approvals presents to the design-builder; rather than insisting that such risk should rest solely with the design-builder, the City shared this risk with CRMG and was very proactive in discussions with the relevant authorities prior to the start of the procurement process and during the design phase. In doing so, all permits and approvals were completed in a timely fashion with no impact to the construction schedule and at no additional cost to either party.

Aspects that could be improved

Given the success of the project and the strong working relationship between the City and CRMG and its members throughout the project, there are few areas that could be improved for the benefit of similar future projects. The only aspect that the private sector identified as meriting consideration for future projects was that there should be an increased level of flexibility in the design and proposed technologies permitted in the procurement process.

Concluding Comments

The Calgary Compost Facility delivered an innovative solution to the City's need for organic waste processing in support of its ambitious waste-reduction goals. The facility is the first composting P3 in Canada and the administrative and educational building is the first building registered for Leadership in Energy and Environmental Design (LEED) Gold v4 in Alberta. The project also marks the first use of a P3 performance bond instead of a letter of credit as insurance for lenders in the event of schedule delays during the construction period. Letters of credit can be onerous for contractors from a capital-cost perspective; lenders, however, have been reluctant to accept P3 performance bonds in the past since such instruments are viewed as more difficult to call upon if required. The use of a P3 performance bond was only made possible through the hard work of CRMG's financial and legal teams. Since the Calgary Composting Facility reached financial close, P3 performance bonds have been used for four other P3 projects across Canada—the Stanton Territorial Hospital, Moncton's Downtown Events Centre, and both of Saskatchewan's Joint-Use School Project bundles.

The City of Calgary procured the project using a uniquely modified Design-Build-Finance—Operate-Maintain (DBF–OM) model that required the private sector to only arrange short-term financing for the construction period while still operating and maintaining the facility over a 10-year period. The model allowed the City to take advantage of low-cost financing that was competitive with public-sector financing while still benefiting from a built-in warranty and guaranteed life cycle renewal during the 10-year

[21] The Total Recordable Incident Frequency (TRIF) rate is a mathematical calculation that describes the number of employees per 100 full-time employees that have been involved in a recordable injury or illness.

operating period. By integrating the design, construction and financing with operations and maintenance, the City was able to realize optimized costs and risk transfer over the facility's life cycle.

While many sectors of the P3 market in Canada are mature and well-established, projects in the environmental sector, including water/wastewater, compost and energy projects, are only beginning to take shape. As leaders in the industry, Maple Reinders and Bird demonstrated their expertise and leadership within the environmental sector on the Calgary Composting Facility. Not only did the CRMG team deliver a best-in-class facility, it did so on time and on budget.

Testimonials

Public sector

Several years ago, The City of Calgary (the City) began work on a project to take food and yard waste from single-family homes out of our garbage stream. Although readily compostable, food and yard waste made up more than half of the garbage produced by single-family homes. A large-scale composting program had the potential to divert 100,000 tonnes of material each year. This would be a significant step in our target to divert 70 per cent of waste from our landfills by 2025.

A program of this size requires a complex industrial facility to properly process the material. It was important to be flexible enough to take advantage of technological advances in a rapidly-changing field, manage some not-insignificant financial and reputational risks associated with the facility's design, construction and operation, and be responsive to changing market conditions.

After extensive study, including a third-party examination of risks and benefits, it was clear that a P3 arrangement, specifically a Design-Build-Finance—Operate-Maintain (DBF–OM) model, would yield the best results.

DBF–OM provides high potential for innovation by bundling together design and construction responsibilities into a single, performance-based contract. As a partner, the operator was also able to collaborate as part of the design and construction process, maximizing future operational efficiency. One example was in the case of odour management—a major risk for industrial compost facilities. Because they were interested in not only the design and construction, but also the long-term operation of the facility, the design was such that it included odour controls above and beyond the extensive requirements that had been requested.

During construction, the contractor was responsible for short-term financing, particularly important during a period where municipal capital budgets are being reduced. They had added incentive to meet timelines, allowing the City to begin its collection schedule on time.

As we move forward with our partnership, a private-sector operator will allow us to take advantage of developing technologies, and to remain nimble and flexible in a way that government cannot always achieve. For example, the contractor is responsible for the sale and marketing of our end product. As a private entity, they are able to more effectively market the product, including setting pricing. The terms of the contract incent them to produce a high-quality product, and to effectively get it to market.

Because the City is able to retain ownership and assess the effectiveness of our partnership after 10 years, it leaves us with flexible options and the ability to adjust the program to meet future waste diversion needs if required.

From the design, through the construction and now the operation, the P3 model has been integral to the success of this project and our single-family food and yard waste collection program.

