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Organic Waste Treatment Plants

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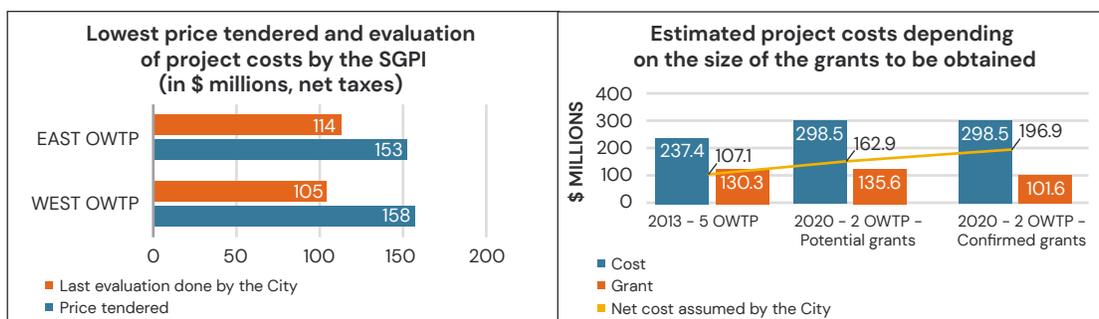
Auditor General of the Ville de Montréal

Organic Waste Treatment Plants

Background

In order to respond to the *Plan directeur de gestion des matières résiduelles de l'agglomération de Montréal 2010-2014* (PDGMR) and become self-reliant in organic waste management, the Ville de Montréal (the City) undertook studies in 2006 that led it, in January 2013, to present to the executive committee (EC) a massive project for the construction and commissioning of five Organic Waste Treatment Plants (OWTPs) including a Centre pilote de prétraitement (CPP). The cost of the project presented to the EC was approximately \$237 million (\$M), for which the City anticipated that it would obtain approximately \$130M in grants from the federal and provincial governments. All but one of the OWTPs was to be operational by the end of 2016; one OWTP was to be operational in 2021.

In 2018, the required investment grew to \$589M. In 2019, the City's EC authorized the granting of two contracts for the production of the West and East OWTPs at a cost of \$298.5M. The decision involved replanning the production of two other OWTPs and the CPP at unspecified future dates. As a result of delays in the project, the City could not obtain all the grants initially anticipated and is now under the obligation to negotiate new agreements with the governments. Thus, in 2020, as a result of increased project costs and reduced grants, the projected net cost of the project for the City should be between \$162.9M and \$196.9M and, as a consequence, might be nearly twice the amount that had been projected six years earlier for the five facilities,¹ while only two will be produced by the end of 2021.



Purpose of the Audit

The purpose of this audit was to ensure that the management of Organic Waste Treatment Plant construction projects is carried out as part of a rigorous process and is adequately monitored.

Results

In light of this overall finding of cost overruns and non-compliance with the timeline, which could have a considerable impact on the total grants originally anticipated from the federal and provincial governments, and considering that the Cadre de gouvernance des projets et des programmes de gestion des actifs municipaux ("Governance Framework") was not complied with completely, and that monitoring and the different accountability reporting processes are incomplete, we conclude that the OWTP construction project was not subject to a sufficiently rigorous process, given the complexity and scope of the project.

¹ In 2013, the net cost of the project to the City for the construction and operation of five OWTPs was to be \$107.1M (\$237.4M – \$130.3M), according to the best-case scenario. In 2020, with the grants confirmed, the net cost to the City should climb to \$196.9M (\$298.5M – \$101.6M) and cover only two OWTPs.

Main Findings

Project Management and Planning

- Some aspects of the Governance Framework pertaining to the planning of projects were not followed.
- Although it was based on studies and forecasts of the City's capacity for organic waste collection over time, it is clear that, the scenario put forth in 2013 was ambitious in terms of organic waste treatment needs, since fewer facilities were now initially required to meet the needs of the population. Thus, the original project, which took into account the requirements and constraints involved in obtaining the full grants from the provincial and federal governments, limited the City's ability to move some OWTP projects forward, while others were delayed.

Mechanisms for Monitoring the Progress of Projects

- Despite the impact of adding two years to the project timeline, the site relocation of the North OWTP from the Complexe environnemental Saint-Michel (CESM) to Rivière-des-Prairies-Pointe-aux-Trembles borough was not the subject of a presentation made to the governance committees to obtain a new execution mandate, as required by the Bureau des projets et programmes d'immobilisations.
- Few risks were identified for this large-scale project and we did not obtain evidence that a risk register was kept up to date.

Accountability Reporting

- While there is accountability reporting to the EC within the context of the project approval process, it was not comprehensive or accurate with respect to information on the differences between the estimated project costs and the bids obtained.
- Concerning the final decision to construct only two OWTPs, there were no quantified analyses of the advantages and disadvantages of the different options presented to the EC, and only the option that was recommended was presented favourably compared with the other options.

In addition to these results, we have made various recommendations to the business units, which are presented in the following pages. These business units were given the opportunity to agree to the recommendations.

List of Acronyms

\$M	million of dollars	PDGMR	<i>Plan directeur de gestion des matières résiduelles de l'agglomération de Montréal 2010-2014</i>
BPPI	Bureau des projets et programmes d'immobilisations	PFP	Programme fonctionnel du procédé
BVG	Bureau du vérificateur général	PFT	Programme fonctionnel et technique
CCGPE	Comité corporatif de gestion des projets d'envergure	PTOMBC	Program for the treatment of organic matter through biomethanization and composting
CCPE	Comité de coordination des projets d'envergure	SE	Service de l'environnement
CESM	Complexe environnemental Saint-Michel	SF	Service des finances
CPP	Centre pilote de prétraitement	SGPI	Service de la gestion et de la planification immobilière
CTA	<i>Cities and Towns Act</i>	TCWP	Three-year capital works program
DAP	Dossier d'approbation de projet		
EC	executive committee		
OWTP	Organic Waste Treatment Plant		

Glossary

Anaerobic digester:	process in which organic waste is broken down by microorganisms in the absence of oxygen
Biomethanization:	synonym of anaerobic digester
Composting:	process in which organic waste is broken down by microorganisms in the presence of oxygen
Digestate:	solid organic fraction of matter produced by an anaerobic digester



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1. Background

1.1. History of Residual Waste Management in the Montréal Agglomeration

A little before the year 2000, the Québec government adopted the objective of diverting 60% of its putrescible organic waste (hereinafter the “organic waste”) from landfill. This target first emerged in the *Politique québécoise de gestion des matières résiduelles 1998–2008*. In 2006, in response to this policy, the metropolitan Montréal community adopted its *Plan métropolitain de gestion des matières résiduelles 2006–2017*². The metropolitan Montréal community, in turn, took up the target of diverting 60% of its organic waste from landfill, focusing, however, on housing consisting of eight units and under.

Since then, the Ville de Montréal (the “City”) has embarked on a variety of studies for the purpose of adopting the *Plan directeur de gestion des matières résiduelles de l’agglomération de Montréal 2010–2014* (PDGMR) for the Montréal agglomeration.³ Already in 2006 and 2007, before the urban agglomeration council adopted the PDGMR in 2009, two external studies⁴ produced by the same firm (Firm A)⁵ recommended that the City attempt to achieve autonomy for the Agglomeration in organic waste treatment. It was proposed that the City treat waste by:

- composting food and green waste collected together in West Montréal Island⁶ in a new closed composting plant;
- anaerobic digestion (biomethanization, or biogas production) of food waste in two new facilities and composting green waste collected separately in the East Island in a semi-closed composting plant on the site of the Complexe environnemental Saint-Michel (CESM).

In 2008, the same firm (Firm A) supported the City in the study⁷ of infrastructure component planning for organic waste in the Montréal agglomeration (hereinafter the “Agglomeration”) by taking up the scenario proposed the previous year featuring four facilities (two anaerobic digesters, one closed composting plant and one

² See timeline – P1 in Appendix 5.2, which presents in diagram form a timeline of all the points raised in this Background section.

³ Unless specified otherwise, the PDGMR referred to in this report is the one covering the 2010–2014 period.

⁴ Timeline – C1 and C2.

⁵ A table in Appendix 5.3. summarizes the different contracts awarded to firms and contractors from 2006 to 2019.

⁶ While sectors had been identified for these treatment plants, no specific location had yet been designated, with the exception of the CESM site.

⁷ Timeline – C3.

semi-closed composting plant). The firm estimated that the City should invest \$115 million (\$M) in 2008 dollars to acquire these four plants: \$70M for the two anaerobic digesters together, \$30M for the closed composting plant and \$15M for a semi-closed composting plant⁸ at the CESM. The firm also estimated that three plants could be commissioned over a five-year period.

In November 2009, the Québec government set up a grant program⁹ intended mainly for municipalities in order to provide financial assistance for the construction of a composting and biogas production plant under the *2006–2012 Climate Change Action Plan*. The City's Program for the treatment of organic matter through biomethanization and composting (PTOMBC) covered the equivalent of^{10,11}:

- two thirds (66.7%) of the eligible costs¹² of biogas production projects;
- half (50%) of the eligible costs of composting projects;
- one third (33.3%) of the costs of acquiring bins for the residential collection of organic waste;
- one third (33.3%) of the costs of pre-project studies (business plans, feasibility studies, design plans and specifications).

The PDGMR, which was adopted by the urban agglomeration council in August 2009,¹³ aimed to achieve a diversion rate of 60% of organic waste within the first five years and a diversion rate of 80% by the end of the next five years.¹⁴ The PDGMR focused on sectoral autonomy for the Agglomeration, meaning that it sought, insofar as possible, to reduce exports of residual waste outside the Agglomeration's territory. It also took up the idea of dividing the territory in two, with a combined green and food waste collection service in West Montréal and two separate collections for green waste and food waste in East Montréal. The idea of using four Organic Waste Treatment Plants (OWTPs), identified in 2008, was an integral part of the PDGMR.¹⁵ A fifth facility, the Centre pilote de prétraitement (CPP), which was

⁸ Semi-closed composting involves pretreatment of organic waste through composting in tunnels (closed system), followed by a treatment involving turned windrows (open system).

⁹ Timeline – G1.

¹⁰ The PTOMBC anticipated that if the federal government also participated in the financing of a composting or biogas production project, the assistance granted by the Québec government would be adjusted so that the total assistance received by the municipality did not exceed that anticipated under the PTOMBC.

¹¹ The PTOMBC anticipated that a first instalment of 30% of the grant would be paid after the project was accepted by the Québec government, a financial assistance agreement was signed between the government and the City and the necessary authorizations to produce the project, including environmental authorizations, were obtained.

¹² Eligible costs included those for the acquisition and installation of equipment necessary for treatment, capital costs for the equipment used to refine the biogas produced, and salaries and employee benefits associated with the construction of the required facilities, but excluded such expenses as costs of work performed before January 1, 2008, costs of land purchases, related real property, easements and rights of way, financing costs and interest on loans, and operating expenses of facilities or equipment.