Rich Valdarchi
Director, Waste & Recycling Services, Utilities and Environmental Protection
The City of Calgary

Private sector

The Calgary Composting Facility Project is a best-in-class, technologically advanced organic waste processing facility that will keep pace with the City of Calgary's ambitious Green Cart food and yard waste collection—the largest of its kind in Canada.

The project utilizes the City of Calgary's public-private partnership funding model in a design-build-operate structure that included short-term financing through the construction phase. In structuring the Chinook Resource Management General partnership (CRMG) team, Bird Construction Inc. and Maple Reinders Inc. focused on identifying key firms who possessed the sector expertise and resources necessary to successfully execute and deliver this important DBFO initiative. There was also a focus on the long-term integration and continuity of the team to meet the requirements of the operational phase of the project.

The team brought together first-class partners, with leading P3 design, construction and maintenance experience, and included Bird Capital Limited Partnership, Maple Reinders PPP Group Ltd., Nason Contracting Ltd., Maple Reinders Group Ltd., Stantec Architecture Ltd., and Aim Environmental Group. The team developed a winning solution that incorporates innovation, environmental stewardship and outstanding building and service quality while at the same time delivering overall value for money to the City of Calgary today and into the future. Currently into the operations period, the CRMG team is operating this innovative facility with flexibility and very limited performance failure, demonstrating the effectiveness of the P3 delivery model.

The CRMG team is excited to be working alongside the City of Calgary to deliver this progressive complex that demonstrates value through enhanced collaboration within the facility and efficiencies realized to date.

Ian Boyd
President & CEO
Bird Construction

Maple Reinders Constructors Ltd., in partnership with Bird Construction Inc., formed the Chinook Resources Management General Partnership Team (CRMG) team in order to present the City of Calgary with a strategic and sound funding model in which to design, construct, finance and operate a centralized composting facility for the city. The CRMG team is proud to have been awarded this project through a competitive bid process.

CRMG was fortunate to be able to bring together a team that consisted of top-rated partners who were leaders in P3 design, construction, finance and operational experience of world-class composting facilities. This exceptional team consisted of Bird Capital Limited Partnership, Maple Reinders PPP Group Ltd., Nason Contracting Ltd., Maple Reinders Constructors Ltd., Stantec Architecture Ltd., and the Aim Environmental Group (a partial subsidiary to the Maple Reinders Group). This project allowed these individual companies to come together as a team to realize a common goal of providing the City of Calgary with a world-class facility that they can all be proud of and which will be utilized to educate the public about the positive impact that composting has on the local, and by extension, global environmental conditions.

All of these members are successful in their own right in the private sector who, through a belief in promoting a culture of service, integrity, and excellence in business, came together as a TEAM to assist the City of Calgary and its residents, in realizing their ambitions for a world-class composting facility. Upon completion, this facility became the nation's first P3-model composting project and LEED Gold v4 project.

This project demonstrated to the private and public sectors that the P3 model can be applied successfully to environmental infrastructure projects, resulting in a facility that will benefit the City of Calgary and the community at large for their current requirements as well as allowing for future growth and expansion.

Currently this unique and innovative facility is being operated by the CRMG team, demonstrating the success and effectiveness of utilizing the P3 delivery model for infrastructure projects now and into the future. Maple Reinders is proud to be part of this unique facility's design and operation and look forward to seeing the positive impact these efforts have for the City of Calgary, its residents and visitors.

Harold Reinders
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Appendix A: Technical Submission Requirements and Weighting, Request for Proposals

1. PROPOSED FACILITY SOLUTION

1.1 Ability of the Equipment and Process to Meet Finished Product Requirements

Maximum Points **10**

Submission Requirements

Submit information demonstrating that the proposed equipment has been used in a similar process configuration to meet finished product requirements when processing Feedstocks similar to those that will be required for the Facility, including:

(a) Source Separated Organics; and
(b) Dewatered Biosolids.

Evaluation Criteria

Ability of Facility to meet Alberta ESRD amending approval 11216-01-07 (zero points awarded if not met);

- Ability of Facility to meet the Compost quality requirements outlined in the Project Agreement (zero points awarded if not met); and
- Ability to meet the additional stability and maturity criteria outlined in the draft Project Agreement.