¹³ Timeline – P2.

¹⁴ In 2018, according to the last assessment of organic waste in the Montréal Agglomeration available at the time of our audit, the recovery rate of organic waste was 26%.

¹⁵ Action 5.5 Operate organic waste treatment facilities (green and food waste).

15 to 20 times smaller in size than what would be required to treat the Agglomeration's household waste, would allow the City to conduct trials and tests on a mechanical-biological pretreatment mechanism with the idea of potentially acquiring a larger plant for the purpose of achieving total self-reliance in residual waste management on the Agglomeration's territory. It was announced at the time that the total capital cost of these five facilities would be \$114M (2008 value).

In February 2010, the Government of Québec, together with the Government of Canada, announced¹⁶ that they would contribute a maximum of \$135.5M,¹⁷ or \$67M from the federal government and \$68.5M provided to the City by the provincial government through the PTOMBC. This was an overall grant covering all five of the OWTPs planned by the City, including the CPP¹⁸ since one of the conditions for obtaining the PTOMBC grant was that it should serve at least 70% of residential occupancy units. According to the press release issued at the time, the total costs of these five OWTPs amounted to \$215.5M, which was already \$100M more than the assessment carried out in 2008.

In 2011 and 2012, the City awarded various professional service contracts mainly to conduct:

- the preliminary implementation studies required to support the amendment to the Urban Planning By-law applicable to each of the sites selected for the establishment of OWTPs (Firm B)¹⁹;
- a study of the organic waste potential in the institutional, commercial and industrial (ICI) sectors (Firm A)²⁰;
- a study of potential markets for the compost produced (Firm A)²¹;
- financial studies and the drafting of the financial component of the business plan for the organic waste treatment facility project (Firm C).²²

Thus, in November 2012,²³ the Service de l'environnement (SE), acting as project manager, completed the business plan for the OWTP project. Table 1 shows the OWTPs entered in the business file, along with their anticipated commissioning dates.

¹⁶ Timeline – G2.

¹⁷ It is important to note that this grant also covered the purchase of organic waste collection tools (bins distributed to citizens) for an amount of \$5.2M. However, these tools are not part of the OWTP construction project, which may explain variations in the amounts of the grants covered later in this report.

¹⁸ For simplification purposes, where OWTPs are referred to generally in this report, they include the four OWTPs plus the CPP.

¹⁹ Timeline – C4.

²⁰ Timeline – C5.

²¹ Timeline – C6.

²² Timeline – C7.

²³ Timeline – BP1.

TABLE 1

OWTPs and Their Anticipated Commissioning Dates According to the 2012 Business Plan

Sector	Technology	Site	Commissioning date
North	Composting	CESM (Villeray–Saint-Michel–Parc-Extension borough)	End of 2016
South	Biomethanization	LaSalle borough	2021
East	Biomethanization	Montréal-Est	End of 2016
West	Compostage	Saint-Laurent borough	End of 2016
N/A ^[a]	Biomethanization	Montréal-Est	End of 2016

^[a] Not applicable. It was planned that the CPP would test residual waste treatment technologies and not serve any specific sector in the Agglomeration.

Table 2, drawn from the November 2012 business plan, shows the cost evaluation carried out by the SE to provide the City with five OWTPs. As mentioned previously, the PTOMBC does not apply to operating expenses, only to expenses appearing under the heading “Capital costs.” Therefore, since the SE anticipated that it would obtain all the grants available, these grants would account for 54.9% of the capital costs.

TABLE 2

Financial Evaluation of the OWTP Project According to the November 2012 Business Plan

Cost category	Costs ^[a]	Details
Capital costs	\$237.4M ^[b]	<ul style="list-style-type: none"> • Three-year capital works program (Agglomeration).
Revenues ^[c]	(\$87.1M)	<ul style="list-style-type: none"> • Sale of compost • Royalties from the industrial, commercial and institutional sectors
Avoided expenses ^[c]	(\$309.4M)	<ul style="list-style-type: none"> • Biogas consumption • Landfill costs for organic waste • Reduction in transportation (fuel costs)
Operating expenses ^[c]	\$623.6M	<ul style="list-style-type: none"> • Operating budget (boroughs and related municipalities)
Subtotal	\$464.5M	
Government grants	(\$130.3M)	<ul style="list-style-type: none"> • Green Infrastructure Fund (Federal) • PTOMBC (Provincial)
Net total	\$334.2M	

^[a] Including net taxes, contingencies and provisions for risks.

^[b] Including a provision of \$14.8M for the acquisition of land for the South and West OWTPs, and a cost adjustment to take inflation into account.

^[c] Evaluation carried out up to 2041.

Source: Service des infrastructures, du transport et de l'environnement – Direction de l'environnement, Business plan of the Montréal agglomeration's organic waste treatment plants, November 2012.

In July 2012, the Government of Québec revised the PTOMBC to create a second phase.²⁴ Phase II of the PTOMBC requires that projects be completed and operational no later than September 30, 2019. In phase II, the percentages of eligible expenses covered remained the same as in phase I, but the eligible expenses itself is capped at:

- \$125/tonne of sludge from water treatment plants to be treated per year by biomethanization;
- \$800/tonne of other organic waste per year to be treated by biomethanization;
- \$600/tonne of organic waste per year to be treated by open composting;
- \$300/tonne of organic waste per year to be treated by closed composting;
- \$100/residential bin required for the collection of organic waste.

Since the City submitted a request to the PTOMBC while Phase I was in effect, it was not subject to these eligible expense limits.

In the business plan produced at the end of 2012, and later in the presentation made to the City's executive committee (EC) at the end of January 2013 for the purpose of obtaining the execution mandate,²⁵ the SE outlined the different management modes for the OWTPs selected: 1) Design–Construction–Maintenance–Operation (the "DCMO") whereby a single contracting authority is responsible for the project and operations as a whole during a given period; 2) Design–Construction followed by Maintenance–Operation (the "DC+MO"), whereby one contracting authority is responsible for project design and construction while another contracting authority is responsible for its maintenance and operation during a given period. Table 3 shows the management mode of each OWTP.

²⁴ Timeline – G3.

²⁵ Timeline – DAP1.

TABLE 3

Management Mode of the Different OWTPs
(2012 Business Plan and January 2013 Presentation to the Executive Committee)

OWTP	Management mode planned by the Service de l'environnement
East OWTP	DCMO ^[a]
South OWTP	DCMO
North OWTP	DC+MO ^[b]
West OWTP	DCMO
CPP	DC+MO

^[a] Design–Construction–Maintenance–Operation all covered in a single contract.

^[b] Design–Construction covered by an initial contract, followed by Maintenance–Operation covered by a second contract.

This presentation of the business plan parameters is a mandatory requirement for obtaining authorization from the EC to proceed with the work, which consists primarily in granting a supporting mandate for the development of project specifications, a mandate for a construction economist to assess the construction costs, all for the purpose of launching calls for tenders to produce different OWTPs.

In April 2013, a contract was awarded to Firm D²⁶ to obtain construction economics services as part of the East, West and North OWTP projects and the CPP. However, the fulfilment of this mandate was contingent upon the results of another mandate granted to Firm B, also in April 2013, for the preparation of specifications for the same plants.²⁷ This firm was to produce the Programme fonctionnel du procédé (PFP), which describes the requirements for organic waste treatment processes, and the Programme fonctionnel et technique (PFT), which describes the requirements associated with the building (e.g., structure, heating, ventilation, electricity, water management) on the basis of which Firm D would prepare cost estimates for the different OWTPs.²⁸

Nevertheless, the production of the PFP required more time than anticipated, considering [TRANSLATION] “the complexity and scale of the projects”, according to a decision-making summary produced by the City, with the result that the SE anticipated that it would need to conduct preliminary studies up to March 2016, and review the design and construction bids in July 2016 rather than in July 2013. Firm B, with the budget provided to fulfil its mandate, was unable to produce the PFT that would enable Firm D to prepare the construction cost estimate. The contract with

²⁶ Timeline – C8.

²⁷ Timeline – C9.

²⁸ According to the *Alberta Association of Architects*, the PFT defines the nature, services, scale, functions and space needs of a project in a sufficiently detailed manner as to allow the design or approvals to move forward.

Firm D was therefore cancelled in May 2015.²⁹ Still, the City paid Firm D 35.7% of the value of the contract to cover the work that it had already done.

While Firm B was fulfilling its mandate, the North OWTP project was relocated from the CESM to Rivière-des-Prairies-Pointe-aux-Trembles borough. The February 2015 report produced by the Office de consultation publique de Montréal³⁰ on the establishment of such an OWTP in this borough states that the site change was due to an administrative decision to no longer build the North OWTP at the CESM. It should be noted that during the 2013 municipal election campaign, the winning mayoral candidate had promised not to build the North OWTP at the CESM and to find another site.

In June 2015, the month following the cancellation of the contract with Firm D, a tender management contract was granted for the OWTP infrastructure project.³¹ In particular, the mandate consisted in:

- producing and aligning the tender documents;
- drafting the PFT for the buildings and site layout for each OWTP while taking into account and adhering to the PFP;
- producing the design plans and specifications for the establishment of all sites;
- producing the design plans and specifications of all the OWTP buildings;
- providing the City with the parameters for assessing all aspects covered in this mandate.³²

It was Firm E that obtained this contract. It should also be noted, however, that since this was a firm specializing in architecture, it enlisted the engineering services of Firm B, the very same firm that had been unable to produce the PFT with the budget estimated by the SE for executing the mandate.

It should also be specified that although Firm E was the lowest compliant bidder, its offer of \$1.5M was 87.2% higher than the City's last estimate for this contract. In the decision-making summary presented to the urban agglomeration council, the SE explains that two thirds of the cost overrun could be attributed to an underestimation of the professional resources required. The SE had estimated that the effort required was 5,400 hours, while the two bidders estimated that they would need about 8,000 hours. The remaining third could be explained by an underestimation of the support needed by professionals during the tendering process.

²⁹ Timeline – C10.

³⁰ Timeline – W1.

³¹ Timeline – C11.

³² This deliverable corresponds to what firm D was to do and for which the City cancelled the contract, nevertheless paying 35.7% of the firm's fees.

Under the Partnership Agreement with municipalities concluded in 2015,³³ the Government of Québec postponed the deadline for commissioning all projects subsidized by the PTOMBC to December 31, 2022.

From February 2017 to January 2019, the SE presented updates of the business plan to the various decision-making authorities for large-scale projects³⁴ for the purpose of obtaining authorization to proceed with the work. Table 4 gives details on changes in infrastructure costs when these presentations were made to the EC.