1.2 Suitability and Functionality of the Facility Design

Maximum Points **20**

Submission Requirements

(a) Provide a detailed conceptual design for the proposed Facility to demonstrate the suitability and functionality to meet the Project requirements, including at a minimum, the following, at a level of detail adequate to support the proposed project cost:
  (i) detailed layout superimposed on the site plan;
  (ii) identify on the layout all structures, foundations required to support equipment and structures, conveyances for Feedstocks and intermediate materials between processing steps;
  (iii) description of building construction type including structural frame, roof, doors, floors, and major openings;
  (iv) traffic routes through the Facility including entrances and exits, and process flow of materials;
  (v) turning diagrams using turning radii for required vehicles;
  (vi) estimated traffic flow and queuing times, in order to demonstrate through-put capacity and interoperability with route collection operations;
  (vii) quantified air flows, air exchanges per hour and equipment capacity for building ventilation, composting aeration systems, and odour management systems;
  (viii) electrical schematic;
  (ix) process and instrumentation diagram;
  (x) description of the process and control and monitoring system; and
  (xi) two major cross-sections through the Facility, including ground elevations, major equipment and required structure elevations.
(b) Provide a detailed process flow diagram showing,
  (i) all unit processes;
  (ii) tanks and other storage facilities and their capacities;
  (iii) all major equipment;
  (iv) material flows throughout the Facility; and
  (v) type of conveyance between all processes, equipment and facilities.
(c) Provide detailed process descriptions for the proposed Composting Process(es) to be used in both indoor and outdoor composting, including,
  (i) approximate dimensions and volume of aeration bays;
  (ii) how materials are moved into, out of and through the proposed Composting Process(es);
  (iii) description of how the material is aerated;
  (iv) aeration rates;
  (v) principle of controlling aeration;
  (vi) process parameters measured and how they are used in controlling the system;
  (vii) how water is added and removed and how moisture in the Compost is measured and controlled;
  (viii) how Amendments will be used; and
  (ix) how odours are controlled.
(d) Provide descriptions of major equipment, including,
  (i) manufacturer, model and capacity, for all major equipment including all pumps, feedstock processing equipment, monitoring equipment, compressors, fans, blowers, fans, generators, engines, tanks, mixers, and similar equipment; and
  (ii) identification of equipment that will require six months or longer advance order, and length of time expected for delivery.
(e) Provide a detailed mass balance on a tonne per month basis for both the first full year of operation (2018) and the tenth year of operation (2027). Detail all inputs, outputs, and intermediate flows, including, but not limited to, Feedstocks, Compost, and Amendments. Any further treatment of the Feedstocks including addition and quantities of Amendments before entering the Composting Process(es) shall be included in the details.
(f) Provide a water/wastewater balance through the entire process from Feedstock processing through finished product, indicating water and wastewater inputs and outputs for all processes on the process flow diagram including vapour losses. Inputs must equal outputs. All water / wastewater flows shall be stated in cubic metres per year. Describe expected wastewater quality.

Evaluation Criteria

Conceptual design meets the definition of "Composting Process(es)" set out in the RFP (zero points awarded if not met);

- Ability to meet the building design and construction requirements outlined in the Project Agreement;
- Ability to meet the design and operating capacity requirements outlined in the Project Agreement;
- Ability to meet all requirements for Facility components outlined in the Project Agreement;
- Ability to meet the process control and monitoring systems requirements outlined in the Project Agreement;
- Ability to meet the materials receiving and storage requirements in the Project Agreement;
- Demonstrated success of similar process monitoring, instruments, and control systems in similar facilities;
- Ability to meet the exterior roadways and access lane requirements outlined in the Project Agreement;
- Ability to meet the Process Water management requirements outlined in the Project Agreement;
- Ability to meet the building ventilation and odour treatment requirements outlined in Schedule 18 of the Project Agreement;
- Demonstrated success of similar equipment processing similar Feedstocks;
- Clear delineation of space and equipment that could be used for expansion and process flexibility;
- Demonstrated ability to in-take materials from route vehicles in a timely and safe manner; and
- Planning appropriate space and equipment to receive, process, cure, package (if required), and load materials for transport to market.

Appendix A: Technical Submission Requirements and Weighting, Request for Proposals (continued)

1.3 Ability of the Facility to Meet Proposed Composting Capacity Requirements

Maximum Points **10**

Submission Requirements
Provide information demonstrating the ability of the Facility to meet proposed processing capacity requirements, including:
(a) annual Feedstock tonnages up to the year 2027, including both Source Separated Organics and Dewatered Biosolids;
(b) seasonal fluctuations and peaking up to the year 2027, including both Source Separated Organics and Dewatered Biosolids;
(c) changes in Feedstock composition; and
(d) contingency capacities.

Evaluation Criteria
Ability of the design to meet the processing capacity requirements for both Source Separated Organics and Dewatered Biosolids, both annual tonnages and seasonal fluctuations (zero points awarded if not met);
- Flexibility in processing system(s) to handle changes in Feedstock composition;
- Maximum allowable contamination rate in Feedstocks; and
- Contingency to accommodate faster than anticipated Feedstock growth and / or Feedstocks from other diversion programs.