TABLE 4

Changes in OWTP Infrastructure Costs Presented by the Service de l'environnement to the Executive Committee

Date of presentation to executive committee	Infrastructure costs presented	Justification of discrepancy from the previous presentation ^[b]
January 30, 2013 (timeline – DAP1)	\$223M ^[a]	-----
April 12, 2017 (timeline – DAP2)	\$344M	+ \$23M for inflation, + \$98M for additional elements (land, CESM site change, specification requirements)
October 17, 2018 (timeline – DAP3)	\$589M	+ \$13M for inflation, + \$231M for adjustments to bid received
January 23, 2019 (timeline – DAP4)	\$331M	Contracts granted for only two OWTPs, rehabilitation of the LaSalle borough site and new planning for the other three OWTPs

^[a] In the presentation delivered on January 30, 2013, the infrastructure costs amounted to \$237M, including \$14.8M for land. The facilities to be constructed amounted to \$222.5M. Since the land acquisition cost was added to the 2017 presentation, a decision was made not to present the original estimate costs in the 2013 value. (The SE proceeded in the same way in the historical background of the project that was presented to the EC in 2017.)

^[b] The values were taken from documents obtained from the SE in which the values had been rounded off. Therefore, the totals may not correspond from one year to the next.

Source: SE and Service de la gestion et de la planification immobilière (SGPI), presentation made to the EC on January 23, 2019, for a project change approval.

At the same time as these presentations were being made to the EC, the City launched three calls for tenders, from May to July 2017, to select firms for the completion of the three OWTPs, all in DCMO management mode (as previously stated, the decision to complete the

³³ Timeline – G4.

³⁴ The Comité corporatif de gestion des projets d'envergure (CCGPE), the Comité de coordination des projets d'envergure (CCPE) and the City's executive committee.

projects in DCMO mode had already been made when the business plan was developed at the end of 2012; a change in management mode for the North OWTP is nevertheless noted following the site relocation). The calls for tenders were for the North (Rivière-des-Prairies–Pointe-aux-Trembles borough),³⁵ East (Montréal-Est)³⁶ and West (Saint-Laurent borough) OWTPs.³⁷ Table 5 shows the results of the lowest compliant bidder's offer for the three calls for tenders.

TABLE 5

**Results of DCMO Tender Management Contracts for Three OWTPs
(All Prices Include Net Taxes)**

		North OWTP	East OWTP	West OWTP
Number of bidders		1	1	2
Lowest compliant bidder		Operator A	Operator B	Operator B
Total price for DCMO	Price tendered	\$103.7M	\$152.6M	\$158.3M
	Estimate ^[a]	\$75.5M	\$113.5M	\$105.0M
	Difference	37.4%	34.4%	50.8%
Price for design and construction (DC)	Price tendered	\$84.0M	\$121.5M	\$132.7M
	Estimate	\$56.6M	\$73.4M	\$78.2M
	Difference	48.4%	65.5%	69.7%
Price for maintenance and operation (MO)	Price tendered	\$19.7M	\$31.1M	\$25.6M
	Estimate	\$18.9M	\$40.1M	\$26.8M
	Difference	4.2%	-22.3%	-4.5%

^[a] Last estimate done by the SGPI, with ±30% accuracy for design and construction costs.

Source: SE and SGPI – Approval of project changes, January 23, 2019

In August 2017,³⁸ when the regulatory framework for the PTOMBC was being updated, the Government of Québec revised the deadline for implementing the construction of the City's second biogas production plant, the South OWTP (LaSalle borough). At that time, the City had until June 30, 2026, to make this OWTP operational, in order to allow optimum coordination between the evolution of the performance of the collection of organic waste and the increased waste treatment capacity on the Agglomeration's territory. It was then agreed that the three other OWTPs and the CPP still had to be operational by December 31, 2022.

³⁵ Timeline – C12.

³⁶ Timeline – C13.

³⁷ Timeline – C14.

³⁸ Timeline – G5.

Finally, in June 2018, one call for tenders was launched³⁹ to retain the services of a firm for quality control of the implementation of the OWTPs. The City received only one bid, from Firm B, the very same one that was doing subcontract work for Firm E when plans and specifications were being prepared for DCMO tender for three OWTPs. Initially, Firm B's offer was 36.9% higher than the City's estimate. Firm B revised its offer, and the difference was reduced to 27.3%. The SGPI states that this difference is due to an underestimate of the [TRANSLATION] "time and effort required to execute industrial projects." In March 2019, this \$4.3M contract, to be executed over a five-year period, was granted to Firm B.⁴⁰

Following the last presentation made to the EC in January 2019, the DCMO tender management contract for the North OWTP (Rivière-des-Prairies-Pointe-aux-Trembles borough) was cancelled in February 2019,⁴¹ while the DCMO tender management contracts for the West (Saint-Laurent borough) and East (Montréal-Est) OWTPs were granted in February 2019 and August 2019, respectively.⁴² The reasons given by the SE to explain the decision to cancel the contract for the North OWTP (Rivière-des-Prairies-Pointe-aux-Trembles borough) was that it considered that the quantities of organic waste collected in 2018 and 2019 did not yet justify keeping three OWTPs operational, and that the City could maintain contracts for treating organic waste in private facilities.

Finally, after we conducted our audit, in October 2019,⁴³ the City entered a period of public consultation to gather comments about a draft version of its new *Plan directeur de gestion des matières résiduelles* for the 2020–2025 period. It emerges from this new plan that the City plans to construct only two OWTPs by 2025: the West OWTP (Saint-Laurent borough), to be completed in 2021, and the East OWTP (Montréal-Est), to be completed in 2022, which is in agreement with the presentation delivered by the SE to the EC in January 2019.

Thus, between the first presentation made to the EC in January 2013 for the purpose of obtaining the first approval to fulfil the mandate and the last presentation that we noted in our audit in January 2019, the investment costs increased by 48.4%, but to build only two of the five OWTPs planned and complete the rehabilitation of the LaSalle borough site. In order to construct the five OWTPs as planned, the investment costs would have been 164.1% higher.

³⁹ Timeline – C15.

⁴⁰ Timeline – C16.

⁴¹ Timeline – C17.

⁴² Timeline – C18 and C19.

⁴³ Timeline – P3.

2. Purpose and Scope of the Audit

Under the provisions of the *Cities and Towns Act (CTA)*, we completed a performance audit mission on Organic Waste Treatment Plants. We performed this mission in accordance with the *Canadian Standard on Assurance Engagement (CSAE) 3001*, described in the *CPA Canada Handbook – Certification*.

The purpose of this audit was to ensure that the management of Organic Waste Treatment Plant construction projects is carried out as part of a rigorous process and is adequately monitored.

The role of the Auditor General of the Ville de Montréal is to provide a conclusion regarding the objectives of the audit. To do so, we collected a sufficient amount of relevant evidence on which to base our conclusion and to obtain a reasonable level of assurance. Our assessment is based on criteria we have deemed valid for the purposes of this audit. They are presented in Appendix 5.1.

The Auditor General of the Ville de Montréal applies *Canadian Standard on Quality Control (CSQC) 1* from the *CPA Canada Handbook – Certification* and, accordingly, maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements. In addition, it complies with the independence and other ethical requirements of the *Code of ethics of chartered professional accountants*, which are founded on fundamental principles of integrity, professional competence and due diligence, confidentiality and professional conduct.

Our audit work focused on the period from January 1, 2012, to September 30, 2019. However, for some aspects, data prior to this period was also considered. It was primarily completed from September 2019 to February 2020. We also took into account information that was sent to us up to April 2021.

The work was primarily performed with the following business units:

- SE – Direction de la gestion des matières résiduelles – Division soutien technique et infrastructure CESM;
- SGPI – Direction de la gestion de projets immobiliers – Division des projets industriels.

Upon completing our audit, we submitted a draft audit report to the managers concerned within the SE and the SGPI for discussion purposes. The final report was then forwarded to the management of each business unit involved in the audit to obtain action plans and timelines for implementing the recommendations concerning it, as well as to the Direction générale, the deputy director-general of Qualité de vie and the deputy director-general of Services institutionnels.

3. Audit Results

3.1. Management and Planning of Organic Waste Treatment Plant Projects

3.1.1. Compliance with the Governance Framework for Large-Scale Projects

In April 2010, the City acquired a *Cadre de gouvernance des projets et des programmes de gestion d'actifs municipaux* (hereinafter "Governance Framework"). This framework is based on best management practices. It was initially applicable to projects, especially municipal asset management projects, requiring investments of \$10M and over. It has been revised several times, once to increase the limit to projects with investments of more than \$50M or annual investments of more than \$10M. With investments of \$114M for the five OWTPs announced in the PDGMR and approved by the urban agglomeration council in August 2009, this project was therefore covered by the Governance Framework. The purpose of complying with the Governance Framework is to:

- clarify the processes of making decisions and establishing priorities;
- increase the City's control over strategic decisions about projects and programs;
- ensure a sufficient level of cooperation for decisions to be made in the best interest of the City and the public;
- ensure that information is shared to allow joint monitoring of projects and programs;
- ensure the effectiveness, integrity, rigour and coherence of municipal actions.

The life cycle of a large-scale project is divided into five phases: 1) justification for the project; 2) project initiation; 3) planning; 4) execution; and, finally, 5) project closure. Since it was anticipated that the OWTP project would be executed in the Design-Construction-Maintenance-Operation management mode, the execution phase is handled by the contractor-operator. Table 6 shows the current phase of the different OWTPs as of September 4, 2019, according to the Bureau des projets et programmes d'immobilisations (BPPI). The West (Saint-Laurent borough) and East (Montréal-Est) OWTPs have been in the execution phase since the SE obtained the authorization to execute the project from the EC in January 2013. In actual fact, as of this date, the execution authorization had been obtained for all the OWTPs, but as a result of various changes made since then, the new presentations made to the EC in 2017, 2018 and 2019, and the decision to cancel the call for tenders for the production of the North OWTP in DCMO mode (Rivière-des-Prairies-Pointe-aux-Trembles borough), this OWTP, the South OWTP (LaSalle borough) and the CPP of Montréal-Est went back to the planning stage of the project life cycle.

TABLE 6

Current Project Management Phase for the Different OWTPs Planned by the Service de l'Environnement

OWTP	Current phase ^[a]	Since	Large-scale project completion date
West OWTP – Saint-Laurent borough	Execution	January 2013	2021
North OWTP – Rivière-des-Prairies–Pointe-aux-Trembles borough	Planning	January 2019	ND ^[b]
South OWTP – LaSalle borough	Planning	January 2019	ND
East OWTP – Montréal-Est	Execution	January 2013	2021
CPP Montréal –Est	Planning	January 2019	ND

^[a] Information obtained on September 4, 2019, that was still valid when the report was issued.

^[b] Not determined.

Source: BPPI.

To proceed from one phase to the next, the Service project manager must update or file a Dossier d'approbation de projet (DAP) with two different authorities in succession:

- the Comité corporatif de gestion des projets d'envergure (CCGPE)⁴⁴;
- the Comité de coordination des projets d'envergure (CCPE).⁴⁵

The CCGPE has only the power to recommend the large-scale project to the CCPE. The CCPE, for its part, has the power to decide whether a project can proceed to the next phase, except for the transition from the planning phase to the execution phase, in which case the CCPE recommends that the EC proceed with the large-scale project, whereupon the EC gives the mandate to execute the project.

⁴⁴ The CCGPE consists of the director general, all deputy directors-general, the director of Service des finances, and the director of the BPPI.

⁴⁵ The CCPE consists of the director general, the deputy director-general of Services institutionnels, the director of the BPPI and eight elected officials.

In accordance with the Governance Framework, the SE is the requesting department, while the SGPI is the executor of this large-scale project. For the SE, this means that the person designated as the project manager in this department is responsible for the execution of all phases of the project, acts as the City's main contact both internally and externally, and is accountable for the management of the project in terms of compliance with the commitments agreed upon, the rules and the City's policies.

The Governance Framework contains seven operating rules governing the following:

- business plan at the transition points;
- cost estimating;
- financial aspects of projects;
- consultation, public affairs and communications;
- procurement strategies and rules;
- contract execution and management;
- audits of management systems.

With respect to the operating rules governing the business plan at transition points and consultation, public affairs and communications aspects, we obtained evidence that the SE complies with the Governance Framework requirements, except in the case of the presentation of a business plan that is amended at the time of a major change; this point is addressed further on in this report. With respect to the operating rule governing audits of management systems, this is not a responsibility of the business units audited, and we therefore did not consider it. For all other operating rules, our findings are as follows:

Operating Rule for Cost Estimating

Based on relevant evidence that we obtained from the different departments audited, the cost estimating rule in the Governance Framework is not followed. According to this rule, *[TRANSLATION] "control estimates are made by third parties separate from those that prepared the calls for tenders and the detailed cost estimates, in order to confirm bid prices."* However, in the case of calls for tenders for the production in DCMO mode of the West (Saint-Laurent borough) and East (Montréal-Est) OWTPs, although the cost estimates were initially made by Firm E, in the SGPI's opinion, the dimensions used for estimates did not correspond *[TRANSLATION] "to an optimized vision of the usual program"* and *[TRANSLATION] "certain special technical requirements provided for in the PFT were applied indifferently to the specific needs of each sector of the plant,"* prompting a re-evaluation of the costs by this department at the end of 2016, or before calls for tenders were launched, from May to July 2017. We obtained evidence that the SGPI subsequently revised the cost estimates at least once, for the West OWTP (Saint-Laurent borough) and the East OWTP (Montréal-Est) in May and June 2018 respectively. Later, once again, it was the SGPI that evaluated the justifications for the discrepancies between the City's estimate and the price tendered by the lowest

compliant bidder. This way of operating does not comply with the operating rules of the Governance Framework for large-scale projects and does not allow for an accurate, independent evaluation of the bidder's price in relation to what the City was planning for the production of this project.

Operating Rule for Financial Aspects

According to the SE, the Service des finances (SF) was involved right from the start of the project—including when the business plan was produced in 2012, while Firm C was conducting the market study, in the procedure for evaluating the project management mode (the evaluation of the appropriateness of using a DCMO management mode), and in the Three-year capital works program (TCWP) funding. According to the Governance Framework, the SF must validate the financial analysis models and propose funding optimization strategies for projects and their budget impacts. While it is true that the SF collaborated with the SE up to 2019, in particular by providing interest and indexation rates to be used for financial analyses concerning TCWP loans, it cannot be argued, based on the evidence we obtained, that the SF participated in a final financial analysis of the project and an examination of different funding optimization strategies for the project before the SE presented it to the EC. Considering that part of the SF's mission is to perform strategic consulting activities in the financial field in accordance with best governance, management and control practices, that the execution mandate that the SE wanted to obtain from the EC for this project was significantly different from the one presented in 2013, that there had been an issue around obtaining the full grant, and that the value of this project was \$298.5M, we think that the SE should have ensured that the SF participated in the final validation of the financial analysis model and the examination of funding optimization strategies for this project.

Operating Rule for Procurement Strategies and Rules

We identified deficiencies in the area of compliance with the procurement rules that form the basis of another operating rule in the Governance Framework. Indeed, the CTA states that the City must estimate the price of any contract that includes an expenditure of \$100,000 or more prior to the opening of bids,⁴⁶ and although the City produced cost estimates prior to the calls for tenders, we noted that it continued to change its estimates following the opening of technical proposals for bids (Envelope no. 1),⁴⁷ mainly for the purpose of taking into account budget changes brought about by tender appendices.⁴⁸ In fact, in the case of the West OWTP (Saint-Laurent borough), the call for tenders ended on May 15, 2018, and the opening of technical proposals for the bids received (Envelope no. 1) also took place on that day. The SGPI estimate used to analyze the offers received is dated May 29, 2018, which

⁴⁶ LCV, CQLR, c.19, section 477.4.

⁴⁷ The legal text makes no distinction in cases where the contract awarding method is to use two envelopes (technical and price) and for which the envelopes are opened on different dates.

⁴⁸ Considering that the last appendix for the West OWTP was published on April 20, 2018, and that the call for tenders ended on May 15, 2018, and that that the last appendix for the East OWTP was published on May 25, 2018, and the call for tenders ended on June 19, 2018, the City would have had the time to revise its estimates based on the appendices published.

is after the receipt of offers. For the East OWTP (Montréal-Est), the call for tenders ended on June 19, 2018, and the opening of technical proposals for bids took place the same day. The document developed by the SGPI for the estimated cost of the project, which was considered to be the City's last estimate, is dated June 28, 2018, or following the opening of technical proposals for bids. This way of proceeding can give the appearance of non-compliance with the CTA.⁴⁹ While changes may have been made to the estimate documents after the bid opening date, we were still able to confirm that the price envelopes (Envelope no. 2) were opened on subsequent dates: June 11, 2018, for the West OWTP, and July 16, 2018, for the East OWTP.

In order to determine the most appropriate market solicitation process, the SE focused on the issue in 2011 and, for this purpose, had consulted the City's Service des affaires juridiques, which, instead of recommending a two-step procedure, i.e., qualifications followed by a call for proposals, recommended taking [TRANSLATION] "the safest and quickest route,"⁵⁰ which was a single-step process. Later on, a market survey, which Firm C produced in 2012 for the SE, concluded that it would be appropriate for the City to clarify aspects of the procurement strategy, especially the division of the procurement process into a call for qualifications and a call for projects. However, on June 16, 2017, before the start of the tender process, the *Act respecting the Communauté métropolitaine de Montréal*⁵¹ was amended following enactment of the *Act mainly to recognize that municipalities are local governments and to increase their autonomy and powers*,⁵² thereby allowing a bid solicitation process that included discussions in the case of insurance, service, construction work or procurement contracts. The advantage of such a procurement strategy is to [TRANSLATION] "clarify the project technically or financially and allowing tenderer to submit a final bid to reflect the outcome of the discussions"⁵³. In return, if it proved to be a process that could put off some potential bidders because it required greater effort on their part but provided no guarantee of winning the contract, the Act provided, following preliminary approval by the Minister of Affaires municipales et de l'Habitation, that the City would have to pay financial compensation to each tenderer for work performed in the context of discussions.⁵⁴

In view of Firm C's 2012 recommendation that other tender strategy options be examined, and the adoption of the regulation that opened up the way for discussions in the tender process, and considering that the advisory capacity of the Service des affaires juridiques does not cover this type of call for tenders, we think that the SGPI should have examined the possibility of launching such a call for tenders, which could have attracted more bidders and also would have provided the City with offers more directly aligned with the City's need for the OWTPs concerned. Since this regulatory amendment was made before the publication of the call for tenders for the East OWTP (Montréal-Est) (June 29, 2017) and the publication of the

⁴⁹ The Act does not specify whether the estimate must be finalized before the opening of technical proposals (Envelope no. 1) or the opening of price proposals (Envelope no. 2).

⁵⁰ Message between the Service des affaires juridiques and the SE, August 12, 2011.

⁵¹ *Act respecting the Communauté métropolitaine de Montréal*, CQLR, c. C-37.01, section 112.0.0.1.

⁵² *Act mainly to recognize that municipalities are local governments and to increase their autonomy and powers*, 2017, Chapter 13.

⁵³ *Act respecting the Communauté métropolitaine de Montréal*, CQLR, c. C-37.01, section 112.0.0.1.

⁵⁴ *Ibid.*

call for tenders for the West OWTP (Saint-Laurent borough) (July 18, 2017), the bid solicitation approach that included discussions could have applied to these OWTPs.

Operating Rule for Contract Execution and Management

For this operating rule, the Governance Framework states that throughout the project, such key areas as responsibility sharing, change management and monitoring, verification of work carried out and actual payment costs need to be taken into account. We noted that after the contract for preparing PFPs and PFTs was granted to Firm B in 2013, for all calls for tenders launched at one stage or another of the process leading to the construction of the OWTPs, the bids obtained by the City were greater than the latest estimates (see Table 7).

More specifically, we questioned what justification there could be for a difference between the City's estimate and a lowest compliant bidder's price that was nearly twice as high (87.2%), and whether the principle of this operating rule of the Governance Framework was followed. This call for tenders,⁵⁵ won by Firm E, with outsourcing to Firm B, concerned professional architecture and engineering services for the launching of calls for tenders for an organic waste treatment facility project. The technical specifications, much like the cost estimate, were developed by the SE. However, the services covered by this call for tenders include (but are not limited to):

- drafting PFTs for buildings and developing sites for each OWTP according to the usual format and content for PFTs, while taking the PFPs into consideration;
- identifying criteria for the urban and architectural integration of each OWTP;
- conducting an evaluation of an existing building on the site of the Saint-Laurent borough OWTP and conducting an analysis of the configuration of the access road;
- identifying connection points at the OWTP site of Rivière-des-Prairies-Pointe-aux-Trembles borough and calculating service capacities;
- producing design plans and specifications for the buildings of all OWTPs.

It is surprising to note that it was the SE that developed these technical specifications and prepared the cost estimate before the call for tenders was launched. We would have expected the SGPI to be the body responsible for these activities for the purpose of publishing them in this call for tenders. A perusal of the decision-making summary presented to the urban agglomeration council to authorize the awarding of the contract raises all the more questions for us. According to that document, the total difference between the bid and the estimate is \$700,772; two thirds of this amount is justified by the fact that the SE had estimated that the effort required was 5,400 hours while the two winning bidders estimated that they needed 8,000 hours to perform the mandate. The greatest differences in terms of estimated hours were in the areas of the design plans and PFTs of buildings. We feel that the sharing of responsibilities in what led to the performance of this contract was deficient. Furthermore, while the SE was the party that requested this

⁵⁵ Timeline – C11.

overall OWTP project, the SGPI, as the party performing the contract, can take on the responsibility of preparing calls for tenders, always in collaboration with the Service de l’approvisionnement. According to the Governance Framework, in cases where there are multidisciplinary teams from various municipal departments, the departments [TRANSLATION] “assume full leadership and responsibility in their [respective] fields.” The SGPI prepared the other three calls for tenders in Table 7 and estimated the cost of services for them.