1.4 Environmental and Nuisance Control Measures

Maximum Points **15**

Submission Requirements
Provide information demonstrating the ability of the Facility to meet environmental and nuisance control requirements, including preliminary plans for managing the following specific environmental and nuisance issues:
(a) odour;
(b) Process Water;
(c) Compost Facility Leachate
(d) storm water;
(e) noise,
(f) traffic; and
(g) greenhouse gas reductions.

Evaluation Criteria
- Effectiveness of environmental and nuisance control measures to address all phases of the Project;
- Ability to meet the Alberta ESRD amending approval 11216-01-07 with respect to:
  - the pollution abatement equipment;
  - the odour complaint management and response plan; and
  - the odour reduction plan.
- Ability of surface water management plan to comply with the Shepard Landfill Staged Master Drainage Plan, the Shepard Resource Recovery Campus stormwater management report, and the Alberta ESRD approval 11216-01-00 and amendments and renewals of that approval;
- Ability of the Facility to meet the Environmental Obligations and Technical Requirements outlined in the Project Agreement; and
- Ability to meet the carbon credits and greenhouse gases requirements outlined in Schedule 18 of the Project Agreement.

1.5 Demonstrated Reliability of Equipment and Processing System(s) at other Comparable Facilities

Maximum Points **5**

Submission Requirements
Provide a written description, based on previous project experience, of the ability of the Proponent's proposed design and equipment to provide:
(a) operability and maintainability;
(b) redundancy and reliability;
(c) expandability and process flexibility; and
(d) ability to market Compost created.
Identify specifically where the proposed Composting Process(es) have been used before and problems encountered and overcome with regard to the above four criteria. List number of installations and list as many specific locations as practical.

Evaluation Criteria
- Relevance of equipment and processing system(s);
- Experience and performance of equipment and processing system(s) at other comparable facilities;
- Ability to meet the expandability and modularity requirements outlined in the Project Agreement; and
- Past performance in processing and marketing Compost.

1.6 Ability to Meet The City's LEED® Requirements, Sustainability Goals and Educational Objectives

Maximum Points **5**

Submission Requirements
Provide a written description, based on previous project experience, of the Proponent's ability to meet The City's LEED® requirements, sustainability goals and educational objectives as described in the Project Agreement included as part of this RFP.

Evaluation Criteria
- Ability to meet LEED® v4 Gold BD+C New Construction certification for the building annex used for administration and educational purposes;
- Ability to meet The City's Sustainable Building Policy CS 005; and
- Ability to incorporate "low impact development" design principles in the surface water management plan.

2. DESIGN, BUILD, OPERATE DELIVERY PLAN

2.1 Processing Capacity Availability Date Guarantee and Implementation of City of Calgary-Wide Program

Maximum Points **5**

Submission Requirements
Provide a processing capacity availability date guarantee and a strategy for implementation (i.e. ramp up) of the City of Calgary-wide SSO green cart program.

Evaluation Criteria
- Availability date guarantee; and
- Length of time required to ramp up from end of commissioning to a full, City of Calgary-wide program.

Appendix A: Technical Submission Requirements and Weighting, Request for Proposals (continued)

2.2 Management Plan

Maximum Points **5**

Submission Requirements

Provide a management system and plan that includes,

(a) a management plan that,
  (i) identifies reporting procedures, communications, quality control, schedule and budget control during all phases of the Project and persons responsible for each function;
  (ii) identifies key responsibilities, reporting structure, and individuals who will be responsible; and
  (iii) includes information systems that will be used to store and retrieve records, data and information developed in each phase of the Project; and

(b) a Project schedule that,
  (i) is a detailed critical path or bar construction schedule including milestone dates for all significant activities; and
  (ii) includes a detailed Gantt chart showing start dates, end dates, durations, and dependencies for all activities from design through commissioning, including at a minimum the following:
    - predesign workshop;
    - design deliverables and review period;
    - permit application preparation and submissions; and
    - delivery dates for long lead- time equipment (greater than 6 months).

Evaluation Criteria

- Effectiveness and thoroughness of the management plan;
- Suitability of key responsibilities and individuals to the Project;
- Effectiveness of reporting structure; and
- Thoroughness and appropriateness of information systems for the Project.