TABLE 7

Difference Between the Price Tendered by the Lowest Compliant Bidder and the Ville de Montréal’s Estimate

Type of service required	Item number on the timeline in appendix 5.2.	Lowest compliant bidder	Difference between bid and City’s estimate
Contract for the launch of the calls for tenders	C11	Firm E, with Firm B under subcontract	+ 87.2%
DCMO contract for the Montréal-Est OWTP	C13	Operator B	+ 34.3% ^[a,b]
DCMO contract for the OWTP of the Saint-Laurent borough	C14	Operator B	+ 51.2% ^[a]
Quality control contract for the implementation of the OWTPs	C15	Firm B	+ 36.9% ^[c]

^[a] This difference is the one before the SGPI reviewed its estimate to adjust it on the basis of the parameters and distinct features of the lowest compliant bid.

^[b] Since the City received only one bid for the East OWTP, it also negotiated with the bidder to revise its price. In the end, there was a 31% difference between the revised price and the City’s last estimate.

^[c] This difference is the one before negotiations took place with the bidder leading to a revision of the price submitted and thereby reducing the difference between the bid and the City’s estimate to 27.3%.

3.1.1.A. Recommendation

We recommend that the Service de l'environnement and the Service de la gestion et de la planification immobilière ensure, for future Organic Waste Treatment Plants for which the production contract has not yet been awarded, that the control estimate of bidders' prices in a call for tenders is prepared by third parties separate from those that prepared the calls for tenders and detailed cost estimates, in order to comply with the Cadre de gouvernance des projets et des programmes de gestion d'actifs municipaux.

3.1.1.B. Recommendation

We recommend that the Service de l'environnement and the Service de la gestion et de la planification immobilière ensure that the financial models used to estimate the production costs of future Organic Waste Treatment Plants for which the production contract has not yet been awarded, as well as the assumptions on which they are based, are validated by the Service des finances.

3.1.1.C. Recommendation

We recommend that the Service de l'environnement and the Service de la gestion et de la planification immobilière ensure that the last estimate of the production costs of future Organic Waste Treatment Plants for which the production contract has not yet been awarded is produced prior to the bid opening date, in order to comply with the *Cities and Towns Act*.

3.1.1.D. Recommendation

We recommend that the Service de l'environnement, for future Organic Waste Treatment Plants for which the production contract has not yet been awarded, delegate the work of preparing technical specifications and cost estimates to the right business unit based on its expertise and ensure compliance with the Cadre de gouvernance des projets et des programmes de gestion d'actifs municipaux.

3.1.2. Planning Organic Waste Treatment Plant Projects

As early as 2008,⁵⁶ the organic waste treatment facility project on the City's territory was seen as a single project consisting of four OWTPs (the concept of the CPP was added later). The business plan developed in 2012 likewise presented this undertaking as a single project, this time including the CPP. There is a certain logic in referring to these OWTPs as integrated projects, mainly because of the interactions that can take place among them. In fact, the composting plant at the West OWTP (Saint-Laurent borough), in addition to treating food and green waste in the sector, must also treat part of the digestate⁵⁷ produced by the South OWTP (LaSalle borough). And the North OWTP (Rivière-des-Prairies–Pointe-aux-Trembles borough) will treat part of the digestate of the South OWTP and all of the digestate of the East OWTP (Montréal-Est) by composting. According to the regulatory framework of the Québec government's PTOMBC, the second financing payment, which accounts for 50% of the total grant, is paid [TRANSLATION] "within 90 days following receipt [...] of proof that the facility was commissioned." The third and final payment (20% of the grant) is paid if at least 70% of the residential occupancy units on the City's territory are served by an organic waste collection service within five years after the facilities are commissioned. In addition, the federal government requires that federal approval of the project be obtained in principle prior to any construction and any awarding of a contract for the construction of OWTPs. This approval was obtained on March 10, 2017, following finalization of the file for the site of the North OWTP (Rivière-des-Prairies–Pointe-aux-Trembles borough). Also, according to the latest version of this regulatory framework, which dates from August 2017, the City must also ensure that the CPP and the OWTPs are operational by the end of 2022, with the exception of the South OWTP (LaSalle borough). The date set by the government for making the South OWTP operational is June 30, 2026. Because of the very nature of the requirements of the PTOMBC and the federal government, the awarding of the full grant from both levels of government is therefore dependent on producing the integrated project as a whole, not specifically on each individual OWTP. Nevertheless, it was not until the SE made the October 2018 presentation to the EC that the concept of the risk of not obtaining the full grant for Phase 1 OWTPs⁵⁸ because of construction delays was first brought up.⁵⁹

⁵⁶ Timeline – C3.

⁵⁷ Product derived from the anaerobic digestion of organic waste, which, most of the time, must undergo additional treatment (composting or other) in order to be considered biologically stable and hygienic.

⁵⁸ West OWTP (Saint-Laurent), East OWTP (Montréal-Est), North OWTP (Rivière-des-Prairies–Pointe-aux-Trembles) and the CPP in Montréal-Est.

⁵⁹ The business plan developed in 2012 refers to the risk of not obtaining the federal grant because of the short tight deadline for obtaining it and to correspondence that the City received from the Québec government that showed that it shared the same concern as the federal government.

In early 2019, upon presentation of the facts by the SE, the EC had accepted the CCPE's recommendation that only the West and East OWTPs (Saint-Laurent borough and Montréal-Est) be constructed by the end of 2021 and that all other OWTPs including the CPP, be replanned. The execution mandate awarded to the SE also included the task of negotiating with the Ministère de l'Environnement et de la Lutte contre les changements climatiques to [TRANSLATION] "maximize the amount of the PTOMBC grant."⁶⁰ While the presentation made to the EC in January 2019 for the purpose of obtaining this execution mandate states that it would be necessary to negotiate with this Ministry, it is necessary to consult the 25th and final page of the presentation's appendices to measure the potential impacts, according to the SE, of commissioning only two OWTPs before the end of 2021. In the SE's estimation, the grants that will be obtained might only range from \$43.7M to \$65M, compared with the full \$130.3M grant that was initially anticipated. In our opinion, the risk of not obtaining the full grant from the federal and provincial governments should have been presented in a much more explicit manner to elected officials.

At the time of our audit, nearly a year after the EC mandated the SE to negotiate with the Québec government to maximize the grants obtained, the SE was unable to provide us with any document or minutes of any meeting with the Ministère de l'Environnement et de la Lutte contre les changements climatiques to show the progress made in discussions and define the range of grants that the City might receive.⁶¹

Table 8 shows changes in the number of OWTPs planned by the City and the net cost of producing them, based on the grants expected as of the date on which the execution mandate was obtained in 2013, when elected officials authorized the construction of the West and East OWTPs, in 2019, and finally in 2020, following our audit, when additional evidence was obtained from the SE. Thus, from 2013 to 2020, of the five OWTPs planned, only two would be produced, at a net cost to the City that was nearly double⁶² what had been originally projected to produce the five OWTPs.

⁶⁰ This negotiation with the Québec government also concerned the federal grant portion, because the City interacts only with the provincial government, which interacts with the federal government.

⁶¹ Following our audit, the SE brought to our attention evidence, obtained in February 2020, of a commitment made by the Québec government to pay the City a grant totaling \$101.6M for the construction and operation of the OWTPs of Saint-Laurent and Montréal-Est, an amount that corresponded to the total grant that Québec planned to provide for the entire project (\$68.5M) and to \$33.1M out of the \$67.1M that the federal government was planning to provide for the five OWTPs. The Québec government stated that it had asked the federal government to review this cut and award the full grant as well, but no decision in this matter had yet been obtained.

⁶² In 2013, the net cost of the project to the City for the construction and operation of five OWTPs was to be \$107.1M (\$237.4M – \$130.3M) according to the best-case scenario. In 2020, with the grants confirmed, the net cost to the City should climb to \$196.9M (\$298.5M – \$101.6M), but for only two OWTPs.

TABLE 8

Evaluation of the Net Cost of the Project from 2013 to 2020 Resulting from the Reduction of the Grants Expected

Date	Number of OWTPs	Total costs	Grants anticipated	Net costs supported by the City
2013	5, including the CPP	\$237.4M ^[a]	\$130.3M (provincial and federal)	\$107.1M
2019	2 • West OWTP (Saint-Laurent borough) • East OWTP – Montréal-Est	\$298.5M ^[b]	Three scenarios considered ^[c]	\$233.5M
				\$254.8M to \$251.5M
				\$298.5M
2020 ^[e]	2 • West OWTP (Saint-Laurent borough) • East OWTP – Montréal-Est	\$298.5M	Scenario retained	\$196.9M ^[d]
				\$162.9M

^[a] Including a provision of \$14.8M for the acquisition of land for the South and West OWTPs.

^[b] The total loan by-law requested by the SE is \$330.8M. The difference of \$32.3M is explained by the acquisition, decontamination and civil infrastructure work (sewers and access road) for the other three OWTPs, which were sent back to the planning phase.

^[c] In the presentation made to the EC for approval of project changes in January 2019, the SE invoked a variety of situations as possible ways of obtaining grants. The Bureau du vérificateur général (BVG) summarized these situations in three scenarios.

^[d] When our report was filed with the City, the federal government had not committed to paying the full grant amount, as initially anticipated. According to a message sent by the Québec government to the City, negotiations between the two levels of government were still under way.

^[e] Evidence obtained from the SE following our audit.

Source: SE, Presentation of the business plan to the EC for project phase transition points, January 2013.

SE, Presentation made to the EC for approval of project changes, January 2019.

The fact that the five OWTPs are integrated into a single project subject to the PTOMBC limited the City's ability to progress more quickly with work on some OWTPs. From May 2013 to April 2015, we noted that there was a slowdown in the work and the preparatory studies conducted to launch calls for tenders for OWTPs. It was during this period that Firm B had to produce the PFP and the PFT for the OWTPs before Firm D did an economic evaluation. As mentioned above, Firm D's mandate was cancelled; the reason given was that Firm B's work in producing the PFP alone had taken too long. We wonder whether, if separate mandates had been granted for the production of the PFP and the PFT of each OWTP, it would have been possible to accelerate the process and undertake cost estimates as the PFP and the PFT of each OWTP became ready. We also question the extent to which the site relocation of the North OWTP from Villeray–Saint-Michel–Parc-Extension borough to Rivière-des-Prairies–Pointe-aux-Trembles borough may have impacted the project as a whole and the production schedule for all OWTPs, not just the North OWTP. However, since the SE did not submit a change request to the EC when the site for this OWTP was changed, we did not obtain evidence that there was a comprehensive reassessment of the impact that this site change would have on the overall project timeline.

The PTOMBC's requirement for obtaining the grant is that, within five years following the establishment of the facilities, 70% of the residential occupancy units on the City's territory be served by an organic waste collection service for the purpose of recovering the waste. It is a matter of initially putting in place tools to collect the waste (brown bins) for a sufficient number of dwellings and then gaining access to facilities to treat the waste collected. In 2013 it was projected that the four OWTPs (excluding the CPP) would have an annual treatment capacity of 199,000 tonnes of organic waste, but the EC's decision in January 2019 to construct only two OWTPs gives the City a capacity of only 110,000 tonnes per year. In hindsight, considering that the Québec government awarded the full grant and that over the next few years, these two OWTPs will have a sufficient treatment capacity, in terms of the organic waste recovery rate, to serve at least 70% of the occupancy units, there is reason to question whether the OWTP project, as it was originally presented for coverage by the PTOMBC, was not overly ambitious. We question whether it would not have been more prudent, appropriate and effective for the City to start with a smaller project, produce it quickly and obtain a full grant, and subsequently adopt a second phase to increase the City's treatment capacity.

3.1.2.A. Recommendation

We recommend that the Service de l'environnement, before undertaking the three Organic Waste Treatment Plants projects that have not yet been approved, conduct a cost-benefit analysis and a financial risk analysis to determine whether it is more advantageous for the City to produce these future Organic Waste Treatment Plants in the form of three separate projects rather than a single comprehensive project, in order to minimize interactions associated with project development and management and thereby promote the establishment of each Organic Waste Treatment Plant as expeditiously as possible.

3.2. Mechanisms for Monitoring the Progress of Projects

In order to promote the success of a project, there must be rigorous monitoring, from project startup to project closeout. According to good project management practices in the public sector,⁶³ the performance of a project is measured by compliance with three objectives: costs, timelines and content, i.e., the satisfaction of needs and compliance with requirements. Any change in one of these objectives will have repercussions on the others. For this reason, it is important to document changes made to a project and undertake a continuous assessment of the various risks associated with it in order to make informed decisions in a timely manner.

According to the Governance Framework, a project sector office, separate from the unit to which the project manager reports, must be established, mainly to ensure monitoring of the project phase transition points, particularly in the areas of compliance with the Governance Framework, cost estimates, financial evaluation, tender appendices, deliverables, project evaluation criteria and information management. Such a sector office is also responsible for handling project management systems and procedures. However, the SE does not have such a project sector office, unlike the SGPI, which acts as a project executor and which does have one. According to the SE, it had not been considered necessary to have one in addition to the SGPI's. The SE also relied on monitoring tools placed at its disposal by the BPPI: the risk management matrix and the table of the stakeholders involved, two tools found in the basic DAP model developed by the BPPI. Despite the support of the BPPI, mainly through its tools, and the presence of a project sector office within the SGPI, our audit work enabled us to identify two components of project management and progress monitoring that were not developed throughout the project. These components are set forth in the next two subsections.

⁶³ "Gestion des risques dans les grands projets d'infrastructure publique – Guide méthodologique," Infrastructure Québec.

Monitoring Major Project Changes

According to good project management practices, it is essential to compile all changes made during a project life cycle in a register. Such change management is a key element of project risk management. It then becomes the project manager's responsibility either to assess the potential impacts of changes before approving them or to seek the necessary authorizations.

According to the guide d'élaboration du DAP designed by the BPPI, this DAP is scalable and must be presented to governance committees during project phase transition points (between initiation and planning and between planning and execution), but also when any other major change is made to the project. In March 2014, the BPPI presented to the EC the process for approving and coordinating large-scale projects. In this presentation, it reiterated this necessity for a requesting department, during the project execution phase, to present another, revised DAP to governance committees if the project had to undergo major changes with respect to the fulfilment conditions defined in the execution mandate. According to the SE, if a change has no impact on the timeline or less than a 10% impact on the costs of the project, it is not necessary to obtain a new execution mandate.

As previously stated, the SE initially obtained the execution mandate for the integrated OWTP project in early 2013.⁶⁴ Later, as shown in Table 4, the SE presented three revised DAP to governance committees for the purpose of obtaining new execution mandates as a result of major project changes in 2017, 2018 and 2019. Each time, the major change was associated with an increase in the estimated project costs that exceeded the 10% tolerance threshold.

Nevertheless, a major change was made to the project between the end of 2013 and an unspecified date in 2014,⁶⁵ when the North OWTP, for which the CESM was being considered as a site, was relocated to Rivière-des-Prairies-Pointe-aux-Trembles borough. According to the SE, this was a decision made to follow up on a promise made during the 2013 municipal election campaign. However, the CESM site had been the subject of a public consultation, a favourable recommendation by the Office de consultation publique de Montréal and the development of the PFP by Firm B in 2013.⁶⁶ Nevertheless, this site change necessitated a new public consultation in the fall of 2014 (the report was produced by the Office de consultation publique de Montréal in February 2015), in which the Office de consultation publique de Montréal stressed [TRANSLATION] *"the lack of transparent prior consultation with the community, which would have promoted the social acceptance [of the project] and would have enabled the three organic waste treatment facilities in the East sector [East OWTP (Montréal-Est), North OWTP (Rivière-des-Prairies-Pointe-aux-Trembles borough), CPP] to have a structuring effect on economic revitalization efforts in the sector."* An engineer in the SE also had to go back to the drawing board to adjust the PFP of the North OWTP (Rivière-des-Prairies-Pointe-aux-Trembles borough) based on the PFP of the West OWTP (Saint-Laurent borough), whose composting operation, like the North OWTP, was to be completely indoors, contrary to what should have

⁶⁴ Timeline – DAP1.

⁶⁵ We were not able to obtain a specific date from the SE for this event.

⁶⁶ Timeline – C9.

been done with the OWTP of CESM (where the composting takes place partly outdoors). Moreover, according to a document presented by the SE to the EC in April 2017 to obtain a new execution mandate because significant changes had been made to the project, an additional cost of \$12M was allocated to the site change for the North OWTP, which represented a 5.4% increase over the previous estimate for the project, which was made in 2012 and presented to the EC in early 2013. This change also led to a change in the scope of the project, since the management mode of the North OWTP was switched from DC+MO to DCMO. According to the rule that the SE must follow, which is to submit a new Demande d'approbation de projet only if the economic difference is greater than 10% (we did not track down the City's official directive justifying this way of operating), it was justified in not making such a presentation to governance committees before 2017. The fact remains, however, that the SE considers this change in sites to have caused a two-year delay in the project as a whole. It bears repeating that, with the exception of the South OWTP (LaSalle borough), OWTPs are developed simultaneously and according to the same timeline. Prior to this site change, the last official timeline had been presented to the EC in January 2013, with an operation start date for all OWTPs toward the end of 2016 (except for the South OWTP, which was to start operations in 2021). However, with respect to the decision made in about 2014 to make a site change involving a new public consultation for which a report was expected in early 2015, we think that it was impossible to meet such a timeline, in which calls for tenders were planned for 2013–2014—exactly the time when the decision to change the site was made. At the SE's April 2017 presentation to the EC, the commissioning date was then postponed to 2020 (2024 for the South OWTP). Considering that the City was originally to commission all OWTPs except the South OWTP (LaSalle borough) by the end of 2019 to obtain grants from the Québec and federal governments, the foreseen impact on the project timeline and the resultant risk of losing the grant should have been sufficiently important as to be presented to governance committees as early as 2014. This would have made it possible to provide an official record of the consequences, risks and issues associated with the site change and thereby ensure transparent management of the project. Furthermore, no change register is kept by the SE to manage this project. Such a register would have enabled this department to reconcile, in writing, this decision to move the site of the North OWTP (Rivière-des-Prairies-Pointe-aux-Trembles borough) and to document the date, the nature and justification of any changes, large or small, and the analysis done to determine the impact of authorizing or not authorizing the change.

Risk Management

In the guide d'élaboration du DAP, a section on project risks, opportunities, assumptions and constraints states that it is necessary to list only the main risks and opportunities, namely the major ones, in a DAP. However, in order to be able to list these major risks, rigorous work of identifying and prioritizing risks is required beforehand. Good risk management practices for major public projects⁶⁷ involve, in addition to identification of risks that might have an impact on the project at any time in its life cycle:

- qualitatively analyzing the risks (significance of risks with respect to achieving the project objectives);
- quantifying the impacts of risks on achieving the objectives;
- planning risk responses by developing strategies to take advantage of opportunities and limit threats by reducing the probability of risk materialization, the magnitude of their impact, or both;
- monitoring and controlling risks by continuously updating the risk register.

This concept of continuous risk monitoring is also addressed in the guide d'élaboration du Dossier d'approbation de projet (DAP)⁶⁸, which states that a risk assessment must *[TRANSLATION] "be carried out according to an iterative process throughout the duration of the project and according to methods used specifically in risk analysis, [and] all risks must be accompanied by an assessment of their importance and a description of how they will be monitored."*

With respect to the SE, we obtained the risk registers for the five OWTPs that had been developed in 2012 for the purpose of producing the business plan. These risk registers are essentially in keeping with good practices, identifying, for each risk, the probability of its occurrence, its importance and consequentially the value of the inherent risk, then the mitigation measures to be established and, lastly, the value of the residual risk. We also obtained the risk register developed by the SGPI for the infrastructure component of the project.

⁶⁷ "Gestion des risques dans les grands projets d'infrastructure publique – Guide méthodologique," Infrastructure Québec.

⁶⁸ This guide was developed by the BPPI in 2012. Although amendments were made to it up to 2015, the section on risk management was not amended after 2012.

Risk registers were developed, but only six of the fourteen risks appearing in these registers were entered in the initial business plan prepared in 2012 for the first presentation made to the EC in 2013; the risks were not necessarily assessed as being the most critical, and no qualitative or quantitative information was disclosed in this document. At that time, the risks involved:

- not obtaining the federal grant;
- lack of social acceptability;
- low public participation in the selective collection of organic waste;
- a low volume of organic waste from the industrial, commercial and institutional sectors;
- inadequate distribution of collection services among boroughs and related municipalities;
- not obtaining certification and a selling price for the compost.

The mitigation measures adopted to minimize either the occurrence of these risks or their impacts are either very general or have not yet been applied by the SE, which means that these risks are not controlled. For instance, concerning the risk of not obtaining a federal grant, the SE states that steps were taken to approach the government. To control the risk of a low volume of organic waste from the industrial, commercial and institutional sectors, the SE states that agreements should be concluded with public and parapublic institutions before construction work is started on OWTPs. There had therefore been no guarantee, when this business plan was produced, that these risks would actually be controlled.

From 2013 to 2017, no new presentation was made to a governance committee and we did not obtain evidence that these risk registers were updated during this period. It was not until a new presentation was made to the EC in April 2017 for the purpose of obtaining a new execution mandate that the risks were updated. This time, the SE presented four risks, only one of which may have been similar to the risks encountered in 2013: the risk that the quantity of organic waste to be treated would increase. Two new risks associated with Phase 2 concern solely its deadline or the failure to carry it out. A fourth risk is simply named [TRANSLATION] “*Design, construction and maintenance risk,*” with no details given about the actual nature of these risks. Furthermore, the mitigation measure for the risk associated with the increase in the quantity of waste to be treated, i.e., the two-phase implementation of the facilities, in turn becomes a risk: the risk of not carrying out Phase 2. Furthermore, the document does not show that the mitigation measure that is presented for this risk will control it. The simple entry of [TRANSLATION] “*Expropriation of land in LaSalle for Phase 2*” appears as a risk mitigation measure. These four risks are presented, along with mitigation measures, without any qualification or quantification of the probability of the occurrence and impacts of the risks. Nevertheless, three months before this presentation was made to the EC, the SGPI had produced and sent to the SE a risk management register containing eight risks. However, of the three greatest inherent risks in terms of criticality, only one is presented to the EC by the SE.