2.3 Design and Permitting Plan

Maximum Points **5**

Submission Requirements

Provide a design and permitting plan that includes,

(a) a design plan that,
  (i) describes the functional organization of the design team including roles and responsibilities of firms and key individuals;
  (ii) describes how design basis information, calculations and draft documents etc. will be managed and used in completion of the design;
  (iii) provides a design quality assurance/quality control plan and an example design quality assurance/quality control plan from a previous project;
  (iv) describes how design decisions will be made and how The City will be involved; and
  (v) provides a preliminary list of drawings and an outline of specifications; and

(b) a permitting plan that,
  (i) identifies the specific permits and regulatory approvals that the Proponent believes will be required, the agency responsible, and the length of time likely to be required; and
  (ii) includes a bar chart schedule indicating start and complete times for permit applications, meetings with agencies, and estimated permit issuance date.

Evaluation Criteria

- Effectiveness and thoroughness of the design and permitting plan;
- Effectiveness of design basis information management and utilization plan;
- Thoroughness and suitability of the quality control/quality assurance plan for the Project;
- Suitability and effectiveness of the design decision and communication process for the Project and The City's oversight;
- Appropriateness of the drawing list and specification outline for the Project;
- Thoroughness and appropriateness of the permitting plan for the Project; and
- Completeness and reasonableness

2.4 Construction and Commissioning Plan

Maximum Points **5**

Submission Requirements

Provide a construction and commissioning plan that includes,

(a) a description of the functional organization of the construction team, including roles and responsibilities of firms and key individuals;
(b) a plan for selection and procurement of subcontractors;
(c) a plan for tracking construction progress and communicating with The City;
(d) a quality assurance/quality control and safety plan, including,
  (i) a construction quality assurance/quality control plan outline, and example plan from a previous project; and
  (ii) a construction safety plan outline, and example plan from a previous project; and
(e) a commissioning plan, including,
  (i) complete personnel and equipment requirements;
  (ii) a schedule showing dates and durations for all tasks;
  (iii) quantities of materials, including Feedstocks, required from The City and when they will be required; and
  (iv) testing plans to demonstrate compliance with requirements of the Project Agreement.

Evaluation Criteria

- Thoroughness of functional organization;
- Suitability of key responsibilities and individuals to the Project;
- Appropriateness of the subcontracting plan for the Project;
- Appropriateness of the construction progress tracking and communication plan for the Project and The City's oversight;
- Thoroughness and appropriateness of the quality assurance/quality control plan;
- Thoroughness and appropriateness of the construction safety plan; and
- Effectiveness and thoroughness of the commissioning plan.

2.5 Operating Plan

Maximum Points **10**

Submission Requirements

Provide an operating plan for the proposed Facility including,

(a) a staffing plan, including numbers, roles, experience, and training program;
(b) a process and monitoring plan;
(c) product quality control procedures;
(d) an emissions plan, including odour, residual waste management, wastewater, storm water, noise and dust;
(e) a preventative maintenance plan;
(f) a contingency plan for down time and material received during peak periods;
(g) lifecycle capital replacement commitment;
(h) health and safety policies;
(i) an environmental management plan; and
(j) record keeping, including as-built records for Facility improvements

Appendix A: Technical Submission Requirements and Weighting, Request for Proposals (continued)

Evaluation Criteria

- Thoroughness and effectiveness of the operating plan to meet the requirements herein;
- Ability to meet the requirements outlined in the Project Agreement;
- Effectiveness in meeting product quality requirements;
- Effectiveness in meeting environmental requirements;
- Thoroughness of preventive maintenance plan;
- Thoroughness of the contingency plan;
- Effectiveness in meeting health and safety requirements;
- Thoroughness of lifecycle capital replacement commitment;
- Reasonableness of the staffing plan; and
- Demonstrated contingency plan for routine maintenance and in case of equipment failure.

3. PRODUCT MARKETING CAPABILITY

3.1 Product Marketing Strategy

Maximum Points **5**

Submission Requirements

Provide a product marketing strategy that is specific for local product markets and Feedstocks to be handled, and that takes advantage of The City's ability to provide assistance. The strategy should include, at a minimum,

(a) an annual budget;
(b) staffing requirements;
(c) product quality and product mix;
(d) product positioning / market segments to approach;
(e) promotional and educational plans; and
(f) sales and distribution plans.

Include markets for Compost products, evidence of market ability to absorb the quantity of Compost products at the price expected, any pre-market processing or transport required, and contingency plan should these markets become unavailable either temporarily or long-term.

Evaluation Criteria

- Thoroughness of marketing strategy;
- Evidence that the marketing strategy is specific and appropriate for City of Calgary markets;
- Evidence that the marketing strategy is appropriate for Feedstocks;
- Evidence that the marketing strategy takes advantage of The City's assistance; and
- Demonstrated ability to process

Total Maximum Points **100**

Appendix B: 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)

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