We also noted the lack of risk monitoring. For example, in 2013, the SE discussed the risk of the lack of social acceptance of the project. In 2017, the SGPI's risk register also identified this risk as an inherent risk with one of the highest criticality levels and the second-highest residual risk (risk that takes mitigation measures into account). However, the SE's presentation to the EC does not address this risk. The risk of not obtaining certification of compost quality, addressed in 2013, is no longer mentioned in 2017. If no risk register is kept by the SE, it is impossible to identify the reasons explaining why this risk is no longer mentioned. Such a register would have made it possible to determine whether this was because the risk no longer exists or because other, more critical risks now existed.

In October 2018, when the SE made another presentation to the EC to obtain a new execution mandate because major changes were made to the project, only three risks were presented. We obtained no evidence that SGPI had updated the risk register and sent it to the SE. No risk associated with the construction of OWTPs is presented. Furthermore, the risks presented by the SE are no longer risks, but facts, findings. One such example was about *[TRANSLATION] "exceeding the deadline of the current normative framework of the PTOMBC grant for Phase 1."* However, when this presentation was given, the Québec government had made an agreement with the municipalities to postpone to 2022 the commissioning date for composting or biogas production plants. The SE, for its part, wanted to obtain an execution mandate from the EC for commissioning the West (Saint-Laurent borough) and East (Montréal-Est) OWTPs in 2021, while postponing commissioning the North OWTP (Rivière-des-Prairies-Pointe-aux-Trembles borough) and the Montréal-Est pilot project to 2024, which is after the deadline anticipated by Québec. It therefore became almost certain that the 2022 deadline would be missed, and for this reason, the SE should have obtained guarantees from the Québec government that the grant would be maintained.

Finally, no risk was presented to the EC at the last presentation for a new execution mandate that we examined, in January 2019.

Based on these findings, we consider the concept of risk management to be poorly understood by the SE and the SGPI. In fact, from 2012 to 2019, the SE presented very few risks to governance committees, even though this was a construction project that had never yet been undertaken in the City and was to be implemented on several sites at a cost of several hundred million dollars using technologies not well known in Québec, with important deadlines that had to be met in order for grants to be maintained. Furthermore, since the SE and the SGPI do not update these registers regularly, it is not possible to demonstrate, as required by good project management practices, that continuous risk management is being performed for this project.

3.2.A. Recommendation

We recommend that the Service de l'environnement acquire tools to keep track of project changes and document the reasons for them and their impacts, whether these changes are minor or major, in order to comply with the process for approving and coordinating large-scale projects and with good project management practices.

3.2.B. Recommendation

We recommend that the Service de l'environnement and the Service de la gestion et de la planification immobilière update the risk register associated with the project on an ongoing basis and inform the governance committees of any major change to the project, in order to comply with the Guide d'élaboration du Dossier d'approbation de projet.

3.3. Accountability

Accountability for the integrated OWTP project takes different forms: internal accountability reporting within the SE, reporting by the SGPI, as the executor, to the SE, as the requesting department, by the SE to the BPPI, and by the SE to governance committees as part of the process for approving large-scale projects subject to the Governance Framework. In the first two cases, we obtained evidence of this accountability reporting. We also obtained evidence that the SE transfers information on project progress on a quarterly basis, in accordance with BPPI requirements. In this section, we focus on accountability to governance committees as part of the project approval process.

Accountability Reporting of the Service de l'Environnement to Governance Committees

As mentioned above, the SE presented the project to the EC in January 2013 in order to obtain an execution mandate.⁶⁹ Presentations were subsequently made in 2017, 2018 and 2019⁷⁰ to obtain new execution mandates because major changes had been made to the project. This is, in a sense, accountability reporting from the SE to the EC. Although the promoter of a large-scale project must submit quarterly reports to the BPPI on compliance with the project timeline, the total budget and scope of the project using a colour code, the BPPI tracking table does not show any accountability reporting of this type by the SE for the quarters from November 2015 to the end of the period covered by our audit, even though the OWTP project appears in this table.

⁶⁹ Timeline – DAP1.

⁷⁰ Timelines – DAP2, DAP3 and DAP4, respectively.

Since the final presentation was the one authorizing the granting of contracts for the construction of the East (Montréal-Est) and West (Saint-Laurent borough) OWTPs, we focused on examining the quality and completeness of the information provided to the EC.

In this last presentation of 2019, the SE explains the differences between the price submitted by the lowest compliant bidder and the City's evaluation as being due to *[TRANSLATION] "current conditions (2018) in the construction market, [which are] different from those at the time of the estimate (2016)." However, according to the data that we obtained from the SE and the SGPI, the SGPI prepared one cost estimate for the project in 2016 and a second one in 2018 (just after the bid opening; see section 3.1.1.). As shown in Table 9, the estimates presented by the SE to the EC in January 2019 agree with the estimate made by the SGPI in 2018 rather than with the 2016 estimate. However, one of the changes made in the 2018 estimate compared to the 2016 estimate was based on the very fact that, in 2018, the market was 3% more overheated than it was at the time of the 2016 estimate. It therefore seems that, in 2019, the SE presented to elected officials the price submitted and the City's 2018 estimate but relied on the 2016 estimate to explain the difference between the price of the lowest bidder and the estimate.*

The SE also states that additional equipment *[TRANSLATION] "is justified by strict odour management requirements that force the bidder to integrate risk mitigation measures."* It is important to remember that bidders must comply with the requirements appearing in tender documents published by the City. The impact of these requirements, including risk mitigation measures, should have been taken into consideration when the SGPI estimated the cost of the project, because the Ministry's new requirements have been known since 2017, while the estimates were revised in 2018.

TABLE 9

Lowest Bid Price Submitted and Evaluation of Project Costs by the SGPI (in Millions of Dollars, Including Net Taxes)

Phase of project	West OWTP – Saint-Laurent borough				East OWTP – Montréal-Est			
	Price submitted ^[a]	Project cost evaluation by the BVG			Price submitted ^[a]	Project cost evaluation by the BVG		
		Presented to the EC in January 2019 ^[a]	Data as of May 2018 ^[b]	Data as of December 2016 ^[b]		Presented to the EC in January 2019 ^[a]	Data as of June 2018 ^[b]	Data as of December 2016 ^[b]
Design	132,7	78,2	80,5	65,4	121,5	73,4	73,9	68,9
Construction								
Maintenance	25,6	26,8	24,3	24,3	31,1	40,1	40,1	40,1
Operation								
Total	158,3	105,0	104,8	89,7	152,6	113,5	114,0	109,0

^[a] Values presented to the EC at the time of the presentation for approval of project changes.

^[b] Cost compilation carried out by the City's BVG based on documents obtained from the SE and the SGPI.

In its January 2019 presentation to the EC, the SE stated that the market [TRANSLATION] “consists of a small number of qualified, recognized players” to account for part of the difference between the City’s estimate and the bids received. According to the decision-making summary⁷¹ for granting the contract to design, construct, operate and maintain the East OWTP (Montréal-Est), of the 55 parties who obtained the tender documents, the City estimated that only five out of eleven operators had the expertise to bid (the other contractors were a government organization, other municipalities, equipment manufacturers, general contractors with no operating expertise and firms of professionals). In the end, the City received only one compliant offer for this call for tenders. While it is true that the market for this type of project seems limited, it is nonetheless noteworthy that in 2012, Firm C had concluded in its market survey that [TRANSLATION] “the five projects planned by the City [had] a certain market attractiveness.” The firm concluded its report by recommending that the City [TRANSLATION] “confirm the conclusions obtained from the survey [by conducting] interviews or a more in-depth paper survey” because “several respondents [had] expressed reservations about some aspects” of the City’s project and that, “depending on what the City decides, it is possible that some aspects of the project might reduce market attractiveness.” The SE did not follow up on Firm C’s 2012 recommendation. We feel that it is therefore difficult to justify later that there was only a small number of players in the market.

⁷¹ Decision-making summary 1190749001.

Finally, in its January 2019 presentation to the EC, the SE also explained that the difference in costs between the City's estimate and the bids received for the West (Saint-Laurent borough) and East (Montréal-Est) OWTPs was due to *[TRANSLATION]* "variations in the exchange rate that were not taken into account due to the volatility observed and the difficulty of anticipating technology suppliers' manufacturing locations." At that time, the SE was talking about a variation in the exchange rate of 20% for the Euro against the Canadian dollar and 24% for the US dollar against the Canadian dollar. However, a clarification about this significant variation in the exchange rate is made on page 55 of the 16th appendix to the document that was presented to the EC. This variation was not calculated since the last estimate of project costs was prepared by the SGPI (May and June 2018) but between 2010 and 2018. Since these last estimates were prepared at the same time as the bids were received, or even a few days afterwards, it is not appropriate to cite a variation in the exchange rate to justify part of the difference.

Based on these different findings associated with the explanation that the SE provided to the EC in January 2019 to justify the difference in costs for the West (Saint-Laurent borough) and East (Montréal-Est) OWTPs between the City's estimate and the lowest bid obtained, we think that the SE has not provided accurate, comprehensive information for accountability reporting purposes.

Presentation of Options to the Executive Committee

At the last presentation made by the SE to the EC to obtain a new execution mandate as a result of major project changes (January 2019⁷²), three options were presented to elected officials:

- Option 1: Cancel and relaunch the calls for tenders;
- Option 2: Cancel the calls for tenders and launch calls for tenders for waste treatment and recovery without using any infrastructure belonging to the City;
- Option 3: Grant contracts associated with facilities for treating the waste collected and cancel the contract for the North OWTP (Rivière-des-Prairies–Pointe-aux-Trembles borough).

In this presentation, the SE recommended Option 3 to the EC. We note that Options 1 and 2 are not quantified and are therefore not sufficiently evaluated. For example, it was mentioned that Option 1 involved a *[TRANSLATION]* "risk of increasing costs (inflation, exchange rate, etc.)" with no quantification of this increase. The SE stated that this option could make it necessary to reduce the technical requirements for the project but did not specify what would be possible and how this could open up the market. The presentation for Option 2 mentioned that there was *[TRANSLATION]* "little treatment capacity currently available or being developed" in the Greater Montréal region. Other than a map shown at the beginning of the presentation indicating where the current quantities were to go, no information was provided to elected officials to support this argument of limited treatment capacity. The SE also states that there was a *[TRANSLATION]* "lack of quality control of outputs

⁷² Timeline – DAP4

on the part of the City” and a “lack of control over environmental impacts.” No additional information was provided to elected officials to support these assertions. No advantage is cited for either Option 1 or 2, but for Option 3, which the SE recommends, the advantages are presented. The option is said to [TRANSLATION] “necessitate the use of private contracts to manage the missing capacity and the contractual securing of these capacities” without, however, specifying what these quantities to be managed externally amount to. Options 1 and 2 cite various risks, but Option 3 does not mention any risks. Yet there is a risk that the City will not obtain a grant from the Québec government as a result of the delays incurred. But instead of referring to any risk, the SE states in its presentation that there is a need to [TRANSLATION] “request negotiations with the MELCC [Ministère de l’Environnement et de la Lutte contre les changements climatiques] to maximize the grant amount and change the production schedule.” The presentation made to elected officials makes no mention of a federal government grant. Nevertheless, at the time of our audit, the SE told us that the federal government is considering the overall project grant for the five OWTPs, and that the postponement, or even failure, to produce three of the five OWTPs could result in the loss of the entire amount of this grant.

We did not obtain evidence from the SE that Options 1 and 2 were analyzed in greater depth than what was presented to elected officials. Yet this was an important decision for the EC to make. We would have expected a comprehensive equivalent analysis to be done for all three options. This therefore does not constitute accountability reporting enabling elected officials to make an informed decision.

3.3.A. Recommendation

We recommend that the Service de l’environnement establish mechanisms to ensure the completeness and accuracy of all information presented by the multidisciplinary teams concerned to governance committees, so that they can make informed decisions with full knowledge of the facts.

3.3.B. Recommendation

We recommend that the Service de l’environnement put in place, for future Organic Waste Treatment Plants for which the production contract has not yet been awarded, mechanisms for presenting options in the areas of risks, costs and timelines to governance committees on a comparable basis, so that these committees can make informed decisions.

4. Conclusion

In response to the *Plan directeur de gestion des matières résiduelles de l'agglomération de Montréal 2010–2014* (PDGMR), the Service de l'environnement (SE) of the Ville de Montréal (the City), obtained authorization from the City's executive committee (EC) in early 2013 to undertake the work requested to go to tender to select contractors and operators for four Organic Waste Treatment Plants (OWTPs) and one Centre pilote de prétraitement (CPP). This Master Plan was a response to Plan métropolitain de gestion des matières résiduelles de la Communauté métropolitaine de Montréal, which aimed to achieve regional autonomy in residual waste management. Prior to this authorization by the EC, the SE had been conducting a variety of exploratory studies since at least 2006 to identify the best options, other than landfill, to manage organic waste. In 2008, the first evaluation of the production of four OWTPs anticipated that a \$115 million (\$M) investment would be necessary and put forth the possibility of making at least three plants operational over the next five years.

Ten years later, in 2018, the required investment surged to \$589M and no OWTP was under construction yet. The preliminary studies were more complex, and a decision was made to relocate one OWTP, leading to new studies and one additional public consultation. In 2019, the City's EC authorized the awarding of two contracts to execute the construction of the West (Saint-Laurent borough) and East (Montréal-Est) OWTPs in Design–Construction–Maintenance–Operation mode for \$298.5M (excluding decontamination costs). The decision also involved replanning the production of the two other OWTPs and the CPP on undetermined future dates.

In light of the overall finding that cost overruns were incurred only to obtain fewer facilities than initially planned in the end (two OWTPs instead of five), considering the risk of not obtaining the full federal government grant (\$33.1M instead of \$67.1M) because of the change that was made to the original project, and considering that the Cadre de gouvernance des projets et des programmes de gestion d'actifs municipaux (the "Governance Framework") was not followed completely, and that the monitoring and the different accountability reporting are incomplete, we conclude that the process followed to carry out the OWTP construction project was not sufficiently rigorous and that the monitoring normally expected in a project of such complexity and scope was inadequate. It is against this background that we recommend that the City:

- ensure that the Governance Framework is followed and applied adequately by all departments involved in the project;
- assess the appropriateness of dividing the production of future OWTPs into separate projects in order to prevent any delay or deferment in the development of technical specifications or in the design and construction of an OWTP from impacting the production of other OWTPs and obtaining the grant;
- ensure that all project changes are documented and that major changes are presented to governance committees for the purpose of obtaining the necessary authorizations to continue the project;

- ensure ongoing monitoring of the potential project risks and the mitigation measures to be established in accordance with best practices in order to reduce the probability of their occurrence or their seriousness in the event that a risk materializes;
- ensure rigorous accountability reporting to governance committees, in particular, justifying differences between prices submitted and the City's estimates on the basis of the assumptions retained to prepare the last estimates in a comprehensive, accurate manner;
- analyze the different options, taking into account the advantages and disadvantages of each, for the purpose of making a recommendation to governance committees, including the EC.

While we were not able to identify all the reasons for the increased costs of producing these OWTPs or the delays relative to the timelines required to obtain the full provincial and federal grants, we think that more rigorous monitoring of best project management practices could have prevented, or at the very least made it possible to proactively manage, many of the elements that forced the SE to make project changes and obtain new authorizations from the EC to continue the projects.

5. Appendices

5.1. Objective and Evaluation Criteria

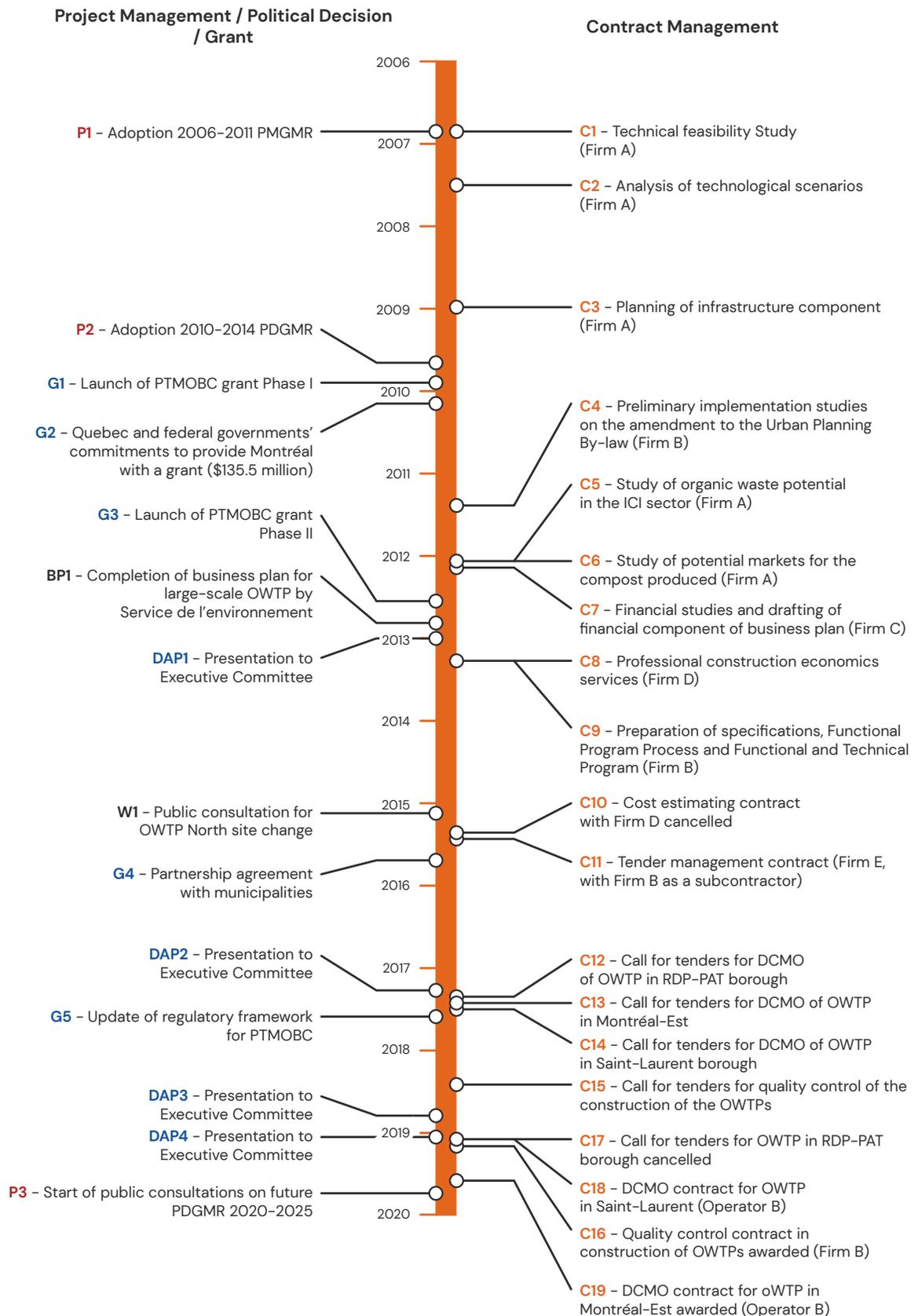
Objective

Ensure that the management of Organic Waste Treatment Plants construction projects is carried out as part of a rigorous process and is adequately monitored.

Evaluation Criteria

- Construction project planning is carried out in accordance with best practices.
- The roles and responsibilities of the stakeholders involved are clearly defined and adequately assumed.
- Mechanisms for monitoring the progress of projects in terms of costs, timelines and deliverables have been put in place and function adequately.
- Accountability reporting on the progress of projects is carried out regularly and in a timely manner.

5.2. Project Timeline



5.3. Table Summarizing the Different Contracts Awarded to Firms and Contractors from 2006 to 2019

Mandate	Year	Firm					Operator	
		A	B	C	D	E	A	B
Technological feasibility study	2006	X						
Analysis of technological scenarios	2007	X						
Infrastructure component planning	2008	X						
Preliminary implementation studies for the amendment of the Urban Planning By-law	2011		X					
Study of the organic waste potential in the ICI sector	2012	X						
Study of potential markets for the compost produced	2012	X						
Financial studies and drafting of the financial component of the business plan	2012			X				
Preparation of specifications, Programme fonctionnel du procédé (PFP) and Programme fonctionnel et technique (PFT) ^[a]	2013		X					
Professional construction economics services (cancelled in 2015) ^[b]	2013				X			
Tender management contract ^[c]	2015		X ^[d]			X		
DCMO management contract for the OWTP in Saint-Laurent borough	2019							X

Mandate	Year	Firm					Operator	
		A	B	C	D	E	A	B
Quality control contract for the construction of the OWTPs	2019		X					
DCMO management contract for the OWTP in Montréal-Est	2019							X

- [a] Firm B was unable to produce the PFT within the time limit granted. The entire budget for the contract was used to produce the PFP.
- [b] Firm E had to use the PFT produced by Firm B to establish the project costs. Since Firm B did not have enough time to produce the PFT, Firm E's mandate was cancelled with monetary compensation for Firm E, which had already started working.
- [c] Part of this contract consisted in producing the PFT that Firm B had not had the time to produce.
- [d] Firm B was a subcontractor of Firm E.



